APPENDIX A CONNECTION ASSESSMENT

Engineering Connection Assessment

P2009 Travers Solar Project Connection

Greengate Power Corporation

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NOTE:

The conclusions and recommendations in this report are based on the results presented in *Attachment A: Engineering Connection Assessment: Study Results*, which was prepared by a third party consultant in accordance with the AESO Connection Process.

The AESO has reviewed the *Engineering Connection Assessment: Study Results*, and finds it acceptable for the purpose of assessing the potential impacts of the proposed connection on the performance of the Alberta interconnected electric system.

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Attachments

1 Introduction

This AESO Engineering Connection Assessment describes the engineering studies that were completed to assess the impact of the Project (as defined below) on the performance of the Alberta interconnected electric system (AIES). This report also provides the AESO's conclusions and recommendations based on the results of the engineering studies.

Attached to this Engineering Connection Assessment are the results of the engineering studies (see Attachment A) and the scope and methodology used to perform the studies (see Attachment A1 to Attachment A7). These attachments provide details regarding the technical criteria, assumptions, and methods for performing these engineering studies, and the results of the engineering studies.

1.1 Project Overview

Greengate Power Corporation (Market Participant) has submitted a request for system access service to the Alberta Electric System Operator (AESO) to connect its proposed Travers MPC Solar Project (Facility) to the AIES. The Facility includes a proposed collector substation, to be designated the Little Bow 991S substation. The Facility is located in the Lomond area in the AESO planning area of Stavely (Area 49).

The Market Participant's request includes: a request for a new system access service in the area, with a Rate STS, *Supply Transmission Service*, contract capacity of 400 MW and a Rate DTS, *Demand Transmission Service*, contract capacity of 0.5 MW; and a request for transmission development (collectively, the Project).

The scheduled in-service date (ISD) for the Project is December 1, 2020.

2 Assessment Scope

2.1 Objectives

The objectives of the AESO Engineering Connection Assessment are as follows:

- Assess the impact of the Project on the performance of the AIES.
- Evaluate Project connection alternatives and identify the AESO's preferred alternative.
- Recommend mitigation measures, if required, to reliably connect the Project to the AIES.
- Identify Project dependencies, including any legal owner of a Transmission Facility (TFO) projects or AESO plans to expand or enhance the transmission system that must be completed prior to connection.

2.2 Existing System

Geographically, the Project is located in the AESO planning area of Stavely (Area 49), which is part of the AESO South Planning Region. Stavely area is surrounded by the planning areas of Strathmore/Blackie (Area 45), High River (Area 46), Brooks (Area 47), Vauxhall (Area 52), Fort MacLeod (Area 53) and Lethbridge (Area 54).

From a transmission system perspective, Stavely area 49 consists primarily of 138 kV and 240 kV transmission systems. Stavely (Area 49) is connected to Brooks (Area 47) through the 240 kV transmission lines 1005L and 1036L, connected to Strathmore/Blackie (Area 45) through the 138 kV transmission line 161L, connected to High River (Area 46) through the 240 kV transmission lines 1037L and 1038L, connected to Lethbridge (Area 54) through the 240 kV transmission lines 1041L and 1005L, and connected to Fort Macleod (Area 53) through the 138 kV transmission line 180L.

Existing constraints in the South planning region are managed in accordance with the procedures set out in Section 302.1 of the ISO rules, *Real Time Transmission Constraint Management* (TCM Rule).

2.3 Study Area

The Study Area for the Project consists of the AESO Planning areas of Strathmore/Blackie (Area 45), High River (Area 46), Brooks (Area 47), Stavely (Area 49), Vauxhall (Area 52), Fort MacLeod (Area 53) and Lethbridge (Area 54), including the tie lines connecting these planning areas to the rest of the AIES. All transmission facilities within the Study Area were studied and monitored for violations of the Reliability Criteria (defined in Section 3.1 of Attachment A1).

3 Connection Alternatives

3.1 Overview

The AESO, in consultation with the TFO in the Study Area and the Market Participant, examined four transmission alternatives to meet the Market Participant's request for system access service, as detailed in Section 3.2.

3.2 Connection Alternatives Examined

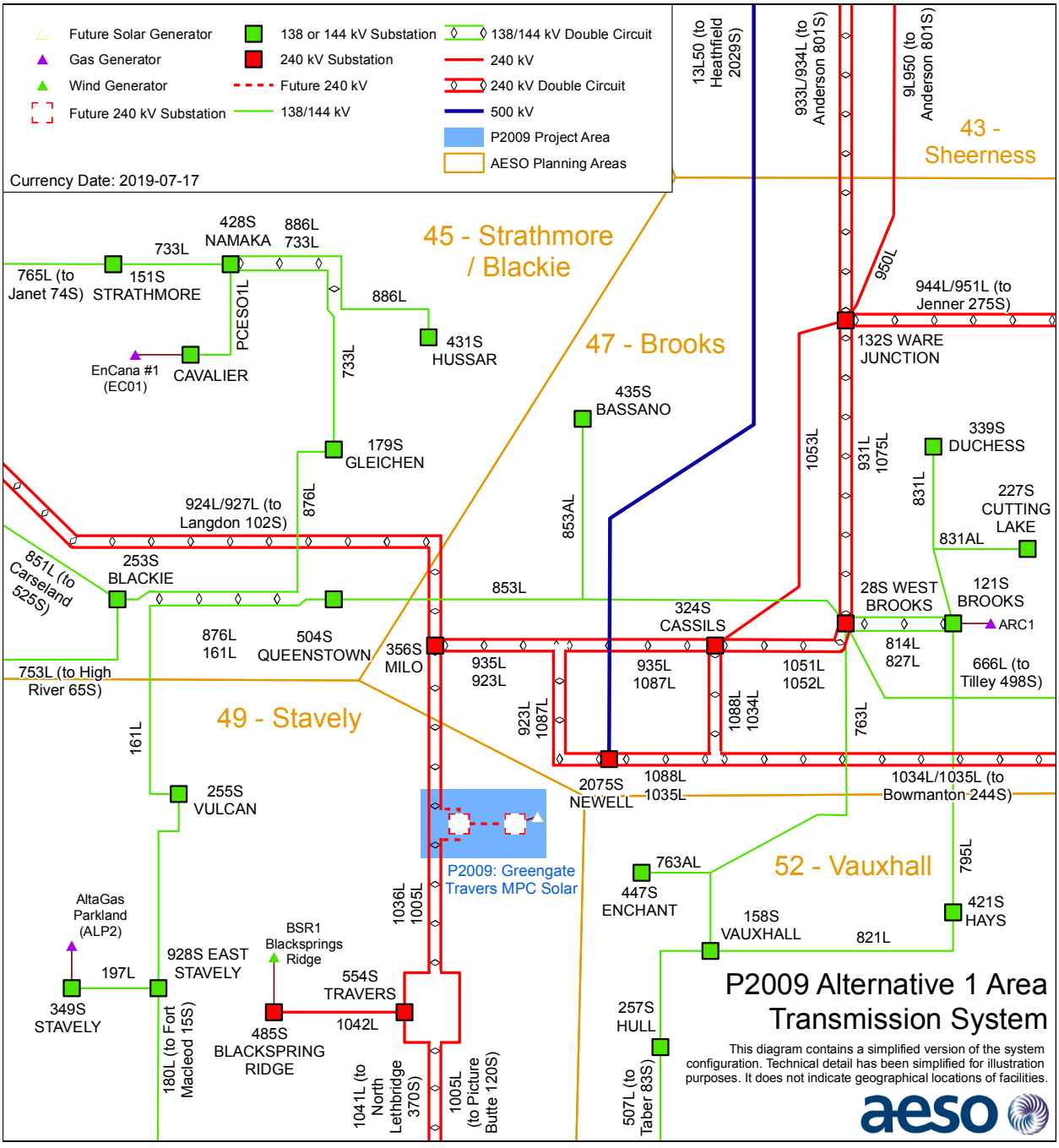
Alternative 1 – In-and-out connection to the existing 240 kV transmission line 1005L

This alternative includes the following developments:

- Add a 240 kV switching station, including three 240 kV circuit breakers, and connect the 240 kV switching station to the existing transmission line 1005L (between Picture Butte 120S and Milo 356S substations) using an in-and-out connection configuration;
- Add a 240 kV circuit, approximately 30 metres in length[1], to connect the Market Participant's proposed Little Bow 991S substation to the 240kV switching station using a radial connection configuration; and
- Add or modify associated equipment as required for the above transmission developments.

[1] Exact line length to be determined by the TFO

Figure 3-1: Connection Alternative 1

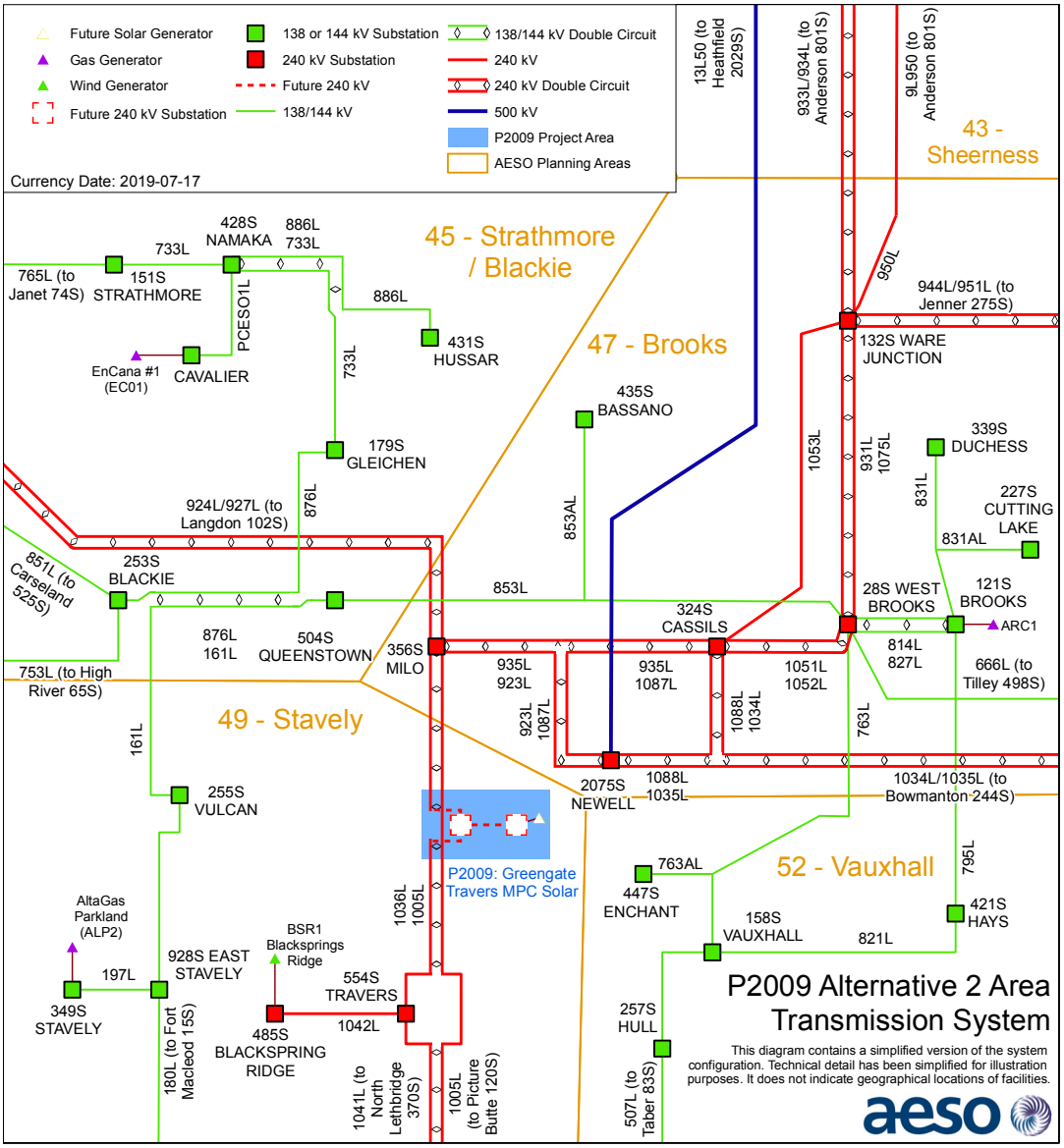


Alternative 2 – In-and-out connection to the existing 240 kV transmission line 1036L

This alternative includes the following developments:

- Add a 240 kV switching station, including three 240 kV circuit breakers and connecting the 240 kV switching station to the existing transmission line 1036L (between Travers 554S and Milo 356S substations) using an in-and-out connection configuration;
- Add a 240 kV circuit, approximately 30 metres in length[2], to connect the Market Participant's proposed Little Bow 991S substation to the 240kV switching station using a radial connection configuration; and
- Add or modify associated equipment as required for the above transmission developments.

Figure 3-2: Connection Alternative 2



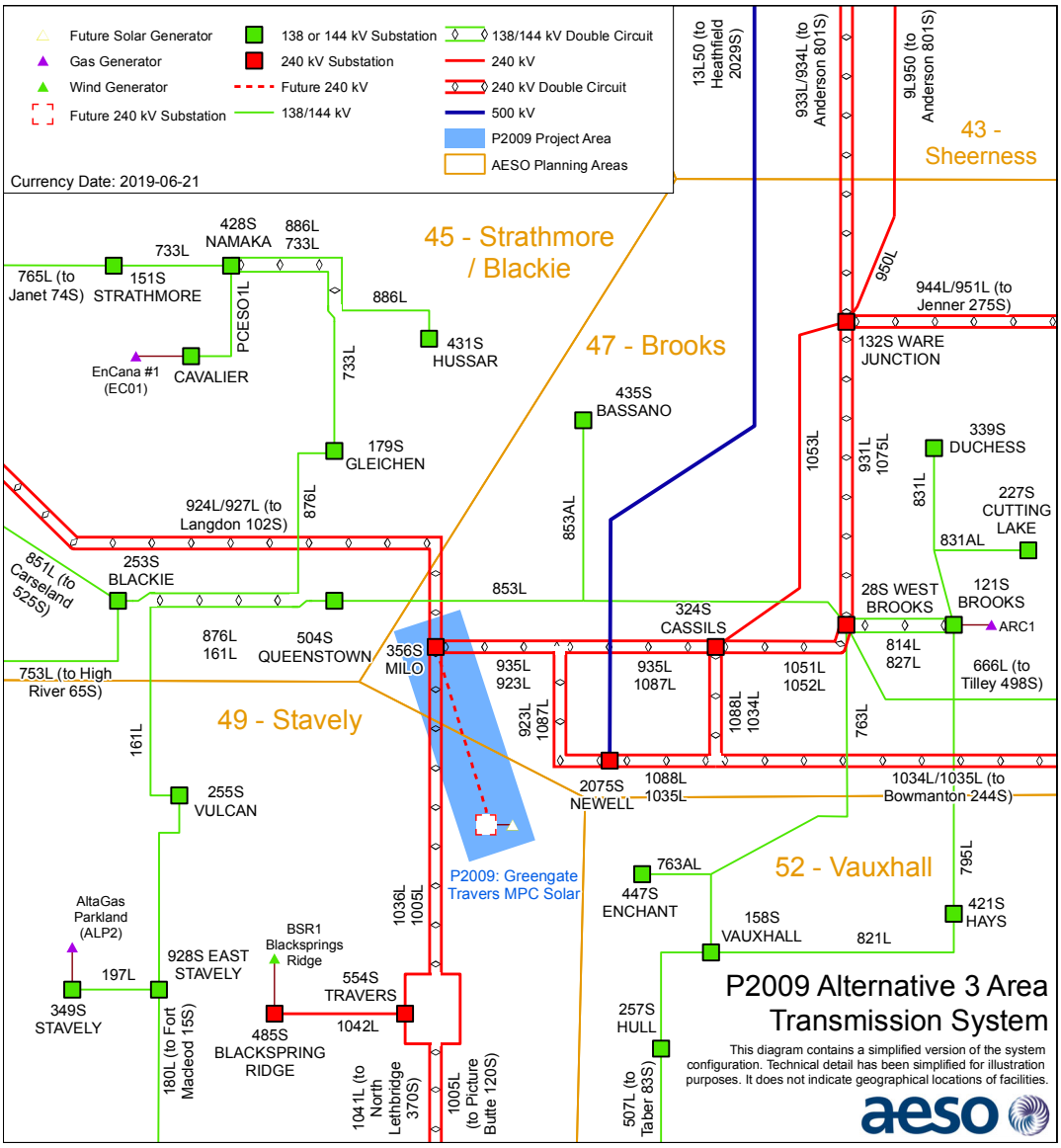
[2] Exact line length to be determined by the TFO

Alternative 3 – Radial connection to the existing 356S Milo substation

This alternative includes the following developments:

- Modify the existing 356S Milo substation, including adding one 240 kV circuit breaker;
- Add a 240 kV circuit, approximately 30 kilometres in length[3], to connect the Market Participant's proposed Little Bow 991S substation to the existing 356S Milo substation using a radial configuration; and
- Add or modify associated equipment as required for the above transmission developments.

Figure 3-3: Connection Alternative 3



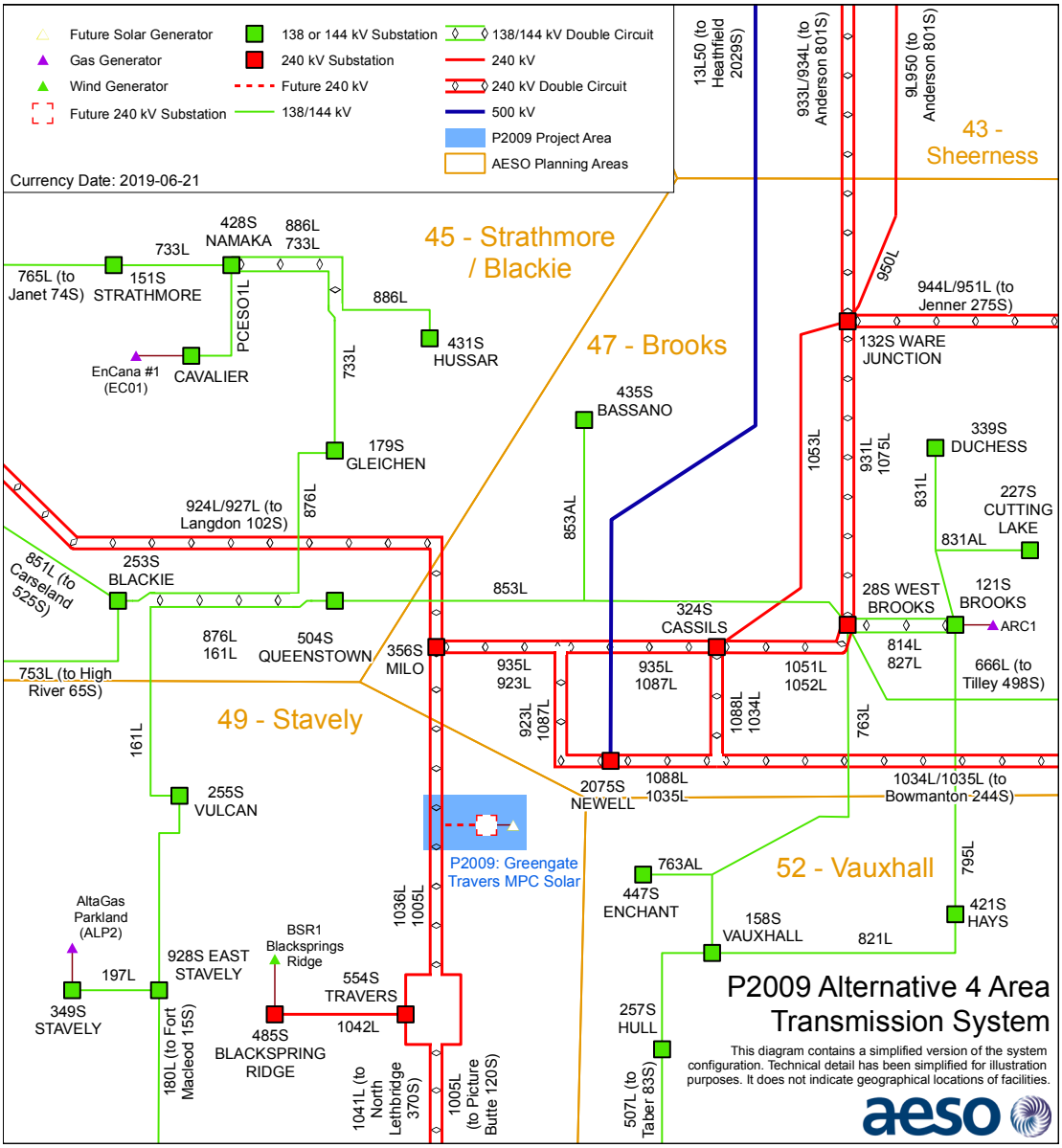
[3] Exact line length to be determined by the TFO

Alternative 4 – T-tap connection to the existing 240 kV transmission line 1005L

This alternative includes the following developments:

- Add a 240 kV circuit, approximately 30 metres in length,[4] to connect the Market Participant's proposed Little Bow 991S substation to the existing 240 kV transmission line 1005L (between Picture Butte 120S and Milo 356S substations) using a T-tap connection configuration; and
- Add or modify associated equipment as required for the above transmission developments.

Figure 3-4: Connection Alternative 4



[4] Exact line length to be determined by the TFO

3.3 Connection Alternatives Selected for Further Study

Alternative 4 was selected for further study.

3.4 Connection Alternatives Not Selected for Further Study

Alternatives 1, 2, and 3 would involve increased transmission development and hence, increased cost, compared to Alternative 4. Therefore, Alternatives 1, 2, and 3 were not selected for further study.

4 Assessment Approach

4.1 Standards, Criteria and Assumptions

A detailed description of the standards, criteria, and assumptions that were used for the connection assessment is provided in Attachment A (see Attachment A1).

4.2 Studies Performed

The scheduled ISD for the Project is December 1, 2020. Therefore, studies were performed using scenarios for 2021 Summer Peak (SP) and 2021 Summer Light (SL).

Short-circuit studies were performed using the 2021 SP and the 2028 Winter Peak (WP) scenarios.

Table 4-1 lists the study scenarios. Post-Project scenarios reflect the requested Rate STS contract capacity of 400 MW at the Little Bow 991S substation.

Table 4-1: Connection Study Scenarios

Scenario No.	Year/Season	System Generation Dispatch Conditions	Scenario Name	Project Load (MW)	Project Generation (MW)
Pre-Project					
1	2021 SP	High Wind, High Import	2021 SP Pre-Project	0	0
2	2021 SL	High Wind, Zero Import	2021 SL Pre-Project	0	0
Post-Project					
3	2021 SP	High Wind, High Import	2021 SP Post-Project	0.5	400
4	2021 SL	High Wind, Zero Import	2021 SL Post-Project	0.5	400
5	2028 WP	All generation in the Study Area on	2028 WP Post-Project	0.5	400

The AESO Planning Region load forecasts used for the connection studies were based on *AESO 2017 Long Term Outlook* (2017 LTO).

4.2.1 Power Flow Studies

The purpose of the power flow studies is to identify and quantify any thermal and voltage criteria violations in the Study Area.

In addition, power flow studies are also used to identify point of delivery (POD) low voltage bus voltage deviations beyond the limits listed in Table 3-1 of Attachment A1.[4]

[4] The AESO's desired post-contingency voltage deviations for low voltage busses represent guidelines rather than criteria. A POD bus voltage deviation that exceeds the desired limits shown in Table 3-1 of Attachment A1 does not represent a Reliability Criteria

Power flow studies were performed for 2021 SP and 2021 SL pre-Project scenarios, and for 2021 SP and 2021 SL post-Project scenarios.

4.2.2 Transient Stability Studies

The purpose of the transient stability studies is to assess the post-Project stability of the transmission system after three-phase to ground faults are applied on selected transmission lines in the Study Area.

Transient stability studies were performed for 2021 SP and 2021 SL post-Project scenarios.

4.2.3 Short-Circuit Current Level Studies

The purpose of short-circuit current level studies is to determine the expected system short-circuit current levels in the vicinity of the Project.

Short circuit studies were performed for the 2021 SP pre-Project scenario and for 2021 SP and 2028 WP post-Project scenarios.

4.3 Mitigation Measure Development and Evaluation

As explained in Section 6 of Attachment A1, mitigation measures were developed to address system performance issues that were identified in the post-Project scenarios. Studies performed to assess the effectiveness of mitigation measures are briefly outlined below.

4.3.1 Post-Mitigation Studies

Power flow studies were performed to assess the impact of the Project on the performance of the AIES following implementation of the AESO's proposed mitigation measures.

4.3.2 Constraint Effective Factor Studies

Constraint effective factor studies were used to determine the generator and load constraint effective factors and to identify the most effective generators or loads to manage thermal criteria violations that were observed under Category B conditions.

violation. Mitigation measures would not be developed to specifically address POD bus voltage deviations that exceed the desired values in Table 3-1 of Attachment A1.

5 Results

5.1 Results Overview

This section provides an assessment of the impact of the Project on the performance of the AIES. The Reliability Criteria violations observed during the connection assessment studies, and the proposed mitigation measures are summarized in Table 5-1.

- Section 5.2 includes an overview of the pre-Project studies results.
- Section 5.3 includes an overview of the post-Project studies results.
- Section 5.4 includes a description of the proposed mitigation measures to address observed Reliability Criteria violations.
- Section 5.5 includes an overview of the post-mitigation studies results.

Detailed study results are provided in Attachment A.

Table 5-1: Summary of Reliability Criteria Violations, Project Impact and Mitigation Measures

Scenario	Type of Reliability Criteria Violation		Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Project Impact	Pre-Project Mitigation Measures	Post-Project Mitigation Measures
	Pre-Project	Post-Project					
2021 SP	None	Thermal - above normal rating	1036L (Milo 356S - Travers 554S)	172L (Coaldale 254S to 172EL Tap Point)	New violation	None	Modify planned RAS for 172L and Real time operational practices
	Thermal - above normal rating	Thermal - above emergency rating		172L (Taber 83S - 172EL Tap Point)	Materially increased violation	Real time operational practices	Modify planned RAS for 172L and Real time operational practices
	None	Thermal - above emergency rating		1005L (Milo 356s - 1005AL Tap Point)	New violation	None	Modify planned RAS for 172L and Real time operational practices
	None	Thermal - above normal rating	1037L (Foothills 237S - Windy Flat 138S)	1005L (Milo 356s - 1005AL Tap Point)	New violation	None	Modify planned RAS for 172L
	None	Thermal - above emergency rating		172L (Taber 83S - 172EL Tap Point)	New violation	None	Modify planned RAS for 172L
	None	Thermal - above normal rating	1038L (Foothills 237S - Windy Flat 138S)	1005L (Milo 356s - 1005AL Tap Point)	New violation	None	Modify planned RAS for 172L
	None	Thermal - above emergency rating		172L (Taber 83S - 172EL Tap Point)	New violation	None	Modify planned RAS for 172L
	None	Thermal - above normal rating	1041L (North Lethbridge 3701S - Travers 554S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating		1005L (Milo 356s - 1005AL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	134ST1 (Transformer T1 in Taber Wind Farm 134S)	172L (Coaldale 254S to 172EL Tap Point)	New violation	None	Modify planned RAS for 172L and Real time operational practices
	Thermal - above emergency rating	Thermal - above emergency rating		172L (Taber 83S - 172EL Tap Point)	Materially increased violation	Planned RAS for 172L	Modify planned RAS for 172L and Real time operational practices
	None	Thermal - above normal rating	15ST1 (Transformer T1 in Fort Macleod 15S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	161L (Vulcan 255S - Queenstown 504S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	170L (Russel 632S - Coleman 799S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	172L (Coaldale 254S - Taber 83S/Hillridge 139S)	1005L (Milo 356s - 1005AL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	180L (Fort Macleod 15S to Vulcan 255S/East Stavely 928S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	241ST1 (Transformer T1 in Uplands 241S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	254ST2 (Transformer T2 in Coaldale 254S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	255ST1 (Transformer T1 in Vulcan 255S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	28ST1 (Transformer T1 in West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	28ST2 (Transformer T2 in West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices

Scenario	Type of Reliability Criteria Violation		Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Project Impact	Pre-Project Mitigation Measures	Post-Project Mitigation Measures
	Pre-Project	Post-Project					
	None	Thermal - above normal rating	336ST1 (Transformer T1 in Fincastle 336S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	507L (Taber 83S - Hull 257S)	1005L (Milo 356s - 1005AL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)	172L (Coaldale 254S to 172EL Tap Point)	New violation	None	Modify planned RAS for 172L and Real time operational practices
	Thermal - above normal rating	Thermal - above emergency rating		172L (Taber 83S - 172EL Tap Point)	Materially increased violation	Real time operational practices	Modify planned RAS for 172L and Real time operational practices
	None	Thermal - above normal rating	610L (Fincastle 336S - Taber 83S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	618ST1 (Transformer T1 in Riverbend 618S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Existing RAS 36
	Thermal - above normal rating	Thermal - above normal rating		820L (Stirling Wind Tap Point - 820AL Tap Point)	Marginally reduced violation	Existing RAS 36	Existing RAS 36
	Thermal - above emergency rating	Thermal - above emergency rating		820L (Coaldale 254s - 820AL Tap Point)	Marginally reduced violation	Existing RAS 36	Existing RAS 36
	None	Thermal - above normal rating	632SPS (Phase Shifter PS in Russel 632S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	666L (Tilley 498S - West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	674ST1 (Transformer T1 in 674S Bowron)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	799ST1 (Transformer T1 in Coleman 799S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	593ST1 (Transformer T1 in Lakeview 593S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	853L (Queenstown 504S - Bassano 435S/West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	923L (Milo 356S - Newell 2075S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	935L (Cassils 324S - Milo 356S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above emergency rating	940L (North Lethbridge 370S - Picture Butte 120S)	1005L (Milo 356s - 1005AL Tap Point)	New violation	None	New RAS for 1005L
	None	Thermal - above normal rating	WATL	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
2021 SL	None	Thermal - above normal rating	1036L (Milo 356S - Travers 554S)	786L (Coleman 799s - BC Hydro Natal B1S)	New violation	None	Modify planned RAS for 172L
	None	Thermal - above emergency rating		1005L (Milo 356s - 1005AL Tap Point)	New violation	None	Modify planned RAS for 172L
	None	Thermal - above emergency rating		172L (Taber 83S - 172EL Tap Point)	New violation	None	Modify planned RAS for 172L
	None	Thermal - above normal rating	1037L (Foothills 237S - Windy Flat 138S)	786L (Coleman 799s - BC Hydro Natal B1S)	New violation	None	Real time operational practices
	None	Thermal - above normal rating		172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices
	None	Thermal - above normal rating	1038L (Foothills 237S - Windy Flat 138S)	786L (Coleman 799s - BC Hydro Natal B1S)	New violation	None	Real time operational practices
	None	Thermal - above normal rating		172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices

Scenario	Type of Reliability Criteria Violation		Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Project Impact	Pre-Project Mitigation Measures	Post-Project Mitigation Measures
	Pre-Project	Post-Project					
	Thermal - above normal rating	Thermal - above emergency rating	134ST1 (Transformer T1 in Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	Materially increased violation	Real time operational practices	Modify planned RAS for 172L
	Thermal - above normal rating	Thermal - above emergency rating	607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	Materially increased violation	Real time operational practices	Modify planned RAS for 172L
	Thermal - above emergency rating	Thermal - above emergency rating	618ST1 (Transformer T1 in Riverbend 618S)	820L (Coaldale 254s - 820AL Tap Point)	Marginally reduced violation	Existing RAS 36 and Real time operational practices	Existing RAS 36 and Real time operational practices
	Thermal - above emergency rating	Thermal - above emergency rating		820L (Stirling Wind Tap Point - 820AL Tap Point)	Marginally reduced violation	Existing RAS 36 and Real time operational practices	Existing RAS 36 and Real time operational practices
	None	Thermal - above normal rating	923L (Milo 356S - Newell 2075S)	172L (Taber 83S - 172EL Tap Point)	New violation	None	Real time operational practices

Notes:

- Marginally increased or marginally decreased violation refers to a percent loading difference (post-Project percent loading minus pre-Project percent loading, represented in absolute value) below 3%.
- Materially increased or materially decreased refers to a percent loading difference (post-Project percent loading minus pre-Project percent loading, represented in absolute value) above or equal to 3%.
- RAS for 172L was proposed for the approved Stirling Wind Project in the *Stirling Wind Project Connection NID*. This RAS is referred to herein as “Planned RAS for 172L”. Further information is provided in Section 5.3 of Attachment A.
- RAS 36 is an Existing RAS (see Section 1.2.2 of Attachment A1). Further information is provided in Section 5.3 of Attachment A.
- In this table, “Modify” refers to adding the Project to the logic of the respective RAS.

5.2 Pre-Project Study Results

5.2.1 Category A Conditions

No Reliability Criteria violations were observed under the Category A conditions (i.e., all elements in service) for any of the pre-Project scenarios. The short-circuit fault levels were found to be within the typical capabilities of the nearby facilities.

5.2.2 Category B Conditions

The pre-Project power flow studies identified a number of thermal violations under Category B conditions (i.e., loss of a single system element).

No voltage deviations were observed that were beyond the limits listed in Table 3-1 of Attachment A1 (hereafter referred to as point of delivery (POD) bus voltage deviations) under Category B conditions.

5.3 Post-Project Study Results

5.3.1 Category A Conditions

No Reliability Criteria violations were observed under Category A conditions for any post-Project scenarios. Post-Project short-circuit fault levels were not significantly higher than pre-Project levels.

The long term short circuit levels were found to be within the designed capabilities of the nearby facilities.

5.3.2 Category B Conditions

Post-Project power flow studies identified a number of thermal violations under Category B conditions.

No POD bus voltage deviations were observed under Category B conditions.

Results did not indicate any transient stability concerns, and the system showed acceptable dynamic response to all Category B conditions studied.

5.4 Mitigation Measures

This section discusses the AESO's proposed mitigation measures to address the system performance issues that were identified in the pre-Project and post-Project scenarios.

5.4.1 Pre-Project

Prior to connection of the Project, some of the observed thermal criteria violations can be managed by using real-time operational practices. The remaining thermal criteria violations can be mitigated with the planned RAS for 172L and existing RAS 36, in combination with real time operational practices, if necessary.

5.4.2 Post-Project

After connection of the Project, most of the thermal criteria violations observed can be mitigated by using real-time operational practices.

Some of the remaining thermal criteria violations can be mitigated by the existing RAS 36, in combination with real time operational practices, if necessary.

After the Project is connected, a new RAS and modifications to a planned RAS are required to mitigate observed Reliability Criteria violations. The thermal criteria violations observed on 138 kV transmission line 172L and 240 kV transmission line 1005L, can be mitigated by modifications to a planned RAS, referred to as the "Modify planned RAS for 172L" and a new RAS, referred to as the "New RAS 1005L", in combination with real time operational practices, if necessary.

5.4.3 Post-Project Mitigation Study Results

Under Category B conditions, most of the observed Reliability Criteria violations requiring RAS were mitigated. Under certain conditions, after the modified planned RAS for 172L and existing RAS 36 actions, real-time operational practices would be required to fully alleviate the thermal criteria violations observed on the 138 kV transmission lines 172L and 820L.

Please refer to Section 5.3 of Attachment A for the detailed evaluation results.

6 Project Dependencies

The Project does not require the completion of any other AESO plans to expand or enhance the transmission system prior to connection.

7 Conclusions and Recommendations

Based on the study results, Alternative 4 is technically viable. The connection assessment identified a number of pre-Project and post-Project system performance issues.

These issues can be mitigated through the use of existing RAS 36, a new RAS for 1005L, modifications to the planned RAS for 172L, and real-time operational practices, alone or in combination, as appropriate. With implementation of these mitigation measures, connecting the Project with the preferred alternative does not adversely affect the performance of the AIES.

The AESO recommends proceeding with the Project using Alternative 4 as the preferred option to respond to the Market Participant's request for system access service. Real-time operational practices and the RAS mentioned above are recommended to mitigate the identified system performance issues.

Alternative 4 involves adding one 240 kV circuit approximately 30 metres in length, to connect the Market Participant's proposed Little Bow 991S substation to the existing 240 kV transmission line 1005L using a T-tap connection. A minimum thermal rating no less than the normal rating of the existing 240 kV transmission line 1005L is recommended for the 240 kV circuit.

Attachment A:
Engineering Connection Assessment Results

Engineering Connection Assessment: Study Results

P2009 Travers Solar Project Connection

Greengate Power Corporation

Date: June 13, 2019

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Contents

Tables

Attachments

1 Introduction

This report presents the results of the engineering studies that were completed by BBA Engineering Ltd. (the Studies Consultant) to assess the impact of the Project (as defined in Attachment A1: AESO Engineering Connection Assessment Scope) on the performance of the Alberta interconnected electric system (AIES). The studies were performed in accordance with Attachment A1: AESO Engineering Connection Assessment: Study Scope, which was prepared by the AESO.

The power system network analysis tool that was used for the studies in this connection assessment was PSS/E version 33.

2 Pre-Project Study Results

This section describes the results of the pre-Project power flow studies.

2.1 Power Flow Studies

Power flow diagrams illustrating the pre-Project power flow studies results for Category A and Category B conditions are provided in Attachment A2.

2.1.1 Scenario 1: 2021 SP Pre-Project

Category A Conditions

No Reliability Criteria (as defined in Section 3.1 of Attachment A1) violations were observed under Category A conditions.

Category B Conditions

Thermal Criteria Violations

Thermal criteria violations were observed under certain Category B conditions as shown in Table 2-1.

Table 2-1: Thermal Criteria Violations under Category B Conditions for Scenario 1

Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Thermal Ratings (MVA)		Pre-Project Results	
		Normal Rating (MVA)	Emergency Rating (MVA)	Observed Power Flow (MVA) [a]	% Loading [b]
134ST1 (Transformer T1 in Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	119	131	134.33	112.88
607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	119	131	130.06	109.29
1036L (Milo 356S - Travers 554S)	172L (Taber 83S - 172EL Tap Point)	119	131	129.39	108.73
618ST1 (Transformer T1 in Riverbend 618S)	820L (Coaldale 254s - 820AL Tap Point)	120	132	132.72	110.61
	820L (Stirling Wind Tap Point - 820AL Tap Point)	120	132	127.73	106.44

Notes:

[a] Power Flow (MVA) is current expressed as MVA (ie. $S = \sqrt{3} \times V_{base} \times I_{actual}$)

[b] % loading is reported as a percentage of the observed power flow (*in MVA* ie. $S = \sqrt{3} \times V_{base} \times I_{actual}$) relative to the transmission line's Normal Rating (also in MVA), as shown in Attachment A1.

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No voltage deviations beyond the limits listed in Table 3-1 of Attachment A1 (hereafter referred to as point of delivery (POD) bus voltage deviations) were observed.

2.1.2 Scenario 2: 2021 SL Pre-Project

Category A Conditions

No Reliability Criteria (as defined in Section 3.1 of Attachment A1) violations were observed under Category A conditions.

Category B Conditions

Thermal Criteria Violations

Thermal criteria violations were observed under certain Category B conditions as shown in Table 2-2.

Table 2-2: Thermal Criteria Violations under Category B Conditions for Scenario 2

Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Thermal Ratings (MVA)		Pre-Project Results	
		Normal Rating (MVA)	Emergency Rating (MVA)	Observed Power Flow (MVA)	% Loading
134ST1 (Transformer T1 in Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	119	131	124.09	104.28
607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	119	131	120.02	100.86
618ST1 (Transformer T1 in Riverbend 618S)	820L (Coaldale 254s - 820AL Tap Point)	120	132	141.11	117.58
	820L (Stirling Wind Tap Point - 820AL Tap Point)	120	132	132.83	110.69

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No POD Bus Voltage Deviations were observed.

3 Post-Project Study Results

This section describes the results of the post-Project power flow studies, and transient stability studies.

As described in Section 2 of Attachment A1, the post-Project studies were performed using Alternative 4.

3.1 Power Flow Studies

Power flow diagrams illustrating the post-Project power flow studies results for Category A and Category B conditions are included in Attachment A3.

3.1.1 Scenario 3: 2021 SP Post-Project

Category A Conditions

No Reliability Criteria (as defined in Section 3.1 of Attachment A1) violations were observed under Category A conditions.

Category B Conditions

Thermal Criteria Violations

Thermal criteria violations were observed under certain Category B conditions as shown in Table 3-1.

Table 3-1: Thermal Criteria Violations under Category B Conditions for Scenario 3

Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Normal Rating (MVA)	Emergency Rating (MVA)	Pre-Project Results		Post-Project Results		% Loading Difference (Post-Pre)
				Observed Power Flow (MVA)	% Loading	Observed Power Flow (MVA)	% Loading	
1036L (Milo 356S - Travers 554S)	172L (Taber 83S - 172EL Tap Point)	119	131	129.39	108.73	155.22	130.40	21.71
	172L (Coaldale 254S - 172EL Tap Point)	119	131	100.20	84.20	126.11	105.97	21.77
	1005L (Milo 356s - 1005AL Tap Point)	481	577	383.84	79.80	641.21	133.31	53.51
1037L (Foothills 237S - Windy Flats 138S)	172L (Taber 83S - 172EL Tap Point)	119	131	108.53	91.20	133.2	111.93	20.7

Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Normal Rating (MVA)	Emergency Rating (MVA)	Pre-Project Results		Post-Project Results		% Loading Difference (Post-Pre)
				Observed Power Flow (MVA)	% Loading	Observed Power Flow (MVA)	% Loading	
	1005L (Milo 356s - 1005AL Tap Point)	481	577	271.28	56.40	523.94	108.93	52.53
1038L (Foothills 237S - Windy Flats 138S)	172L (Taber 83S - 172EL Tap Point)	119	131	108.53	91.20	133.23	111.96	20.76
	1005L (Milo 356s - 1005AL Tap Point)	481	577	271.28	56.40	524.07	108.95	52.55
1041L (North Lethbridge 3701S - Travers 554S)	172L (Taber 83S - 172EL Tap Point)	119	131	98.89	83.10	124.74	104.82	21.72
	1005L (Milo 356s - 1005AL Tap Point)	481	577	242.42	50.40	498.50	103.64	53.24
134ST1 (Transformer T1 in Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	119	131	134.33	112.88	157.34	132.22	19.34
	172L (Coaldale 254S - 172EL Tap Point)	119	131	104.24	87.60	127.47	107.12	19.52
15ST1 (Transformer T1 in Fort Macleod 15S)	172L (Taber 83S - 172EL Tap Point)	119	131	102.46	86.10	127.35	107.02	20.92
161L (Vulcan 255S - Queenstown 504S)	172L (Taber 83S - 172EL Tap Point)	119	131	102.58	86.20	121.47	102.08	15.88
170L (Russel 632S - Coleman 799S)	172L (Taber 83S - 172EL Tap Point)	119	131	96.99	81.50	120.60	101.34	19.84
172L (Coaldale 254S - Taber 83S/Hillridge 139S)	1005L (Milo 356s - 1005AL Tap Point)	481	577	238.58	49.60	491.75	102.23	52.63
180L (Fort Macleod 15S to Vulcan 255S/East Stavely 928S)	172L (Taber 83S - 172EL Tap Point)	119	131	99.96	84.00	124.83	104.90	20.90
241ST1 (Transformer T1 in Uplands 241S)	172L (Taber 83S - 172EL Tap Point)	119	131	96.03	80.70	119.30	100.25	19.55

Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Normal Rating (MVA)	Emergency Rating (MVA)	Pre-Project Results		Post-Project Results		% Loading Difference (Post-Pre)
				Observed Power Flow (MVA)	% Loading	Observed Power Flow (MVA)	% Loading	
254ST2 (Transformer T2 in Coaldale 254S)	172L (Taber 83S - 172EL Tap Point)	119	131	96.27	80.90	119.56	100.47	19.57
255ST1 (Transformer T1 in Vulcan 255S)	172L (Taber 83S - 172EL Tap Point)	119	131	97.82	82.20	122.71	103.12	20.92
28ST1 (Transformer T1 in West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	119	131	97.58	82.00	120.20	101.01	19.01
28ST2 (Transformer T2 in West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	119	131	97.46	81.90	120.12	100.94	19.04
336ST1 (Transformer T1 in Fincastle 336S)	172L (Taber 83S - 172EL Tap Point)	119	131	104.96	88.20	122.78	103.18	14.98
507L (Taber 83S - Hull 257S)	1005L (Milo 356s - 1005AL Tap Point)	481	577	231.36	48.10	481.12	100.02	51.92
WATL	172L (Taber 83S - 172EL Tap Point)	119	131	96.99	81.50	120.37	101.15	19.65
593ST1 (Transformer T1 in Lakeview 593S)	172L (Taber 83S - 172EL Tap Point)	119	131	96.39	81.00	119.72	100.61	19.61
607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	119	131	130.06	109.29	153.03	128.60	19.30
	172L (Coaldale 254S - 172EL Tap Point)	119	131	99.96	84.00	123.07	103.42	19.42
610L (Fincastle Sub 336S - Taber 83S)	172L (Taber 83S - 172EL Tap Point)	119	131	101.39	85.20	119.17	100.14	14.94
618ST1 (Transformer T1 in Riverbend 618S)	172L (Taber 83S - 172EL Tap Point)	119	131	95.91	80.60	119.16	100.13	19.53
	820L (Coaldale 254s - 820AL Tap Point)	120	132	132.72	110.60	132.69	110.58	-0.03

Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Normal Rating (MVA)	Emergency Rating (MVA)	Pre-Project Results		Post-Project Results		% Loading Difference (Post-Pre)
				Observed Power Flow (MVA)	% Loading	Observed Power Flow (MVA)	% Loading	
	820L (Stirling Wind Tap Point - 820AL Tap Point)	120	132	127.73	106.44	127.72	106.43	-0.01
632PS (Phase Shifter PS in Russel 632S)	172L (Taber 83S - 172EL Tap Point)	119	131	96.99	81.50	120.59	101.34	19.84
666L (Tilley 498S - West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	119	131	97.34	81.80	120.92	101.61	19.81
674ST1 (Transformer T1 in Bowron 674S)	172L (Taber 83S - 172EL Tap Point)	119	131	95.91	80.60	119.33	100.28	19.68
799ST1 (Transformer T1 in Coleman 799S)	172L (Taber 83S - 172EL Tap Point)	119	131	96.99	81.50	120.59	101.34	19.83
853L (Queenstown 504S - Bassano 435S/West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	119	131	94.84	79.70	119.67	100.56	20.86
923L (Milo 356S - Newell 2075S)	172L (Taber 83S - 172EL Tap Point)	119	131	96.63	81.20	128.49	107.97	26.77
935L (Cassils 324S - Milo 356S)	172L (Taber 83S - 172EL Tap Point)	119	131	94.01	79.00	125.78	105.70	26.70
940L (North Lethbridge 370S - Picture Butte 120S)	1005L (Milo 356s - 1005AL Tap Point)	481	577	277.54	57.70	644.56	134.00	76.30

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No POD bus voltage deviations were observed.

3.1.2 Scenario 4: 2021 SL Post-Project

Category A Conditions

No Reliability Criteria (as defined in Section 3.1 of Attachment A1) violations were observed under Category A conditions.

Category B Conditions

Thermal Criteria Violations

Thermal criteria violations were observed under certain Category B conditions as shown in Table 3-2.

Table 3-2: Thermal Criteria Violations under Category B Conditions for Scenario 4

Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Normal Rating (MVA)	Emergency Rating (MVA)	Pre-Project Results		Post-Project Results		% Loading Difference (Post-Pre)
				Observed Power Flow (MVA)	% Loading	Observed Power Flow (MVA)	% Loading	
1036L (Milo 356S - Travers 554S)	1005L (Milo 356s - 1005AL Tap Point)	481	577	330.92	68.80	593.61	123.41	54.61
	172L (Taber 83S - 172EL Tap Point)	119	131	118.76	99.80	144.63	121.54	21.74
	786L (Coleman 799s - BC Hydro Natal B1S)	99	109	92.76	93.70	99.16	100.16	6.46
1037L (Foothills 237S - Windy Flat 138S)	786L (Coleman 799s - BC Hydro Natal B1S)	99	109	98.70	99.70	105.99	107.06	7.36
	172L (Taber 83S - 172EL Tap Point)	119	131	97.22	81.70	122.15	102.65	20.95
1038L (Foothills 237S - Windy Flat 138S)	786L (Coleman 799s - BC Hydro Natal B1S)	99	109	98.70	99.70	106.03	107.10	7.40
	172L (Taber 83S - 172EL Tap Point)	119	131	97.34	81.80	122.18	102.67	20.87
134ST1 (Transformer T1 in Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	119	131	124.09	104.28	147.39	123.86	19.58

Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Normal Rating (MVA)	Emergency Rating (MVA)	Pre-Project Results		Post-Project Results		% Loading Difference (Post-Pre)
				Observed Power Flow (MVA)	% Loading	Observed Power Flow (MVA)	% Loading	
618ST1 (Transformer T1 in Riverbend 618S)	820L (Coaldale 254s - 820AL Tap Point)	120	132	141.11	117.59	141.1	117.58	-0.01
	820L (Stirling Wind Tap Point - 820AL Tap Point)	120	132	132.83	110.69	132.81	110.68	-0.02
607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	119	131	120.02	100.86	143.28	120.40	19.55
923L (Milo 356S - Newell 2075S)	172L (Taber 83S - 172EL Tap Point)	119	131	87.82	73.80	119.96	100.81	27.01

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No POD bus voltage deviations were observed.

3.2 Transient Stability Studies

Transient stability studies were completed for Scenario 3 - 2021 SP post-Project and Scenario 4 - 2021 SL post-Project.

The results did not indicate any transient stability concerns, and the system showed acceptable dynamic response to all Category B conditions studied, as shown in Table 3-3 and Table 3-4. The post-Project transient stability plots are provided in Attachment A4. The dynamic data and assumptions of all equipment proposed for the Facility are provided in Attachment A5.

Table 3-3: Transient Stability Study Results under Category B Conditions for Scenario 3

Studied Contingency	Fault Description and Location	Results
924L (Milo 356S - Langdon 102S)	3-phase fault at Milo 356S	Stable
	3-phase fault at Langdon 102S	Stable
935L (Milo 356S - Cassils 324S)	3-phase fault at Milo 356S	Stable
	3-phase fault at Cassils 324S	Stable

Studied Contingency	Fault Description and Location	Results
923L (Milo 356S - Newell 2075S)	3-phase fault at Milo 356S	Stable
	3-phase fault at Newell 2075S	Stable
1041L (Travers 554S - North Lethbridge 370S)	3-phase fault at Travers 554S	Stable
	3-phase fault at North Lethbridge 370S	Stable
1005L (Picture Butte 120S – Little Bow 991S - Milo 356S)	3-phase fault at Picture Butte 120S	Stable
	3-phase fault at Milo 356S	Stable
1036L (Milo 356S - Travers 554S)	3-phase fault at Travers 554S	Stable
	3-phase fault at Milo 356S	Stable
1037L (Windy Flats 138S - Foothills 237S)	3-phase fault at Windy Flats 138S	Stable
	3-phase fault at Foothills 237S	Stable
940L (North Lethbridge 370S - Picture Butte 120S)	3-phase fault at North Lethbridge 370S	Stable
	3-phase fault at Picture Butte 120S	Stable
967L (North Lethbridge 370S - Windy Flats 138S)	3- phase fault at North Lethbridge 370S	Stable
	3-phase fault at Windy Flats 138S	Stable
180L (Vulcan 255S - Fort Macleod 15S/Stavely 349S)	3-phase fault at Vulcan 255S	Stable
	3-phase fault at Fort Macleod 15S	Stable
161L (Vulcan 255S - Queenstown 504S)	3-phase fault at Vulcan 255S	Stable
	3-phase fault at Queenstown 504S	Stable
853L (Queenstown 504S – Bassano 435S/West Brooks 28S)	3- phase fault at Queenstown 504S	Stable
	3-phase fault at West Brooks 28S	Stable

Table 3-4: Transient Stability Study Results under Category B Conditions for Scenario 4

Studied Contingency	Fault Description and Location	Results
924L (Milo 356S - Langdon 102S)	3-phase fault at Milo 356S	Stable
	3-phase fault at Langdon 102S	Stable
935L (Milo 356S - Cassils 324S)	3-phase fault at Milo 356S	Stable
	3-phase fault at Cassils 324S	Stable
923L (Milo 356S - Newell 2075S)	3-phase fault at Milo 356S	Stable
	3-phase fault at Newell 2075S	Stable
1041L (Travers 554S - North Lethbridge 370S)	3-phase fault at Travers 554S	Stable
	3-phase fault at North Lethbridge 370S	Stable
1005L (Picture Butte 120S – Little Bow 991S - Milo	3-phase fault at Picture Butte 120S	Stable

Studied Contingency	Fault Description and Location	Results
356S)	3-phase fault at Milo 356S	Stable
1036L (Milo 356S - Travers 554S)	3-phase fault at Travers 554S	Stable
	3-phase fault at Milo 356S	Stable
1037L (Windy Flats 138S - Foothills 237S)	3-phase fault at Windy Flats 138S	Stable
	3-phase fault at Foothills 237S	Stable
940L (North Lethbridge 370S - Picture Butte 120S)	3-phase fault at North Lethbridge 370S	Stable
	3-phase fault at Picture Butte 120S	Stable
967L (North Lethbridge 370S - Windy Flats 138S)	3- phase fault at North Lethbridge 370S	Stable
	3-phase fault at Windy Flats 138S	Stable
180L (Vulcan 255S - Fort Macleod 15S/Stavely 349S)	3-phase fault at Vulcan 255S	Stable
	3-phase fault at Fort Macleod 15S	Stable
161L (Vulcan 255S - Queenstown 504S)	3-phase fault at Vulcan 255S	Stable
	3-phase fault at Queenstown 504S	Stable
853L (Queenstown 504S – Bassano 435S/West Brooks 28S)	3- phase fault at Queenstown 504S	Stable
	3-phase fault at West Brooks 28S	Stable

4 Short Circuit Studies

4.1 Pre-Project Results

4.1.1 Scenario 1: 2021 SP Pre-Project

Pre-Project short-circuit current levels for Scenario 1 are provided in Table 4-1[1].

Table 4-1: Pre-Project Short-Circuit Current Levels for Scenario 1

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage (kV)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
Langdon 102S	240	252.0	21.2	0.002763+j0.012244	21.3	0.001742+j0.012421
North Lethbridge 370S	240	241.9	10.9	0.004898+j0.023231	7.9	0.012584+j0.049805
	138	143.5	12.5	0.008697+j0.036199	9.8	0.014605+j0.067276
West Brooks 28S	240	252.5	13.2	0.004621+j0.021002	13.1	0.002799+j0.021761
	138	144.5	14.6	0.006852+j0.032870	16.2	0.001930+j0.023258
Picture Butte 120S	240	247.0	8.8	0.005500+j0.029687	5.8	0.017880+j0.075458
Black Spring Ridge 485S	240	246.4	6.4	0.006423+j0.041009	4.2	0.025371+j0.104252
Travers 554S	240	246.7	8.3	0.005663+j0.031769	5.7	0.016283+j0.075889
Cassils 324S	240	252.5	13.2	0.004604+j0.020971	13.0	0.003077+j0.022365
Milo 356S	240	250.0	13.2	0.004184+j0.020269	8.9	0.011595+j0.050027
Newell 2075S	240	252.0	12.4	0.004810+j0.022392	11.6	0.004652+j0.027802

4.2 Post-Project Results

4.2.1 Scenario 3: 2021 SP Post-Project

Post-Project short-circuit current levels for Scenario 3 are provided in Table 4-2.

[1] Short-circuit current studies were based on modeling information provided to the AESO by third parties. The authenticity of the modeling information has not been validated. Fault levels could change as a result of system developments, new customer connections, or additional generation in the area. It is recommended that these changes be monitored and fault levels reviewed to ensure that the fault levels are within equipment operating limits. The information provided in this study should not be used as the sole source of information for electrical equipment specifications or for the design of safety-grounding systems.

Table 4-2: Post-Project Short-Circuit Current Levels for Scenario 3

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage (kV)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
Langdon 102S	240	251.0	21.1	0.002777+j0.012244	21.3	0.001741+j0.012383
North Lethbridge 370S	240	241.5	11.0	0.004868+j0.023113	8.9	0.009289+j0.039035
	138	143.4	12.5	0.008668+j0.036113	10.5	0.011283+j0.057809
West Brooks 28S	240	252.0	13.0	0.004740+j0.021208	13.2	0.002745+j0.020959
	138	144.0	14.4	0.006978+j0.033029	16.2	0.001893+j0.022794
Picture Butte 120S	240	247.4	8.9	0.005461+j0.029542	7.0	0.011706+j0.054145
Black Spring Ridge 485S	240	245.7	6.4	0.006412+j0.040929	4.0	0.029867+j0.115403
Travers 554S	240	246.1	8.3	0.005657+j0.031712	5.2	0.020707+j0.086951
Cassils 324S	240	252.0	13.0	0.004722+j0.021175	13.1	0.003002+j0.021489
Milo 356S	240	249.8	13.2	0.004210+j0.020284	10.2	0.008450+j0.038413
Newell 2075S	240	251.5	12.3	0.004923+j0.022584	11.7	0.004519+j0.026690
Little Bow 991S	240	251.8	8.10	0.005966+j0.033409	6.6	0.001134+j0.017886

4.2.2 Scenario 5: 2028 WP Post-Project

Post-Project short-circuit current levels for Scenario 5 are provided in Table 4-3.

Table 4-3: Post-Project Short-Circuit Current Levels for Scenario 5

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage (kV)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
Langdon 102S	240	250.8	22.6	0.002139+j0.011009	21.8	0.001743+j0.012365
North Lethbridge 370S	240	244.6	11	0.004117+j0.021952	9.2	0.005893+j0.035067
	138	139.6	12.1	0.007483+j0.034358	10.4	0.007522+j0.052264
West Brooks 28S	240	252.5	13.9	0.003185+j0.018085	14.3	0.001917+j0.016796
	138	139.7	14.3	0.004980+j0.029382	16.2	0.001302+j0.019670
Picture Butte 120S	240	246.4	8.5	0.004859+j0.028842	6.1	0.012348+j0.061459
Black Spring Ridge 485S	240	247.8	6.3	0.005630+j0.039296	4.5	0.018667+j0.086752
Travers 554S	240	247.9	8.2	0.004885+j0.030207	6.2	0.009689+j0.058533
Cassils 324S	240	252.5	14	0.003164+j0.018029	14.2	0.002201+j0.017465
Milo 356S	240	249.8	13.4	0.003320+j0.018547	9.4	0.009216+j0.042177

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage (kV)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
Newell 2075S	240	252.7	13.1	0.003293+j0.019196	12.4	0.003762+j0.022719
Little Bow 991S	240	249.1	7.7	0.005231+j0.032170	5.1	0.018008+j0.082468

5 Mitigation Measure Development and Evaluation

The Studies Consultant, in consultation with the AESO, developed mitigation measures to address the system performance issues that were identified in the post-Project scenarios. Existing remedial action schemes (RASs) are described in Section 1.2.2 of Attachment A1.

5.1 Pre-Project

Pre-Project mitigation measures are summarized in Table 5-1.

Table 5-1: Pre-Project Mitigation Measures

Mitigation Measure	Details of Violation (Violation Observed On)	Contingency (System Element Lost)
Planned RAS for 172L [a]	172L (83S Taber - 172EL Tap Point)	134ST1 (Transformer T1 in Taber Wind Farm 134S)
Existing RAS 36 and Real time operational practices	820L (Coaldale 254s - 820AL Tap Point)	618ST1 (Transformer T1 in Riverbend 618S)
	820L (Stirling Wind Tap Point - 820AL Tap Point)	
Real time operational practices	172L (83S Taber - 172EL Tap Point)	607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)
		1036L (Milo 356S - Travers 554S)

Notes:

[a] RAS for 172L was proposed for the approved Stirling Wind Project in the Stirling Wind Project Connection NID. This RAS is referred to herein as "Planned RAS for 172L".

5.2 Post-Project

Post-Project mitigation measures are summarized in Table 5-2.

Table 5-2: Post-Project Mitigation Measures

Mitigation Measure	Details of Violation (Violation Observed On)	Contingency (System Element Lost)
New RAS for 1005L [a]	1005L (Milo 356s - 1005AL Tap Point)	940L (North Lethbridge 370S - Picture Butte 120S)
Modify Planned RAS for 172L and Real time operational practices [b]	1005L (Milo 356s - 1005AL Tap Point)	1036L (Milo 356S - Travers 554S)
	172L (Coaldale 254S - 172EL Tap Point)	
	172L (Taber 83S - 172EL Tap Point)	
	172L (Coaldale 254S - 172EL Tap Point)	134ST1 (Transformer T1 in Taber Wind Farm 134S)
	172L (Taber 83S - 172EL Tap Point)	
	172L (Coaldale 254S - 172EL Tap Point)	607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)
	172L (Taber 83S - 172EL Tap Point)	

Mitigation Measure	Details of Violation (Violation Observed On)	Contingency (System Element Lost)
Modify Planned RAS for 172L	786L (Coleman 799s - BC Hydro Natal B1S)	1036L (Milo 356S - Travers 554S)
	1005L (Milo 356s - 1005AL Tap Point)	1037L (Foothills 237S - Windy Flats 138S)
	172L (Taber 83S - 172EL Tap Point)	
	1005L (Milo 356s - 1005AL Tap Point)	1038L (Foothills 237S - Windy Flats 138S)
	172L (Taber 83S - 172EL Tap Point)	
Existing RAS 36 and Real time operational practices	172L (Taber 83S - 172EL Tap Point)	618ST1 (Transformer T1 in Riverbend 618S)
	820L (Coaldale 254s - 820AL Tap Point)	
	820L (Stirling Wind Tap Point - 820AL Tap Point)	
Real time operational practices	786L (Coleman 799s - BC Hydro Natal B1S)	1037L (Foothills 237S - Windy Flat 138S)
	786L (Coleman 799s - BC Hydro Natal B1S)	1038L (Foothills 237S - Windy Flat 138S)
	1005L (Milo 356s - 1005AL Tap Point)	1041L (North Lethbridge 3701S - Travers 554S)
	172L (Taber 83S - 172EL Tap Point)	
	172L (Taber 83S - 172EL Tap Point)	15ST1 (Transformer T1 in Fort Macleod 15S)
	172L (Taber 83S - 172EL Tap Point)	161L (Vulcan 255S - Queenstown 504S)
	172L (Taber 83S - 172EL Tap Point)	170L (Russel 632S - Coleman 799S)
	1005L (Milo 356s - 1005AL Tap Point)	172L (Coaldale 254S - Taber 83S/Hillridge 139S)
	172L (Taber 83S - 172EL Tap Point)	180L (Fort Macleod 15S to Vulcan 255S/East Stavely 928S)
	172L (Taber 83S - 172EL Tap Point)	241ST1 (Transformer T1 in Uplands 241S)
	172L (Taber 83S - 172EL Tap Point)	254ST2 (Transformer T2 in Coaldale 254S)
	172L (Taber 83S - 172EL Tap Point)	255ST1 (Transformer T1 in Vulcan 255S)
	172L (Taber 83S - 172EL Tap Point)	28ST1 (Transformer T1 in 28S West Brooks)
	172L (Taber 83S - 172EL Tap Point)	28ST2 (Transformer T2 in 28S West Brooks)
	172L (Taber 83S - 172EL Tap Point)	336ST1 (Transformer T1 in Fincastle 336S)
	1005L (Milo 356s - 1005AL Tap Point)	507L (Taber 83S - Hull 257S)
	172L (Taber 83S - 172EL Tap Point)	593ST1 (Transformer T1 in Lakeview 593S)
	172L (Taber 83S - 172EL Tap Point)	610L (Fincastle Sub 336S - Taber 83S)
	172L (Taber 83S - 172EL Tap Point)	632PS (Phase Shifter PS in Russel 632S)
	172L (Taber 83S - 172EL Tap Point)	666L (Tilley 498S - West Brooks 28S)
	172L (Taber 83S - 172EL Tap Point)	674ST1 (Transformer T1 in Bowron 674S)
	172L (Taber 83S - 172EL Tap Point)	799ST1 (Transformer T1 in Coleman 799S)

Mitigation Measure	Details of Violation (Violation Observed On)	Contingency (System Element Lost)
	172L (Taber 83S - 172EL Tap Point)	853L (Queenstown 504S - Bassano 435S/West Brooks 28S)
	172L (Taber 83S - 172EL Tap Point)	923L (Milo 356S - Newell 2075S)
	172L (Taber 83S - 172EL Tap Point)	935L (Cassils 324S - Milo 356S)
	172L (Taber 83S - 172EL Tap Point)	WATL

Notes:

[a] "New" refers to adding the new RASs for the project.

[b] "Modify" refers to adding the Project to the logic of the planned RAS 172L.

5.3 Evaluation of Mitigation Measures

This section describes the results of the power flow studies that were performed to assess the impact of the Project on the performance of the AIES following the implementation of proposed mitigation measures.

- Modify Planned RAS for 172L: Trip P1719 Stirling Wind Project and P2009 Travers Solar Project
- New RAS for 1005L: Trip P2009 Travers Solar Project
- Existing RAS 36: Trip Suncor Magrath (SCR2)

The post-mitigation measures studies were performed under Category B conditions for Scenario 3 and 4 using Alternative 4 and the RASs described in the previous section.

The post-mitigation power flow diagrams for selected Category B conditions are provided in Attachment A6. Post-mitigation power flow diagrams present only those post-Project contingencies that result in thermal criteria violations that require RAS mitigation. Post-Project contingencies that result in thermal criteria violations that can be mitigated by real-time operational practices were not simulated.

5.3.1 Scenario 3: 2021 SP Post-Project

Category B Conditions

Thermal criteria violations observed under certain Category B conditions in the post-Project studies were mitigated by RASs as shown in Table 5-3.

Under certain conditions, after the modified planned RAS for 172L action, real-time operational practices would be required to fully alleviate the thermal criteria violations observed on the 138 kV transmission line 172L.

Table 5-3: Post-RAS Power Flow Study Results for Scenario 3

Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Seasonal Continuous Rating (MVA)	Short-term (Emergency) Rating (MVA)	Post-Project Results		Post-RAS Action Results	
				Power Flow (MVA)	% Loading	Power Flow (MVA)	% Loading
1036L (Milo 356S - Travers 554S) [a]	172L (Coaldale 254S - 172EL Tap Point)	119	131	126.11	105.97	93.59	78.65
	172L (Taber 83S - 172EL Tap Point)	119	131	155.22	130.44	119.77	100.65
	1005L (Milo 356s - 1005AL Tap Point)	481	577	641.21	133.31	392.59	81.62
1037L (Foothills 237S - Windy Flats 138S)	1005L (Milo 356s - 1005AL Tap Point)	481	577	523.94	108.93	271.52	56.45
	172L (Taber 83S - 172EL Tap Point)	119	131	133.20	111.93	97.84	82.22
1038L (Foothills 237S - Windy Flats 138S)	1005L (Milo 356s - 1005AL Tap Point)	481	577	524.07	108.95	308.13	64.06
	172L (Taber 83S - 172EL Tap Point)	119	131	133.23	111.96	107.05	89.96
134ST1 (Transformer T1 in Taber Wind Farm 134S) [a]	172L (Coaldale 254S - 172EL Tap Point)	119	131	127.47	107.12	97.88	82.25
	172L (Taber 83S - 172EL Tap Point)	119	131	157.34	132.22	124.91	104.97
607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S) [a]	172L (Coaldale 254S - 172EL Tap Point)	119	131	123.07	103.42	92.84	78.02
	172L (Taber 83S - 172EL Tap Point)	119	131	153.03	128.60	119.37	100.31
618ST1 (Transformer T1 in Riverbend 618S)	172L (Taber 83S - 172EL Tap Point)	119	131	119.16	100.13	115.49	97.05
	820L (Stirling Wind Tap Point - 820AL Tap Point)	120	132	127.72	106.43	112.02	93.35
	820L (Coaldale 254s - 820AL Tap Point)	120	132	132.69	110.58	117.19	97.66
940L (North Lethbridge 370S - Picture Butte 120S)	1005L (Milo 356s - 1005AL Tap Point)	481	577	644.56	134.00	277.63	57.72

Notes:

[a] Under this contingency, the post-RAS Real Time Operating Procedures consist of dispatching down EATL flow from South to North until the loading on 172L drops below 98% of its continuous seasonal rating.

5.3.2 Scenario 4: 2021 SL Post-Project

Category B Conditions

The thermal and voltage criteria violations observed under certain Category B conditions in the post-Project studies were mitigated by RASs as shown in Table 5-4.

Table 5-4: Post-RAS Power Flow Study Results for Scenario 4

Contingency (System Element Lost)	Details of Violation (Violation Observed On)	Seasonal Continuous Rating (MVA)	Short-term (Emergency) Rating (MVA)	Post-Project Results		Post-RAS Action Results	
				Power Flow (MVA)	% Loading	Power Flow (MVA)	% Loading
1036L (Milo 356S - Travers 554S)	786L (Coleman 799s - BC Hydro Natal B1S)	99	109	99.16	100.16	56.61	57.18
	1005L (Milo 356s - 1005AL Tap Point)	481	577	593.61	123.41	328.57	68.31
	172L (Taber 83S - 172EL Tap Point)	119	131	144.63	121.54	110.02	92.45
134ST1 (Transformer T1 in Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	119	131	147.39	123.86	116.60	97.98
607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	119	131	143.28	120.40	112.01	94.13
618ST1 (Transformer T1 in Riverbend 618S) [a]	820L (Coaldale 254s - 820AL Tap Point)	120	132	141.1	117.58	125.63	104.69
	820L (Stirling Wind Tap Point - 820AL Tap Point)	120	132	132.81	110.68	117.13	97.61

Notes:

[a] Under this contingency, after RAS 36 action, real-time operational practices would be required to fully alleviate the thermal criteria violations observed on the 138 kV transmission line 820L.

5.4 Constraint Effective Factor Studies

Constraint effective factor studies were conducted for all post-Project scenarios. The constraint effective factors were calculated for all Category B conditions when the loadings of the monitored transmission elements in the Study Area exceeded 100% (i.e., for all of the contingencies that resulted in thermal criteria violations). The results of the constraint effective factor studies are provided in Attachment A7.

Attachment A1
Engineering Connection Assessment: Study Scope

Engineering Connection Assessment: Study Scope

P2009 Greengate Travers MPC Solar

Greengate Power Corporation

Date: March 15, 2019

Version: V1D1

Classification: Public

Company Name	Name and Credentials	Date	Signature
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1 Introduction

This Study Scope provides an overview of the engineering studies to be completed by BBA Engineering Ltd. (the Studies Consultant) to assess the impact of the Project (as defined in Section 1.1) on the performance of the Alberta interconnected electric system (AIES). Technical criteria, assumptions and methods for performing these engineering studies are provided in this document.

1.1 Project Overview

Greengate Power Corporation (Market Participant) has submitted a request for system access service to the Alberta Electric System Operator (AESO) to connect its proposed Travers Solar Project (Facility) to the AIES. The Facility includes a proposed collector station, to be designated the Little Bow 991S substation. The Facility is planned to be located in the Lomond area, in the AESO planning area of Stavely (Area 49).

The Market Participant's request includes: a request for a new system access service in the area, with a Rate STS, *Supply Transmission Service*, contract capacity of 400 MW and a Rate DTS, *Demand Transmission Service*, contract capacity of 0.5 MW; and a request for transmission development (collectively, the Project).

The scheduled in-service date (ISD) for the Project is December 1, 2020.

Load and generation components of the Project are listed in Table 1-1.

Table 1-1: Project Load and Generation Details

Project Component		Description
Load	Existing Rate DTS, *Demand Transmission Service,* contract capacity	No existing contract
	Requested Rate DTS	0.5 MW
	Type	Station Service
	Motors (number and size)	Not Applicable
	Power factor	Not Applicable
	Future load expansion plans	No
Generation *	Generation type	Solar
	Existing Rate STS, *Supply Transmission Service,* contract capacity	No existing contract
	Requested Rate STS	400 MW
	Number and size of generating units	to be finalized
	Maximum authorized real power (MARP)	400 MW
	Maximum capability (MC)	400 MW
	Reactive power capability	131.47 MVAr (0.95 pf absorbing)

Project Component		Description
		193.8 MVAr (0.9 pf producing)
	Future generation expansion plans	No

Note:

MARP and MC are defined in the AESO's *Consolidated Authoritative Document Glossary*, which can be found on the AESO's website.

* It is assumed that the aggregated generating facilities have the minimum continuous reactive power capability of either supplying reactive power at 0.9 power factor (PF) lagging or absorbing reactive power at 0.95 PF leading, per the technical requirements of Section 502.1 of the ISO rules, *Aggregated Generating Facilities Technical Requirements*.

1.2 Existing System Overview

1.2.1 Study Area

Geographically, the Project is located in the AESO planning area of Stavely (Area 49). The Stavely area is adjacent to the planning areas of Strathmore/Blackie (Area 45), High River (Area 46), Brooks (Area 47), Vauxhall (Area 52), Fort MacLeod (Area 53) and Lethbridge (Area 54). From a transmission perspective, the Stavely area consists mainly of 240 kV and 138 kV transmission systems.

The Study Area for the Project consists of the AESO Planning areas of Strathmore/Blackie (Area 45), High River (Area 46), Brooks (Area 47), Stavely (Area 49), Vauxhall (Area 52), Fort MacLeod (Area 53) and Lethbridge (Area 54), including the tie lines connecting these planning areas to the rest of the AIES. All transmission facilities within the Study Area were studied and monitored for violations of the Reliability Criteria (defined in Section 3.1).

The existing transmission system in the Study Area is shown in Figure 1-1.

1.2.2 Existing Constraints

Existing constraints in the Study Area are managed in accordance with the procedures set out in Section 302.1 of the ISO rules, *Real Time Transmission Constraint Management* (TCM Rule).

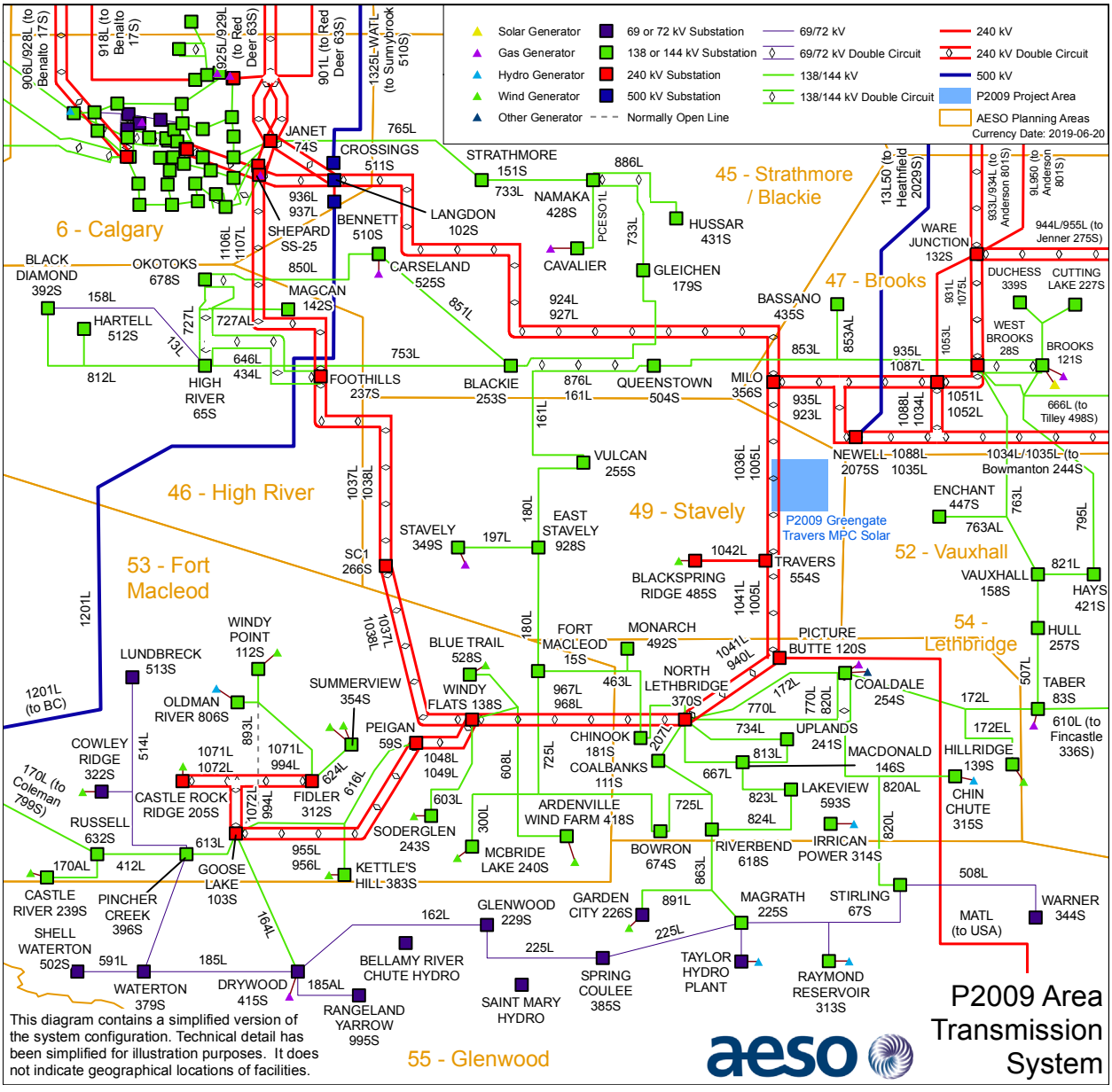
There are a number of constraints in the Study Area that are mitigated by existing remedial action schemes (RASs).

The following existing RASs are used to manage constraints in the area:

- RAS 36: Garden City 226s WAGF Trip Scheme
- RAS 37: Peigan 59s - 616L Overload Mitigation Scheme
- RAS 40: Coleman 799s - 786L Overload Mitigation Scheme
- RAS 129: Goose Lake 103s 613L Overload Mitigation Scheme
- RAS 136: Direct Transfer Trip to MATL on Loss of 1201L
- RAS 137: MATL Local Detection Scheme
- RAS 141: 498S Voltage Instability Mitigation

- RAS 149: EATL HVDC
- RAS 150: WATL HVDC
- RAS 157: Chestermere 419S Overload and Voltage Stability Mitigation
- RAS 604: Windy Point/Oldman River Tripping Scheme
- RAS 605: Summerview Tripping Scheme

Figure 1-1: Existing Transmission System in the Study Area



2 Connection Alternative to be Studied

The following alternative will be studied:

Alternative 4 – T-tap connection to the existing 240 kV transmission line 1005L

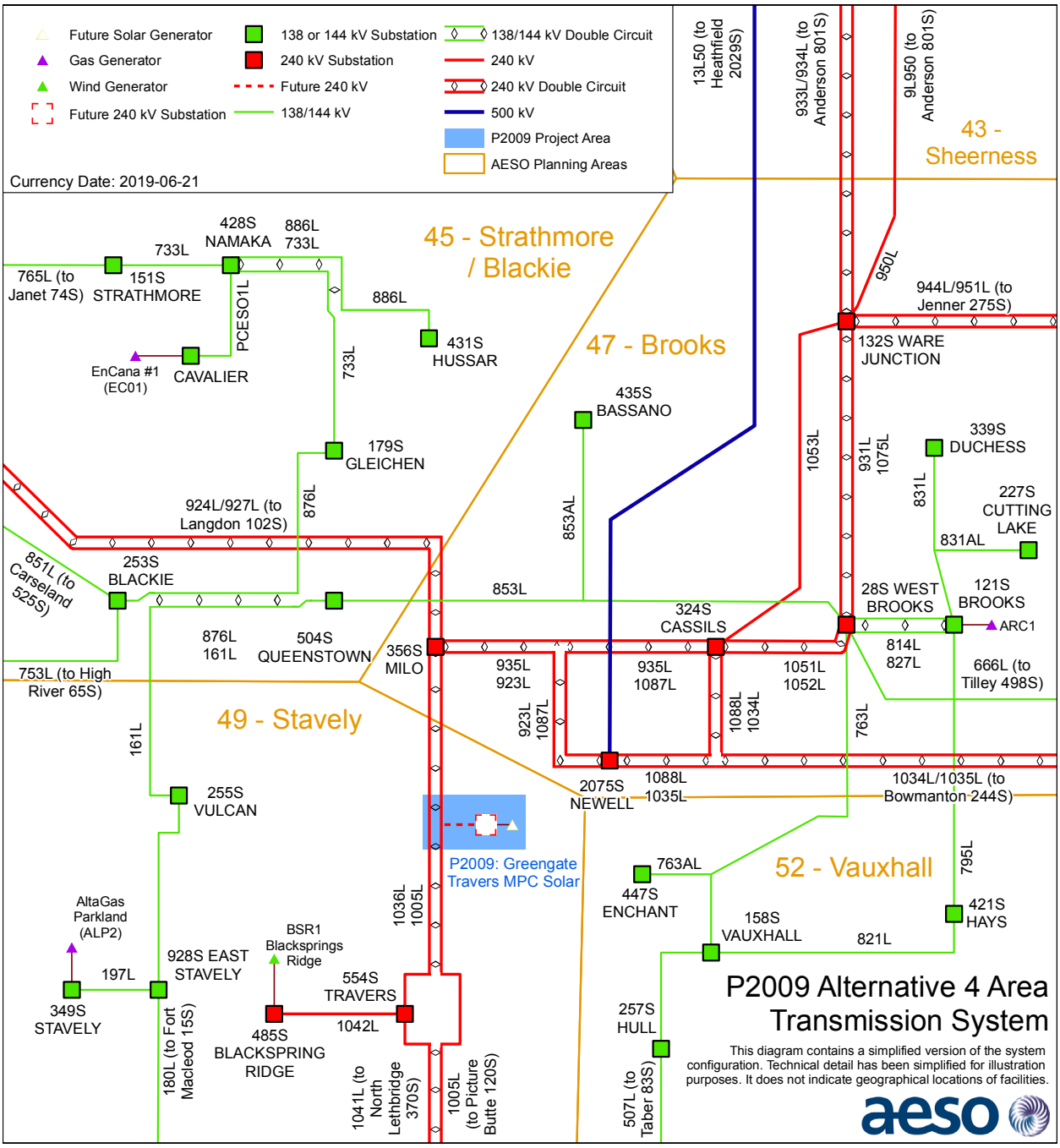
This alternative includes the following developments:

- Add a 240 kV circuit, approximately 30 meters in length[1], to connect the Market Participant's proposed Little Bow 991S substation to the existing 240 kV transmission line 1005L (between Picture Butte 120S and Milo 356S substations) using a T-tap connection configuration; and
- Add or modify associated equipment as required for the above transmission developments.

The proposed connection configuration is shown in Figure 2-1.

[1] Exact line length is to be determined by the TFO.

Figure 2-1: Connection Alternative 4



3 Criteria, Standards and Requirements

3.1 AESO Reliability Criteria

The Transmission Planning (TPL) Standards, which are included in the Alberta Reliability Standards, and *Transmission Planning Criteria – Basis and Assumptions (see Attachment A),* (collectively, the Reliability Criteria) will be applied to evaluate system performance under Category A system conditions (i.e., all elements in-service) and following Category B contingencies (i.e., single element outage), prior to and following the studied alternatives. Below is a summary of Category A and Category B system conditions.

Category A, often referred to as the N-0 condition, represents a normal system with no contingencies and all facilities in service. Under this condition, the system must be able to supply all firm load and firm transfers to other areas. All equipment must operate within its applicable rating, voltages must be within their applicable range, and the system must be stable with no cascading outages.

Category B events, often referred to as an N-1 or N-G-1 with the most critical generator out of service, result in the loss of any single specified system element under specified fault conditions with normal clearing. These elements are a generator, a transmission circuit, a transformer, or a single pole of a DC transmission line. The acceptable impact on the system is the same as Category A. Planned or controlled interruptions of electric supply to radial customers or some local network customers, connected to or supplied by the faulted element or by the affected area, may occur in certain areas without impacting the overall reliability of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted firm (non-recallable reserved) transmission service electric power transfers.

The TPL standards, TPL-001-AB-0 and TPL-002-AB1-0 have referenced Applicable Ratings when specifying the required system performance under Category A and Category B events. For the purpose of applying the TPL standards to the studies documented in this report, Applicable Ratings are defined as follows:

- Normal thermal rating of the line's loading limits for each season.
- The highest specified loading limits for transformers
- For Category A conditions: Voltage range under normal operating condition per AESO Information Document #2010-007RS, *General Operating Practices – Voltage Control* (ID #2010-007RS). For the busses not listed in ID #2010-007RS, Table 2-1 in the *Transmission Planning Criteria – Basis and Assumptions* applies.
- For Category B conditions: The extreme voltage range values per Table 2-1 in the *Transmission Planning Criteria – Basis and Assumptions.*
- Desired post-contingency voltage deviation limits for three defined post-event timeframes as provided in Table 3-1.

Table 3-1: Post-Contingency Voltage Deviation Guidelines for Low Voltage Busses

Parameter and reference point	Time Period		
	Post Transient (up to 30 sec)	Post Auto Control (30 sec to 5 min)	Post Manual Control (Steady State)
Voltage deviation from steady state at point-of-delivery (POD) low voltage bus.	±10%	±7%	±5%

3.2 ISO Rules and Information Documents

ID #2010-007RS will be used to establish system normal (i.e., pre-contingency) voltage profiles for the Study Area.

The TCM Rule will be followed to set up the study scenarios and assess the impact of the Project. In addition, due regard will be given to the AESO's *Connection Study Requirements*, the AESO's *Generation and Load Interconnection Standard*, Section 502.5 of the ISO rules, *Generating Unit Technical Requirements*, and Section 502.6 of the ISO rules, *Generating Unit Operating Requirements*.

3.3 Aggregated Generating Facility Requirements

The Facility should meet the technical requirements presented in Section 502.1 of the ISO rules, *Aggregated Generating Facilities Technical Requirements*.

4 Scenarios and Assumptions

4.1 Scenarios

The following section describes the scenarios to be studied and the assumptions to be used in the studies.

Connection scenarios must be studied as outlined in Table 4-1.

Table 4-1: Connection Study Scenarios

Scenario No.	Year/Season	System Generation Dispatch Conditions[a]	Scenario Name	Project Load (MW)	Project Generation (MW)
Pre-Project					
1	2021 Summer Peak (SP)	High Wind, High Import	2021 SP Pre-Project	0	0
2	2021 Summer Light (SL)	High Wind, Zero Import	2021 SL Pre-Project	0	0
Post-Project					
3	2021 Summer Peak (SP)	High Wind, High Import	2021 SP Post-Project	0.5	400
4	2021 Summer Light (SL)	High Wind, Zero Import	2021 SL Post-Project	0.5	400
5	2028 Winter Peak (WP)	All generation in the Study Area on	2028 WP Post-Project	0.5	400

4.2 Assumptions

4.2.1 System Project Assumptions

The pre-Project and post-Project connection assessment will not include any system transmission projects because there are no planned system transmission developments in the Study Area that are expected to be in service before the scheduled Project ISD.

4.2.2 Connection Project Assumptions

Table 4-2 summarizes the connection project in the Study Area that will be included in the studies.

Table 4-2: Planned Connection Projects Included in the Studies

AESO Project No.	AESO Project Name	AESO Planning Area No.	Generation (MW)	Load (MW)	Scheduled ISD	AUC NID Decision No.
1336	BowArk Energy Queenstown Power Plant[a]	45	94.0	1.7	Oct 1, 2020	Decision 20200-D01-2015

[a] Transmission topology is included in the studies, but the generation unit is dispatched to 0 MW.

4.2.3 Load Assumptions

The load forecast to be used for the studies is shown in Table 4-3 and is a forecast for the AESO South Planning region peak based on the *AESO's 2017 Long-term Outlook* (2017 LTO)[2]. For the studies, when loads for the Alberta Internal Load (AIL) are modified to align with the load forecast in the 2017 LTO, the active power to reactive power ratio in the base case scenarios will be maintained.

Table 4-3: Forecast Area Peak Load (2017 LTO at AESO South Planning Region Peak)

AESO Planning Area or Region Name	Forecast Peak Load by Year/Season (MW)	
	2021 SP	2021 SL
South Planning Region[a]	1,400	840

Note:
[a] The South Region comprises the following AESO planning areas: 4, 43 ,44 ,45 ,46 ,47, 48, 49, 52,53 ,54, and 55

4.2.4 Generation Assumptions

The generation forecast to be used for the studies is based on the 2017 LTO. The generation assumptions for the studies will assume high wind dispatch conditions. Additional studies may be required in the event of changes to the AESO's corporate forecast.

The non-renewable and hydro generation dispatch conditions for the study scenarios are described in Table 4-4.

Table 4-4: Existing Non-Renewable and Hydro Generation Dispatch Conditions

Facility Name	Bus No.	Pmax (MW)	AESO Planning Area No	Fuel Type	Unit Net Generation[a] (MW) per Scenario	
					2021 SP	2021 SL
Irrican Hydro (ICP1)	450	7	54	Hydro	4.2	3.8
Lethbridge Coaldale (ME04)	4690	6	54	Gas	4.6	0
AltaGas Bantry (ALP1)	4275	7	47	Gas	3.6	0
Carseland Cogen (TC01)	3251,4251	95	45	Gas	64	64.6
Cavalier (EC01)	3247,4247	120	45	Gas	96.4	48.5
Altagas Parkland (ALP2)	4235	10	49	Gas	0.8	0
Oldman River (OMRH)	2230	32	53	Hydro	24.2	30.8
Chin Chute (CHIN)	407	15	54	Hydro	6	9.1

[2] The 2017 LTO is available on the AESO website.

Facility Name	Bus No.	Pmax (MW)	AESO Planning Area No	Fuel Type	Unit Net Generation[a] (MW) per Scenario	
					2021 SP	2021 SL
Lethbridge Burdet (ME04)	4269	7	52	Gas	6.1	0
Lethbridge Taber (ME02)	3272	8	52	Gas	6.3	0

Notes:
[a] "Unit Net Generation" refers to gross generating unit output (MW) less unit service load.

Per the 2017 LTO, the total forecast renewable electricity generation in 2021 is 2,594 MW. This includes existing, under construction and planned renewable electricity generation facilities.

Using the 2017 LTO's 2021 renewable generation forecast of 2,594 MW, the generation assumptions will dispatch the renewable electricity generation facilities in order to yield the credible worst-case power flow conditions for the Study Area. Pre-Project dispatch levels for the existing and under-construction renewable electricity generation facilities are shown in Table 4-5.

Table 4-5: Dispatch Conditions for Existing & Under Construction Renewable Generation Facilities

Facility Name and Code	AESO Planning Area No.	Bus Number	MC (MW)	Unit Net Generation[a] (MW) per Scenario
				2021 SP/SL
AESO South Planning Region				
Ardenville Wind (ARD1)	53	4735, 4740	68	68
Blue Trail Wind (BTR1)	53	66328, 67328	66	66
Castle River #1 (CR1)	53	2234, 3234	39	39
Castle Rock Wind Farm (CRR1)	53	67221	77	77
Cowley Ridge (CRWD)	53	4264	20	20
Enmax Taber (TAB1)	52	15343, 16343	81	81
Kettles Hill (KHW1)	53	2402, 3402	63	63
McBride Lake Windfarm (AKE1)	53	2901, 3901, 4901	73	73
Soderglen Wind (GWW1)	53	12358, 13358	71	71
Summerview 1 (IEW1)	53	2338, 3338	66	66
Summerview 2 (IEW2)	53	4339, 5337	66	66
Suncor Chin Chute (SCR3)	54	2389	30	30
Suncor Magrath (SCR2)	53	11002	30	30
Suncor Wintering Hills (SCR4)	43	60789, 60791, 60793, 60846, 60848, 60850	88	88

Facility Name and Code	AESO Planning Area No.	Bus Number	MC (MW)	Unit Net Generation[a] (MW) per Scenario
				2021 SP/SL
Old Man River (OWF1)	53	61543	46	46
Blackspring Ridge (BSR1)	49	61736, 61737	300	300
Brooks Solar (BSC1)	47	553257	15	15
AESO South Planning Region Subtotal			**1,199.0**	**1,199.0**
AESO Central Planning Region				
Ghost Pine (NEP1)	42	2621 to 2625	82	82
Halkirk (HAL1)	42	66435, 67435	150	150
Fortis Bull Creek Phases 1 and 2 (BUL1 & BUL2)	37	550003, 550004	29.5	29.5
AESO Central Planning Region Subtotal			**261.5**	**261.5**
Total			**1,460.5**	**1,460.5**

Note:
[a] "Unit Net Generation" refers to gross generating unit output (MW) less unit service load.

Table 4-6 lists the pre-Project dispatch levels for the planned renewable generation projects in the AESO South and Central planning regions that are included in the study scenarios. Planned renewable generation projects not listed in Table 4-6 are not included in the study and will not be dispatched.

Table 4-6: Dispatch Conditions for Planned Renewable Generation Projects

AESO Project Number	Project Name	Project Type	Planned ISD	Planning Area	Pmax (MW)	Unit Net Generation Dispatch[a] (MW)
						2021 SP/SL
South Planning Region						
462	Castle Rock Ridge Wind Power Plant Phase 2	Wind	Jun 30, 2019	53	30.6	30.6
524	Enel Alberta Riverview Wind Farm	Wind	Sep 25, 2019	53	115	115
1800	Capital Power Whitla Wind Phase 1	Wind	Jul 15, 2019	4	201.6	201.6
2122	EDF Cypress Wind	Wind	Jun 1, 2021	4	201.6	201.6
1533	Jenner Wind Power Project	Wind	Aug 15, 2020	48	122.4	122.4
1698	Jenner Wind Power Project 2	Wind	Aug 15, 2020	48	71.4	71.4
1853	Buffalo Atlee Wind Farm 1	Wind	Dec 1,	48	17.25	17.25

AESO Project Number	Project Name	Project Type	Planned ISD	Planning Area	Pmax (MW)	Unit Net Generation Dispatch[a] (MW)
						2021 SP/SL
			2020			
2199	Buffalo Atlee Wind Farm 2	Wind	Dec 1, 2020	48	13.8	13.8
1892	Buffalo Atlee Wind Farm 3	Wind	Dec 1, 2020	48	17.25	17.25
1719	Stirling Wind Project	Wind	Dec 20, 2019	54	113	113
2041	Windrise Wind	Wind	Nov 1, 2020	53	207	207
Subtotal (Southern Alberta)					**1,110.9**	**1,110.9**
Central Planning Region						
1567	Sharp Hills Wind Farm	Wind	Jun 1, 2020	42	248.4	22.6
Subtotal (Central Alberta)					**248.4**	**22.6**
Total Planned						**1,133.5**
Total Planned, Existing and Under Construction						**2,594.0**

The post-Project scenario renewable generation dispatch levels were identical to the pre-Project scenario dispatch levels shown in Table 4-5 and Table 4-6, except for Ghost Pine (NEP1), Halkirk (HAL1), Fortis Bull Creek Phases 1 and 2 (BUL1 & BUL2) and Sharp Hills Wind Farms which were switched off and the Jenner Wind Power Project was dispatched down from 122.4 MW to 6.5 MW. The Facility was dispatched to 400 MW in all post-Project scenarios. This will result in a total renewable dispatch consistent with the 2017 LTO's renewable generation forecast of 2,594 MW for 2021.

4.2.5 Intertie Flow Assumptions

The intertie flow assumptions for the Alberta-British Columbia (AB-BC), Alberta-Saskatchewan (AB-SK), and Alberta-Montana (MATL) interties are shown in Table 4-7.

For the 2028 WP Post-Project scenario, the intertie flows should be set to the AESO planning base cases.

Table 4-7: Intertie Flows by Scenario

Scenario Number	Scenario Name	Import (-) / Export (+) by Intertie		
		AB-BC	AB-SK	MATL
1	2021 SP Pre-Project	-430	0	-300
2	2021 SL Pre-Project	0	0	0
3	2021 SP Post-Project	-430	0	-300

Scenario Number	Scenario Name	Import (-) / Export (+) by Intertie		
		AB-BC	AB-SK	MATL
4	2021 SL Post-Project	0	0	0

4.2.6 HVDC Power Order Assumptions

The Western Alberta Transmission Line (WATL) and the Eastern Alberta Transmission Line (EATL) are high-voltage direct current (HVDC) transmission lines. The HVDC power order assumptions for the studies will be set to minimize losses for the pre-Project and post-Project study scenarios.

For the 2028 WP Post-Project scenario, the HVDC flows should be set to the AESO planning base cases.

Table 4-8: HVDC Power Order by Scenario

Scenario Number	Scenario Name	WATL (MW)*	EATL (MW)*
1	2021 SP Pre-Project	450 S → N	750 S → N
2	2021 SL Pre-Project	200 S → N	600 S → N
3	2021 SP Post-Project	450 S → N	750 S → N
4	2021 SL Post-Project	200 S → N	600 S → N

Notes:
N → S: HVDC flow direction is North to South
S → N: HVDC flow direction is South to North

The reactive power limits of the MVAr exchanges between the HVDC terminals (WATL and EATL) and the connected alternating current (AC) transmission systems are shown in Table 4-9. These limits must be maintained when performing the studies.

Table 4-9: HVDC to Adjacent AC System MVAr Exchange Limits

HVDC Facility	North Terminal Reactive Power Limit (MVAr)	South Terminal Reactive Power Limit (MVAr)
EATL	-85 to 75	-35 to 35
WATL	-75 to 75	-35 to 35

4.2.7 Transmission Facility Ratings

The legal owner of transmission facilities (TFO) provided the thermal ratings assumptions for the existing transmission lines in the Study Area. Table 4-10 shows the normal ratings and emergency ratings for the key transmission lines in the Study Area, which will be used to perform the engineering studies.

Table 4-10: Thermal Rating Assumptions for Key Transmission Lines in the Study Area

Line ID	Line Description	Voltage Class (kV)	Normal Rating (MVA)		Emergency Rating (MVA)	
			Summer	Winter	Summer	Winter
1005L	Picture Butte 120S – Milo 356S	240	481	581	577	697
1036L	Milo 356S – Travers 554S	240	481	581	577	697
1041L	Travers 554S – North Lethbridge 370S	240	481	499	553	648
1042L	Travers 554S – Blacksping Ridge 485S	240	488	606	586	727
940L	Picture Butte 120S - North Lethbridge 370S	240	481	499	577	697
935L	Milo 356S – Cassils 324S	240	547	676	656	811
923L	Milo 356S – Newell 2075S	240	547	676	656	811
924L	Milo 356S – Langdon 102S	240	547	676	656	811
927L	Milo 356S – Langdon 102S	240	576	711	691	853
1037L	Foothills 237S – Windy Flasts 138S	240	973	1208	1071	1330
1038L	Foothills 237S – Windy Flasts 138S	240	973	1208	1071	1330
967L	Windy Flasts 138S - North Lethbridge 370S	240	499	499	599	648
968L	Windy Flasts 138S - North Lethbridge 370S	240	499	499	733	748
161L	Vulcan 255S - Queenstown 504S	138	117	120	129	160
180L	East Stavely 928S – For Macleod15S	138	112	135	124	146
180L	East Stavely 928S – Vulcan 255S	138	112	120	124	146
172L	Chinook L181S - North Lethbridge 370S	138	85	90	94	99
172L	North Lethbridge 370S – Coaldale 254S	138	119	146	131	161
172L	Coaldale 254S - 172EL Tap Point	138	119	146	131	161
172L	Taber 83S - 172EL Tap Point	138	119	146	131	161
725L	Bowron L674S – 725AL Tap Point	138	122	150	134	165
725L	725AL Tap Point - Coalbank 111S	138	116	146	128	161
725L	725BL Tap Point - Fort Macleod 15S	138	119	146	131	161
725L	725BL Tap Point - Brown 674S	138	91	128	100	141
207L	Coalbanks 111S - North Lethbridge 370S	138	120	148	132	163
734L	Uplands 241S - North Lethbridge 370S	138	167	201	184	218
824L	Lakeview 593S - Riverbend 618S	138	167	201	184	218
667L	Macdonald 146S - North Lethbridge 370S	138	174	215	191	237
820L	Stirling 67S – 820AL Tap Point	138	120	148	132	163
820L	Coaldale 254S - 820AL Tap Point	138	120	148	132	163

Line ID	Line Description	Voltage Class (kV)	Normal Rating (MVA)		Emergency Rating (MVA)	
			Summer	Winter	Summer	Winter
820L	Stirling Wind Tap Point - 820AL Tap Point	138	120	148	132	163
770L	North Lethbridge 370S - Coaldale 254S	138	120	148	132	163
853L	Queenstown 504S – 853AL Tap Point	138	121	148	133	163
853L	Westbrooks 28S – 853AL Tap Point	138	121	148	133	163
786L	Coleman 799s - BC Hydro Natal B1S	138	99	132	109	145

The TFO provided the details of the substation transformers in the Study Area. The key transformers in the Study Area are shown in Table 4-11.

Table 4-11: Summary of Key Transformer Ratings in the Study Area

Substation Name and Number	Transformer ID	Transformer Voltages (kV)	Transformer Rating (MVA)
West Brooks 28S	T1	240/138 kV	400
	T2	240/138 kV	400
North Lethbridge 370S	T3	240/138 kV	193.6
	T5	240/138 kV	200
	T6	240/138 kV	200
Windy Flats 138S	T2	240/138 kV	400
Peigan 59S	T1	240/138 kV	179
Fidler 312S	T1	240/138 kV	400
Goose Lake 103S	T1	240/138 kV	400

The TFO provided the details of the shunt elements in the Study Area. The key shunt elements in the Study Area are shown in Table 4-12.

Table 4-12: Summary of Key Shunt Elements in the Study Area

Substation Name and Number	Voltage Class (kV)	Capacitors		Reactors	
		Number of Switched Shunt Blocks	Total at Nominal Voltage (MVAr)	Number of Switched Shunt Blocks	Total at Nominal Voltage (MVAr)
Hillridge 139S	25	1	1.8	-	-
West Brooks 28S	240	-	-	1	50
Strathmore 151S	138	1	24.35	-	-

Substation Name and Number	Voltage Class (kV)	Capacitors		Reactors	
		Number of Switched Shunt Blocks	Total at Nominal Voltage (MVAr)	Number of Switched Shunt Blocks	Total at Nominal Voltage (MVAr)
Blackie 253S	138	1	24.46	-	-
Hussar 431S	138	1	9.17	-	-
Magcan 142S	138	1	24.46	-	-
Tilley 498S	138	1	27.17	-	-
Burdett 368S	138	1	24.46	-	-
		1	24.5	-	-
Hays 421S	138	1	22.96	-	-
Taber 83S	138	1	24.46	-	-
		1	24.5	-	-

4.2.8 Protection Fault Clearing Times

The transient stability studies will be performed using the actual fault clearing times for the selected contingencies, as provided by the TFO and as shown in Table 4-13. Only those contingencies shown in Table 4-13 will be studied for transient stability studies. If the TFOs did not specify the fault clearing times (e.g. for new transmission lines) for a selected contingency, then the studies for that contingency will be performed using the standard fault clearing times that are specified in Table 2-3 of the AESO's *Transmission Planning Criteria – Basis and Assumptions*.

Table 4-13: Protection Fault Clearing Times

Contingency (System Element Lost)	Fault Location	Clearing Times (Cycles)	
		Near End	Far End
924L (Milo 356S - Langdon 102S)	Milo 356S	5	6
924L (Langdon 102S - Milo 356S)	Langdon 102S	5	6
935L (Milo 356S - Cassils 324S)	Milo 356S	5	6
935L (Cassils 324S - Milo 356S)	Cassils 324S	5	6
923L (Milo 356S - Newell 2075S)	Milo 356S	5	6
923L (Newell 2075S - Milo 356S)	Newell 2075S	5	6
1041L (Travers 554S - North Lethbridge 370S)	Travers 554S	5	6
1041L (North Lethbridge 370S - Travers 554S)	North Lethbridge 370S	5	6
1005L (Picture Butte 120S – Little Bow 991S - Milo 356S)	Picture Butte 120S	5	6/6
1005L (Milo 356S - – Little Bow 991S - Picture Butte 120S)	Milo 356S	5	6/6

1036L (Travers 554S - Milo 356S)	Travers 554S	5	6
1036L (Milo 356S - Travers 554S)	Milo 356S	5	6
1037L (Windy Flats 138S - Foothills 237S)	Windy Flats 138S	5	6
1037L (Foothills 237S - Windy Flats 138S)	Foothills 237S	5	6
940L (North Lethbridge 370S - Picture Butte 120S)	North Lethbridge 370S	5	6
940L (Picture Butte 120S- North Lethbridge 370S)	Picture Butte 120S	5	6
967L (North Lethbridge 370S - Windy Flats 138S)	North Lethbridge 370S	5	6
967L (Windy Flats 138S - North Lethbridge 370S)	Windy Flats 138S	5	6
180L (Vulcan 255S - Fort Macleod 15S/Stavely 349S)	Vulcan 255S	9	30/60
180L (Stavely 349S - Vulcan 255S/Fort Macleod 15S)	Fort Macleod 15S	9	30/60
161L (Vulcan 255S - Queenstown 504S)	Vulcan 255S	9	30
161L (Queenstown 504S - Vulcan 255S)	Queenstown 504S	9	30
853L (Queenstown 504S – Bassano 435S/Westbrooks 28S)	Queenstown 504S	9	30/60
853L (Westbrooks 28S - Bassano 435S /Queenstown 504S)	Westbrooks 28S	9	30/60

4.2.9 Voltage Profile Assumption

ID #2010-007RS will be used to establish system normal (i.e., pre-contingency) voltage profiles for key area busses prior to commencing any studies. Table 2-1 of the *Transmission Planning Criteria – Basis and Assumptions* applies for the busses not included in ID #2010-007RS. These voltages will be used to set the voltage profile for the study base cases prior to the power flow studies.

5 Study Methodology

5.1 Engineering Studies

The engineering studies to be performed for this connection assessment are identified in Table 5-1.

Table 5-1: Summary of Engineering Studies to be performed

Scenario No. and Name		Power Flow		Transient Stability		Short Circuit
		Category		Category		Category A
		A	B	A	B	
Pre-Project						
1	2021 SP	X	X			X
2	2021 SL	X	X			
Post-Project						
3	2021 SP	X	X		X	X
4	2021 SL	X	X		X	
5	2028 WP					X

For the engineering studies, all transmission facilities 69 kV and above, within the Study Area and the transmission lines connecting these planning areas to neighbouring planning areas will be studied and monitored to assess the impact of the Project on the performance of the AIES, including any violations of the Reliability Criteria (as defined in Section 3.1).

5.2 Power Flow Studies

Power flow studies will be performed to identify thermal and voltage criteria violations as per the Reliability Criteria, and any deviations from the limits listed in Table 3-1.

For the Category B power flow studies, the transformer taps and switched shunt reactive compensating devices such as shunt capacitors and reactors will be locked and continuous shunt devices will be enabled.

Voltage deviations at point-of-delivery (POD) low voltage busses will also be assessed for both the pre-Project and post-Project networks by first locking all tap changers and area shunt reactive compensating devices to identify any post-transient voltage deviations above 10%. Second, tap changers will be allowed to move while shunt reactive compensating devices remained locked to determine if any voltage deviations above 7% would occur in the area. Third, all the taps and shunt reactive compensating devices will be allowed to adjust, and voltage deviations above 5% will be reported.

The scenarios and cases to be studied are shown in Table 5-1.

5.2.1 Contingencies to be Studied

Power flow studies will be performed for the Category A and all Category B conditions in the Study Area.

5.3 Transient Stability Studies

The Genesee generating unit 3 in Wabamun (Area 40) will be used as the reference for the studies.

The report presenting the results of the transient stability studies must provide response plots for rotor angle, active and reactive power output, and terminal voltage for the proposed generation facility and power plants listed below:

- Sheerness Power Plant
- Shepard Power Plant
- Blackspring Ridge Wind Power Plant
- Stirling Wind Power Plant
- Cavalier Gas Power Plant

The transient response voltages shall be monitored at the following key 240 kV buses:

- Picture Butte 120S substation
- Milo 356S substation
- Travers 554S substation
- North Lethbridge 370S substation
- Blackspring Ridge 485S substation
- Little Bow 991S substation

Other busses will be monitored and will be reported as determined by the results. The results report must also provide the key branches active and reactive power flow surrounding the Facility:

- 240 kV transmission lines: 1005L, 1036L, 1041L, 1042L, 924L, 940L, 935L, and 923L

Transient stability studies will be performed for the post-Project scenarios as shown in Table 5-1. If any transient stability issues are observed, transient stability analysis will be performed for the corresponding pre-Project scenarios.

5.3.1 Contingencies to be Studied

Transient stability studies will be performed for the contingencies shown in Table 4-13

5.4 Short-Circuit Current Level Studies

A maximum fault level must be provided for the substations in the vicinity of the Project assuming normal system operation with all transmission elements in service and generation dispatched. Three-phase faults and single line-to-ground faults will be simulated. Polar coordinates and per-unit values will be used for reporting the results.

Short-circuit analysis will be performed for the 2021 SP pre-Project scenario and 2021 SP and 2028 WP post-Project scenarios.

Estimated maximum three-phase faults and single line-to-ground short-circuit current levels will be reported for the following substations:

- Little Bow 991S substation
- Milo 356S substation
- Picture Butte 120S substation
- North Lethbridge 370S substation
- Langdon 102S substation
- Travers 554S substation
- Black Spring Ridge 485S substation
- Newell 2075S substation
- Cassils 324S substation
- Westbrooks 28S substation

Further sensitivity studies, in consultation with the TFO, may be required if the primary short-circuit analysis indicates a potential to exceed or approach the existing fault rating of the transmission facilities.

The scenarios to be studied are as shown in Table 5-1.

6 Mitigation Measures

6.1 Development

Mitigation measures may be required if the post-Project study results identify system performance issues. Mitigation measures for the Project may involve modifying or adding real-time operational practices and/or remedial action schemes (RASs).

The Studies Consultant will notify the AESO of any system performance issues in a timely manner, following which the AESO Studies Engineer may instruct the Studies Consultant as follows:

- Develop tables showing the constraint effective factors[3] for generation or load based on thermal criteria violations that are observed.
- Collaborate with the AESO to propose changes, if any, to the connection alternatives that could remove the requirement for a RAS.
- Collaborate with the AESO to study modifications to existing and/or planned RASs, proposed by the AESO, to ensure the coordination of existing protection schemes with the addition of any proposed protection schemes.
- Collaborate with the AESO to identify and study new RASs, if any, that may be required to ensure system reliability is maintained after connecting the Project to the AIES.

The AESO Studies Engineer will work closely with the Studies Consultant and guide the development and/or modifications of the proposed mitigation measures to ensure system reliability, security and compliance with AESO ID #2018-018T, *Provision of System Access Service and the Connection Process*.

6.2 Evaluation

6.2.1 Post-Mitigation Studies

Studies to evaluate the effectiveness of mitigation measures, if required, will be performed in accordance with the technical criteria, assumptions, and methods provided in this Study Scope and in accordance with further instructions from the AESO.

6.2.2 Constraint Effective Factor Studies

Constraint effective factor analysis are used to determine the generator- and load- constraint effective factors and to identify the most effective generators or loads to manage the thermal criteria violations, if any, that are observed under Category B conditions.

[3] Constraint effective factor studies are performed to determine the generator- and load- constraint effective factors. Constraint effective factors are used to estimate the ability of generators and loads to manage transmission constraints. A generator's or load's constraint effective factor is defined as the change in power flow over a specific transmission line following a change in the generator's energy production or in the load's energy consumption. The greater the constraint effective factor, the more effective a generator or load can be in managing a thermal criteria violation on the specific transmission line.

7 Changes to Study Assumptions

This study will utilize the AESO's planning base cases, which include the AESO's current corporate forecast (2017 LTO). Sensitivity studies or restudy may be required in the event of revisions to the AESO's corporate forecast. Additional engineering studies may also be required to assess new connection alternatives, changes to project ISD, or delays in proposed system developments. Any additional or revised study requirements shall be captured in a signed Study Scope Amendment document.

Attachment A: Transmission Planning Criteria – Basis and Assumptions

Transmission Planning Criteria – Basis and Assumptions

Date: July 9, 2019

Version: V1.2

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1. Introduction

This document presents the reliability standards, criteria, and assumptions to be used as the basis for planning the Alberta Transmission System. The criteria, standards and assumptions identified in this document supersede those previously established.

2. Transmission Reliability Standards and Criteria[1]

The AESO applies the following Alberta Reliability Standards to ensure that the transmission system is planned to meet applicable performance requirements under a defined set of system conditions and contingencies. A brief description of each of these standards is given below:

1. **TPL-001-AB-0: System Performance Under Normal Conditions**

   Category A represents a normal system condition with all elements in service (N-0). All equipment must be within its applicable rating, voltages must be within their applicable ratings and the system must be stable with no cascading outages. Under Category A, electric supply to load cannot be interrupted and generating units cannot be removed from service.

2. **TPL-002-AB1-0: System Performance Following Loss of a Single BES Element**

   Category B events result in the loss of any single element (N-1) under specified fault conditions with normal clearing. The specified elements are a generating unit, a transmission circuit, a transformer or a single pole of a direct current transmission line. The acceptable impact on the system is the same as Category A with the exception that radial customers or some local network customers, including loads or generating units, are allowed to be disconnected from the system if they are connected through the faulted element. The loss of opportunity load or opportunity interchanges is allowed. No cascading can occur.

3. **TPL-003-AB-0: System Performance Following Loss of Two or More BES Elements**

   Category C events result in the loss of two or more bulk electric system elements (sequential, N-1-1 or concurrent, N-2) under specified fault conditions and include both normal and delayed fault clearing. All of the system limits for Category A and B events apply with the exception that planned and controlled loss of firm load, firm transfers and/or generation is acceptable provided there is no cascading.

4. **TPL-004-AB-0: System Performance Following Extreme BES Events**

   Category D represents a wide variety of extreme, rare and unpredictable events, which may result in the loss of load and generation in widespread areas. The system may not be able to reach a new stable steady state, which means a blackout is a possible outcome. The AESO needs to evaluate these events, at its discretion, for risks and consequences prior to creating mitigation plans.

5. **FAC-014-AB1-2: Establishing and Communicating System Operating Limits**

   The AESO is required to establish system operating limits where a contingency is not mitigated through construction of transmission facilities

[1] A complete description of the *Alberta Reliability Standards* can be found on the AESO's website: https://www.aeso.ca/rules-standards-and-tariff/alberta-reliability-standards/

2.1 Thermal Loading Criteria

The AESO Thermal Loading Criteria require that the continuous thermal rating of any transmission element is not exceeded under normal and post-contingency operating conditions. Thermal limits are assumed to be 100% of the respective normal summer and winter ratings. Emergency limits are not considered in the planning evaluations.

2.2 Voltage Range and Voltage Stability Criteria

The normal minimum and maximum voltage limits as specified in the following table are used to identify Category A system voltage violations, while the extreme minimum and maximum limits are used to identify Category B and C system violations. Table 2-1 presents the acceptable steady state and contingency state voltage ranges for the AIES. Table 2-2 provides voltage stability criteria used to test the system performance.

Table 2-1: Acceptable Range of Steady State Voltage (kV)

Nominal Voltage	Extreme Minimum	Normal Minimum	Normal Maximum	Extreme Maximum
500	475	500	525	550
240	216	234	252	264
260 (Northeast & Northwest)*	234	247	266	275
144	130	137	151	155
138	124	135	145	152
72	65	68.5	75.5	79
69	62	65.5	72.5	76

Table 2-2: Voltage Stability Criteria

Performance Level	Disturbance (1)(2)(3)(4) Initiated by: Fault of No Fault DC Disturbance	MW Margin (P-V method) (5)(6)(7)	MVAr Margin (V-Q method) (6)(7)
A	Any element such as: One Generator One Circuit One Transformer One Reactive Power Source One DC Monopole	≥5%	Worst Case Scenario(8)
B	Bus Section	≥5%	50% of Margin Requirement in Level A
C	Any combination of two elements such as: A Line and a Generator A Line and a Reactive Power Source Two Generators Two Circuits Two Transformers Two Reactive Power Sources DC Bipole	≥2.5%	50% of Margin Requirement in Level A
D	Any combination of three or more elements such as: Three or More Circuits on ROW Entire Substation Entire Plant Including Switchyard	> 0	> 0

2.3 Transient Stability Analysis Assumptions

Standard fault clearing times as shown in Table 2-3 are used for the new facilities or when the actual clearing times are not available for the existing facilities. Double line-to-ground faults are applied for the Category C5 events with normal clearing times. Single line-to-ground faults are applied for Category C6 to C9 events with delayed clearing times as depicted in Table 2-4 and Table 2-5.

