APPENDIX A CONNECTION ASSESSMENT

Engineering Connection Assessment

P2453 EDTI Edmonton 3 H2 Plant Cogen

EPCOR Distribution & Transmission Inc.

Air Products Canada Ltd.

Date: September 20, 2022

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Classification: Public

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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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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 A). 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

EPCOR Distribution & Transmission Inc. (EDTI), in its capacity as the legal owner of an electric distribution system (DFO), has submitted a request for system access service to the Alberta Electric System Operator (AESO) to serve a new industrial Air Products Canada Ltd. load in the City of Edmonton area. Air Products Canada Ltd. has also submitted a request for system access service to the AESO requesting a connection for its proposed industrial system (the ISD) in the City of Edmonton area.

The EDTI request includes a request for a Rate DTS, *Demand Transmission Service*, contract capacity of 50 MW; and a request for transmission development. The Air Products Ltd. request includes a request for a Rate STS, *Supply Transmission Service*, contract capacity of 20 MW and a request for transmission development (collectively, the Project).

The Project in-service date (ISD) used for the purpose of the studies is September 23, 2023.

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 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 Edmonton (Area 60), which is part of the AESO Edmonton Planning Region. Area 60 is surrounded by the planning areas of Wabamun (Area 40), Fort Saskatchewan (Area 33) and Wetaskiwin (Area 31).

From a transmission system perspective, Area 60 consists primarily of a 500 kV and 240 kV transmission system.

Existing constraints in the Edmonton 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 Edmonton (Area 60) and Fort Saskatchewan (Area 33), including the tie lines connecting these planning areas to the rest of the AIES. All transmission facilities within the Study Area will be 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, EDTI and Air Products Canada Ltd., examined 9 transmission alternatives to meet the requests from EDTI and Air Products for system access service, as detailed in Section 3.2.[1]

3.2 Connection Alternatives Examined

Below is a description of the developments associated with the transmission alternatives that were examined for the Project.

3.3 Alternative 1 – Upgrade Clover Bar 987S Substation

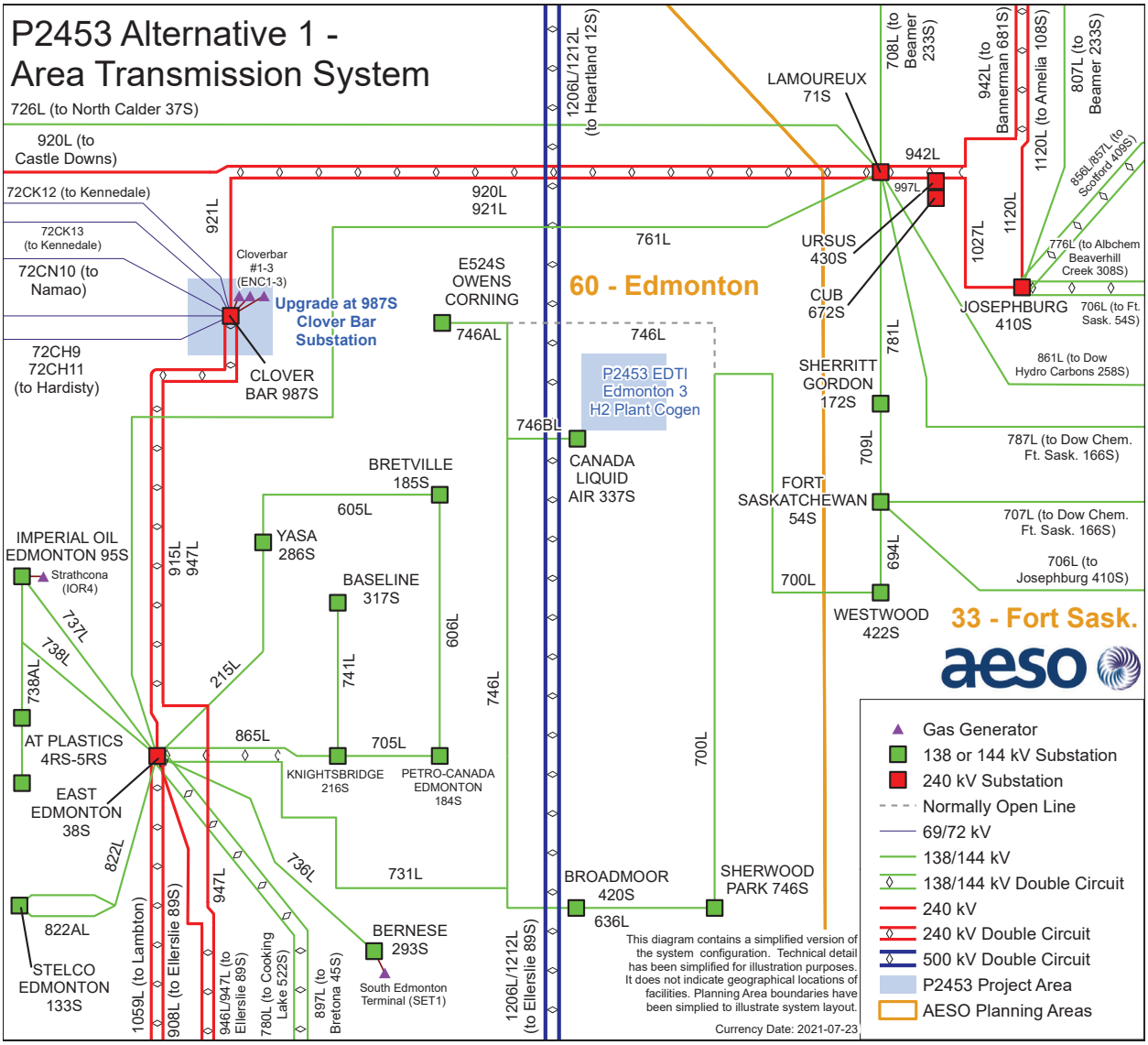
This alternative includes the following developments:

- Upgrade the Clover Bar 987S substation, including adding one 240/25 kV transformer, two 240 kV circuit breakers and one 25 kV circuit breaker;
- Add or modify associated equipment as required for the above transmission developments.

The proposed connection configuration is shown in Figure 3-1.

[1] These alternatives reflect more up to date engineering design than the alternatives identified in EDTI's *Distribution Deficiency Report (DDR) for Air Products,* which is filed under a separate cover.

Figure 3-1: Connection Alternative 1



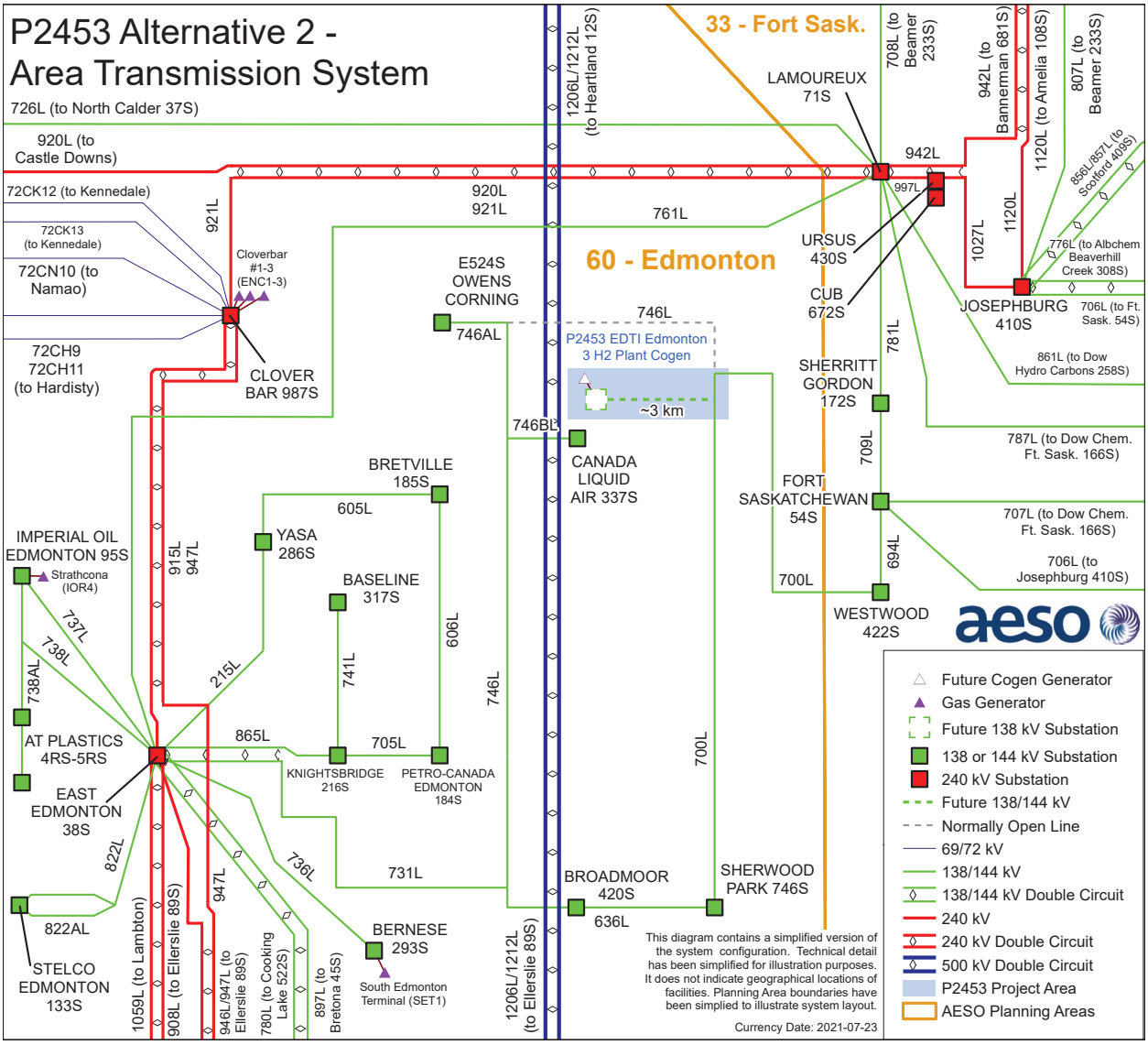
3.4 Alternative 2 – 138 kV T-tap Connection to 700L

This alternative includes the following developments:

- Add one 138 kV circuit, approximately 3 km in length, to connect the ISD to the existing 138 kV transmission line 700L (between the 746L Normally Open "N.O." tap and 746S Sherwood Park), using a T-tap configuration; and
- Add or modify associated equipment as required for the above transmission developments.

The proposed connection configuration is shown in Figure 3-2.

Figure 3-2: Connection Alternative 2



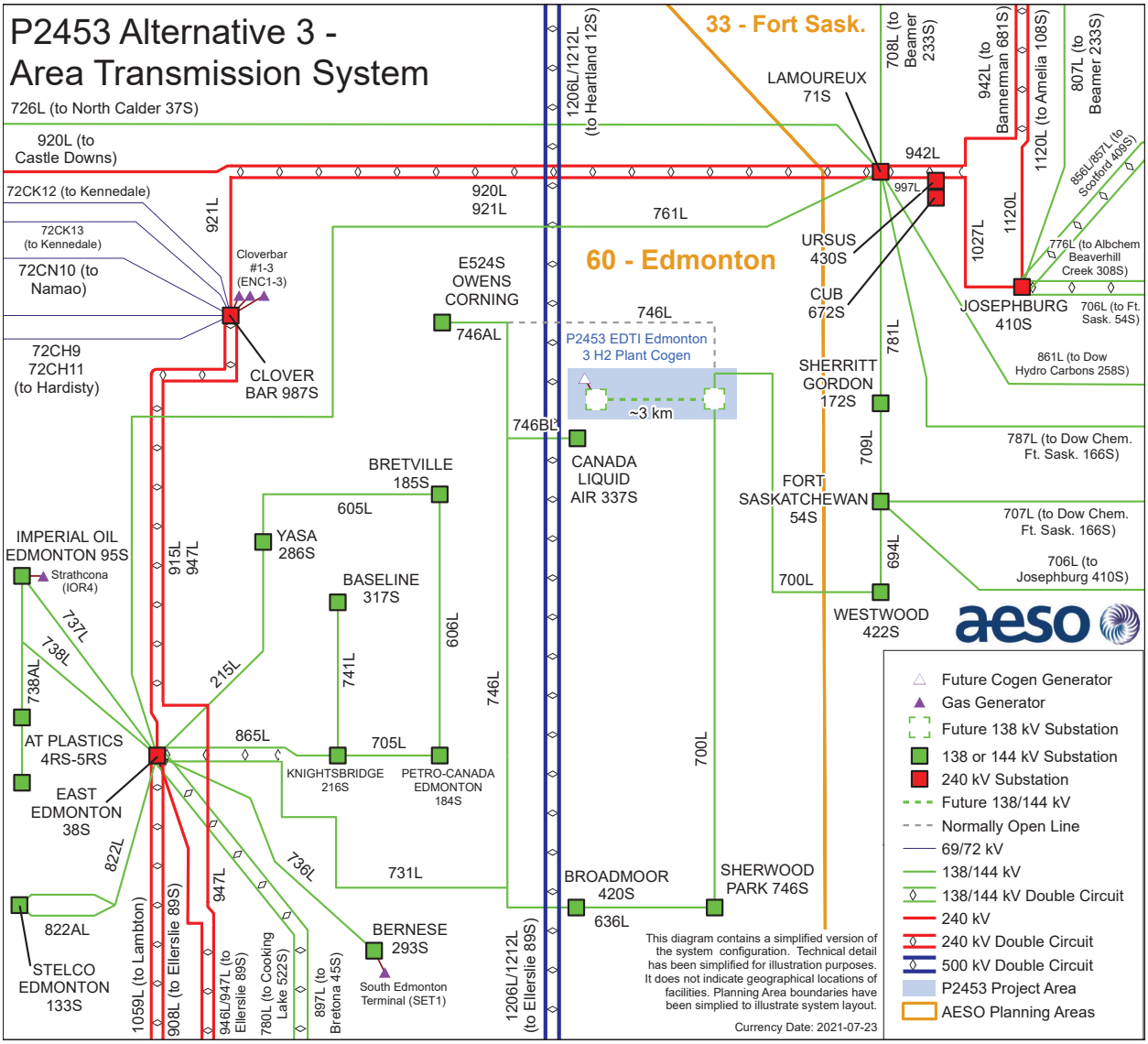
3.5 Alternative 3 – 138 kV In-and-Out Connection to 700L

This alternative includes the following developments:

- Add a switching substation, including three 138 kV circuit breakers;
- Add one 138 kV circuit, approximately 3 km in length, to connect the new switching station to the existing 138 kV transmission line 700L (between the 746L N.O. tap and 746S Sherwood Park), using an in-and-out configuration; and
- Add or modify associated equipment as required for the above transmission developments.

The proposed connection configuration is shown in Figure 3-3.

Figure 3-3: Connection Alternative 3



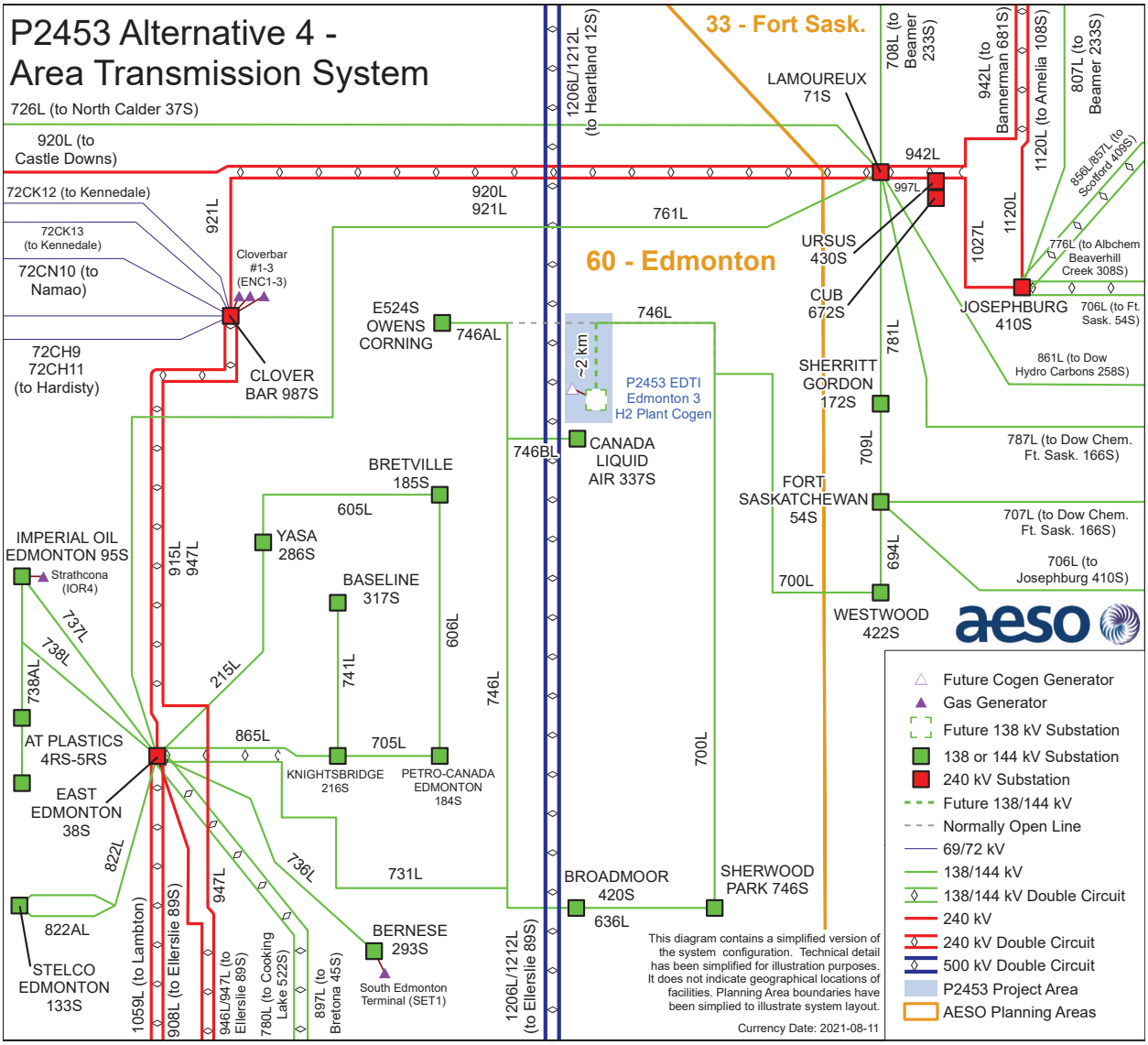
3.6 Alternative 4 – 138 kV T-tap Connection to 746L

This alternative includes the following developments:

- Add one 138 kV circuit, approximately 2 km in length, to connect the ISD to the existing 138 kV transmission line 746L (between the 700L tap and the N.O. switch east of the 746AL tap), using a T-tap configuration; and
- Add or modify associated equipment as required for the above transmission developments.

The proposed connection configuration is shown in Figure 3-4.

Figure 3-4: Connection Alternative 4



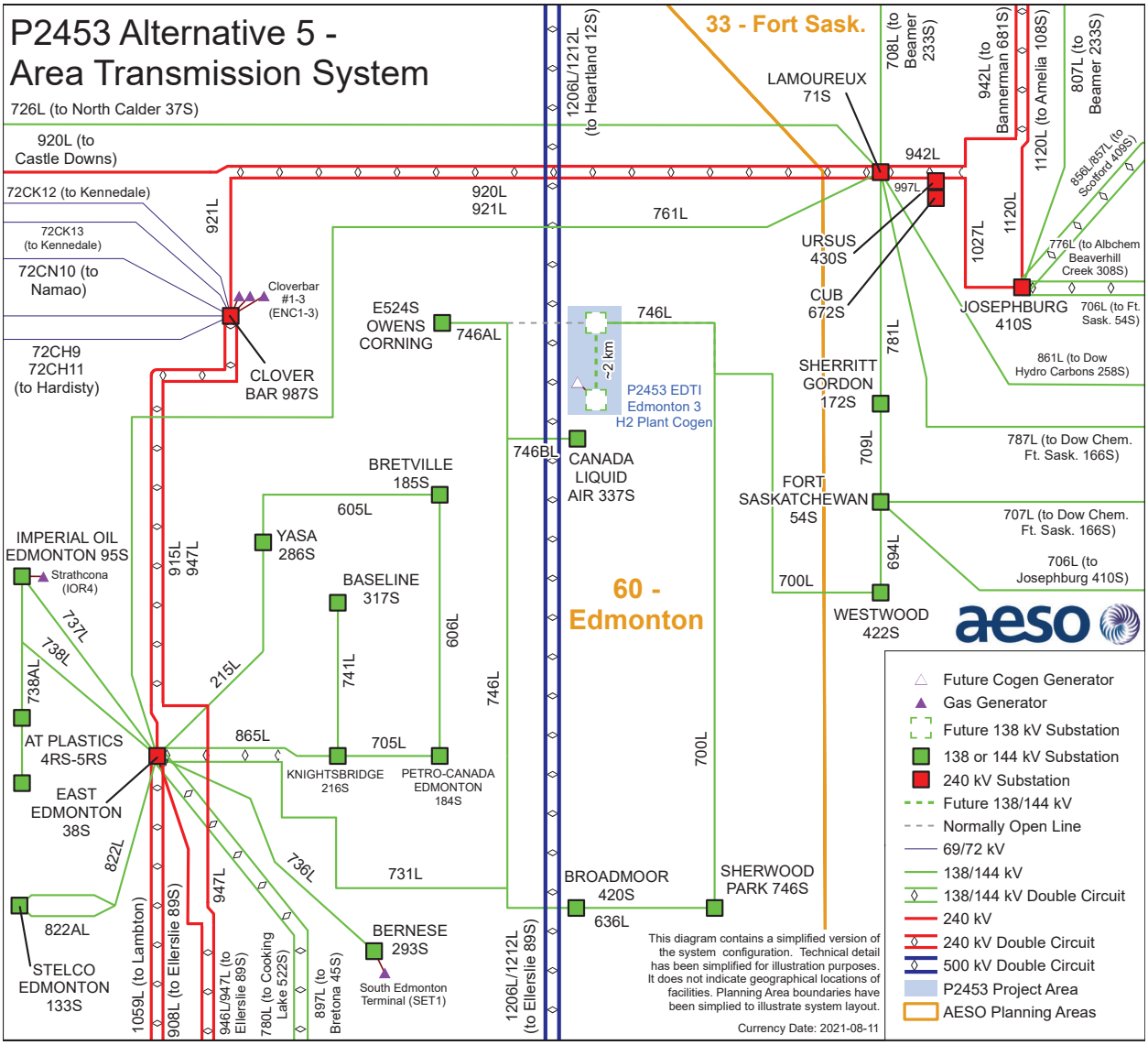
3.7 Alternative 5 – 138 kV In-and-Out Connection to 746L

This alternative includes the following developments:

- Add a switching substation, with three 138 kV circuit breakers;
- Add two 138 kV circuits, approximately 2 km in length, to connect the new switching station to the existing 138 kV transmission line 746L (between the 700L tap and the N.O. switch east of the 746AL tap), using an in-and-out configuration; and
- Add or modify associated equipment as required for the above transmission developments.

The proposed connection configuration is shown in Figure 3-5.

Figure 3-5: Connection Alternative 5



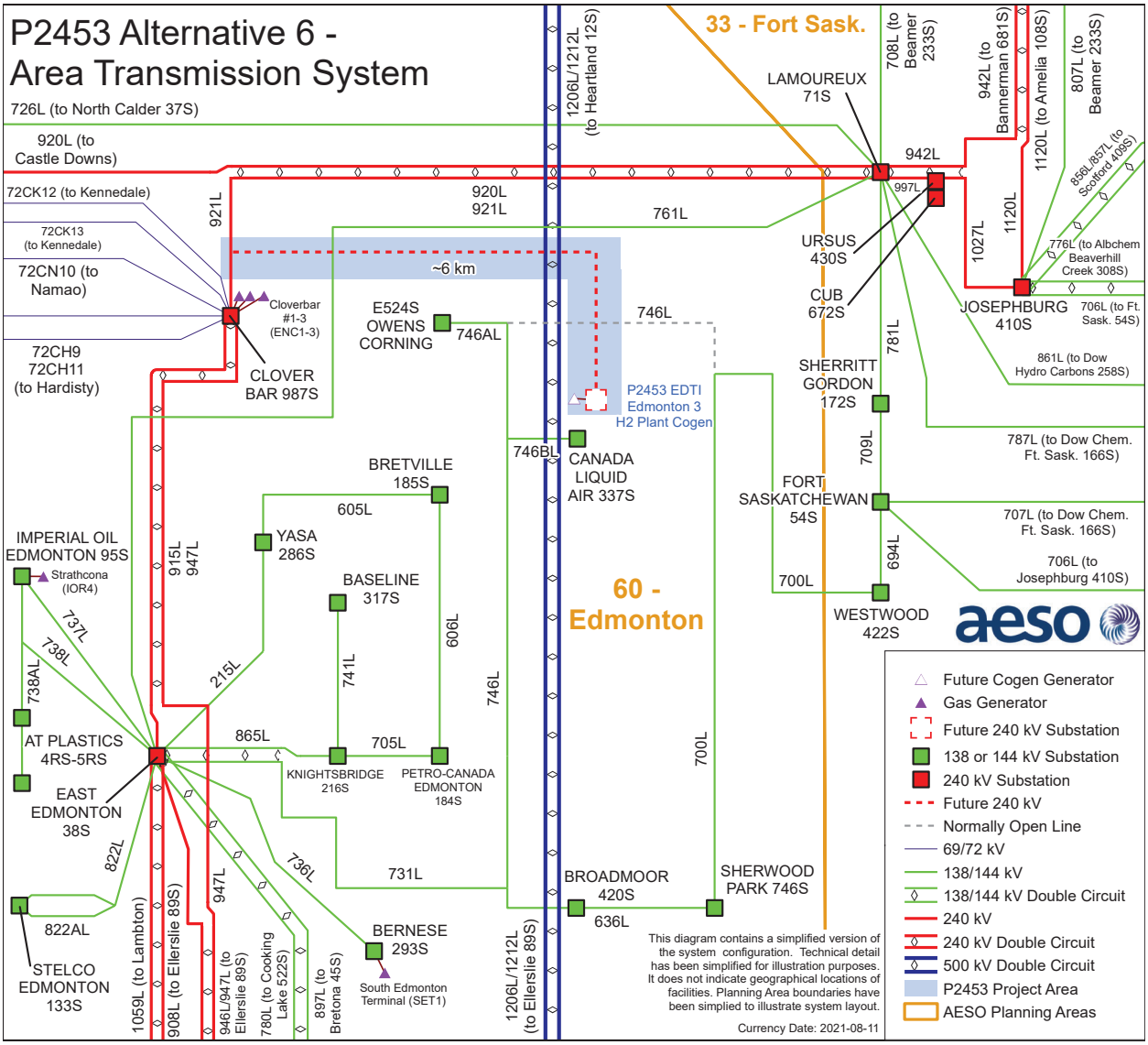
3.8 Alternative 6 – 240 kV T-tap Connection to 921L

This alternative includes the following developments:

- Add one 240 kV circuit, approximately 6 km in length, to connect the ISD to the existing 240 kV transmission line 921L (between 987S Clover Bar and 71S Lamoureux), using a T-tap configuration; and
- Add or modify associated equipment as required for the above transmission developments.

The proposed connection configuration is shown in Figure 3-6.

Figure 3-6: Connection Alternative 6



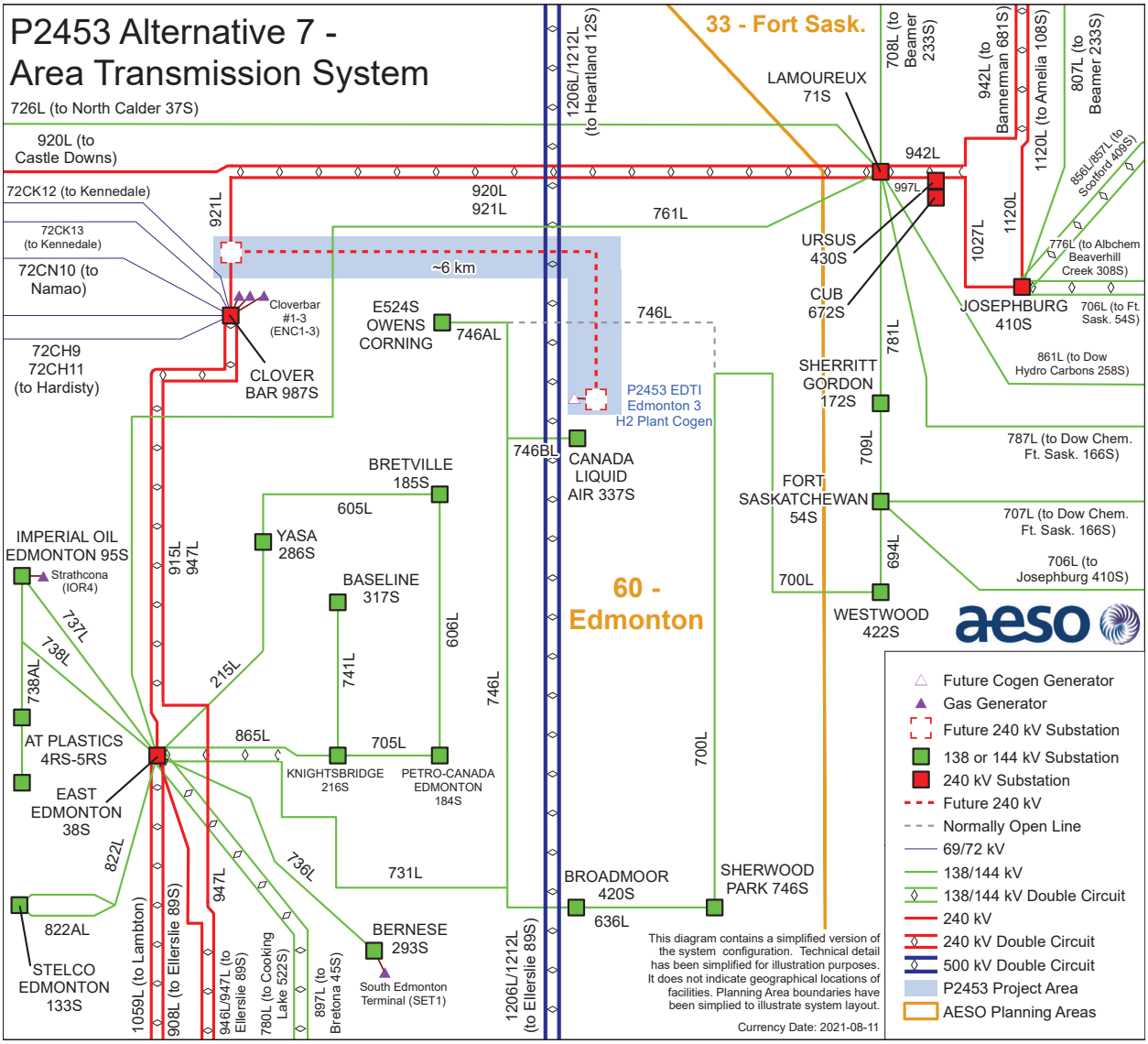
3.9 Alternative 7 – 240 kV In-and-Out Connection to 921L

This alternative includes the following developments:

- Add a switching substation, including five 240 kV circuit breakers;
- Add one 240 kV circuits, approximately 6 km in length, to connect the new switching station to the existing 240 kV transmission line 921L (between 987S Clover Bar and 71S Lamoureux), using an in-and-out configuration; and
- Add or modify associated equipment as required for the above transmission developments.

The proposed connection configuration is shown in Figure 3-7.

Figure 3-7: Connection Alternative 7



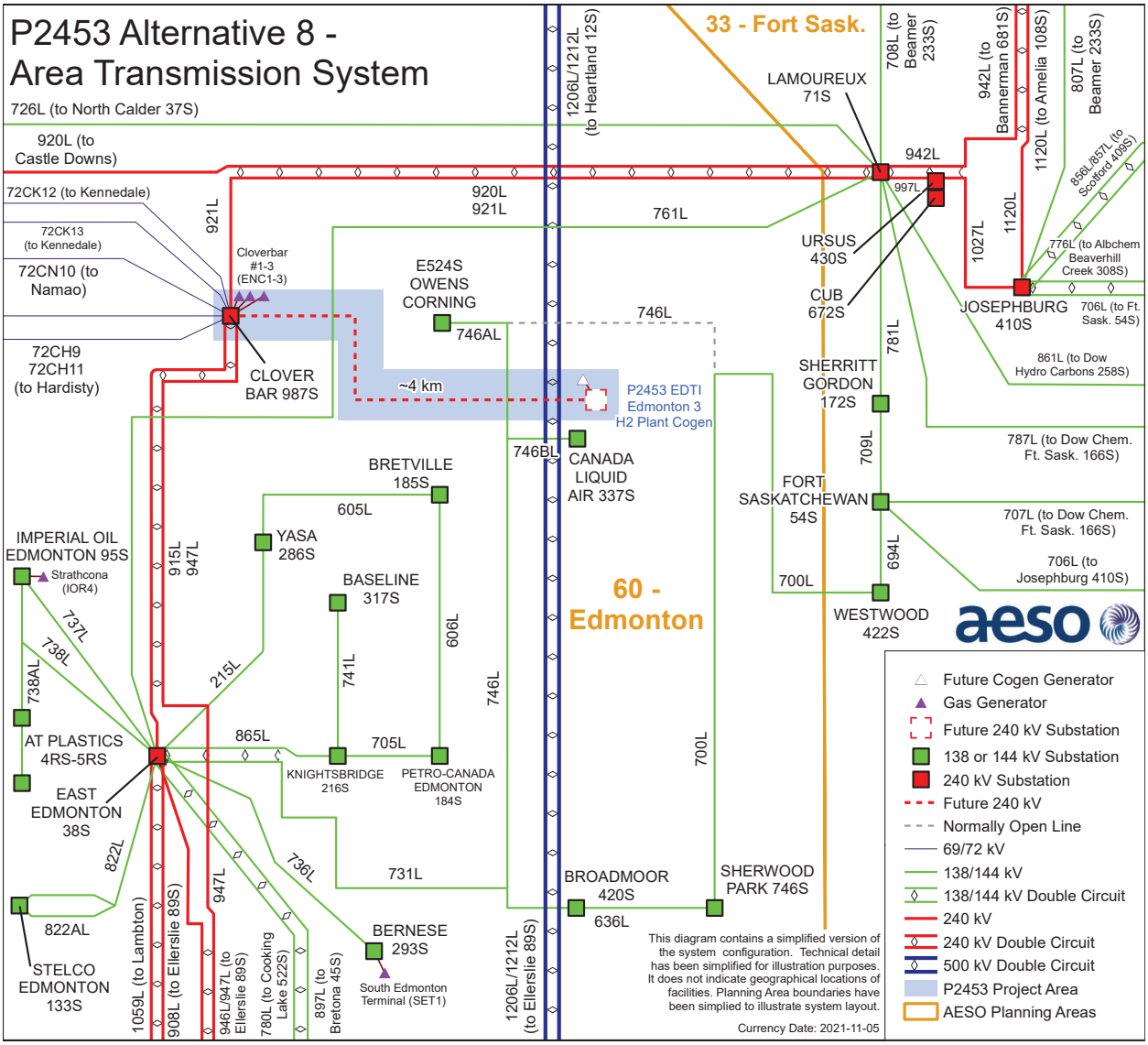
3.10 Alternative 8 – Radial 240 kV Connection to Clover Bar 987S

This alternative includes the following developments:

- Modify the existing Clover Bar 987S substation, including adding two 240 kV circuit breakers;
- Add one 240 kV circuit, approximately 4 km in length, to connect the ISD to Clover Bar 987S using a radial configuration; and
- Add or modify associated equipment as required for the above transmission developments.

The proposed connection configuration is shown in Figure 3-8.

Figure 3-8: Connection Alternative 8



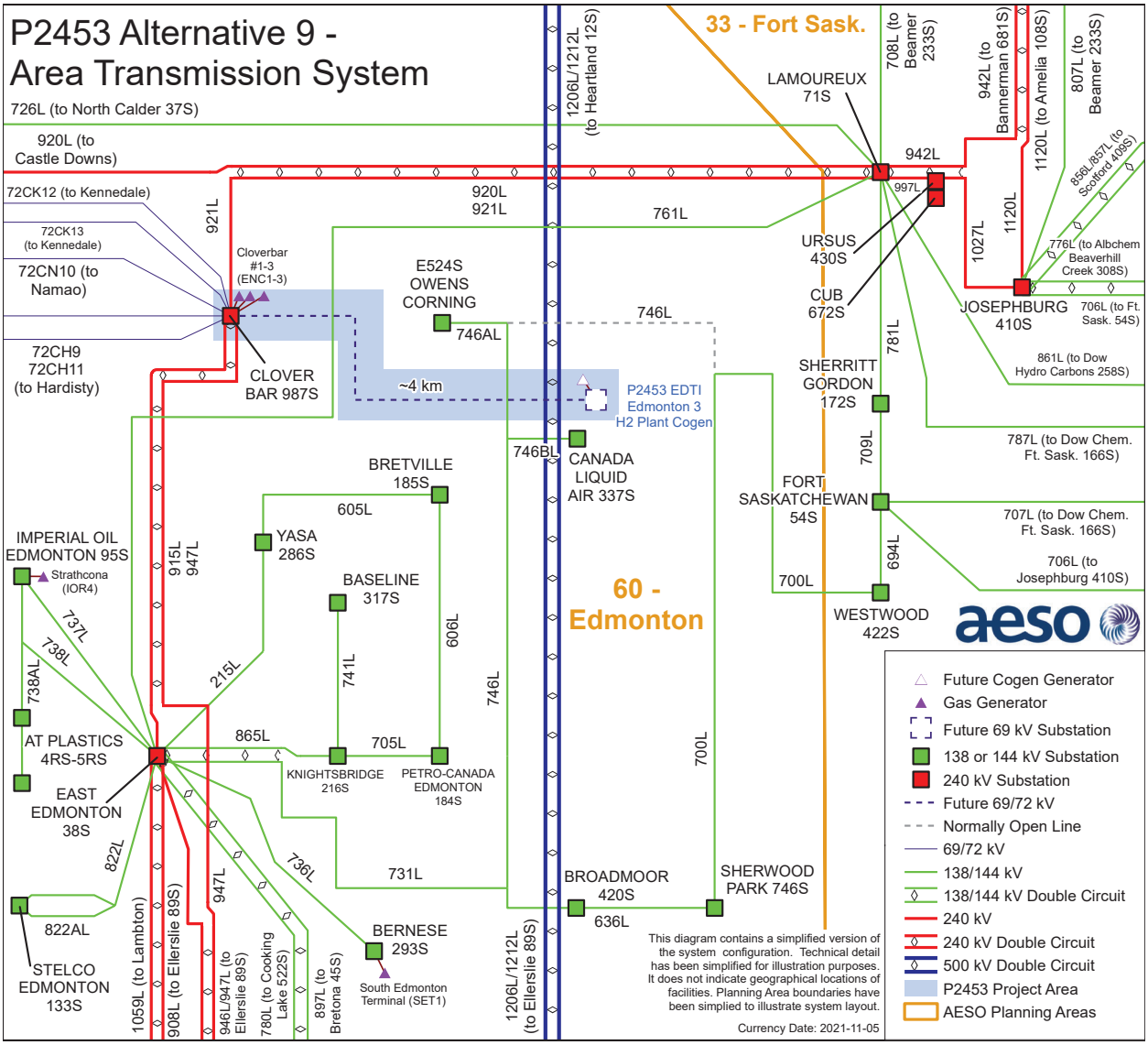
3.11 Alternative 9 – Radial 72 kV Connection to Clover Bar 987S

This alternative includes the following developments:

- Modify the existing Clover Bar 987S, including adding one 72 kV circuit breaker;
- Add one new 72 kV circuit, approximately 4 km in length, to connect the ISD to Clover Bar 987S using a radial configuration; and
- Add or modify associated equipment as required for the above transmission developments.

The proposed connection configuration is shown in Figure 3-9.

Figure 3-9: Connection Alternative 9



3.12 Connection Alternatives Selected for Further Studies

Alternative 8 is selected for further studies.

3.13 Connection Alternatives Not Selected for Further Studies

Alternative 1 is ruled out due to Air Products Canada Ltd. requirements. Specifically, Air Products Canada Ltd. noted that compared to transmission connected alternatives, the distribution connected alternative would result in lower reliability which would not be acceptable, as well as potential limitations to future expandability. In addition, preliminary calculations suggest that the voltage drop due to motor starting is beyond the acceptable threshold required by Air Products Canada Ltd. within its ISD. The AESO agrees with the information provided, based on the size of the project.

Based on the connection studies performed in Stage 2, alternatives 2 and 4 would result in Category B thermal criteria violations beyond emergency ratings based on the 138 kV transmission line ratings and the existing flows on the local 138 kV transmission system.

Alternative 6 would result in lower reliability when compared to Alternative 8, due to the T-tap connection configuration, which is not acceptable to Air Products Canada Ltd.

Alternatives 3, 5, and 7 are electrically similar to alternatives 2, 4 and 6, however, require greater scope of transmission development and therefore would be higher cost.

EDTI Transmission has advised that alternative 9 would require substation expansion to facilitate the addition of the additional 72 kV termination as well as greater difficulty in terminating a new 72 kV transmission line as compared to a new 240 kV transmission line to Clover Bar 987S. The Clover Bar 987S 72 kV section is bordered by the North Saskatchewan River to the west, 240 kV transmission lines to the north, the Cloverbar 240 kV section to the east and the Clover Bar Energy Centre to the south.

Therefore, alternatives 1, 2, 3, 4, 5, 6, 7 and 9 are not selected for further studies.

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

At the time of study, the scheduled ISD for the Project was September 23, 2023. Therefore, studies were performed using scenarios for 2024. After the studies were completed, the ISD was delayed to November 20, 2023. Based on the small change in ISD and the scenarios originally selected, no restudies or sensitivity studies were added.

Short-circuit studies were performed using the 2024 and 2031 WP scenarios.

Table 4-1 lists the study scenarios. Post-Project scenarios reflect the requested Rate DTS and STS contract capacity increases of 50 MW and 20 MW, respectively. One sensitivity scenario was added to study the maximum export from the ISD under ISD-internal contingency conditions.

Table 4-1: Connection Study Scenarios

Scenario No.	Year/Season	System Generation Dispatch Conditions	Scenario Name	Project Net Import (MW)	Project Net Export (MW)
Pre-Project (STS)					
1	2024 Summer Peak (SP)	High Edmonton region generation	2024 SP STS Pre-Project	0	0
2	2024 Summer Light (SL)		2024 SL STS Pre-Project	0	0
3	2024 Winter Peak (WP)		2024 WP STS Pre-Project	0	0
Post -Project (STS)					
4	2024 SP	High Edmonton region generation	2024 SP STS Post-Project	0	20
5	2024 SL		2024 SL STS Post -Project	0	20
6	2024 WP		2024 WP STS Post -Project	0	20
7	2031 WP	All study region (area 33, 60) generation in-service	2031 WP STS Post-Project	0	20
Pre-Project (DTS)					
8	2024 SP	Low Edmonton region generation	2024 SP DTS Pre-Project	0	0
9	2024 WP		2024 WP DTS Pre-Project	0	0

Scenario No.	Year/Season	System Generation Dispatch Conditions	Scenario Name	Project Net Import (MW)	Project Net Export (MW)
Post-Project (DTS)					
10	2024 SP	Low Edmonton region generation	2024 SP DTS Post-Project	50	0
11	2024 WP		2024 WP DTS Post-Project	50	0
Post -Project Sensitivity (STS)					
5a	2024 SL	High Edmonton region generation	2024 SL STS Post-Project	0	60

The AESO Planning Region load forecasts used for the connection studies were based on the *AESO 2021 Long-Term Outlook* (2021 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.[2]

Power flow studies were performed for the 2024 SP, 2024 SL and 2024 WP pre-Project scenarios, and for the 2024 SP, 2024 SL and 2024 WP post-Project scenarios.

