Alberta Utilities Commission

In the Matter of the Need for the Mustus Biomass Energy Connection

And in the matter of the *Electric Utilities Act*, S.A. 2003, c. E-5.1, the *Alberta Utilities Commission Act*, S.A. 2007, c. A-37.2, the *Hydro and Electric Energy Act*, R.S.A. 2000, c. H-16, the *Transmission Regulation*, AR 86/2007 and Alberta Utilities Commission Rule 007, all as amended

Application of the Alberta Electric System Operator for approval of the Mustus Biomass Energy Connection Needs Identification Document

PART A - APPLICATION

1 Introduction

1.1 Application – Pursuant to Section 34(1)(c) of the *Electric Utilities Act* (Act), and in accordance with the further provisions set out in legislation,[1] the Alberta Electric System Operator (AESO) applies to the Alberta Utilities Commission (Commission) for approval of the *Mustus Biomass Energy Connection Needs Identification Document* (Application).

1.2 Application Overview – This Application describes the need for transmission development arising from a request from Mustus Energy Ltd. (the "market participant") for transmission system access service for its proposed 44 MW Biomass Power generating facility, located in the High Level area (Facility). Connection of the Facility to the transmission system will require a new 144 kV circuit between the market participant's proposed Windy Hill 675S substation and the existing Blumenort 832S substation (the Proposed Transmission Development, as further described in Paragraph 2.2). The expected in-service date for the new connection is Q1, 2015.

Having followed the AESO Connection Process,[2] the AESO has determined that the Proposed Transmission Development provides a reasonable opportunity for the market participant to exchange electricity and is consistent with the AESO's long-term transmission forecasts and plans for the area. The AESO, in accordance with its responsibility to plan the transmission system, submits this Application to the Commission for approval.[3, 4]

[1] The Alberta Utilities Commission Act, S.A. 2007, c. A-37.2, the Hydro and Electric Energy Act, R.S.A. 2000, c. H-16, the Transmission Regulation, AR 86/2007 and Alberta Utilities Commission Rule 007, all as amended.

[2] For information purposes, refer to note iv of Part C of this Application for more information on the AESO Connection Process.

[3] For information purposes, some of the legislative provisions relating to the AESO's planning duties and duty to provide system access service are referenced in notes i and ii of Part C of this Application.

[4] Note v of Part C of this Application describes the Application scope in more detail.

1.3 AESO Directions to the TFO – During the AESO Connection Process, the AESO issued various directions to ATCO Electric Ltd. (ATCO), as the legal owner of transmission facilities (TFO), including direction to assist the AESO in preparing its needs identification document.[5]

[5] The directions are described in more detail in the following Sections of this Application and in Part C, note vi.

2 Need Overview and Proposed Transmission Development

2.1 Duty to Provide Transmission System Access Service – The AESO, pursuant to its responsibilities under Section 29 of the Act, must provide system access service on the transmission system in a manner that gives all market participants a reasonable opportunity to exchange electric energy and ancillary services.

The market participant has requested connection of its Facility to the transmission system, thereby establishing the need for transmission development. Through the AESO Connection Process, the AESO, the TFO and the market participant have collaborated to determine the characteristics of the Proposed Transmission Development and the AESO has assessed the impacts of connecting the Facility to the transmission system and issued directions to the TFO to prepare a transmission facility proposal [6] to meet the market participant's need.

2.2 Proposed Transmission Development – The Proposed Transmission Development includes the following major elements:

1. add a new 144 kV circuit, with a minimum capacity of 50 MVA, from the market participant's proposed Windy Hill 675S substation to the existing Blumenort 832S substation; and
2. modify, alter, add or remove equipment, including switchgear, and any operational, protections, control and telecommunication devices required to undertake the work as planned, ensure proper integration with the transmission system and to prevent the Facility from islanding on the transmission system.[7]

[6] Also referred to as facility application, or FA, under Commission Rule 007.

[7] Details and configuration of equipment required for the Proposed Transmission Development, including substation single-line diagrams, are more specifically described in the AESO's Functional Specification included in the TFO's transmission Facility Proposal. Also, further details will be determined as detailed engineering progresses and the market participant's operating requirements are finalized. Routing and/or siting of transmission facilities do not form part of this Application and are addressed in the TFO's Facility Proposal. The new 144 kV circuit is currently estimated to have a length of approximately 23 km. This is subject to change as routing is finalized by the TFO. Market participant facilities that may subsequently be connected to the Proposed Transmission Development are the responsibility of the market participant and are not included in the Application.

2.3 Proposed Transmission Development Cost Estimates – The AESO directed the TFO to prepare a cost estimate for the Proposed Transmission Development. The TFO has estimated the in-service cost of the Proposed Transmission Development described in Section 2.2 to be approximately $18 million (+20%/-10%, $2015). In accordance with the ISO tariff, the AESO has determined that the $18 million estimate is comprised of approximately $15 million in market participant costs and $3 million in system-related costs.

2.4 Transmission Development Alternatives – No alternatives to the Proposed Transmission Development were identified by the AESO, the TFO or the market participant.

2.5 Connection Assessment – Power flow, transient stability and short circuit analyses were conducted to assess the impact of the proposed connection on the transmission system.[8] Load and generation assumptions used in the analyses align with the AESO *2012 Long-term Outlook* (2012LTO) corporate forecast. The AESO's corporate load forecasts are used by the AESO to assess adequacy of the regional transmission system and to identify future transmission system expansion and enhancement plans.

Power flow analysis indicates that no thermal overloads or voltage criteria violations would result from connection of the Facility to the transmission system. Transient stability analysis demonstrates that, under a fault of 7L76 line in the vicinity of High Level 786S substation, the Facility and Blumenort 832S substation load would constitute an islanding system prior to protection operation at the Blumenort 832S substation. The Proposed Transmission Development includes the protections necessary to prevent the Facility from islanding on the transmission system.[9] Consequently, the AESO has determined that the Proposed Transmission Development will not adversely affect the transmission system.

[8] The Connection Assessment is included as Appendix A to the Application.

[9] Details and configuration of equipment required for the Proposed Transmission Development, including protections to prevent islanding, are more specifically described in the TFO's Facility Proposal.

2.6 Transmission Interdependencies – There are no transmission interdependencies associated with the Proposed Transmission Development. Future AESO needs identification documents in the area will assume the Proposed Transmission Development will be in-service for the date specified, unless new information indicates otherwise.

2.7 AESO Participant Involvement Program – The AESO directed the TFO to assist the AESO in conducting a participant involvement program (PIP), in accordance with requirement NID13 and Appendix A of Commission Rule 007. Between June 2013 and March 2014, the TFO and the AESO utilized various methods to notify occupants, residents and landowners of the need for the Proposed Transmission Development in the area where transmission facilities could be installed to address the identified need. The AESO has received no indication of concern from any party regarding the need for the Proposed Transmission Development.[10]

2.8 Information In Regards to Rule 007, Section 6.1 - NID12 – The AESO has been advised that the TFO's Facility Proposal will address the major aspects listed in Commission Rule 007, Section 6.1 – NID12. In consideration of that fact, and as the filing of the Application is combined with the TFO Facility Proposal, the AESO has not undertaken a separate assessment of the sort contemplated in Commission Rule 007, Section 6.1 – NID12.

2.9 Approval is in the Public Interest – Having regard to the following:

- the transmission planning duties of the AESO as described in Sections 29, 33 and 34 of the Act;
- information obtained from AESO PIP Activities;
- the market participant's System Access Service Request;
- the Connection Assessment; and
- the AESO's long-term transmission system plans,

[10] Further information regarding the AESO's PIP for this Application is included as Appendix C.

it is the conclusion of the AESO that the Proposed Transmission Development provides a reasonable opportunity for the market participant to exchange electricity. In consideration of these factors, the AESO submits that approval of the Application is in the public interest.

3 Request to Combine this Application with the Facility Proposal for Consideration in a Single Process

3.1 Pursuant to Subsection 35(1) of the Act, the AESO has directed the TFO to prepare a Facility Proposal to meet the need identified. The AESO understands that the TFO Facility Proposal will be filed shortly.[11] The AESO requests, and understands that the TFO will also request, that this Application be combined with the Facility Proposal for consideration by the Commission in a single process. This request is consistent with Section 15.4 of the *Hydro and Electric Energy Act* and Section 6 of Commission Rule 007.

3.2 While it is believed that this Application and the Facility Proposal will be materially consistent, the AESO respectfully requests that in its consideration of both, the Commission be mindful of the fact that the documents have been prepared separately and for different purposes. The purpose of this Application is to obtain approval of the need for the identified transmission system developments and provide a preliminary description of the manner proposed to meet that need. In contrast, the Facility Proposal will contain more detailed engineering and designs for the Proposed Transmission Development and seek approval for the construction and operation of specific facilities.

[11] The AESO understands that ATCO intends to file a Facility Proposal relating to this Application to be titled, *Blumenort Transmission Project*.

4 Relief Requested

4.1 Having regard to the factors set out in Section 38 of the *Transmission Regulation*, and in particular, Subsections 38(d) and (e), the AESO submits that its assessment of the need to meet the market participant's request for transmission system access service is technically complete and that approval of the need for the Proposed Transmission Development, as described in Section 2.2, is in the public interest.

4.2 For the reasons set out herein, and pursuant to Section 34 of the Act, the AESO requests that the Commission approve this Application, including issuing an approval of the need for a new 144 kV transmission circuit, as follows:

A. add a new 144 kV circuit from the market participant's proposed Windy Hill 675S substation to the existing Blumenort 832S substation; and

B. modify, alter, add or remove equipment, including switchgear, and any operational, protections, control and telecommunication devices required to undertake the work as planned, ensure proper integration with the transmission system and to prevent the Facility from islanding on the transmission system.

All of which is respectfully submitted this 20th day of March 2014.

Alberta Electric System Operator

Doyle Sullivan, P.Eng.
Director, Regulatory Services

PART B – APPLICATION APPENDICES

The following appended documents support the Application (Part A).

APPENDIX A **Connection Assessment –** Appendix A contains the *Connection Engineering Study Report for AUC Application Mustus Energy – Biomass Generating Plant*, which contains an assessment of transmission system performance prior to and following the connection of the Proposed Transmission Development. Appendix A describes the study scope and methodology, assumptions, reliability criteria and detailed results.

.**APPENDIX B** **TFO Capital Cost Estimates –** Appendix B contains detailed cost estimates corresponding to the Proposed Transmission Development. These estimates have been prepared by the TFO at the direction of the AESO. These estimates have been prepared to an approximate accuracy level of +20%/-10%, which exceeds the accuracy required by Commission Rule 007, NID10.

APPENDIX C **AESO PIP –** Appendix C contains a summary of the PIP activities conducted regarding the need for the Proposed Transmission Development. Copies of the relevant materials distributed during the PIP are attached for reference.

APPENDIX D **Information Regarding to Rule 007, Section 6.1 - NID12** – Appendix D contains the letter provided by the TFO confirming that the seven major aspects of Commission Rule 007, NID12 will be addressed within the TFO Facility Application.

PART C – REFERENCES

i. **AESO Planning Duties and Responsibilities –** Certain aspects of AESO duties and responsibilities with respect to planning the transmission system are described in the Act. For example, Section 17, Subsections (g), (h), (i), and (j), describe the general planning duties of the AESO.[12] Section 33 of the Act states that the AESO "must forecast the needs of Alberta and develop plans for the transmission system to provide efficient, reliable, and non-discriminatory system access service and the timely implementation of required transmission system expansions and enhancements". Where, as in this case, the market participant (refer to note ii below) is requesting transmission system access service, the AESO must prepare and submit for Commission approval, as per Section 34(1)(c), a needs identification document that describes the need to respond to requests for system access service, including the assessments undertaken by the AESO regarding the manner proposed to address that need. Other aspects of the AESO's transmission planning duties and responsibilities are set out in Sections 8, 10, and 11, of the *Transmission Regulation*.

ii. **Duty to Provide Transmission System Access** – Section 29 of the Act states that the AESO "must provide system access service on the transmission system in a manner that gives all market participants [the market participant in this case] wishing to exchange electric energy and ancillary services a reasonable opportunity to do so".

iii. **AESO Planning Criteria** – The AESO is required to plan a transmission system that satisfies applicable reliability standards.

iv. **AESO Connection Process** – For information purposes, the AESO Connection Process, which changes from time to time, is generally described at: http://www.aeso.ca/8602.html[13]

v. **Application for Approval of the Need for Expansion or Enhancement of the Capability of the Transmission System –** This Application is directed solely to the question of the need for expansion or enhancement of the capability of the transmission system as more fully described in the Act and the Transmission Regulation. This Application does not seek approval of those aspects of transmission development that are managed and executed separately from the needs identification document approval process. Other aspects of the AESO's responsibilities regarding transmission development are managed under the appropriate processes, including the ISO Rules, Alberta Reliability Standards and the ISO Tariff, which are also subject to specific

[12] The legislation and regulations refer to the Independent System Operator or ISO. "AESO" and "Alberta Electric System Operator" are the registered trade names of the Independent System Operator.

[13] This link is provided for ease of reference and does not form part of this Application.

regulatory approvals. While the Application or its supporting appendices may refer to such other processes or information from time to time, the inclusion of such information is for context and reference only**.**

Furthermore, this Application is directed solely to the question of the need for expansion or enhancement of the capability of the transmission system. Any reference within the Application to market participants or other parties and/or the facilities they may own and operate or may wish to own and operate is not intended to constitute an application for approval of such facilities, and the responsibility for seeking such regulatory or other approval remains the responsibility of such market participants or other parties.

vi. **Directions to the TFO** – Pursuant to Subsection 35(1) of the Act, the AESO has directed the TFO, in whose service territories the need is located, to prepare a Transmission Facility Proposal to meet the need identified. The Transmission Facility Proposal is also submitted to the Commission for approval. The TFO has also been directed by the AESO under Section 39 of the Act to prepare a proposal to provide services to address the need for the Proposed Transmission Development. The AESO has also directed the TFO, pursuant to Section 39 of the Act and Section 14 of the *Transmission Regulation*, to assist in the preparation of the AESO's Application.

vii. **Capital Cost Estimates** – The provision of capital costs estimates in the Application is for the purposes of relative comparison and context only. The AESO's responsibilities in respect of project cost reporting are described in the *Transmission Regulation*, including Section 25, and ISO Rule 9.1.

APPENDIX A CONNECTION ASSESSMENT

Connection Engineering Study Report for AUC Application

Mustus Energy – Biomass Generating Plant

File No. RP-05-803

Revision: 2

Revision Date: 2014-02-27

	Name	Date	Signature
Prepared by:	Liuzhong Shi, P.Eng.	Feb 27, 2014.	Liuzhong Shi
Reviewed/Approved by:	Sami Abdulsalam, P.Eng. Manager, Projects & System Access Studies	Feb 27, 2014	

APEGA Permit to Practice P-08200

Executive Summary

Project Overview

Mustus Energy Limited (MEL) is proposing to construct the Windy Hill Biomass Generating Plant as a new point of supply (POS), and the associated customer owned 144/13.6 kV substation Windy Hill 675S, which together constitute the "Plant". The Plant is located in the AESO High Level Planning Area (Area 18) in northwest of Alberta and is approximately 20 km southeast to the Blumenort 832S substation. The estimated in-service date for the Mustus plant is February 2, 2015.

The Plant will be connected to the Alberta Interconnected Electric System (AIES) via a new 23km 144 kV transmission line from Blumenort 832S substation to the new Windy Hill 675S substation as project 803 (the "Project"). MEL has requested a Supply Transmission Service (STS) capacity of 41.5 MW.

Existing System

The Project is located in the Northwest Region of the Alberta Interconnected Electric System ("AIES") in Area 18, High Level. Figure 1 shows the assumed system configuration of the Northwest Region at the time of Project ISD. The Area 18 consists of a 144 kV network that is mainly supplied from the Wesley Creek 834S 240/144 kV substation and the generators in the Rainbow Lake area (Area 17). The NW region transmission system consists of long 144 kV and 240 kV transmission lines. The Northwest region imports power from the rest of the AIES.

Study Summary

The initial in-service-date for the Plant was Q1, 2014 and later was changed to February 2015. During the time period from the initial Q1, 2014 to the later February, 2015, there are neither system upgrades in NW region, nor material changes to local load and generation development. Therefore the power flow, transient stability analysis performed for the 2013 winter peak, 2014 summer peak and 2014 summer light conditions remain valid to evaluate the impact of the Plant connection on the AIES. Short circuit analysis was performed for the 2014 winter peak and 2022 winter peak conditions to establish the expected short circuit levels in the vicinity of the Plant.

Load flow analysis indicated no thermal overload of the transmission facilities or voltage criteria violation after the connection of the Plant.

Transient stability analysis also found that for a fault in the vicinity of High Level 786S on 7L76, the Biomass generation and Blumenort 832S load constitute an islanding system for 27 cycles before Blumenort 832S protection operates. The frequency of this islanding system rose to about 63 Hz if the generator was not tripped earlier. A similar concern of under frequency can occur if generation would be less than load in the same island under certain conditions.

Alternative Selected

A direct single 144 kV transmission line connection to the existing Blumenort 832S was chosen by Mustus Energy Limited to be the only alternative.

Recommendation

It is recommended to proceed with the selected alternative with the below recommendations:

- The existing protections relays for transmission lines 7L113 and 7L64 are step distance relays. The AESO has confirmed with ATCO that there is OPGW between Arcenciel - Rainbow Lake-Ring Creek and there is digital Microwave between Meikle and Rainbow Lake. Based on the existing communication conditions, teleprotection is recommended on these two transmission lines to improve stability.

- The AESO has confirmed with ATCO that telecommunication channels exist for 7L59 between High Level 786S and KegRiver 789S. Therefore, teleprotection is recommended on 7L59 to improve stability.

- Transient stability analysis found that for a fault on transmission line 7L76 in the vicinity of High Level 786S substation, the Biomass generation and Blumenort 832S load constitute an islanded system for 27 cycles before Blumenort 832S protection operates. The frequency of this islanding system rose to about 63 Hz if the generator was not tripped earlier. A similar concern of under frequency can occur if generation would be less than load in the same island under certain conditions. Line protections and teleprotection are planned as part of the Project to address the over and under frequency concerns due to islanding.

Contents

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1. Introduction

This Customer Connection Engineering Study Report presents the results of the study conducted to analyze the proposed connection of the Windy Hill Biomass Generating Plant project to the AIES.

1.1. Project

1.1.1. Project Overview

Mustus Energy Limited (MEL) is proposing to construct the Plant in the southeast quarter of Section 13, Township 106, and Range 14 West of 5th Meridian, approximately 20 km southeast of the Blumenort 832S substation.

This Plant is proposed to be connected to the AIES by a new customer-owned 144/13.8 kV substation (Windy Hill substation 675S) and approximately 23 km of 144 kV transmission line between the Windy Hill 675S substation and the Blumenort 832S substation. These facilities are estimated to be in-service on February 2, 2015.

1.1.2. Load Component

There is no load component indicated for this Project.

1.1.3. Generation Component

The generation component is a single, 44 MW Biomass turbine generator unit with an ISD of February 2, 2015. MEL has requested a Supply Transmission Service (STS) capacity of 41.5 MW.

The generator will meet reactive power requirement given in AESO Generation and Goad Interconnection Standard, i.e., the generator will be able to continuously operate at 0.9 lagging power factor (over-excited) and 0.95 leading power factor (under-excited) as the minimum.

1.1.4. Study Objectives

The objectives of the study were the as follows:

- To assess the impact of connecting the Plant on the performance of the transmission system in the study area.
- Identify any reliability concerns associated with the connection of the Plant to the AIES.

- Propose and assess possible solutions to any violations of reliability criteria that were identified.

In order to identify any reliability concerns, power flow, transient and short circuit analyses were performed to compare the system response before and after the connection of the Plant. The system response was evaluated against the AESO Reliability Criteria.

1.1.5. Study Area

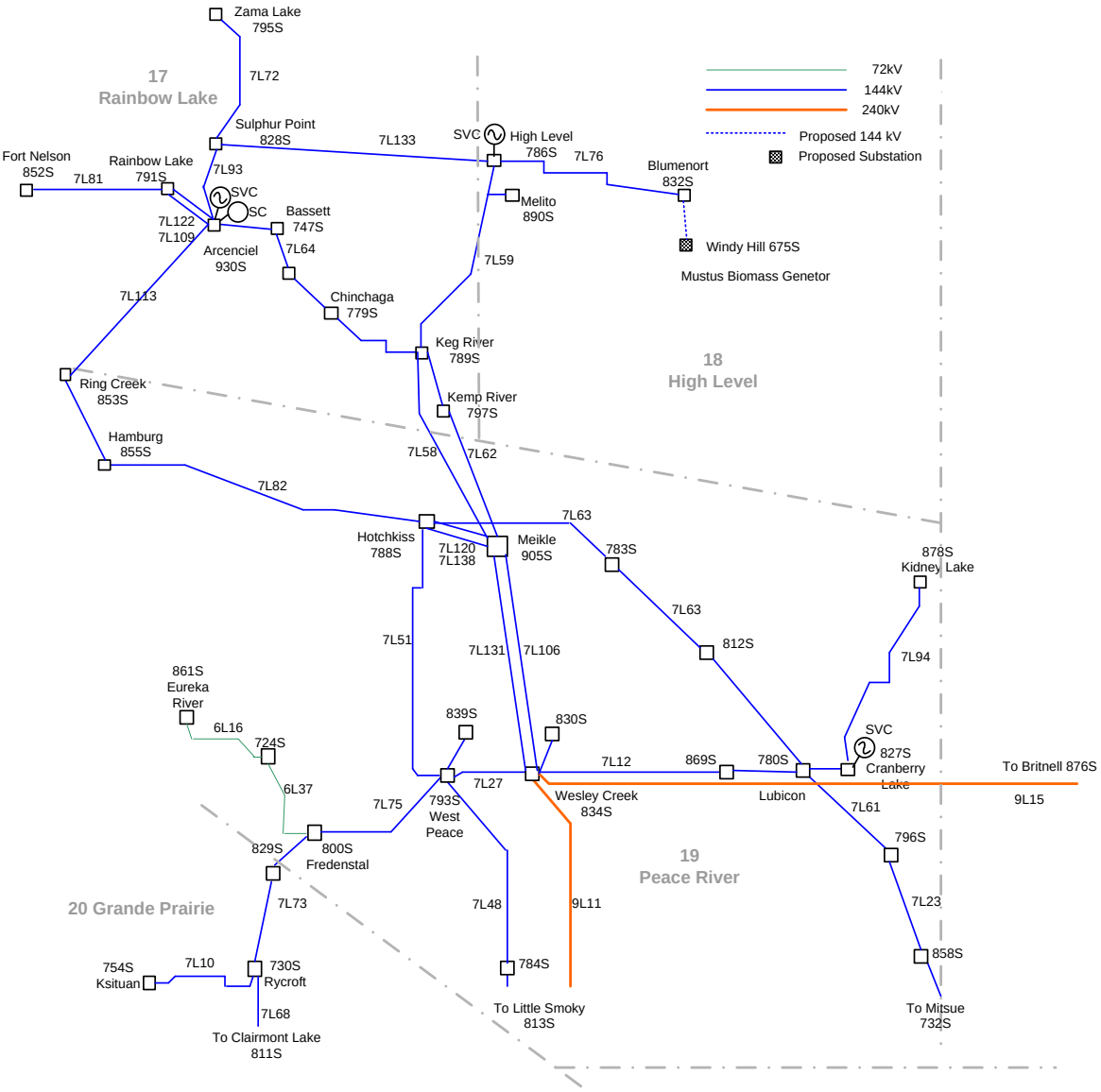
1.1.5.1. Study Area Description

The Project is located in the Northwest Region of the Alberta Interconnected Electric System ("AIES") in Area 18, High Level. Figure 1 shows the assumed system configuration of the Northwest Region at the time of Project ISD. The Area 18 consists of a 144 kV network that is mainly supplied from the Wesley Creek 834S 240/144 kV substation and the generators in the Rainbow Lake area (Area 17). The NW region transmission system consists of long 144 kV and 240 kV transmission lines. The Northwest region imports power from the rest of the AIES.

The existing 144 kV Blumenort 832S substation and the transmission line from Blumenort 832S substation to High Level 785S are the nearest transmission facilities to the proposed Windy Hill Biomass Generating Plant. The Windy Hill Biomass Generating Plant will be connected to the AIES via a new 23km 144 kV transmission line from Blumenort 832S substation to the new Windy Hill substation 675S. Area 17 and 18 are selected to be the study areas for this Project.

Figure 1 below shows an overview of the transmission system in the northwest Alberta including High Level planning area (Area 18).

Figure 1: An Overview of the Transmission System in Study Area



1.2. Existing Constraints

The transmission system in the region is currently weak and relies on Transmission Must Runs (TMR) located in the region to provide voltage support and reliability. Currently, Northwest (NW) Alberta Transmission system operates under ISO Rule 302.1, formerly OPP 501.

1.2.1.1. AESO Long-Term Plans

Listing of system projects for the study area is shown in Table 1.

Table 1: Summary of System Projects

Project Name	In-Service Date
Northwest (NW) Alberta Transmission Development Project (P535)	2013

1.2.2. Studies Performed

Studies were performed for both pre-connection and post-connection system conditions. PTI PSS/E Version 33 was used to simulate the electrical system. Comparing the pre-connection and post-connection studies identifies issues that results from, are aggravated by, or are alleviated by the connection.

The in-service-date for the Plant was Q1, 2014 initially and was changed to February 2015 later. During the time period from the initial Q1, 2014 to the later February, 2015, there are neither system upgrades in NW region, nor material changes to local load and generation development. Therefore the power flow, transient stability analysis performed for the 2013 winter peak, 2014 summer peak and 2014 summer light conditions remain valid to evaluate the impact of the proposed Windy Hill Biomass Generating Plant Station on the AIES.

The following studies were performed for the pre-connection condition considering Category A, B and selected C level contingencies:

- Power flow analysis, 2013 WP and 2014 SP
- Transient stability analysis, 2013 WP, 2014 SP and 2014 SL
- Short-Circuit fault analysis, 2013 WP

The following studies were performed for the post-connection condition considering Category A, B and selected C level contingencies:

- Power flow analysis, 2013 WP, 2014 SP and 2014 SL
- Transient stability analysis, 2013 WP, 2014 SP and 2014 SL
- Short-Circuit fault analysis, 2013 WP and 2022WP

1.3. Report Overview

The Executive Summary provides a high-level summary of the report and its conclusions. Section 1 provides an introduction. Section 2 describes the criteria, system data, and study assumptions. Section 3 presents the study methodology. Section 4 discusses the pre-connection system assessment. Section 5 presents the connection alternatives. Section 6 provides a technical analysis of the connection alternatives. Section 7 provides a short-circuit analysis. Section 8 discusses Project interdependencies. Section 9 presents the summary and conclusions.

2. Criteria, System Data, and Study Assumptions

2.1. Criteria, Standards, and Requirements

2.1.1. AESO Transmission Reliability Criteria

The current AESO Alberta Reliability Standard[1] and requirements for system planning studies were followed throughout the analysis as specified in the Study Scope.

More specifically, the current AESO Transmission Reliability Criteria (Criteria) were applied in the study to test the interconnection for acceptable performance following Category A (i.e. all elements in service), Category B (i.e. an element out of service) and selected Category C (more than one transmission element out of service) contingencies. As per the Criteria, all equipment must operate within acceptable thermal and voltage limits and the system must be stable with no cascading outages. Voltage deviation criteria were applied to verify that acceptable voltage levels exist following contingencies.

Table 2: AESO's Transmission Reliability Criteria – Acceptable Range of Steady State Voltage (kV)

Nominal	Extreme Minimum	Normal Minimum	Normal Maximum	Extreme Maximum
500	500	510	540	550
240	220	240	264	264
240 Ft. McMurray, Northwest	220	250	269	275
144	130	137	151	155
138	124	135	145	150
72	65	71	75	78
69	62	65	72	74

2.1.2. AESO Operating Policies and Procedures (OPPs) and Authoritative Documents (ADs)

Applicable ISO Rules (formerly OPPs) were used when developing the study base cases and during the analysis. Two salient rules include ISO Rule 302.1 (formerly OPP 501) that addresses operation of the existing transmission system constraints and TMR requirements,

[1] The Alberta Reliability Standard is presently available at: http://www.aeso.ca/rulesprocedures/17006.html

and the AESO Voltage Control Practice ID # 2010-007RS that addresses the system operation with respect to system voltages.

2.2. Load and Generation Assumptions

2.2.1. Load Assumptions

The load assumption for the study was based on the AESO's 2012 Long-Term Outlook (LTO).

Table 3: AESO Northwest System Regional Coincident Load Profiles (LTO 2012)

	2013-2014 WP	2014 SP	2014 SL
Substations	Forecast Peak Load (MW)		
Blumenort 832S	16.9	12.8	5.1
NW Region	Forecast Peak Load (MW)		
NW Region (Area 17, 18, 19, 20, 21, 22, 23, 24, 26	1147.3	1090.0	945.2
AIES	Forecast Peak Load (MW)		
AIL Load	11312.5	10673	7833

2.2.2. Generation Assumptions

Table 4 provides the generation dispatch in the study areas. The high generation dispatch in summer peak scenario is to assess the impact of the new generation on thermal constraints in the study areas. The zero generation dispatch in Area 17 in winter peak and summer light scenarios is to assess the system transient stability level. While generators in the study area are frequently above zero output, with the completion of the P535 NW Alberta Transmission Development Project, the Area 17 Rainbow Lake TMR requirements is eliminated. Therefore, to test system transient stability in the Rainbow Lake area under the different connection alternatives, more than one unit was turned off line to represent a worst case generation assumption.

Table 4: Local Generators in the Study Cases

Name	Bus	Symbol	Max Capacity (MW)	Qmax (MVAr)	Qmin (MVAr)	Generation Level Modeled in the Study Case (MW)		
						2013-2014WP	2014SP	2014SL
Windy Hill	11013	WIND02-G1	44	21	-14.5	41.5	41.5	41.5
Fort Nelson	1015	FORT NE9-G1	52.2	25.3	-18.1	Off-Line	38	Off-Line
	1019	FORT NE8-G2	28	17.4	-12.5	Off-Line	21	Off-Line
Rainbow Lake	1032	RBW 2-G2	44.1	21.4	-14.5	Off-Line	25	Off-Line
	1035	RBW 4-G4	52.7	25.5	-17.3	Off-Line	40	Off-Line
	1037	RBW5-G5	52.7	25.5	-17.3	Off-Line	45	Off-Line

2.2.3. Intertie Flow Assumptions

The study areas are considered far from the BC intertie. The BC intertie flows will not have a significant impact on the study areas.

2.3. System Projects

Table 5 lists transmission projects that should be included in the AESO base cases.

Table 5: Summary of System Projects Included in the Study Cases

Project Number	Project Name	Projected in-service date	Study Case (In Service/Not in Service)
P-535	Northwest Transmission Development	2013	In Service
P-817	North-Central Transmission Development	2013	In Service

2.4. Customer Connection Projects

Relevant customer connection projects that were included in the study cases are outlined in Table 6.

Table 6: Projects Included in the Planning Models

Project Number	Project Name	Projected in-service date	Load (MW)	Generation (MW)
P-892	High Level Transformer Upgrade (Reliability Project)	2012	0	--
P-1018	Buchanan Creek	April, 2014	5.4 MW	

2.5. Facility Ratings and Shunt Elements

Table 7 provides the transmission line ratings in the vicinity of Windy Hill substation 675S connection point.

Table 7: Summary of Transmission Line Ratings

Line	Description	Voltage (kV)	Summer Rating (MVA)	Winter Rating (MVA)
7L131	Meikle 905S - WesleyCreek 834S	144	299	299
7L133	High Level 786S - Sulphur Point 828S	144	114	146
7L51	Hotchkiss 788S - West Peace River 793S	144	99	99
7L58	KegRiver 789S - Meikle 905S	144	114	146
7L62	KegRiver 789S - Meikle 905S	144	114	146
7L63	Hotchkiss 788S - Lubicon 780S	144	99	99
7L76	High Level 786S - Blumenort 832S	144	47	47
7L59	KegRiver 789S - High Level 786S	144	114	145
9L11	WesleyCreek 834S - Little Smoky 813S	240	249	249
9L15	WesleyCreek 834S - Brintnell 876S	240	549	701

Table 8 provides the shunt elements that are relevant for this connection study. These shunt elements were switched on or off as required to maintain the voltage limits in the AESO Transmission Reliability Criteria or AESO Voltage Control Practice ID # 2010-007RS.

Table 8: Reactive Elements

Station Name and Number	Voltage (kV)	Capacitor (MVar)	Reactor (Mvar)	SVC (Mvar)	SC (Mvar)
Arcenciel 930S	144	30			
	15			+/- 30	
	13.8				+50/-30
High Level 786S	15			+/- 30	
KegRiver789S	144	13.16	-9.18		
Sulphur Point 828S	25	10			

2.6. Dynamic Data and Assumptions

The dynamic model is shown in Table 9, Table 10 and Table 11.

Table 9: Generator Dynamic

Generator Dynamic Data (GENSAL model)										
T'do	**T"do**	**T"qo**	**H**	**D**	**Xd**	**Xq**	**X'd**	**X'q**	**X"d**	**Xl**
9.4	0.04	0.13	1.71	4.7	1.77	0.94	0.26		0.18	0.18
S(1.0)	**S(1.2)**									
0.0625	0.46									

Table 10: Exciter Dynamic Data

Exciter Dynamic Data (SEXS model)					
TA/TB	**TB (>0)**	**K**	**TE**	**EMIN**	**EMAX**
0.1	10	100	0.1	0.0	3.0

Table 11: Governor Dynamic Data

Stabilizer Dynamic Data (TGOV1 model)						
R	**T1 (>0, sec)**	**V MAX**	**V MIN**	**T2 (sec)**	**T3 (>0, sec)**	**Dt**
0.1	10	100	0.1	0.0	3.0	3.0

2.7. Protection Fault Clearing Times

Table 12 provides the fault clearing time that will be applied in the transient stability analysis.

Table 12: Fault Clearing Times

Line ID	Line Terminals		Fault Location	Fault Clearing Cycles	
	Terminal 1	Terminal 2		Terminal 1	Terminal 2
7L133	High Level 786S	Sulphur Point 828S	Sulphur Point 828S	6	8
			High Level 786S	6	8
7L59	High Level 786S	KegRiver 789S	High Level 786S	6	8
			KegRiver 789S	6	8
7L62	KegRiver 789S	Meikle 905S	KegRiver 789S	6	8
			Meikle 905S	6	8
7L58	KegRiver 789S	Meikle 905S	KegRiver 789S	6	8
			Meikle 905S	6	8
7L113	Arcenciel 930S	Ring Creek 853S	Arcenciel 930S	6	8
			Ring Creek 853S	6	8
7L82	Ring Creek 853S	Hotchkiss 788S	Ring Creek 853S	6	42
			Hotchkiss 788S	6	24
7L64	Arcenciel 930S	Keg River 789S	Arcenciel 930S	6	8
			Keg River 789S	6	8
7L76	High Level 786S	Blumenort 832S	High Level 786S	6	27
			Blumenort 832S	6	27
7L180	Blumenort 832S	Windy Hill 675S	Blumenort 832S	6	8
			Windy Hill 675S	6	8

Note:

1, the existing protections relays for 7L113 and 7L64 are step distance relays. The AESO has confirmed with ATCO that there is OPGW between Arcenciel - Rainbow Lake-Ring Creek and there is digital Microwave between the between Meikle and Rainbow Lake. Therefore, teleprotection shall be implemented on these two transmission lines, near-end 6 cycles and remote-end 8 cycles' fault clearing times for 7L113 and 7L64 are therefore used for Project studies.

2, The AESO has confirmed with ATCO that telecommunication channels exist for 7L59 between High Level 786S and KegRiver 789S. Therefore, teleprotection shall be implemented on 7L59, near-end 6 cycles and remote-end 8 cycles' fault clearing times for 7L59 are therefore used for Project studies.

3, line protection is available at High Level (786S) end only for 7L76 for the existing system. Protection shall be installed at Blumenort (832S) end for 7L76 to accommodate the interconnection of the Project.

2.8. Voltage Profile Assumptions

AESO Voltage Control Practice ID # 2010-007RS was used to establish normal system (i.e. pre-contingency) voltage profiles for all area busses prior to commencing any studies. Key study area bus voltage ranges are shown in Table 13.

Table 13: Summary of Voltage at Key Nodes in the Study Region

Bus Name & kV	Nominal Voltage (kV)	Minimum Voltage (kV)	Desired Range (kV)
High Level 138	144	144	148 - 151
Keg River 138	144	144	148 - 151
Rainbow Lake 138	144	137	148 - 150

3. Study Methodology

3.1. Study Objectives

The objectives of the study were the following:

- To assess the impact of connecting the Plant on the performance of the transmission system in the study area.
- Identify any reliability concerns associated with the connection of the Plant to the AIES.
- Propose and assess possible solutions to any violations of reliability criteria that were identified.

In order to identify any reliability concerns, power flow, transient stability, and short circuit analyses were performed. Whenever any reliability concerns were identified the system response was compared before and after the connection of the Plant to confirm whether the issue is caused or aggravated by the addition of the Plant.

3.2. Study Scenarios

The system study was performed using 2013-2014 Winter peak case and 2014 Summer Peak and Summer Light cases. The load and generation dispatch assumptions are provided in section 2.2.1 and section 2.2.2.

3.3. Connection Studies Carried Out

The analysis performed included:

1. Power flow (Category A and B for 2013 winter peak, 2014 summer peak and summer light scenarios)
2. Short circuit analysis (for 2013-2014 and 2022 winter peak only)
3. Transient stability analysis (Category B for 2013 winter peak, 2014 summer peak and summer light scenarios)

3.4. Power Flow Analysis

Power flow studies were performed with PSSE Version 33 for the pre-connection and post-connection conditions for the 2013-14 winter peak and 2014 summer peak cases. 2014 summer light load scenarios were tested with Windy Hill Biomass generating unit in service.

The objective of the power flow analysis was to check thermal overload or voltage reliability criteria violations in the study area before and after the connection of the Plant.

3.4.1. Contingencies Studied

For the Category B contingency analysis, the study considered all single outages of transmission facility in Rainbow Lake and High Level areas and the ties to the surrounding planning areas. The Category B contingencies listed in Table 14 were considered to be the most critical ones for the purpose of Windy Hill Biomass generating study. The study areas monitored for voltage and thermal violations were Areas 17, 18, and 19.

Table 14: Critical Category B Contingencies for Windy Hill Biomass facility Connection Study

Outage	Description
7L59	High Level 786S - KegRiver 789S
7L62	KegRiver 789S - Meikle 905S
7L64	Arcenciel 930S - KegRiver 789S
7L76	High Level 786S - Blumenort 832S
7L113	Arcenciel 930S - RingCreek 853S
7L133	High Level 786S - Sulphurpoint 828S
7L180	Blumenort 832S –Windy Hills 675S

3.5. Voltage Stability (PV) Analysis

Voltage stability analysis is not required for the Project.

3.6. Short-Circuit Analysis

Short circuit analysis was performed for the 2013-14 winter peak study case with and without the proposed Windy Hill Biomass facility. Ten year short circuit levels for the facility design document will be determined using the 2022 winter peak planning case.

Line-to-ground and three-phase fault current was calculated for Windy Hill substation and the adjacent substations.

3.7. Transient Stability Analysis

Transient stability studies were performed for the proposed alternative development using the modified 2013-14 winter peak, 2014 summer peak and 2014 summer light cases.

Stability plots for relevant quantities including bus voltage, machine relative angle, active and reactive power outputs for the proposed generating unit was provided along with relative machine angles for selected machines and buses in close to the connection point. Genesee unit #1 was used as the reference.

For line faults, a sustained 3 phase fault was assumed at both the near and far end of transmission lines. Assumed clearing times were specified in Table 12 in Section 2.7.

3.7.1. Contingencies Studied

Transient stability was performed for the same category B contingencies shown in Table 12 in section 2.7.

3.8. Sensitivity Studies

No specific sensitivity studies were performed.

4. Pre-Connection System Assessment

4.1. Pre-Connection Power Flow Analysis

4.1.1. 2013-2014 Winter Peak Results

Category A - The results for Category A condition indicated no thermal overload of the transmission facilities or voltage criteria violation.

Category B – The results for Category A condition indicated no thermal overload of the transmission facilities or voltage criteria violation.

4.1.2. 2014 Summer Peak Results

Category A - The results for Category A condition indicated no thermal overload of the transmission facilities or voltage criteria violation.

Category B – The results for Category A condition indicated no thermal overload of the transmission facilities or voltage criteria violation.

Attachment A contains the power flow single line diagrams for the pre-connection system assessment.

4.2. Pre-Connection Voltage Stability Analysis

Voltage stability analysis is not required for the Project.

4.3. Pre-Connection Transient Stability Analysis

Pre-connection transient stability analysis was performed for all category B contingencies shown in Table 12 for 2013-2014 winter peak, 2014 summer peak and summer light scenarios. There was no transient stability concern observed.

Table 15 summarizes the results of the transient analysis for the respective element outages simulated for the proposed alternative for the scenarios considered.

Table 15: Summary of Pre-Connection Transient Stability

Line ID	Line Terminals		Fault Location	Fault Clearing Cycles		Performance		
	Terminal 1	Terminal 2		Terminal 1	Terminal 2	2013WP	2014SP	2014SL
7L133	High Level 786S	Sulphur Point 828S	Sulphur Point 828S	6	8	stable	stable	stable
			High Level 786S	6	8	stable	stable	stable
7L59	High Level 786S	KegRiver 789S	High Level 786S	6	8	stable	stable	stable
			KegRiver 789S	6	8	stable	stable	stable
7L62	KegRiver 789S	Meikle 905S	KegRiver 789S	6	8	stable	stable	stable
			Meikle 905S	6	8	stable	stable	stable
7L58	KegRiver 789S	Meikle 905S	KegRiver 789S	6	8	stable	stable	stable
			Meikle 905S	6	8	stable	stable	stable
7L113	Arcenciel 930S	Ring Creek 853S	Arcenciel 930S	6	8	stable	stable	stable
			Ring Creek 853S	6	8	stable	stable	stable
7L82	Ring Creek 853S	Hotchkiss 788S	Ring Creek 853S	6	42	stable	stable	stable
			Hotchkiss 788S	6	24	stable	stable	stable
7L64	Arcenciel 930S	Keg River 789S	Arcenciel 930S	6	8	stable	stable	stable
			Keg River 789S	6	8	stable	stable	stable

Attachment B contains the system dynamic responses following the Category B contingencies, the plots for selected bus voltages, generator angles, frequencies and active and reactive outputs can be found. Attachment B-1 contains the system dynamic responses for 2013-2014 winter peak scenarios, while Attachment B-2 contains the system dynamic responses for 2014 summer peak scenario and Attachment B-3 contains the system dynamic responses for 2014 summer light scenario. The fault at Terminal 1 end is designated with suffix "_A" following the contingency description while the fault at Terminal 1 end is designated with suffix "_B" following the contingency description.

5. Connection Alternatives

5.1. Overview

The customer chose the only connection alternative, Alternative 1: build a new 144 kV transmission line to connect the Plant to the existing Blumenort 832S substation. This alternative will involve the following developments:

- Approximately 23km of new 144 kV transmission line connecting the Project to Blumenort 832S,
- Telecommunication will be installed for 7L180 between Blumenort 832S substation and Windy Hill 675S.
- One (1) 144 kV circuit breaker and associated equipment including a single phase line PT, at Blumenort 832S substation. This line PT is on new line 7L180 and is required for implementing “dead line close only” scheme
- A single phase line PT, at High Level substation 786S. This line PT is on 7L76 and is required for implementing “dead line close only” scheme.

6. Technical Analysis of the Connection Alternatives

Results of the analysis performed for the connection alternative are discussed in detail in this section.

6.1. Alternative 1

Alternative 1 is the only alternative chosen by the customer: build a new 144 kV transmission line to connect the Plant to Blumenort 832S.

6.1.1. Power Flow Analysis (Alternative 1)

2013-2014 Winter Peak Results

Category A - The results for Category A condition indicated no thermal overload of the transmission facilities or voltage criteria violation.

Category B – The results for Category A condition indicated no thermal overload of the transmission facilities or voltage criteria violation.

2014 Summer Peak Results

Category A - The results for Category A condition indicated no thermal overload of the transmission facilities or voltage criteria violation.

Category B – The results for Category A condition indicated no thermal overload of the transmission facilities or voltage criteria violation.

2014 Summer Light Results

Category A - The results for Category A condition indicated no thermal overload of the transmission facilities or voltage criteria violation.

Category B – The results for Category A condition indicated no thermal overload of the transmission facilities or voltage criteria violation.

Attachment C contains the power flow single line diagrams for the pre-connection system assessment.

6.1.2. Voltage Stability Analysis (Alternative 1)

Voltage stability analysis is not required for the Project.

6.1.3. Transient Stability Analysis (Alternative 1)

Table 16 summarizes the results of the transient analysis for the respective element outages simulated for the proposed alternative for the scenarios considered.

Table 16: Summary of Post-Connection Transient Stability

Line ID	Line Terminals		Fault Location	Fault Clearing Cycles		Performance		
	Terminal 1	Terminal 2		Terminal 1	Terminal 2	2013WP	2014SP	2014SL
7L133	High Level 786S	Sulphur Point 828S	Sulphur Point 828S	6	8	stable	stable	stable
			High Level 786S	6	8	stable	stable	stable
7L59	High Level 786S	KegRiver 789S	High Level 786S	6	8	stable	stable	stable
			KegRiver 789S	6	8	stable	stable	stable
7L62	KegRiver 789S	Meikle 905S	KegRiver 789S	6	8	stable	stable	stable
			Meikle 905S	6	8	stable	stable	stable
7L58	KegRiver 789S	Meikle 905S	KegRiver 789S	6	8	stable	stable	stable
			Meikle 905S	6	8	stable	stable	stable
7L113	Arcenciel 930S	Ring Creek 853S	Arcenciel 930S	6	8	stable	stable	stable
			Ring Creek 853S	6	8	stable	stable	stable
7L82	Ring Creek 853S	Hotchkiss 788S	Ring Creek 853S	6	42	stable	stable	stable
			Hotchkiss 788S	6	24	stable	stable	stable
7L64	Arcenciel 930S	Keg River 789S	Arcenciel 930S	6	8	stable	stable	stable
			Keg River 789S	6	8	stable	stable	stable
7L76	High Level 786S	Blumenort 832S	High Level 786S	6	27	islanding	islanding	islanding
			Blumenort 832S	6	27	islanding	islanding	islanding

Attachment D contains the system dynamic responses following the Category B contingencies, the plots for selected bus voltages, generator angles, frequencies and active and reactive outputs can be found. Attachment D-1 contains the system dynamic responses for 2013-2014 winter peak scenarios, while Attachment D-2 contains the system dynamic responses for 2014 summer peak scenario and Attachment D-3 contains the system dynamic responses for 2014 summer light scenario. The fault at Terminal 1 end is designated with suffix "_A" following the contingency description while the fault at Terminal 1 end is designated with suffix "_B" following the contingency description.

The transient stability analysis for 2013WP, 2014SP and 2014 SL scenarios did not indicate any transient stability concerns or islanding concerns except for 7L76. All generators remain stable with quickly dampened oscillatory response.

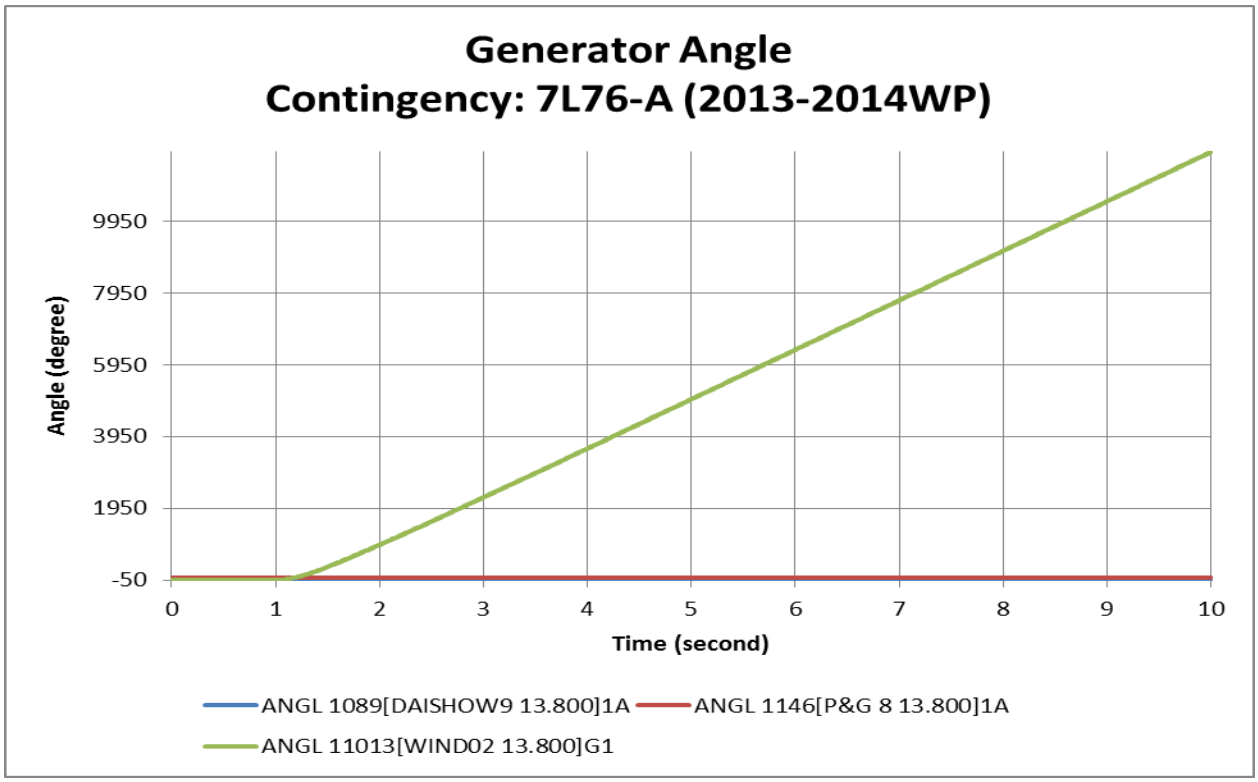
Analyses on a fault in the vicinity of High Level 786S on 7L76

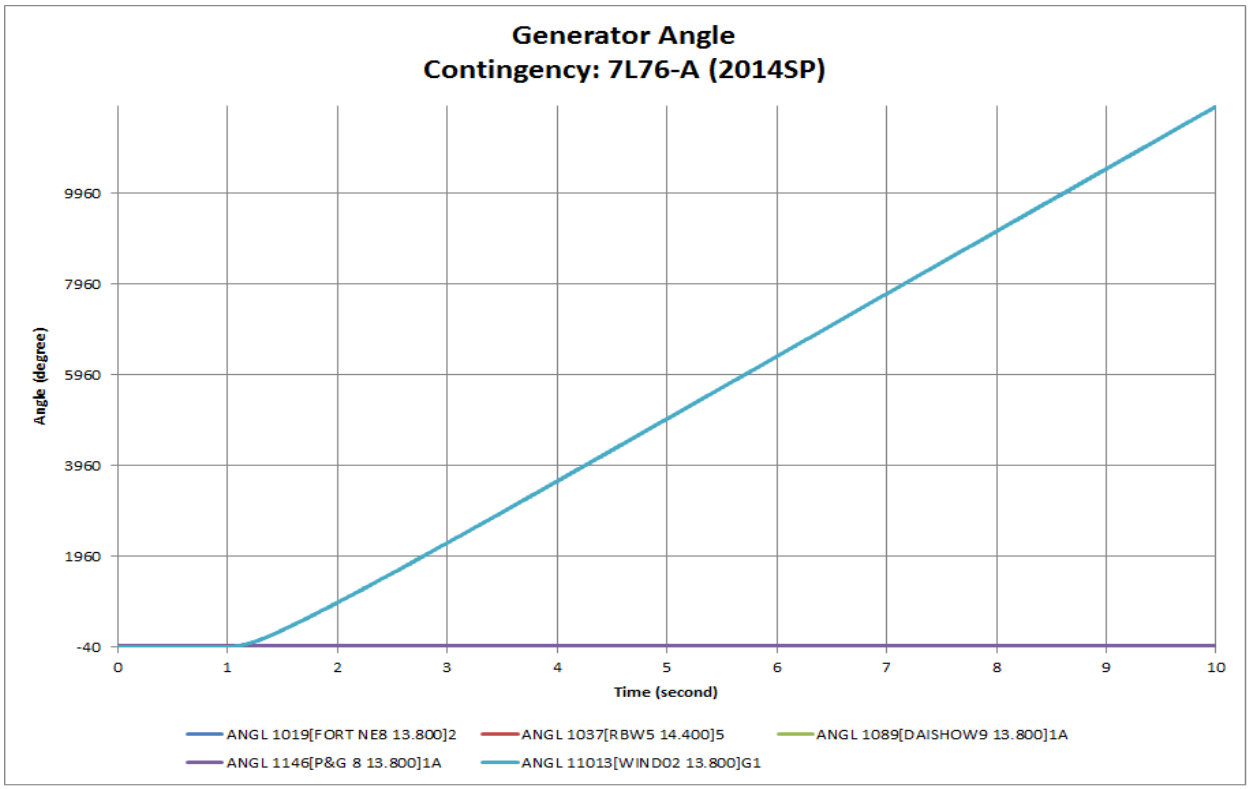
Line protection is available at High Level (786S) end only for 7L76 (High Level 786S to Blumenort 832S) for the existing system. Protection shall be installed at Blumenort 832S end for 7L76 to accommodate the interconnection of the Project. The fault clearing times of 7L76 are 6 and 27 cycles for near end and remote end fault.

For a fault in the vicinity of High Level 786S on 7L76, High Level breaker trips open in 6 cycles, the breaker at Blumenort 832S would take 27 cycles to trip open. During the 27 cycles, the Biomass generation and Blumenort 832S load formed an islanding system. The transient analysis indicated that the frequency of the islanding system monitored at Blumenort 832S 138k kV bus rose up to about 63Hz if the generator was not tripped earlier. A similar concern of under frequency can occur if generation would be less than load in the same island under certain conditions.

Figure 2 shows the generator angle performance and Figure 3 shows the frequency performance for a fault in the vicinity of High Level 786S on 7L76 for 2013-2014 WP, 2014 SP and 2014SL.

Figure 2: Generation Angle Performance for a Fault in the Vicinity of High Level 786S on 7L76




Generator Angle
Contingency: 7L76-A (2014SP)
Angle (degree)
9960
7960
5960
3960
1960
-40
0
1
2
3
4
5
6
7
8
9
10
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

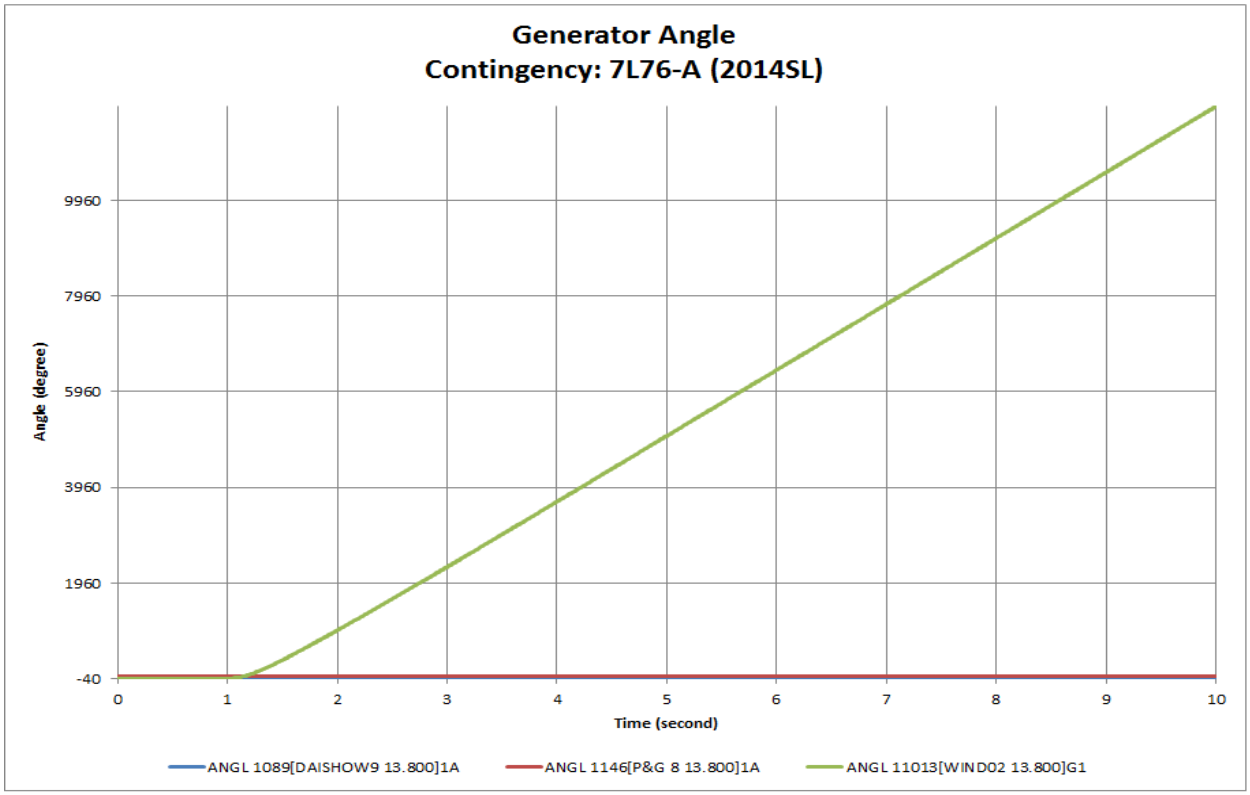
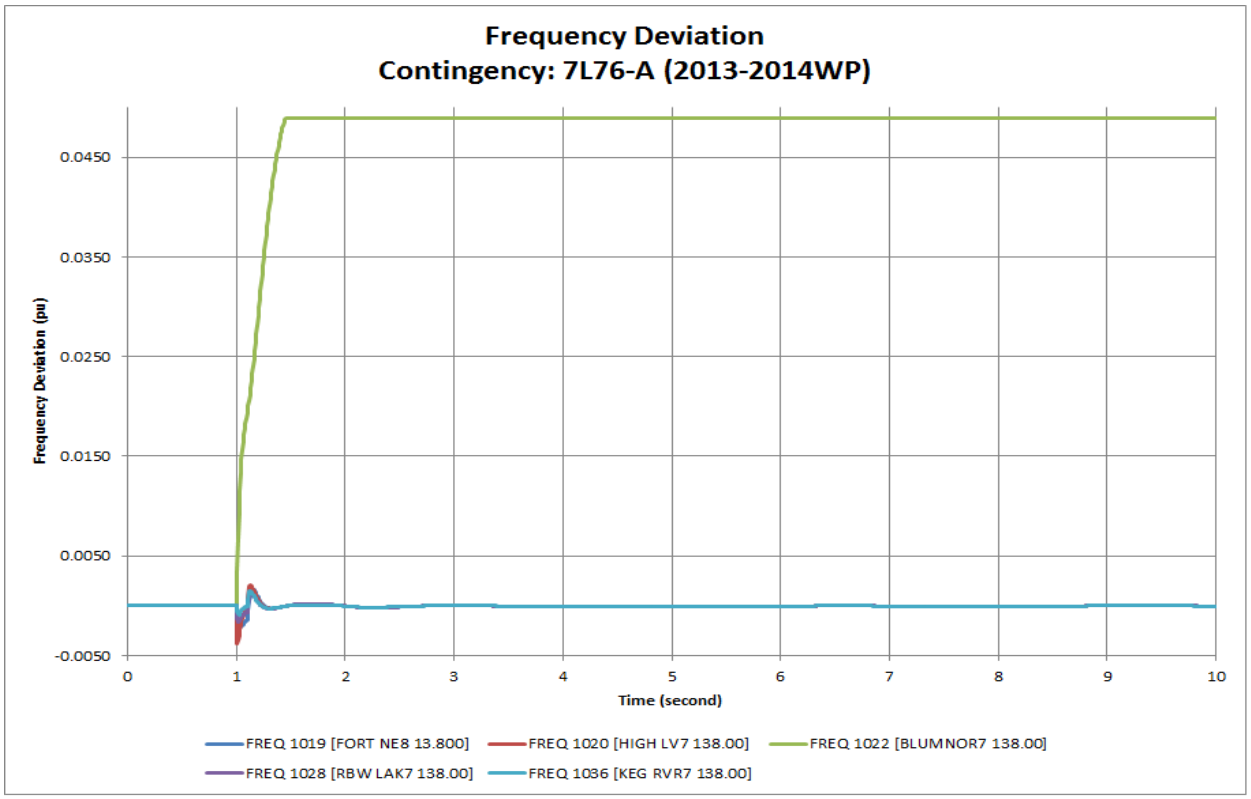
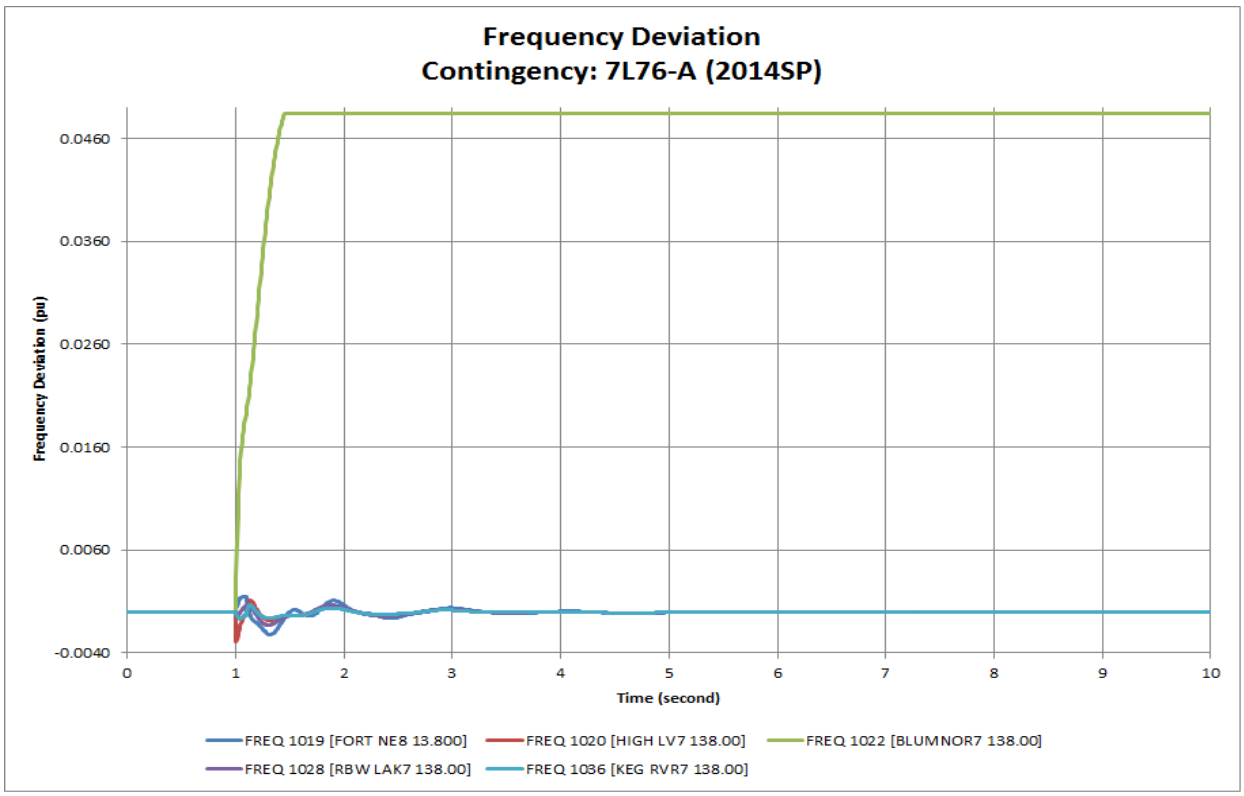
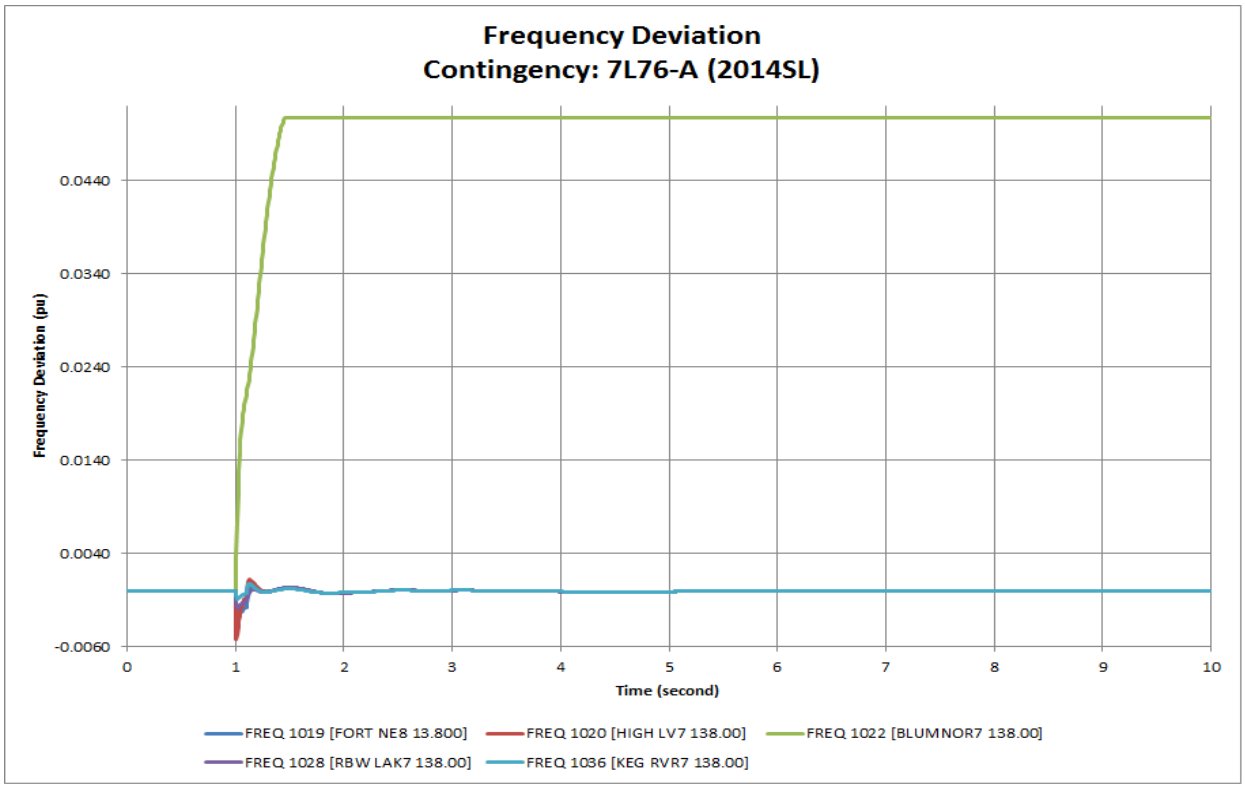

Generator Angle
Contingency: 7L76-A (2014SL)
Angle (degree)
9960
7960
5960
3960
1960
-40
0
1
2
3
4
5
6
7
8
9
10
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

Figure 3: Bus Frequency Performance for a Fault in the Vicinity of High Level 786S on 7L76







6.1.4. Mitigation Measures for Identified Issues (Alternative 1)

Mitigation Measures for the Off-Nominal Frequency Due to Islanding

Transient stability analysis found that for a fault on transmission line 7L76 in the vicinity of High Level 786S substation, the Biomass generation and Blumenort 832S load constitute an islanded system for 27 cycles before Blumenort 832S protection operates. The frequency of this islanding system rose to about 63 Hz if the generator was not tripped earlier. A similar concern of under frequency can occur if generation would be less than load in the same island under certain conditions. Line protections and teleproection are planned as part of the Project to address the over and under frequency concerns due to islanding.

6.2. Conclusions and Recommendations

7L113 and 7L64 Protection Upgrade

The existing protections relays for 7L113 and 7L64 are step distance relays. The AESO has confirmed with ATCO that there is OPGW between Arcenciel - Rainbow Lake-Ring Creek and there is digital Microwave between Meikle and Rainbow Lake. Base on the existing communication conditions, teleprotection is recommended on these two transmission lines to improve stability.

7L59 Protection Upgrade

The AESO has confirmed with ATCO that telecommunication channels exist for 7L59 between High Level 786S and KegRiver 789S. Therefore, teleprotection is recommended on 7L59 to improve stability.

Mitigation Measures for the Off-Nominal Frequency Due to Islanding

Transient stability analysis found that for a fault on transmission line 7L76 in the vicinity of High Level 786S substation, the Biomass generation and Blumenort 832S load constitute an islanded system for 27 cycles before Blumenort 832S protection operates. The frequency of this islanding system rose to about 63 Hz if the generator was not tripped earlier. A similar concern of under frequency can occur if generation would be less than load in the same island under certain conditions. Line protections and teleprotection are planned as part of the Project to address the over and under frequency concerns due to islanding.

7. Short-Circuit Analysis

Short circuit analysis was performed using the 2013-2014WP and 2022WP scenarios to determine the expected system short circuit levels in the vicinity of Windy Hill 675S substation. Single phase and three phase fault currents were calculated at Windy Hill 675S substation as well as the adjacent existing substations. The results are provided in the subsections below.

To establish the worst short-circuit level, the analysis assumed all Area 17 generation units to be in-service.

7.1. Pre-Connection

Table 17 provides the 2013-2014 WP short circuit level without the Windy Hill 675S substation.

Table 17: Summary of Short-Circuit Current Levels – Pre-Connection (2013-2014WP)

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)1	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)1
High Level 786S	138	1.083	1.88	0.094765+j0.220993	2.48	0.005568+j0.071316
Blumenort 832S	138	1.072	1.08	0.184657+j0.374369	1.29	0.033152+j0.211239

Note: 1) per unit (p.u.) quantities are on 100MVA, 138kV base

7.2. Post-Connection

Table 18 and Table 19 provide 2013-2014WP and 2022WP short circuit level with Windy Hill 675S substation in-service.

Table 18: Summary of Short-Circuit Current Levels – Post-Connection (2013-2014WP)

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)[1]	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)[1]
High Level 786S	138	1.083	2.38	0.061579+j0.179771	3.02	0.005568+j0.071316
Blumenort 832S	138	1.092	1.69	0.080304+j0.257491	1.82	0.033152+j0.211239
Windy Hill 675S	138	1.094	1.61	0.072630+j0.274120	1.86	0.014634+j0.171125
	13.8	1.000	18.22	0.026519+j0.227987	15.19	0.000000+j0.368852

Note: 1) per unit (p.u.) quantities are on 100MVA, 138kV base

Table 19: Summary of Short-Circuit Current Levels –Post-Connection (2022WP)

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)[1]	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)[1]
High Level 786S	138	1.083	2.32	0.062615+j0.183509	2.48	0.019988+j0.158050
Blumenort 832S	138	1.193	1.67	0.079454+j0.261163	1.65	0.048136+j0.281906
Windy Hill 675S	138	1.096	1.60	0.071786+j0.277208	1.80	0.015470+j0.191431
	13.8	1.000	18.12	0.026185+j0.229077	15.14	0.000000+j0.368852

Note: 1) per unit (p.u.) quantities are on 100MVA, 138kV base

8. Project Interdependencies

Studies and the assumptions made regarding the system analysis described herein are consistent with the AESO's long-term transmission system plans for the region.

The Project is not specifically dependent on any projects.

9. Summary and Conclusion

Mustus Energy Limited, or MEL, is proposing to construct the Windy Hill Biomass Generating Plant Station as a new point of supply. The Plant is located in the AESO High Level Planning Area (Area 18) in northwest Alberta and is approximately 20 km southeast to the Blumenort 832S substation. MEL has chosen the only connection alternative: connect the Windy Hill Plant to the Blumenort 832S substation via a new 23km 144 kV transmission line. MEL has requested a Supply Transmission Service (STS) capacity of 41.5 MW. The estimated in-service date for the Mustus plant is February 2, 2015.

Power flow and transient stability analyses were performed for the 2013 WP, 2014 SP and 2014 SL conditions to evaluate the impact of connecting the proposed Plant to the AIES. Short circuit analysis was performed for the 2014 WP and 2022 WP conditions to establish the expected short circuit levels in the vicinity of the Plant.

Load flow analysis indicated no thermal overload of the transmission facilities or voltage criteria violation after the connection of the Windy Hill Biomass generation.

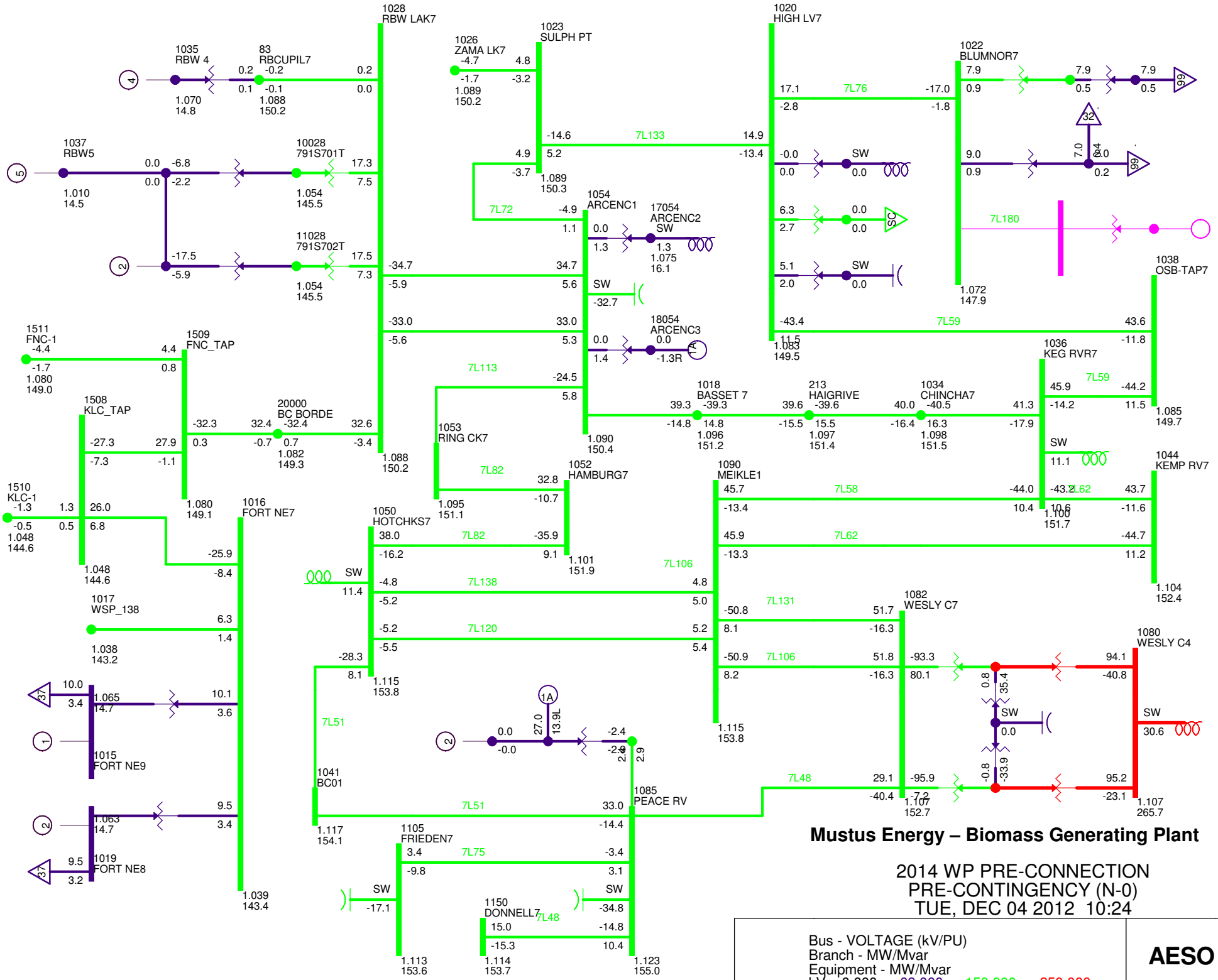
The existing protections relays for 7L113 and 7L64 are step distance relays. The AESO has confirmed with ATCO that there is OPGW between Arcenciel - Rainbow Lake-Ring Creek and there is digital Microwave between Meikle and Rainbow Lake. Base on the existing communication conditions, teleprotection is recommended on these two transmission lines to improve stability.

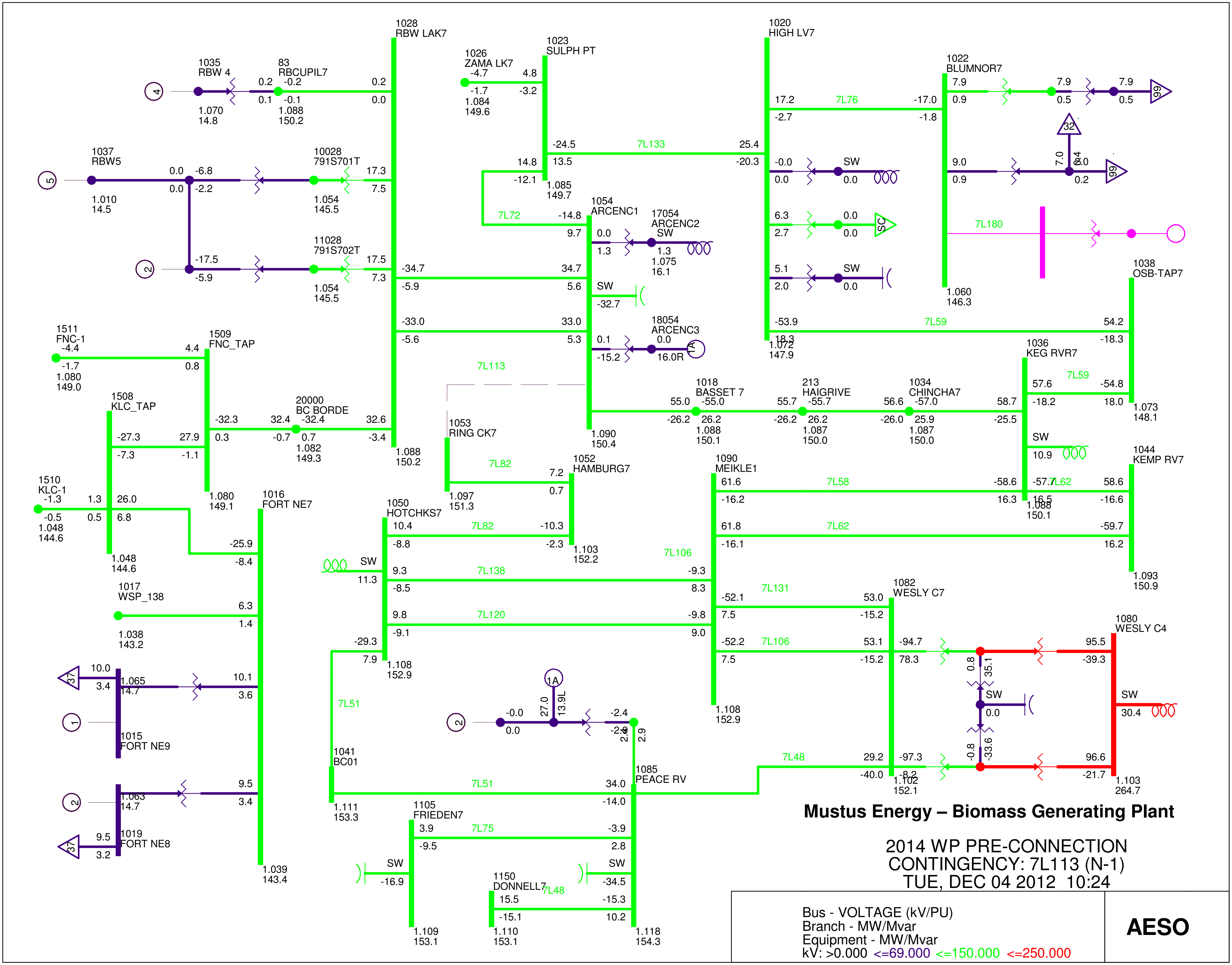
The AESO has confirmed with ATCO that telecommunication channels exist for 7L59 between High Level 786S and KegRiver 789S. Therefore, teleprotection is recommended on 7L59 to improve stability.

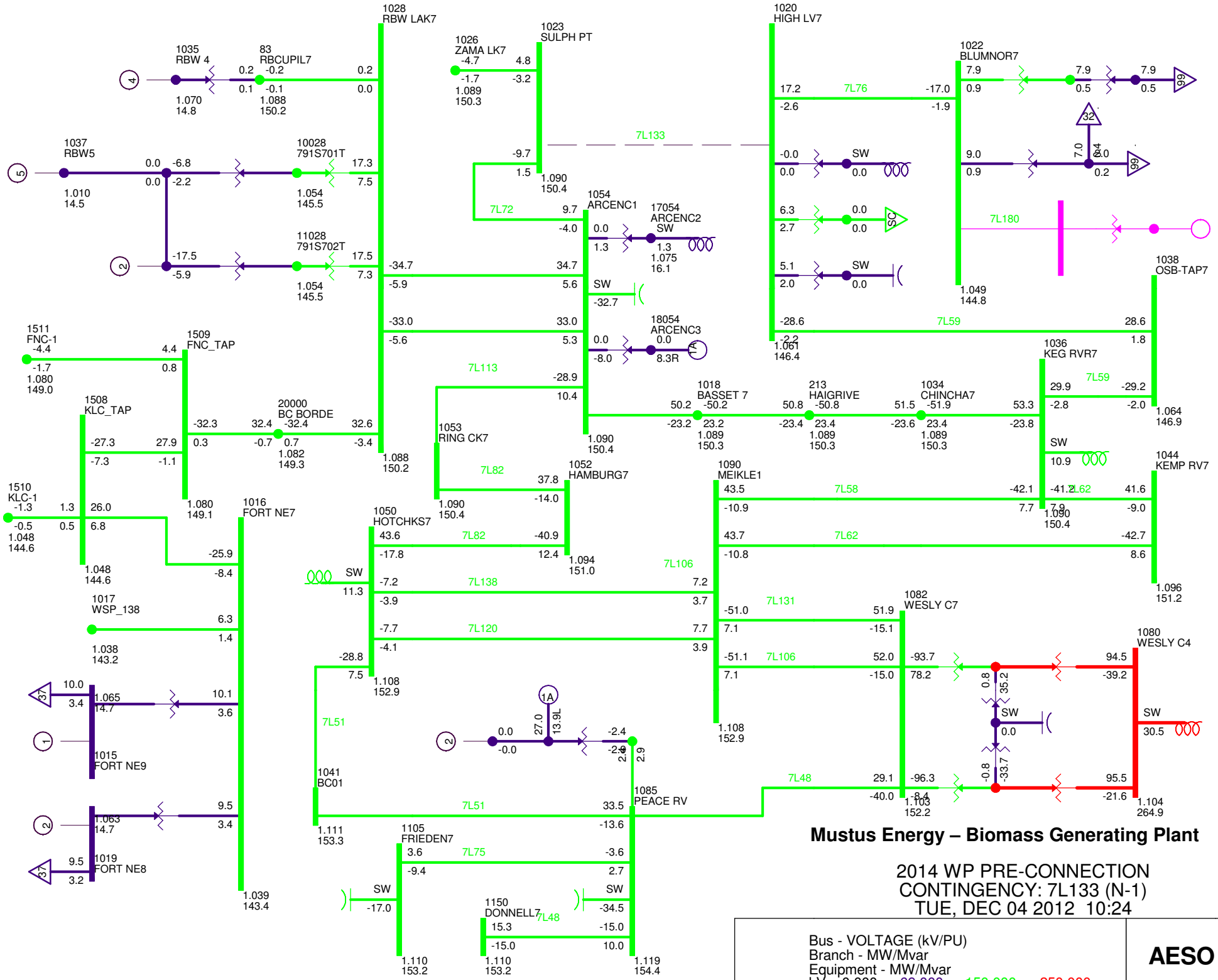
Transient stability analysis found that for a fault in the vicinity of High Level 786S on 7L76, the Biomass generation and Blumenort 832S load constitute an islanding system for 27 cycles before Blumenort 832S protection operates. The frequency of this islanding system rose to about 63 Hz if the generator was not tripped earlier. A similar concern of under frequency can occur if generation would be less than load in the same island under certain conditions. Line protections and teleprotection are planned as part of the Project to address the over and under frequency concerns due to islanding.

Attachment A-1

Pre-Connection Single Line Diagrams (2013-2014 WP)


1028
RBW LAK7
1035
RBW 4
83
RBCUPIL7
1026
ZAMA LK7
1023
SULPH PT
1020
HIGH LV7
1022
BLUMNOR7
1037
RBW5
10028
791S701T
11028
791S702T
1054
ARCENC1
17054
ARCENC2
SW
18054
ARCENC3
1038
OSB-TAP7
1511
FNC-1
1509
FNC_TAP
1508
KLC_TAP
20000
BC BORDE
1053
RING CK7
1018
BASSET 7
213
HAIGRIVE
1034
CHINCHA7
1036
KEG RVR7
1044
KEMP RV7
1510
KLC-1
1016
FORT NE7
1017
WSP_138
1050
HOTCHKS7
1052
HAMBURG7
1090
MEIKLE1
1082
WESLY C7
1080
WESLY C4
1015
FORT NE9
1019
FORT NE8
1041
BC01
1085
PEACE RV
1105
FRIEDEN7
1150
DONNELL7
7L76
7L133
7L72
7L180
7L59
7L113
7L82
7L58
7L62
7L106
7L138
7L131
7L120
7L51
7L48
7L75
Mustus Energy – Biomass Generating Plant
2014 WP PRE-CONNECTION
PRE-CONTINGENCY (N-0)
TUE, DEC 04 2012 10:24
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO


1028 RBW LAK7
1023 SULPH PT
1026 ZAMA LK7
1020 HIGH LV7
1022 BLUMNOR7
1035 RBW 4
83 RBCUPIL7
1037 RBW5
10028 791S701T
11028 791S702T
1054 ARCENC1
17054 ARCENC2
18054 ARCENC3
1038 OSB-TAP7
1511 FNC-1
1509 FNC_TAP
1508 KLC_TAP
20000 BC BORDE
1053 RING CK7
1018 BASSET 7
213 HAIGRIVE
1034 CHINCHA7
1036 KEG RVR7
1044 KEMP RV7
1052 HAMBURG7
1090 MEIKLE1
1510 KLC-1
1016 FORT NE7
1050 HOTCHKS7
1017 WSP_138
1082 WESLY C7
1080 WESLY C4
1015 FORT NE9
1041 BC01
1085 PEACE RV
1019 FORT NE8
1105 FRIEDEN7
1150 DONNELL7
7L76
7L133
7L72
7L113
7L59
7L180
7L82
7L58
7L62
7L138
7L106
7L120
7L131
7L51
7L48
7L75
Mustus Energy – Biomass Generating Plant
2014 WP PRE-CONNECTION
CONTINGENCY: 7L113 (N-1)
TUE, DEC 04 2012 10:24
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO

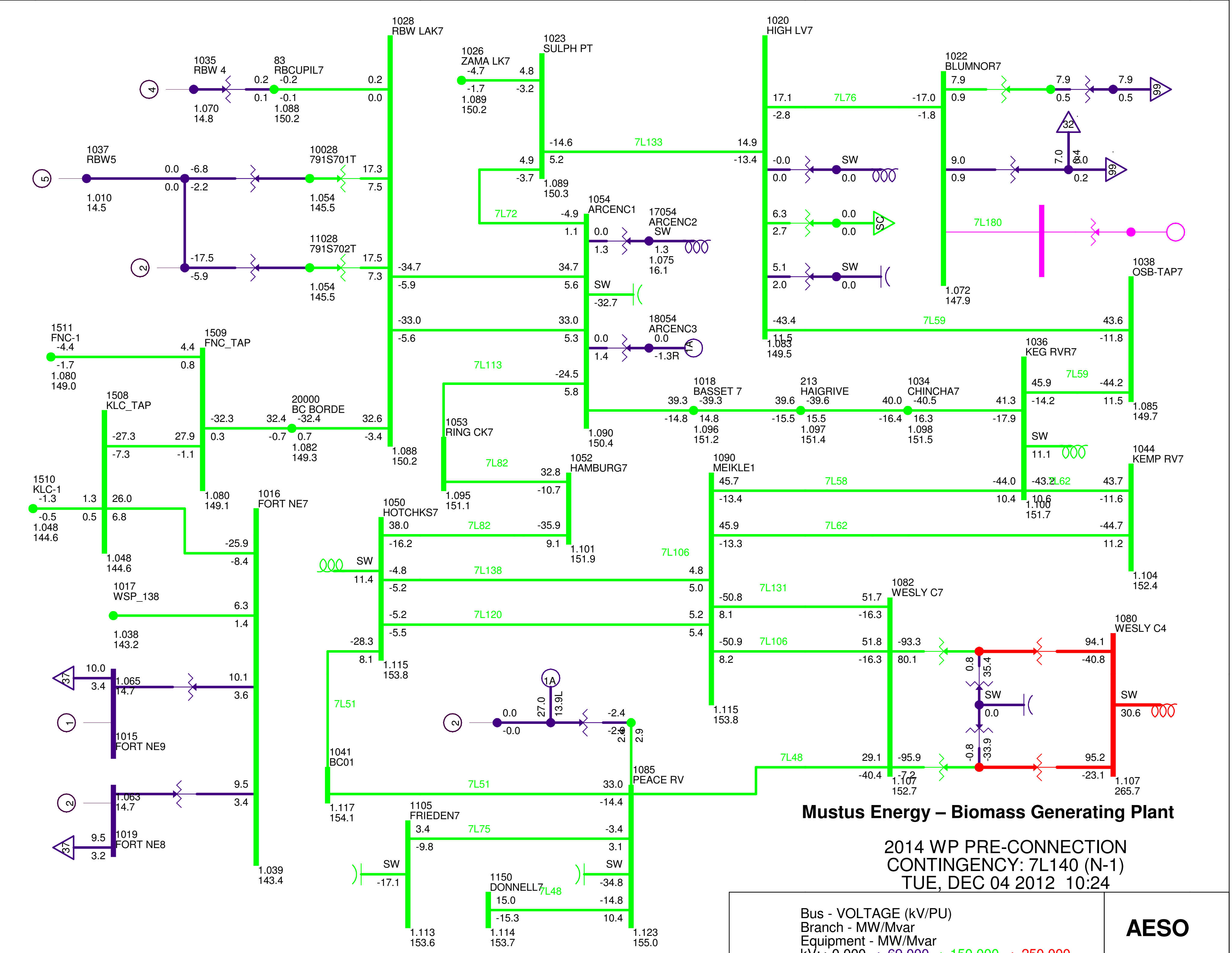


Mustus Energy – Biomass Generating Plant

2014 WP PRE-CONNECTION
CONTINGENCY: 7L133 (N-1)
TUE, DEC 04 2012 10:24

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO

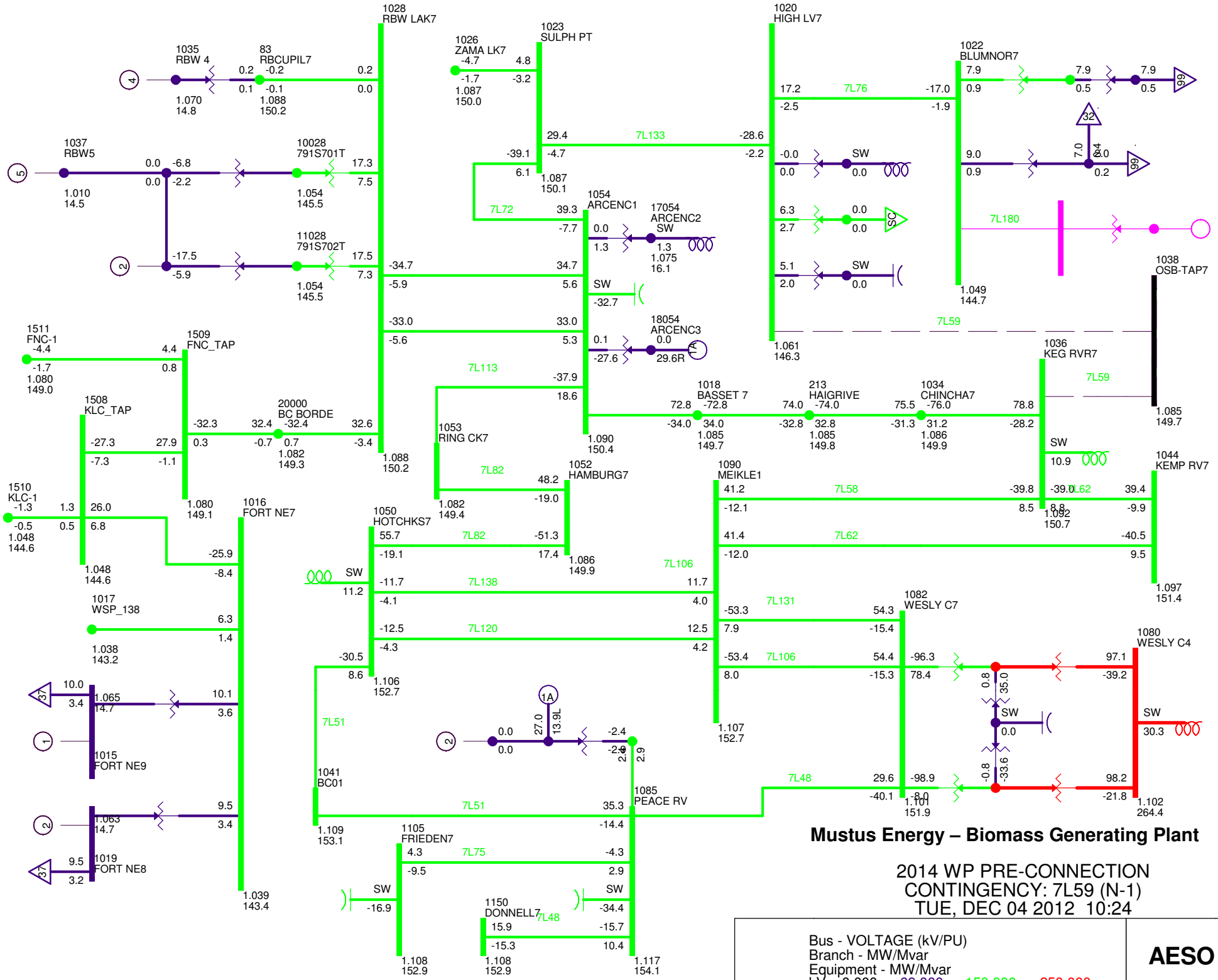


Mustus Energy – Biomass Generating Plant

2014 WP PRE-CONNECTION
CONTINGENCY: 7L140 (N-1)
TUE, DEC 04 2012 10:24

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO

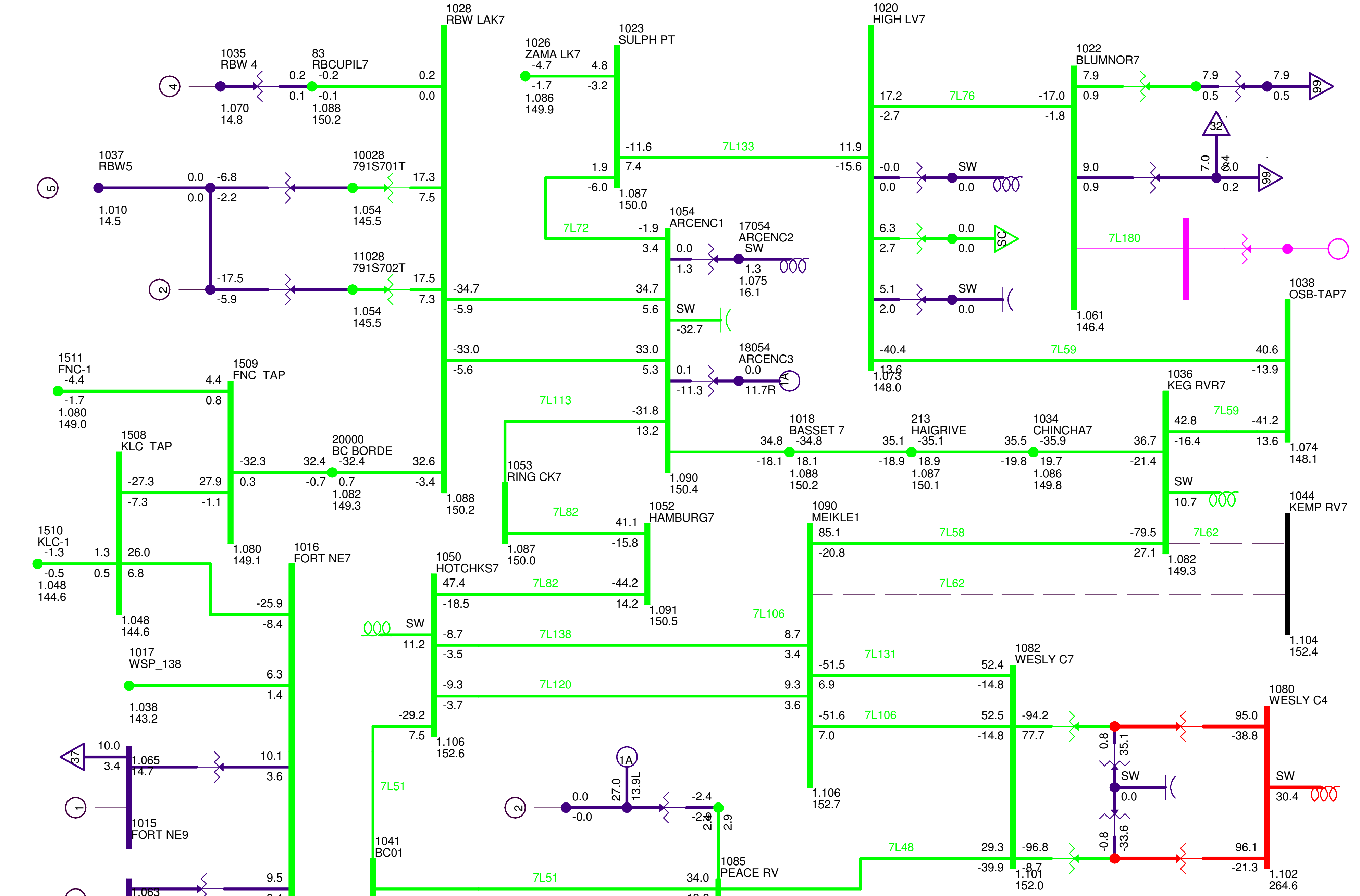


Mustus Energy – Biomass Generating Plant

2014 WP PRE-CONNECTION
CONTINGENCY: 7L59 (N-1)
TUE, DEC 04 2012 10:24

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

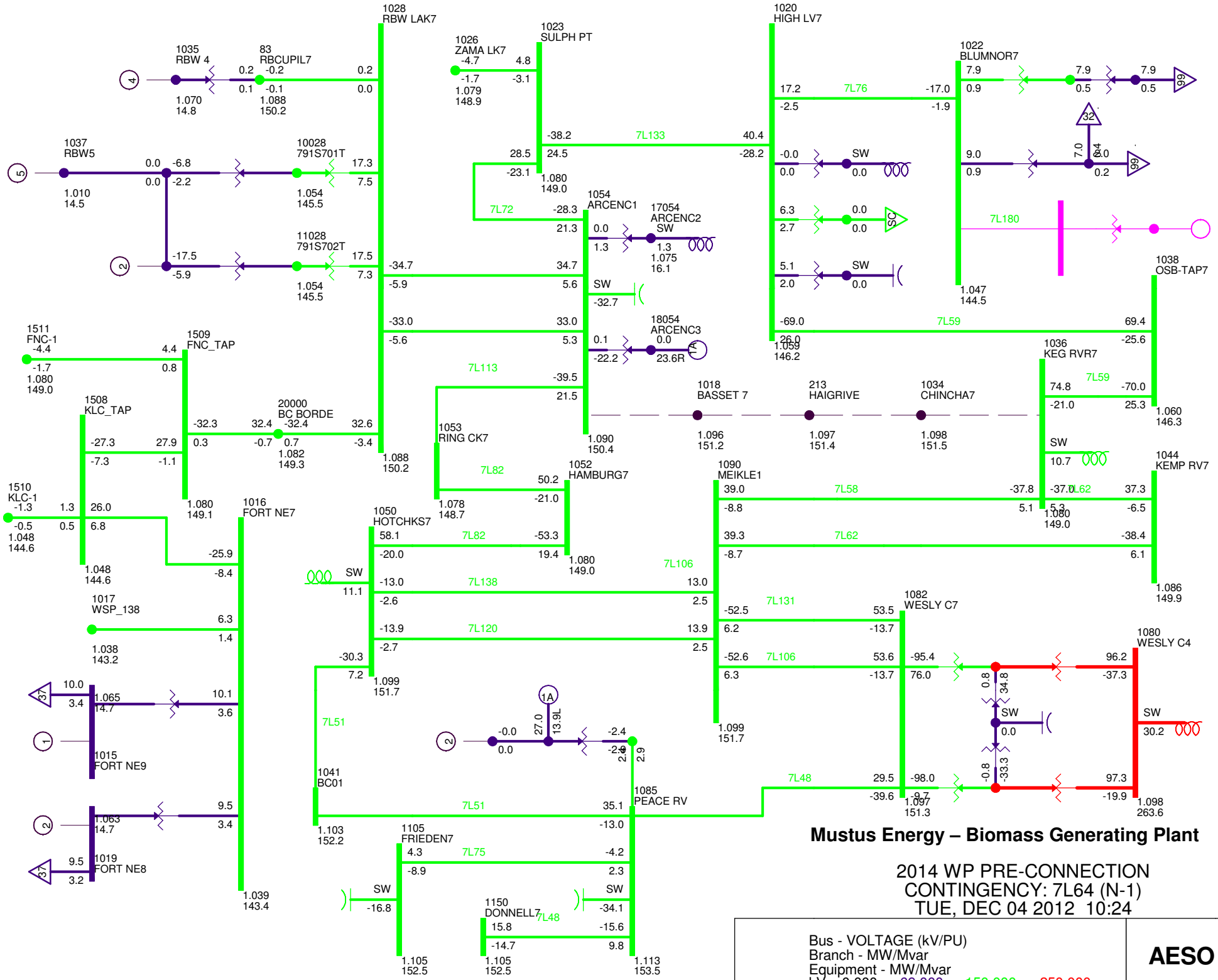
AESO



Mustus Energy – Biomass Generating Plant

2014 WP PRE-CONNECTION
CONTINGENCY: 7L62 (N-1)
TUE, DEC 04 2012 10:24

Bus - VOLTAGE (kV/PU) Branch - MW/Mvar Equipment - MW/Mvar kV: >0.000 <=69.000 <=150.000 <=250.000	AESO

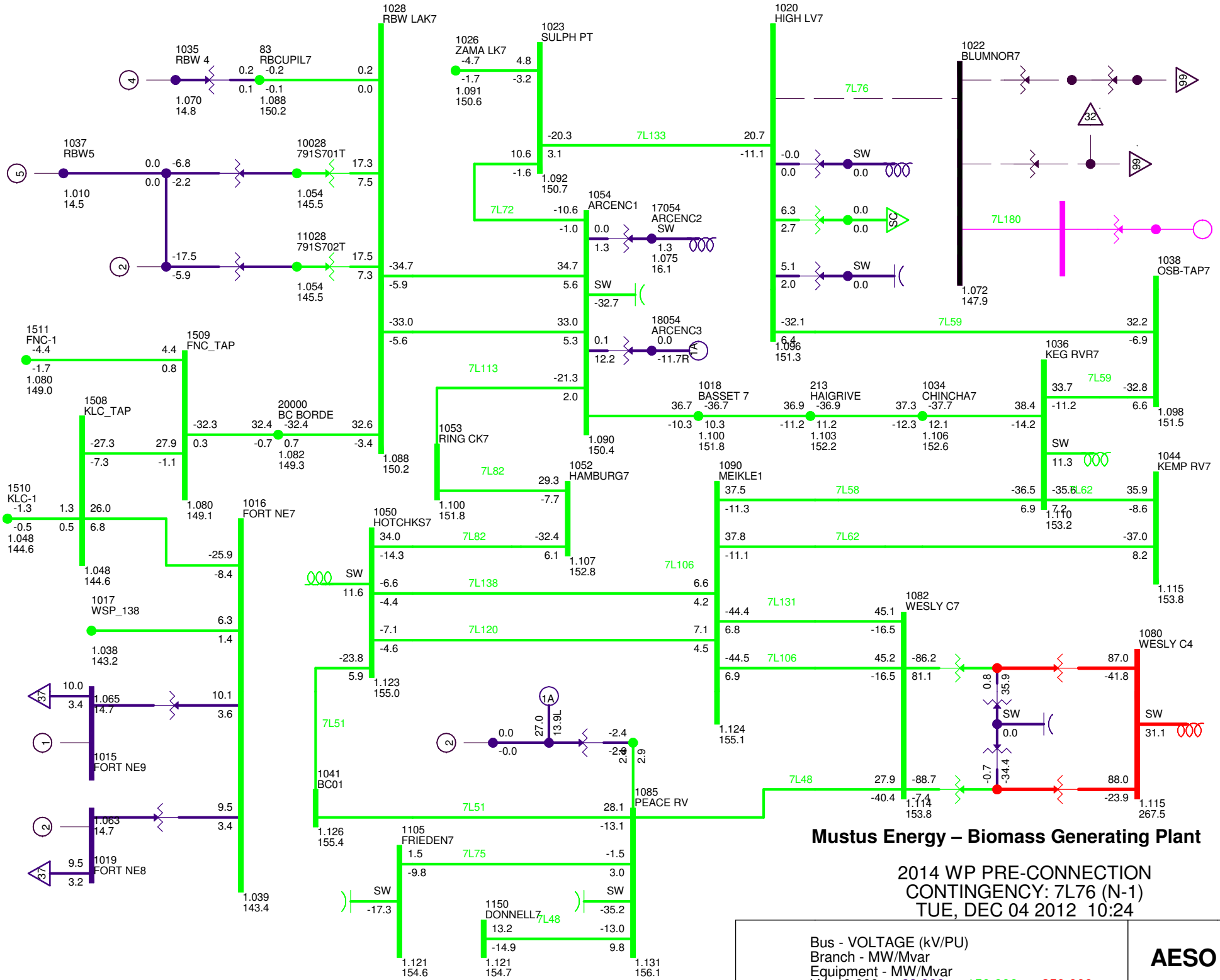


Mustus Energy – Biomass Generating Plant

2014 WP PRE-CONNECTION
CONTINGENCY: 7L64 (N-1)
TUE, DEC 04 2012 10:24

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO



Mustus Energy – Biomass Generating Plant

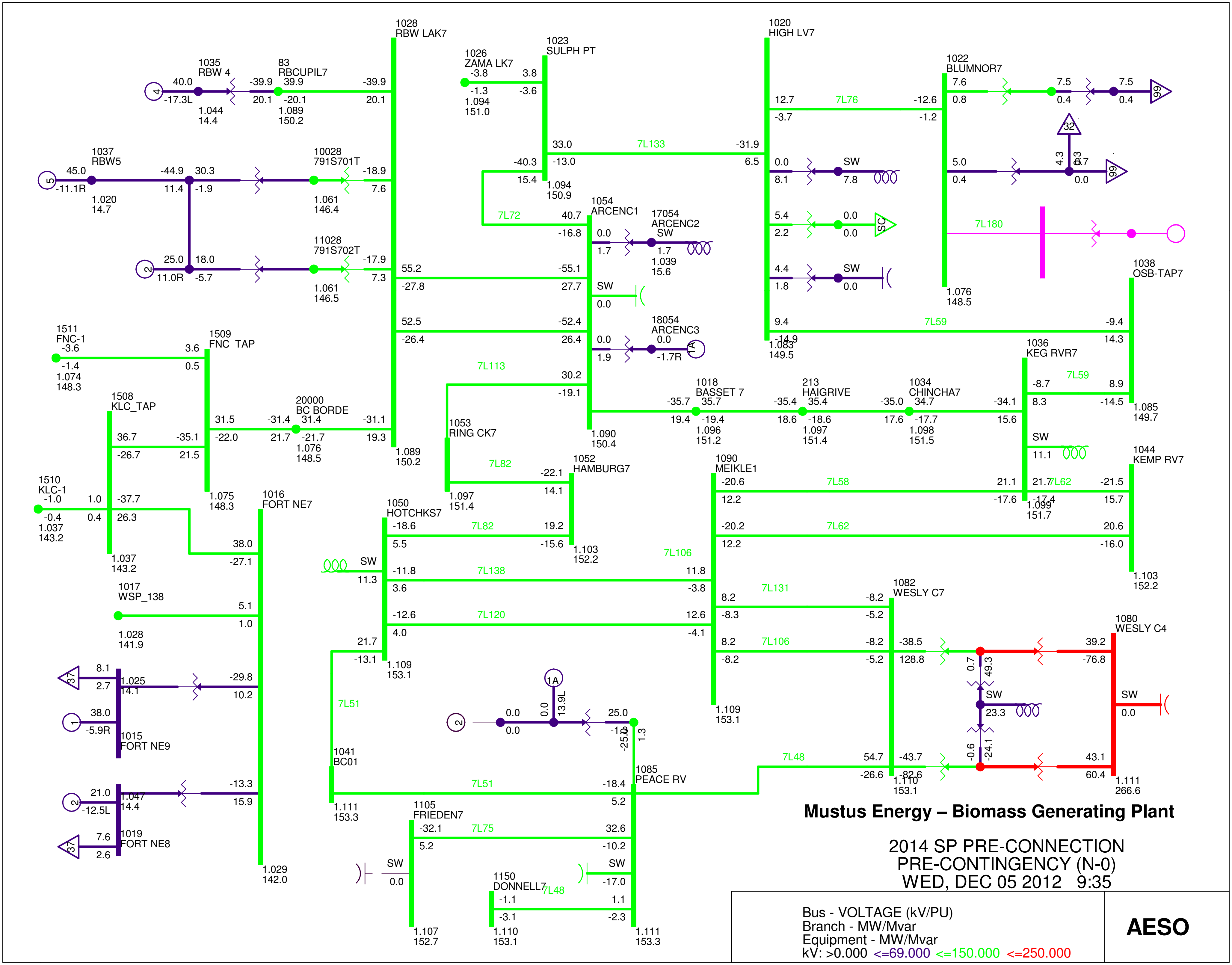
2014 WP PRE-CONNECTION
CONTINGENCY: 7L76 (N-1)
TUE, DEC 04 2012 10:24

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

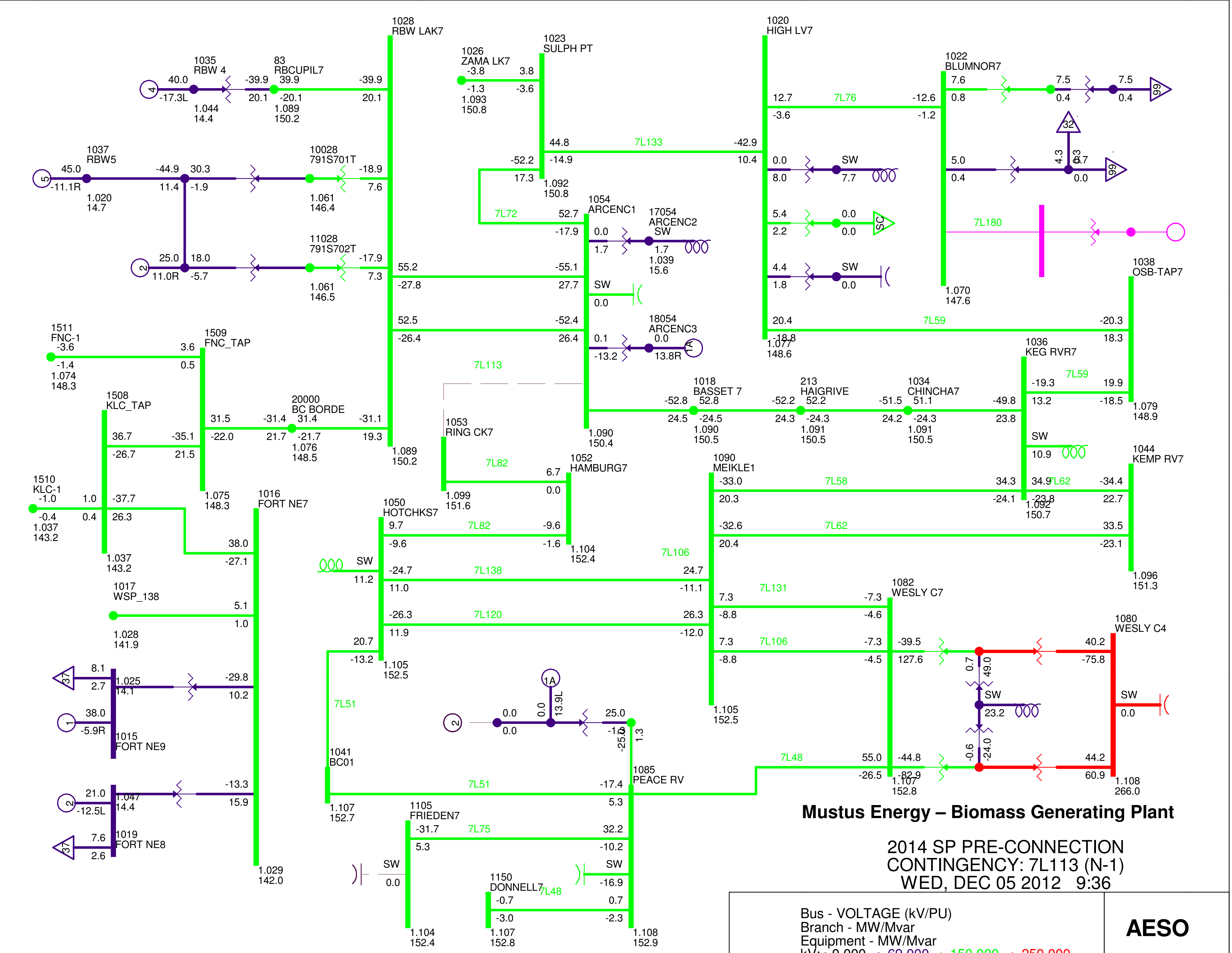
AESO

Attachment A-2

Pre-Connection Single Line Diagrams (2014 SP)



1028
RBW LAK7
1023
SULPH PT
1026
ZAMA LK7
1020
HIGH LV7
1022
BLUMNOR7
1035
RBW 4
83
RBCUPIL7
1037
RBW5
10028
791S701T
11028
791S702T
1054
ARCENC1
17054
ARCENC2
18054
ARCENC3
1038
OSB-TAP7
1036
KEG RVR7
1511
FNC-1
1509
FNC_TAP
1508
KLC_TAP
20000
BC BORDE
1053
RING CK7
1018
BASSET 7
213
HAIGRIVE
1034
CHINCHA7
1510
KLC-1
1016
FORT NE7
1050
HOTCHKS7
1052
HAMBURG7
1090
MEIKLE1
1044
KEMP RV7
1017
WSP_138
1082
WESLY C7
1080
WESLY C4
1015
FORT NE9
1019
FORT NE8
1041
BC01
1085
PEACE RV
1105
FRIEDEN7
1150
DONNELL7
7L76
7L133
7L72
7L180
7L59
7L113
7L82
7L58
7L62
7L106
7L138
7L131
7L120
7L51
7L48
7L75
SW
Mustus Energy – Biomass Generating Plant
2014 SP PRE-CONNECTION
PRE-CONTINGENCY (N-0)
WED, DEC 05 2012 9:35
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO

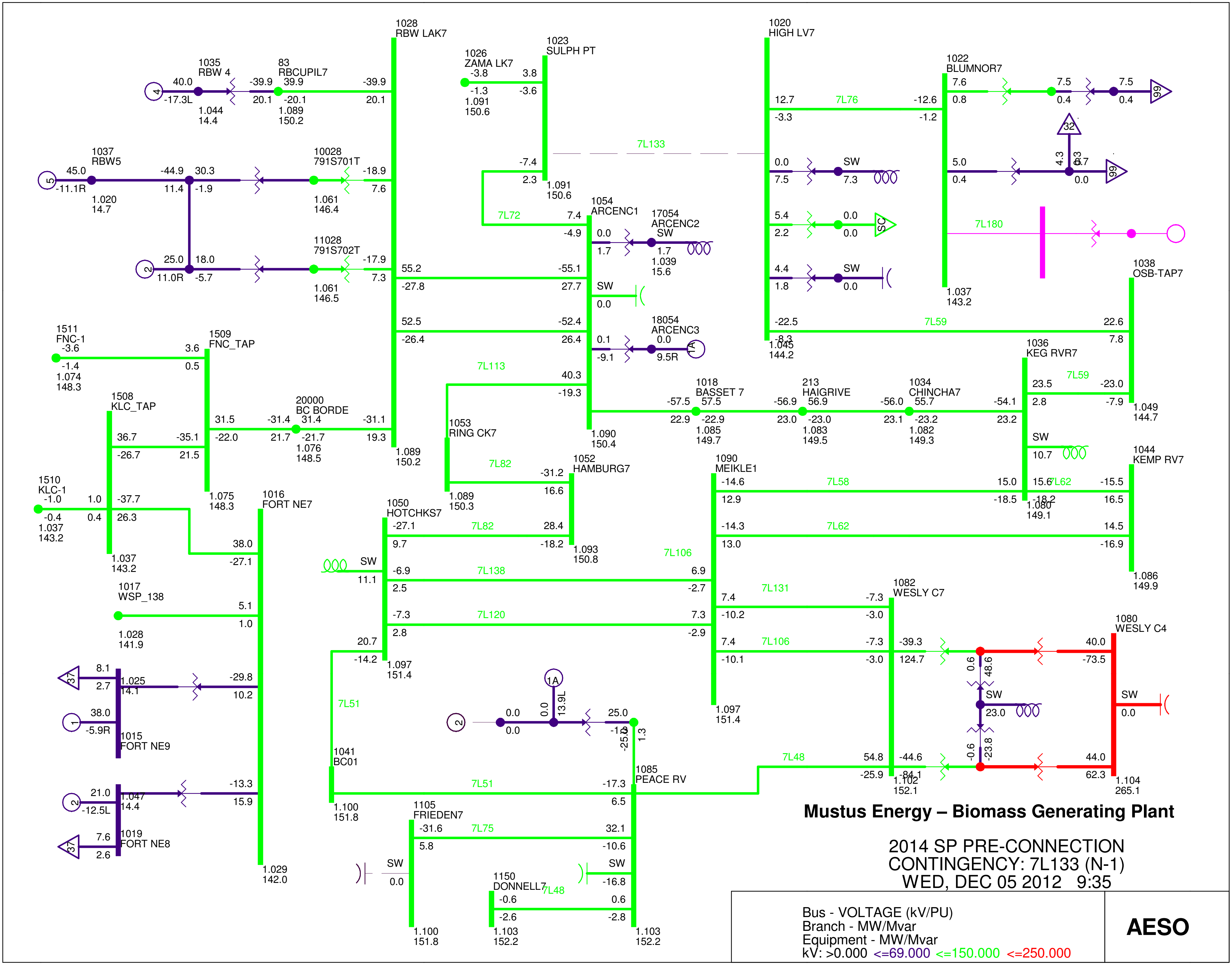


Mustus Energy – Biomass Generating Plant

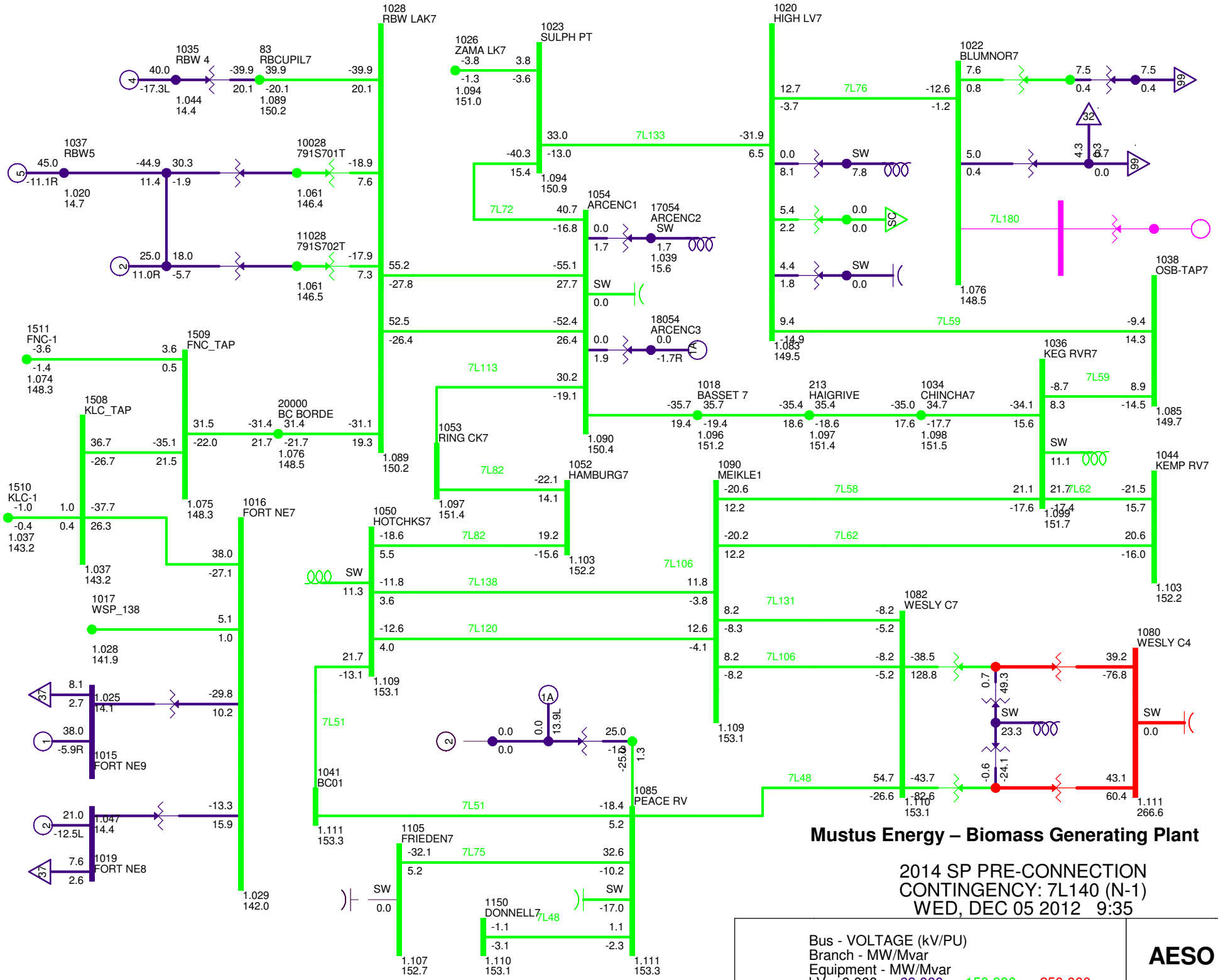
2014 SP PRE-CONNECTION
CONTINGENCY: 7L113 (N-1)
WED, DEC 05 2012 9:36

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO



1028 RBW LAK7
1023 SULPH PT
1026 ZAMA LK7
1035 RBW 4
83 RBCUPIL7
1037 RBW5
10028 791S701T
11028 791S702T
1020 HIGH LV7
1022 BLUMNOR7
7L76
7L133
7L180
1054 ARCENC1
17054 ARCENC2
18054 ARCENC3
7L72
7L113
1038 OSB-TAP7
7L59
1036 KEG RVR7
1511 FNC-1
1509 FNC_TAP
1508 KLC_TAP
20000 BC BORDE
1510 KLC-1
1053 RING CK7
1018 BASSET 7
213 HAIGRIVE
1034 CHINCHA7
7L82
1052 HAMBURG7
1090 MEIKLE1
1044 KEMP RV7
7L58
7L62
1016 FORT NE7
1050 HOTCHKS7
7L106
7L138
7L131
1082 WESLY C7
1080 WESLY C4
1017 WSP_138
7L120
1015 FORT NE9
1019 FORT NE8
7L51
1041 BC01
1085 PEACE RV
7L48
1105 FRIEDEN7
7L75
1150 DONNELL7
Mustus Energy – Biomass Generating Plant
2014 SP PRE-CONNECTION
CONTINGENCY: 7L133 (N-1)
WED, DEC 05 2012 9:35
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO

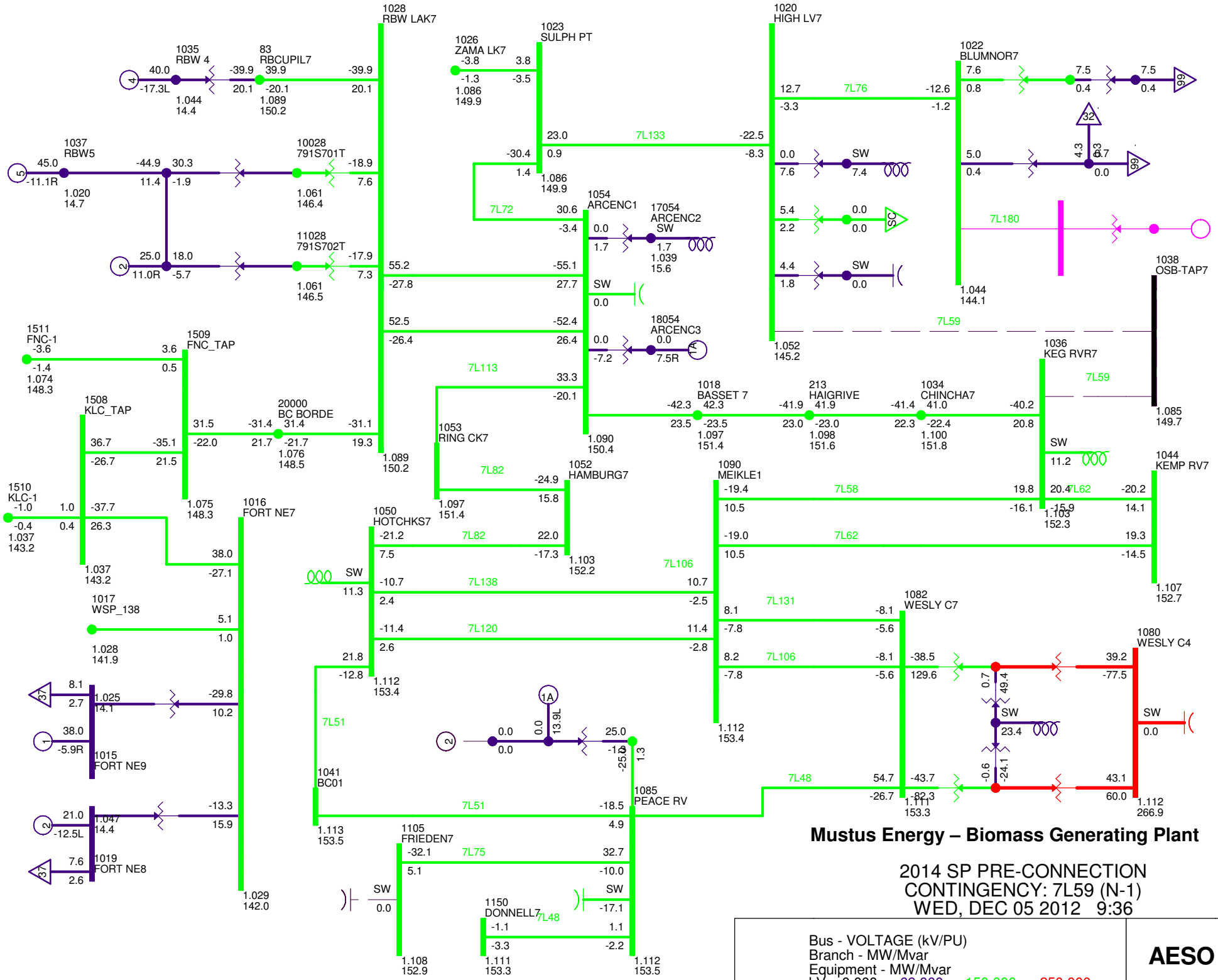


Mustus Energy – Biomass Generating Plant

2014 SP PRE-CONNECTION
CONTINGENCY: 7L140 (N-1)
WED, DEC 05 2012 9:35

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO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RBW 4
83
RBCUPIL7
1026
ZAMA LK7
1023
SULPH PT
1020
HIGH LV7
1022
BLUMNOR7
1037
RBW5
10028
791S701T
11028
791S702T
1054
ARCENC1
17054
ARCENC2
SW
18054
ARCENC3
7L72
7L133
7L76
7L180
7L59
1038
OSB-TAP7
1511
FNC-1
1509
FNC_TAP
1508
KLC_TAP
20000
BC BORDE
1053
RING CK7
7L113
1018
BASSET 7
213
HAIGRIVE
1034
CHINCHA7
1036
KEG RVR7
1044
KEMP RV7
1510
KLC-1
1016
FORT NE7
1052
HAMBURG7
1050
HOTCHKS7
7L82
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MEIKLE1
7L58
7L62
1082
WESLY C7
1080
WESLY C4
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WSP_138
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1015
FORT NE9
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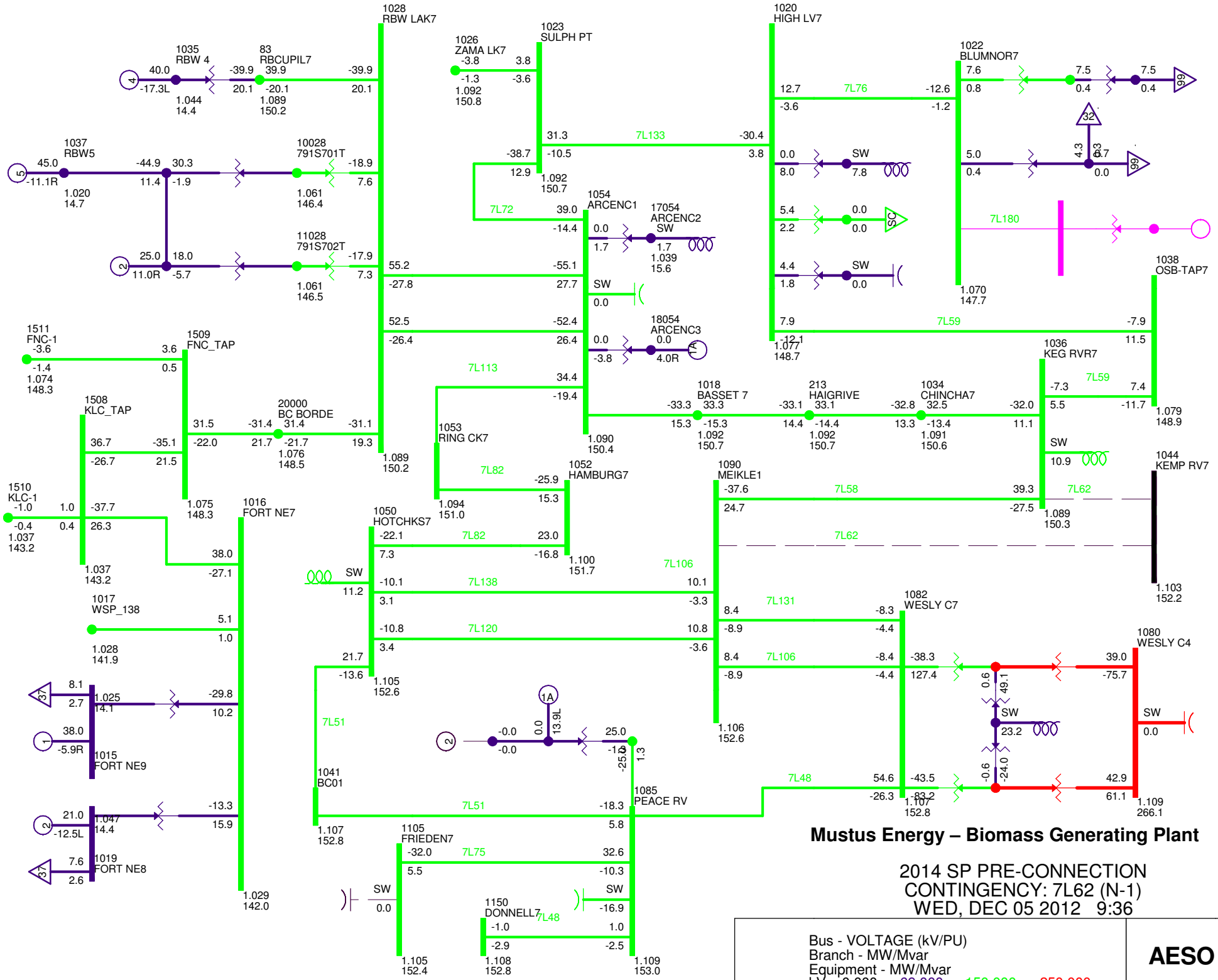
1019
FORT NE8
1041
BC01
7L51
1085
PEACE RV
7L48
1105
FRIEDEN7
7L75
1150
DONNELL7
1089
150.2
1090
150.4
1052
145.2
1044
144.1
1085
149.7
1107
152.7
1112
153.4
1112
266.9
1029
142.0
1113
153.5
1108
152.9
1111
153.3
1112
153.5
Mustus Energy – Biomass Generating Plant
2014 SP PRE-CONNECTION
CONTINGENCY: 7L59 (N-1)
WED, DEC 05 2012 9:36
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO

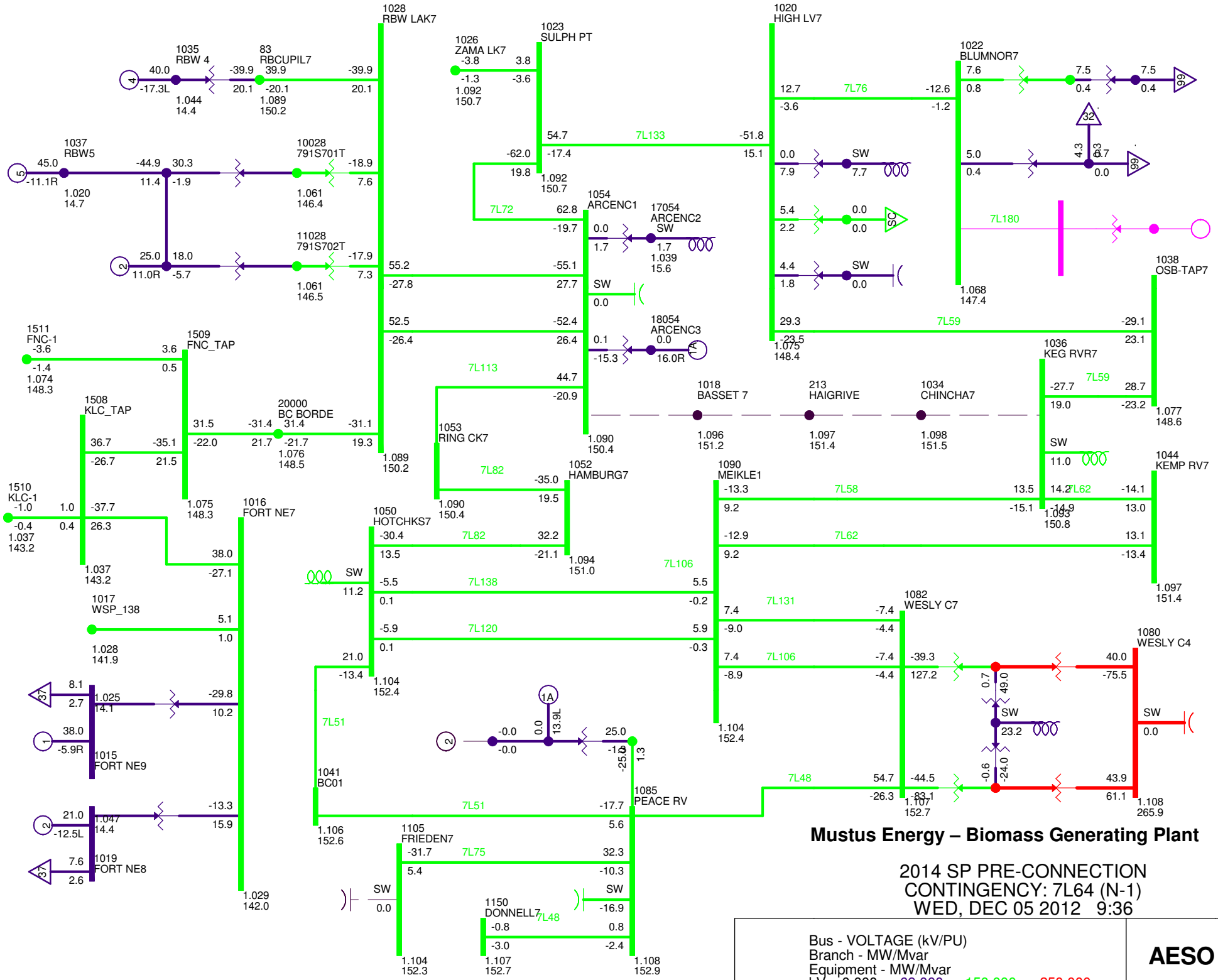


Mustus Energy – Biomass Generating Plant

2014 SP PRE-CONNECTION
CONTINGENCY: 7L62 (N-1)
WED, DEC 05 2012 9:36

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO

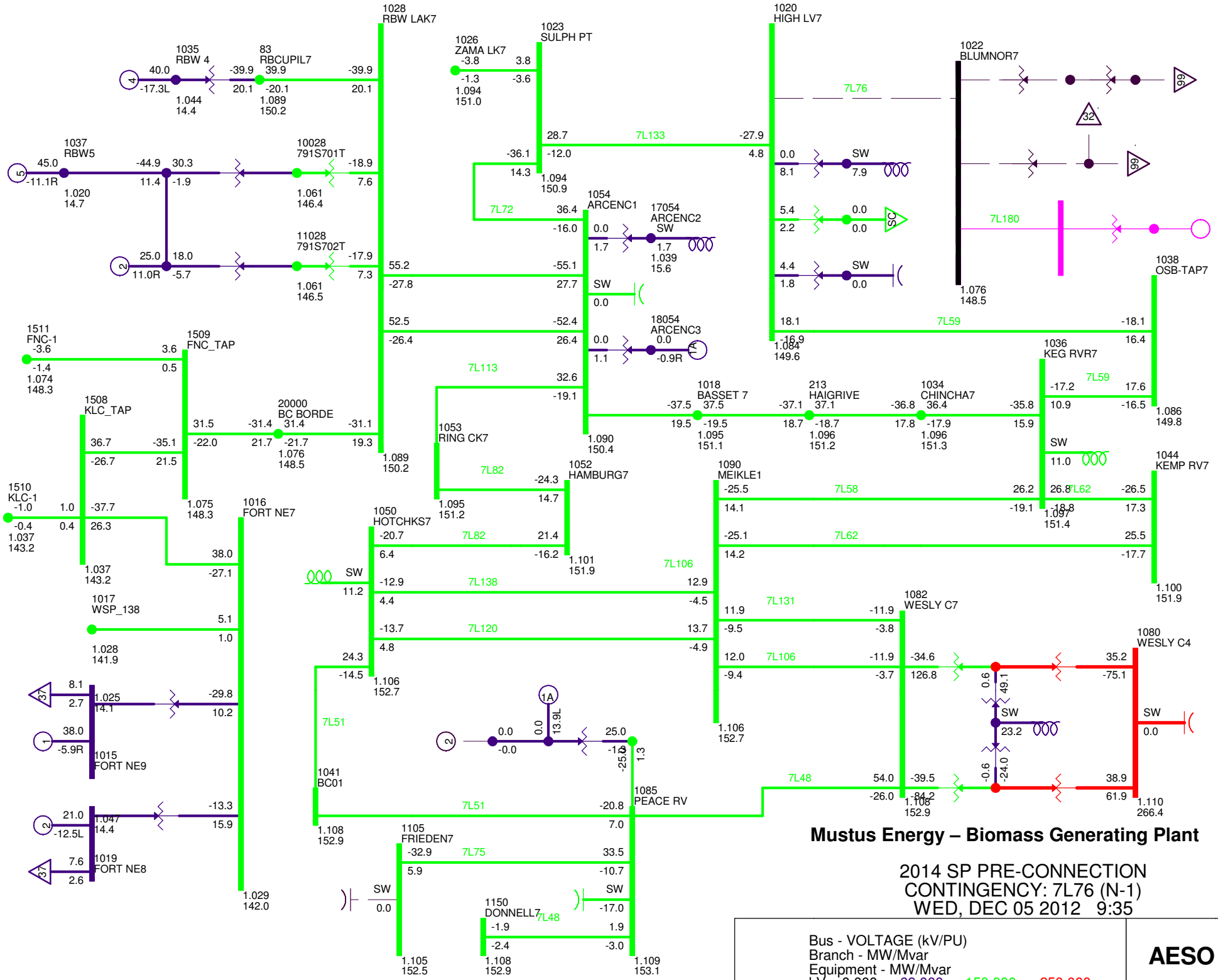


Mustus Energy – Biomass Generating Plant

2014 SP PRE-CONNECTION
CONTINGENCY: 7L64 (N-1)
WED, DEC 05 2012 9:36

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO


1028
RBW LAK7
1035
RBW 4
83
RBCUPIL7
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ZAMA LK7
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SULPH PT
1020
HIGH LV7
1022
BLUMNOR7
1037
RBW5
10028
791S701T
11028
791S702T
1054
ARCENC1
17054
ARCENC2
SW
18054
ARCENC3
7L72
7L133
7L76
7L180
7L59
1038
OSB-TAP7
1511
FNC-1
1509
FNC_TAP
1508
KLC_TAP
20000
BC BORDE
1053
RING CK7
7L113
1018
BASSET 7
213
HAIGRIVE
1034
CHINCHA7
1036
KEG RVR7
1044
KEMP RV7
1510
KLC-1
1052
HAMBURG7
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MEIKLE1
7L58
7L62
1050
HOTCHKS7
7L106
7L138
7L120
7L131
1082
WESLY C7
1080
WESLY C4
1017
WSP_138
1016
FORT NE7
1025
1015
FORT NE9
1047
1019
FORT NE8
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7L51
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BC01
1085
PEACE RV
7L48
1105
FRIEDEN7
7L75
1150
DONNELL7
1029
142.0
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148.3
1089
150.2
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149.6
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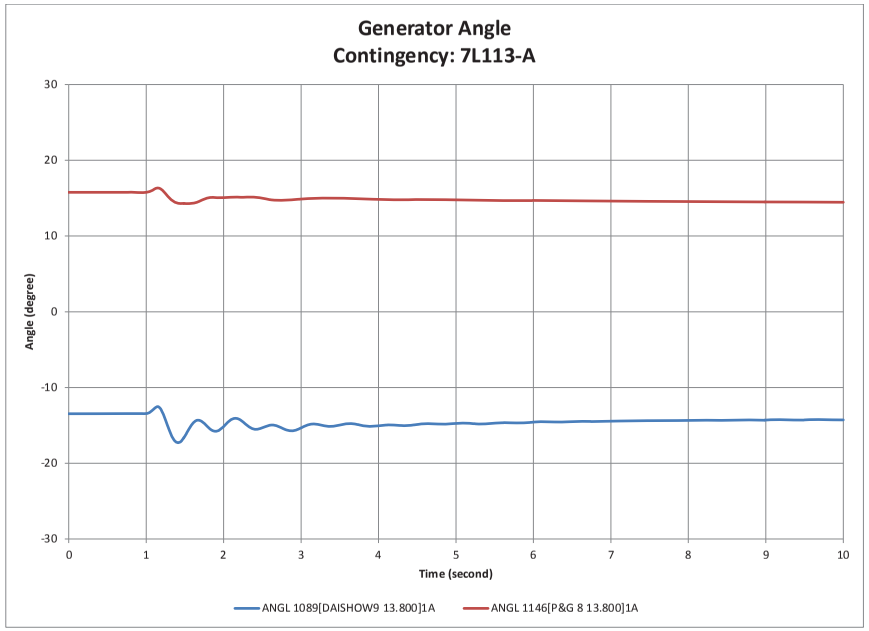
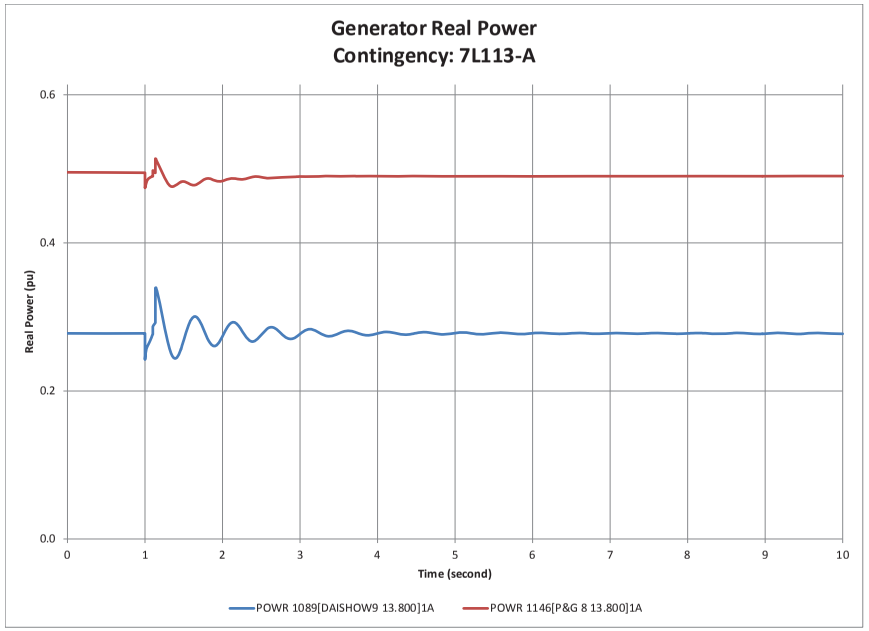
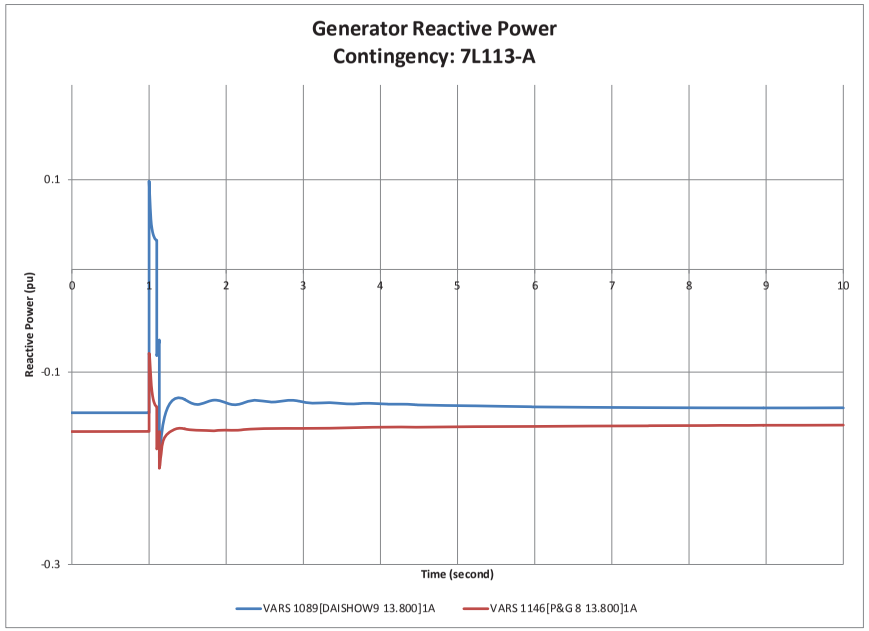
151.4
1100
151.9
1106
152.7
1101
151.9
1108
152.9
1110
266.4
1105
152.5
1109
153.1
Mustus Energy – Biomass Generating Plant
2014 SP PRE-CONNECTION
CONTINGENCY: 7L76 (N-1)
WED, DEC 05 2012 9:35
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO

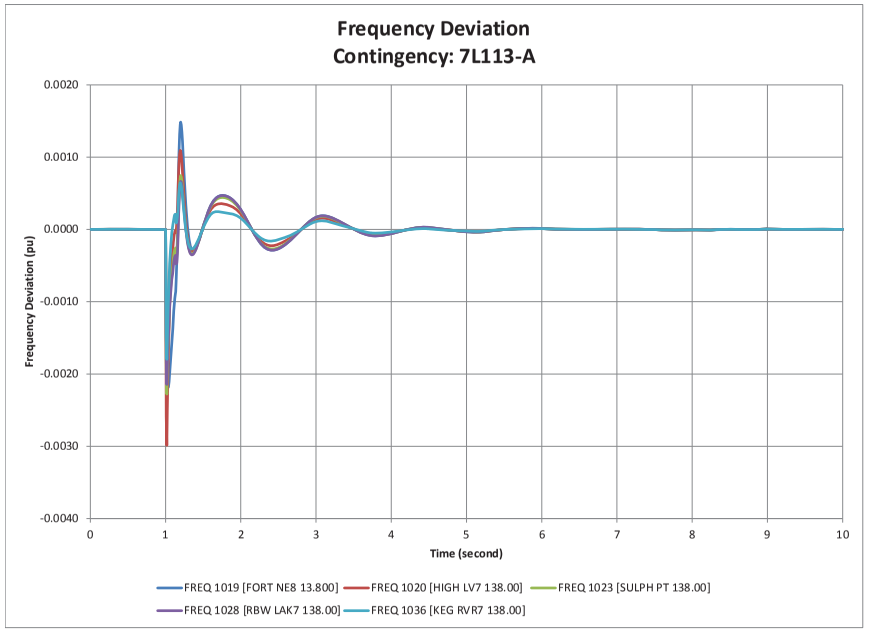
Attachment B-1

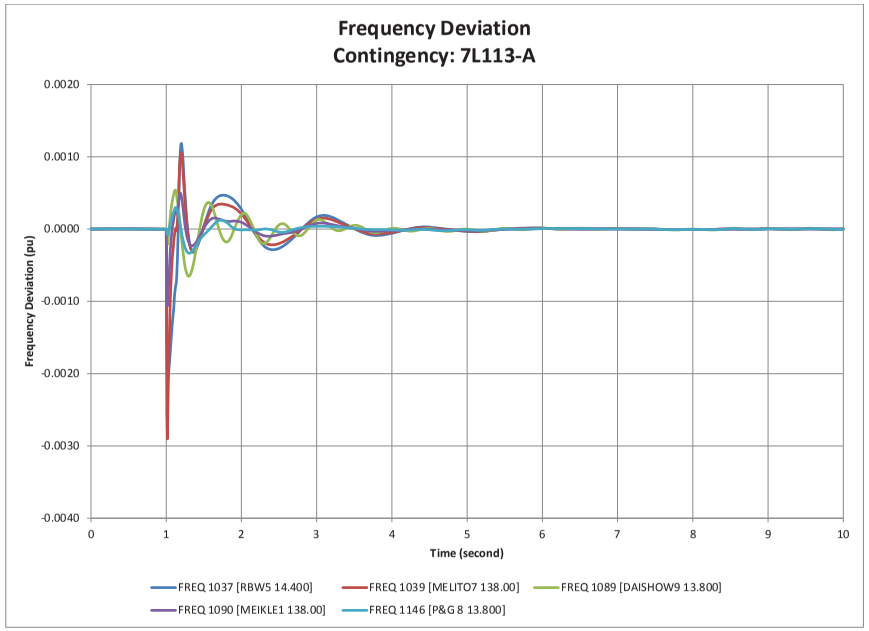
Pre-Connection Transient Stability Analysis Results (2013-2014 WP)

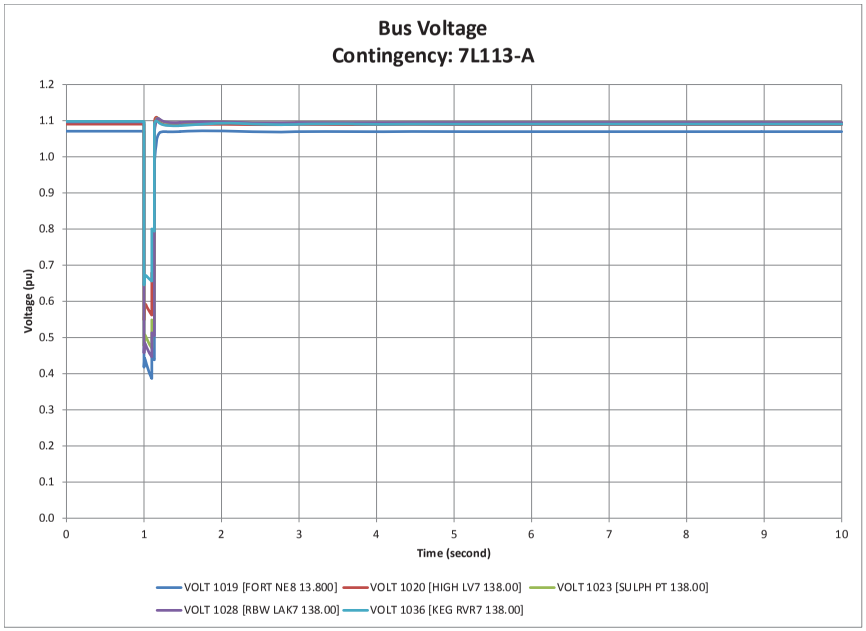

Generator Angle
Contingency: 7L113-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

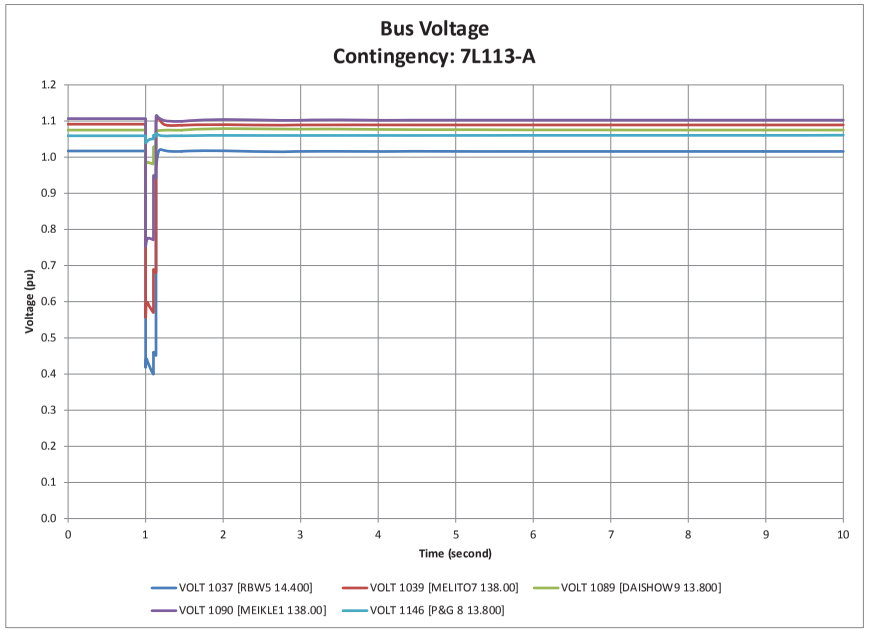

Generator Real Power
Contingency: 7L113-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

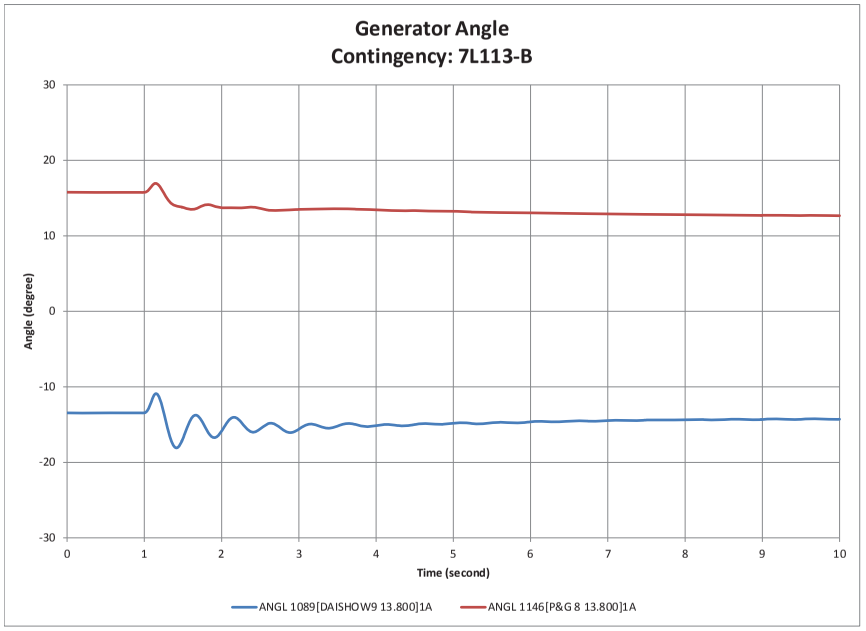

Generator Reactive Power
Contingency: 7L113-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

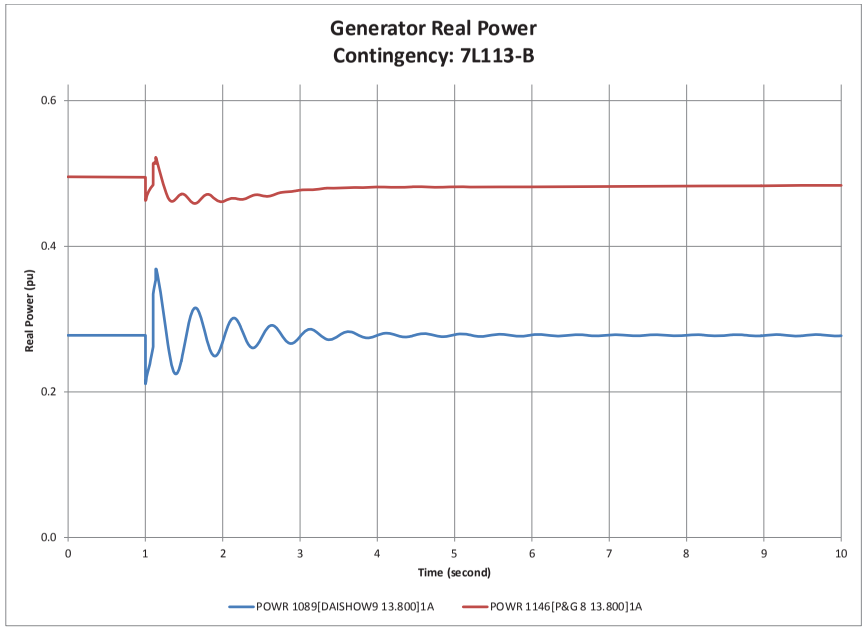

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

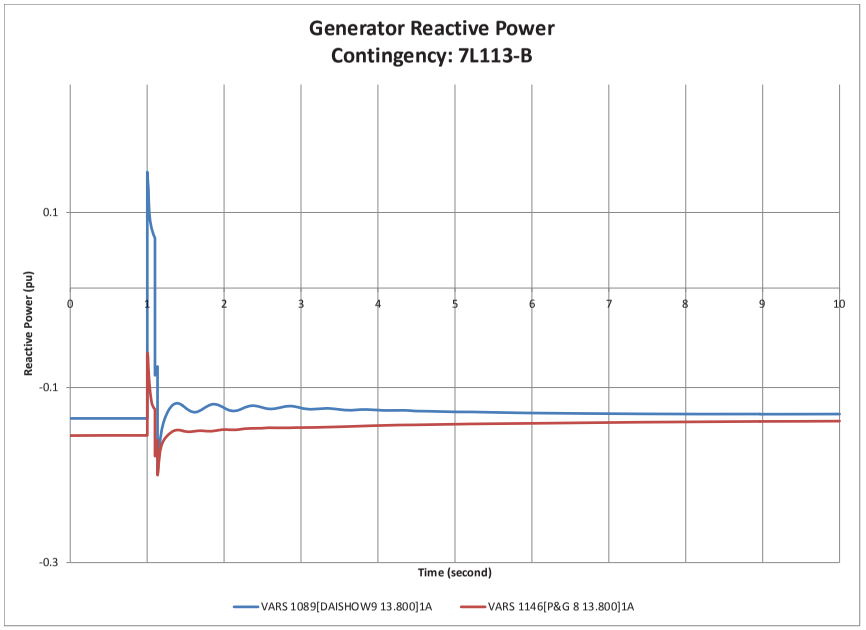

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

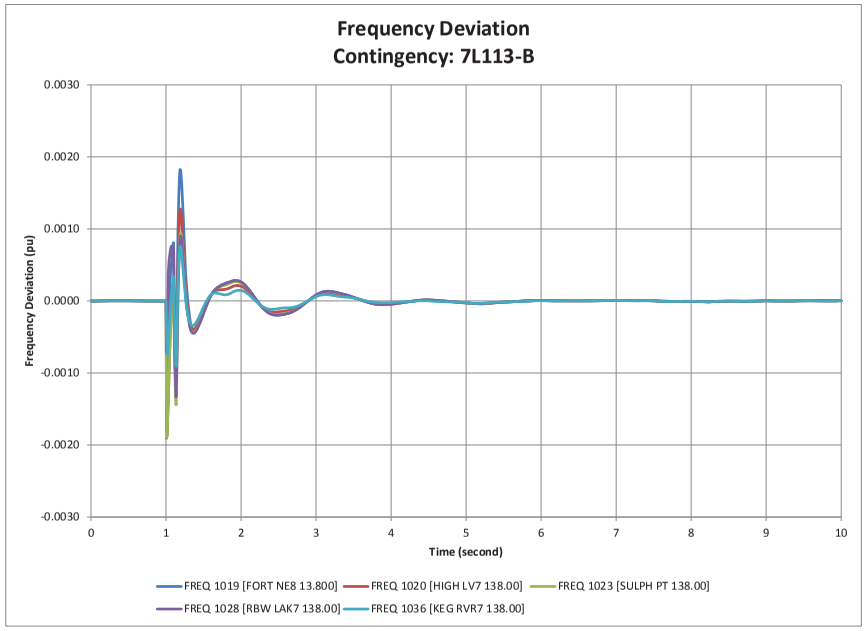

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

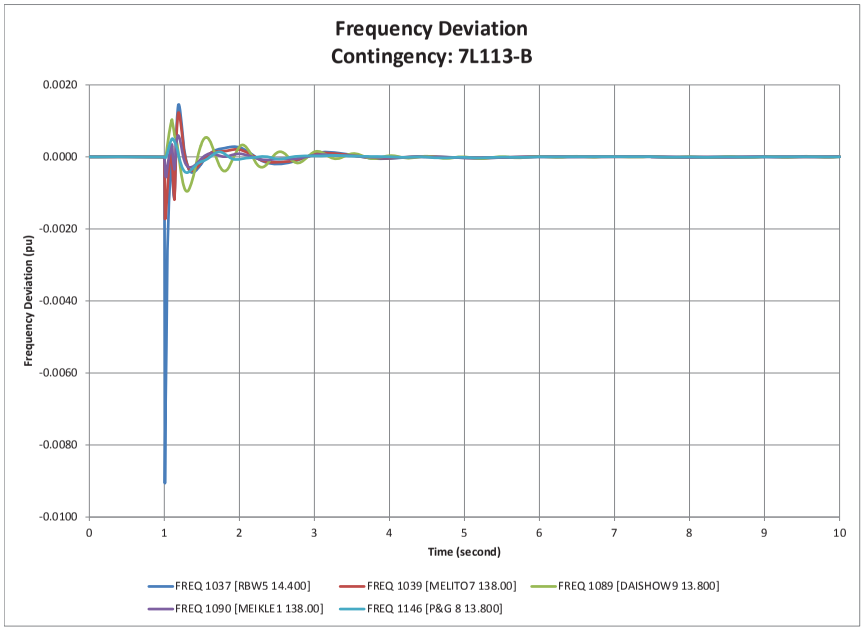

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

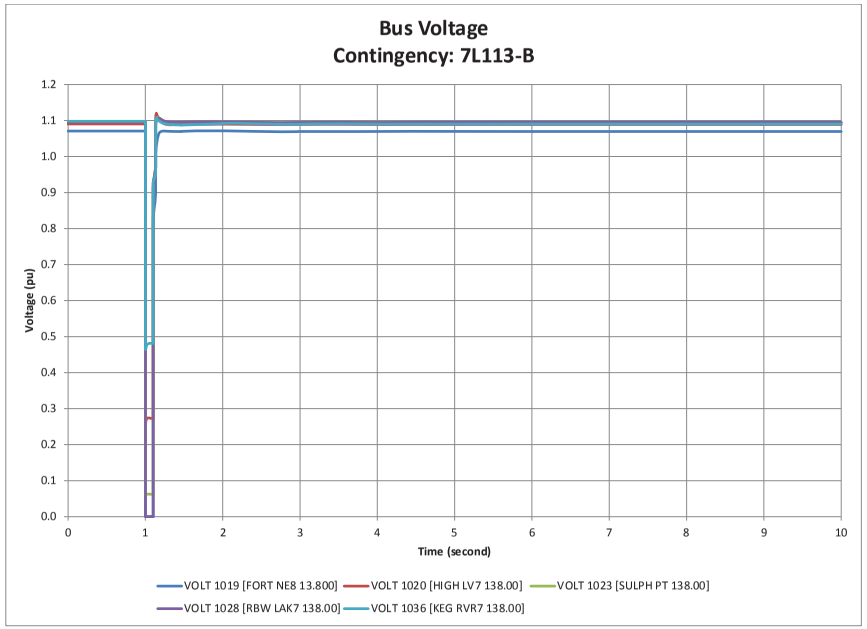

Generator Angle
Contingency: 7L113-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

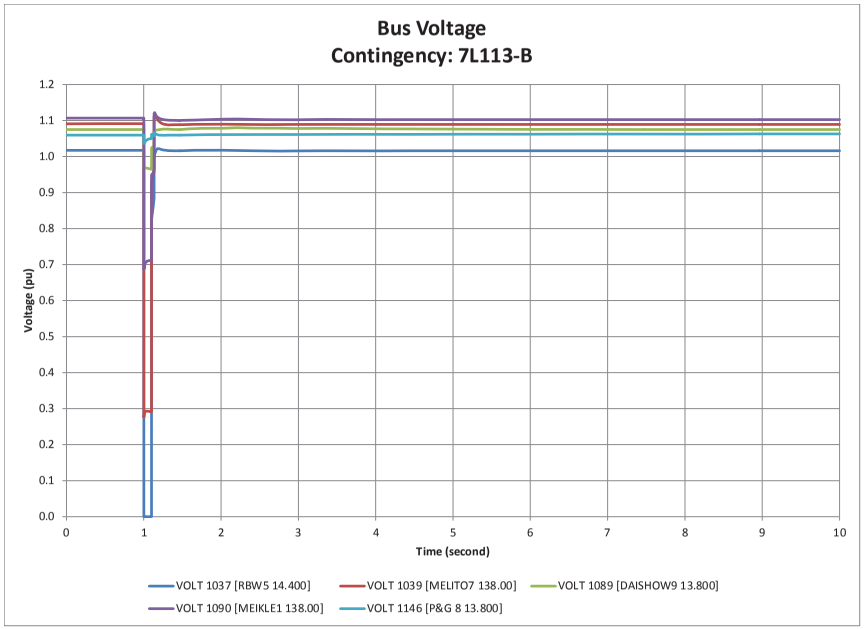

Generator Real Power
Contingency: 7L113-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

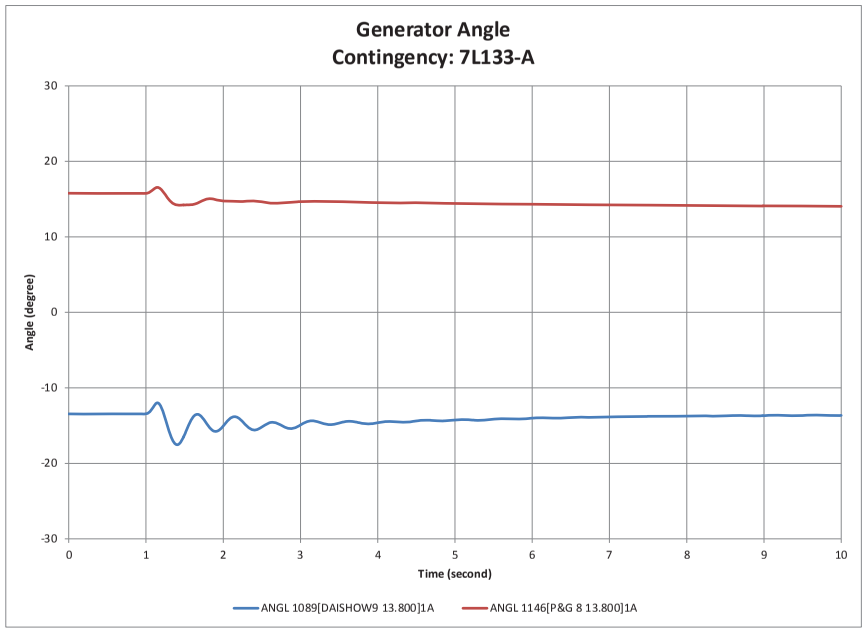

Generator Reactive Power
Contingency: 7L113-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