Table 2-3: Fault Clearing Times

Nominal (kV)	Near End (Cycles)	Far End (Cycles)
500	4	5
240	5	6
144/138 with telecommunications	6	8
144/138 without telecommunications	6	30

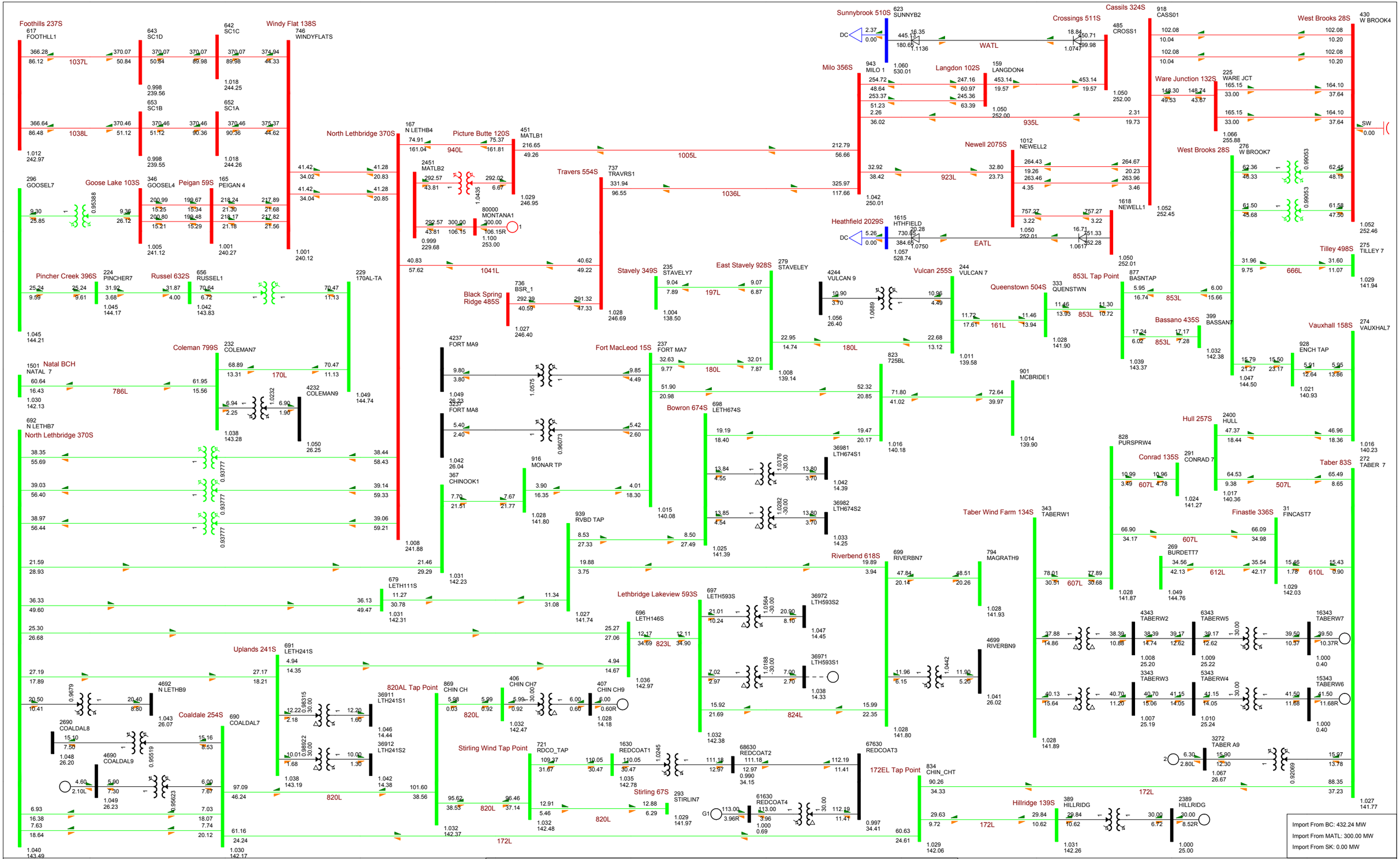
Table 2-4: Stuck Breaker Clearing Times for Lines

Voltage (kV)	Fault Clearing Times (Cycles)		
	Near End	Far End	2nd Ckt (C5 and C7 only)
138/144	15	24	24
240	12	6	14
500	9	5	11

Table 2-5: Stuck Breaker Clearing Times for Transformers

Voltage (kV)	Fault Location	Fault Clearing Times (Cycles)		
		High Side	Low Side	2nd Ckt (breaker fail)
240/138	240 kV side	12	6	14
	138 kV side	5	15	24
500/240	500 kV side	9	5	11
	240 kV side	4	12	14

Attachment A2
Pre-Project Power Flow Diagrams



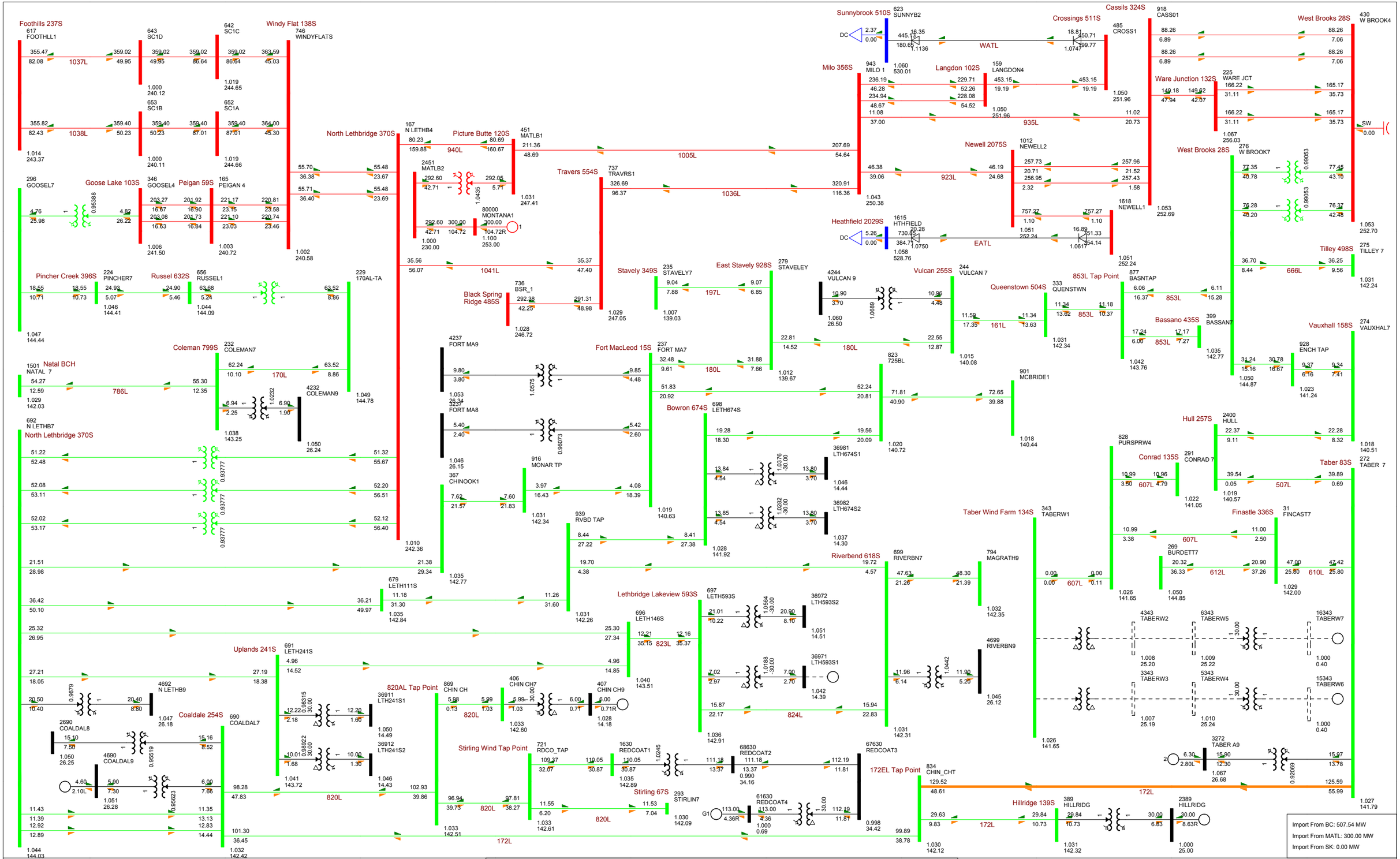
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A2-1: 2021 Summer Peak Pre-Project
Category A -No Contingency

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



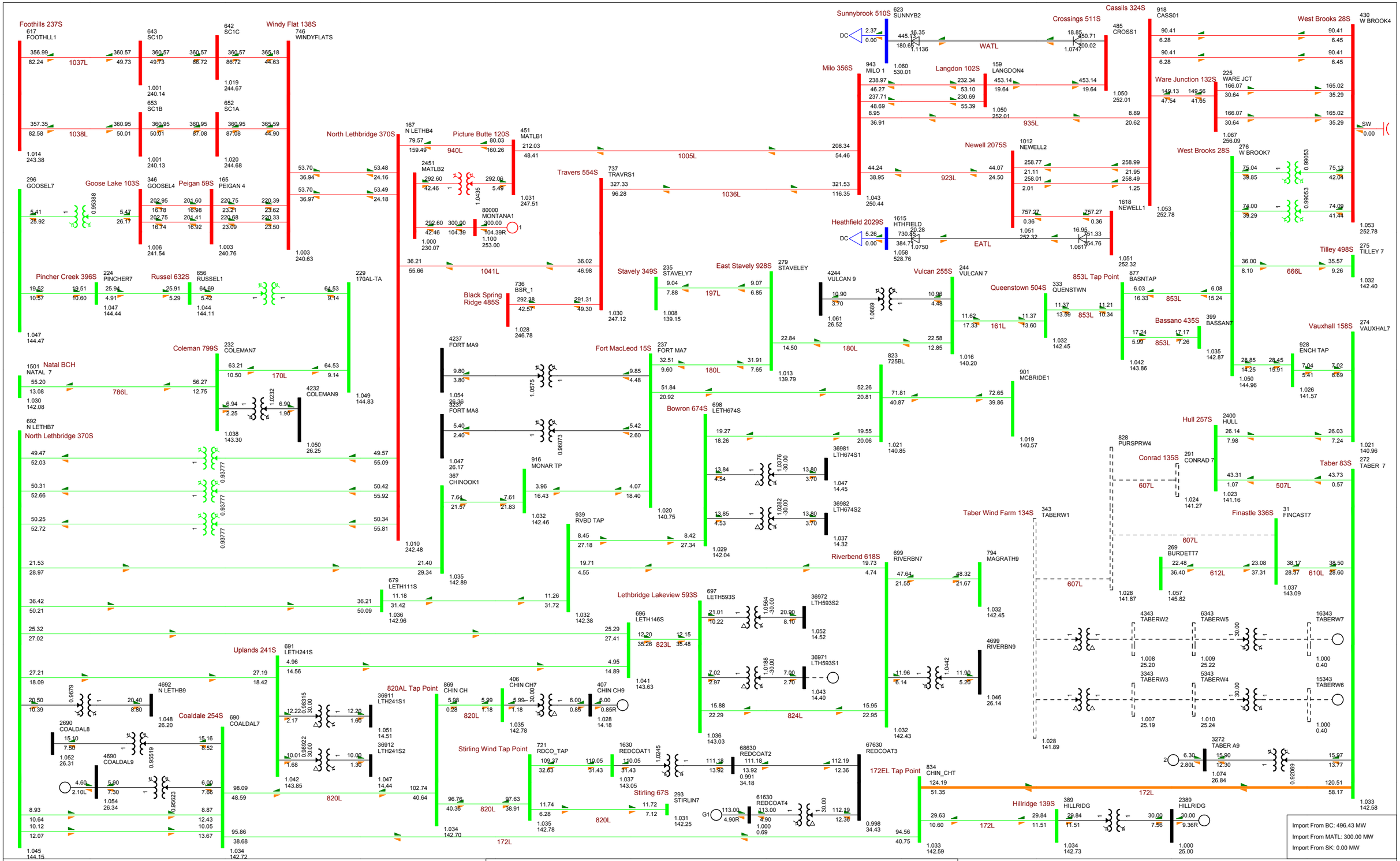
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A2-2: 2021 Summer Peak Pre-Project
Category B - Contingency of 134ST1 (Transformer T1 in Taber Wind Farm 134S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



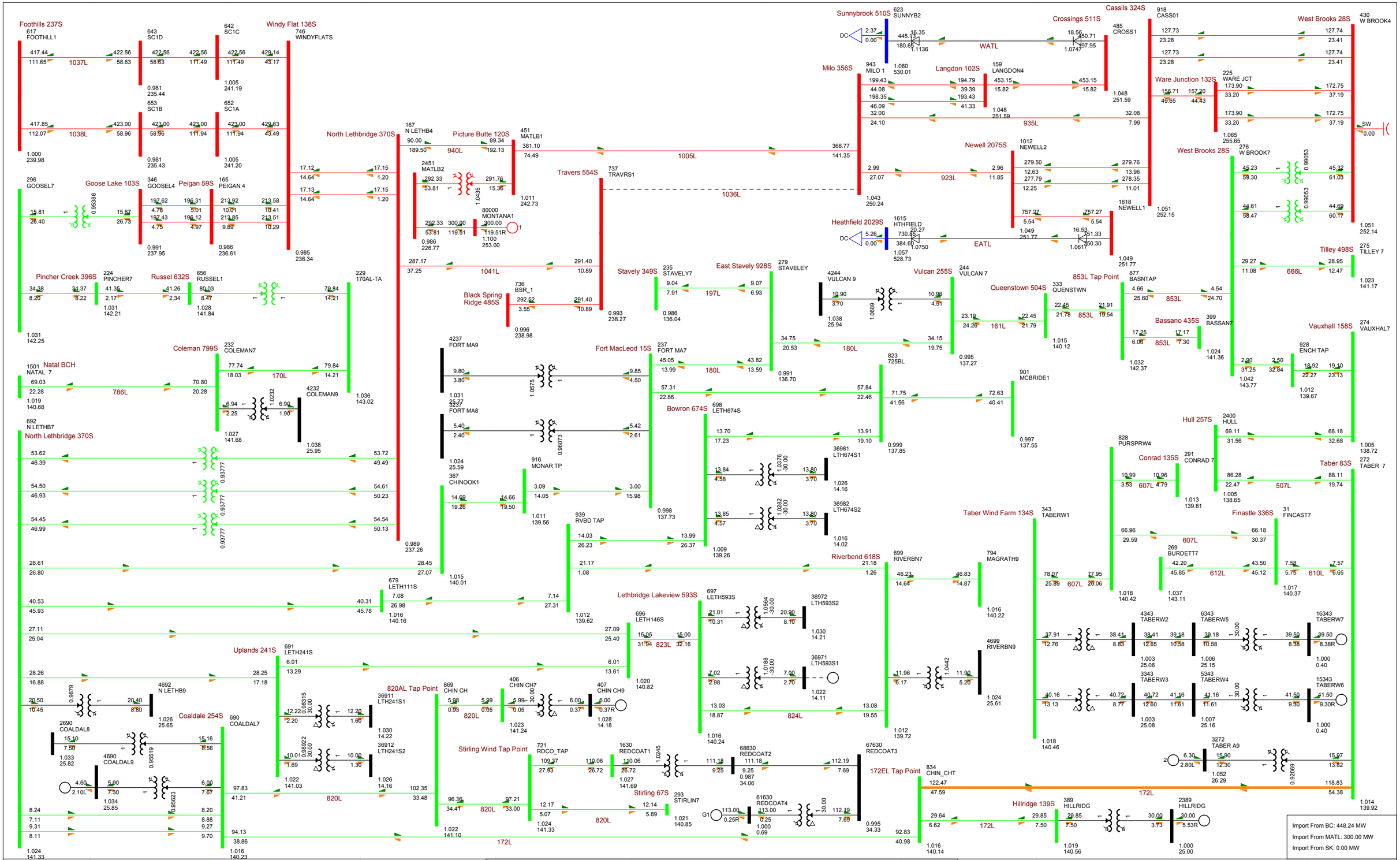
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A2-3: 2021 Summer Peak Pre-Project
Category B - Contingency of 607L (Finastle 336S - Conrad 135S/Taber Wind Farm 134S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



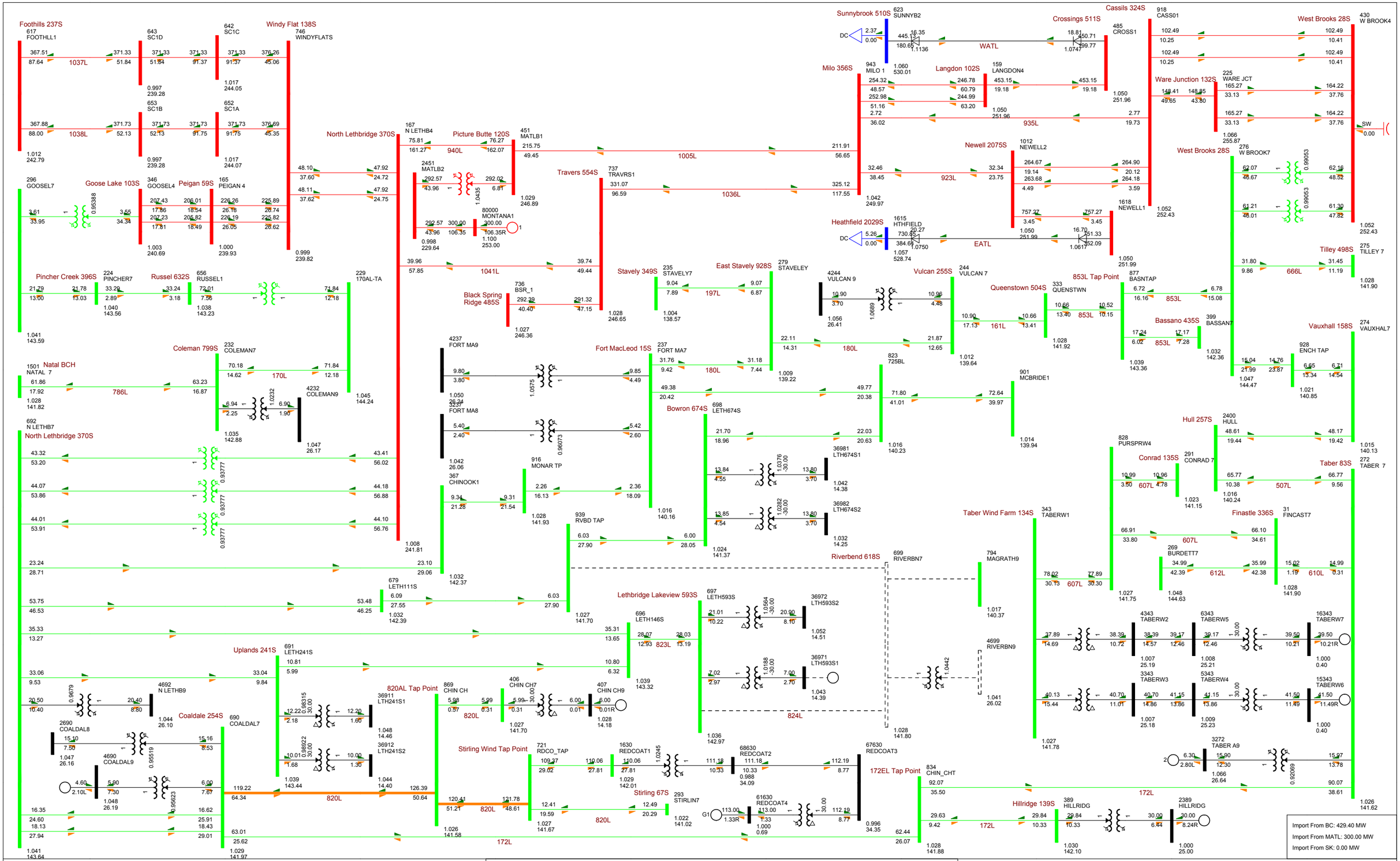
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A2-4: 2021 Summer Peak Pre-Project
Category B - Contingency of 1036L (Milo 356S - Travers 554S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



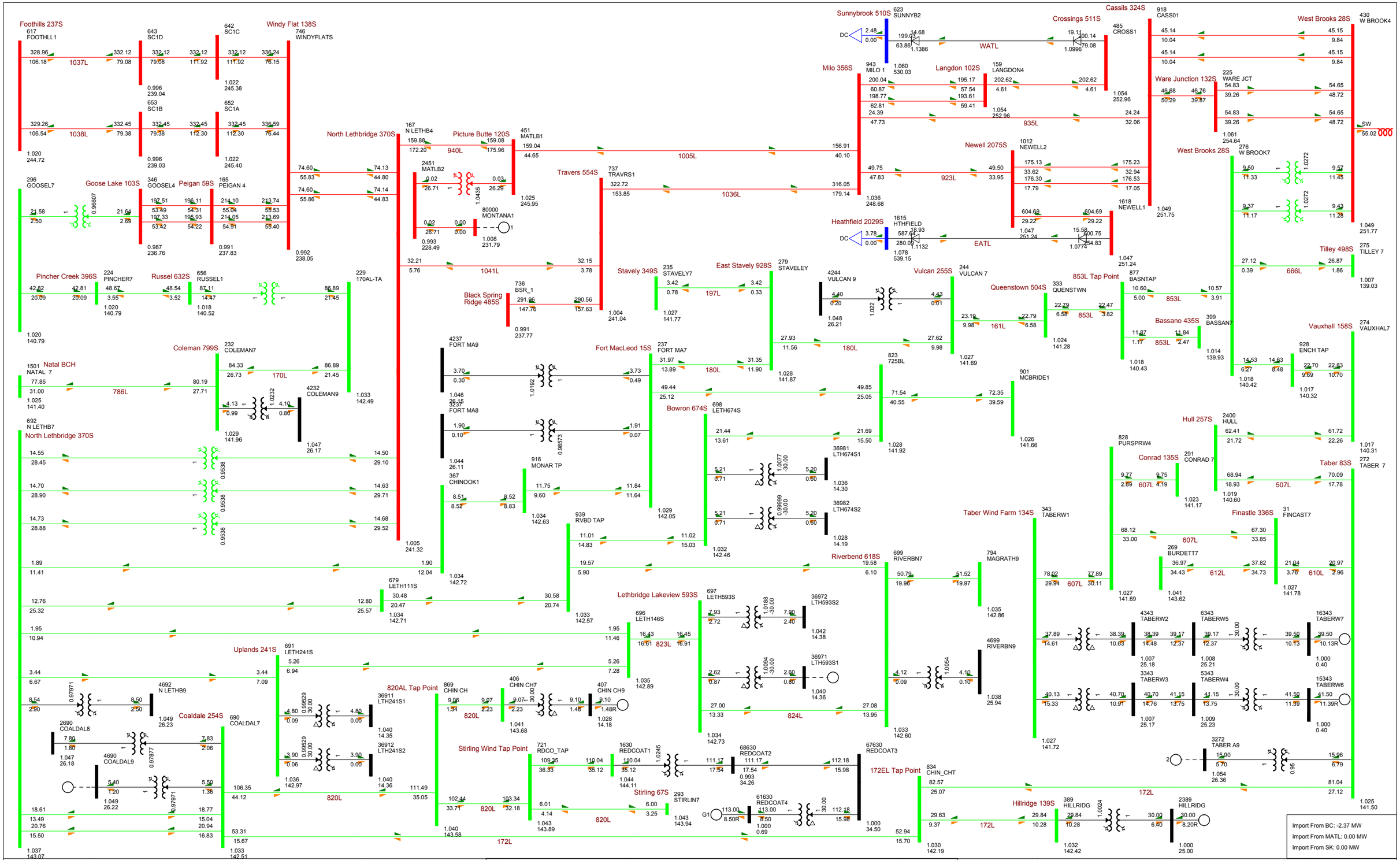
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A2-5: 2021 Summer Peak Pre-Project
Category B - Contingency of 618ST1 (Transformer T1 in Riverbend 618S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



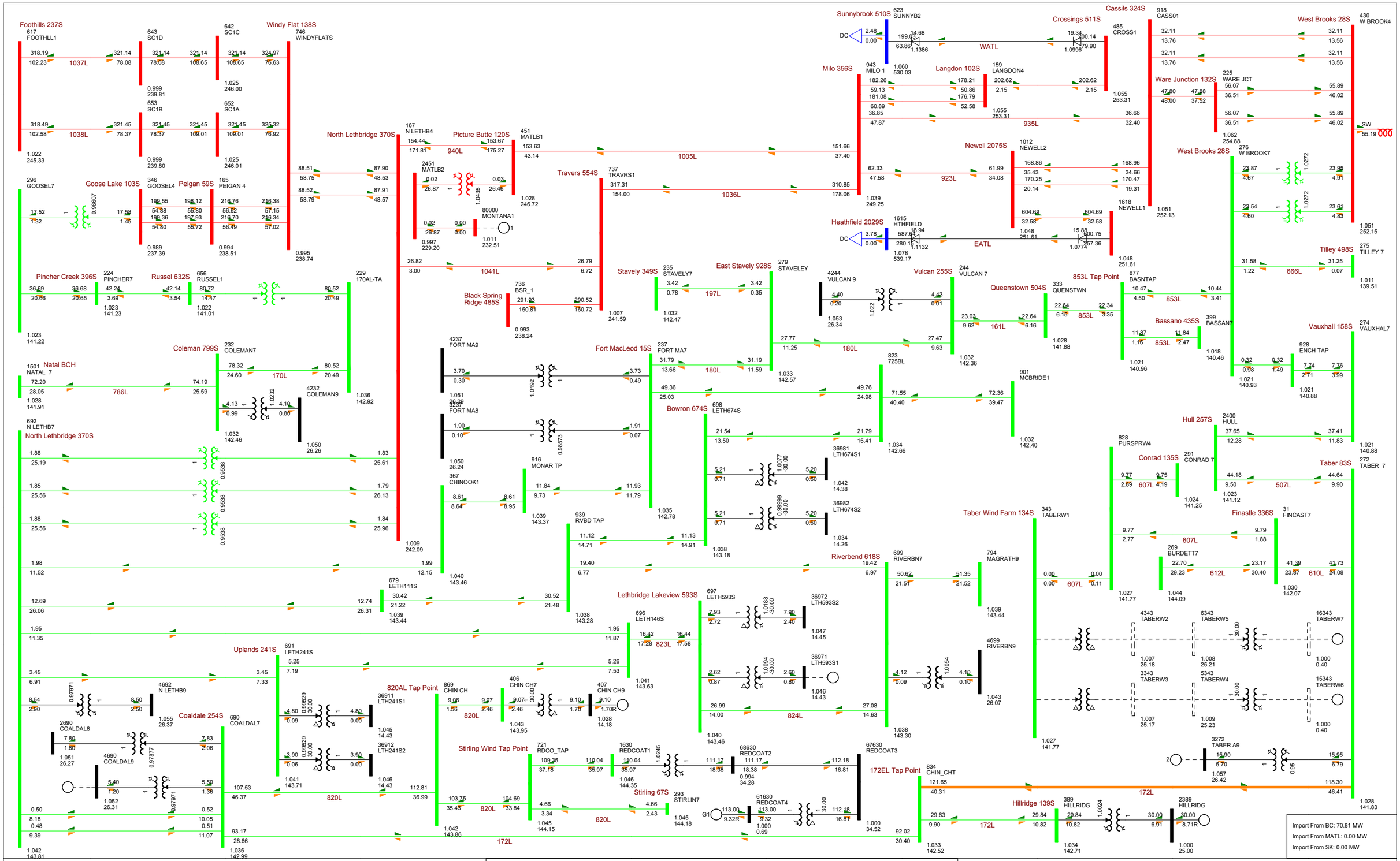
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A2-6: 2021 Summer Light Pre-Project
Category A - No Contingency

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



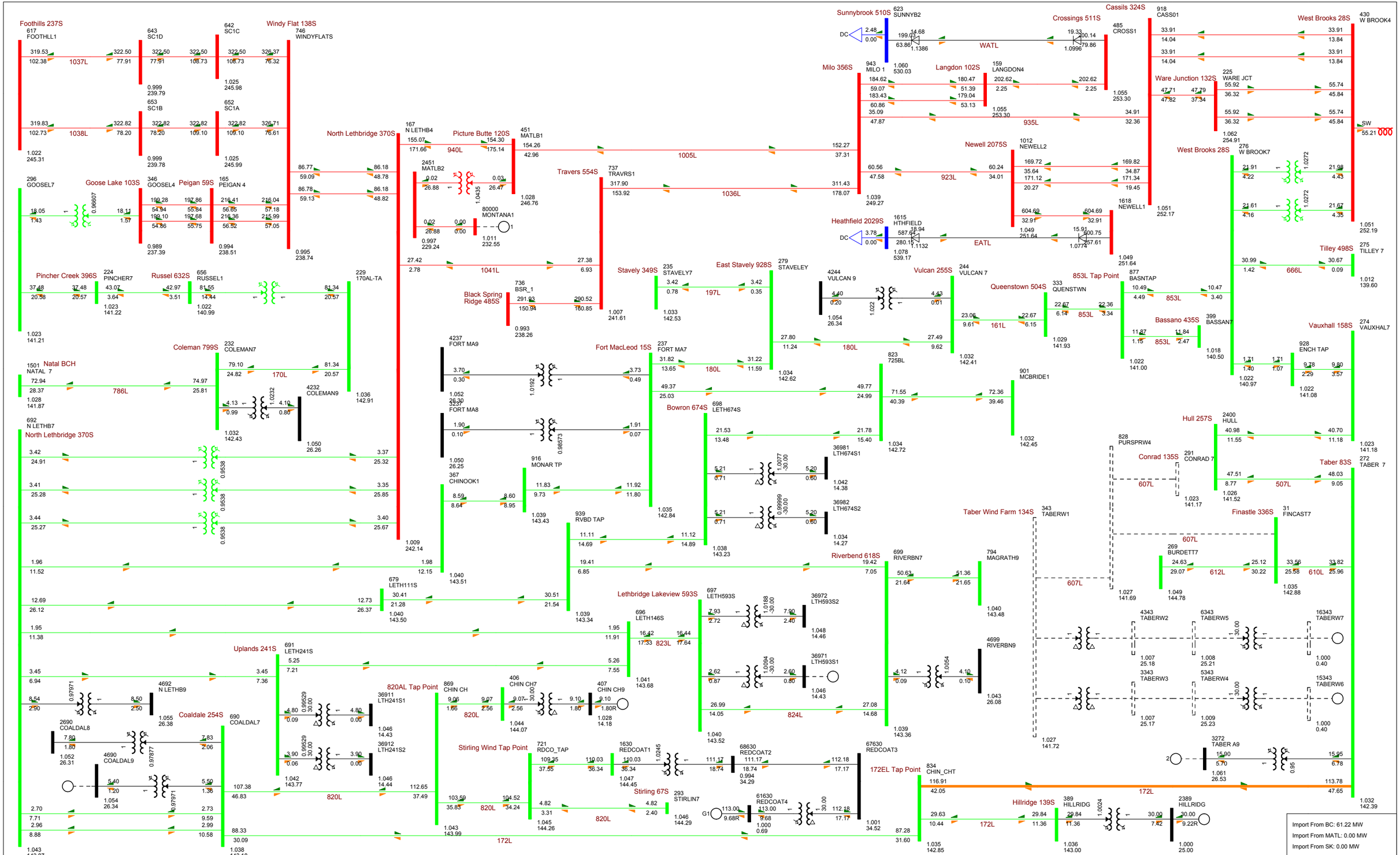
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

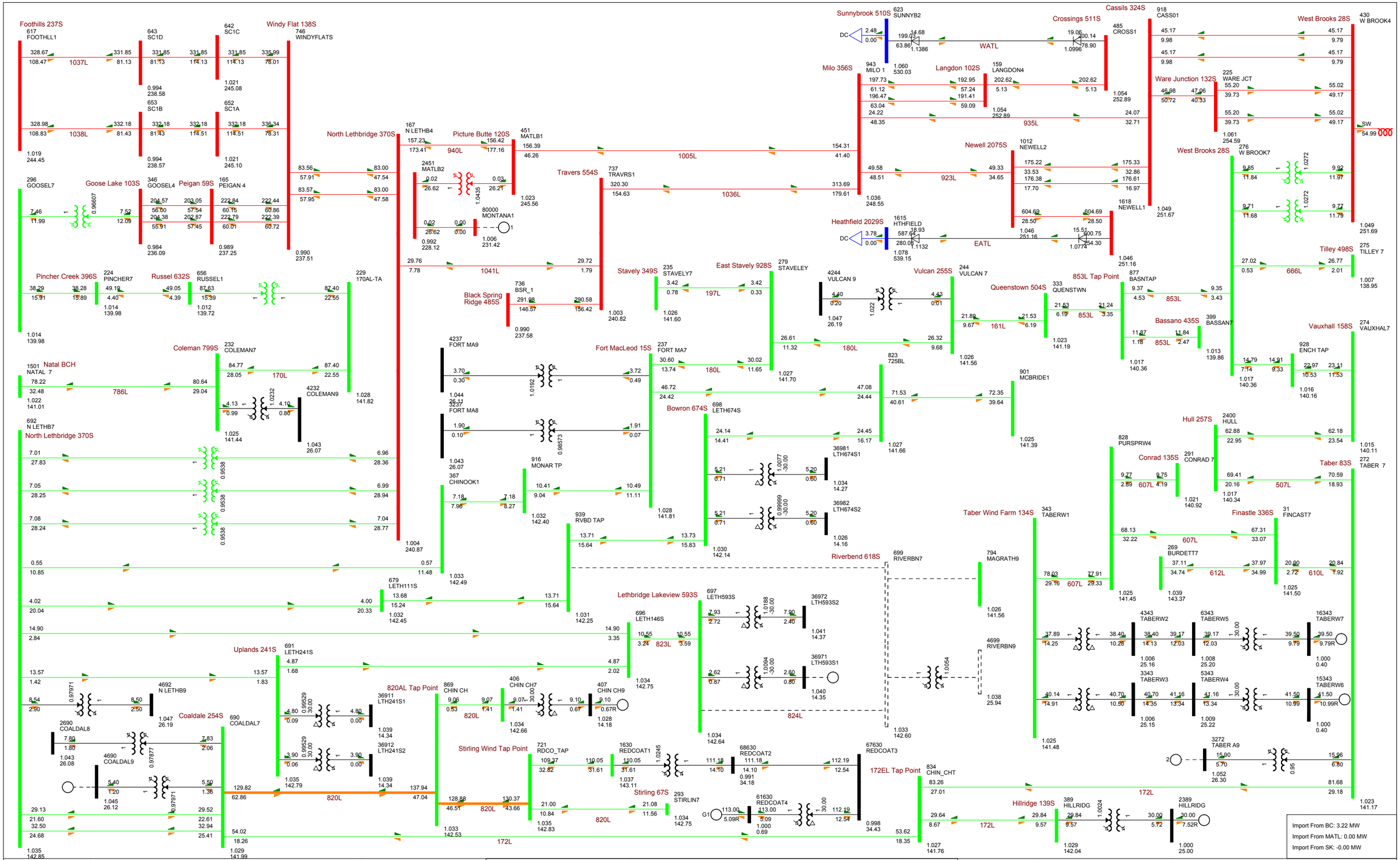
Figure A2-7: 2021 Summer Light Pre-Project
Category B - Contingency of 134ST1 (Transformer T1 in Taber Wind Farm 134S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000


Foothills 237S
617 FOOTHLL1
643 SC1D
642 SC1C
Windy Flat 138S
746 WINDYFLATS
319.53 322.50 322.50 322.50 322.50 326.37
102.38 1037L 77.91 77.91 108.73 108.73 76.32
1.022 245.31
0.999 239.79
1.025 245.98
653 SC1B
652 SC1A
319.83 322.82 322.82 322.82 322.82 326.71
102.73 1038L 78.20 78.20 109.10 109.10 76.61
0.999 239.78
1.025 245.99
86.77 59.09
86.78 59.13
0.995 238.74
North Lethbridge 370S
86.18 48.78
86.18 48.82
167 N LETHB4
155.07 171.66 940L 175.14 154.30
Picture Butte 120S
451 MATLB1
154.26 42.96
1.028 246.76
2451 MATLB2
0.02 26.88
0.03 26.47
1.0435
80000 MONTANA1
0.02 26.88
0.00 0.00
1.011 232.55
0.997 229.24
1005L
152.27 37.31
311.43 178.07
1.039 249.27
Travers 554S
737 TRAVRS1
317.90 153.92
1036L
27.42 2.78 1041L 27.38 6.93
1.007 241.61
Black Spring Ridge 485S
736 BSR_1
291.93 150.94
290.52 160.85
0.993 238.26
Stavely 349S
235 STAVELY7
3.42 0.78 197L 3.42 0.35
1.033 142.53
East Stavely 928S
279 STAVELEY
27.80 11.24 180L 27.49 9.62
1.034 142.62
Sunnybrook 510S
623 SUNNYB2
DC 2.48 0.00
199.03 63.86 1.1386 14.68
WATL
19.33 1.0996 200.14 79.86
Crossings 511S
Cassils 324S
485 CROSS1
1.055 253.30
935L
943 MILO 1
1.060 530.03
184.62 59.07 183.43 60.86 35.09 47.87
Milo 356S
Langdon 102S
159 LANGDON4
180.47 51.39 179.04 53.13
202.62 2.25 202.62 2.25
1.055 253.30
34.91 32.36
923L
60.56 47.58
60.24 34.01
Newell 2075S
1012 NEWELL2
169.72 35.64 171.12 20.27
169.82 34.87 171.34 19.45
1.039 249.27
Heathfield 2029S
1615 HTHFIELD
DC 3.78 0.00
18.94 587.64 280.15 1.1132
1.078 539.17
EATL
604.69 32.91
604.69 32.91
1.049 251.64
15.91 600.75 1.0774 257.61
1618 NEWELL1
1.049 251.64
1.051 252.17
West Brooks 28S
West Brooks 28S
430 W BROOK4
33.91 14.04
33.91 13.84
33.91 14.04
33.91 13.84
Ware Junction 132S
225 WARE JCT
47.71 47.82
47.79 37.34
55.92 36.32
55.74 45.84
55.92 36.32
55.74 45.84
1.062 254.91
SW
55.21
1.051 252.19
West Brooks 28S
276 W BROOK7
21.91 4.22
21.98 4.43
1.0272
21.61 4.16
21.67 4.35
1.0272
Tilley 498S
275 TILLEY 7
30.99 1.42 666L 30.67 0.09
1.012 139.60
853L Tap Point
877 BASNTAP
10.49 4.49 853L 10.47 3.40
1.022 141.00
Bassano 435S
399 BASSANT
11.87 1.15 853L 11.84 2.47
1.018 140.50
Vauxhall 158S
274 VAUXHAL7
928 ENCH TAP
1.71 1.40 1.71 1.07
9.78 2.29 9.80 3.57
1.022 140.97
1.022 141.08
Queenstown 504S
333 QUENSTWN
22.67 6.14 853L 22.36 3.34
1.029 141.93
Vulcan 255S
244 VULCAN 7
4244 VULCAN 9
4.40 0.20
1.022
4.43 0.01
1.054 26.34
23.06 9.61 161L 22.67 6.15
1.032 142.41
Pincher Creek 396S
224 PINCHER7
37.48 20.58 37.48 20.57
43.07 3.64
1.023 141.22
Russel 632S
656 RUSSEL1
42.97 3.51
81.55 14.44
1.022 140.99
229 170AL-TA
81.34 20.57
1.036 142.91
1.023 141.21
Goose Lake 103S
296 GOOSEL7
0.98607
18.05 1.43
18.11 1.57
Peigan 59S
346 GOOSEL4
165 PEIGAN 4
189.28 54.94 189.10 54.86
197.86 55.84 197.68 55.75
216.41 56.65 216.36 56.52
216.04 57.18 215.99 57.05
0.989 237.39
0.994 238.51
Coleman 799S
232 COLEMAN7
79.10 24.82 170L 81.34 20.57
4.13 0.99
1.0232
4.10 0.80
4232 COLEMAN9
1.032 142.43
1.050 26.26
Natal BCH
1501 NATAL 7
72.94 28.37 786L 74.97 25.81
1.028 141.87
692 N LETHB7
3.42 24.91
3.41 25.28
3.44 25.27
0.9538
3.37 25.32
3.35 25.85
3.40 25.67
1.96 11.52
1.95 11.38
1.98 12.15
1.009 242.14
12.69 26.12
12.73 26.37
679 LETH111S
30.41 21.28
1.040 143.50
1.040 143.51
1.95 11.91
1.039 143.34
939 RVBD TAP
11.11 14.69
11.12 14.89
19.41 6.85
30.51 21.54
1.038 143.23
1.035 142.84
Fort MacLeod 15S
237 FORT MA7
31.82 13.65 180L 31.22 11.59
1.034 142.62
49.37 25.03
49.77 24.99
4237 FORT MA9
3.70 0.30
3.73 0.49
1.052 26.30
1.0192
3237 FORT MA8
1.90 0.10
1.91 0.07
1.050 26.25
0.98573
916 MONAR TP
11.83 9.73
11.92 11.80
367 CHINOOK1
8.59 8.64
8.60 8.95
1.039 143.43
Bowron 674S
698 LETH674S
21.53 13.48
21.78 15.40
36981 LTH674S1
5.21 0.71
1.0077 -30.00
5.20 0.60
1.042 14.38
36982 LTH674S2
1.034 14.27
1.034 142.72
Riverbend 618S
19.42 7.05
699 RIVERBN7
50.63 21.64
51.36 21.65
1.039 143.36
4.12 0.09
1.0054
4.10 0.10
794 MAGRATH9
1.040 143.48
4699 RIVERBN9
1.043 26.08
Taber Wind Farm 134S
343 TABERW1
607L
1.027 141.72
Hillridge 139S
389 HILLRIDG
29.84 11.36
29.84 11.36
1.0024
30.00 7.42
2389 HILLRIDG
30.00 9.22R
1.036 143.00
1.000 25.00
Conrad 135S
828 PURSPRW4
291 CONRAD 7
607L
1.023 141.17
Hull 257S
2400 HULL
40.98 11.55
40.70 11.18
1.026 141.52
1.023 141.18
Finastle 336S
31 FINCAST7
607L
269 BURDETT7
24.63 29.07
25.12 30.22
612L
33.56 25.58
33.82 25.96
610L
1.049 144.78
1.035 142.88
Taber 83S
272 TABER 7
48.03 9.05
507L
1.032 142.39
Import From BC: 61.22 MW
Import From MATL: 0.00 MW
Import From SK: 0.00 MW
Lethbridge Lakeview 593S
697 LETH593S
7.93 2.72
1.0188 -30.00
7.90 2.40
36972 LTH593S2
1.048 14.46
2.62 0.87
1.0094 -30.00
2.60 0.80
36971 LTH593S1
1.046 14.43
26.99 14.05
824L
27.08 14.68
1.040 143.52
696 LETH146S
16.42 17.33
823L
16.44 17.64
1.041 143.68
Uplands 241S
691 LETH241S
5.25 7.21
5.26 7.55
3.45 6.94
3.45 7.36
0.97971
4692 N LETHB9
8.54 2.90
8.50 2.50
1.055 26.38
2690 COALDAL8
7.80 1.80
7.83 2.06
1.052 26.31
4690 COALDAL9
0.97877
5.40 1.20
5.59 1.36
1.054 26.34
0.97971
2.70 7.71
2.73 9.59
2.96 2.99
8.88 10.58
1.043 143.87
Coaldale 254S
690 COALDAL7
107.38 46.83
112.65 37.49
88.33 30.09
1.038 143.18
820L
820AL Tap Point
869 CHIN CH
9.06 1.66
9.07 2.56
406 CHIN CH7
9.07 2.56
30.00
9.10 1.80
407 CHIN CH9
9.10 1.80R
1.028 14.18
1.044 144.07
820L
0.96529 30.00
4.80 0.09
4.80 0.00
36911 LTH241S1
1.046 14.43
0.96529 30.00
3.90 0.06
3.90 0.00
36912 LTH241S2
1.046 14.44
1.042 143.77
820L
Stirling Wind Tap Point
721 RDCO_TAP
109.35 37.55
110.03 36.34
1630 REDCOAT1
110.03 36.34
1.0245
111.17 18.74
68630 REDCOAT2
111.17 18.74
0.994 34.29
112.18 17.17
67630 REDCOAT3
1.047 144.45
103.59 35.83
104.52 34.24
820L
4.82 3.31
1.045 144.26
Stirling 67S
293 STIRLIN7
4.82 2.40
1.046 144.29
820L
G1 113.00 9.68R
61630 REDCOAT4
113.00 9.68
1.000 0.69
30.00
112.18 17.17
1.043 143.99
172L
1.001 34.52
172EL Tap Point
834 CHIN_CHT
116.91 42.05
87.28 31.60
29.63 10.44
172L
1.035 142.85
3272 TABER A9
15.90 5.70
15.95 6.78
0.95
1.061 26.53
113.78 47.65
Taber Wind Farm 134S
343 TABERW1
607L
4343 TABERW2
6343 TABERW5
16343 TABERW7
1.007 25.18
1.008 25.21
1.000 0.40
3343 TABERW3
5343 TABERW4
15343 TABERW6
1.007 25.17
1.009 25.23
1.000 0.40
1.027 141.72
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3
Figure A2-8: 2021 Summer Light Pre-Project
Category B - Contingency of 607L (Finastle 336S - Conrad 135S/Taber Wind Farm 134S)
Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

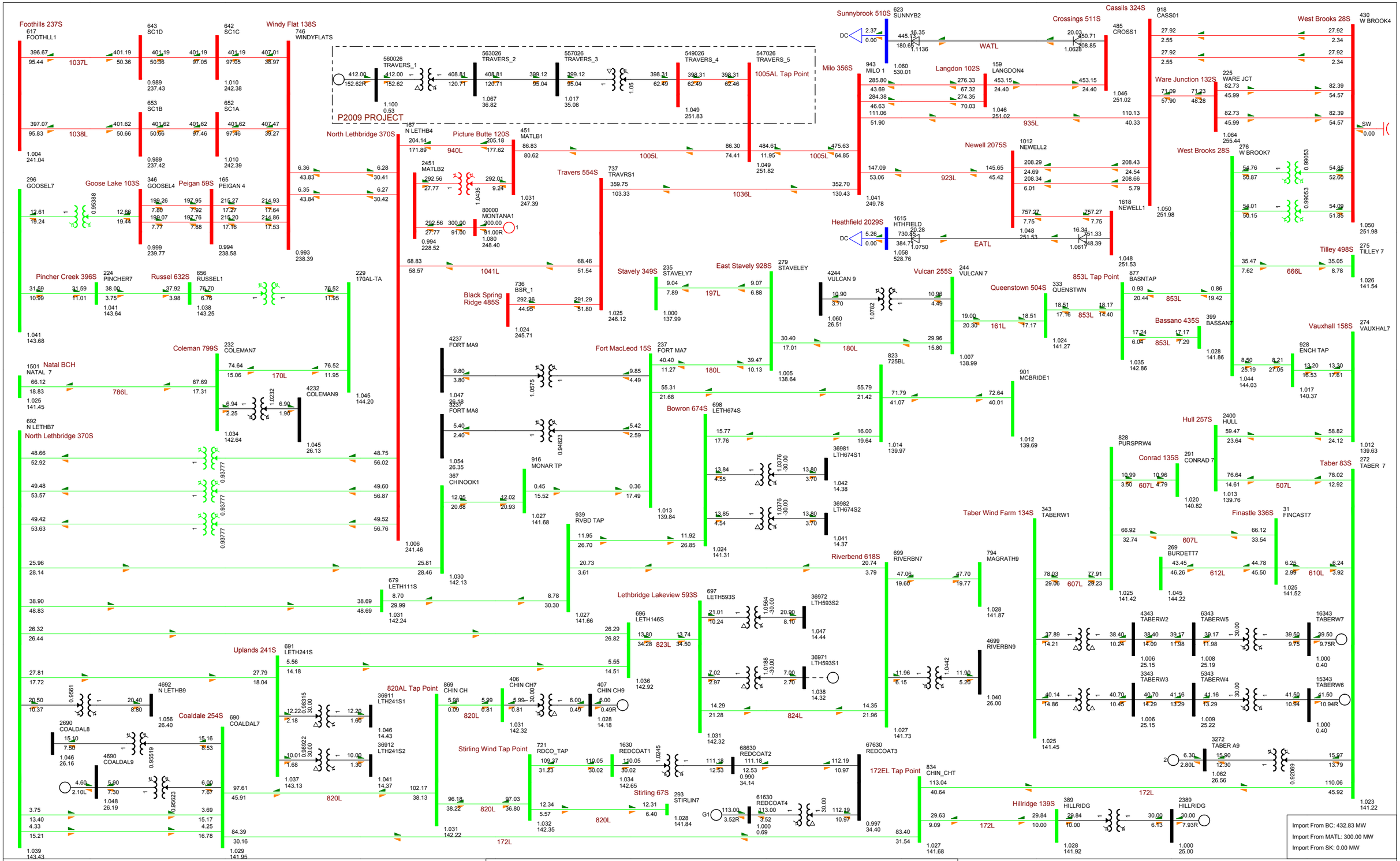
Figure A2-9: 2021 Summer Light Pre-Project
Category B - Contingency of 618ST1 (Transformer T1 in Riverbend 618S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000

Attachment A3
Post-Project Power Flow Diagrams



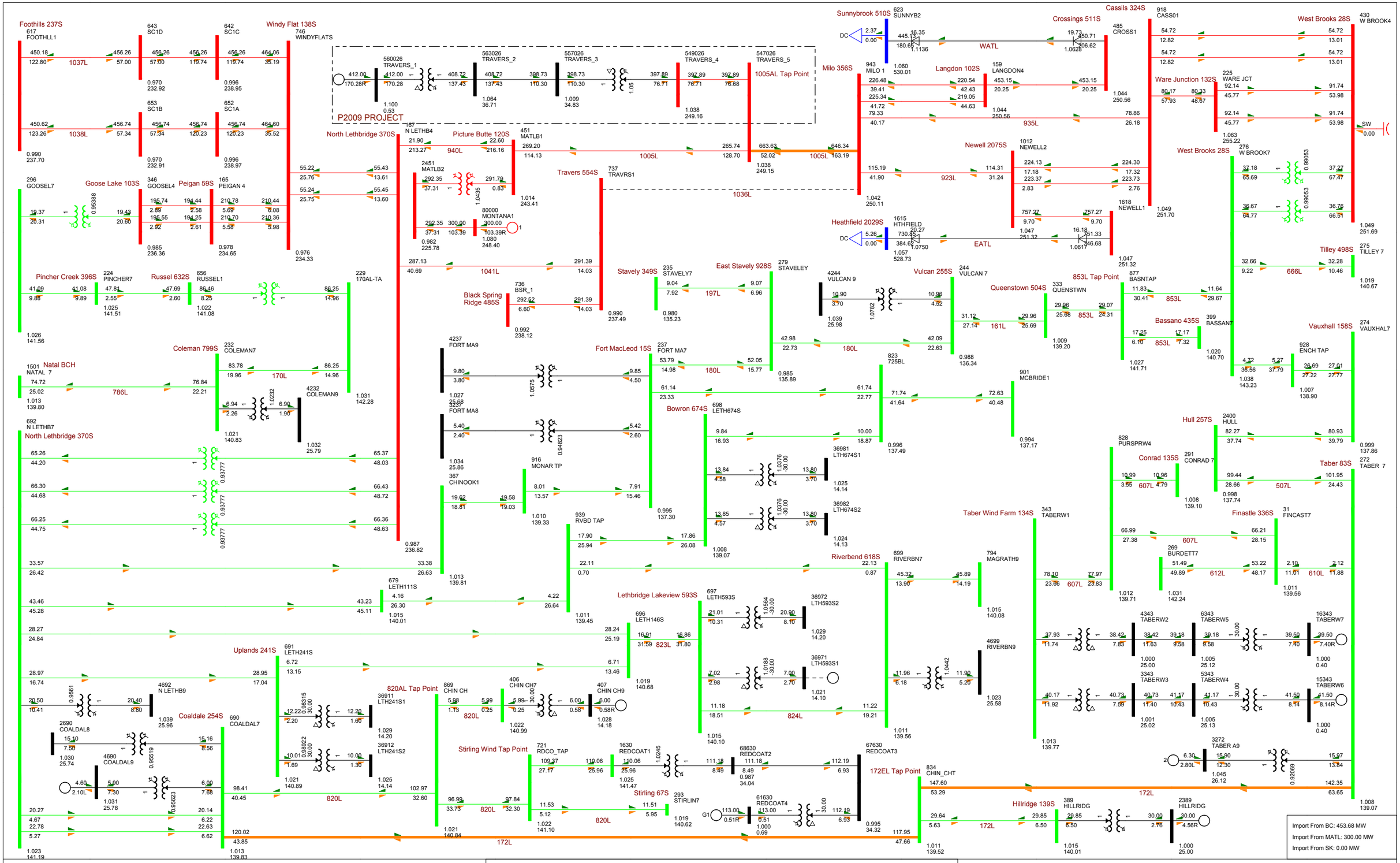
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-1: 2021 Summer Peak Post-Project
Category A -No Contingency

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

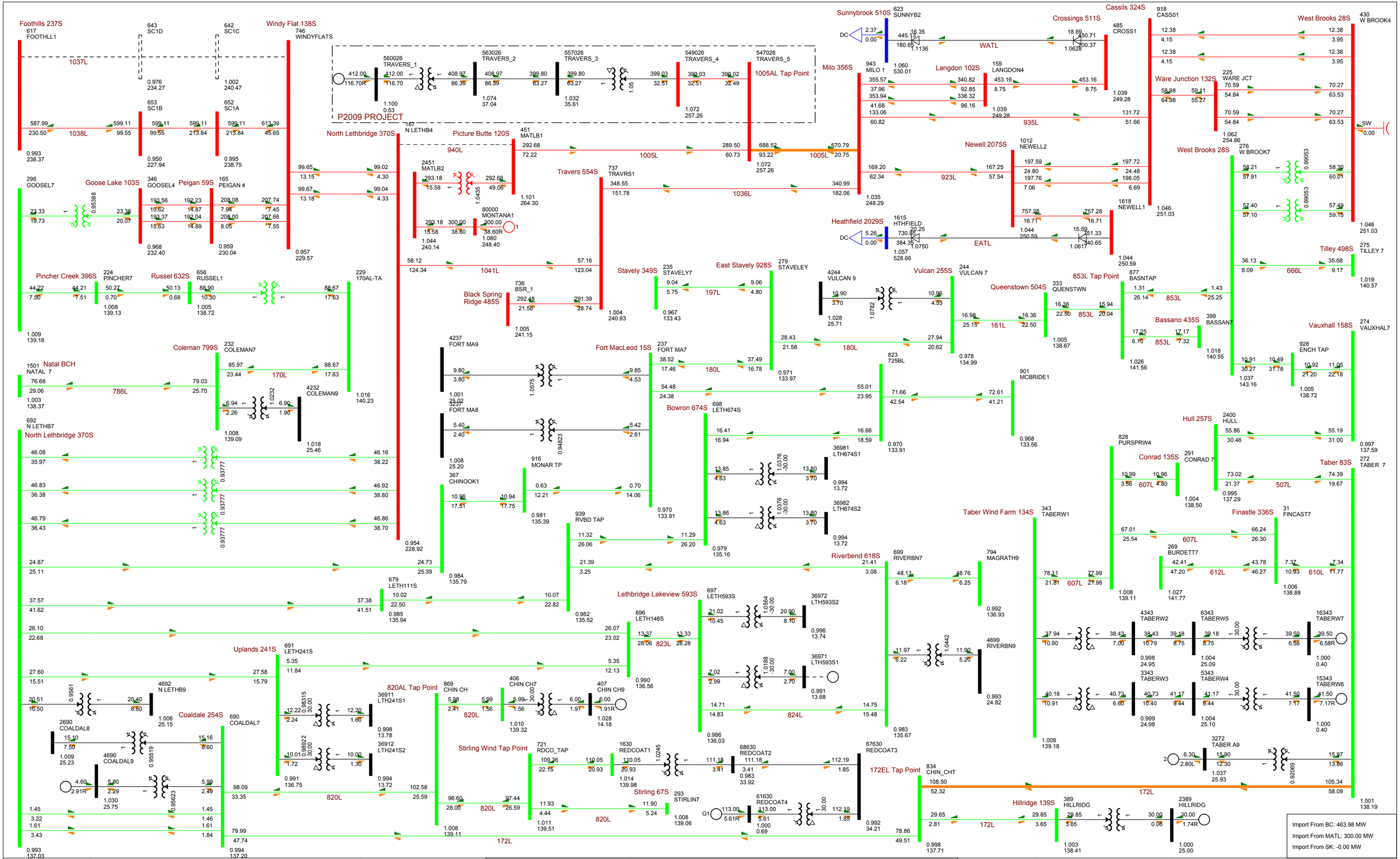
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-2: 2021 Summer Peak Post-Project
Category B - Contingency of 1036L (Milo 356S - Travers 554S)

Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



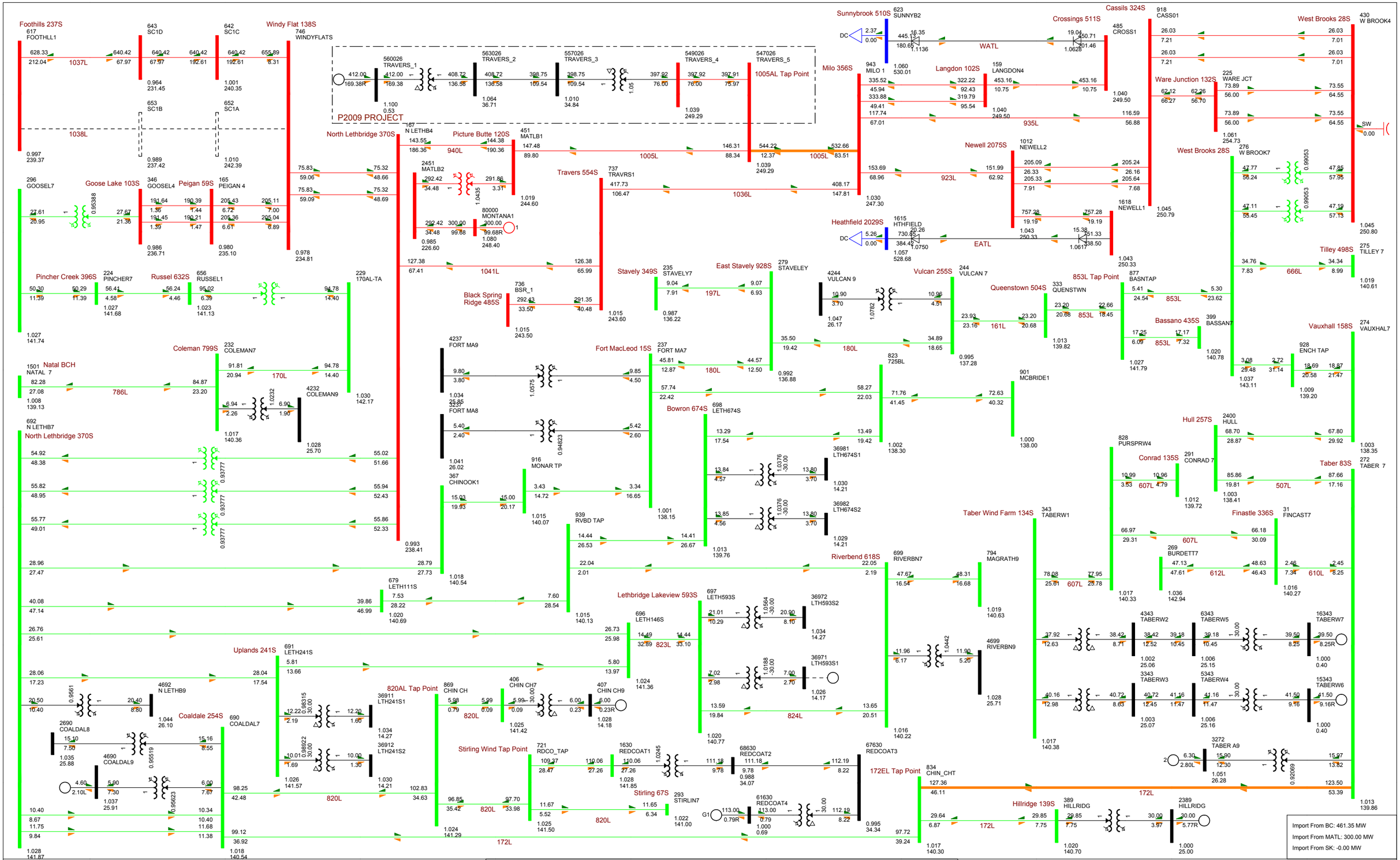
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-3: 2021 Summer Peak Post-Project
Category B - Contingency of 1037L (Foothills 237S - Windy Flat 138S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



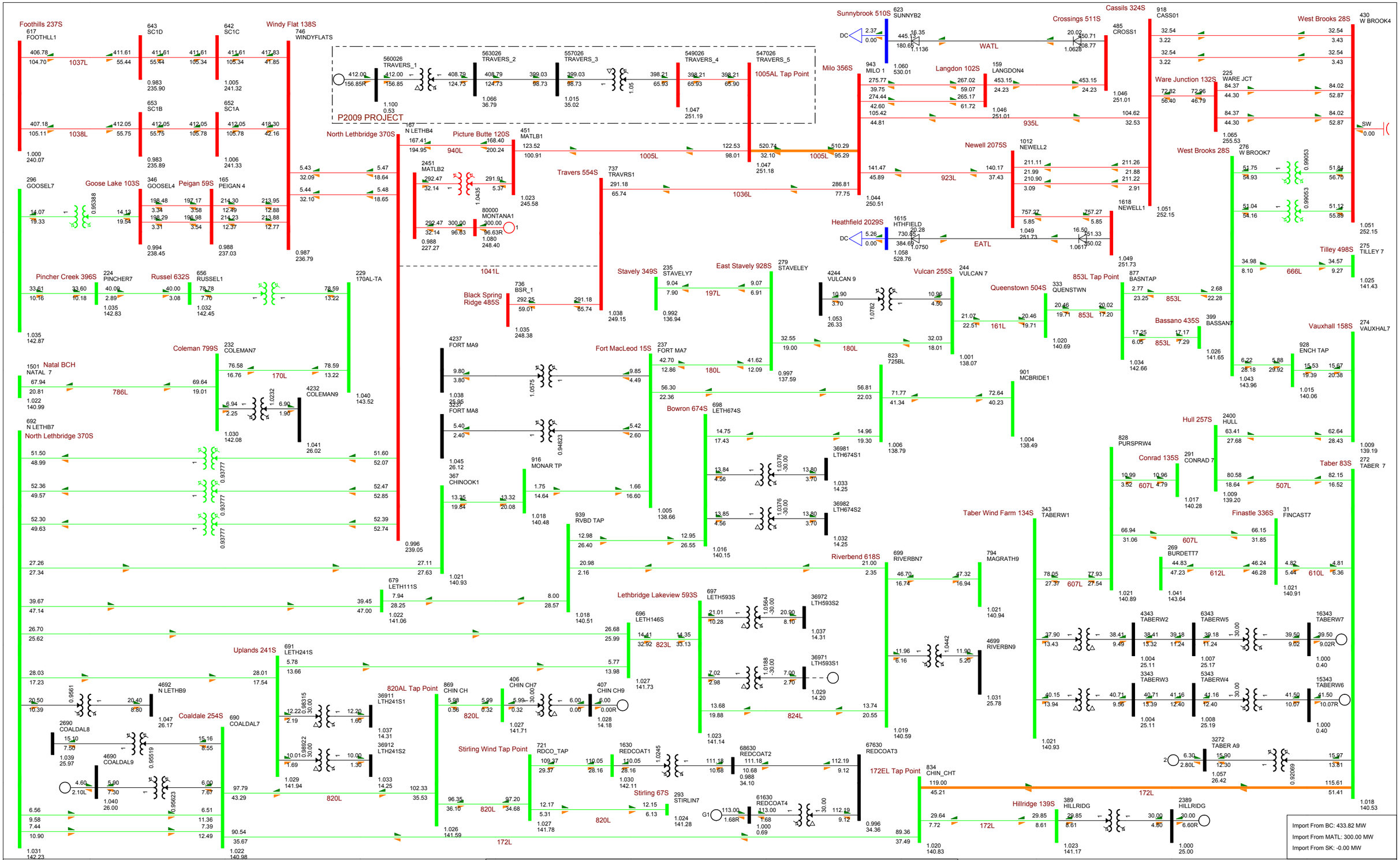
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-4: 2021 Summer Peak Post-Project
Category B - Contingency of 1038L (Foothills 237S - Windy Flat 138S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



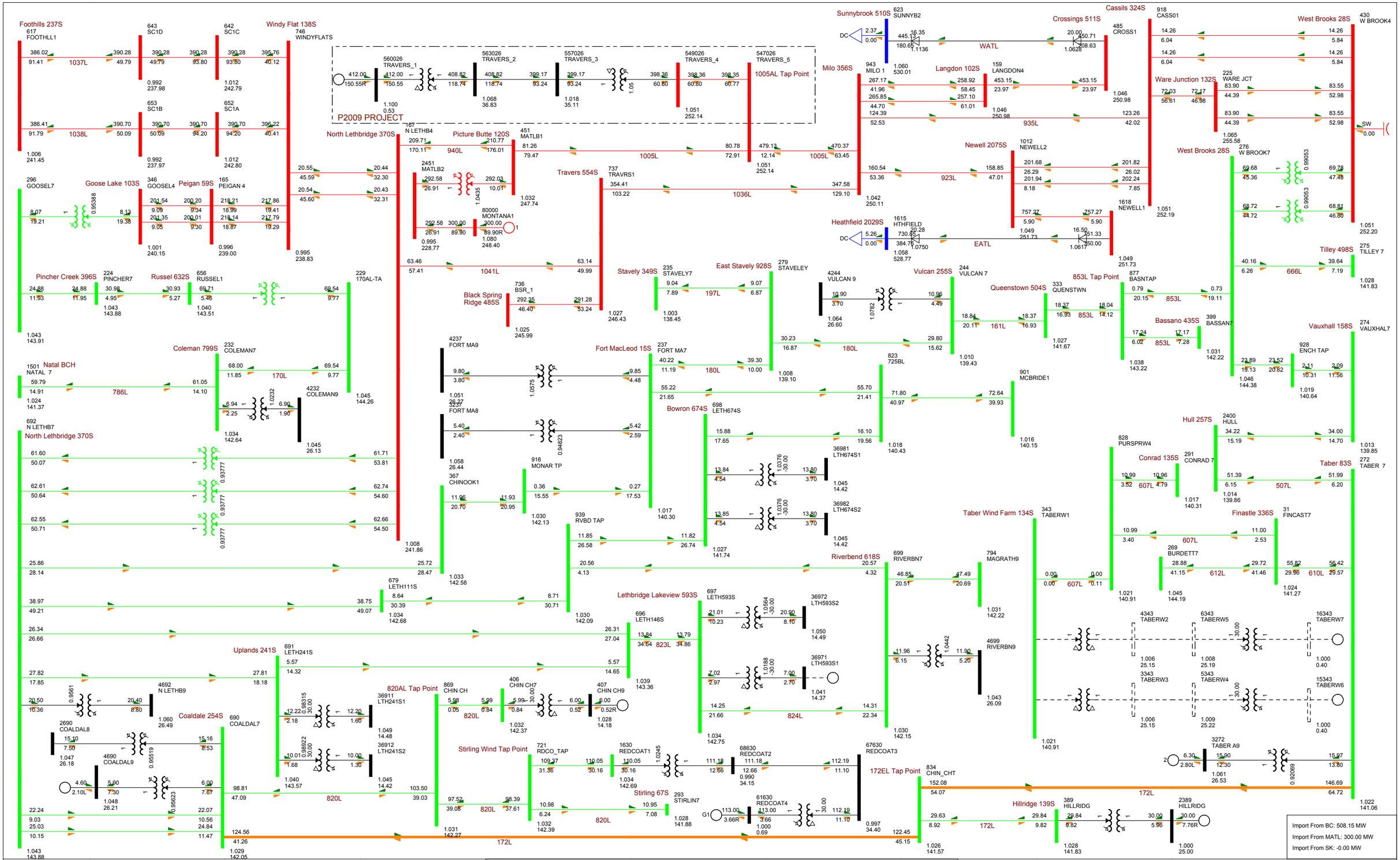
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-5: 2021 Summer Peak Post-Project
Category B - Contingency of 1041L (North Lethbridge 3701S - Travers 554S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



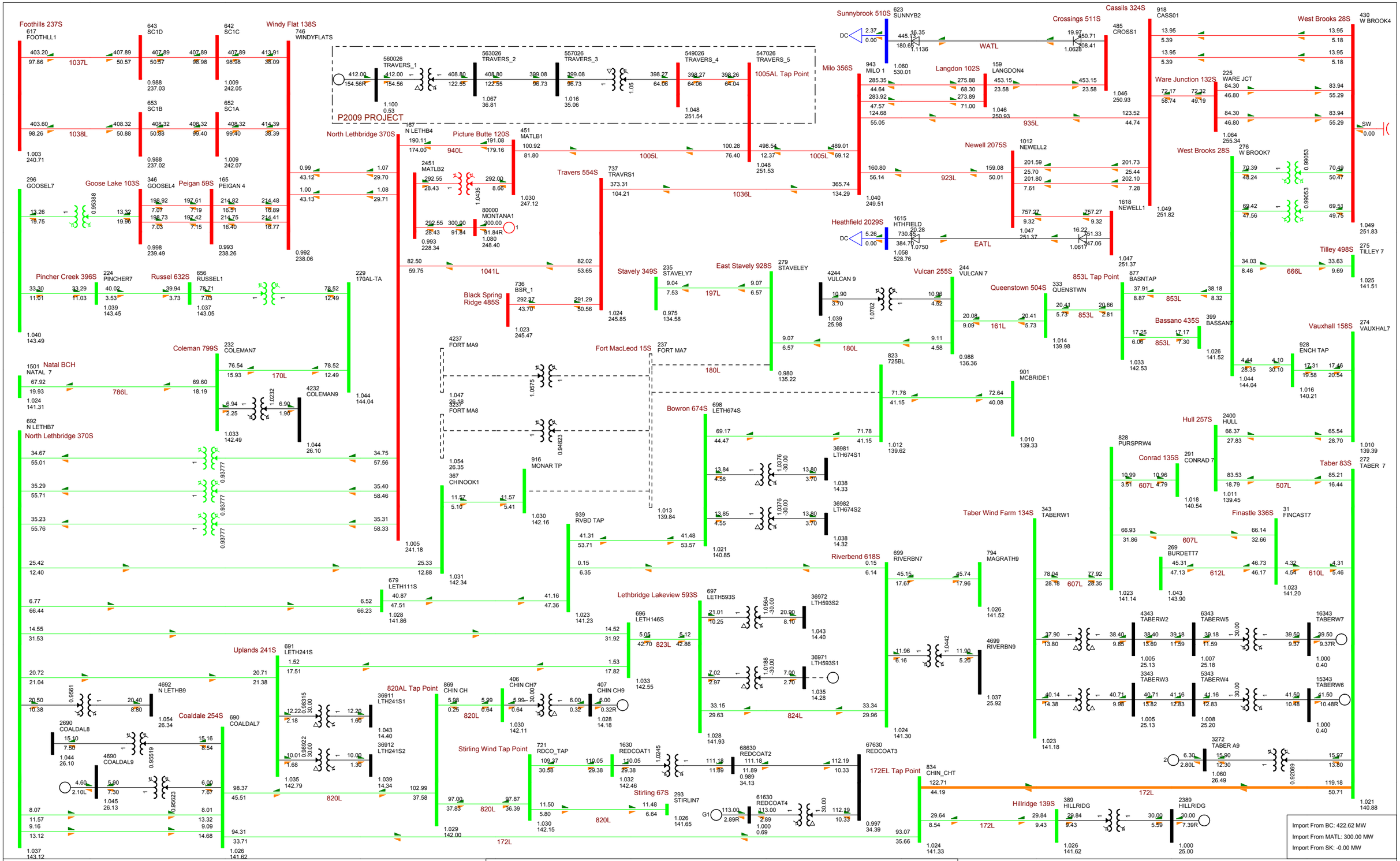
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-6: 2021 Summer Peak Post-Project
Category B - Contingency of 134ST1 (Transformer T1 in Taber Wind Farm 134S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



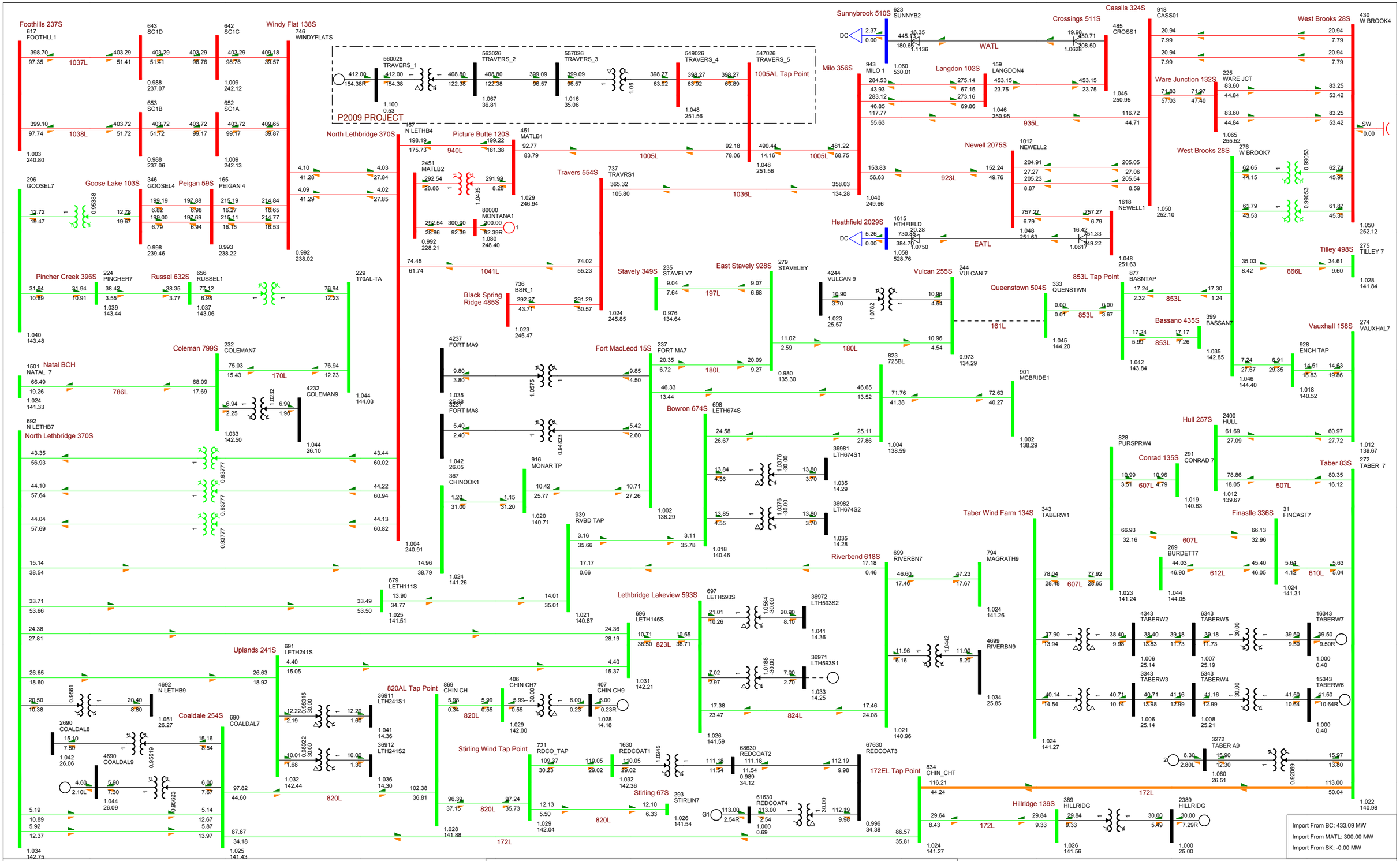
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-7: 2021 Summer Peak Post-Project
Category B - Contingency of 15ST1 (Transformer T1 in Fort Macleod 15S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



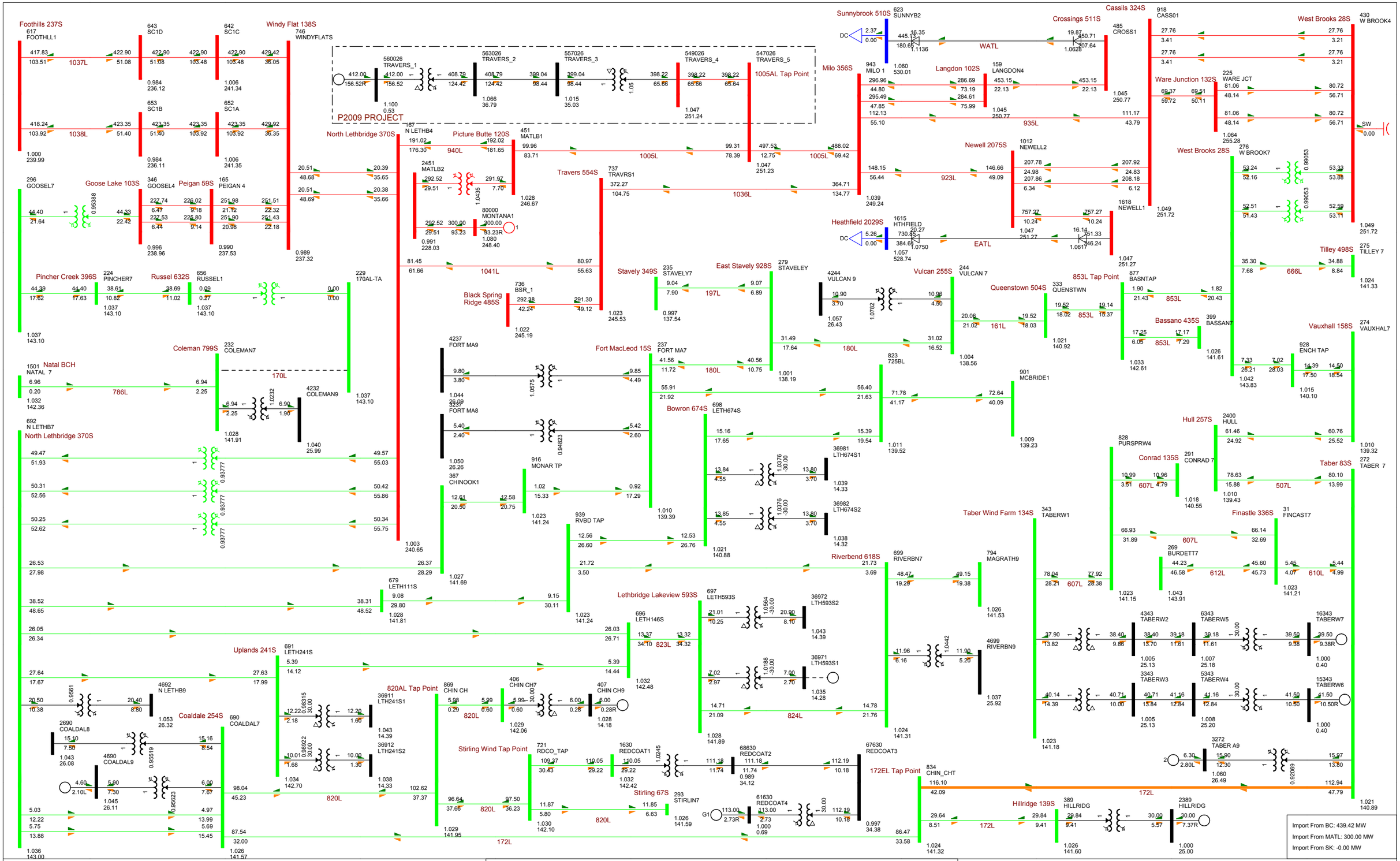
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-8: 2021 Summer Peak Post-Project
Category B - Contingency of 161L (Vulcan 255S - Queenstown 504S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



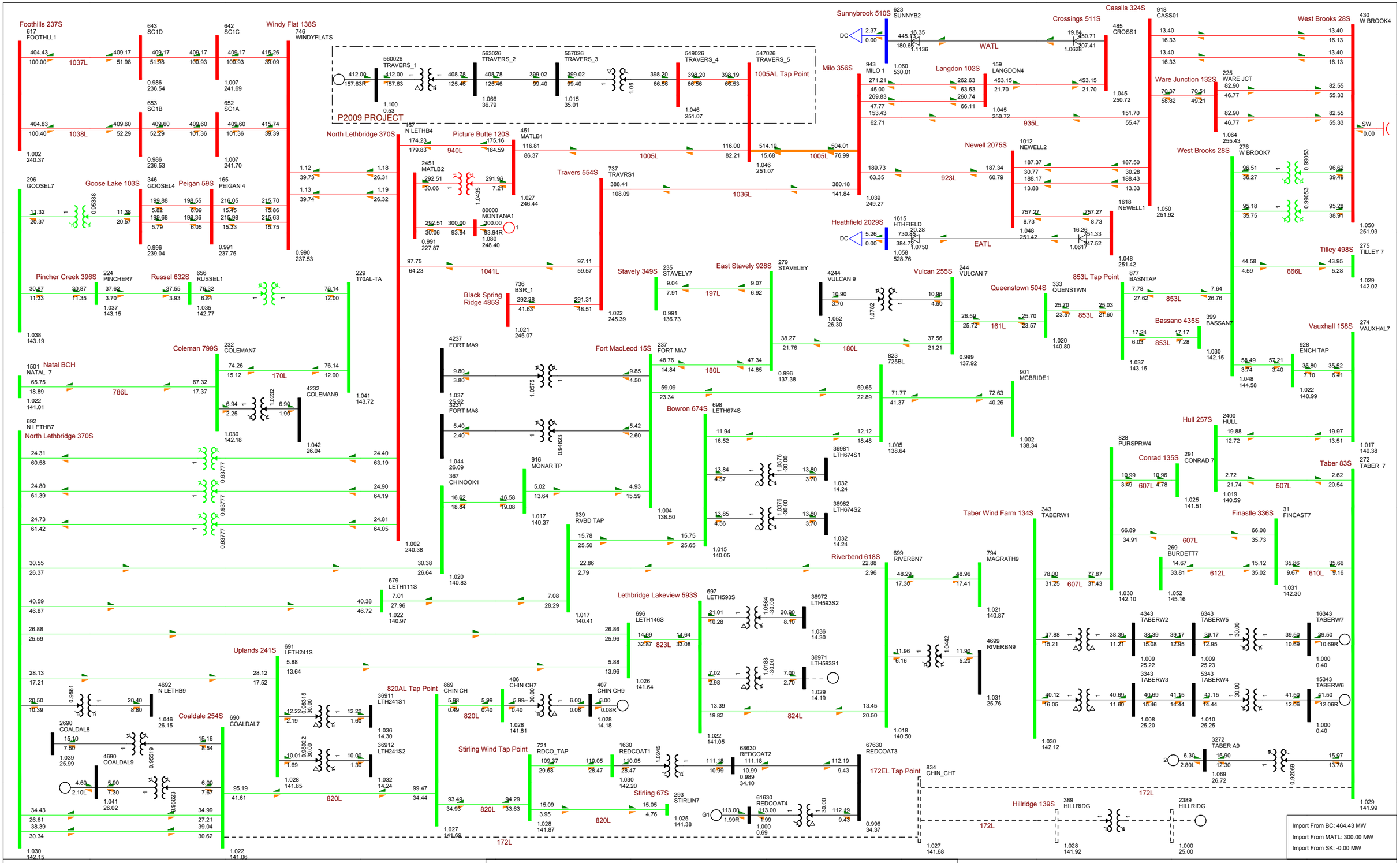
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-9: 2021 Summer Peak Post-Project
Category B - Contingency of 170L (Russel 632S - Coleman 799S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



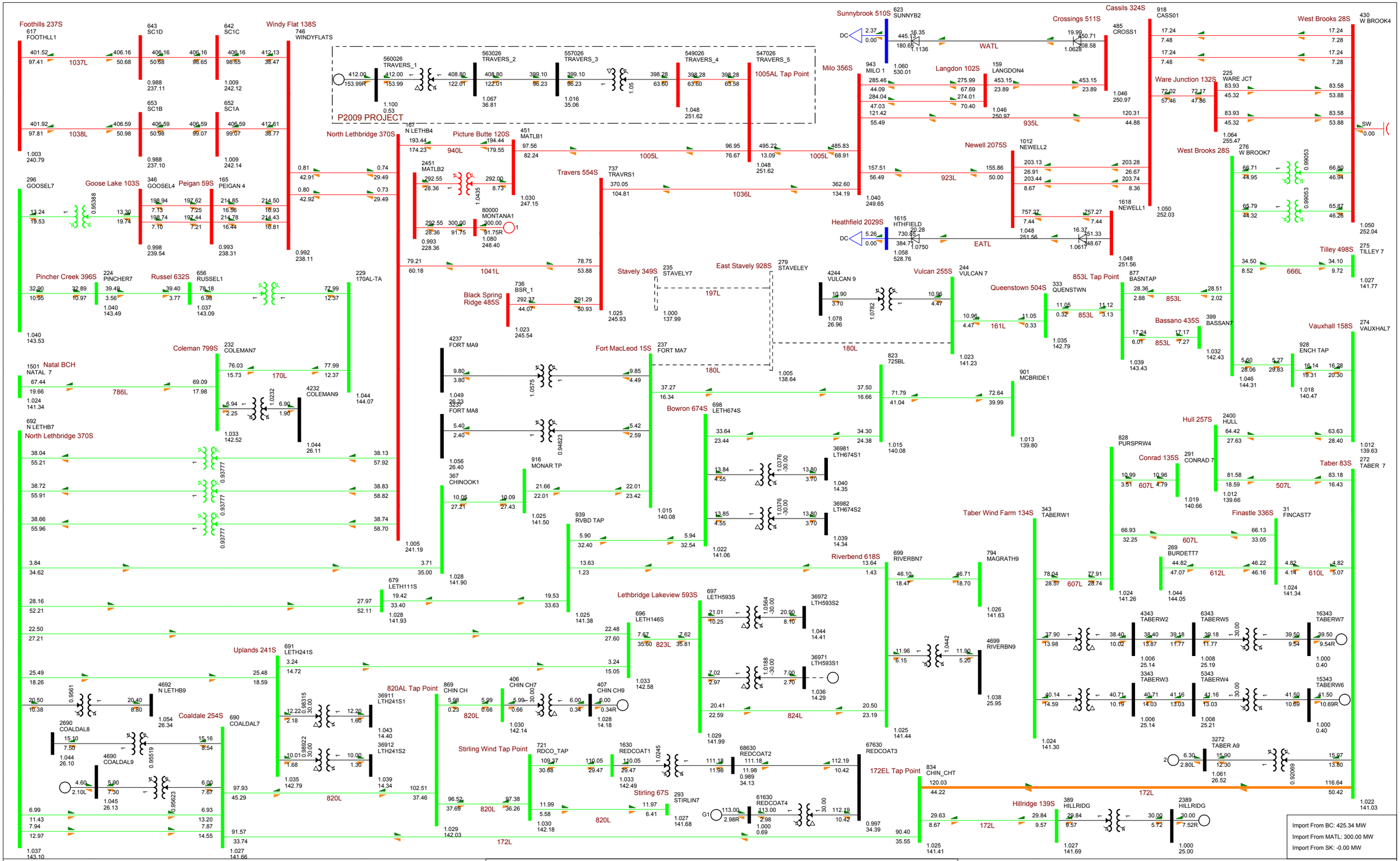
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-10: 2021 Summer Peak Post-Project
Category B - Contingency of 172L (Coaldale 254S - Taber 83S/Hillridge 139S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

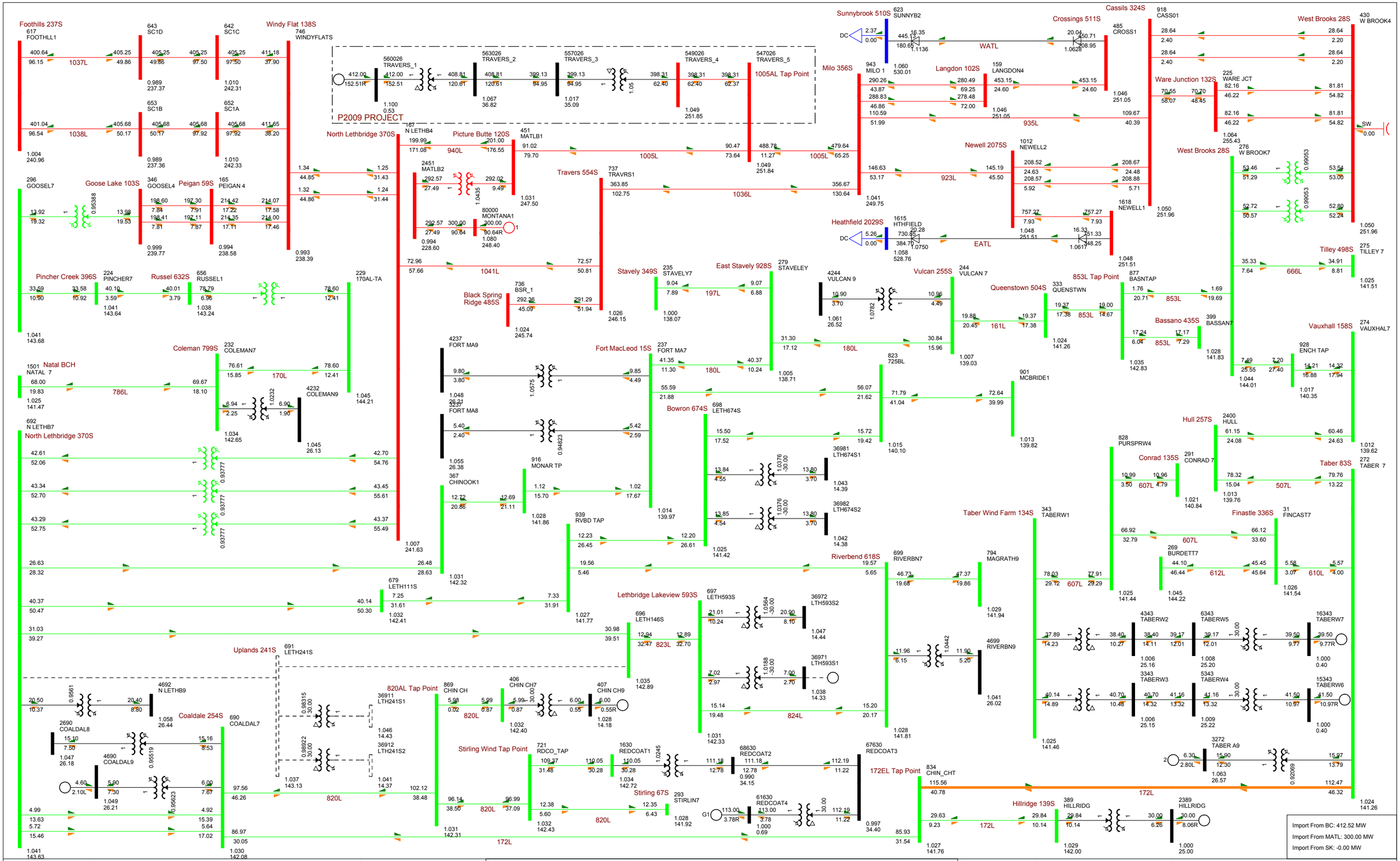
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-11: 2021 Summer Peak Post-Project
Category B - Contingency of 180L (Fort Macleod 15S to Vulcan 255S/East Stavely 928S)

Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



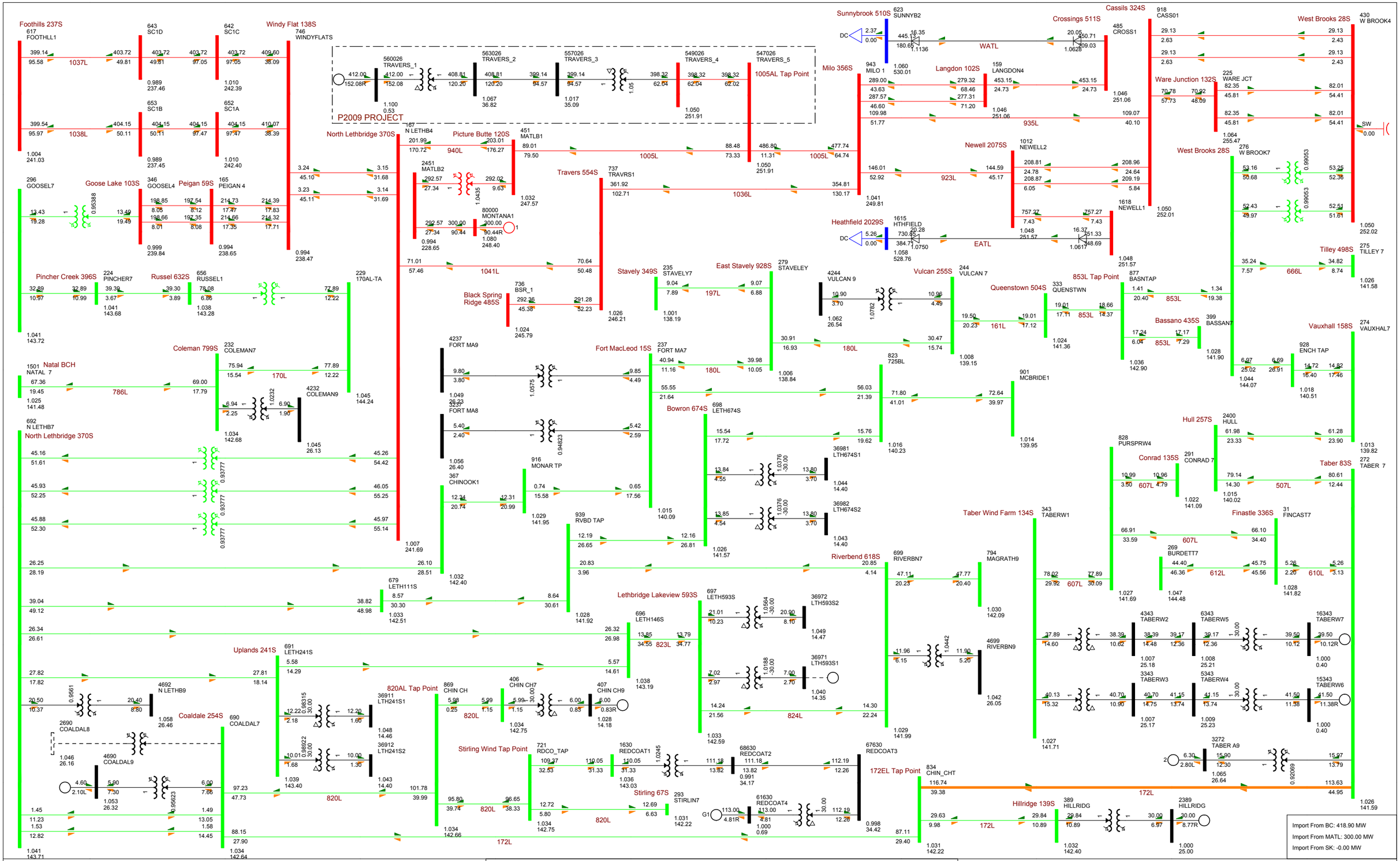
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-12: 2021 Summer Peak Post-Project
Category B - Contingency of 241ST1 (Transformer T1 in Uplands 241S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



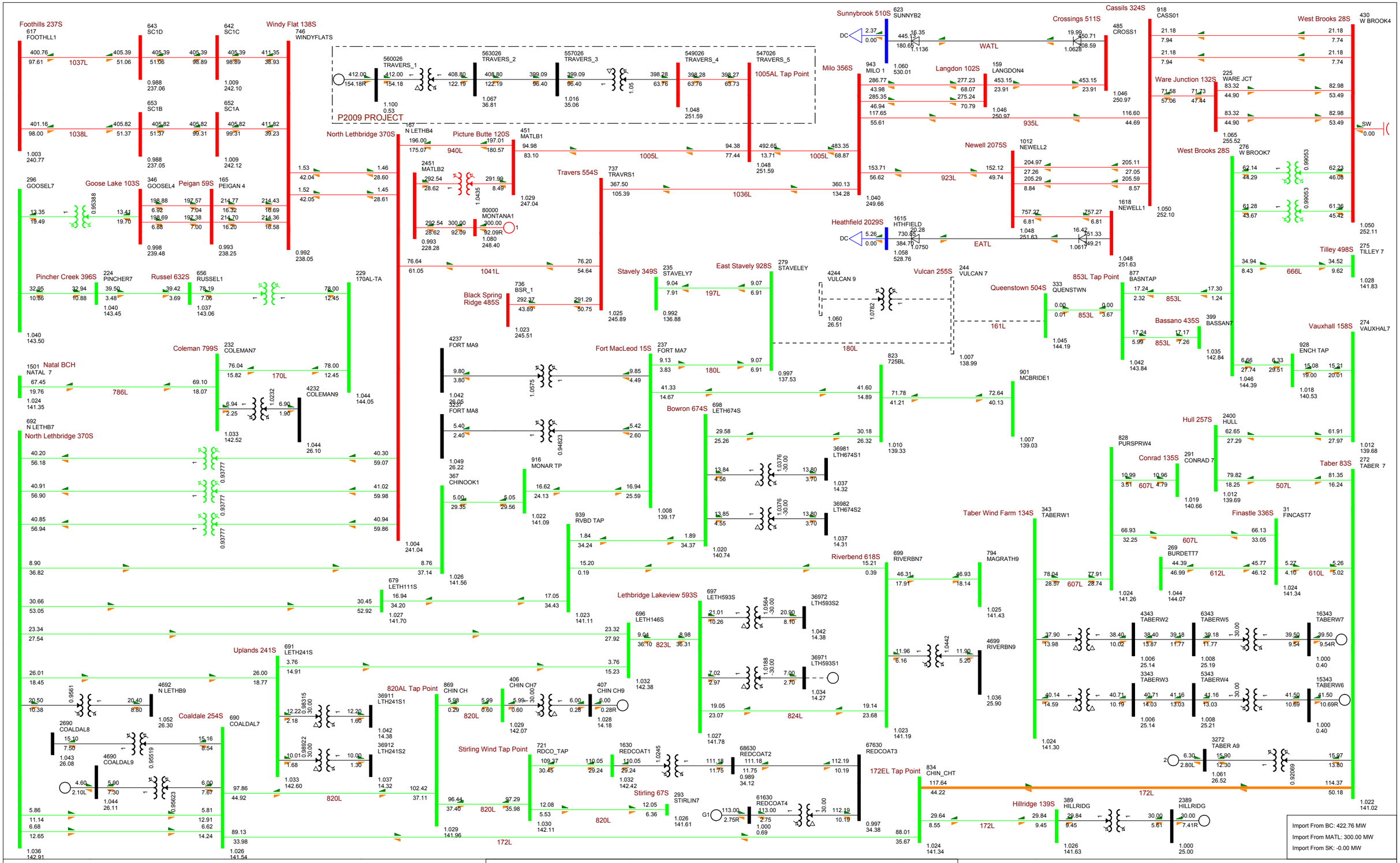
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-13: 2021 Summer Peak Post-Project
Category B - Contingency of 254ST2 (Transformer T2 in Coaldale 254S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



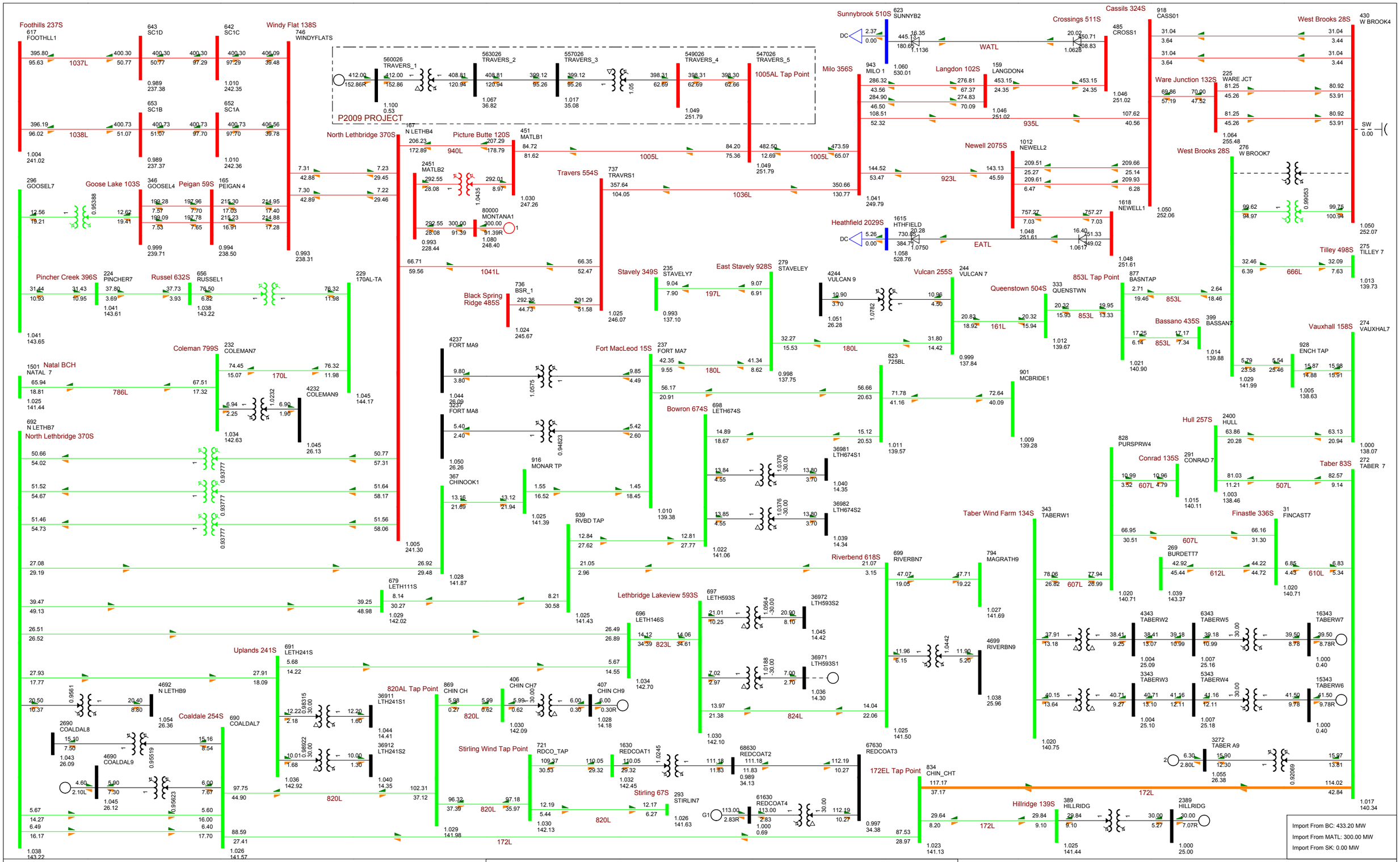
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-14: 2021 Summer Peak Post-Project
Category B - Contingency of 255ST1 (Transformer T1 in Vulcan 255S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



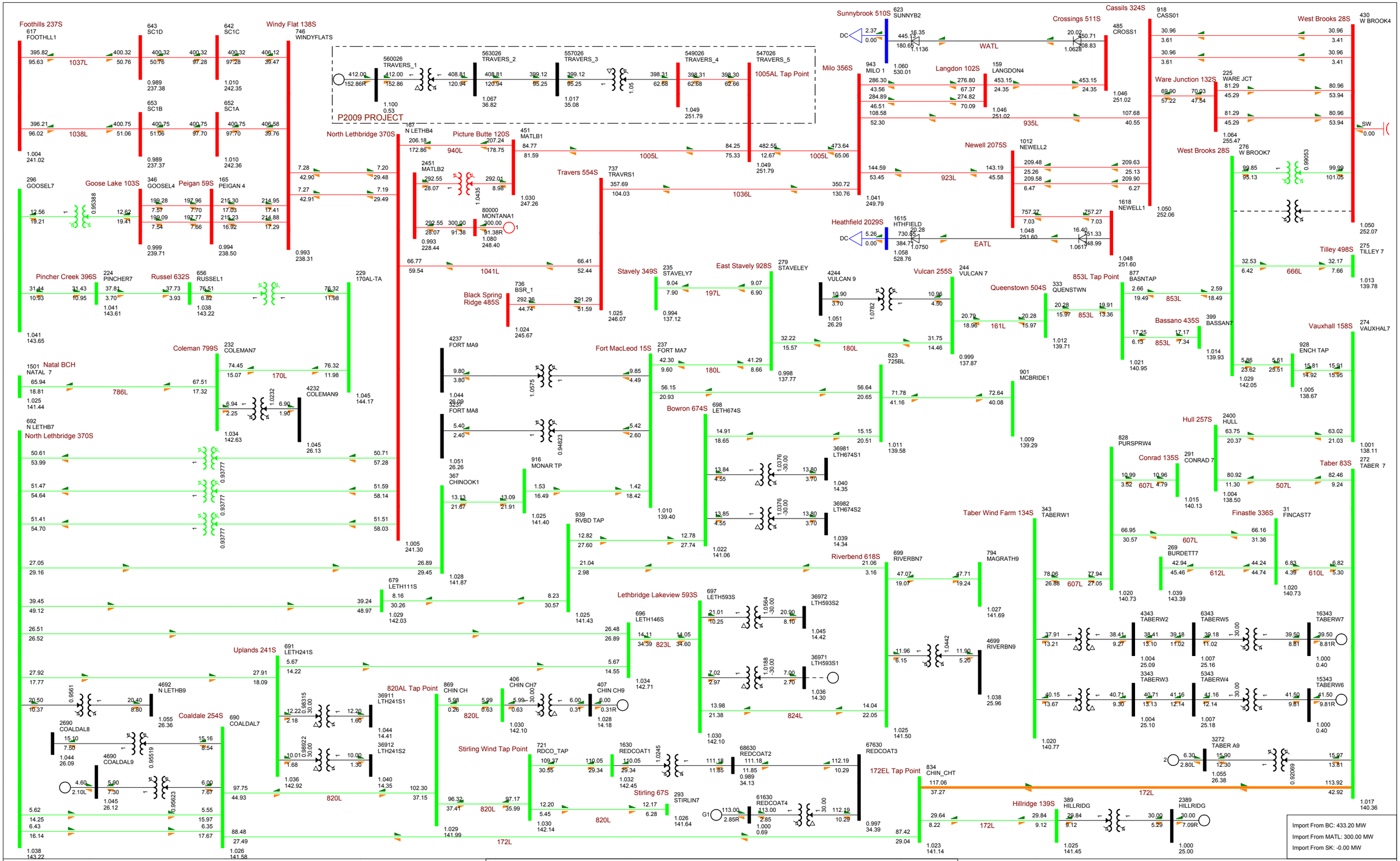
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-15: 2021 Summer Peak Post-Project
Category B - Contingency of 28ST1 (Transformer T1 in West Brooks 28S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

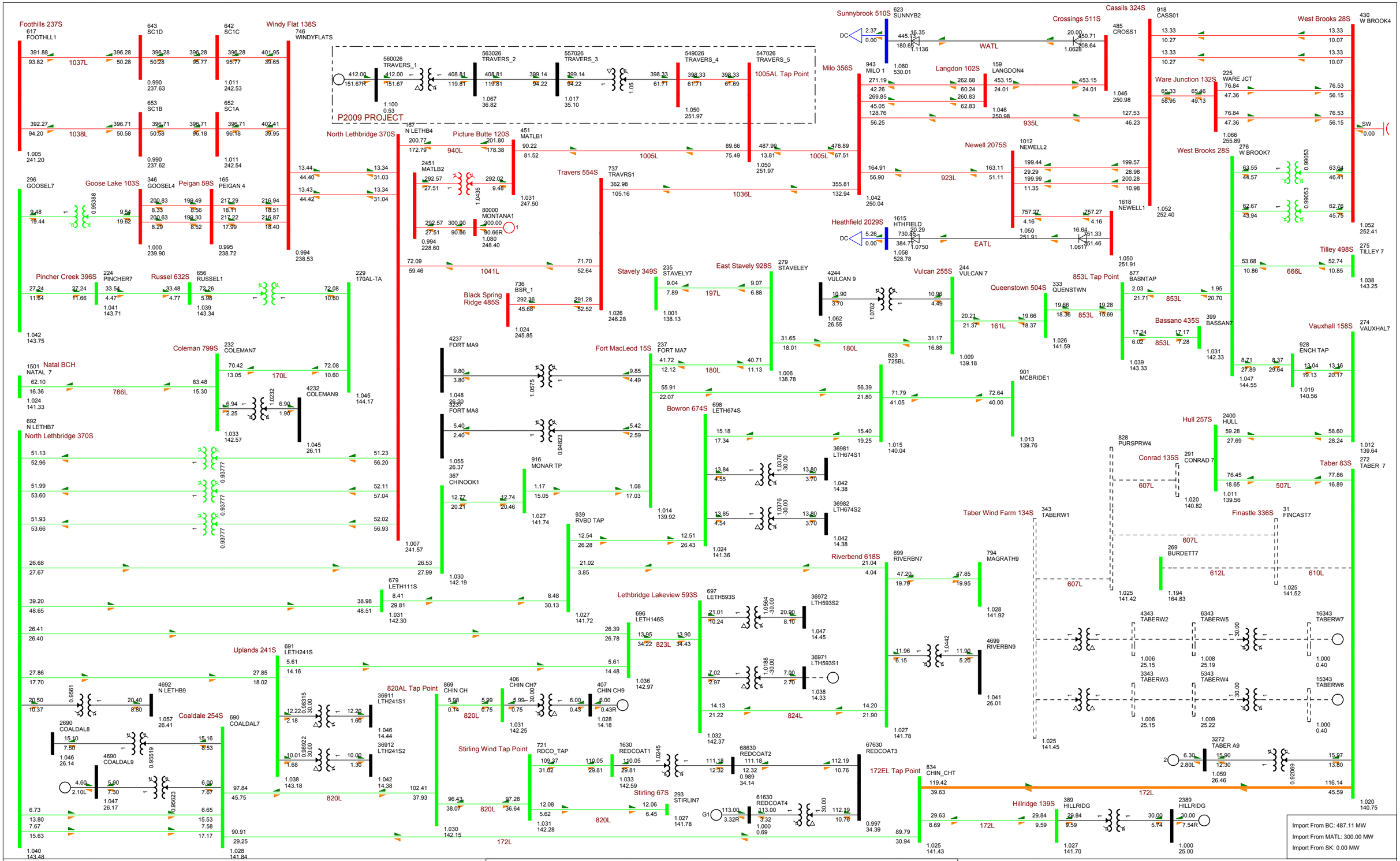
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-16: 2021 Summer Peak Post-Project
Category B - Contingency of 28ST2 (Transformer T2 in West Brooks 28S)

Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



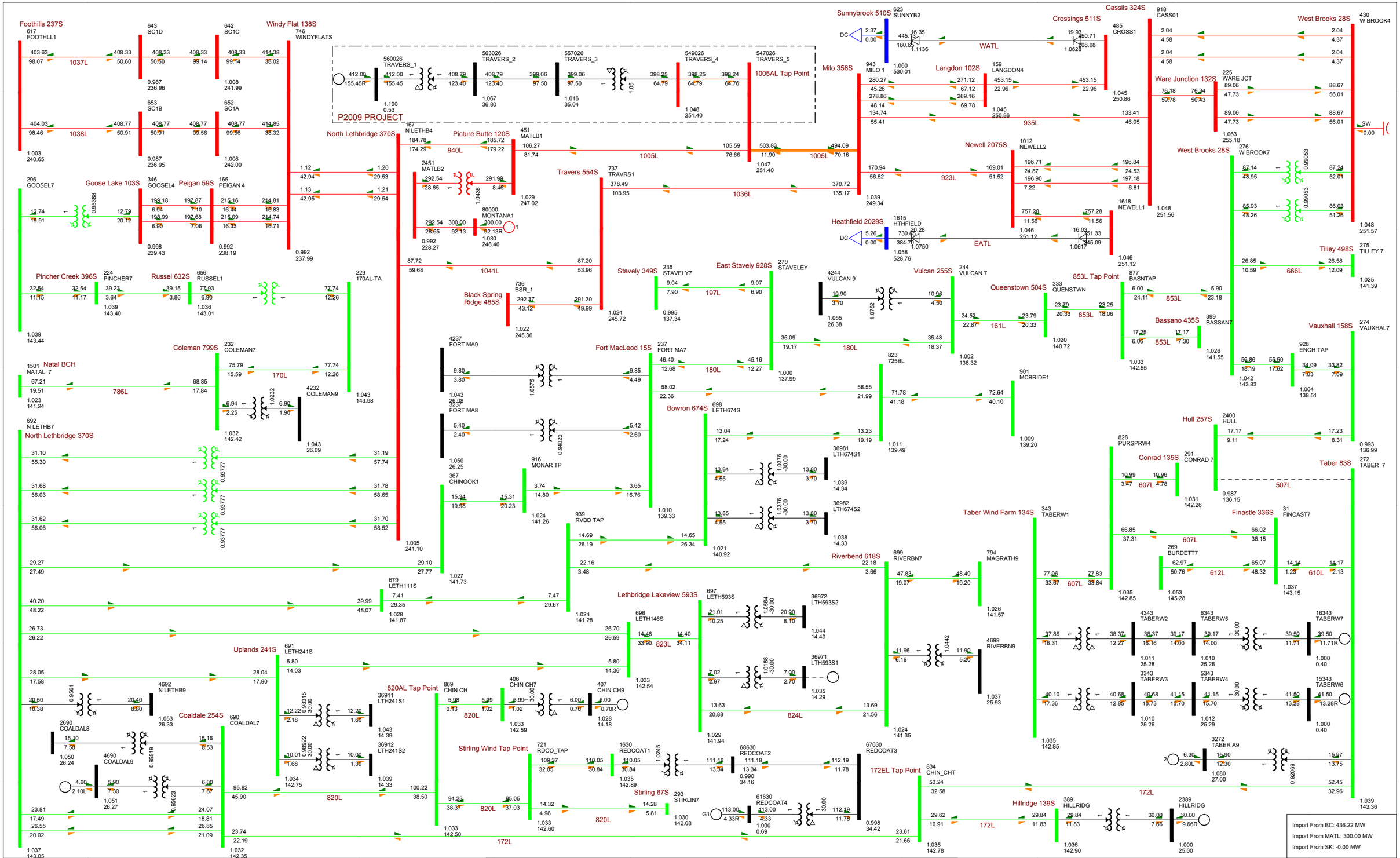
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-17: 2021 Summer Peak Post-Project
Category B - Contingency of 336ST1 (Transformer T1 in Fincastle 336S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

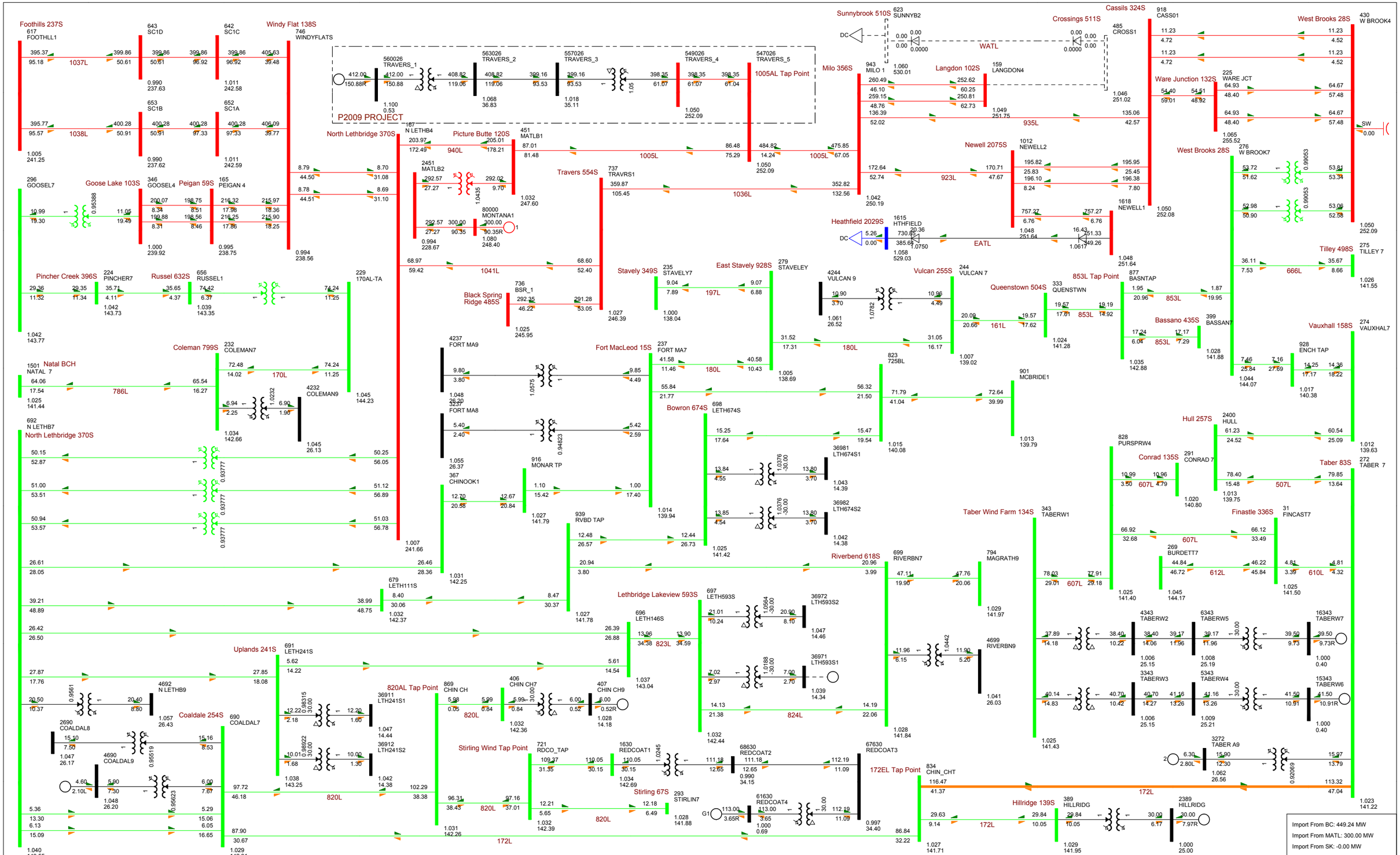
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-18: 2021 Summer Peak Post-Project
Category B - Contingency of 507L (Taber 83S - Hull 257S)

Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



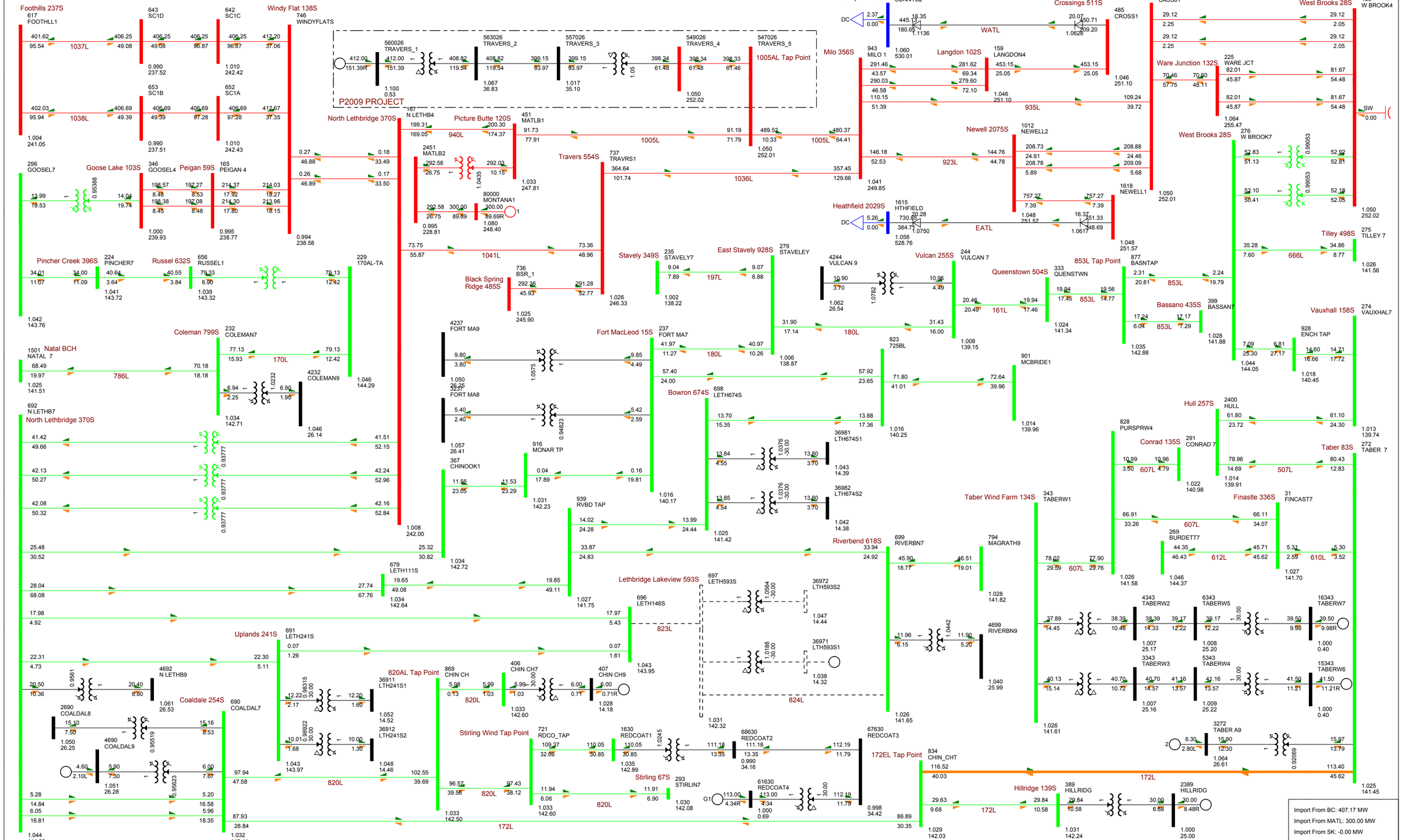
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-19: 2021 Summer Peak Post-Project
Category B - Contingency of WATL

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



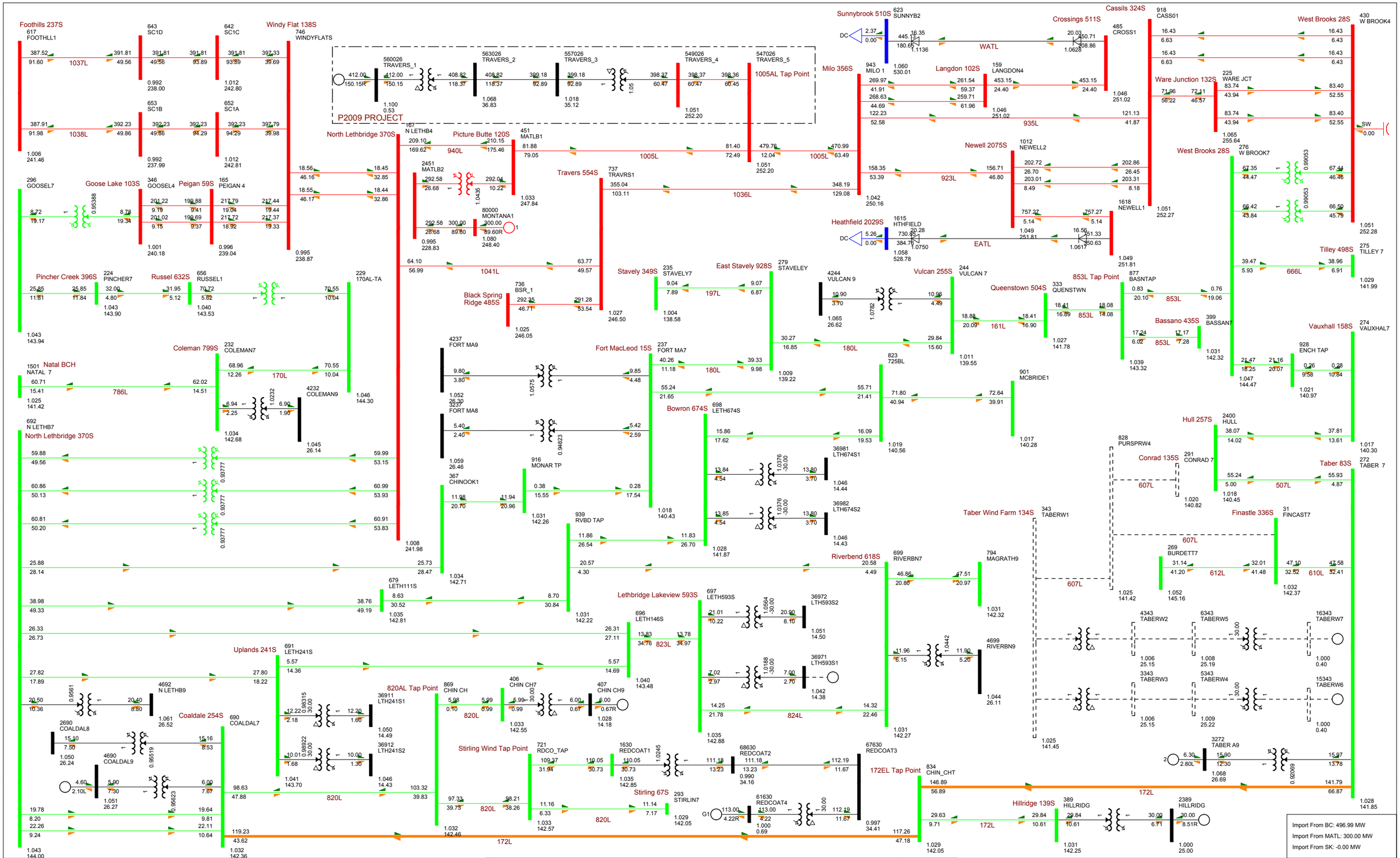
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-20: 2021 Summer Peak Post-Project
Category B - Contingency of 593ST1 (Transformer T1 in Lakeview 593S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

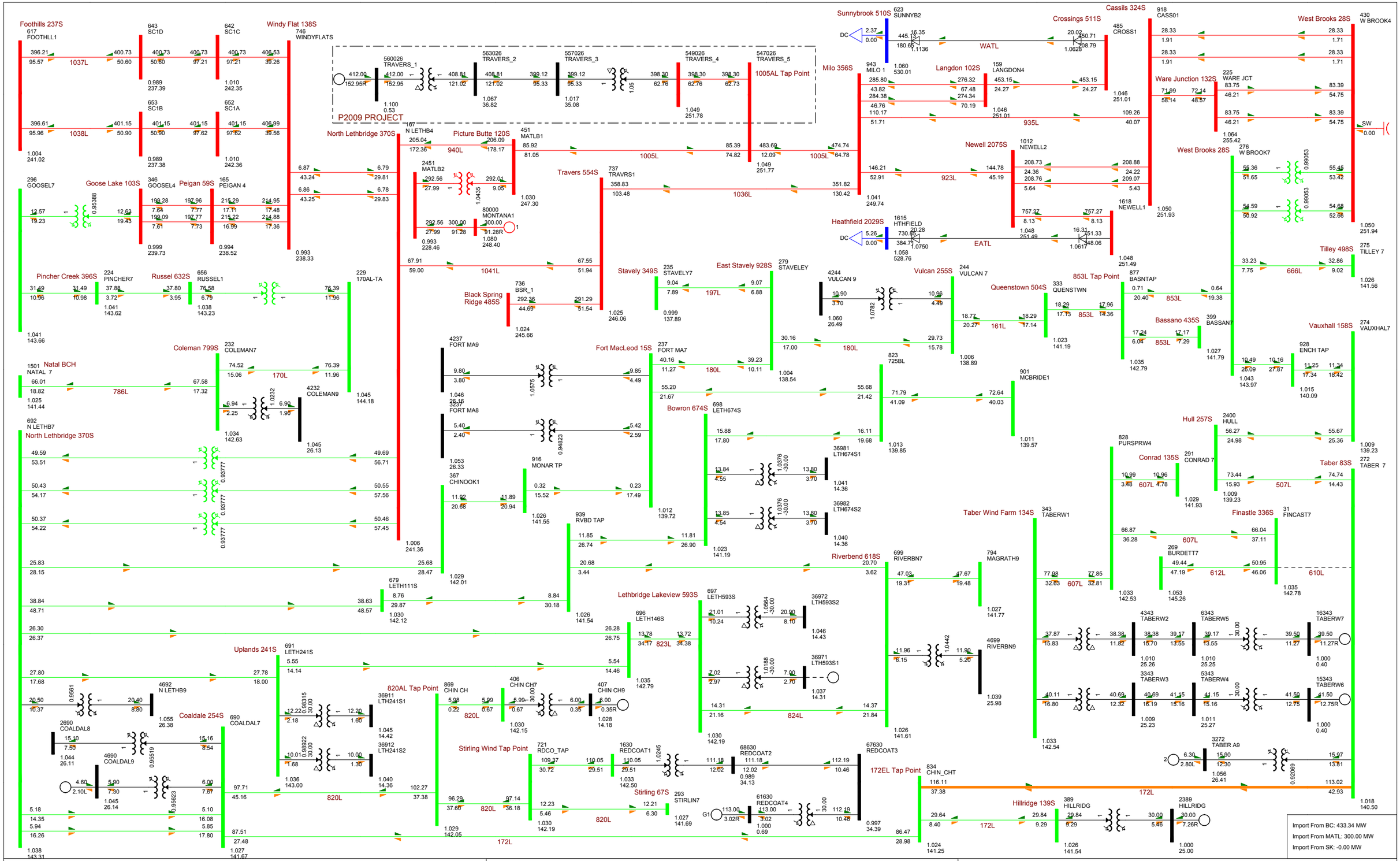
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-21: 2021 Summer Peak Post-Project
Category B - Contingency of 607L (Finastle 336S - Conrad 135S/Taber Wind Farm 134S)

Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



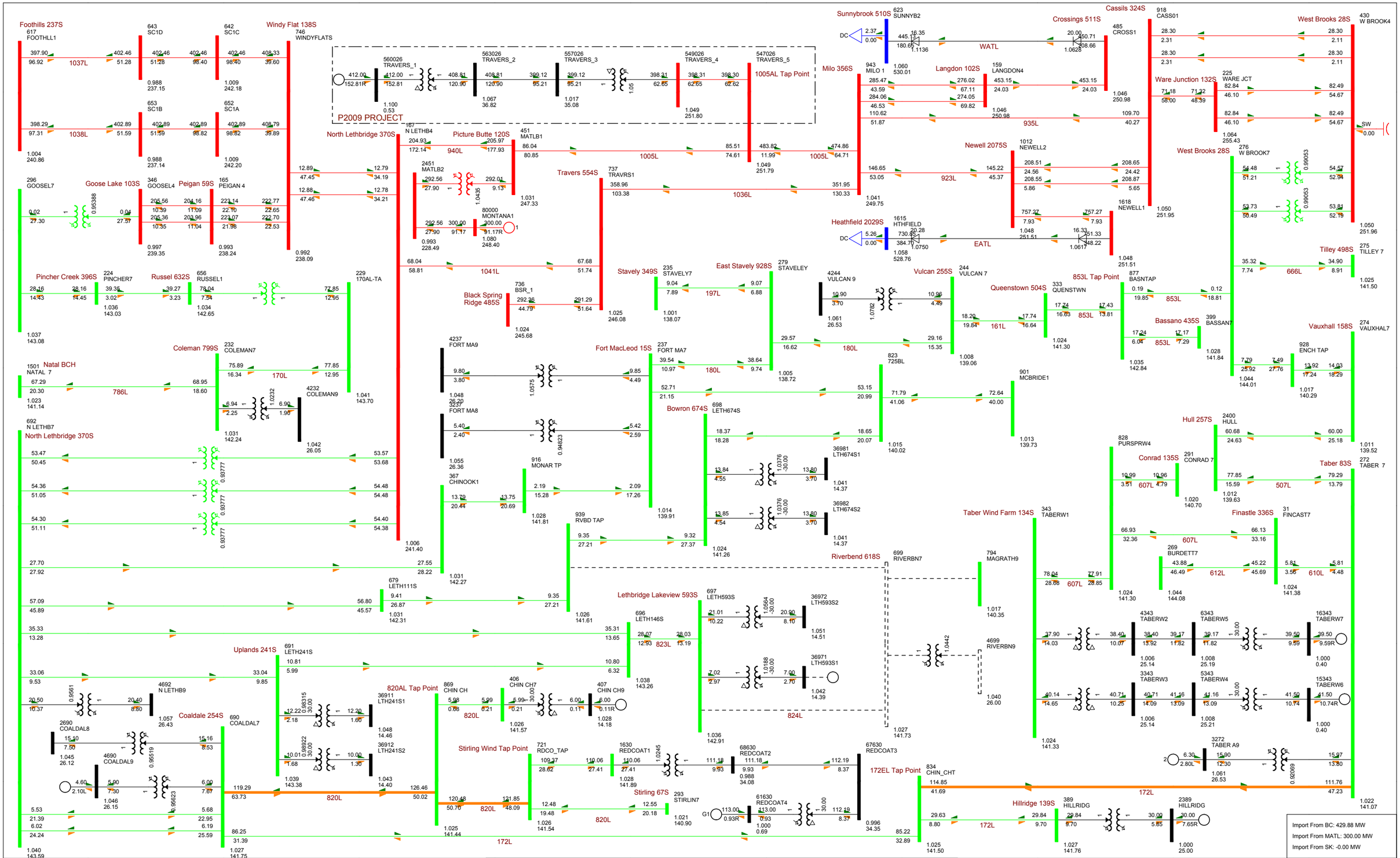
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-22: 2021 Summer Peak Post-Project
Category B - Contingency of 610L (Fincastle Sub 336S - Taber 83S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



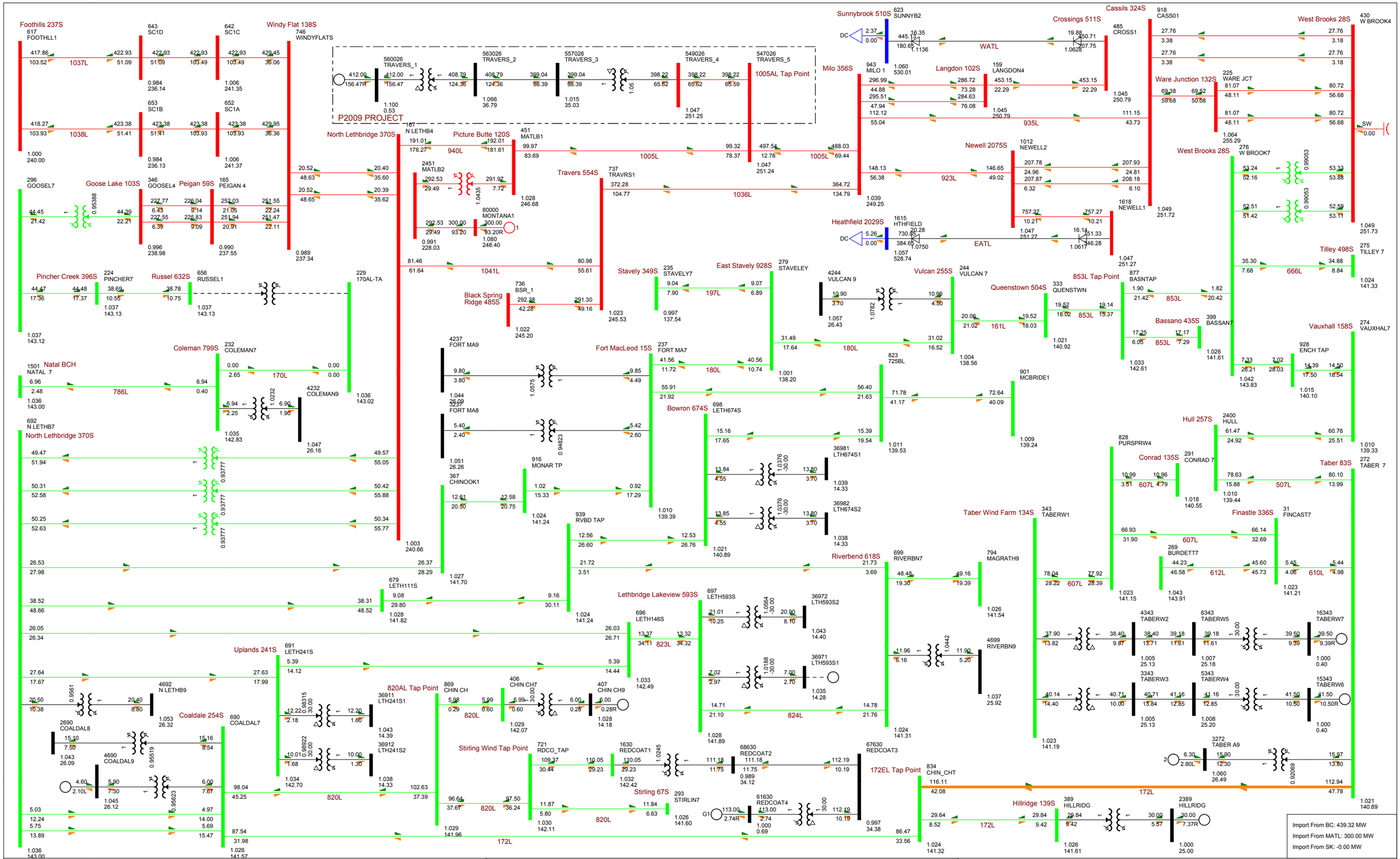
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-23: 2021 Summer Peak Post-Project
Category B - Contingency of 618ST1 (Transformer T1 in Riverbend 618S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

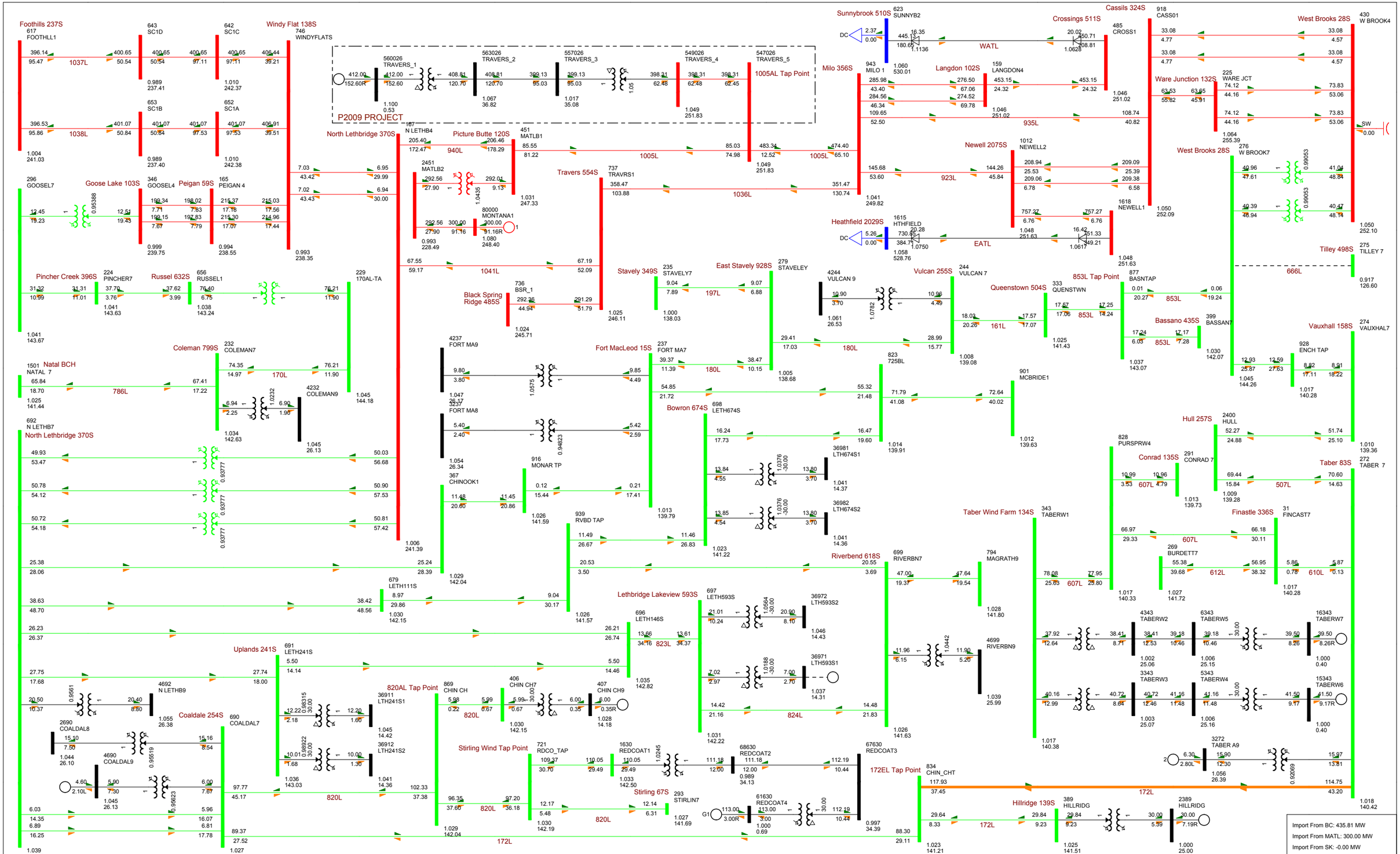
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-24: 2021 Summer Peak Post-Project
Category B - Contingency of 632PS (Phase Shifter PS in Russel 632S)

Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



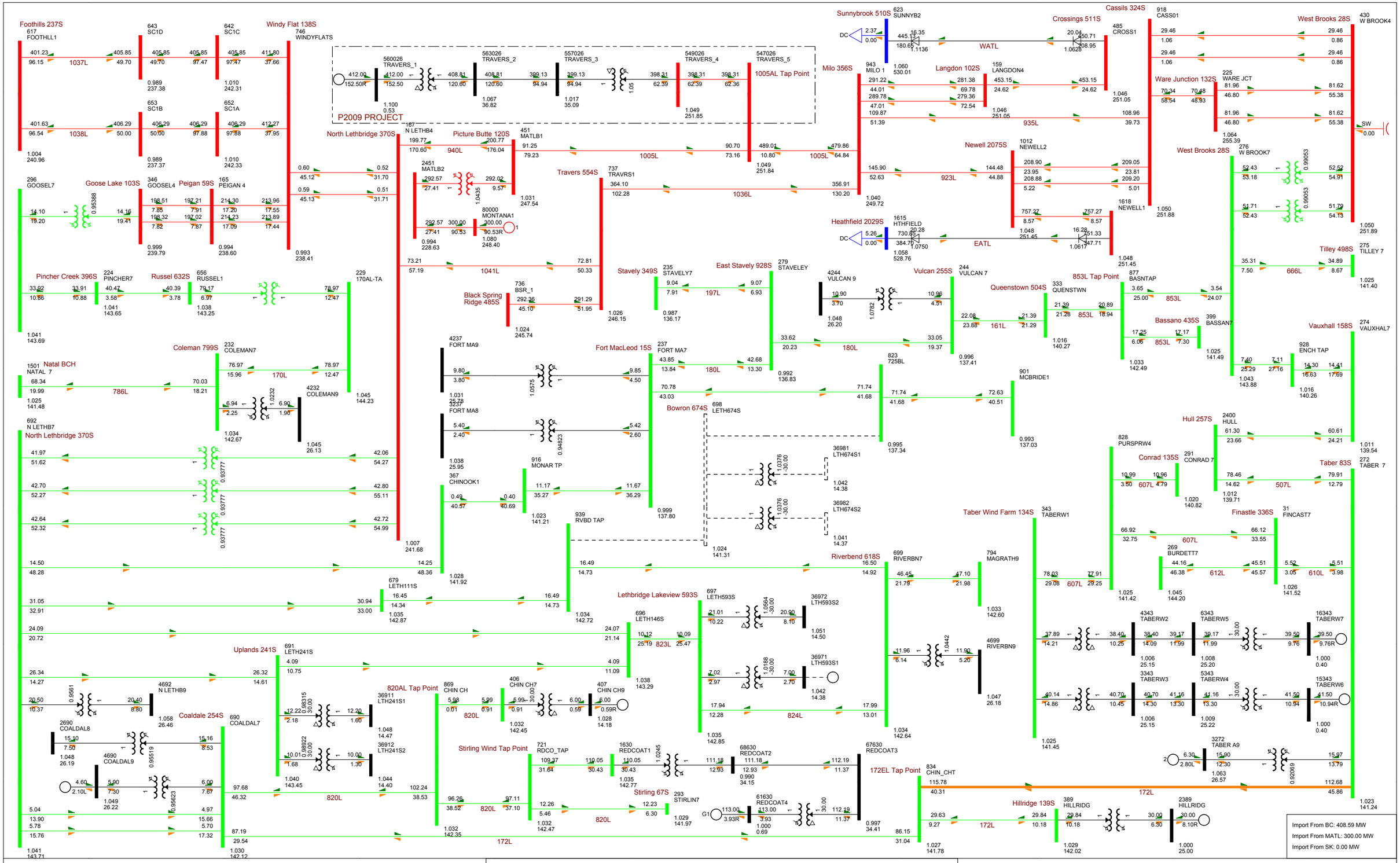
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-25: 2021 Summer Peak Post-Project
Category B - Contingency of 666L (Tilley 498S - West Brooks 28S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