4.2.2 Voltage Stability Studies

The purpose of the voltage stability studies is to determine the ability of the transmission system to maintain voltage stability at the busses in the Study Area.

Voltage stability studies were performed for 2024 WP post-Project scenarios.

4.2.3 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 select transmission lines in the Study Area.

Transient stability studies were performed for 2024 SL and 2024 WP post-Project scenarios.

4.2.4 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.

[2] 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 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.

Short circuit studies were performed for the 2024 WP pre-Project scenario and for 2024 WP and 2031 WP post-Project scenarios.

4.2.5 Motor Starting Studies

The purpose of the motor starting studies is to evaluate the potential impact of motor starting on the performance of the surrounding transmission system. The study identifies the mitigation measures required to avoid any negative system impact associated with motor starting.

Motor starting studies were performed for 2024 SP and 2024 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.

5 Interpretation of 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	Project Impact	Pre-Project Mitigation Measures	Post-Project Mitigation Measures
	Pre-Project	Post-Project					
2024 SP (High Gen)	Thermal - above normal rating	Thermal - above normal rating	694L (Westwood 422S to Fort Saskatchewan 54S)	731L (East Edmonton 38S to 746L JCT)	Marginally decreased	Real time operational practices	Real time operational practices
2024 SP (High Gen)	Thermal - above normal rating	Thermal - above normal rating	72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	Materially decreased	Real time operational practices	Real time operational practices
2024 SP (High Gen)	Thermal - above normal rating	Thermal - above normal rating	72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	Materially decreased	Real time operational practices	Real time operational practices
2024 SP (High Gen)	Thermal - above normal rating	Thermal - above normal rating	72CK13 (Clover Bar 987S to Kennedale)	72CK12 (Clover Bar 987S to Kennedale)	Marginally decreased	Real time operational practices	Real time operational practices
2024 SL (High Gen)	Thermal - above normal rating	Thermal - above normal rating	807L (Josephburg 410S to Beamer 233S)	708L (Lamoureux 71S to 708AL Tap)	Marginally increased	Real time operational practices	Real time operational practices
2024 WP (High Gen)	Thermal - above normal rating	Thermal - above normal rating	72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	Materially decreased	Real time operational practices	Real time operational practices
2024 WP (High Gen)	Thermal - above normal rating	Thermal - above normal rating	72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	Materially decreased	Real time operational practices	Real time operational practices
2024 WP (High Gen)	Thermal - above normal rating	Thermal - above normal rating	72CK13 (Clover Bar 987S to Kennedale)	72CK12 (Clover Bar 987S to Kennedale)	Marginally decreased	Real time operational practices	Real time operational practices
2024 SP (Low Gen)	Thermal - above normal rating	Thermal - above normal rating	694L (Westwood 422S to Fort Saskatchewan 54S)	731L (East Edmonton 38S to 746L JCT)	Marginally decreased	Real time operational practices	Real time operational practices
2024 SP (Low Gen)	Thermal - above normal rating	Thermal - above normal rating	72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	Materially decreased	Real time operational practices	Real time operational practices
2024 SP (Low Gen)	Thermal - above normal rating	Thermal - above normal rating	72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	Materially decreased	Real time operational practices	Real time operational practices
2024 SP (Low Gen)	Thermal - above normal rating	Thermal - above normal rating	72RG7 (Rossdale to Garneau)	72RG1 (Rossdale to Garneau)	Materially decreased	Planned Project RAS for P1649	Planned RAS for P1649
2024 WP (Low Gen)	Thermal - above normal rating	Thermal - above normal rating	72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	Marginally decreased	Real time operational practices	Real time operational practices
2024 WP (Low Gen)	Thermal - above normal rating	Thermal - above normal rating	72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	Marginally decreased	Real time operational practices	Real time operational practices
2024 SP (High Gen sensitivity)	Thermal - above normal rating	Thermal - above normal rating	807L (Josephburg 410S to Beamer 233S)	708L (Lamoureux 71S to 708AL Tap)	Marginally increased	Real time operational practices	Real time operational practices

Notes:

- Marginally increased (or marginally decreased) refers to a percent loading difference (post-Project percent loading minus pre-Project percent loading) between 0% and 3% (or -3%).
- Materially increased (or materially decreased) refers to a percent loading difference (post-Project percent loading minus pre-Project percent loading) above or equal to 3% (or below or equal to -3%).
- The P1649 Project RAS was included in the approved *Transmission Enhancements in the West Edmonton Area Needs Identification Document.* This RAS is referred to herein as “Planned RAS for P1649”.

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).

5.3 Post-Project Study Results

5.3.1 Category A Conditions

No Reliability Criteria violations were observed under Category A conditions for any pre-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 and voltage stability studies identified a number of system performance issues under Category B conditions, namely: thermal criteria violations. The majority of these thermal criteria violations were materially reduced following the connection of the Project, with the exception of 708L (Lamoureux 71S – 708AL Tap), which was marginally increased.

The voltage stability margin was met for all studied conditions.

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

Motor starting studies did not indicate any voltage drops above 5% on any system buses.

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.

Thermal loading above emergency rating was identified on 138 kV transmission line 807L (between Beamer 233S and the 807AL tap-point) in both pre-Project and post-Project scenarios, with the Project marginally decreasing or having no impact on the loading. Due to this, the 807L Capacity Increase project (P1381) was modeled in all scenarios.

5.4.1 Pre-Project

Prior to connection of the Project, all of the observed thermal criteria violations can be managed by using real-time operational practices.

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.

The remaining thermal criteria violations can be mitigated by the planned RAS for P1649.

5.4.3 Post-Project Mitigation Study Results

Under Category B conditions, all of the observed Reliability Criteria violations requiring RAS were mitigated.

6 Project Dependencies

The Project is not dependent on the completion of any system projects or plans.

7 Conclusions and Recommendations

Based on the study results, Alternative 8 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 planned RAS for P1649 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 8 as the preferred alternative to respond to the EDTI and Air Products Canada Ltd. requests for system access service. Real-time operational practices and the RAS mentioned above are recommended to mitigate the identified system performance issues.

Alternative 8 involves adding 4 km of 240 kV transmission circuit and modifying Clover Bar 987S, including adding two 240 kV circuit breakers.

The conductor used for the 240 kV circuit should have a minimum capacity of 487 MVA to align with AESO minimum facility capacity standards and meet the requested contract capacities.

Attachment A:
Engineering Connection Assessment Results

Engineering Connection Assessment: Study Results

P2453 EDTI Edmonton 3 H2 Plant Cogen

EPCOR Distribution & Transmission Inc.

Date: July 19, 2022
Version: V1 Final
Classification: Public

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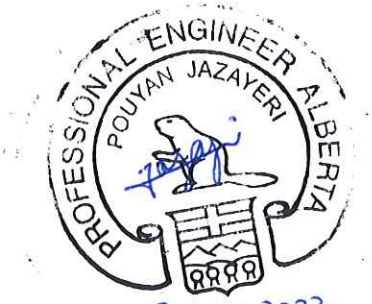

Sep 21, 2022
Member #74277

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1 Introduction

This report presents the results of the engineering studies that were completed by Hardline 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: 2024 Summer Peak High Edmonton Generation 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)	Violation Location Details	Thermal Ratings[a] (MVA)		Pre-Project Results	
		Normal Rating	Emergency Rating	Power Flow[b] (MVA)	% Loading[c]
694L (Westwood 422S to Fort Saskatchewan 54S)	731L (East Edmonton 38S to 746L JCT)	133	146	143.8	108.1
72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	38.3	76.5	45.2	117.9
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	38.3	76.5	45.2	117.9
72CK13 (Clover Bar 987S to Kennedale)	72CK12 (Clover Bar 987S to Kennedale)	56.5	61.0	58.5	103.6
38S T3	694L (Westwood 422S to Fort Saskatchewan 54S)	119	131	119.2	100.2
700L (Sherwood Park 746S to Westwood 422S)	694L (Westwood 422S to Fort Saskatchewan 54S)	119	131	119.6	100.5
865L_731L (East Edmonton 38S to Knightsbridge 216S to Broadmoor 420S)	694L (Westwood 422S to Fort Saskatchewan 54S)	119	131	119.6	100.5

Notes:

[a] The facility ratings shown in Attachment A1 have been adjusted from a [72/144] kV voltage base to a [69/138] kV voltage base, as is used by the power system network analysis tool.

[b] Power flow (MVA) is current expressed as MVA (i.e., $S = \sqrt{3} \times V_{base} \times I_{actual}$)

[c] Reported as a percentage of the power flow (in MVA, i.e., $S = \sqrt{3} \times V_{base} \times I_{actual}$) 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: 2024 Summer Light High Edmonton Generation 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[1].

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

Contingency (System Element Lost)	Violation Location Details	Thermal Ratings (MVA)		Pre-Project Results	
		Normal Rating	Emergency Rating	Power Flow (MVA)	% Loading
807L (Josephburg 410S to Beamer 233S)	708L (Lamoureux 71S to 708AL Tap)	121	133	127.7	105.5

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No voltage deviations beyond the limits for POD bus voltage deviations were observed.

2.1.3 Scenario 3: 2024 Winter Peak High Edmonton Generation Pre-Project

Category A Conditions

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

[1] The 807L capacity increase system project (P1381), which increase the summer/winter rating of 807L between Beamer and the tap point from 85/90 MVA (summer/winter) to 175/217 MVA (summer/winter), has been included in the study as 807L loading over emergency rating was observed in the pre-Project scenarios.

Category B Conditions

Thermal Criteria Violations

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

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

Contingency (System Element Lost)	Violation Location Details	Thermal Ratings (MVA)		Pre-Project Results	
		Normal Rating	Emergency Rating	Power Flow (MVA)	% Loading
72CH9(Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	38.3	76.5	57.3	149.6
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	38.3	76.5	57.3	149.5
72CK13 (Clover Bar 987S to Kennedale)	72CK12 (Clover Bar 987S to Kennedale)	56.5	65.1	58.4	103.3

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No voltage deviations beyond the limits for POD bus voltage deviations were observed.

2.1.4 Scenario 8: 2024 Summer Peak Low Edmonton Generation 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 2-4.

Table 2-4: Thermal Criteria Violations under Category B Conditions for Scenario 8

Contingency (System Element Lost)	Violation Location Details	Thermal Ratings (MVA)		Pre-Project Results	
		Normal Rating	Emergency Rating	Power Flow (MVA)	% Loading
694L (Westwood 422S to Fort Saskatchewan 54S)	731L (East Edmonton 38S to 746L JCT)	133	146	144.4	108.6
72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	38.3	76.5	44.9	117.2
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	38.3	76.5	44.9	117.2
72CK13 (Clover Bar 987S to Kennedale)	72CK12 (Clover Bar 987S to Kennedale)	56.5	61.0	58.2	103.0
72RG7 (Rossdale to Garneau)	72RG1 (Rossdale to Garneau)	57.5	133.9	69.2	120.3

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No voltage deviations beyond the limits for POD bus voltage deviations were observed.

2.1.5 Scenario 9: 2024 Winter Peak Low Edmonton Generation 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 2-5.

Table 2-5: Thermal Criteria Violations under Category B Conditions for Scenario 9

Contingency (System Element Lost)	Violation Location Details	Thermal Ratings (MVA)		Pre-Project Results	
		Normal Rating	Emergency Rating	Power Flow (MVA)	% Loading
72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	38.3	76.5	56.9	148.6
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	38.3	76.5	56.9	148.6
72CK13 (Clover Bar 987S to Kennedale)	72CK12 (Clover Bar 987S to Kennedale)	56.5	65.1	57.9	102.5

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No voltage deviations beyond the limits for POD bus voltage deviations were observed.

3 Post-Project Study Results

This section describes the results of the post-Project power flow studies, voltage stability studies, transient stability studies, and motor starting studies. As described in Section 2 of Attachment A1, the post-Project studies were performed using Alternative 8.

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 4: 2024 Summer Peak High Edmonton Generation Post-Project

Category A Conditions

No Reliability Criteria violations were observed under Category A conditions.

Category B Conditions

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 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	
694L (Westwood 422S to Fort Saskatchewan 54S)	731L (East Edmonton 38S to 746L JCT)	133	146	143.8	108.1	140.8	105.9	-2.2
72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	38.3	76.5	45.2	117.9	44.0	114.8	-3.1
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	38.3	76.5	45.2	117.9	44.0	114.8	-3.1
72CK13 (Clover Bar 987S to Kennedale)	72CK12 (Clover Bar 987S to Kennedale)	56.5	61.0	58.5	103.6	57.1	101.0	-2.6

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 5: 2024 Summer Light High Edmonton Generation Post-Project

Category A Conditions

No Reliability Criteria violations were observed under Category A conditions.

Category B Conditions

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 5

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	
807L (Josephburg 410S to Beamer 233S)	708L (Lamoureux 71S to 708AL Tap)	121	133	127.7	105.5	128.0	105.8	0.3

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No POD bus voltage deviations were observed.

3.1.3 Scenario 6: 2024 Winter Peak High Edmonton Generation Post-Project

Category A Conditions

No Reliability Criteria violations were observed under Category A conditions.

Category B Conditions

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

Table 3-3: Thermal Criteria Violations under Category B Conditions for Scenario 6

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	
72CH9 (Clover Bar 987S to	72CH11 (Clover Bar	38.3	76.5	57.3	149.6	55.8	145.8	-3.8

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	
Hardisty)	987S to Hardisty)							
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	38.3	76.5	57.3	149.5	55.8	145.7	-3.8
72CK13 (Clover Bar 987S to Kennedale)	72CK12 (Clover Bar 987S to Kennedale)	56.5	65.1	58.4	103.3	56.8	100.6	-2.7

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No POD bus voltage deviations were observed.

3.1.4 Scenario 10: 2024 Summer Peak Low Edmonton Generation Post-Project

Category A Conditions

No Reliability Criteria violations were observed under Category A conditions.

Category B Conditions

Thermal criteria violations were observed under certain Category B conditions as shown in Table 3-4.

Table 3-4: Thermal Criteria Violations under Category B Conditions for Scenario 10

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	
694L (Westwood 422S to Fort Saskatchewan 54S)	731L (East Edmonton 38S to 746L JCT)	133	146	144.4	108.6	141.0	106.0	-2.6
72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	38.3	76.5	44.9	117.2	43.5	113.7	-3.5
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	38.3	76.5	44.9	117.2	43.5	113.7	-3.5
72RG7	72RG1	57.5	133.9	69.2	120.3	66.8	116.2	-4.1

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	
(Rossdale to Garneau)	(Rossdale to Garneau)							

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No POD bus voltage deviations were observed.

3.1.5 Scenario 11: 2024 Winter Peak Low Edmonton Generation Post-Project

Category A Conditions

No Reliability Criteria violations were observed under Category A conditions.

Category B Conditions

Thermal criteria violations were observed under certain Category B conditions as shown in Table 3-5.

Table 3-5: Thermal Criteria Violations under Category B Conditions for Scenario 11

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	
72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	38.3	76.5	56.9	148.6	55.4	144.7	-3.9
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	38.3	76.5	56.8	148.5	55.4	144.6	-3.9

Voltage Criteria Violations

No voltage criteria violations were observed under Category B conditions.

POD Bus Voltage Deviations

No POD bus voltage deviations were observed.

3.1.6 Scenario 5a: 2024 Summer Light High Edmonton Generation Post-Project - Sensitivity

Category A Conditions

No Reliability Criteria violations were observed under Category A conditions.

Category B Conditions

Thermal criteria violations were observed under certain Category B conditions as shown in Table 3-6.

Table 3-6: Thermal Criteria Violations under Category B Conditions for Scenario 5a

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	
807L (Josephburg 410S to Beamer 233S)	708L (Lamoureux 71S to 708AL Tap)	121	133	127.7	105.5	128.0	105.8	0.3

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 Voltage Stability Studies

3.2.1 Scenario 11: 2024 WP LG Post-Project

Voltage stability analysis was performed for the 2024 WP LG post-Project scenario. The reference load level for the Study Area is 1969.9 MW. For Category B contingencies, the minimum incremental load transfer is 5% of the reference load, or 98.5 MW (0.05 x 1969.9 MW = 98.5 MW), in order to meet the voltage stability criteria.

Table 3-7 provides the voltage stability study results under the Category A condition and for the five worst contingencies under Category B conditions. The voltage stability diagrams are provided in Attachment A4.

The voltage stability margin was met for all studied conditions

Table 3-7: Voltage Stability Study Results under Category B Conditions for Scenario 11

Contingency (System Element Lost)	From	To	Maximum Incremental Transfer (MW)	Meets Criteria?
N-0	System Normal		1000.0	Yes
838L	Devon 14S	Leduc 325S	760.0	Yes
E805S T1	E805S Jasper Terminal 240/69 kV Transformer T1		760.0	Yes
14ST1	Devon 14S 138/25 kV Transformer T1 with 838L and 739L		760.0	Yes
E665ST1	E665S Dome 240/69 kV Transformer T3		880.0	Yes
905L	North Calder 37S	Wabamun 19S	920.0	Yes

3.3 Transient Stability Studies

Transient stability studies were completed for 2024 SL HG and 2024 WP HG post-Project scenarios (Scenario 5, Scenario 5a, and Scenario 6).

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 3-8 to Table 3-10. The post-Project transient stability plots are provided in Attachment A5. The dynamic data and assumptions of all equipment proposed for the Facility are provided in Attachment A7.

Table 3-8: Transient Stability Study Results under Category B Conditions for Scenario 5

Studied Contingency	Fault Description and Location	Results
915L (East Edmonton 38S - Clover Bar 987S)	3-phase fault at East Edmonton 38S	Stable
	3-phase fault at Clover Bar 987S	Stable
921L (Clover Bar 987S - Lamoureux 71S)	3-phase fault at Clover Bar 987S	Stable

	3-phase fault at Lamoureux 71S	Stable
947L (Clover Bar 987S - Ellerslie 89S)	3-phase fault at Clover Bar 987S	Stable
	3-phase fault at Ellerslie 89S	Stable
New 240 kV Project Line (New Sub - Clover Bar 987S)	3-phase fault at Clover Bar 987S	Stable
	3-phase fault at New Sub	Stable
C5: 915L/947L	3-phase fault at Clover Bar 987S	Stable

Table 3-9: Transient Stability Study Results under Category B Conditions for Scenario 6

Studied Contingency	Fault Description and Location	Results
915L (East Edmonton 38S - Clover Bar 987S)	3-phase fault at East Edmonton 38S	Stable
	3-phase fault at Clover Bar 987S	Stable
921L (Clover Bar 987S - Lamoureux 71S)	3-phase fault at Clover Bar 987S	Stable
	3-phase fault at Lamoureux 71S	Stable
947L (Clover Bar 987S - Ellerslie 89S)	3-phase fault at Clover Bar 987S	Stable
	3-phase fault at Ellerslie 89S	Stable
New 240 kV Project Line (New Sub - Clover Bar 987S)	3-phase fault at Clover Bar 987S	Stable
	3-phase fault at New Sub	Stable
C5: 915L/947L	3-phase fault at Clover Bar 987S	Stable

Table 3-10: Transient Stability Study Results under Category B Conditions for Scenario 5a

Studied Contingency	Fault Description and Location	Results
915L (East Edmonton 38S - Clover Bar 987S)	3-phase fault at East Edmonton 38S	Stable
	3-phase fault at Clover Bar 987S	Stable
921L (Clover Bar 987S - Lamoureux 71S)	3-phase fault at Clover Bar 987S	Stable
	3-phase fault at Lamoureux 71S	Stable
947L (Clover Bar 987S - Ellerslie 89S)	3-phase fault at Clover Bar 987S	Stable
	3-phase fault at Ellerslie 89S	Stable
New 240 kV Project Line (New Sub - Clover Bar 987S)	3-phase fault at Clover Bar 987S	Stable
	3-phase fault at New Sub	Stable
C5: 915L/947L	3-phase fault at Clover Bar 987S	Stable

3.4 Motor Starting Studies

Motor starting studies were conducted under system normal and worst-case Category B contingencies (determined based on power flow analysis) in the 2024 SP LG and 2024 WP LG post-Project scenarios. Table 3-11 and Table 3-12 show the summary of the motor starting performance.

Table 3-11: Motor Starting Performance (M4 - 11500 hp)

Condition	Air Products Edmonton 3 H2 Plant Nominal Voltage (kV)	Voltage Before Motor Start (kV)	Voltage After Motor Start (kV)	Voltage Dip (kV)	% Voltage Dip
N-0	HV bus voltage	246.18	244.92	1.27	0.52
	LV bus voltage	13.82	11.48	2.33	16.89
N-1: 921L (Clover Bar 987S to Lamoureux 71S)	HV bus voltage	246.83	245.39	1.44	0.58
	LV bus voltage	13.81	11.47	2.34	16.95
N-1: 947L (Clover Bar 987S to Ellerslie 89S)	HV bus voltage	246.19	244.57	1.62	0.66
	LV bus voltage	13.82	11.47	2.35	17.00
N-1: 915L (Clover Bar 987S to East Edmonton 38S)	HV bus voltage	246.19	244.57	1.62	0.66
	LV bus voltage	13.82	11.47	2.35	17.00

Table 3-12: Motor Starting Performance (M5 - 7500 hp)

Condition	Air Products Edmonton 3 H2 Plant Nominal Voltage (kV)	Voltage Before Motor Start (kV)	Voltage After Motor Start (kV)	Voltage Dip (kV)	% Voltage Dip
N-0	HV bus voltage	246.22	245.17	1.05	0.43
	LV bus voltage	13.84	11.57	2.27	16.41
N-1: 921L (Clover Bar 987S to Lamoureux 71S)	HV bus voltage	245.85	244.66	1.20	0.49
	LV bus voltage	13.83	11.55	2.28	16.46
N-1: 947L (Clover Bar 987S to Ellerslie 89S)	HV bus voltage	245.60	244.45	1.15	0.47
	LV bus voltage	13.82	11.55	2.27	16.45
N-1: 915L (Clover Bar 987S to East Edmonton 38S)	HV bus voltage	246.24	244.88	1.35	0.55
	LV bus voltage	13.84	11.55	2.28	16.50

The motor starting results show that the voltage drop caused by “across-the-line” motor starting at the proposed Air Products Edmonton 3 H2 Plant 240 kV bus is below 5% under both normal and contingency conditions. The simulation results suggest that the impact on the voltage due to “across-the-line” starting of one motor is acceptable.

4 Short Circuit Studies

4.1 Pre-Project Results

Pre-Project short-circuit current levels are provided in Table 4-1[2].

Table 4-1: Pre-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)
Clover Bar 987S	240	244.2	22.89	0.002174+ j0.010697	18.53	0.002912+ j0.018480
	69	72.4	31.28	0.003002+ j0.028373	32.62	0.001776+ j0.025011
Lamoureux 71S	240	244.4	22.31	0.001942+ j0.011019	19.02	0.002464+ j0.016875
	138	141.2	30.64	0.002681+ j0.013945	27.97	0.002480+ j0.018222
East Edmonton 38S	240	243.5	24.68	0.002208+ j0.009864	19.19	0.003909+ j0.018457
	138	140.8	22.87	0.003652+ j0.018672	19.12	0.004450+ j0.030000
E524S Owens Corning	138	140.1	13.43	0.009108+ j0.030924	9.23	0.016116+ j0.074690
Canada Liquid Air 337S	138	140.1	14.60	0.008001+ j0.028566	10.25	0.013915+ j0.066140
Broadmoor 420S	138	140.2	18.21	0.005724+ j0.023098	13.56	0.009029+ j0.047528
Sherwood Park 746S	138	139.8	14.65	0.009132+ j0.028044	9.98	0.015983+ j0.069303
Westwood 422S	138	140.6	18.05	0.007495+ j0.022817	12.92	0.012235+ j0.051369
Fort Saskatchewan 54S	138	141.0	26.22	0.004056+ j0.016064	21.84	0.005073+ j0.026179

4.2 Post-Project Results

4.2.1 Scenario 6: 2024 WP HG Post-Project

Post-Project short-circuit current levels for Scenario 6 are provided in Table 4-2.

[2] 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 6

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)
Clover Bar 987S	240	244.8	23.39	0.002080+ j0.010515	18.77	0.002913+ j0.018492
	69	72.5	31.47	0.002908+ j0.028283	32.79	0.001776+ j0.025015
Lamoureux 71S	240	244.9	22.48	0.001898+ j0.010968	19.12	0.002464+ j0.016877
	138	141.4	30.81	0.002642+ j0.013909	28.09	0.002480+ j0.018223
East Edmonton 38S	240	244.2	25.05	0.002136+ j0.009763	19.36	0.003911+ j0.018475
	138	141.1	23.03	0.003566+ j0.018625	19.21	0.004452+ j0.030015
E524S Owens Corning	138	140.5	13.51	0.009022+ j0.030886	9.27	0.016118+ j0.074704
Canada Liquid Air 337S	138	140.5	14.68	0.007915+ j0.028527	10.29	0.013918+ j0.066153
Broadmoor 420S	138	140.5	18.31	0.005639+ j0.023059	13.62	0.009030+ j0.047541
Sherwood Park 746S	138	140.2	14.72	0.009052+ j0.028013	10.02	0.015984+ j0.069313
Westwood 422S	138	140.8	18.13	0.007450+ j0.022783	12.96	0.012235+ j0.051371
Fort Saskatchewan 54S	138	141.2	26.34	0.004018+ j0.016030	21.92	0.005073+ j0.026179
EDM3 H2 Plant	240	244.9	16.32	0.002449+ j0.015174	11.60	0.006343+ j0.033592

4.2.2 Scenario 7: 2031 WP HG Post-Project

Post-Project short-circuit current levels for Scenario 7 are provided in Table 4-3.

Table 4-3: Post-Project Short-Circuit Current Levels for Scenario 7

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)
Clover Bar 987S	240	244.6	23.03	0.002153+ j0.010537	18.49	0.002930+ j0.018514
	69	72.4	31.03	0.003038+ j0.028327	32.34	0.001775+ j0.025025
Lamoureux 71S	240	244.4	22.42	0.001921+ j0.010859	19.15	0.002406+ j0.016534
	138	141.1	30.60	0.002679+ j0.013830	27.96	0.002444+ j0.018028
East Edmonton 38S	240	243.8	24.61	0.002213+ j0.009785	19.10	0.003880+ j0.018383
	138	141.0	22.71	0.003699+ j0.018629	18.99	0.004422+ j0.029914
E524S Owens Corning	138	140.3	13.33	0.009162+ j0.030859	9.16	0.016089+ j0.074600
Canada Liquid Air 337S	138	140.3	14.48	0.008054+ j0.028503	10.17	0.013889+ j0.066050
Broadmoor 420S	138	140.3	18.08	0.005778+ j0.023032	13.46	0.009002+ j0.047437
Sherwood Park 746S	138	139.9	14.54	0.009174+ j0.027964	9.90	0.015957+ j0.069198

Westwood 422S	138	140.5	17.95	0.007501+ j0.022706	12.84	0.012209+ j0.051213
Fort Saskatchewan 54S	138	140.9	26.16	0.004057+ j0.015945	21.78	0.005046+ j0.026005

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	Location of Observed Violation	Contingency
Real time operational practices	72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)
	72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)
	72CK12 (Clover Bar 987S to Kennedale)	72CK13 (Clover Bar 987S to Kennedale)
	731L (East Edmonton 38S to 746L JCT)	694L (Westwood 422S to Fort Saskatchewan 54S)
	694L (Westwood 422S to Fort Saskatchewan 54S)	East Edmonton Transformer T3, or 700L (Sherwood Park 746S to Westwood 422S), or 865L_731L (East Edmonton 38S to Knightsbridge 216S to Broadmoor 420S)
	708L (Lamoureux 71S to 708AL Tap)	807L (Josephburg 410S to Beamer 233S)
Planned RAS for P1649	72RG1 (Rossdale to Garneau)	72RG7 (Rossdale to Garneau)

5.2 Post-Project

The same violations as the pre-Project scenarios were observed for the post-Project scenarios. All thermal overloading is under emergency rating of the element. The same mitigation measures are summarized in Table 5-2.

Table 5-2: Post-Project Mitigation Measures

Mitigation Measure	Location of Observed Violation	Contingency
Real time operational practices	72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)
	72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)
	72CK12 (Clover Bar 987S to Kennedale)	72CK13 (Clover Bar 987S to Kennedale)
	731L (East Edmonton 38S to 746L JCT)	694L (Westwood 422S to Fort Saskatchewan 54S)
	694L (Westwood 422S to Fort Saskatchewan 54S)	East Edmonton Transformer T3, or 700L (Sherwood Park 746S to Westwood 422S), or 865L_731L (East Edmonton 38S to Knightsbridge 216S to Broadmoor 420S)
	708L (Lamoureux 71S to 708AL Tap)	807L (Josephburg 410S to Beamer 233S)

Planned RAS for P1649	72RG1 (Rossdale to Garneau)	72RG7 (Rossdale to Garneau)

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.

Post-mitigation power flow studies 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 or TFO capital maintenance projects were not studied nor reported. Since this project marginally reduces the overload on 72RG1 after loss of 72RG7, Planned RAS for P1649 was not studied.

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 A9.

Attachment A1
Engineering Connection Assessment: Study Scope

Study Scope

P2453 EDTI Edmonton 3 H2 Plant Cogen

EPCOR Distribution & Transmission Inc.

Date: 2022-02-25

Version: V3

Classification: Public

Company Name	Name and Credentials	Date	Signature
EPCOR Distribution & Transmission Inc. [Market Participant]	Sarah Hanson, P. Eng.	02/03/2022	
AESO	Myron Jin-Li, P. Eng.	March 8, 2022	
EPCOR Distribution & Transmission Inc. [Transmission Facility Owner]	John Cassano, P. eng.	02/03/2022	
Air Products [Generation Facility Owner]	Mark Seldenthuis	02/03/2022	

Contents

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1 Introduction

This Study Scope provides an overview of the engineering studies to be completed by EPCOR Distribution & Transmission Inc. (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

EPCOR Distribution & Transmission Inc. (EDTI), in its capacity as the legal owner of an electric distribution system (DFO), has submitted a request for system access service to the Alberta Electric System Operator (AESO) to connect a new hydrogen production plant "the Plant" in the Edmonton city limits, north of Sherwood Park.

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 20 MW and a Rate DTS, *Demand Transmission Service*, contract capacity of 50 MW; and a request for transmission development (collectively, the Project).

The Project in-service date (ISD) used for the purpose of the studies is September 23, 2023.

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	50 MW
	Type	Industrial
	Motors (number and size)	1 x 24,000 hp 1 x 15,500 hp 1 x 11,500 hp 1 x 11,000 hp 1 x 7,500 hp 1 x 3,500 hp Numerous other motors < 2,000 hp
	Power factor	0.9 pf
	Future load expansion plans	No
Generation	Generation type	Cogen
	Existing Rate STS, *Supply Transmission Service,* contract capacity	No existing contract.

Project Component		Description
	Requested Rate STS	20 MW
	Number and size of generating units	3 x 23 MVA Gas Turbine Generators 1 x 39 MVA Steam Generator
	Maximum authorized real power (MARP)	88 MW
	Maximum capability (MC)	20 MW Note: Under contingencies within the plant, as much as 60MW may temporarily be exported to the power system for short periods of time while the internal generation and processes ramp down.
	Reactive power capability	0.95 pf absorbing
		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.

1.2 Existing System Overview

1.2.1 Study Area

Geographically, the Project is located in the AESO planning area of Edmonton (Area 60).

The Study Area consists of the AESO Edmonton (Area 60) and Fort Sask. (Area 33), including the tie lines connecting these planning areas to the rest of the AIES.

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).

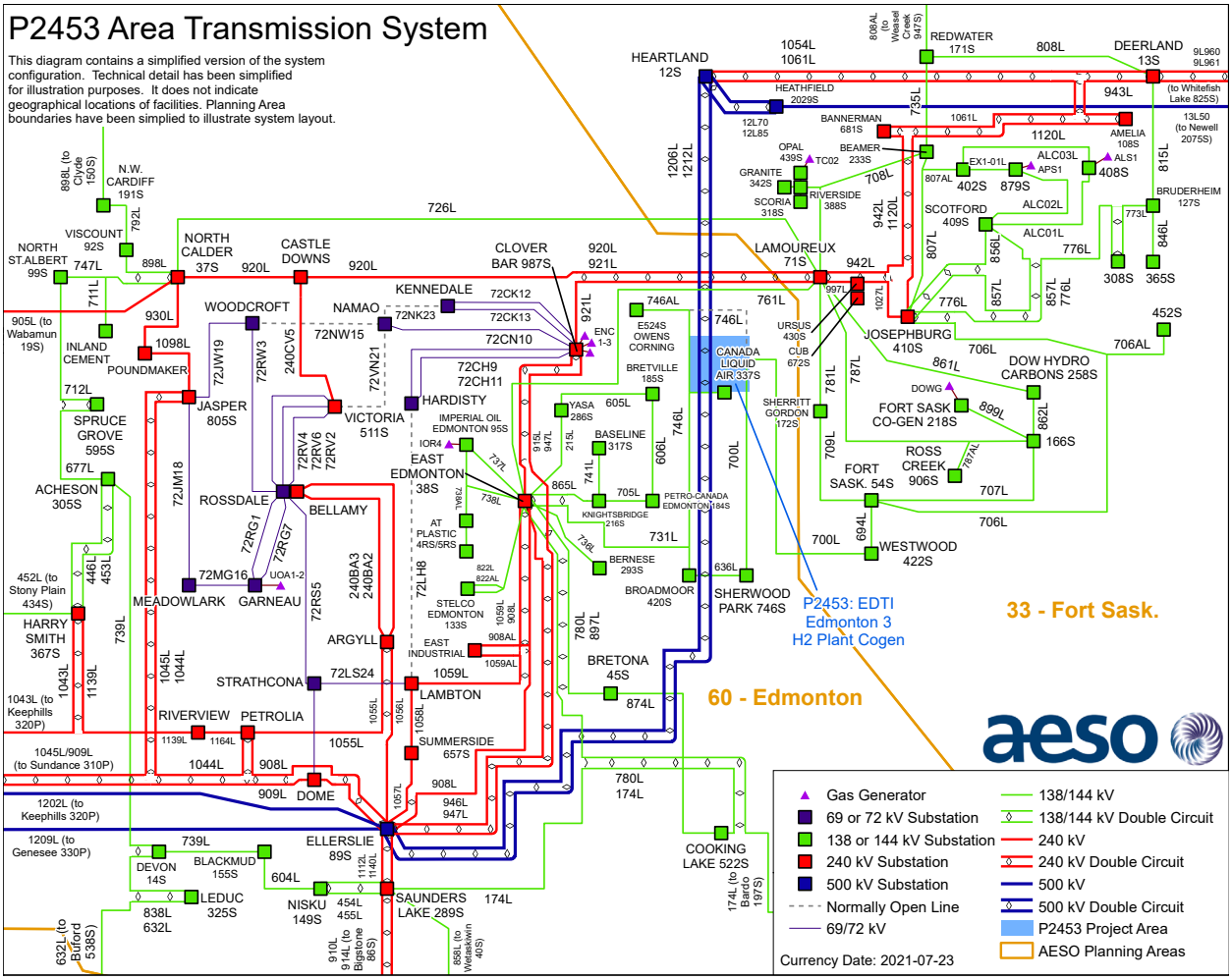
There are a number of constraints in the Study Area that are mitigated by existing remedial action schemes (RASs) and/or other protection schemes.

The following existing RASs and/or other protection schemes are used to manage constraints in the area:

- RAS 149 EATL HVDC
- RAS 150 WATL HVDC

There is also a planned RAS, the Garneau-Meadowlark Reconfiguration RAS, which will come in service with the approved West Edmonton Transmission Upgrade Project (P1649)

Figure 1-1: Transmission System in the Study Area



2 Connection Alternative to be Studied

The following alternative will be studied:

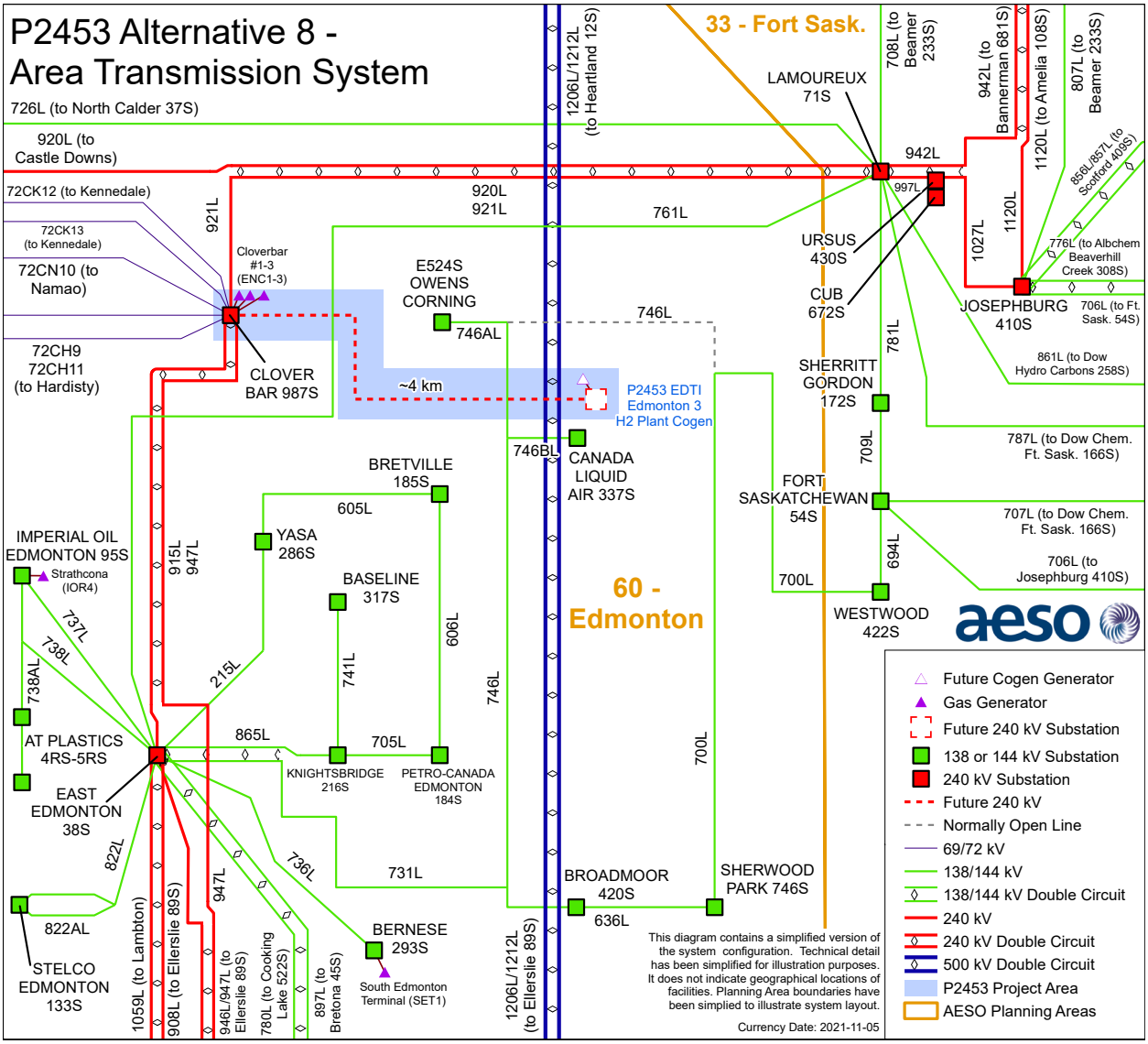
2.1 Alternative 8 – Radial 240 kV connection to Clover Bar 987S

This alternative includes the following developments:

- Modify the existing Clover Bar 987S, including adding two (2) 240 kV circuit breakers;
- Add one new 240kV circuit, approximately 4 km in length, to connect the Facility to Clover Bar 987S using a radial configuration, and
- Add or modify associated equipment as required for the above transmission developments.

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

Figure 2-1: Connection Alternative 8



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, Category B, and Category C5 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 [and Category C5] conditions: The extreme voltage range values per Table 2-1 in the *Transmission Planning Criteria – Basis and Assumptions; and*
- 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 following:

- The AESO's *Connection Study Requirements*;
- Section 502.7 of the ISO rules, *Load Facility Technical Requirements*;
- Section 502.5 of the ISO rules *Generating Unit Technical Requirements*;
- Section 502.6 of the ISO rules *Generating Unit Operating 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	Scenario Name	Project Net Import (MW)	Project Net Export (MW)
Pre-Project (STS)					
1	2024 Summer Peak (SP)	High Edmonton region generation	2024 SP STS Pre-Project	0	0
2	2024 Summer Light (SL)		2024 SL STS Pre-Project	0	0
3	2024 Winter Peak (WP)		2024 WP STS Pre-Project	0	0
Post -Project (STS)					
4	2024 SP	High Edmonton region generation	2024 SP STS Post-Project	0	20
5	2024 SL		2024 SL STS Post -Project	0	20
6	2024 WP		2024 WP STS Post -Project	0	20
7	2031 WP	All study region (area 33, 40, 60) generation in-service	2031 WP STS Post-Project	0	20
Pre-Project (DTS)					
8	2024 SP	Low Edmonton region generation	2024 SP DTS Pre-Project	0	0
9	2024 WP		2024 WP DTS Pre-Project	0	0
Post-Project (DTS)					
10	2024 SP	Low Edmonton region generation	2024 SP DTS Post-Project	50	0
11	2024 WP		2024 WP DTS Post-Project	50	0
Post -Project Sensitivity (STS)					
5a	2024 SL	High Edmonton region generation	2024 SL STS Post-Project	0	60

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

There are no connection projects in the Study Area that need to be included in the studies in addition to the connection projects already modeled in the 2021 Planning Base Case Suite (2021 PBCS).

4.2.3 Load Assumptions

The load forecast to be used for the studies is shown in Table 4-2 and is a forecast for the AESO Edmonton Planning Region peak based on the AESO 2021 Long-Term Outlook[1] with modifications to incorporate the latest forecast intelligence. For the post-Project studies, when the Study Area loads are modified to align with the regional load forecast, the active power to reactive power ratio in the base case scenarios shall be maintained.

Table 4-2: Forecast Load (at AESO Edmonton Planning Region Peak)

AESO Planning Region Name	Forecast Peak Load by Year/Season (MW)		
	2024 SP	2024 SL	2024 WP
Edmonton Planning Region[1]	2119	1194	2277

Note:
[1] The Edmonton Region comprises the following AESO planning areas: 31 40, 60

IDEV files contain non-motor loads in zones 34, 36, and 351. These loads are not accounted for in the forecasted peak loads shown above and should not be considered when scaling load. The AESO engineer will provide guidance to load scaling procedures as required.

4.2.4 Generation Assumptions

The generation forecast to be used for the studies is based on the 2021 LTO with modifications to incorporate the latest forecast intelligence. The generation assumptions for the STS studies will assume high generation in the Study Area. The generation assumptions for the DTS studies will assume low generation in the Study Area. Additional studies may be required in the event of changes to the AESO's corporate forecast.

The existing generation (excluding wind and solar) dispatch conditions for the study scenarios are described in Table 4-3.