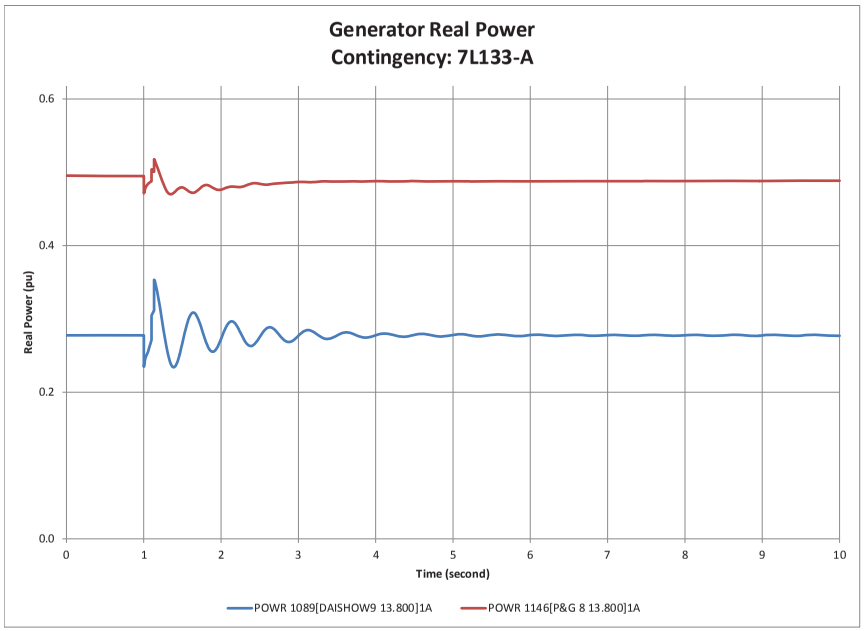

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

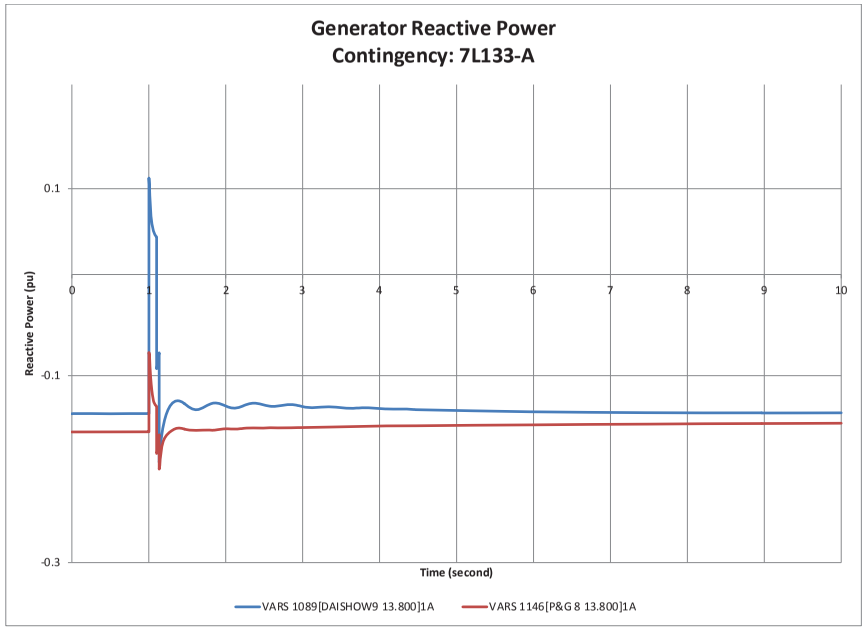

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

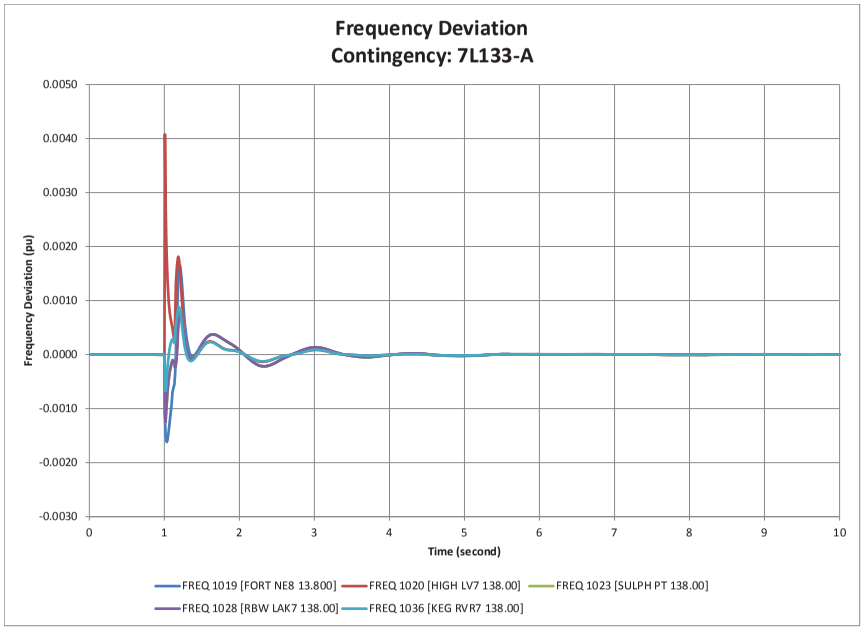

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

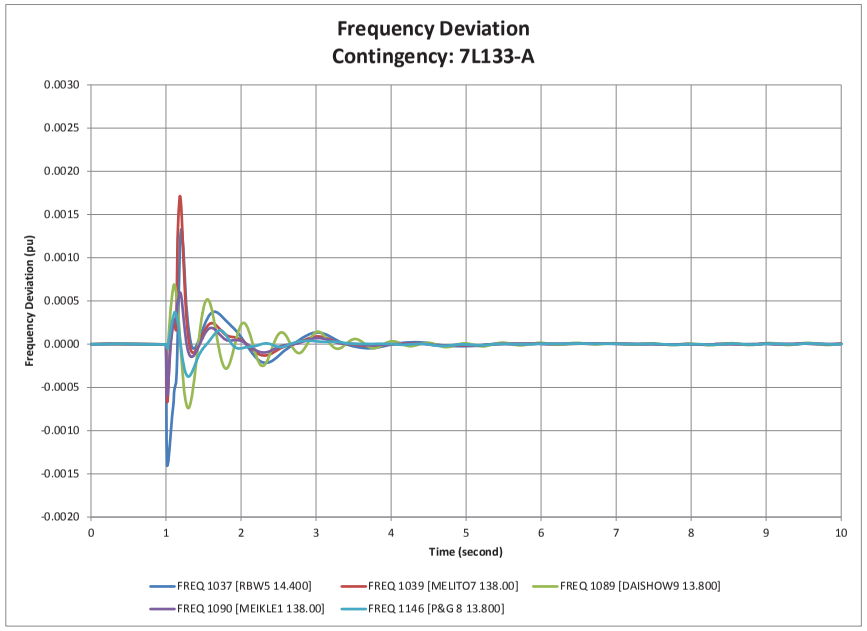

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

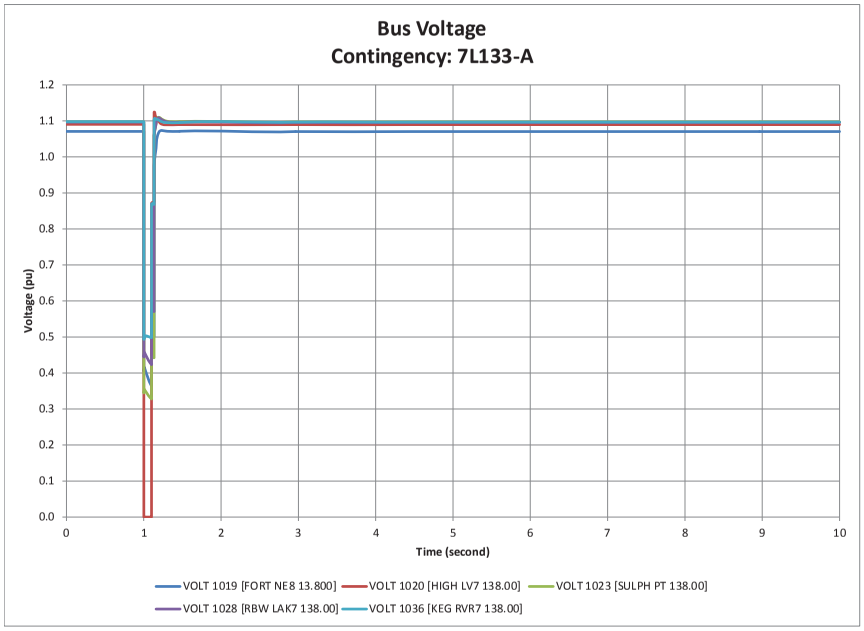

Generator Angle
Contingency: 7L133-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

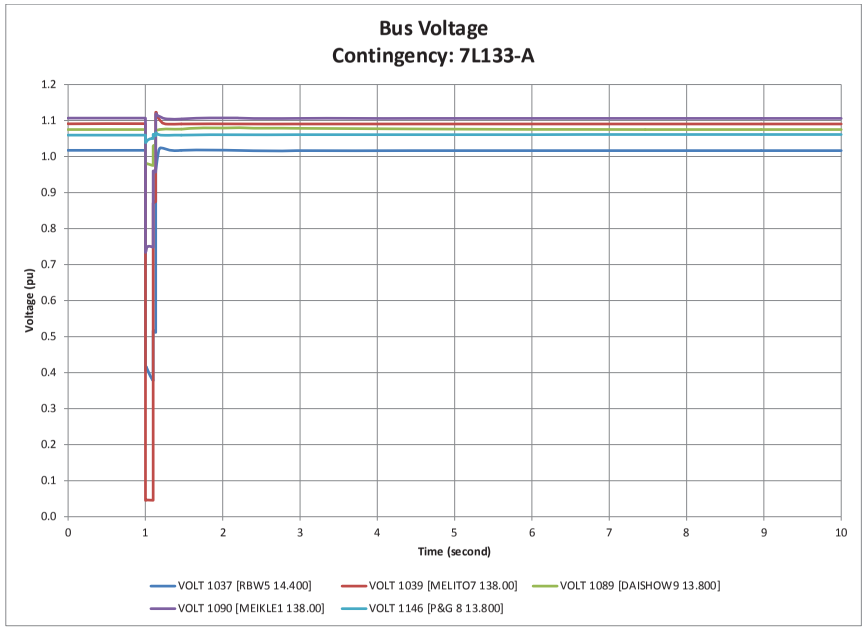

Generator Real Power
Contingency: 7L133-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

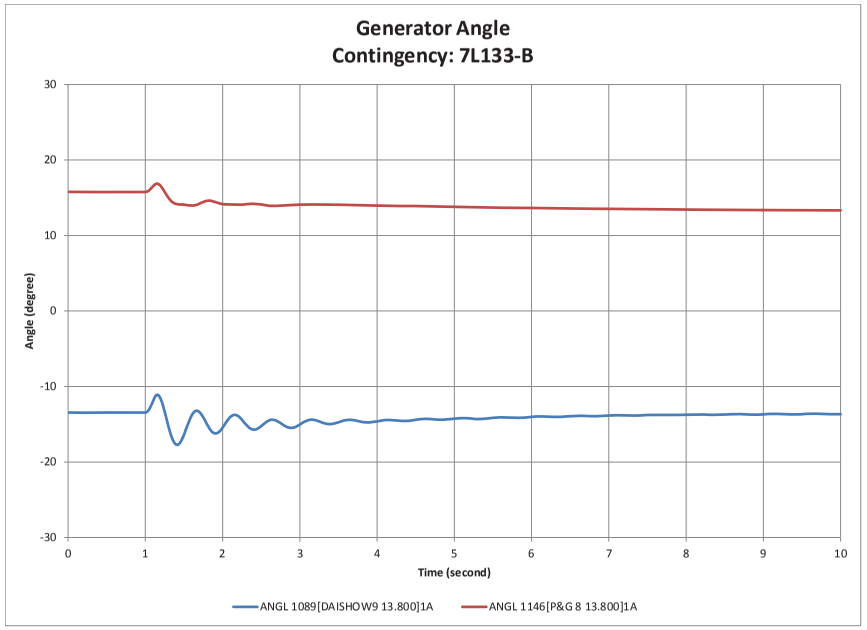

Generator Reactive Power
Contingency: 7L133-A
Reactive Power (pu)
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

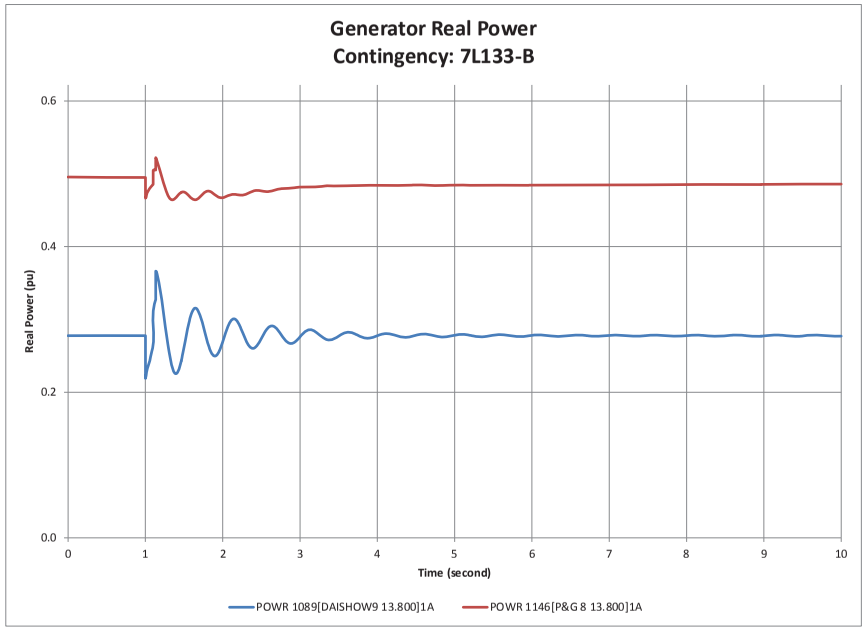

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

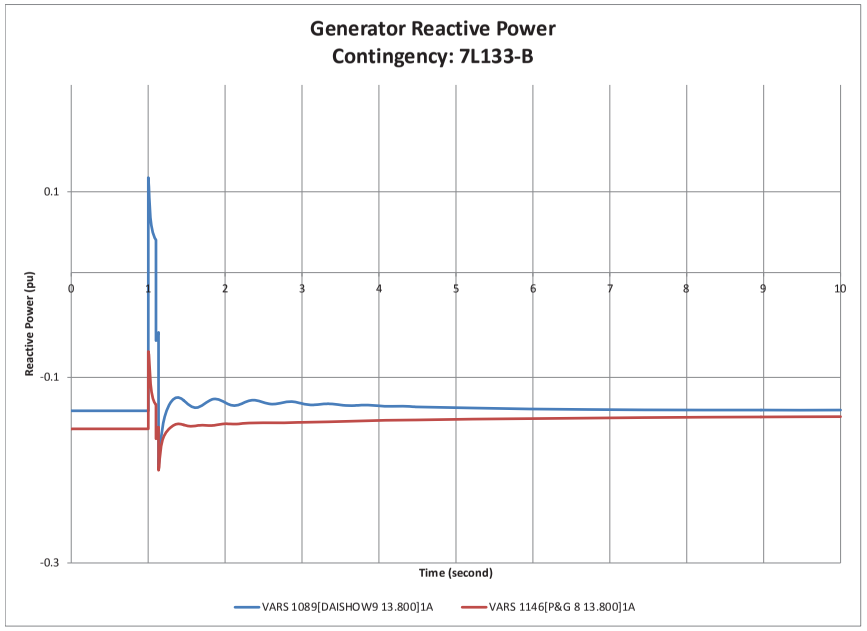

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
-0.0005
-0.0010
-0.0015
-0.0020
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

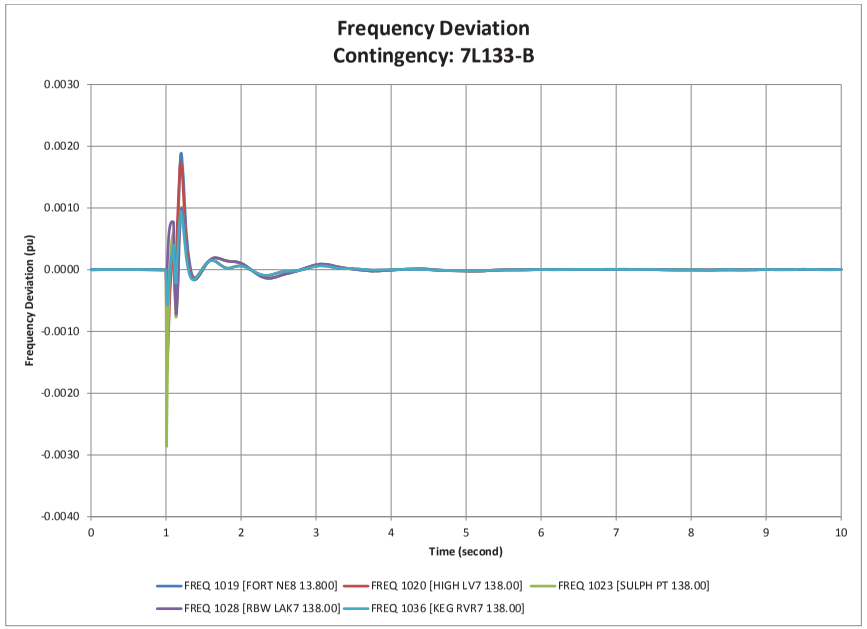

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

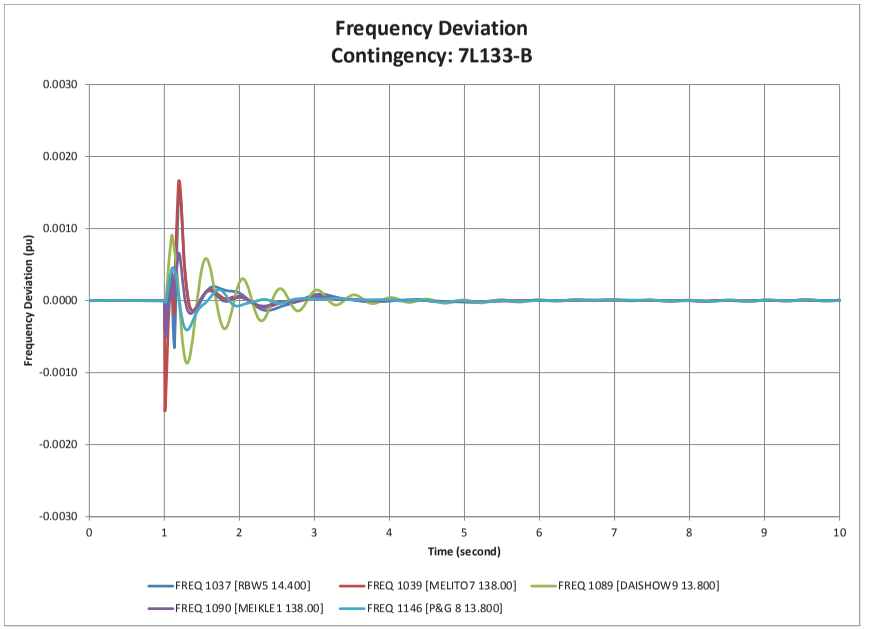

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

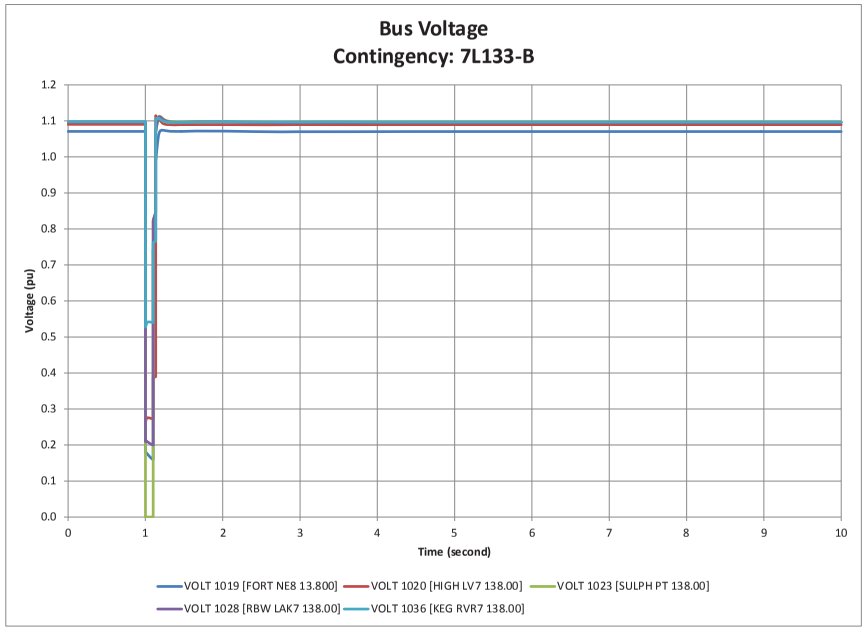

Generator Angle
Contingency: 7L133-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

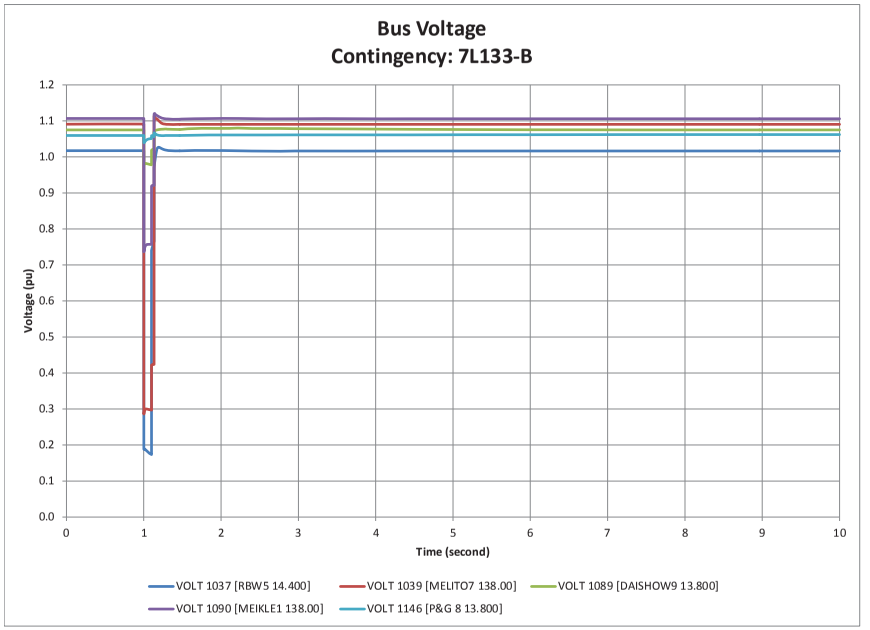

Generator Real Power
Contingency: 7L133-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

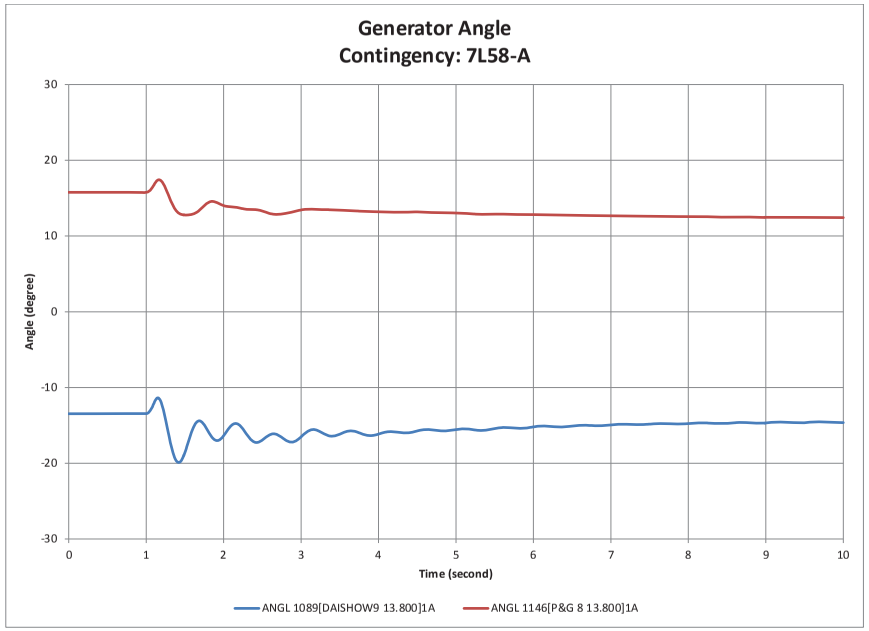

Generator Reactive Power
Contingency: 7L133-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

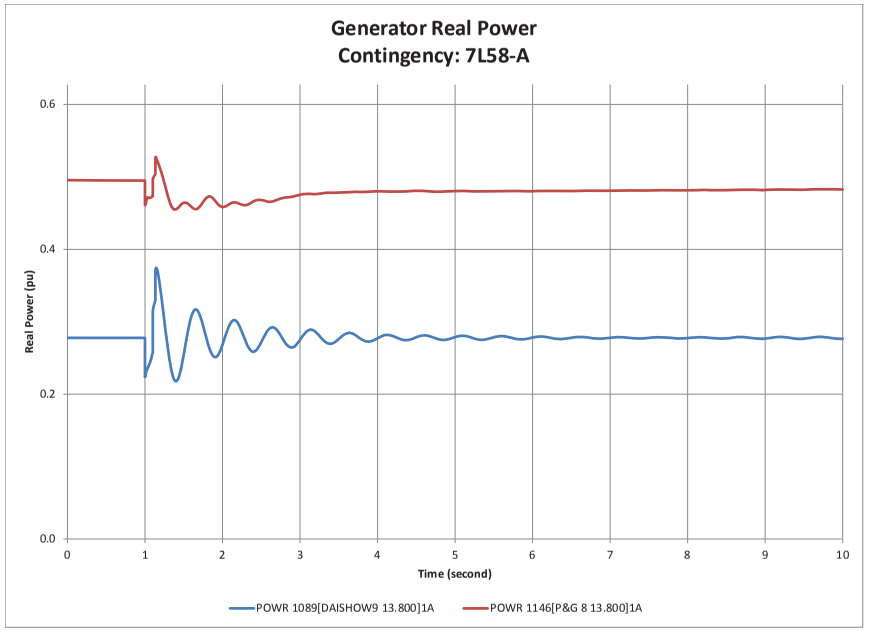

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

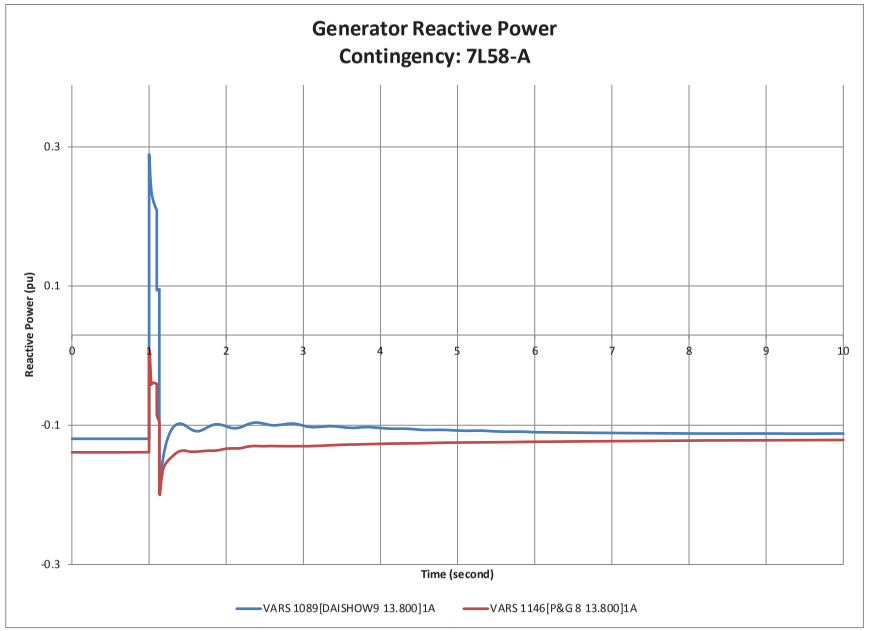

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

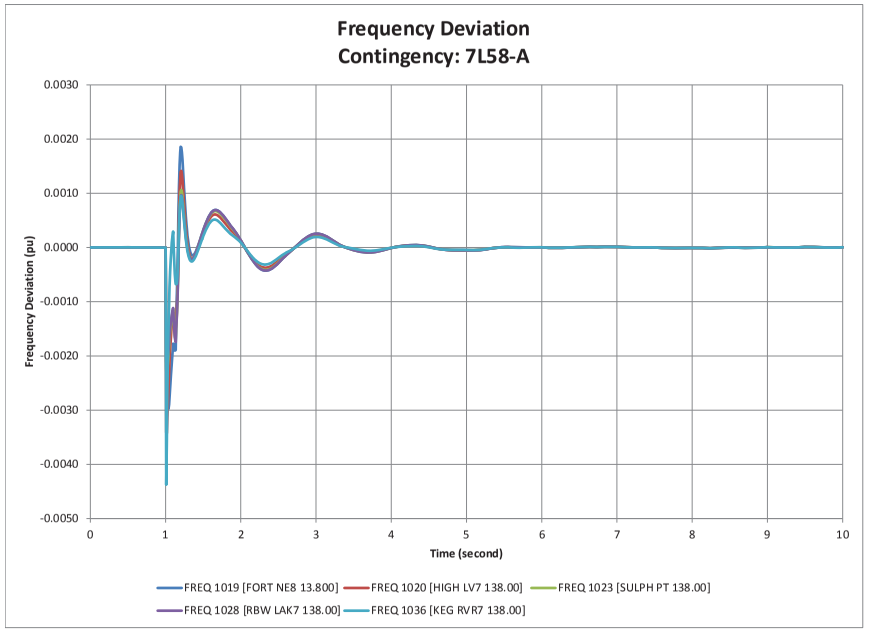

Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

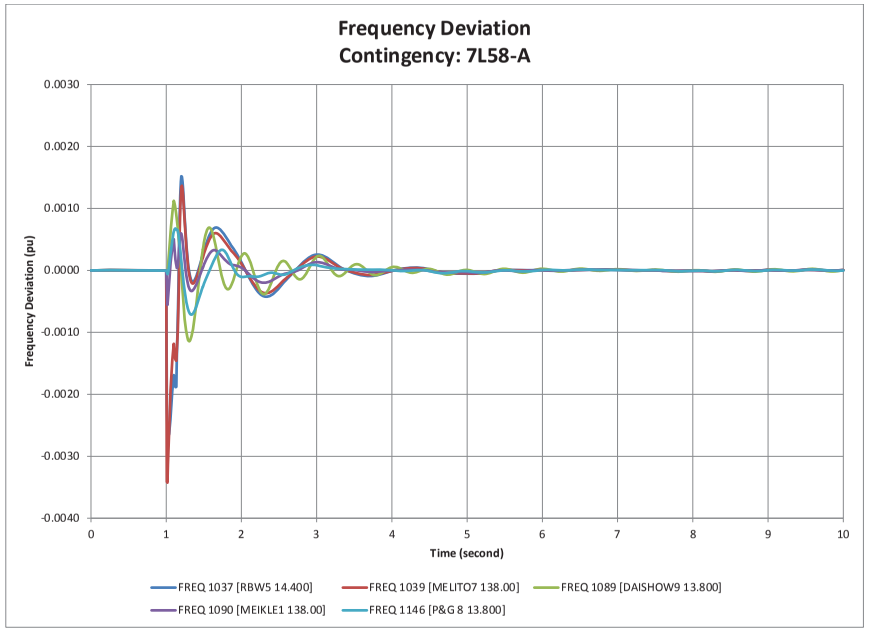

Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

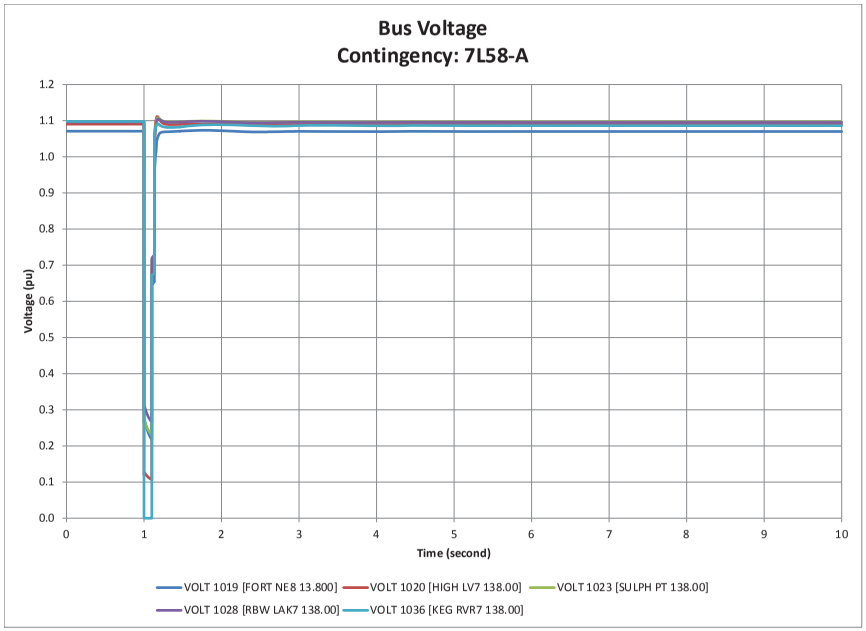

Generator Angle
Contingency: 7L58-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

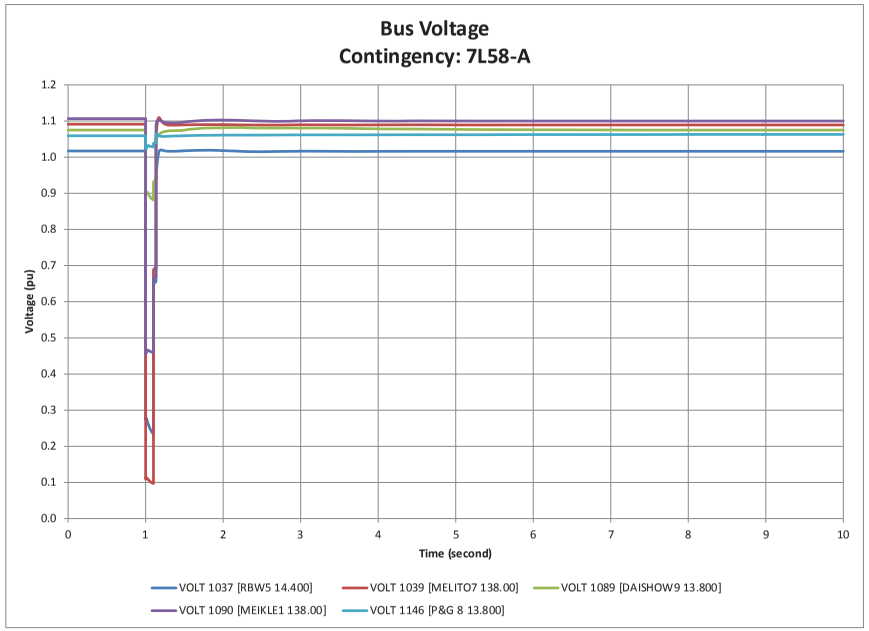

Generator Real Power
Contingency: 7L58-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

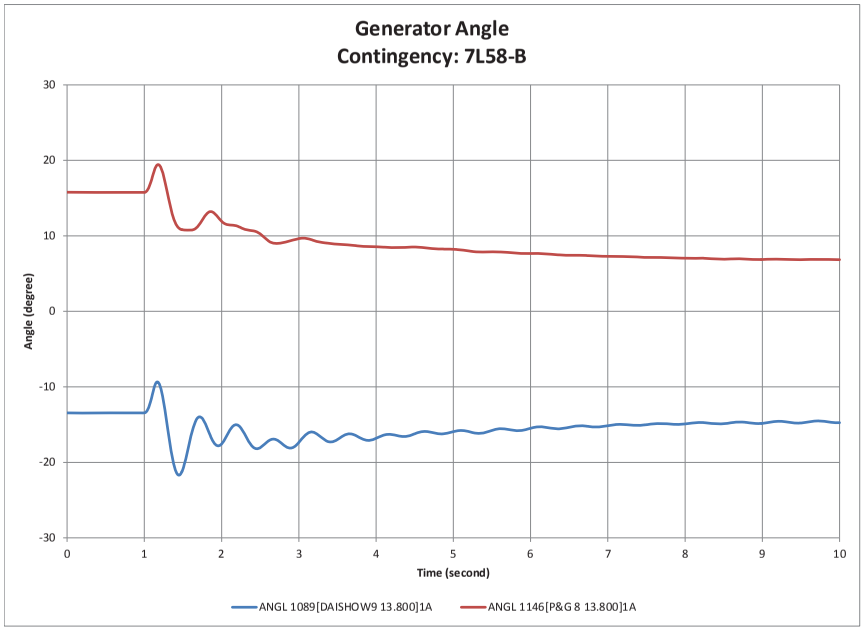

Generator Reactive Power
Contingency: 7L58-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

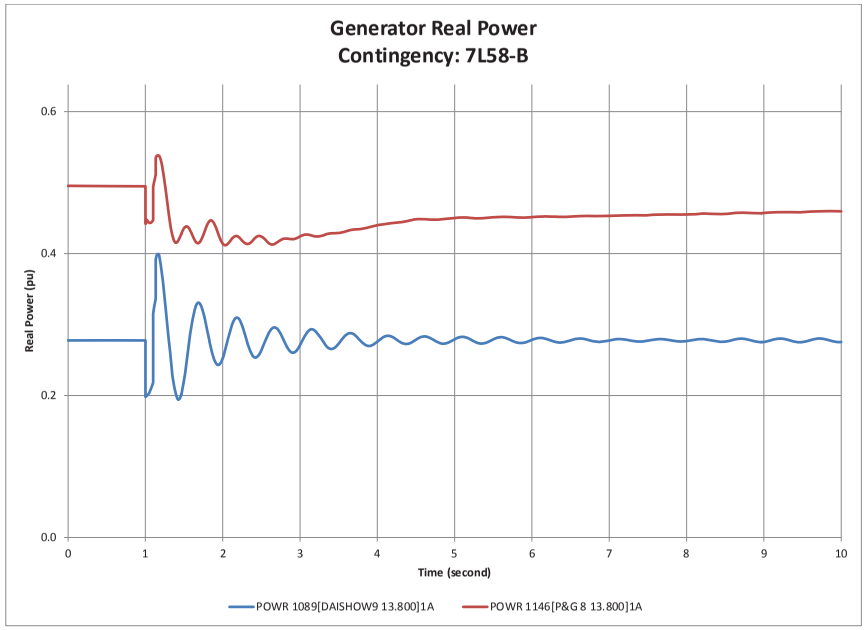

Frequency Deviation
Contingency: 7L58-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

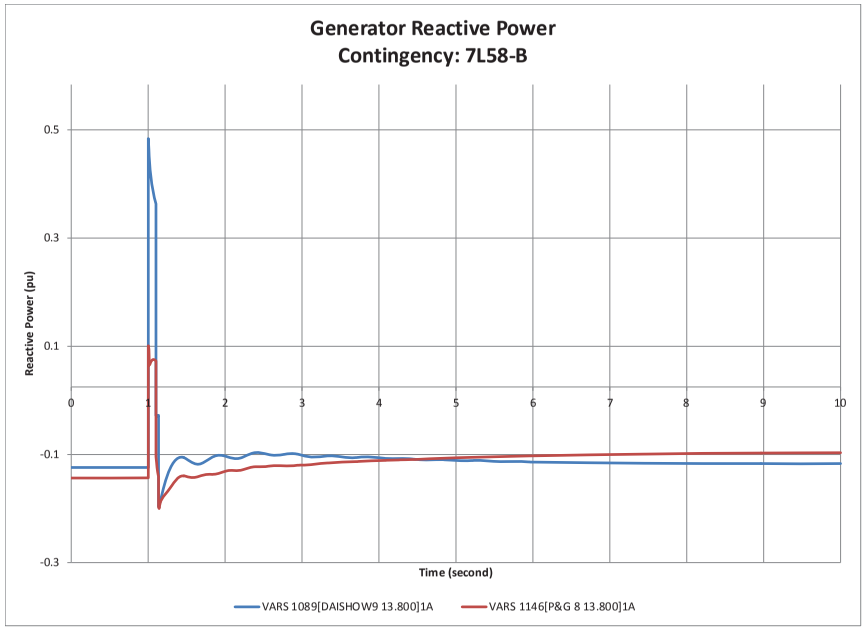

Frequency Deviation
Contingency: 7L58-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

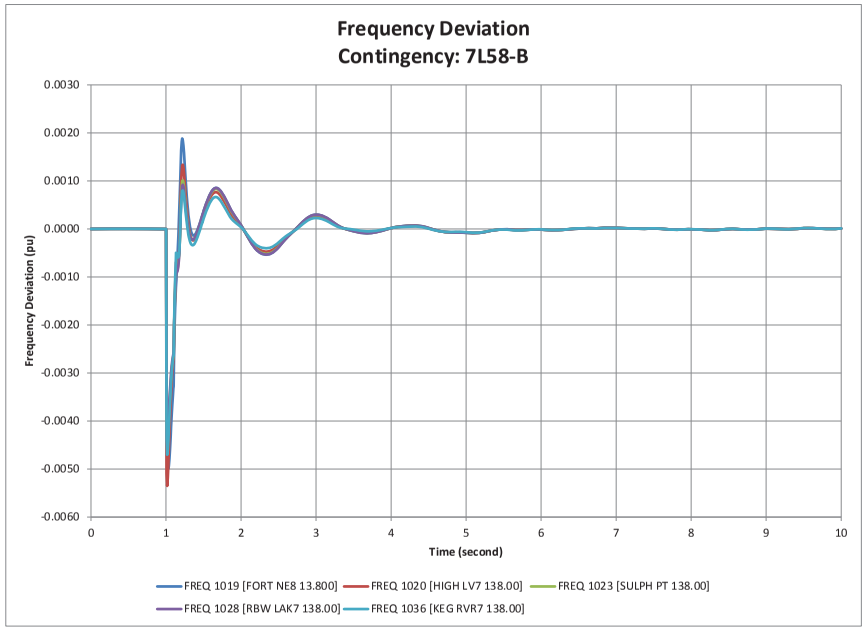

Bus Voltage
Contingency: 7L58-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

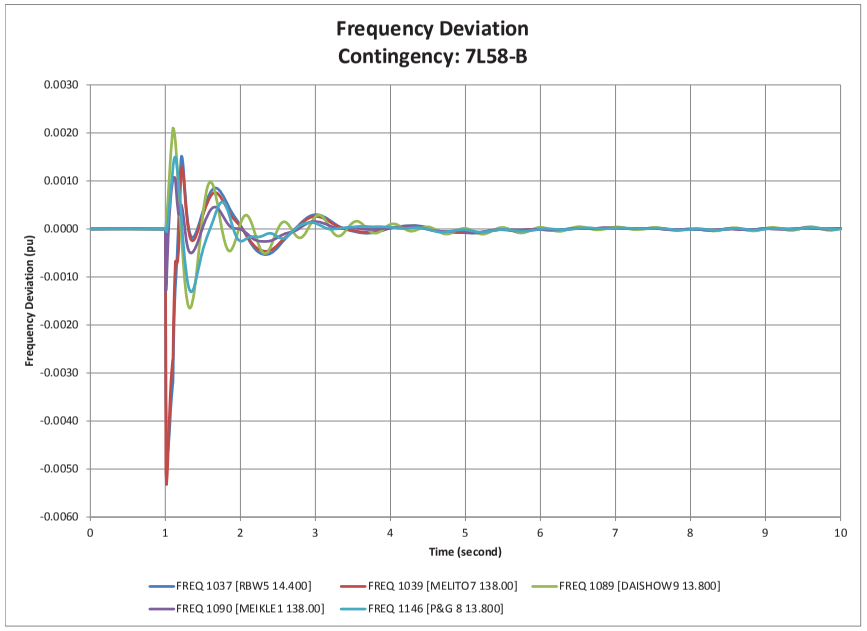

Bus Voltage
Contingency: 7L58-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

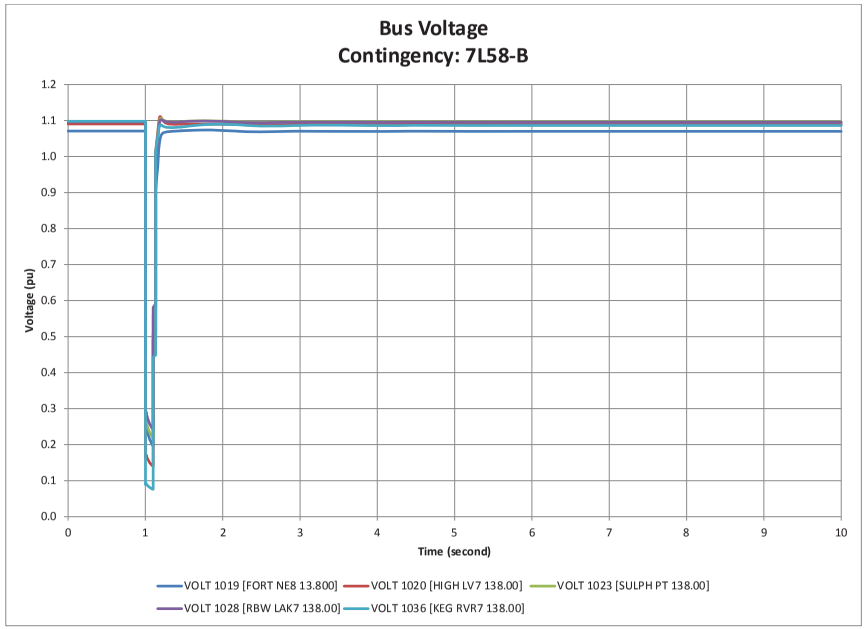

Generator Angle
Contingency: 7L58-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

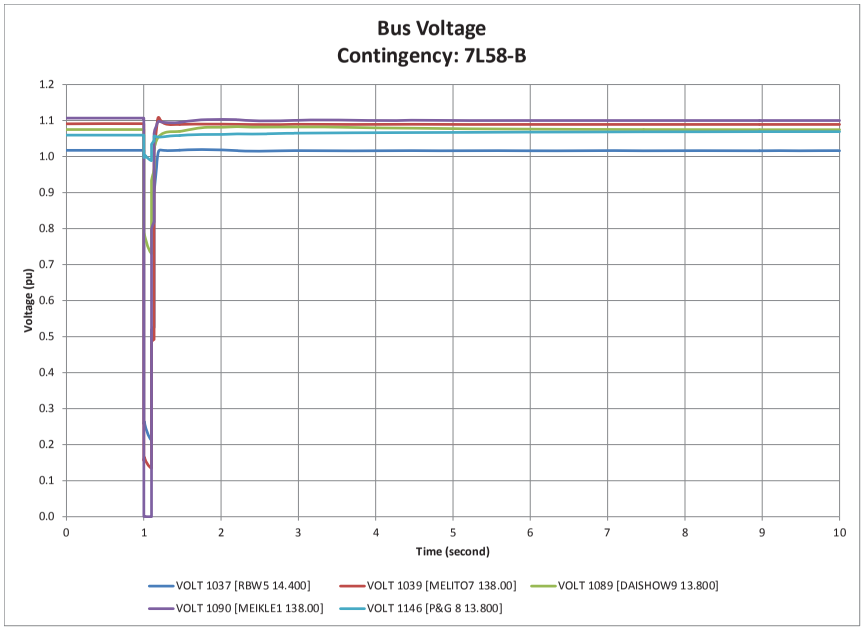

Generator Real Power
Contingency: 7L58-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

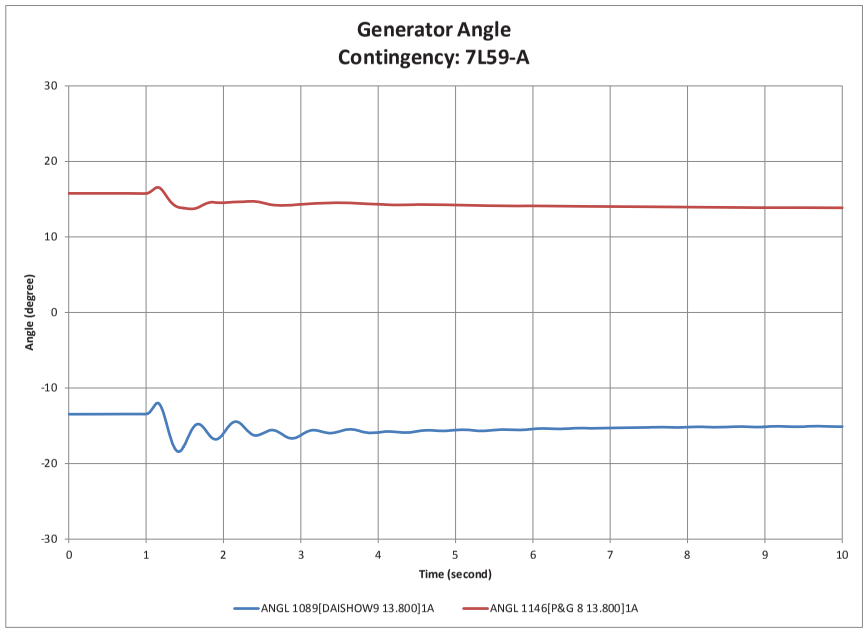

Generator Reactive Power
Contingency: 7L58-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

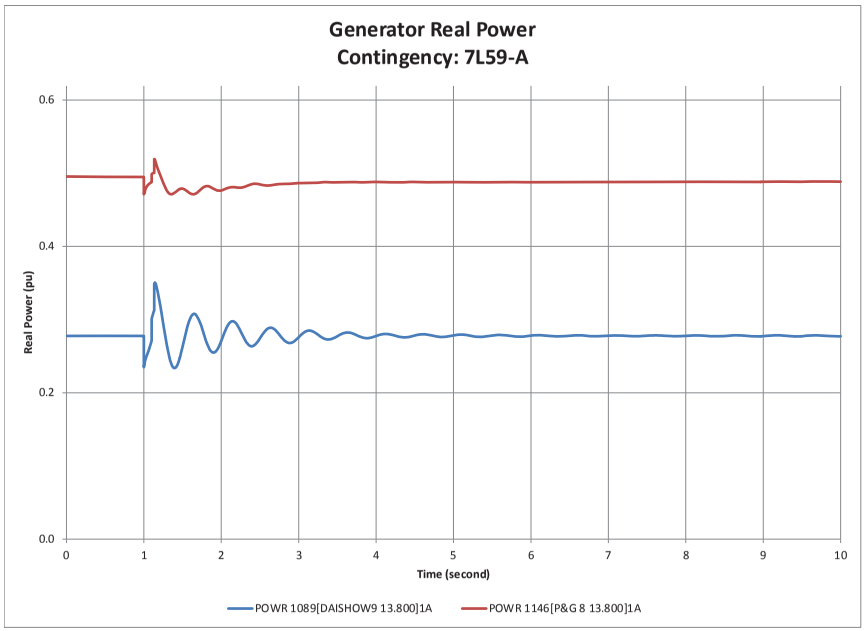

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

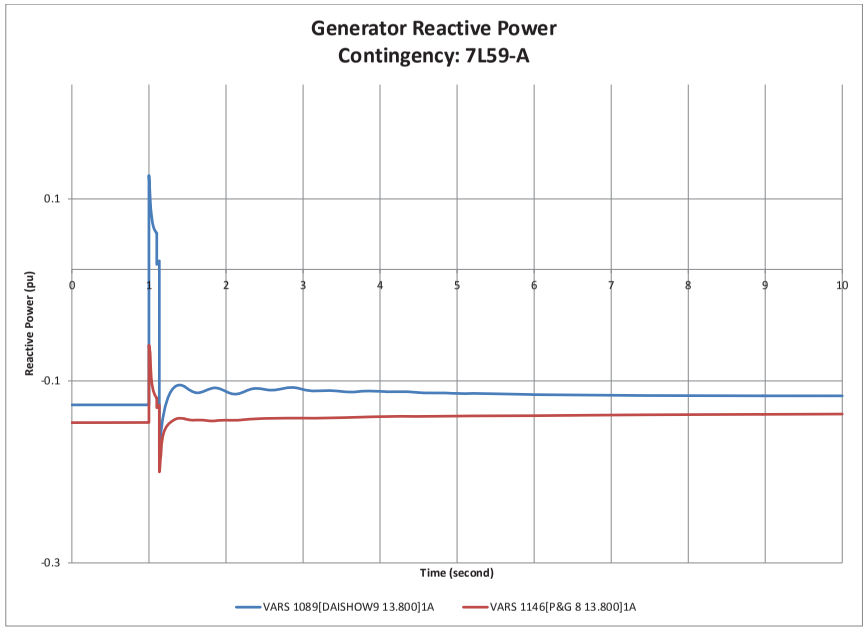

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

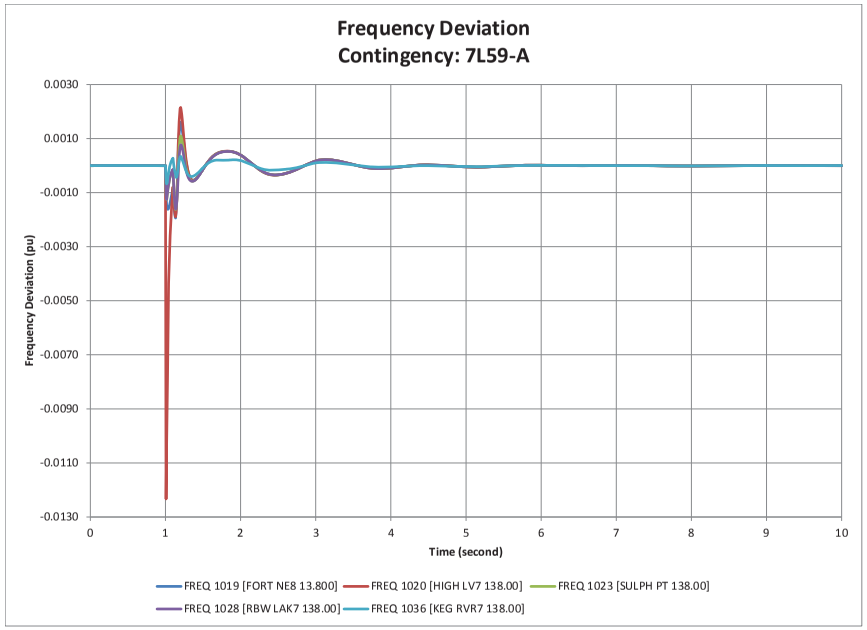

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

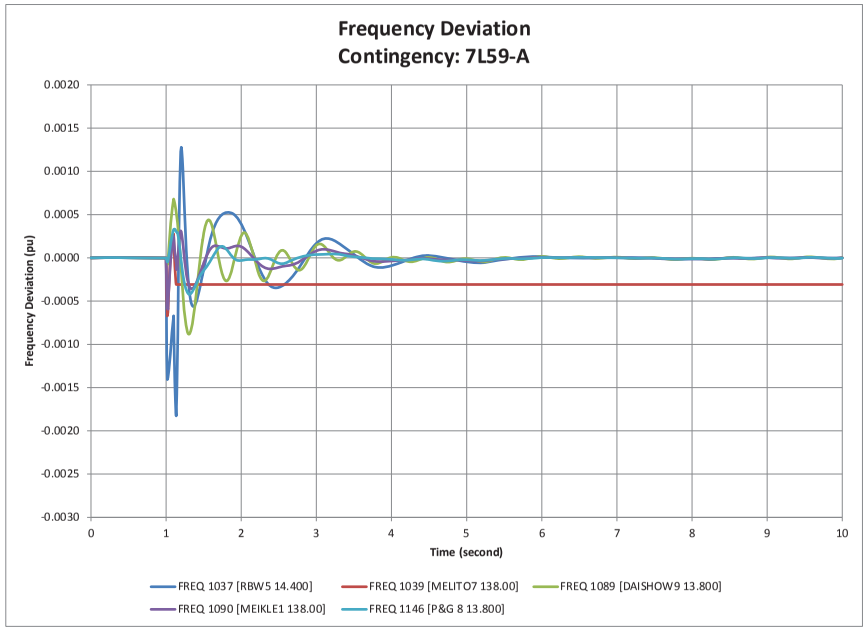

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

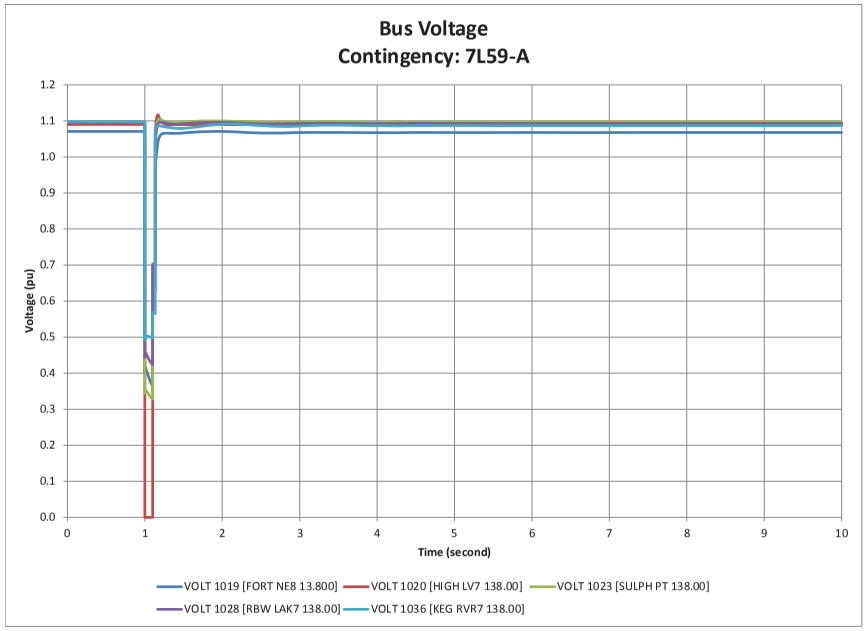

Generator Angle
Contingency: 7L59-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

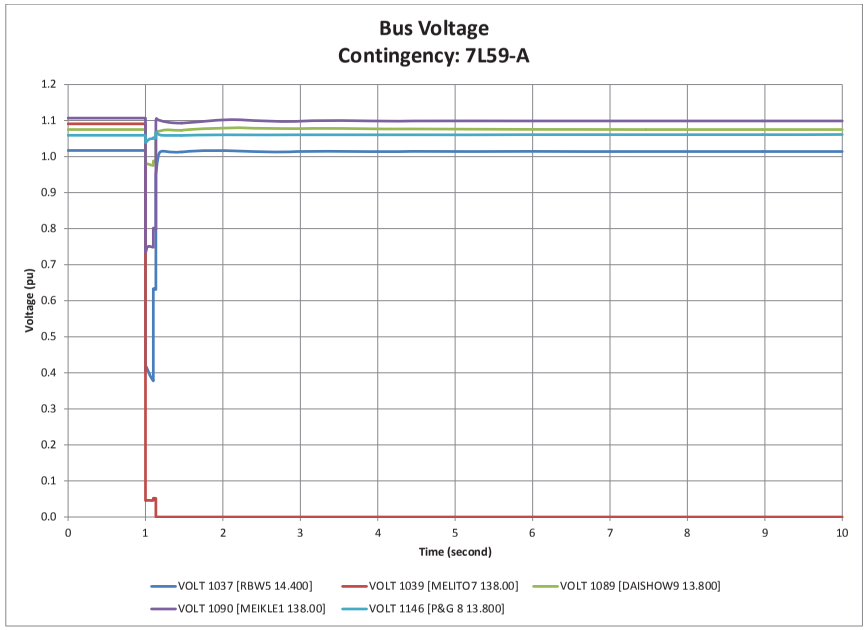

Generator Real Power
Contingency: 7L59-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

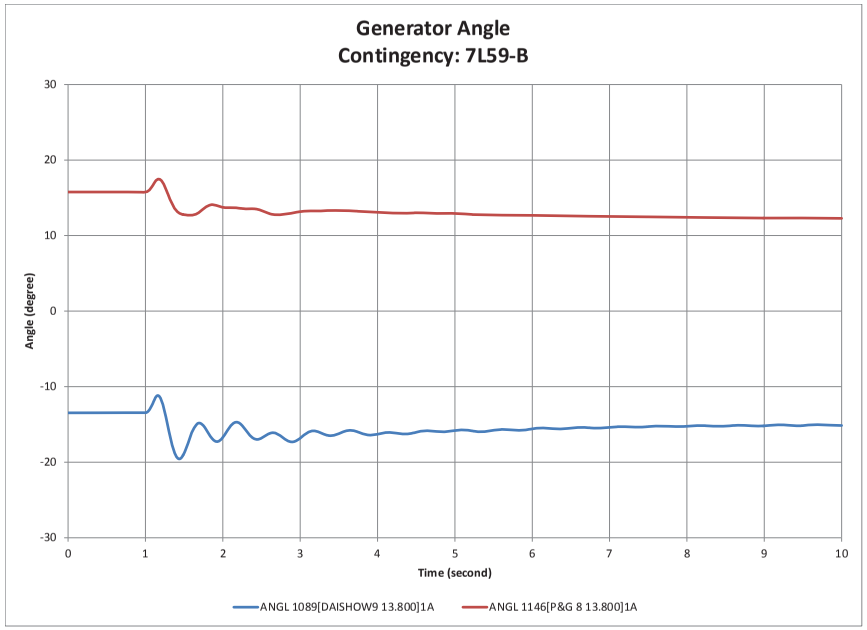

Generator Reactive Power
Contingency: 7L59-A
Reactive Power (pu)
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

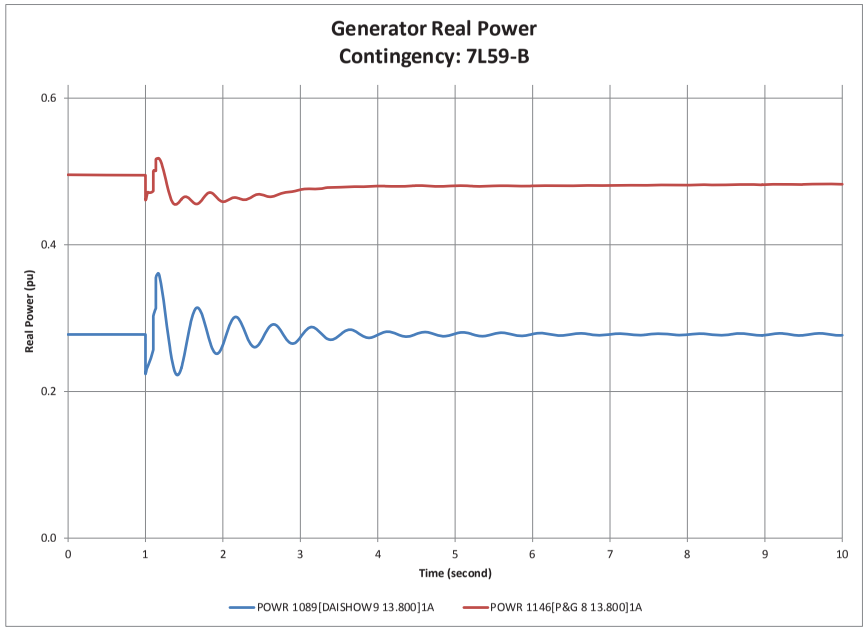

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
0.0030
0.0010
-0.0010
-0.0030
-0.0050
-0.0070
-0.0090
-0.0110
-0.0130
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

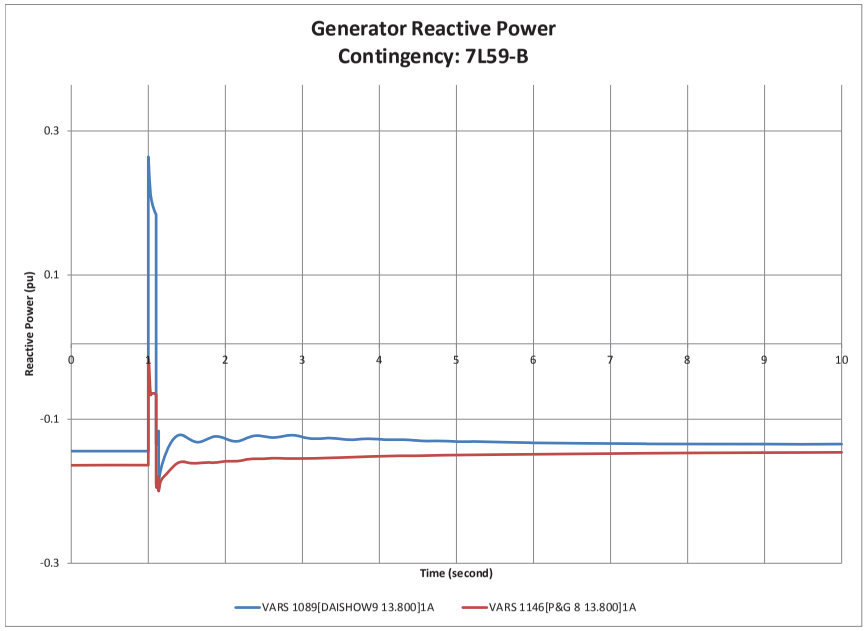

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
0.0020
0.0015
0.0010
0.0005
0.0000
-0.0005
-0.0010
-0.0015
-0.0020
-0.0025
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

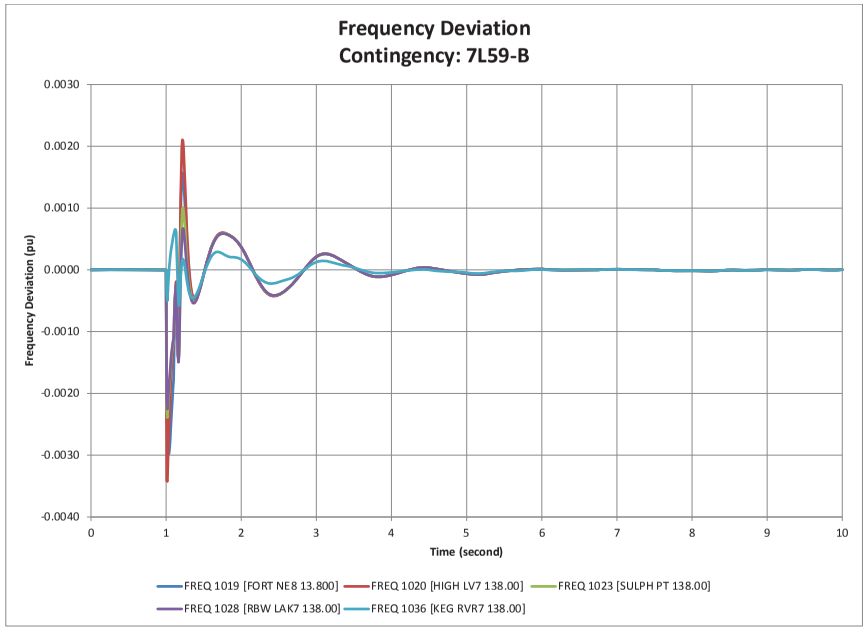

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

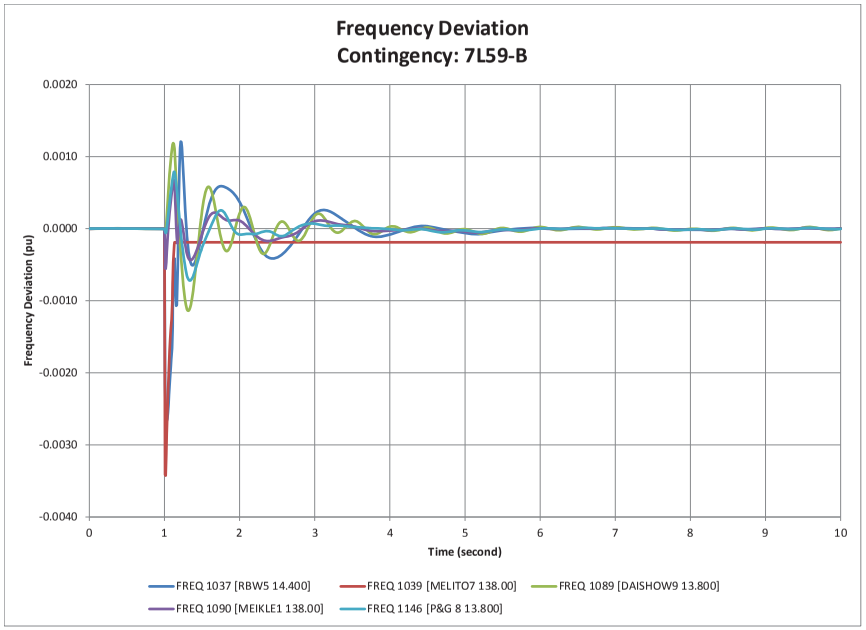

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

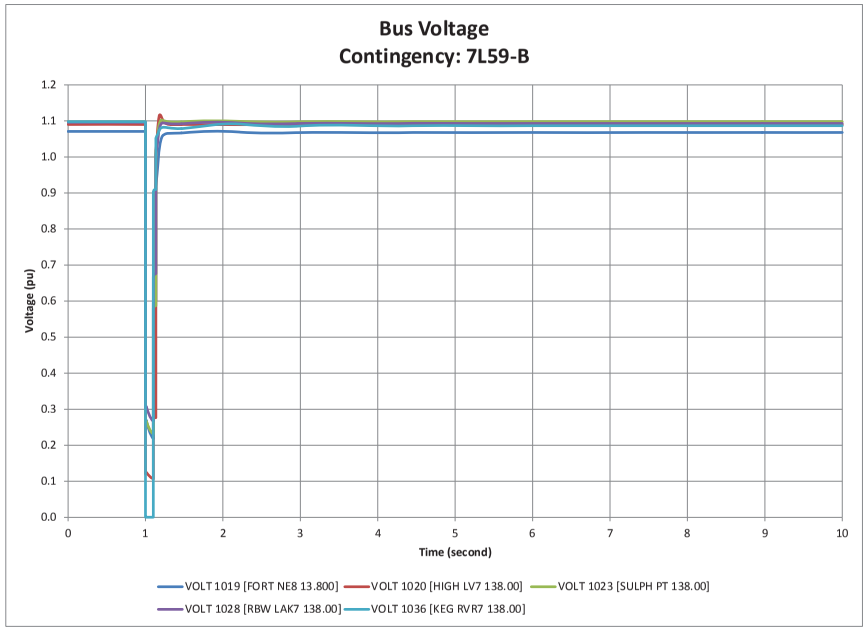

Generator Angle
Contingency: 7L59-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

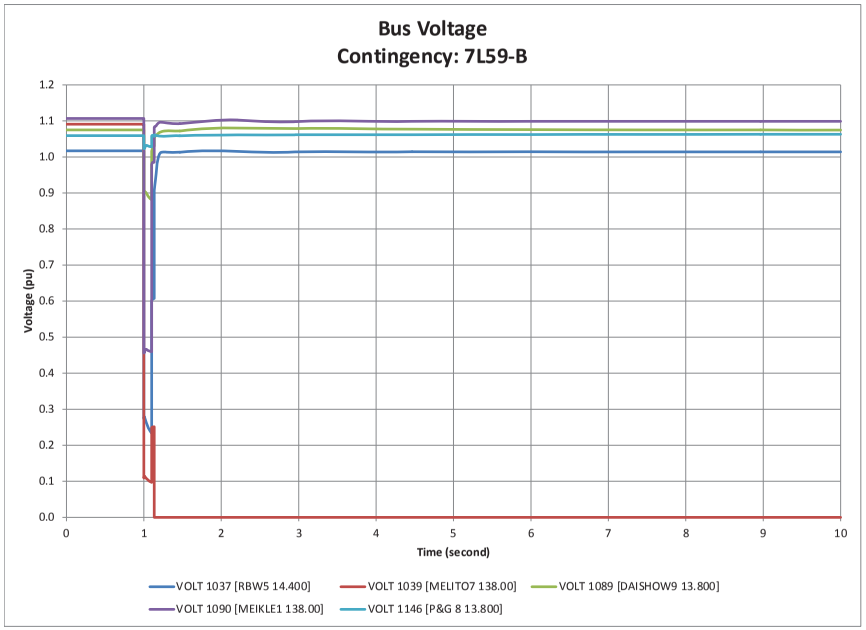

Generator Real Power
Contingency: 7L59-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

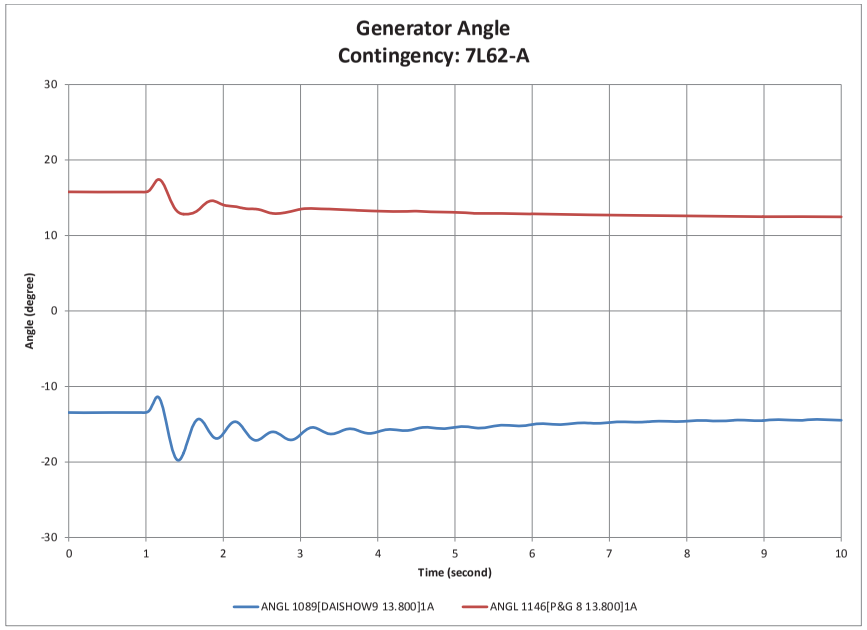

Generator Reactive Power
Contingency: 7L59-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

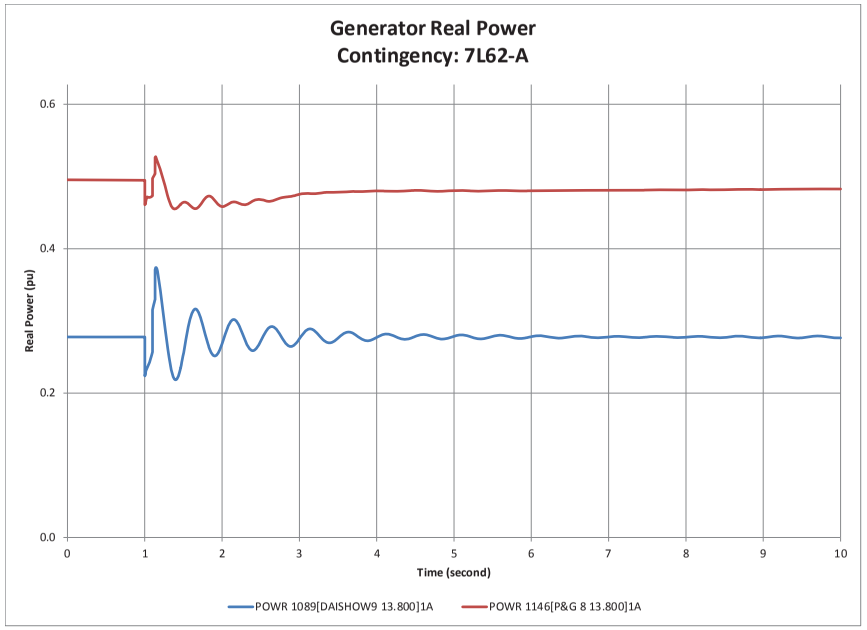

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

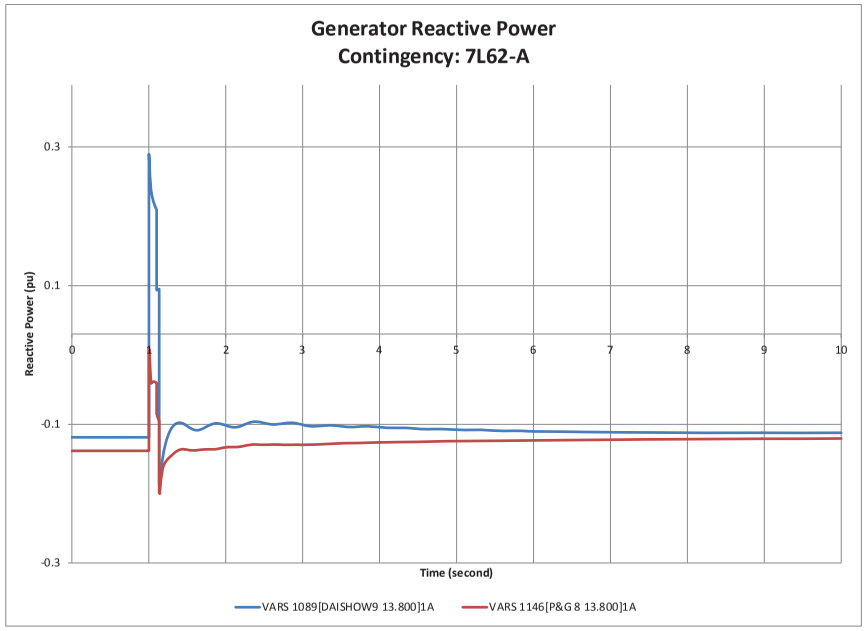

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

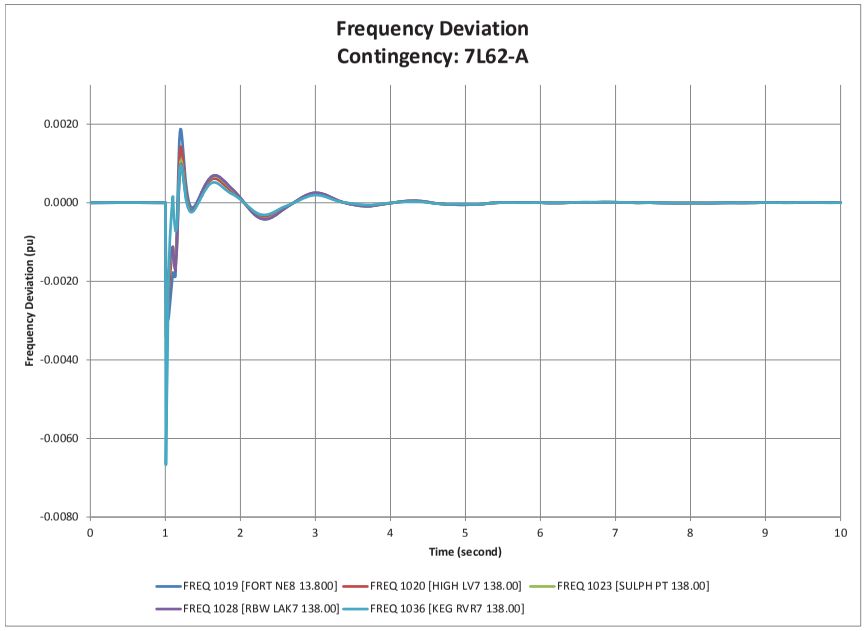

Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

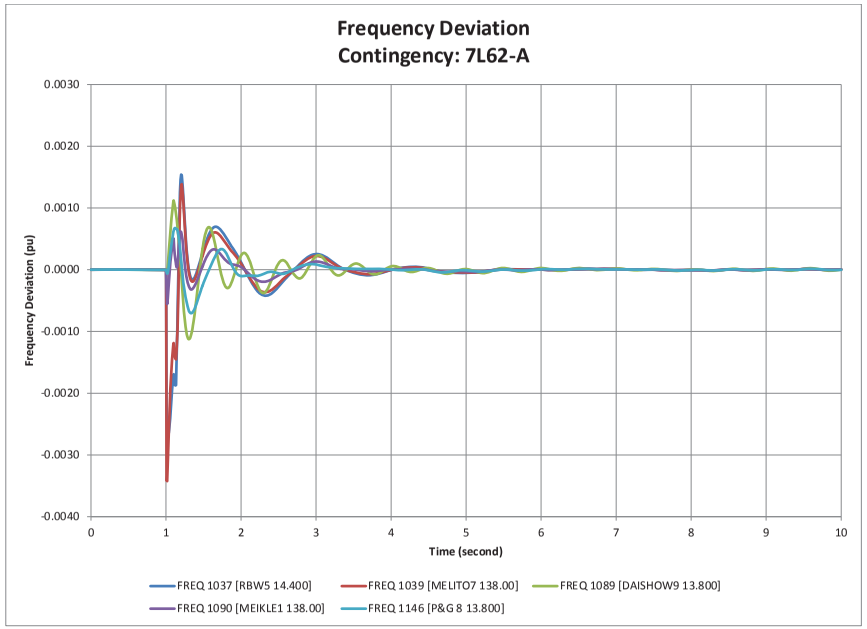

Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

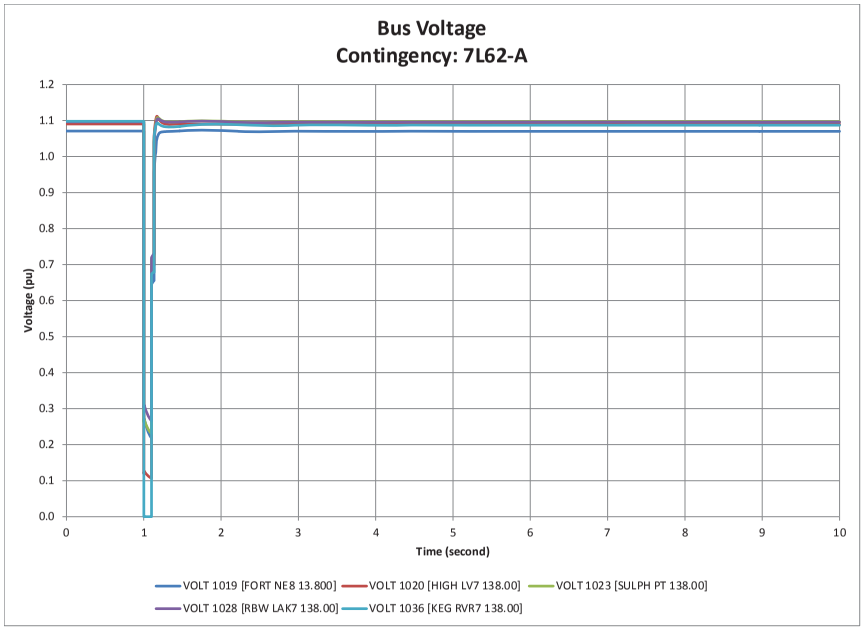

Generator Angle
Contingency: 7L62-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

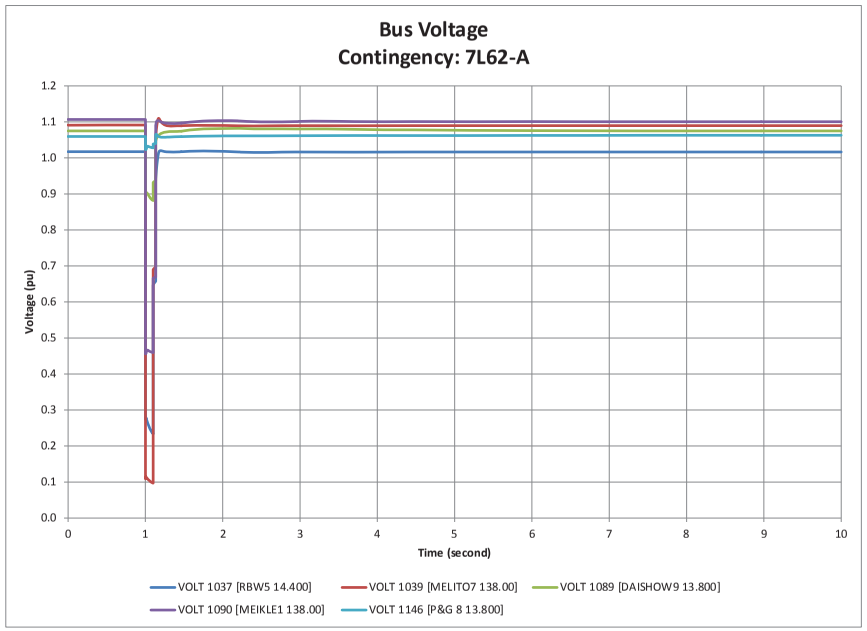

Generator Real Power
Contingency: 7L62-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

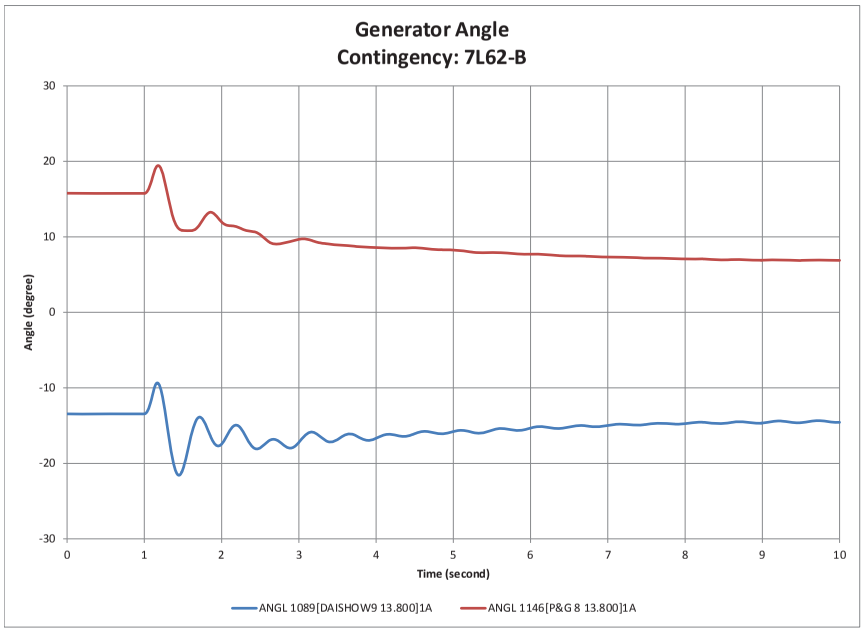

Generator Reactive Power
Contingency: 7L62-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

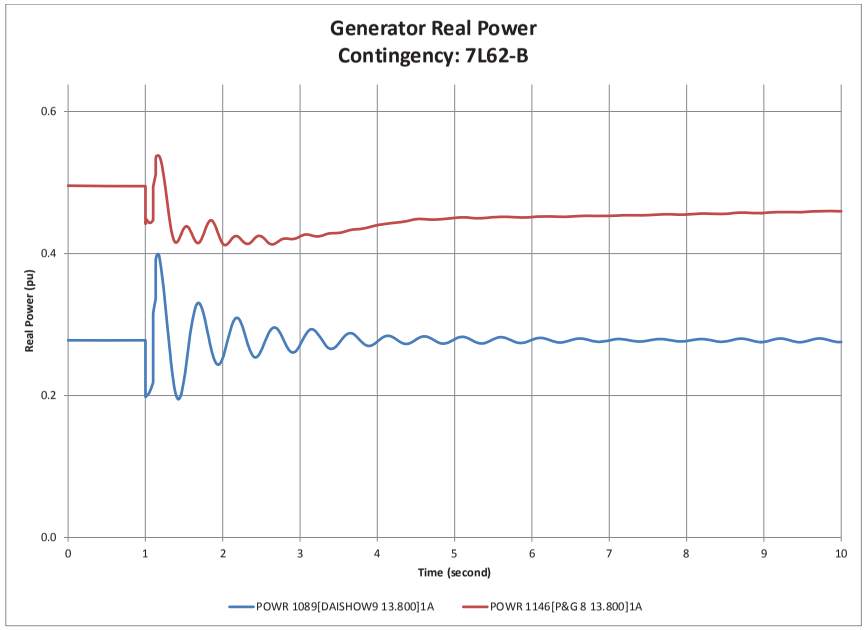

Frequency Deviation
Contingency: 7L62-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

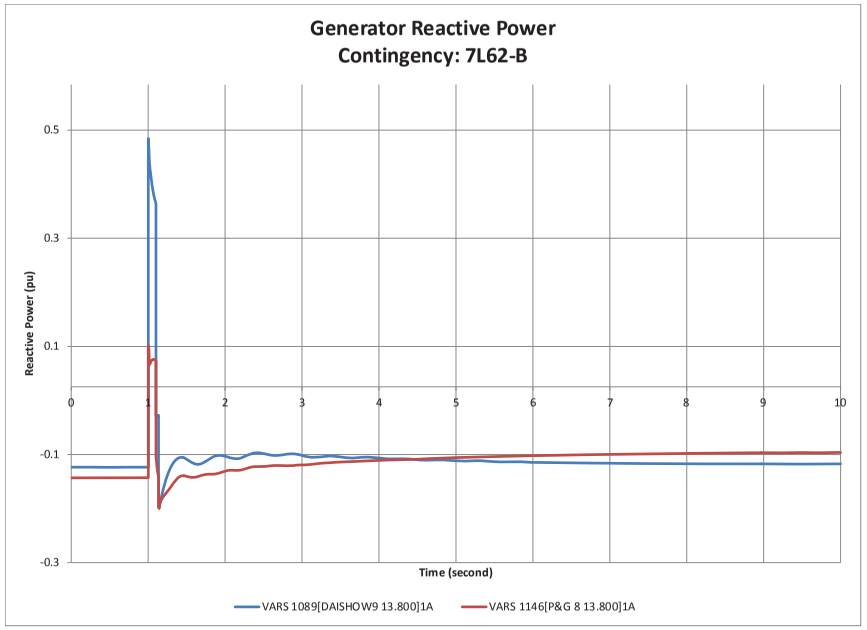

Frequency Deviation
Contingency: 7L62-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

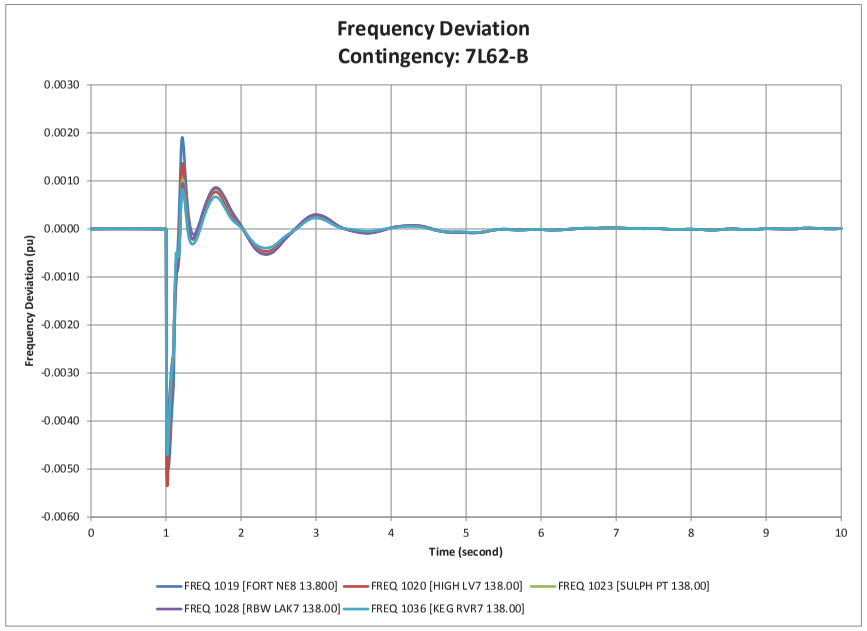

Bus Voltage
Contingency: 7L62-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

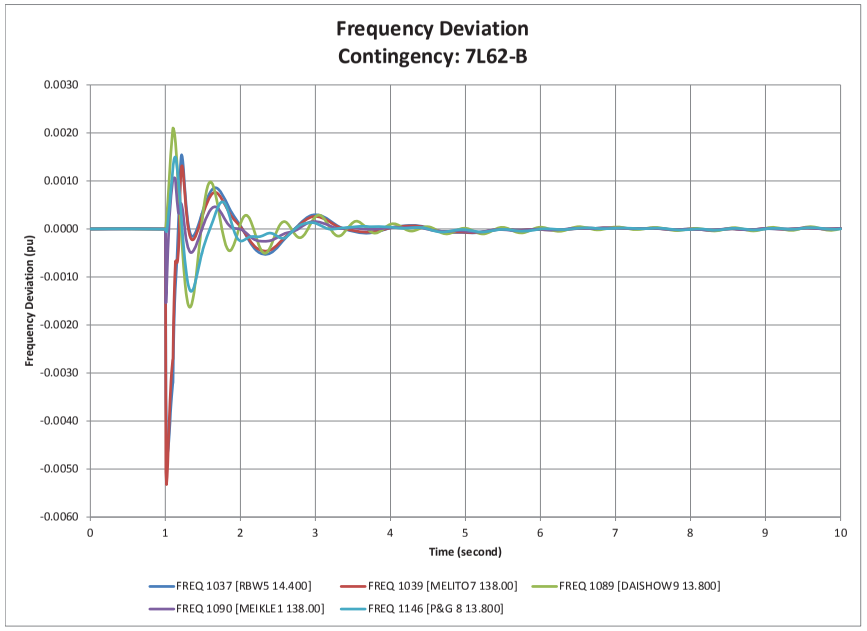

Bus Voltage
Contingency: 7L62-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

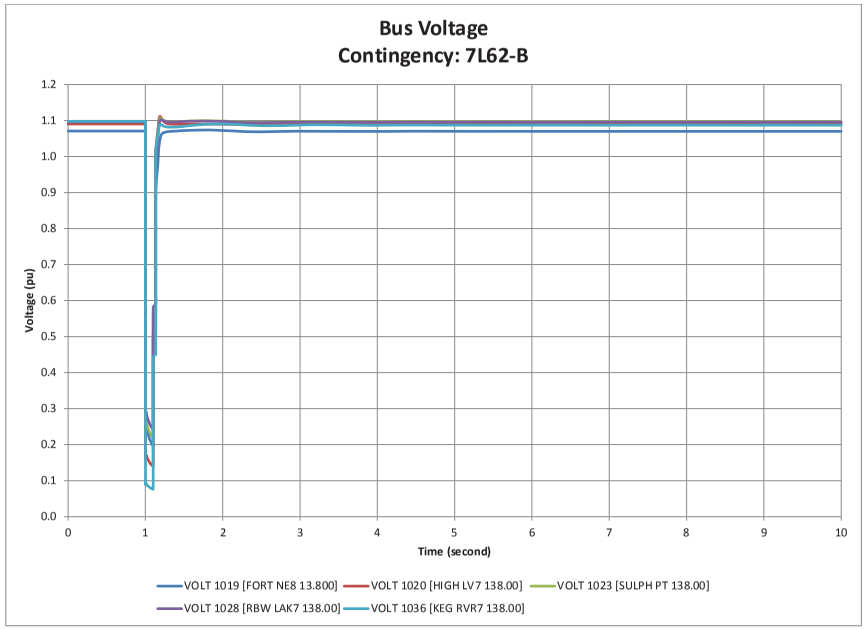

Generator Angle
Contingency: 7L62-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

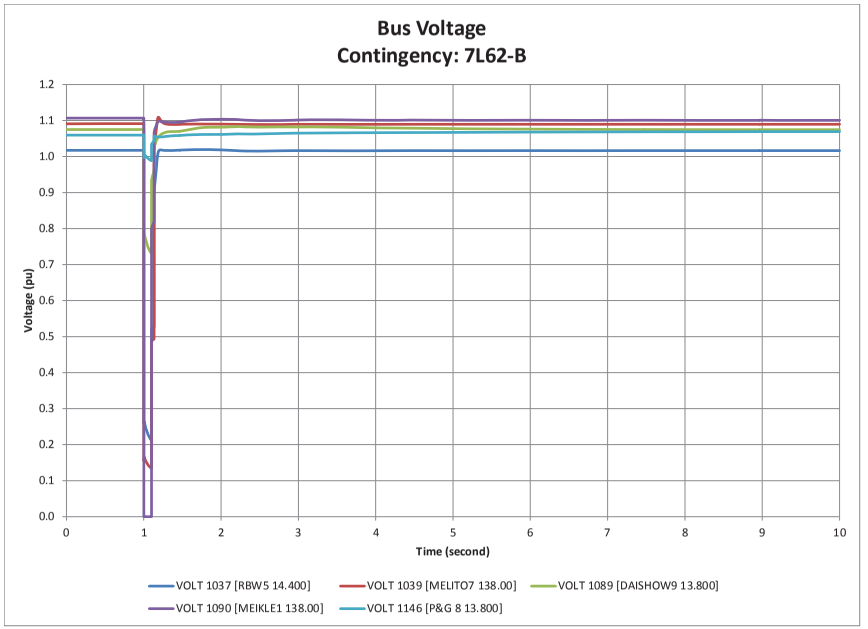

Generator Real Power
Contingency: 7L62-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

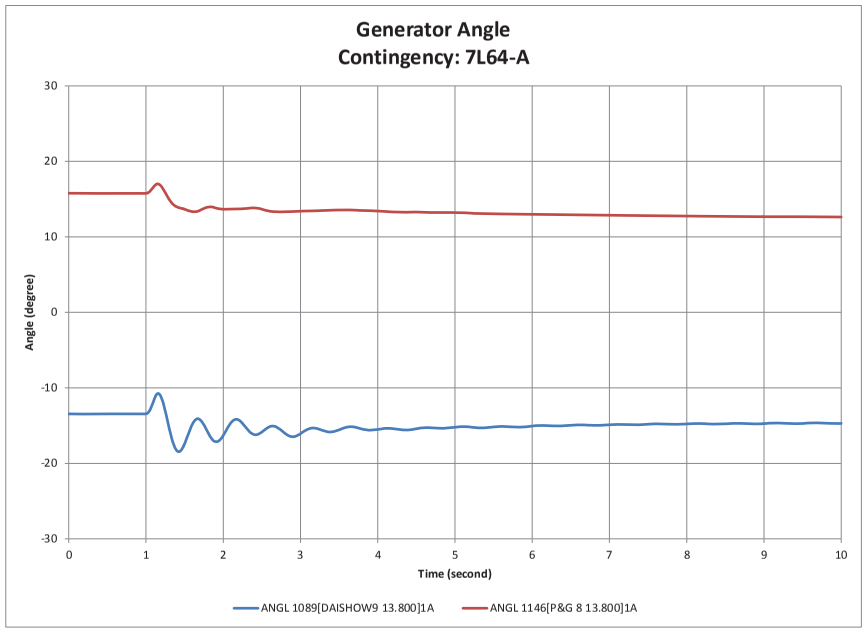

Generator Reactive Power
Contingency: 7L62-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

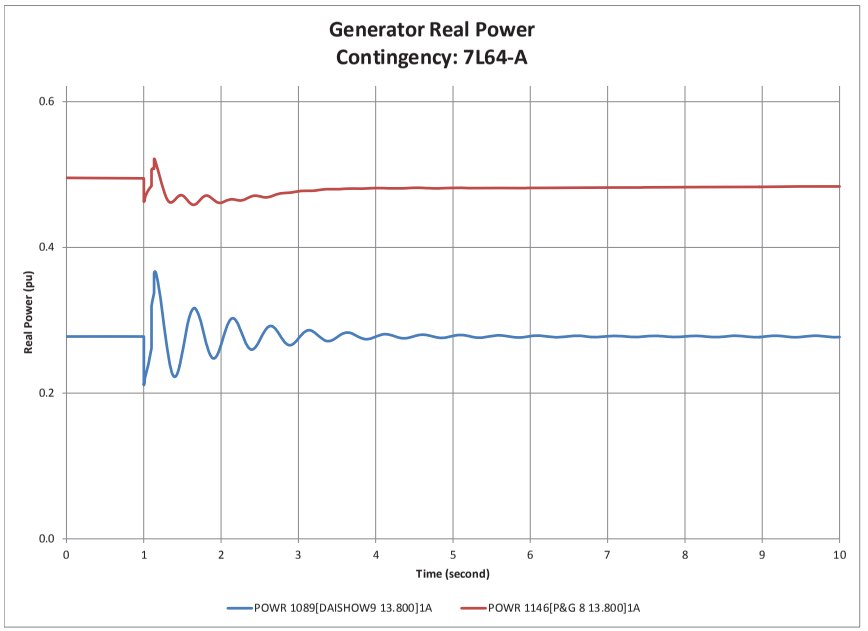

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

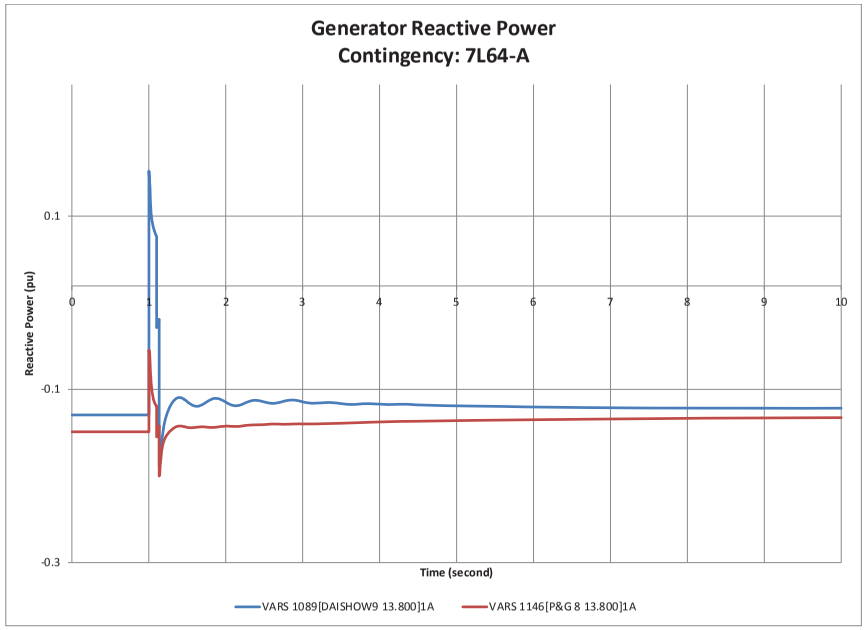

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

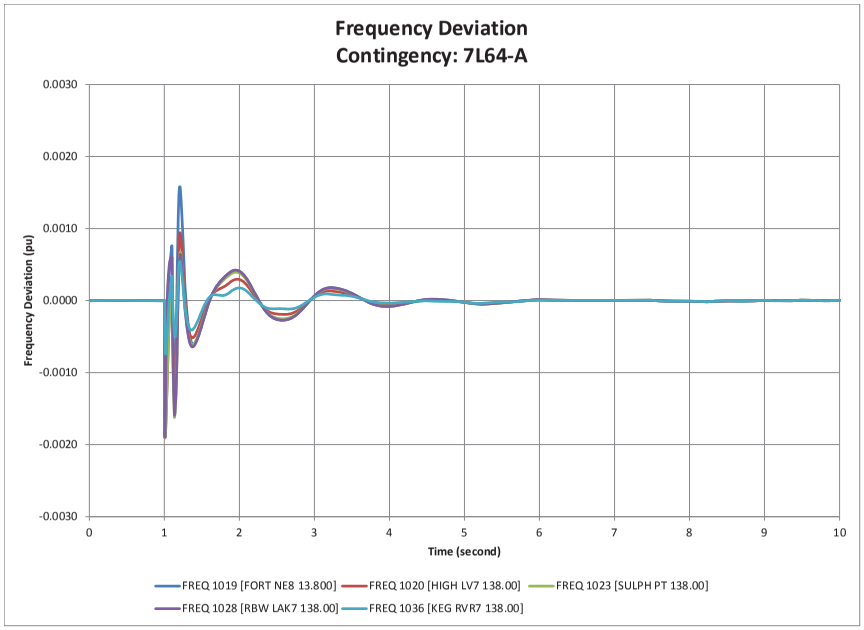

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

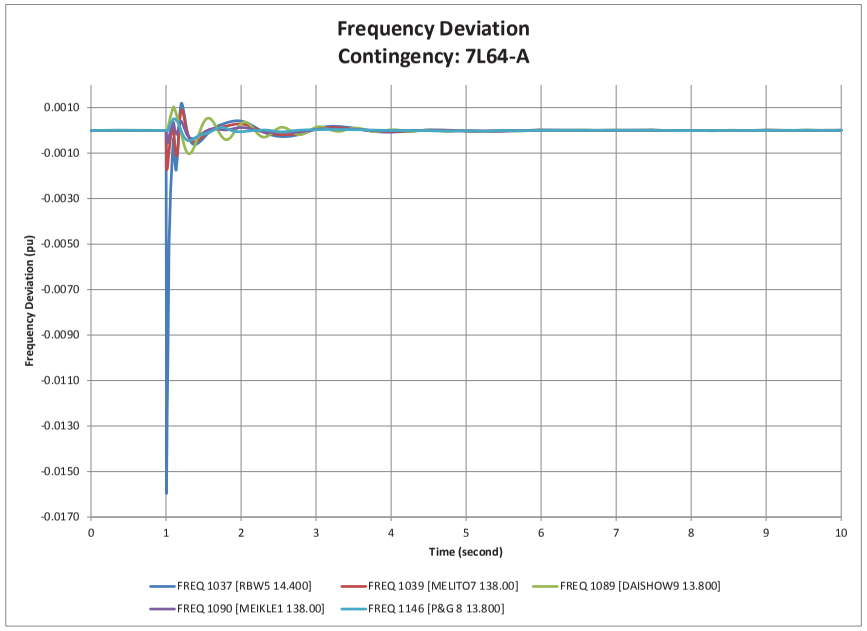

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

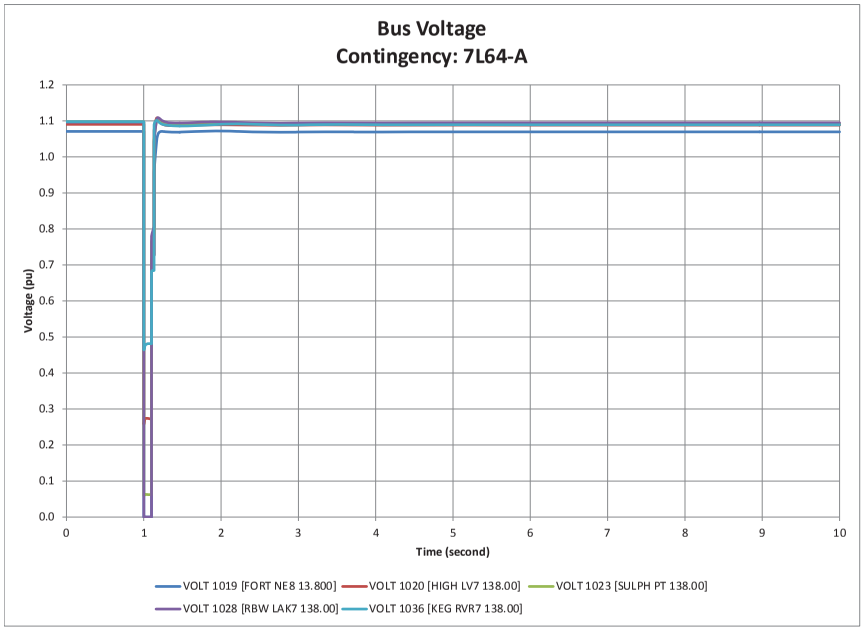

Generator Angle
Contingency: 7L64-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

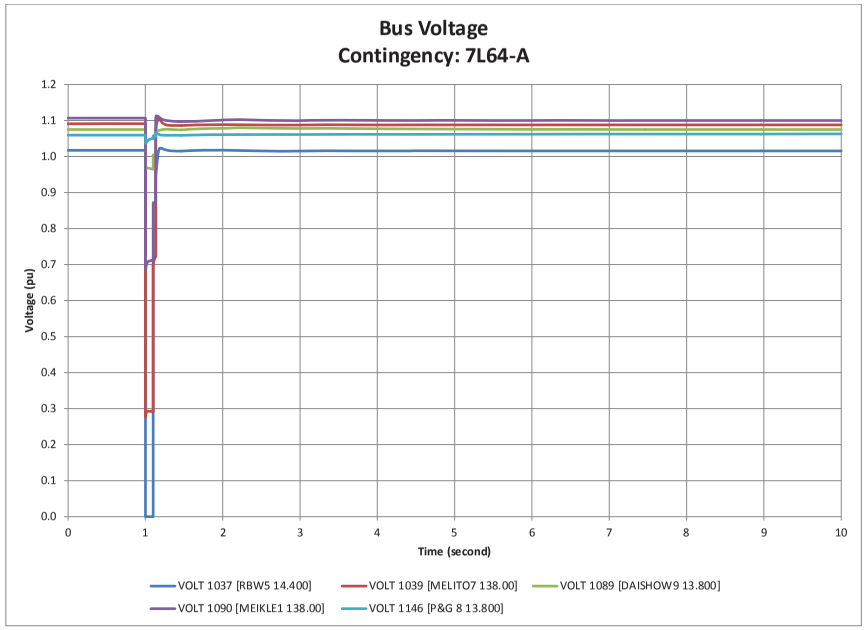

Generator Real Power
Contingency: 7L64-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

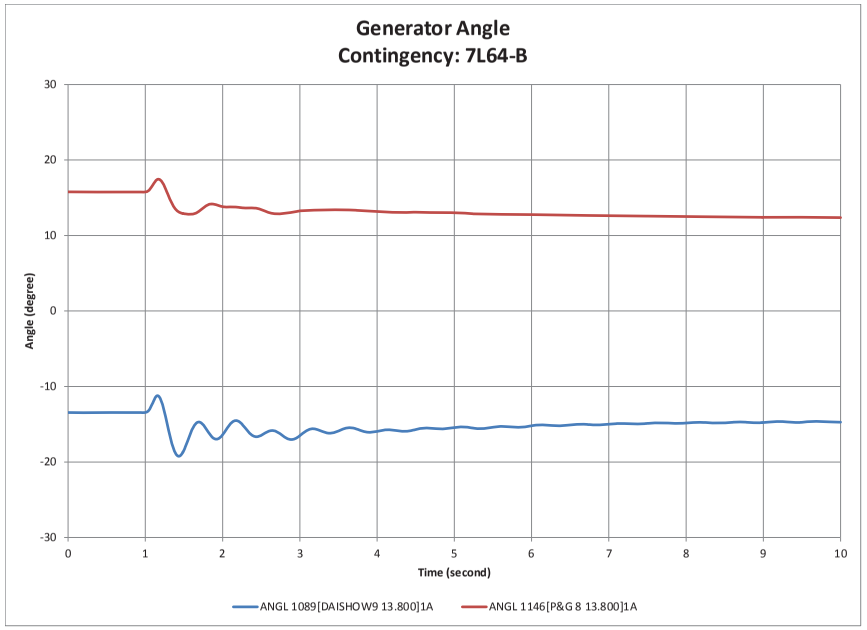

Generator Reactive Power
Contingency: 7L64-A
Reactive Power (pu)
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

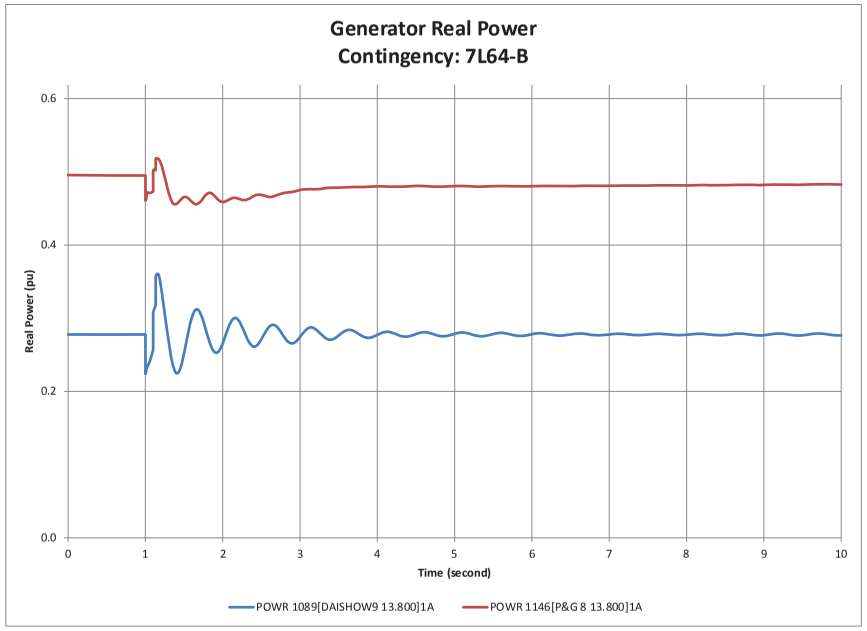

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

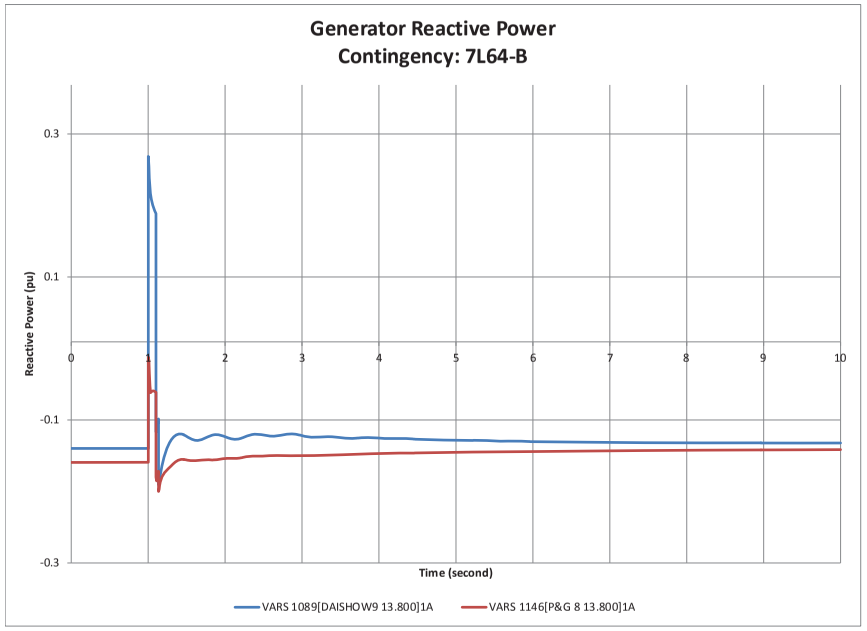

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
0.0010
-0.0010
-0.0030
-0.0050
-0.0070
-0.0090
-0.0110
-0.0130
-0.0150
-0.0170
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

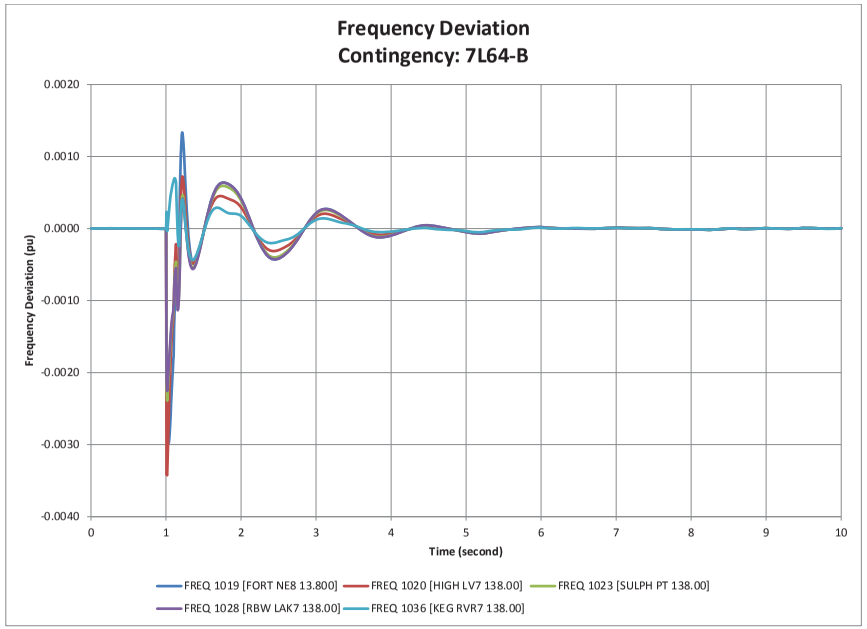

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

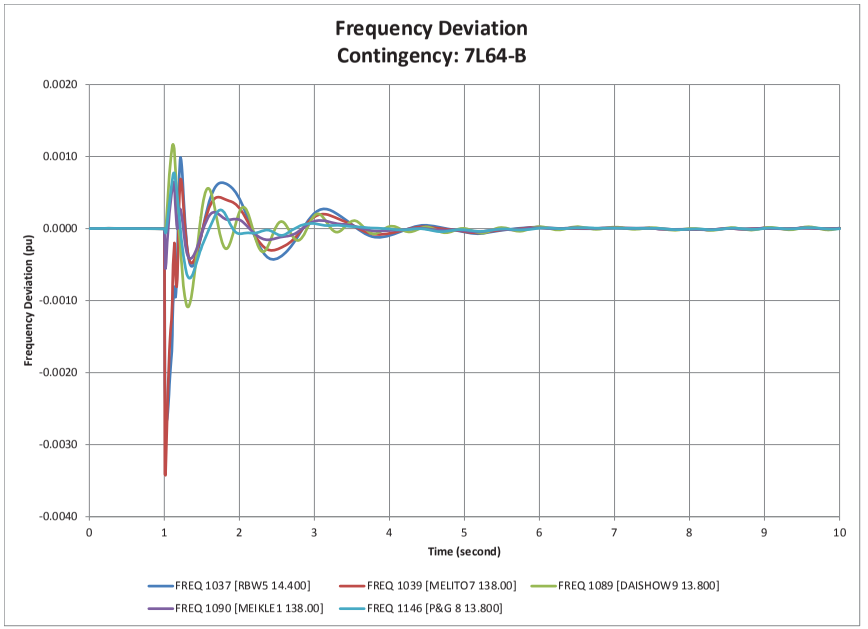

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

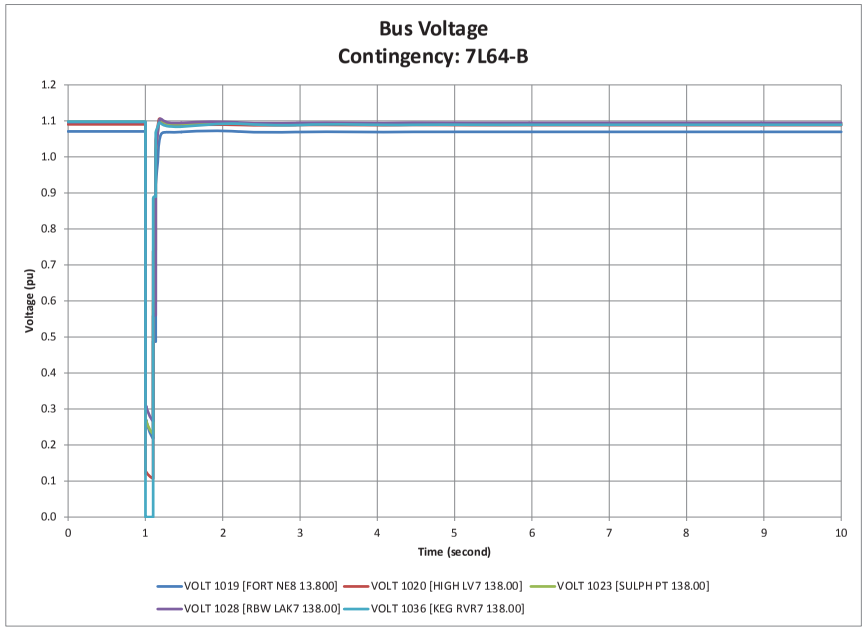

Generator Angle
Contingency: 7L64-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

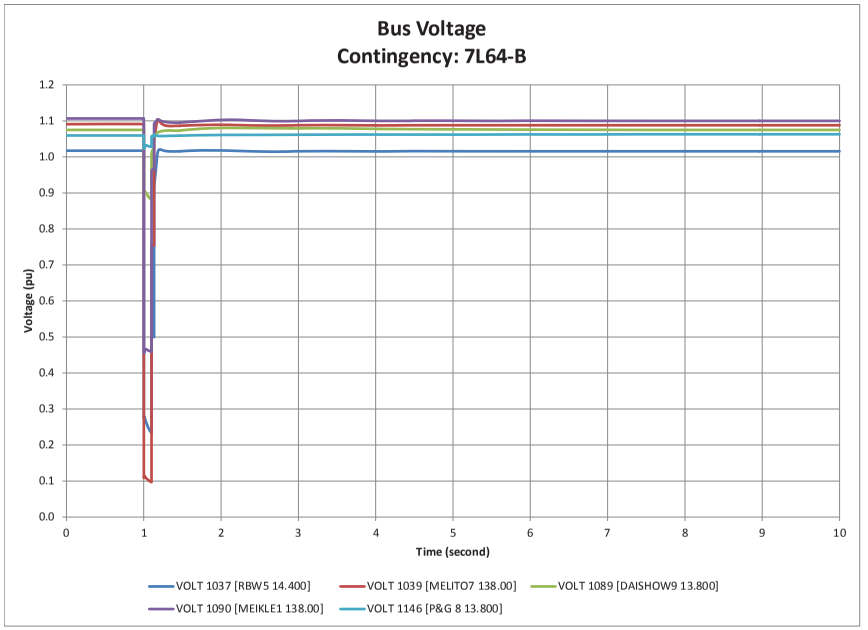

Generator Real Power
Contingency: 7L64-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

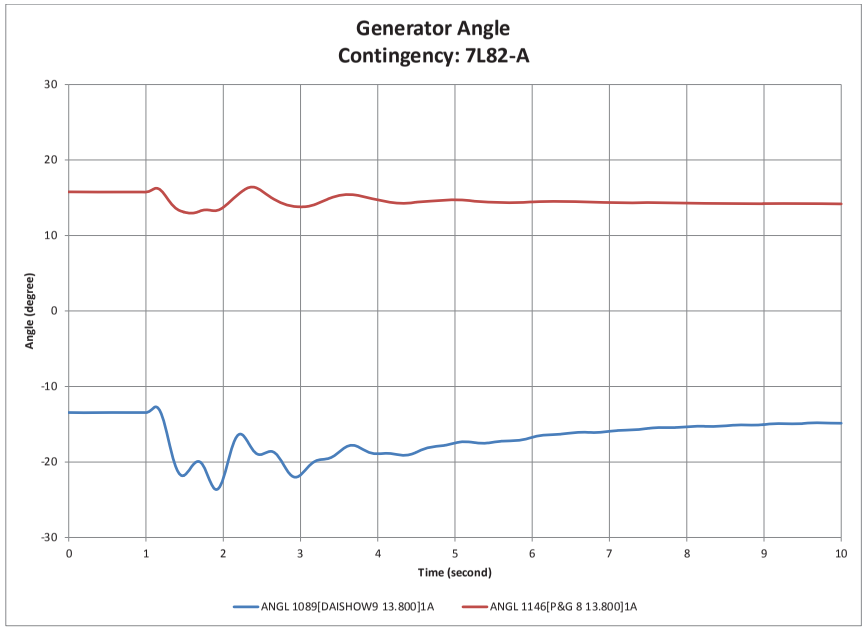

Generator Reactive Power
Contingency: 7L64-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

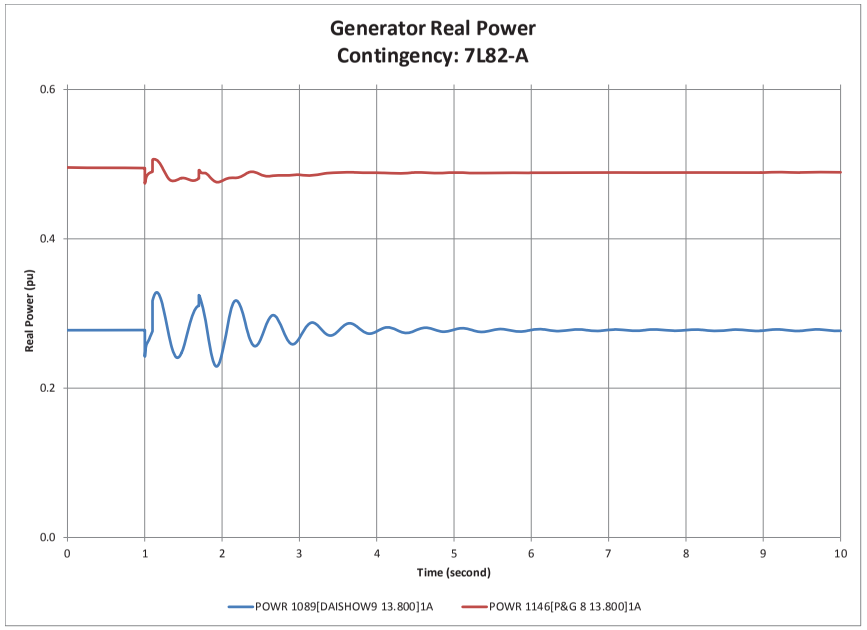

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

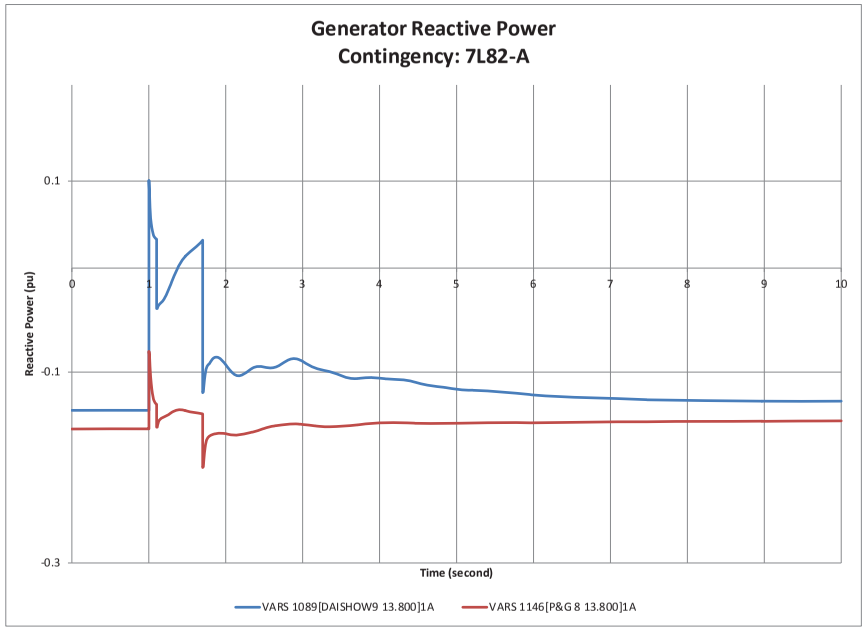

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

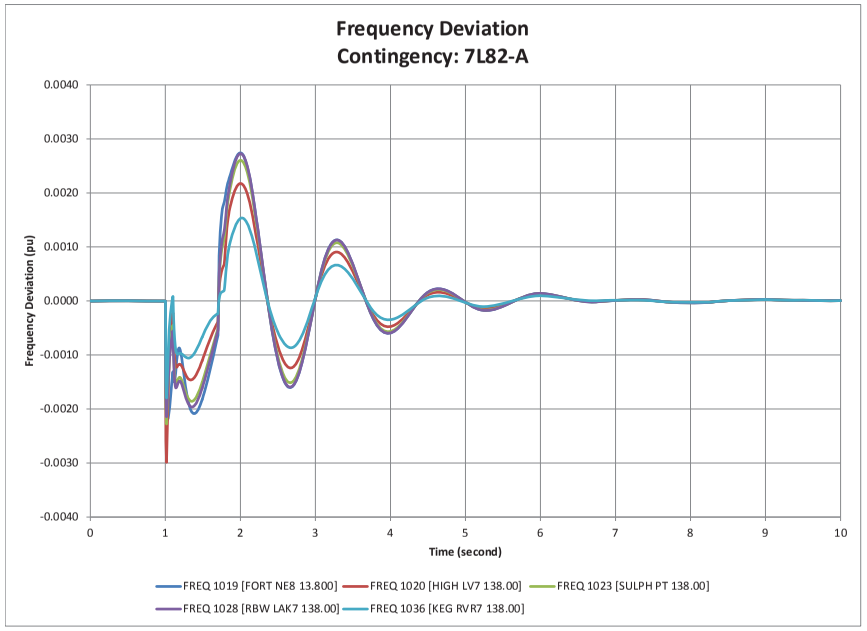

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

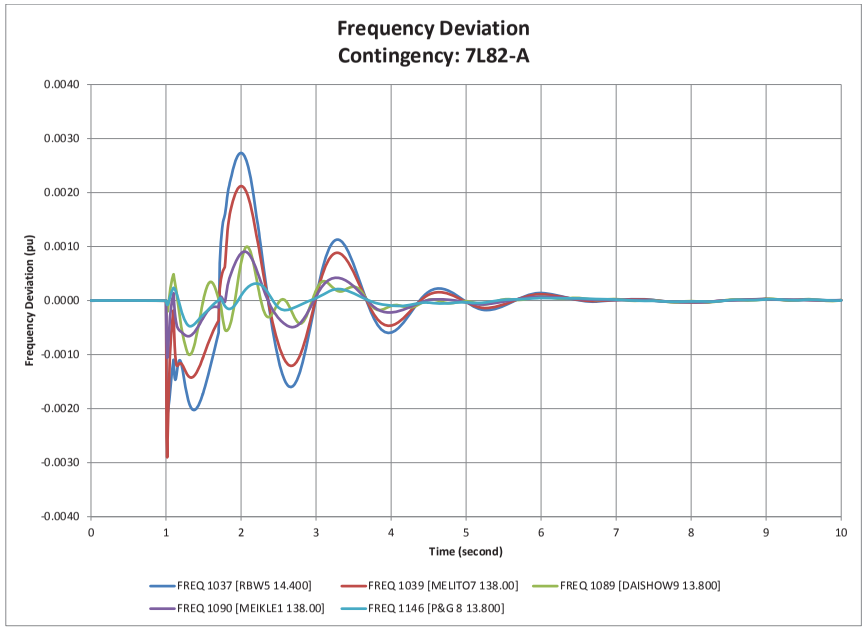

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

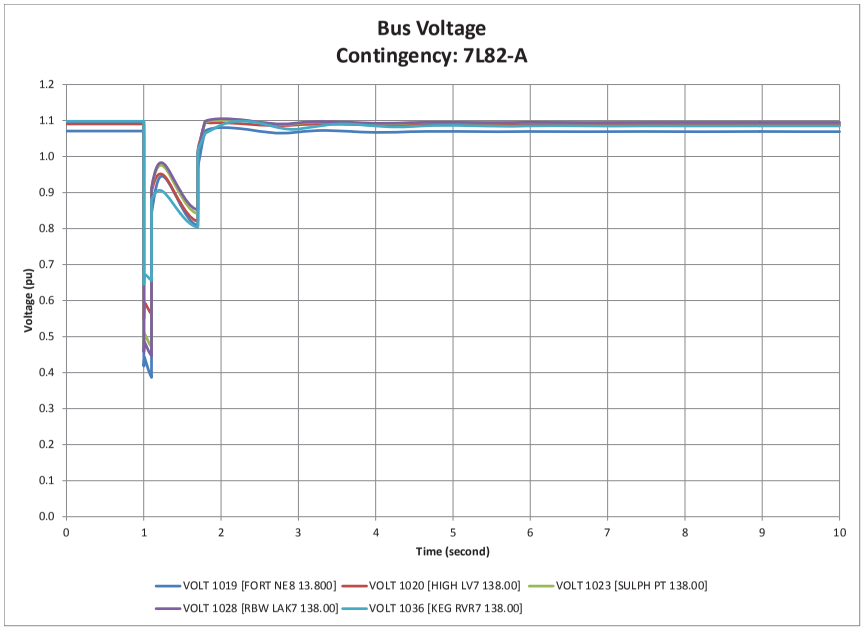

Generator Angle
Contingency: 7L82-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

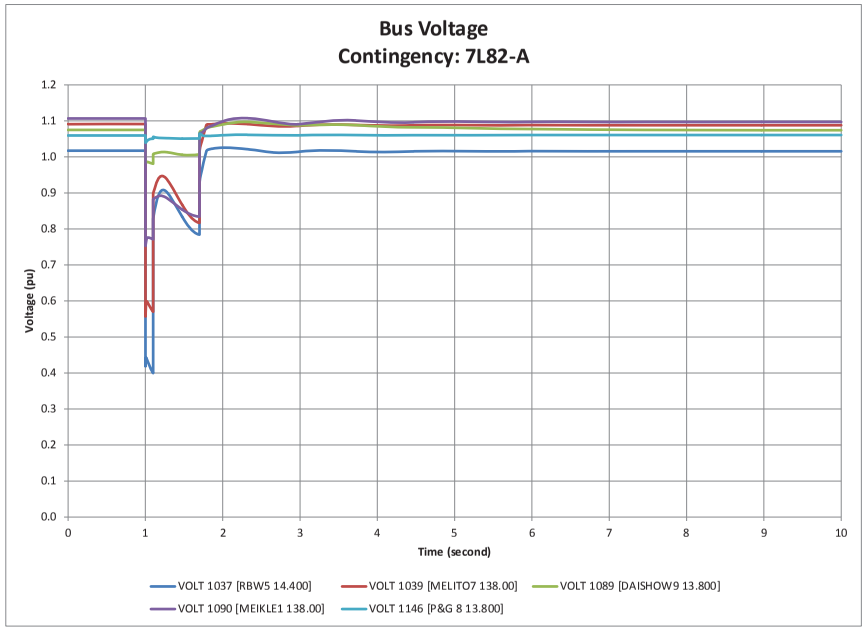

Generator Real Power
Contingency: 7L82-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

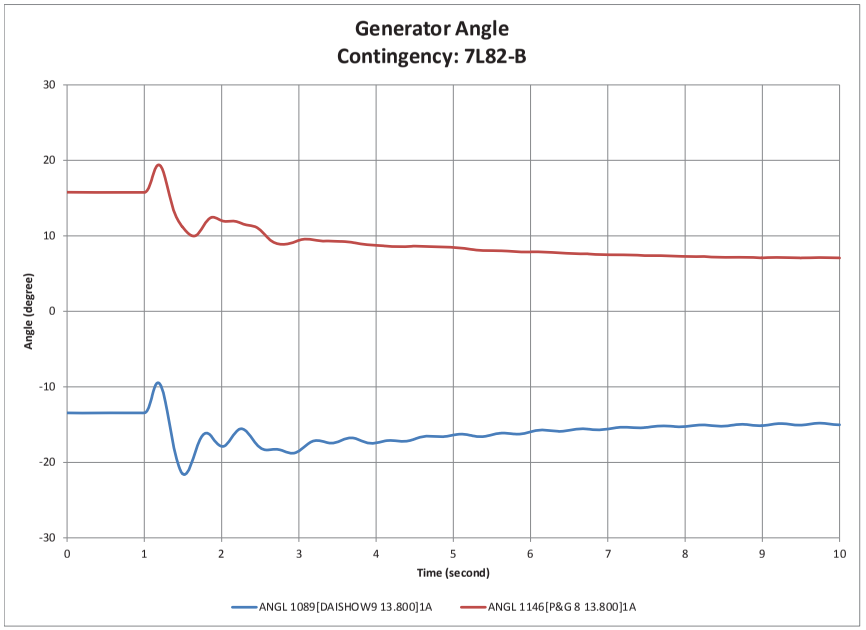

Generator Reactive Power
Contingency: 7L82-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

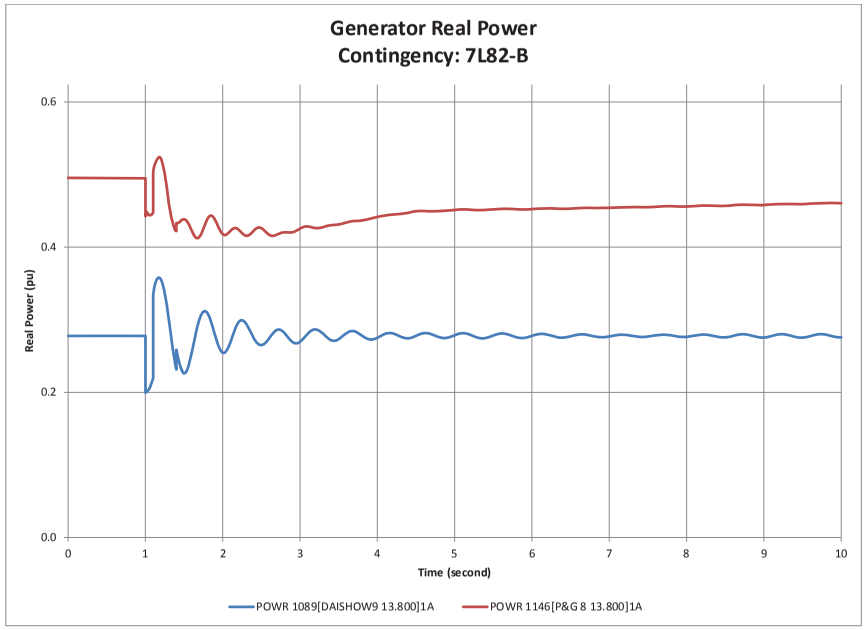

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

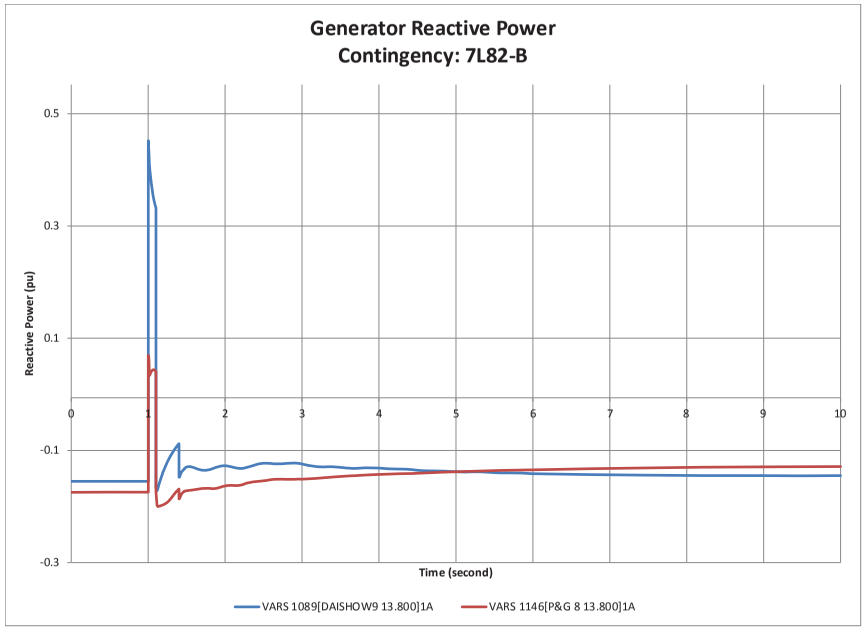

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

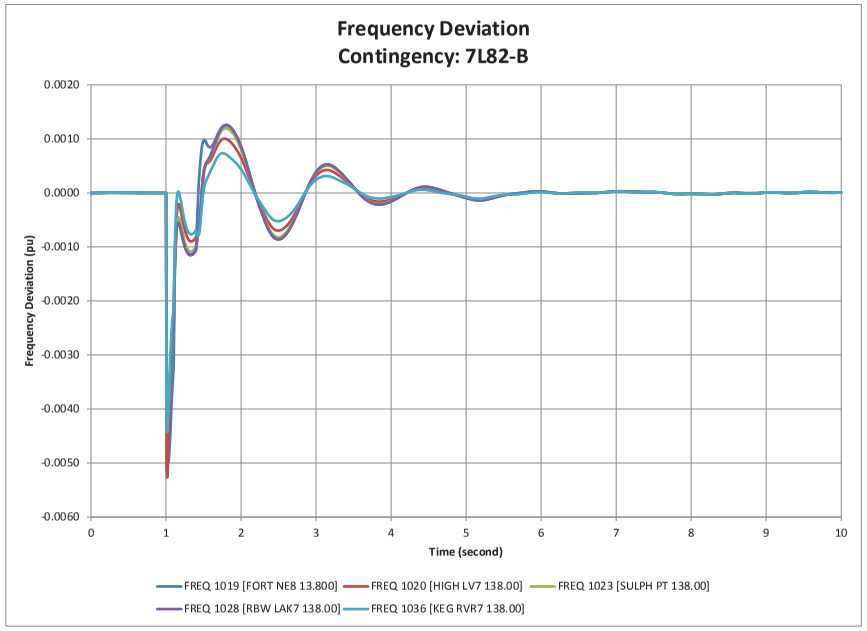

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

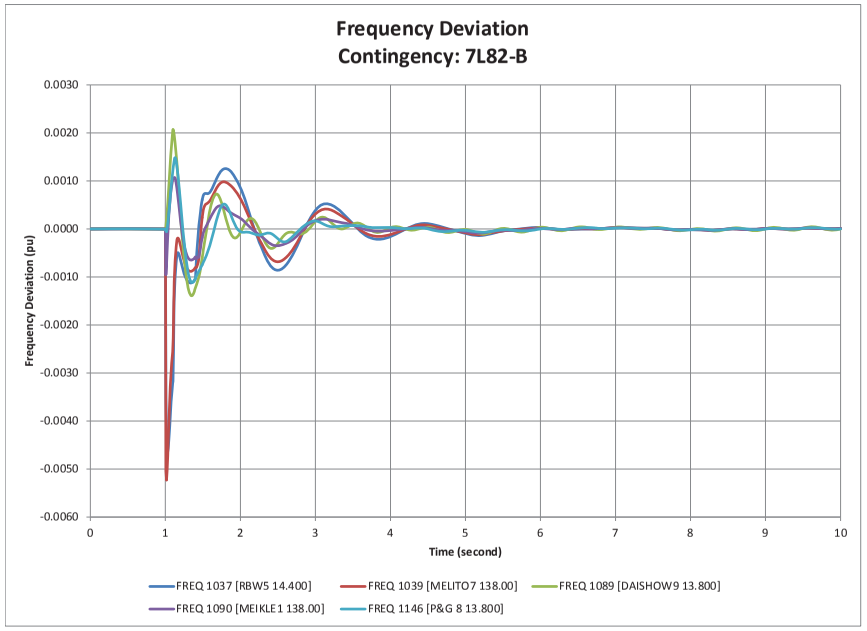

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

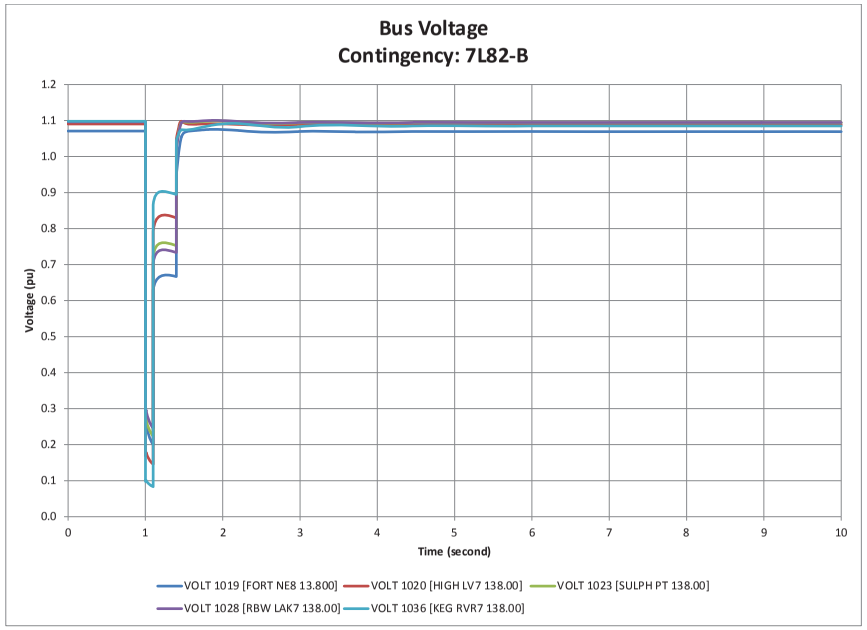

Generator Angle
Contingency: 7L82-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

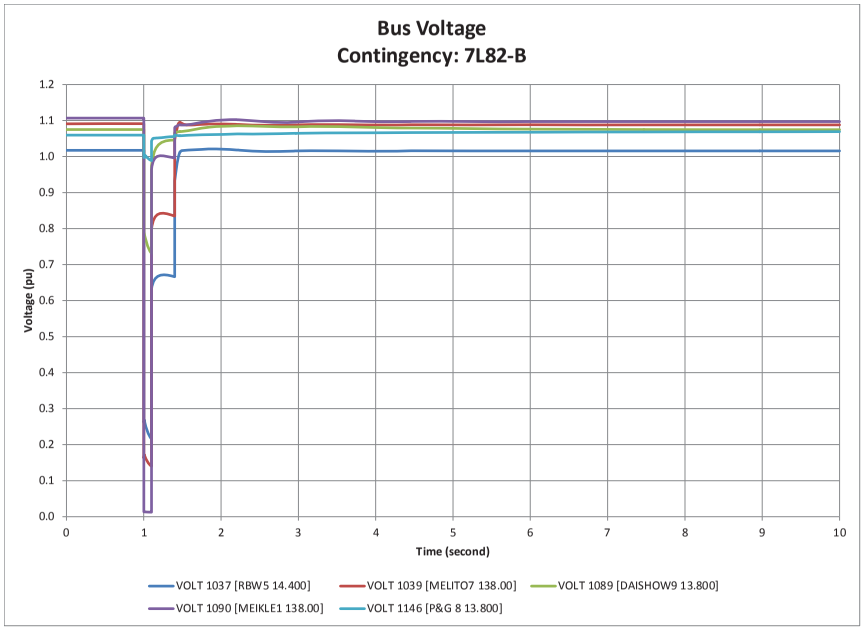

Generator Real Power
Contingency: 7L82-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A


Generator Reactive Power
Contingency: 7L82-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A


Frequency Deviation
Contingency: 7L82-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

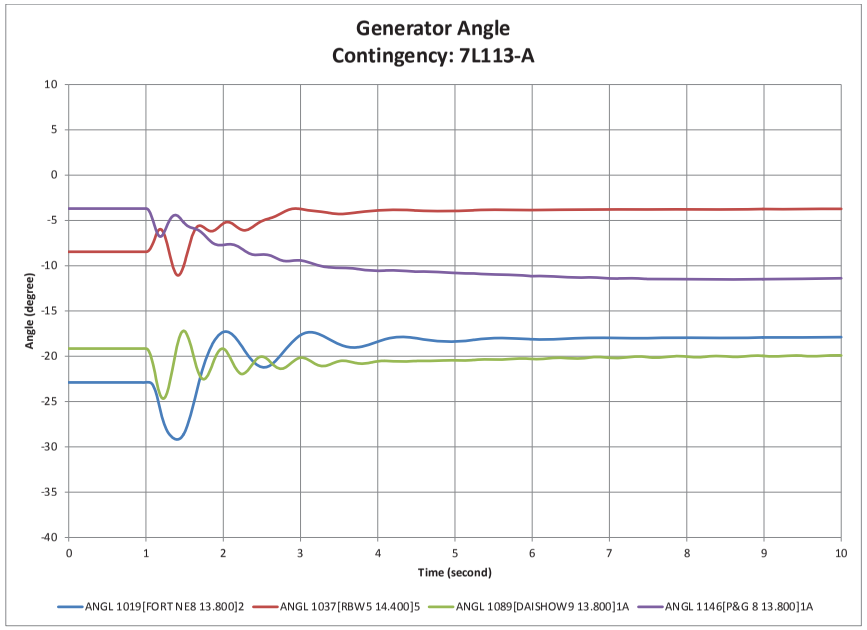

Frequency Deviation
Contingency: 7L82-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

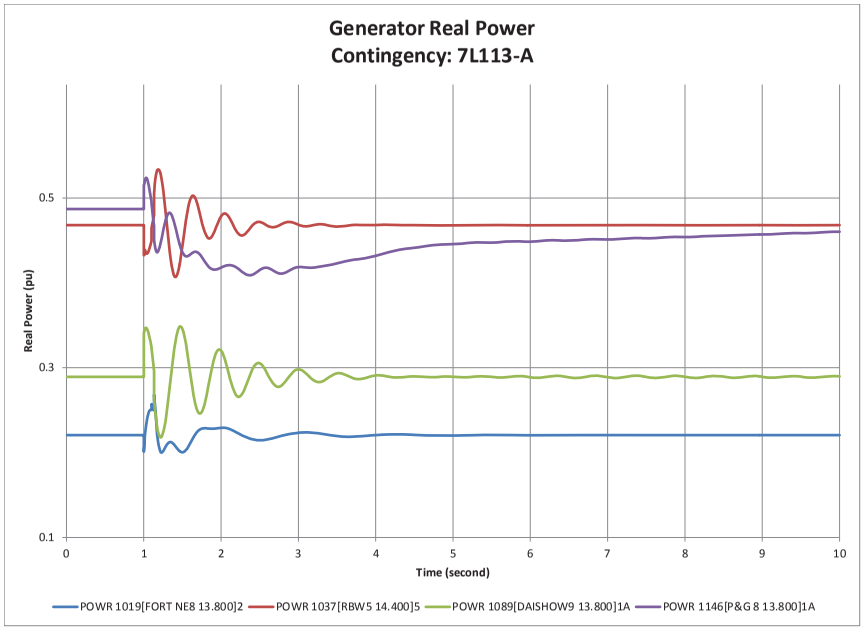

Bus Voltage
Contingency: 7L82-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

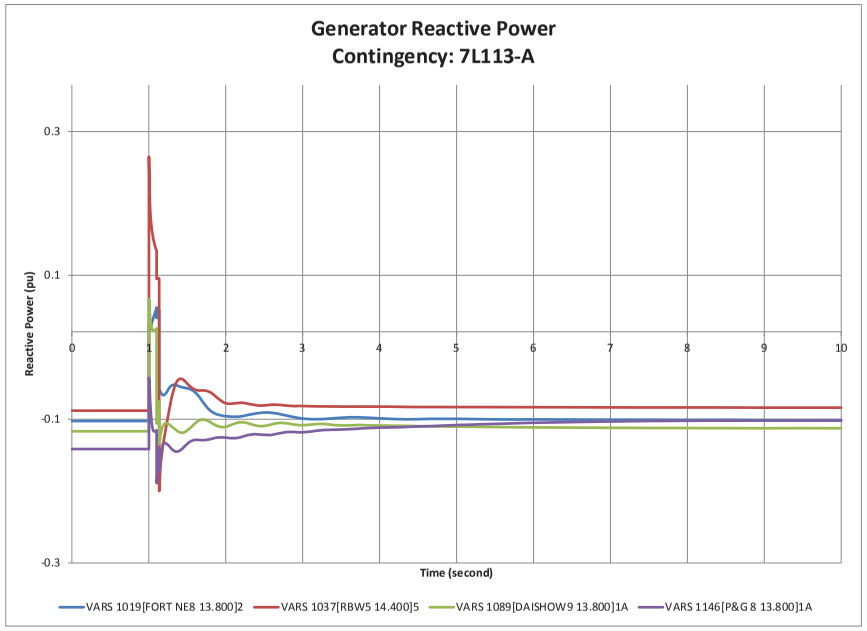

Bus Voltage
Contingency: 7L82-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

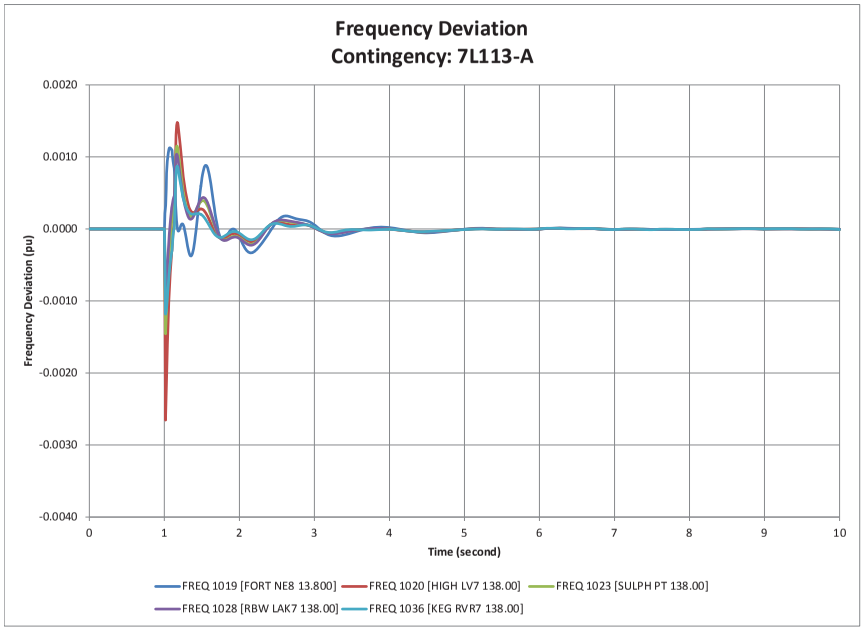
Attachment B-2

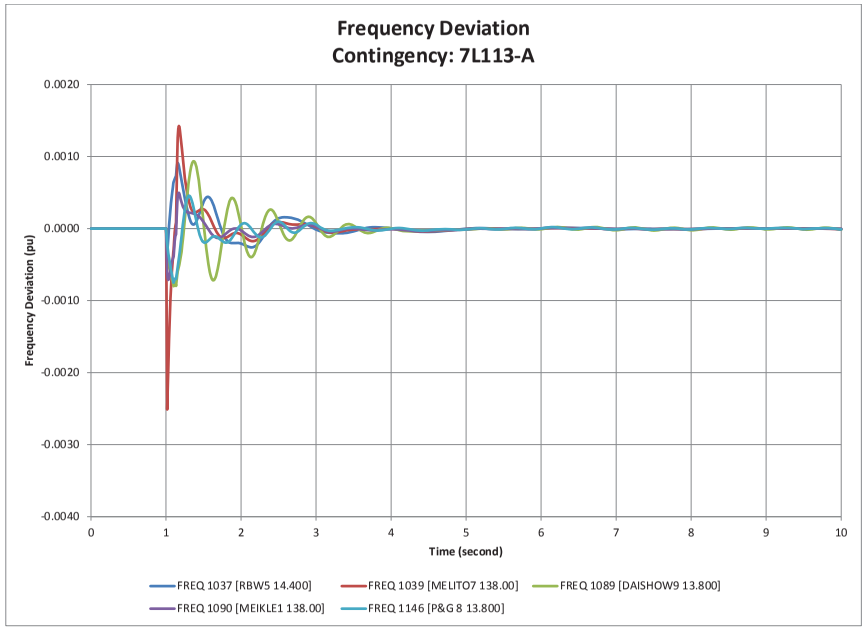
Pre-Connection Transient Stability Analysis Results (2014 SP)

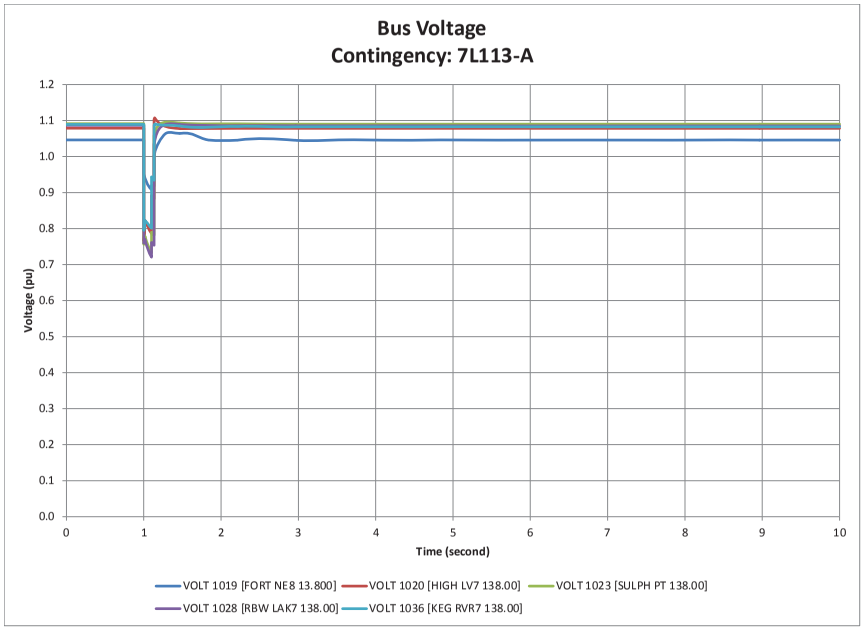

Generator Angle
Contingency: 7L113-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

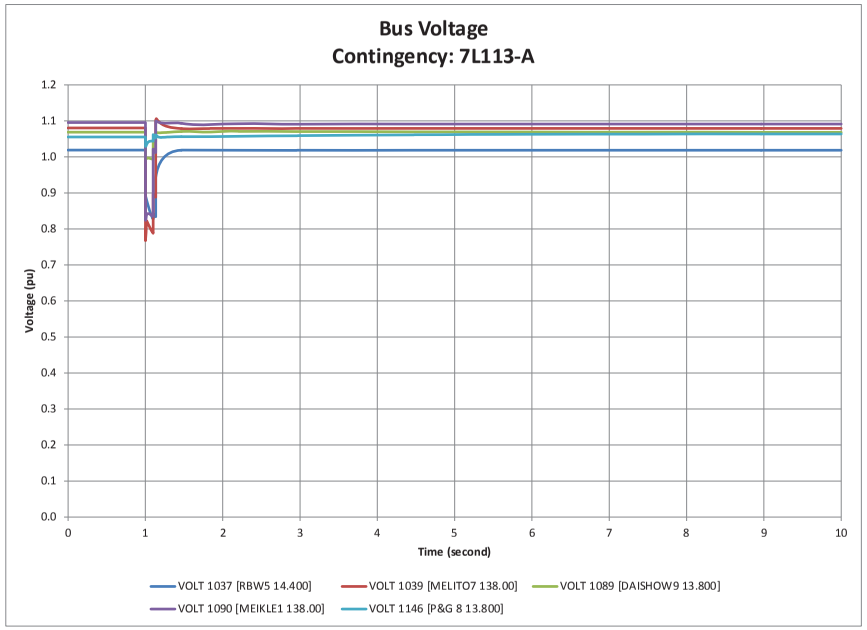

Generator Real Power
Contingency: 7L113-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

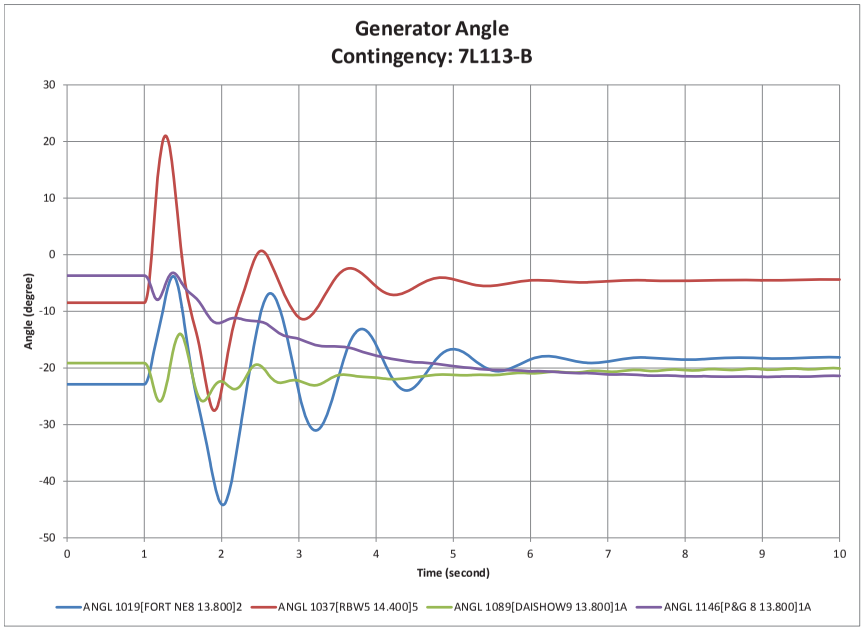

Generator Reactive Power
Contingency: 7L113-A
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

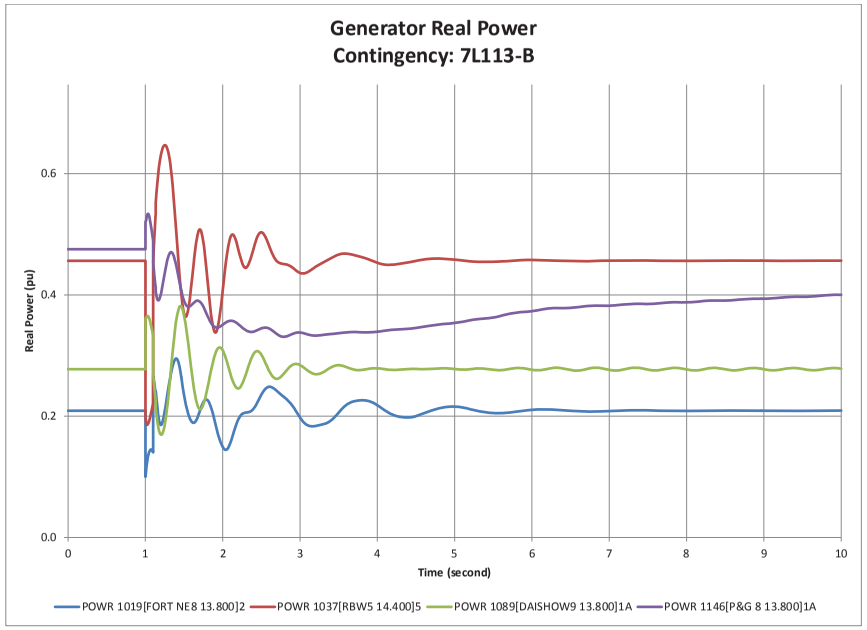

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

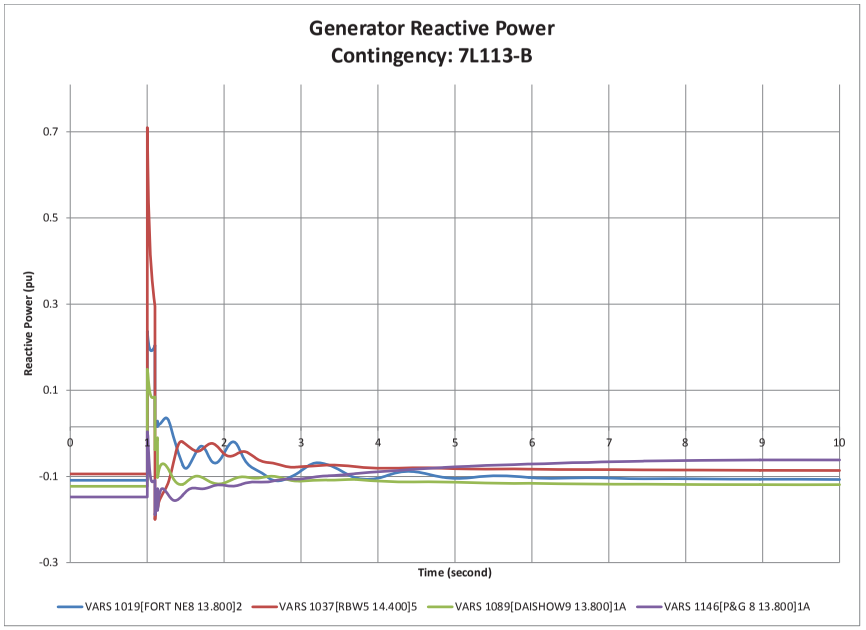

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

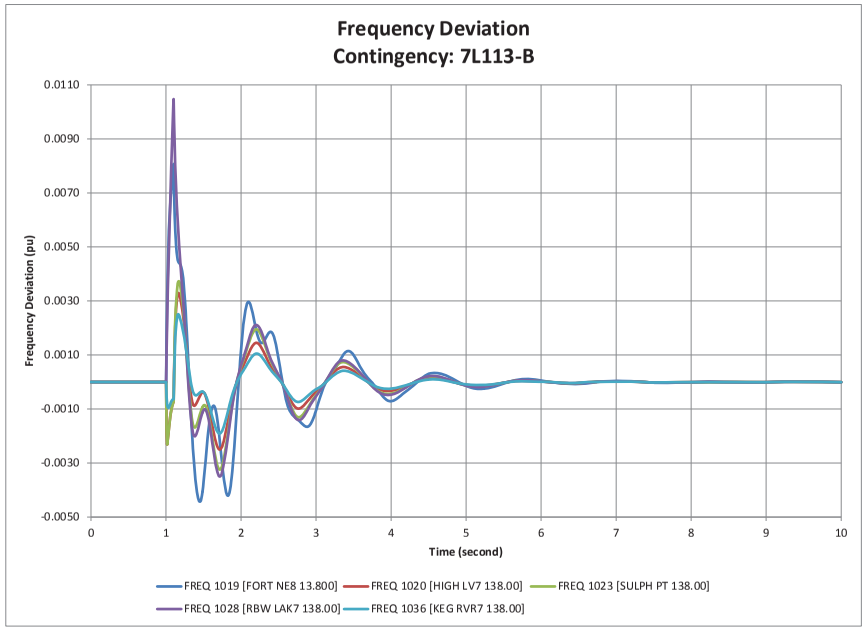

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

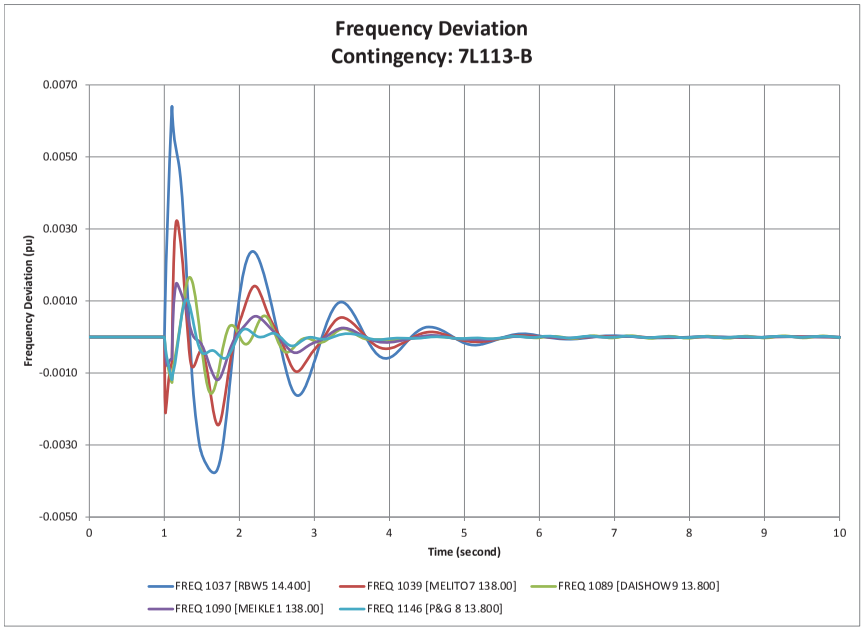

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

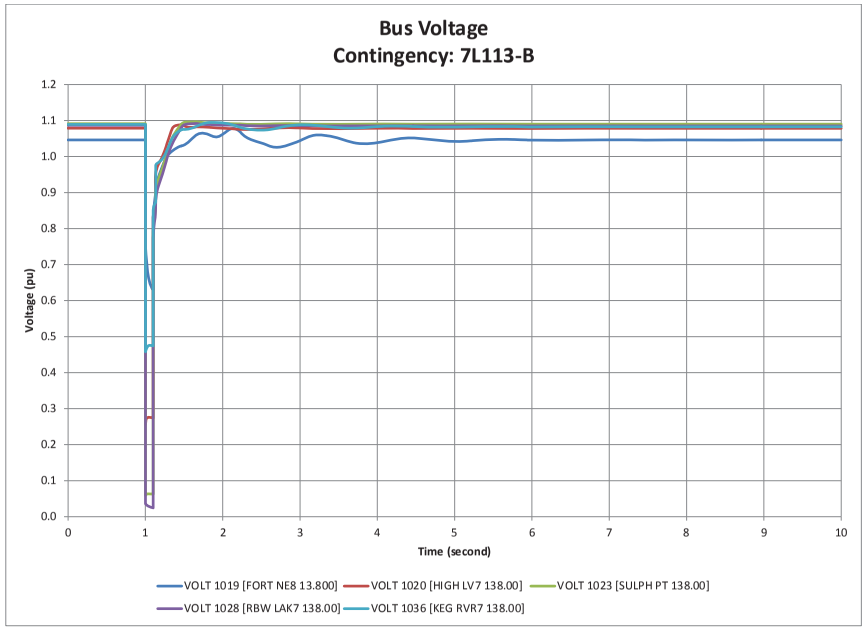

Generator Angle
Contingency: 7L113-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

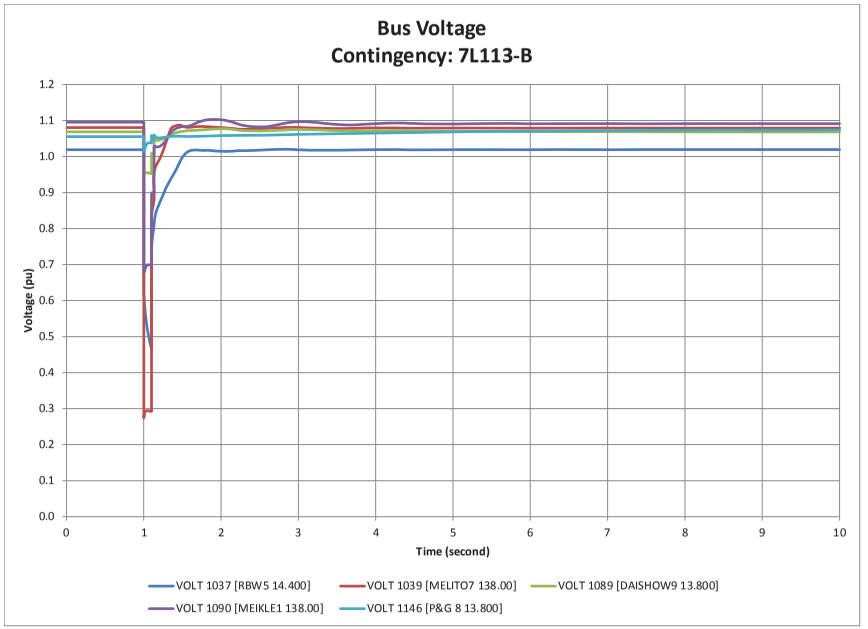

Generator Real Power
Contingency: 7L113-B
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