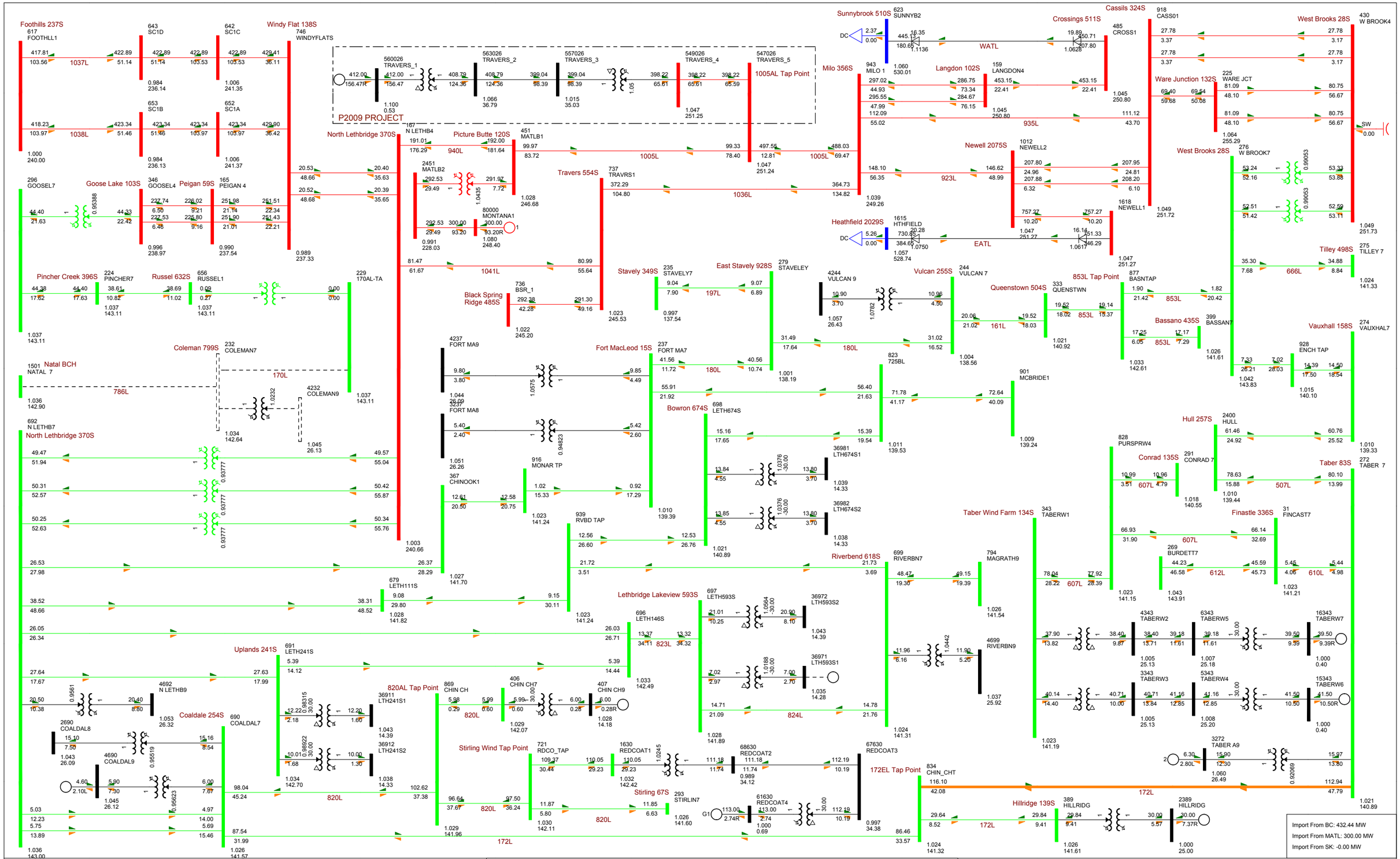
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-26: 2021 Summer Peak Post-Project
Category B - Contingency of 674ST1 (Transformer T1 in Bowron 674S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

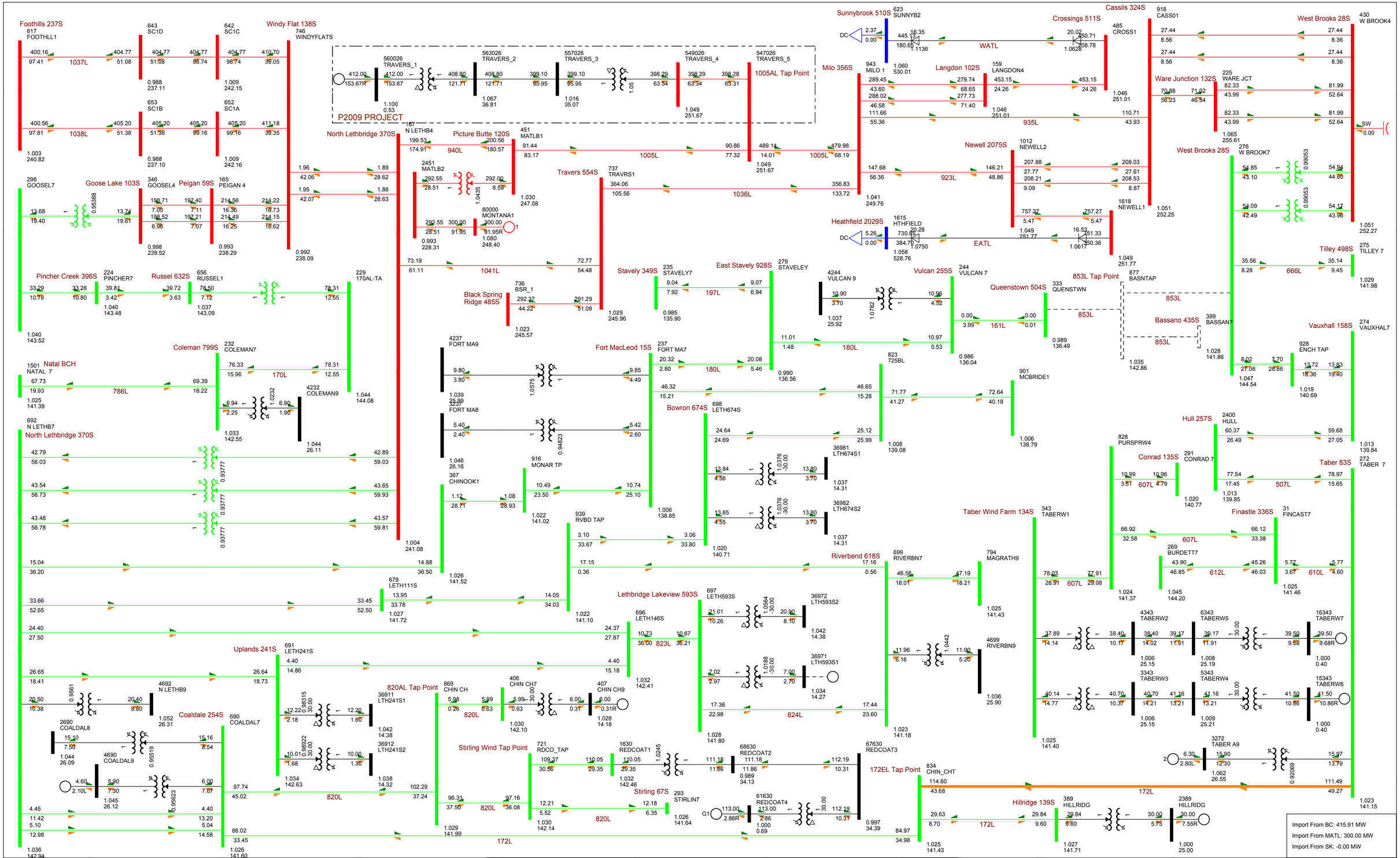
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-27: 2021 Summer Peak Post-Project
Category B - Contingency of 799ST1 (Transformer T1 in Coleman 799S)

Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



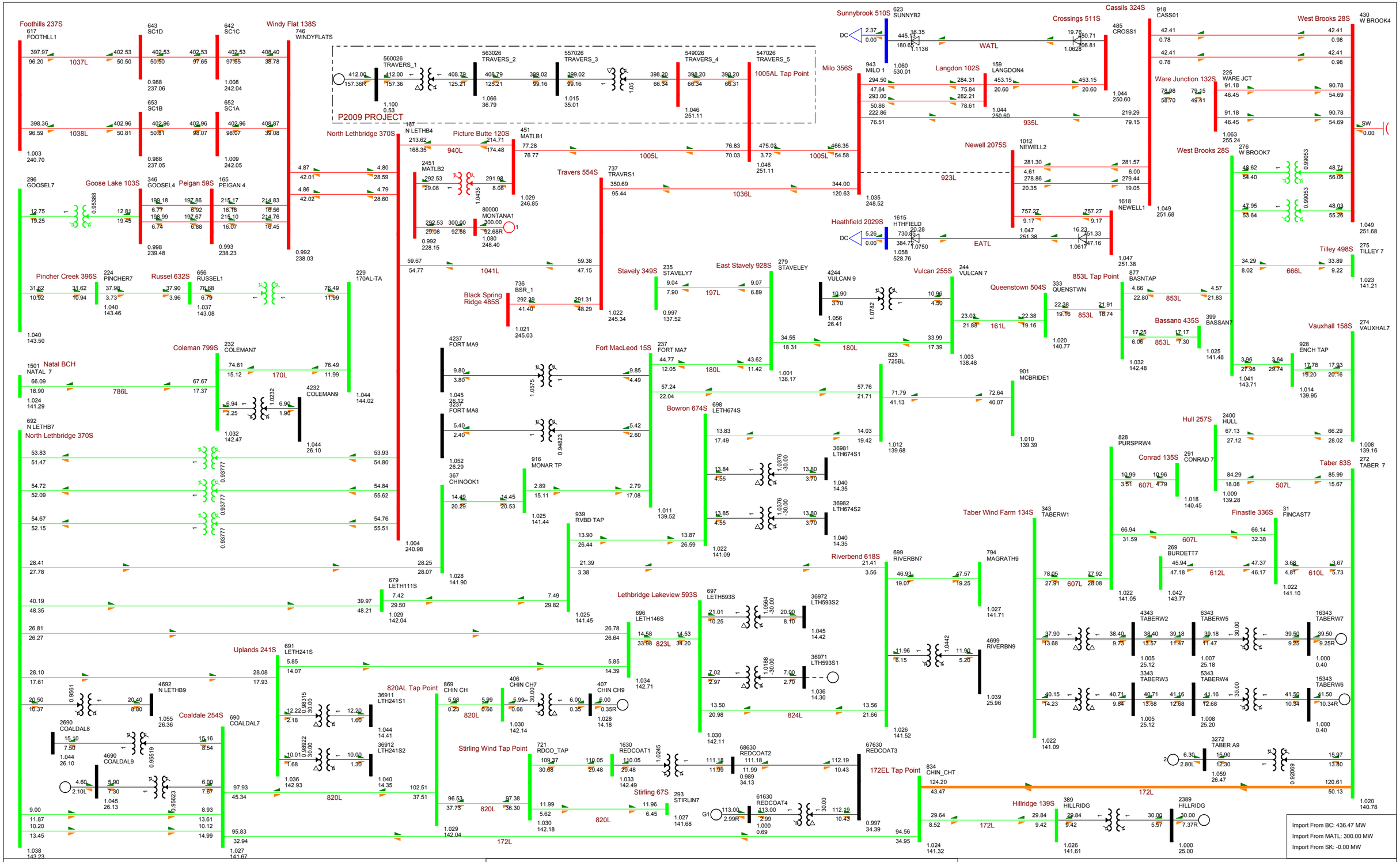
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-28: 2021 Summer Peak Post-Project
Category B - Contingency of 853L (Queenstown 504S - Bassano 435S/West Brooks 28S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



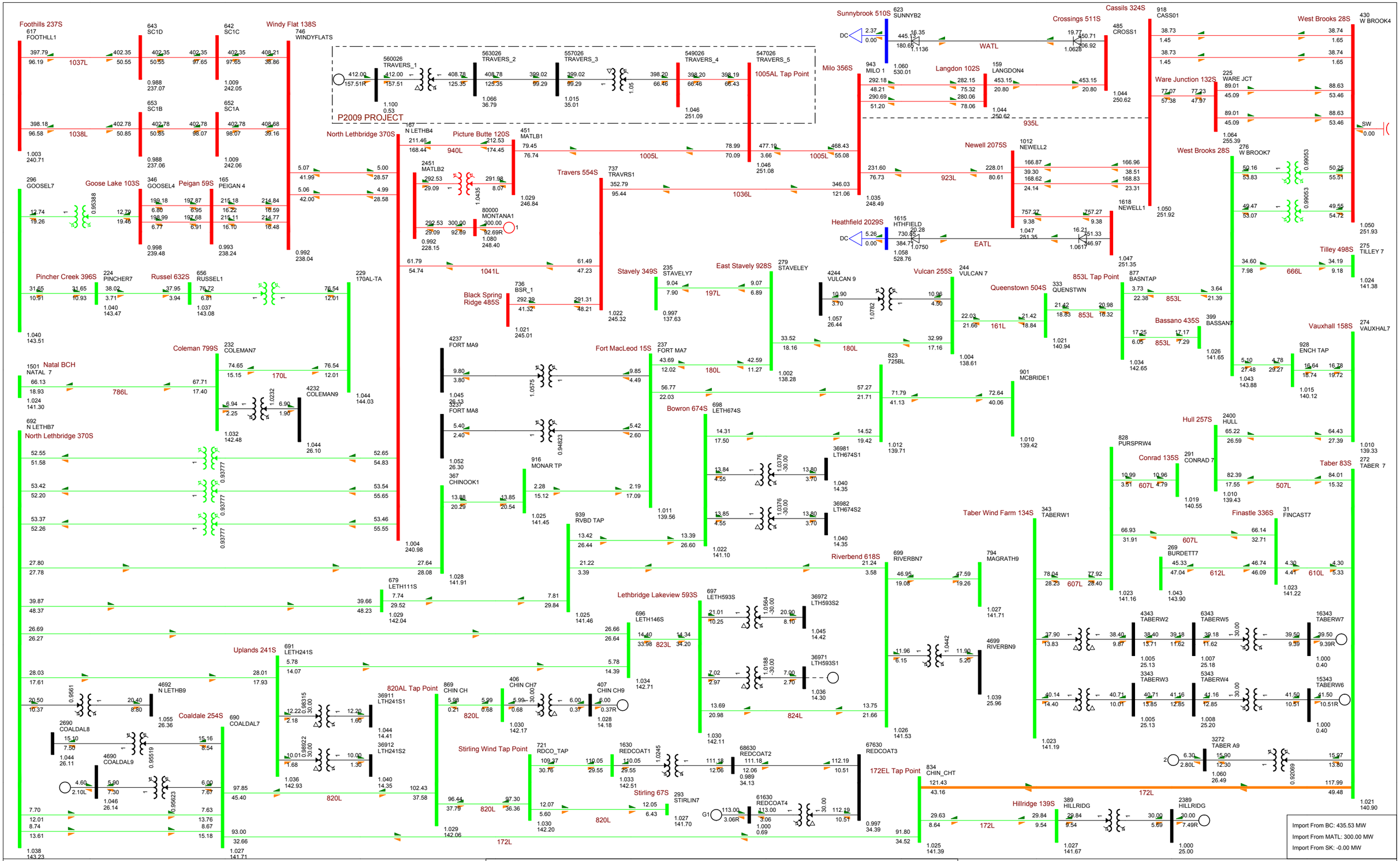
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-29: 2021 Summer Peak Post-Project
Category B - Contingency of 923L (356S Milo - Newell 2075S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

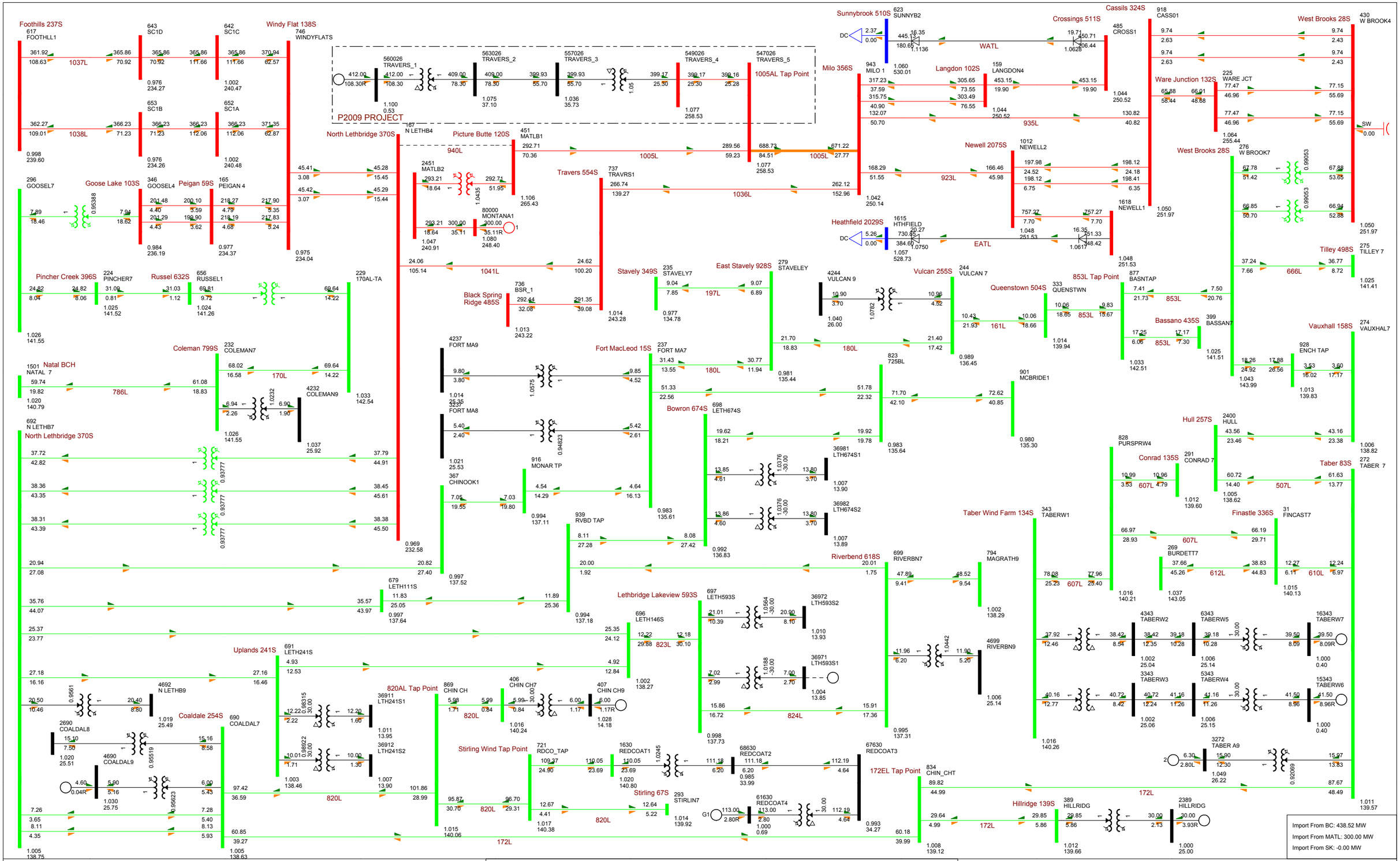
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-30: 2021 Summer Peak Post-Project
Category B - Contingency of 935L (Cassils 324S - Milo 356S)

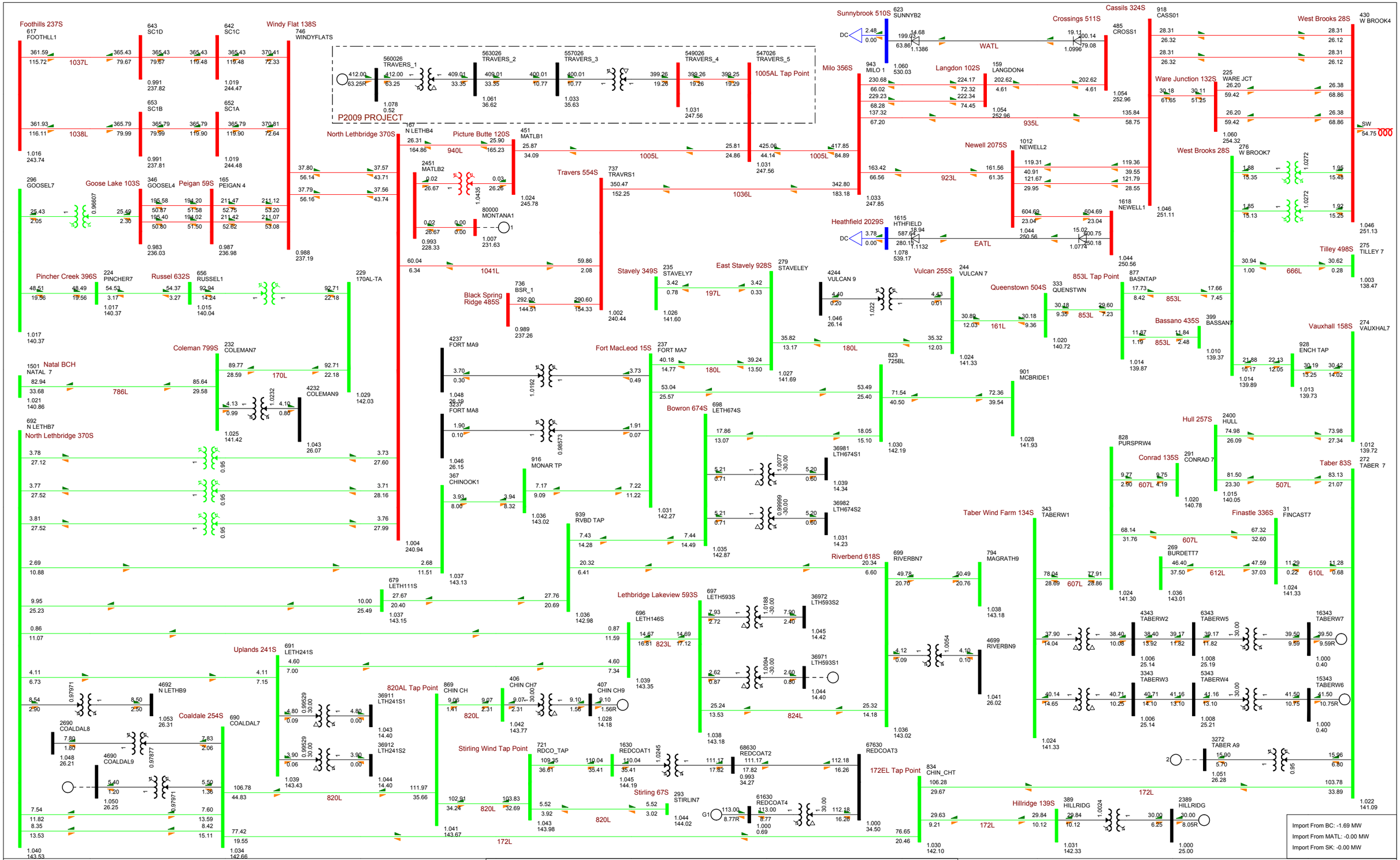
Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-31: 2021 Summer Peak Post-Project
Category B - Contingency of 940L (North Lethbridge 370S - Picture Butte 120S)

Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



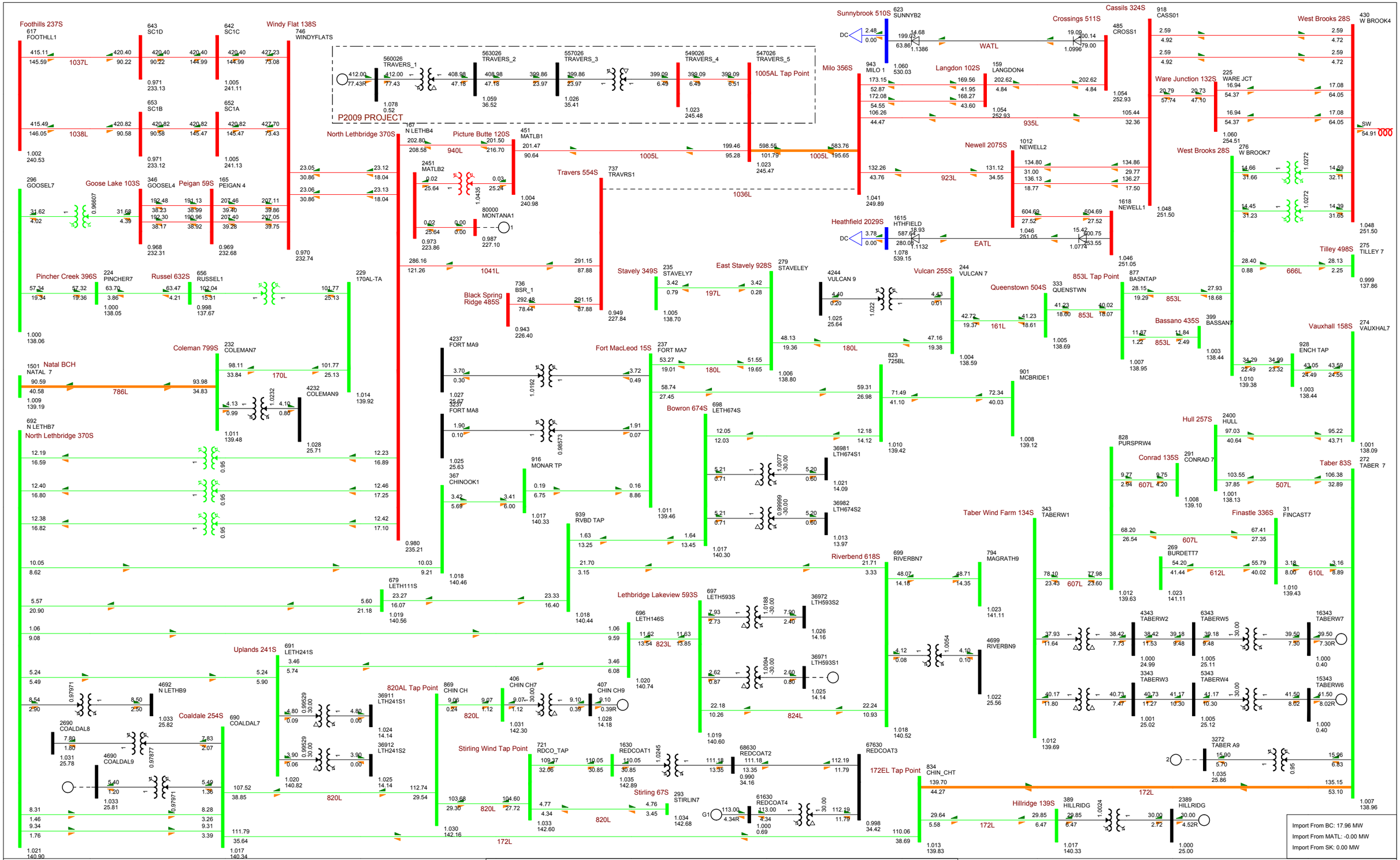
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-32: 2021 Summer Light Post-Project
Category A - No Contingency

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

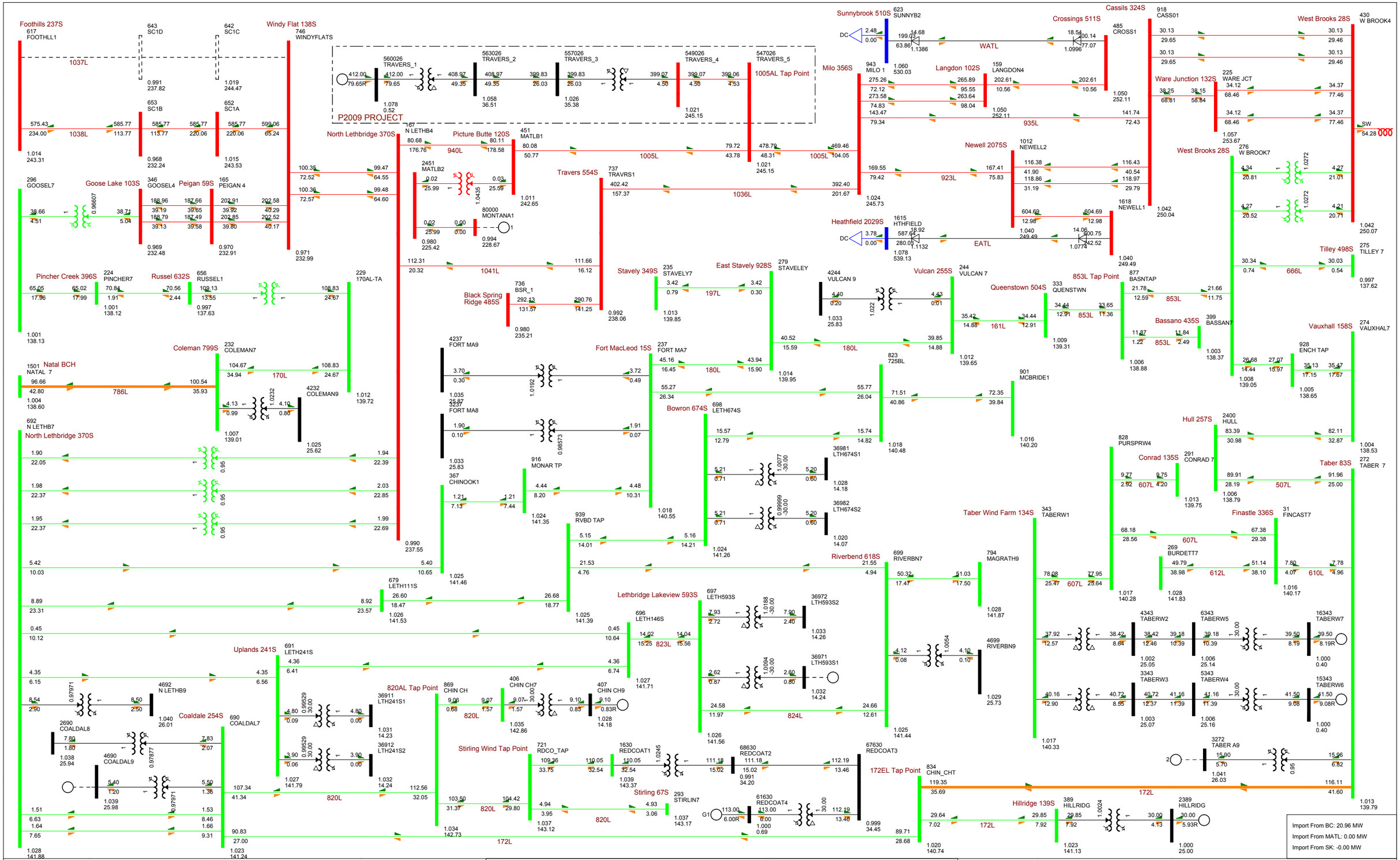
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-33: 2021 Summer Light Post-Project
Category B - Contingency of 1036L (Milo 356S - Travers 554S)

Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



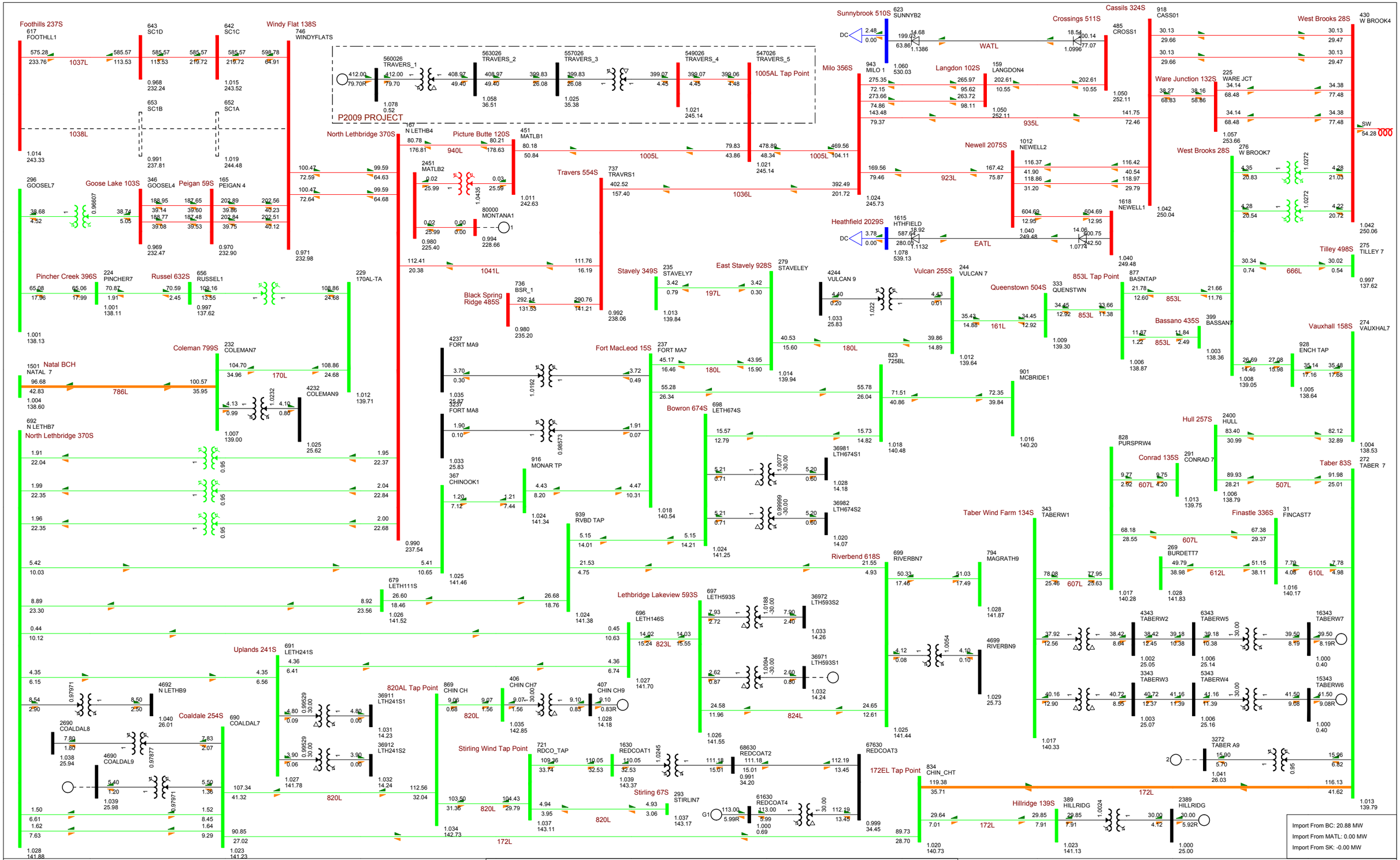
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-34: 2021 Summer Light Post-Project
Category B - Contingency of 1037L (Foothills 237S - Windy Flat 138S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



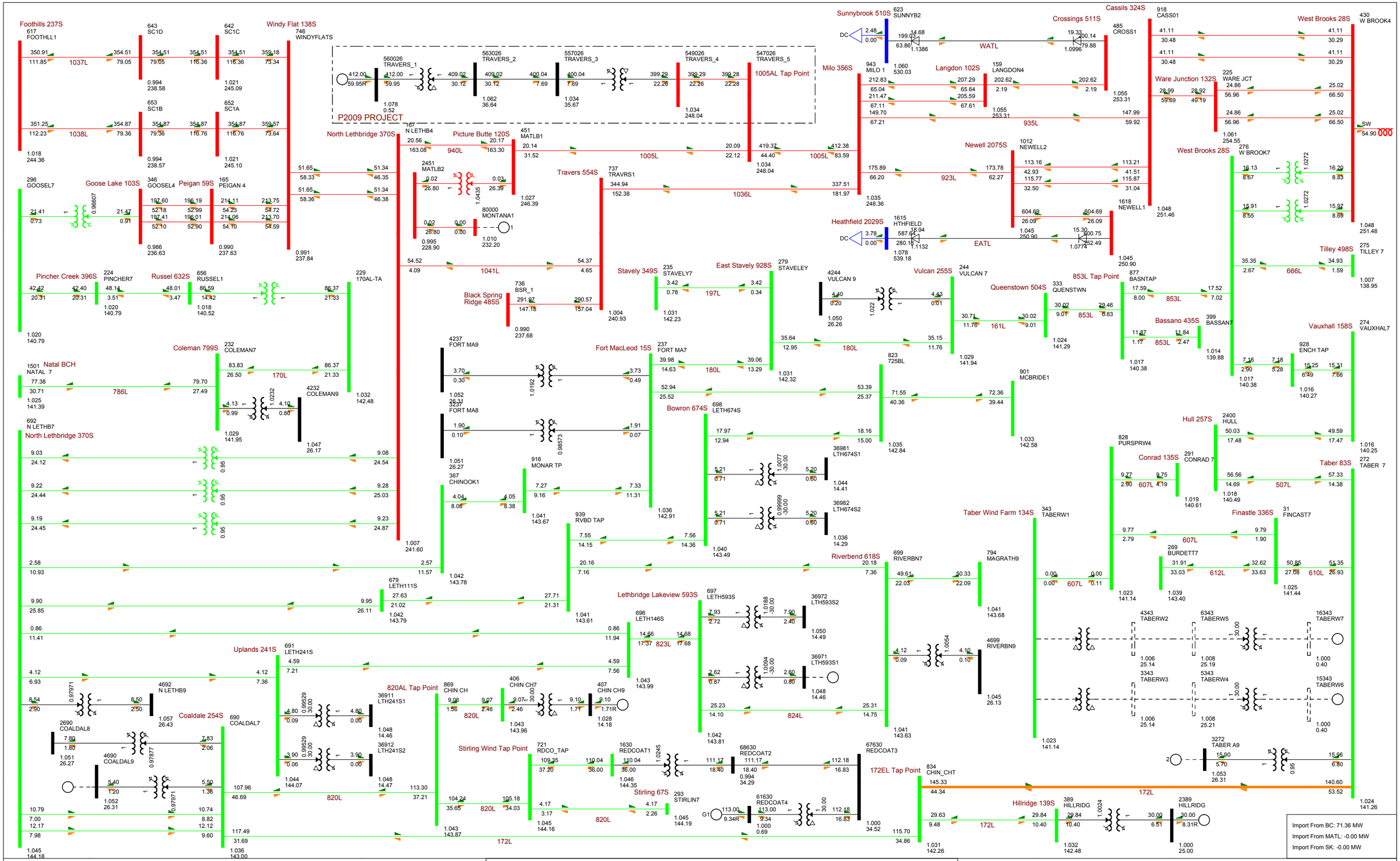
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-35: 2021 Summer Light Post-Project
Category B - Contingency of 1038L (Foothills 237S - Windy Flat 138S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



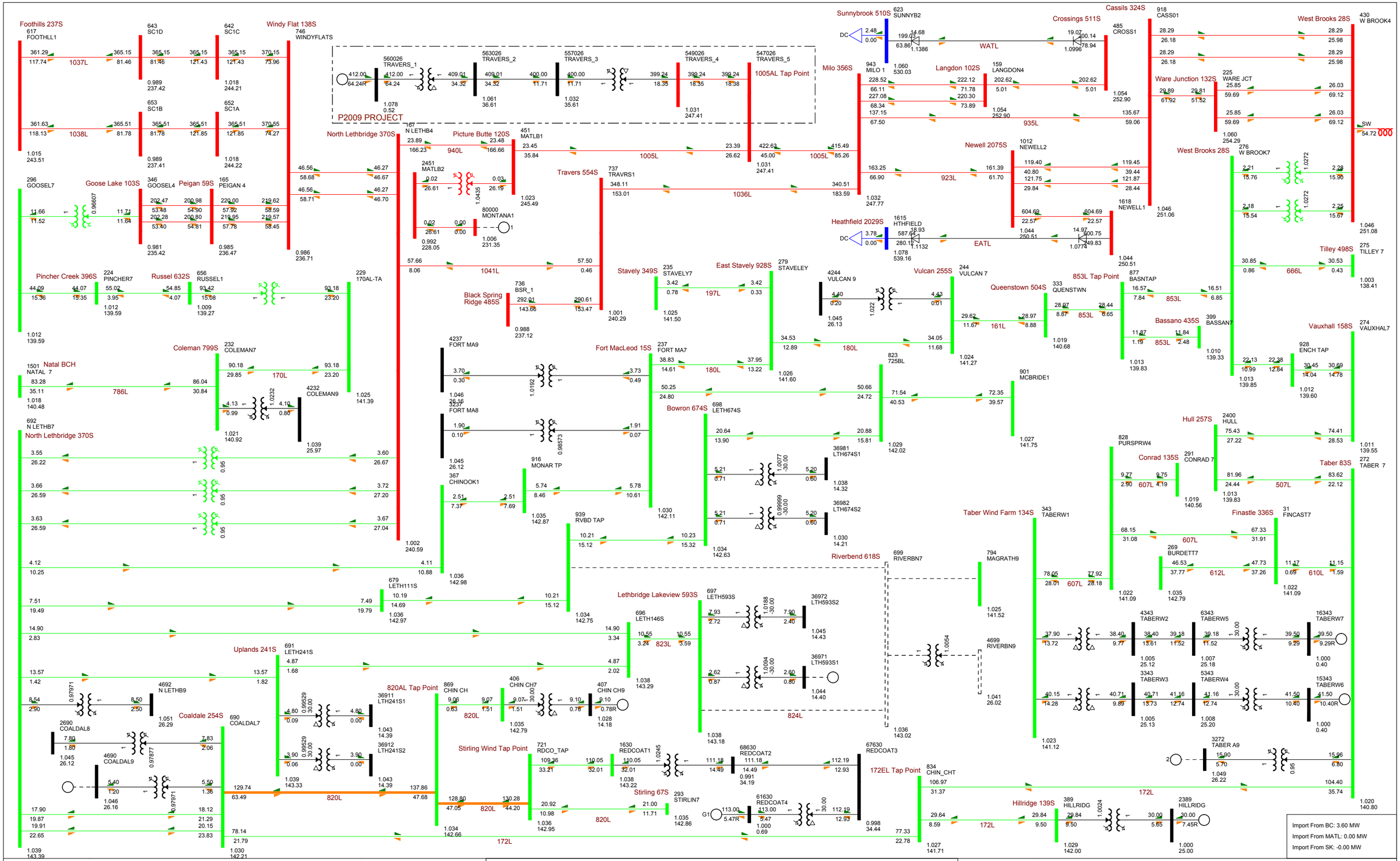
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-36: 2021 Summer Light Post-Project
Category B - Contingency of 134ST1 (Transformer T1 in Taber Wind Farm 134S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



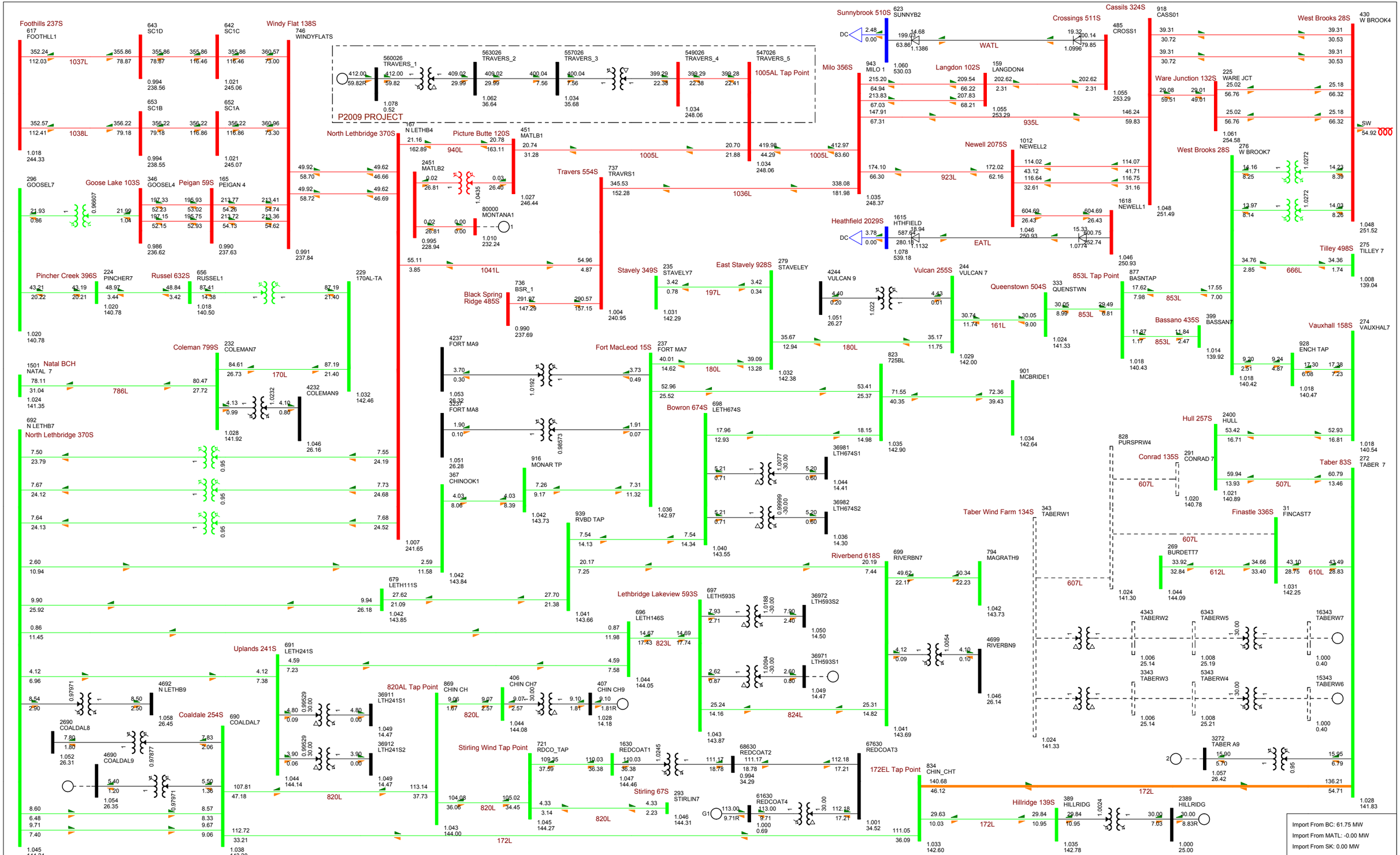
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-37: 2021 Summer Light Post-Project
Category B - Contingency of 618ST1 (Transformer T1 in Riverbend 618S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



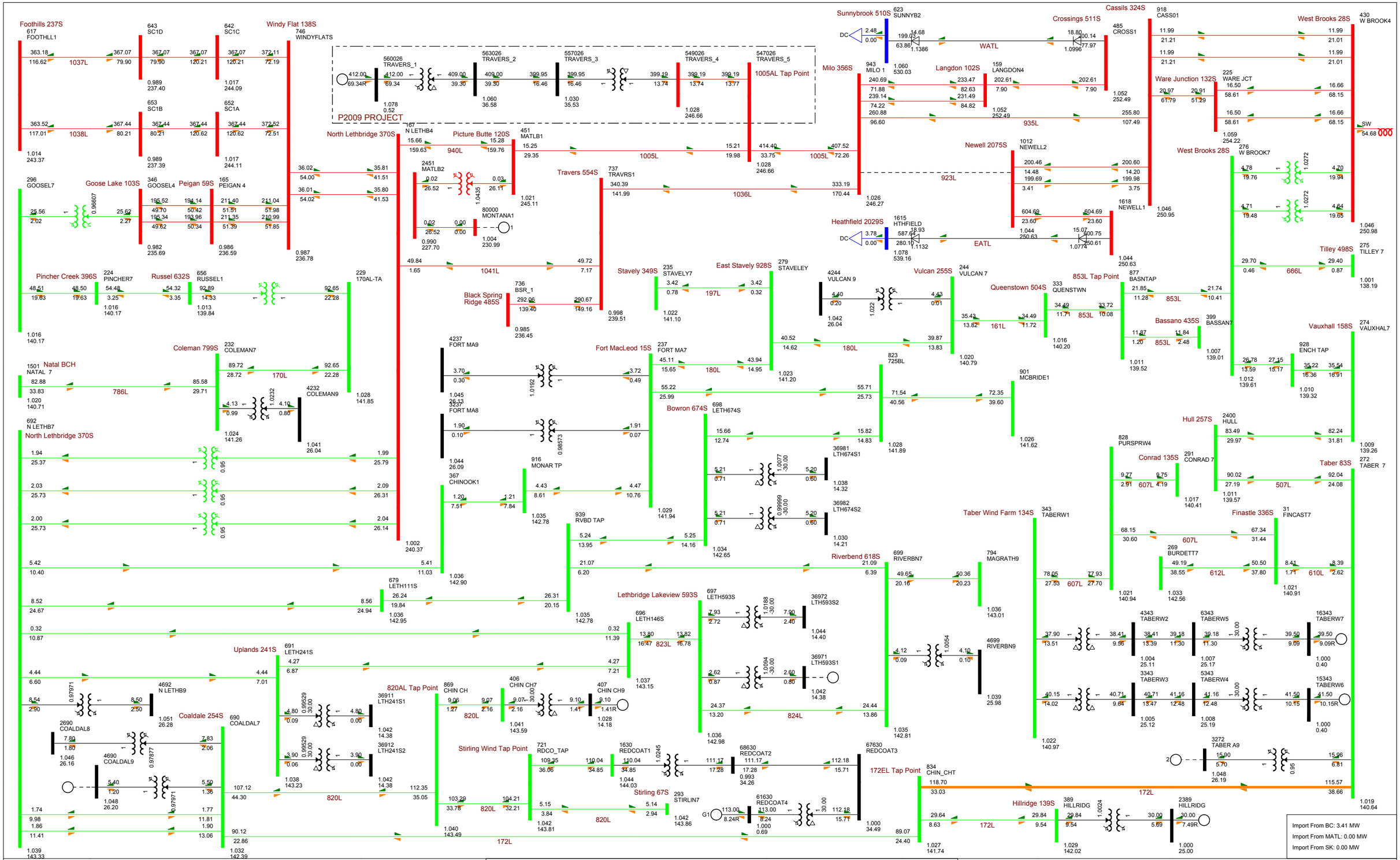
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-38: 2021 Summer Light Post-Project
Category B - Contingency of 607L (Finastle 336S - Conrad 135S/Taber Wind Farm 134S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A3-39: 2021 Summer Light Post-Project
Category B - Contingency of 923L (356S Milo - Newell 2075S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000

Attachment A4
Post-Project Transient Stability Diagrams

FIGURE A4-1: P2009_2021SP_POST
CATB-924L_FAULT_AT_MILO_356S

FILE: 924L-fault-Milo_356S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

TUE, JUN 11 2019 17:28
MACHINE VOLTAGE
TIME (SECONDS)

FIGURE A4-1: P2009_2021SP_POST
CATB-924L_FAULT_AT_MILO_356S

FILE: 924L-fault-Milo_356S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

TUE, JUN 11 2019 17:28
MACHINE MVAR
TIME (SECONDS)

FIGURE A4-1: P2009_2021SP_POST
CATB-924L_FAULT_AT_MILO_356S

FILE: 924L-fault-Milo_356S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

TUE, JUN 11 2019 17:28
MACHINE ANGEL
TIME (SECONDS)

FIGURE A4-1: P2009_2021SP_POST
CATB-924L_FAULT_AT_MILO_356S

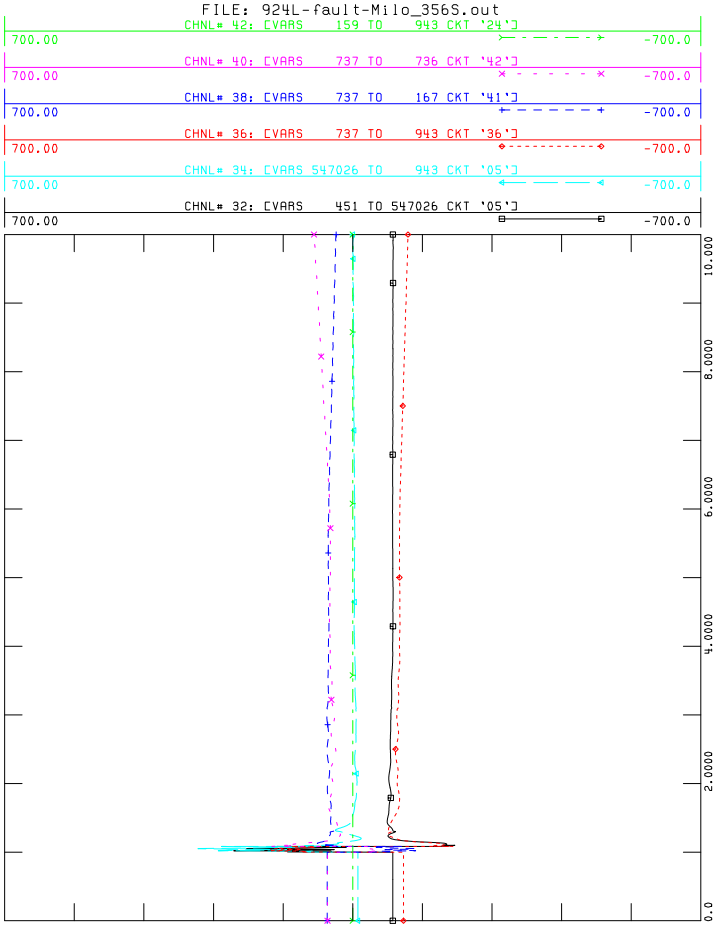
FILE: 924L-fault-Milo_356S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

TUE, JUN 11 2019 17:28
MACHINE MW
TIME (SECONDS)

FIGURE A4-1: P2009_2021SP_POST
CATB-924L_FAULT_AT_MILO_356S

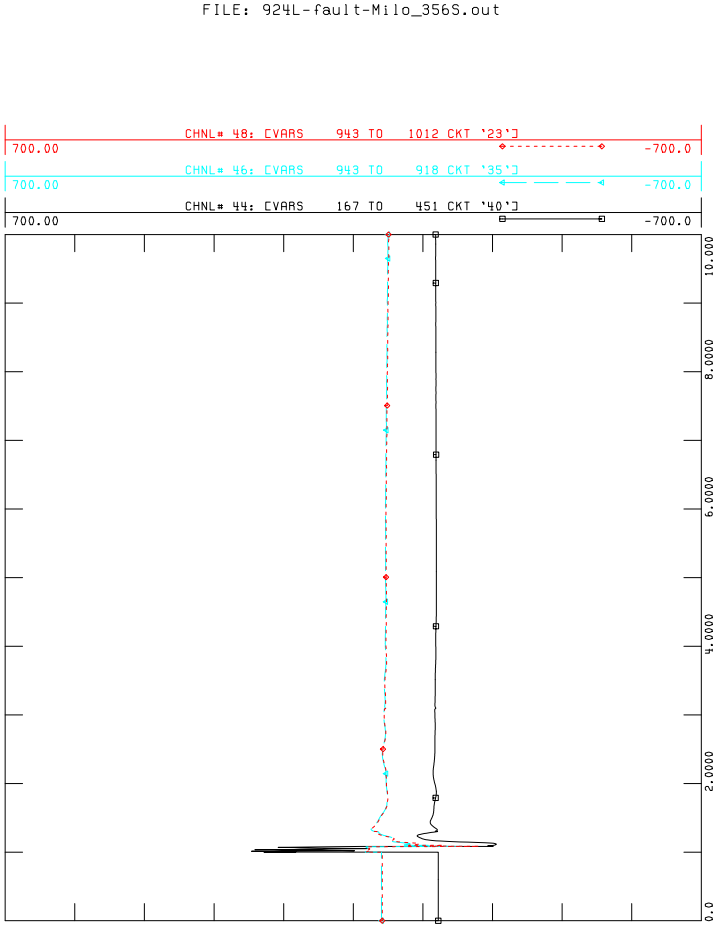
FILE: 924L-fault-Milo_356S.out



TUE, JUN 11 2019 17:28
LINE MVAR

FIGURE A4-1: P2009_2021SP_POST
CATB-924L_FAULT_AT_MILO_356S

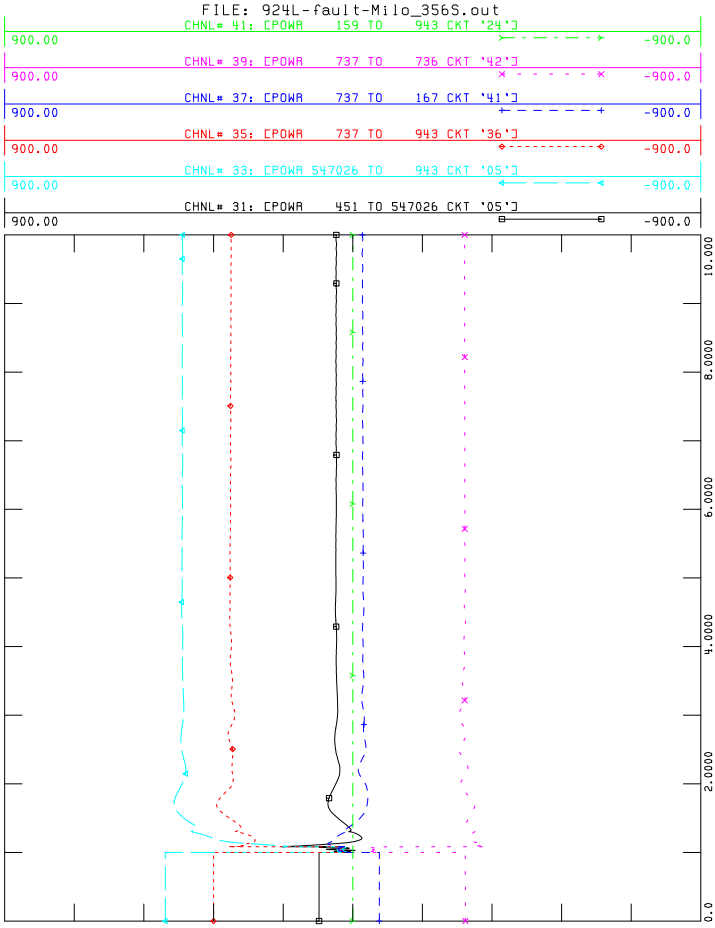
FILE: 924L-fault-Milo_356S.out



TUE, JUN 11 2019 17:28
LINE MVAR

FIGURE A4-1: P2009_2021SP_POST
CATB-924L_FAULT_AT_MILO_356S

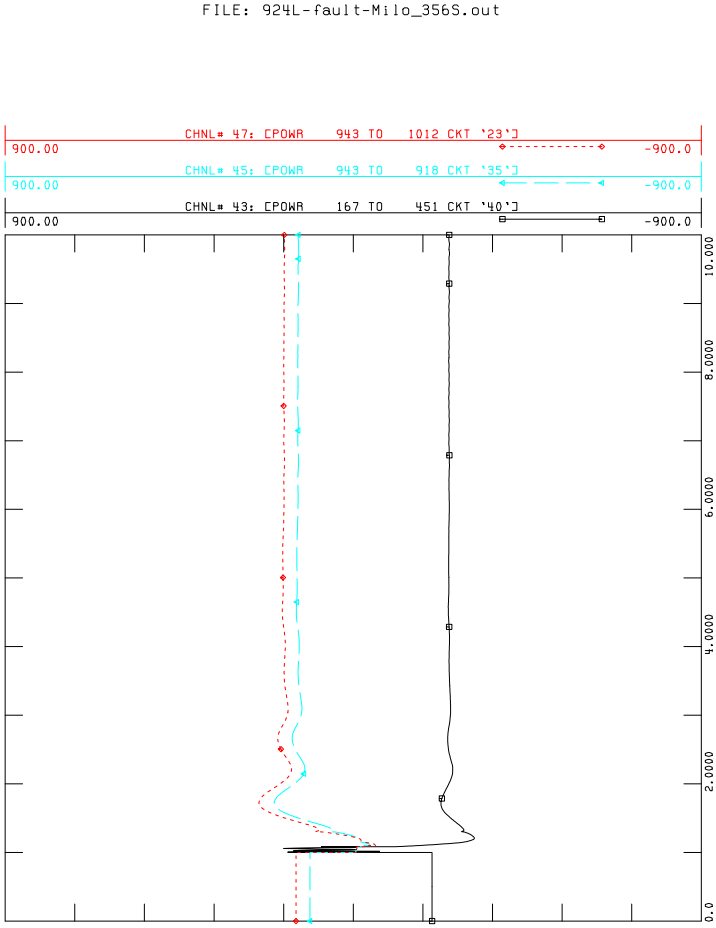
FILE: 924L-fault-Milo_356S.out



TUE, JUN 11 2019 17:28
LINE MW

FIGURE A4-1: P2009_2021SP_POST
CATB-924L_FAULT_AT_MILO_356S

FILE: 924L-fault-Milo_356S.out



TUE, JUN 11 2019 17:28
LINE MW

FIGURE A4-1: P2009_2021SP_POST
CATB-924L_FAULT_AT_MILO_356S

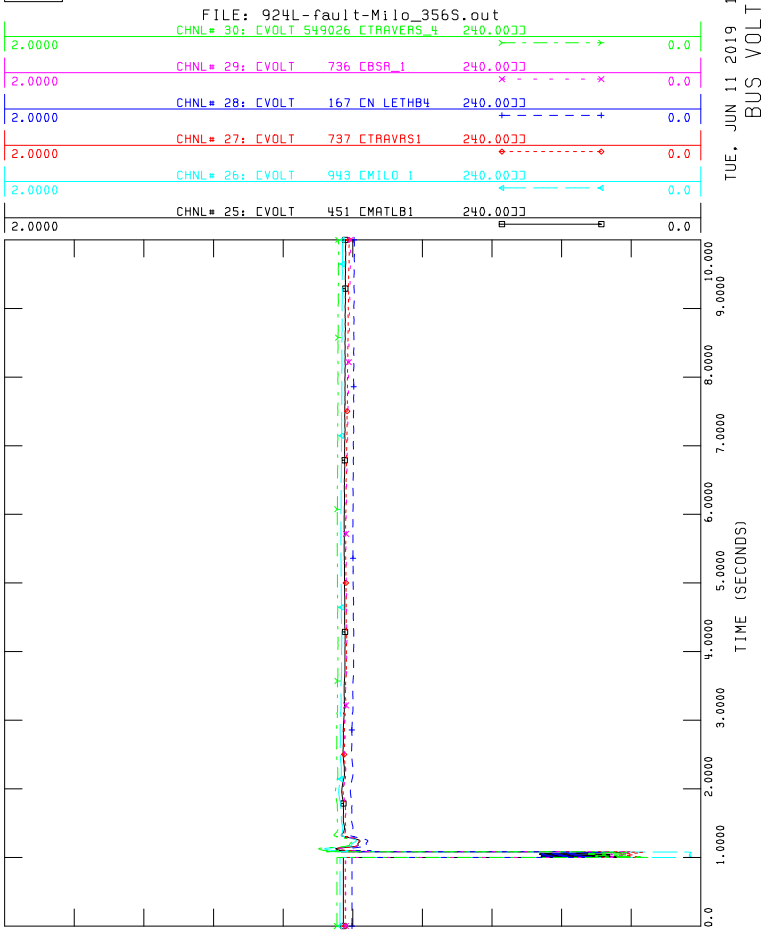


FIGURE A4-2: P2009_2021SP_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

TUE, JUN 11 2019 17:31

MACHINE VOLTAGE

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

2.0000 / 0.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

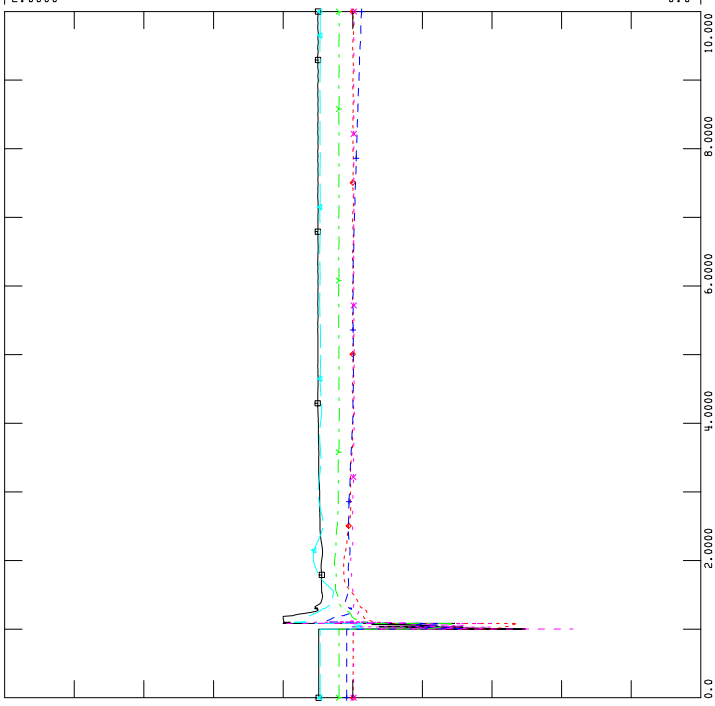


FIGURE A4-2: P2009_2021SP_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

TUE, JUN 11 2019 17:31

MACHINE MVAR

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

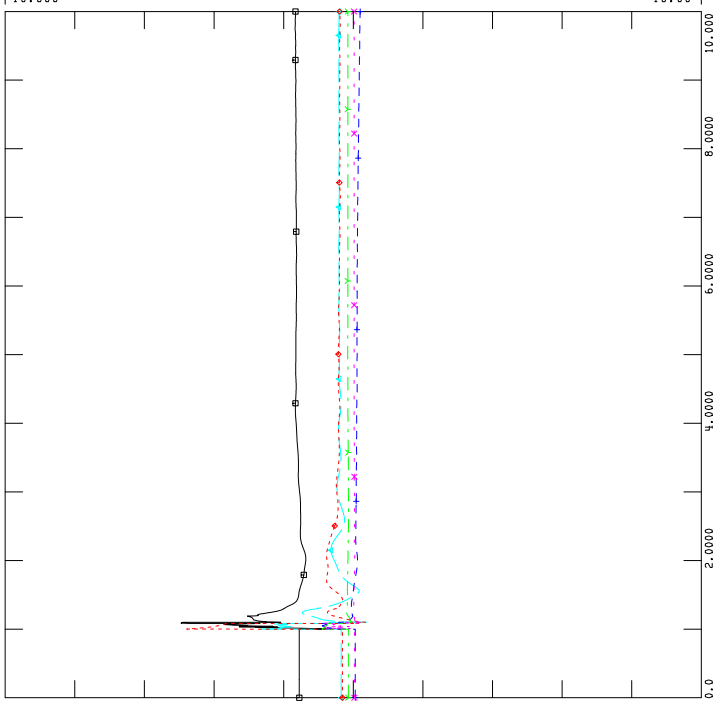


FIGURE A4-2: P2009_2021SP_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

TUE, JUN 11 2019 17:31

MACHINE ANGEL

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

100.00 / -100.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

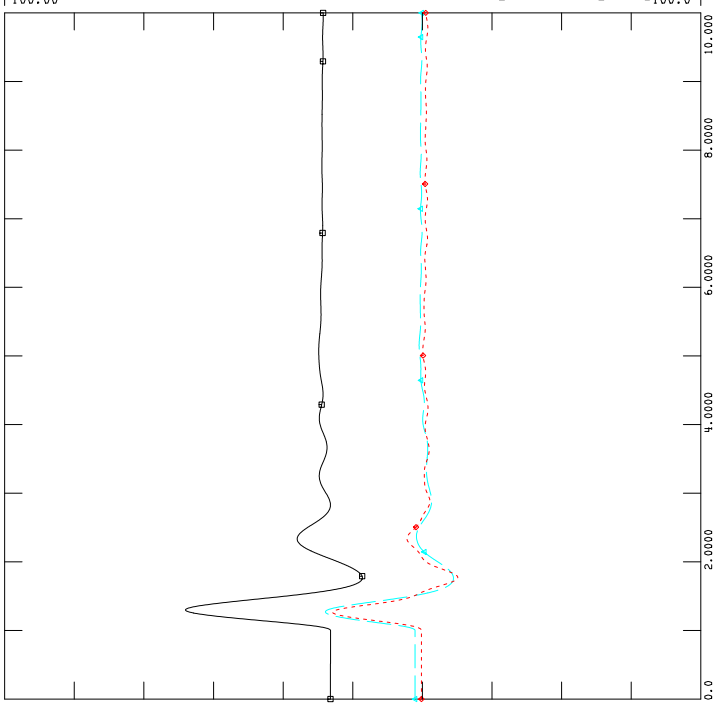


FIGURE A4-2: P2009_2021SP_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

TUE, JUN 11 2019 17:31

MACHINE MW

CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

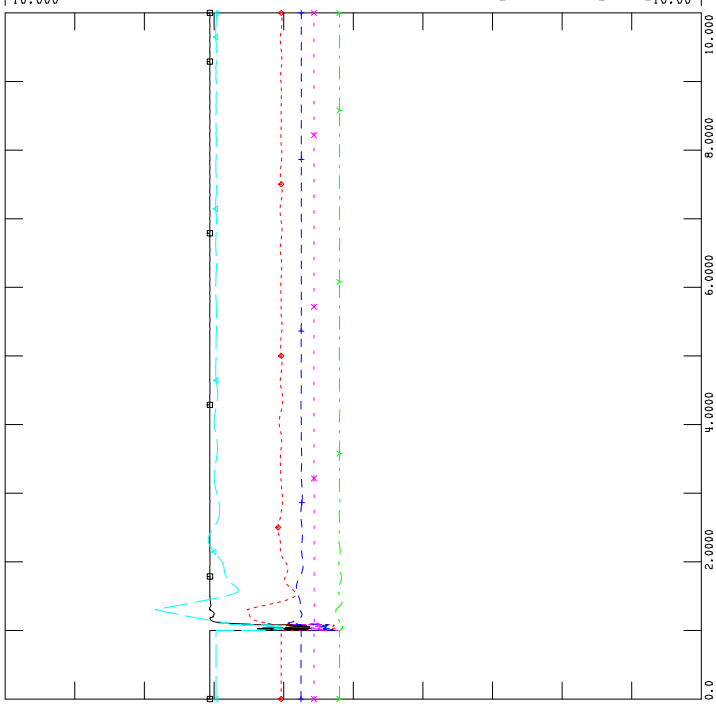


FIGURE A4-2: P2009_2021SP_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

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LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-2: P2009_2021SP_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TUE, JUN 11 2019 17:31
LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-2: P2009_2021SP_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TUE, JUN 11 2019 17:31
LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-2: P2009_2021SP_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TUE, JUN 11 2019 17:31
LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-2: P2009_2021SP_POST
CATB-924L_FAULT_AT_LANGDON_102S

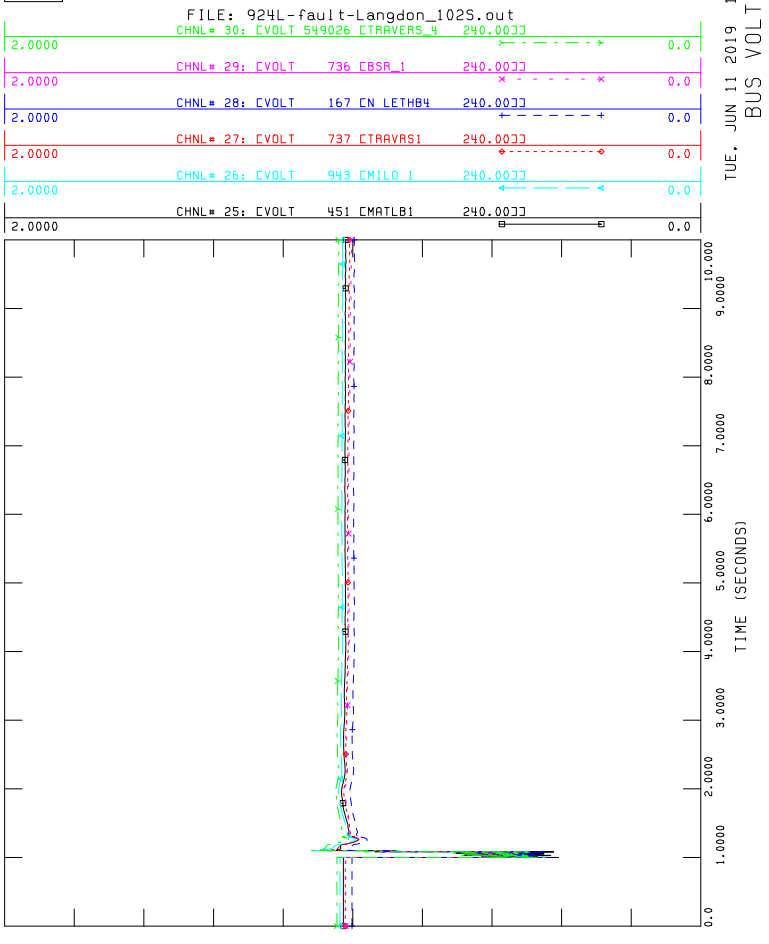

FIGURE A4-3: P2009_2021SP_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800ǃ1ǃ
CHNL# 23: CETRM 61630CREDCOAT4 0.6900ǃG1ǃ
CHNL# 22: CETRM 61736CBSR_4 0.6900ǃ1ǃ
CHNL# 21: CETRM 773CSECST 20.000ǃ1ǃ
CHNL# 20: CETRM 1482CSHEER 1 19.000ǃ1ǃ
CHNL# 19: CETRM560026CTRAVERS_1 0.4800ǃPVǃ

2.0000 / 0.0

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MACHINE VOLTAGE

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

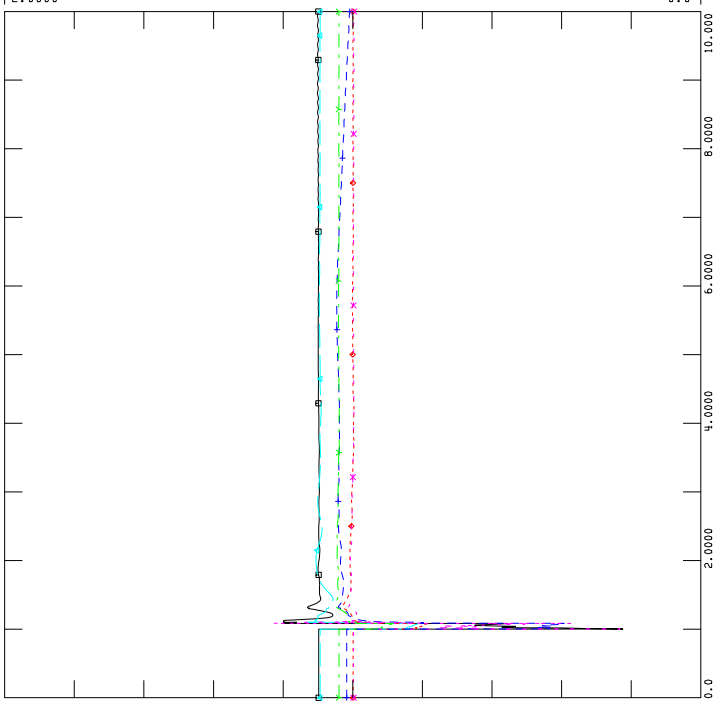


FIGURE A4-3: P2009_2021SP_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800ǃ1ǃ
CHNL# 17: CVARS 61630CREDCOAT4 0.6900ǃG1ǃ
CHNL# 16: CVARS 61736CBSR_4 0.6900ǃ1ǃ
CHNL# 15: CVARS 773CSECST 20.000ǃ1ǃ
CHNL# 14: CVARS 1482CSHEER 1 19.000ǃ1ǃ
CHNL# 13: CVARS560026CTRAVERS_1 0.4800ǃPVǃ

10.000 / -10.00

TUE, JUN 11 2019 17:34
MACHINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

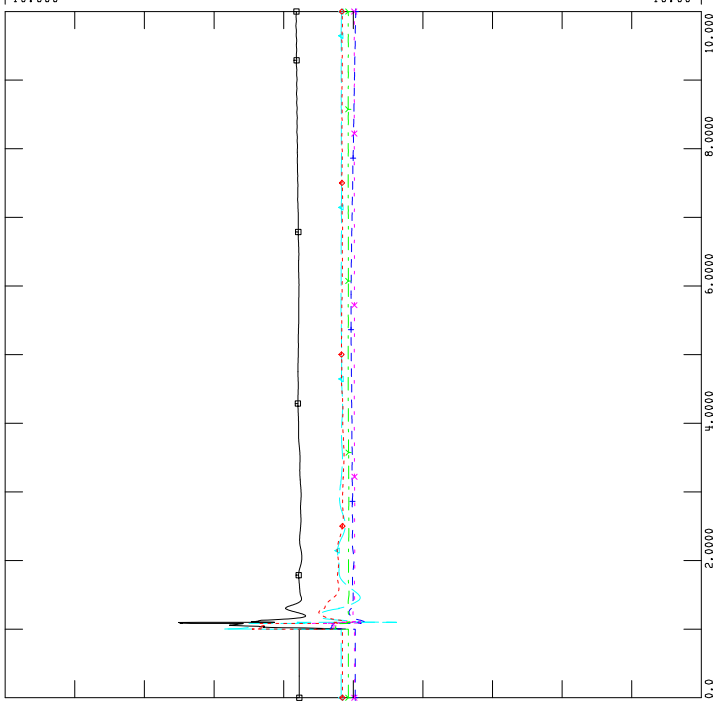


FIGURE A4-3: P2009_2021SP_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800ǃ1ǃ
CHNL# 3: CANGL 773CSECST 20.000ǃ1ǃ
CHNL# 2: CANGL 1482CSHEER 1 19.000ǃ1ǃ

100.00 / -100.0

TUE, JUN 11 2019 17:33
MACHINE ANGEL

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

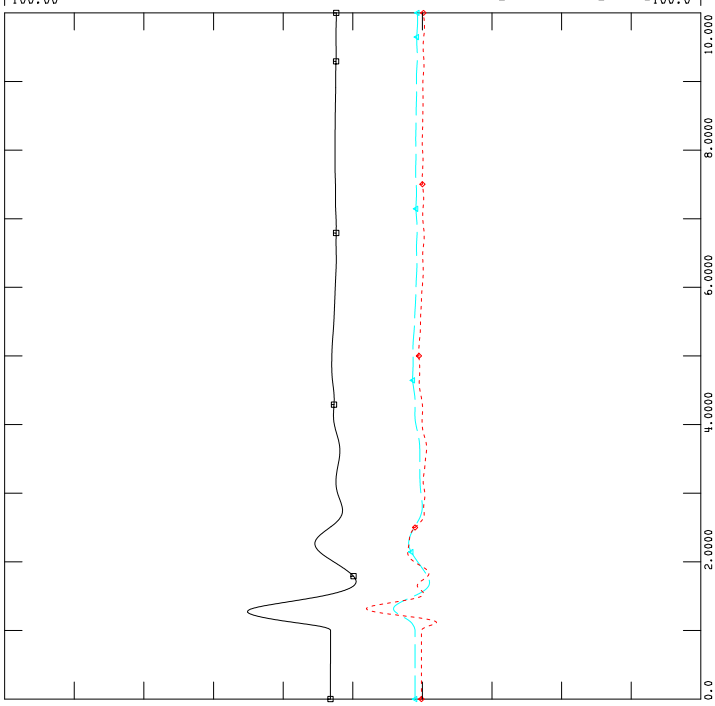


FIGURE A4-3: P2009_2021SP_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800ǃ1ǃ
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900ǃG1ǃ
CHNL# 10: CPOWR 61736CBSR_4 0.6900ǃ1ǃ
CHNL# 9: CPOWR 773CSECST 20.000ǃ1ǃ
CHNL# 8: CPOWR 1482CSHEER 1 19.000ǃ1ǃ
CHNL# 7: CPOWR560026CTRAVERS_1 0.4800ǃPVǃ

10.000 / -10.00

TUE, JUN 11 2019 17:34
MACHINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

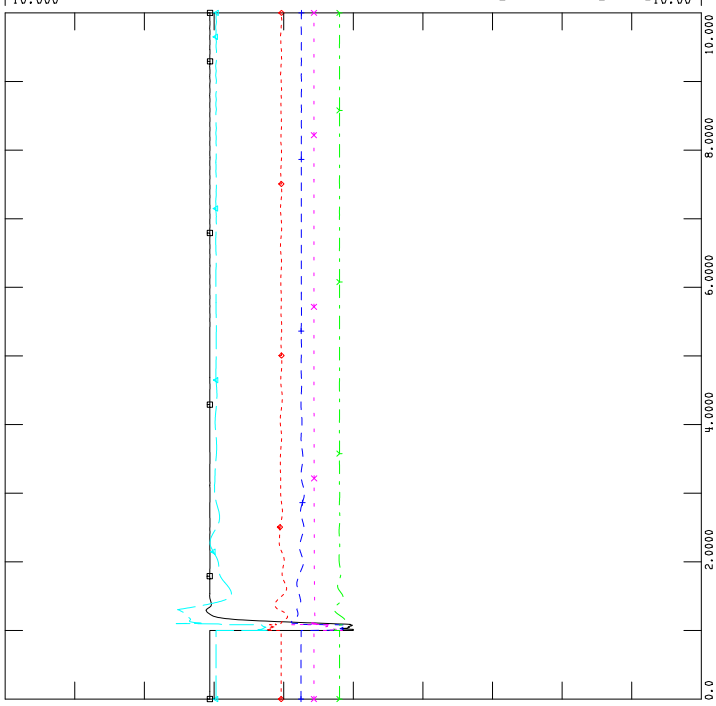
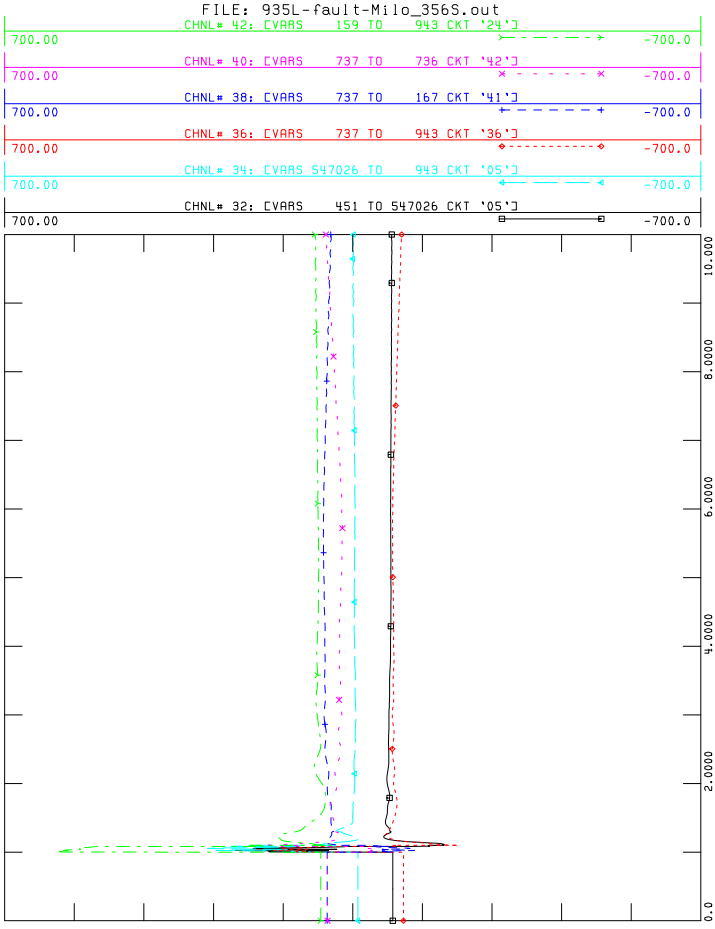


FIGURE A4-3: P2009_2021SP_POST
CATB-935L_FAULT_AT_MILO_356S

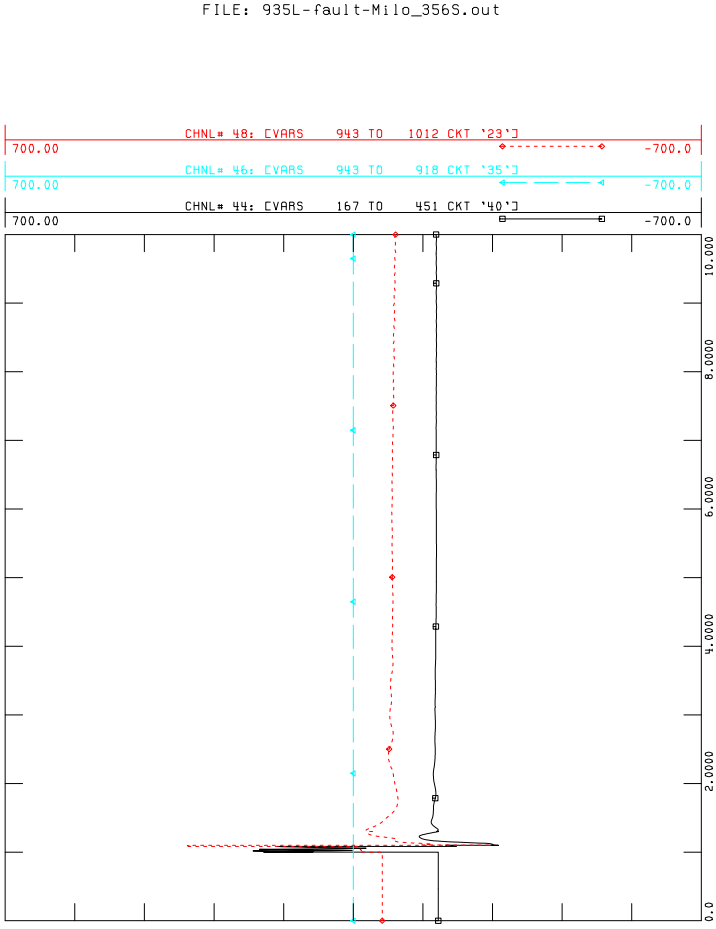
FILE: 935L-fault-Milo_356S.out



TUE, JUN 11 2019 17:34
LINE MVAR

FIGURE A4-3: P2009_2021SP_POST
CATB-935L_FAULT_AT_MILO_356S

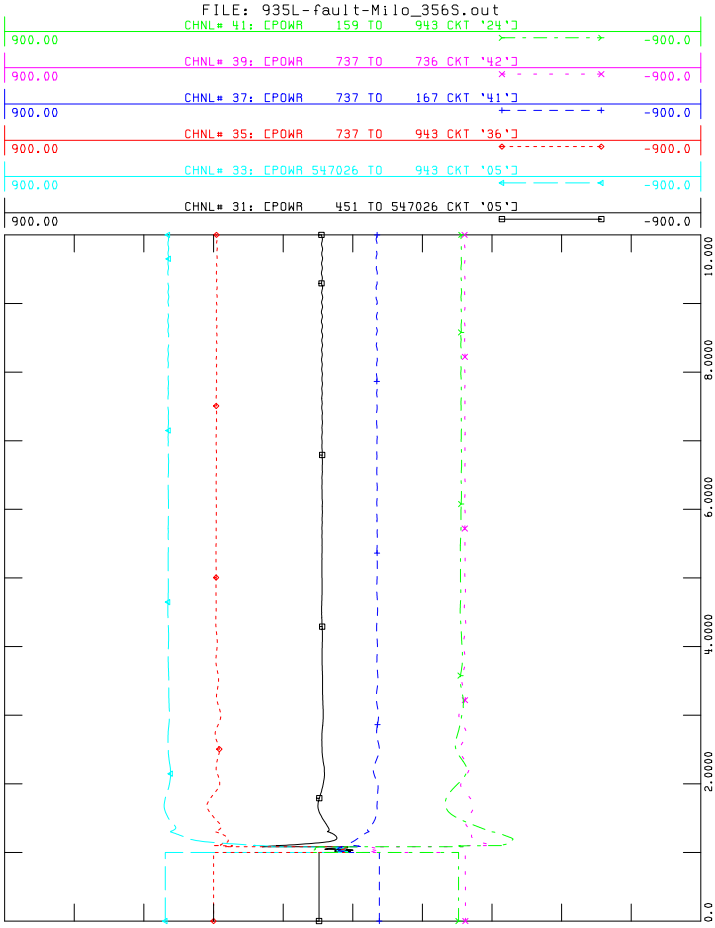
FILE: 935L-fault-Milo_356S.out



TUE, JUN 11 2019 17:34
LINE MVAR

FIGURE A4-3: P2009_2021SP_POST
CATB-935L_FAULT_AT_MILO_356S

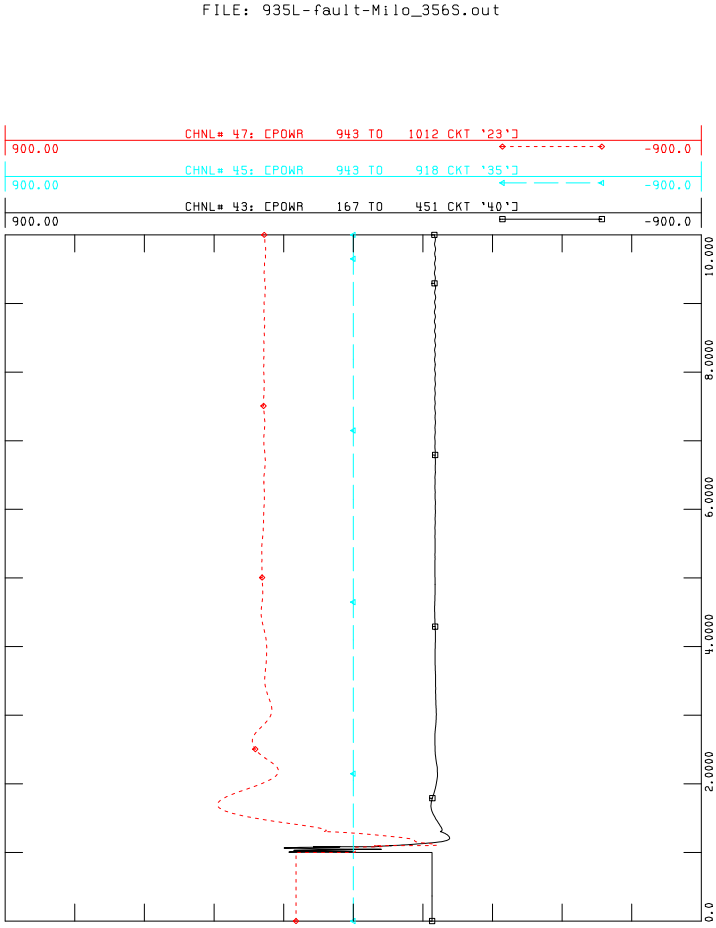
FILE: 935L-fault-Milo_356S.out



TUE, JUN 11 2019 17:34
LINE MW

FIGURE A4-3: P2009_2021SP_POST
CATB-935L_FAULT_AT_MILO_356S

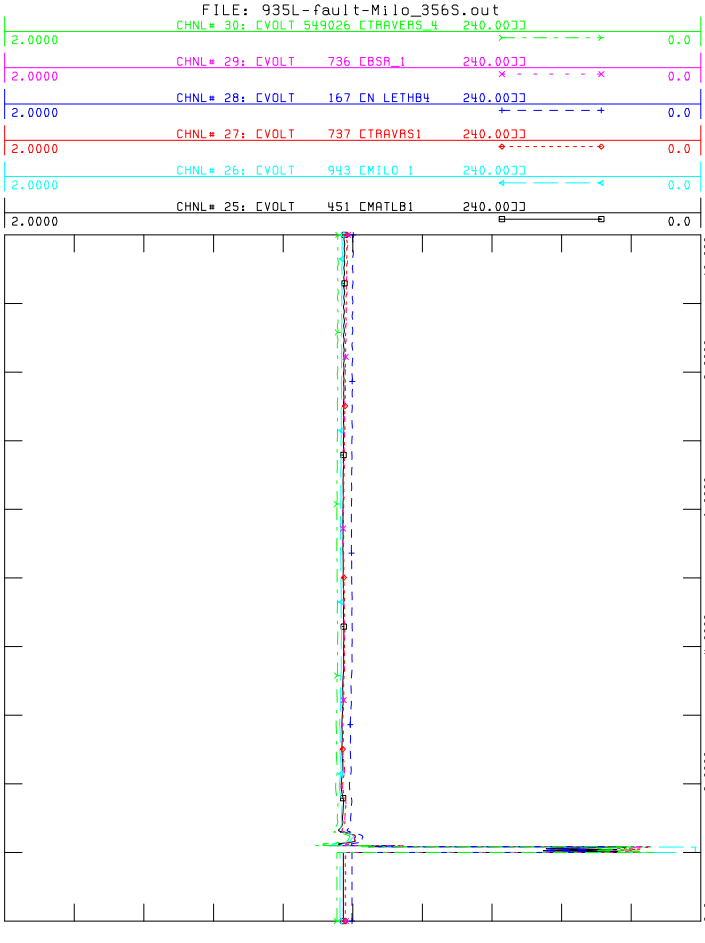
FILE: 935L-fault-Milo_356S.out



TUE, JUN 11 2019 17:34
LINE MW

FIGURE A4-3: P2009_2021SP_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out



TUE, JUN 11 2019 17:34
BUS VOLTAGE

FIGURE A4-4: P2009_2021SP_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 23: CETRM 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 22: CETRM 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 21: CETRM 773CSECST 20.000ǁ1ǁ
CHNL# 20: CETRM 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 19: CETRM560026CTRAVERS_1 0.4800ǁPVǁ

2.0000 / 0.0

TIME (SECONDS): 0.0, 1.0000, 2.0000, 3.0000, 4.0000, 5.0000, 6.0000, 7.0000, 8.0000, 9.0000, 10.000

TUE, JUN 11 2019 17:35
MACHINE VOLTAGE

FIGURE A4-4: P2009_2021SP_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 17: CVARS 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 16: CVARS 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 15: CVARS 773CSECST 20.000ǁ1ǁ
CHNL# 14: CVARS 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 13: CVARS560026CTRAVERS_1 0.4800ǁPVǁ

10.000 / -10.00

TIME (SECONDS): 0.0, 1.0000, 2.0000, 3.0000, 4.0000, 5.0000, 6.0000, 7.0000, 8.0000, 9.0000, 10.000

TUE, JUN 11 2019 17:35
MACHINE MVAR

FIGURE A4-4: P2009_2021SP_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 3: CANGL 773CSECST 20.000ǁ1ǁ
CHNL# 2: CANGL 1482CSHEER 1 19.000ǁ1ǁ

100.00 / -100.0

TIME (SECONDS): 0.0, 1.0000, 2.0000, 3.0000, 4.0000, 5.0000, 6.0000, 7.0000, 8.0000, 9.0000, 10.000

TUE, JUN 11 2019 17:35
MACHINE ANGEL

FIGURE A4-4: P2009_2021SP_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 10: CPOWR 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 9: CPOWR 773CSECST 20.000ǁ1ǁ
CHNL# 8: CPOWR 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 7: CPOWR560026CTRAVERS_1 0.4800ǁPVǁ

10.000 / -10.00

TIME (SECONDS): 0.0, 1.0000, 2.0000, 3.0000, 4.0000, 5.0000, 6.0000, 7.0000, 8.0000, 9.0000, 10.000

TUE, JUN 11 2019 17:35
MACHINE MW

FIGURE A4-4: P2009_2021SP_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TUE, JUN 11 2019 17:35
LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-4: P2009_2021SP_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TUE, JUN 11 2019 17:35
LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-4: P2009_2021SP_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TUE, JUN 11 2019 17:35
LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-4: P2009_2021SP_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TUE, JUN 11 2019 17:35
LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-4: P2009_2021SP_POST
CATB-935L_FAULT_AT_CASSILS_324S

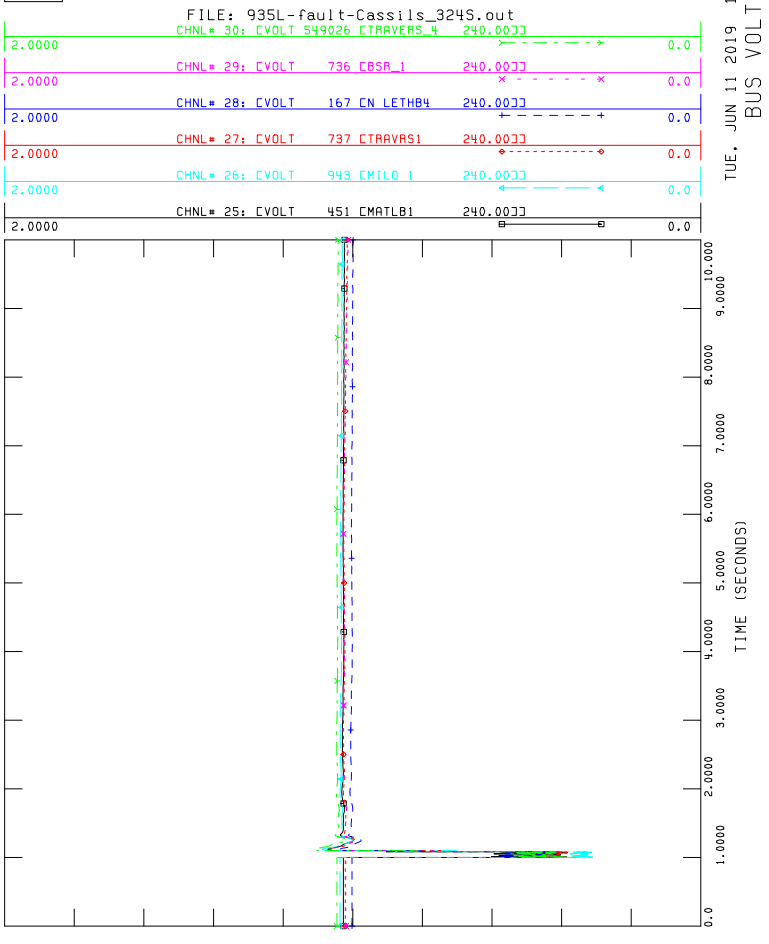


FIGURE A4-5: P2009_2021SP_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

TUE, JUN 11 2019 17:37
MACHINE VOLTAGE
TIME (SECONDS)

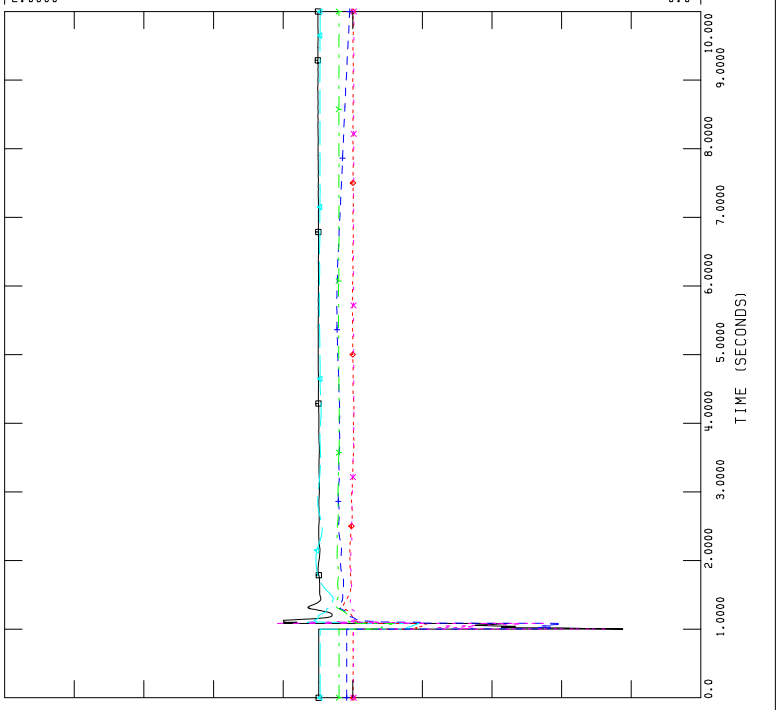


FIGURE A4-5: P2009_2021SP_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

TUE, JUN 11 2019 17:37
MACHINE MVAR
TIME (SECONDS)

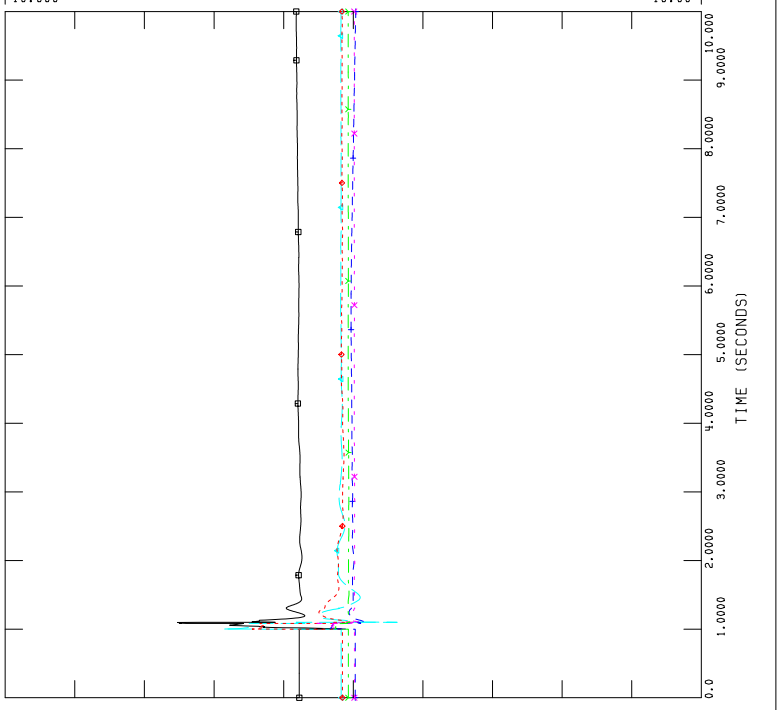


FIGURE A4-5: P2009_2021SP_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

TUE, JUN 11 2019 17:37
MACHINE ANGEL
TIME (SECONDS)

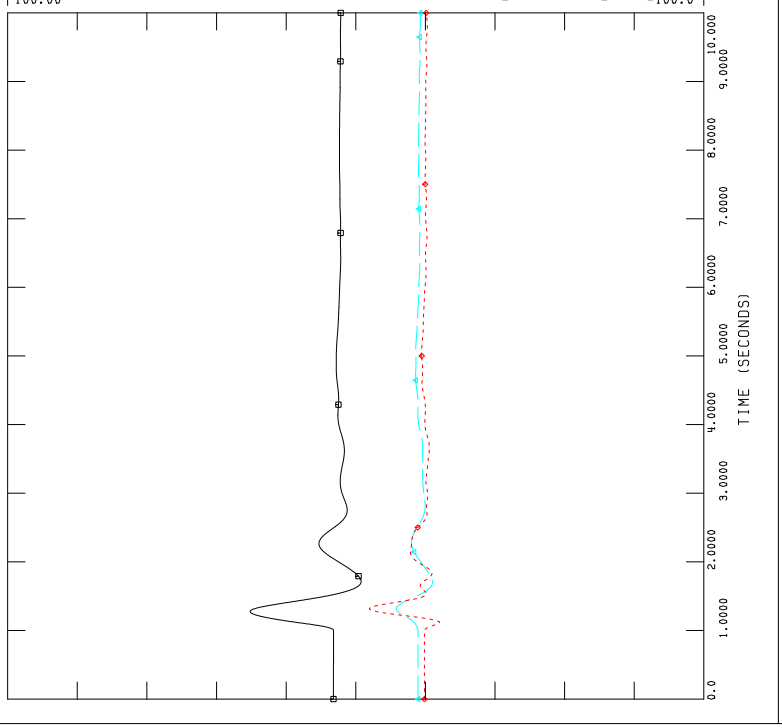


FIGURE A4-5: P2009_2021SP_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

TUE, JUN 11 2019 17:37
MACHINE MW
TIME (SECONDS)

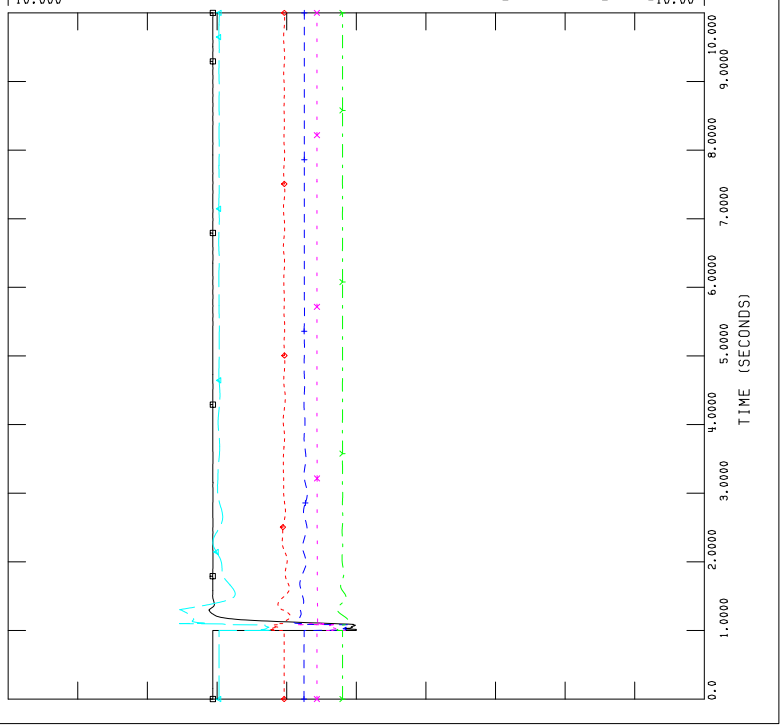


FIGURE A4-5: P2009_2021SP_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

TUE, JUN 11 2019 17:37

LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-5: P2009_2021SP_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

TUE, JUN 11 2019 17:37

LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-5: P2009_2021SP_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

TUE, JUN 11 2019 17:37

LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-5: P2009_2021SP_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

TUE, JUN 11 2019 17:37

LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-5: P2009_2021SP_POST
CATB-923L_FAULT_AT_MILO_356S

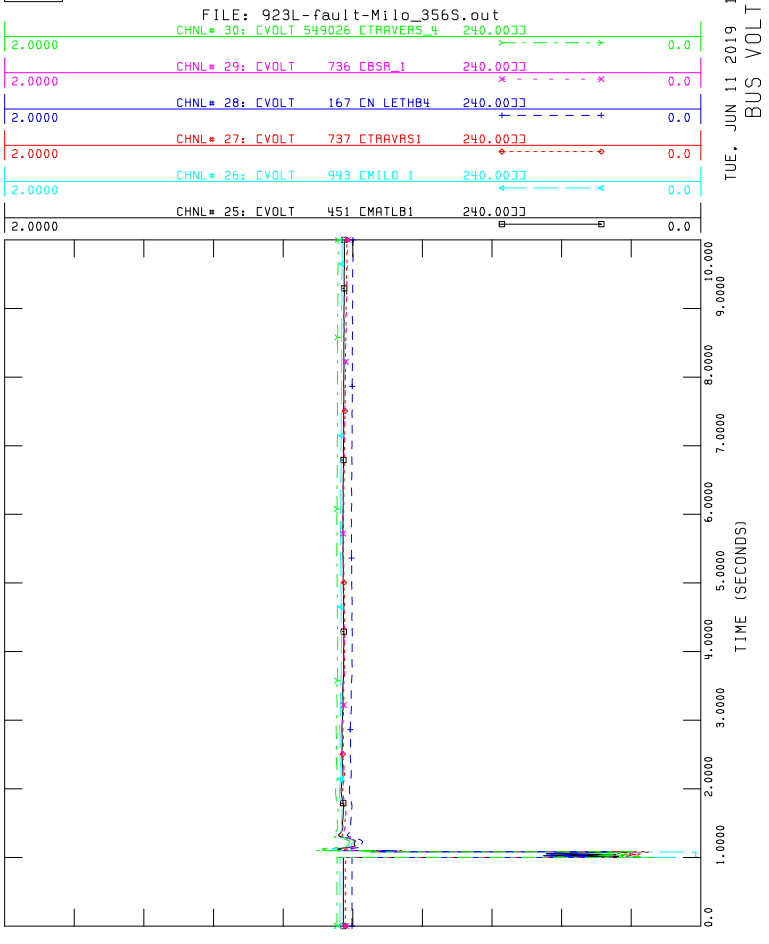


FIGURE A4-6: P2009_2021SP_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

MACHINE VOLTAGE
TUE, JUN 11 2019 17:38
TIME (SECONDS)

FIGURE A4-6: P2009_2021SP_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

MACHINE MVAR
TUE, JUN 11 2019 17:38
TIME (SECONDS)

FIGURE A4-6: P2009_2021SP_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

MACHINE ANGEL
TUE, JUN 11 2019 17:38
TIME (SECONDS)

FIGURE A4-6: P2009_2021SP_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

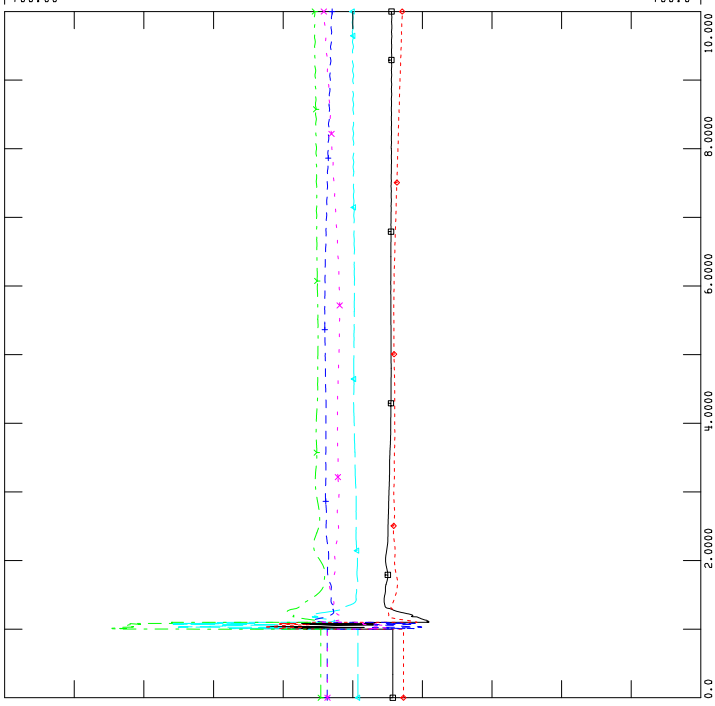
MACHINE MW
TUE, JUN 11 2019 17:38
TIME (SECONDS)

FIGURE A4-6: P2009_2021SP_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0



TIME (SECONDS)

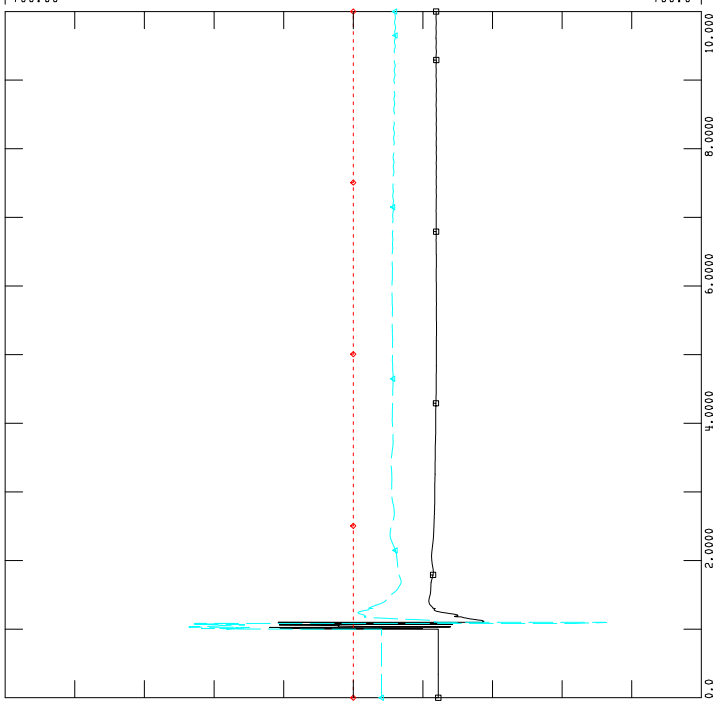
TUE, JUN 11 2019 17:38
LINE MVAR

FIGURE A4-6: P2009_2021SP_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0



TIME (SECONDS)

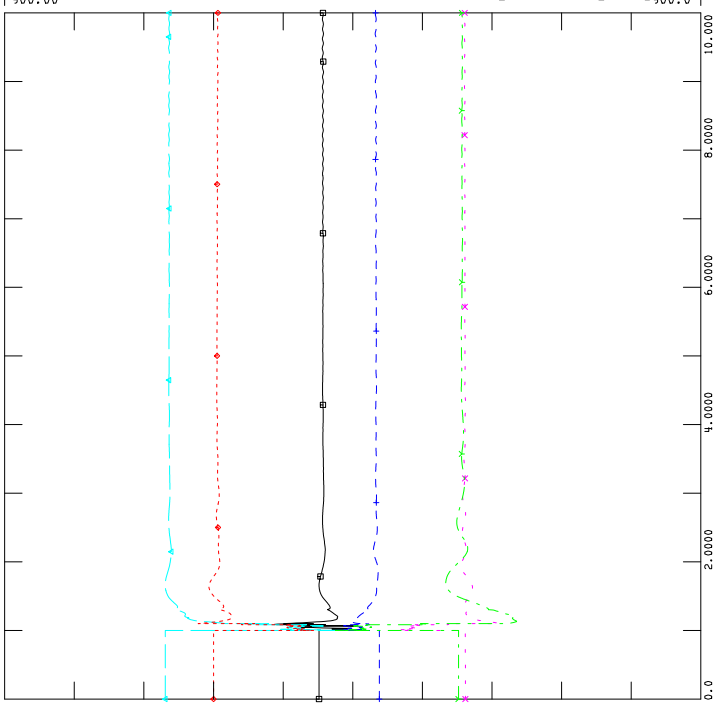
TUE, JUN 11 2019 17:38
LINE MVAR

FIGURE A4-6: P2009_2021SP_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0



TIME (SECONDS)

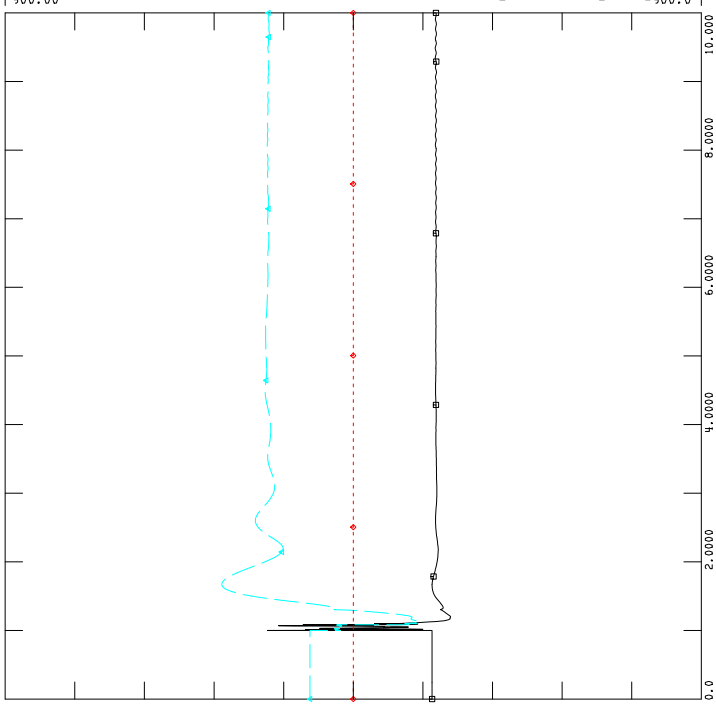
TUE, JUN 11 2019 17:38
LINE MW

FIGURE A4-6: P2009_2021SP_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0



TIME (SECONDS)

TUE, JUN 11 2019 17:38
LINE MW

FIGURE A4-6: P2009_2021SP_POST
CATB-923L_FAULT_AT_NEWELL_2075S

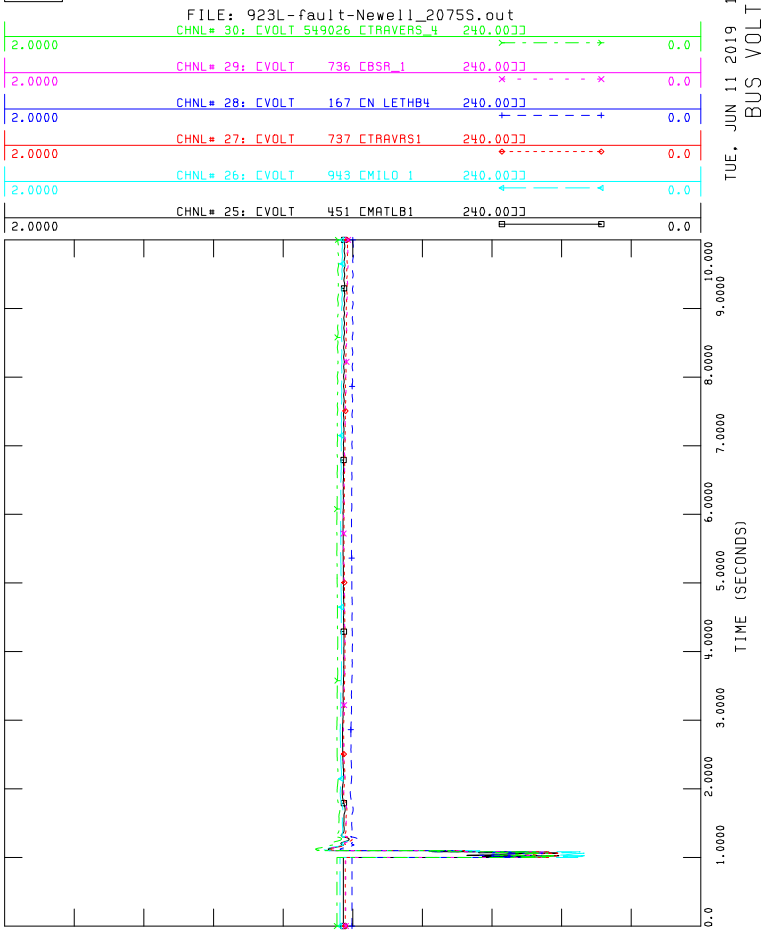


FIGURE A4-7: P2009_2021SP_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

TUE, JUN 11 2019 17:38
MACHINE VOLTAGE
TIME (SECONDS)

FIGURE A4-7: P2009_2021SP_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

TUE, JUN 11 2019 17:38
MACHINE MVAR
TIME (SECONDS)

FIGURE A4-7: P2009_2021SP_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

TUE, JUN 11 2019 17:38
MACHINE ANGEL
TIME (SECONDS)

FIGURE A4-7: P2009_2021SP_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800]PV]

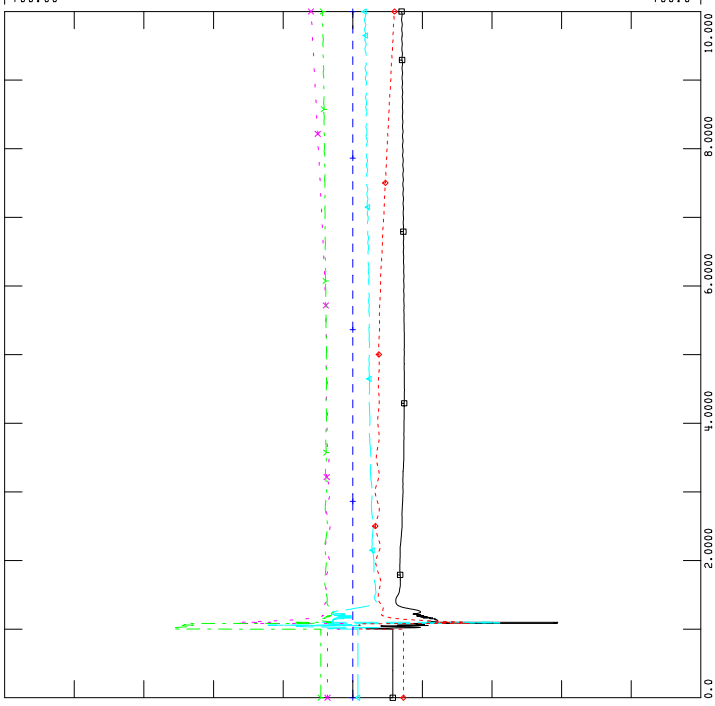
TUE, JUN 11 2019 17:38
MACHINE MW
TIME (SECONDS)

FIGURE A4-7: P2009_2021SP_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 42: EVARS 159 TO 943 CKT '24'
CHNL# 40: EVARS 737 TO 736 CKT '42'
CHNL# 38: EVARS 737 TO 167 CKT '41'
CHNL# 36: EVARS 737 TO 943 CKT '36'
CHNL# 34: EVARS 547026 TO 943 CKT '05'
CHNL# 32: EVARS 451 TO 547026 CKT '05'

700.00 / -700.0



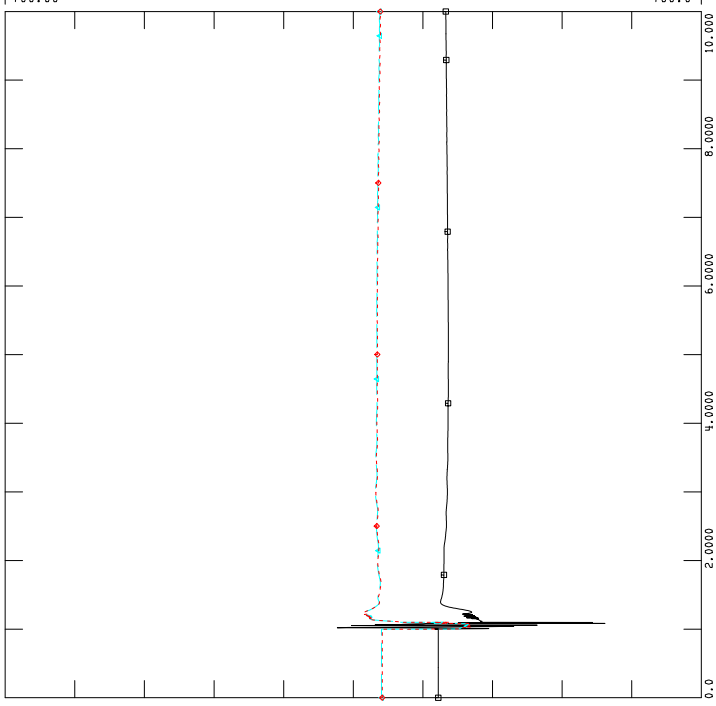
TUE, JUN 11 2019 17:39
LINE MVAR

FIGURE A4-7: P2009_2021SP_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 48: EVARS 943 TO 1012 CKT '23'
CHNL# 46: EVARS 943 TO 918 CKT '35'
CHNL# 44: EVARS 167 TO 451 CKT '40'

700.00 / -700.0



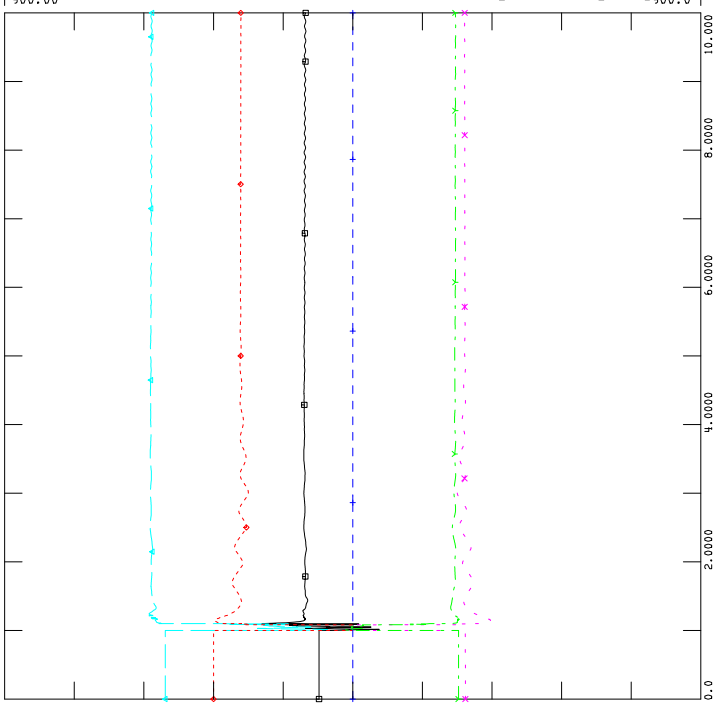
TUE, JUN 11 2019 17:39
LINE MVAR

FIGURE A4-7: P2009_2021SP_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0



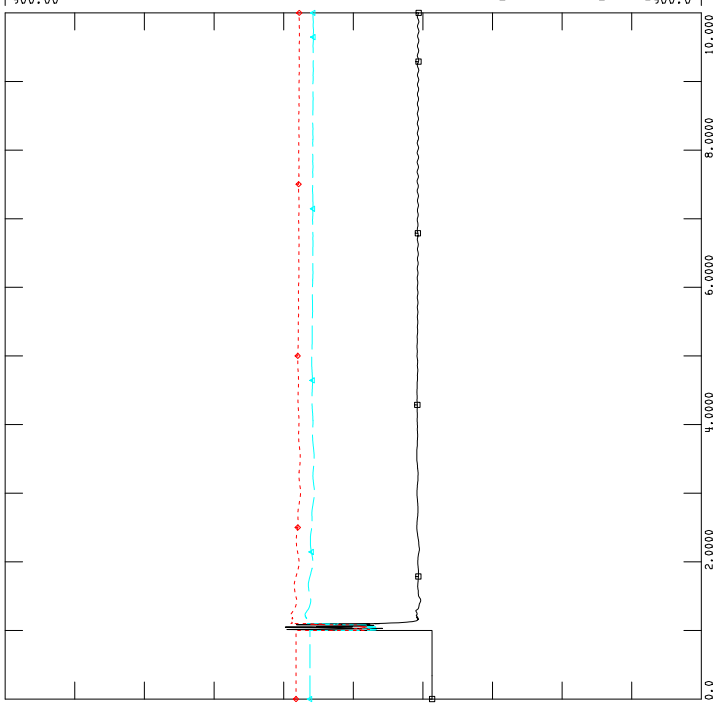
TUE, JUN 11 2019 17:38
LINE MW

FIGURE A4-7: P2009_2021SP_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0



TUE, JUN 11 2019 17:39
LINE MW

FIGURE A4-7: P2009_2021SP_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

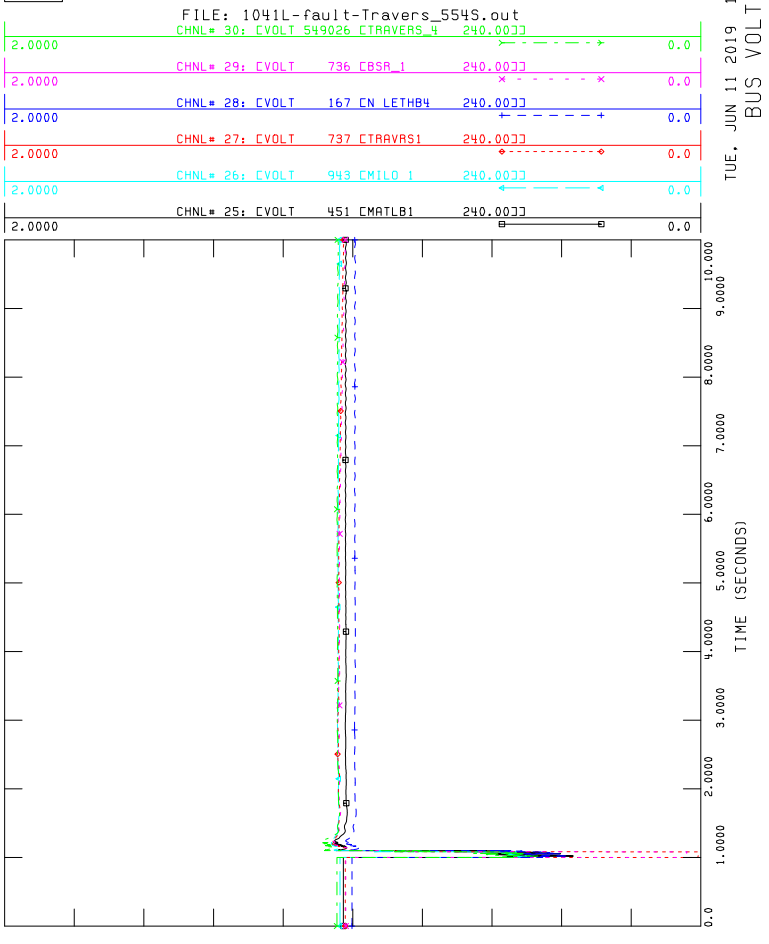


FIGURE A4-8: P2009_2021SP_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 17:39

MACHINE VOLTAGE

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

2.0000 / 0.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

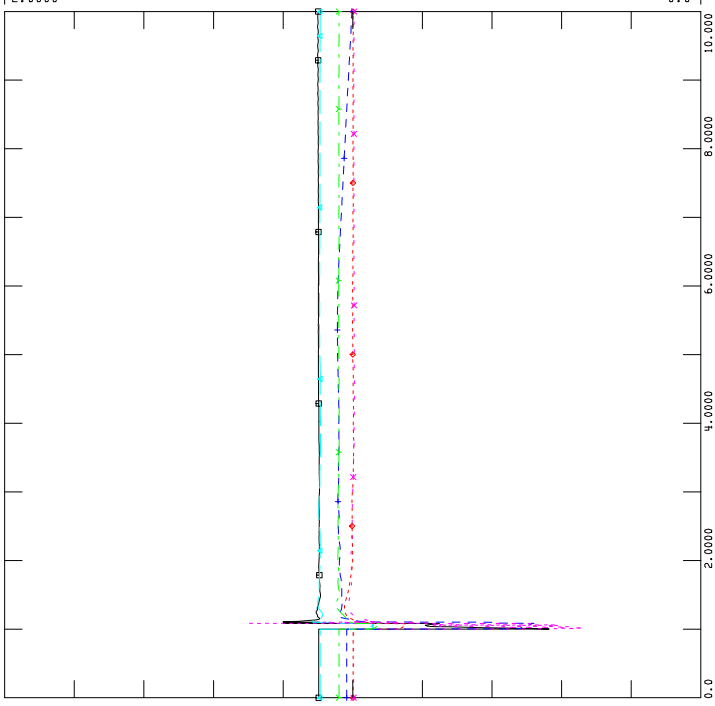


FIGURE A4-8: P2009_2021SP_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 17:39