The University of Alberta unit #2 was determined to be the critical generator, and shall be modelled as being offline to simulate the N-G condition in the DTS study scenarios.

[1] The [e.g., 2017 LTO] is available on the AESO website.

Table 4-3: Existing Generation (excluding Wind and Solar) Dispatch Conditions for STS Scenarios

Facility Name	Unit No.	Bus No.	MC (MW)	AESO Planning Area No.	Unit Net Generation[a] (MW) by Scenario		
					2024 SP	2024 SL	2024 WP
Cloverbar	1	25516	48	60	43	38	45
Cloverbar	2	26516	101	60	96	63	98
Cloverbar	3	26516	101	60	96	97	98
University of Alberta	1, 2	25352, 25353	39	60	25	21	31

Table 4-4: Existing Generation (excluding Wind and Solar) Dispatch Conditions for DTS Scenarios

Facility Name	Unit No.	Bus No.	MC (MW)	AESO Planning Area No.	Unit Net Generation[a] (MW) by Scenario	
					2024 SP	2024 WP
Cloverbar	1	25516	48	60	Not in merit	Not in merit
	2	26516	101	60		
	3	26516	101	60		
University of Alberta (N-G)[2]	1, 2	25352, 25353	39	60	2	13

Notes:
[a] "Unit Net Generation" refers to gross generating unit output (MW) less unit service load.
[b] "N-G" indicates the critical generating unit that is assumed by the AESO to be offline to test the N-G contingency condition
[c] "Not in merit" means that the generating unit has operating blocks whose prices are above the system marginal price.

4.2.5 Intertie Flow Assumptions

The Alberta-British Columbia (AB-BC), Alberta-Saskatchewan (AB-SK), and Alberta-Montana (MATL) intertie points are deemed to be too far away from the Study Area to have any material impact on the connection assessment. Therefore, intertie flow values shall be set to the AESO planning base case values and will not be adjusted for the studies.

[2] The University of Alberta units are forecasted together. To simulate the N-G condition, the combined unit net generation is to be dispatched as per Table 4-5 and then Unit #2 set to out-of-service

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 2031 WP scenario, the HVDC power order should be as per the AESO base cases and will not be adjusted.

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 4-5. These limits must be maintained when performing the studies.

Table 4-5: 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 4-6 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.

Remove the notes under the following table that are not applicable.

Table 4-6: Thermal Rating Assumptions for Key Transmission Lines in the Study Area

Line ID	Line Description	Voltage Class (kV)	Nominal Rating (MVA)		Short-term[3] Rating (MVA)	
			Summer	Winter	Summer	Winter
921L	*Clover Bar E987S to Lamoureux 71S*	*240*	*417*	*499*	*500*	*620*
915L	*Clover Bar E987S to East Edmonton 38S*	*240*	*492*	*499*	*590*	*648*
947L	*Clover Bar E987S to Ellerslie 89S*	*240*	*493*	*611*	*592*	*743*
908AL	*East Industrial E52S to JCT. 908AL*	*240*	*499*	*499*	*499*	*499*
1059AL	*East Industrial to JCT. EP 1059AL*	*240*	*499*	*499*	*499*	*499*
1057L	*Summerside E657S to Ellerslie 89S*	*240*	*594*	*713*	*654*	*733*
1058L	*Lambton E803S to Summerside E657S*	*240*	*499*	*499*	*499*	*499*

[3] When line loading in post Category B contingency is observed to exceed nominal rating and is less than the Short-term (emergency) rating, it is assumed that AESO and TFO operating practices can manage the constraint within the time requirements of TFO short time (emergency) rating.

Line ID	Line Description	Voltage Class (kV)	Nominal Rating (MVA)		Short-term[3] Rating (MVA)	
			Summer	Winter	Summer	Winter
908L	Petrolia E816S to Ellerslie 89S	240	505	648	606	706
909L	Dome E665S to Sundance 310P	240	481	499	499	499
909L	Ellerslie 89S to Dome E665S	240	499	499	499	499
908L	JCT. 908AL to East Edmonton 38S	240	499	499	599	648
1059L	JCT. EP 1059AL to East Edmonton 38S	240	499	499	599	648
1055L [a]	Petrolia E816S to Argyll E629S	240	419	517	419	517
1056L [b]	Ellerslie 89S to Argyll E629S	240	419	517	419	517
240BA2 [b]	Argyll E629S to Bellamy E814S	240	400	479	473	540
240BA3 [a]	Argyll E629S to Bellamy E814S	240	400	479	473	540
240CV5	Castle Downs E557S to Victoria E511S	240	475	503	475	503
780L	East Edmonton 38S to Cooking Lake	138	98	132	108	145
174L	Saunders Lake 289S to Bardo 197S	138	85	90	94	99
72CH9	Clover Bar E987S to Hardisty	69 [g]	38.3	38.3	76.5	76.5
72CH11	Clover Bar E987S to Hardisty	69 [g]	38.3	38.3	76.5	76.5
72CK12	Clover Bar E987S to Kennedale	69 [g]	56.5 [c]	56.5 [c]	61.0	65.1
72CK13	Clover Bar E987S to Kennedale	69 [g]	59.4 [c]	59.4 [c]	61.0	65.1
72CN10	Clover Bar E987S to Namao	69 [g]	57.4	57.4	57.4	57.4
72JM18	Jasper E805S to Meadowlark	69 [g]	57.4	62.7	57.4	62.7
72JW19	Jasper E805S to Woodcroft	69 [g]	57.4	62.7	57.4	62.7
72KN23	Kennedale to Namao	69 [g]	57.4	57.4	57.4	57.4
72LH8	Lambton E803S to Hardisty	69 [g]	86.6	118.9	101.0	129.7
72LS24	Lambton E803S to Strathcona	69 [g]	86.6	118.9	101.0	129.7
72MG16	Meadowlark to Garneau	69 [g]	57.4	62.7	57.4	62.7
72NW15	Namao to Woodcroft	69 [g]	61.5	84.9	71.7	92.6
72RG1	Rossdale to Garneau	69 [g]	57.5	62.7	133.9 [d]	133.9 [d]
72RG7	Rossdale to Garneau	69 [g]	76.5	86.0	133.9 [d]	133.9 [d]
72RV2	Rossdale to E511S Victoria [e]	69 [g]	71.6	81.7	89.8	99.2
72RV4	Rossdale to E511S Victoria [e]	69 [g]	89.9	100.3	126.2	135.0
72RV6	Rossdale to E511S Victoria [e]	69 [g]	82.3	87.1	100.3	104.5

Line ID	Line Description	Voltage Class (kV)	Nominal Rating (MVA)		Short-term[3] Rating (MVA)	
			Summer	Winter	Summer	Winter
72RW3	*Rossdale to Woodcroft*	*69 g*	*57.4*	*62.7*	*57.4*	*62.7*
72VN21	*E511S Victoria to Namao*	*69 g*	*57.4*	*62.7*	*57.4*	*62.7*

NOTES:

a 1055L and 240BA3 are one circuit under normal operating mode. The overall rating is 400 MVA (summer) and 479 MVA (winter). If either 240BA2 or 1056L is out of service, the overall rating will be 419 MVA (summer) and 517 MVA (winter).

b 1056L and 240BA2 are one circuit under normal operating mode. The overall rating is 400 MVA (summer) and 479 MVA (winter). If either 240BA3 or 1055L is out of service, the overall rating will be 419 MVA (summer) and 517 MVA (winter).

c 72CK12 normal summer and winter rating with 72CK13 out of service is 479 A (56.5 MVA at 69 kV). 72CK13 normal summer and winter rating with 72CK12 out of service is 497 A (59.4 MVA at 69 kV)

d 72RG1 and 72RG7 can be operated to emergency ratings for a maximum duration of 10 minutes.

e Ratings for 72kV facilities in this table and in the study cases have been converted to MVA ratings based on 69 kV.

The TFO provided the details of the substation transformers in the Study Area. The key transformers in the Study Area are shown in Table 4-7.

Table 4-7: Summary of Key Transformer Ratings in the Study Area

Substation Name and Number	Transformer ID	Transformer Voltages (kV)	MVA Rating
Ellerslie 89S	*T1*	*500/240*	*1200.0*
	T2	*500/240*	*1200.0*
East Edmonton 38S	*T1*	*240/138*	*341.8*
	T2	*240/138*	*340.6*
Clover Bar 987S	*T1*	*240/69*	*200*
	T2	*240/69*	*200*
East Industrial E52S	*T1*	*240/25*	*63.0*

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 4-8.

Table 4-8: 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)
East Edmonton 38S	*138*	*2*	*48.91*	-	-
Nisku 149S	*138*	*1*	*30*	-	-
Acheson 305S	*138*	*1*	*24.46*	-	-
Jasper 805S	*240*	*1*	*105.31*	-	-
Rossdale	*69*	*2*	*90.58*	-	-
Cloverbar 987S	*69*	*1*	*31.57*	-	-
Stelco Edmonton 133S	*34.5*	*1*	*16.8*	-	-
		1	*30*	-	-

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 TFOs and as shown in Table 4-9. Only those contingencies shown in Table 4-9 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 4-9: Protection Fault Clearing Times

Contingency (System Element Lost)	Fault Location	Clearing Times (Cycles)	
		Near End	Far End
915L (East Edmonton 38S – Clover Bar 987S)	East Edmonton 38S	5	6
915L (East Edmonton 38S – Clover Bar 987S)	Clover Bar 987S	5	6
921L (Clover Bar 987S – Lamoureux 71S)	Clover Bar 987S	5	6
921L (Clover Bar 987S – Lamoureux 71S)	Lamoureux 71S	5	6
947L (Clover Bar 987S – Ellerslie 89S)	Clover Bar 987S	5	6
947L (Clover Bar 987S – Ellerslie 89S)	Ellerslie 89S	5	6
New 240 kV Project line (New project substation – Clover Bar 987S)	Clover Bar 987S	5	6
New 240 kV Project line (New project substation – Clover Bar 987S)	New project substation	5	6
C5: 915L/947L	Clover Bar 987S	5	6

4.2.9 Project Dynamic Data

Dynamic data for the Project can be found in Attachment A7.

4.2.10 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.

4.2.11 Motor Data and Assumptions

The data to be used in the motor starting studies is provided in Table 4-10 below.

Table 4-10: Motor Nameplate and Calculated Data

Motor Rating	Value

Rated power	TBD
Rated voltage	TBD
Rated current	TBD
Rated speed	TBD
Rated torque	TBD
Nominal power factor	TBD
Nominal efficiency	TBD
Moment of inertia (motor)	TBD
Moment of inertia (driven machine)	TBD
Locked-rotor torque	TBD
Breakdown torque	TBD
Locked-rotor current	TBD
MVA base	TBD
Rated motor speed p.u	TBD
Driven machine torque p.u. @ n=ns	TBD

5 Study Methodology

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

Table 5-1: Summary of the Studies to be Performed

Scenario No. and Name		Power Flow			Voltage Stability			Transient Stability			Motor Starting		Short Circuit
		Category			Category			Category			Category		Category A
		A	B	C5	A	B	C5	A	B	C5	A	B	
Pre-Project (STS)													
1	2024 SP	X	X										
2	2024 SL	X	X										
3	2024 WP	X	X										X
Post-Project (STS)													
4	2024 SP	X	X										
5	2024 SL	X	X					X	X	X			
6	2024 WP	X	X					X	X	X			X
7	2031 WP												X
Pre-Project (DTS)													
8	2024 SP	X	X										
9	2024 WP	X	X										
Post-Project (DTS)													
10	2024 SP	X	X								X	X	
11	2024 WP	X	X		X	X					X	X	
Post-Project Sensitivity (STS)													
5a	2024 SP	X	X					X	X	X			

*Pre-project voltage and transient stability studies may be requested if post-project performance issues are identified

For the engineering studies, all transmission facilities 72 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).

5.1 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 information purposes, the Studies Consultant must also provide, as a separate file, a list of any transmission elements where the thermal loading exceeds 95% of the element's normal rating under Category A and Category B conditions.

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 to be studied are shown in Table 5-1.

5.1.1 Contingencies to be Studied

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

5.2 Voltage Stability Studies

The objective of the voltage stability studies is to determine the ability of the transmission system to maintain voltage stability margin at all busses under Category A and Category B conditions. The power-voltage (PV) curve is a representation of voltage change as a result of increased power transfer between two systems. The incremental transfers will be reported at the collapse point.

Voltage stability studies will be performed for the post-Project scenarios. For load connection projects, the load level modeled in post-Project scenarios is the same as, or higher than, in pre-Project scenarios. Therefore, voltage stability studies for pre-Project scenarios will only be performed if post-Project scenarios show voltage stability criteria violations.

Voltage stability studies will be performed according to the Western Electricity Coordinating Council (WECC) Voltage Stability Assessment Methodology. WECC voltage stability criteria states, for load areas, post-transient voltage stability margin is required for the area modeled at a minimum of 105% of the reference load level for Category A conditions and for Category B conditions. For this standard, the reference load level is the maximum established planned load.

Typically, voltage stability studies are carried out assuming the worst case scenarios in terms of loading. In this connection assessment, the voltage stability studies will be performed by increasing load in Area 60 (Edmonton) and increasing generation in Area 6 (Calgary).

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

5.2.1 Contingencies to be Studied

Voltage stability studies will be performed for all Category B contingencies in the Study Area. The Category A condition and the five contingencies with the smallest stability margin will be presented in the results.

5.3 Transient Stability Studies

Genesee #3 in 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 several variables, including rotor angle, and active and reactive power output for the Cloverbar, Sundance, Keephills and Genesee generating units. The results report must also provide the 500 kV, 240 kV and 138 kV bus voltage levels for substations near the point of connection. Other busses will be monitored and will be reported as determined by the results. The results report must also provide the key branch active and reactive power flow surrounding the Facility.

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 4-9

5.4 Motor Starting Studies

The analysis may consider the starting of one motor, with its variable frequency driver (VFD) out of service, while the other motors will be running at full load. If multiple motors may start simultaneously, the number of motors, size of motors, and probability of starting them simultaneously should be provided. The following assumptions will used in conducting the motor starting studies:

- The transient voltage dip at the POD bus should not exceed 5% when starting a single motor.
- The motors will not start simultaneously.

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

5.4.1 Contingencies to be Studied

Motor starting studies will be performed for the worst case contingencies identified in the voltage stability and power flow studies.

5.5 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.

Winter peak scenarios will be used for the short-circuit studies because winter peak scenarios generally produce higher short-circuit current levels than summer peak scenarios.

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

- Clover Bar 987S
- Lamoureux 71S
- East Edmonton 38S
- E524S Owens Corning

- Canada Liquid Air 337S
- Broadmoor 420S
- Sherwood Park 746S
- Westwood 422S
- Fort Saskatchewan 54S
- the Project substation (in post-Project studies only)

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.

5.6 Sub-Synchronous Interaction (SSI) Studies

Due to the location of the project being electrically far from any HVDC converter station or series compensated line, SSI studies are not required for this Project.

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 must 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[4] 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.

[4] 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 are based on the AESO's current corporate forecast (2021 LTO) with modifications to incorporate the latest forecast intelligence. Sensitivity studies or restudy may be required in the event of revisions to the AESO's corporate forecast, forecast intelligence, or other study assumptions. 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	150
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

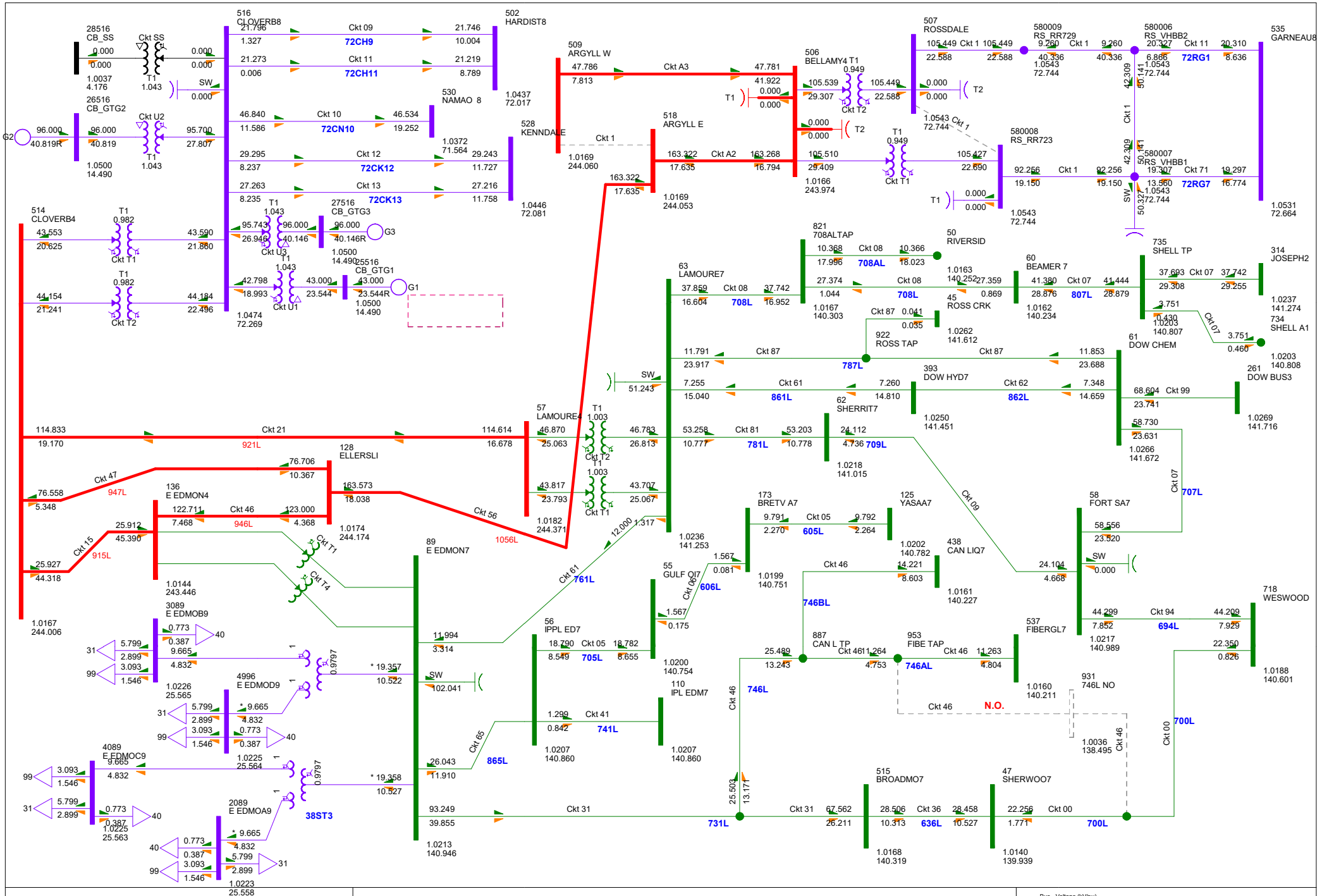

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FIGURE A2.1-1-N-0: NORMAL OPERATION
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

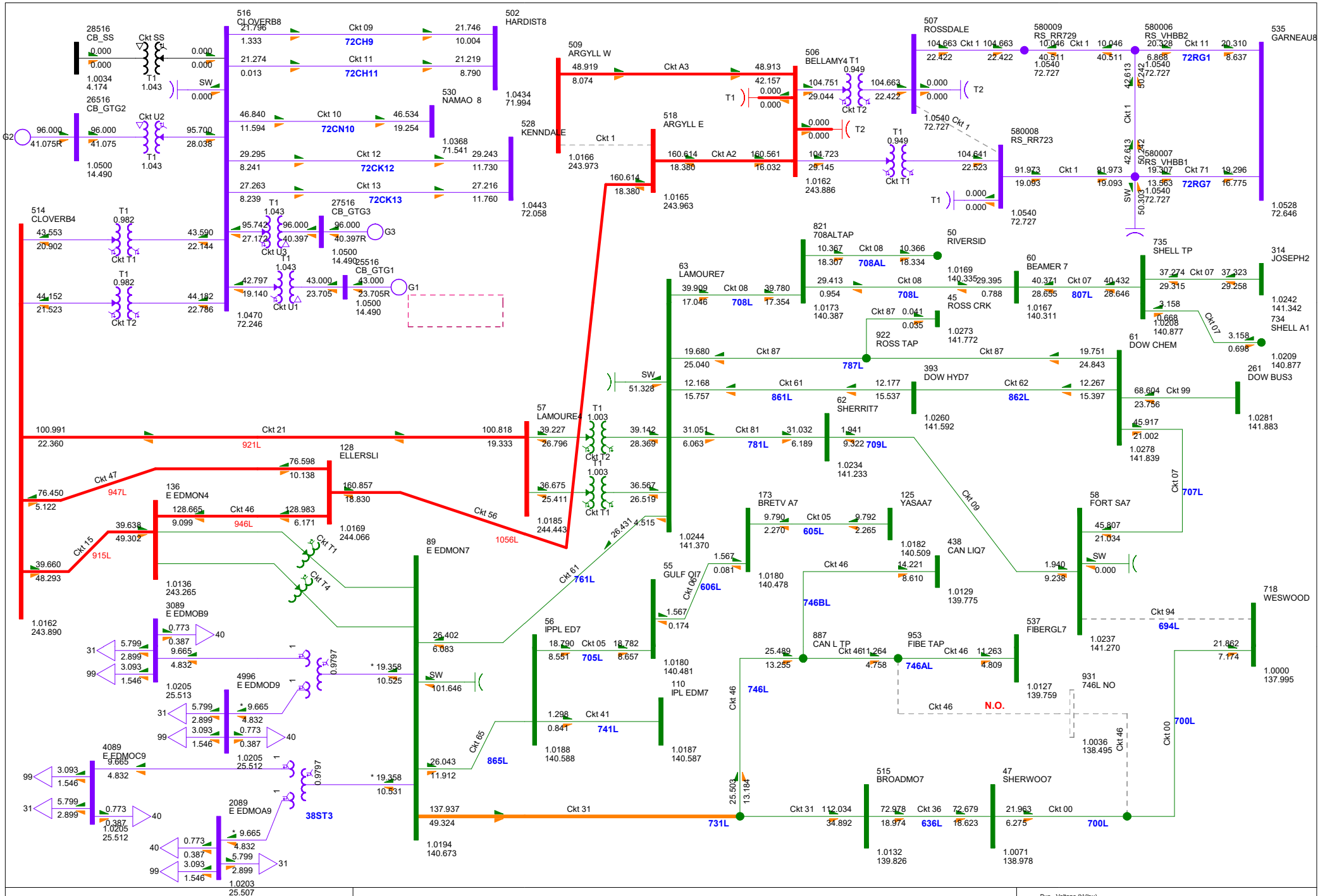

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FIGURE A2.1-2 N-1: 694L (WESTWOOD 422S TO FORT SASKATCHEWAN 54S)
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

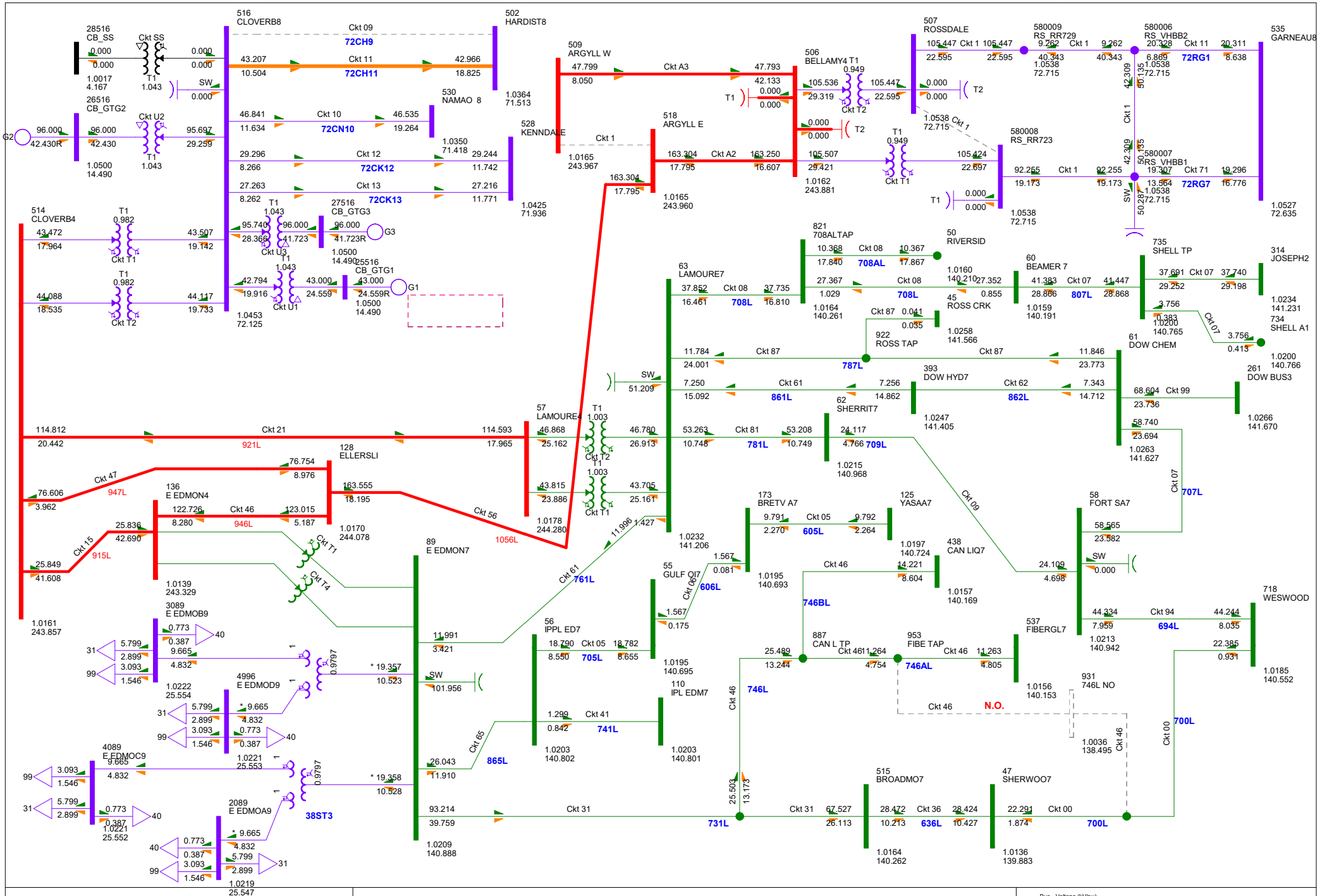

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FIGURE A2.1-3 N-1: 72CH9 (CLOVER BAR 987S TO HARDISTY)
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

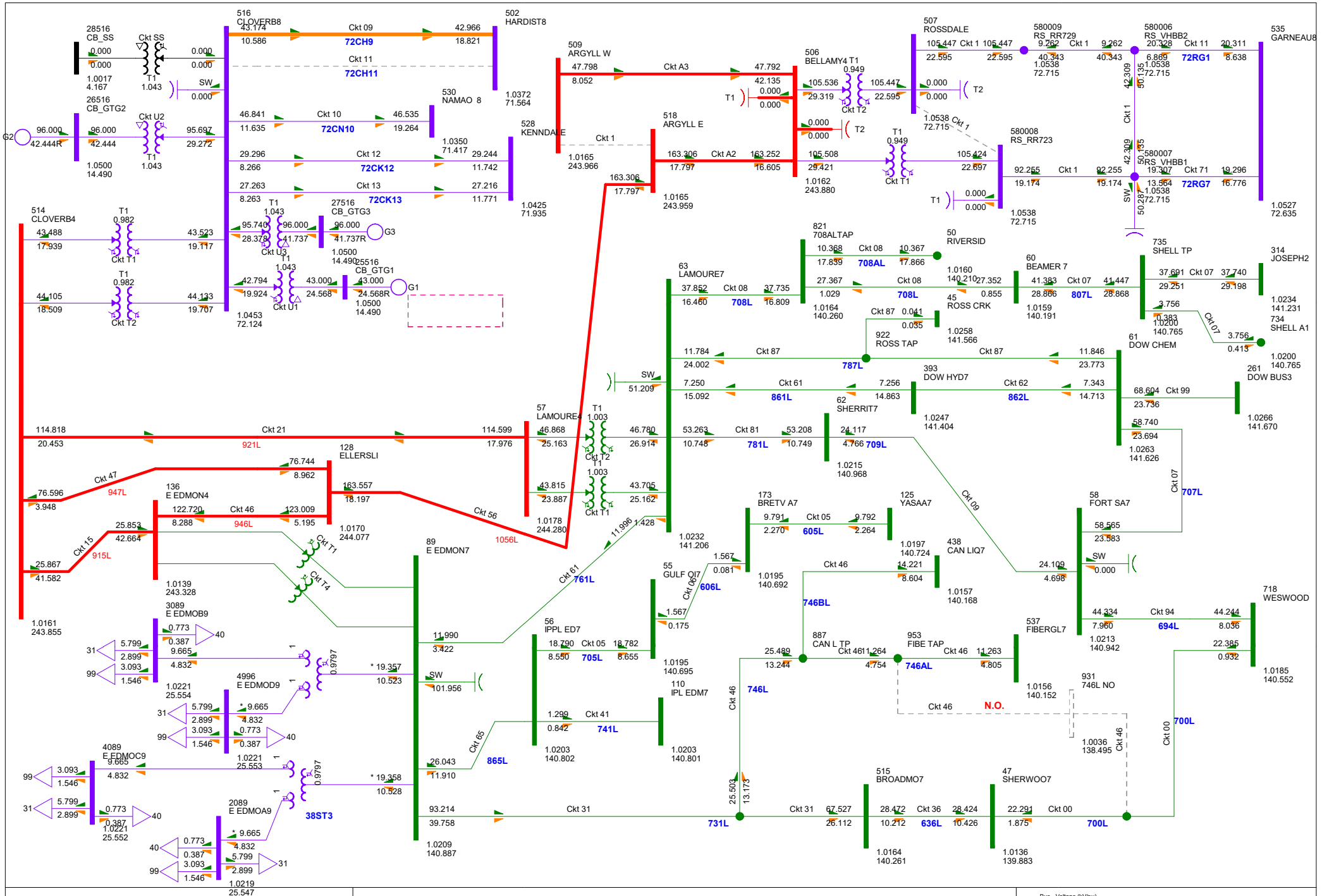

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FIGURE A2.1-4 N-1: 72CH11 (CLOVER BAR 987S TO HARDISTY)
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

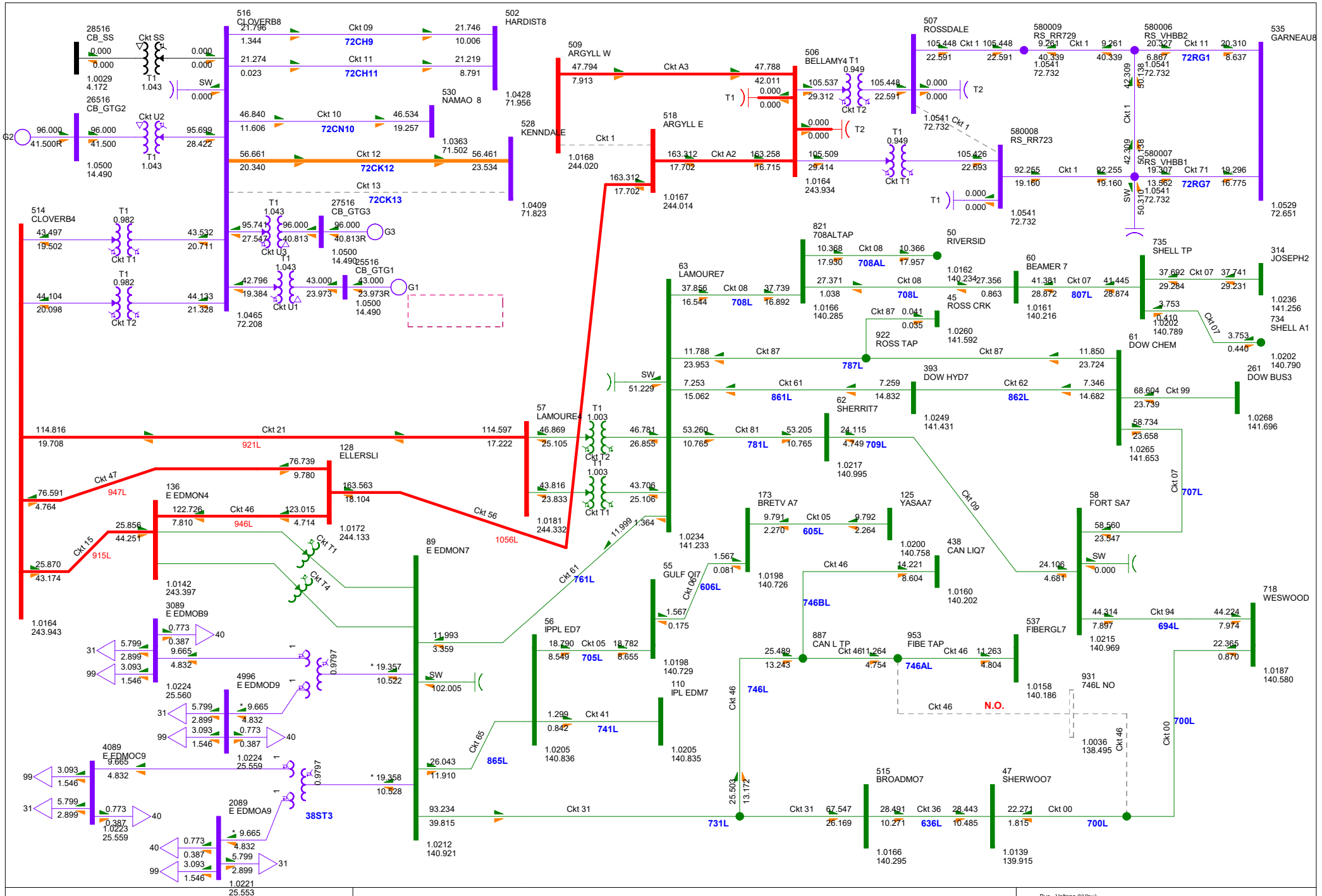

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FIGURE A2.1-5 N-1: 72CK13 (CLOVER BAR 987S TO KENNEDALE)
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

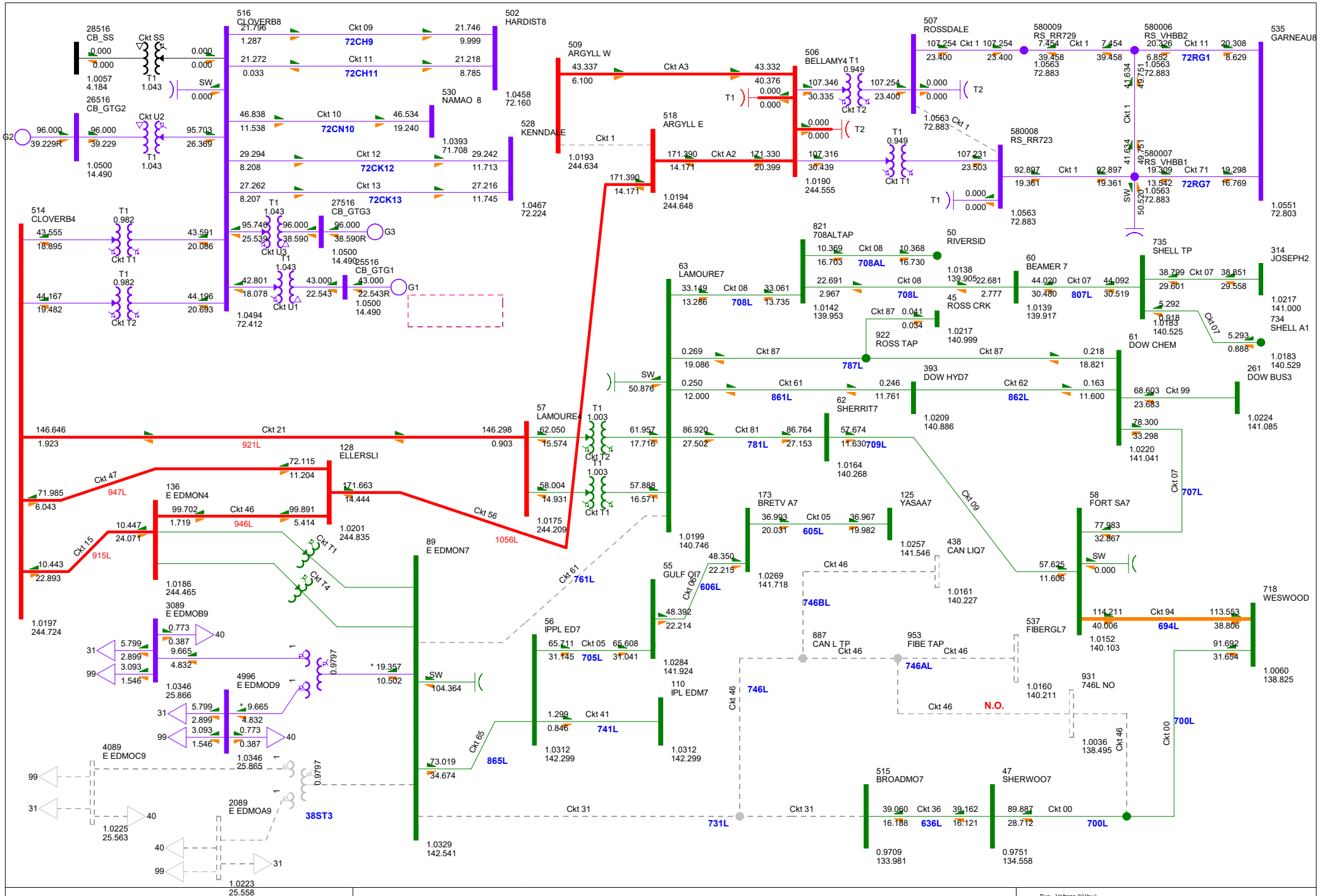

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FIGURE A2.1-6 N-1: EAST EDMONTON TRANSFORMER T3
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

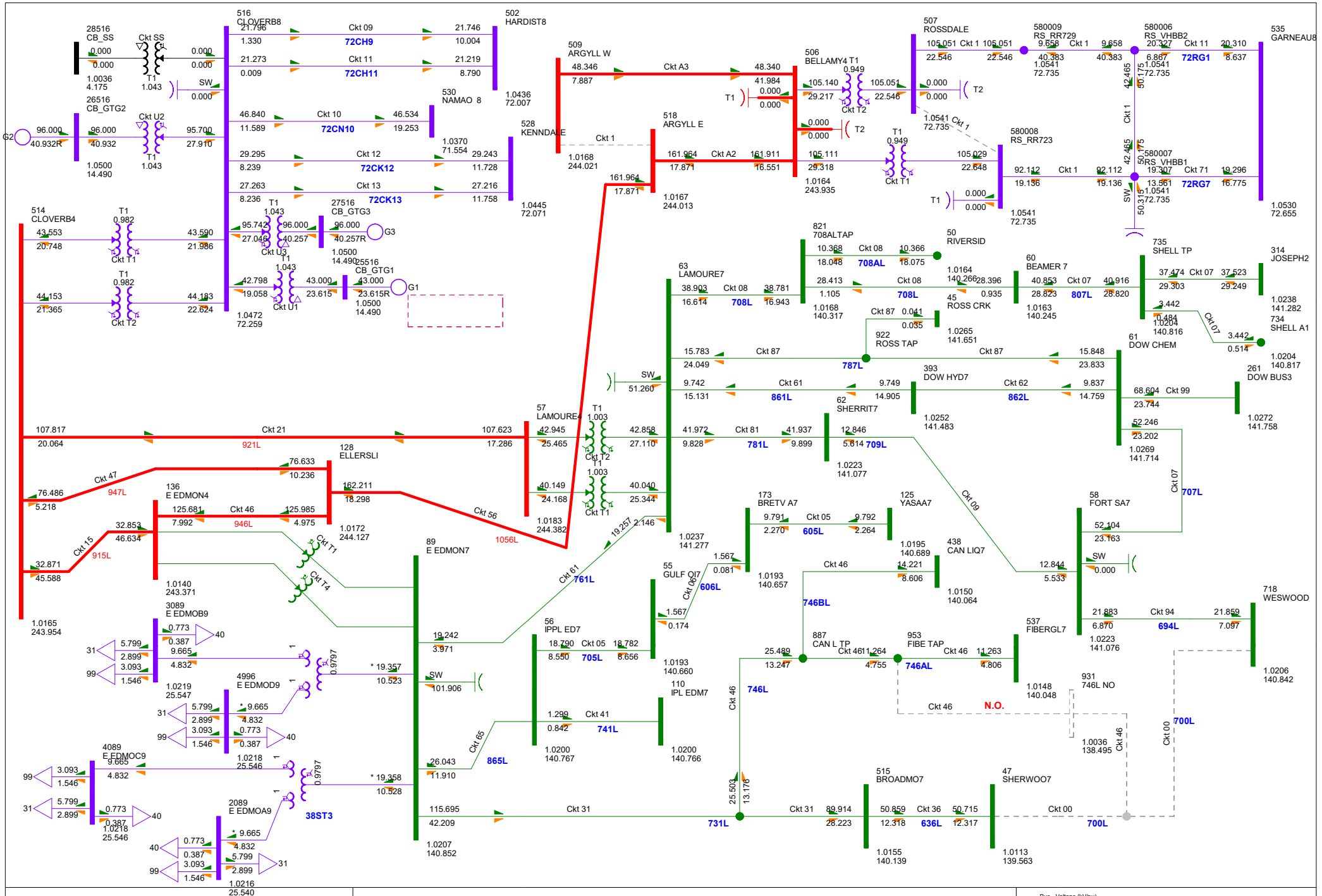

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FIGURE A2.1-7 N-1: 700L (WESTWOOD 422S TO SHERWOOD PARK 746S)
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