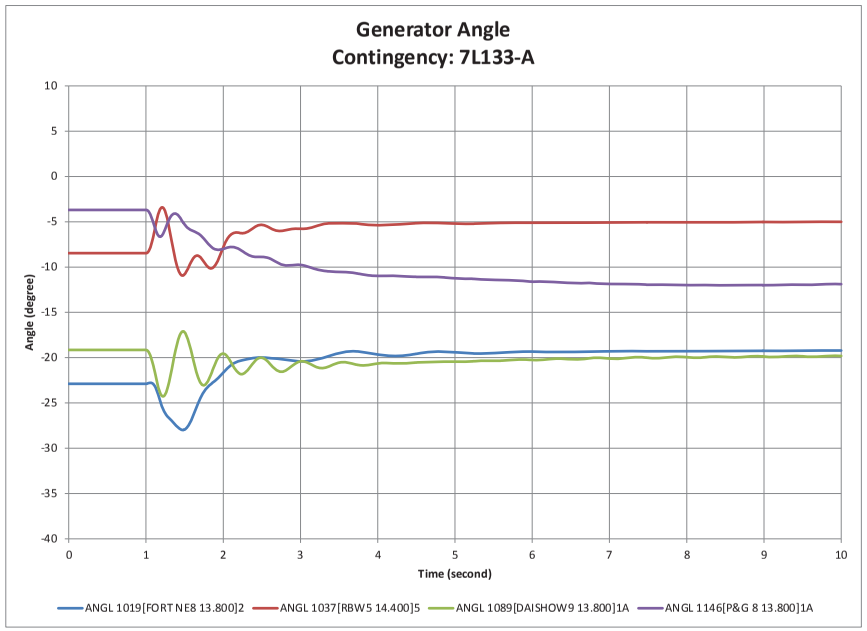

Generator Reactive Power
Contingency: 7L113-B
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

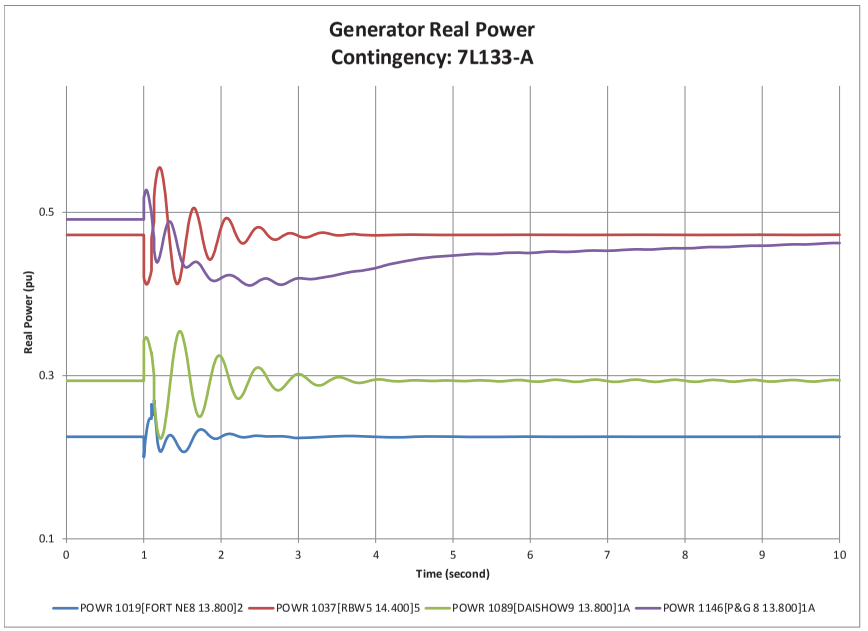

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

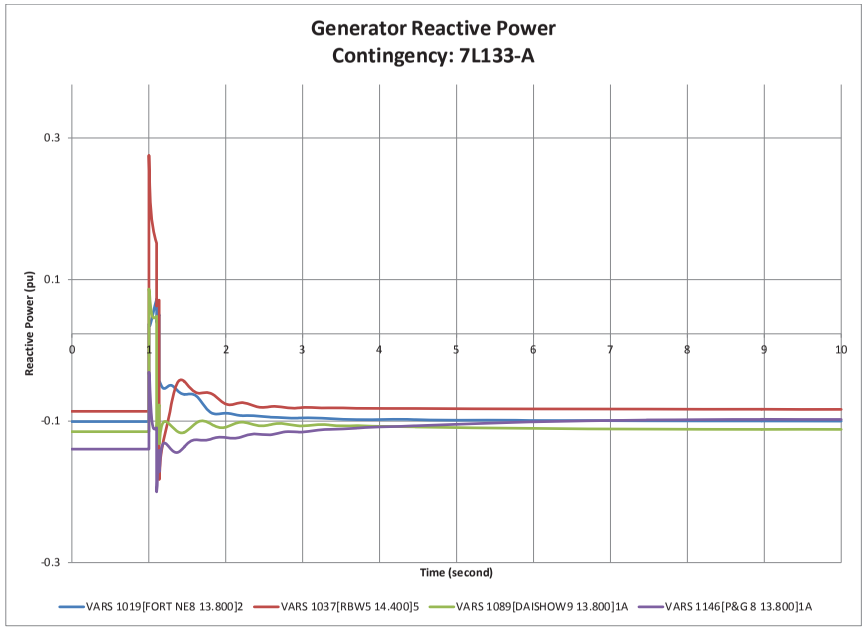

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

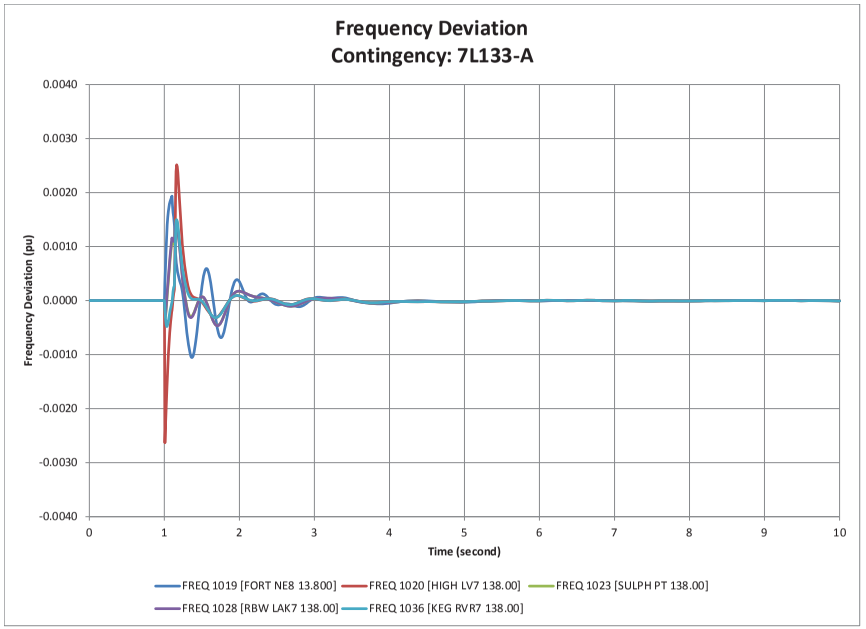

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

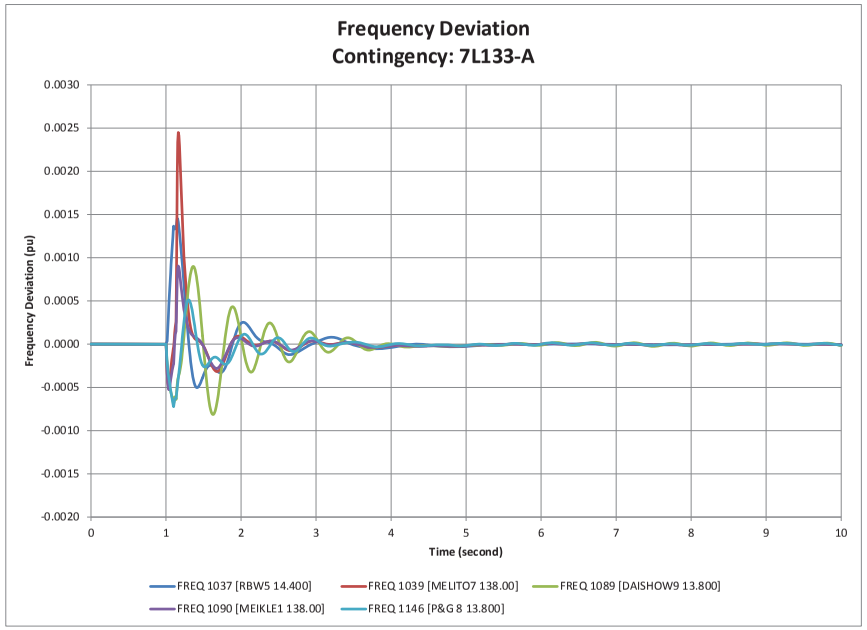

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

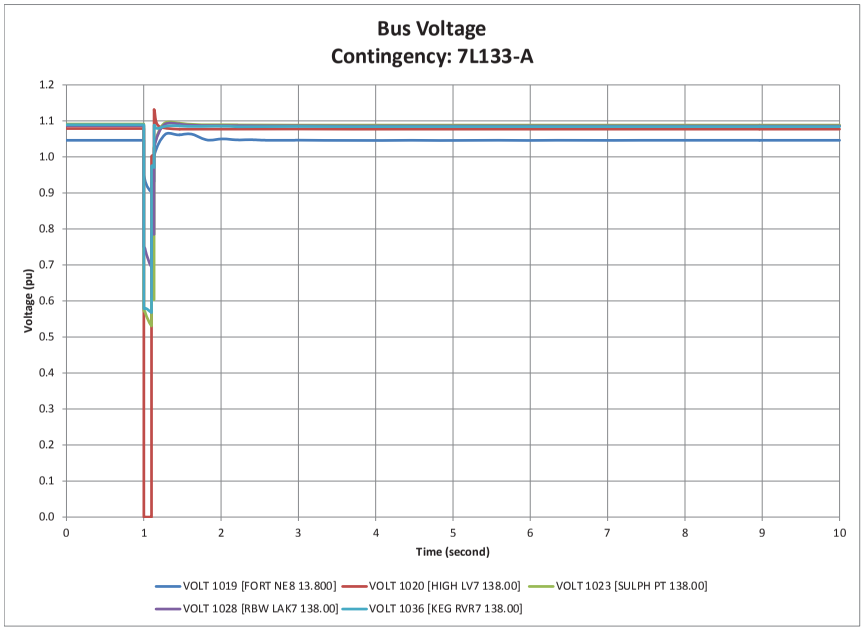

Generator Angle
Contingency: 7L133-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

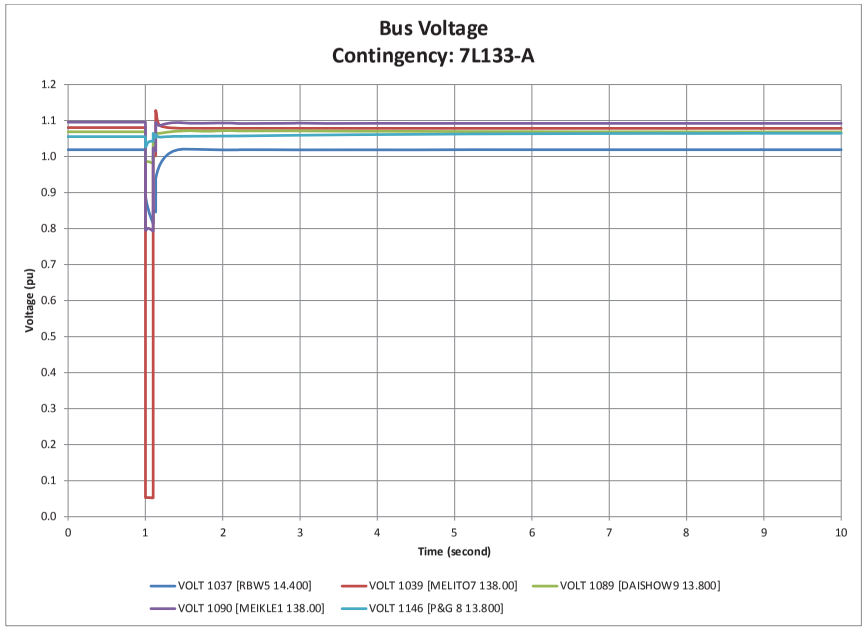

Generator Real Power
Contingency: 7L133-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

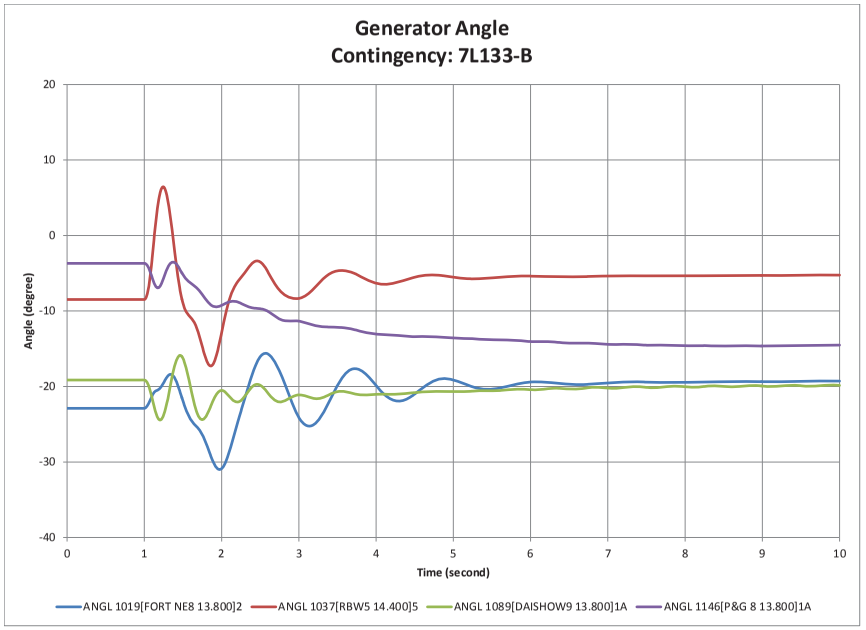

Generator Reactive Power
Contingency: 7L133-A
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

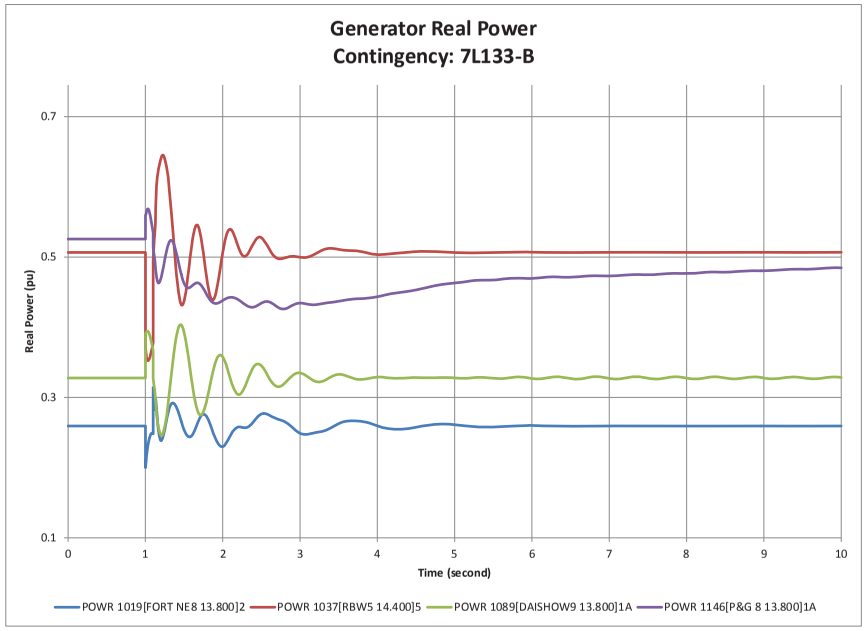

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

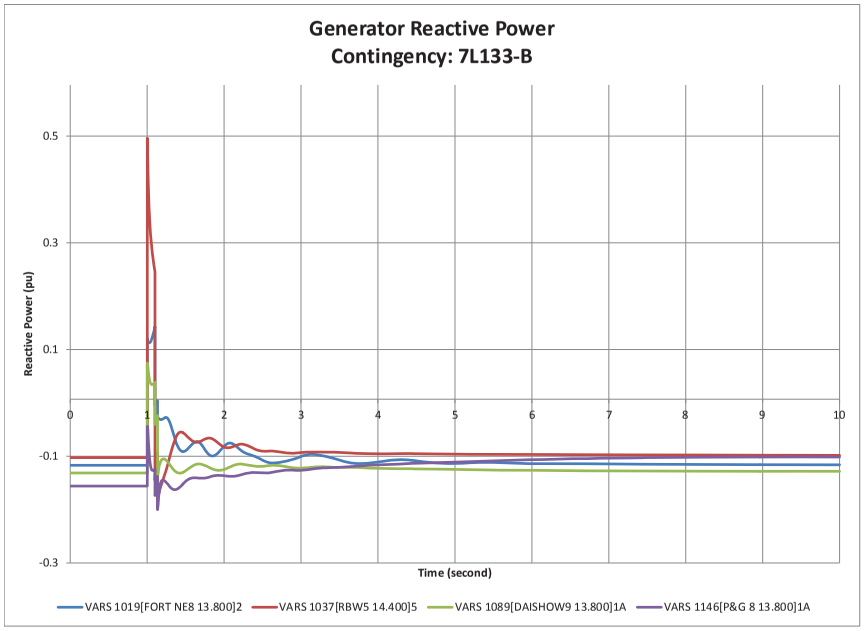

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

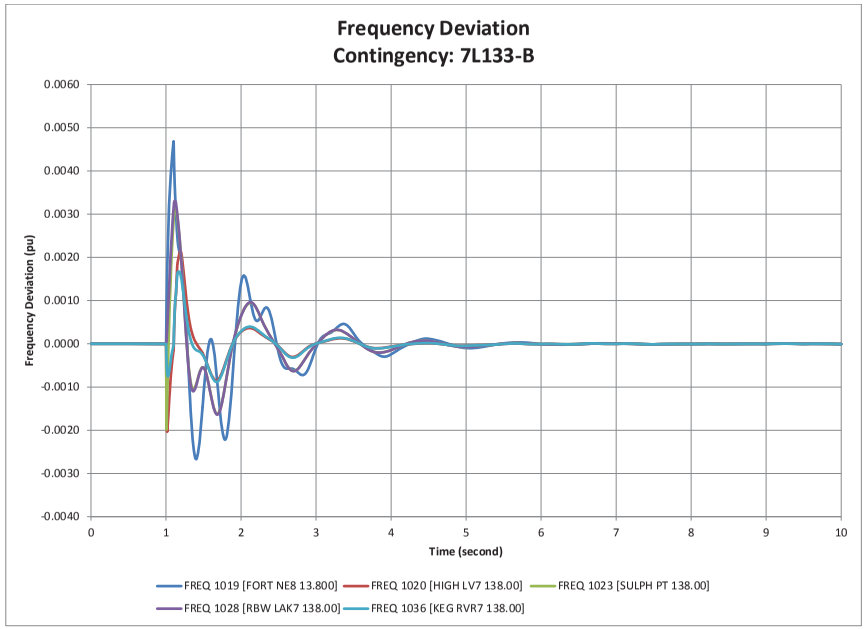

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

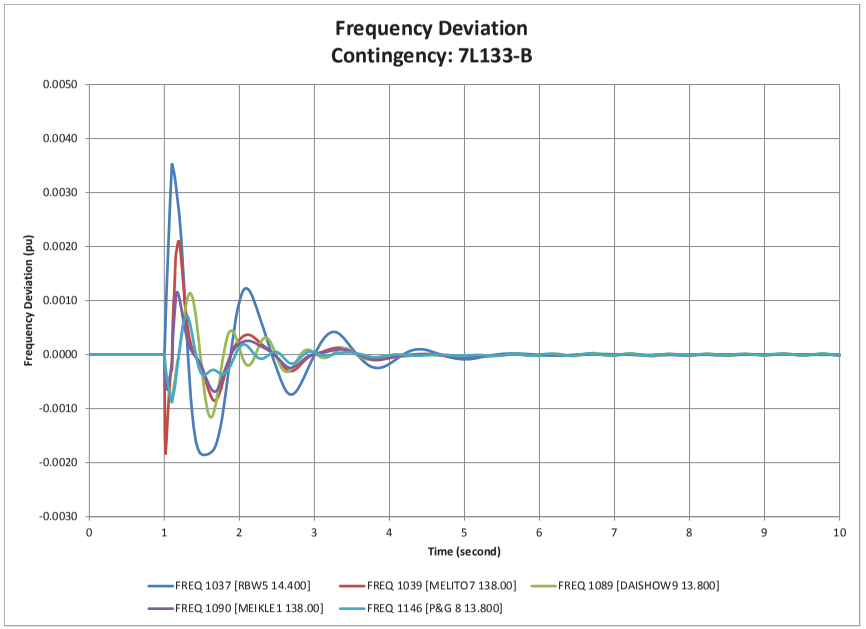

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

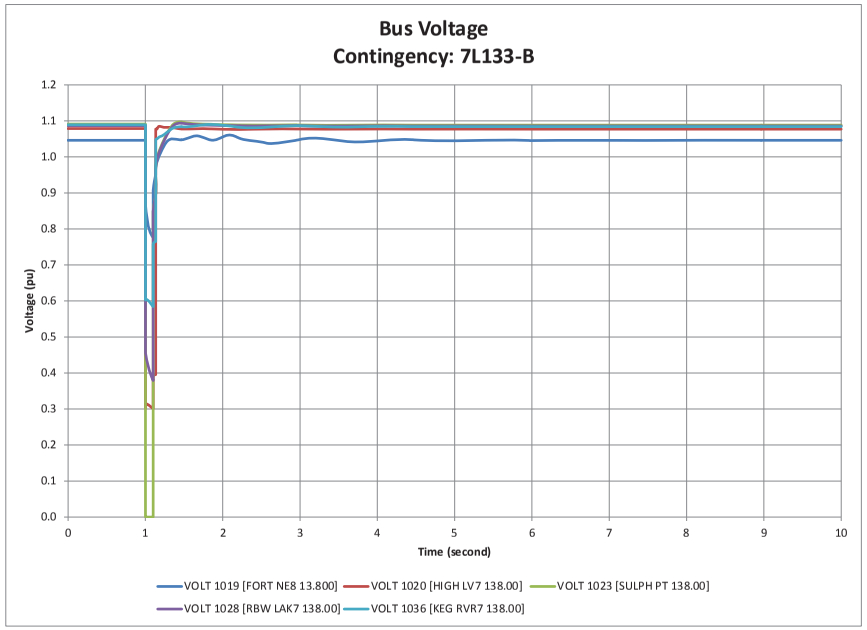

Generator Angle
Contingency: 7L133-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

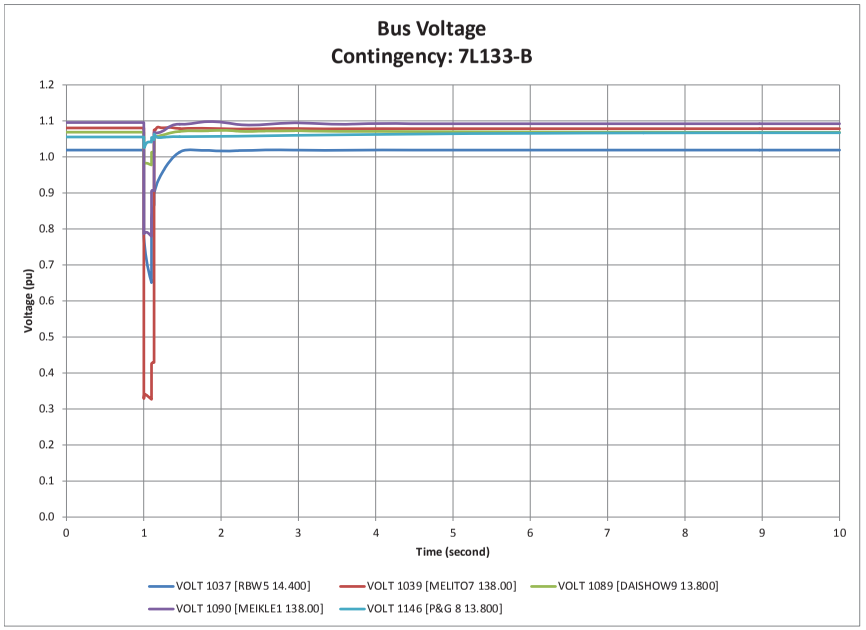

Generator Real Power
Contingency: 7L133-B
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

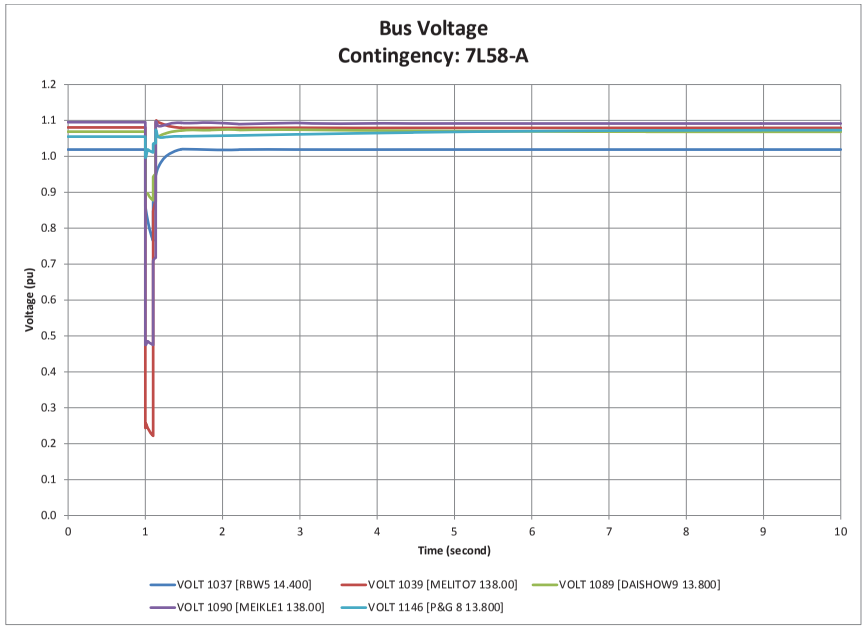

Generator Reactive Power
Contingency: 7L133-B
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

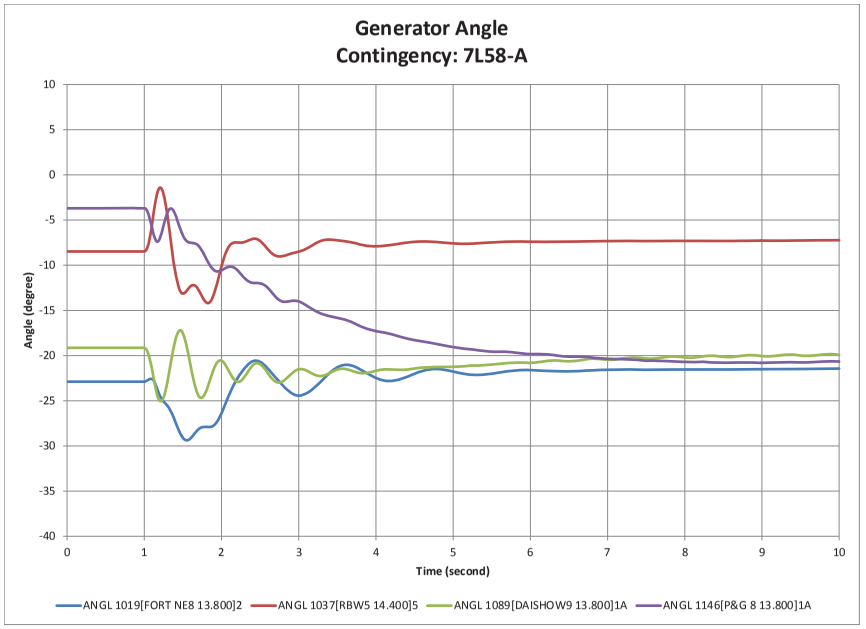

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

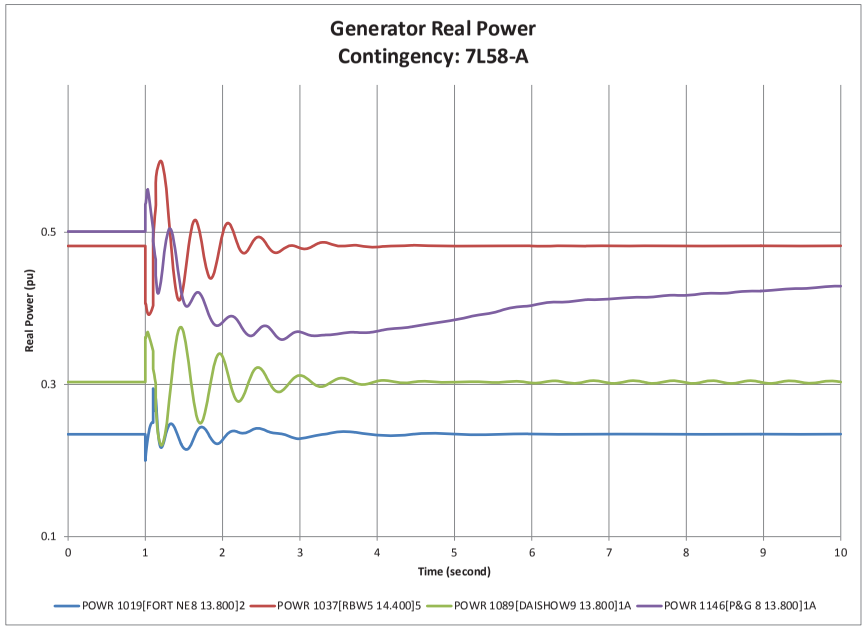

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

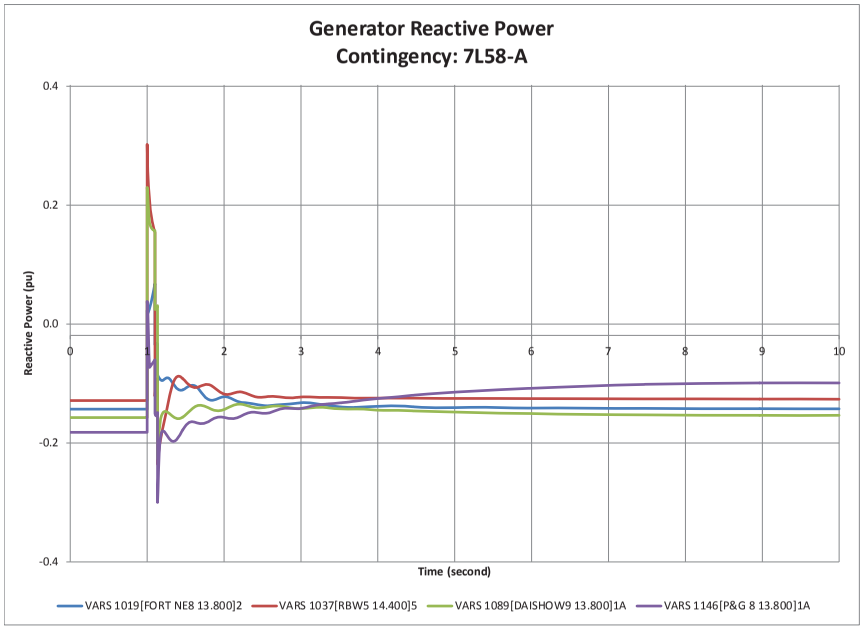

Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

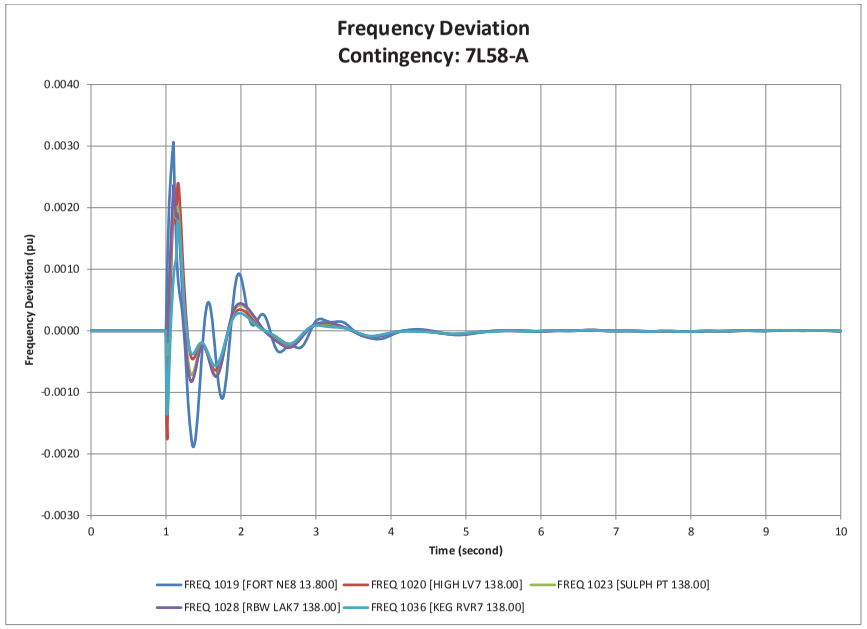

Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

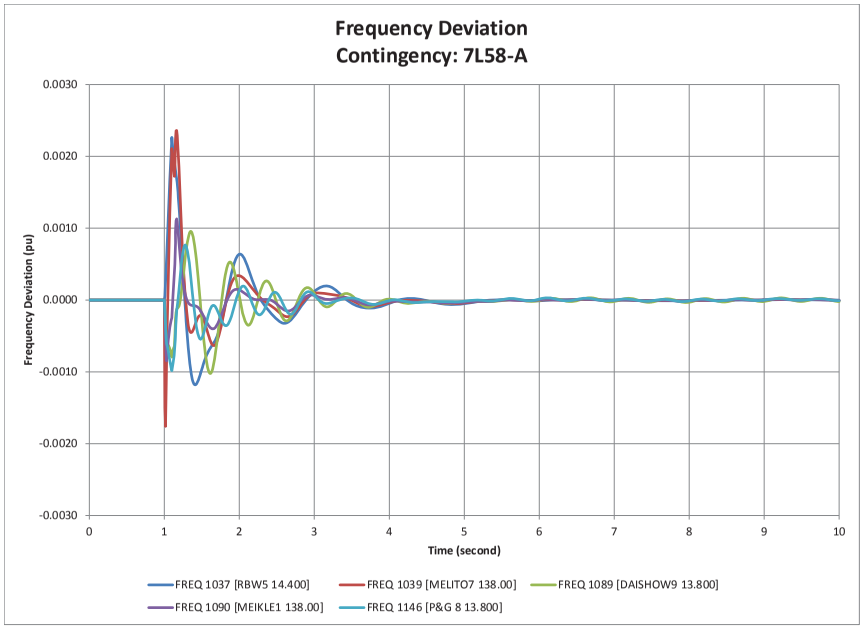

Bus Voltage
Contingency: 7L58-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

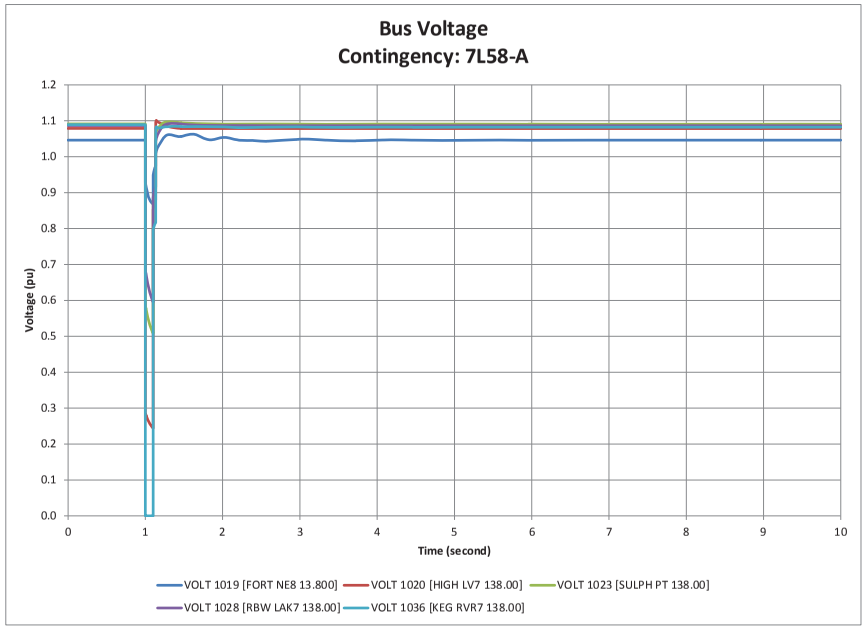

Generator Angle
Contingency: 7L58-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

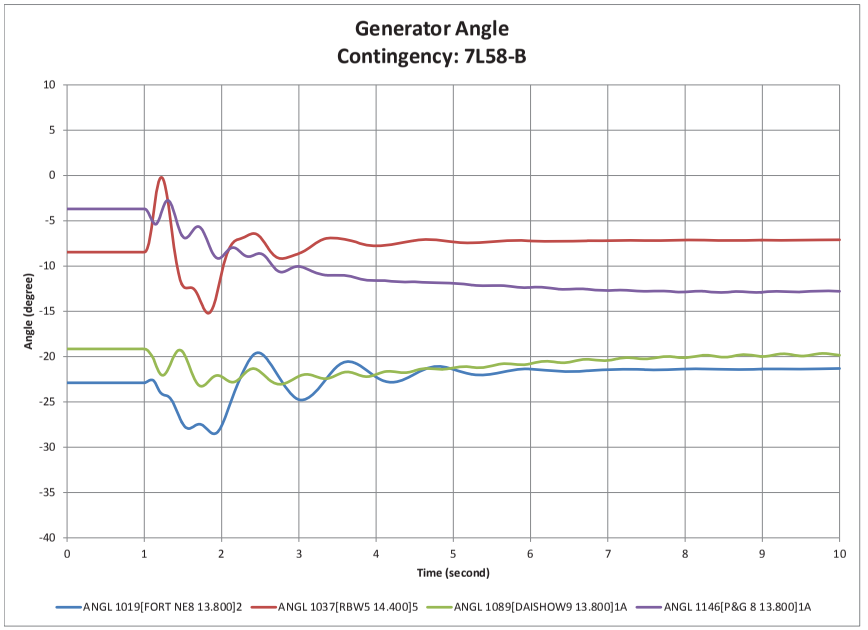

Generator Real Power
Contingency: 7L58-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

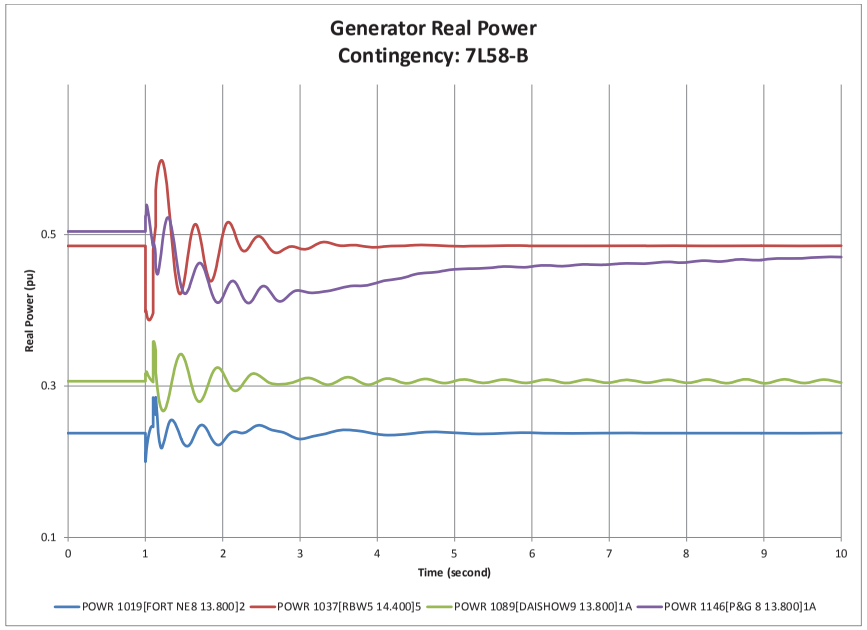

Generator Reactive Power
Contingency: 7L58-A
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

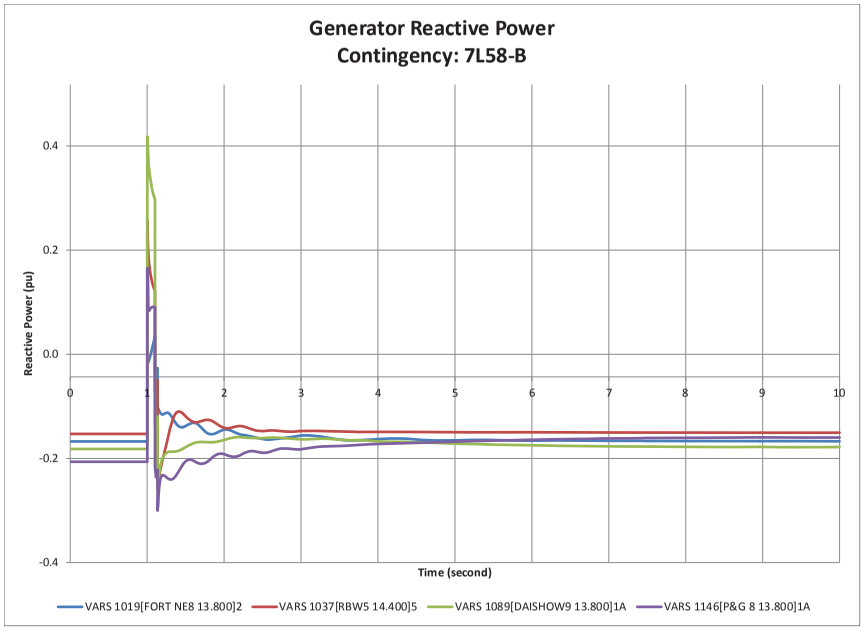

Frequency Deviation
Contingency: 7L58-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

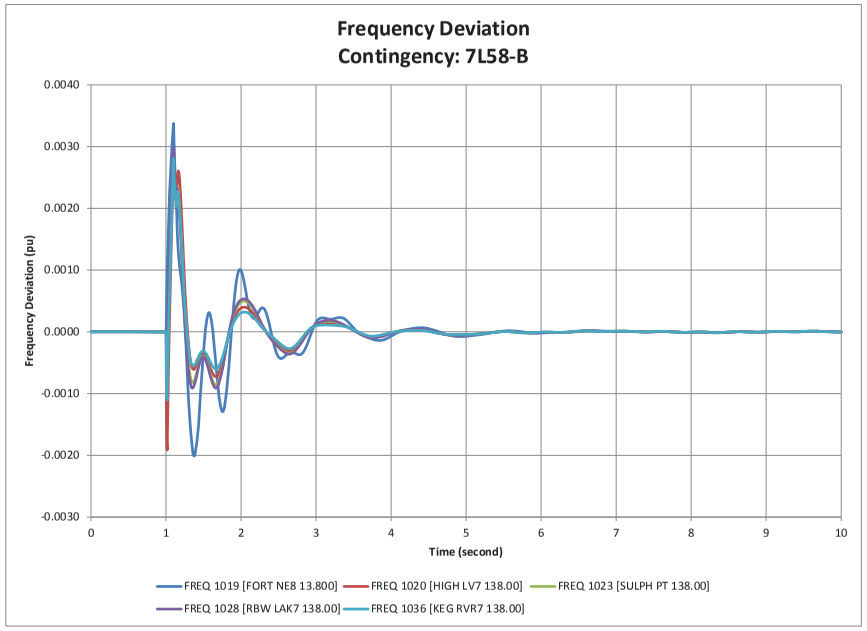

Frequency Deviation
Contingency: 7L58-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

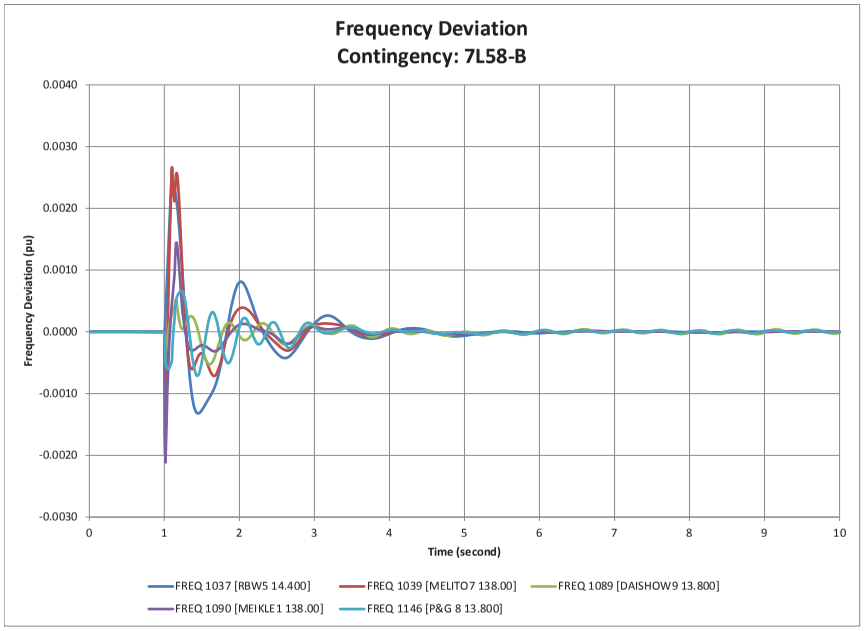

Bus Voltage
Contingency: 7L58-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

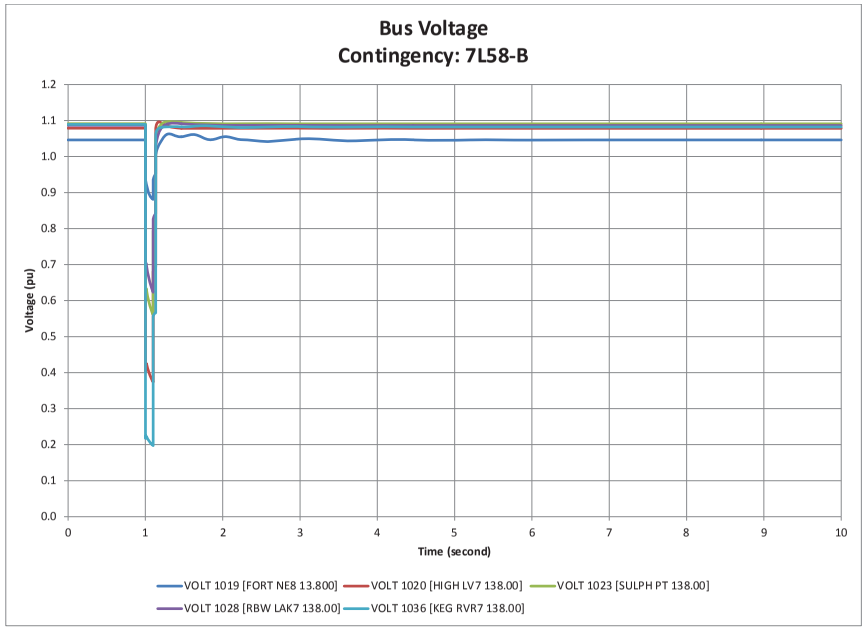

Generator Angle
Contingency: 7L58-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

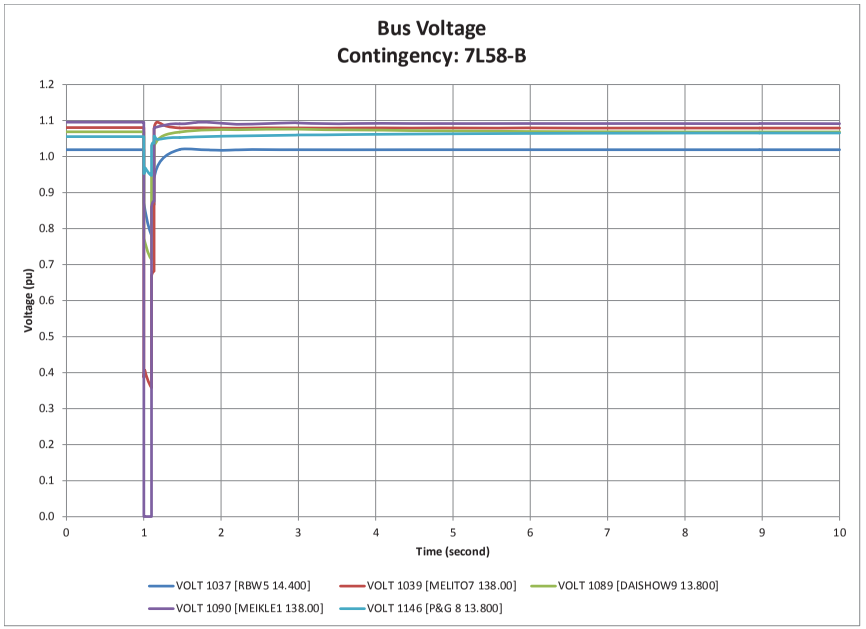

Generator Real Power
Contingency: 7L58-B
Real Power (pu)
0.5
0.3
0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

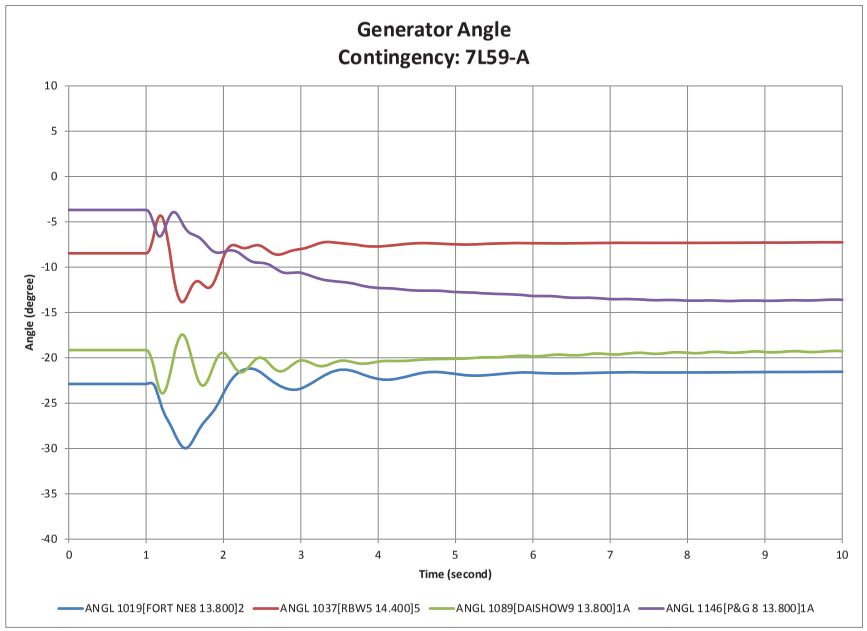

Generator Reactive Power
Contingency: 7L58-B
Reactive Power (pu)
0.4
0.2
0.0
-0.2
-0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

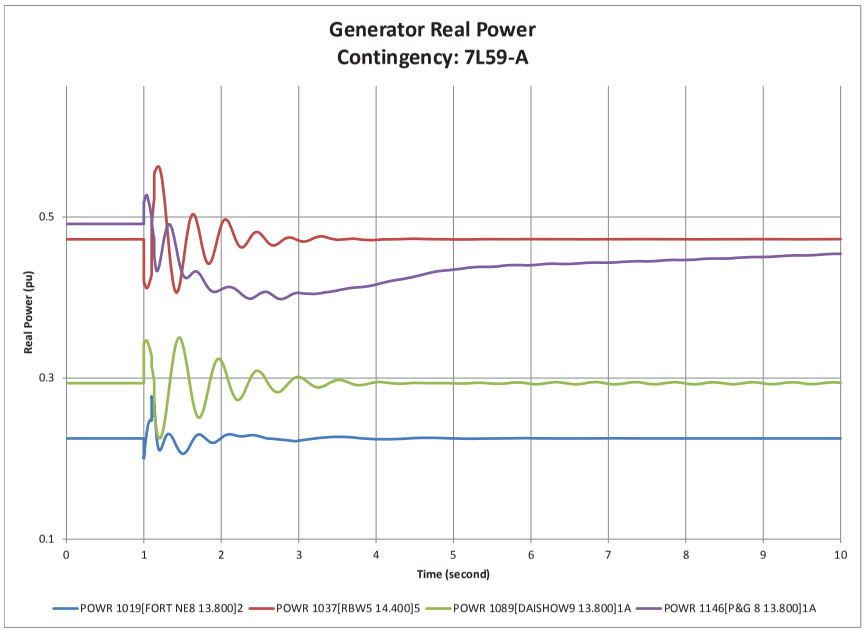

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

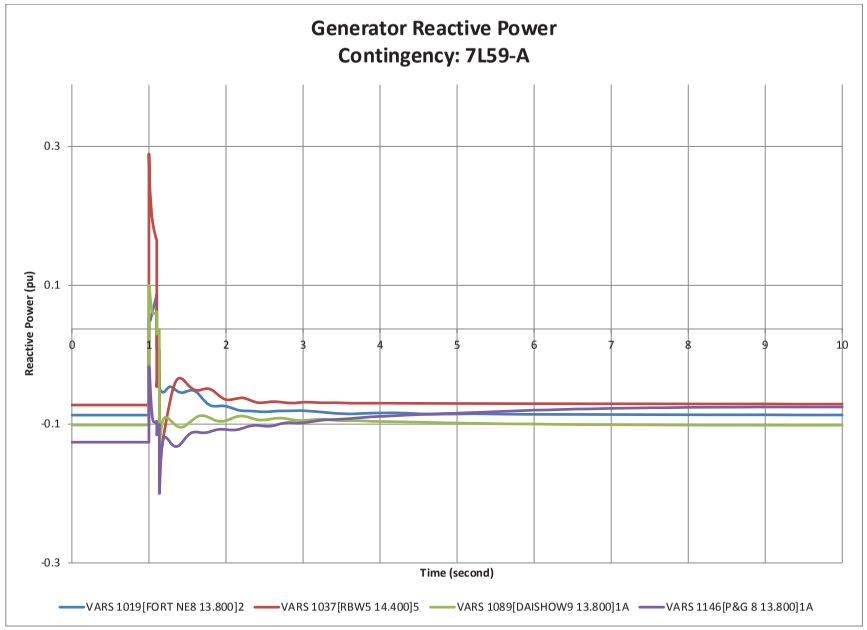

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

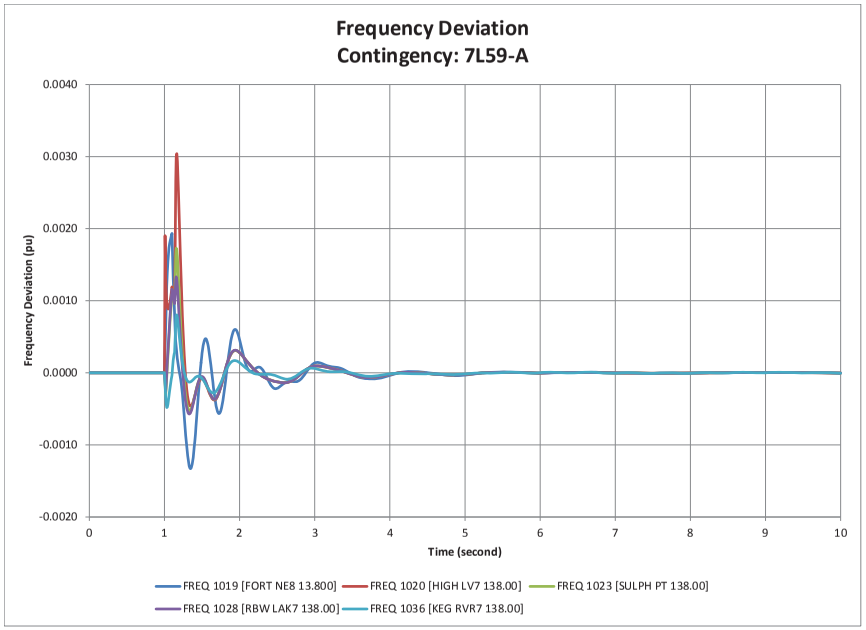

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

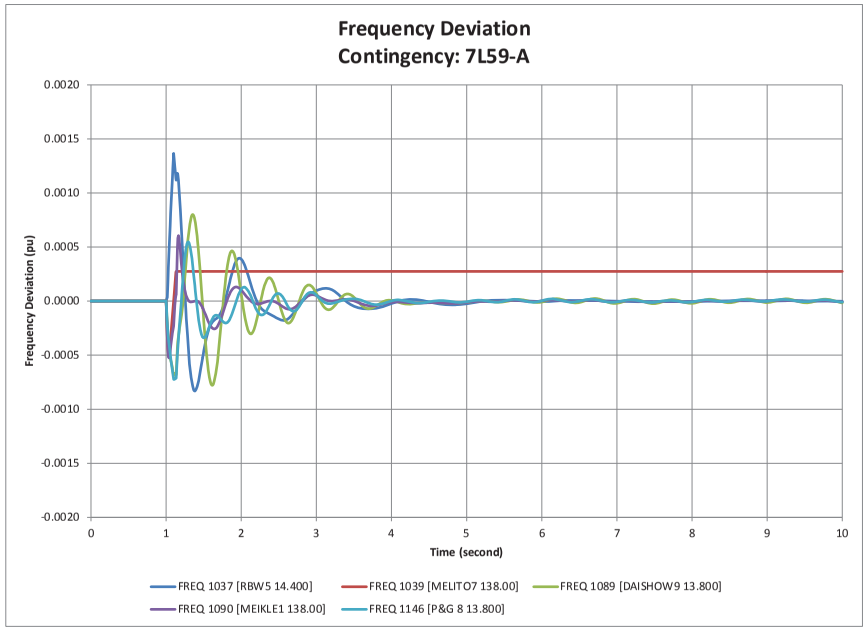

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

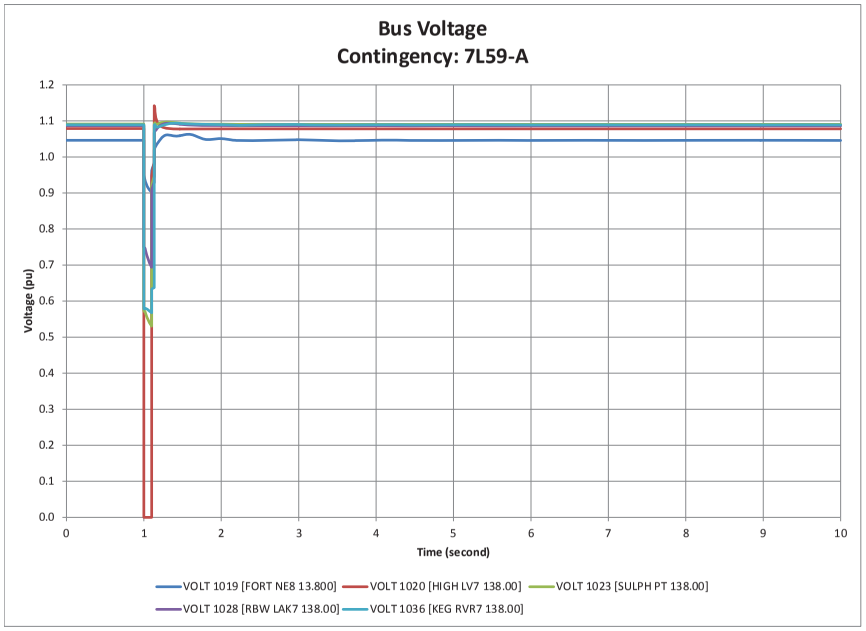

Generator Angle
Contingency: 7L59-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

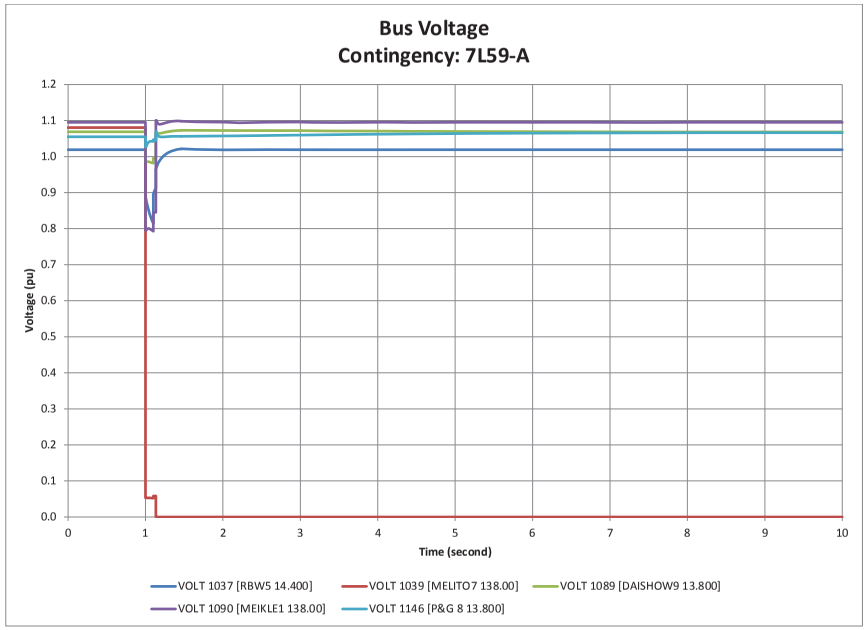

Generator Real Power
Contingency: 7L59-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

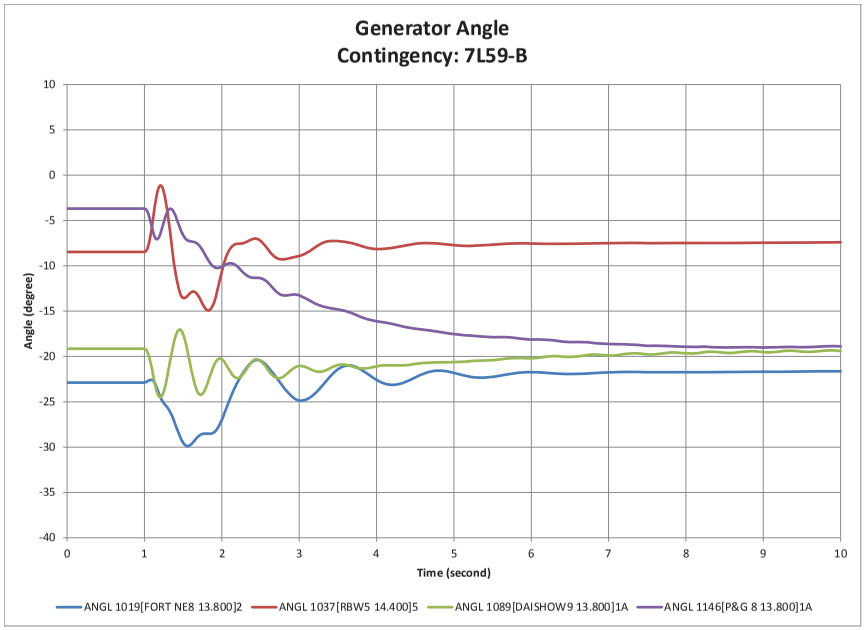

Generator Reactive Power
Contingency: 7L59-A
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

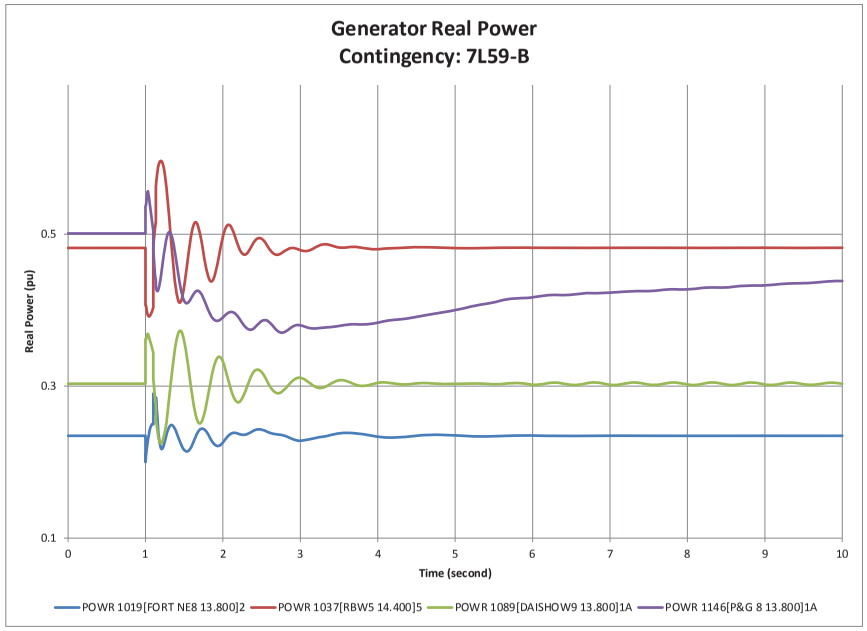

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

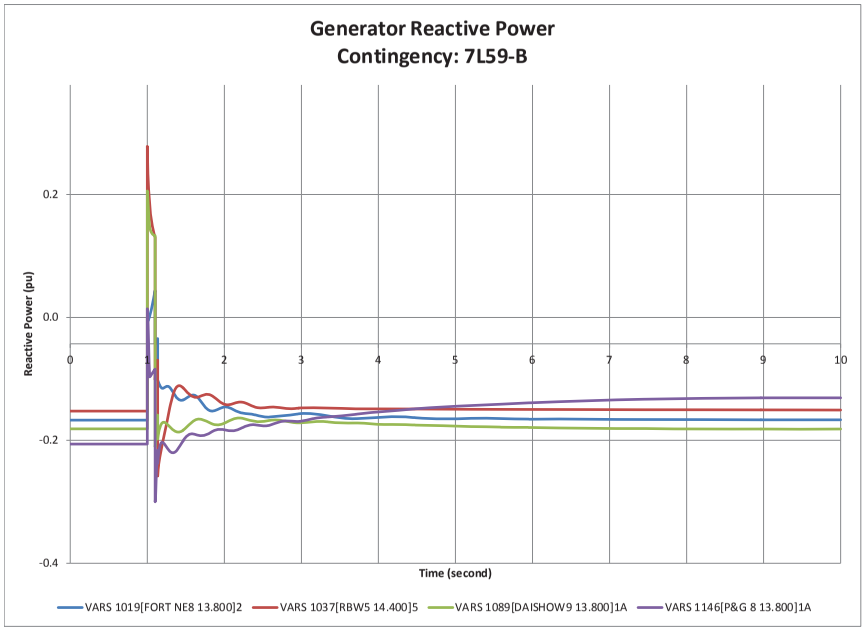

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

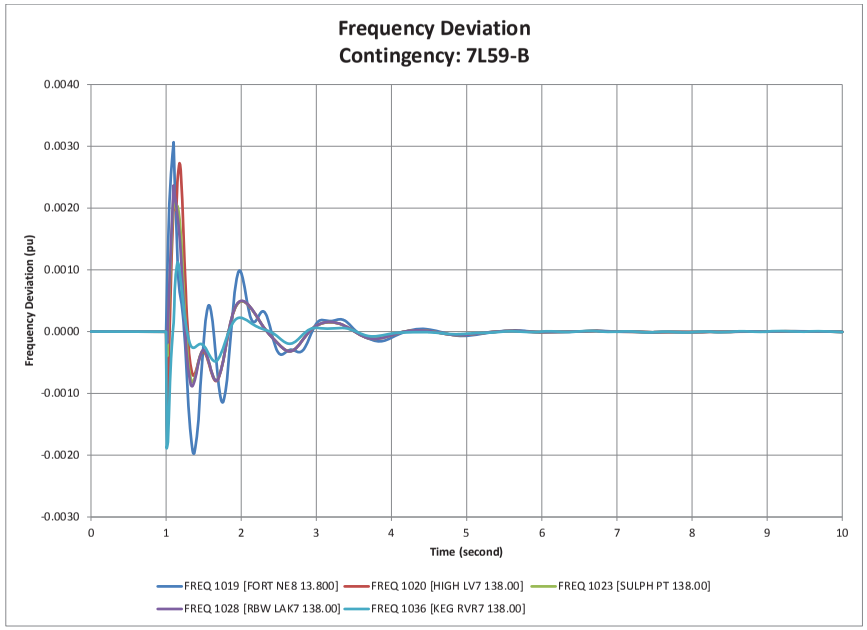

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

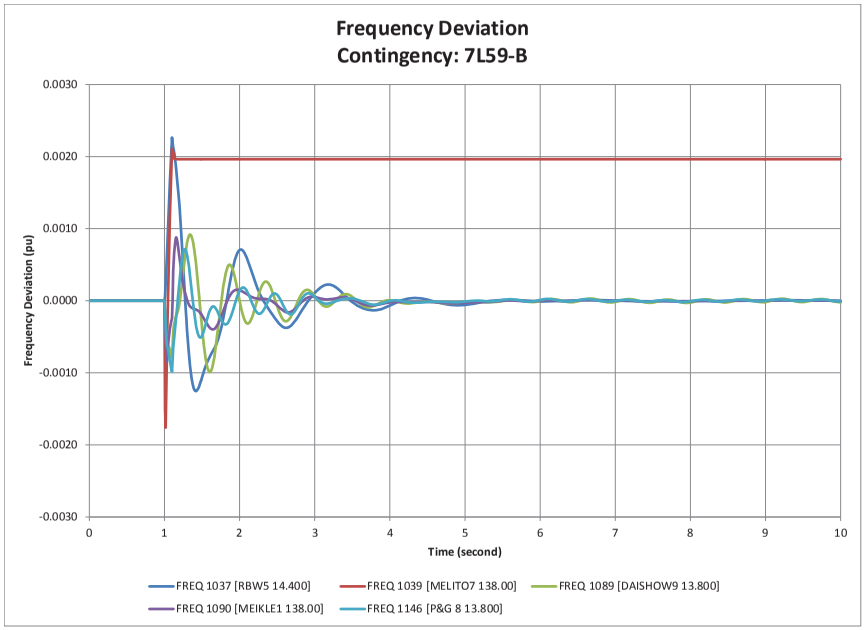

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

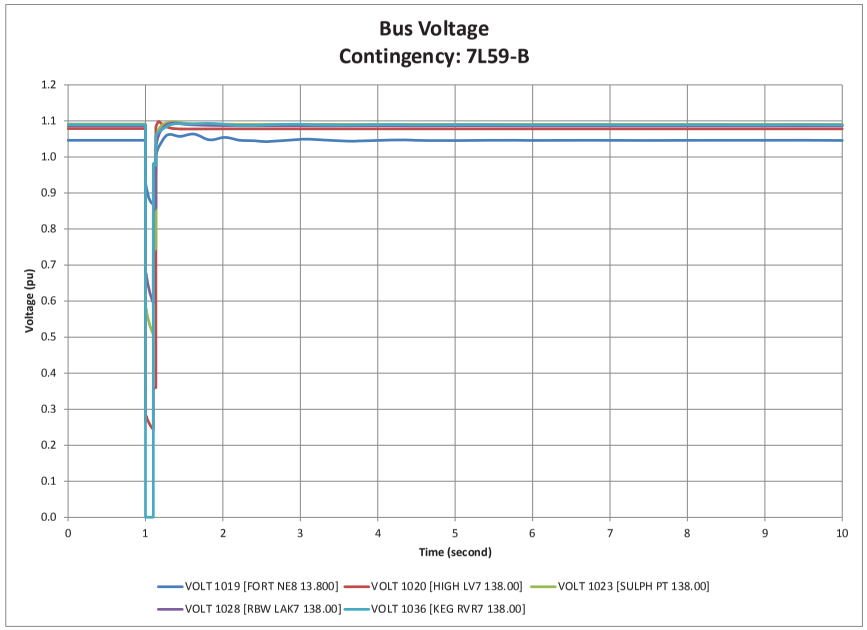

Generator Angle
Contingency: 7L59-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

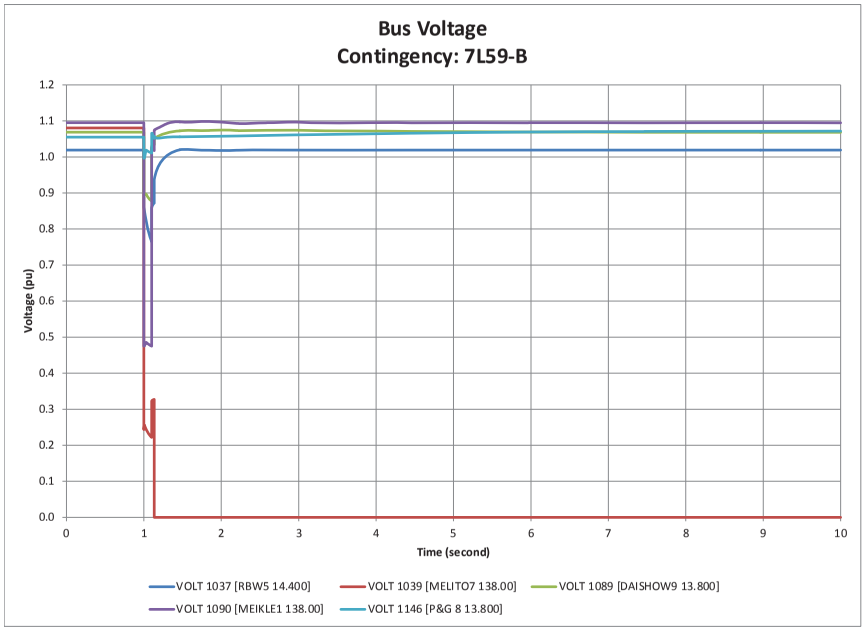

Generator Real Power
Contingency: 7L59-B
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

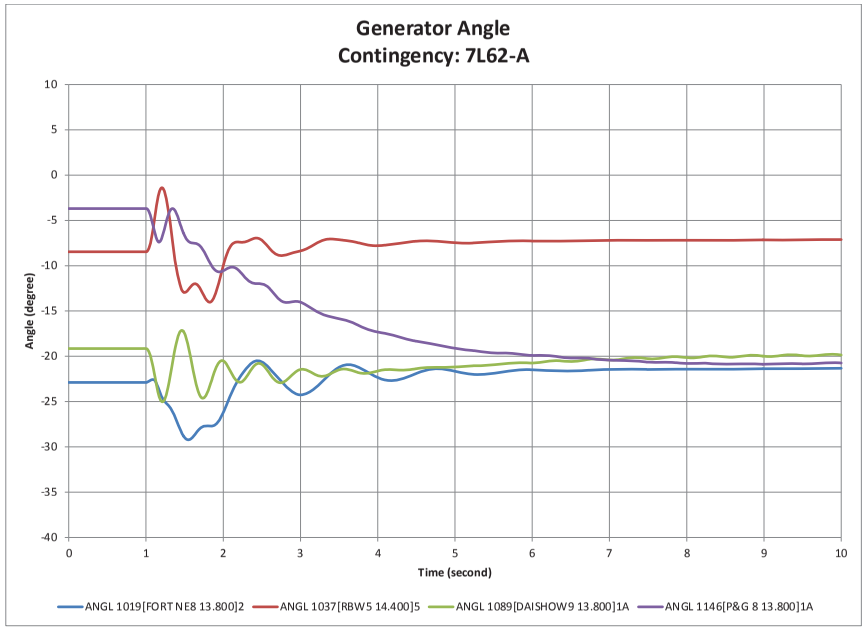

Generator Reactive Power
Contingency: 7L59-B
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

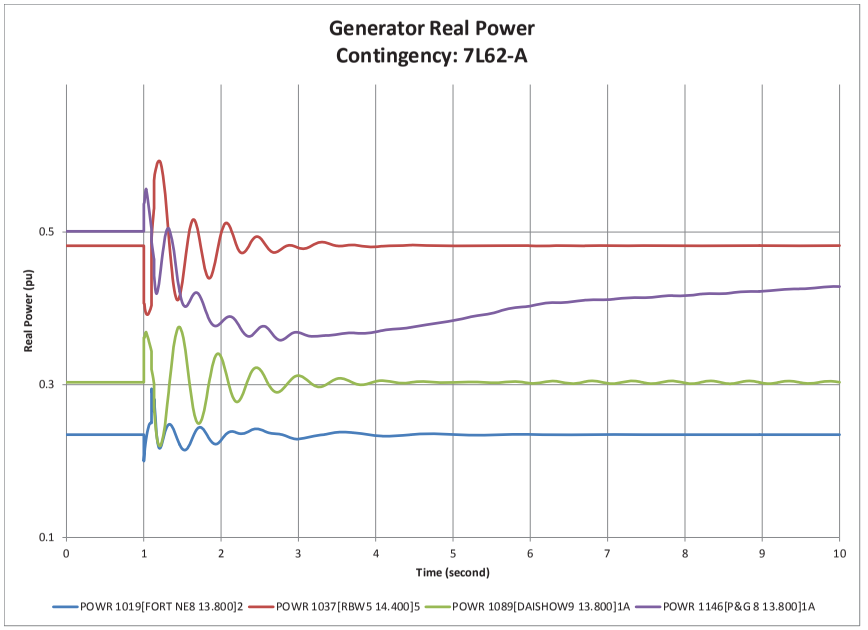

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

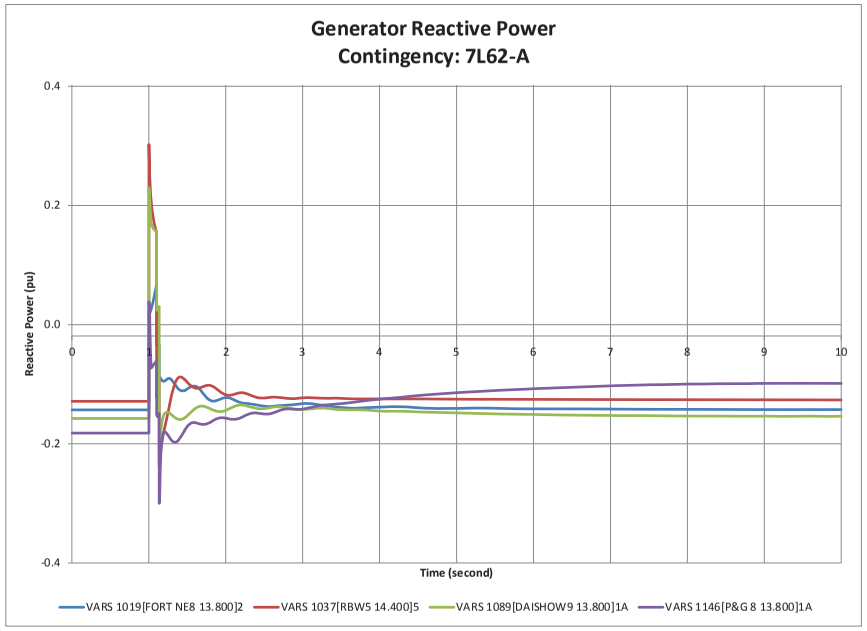

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

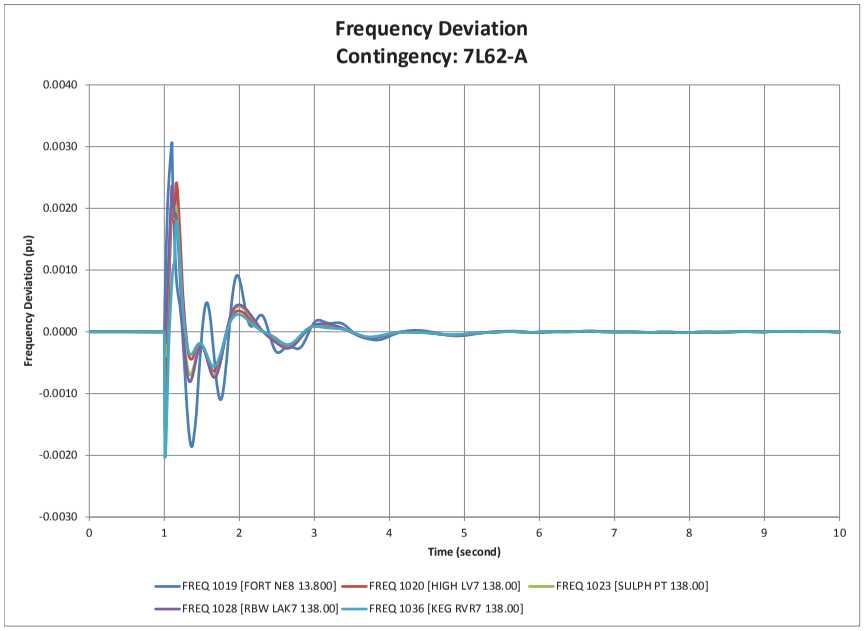

Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

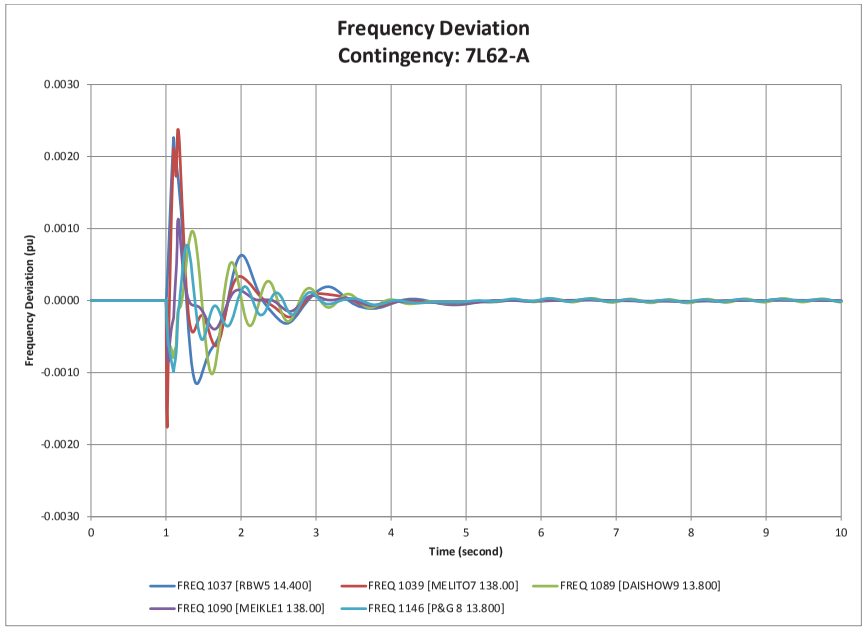

Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

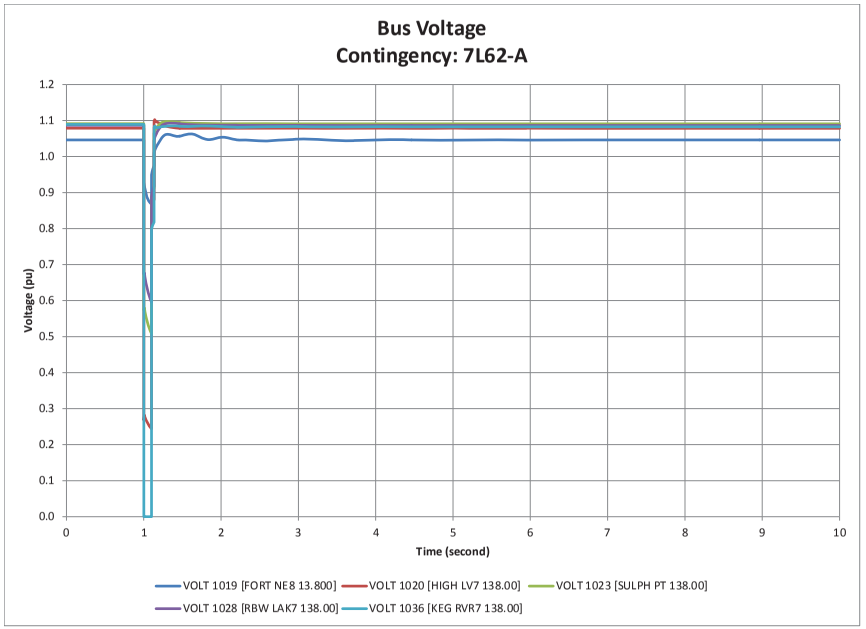

Generator Angle
Contingency: 7L62-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

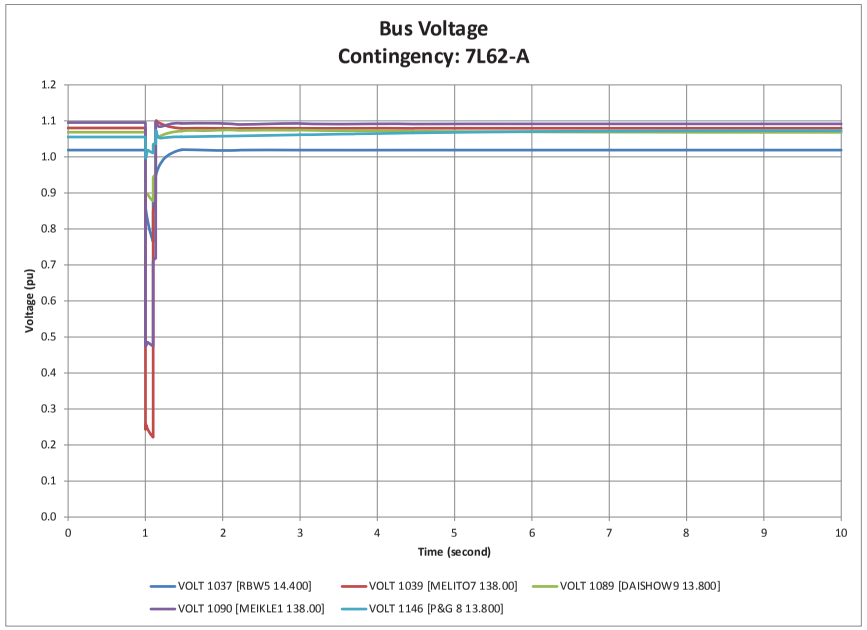

Generator Real Power
Contingency: 7L62-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

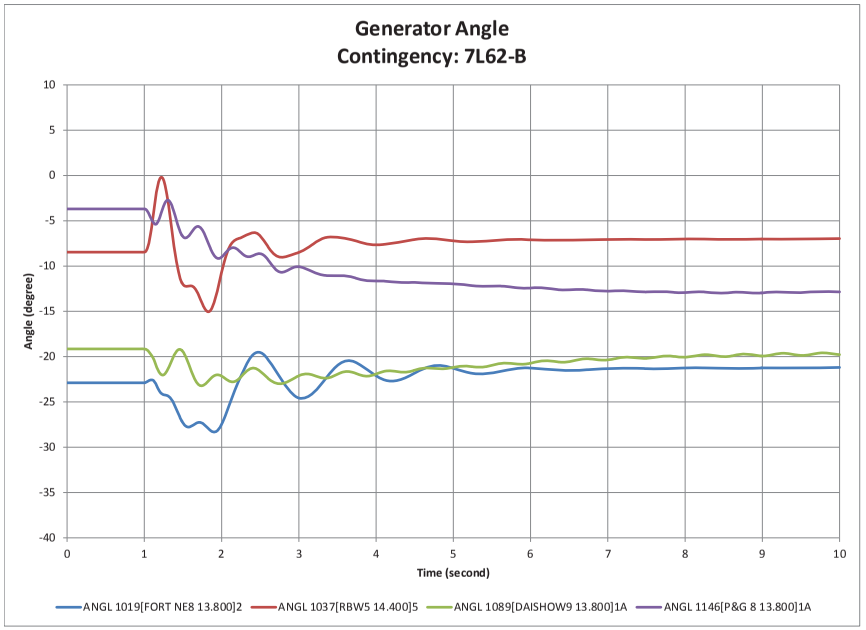

Generator Reactive Power
Contingency: 7L62-A
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

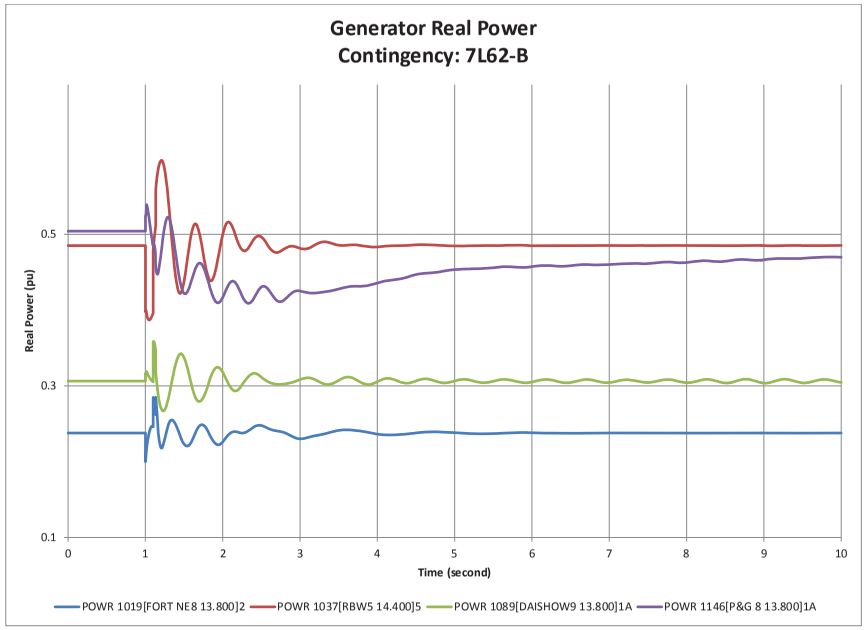

Frequency Deviation
Contingency: 7L62-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

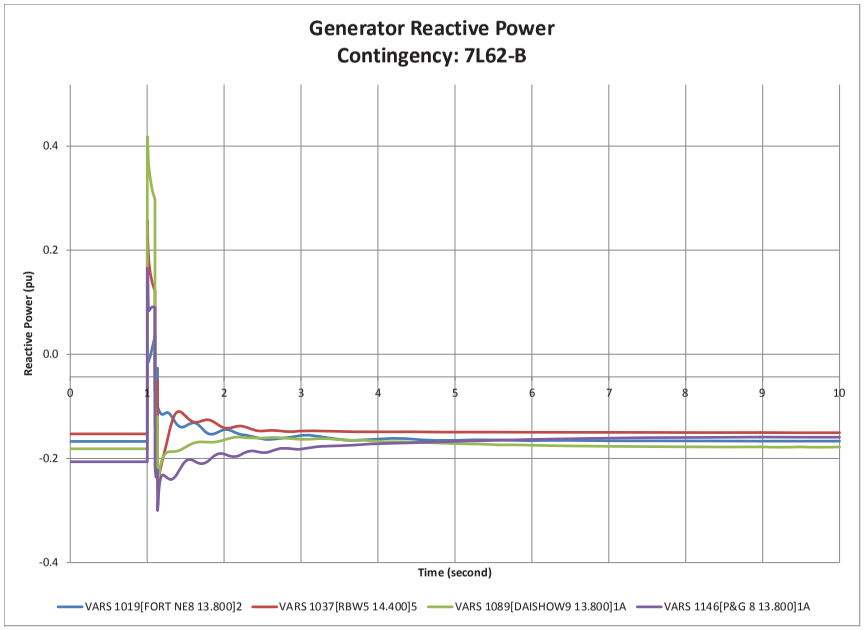

Frequency Deviation
Contingency: 7L62-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

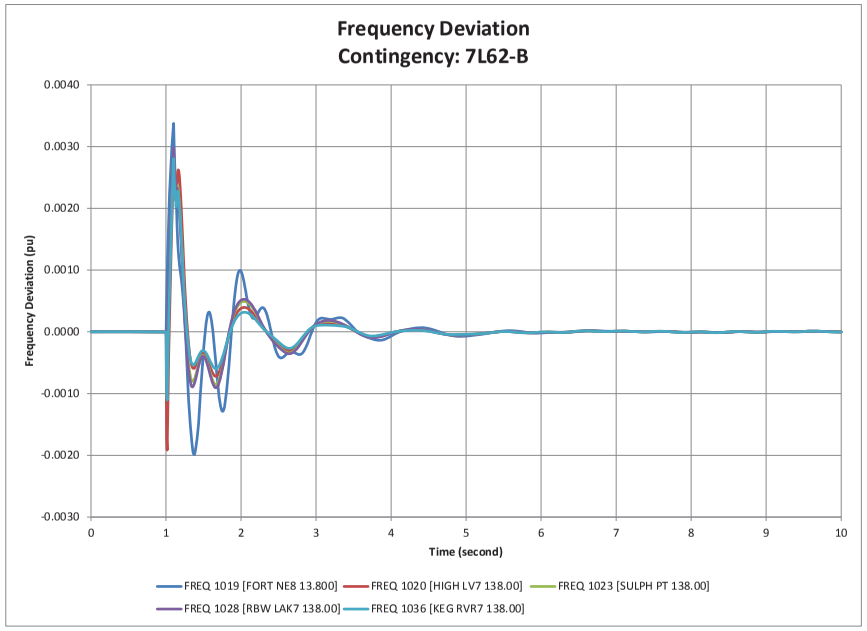

Bus Voltage
Contingency: 7L62-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

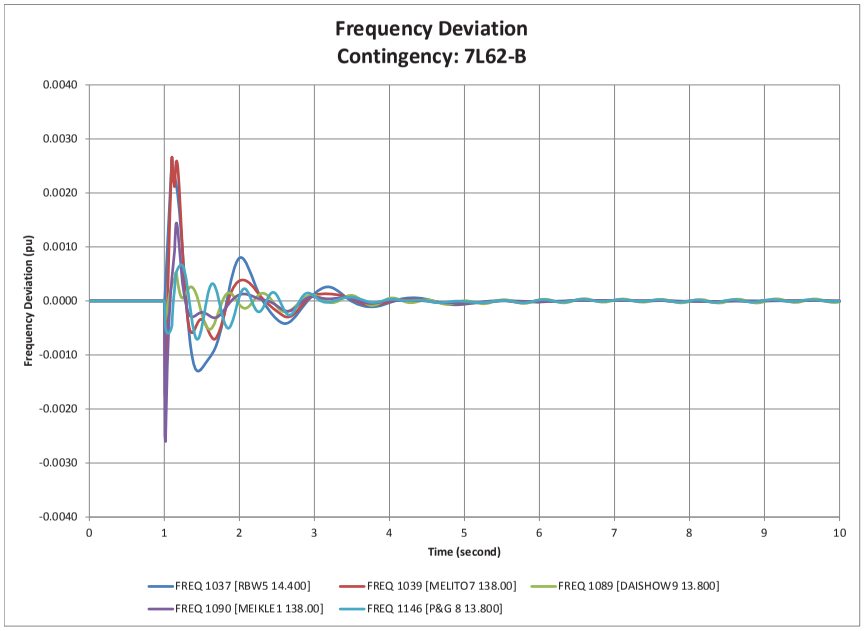

Bus Voltage
Contingency: 7L62-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

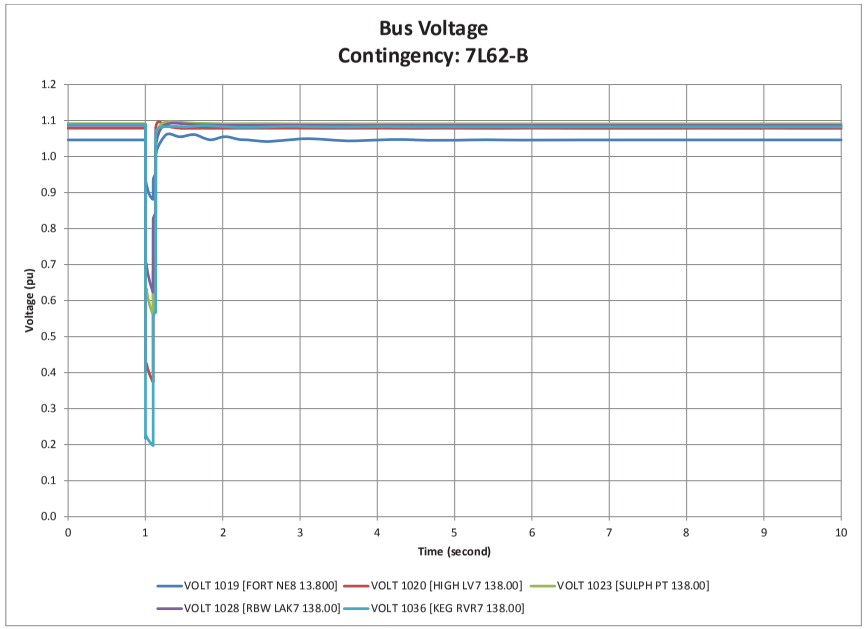

Generator Angle
Contingency: 7L62-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

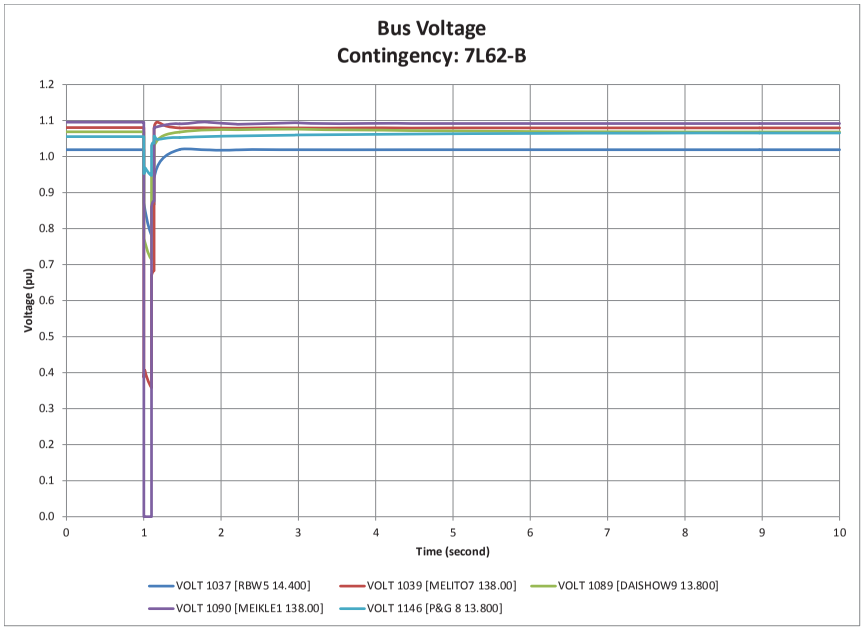

Generator Real Power
Contingency: 7L62-B
Real Power (pu)
0.5
0.3
0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

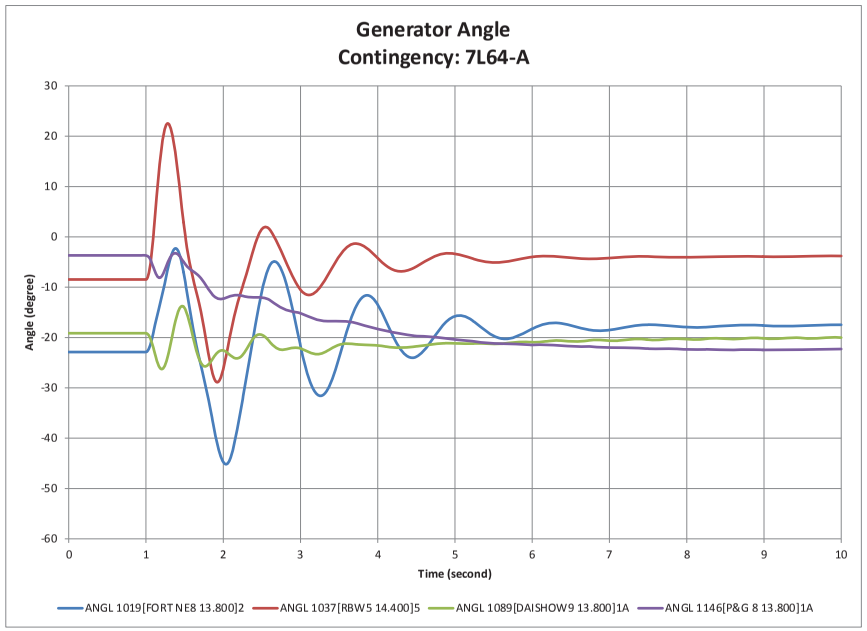

Generator Reactive Power
Contingency: 7L62-B
Reactive Power (pu)
0.4
0.2
0.0
-0.2
-0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

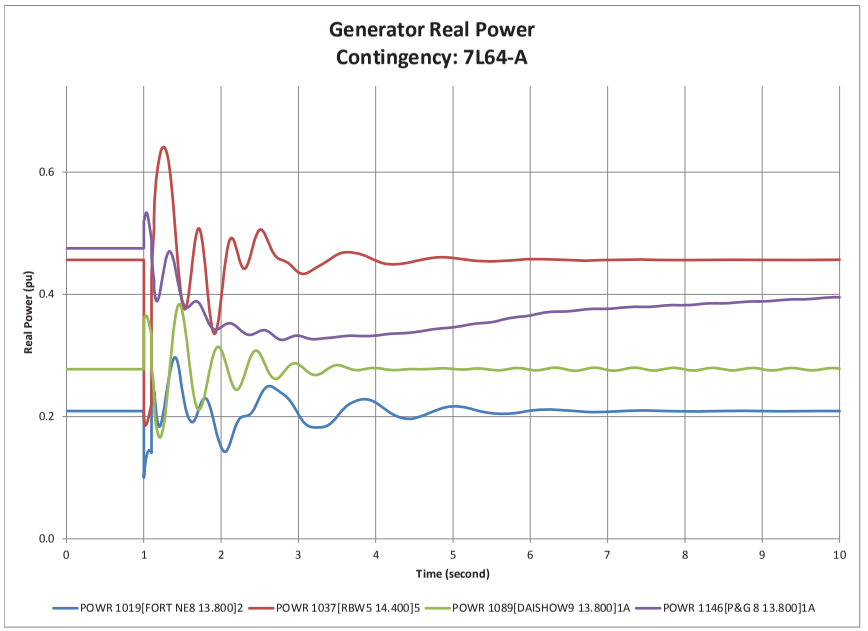

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

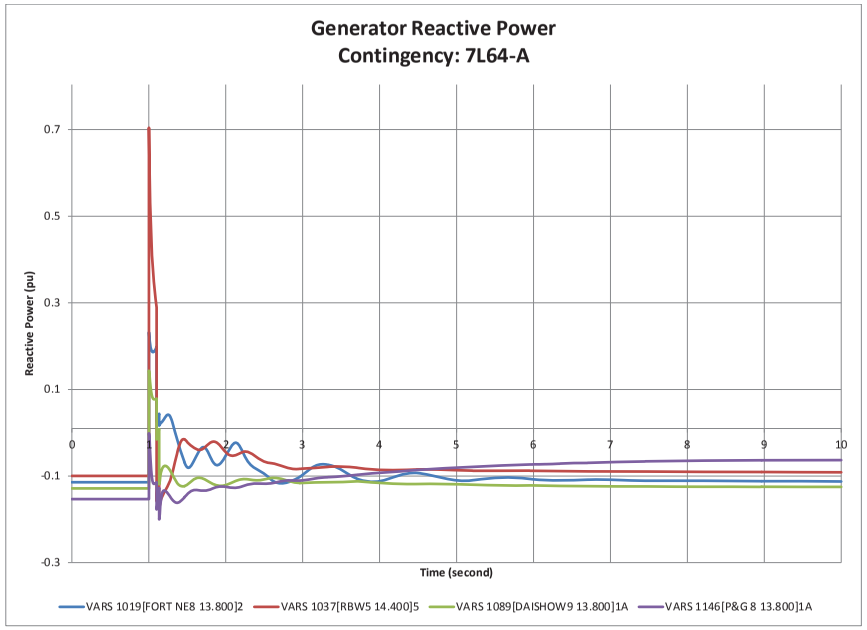

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

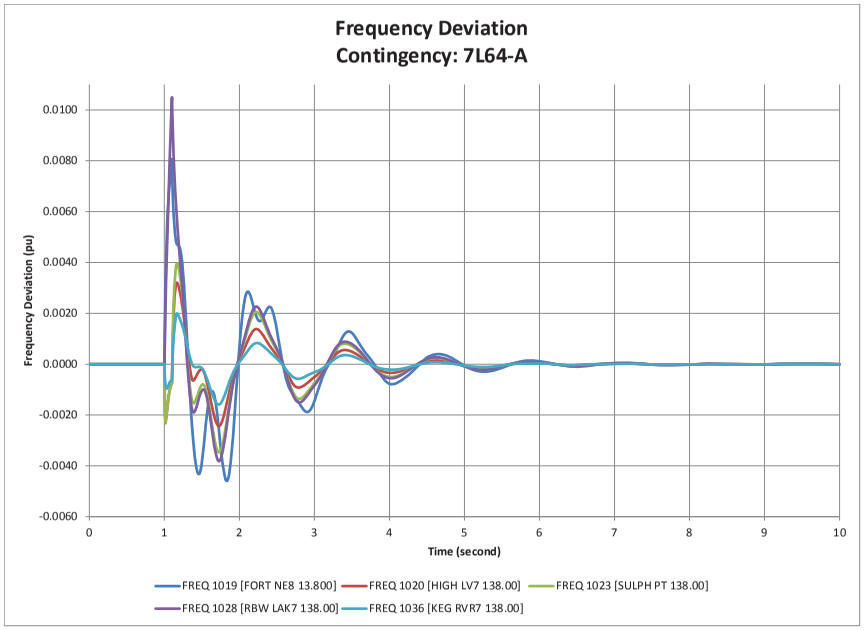

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

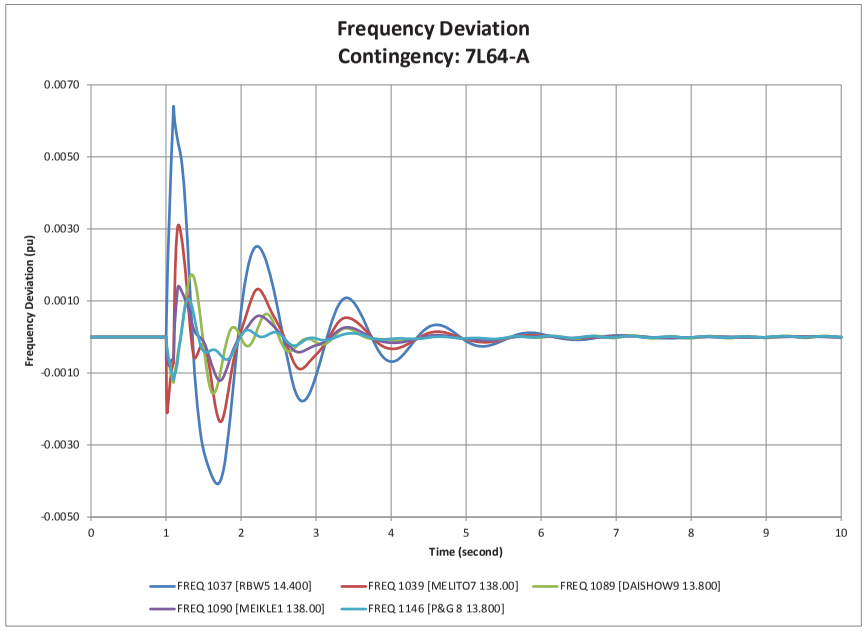

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

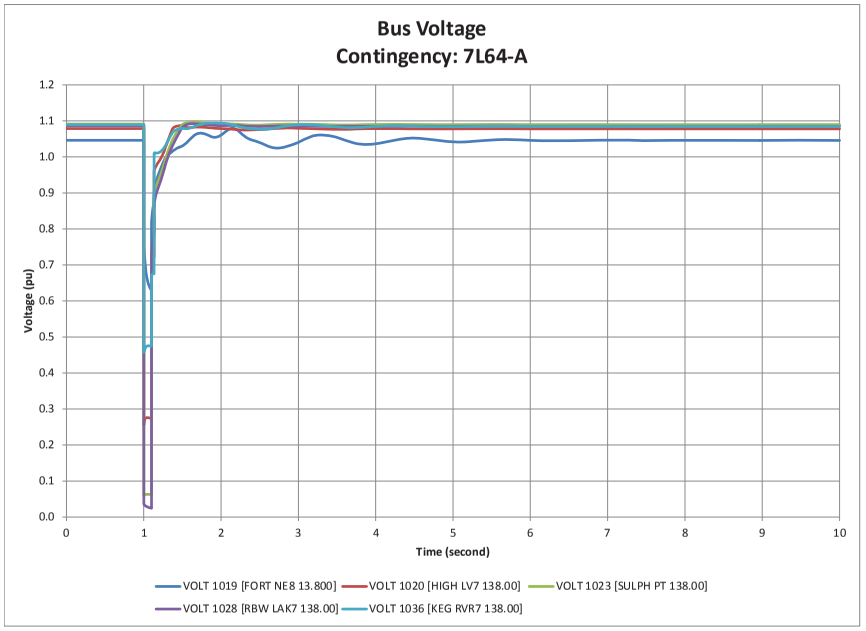

Generator Angle
Contingency: 7L64-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

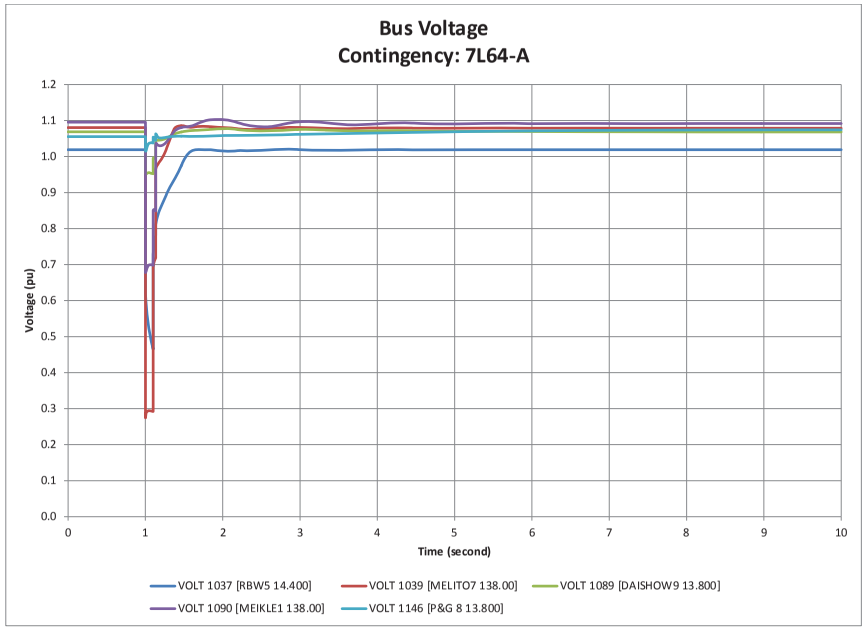

Generator Real Power
Contingency: 7L64-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

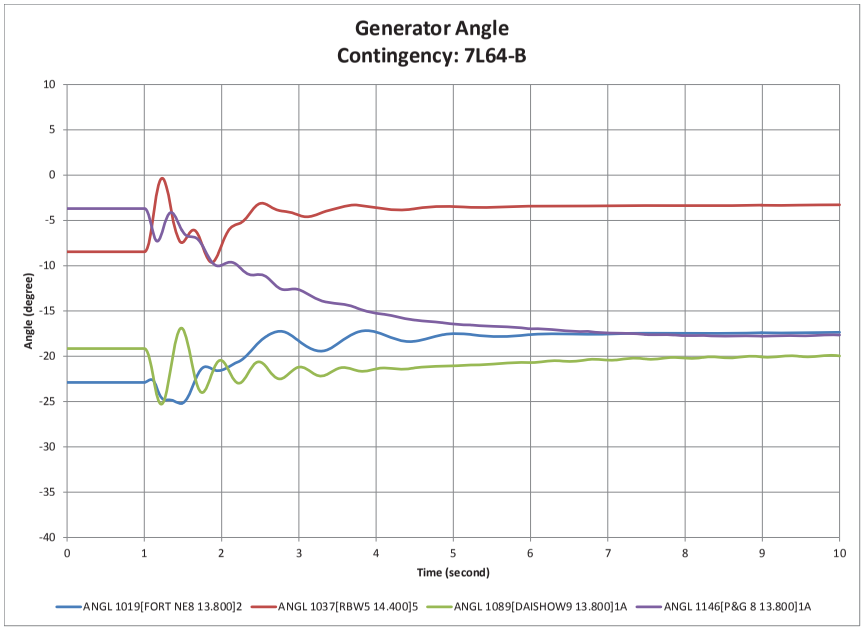

Generator Reactive Power
Contingency: 7L64-A
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

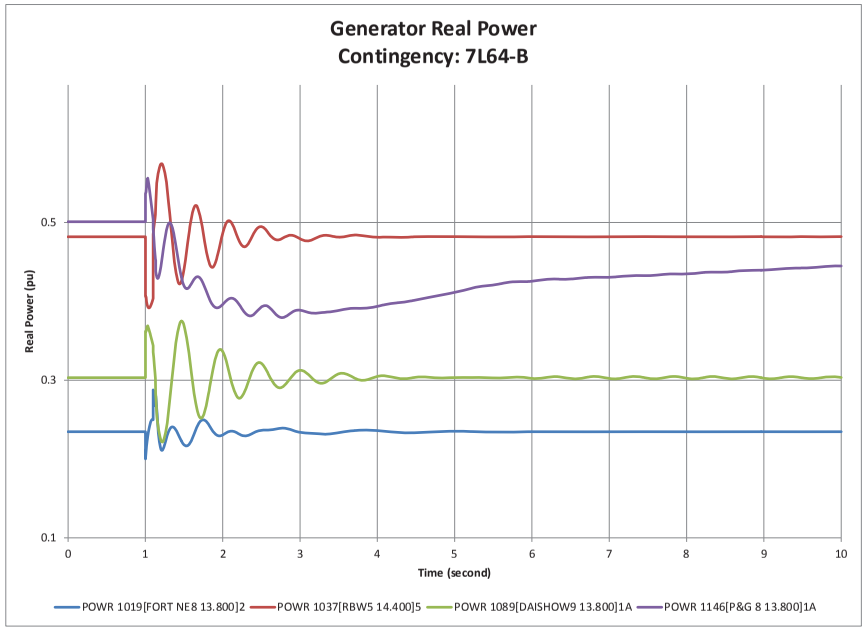

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

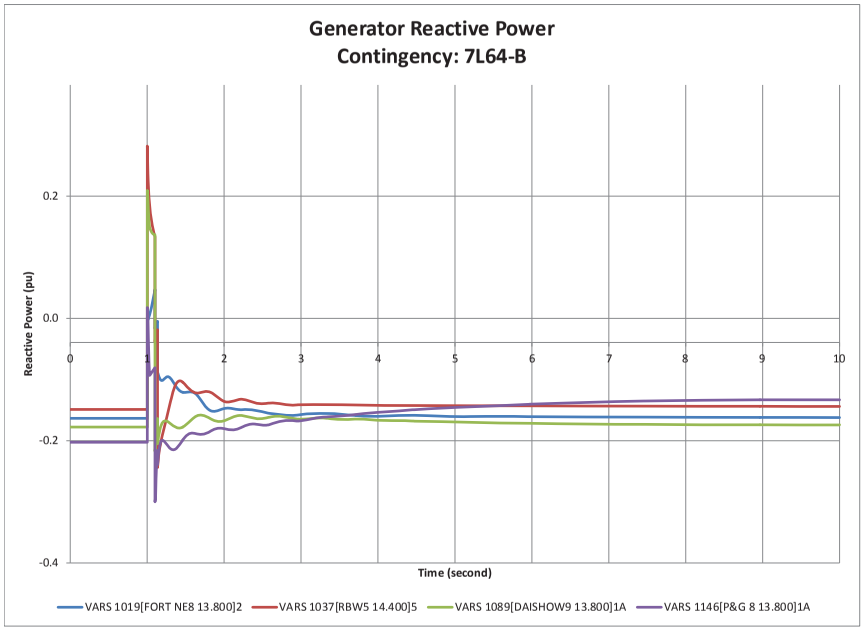

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

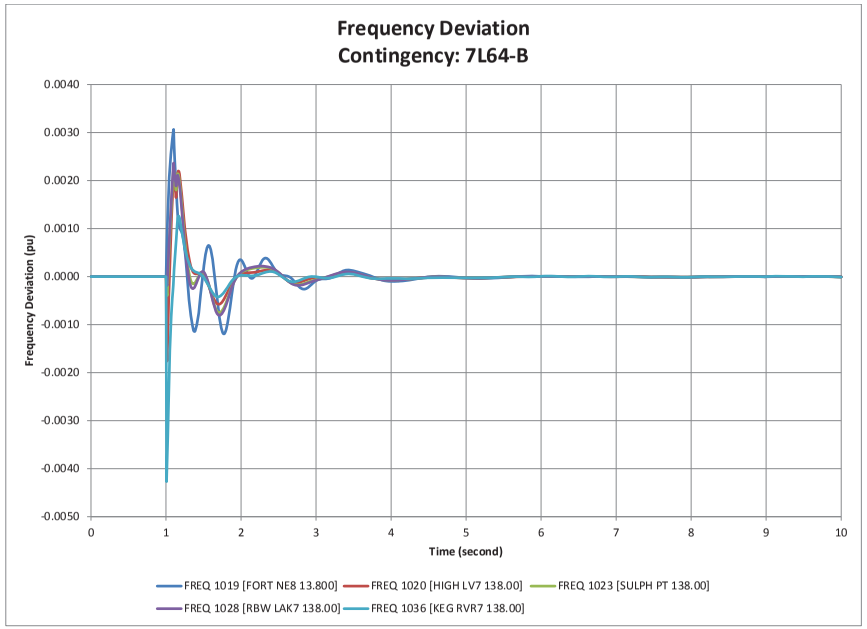

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

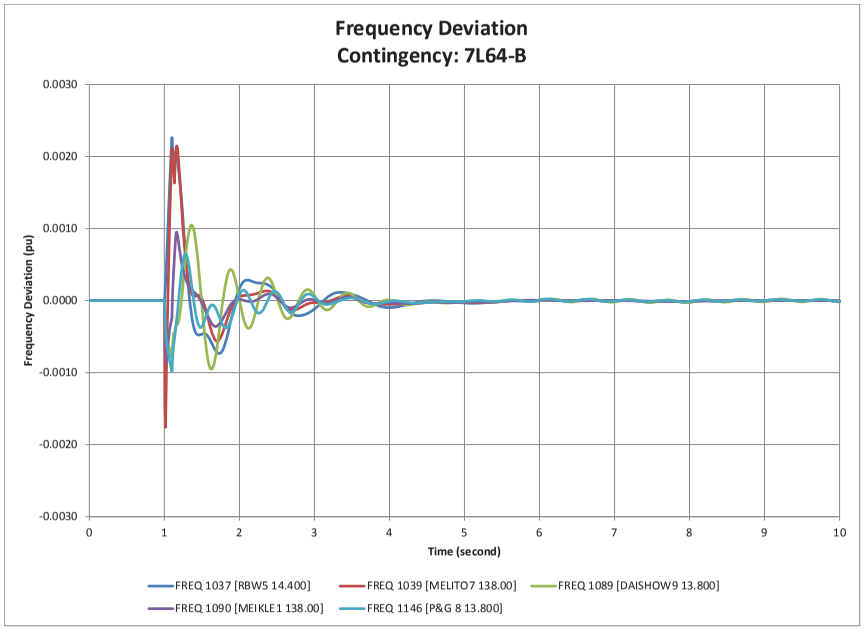

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

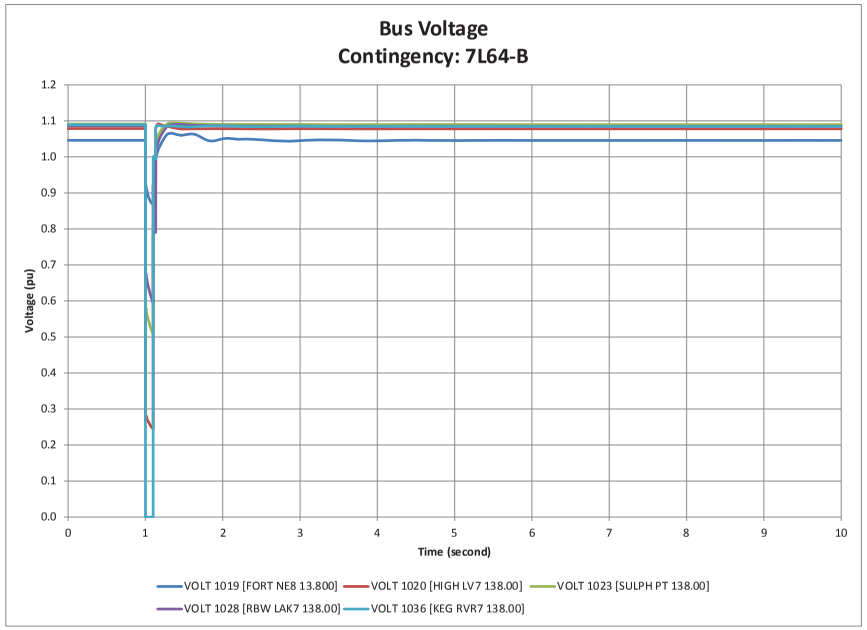

Generator Angle
Contingency: 7L64-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

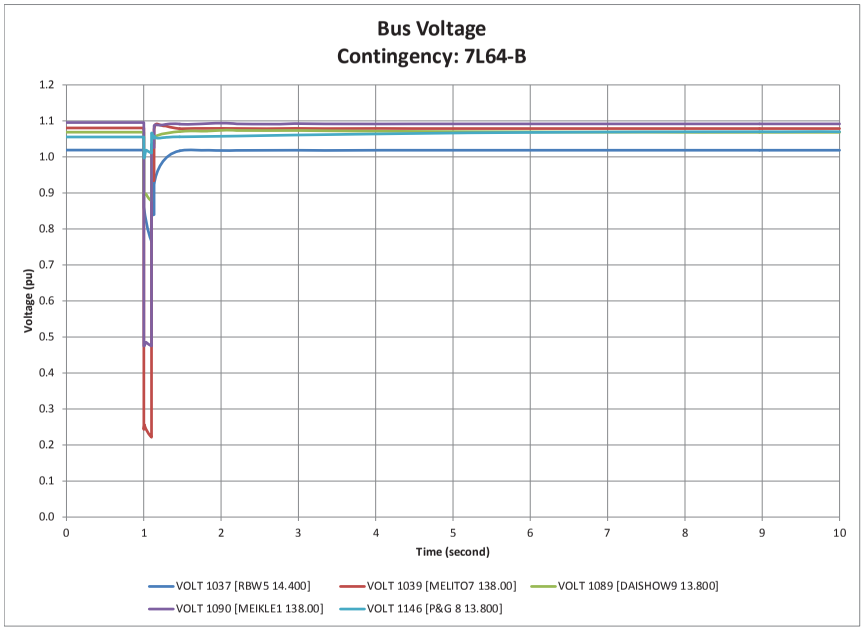

Generator Real Power
Contingency: 7L64-B
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

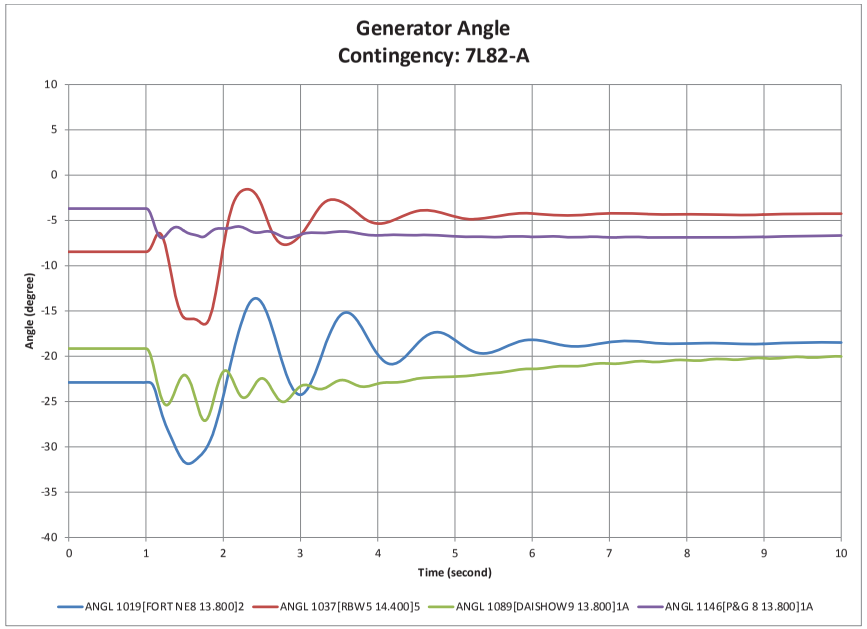

Generator Reactive Power
Contingency: 7L64-B
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

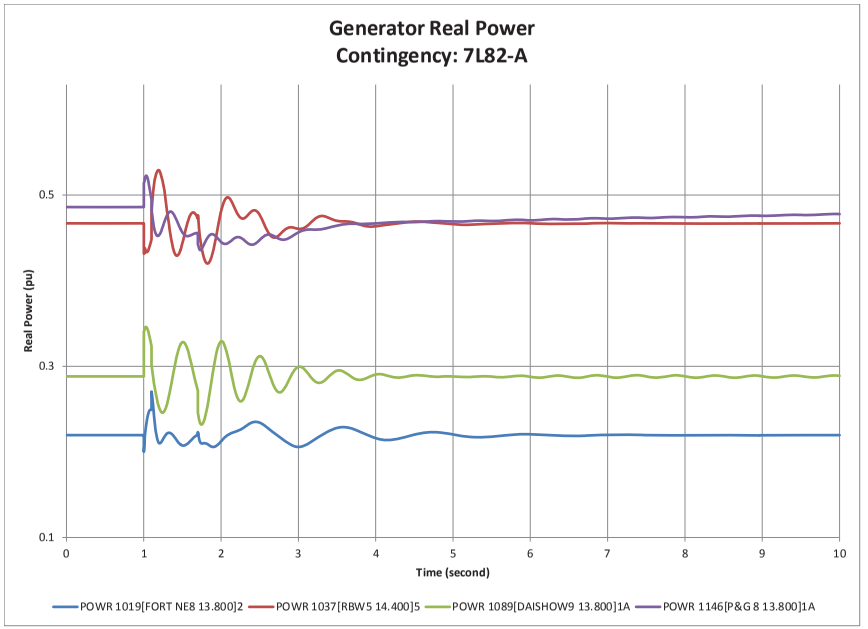

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

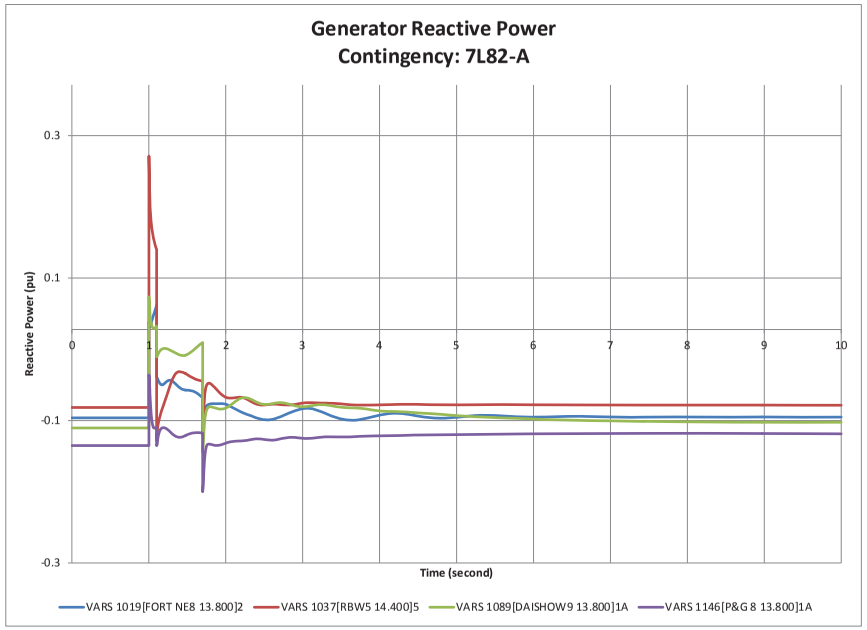

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

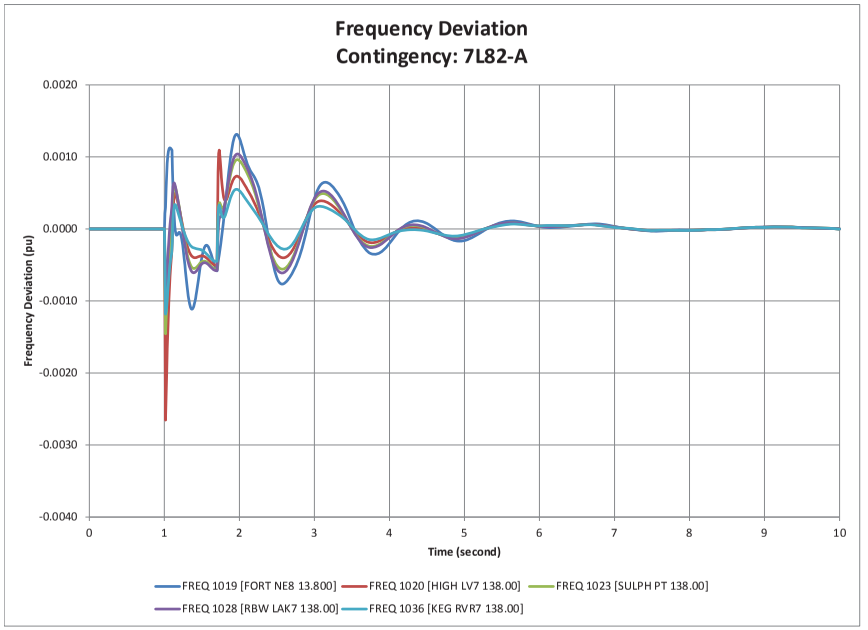

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

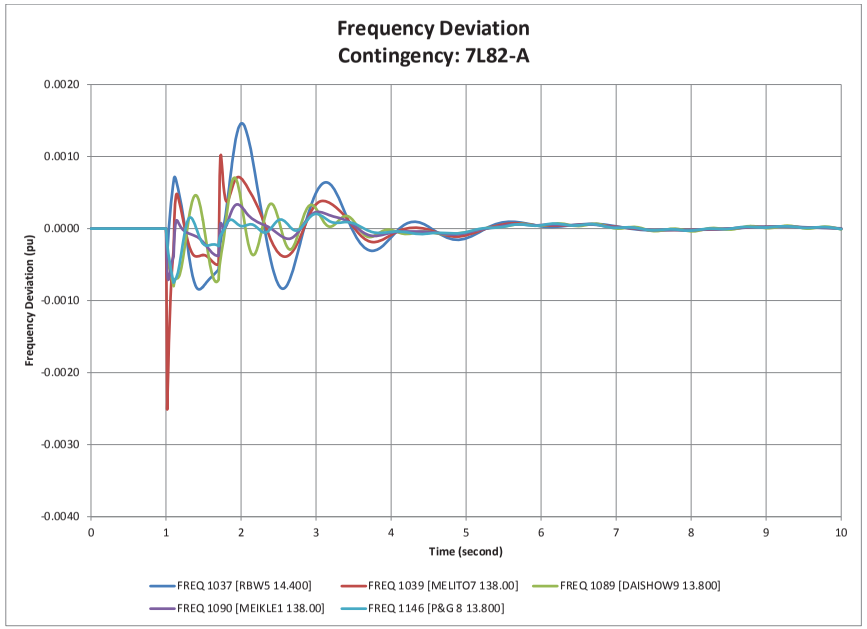

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

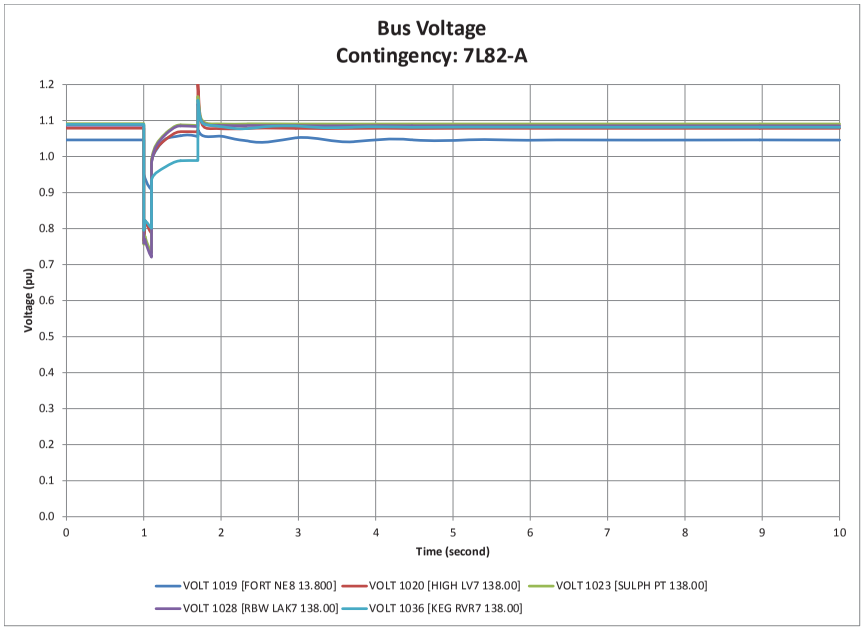

Generator Angle
Contingency: 7L82-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

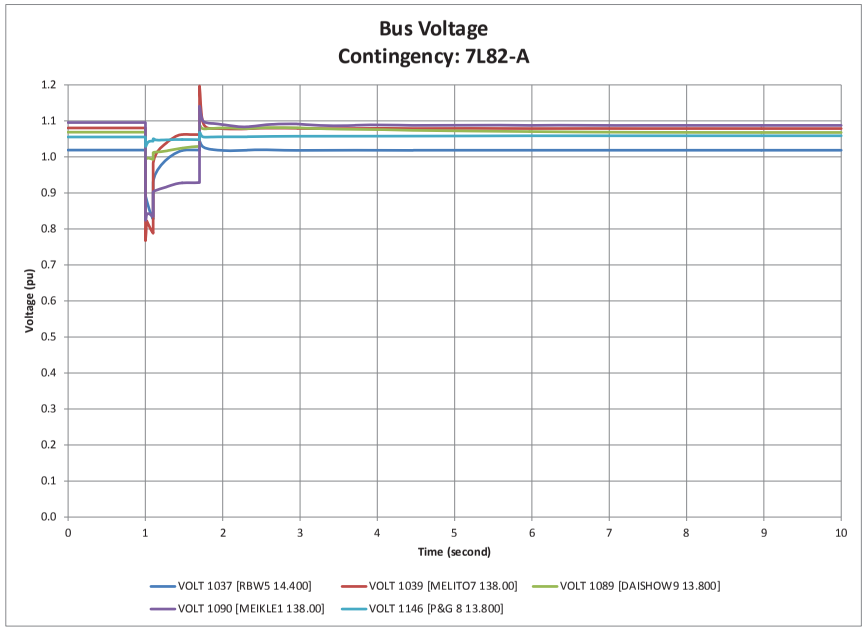

Generator Real Power
Contingency: 7L82-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

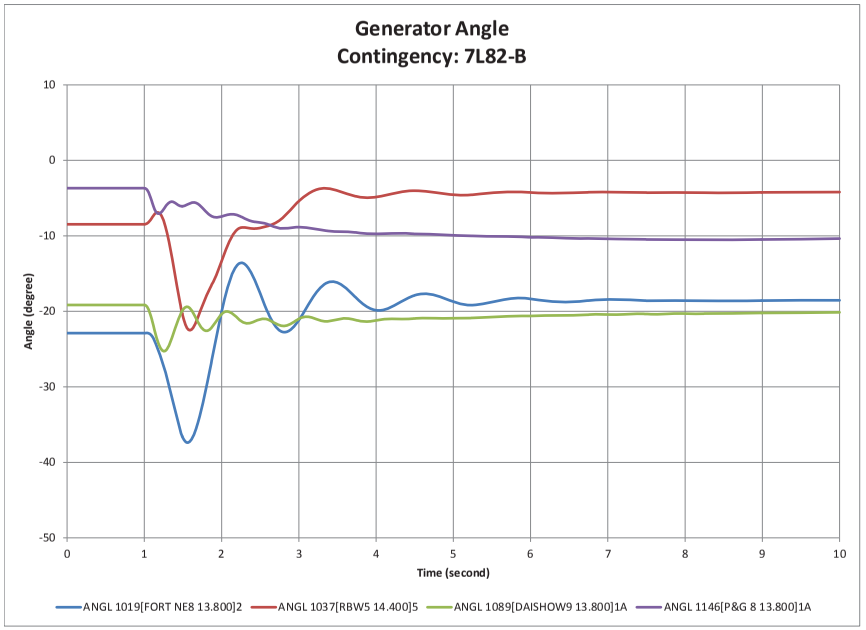

Generator Reactive Power
Contingency: 7L82-A
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

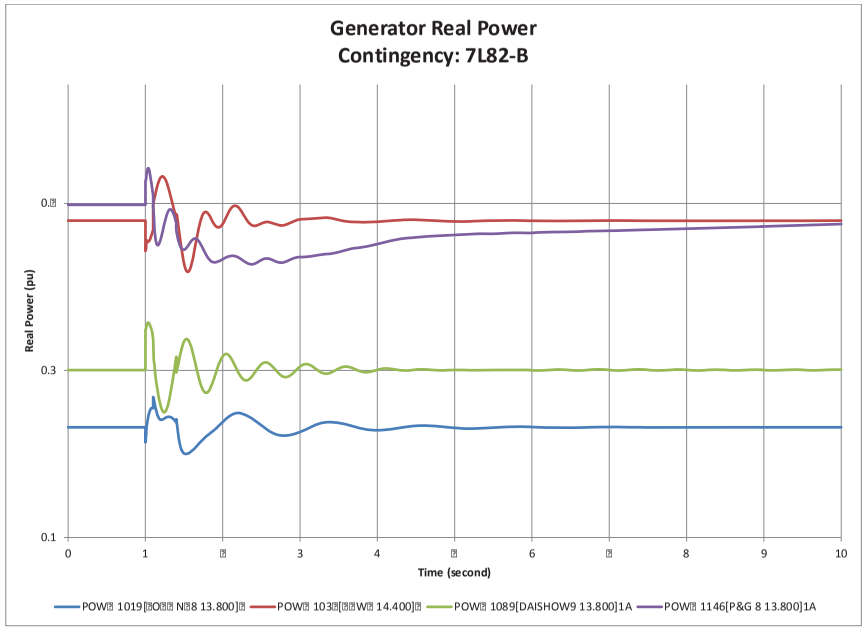

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

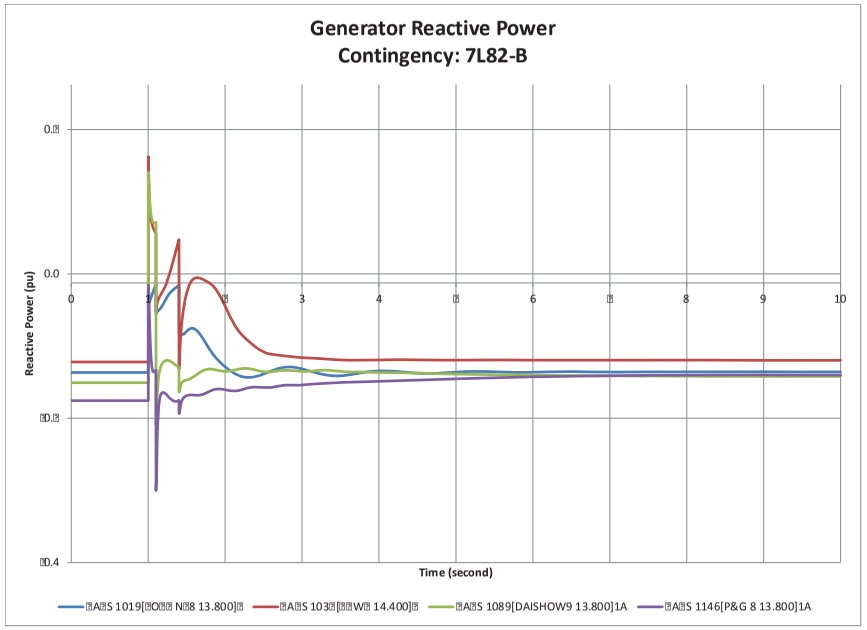

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

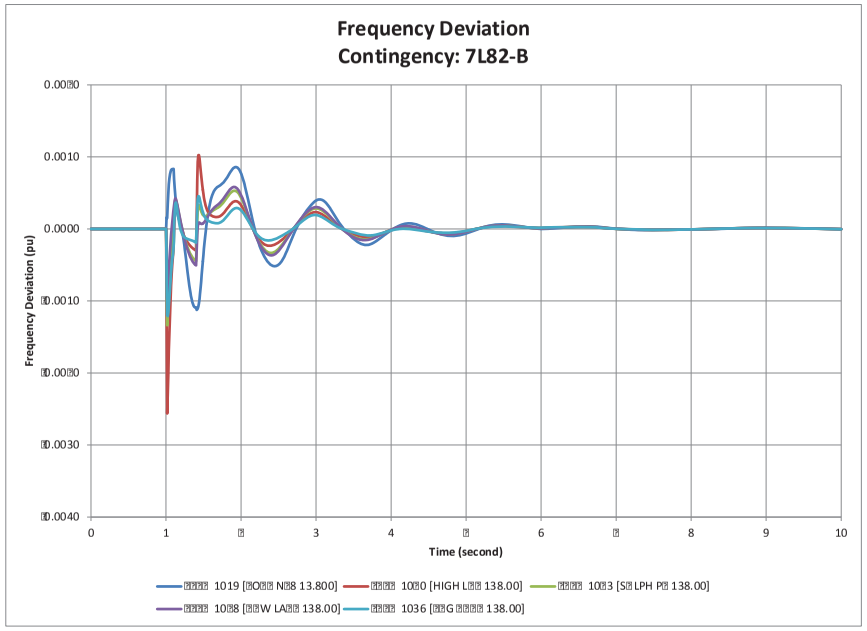

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

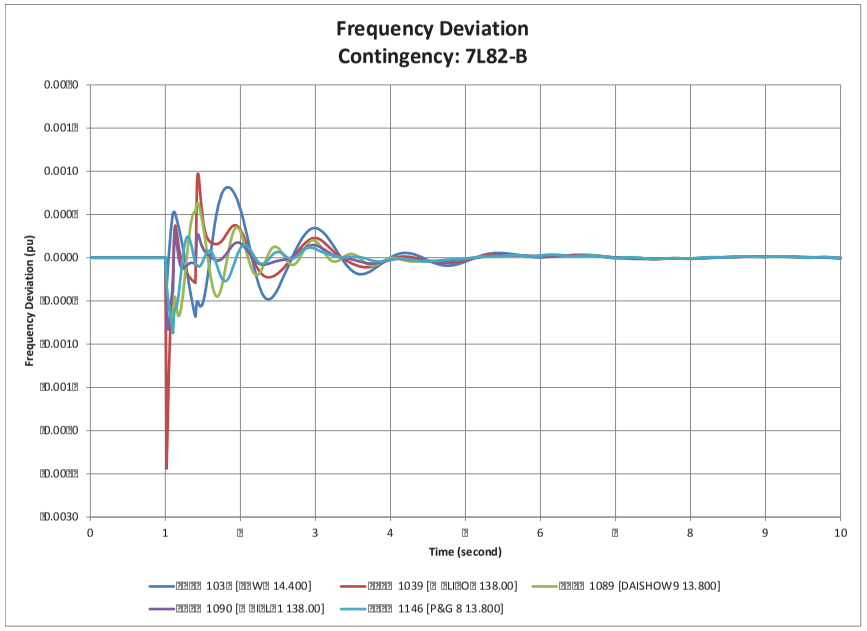

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

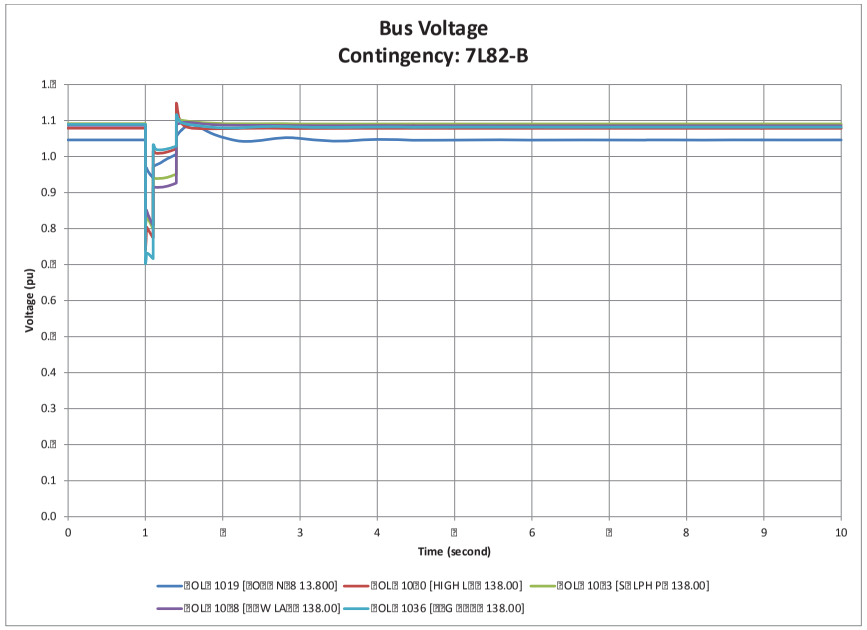

Generator Angle
Contingency: 7L82-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

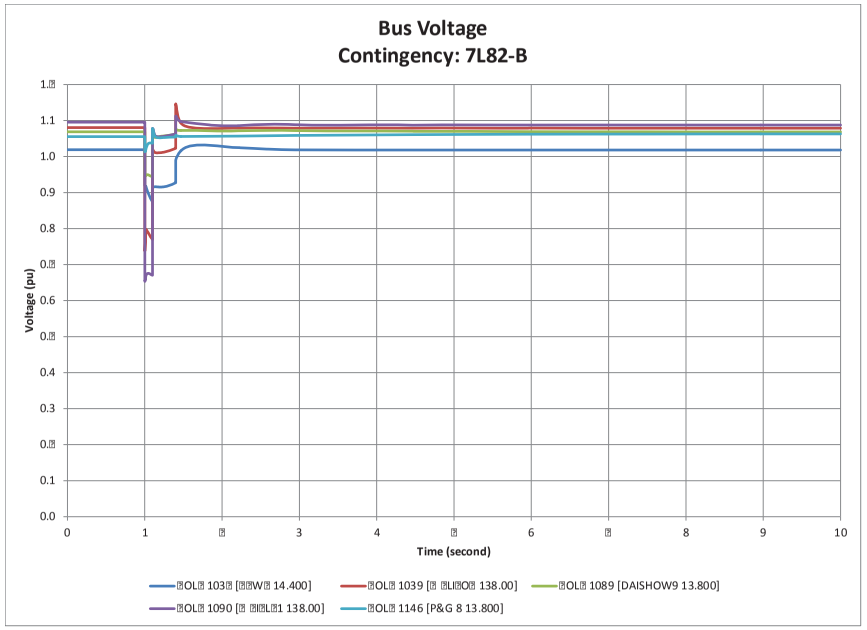

Generator Real Power
Contingency: 7L82-B
Real Power (pu)
0.3
0.1
0
1
3
4
6
8
9
10
Time (second)
POW 1019[O N8 13.800]
POW 103[W 14.400]
POW 1089[DAISHOW9 13.800]1A
POW 1146[P&G 8 13.800]1A


Generator Reactive Power
Contingency: 7L82-B
Reactive Power (pu)
0.0
0
3
4
6
8
9
10
Time (second)
AS 1019[O N8 13.800]
AS 103[W 14.400]
AS 1089[DAISHOW9 13.800]1A
AS 1146[P&G 8 13.800]1A


Frequency Deviation
Contingency: 7L82-B
Frequency Deviation (pu)
0.0010
0.0000
0
1
3
4
6
8
9
10
Time (second)
1019 [O N8 13.800]
1039 [HIGH L 138.00]
1089 [SLPH P 138.00]
1038 [W LA 138.00]
1036 [G 138.00]

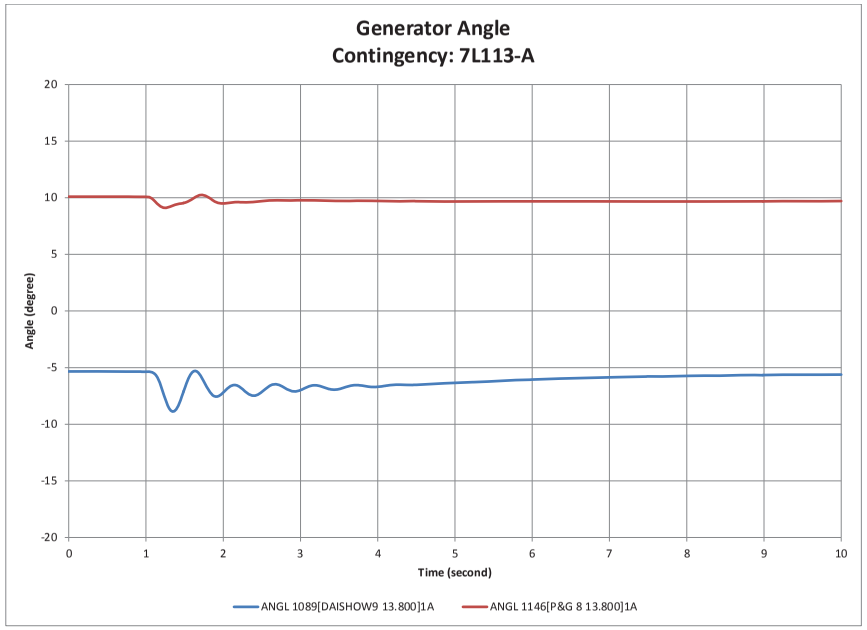

Frequency Deviation
Contingency: 7L82-B
Frequency Deviation (pu)
0.0010
0.0000
0
1
3
4
6
8
9
10
Time (second)
103 [W 14.400]
1039 [LIO 138.00]
1089 [DAISHOW9 13.800]
1090 [IGL1 138.00]
1146 [P&G 8 13.800]

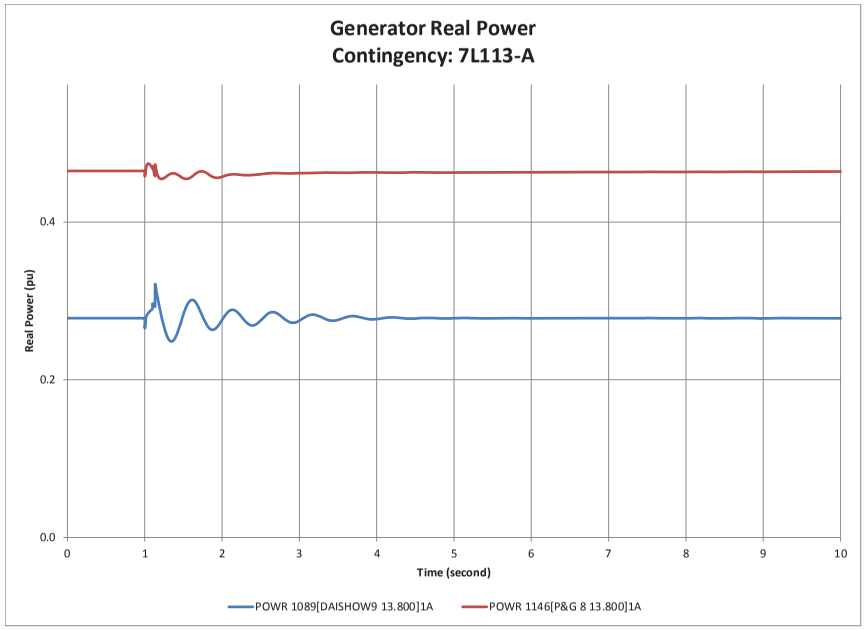

Bus Voltage
Contingency: 7L82-B
Voltage (pu)
Time (second)
0
1
3
4
6
8
9
10
0.0
0.1
0.3
0.4
0.6
0.8
0.9
1.0
1.1

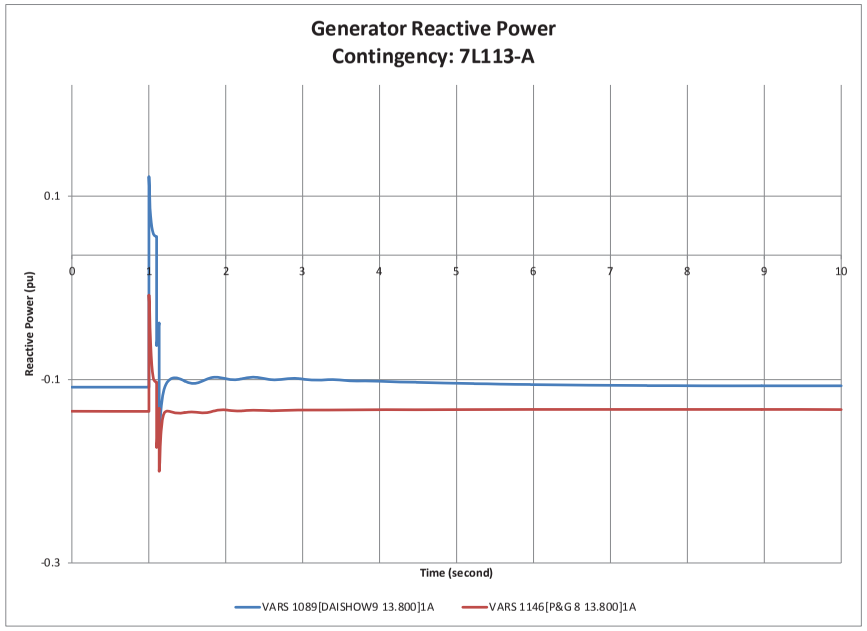

Bus Voltage
Contingency: 7L82-B
Voltage (pu)
Time (second)
0
1
3
4
6
8
9
10
0.0
0.1
0.3
0.4
0.6
0.8
0.9
1.0
1.1

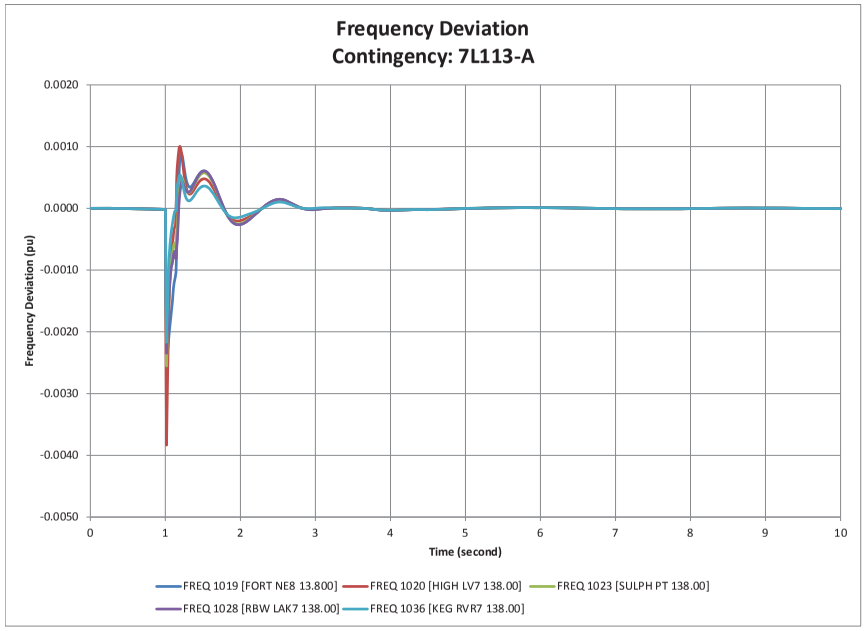
Attachment B-3

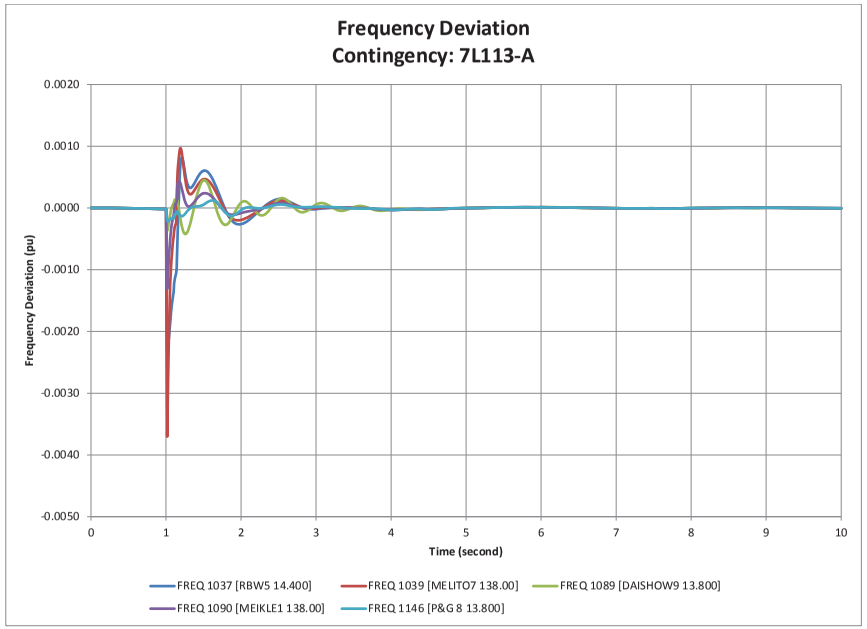
Pre-Connection Transient Stability Analysis Results (2014 SL)

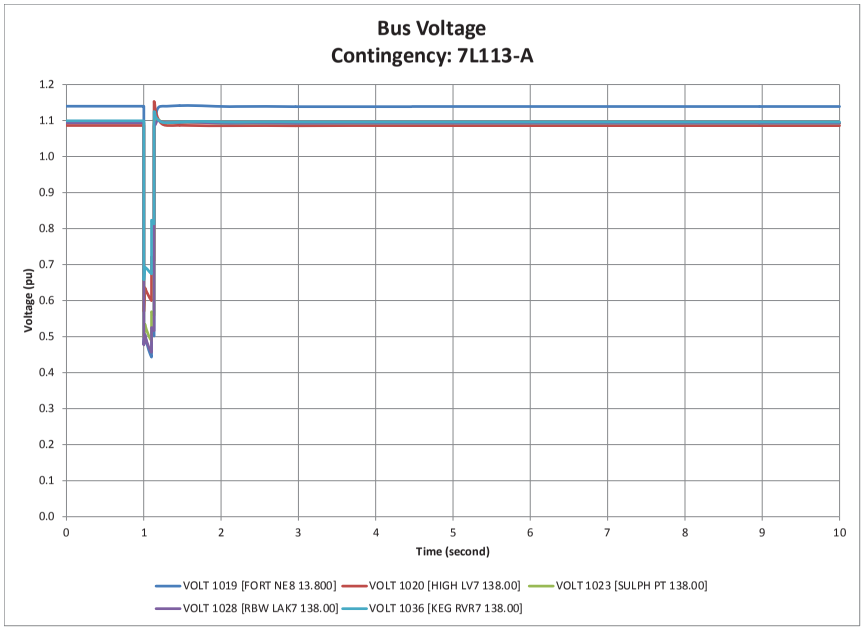

Generator Angle
Contingency: 7L113-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

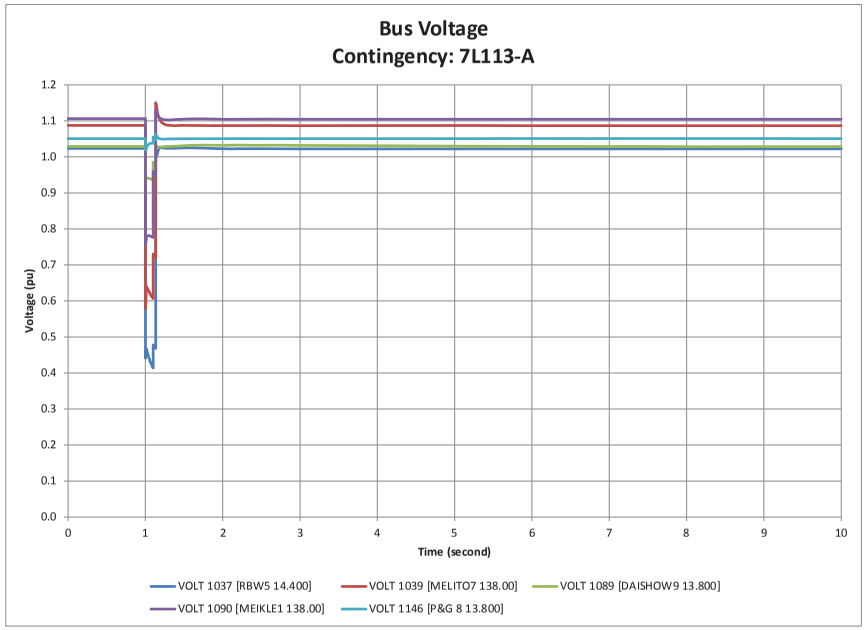

Generator Real Power
Contingency: 7L113-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

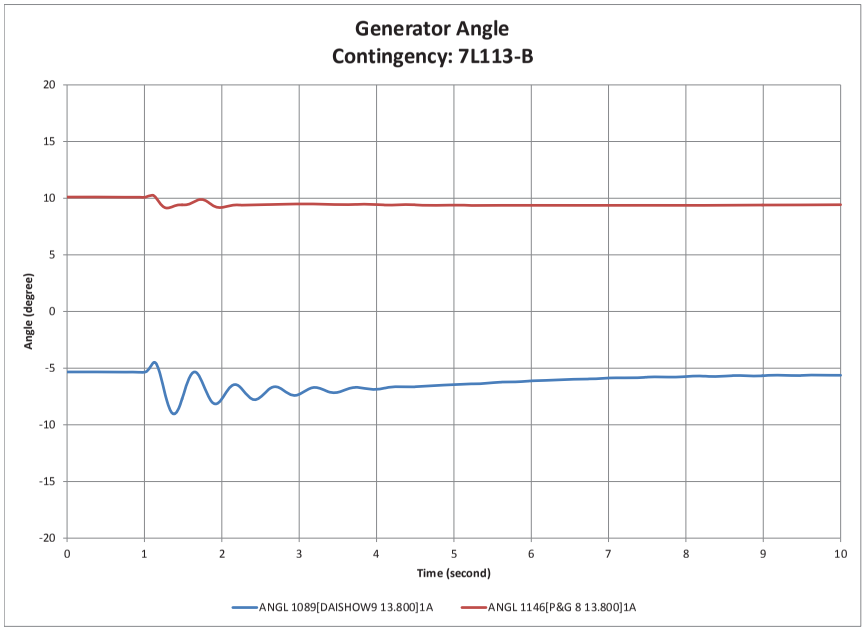

Generator Reactive Power
Contingency: 7L113-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

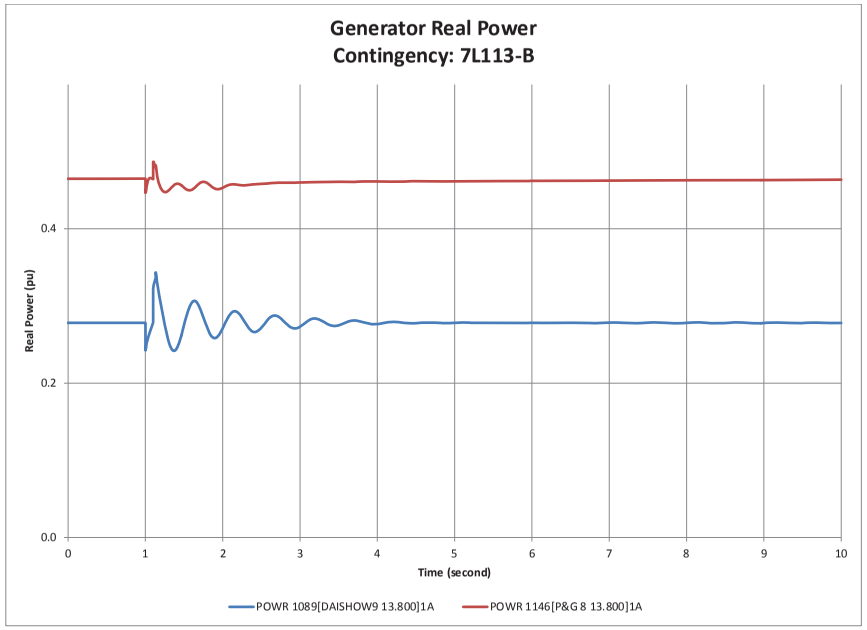

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

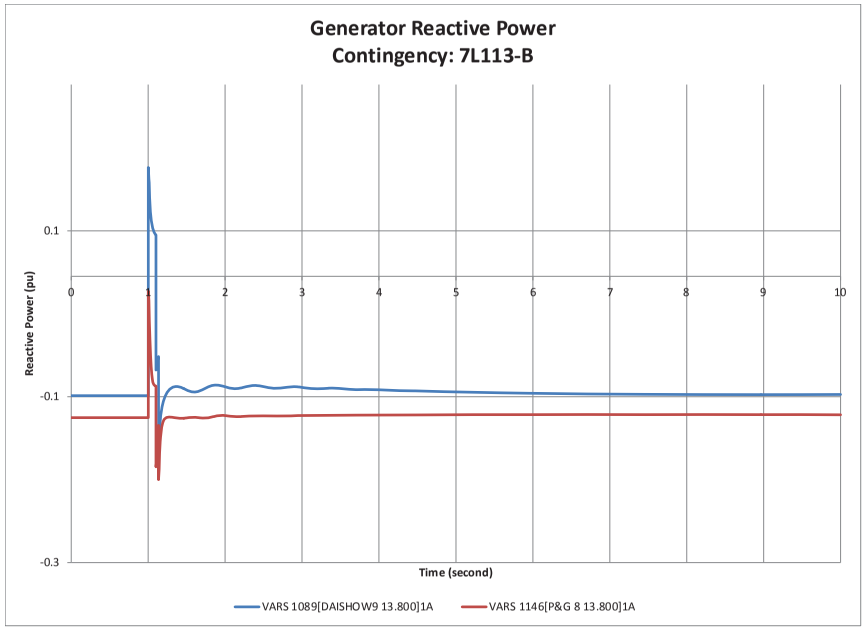

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

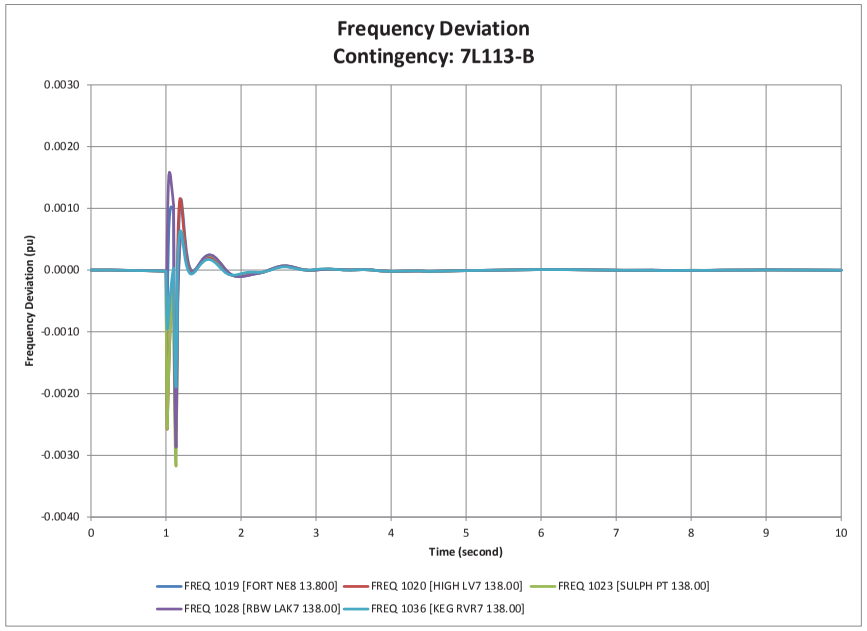

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

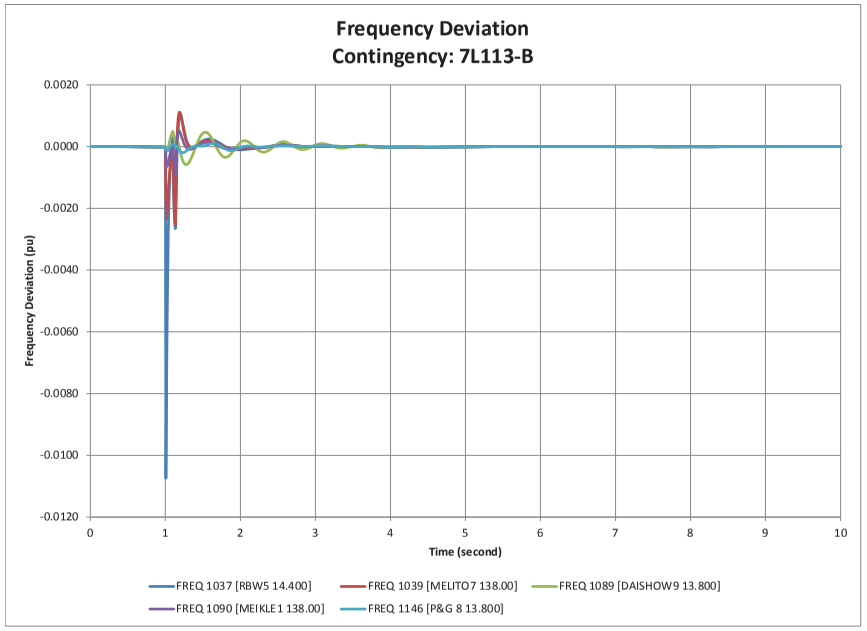

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

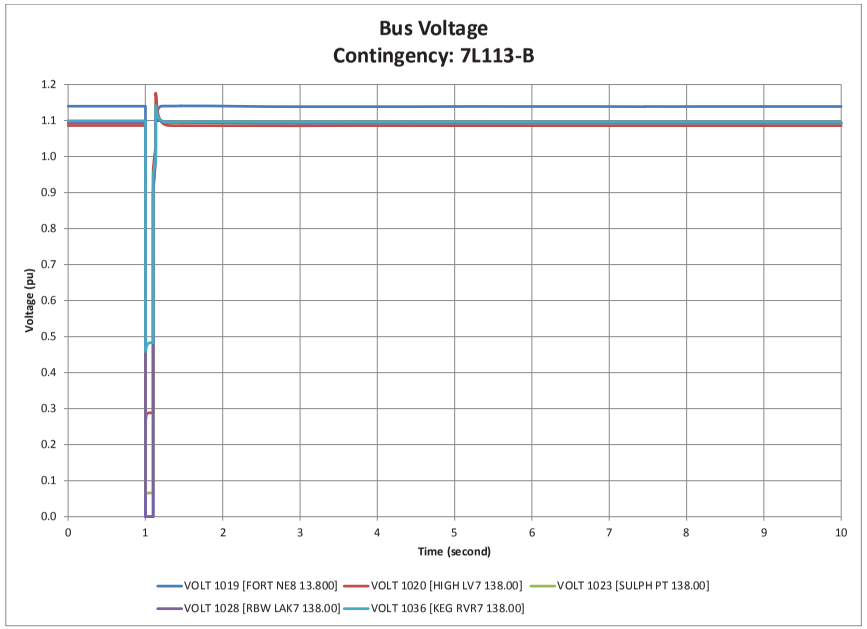

Generator Angle
Contingency: 7L113-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