MACHINE MVAR

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

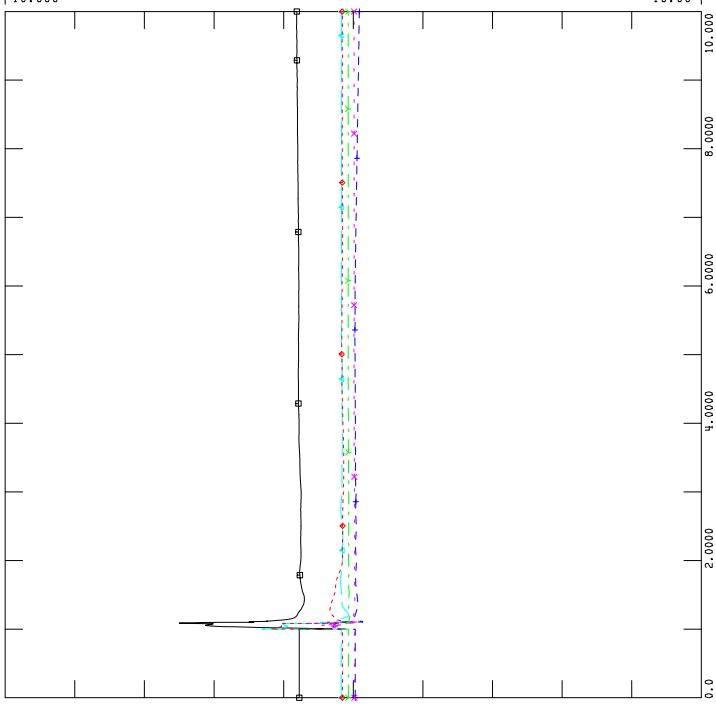


FIGURE A4-8: P2009_2021SP_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 17:39

MACHINE ANGEL

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

100.00 / -100.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

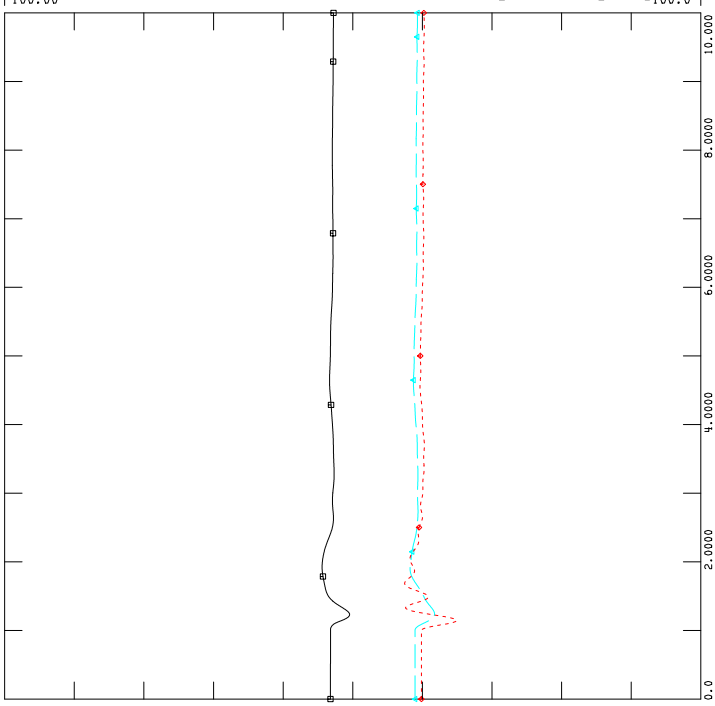


FIGURE A4-8: P2009_2021SP_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out

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MACHINE MW

CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

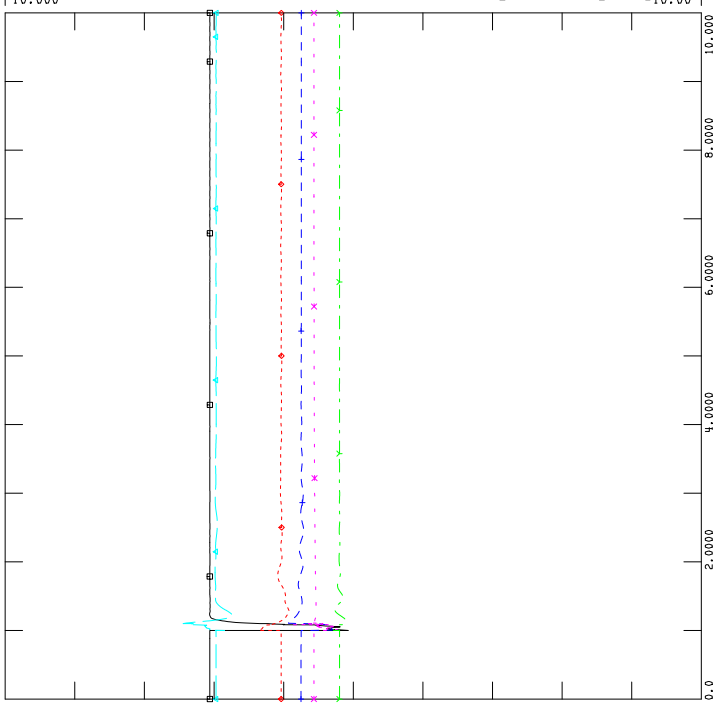
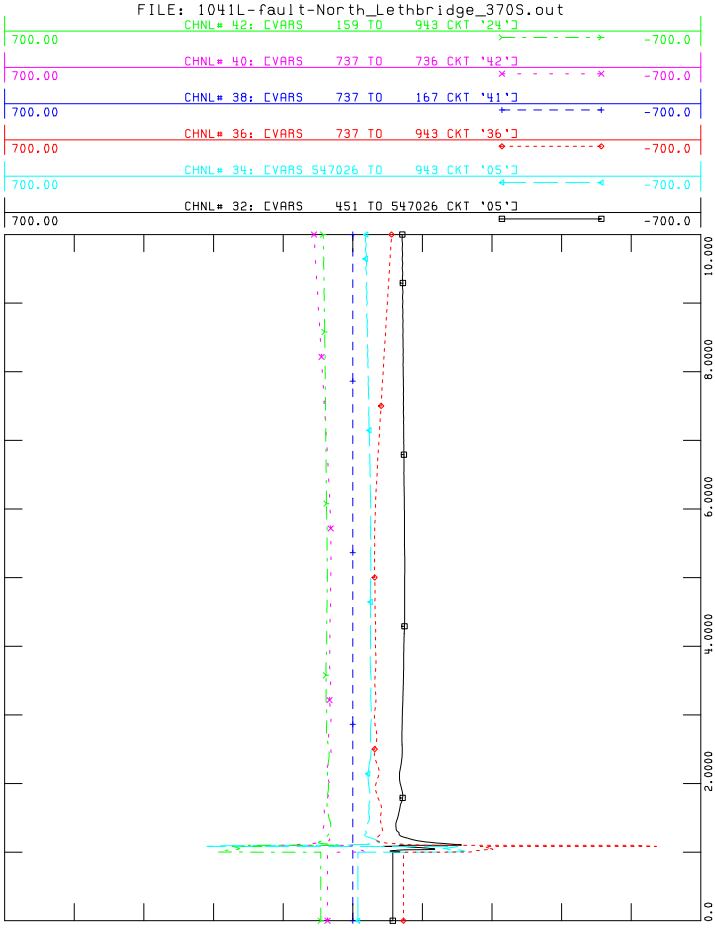


FIGURE A4-8: P2009_2021SP_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out



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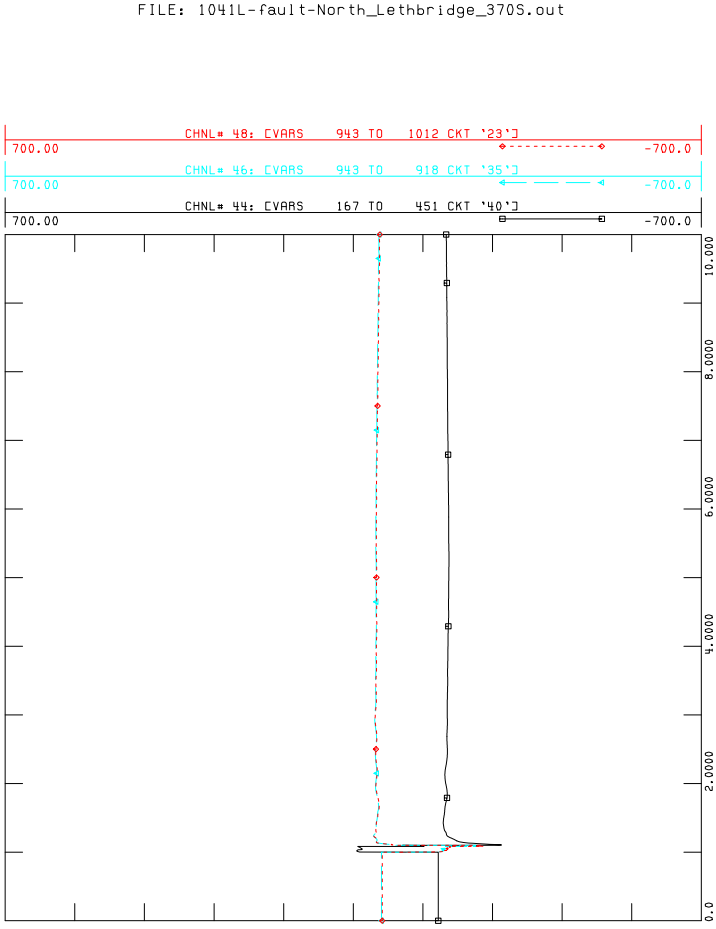
LINE MVAR

FIGURE A4-8: P2009_2021SP_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out



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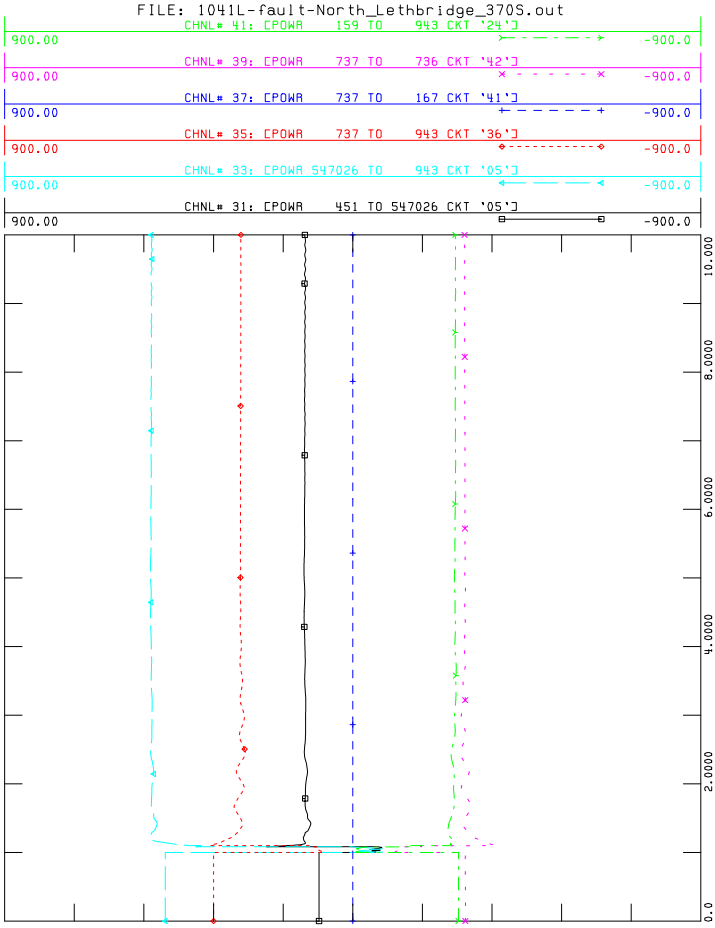
LINE MVAR

FIGURE A4-8: P2009_2021SP_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

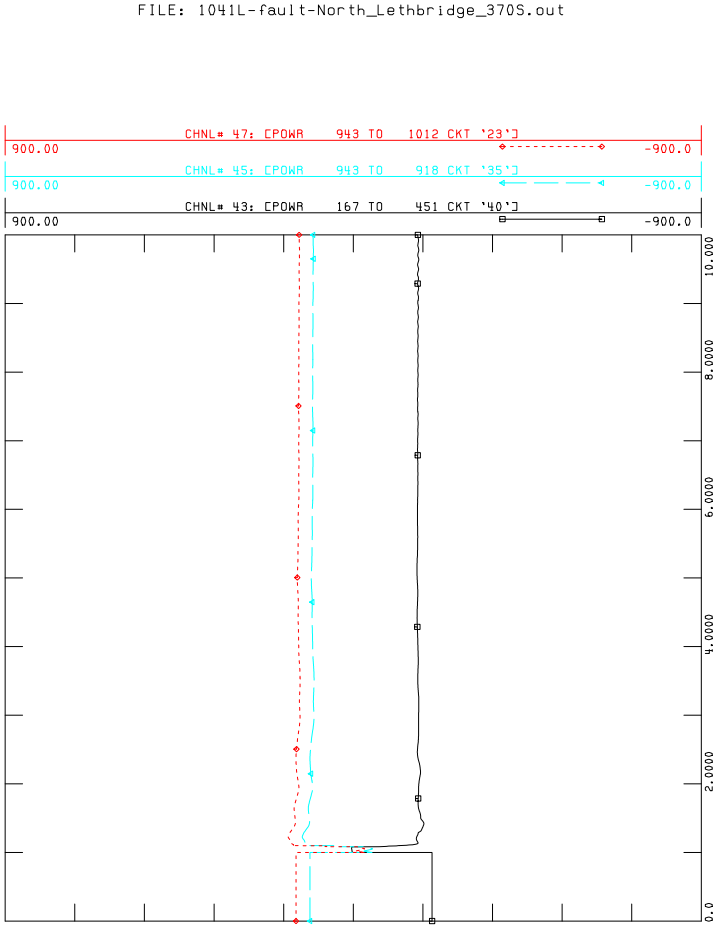
FILE: 1041L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 17:39
LINE MW

FIGURE A4-8: P2009_2021SP_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out



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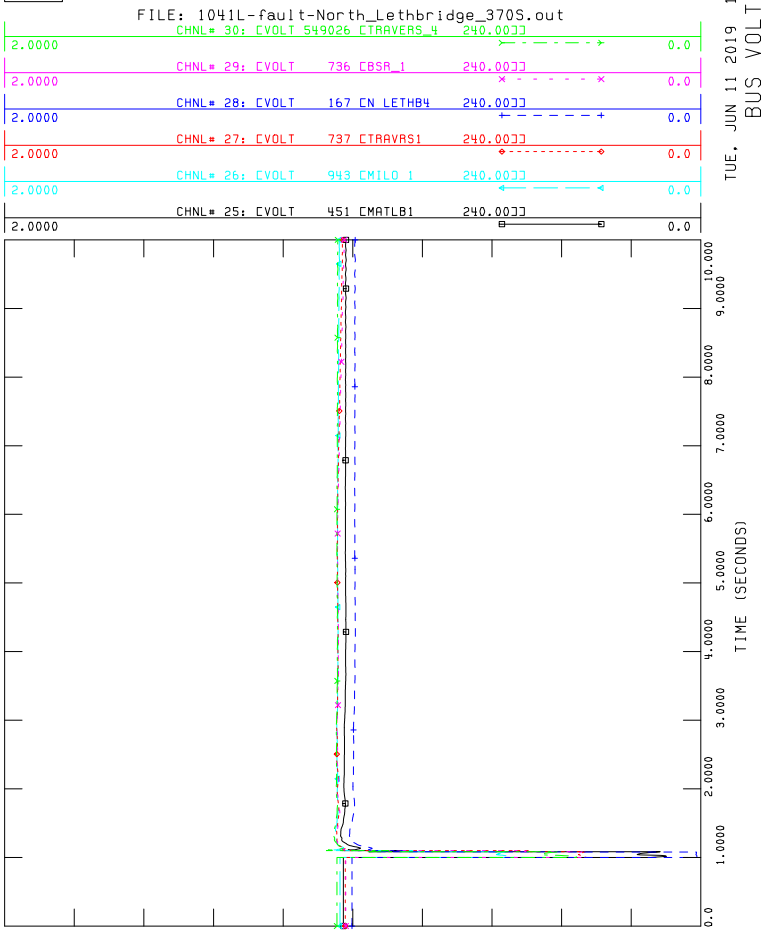
LINE MW

FIGURE A4-8: P2009_2021SP_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out



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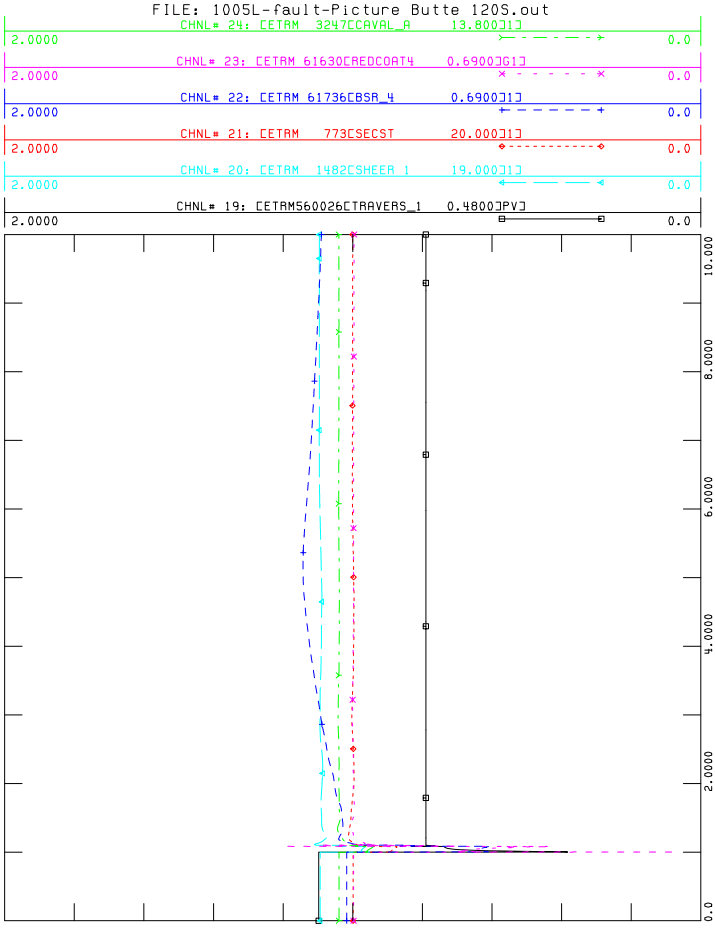
BUS VOLTAGE

FIGURE A4-9: P2009_2021SP_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

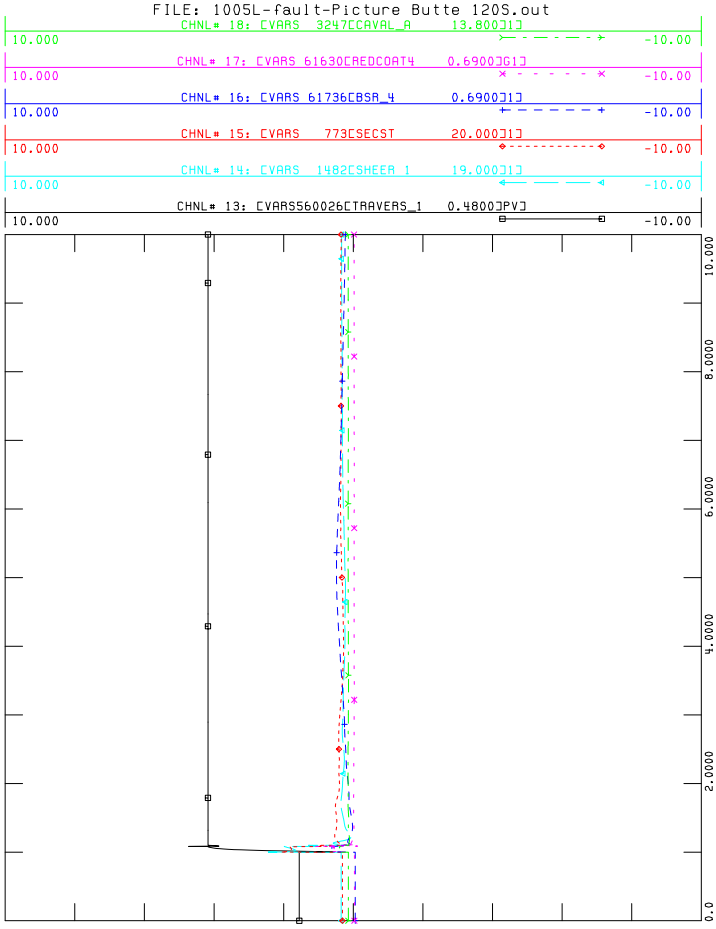
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 17:40
MACHINE VOLTAGE

FIGURE A4-9: P2009_2021SP_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

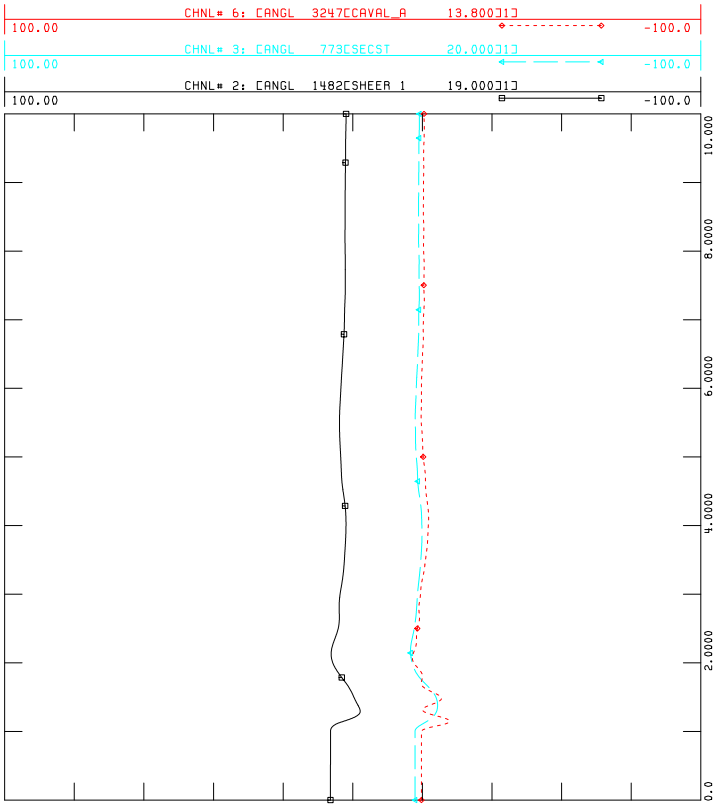
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 17:40
MACHINE MVAR

FIGURE A4-9: P2009_2021SP_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

FILE: 1005L-fault-Picture Butte 120S.out



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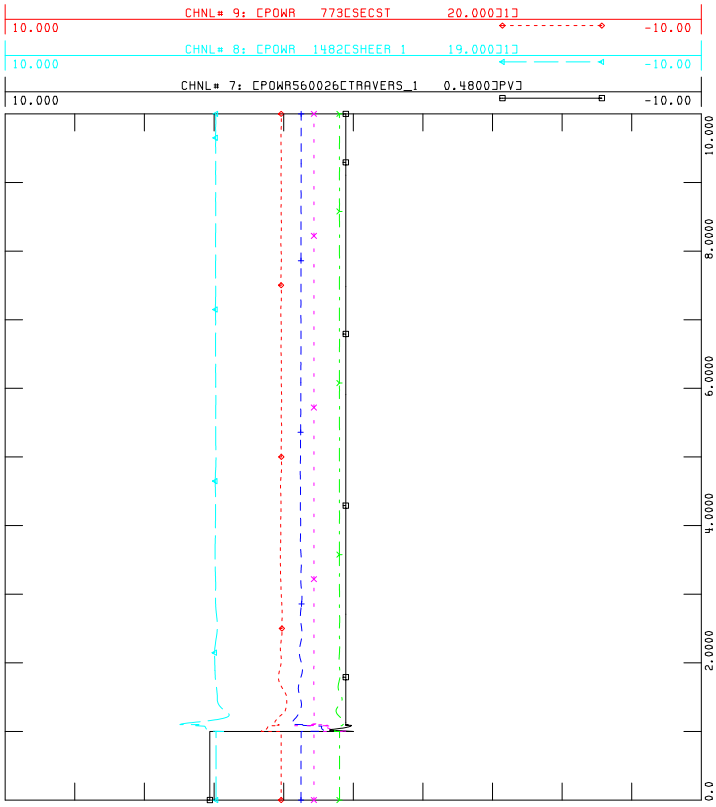
MACHINE ANGEL

FIGURE A4-9: P2009_2021SP_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

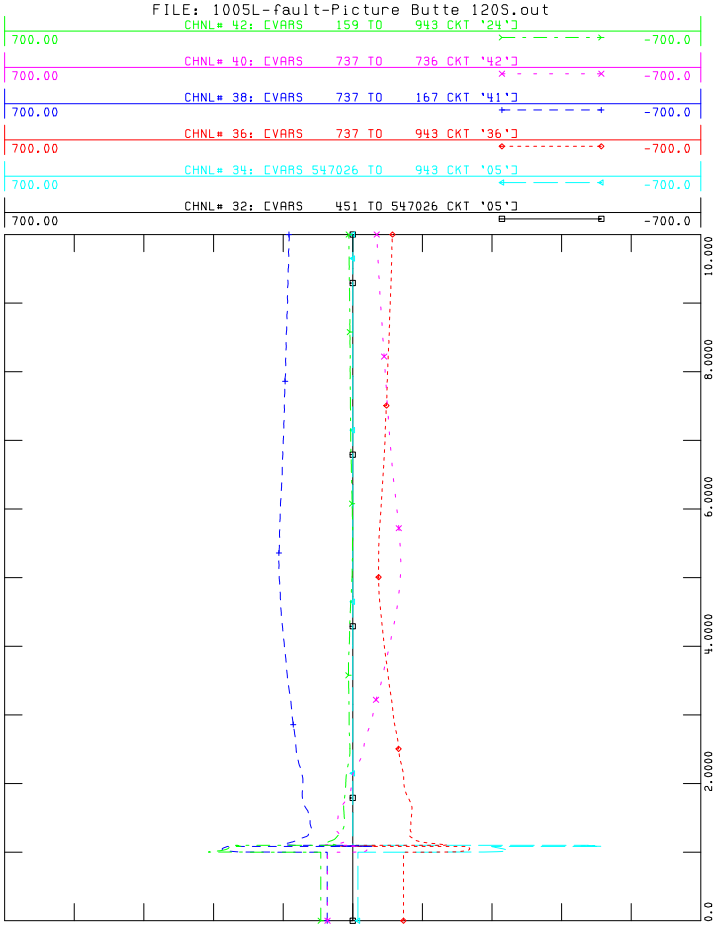
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 17:40
MACHINE MW

FIGURE A4-9: P2009_2021SP_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

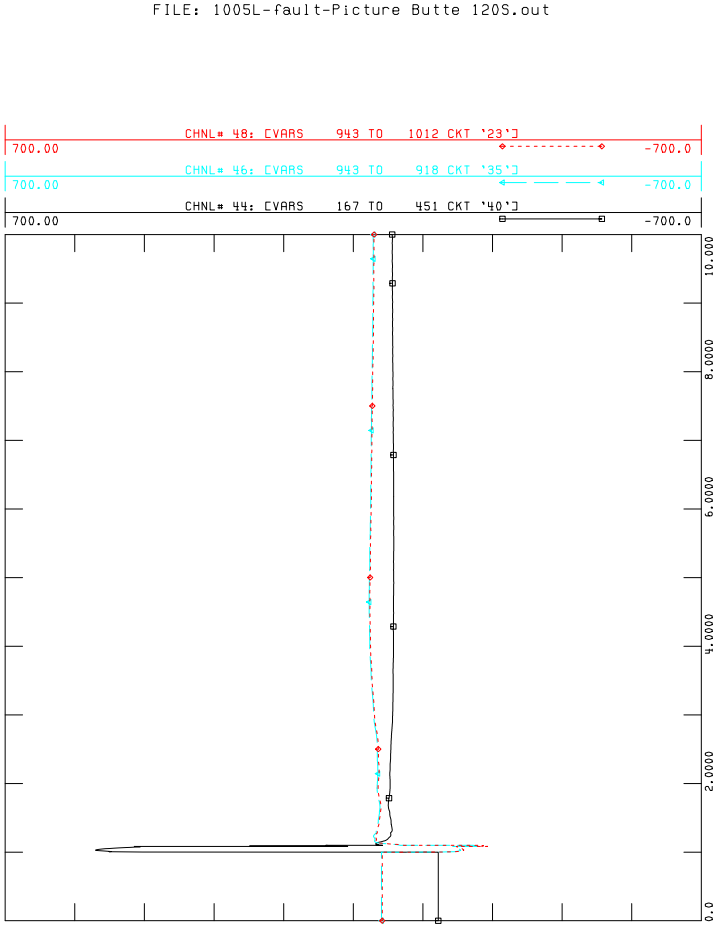
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 17:40
LINE MVAR

FIGURE A4-9: P2009_2021SP_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

FILE: 1005L-fault-Picture Butte 120S.out



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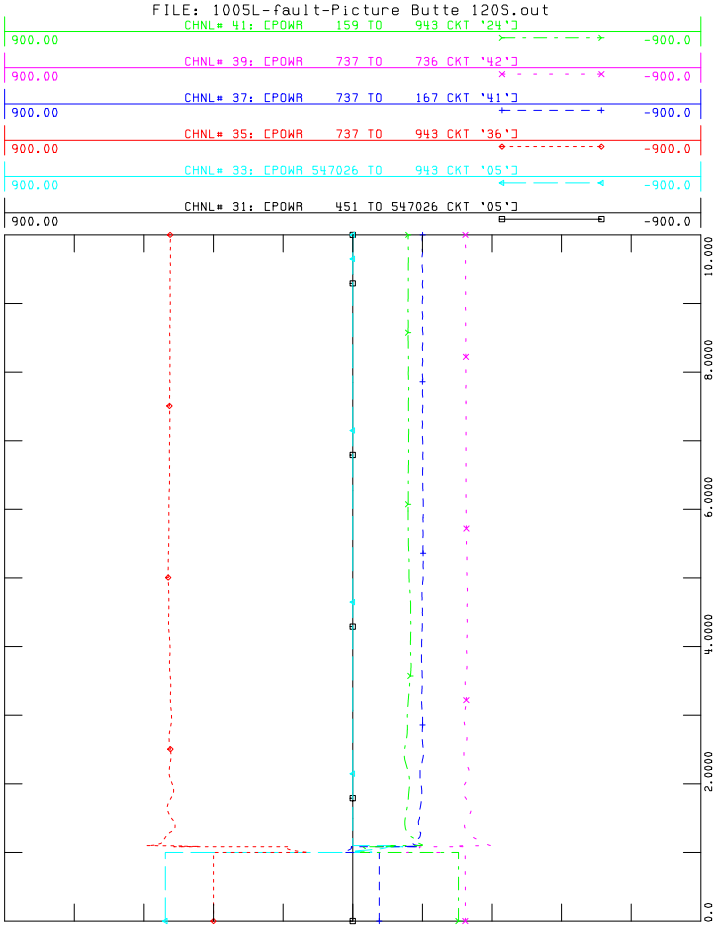
LINE MVAR

FIGURE A4-9: P2009_2021SP_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

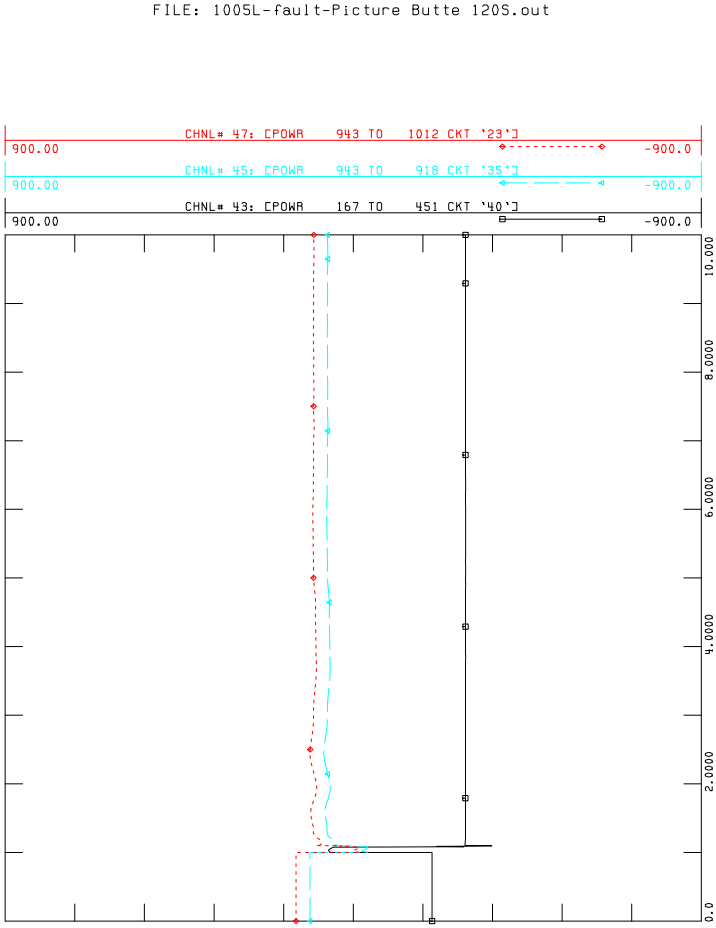
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 17:40
LINE MW

FIGURE A4-9: P2009_2021SP_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

FILE: 1005L-fault-Picture Butte 120S.out



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LINE MW

FIGURE A4-9: P2009_2021SP_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

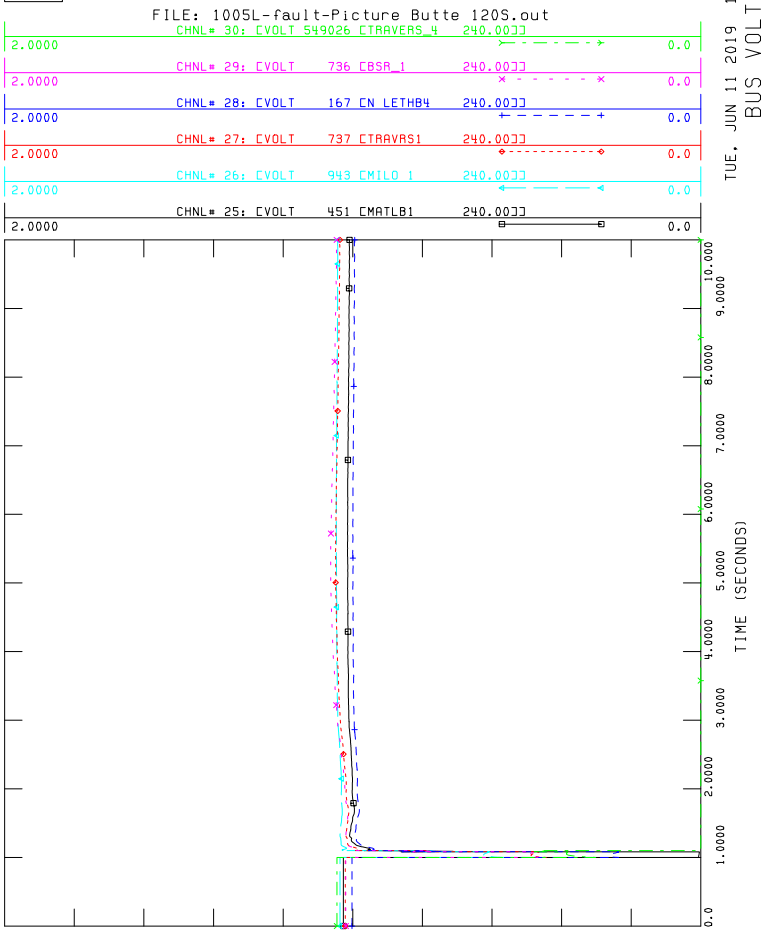

FIGURE A4-10: P2009_2021SP_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800ǴǴ
CHNL# 23: CETRM 61630CREDCOAT4 0.6900ǴG1Ǵ
CHNL# 22: CETRM 61736CBSR_4 0.6900ǴǴ
CHNL# 21: CETRM 773CSECST 20.000ǴǴ
CHNL# 20: CETRM 1482CSHEER 1 19.000ǴǴ
CHNL# 19: CETRM560026CTRAVERS_1 0.4800ǴPVǴ

MACHINE VOLTAGE
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TIME (SECONDS)

FIGURE A4-10: P2009_2021SP_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800ǴǴ
CHNL# 17: CVARS 61630CREDCOAT4 0.6900ǴG1Ǵ
CHNL# 16: CVARS 61736CBSR_4 0.6900ǴǴ
CHNL# 15: CVARS 773CSECST 20.000ǴǴ
CHNL# 14: CVARS 1482CSHEER 1 19.000ǴǴ
CHNL# 13: CVARS560026CTRAVERS_1 0.4800ǴPVǴ

MACHINE MVAR
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TIME (SECONDS)

FIGURE A4-10: P2009_2021SP_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800ǴǴ
CHNL# 3: CANGL 773CSECST 20.000ǴǴ
CHNL# 2: CANGL 1482CSHEER 1 19.000ǴǴ

MACHINE ANGEL
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TIME (SECONDS)

FIGURE A4-10: P2009_2021SP_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800ǴǴ
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900ǴG1Ǵ
CHNL# 10: CPOWR 61736CBSR_4 0.6900ǴǴ
CHNL# 9: CPOWR 773CSECST 20.000ǴǴ
CHNL# 8: CPOWR 1482CSHEER 1 19.000ǴǴ
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800ǴPVǴ

MACHINE MW
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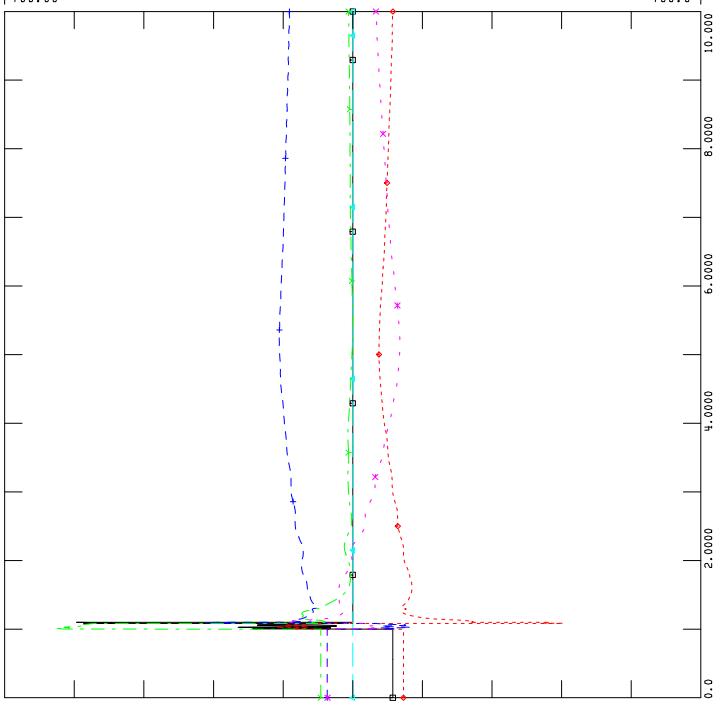
TIME (SECONDS)

FIGURE A4-10: P2009_2021SP_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0



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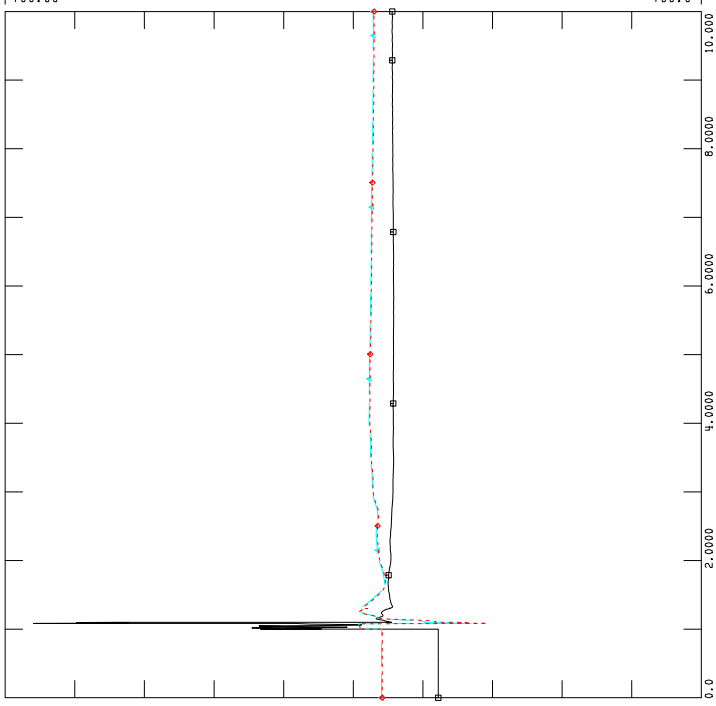
LINE MVAR

FIGURE A4-10: P2009_2021SP_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0



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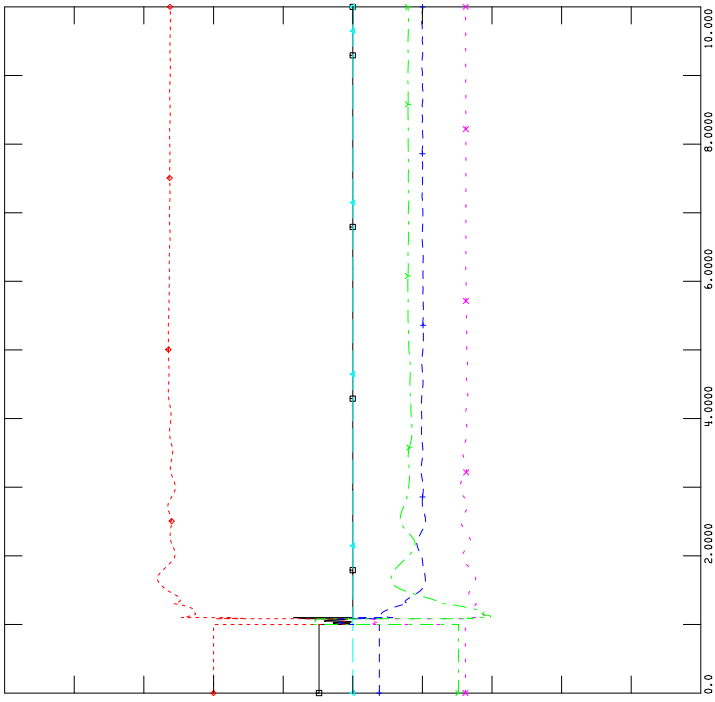
LINE MVAR

FIGURE A4-10: P2009_2021SP_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0



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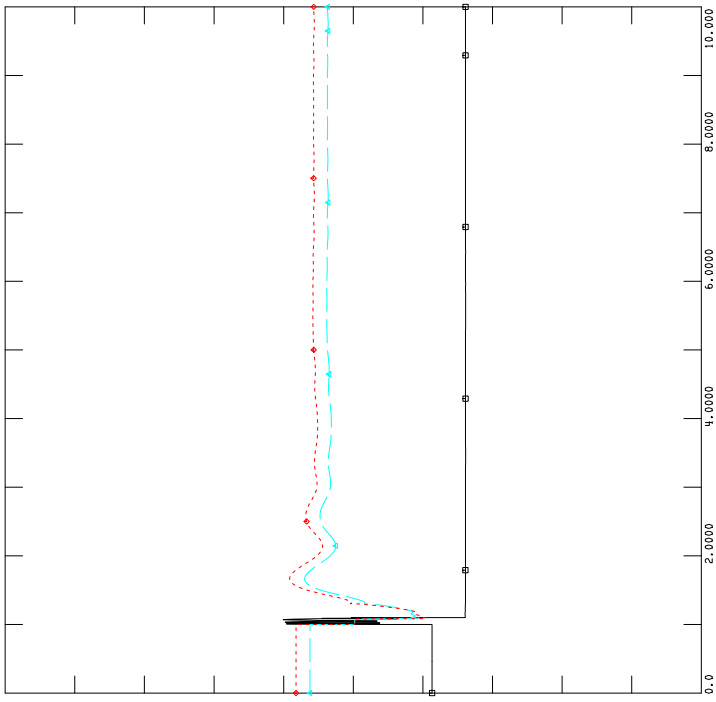
LINE MW

FIGURE A4-10: P2009_2021SP_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0



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LINE MW

FIGURE A4-10: P2009_2021SP_POST
CATB-1005L_FAULT_AT_MILO_356S

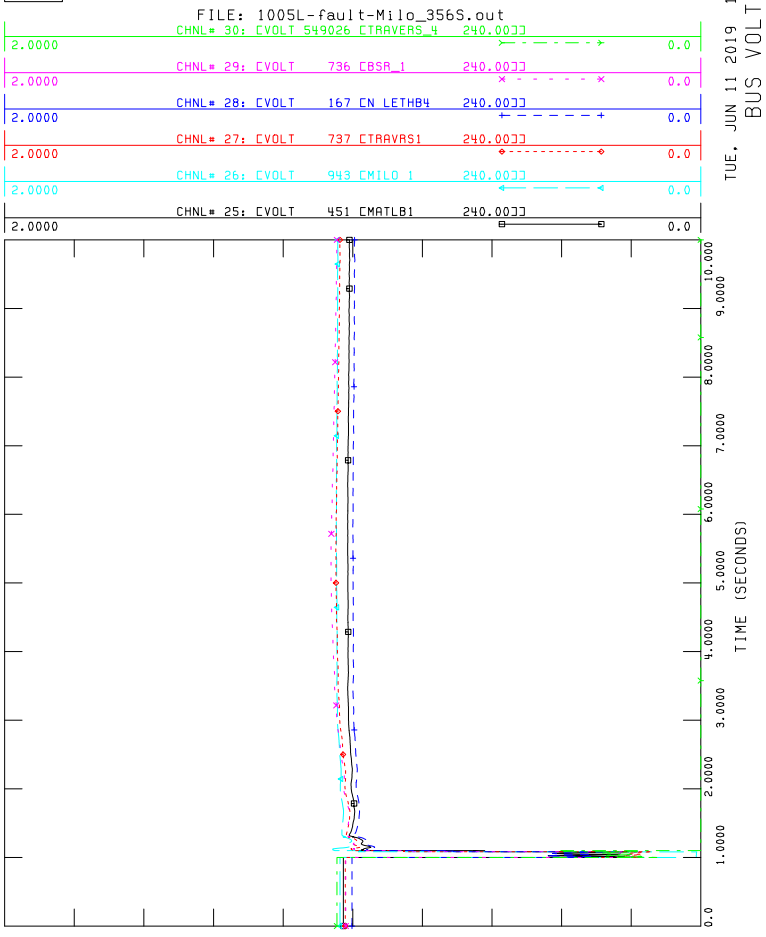
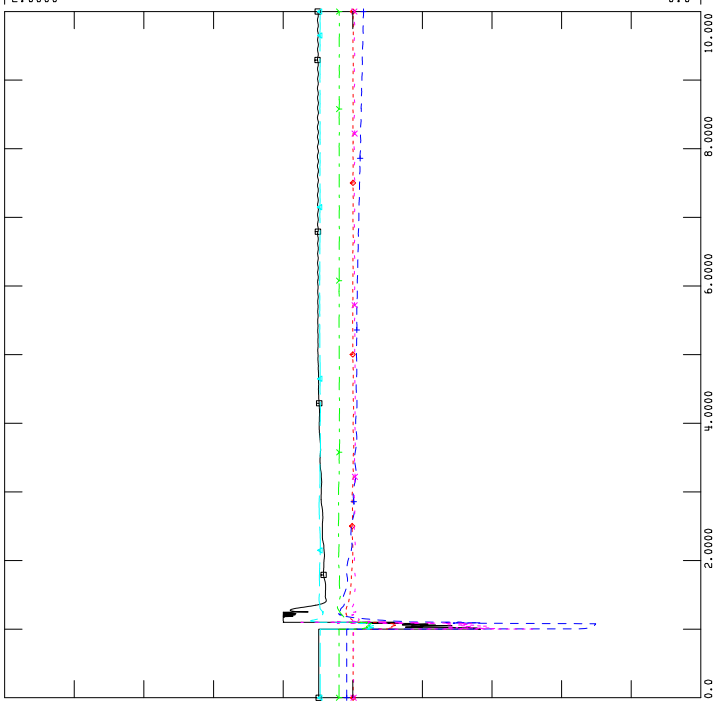


FIGURE A4-11: P2009_2021SP_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
2.0000 0.0
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
2.0000 0.0
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
2.0000 0.0
CHNL# 21: CETRM 773CSECST 20.000J1J
2.0000 0.0
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
2.0000 0.0
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ
2.0000 0.0



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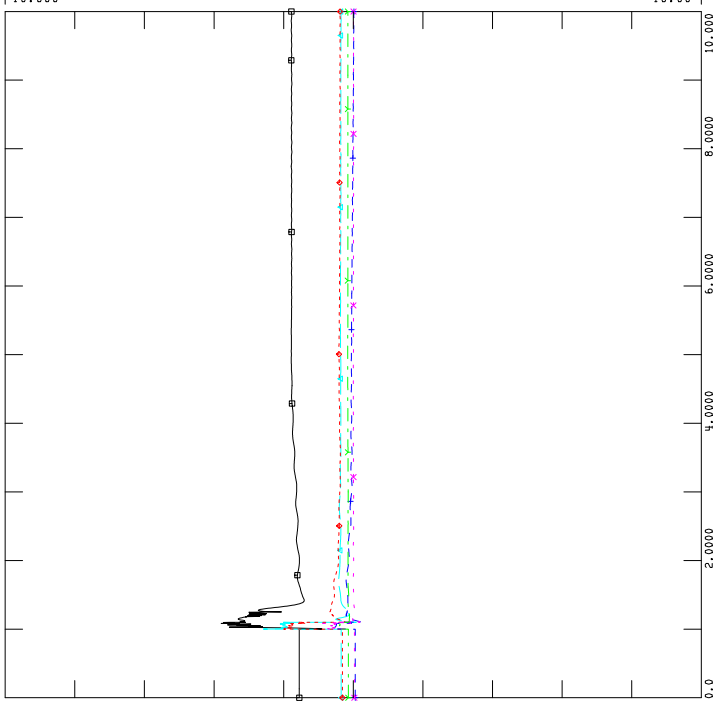
MACHINE VOLTAGE

FIGURE A4-11: P2009_2021SP_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
10.000 -10.00
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
10.000 -10.00
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
10.000 -10.00
CHNL# 15: CVARS 773CSECST 20.000J1J
10.000 -10.00
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
10.000 -10.00
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ
10.000 -10.00



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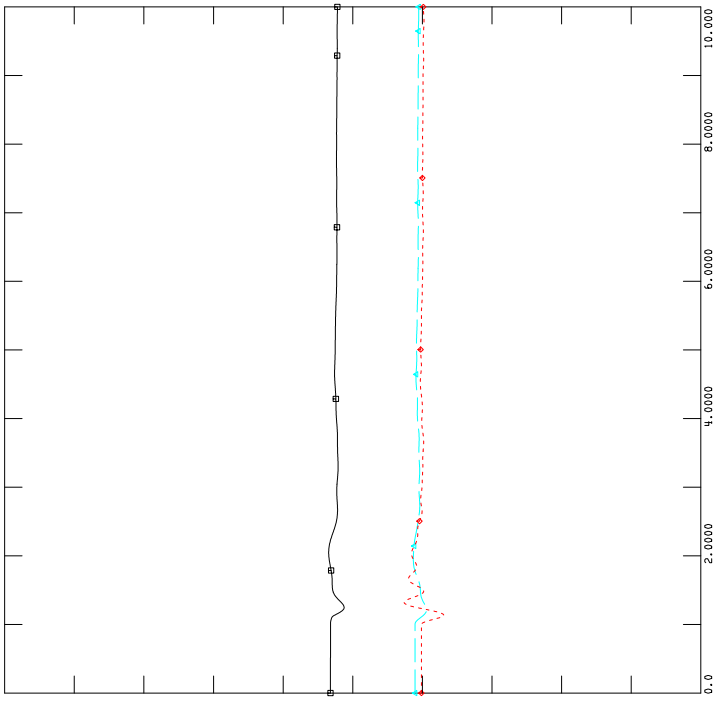
MACHINE MVAR

FIGURE A4-11: P2009_2021SP_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
100.00 -100.0
CHNL# 3: CANGL 773CSECST 20.000J1J
100.00 -100.0
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J
100.00 -100.0



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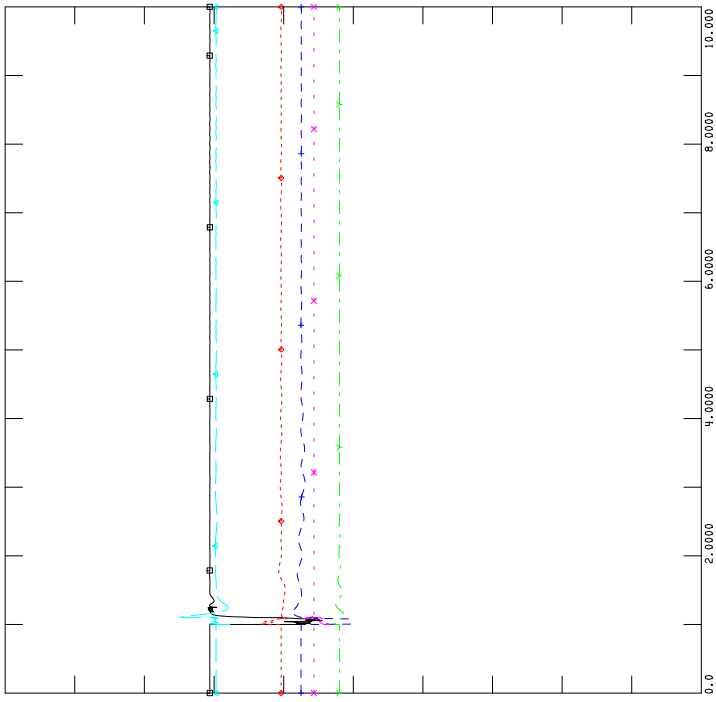
MACHINE ANGEL

FIGURE A4-11: P2009_2021SP_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
10.000 -10.00
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
10.000 -10.00
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
10.000 -10.00
CHNL# 9: CPOWR 773CSECST 20.000J1J
10.000 -10.00
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
10.000 -10.00
CHNL# 7: CPOWR560026CTRAVERS_1 0.4800JPVJ
10.000 -10.00



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MACHINE MW

FIGURE A4-11: P2009_2021SP_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 42: EVARS 159 TO 943 CKT '24'
CHNL# 40: EVARS 737 TO 736 CKT '42'
CHNL# 38: EVARS 737 TO 167 CKT '41'
CHNL# 36: EVARS 737 TO 943 CKT '36'
CHNL# 34: EVARS 547026 TO 943 CKT '05'
CHNL# 32: EVARS 451 TO 547026 CKT '05'

700.00 / -700.0

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LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

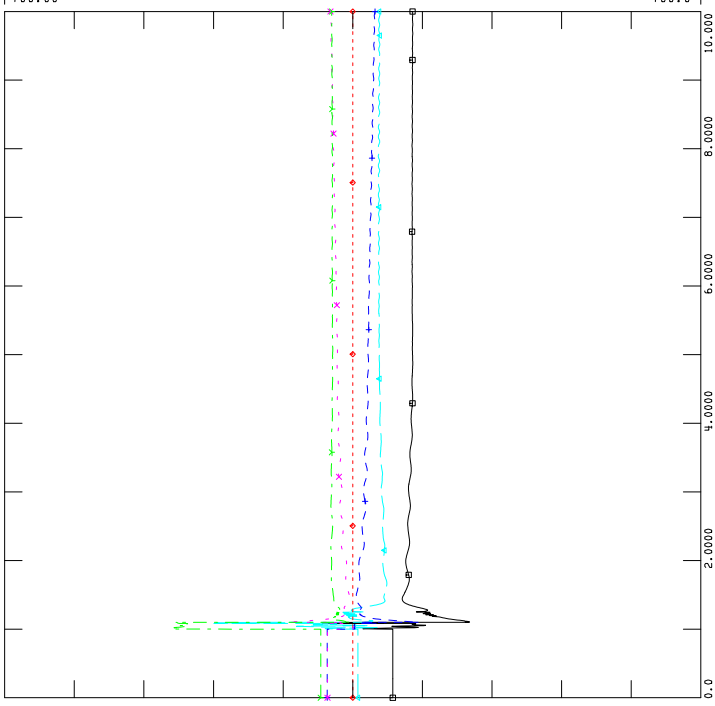

FIGURE A4-11: P2009_2021SP_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 48: EVARS 943 TO 1012 CKT '23'
CHNL# 46: EVARS 943 TO 918 CKT '35'
CHNL# 44: EVARS 167 TO 451 CKT '40'

700.00 / -700.0

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LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

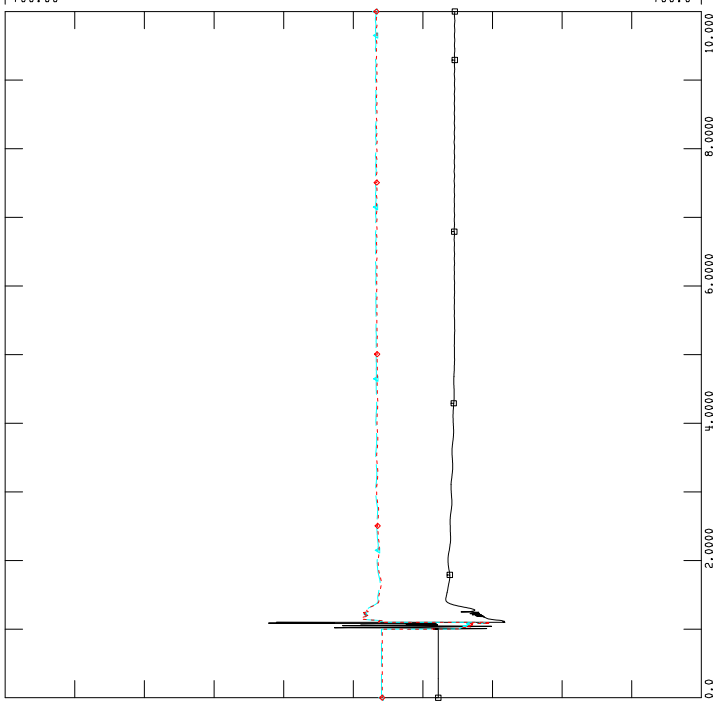

FIGURE A4-11: P2009_2021SP_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

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LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

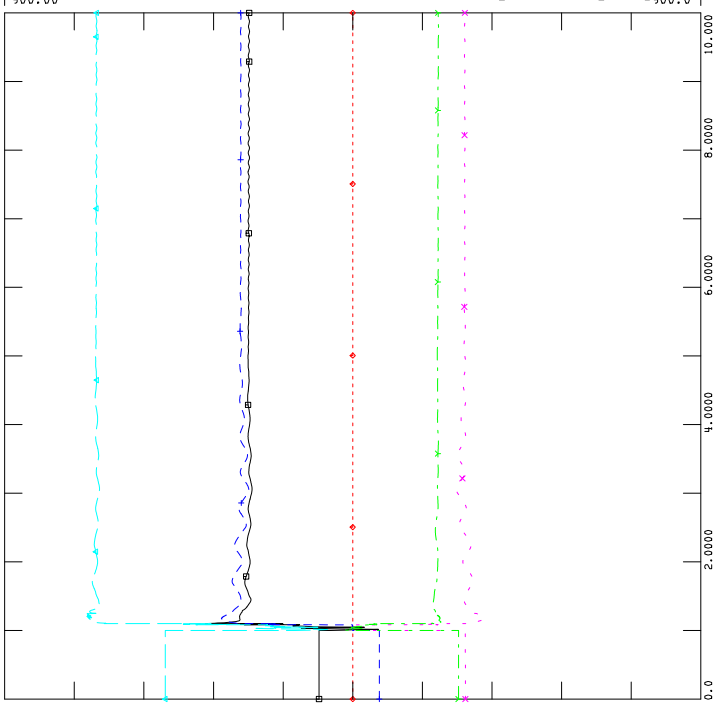


FIGURE A4-11: P2009_2021SP_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TUE, JUN 11 2019 17:42
LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

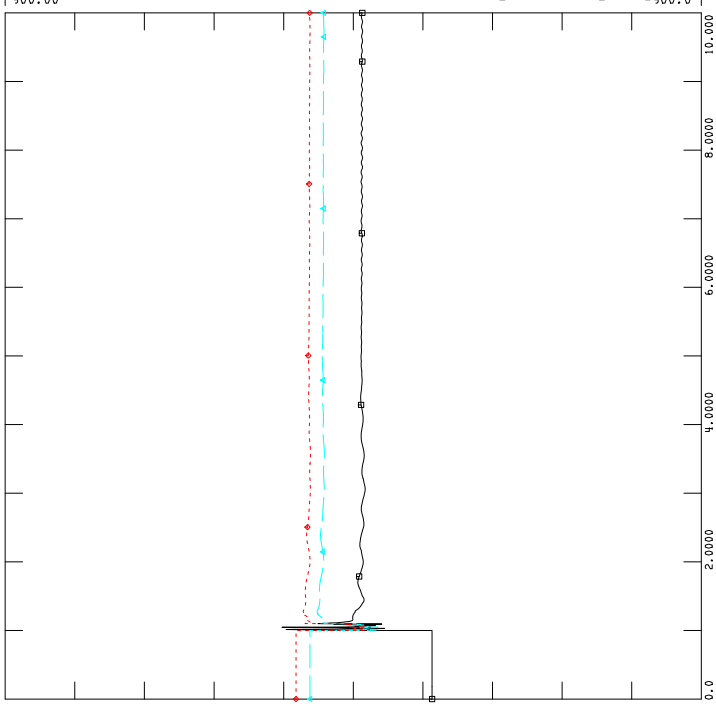


FIGURE A4-11: P2009_2021SP_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

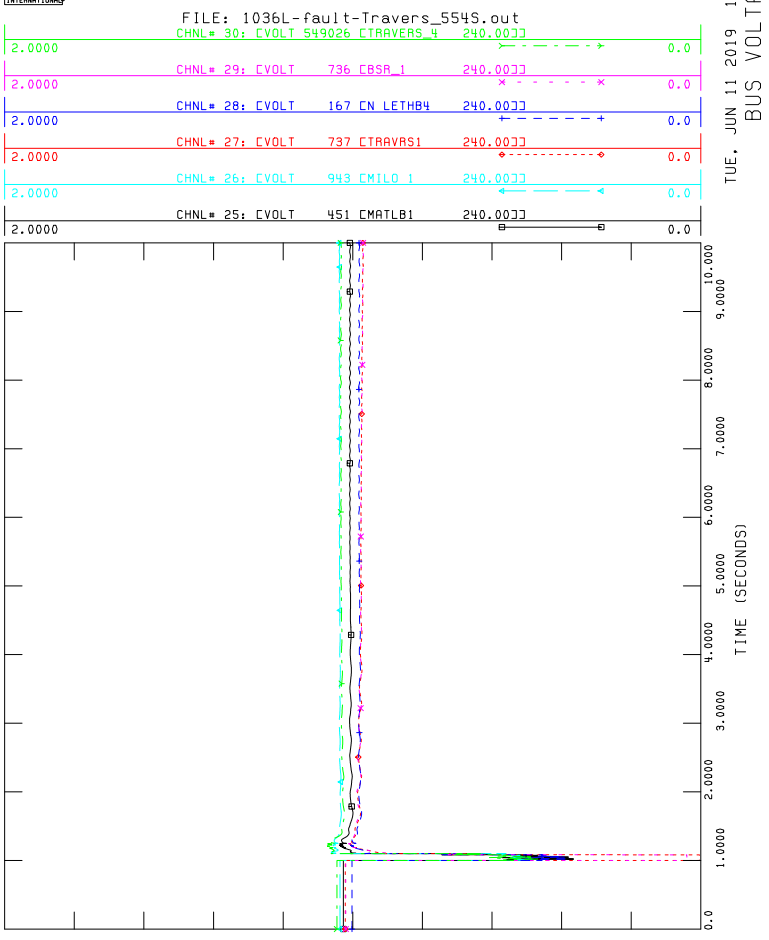
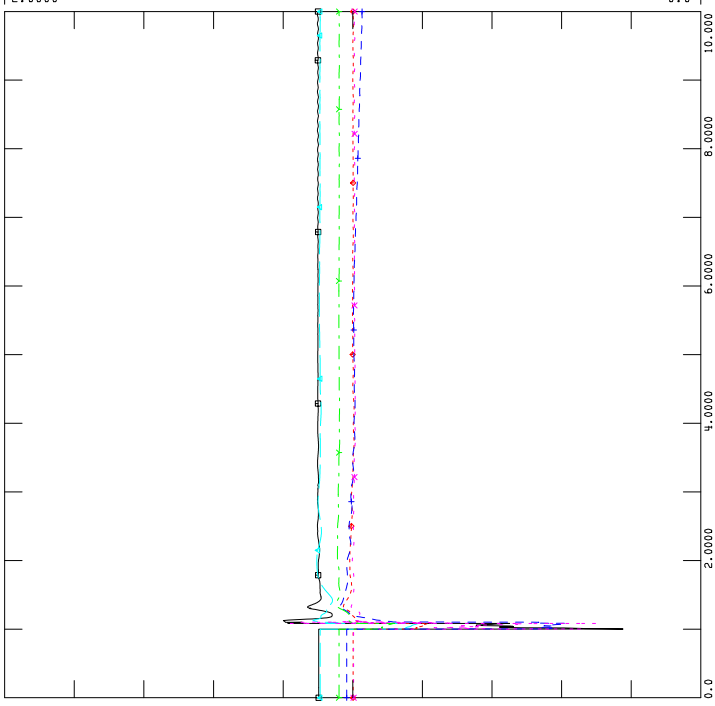


FIGURE A4-12: P2009_2021SP_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 24: ETRM 3247CAVAL_A 13.800
CHNL# 23: ETRM 61630CREDCOAT4 0.6900
CHNL# 22: ETRM 61736CBSR_4 0.6900
CHNL# 21: ETRM 773CSECST 20.000
CHNL# 20: ETRM 1482CSHEER 1 19.000
CHNL# 19: ETRM560026CTRAVERS_1 0.4800PV

2.0000 / 0.0



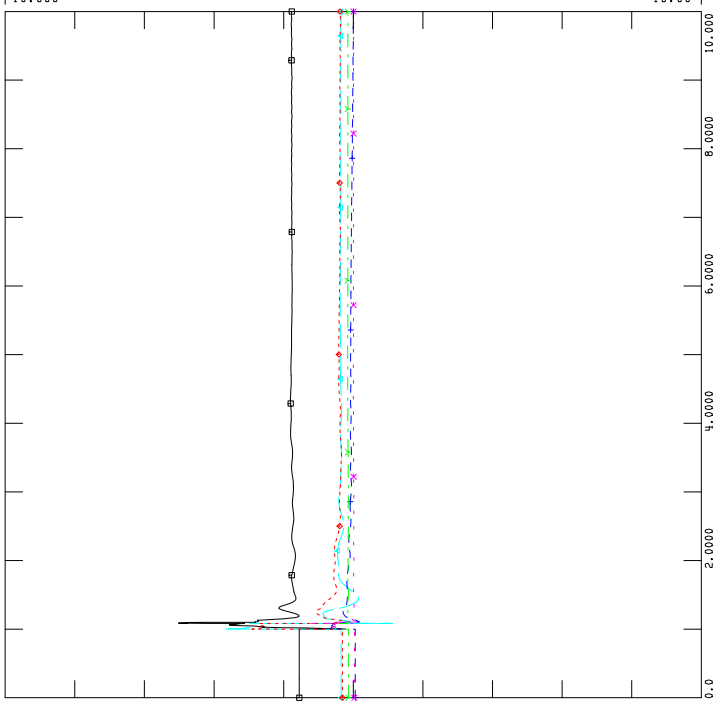
TUE, JUN 11 2019 17:43
MACHINE VOLTAGE

FIGURE A4-12: P2009_2021SP_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 18: EVARS 3247CAVAL_A 13.800
CHNL# 17: EVARS 61630CREDCOAT4 0.6900
CHNL# 16: EVARS 61736CBSR_4 0.6900
CHNL# 15: EVARS 773CSECST 20.000
CHNL# 14: EVARS 1482CSHEER 1 19.000
CHNL# 13: EVARS560026CTRAVERS_1 0.4800PV

10.000 / -10.00



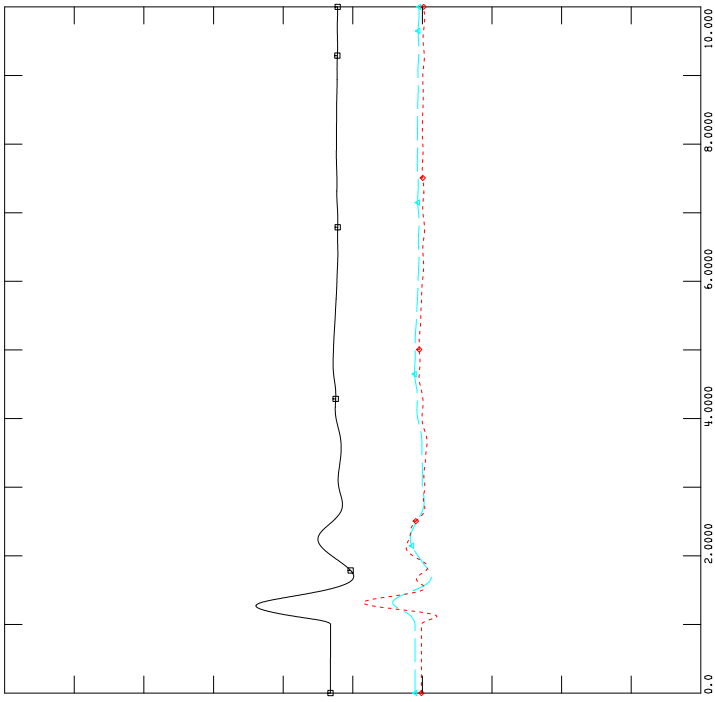
TUE, JUN 11 2019 17:43
MACHINE MVAR

FIGURE A4-12: P2009_2021SP_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 6: ANGL 3247CAVAL_A 13.800
CHNL# 3: ANGL 773CSECST 20.000
CHNL# 2: ANGL 1482CSHEER 1 19.000

100.00 / -100.0



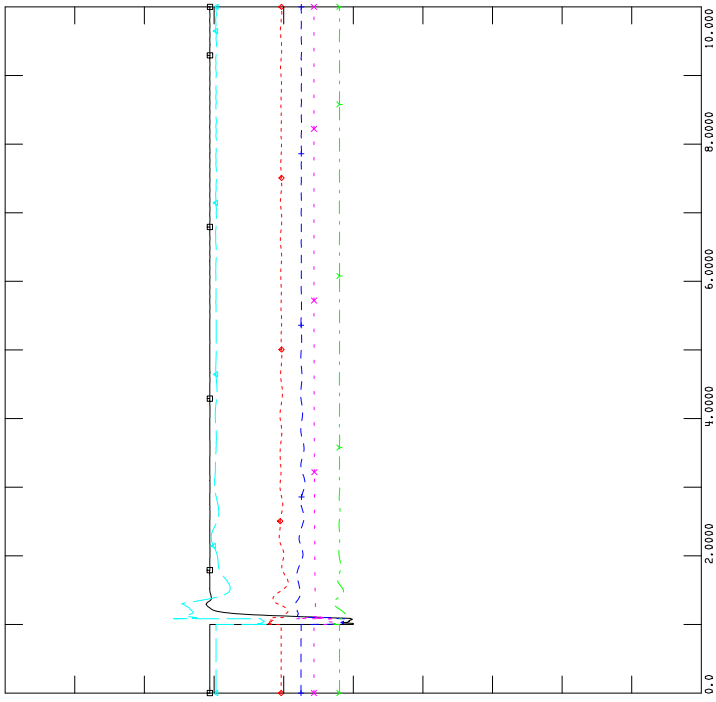
TUE, JUN 11 2019 17:43
MACHINE ANGEL

FIGURE A4-12: P2009_2021SP_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 12: POWR 3247CAVAL_A 13.800
CHNL# 11: POWR 61630CREDCOAT4 0.6900
CHNL# 10: POWR 61736CBSR_4 0.6900
CHNL# 9: POWR 773CSECST 20.000
CHNL# 8: POWR 1482CSHEER 1 19.000
CHNL# 7: POWRS60026CTRAVERS_1 0.4800PV

10.000 / -10.00



TUE, JUN 11 2019 17:43
MACHINE MW

FIGURE A4-12: P2009_2021SP_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TUE, JUN 11 2019 17:43
LINE MVAR

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

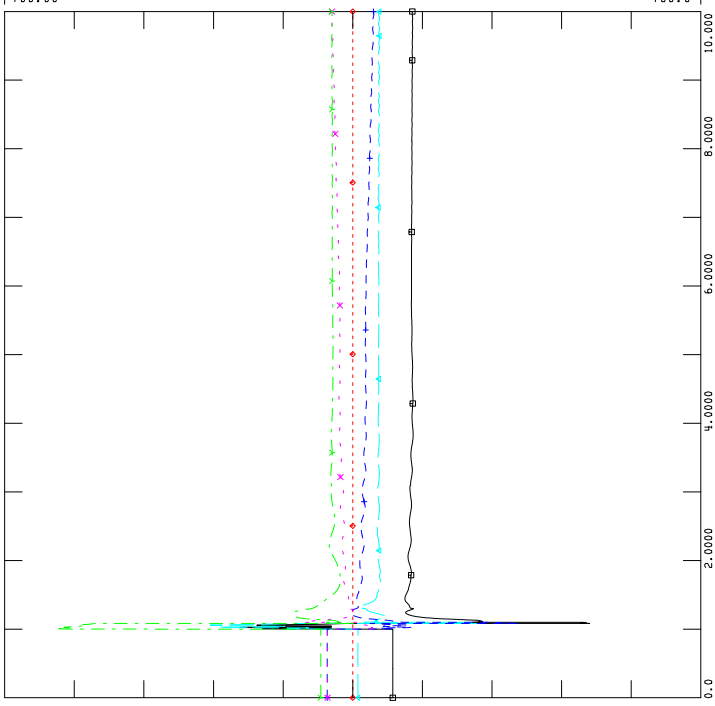


FIGURE A4-12: P2009_2021SP_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TUE, JUN 11 2019 17:43
LINE MVAR

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

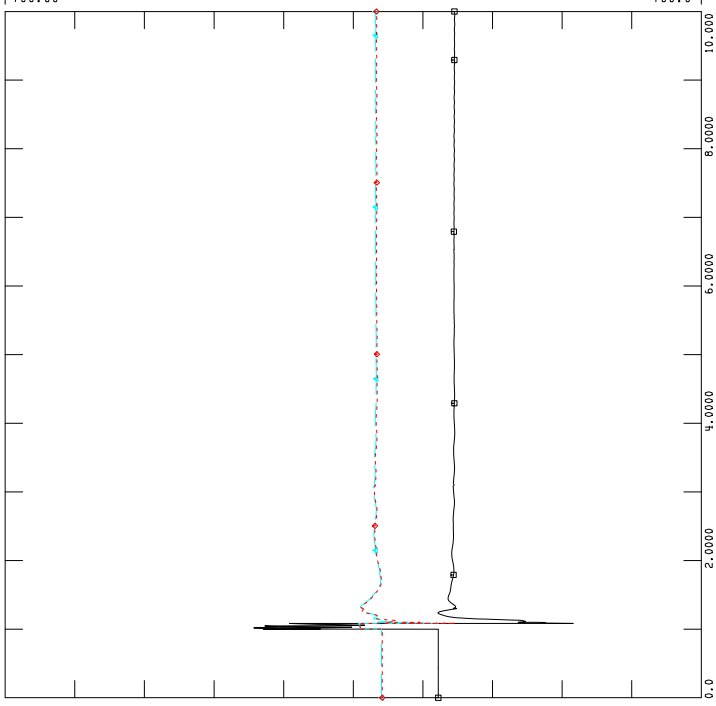


FIGURE A4-12: P2009_2021SP_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TUE, JUN 11 2019 17:43
LINE MW

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

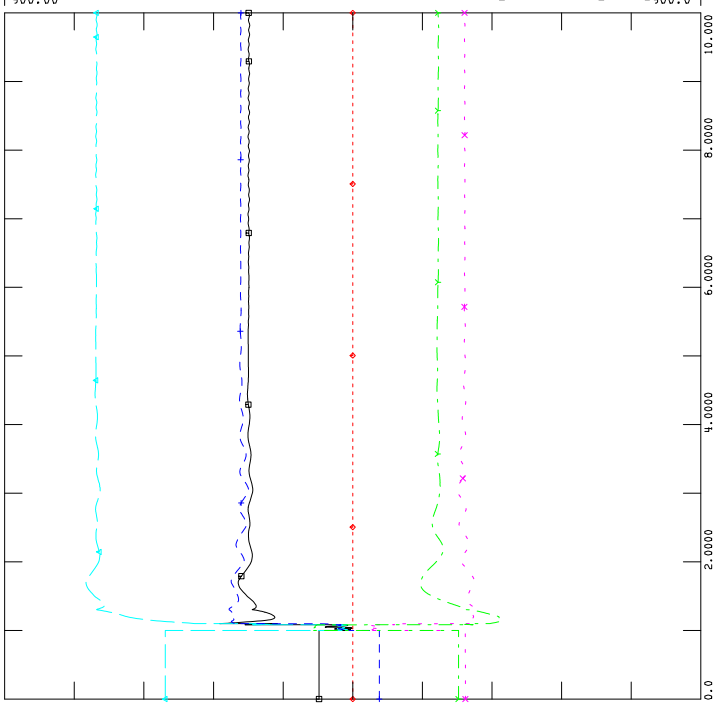


FIGURE A4-12: P2009_2021SP_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TUE, JUN 11 2019 17:43
LINE MW

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

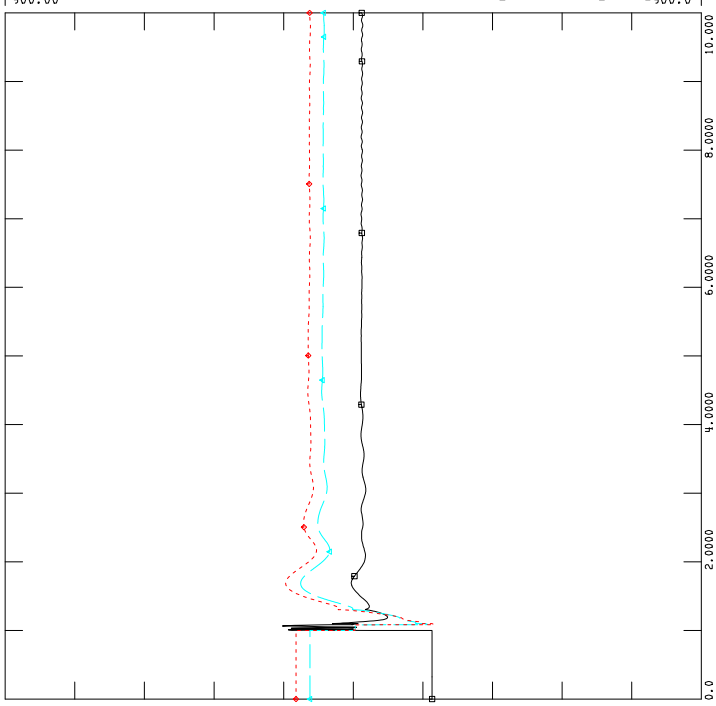


FIGURE A4-12: P2009_2021SP_POST
CATB-1036L_FAULT_AT_MILO_356S

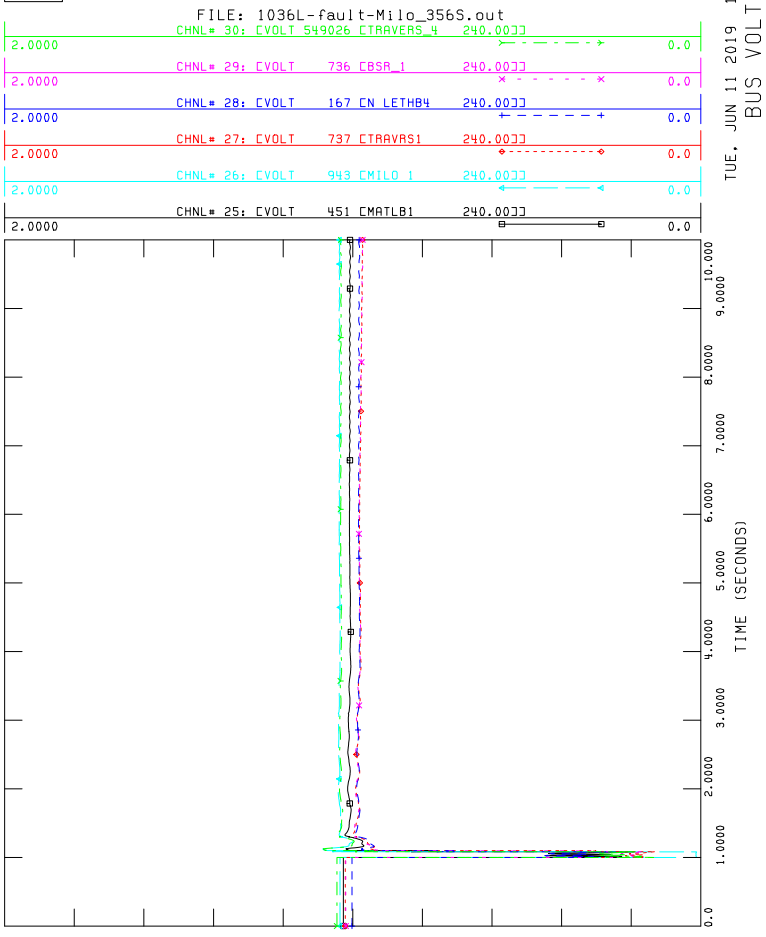


FIGURE A4-13: P2009_2021SP_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

FILE: 1037L-fault-Windy_Flats_138S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

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MACHINE VOLTAGE

TIME (SECONDS)

FIGURE A4-13: P2009_2021SP_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

FILE: 1037L-fault-Windy_Flats_138S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

TUE, JUN 11 2019 17:44
MACHINE MVAR

TIME (SECONDS)

FIGURE A4-13: P2009_2021SP_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

FILE: 1037L-fault-Windy_Flats_138S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

TUE, JUN 11 2019 17:44
MACHINE ANGEL

TIME (SECONDS)

FIGURE A4-13: P2009_2021SP_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

FILE: 1037L-fault-Windy_Flats_138S.out

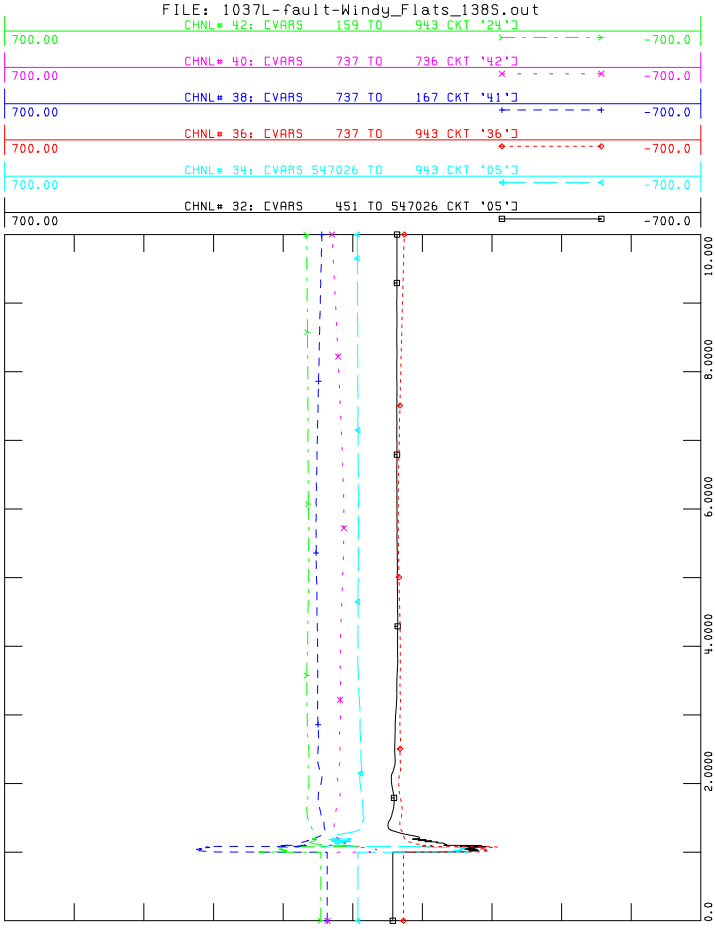
CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

TUE, JUN 11 2019 17:44
MACHINE MW

TIME (SECONDS)

FIGURE A4-13: P2009_2021SP_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

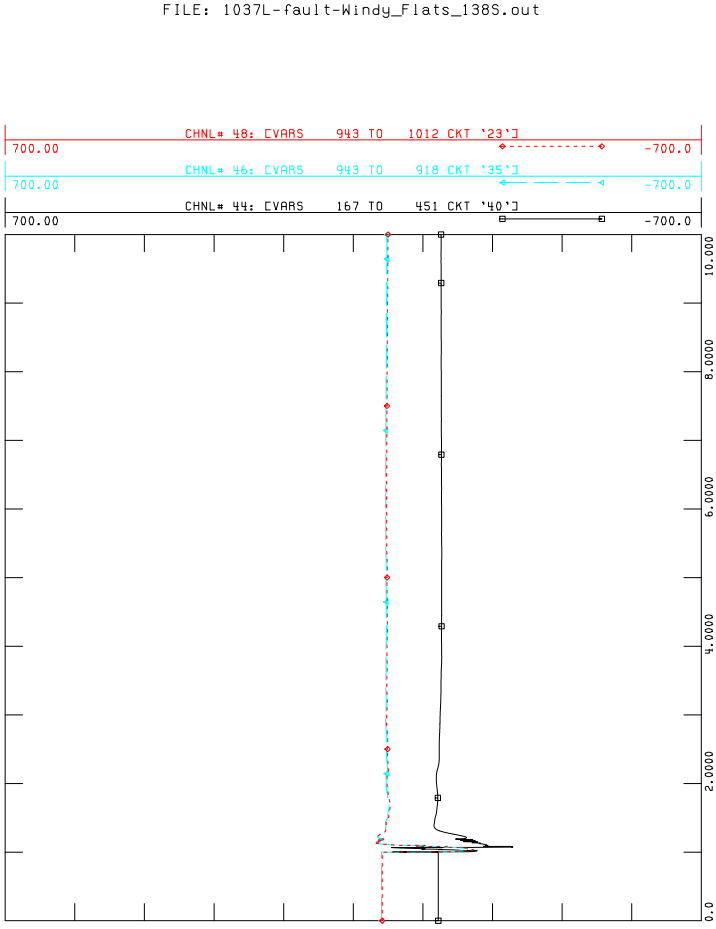
FILE: 1037L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 17:44
LINE MVAR

FIGURE A4-13: P2009_2021SP_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

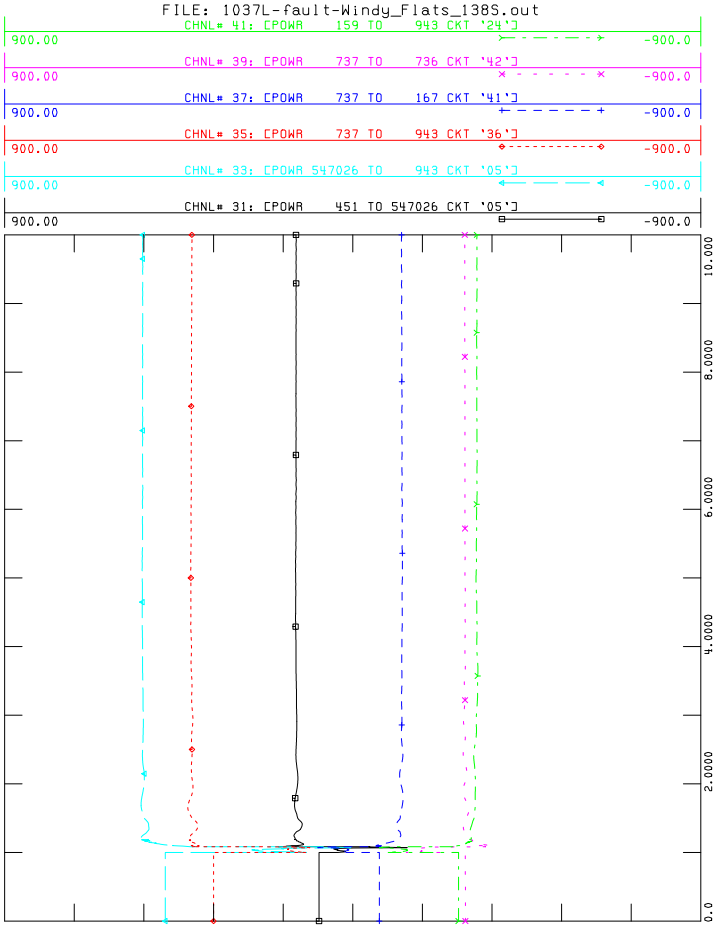
FILE: 1037L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 17:44
LINE MVAR

FIGURE A4-13: P2009_2021SP_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

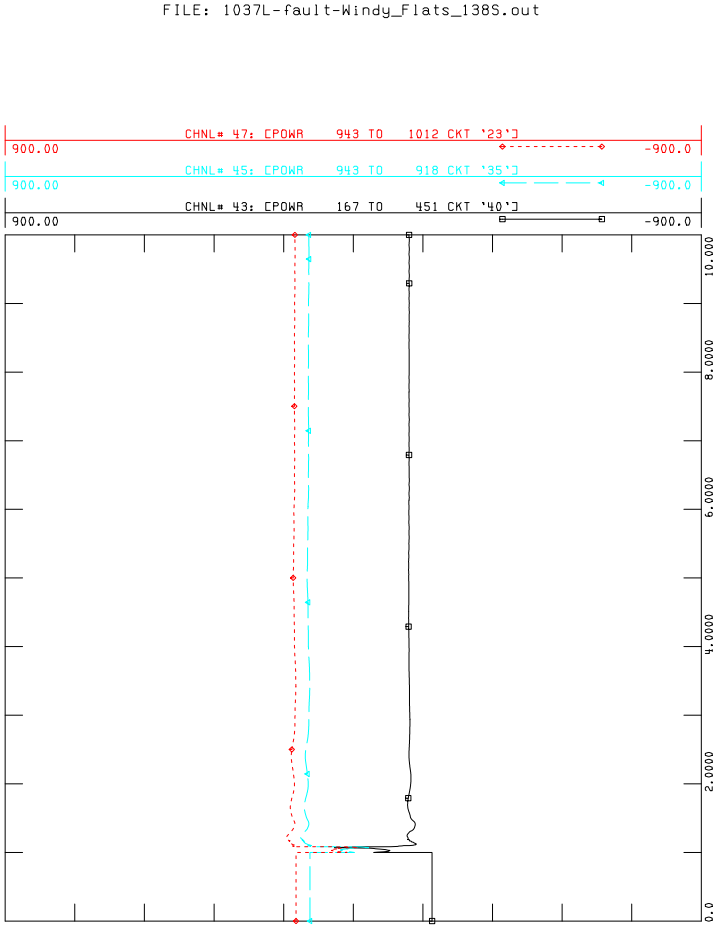
FILE: 1037L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 17:44
LINE MW

FIGURE A4-13: P2009_2021SP_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

FILE: 1037L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 17:44
LINE MW

FIGURE A4-13: P2009_2021SP_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

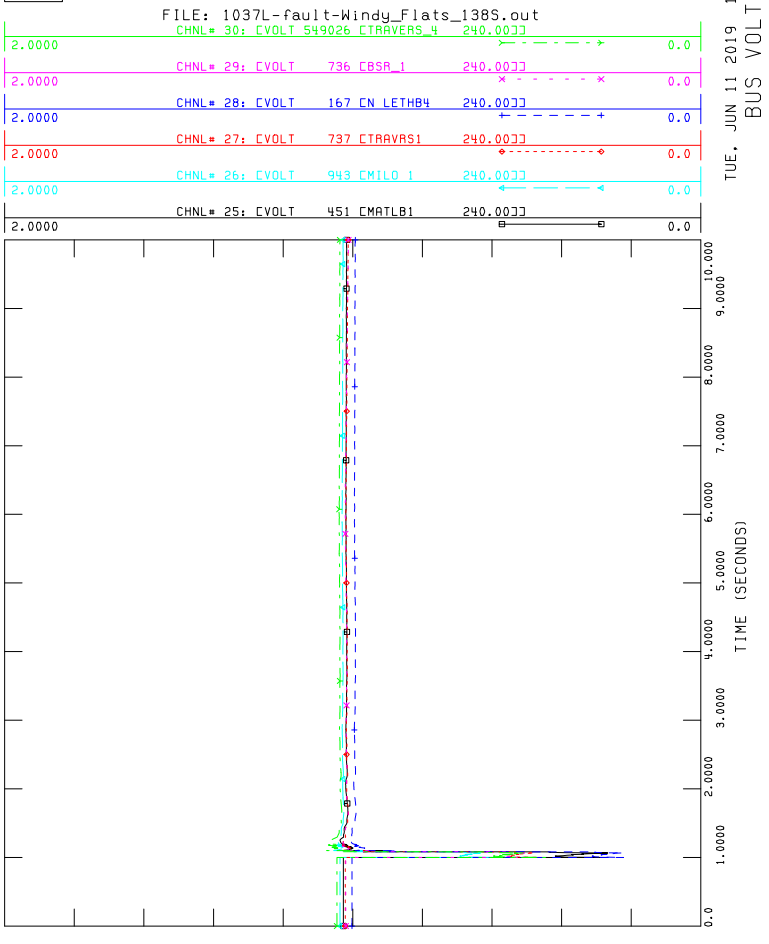


FIGURE A4-14: P2009_2021SP_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 17:45

MACHINE VOLTAGE

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

2.0000 / 0.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

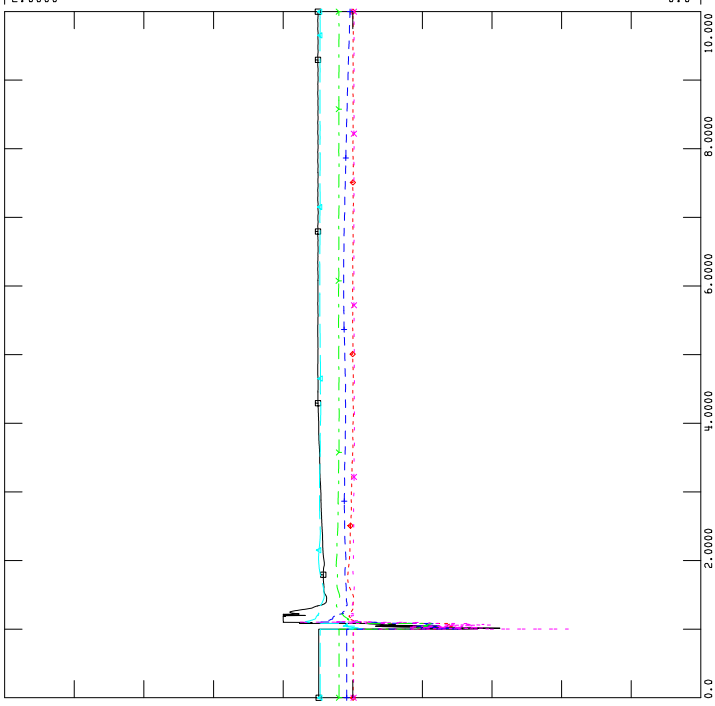


FIGURE A4-14: P2009_2021SP_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 17:45

MACHINE MVAR

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

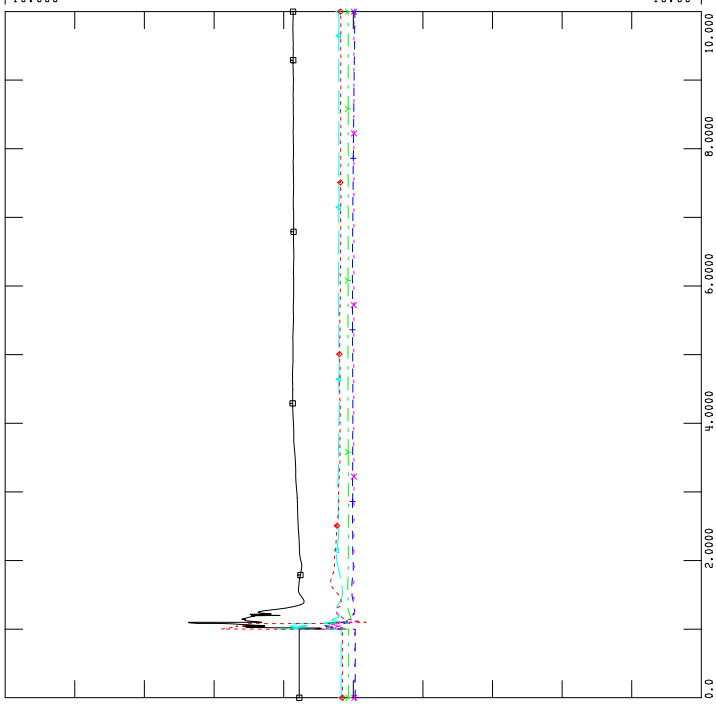


FIGURE A4-14: P2009_2021SP_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 17:45

MACHINE ANGEL

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

100.00 / -100.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

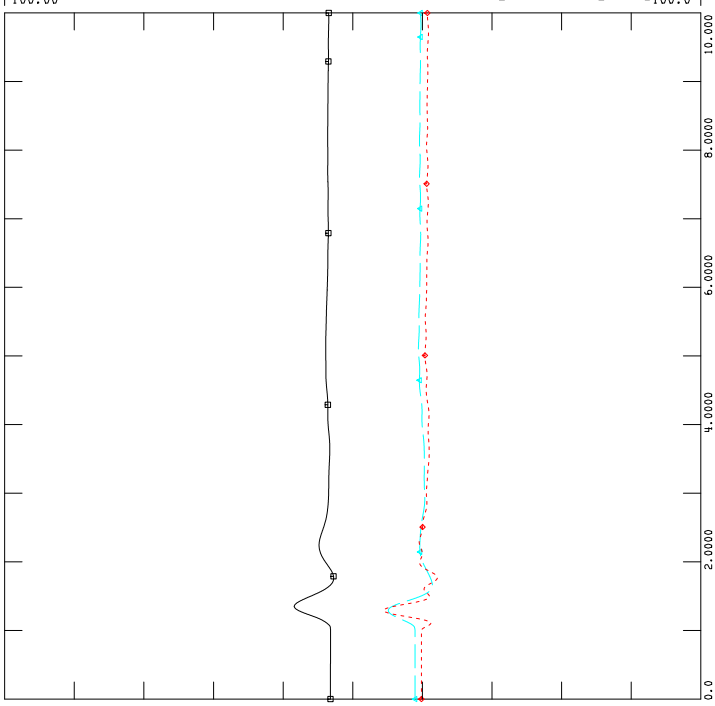


FIGURE A4-14: P2009_2021SP_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 17:45

MACHINE MW

CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

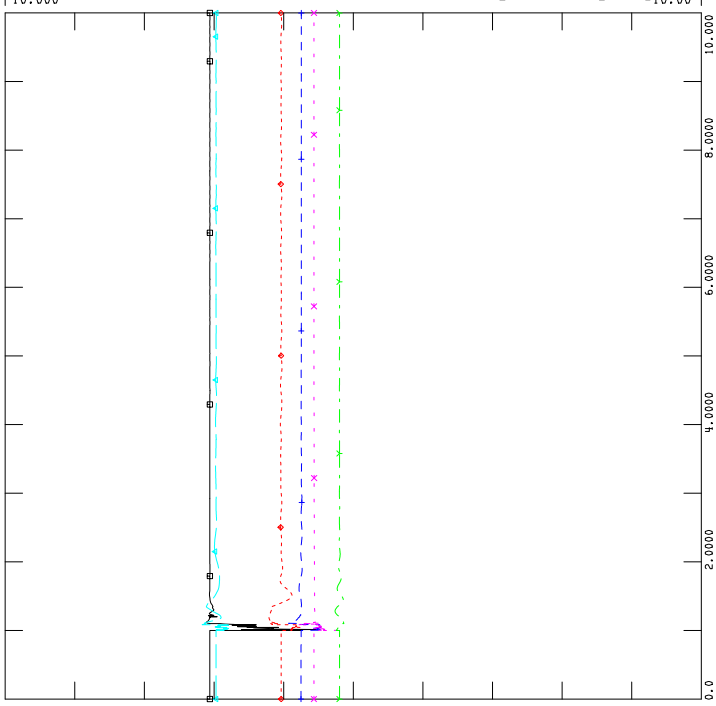


FIGURE A4-14: P2009_2021SP_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 17:45

LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-14: P2009_2021SP_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 17:45

LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-14: P2009_2021SP_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 17:45

LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-14: P2009_2021SP_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 17:45

LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-14: P2009_2021SP_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

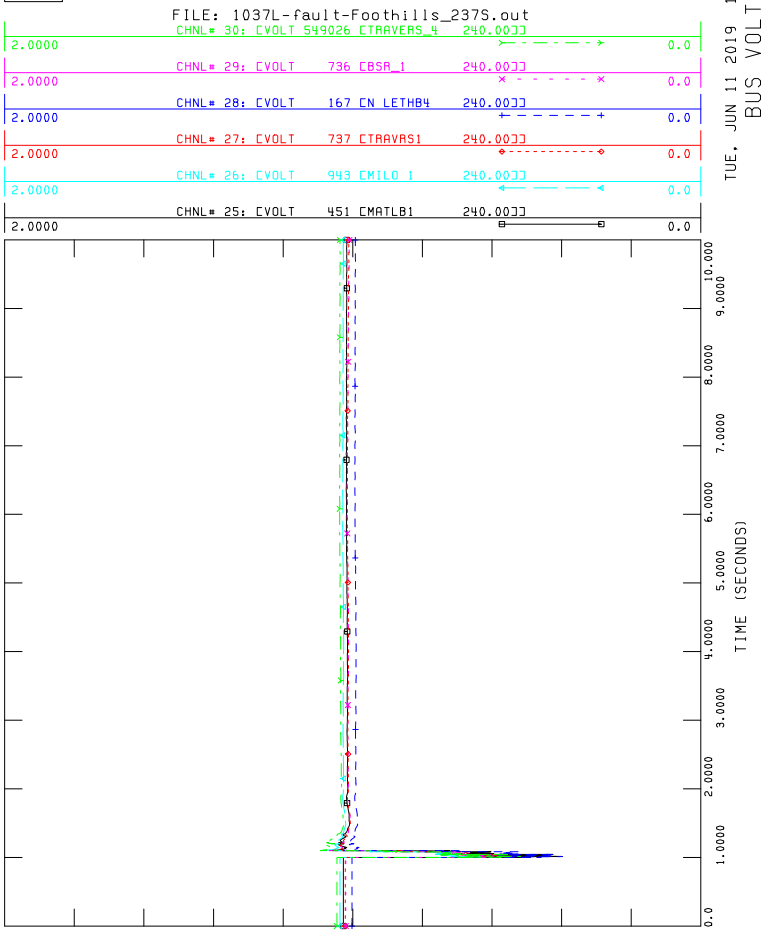


FIGURE A4-15: P2009_2021SP_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 17:45
MACHINE VOLTAGE

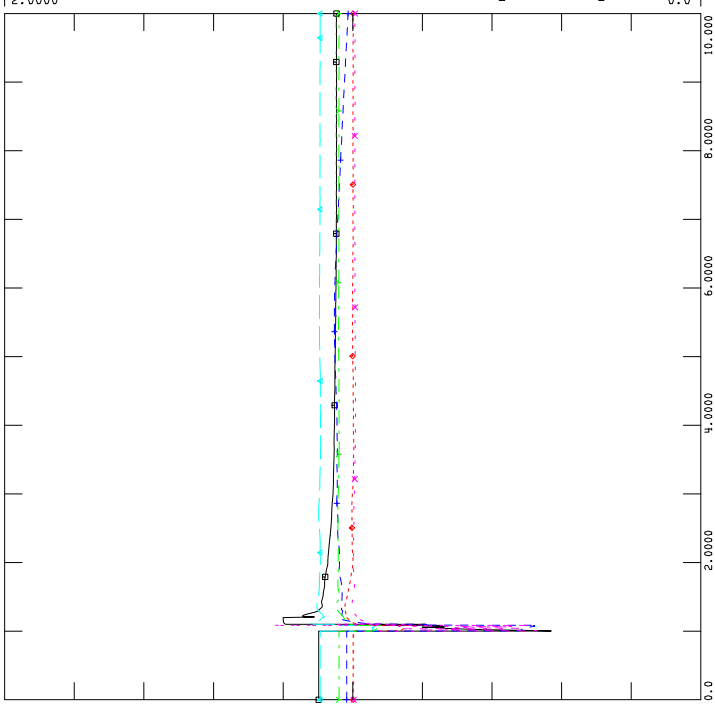


FIGURE A4-15: P2009_2021SP_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 17:46
MACHINE MVAR

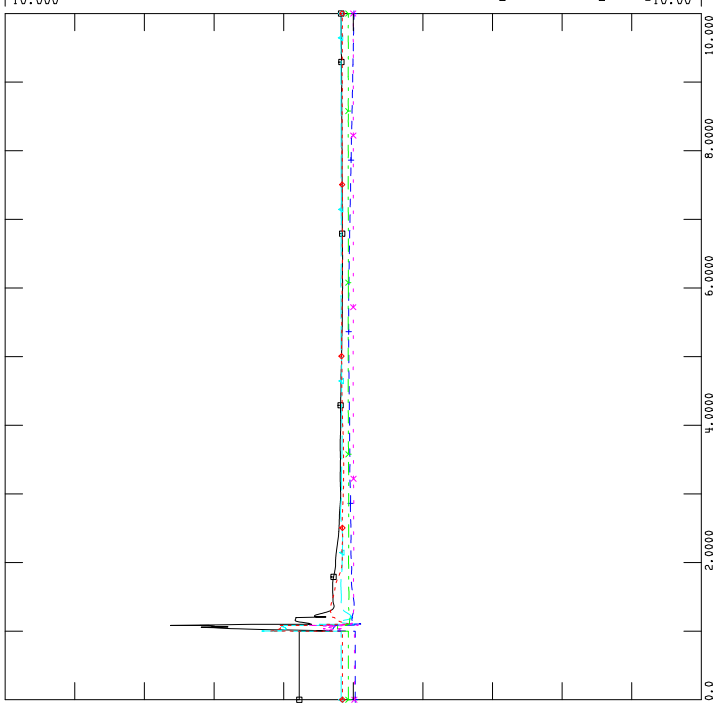


FIGURE A4-15: P2009_2021SP_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 17:45
MACHINE ANGEL

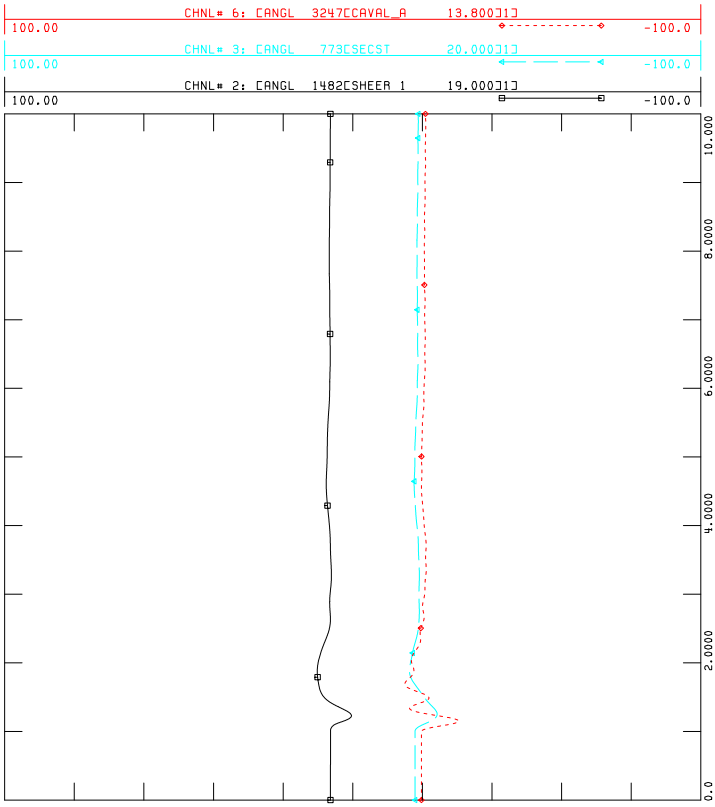


FIGURE A4-15: P2009_2021SP_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 17:45
MACHINE MW

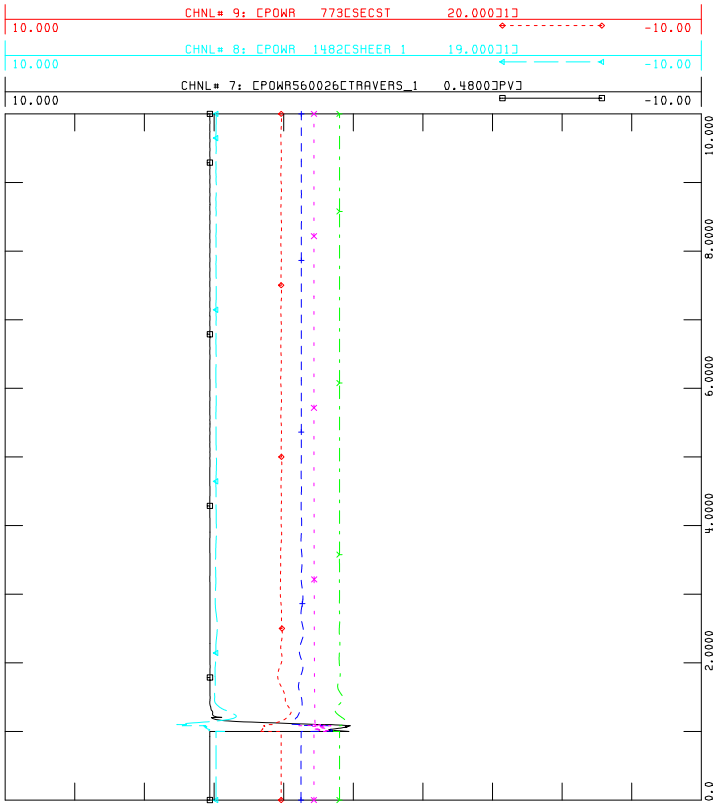


FIGURE A4-15: P2009_2021SP_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

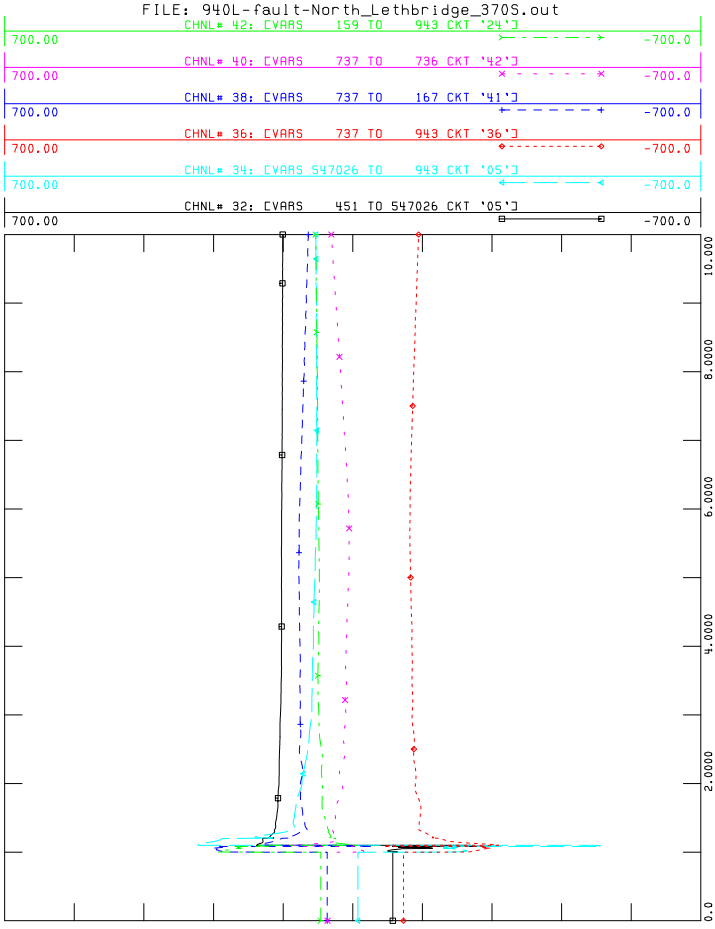


FIGURE A4-15: P2009_2021SP_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

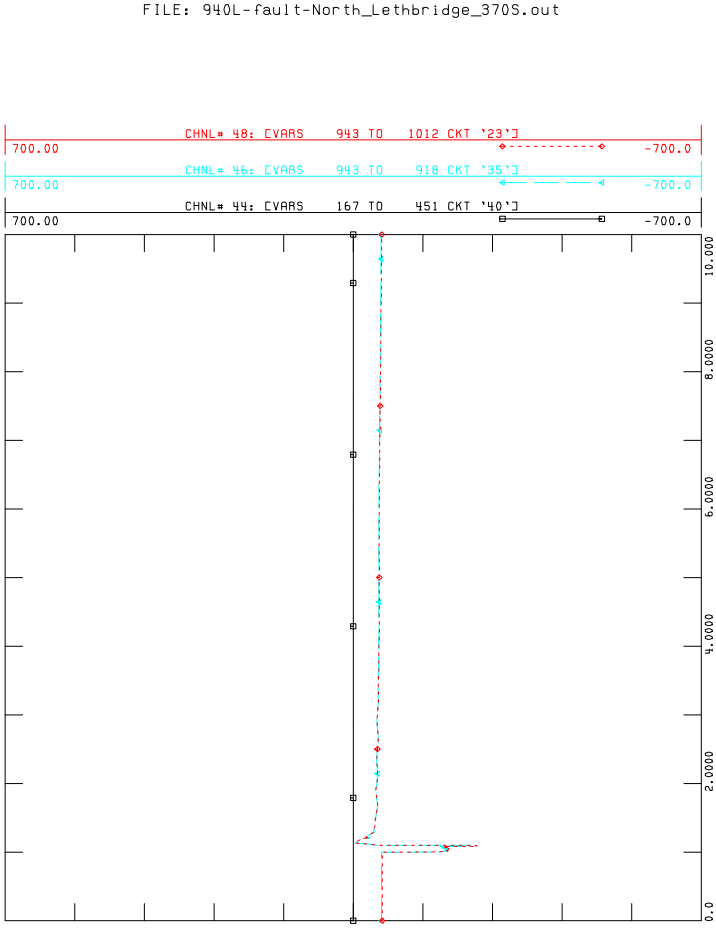


FIGURE A4-15: P2009_2021SP_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

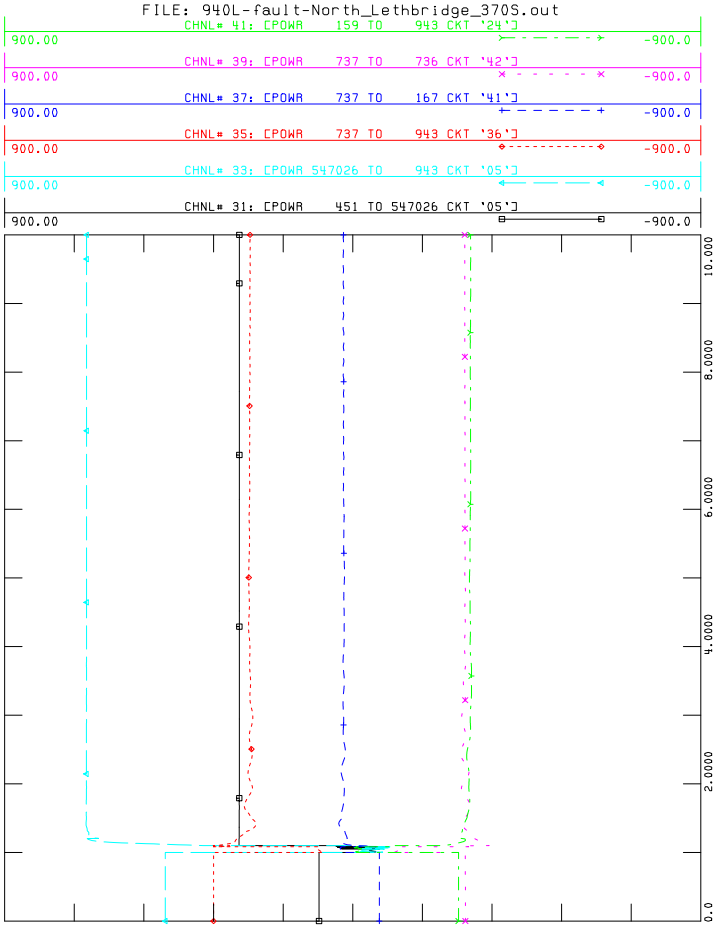


FIGURE A4-15: P2009_2021SP_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

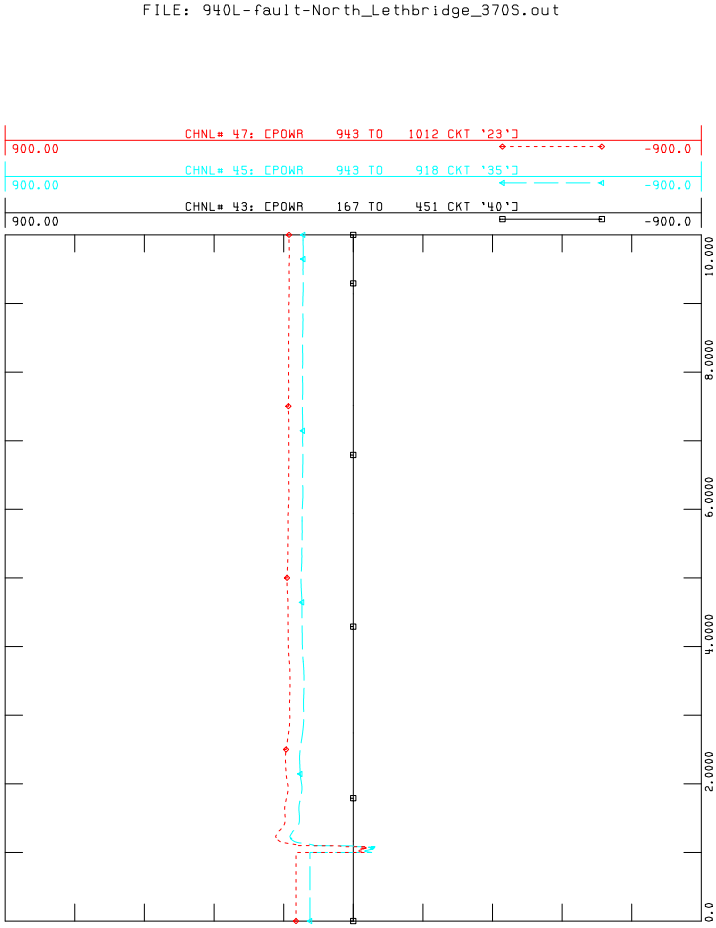


FIGURE A4-15: P2009_2021SP_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

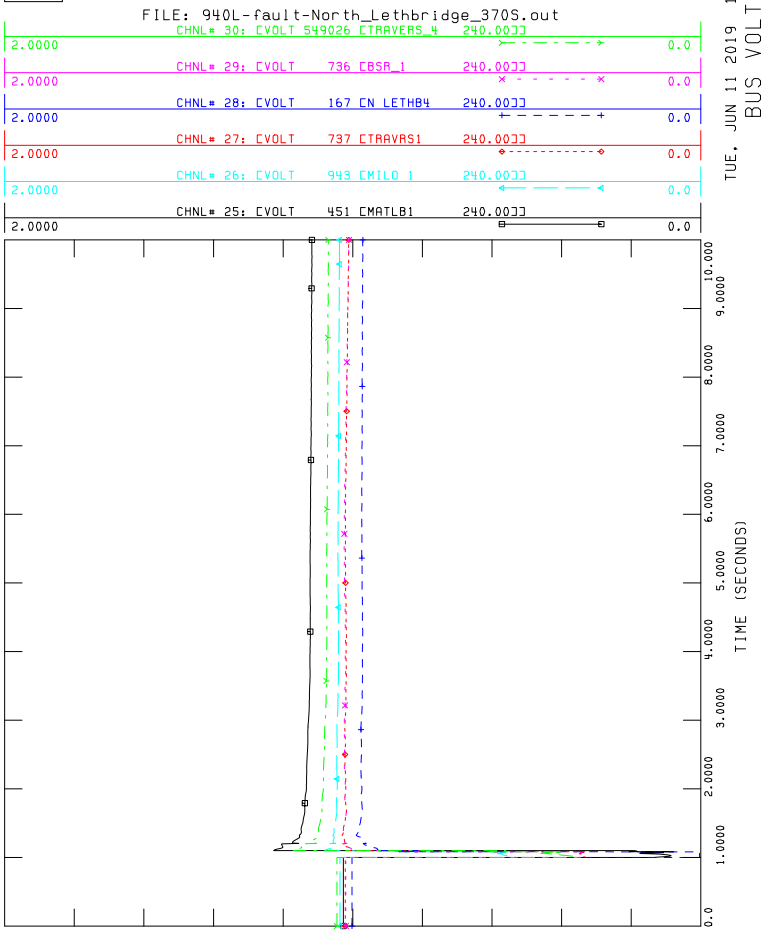


FIGURE A4-16: P2009_2021SP_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 17:47

MACHINE VOLTAGE

CHNL# 24: CETRM 3247CCAVAL_A 13.800ǁ1ǁ
2.0000 0.0
CHNL# 23: CETRM 61630CREDCOAT4 0.6900ǁG1ǁ
2.0000 0.0
CHNL# 22: CETRM 61736CBSR_4 0.6900ǁ1ǁ
2.0000 0.0
CHNL# 21: CETRM 773CSECST 20.000ǁ1ǁ
2.0000 0.0
CHNL# 20: CETRM 1482CSHEER 1 19.000ǁ1ǁ
2.0000 0.0
CHNL# 19: CETRMS60026CTRAVERS_1 0.4800ǁPVǁ
2.0000 0.0

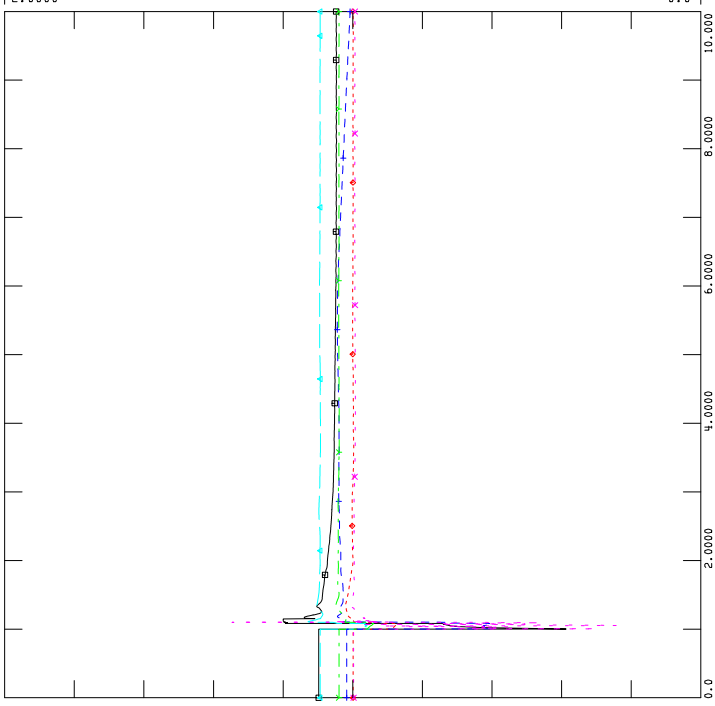


FIGURE A4-16: P2009_2021SP_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 17:47

MACHINE MVAR

CHNL# 18: CVARS 3247CCAVAL_A 13.800ǁ1ǁ
10.000 -10.00
CHNL# 17: CVARS 61630CREDCOAT4 0.6900ǁG1ǁ
10.000 -10.00
CHNL# 16: CVARS 61736CBSR_4 0.6900ǁ1ǁ
10.000 -10.00
CHNL# 15: CVARS 773CSECST 20.000ǁ1ǁ
10.000 -10.00
CHNL# 14: CVARS 1482CSHEER 1 19.000ǁ1ǁ
10.000 -10.00
CHNL# 13: CVARSS60026CTRAVERS_1 0.4800ǁPVǁ
10.000 -10.00

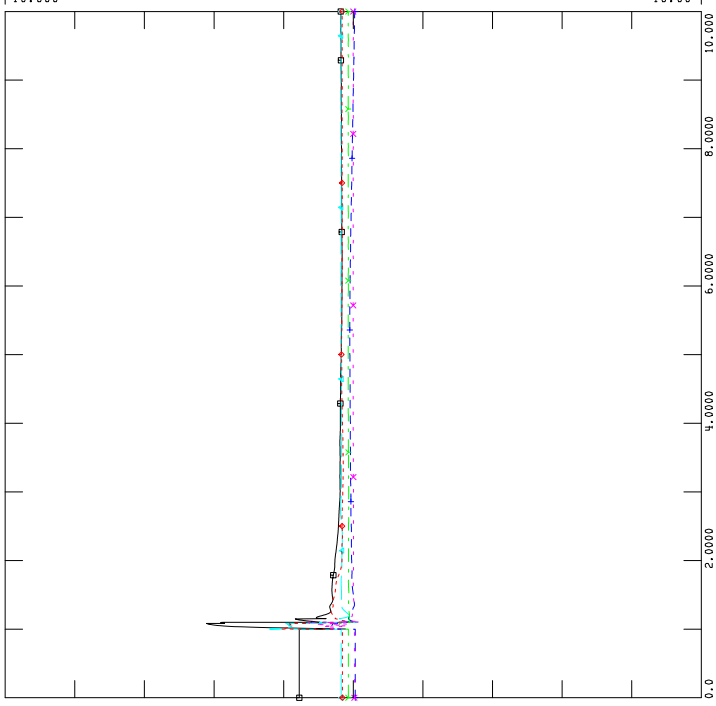


FIGURE A4-16: P2009_2021SP_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 17:47

MACHINE ANGEL

CHNL# 6: CANGL 3247CCAVAL_A 13.800ǁ1ǁ
100.00 -100.0
CHNL# 3: CANGL 773CSECST 20.000ǁ1ǁ
100.00 -100.0
CHNL# 2: CANGL 1482CSHEER 1 19.000ǁ1ǁ
100.00 -100.0

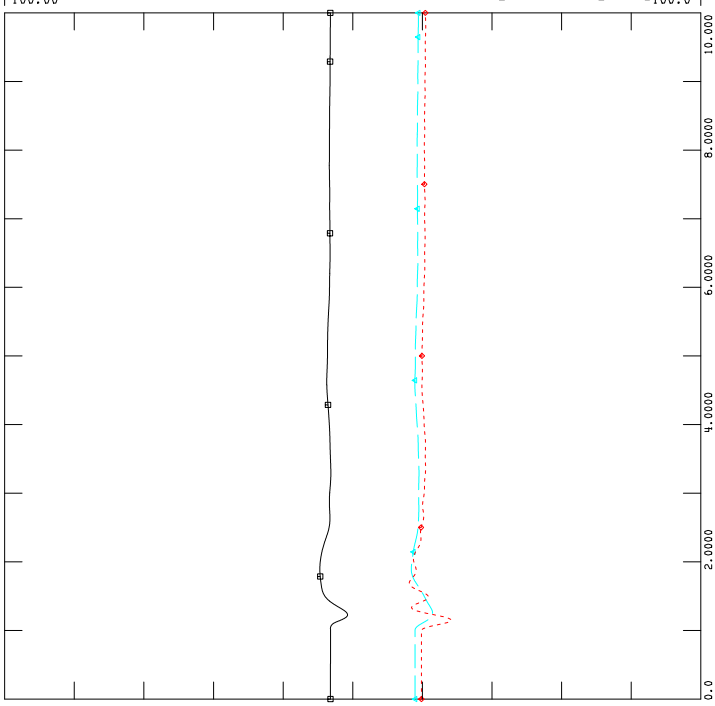


FIGURE A4-16: P2009_2021SP_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 17:47

MACHINE MW

CHNL# 12: CPOWR 3247CCAVAL_A 13.800ǁ1ǁ
10.000 -10.00
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900ǁG1ǁ
10.000 -10.00
CHNL# 10: CPOWR 61736CBSR_4 0.6900ǁ1ǁ
10.000 -10.00
CHNL# 9: CPOWR 773CSECST 20.000ǁ1ǁ
10.000 -10.00
CHNL# 8: CPOWR 1482CSHEER 1 19.000ǁ1ǁ
10.000 -10.00
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800ǁPVǁ
10.000 -10.00