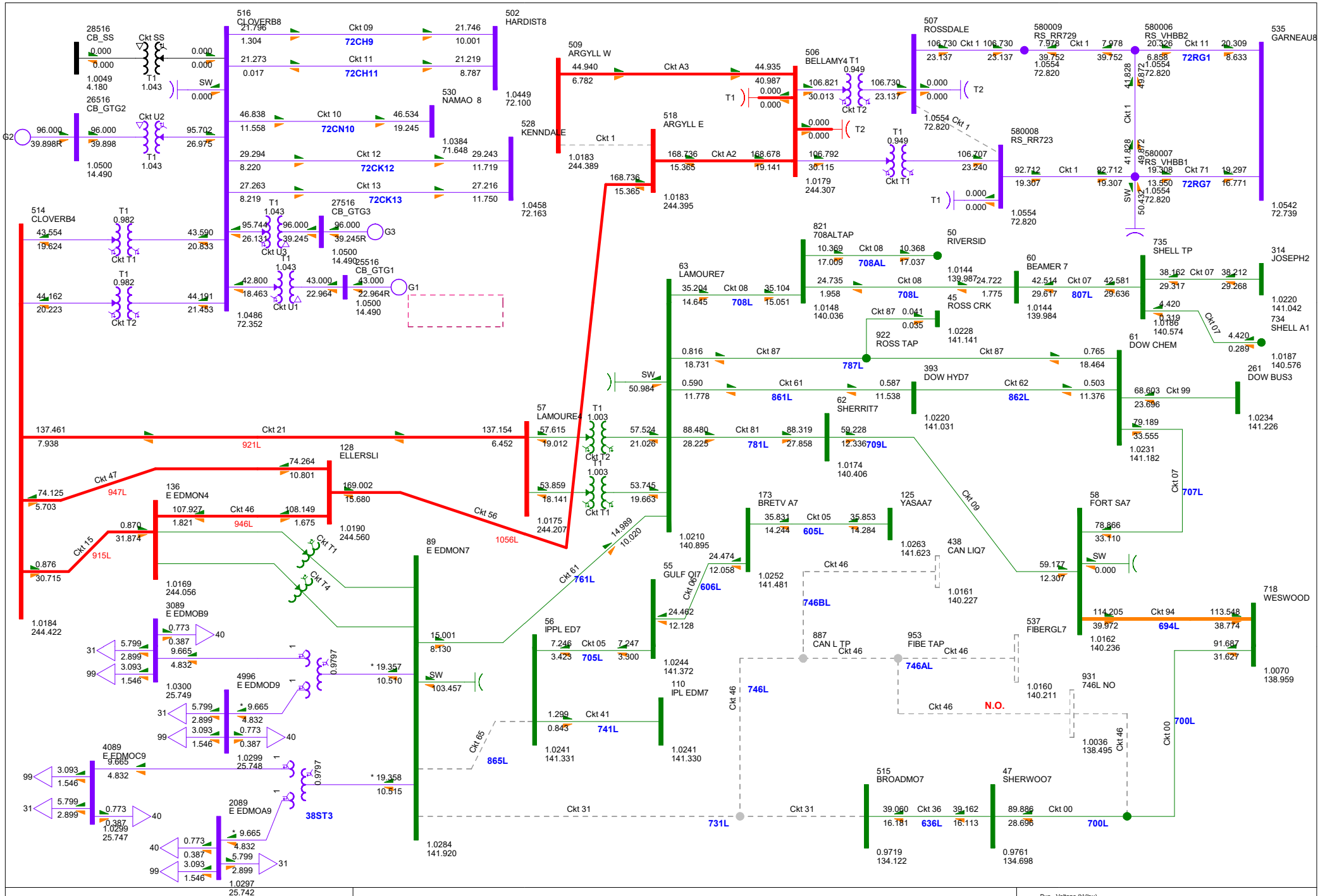

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FIGURE A2.1-8 N-1: 731L (EAST EDMONTON 38S TO BROADMOOR 420S)
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

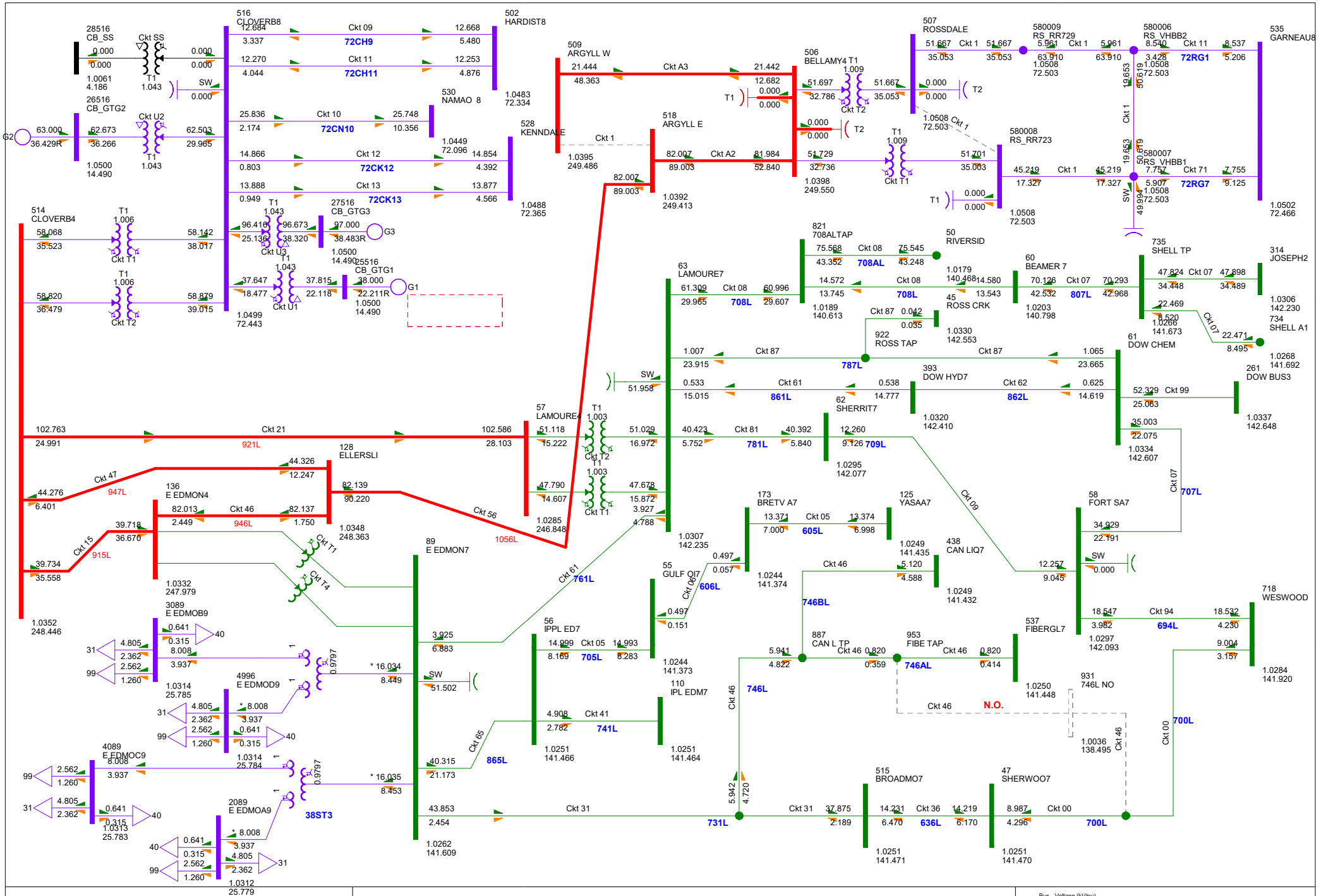

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FIGURE A2.2-1-N-0: NORMAL OPERATION
2024 SUMMER LIGHT (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

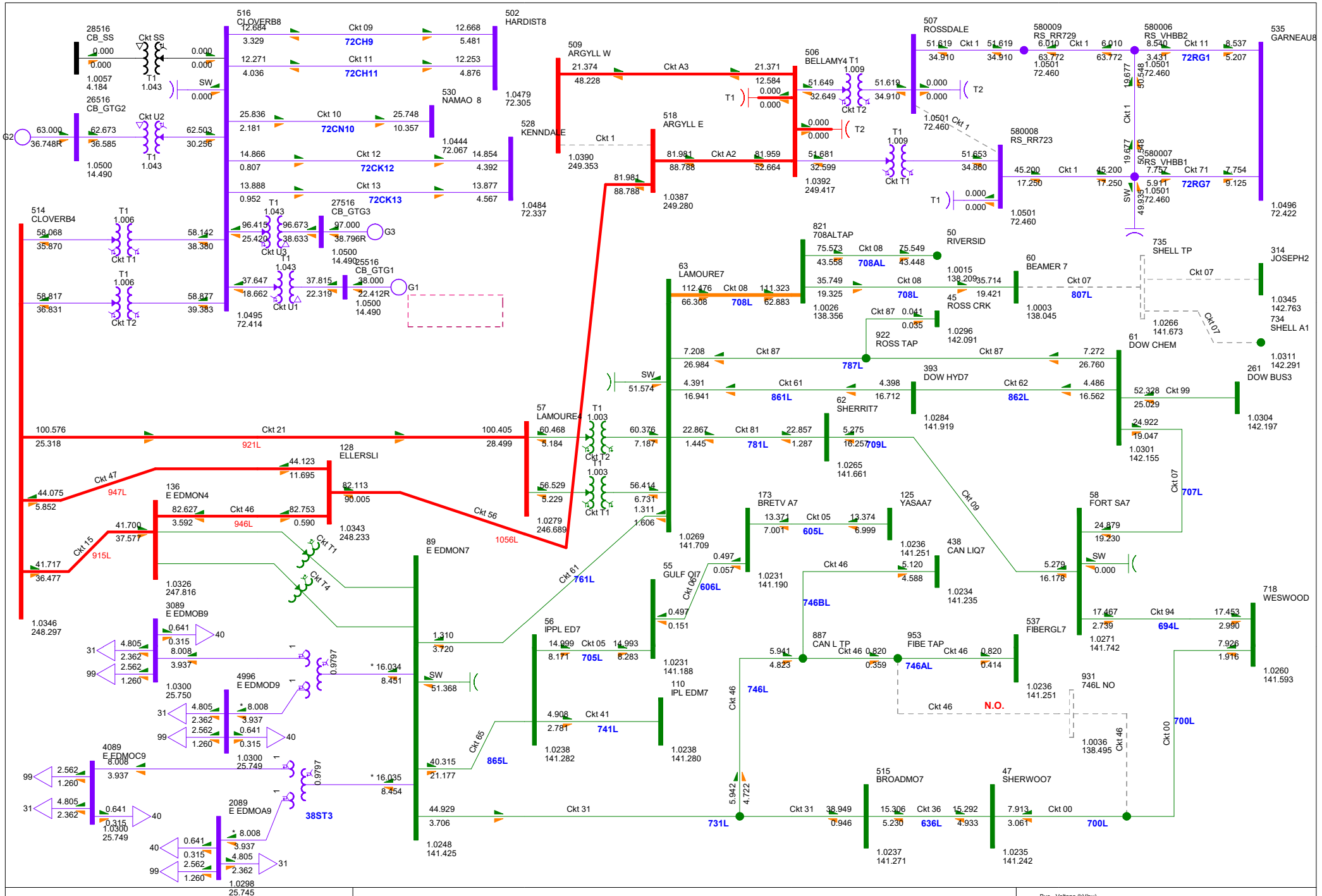

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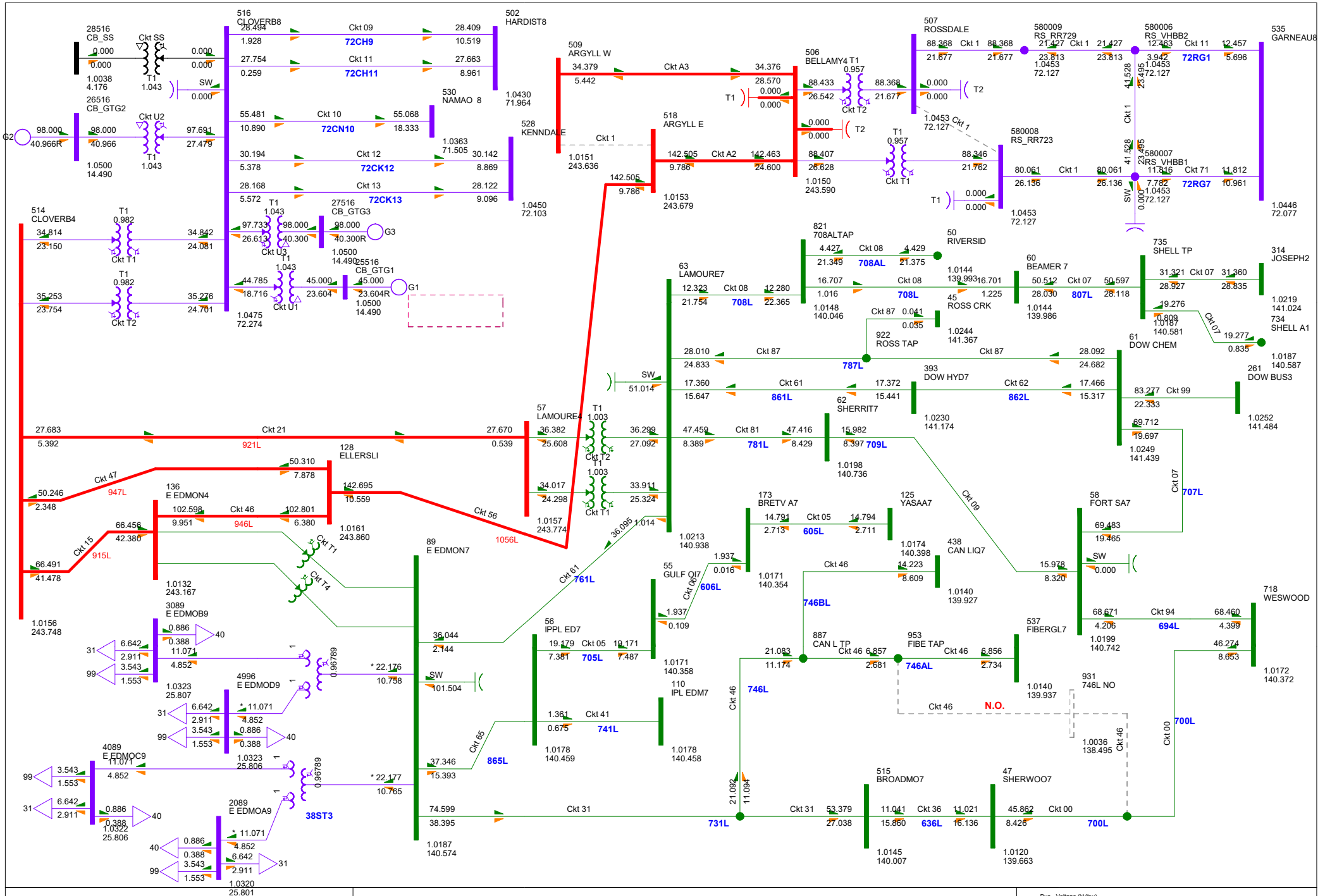
FIGURE A2.2-2 N-1: 807L (BEAMER 233S TO JOSEPHBURG 410S)
2024 SUMMER LIGHT (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

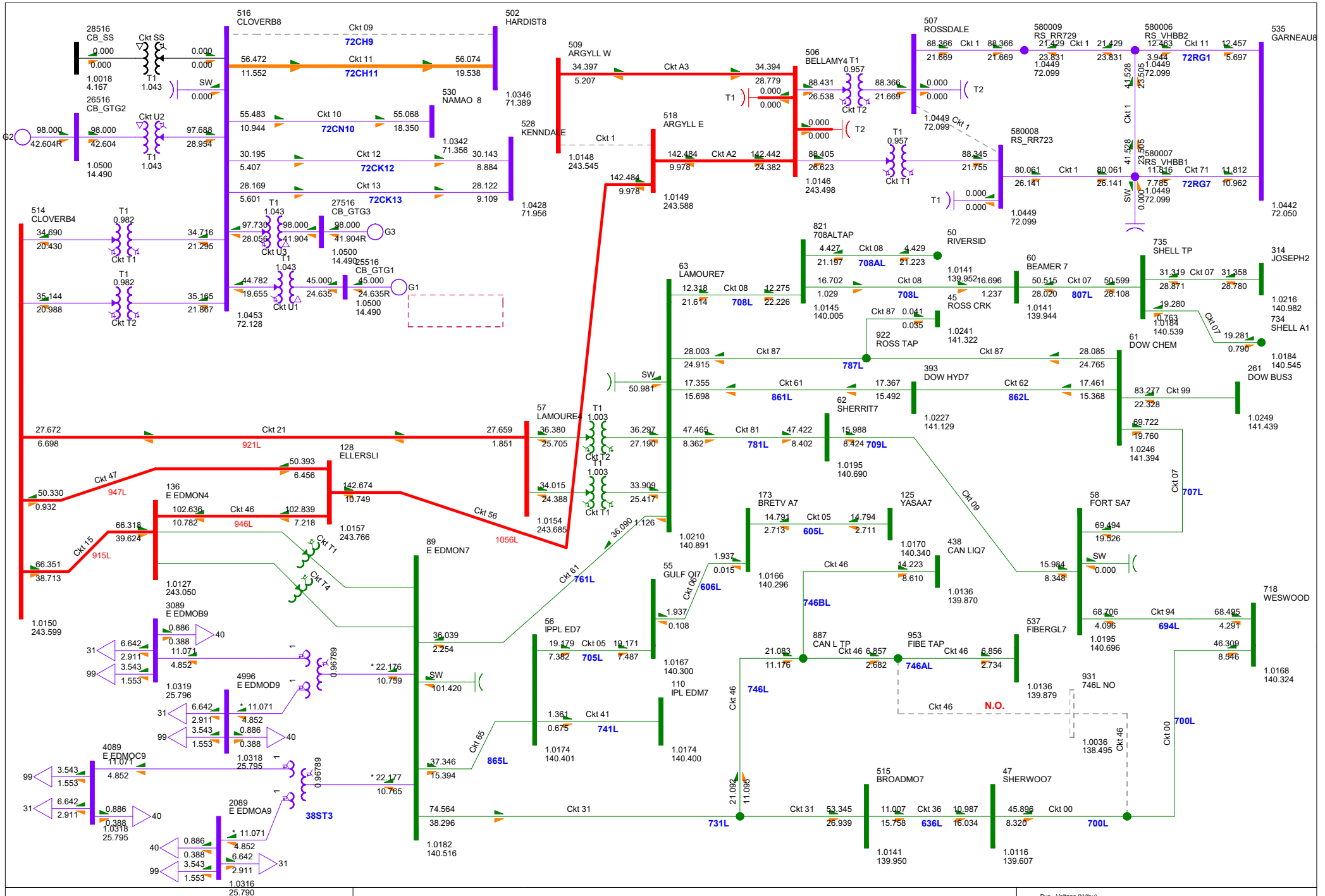
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.3-1-N-0: NORMAL OPERATION
2024 WINTER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

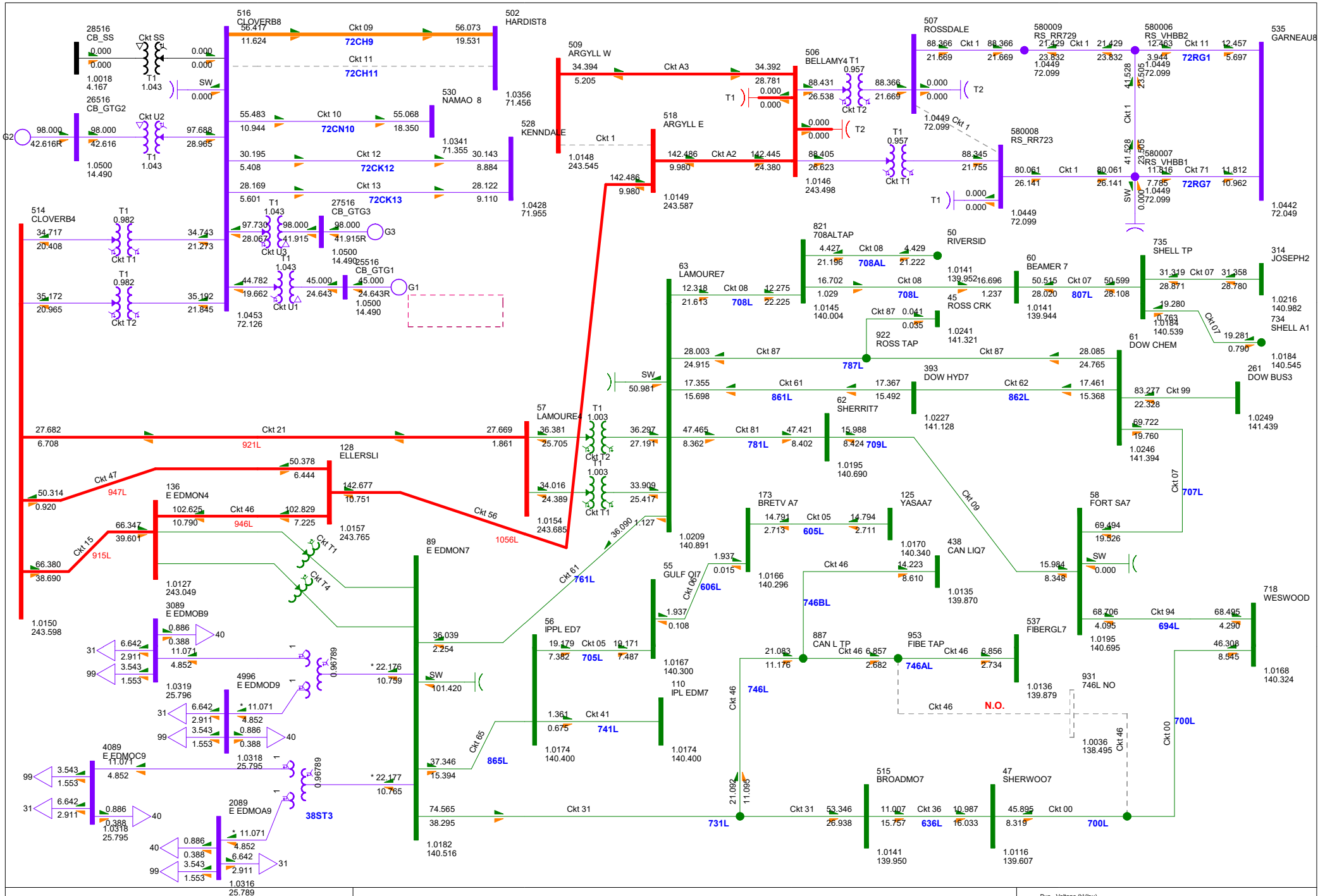
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate B
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.3-2 N-1: 72CH9 (CLOVER BAR 987S TO HARDISTY)
2024 WINTER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

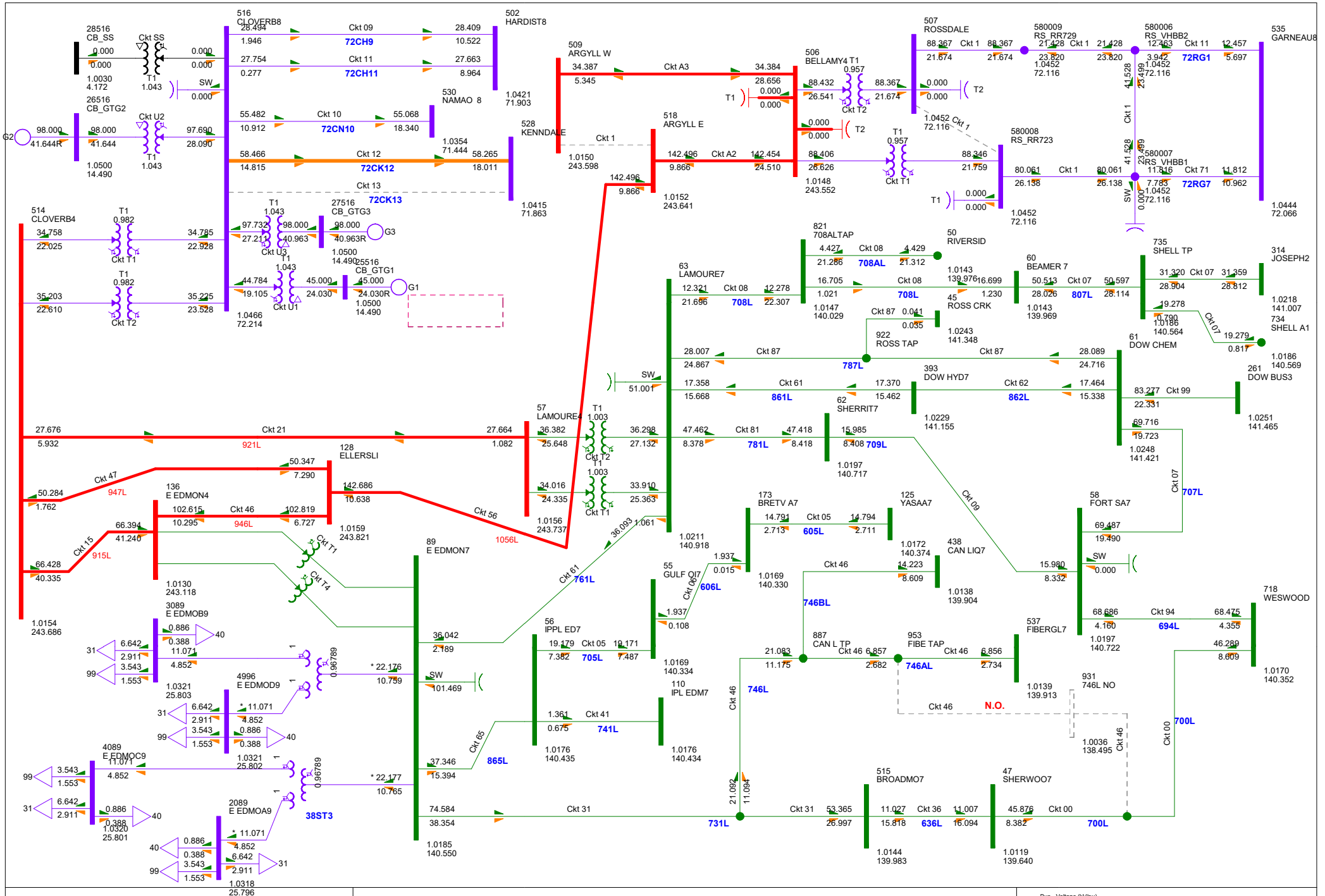
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate B
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.3-3 N-1: 72CH11 (CLOVER BAR 987S TO HARDISTY)
2024 WINTER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

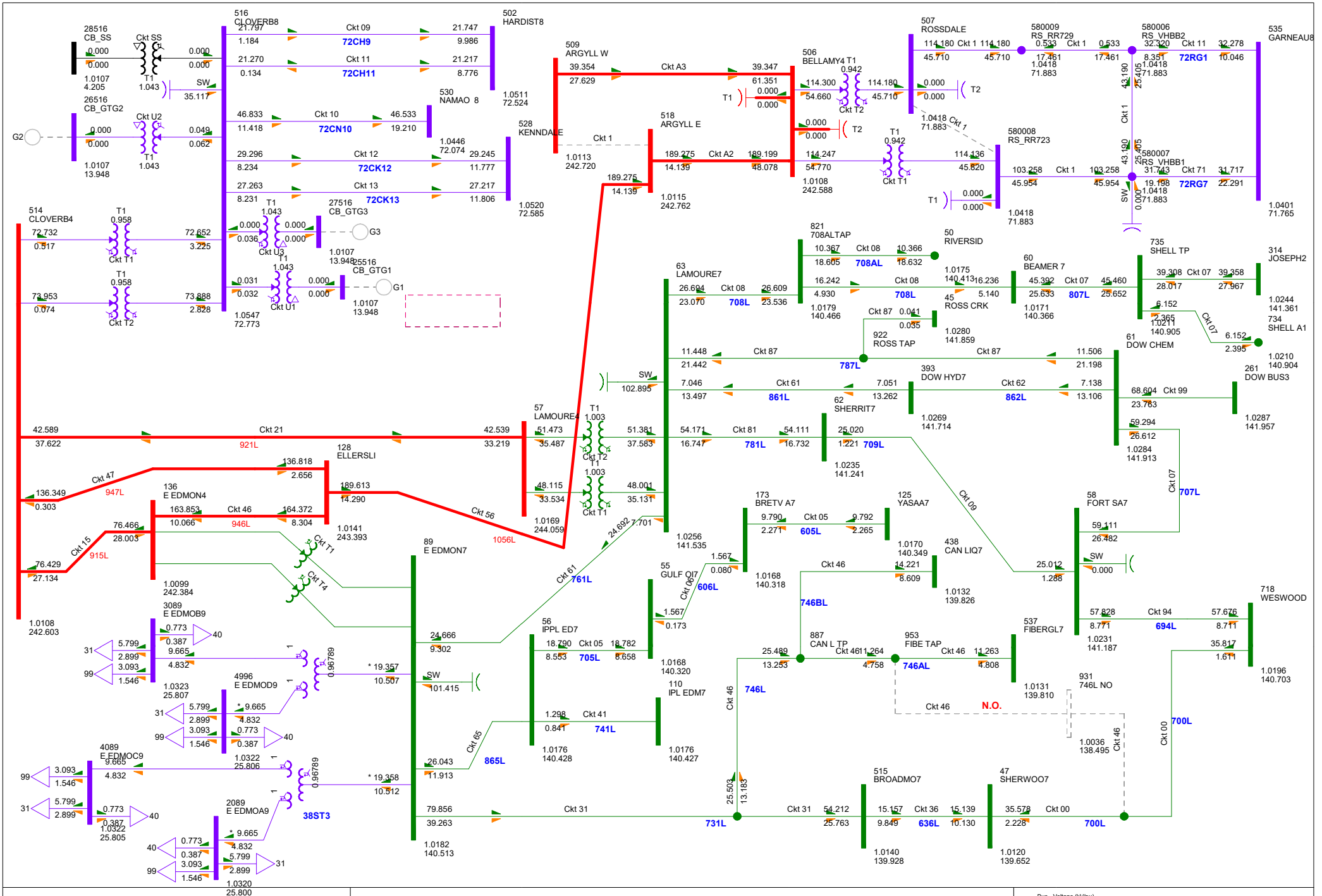
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate B
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.3-4 N-1: 72CK13 (CLOVER BAR 987S TO KENNEDALE)
2024 WINTER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

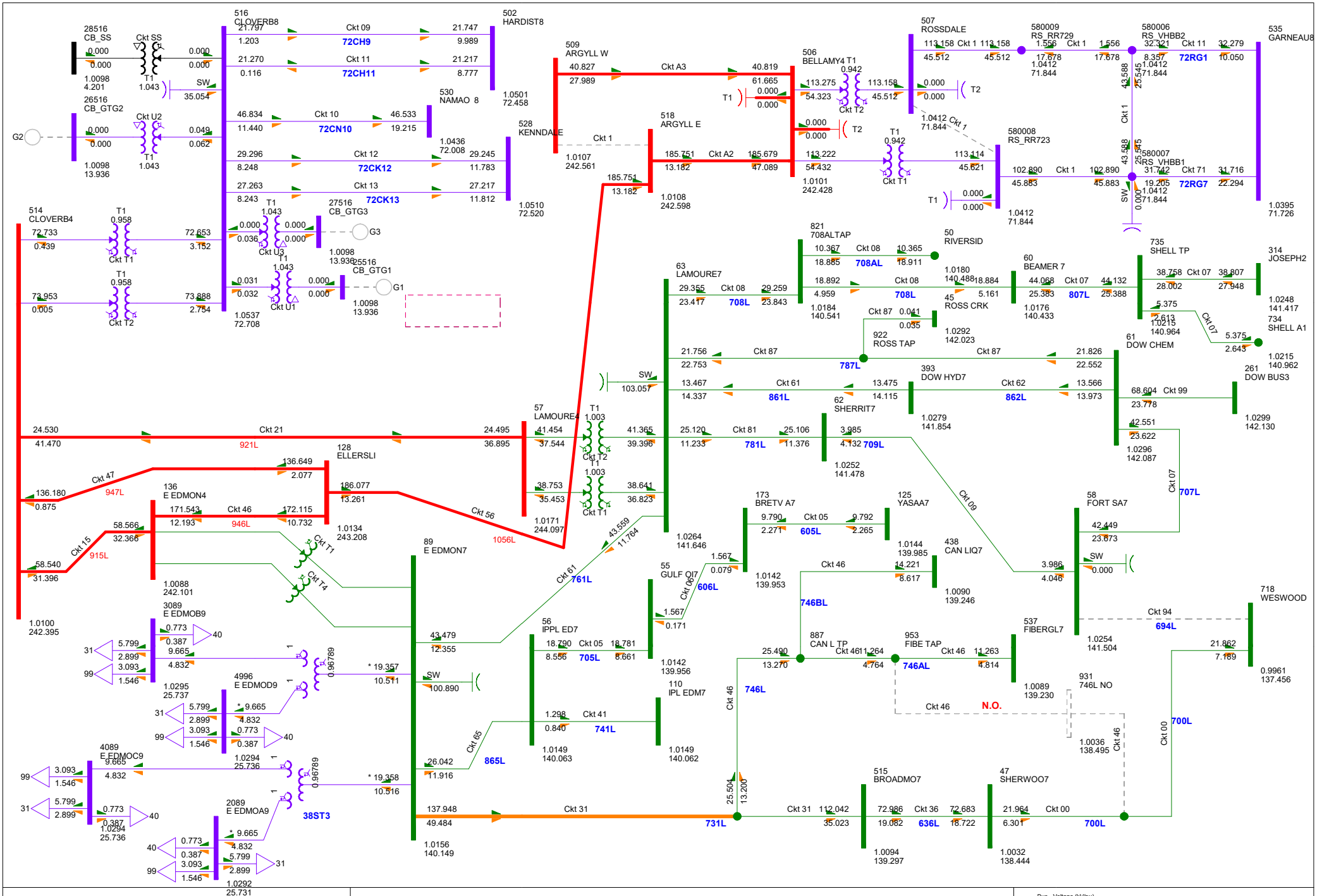
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate B
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.4-1-N-0: NORMAL OPERATION
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

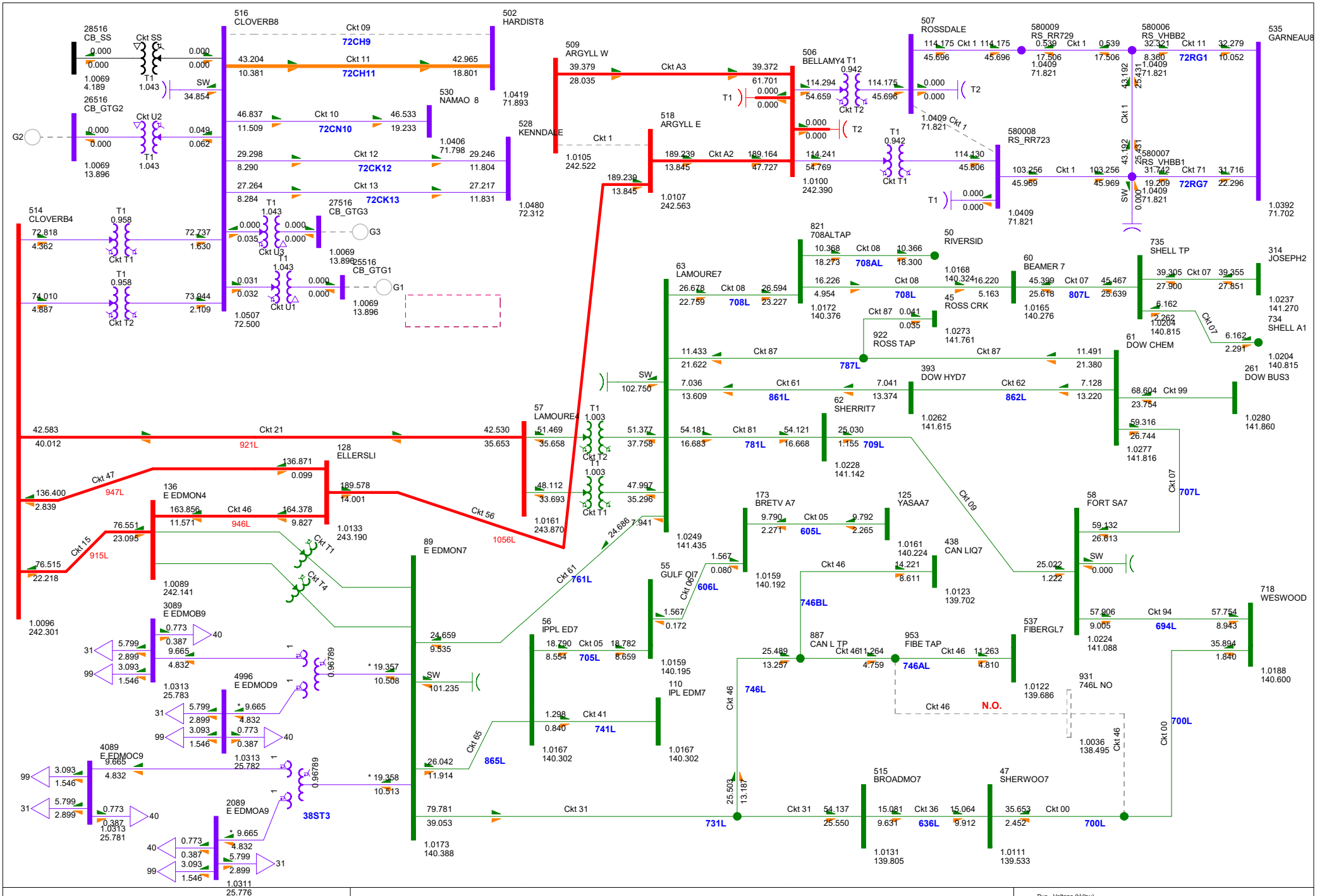
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.4-2 N-1: 694L (WESTWOOD 422S TO FORT SASKATCHEWAN 54S)
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

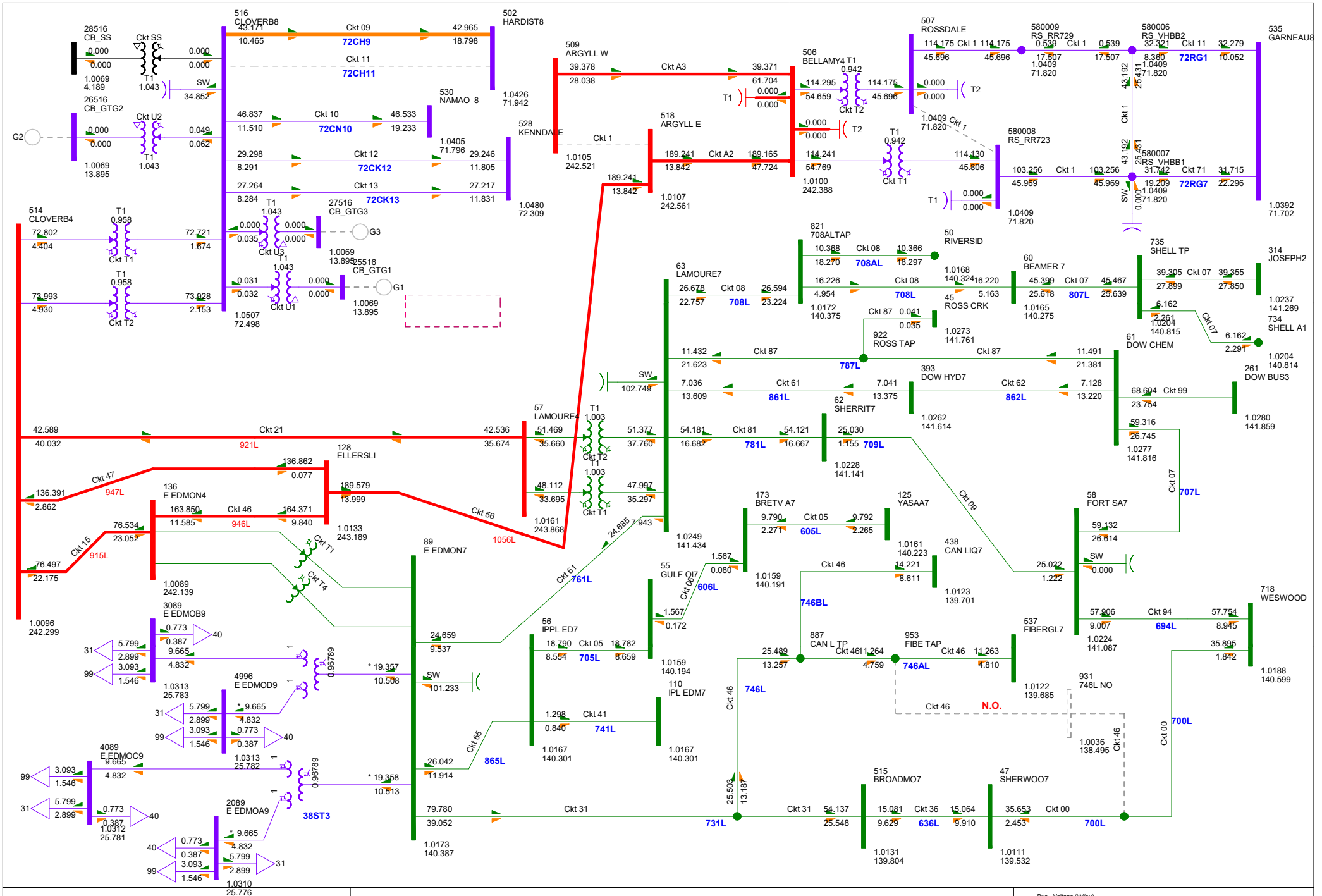
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.4-3 N-1: 72CH9 (CLOVER BAR 987S TO HARDISTY)
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

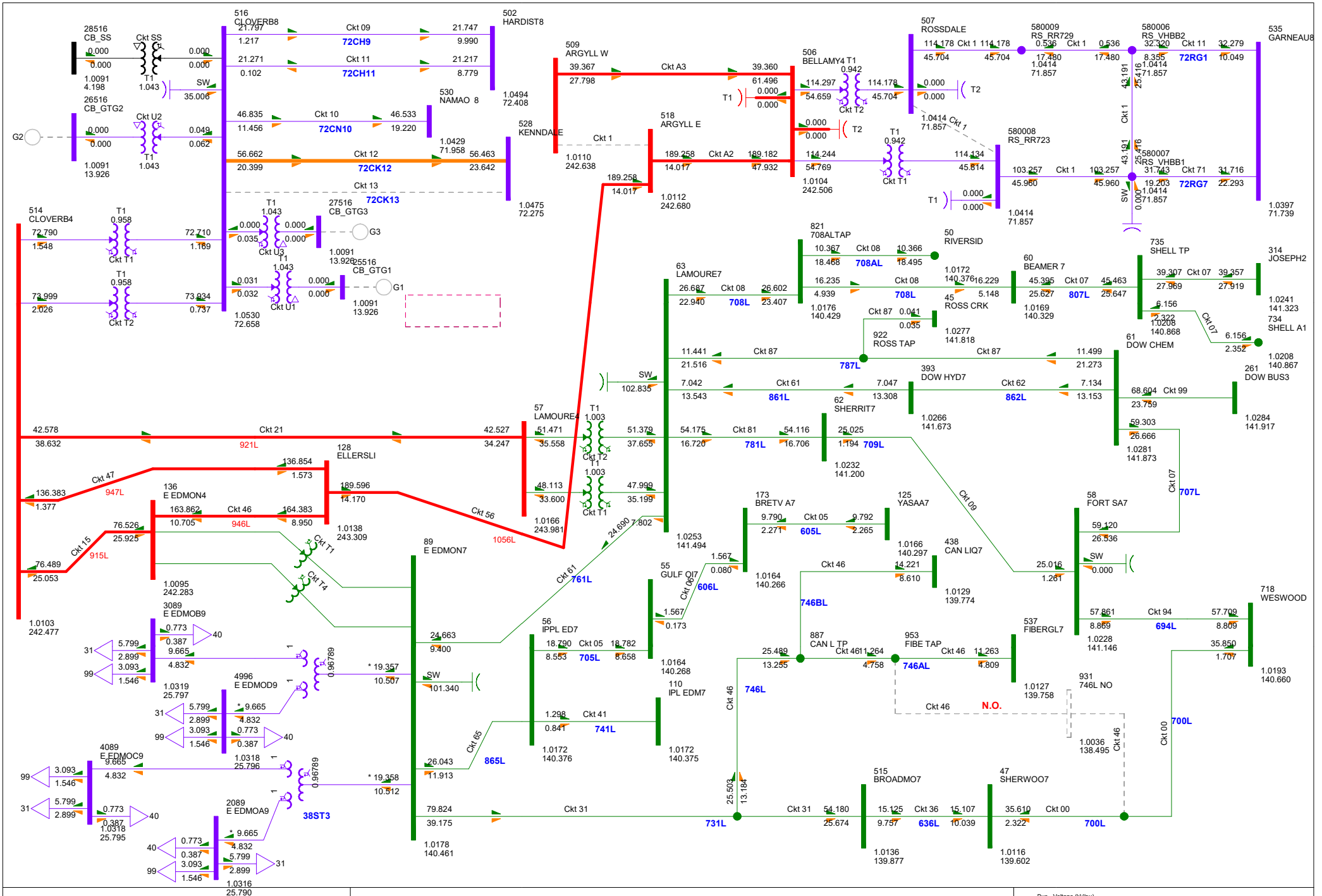
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