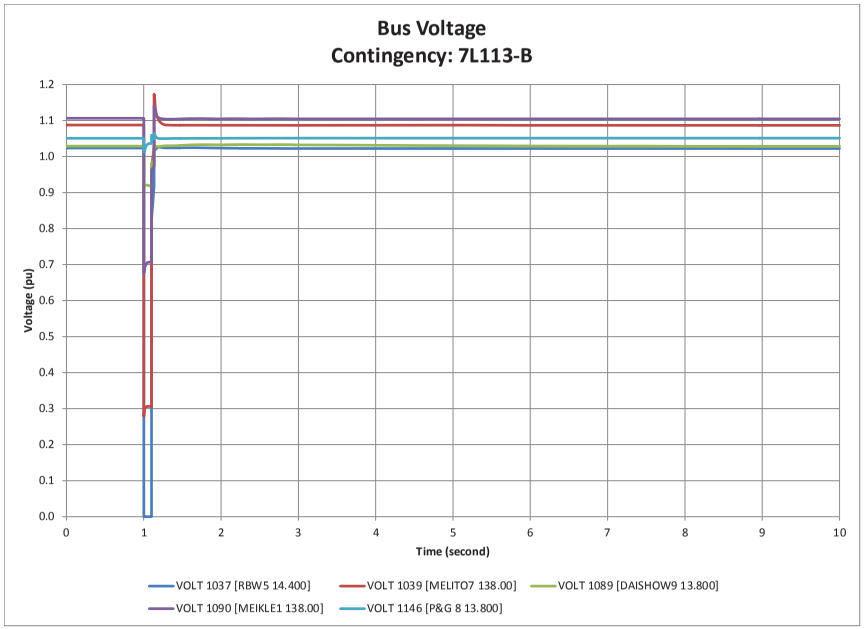

Generator Real Power
Contingency: 7L113-B
Real Power (pu)
0.0
0.2
0.4
0 1 2 3 4 5 6 7 8 9 10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

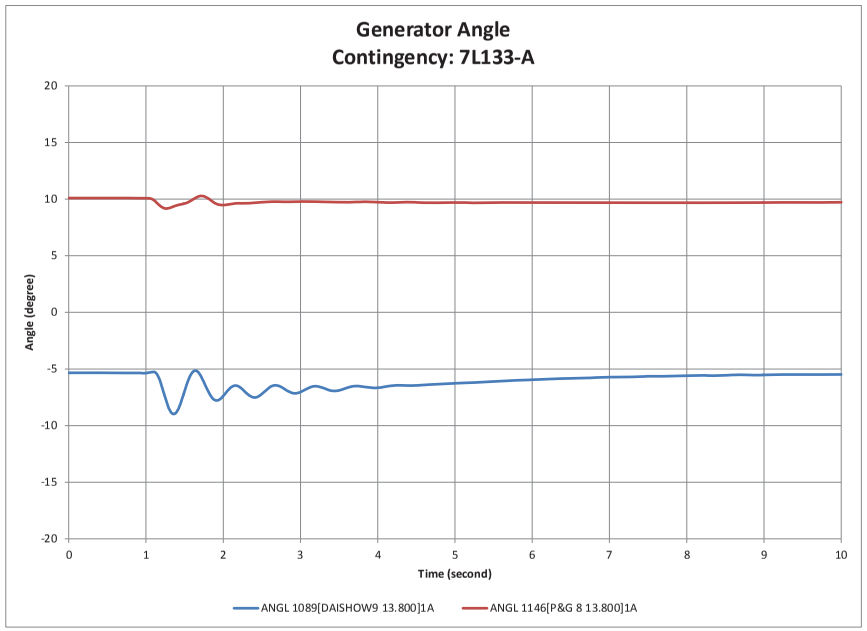

Generator Reactive Power
Contingency: 7L113-B
Reactive Power (pu)
0.1
-0.1
-0.3
0 1 2 3 4 5 6 7 8 9 10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

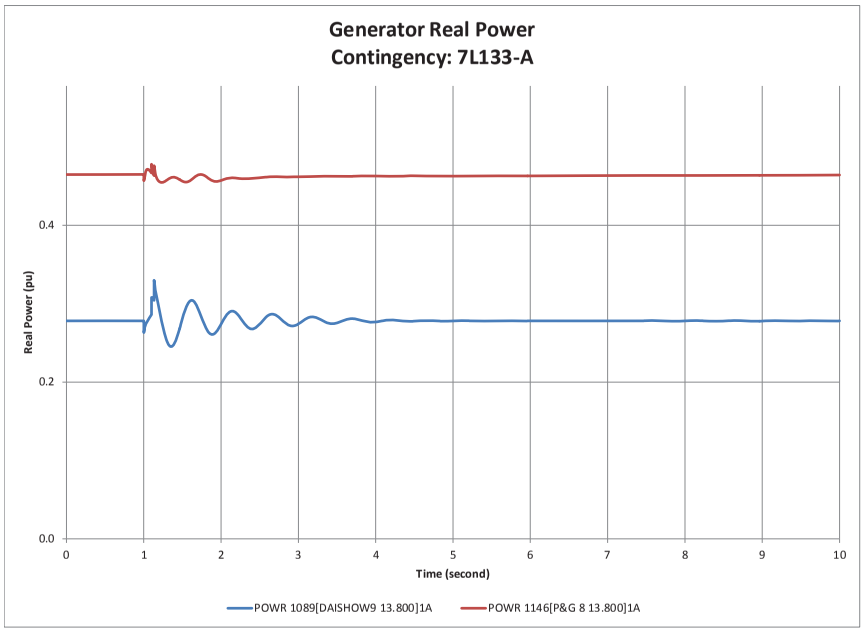

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
0 1 2 3 4 5 6 7 8 9 10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

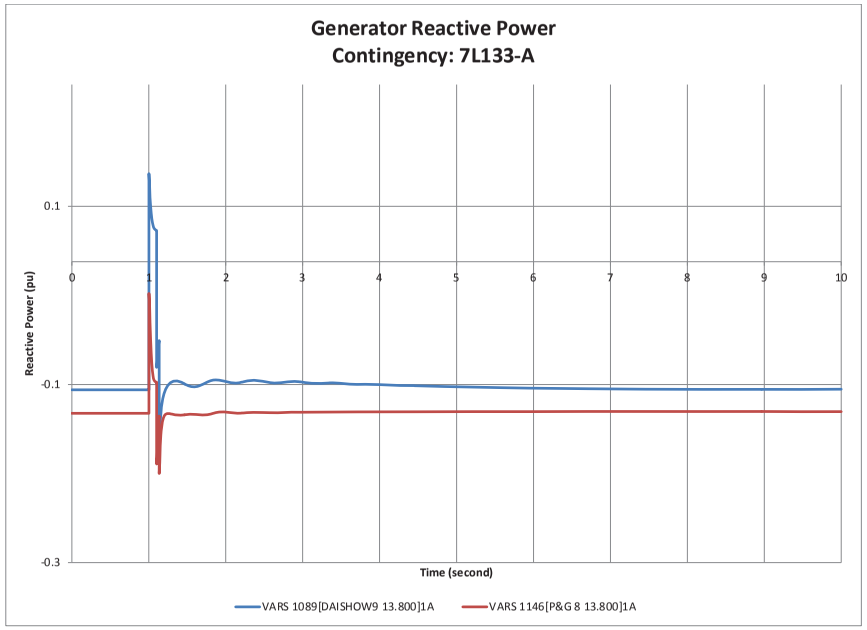

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
0.0020
0.0000
-0.0020
-0.0040
-0.0060
-0.0080
-0.0100
-0.0120
0 1 2 3 4 5 6 7 8 9 10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

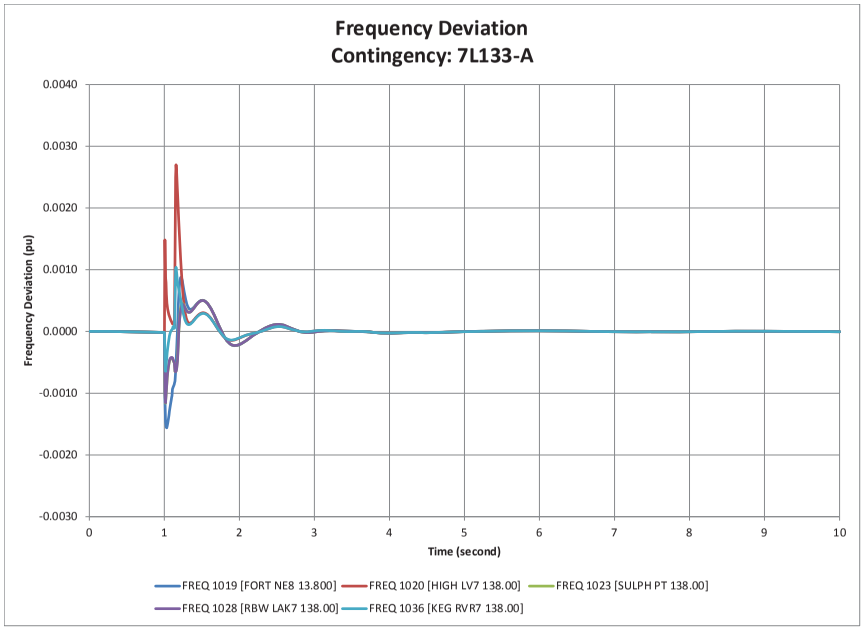

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

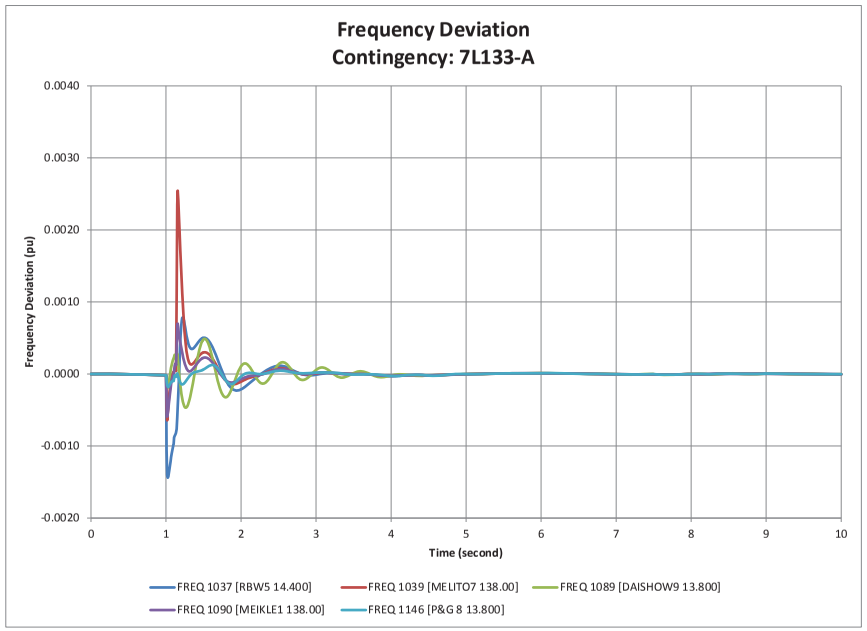

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

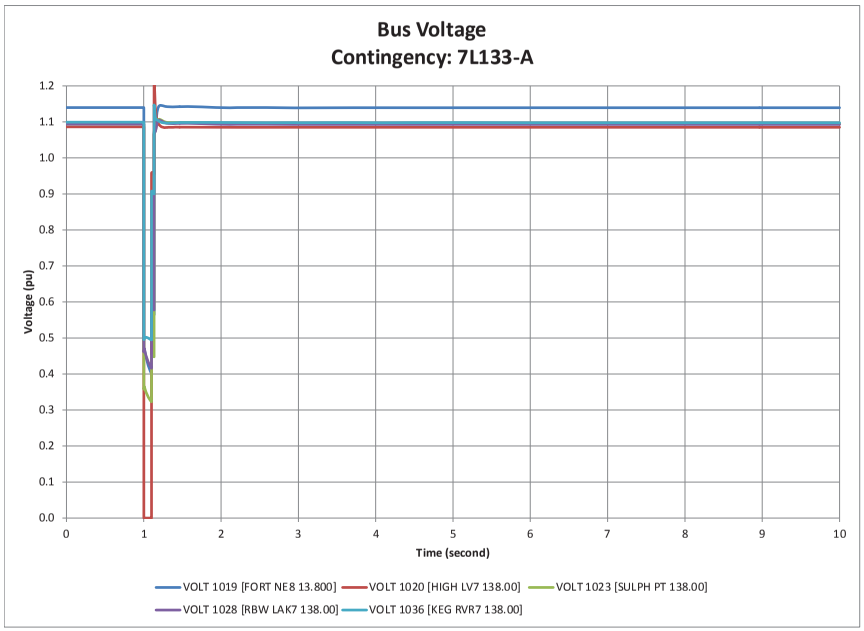

Generator Angle
Contingency: 7L133-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

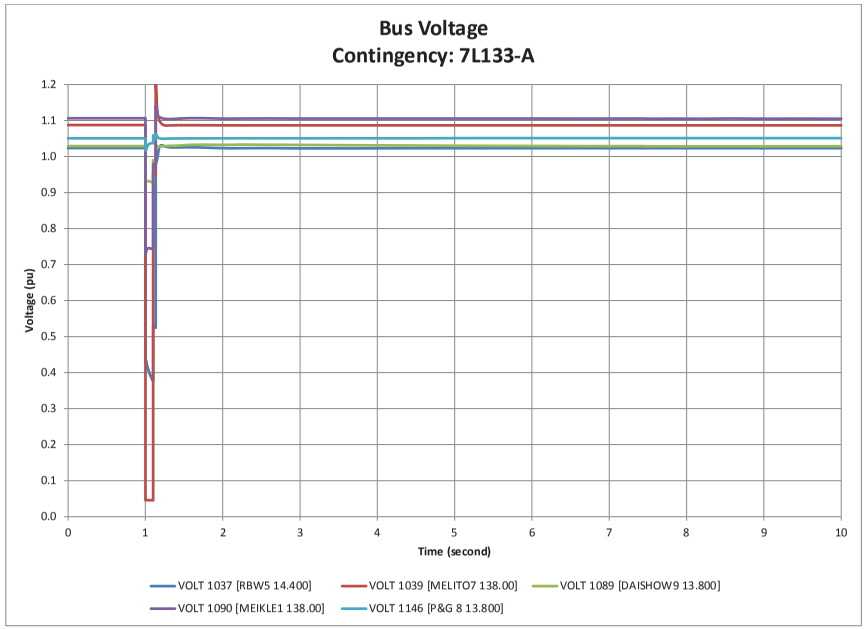

Generator Real Power
Contingency: 7L133-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

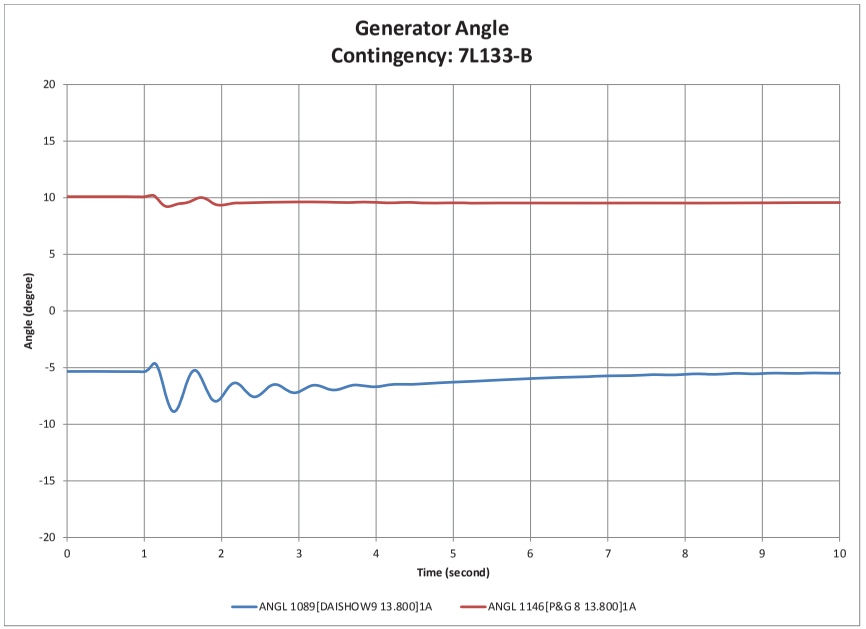

Generator Reactive Power
Contingency: 7L133-A
Reactive Power (pu)
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

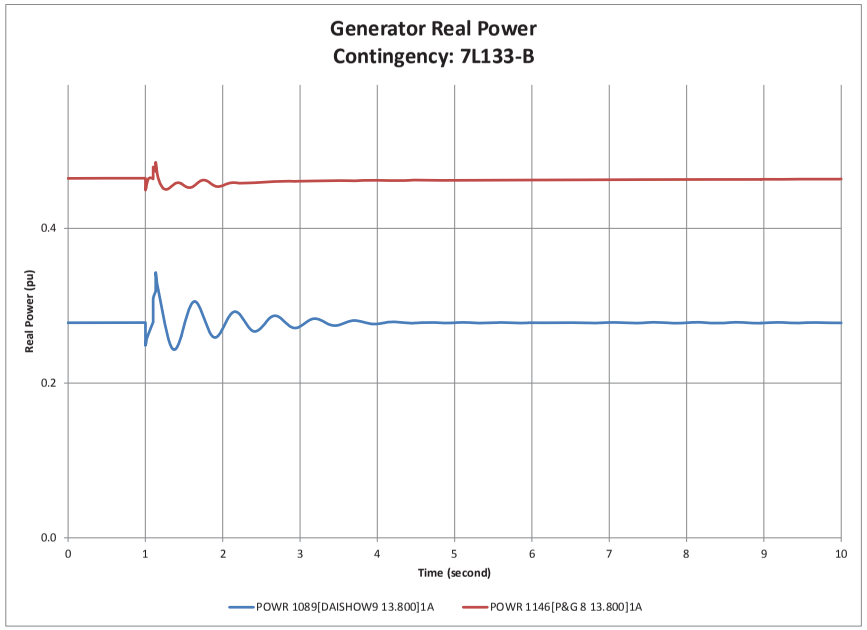

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

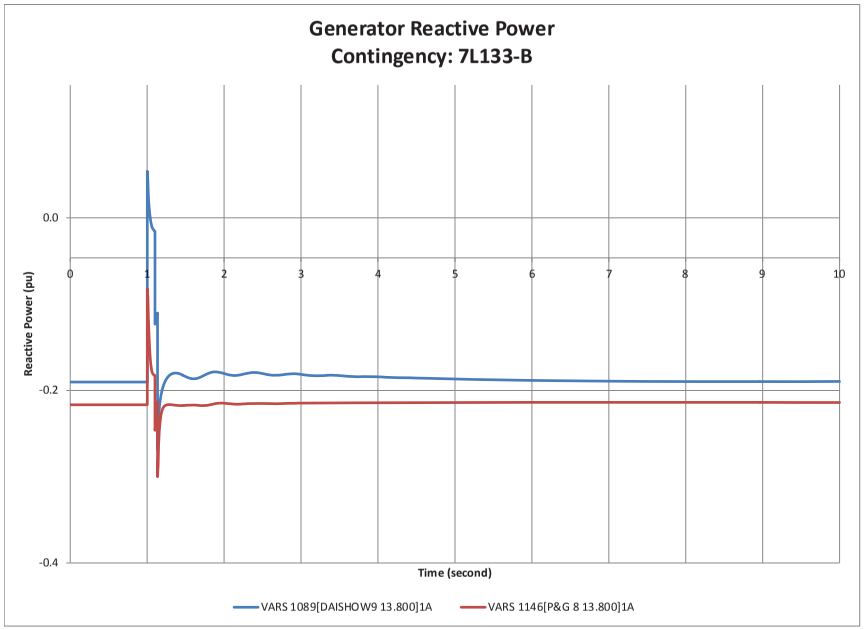

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

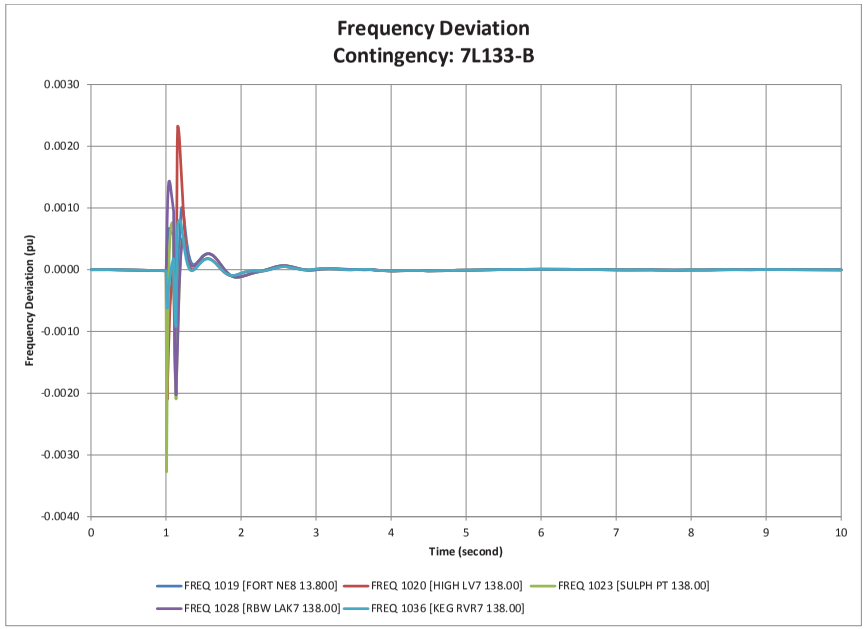

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

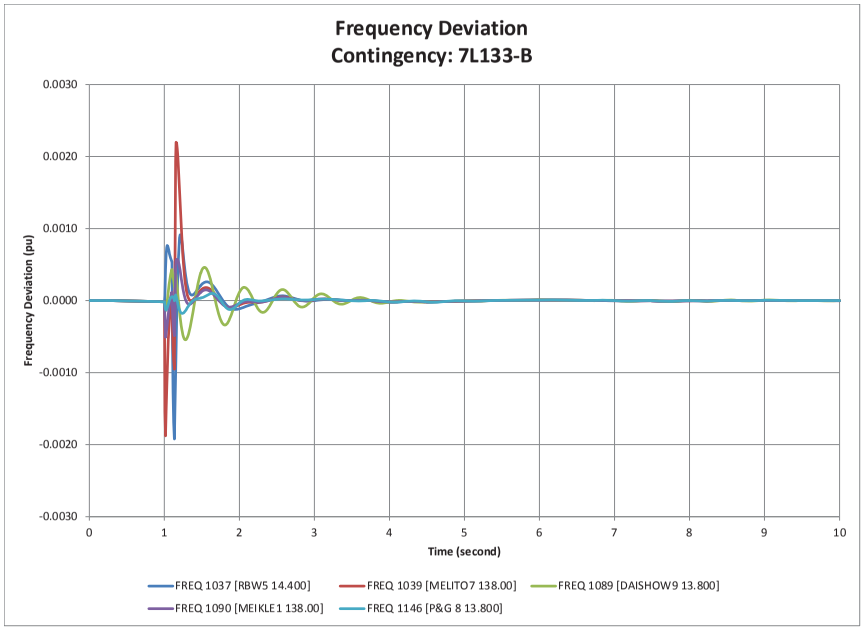

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

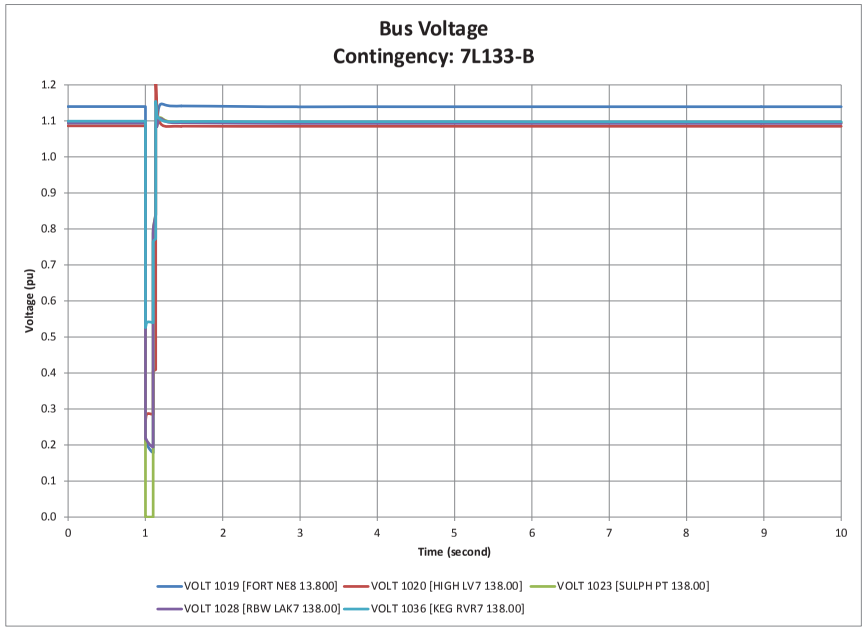

Generator Angle
Contingency: 7L133-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

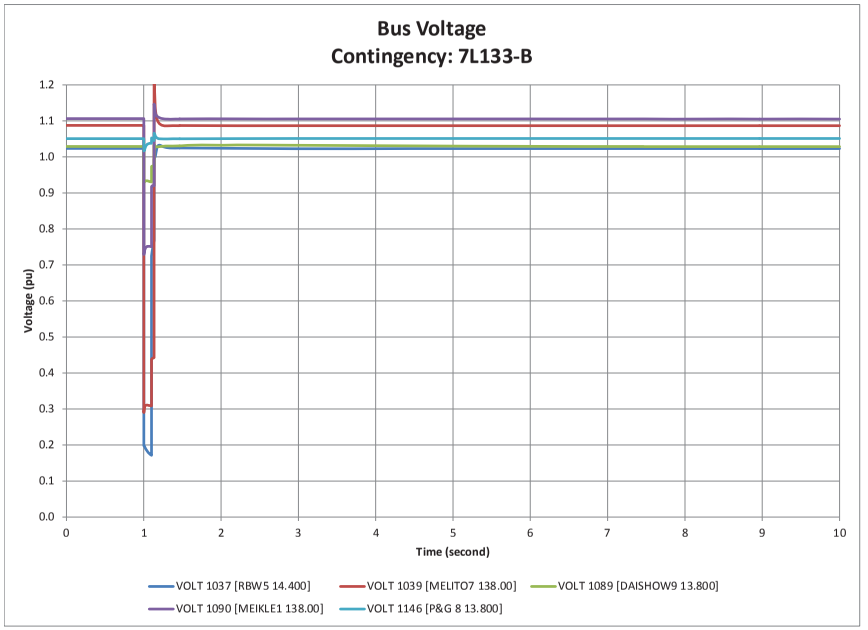

Generator Real Power
Contingency: 7L133-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

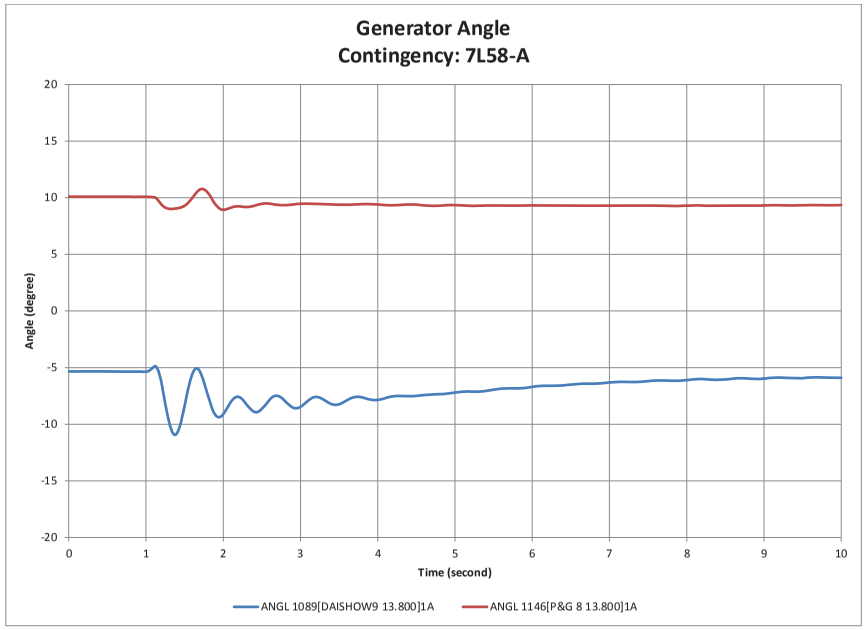

Generator Reactive Power
Contingency: 7L133-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

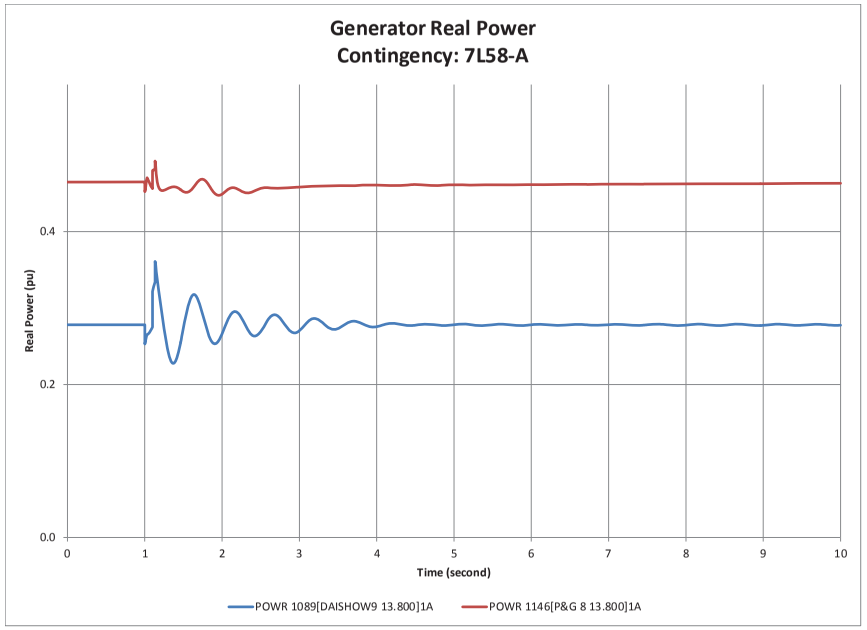

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

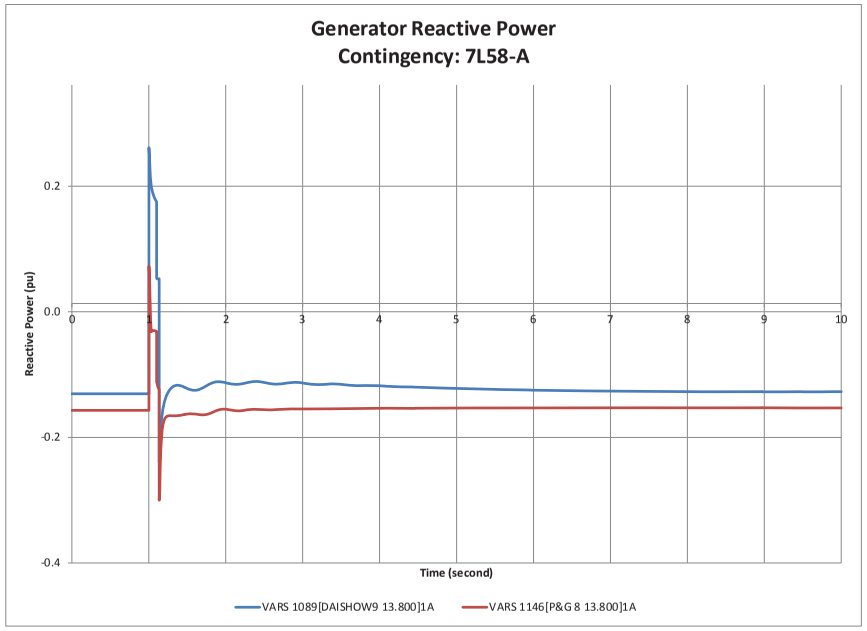

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

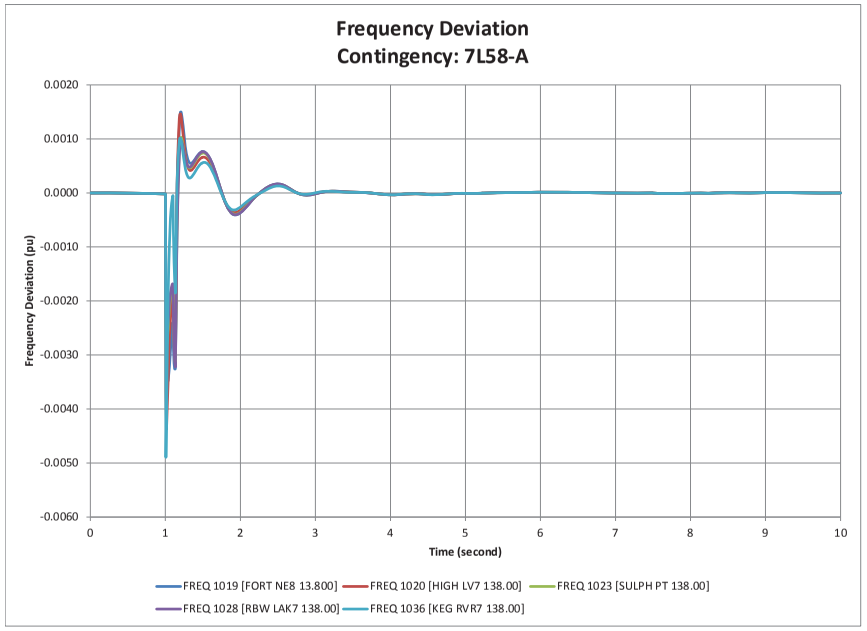

Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

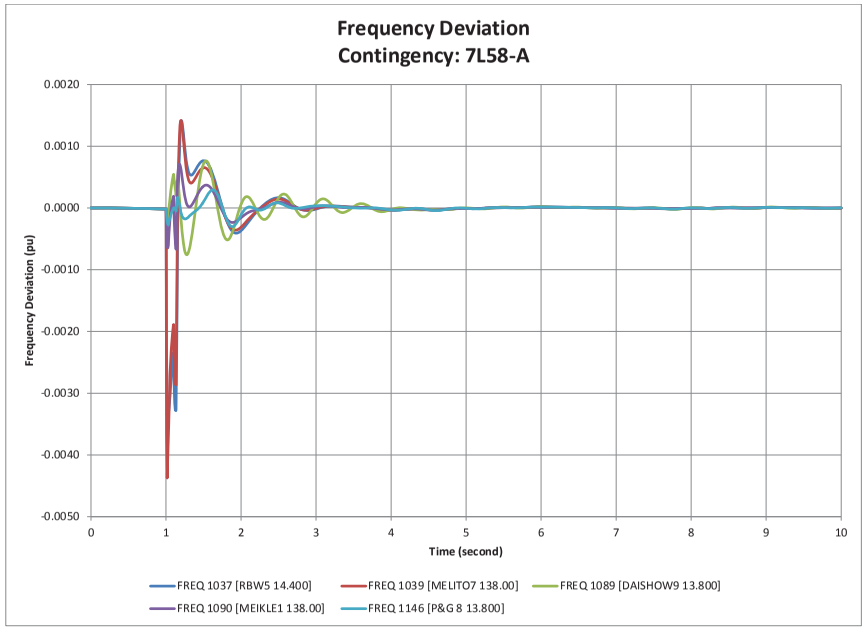

Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

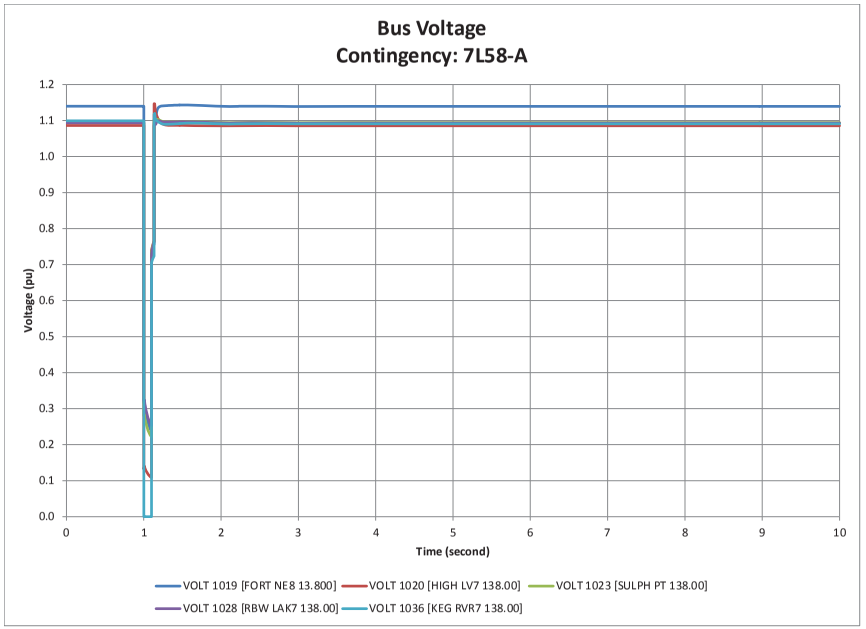

Generator Angle
Contingency: 7L58-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

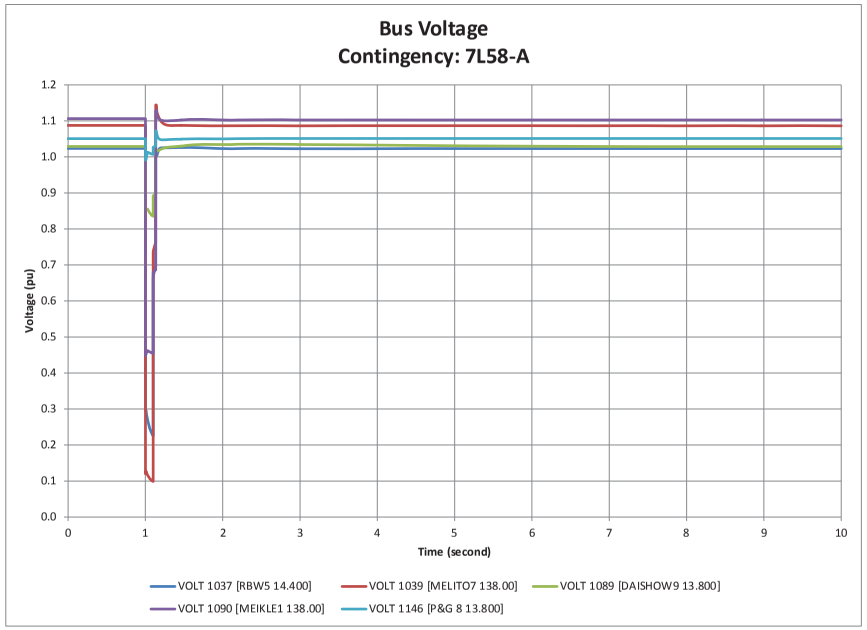

Generator Real Power
Contingency: 7L58-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

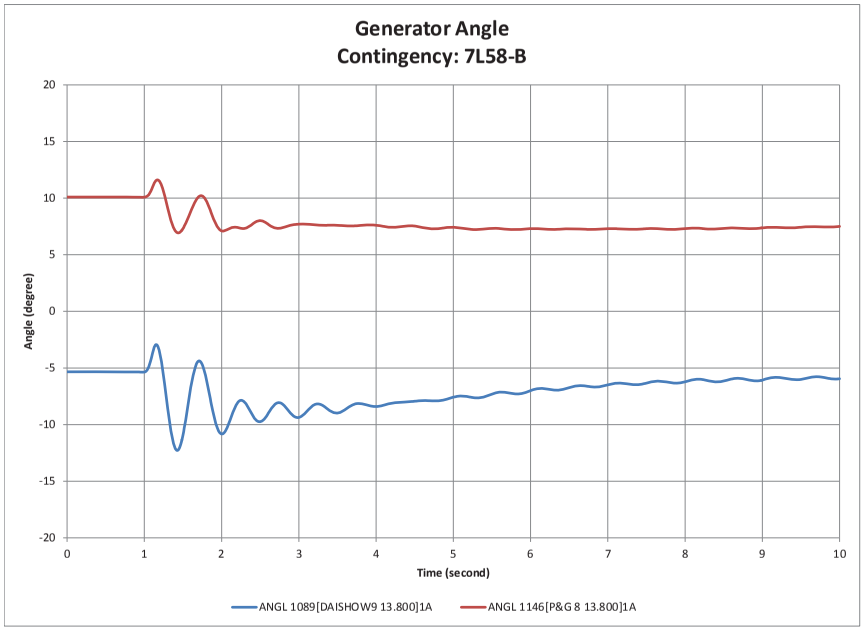

Generator Reactive Power
Contingency: 7L58-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

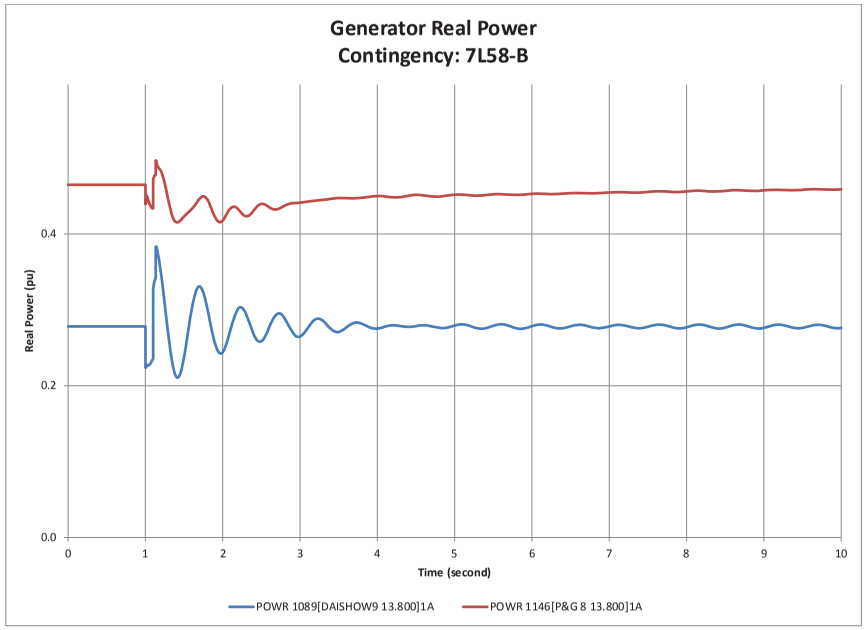

Frequency Deviation
Contingency: 7L58-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

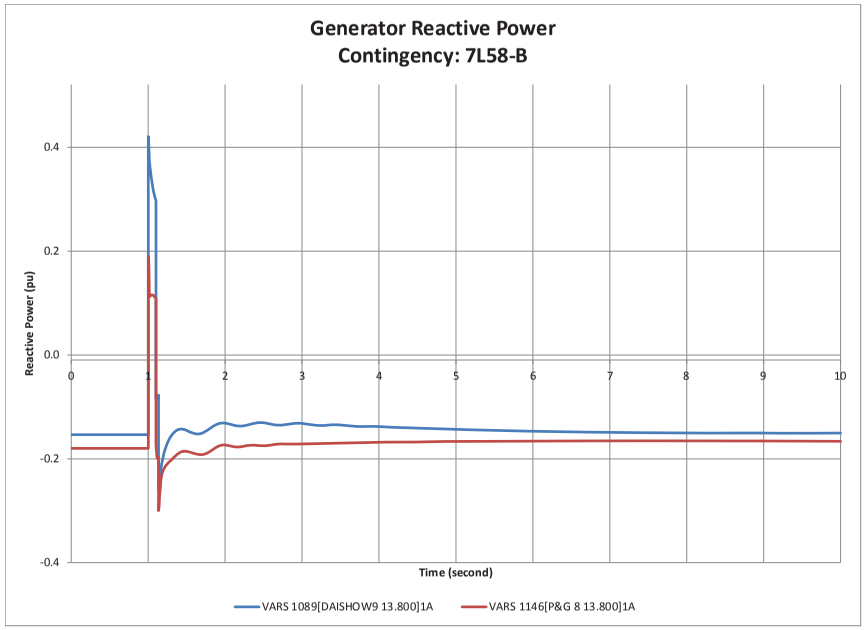

Frequency Deviation
Contingency: 7L58-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

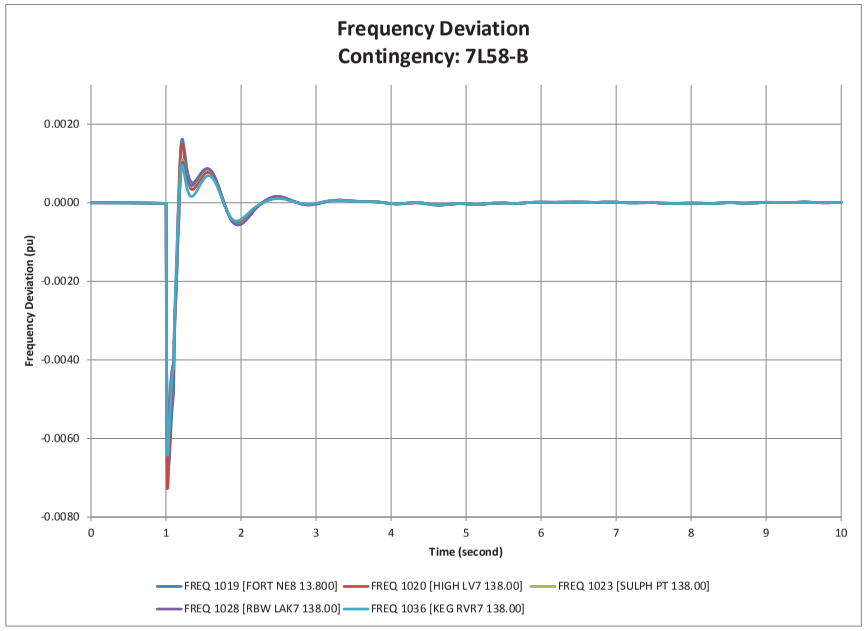

Bus Voltage
Contingency: 7L58-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

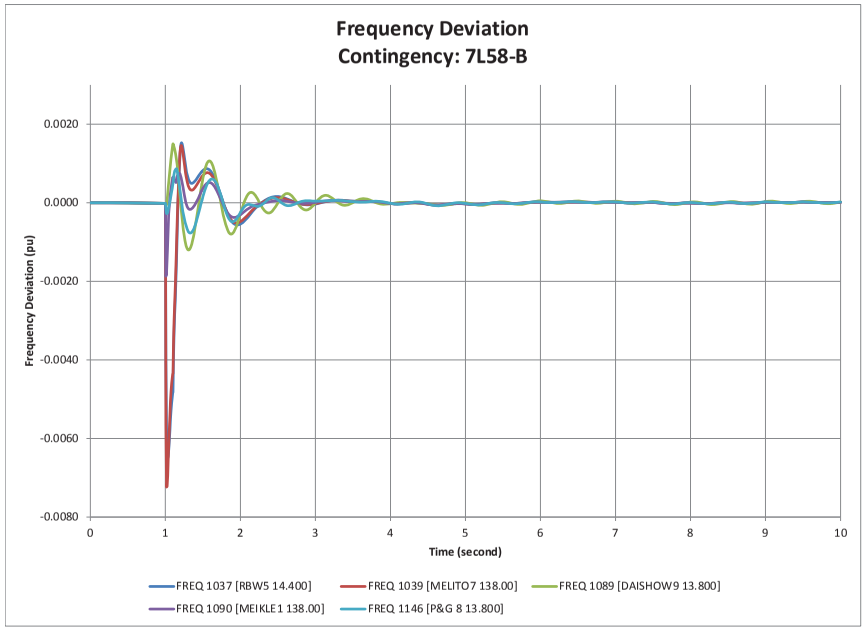

Bus Voltage
Contingency: 7L58-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

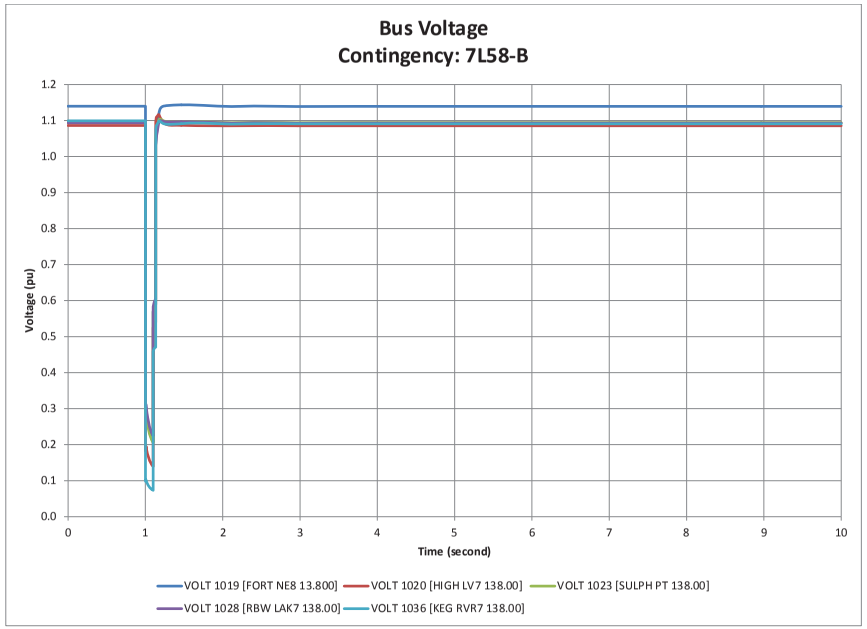

Generator Angle
Contingency: 7L58-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

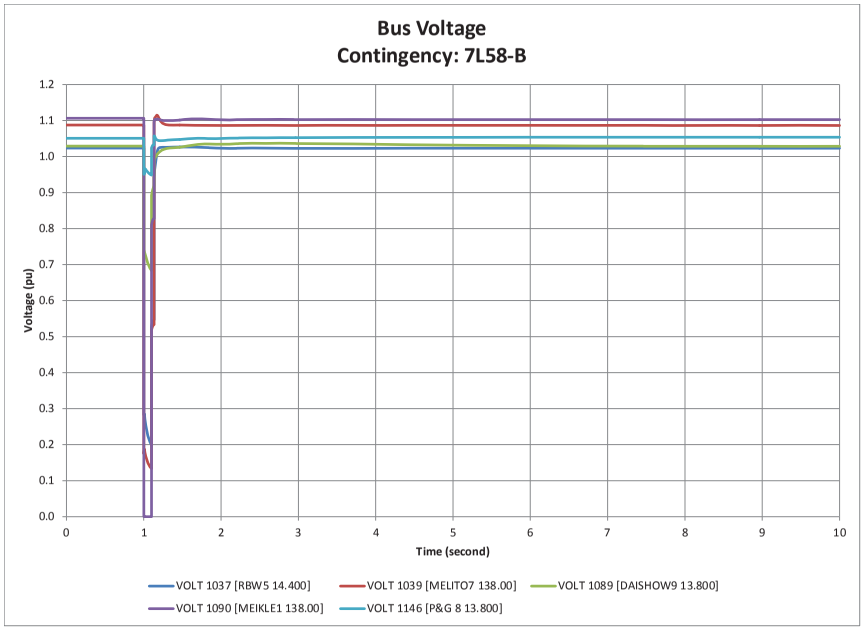

Generator Real Power
Contingency: 7L58-B
Real Power (pu)
0.0
0.2
0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

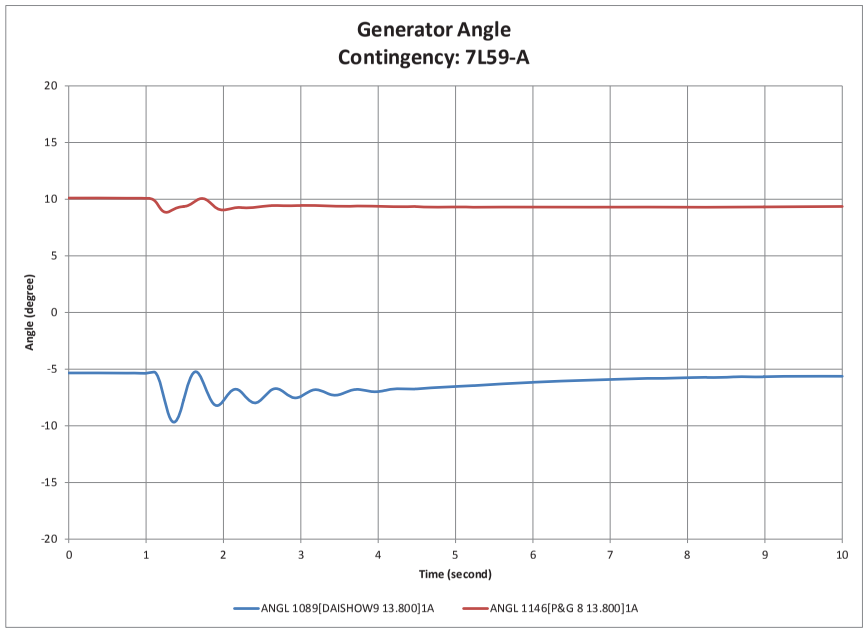

Generator Reactive Power
Contingency: 7L58-B
Reactive Power (pu)
-0.4
-0.2
0.0
0.2
0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

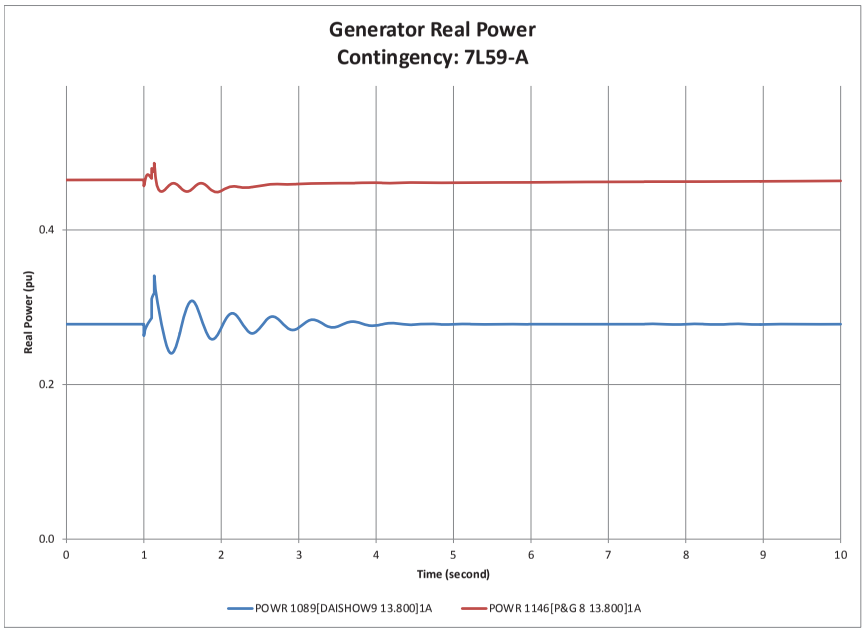

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
-0.0080
-0.0060
-0.0040
-0.0020
0.0000
0.0020
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

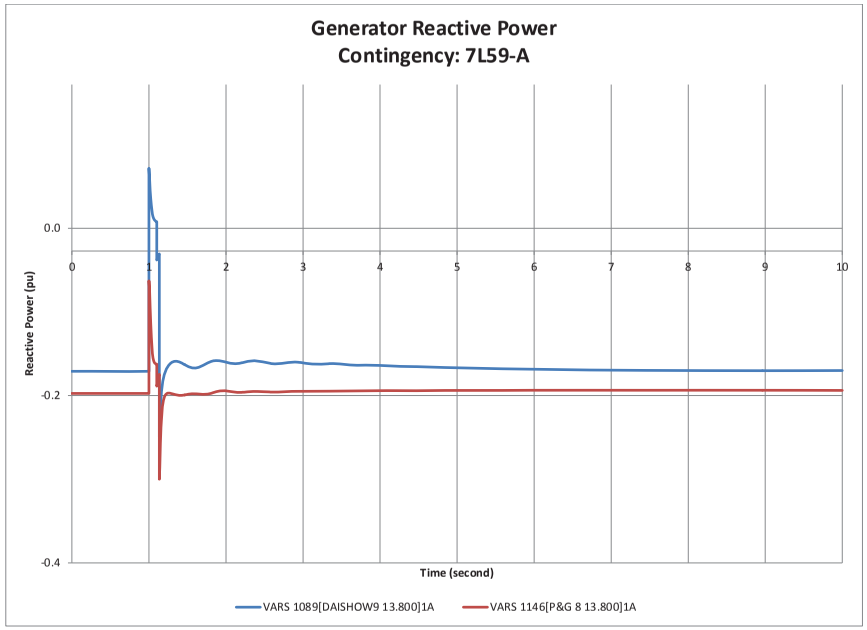

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
-0.0080
-0.0060
-0.0040
-0.0020
0.0000
0.0020
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

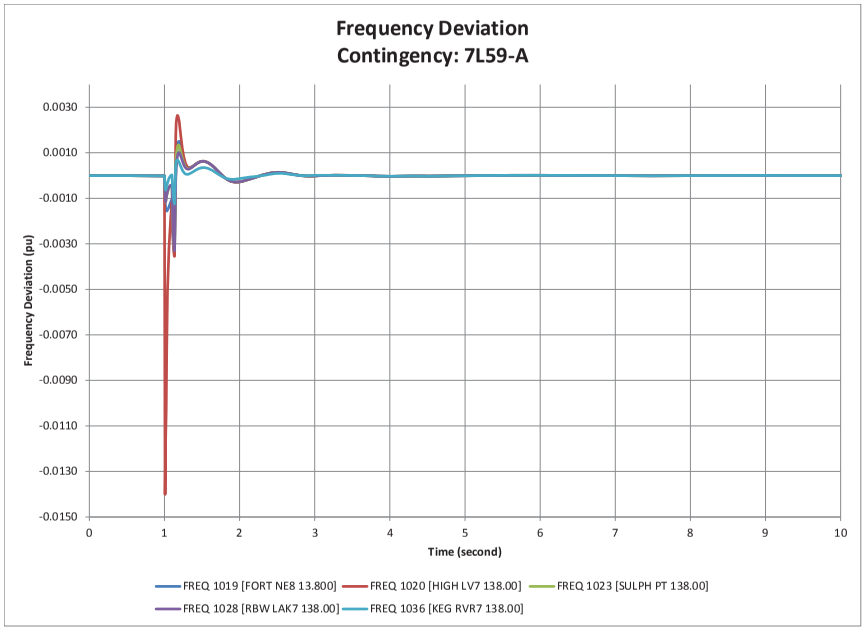

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

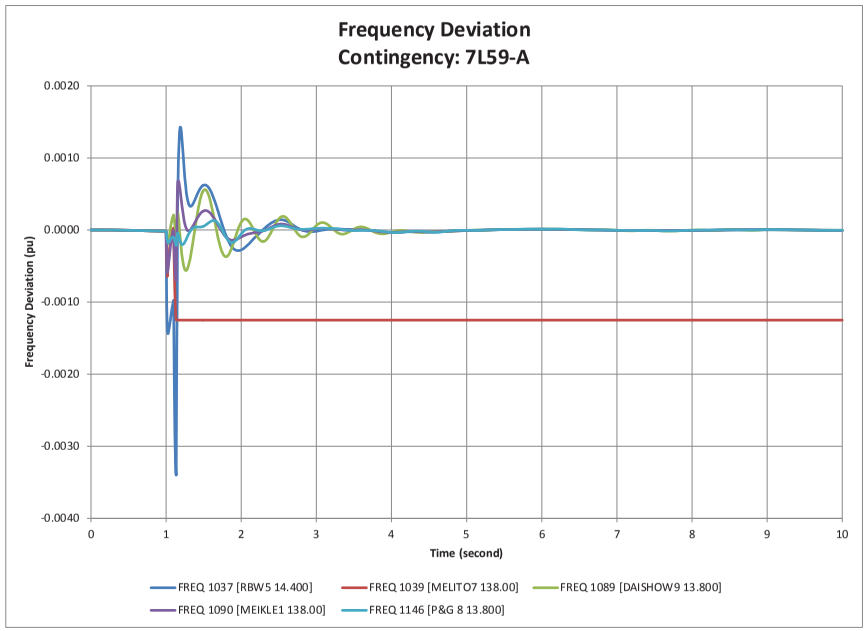

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

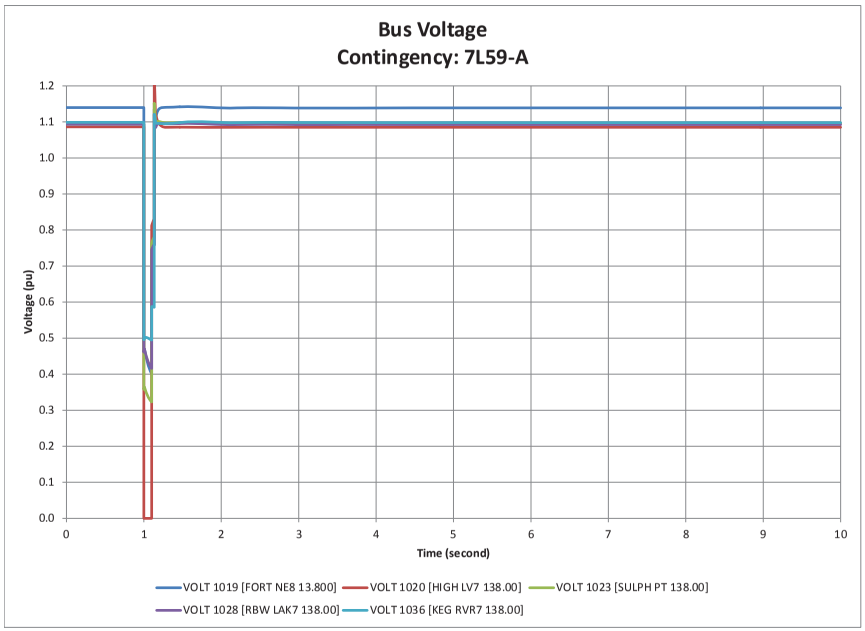

Generator Angle
Contingency: 7L59-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

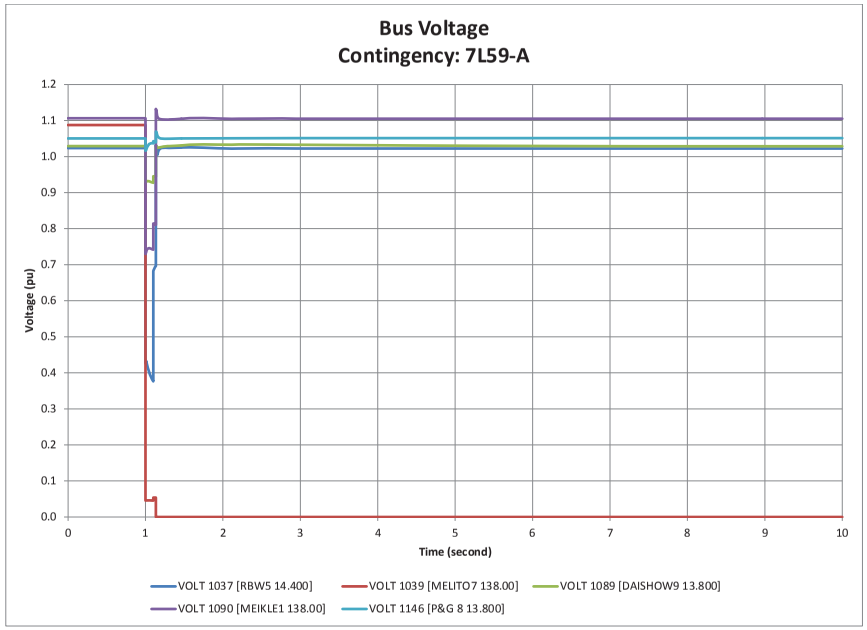

Generator Real Power
Contingency: 7L59-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

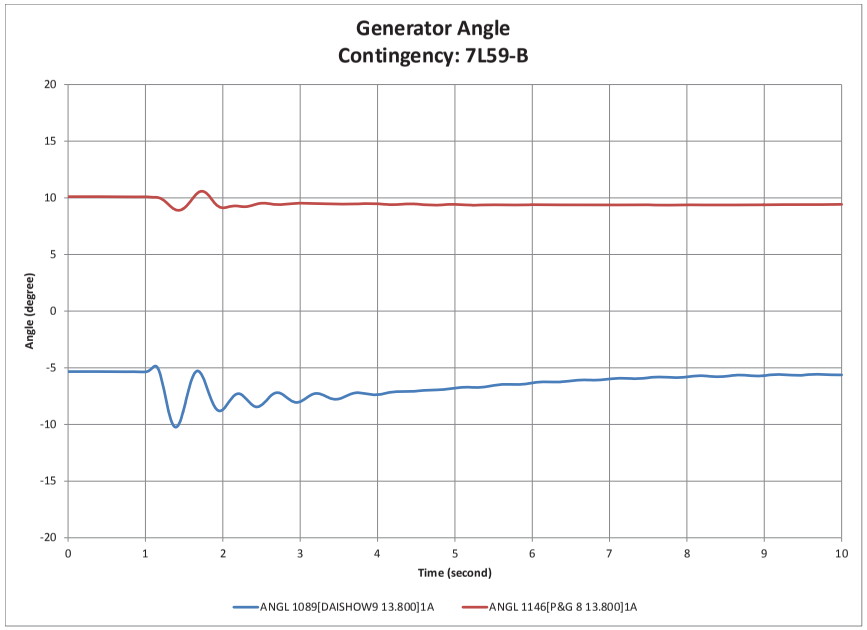

Generator Reactive Power
Contingency: 7L59-A
Reactive Power (pu)
0.0
-0.2
-0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

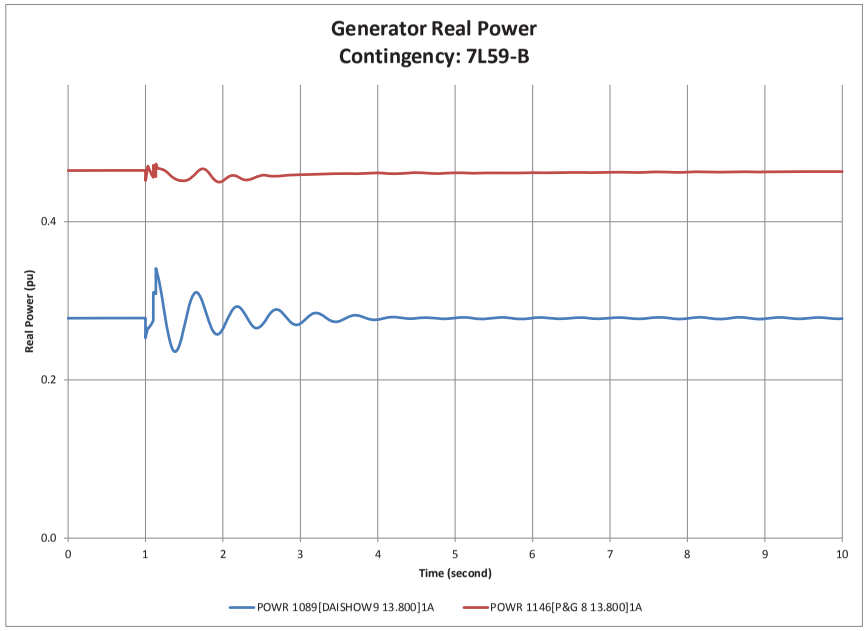

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
0.0030
0.0010
-0.0010
-0.0030
-0.0050
-0.0070
-0.0090
-0.0110
-0.0130
-0.0150
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

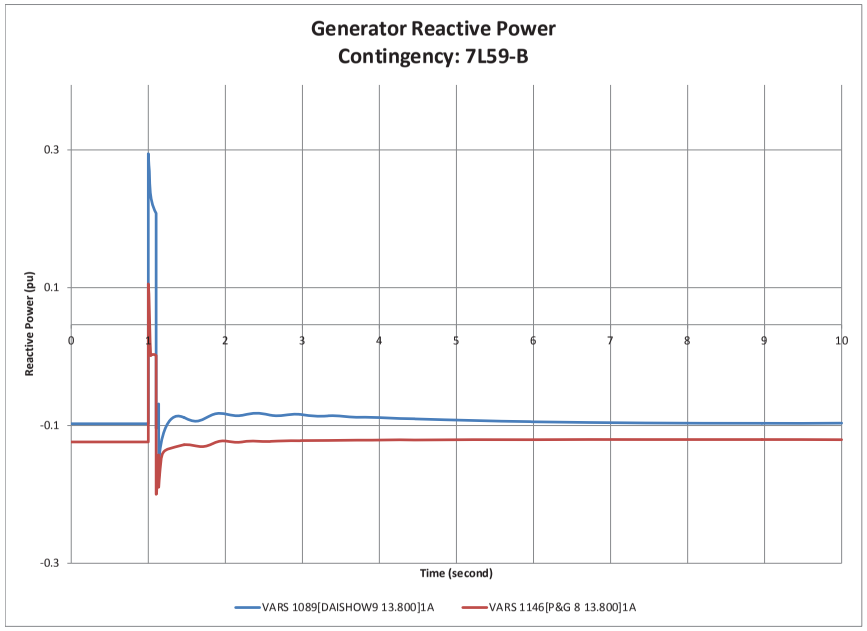

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

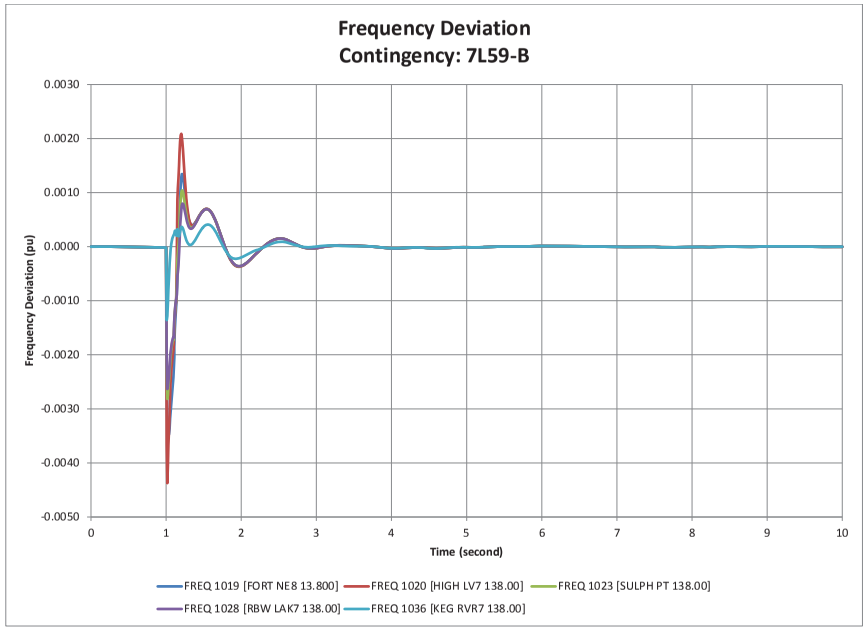

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

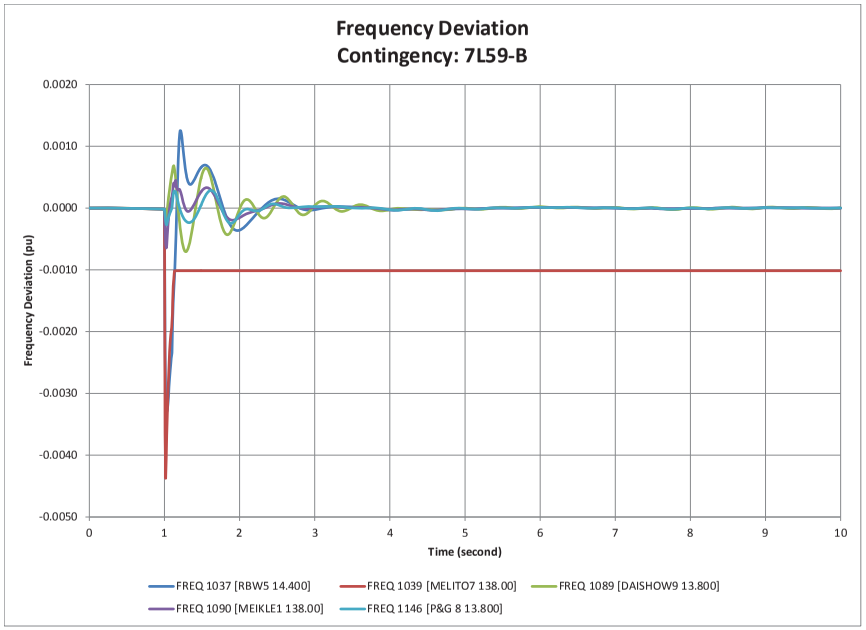

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

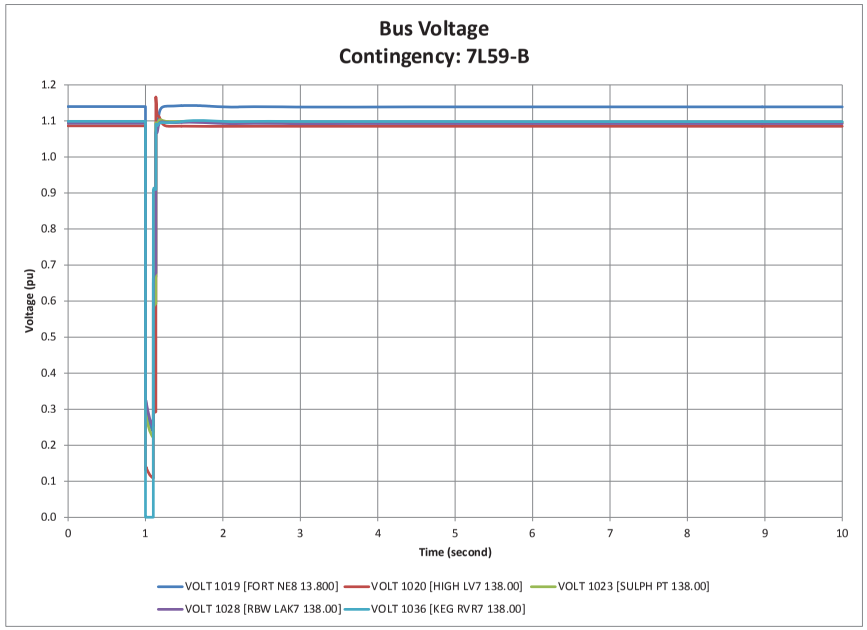

Generator Angle
Contingency: 7L59-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

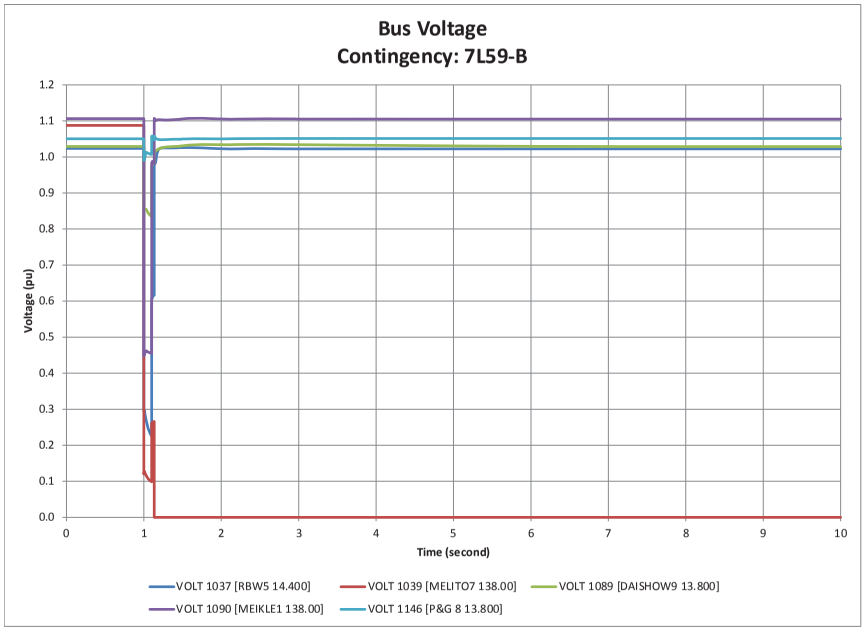

Generator Real Power
Contingency: 7L59-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

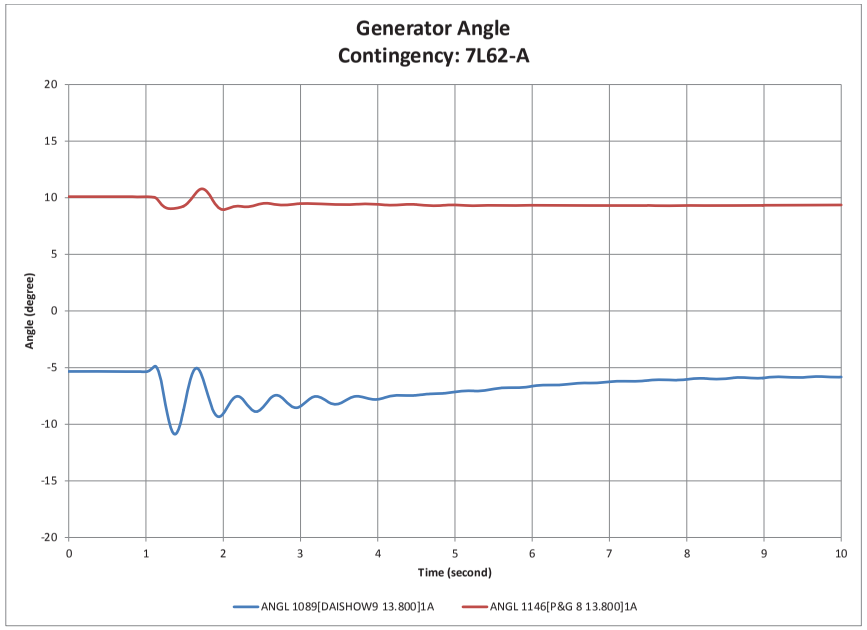

Generator Reactive Power
Contingency: 7L59-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

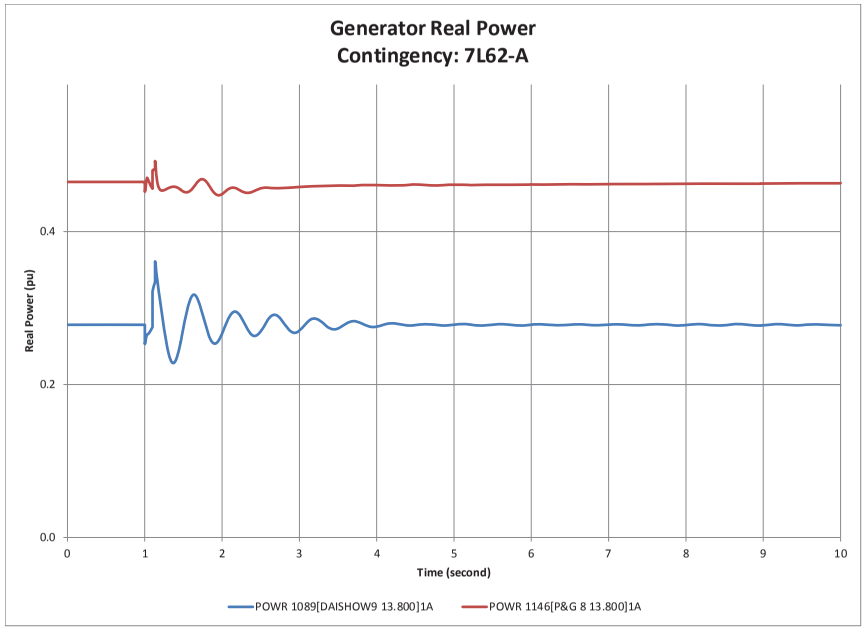

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

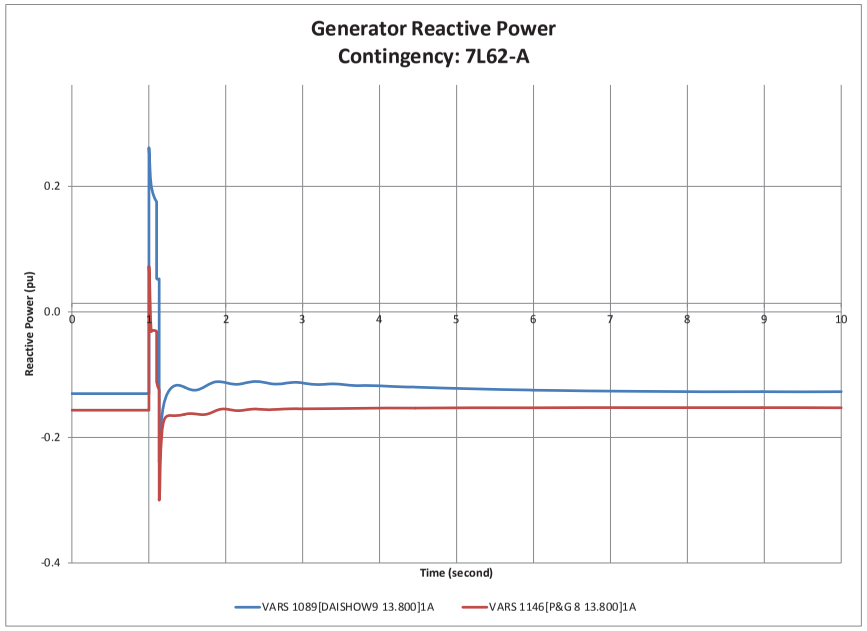

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

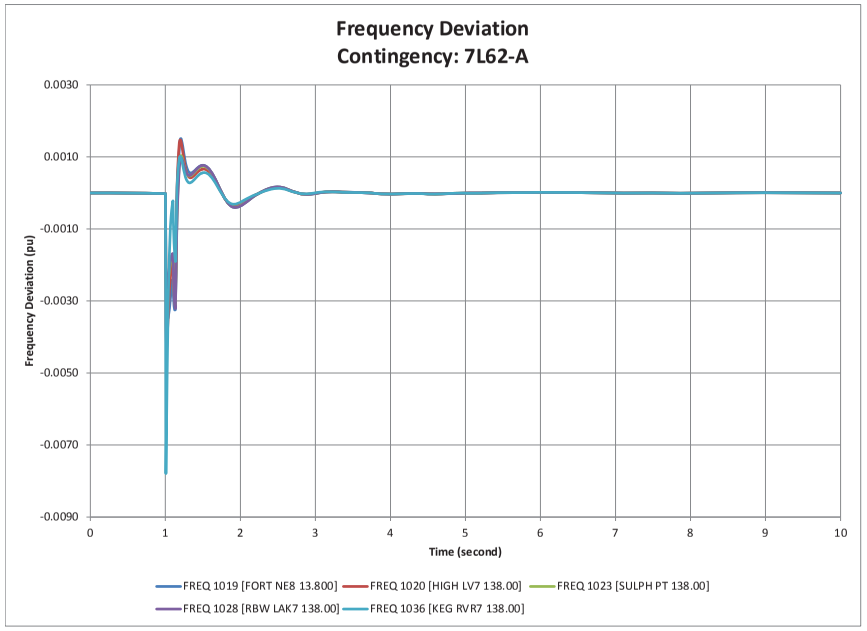

Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

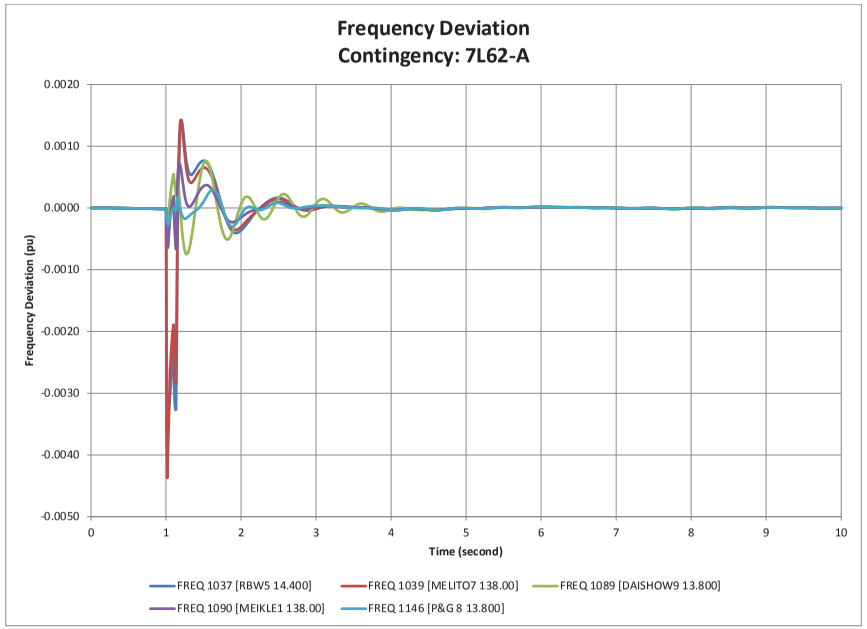

Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

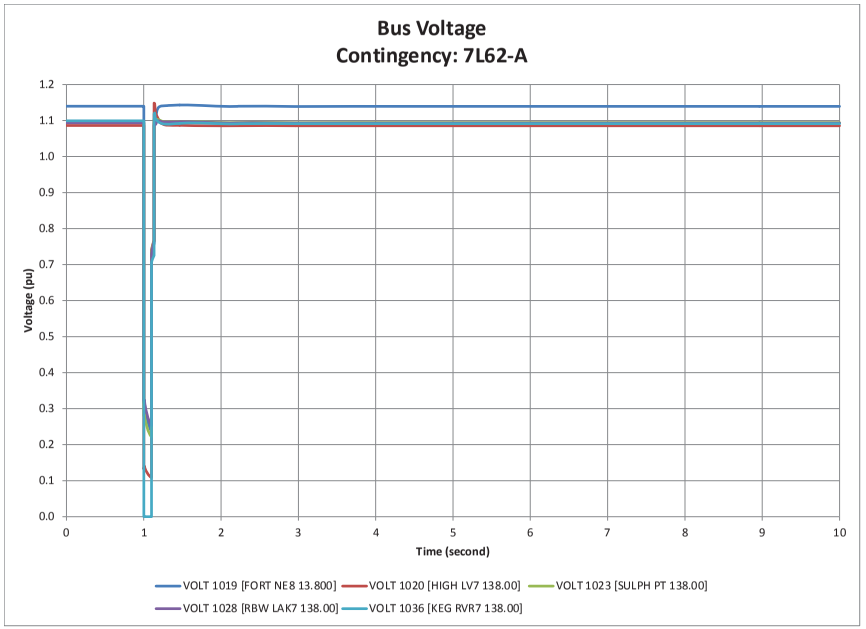

Generator Angle
Contingency: 7L62-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

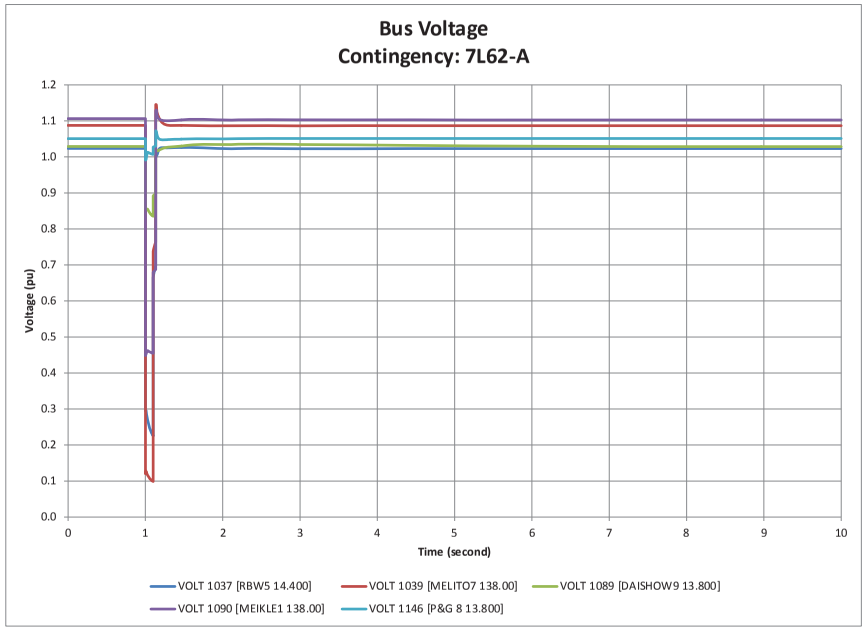

Generator Real Power
Contingency: 7L62-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

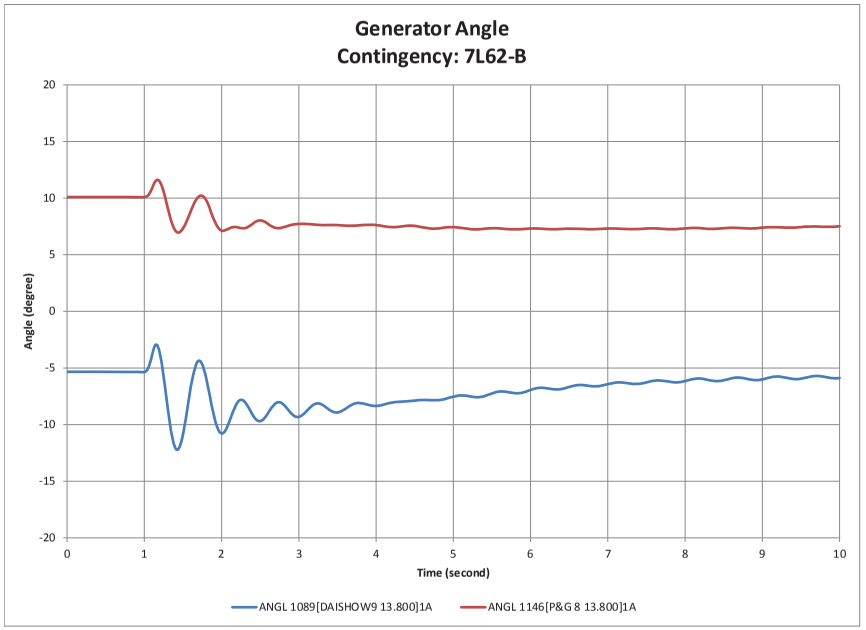

Generator Reactive Power
Contingency: 7L62-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

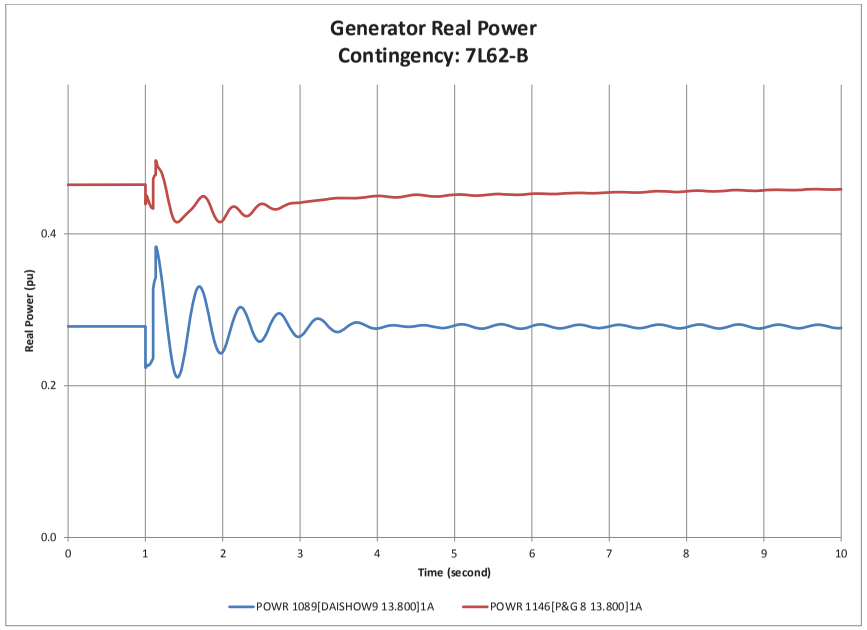

Frequency Deviation
Contingency: 7L62-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

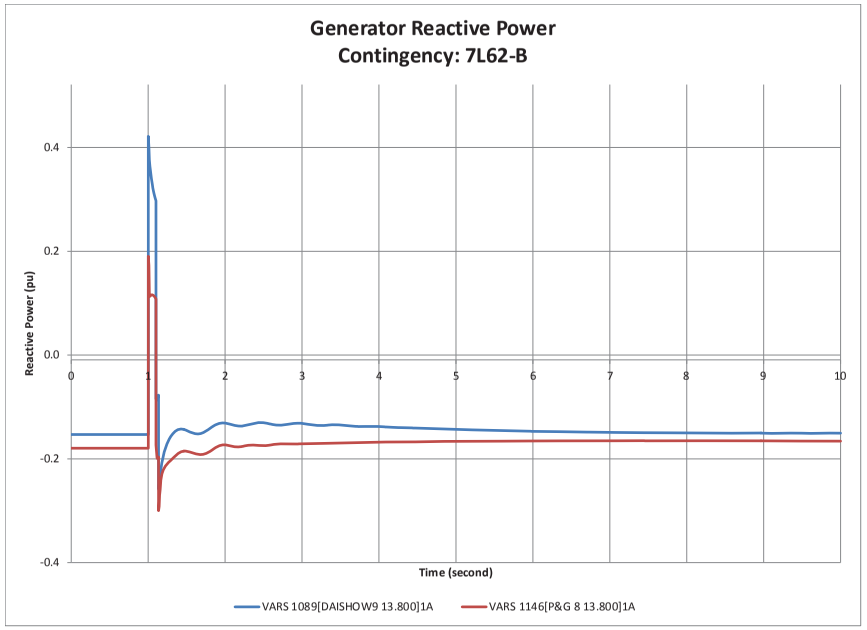

Frequency Deviation
Contingency: 7L62-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

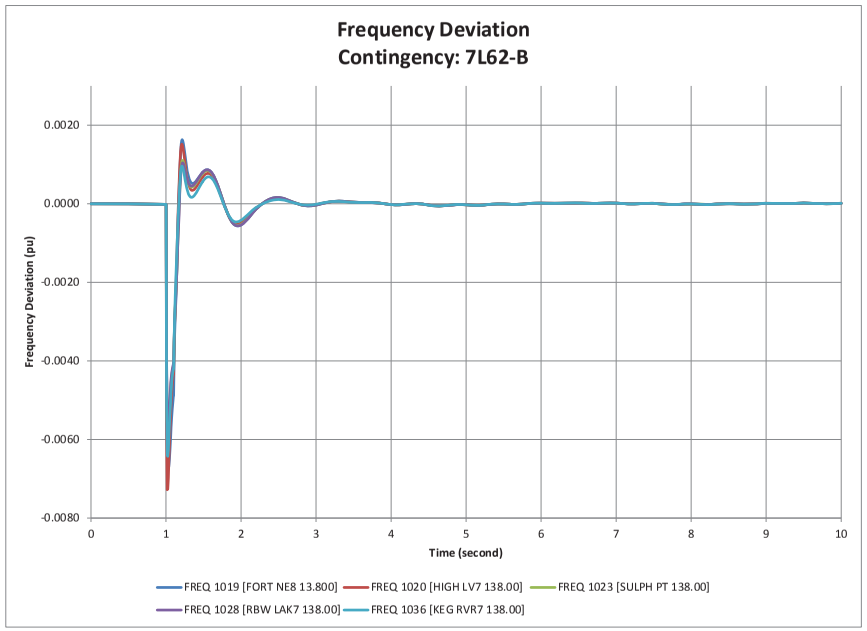

Bus Voltage
Contingency: 7L62-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

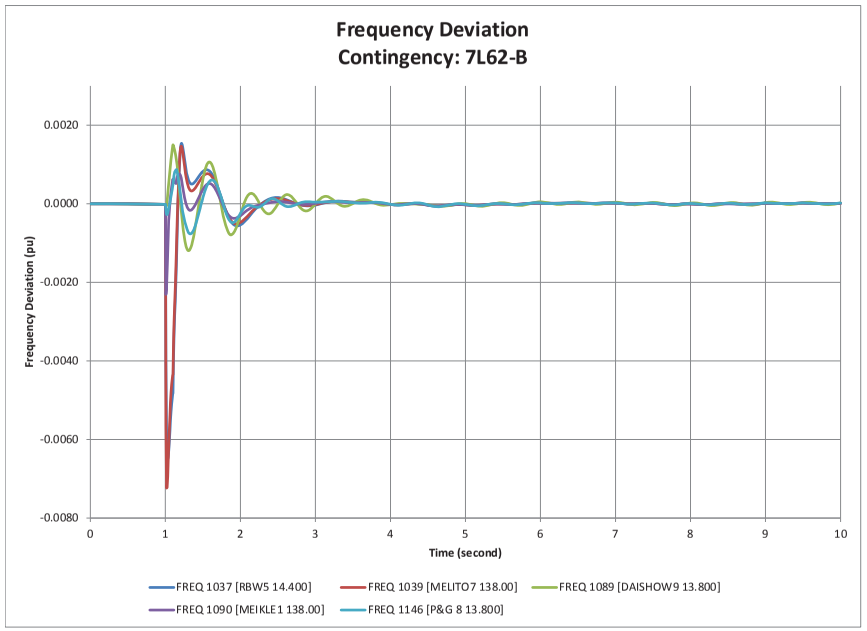

Bus Voltage
Contingency: 7L62-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

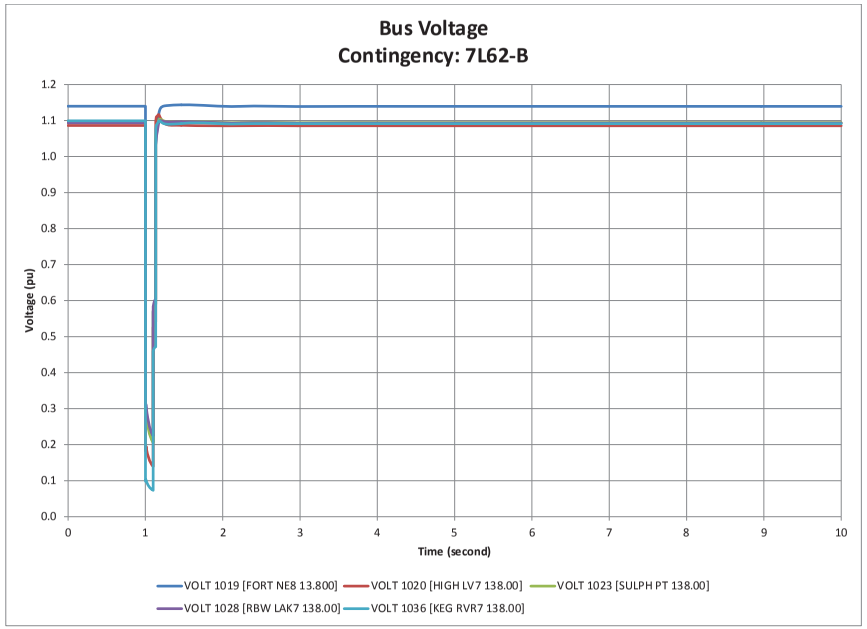

Generator Angle
Contingency: 7L62-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

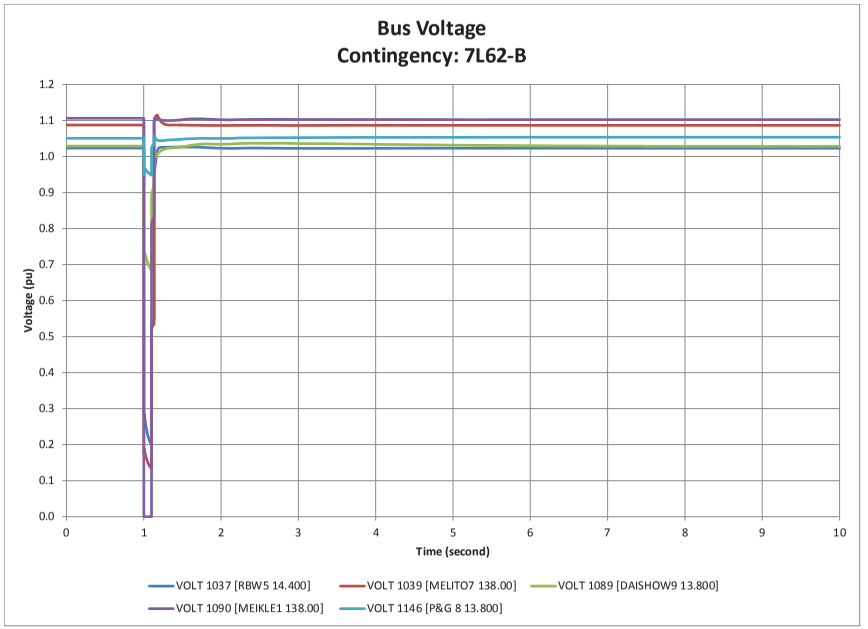

Generator Real Power
Contingency: 7L62-B
Real Power (pu)
0.0
0.2
0.4
0 1 2 3 4 5 6 7 8 9 10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

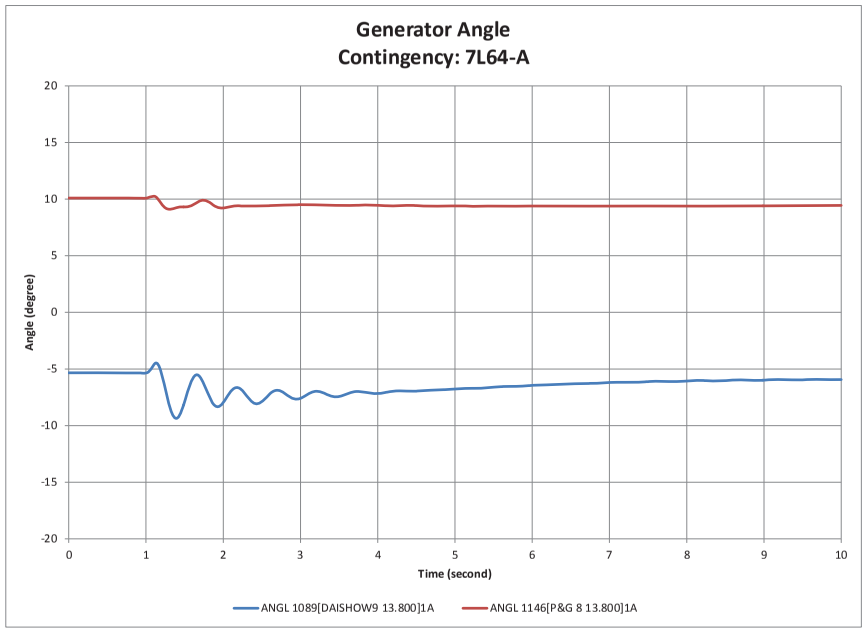

Generator Reactive Power
Contingency: 7L62-B
Reactive Power (pu)
-0.4
-0.2
0.0
0.2
0.4
0 1 2 3 4 5 6 7 8 9 10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

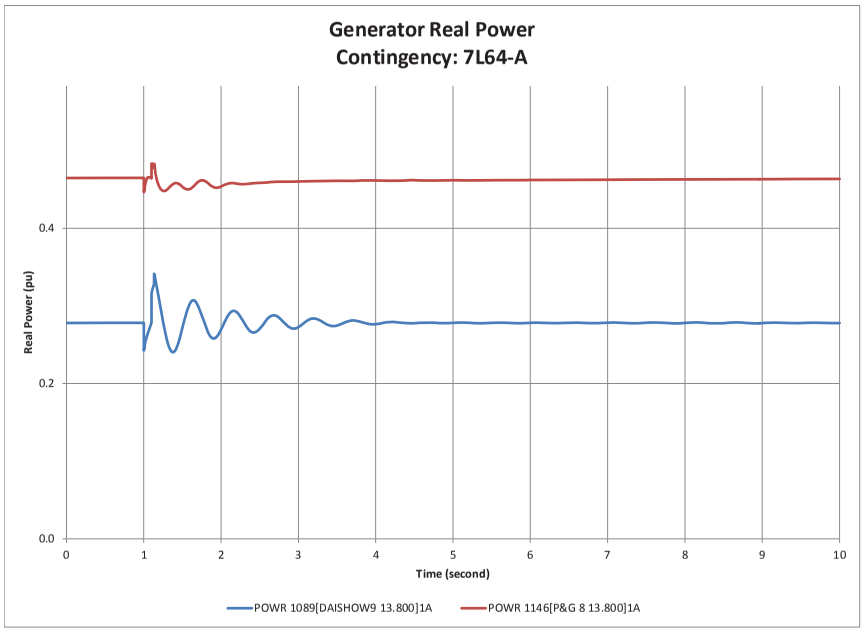

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
-0.0080
-0.0060
-0.0040
-0.0020
0.0000
0.0020
0 1 2 3 4 5 6 7 8 9 10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

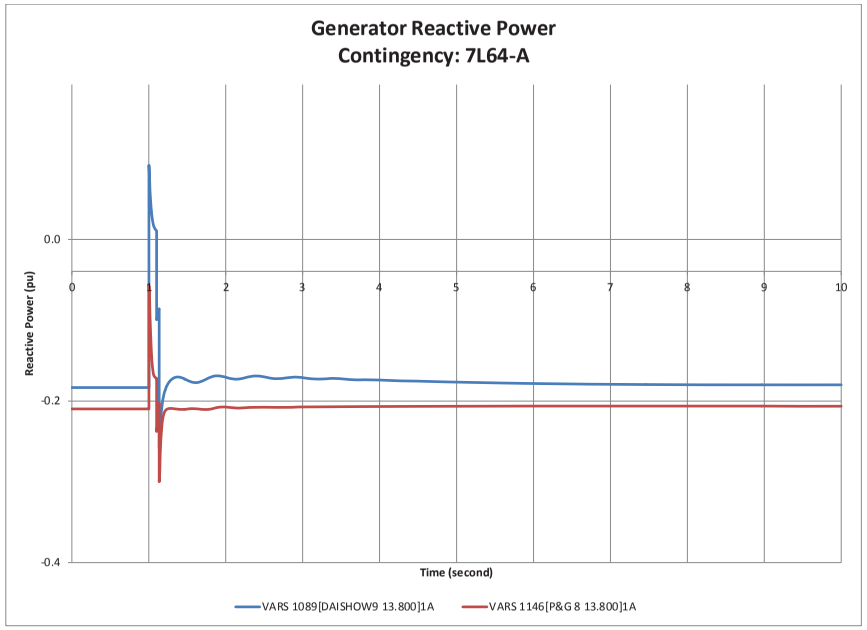

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
-0.0080
-0.0060
-0.0040
-0.0020
0.0000
0.0020
0 1 2 3 4 5 6 7 8 9 10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

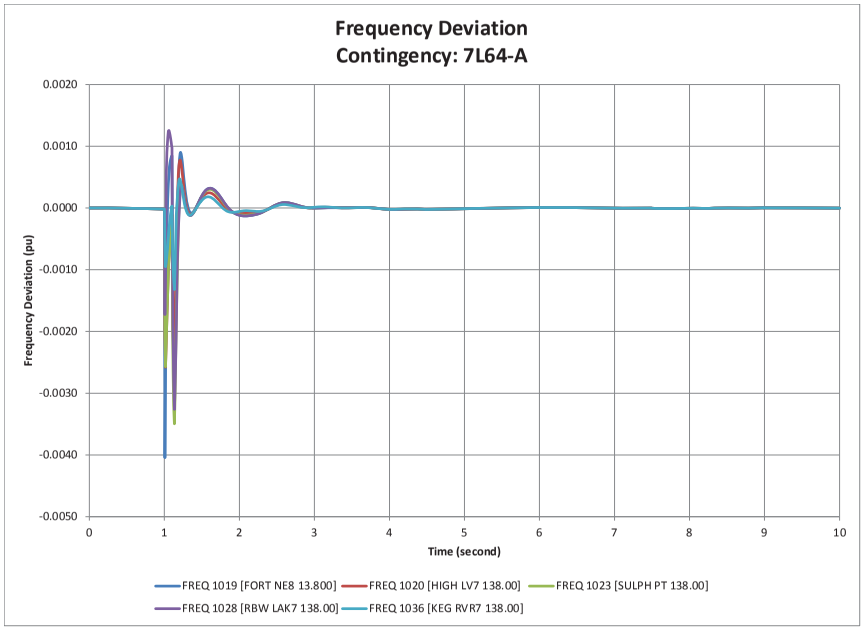

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

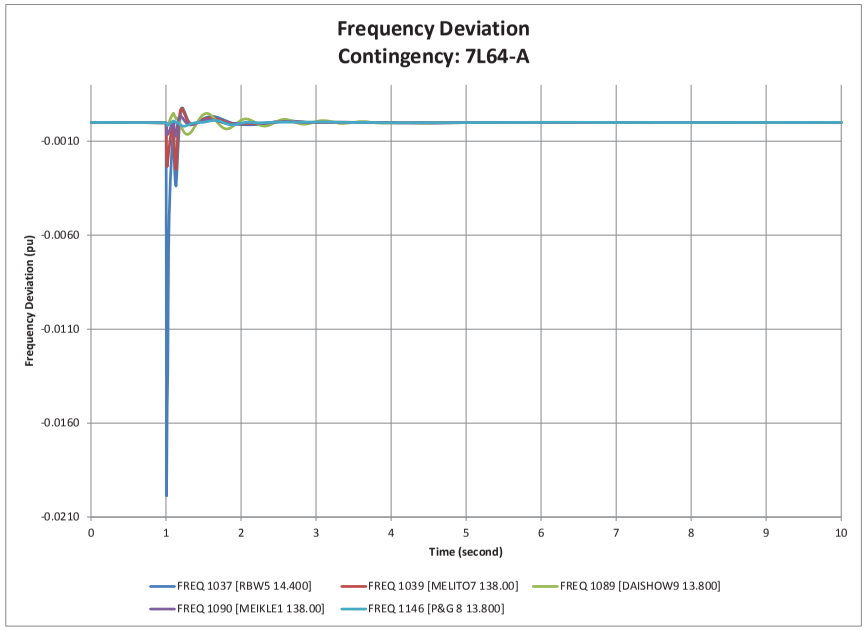

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

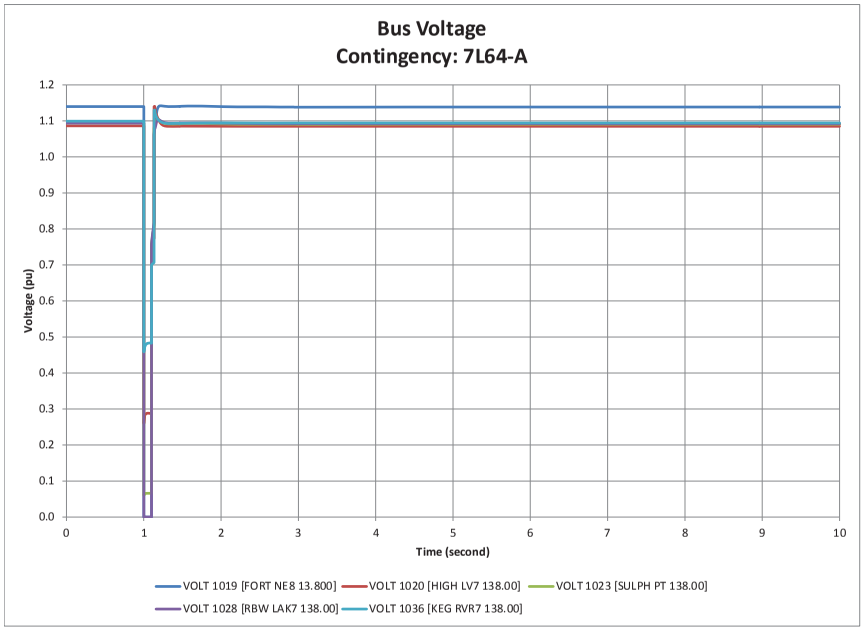

Generator Angle
Contingency: 7L64-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

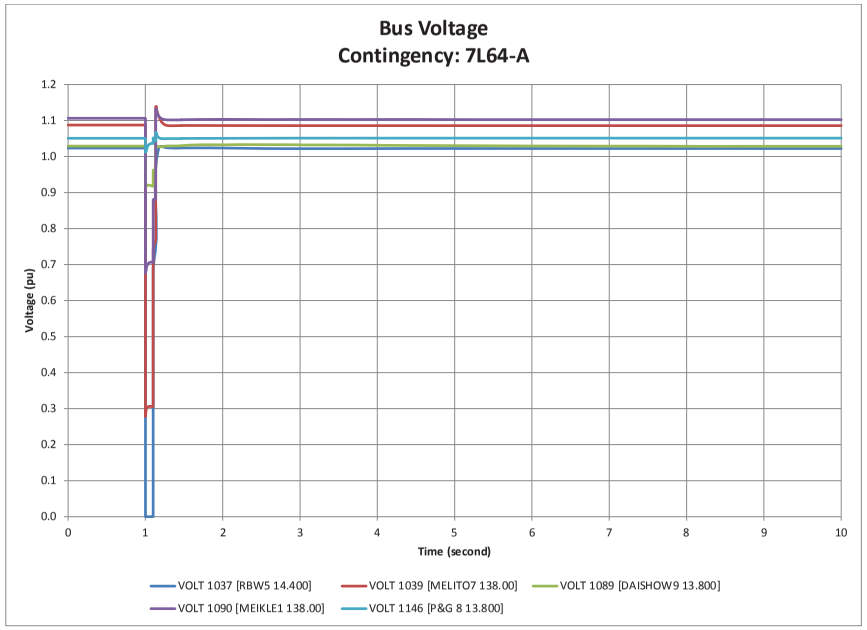

Generator Real Power
Contingency: 7L64-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

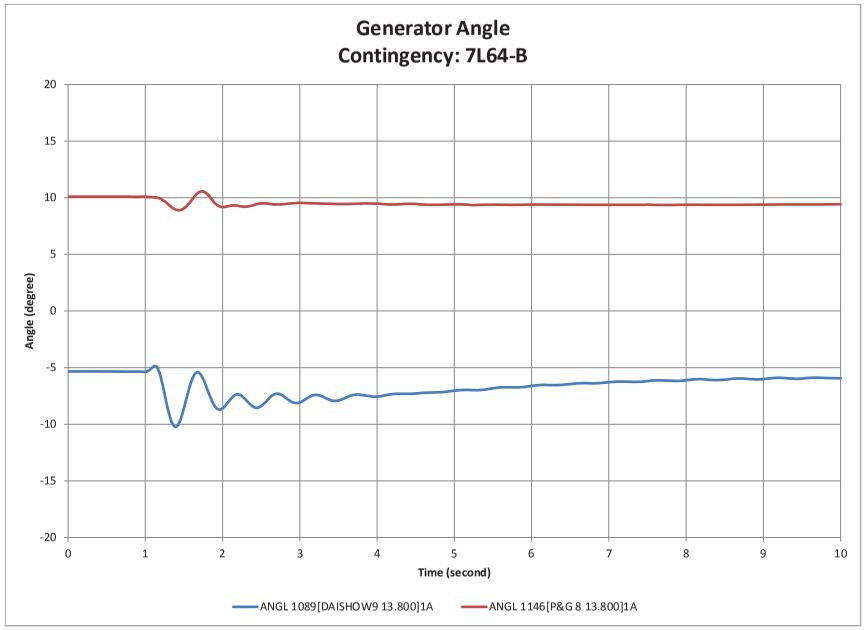

Generator Reactive Power
Contingency: 7L64-A
Reactive Power (pu)
0.0
-0.2
-0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

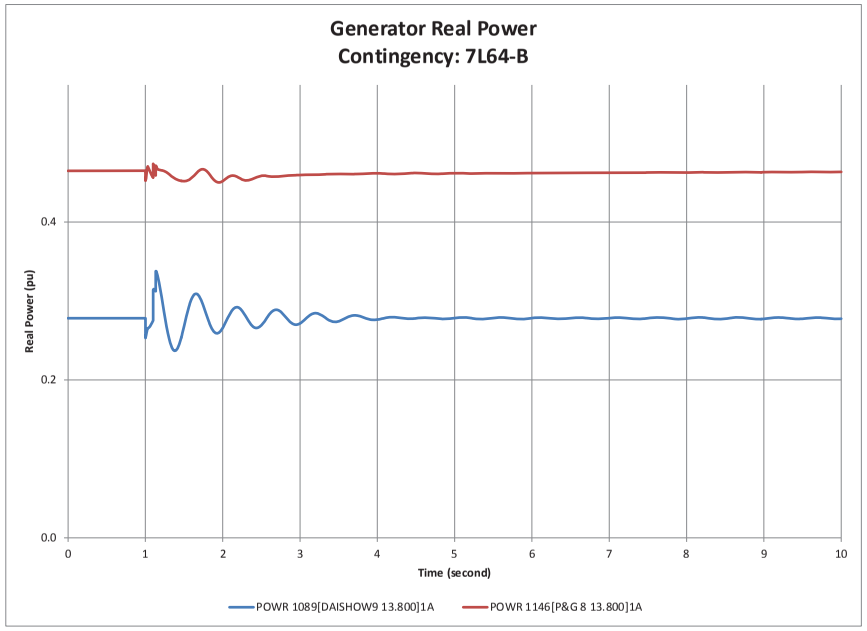

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
-0.0050
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

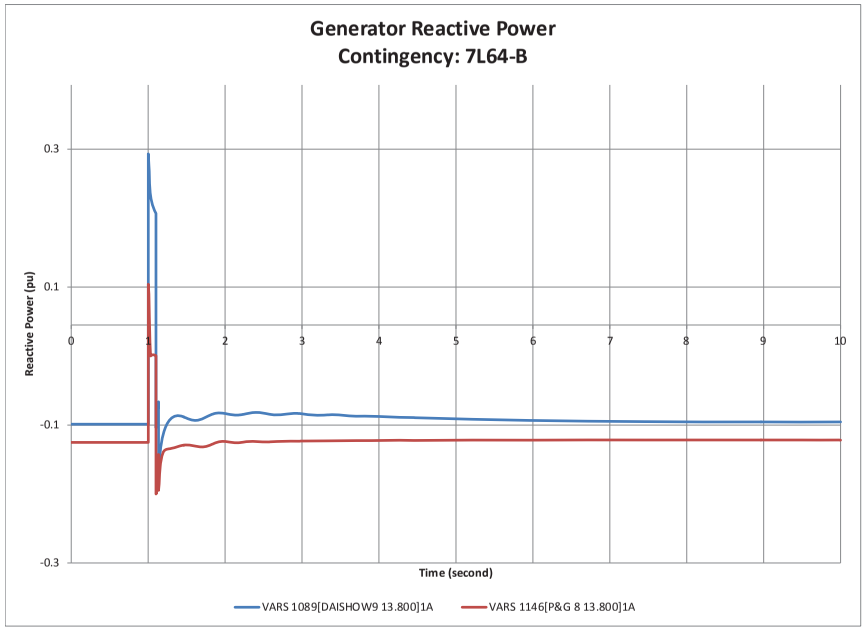

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
-0.0010
-0.0060
-0.0110
-0.0160
-0.0210
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

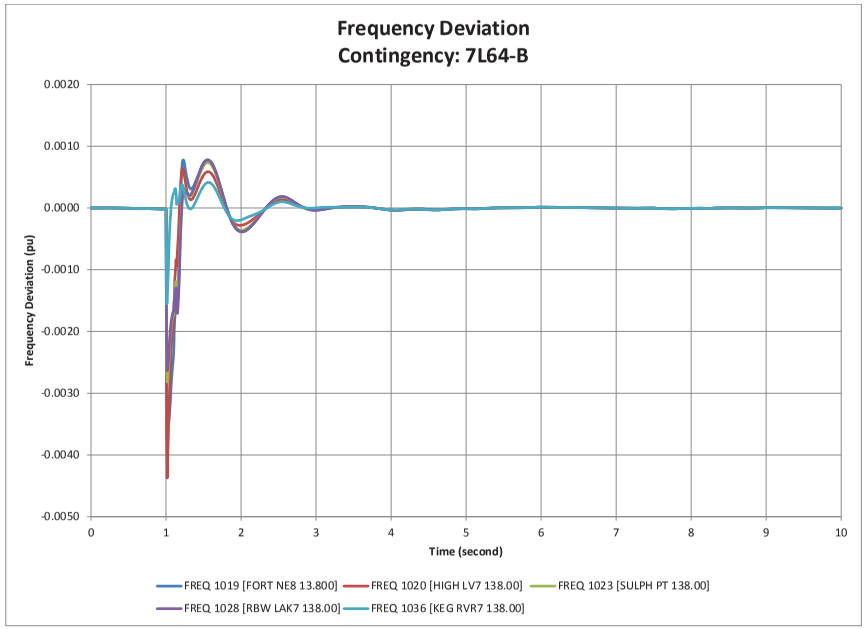

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

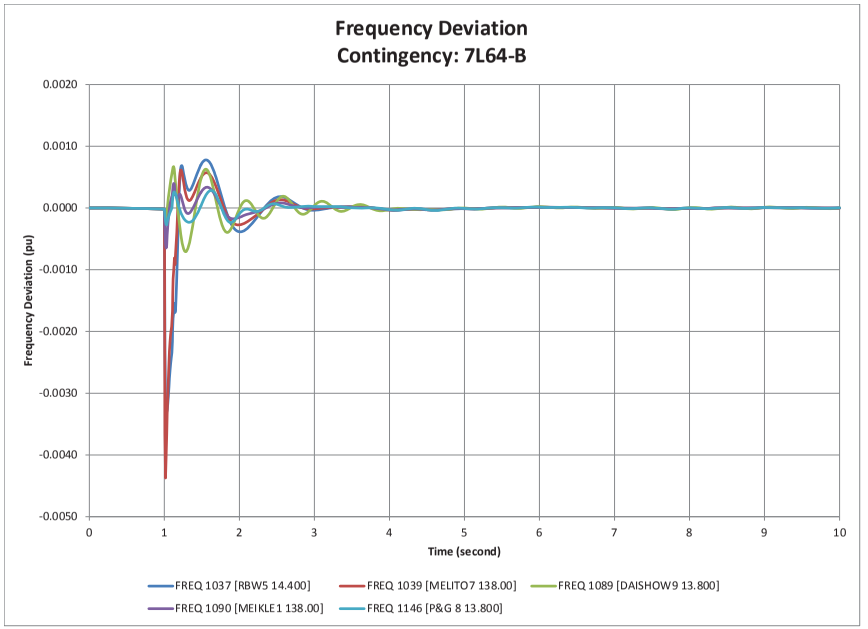

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

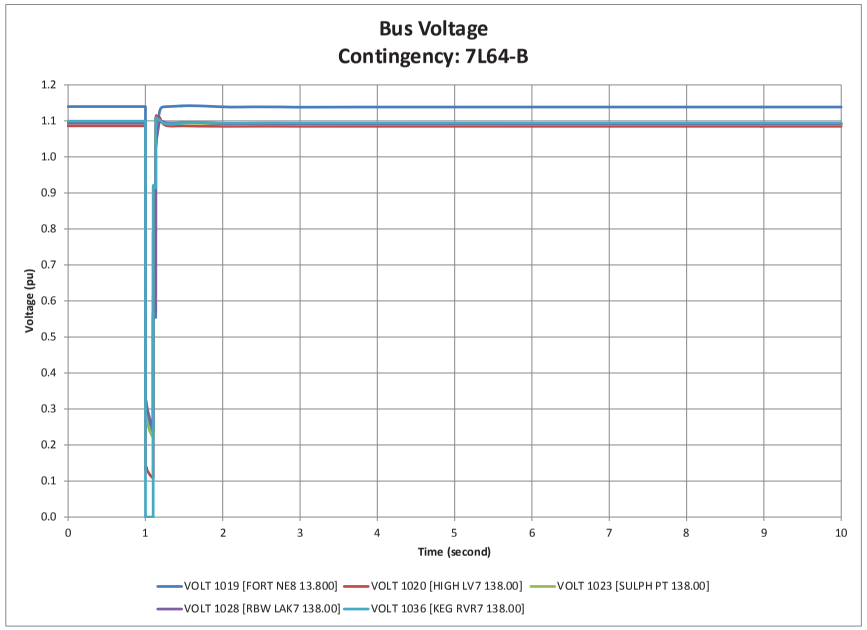

Generator Angle
Contingency: 7L64-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

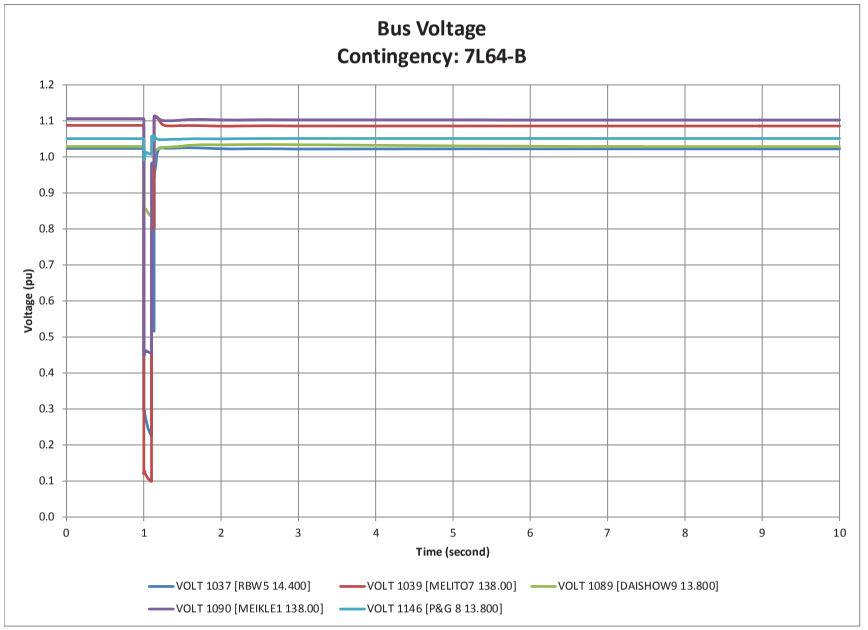

Generator Real Power
Contingency: 7L64-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

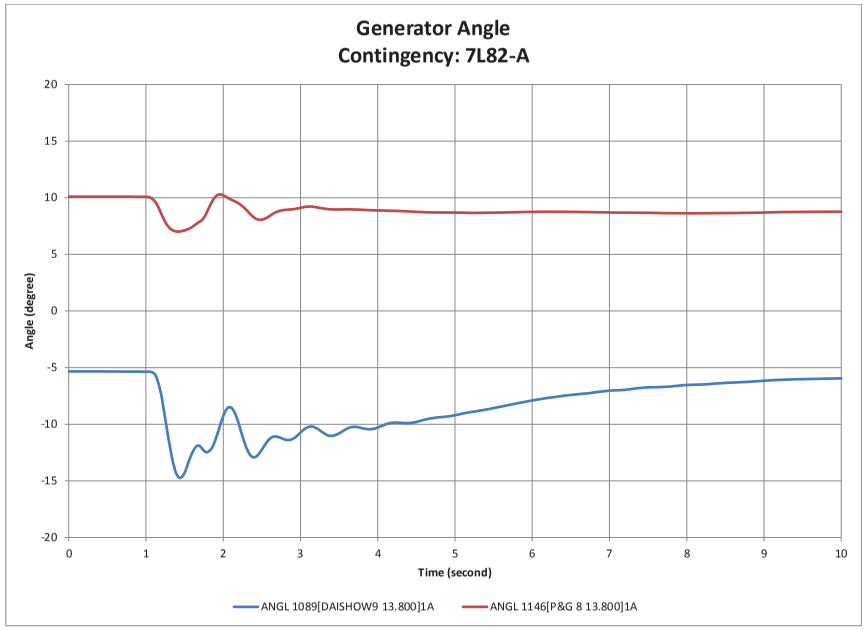

Generator Reactive Power
Contingency: 7L64-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

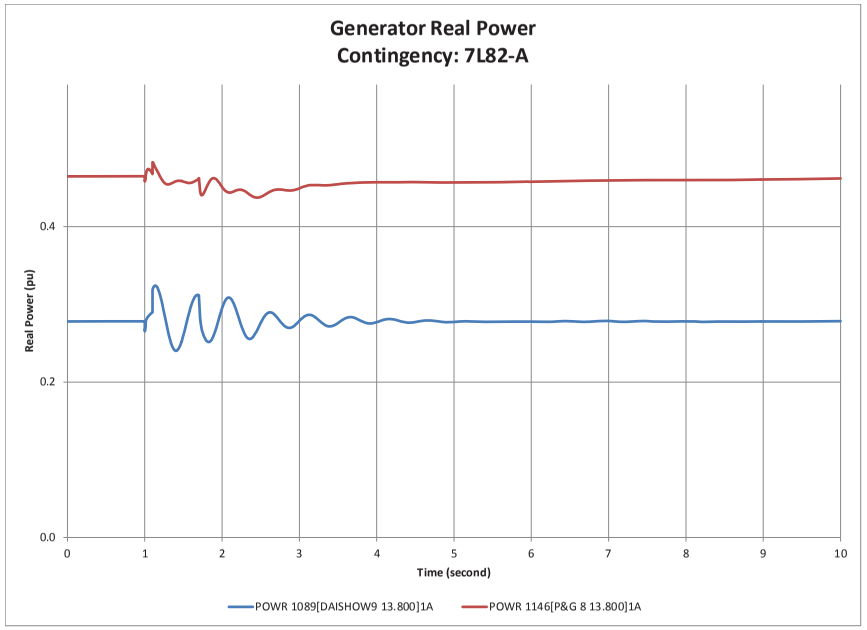

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

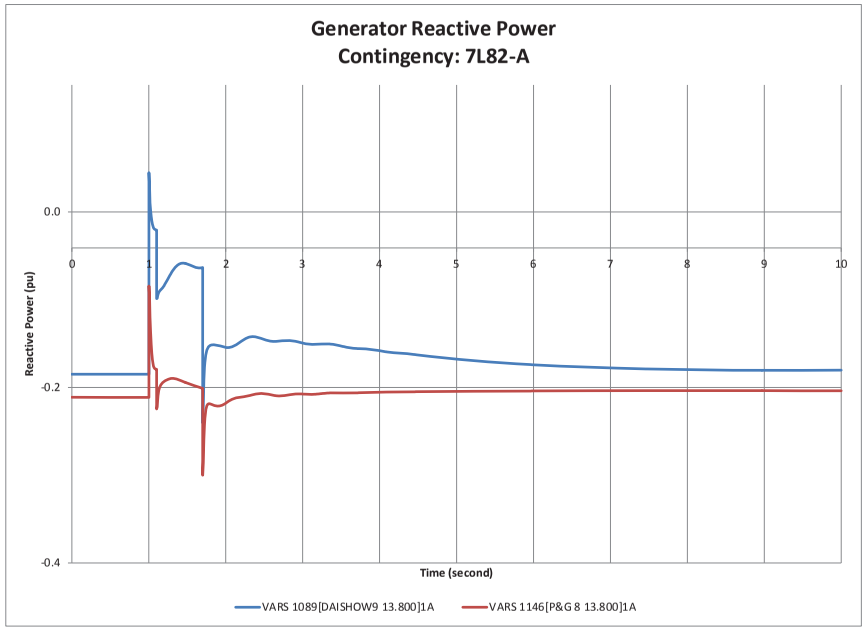

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

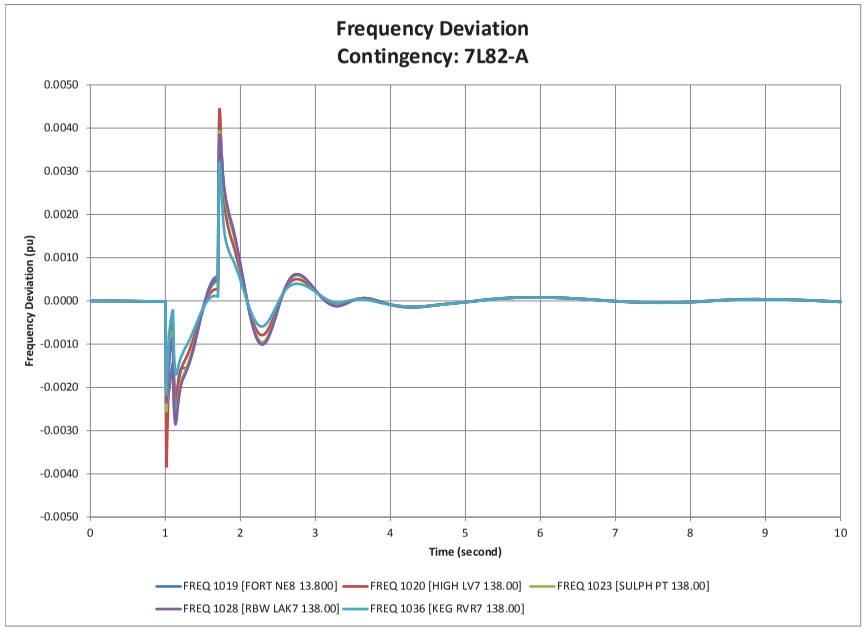

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

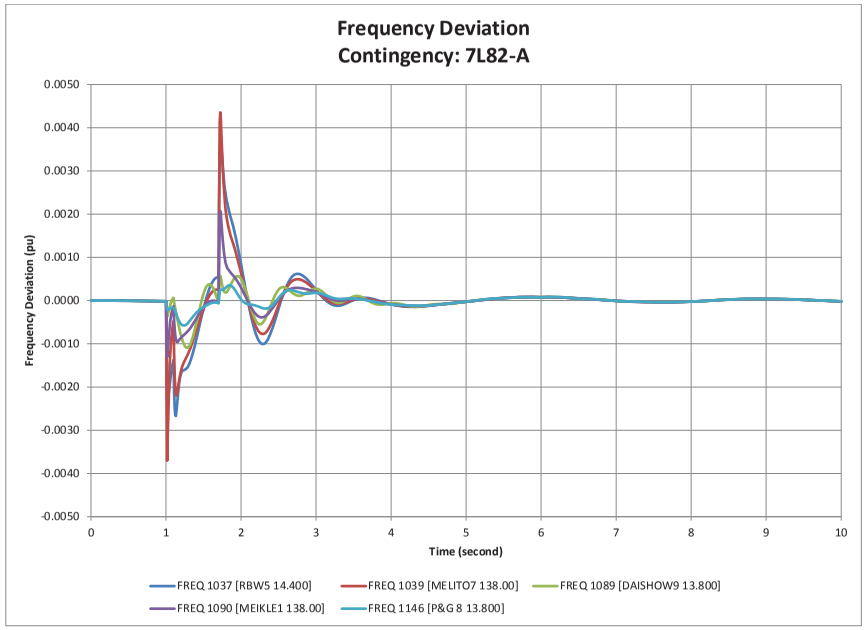

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

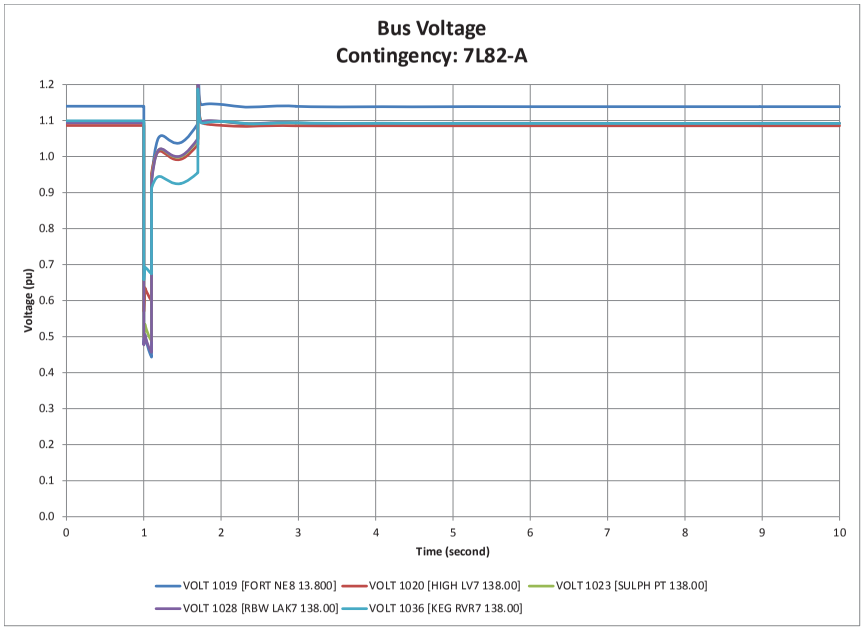

Generator Angle
Contingency: 7L82-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

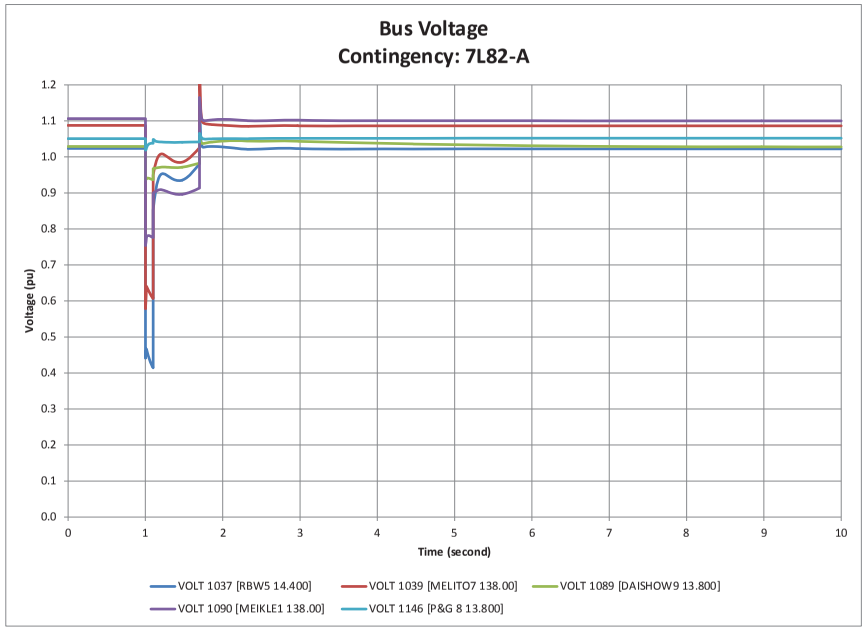

Generator Real Power
Contingency: 7L82-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A

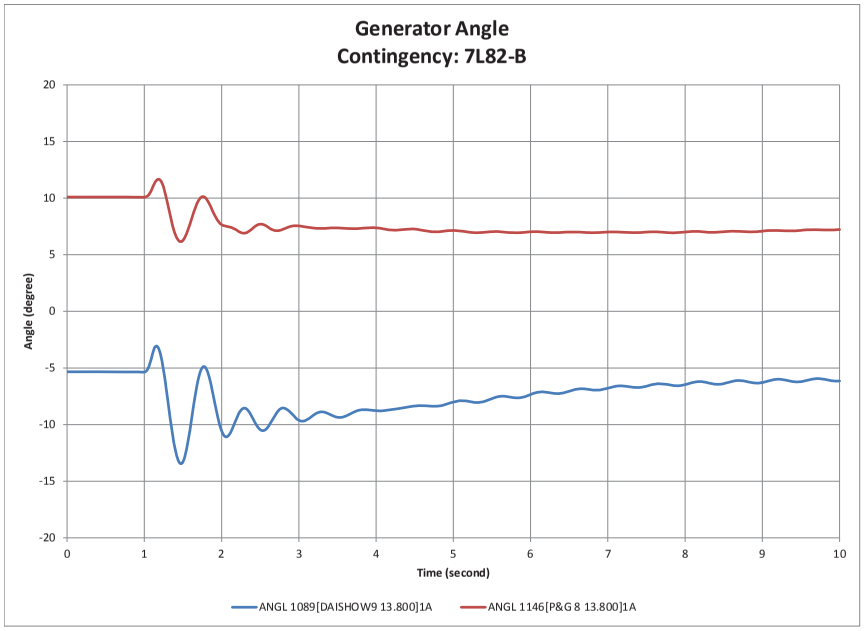

Generator Reactive Power
Contingency: 7L82-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A

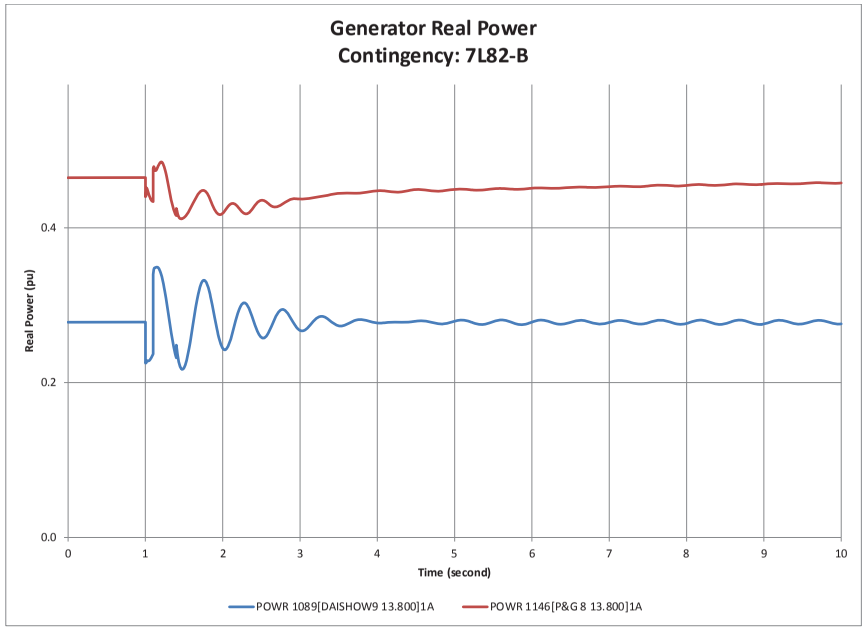

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

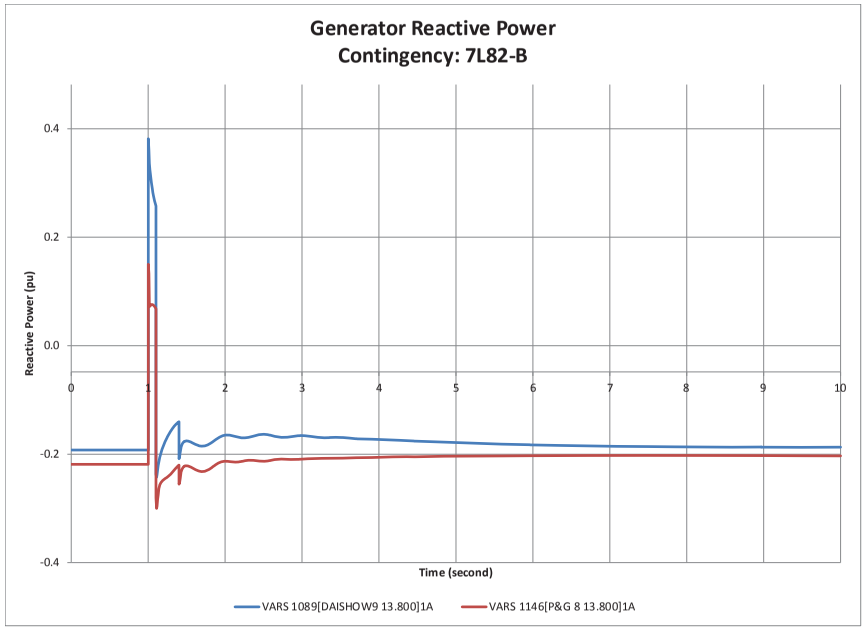

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]

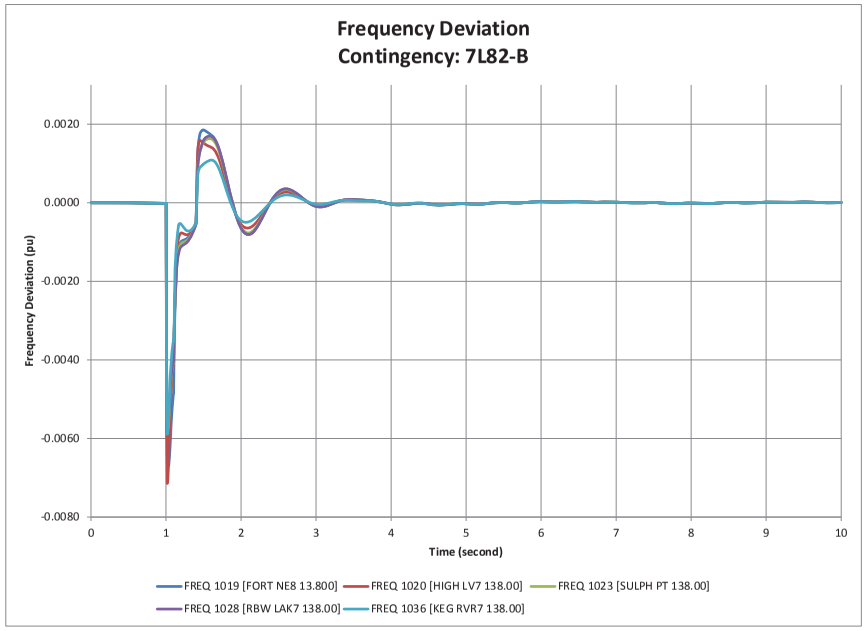

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

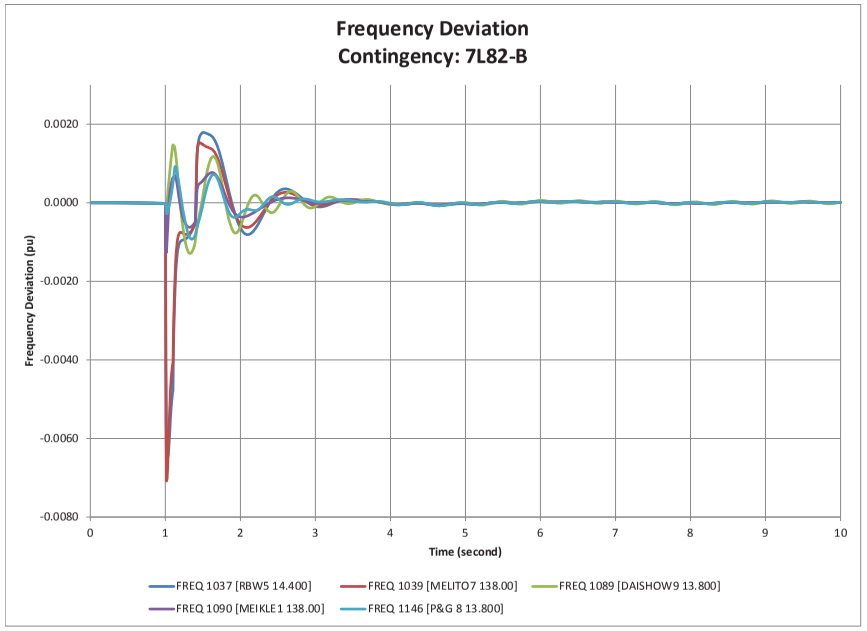

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

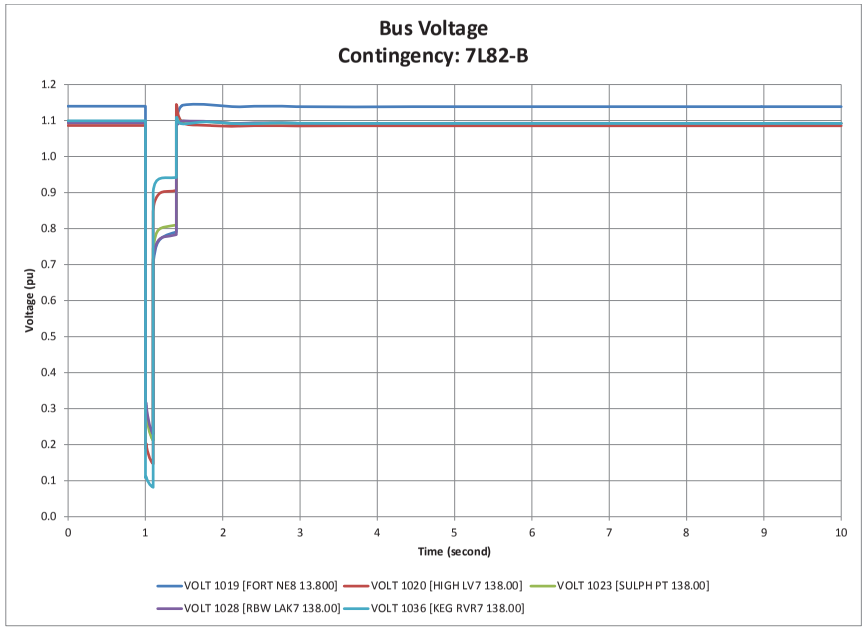

Generator Angle
Contingency: 7L82-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A

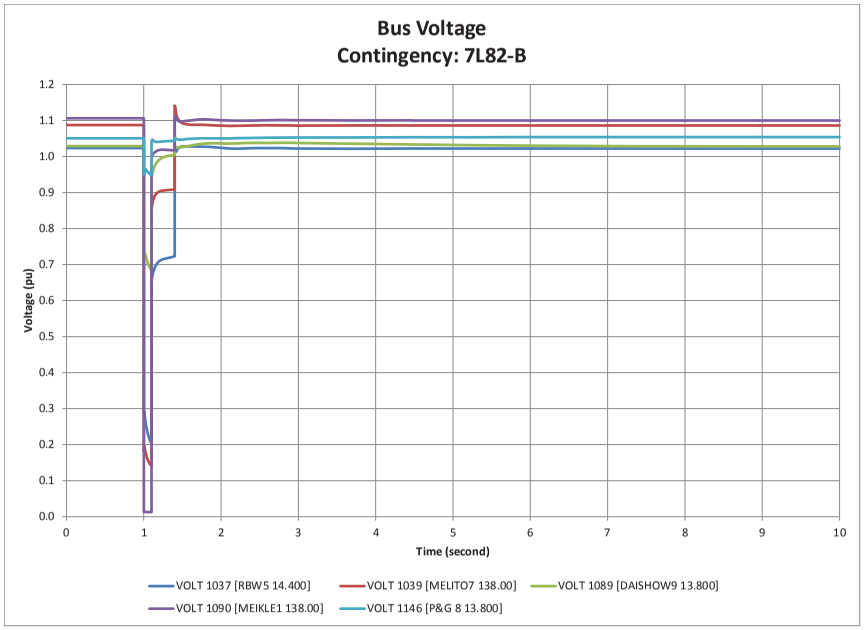

Generator Real Power
Contingency: 7L82-B
Real Power (pu)
0.0
0.2
0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A


Generator Reactive Power
Contingency: 7L82-B
Reactive Power (pu)
-0.4
-0.2
0.0
0.2
0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A


Frequency Deviation
Contingency: 7L82-B
Frequency Deviation (pu)
-0.0080
-0.0060
-0.0040
-0.0020
0.0000
0.0020
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

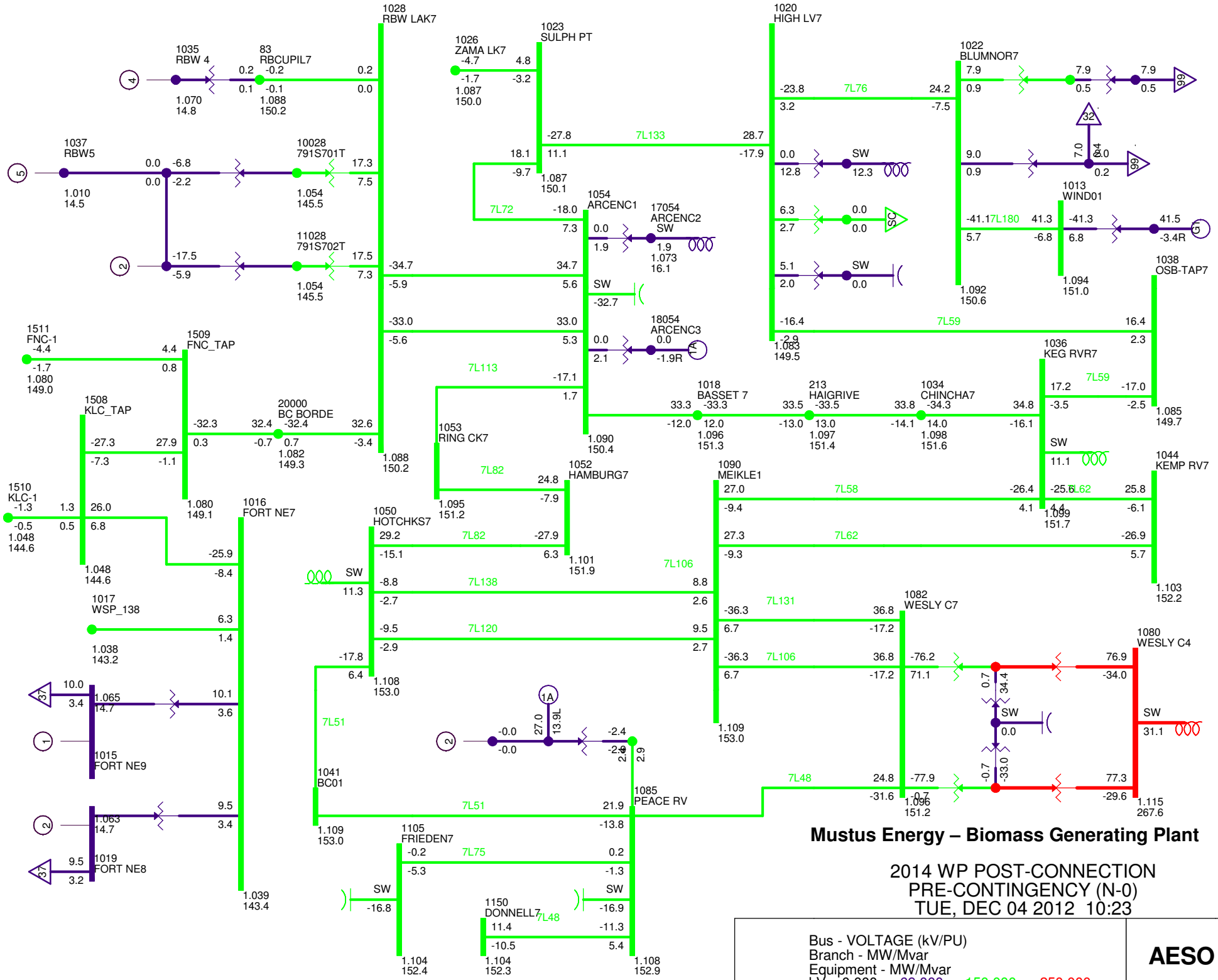

Frequency Deviation
Contingency: 7L82-B
Frequency Deviation (pu)
-0.0080
-0.0060
-0.0040
-0.0020
0.0000
0.0020
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]


Bus Voltage
Contingency: 7L82-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]


Bus Voltage
Contingency: 7L82-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]

Attachment C-1

Post-Connection Single Line Diagrams (2013-2014 WP)

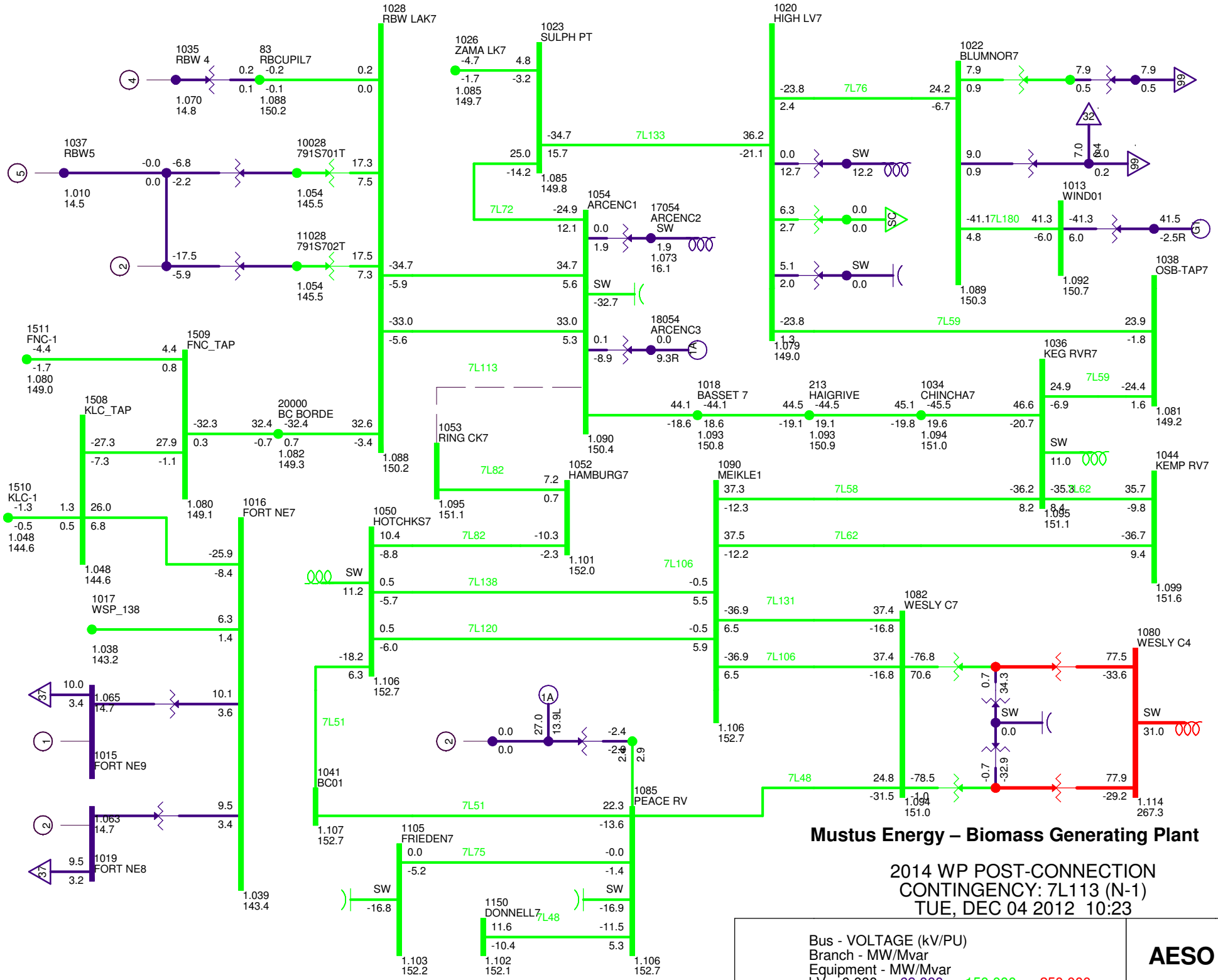


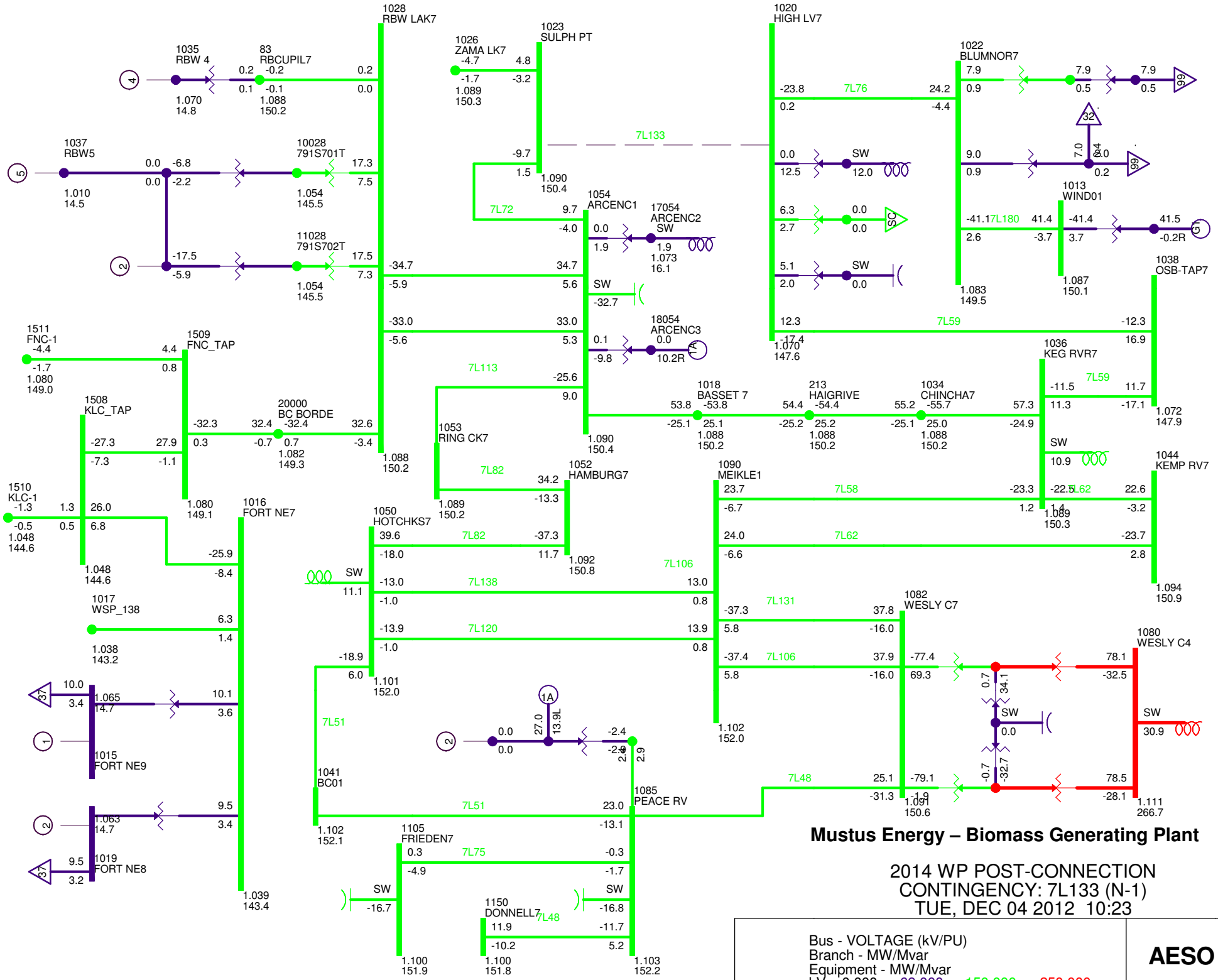
Mustus Energy – Biomass Generating Plant

2014 WP POST-CONNECTION
PRE-CONTINGENCY (N-0)
TUE, DEC 04 2012 10:23

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO


1028
RBW LAK7
1035
RBW 4
83
RBCUPIL7
1026
ZAMA LK7
1023
SULPH PT
1020
HIGH LV7
1022
BLUMNOR7
1037
RBW5
10028
791S701T
11028
791S702T
1054
ARCENC1
17054
ARCENC2
SW
18054
ARCENC3
9.3R
1013
WIND01
1038
OSB-TAP7
1511
FNC-1
1509
FNC_TAP
1508
KLC_TAP
20000
BC BORDE
1053
RING CK7
1052
HAMBURG7
1018
BASSET 7
213
HAIGRIVE
1034
CHINCHA7
1036
KEG RVR7
1044
KEMP RV7
1510
KLC-1
1016
FORT NE7
1017
WSP_138
1050
HOTCHKS7
1090
MEIKLE1
1082
WESLY C7
1080
WESLY C4
1015
FORT NE9
1019
FORT NE8
1041
BC01
1085
PEACE RV
1105
FRIEDEN7
1150
DONNELL7
7L59
7L76
7L133
7L72
7L180
7L113
7L82
7L58
7L62
7L106
7L138
7L120
7L131
7L51
7L48
7L75
1039
143.4
1088
150.2
1090
150.4
1079
149.0
1089
150.3
1092
150.7
1081
149.2
1095
151.1
1099
151.6
1106
152.7
1107
152.7
1103
152.2
1102
152.1
1114
267.3
Mustus Energy – Biomass Generating Plant
2014 WP POST-CONNECTION
CONTINGENCY: 7L113 (N-1)
TUE, DEC 04 2012 10:23
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO