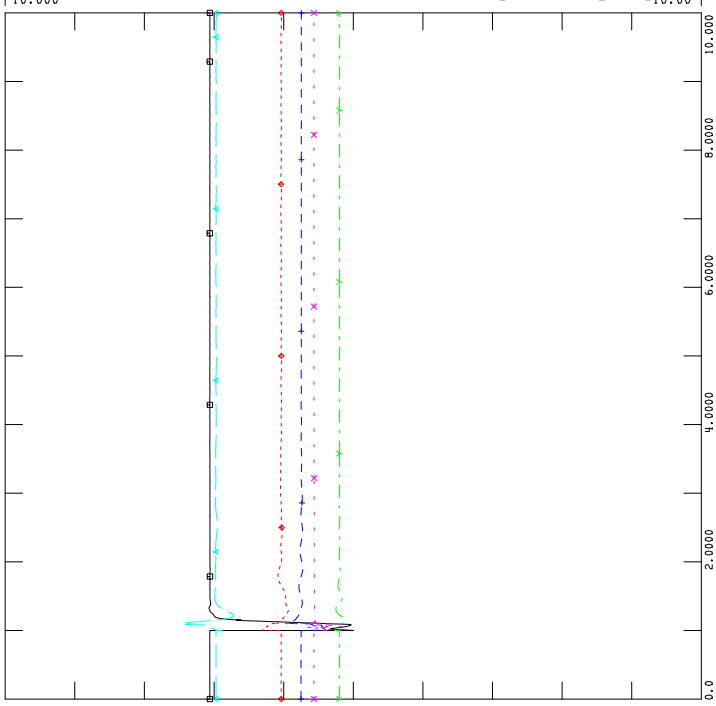
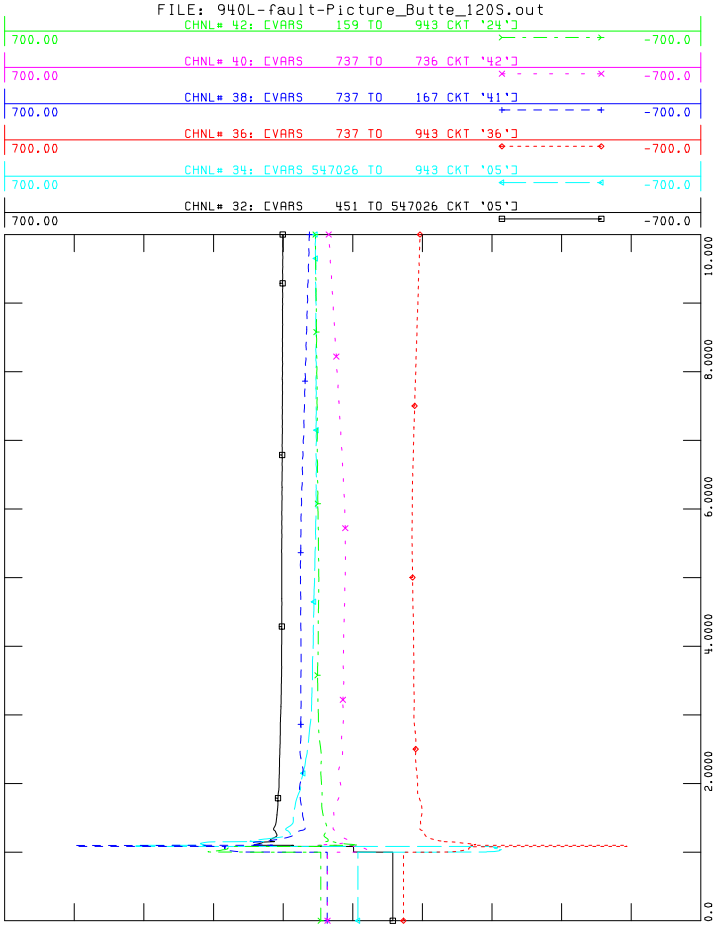


FIGURE A4-16: P2009_2021SP_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

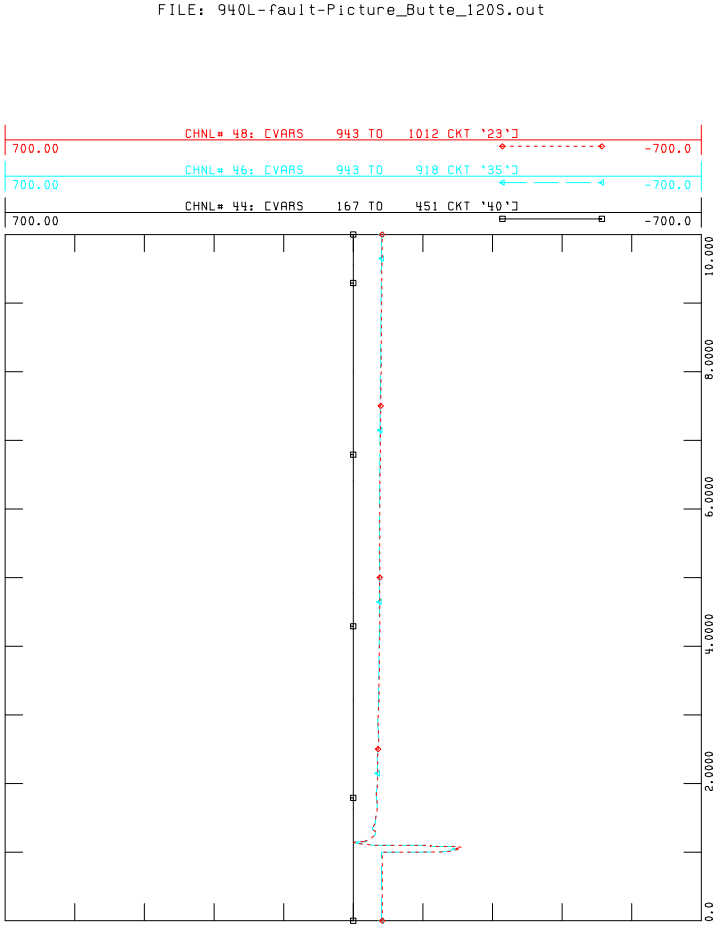
FILE: 940L-fault-Picture_Butte_120S.out



TUE, JUN 11 2019 17:47
LINE MVAR

FIGURE A4-16: P2009_2021SP_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

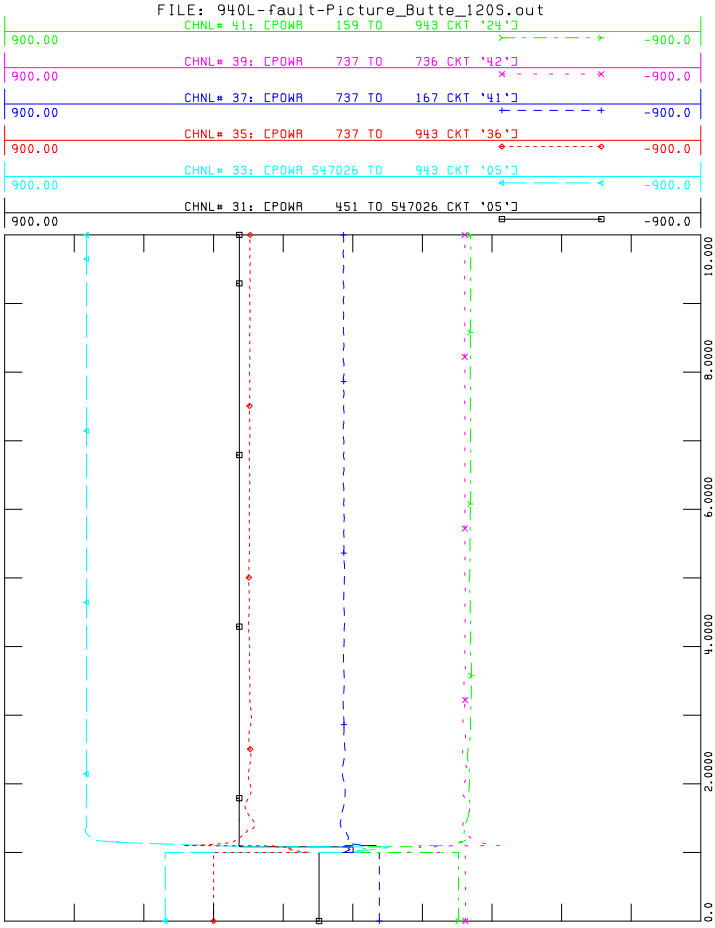
FILE: 940L-fault-Picture_Butte_120S.out



TUE, JUN 11 2019 17:47
LINE MVAR

FIGURE A4-16: P2009_2021SP_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

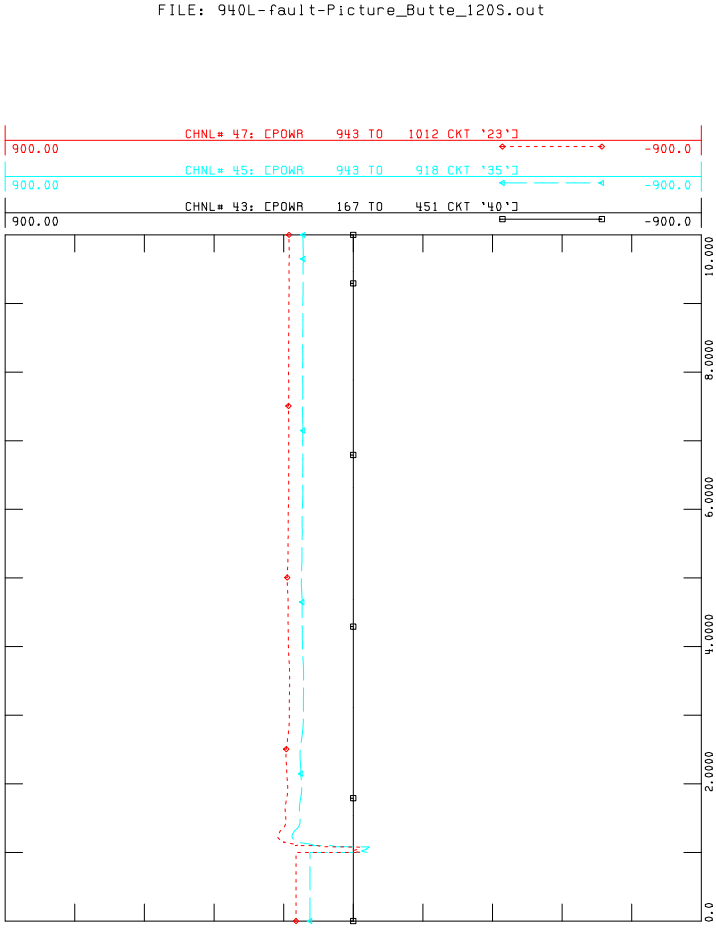
FILE: 940L-fault-Picture_Butte_120S.out



TUE, JUN 11 2019 17:47
LINE MW

FIGURE A4-16: P2009_2021SP_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out



TUE, JUN 11 2019 17:47
LINE MW

FIGURE A4-16: P2009_2021SP_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

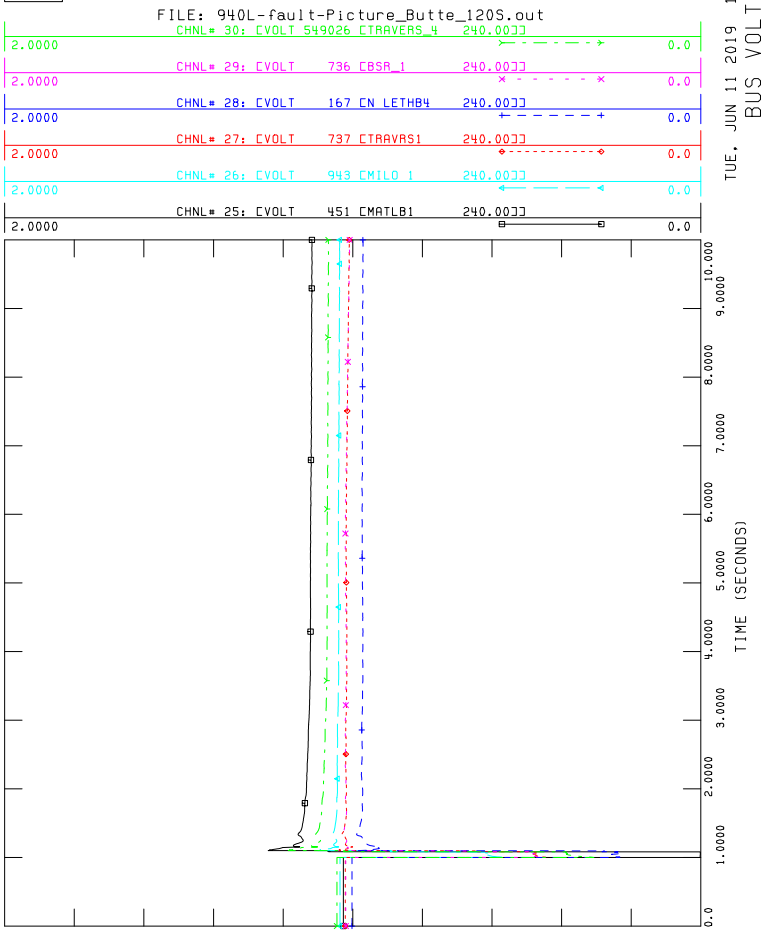


FIGURE A4-17: P2009_2021SP_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 17:48

MACHINE VOLTAGE

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

2.0000 / 0.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

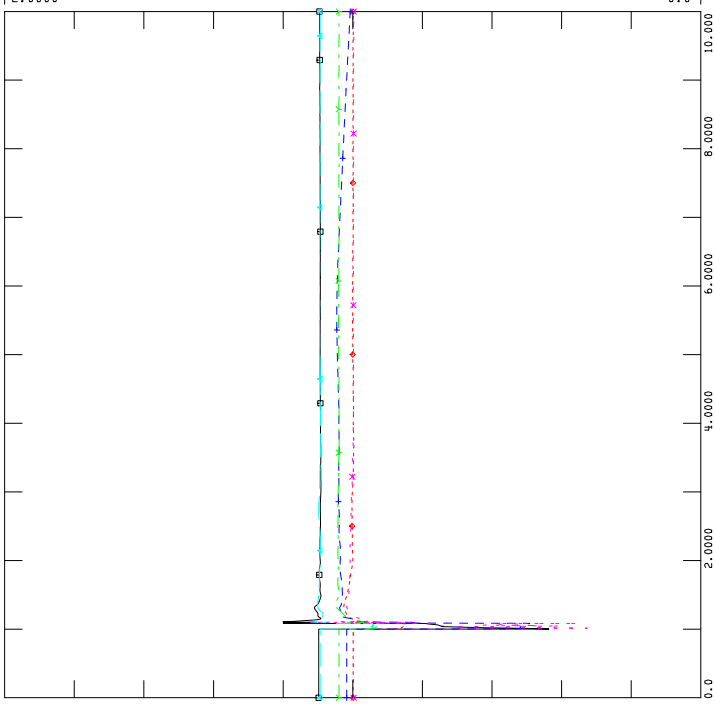


FIGURE A4-17: P2009_2021SP_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 17:48

MACHINE MVAR

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

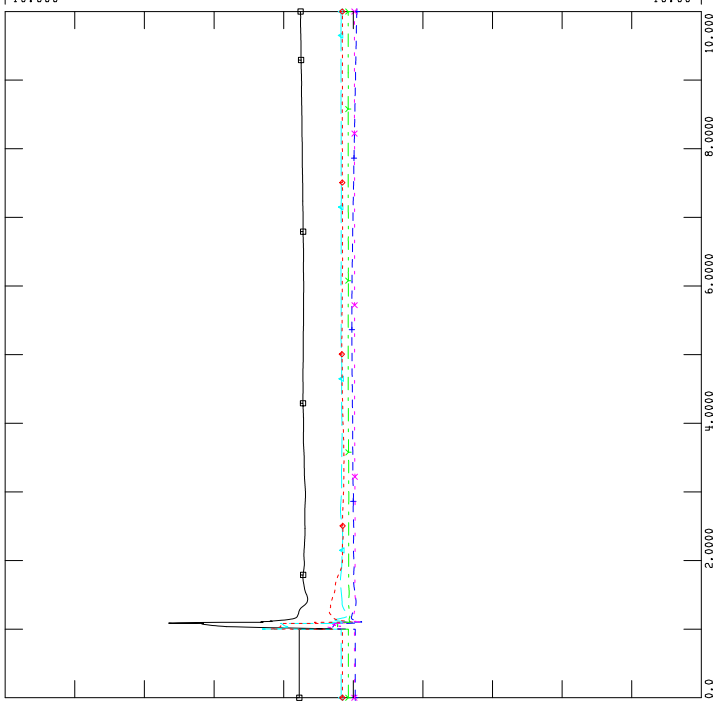


FIGURE A4-17: P2009_2021SP_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 17:48

MACHINE ANGEL

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

100.00 / -100.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

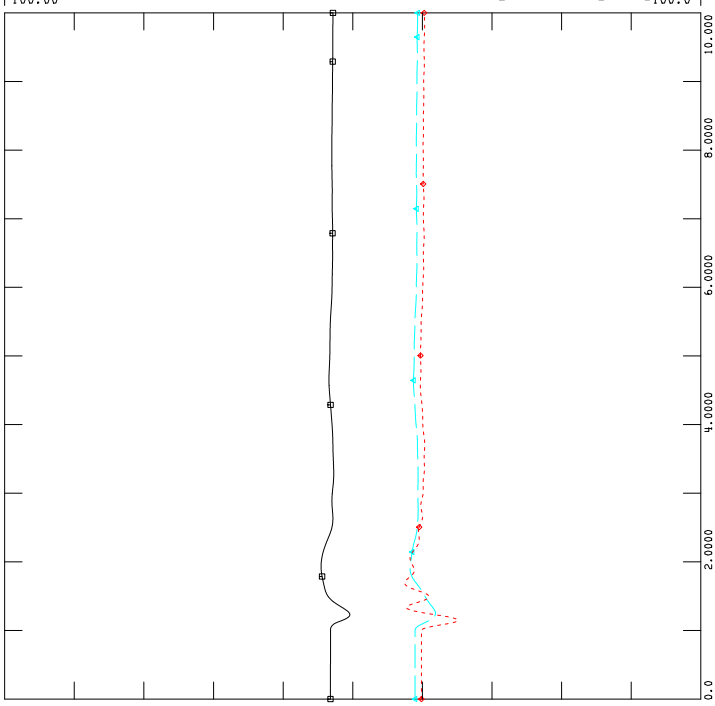


FIGURE A4-17: P2009_2021SP_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 17:48

MACHINE MW

CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

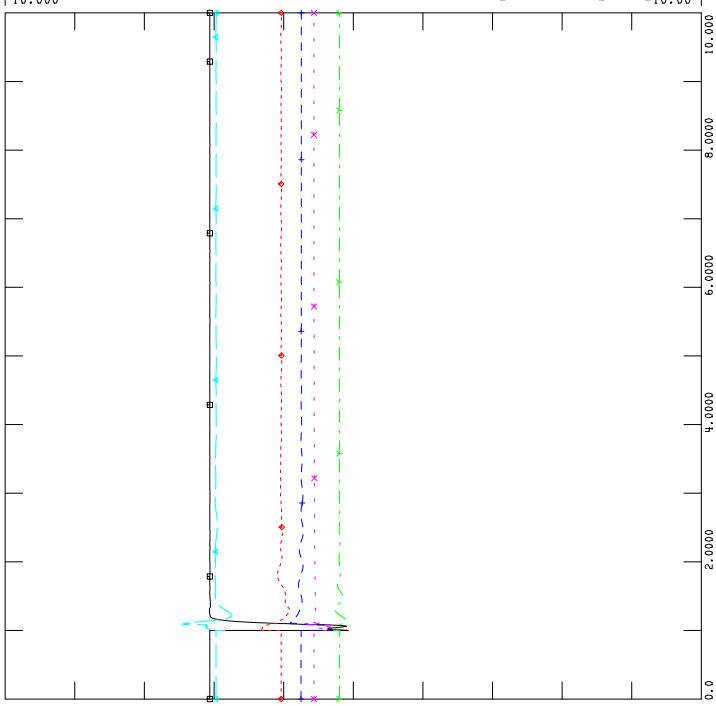


FIGURE A4-17: P2009_2021SP_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

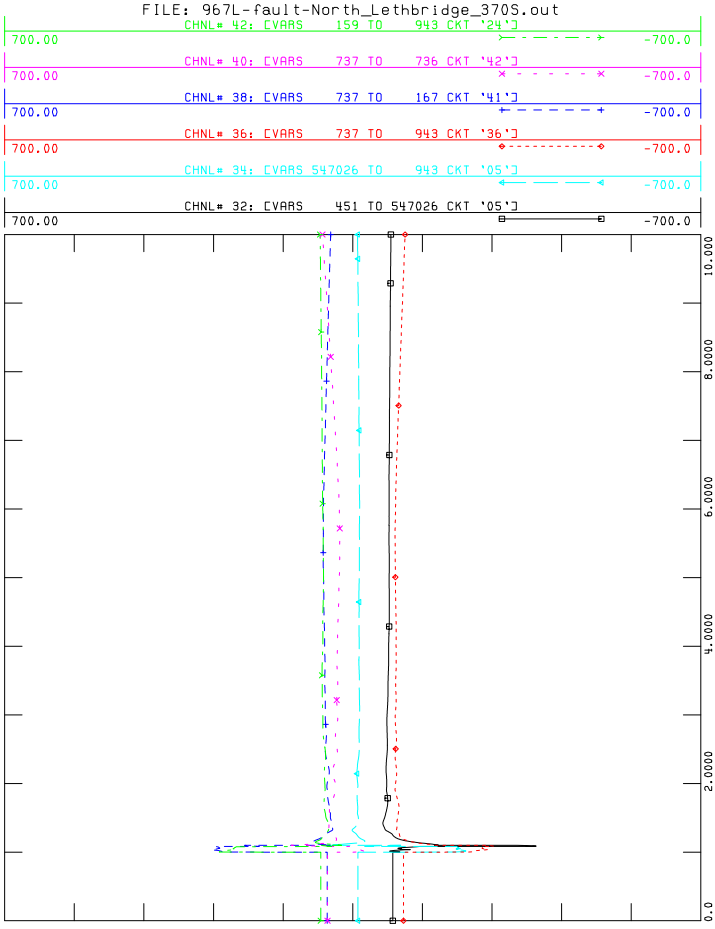


FIGURE A4-17: P2009_2021SP_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

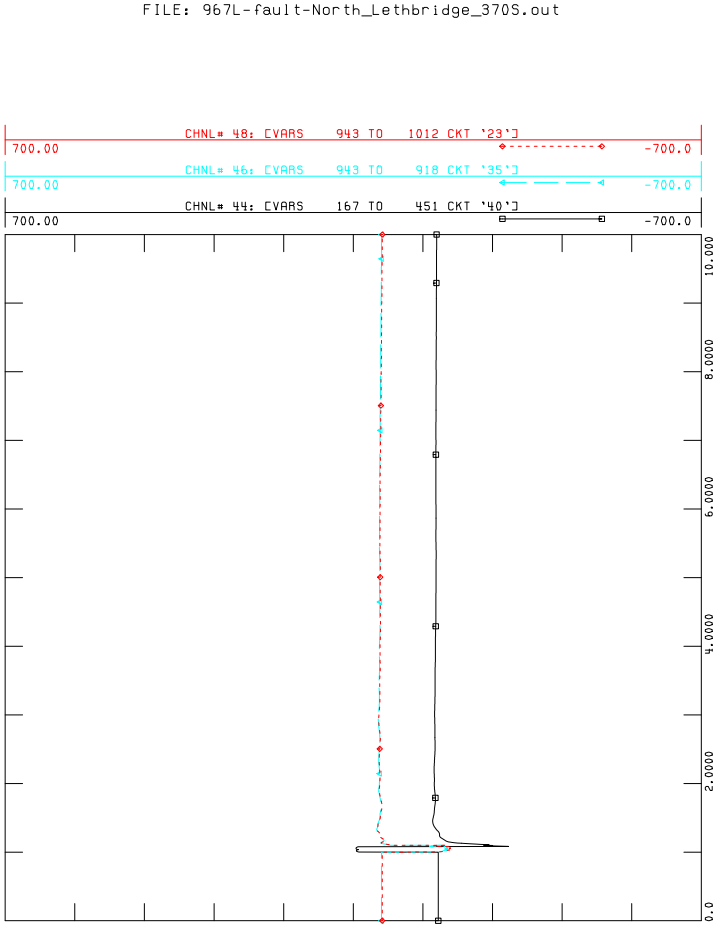


FIGURE A4-17: P2009_2021SP_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

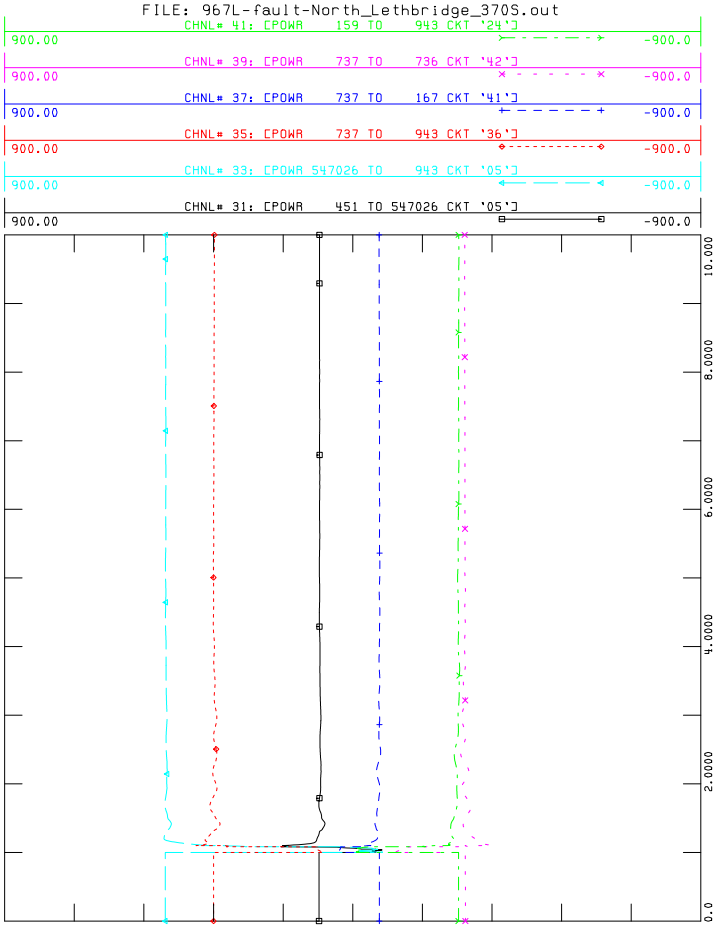


FIGURE A4-17: P2009_2021SP_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

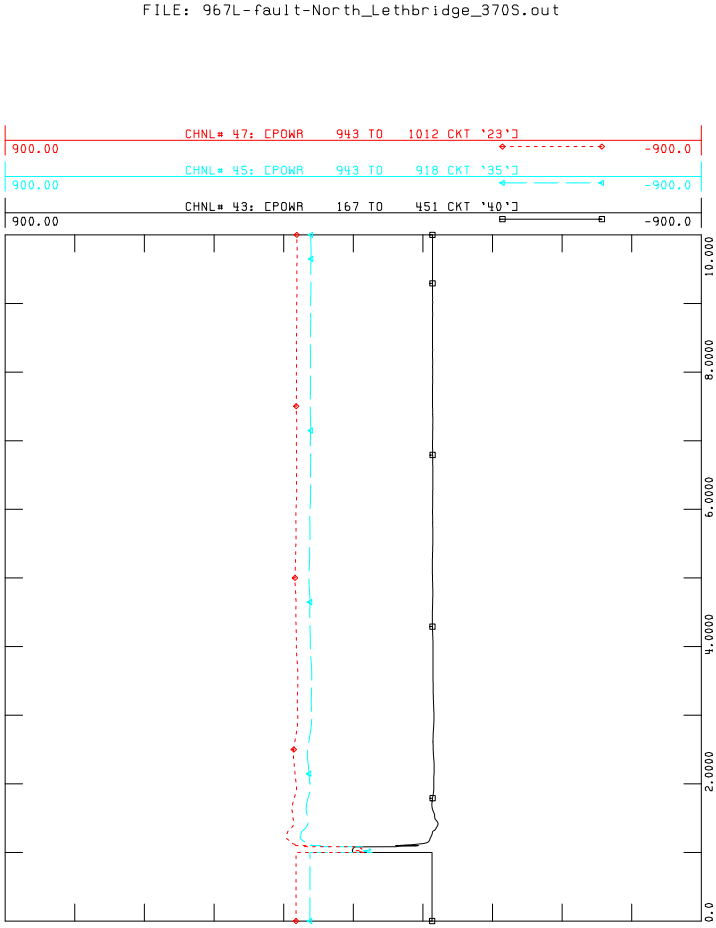


FIGURE A4-17: P2009_2021SP_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

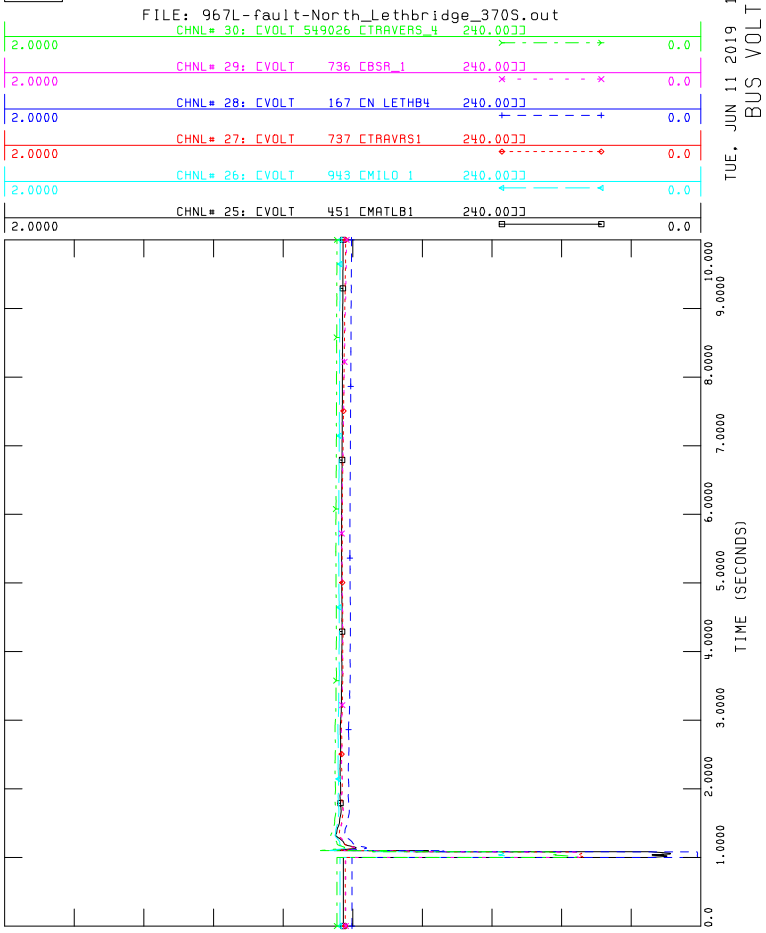


FIGURE A4-18: P2009_2021SP_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

TUE, JUN 11 2019 17:49

MACHINE VOLTAGE

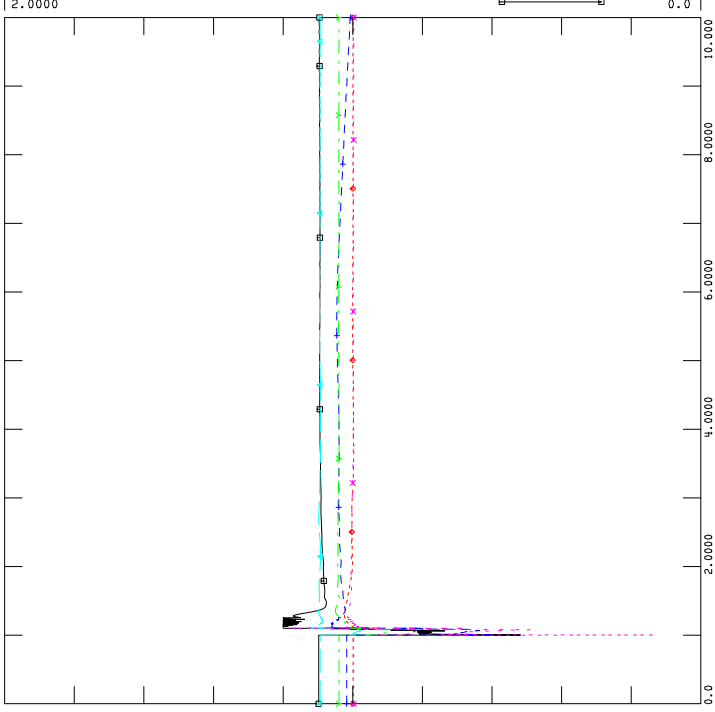


FIGURE A4-18: P2009_2021SP_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

TUE, JUN 11 2019 17:49

MACHINE MVAR

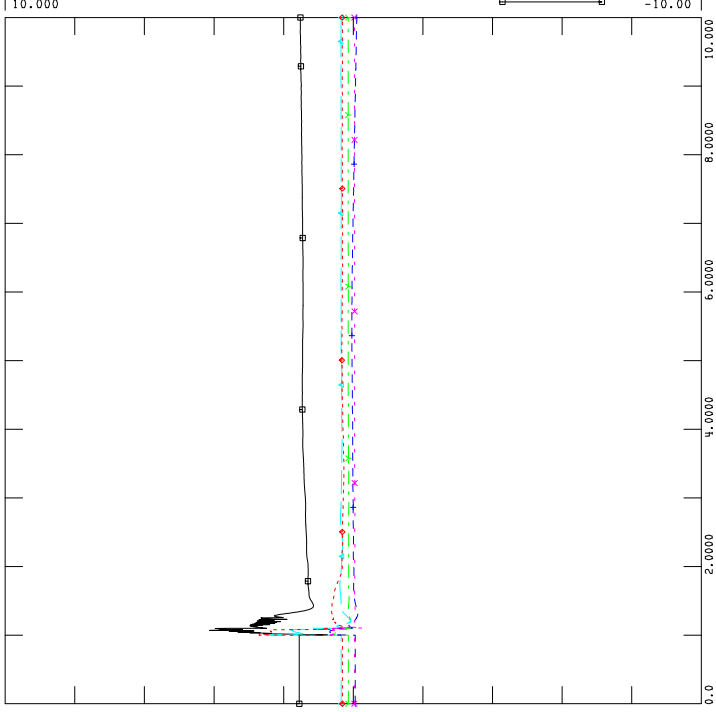


FIGURE A4-18: P2009_2021SP_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

TUE, JUN 11 2019 17:49

MACHINE ANGEL

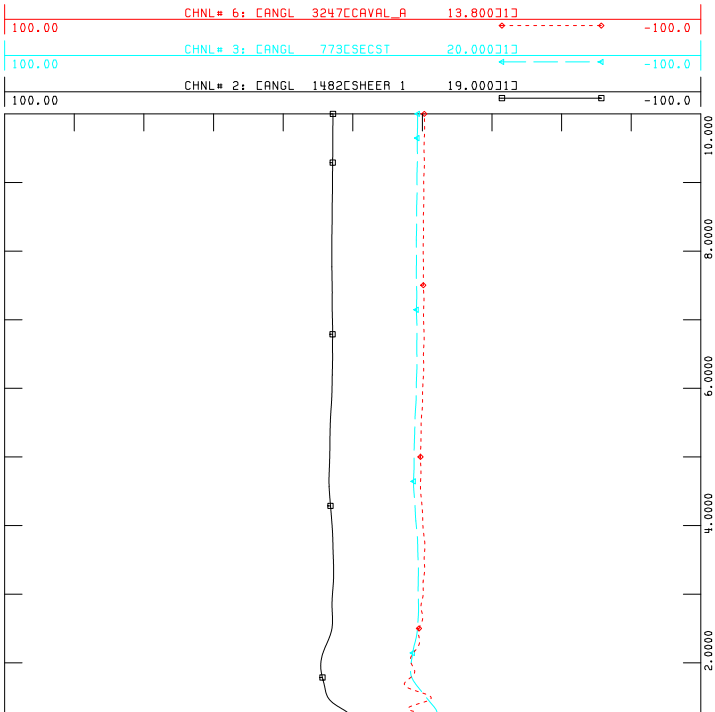


FIGURE A4-18: P2009_2021SP_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

TUE, JUN 11 2019 17:49

MACHINE MW

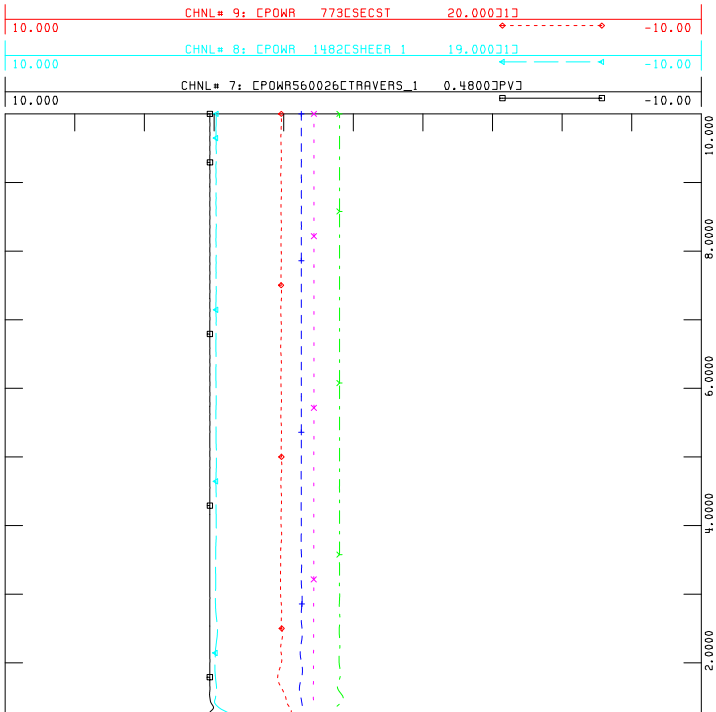


FIGURE A4-18: P2009_2021SP_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

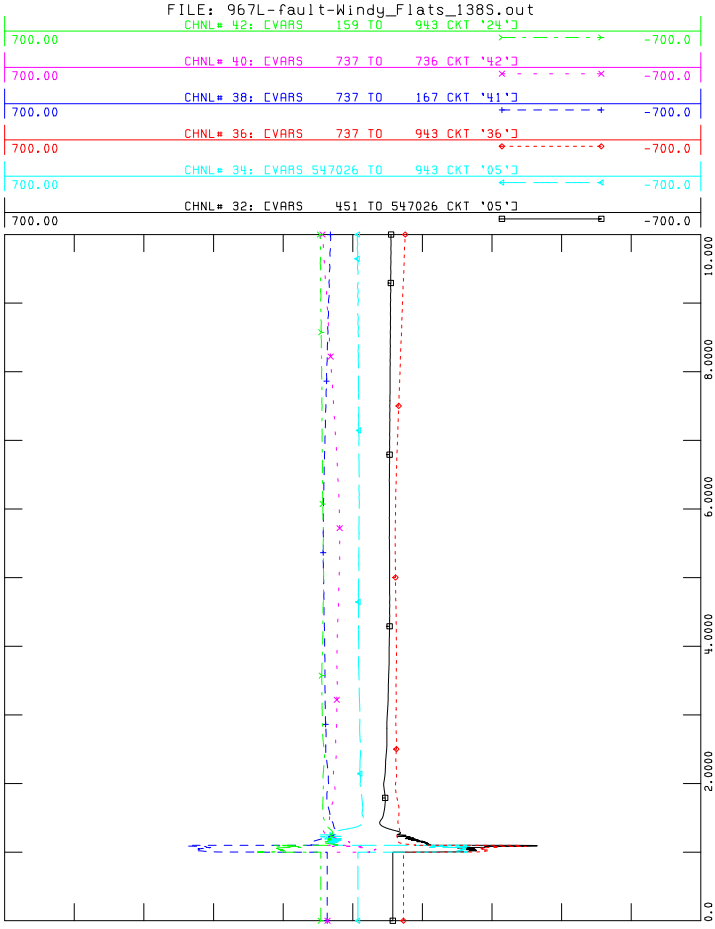


FIGURE A4-18: P2009_2021SP_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

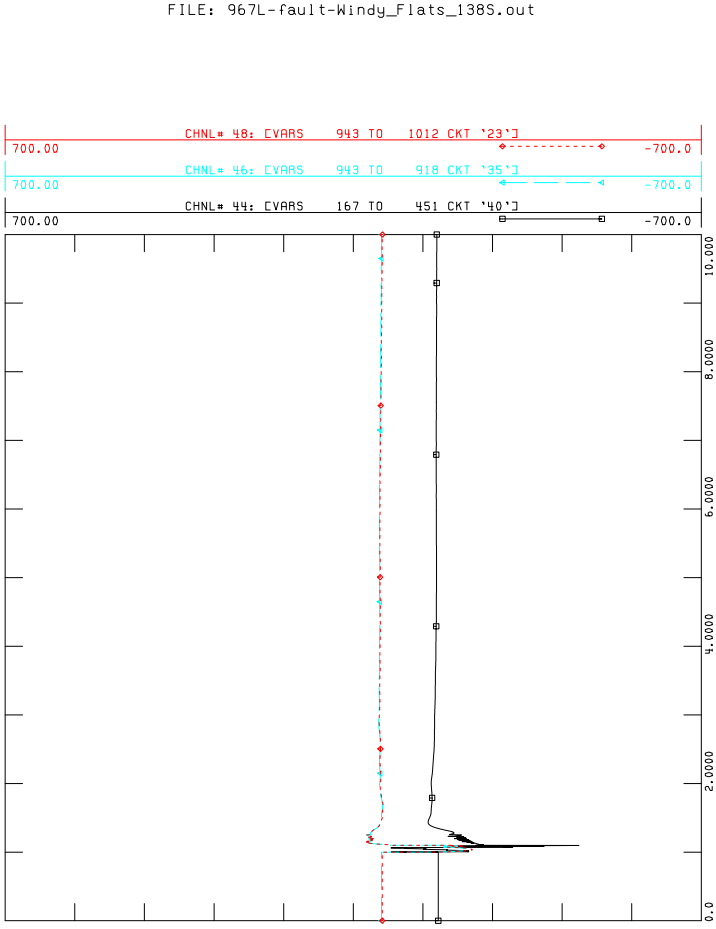


FIGURE A4-18: P2009_2021SP_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

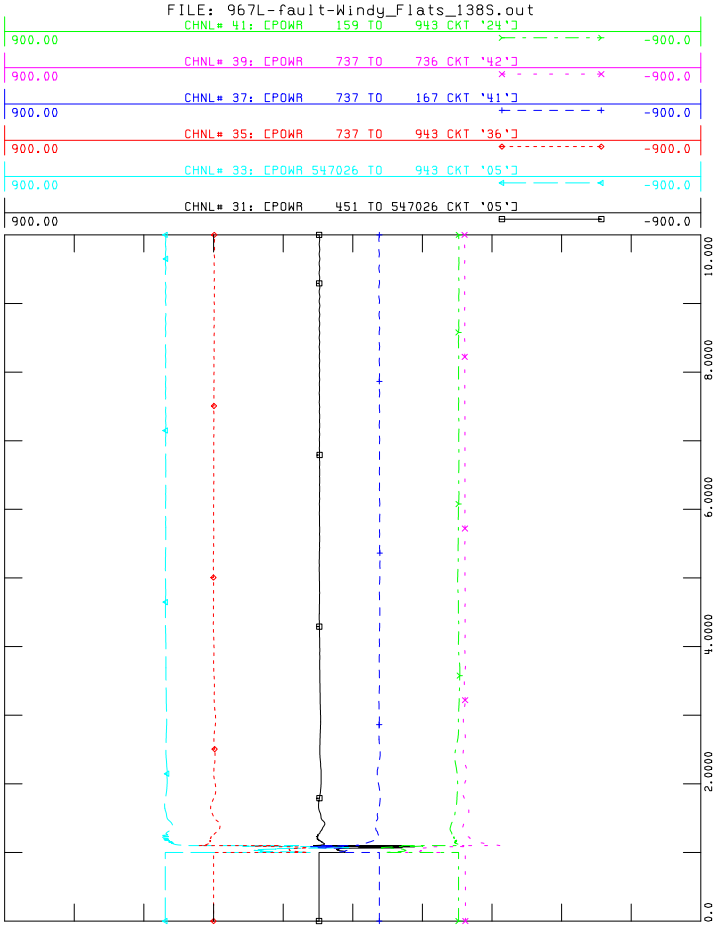


FIGURE A4-18: P2009_2021SP_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

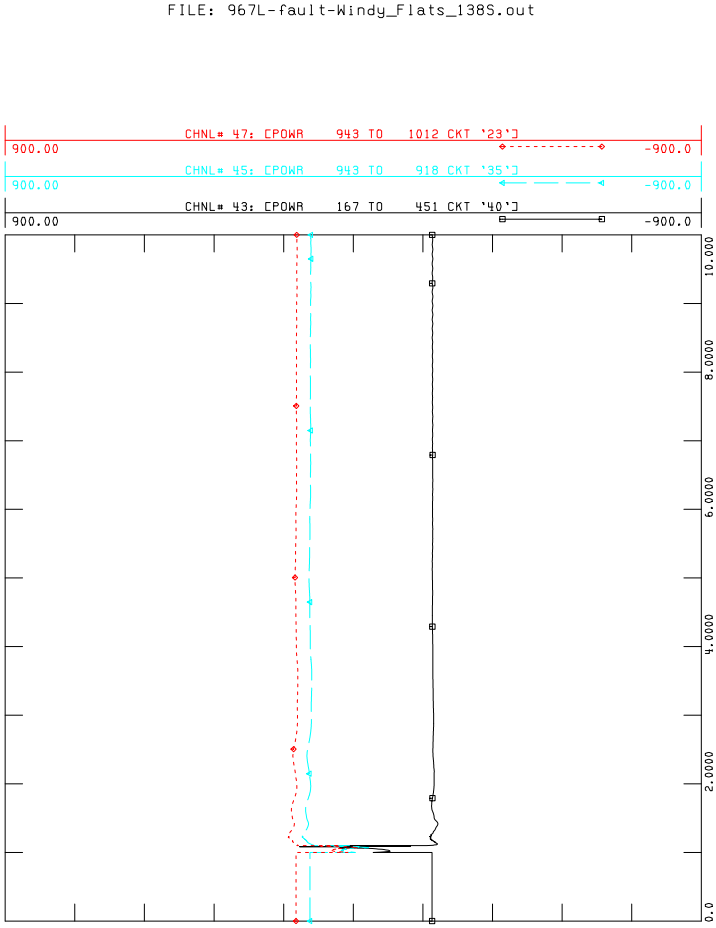


FIGURE A4-18: P2009_2021SP_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

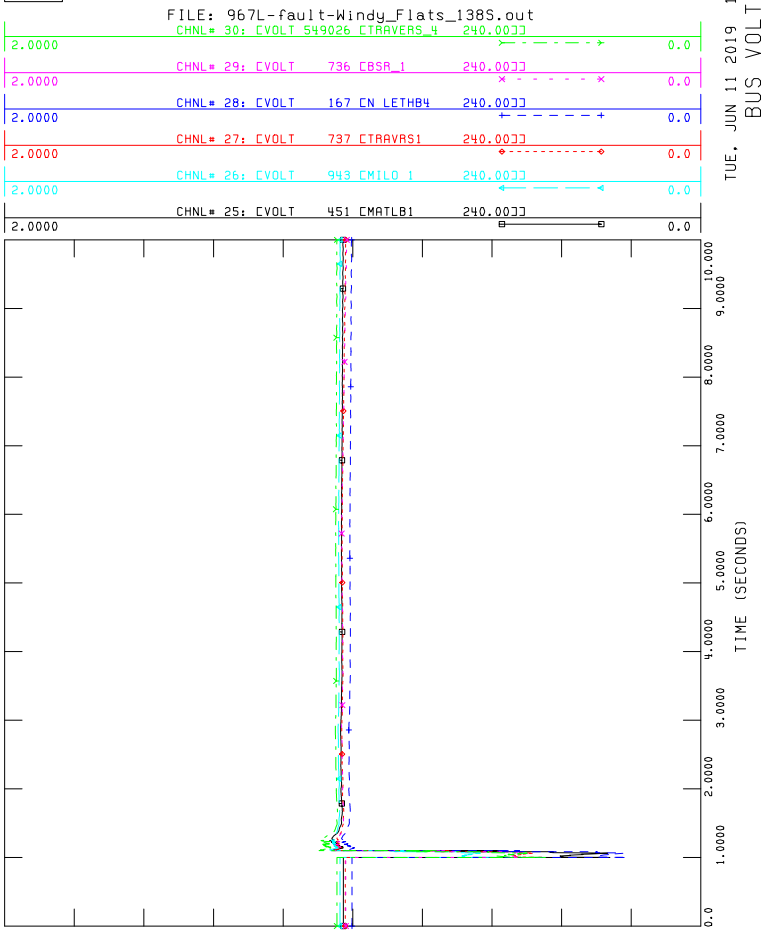


FIGURE A4-19: P2009_2021SP_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

2.0000 / 0.0

TUE, JUN 11 2019 17:50
MACHINE VOLTAGE

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-19: P2009_2021SP_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 17:50
MACHINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-19: P2009_2021SP_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

100.00 / -100.0

TUE, JUN 11 2019 17:50
MACHINE ANGEL

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-19: P2009_2021SP_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 17:50
MACHINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-19: P2009_2021SP_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

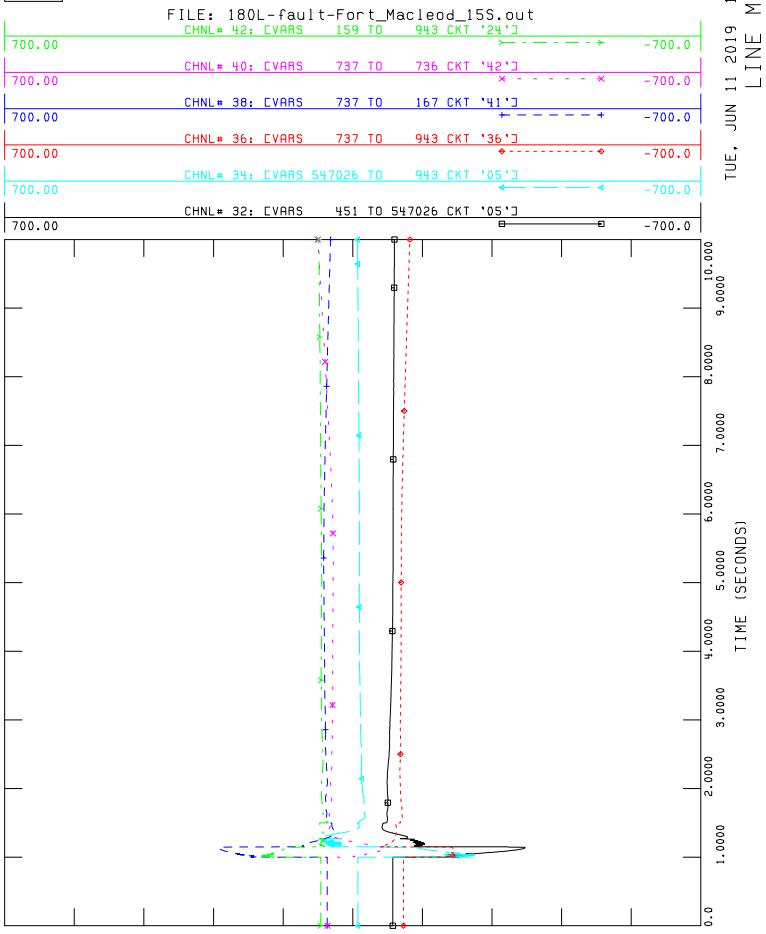


FIGURE A4-19: P2009_2021SP_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

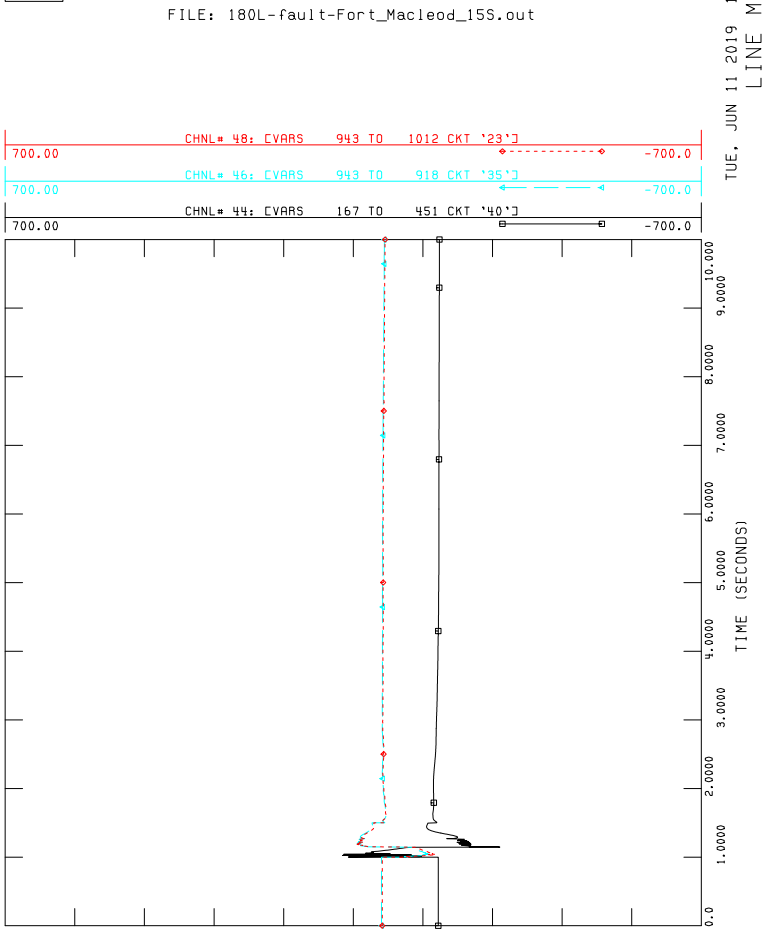


FIGURE A4-19: P2009_2021SP_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

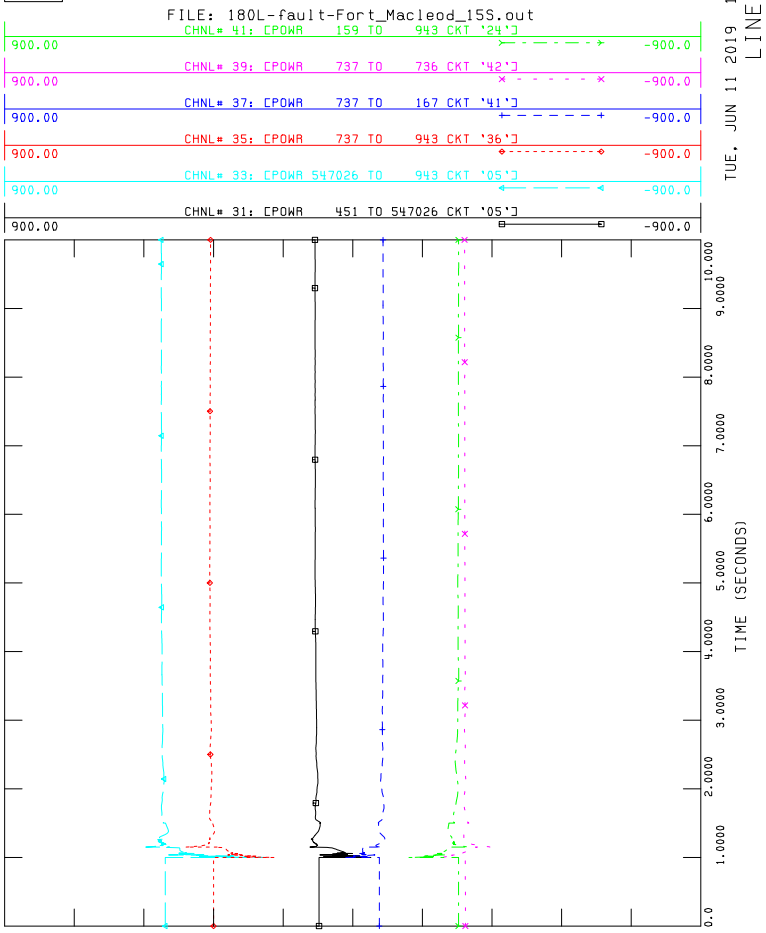


FIGURE A4-19: P2009_2021SP_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

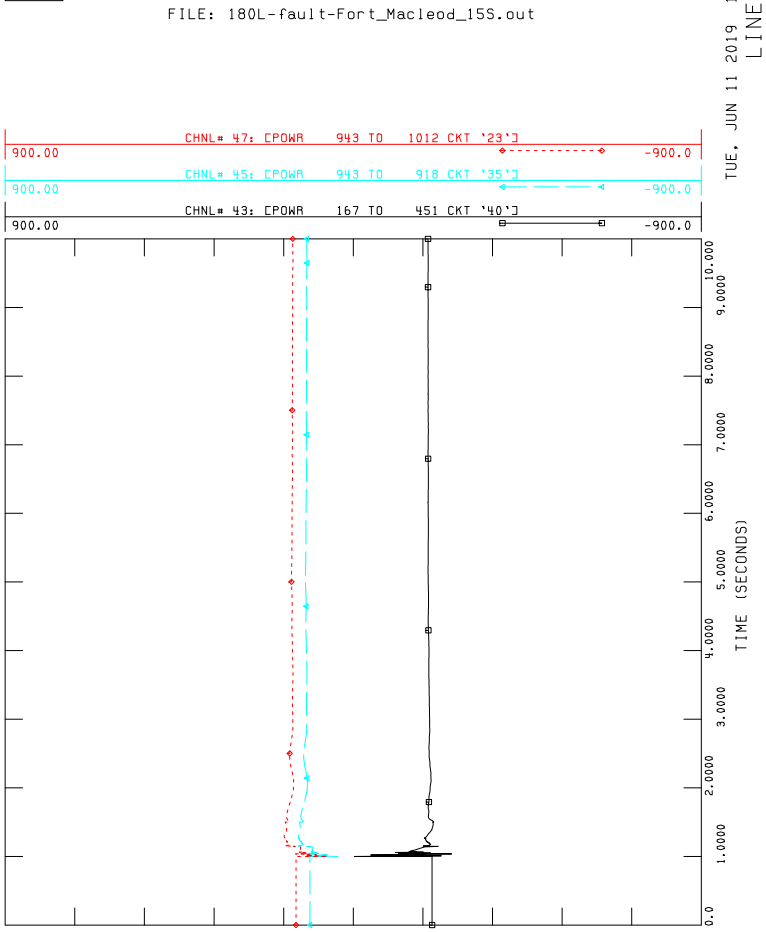


FIGURE A4-19: P2009_2021SP_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

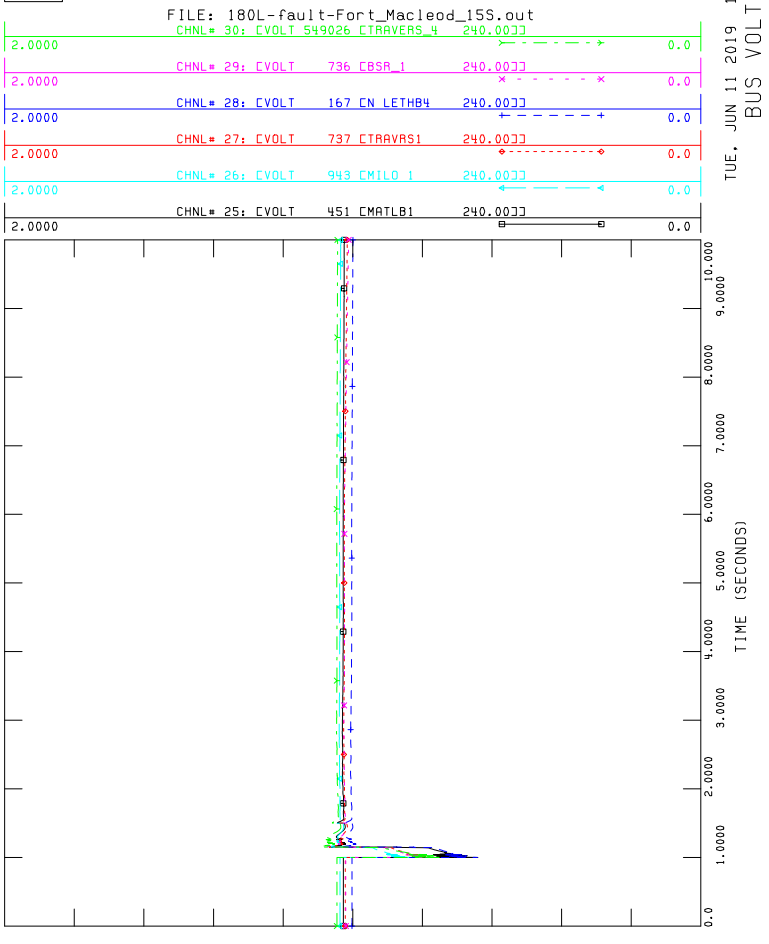


FIGURE A4-20: P2009_2021SP_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

MACHINE VOLTAGE
TUE, JUN 11 2019 17:51
TIME (SECONDS)

FIGURE A4-20: P2009_2021SP_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

MACHINE MVAR
TUE, JUN 11 2019 17:51
TIME (SECONDS)

FIGURE A4-20: P2009_2021SP_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

MACHINE ANGEL
TUE, JUN 11 2019 17:51
TIME (SECONDS)

FIGURE A4-20: P2009_2021SP_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

MACHINE MW
TUE, JUN 11 2019 17:51
TIME (SECONDS)

FIGURE A4-20: P2009_2021SP_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

TUE, JUN 11 2019 17:51

LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-20: P2009_2021SP_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

TUE, JUN 11 2019 17:51

LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-20: P2009_2021SP_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

TUE, JUN 11 2019 17:51

LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-20: P2009_2021SP_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

TUE, JUN 11 2019 17:51

LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-20: P2009_2021SP_POST
CATB-180L_FAULT_AT_VULCAN_255S

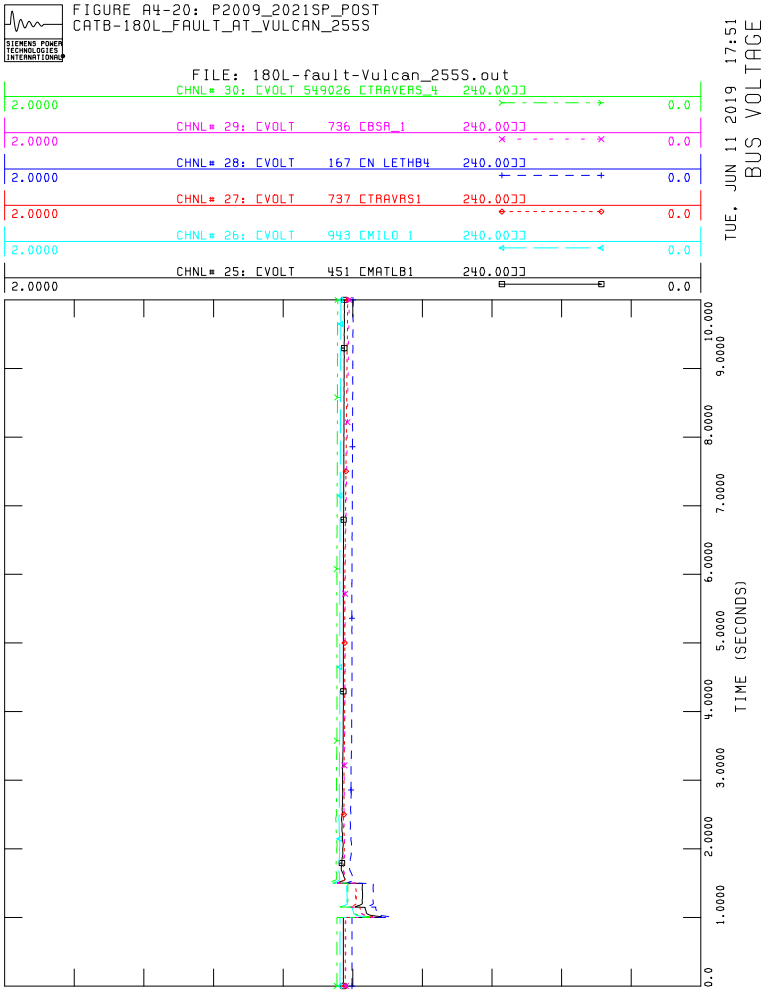


FIGURE A4-21: P2009_2021SP_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800ǃ1ǃ
CHNL# 23: CETRM 61630CREDCOAT4 0.6900ǃG1ǃ
CHNL# 22: CETRM 61736CBSR_4 0.6900ǃ1ǃ
CHNL# 21: CETRM 773CSECST 20.000ǃ1ǃ
CHNL# 20: CETRM 1482CSHEER 1 19.000ǃ1ǃ
CHNL# 19: CETRMS60026CTRAVERS_1 0.4800ǃPVǃ

TUE, JUN 11 2019 17:52
MACHINE VOLTAGE
TIME (SECONDS)

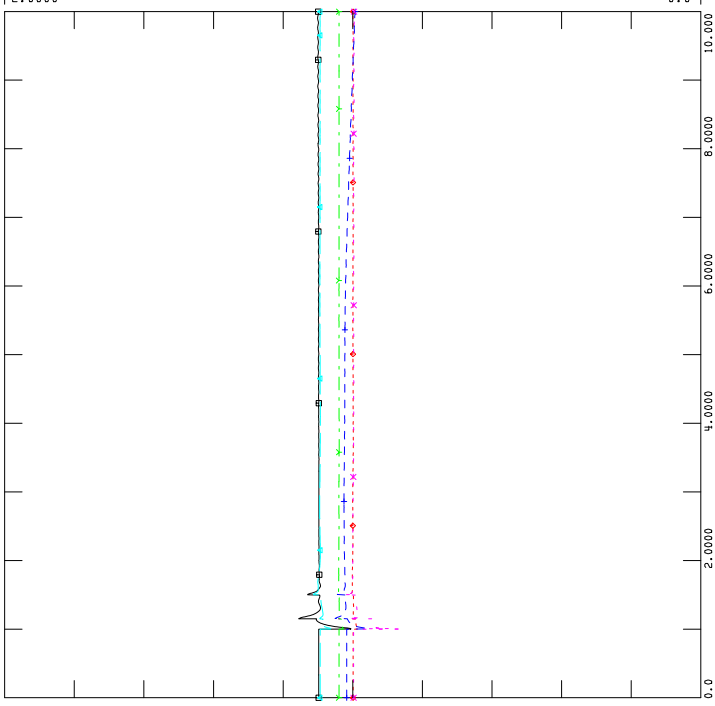


FIGURE A4-21: P2009_2021SP_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800ǃ1ǃ
CHNL# 17: CVARS 61630CREDCOAT4 0.6900ǃG1ǃ
CHNL# 16: CVARS 61736CBSR_4 0.6900ǃ1ǃ
CHNL# 15: CVARS 773CSECST 20.000ǃ1ǃ
CHNL# 14: CVARS 1482CSHEER 1 19.000ǃ1ǃ
CHNL# 13: CVARSS60026CTRAVERS_1 0.4800ǃPVǃ

TUE, JUN 11 2019 17:52
MACHINE MVAR
TIME (SECONDS)

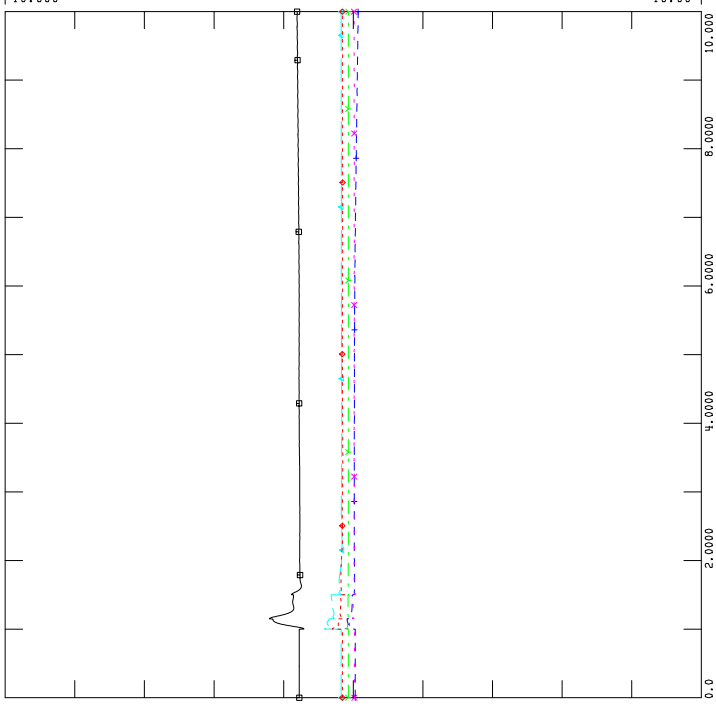


FIGURE A4-21: P2009_2021SP_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800ǃ1ǃ
CHNL# 3: CANGL 773CSECST 20.000ǃ1ǃ
CHNL# 2: CANGL 1482CSHEER 1 19.000ǃ1ǃ

TUE, JUN 11 2019 17:52
MACHINE ANGEL
TIME (SECONDS)

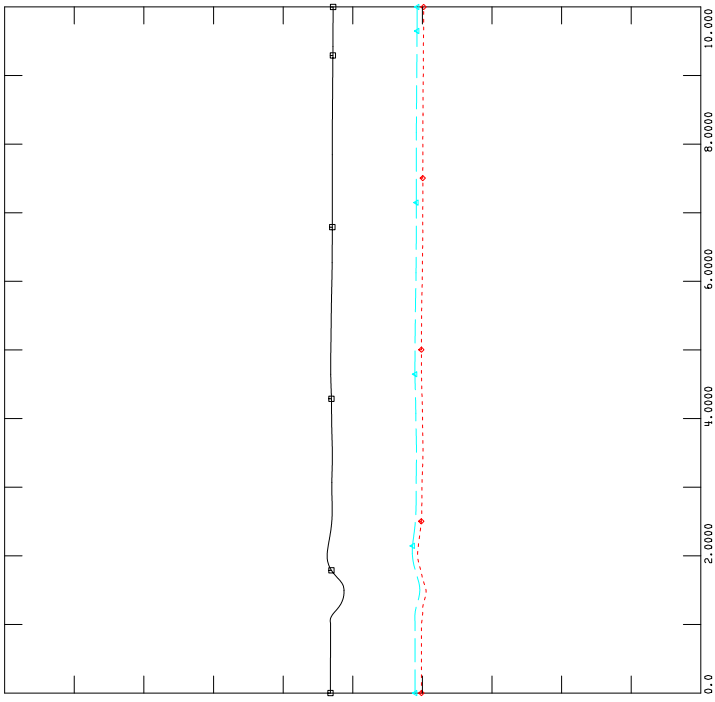


FIGURE A4-21: P2009_2021SP_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800ǃ1ǃ
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900ǃG1ǃ
CHNL# 10: CPOWR 61736CBSR_4 0.6900ǃ1ǃ
CHNL# 9: CPOWR 773CSECST 20.000ǃ1ǃ
CHNL# 8: CPOWR 1482CSHEER 1 19.000ǃ1ǃ
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800ǃPVǃ

TUE, JUN 11 2019 17:52
MACHINE MW
TIME (SECONDS)

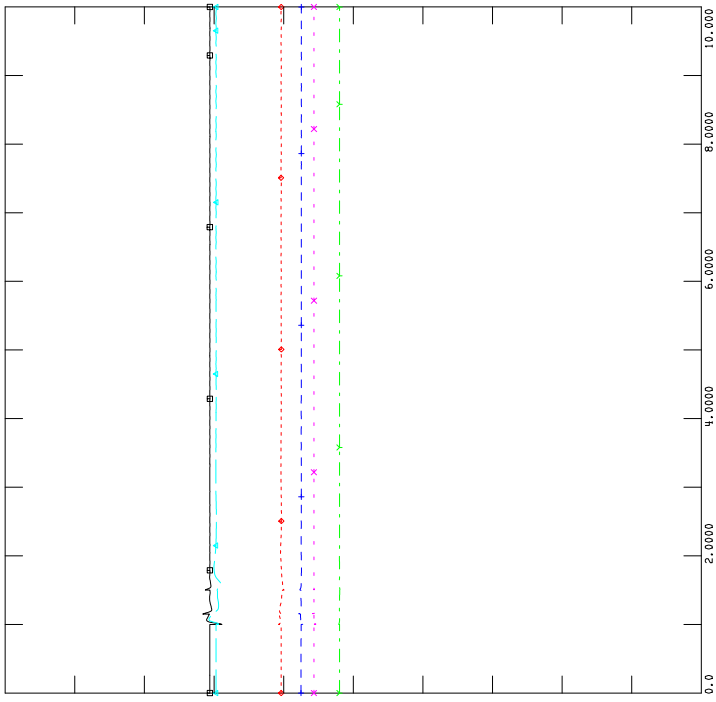


FIGURE A4-21: P2009_2021SP_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

TUE, JUN 11 2019 17:52
LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-21: P2009_2021SP_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

TUE, JUN 11 2019 17:52
LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-21: P2009_2021SP_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

TUE, JUN 11 2019 17:52
LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-21: P2009_2021SP_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

TUE, JUN 11 2019 17:52
LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-21: P2009_2021SP_POST
CATB-161L_FAULT_AT_VULCAN_255S

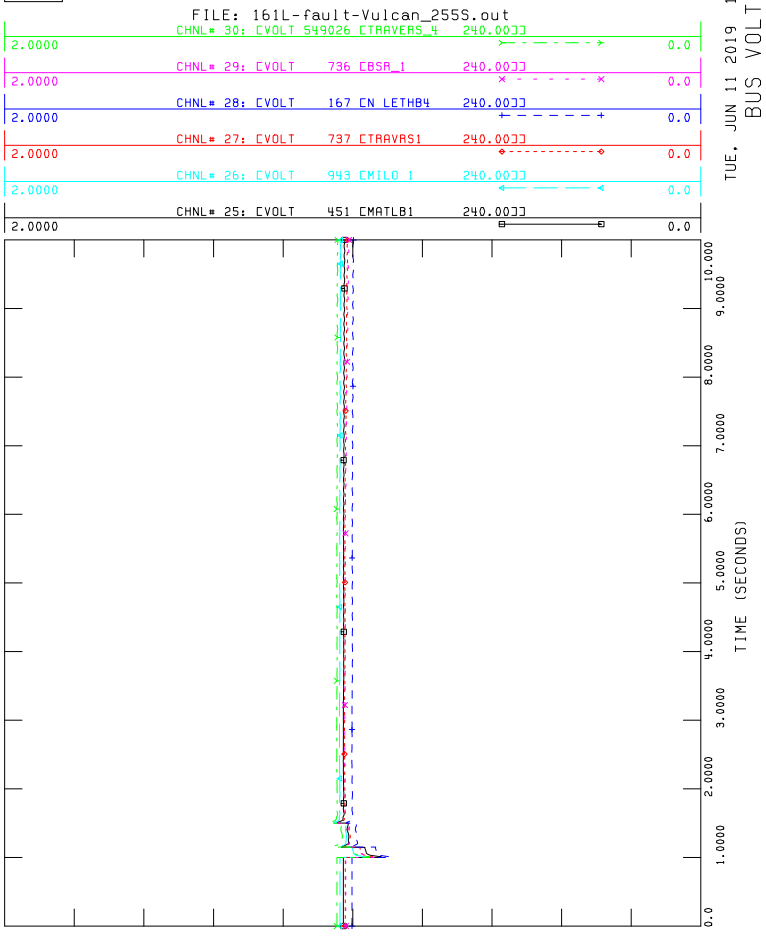


FIGURE A4-22: P2009_2021SP_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

FILE: 161L-fault-Queenstown_504S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

2.0000 / 0.0

TIME (SECONDS) 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

TUE, JUN 11 2019 17:53
MACHINE VOLTAGE

FIGURE A4-22: P2009_2021SP_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

FILE: 161L-fault-Queenstown_504S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS) 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

TUE, JUN 11 2019 17:53
MACHINE MVAR

FIGURE A4-22: P2009_2021SP_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

FILE: 161L-fault-Queenstown_504S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

100.00 / -100.0

TIME (SECONDS) 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

TUE, JUN 11 2019 17:53
MACHINE ANGEL

FIGURE A4-22: P2009_2021SP_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

FILE: 161L-fault-Queenstown_504S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWR560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS) 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

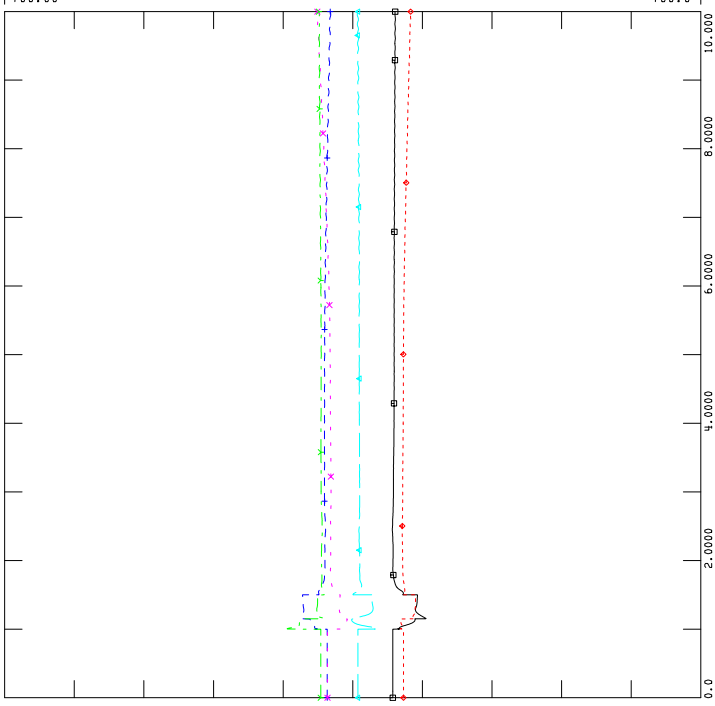
TUE, JUN 11 2019 17:53
MACHINE MW

FIGURE A4-22: P2009_2021SP_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

FILE: 161L-fault-Queenstown_504S.out

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0



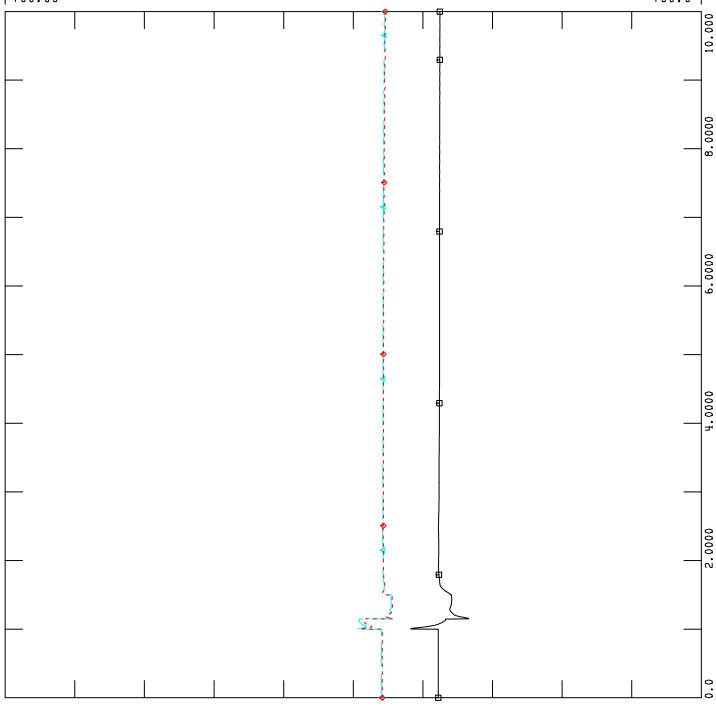
TUE, JUN 11 2019 17:53
LINE MVAR

FIGURE A4-22: P2009_2021SP_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

FILE: 161L-fault-Queenstown_504S.out

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0



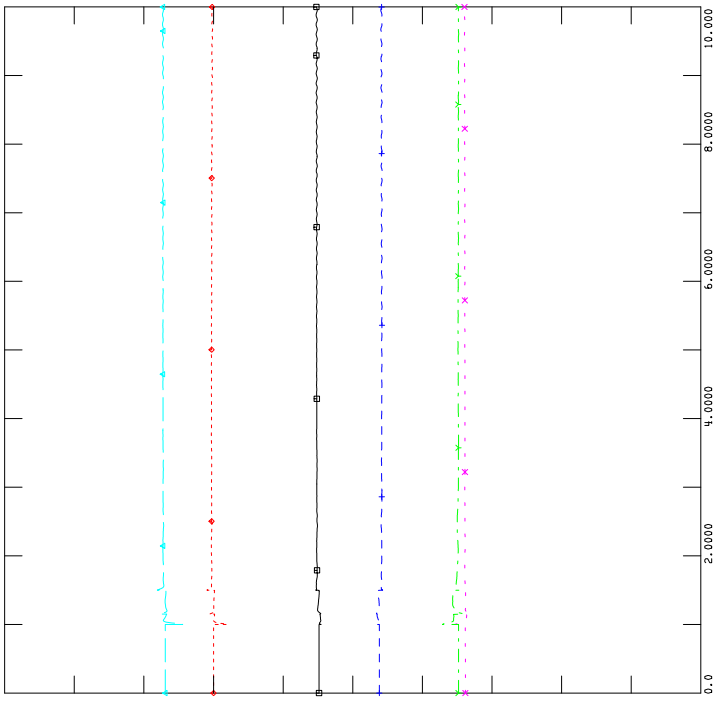
TUE, JUN 11 2019 17:53
LINE MVAR

FIGURE A4-22: P2009_2021SP_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

FILE: 161L-fault-Queenstown_504S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0



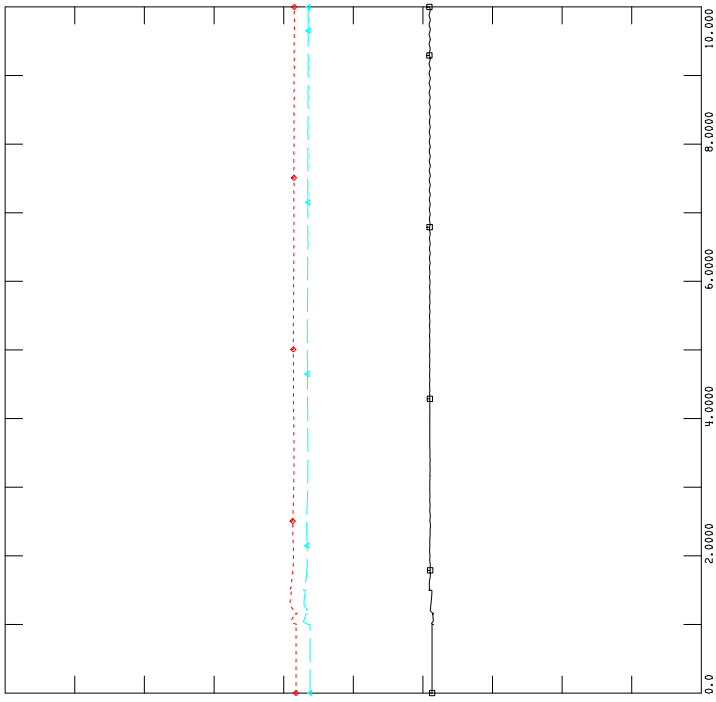
TUE, JUN 11 2019 17:53
LINE MW

FIGURE A4-22: P2009_2021SP_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

FILE: 161L-fault-Queenstown_504S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0



TUE, JUN 11 2019 17:53
LINE MW

FIGURE A4-22: P2009_2021SP_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

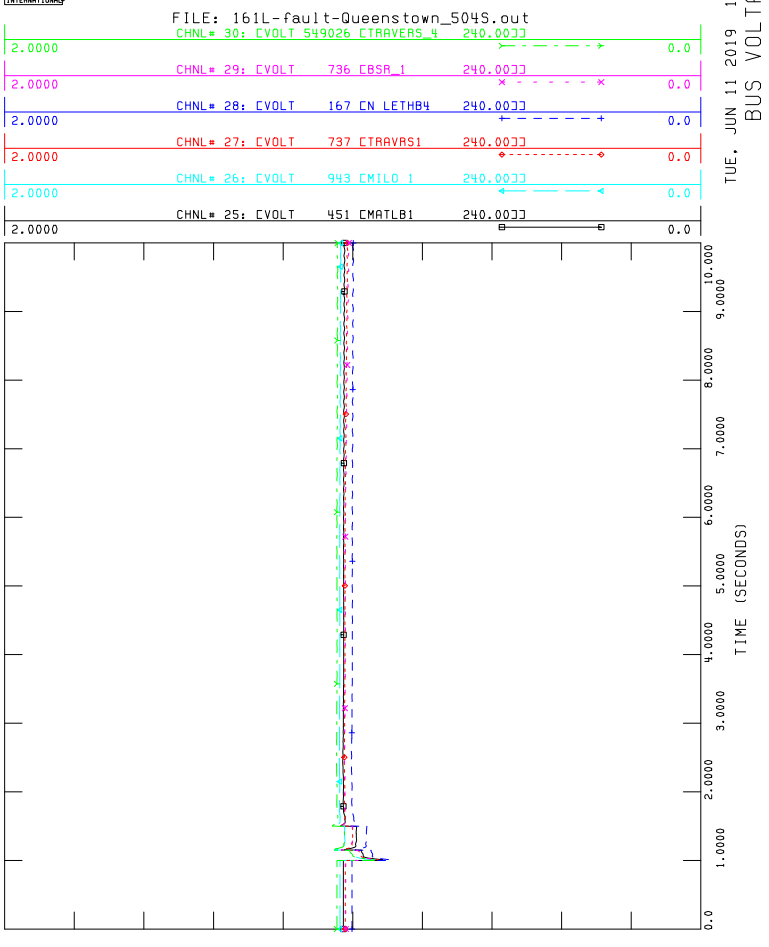


FIGURE A4-23: P2009_2021SP_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

2.0000 / 0.0

TUE, JUN 11 2019 17:54
MACHINE VOLTAGE

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-23: P2009_2021SP_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TUE, JUN 11 2019 17:54
MACHINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-23: P2009_2021SP_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

100.00 / -100.0

TUE, JUN 11 2019 17:54
MACHINE ANGEL

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-23: P2009_2021SP_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWR560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TUE, JUN 11 2019 17:54
MACHINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-23: P2009_2021SP_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

TUE, JUN 11 2019 17:54

LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

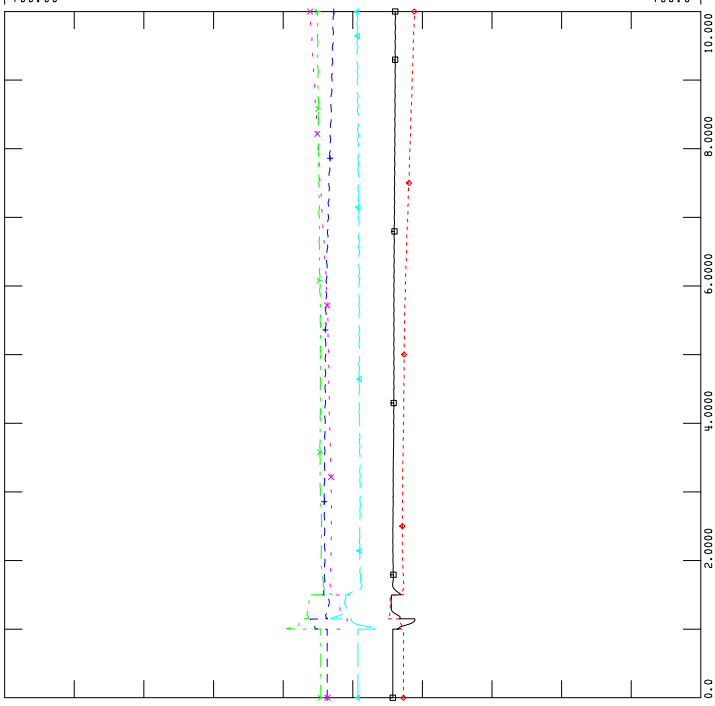


FIGURE A4-23: P2009_2021SP_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

TUE, JUN 11 2019 17:54

LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

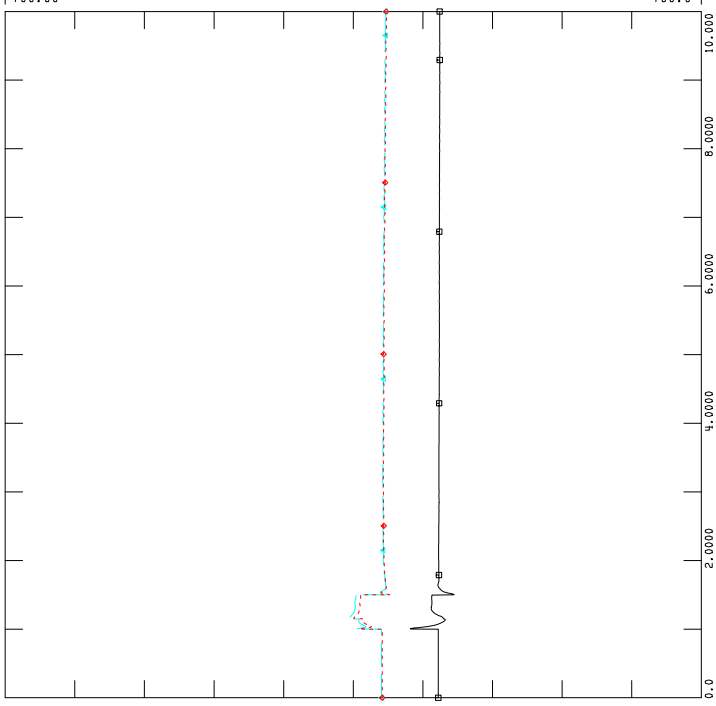


FIGURE A4-23: P2009_2021SP_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

TUE, JUN 11 2019 17:54

LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

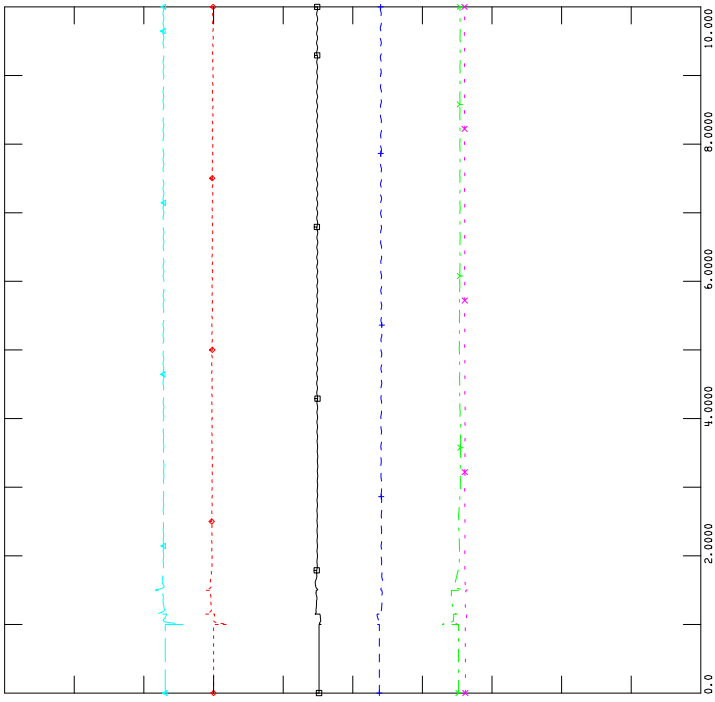


FIGURE A4-23: P2009_2021SP_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

TUE, JUN 11 2019 17:54

LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

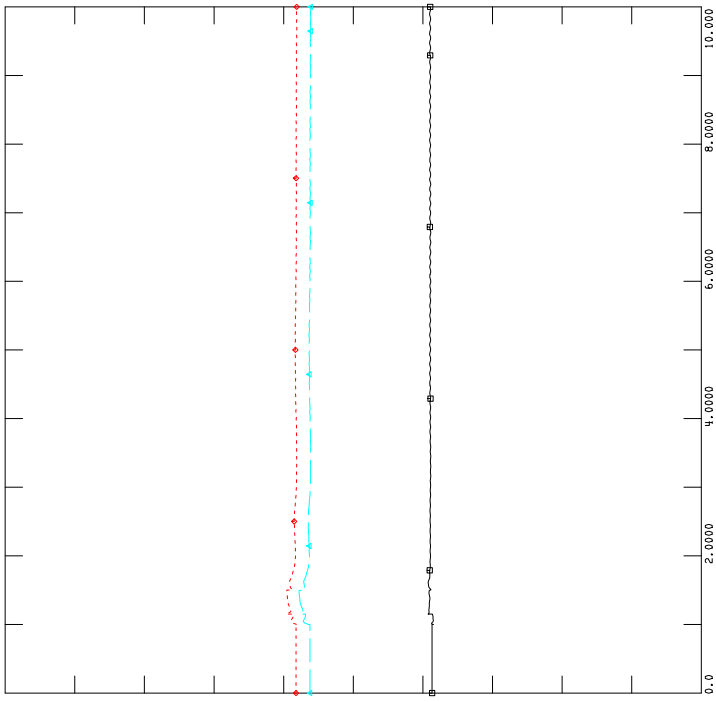


FIGURE A4-23: P2009_2021SP_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

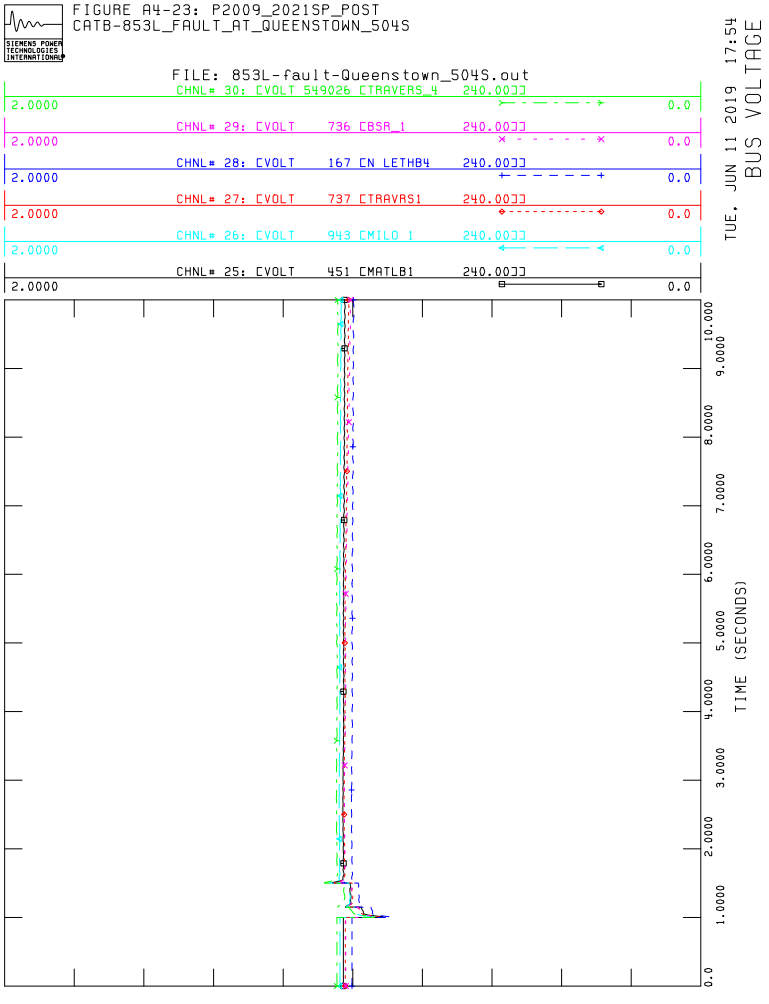


FIGURE A4-24: P2009_2021SP_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

2.0000 / 0.0

TUE, JUN 11 2019 17:55
MACHINE VOLTAGE

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-24: P2009_2021SP_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TUE, JUN 11 2019 17:55
MACHINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-24: P2009_2021SP_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

100.00 / -100.0

TUE, JUN 11 2019 17:54
MACHINE ANGEL

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-24: P2009_2021SP_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800]PV]

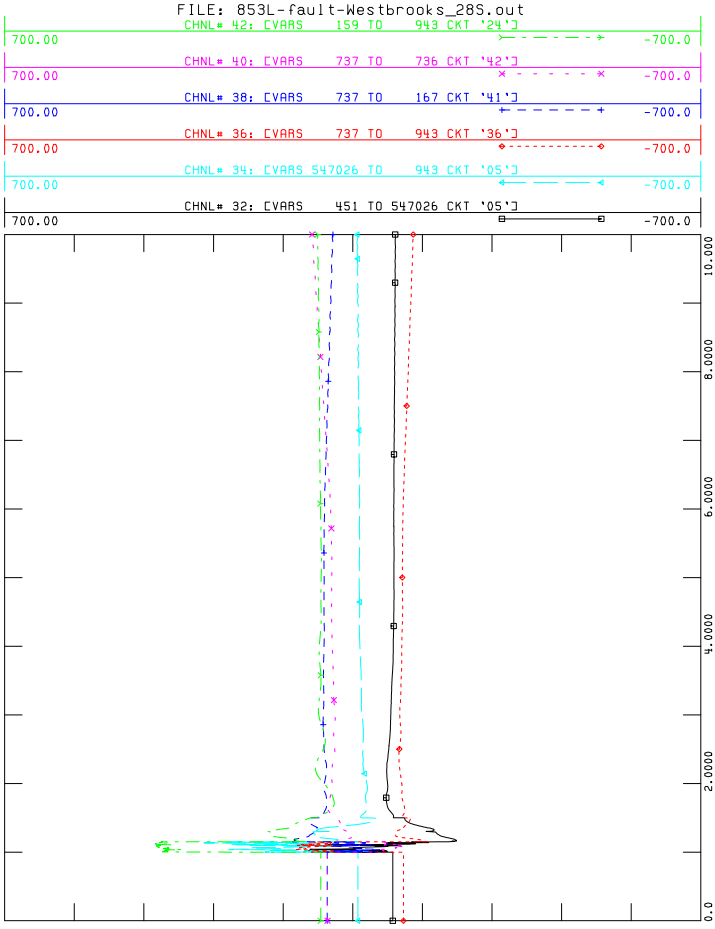
10.000 / -10.00

TUE, JUN 11 2019 17:55
MACHINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-24: P2009_2021SP_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

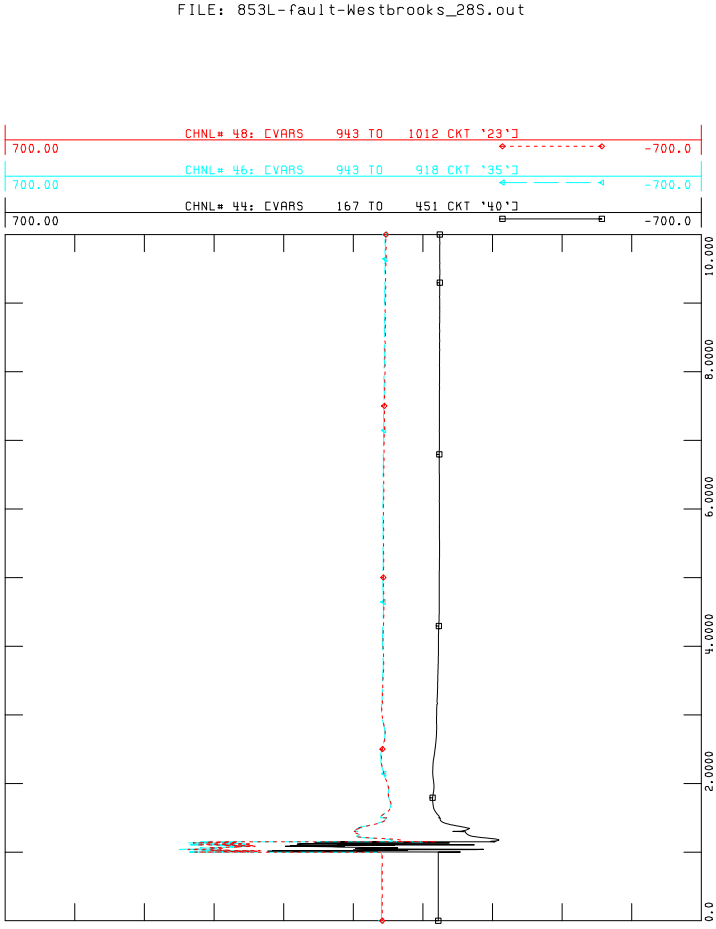
FILE: 853L-fault-Westbrooks_28S.out



TUE, JUN 11 2019 17:55
LINE MVAR

FIGURE A4-24: P2009_2021SP_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

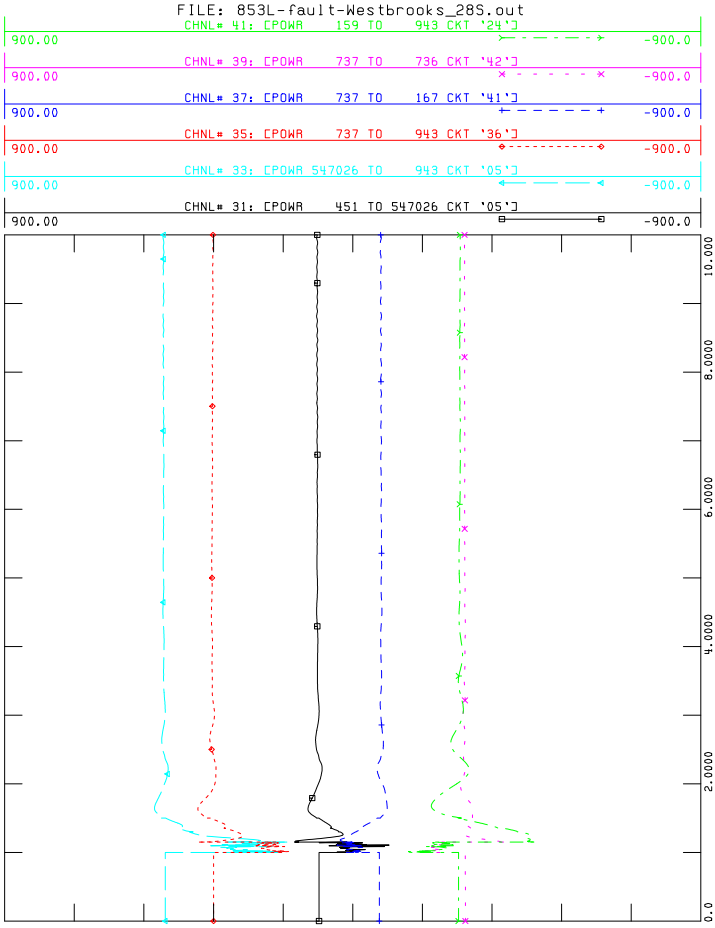
FILE: 853L-fault-Westbrooks_28S.out



TUE, JUN 11 2019 17:55
LINE MVAR

FIGURE A4-24: P2009_2021SP_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

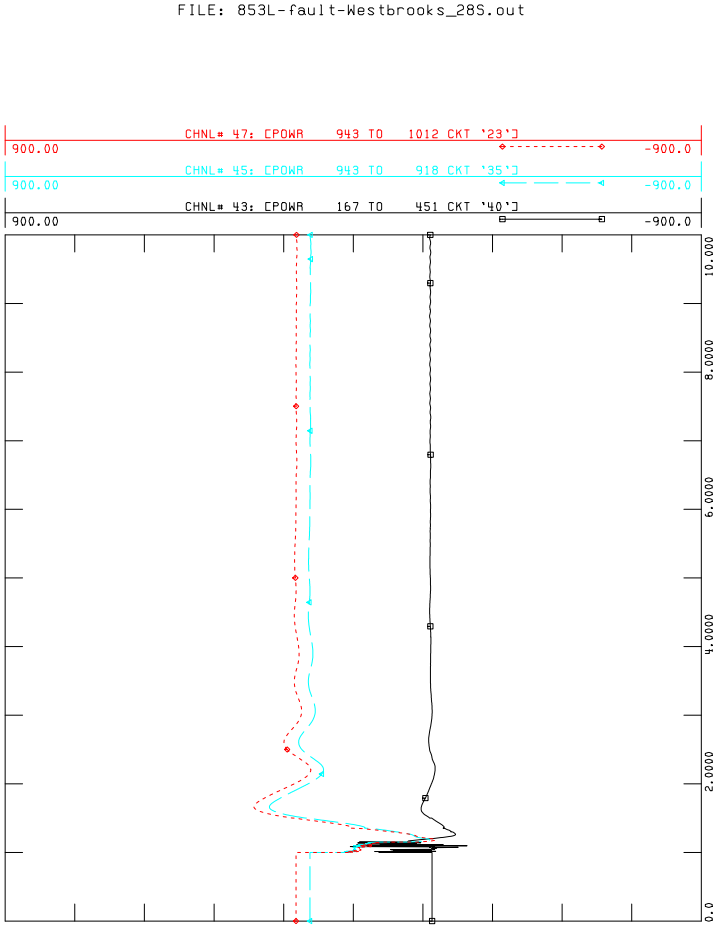
FILE: 853L-fault-Westbrooks_28S.out



TUE, JUN 11 2019 17:55
LINE MW

FIGURE A4-24: P2009_2021SP_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out



TUE, JUN 11 2019 17:55
LINE MW

FIGURE A4-24: P2009_2021SP_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

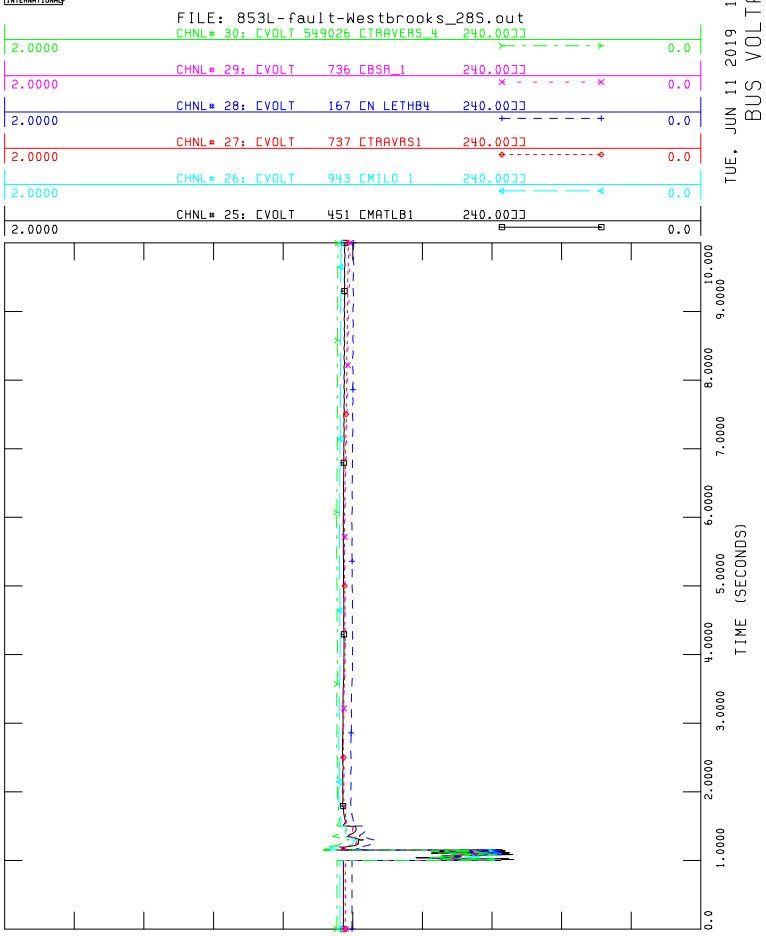


FIGURE A4-25: P2009_2021SL_POST
CATB-924L_FAULT_AT_MILO_356S

FILE: 924L-fault-Milo_356S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 23: CETRM 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 22: CETRM 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 21: CETRM 773CSECST 20.000ǁ1ǁ
CHNL# 20: CETRM 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 19: CETRM560026CTRAVERS_1 0.4800ǁPVǁ

2.0000 / 0.0

TUE, JUN 11 2019 17:59
MACHINE VOLTAGE

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-25: P2009_2021SL_POST
CATB-924L_FAULT_AT_MILO_356S

FILE: 924L-fault-Milo_356S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 17: CVARS 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 16: CVARS 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 15: CVARS 773CSECST 20.000ǁ1ǁ
CHNL# 14: CVARS 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 13: CVARS560026CTRAVERS_1 0.4800ǁPVǁ

10.000 / -10.00

TUE, JUN 11 2019 17:59
MACHINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-25: P2009_2021SL_POST
CATB-924L_FAULT_AT_MILO_356S

FILE: 924L-fault-Milo_356S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 3: CANGL 773CSECST 20.000ǁ1ǁ
CHNL# 2: CANGL 1482CSHEER 1 19.000ǁ1ǁ

100.00 / -100.0

TUE, JUN 11 2019 17:59
MACHINE ANGEL

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-25: P2009_2021SL_POST
CATB-924L_FAULT_AT_MILO_356S

FILE: 924L-fault-Milo_356S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 10: CPOWR 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 9: CPOWR 773CSECST 20.000ǁ1ǁ
CHNL# 8: CPOWR 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 7: CPOWR560026CTRAVERS_1 0.4800ǁPVǁ

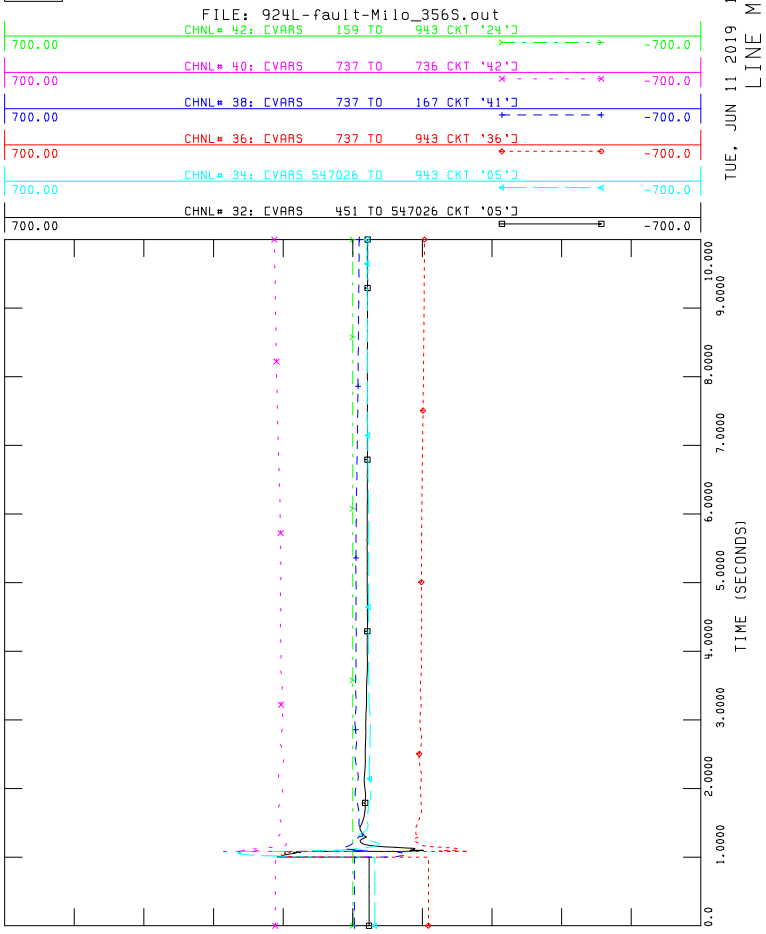
10.000 / -10.00

TUE, JUN 11 2019 17:59
MACHINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-25: P2009_2021SL_POST
CATB-924L_FAULT_AT_MILO_356S

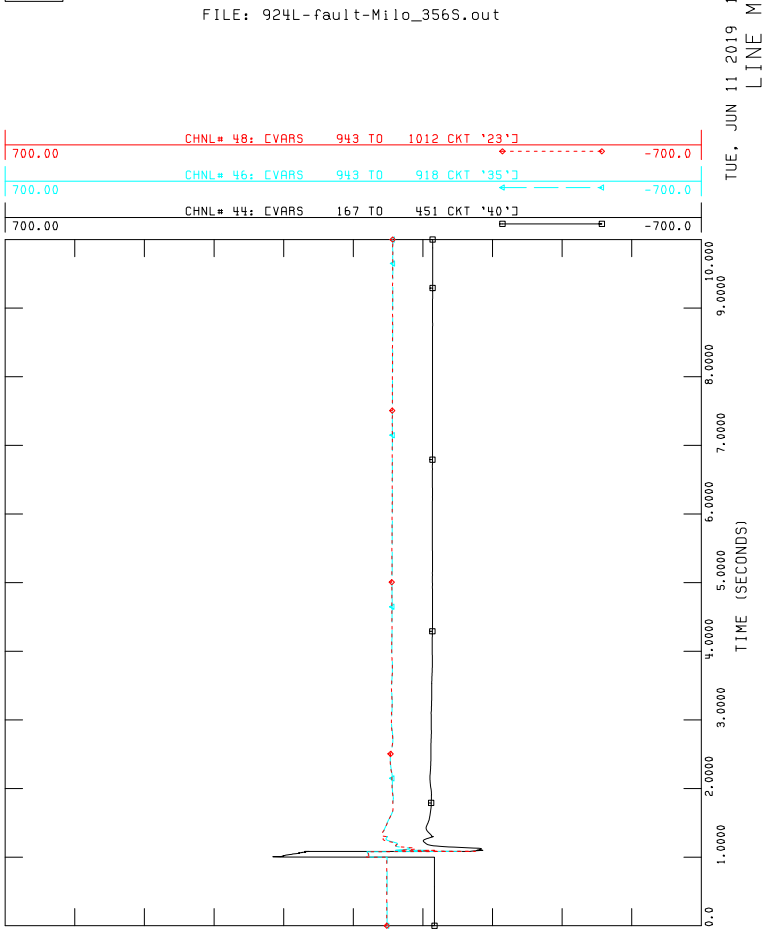
FILE: 924L-fault-Milo_356S.out



TUE, JUN 11 2019 17:59
LINE MVAR

FIGURE A4-25: P2009_2021SL_POST
CATB-924L_FAULT_AT_MILO_356S

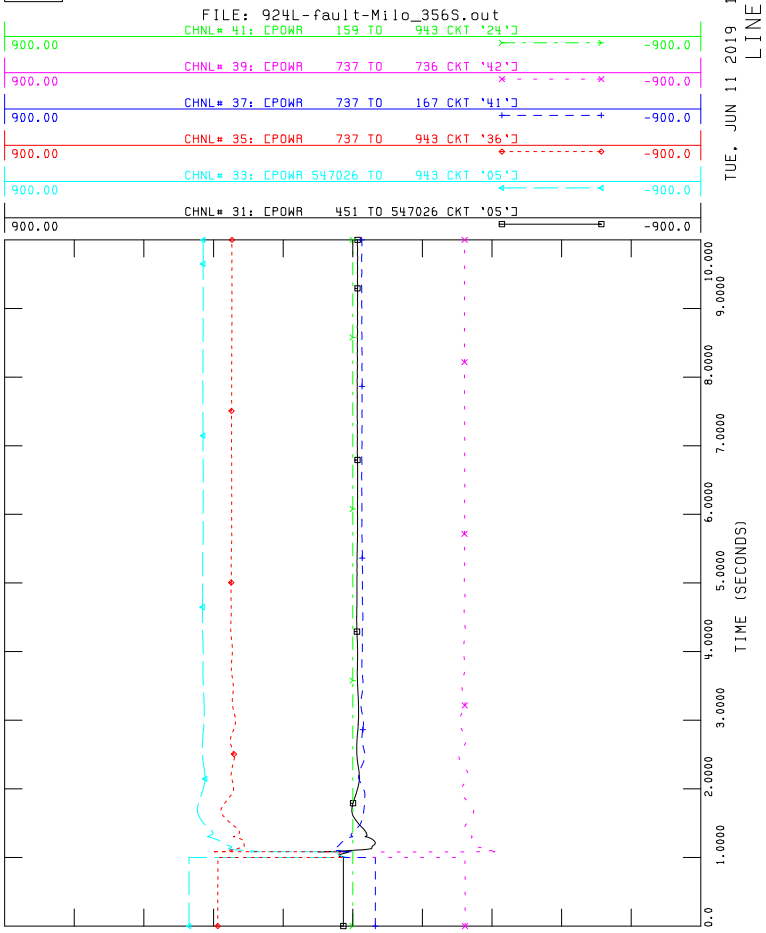
FILE: 924L-fault-Milo_356S.out



TUE, JUN 11 2019 17:59
LINE MVAR

FIGURE A4-25: P2009_2021SL_POST
CATB-924L_FAULT_AT_MILO_356S

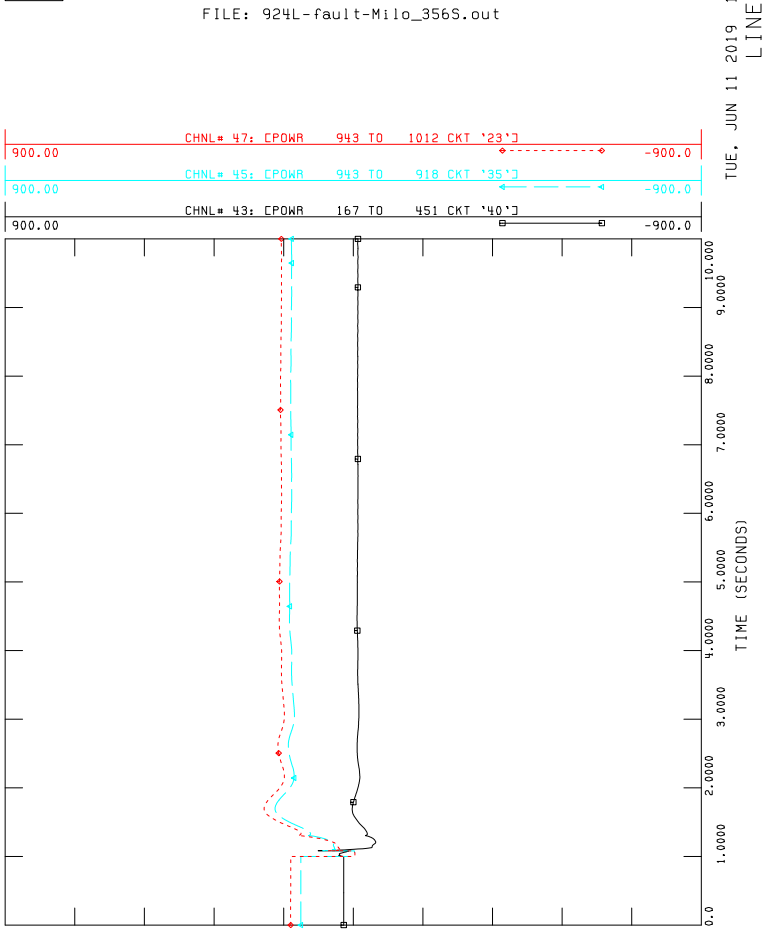
FILE: 924L-fault-Milo_356S.out



TUE, JUN 11 2019 17:59
LINE MW

FIGURE A4-25: P2009_2021SL_POST
CATB-924L_FAULT_AT_MILO_356S

FILE: 924L-fault-Milo_356S.out



TUE, JUN 11 2019 17:59
LINE MW

FIGURE A4-25: P2009_2021SL_POST
CATB-924L_FAULT_AT_MILO_356S

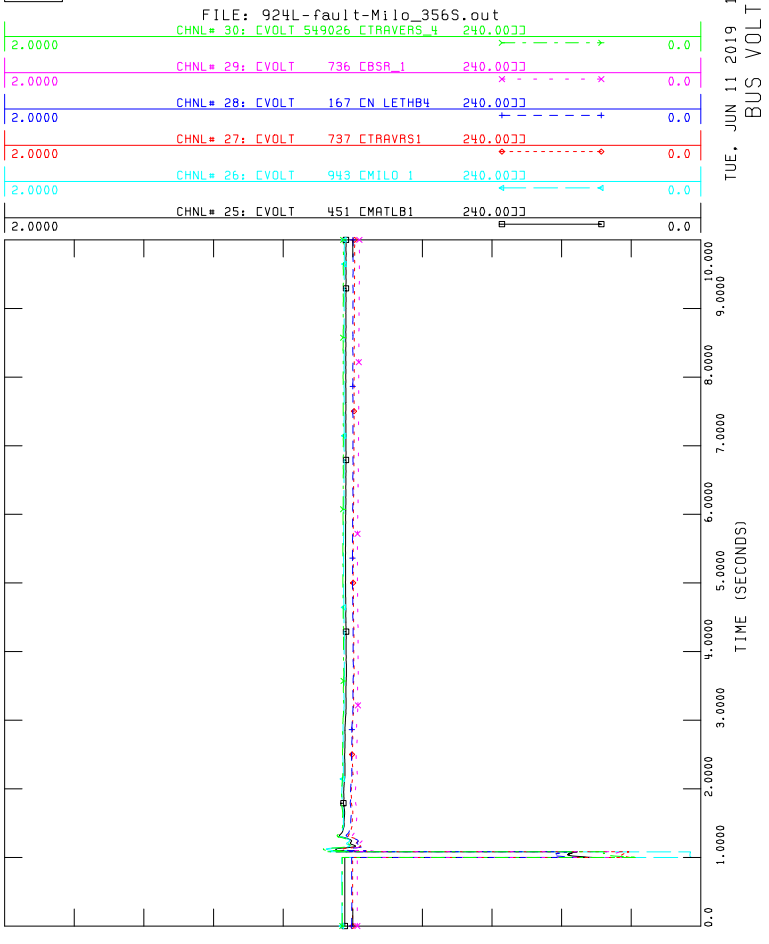


FIGURE A4-26: P2009_2021SL_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

TUE, JUN 11 2019 18:00
MACHINE VOLTAGE

TIME (SECONDS)

FIGURE A4-26: P2009_2021SL_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

TUE, JUN 11 2019 18:00
MACHINE MVAR

TIME (SECONDS)

FIGURE A4-26: P2009_2021SL_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

TUE, JUN 11 2019 18:00
MACHINE ANGEL

TIME (SECONDS)

FIGURE A4-26: P2009_2021SL_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out

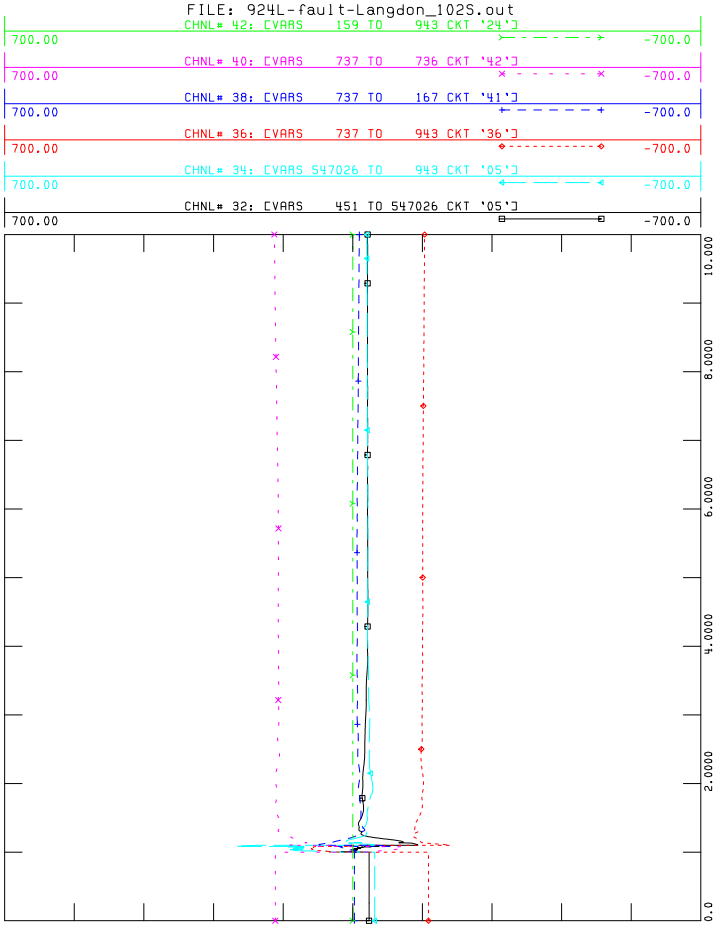
CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

TUE, JUN 11 2019 18:00
MACHINE MW

TIME (SECONDS)

FIGURE A4-26: P2009_2021SL_POST
CATB-924L_FAULT_AT_LANGDON_102S

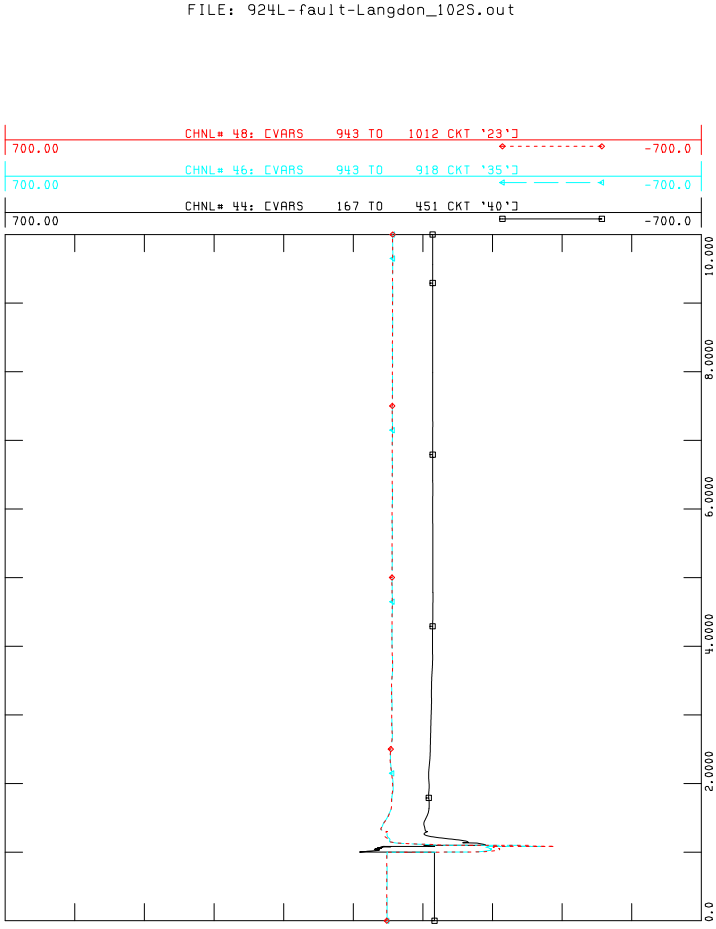
FILE: 924L-fault-Langdon_102S.out



TUE, JUN 11 2019 18:00
LINE MVAR

FIGURE A4-26: P2009_2021SL_POST
CATB-924L_FAULT_AT_LANGDON_102S

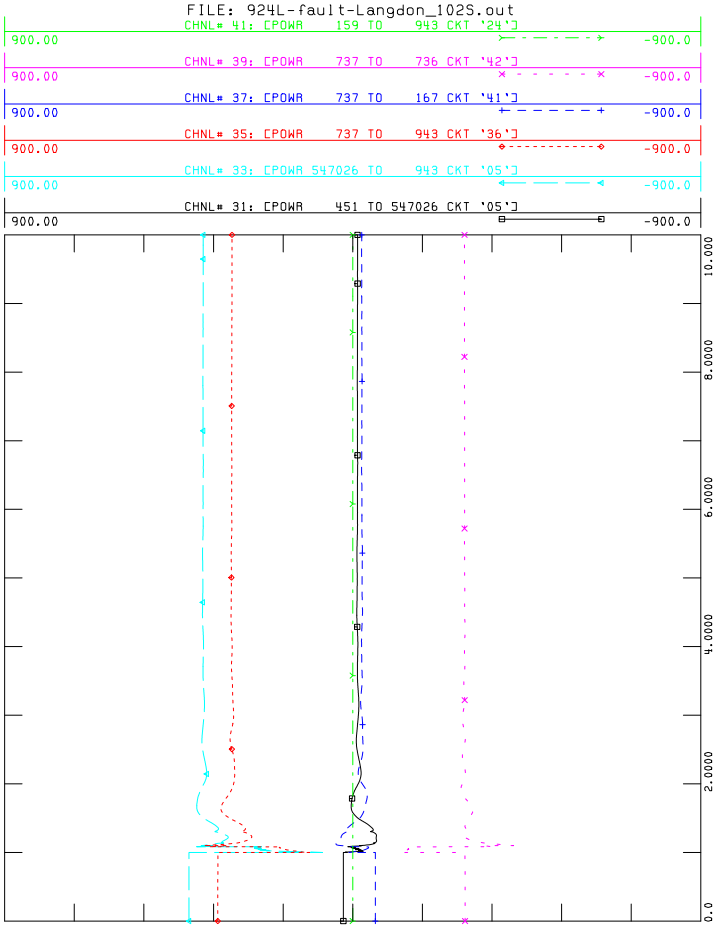
FILE: 924L-fault-Langdon_102S.out



TUE, JUN 11 2019 18:00
LINE MVAR

FIGURE A4-26: P2009_2021SL_POST
CATB-924L_FAULT_AT_LANGDON_102S

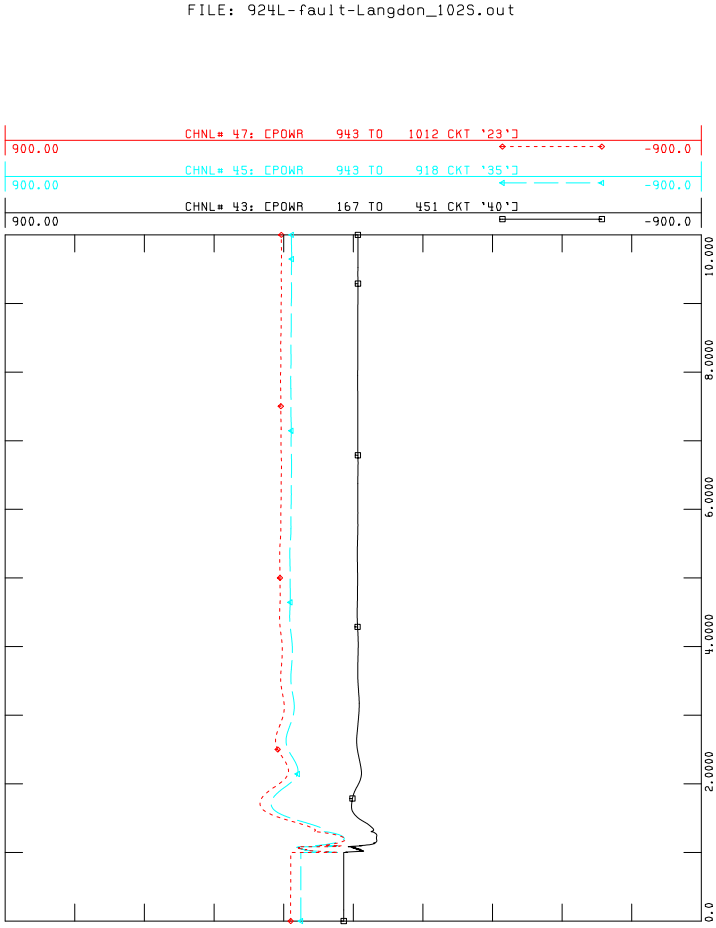
FILE: 924L-fault-Langdon_102S.out



TUE, JUN 11 2019 18:00
LINE MW

FIGURE A4-26: P2009_2021SL_POST
CATB-924L_FAULT_AT_LANGDON_102S

FILE: 924L-fault-Langdon_102S.out



TUE, JUN 11 2019 18:00
LINE MW

FIGURE A4-26: P2009_2021SL_POST
CATB-924L_FAULT_AT_LANGDON_102S

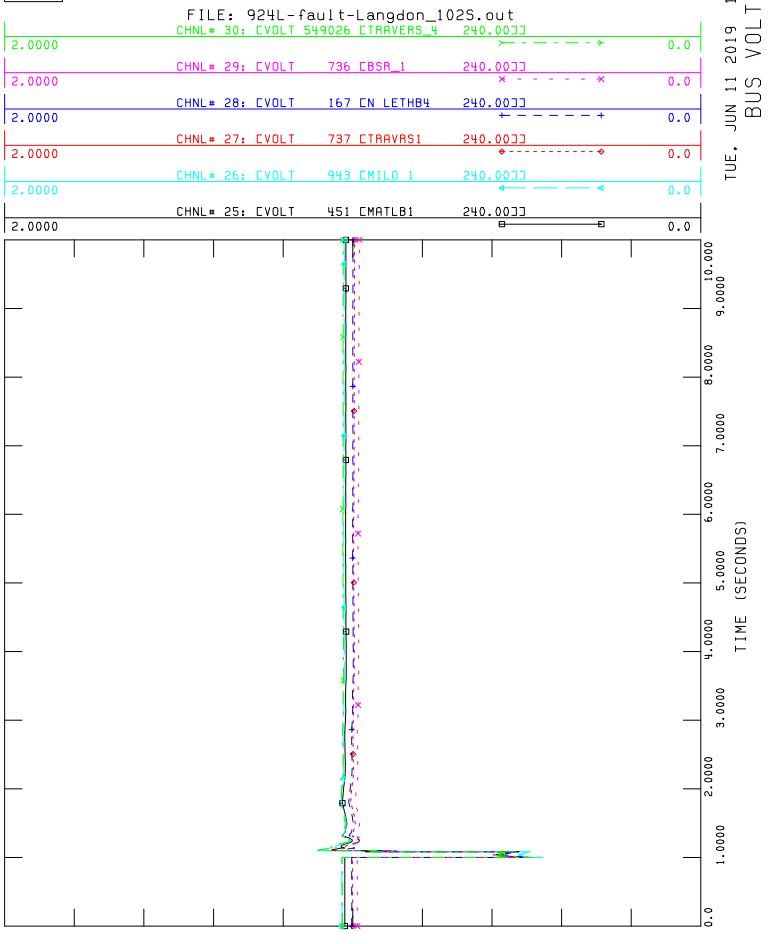


FIGURE A4-27: P2009_2021SL_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 23: CETRM 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 22: CETRM 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 21: CETRM 773CSECST 20.000ǁ1ǁ
CHNL# 20: CETRM 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 19: CETRMS60026CTRAVERS_1 0.4800ǁPVǁ