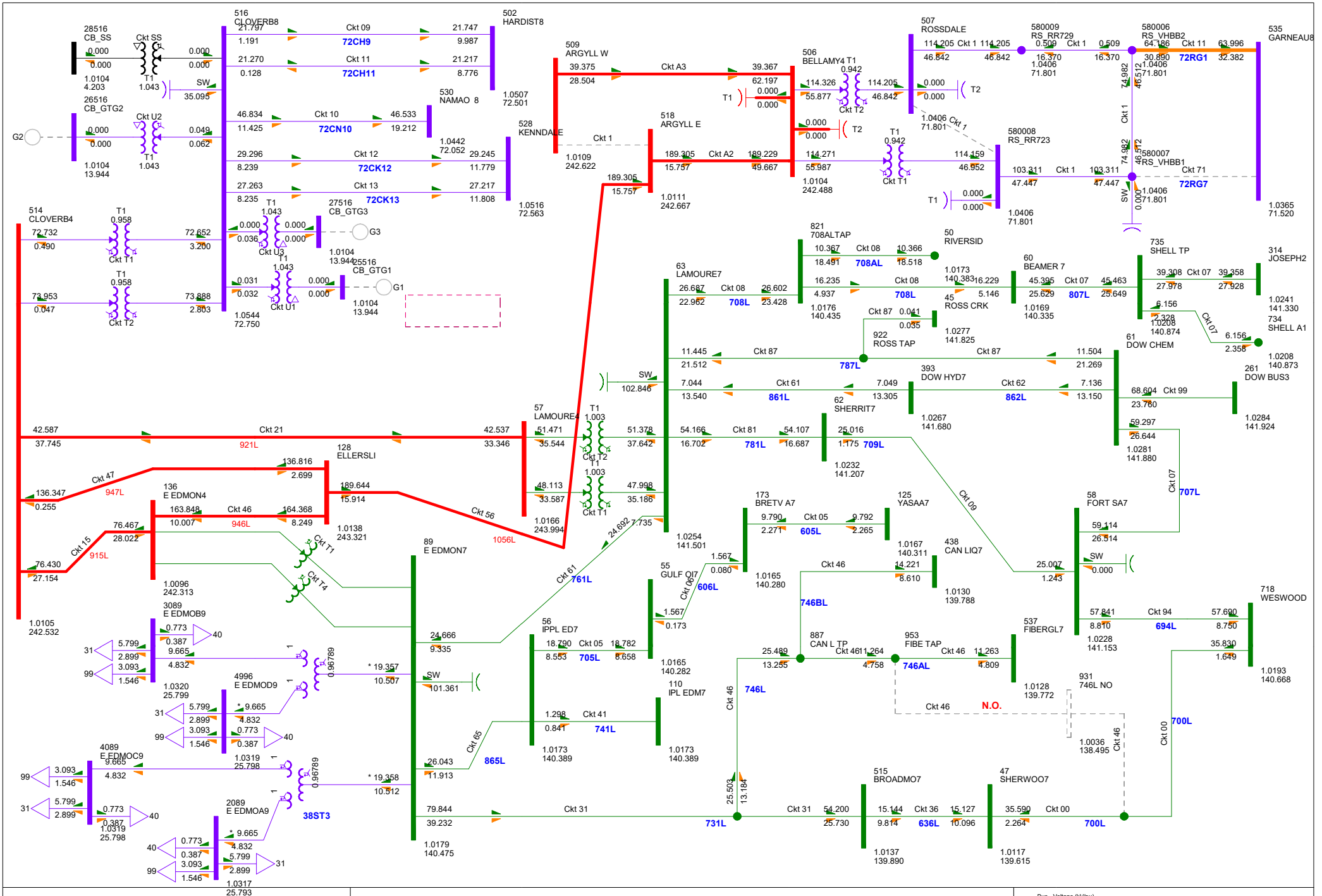
FIGURE A2.4-4 N-1: 72CH11 (CLOVER BAR 987S TO HARDISTY)
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

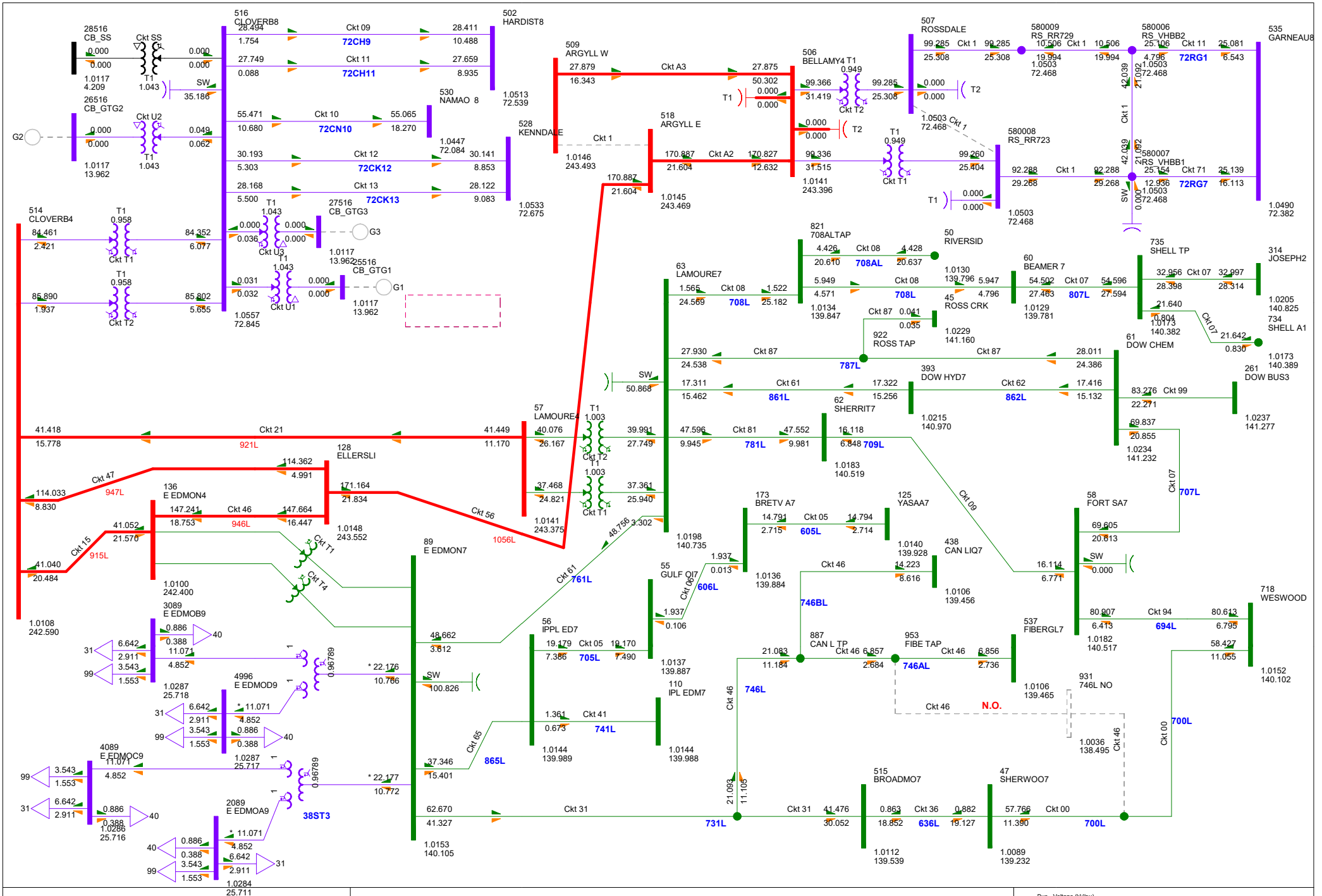
FIGURE A2.4-5 N-1: 72CK13 (CLOVER BAR 987S TO KENNEDALE)
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.4-6 N-1: 72RG7 (ROSSDALE TO GARNEAU)
2024 SUMMER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

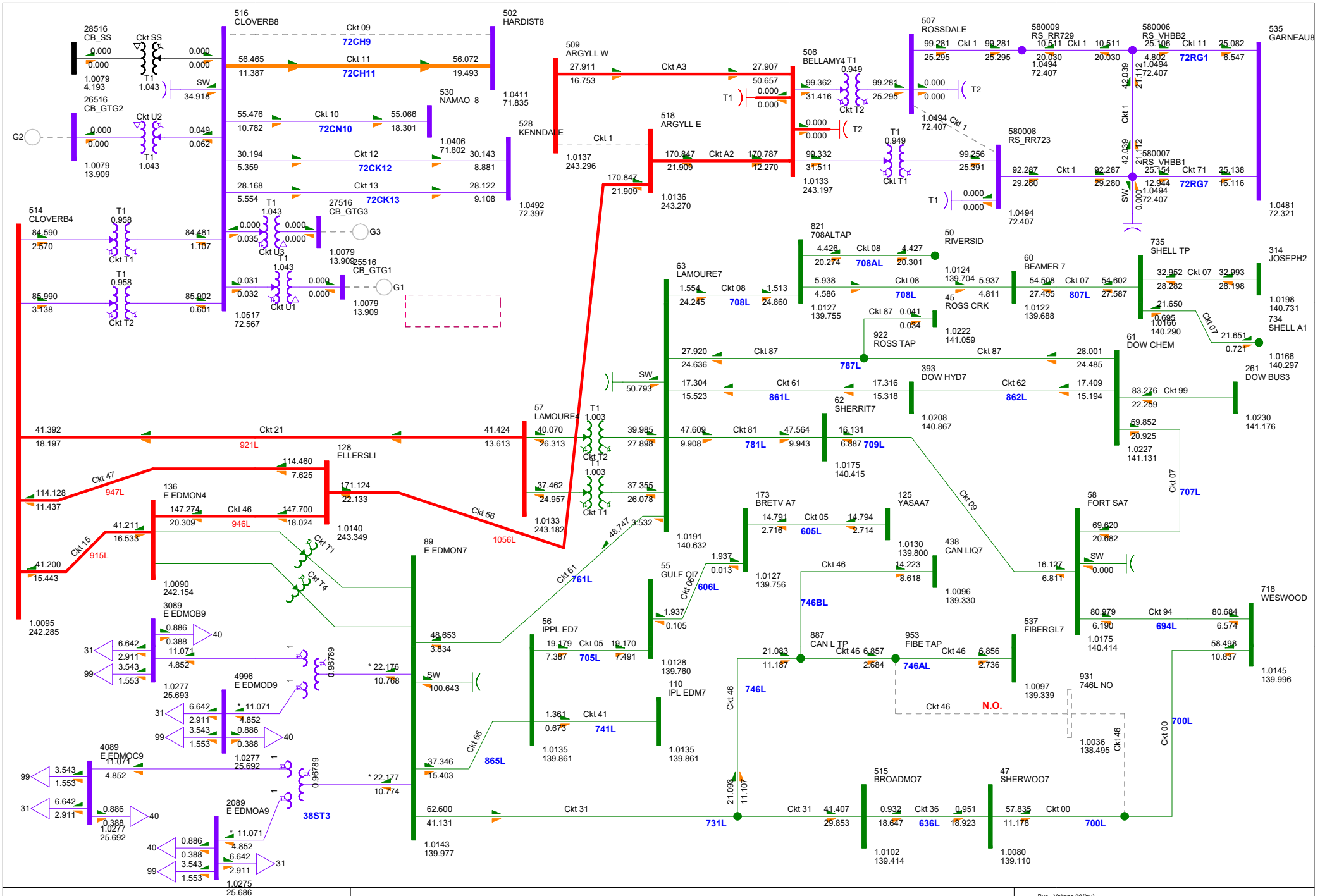
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.5-1-N-0: NORMAL OPERATION
2024 WINTER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

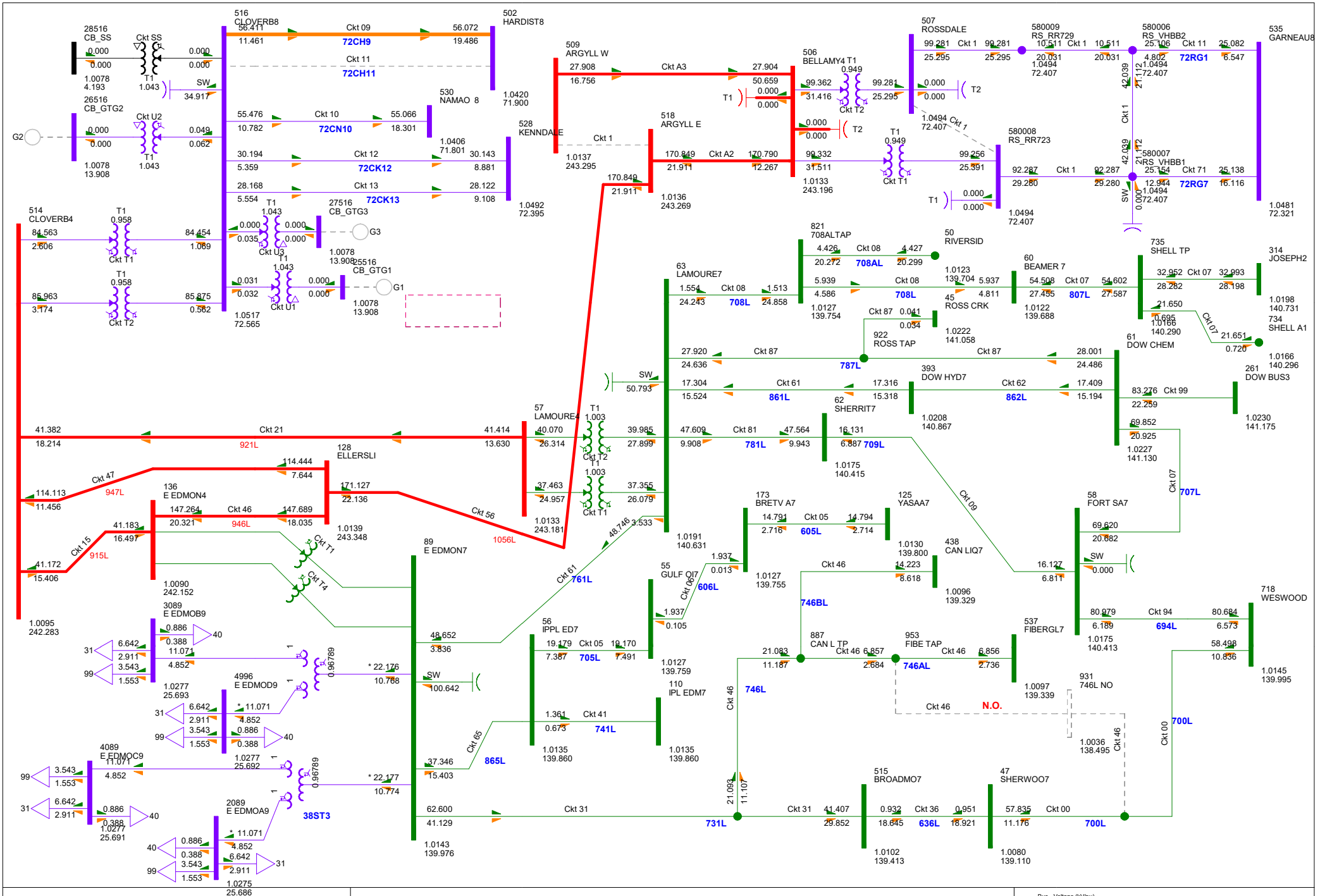
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.5-2 N-1: 72CH9 (CLOVER BAR 987S TO HARDISTY)
2024 WINTER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

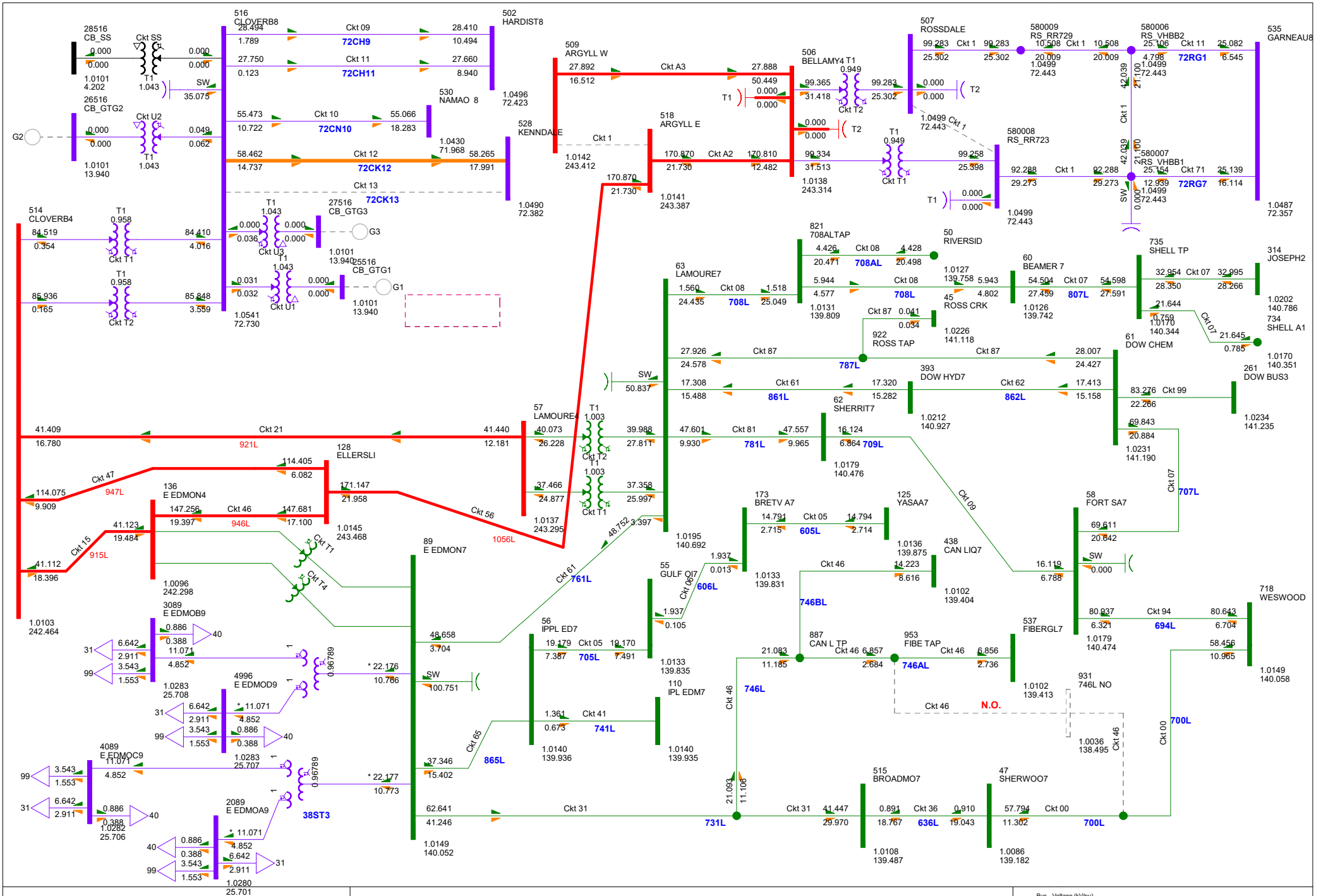
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.5-3 N-1: 72CH11 (CLOVER BAR 987S TO HARDISTY)
2024 WINTER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

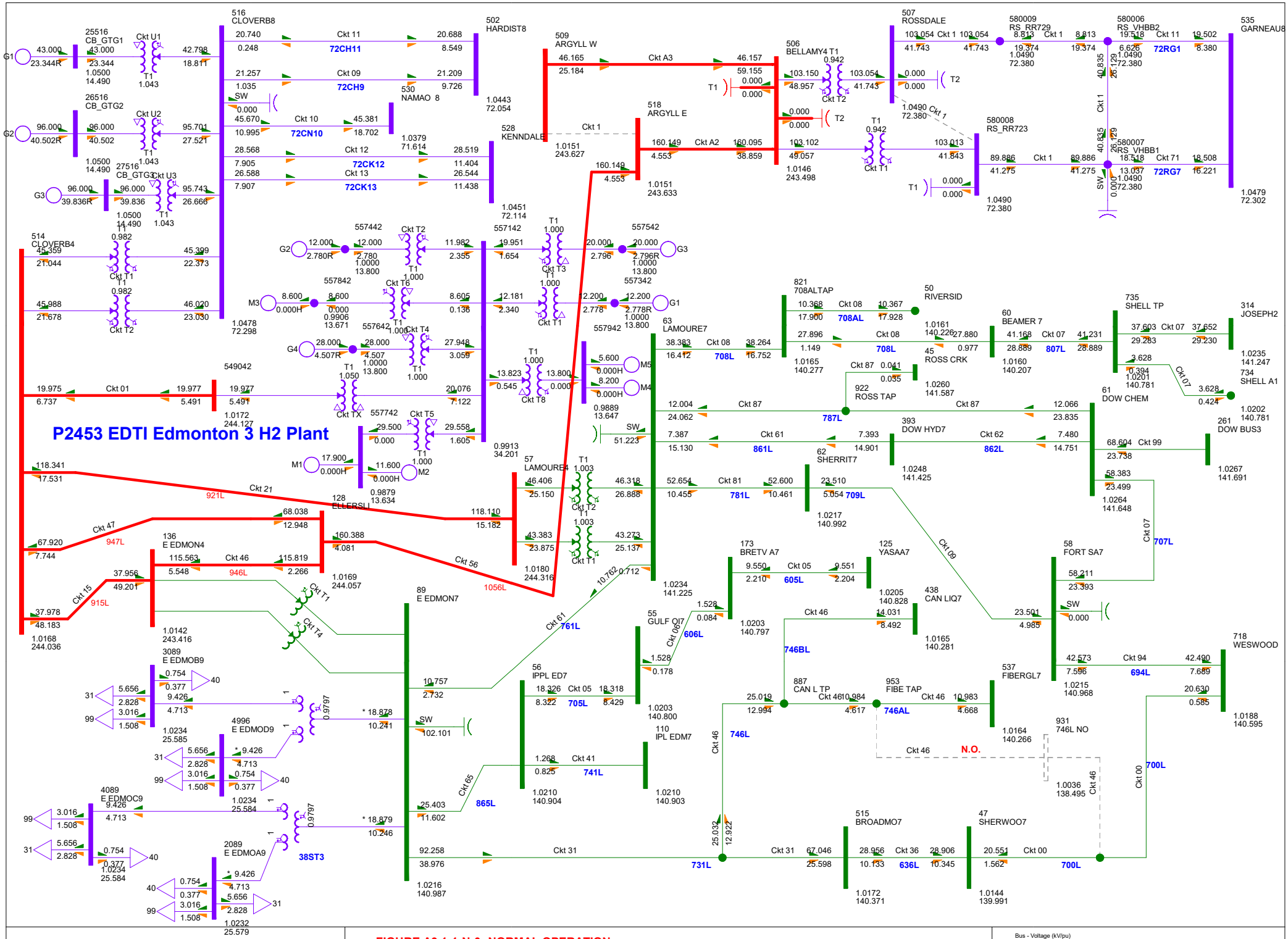


P2453 EDTI Edmonton 3 H2 Plant

FIGURE A2.5-4 N-1: 72CK13 (CLOVER BAR 987S TO KENNEDALE)
2024 WINTER PEAK (PRE-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV/0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

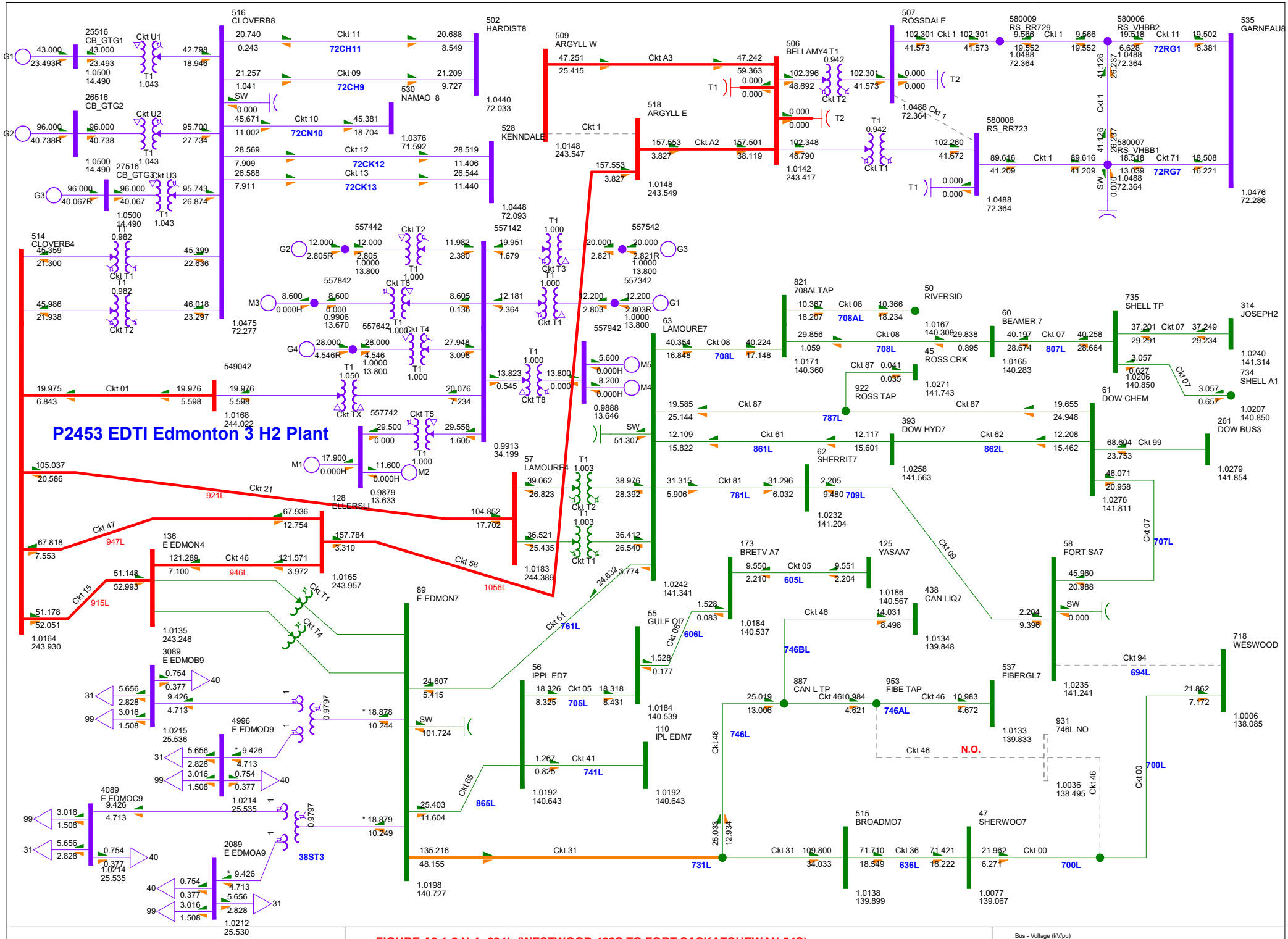
Attachment A3
Post-Project Power Flow Diagrams

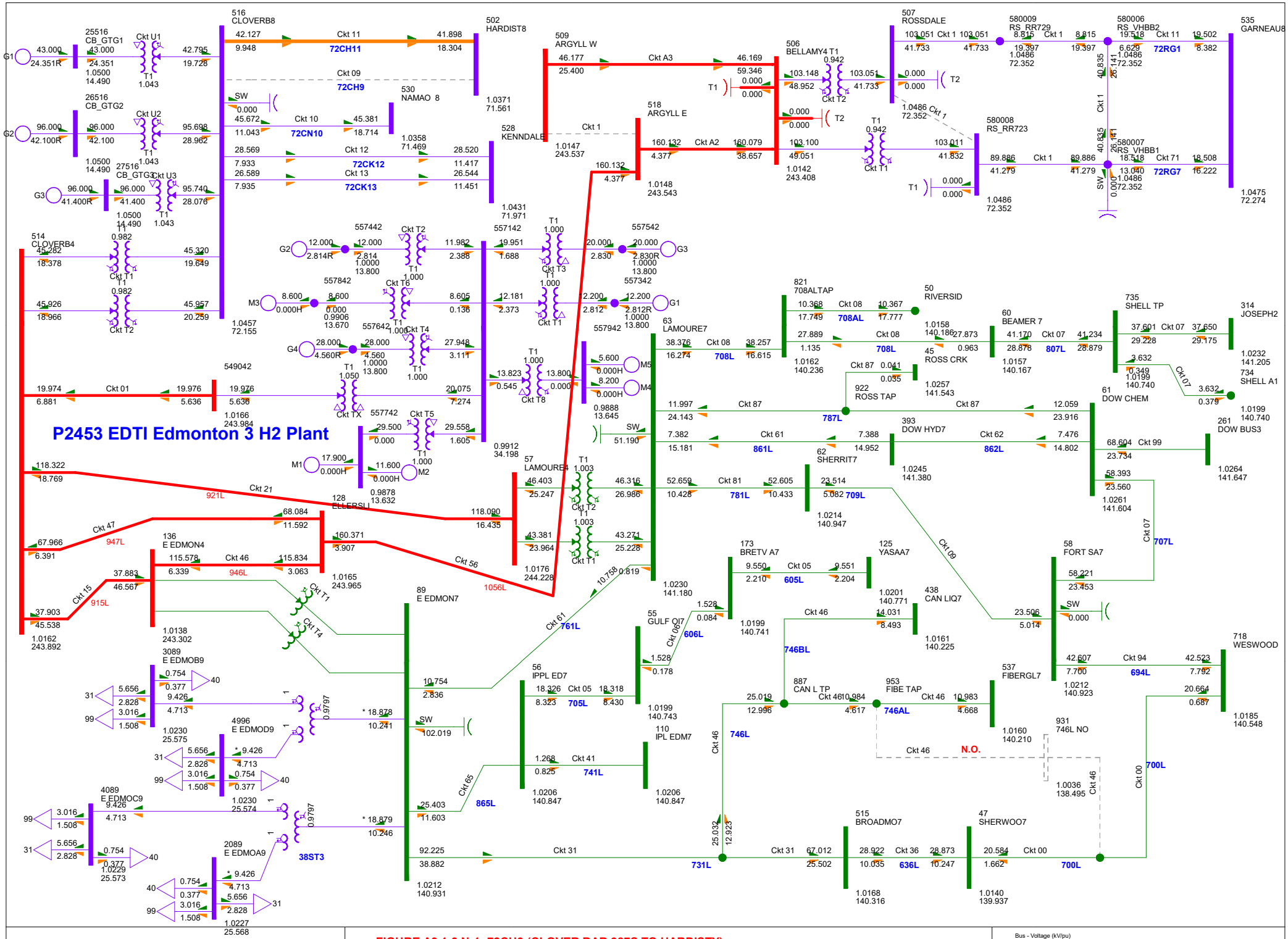


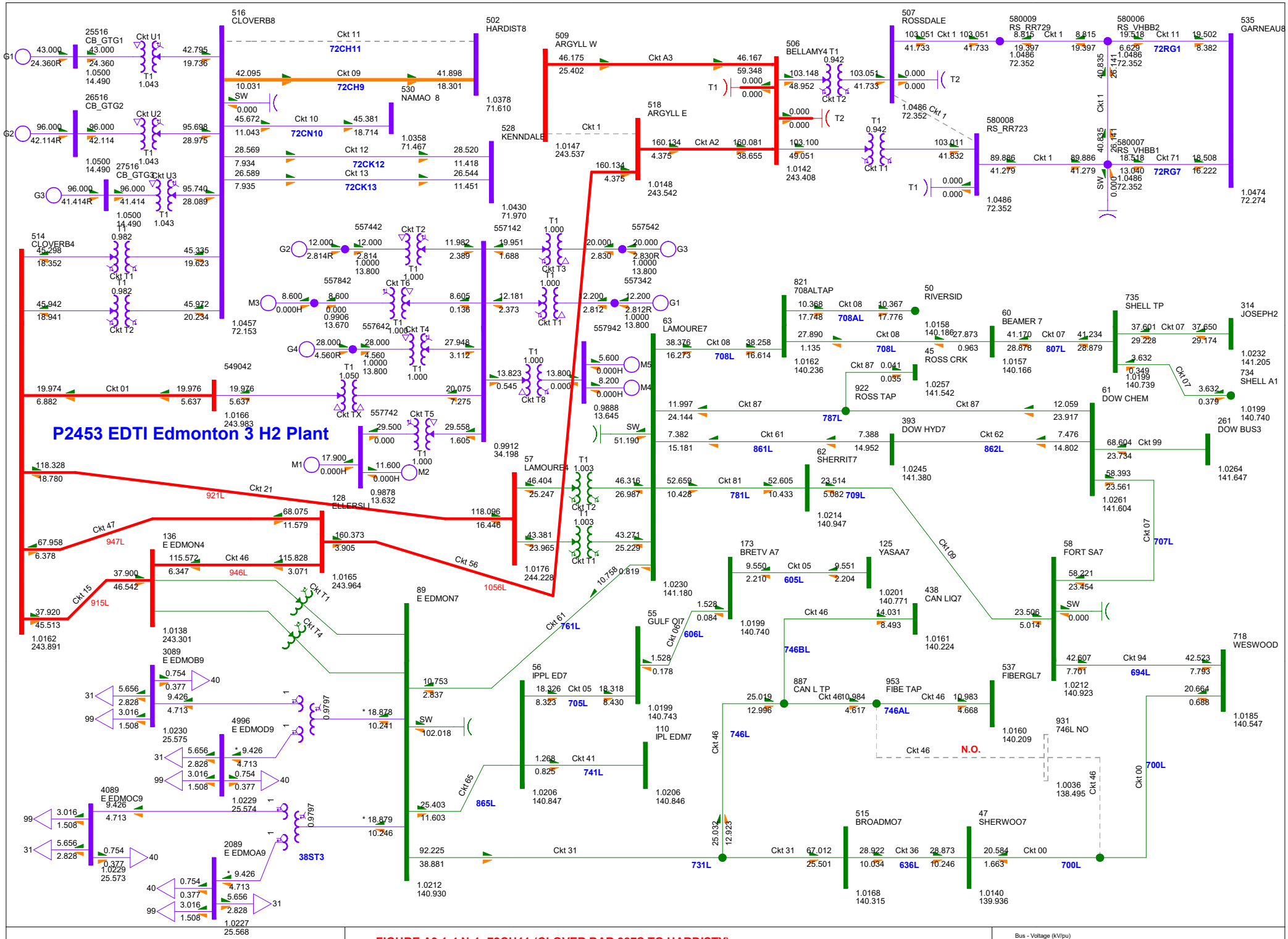
P2453 EDTI Edmonton 3 H2 Plant

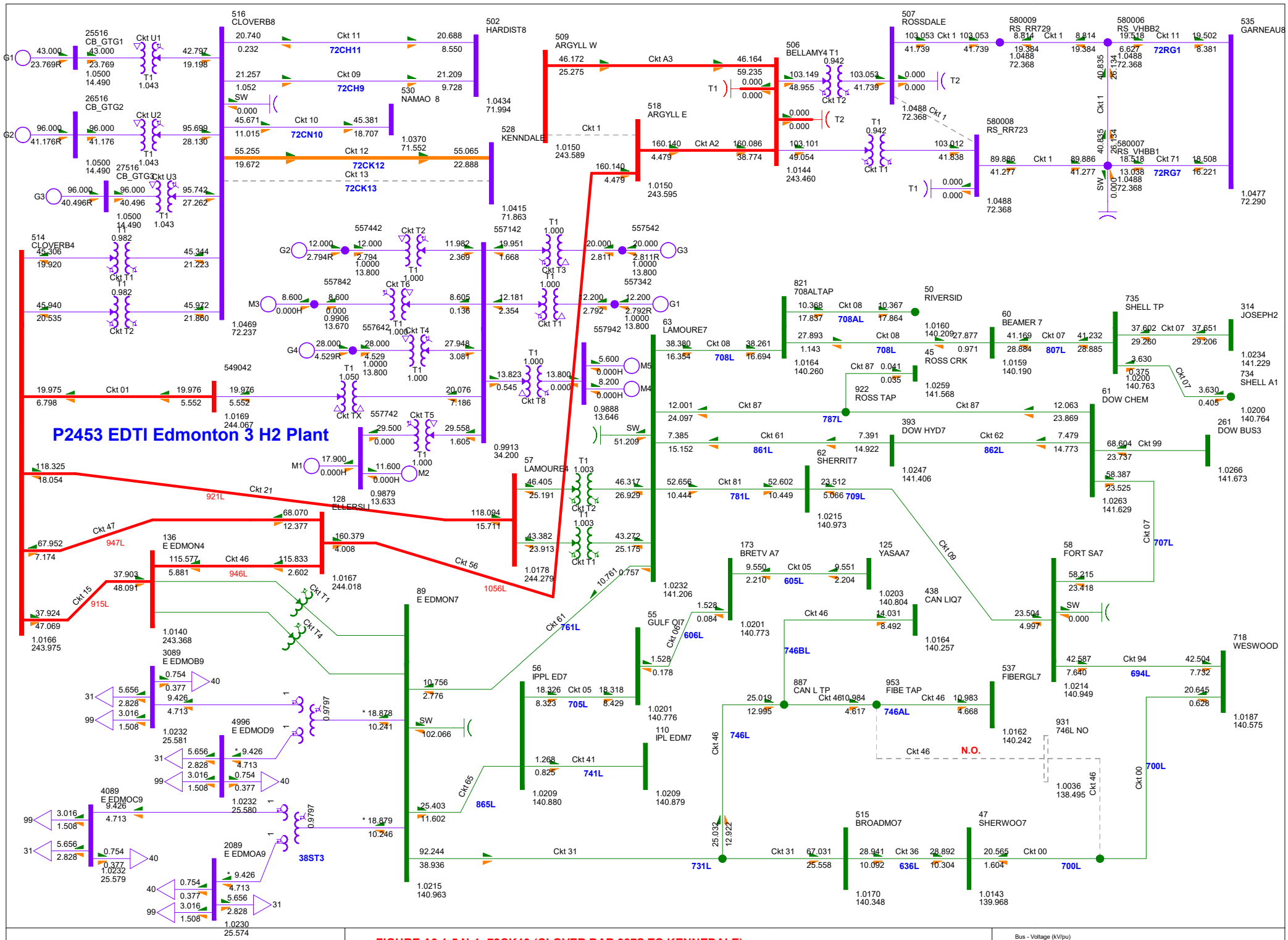
FIGURE A3.1-1-N-0: NORMAL OPERATION
2024 SUMMER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000


P2453 EDTI Edmonton 3 H2 Plant
516 CLOVERB8
502 HARDIST8
509 ARGYLL W
518 ARGYLL E
528 KENNDALE
506 BELLAMY4
507 ROSSDALE
580009 RS_RR729
580006 RS_VHBB2
535 GARNEAU8
580008 RS_RR723
580007 RS_VHBB1
514 CLOVERB4
549042
63 LAMOURE7
57 LAMOURE4
821 708ALTAP
50 RIVERSID
60 BEAMER 7
735 SHELL TP
314 JOSEPH2
734 SHELL A1
61 DOW CHEM
922 ROSS TAP
45 ROSS CRK
393 DOW HYD7
261 DOW BUS3
62 SHERRIT7
128 ELLERSLI
136 E EDMON4
89 E EDMON7
3089 E EDMOB9
4996 E EDMOD9
4089 E EDMOC9
2089 E EDMOA9
38ST3
173 BRETV A7
125 YASAA7
58 FORT SA7
438 CAN LIQ7
55 GULF OI7
56 IPPL ED7
110 IPL EDM7
887 CAN L TP
953 FIBE TAP
537 FIBERGL7
718 WESWOOD
931 746L NO
515 BROADMO7
47 SHERWOO7
921L
947L
946L
915L
1056L
761L
606L
705L
741L
865L
746L
746BL
746AL
731L
636L
700L
694L
707L
709L
862L
861L
787L
708L
708AL
807L
605L
N.O.
P2453 EDTI Edmonton 3 H2 Plant
FIGURE A3.1-2 N-1: 694L (WESTWOOD 422S TO FORT SASKATCHEWAN 54S)
2024 SUMMER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000


P2453 EDTI Edmonton 3 H2 Plant
516 CLOVERB8
502 HARDIST8
509 ARGYLL W
506 BELLAMY4
507 ROSSDALE
580009 RS_RR729
580006 RS_VHBB2
535 GARNEAU8
72CH11
72CH9
530 NAMAO 8
528 KENNDALE
518 ARGYLL E
580008 RS_RR723
580007 RS_VHBB1
72RG1
72RG7
72CN10
72CK12
72CK13
514 CLOVERB4
549042
63 LAMOURE7
821 708ALTAP
50 RIVERSID
60 BEAMER 7
735 SHELL TP
314 JOSEPH2
734 SHELL A1
61 DOW CHEM
261 DOW BUS3
922 ROSS TAP
45 ROSS CRK
393 DOW HYD7
62 SHERRIT7
57 LAMOURE4
128 ELLERSLI
921L
947L
946L
915L
1056L
136 E EDMON4
89 E EDMON7
3089 E EDMOB9
4996 E EDMOD9
4089 E EDMOC9
2089 E EDMOA9
38ST3
761L
606L
605L
746BL
746L
746AL
741L
705L
865L
731L
700L
694L
707L
787L
861L
862L
709L
781L
708L
708AL
807L
173 BRETV A7
125 YASAA7
438 CAN LIQ7
58 FORT SA7
55 GULF OI7
56 IPPL ED7
110 IPL EDM7
887 CAN L TP
953 FIBE TAP
537 FIBERGL7
718 WESWOOD
931 746L NO
515 BROADMO7
47 SHERWOO7
N.O.
Ckt 21
Ckt 47
Ckt 15
Ckt 56
Ckt 61
Ckt 09
Ckt 07
Ckt 00
Ckt 46
Ckt 65
Ckt 05
Ckt 87
Ckt 81
Ckt 62
Ckt 99
Ckt 94
Ckt 41
Ckt 31
Ckt 36
P2453 EDTI Edmonton 3 H2 Plant
FIGURE A3.1-3 N-1: 72CH9 (CLOVER BAR 987S TO HARDISTY)
2024 SUMMER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