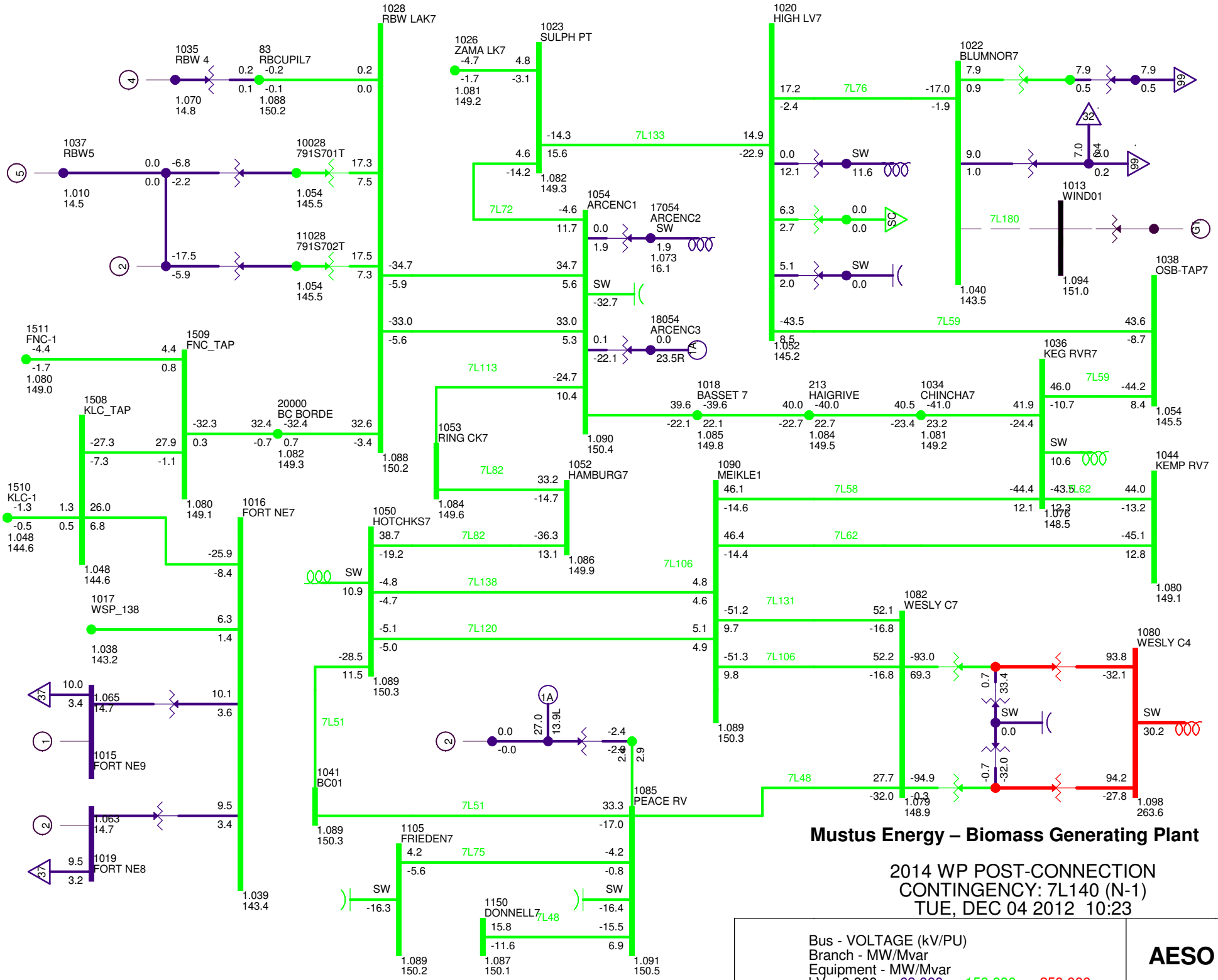


Mustus Energy – Biomass Generating Plant

2014 WP POST-CONNECTION
CONTINGENCY: 7L133 (N-1)
TUE, DEC 04 2012 10:23

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO

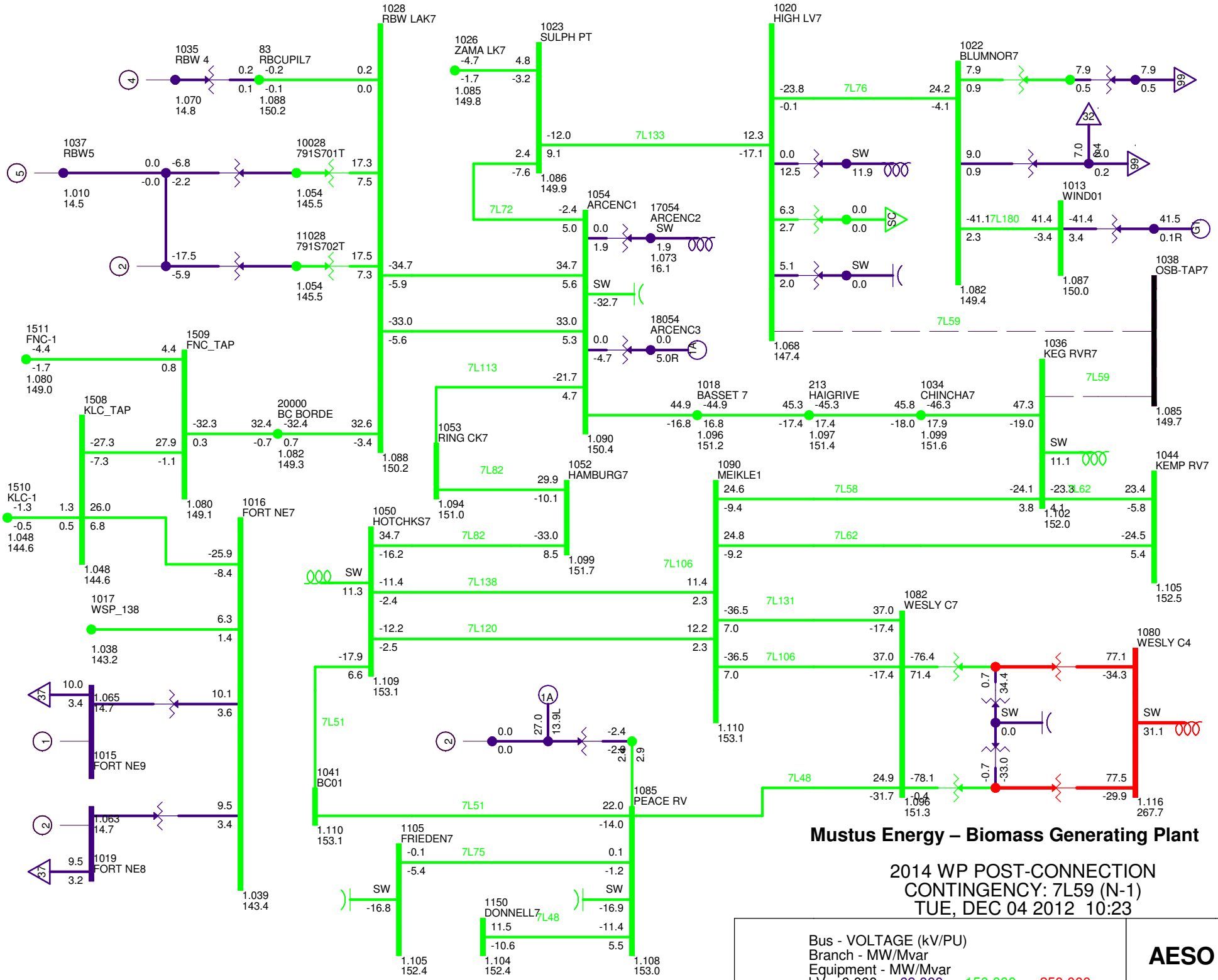


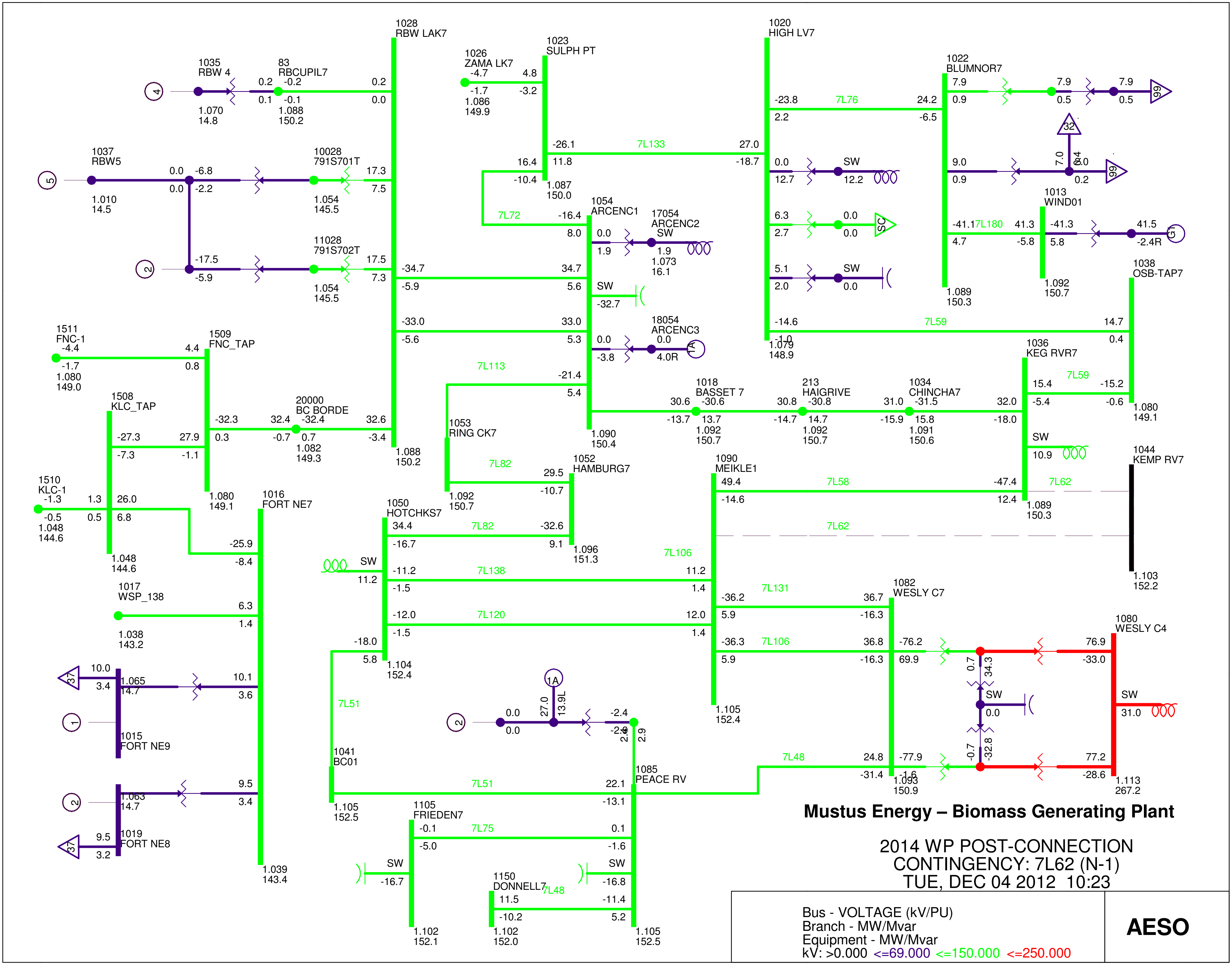
Mustus Energy – Biomass Generating Plant

2014 WP POST-CONNECTION
CONTINGENCY: 7L140 (N-1)
TUE, DEC 04 2012 10:23

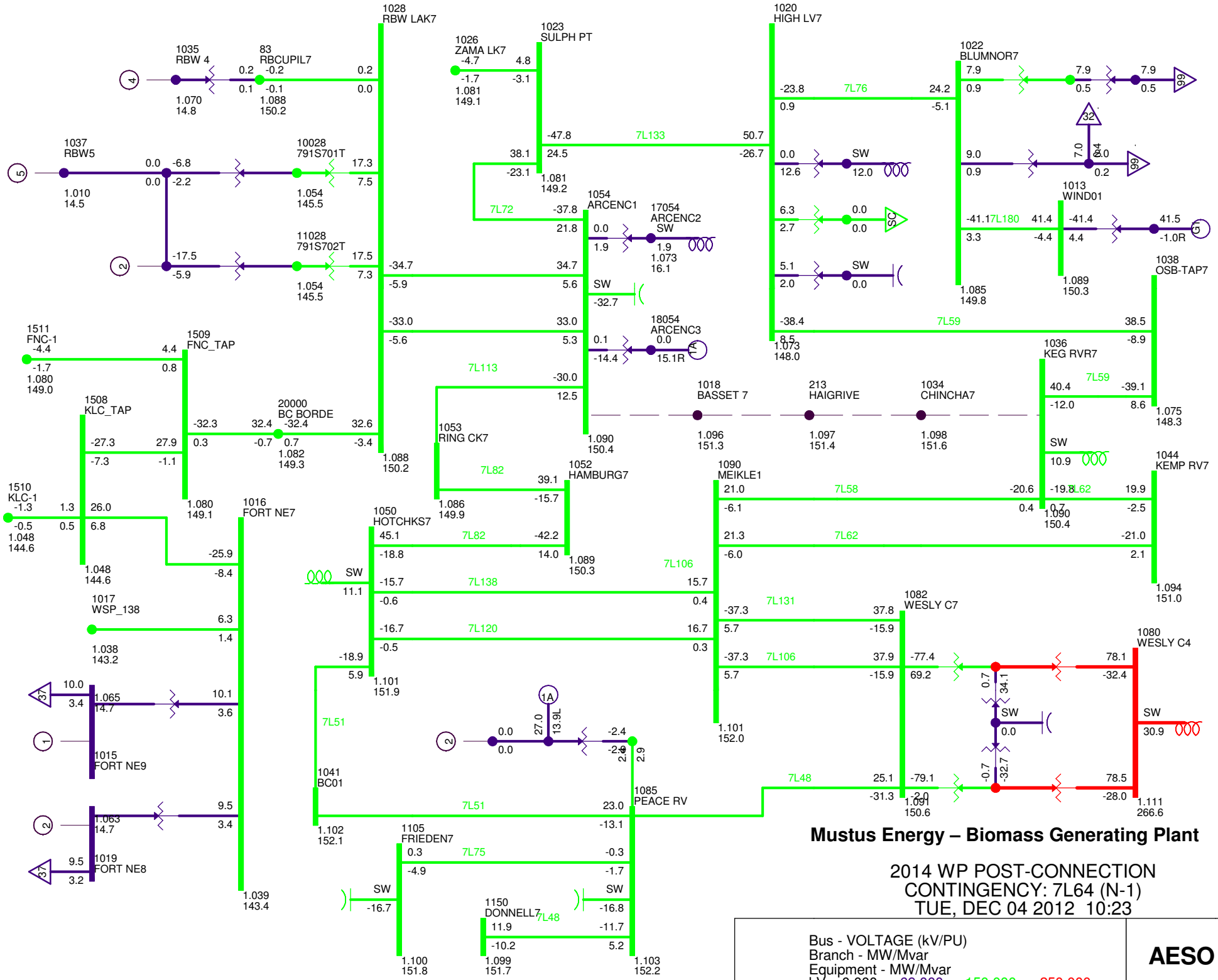
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

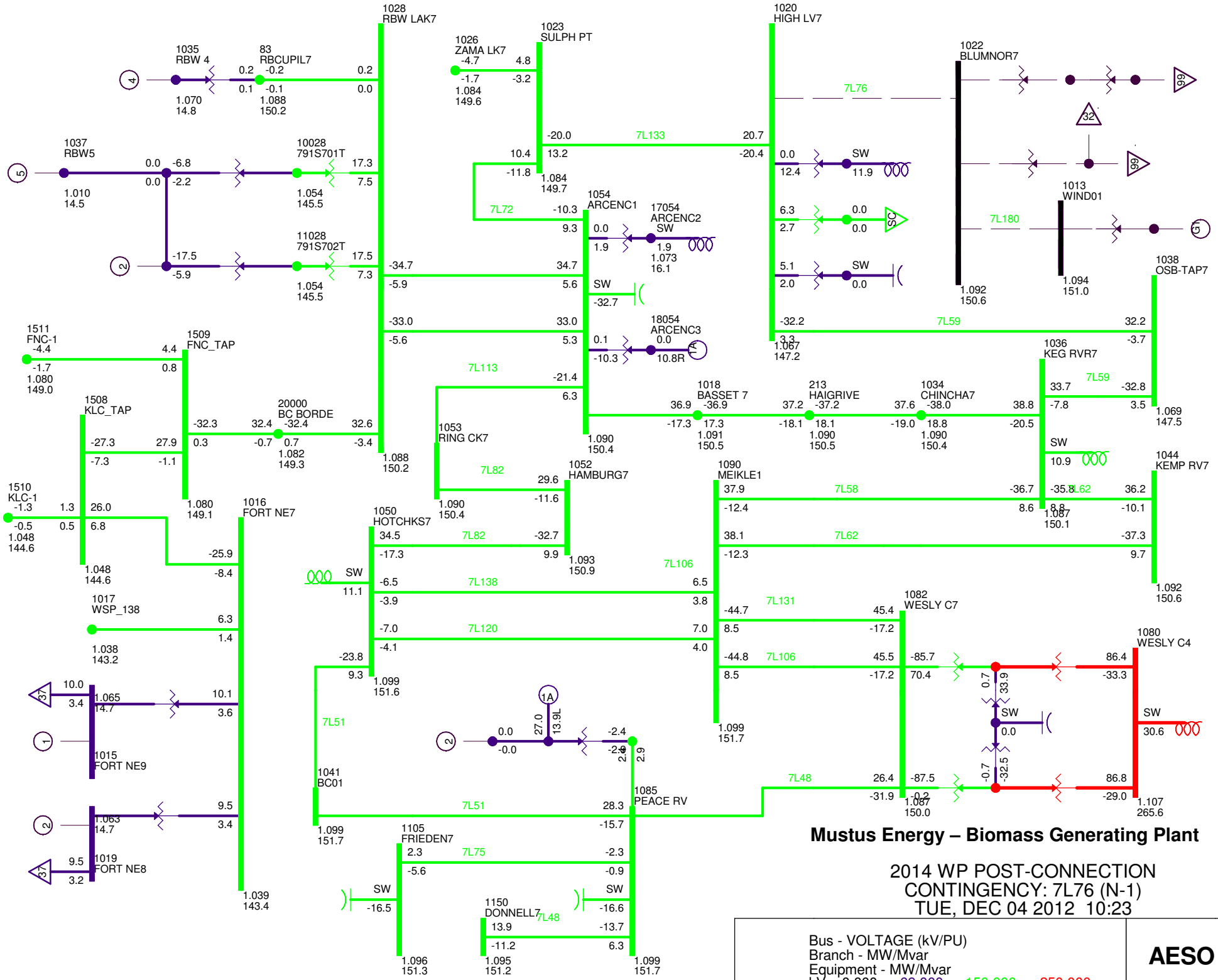
AESO


1028
RBW LAK7
1035
RBW 4
83
RBCUPIL7
1026
ZAMA LK7
1023
SULPH PT
1020
HIGH LV7
1022
BLUMNOR7
1037
RBW5
10028
791S701T
11028
791S702T
1054
ARCENC1
17054
ARCENC2
SW
18054
ARCENC3
7L72
7L133
7L76
7L180
1013
WIND01
1038
OSB-TAP7
7L59
1511
FNC-1
1509
FNC_TAP
1508
KLC_TAP
20000
BC BORDE
1053
RING CK7
7L113
1018
BASSET 7
213
HAIGRIVE
1034
CHINCHA7
1036
KEG RVR7
1510
KLC-1
1016
FORT NE7
1017
WSP_138
1050
HOTCHKS7
7L82
1052
HAMBURG7
1090
MEIKLE1
7L58
7L62
1044
KEMP RV7
7L106
7L138
7L131
1082
WESLY C7
1080
WESLY C4
7L120
1015
FORT NE9
1019
FORT NE8
7L51
1041
BC01
1085
PEACE RV
7L48
1105
FRIEDEN7
7L75
1150
DONNELL7
1039
143.4
1088
150.2
1090
150.4
1068
147.4
1082
149.4
1087
150.0
1085
149.7
1102
152.0
1105
152.5
1110
153.1
1096
151.3
1116
267.7
1105
152.4
1104
152.4
1108
153.0
Mustus Energy – Biomass Generating Plant
2014 WP POST-CONNECTION
CONTINGENCY: 7L59 (N-1)
TUE, DEC 04 2012 10:23
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO



Mustus Energy – Biomass Generating Plant
2014 WP POST-CONNECTION
CONTINGENCY: 7L62 (N-1)
TUE, DEC 04 2012 10:23
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO
1028 RBW LAK7
1035 RBW 4
83 RBCUPIL7
1026 ZAMA LK7
1023 SULPH PT
1020 HIGH LV7
1022 BLUMNOR7
1037 RBW5
10028 791S701T
11028 791S702T
1013 WIND01
1054 ARCENC1
17054 ARCENC2
18054 ARCENC3
1038 OSB-TAP7
1511 FNC-1
1509 FNC_TAP
1036 KEG RVR7
1508 KLC_TAP
20000 BC BORDE
1018 BASSET 7
213 HAIGRIVE
1034 CHINCHA7
1053 RING CK7
1052 HAMBURG7
1090 MEIKLE1
1044 KEMP RV7
1510 KLC-1
1016 FORT NE7
1050 HOTCHKS7
1017 WSP_138
1082 WESLY C7
1080 WESLY C4
1015 FORT NE9
1041 BC01
1085 PEACE RV
1019 FORT NE8
1105 FRIEDEN7
1150 DONNELL7
7L76
7L133
7L72
7L180
7L59
7L113
7L82
7L58
7L62
7L106
7L138
7L131
7L120
7L51
7L48
7L75


1028
RBW LAK7
1035
RBW 4
83
RBCUPIL7
1026
ZAMA LK7
1023
SULPH PT
1020
HIGH LV7
1022
BLUMNOR7
1037
RBW5
10028
791S701T
11028
791S702T
1054
ARCENC1
17054
ARCENC2
SW
18054
ARCENC3
1013
WIND01
1038
OSB-TAP7
1511
FNC-1
1509
FNC_TAP
1508
KLC_TAP
20000
BC BORDE
1053
RING CK7
1052
HAMBURG7
1018
BASSET 7
213
HAIGRIVE
1034
CHINCHA7
1036
KEG RVR7
1044
KEMP RV7
1090
MEIKLE1
1510
KLC-1
1016
FORT NE7
1050
HOTCHKS7
1017
WSP_138
1082
WESLY C7
1080
WESLY C4
1015
FORT NE9
1019
FORT NE8
1041
BC01
1085
PEACE RV
1105
FRIEDEN7
1150
DONNELL7
7L72
7L133
7L76
7L180
7L59
7L113
7L82
7L58
7L62
7L106
7L131
7L138
7L120
7L51
7L48
7L75
Mustus Energy – Biomass Generating Plant
2014 WP POST-CONNECTION
CONTINGENCY: 7L64 (N-1)
TUE, DEC 04 2012 10:23
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO



Mustus Energy – Biomass Generating Plant

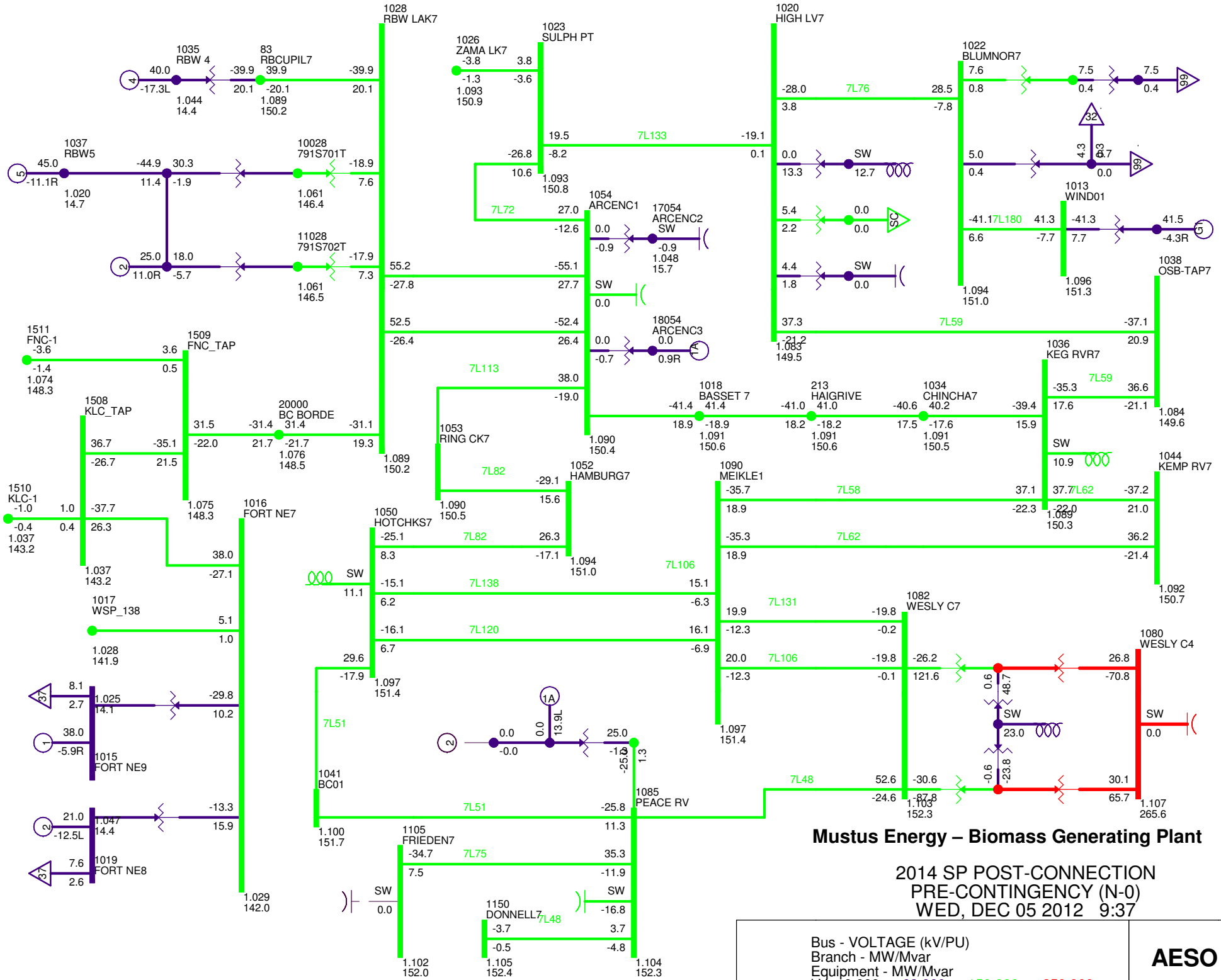
2014 WP POST-CONNECTION
CONTINGENCY: 7L76 (N-1)
TUE, DEC 04 2012 10:23

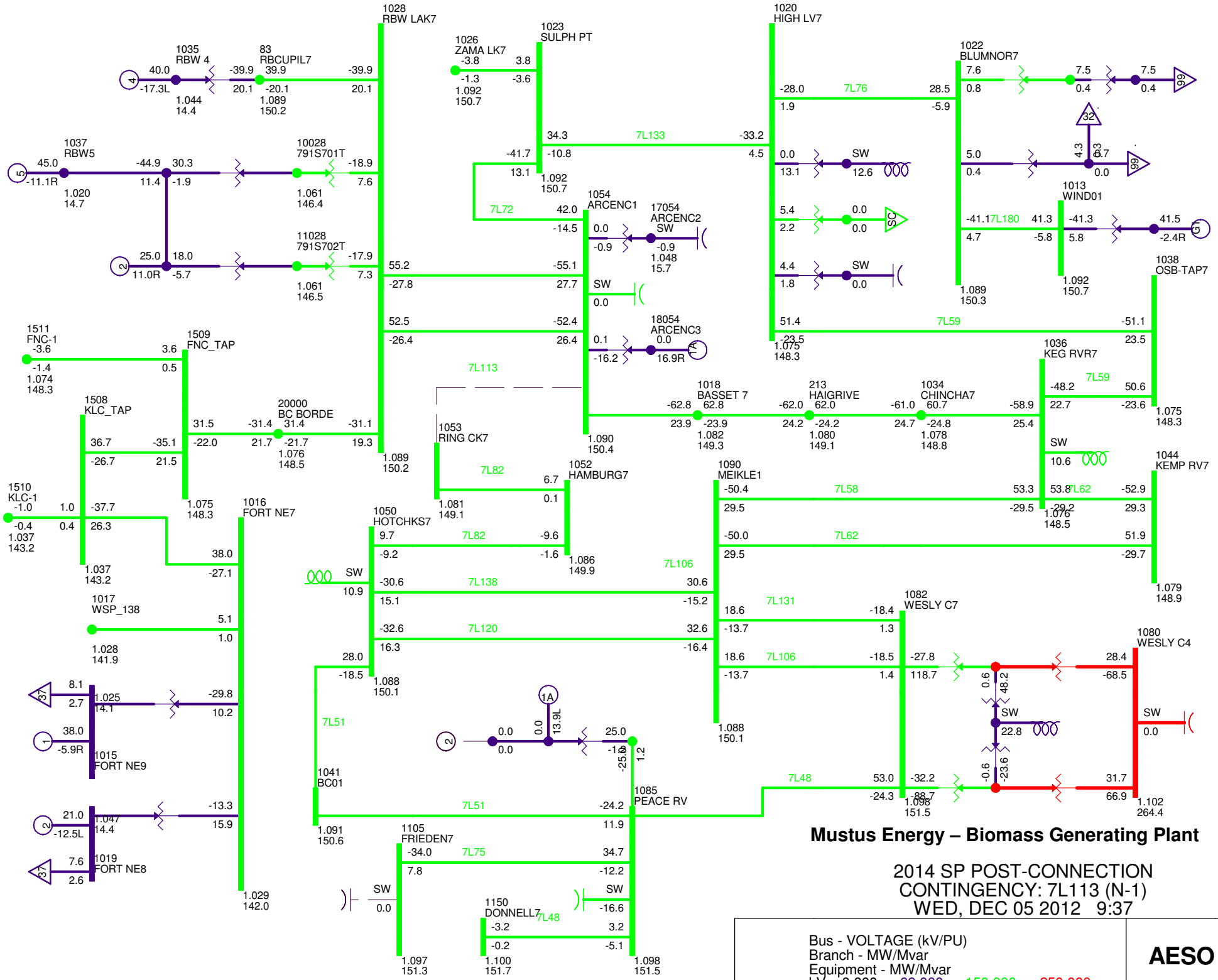
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

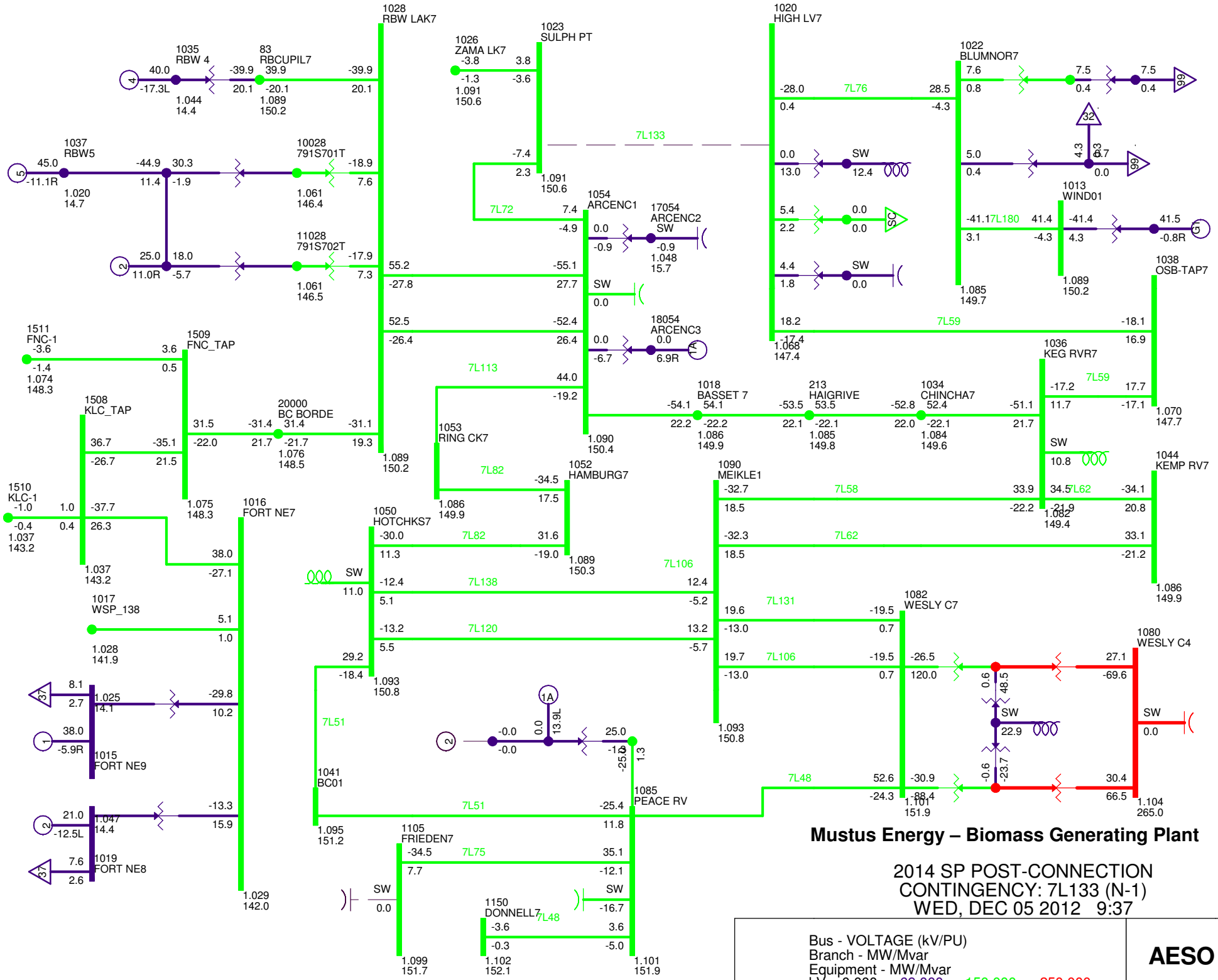
AESO

Attachment C-2

Post-Connection Single Line Diagrams (2014 SP)


1028
RBW LAK7
1035
RBW 4
83
RBCUPIL7
1026
ZAMA LK7
1023
SULPH PT
1020
HIGH LV7
1022
BLUMNOR7
1037
RBW5
10028
791S701T
11028
791S702T
1054
ARCENC1
17054
ARCENC2
18054
ARCENC3
7L72
7L133
7L76
7L180
1013
WIND01
1038
OSB-TAP7
1511
FNC-1
1509
FNC_TAP
1508
KLC_TAP
20000
BC BORDE
1053
RING CK7
7L113
1018
BASSET 7
213
HAIGRIVE
1034
CHINCHA7
1036
KEG RVR7
7L59
1510
KLC-1
1037
143.2
1016
FORT NE7
1017
WSP_138
1028
141.9
1015
FORT NE9
1019
FORT NE8
1029
142.0
1050
HOTCHKS7
1052
HAMBURG7
7L82
1090
MEIKLE1
7L58
7L62
1044
KEMP RV7
7L106
7L138
7L120
7L131
1082
WESLY C7
1080
WESLY C4
1097
151.4
1092
150.7
1041
BC01
1085
PEACE RV
7L51
7L48
1100
151.7
1105
FRIEDEN7
7L75
1150
DONNELL7
1102
152.0
1104
152.3
1107
265.6
SW
SC
1A
Mustus Energy – Biomass Generating Plant
2014 SP POST-CONNECTION
PRE-CONTINGENCY (N-0)
WED, DEC 05 2012 9:37
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO


1028 RBW LAK7
1035 RBW 4
83 RBCUPIL7
1026 ZAMA LK7
1023 SULPH PT
1020 HIGH LV7
1022 BLUMNOR7
1037 RBW5
10028 791S701T
11028 791S702T
1054 ARCENC1
17054 ARCENC2 SW
18054 ARCENC3
1013 WIND01
1038 OSB-TAP7
1511 FNC-1
1509 FNC_TAP
1508 KLC_TAP
20000 BC BORDE
1053 RING CK7
1052 HAMBURG7
1018 BASSET 7
213 HAIGRIVE
1034 CHINCHA7
1036 KEG RVR7
1044 KEMP RV7
1090 MEIKLE1
1082 WESLY C7
1080 WESLY C4
1510 KLC-1
1016 FORT NE7
1017 WSP_138
1050 HOTCHKS7
1041 BC01
1105 FRIEDEN7
1150 DONNELL7
1085 PEACE RV
1015 FORT NE9
1019 FORT NE8
7L113
7L72
7L133
7L76
7L180
7L59
7L82
7L58
7L62
7L106
7L138
7L120
7L131
7L51
7L75
7L48
SW
SC
1A
Mustus Energy – Biomass Generating Plant
2014 SP POST-CONNECTION
CONTINGENCY: 7L113 (N-1)
WED, DEC 05 2012 9:37
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO

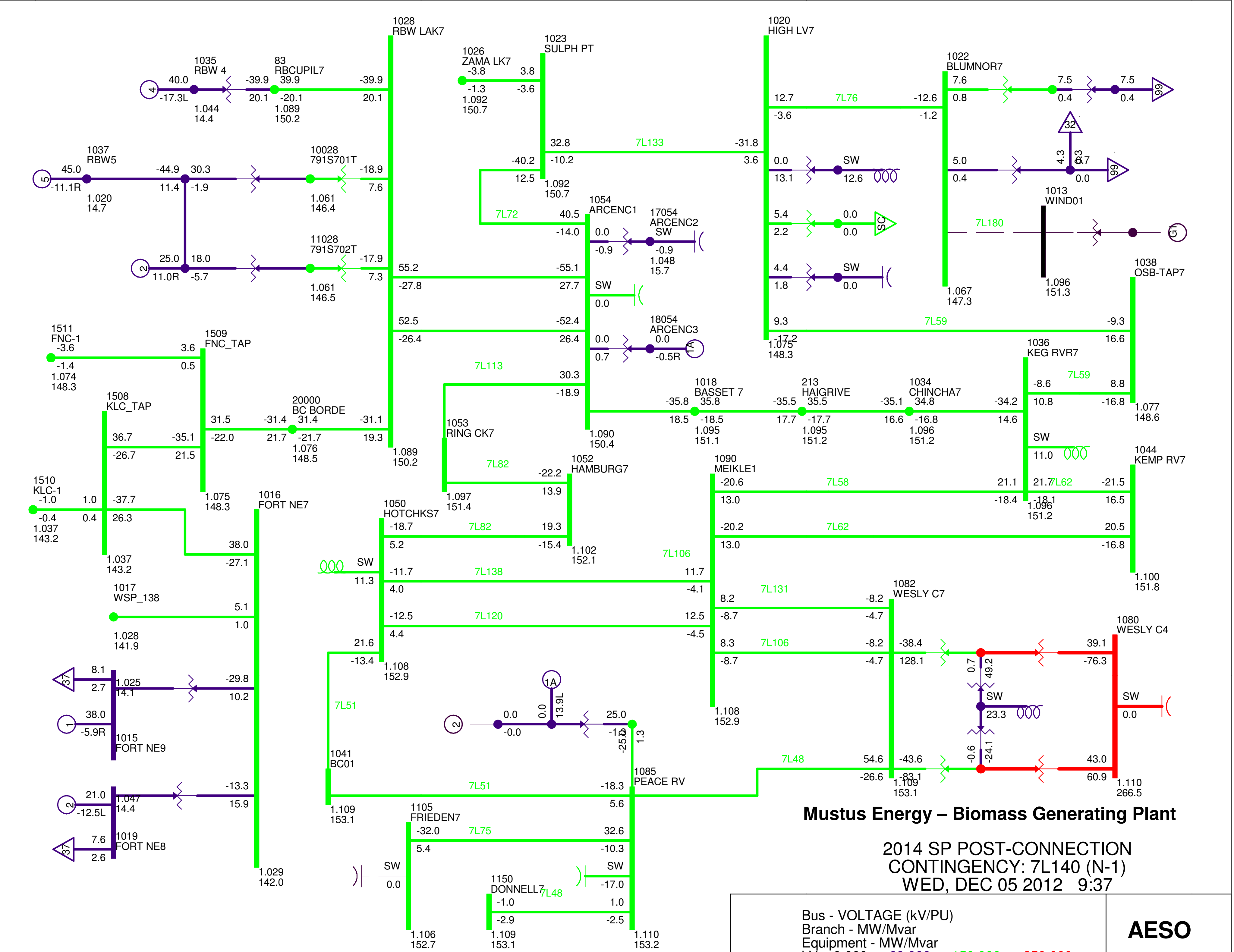


Mustus Energy – Biomass Generating Plant

2014 SP POST-CONNECTION
CONTINGENCY: 7L133 (N-1)
WED, DEC 05 2012 9:37

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO

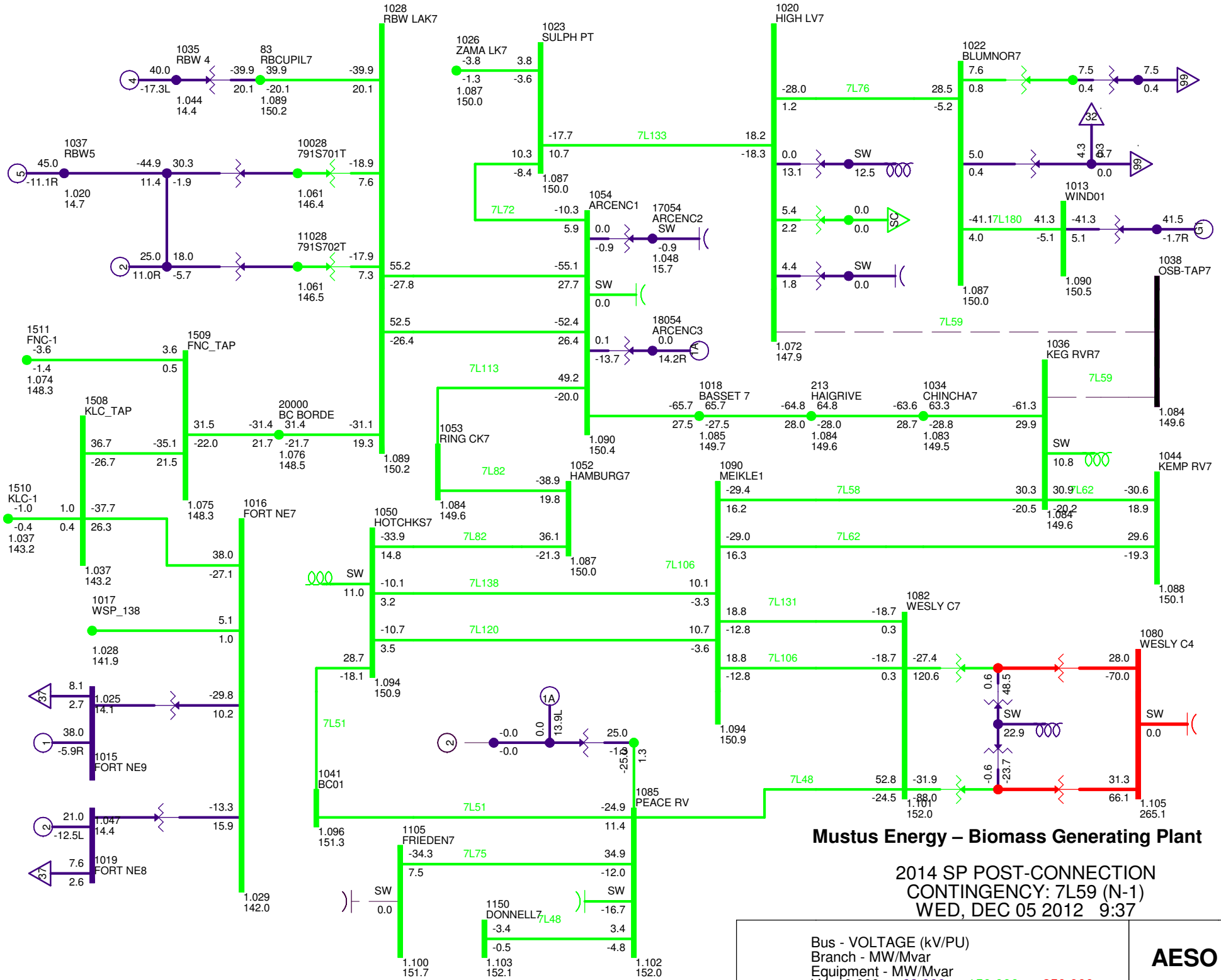


Mustus Energy – Biomass Generating Plant

2014 SP POST-CONNECTION
CONTINGENCY: 7L140 (N-1)
WED, DEC 05 2012 9:37

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO

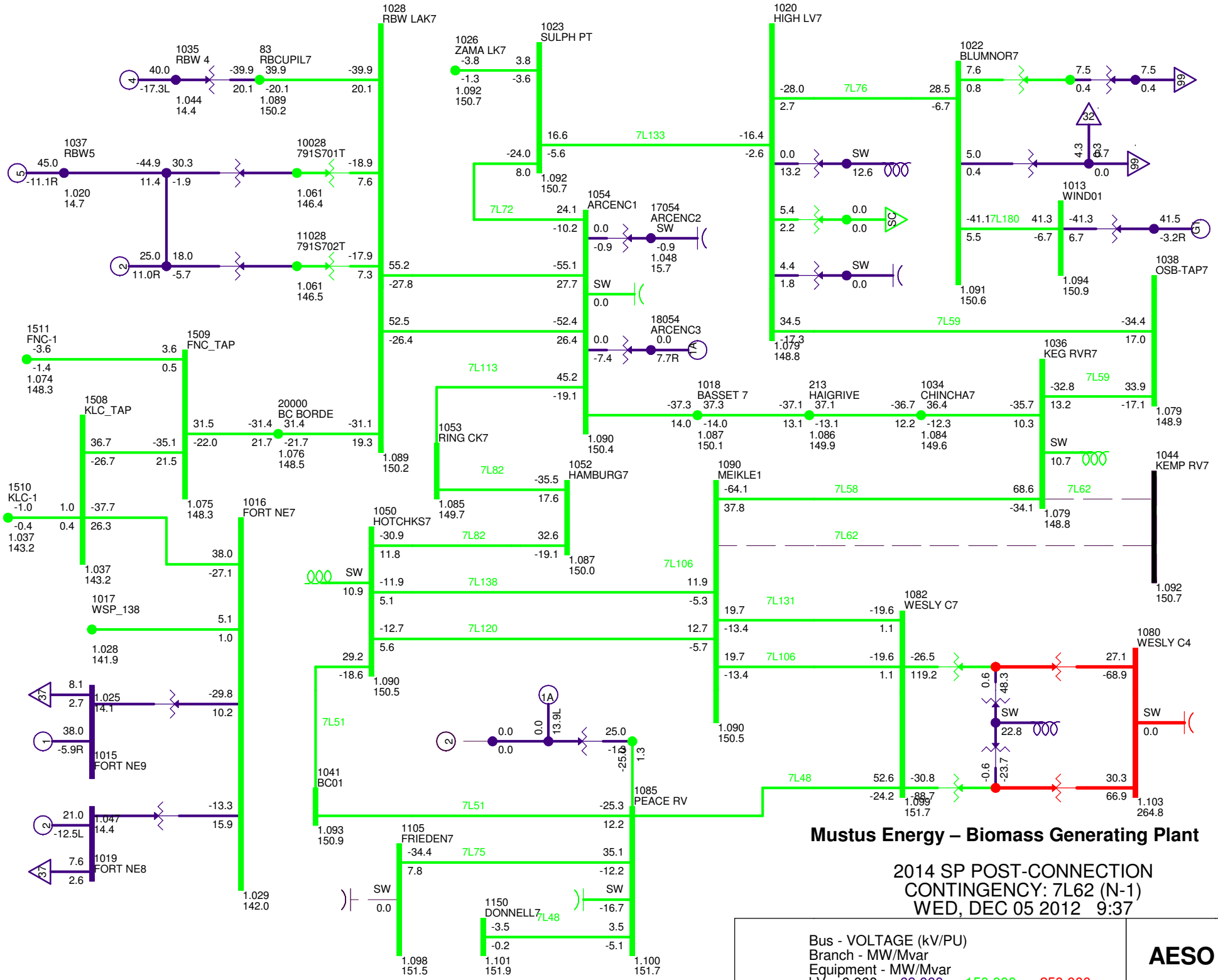


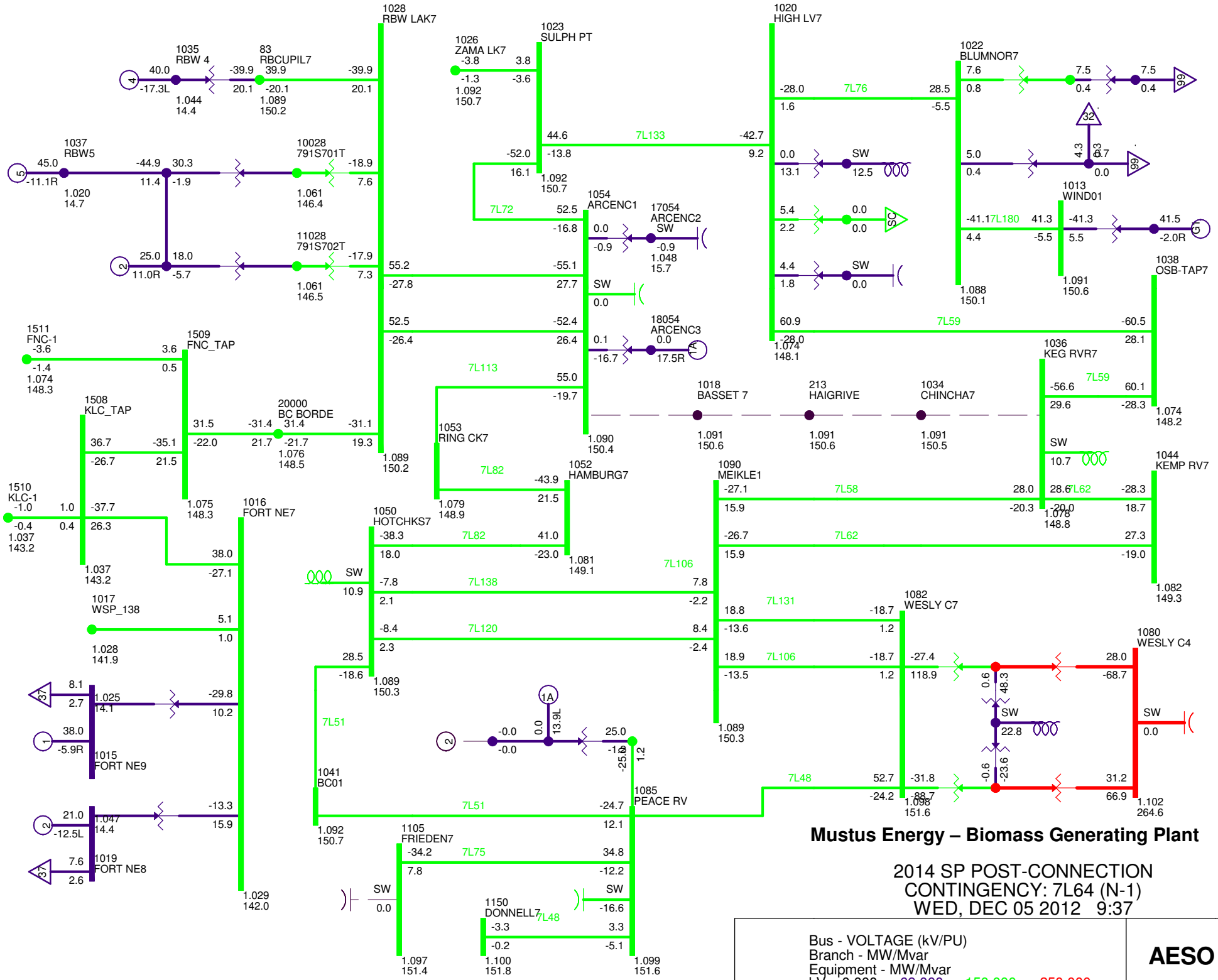
Mustus Energy – Biomass Generating Plant

2014 SP POST-CONNECTION
CONTINGENCY: 7L59 (N-1)
WED, DEC 05 2012 9:37

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO


1028
RBW LAK7
1035
RBW 4
83
RBCUPIL7
1026
ZAMA LK7
1023
SULPH PT
1020
HIGH LV7
1022
BLUMNOR7
1037
RBW5
10028
791S701T
11028
791S702T
1054
ARCENC1
17054
ARCENC2
SW
18054
ARCENC3
7L72
7L133
7L76
7L59
1013
WIND01
7L180
1038
OSB-TAP7
1511
FNC-1
1509
FNC_TAP
1508
KLC_TAP
20000
BC BORDE
1053
RING CK7
7L113
1018
BASSET 7
213
HAIGRIVE
1034
CHINCHA7
1036
KEG RVR7
1044
KEMP RV7
1510
KLC-1
1016
FORT NE7
1017
WSP_138
1050
HOTCHKS7
1052
HAMBURG7
7L82
1090
MEIKLE1
7L58
7L62
1082
WESLY C7
1080
WESLY C4
7L106
7L138
7L120
7L131
1041
BC01
1085
PEACE RV
7L51
7L48
1105
FRIEDEN7
7L75
1150
DONNELL7
1015
FORT NE9
1019
FORT NE8
Mustus Energy – Biomass Generating Plant
2014 SP POST-CONNECTION
CONTINGENCY: 7L62 (N-1)
WED, DEC 05 2012 9:37
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO

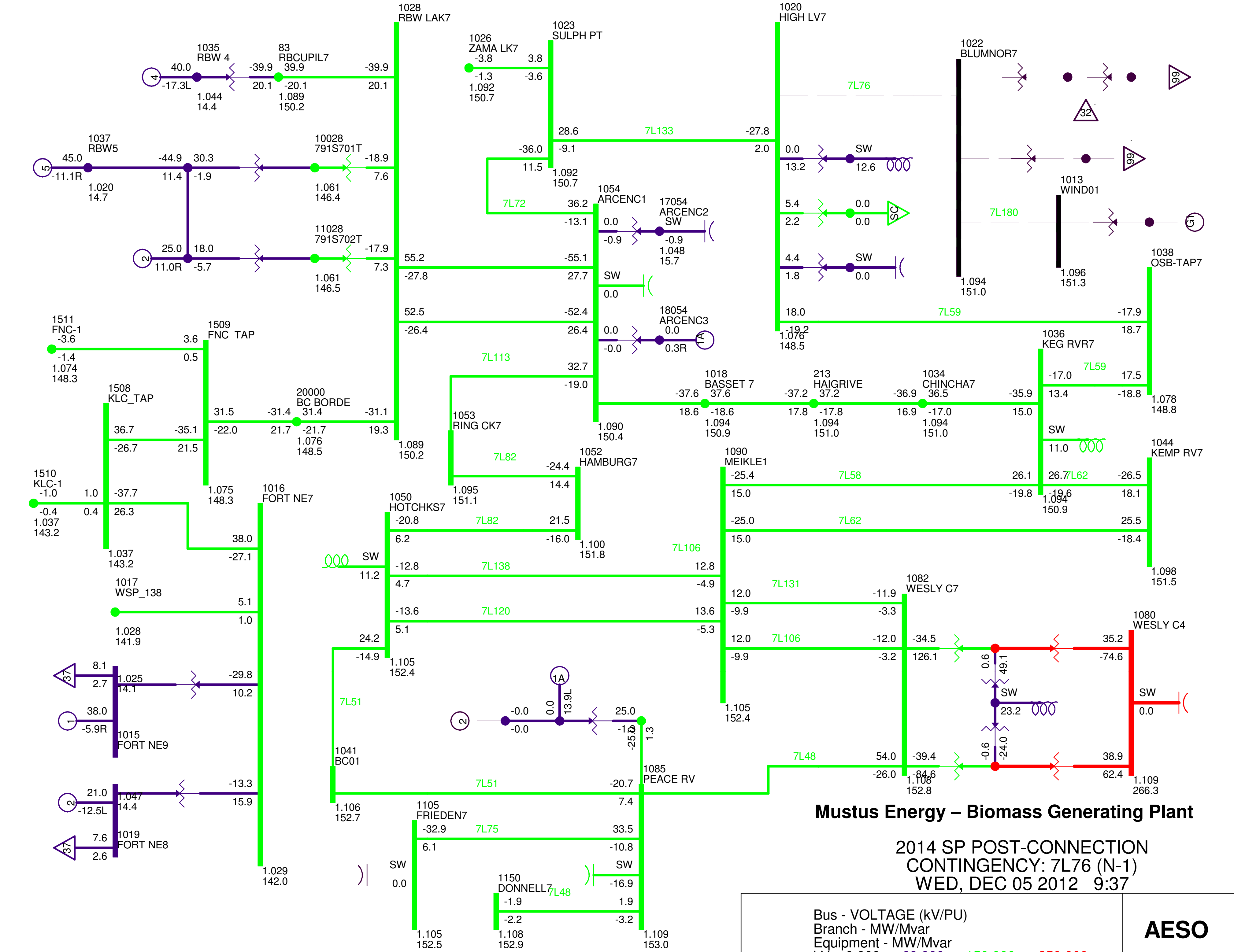


Mustus Energy – Biomass Generating Plant

2014 SP POST-CONNECTION
CONTINGENCY: 7L64 (N-1)
WED, DEC 05 2012 9:37

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO



Mustus Energy – Biomass Generating Plant

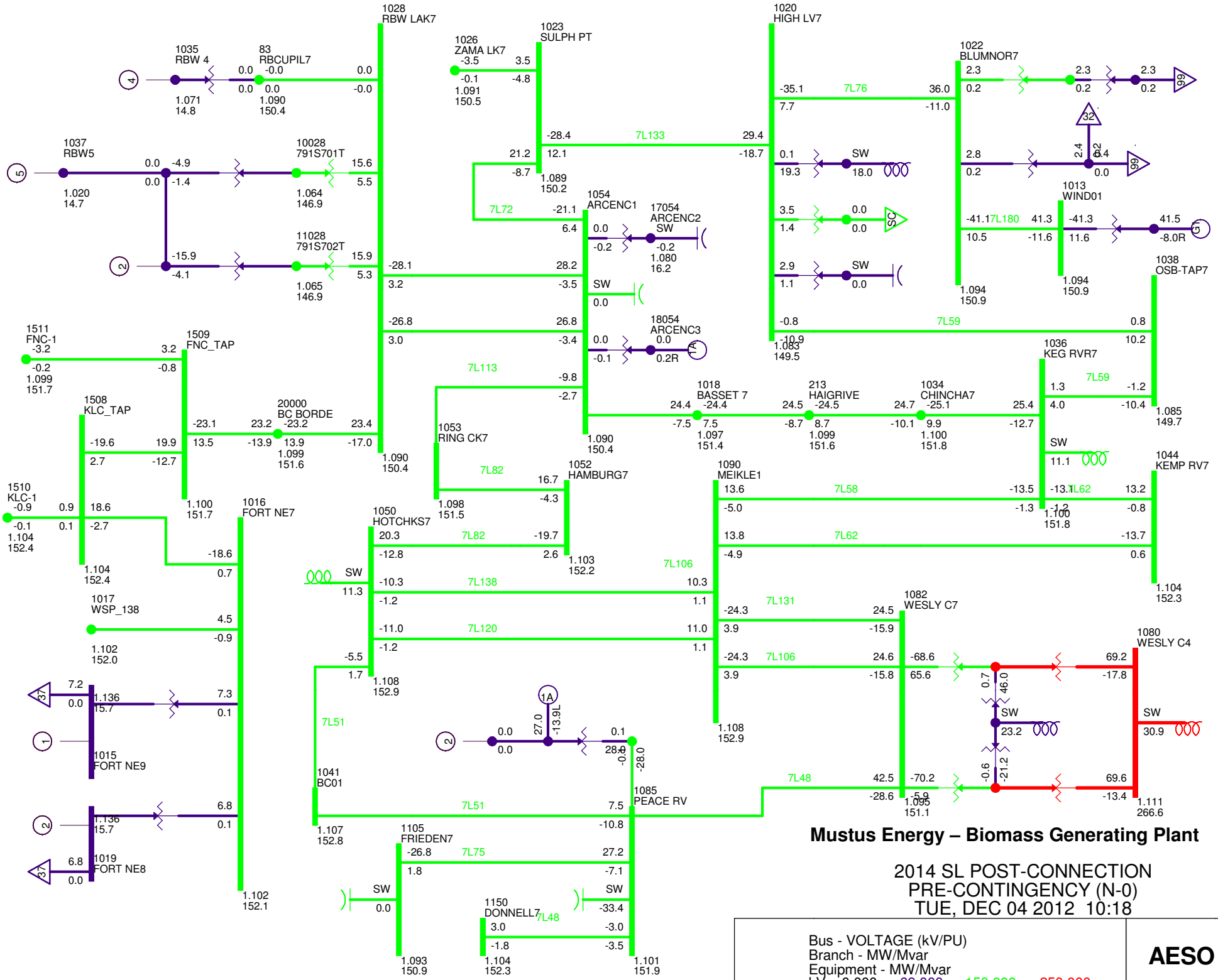
2014 SP POST-CONNECTION
CONTINGENCY: 7L76 (N-1)
WED, DEC 05 2012 9:37

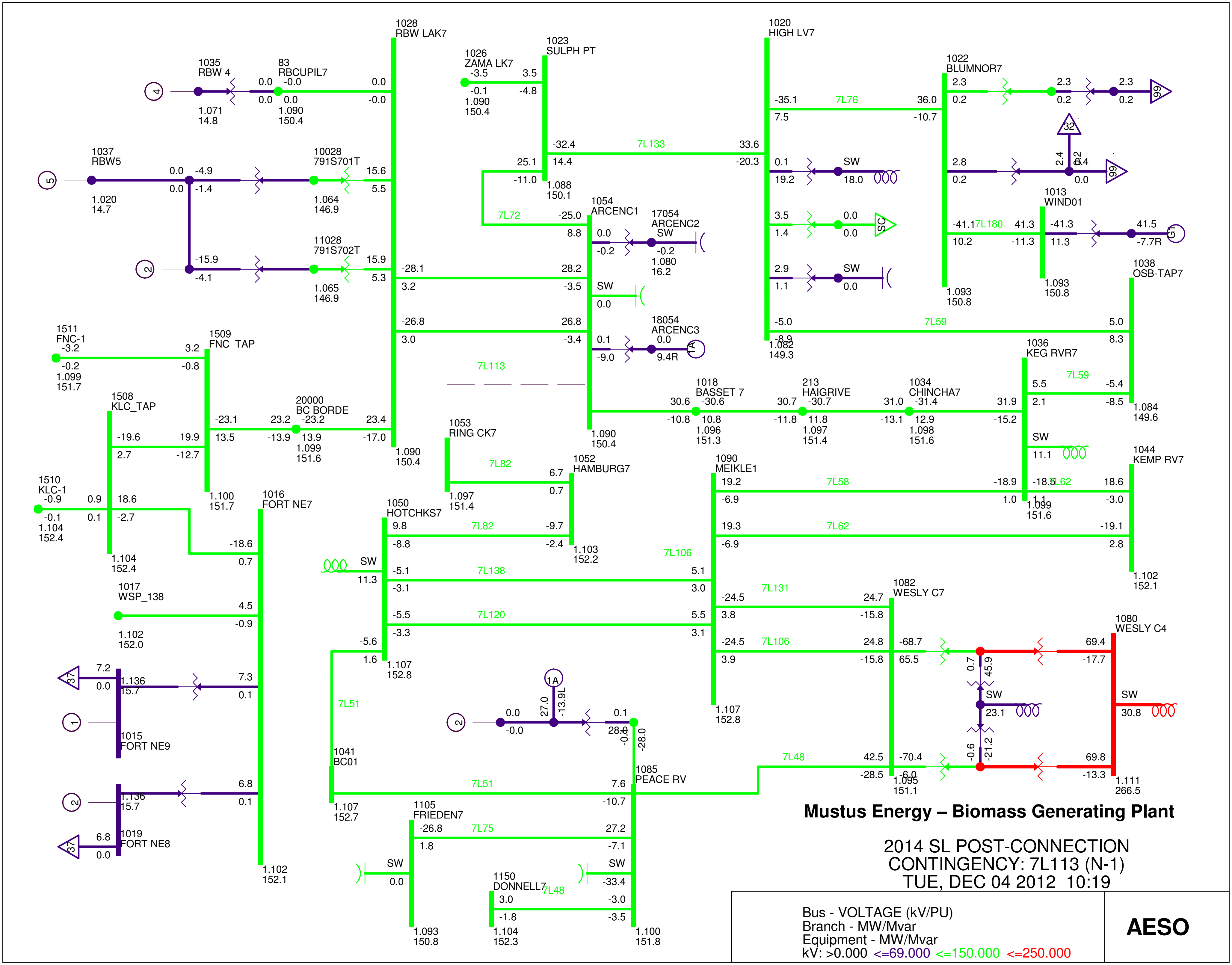
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

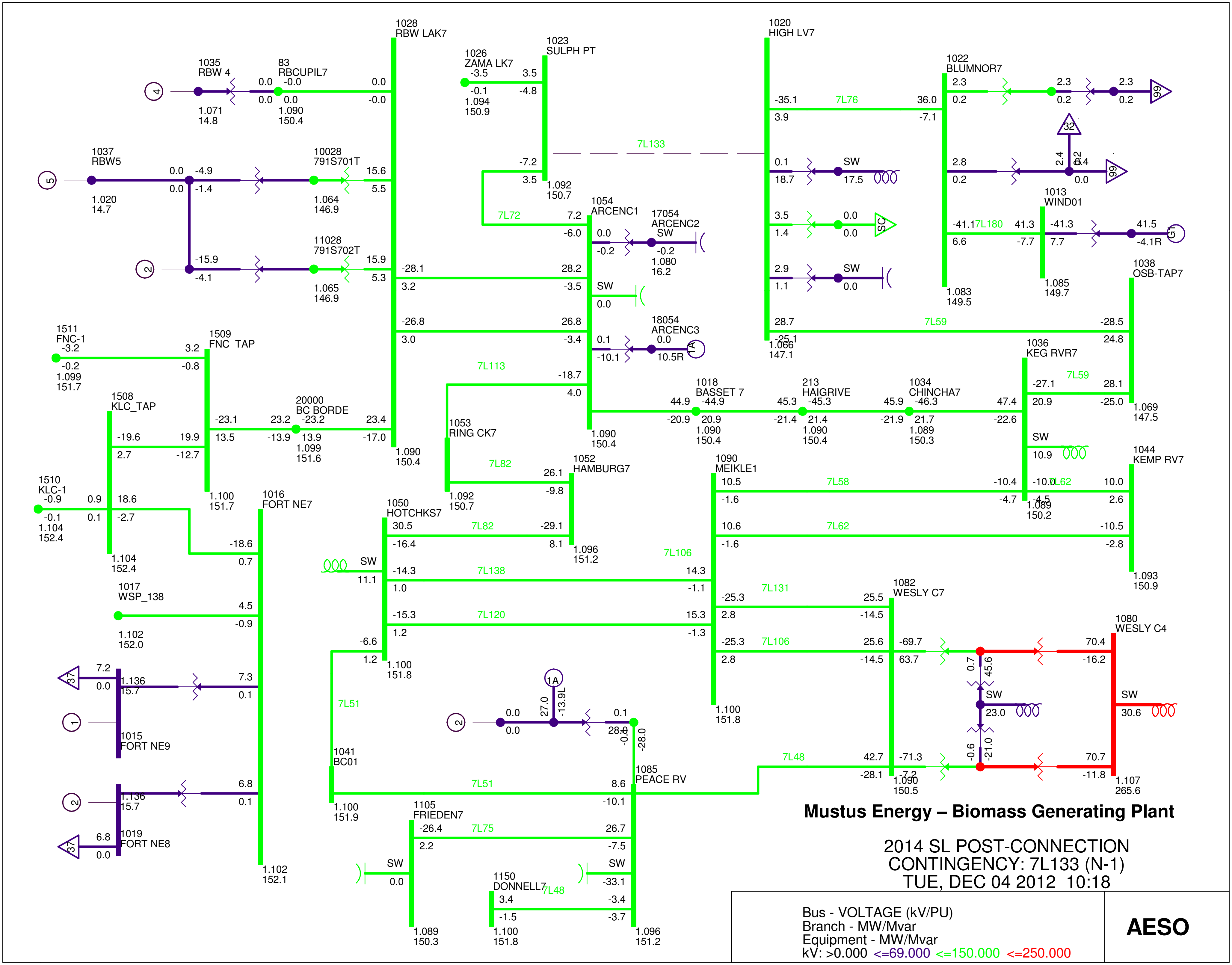
AESO

Attachment C-3

Post-Connection Single Line Diagrams (2014 SL)


1028 RBW LAK7
1035 RBW 4
83 RBCUPIL7
1026 ZAMA LK7
1023 SULPH PT
1020 HIGH LV7
1022 BLUMNOR7
1037 RBW5
10028 791S701T
11028 791S702T
1054 ARCENC1
17054 ARCENC2
18054 ARCENC3
1013 WIND01
1038 OSB-TAP7
1511 FNC-1
1509 FNC_TAP
1508 KLC_TAP
20000 BC BORDE
1510 KLC-1
1053 RING CK7
1052 HAMBURG7
1018 BASSET 7
213 HAIGRIVE
1034 CHINCHA7
1036 KEG RVR7
1044 KEMP RV7
1090 MEIKLE1
1082 WESLY C7
1080 WESLY C4
1016 FORT NE7
1017 WSP_138
1015 FORT NE9
1019 FORT NE8
1050 HOTCHKS7
1041 BC01
1105 FRIEDEN7
1150 DONNELL7
1085 PEACE RV
1111 266.6
7L76
7L133
7L72
7L180
7L59
7L113
7L82
7L58
7L62
7L106
7L138
7L131
7L120
7L51
7L75
7L48
SW
SC
Mustus Energy – Biomass Generating Plant
2014 SL POST-CONNECTION
PRE-CONTINGENCY (N-0)
TUE, DEC 04 2012 10:18
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO


1028 RBW LAK7
1023 SULPH PT
1026 ZAMA LK7
1020 HIGH LV7
1022 BLUMNOR7
1035 RBW 4
83 RBCUPIL7
1037 RBW5
10028 791S701T
11028 791S702T
1054 ARCENC1
17054 ARCENC2
18054 ARCENC3
1013 WIND01
1038 OSB-TAP7
1511 FNC-1
1509 FNC_TAP
1508 KLC_TAP
20000 BC BORDE
1053 RING CK7
1018 BASSET 7
213 HAIGRIVE
1034 CHINCHA7
1036 KEG RVR7
1044 KEMP RV7
1510 KLC-1
1016 FORT NE7
1050 HOTCHKS7
1052 HAMBURG7
1090 MEIKLE1
1017 WSP_138
1082 WESLY C7
1080 WESLY C4
1015 FORT NE9
1019 FORT NE8
1041 BC01
1085 PEACE RV
1105 FRIEDEN7
1150 DONNELL7
7L76
7L133
7L72
7L180
7L59
7L113
7L82
7L58
7L62
7L106
7L138
7L131
7L120
7L51
7L48
7L75
SW
Mustus Energy – Biomass Generating Plant
2014 SL POST-CONNECTION
CONTINGENCY: 7L113 (N-1)
TUE, DEC 04 2012 10:19
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO

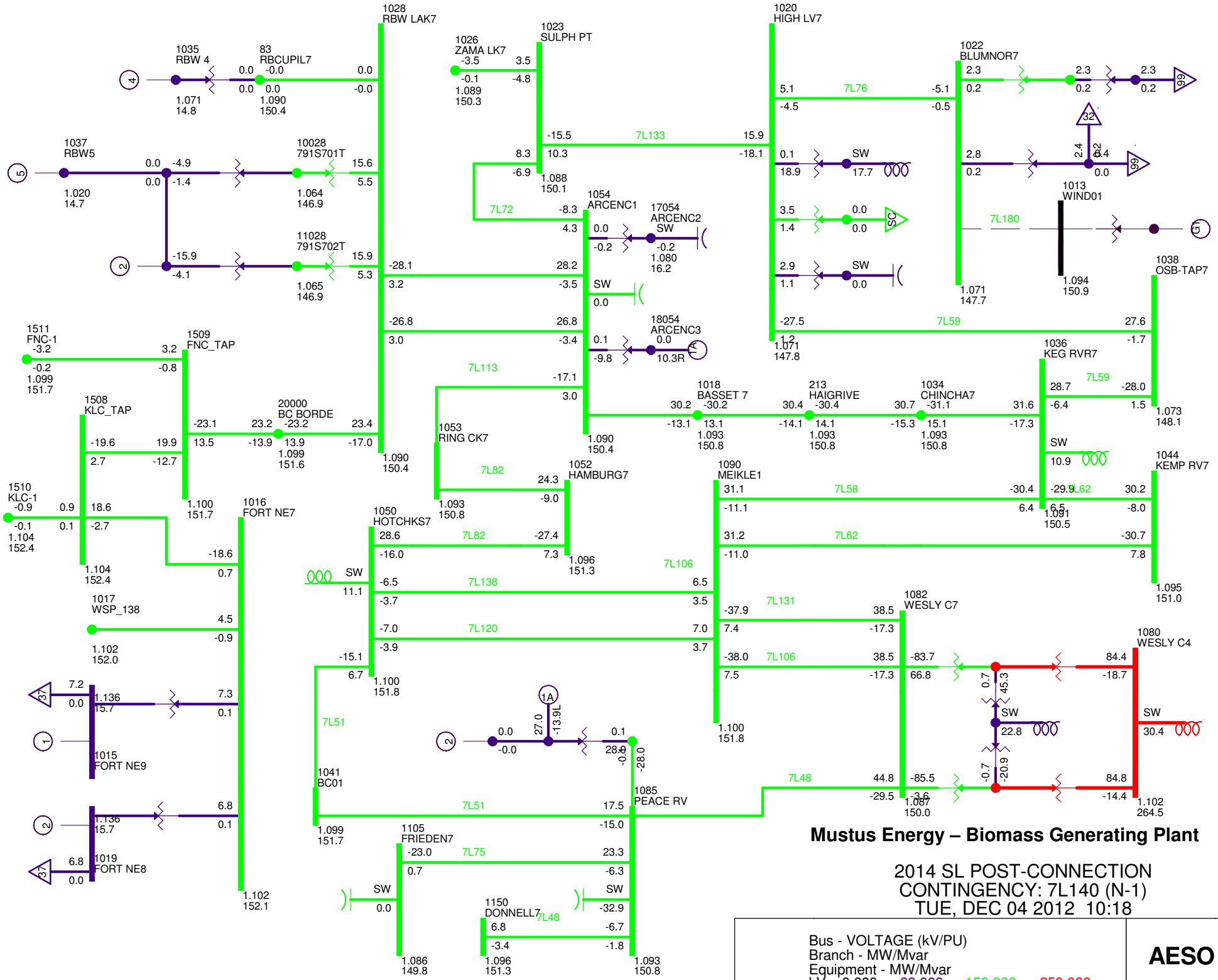


Mustus Energy – Biomass Generating Plant

2014 SL POST-CONNECTION
CONTINGENCY: 7L133 (N-1)
TUE, DEC 04 2012 10:18

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO

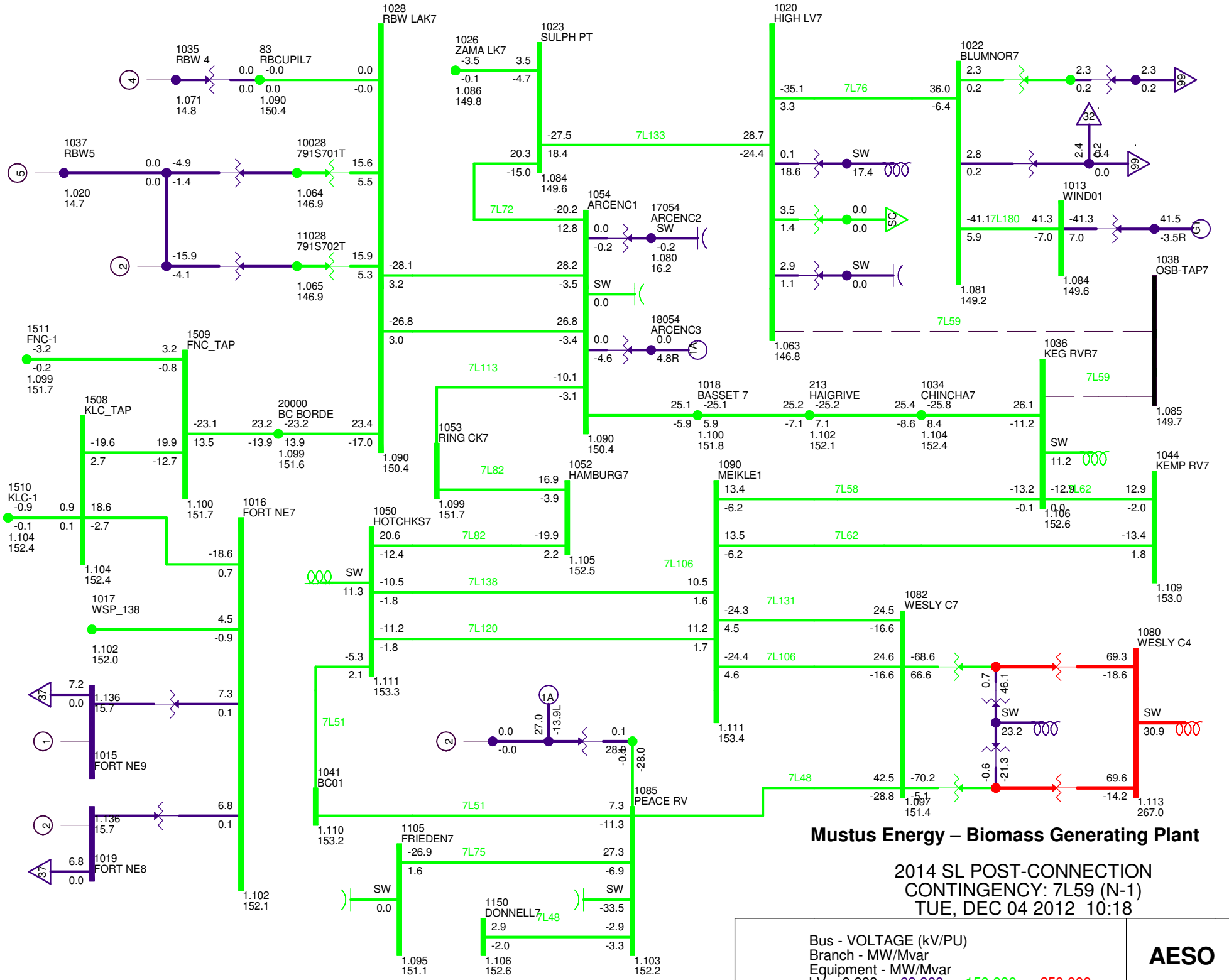


Mustus Energy – Biomass Generating Plant

2014 SL POST-CONNECTION
CONTINGENCY: 7L140 (N-1)
TUE, DEC 04 2012 10:18

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO

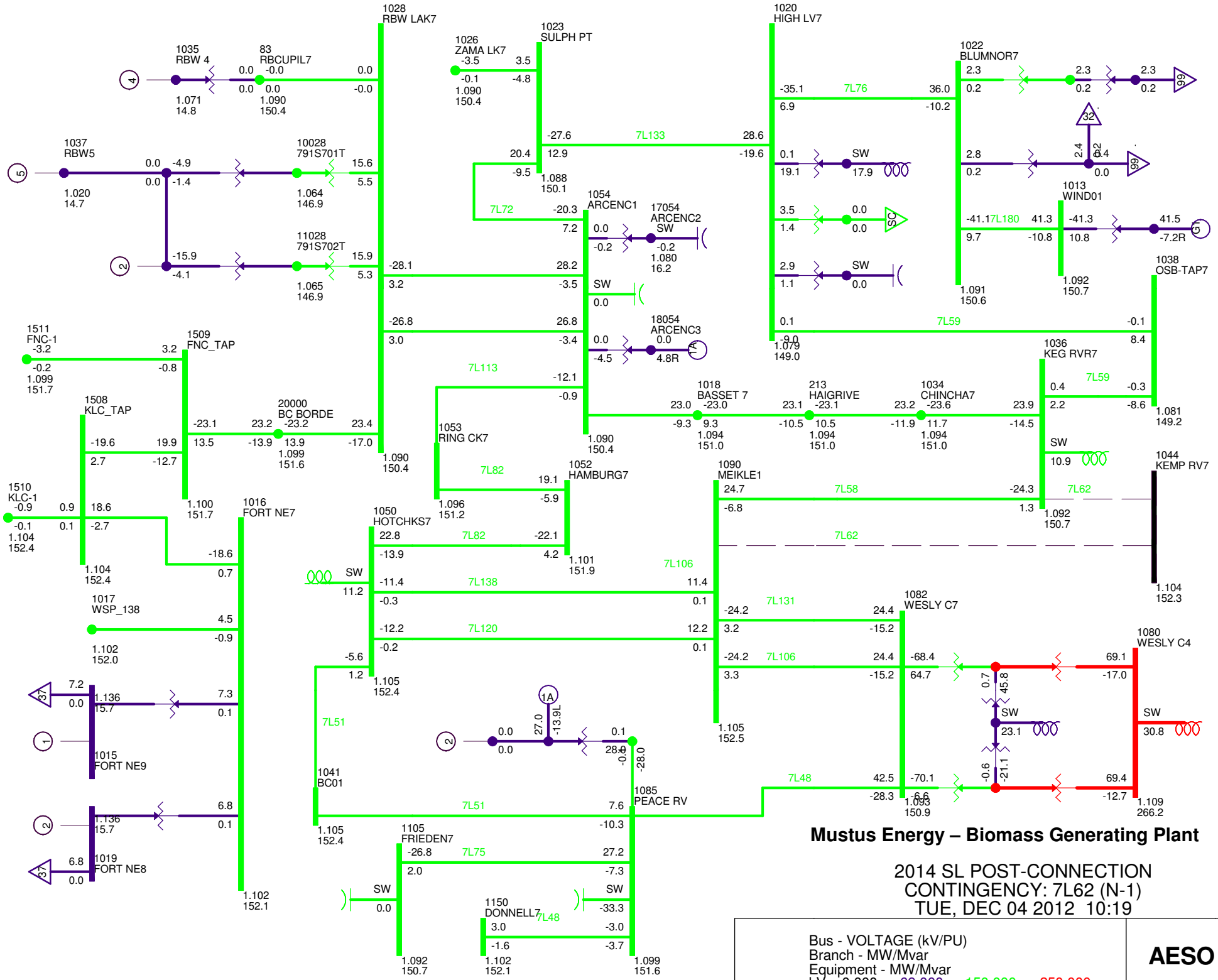


Mustus Energy – Biomass Generating Plant

2014 SL POST-CONNECTION
CONTINGENCY: 7L59 (N-1)
TUE, DEC 04 2012 10:18

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO

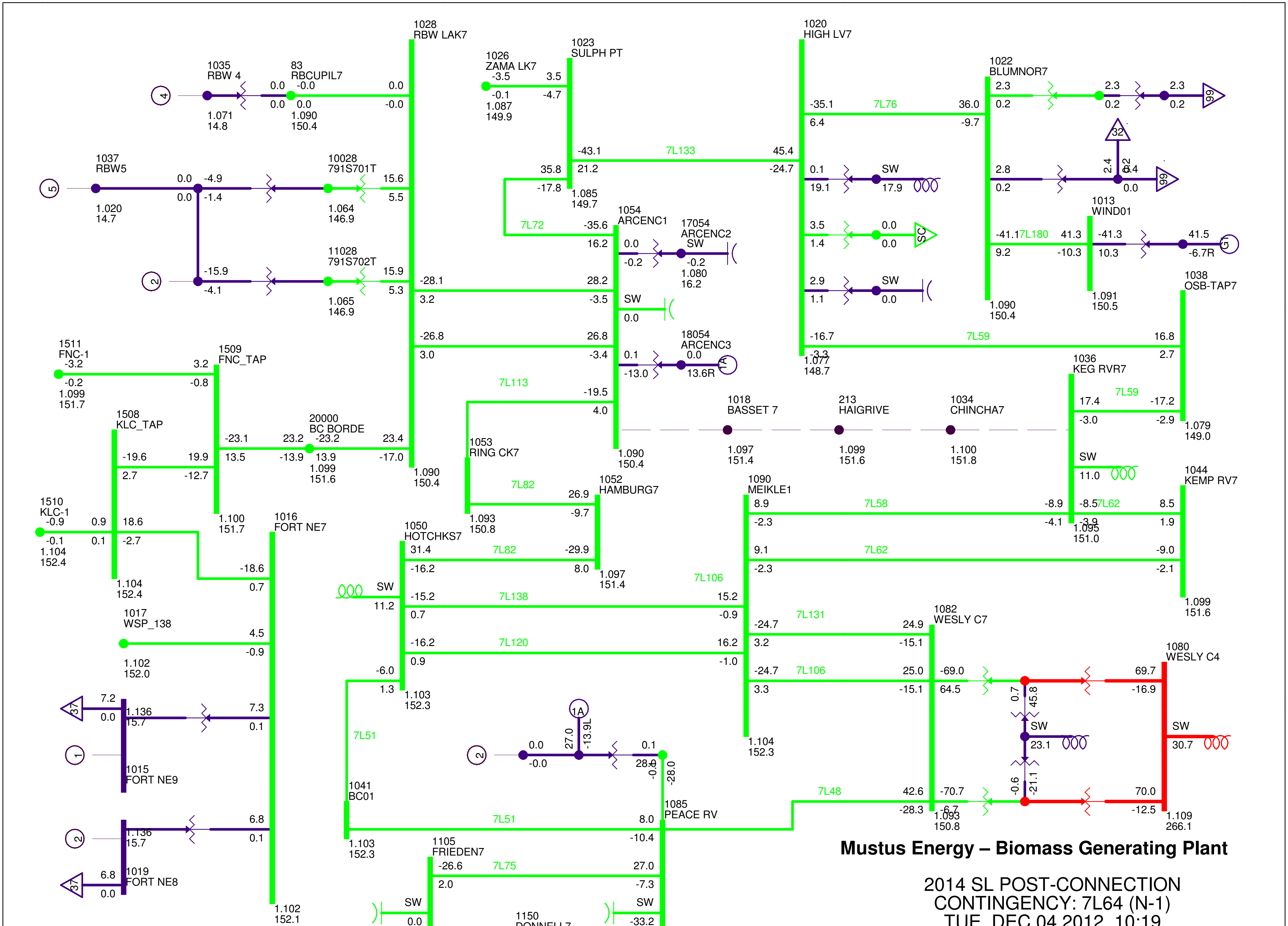


Mustus Energy – Biomass Generating Plant

2014 SL POST-CONNECTION
CONTINGENCY: 7L62 (N-1)
TUE, DEC 04 2012 10:19

Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

AESO

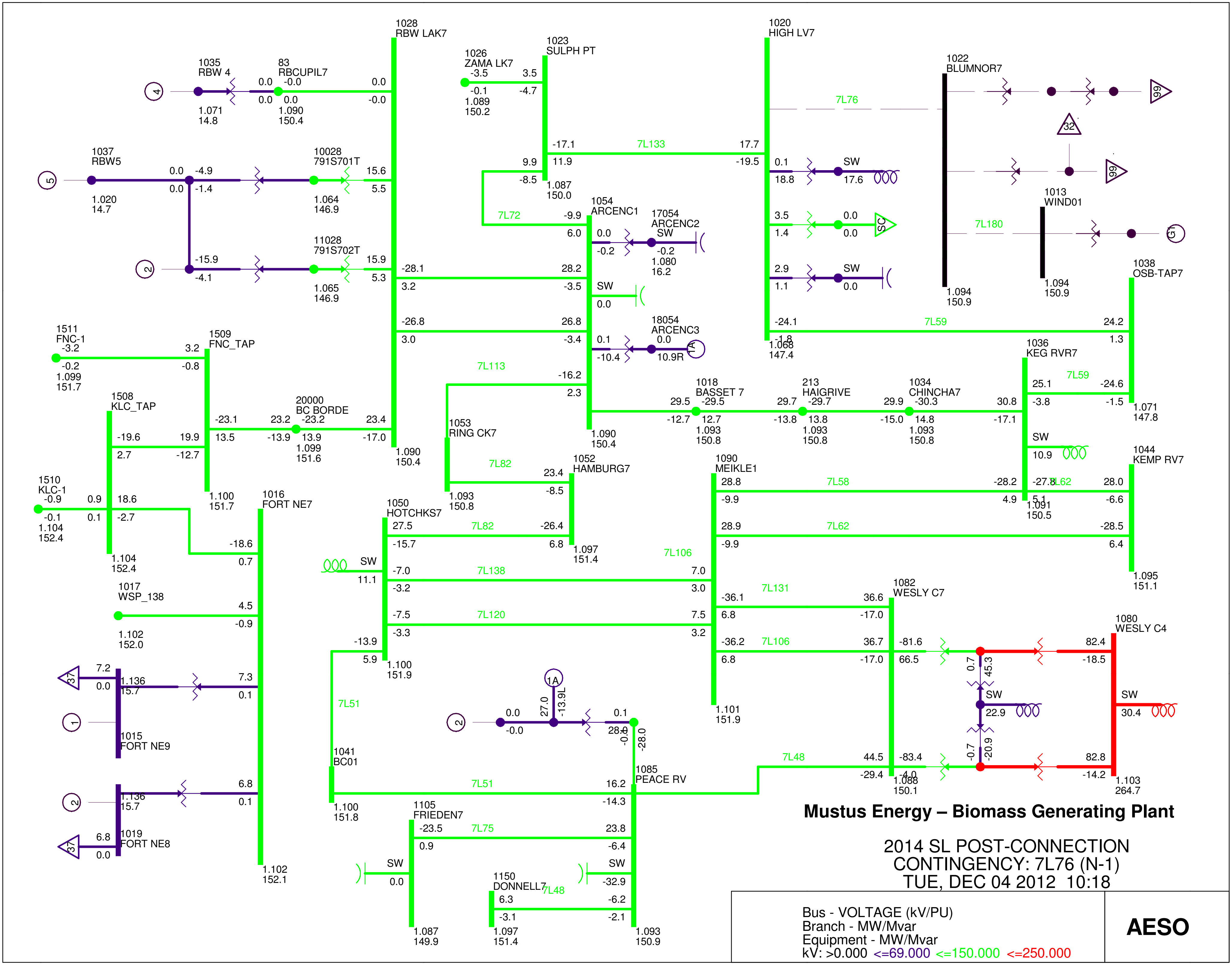


Mustus Energy – Biomass Generating Plant

2014 SL POST-CONNECTION
CONTINGENCY: 7L64 (N-1)
TUE, DEC 04 2012 10:19

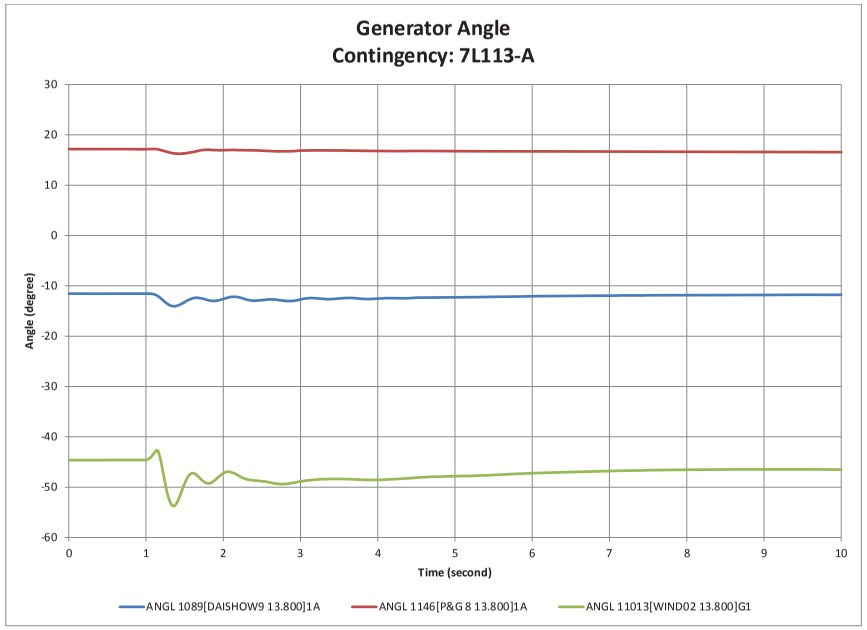
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000

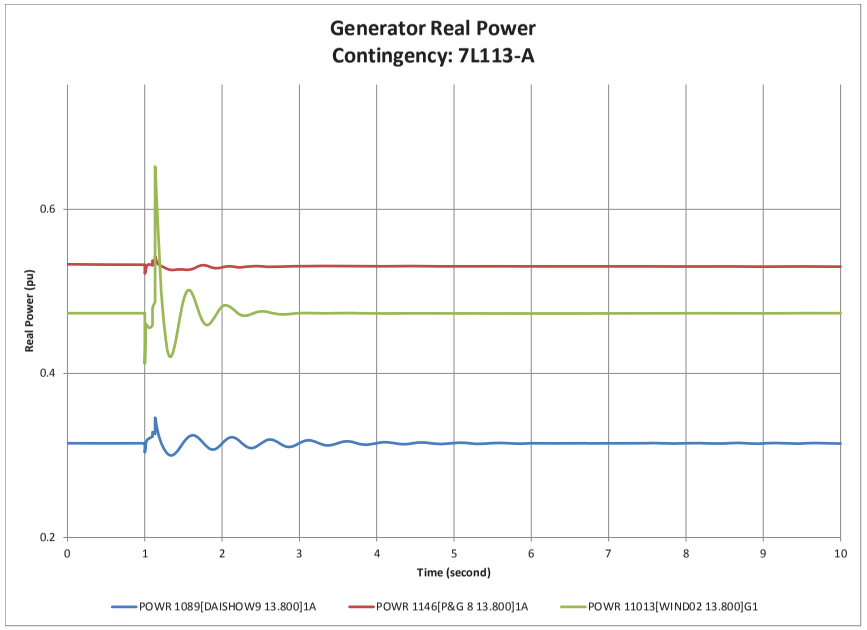
AESO

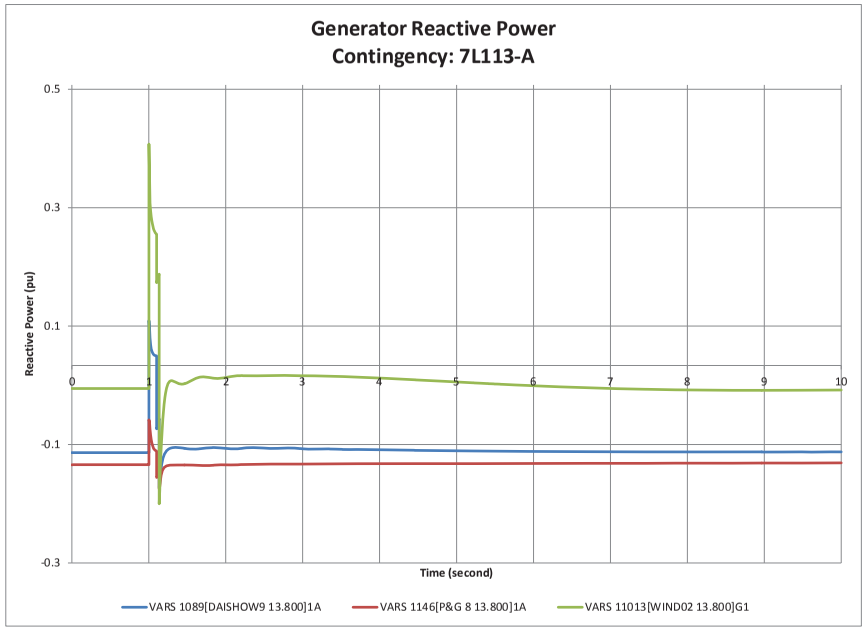

1028 RBW LAK7
1035 RBW 4
83 RBCUPIL7
1026 ZAMA LK7
1023 SULPH PT
1020 HIGH LV7
1022 BLUMNOR7
1037 RBW5
10028 791S701T
11028 791S702T
1054 ARCENC1
17054 ARCENC2
18054 ARCENC3
1013 WIND01
1038 OSB-TAP7
1511 FNC-1
1509 FNC_TAP
1508 KLC_TAP
20000 BC BORDE
1053 RING CK7
1018 BASSET 7
213 HAIGRIVE
1034 CHINCHA7
1036 KEG RVR7
1052 HAMBURG7
1090 MEIKLE1
1044 KEMP RV7
1510 KLC-1
1016 FORT NE7
1050 HOTCHKS7
1017 WSP_138
1082 WESLY C7
1080 WESLY C4
1015 FORT NE9
1041 BC01
1085 PEACE RV
1019 FORT NE8
1105 FRIEDEN7
1150 DONNELL7
7L76
7L133
7L72
7L113
7L180
7L59
7L82
7L58
7L62
7L106
7L138
7L131
7L120
7L51
7L48
7L75
SW
Mustus Energy – Biomass Generating Plant
2014 SL POST-CONNECTION
CONTINGENCY: 7L76 (N-1)
TUE, DEC 04 2012 10:18
Bus - VOLTAGE (kV/PU)
Branch - MW/Mvar
Equipment - MW/Mvar
kV: >0.000 <=69.000 <=150.000 <=250.000
AESO

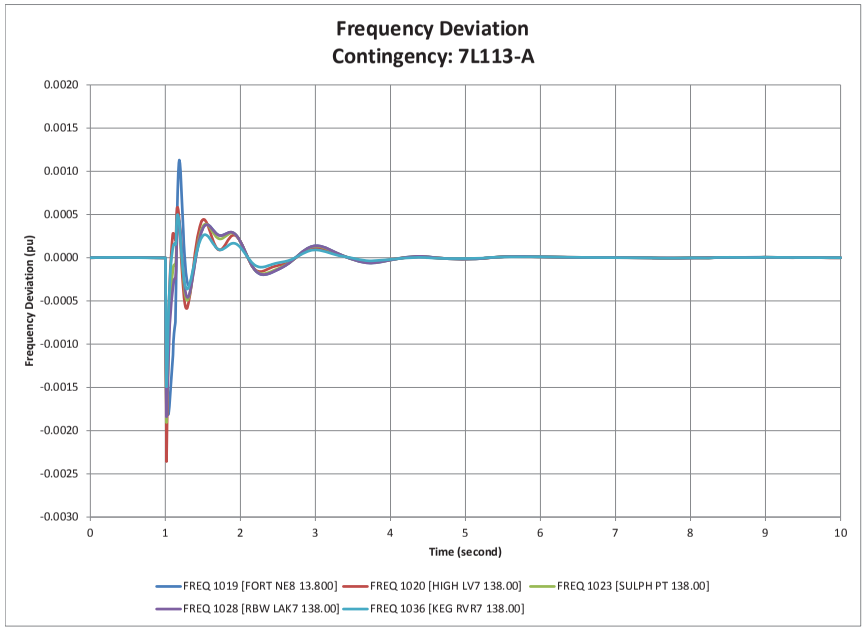
Attachment D-1

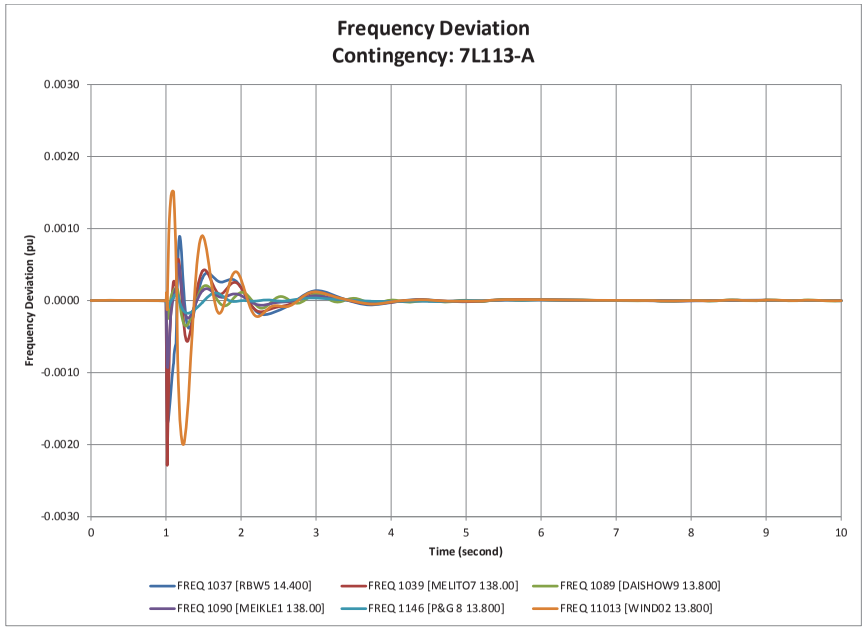
Post-Connection Transient Stability Analysis Results (2013-2014 WP)

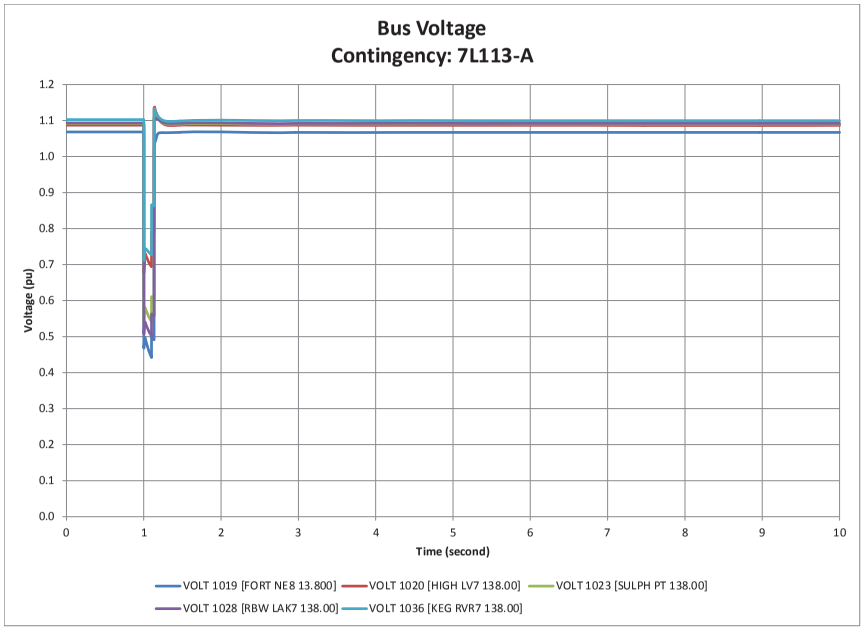

Generator Angle
Contingency: 7L113-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

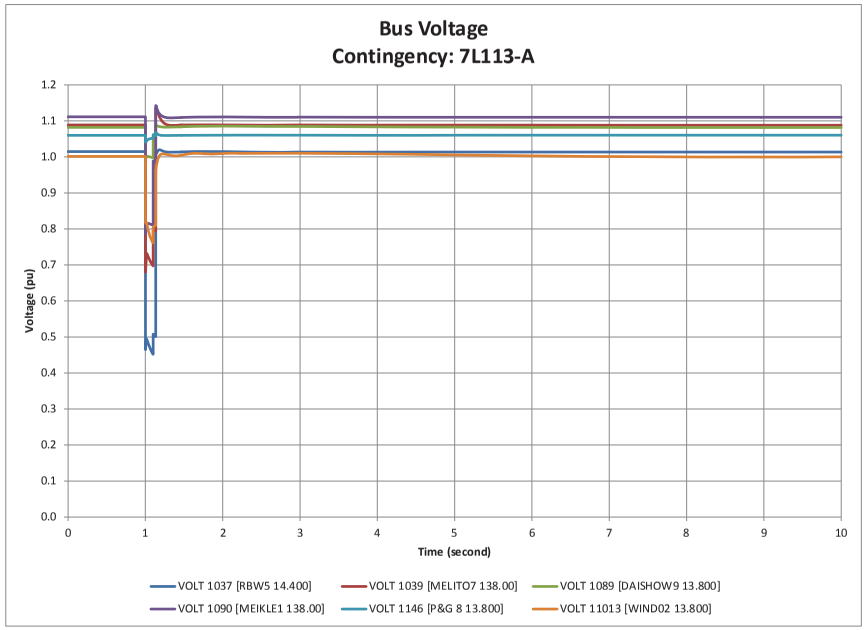

Generator Real Power
Contingency: 7L113-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

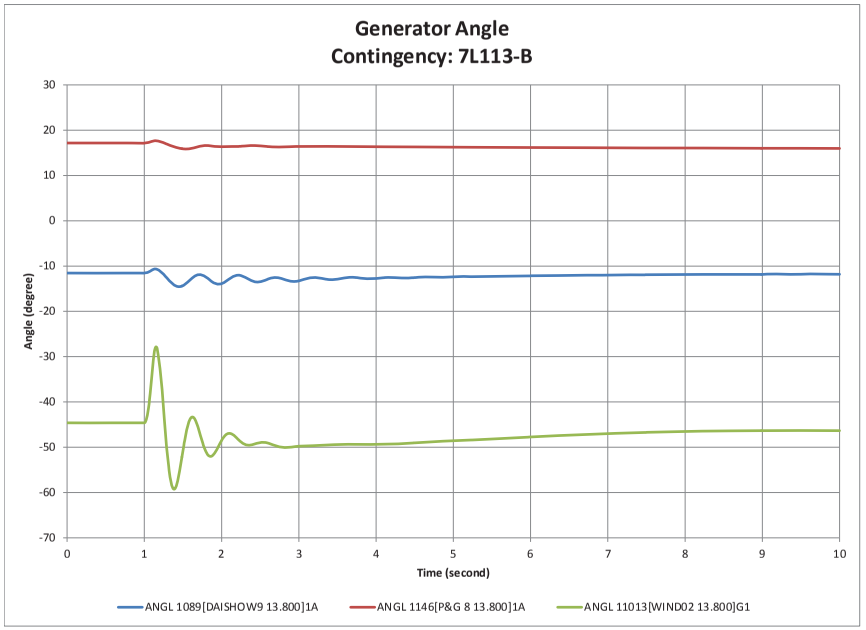

Generator Reactive Power
Contingency: 7L113-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

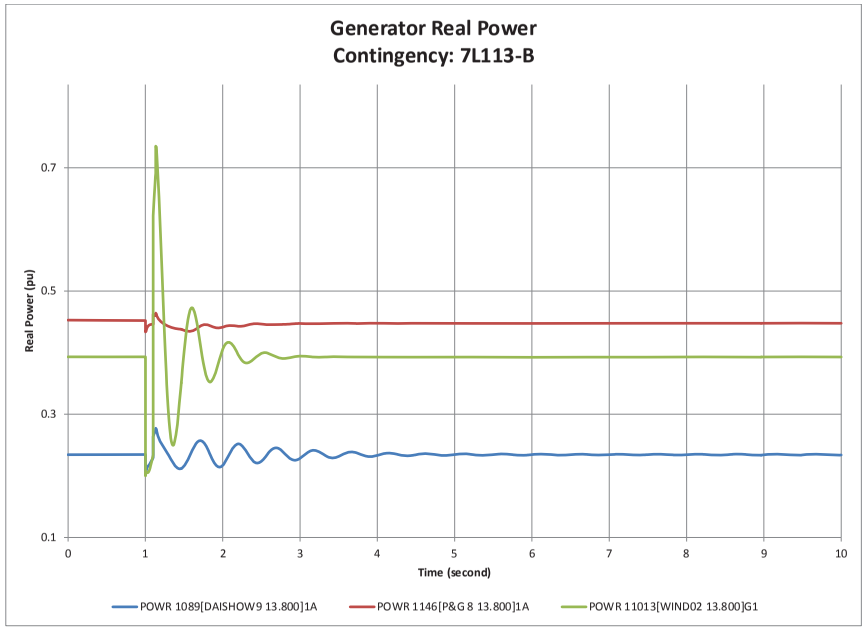

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

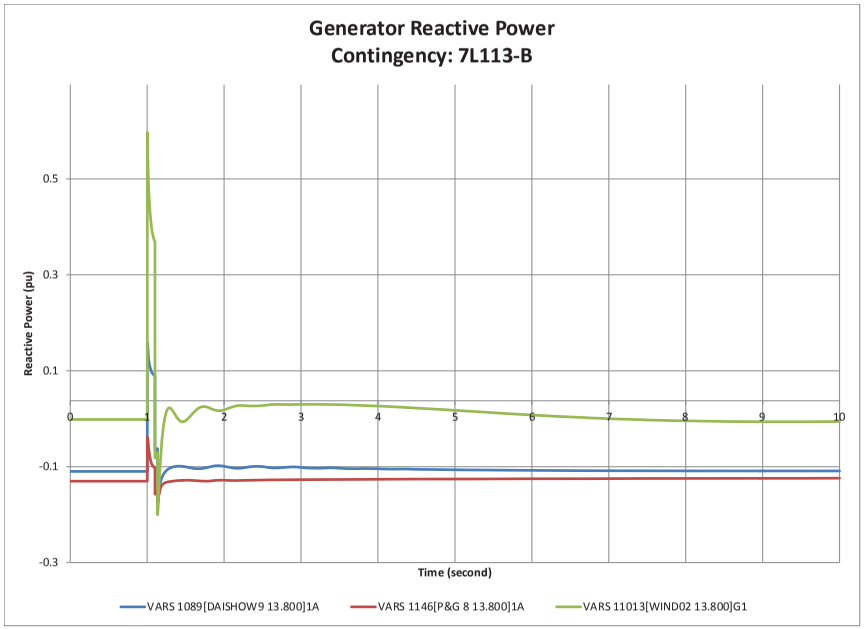

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

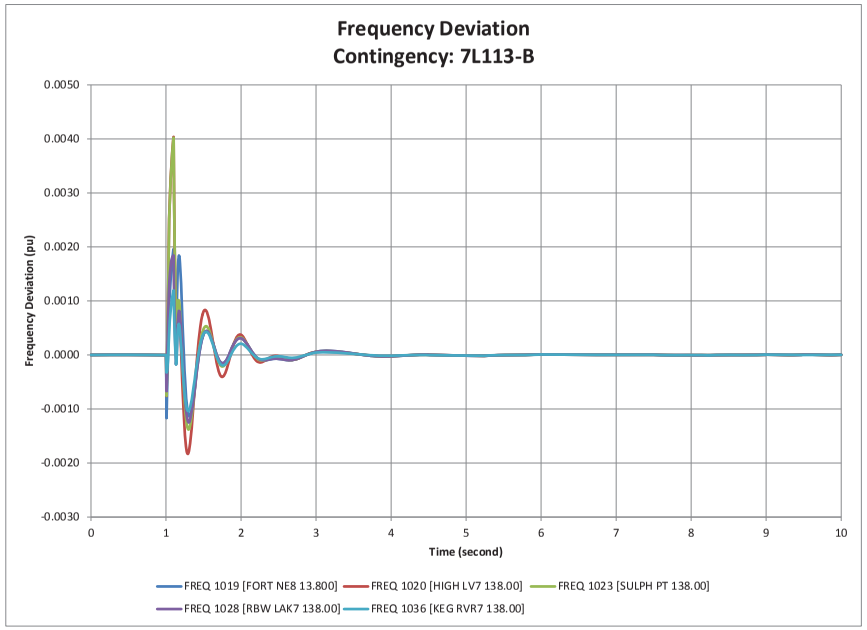

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

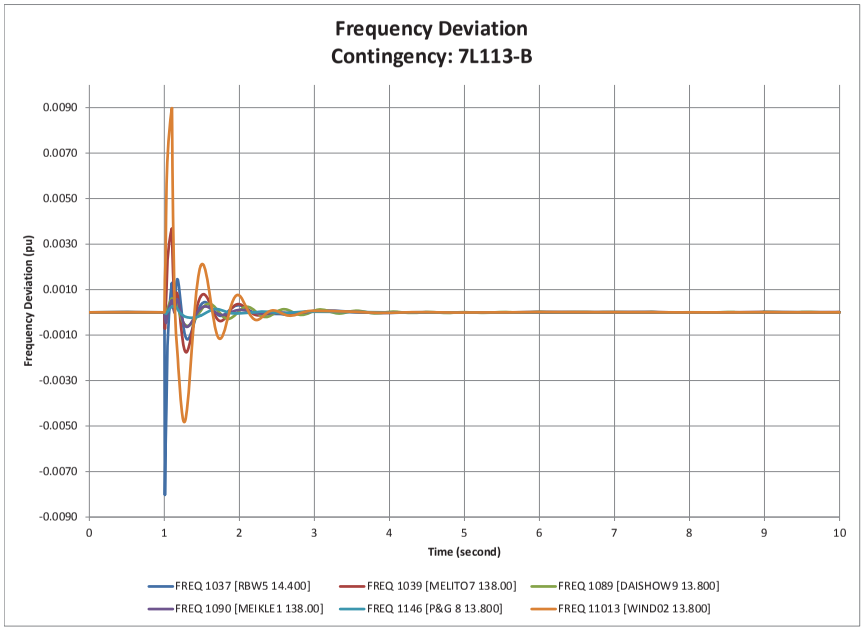

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

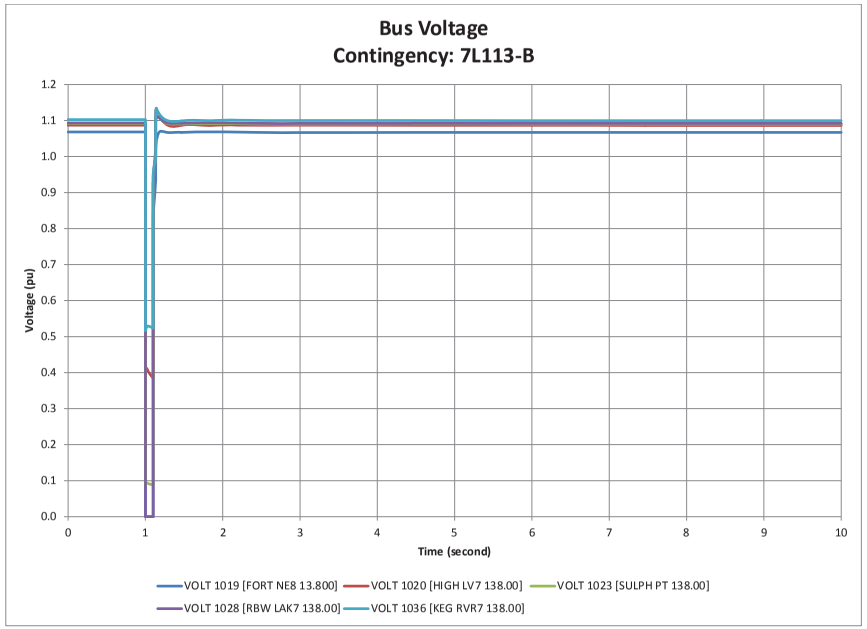

Generator Angle
Contingency: 7L113-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

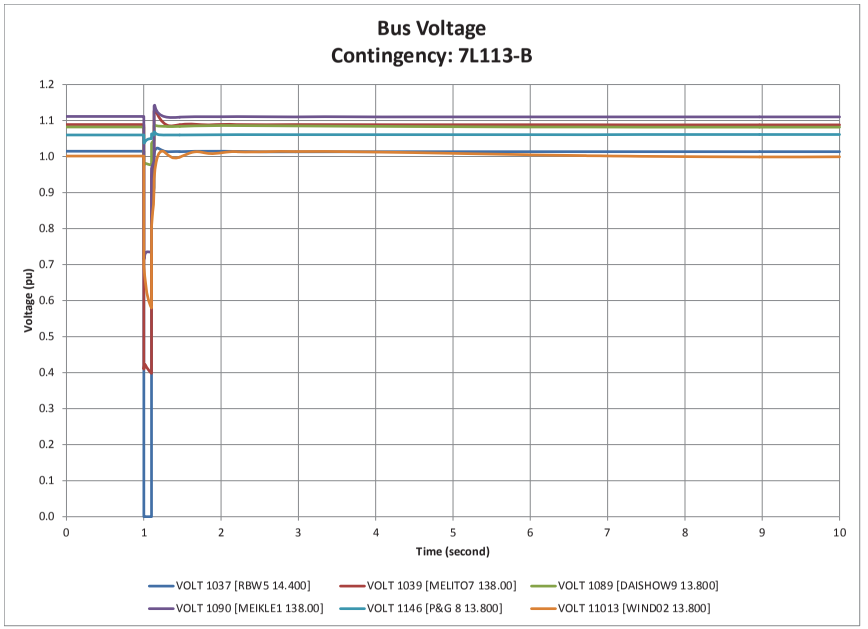

Generator Real Power
Contingency: 7L113-B
Real Power (pu)
0.7
0.5
0.3
0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

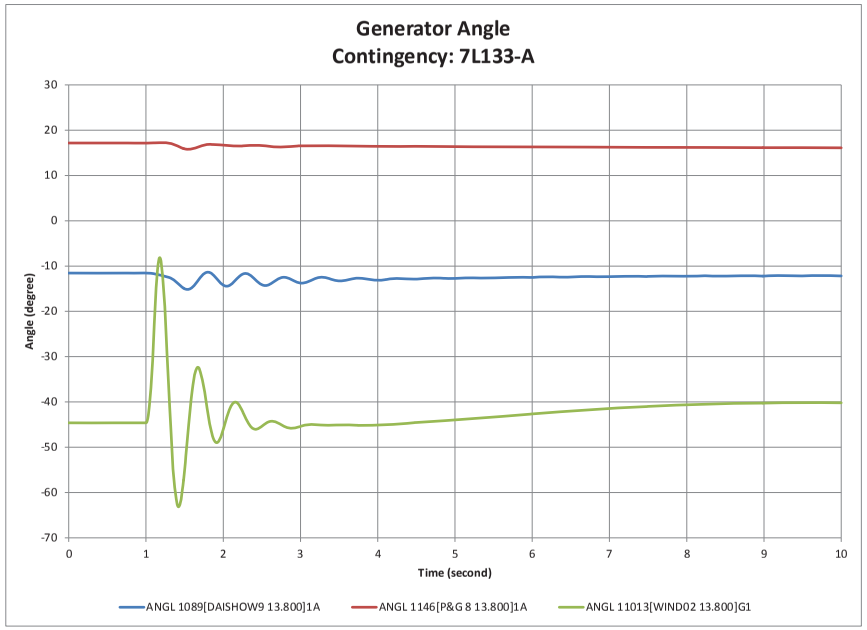

Generator Reactive Power
Contingency: 7L113-B
Reactive Power (pu)
0.5
0.3
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

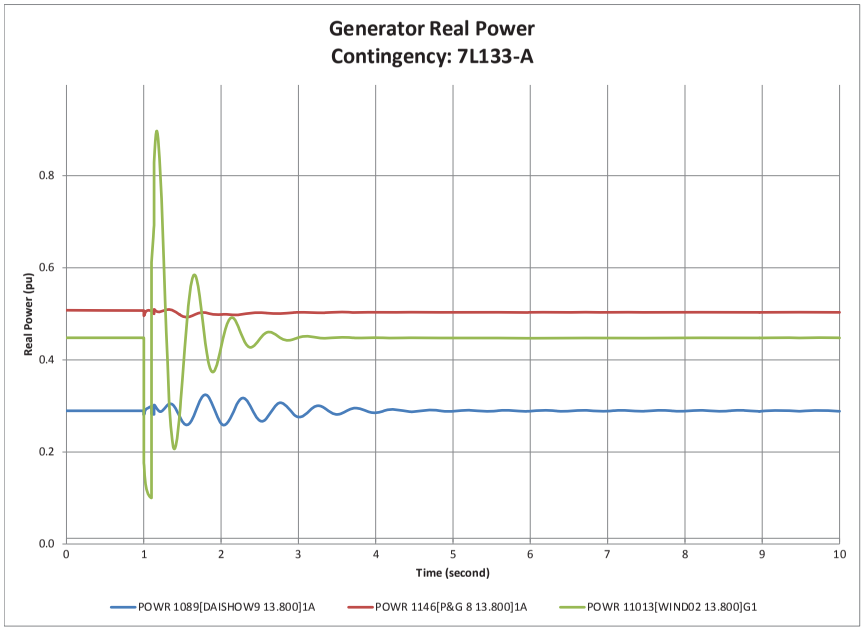

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

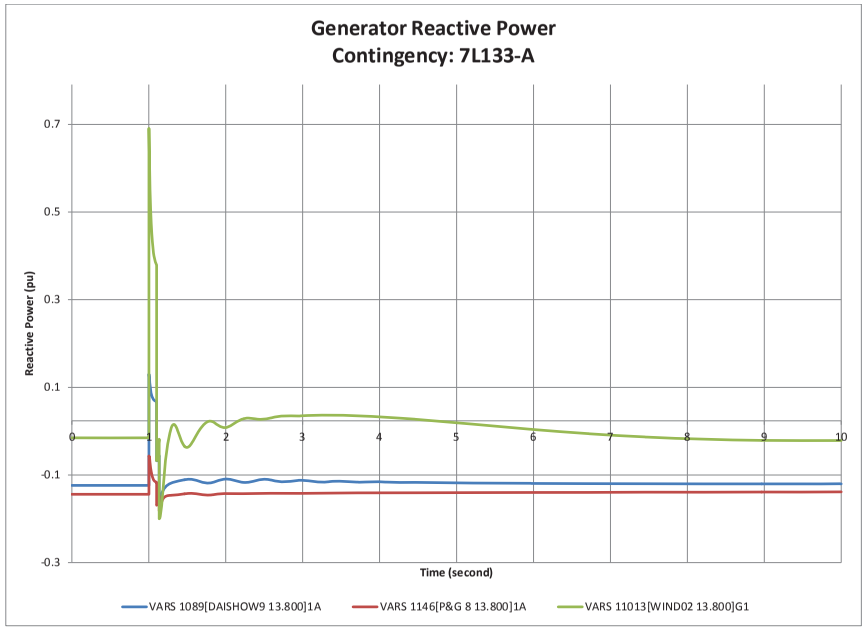

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
0.0090
0.0070
0.0050
0.0030
0.0010
-0.0010
-0.0030
-0.0050
-0.0070
-0.0090
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

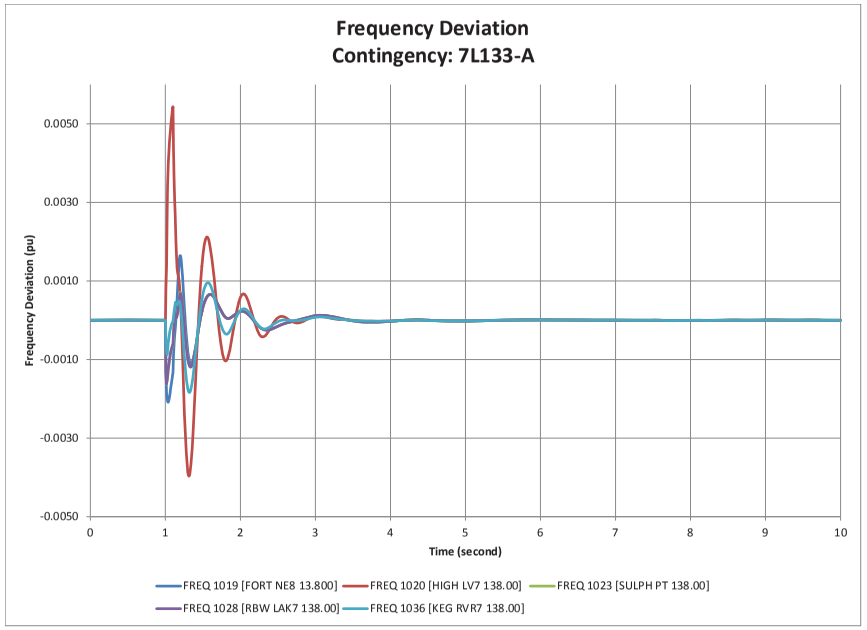

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

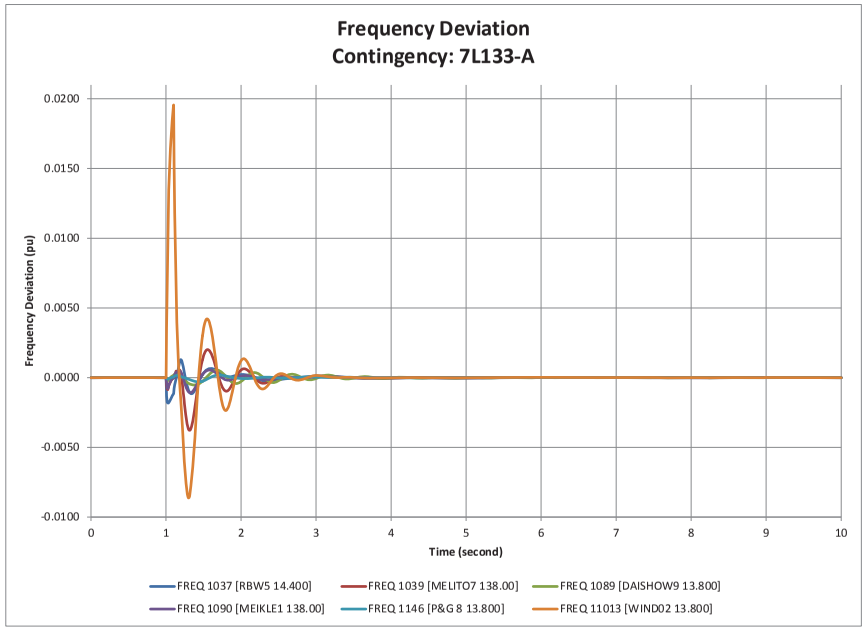

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

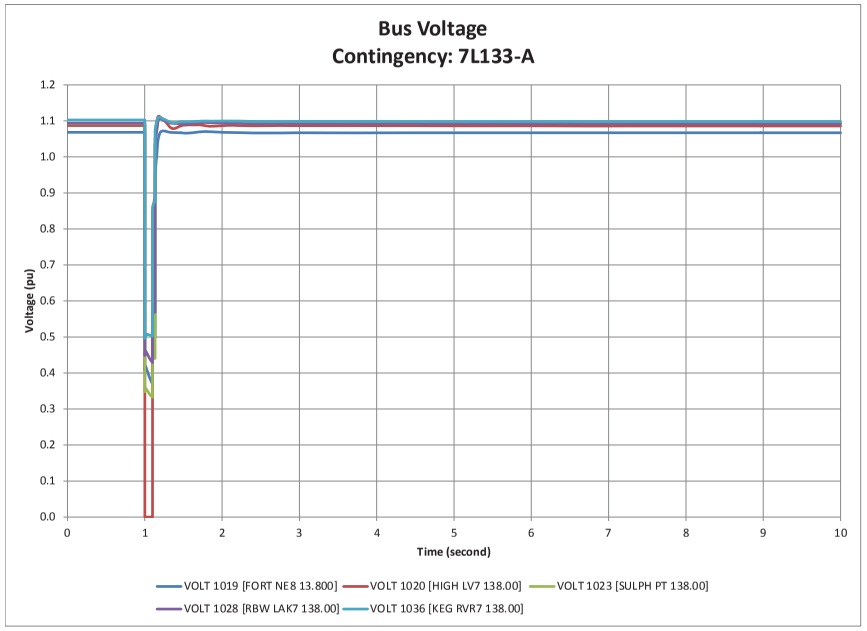

Generator Angle
Contingency: 7L133-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

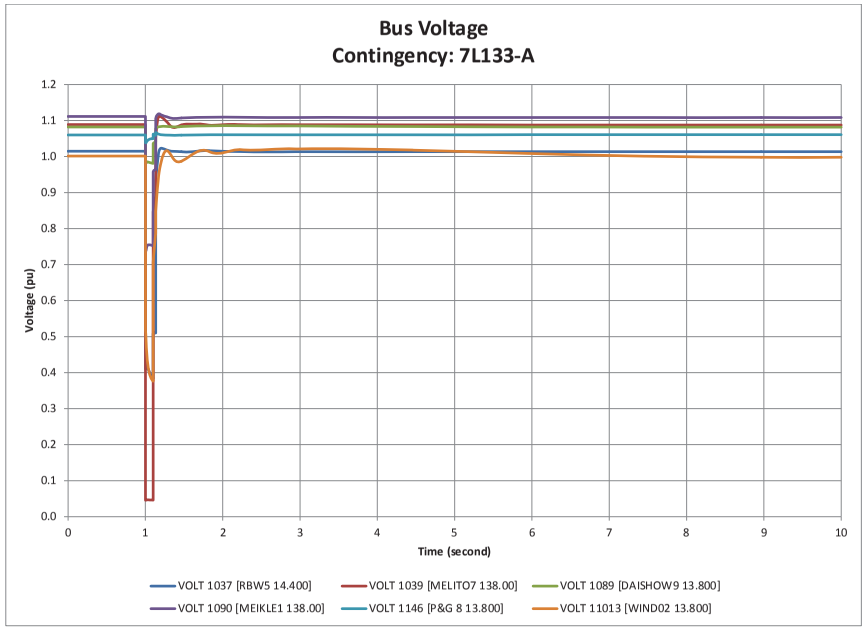

Generator Real Power
Contingency: 7L133-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

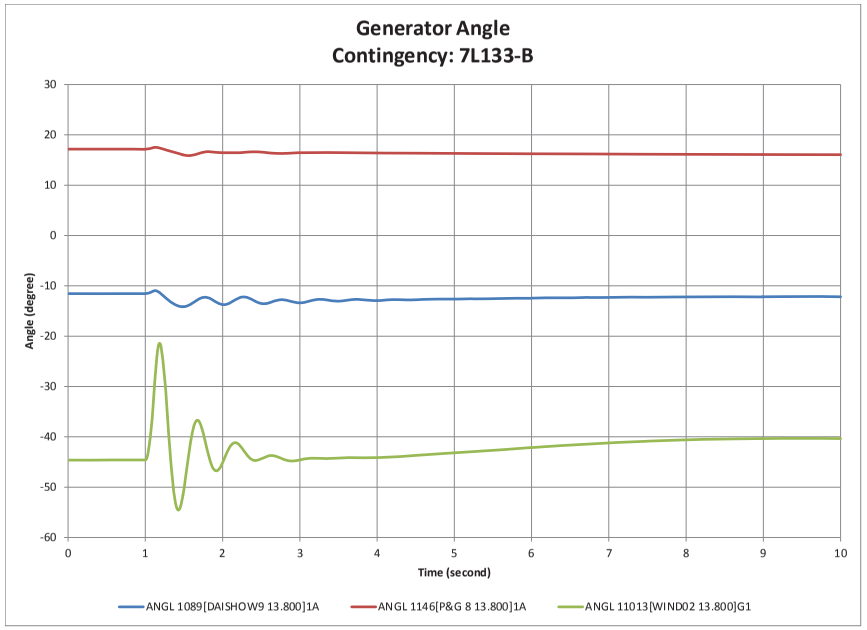

Generator Reactive Power
Contingency: 7L133-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

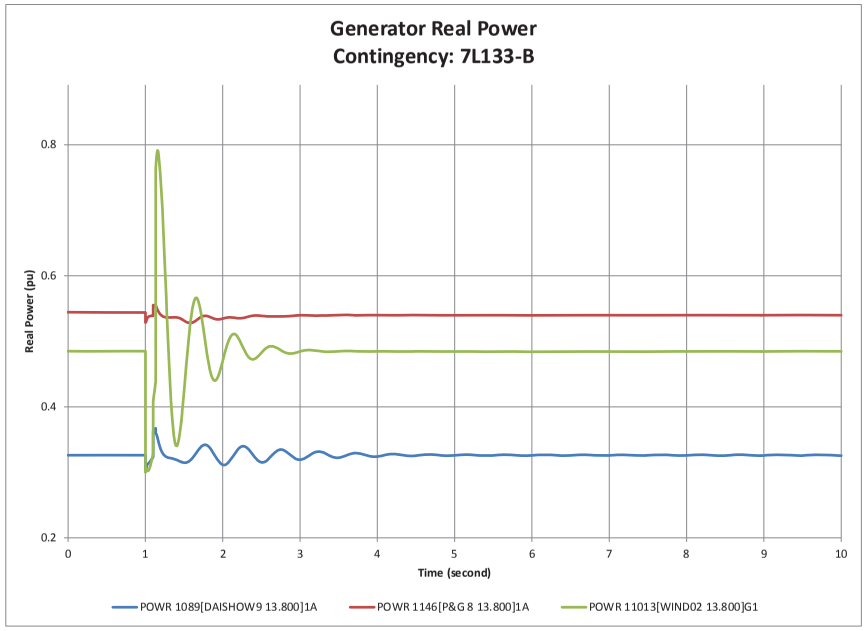

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

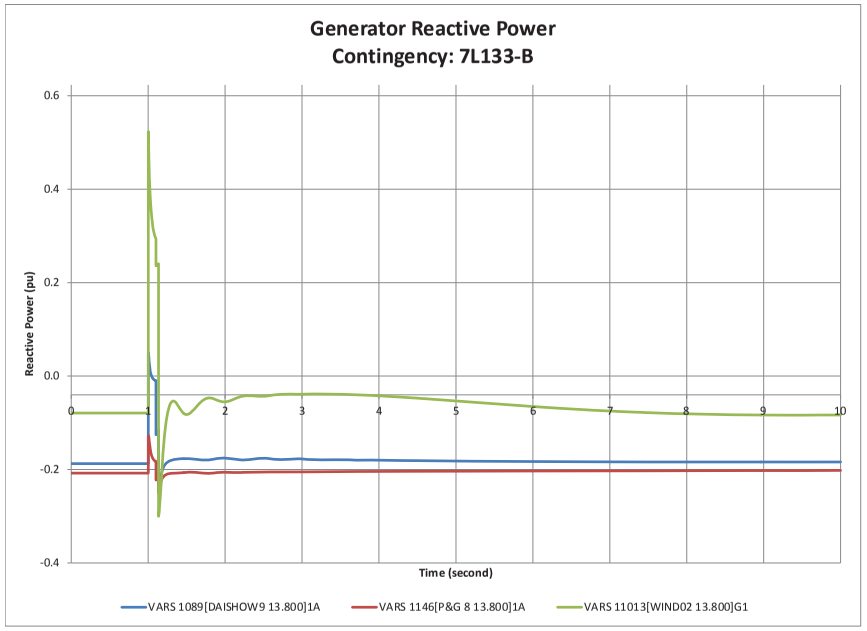

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

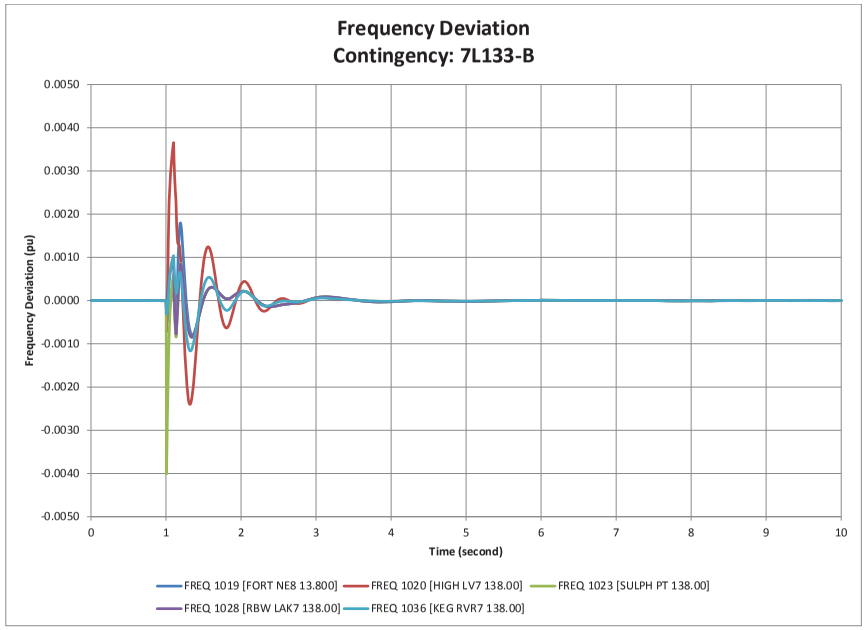

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

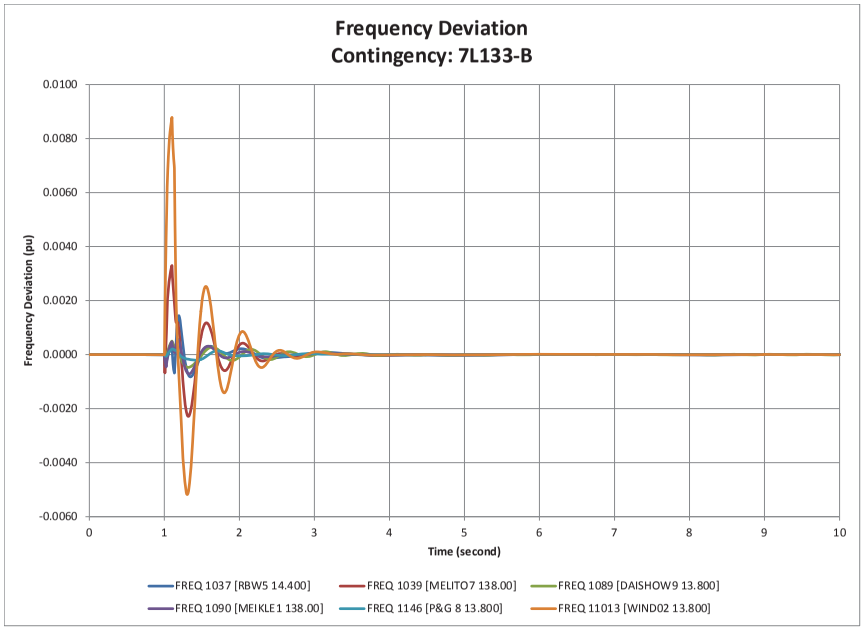

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

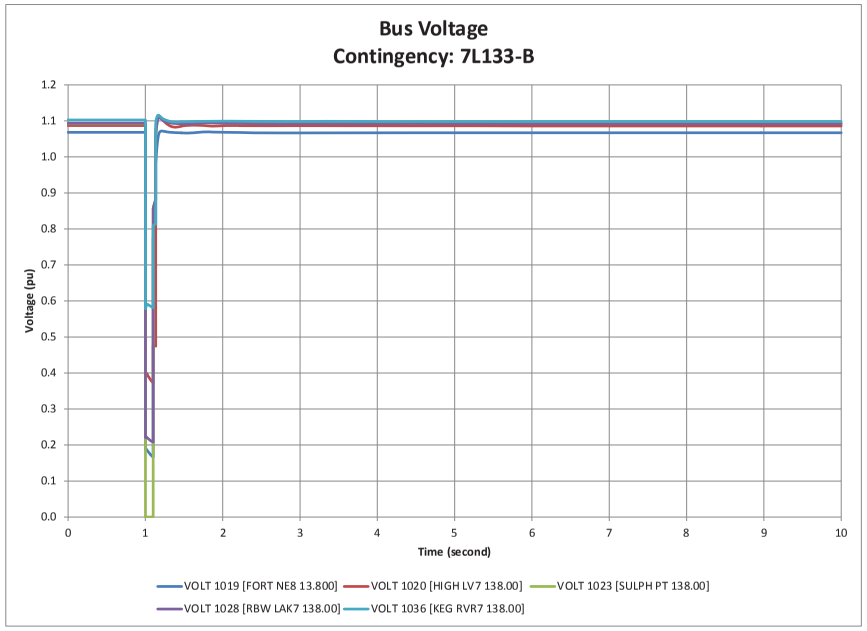

Generator Angle
Contingency: 7L133-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

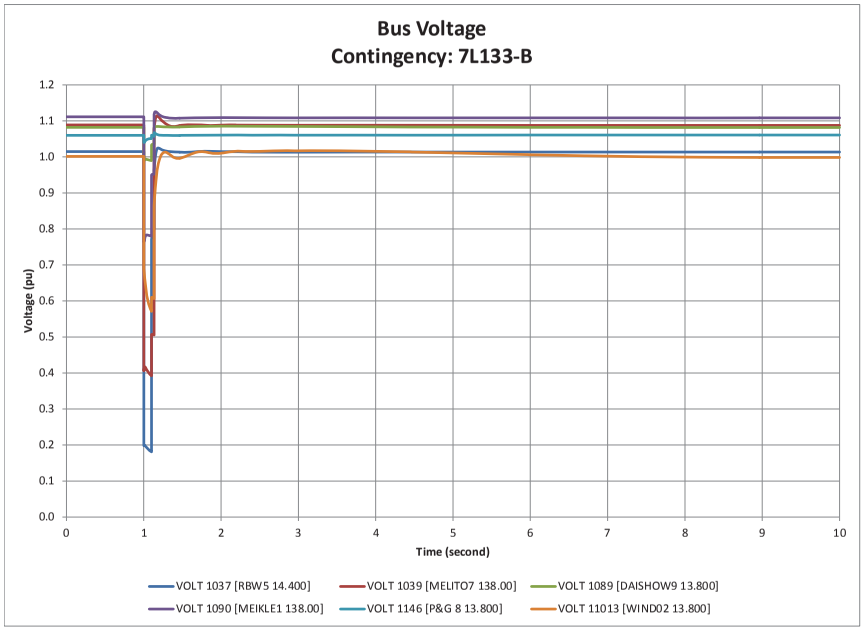

Generator Real Power
Contingency: 7L133-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

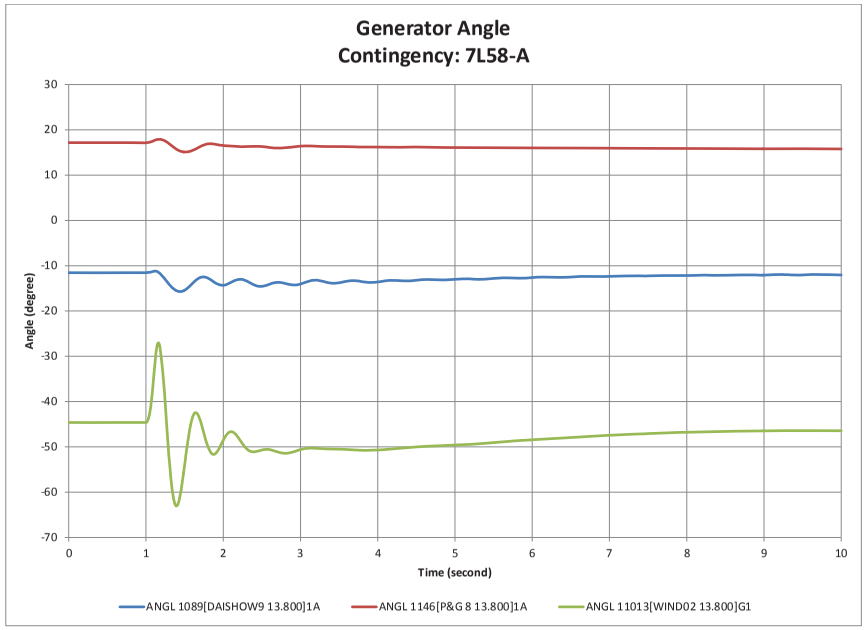

Generator Reactive Power
Contingency: 7L133-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

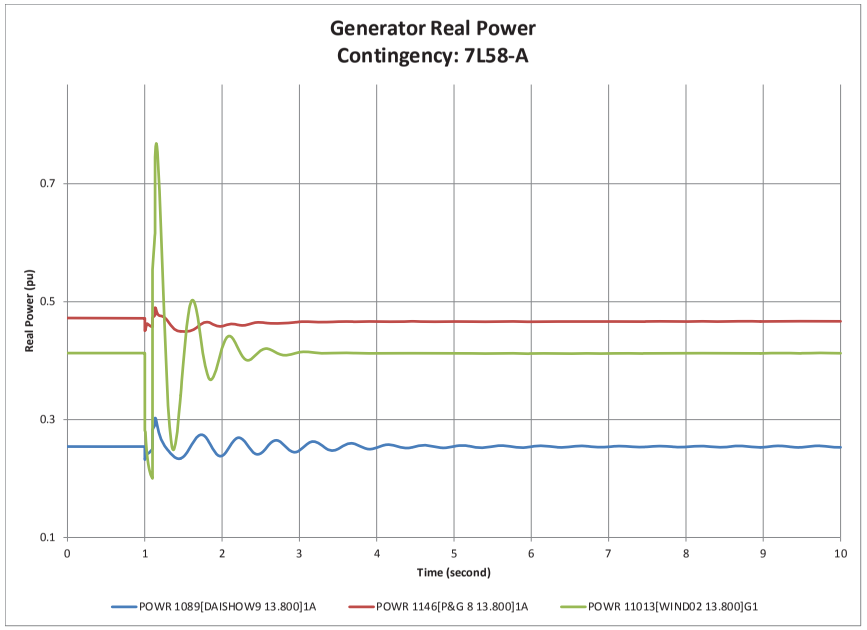

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

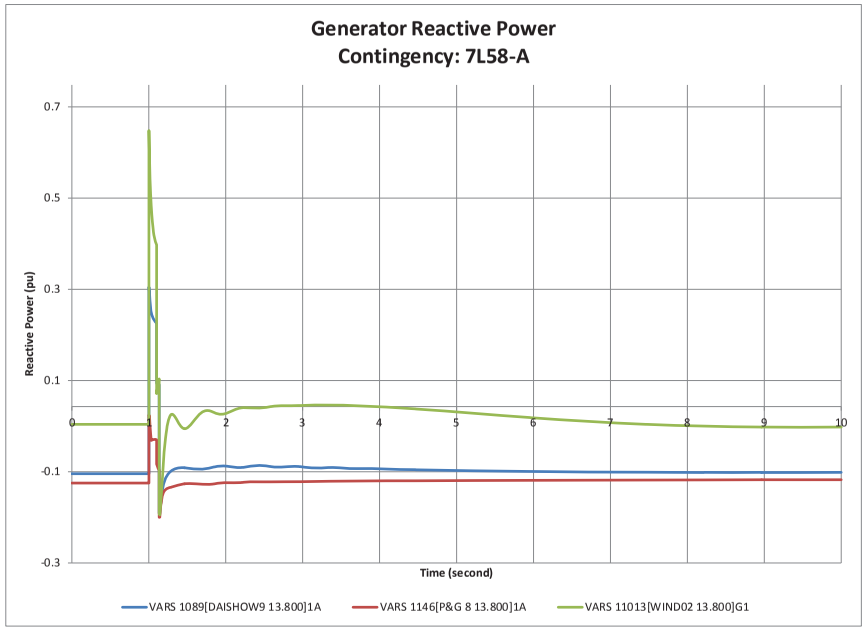

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

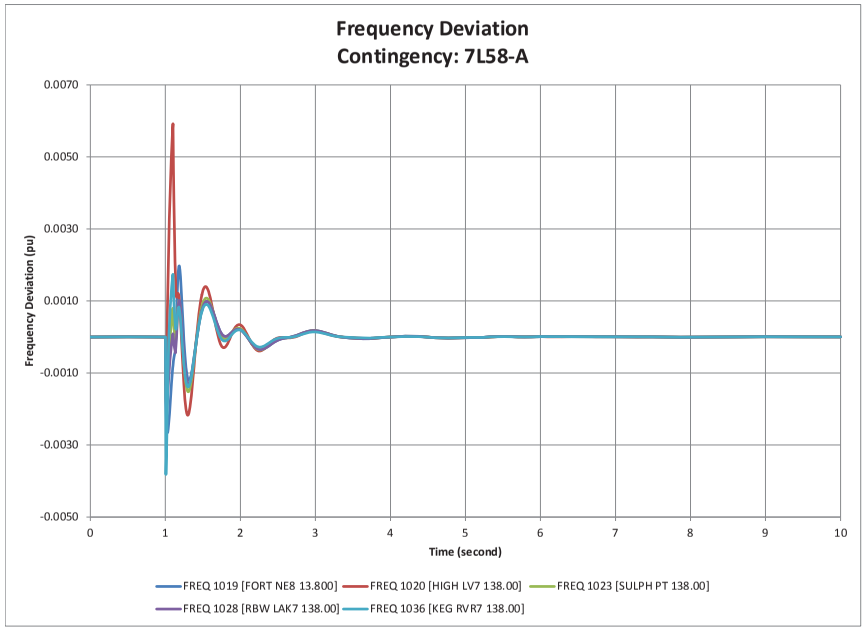

Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]


Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

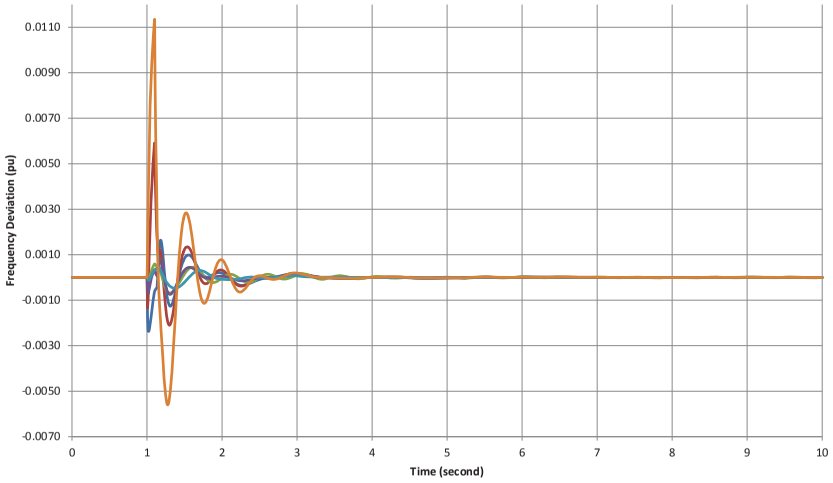

Generator Angle
Contingency: 7L58-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1


Generator Real Power
Contingency: 7L58-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

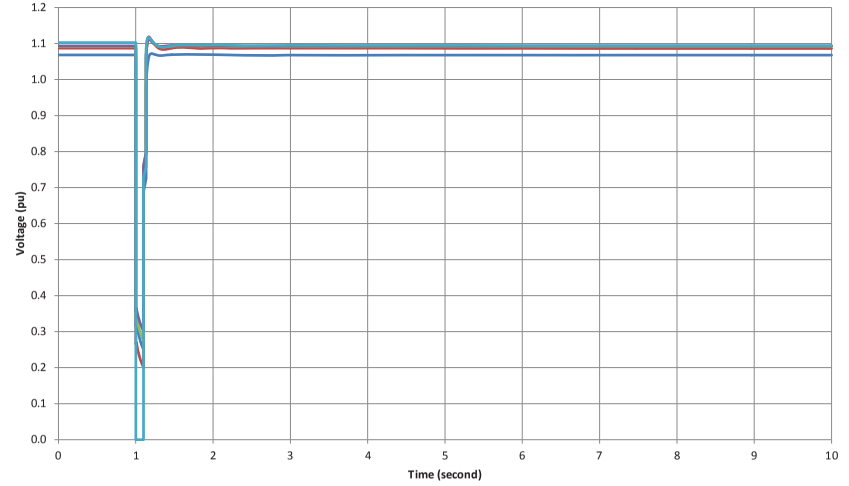

Generator Reactive Power
Contingency: 7L58-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1


Frequency Deviation
Contingency: 7L58-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

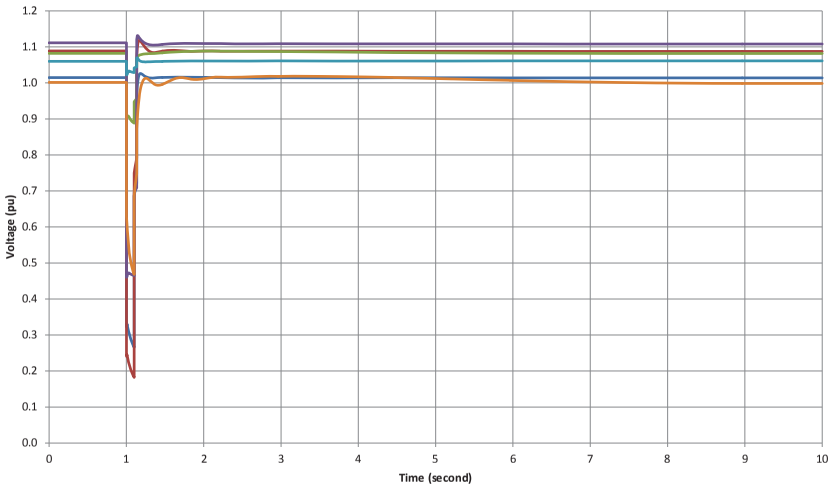
Frequency Deviation
Contingency: 7L58-A



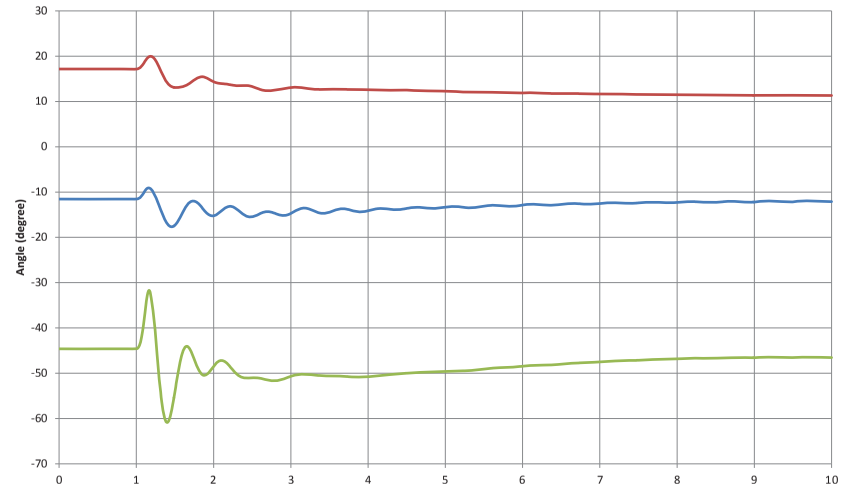
Bus Voltage
Contingency: 7L58-A

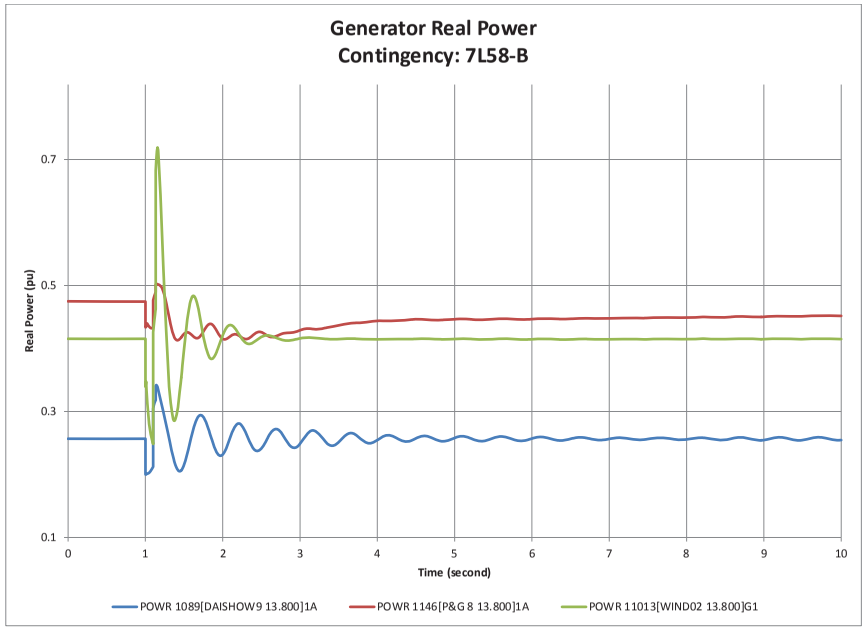


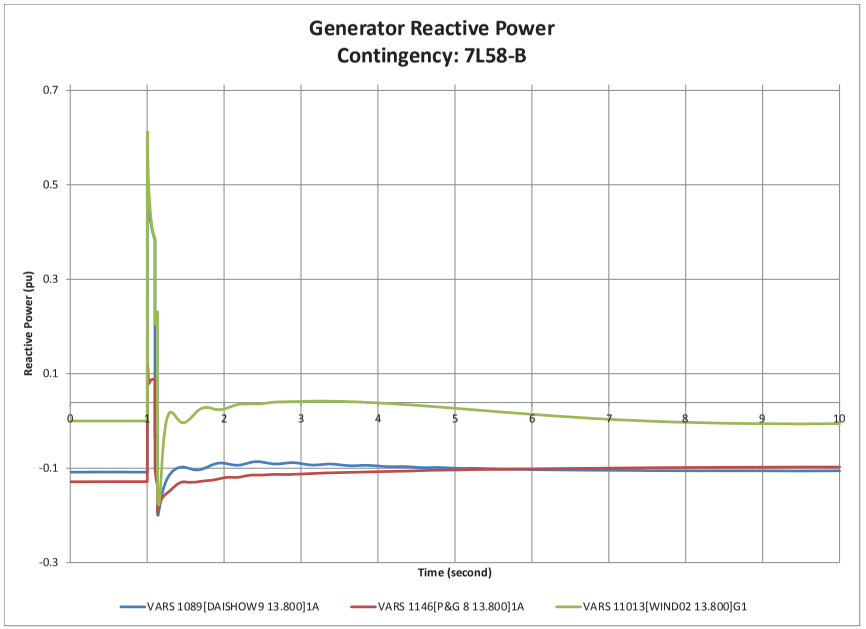
Bus Voltage
Contingency: 7L58-A

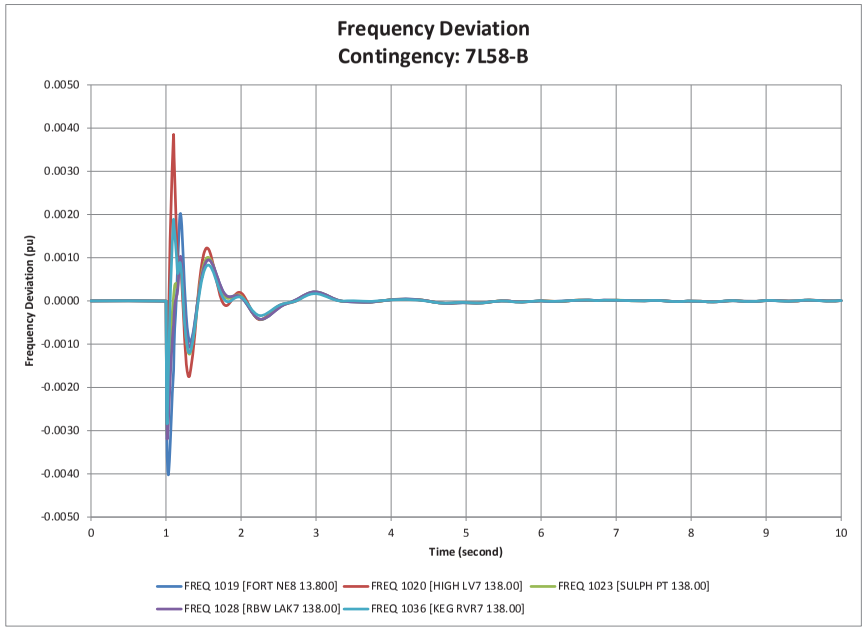


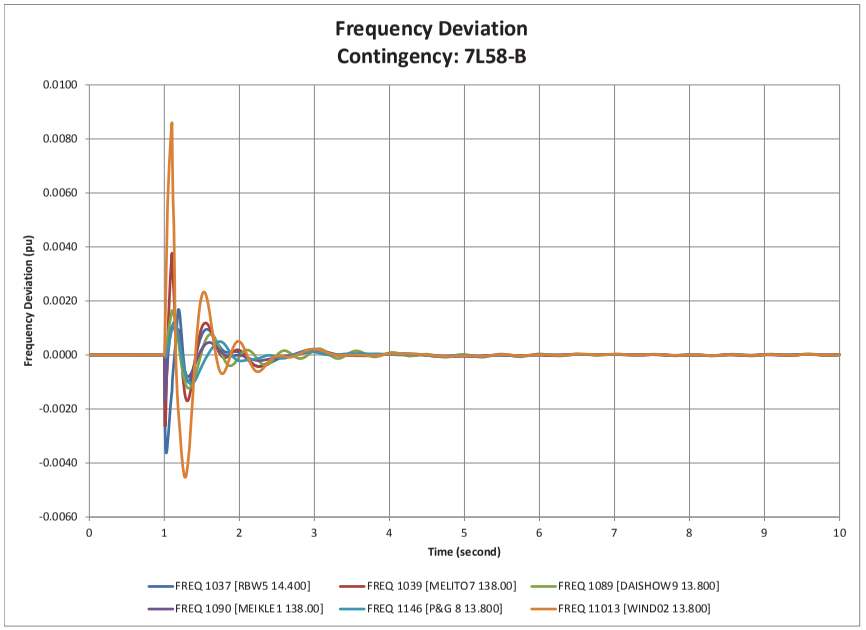
Generator Angle
Contingency: 7L58-B

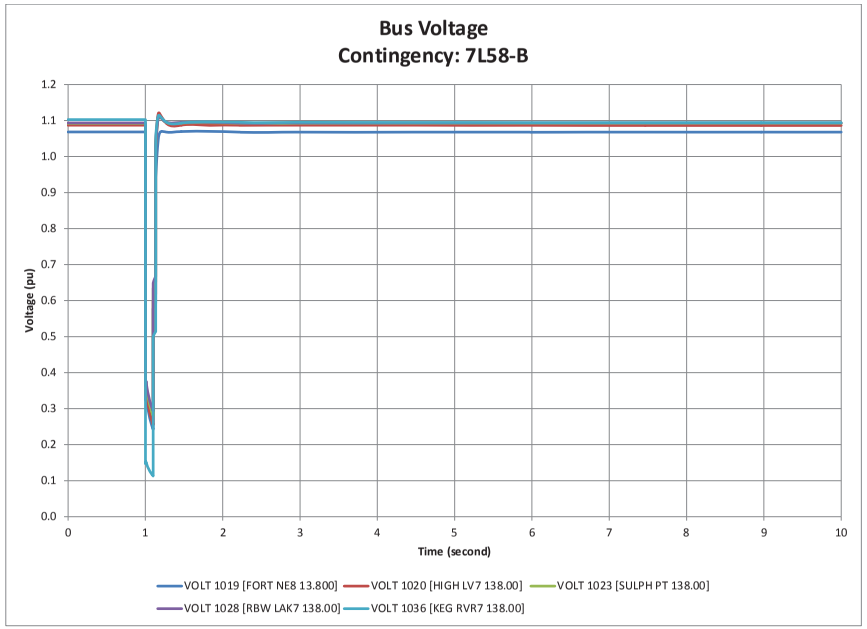


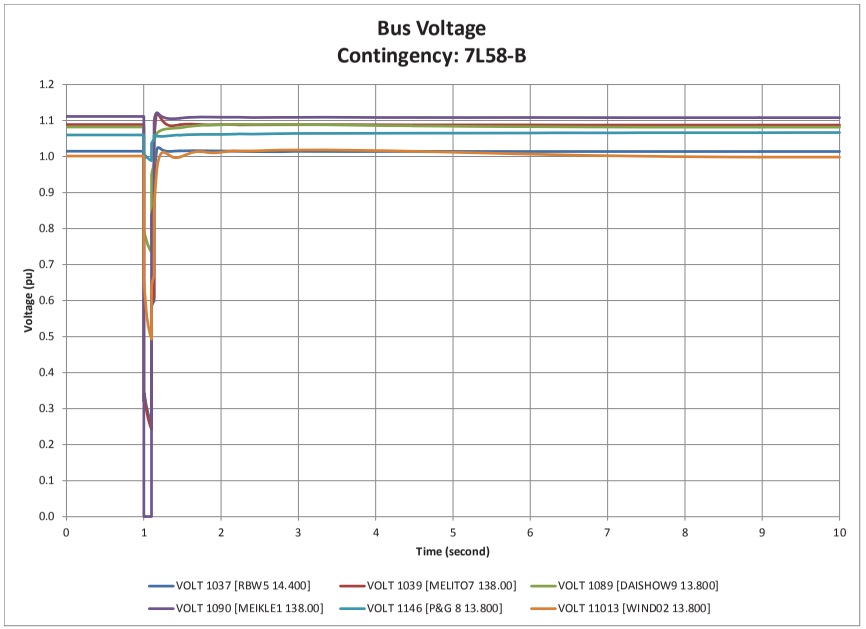

Generator Real Power
Contingency: 7L58-B
Real Power (pu)
0.7
0.5
0.3
0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

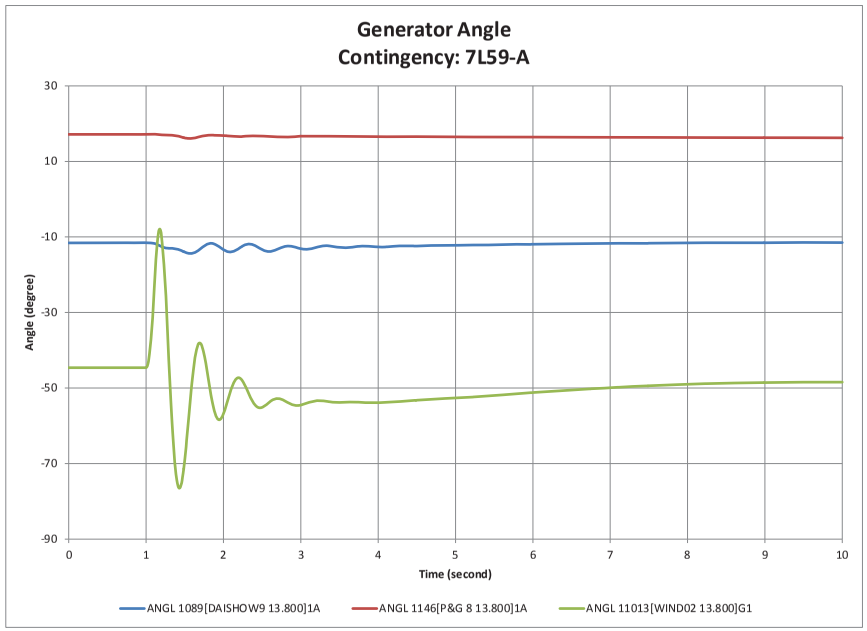

Generator Reactive Power
Contingency: 7L58-B
Reactive Power (pu)
0.7
0.5
0.3
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

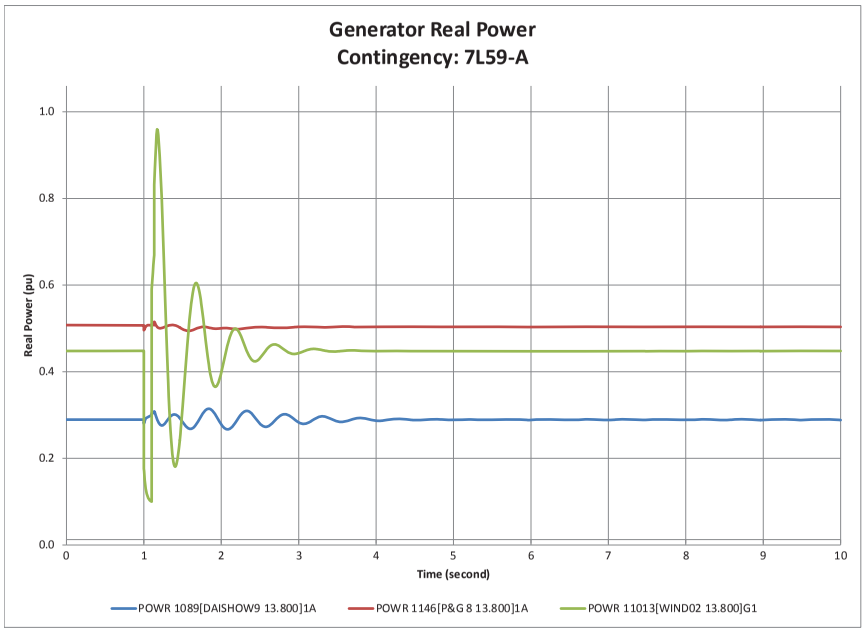

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
-0.0050
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

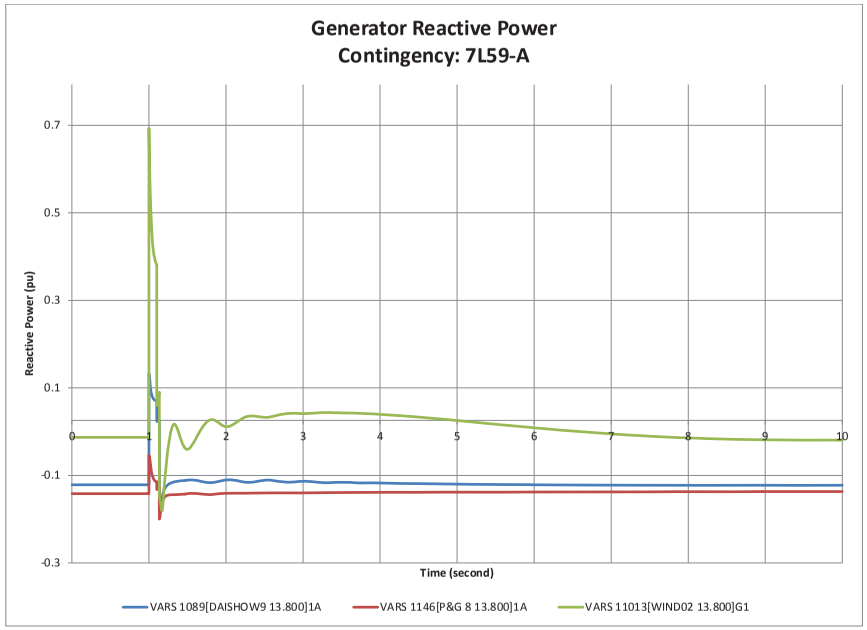

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
0.0100
0.0080
0.0060
0.0040
0.0020
0.0000
-0.0020
-0.0040
-0.0060
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

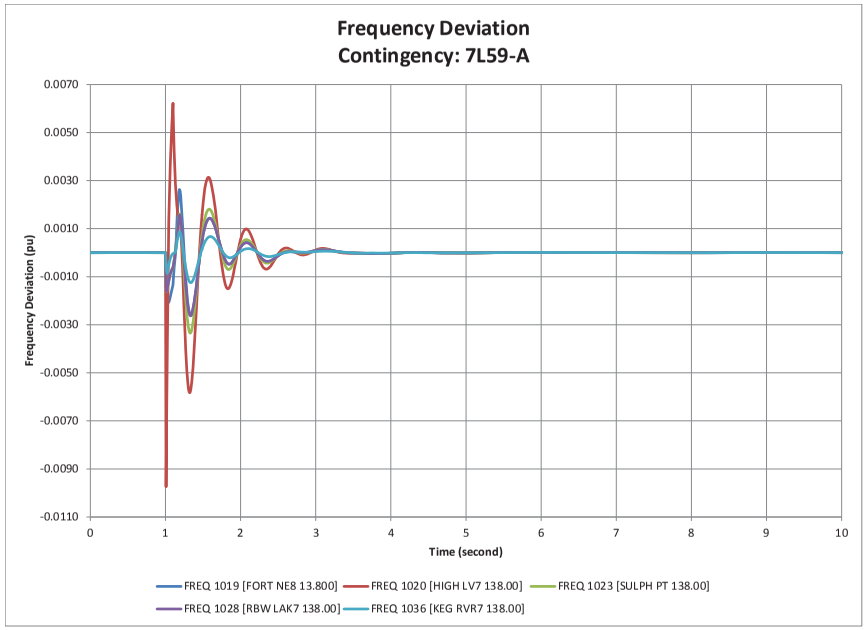

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

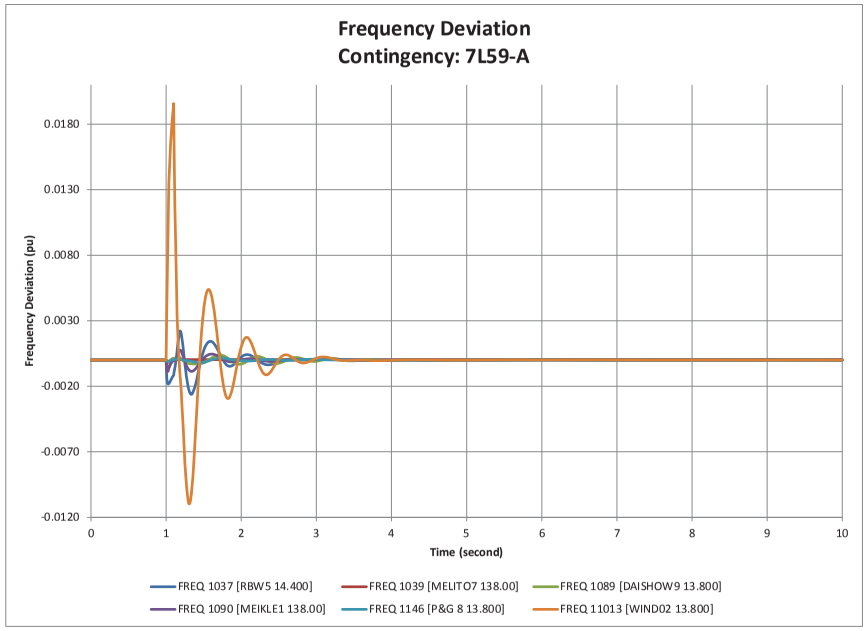

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

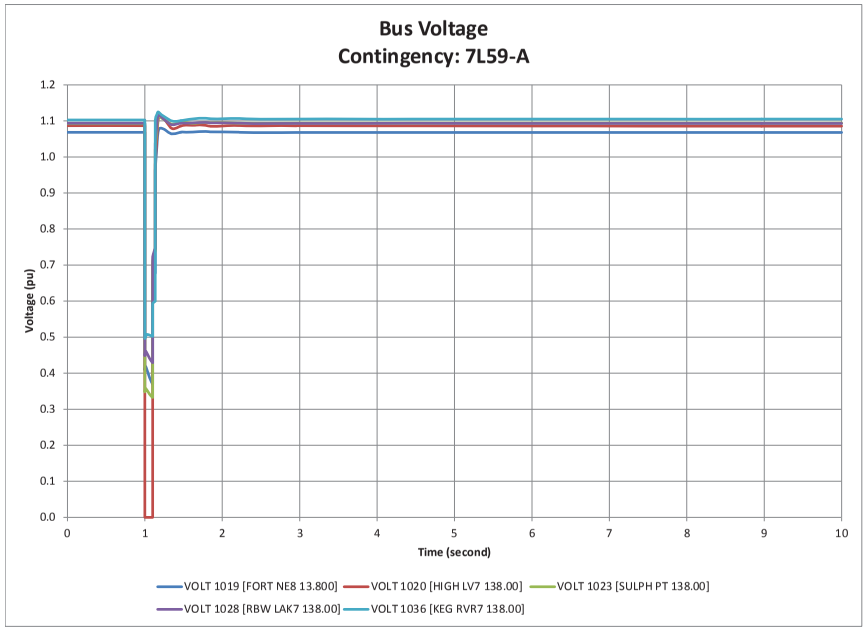

Generator Angle
Contingency: 7L59-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