2.0000 / 0.0

TUE, JUN 11 2019 18:03
MACHINE VOLTAGE

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

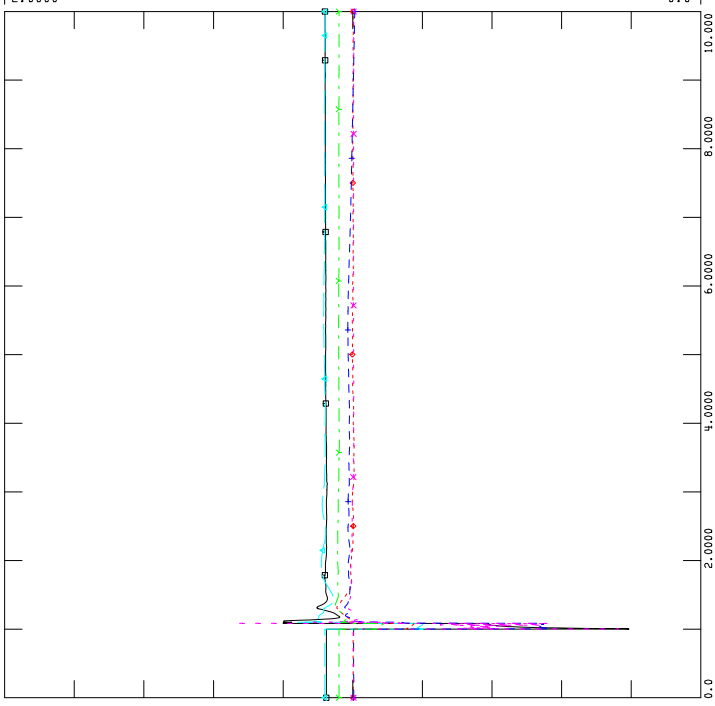


FIGURE A4-27: P2009_2021SL_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 17: CVARS 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 16: CVARS 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 15: CVARS 773CSECST 20.000ǁ1ǁ
CHNL# 14: CVARS 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 13: CVARSS60026CTRAVERS_1 0.4800ǁPVǁ

10.000 / -10.00

TUE, JUN 11 2019 18:03
MACHINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

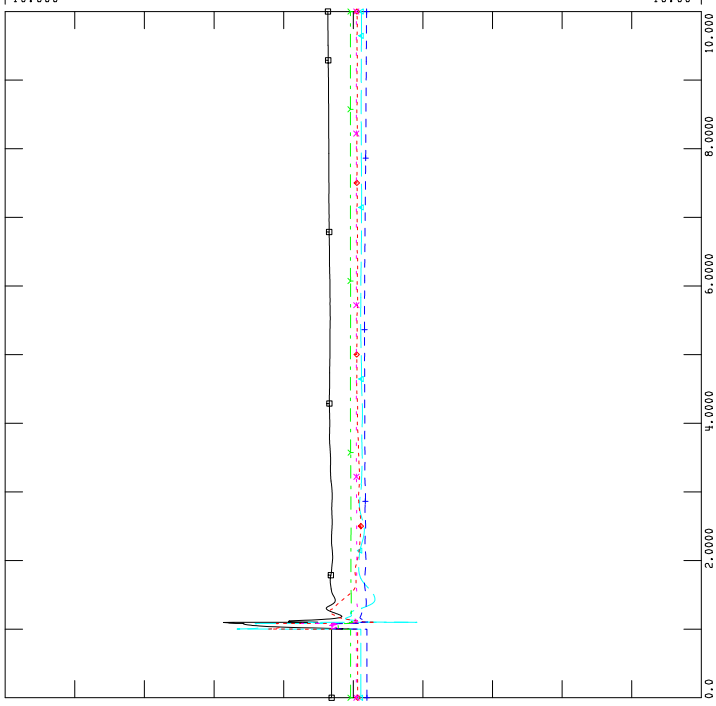


FIGURE A4-27: P2009_2021SL_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 3: CANGL 773CSECST 20.000ǁ1ǁ
CHNL# 2: CANGL 1482CSHEER 1 19.000ǁ1ǁ

100.00 / -100.0

TUE, JUN 11 2019 18:03
MACHINE ANGEL

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

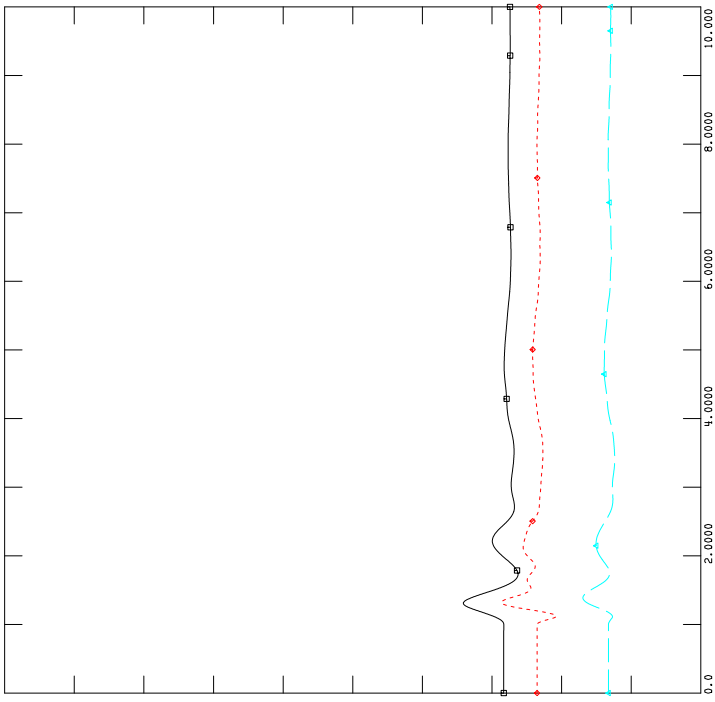


FIGURE A4-27: P2009_2021SL_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 10: CPOWR 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 9: CPOWR 773CSECST 20.000ǁ1ǁ
CHNL# 8: CPOWR 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800ǁPVǁ

10.000 / -10.00

TUE, JUN 11 2019 18:03
MACHINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

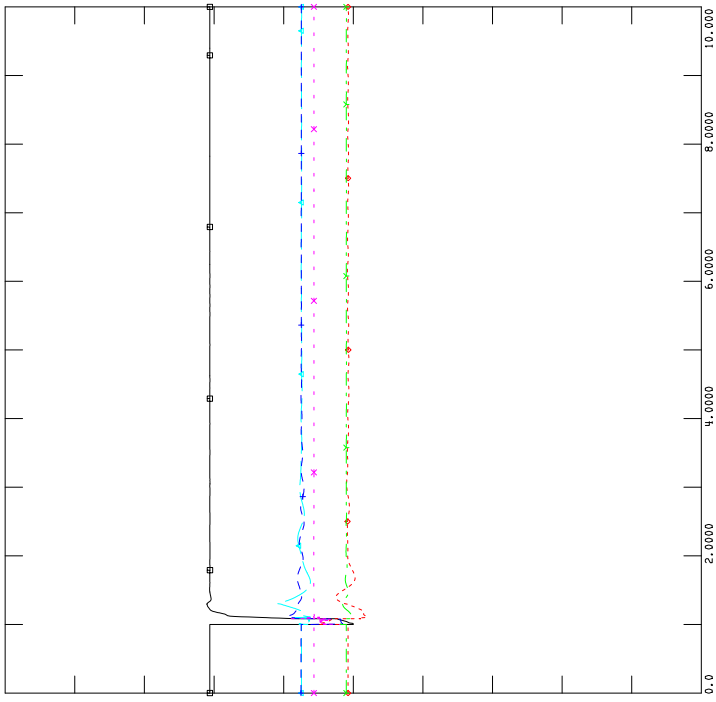


FIGURE A4-27: P2009_2021SL_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TUE, JUN 11 2019 18:04
LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

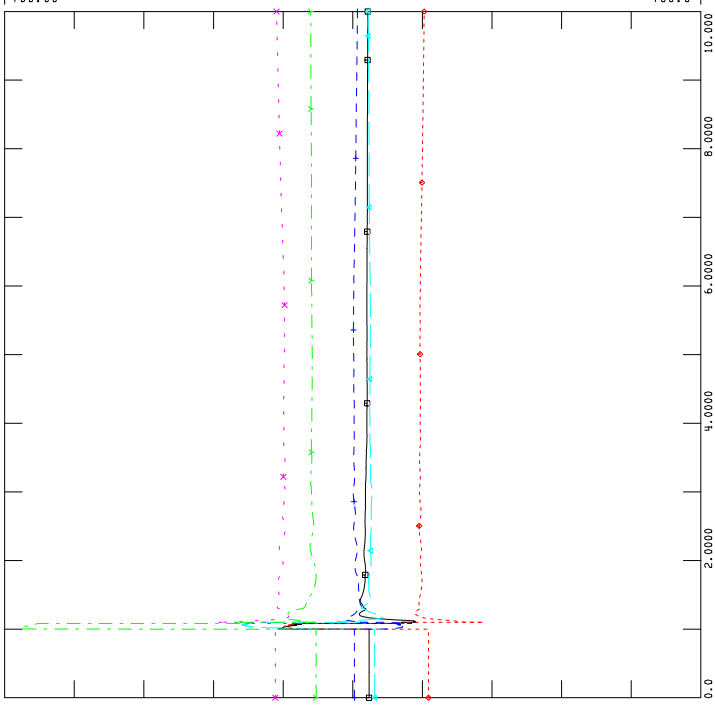


FIGURE A4-27: P2009_2021SL_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TUE, JUN 11 2019 18:04
LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

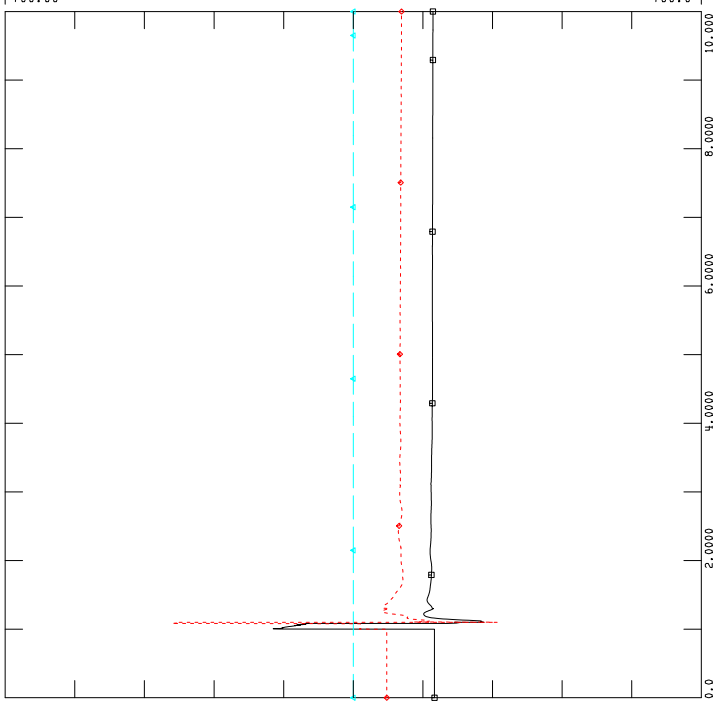


FIGURE A4-27: P2009_2021SL_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TUE, JUN 11 2019 18:03
LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

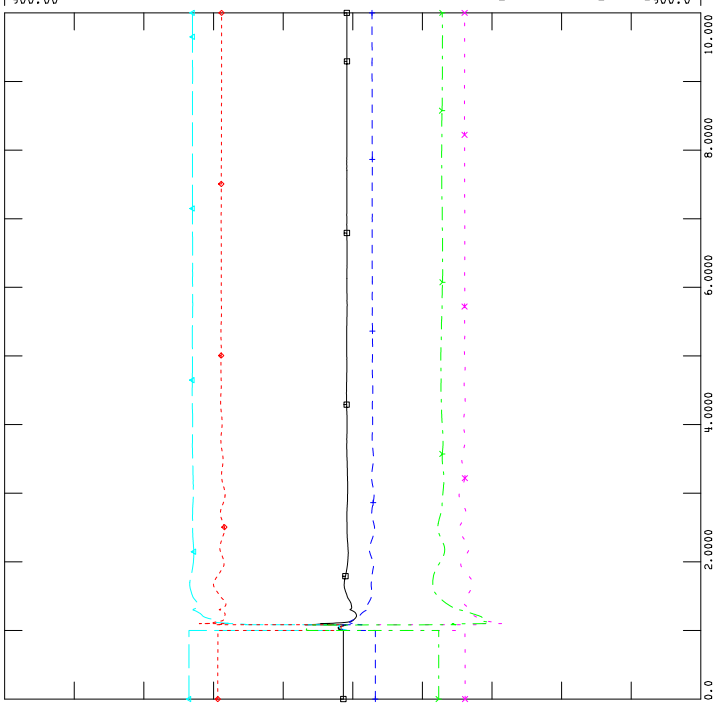


FIGURE A4-27: P2009_2021SL_POST
CATB-935L_FAULT_AT_MILO_356S

FILE: 935L-fault-Milo_356S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TUE, JUN 11 2019 18:04
LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

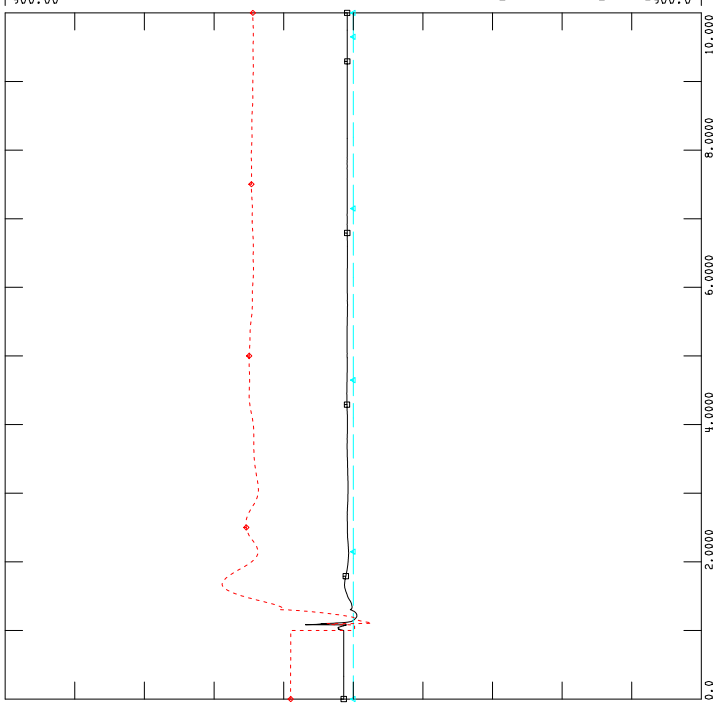


FIGURE A4-27: P2009_2021SL_POST
CATB-935L_FAULT_AT_MILO_356S

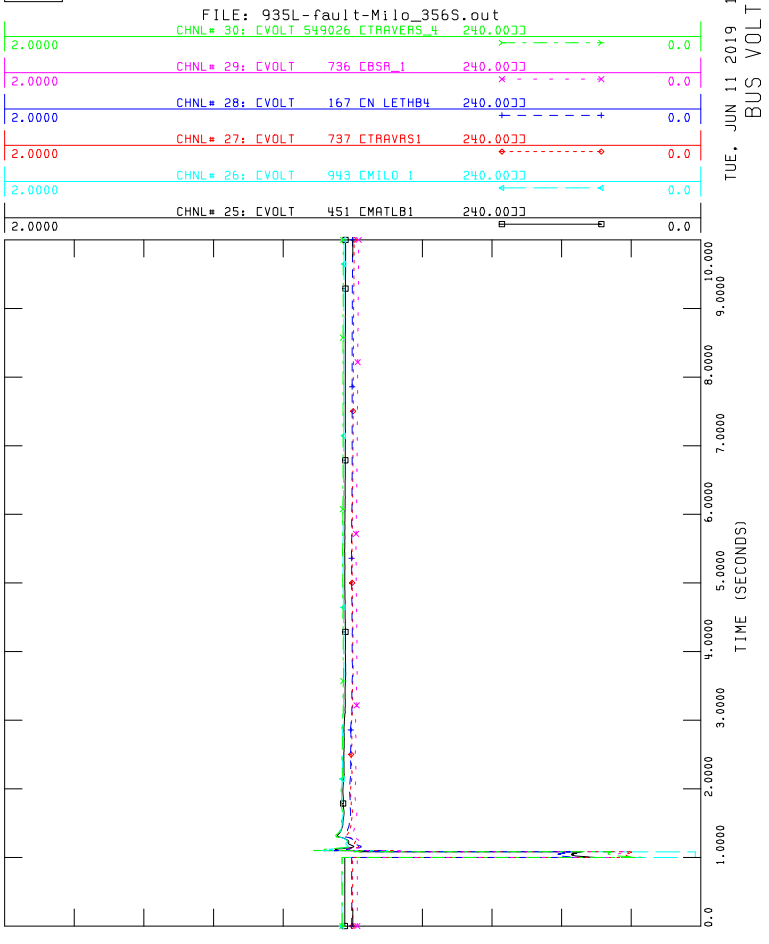
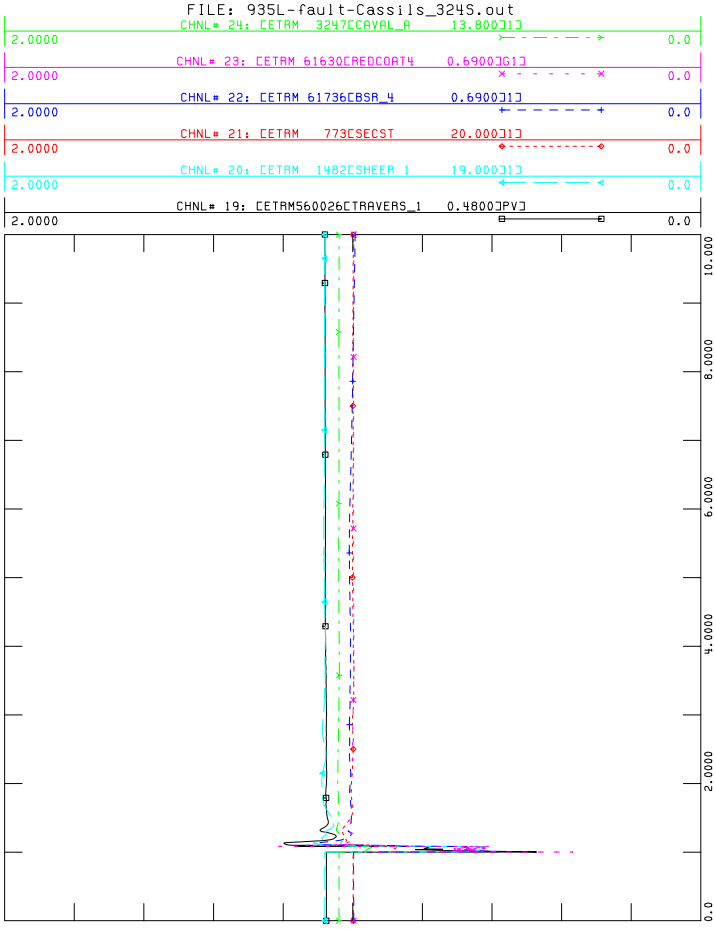


FIGURE A4-28: P2009_2021SL_POST
CATB-935L_FAULT_AT_CASSILS_324S

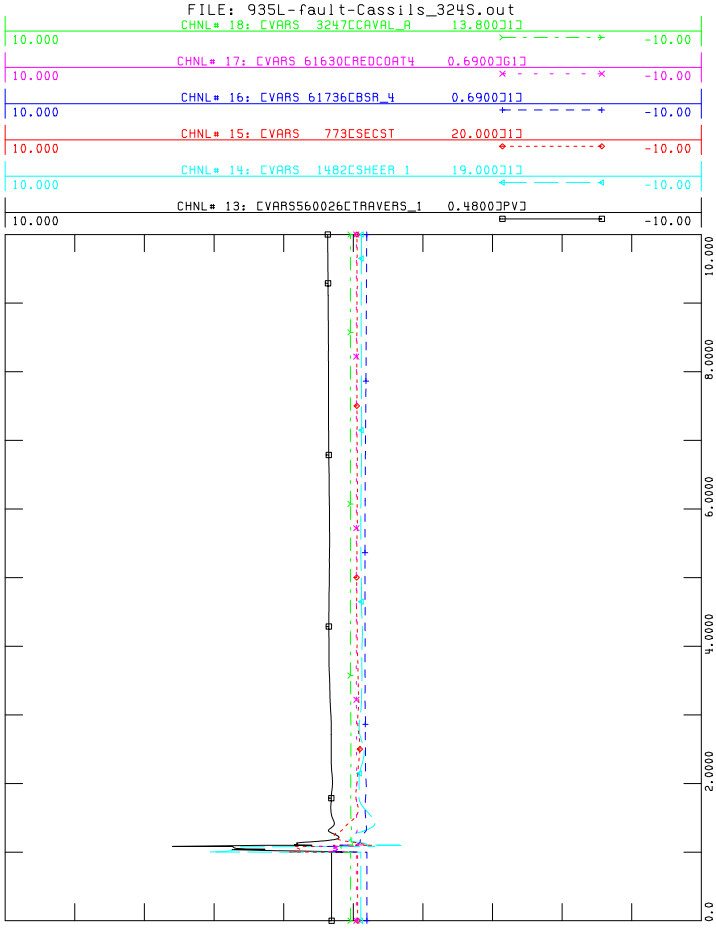
FILE: 935L-fault-Cassils_324S.out



TUE, JUN 11 2019 18:05
MACHINE VOLTAGE

FIGURE A4-28: P2009_2021SL_POST
CATB-935L_FAULT_AT_CASSILS_324S

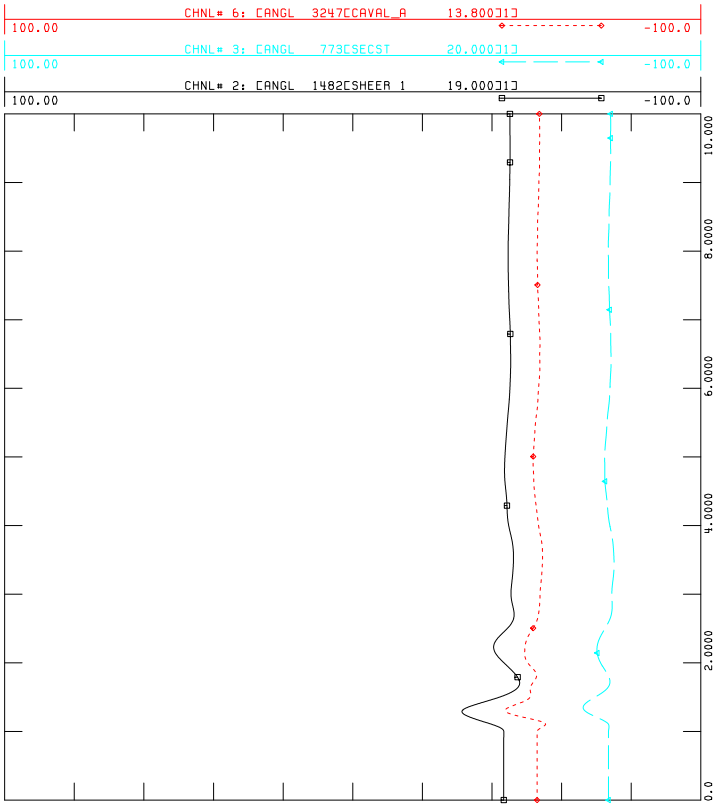
FILE: 935L-fault-Cassils_324S.out



TUE, JUN 11 2019 18:05
MACHINE MVAR

FIGURE A4-28: P2009_2021SL_POST
CATB-935L_FAULT_AT_CASSILS_324S

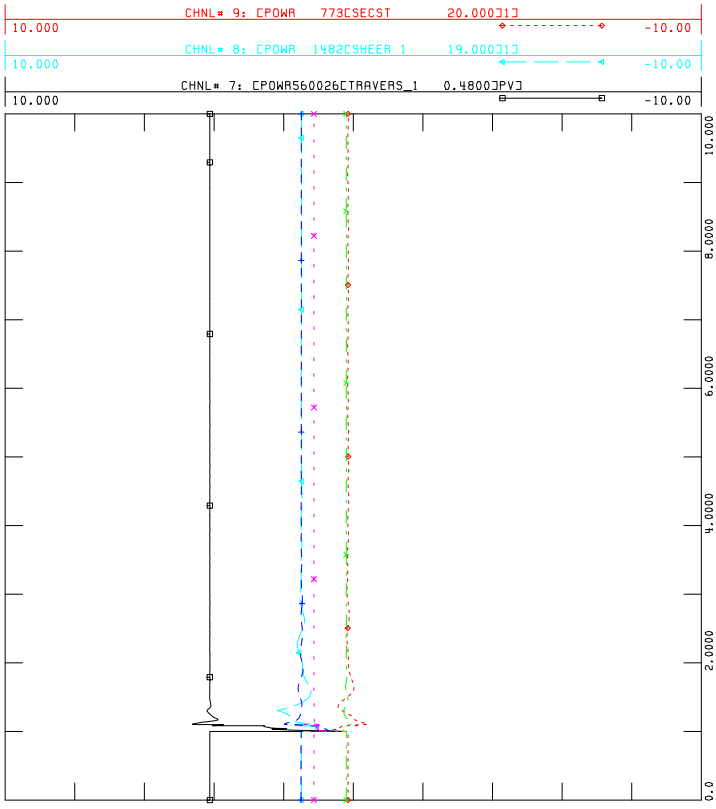
FILE: 935L-fault-Cassils_324S.out



TUE, JUN 11 2019 18:05
MACHINE ANGEL

FIGURE A4-28: P2009_2021SL_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out



TUE, JUN 11 2019 18:05
MACHINE MW

FIGURE A4-28: P2009_2021SL_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

TUE, JUN 11 2019 18:05

LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-28: P2009_2021SL_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

TUE, JUN 11 2019 18:05

LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-28: P2009_2021SL_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

TUE, JUN 11 2019 18:05

LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-28: P2009_2021SL_POST
CATB-935L_FAULT_AT_CASSILS_324S

FILE: 935L-fault-Cassils_324S.out

TUE, JUN 11 2019 18:05

LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-28: P2009_2021SL_POST
CATB-935L_FAULT_AT_CASSILS_324S

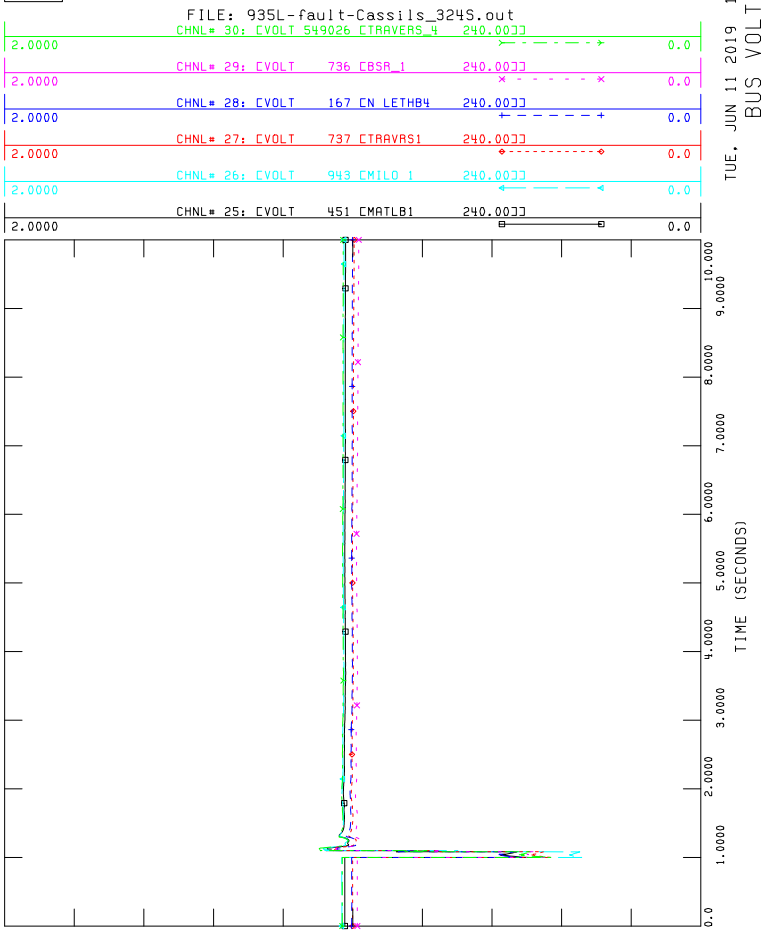


FIGURE A4-29: P2009_2021SL_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 23: CETRM 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 22: CETRM 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 21: CETRM 773CSECST 20.000ǁ1ǁ
CHNL# 20: CETRM 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 19: CETRMS60026CTRAVERS_1 0.4800ǁPVǁ

2.0000 / 0.0

TUE, JUN 11 2019 18:06
MACHINE VOLTAGE

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

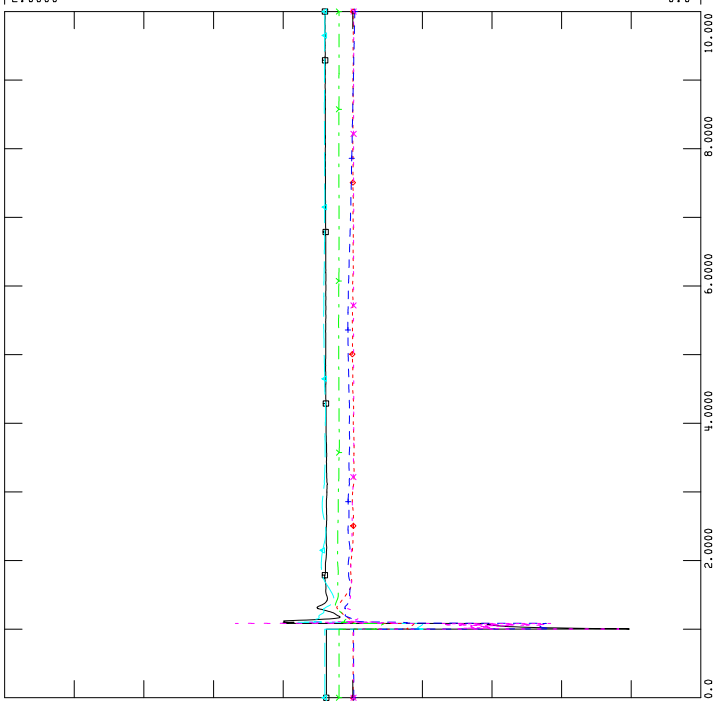


FIGURE A4-29: P2009_2021SL_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 17: CVARS 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 16: CVARS 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 15: CVARS 773CSECST 20.000ǁ1ǁ
CHNL# 14: CVARS 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 13: CVARSS60026CTRAVERS_1 0.4800ǁPVǁ

10.000 / -10.00

TUE, JUN 11 2019 18:06
MACHINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

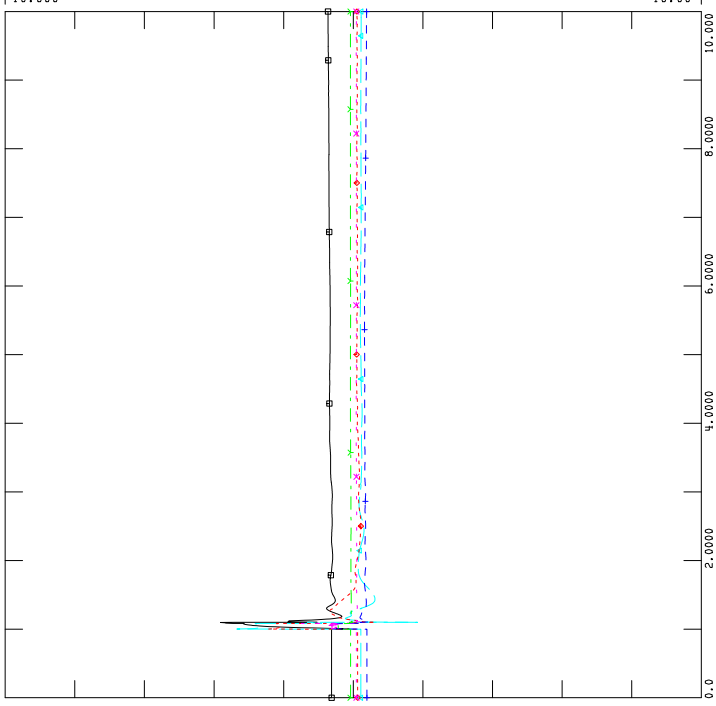


FIGURE A4-29: P2009_2021SL_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 3: CANGL 773CSECST 20.000ǁ1ǁ
CHNL# 2: CANGL 1482CSHEER 1 19.000ǁ1ǁ

100.00 / -100.0

TUE, JUN 11 2019 18:06
MACHINE ANGEL

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

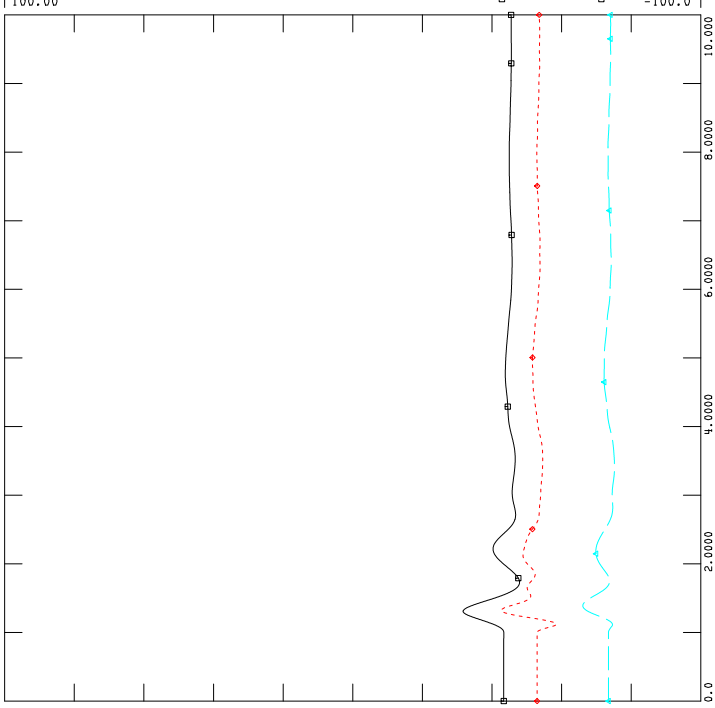


FIGURE A4-29: P2009_2021SL_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 10: CPOWR 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 9: CPOWR 773CSECST 20.000ǁ1ǁ
CHNL# 8: CPOWR 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800ǁPVǁ

10.000 / -10.00

TUE, JUN 11 2019 18:06
MACHINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

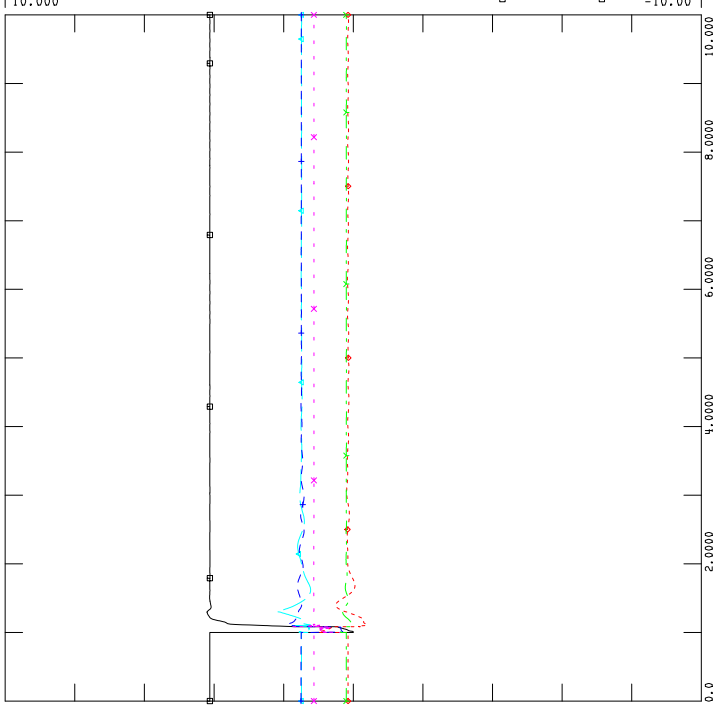
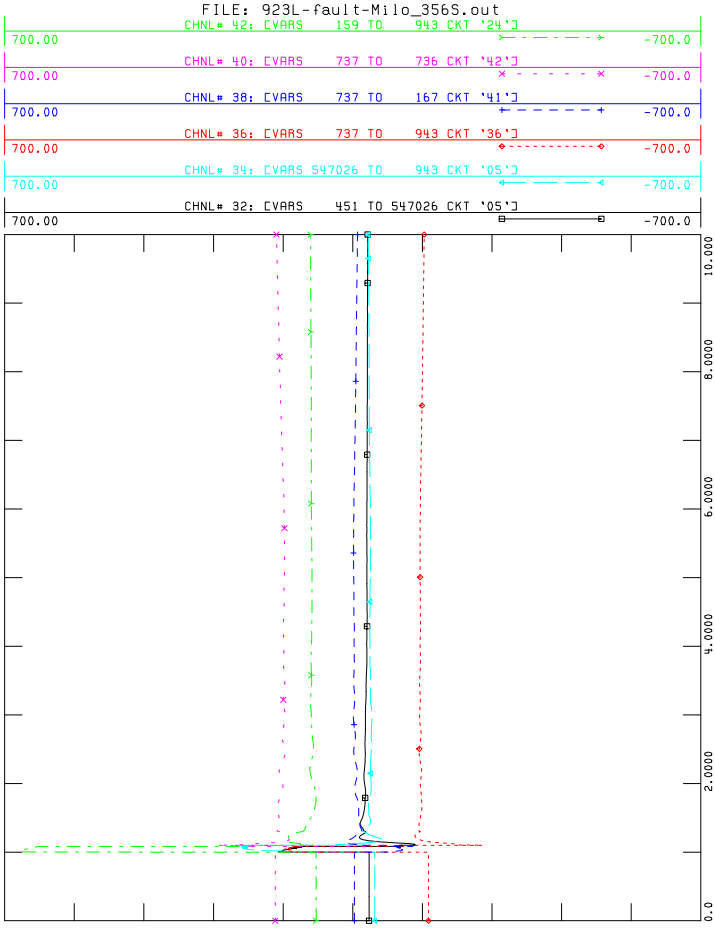


FIGURE A4-29: P2009_2021SL_POST
CATB-923L_FAULT_AT_MILO_356S

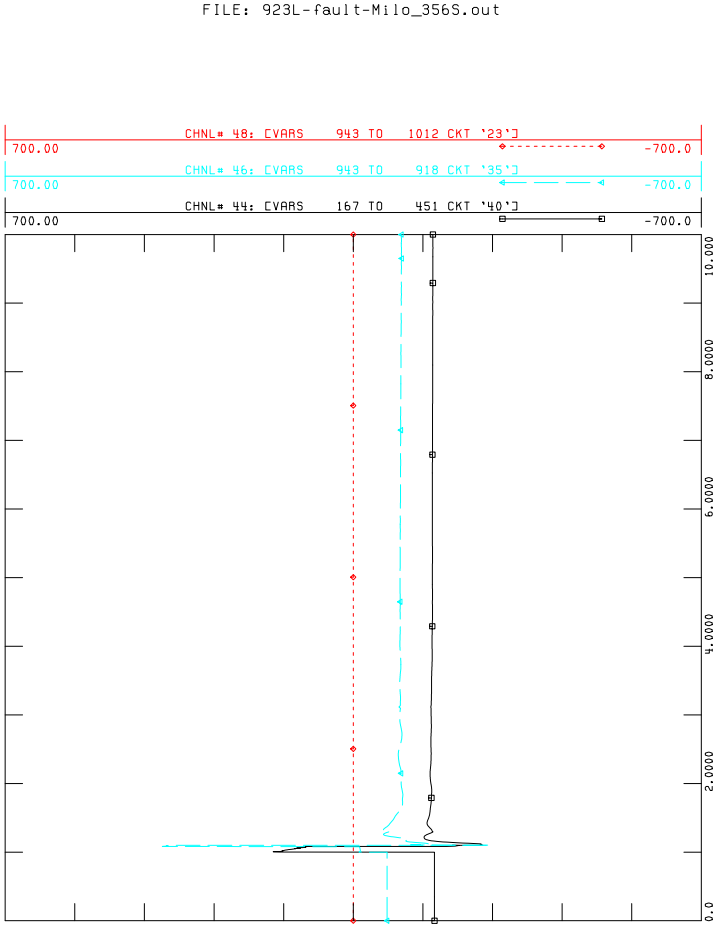
FILE: 923L-fault-Milo_356S.out



TUE, JUN 11 2019 18:06
LINE MVAR

FIGURE A4-29: P2009_2021SL_POST
CATB-923L_FAULT_AT_MILO_356S

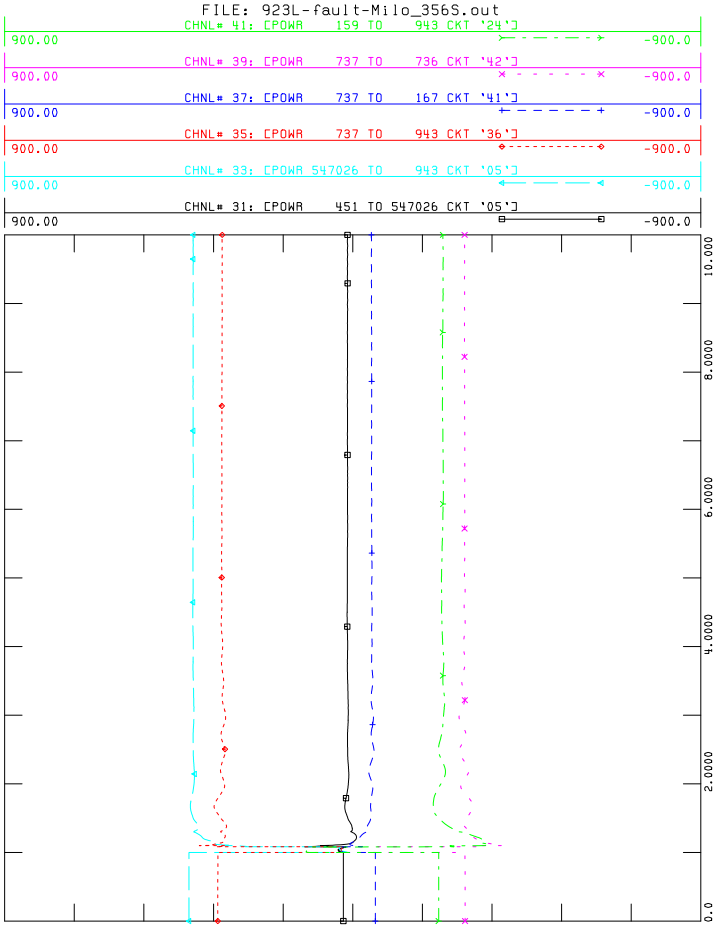
FILE: 923L-fault-Milo_356S.out



TUE, JUN 11 2019 18:06
LINE MVAR

FIGURE A4-29: P2009_2021SL_POST
CATB-923L_FAULT_AT_MILO_356S

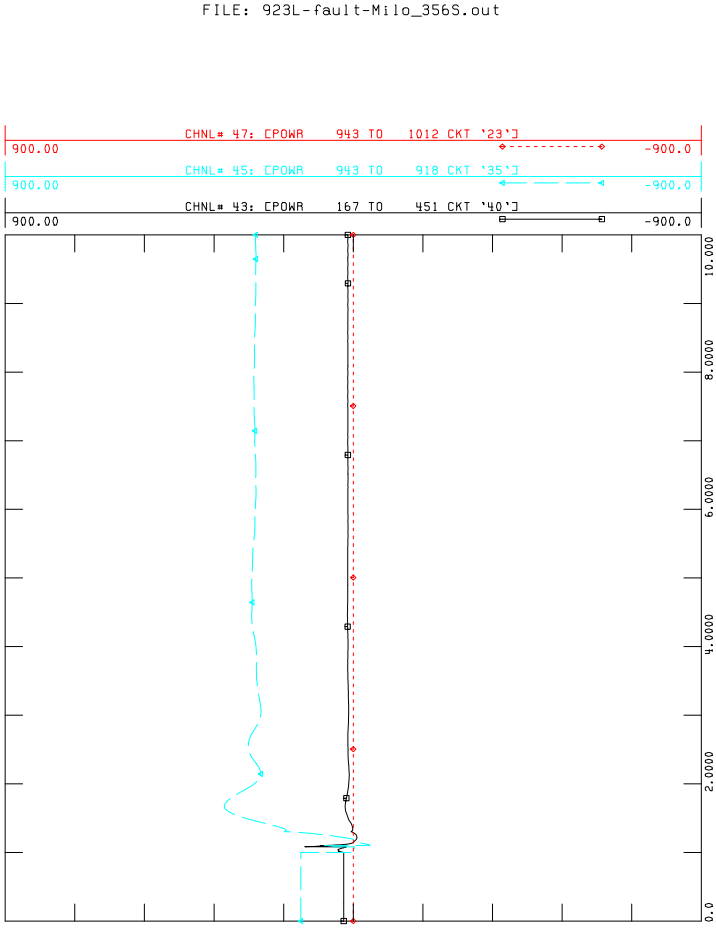
FILE: 923L-fault-Milo_356S.out



TUE, JUN 11 2019 18:06
LINE MW

FIGURE A4-29: P2009_2021SL_POST
CATB-923L_FAULT_AT_MILO_356S

FILE: 923L-fault-Milo_356S.out



TUE, JUN 11 2019 18:06
LINE MW

FIGURE A4-29: P2009_2021SL_POST
CATB-923L_FAULT_AT_MILO_356S

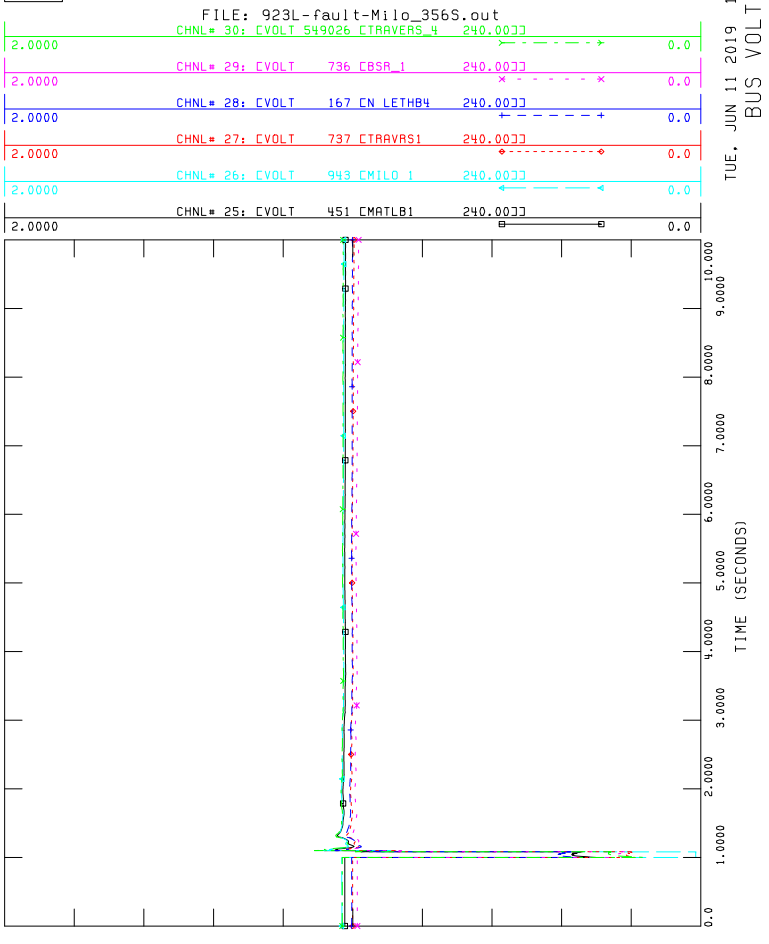


FIGURE A4-30: P2009_2021SL_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

2.0000 / 0.0

TUE, JUN 11 2019 18:07
MACHINE VOLTAGE

TIME (SECONDS)

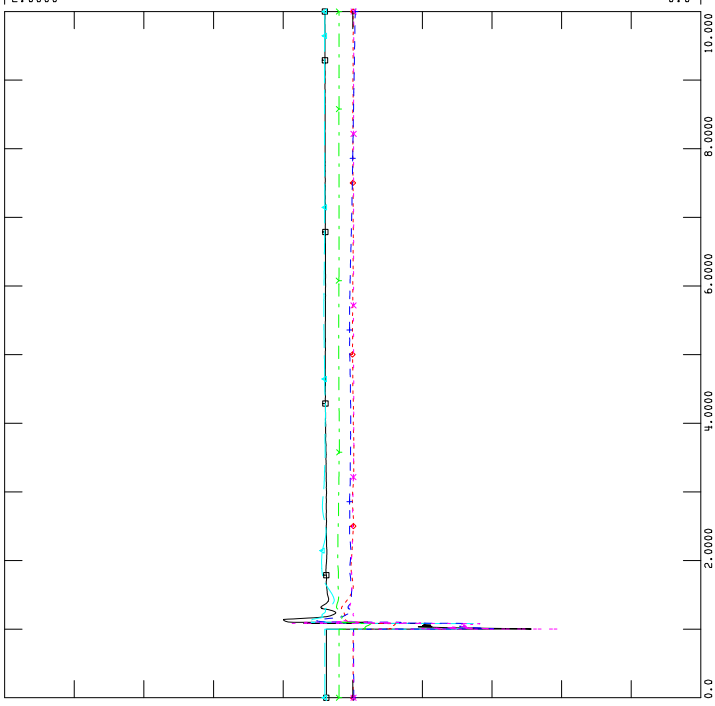


FIGURE A4-30: P2009_2021SL_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 18:07
MACHINE MVAR

TIME (SECONDS)

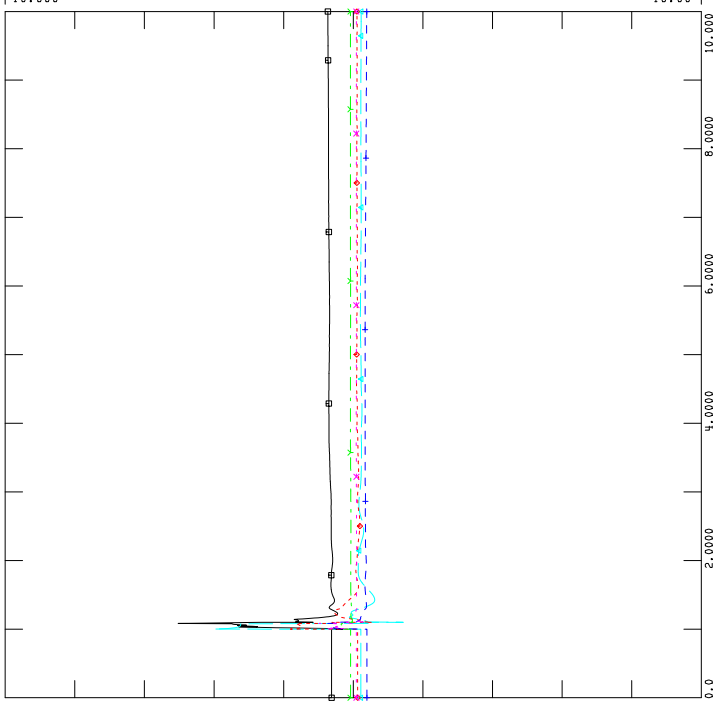


FIGURE A4-30: P2009_2021SL_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

100.00 / -100.0

TUE, JUN 11 2019 18:07
MACHINE ANGEL

TIME (SECONDS)

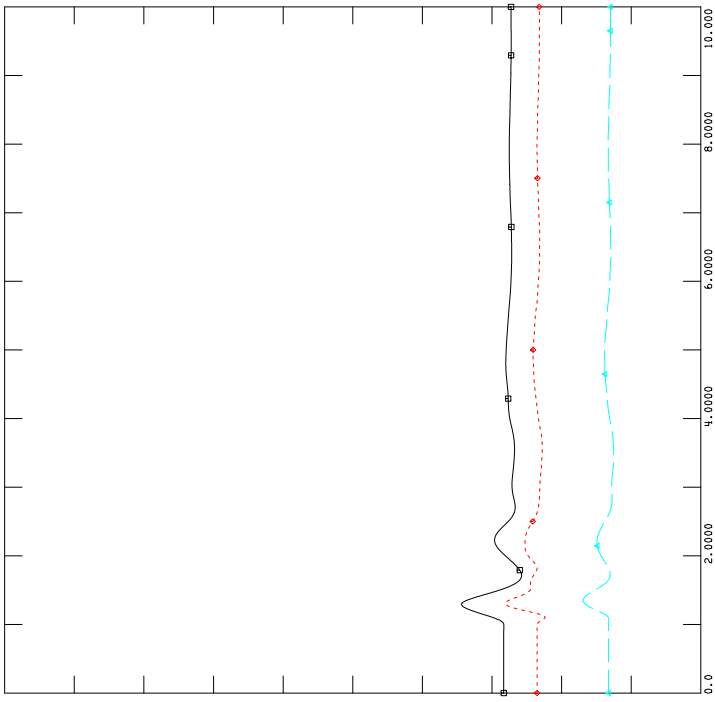


FIGURE A4-30: P2009_2021SL_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 18:07
MACHINE MW

TIME (SECONDS)

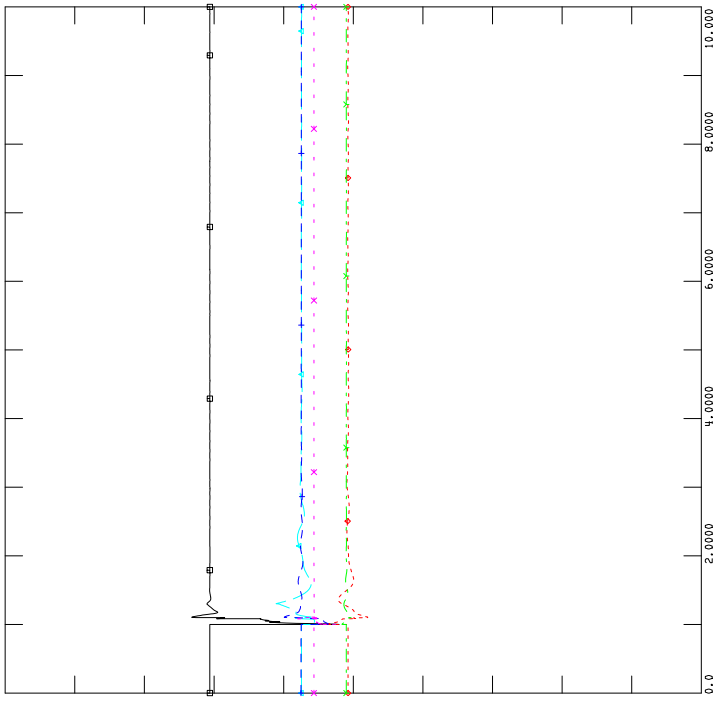
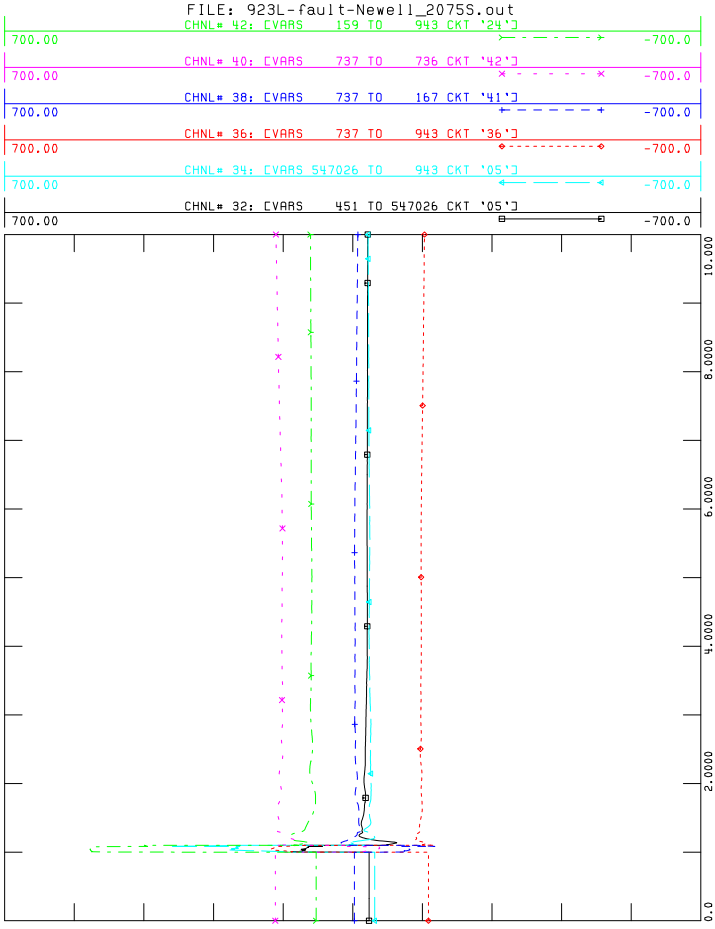


FIGURE A4-30: P2009_2021SL_POST
CATB-923L_FAULT_AT_NEWELL_2075S

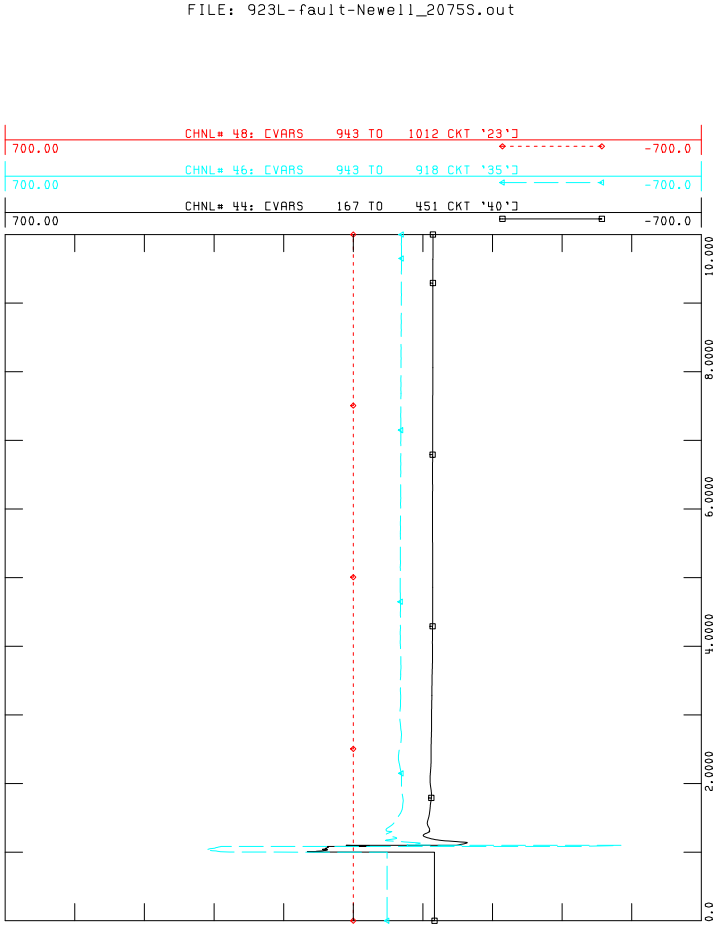
FILE: 923L-fault-Newell_2075S.out



TUE, JUN 11 2019 18:07
LINE MVAR

FIGURE A4-30: P2009_2021SL_POST
CATB-923L_FAULT_AT_NEWELL_2075S

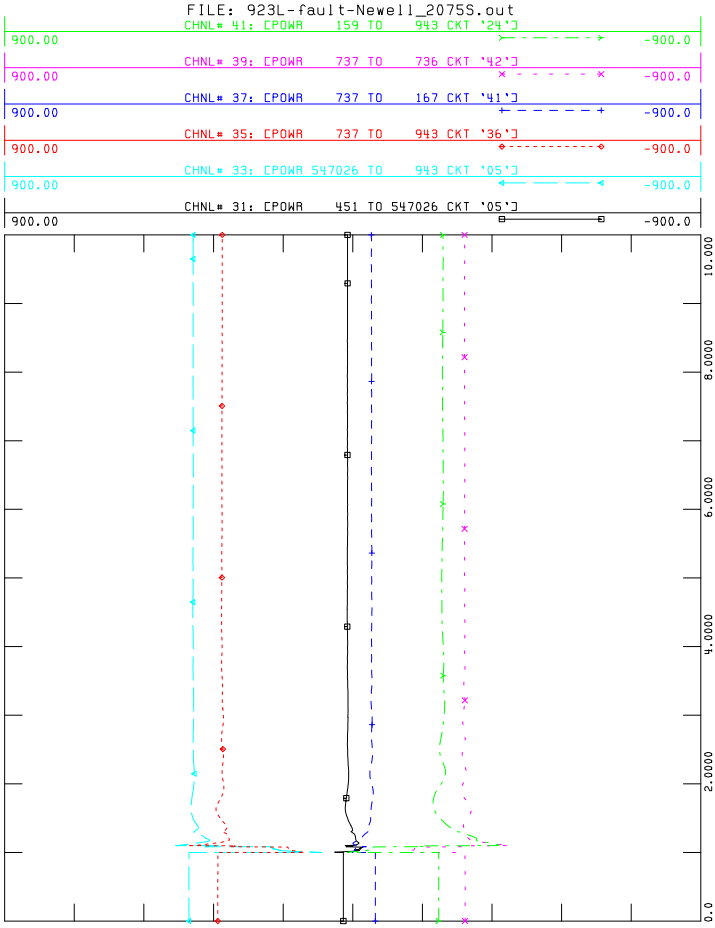
FILE: 923L-fault-Newell_2075S.out



TUE, JUN 11 2019 18:07
LINE MVAR

FIGURE A4-30: P2009_2021SL_POST
CATB-923L_FAULT_AT_NEWELL_2075S

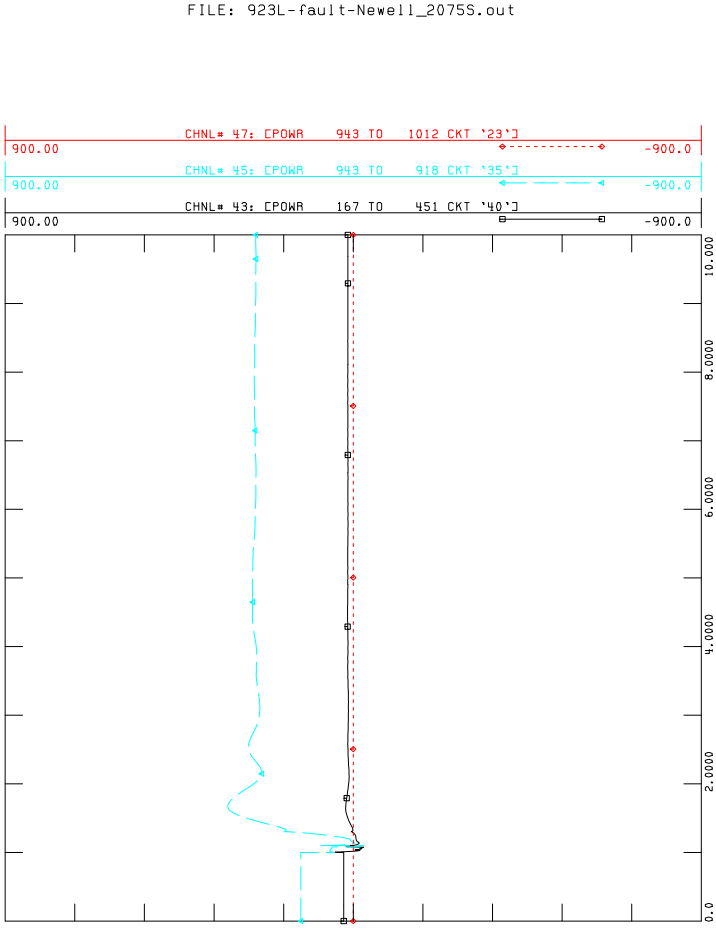
FILE: 923L-fault-Newell_2075S.out



TUE, JUN 11 2019 18:07
LINE MW

FIGURE A4-30: P2009_2021SL_POST
CATB-923L_FAULT_AT_NEWELL_2075S

FILE: 923L-fault-Newell_2075S.out



TUE, JUN 11 2019 18:07
LINE MW

FIGURE A4-30: P2009_2021SL_POST
CATB-923L_FAULT_AT_NEWELL_2075S

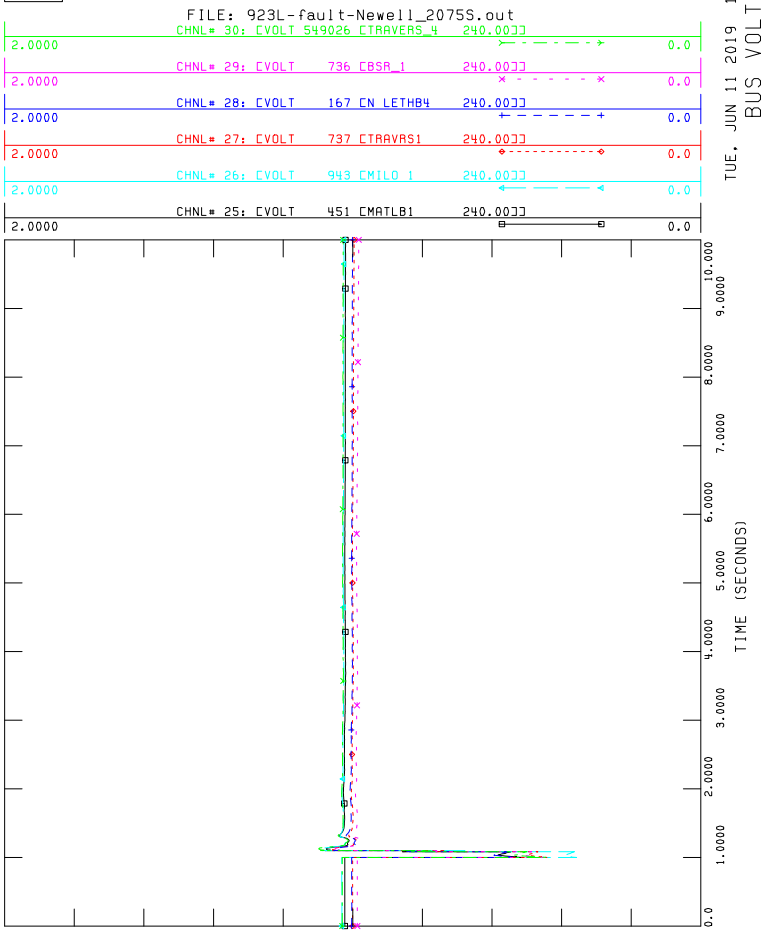


FIGURE A4-31: P2009_2021SL_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 23: CETRM 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 22: CETRM 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 21: CETRM 773CSECST 20.000ǁ1ǁ
CHNL# 20: CETRM 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 19: CETRMS60026CTRAVERS_1 0.4800ǁPVǁ

2.0000 / 0.0

TUE, JUN 11 2019 18:08
MACHINE VOLTAGE

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-31: P2009_2021SL_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 17: CVARS 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 16: CVARS 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 15: CVARS 773CSECST 20.000ǁ1ǁ
CHNL# 14: CVARS 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 13: CVARSS60026CTRAVERS_1 0.4800ǁPVǁ

10.000 / -10.00

TUE, JUN 11 2019 18:08
MACHINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-31: P2009_2021SL_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 3: CANGL 773CSECST 20.000ǁ1ǁ
CHNL# 2: CANGL 1482CSHEER 1 19.000ǁ1ǁ

100.00 / -100.0

TUE, JUN 11 2019 18:08
MACHINE ANGEL

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-31: P2009_2021SL_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800ǁ1ǁ
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900ǁG1ǁ
CHNL# 10: CPOWR 61736CBSR_4 0.6900ǁ1ǁ
CHNL# 9: CPOWR 773CSECST 20.000ǁ1ǁ
CHNL# 8: CPOWR 1482CSHEER 1 19.000ǁ1ǁ
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800ǁPVǁ

10.000 / -10.00

TUE, JUN 11 2019 18:08
MACHINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-31: P2009_2021SL_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TUE, JUN 11 2019 18:08
LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

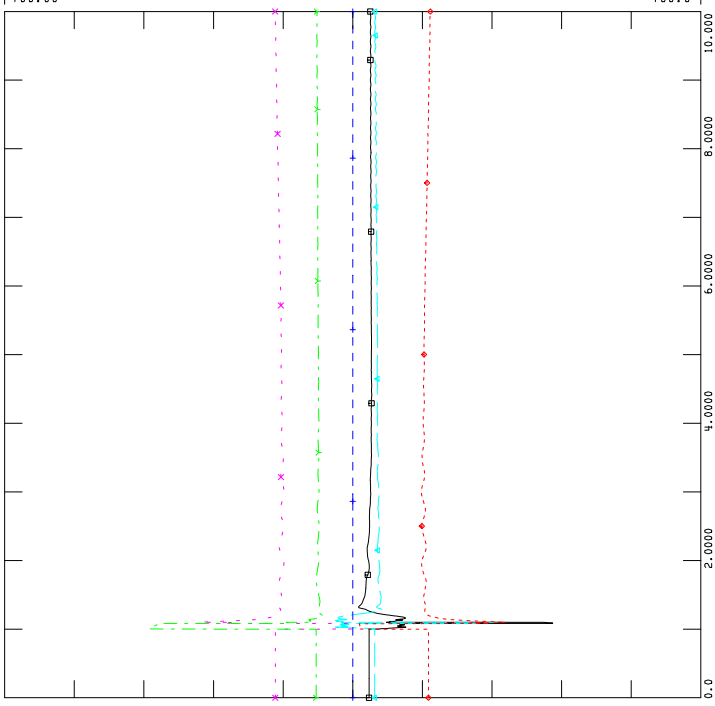


FIGURE A4-31: P2009_2021SL_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TUE, JUN 11 2019 18:08
LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

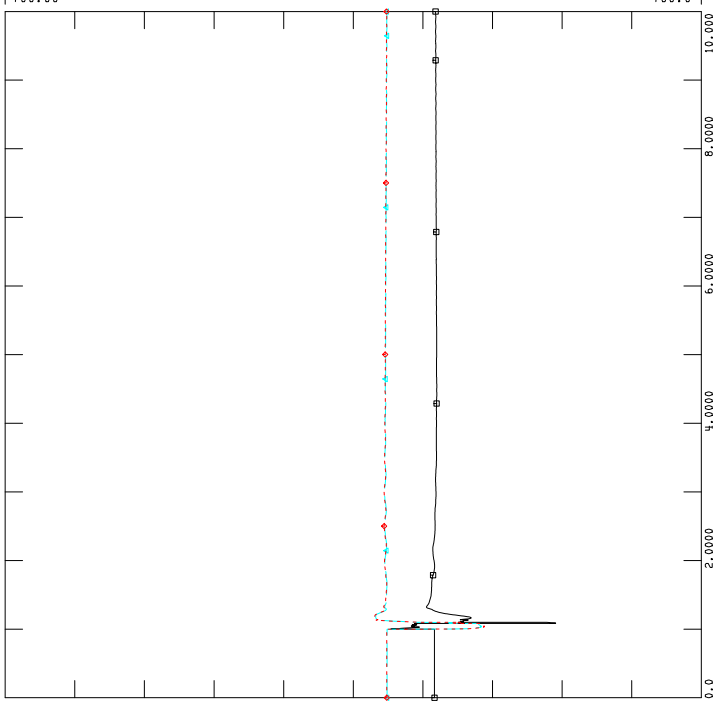


FIGURE A4-31: P2009_2021SL_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TUE, JUN 11 2019 18:08
LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

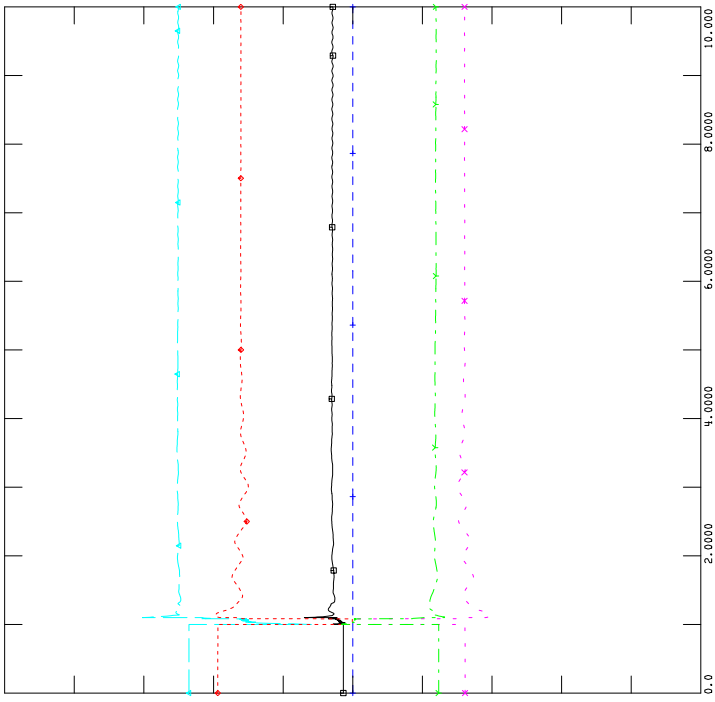


FIGURE A4-31: P2009_2021SL_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

FILE: 1041L-fault-Travers_554S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TUE, JUN 11 2019 18:08
LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

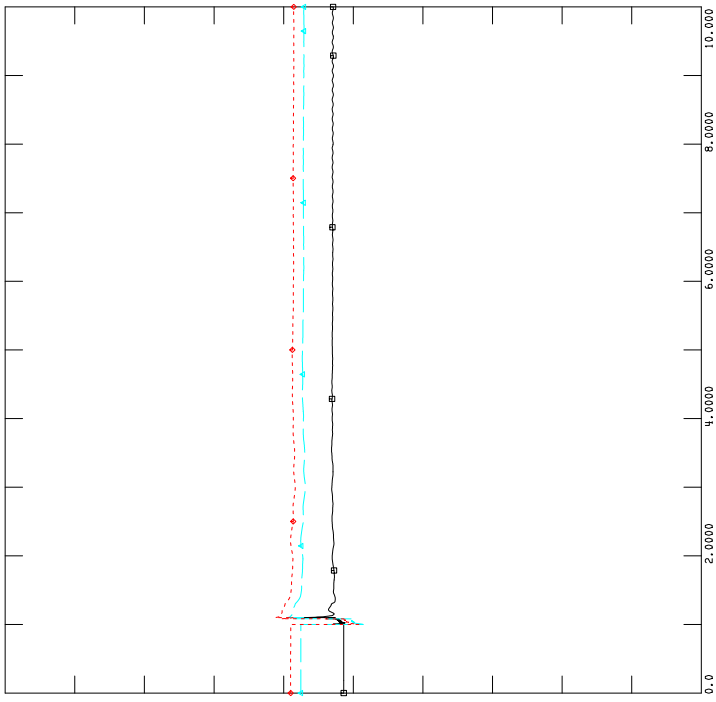


FIGURE A4-31: P2009_2021SL_POST
CATB-1041L_FAULT_AT_TRAVERS_554S

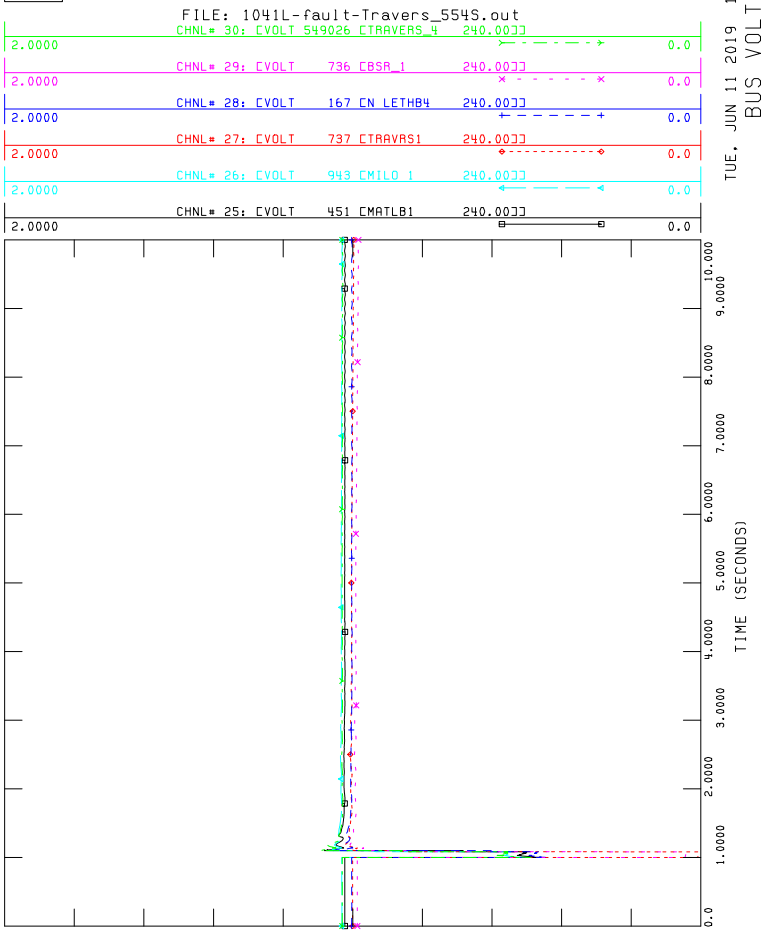
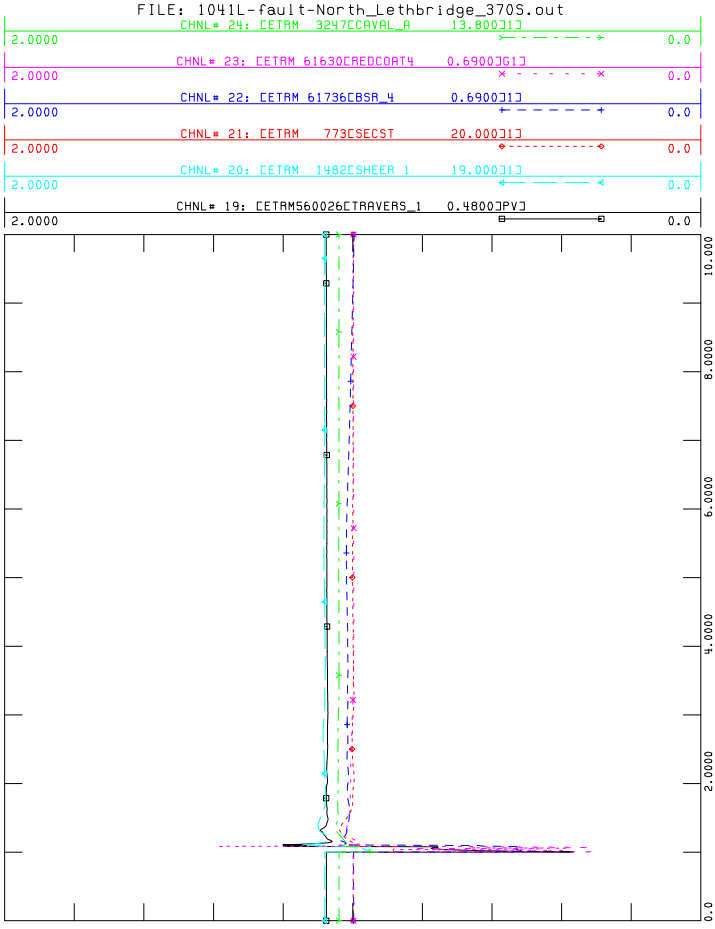


FIGURE A4-32: P2009_2021SL_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

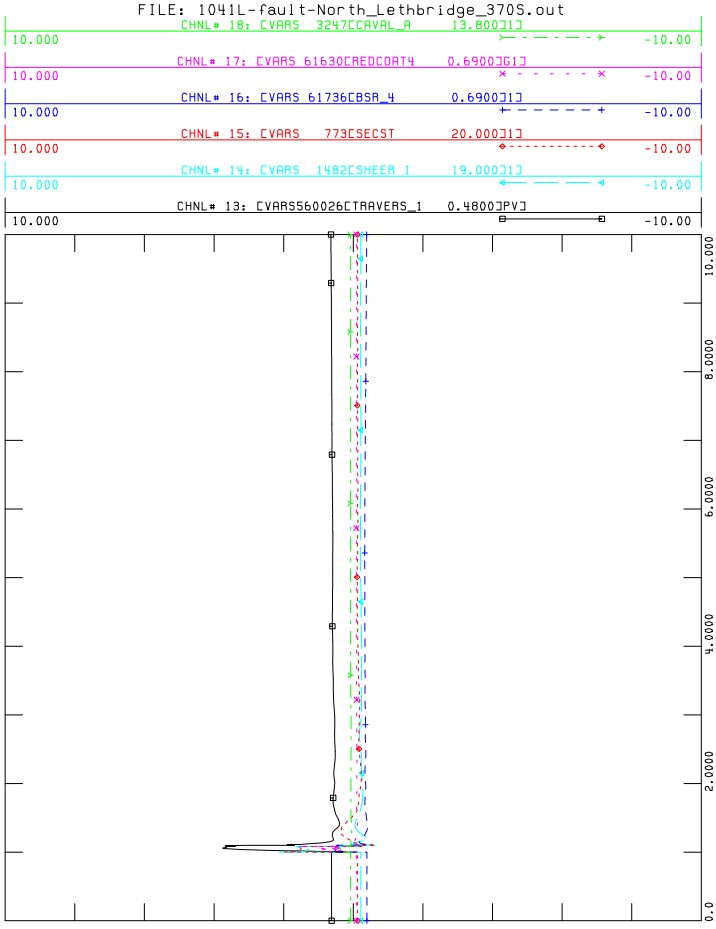
FILE: 1041L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:09
MACHINE VOLTAGE

FIGURE A4-32: P2009_2021SL_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

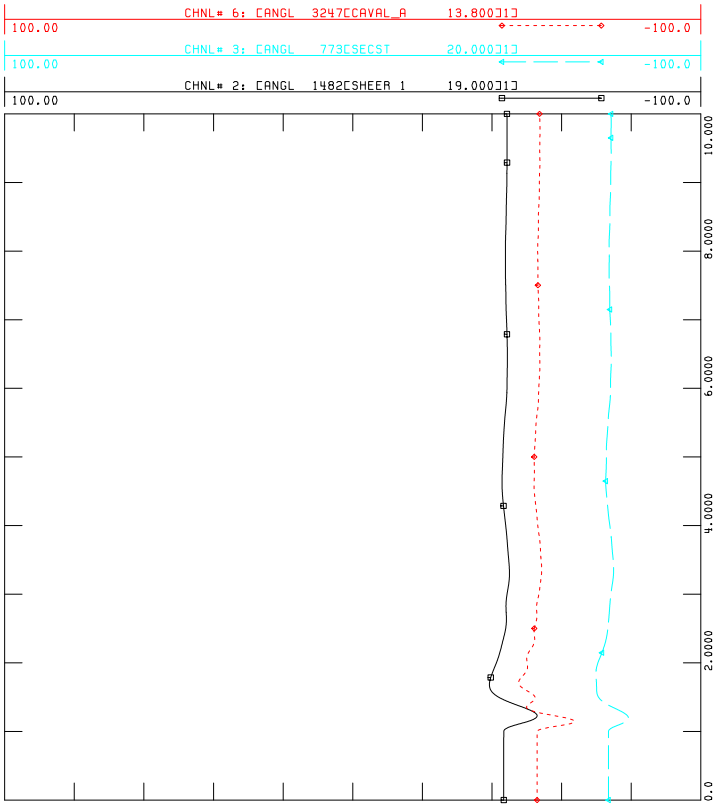
FILE: 1041L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:09
MACHINE MVAR

FIGURE A4-32: P2009_2021SL_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

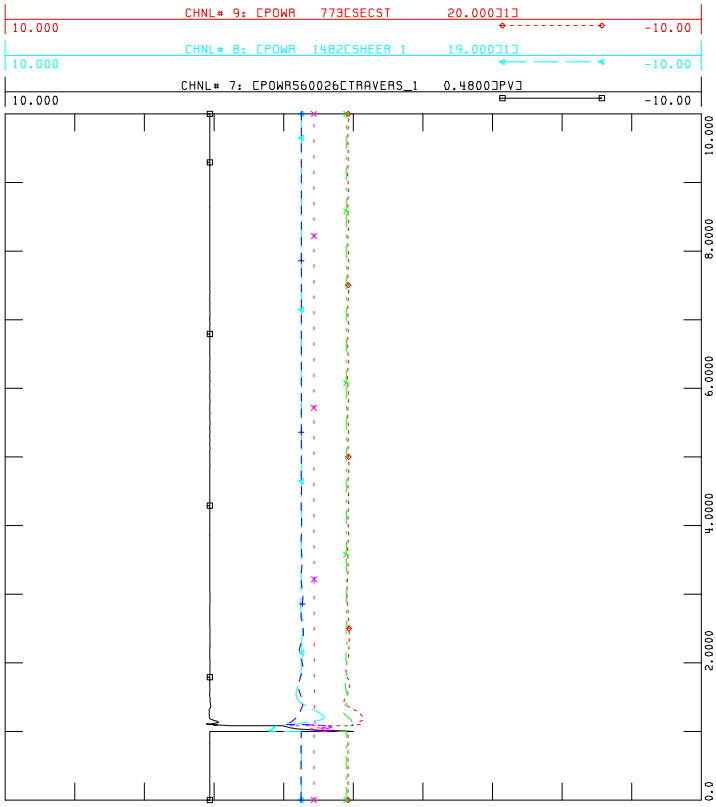
FILE: 1041L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:09
MACHINE ANGEL

FIGURE A4-32: P2009_2021SL_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:09
MACHINE MW

FIGURE A4-32: P2009_2021SL_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out

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LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

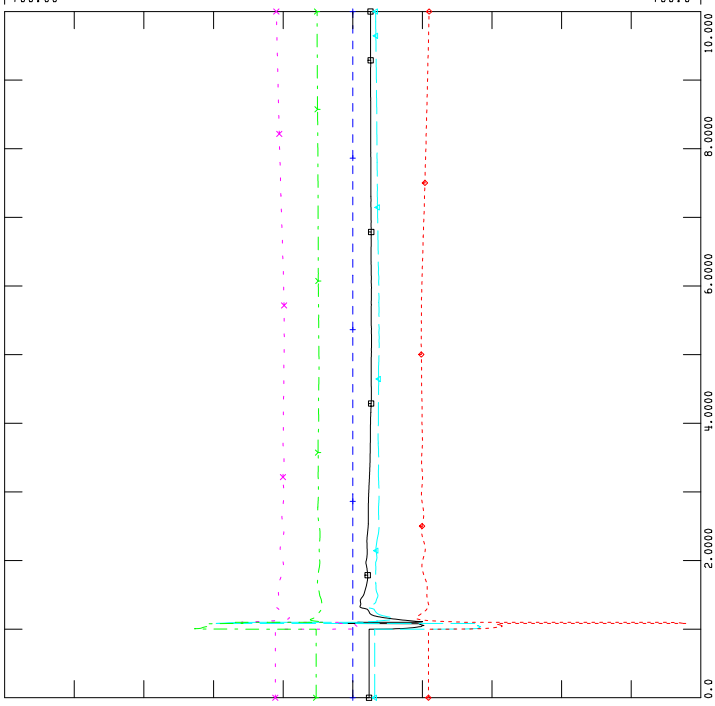

FIGURE A4-32: P2009_2021SL_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out

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LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

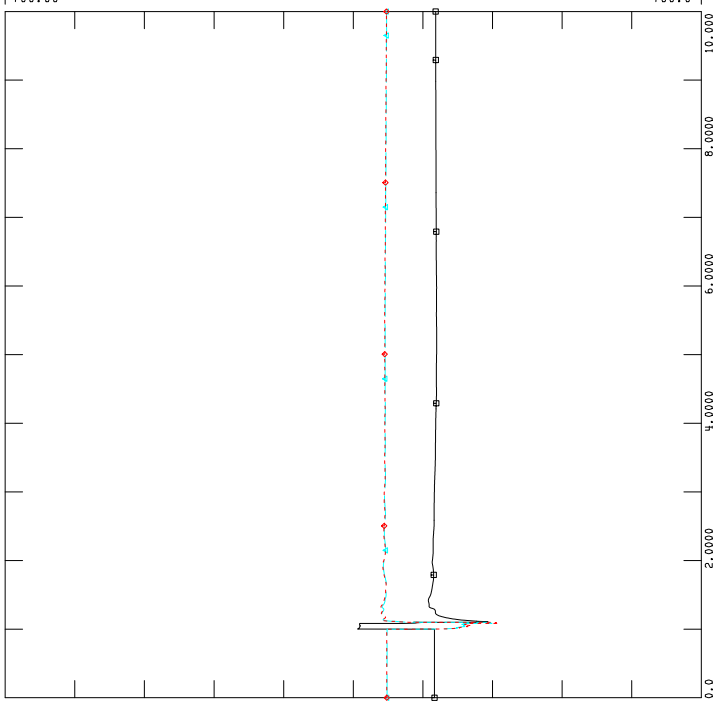


FIGURE A4-32: P2009_2021SL_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 18:09

LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

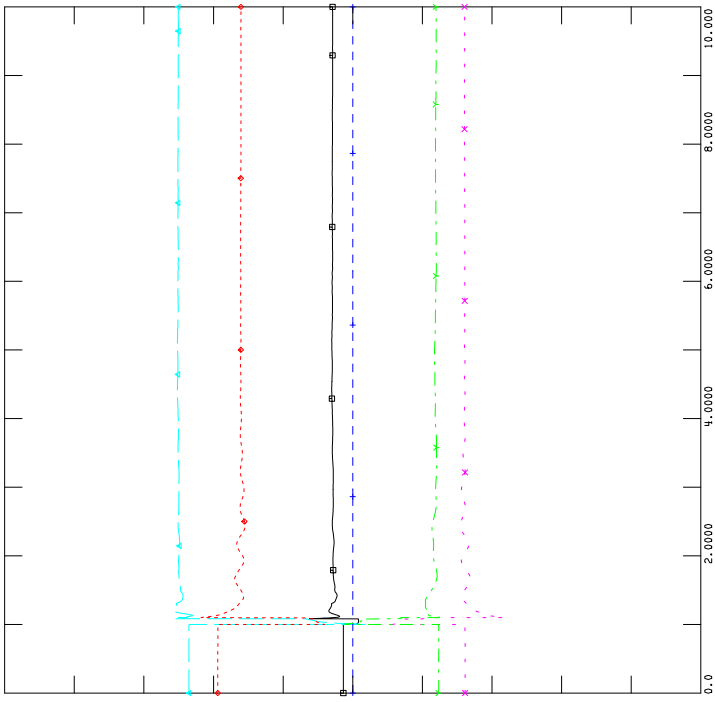


FIGURE A4-32: P2009_2021SL_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 1041L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 18:09

LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

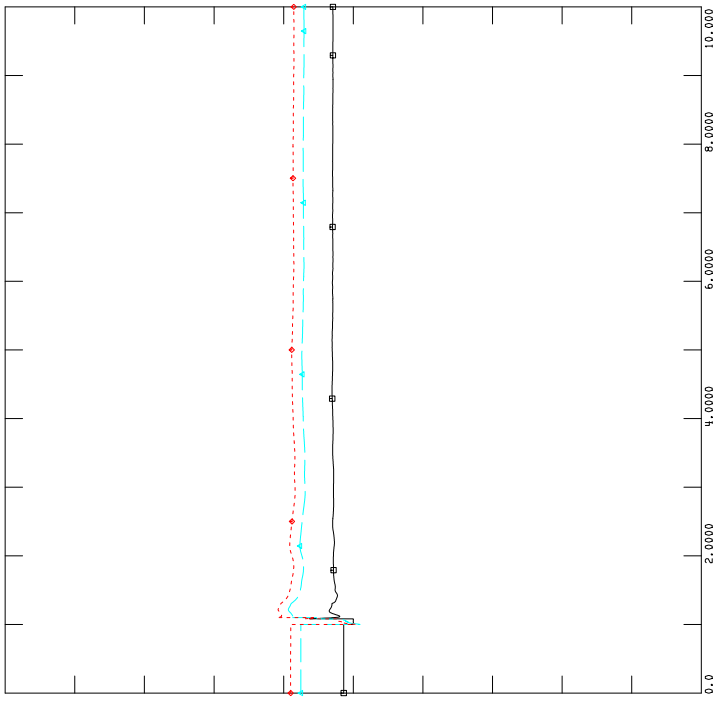
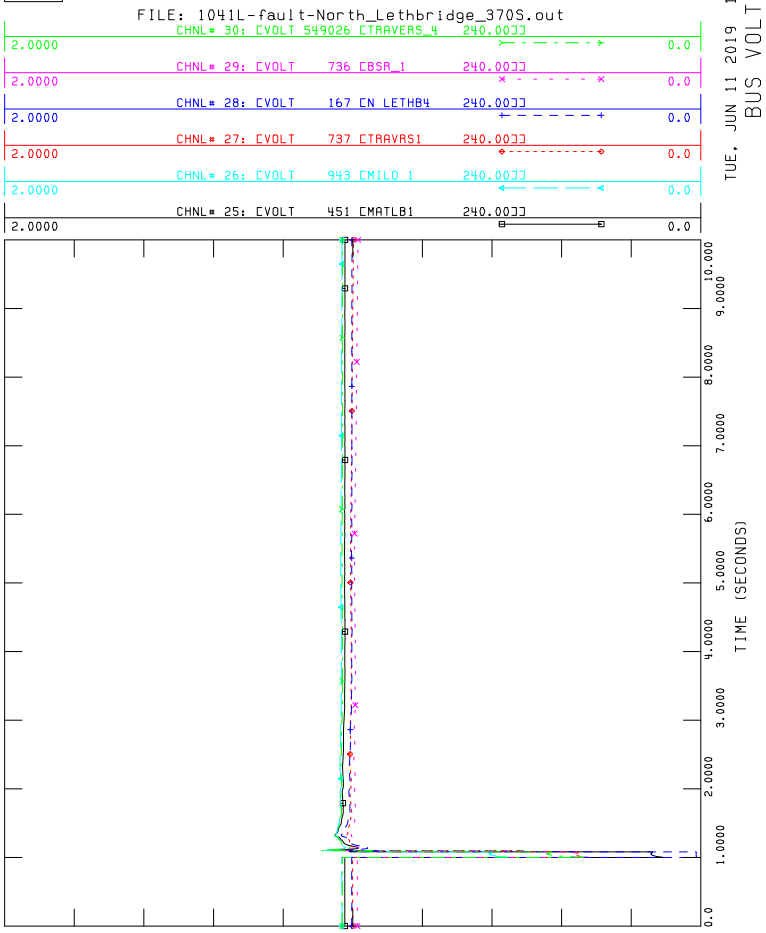


FIGURE A4-32: P2009_2021SL_POST
CATB-1041L_FAULT_AT_NORTH_LETHBRIDGE_370S

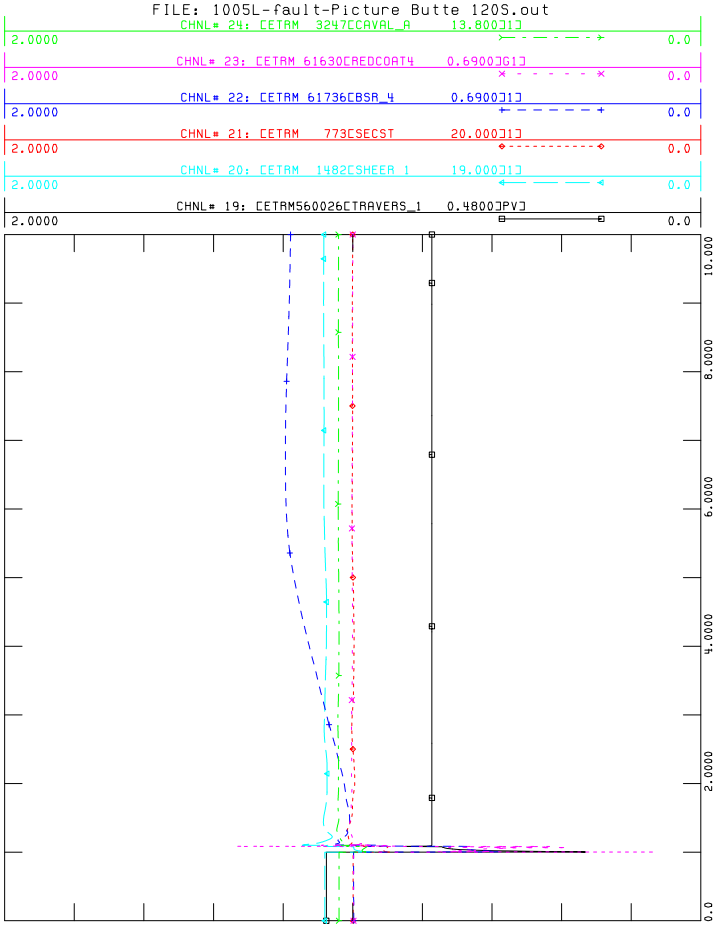
FILE: 1041L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:09
BUS VOLTAGE

FIGURE A4-33: P2009_2021SL_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

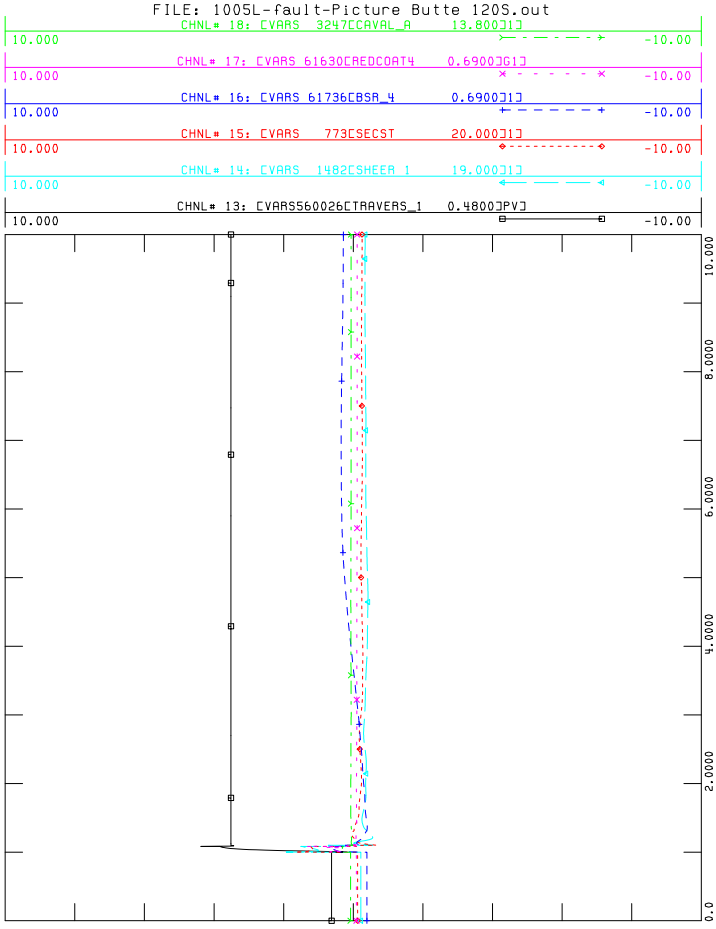
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 18:09
MACHINE VOLTAGE

FIGURE A4-33: P2009_2021SL_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

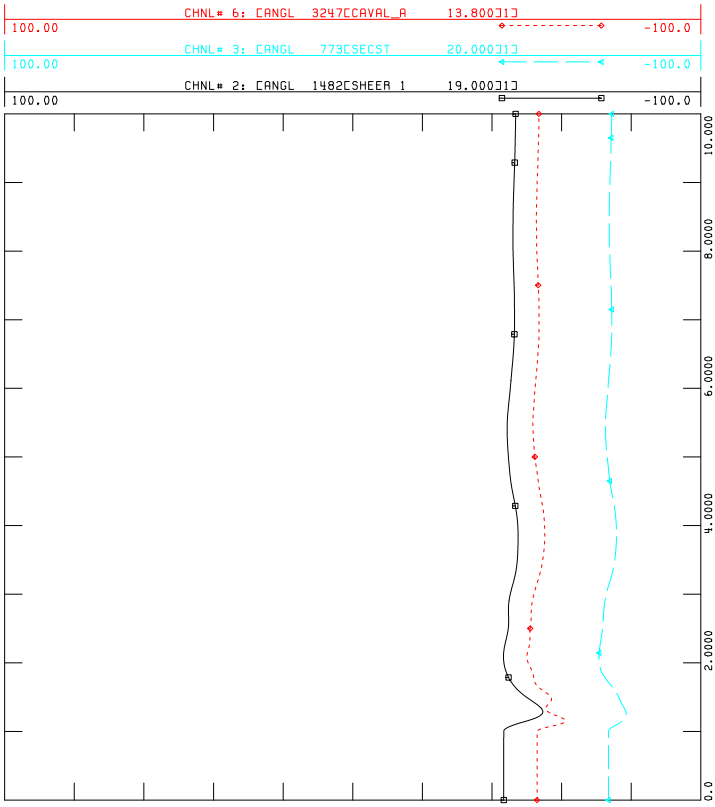
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 18:09
MACHINE MVAR

FIGURE A4-33: P2009_2021SL_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

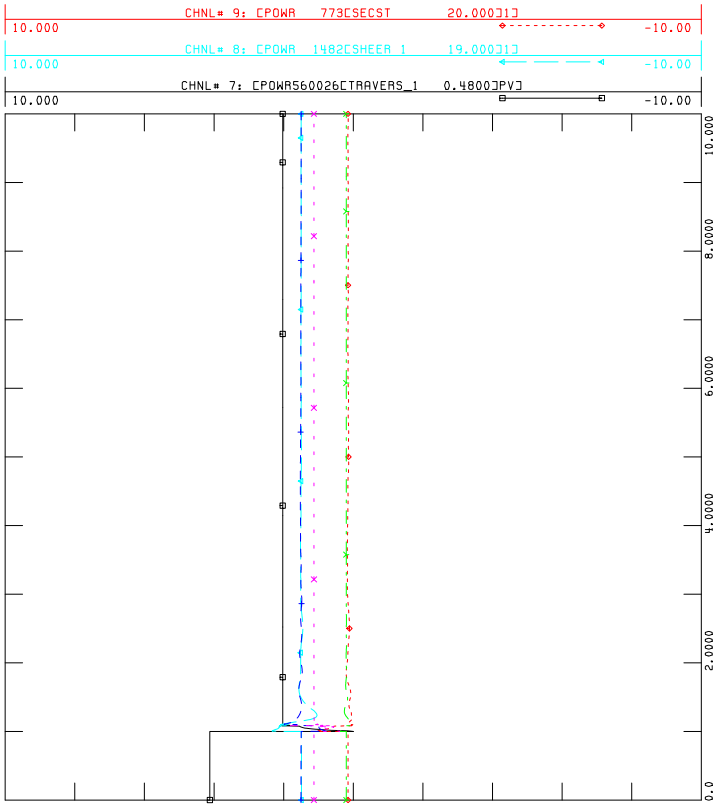
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 18:09
MACHINE ANGEL

FIGURE A4-33: P2009_2021SL_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

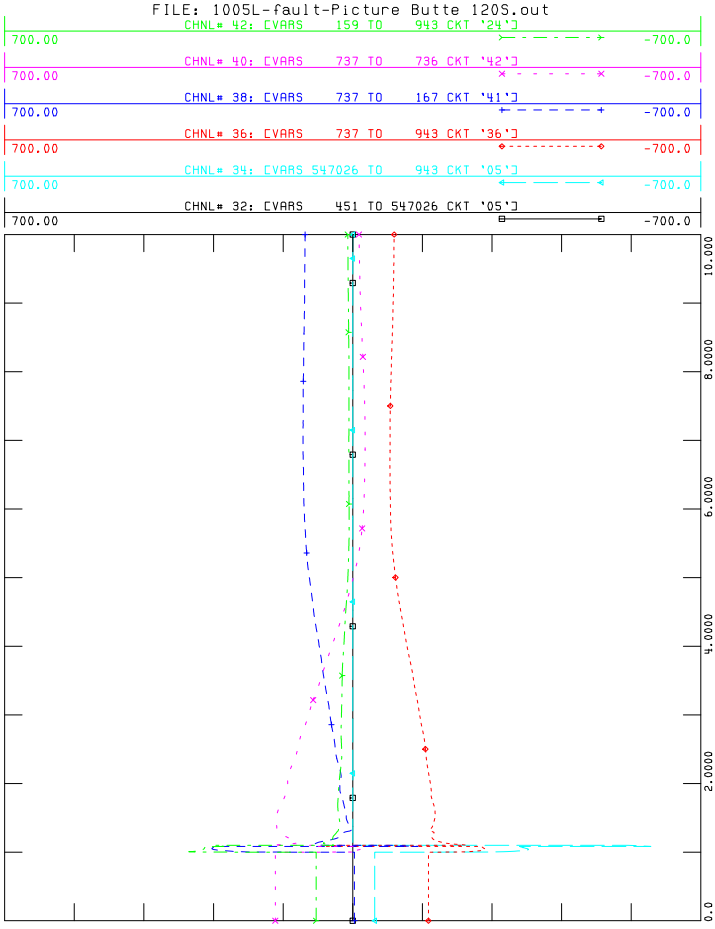
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 18:09
MACHINE MW

FIGURE A4-33: P2009_2021SL_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

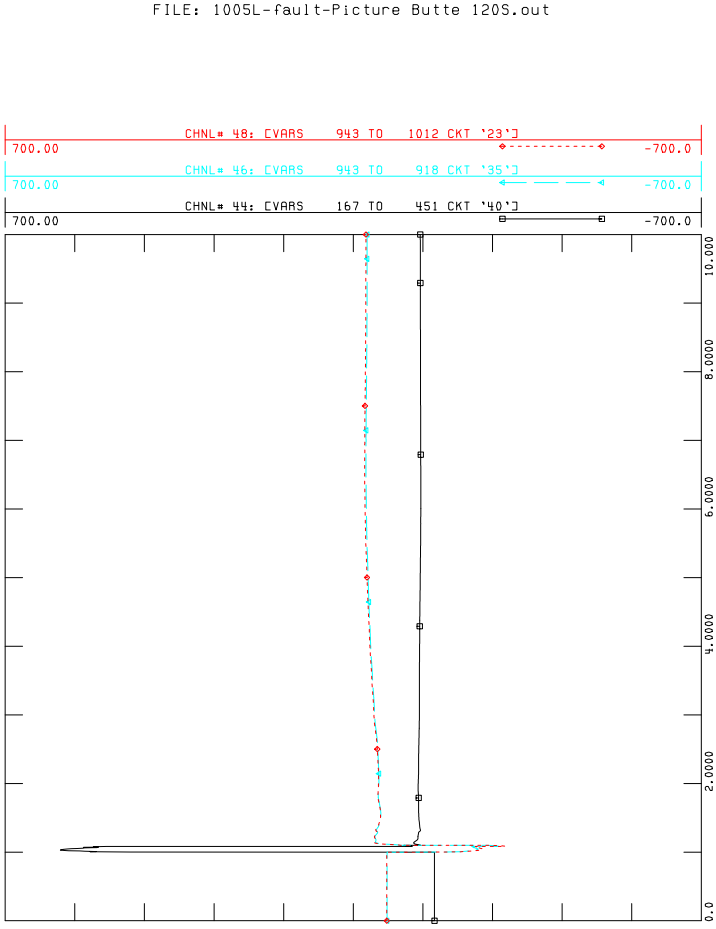
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 18:09
LINE MVAR

FIGURE A4-33: P2009_2021SL_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

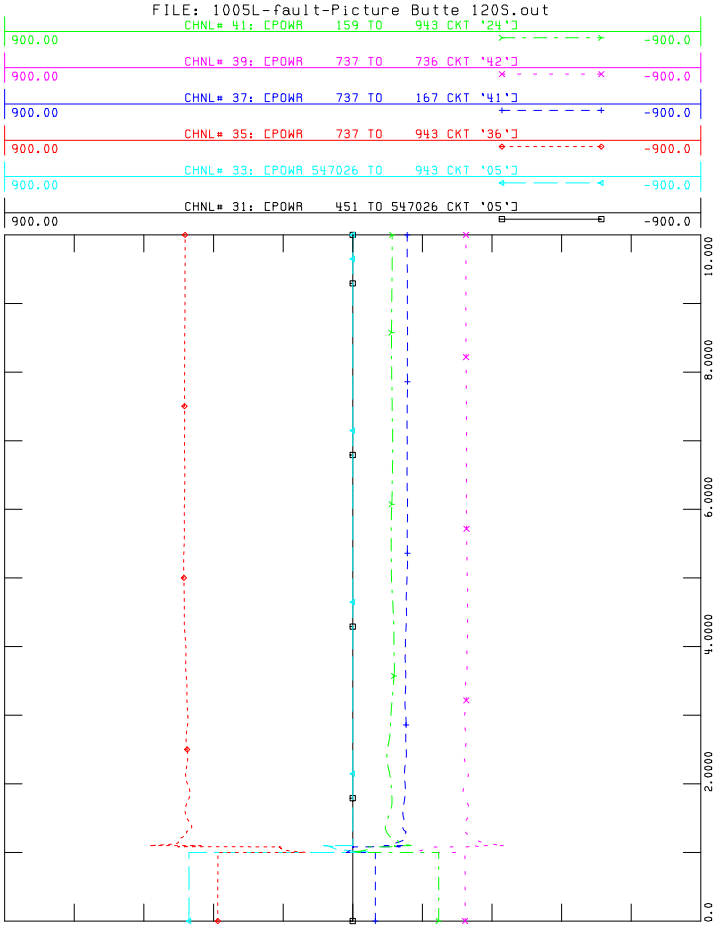
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 18:09
LINE MVAR

FIGURE A4-33: P2009_2021SL_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

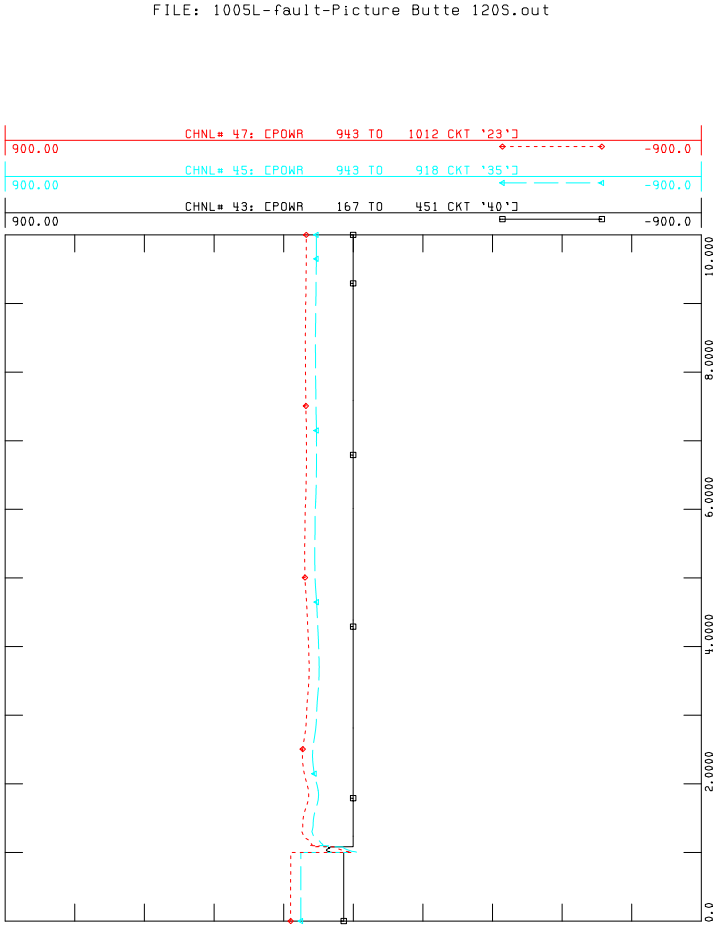
FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 18:09
LINE MW

FIGURE A4-33: P2009_2021SL_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

FILE: 1005L-fault-Picture Butte 120S.out



TUE, JUN 11 2019 18:09
LINE MW

FIGURE A4-33: P2009_2021SL_POST
CATB-1005L_FAULT_AT_PICTURE BUTTE 120S

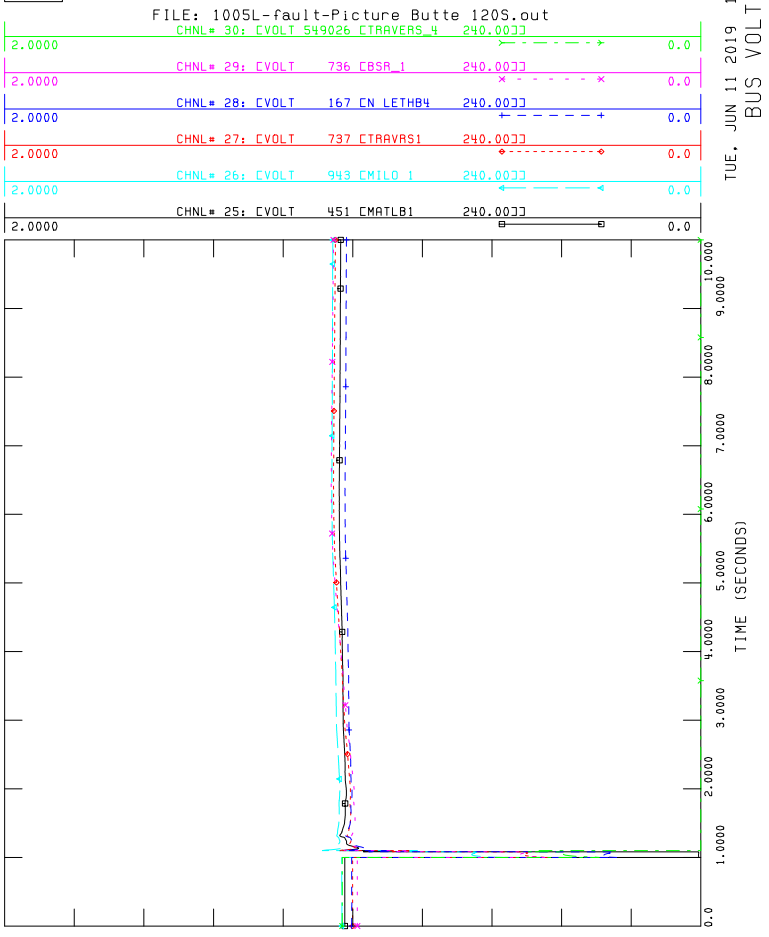


FIGURE A4-34: P2009_2021SL_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 24: ETRM 3247CCAVAL_A 13.800
CHNL# 23: ETRM 61630CREDCOAT4 0.6900
CHNL# 22: ETRM 61736CBSR_4 0.6900
CHNL# 21: ETRM 773CSECST 20.000
CHNL# 20: ETRM 1482CSHEER 1 19.000
CHNL# 19: ETRM560026CTRAVERS_1 0.4800

TUE, JUN 11 2019 18:10
MACHINE VOLTAGE

TIME (SECONDS)

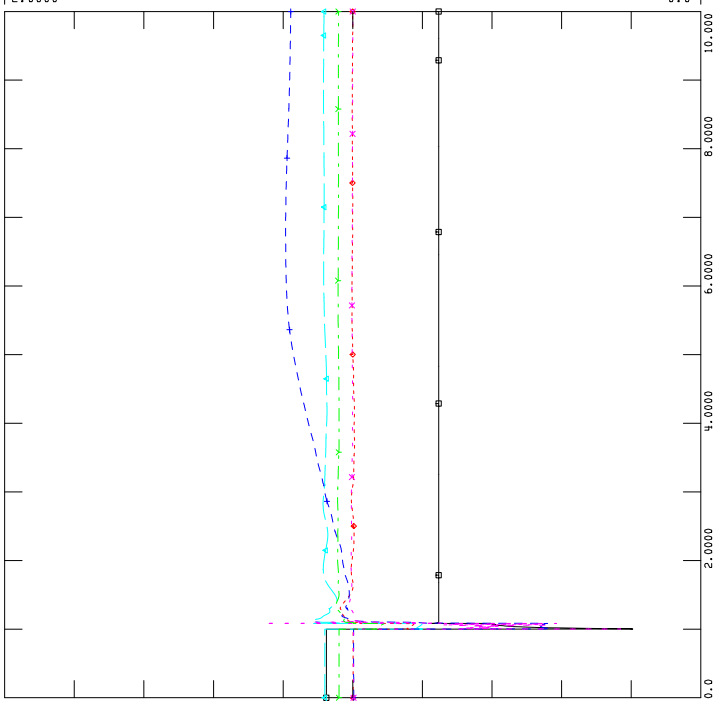


FIGURE A4-34: P2009_2021SL_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 18: EVARS 3247CCAVAL_A 13.800
CHNL# 17: EVARS 61630CREDCOAT4 0.6900
CHNL# 16: EVARS 61736CBSR_4 0.6900
CHNL# 15: EVARS 773CSECST 20.000
CHNL# 14: EVARS 1482CSHEER 1 19.000
CHNL# 13: EVARS560026CTRAVERS_1 0.4800

TUE, JUN 11 2019 18:10
MACHINE MVAR

TIME (SECONDS)

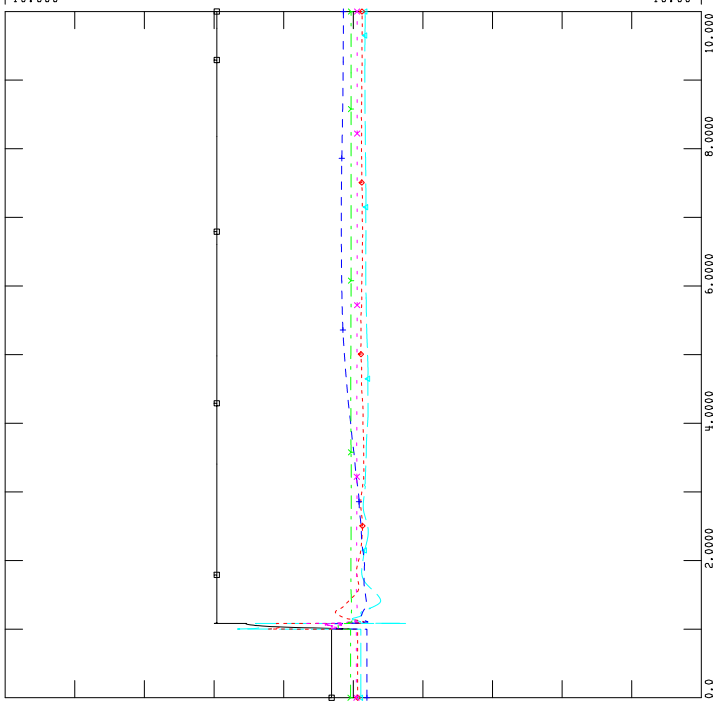


FIGURE A4-34: P2009_2021SL_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 6: ANGL 3247CCAVAL_A 13.800
CHNL# 3: ANGL 773CSECST 20.000
CHNL# 2: ANGL 1482CSHEER 1 19.000

TUE, JUN 11 2019 18:10
MACHINE ANGEL

TIME (SECONDS)

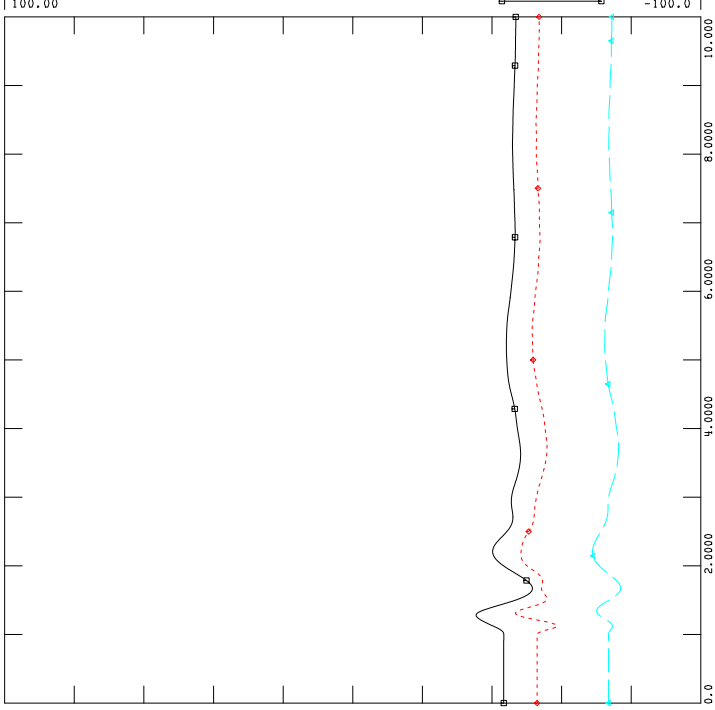


FIGURE A4-34: P2009_2021SL_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 12: POWR 3247CCAVAL_A 13.800
CHNL# 11: POWR 61630CREDCOAT4 0.6900
CHNL# 10: POWR 61736CBSR_4 0.6900
CHNL# 9: POWR 773CSECST 20.000
CHNL# 8: POWR 1482CSHEER 1 19.000
CHNL# 7: POWRS60026CTRAVERS_1 0.4800

TUE, JUN 11 2019 18:10
MACHINE MW

TIME (SECONDS)

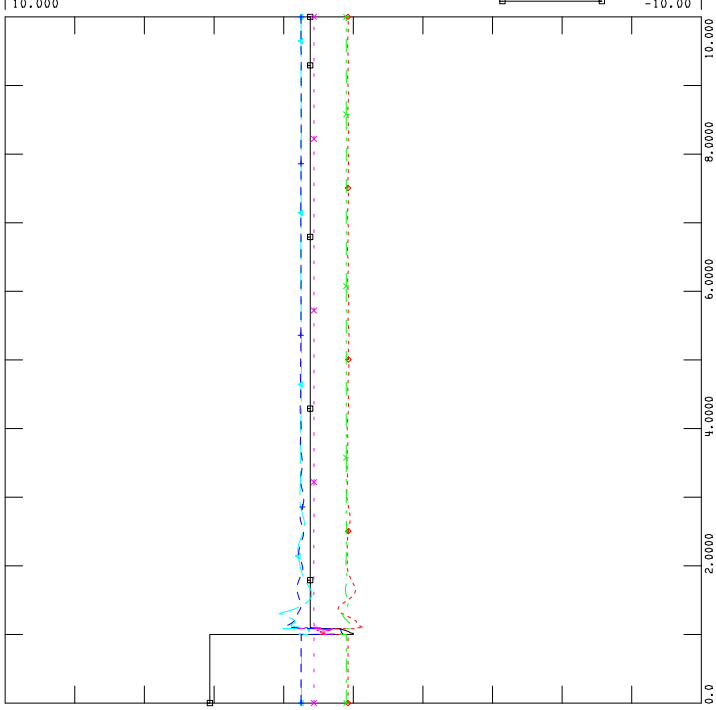


FIGURE A4-34: P2009_2021SL_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TUE, JUN 11 2019 18:10
LINE MVAR

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

FIGURE A4-34: P2009_2021SL_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TUE, JUN 11 2019 18:10
LINE MVAR

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

FIGURE A4-34: P2009_2021SL_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TUE, JUN 11 2019 18:10
LINE MW

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

FIGURE A4-34: P2009_2021SL_POST
CATB-1005L_FAULT_AT_MILO_356S

FILE: 1005L-fault-Milo_356S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TUE, JUN 11 2019 18:10
LINE MW

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

FIGURE A4-34: P2009_2021SL_POST
CATB-1005L_FAULT_AT_MILO_356S

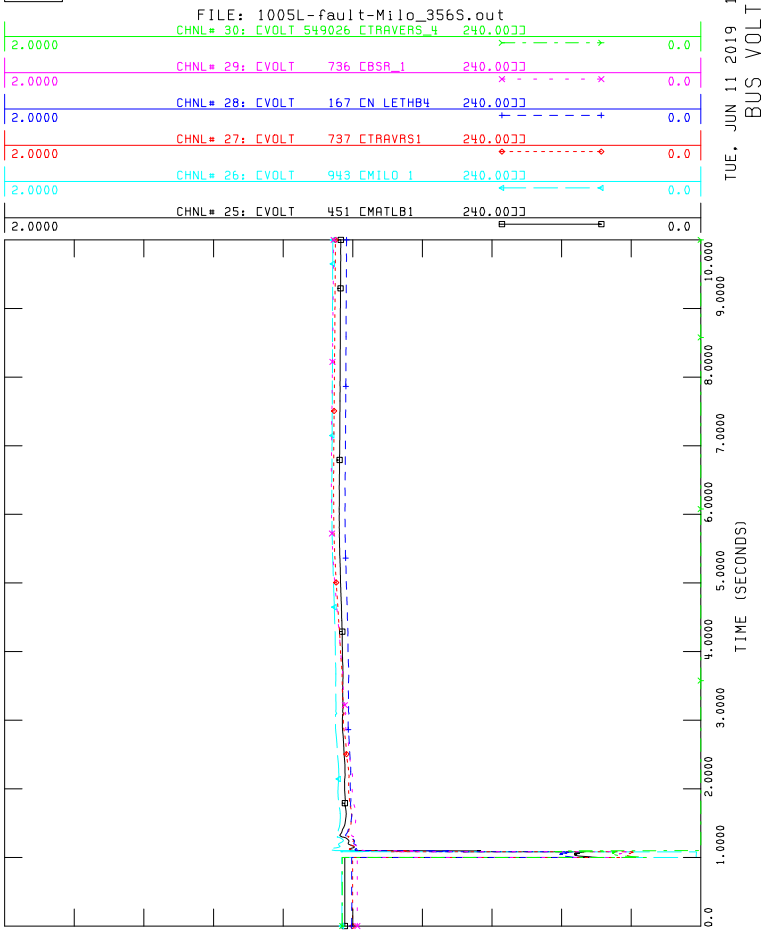


FIGURE A4-35: P2009_2021SL_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

2.0000 / 0.0

TUE, JUN 11 2019 18:11
MACHINE VOLTAGE

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-35: P2009_2021SL_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 18:11
MACHINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-35: P2009_2021SL_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

100.00 / -100.0

TUE, JUN 11 2019 18:11
MACHINE ANGEL

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-35: P2009_2021SL_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 18:11
MACHINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-35: P2009_2021SL_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TUE, JUN 11 2019 18:11
LINE MVAR

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

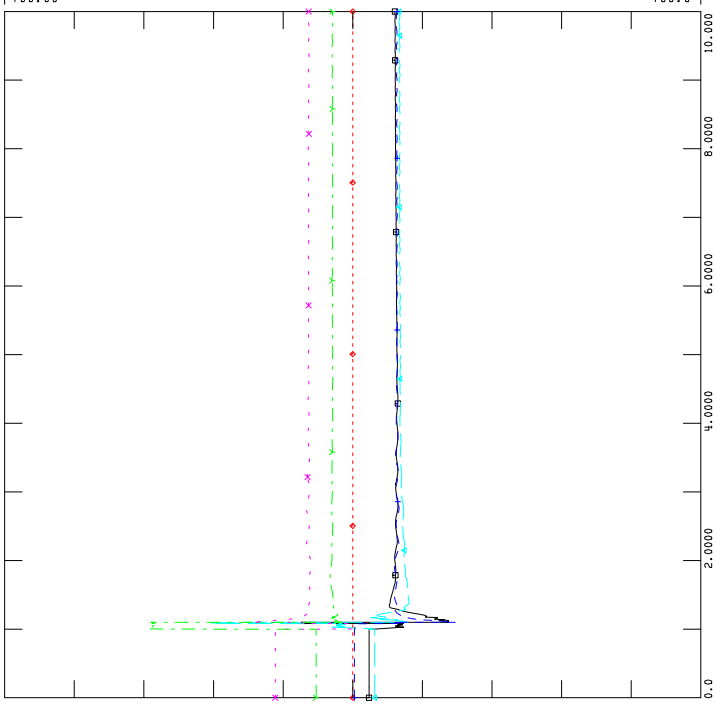


FIGURE A4-35: P2009_2021SL_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TUE, JUN 11 2019 18:11
LINE MVAR