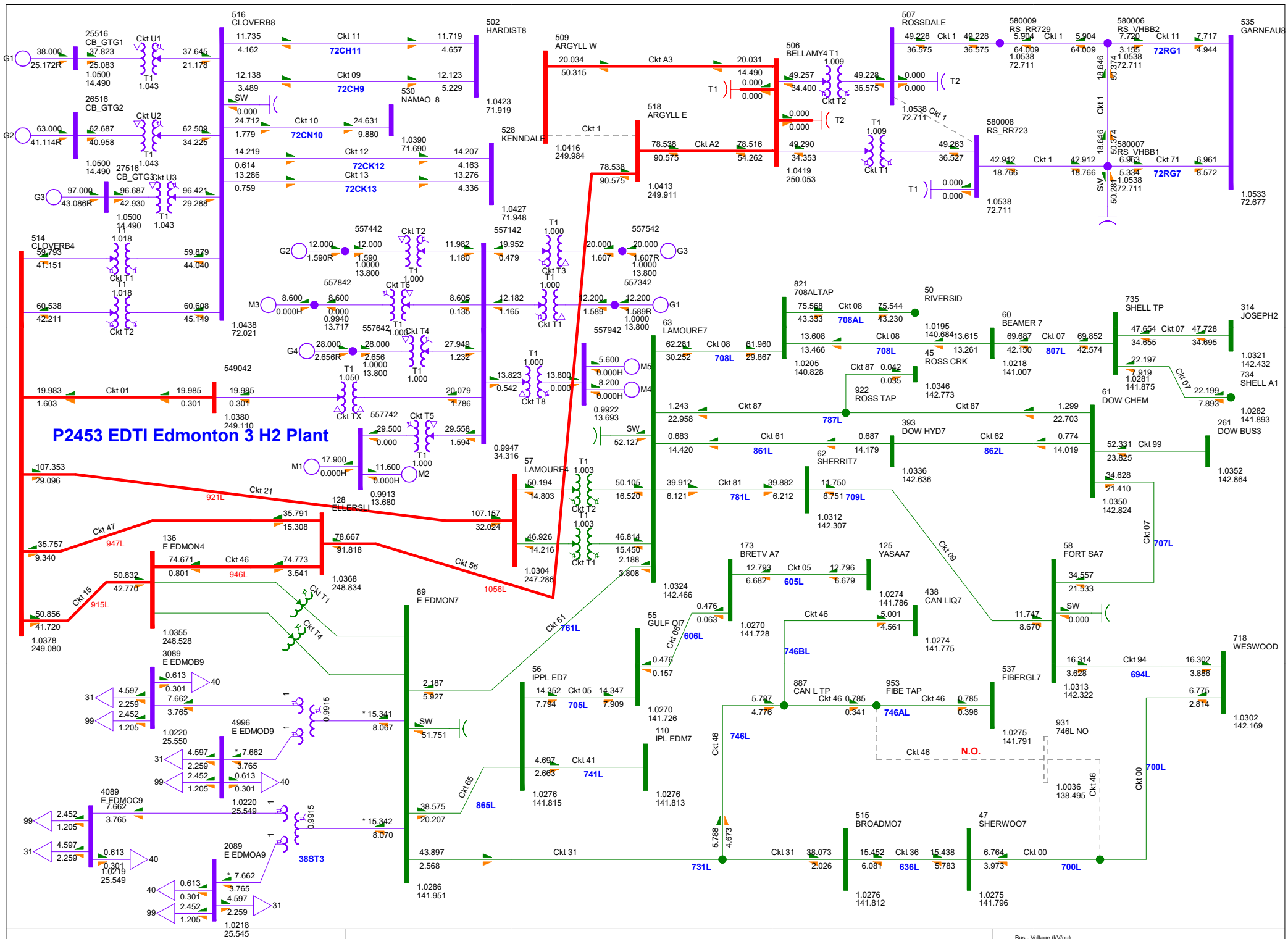

P2453 EDTI Edmonton 3 H2 Plant
516 CLOVERB8
502 HARDIST8
509 ARGYLL W
518 ARGYLL E
528 KENNDALE
506 BELLAMY4
507 ROSSDALE
580009 RS_RR729
580006 RS_VHBB2
535 GARNEAU8
580008 RS_RR723
580007 RS_VHBB1
25516 CB_GTG1
26516 CB_GTG2
27516 CB_GTG3
514 CLOVERB4
549042
557442
557842
557642
557742
557142
557542
557342
557942
821 708ALTAP
50 RIVERSID
45 ROSS CRK
922 ROSS TAP
60 BEAMER 7
735 SHELL TP
314 JOSEPH2
734 SHELL A1
61 DOW CHEM
63 LAMOURE7
57 LAMOURE4
128 ELLERSLI
136 E EDMON4
3089 E EDMOB9
4996 E EDMOD9
4089 E EDMOC9
2089 E EDMOA9
89 E EDMON7
38ST3
393 DOW HYD7
62 SHERRIT7
261 DOW BUS3
173 BRETV A7
125 YASAA7
438 CAN LIQ7
58 FORT SA7
718 WESWOOD
55 GULF OI7
56 IPPL ED7
110 IPL EDM7
887 CAN L TP
953 FIBE TAP
537 FIBERGL7
931 746L NO
515 BROADMO7
47 SHERWOO7
921L
947L
946L
915L
1056L
865L
731L
700L
707L
694L
605L
606L
705L
741L
746L
746AL
746BL
761L
862L
709L
787L
861L
781L
708L
708AL
807L
N.O.
Ckt 21
Ckt 47
Ckt 15
Ckt 56
Ckt 61
Ckt 65
Ckt 09
Ckt 07
Ckt 00
Ckt 46
Ckt 31
Ckt 87
Ckt 94
72CH11
72CH9
72CN10
72CK12
72CK13
72RG1
72RG7
P2453 EDTI Edmonton 3 H2 Plant
FIGURE A3.1-4 N-1: 72CH11 (CLOVER BAR 987S TO HARDISTY)
2024 SUMMER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A3.1-5 N-1: 72CK13 (CLOVER BAR 987S TO KENNEDALE)
2024 SUMMER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000


P2453 EDTI Edmonton 3 H2 Plant
516 CLOVERB8
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509 ARGYLL W
518 ARGYLL E
528 KENNDALE
506 BELLAMY4
507 ROSSDALE
580009 RS_RR729
580006 RS_VHBB2
535 GARNEAU8
580008 RS_RR723
580007 RS_VHBB1
514 CLOVERB4
549042
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557542
557342
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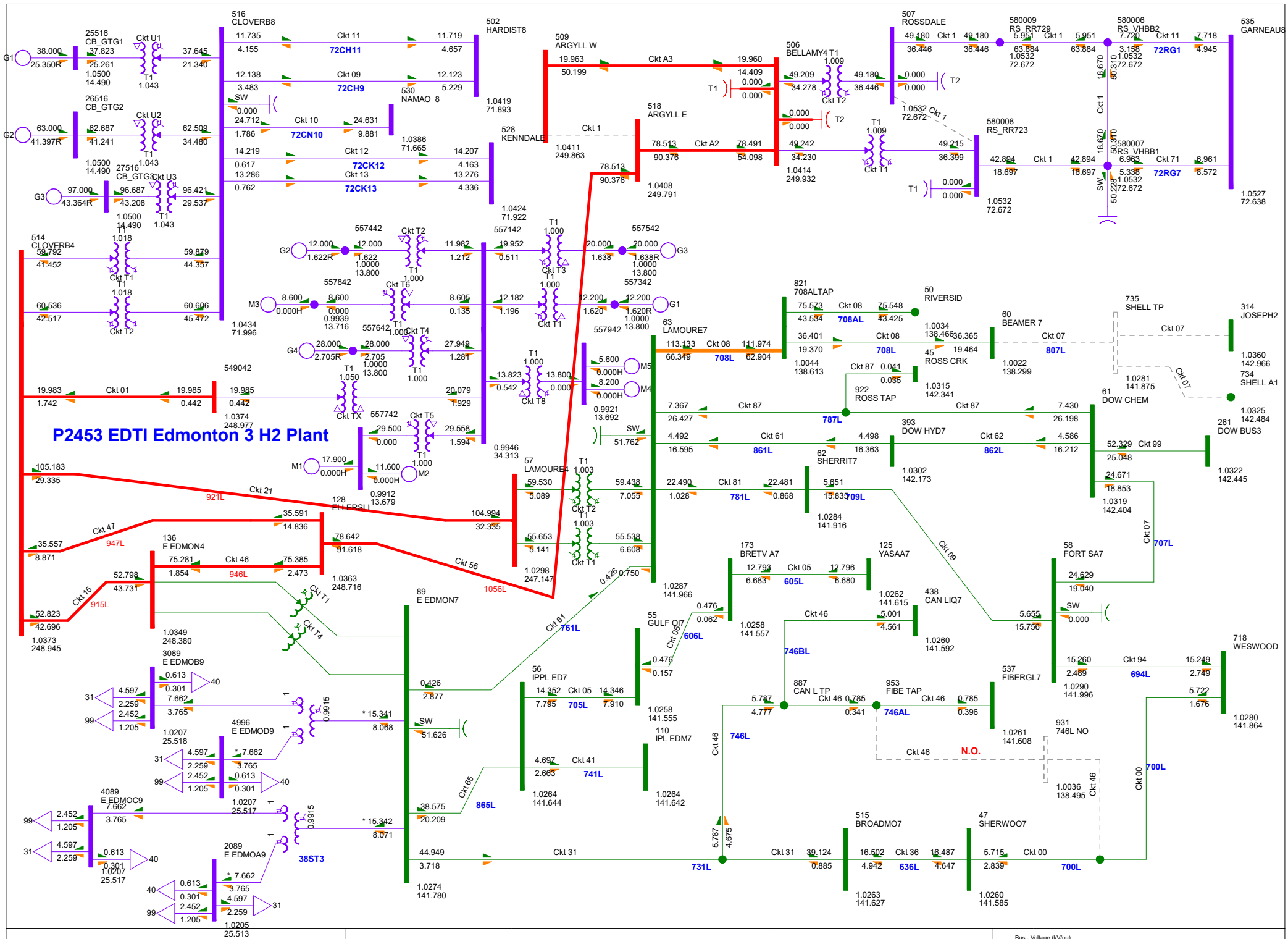
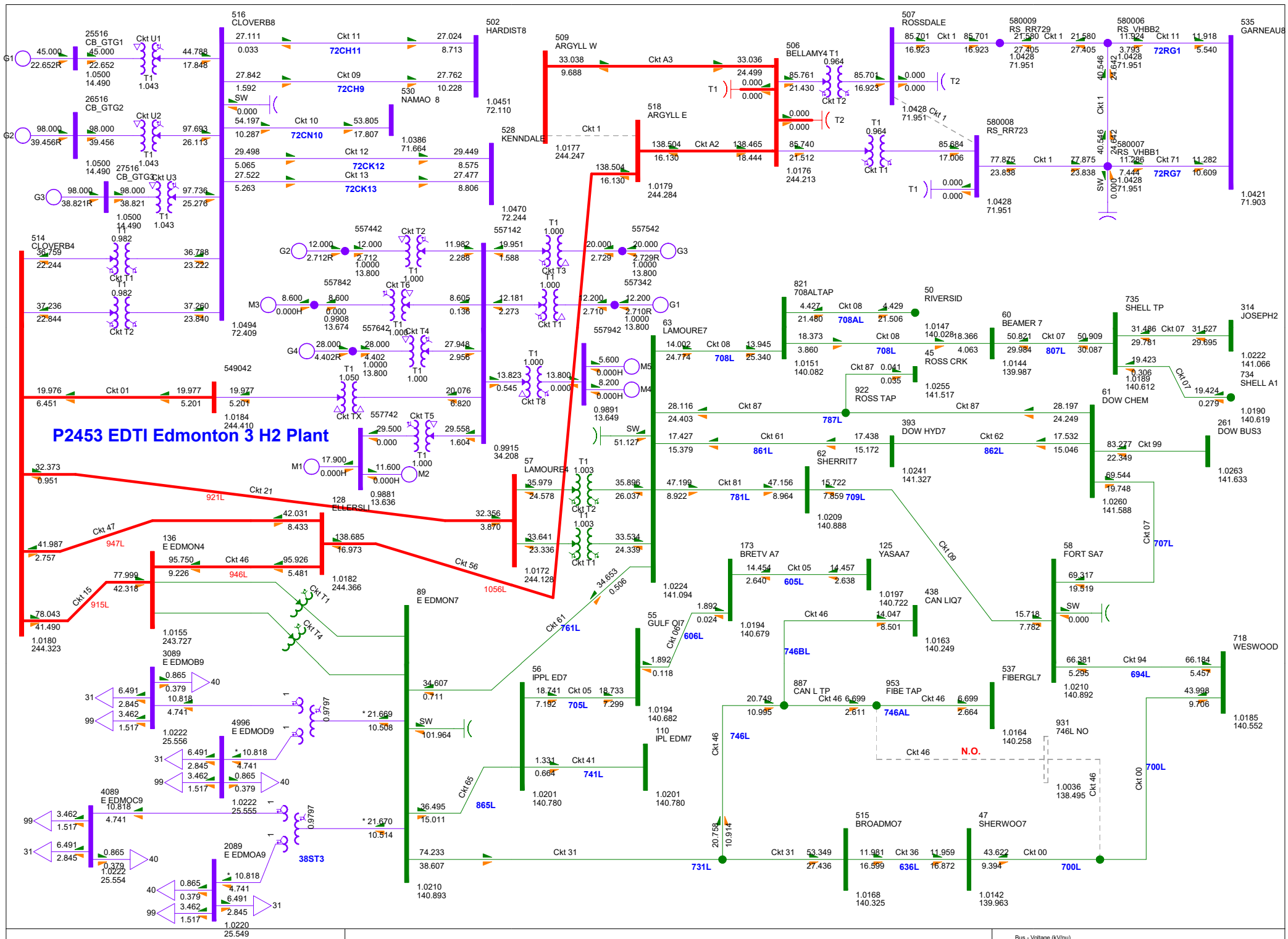
821 708ALTAP
50 RIVERSID
45 ROSS CRK
922 ROSS TAP
60 BEAMER 7
735 SHELL TP
314 JOSEPH2
734 SHELL A1
61 DOW CHEM
63 LAMOURE7
57 LAMOURE4
128 ELLERSLI
136 E EDMON4
3089 E EDMOB9
4996 E EDMOD9
4089 E EDMOC9
2089 E EDMOA9
89 E EDMON7
38ST3
393 DOW HYD7
62 SHERRIT7
261 DOW BUS3
173 BRETV A7
125 YASAA7
438 CAN LIQ7
58 FORT SA7
718 WESWOOD
55 GULF QI7
56 IPPL ED7
110 IPL EDM7
887 CAN L TP
953 FIBE TAP
537 FIBERGL7
931 746L NO
515 BROADMO7
47 SHERWOO7
921L
947L
946L
915L
1056L
865L
731L
700L
707L
694L
N.O.
FIGURE A3.2-1-N-0: NORMAL OPERATION
2024 SUMMER LIGHT (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A3.2-2 N-1: 807L (BEAMER 233S TO JOSEPHBURG 410S)
2024 SUMMER LIGHT (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

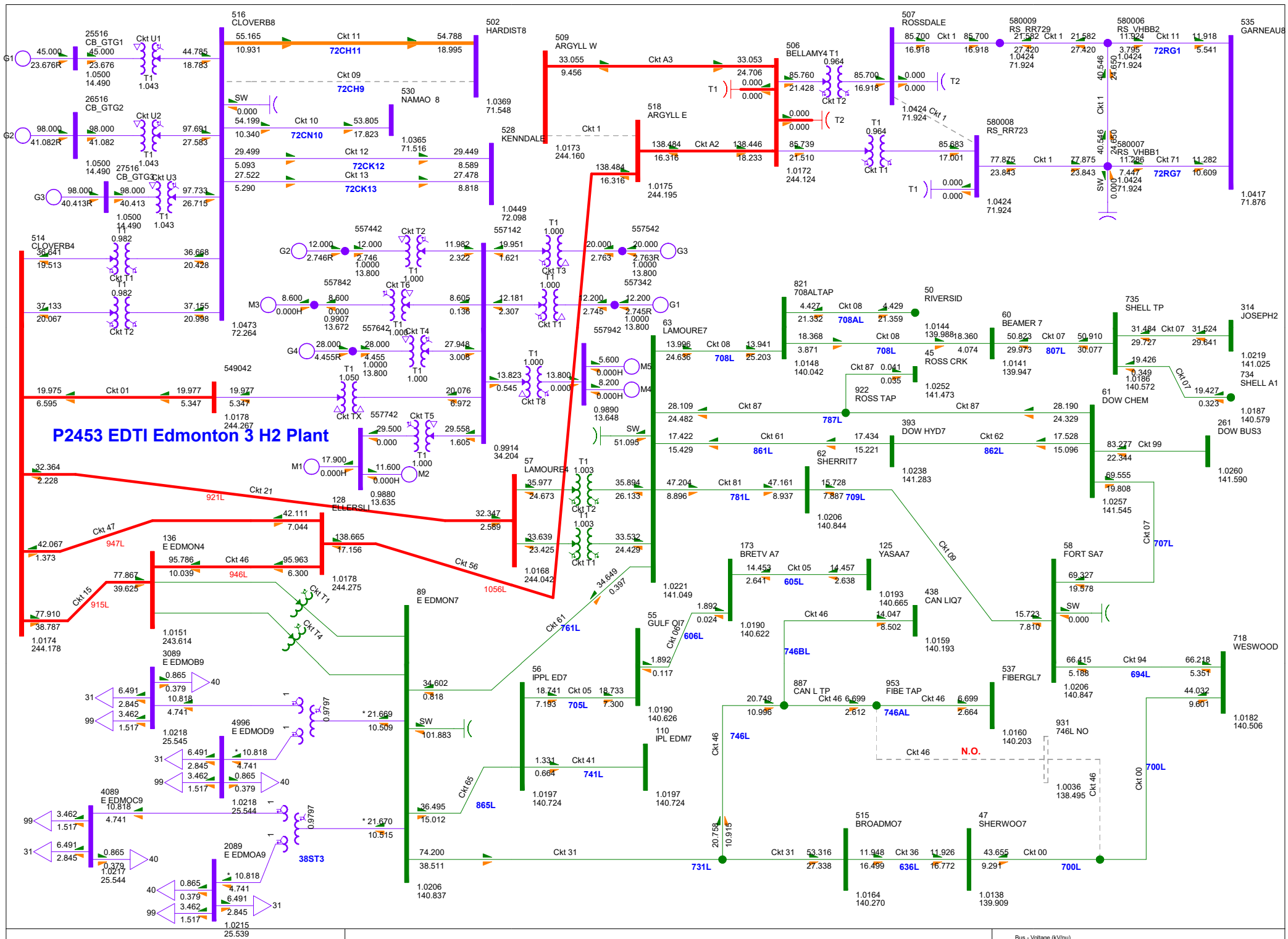
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

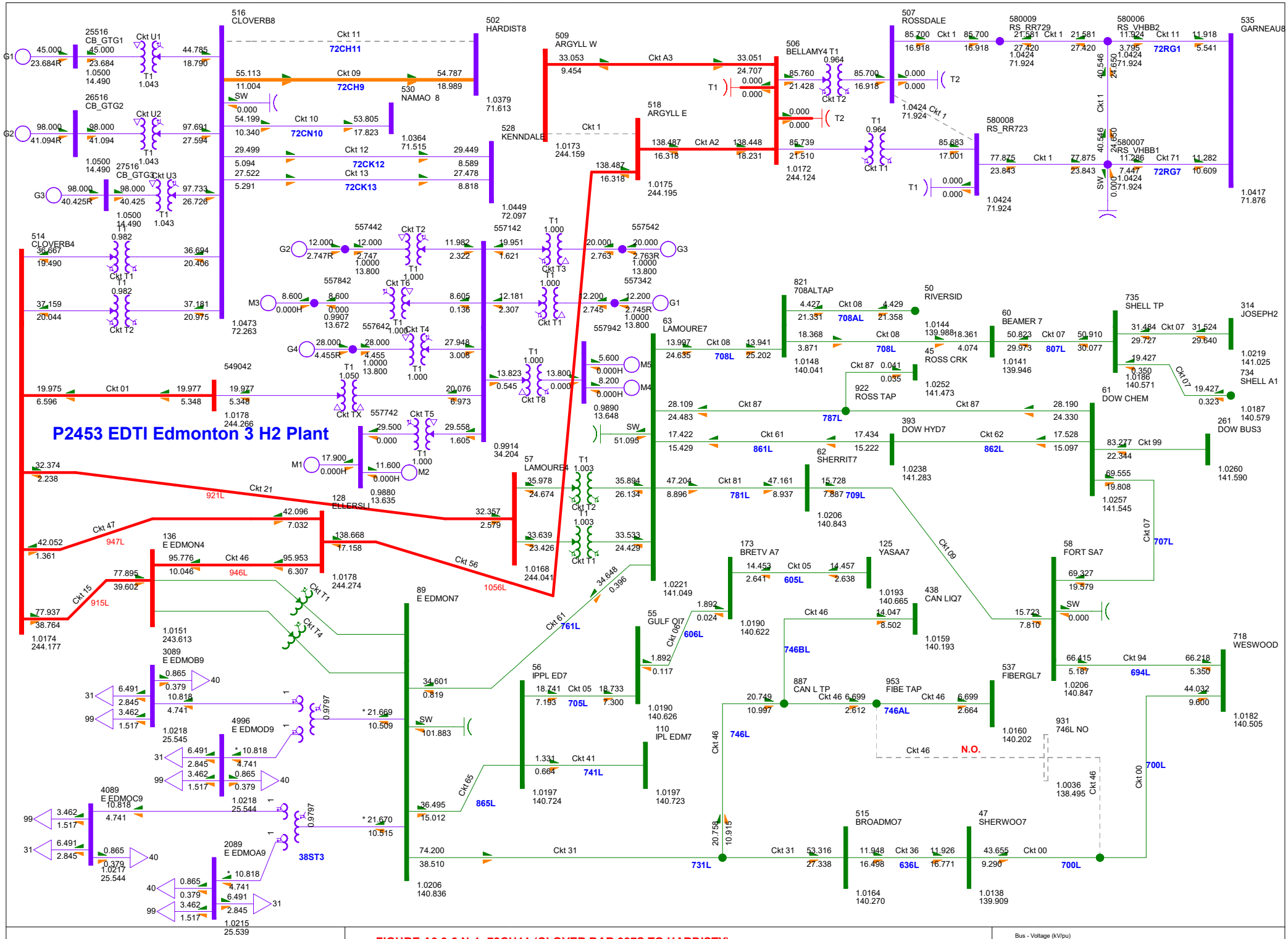


P2453 EDTI Edmonton 3 H2 Plant

FIGURE A3.3-1-N-0: NORMAL OPERATION
2024 WINTER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate B
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

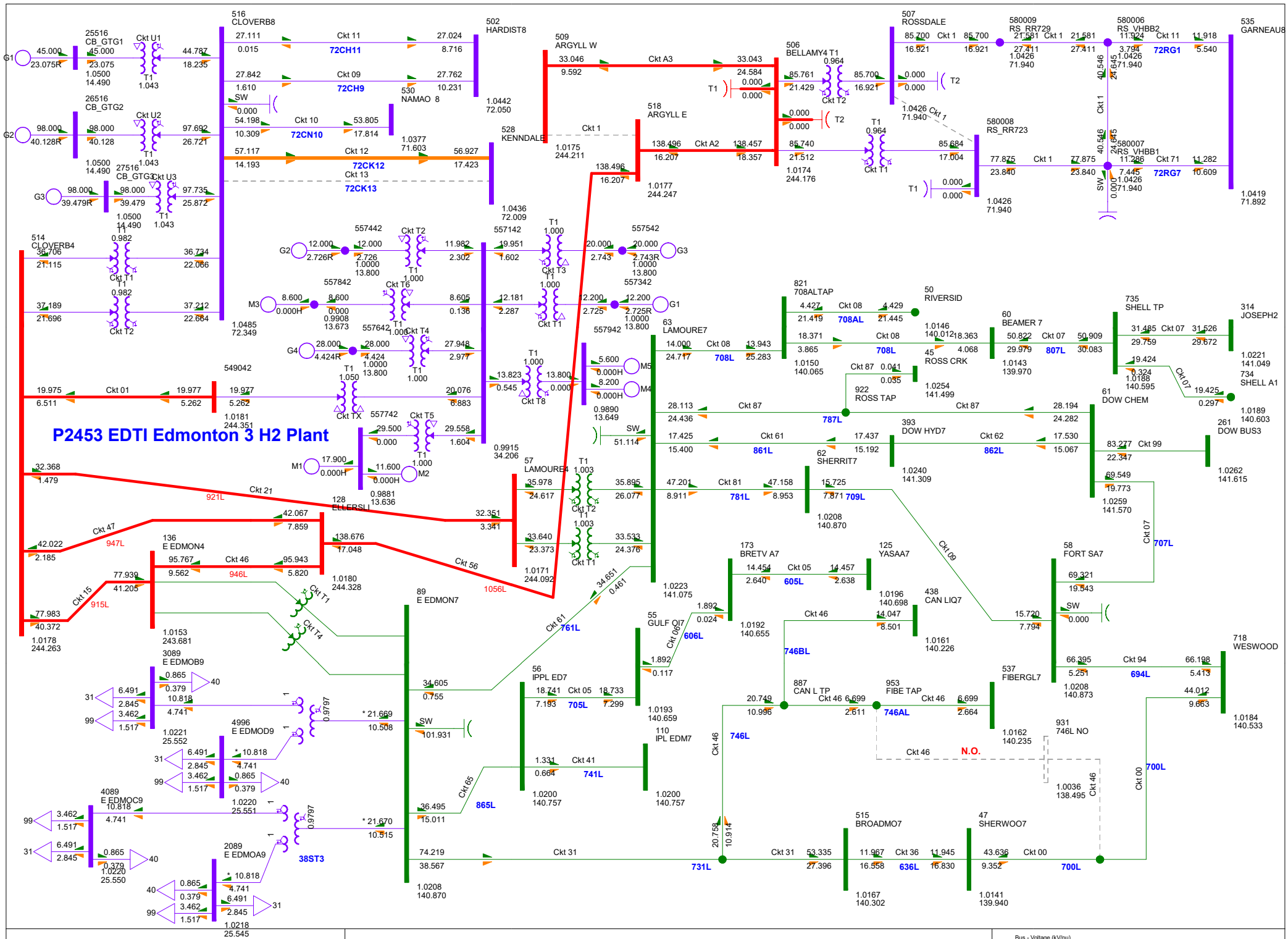

P2453 EDTI Edmonton 3 H2 Plant
516 CLOVERB8
502 HARDIST8
509 ARGYLL W
506 BELLAMY4
507 ROSSDALE
580009 RS_RR729
580006 RS_VHBB2
535 GARNEAU8
518 ARGYLL E
528 KENNDALE
580008 RS_RR723
580007 RS_VHBB1
514 CLOVERB4
557442
557142
557542
557842
557342
557642
557942
549042
557742
821 708ALTAP
50 RIVERSID
60 BEAMER 7
735 SHELL TP
314 JOSEPH2
734 SHELL A1
63 LAMOURE7
922 ROSS TAP
45 ROSS CRK
61 DOW CHEM
393 DOW HYD7
261 DOW BUS3
62 SHERRIT7
57 LAMOURE4
128 ELLERSLI
136 E EDMON4
89 E EDMON7
3089 E EDMOB9
4996 E EDMOD9
4089 E EDMOC9
2089 E EDMOA9
38ST3
173 BRETV A7
125 YASAA7
58 FORT SA7
718 WESWOOD
438 CAN LIQ7
55 GULF OI7
56 IPPL ED7
110 IPL EDM7
887 CAN L TP
953 FIBE TAP
537 FIBERGL7
931 746L NO
515 BROADMO7
47 SHERWOO7
921L
947L
915L
1056L
761L
606L
705L
741L
865L
731L
746L
746BL
746AL
636L
700L
707L
694L
605L
862L
861L
787L
709L
708L
708AL
807L
N.O.
FIGURE A3.3-2 N-1: 72CH9 (CLOVER BAR 987S TO HARDISTY)
2024 WINTER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate B
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000

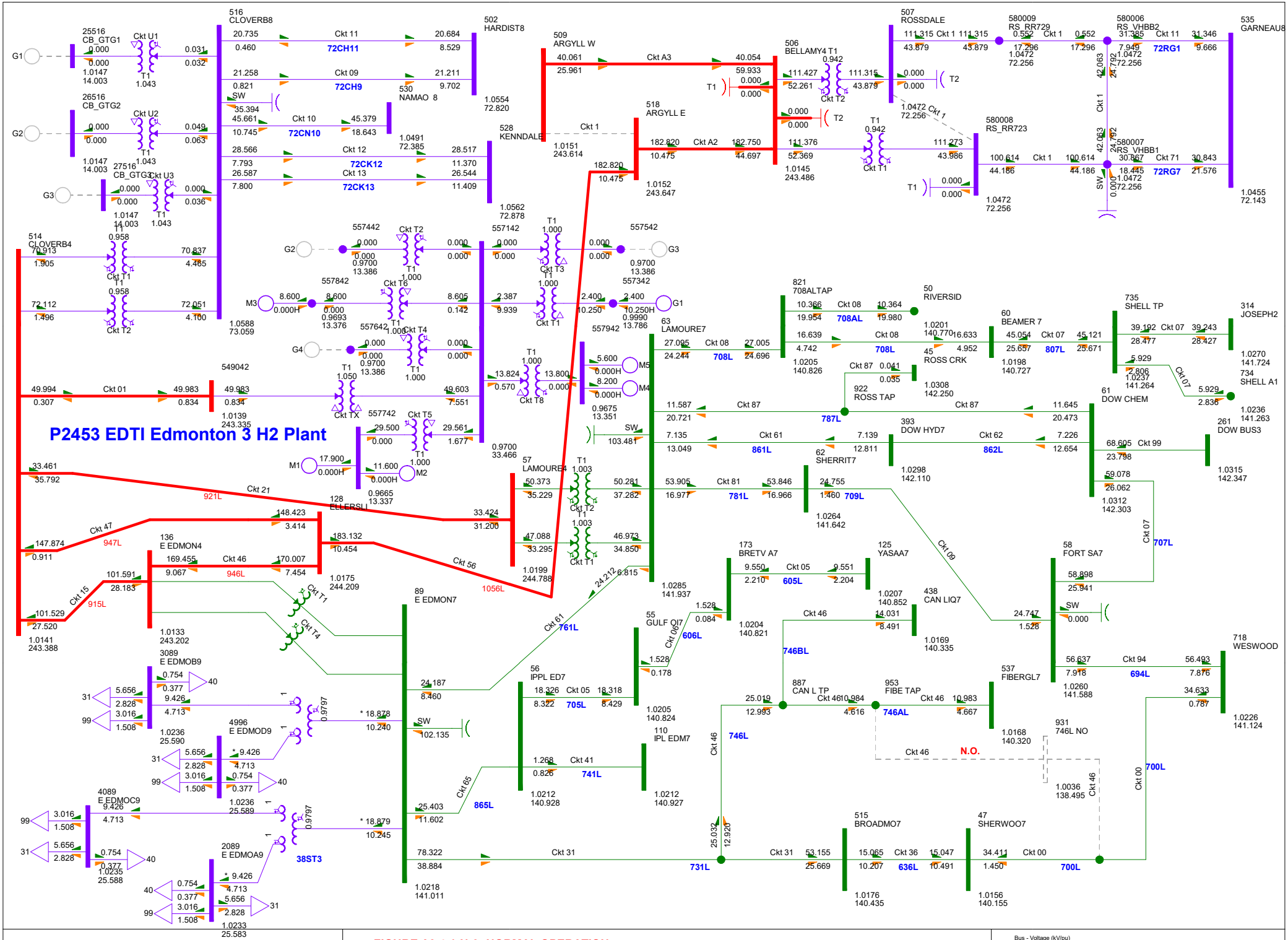


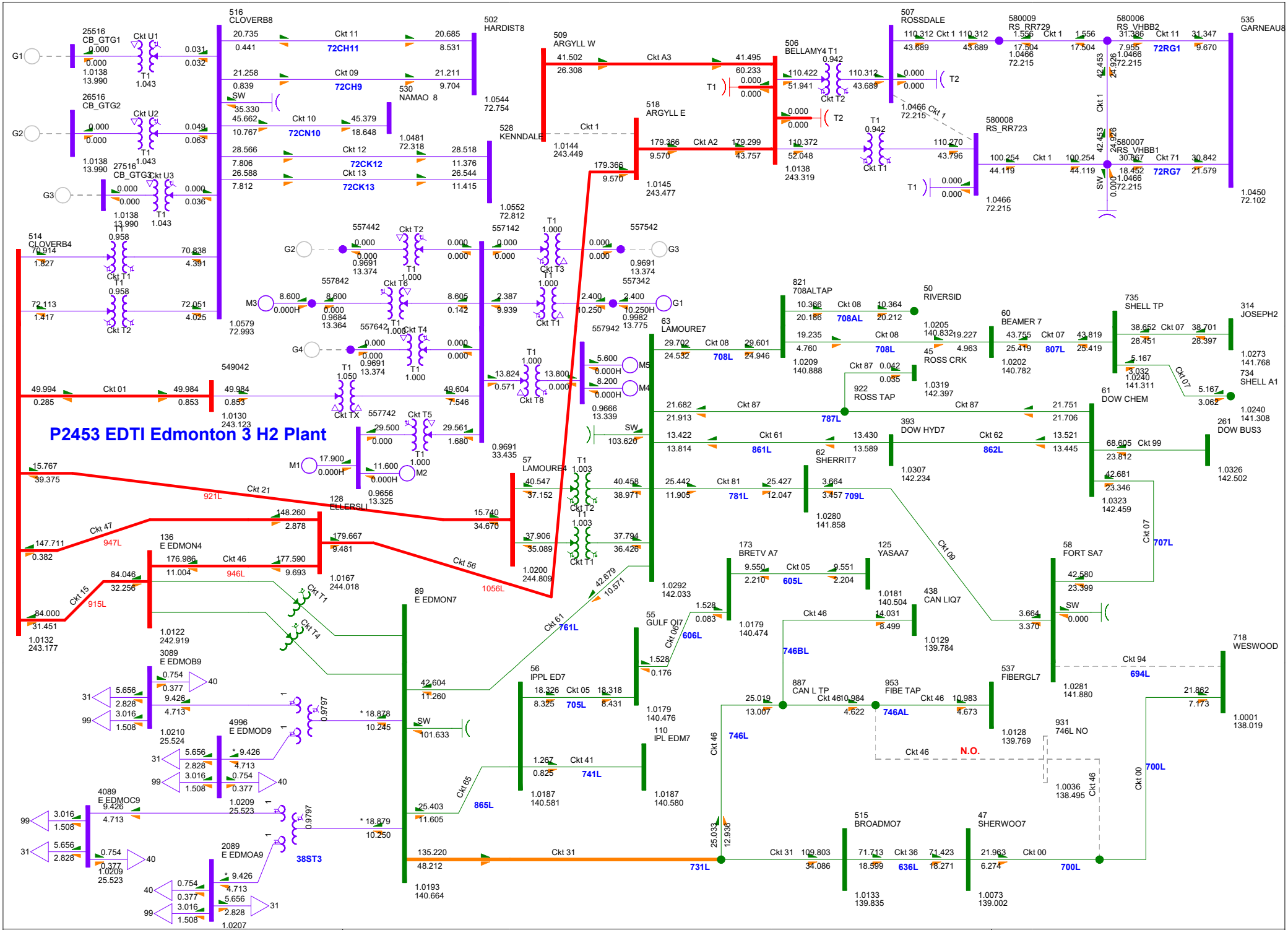
P2453 EDTI Edmonton 3 H2 Plant

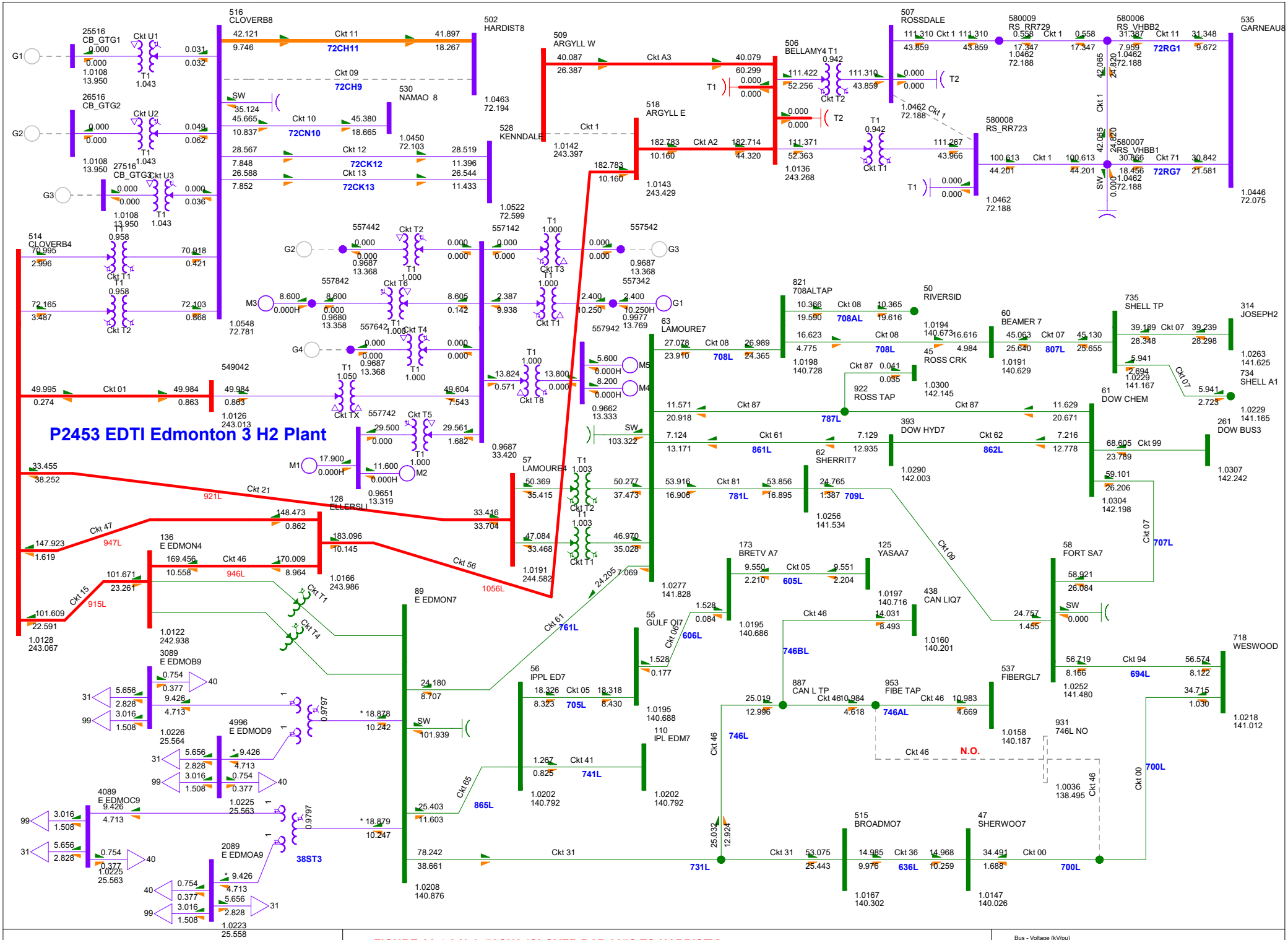
FIGURE A3.3-3 N-1: 72CH11 (CLOVER BAR 987S TO HARDISTY)
2024 WINTER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

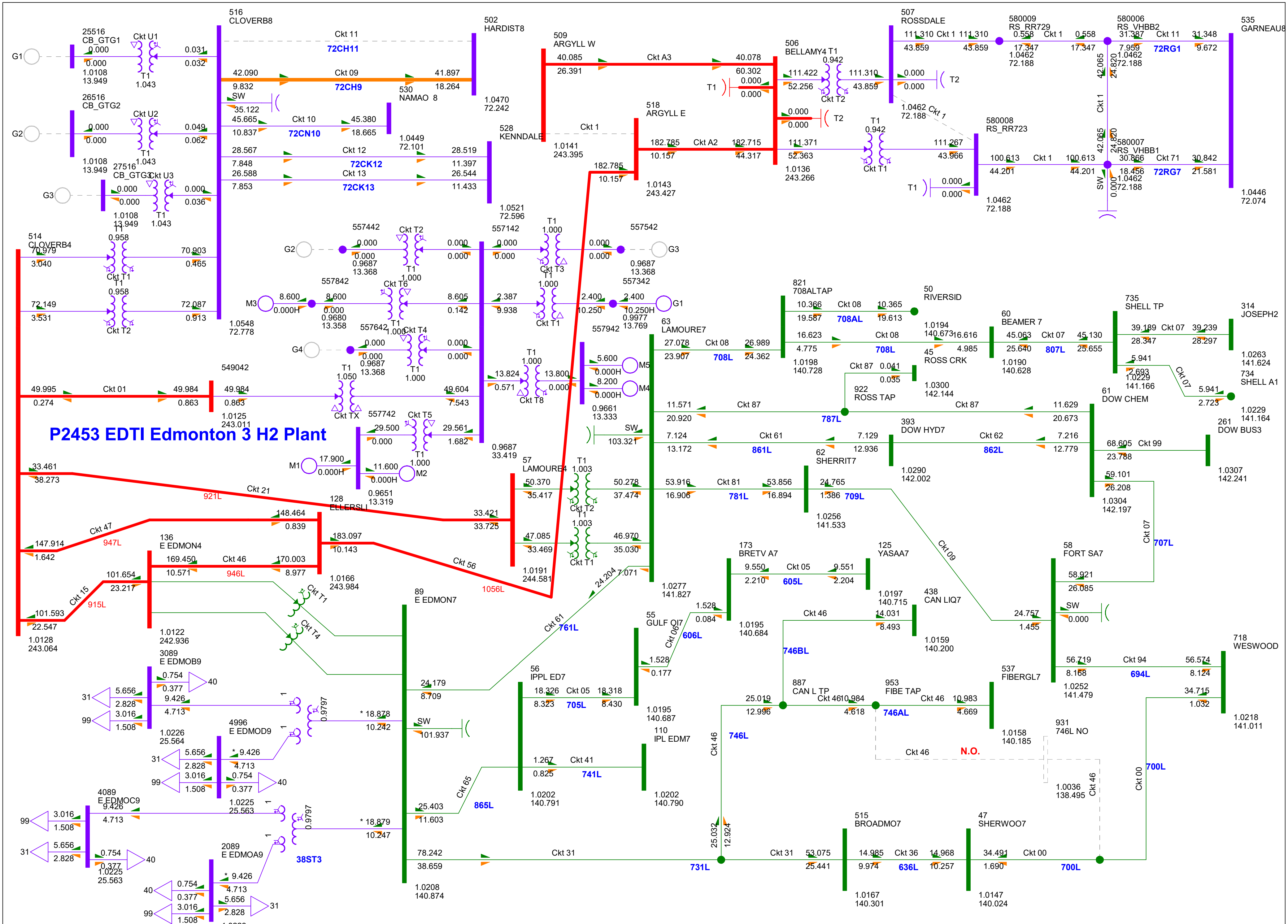
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate B
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000


P2453 EDTI Edmonton 3 H2 Plant
516 CLOVERB8
502 HARDIST8
509 ARGYLL W
506 BELLAMY4 T1
507 ROSSDALE
580009 RS_RR729
580006 RS_VHBB2
535 GARNEAU8
518 ARGYLL E
528 KENNDALE
580008 RS_RR723
580007 RS_VHBB1
514 CLOVERB4
549042
557442
557142
557542
557842
557642
557742
557942
557342
821 708ALTAP
50 RIVERSID
60 BEAMER 7
735 SHELL TP
314 JOSEPH2
734 SHELL A1
63 LAMOURE7
922 ROSS TAP
45 ROSS CRK
61 DOW CHEM
393 DOW HYD7
62 SHERRIT7
261 DOW BUS3
57 LAMOURE4
128 ELLERSLI
136 E EDMON4
89 E EDMON7
3089 E EDMOB9
4996 E EDMOD9
4089 E EDMOC9
2089 E EDMOA9
38ST3
173 BRETV A7
125 YASAA7
58 FORT SA7
55 GULF QI7
438 CAN LIQ7
56 IPPL ED7
537 FIBERGL7
718 WESWOOD
110 IPL EDM7
887 CAN L TP
953 FIBE TAP
931 746L NO
515 BROADMO7
47 SHERWOO7
700L
707L
709L
781L
787L
861L
862L
605L
606L
705L
741L
746L
746AL
746BL
694L
636L
731L
865L
915L
921L
947L
946L
1056L
761L
N.O.
P2453 EDTI Edmonton 3 H2 Plant
FIGURE A3.3-4 N-1: 72CK13 (CLOVER BAR 987S TO KENNEDALE)
2024 WINTER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate B
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000