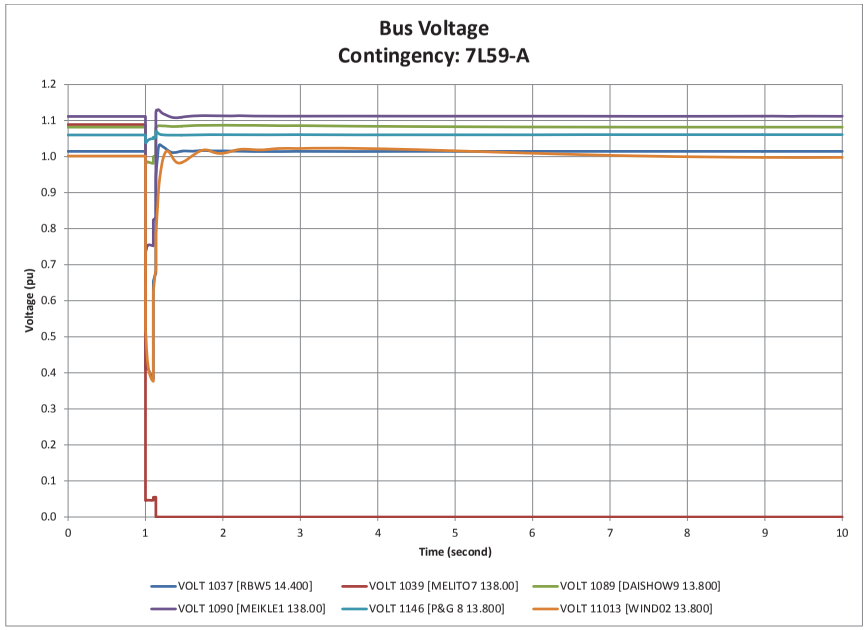

Generator Real Power
Contingency: 7L59-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

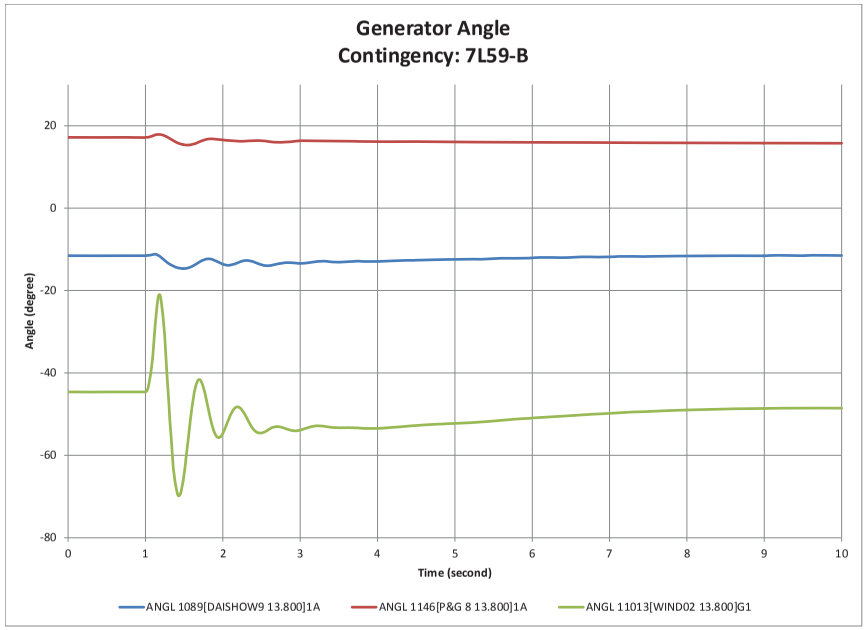

Generator Reactive Power
Contingency: 7L59-A
Reactive Power (pu)
0.7
0.5
0.3
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

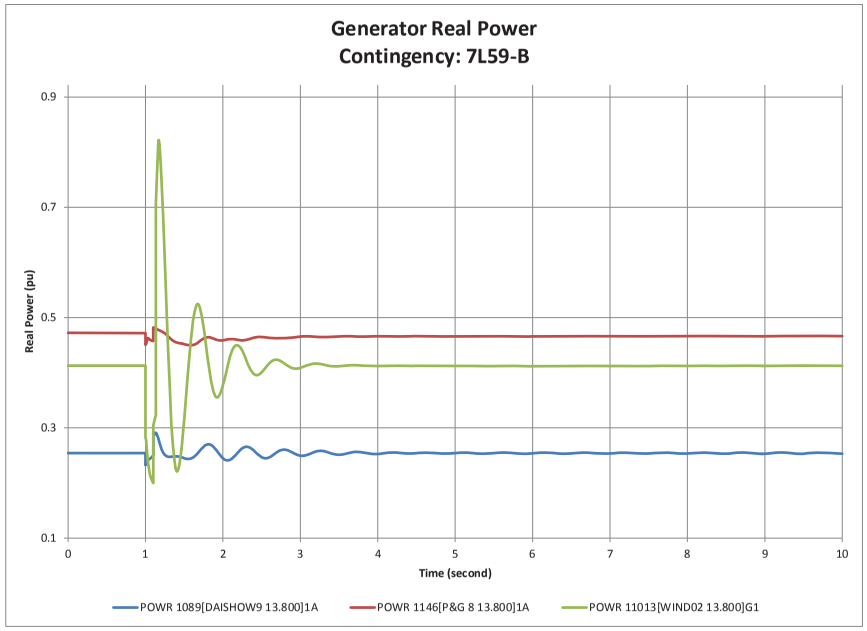

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
0.0070
0.0050
0.0030
0.0010
-0.0010
-0.0030
-0.0050
-0.0070
-0.0090
-0.0110
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

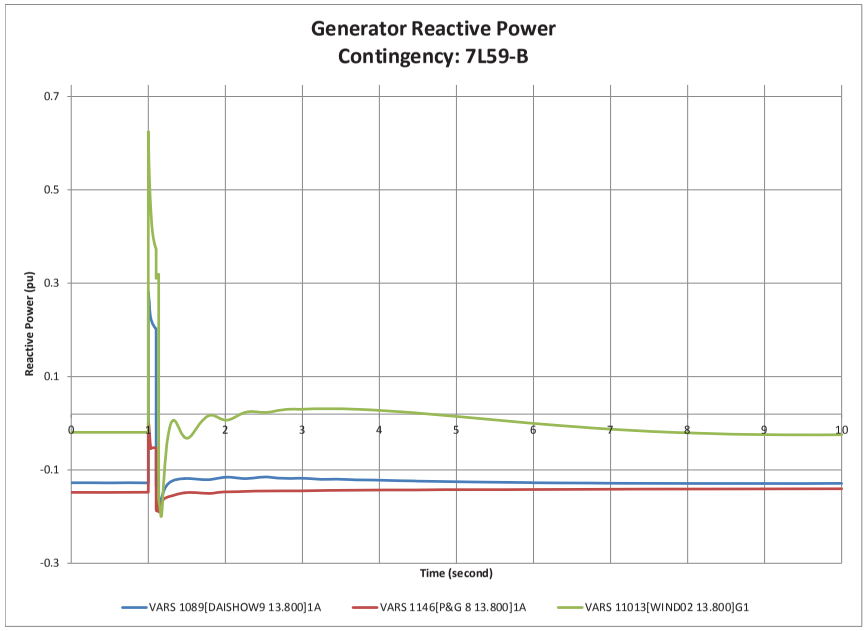

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
0.0180
0.0130
0.0080
0.0030
-0.0020
-0.0070
-0.0120
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

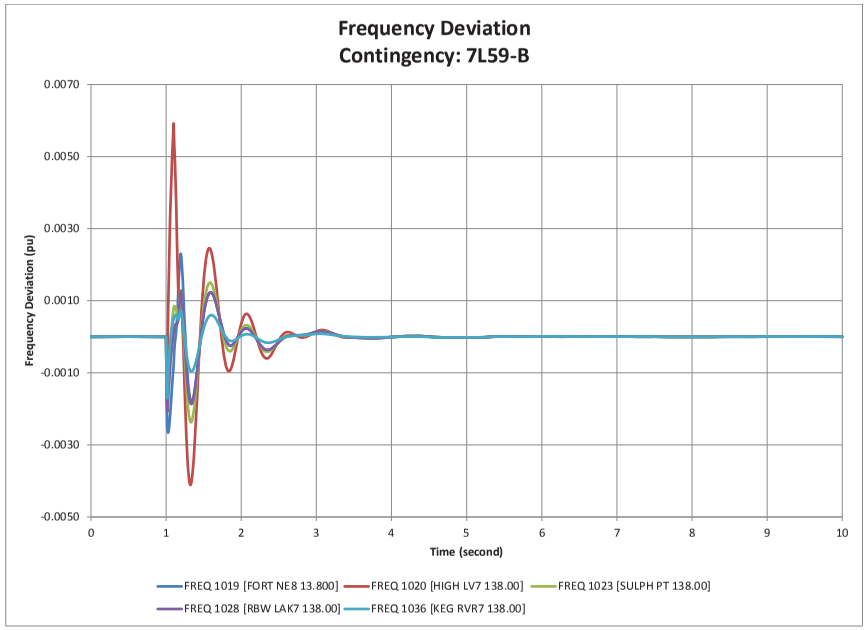

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

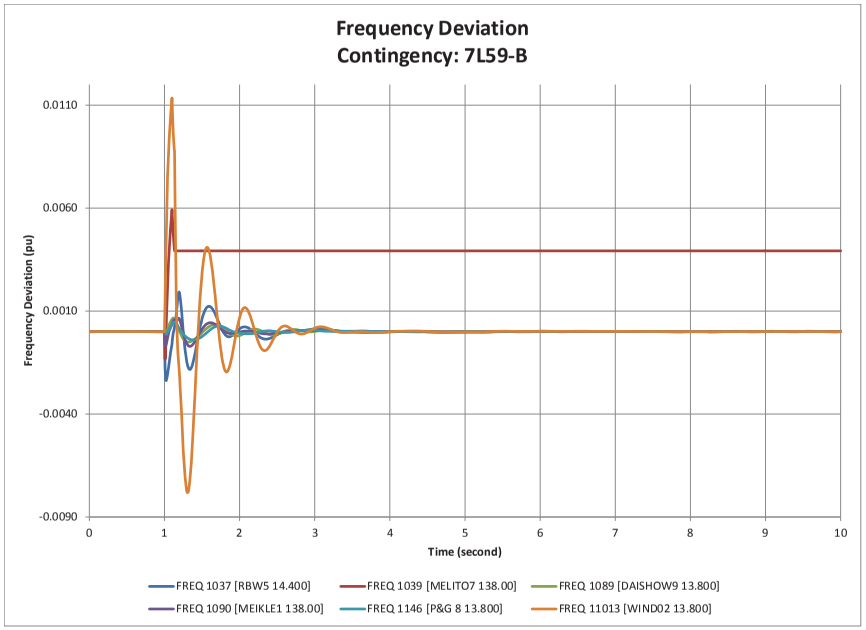

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

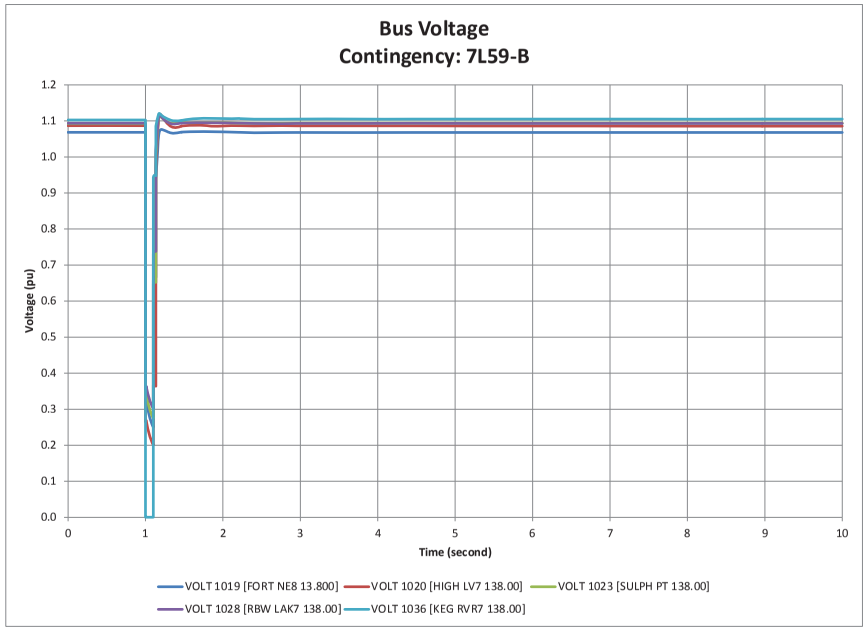

Generator Angle
Contingency: 7L59-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

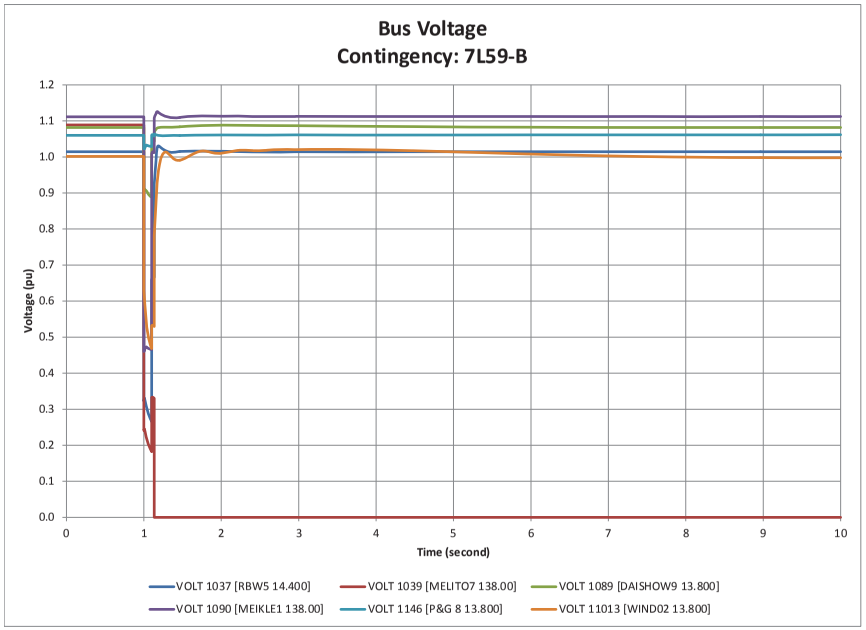

Generator Real Power
Contingency: 7L59-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

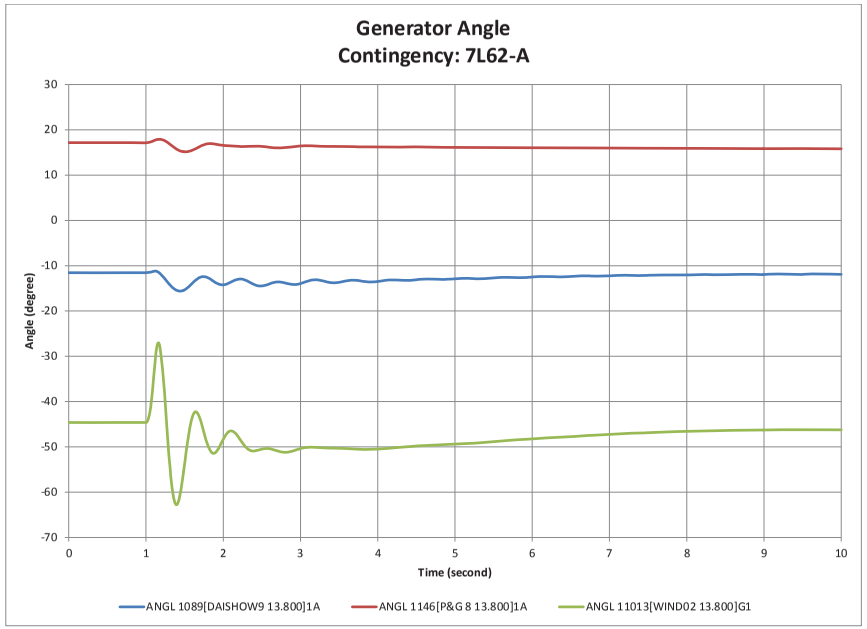

Generator Reactive Power
Contingency: 7L59-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

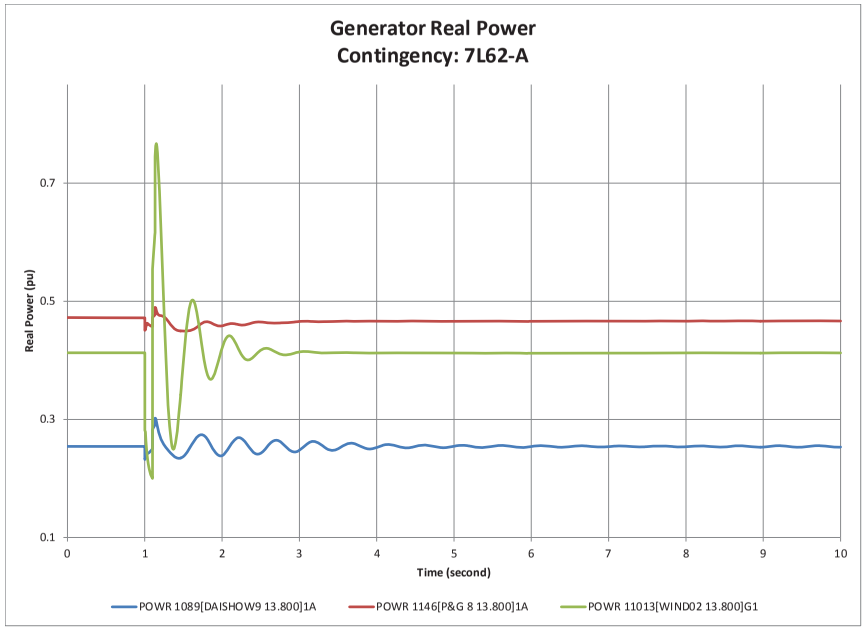

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

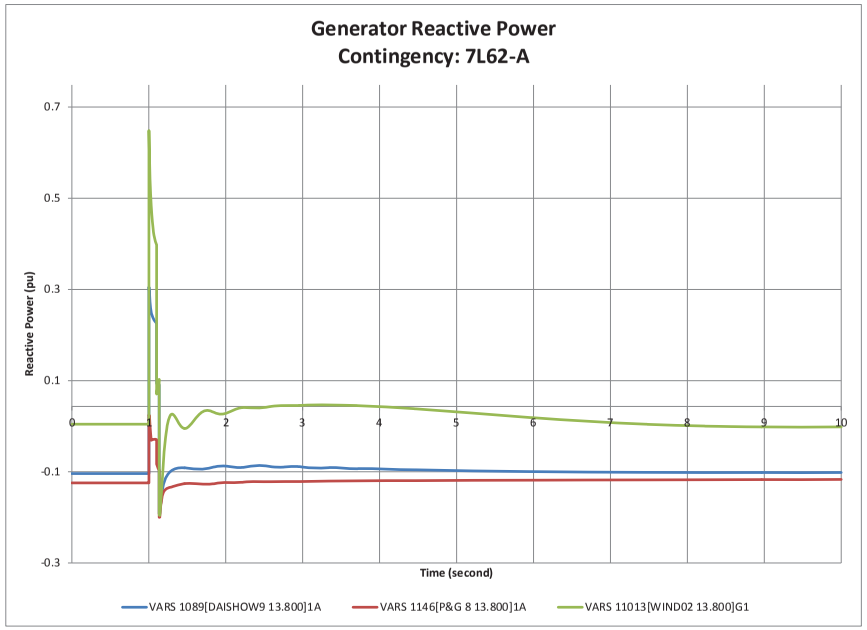

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

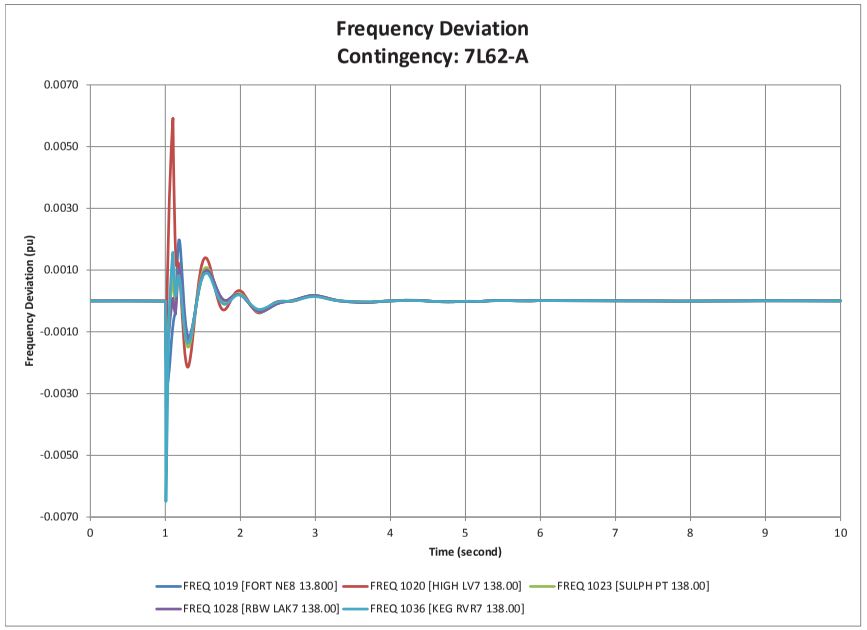

Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

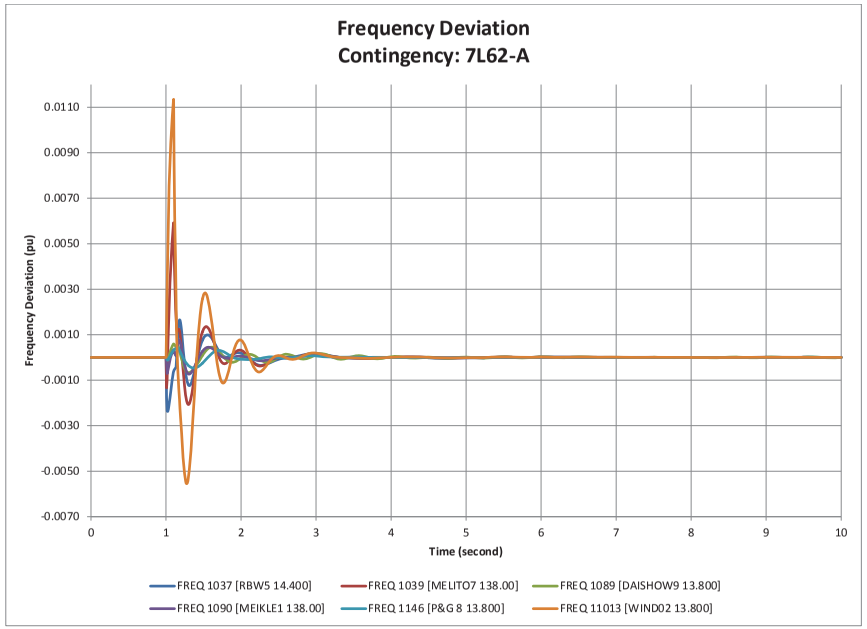

Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

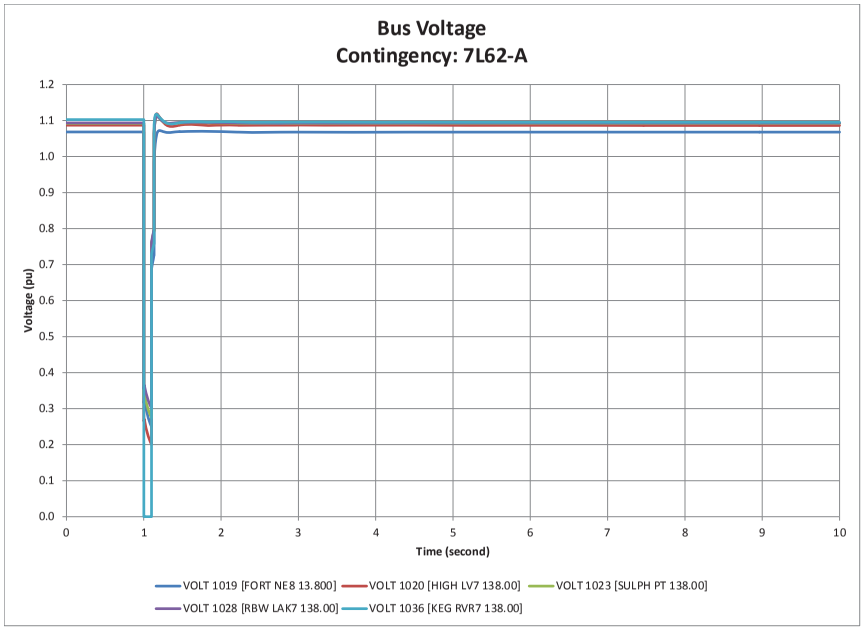

Generator Angle
Contingency: 7L62-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

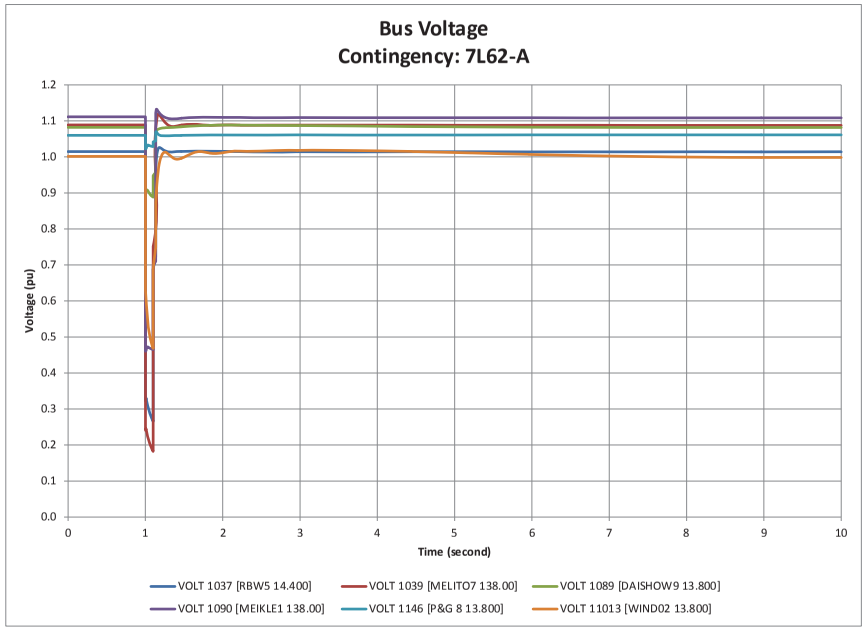

Generator Real Power
Contingency: 7L62-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

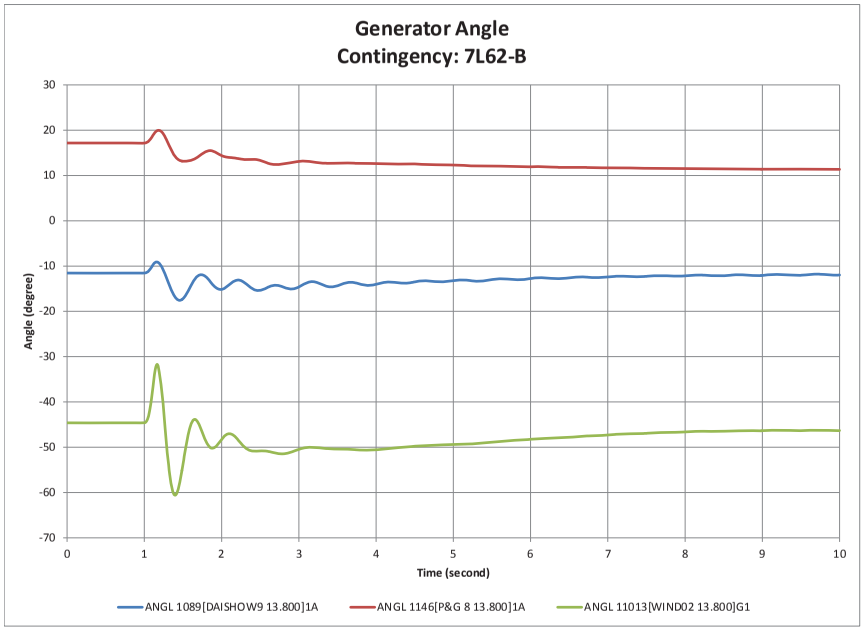

Generator Reactive Power
Contingency: 7L62-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

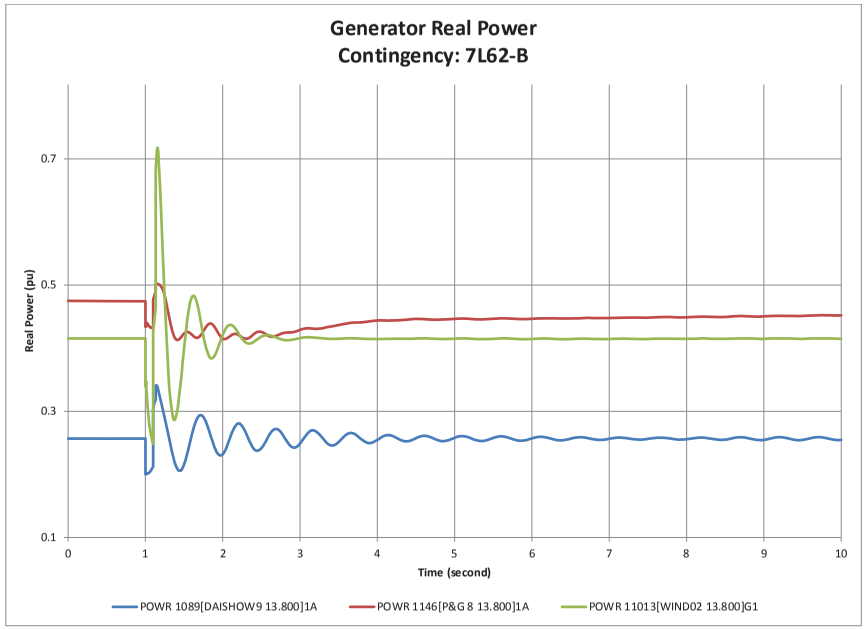

Frequency Deviation
Contingency: 7L62-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

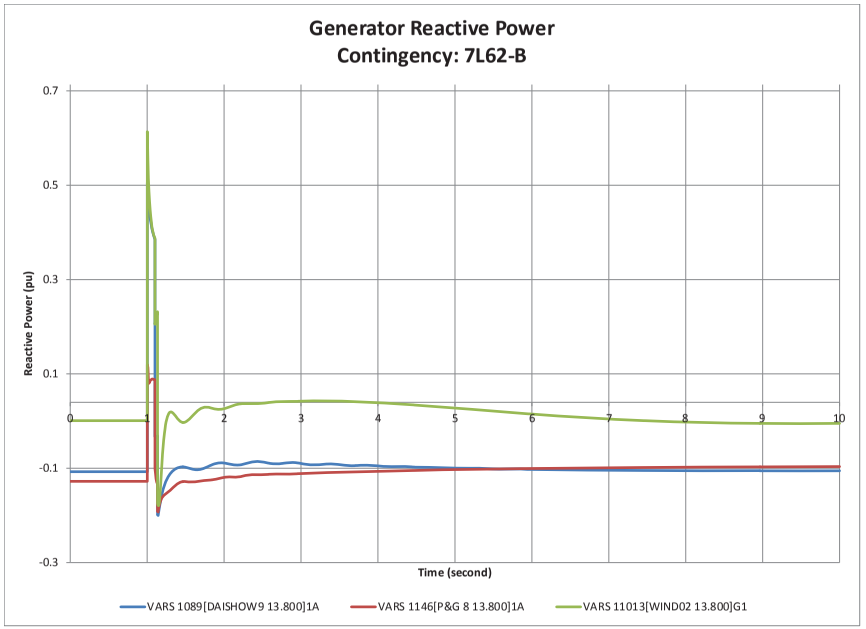

Frequency Deviation
Contingency: 7L62-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

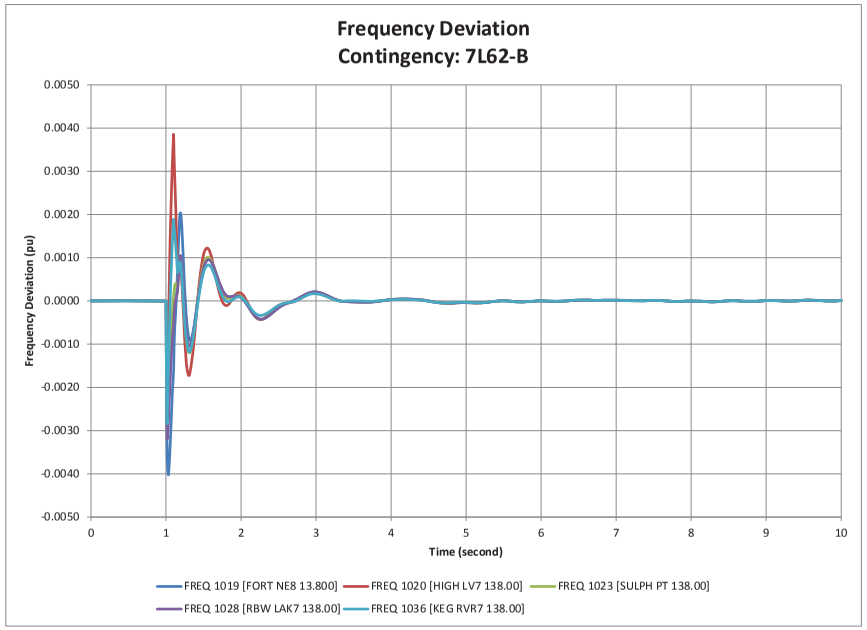

Bus Voltage
Contingency: 7L62-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

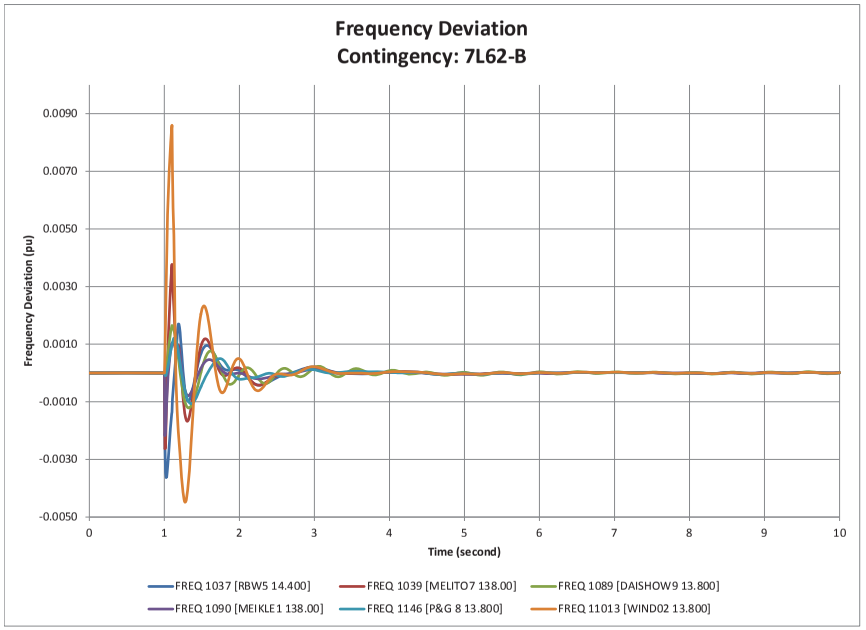

Bus Voltage
Contingency: 7L62-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

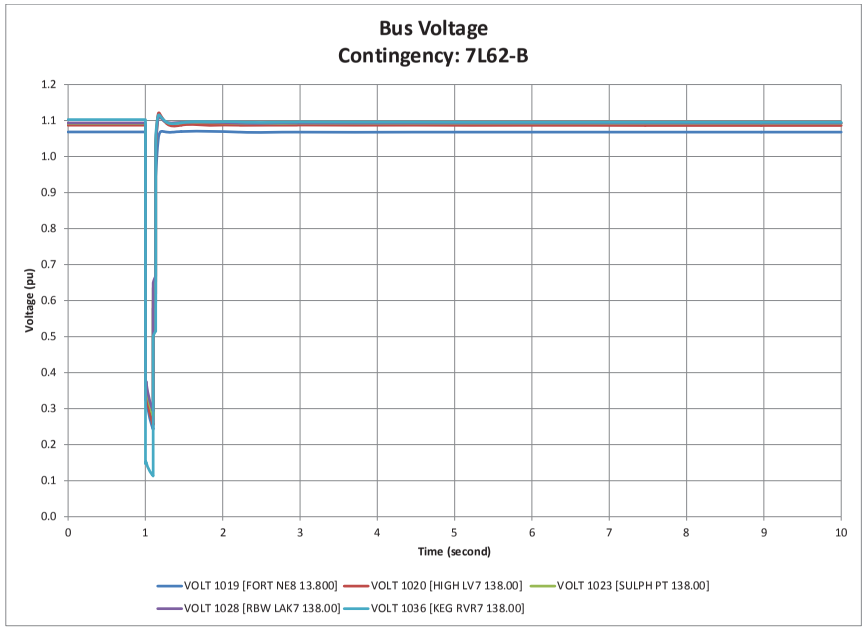

Generator Angle
Contingency: 7L62-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

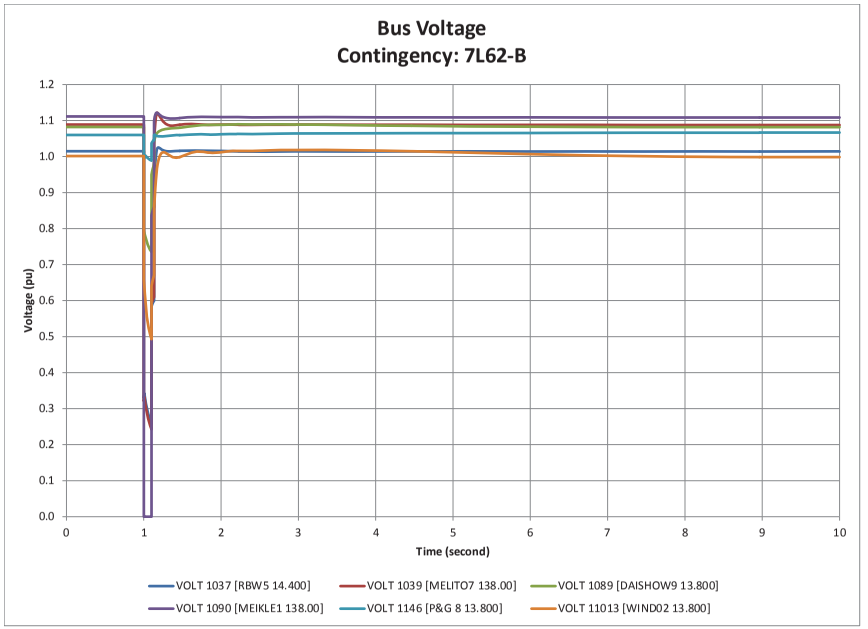

Generator Real Power
Contingency: 7L62-B
Real Power (pu)
0.7
0.5
0.3
0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

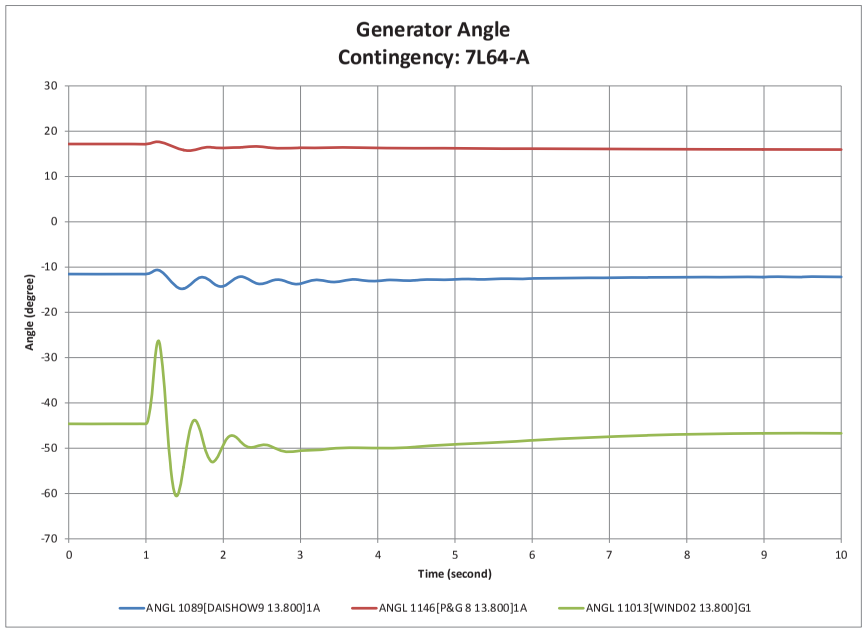

Generator Reactive Power
Contingency: 7L62-B
Reactive Power (pu)
0.7
0.5
0.3
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

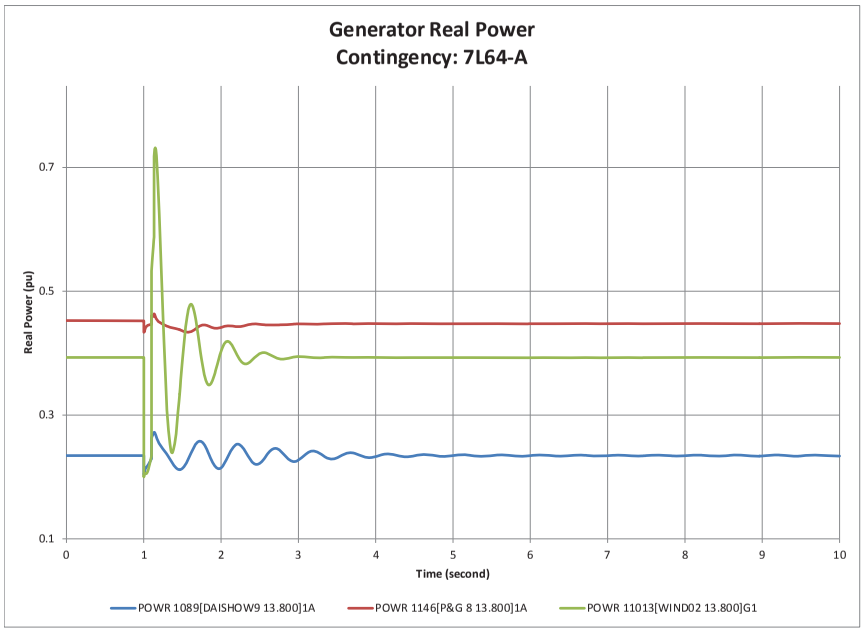

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
-0.0050
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

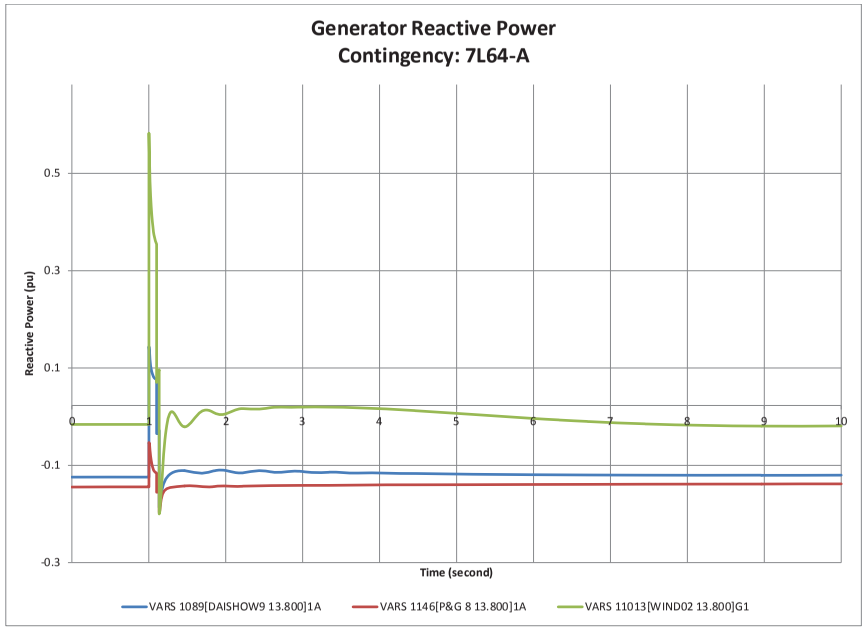

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
0.0090
0.0070
0.0050
0.0030
0.0010
-0.0010
-0.0030
-0.0050
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

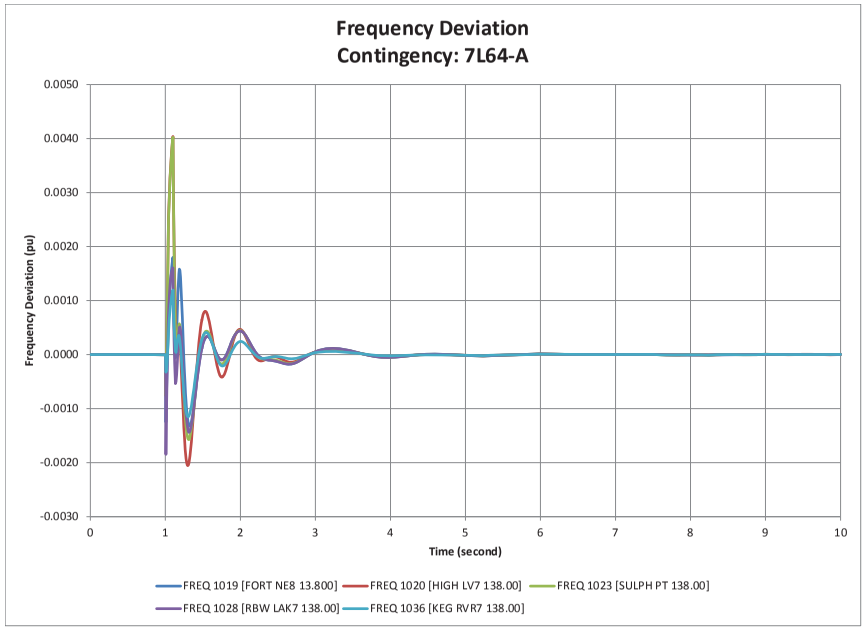

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

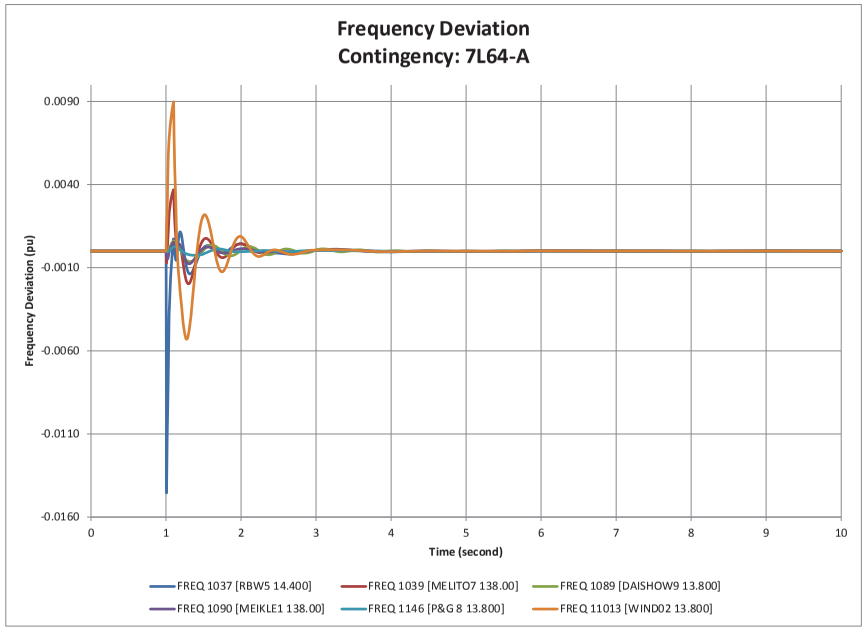

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

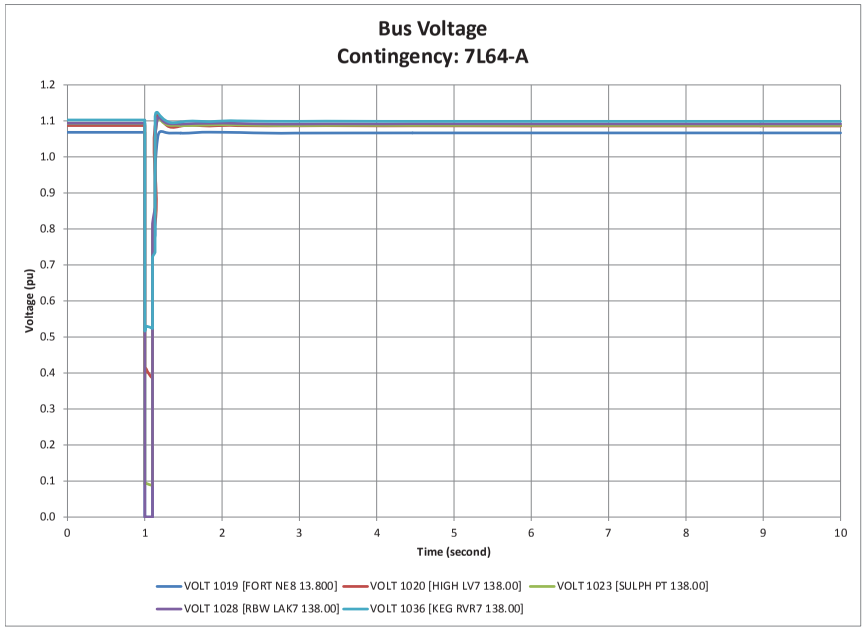

Generator Angle
Contingency: 7L64-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

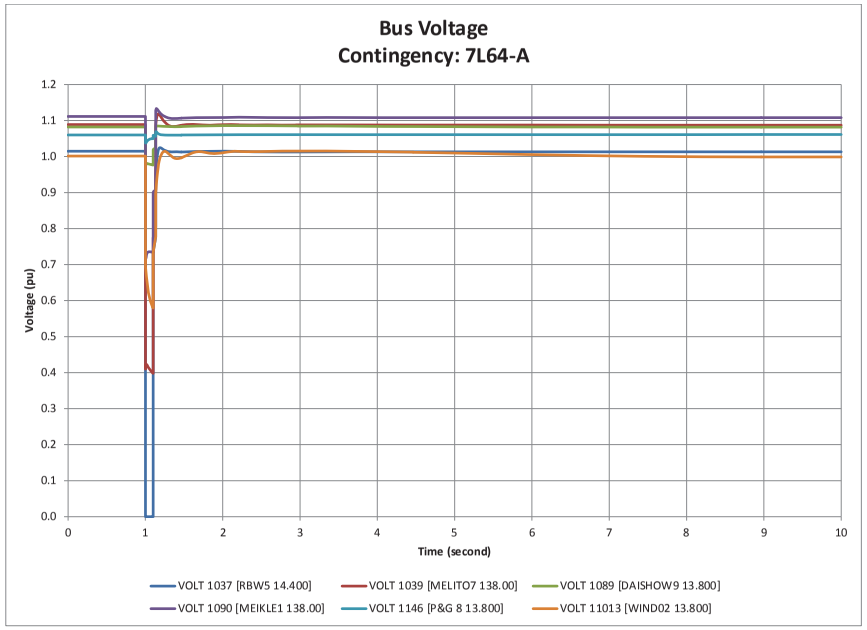

Generator Real Power
Contingency: 7L64-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

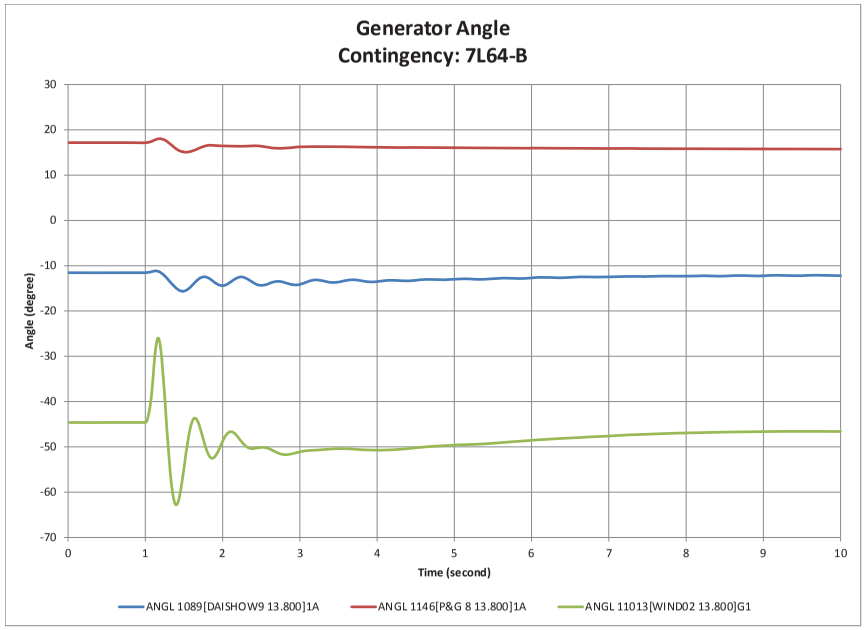

Generator Reactive Power
Contingency: 7L64-A
Reactive Power (pu)
0.5
0.3
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

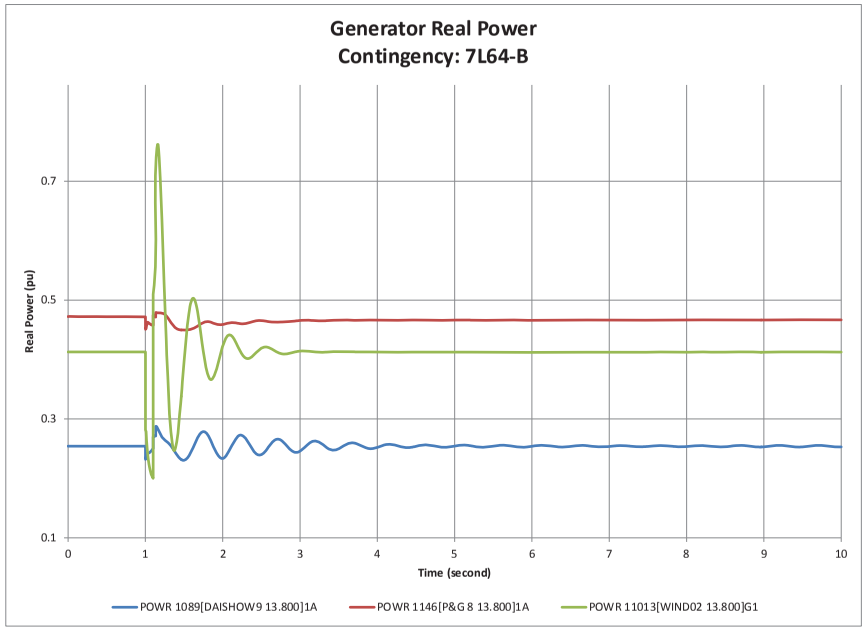

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

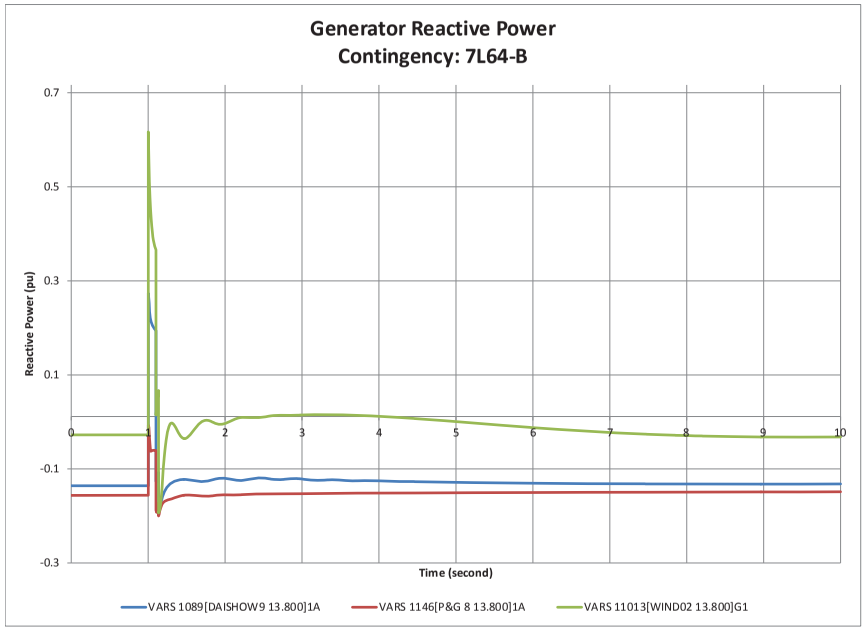

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
0.0090
0.0040
-0.0010
-0.0060
-0.0110
-0.0160
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

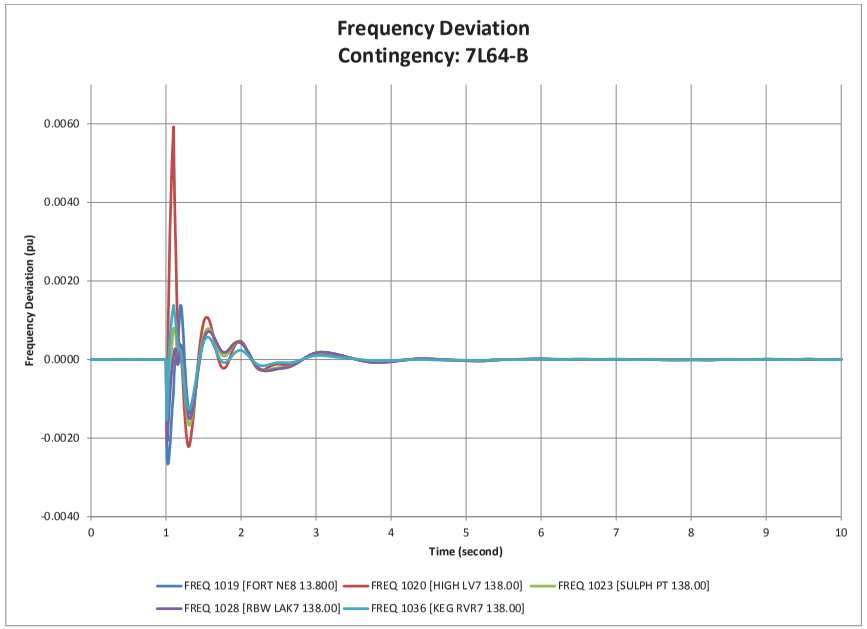

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

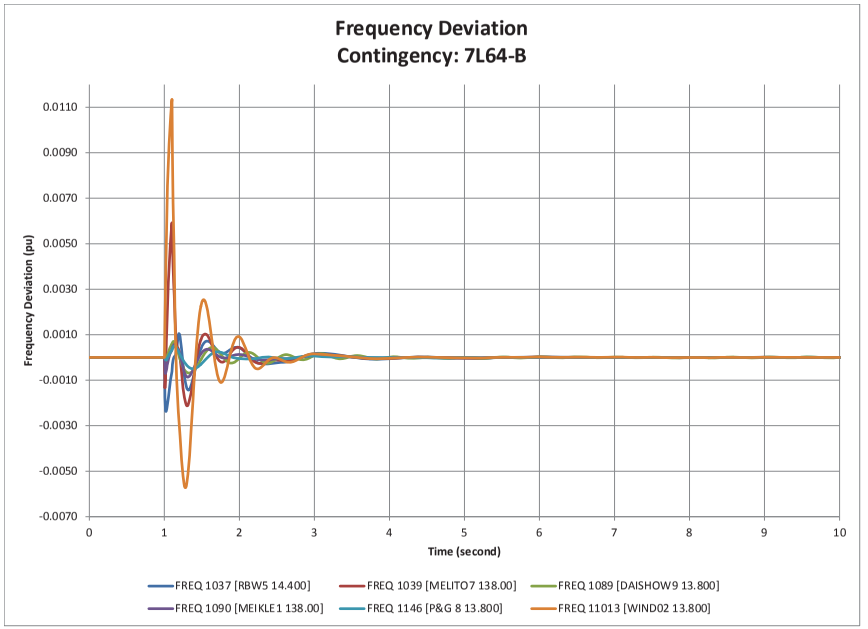

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

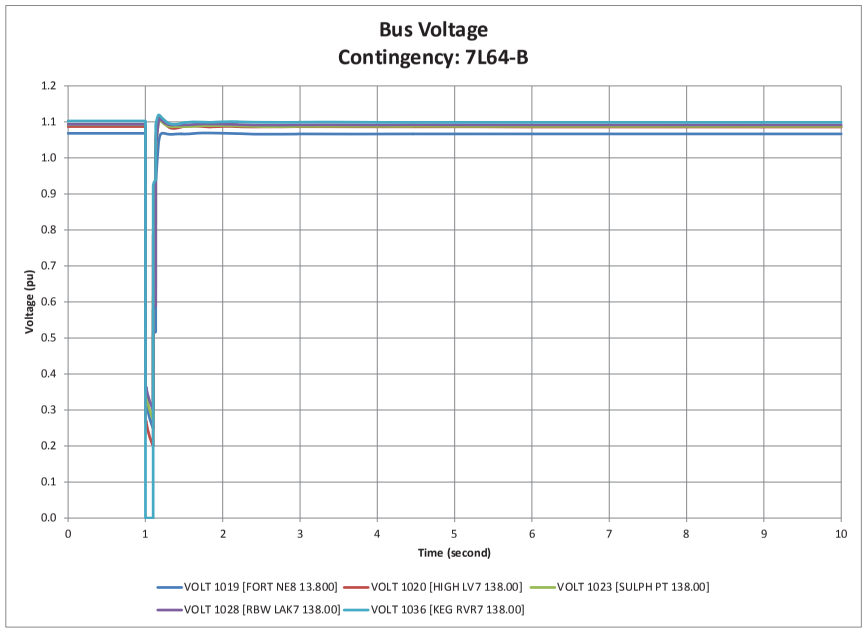

Generator Angle
Contingency: 7L64-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

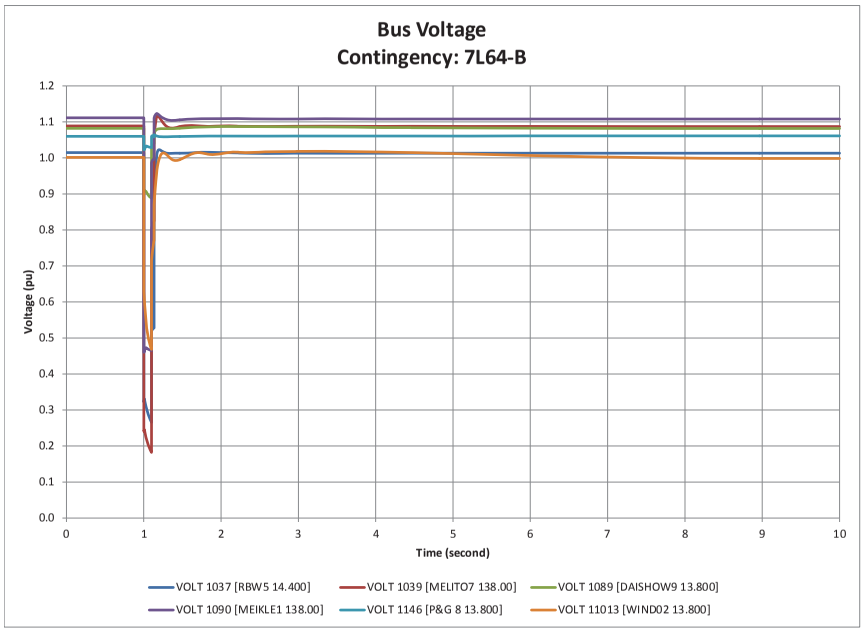

Generator Real Power
Contingency: 7L64-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

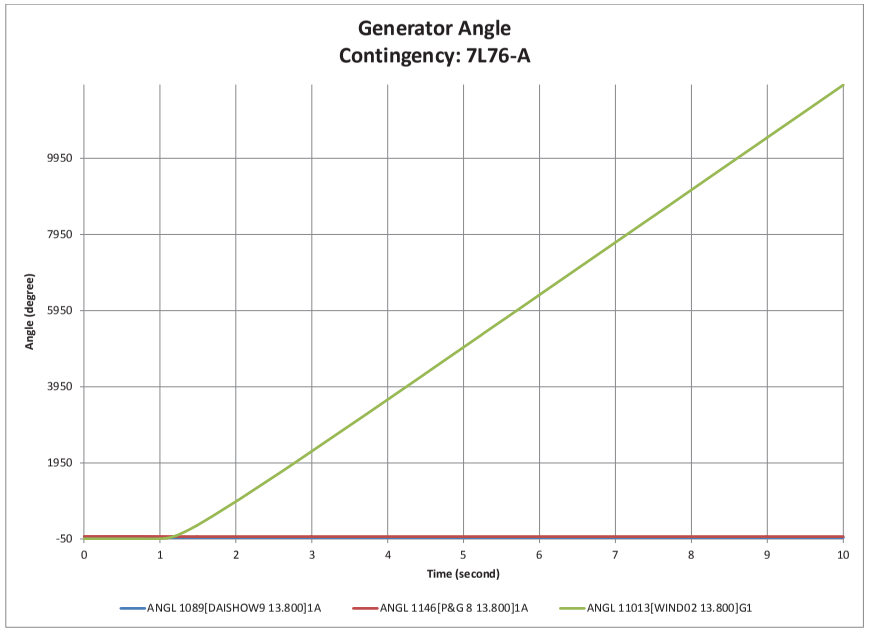

Generator Reactive Power
Contingency: 7L64-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

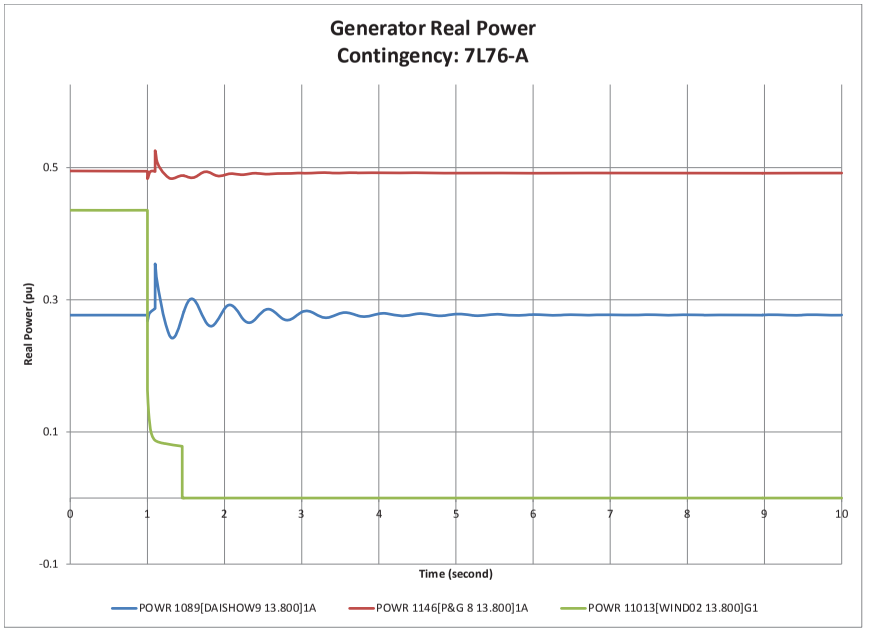

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
0.0060
0.0040
0.0020
0.0000
-0.0020
-0.0040
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

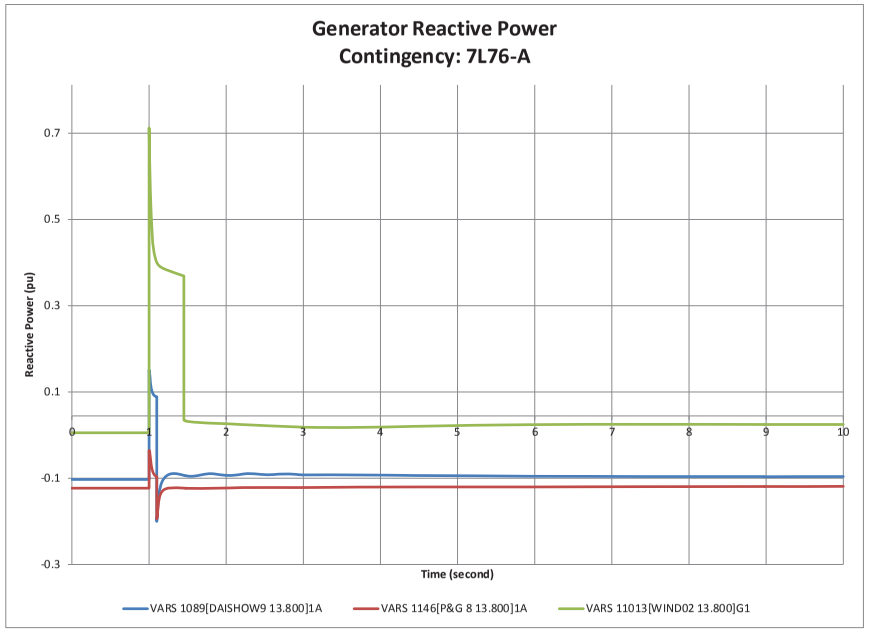

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
0.0110
0.0090
0.0070
0.0050
0.0030
0.0010
-0.0010
-0.0030
-0.0050
-0.0070
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

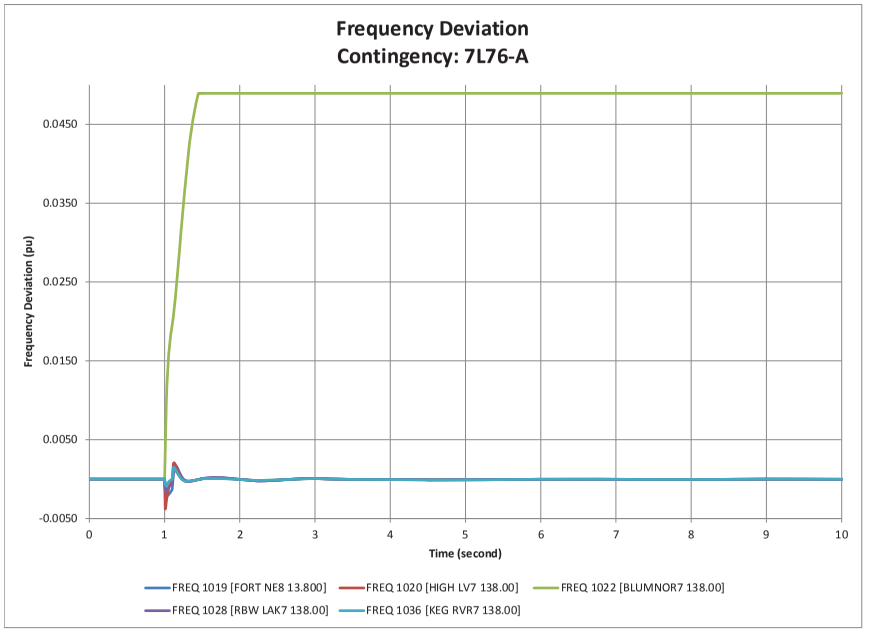

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

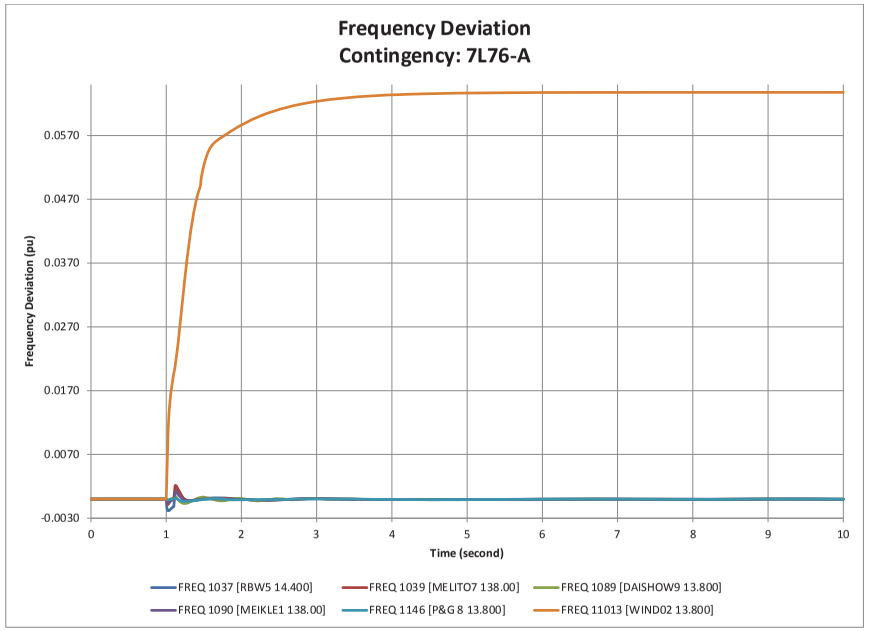

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

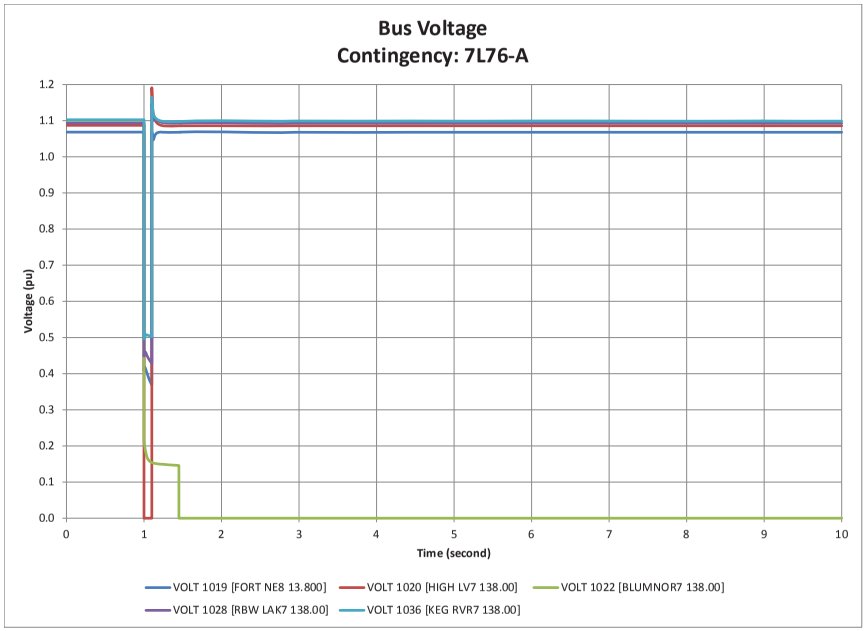

Generator Angle
Contingency: 7L76-A
Angle (degree)
9950
7950
5950
3950
1950
-50
0
1
2
3
4
5
6
7
8
9
10
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

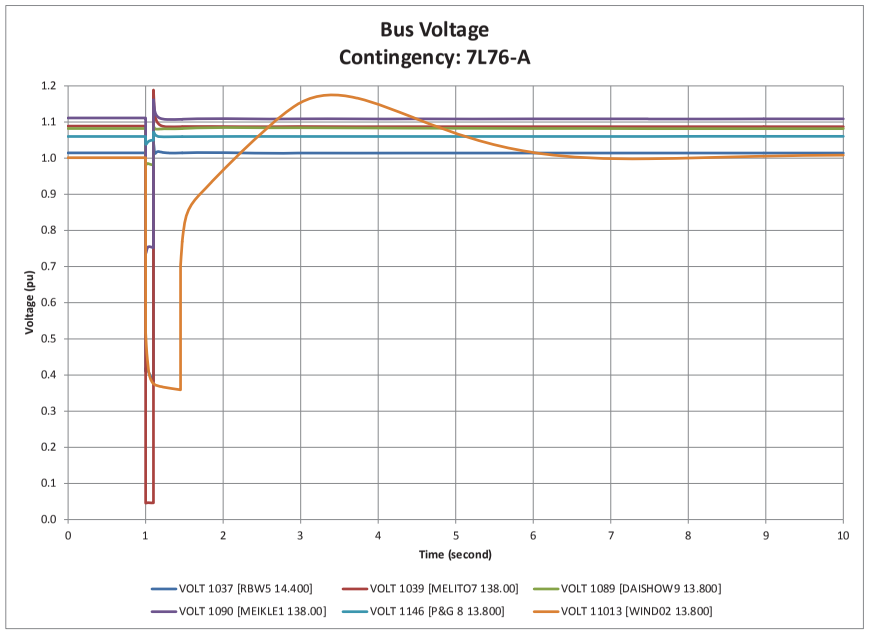

Generator Real Power
Contingency: 7L76-A
Real Power (pu)
0.5
0.3
0.1
-0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

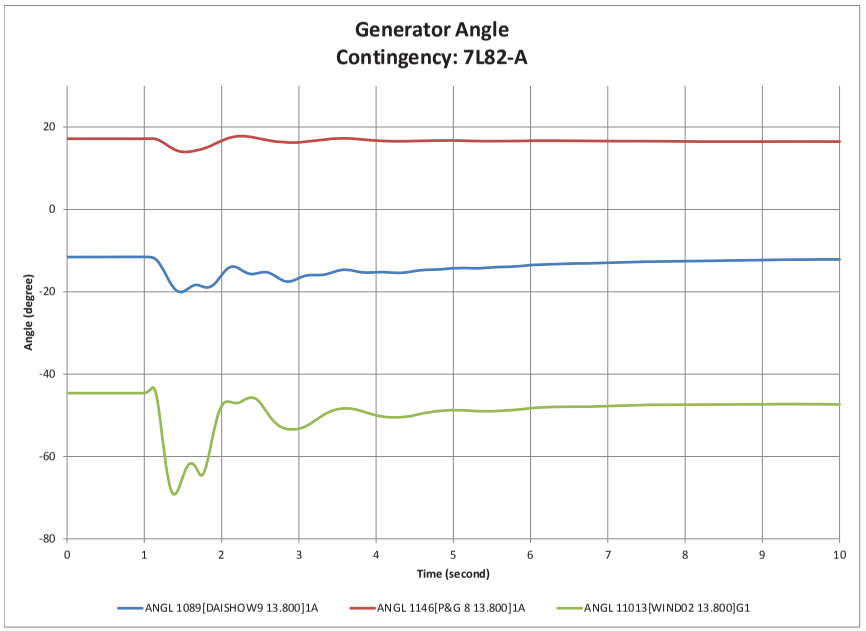

Generator Reactive Power
Contingency: 7L76-A
Reactive Power (pu)
0.7
0.5
0.3
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

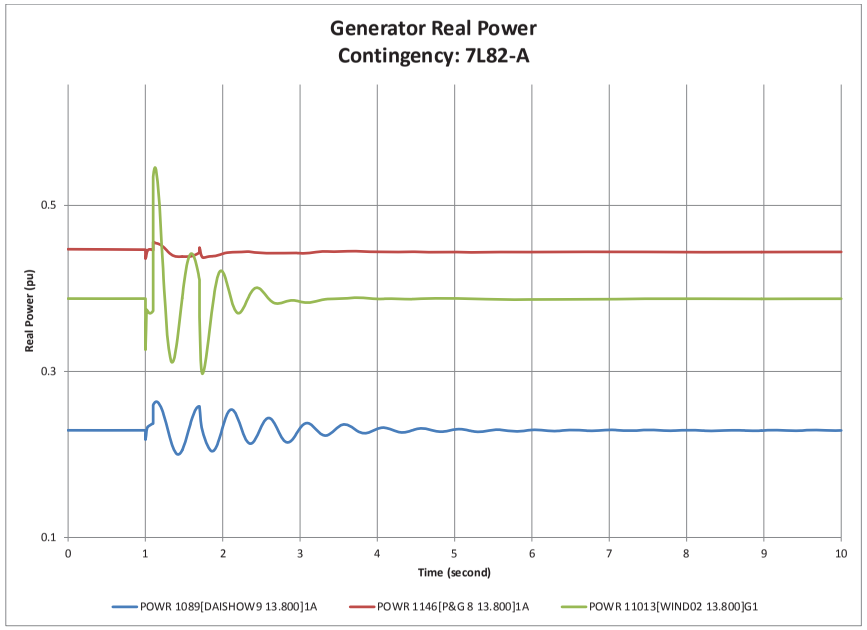

Frequency Deviation
Contingency: 7L76-A
Frequency Deviation (pu)
0.0450
0.0350
0.0250
0.0150
0.0050
-0.0050
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1022 [BLUMNOR7 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

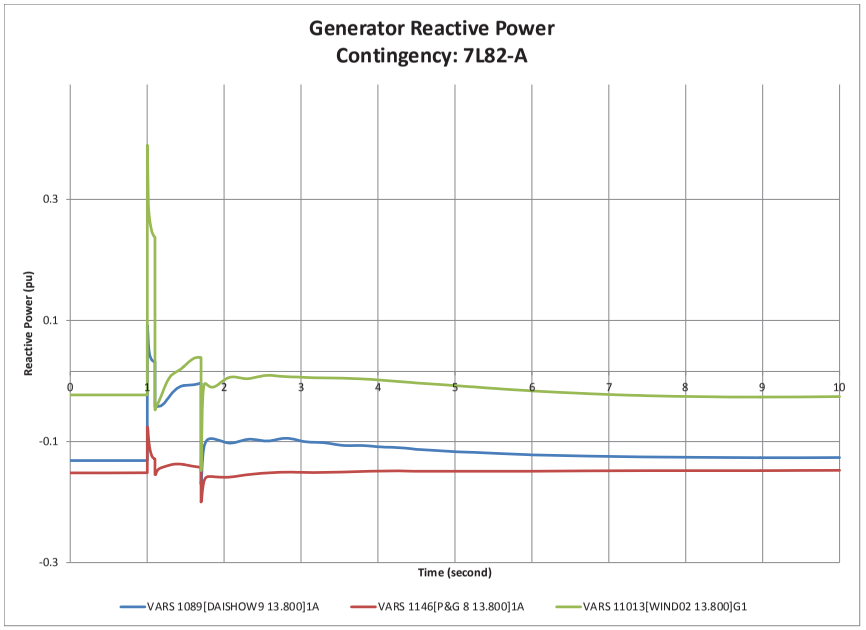

Frequency Deviation
Contingency: 7L76-A
Frequency Deviation (pu)
0.0570
0.0470
0.0370
0.0270
0.0170
0.0070
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

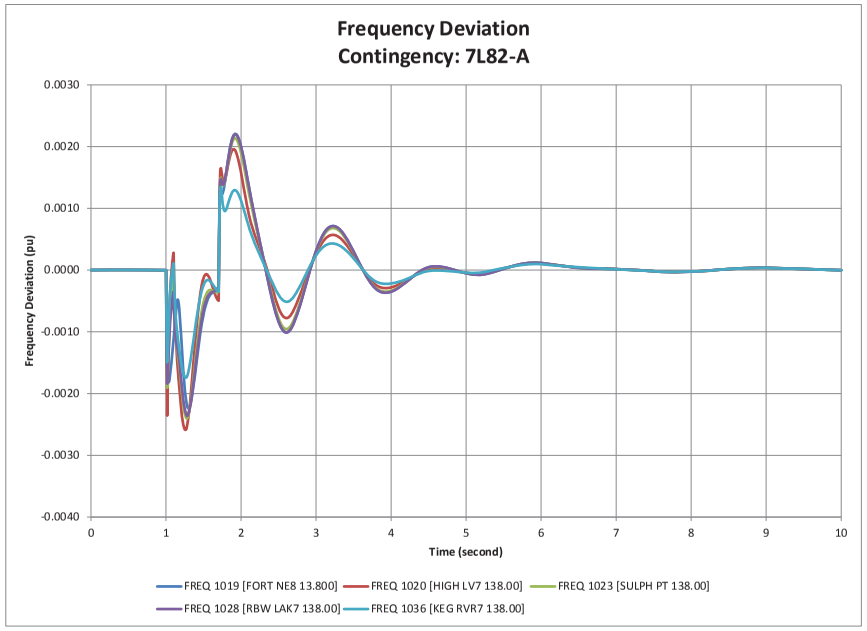

Bus Voltage
Contingency: 7L76-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1022 [BLUMNOR7 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

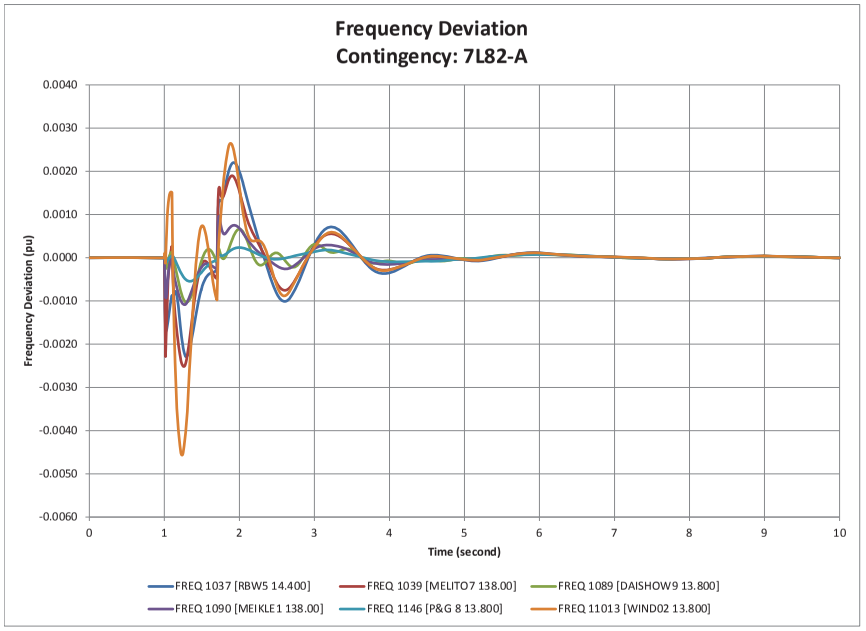

Bus Voltage
Contingency: 7L76-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

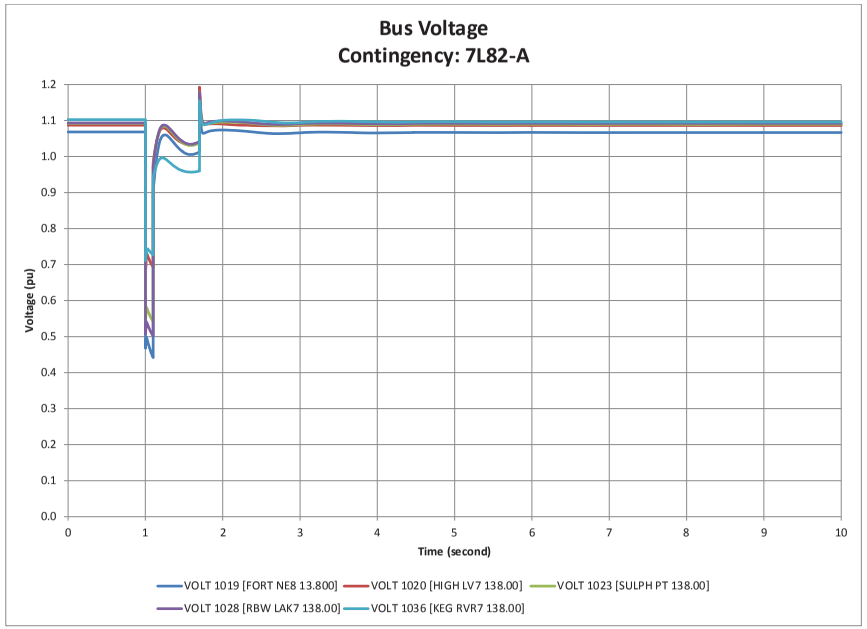

Generator Angle
Contingency: 7L82-A
Angle (degree)
20
0
-20
-40
-60
-80
0
1
2
3
4
5
6
7
8
9
10
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

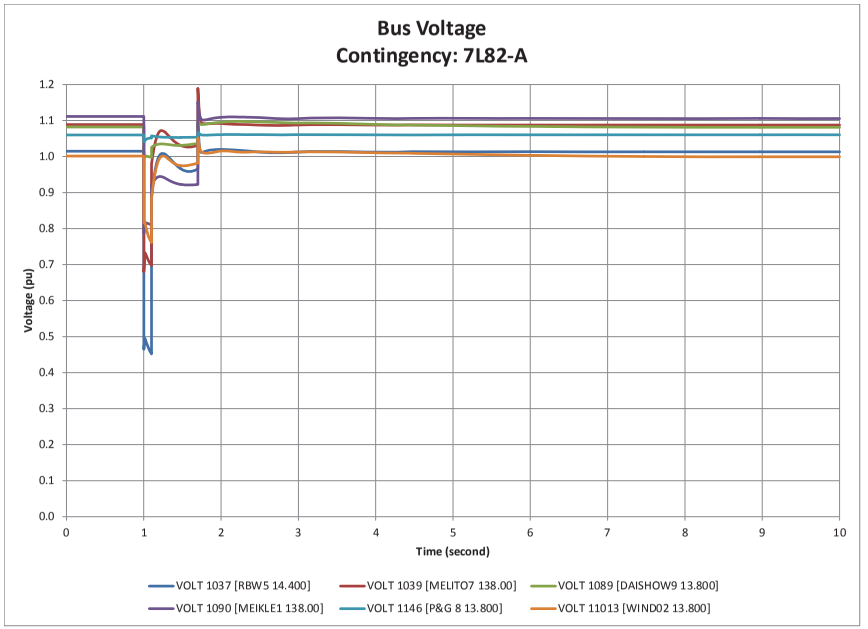

Generator Real Power
Contingency: 7L82-A
Real Power (pu)
0.5
0.3
0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

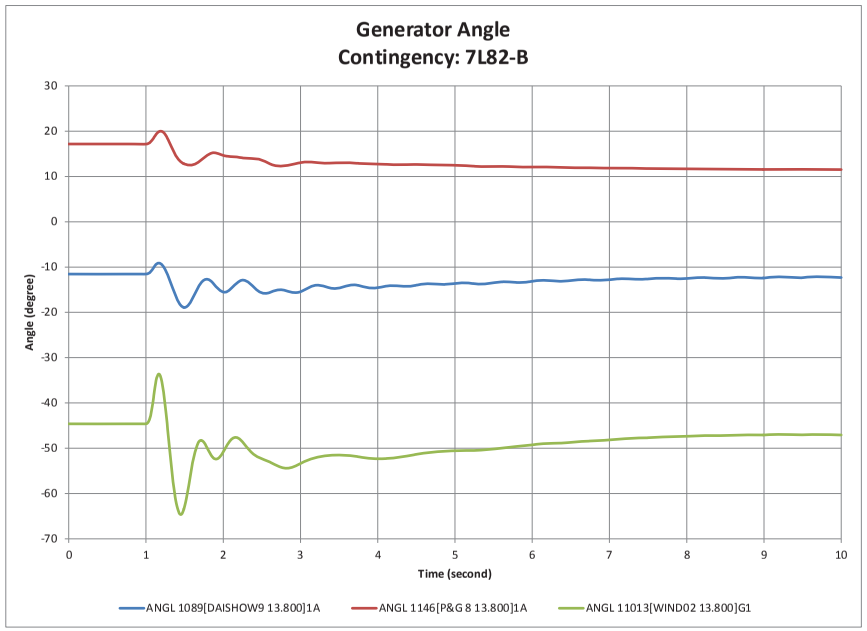

Generator Reactive Power
Contingency: 7L82-A
Reactive Power (pu)
0.3
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

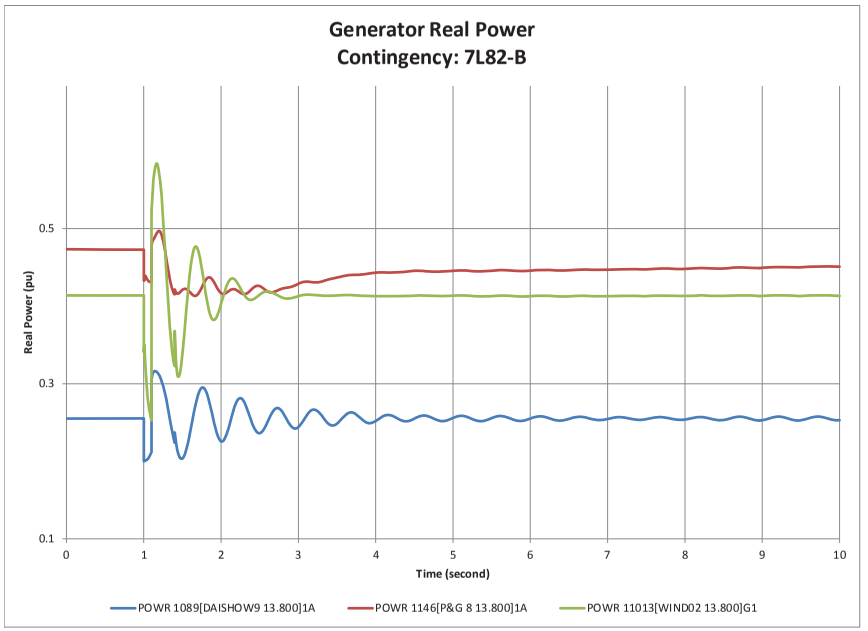

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

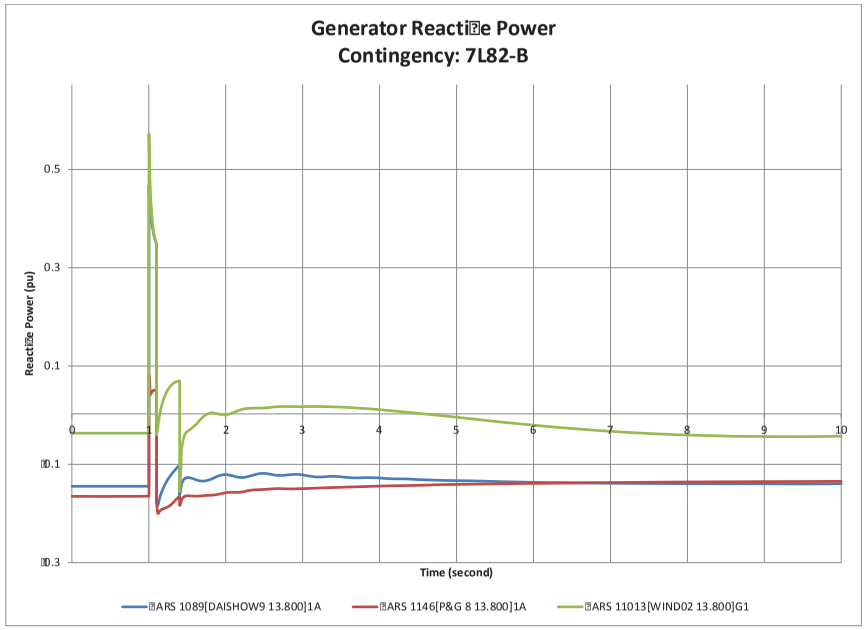

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
-0.0050
-0.0060
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

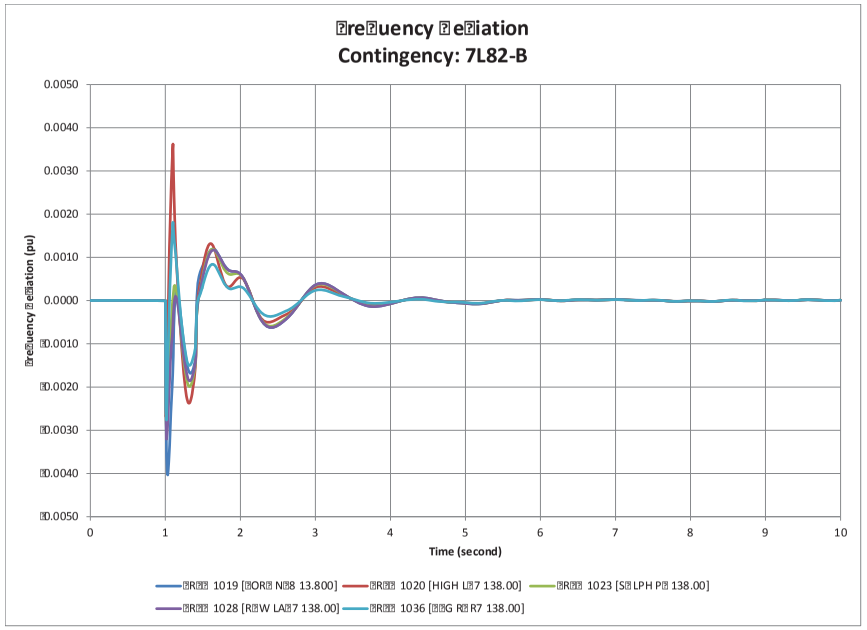

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

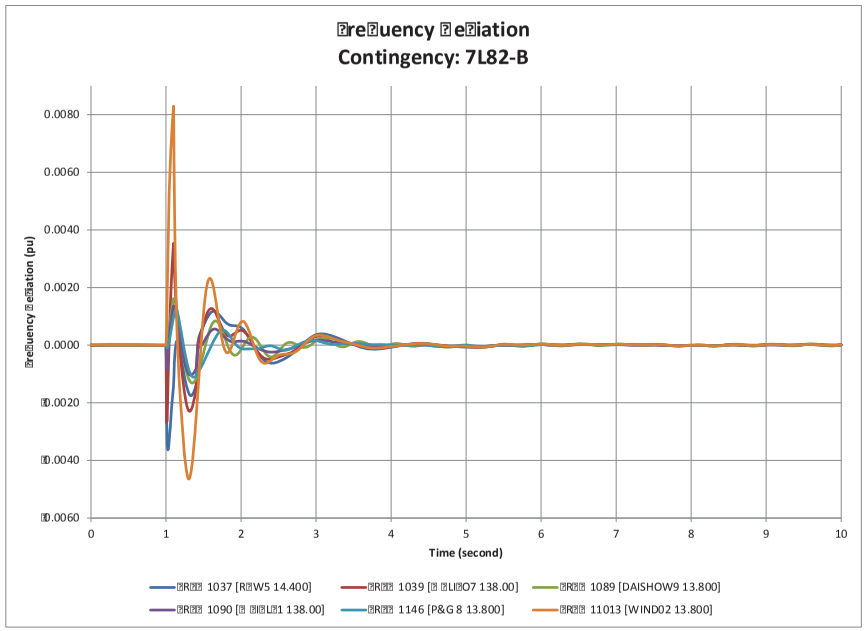

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

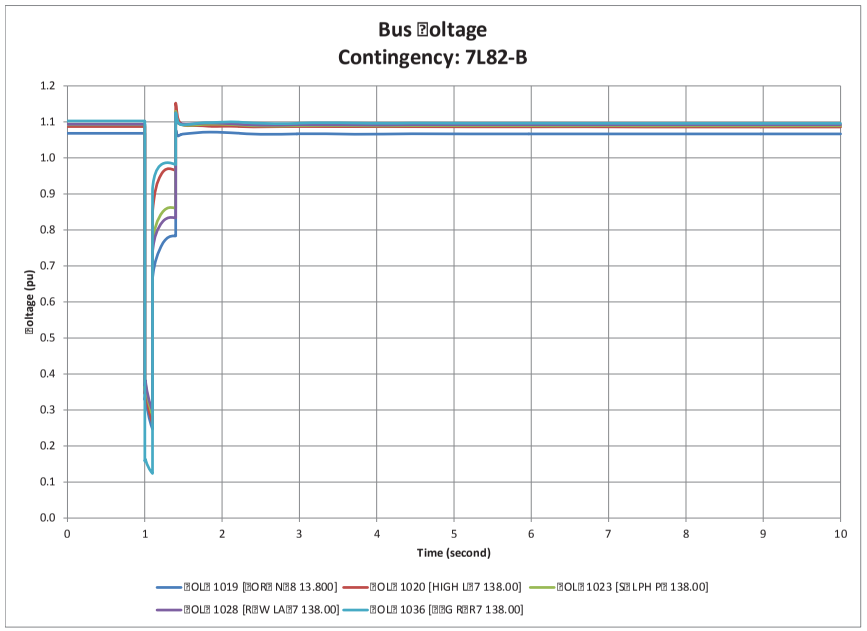

Generator Angle
Contingency: 7L82-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

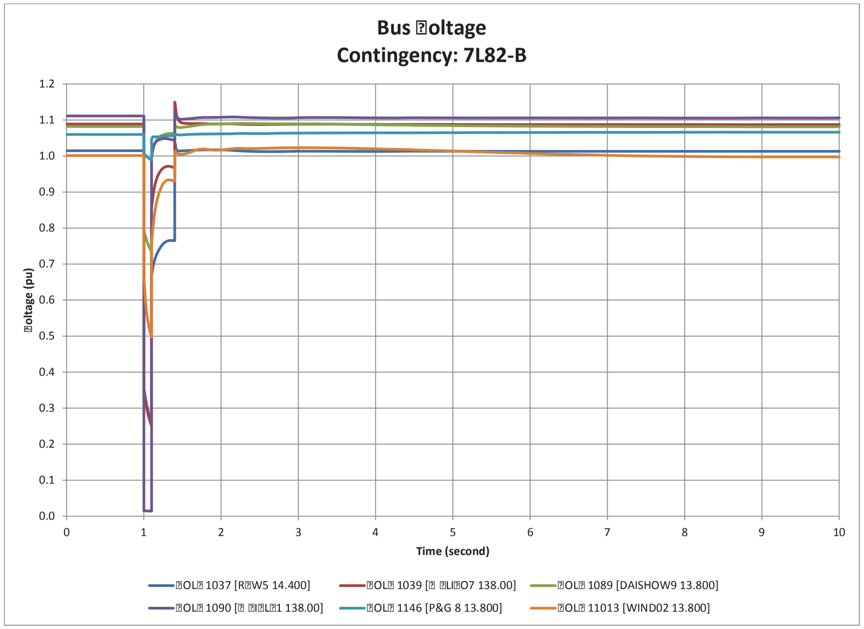

Generator Real Power
Contingency: 7L82-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1


Generator Reacti e Power
Contingency: 7L82-B
Reacti e Power (pu)
0.5
0.3
0.1
0.1
0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
ARS 1089[DAISHOW9 13.800]1A
ARS 1146[P&G 8 13.800]1A
ARS 11013[WIND02 13.800]G1


re uency e iation
Contingency: 7L82-B
re uency e iation (pu)
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
0.0010
0.0020
0.0030
0.0040
0.0050
0
1
2
3
4
5
6
7
8
9
10
Time (second)
R 1019 [ORE N8 13.800]
R 1020 [HIGH L7 138.00]
R 1023 [SLPH P 138.00]
R 1028 [RW LA7 138.00]
R 1036 [G R R7 138.00]

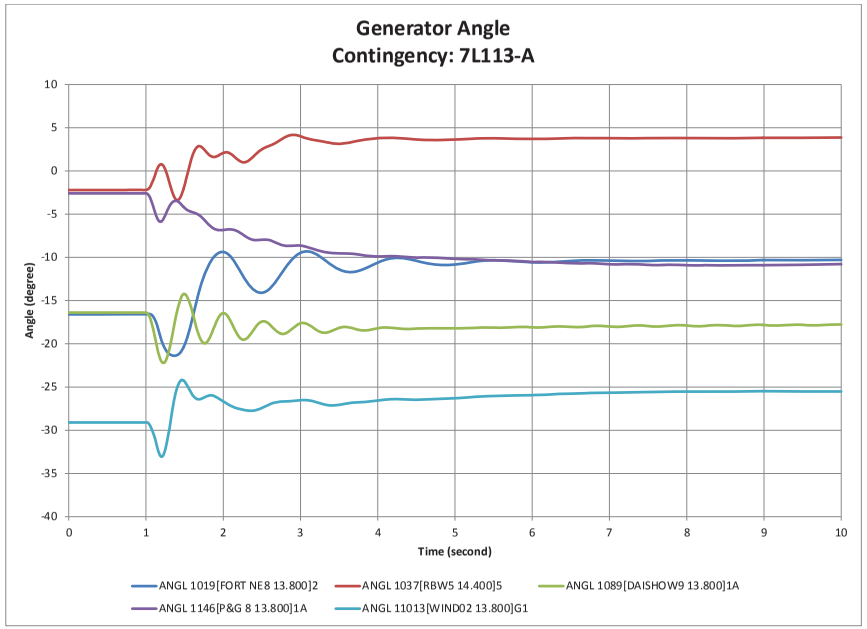

re uency e iation
Contingency: 7L82-B
re uency e iation (pu)
0.0080
0.0060
0.0040
0.0020
0.0000
0.0020
0.0040
0.0060
0
1
2
3
4
5
6
7
8
9
10
Time (second)
R 1037 [RW5 14.400]
R 1039 [LIO7 138.00]
R 1089 [DAISHOW9 13.800]
R 1090 [IL1 138.00]
R 1146 [P&G 8 13.800]
R 11013 [WIND02 13.800]

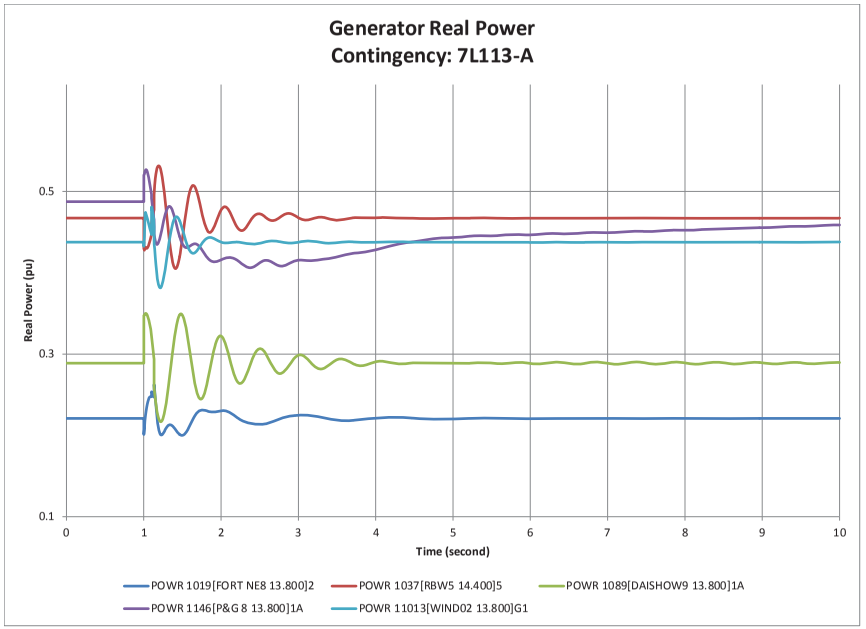

Bus oltage
Contingency: 7L82-B
oltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
OL 1019 [ORE N8 13.800]
OL 1020 [HIGH L7 138.00]
OL 1023 [SLPH P 138.00]
OL 1028 [RW LA7 138.00]
OL 1036 [G R R7 138.00]

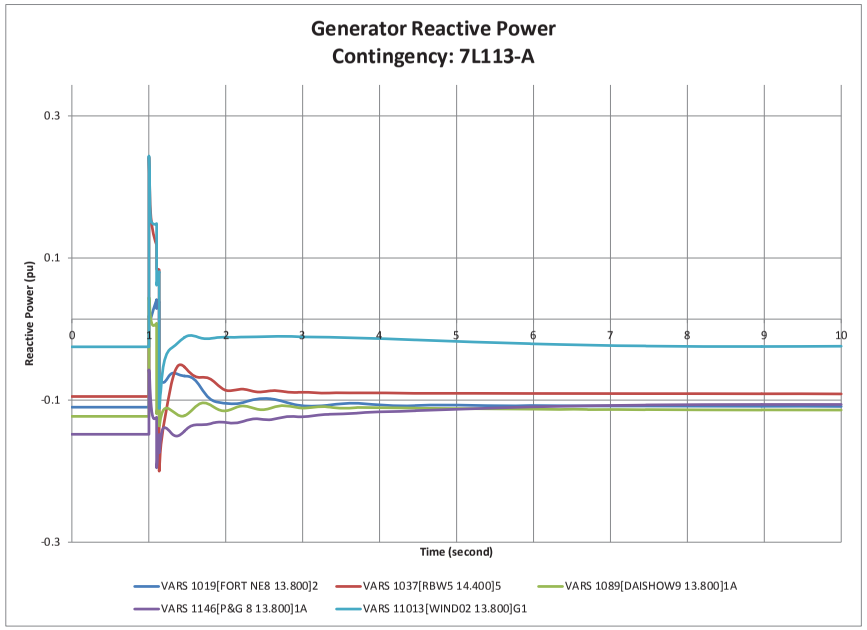

Bus ?oltage
Contingency: 7L82-B
?oltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
?OL? 1037 [R?W5 14.400]
?OL? 1039 [? ?LI?O7 138.00]
?OL? 1089 [DAISHOW9 13.800]
?OL? 1090 [? ?I?L?1 138.00]
?OL? 1146 [P&G 8 13.800]
?OL? 11013 [WIND02 13.800]

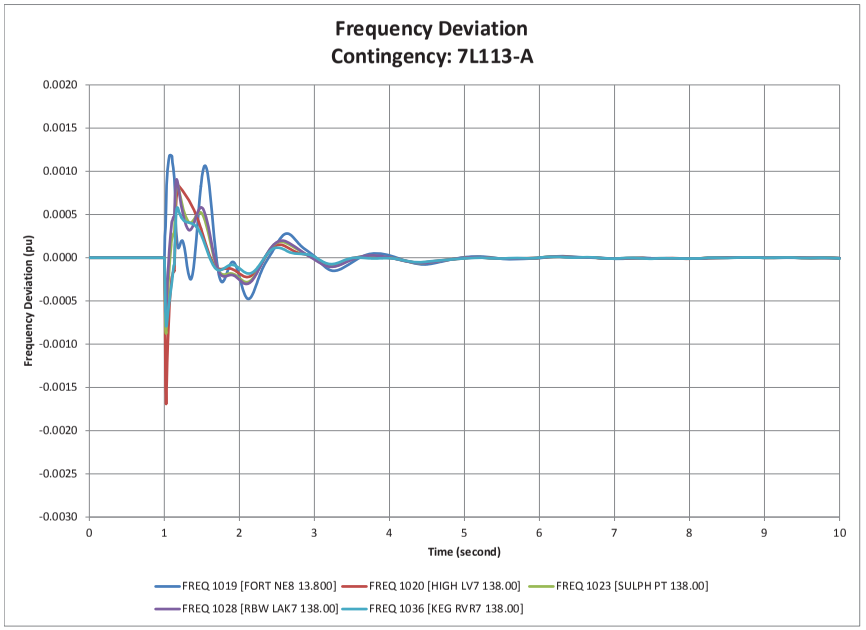
Attachment D-2

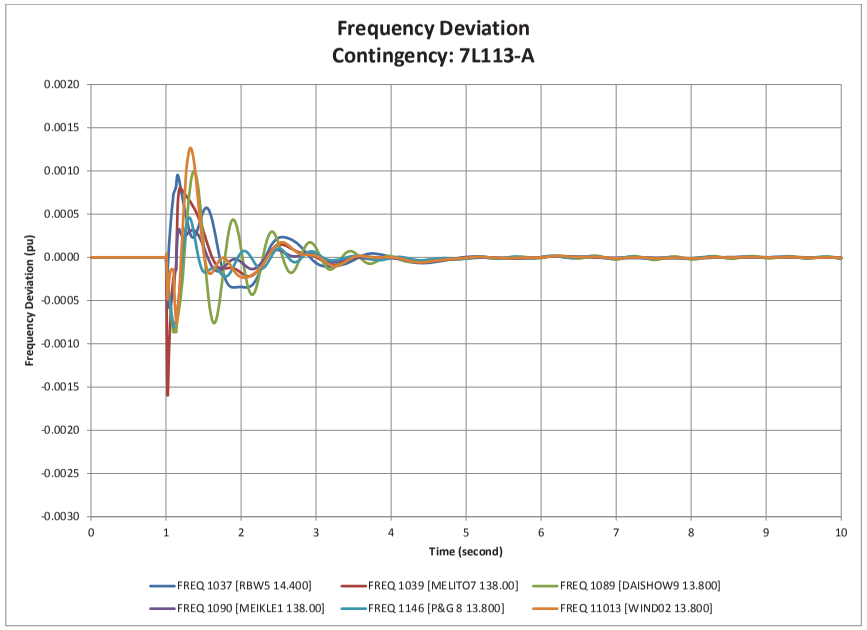
Post-Connection Transient Stability Analysis Results (2014 SP)

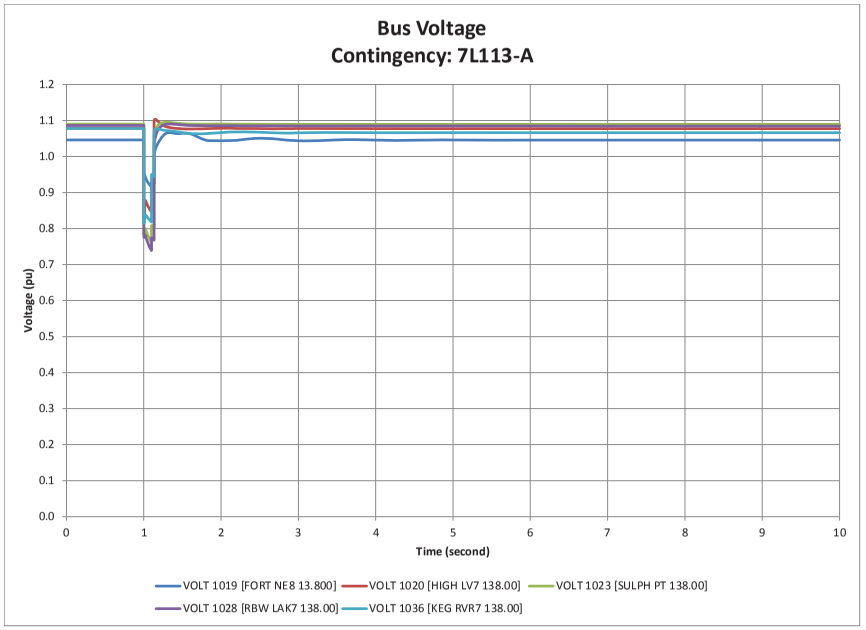

Generator Angle
Contingency: 7L113-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

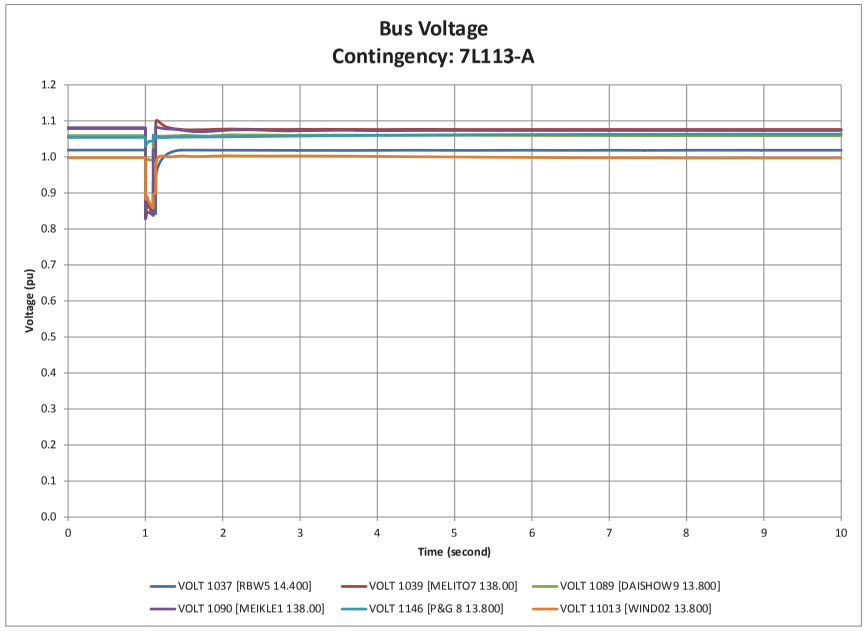

Generator Real Power
Contingency: 7L113-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

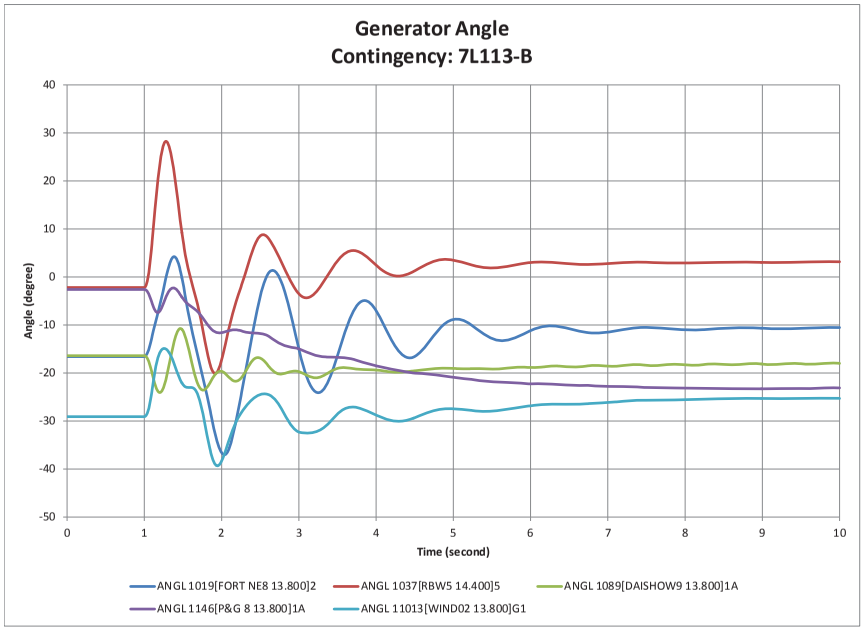

Generator Reactive Power
Contingency: 7L113-A
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

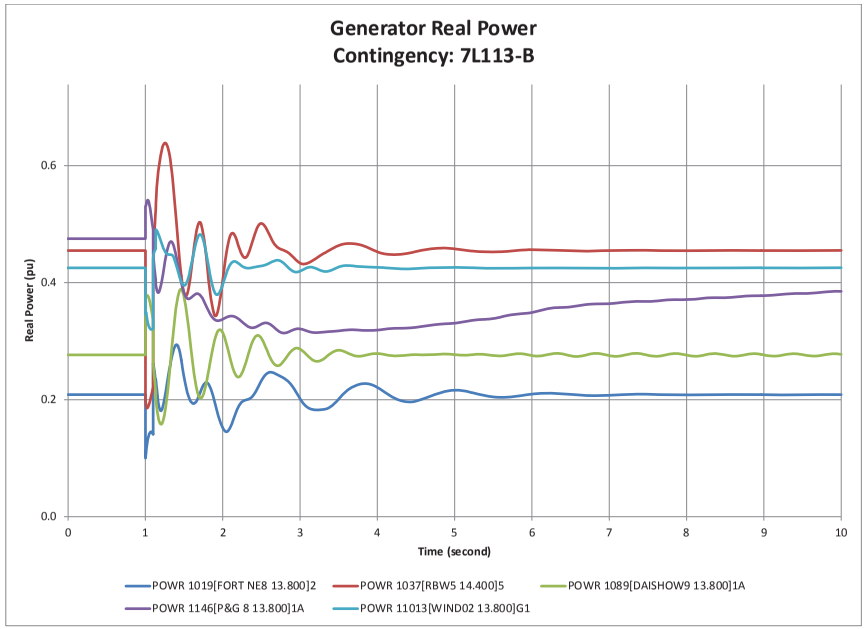

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

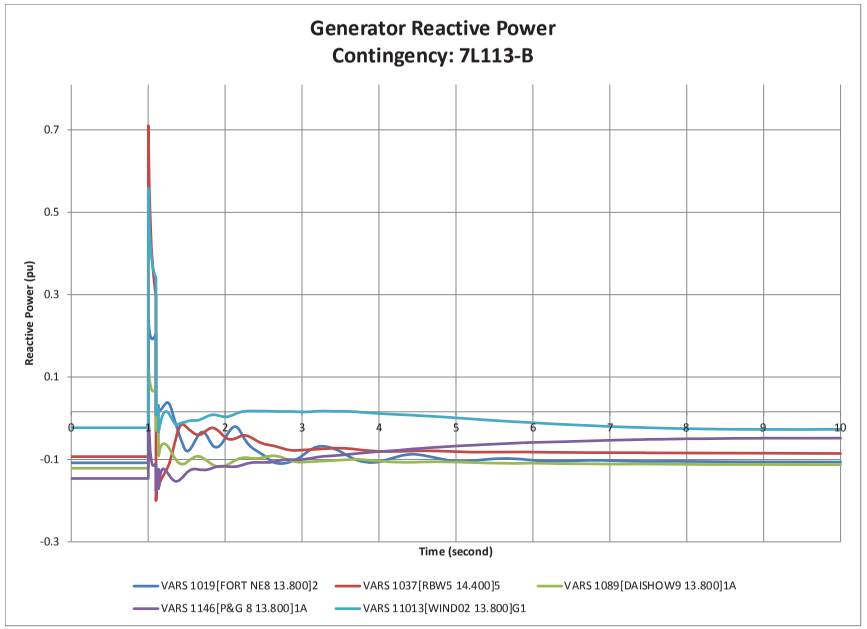

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

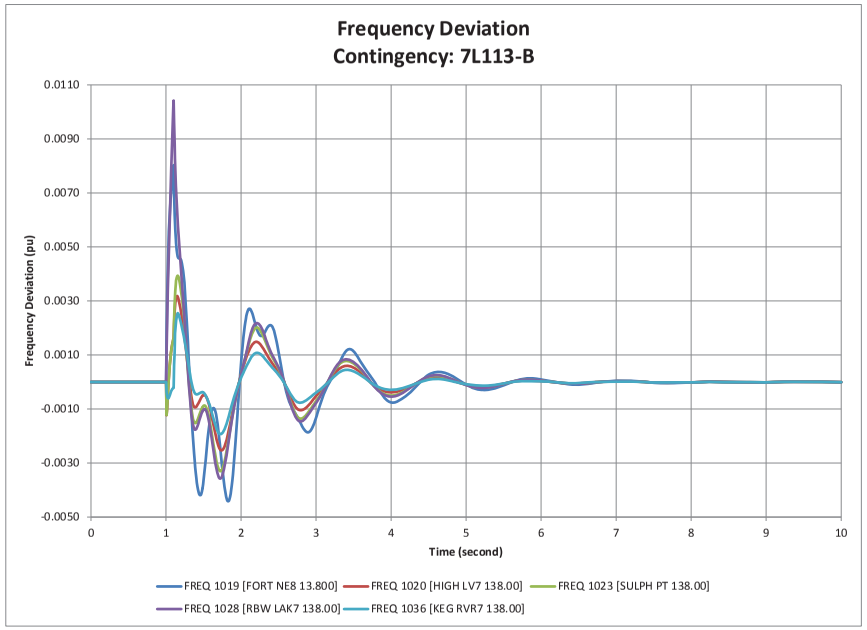

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

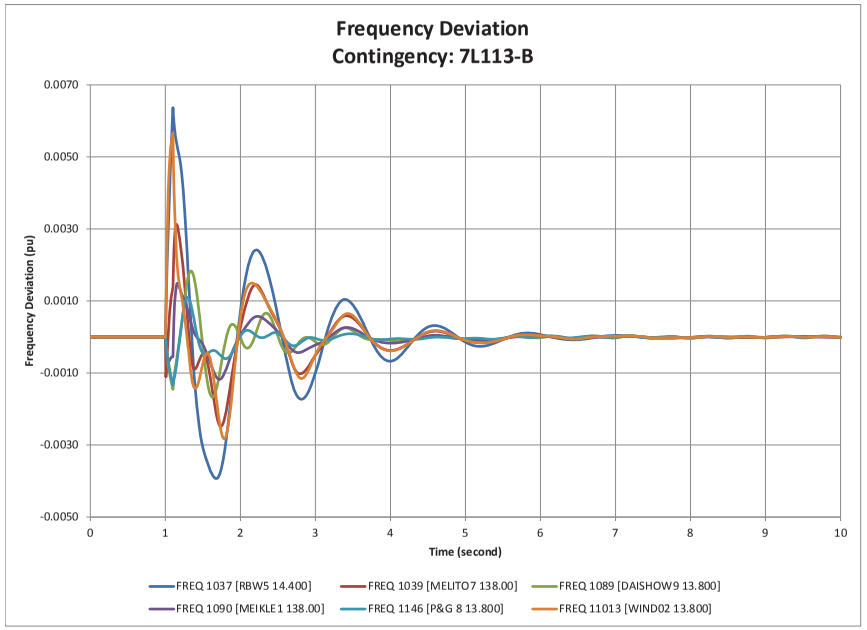

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

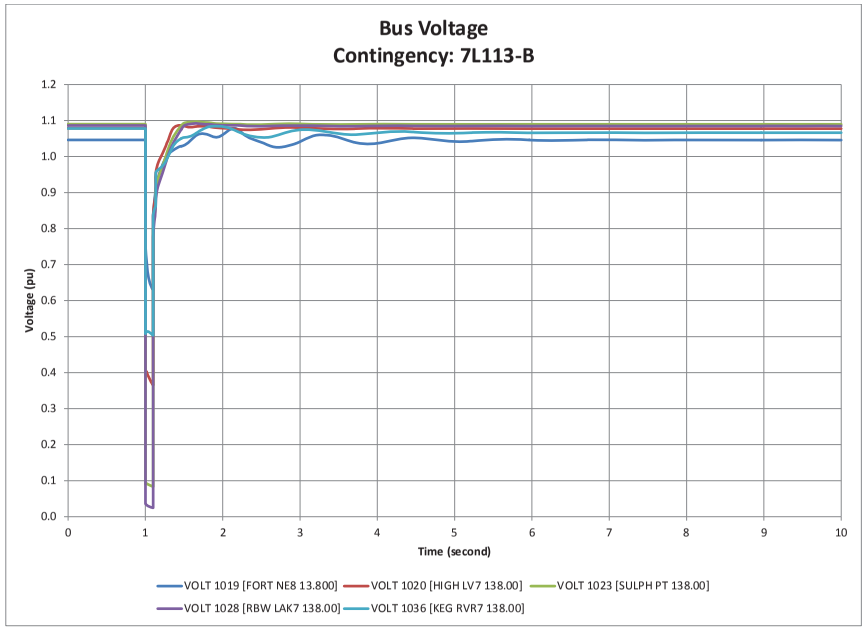

Generator Angle
Contingency: 7L113-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

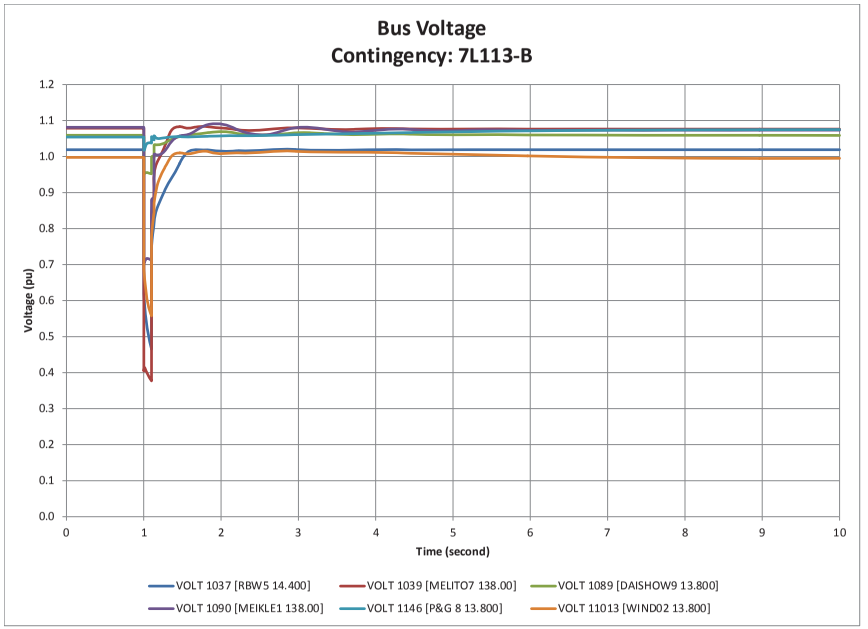

Generator Real Power
Contingency: 7L113-B
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

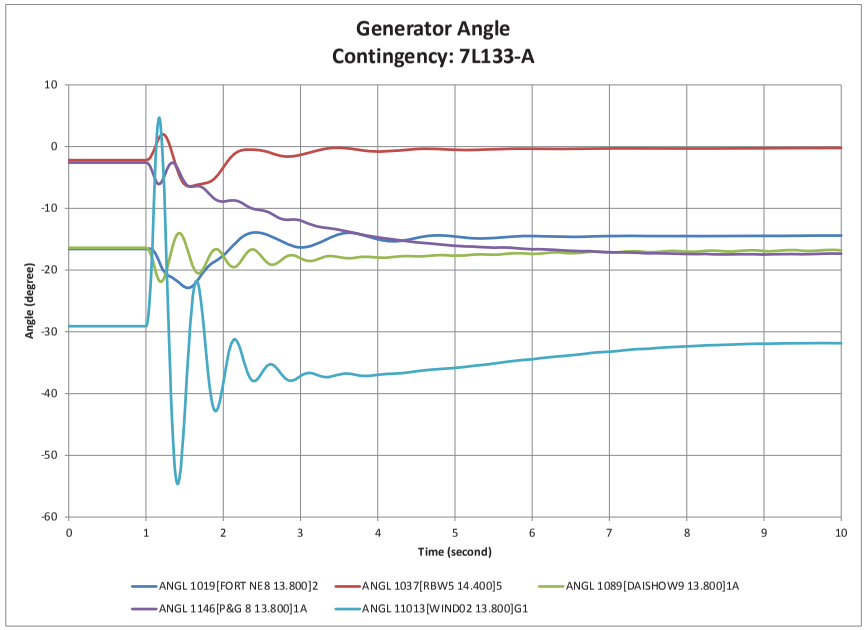

Generator Reactive Power
Contingency: 7L113-B
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

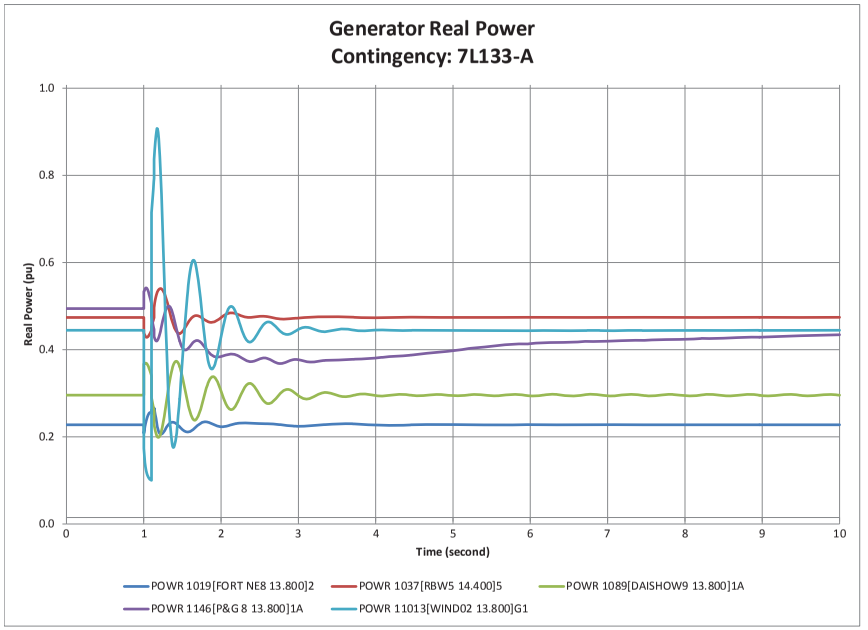

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

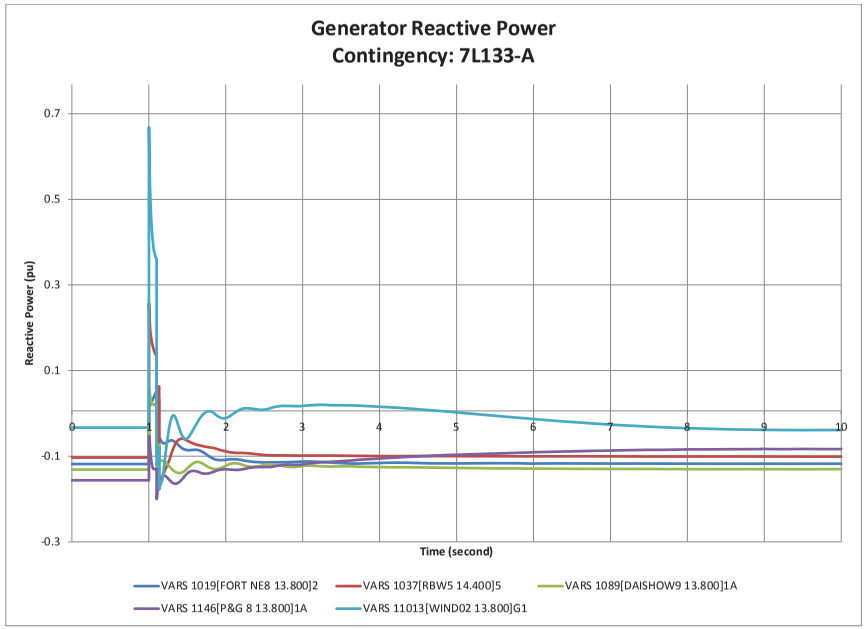

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

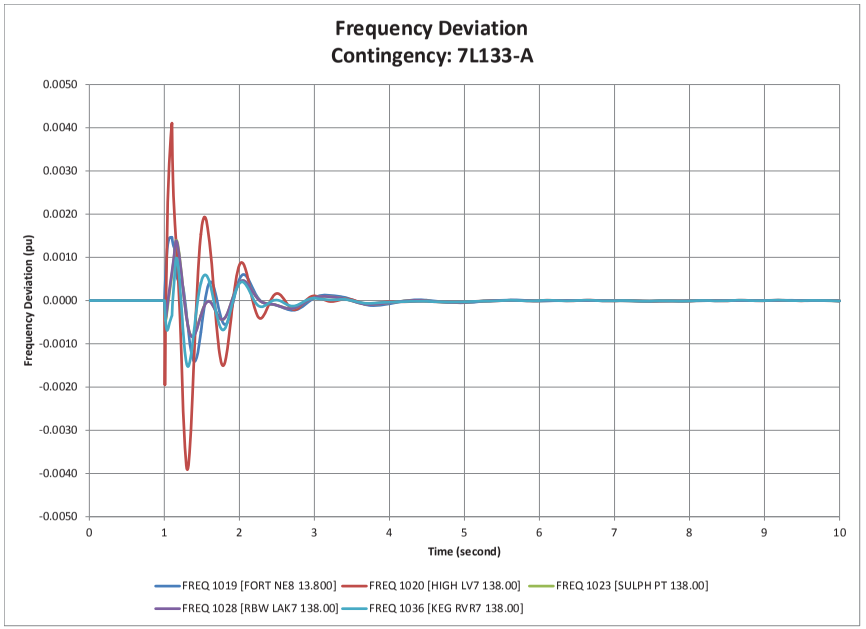

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

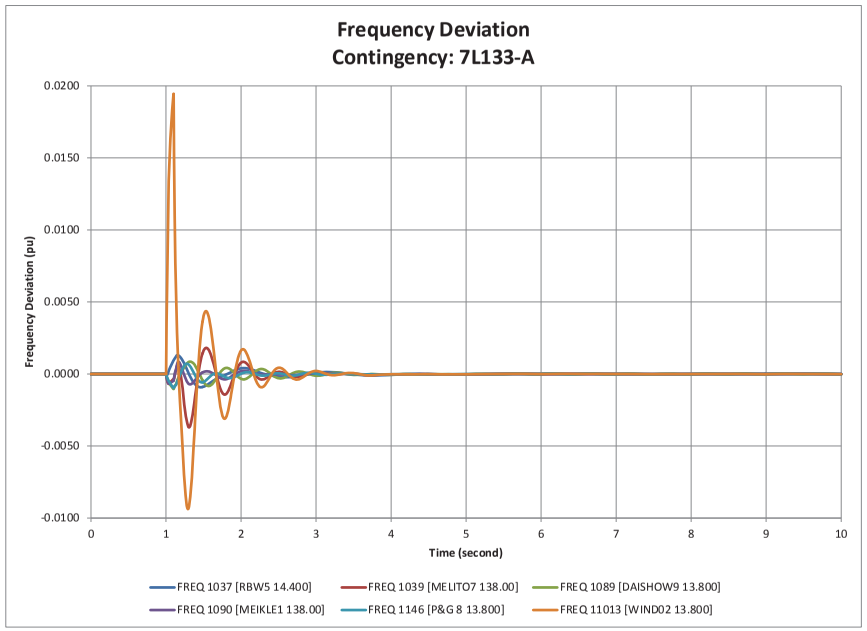

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

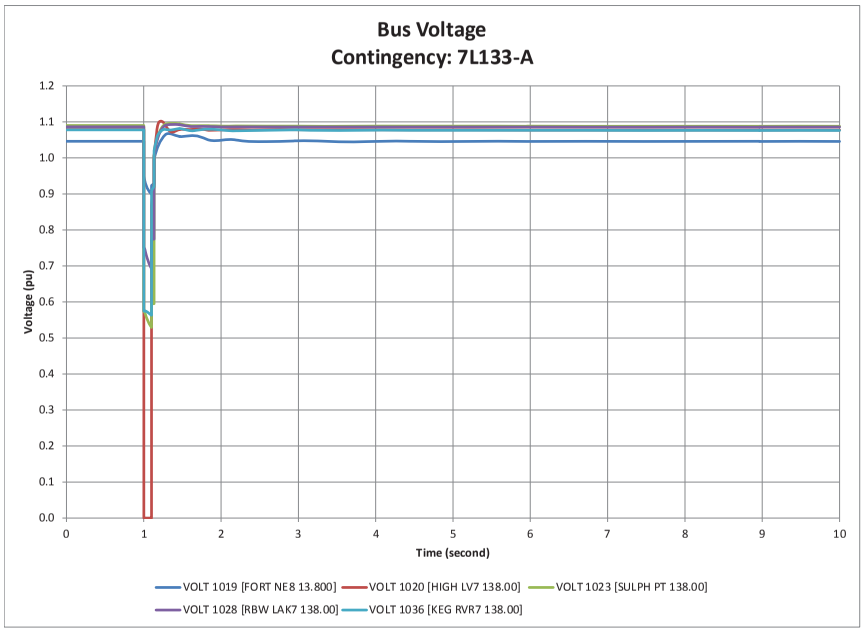

Generator Angle
Contingency: 7L133-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

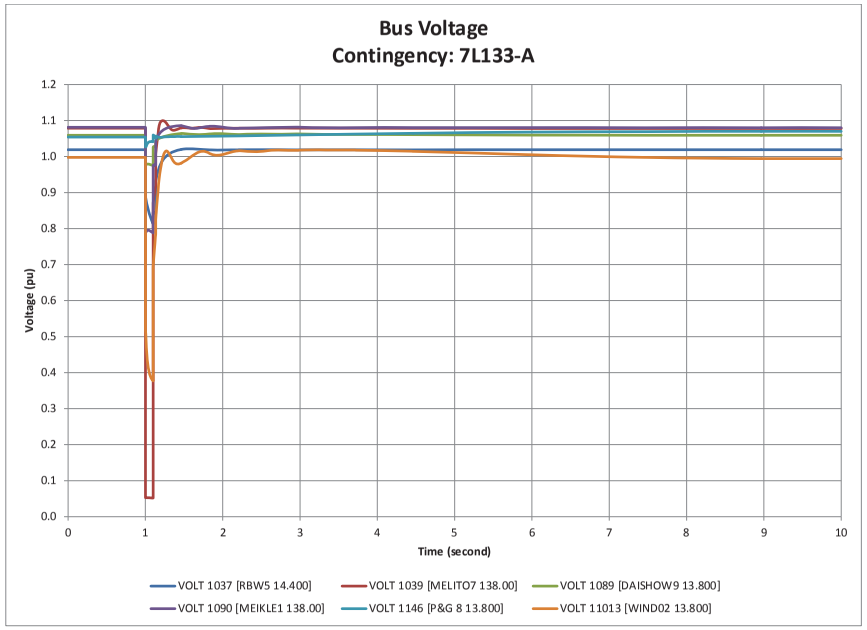

Generator Real Power
Contingency: 7L133-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

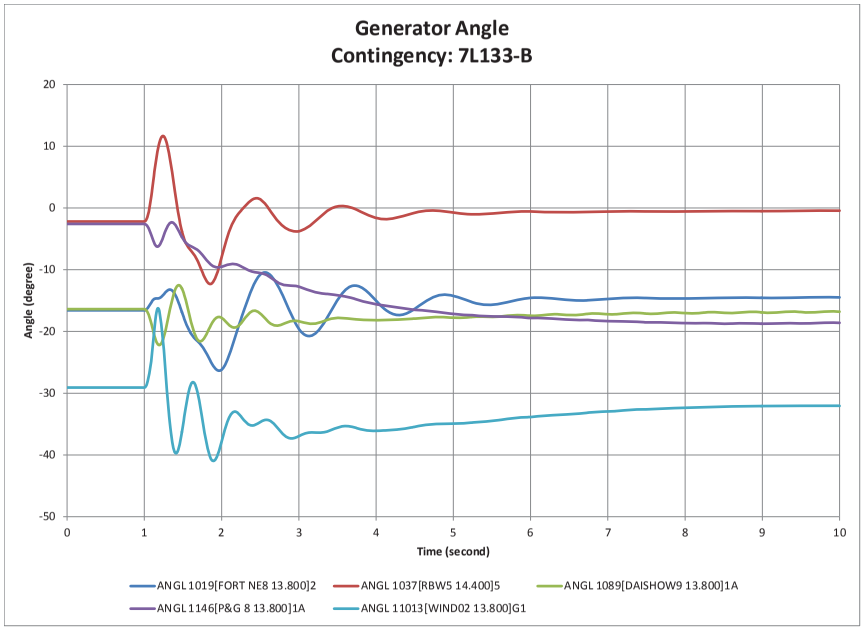

Generator Reactive Power
Contingency: 7L133-A
Reactive Power (pu)
0.7
0.5
0.3
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

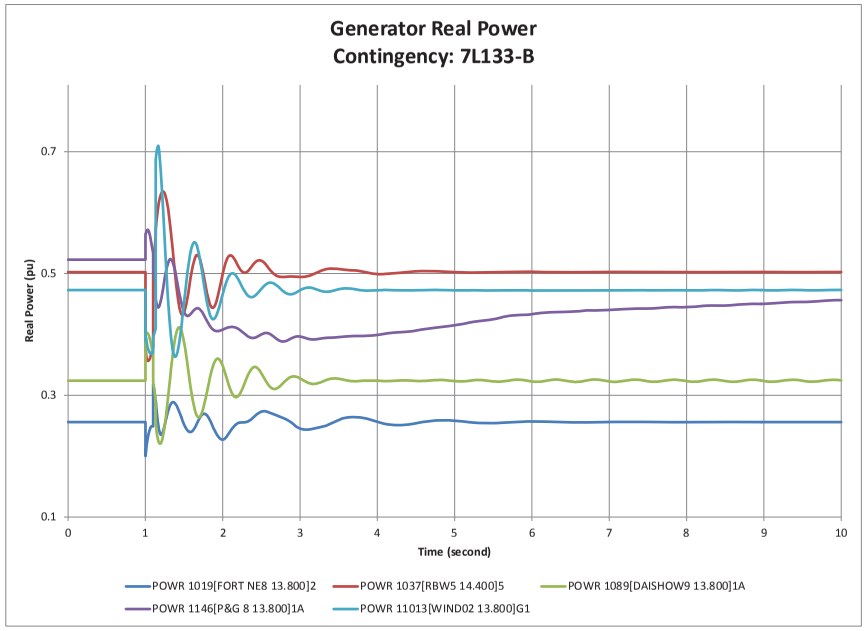

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
-0.0050
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

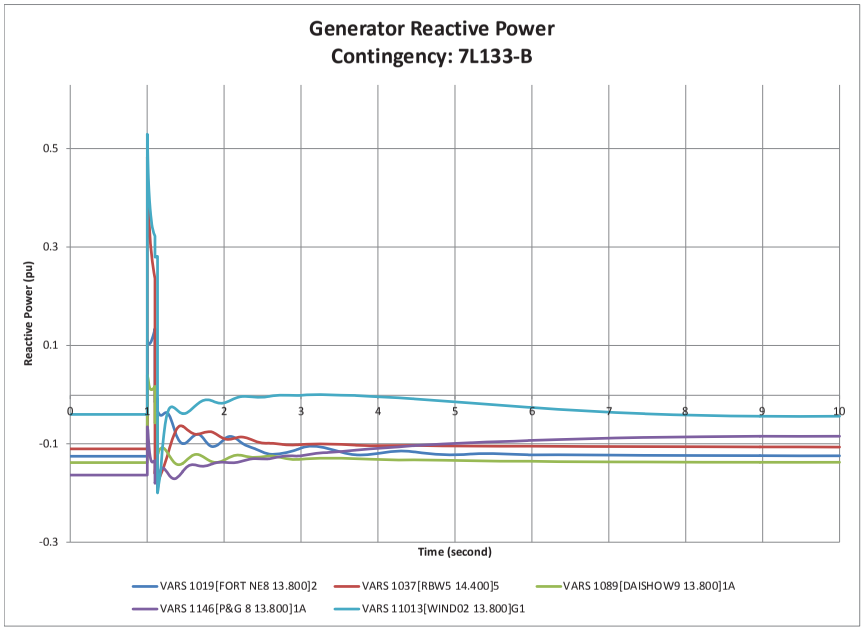

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
0.0200
0.0150
0.0100
0.0050
0.0000
-0.0050
-0.0100
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

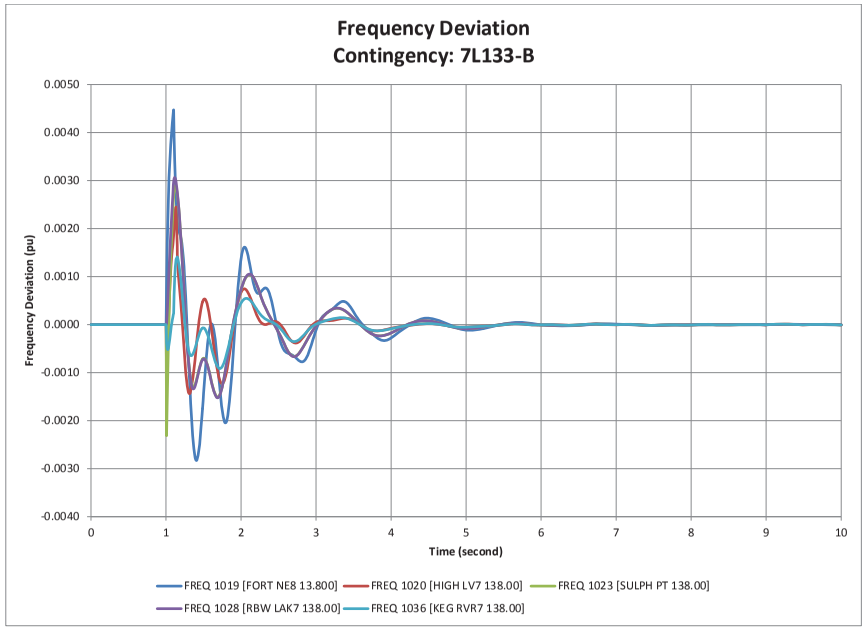

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

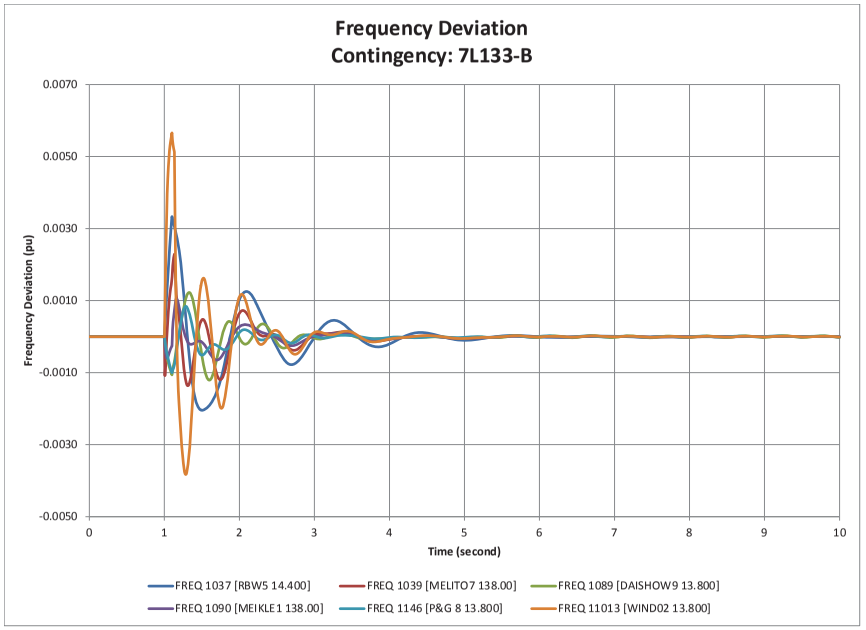

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

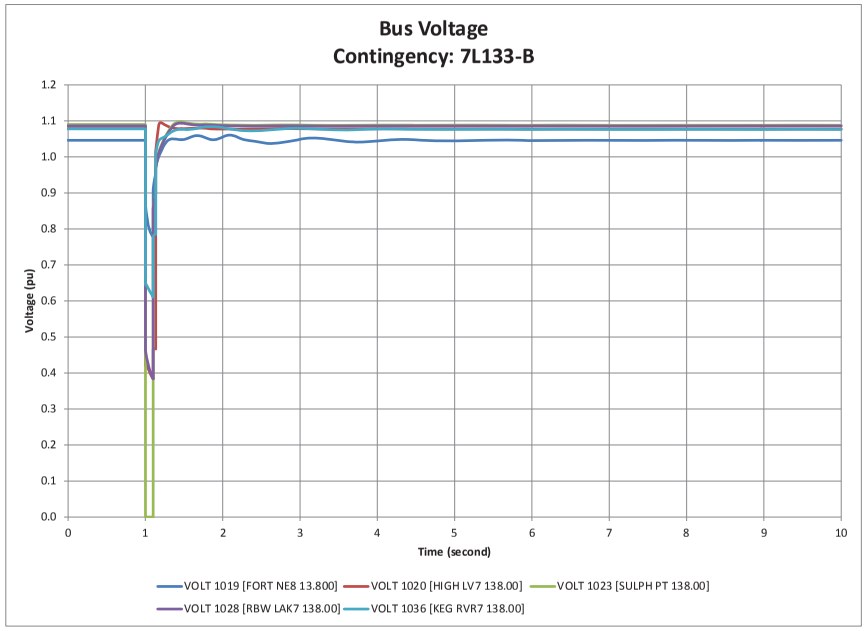

Generator Angle
Contingency: 7L133-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

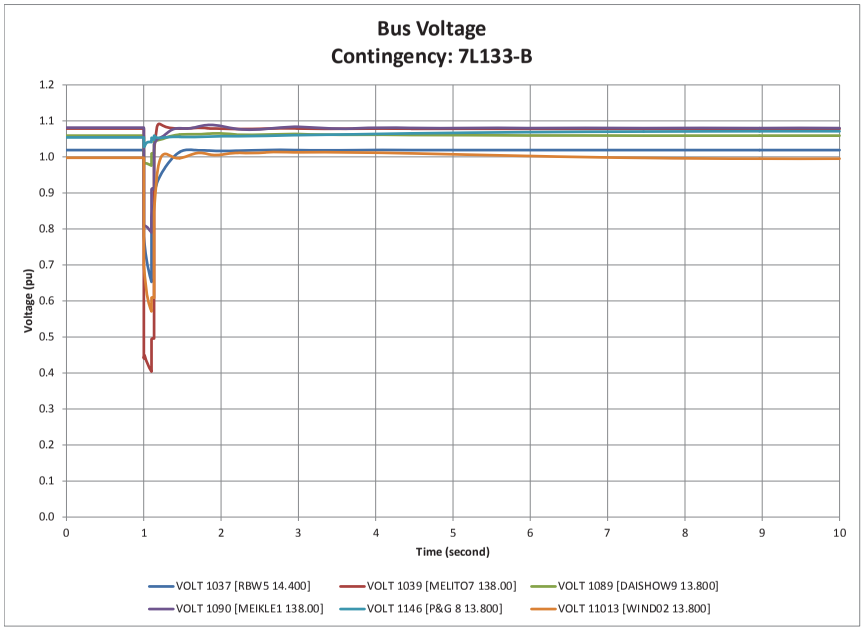

Generator Real Power
Contingency: 7L133-B
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

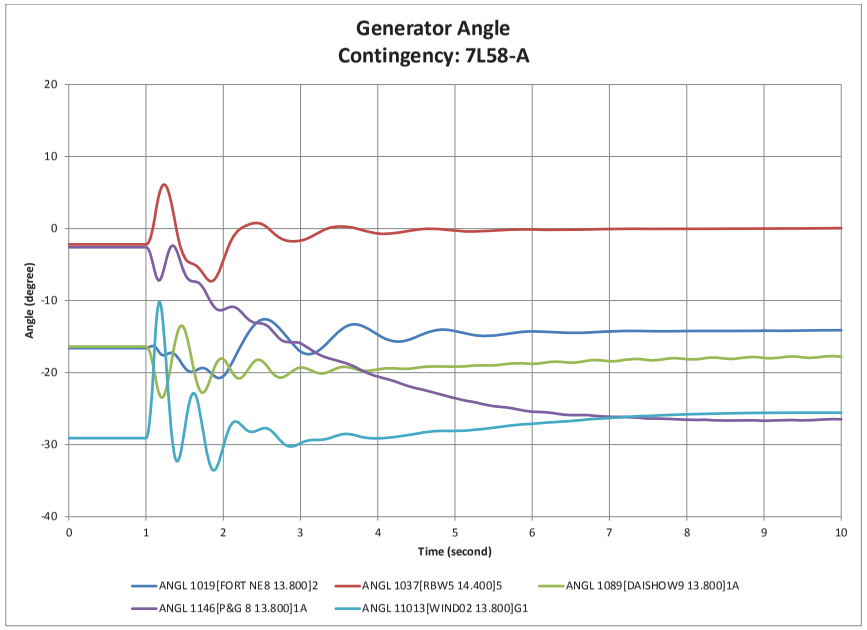

Generator Reactive Power
Contingency: 7L133-B
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

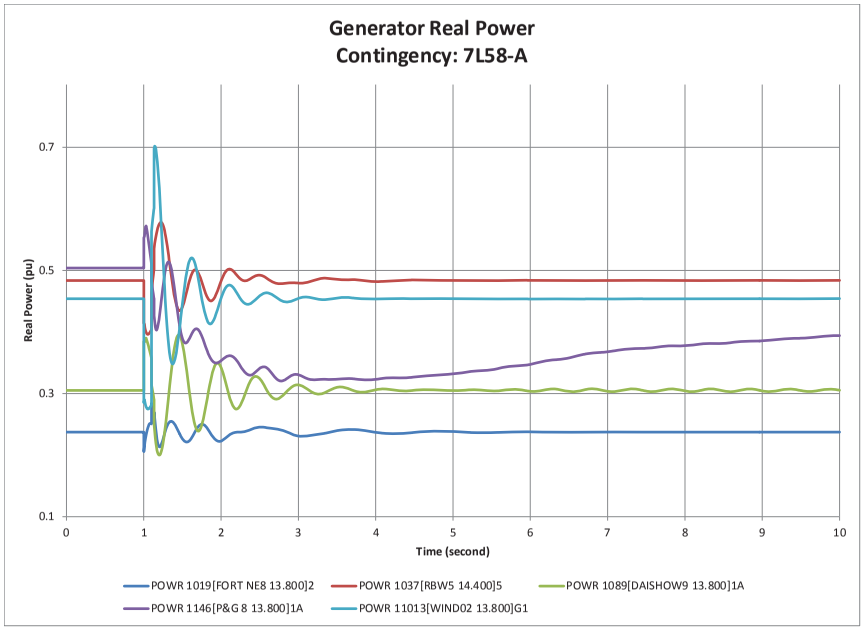

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

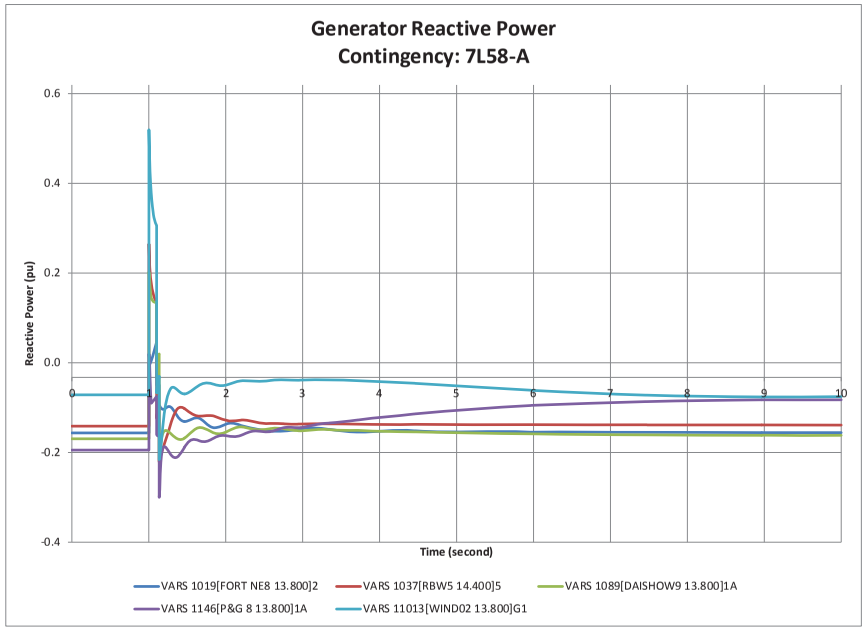

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

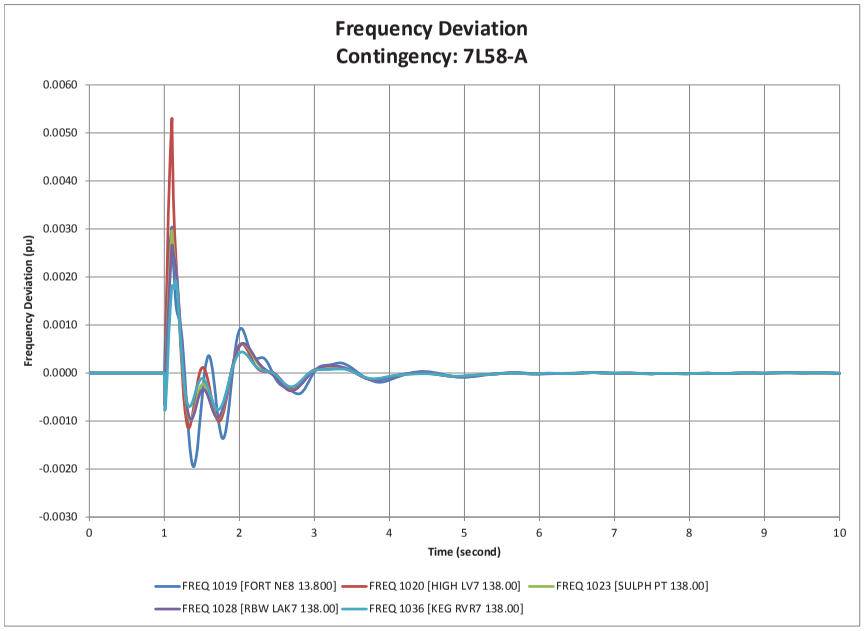

Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]


Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

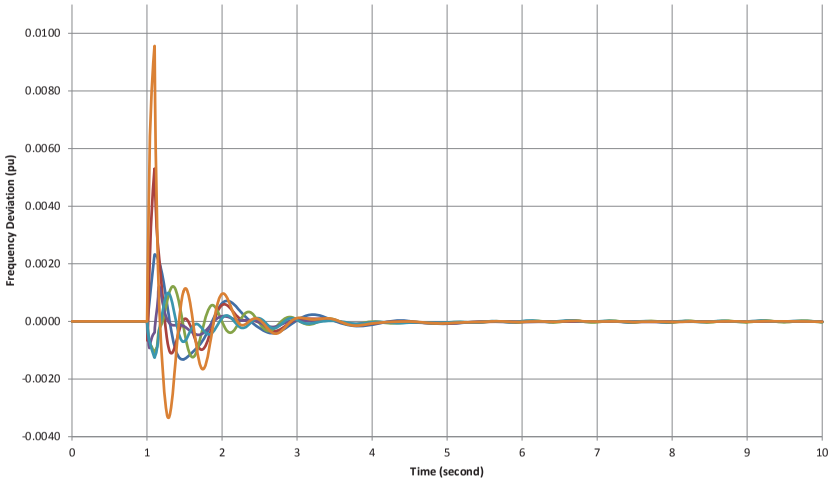

Generator Angle
Contingency: 7L58-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1


Generator Real Power
Contingency: 7L58-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

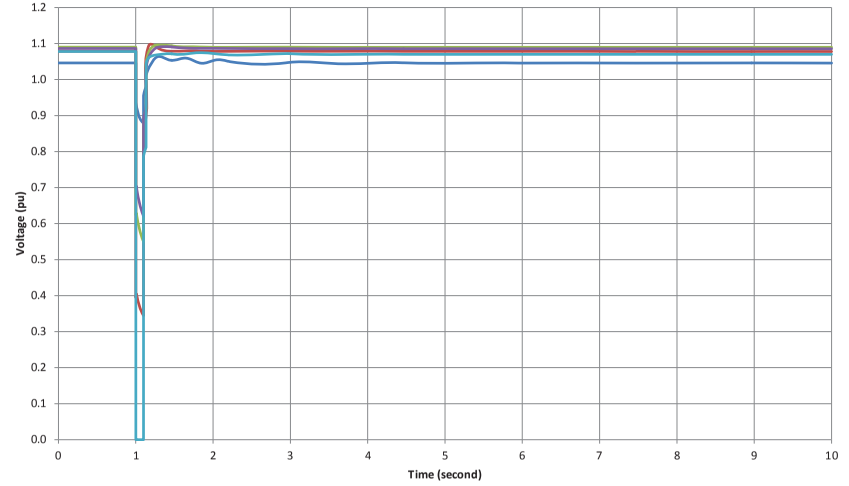

Generator Reactive Power
Contingency: 7L58-A
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1


Frequency Deviation
Contingency: 7L58-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

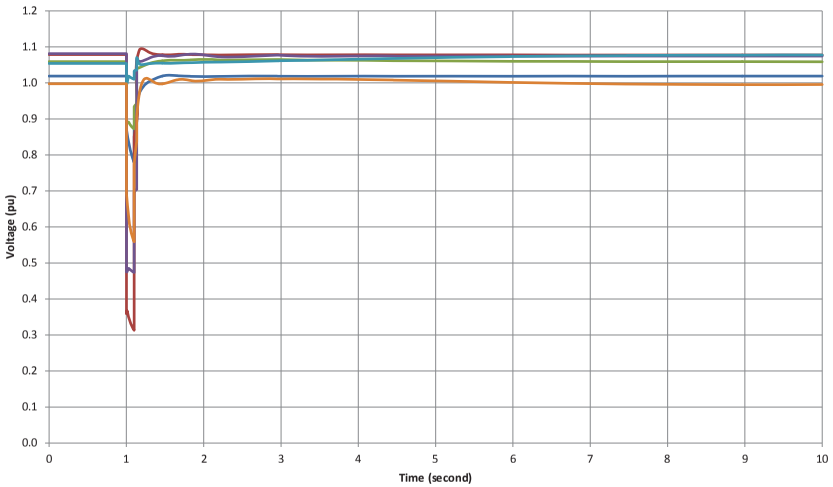
Frequency Deviation
Contingency: 7L58-A



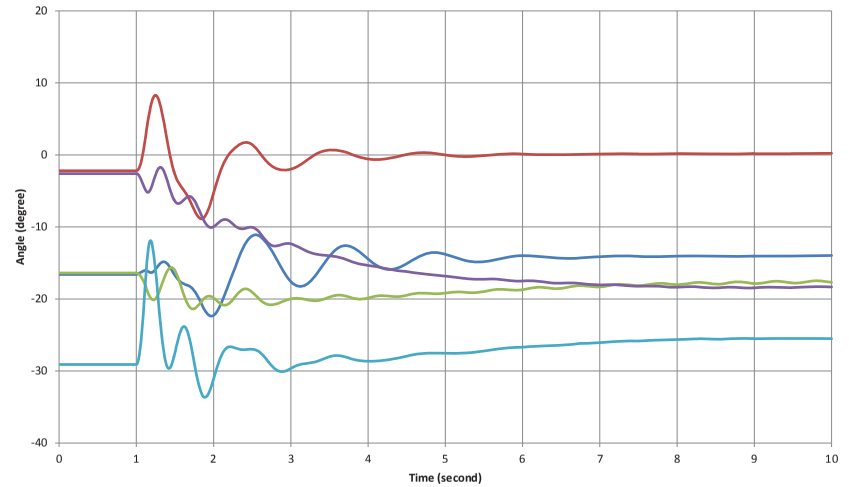
Bus Voltage
Contingency: 7L58-A

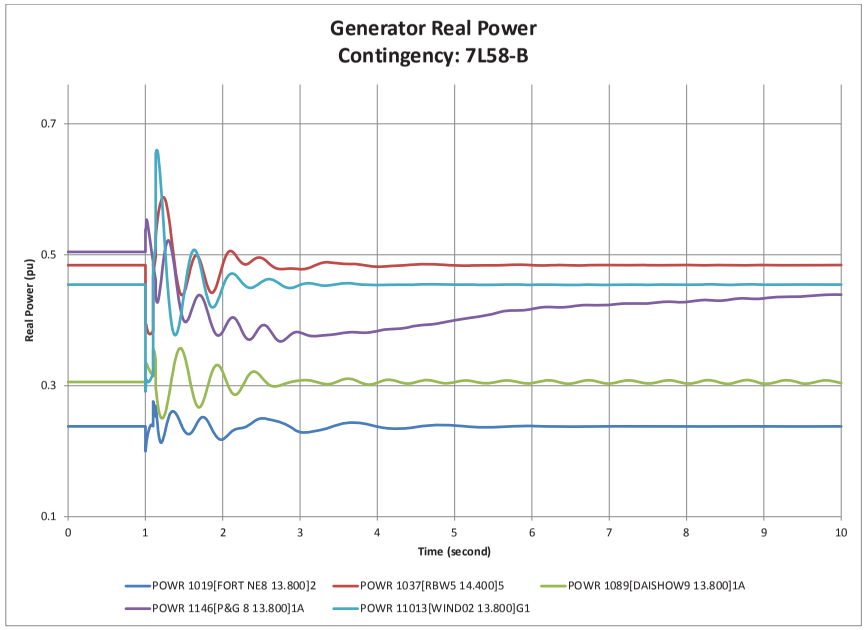


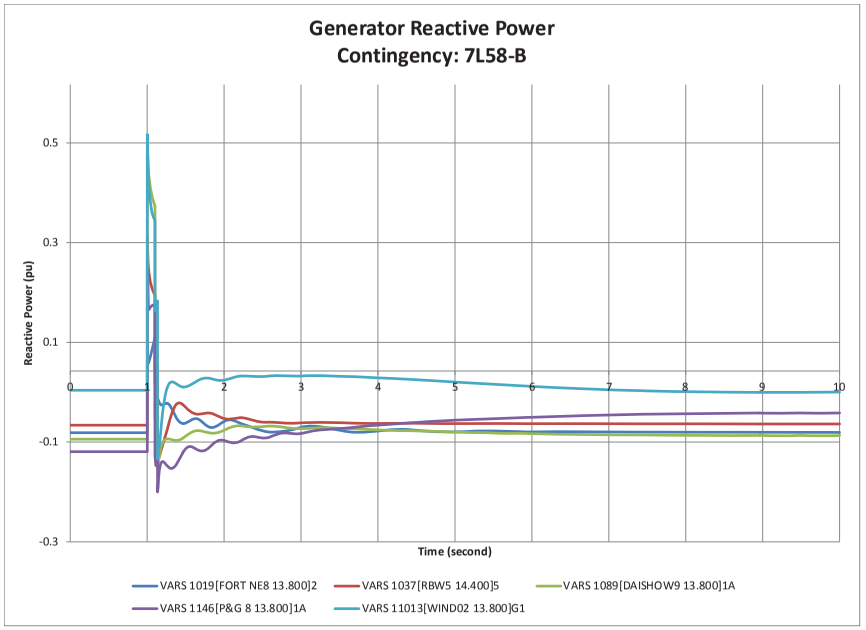
Bus Voltage
Contingency: 7L58-A

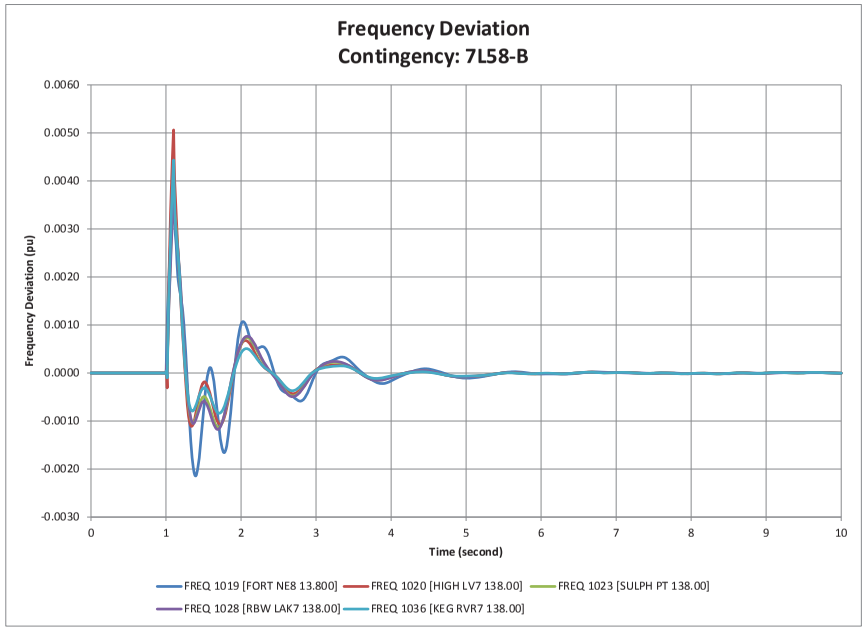


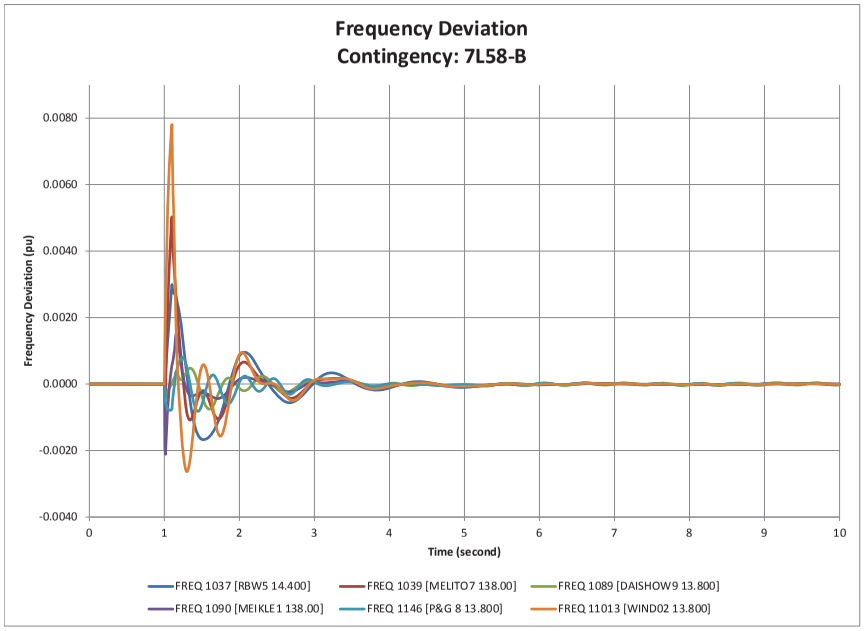
Generator Angle
Contingency: 7L58-B

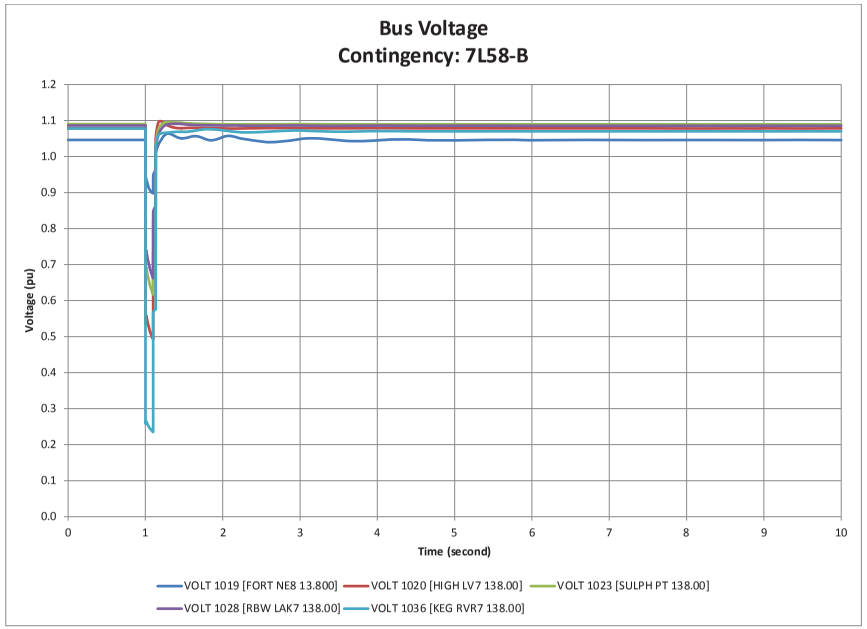


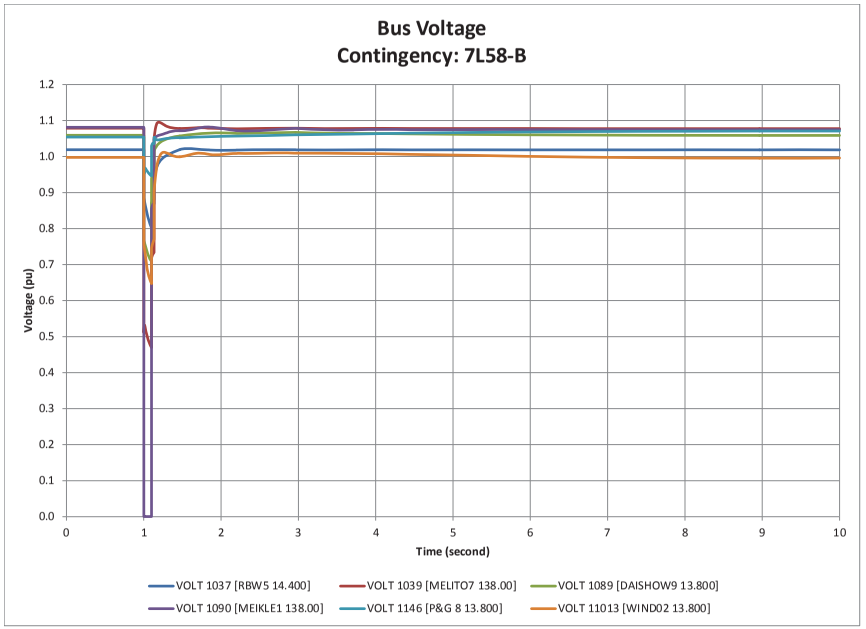

Generator Real Power
Contingency: 7L58-B
Real Power (pu)
0.7
0.5
0.3
0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