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

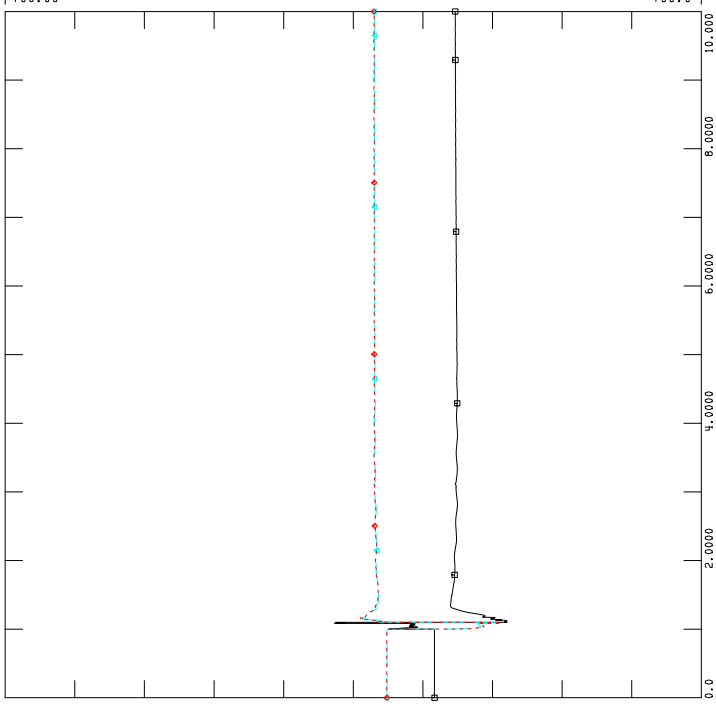


FIGURE A4-35: P2009_2021SL_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TUE, JUN 11 2019 18:11
LINE MW

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

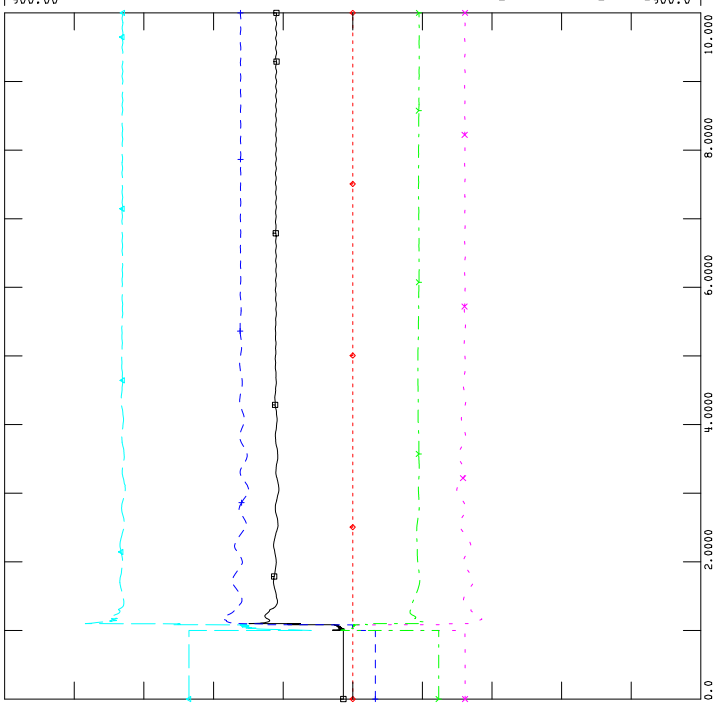


FIGURE A4-35: P2009_2021SL_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

FILE: 1036L-fault-Travers_554S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TUE, JUN 11 2019 18:11
LINE MW

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000
TIME (SECONDS)

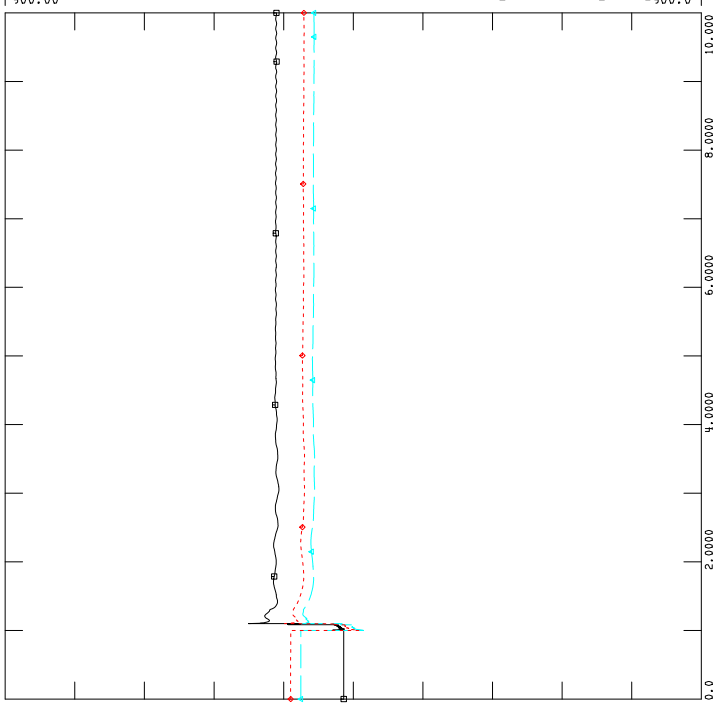


FIGURE A4-35: P2009_2021SL_POST
CATB-1036L_FAULT_AT_TRAVERS_554S

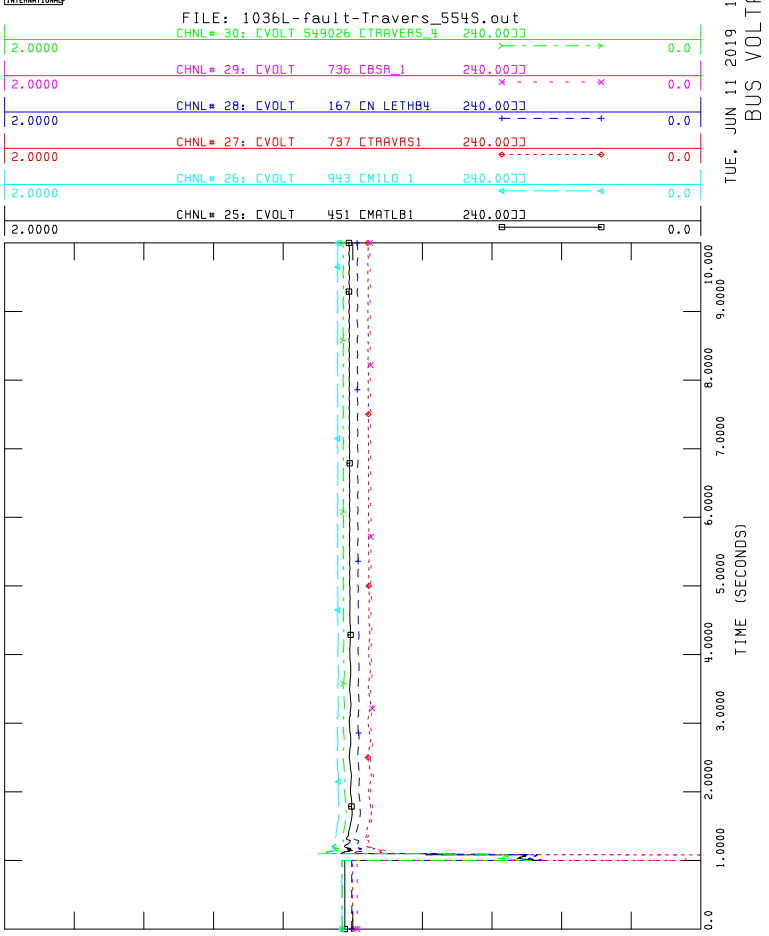


FIGURE A4-36: P2009_2021SL_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

2.0000 / 0.0

TUE, JUN 11 2019 18:12
MACHINE VOLTAGE

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-36: P2009_2021SL_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 18:12
MACHINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-36: P2009_2021SL_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

100.00 / -100.0

TUE, JUN 11 2019 18:12
MACHINE ANGEL

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-36: P2009_2021SL_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 18:12
MACHINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-36: P2009_2021SL_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TUE, JUN 11 2019 18:12
LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

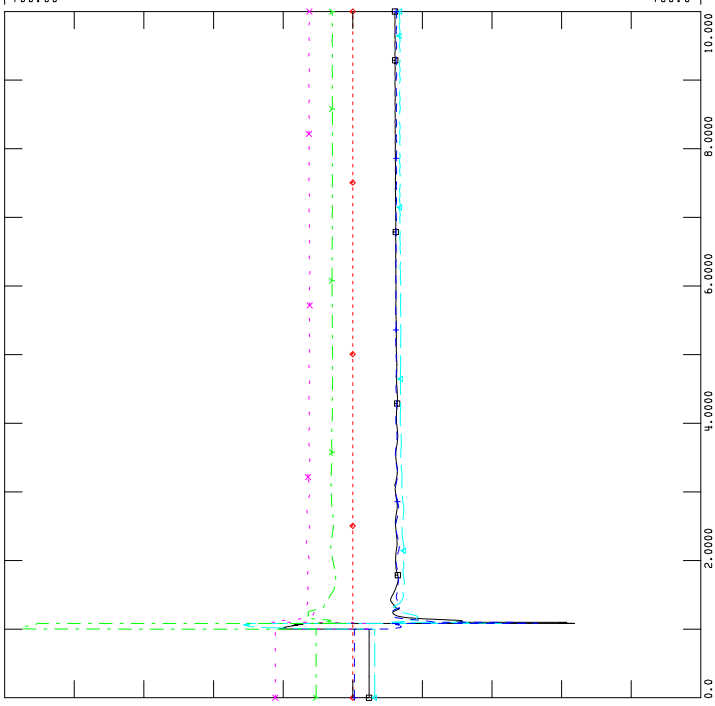


FIGURE A4-36: P2009_2021SL_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TUE, JUN 11 2019 18:12
LINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

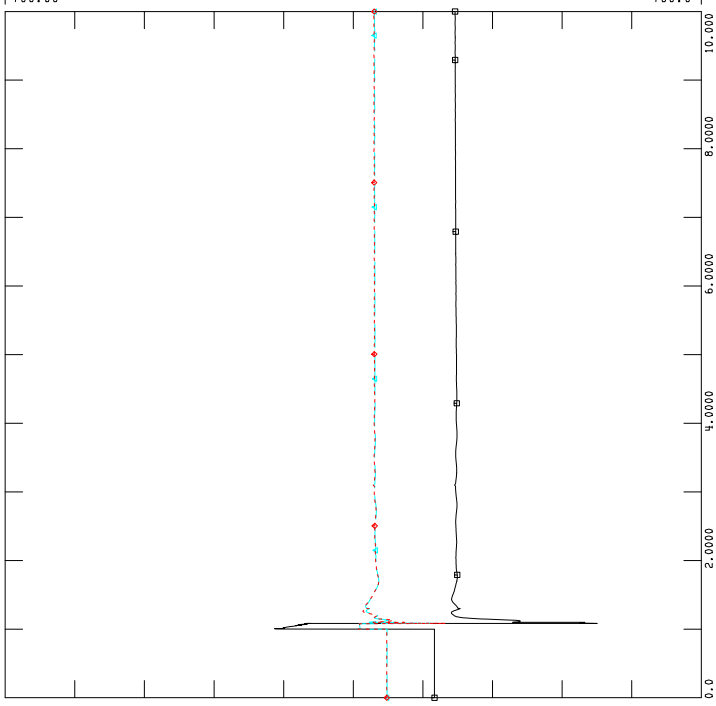


FIGURE A4-36: P2009_2021SL_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TUE, JUN 11 2019 18:12
LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

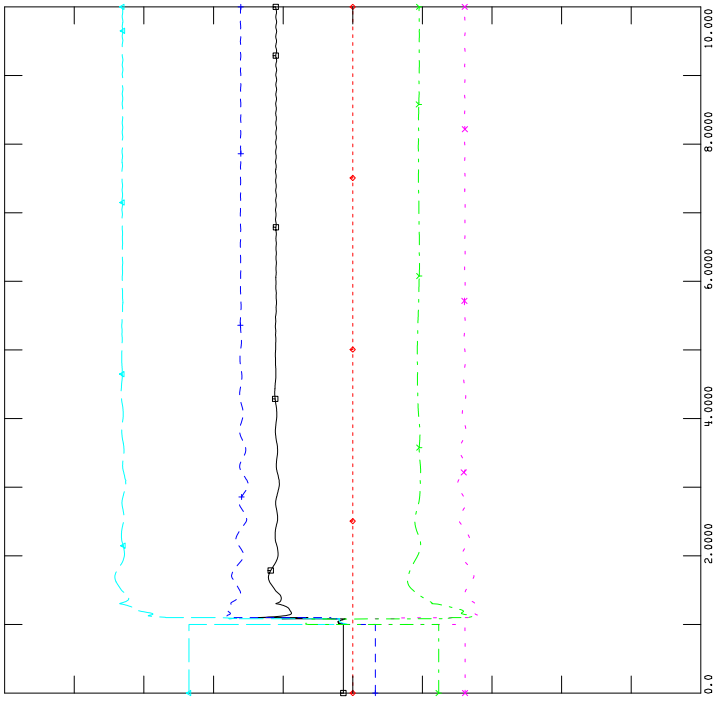


FIGURE A4-36: P2009_2021SL_POST
CATB-1036L_FAULT_AT_MILO_356S

FILE: 1036L-fault-Milo_356S.out

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TUE, JUN 11 2019 18:12
LINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

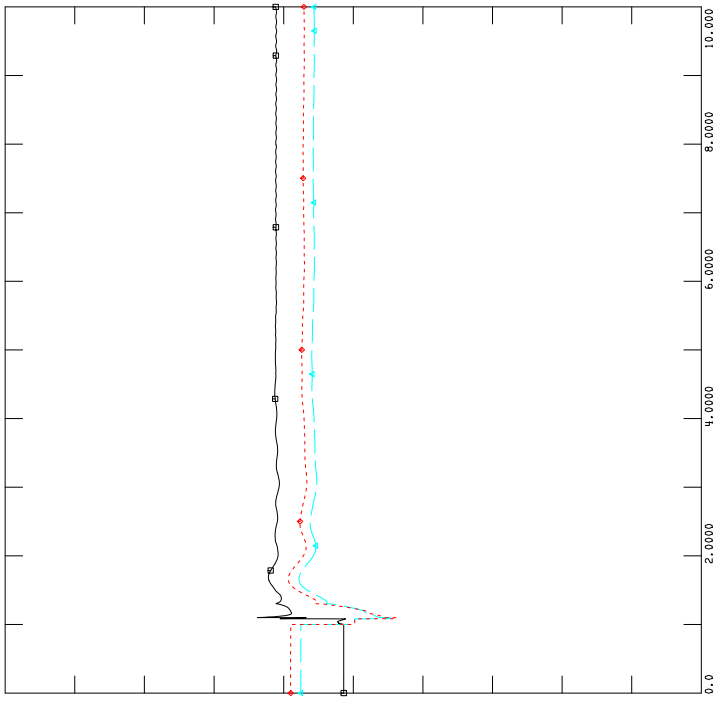


FIGURE A4-36: P2009_2021SL_POST
CATB-1036L_FAULT_AT_MILO_356S

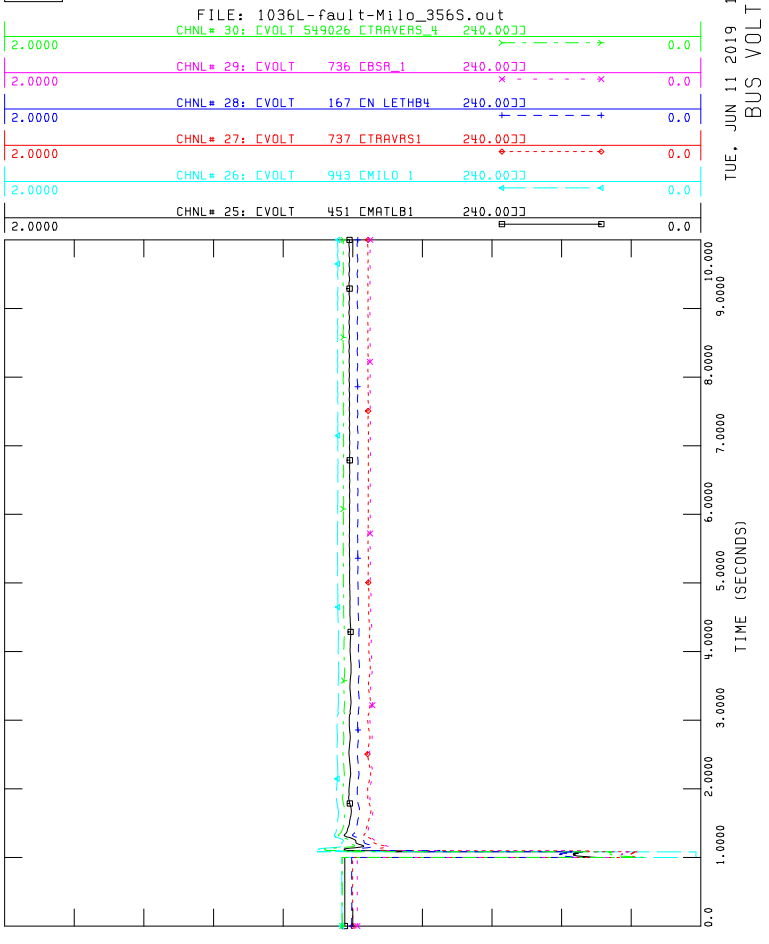


FIGURE A4-37: P2009_2021SL_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

FILE: 1037L-fault-Windy_Flats_138S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

TUE, JUN 11 2019 18:13
MACHINE VOLTAGE

TIME (SECONDS)

FIGURE A4-37: P2009_2021SL_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

FILE: 1037L-fault-Windy_Flats_138S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

TUE, JUN 11 2019 18:13
MACHINE MVAR

TIME (SECONDS)

FIGURE A4-37: P2009_2021SL_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

FILE: 1037L-fault-Windy_Flats_138S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

TUE, JUN 11 2019 18:13
MACHINE ANGEL

TIME (SECONDS)

FIGURE A4-37: P2009_2021SL_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

FILE: 1037L-fault-Windy_Flats_138S.out

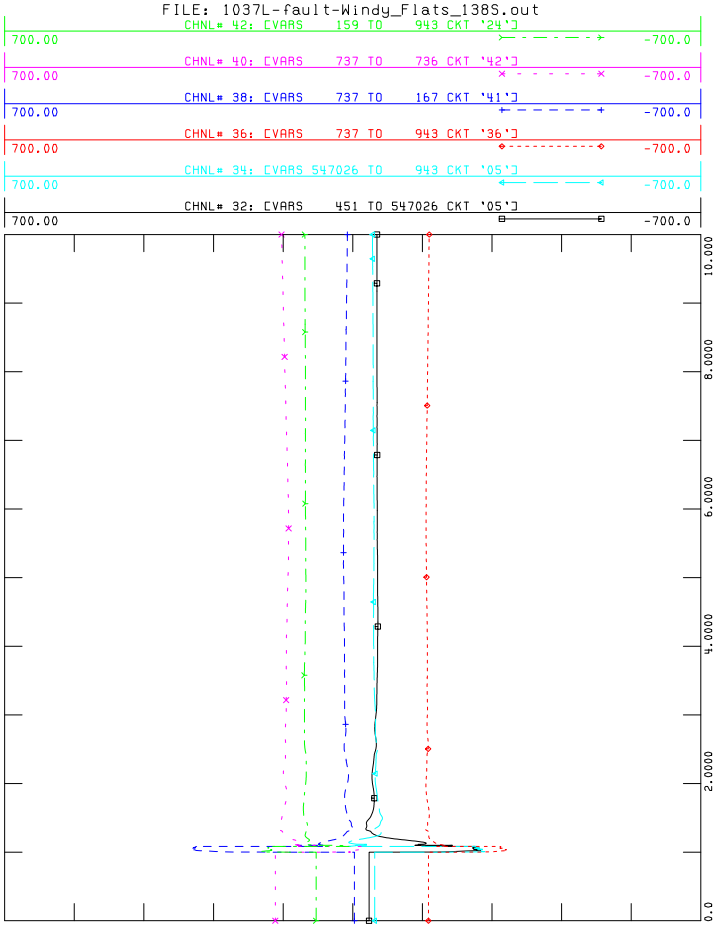
CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800]PV]

TUE, JUN 11 2019 18:13
MACHINE MW

TIME (SECONDS)

FIGURE A4-37: P2009_2021SL_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

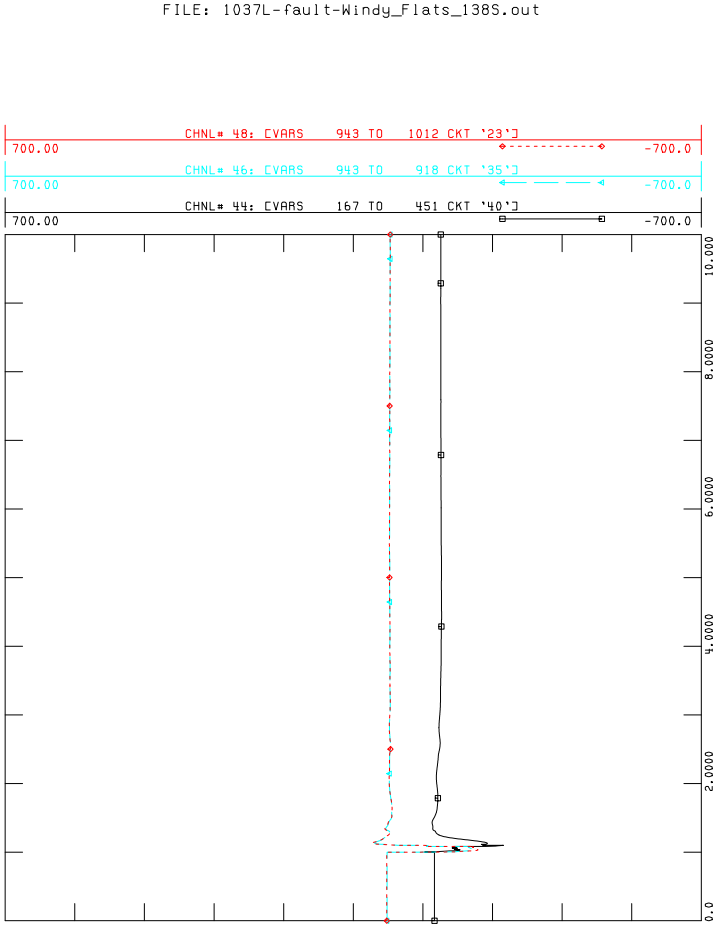
FILE: 1037L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 18:13
LINE MVAR

FIGURE A4-37: P2009_2021SL_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

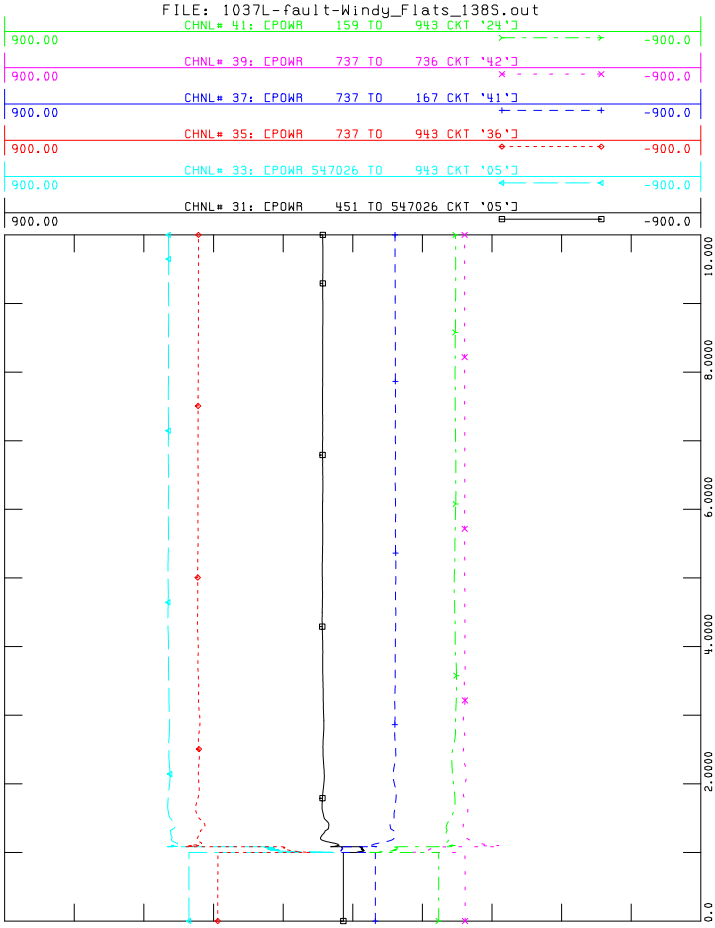
FILE: 1037L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 18:13
LINE MVAR

FIGURE A4-37: P2009_2021SL_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

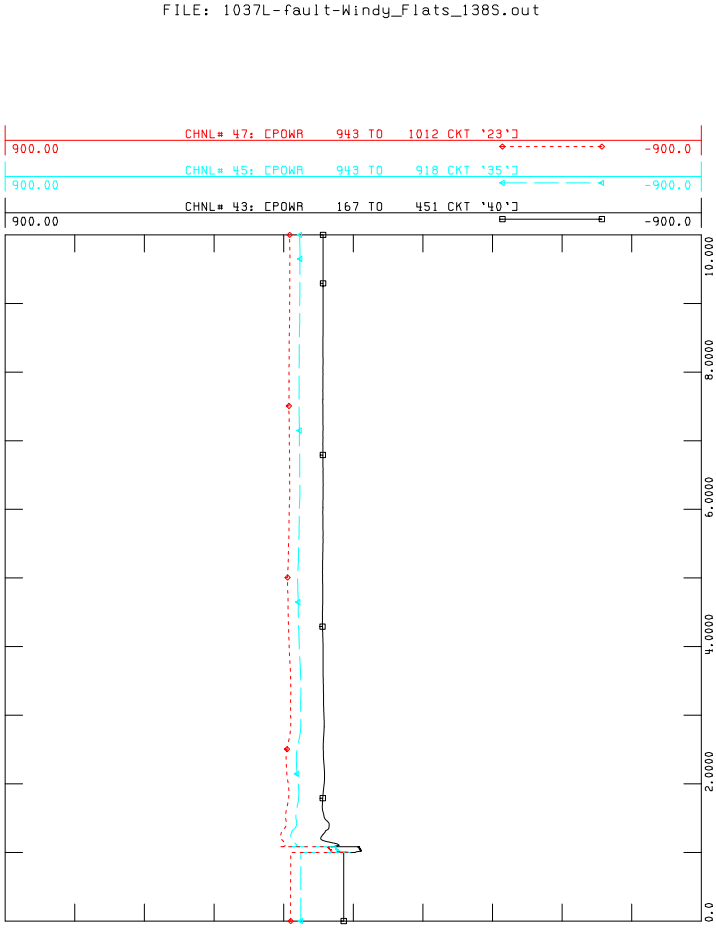
FILE: 1037L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 18:13
LINE MW

FIGURE A4-37: P2009_2021SL_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

FILE: 1037L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 18:13
LINE MW

FIGURE A4-37: P2009_2021SL_POST
CATB-1037L_FAULT_AT_WINDY_FLATS_138S

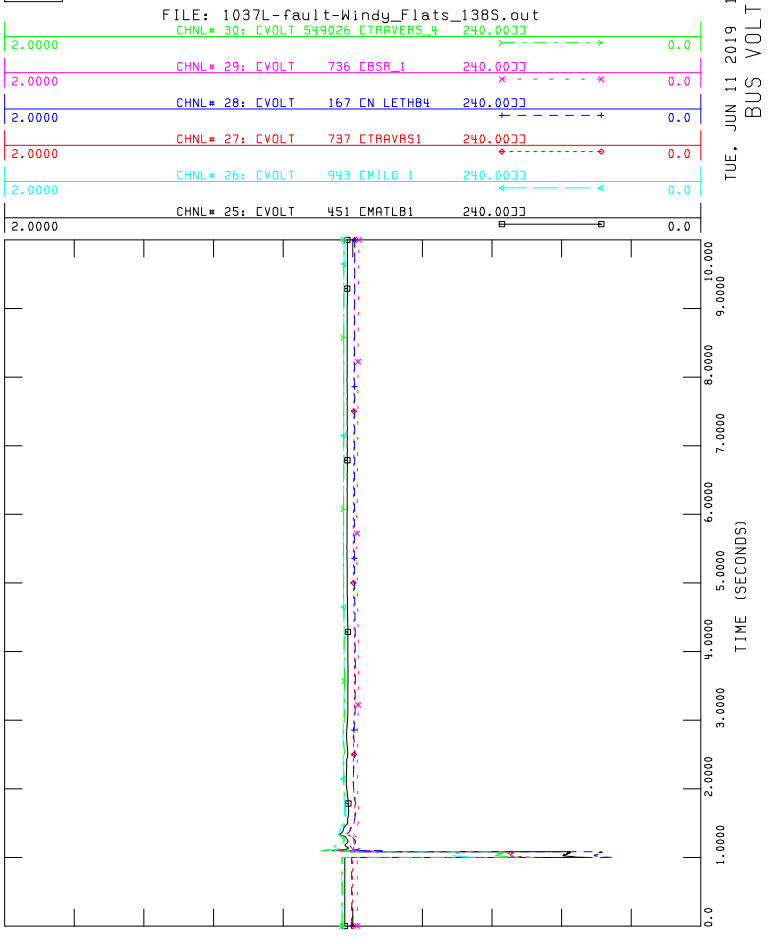
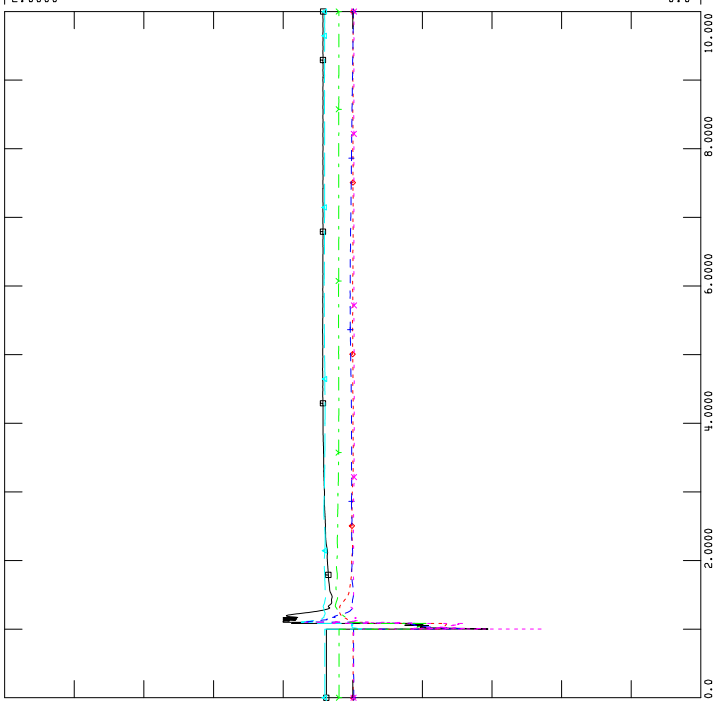


FIGURE A4-38: P2009_2021SL_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

2.0000 / 0.0



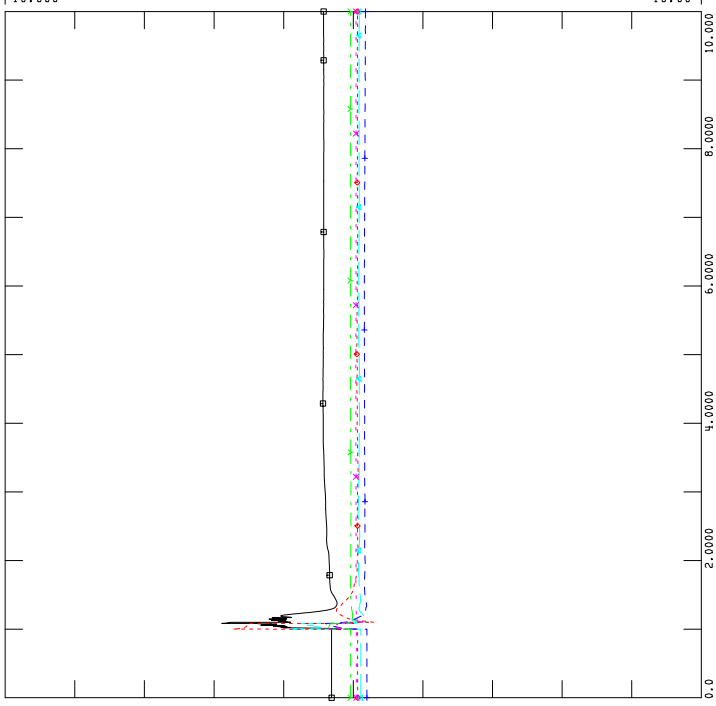
TUE, JUN 11 2019 18:13
MACHINE VOLTAGE

FIGURE A4-38: P2009_2021SL_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00



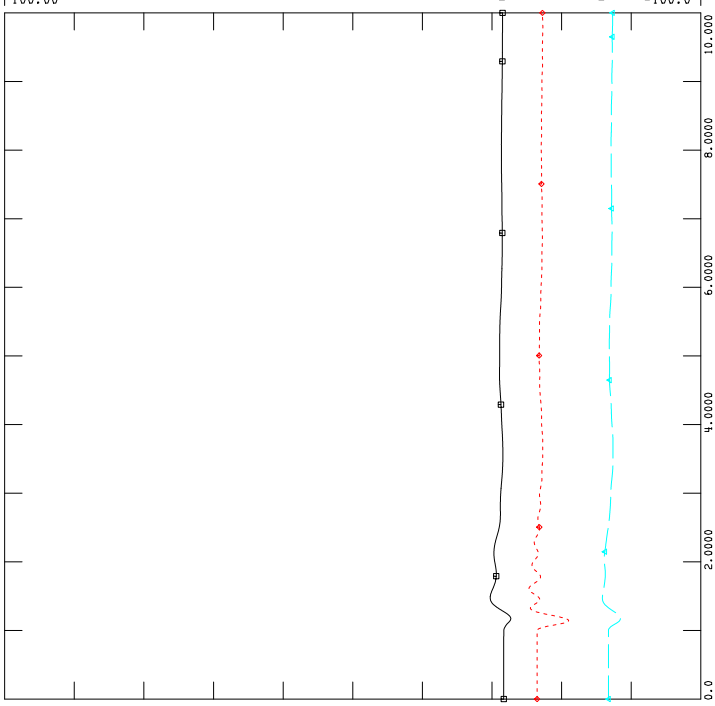
TUE, JUN 11 2019 18:13
MACHINE MVAR

FIGURE A4-38: P2009_2021SL_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

100.00 / -100.0



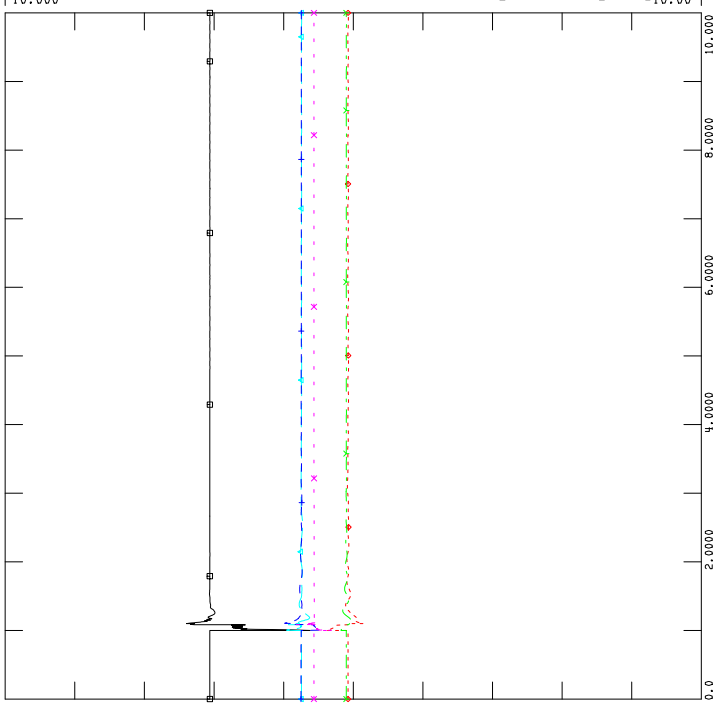
TUE, JUN 11 2019 18:13
MACHINE ANGEL

FIGURE A4-38: P2009_2021SL_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00



TUE, JUN 11 2019 18:13
MACHINE MW

FIGURE A4-38: P2009_2021SL_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 18:13

LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

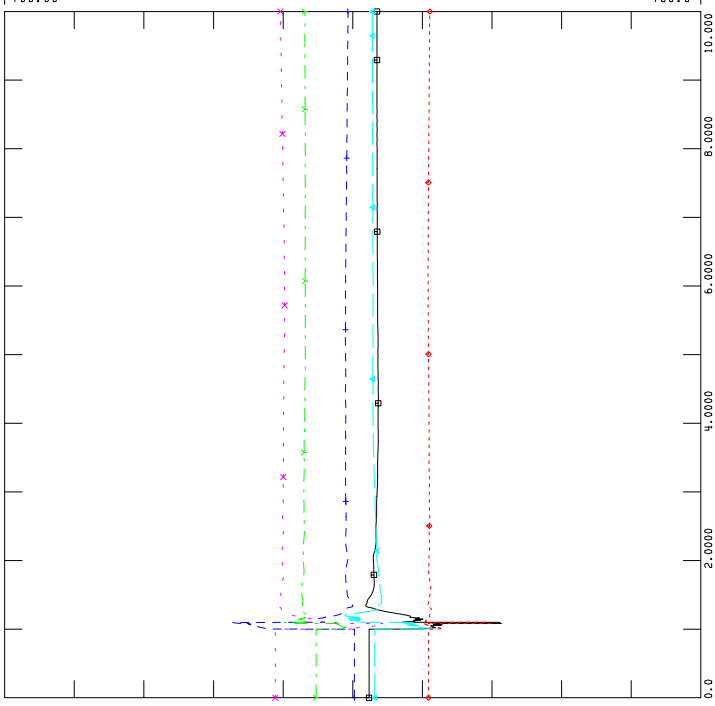


FIGURE A4-38: P2009_2021SL_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 18:13

LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

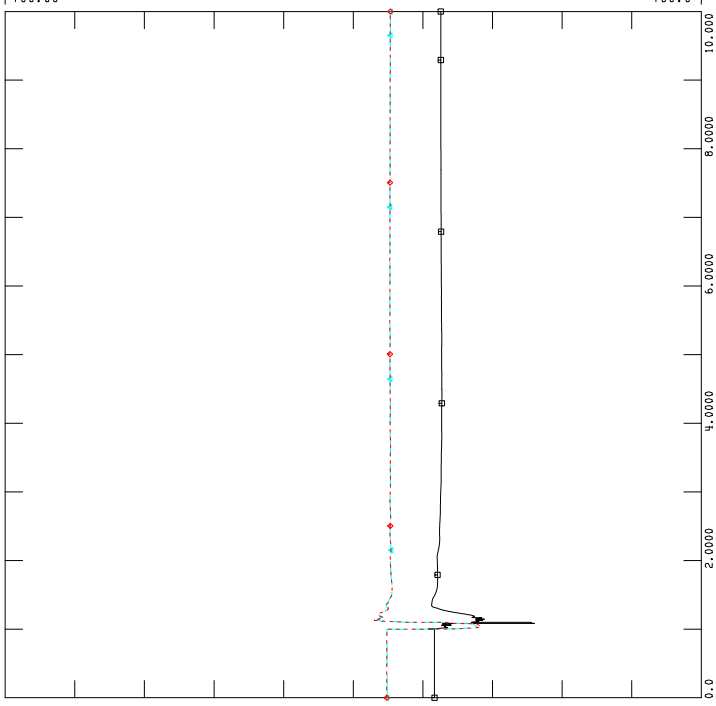


FIGURE A4-38: P2009_2021SL_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 18:13

LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

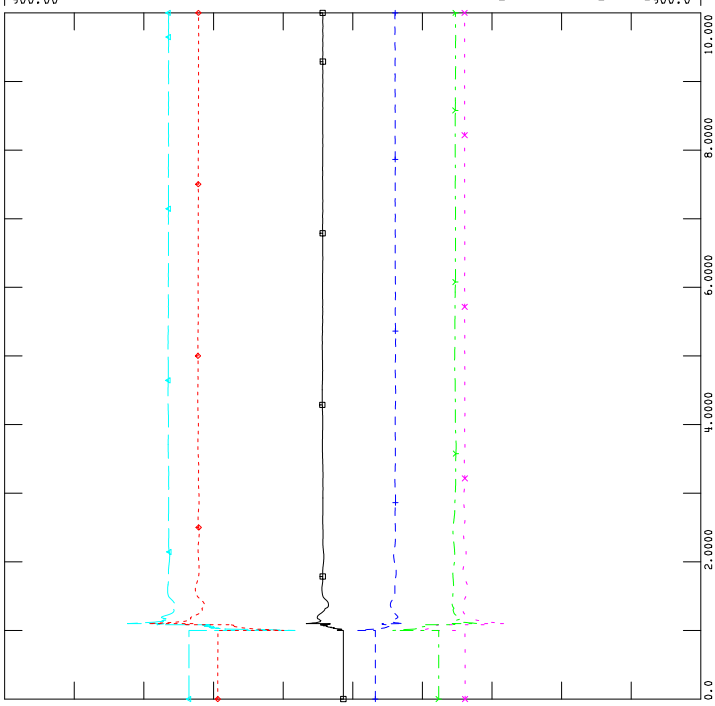


FIGURE A4-38: P2009_2021SL_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

FILE: 1037L-fault-Foothills_237S.out

TUE, JUN 11 2019 18:13

LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

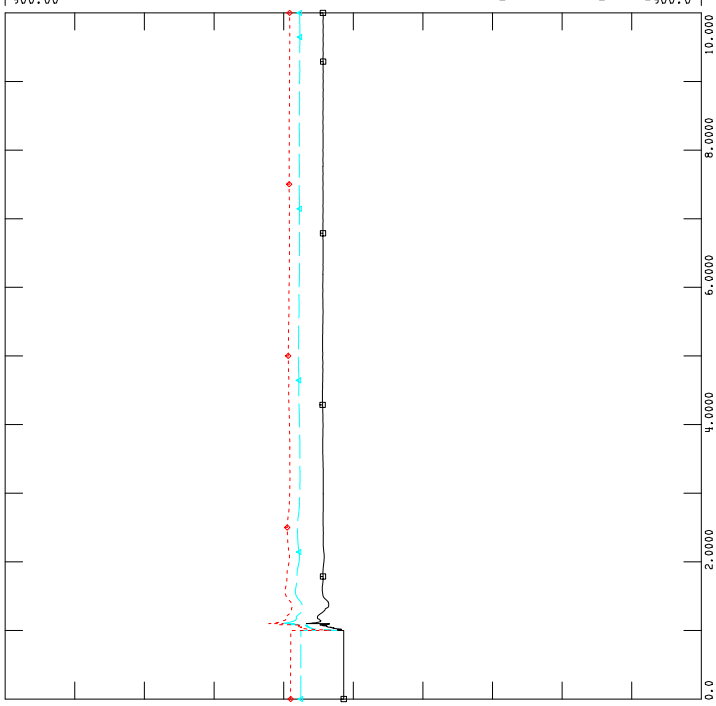


FIGURE A4-38: P2009_2021SL_POST
CATB-1037L_FAULT_AT_FOOTHILLS_237S

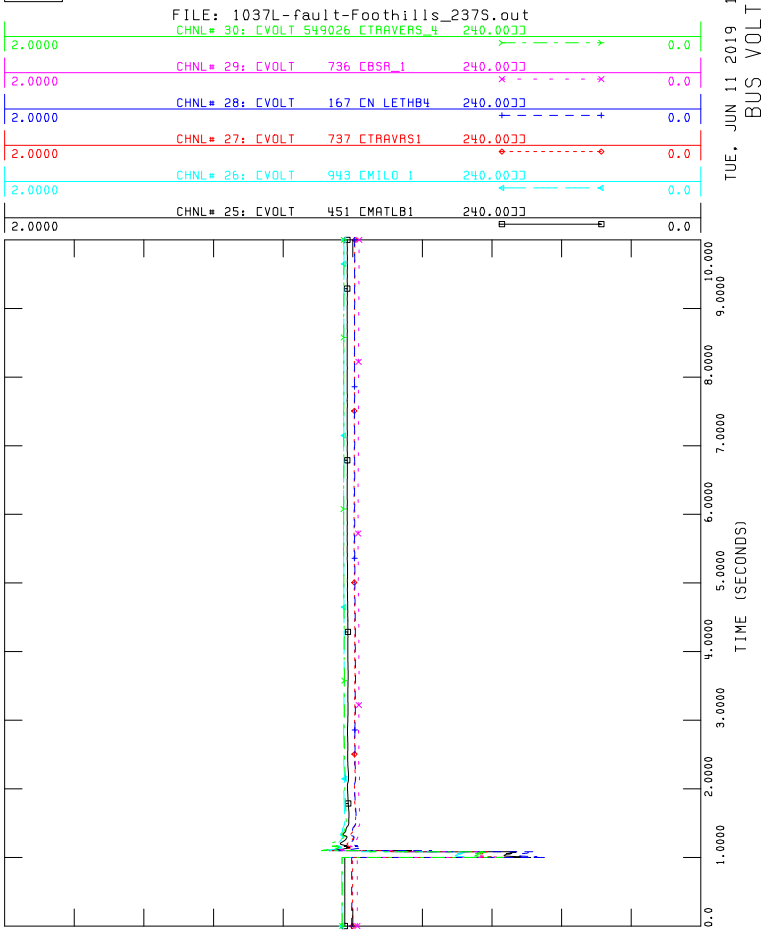


FIGURE A4-39: P2009_2021SL_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

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MACHINE VOLTAGE

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

2.0000 / 0.0

TIME (SECONDS)

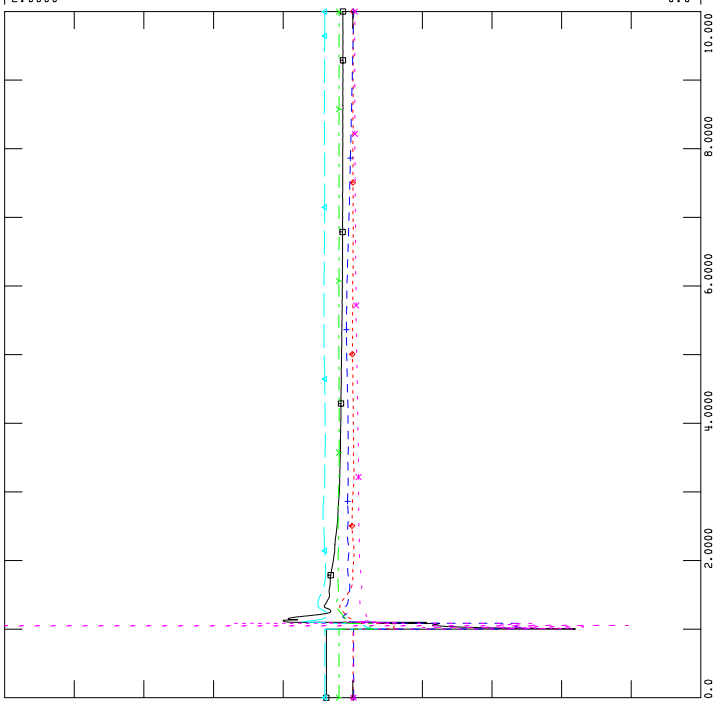


FIGURE A4-39: P2009_2021SL_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 18:14

MACHINE MVAR

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

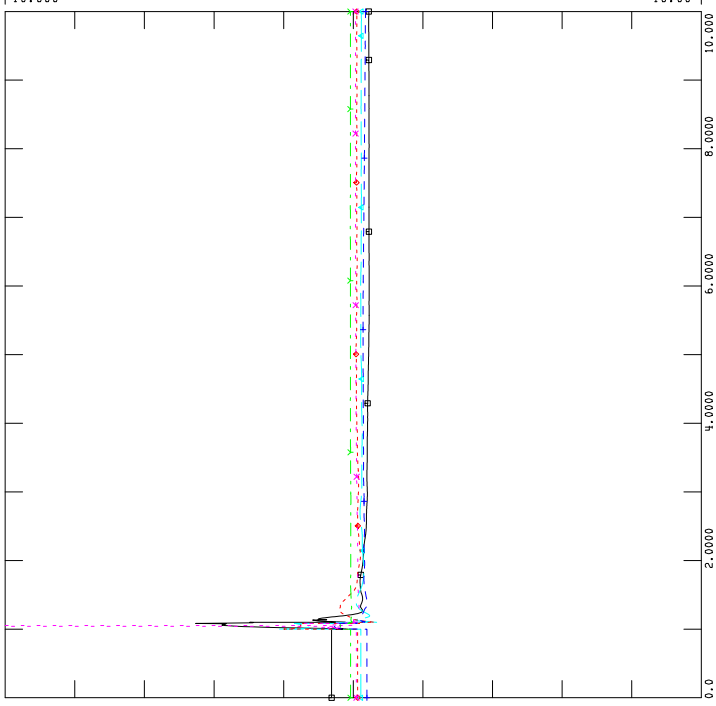


FIGURE A4-39: P2009_2021SL_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 18:14

MACHINE ANGEL

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

100.00 / -100.0

TIME (SECONDS)

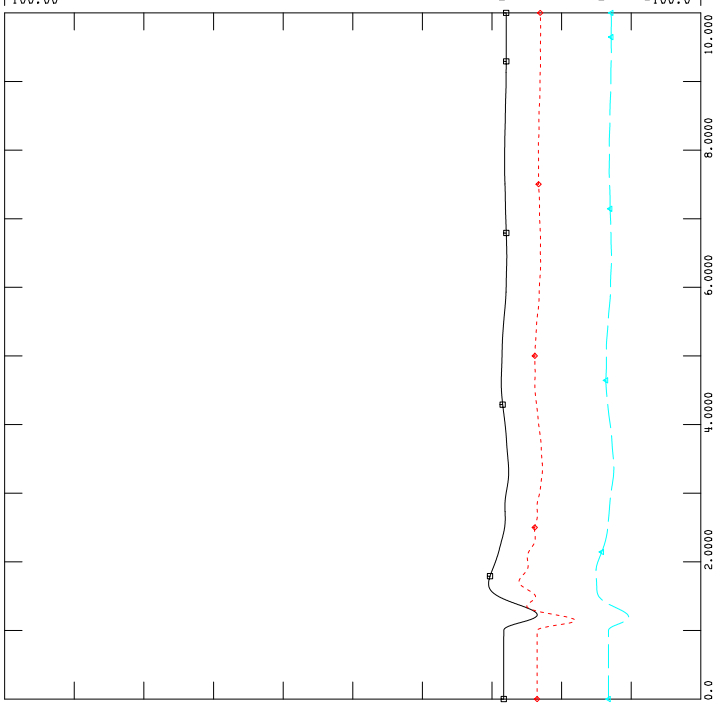


FIGURE A4-39: P2009_2021SL_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 18:14

MACHINE MW

CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWR560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

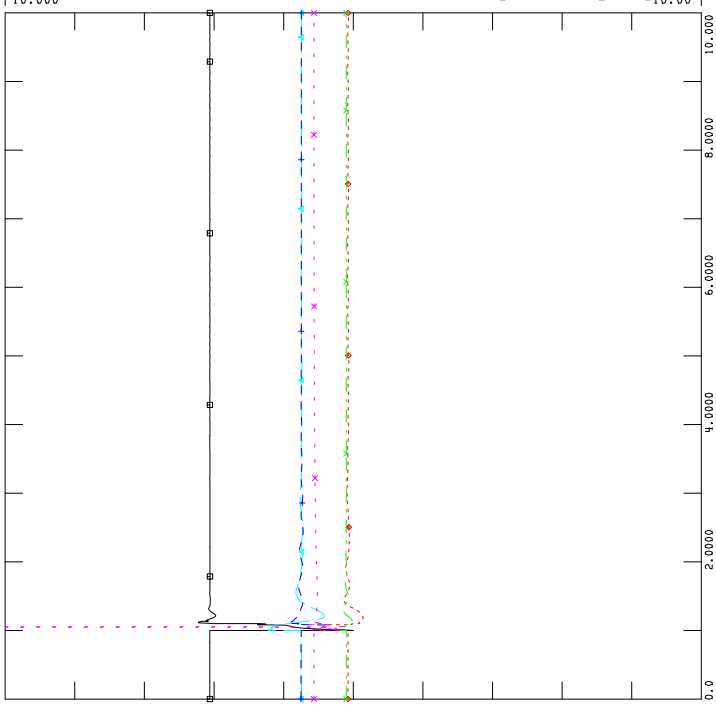
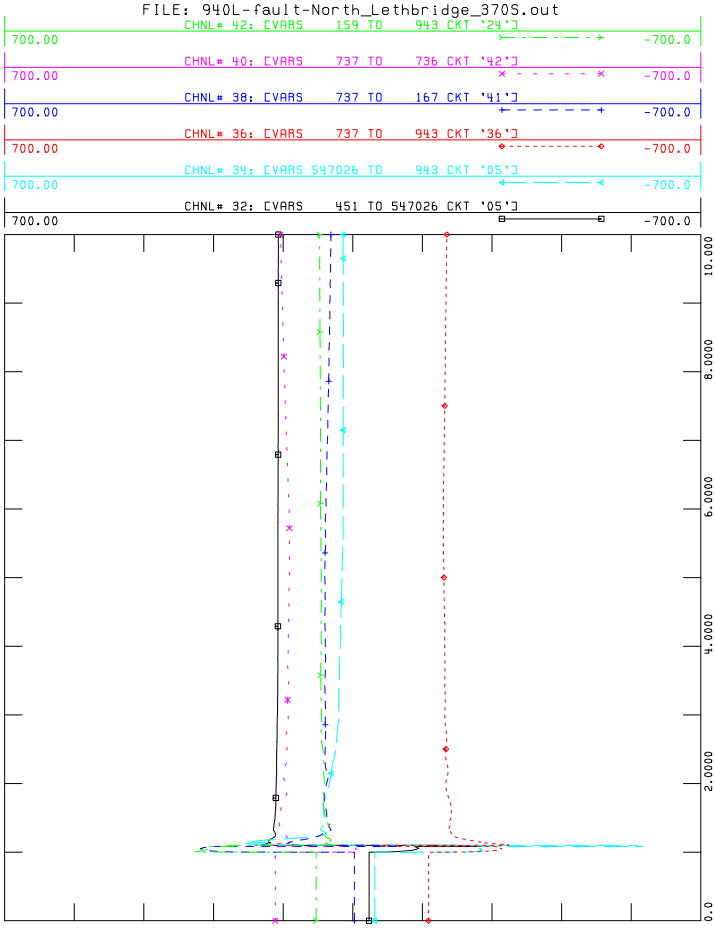


FIGURE A4-39: P2009_2021SL_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

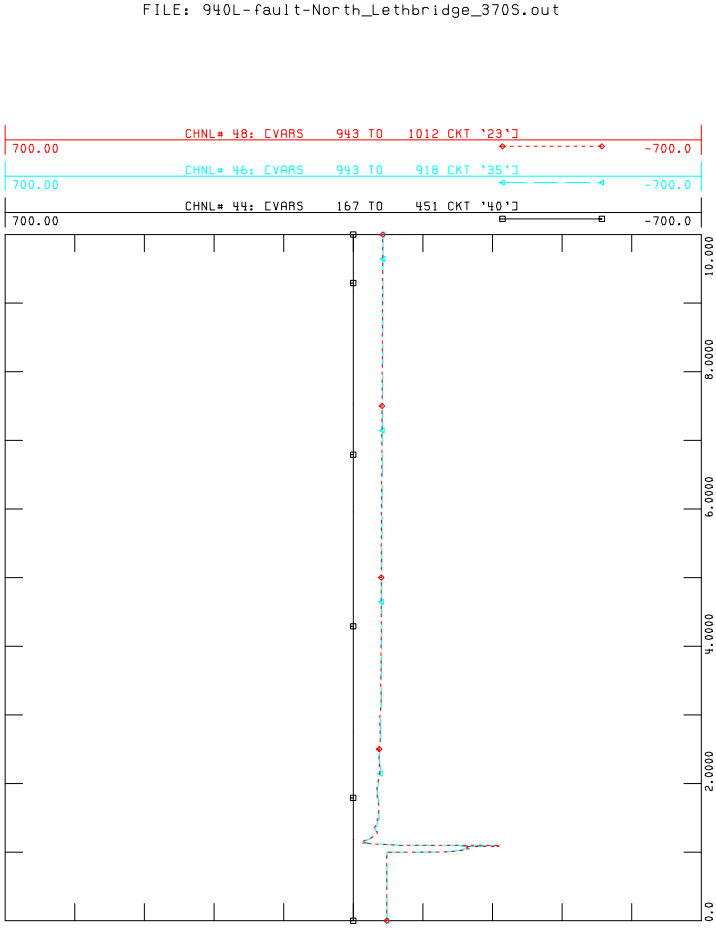
FILE: 940L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:14
LINE MVAR

FIGURE A4-39: P2009_2021SL_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

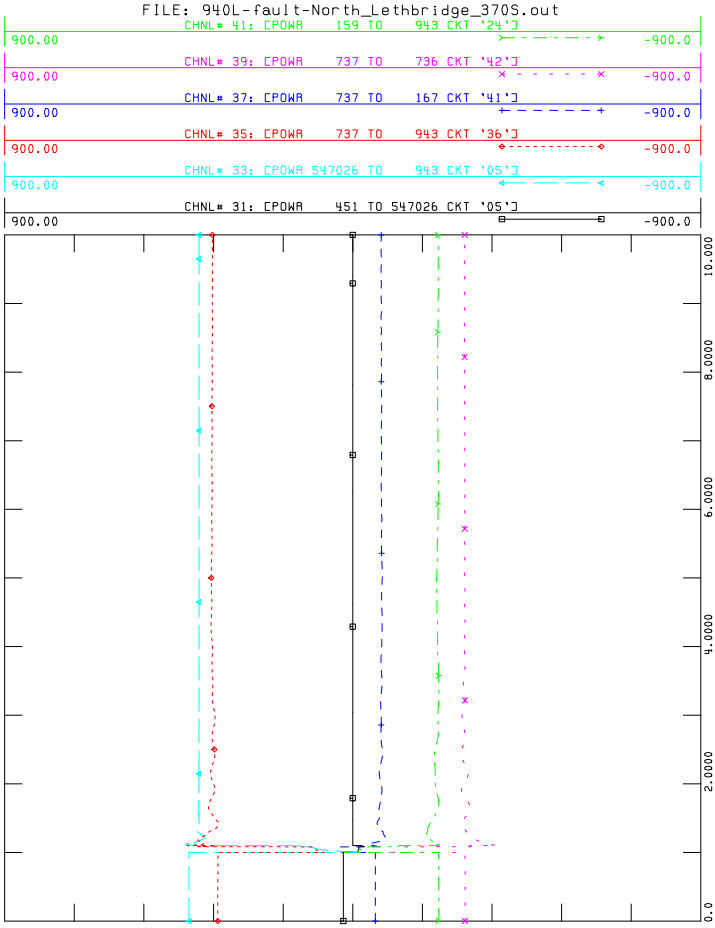
FILE: 940L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:14
LINE MVAR

FIGURE A4-39: P2009_2021SL_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

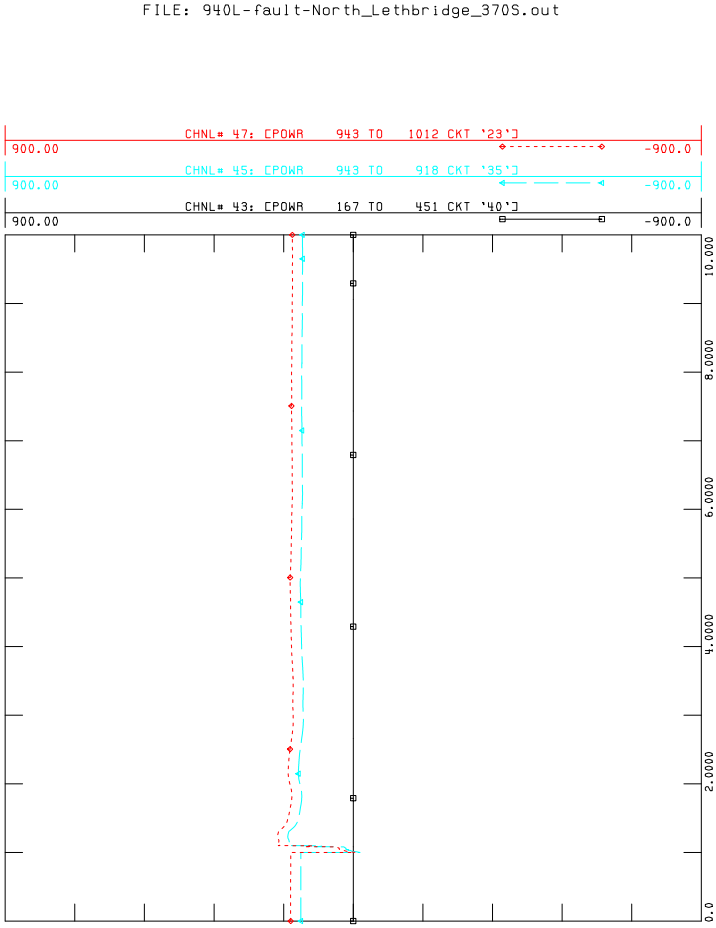
FILE: 940L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:14
LINE MW

FIGURE A4-39: P2009_2021SL_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 940L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:14
LINE MW

FIGURE A4-39: P2009_2021SL_POST
CATB-940L_FAULT_AT_NORTH_LETHBRIDGE_370S

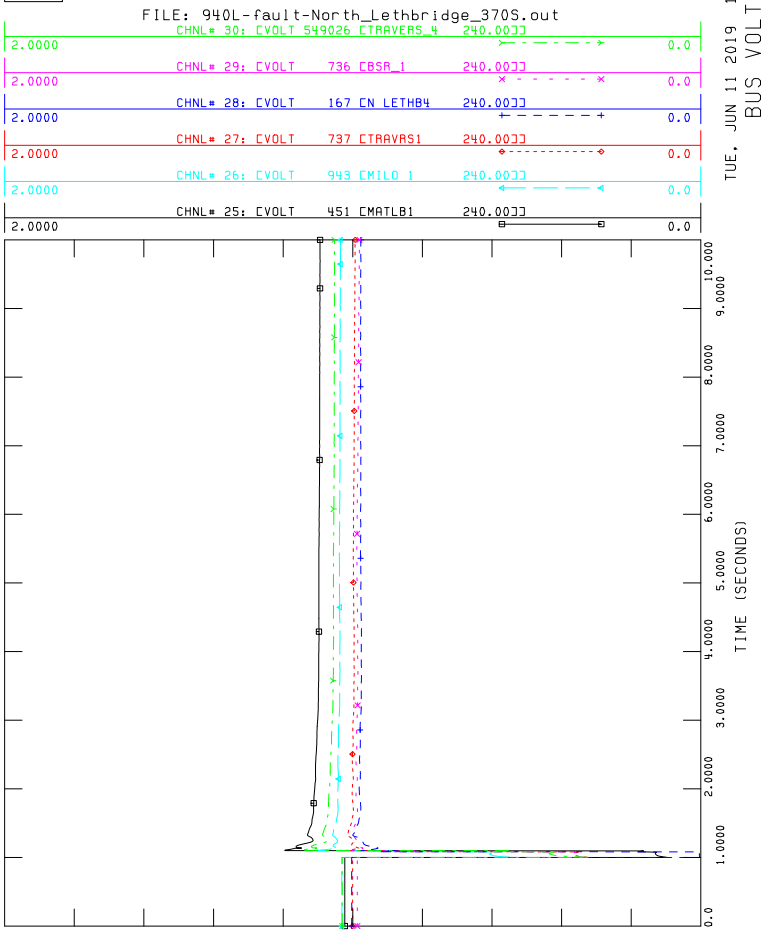


FIGURE A4-40: P2009_2021SL_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 18:15

MACHINE VOLTAGE

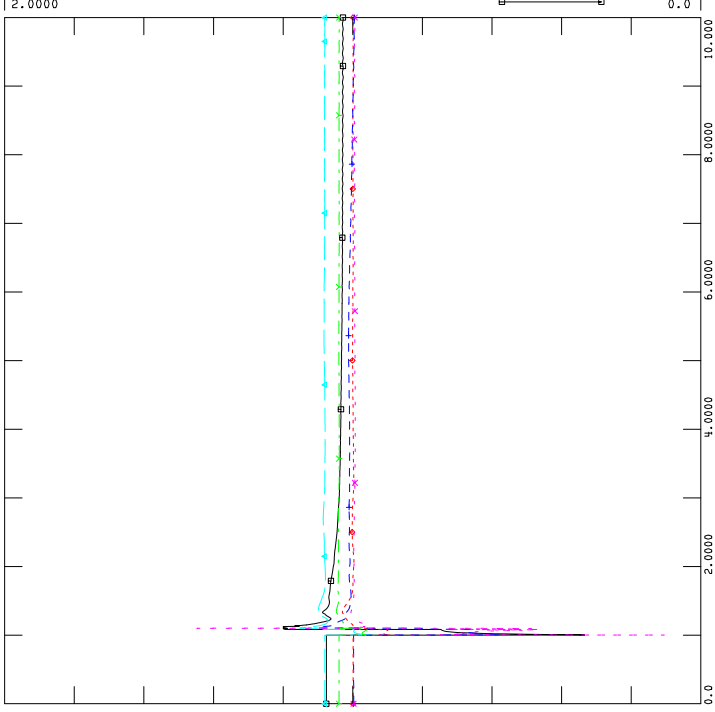


FIGURE A4-40: P2009_2021SL_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 18:15

MACHINE MVAR

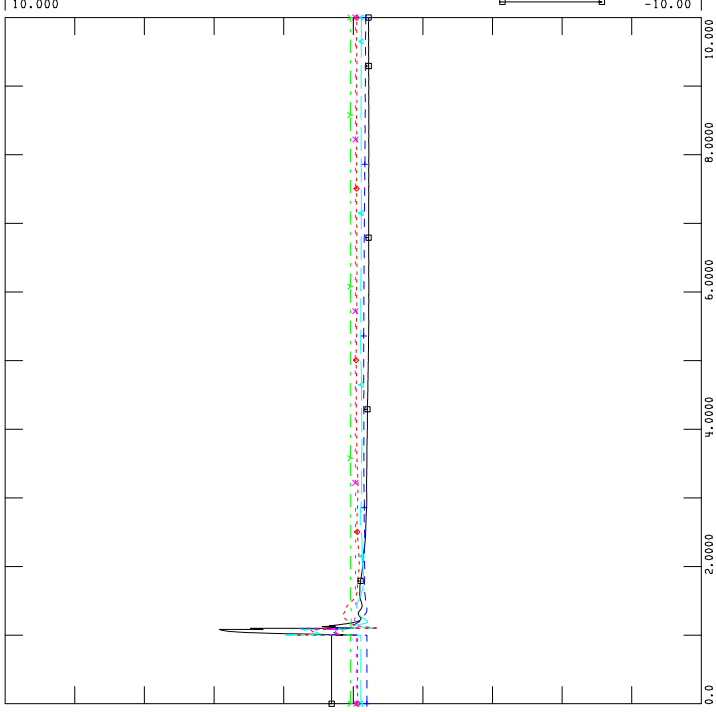


FIGURE A4-40: P2009_2021SL_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 18:15

MACHINE ANGEL

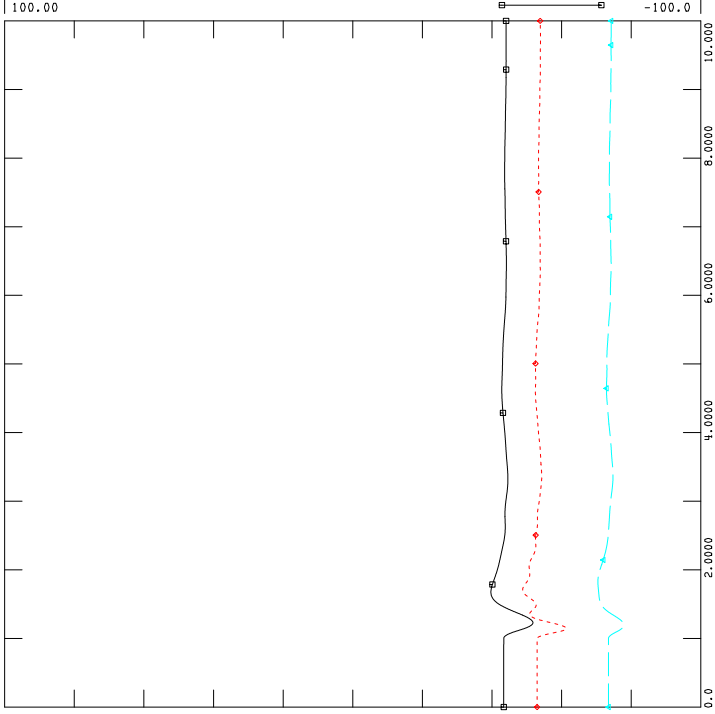


FIGURE A4-40: P2009_2021SL_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 18:15

MACHINE MW

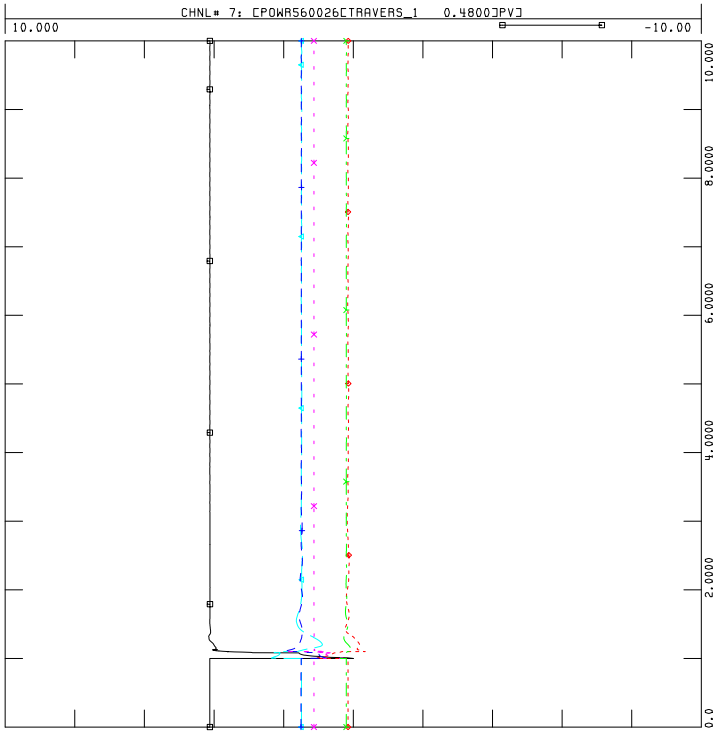


FIGURE A4-40: P2009_2021SL_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 18:15

LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

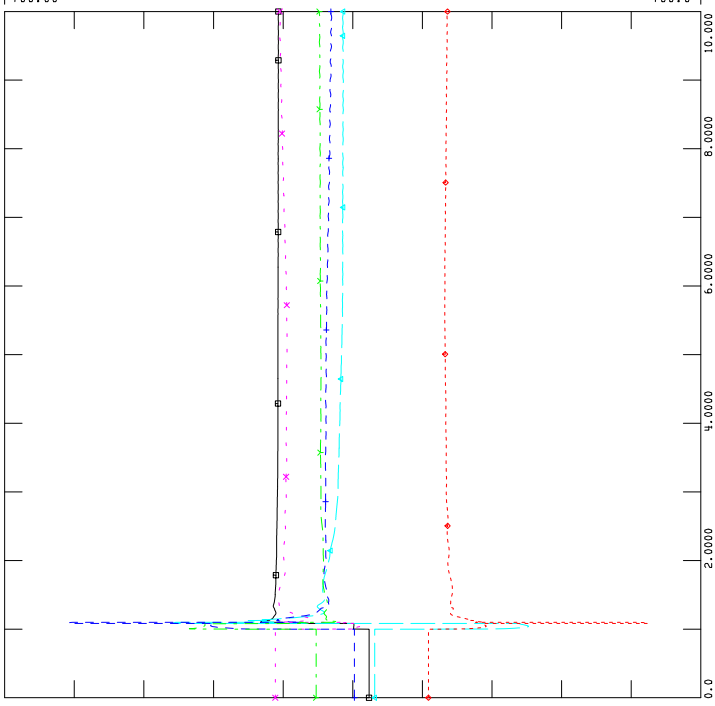


FIGURE A4-40: P2009_2021SL_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 18:15

LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

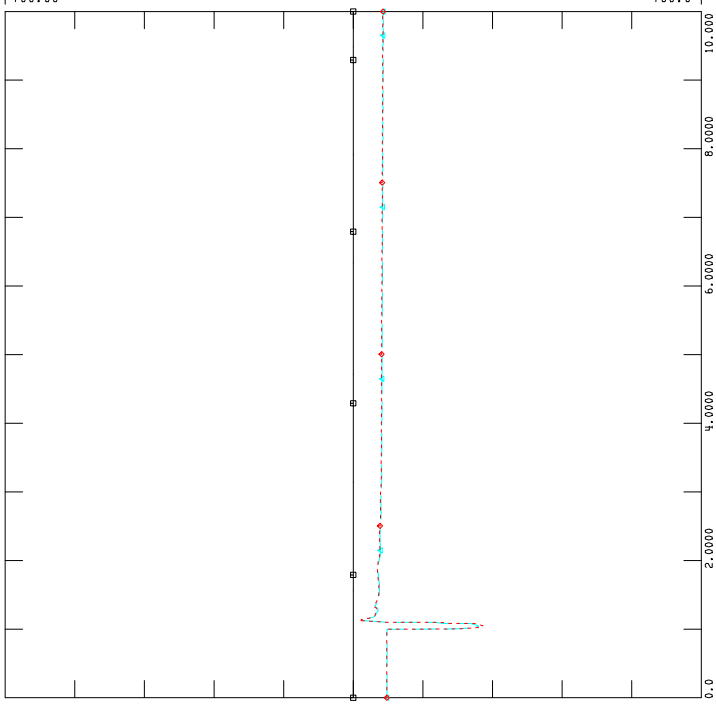


FIGURE A4-40: P2009_2021SL_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 18:15

LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

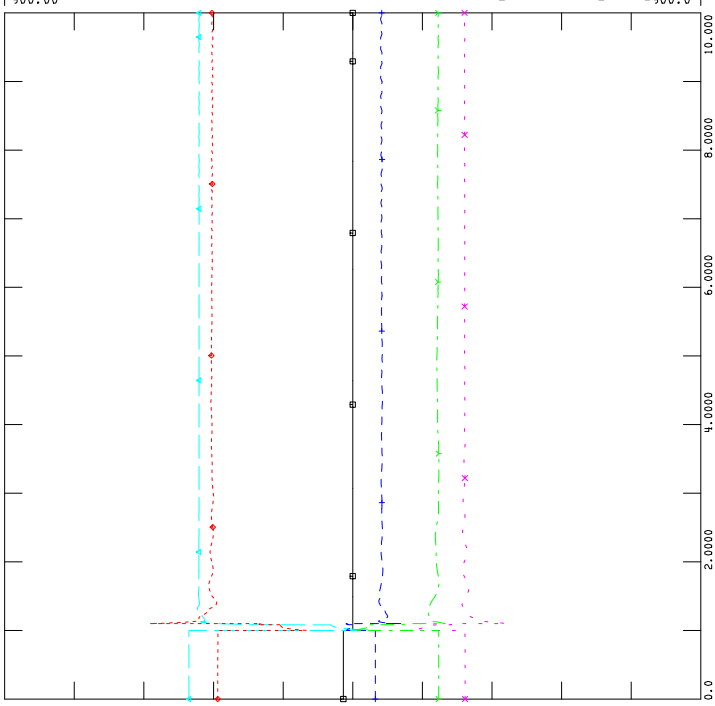


FIGURE A4-40: P2009_2021SL_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

FILE: 940L-fault-Picture_Butte_120S.out

TUE, JUN 11 2019 18:15

LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

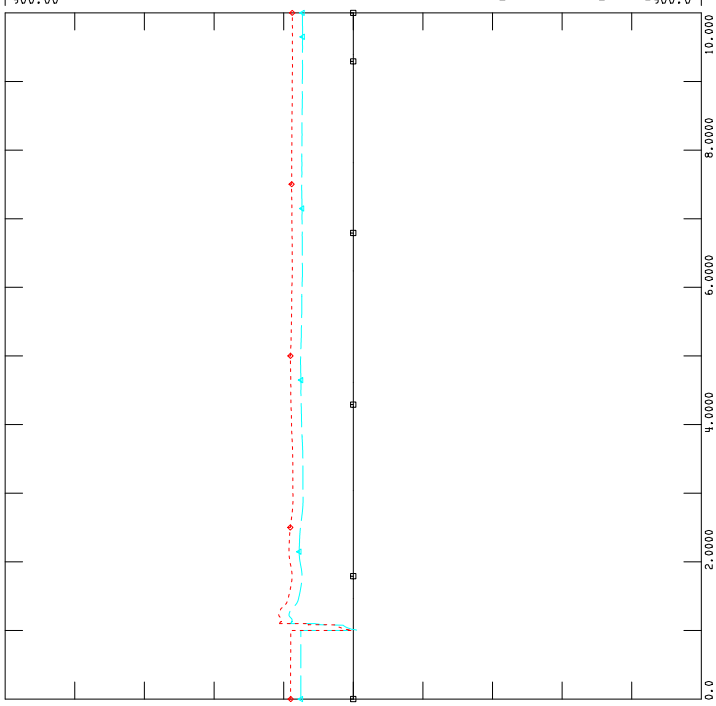


FIGURE A4-40: P2009_2021SL_POST
CATB-940L_FAULT_AT_PICTURE_BUTTE_120S

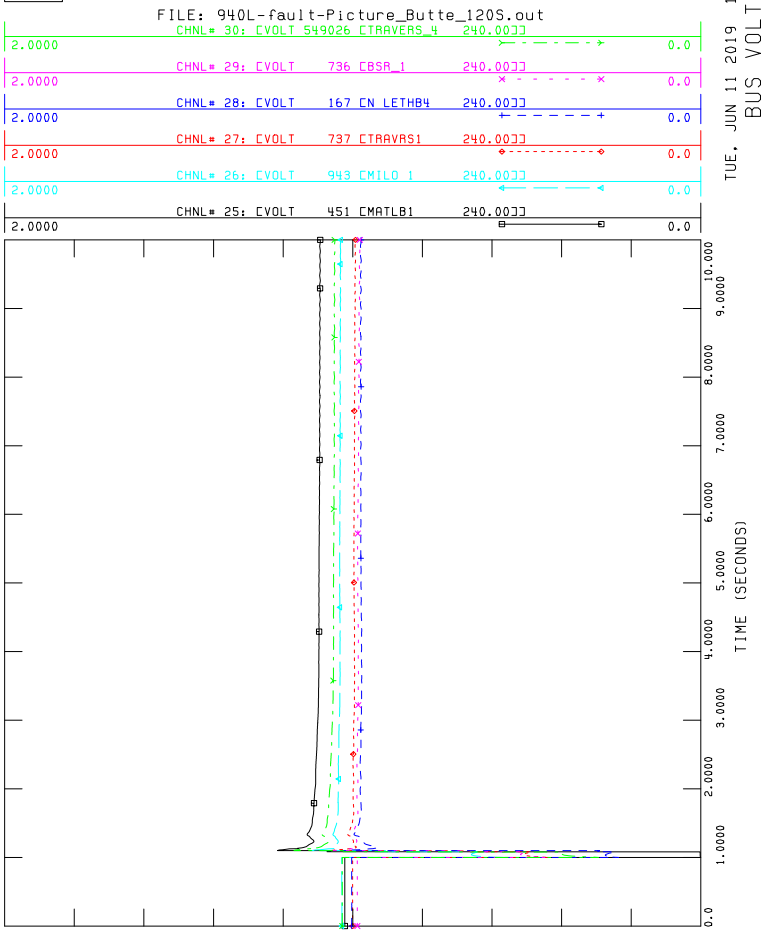


FIGURE A4-41: P2009_2021SL_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 18:16

MACHINE VOLTAGE

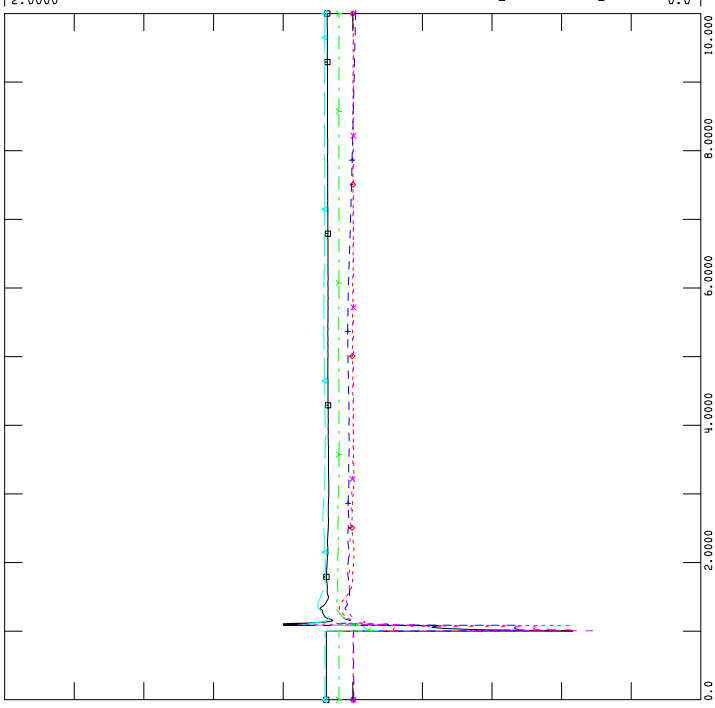


FIGURE A4-41: P2009_2021SL_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 18:16

MACHINE MVAR

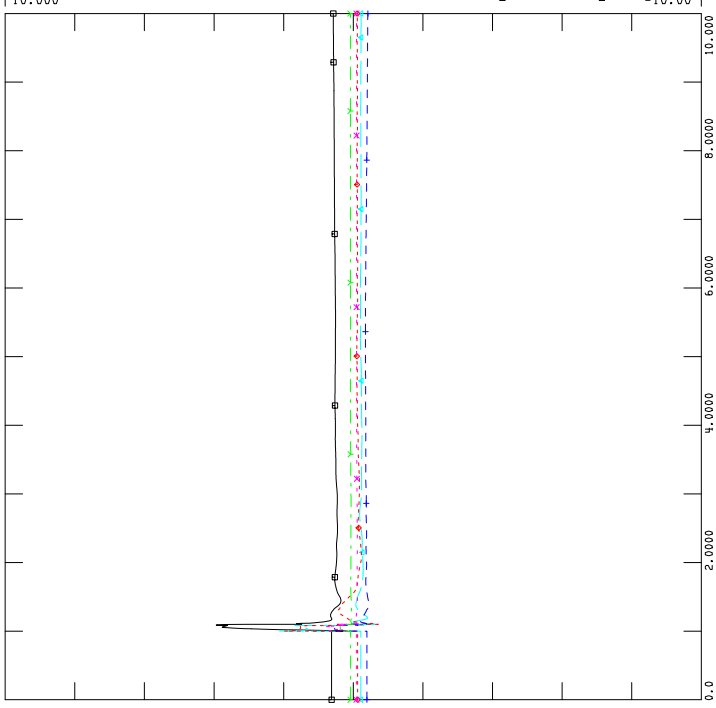


FIGURE A4-41: P2009_2021SL_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 18:16

MACHINE ANGEL

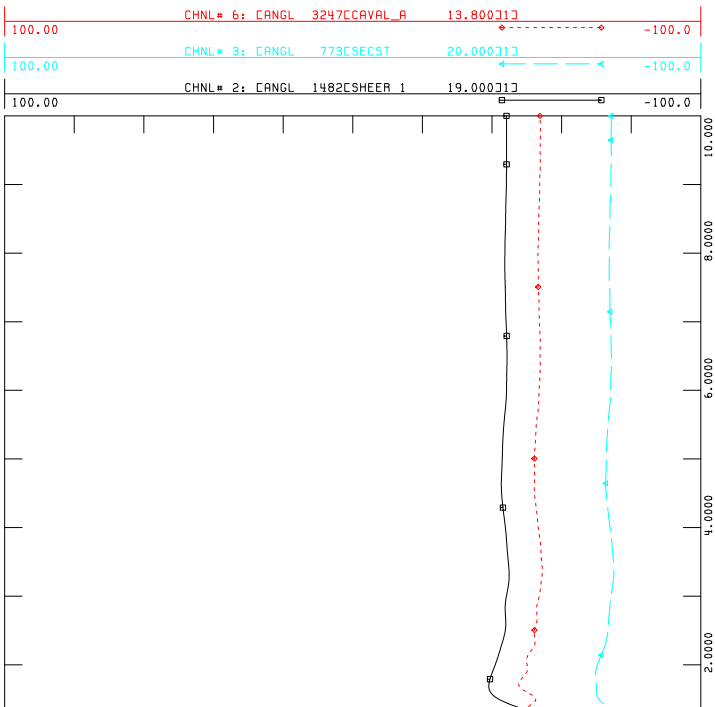


FIGURE A4-41: P2009_2021SL_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out

TUE, JUN 11 2019 18:16

MACHINE MW

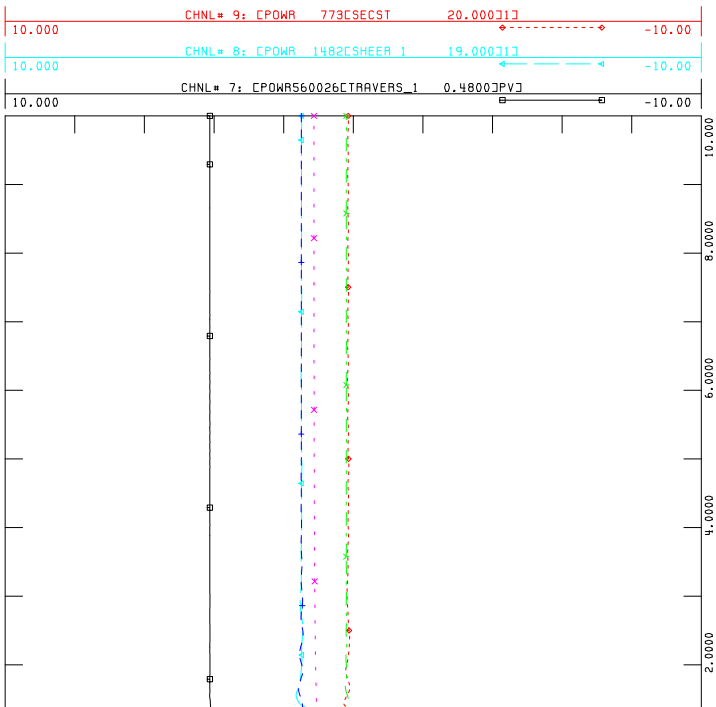
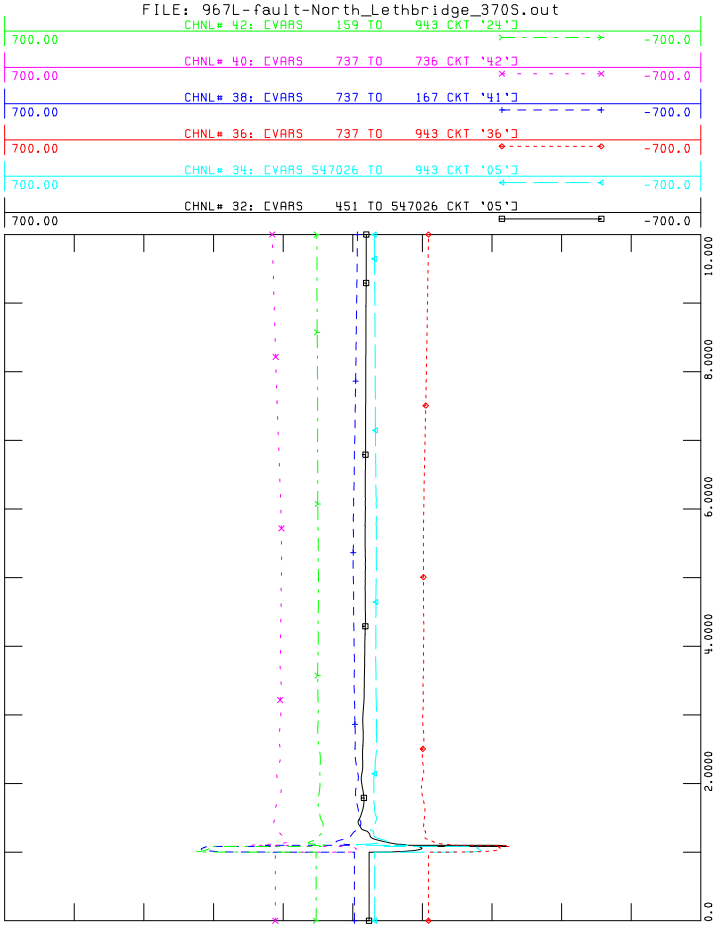


FIGURE A4-41: P2009_2021SL_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

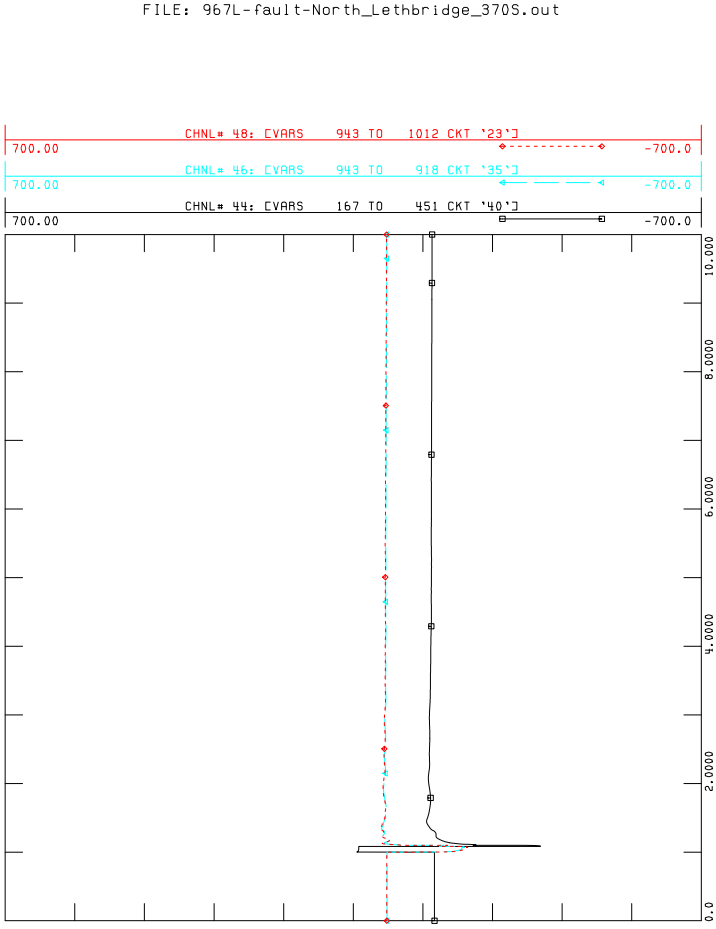
FILE: 967L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:16
LINE MVAR

FIGURE A4-41: P2009_2021SL_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

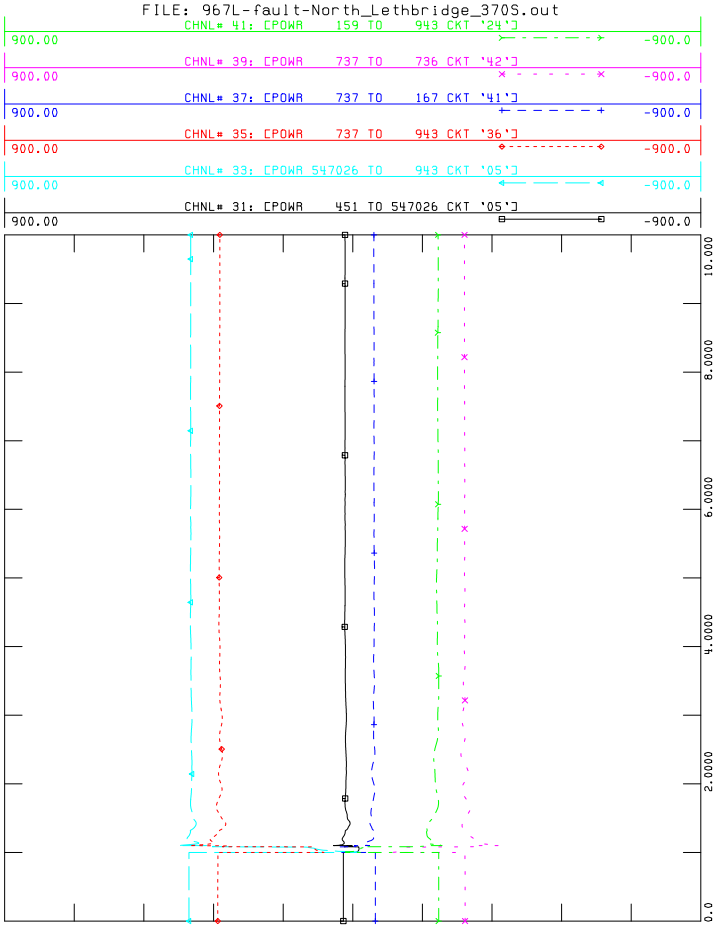
FILE: 967L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:16
LINE MVAR

FIGURE A4-41: P2009_2021SL_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

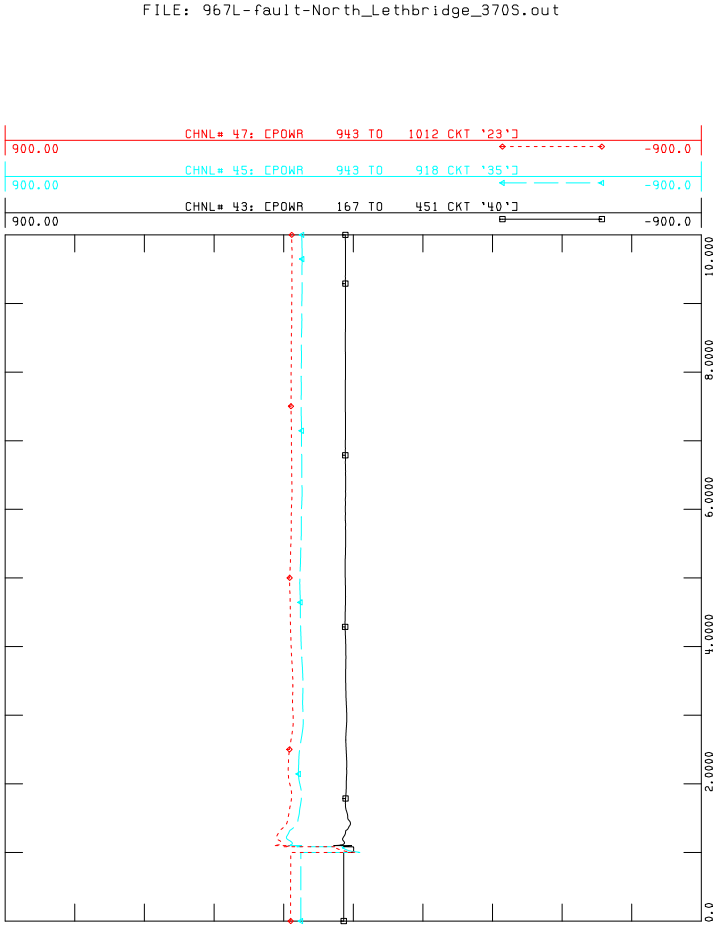
FILE: 967L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:16
LINE MW

FIGURE A4-41: P2009_2021SL_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

FILE: 967L-fault-North_Lethbridge_370S.out



TUE, JUN 11 2019 18:16
LINE MW

FIGURE A4-41: P2009_2021SL_POST
CATB-967L_FAULT_AT_NORTH_LETHBRIDGE_370S

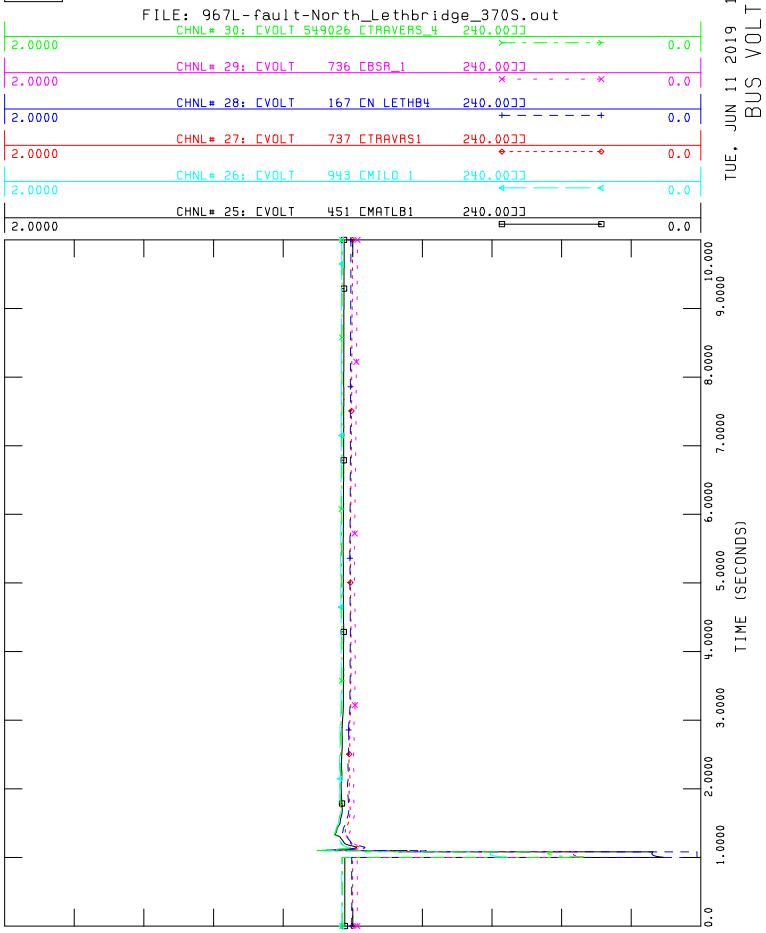


FIGURE A4-42: P2009_2021SL_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

TUE, JUN 11 2019 18:17
MACHINE VOLTAGE

TIME (SECONDS)

FIGURE A4-42: P2009_2021SL_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

TUE, JUN 11 2019 18:17
MACHINE MVAR

TIME (SECONDS)

FIGURE A4-42: P2009_2021SL_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

TUE, JUN 11 2019 18:17
MACHINE ANGEL

TIME (SECONDS)

FIGURE A4-42: P2009_2021SL_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out

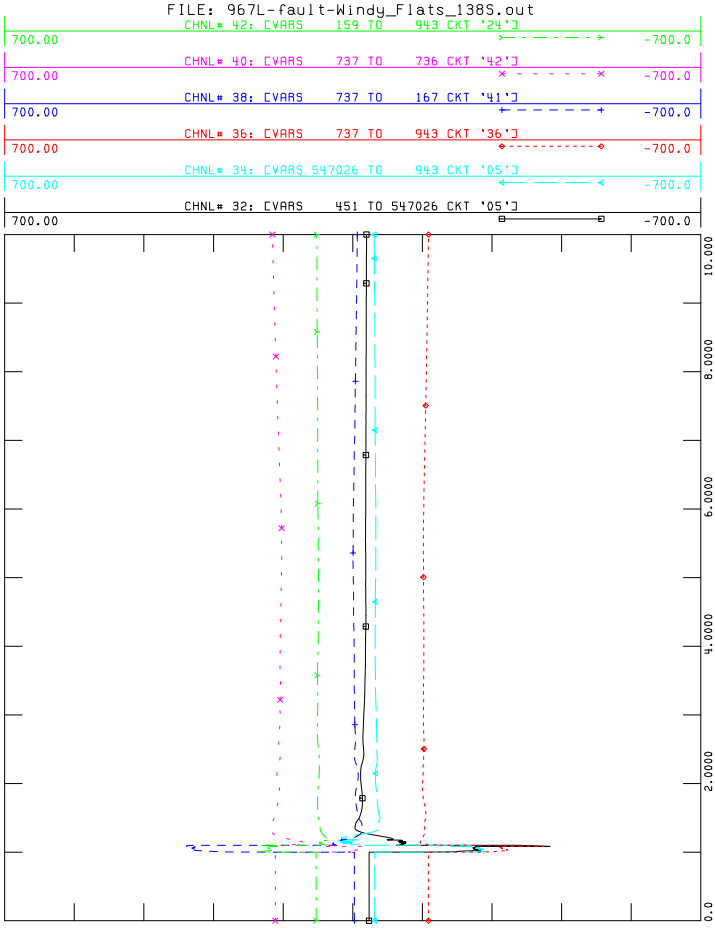
CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWR560026CTRAVERS_1 0.4800]PV]

TUE, JUN 11 2019 18:17
MACHINE MW

TIME (SECONDS)

FIGURE A4-42: P2009_2021SL_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

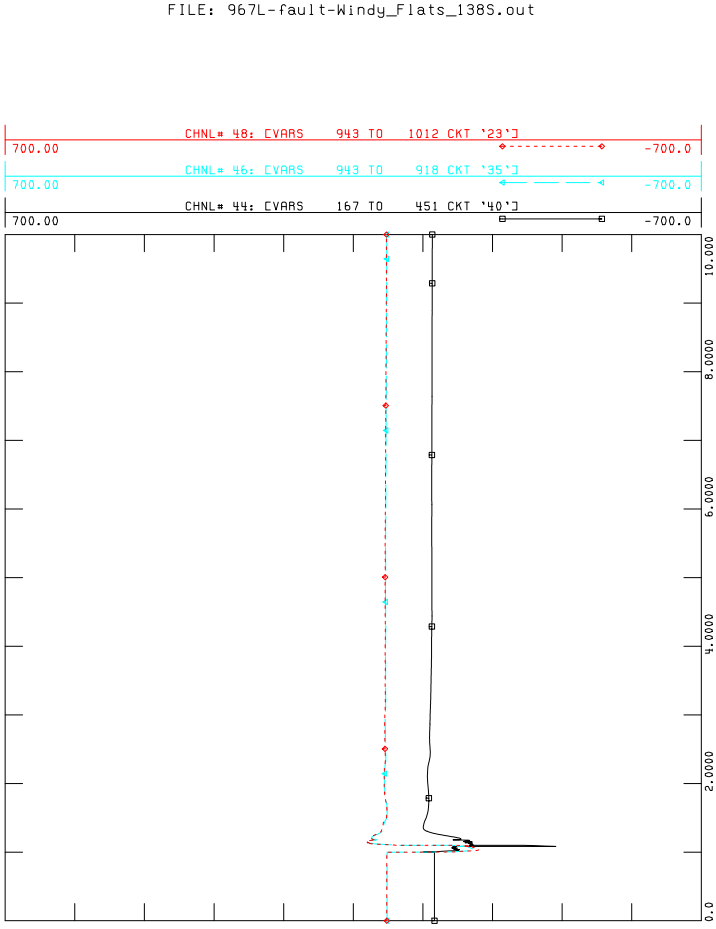
FILE: 967L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 18:17
LINE MVAR

FIGURE A4-42: P2009_2021SL_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

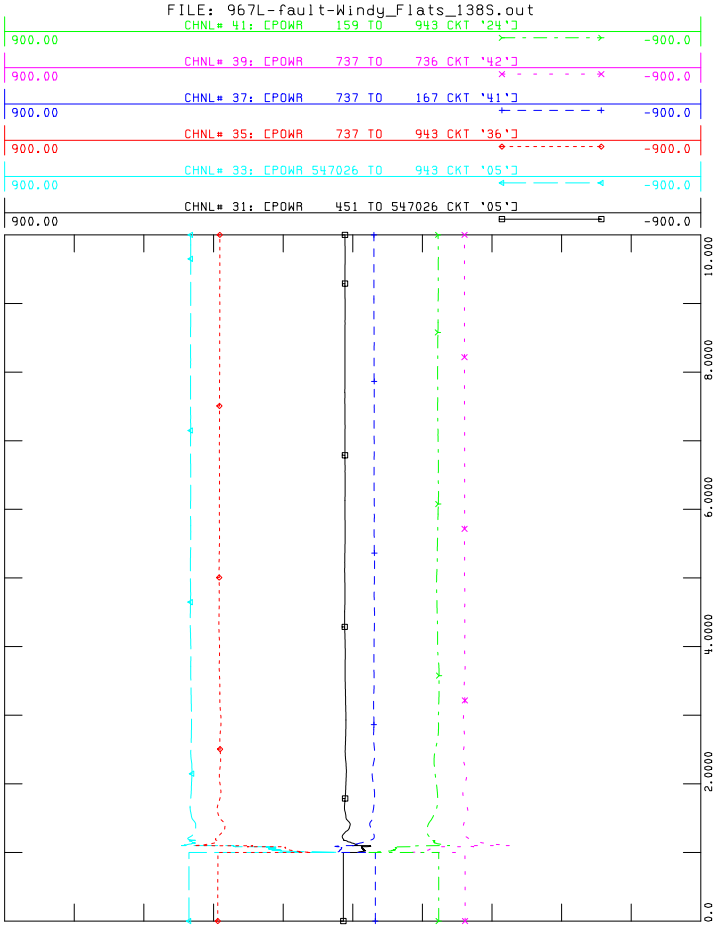
FILE: 967L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 18:17
LINE MVAR

FIGURE A4-42: P2009_2021SL_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

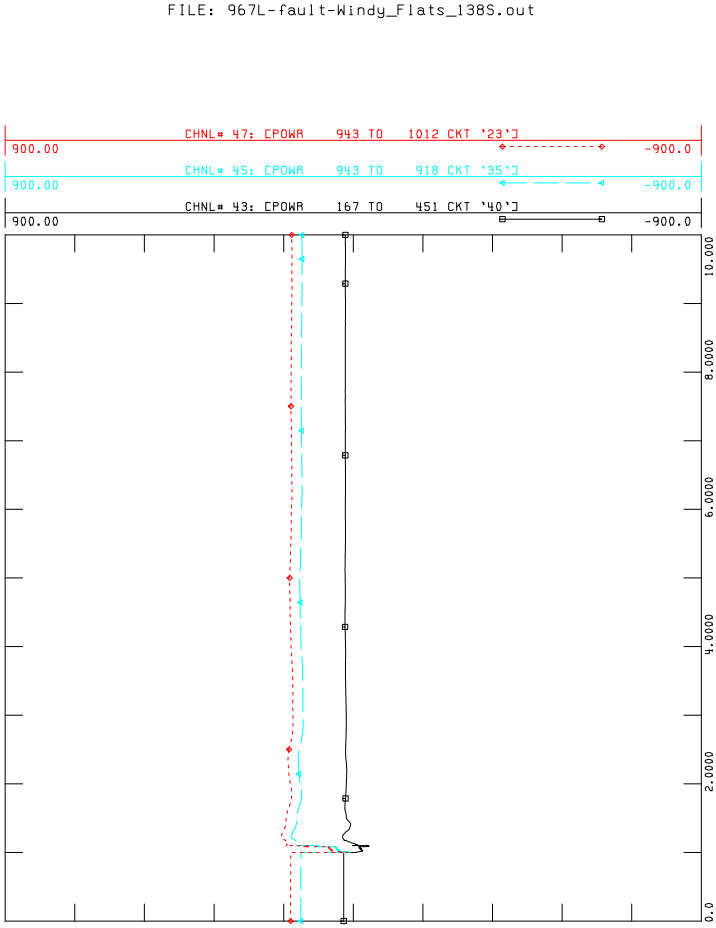
FILE: 967L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 18:17
LINE MW

FIGURE A4-42: P2009_2021SL_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

FILE: 967L-fault-Windy_Flats_138S.out



TUE, JUN 11 2019 18:17
LINE MW

FIGURE A4-42: P2009_2021SL_POST
CATB-967L_FAULT_AT_WINDY_FLATS_138S

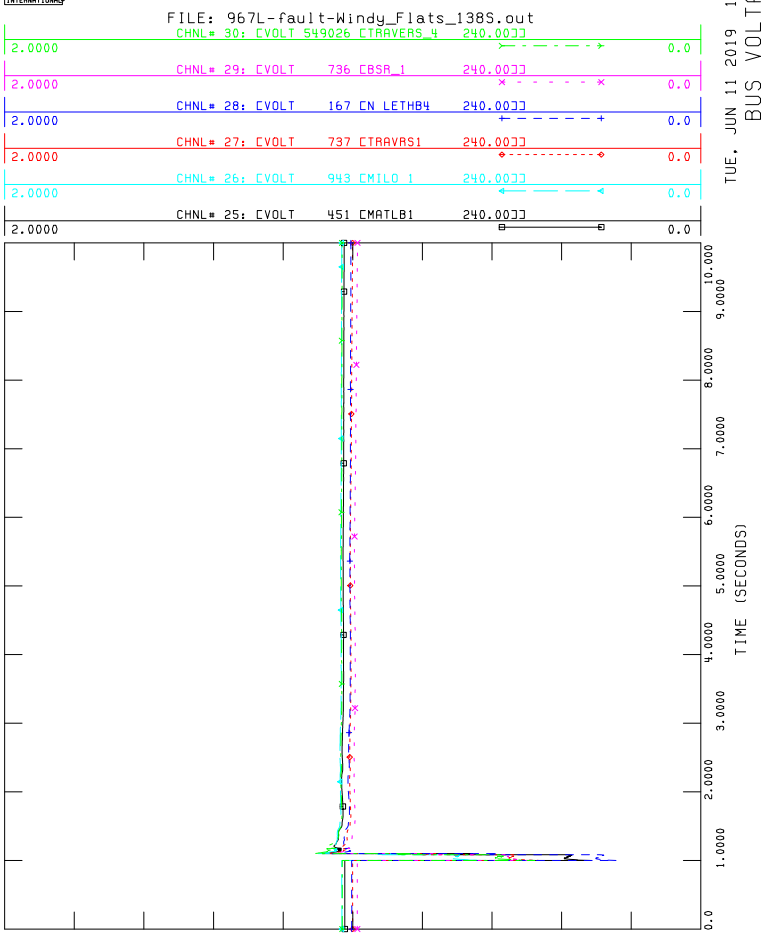


FIGURE A4-43: P2009_2021SL_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

TUE, JUN 11 2019 18:17

MACHINE VOLTAGE

CHNL# 24: CETRM 3247CCAVAL_A 13.800]1]
CHNL# 23: CETRM 61630CREDCOAT4 0.6900]G1]
CHNL# 22: CETRM 61736CBSR_4 0.6900]1]
CHNL# 21: CETRM 773CSECST 20.000]1]
CHNL# 20: CETRM 1482CSHEER 1 19.000]1]
CHNL# 19: CETRM560026CTRAVERS_1 0.4800]PV]

2.0000 / 0.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

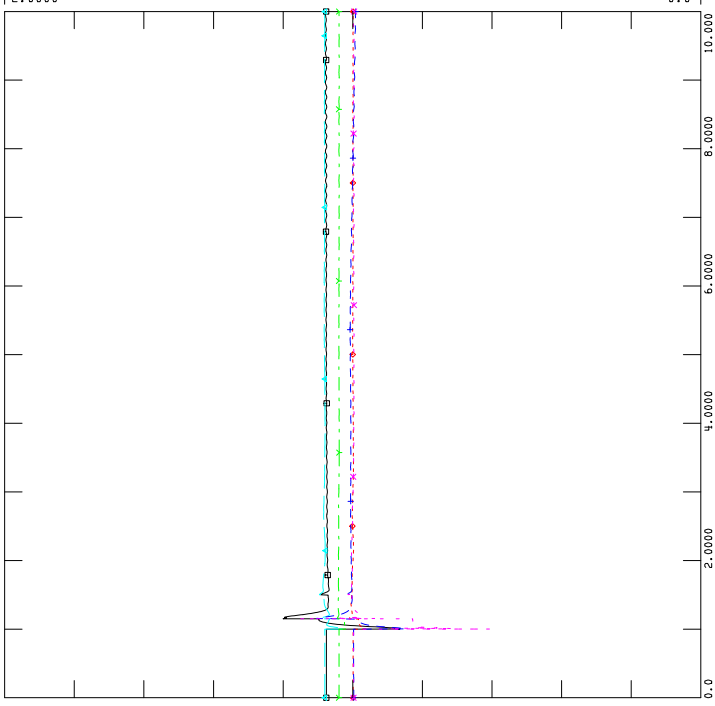


FIGURE A4-43: P2009_2021SL_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

TUE, JUN 11 2019 18:17

MACHINE MVAR

CHNL# 18: CVARS 3247CCAVAL_A 13.800]1]
CHNL# 17: CVARS 61630CREDCOAT4 0.6900]G1]
CHNL# 16: CVARS 61736CBSR_4 0.6900]1]
CHNL# 15: CVARS 773CSECST 20.000]1]
CHNL# 14: CVARS 1482CSHEER 1 19.000]1]
CHNL# 13: CVARS560026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

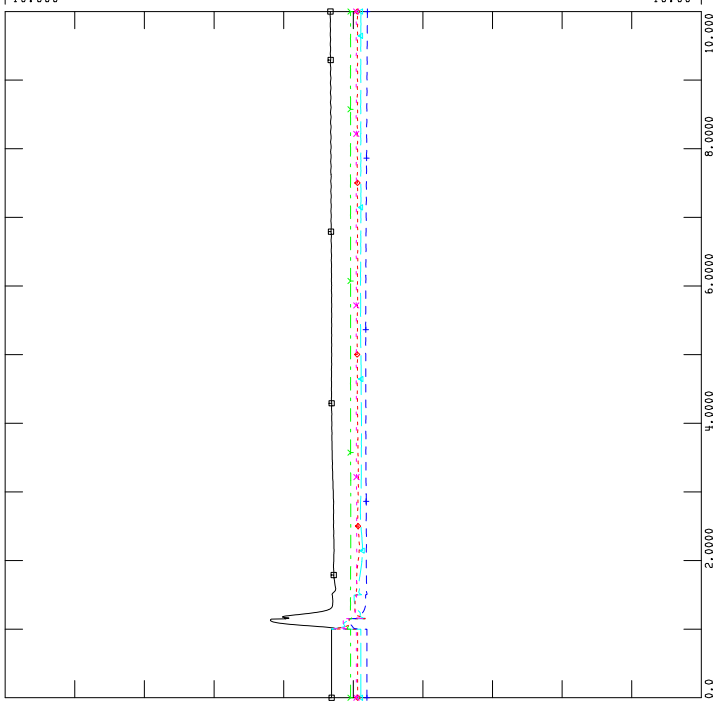


FIGURE A4-43: P2009_2021SL_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

TUE, JUN 11 2019 18:17

MACHINE ANGEL

CHNL# 6: CANGL 3247CCAVAL_A 13.800]1]
CHNL# 3: CANGL 773CSECST 20.000]1]
CHNL# 2: CANGL 1482CSHEER 1 19.000]1]

100.00 / -100.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

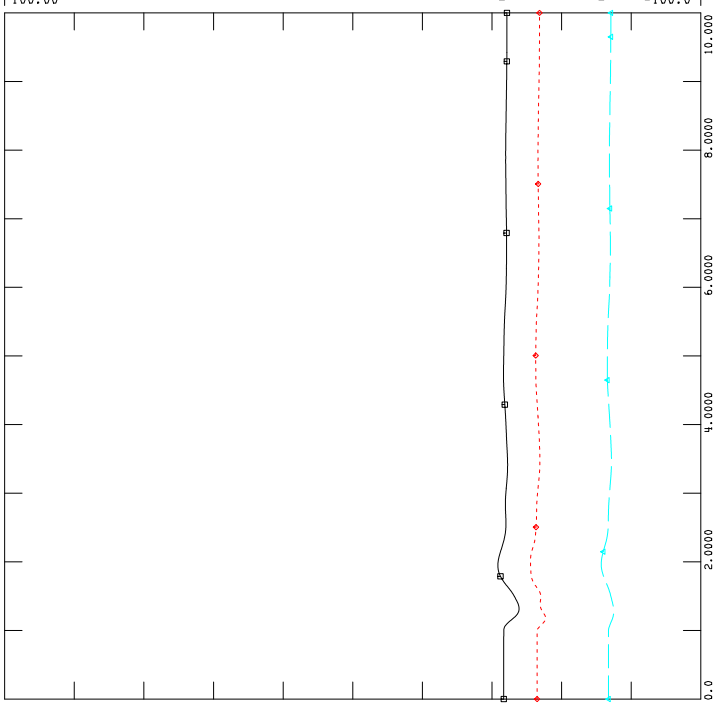


FIGURE A4-43: P2009_2021SL_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

TUE, JUN 11 2019 18:17

MACHINE MW

CHNL# 12: CPOWR 3247CCAVAL_A 13.800]1]
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900]G1]
CHNL# 10: CPOWR 61736CBSR_4 0.6900]1]
CHNL# 9: CPOWR 773CSECST 20.000]1]
CHNL# 8: CPOWR 1482CSHEER 1 19.000]1]
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800]PV]

10.000 / -10.00

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

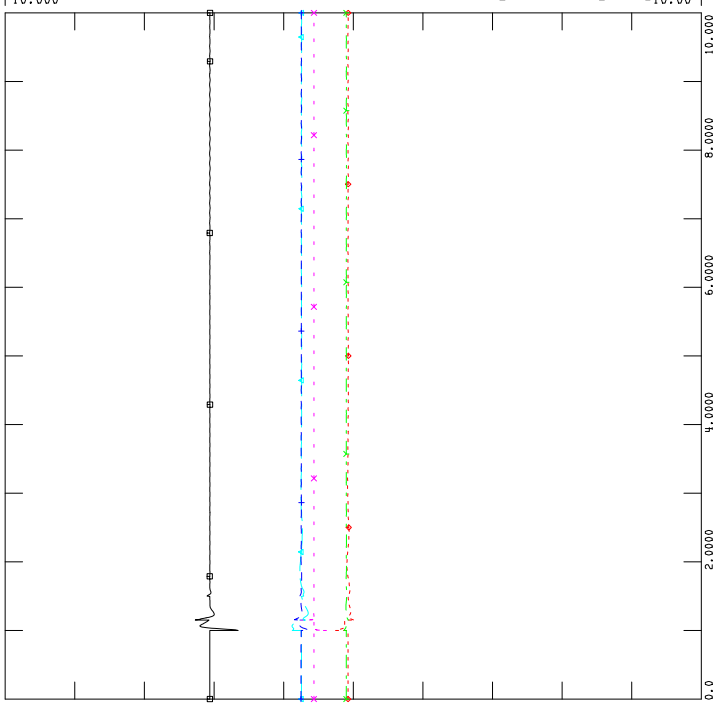


FIGURE A4-43: P2009_2021SL_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

TUE, JUN 11 2019 18:17

LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-43: P2009_2021SL_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

TUE, JUN 11 2019 18:17

LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-43: P2009_2021SL_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

TUE, JUN 11 2019 18:17

LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-43: P2009_2021SL_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

FILE: 180L-fault-Fort_Macleod_15S.out

TUE, JUN 11 2019 18:17

LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-43: P2009_2021SL_POST
CATB-180L_FAULT_AT_FORT_MACLEOD_15S

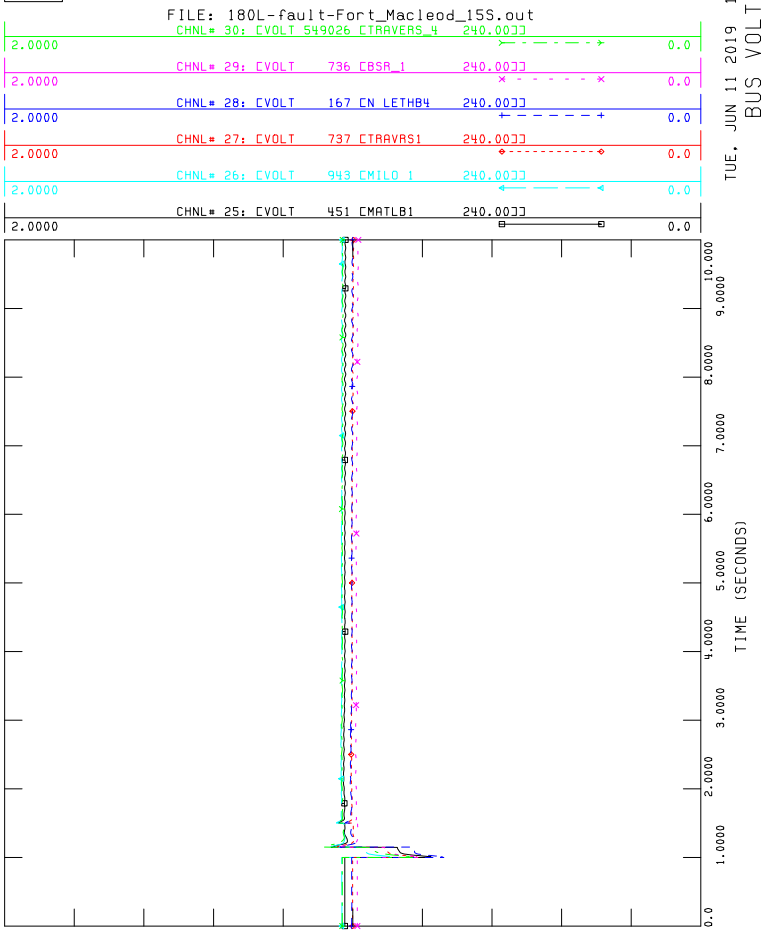


FIGURE A4-44: P2009_2021SL_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

2.0000 / 0.0

TUE, JUN 11 2019 18:18
MACHINE VOLTAGE

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-44: P2009_2021SL_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 18:18
MACHINE MVAR

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-44: P2009_2021SL_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

100.00 / -100.0

TUE, JUN 11 2019 18:18
MACHINE ANGEL

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-44: P2009_2021SL_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 18:18
MACHINE MW

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-44: P2009_2021SL_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

TUE, JUN 11 2019 18:18

LINE MVAR

CHNL# 42: EVARS 159 TO 943 CKT '24'
CHNL# 40: EVARS 737 TO 736 CKT '42'
CHNL# 38: EVARS 737 TO 167 CKT '41'
CHNL# 36: EVARS 737 TO 943 CKT '36'
CHNL# 34: EVARS 547026 TO 943 CKT '05'
CHNL# 32: EVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-44: P2009_2021SL_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

TUE, JUN 11 2019 18:18

LINE MVAR

CHNL# 48: EVARS 943 TO 1012 CKT '23'
CHNL# 46: EVARS 943 TO 918 CKT '35'
CHNL# 44: EVARS 167 TO 451 CKT '40'

700.00 / -700.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-44: P2009_2021SL_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

TUE, JUN 11 2019 18:18

LINE MW

CHNL# 41: EPOWR 159 TO 943 CKT '24'
CHNL# 39: EPOWR 737 TO 736 CKT '42'
CHNL# 37: EPOWR 737 TO 167 CKT '41'
CHNL# 35: EPOWR 737 TO 943 CKT '36'
CHNL# 33: EPOWR 547026 TO 943 CKT '05'
CHNL# 31: EPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-44: P2009_2021SL_POST
CATB-180L_FAULT_AT_VULCAN_255S

FILE: 180L-fault-Vulcan_255S.out

TUE, JUN 11 2019 18:18

LINE MW

CHNL# 47: EPOWR 943 TO 1012 CKT '23'
CHNL# 45: EPOWR 943 TO 918 CKT '35'
CHNL# 43: EPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TIME (SECONDS)

0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-44: P2009_2021SL_POST
CATB-180L_FAULT_AT_VULCAN_255S

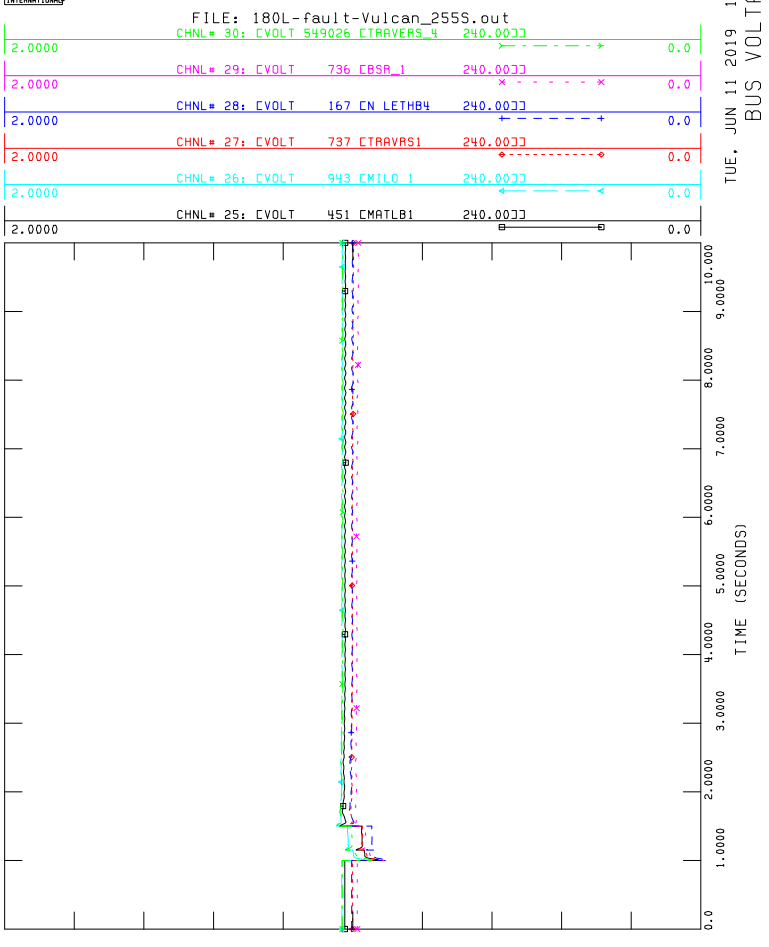
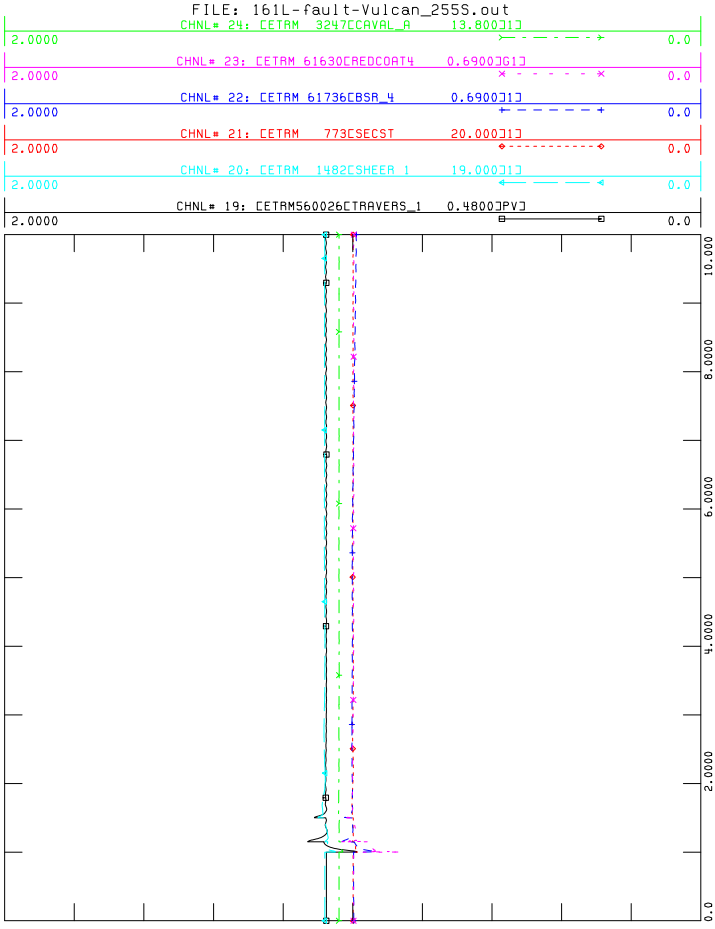