P2453 EDTI Edmonton 3 H2 Plant
516 CLOVERB8
502 HARDIST8
509 ARGYLL W
506 BELLAMY4 T1
507 ROSSDALE
580009 RS_RR729
580006 RS_VHBB2
535 GARNEAU8
518 ARGYLL E
528 KENNDALE
580008 RS_RR723
580007 RS_VHBB1
514 CLOVERB4
549042
821 708ALTAP
50 RIVERSID
60 BEAMER 7
735 SHELL TP
314 JOSEPH2
734 SHELL A1
63 LAMOURE7
45 ROSS CRK
922 ROSS TAP
61 DOW CHEM
393 DOW HYD7
261 DOW BUS3
62 SHERRIT7
57 LAMOURE4
128 ELLERSLI
136 E EDMON4
89 E EDMON7
3089 E EDMOB9
4996 E EDMOD9
4089 E EDMOC9
2089 E EDMOA9
38ST3
173 BRETV A7
125 YASAA7
58 FORT SA7
718 WESWOOD
438 CAN LIQ7
55 GULF OI7
56 IPPL ED7
110 IPL EDM7
887 CAN L TP
953 FIBE TAP
537 FIBERGL7
931 746L NO
515 BROADMO7
47 SHERWOO7
921L
947L
915L
1056L
731L
865L
N.O.
P2453 EDTI Edmonton 3 H2 Plant
FIGURE A3.4-1-N-0: NORMAL OPERATION
2024 SUMMER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

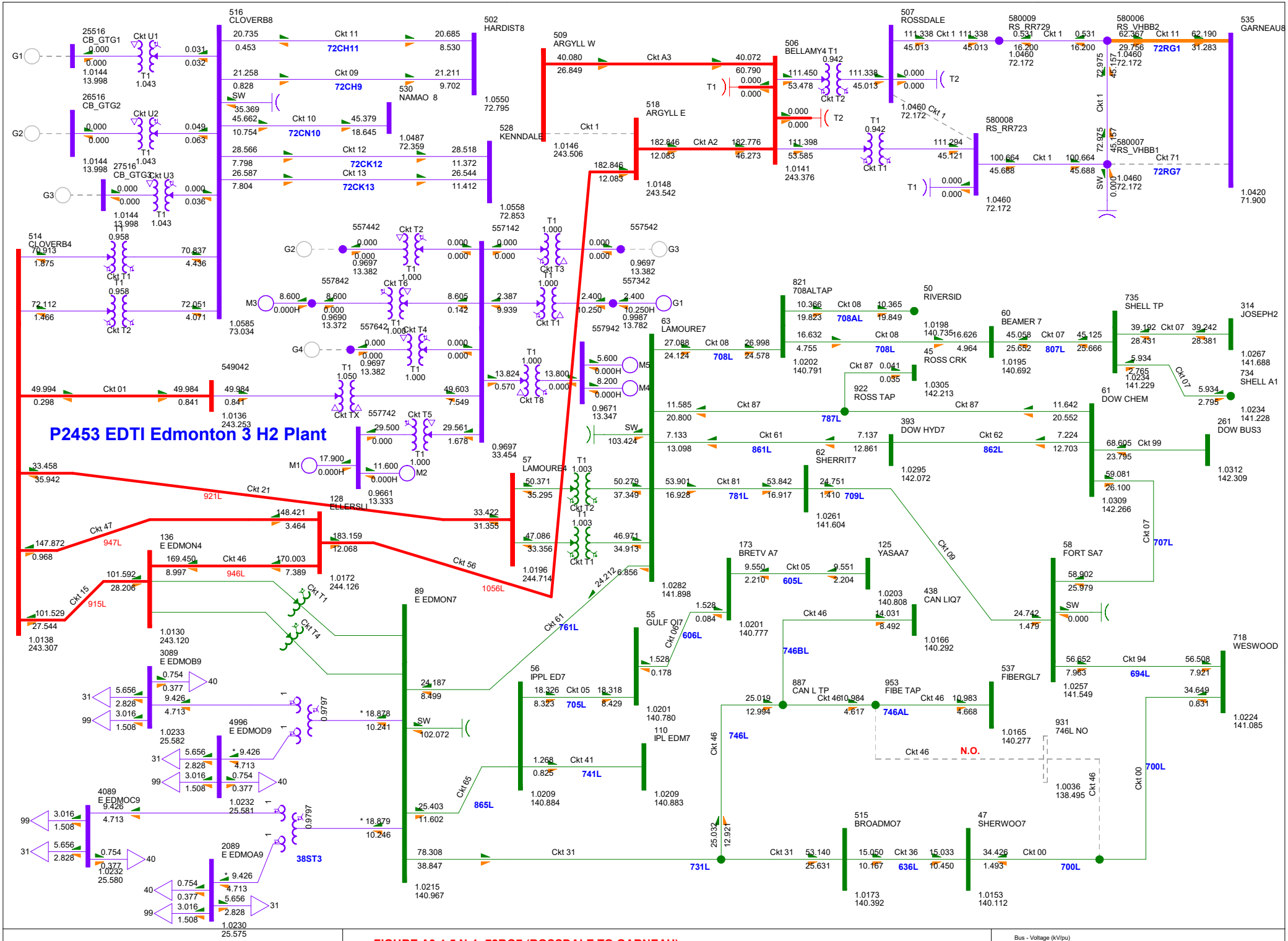

P2453 EDTI Edmonton 3 H2 Plant
516 CLOVERB8
502 HARDIST8
509 ARGYLL W
506 BELLAMY4 T1
507 ROSSDALE
580009 RS_RR729
580006 RS_VHBB2
535 GARNEAU8
518 ARGYLL E
528 KENNDALE
580008 RS_RR723
580007 RS_VHBB1
514 CLOVERB4
549042
821 708ALTAP
50 RIVERSID
60 BEAMER 7
735 SHELL TP
314 JOSEPH2
734 SHELL A1
63 LAMOURE7
922 ROSS TAP
45 ROSS CRK
61 DOW CHEM
393 DOW HYD7
261 DOW BUS3
62 SHERRIT7
57 LAMOURE4
128 ELLERSLI
136 E EDMON4
89 E EDMON7
3089 E EDMOB9
4996 E EDMOD9
4089 E EDMOC9
2089 E EDMOA9
38ST3
55 GULF QI7
56 IPPL ED7
110 IPL EDM7
173 BRETV A7
125 YASAA7
438 CAN LIQ7
887 CAN L TP
953 FIBE TAP
931 746L NO
58 FORT SA7
537 FIBERGL7
718 WESWOOD
515 BROADMO7
47 SHERWOO7
921L
947L
915L
1056L
761L
606L
746BL
746L
746AL
741L
865L
731L
707L
694L
700L
636L
N.O.
FIGURE A3.4-2 N-1: 694L (WESTWOOD 422S TO FORT SASKATCHEWAN 54S)
2024 SUMMER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000


P2453 EDTI Edmonton 3 H2 Plant
516 CLOVERB8
502 HARDIST8
509 ARGYLL W
506 BELLAMY4 T1
507 ROSSDALE
580009 RS_RR729
580006 RS_VHBB2
535 GARNEAU8
518 ARGYLL E
528 KENNDALE
530 NAMAO 8
580008 RS_RR723
580007 RS_VHBB1
514 CLOVERB4
549042
63 LAMOURE7
821 708ALTAP
50 RIVERSID
60 BEAMER 7
735 SHELL TP
314 JOSEPH2
734 SHELL A1
61 DOW CHEM
922 ROSS TAP
45 ROSS CRK
393 DOW HYD7
62 SHERRIT7
261 DOW BUS3
57 LAMOURE4
128 ELLERSLI
136 E EDMON4
89 E EDMON7
3089 E EDMOB9
4996 E EDMOD9
4089 E EDMOC9
2089 E EDMOA9
38ST3
55 GULF QI7
56 IPPL ED7
110 IPL EDM7
173 BRETV A7
125 YASAA7
438 CAN LIQ7
887 CAN L TP
953 FIBE TAP
58 FORT SA7
537 FIBERGL7
931 746L NO
718 WESWOOD
515 BROADMO7
47 SHERWOO7
25516 CB_GTG1
26516 CB_GTG2
27516 CB_GTG3
557442
557842
557642
557742
557142
557542
557342
557942
72CH11
72CH9
72CN10
72CK12
72CK13
72RG1
72RG7
921L
947L
946L
915L
1056L
761L
606L
705L
741L
865L
746BL
746L
746AL
731L
636L
694L
707L
700L
N.O.
Ckt 11
Ckt 09
Ckt 10
Ckt 12
Ckt 13
Ckt A3
Ckt A2
Ckt 1
Ckt 01
Ckt 21
Ckt 47
Ckt 46
Ckt 15
Ckt 56
Ckt 61
Ckt 65
Ckt 41
Ckt 31
Ckt 87
Ckt 08
Ckt 07
Ckt 09
Ckt 05
Ckt 99
Ckt 94
Ckt 00
Ckt 46
708AL
708L
807L
787L
861L
862L
709L
P2453 EDTI Edmonton 3 H2 Plant
FIGURE A3.4-3 N-1: 72CH9 (CLOVER BAR 987S TO HARDISTY)
2024 SUMMER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

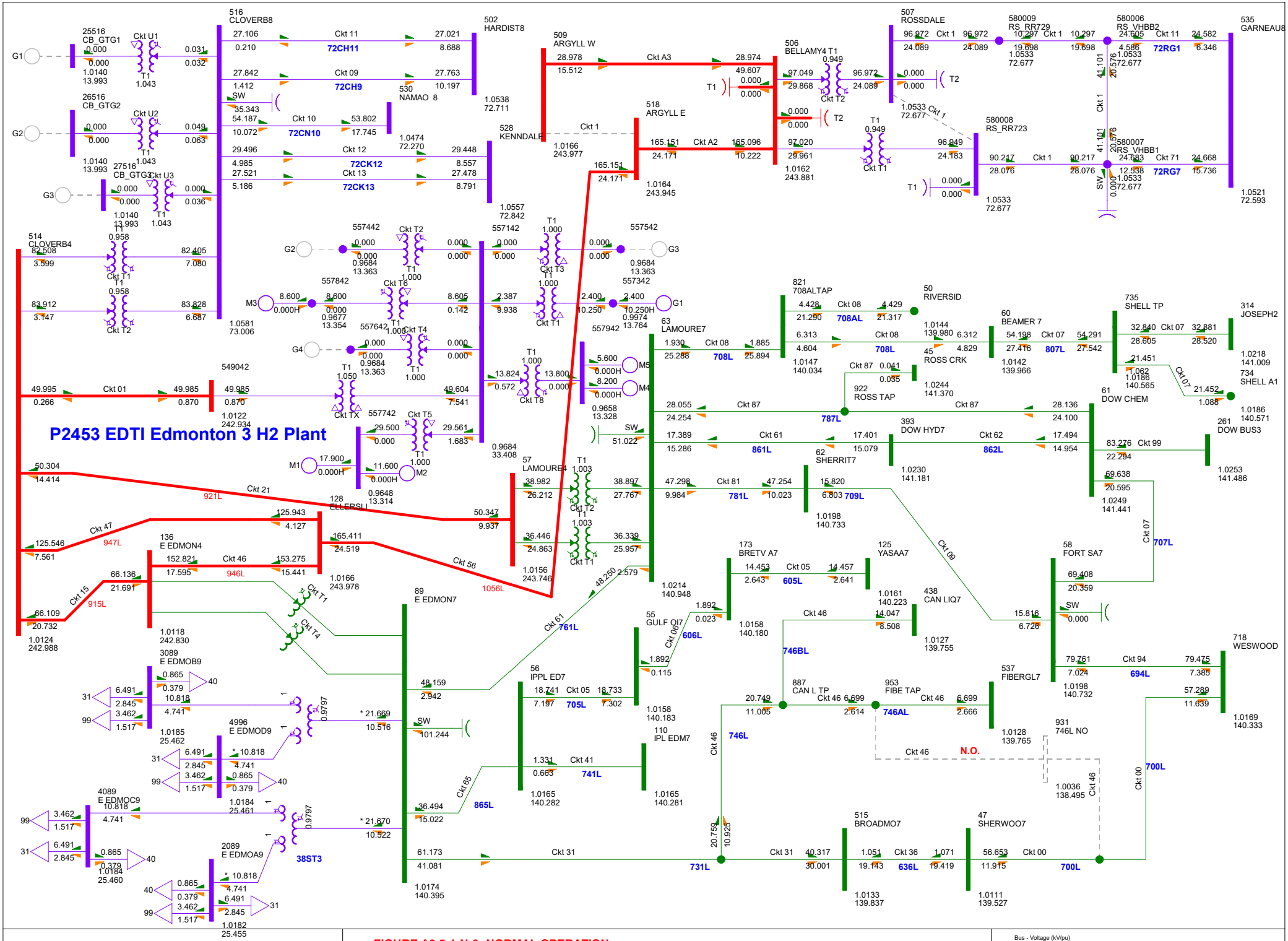
FIGURE A3.4-4 N-1: 72CH11 (CLOVER BAR 987S TO HARDISTY)
2024 SUMMER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A3.4-5 N-1: 72RG7 (ROSSDALE TO GARNEAU)
2024 SUMMER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

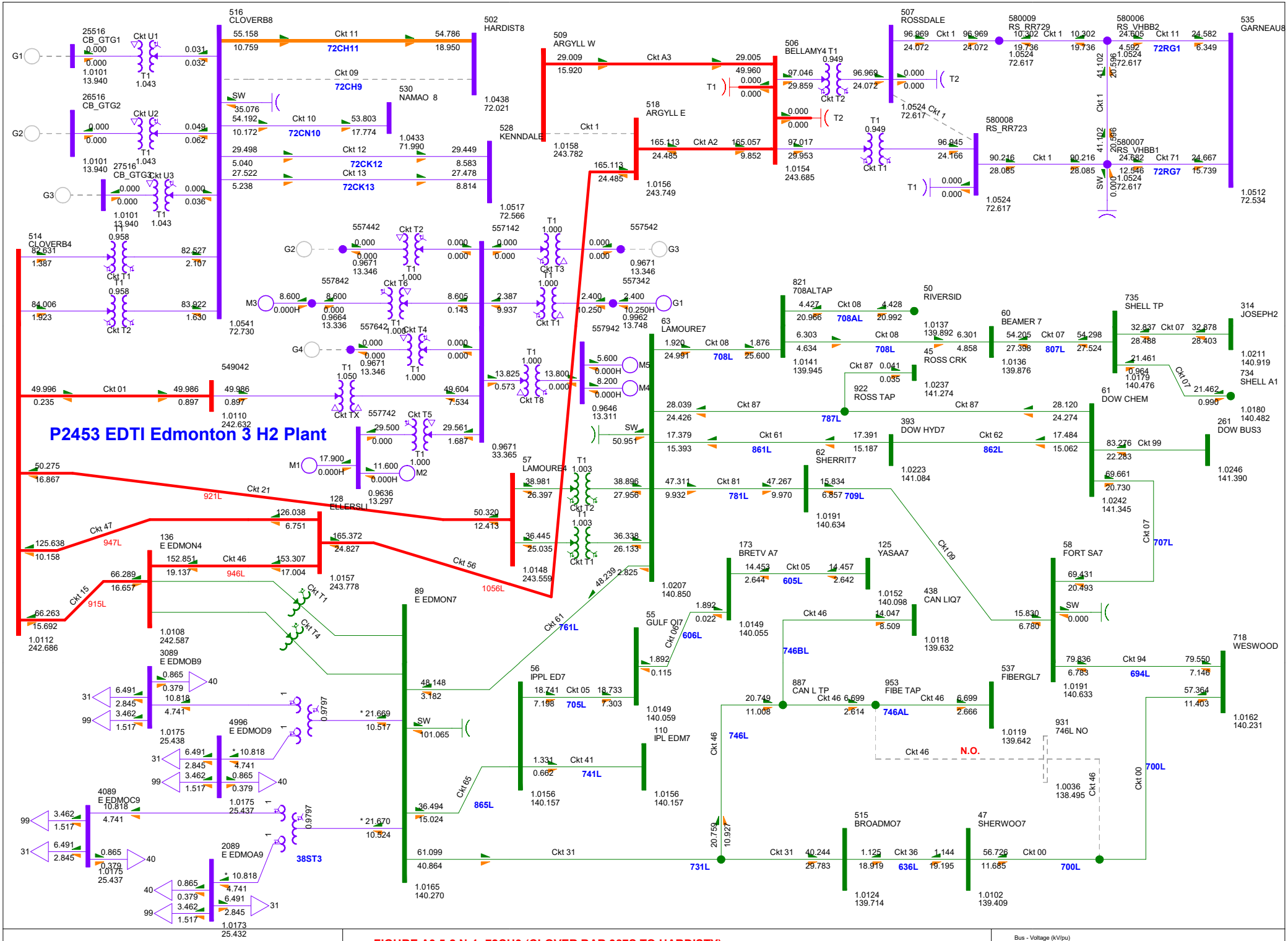
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A3.5-1-N-0: NORMAL OPERATION
2024 WINTER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

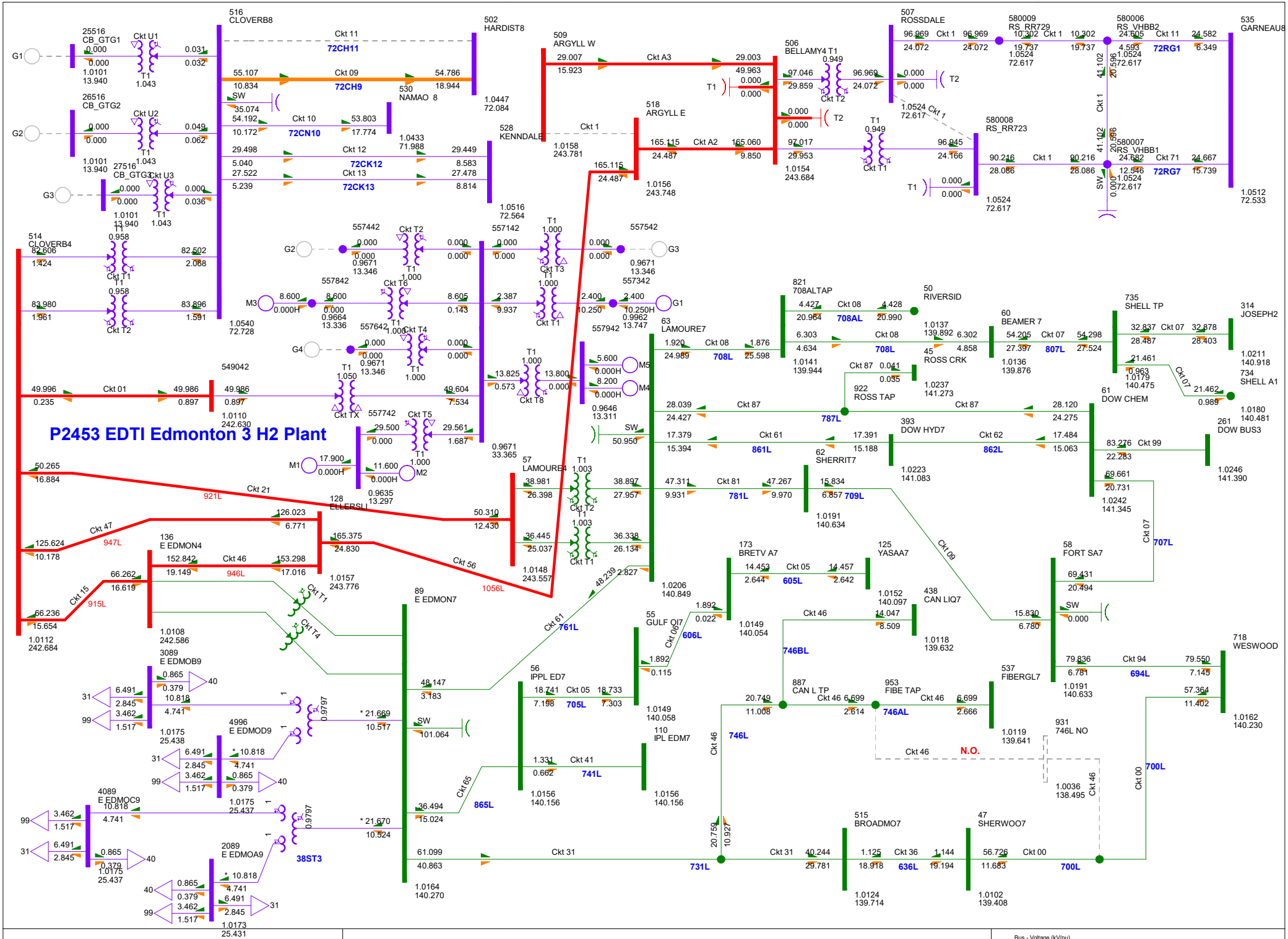
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A3.5-2 N-1: 72CH9 (CLOVER BAR 987S TO HARDISTY)
2024 WINTER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

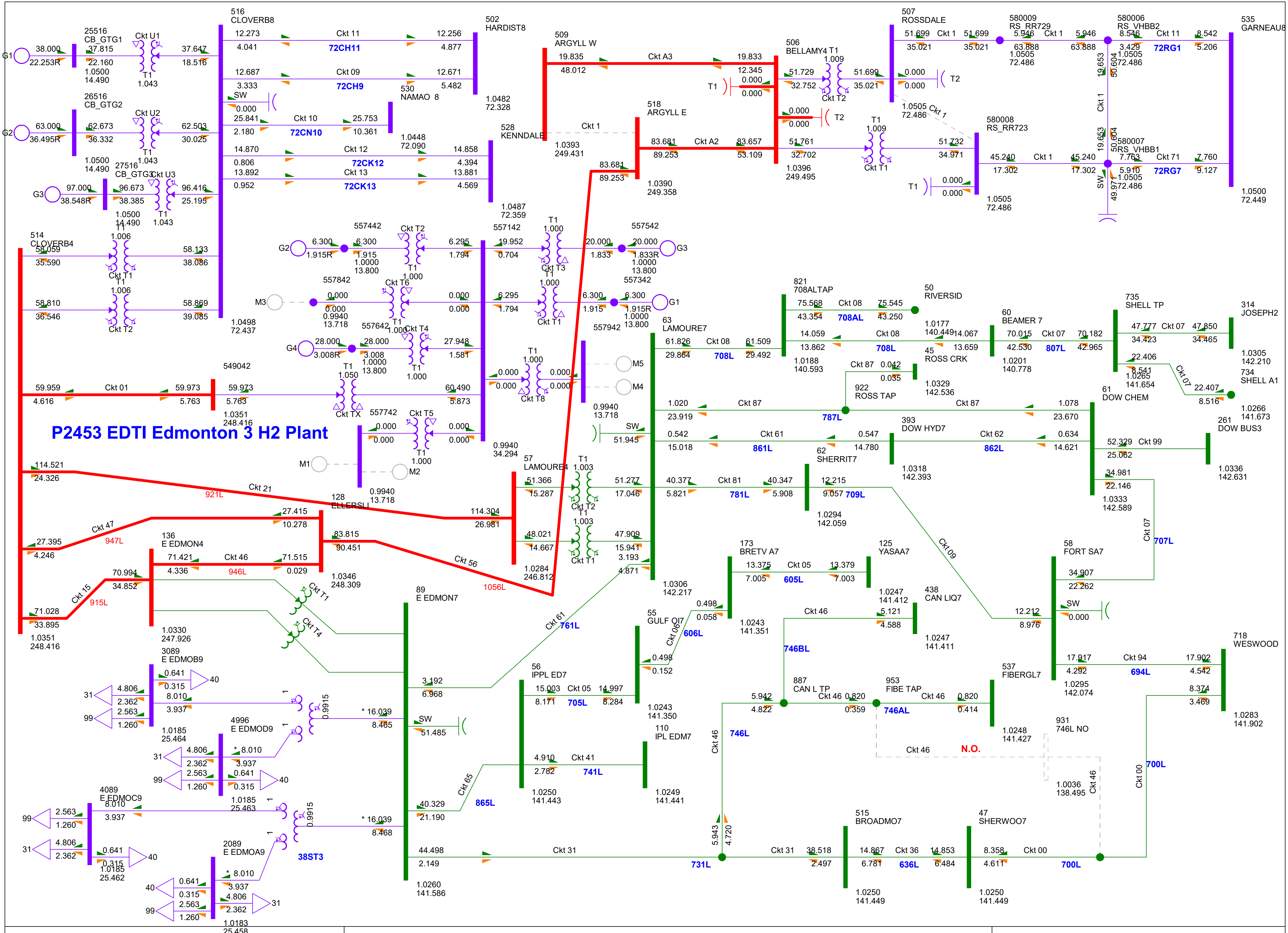
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

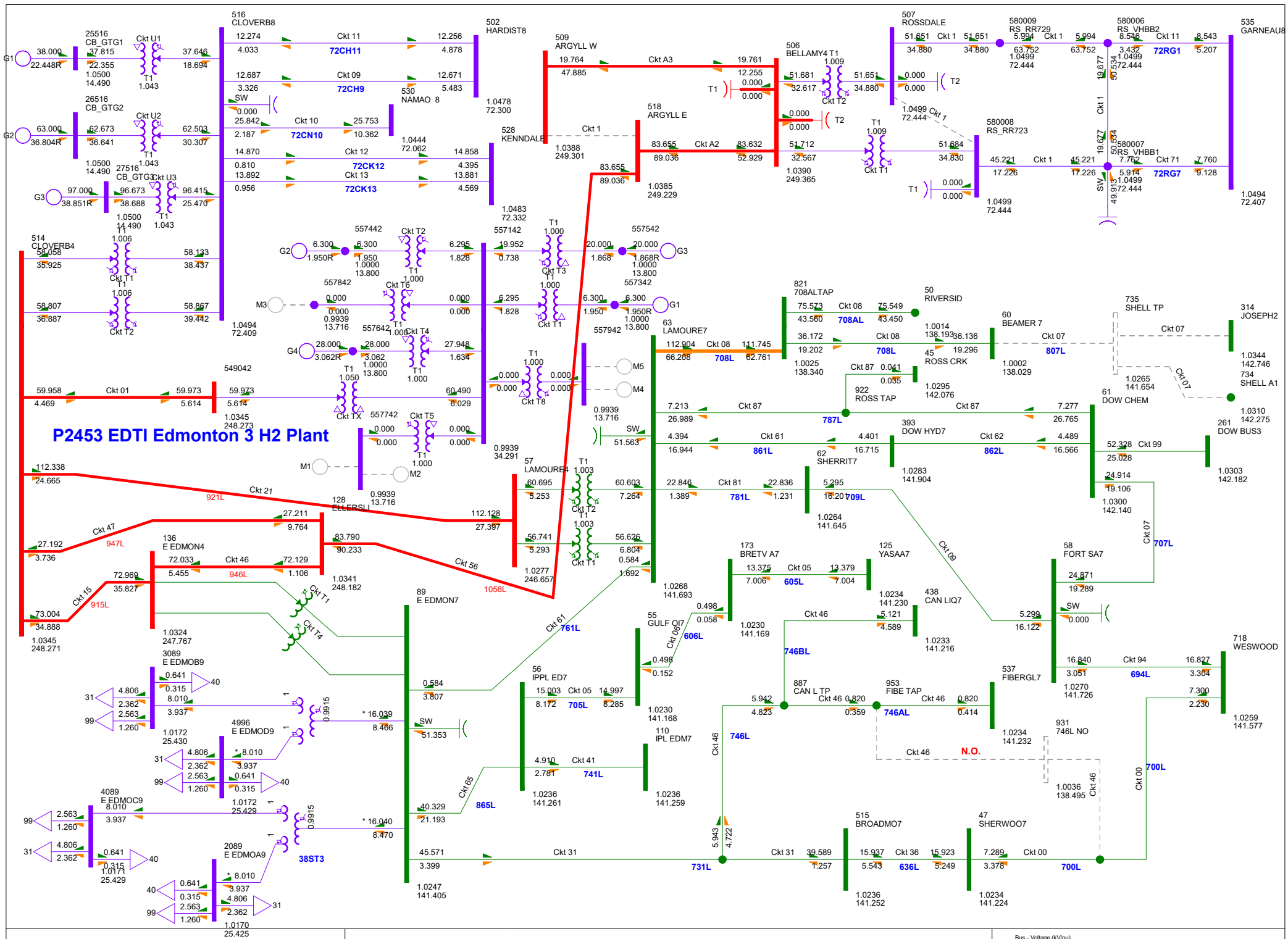
FIGURE A3.5-3 N-1: 72CH11 (CLOVER BAR 987S TO HARDISTY)
2024 WINTER PEAK (POST-PROJECT)
PRINTED ON SATURDAY 02. JULY 2022

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000<=138.000<=240.000<=500.000>500.000



P2453 EDTI Edmonton 3 H2 Plant

FIGURE A3.6-1-N-0: NORMAL OPERATION
2024 SUMMER LIGHT (POST-PROJECT) - SENSITIVITY
PRINTED ON SATURDAY 02. JULY 2022

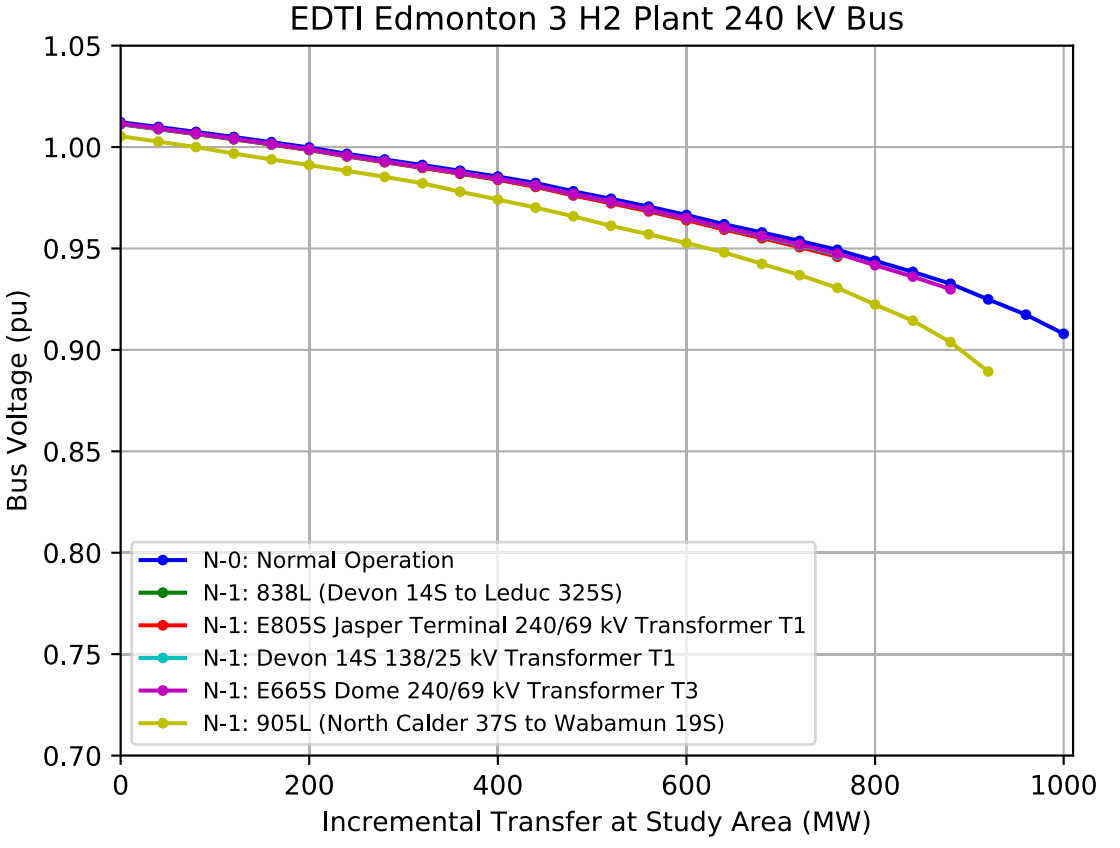


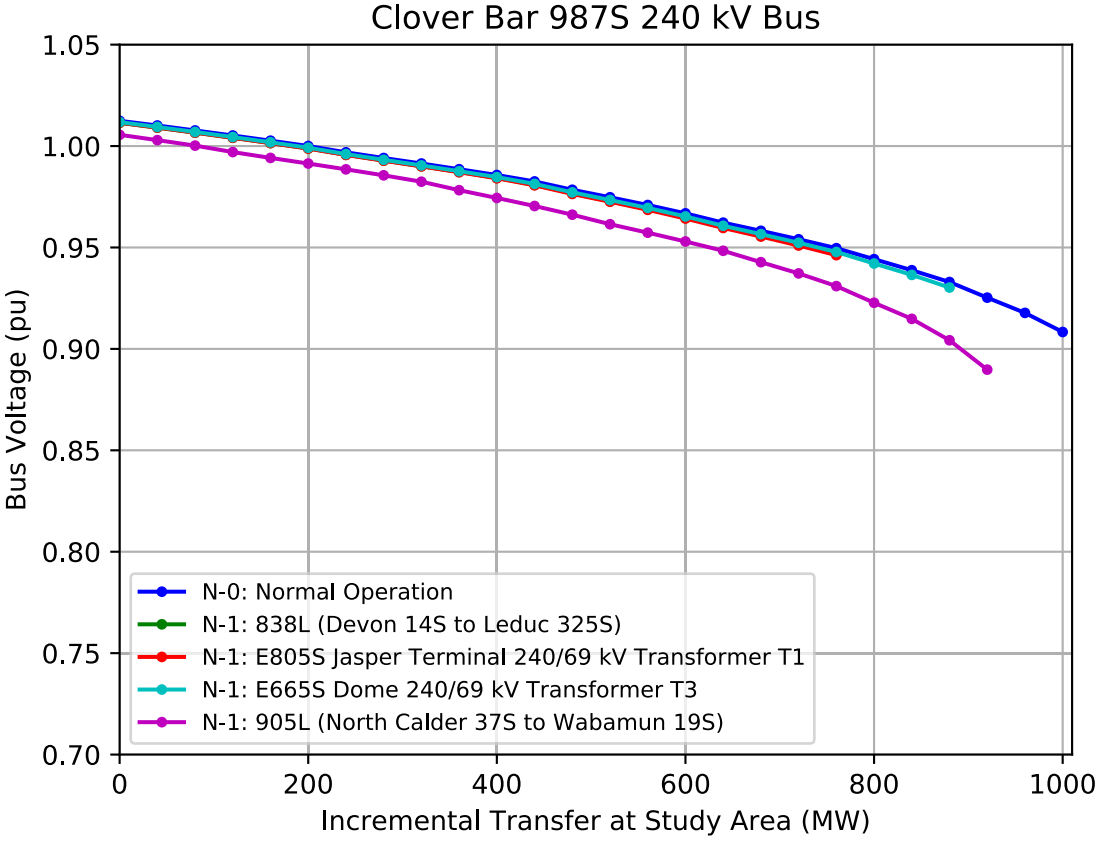
P2453 EDTI Edmonton 3 H2 Plant

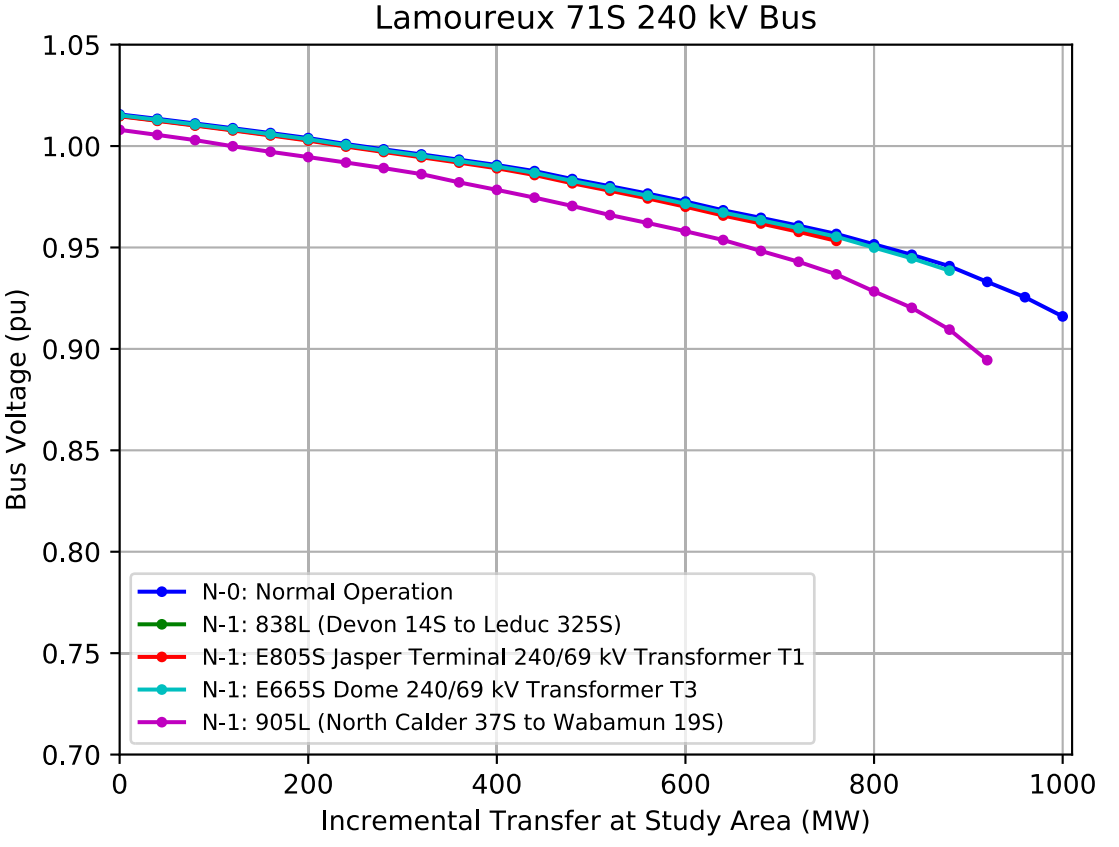
FIGURE A3.6-2 N-1: 807L (BEAMER 233S TO JOSEPHBURG 410S)
2024 SUMMER LIGHT (POST-PROJECT) - SENSITIVITY
PRINTED ON SATURDAY 02. JULY 2022

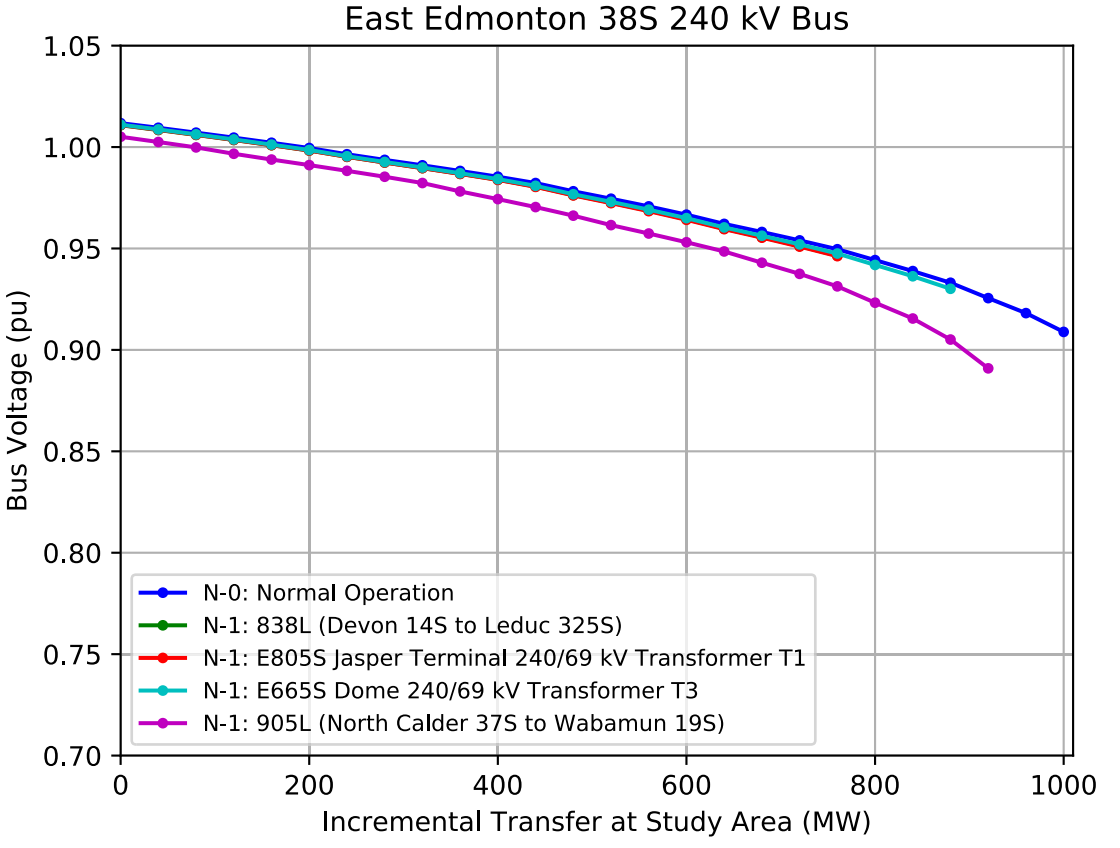
Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100OV 0.900UV
kV: <=10.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

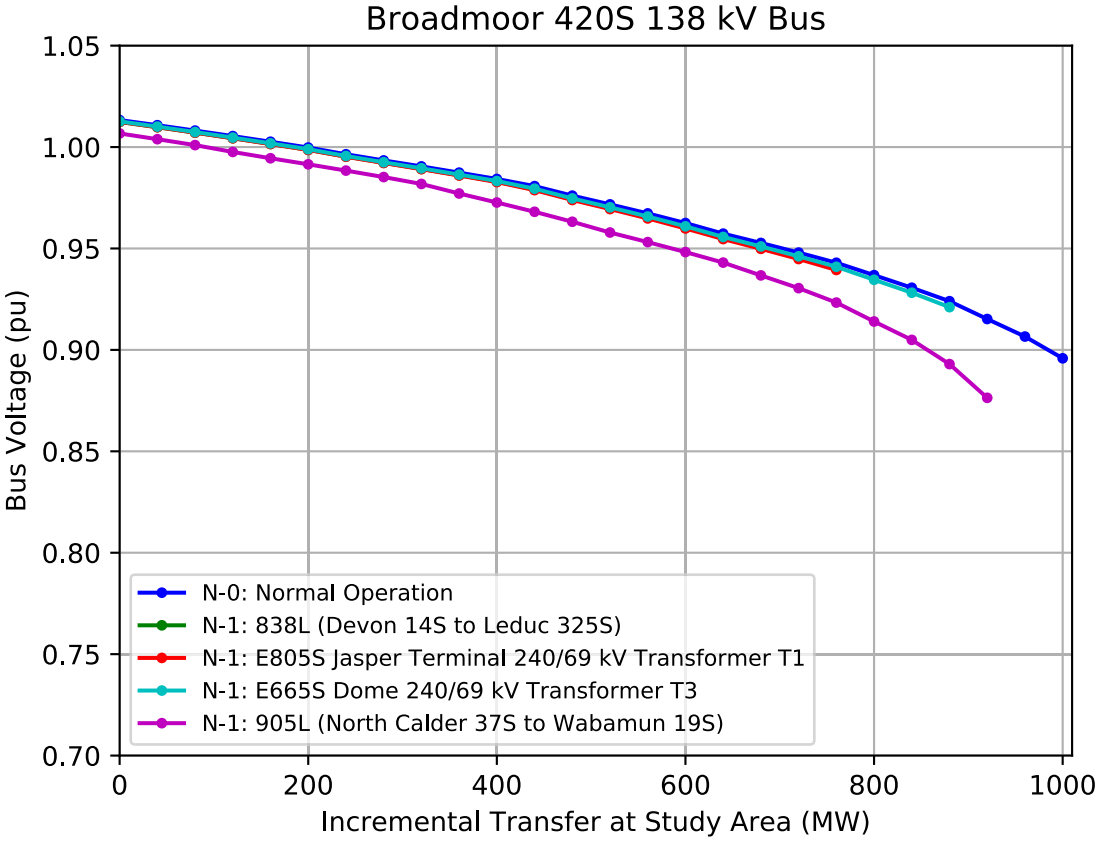
Attachment A4
Post-Project Voltage Stability Diagrams