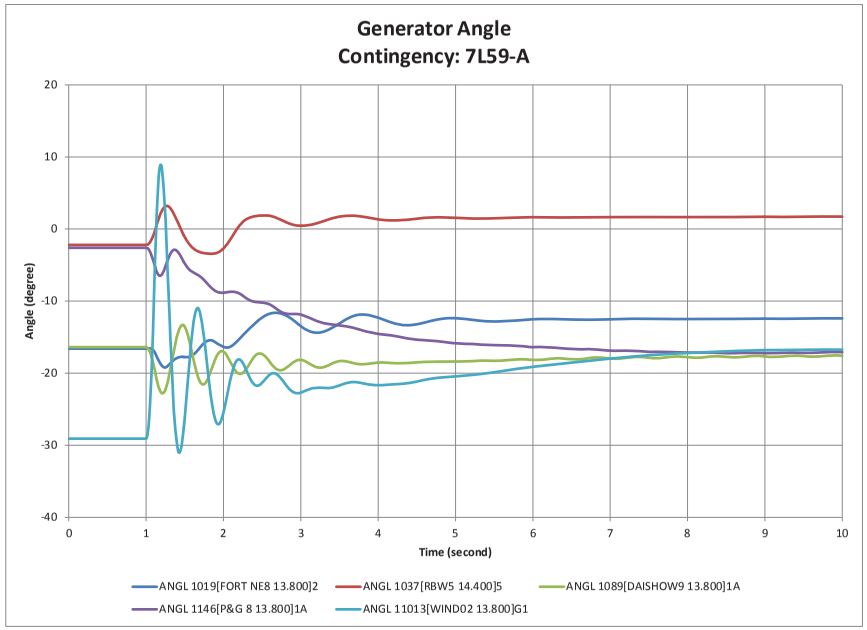

Generator Reactive Power
Contingency: 7L58-B
Reactive Power (pu)
0.5
0.3
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

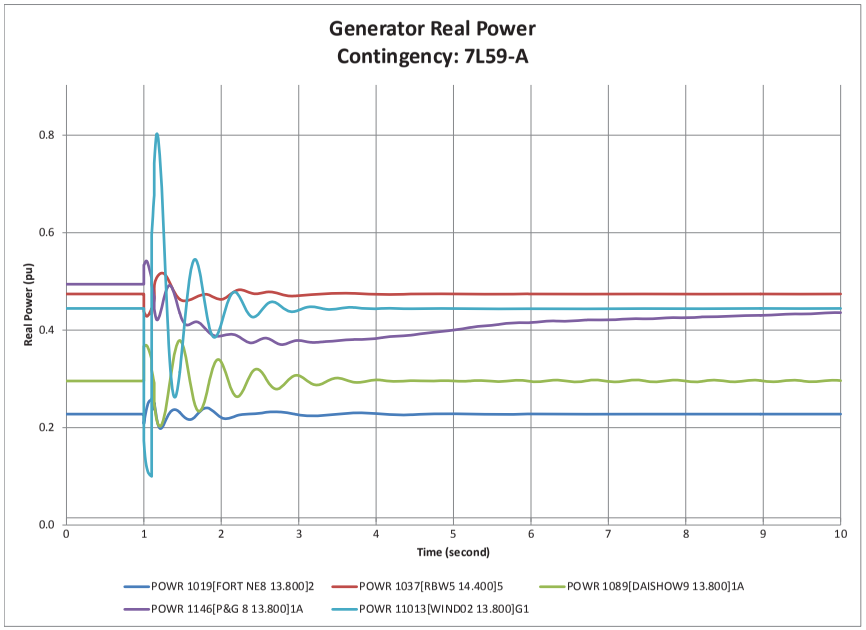

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
0.0060
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

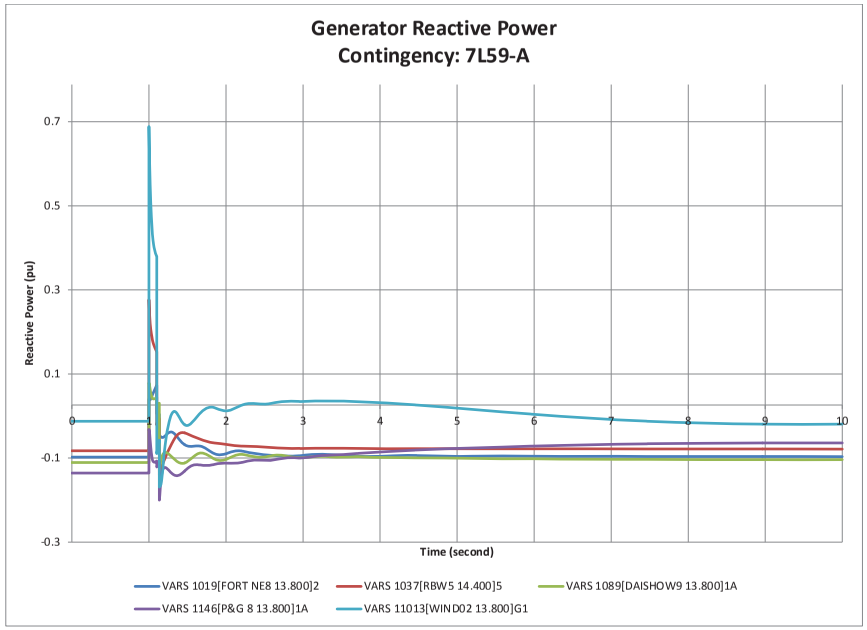

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
0.0080
0.0060
0.0040
0.0020
0.0000
-0.0020
-0.0040
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

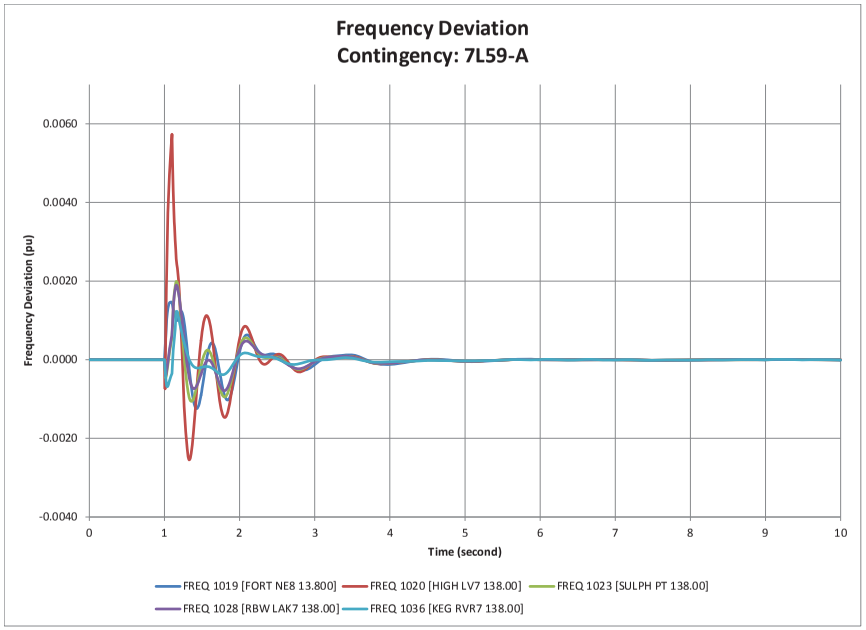

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

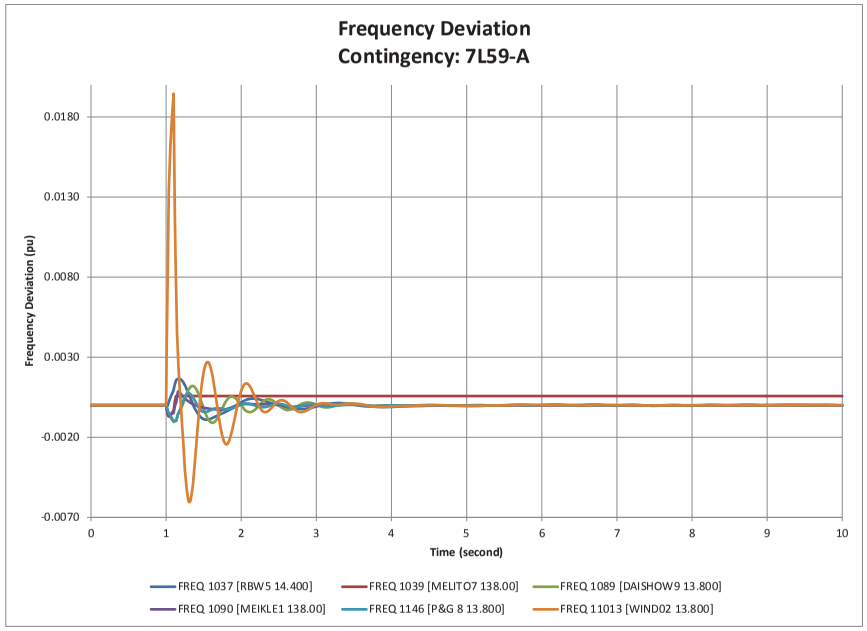

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

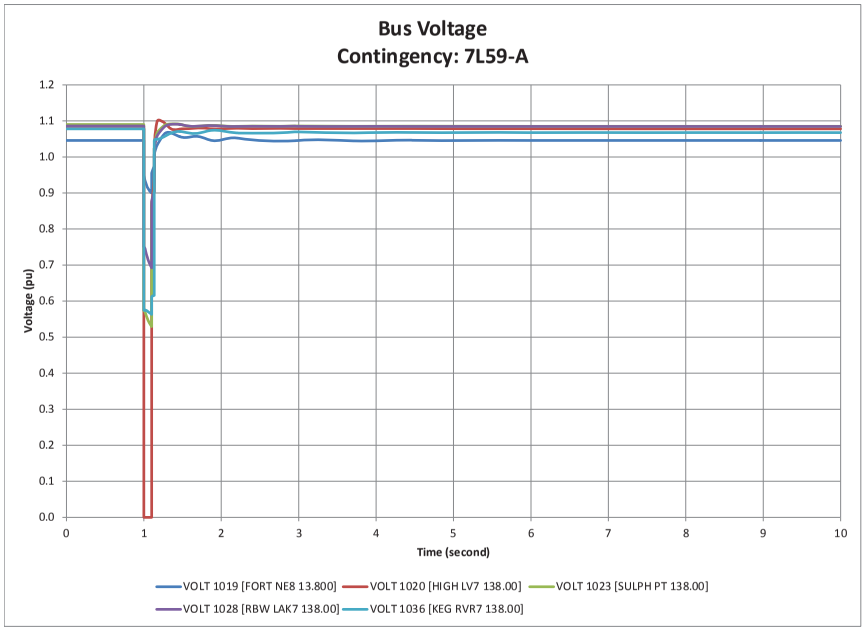

Generator Angle
Contingency: 7L59-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

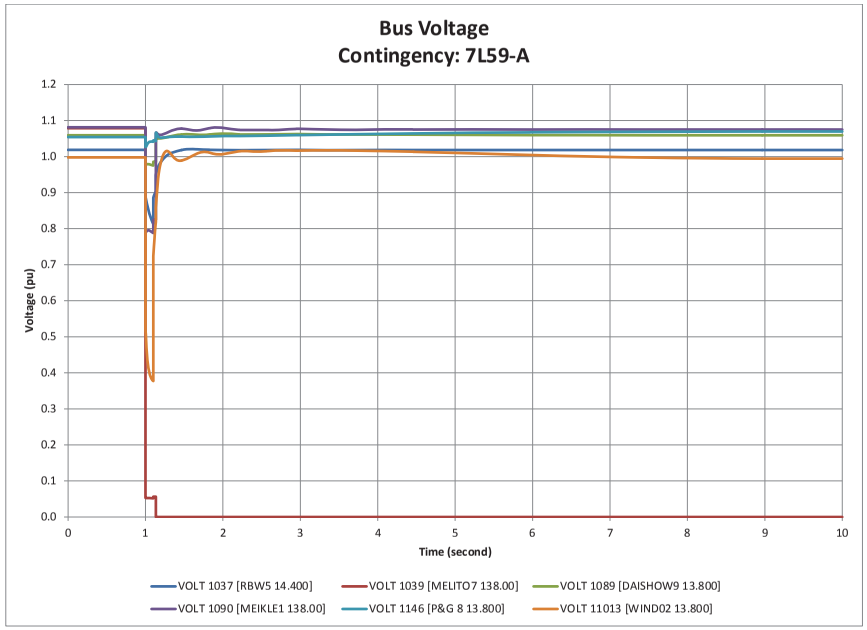

Generator Real Power
Contingency: 7L59-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

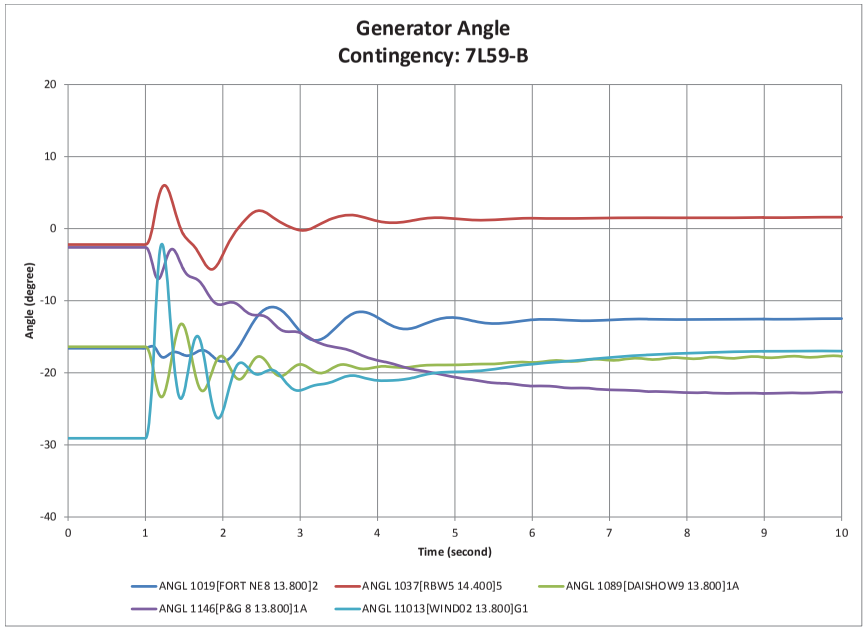

Generator Reactive Power
Contingency: 7L59-A
Reactive Power (pu)
0.7
0.5
0.3
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

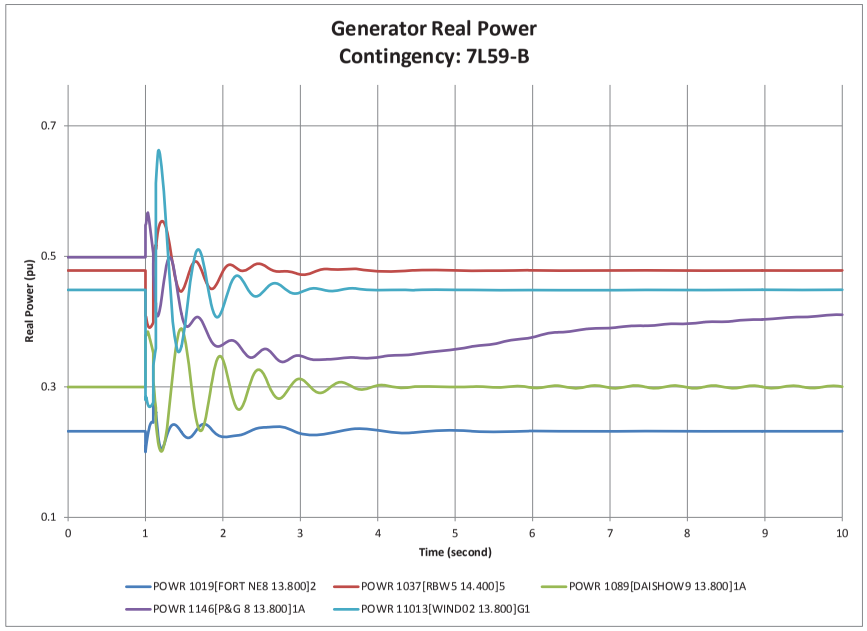

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
0.0060
0.0040
0.0020
0.0000
-0.0020
-0.0040
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

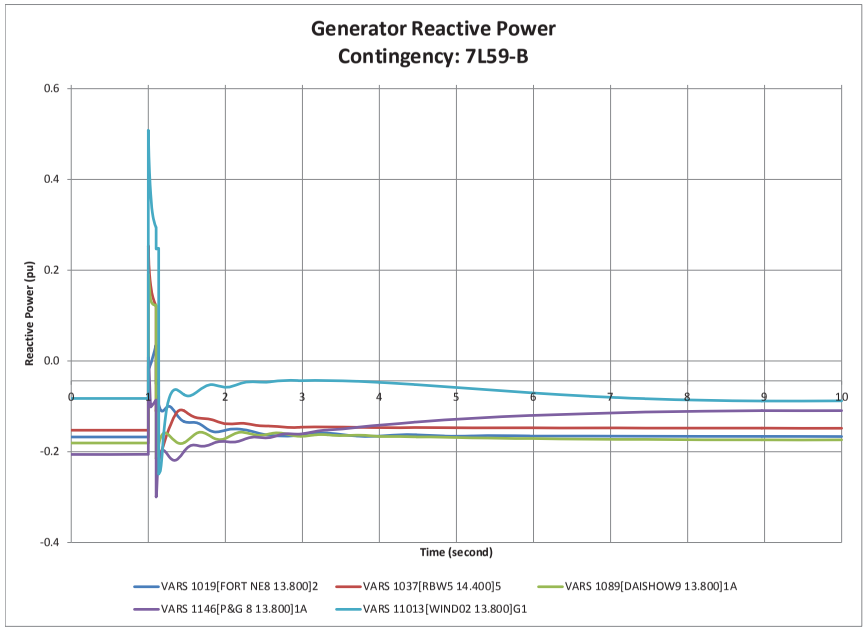

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
0.0180
0.0130
0.0080
0.0030
-0.0020
-0.0070
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

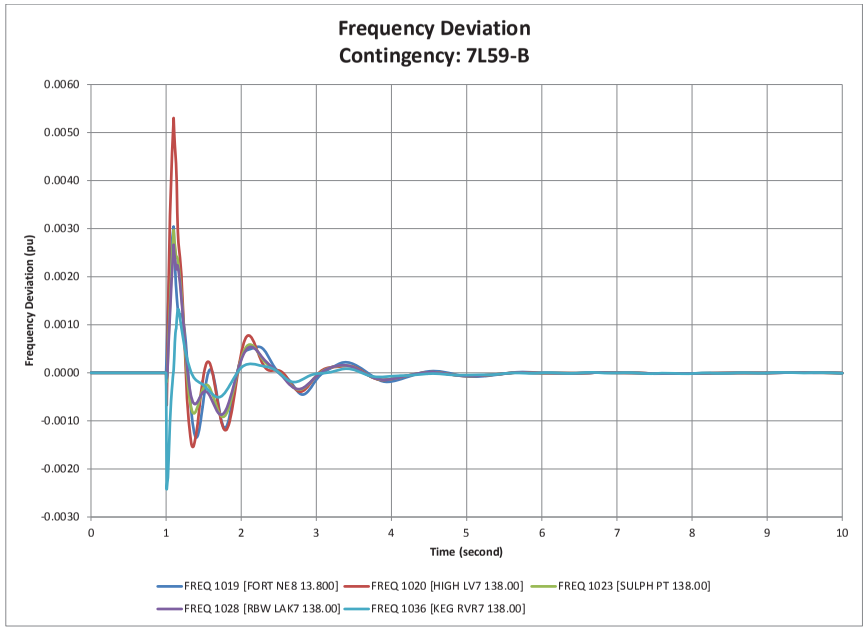

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

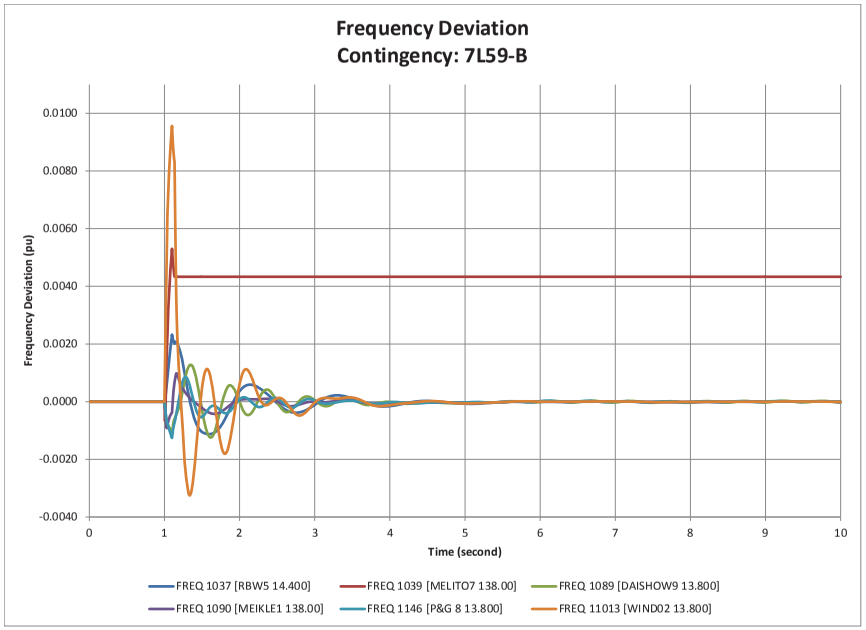

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

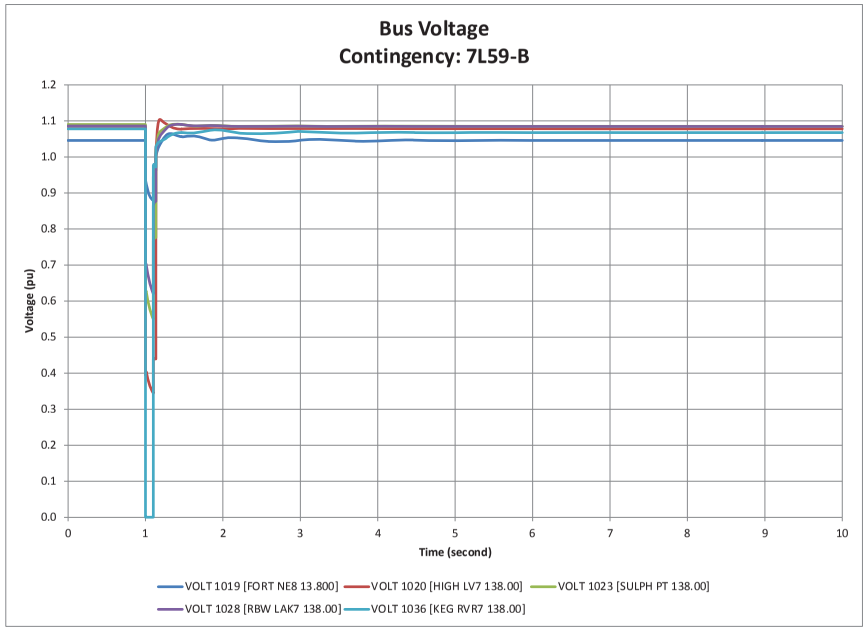

Generator Angle
Contingency: 7L59-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

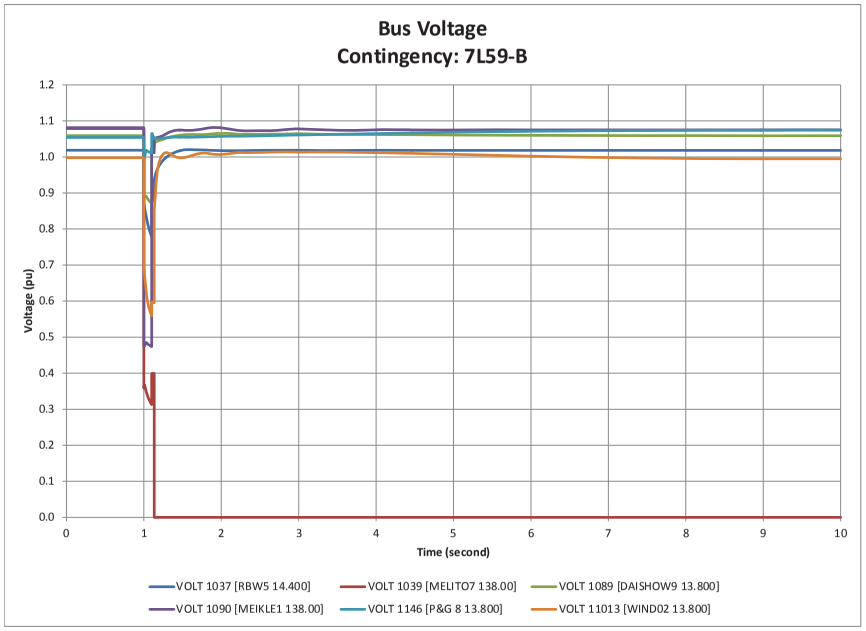

Generator Real Power
Contingency: 7L59-B
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

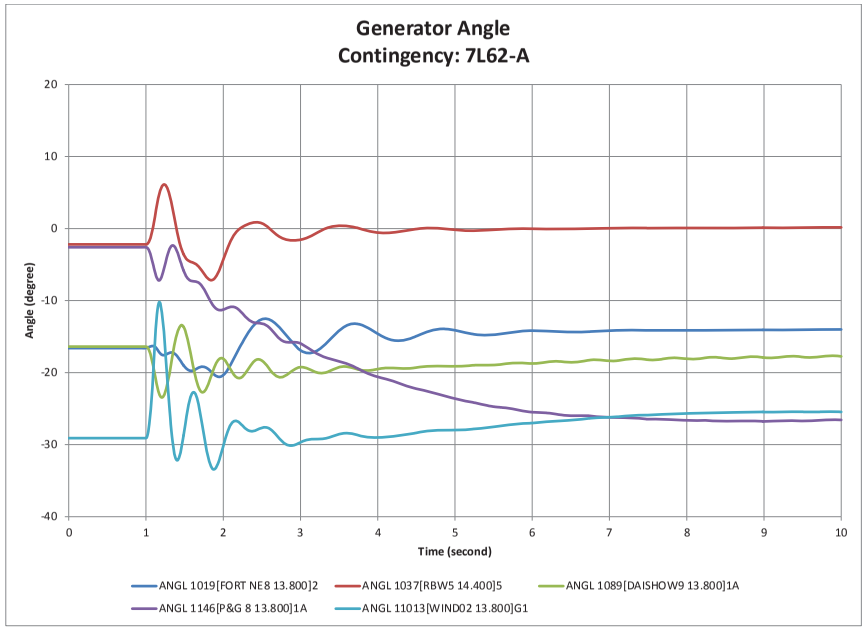

Generator Reactive Power
Contingency: 7L59-B
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

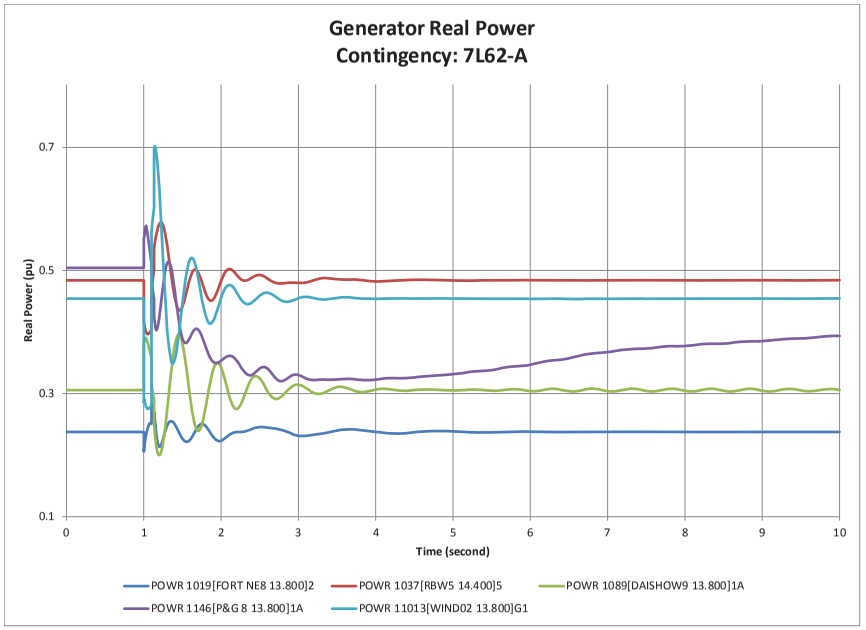

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

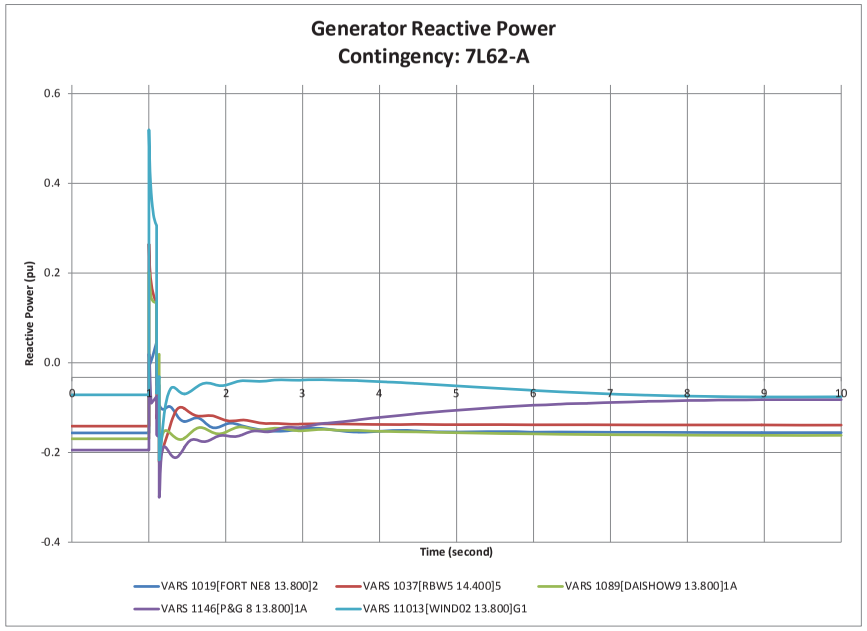

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

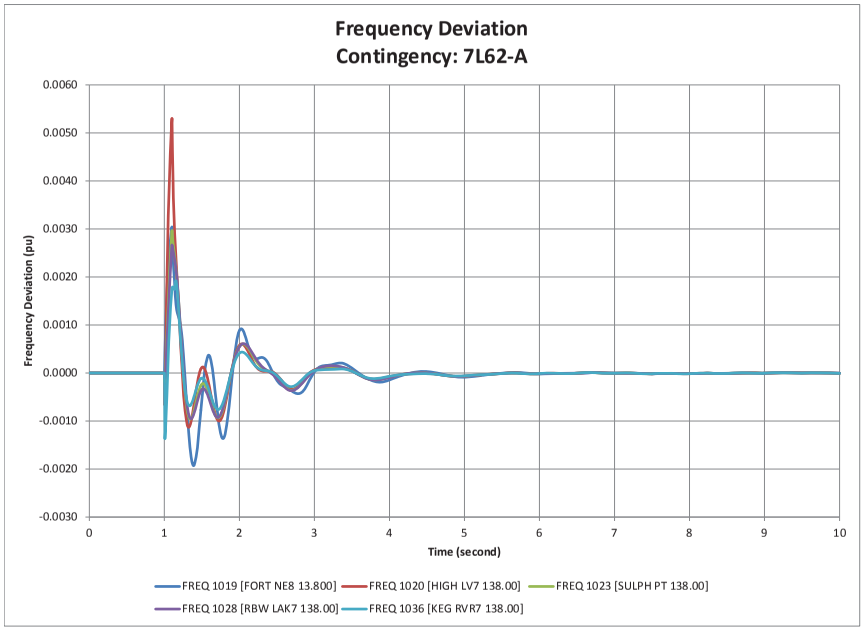

Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]


Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

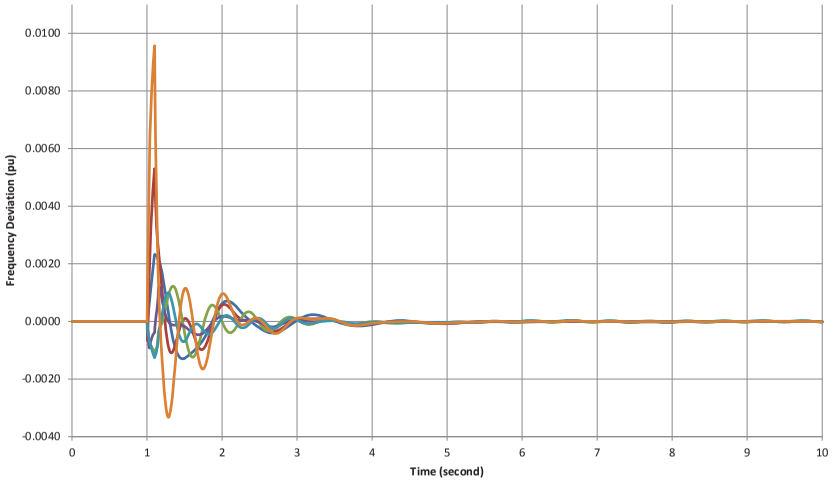

Generator Angle
Contingency: 7L62-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1


Generator Real Power
Contingency: 7L62-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

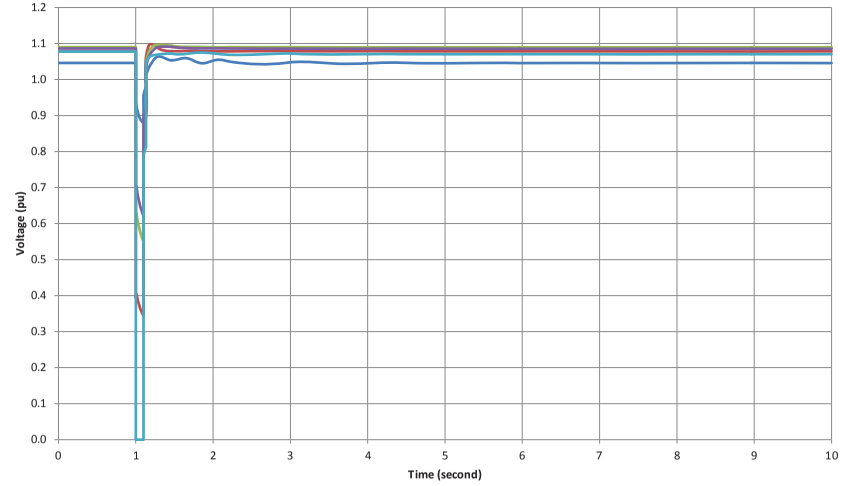

Generator Reactive Power
Contingency: 7L62-A
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1


Frequency Deviation
Contingency: 7L62-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

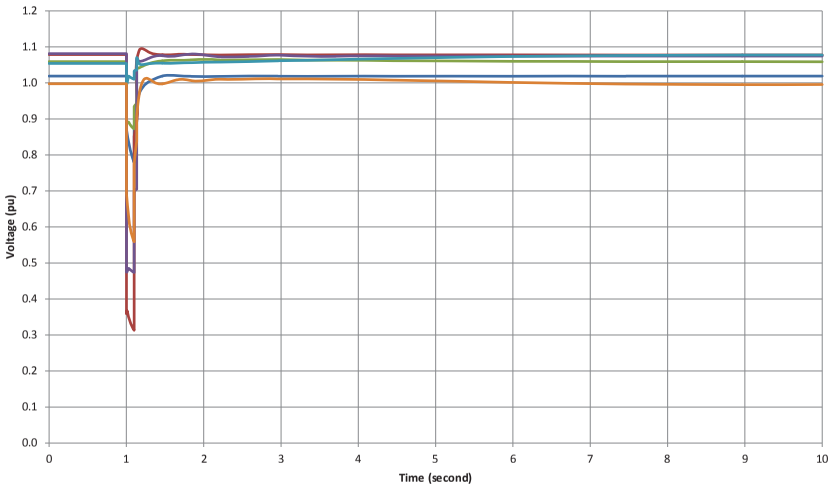
Frequency Deviation
Contingency: 7L62-A



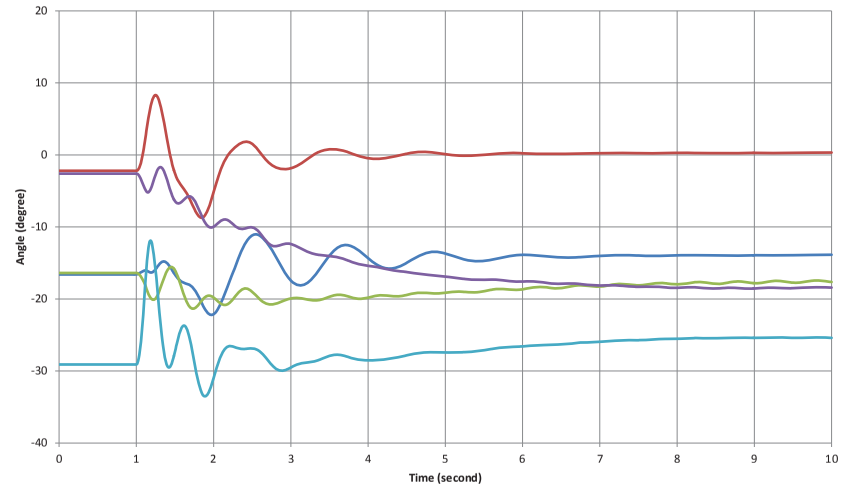
Bus Voltage
Contingency: 7L62-A

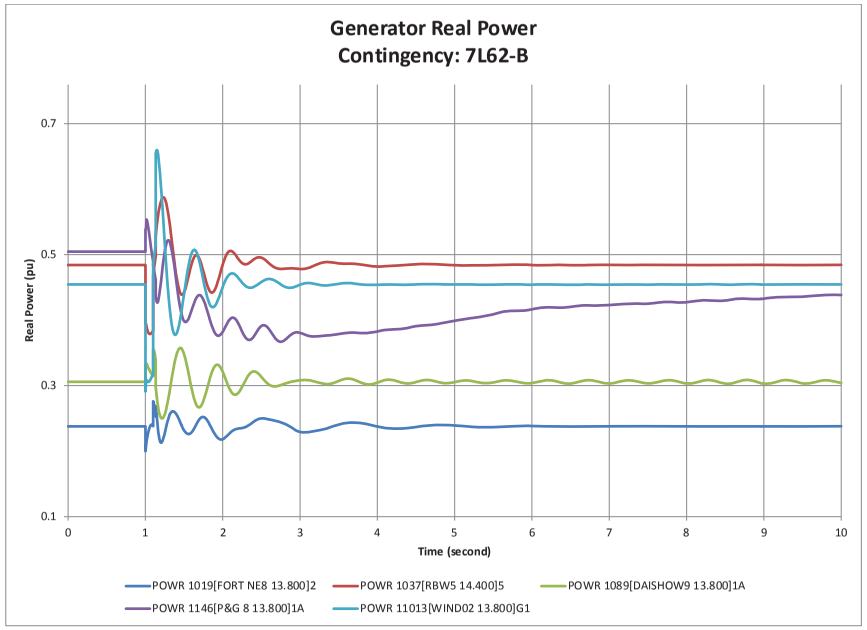


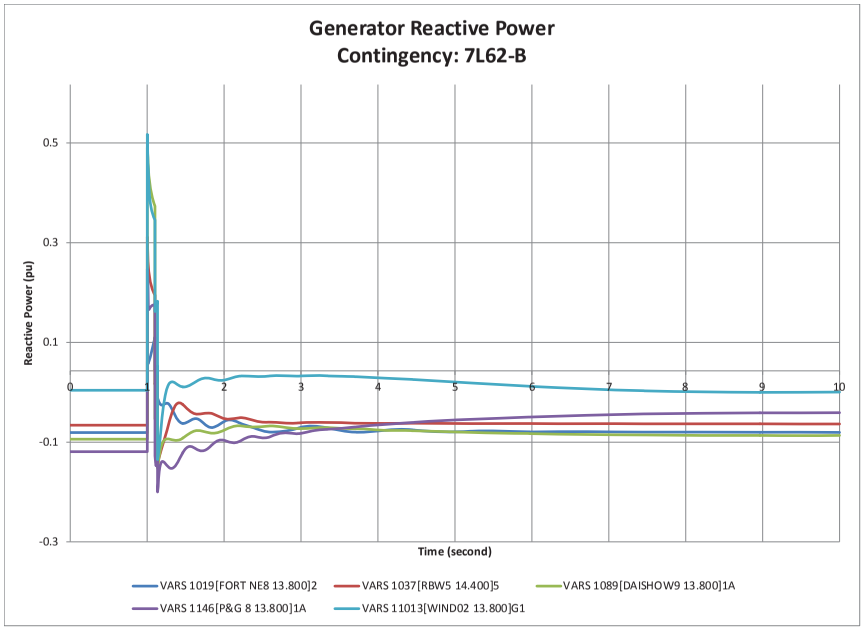
Bus Voltage
Contingency: 7L62-A

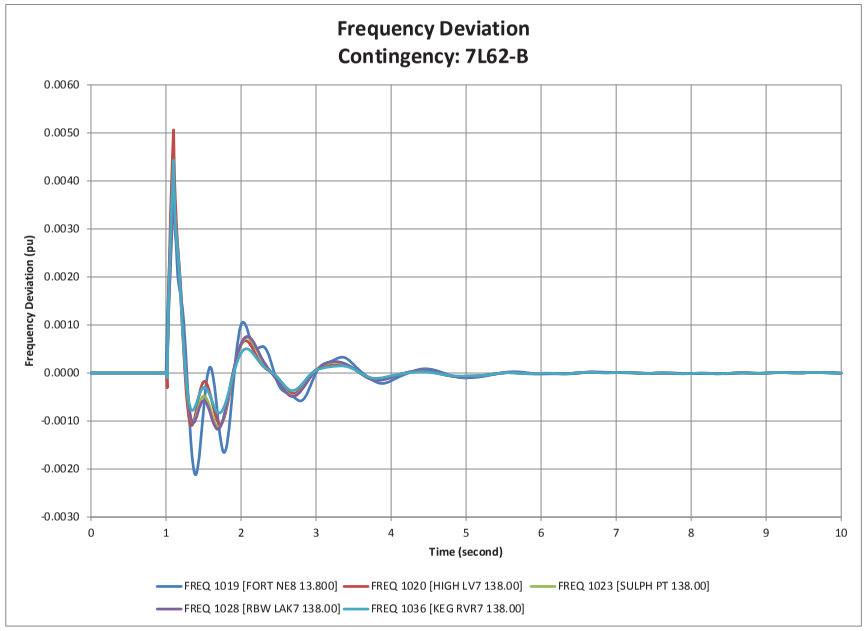


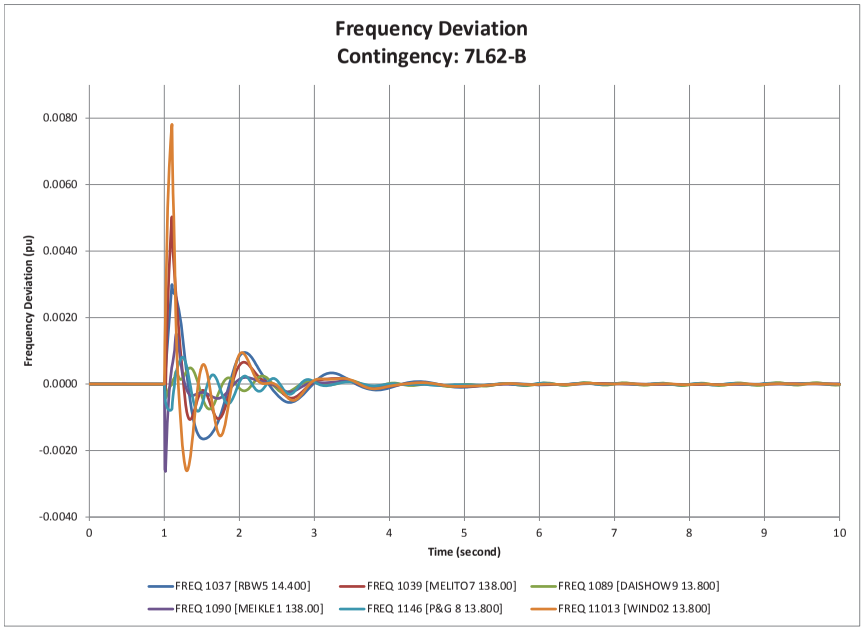
Generator Angle
Contingency: 7L62-B

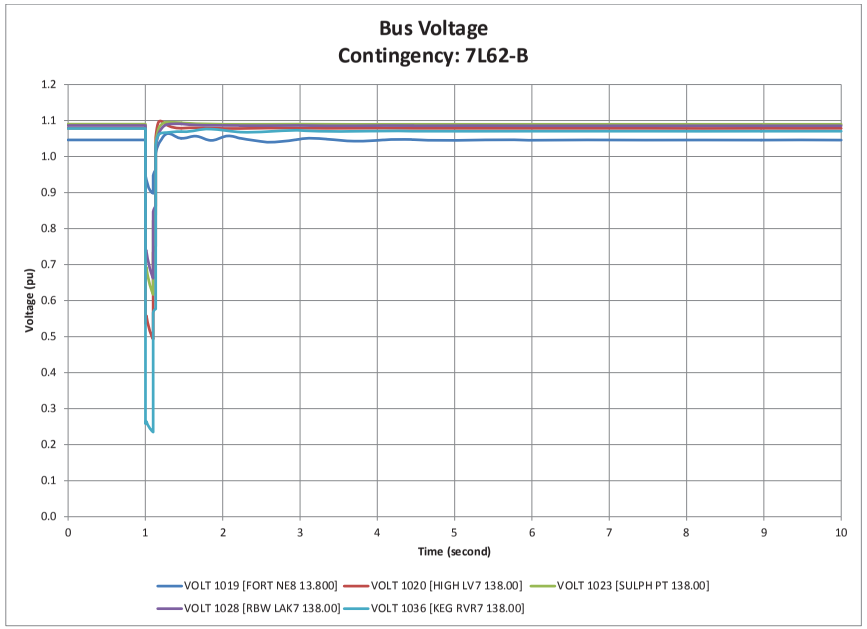


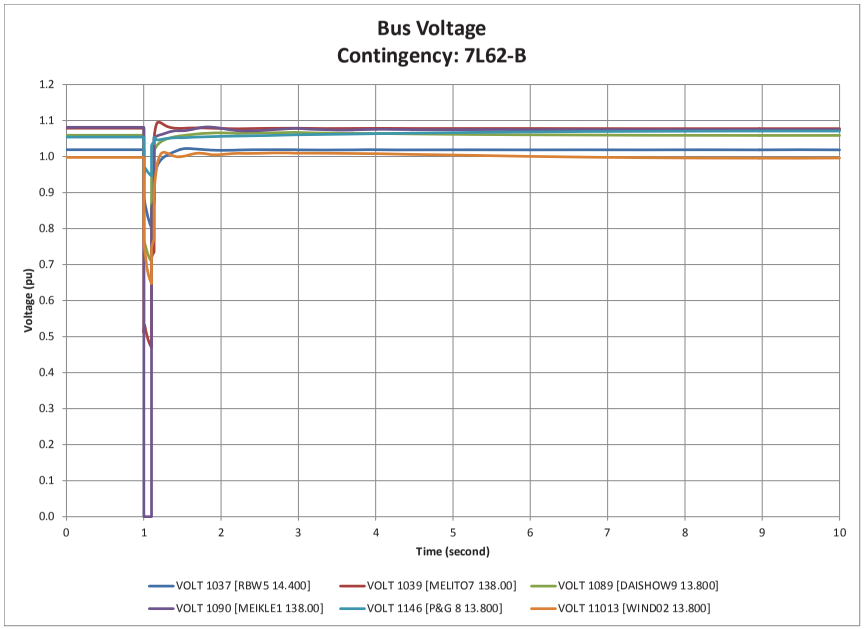

Generator Real Power
Contingency: 7L62-B
Real Power (pu)
0.7
0.5
0.3
0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

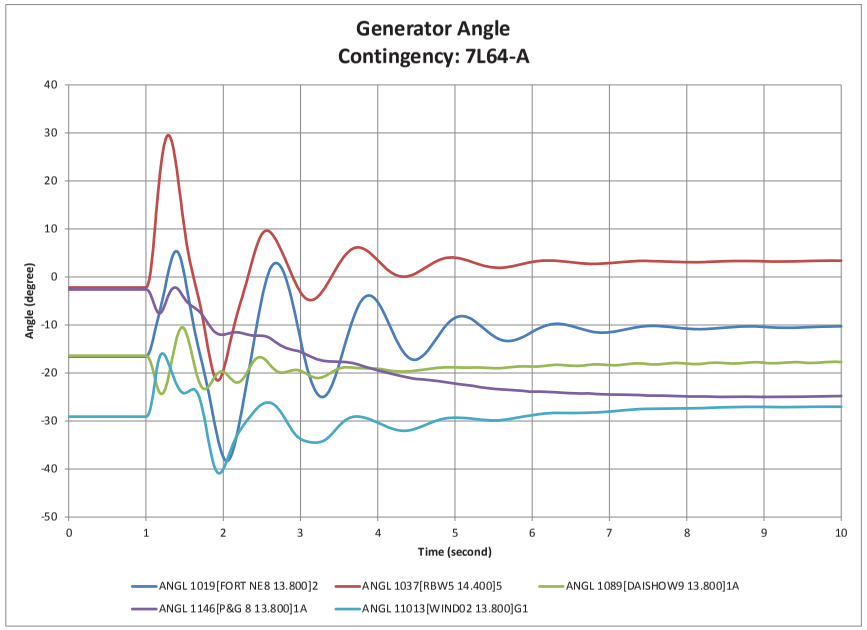

Generator Reactive Power
Contingency: 7L62-B
Reactive Power (pu)
0.5
0.3
0.1
-0.1
-0.3
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

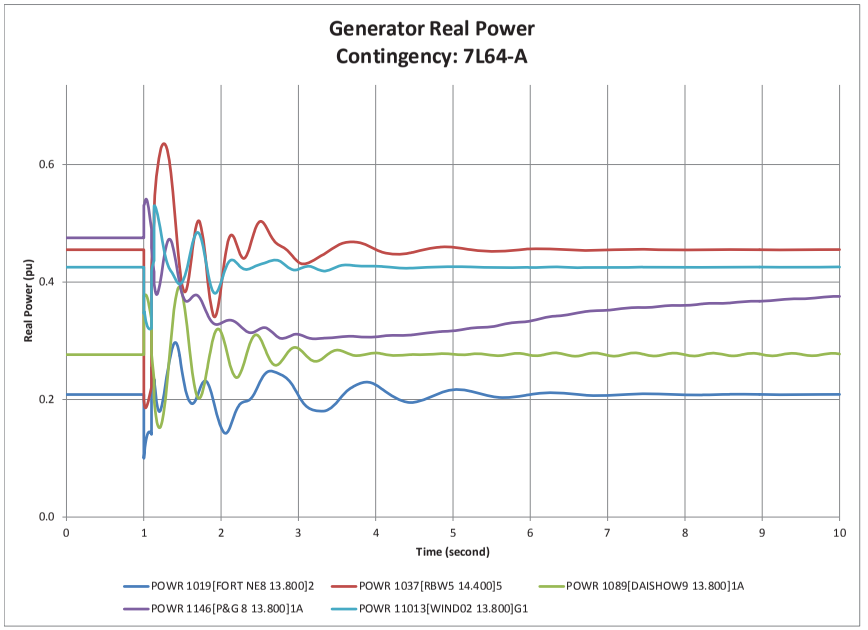

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
0.0060
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

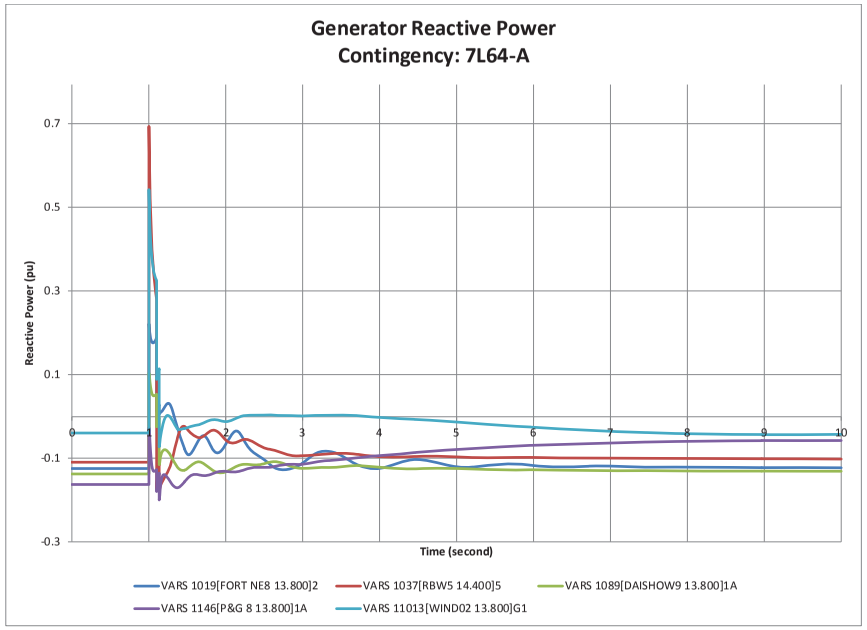

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
0.0080
0.0060
0.0040
0.0020
0.0000
-0.0020
-0.0040
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

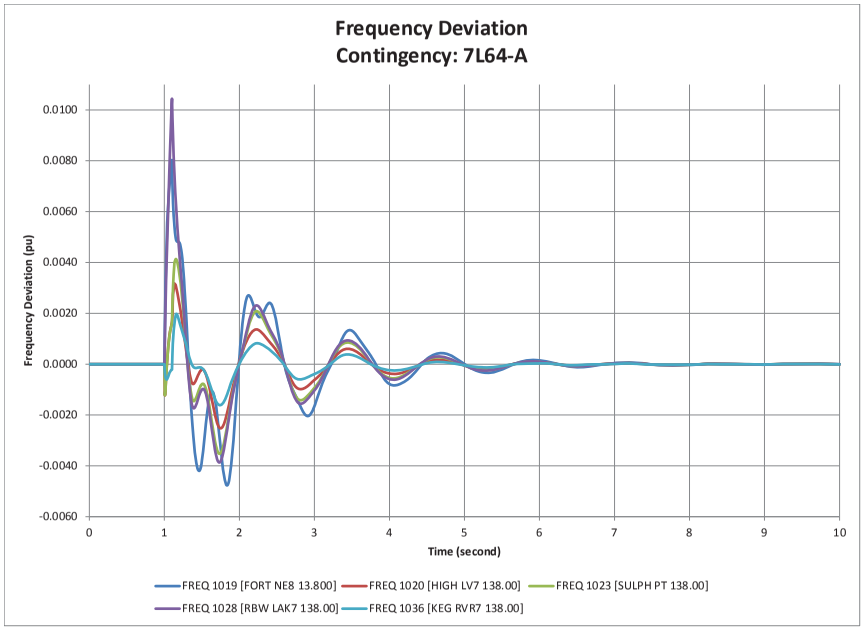

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

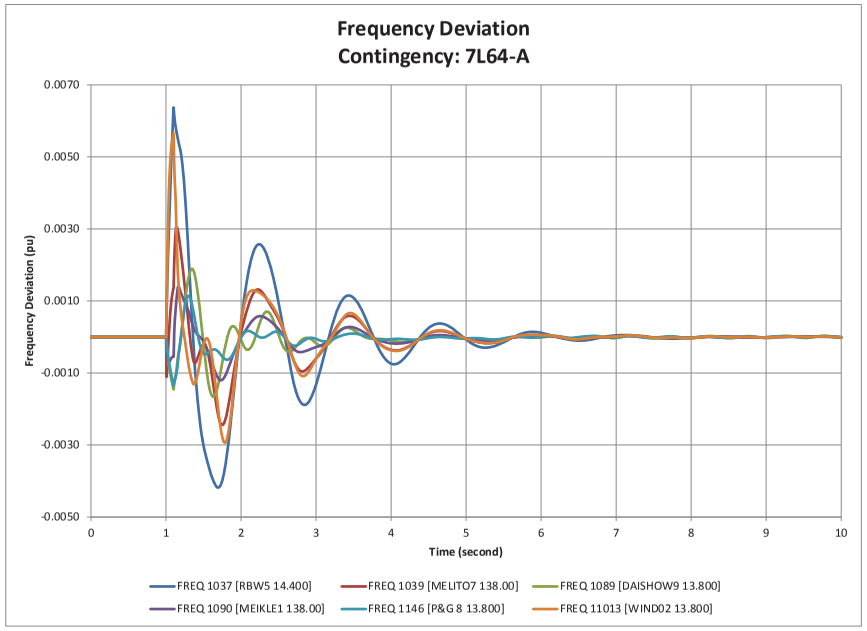

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

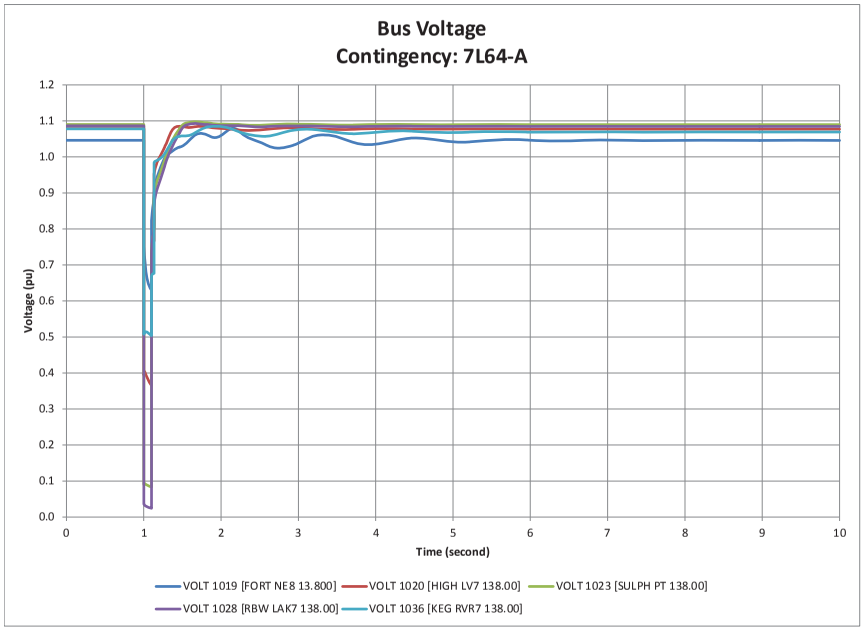

Generator Angle
Contingency: 7L64-A
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

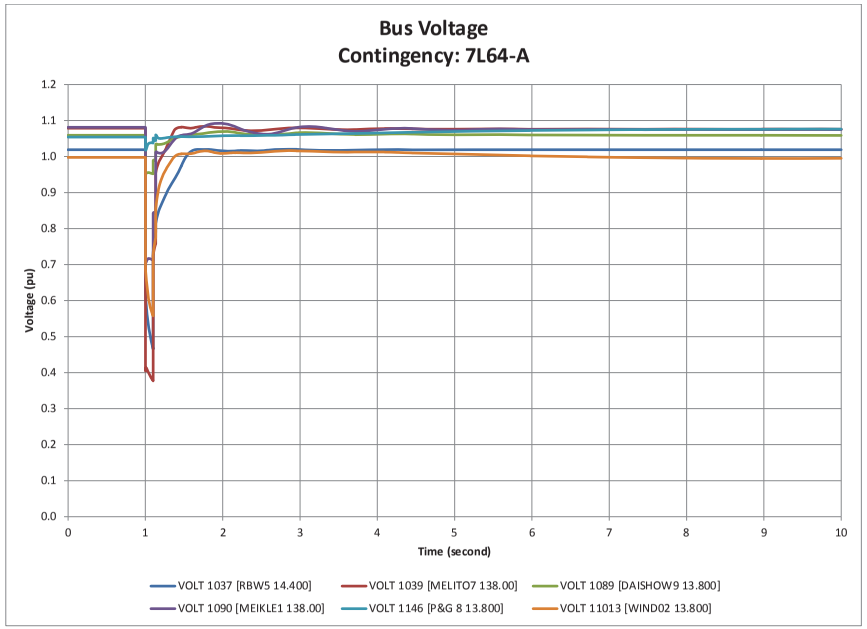

Generator Real Power
Contingency: 7L64-A
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

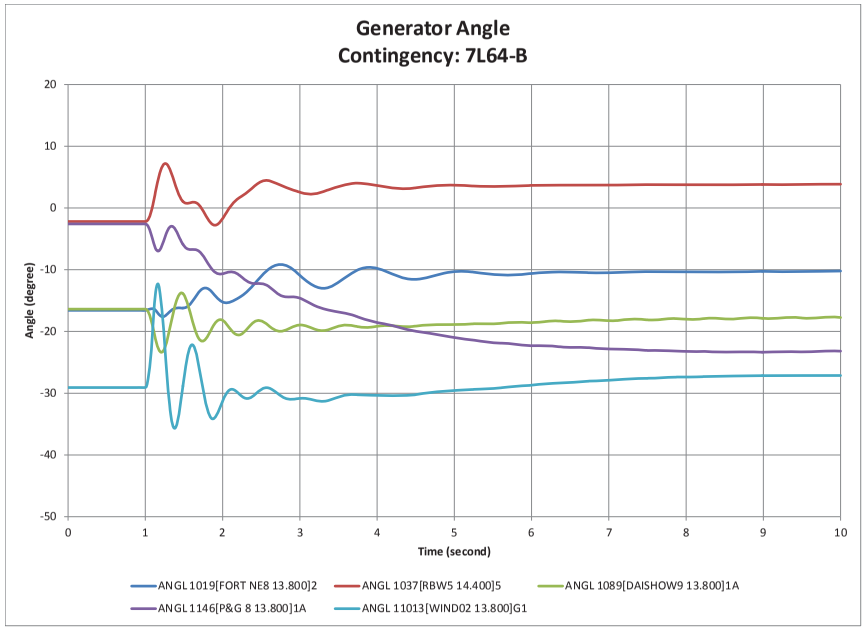

Generator Reactive Power
Contingency: 7L64-A
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

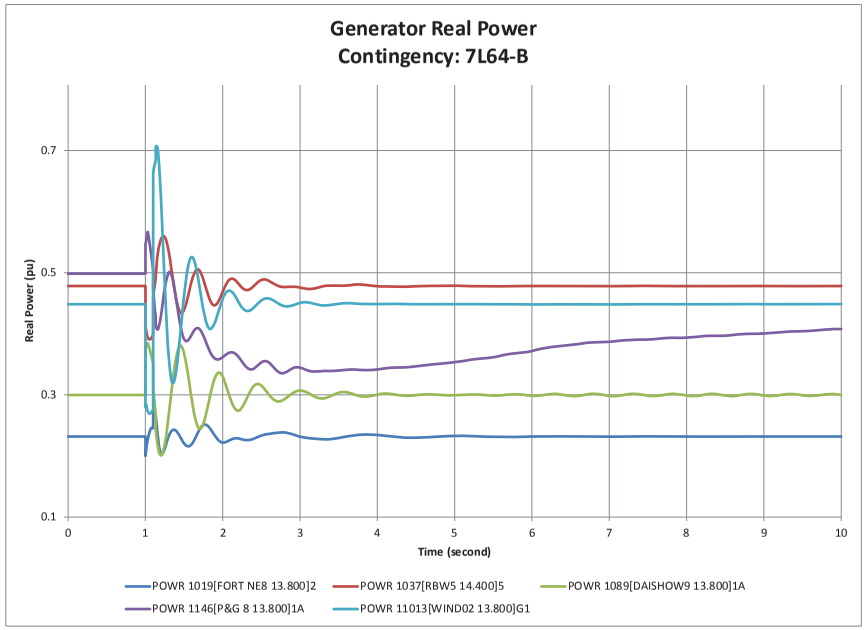

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

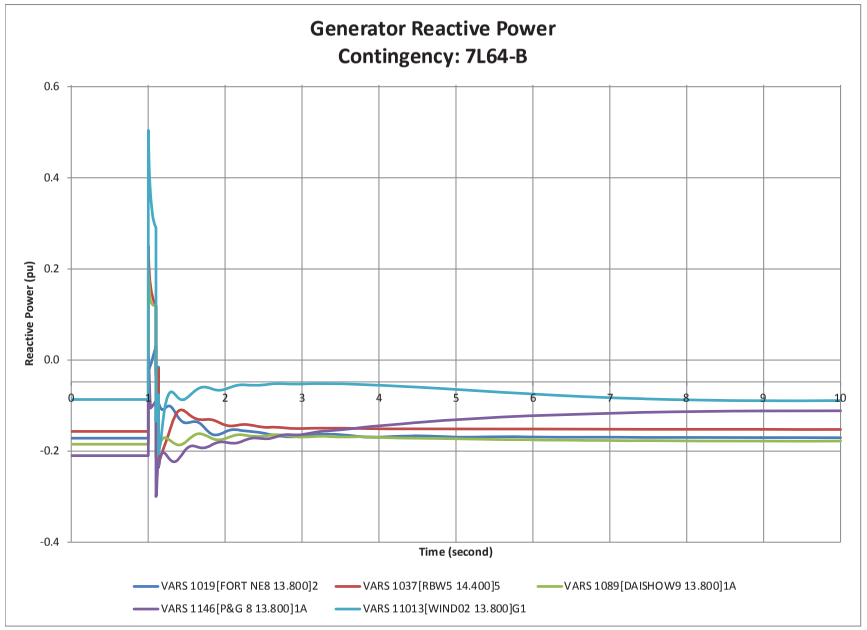

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

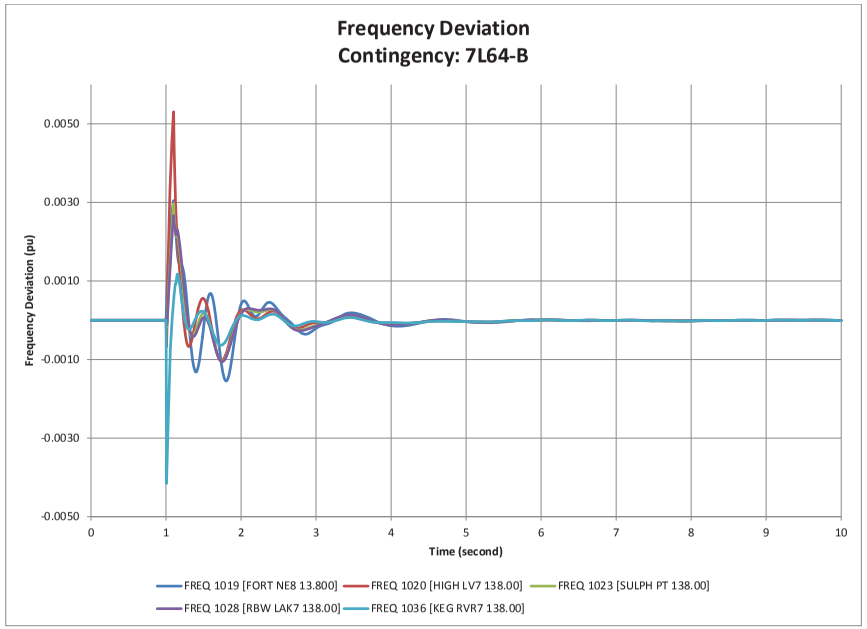

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

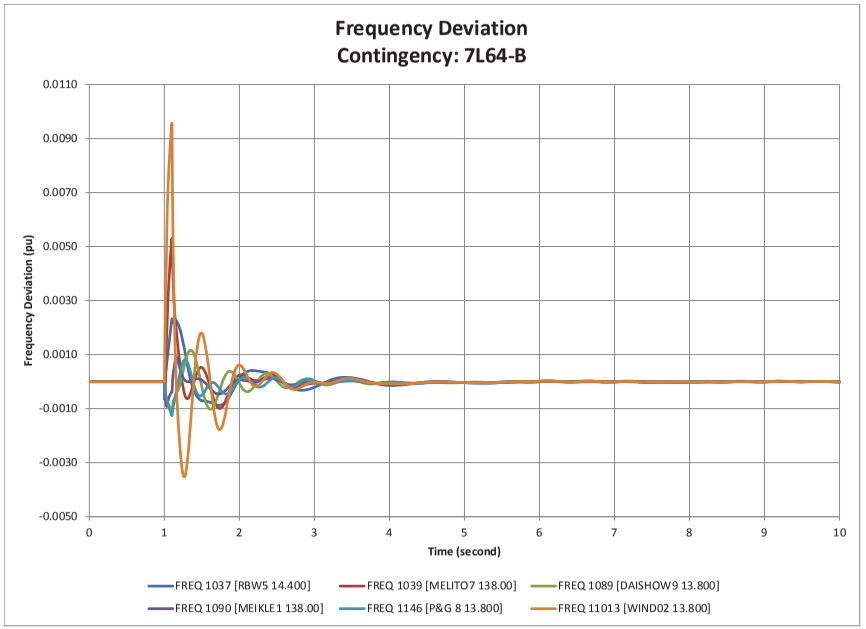

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

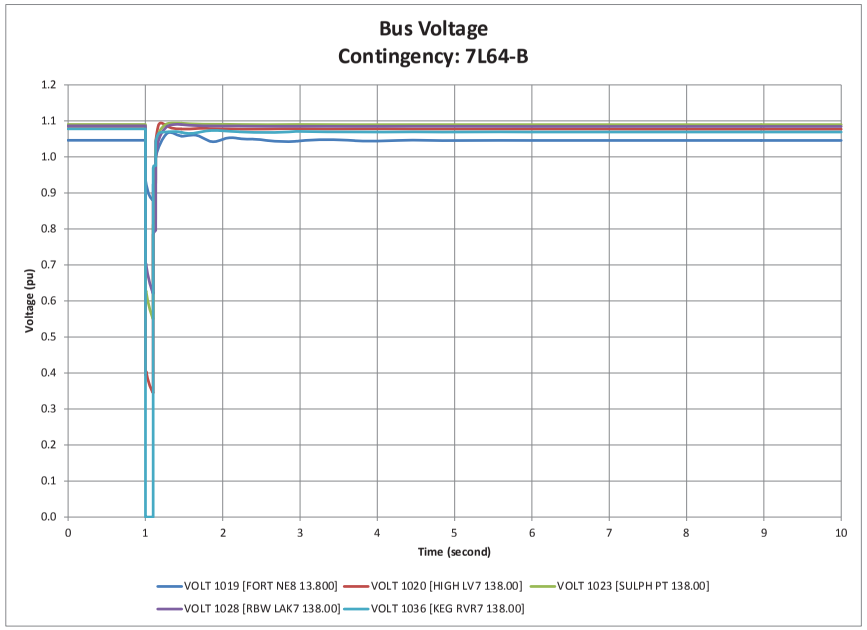

Generator Angle
Contingency: 7L64-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

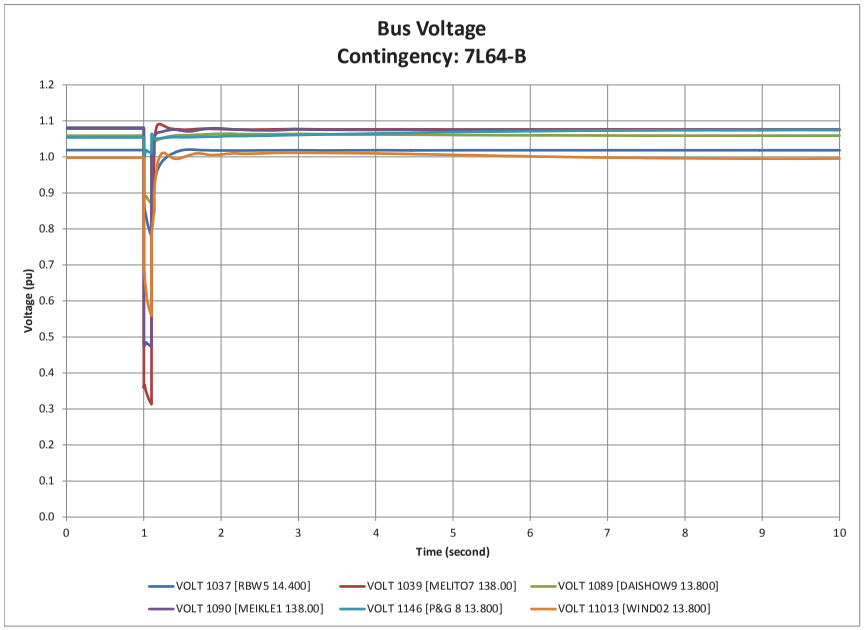

Generator Real Power
Contingency: 7L64-B
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

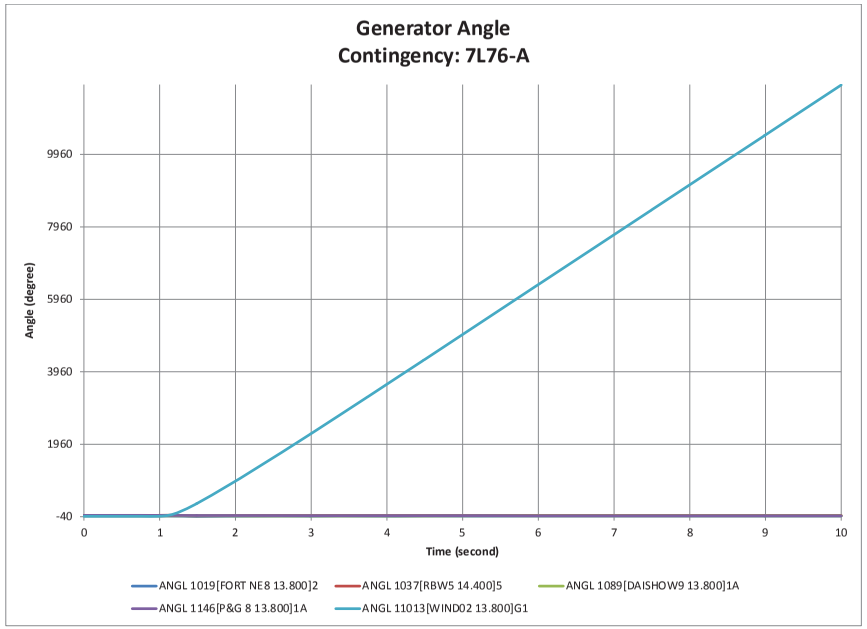

Generator Reactive Power
Contingency: 7L64-B
Reactive Power (pu)
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

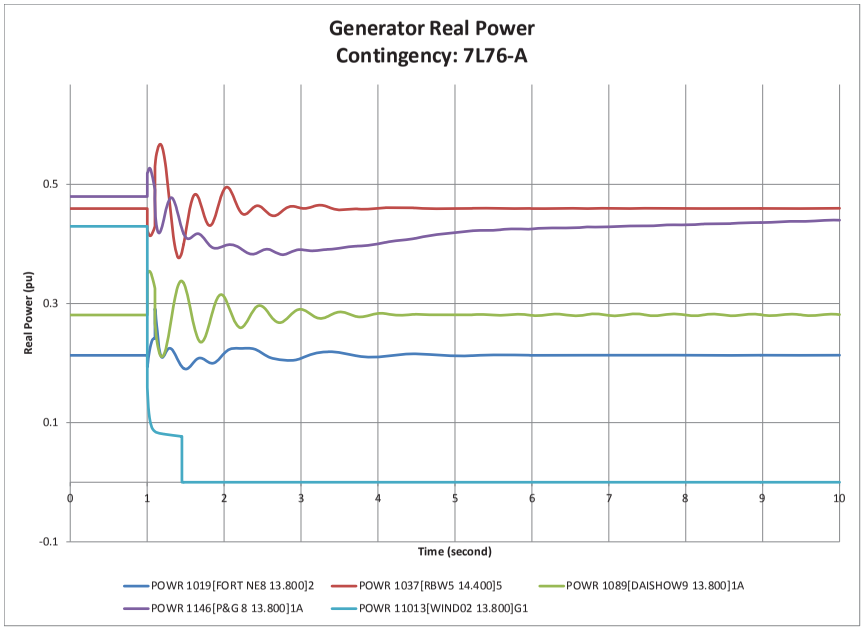

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

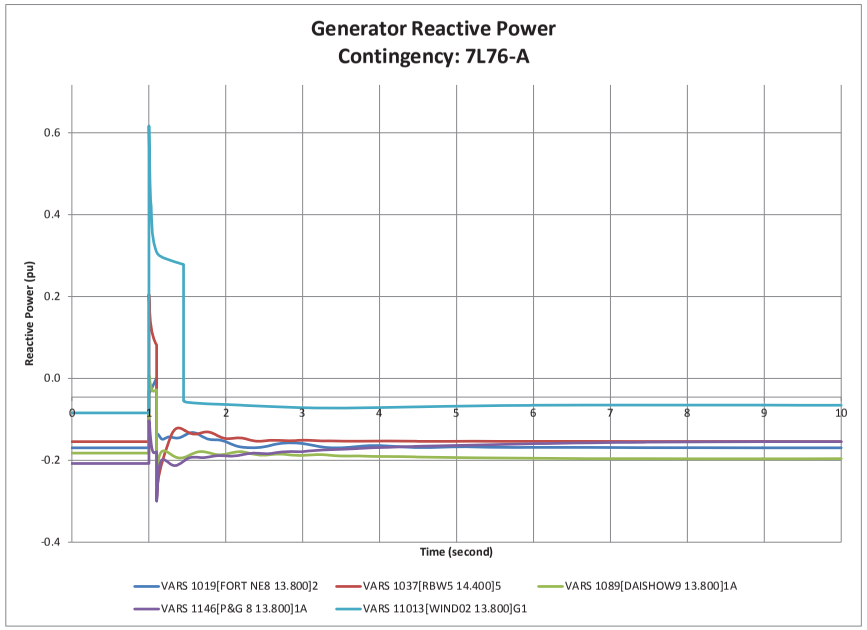

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

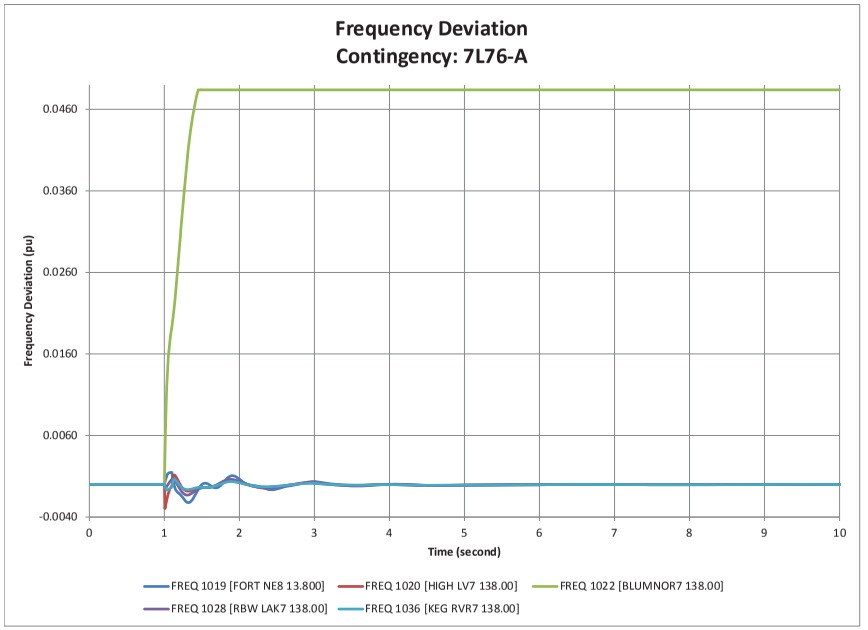

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

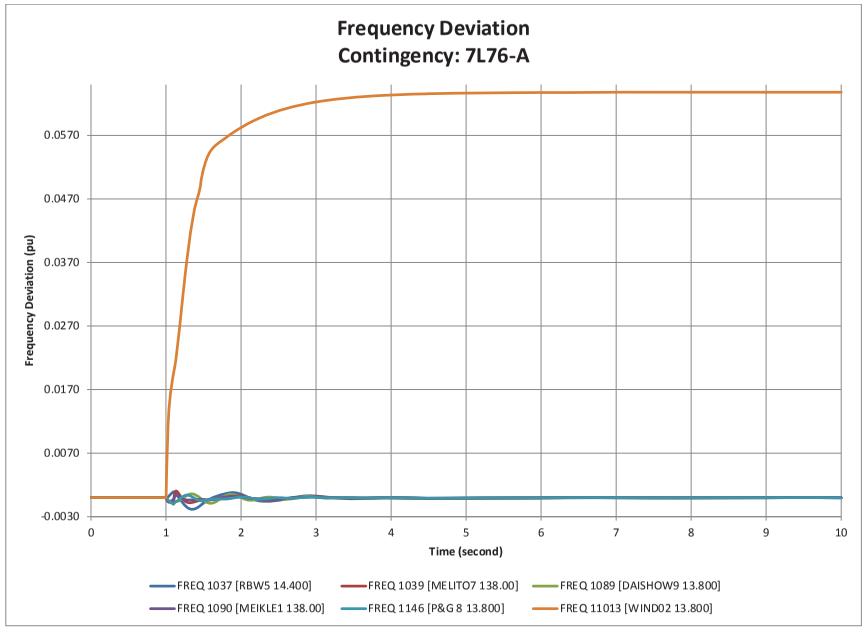

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

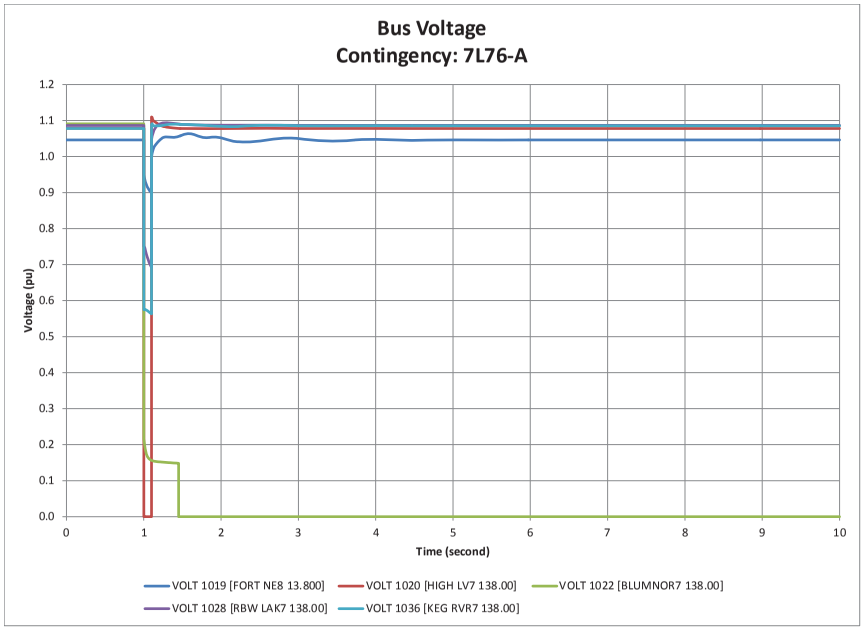

Generator Angle
Contingency: 7L76-A
Angle (degree)
9960
7960
5960
3960
1960
-40
0
1
2
3
4
5
6
7
8
9
10
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

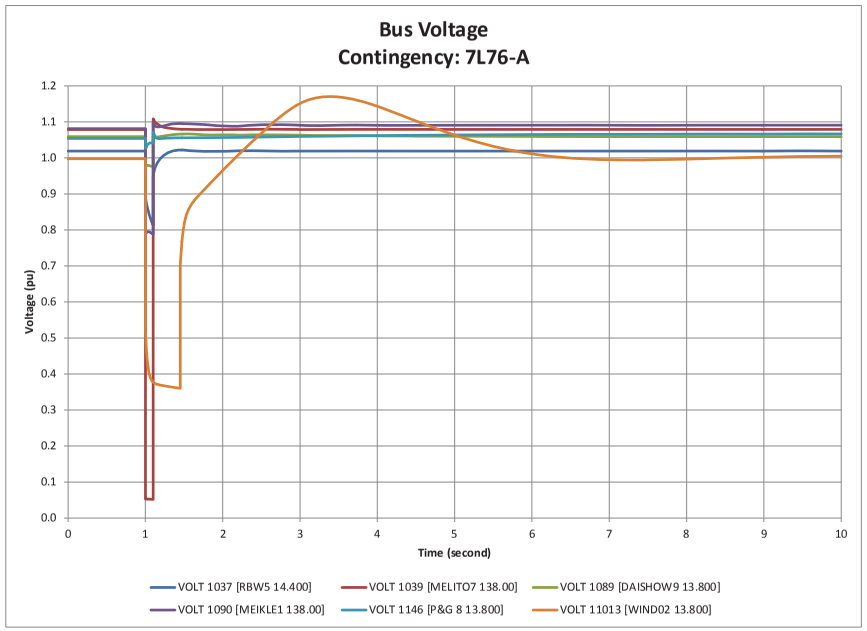

Generator Real Power
Contingency: 7L76-A
Real Power (pu)
0.5
0.3
0.1
-0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

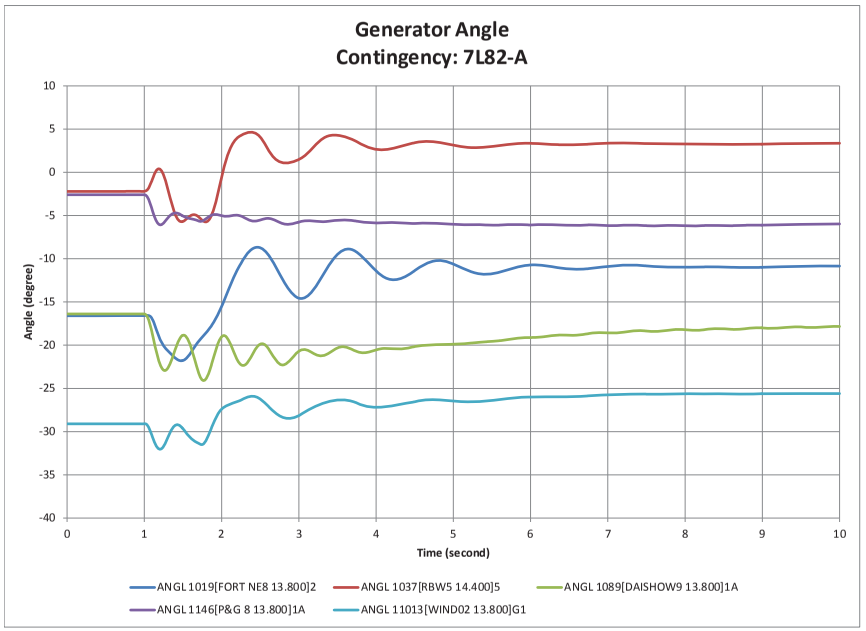

Generator Reactive Power
Contingency: 7L76-A
Reactive Power (pu)
0.6
0.4
0.2
0.0
-0.2
-0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

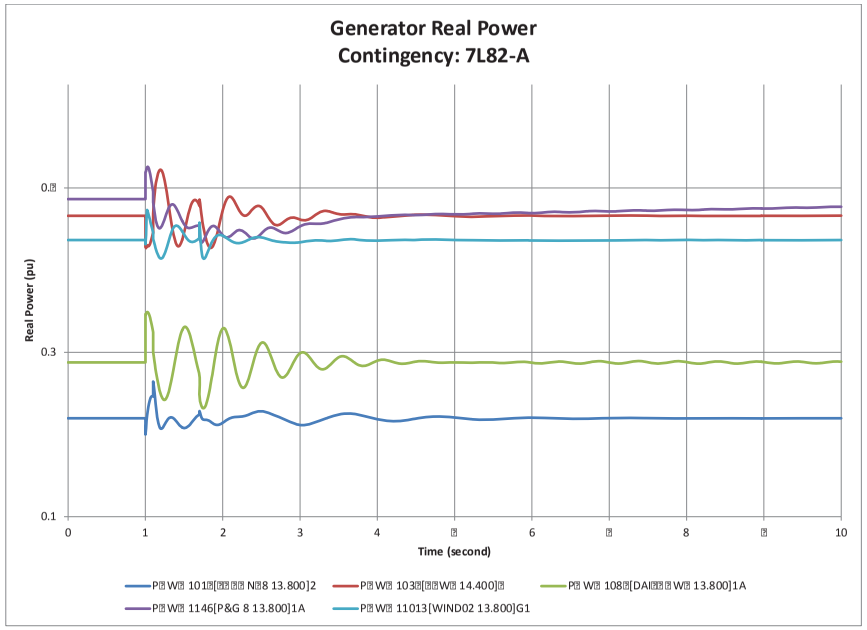

Frequency Deviation
Contingency: 7L76-A
Frequency Deviation (pu)
0.0460
0.0360
0.0260
0.0160
0.0060
-0.0040
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1022 [BLUMNOR7 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

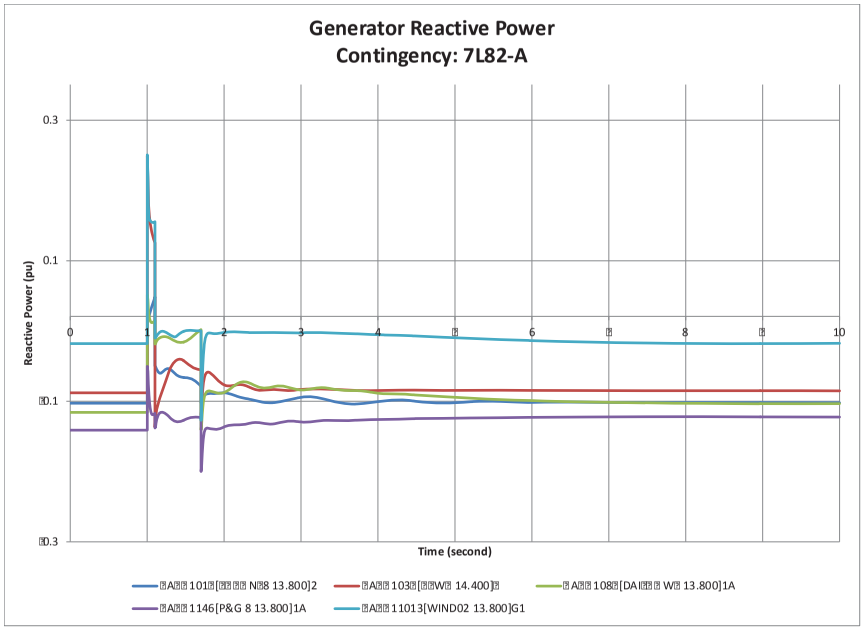

Frequency Deviation
Contingency: 7L76-A
Frequency Deviation (pu)
0.0570
0.0470
0.0370
0.0270
0.0170
0.0070
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

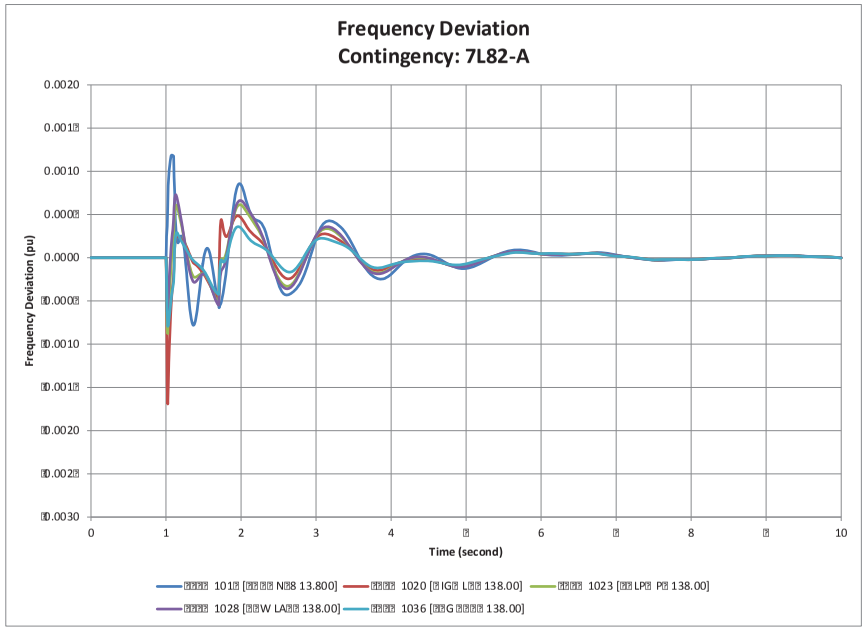

Bus Voltage
Contingency: 7L76-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1022 [BLUMNOR7 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

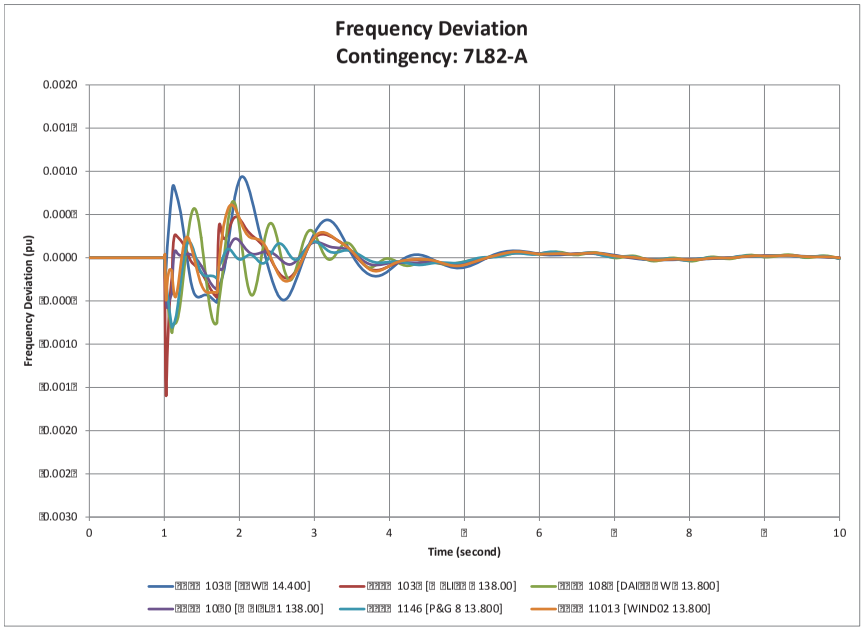

Bus Voltage
Contingency: 7L76-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

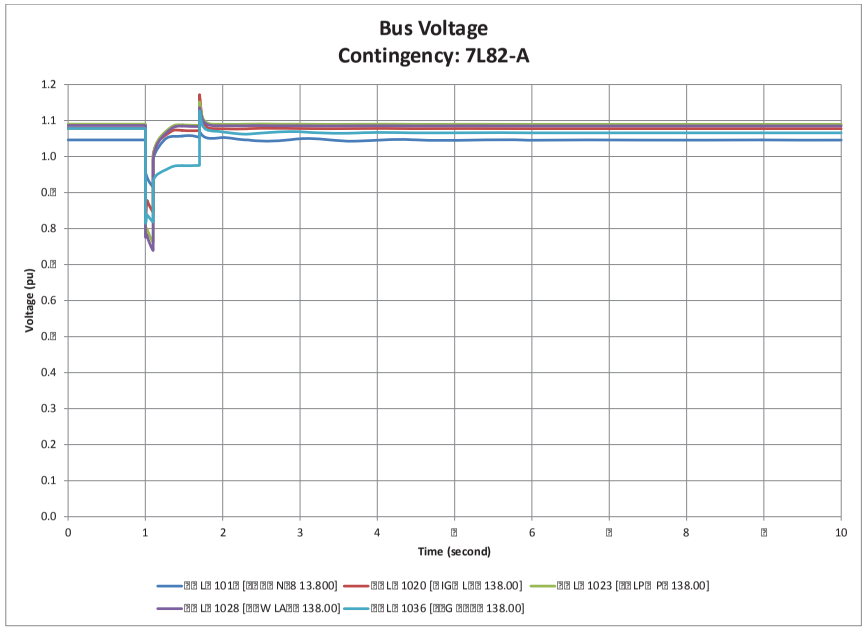

Generator Angle
Contingency: 7L82-A
Angle (degree)
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
0
1
2
3
4
5
6
7
8
9
10
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

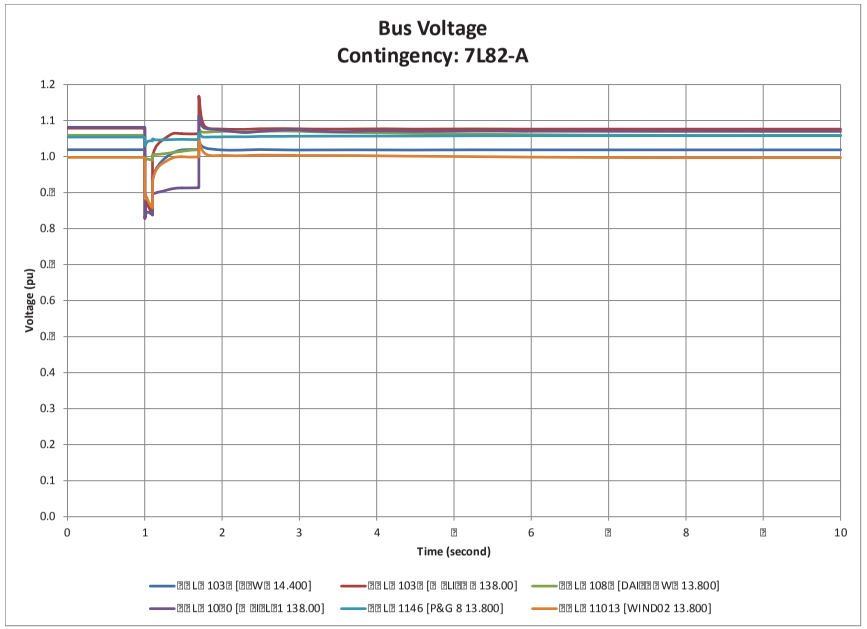

Generator Real Power
Contingency: 7L82-A
Real Power (pu)
Time (second)

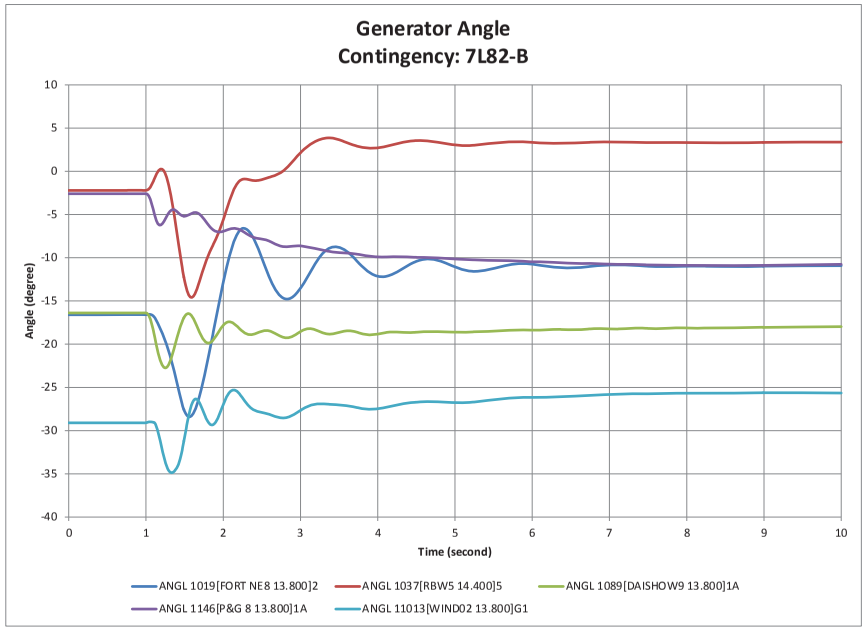

Generator Reactive Power
Contingency: 7L82-A
Reactive Power (pu)
Time (second)

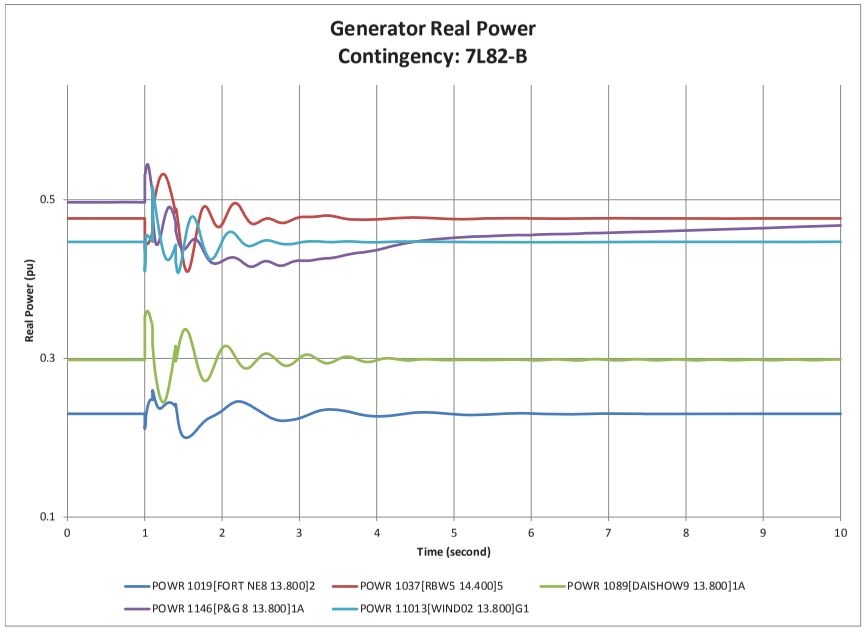

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
Time (second)

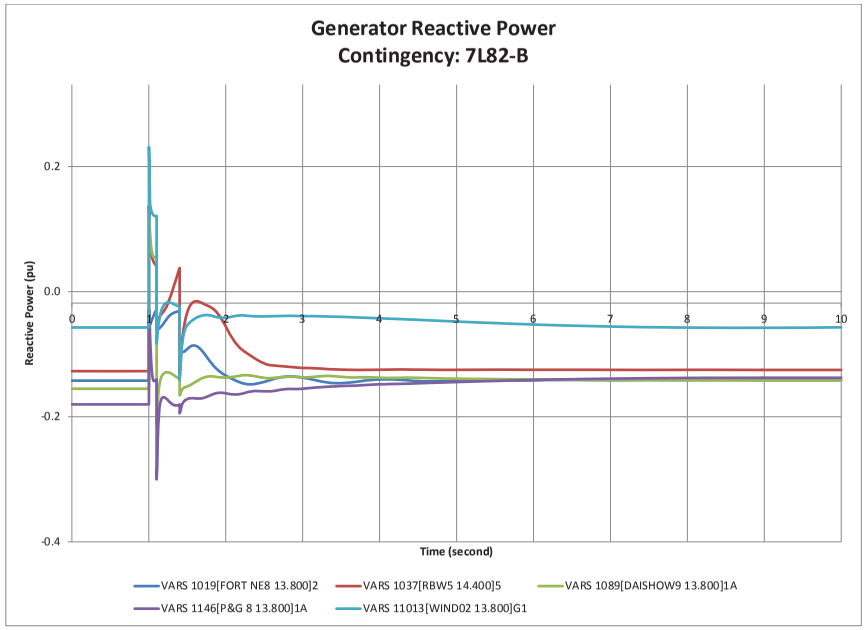

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
Time (second)

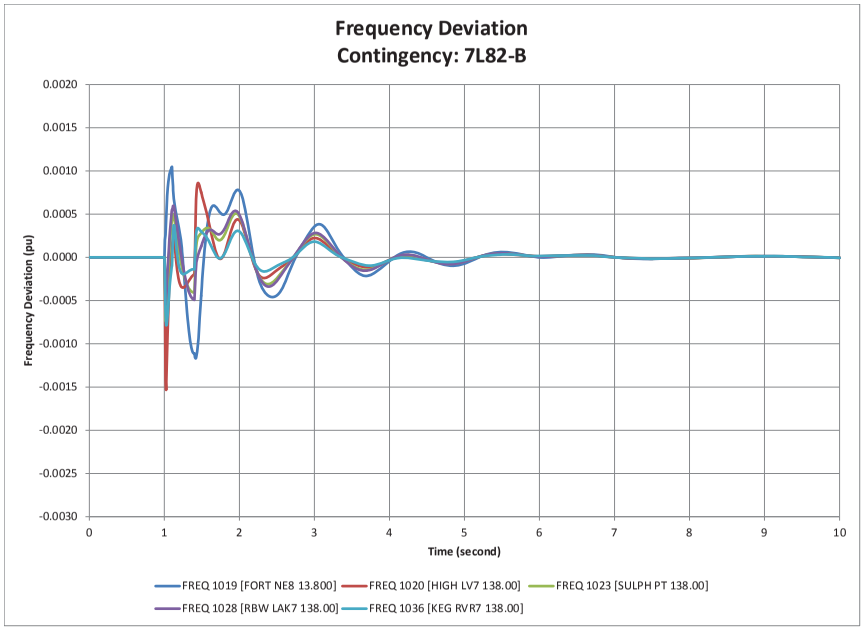

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)

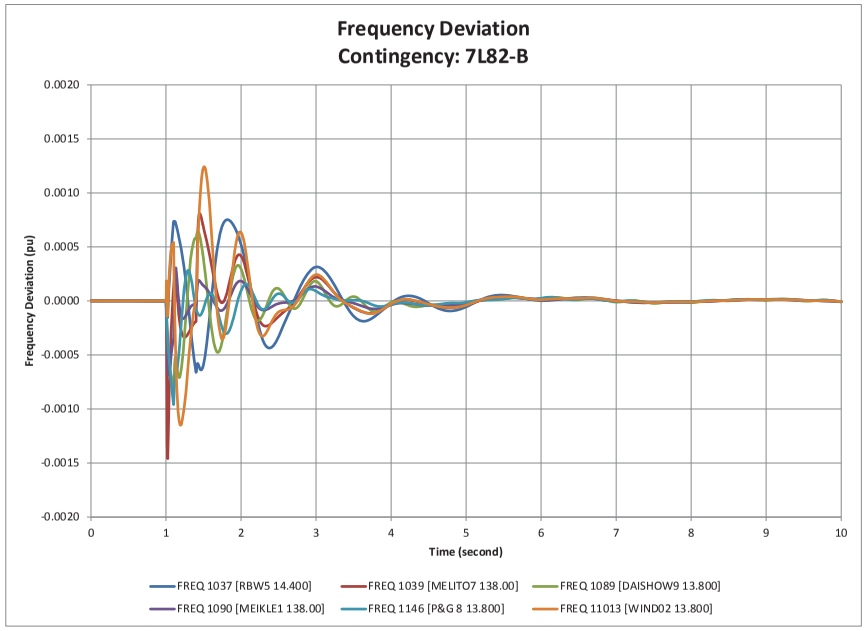

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)

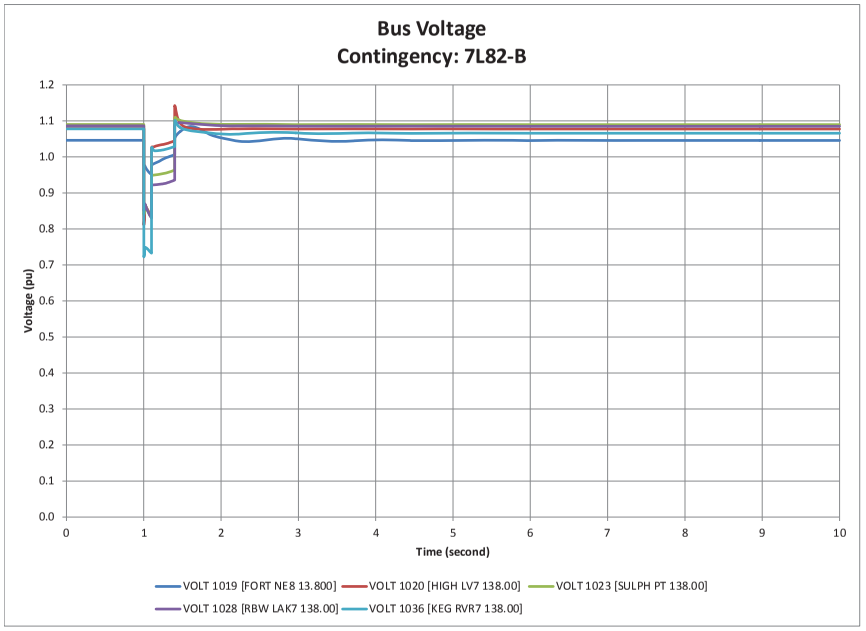

Generator Angle
Contingency: 7L82-B
Angle (degree)
Time (second)
ANGL 1019[FORT NE8 13.800]2
ANGL 1037[RBW5 14.400]5
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

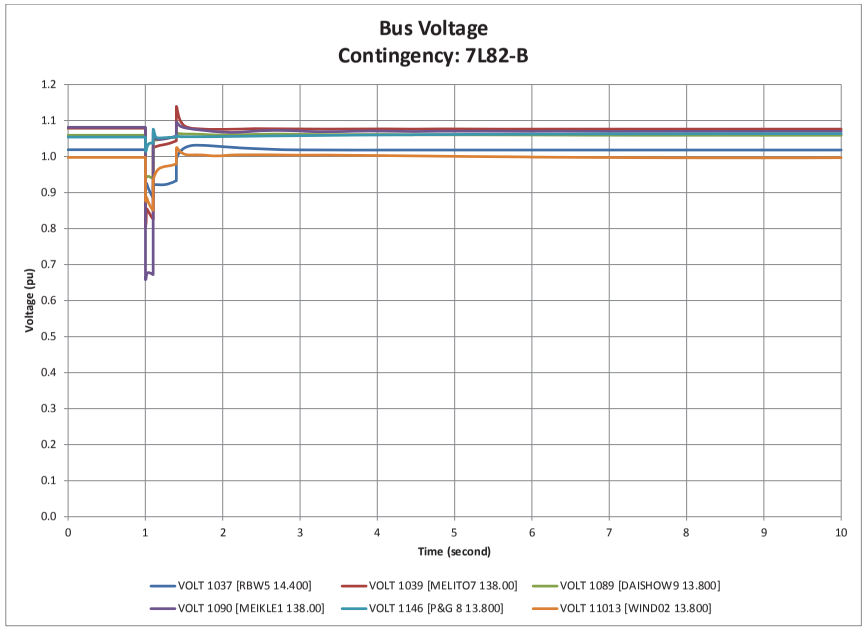

Generator Real Power
Contingency: 7L82-B
Real Power (pu)
Time (second)
POWR 1019[FORT NE8 13.800]2
POWR 1037[RBW5 14.400]5
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1


Generator Reactive Power
Contingency: 7L82-B
Reactive Power (pu)
0.2
0.0
-0.2
-0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1019[FORT NE8 13.800]2
VARS 1037[RBW5 14.400]5
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1


Frequency Deviation
Contingency: 7L82-B
Frequency Deviation (pu)
0.0020
0.0015
0.0010
0.0005
0.0000
-0.0005
-0.0010
-0.0015
-0.0020
-0.0025
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

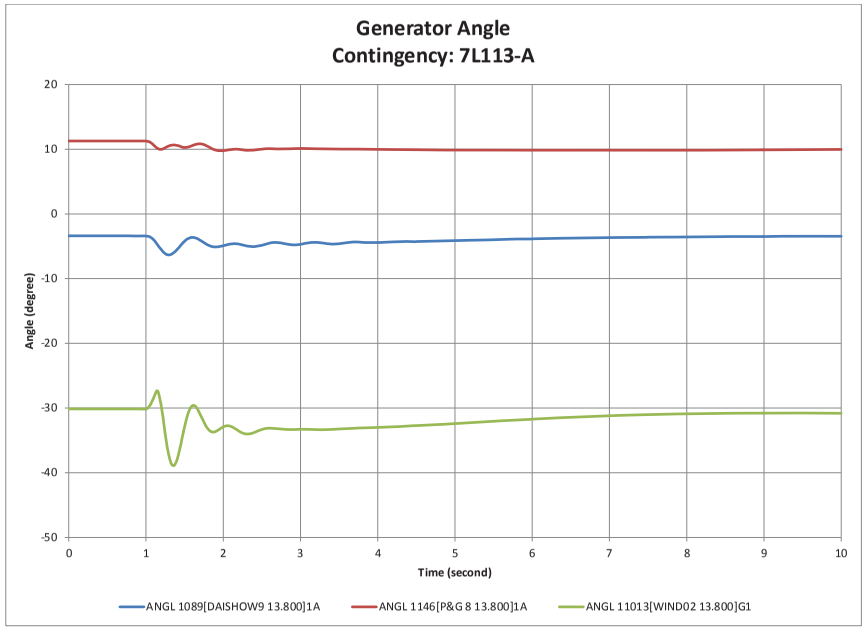

Frequency Deviation
Contingency: 7L82-B
Frequency Deviation (pu)
0.0020
0.0015
0.0010
0.0005
0.0000
-0.0005
-0.0010
-0.0015
-0.0020
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

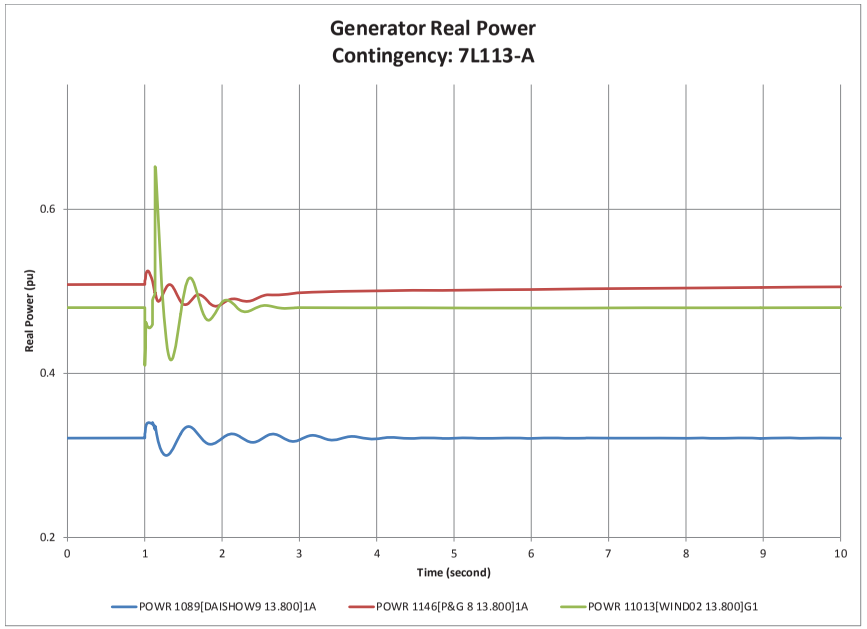

Bus Voltage
Contingency: 7L82-B
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

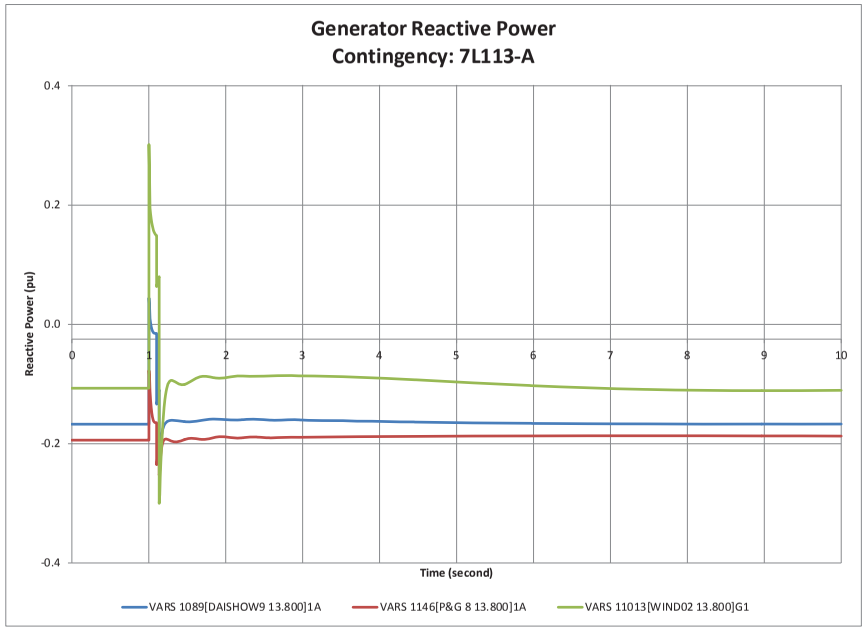

Bus Voltage
Contingency: 7L82-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

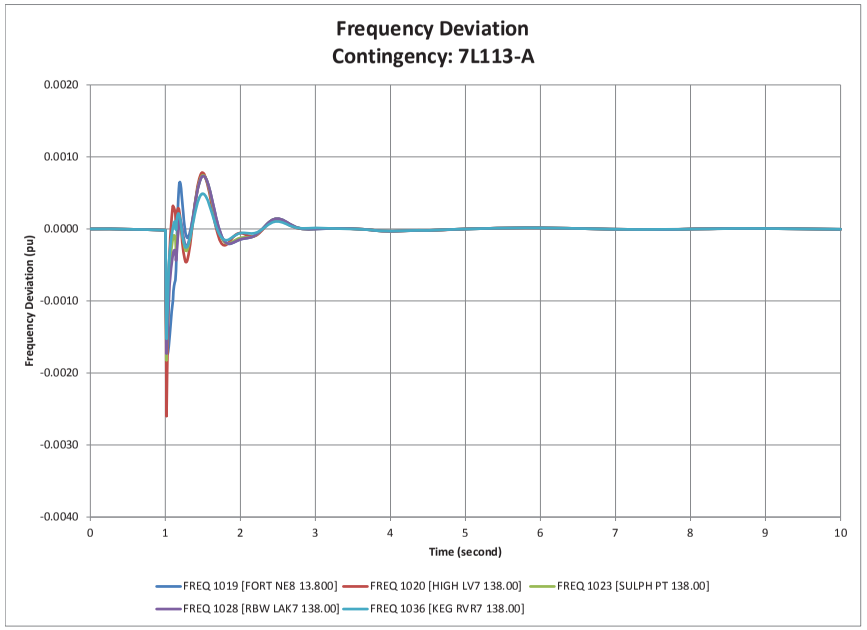
Attachment D-3

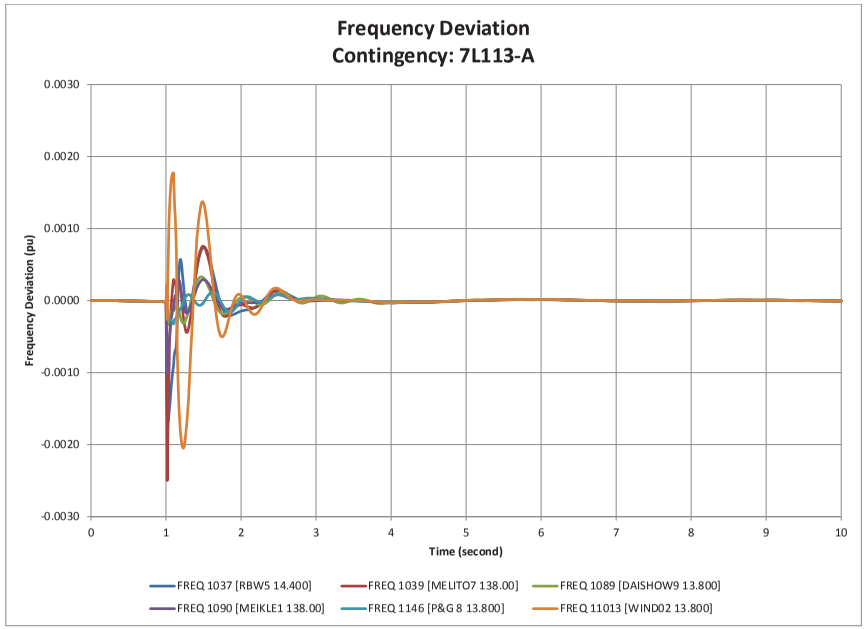
Post-Connection Transient Stability Analysis Results (2014 SL)

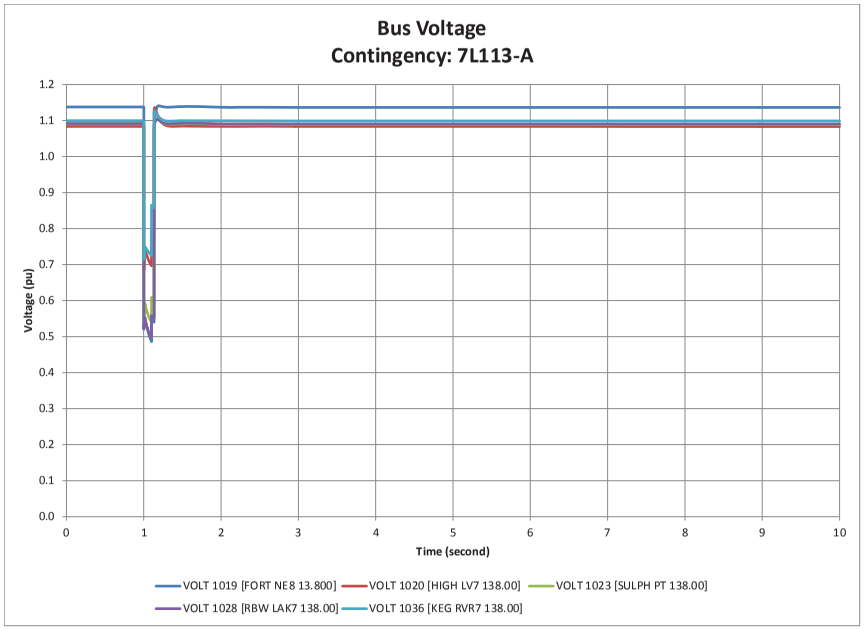

Generator Angle
Contingency: 7L113-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

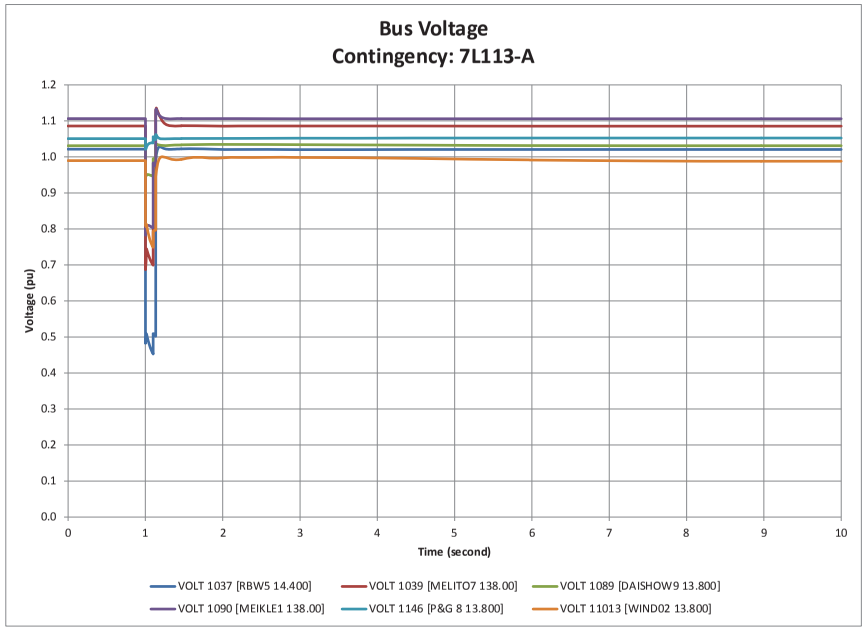

Generator Real Power
Contingency: 7L113-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

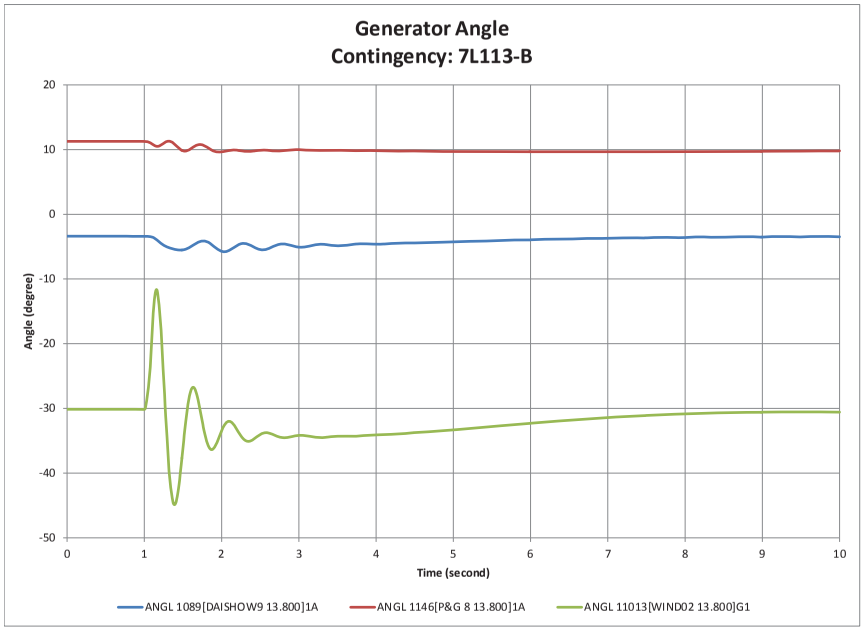

Generator Reactive Power
Contingency: 7L113-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

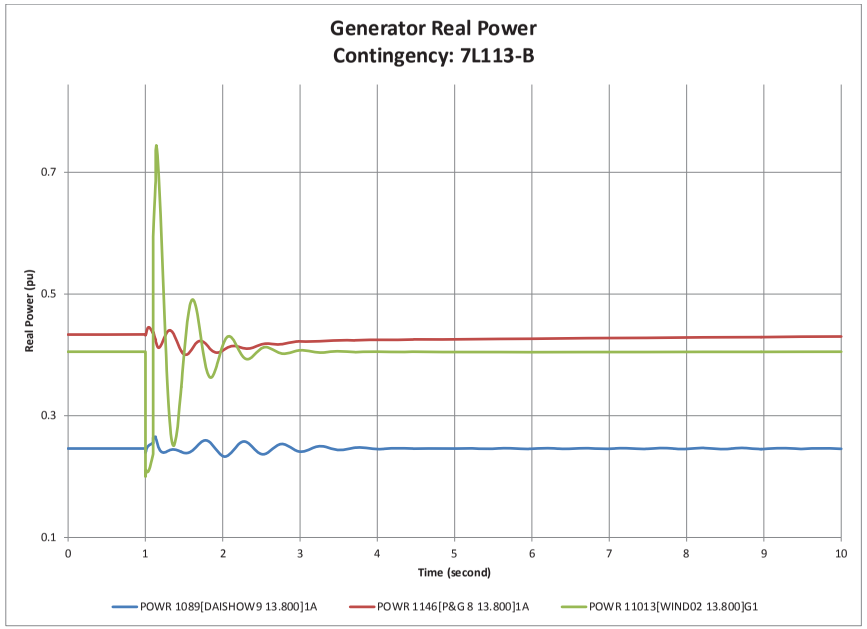

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

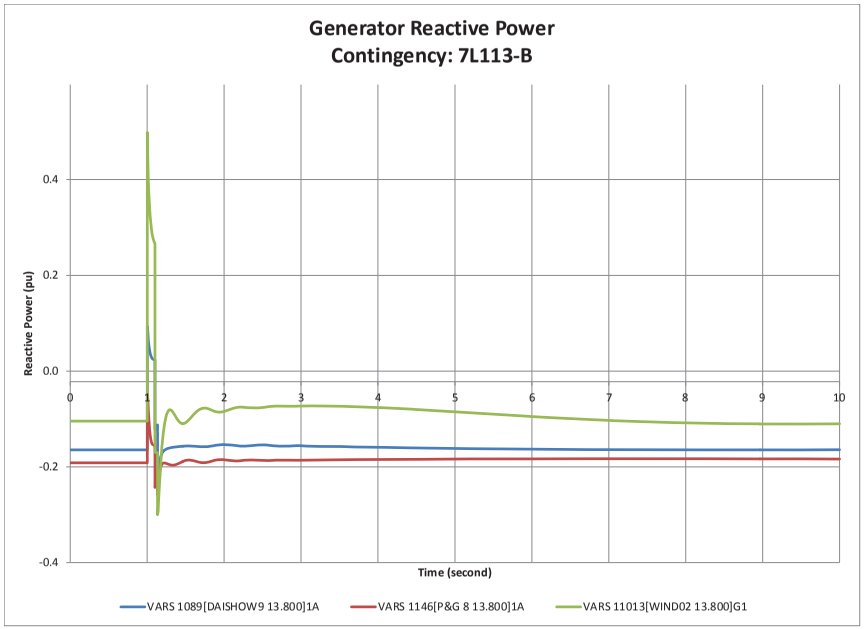

Frequency Deviation
Contingency: 7L113-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

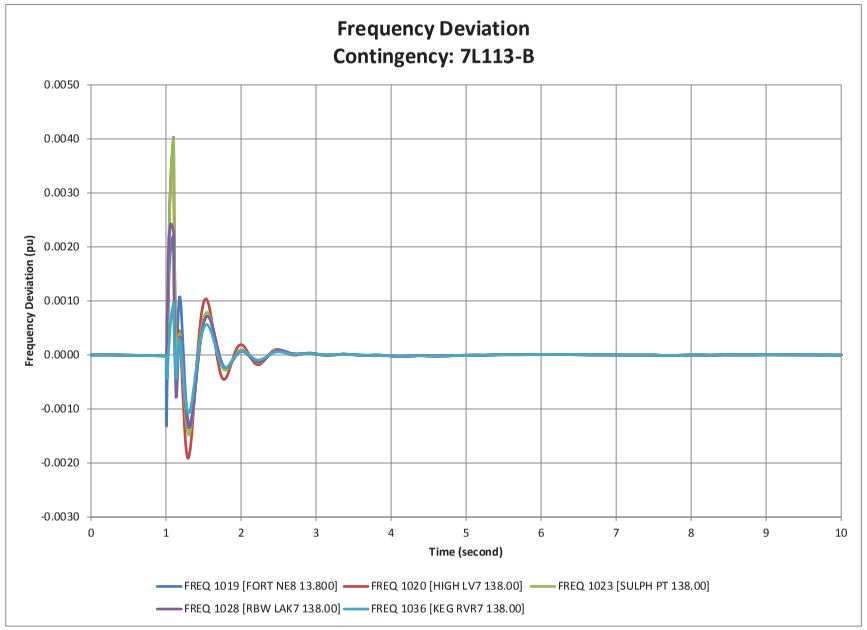

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

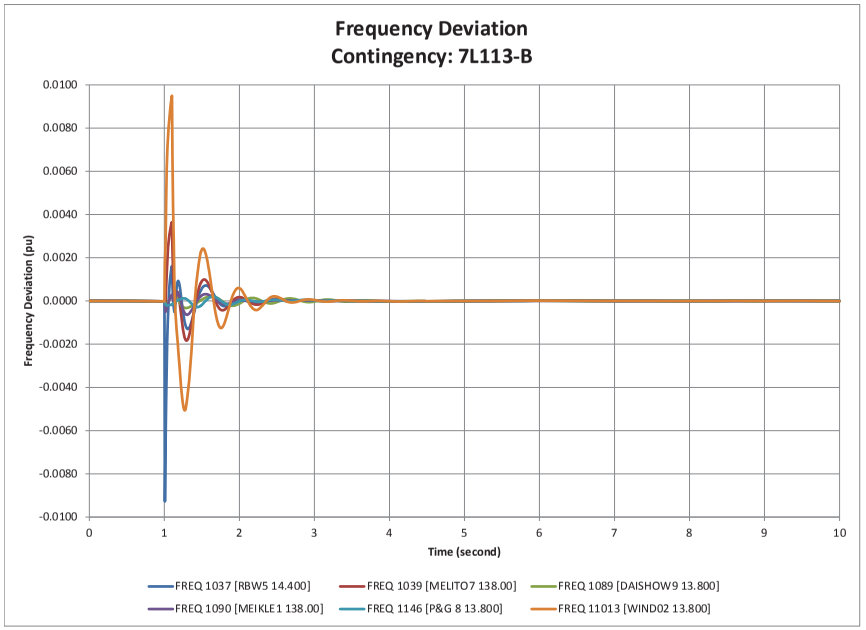

Bus Voltage
Contingency: 7L113-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

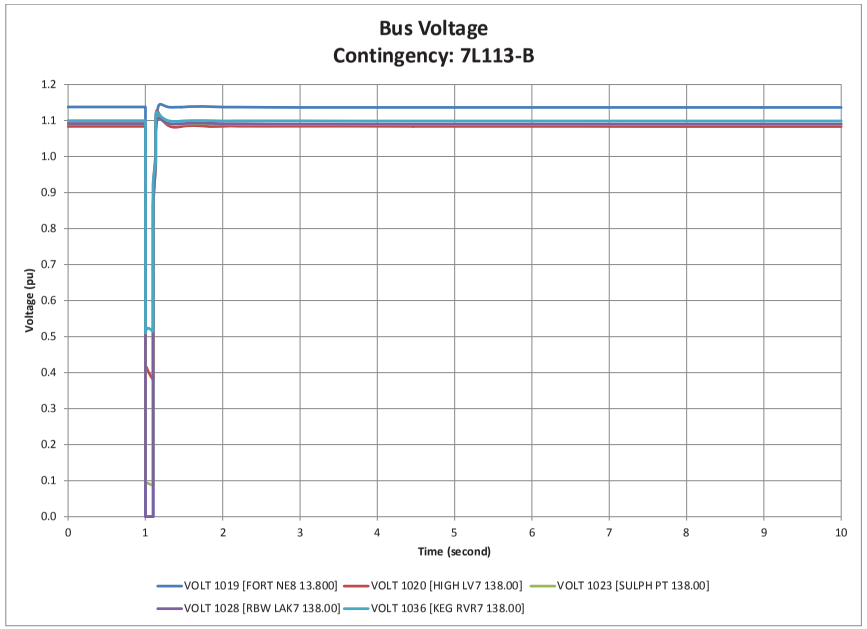

Generator Angle
Contingency: 7L113-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

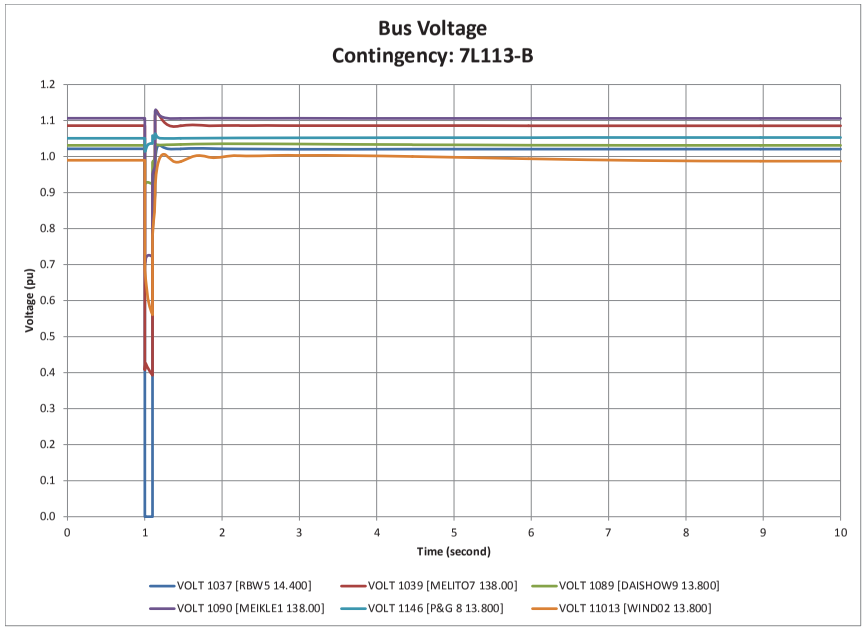

Generator Real Power
Contingency: 7L113-B
Real Power (pu)
0.7
0.5
0.3
0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

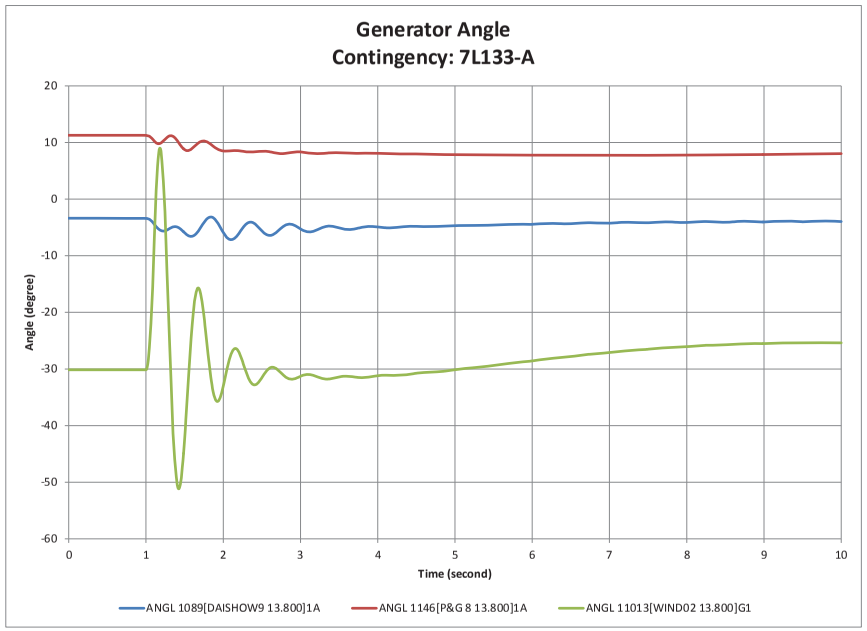

Generator Reactive Power
Contingency: 7L113-B
Reactive Power (pu)
0.4
0.2
0.0
-0.2
-0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

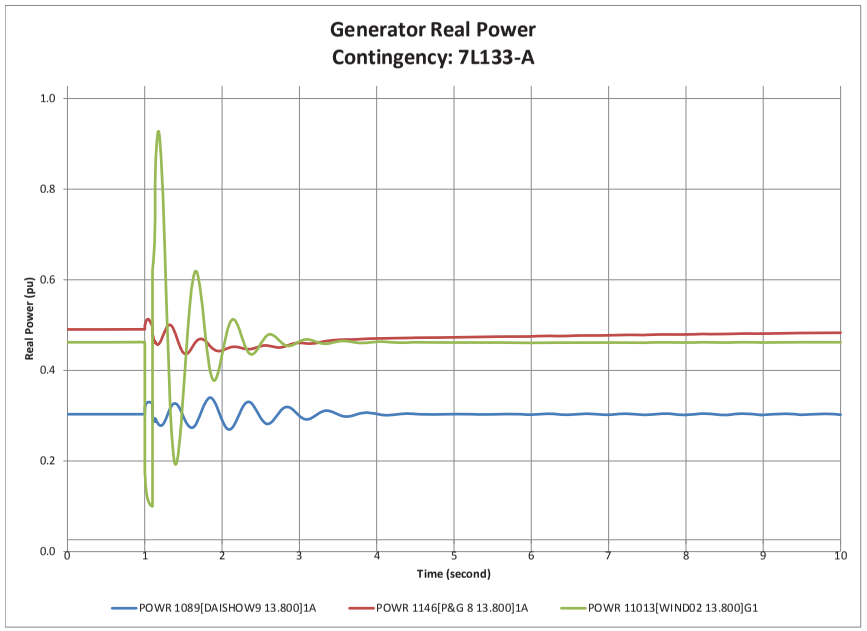

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

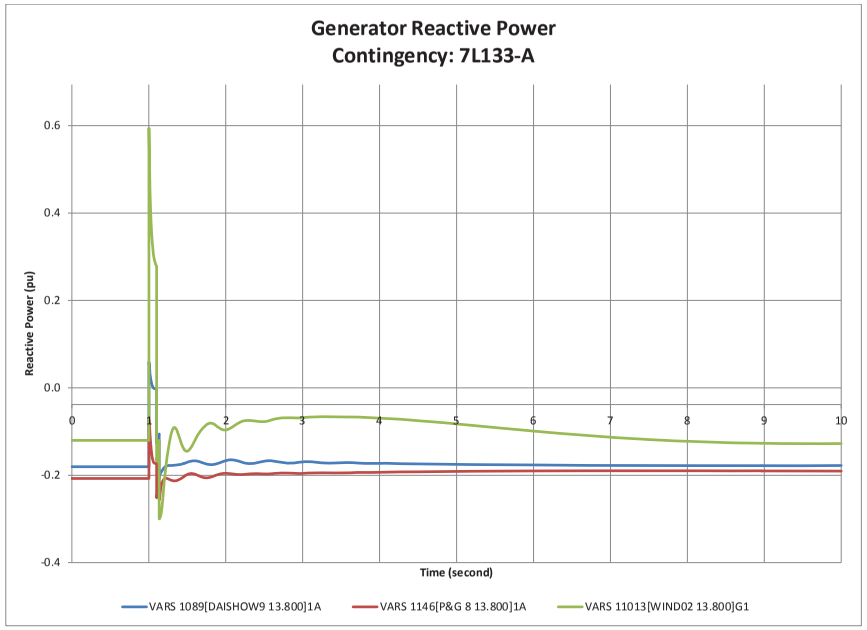

Frequency Deviation
Contingency: 7L113-B
Frequency Deviation (pu)
0.0100
0.0080
0.0060
0.0040
0.0020
0.0000
-0.0020
-0.0040
-0.0060
-0.0080
-0.0100
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

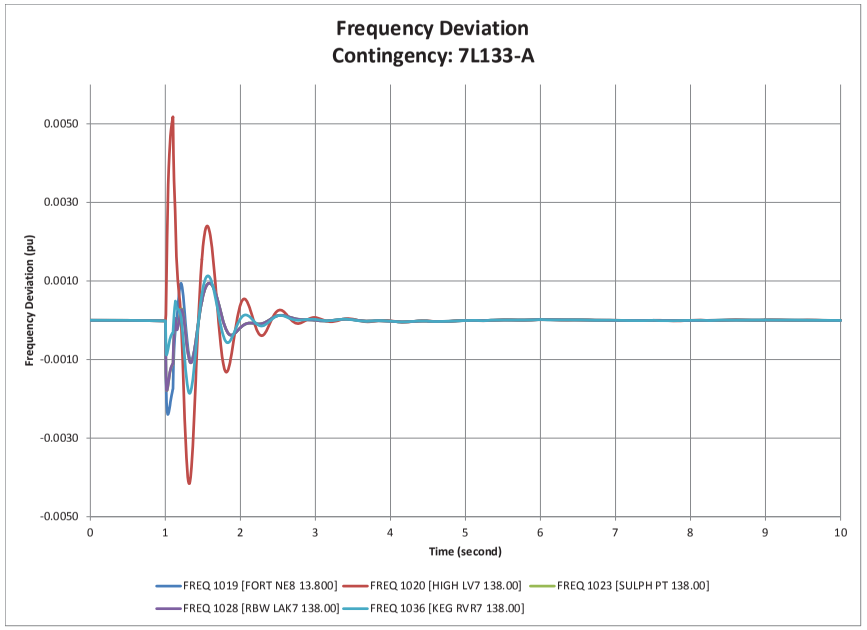

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

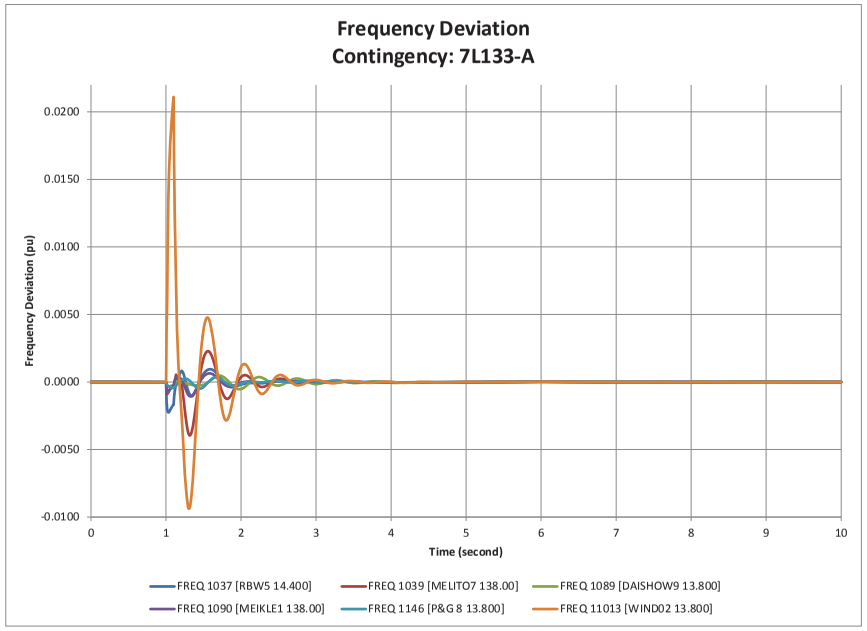

Bus Voltage
Contingency: 7L113-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

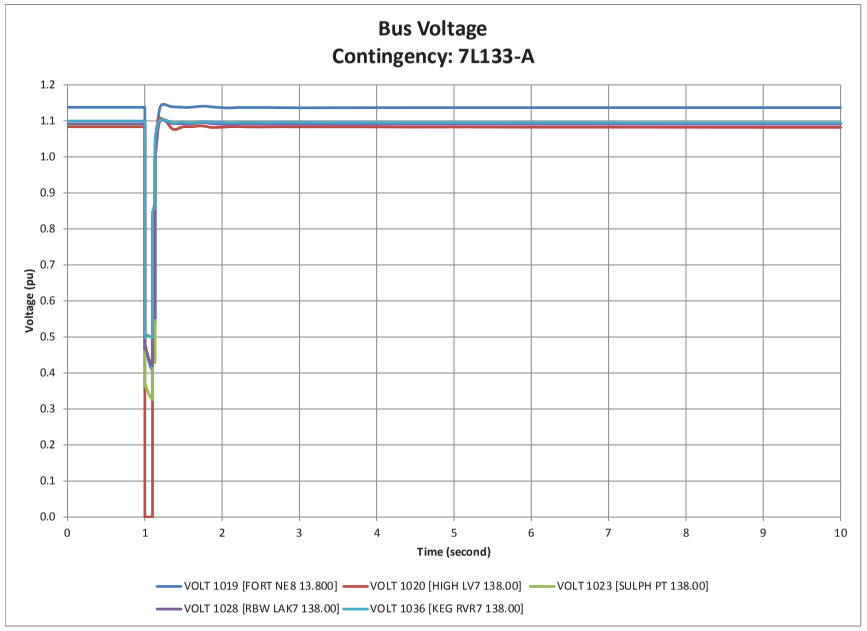

Generator Angle
Contingency: 7L133-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

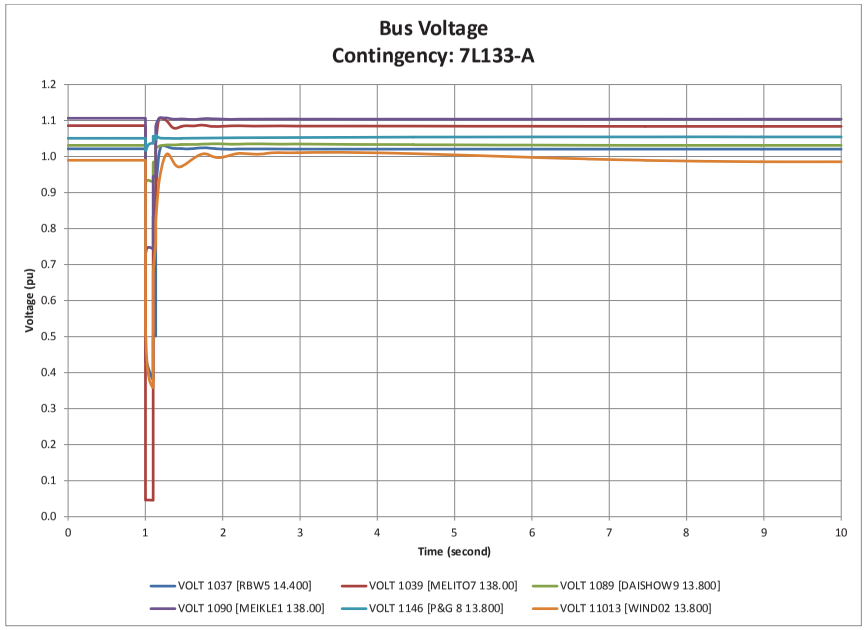

Generator Real Power
Contingency: 7L133-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

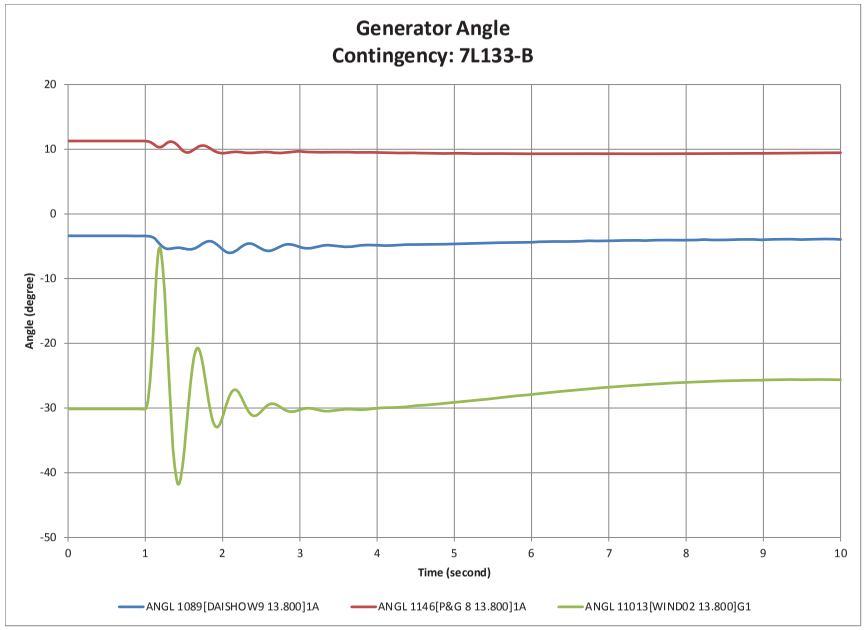

Generator Reactive Power
Contingency: 7L133-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

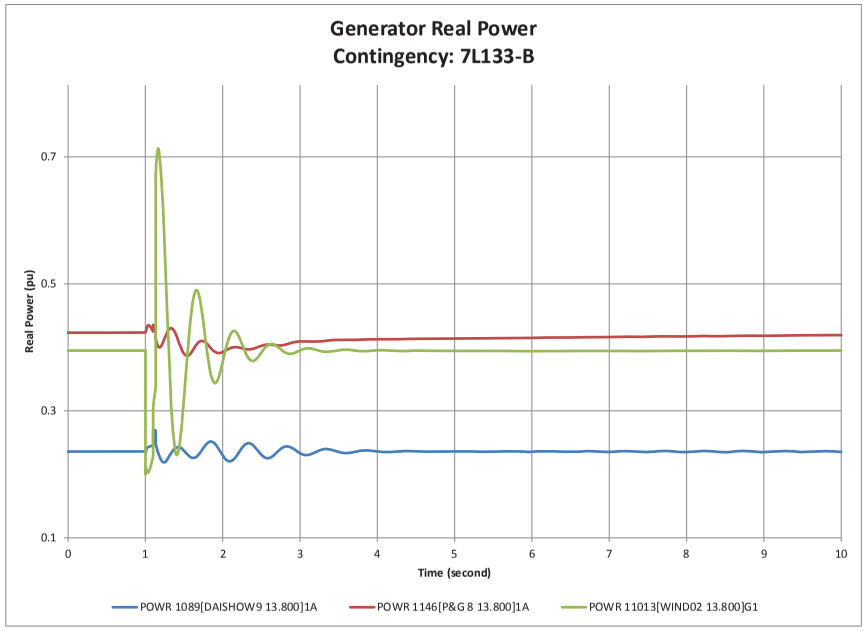

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

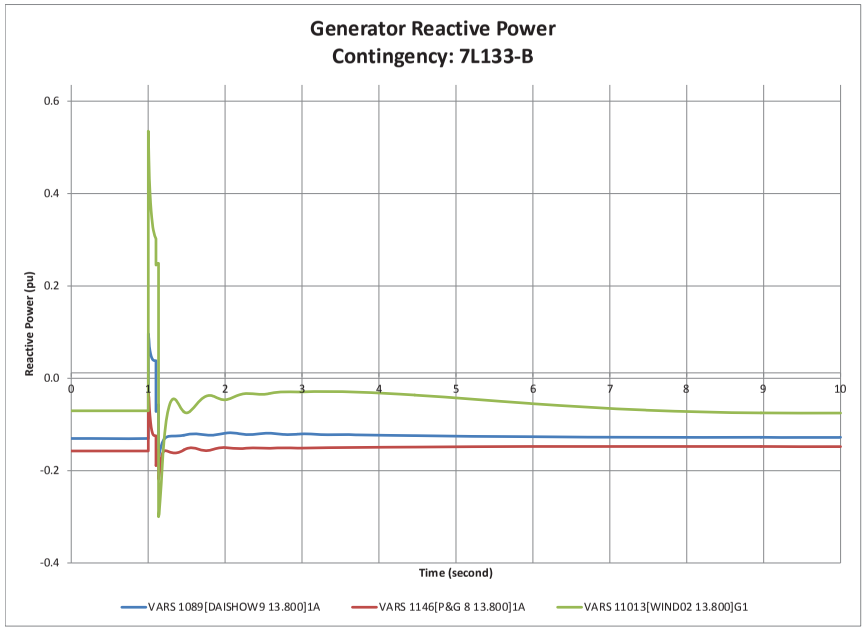

Frequency Deviation
Contingency: 7L133-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

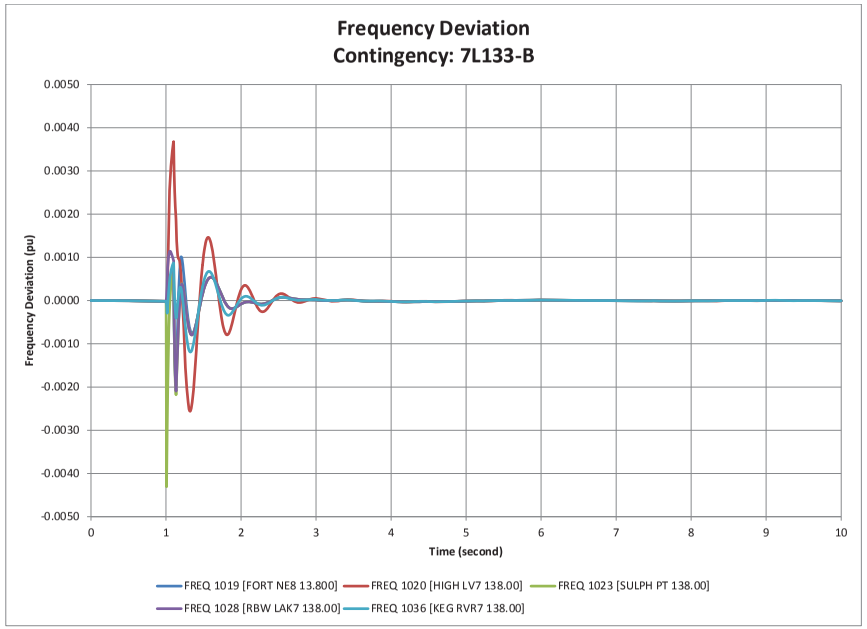

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

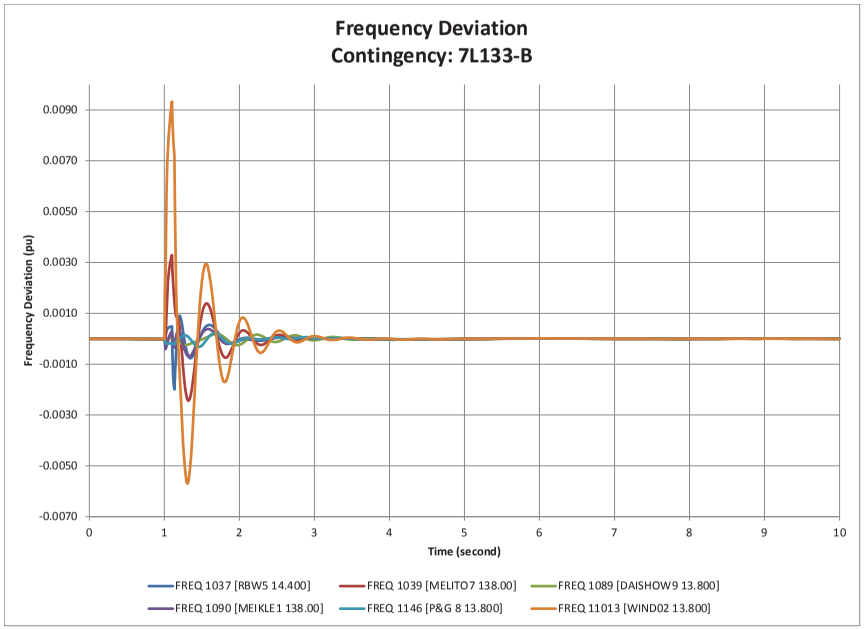

Bus Voltage
Contingency: 7L133-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

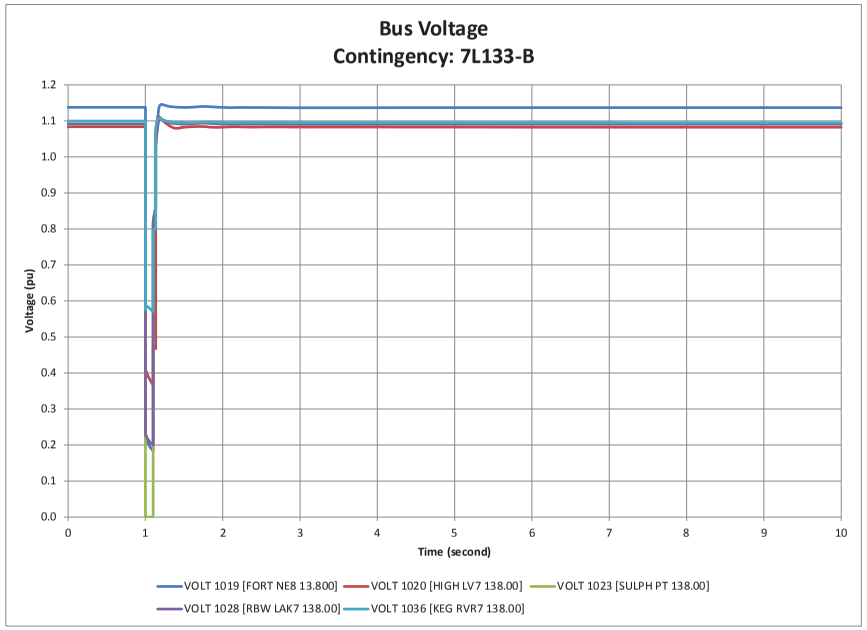

Generator Angle
Contingency: 7L133-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

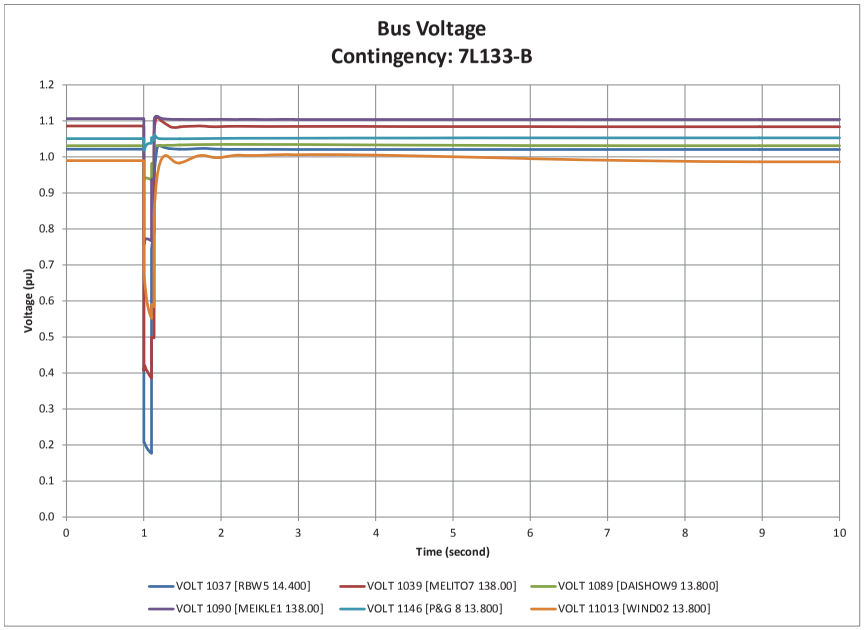

Generator Real Power
Contingency: 7L133-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

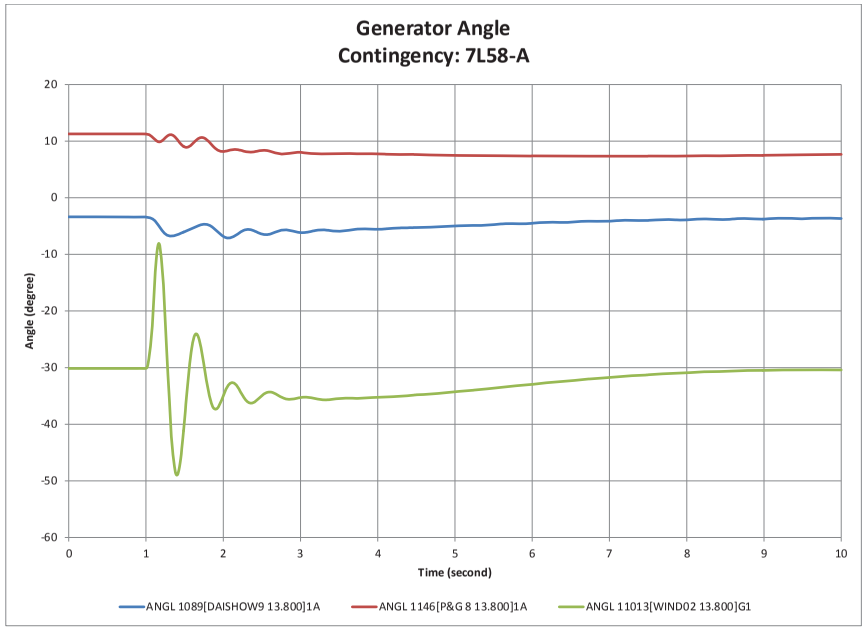

Generator Reactive Power
Contingency: 7L133-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