FIGURE A4-45: P2009_2021SL_POST
CATB-161L_FAULT_AT_VULCAN_255S

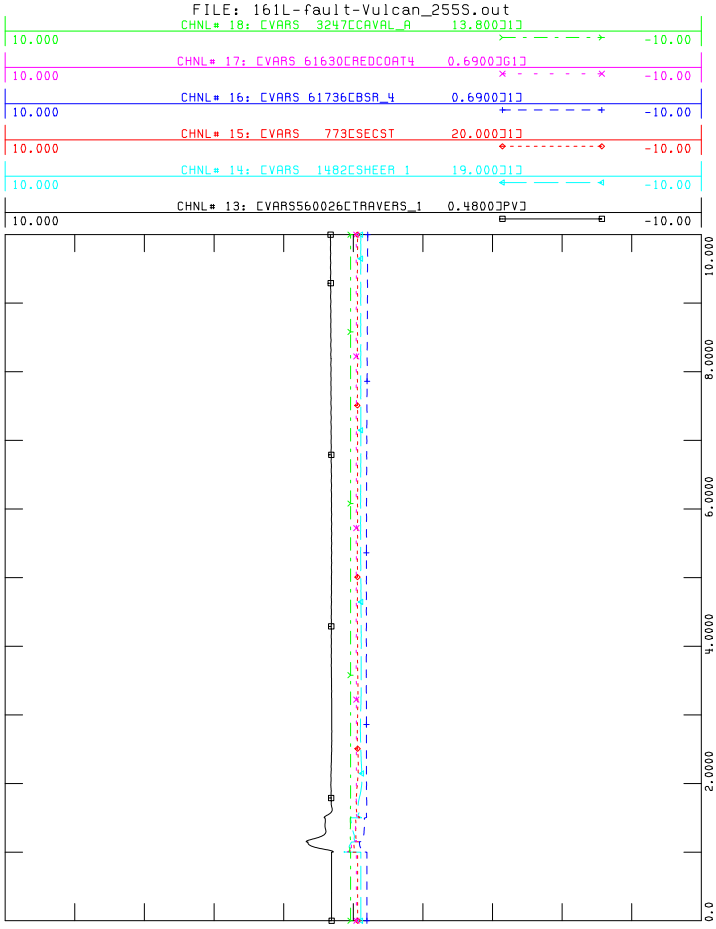
FILE: 161L-fault-Vulcan_255S.out



TUE, JUN 11 2019 18:19
MACHINE VOLTAGE

FIGURE A4-45: P2009_2021SL_POST
CATB-161L_FAULT_AT_VULCAN_255S

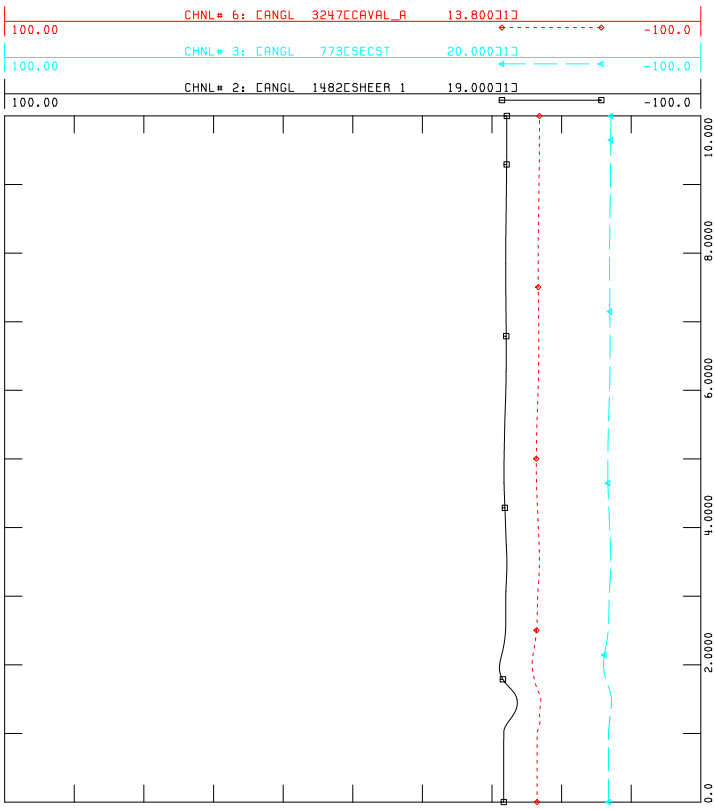
FILE: 161L-fault-Vulcan_255S.out



TUE, JUN 11 2019 18:19
MACHINE MVAR

FIGURE A4-45: P2009_2021SL_POST
CATB-161L_FAULT_AT_VULCAN_255S

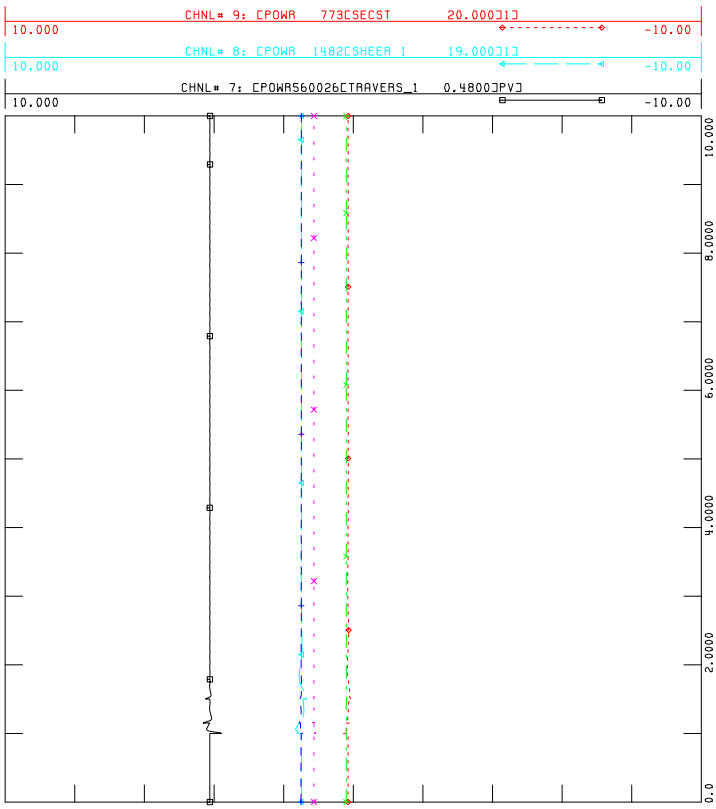
FILE: 161L-fault-Vulcan_255S.out



TUE, JUN 11 2019 18:19
MACHINE ANGEL

FIGURE A4-45: P2009_2021SL_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out



TUE, JUN 11 2019 18:19
MACHINE MW

FIGURE A4-45: P2009_2021SL_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

TUE, JUN 11 2019 18:19
LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-45: P2009_2021SL_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

TUE, JUN 11 2019 18:19
LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-45: P2009_2021SL_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

TUE, JUN 11 2019 18:19
LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-45: P2009_2021SL_POST
CATB-161L_FAULT_AT_VULCAN_255S

FILE: 161L-fault-Vulcan_255S.out

TUE, JUN 11 2019 18:19
LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-45: P2009_2021SL_POST
CATB-161L_FAULT_AT_VULCAN_255S

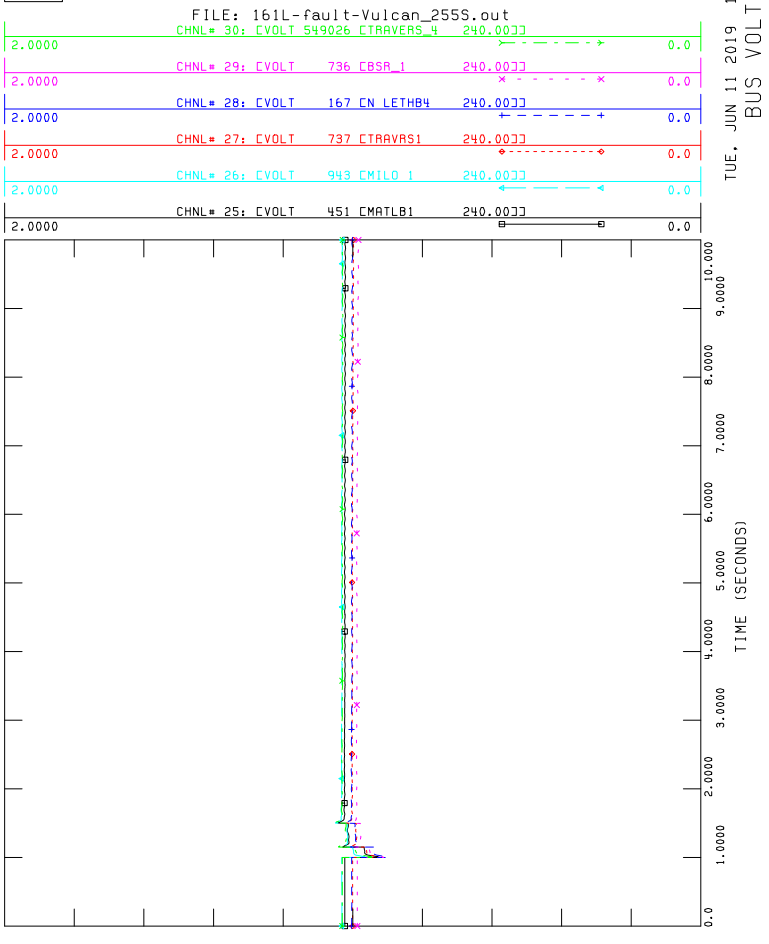
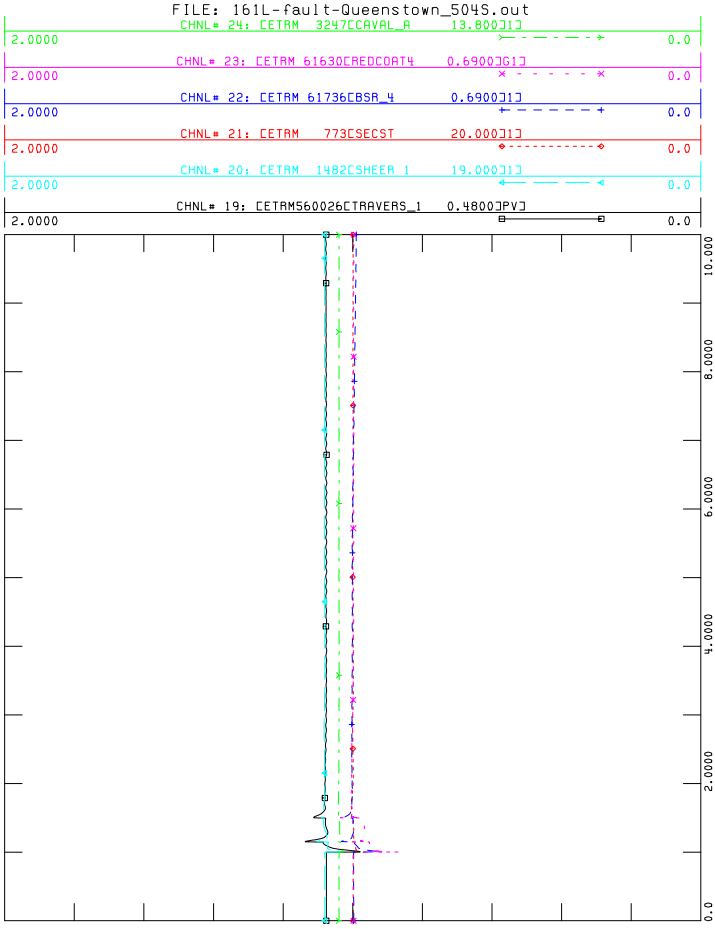


FIGURE A4-46: P2009_2021SL_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

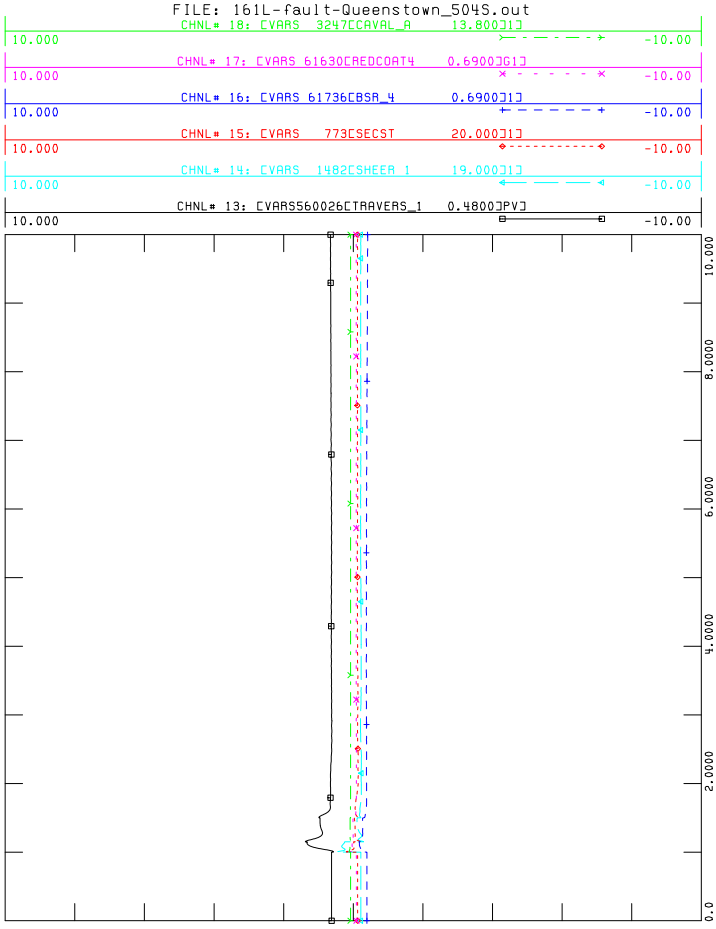
FILE: 161L-fault-Queenstown_504S.out



TUE, JUN 11 2019 18:20
MACHINE VOLTAGE

FIGURE A4-46: P2009_2021SL_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

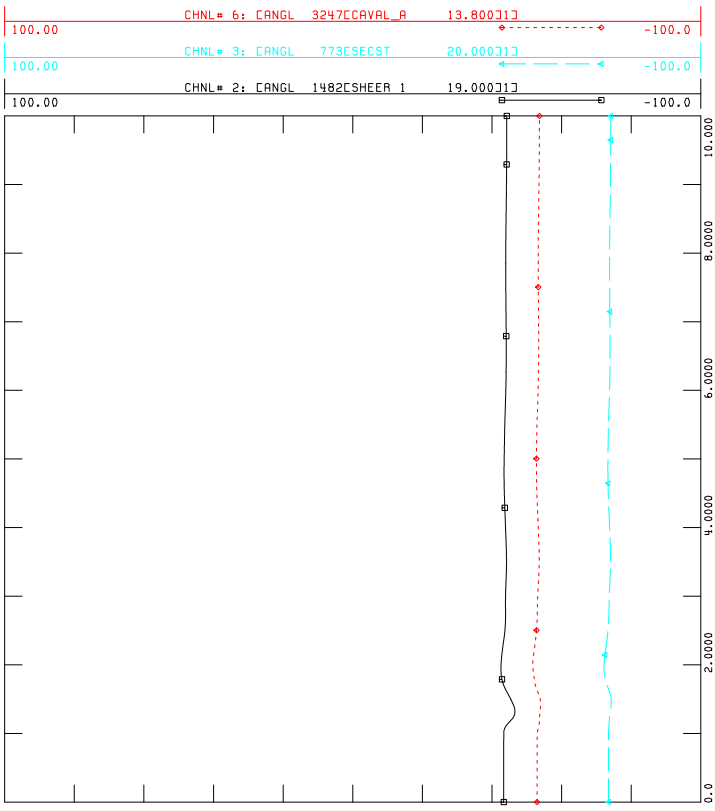
FILE: 161L-fault-Queenstown_504S.out



TUE, JUN 11 2019 18:20
MACHINE MVAR

FIGURE A4-46: P2009_2021SL_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

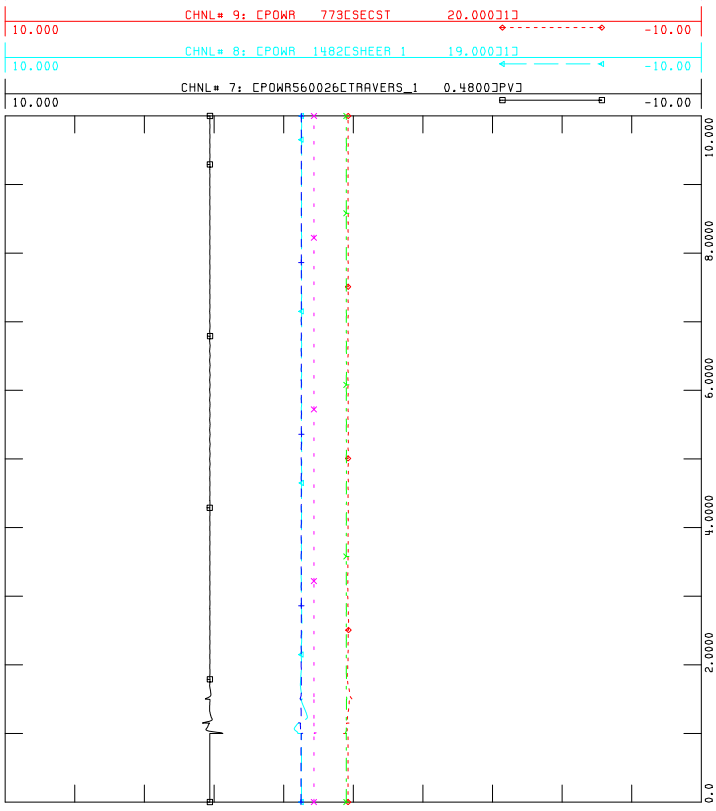
FILE: 161L-fault-Queenstown_504S.out



TUE, JUN 11 2019 18:20
MACHINE ANGEL

FIGURE A4-46: P2009_2021SL_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

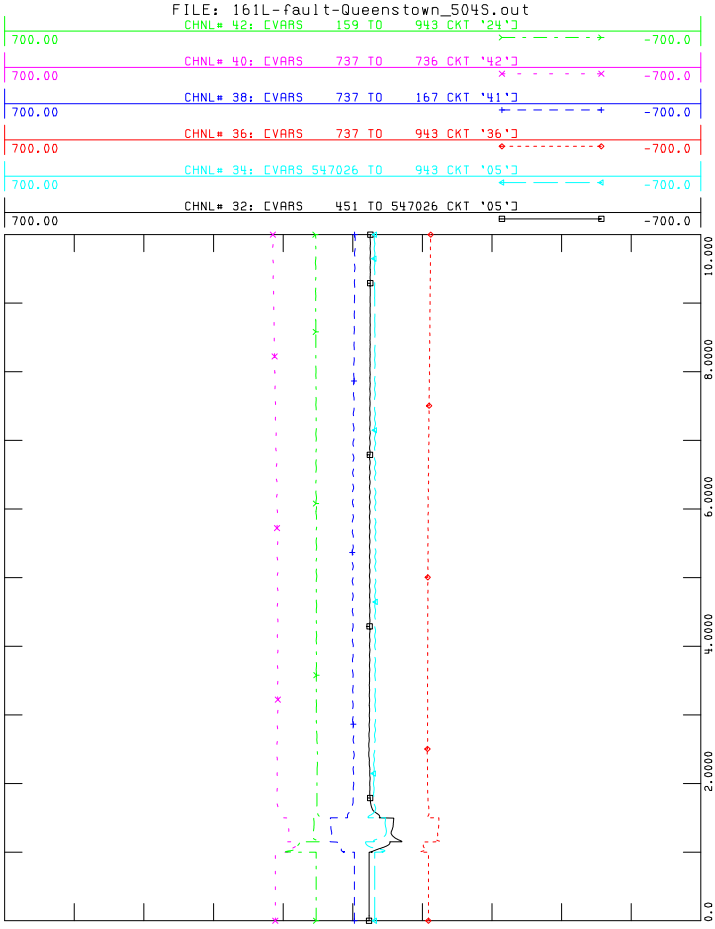
FILE: 161L-fault-Queenstown_504S.out



TUE, JUN 11 2019 18:20
MACHINE MW

FIGURE A4-46: P2009_2021SL_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

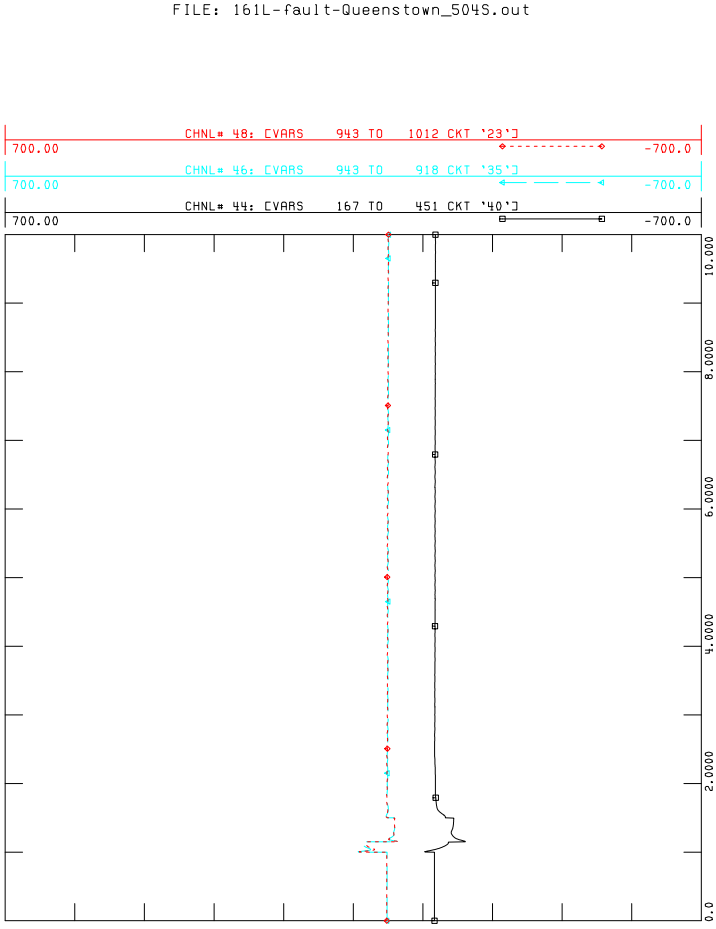
FILE: 161L-fault-Queenstown_504S.out



TUE, JUN 11 2019 18:20
LINE MVAR

FIGURE A4-46: P2009_2021SL_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

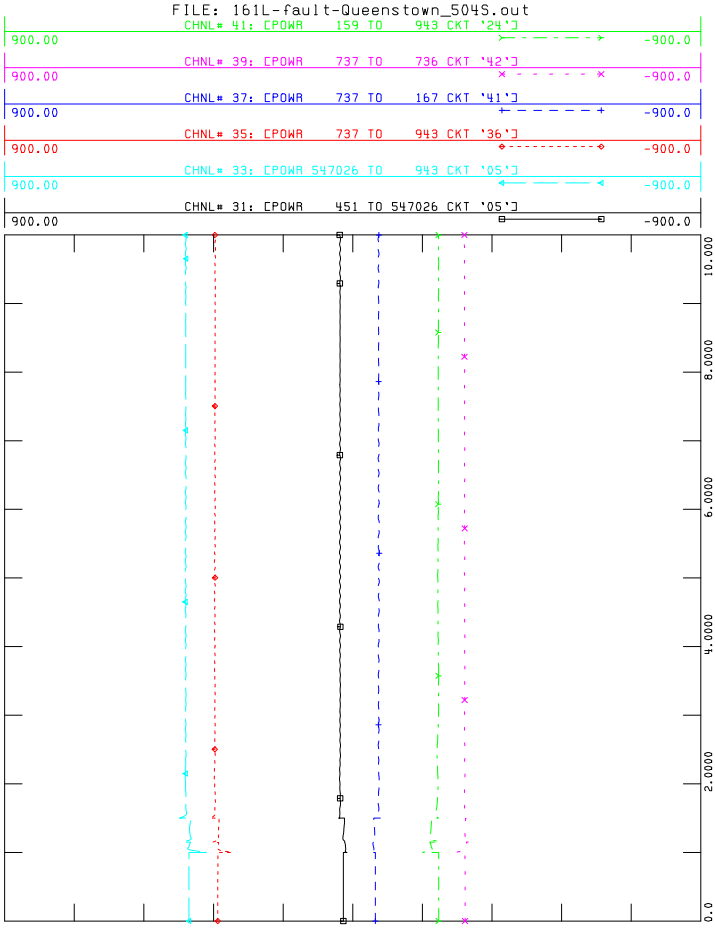
FILE: 161L-fault-Queenstown_504S.out



TUE, JUN 11 2019 18:20
LINE MVAR

FIGURE A4-46: P2009_2021SL_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

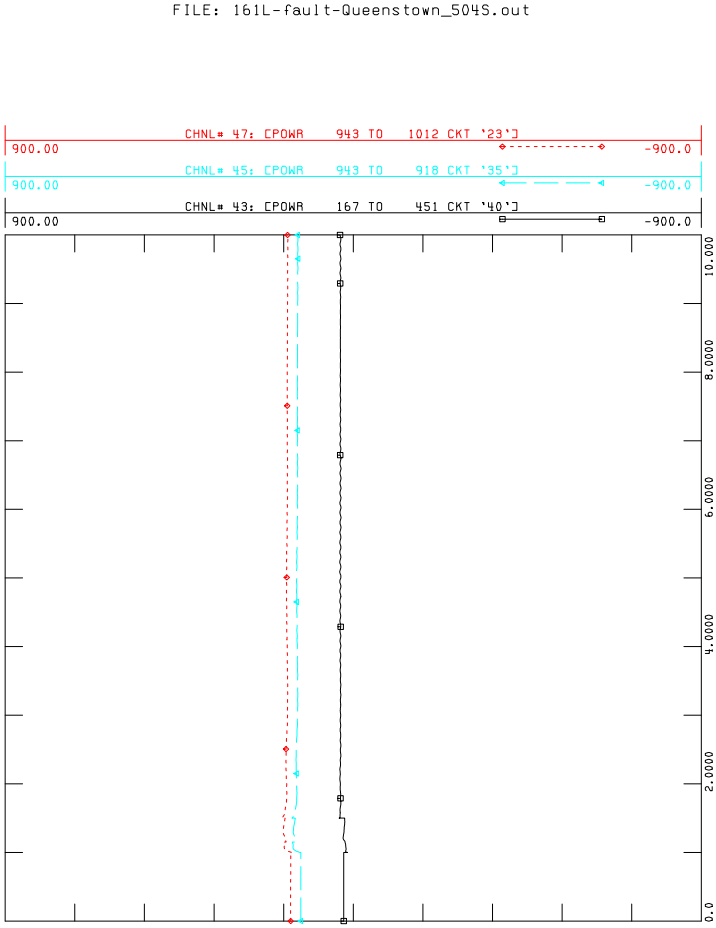
FILE: 161L-fault-Queenstown_504S.out



TUE, JUN 11 2019 18:20
LINE MW

FIGURE A4-46: P2009_2021SL_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

FILE: 161L-fault-Queenstown_504S.out



TUE, JUN 11 2019 18:20
LINE MW

FIGURE A4-46: P2009_2021SL_POST
CATB-161L_FAULT_AT_QUEENSTOWN_504S

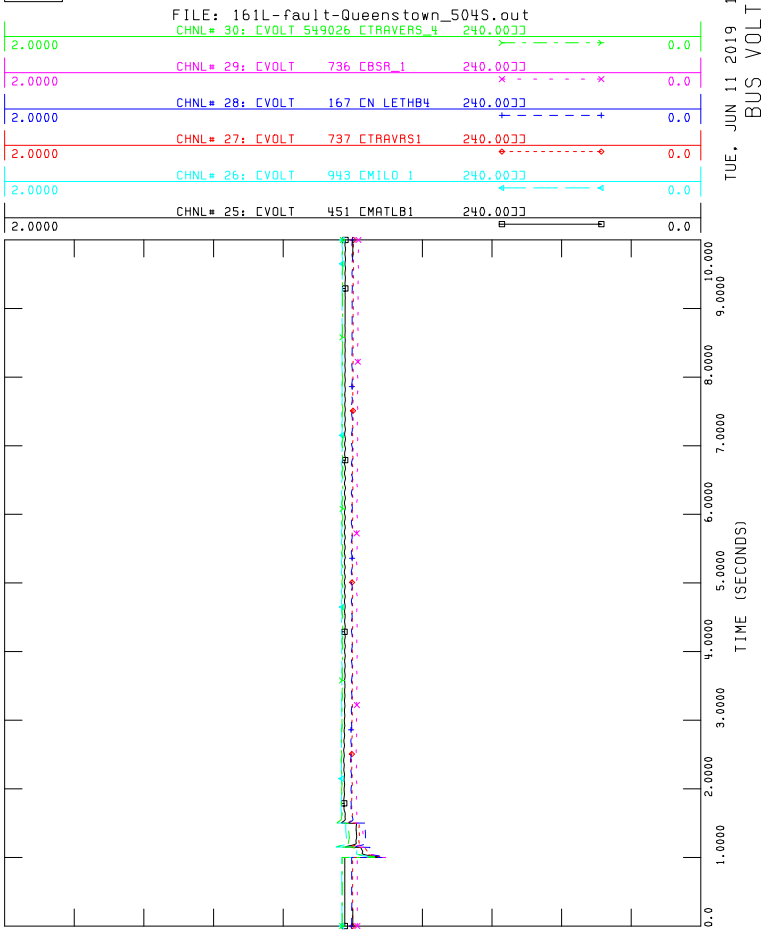


FIGURE A4-47: P2009_2021SL_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

2.0000 / 0.0

MACHINE VOLTAGE
TUE, JUN 11 2019 18:21

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-47: P2009_2021SL_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

MACHINE MVAR
TUE, JUN 11 2019 18:21

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-47: P2009_2021SL_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

100.00 / -100.0

MACHINE ANGEL
TUE, JUN 11 2019 18:20

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-47: P2009_2021SL_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

MACHINE MW
TUE, JUN 11 2019 18:21

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

FIGURE A4-47: P2009_2021SL_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

TUE, JUN 11 2019 18:21
LINE MVAR

CHNL# 42: EVARS 159 TO 943 CKT '24'
CHNL# 40: EVARS 737 TO 736 CKT '42'
CHNL# 38: EVARS 737 TO 167 CKT '41'
CHNL# 36: EVARS 737 TO 943 CKT '36'
CHNL# 34: EVARS 547026 TO 943 CKT '05'
CHNL# 32: EVARS 451 TO 547026 CKT '05'

700.00 / -700.0

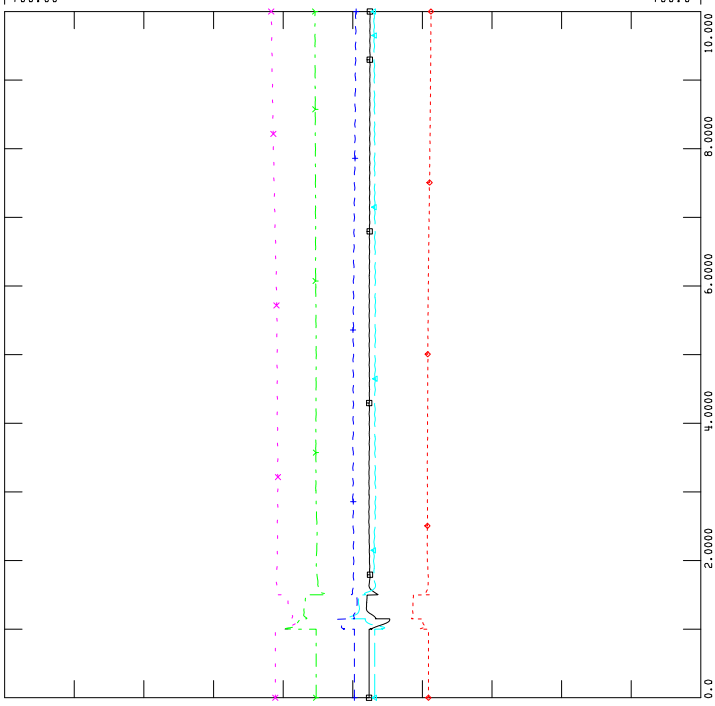


FIGURE A4-47: P2009_2021SL_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

TUE, JUN 11 2019 18:21
LINE MVAR

CHNL# 48: EVARS 943 TO 1012 CKT '23'
CHNL# 46: EVARS 943 TO 918 CKT '35'
CHNL# 44: EVARS 167 TO 451 CKT '40'

700.00 / -700.0

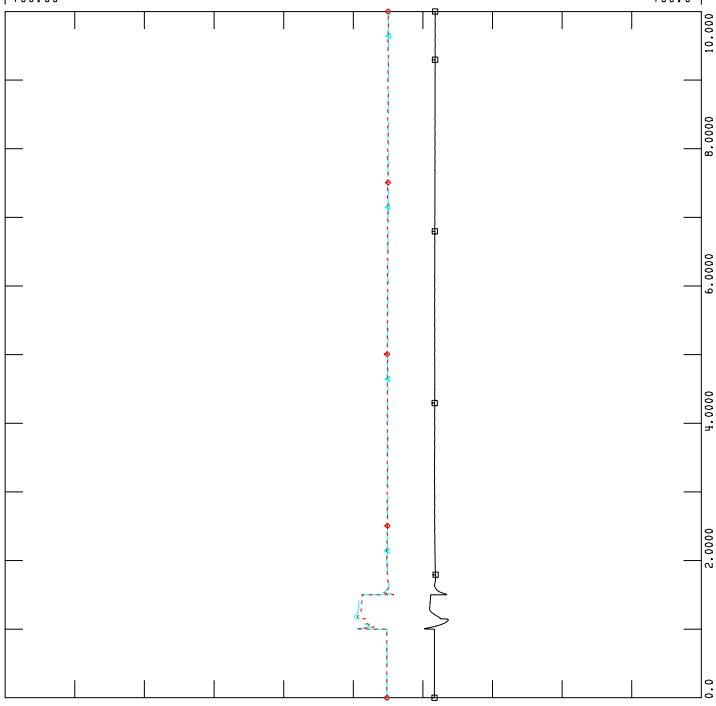


FIGURE A4-47: P2009_2021SL_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

TUE, JUN 11 2019 18:21
LINE MW

CHNL# 41: EPOWR 159 TO 943 CKT '24'
CHNL# 39: EPOWR 737 TO 736 CKT '42'
CHNL# 37: EPOWR 737 TO 167 CKT '41'
CHNL# 35: EPOWR 737 TO 943 CKT '36'
CHNL# 33: EPOWR 547026 TO 943 CKT '05'
CHNL# 31: EPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

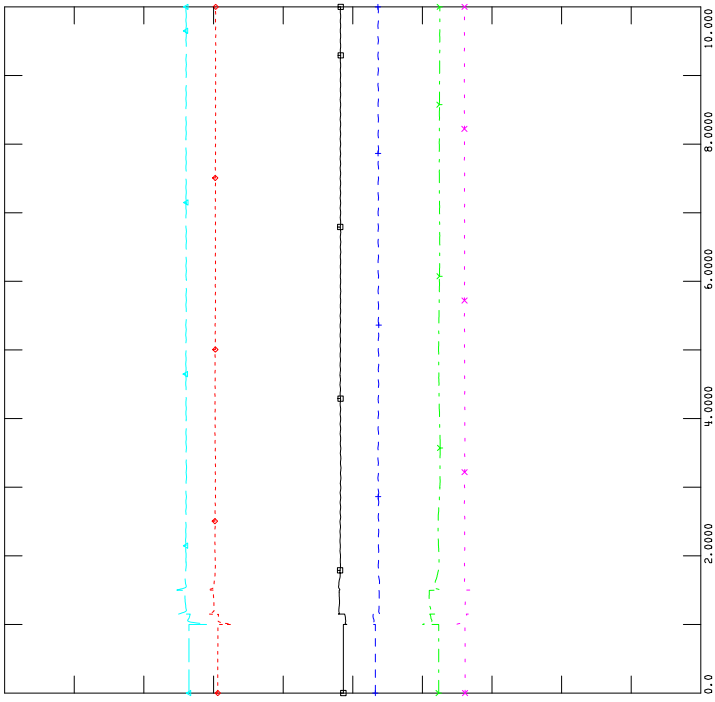


FIGURE A4-47: P2009_2021SL_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

FILE: 853L-fault-Queenstown_504S.out

TUE, JUN 11 2019 18:21
LINE MW

CHNL# 47: EPOWR 943 TO 1012 CKT '23'
CHNL# 45: EPOWR 943 TO 918 CKT '35'
CHNL# 43: EPOWR 167 TO 451 CKT '40'

900.00 / -900.0

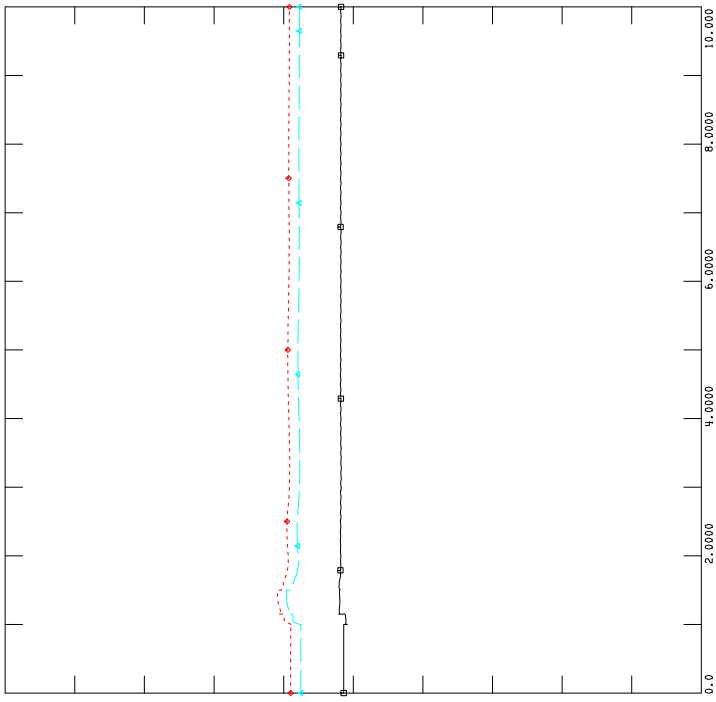


FIGURE A4-47: P2009_2021SL_POST
CATB-853L_FAULT_AT_QUEENSTOWN_504S

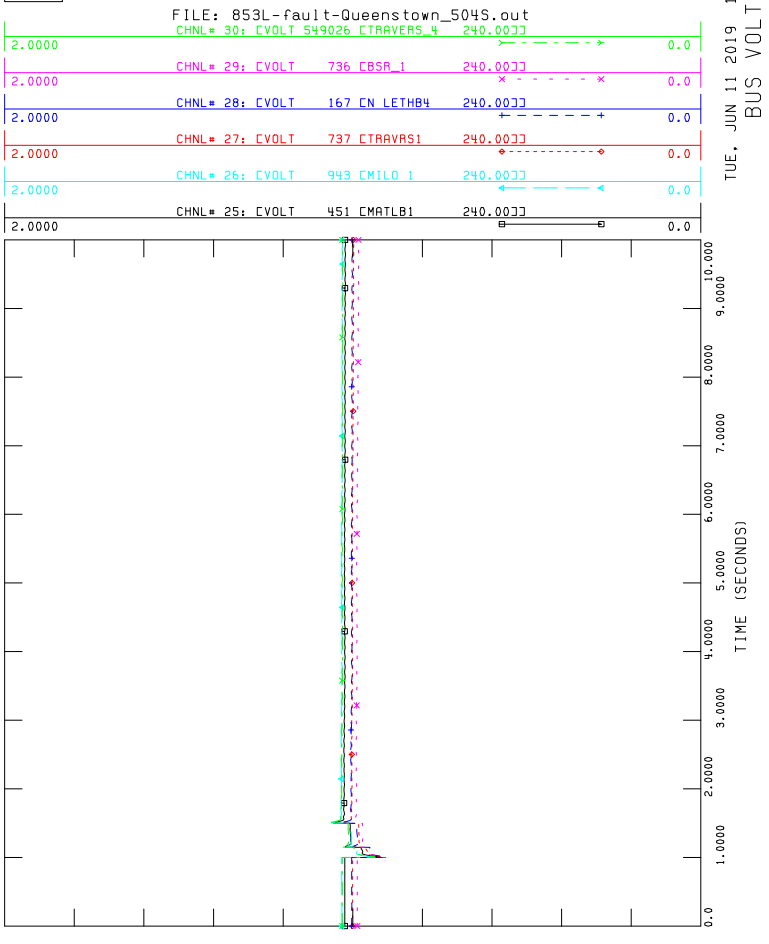


FIGURE A4-48: P2009_2021SL_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

CHNL# 24: CETRM 3247CCAVAL_A 13.800J1J
CHNL# 23: CETRM 61630CREDCOAT4 0.6900JG1J
CHNL# 22: CETRM 61736CBSR_4 0.6900J1J
CHNL# 21: CETRM 773CSECST 20.000J1J
CHNL# 20: CETRM 1482CSHEER 1 19.000J1J
CHNL# 19: CETRM560026CTRAVERS_1 0.4800JPVJ

2.0000 / 0.0

TUE, JUN 11 2019 18:21
MACHINE VOLTAGE

TIME (SECONDS)

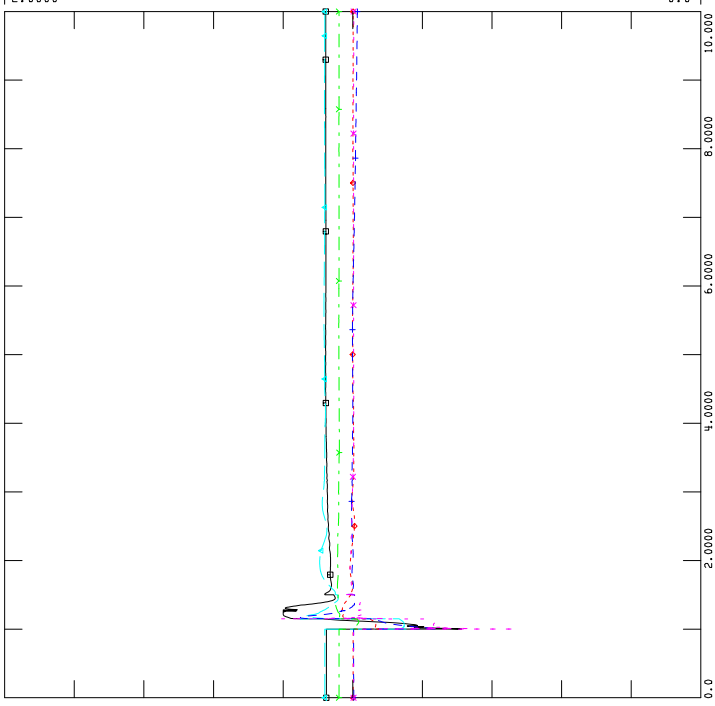


FIGURE A4-48: P2009_2021SL_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

CHNL# 18: CVARS 3247CCAVAL_A 13.800J1J
CHNL# 17: CVARS 61630CREDCOAT4 0.6900JG1J
CHNL# 16: CVARS 61736CBSR_4 0.6900J1J
CHNL# 15: CVARS 773CSECST 20.000J1J
CHNL# 14: CVARS 1482CSHEER 1 19.000J1J
CHNL# 13: CVARS560026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 18:21
MACHINE MVAR

TIME (SECONDS)

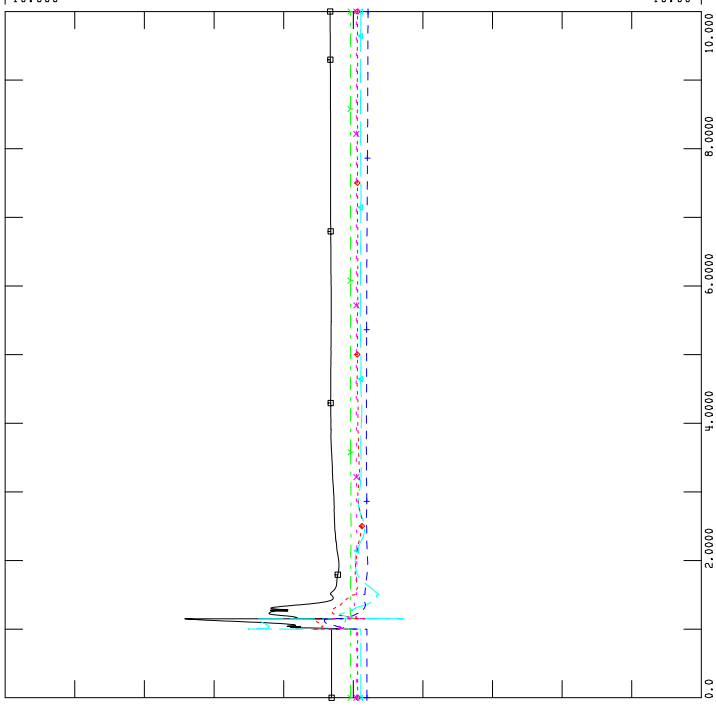


FIGURE A4-48: P2009_2021SL_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

CHNL# 6: CANGL 3247CCAVAL_A 13.800J1J
CHNL# 3: CANGL 773CSECST 20.000J1J
CHNL# 2: CANGL 1482CSHEER 1 19.000J1J

100.00 / -100.0

TUE, JUN 11 2019 18:21
MACHINE ANGEL

TIME (SECONDS)

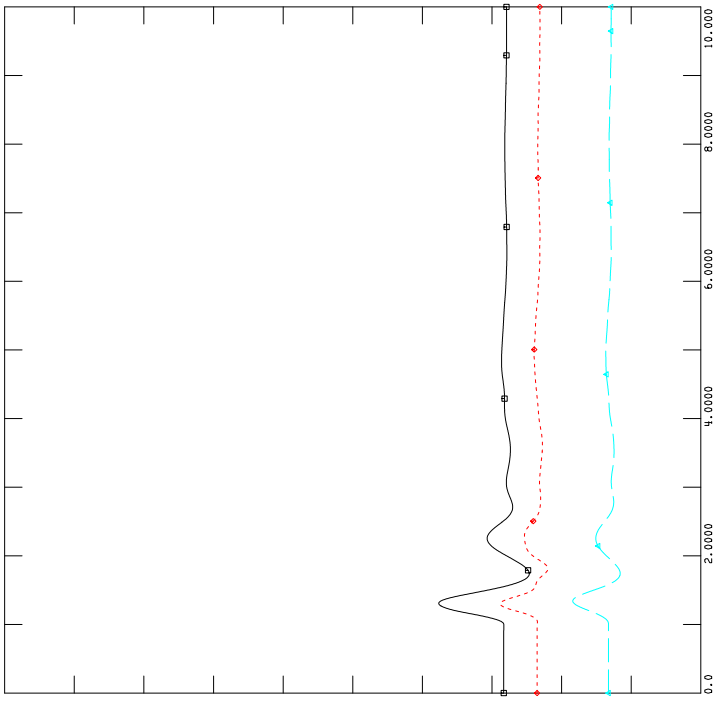


FIGURE A4-48: P2009_2021SL_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

CHNL# 12: CPOWR 3247CCAVAL_A 13.800J1J
CHNL# 11: CPOWR 61630CREDCOAT4 0.6900JG1J
CHNL# 10: CPOWR 61736CBSR_4 0.6900J1J
CHNL# 9: CPOWR 773CSECST 20.000J1J
CHNL# 8: CPOWR 1482CSHEER 1 19.000J1J
CHNL# 7: CPOWRS60026CTRAVERS_1 0.4800JPVJ

10.000 / -10.00

TUE, JUN 11 2019 18:21
MACHINE MW

TIME (SECONDS)

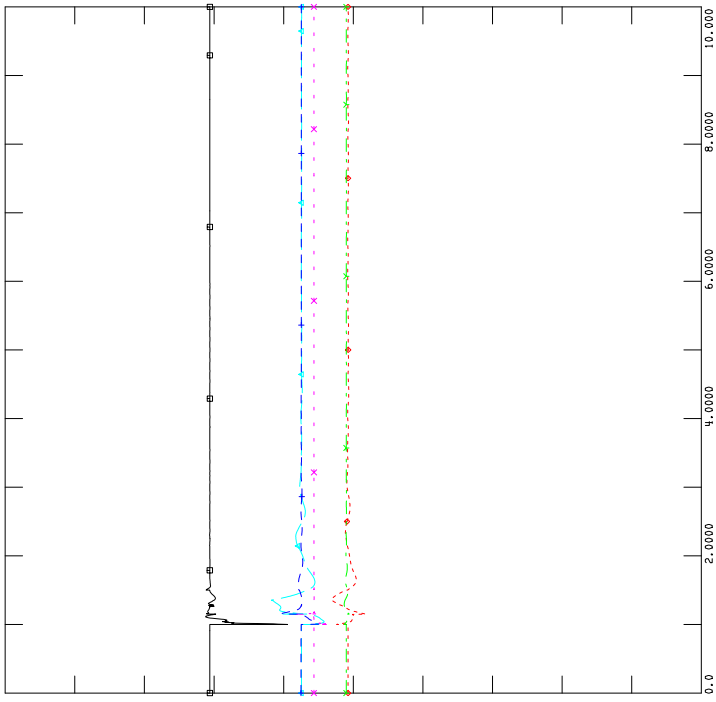


FIGURE A4-48: P2009_2021SL_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

TUE, JUN 11 2019 18:22
LINE MVAR

CHNL# 42: CVARS 159 TO 943 CKT '24'
CHNL# 40: CVARS 737 TO 736 CKT '42'
CHNL# 38: CVARS 737 TO 167 CKT '41'
CHNL# 36: CVARS 737 TO 943 CKT '36'
CHNL# 34: CVARS 547026 TO 943 CKT '05'
CHNL# 32: CVARS 451 TO 547026 CKT '05'

700.00 / -700.0

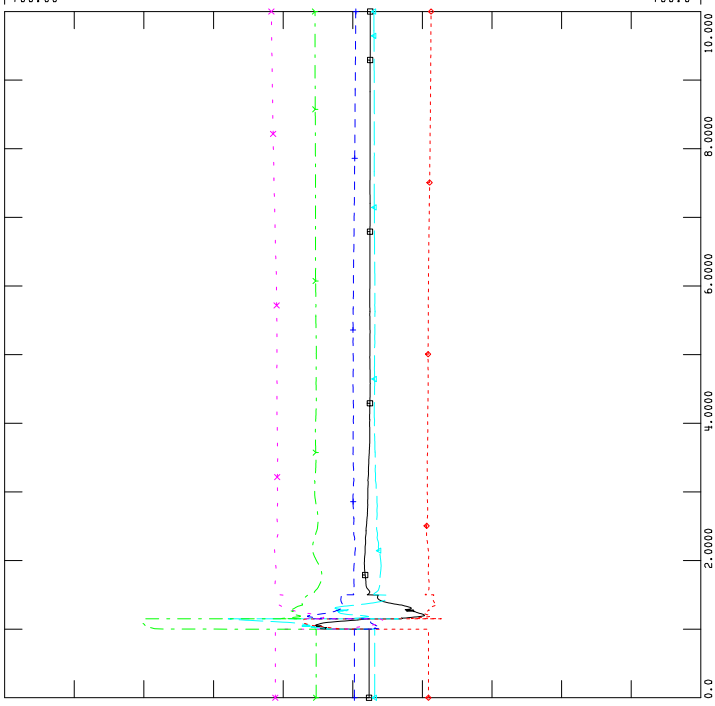


FIGURE A4-48: P2009_2021SL_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

TUE, JUN 11 2019 18:22
LINE MVAR

CHNL# 48: CVARS 943 TO 1012 CKT '23'
CHNL# 46: CVARS 943 TO 918 CKT '35'
CHNL# 44: CVARS 167 TO 451 CKT '40'

700.00 / -700.0

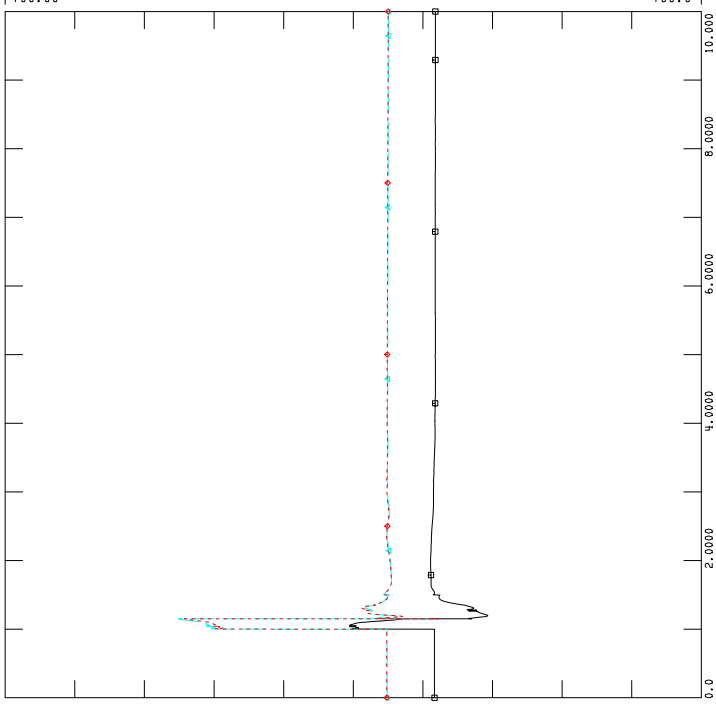


FIGURE A4-48: P2009_2021SL_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

TUE, JUN 11 2019 18:21
LINE MW

CHNL# 41: CPOWR 159 TO 943 CKT '24'
CHNL# 39: CPOWR 737 TO 736 CKT '42'
CHNL# 37: CPOWR 737 TO 167 CKT '41'
CHNL# 35: CPOWR 737 TO 943 CKT '36'
CHNL# 33: CPOWR 547026 TO 943 CKT '05'
CHNL# 31: CPOWR 451 TO 547026 CKT '05'

900.00 / -900.0

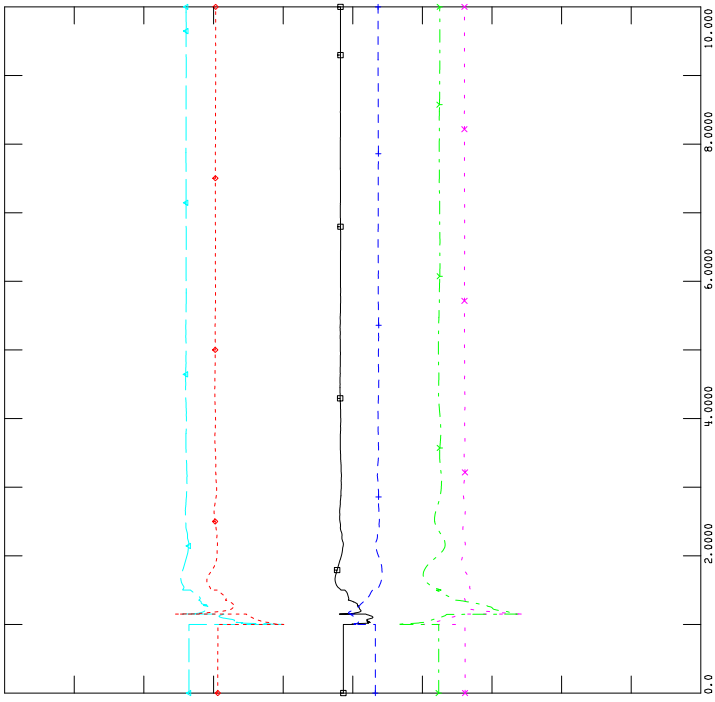


FIGURE A4-48: P2009_2021SL_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S

FILE: 853L-fault-Westbrooks_28S.out

TUE, JUN 11 2019 18:22
LINE MW

CHNL# 47: CPOWR 943 TO 1012 CKT '23'
CHNL# 45: CPOWR 943 TO 918 CKT '35'
CHNL# 43: CPOWR 167 TO 451 CKT '40'

900.00 / -900.0

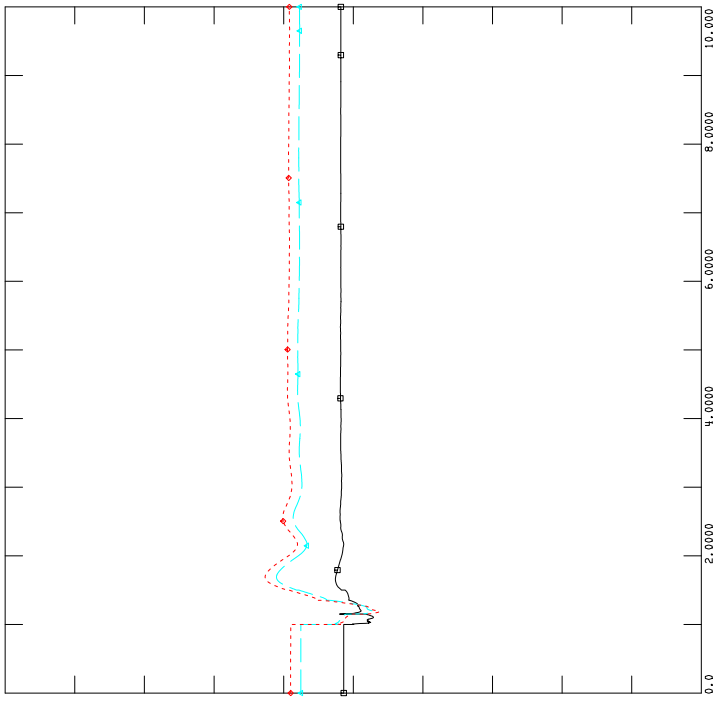
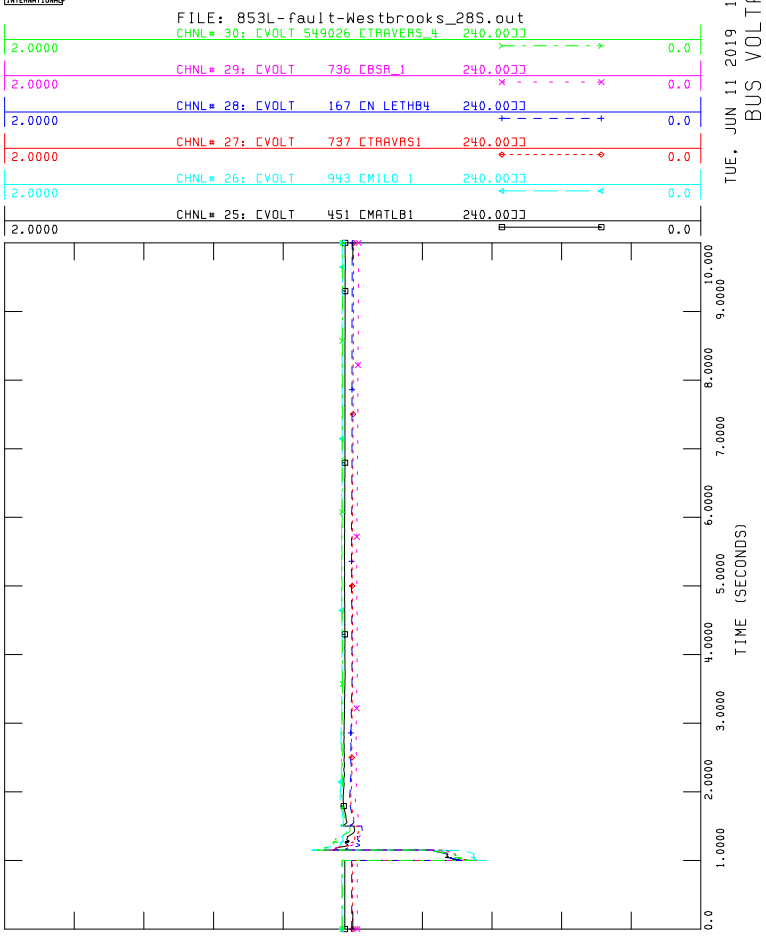


FIGURE A4-48: P2009_2021SL_POST
CATB-853L_FAULT_AT_WESTBROOKS_28S



Attachment A5
Dynamic Data and Assumptions

The dynamic data of the equipment proposed for connection of the TRAVERS Solar Project to the grid is listed in the below tables.

Table A5-1: Renewable Energy Generator/Converter Model

Renewable Energy Generator/Converter Model											
Lvplsw	**Tg**	**Rrpwr**	**Brkpt**	**Zerox**	**Lvpl1**	**Volim**	**Lvpnt1**	**Lvpnt0**	**Iolim**	**Tfltr**	**Khv**
1	0.2E-01	10	0.9	0.5	1.22	1.2	0.8	0.4	-1.3	0.2E-01	0.7
Iqrmax	**Iqrmin**	**Accel**									
9999	-9999	1									

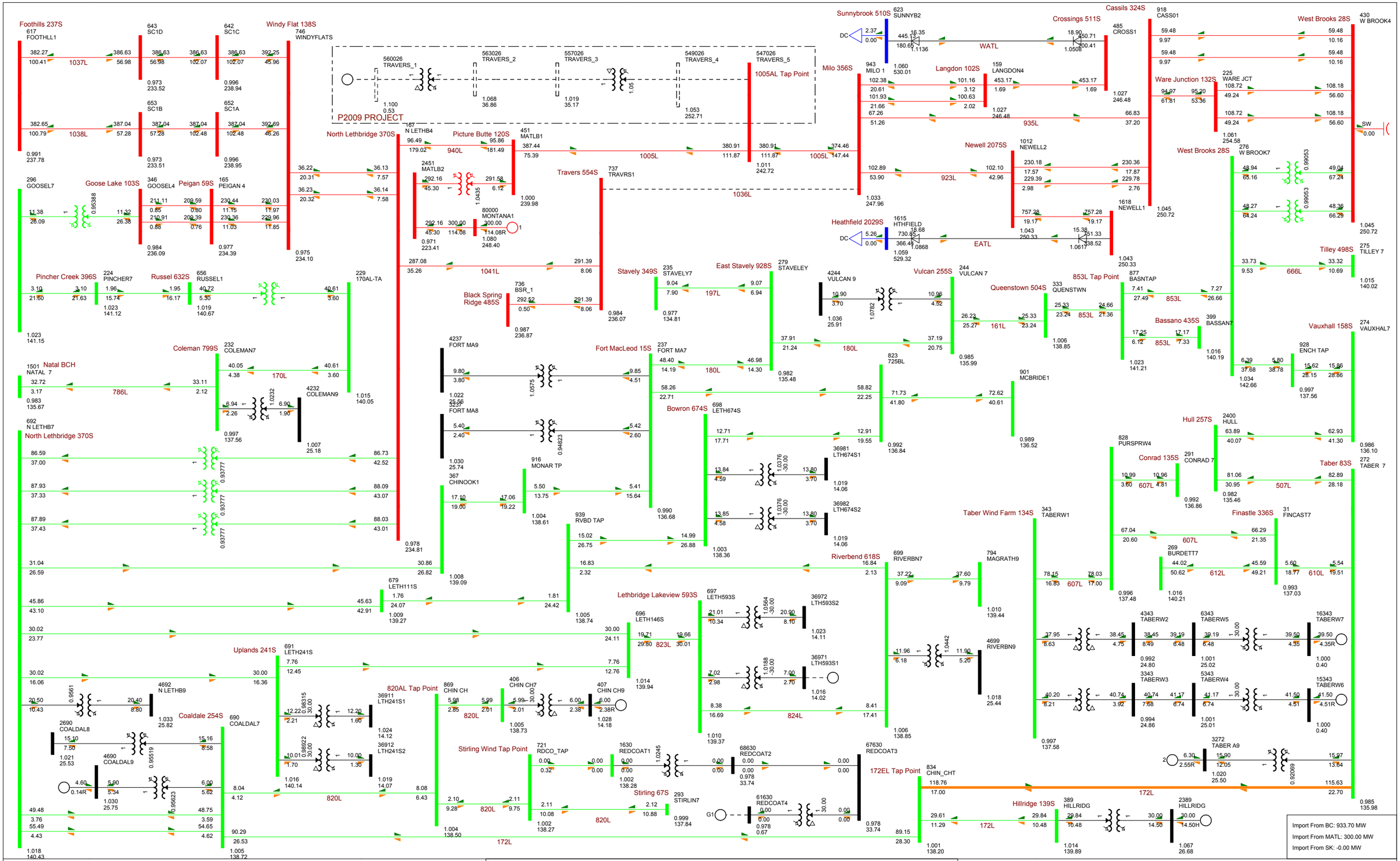
Table A5-2: Electrical Control Model for Large Scale PV

Electrical Control Model for Large Scale PV											
Bus number for voltage control	**PFFLAG**	**VFLAG**	**QFLAG**	**PQFLAG**	**Vdip**	**Vup**	**Trv**	**dbd1**	**dbd2**	**Kqv**	**Iqhl**
557026	0	1	1	1	0.9	1.2	0.01	-0.05	0.05	5	1.05
Iqll	**Vref0**	**Tp**	**QMax**	**QMin**	**VMAX**	**VMIN**	**Kqp**	**Kqi**	**Kvp**	**Kvi**	**Tiq**
-1.05	1	0.01	0.436	-0.436	1.1	0.9	0	0.1	0	40	0.02
dPmax	**dPmin**	**PMAX**	**PMIN**	**Imax**	**Tpord**						
99	-99	1	0	1.3	0.02						

Table A5-3: Generic Renewable Plant Control Model

Generic Renewable Plant Control Model											
Bus number for voltage control	**Monitored branch FROM bus number for line drop compensation**	**Monitored branch TO bus number for line drop compensation**	**Branch circuit id for line drop compensation**	**VCFlag**	**RefFlag**	**Fflag**	**Tfltr**	**Kp**	**Ki**	**Tft**	**Tfv**
557026	0	0	'0'	1	1	0	0.02	18	5	0	0.15
Vfrz	**Rc**	**Xc**	**Kc**	**emax**	**emin**	**dbd1**	**dbd2**	**Qmax**	**Qmin**	**Kpg**	**Kig**
0	0	0	0.02	0.1	-0.1	0	0	0.436	-0.436	0.1	0.05
Tp	**fdbd1**	**fdbd2**	**femax**	**femin**	**Pmax**	**Pmin**	**Tg**	**Ddn**	**Dup**		
0.25	0.01	-0.01	999	-999	1	0	0.15	20	0		

Attachment A6
Post-Mitigation Power Flow Diagrams



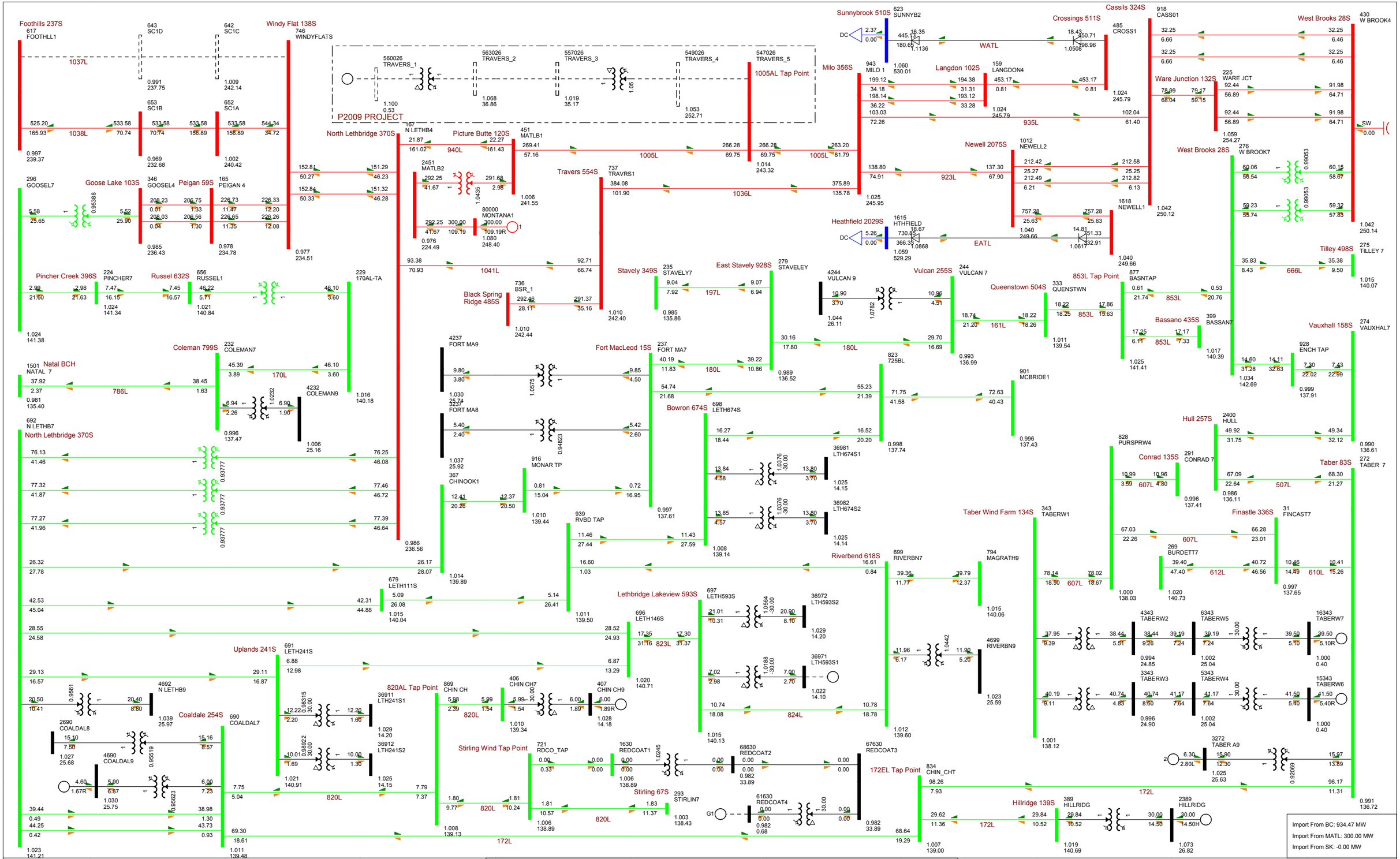
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A6-1: 2021 Summer Peak Post-Project Post-RAS
Category B - Contingency of 1036L (Milo 356S - Travers 554S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



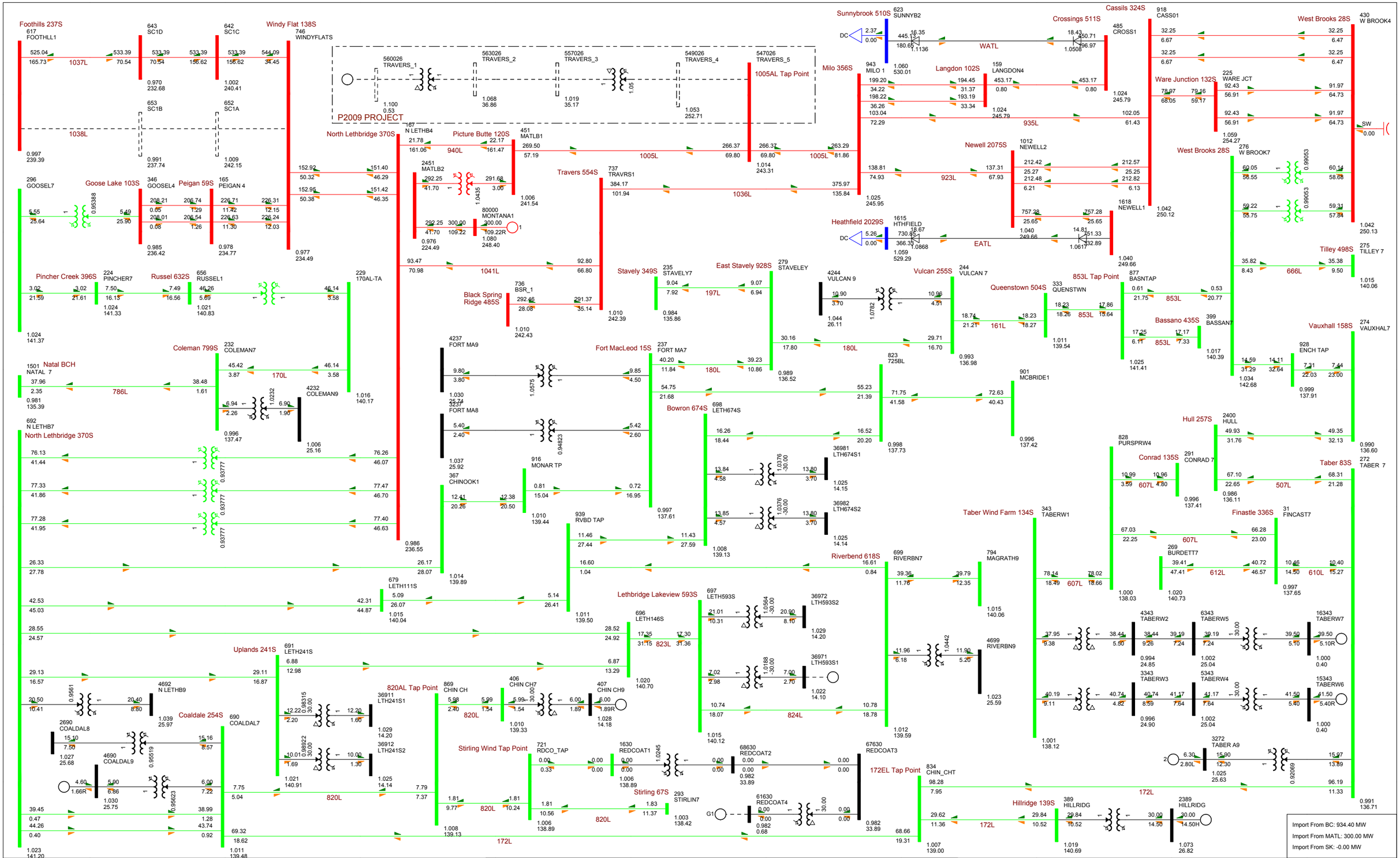
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A6-2: 2021 Summer Peak Post-Project Post-RAS
Category B - Contingency of 1037L (Foothills 237S - Windy Flats 138S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



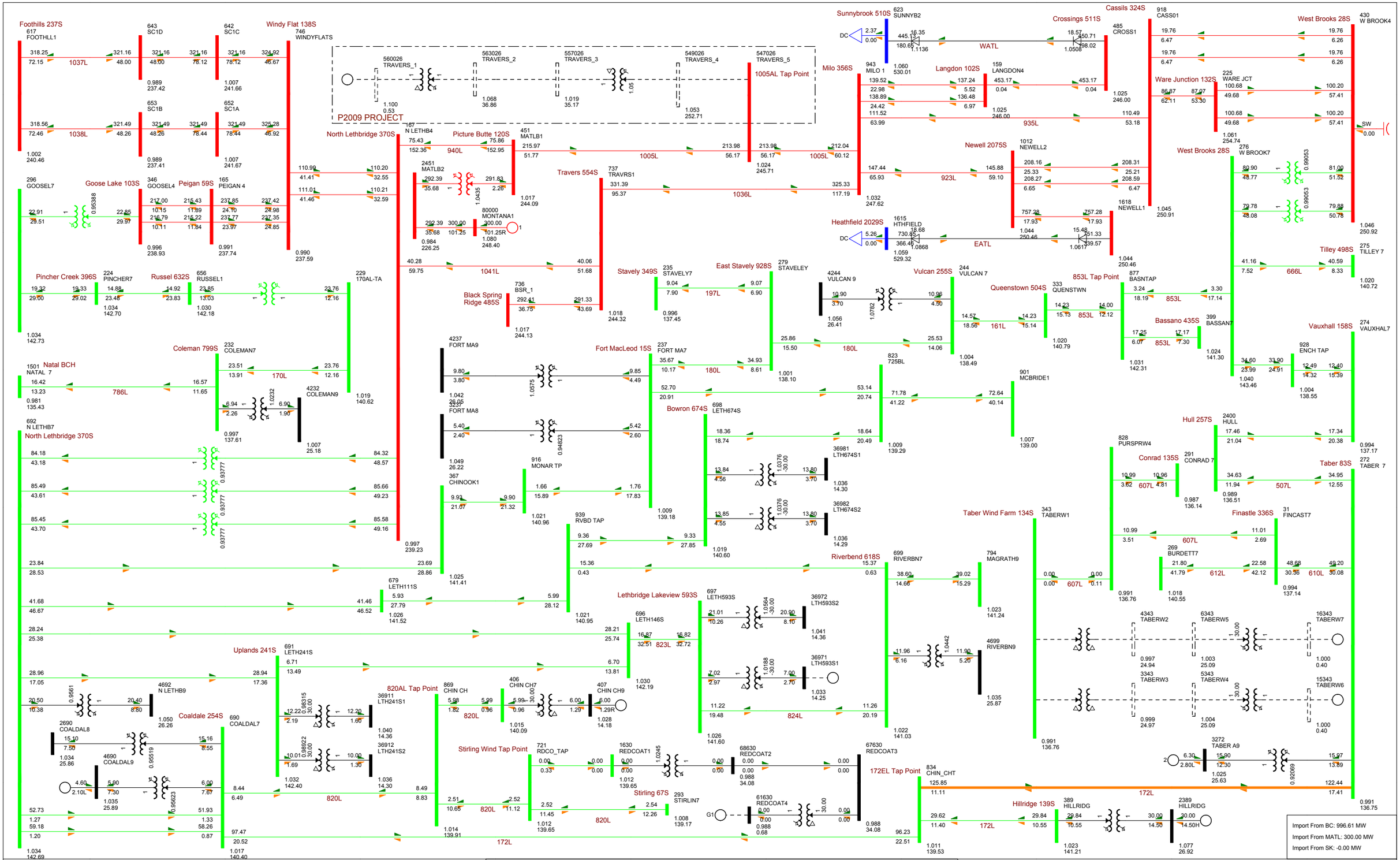
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A6-3: 2021 Summer Peak Post-Project Post-RAS
Category B - Contingency of 1038L (Foothills 237S - Windy Flats 138S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



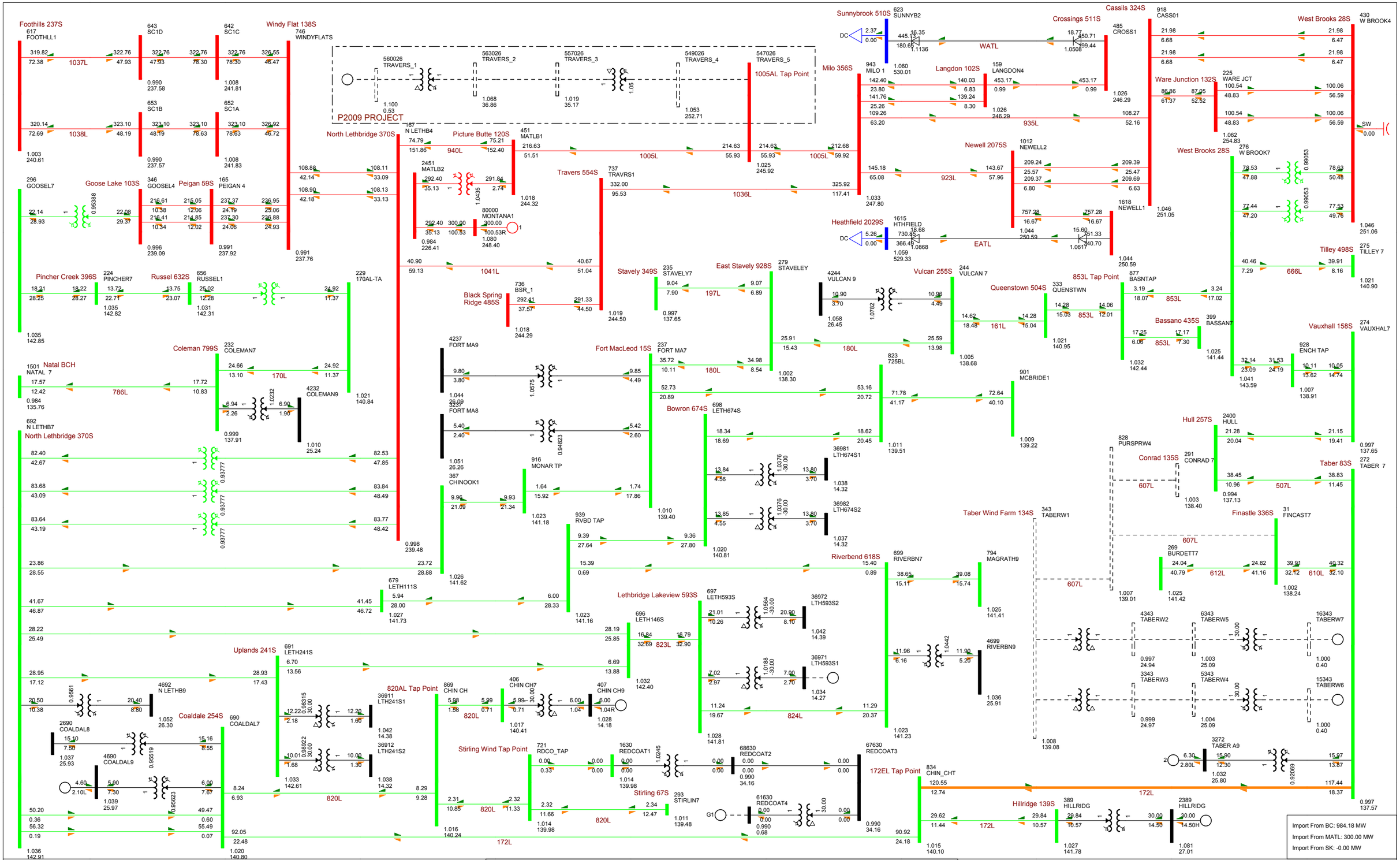
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A6-4: 2021 Summer Peak Post-Project Post-RAS
Category B - Contingency of 134ST1 (Transformer T1 in Taber Wind Farm 134S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



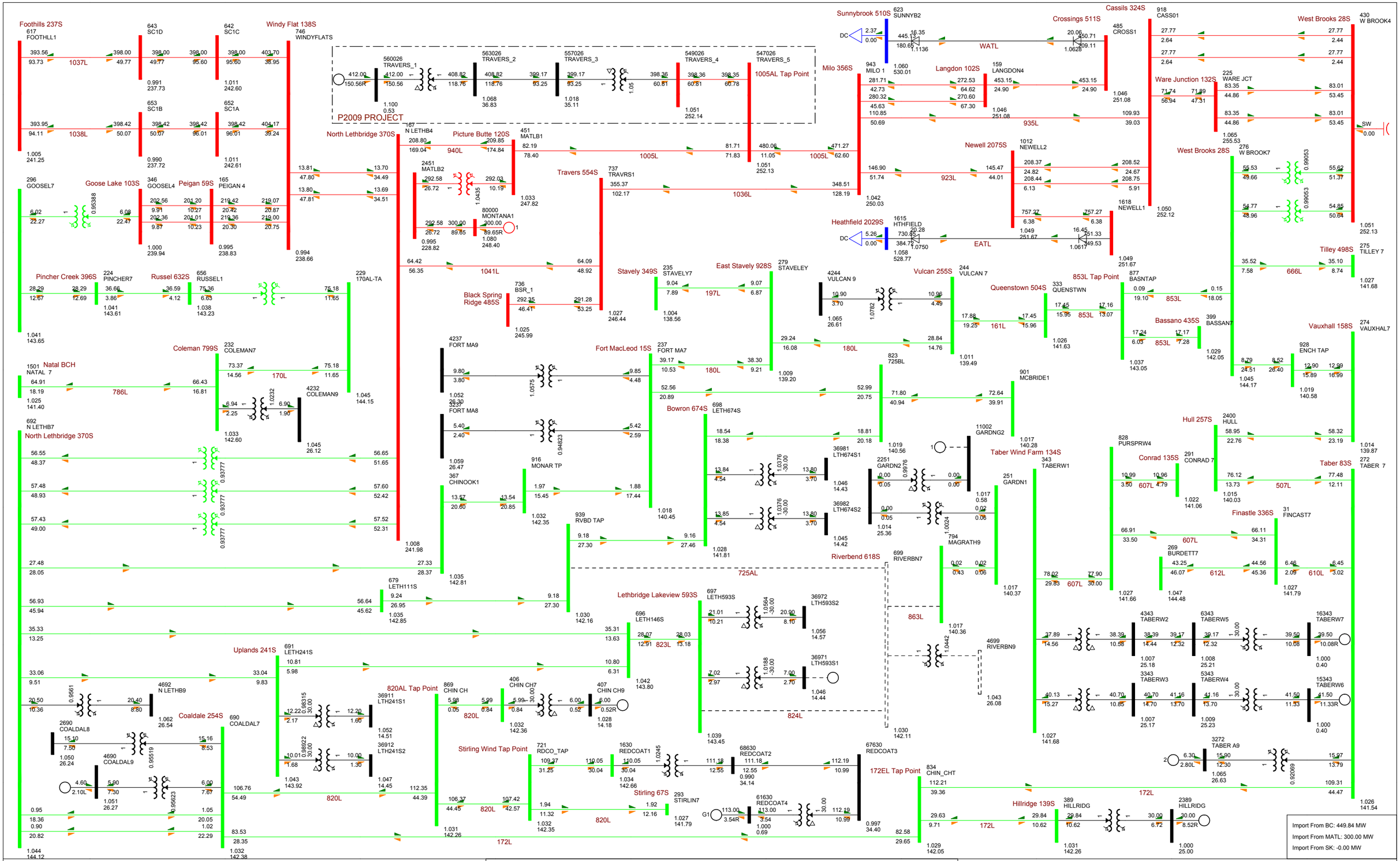
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A6-5: 2021 Summer Peak Post-Project Post-RAS
Category B - Contingency of 607L (Finastle 336S - Conrad 135S/Taber Wind Farm 134S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



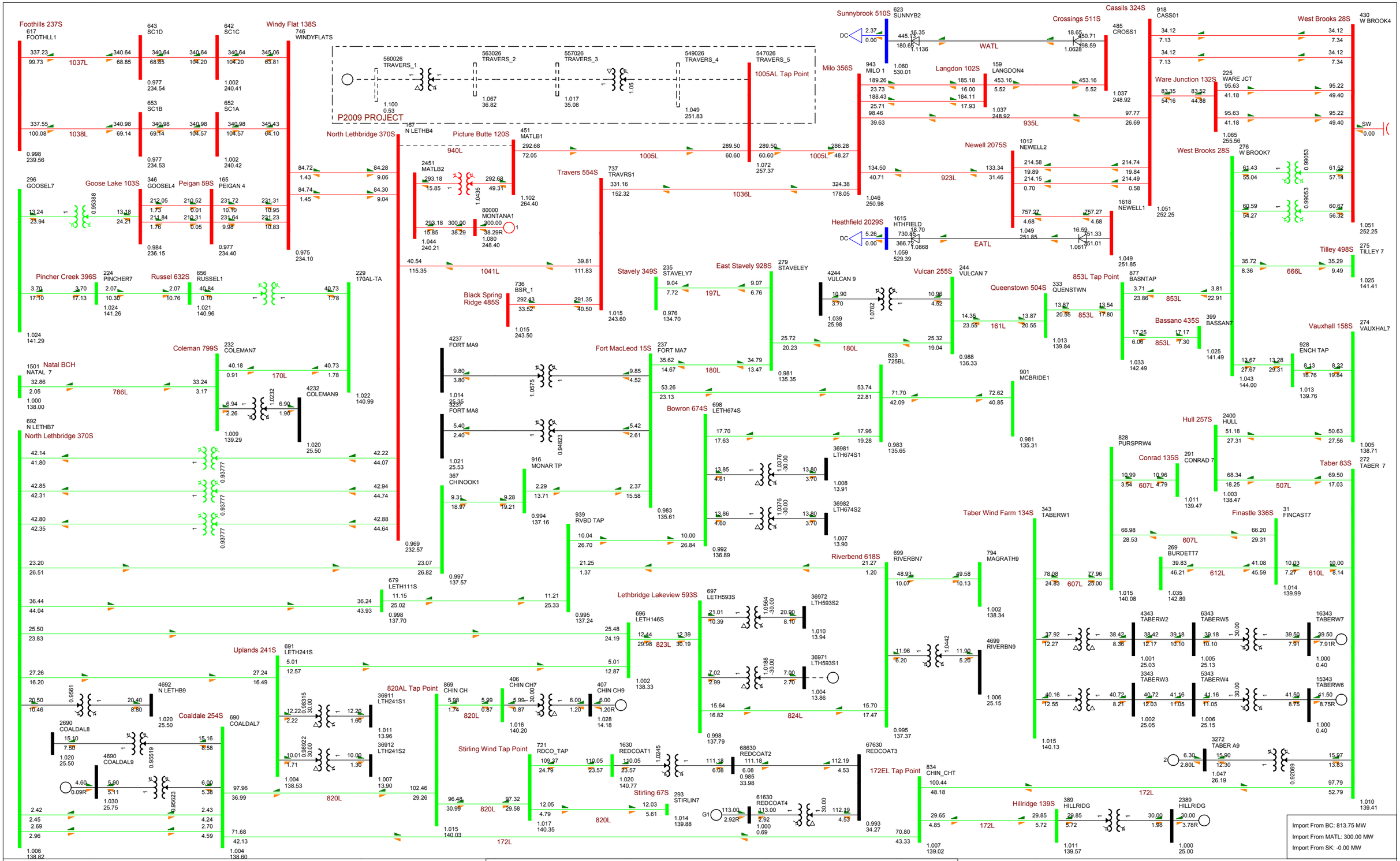
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A6-6: 2021 Summer Peak Post-Project Post-RAS
Category B - Contingency of 618ST1 (Transformer T1 in Riverbend 618S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



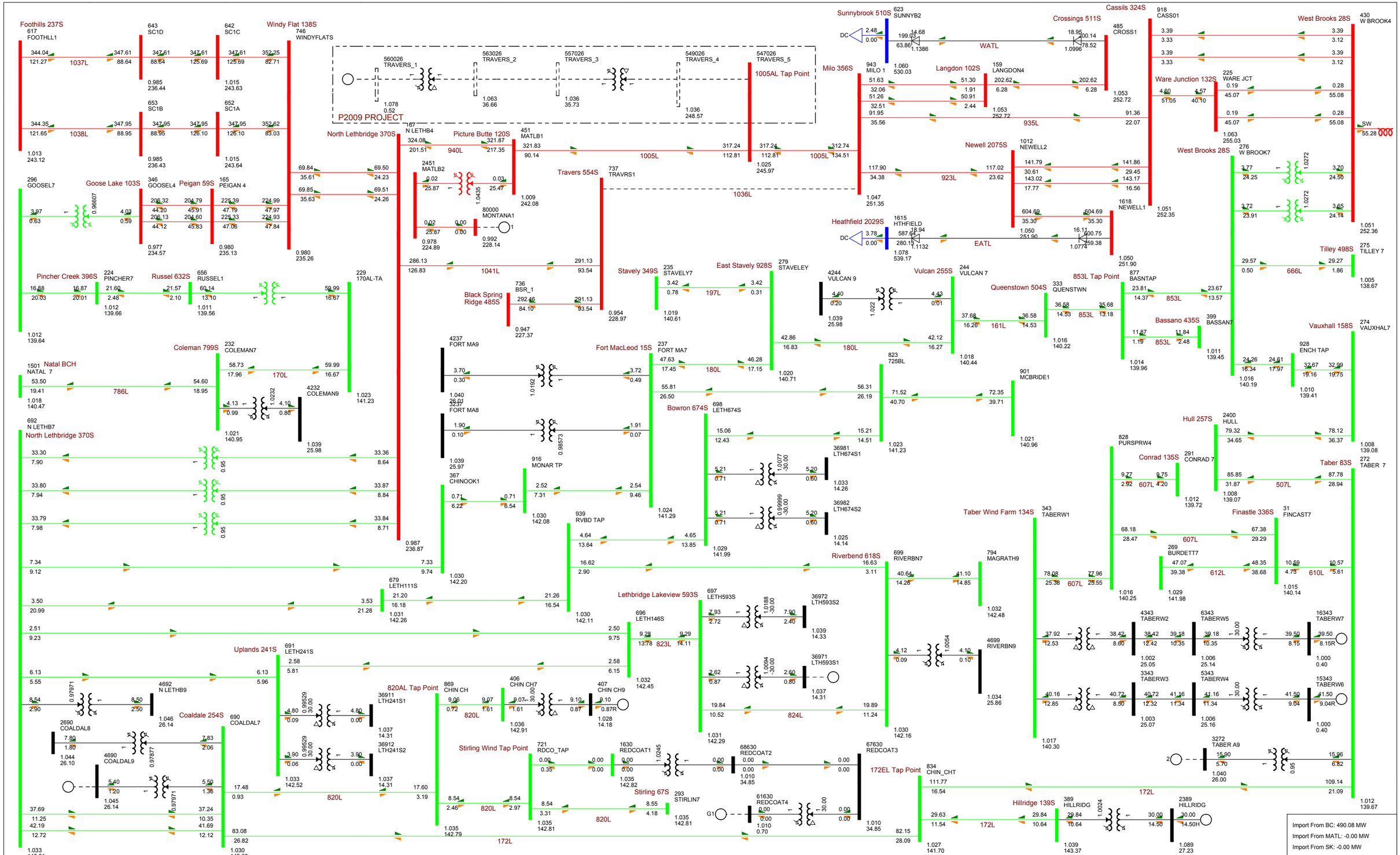
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A6-7: 2021 Summer Peak Post-Project Post-RAS
Category B - Contingency of 940L (370S North Lethbridge - Picture Butte120S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

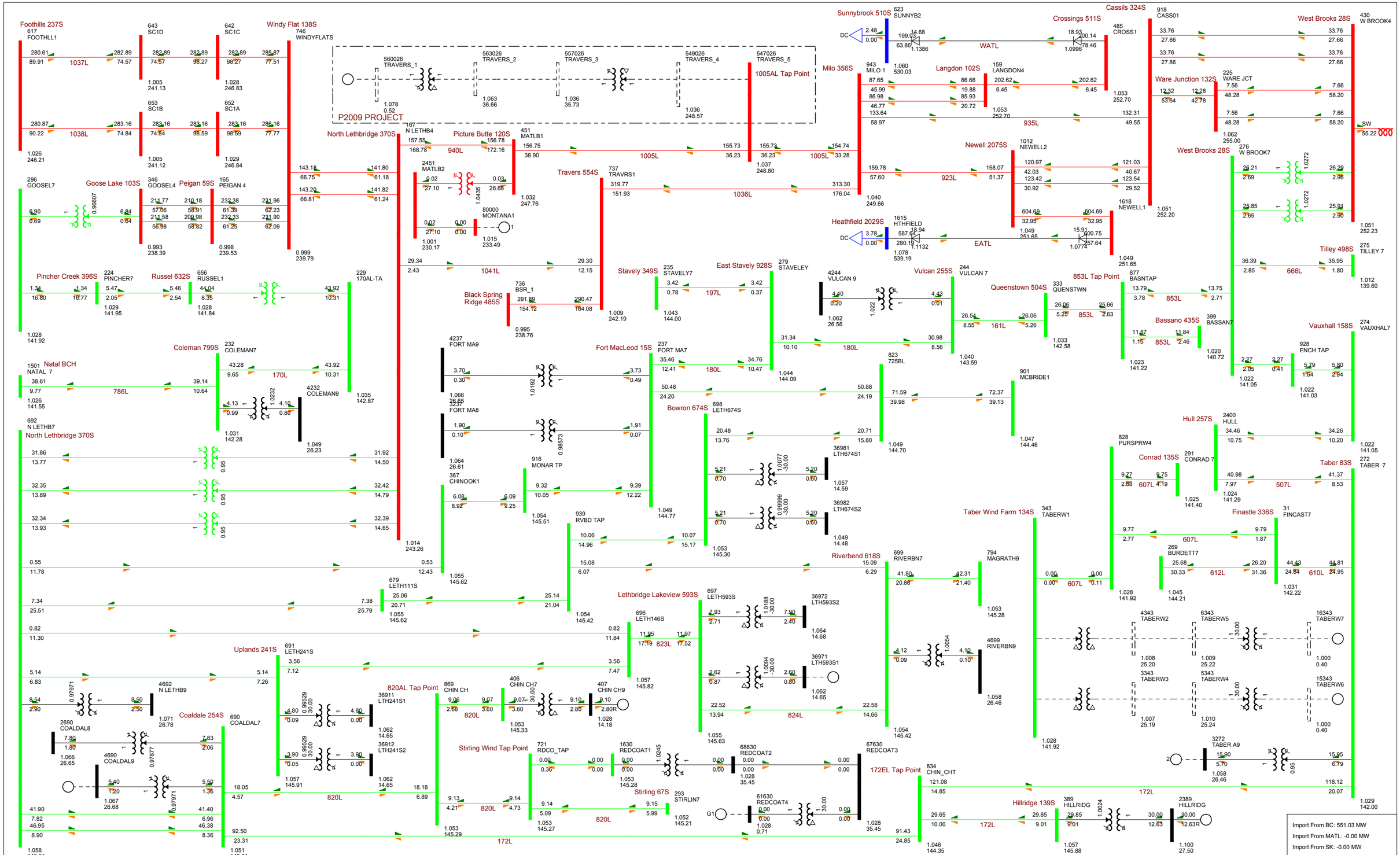
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A6-8: 2021 Summer Light Post-Project Post-RAS
Category B - Contingency of 1036L (Milo 356S - Travers 554S)

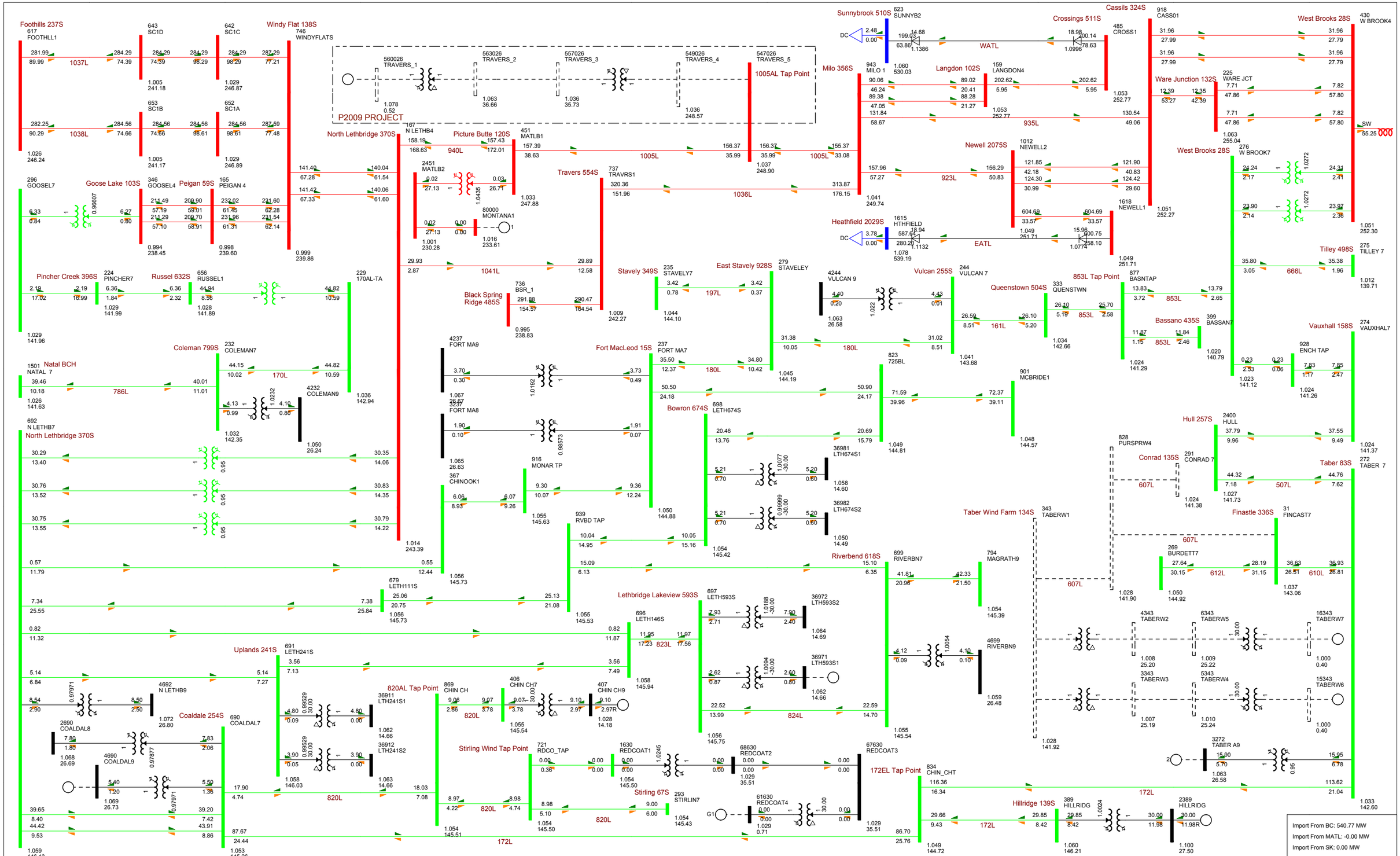
Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A6-9: 2021 Summer Light Post-Project Post-RAS
Category B - Contingency of 134ST1 (Transformer T1 in Taber Wind Farm 134S)

Legend:
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



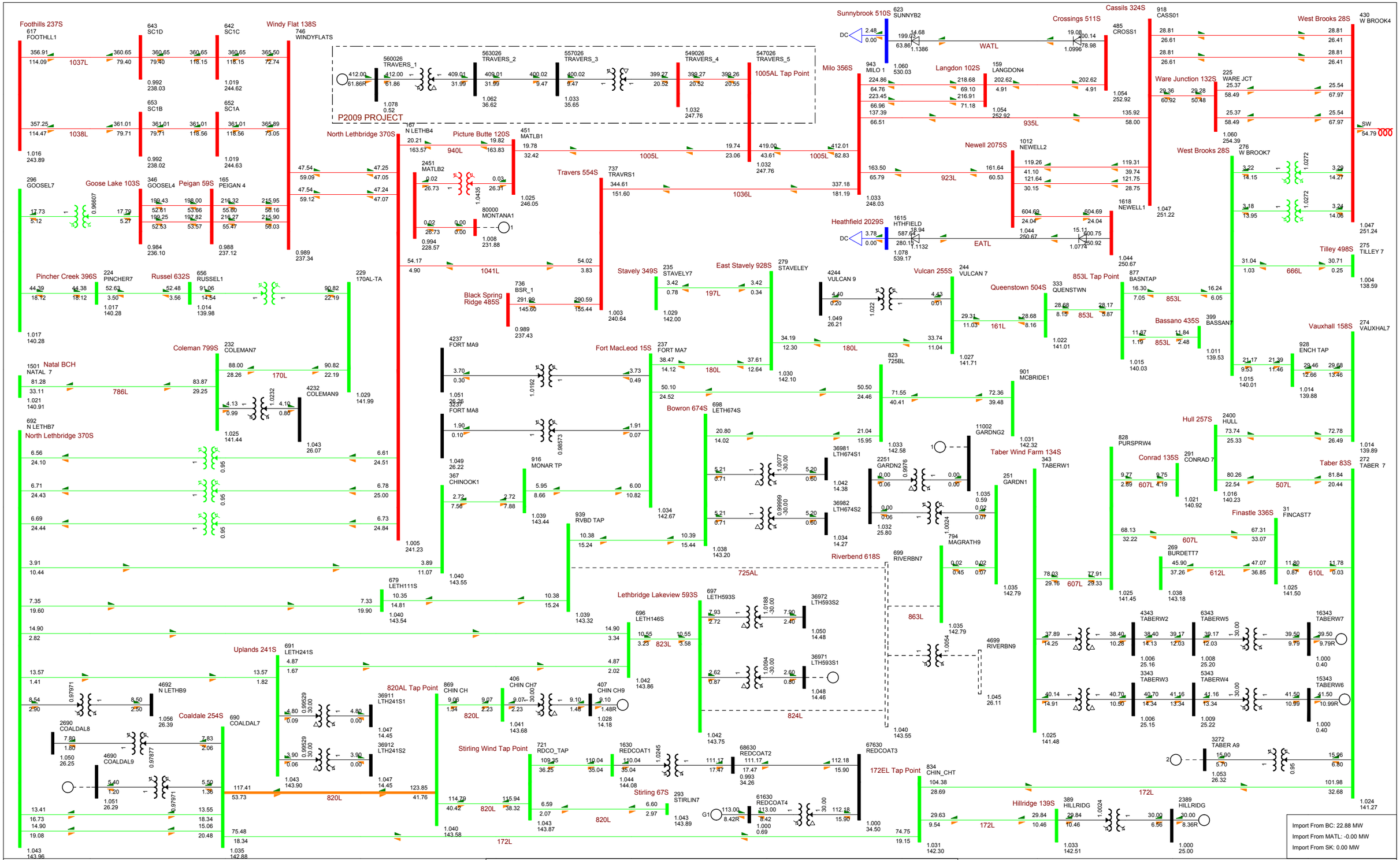
Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A6-10: 2021 Summer Light Post-Project Post-RAS
Category B - Contingency of 607L (Finastle 336S - Conrad 135S/Taber Wind Farm 134S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000



Greengate Travers MPC Solar
AESO Project Number: P2009 Stage-3

Figure A6-11: 2021 Summer Light Post-Project Post-RAS
Category B - Contingency of 618ST1 (Transformer T1 in Riverbend 618S)

Legend:

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A

kV: >0.000 <=69.000 <=138.000 <=240.000 <=500.000 <=800.000 <=1000.000 >1000.000

Attachment A7
Constraint Effective Factors Table

Table A7-1: Generator Type

Generating Facility Name And Unit Number																										
AltaGas Bantry (ALP1)	Altagas Parkland (ALP2)	Ardenville Wind (ARD1)	Blackspring Ridge (BSR1)	Blue Trail Wind (BTR1)	Carseland Cogen (TC01)	Castle River #1 (CR1)	Castle Rock Ridge Wind Power Plant Phase 2	Castle Rock Wind Farm (CRR1)	Cavalier (EC01)	Chin Chute (CHIN)	Cowley Ridge (CRWD)	Enel Alberta Riverview Wind Farm	Enmax Taber (TAB1)	Irrican Hydro (ICP1)	Kettles Hill (KHW1)	Lethbridge Burdett (ME03)	Lethbridge Coaldale (ME04)	Lethbridge Taber (ME02)	McBride Lake Windfarm (AKE1)	Old Man River (OWF1)	Oldman River (OMRH)	P2009 Greengate Travers MPC Solar	Soderglen Wind (GWW1)	Stirling Wind Project	Summerview 1 (IEW1)	Summerview 2 (IEW2)	Suncor Chin Chute (SCR3)	Windrise Wind
Gas	Gas	Wind	Wind	Wind	Gas	Wind	Wind	Wind	Gas	Hydro	Wind	Wind	Wind	Hydro	Wind	Gas	Gas	Gas	Wind	Wind	Hydro	Solar	Wind	Wind	Wind	Wind	Wind	Wind

Table A7-2: Constraint Effective Factors under N-1 Contingencies for Post-Project Scenarios

Scenario	CONTINGENCY	MONITORED	Generating Facility Name And Unit Number																										
			AltaGas Bantry (ALP1)	Altagas Parkland (ALP2)	Ardenville Wind (ARD1)	Blackspring Ridge (BSR1)	Blue Trail Wind (BTR1)	Carseland Cogen (TC01)	Castle River #1 (CR1)	Castle Rock Ridge Wind Power Plant Phase 2	Castle Rock Wind Farm (CRR1)	Cavalier (EC01)	Chin Chute (CHIN)	Cowley Ridge (CRWD)	Enel Alberta Riverview Wind Farm	Enmax Taber (TAB1)	Irrican Hydro (ICP1)	Kettles Hill (KHW1)	Lethbridge Burdett (ME03)	Lethbridge Coaldale (ME04)	Lethbridge Taber (ME02)	McBride Lake Windfarm (AKE1)	Old Man River (OWF1)	Oldman River (OMRH)	P2009 Greengate Travers MPC Solar	Soderglen Wind (GWW1)	Stirling Wind Project	Summerview 1 (IEW1)	Summerview 2 (IEW2)	Suncor Chin Chute (SCR3)	Windrise Wind
Scenario #3: 2021 SP Post-Project	1036L (Milo 356S - Travers 554S)	1005L (Milo 356s - 1005AL Tap Point)	-7.9%	16.1%	22.6%	30.3%	22.4%	7.5%	20.9%	21.9%	21.8%	3.3%	22.5%	21.0%	20.9%	10.0%	21.6%	22.3%	6.3%	23.0%	10.6%	26.2%	21.9%	22.3%	58.5%	21.9%	21.4%	22.2%	21.5%	18.9%	22.3%
	1036L (Milo 356S - Travers 554S)	172L (Coaldale 254S - 172EL Tap Point)	-12.3%	6.5%	5.0%	6.6%	4.9%	1.7%	4.7%	4.9%	4.9%	0.6%	20.3%	4.6%	4.6%	-46.0%	16.4%	4.9%	-41.5%	25.5%	-50.3%	7.8%	4.9%	5.0%	1.6%	4.8%	17.5%	4.9%	4.8%	-65.5%	4.9%
	1036L (Milo 356S - Travers 554S)	172L (Taber 83S - 172EL Tap Point)	-11.9%	6.3%	4.8%	6.3%	4.7%	1.7%	4.5%	4.7%	4.7%	0.6%	19.6%	4.4%	4.4%	-44.5%	15.7%	4.7%	-40.2%	24.8%	-48.8%	7.3%	4.7%	4.8%	1.5%	4.6%	16.8%	4.7%	4.6%	34.3%	4.7%
	1037L (Foothills 237S - Windy Flat 138S)	1005L (Milo 356s - 1005AL Tap Point)	-4.1%	13.4%	19.0%	4.4%	18.9%	3.6%	17.6%	18.5%	18.4%	1.3%	17.6%	17.6%	17.6%	8.6%	17.0%	18.7%	6.2%	18.2%	9.4%	20.3%	18.5%	18.8%	59.1%	18.4%	16.7%	18.6%	18.1%	15.2%	18.8%
	1037L (Foothills 237S - Windy Flat 138S)	172L (Taber 83S - 172EL Tap Point)	-11.2%	5.7%	4.2%	1.8%	4.1%	0.8%	3.9%	4.2%	4.1%	0.2%	18.6%	3.8%	3.8%	-44.8%	14.9%	4.1%	-40.8%	23.5%	-49.9%	6.5%	4.1%	4.2%	1.7%	4.0%	16.0%	4.1%	4.0%	33.0%	4.1%
	1038L (Foothills 237S - Windy Flat 138S)	1005L (Milo 356s - 1005AL Tap Point)	-4.0%	13.4%	19.1%	4.4%	18.9%	3.6%	17.6%	18.5%	18.4%	1.3%	17.6%	17.6%	17.6%	8.6%	17.0%	18.7%	6.2%	18.2%	9.4%	20.3%	18.5%	18.8%	59.1%	18.4%	16.7%	18.6%	18.1%	15.2%	18.8%
	1038L (Foothills 237S - Windy Flat 138S)	172L (Taber 83S - 172EL Tap Point)	-11.2%	5.7%	4.2%	1.8%	4.1%	0.8%	3.9%	4.2%	4.1%	0.2%	18.6%	3.8%	3.8%	-44.8%	14.9%	4.1%	-40.8%	23.5%	-49.8%	6.5%	4.1%	4.2%	1.7%	4.0%	16.0%	4.1%	4.0%	33.0%	4.1%
	1041L (North Lethbridge 3701S - Travers 554S)	1005L (Milo 356s - 1005AL Tap Point)	-8.2%	16.2%	22.7%	-16.6%	22.5%	7.7%	21.0%	22.0%	22.0%	3.4%	22.6%	21.1%	21.0%	9.8%	21.8%	22.4%	6.3%	23.1%	10.7%	26.6%	22.0%	22.4%	58.6%	22.0%	21.5%	22.3%	21.7%	18.9%	22.5%
	1041L (North Lethbridge 3701S - Travers 554S)	172L (Taber 83S - 172EL Tap Point)	-12.2%	6.1%	4.7%	-2.4%	4.6%	1.7%	4.3%	4.6%	4.5%	0.6%	19.3%	4.2%	4.2%	-44.7%	15.6%	4.5%	-41.1%	24.2%	-49.9%	7.3%	4.5%	4.7%	1.3%	4.4%	16.7%	4.5%	4.4%	33.4%	4.6%
	134ST1 (Transformer T1 in Taber Wind Farm 134S)	172L (Coaldale 254S - 172EL Tap Point)	-12.2%	5.1%	3.2%	1.2%	3.2%	1.2%	3.0%	3.2%	3.2%	0.4%	18.3%	2.8%	2.9%	0.0%	14.5%	3.1%	-43.5%	23.3%	-52.4%	5.6%	3.1%	3.3%	1.1%	3.0%	15.6%	3.1%	3.0%	-67.5%	3.1%
	134ST1 (Transformer T1 in Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	-11.8%	4.9%	3.1%	1.1%	3.0%	1.1%	2.9%	3.1%	3.0%	0.4%	17.7%	2.7%	2.8%	0.0%	13.9%	3.0%	-42.2%	22.7%	-50.9%	5.3%	3.0%	3.1%	1.0%	2.9%	15.0%	3.0%	2.9%	32.3%	3.0%
	15ST1 (Transformer T1 in Fort Macleod 15S)	172L (Taber 83S - 172EL Tap Point)	-12.5%	-11.3%	3.5%	1.3%	3.4%	1.3%	3.3%	3.5%	3.4%	0.5%	18.2%	3.1%	3.2%	-45.5%	14.5%	3.4%	-41.7%	23.1%	-50.7%	5.6%	3.4%	3.5%	1.2%	3.3%	15.6%	3.4%	3.3%	32.4%	3.4%
	161L (Vulcan 255S - Queenstown 504S)	172L (Taber 83S - 172EL Tap Point)	-12.5%	12.3%	3.5%	1.3%	3.4%	1.2%	3.3%	3.5%	3.4%	0.5%	18.3%	3.2%	3.2%	-45.3%	14.7%	3.4%	-41.7%	23.1%	-50.7%	7.3%	3.4%	3.6%	1.2%	3.3%	15.8%	3.4%	3.3%	32.4%	3.4%
	170L (Russel 632S - Coleman 799S)	172L (Taber 83S - 172EL Tap Point)	-11.4%	5.3%	3.7%	1.5%	3.6%	1.5%	3.8%	3.7%	3.7%	0.7%	18.2%	3.5%	3.4%	-45.1%	14.5%	3.7%	-41.4%	22.8%	-50.6%	6.2%	3.7%	3.8%	1.5%	3.5%	15.7%	3.6%	3.5%	32.3%	3.6%
	172L (Coaldale 254S - Taber 83S/Hillridge 139S)	1005L (Milo 356s - 1005AL Tap Point)	-9.3%	12.4%	16.2%	2.8%	16.1%	5.5%	15.0%	15.7%	15.7%	2.4%	20.3%	15.1%	15.0%	-9.0%	18.6%	15.9%	-9.6%	22.1%	-9.5%	19.7%	15.7%	16.0%	57.6%	15.7%	18.9%	15.9%	15.4%	0.0%	16.0%
	180L (Fort Macleod 15S to Vulcan 255S/East Stavely 928S)	172L (Taber 83S - 172EL Tap Point)	-12.5%	0.0%	3.5%	1.3%	3.4%	1.3%	3.3%	3.5%	3.4%	0.5%	18.3%	3.1%	3.2%	-45.4%	14.6%	3.4%	-41.7%	23.1%	-50.7%	6.9%	3.4%	3.5%	1.2%	3.3%	15.7%	3.4%	3.3%	32.4%	3.4%
	241ST1 (Transformer T1 in Uplands 241S)	172L (Taber 83S - 172EL Tap Point)	-11.8%	4.9%	3.3%	1.2%	3.2%	1.2%	3.1%	3.2%	3.2%	0.4%	17.8%	3.0%	3.0%	-45.6%	14.1%	3.2%	-41.9%	22.4%	-51.1%	5.9%	3.2%	3.3%	1.1%	3.1%	15.3%	3.2%	3.1%	31.8%	3.2%
	254ST2 (Transformer T2 in 254S COALDALE)	172L (Taber 83S - 172EL Tap Point)	-11.8%	4.9%	3.3%	1.2%	3.2%	1.2%	3.1%	3.3%	3.2%	0.4%	17.8%	3.0%	3.0%	-45.6%	14.2%	3.2%	-42.0%	22.3%	-51.2%	6.0%	3.2%	3.3%	1.1%	3.1%	15.3%	3.2%	3.1%	31.7%	3.2%
	255ST1 (Tranformer T1 in Vulcan 255S)	172L (Taber 83S - 172EL Tap Point)	-12.5%	12.1%	3.5%	1.3%	3.4%	1.3%	3.3%	3.4%	3.4%	0.5%	18.3%	3.1%	3.2%	-45.4%	14.6%	3.4%	-41.7%	23.1%	-50.7%	6.9%	3.4%	3.5%	1.2%	3.3%	15.7%	3.4%	3.3%	32.3%	3.4%
	28ST1 (Transformer T1 in West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	-14.3%	3.7%	3.1%	1.1%	3.1%	1.1%	2.9%	3.1%	3.1%	0.4%	17.2%	2.8%	2.8%	-46.7%	13.7%	3.0%	-43.2%	21.7%	-52.5%	5.5%	3.1%	3.2%	1.1%	3.0%	14.9%	3.0%	3.0%	30.9%	3.1%
	28ST2 (Transformer T2 in West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	-14.3%	3.8%	3.1%	1.2%	3.1%	1.1%	2.9%	3.1%	3.1%	0.4%	17.2%	2.8%	2.9%	-46.7%	13.7%	3.0%	-43.2%	21.7%	-52.5%	5.5%	3.1%	3.2%	1.1%	3.0%	14.9%	3.0%	3.0%	31.0%	3.1%
	336ST1 (Transformer T1 in Fincastle 336S)	172L (Taber 83S - 172EL Tap Point)	-8.7%	3.9%	2.7%	0.9%	2.7%	1.0%	2.5%	2.7%	2.7%	0.4%	15.2%	2.4%	2.5%	0.0%	12.0%	2.6%	-7.0%	19.4%	-57.9%	4.8%	2.7%	2.8%	0.9%	2.6%	13.0%	2.6%	2.6%	27.5%	2.6%
	507L (Taber 83S - Hull 257S)	1005L (Milo 356s - 1005AL Tap Point)	-7.0%	11.7%	15.7%	2.5%	15.6%	5.4%	14.5%	15.3%	15.2%	2.4%	18.0%	14.6%	14.5%	13.5%	16.8%	15.5%	10.5%	19.2%	15.5%	18.8%	15.3%	15.5%	57.4%	15.2%	16.9%	15.4%	15.0%	17.8%	15.5%
	607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)	172L (Coaldale 254S - 172EL Tap Point)	-12.2%	5.1%	3.2%	1.2%	3.2%	1.2%	3.0%	3.2%	3.2%	0.4%	18.3%	2.9%	2.9%	0.0%	14.5%	3.1%	-43.3%	23.3%	-52.3%	5.7%	3.2%	3.3%	1.1%	3.1%	15.7%	3.1%	3.1%	-67.4%	3.2%
	607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	-11.8%	4.9%	3.1%	1.1%	3.1%	1.2%	2.9%	3.1%	3.1%	0.4%	17.7%	2.8%	2.8%	0.0%	14.0%	3.0%	-42.2%	22.7%	-50.9%	5.4%	3.1%	3.2%	1.0%	2.9%	15.1%	3.0%	2.9%	32.3%	3.0%
	610L (336S Fincastle Sub - 83S TABER)	172L (Taber 83S - 172EL Tap Point)	-8.6%	3.9%	2.7%	0.9%	2.7%	1.0%	2.6%	2.7%	2.7%	0.4%	15.1%	2.4%	2.5%	-4.9%	12.0%	2.6%	-5.8%	19.3%	-58.1%	4.8%	2.7%	2.8%	0.9%	2.6%	13.0%	2.6%	2.6%	27.3%	2.7%
	618ST1 (Transformer T1 in Riverbend 618S)	172L (Taber 83S - 172EL Tap Point)	-11.8%	4.9%	3.2%	1.2%	3.2%	1.2%	3.0%	3.2%	3.2%	0.4%	17.4%	3.0%	2.9%	-45.6%	13.9%	3.1%	-41.8%	22.3%	-51.0%	5.6%	3.2%	3.3%	1.1%	3.0%	14.8%	3.1%	3.0%	31.7%	3.1%
	618ST1 (Transformer T1 in Riverbend 618S)	820L (Coaldale 254s - 820AL Tap Point)	-0.5%	-0.8%	0.2%	-0.3%	0.2%	0.0%	1.1%	0.5%	0.5%	0.0%	93.9%	2.1%	0.4%	-1.2%	77.7%	1.0%	-1.2%	-1.9%	-1.4%	-0.6%	0.5%	0.5%	-0.3%	0.2%	85.7%	0.5%	0.5%	-1.7%	0.2%
	618ST1 (Transformer T1 in Riverbend 618S)	820L (Stirling Wind Tap Point - 820AL Tap Point)	-0.6%	-0.8%	0.2%	-0.3%	0.2%	0.0%	1.1%	0.5%	0.5%	0.0%	-5.5%	2.2%	0.5%	-1.2%	79.4%	1.0%	-1.2%	-1.9%	-1.4%	-0.7%	0.5%	0.5%	-0.3%	0.2%	87.7%	0.5%	0.5%	-1.7%	0.2%
	632PS (Phase Shifter PS in Russel 632S)	172L (Taber 83S - 172EL Tap Point)	-11.4%	5.3%	3.7%	1.5%	3.6%	1.5%	3.8%	3.7%	3.7%	0.7%	18.2%	3.5%	3.4%	-45.1%	14.5%	3.7%	-41.4%	22.8%	-50.6%	6.2%	3.7%	3.8%	1.5%	3.5%	15.7%	3.6%	3.5%	32.3%	3.6%

Scenario	CONTINGENCY	MONITORED	Generating Facility Name And Unit Number																											
			AltaGas Bantry (ALP1)	Altagas Parkland (ALP2)	Ardenville Wind (ARD1)	Blackspring Ridge (BSR1)	Blue Trail Wind (BTR1)	Carseland Cogen (TC01)	Castle River #1 (CR1)	Castle Rock Ridge Wind Power Plant Phase 2	Castle Rock Wind Farm (CRR1)	Cavalier (EC01)	Chin Chute (CHIN)	Cowley Ridge (CRWD)	Enel Alberta Riverview Wind Farm	Enmax Taber (TAB1)	Irrican Hydro (ICP1)	Kettles Hill (KHW1)	Lethbridge Burdett (ME03)	Lethbridge Coaldale (ME04)	Lethbridge Taber (ME02)	McBride Lake Windfarm (AKE1)	Old Man River (OWF1)	Oldman River (OMRH)	P2009 Greengate Travers MPC Solar	Soderglen Wind (GWW1)	Stirling Wind Project	Summerview 1 (IEW1)	Summerview 2 (IEW2)	Suncor Chin Chute (SCR3)	Windrise Wind
	666L (Tilley 498S - West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	-24.7%	4.9%	3.2%	1.2%	3.1%	1.1%	3.0%	3.2%	3.1%	0.4%	17.5%	2.9%	2.9%	-46.7%	13.9%	3.1%	-43.9%	22.1%	-51.7%	5.7%	3.1%	3.2%	1.1%	3.0%	15.0%	3.1%	3.0%	31.3%	3.1%
	674ST1 (Transformer T1 in Bowron 674S)	172L (Taber 83S - 172EL Tap Point)	-11.9%	3.6%	3.3%	1.2%	3.2%	1.2%	3.1%	3.3%	3.2%	0.4%	17.8%	3.0%	3.0%	-45.6%	14.2%	3.2%	-41.9%	22.4%	-51.1%	3.8%	3.2%	3.3%	1.1%	3.1%	15.4%	3.2%	3.1%	31.8%	3.2%
	799ST1 (Transformer T1 in Coleman 799S)	172L (Taber 83S - 172EL Tap Point)	-11.4%	5.3%	3.7%	1.5%	3.6%	1.5%	3.8%	3.7%	3.7%	0.7%	18.2%	3.5%	3.4%	-45.1%	14.5%	3.7%	-41.4%	22.8%	-50.6%	6.2%	3.7%	3.8%	1.5%	3.5%	15.7%	3.6%	3.5%	32.3%	3.6%
	593ST1 (Transformer T1 in Lakeview 593S)	172L (Taber 83S - 172EL Tap Point)	-11.8%	4.8%	3.3%	1.2%	3.2%	1.2%	3.1%	3.3%	3.2%	0.4%	17.7%	3.0%	3.0%	-45.6%	14.1%	3.2%	-41.9%	22.3%	-51.1%	5.9%	3.2%	3.3%	1.1%	3.1%	15.3%	3.2%	3.1%	31.8%	3.2%
	853L (Queenstown 504S - Bassano 435S/West Brooks 28S)	172L (Taber 83S - 172EL Tap Point)	-12.5%	12.6%	3.5%	1.3%	3.4%	1.3%	3.3%	3.4%	3.4%	0.5%	18.3%	3.1%	3.2%	-45.4%	14.6%	3.4%	-41.8%	23.1%	-50.8%	6.9%	3.4%	3.5%	1.2%	3.3%	15.7%	3.4%	3.3%	32.3%	3.4%
	923L (Milo 356S - Newell 2075S)	172L (Taber 83S - 172EL Tap Point)	-14.3%	4.0%	3.3%	1.6%	3.3%	1.1%	3.1%	3.3%	3.3%	0.4%	17.5%	3.0%	3.0%	-46.6%	14.0%	3.2%	-43.2%	22.1%	-52.0%	5.7%	3.3%	3.4%	1.5%	3.2%	15.1%	3.2%	3.2%	31.4%	3.3%
	935L (Cassils 324S - Milo 356S)	172L (Taber 83S - 172EL Tap Point)	-14.2%	4.0%	3.3%	1.6%	3.3%	1.1%	3.1%	3.3%	3.3%	0.4%	17.6%	3.0%	3.0%	-46.6%	14.0%	3.3%	-43.2%	22.1%	-52.0%	5.7%	3.3%	3.4%	1.5%	3.2%	15.1%	3.2%	3.2%	31.4%	3.3%
	940L (North Lethbridge 370S - Picture Butte 120S)	1005L (Milo 356s - 1005AL Tap Point)	0.0%	0.0%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	93.6%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%
	WATL	172L (Taber 83S - 172EL Tap Point)	-11.8%	4.9%	3.3%	1.2%	3.2%	1.1%	3.1%	3.2%	3.2%	0.4%	17.8%	2.9%	3.0%	-45.5%	14.1%	3.2%	-41.8%	22.4%	-51.0%	5.9%	3.2%	3.3%	1.1%	3.1%	15.3%	3.1%	3.1%	31.8%	3.2%
Scenario #4: 2021 SL Post-Project	1036L (Milo 356S - Travers 554S)	1005L (Milo 356s - 1005AL Tap Point)	0.0%	0.0%	22.1%	29.7%	21.8%	7.6%	20.5%	21.4%	21.3%	3.4%	22.1%	20.5%	20.0%	10.3%	21.2%	21.7%	0.0%	0.0%	0.0%	25.6%	21.4%	21.7%	58.9%	21.3%	20.9%	21.3%	20.9%	19.0%	21.6%
	1036L (Milo 356S - Travers 554S)	172L (Taber 83S - 172EL Tap Point)	0.0%	0.0%	4.9%	6.4%	4.8%	1.7%	4.6%	4.8%	4.7%	0.7%	19.2%	4.5%	4.4%	-44.5%	15.6%	4.8%	0.0%	0.0%	0.0%	7.8%	4.8%	4.9%	1.6%	4.6%	16.7%	4.7%	4.6%	34.0%	4.7%
	1036L (Milo 356S - Travers 554S)	786L (Coleman 799s - BC Hydro Natal B1S))	0.0%	0.0%	9.0%	7.7%	8.8%	6.6%	17.9%	10.6%	10.5%	5.7%	7.1%	12.4%	9.4%	6.6%	6.6%	12.8%	0.0%	0.0%	0.0%	7.4%	10.5%	10.8%	6.6%	8.5%	6.5%	10.4%	10.1%	7.4%	8.7%
	1037L (Foothills 237S - Windy Flat 138S)	172L (Taber 83S - 172EL Tap Point)	0.0%	0.0%	4.3%	1.9%	4.2%	0.8%	4.1%	4.3%	4.2%	0.3%	18.3%	3.9%	3.8%	-44.9%	14.7%	4.2%	0.0%	0.0%	0.0%	6.9%	4.2%	4.3%	1.8%	4.1%	15.9%	4.2%	4.1%	32.6%	4.2%
	1037L (Foothills 237S - Windy Flat 138S)	786L (Coleman 799s - BC Hydro Natal B1S))	0.0%	0.0%	9.5%	7.1%	9.3%	6.0%	18.1%	11.0%	10.9%	5.3%	7.3%	12.6%	9.8%	6.9%	6.8%	13.1%	0.0%	0.0%	0.0%	7.7%	10.9%	11.2%	7.0%	9.0%	6.7%	10.8%	10.5%	7.7%	9.2%
	1038L (Foothills 237S - Windy Flat 138S)	172L (Taber 83S - 172EL Tap Point)	0.0%	0.0%	4.3%	1.9%	4.2%	0.8%	4.1%	4.3%	4.2%	0.3%	18.3%	3.9%	3.8%	-44.9%	14.7%	4.2%	0.0%	0.0%	0.0%	6.9%	4.2%	4.3%	1.8%	4.1%	15.9%	4.2%	4.1%	32.6%	4.2%
	1038L (Foothills 237S - Windy Flat 138S)	786L (Coleman 799s - BC Hydro Natal B1S))	0.0%	0.0%	9.5%	7.1%	9.3%	6.0%	18.1%	11.0%	10.9%	5.3%	7.3%	12.6%	9.8%	6.9%	6.8%	13.1%	0.0%	0.0%	0.0%	7.7%	10.9%	11.2%	7.0%	9.0%	6.7%	10.8%	10.5%	7.7%	9.2%
	134ST1 (Transformer T1 in Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	0.0%	0.0%	3.2%	1.2%	3.1%	1.2%	3.0%	3.1%	3.1%	0.5%	17.3%	2.8%	2.8%	0.0%	13.8%	3.1%	0.0%	0.0%	0.0%	5.8%	3.1%	3.2%	1.1%	3.0%	14.9%	3.1%	3.0%	32.0%	3.0%
	607L (Fincastle 336S - Conrad 135S/Taber Wind Farm 134S)	172L (Taber 83S - 172EL Tap Point)	0.0%	0.0%	3.2%	1.2%	3.1%	1.2%	3.0%	3.2%	3.1%	0.5%	17.4%	2.9%	2.8%	0.0%	13.8%	3.1%	0.0%	0.0%	0.0%	5.8%	3.1%	3.2%	1.1%	3.0%	15.0%	3.1%	3.0%	32.0%	3.1%
	618ST1 (Transformer T1 in Riverbend 618S)	820L (Coaldale 254s - 820AL Tap Point)	0.0%	0.0%	0.2%	-0.3%	0.2%	0.0%	1.2%	0.5%	0.5%	0.0%	93.7%	2.4%	0.4%	-1.2%	77.8%	1.0%	0.0%	0.0%	0.0%	-0.7%	0.5%	0.5%	-0.3%	0.2%	85.7%	0.5%	0.5%	-1.7%	0.2%
	618ST1 (Transformer T1 in Riverbend 618S)	820L (Stirling Wind Tap Point - 820AL Tap Point)	0.0%	0.0%	0.2%	-0.3%	0.2%	0.0%	1.2%	0.5%	0.5%	0.0%	-5.4%	2.4%	0.5%	-1.2%	79.6%	1.1%	0.0%	0.0%	0.0%	-0.7%	0.5%	0.5%	-0.3%	0.2%	87.8%	0.5%	0.5%	-1.7%	0.2%
	923L (Milo 356S - Newell 2075S)	172L (Taber 83S - 172EL Tap Point)	0.0%	0.0%	3.4%	1.7%	3.3%	1.2%	3.2%	3.3%	3.3%	0.4%	17.2%	3.1%	3.0%	-46.6%	13.8%	3.3%	0.0%	0.0%	0.0%	6.1%	3.3%	3.4%	1.6%	3.2%	15.0%	3.3%	3.2%	31.2%	3.3%