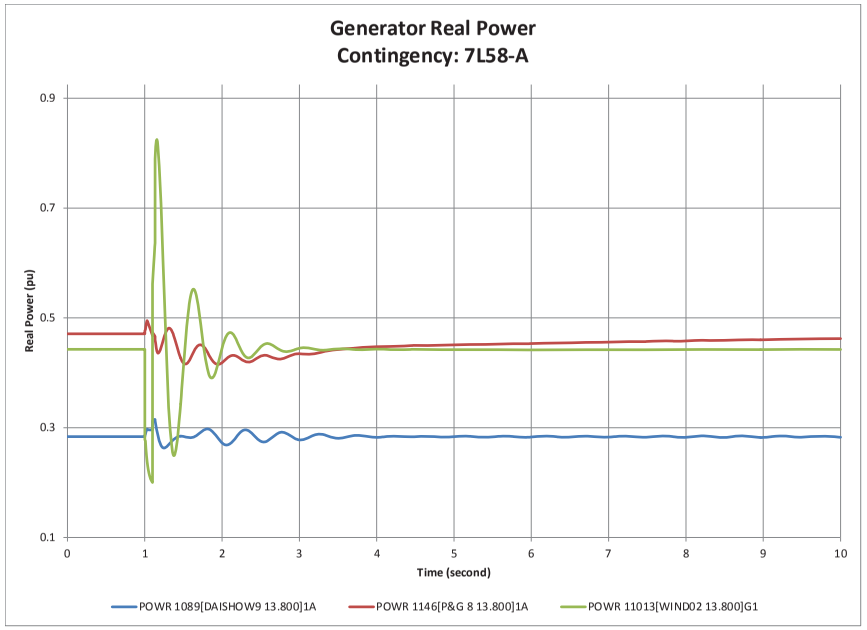

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

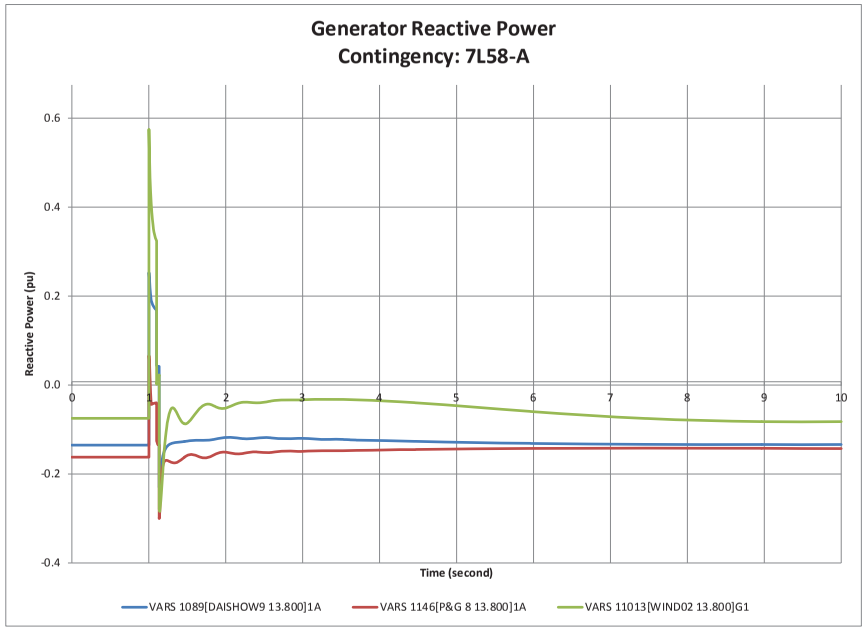

Frequency Deviation
Contingency: 7L133-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

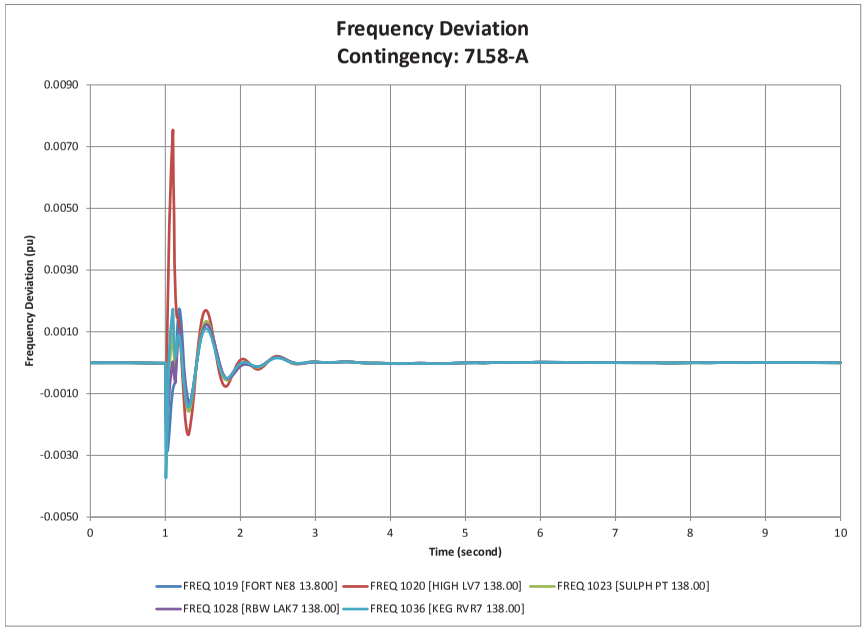

Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]


Bus Voltage
Contingency: 7L133-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

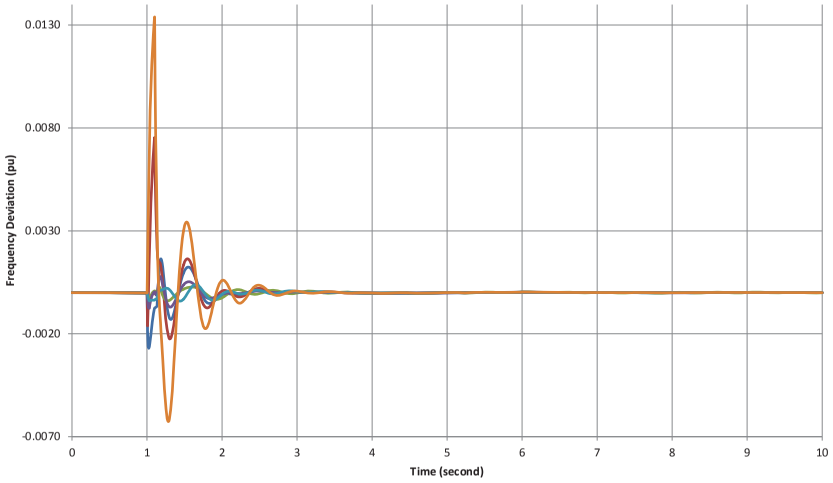

Generator Angle
Contingency: 7L58-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1


Generator Real Power
Contingency: 7L58-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

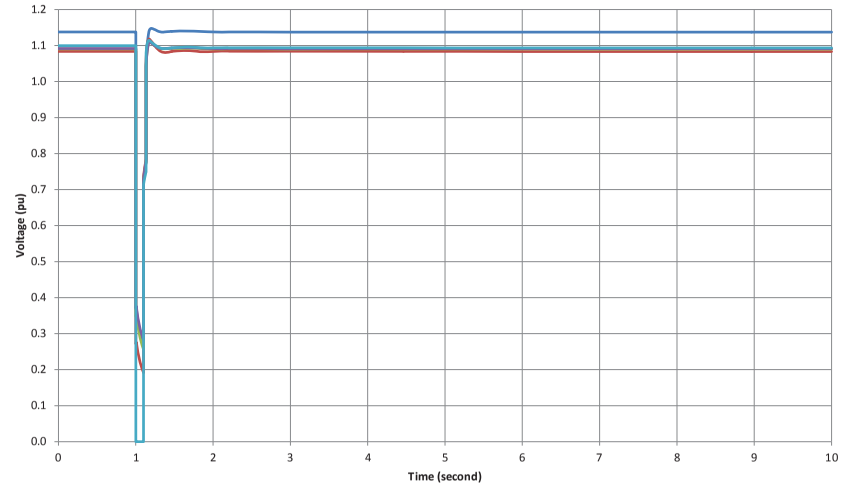

Generator Reactive Power
Contingency: 7L58-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1


Frequency Deviation
Contingency: 7L58-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

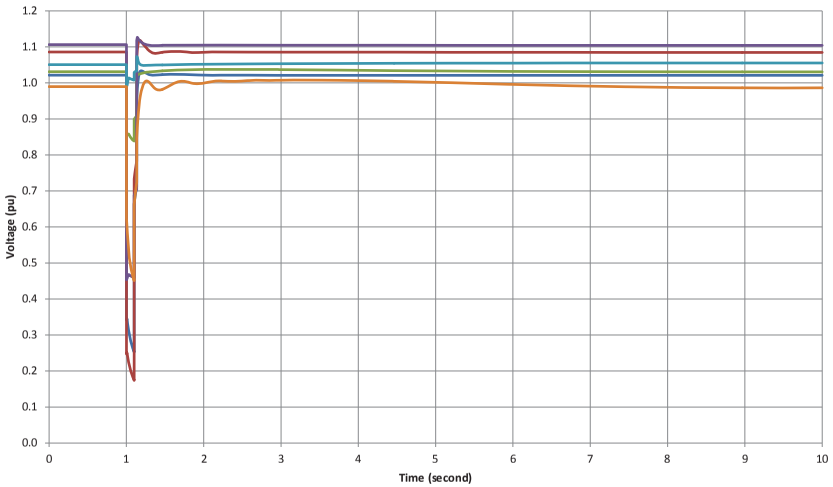
Frequency Deviation
Contingency: 7L58-A



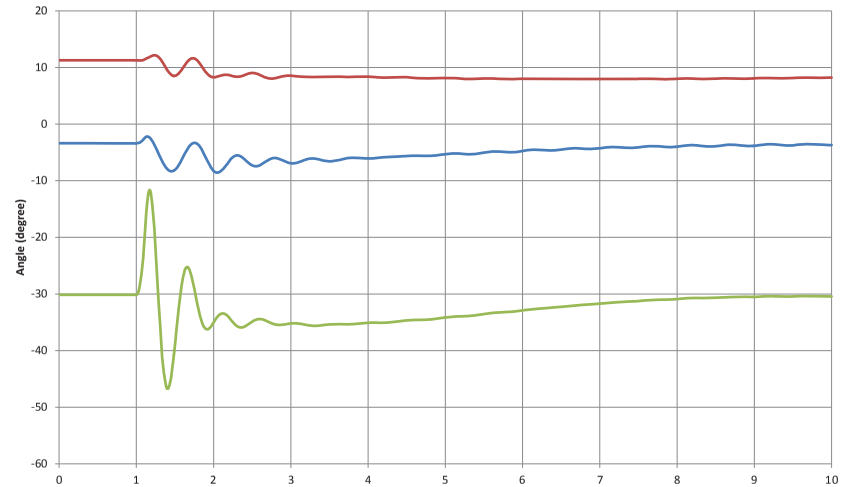
Bus Voltage
Contingency: 7L58-A

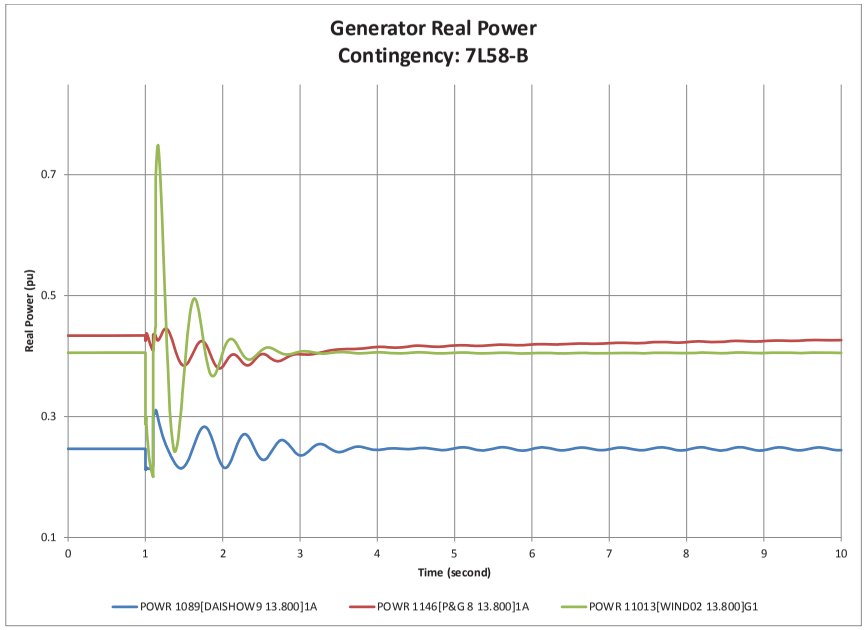


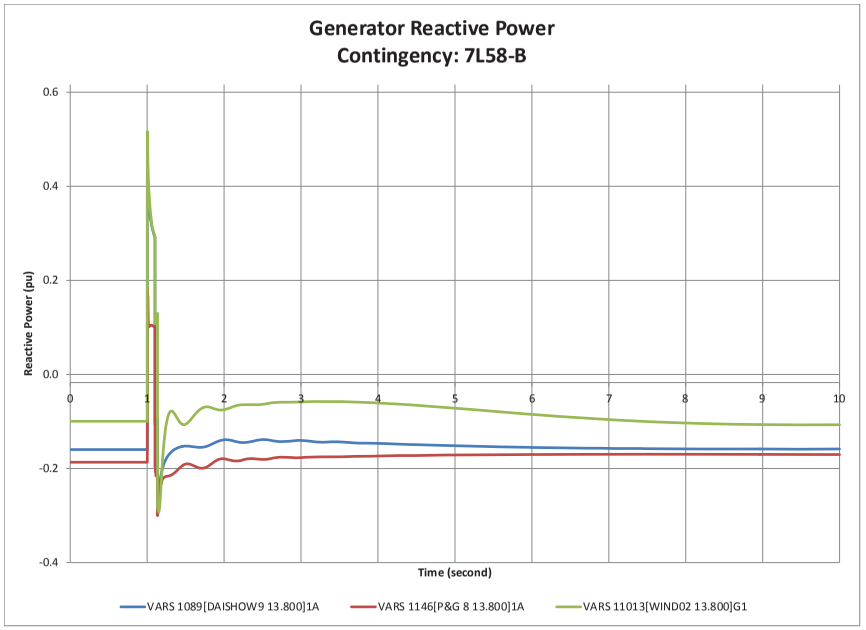
Bus Voltage
Contingency: 7L58-A

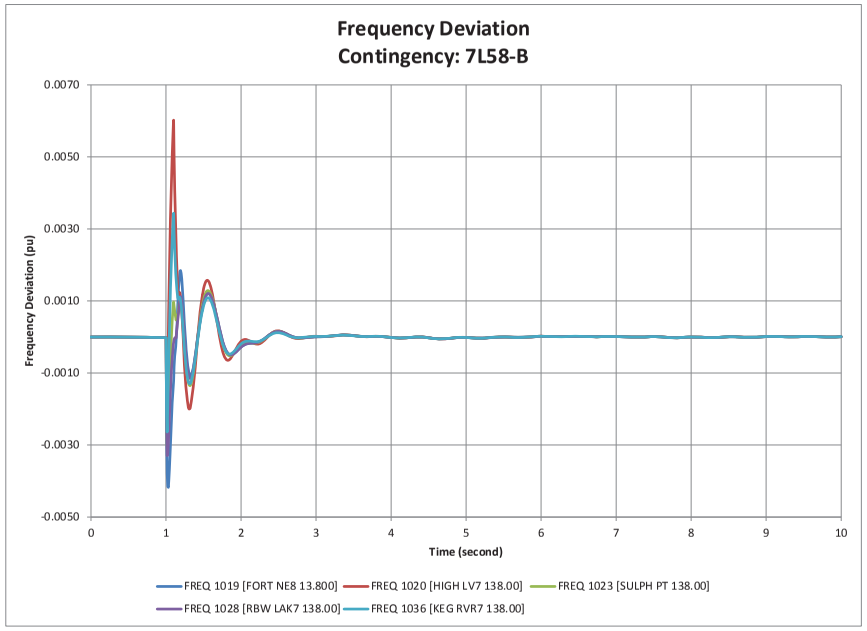


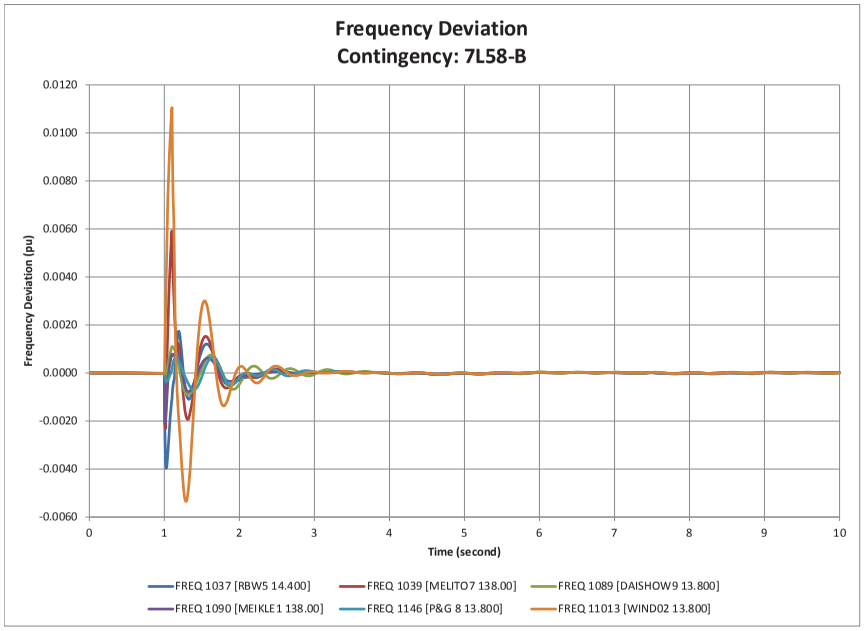
Generator Angle
Contingency: 7L58-B

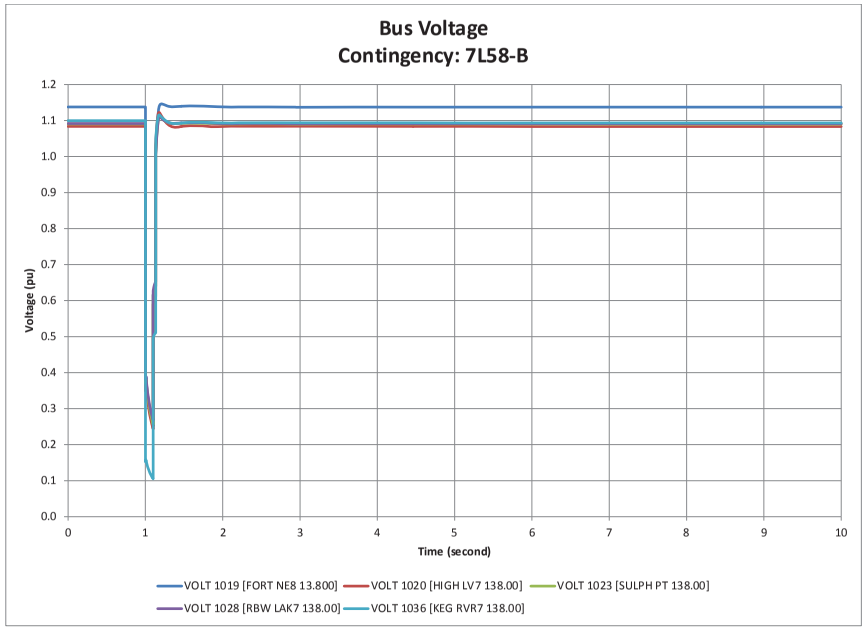


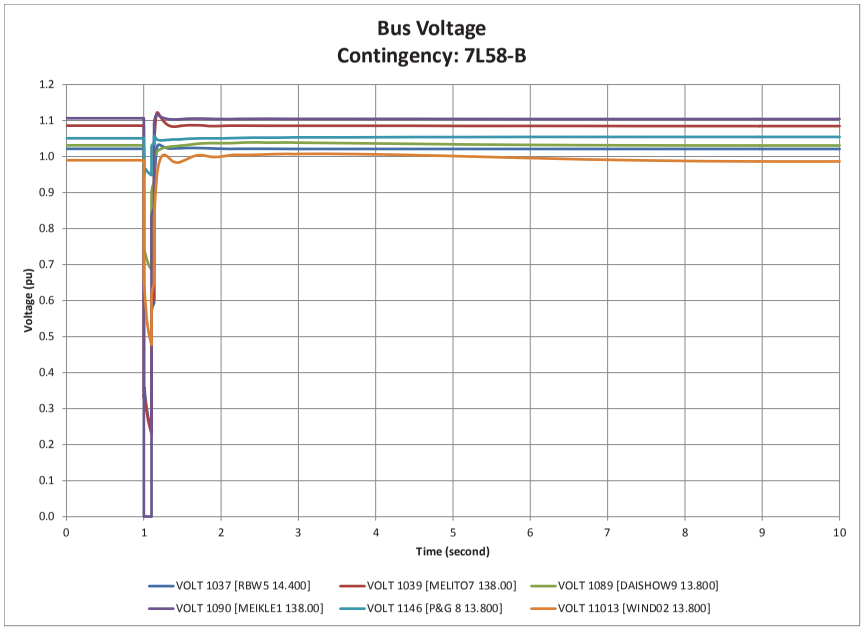

Generator Real Power
Contingency: 7L58-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

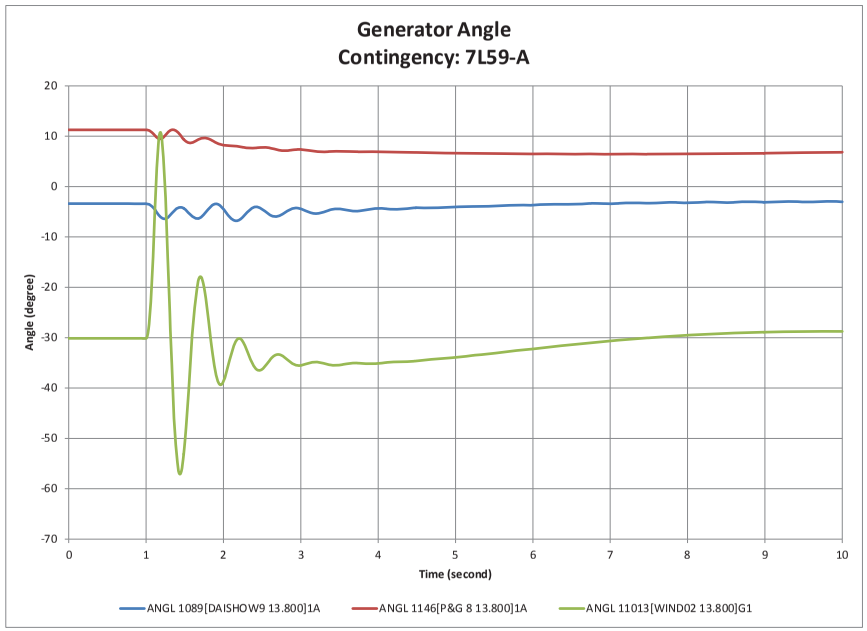

Generator Reactive Power
Contingency: 7L58-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

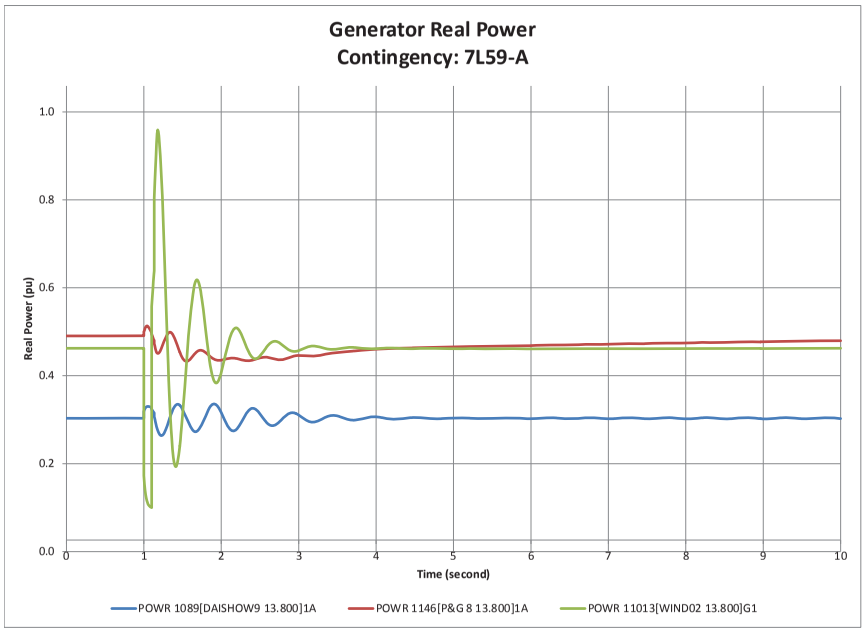

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

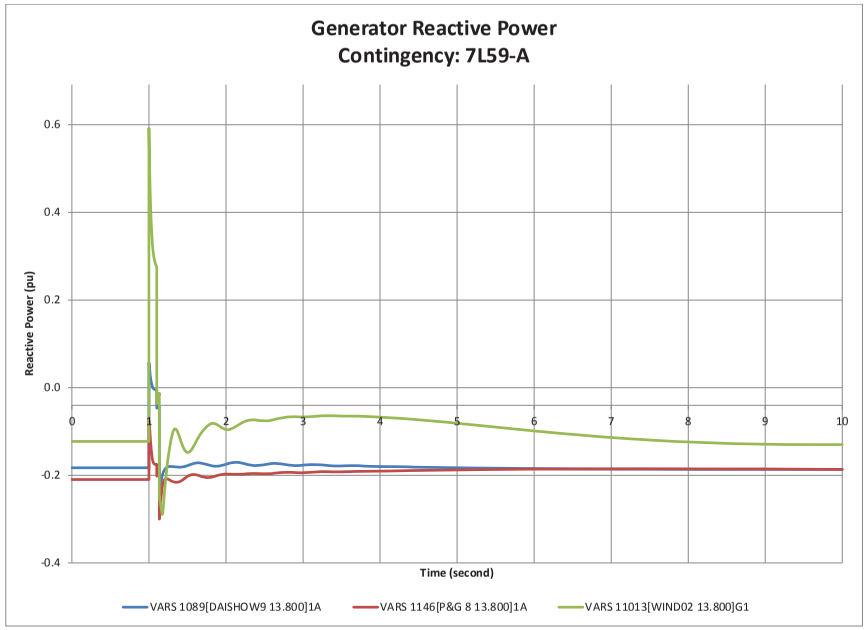

Frequency Deviation
Contingency: 7L58-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

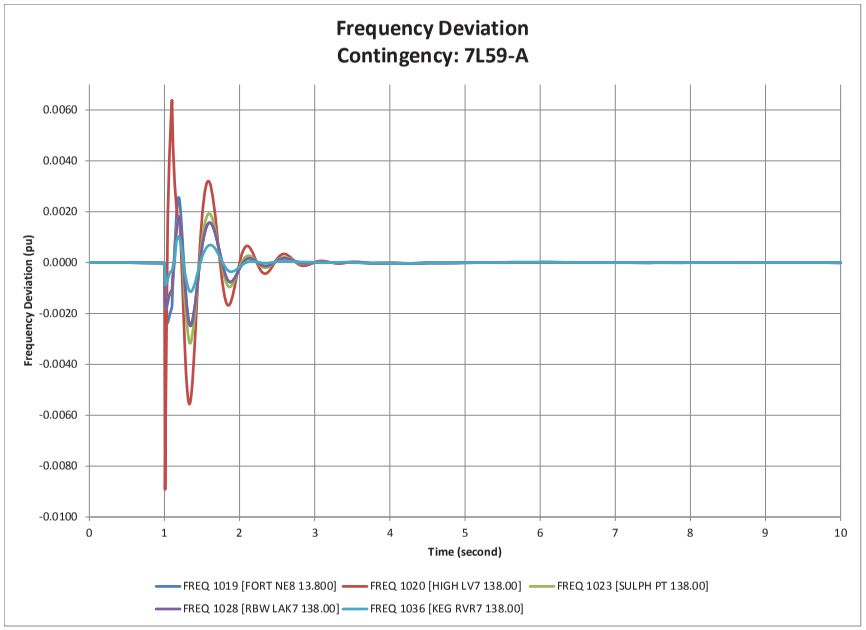

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

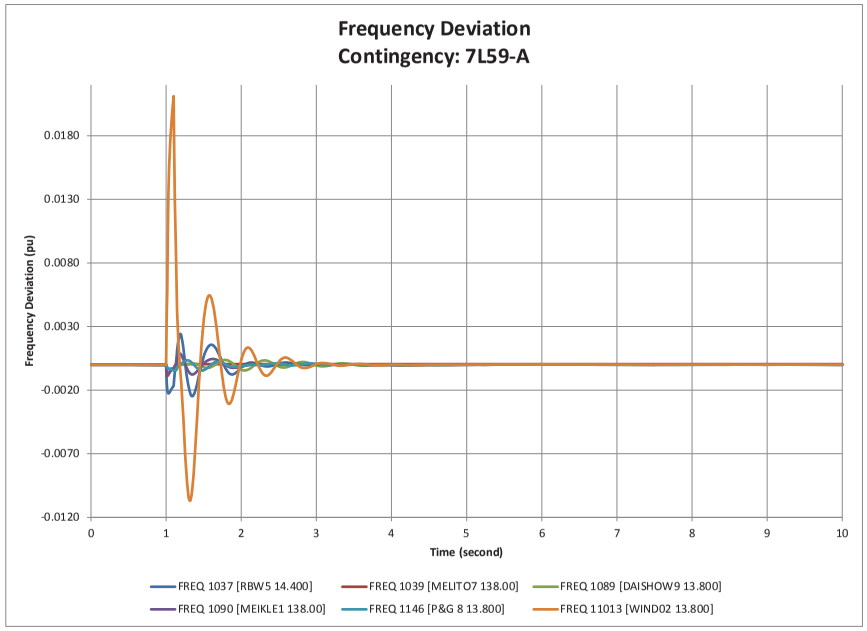

Bus Voltage
Contingency: 7L58-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

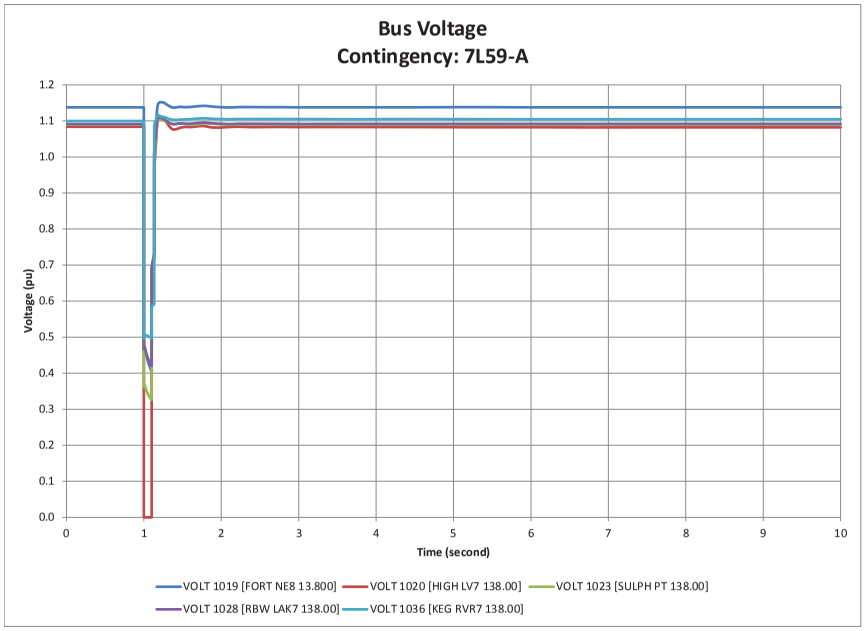

Generator Angle
Contingency: 7L59-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

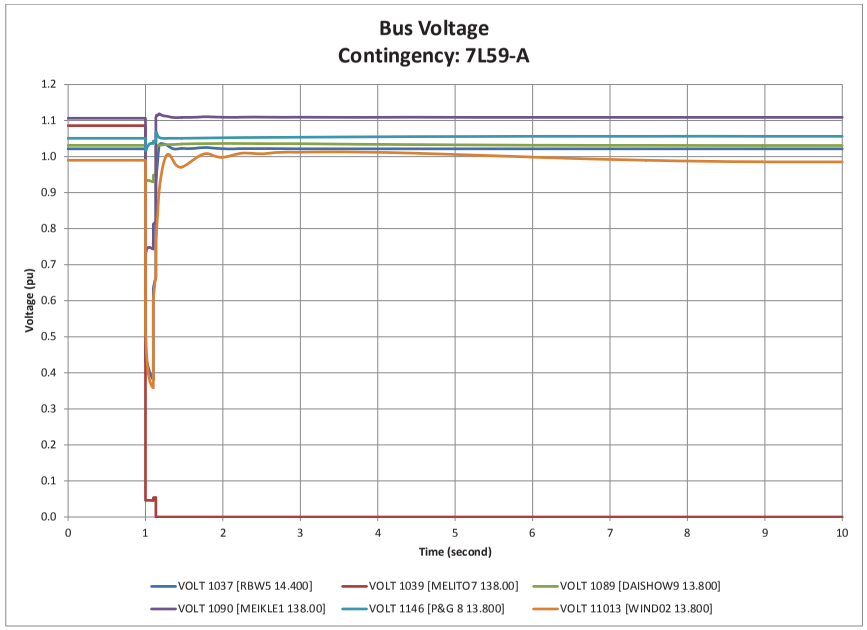

Generator Real Power
Contingency: 7L59-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

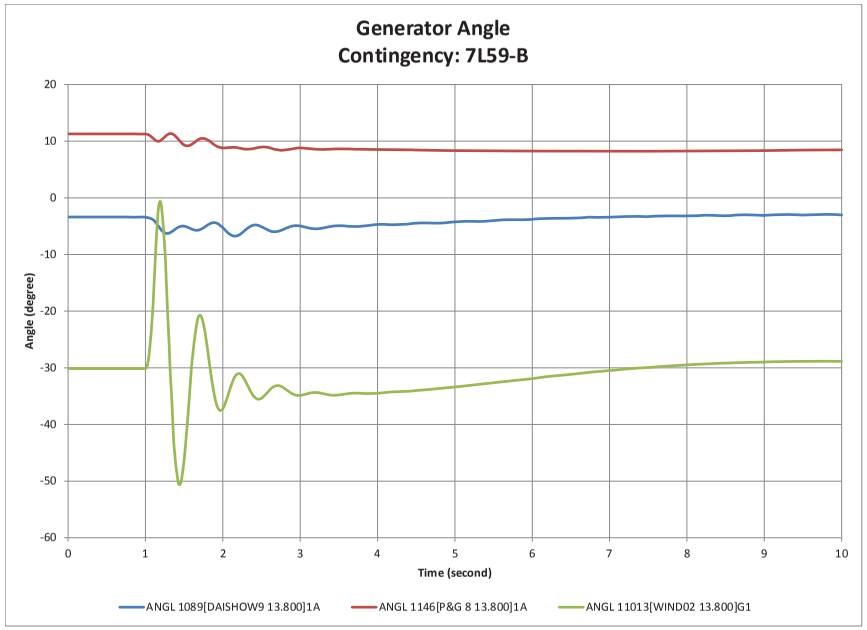

Generator Reactive Power
Contingency: 7L59-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

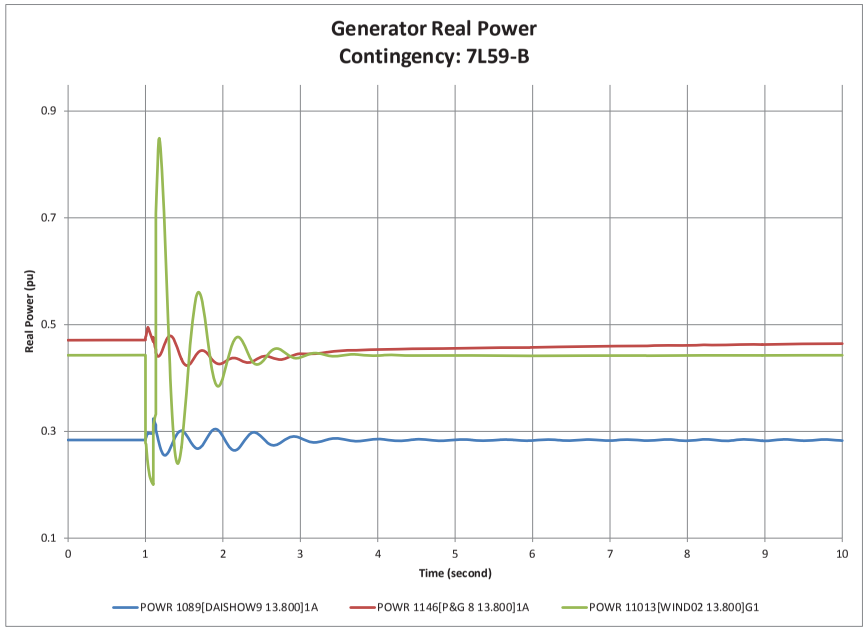

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

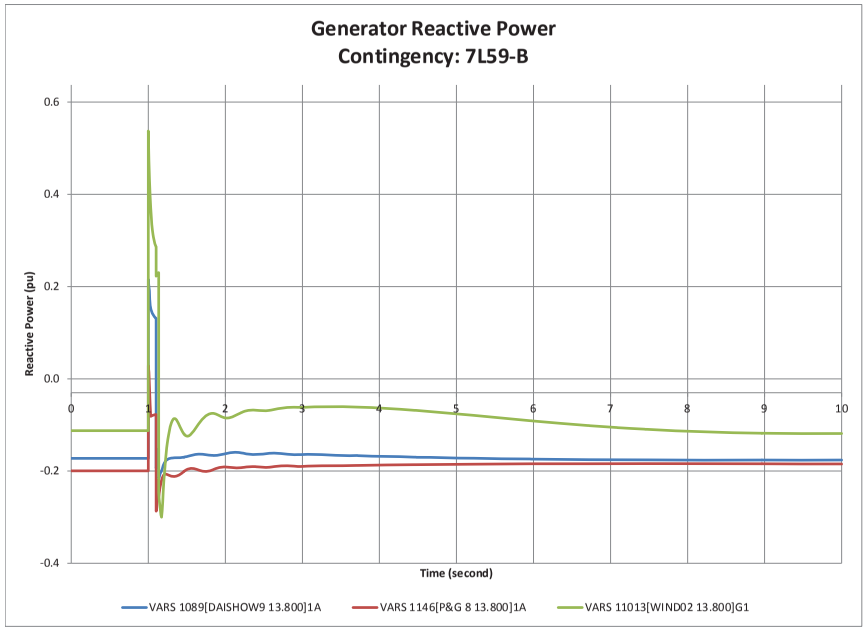

Frequency Deviation
Contingency: 7L59-A
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

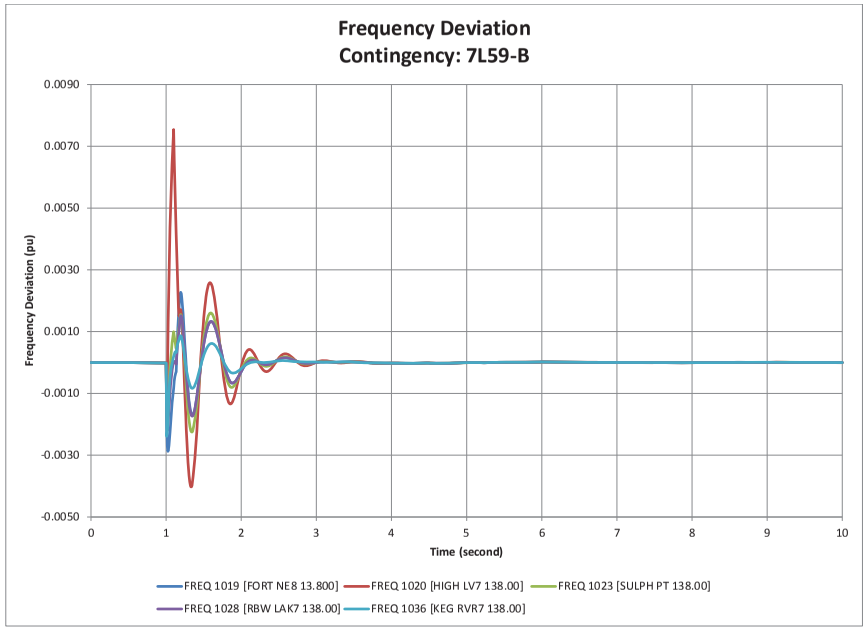

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

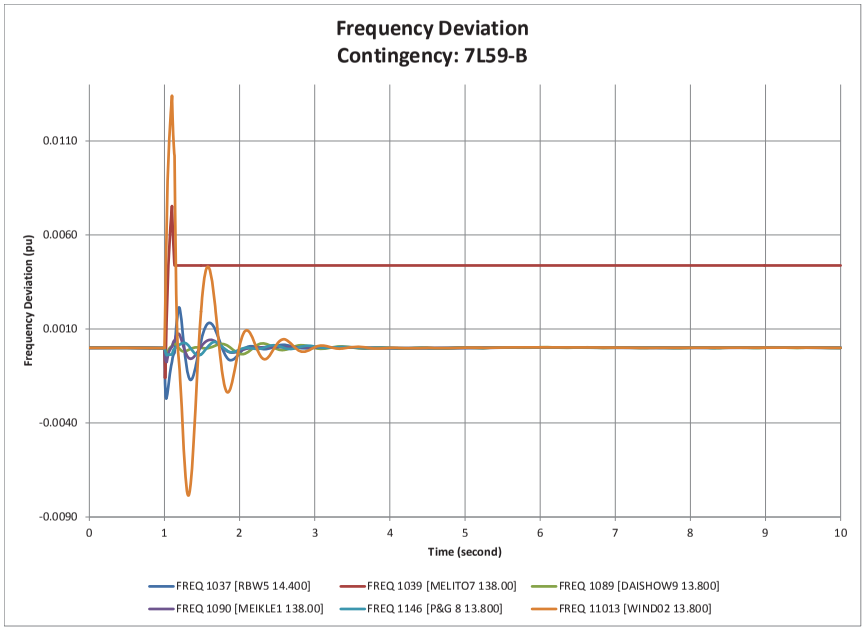

Bus Voltage
Contingency: 7L59-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

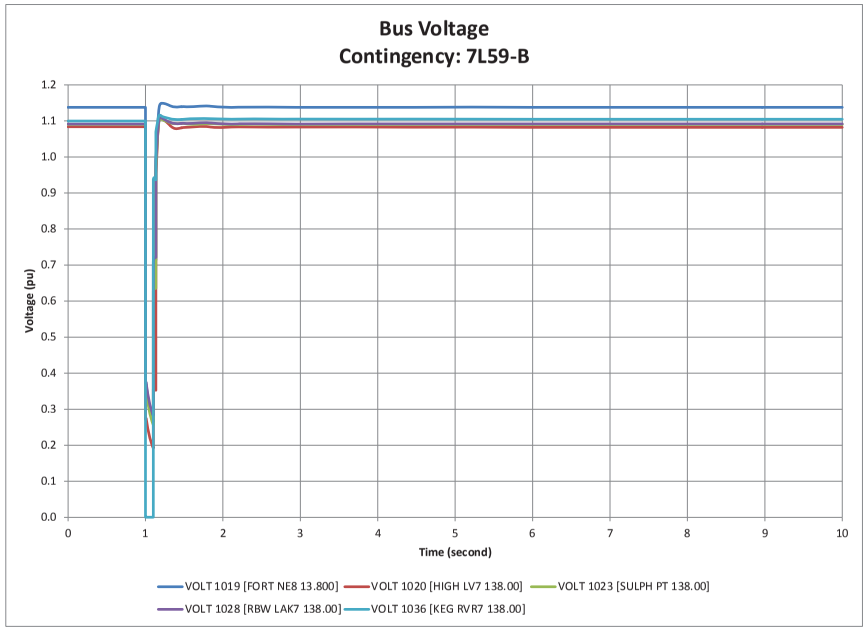

Generator Angle
Contingency: 7L59-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

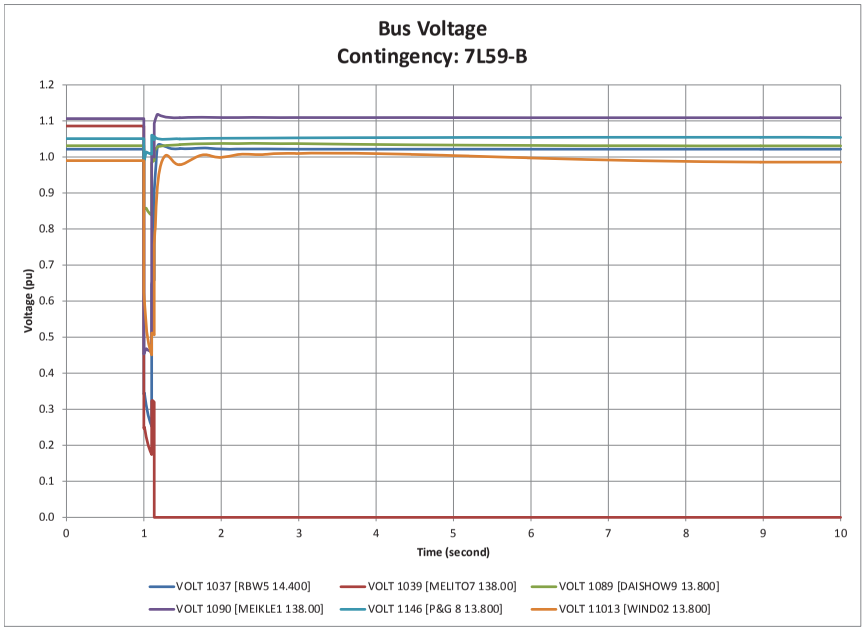

Generator Real Power
Contingency: 7L59-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

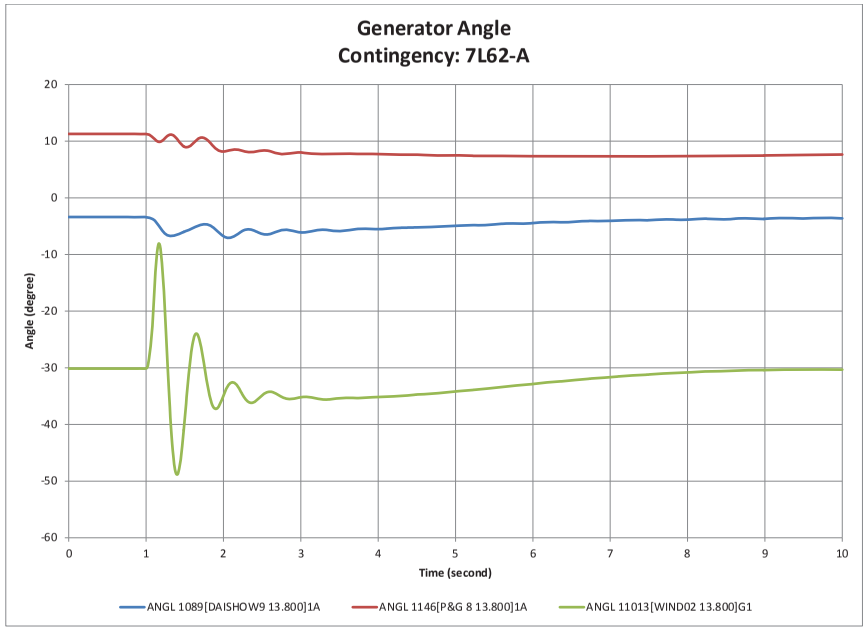

Generator Reactive Power
Contingency: 7L59-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

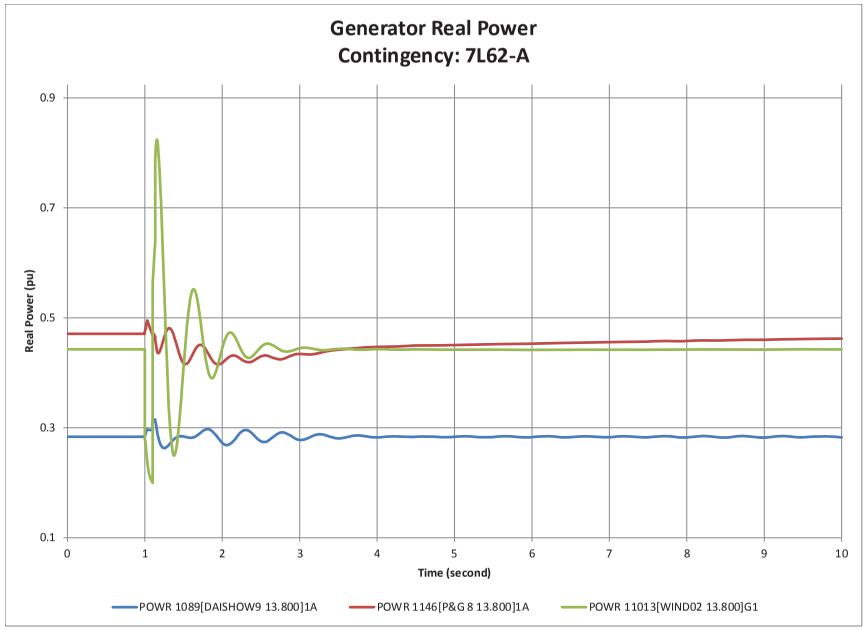

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

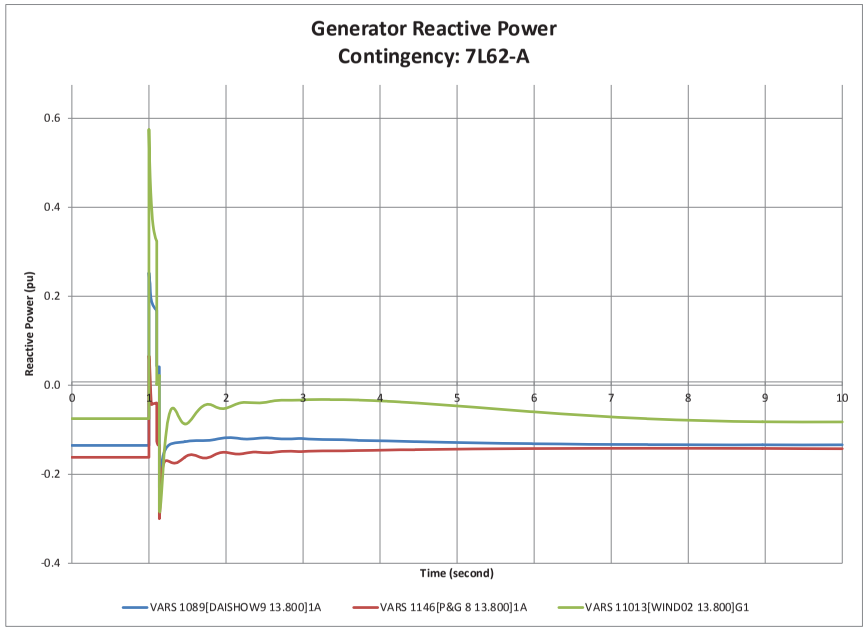

Frequency Deviation
Contingency: 7L59-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

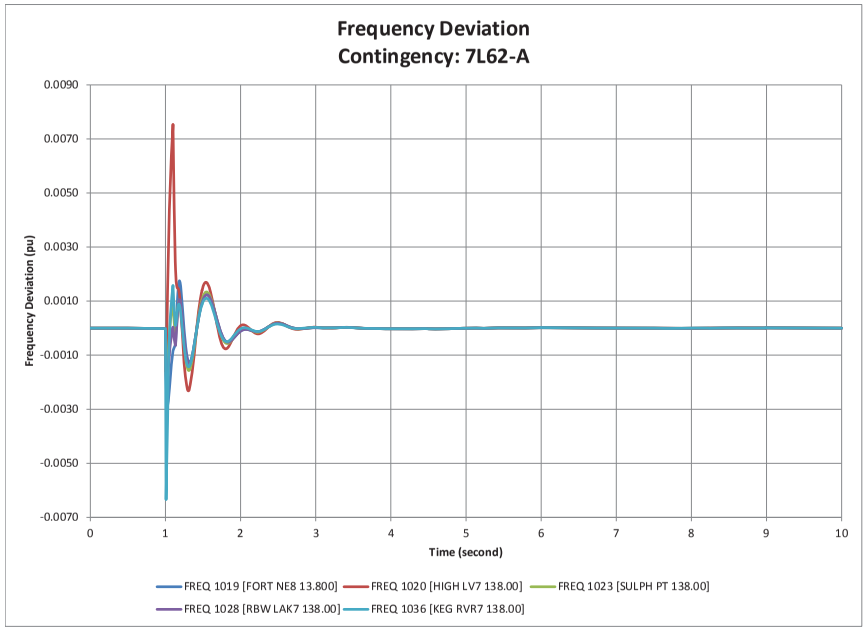

Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

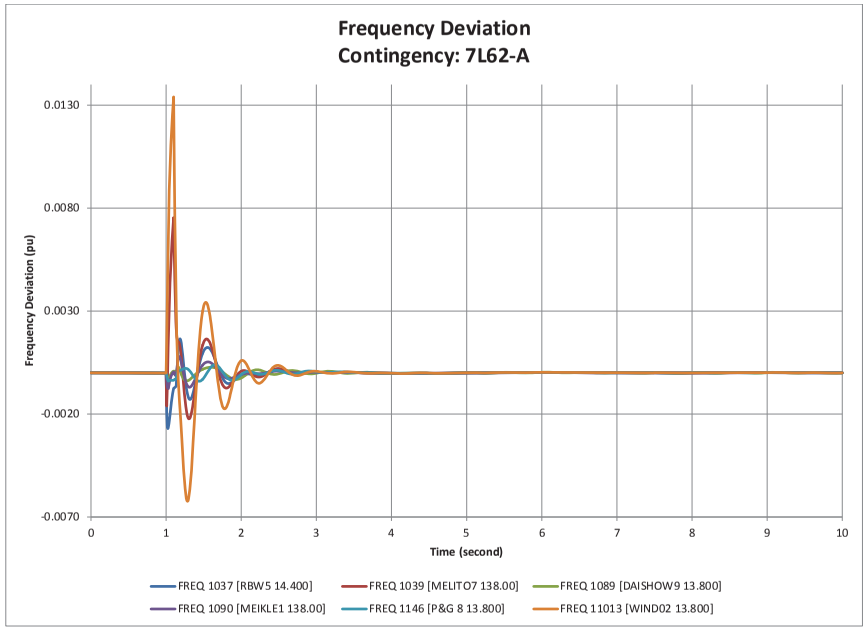

Bus Voltage
Contingency: 7L59-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

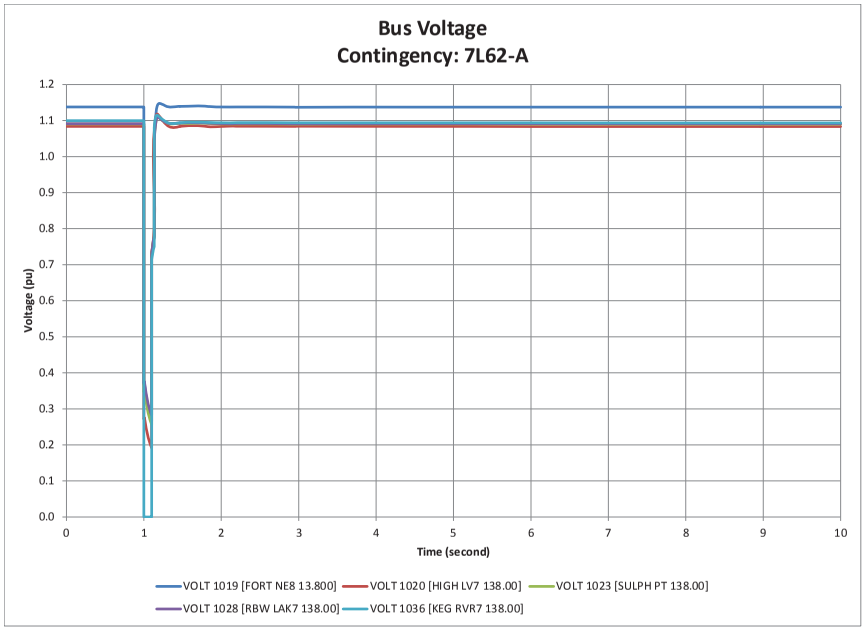

Generator Angle
Contingency: 7L62-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

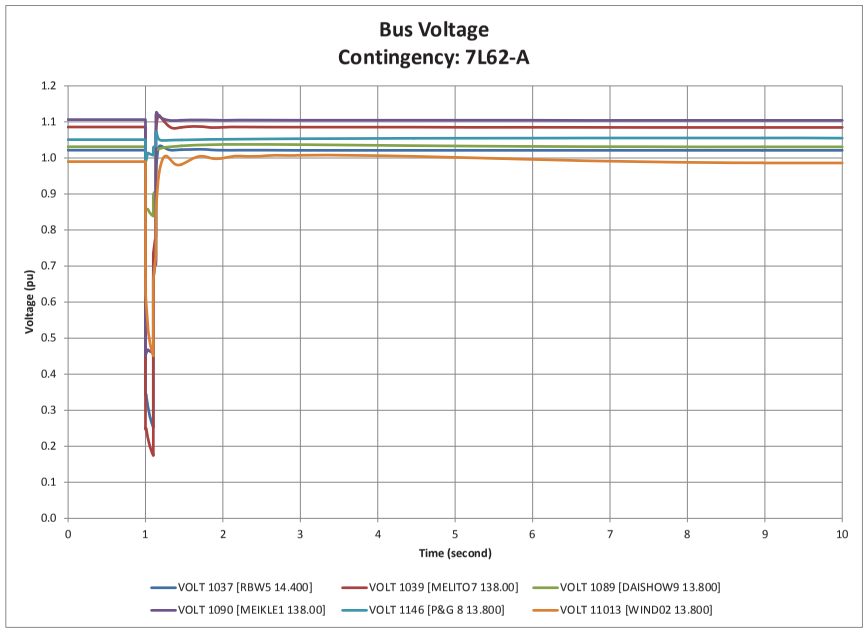

Generator Real Power
Contingency: 7L62-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

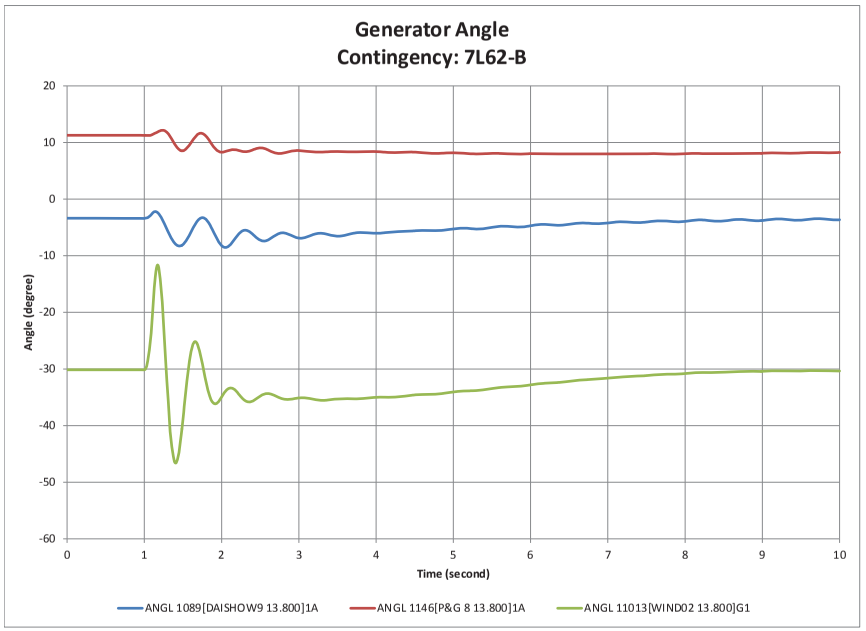

Generator Reactive Power
Contingency: 7L62-A
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

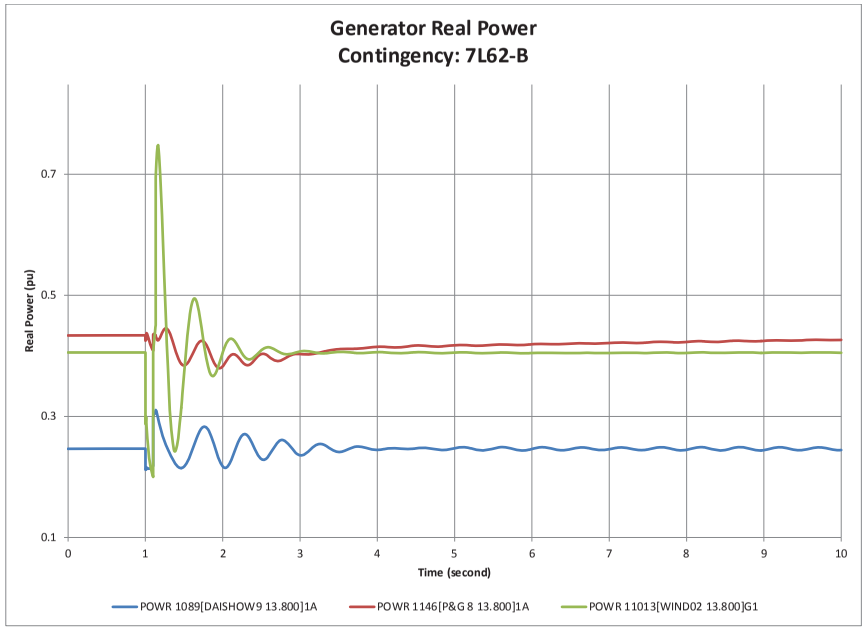

Frequency Deviation
Contingency: 7L62-A
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

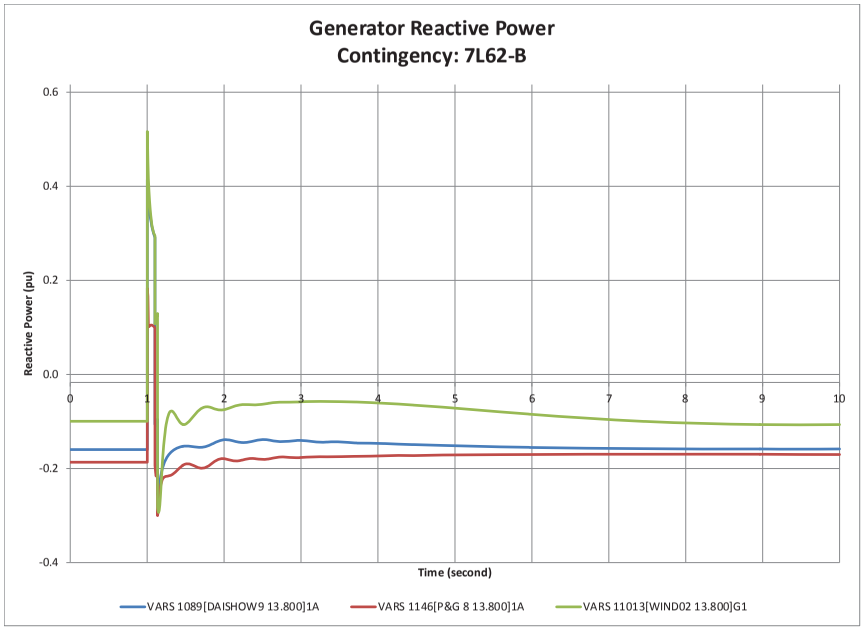

Frequency Deviation
Contingency: 7L62-A
Frequency Deviation (pu)
0.0130
0.0080
0.0030
-0.0020
-0.0070
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

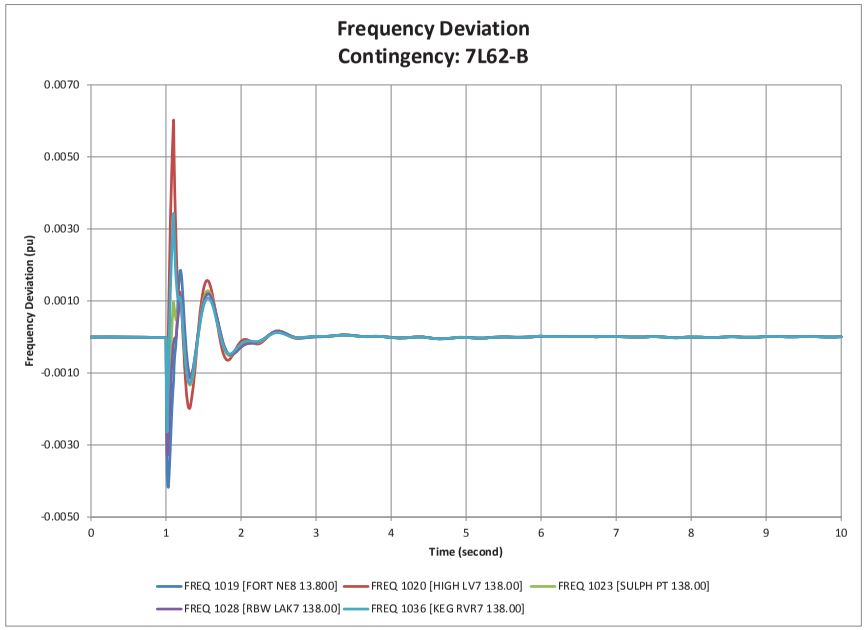

Bus Voltage
Contingency: 7L62-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

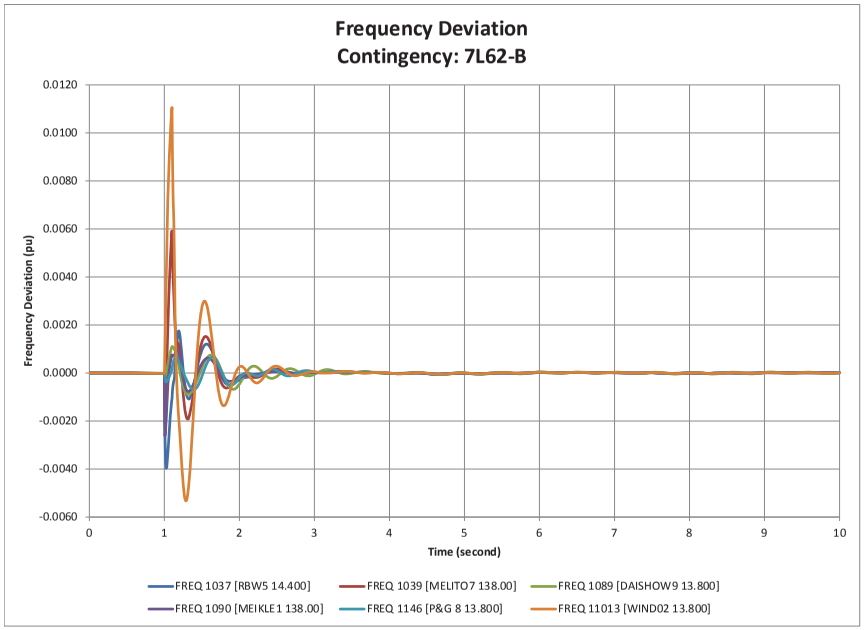

Bus Voltage
Contingency: 7L62-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

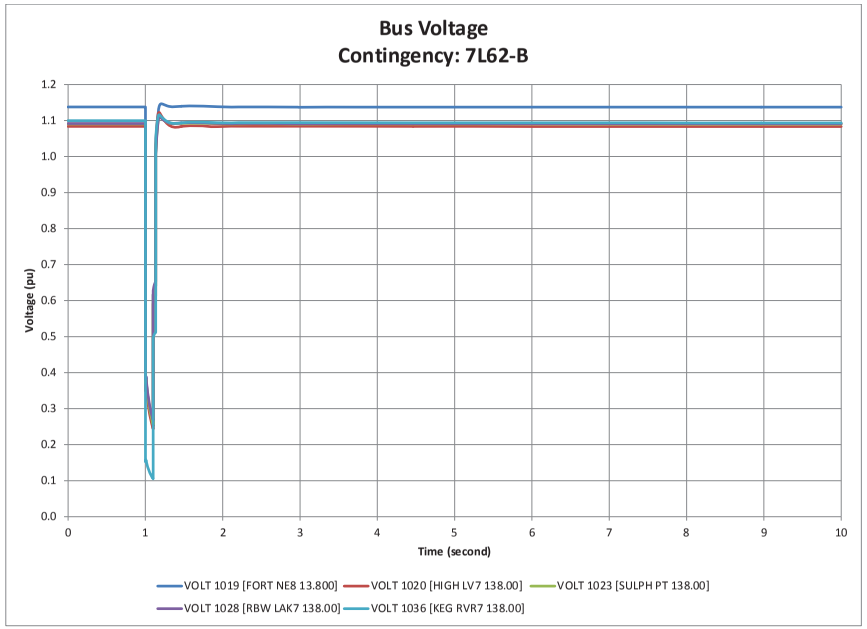

Generator Angle
Contingency: 7L62-B
Angle (degree)
20
10
0
-10
-20
-30
-40
-50
-60
0
1
2
3
4
5
6
7
8
9
10
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

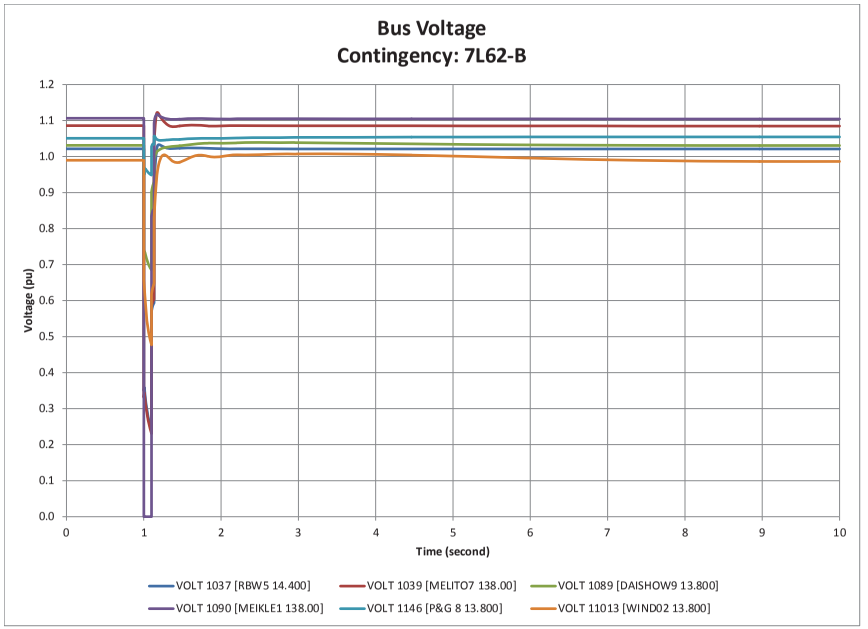

Generator Real Power
Contingency: 7L62-B
Real Power (pu)
0.7
0.5
0.3
0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

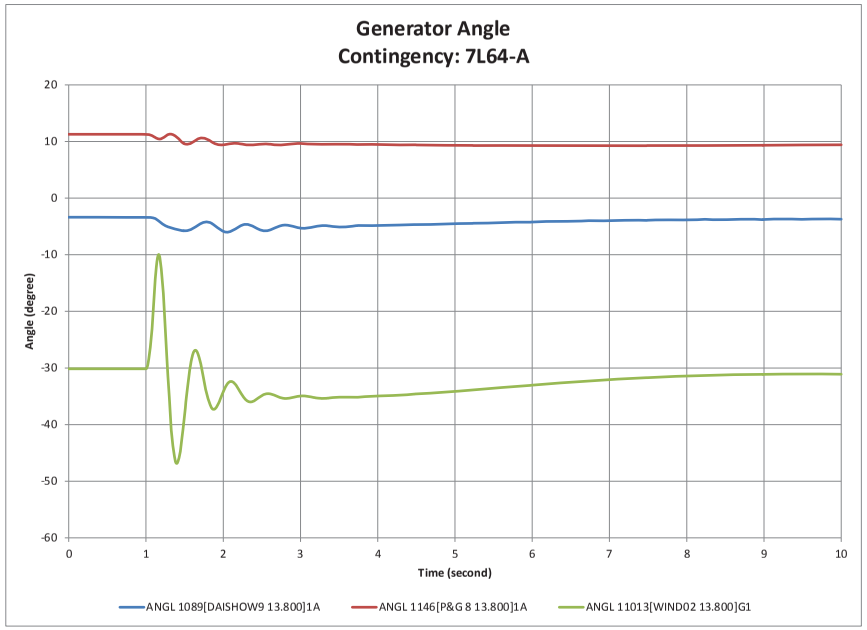

Generator Reactive Power
Contingency: 7L62-B
Reactive Power (pu)
0.6
0.4
0.2
0.0
-0.2
-0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

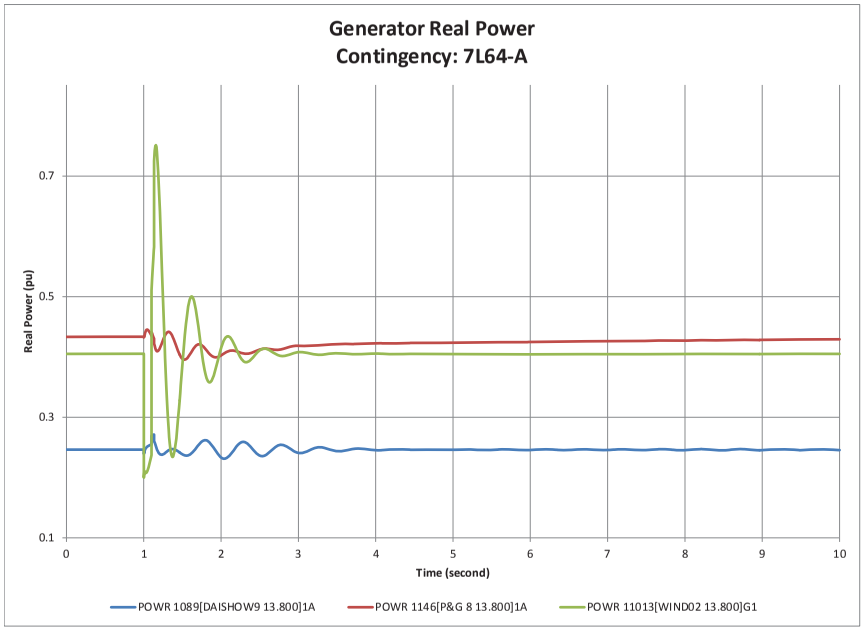

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
0.0070
0.0050
0.0030
0.0010
-0.0010
-0.0030
-0.0050
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

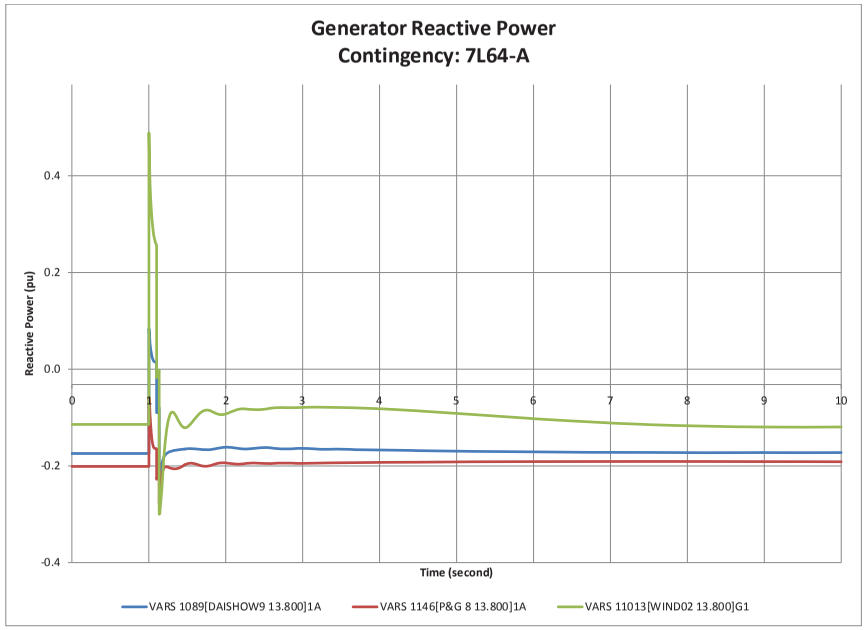

Frequency Deviation
Contingency: 7L62-B
Frequency Deviation (pu)
0.0120
0.0100
0.0080
0.0060
0.0040
0.0020
0.0000
-0.0020
-0.0040
-0.0060
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

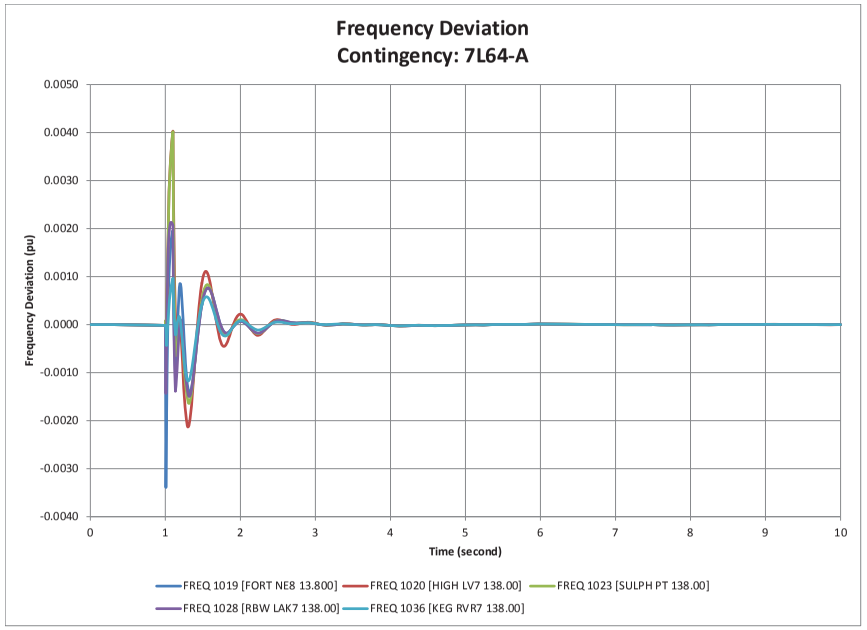

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

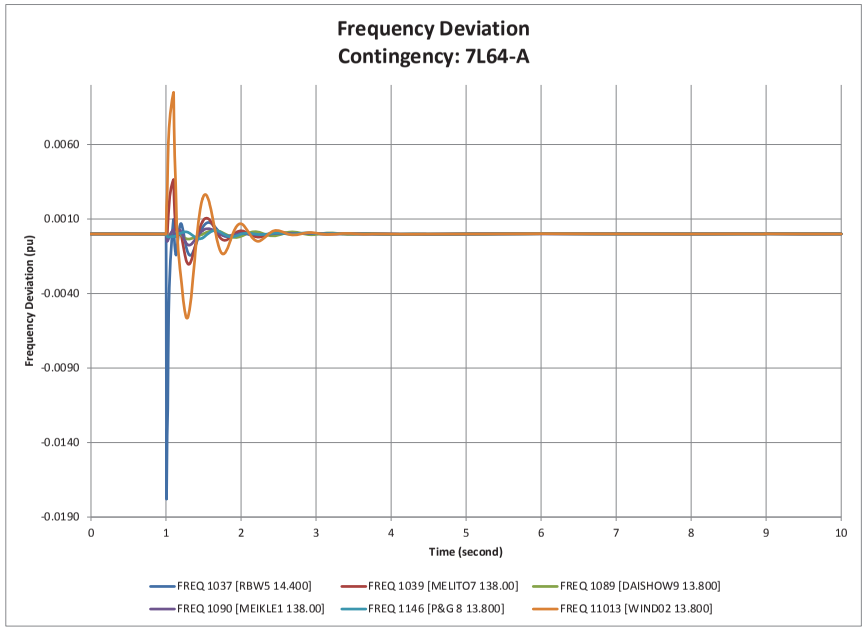

Bus Voltage
Contingency: 7L62-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

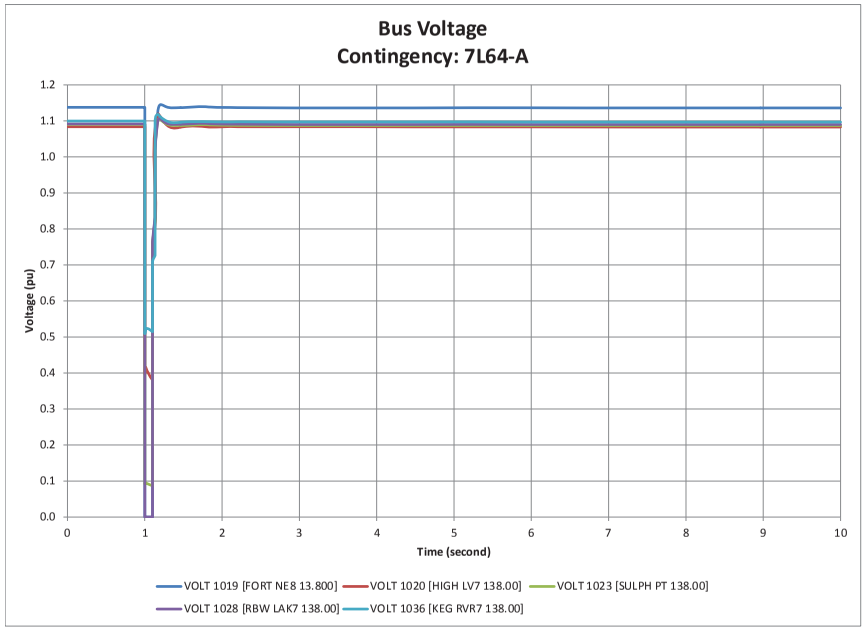

Generator Angle
Contingency: 7L64-A
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

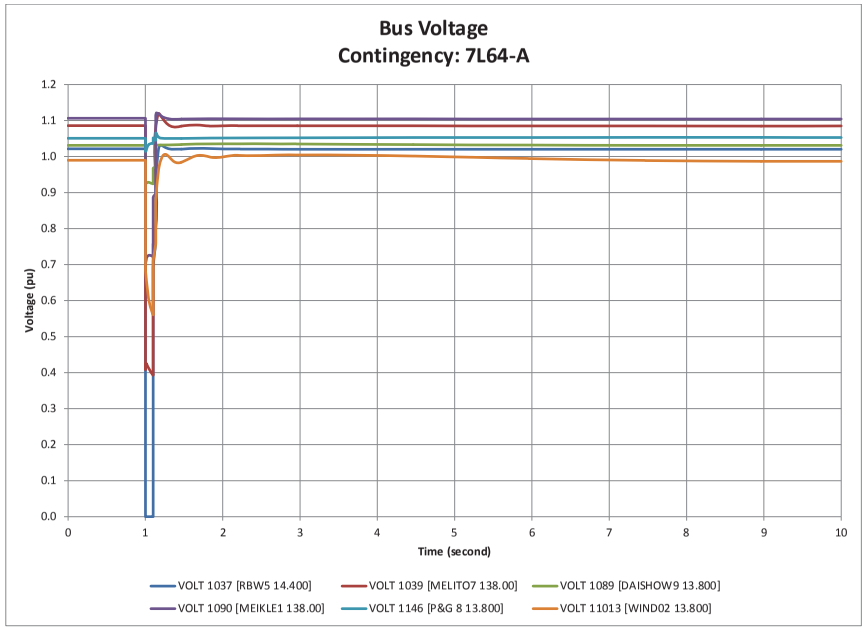

Generator Real Power
Contingency: 7L64-A
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

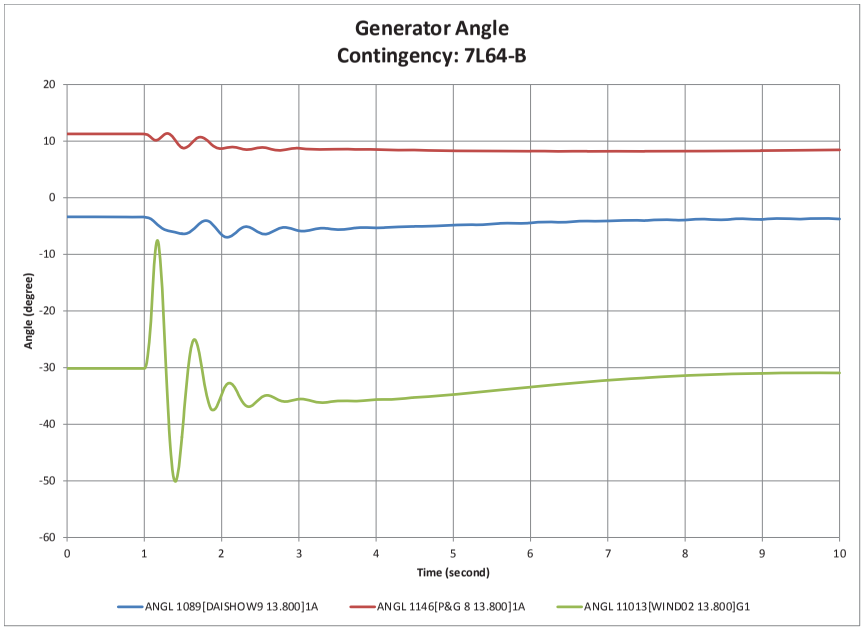

Generator Reactive Power
Contingency: 7L64-A
Reactive Power (pu)
0.4
0.2
0.0
-0.2
-0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

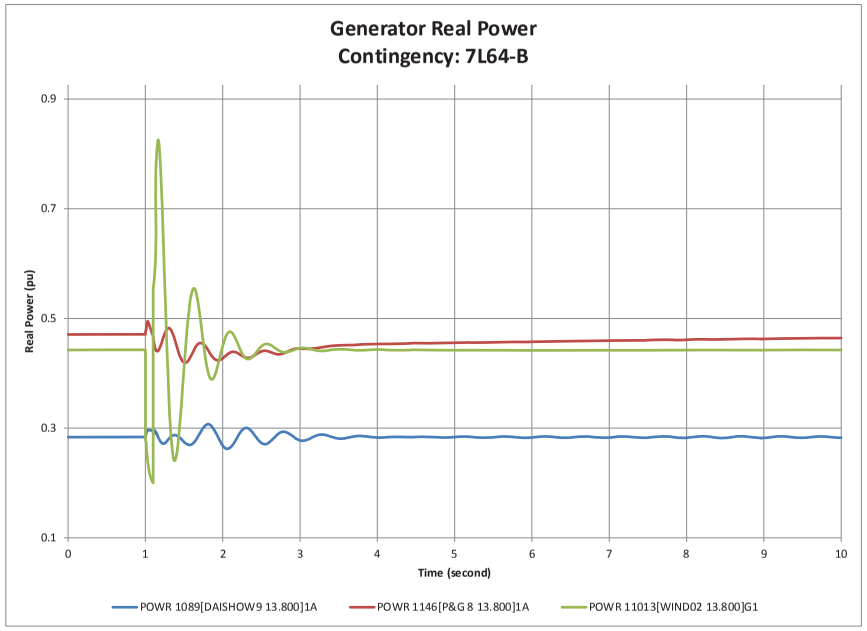

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

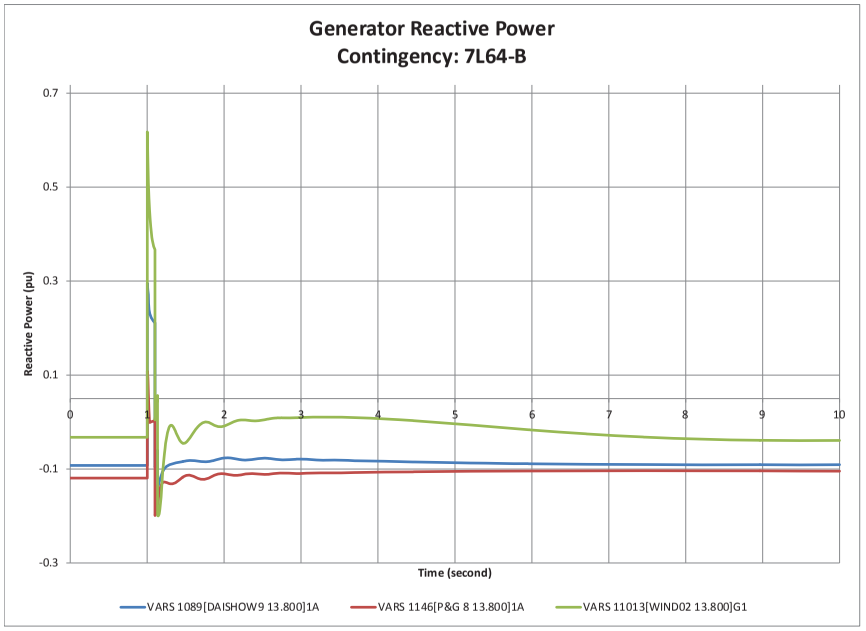

Frequency Deviation
Contingency: 7L64-A
Frequency Deviation (pu)
0.0060
0.0010
-0.0040
-0.0090
-0.0140
-0.0190
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

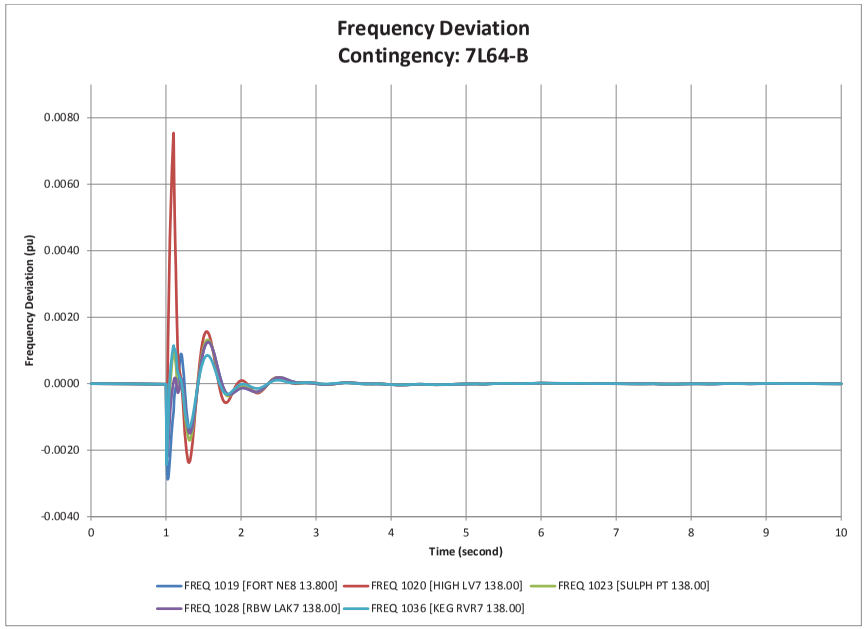

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

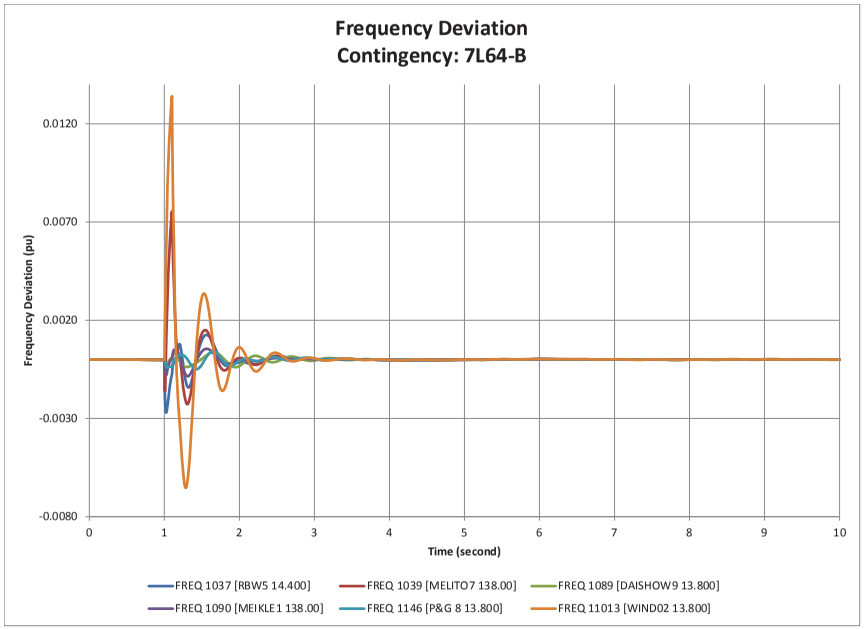

Bus Voltage
Contingency: 7L64-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

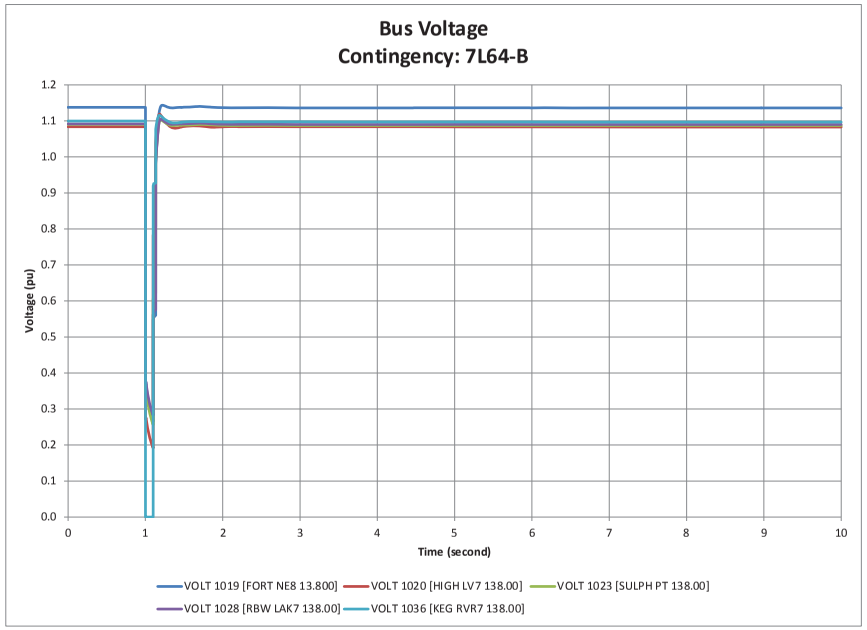

Generator Angle
Contingency: 7L64-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

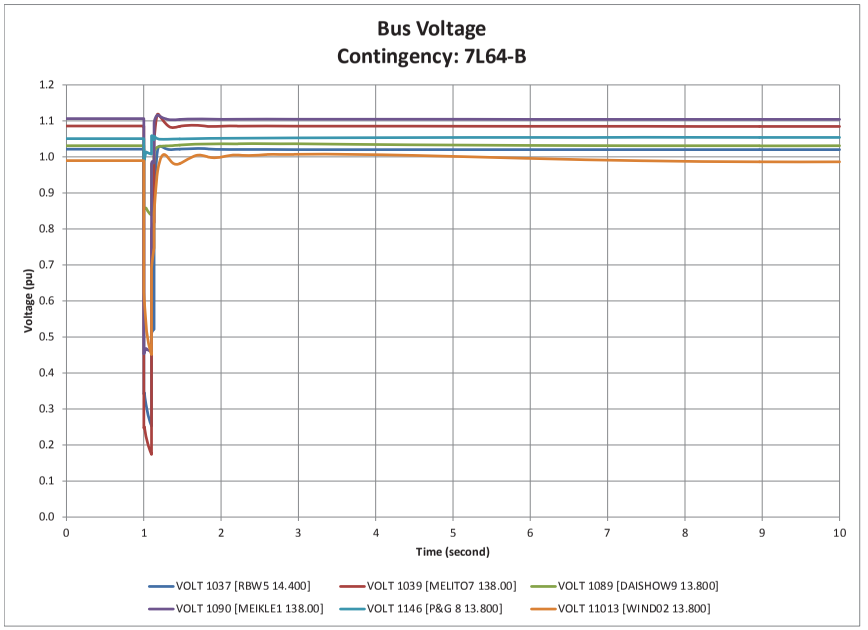

Generator Real Power
Contingency: 7L64-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

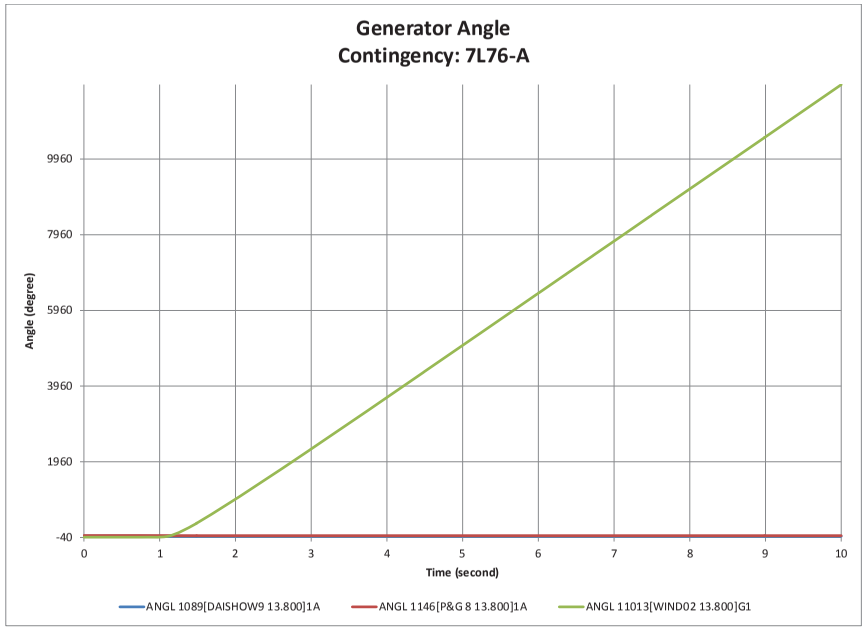

Generator Reactive Power
Contingency: 7L64-B
Reactive Power (pu)
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

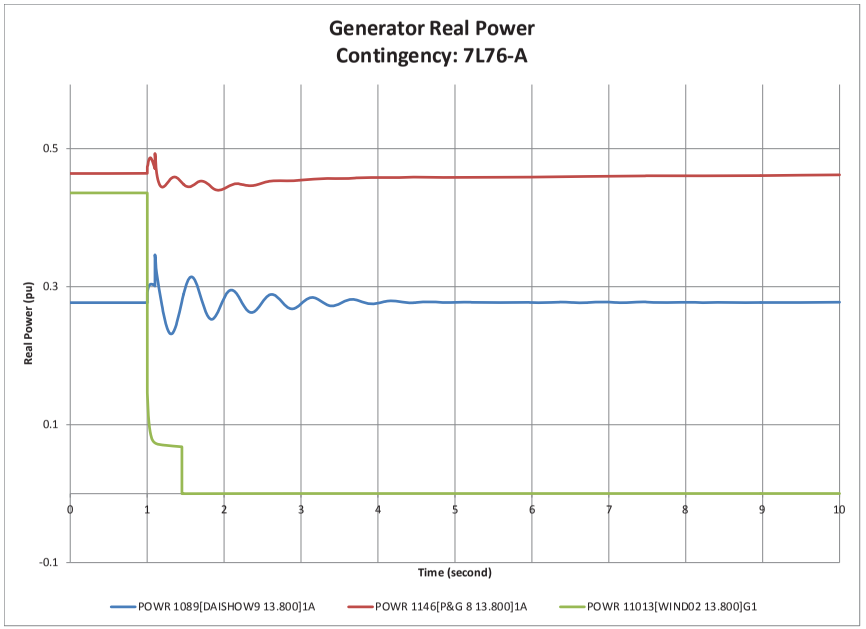

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

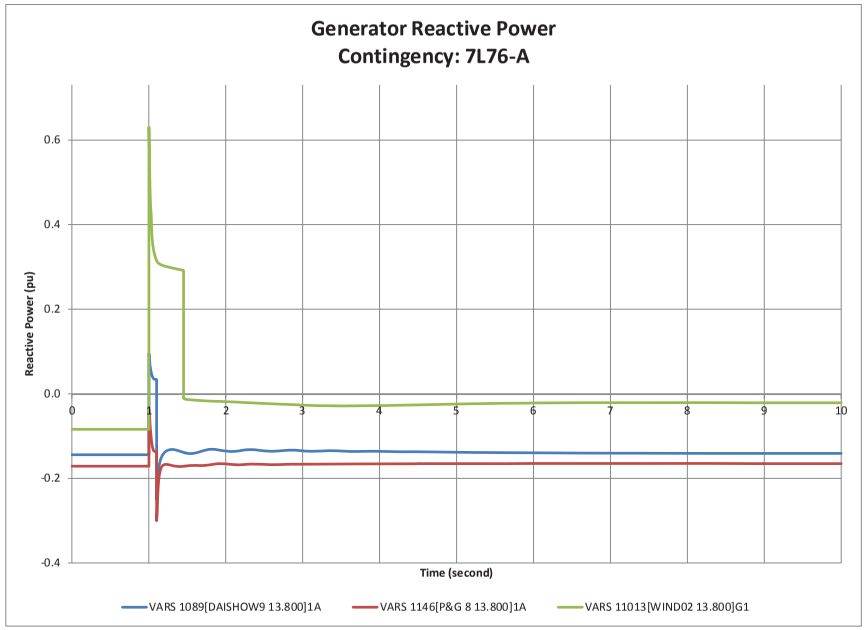

Frequency Deviation
Contingency: 7L64-B
Frequency Deviation (pu)
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

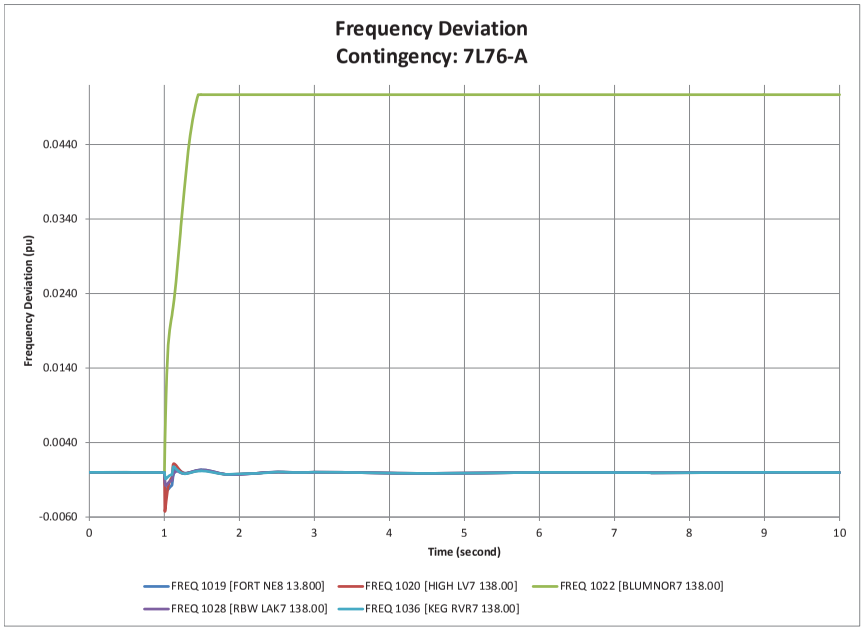

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

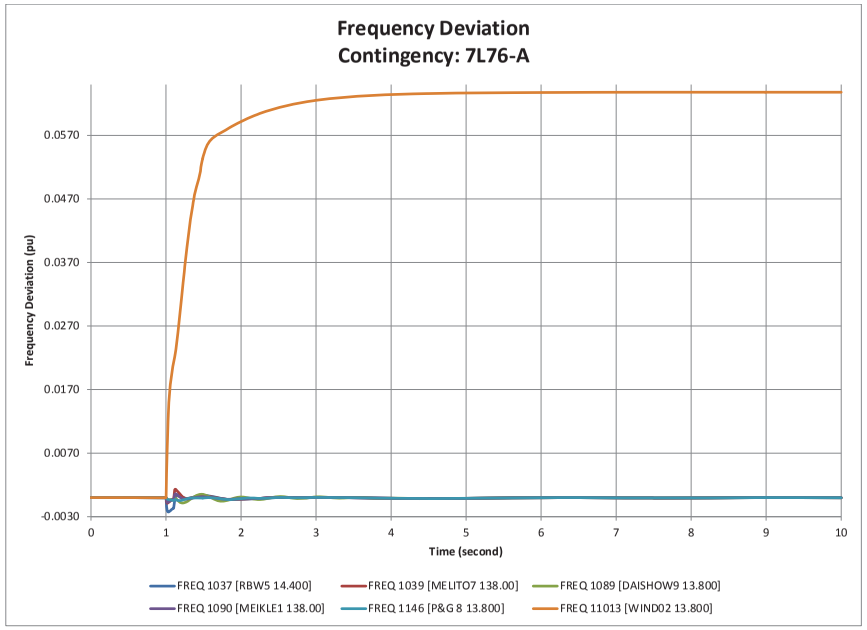

Bus Voltage
Contingency: 7L64-B
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

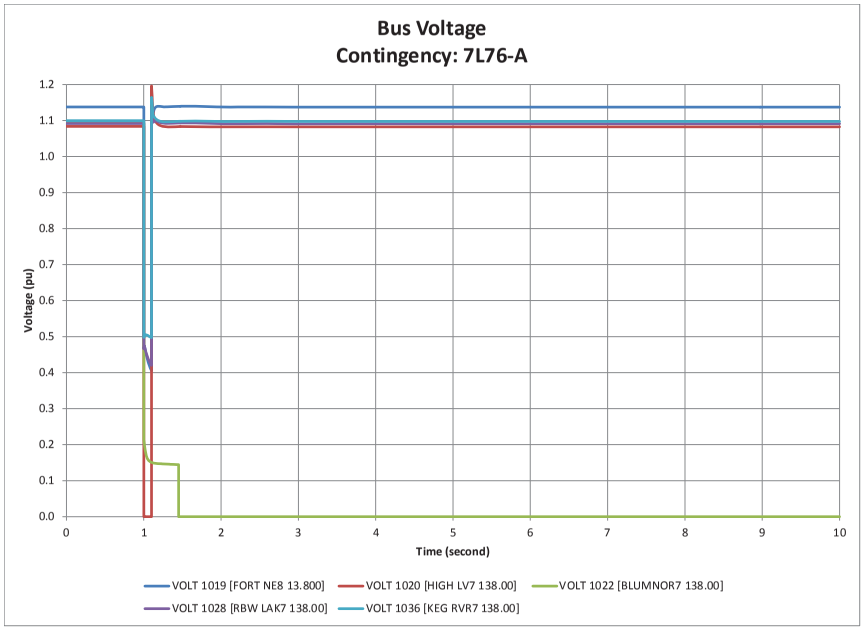

Generator Angle
Contingency: 7L76-A
Angle (degree)
9960
7960
5960
3960
1960
-40
0
1
2
3
4
5
6
7
8
9
10
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

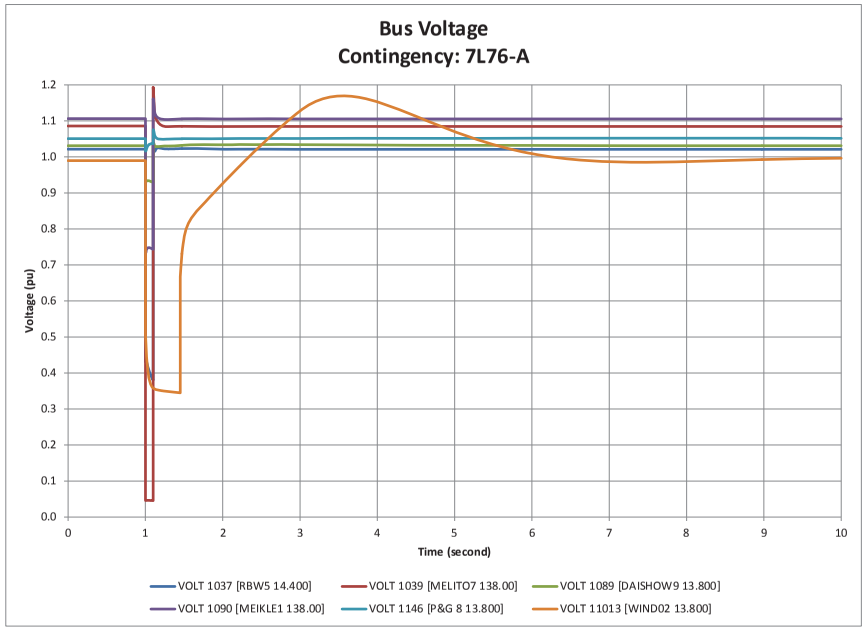

Generator Real Power
Contingency: 7L76-A
Real Power (pu)
0.5
0.3
0.1
-0.1
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

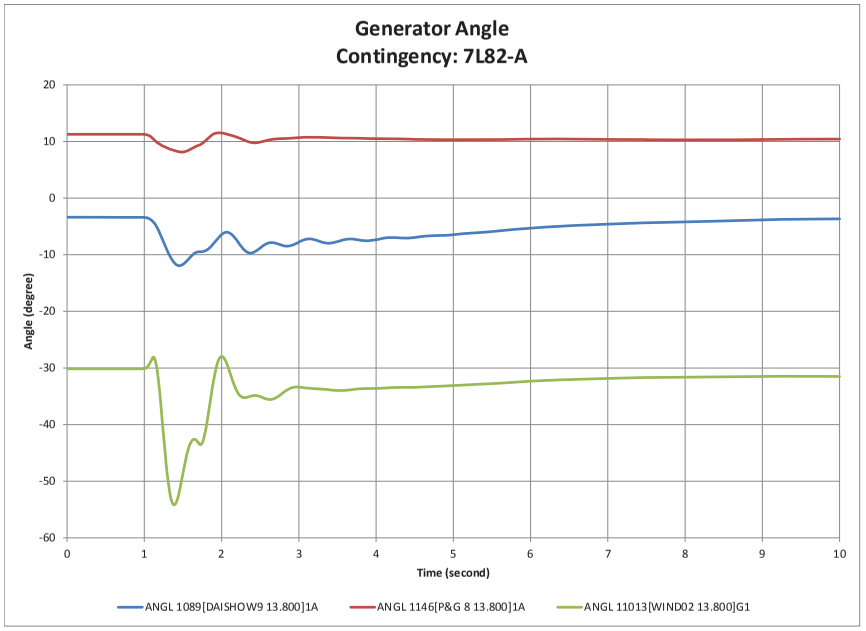

Generator Reactive Power
Contingency: 7L76-A
Reactive Power (pu)
0.6
0.4
0.2
0.0
-0.2
-0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

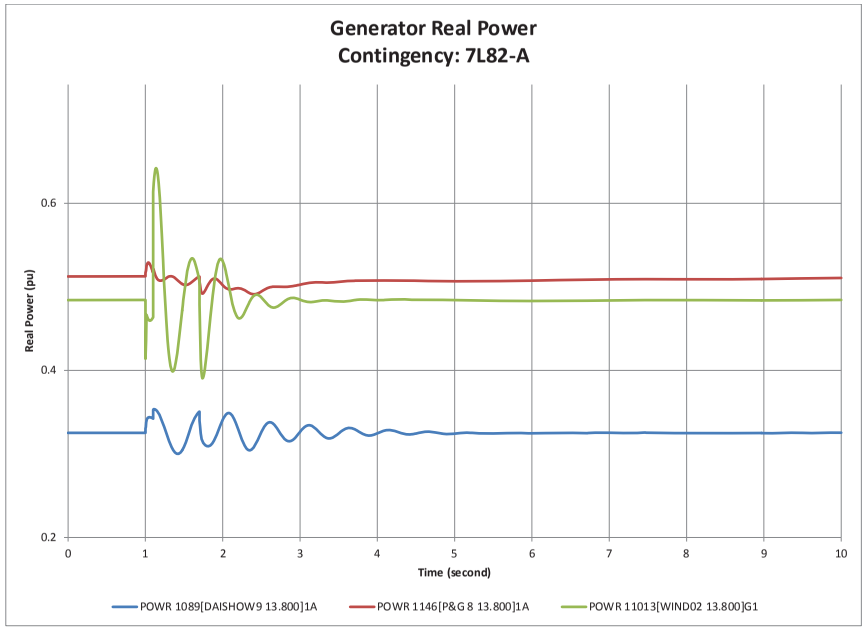

Frequency Deviation
Contingency: 7L76-A
Frequency Deviation (pu)
0.0440
0.0340
0.0240
0.0140
0.0040
-0.0060
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1022 [BLUMNOR7 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

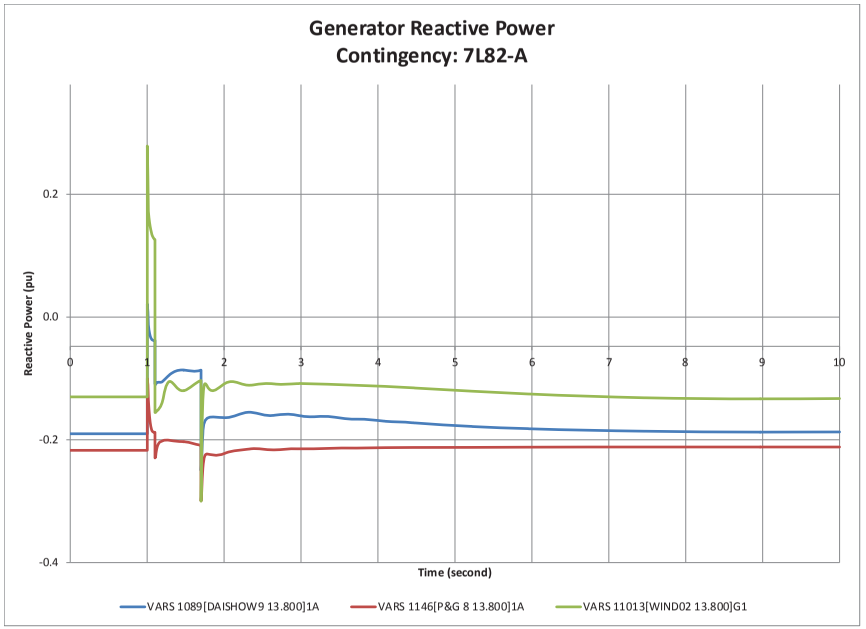

Frequency Deviation
Contingency: 7L76-A
Frequency Deviation (pu)
0.0570
0.0470
0.0370
0.0270
0.0170
0.0070
-0.0030
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

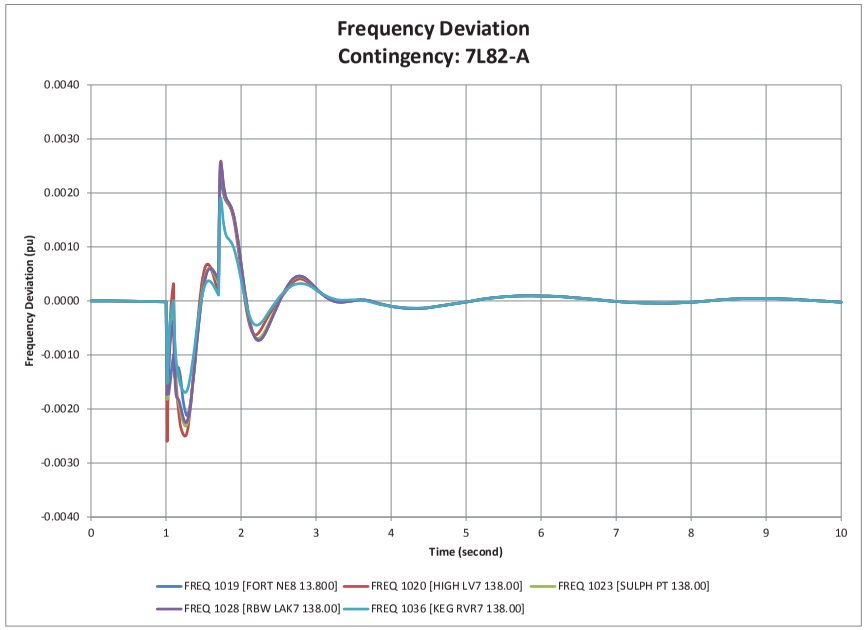

Bus Voltage
Contingency: 7L76-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1022 [BLUMNOR7 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

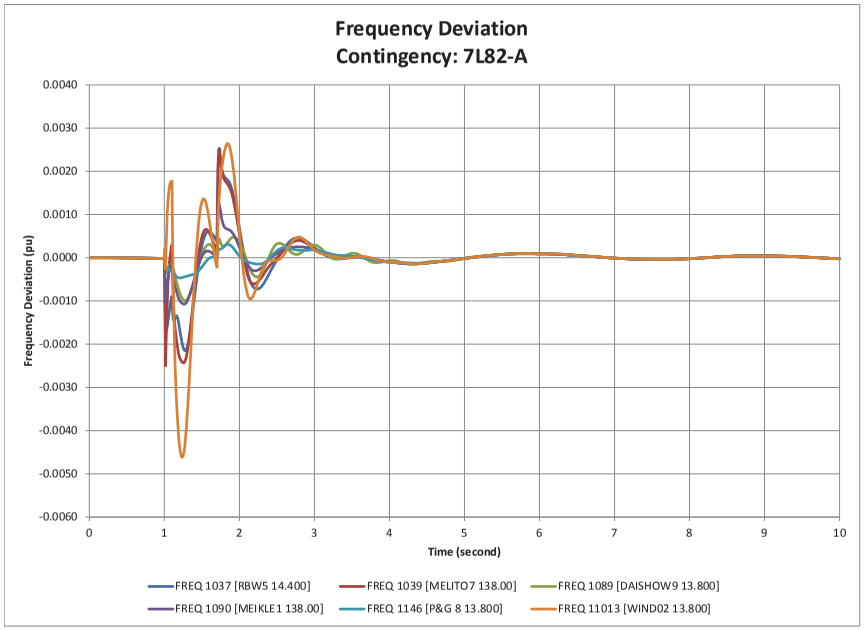

Bus Voltage
Contingency: 7L76-A
Voltage (pu)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]

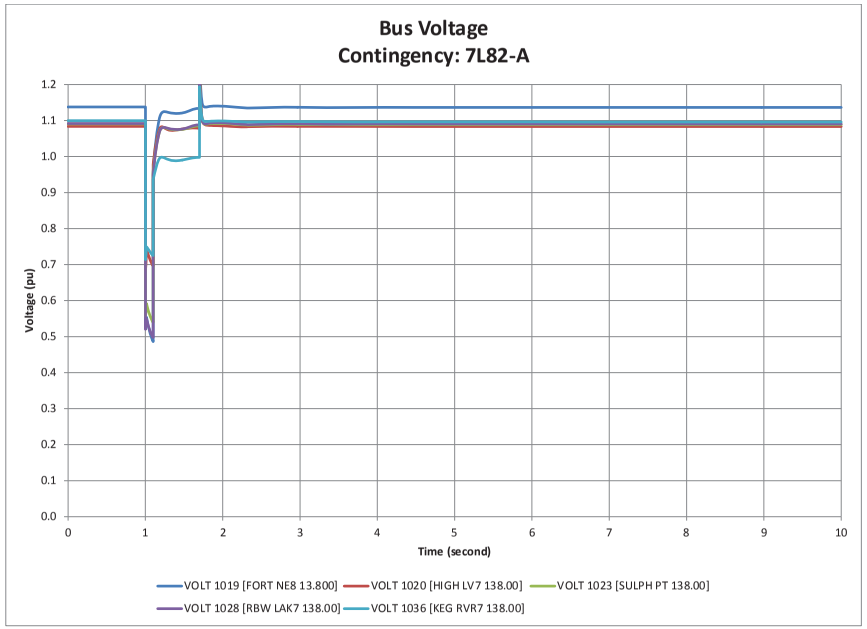

Generator Angle
Contingency: 7L82-A
Angle (degree)
20
10
0
-10
-20
-30
-40
-50
-60
0
1
2
3
4
5
6
7
8
9
10
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1

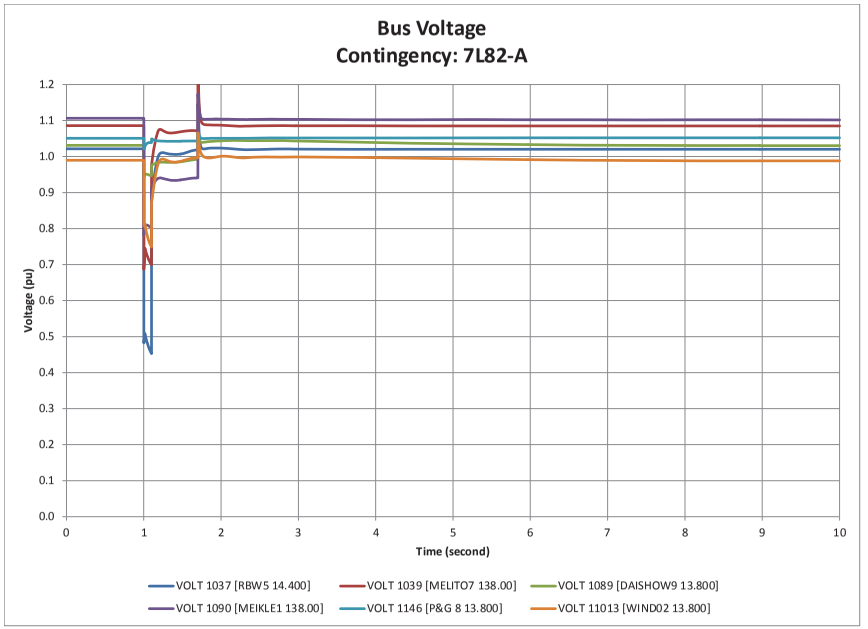

Generator Real Power
Contingency: 7L82-A
Real Power (pu)
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
10
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1

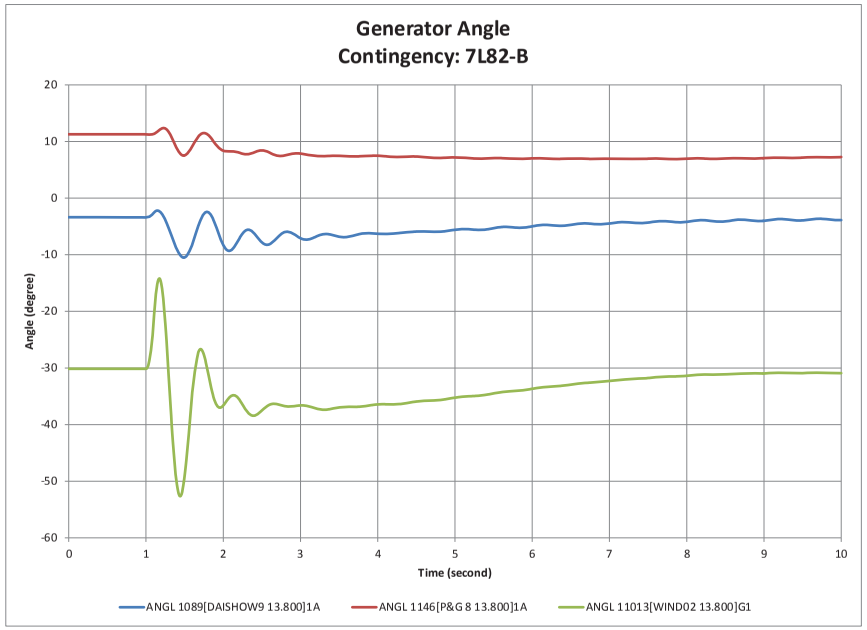

Generator Reactive Power
Contingency: 7L82-A
Reactive Power (pu)
0.2
0.0
-0.2
-0.4
0
1
2
3
4
5
6
7
8
9
10
Time (second)
VARS 1089[DAISHOW9 13.800]1A
VARS 1146[P&G 8 13.800]1A
VARS 11013[WIND02 13.800]G1

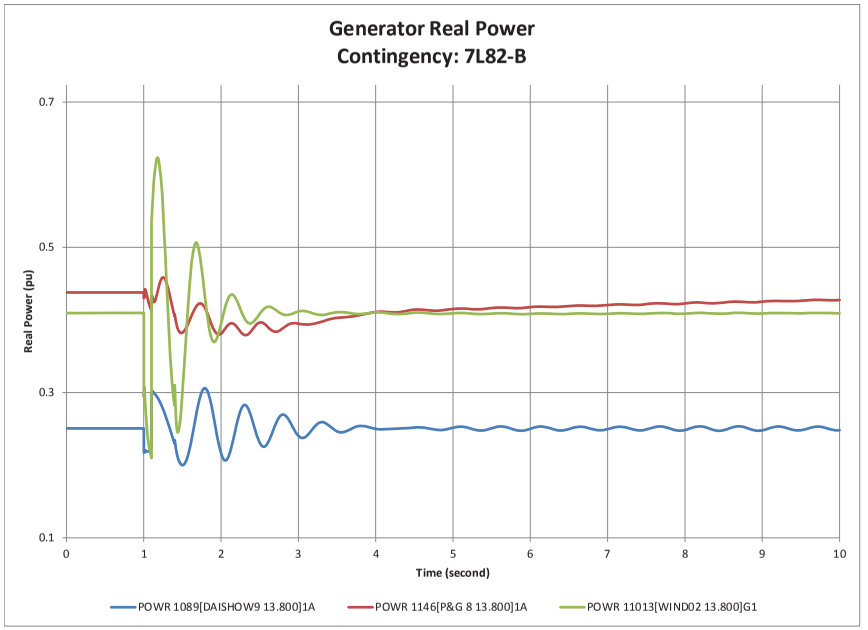

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1019 [FORT NE8 13.800]
FREQ 1020 [HIGH LV7 138.00]
FREQ 1023 [SULPH PT 138.00]
FREQ 1028 [RBW LAK7 138.00]
FREQ 1036 [KEG RVR7 138.00]

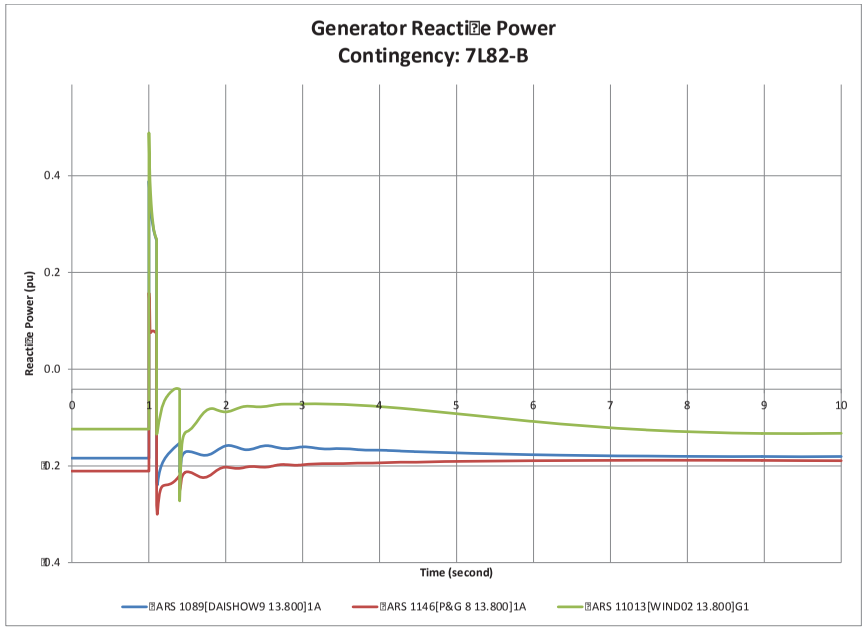

Frequency Deviation
Contingency: 7L82-A
Frequency Deviation (pu)
0.0040
0.0030
0.0020
0.0010
0.0000
-0.0010
-0.0020
-0.0030
-0.0040
-0.0050
-0.0060
0
1
2
3
4
5
6
7
8
9
10
Time (second)
FREQ 1037 [RBW5 14.400]
FREQ 1039 [MELITO7 138.00]
FREQ 1089 [DAISHOW9 13.800]
FREQ 1090 [MEIKLE1 138.00]
FREQ 1146 [P&G 8 13.800]
FREQ 11013 [WIND02 13.800]

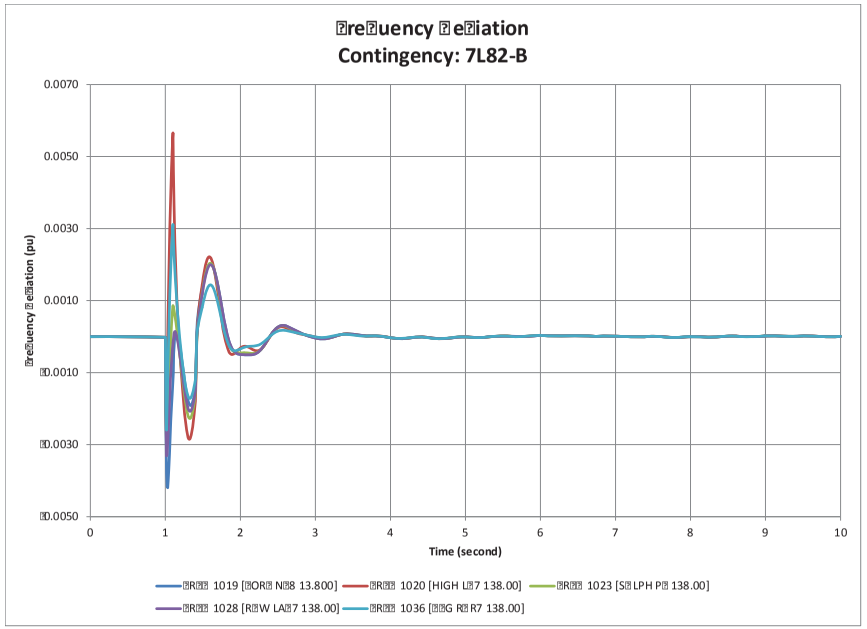

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)
VOLT 1019 [FORT NE8 13.800]
VOLT 1020 [HIGH LV7 138.00]
VOLT 1023 [SULPH PT 138.00]
VOLT 1028 [RBW LAK7 138.00]
VOLT 1036 [KEG RVR7 138.00]

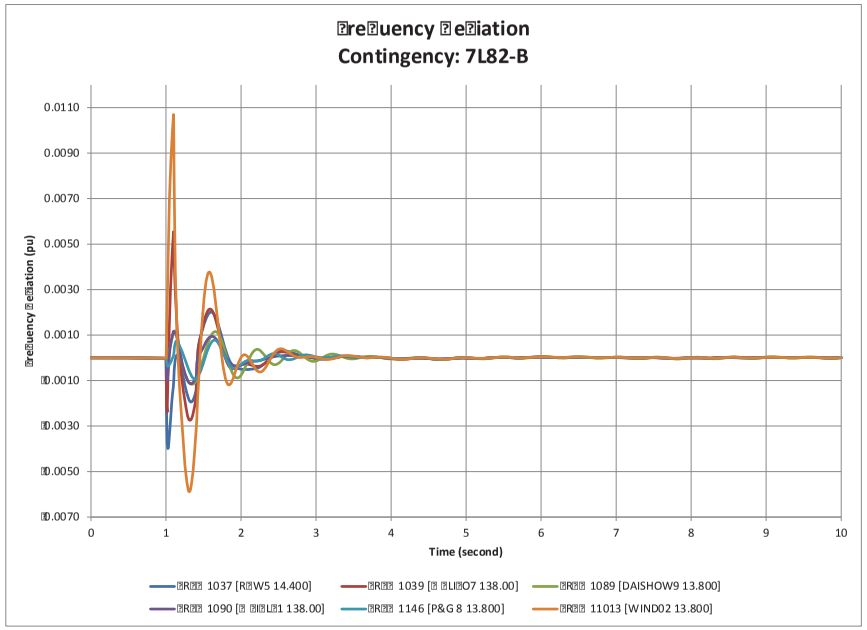

Bus Voltage
Contingency: 7L82-A
Voltage (pu)
Time (second)
VOLT 1037 [RBW5 14.400]
VOLT 1039 [MELITO7 138.00]
VOLT 1089 [DAISHOW9 13.800]
VOLT 1090 [MEIKLE1 138.00]
VOLT 1146 [P&G 8 13.800]
VOLT 11013 [WIND02 13.800]


Generator Angle
Contingency: 7L82-B
Angle (degree)
Time (second)
ANGL 1089[DAISHOW9 13.800]1A
ANGL 1146[P&G 8 13.800]1A
ANGL 11013[WIND02 13.800]G1


Generator Real Power
Contingency: 7L82-B
Real Power (pu)
Time (second)
POWR 1089[DAISHOW9 13.800]1A
POWR 1146[P&G 8 13.800]1A
POWR 11013[WIND02 13.800]G1


Generator Reacti e Power
Contingency: 7L82-B
Reacti e Power (pu)
Time (second)
ARS 1089[DAISHOW9 13.800]1A
ARS 1146[P&G 8 13.800]1A
ARS 11013[WIND02 13.800]G1


re uency e iation
Contingency: 7L82-B
re uency e iation (pu)
Time (second)
R 1019 [OR N 8 13.800]
R 1020 [HIGH L 7 138.00]
R 1023 [S LPH P 138.00]
R 1028 [R W LA 7 138.00]
R 1036 [G R R7 138.00]


re uency e iation
Contingency: 7L82-B
re uency e iation (pu)
Time (second)
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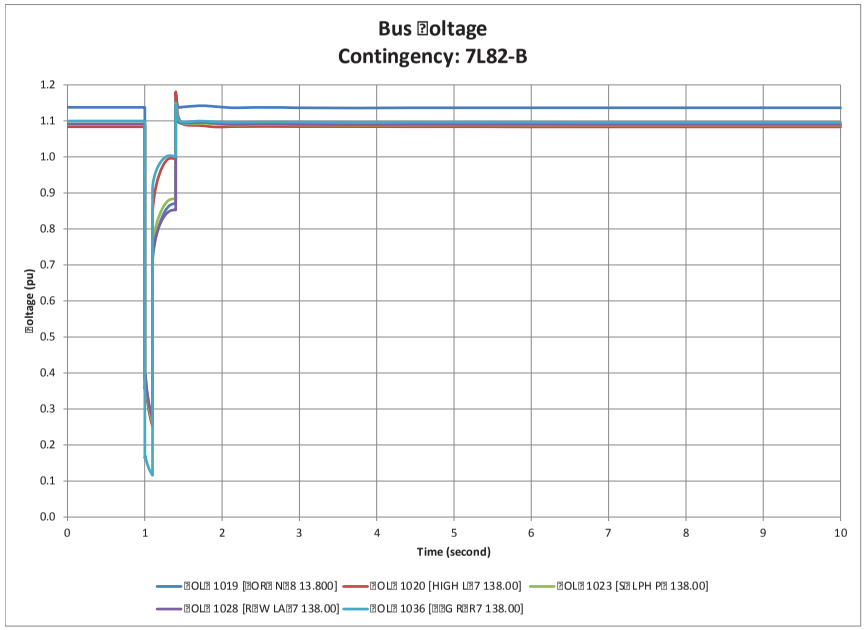
R 1039 [LIO7 138.00]
R 1089 [DAISHOW9 13.800]
R 1090 [IL1 138.00]
R 1146 [P&G 8 13.800]
R 11013 [WIND02 13.800]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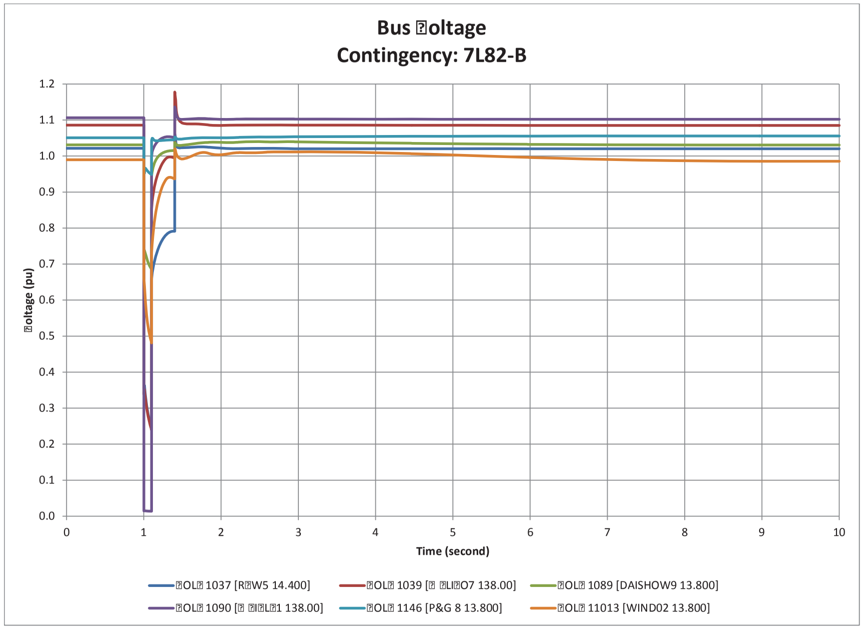
OL 1023 [S LPH P 138.00]
OL 1028 [R W LA 7 138.00]
OL 1036 [G R R7 138.00]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⍰OL⍰ 1039 [⍰ ⍰LI⍰O7 138.00]
⍰OL⍰ 1089 [DAISHOW9 13.800]
⍰OL⍰ 1090 [⍰ ⍰I⍰L⍰1 138.00]
⍰OL⍰ 1146 [P&G 8 13.800]
⍰OL⍰ 11013 [WIND02 13.800]

APPENDIX B TFO CAPITAL COST ESTIMATES

Proposal to Provide Services (PPS) - Estimate Summary

Project: Blumenort - Windy Hills 144kV Transmission Line
TFO: ATCO Electric
Prepared by: Gilles Hetu
Date: 2013-10-25
Accuracy: +20 / -10%

	System Portion	Customer Portion	TOTAL
Transmission Line Costs			
Material	$ -	$ 1,489,202	$ 1,489,202
Labour	$ -	$ 5,391,043	$ 5,391,043
Total-Transmission line	**$ -**	**$ 6,880,246**	**$ 6,880,246**
Substation Facilities Cost			
Material	$ 246,972	$ 408,010	$ 654,983
Labour	$ 947,998	$ 874,266	$ 1,822,264
Total-Substations	**$ 1,194,970**	**$ 1,282,276**	**$ 2,477,246**
Telecommunications Cost			
Material	$ 344,402	$ 4,319	$ 348,721
Labour	$ 230,585	$ 113,210	$ 343,796
Total-Telecommunication	**$ 574,987**	**$ 117,530**	**$ 692,517**
Owner Costs			
Proposal to Provide Service	$ 57,510	$ 269,036	$ 326,546
Facility Applications	$ 179,143	$ 838,052	$ 1,017,196
Land Rights - Easements	$ -	$ 522,457	$ 522,457
Land - Damage Claims	$ -	$ -	$ -
Land - Acquisitions	$ -	$ -	$ -
Owners Costs	**$ 236,653**	**$ 1,629,545**	**$ 1,866,198**
Distributed Costs			
Procurement	$ 22,102	$ 109,150	$ 131,252
Project Management	$ 92,393	$ 456,281	$ 548,674
Construction Management	$ 176,402	$ 871,158	$ 1,047,560
Contingency	$ 303,440	$ 1,498,529	$ 1,801,968
Distributed Costs	**$ 594,337**	**$ 2,935,118**	**$ 3,529,454**
Total Owners and Dist. Costs	**$ 830,990**	**$ 4,564,663**	**$ 5,395,653**
Total Direct Costs	**$ 2,600,948**	**$ 12,844,715**	**$ 15,445,662**
Salvage - Transmission Line Labour	$ 5,660	$ 19,340	$ 25,000
Salvage - Substation Labour	$ 8,000	$ -	$ 8,000
Land Remediation and Reclamation	$ -	$ -	$ -
Salvage Costs	**$ 13,660**	**$ 19,340**	**$ 33,000**
Other Costs			
Inflation	$ 96,010	$ 472,376	$ 568,386
E&S	$ 257,024	$ 1,264,576	$ 1,521,600
AFUDC	$ -	$ -	$ -
Total Indirect Costs	**$ 366,694**	**$ 1,756,292**	**$ 2,122,986**
TOTAL PROJECT COSTS	**$ 2,967,642**	**$ 14,601,006**	**$ 17,568,648**

Assumptions and Risks

See Basis of estimate

APPENDIX C PARTICIPANT INVOLVEMENT PROGRAM (PIP)

1.0 Participant Involvement Program (PIP)

From June 2013 to March 2014, the AESO conducted a Participant Involvement Program (PIP) to assist in preparing its *Mustus Biomass Energy Connection Needs Identification Document* (NID)**.** The AESO directed transmission facility owner (TFO) ATCO Electric Ltd. (ATCO) to assist the AESO in providing notification in accordance with NID 13 and Appendix A of Alberta Utilities Commission Rule 007.

The AESO's PIP was designed to notify and provide information to all occupants, residents and landowners within 800 metres of the proposed development, as well as to other interested parties, including the following First Nations, Métis Nations, government agencies and other organizations:

- Beaver First Nation
- Tallcree First Nation
- Little Red First Nation
- Métis Nation of Alberta – Zone 6
- Mackenzie County
- Alberta Environment and Sustainable Resource Development
- Alberta Transportation
- Alberta Agriculture and Rural Development – Rural Electric and Information Systems Branch
- Alberta Energy – Infrastructure Policy
- Alberta Government Services – Director of Cemeteries
- Industry Canada
- Ducks Unlimited Canada
- TELUS Communications

1.1 Description of Participant Involvement Program

The AESO used a variety of methods to notify stakeholders on the need for the Mustus Biomass Energy connection. The AESO developed a one-page need overview document that described the need for the proposed transmission development. A copy of this document was posted to the AESO website at http://www.aeso.ca/transmission/29084.html on August 7, 2013. A copy of the need overview is included as Attachment 1.

The need overview was also included with ATCO's project-specific information package mailed on June 21, 2013 to occupants, residents and landowners within 800 meters of the proposed transmission development as well as to the First Nations, Métis Nations, government agencies and other organizations noted above. Attachment 2 includes a copy of ATCO's brochure.

Most recently, the AESO advertised its intention to file the Windy Hill Generation Plant Connection NID in the Northern Pioneer and High Level Echo newspapers on March 5, 2014. A copy of the final proof has been included as Attachment 3.

As directed by the AESO, the TFO was prepared to direct any inquiries or concerns about the project need to the AESO. The TFO has indicated that Stakeholders have not identified any concerns with the need for the proposed transmission development.

To ensure that stakeholders had the opportunity to provide feedback, the AESO also provided stakeholders with a dedicated, toll-free telephone line (1-888-866-2959) and a dedicated email address (stakeholder.relations@aeso.ca). AESO contact information, along with the AESO's mailing address (2500, 330 5th Ave, SW, Calgary) and website address (www.aeso.ca), and a privacy statement that described how the AESO honours Alberta's Personal Information Protection Act, were included on all AESO communications related to this application.

1.2 Issues and Concerns Raised

The AESO has received no indication of concern from any party about the need for the proposed transmission development.

1.3 List of Attachments

- Attachment 1 – AESO Need Overview
- Attachment 2 – ATCO's Information Brochure – "*Shape the Conversation - Blumenort Transmission Project*" (June 2013)
- Attachment 3– Notification of Filing Advertisement – Final Proof

Attachment 1 – AESO Need Overview

Need for the Windy Hill Biomass Generation Plant Connection in the High Level Area

Transmission Development Information for Stakeholders

Mustus Energy Limited (Mustus) has applied to the Alberta Electric System Operator (AESO) for connection of its Windy Hill Biomass Generation Plant to be located in the High Level area. Mustus's connection request can be met by modifying the Blumenort 832S substation and adding a 144 kV transmission line between the Blumenort 832S and Mustus's Windy Hill 675S substation.

The AESO is processing Mustus's request, including providing information to landowners, occupants, residents and agencies in the High Level area that may be near the proposed transmission development. The AESO intends to apply to the Alberta Utilities Commission (AUC) for approval of this need in early 2014. The AESO's needs identification document (NID) application will be available on the AESO's website at www.aeso.ca/transmission/8969.html at the time of its application to the AUC.

Who is the AESO?

Alberta's transmission system, sometimes referred to as the Alberta Interconnected Electric System (AIES), is planned and operated by the AESO. The transmission system comprises the high-voltage lines, towers and equipment (generally 69 kV and above) that transmit electricity from generators to lower voltage systems that distribute electricity to cities, towns, rural areas and large industrial customers.

The AESO's role is to maintain safe, reliable and economic operation of the AIES. The AESO's planning responsibility includes determining the need for transmission system development and the manner in which that need is met. The AESO is also mandated to facilitate the interconnection of qualified market participants to the AIES. The AESO is regulated by the AUC and must apply to the AUC for approval of its NID.

How is ATCO Electric Ltd. involved?

ATCO Electric Ltd. (ATCO) is the transmission facilities owner (TFO) in the High Level area. While the AESO is responsible for identifying that transmission system development is needed, ATCO is responsible for detailed siting and routing, constructing, operating and maintaining the associated transmission facilities. The AESO has directed ATCO to provide information to stakeholders on this need and to file a facility proposal application with the AUC which will include a detailed description and location of the proposed transmission development.

2500, 330-5th Avenue SW, Calgary, Alberta T2P 0L4 Phone: 403-539-2450 Fax: 403-539-2949
www.aeso.ca www.poweringalberta.com

Further Information

The AESO appreciates your views on the need for transmission system development and your comments are encouraged. If you have any questions or suggestions regarding the need for the proposed transmission system development in the High Level area or the AESO's application regarding this need, please contact:

Megan Harris
AESO Stakeholder Relations
1-888-866-2959
stakeholder.relations@aeso.ca
2500, 330 – 5th Avenue SW
Calgary, Alberta T2P 0L4

The AESO is committed to protecting your personal privacy in accordance with Alberta's Personal Information Protection Act. Any personal information collected by the AESO with regard to this project may be used to provide you with further information about the project, may be disclosed to the Alberta Utilities Commission (and as a result, may become public), and may also be disclosed to ATCO as the legal owners of transmission facilities in your area. If you have any questions about how the AESO will use and disclose your personal information, please contact us at 1-888-866-2959 or at stakeholder.relations@aeso.ca

Attachment 2 – ATCO's Information Brochure – "*Shape the Conversation - Blumenort Transmission Project*" (June 2013)

ATCO Electric

SHAPE the conversation

June 2013

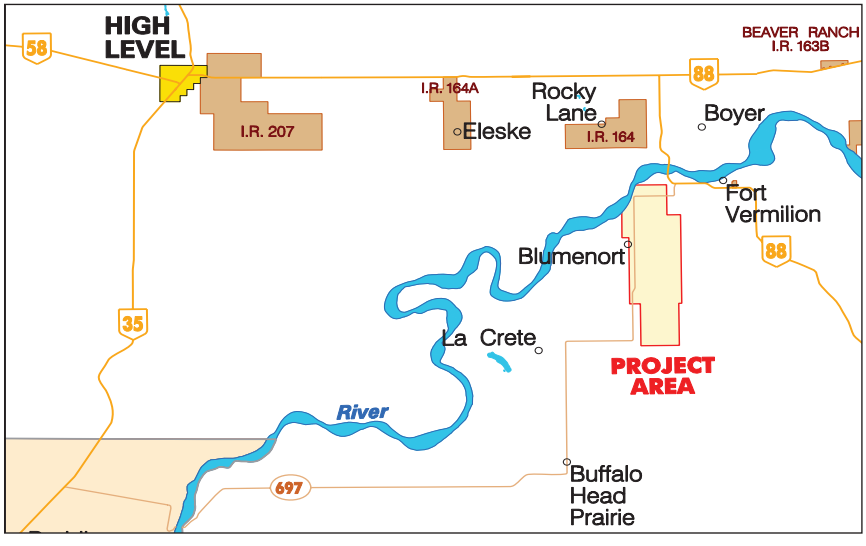
PROJECT NEWSLETTER 1

BLUMENORT TRANSMISSION PROJECT

The Blumenort transmission project will help meet the increased demand for electricity in your area.

If approved, about 23 kilometres of new transmission line will be built. The new line will connect the existing Blumenort substation to the new Windy Hill substation planned as part of an adjacent project. The Blumenort substation will be expanded. The new facilities will support industrial demand and other developments in the area.

ATCO Electric is seeking your input on how this project may affect you.



Since the 1980s, growth of Alberta's electric system has not kept pace with Albertans rising electricity needs. New projects are being planned to meet those needs.

ATCO Electric's consultations with landholders on transmission projects routinely lead to improvements on our projects. We have adjusted routes, developed new route options, and rejected other routes as a result of feedback and conversations with landholders.

Please provide your feedback on this project and help shape the conversation.

The Blumenort transmission project began in January 2010 and was put on hold. We are now re-starting the project.

Open House

We look forward to meeting with you and learning more about how, together, we can find the best locations for these new transmission facilities.

ATCO Electric representatives will be available at an open house to share information, gather your input and address any questions or concerns you may have. Project information and displays will also be on hand for you to review. Please join us and help determine the best routes for the Blumenort transmission project.

Wednesday July 10, 2013
4:00 pm – 8:00 pm
Hill Crest Community School, located at Highway 697 and Blumenort Road.

THE PROJECT

A new transmission line is being planned for your area. If approved, the Blumenort transmission project will connect the existing Blumenort substation to the planned Windy Hill substation and about 23 kilometres of new transmission line will be built. The new facilities will support industrial demand and other developments in the area.

Local Benefits

Upgrading the transmission system in your area will:

- Improve access to safe, secure and reliable power
- Allow future businesses to connect to Alberta's electric system
- Encourage investment in our province

If you are a local business and would like information on ATCO Electric's approved vendors list, please contact us toll free at 1-855-420-5775 or by email at consultation@atcoelectric.com

The Process

In the coming weeks, ATCO Electric will be contacting everyone in the vicinity of some early route concepts for the Blumenort transmission project (see enclosed map). Our research indicates that you are in the vicinity of these early route concepts.

We would like to meet with you to find out what you think about these route concepts, whether you have any ideas for other route options, concerns or information on the routes that you would like to share, or if you have any questions you would like answered. These conversations will help us to determine the best route options for the new transmission line developments.

Once this initial consultation phase is complete, ATCO Electric will narrow the routes down to selected options that appear to be the best routes. We may begin another round of consultations with everyone in the vicinity of these selected options to see if additional changes are required and feasible (see *The Schedule* below).

In developing route options, ATCO Electric must consider a range of route constraints and barriers – including proximity to residences (see *Transmission Routes* on next page). We undertake extensive studies to understand the potential impacts on wildlife, wetlands and other sensitive areas.

Consultation with landholders routinely leads to improvements on our projects. We have adjusted routes, developed new route options, and rejected other routes because of conversations with landholders. Your feedback and input will help determine the best possible routes.

In addition to the in-person and telephone consultations that ATCO Electric will undertake, we invite anyone who is interested in this project to:

- Join us at an open house (see back page for date & location);
- Provide feedback and share other information using the enclosed reply form and postage paid envelope;
- Be a part of the conversation. If you have any questions, concerns or other information regarding this project, we want to hear from you.

THE SCHEDULE

1. Public consultation begins with sharing information about the project in order to find the best options
2. We gather your input. Based on this input and other factors, route option(s) are selected.
3. ATCO Electric submits an application to the AUC to build the proposed facilities.
4. The AUC reviews the application in a public process.
5. If approved, construction of the new facilities begins.

PUBLIC CONSULTATION
is a continuous process that occurs throughout the life of the project

The Right-of-Way

The term right-of-way refers to the area a transmission line uses - including areas on either side of the line. Right-of-ways must have a minimum width to ensure safety and ongoing access for maintenance.

For safety reasons, some general restrictions on the use of the land in the direct vicinity of the transmission line may apply. These include setbacks for development.

The right-of-way:

- Will follow property boundaries if feasible;
- In some situations, will follow existing features like a road, pipeline or another power line;
- Typical width for this project is 18 metres;
- Other dimensions will depend on the type and size of the required structure, existing land use, surrounding features and other factors.

Once proposed routes have been submitted to the Alberta Utilities Commission, ATCO Electric begins coordinating agreements with landholders to acquire rights-of-way. Once a right-of-way is constructed, landholders continue to use the right-of-way subject to the terms of agreements made between the landholder and ATCO Electric.

Transmission Routes

Prior to consultation with landholders, ATCO Electric develops early route concepts (see enclosed map). In selecting early route concepts, ATCO Electric considers numerous constraints and barriers, including:

- Proximity to residences
- Environmentally sensitive areas
- Wetlands
- Existing infrastructure (i.e. other transmission lines, roads,highways, pipelines, telecommunication towers)
- Planned developments
- Agriculture operations
- Visual factors
- Construction & land acquisition costs
- Quarter and section lines
- Other special considerations (i.e. access roads)

The enclosed map shows some early route concepts. New options may be developed in response to feedback, landholder consultations and ongoing study of the project area. Only one route will be selected and built.

If you are within the vicinity of any of the enclosed route options, ATCO Electric will contact you to schedule a personal consultation.

Anyone who is interested in speaking with ATCO Electric on this proposed project can contact us to arrange a consultation at their convenience. Please see our contact information on the back page.

project notification & open house - early route concepts

route options selected

consultation continues

right-of-way acquisition process begins

AUC process continues

facilities completed and operating

JUNE to OCTOBER 2013

open house held at
Hill Crest Community School
July 10 from 4 to 8 pm
*more details on back page

NOVEMBER 2013 to MARCH 2014

application filed with the
Alberta Utilities Commission (AUC)
(proposed routes)

APRIL 2014 to FEBRUARY 2015

if approval is granted by the AUC,
construction begins

CONTACT INFORMATION

Your comments and concerns are important to us. Please contact us if you would like to learn more about this project or if you would like to share information with us.

Call us toll free at: 1-855-420-5775 or contact the project planner directly:

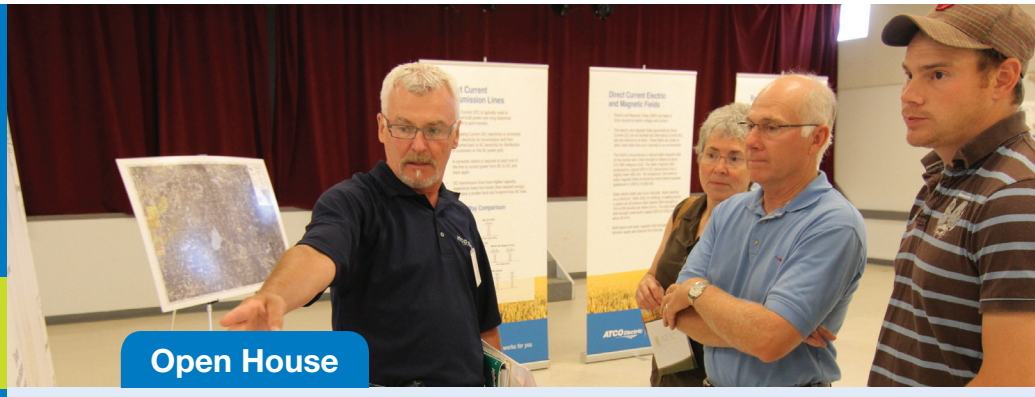
Nathan Jones
Right-of-Way Planning
ATCO Electric
10035-105 Street
Edmonton, AB T5J 2V6

Phone: 780-420-4184
Email: consultation@atcoelectric.com
Website: atcoelectric.com
Fax: 780-420-5030

Alberta Electric System Operator (AESO)
Phone: 1-888-866-2959
Email: stakeholder.relations@aeso.ca

Alberta Utilities Commission (AUC)
Phone: 780-427-4903
(for toll-free, dial 310-0000 first)
Email: consumer-relations@auc.ab.ca

Scan with your smart phone for project contact information



Open House

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ATCO Electric representatives will be available at an open house to share information, gather your input and address any questions or concerns you may have. Project information and displays will also be on hand for you to review. Please join us and help determine the best route for the Blumenort transmission project.

Wednesday July 10, 2013
4:00 pm – 8:00 pm
Hill Crest Community School, located at Highway 697 and Blumenort Road.

Did You Know...

When upgrades to Alberta's electrical system are needed, they are identified by the Alberta Electric System Operator (AESO).

The AESO is an independent, not-for-profit organization responsible for the safe, reliable and economic planning and operation of the provincial transmission grid. For more information about why this project is needed, please refer to the AESO's *Need Overview* included with this package, or visit www.aeso.ca. If you have any questions or concerns about the need for this project you may contact the AESO directly or you can make your concerns known to an ATCO Electric representative who will communicate them to the AESO on your behalf.

ATCO Electric

atcoelectric.com

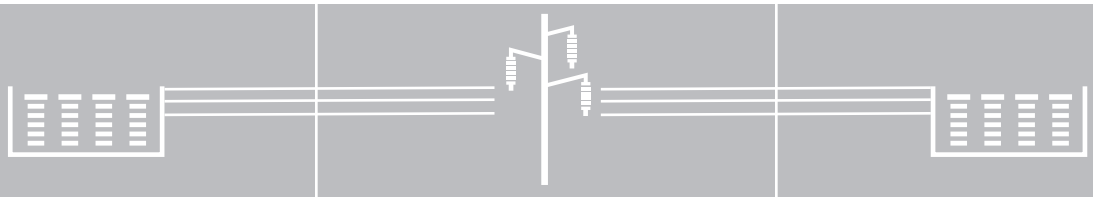
ATCO Electric

The Technical Details

June 2013

BLUMENORT TRANSMISSION PROJECT

The technical details of facilities associated with the Blumenort transmission project are described in this fact sheet. Designs may vary as plans are finalized.



Existing Blumenort Substation

The project will require upgrades to our existing Blumenort substation (called 832S). The substation is located approximately three kilometres (km) northeast of the Hamlet of La Crete, in the northwest quarter of Section 12-108-14 W5M.

THE DETAILS

The substation upgrades will include adding the following new equipment (please refer to the back of this fact sheet for equipment definitions):

- one 144-kV circuit breaker
- new 61 metre (m) telecommunication tower
- related support equipment and structures

In order to make room for the new equipment, the existing fence line will be expanded by about a third. The new fence will measure 63 m x 109 m.

New 144-kV Transmission Line

We are planning to build a new transmission line connecting the Blumenort substation with the planned Windy Hill substation. The new line will be called 7L180.

THE DETAILS

If approved, the transmission line will be 144-kV and approximately 23 km long. The line will consist of:

- three conductor wires
- one overhead shield wire
- 'Davit Arm' structure

The typical structure is described in more detail on the back of this fact sheet.

New Windy Hill Substation

The planned Windy Hill substation (to be called 675S), will be located approximately 15 km east of the Hamlet of La Crete, in the southeast quarter of Section 13-106-14 W5M.

THE DETAILS

The Windy Hill substation is planned as part of an adjacent project.

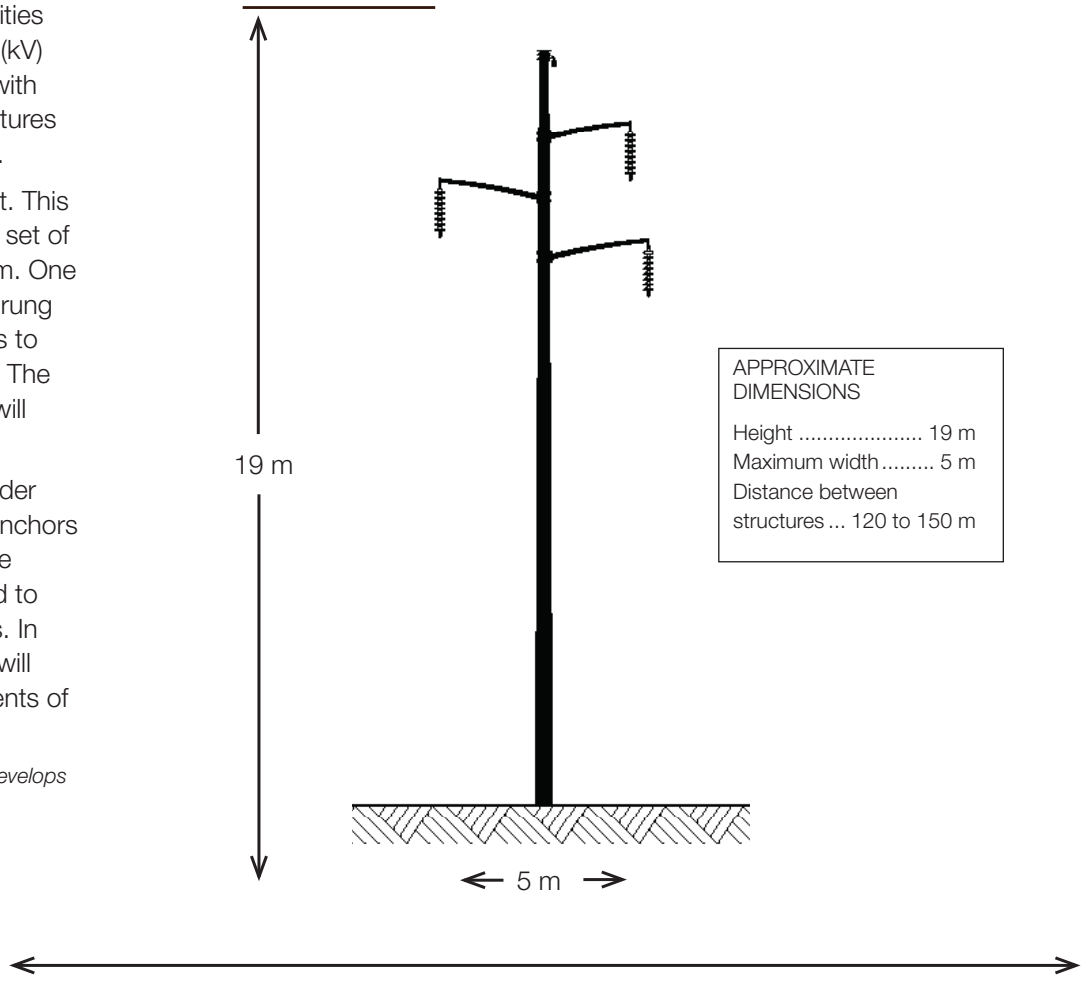
What It Will Look Like

If approved by the Alberta Utilities Commission, the 144-kilovolt (kV) transmission line will be built with single circuit 'Davit Arm' structures similar to the one shown here.

Structures will be single-circuit. This means that they will have one set of three wires strung across them. One overhead shield wire will be strung from the tops of the structures to protect the line from lightning. The distance between structures will range from 120 m to 150 m.

Non-typical structures with wider bases and/or guy wires and anchors may be required where the line ends or bends, at corners and to go over and around obstacles. In all cases minimum clearance will meet or exceed the requirements of provincial safety regulations.

**Details may change as the project develops and designs are finalized.*



Typical right-of-way for this project is 18 m

**Right-of-ways are cleared of trees, bush and debris to allow access for construction and ongoing maintenance.*

Definitions

Capacitor bank: Acts like a temporary battery to store electrical energy created between conductors and maintain power supply. It also regulates the flow of electricity.

Circuit: A circuit is a group of wires electricity flows through. ATCO Electric's transmission lines can be single or double circuit. A single circuit line has three wires and a double circuit line has six. A transmission line may also have one or two shield wires on the top of the structures to protect the line from lightning.

Circuit breaker: An automatic switch that is designed to protect an electrical circuit from overloading by shutting off the flow of electricity.

Consultation: A meeting where advice, information and views are exchanged.

Double Circuit: Two isolated transmission lines that share the same pole. They have one set of three wires on each side.

Easement: A right to use private or crown land for the placement of transmission lines and structures.

Kilovolt (kV): A kilovolt is equal to one thousand volts. This unit of measurement is most commonly used when describing transmission and distribution lines. Distribution and transmission lines in Alberta carry between 4-kV (4,000 volts) and 500-kV (500,000 volts).

Right-of-way: A right-of-way is the use of a strip of land acquired for the construction and operation of a transmission line. The term right-of-way is also used to refer to the physical space a transmission line encompasses, including areas on either side of the line.

Transformer: A transformer is the device in a substation that steps voltage up or down. It 'transforms' the electricity from higher transmission voltages to the lower distribution voltages that power your home.

Termination: A termination is the point where a power line ends and connects to a substation.

consultation@atcoelectric.com
1-855-420-5775 (toll free)

ATCO Electric

108–14–5

108–13–5

W1 EXISTING 832S BLUMENORT SUBSTATION

W2

EAST ROUTE CONCEPT

E2

E4

WEST ROUTE CONCEPT

CONNECTOR ROUTE CONCEPT

W5

E6

E8

W4

W8

W7

CENTRAL ROUTE CONCEPT

EAST ROUTE CONCEPT

107–14–5

W9

W10

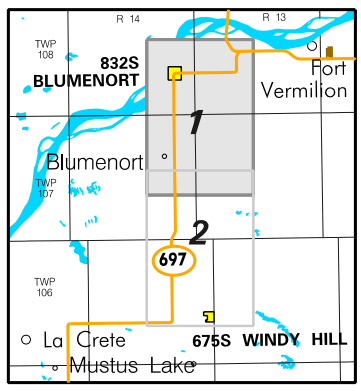
107–13–5

C9

C10

LEGEND

- West Route Concept
- Central Route Concept
- Connector Route Concept
- East Route Concept
- Route Concept Start Point(s)
- Route Concept End Point(s)
- Residence
- Church /Community Hall
- School
- Existing 144 kV Transmission Line



ATCO Electric

Blumenort 144 kV Transmission Project

ROUTE CONCEPTS MOSAIC

1:35 000

RS–7L180 – P – 05a

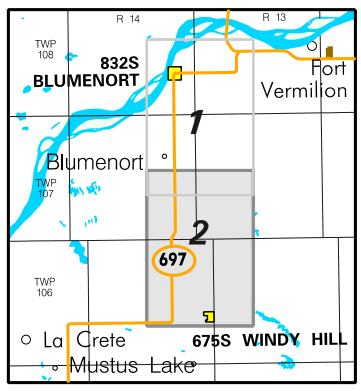
Cartography by Ian Mackenzie Approved by Nathan Jones June 2013

ROUTE CONCEPTS MAP

C9
C10
W12
C11
E14
W11
CONNECTOR ROUTE CONCEPT
WEST ROUTE CONCEPT
CONNECTOR ROUTE CONCEPT
C15
C16
W15
W16
E16
E17
CENTRAL ROUTE CONCEPT
C17
EAST ROUTE CONCEPT
C18
W18
W19
W20
CONNECTOR ROUTE CONCEPT
W21
A20
A21
106–14–5
106–13–5
W22
E23
675S WINDY HILL (MUSTUS) SUBSTATION

LEGEND

- West Route Concept
- Central Route Concept
- Connector Route Concept
- East Route Concept
- Route Concept Start Point(s)
- Route Concept End Point(s)
- Residence
- Church /Community Hall
- School
- Existing 144 kV Transmission Line



ATCO Electric

Blumenort 144 kV Transmission Project

ROUTE CONCEPTS MOSAIC

1:35 000

RS–7L180 – P – 05b

Cartography by Ian Mackenzie Approved by Nathan Jones June 2013

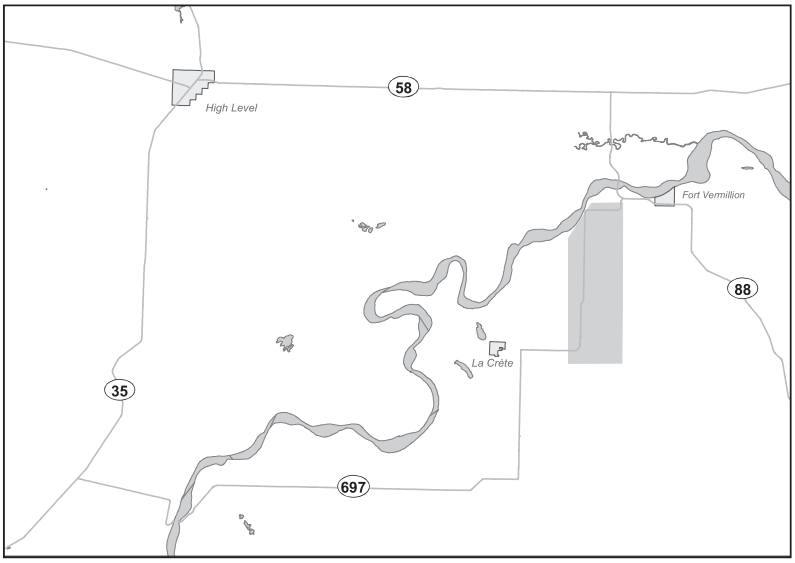
ROUTE CONCEPTS MAP

Attachment 3 – Notification of Filing Advertisement – Final Proof

Notification of AESO Regulatory Filing Addressing the Need for the Mustus Biomass Energy Connection in the High Level Area

The Alberta Electric System Operator (AESO) advises you of its intention to file a Needs Identification Document (NID) for the Mustus Biomass Energy Connection with the Alberta Utilities Commission (AUC) on or after March 19, 2014.

Mustus Energy Limited (Mustus) has requested system access service for its Windy Hill Biomass Generation Plant to be located in the High Level area. Addressing Mustus's request requires transmission system development which is proposed to include modifying the existing Blumenort 832S substation and adding a new 144 kV transmission line between the Blumenort 832S substation and the proposed Mustus Windy Hill 675S substation.



The shaded area indicates the approximate area where the proposed transmission development is needed. In a separate application called a Facility Application, ATCO Electric Ltd. (ATCO), the transmission facility owner (TFO) in the area, will describe the specific routes and sites for the proposed transmission development, and request AUC approval to construct and operate these transmission facilities. The specific substation sites and transmission line routes applied for by ATCO may extend beyond the area shown.

The AESO and ATCO presented this need to stakeholders, including residents, occupants and landowners, from June 2013 to March 2014. The AESO has considered feedback gathered from stakeholders, and technical and cost considerations, and will apply to the AUC for approval of the need for this transmission development. Once filed, the NID will be posted on the AESO website at http://www.aeso.ca/transmission/29084.html

Please visit our website, www.aeso.ca for more information, or contact the AESO at 1-888-866-2959 or stakeholder.relations@aeso.ca

aeso
ALBERTA ELECTRIC SYSTEM OPERATOR

tmp.worldwide
Integrated Marketing Communications

Artist:	2N
Docket:	103278
Date:	Feb 28, 2014
Size:	5"
Proof:	1
	1 of 1
Publications(s):	LaCrete/FtVerm High Level

APPENDIX D INFORMATION REGARDING TO RULE 007, SECTION 6.1 – NID12

December 16, 2013

Gerardo Marquez
Alberta Electric System Operator
2500, 330 – 5th Avenue SW
Calgary, Alberta, T2P 0L4

Dear Mr. Marquez;

RE: Confirmation of AUC Rule 007, NID 12 Content in Facilities Application
Blumenort Transmission Project
AESO Project File No.: 803

The seven major aspects of AUC Rule 007, NID 12, will be addressed through ATCO Electric's Facilities Application for the above referenced project, where applicable.

The seven aspects are listed below:

1. Agricultural Impact
2. Residential Impact
3. Environmental Impact
4. Cost
5. Electrical considerations
6. Visual Impacts
7. Special Constraints

Sincerely,
ATCO Electric Ltd.

<Original signed by >

Nathan Jones
Environmental/Right-of-Way Planner
ATCO Electric Ltd.
Tel: 780-420-4184
Nathan.Jones@atcoelectric.com