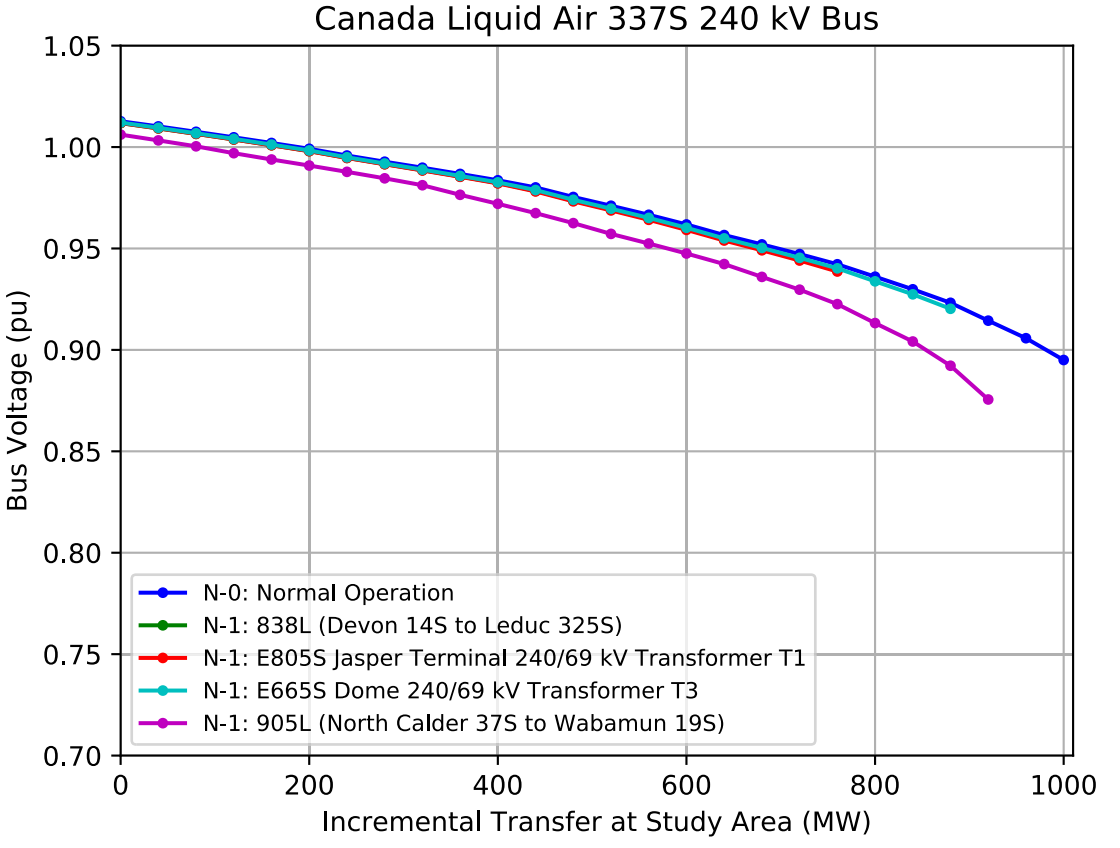

EDTI Edmonton 3 H2 Plant 240 kV Bus
Bus Voltage (pu)
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0
200
400
600
800
1000
Incremental Transfer at Study Area (MW)
N-0: Normal Operation
N-1: 838L (Devon 14S to Leduc 325S)
N-1: E805S Jasper Terminal 240/69 kV Transformer T1
N-1: Devon 14S 138/25 kV Transformer T1
N-1: E665S Dome 240/69 kV Transformer T3
N-1: 905L (North Calder 37S to Wabamun 19S)


Clover Bar 987S 240 kV Bus
Bus Voltage (pu)
Incremental Transfer at Study Area (MW)
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0
200
400
600
800
1000
N-0: Normal Operation
N-1: 838L (Devon 14S to Leduc 325S)
N-1: E805S Jasper Terminal 240/69 kV Transformer T1
N-1: E665S Dome 240/69 kV Transformer T3
N-1: 905L (North Calder 37S to Wabamun 19S)


Lamoureux 71S 240 kV Bus
Bus Voltage (pu)
Incremental Transfer at Study Area (MW)
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0
200
400
600
800
1000
N-0: Normal Operation
N-1: 838L (Devon 14S to Leduc 325S)
N-1: E805S Jasper Terminal 240/69 kV Transformer T1
N-1: E665S Dome 240/69 kV Transformer T3
N-1: 905L (North Calder 37S to Wabamun 19S)


East Edmonton 38S 240 kV Bus
Bus Voltage (pu)
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0
200
400
600
800
1000
Incremental Transfer at Study Area (MW)
N-0: Normal Operation
N-1: 838L (Devon 14S to Leduc 325S)
N-1: E805S Jasper Terminal 240/69 kV Transformer T1
N-1: E665S Dome 240/69 kV Transformer T3
N-1: 905L (North Calder 37S to Wabamun 19S)

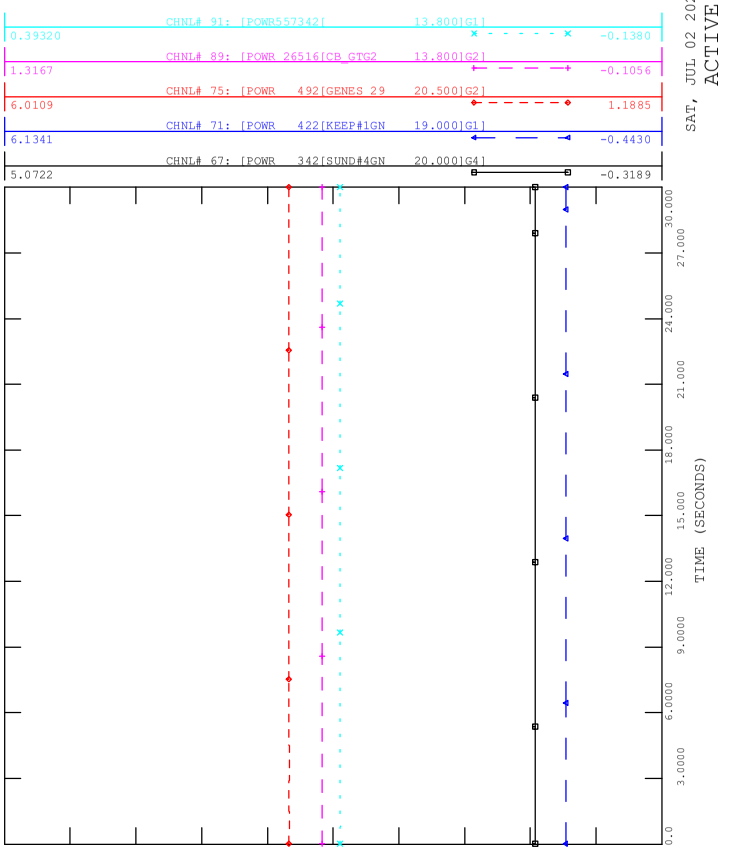

Broadmoor 420S 138 kV Bus
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
Bus Voltage (pu)
0
200
400
600
800
1000
Incremental Transfer at Study Area (MW)
N-0: Normal Operation
N-1: 838L (Devon 14S to Leduc 325S)
N-1: E805S Jasper Terminal 240/69 kV Transformer T1
N-1: E665S Dome 240/69 kV Transformer T3
N-1: 905L (North Calder 37S to Wabamun 19S)


Canada Liquid Air 337S 240 kV Bus
Bus Voltage (pu)
Incremental Transfer at Study Area (MW)
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0
200
400
600
800
1000
N-0: Normal Operation
N-1: 838L (Devon 14S to Leduc 325S)
N-1: E805S Jasper Terminal 240/69 kV Transformer T1
N-1: E665S Dome 240/69 kV Transformer T3
N-1: 905L (North Calder 37S to Wabamun 19S)

Attachment A5
Post-Project Transient Stability Diagrams

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_NOFAULT

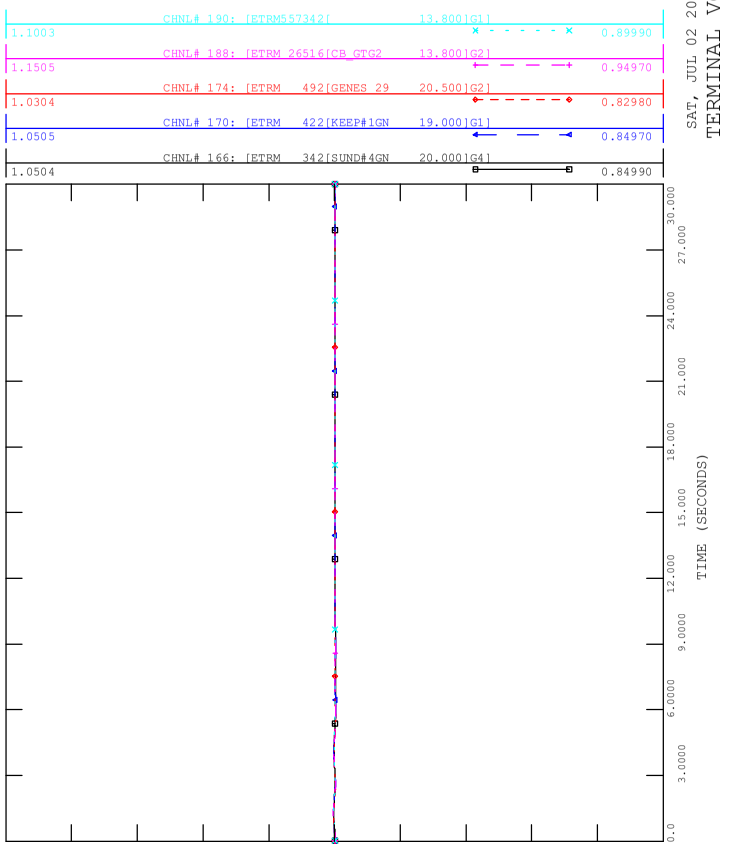
FILE: scn5_SL_nofault.out



SAT, JUL 02 2022 15:00
ACTIVE POWER

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_NOFAULT

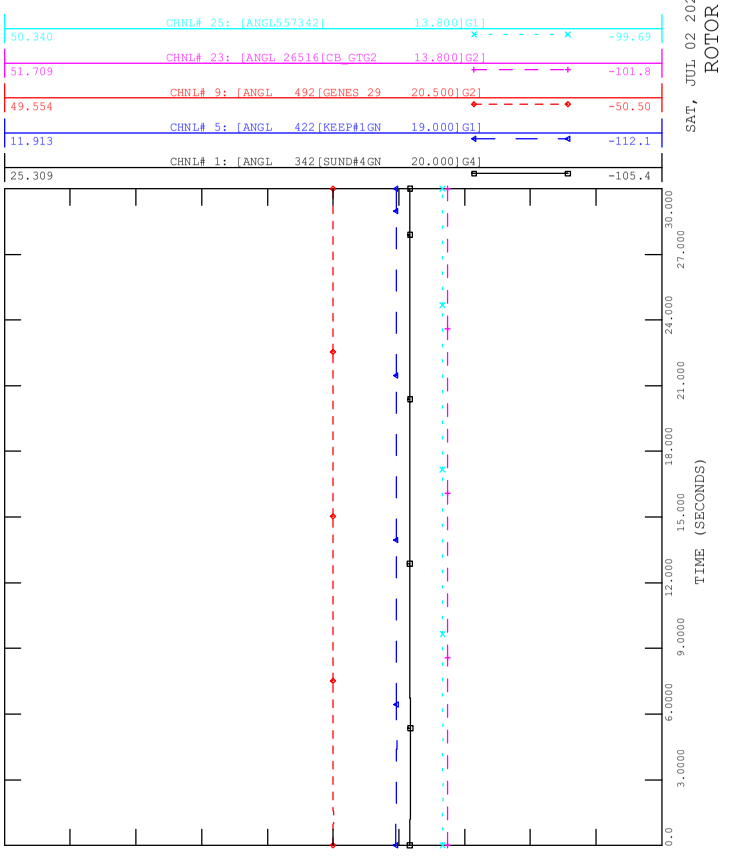
FILE: scn5_SL_nofault.out



SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_NOFAULT

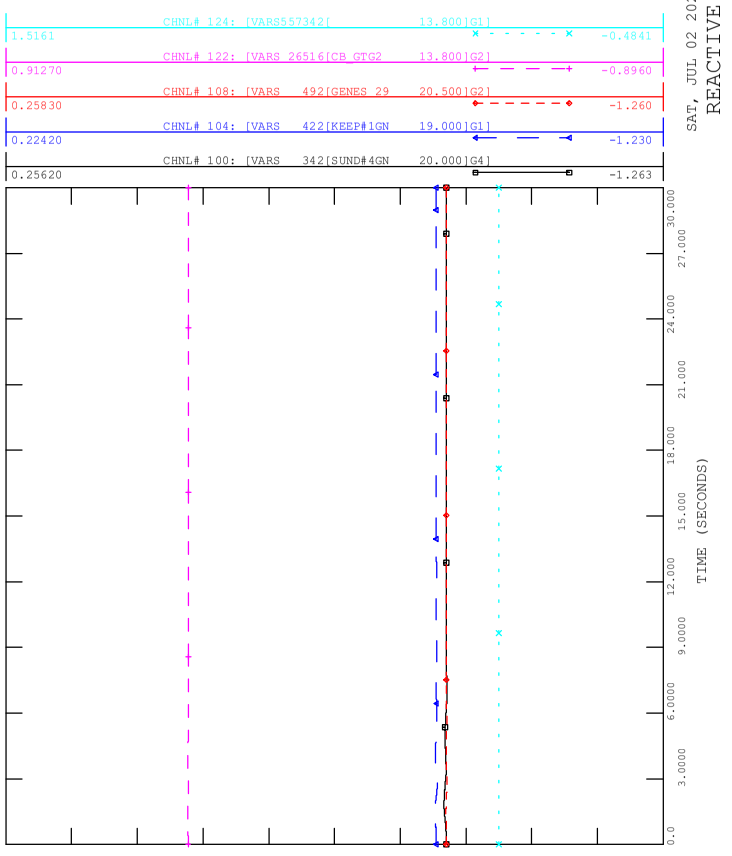
FILE: scn5_SL_nofault.out



SAT, JUL 02 2022 15:00
ROTOR ANGLE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_NOFAULT

FILE: scn5_SL_nofault.out



SAT, JUL 02 2022 15:00
REACTIVE POWER

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_NOFAULT

FILE: scn5_SL_nofault.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1383 0.93780
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1292 0.92880
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1305 0.93010
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1223 0.92180
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1201 0.91960

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_NOFAULT

FILE: scn5_SL_nofault.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8_Q] 40.543 -39.46
CHNL# 234: [921L_Q] 8.0805 -72.15
CHNL# 232: [NEWLINE_Q] 38.414 -41.63
CHNL# 230: [947L_Q] 24.704 -55.39
CHNL# 228: [915L_Q] -2.731 -82.91

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_NOFAULT

FILE: scn5_SL_nofault.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1381 0.93770
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1223 0.92180
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1399 0.93950
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1307 0.93020
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1278 0.92740

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_NOFAULT

FILE: scn5_SL_nofault.out

SAT, JUL 02 2022 15:00 BRANCH P

CHNL# 235: [T8_P] 153.83 -126.2
CHNL# 233: [921L_P] 66.774 -147.7
CHNL# 231: [NEWLINE_P] 120.10 -60.04
CHNL# 229: [947L_P] 76.138 -54.37
CHNL# 227: [915L_P] 10.369 -91.05

TIME (SECONDS)

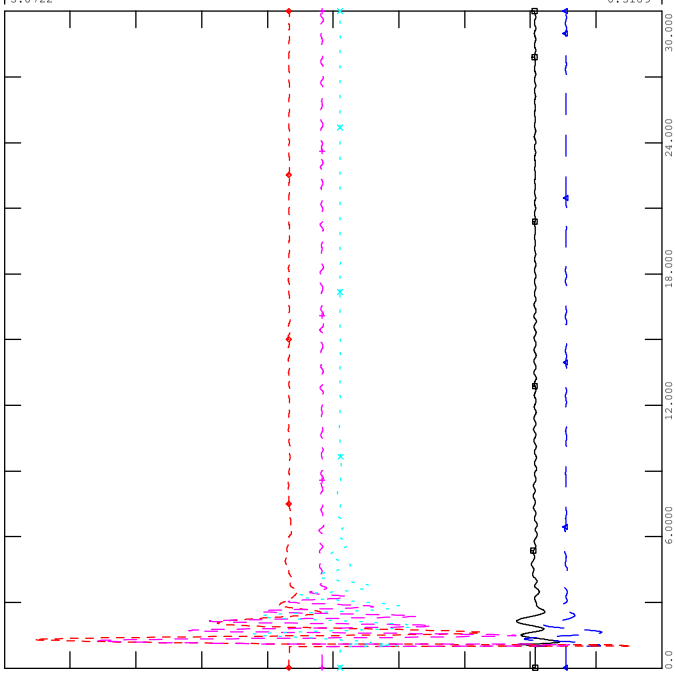
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_01_915L_EASTEDMONTON

FILE: scn5_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

CHNL# 91: [POWR557342[13.800]G1]
0.39320 -0.1380
CHNL# 89: [POWR 26516[CB_GTG2 13.800]G2]
1.3167 -0.1056
CHNL# 75: [POWR 492[GENES 29 20.500]G2]
6.0109 1.1885
CHNL# 71: [POWR 422[KEEP#1GN 19.000]G1]
6.1341 -0.4430
CHNL# 67: [POWR 342[SUND#4GN 20.000]G4]
5.0722 -0.3189



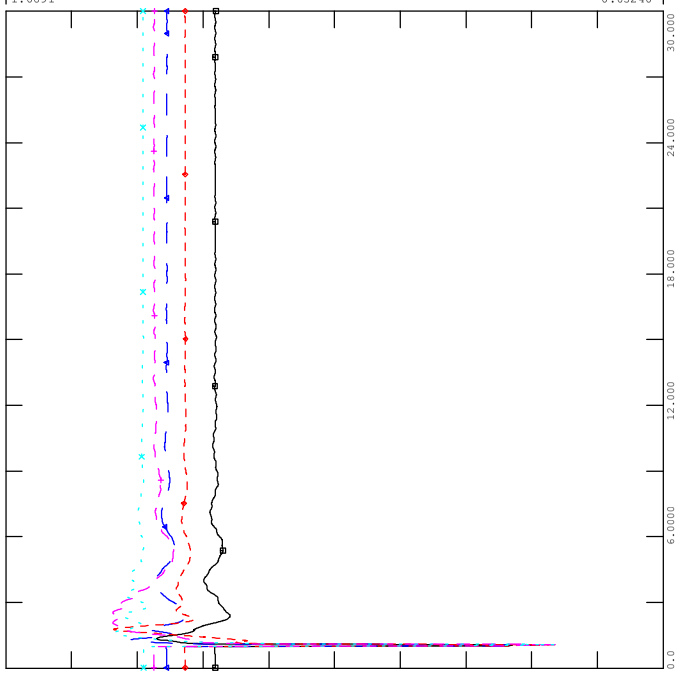
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_01_915L_EASTEDMONTON

FILE: scn5_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

CHNL# 190: [ETRM557342[13.800]G1]
1.1270 0.52060
CHNL# 188: [ETRM 26516[CB_GTG2 13.800]G2]
1.1888 0.57340
CHNL# 174: [ETRM 492[GENES 29 20.500]G2]
1.0964 0.48610
CHNL# 170: [ETRM 422[KEEP#1GN 19.000]G1]
1.0789 0.55250
CHNL# 166: [ETRM 342[SUND#4GN 20.000]G4]
1.0891 0.65240



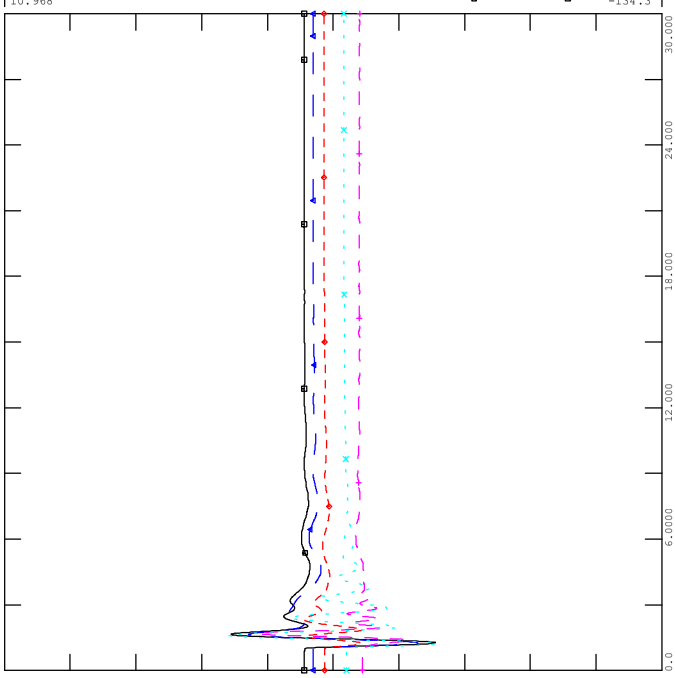
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_01_915L_EASTEDMONTON

FILE: scn5_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

CHNL# 25: [ANGL557342[13.800]G1]
26.917 -120.3
CHNL# 23: [ANGL 26516[CB_GTG2 13.800]G2]
19.111 -110.9
CHNL# 9: [ANGL 492[GENES 29 20.500]G2]
52.982 -56.80
CHNL# 5: [ANGL 422[KEEP#1GN 19.000]G1]
1.4548 -133.4
CHNL# 1: [ANGL 342[SUND#4GN 20.000]G4]
10.968 -134.3



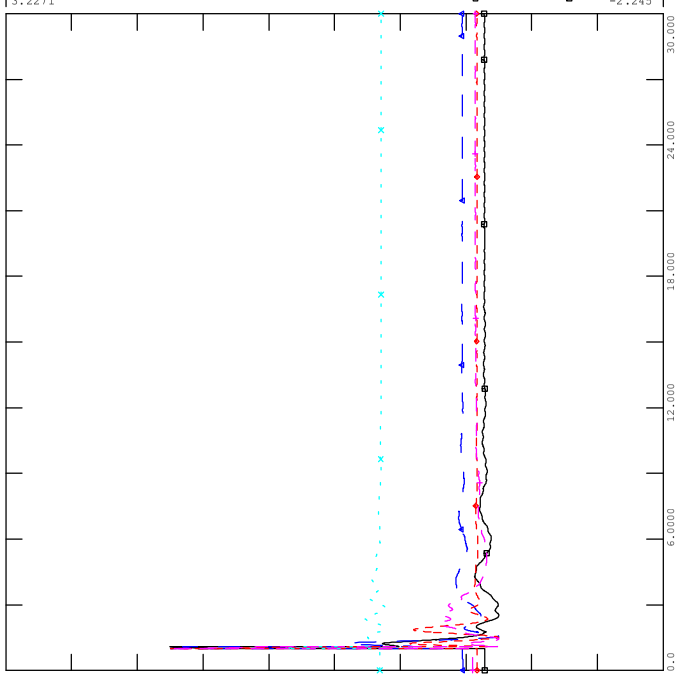
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_01_915L_EASTEDMONTON

FILE: scn5_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

REACTIVE POWER

CHNL# 124: [VARS557342[13.800]G1]
0.68900 -0.4935
CHNL# 122: [VARS 26516[CB_GTG2 13.800]G2]
3.7307 -0.9445
CHNL# 108: [VARS 492[GENES 29 20.500]G2]
4.8875 -2.987
CHNL# 104: [VARS 422[KEEP#1GN 19.000]G1]
3.9624 -2.787
CHNL# 100: [VARS 342[SUND#4GN 20.000]G4]
3.2271 -2.245



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_01_915L_EASTEDMONTON

FILE: scn5_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1643 0.02710
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1501 0.16100
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1513 0.23560
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1606 0.38510
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1594 0.39500

TIME (SECONDS)

0.0 3.0000 6.0000 9.0000 12.000 15.000 18.000 21.000 24.000 27.000 30.000

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_01_915L_EASTEDMONTON

FILE: scn5_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

BRANCH Q

CHNL# 236: [T8 Q] 60.205 -58.29
CHNL# 234: [921L Q] 1345.1 -527.5
CHNL# 232: [NEWLINE Q] 69.208 -65.01
CHNL# 230: [947L Q] 2183.5 -811.9
CHNL# 228: [915L Q] 2120.8 -6362.

TIME (SECONDS)

0.0 3.0000 6.0000 9.0000 12.000 15.000 18.000 21.000 24.000 27.000 30.000

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_01_915L_EASTEDMONTON

FILE: scn5_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1643 0.02060
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1606 0.38510
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1730 0.30310
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1520 0.23690
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1488 0.08750

TIME (SECONDS)

0.0 3.0000 6.0000 9.0000 12.000 15.000 18.000 21.000 24.000 27.000 30.000

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_01_915L_EASTEDMONTON

FILE: scn5_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

BRANCH P

CHNL# 235: [T8 P] 61.672 -33.94
CHNL# 233: [921L P] 152.79 -297.1
CHNL# 231: [NEWLINE P] 39.689 -87.81
CHNL# 229: [947L P] 363.78 -211.8
CHNL# 227: [915L P] 2562.2 -7687.

TIME (SECONDS)

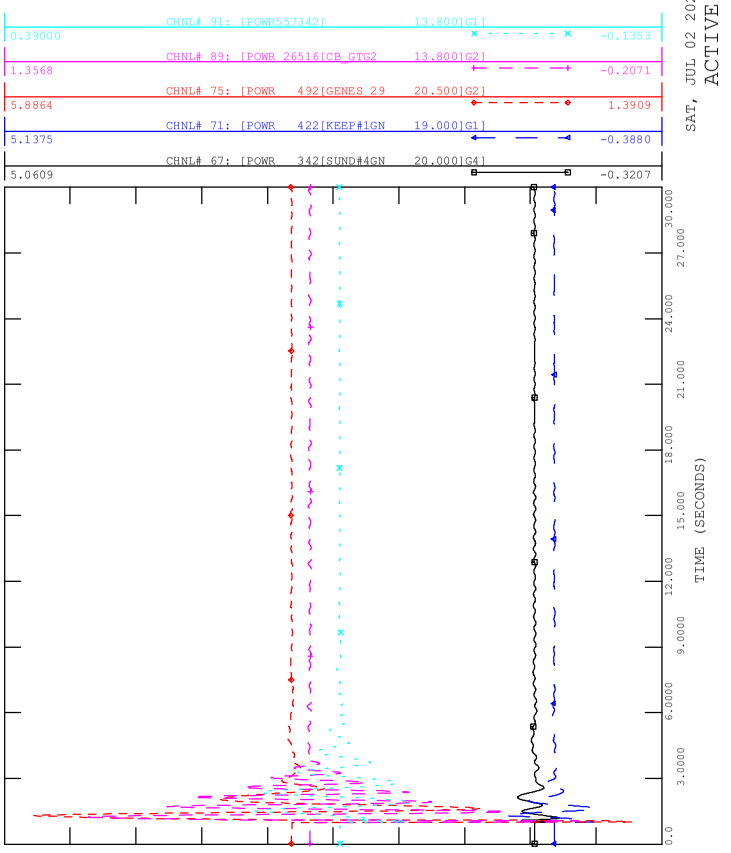
0.0 3.0000 6.0000 9.0000 12.000 15.000 18.000 21.000 24.000 27.000 30.000

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_02_915L_CLOVERBAR

FILE: scn5_SL_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

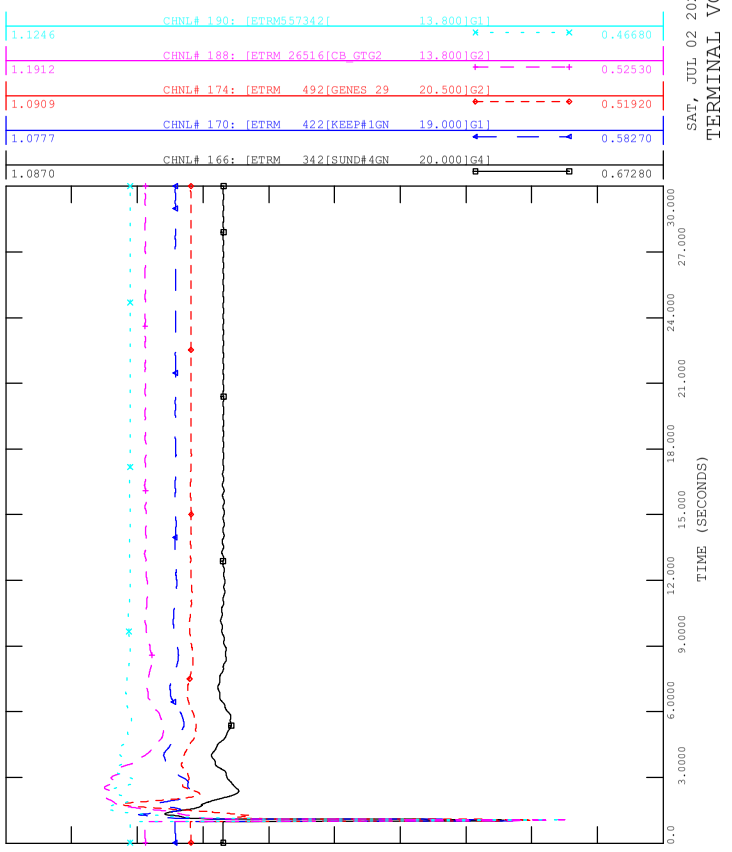


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_02_915L_CLOVERBAR

FILE: scn5_SL_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

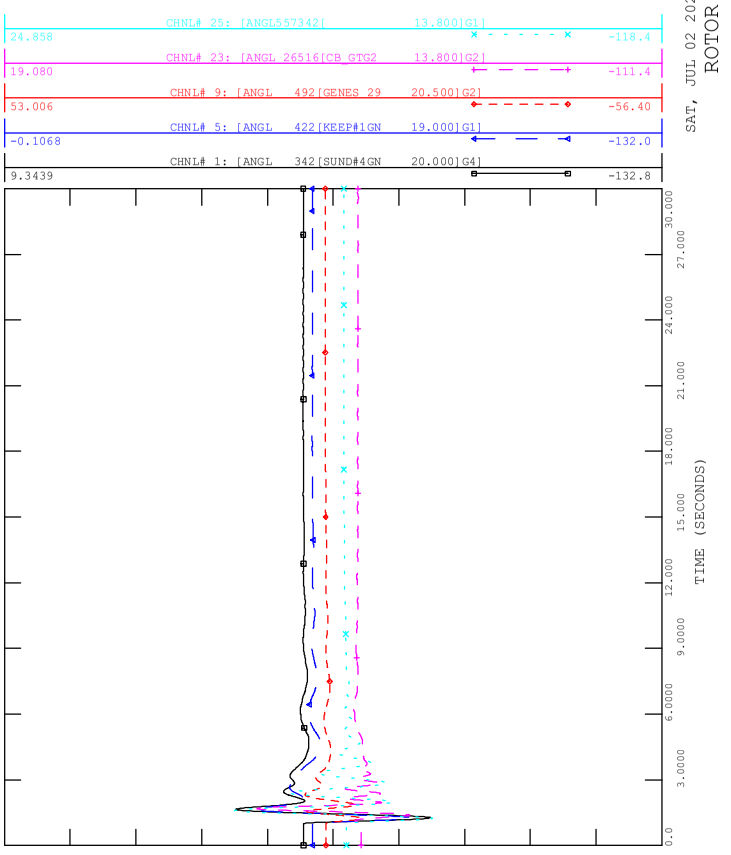


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_02_915L_CLOVERBAR

FILE: scn5_SL_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

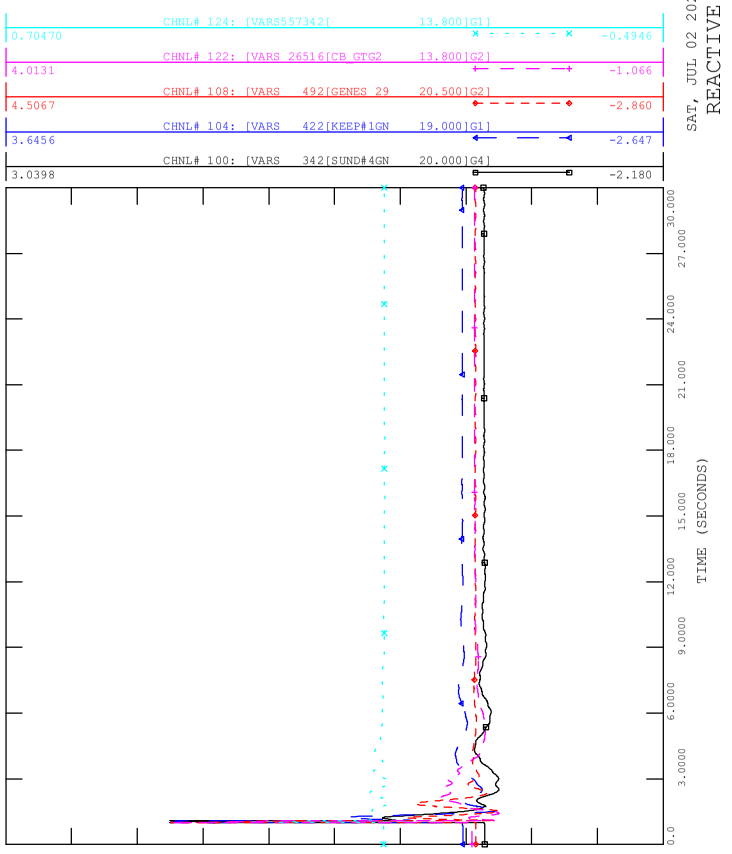


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_02_915L_CLOVERBAR

FILE: scn5_SL_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

REACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_02_915L_CLOVERBAR

FILE: scn5_SL_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1630 -0.0906
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1493 0.23070
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1505 0.27630
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1589 0.43500
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1576 0.44400

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_02_915L_CLOVERBAR

FILE: scn5_SL_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8 Q] 60.372 -59.87
CHNL# 234: [921L Q] 1051.4 -430.9
CHNL# 232: [NEWLINE Q] 68.418 -65.73
CHNL# 230: [947L Q] 1092.6 -719.8
CHNL# 228: [915L Q] 40.000 -83.47

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_02_915L_CLOVERBAR

FILE: scn5_SL_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1630 -0.0978
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1589 0.43500
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1716 0.36110
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1511 0.22950
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1480 0.18570

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_02_915L_CLOVERBAR

FILE: scn5_SL_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH P

CHNL# 235: [T8 P] 61.244 -34.68
CHNL# 233: [921L P] 184.09 -317.0
CHNL# 231: [NEWLINE P] 39.964 -87.64
CHNL# 229: [947L P] 190.42 -160.8
CHNL# 227: [915L P] 40.000 -91.76

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_03_921L_CLOVERBAR

FILE: scn5_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

CHNL# 91: [POWR557342[13.800]G1]
0.38710 -0.1332
CHNL# 89: [POWR 26516[CB_GTG2 13.800]G2]
1.3445 -0.2003
CHNL# 75: [POWR 492[GENES 29 20.500]G2]
5.7365 1.4123
CHNL# 71: [POWR 422[KEEP#1GN 19.000]G1]
5.1411 -0.2990
CHNL# 67: [POWR 342[SUND#4GN 20.000]G4]
5.0510 -0.3315

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_03_921L_CLOVERBAR

FILE: scn5_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

CHNL# 190: [ETRM557342[13.800]G1]
1.1239 0.47130
CHNL# 188: [ETRM 26516[CB_GTG2 13.800]G2]
1.1897 0.52930
CHNL# 174: [ETRM 492[GENES 29 20.500]G2]
1.0828 0.52240
CHNL# 170: [ETRM 422[KEEP#1GN 19.000]G1]
1.0752 0.58550
CHNL# 166: [ETRM 342[SUND#4GN 20.000]G4]
1.0842 0.67480

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_03_921L_CLOVERBAR

FILE: scn5_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

CHNL# 25: [ANGL557342[13.800]G1]
21.498 -116.8
CHNL# 23: [ANGL 26516[CB_GTG2 13.800]G2]
16.623 -111.0
CHNL# 9: [ANGL 492[GENES 29 20.500]G2]
52.684 -56.00
CHNL# 5: [ANGL 422[KEEP#1GN 19.000]G1]
-2.592 -130.2
CHNL# 1: [ANGL 342[SUND#4GN 20.000]G4]
6.7191 -130.6

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_03_921L_CLOVERBAR

FILE: scn5_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

REACTIVE POWER

CHNL# 124: [VARS557342[13.800]G1]
0.70350 -0.4948
CHNL# 122: [VARS 26516[CB_GTG2 13.800]G2]
3.9852 -1.035
CHNL# 108: [VARS 492[GENES 29 20.500]G2]
4.4675 -2.845
CHNL# 104: [VARS 422[KEEP#1GN 19.000]G1]
3.6001 -2.591
CHNL# 100: [VARS 342[SUND#4GN 20.000]G4]
3.0200 -2.167

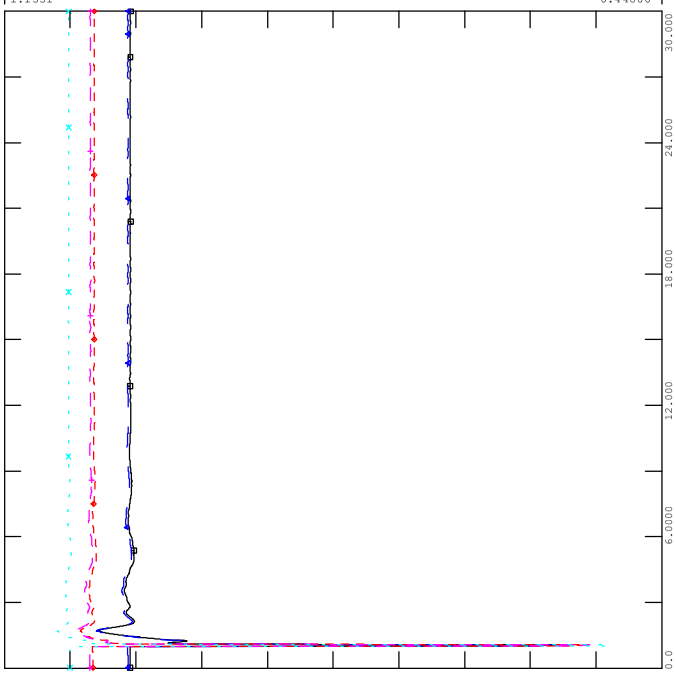
TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_03_921L_CLOVERBAR

FILE: scn5_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]]
1.1623 -0.0809
CHNL# 217: [VOLT 961 [746L JNC 138.00]]
1.1472 0.23560
CHNL# 216: [VOLT 718 [WESWOOD 138.00]]
1.1467 0.27970
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]]
1.1567 0.43970
CHNL# 214: [VOLT 525 [GENESEE4 500.00]]
1.1551 0.44860

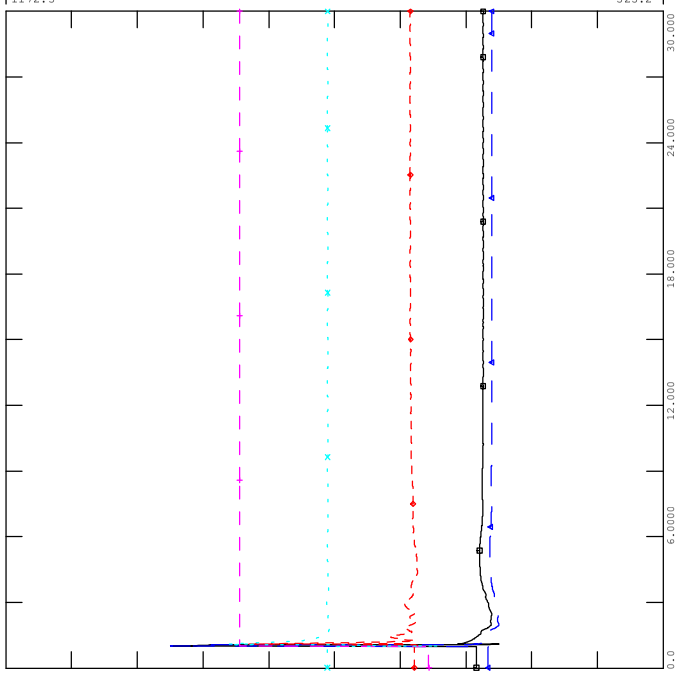


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_03_921L_CLOVERBAR

FILE: scn5_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8 Q]
58.333 -59.76
CHNL# 234: [921L Q]
40.000 -72.41
CHNL# 232: [NEWLINE Q]
65.772 -42.70
CHNL# 230: [947L Q]
994.86 -381.8
CHNL# 228: [915L Q]
1172.3 -525.2

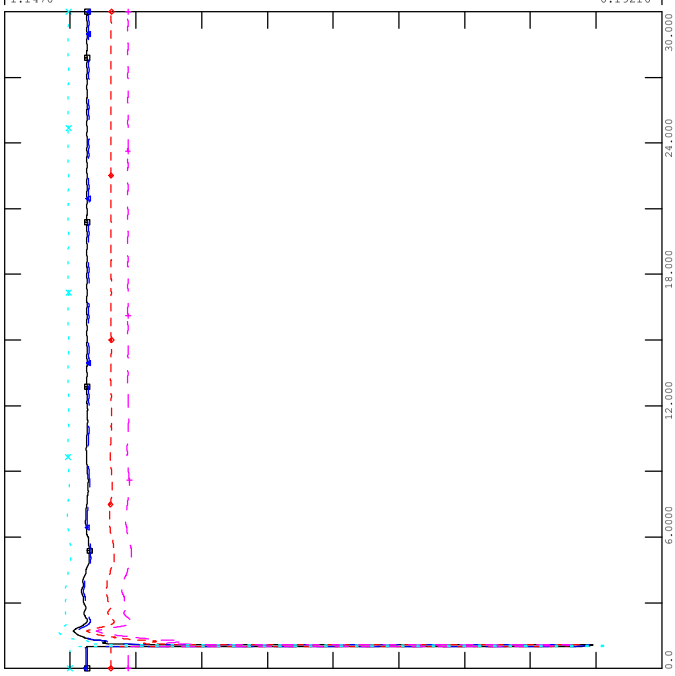


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_03_921L_CLOVERBAR

FILE: scn5_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]]
1.1623 -0.0881
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]]
1.1567 0.43970
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]]
1.1700 0.36660
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]]
1.1433 0.23050
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]]
1.1476 0.19210

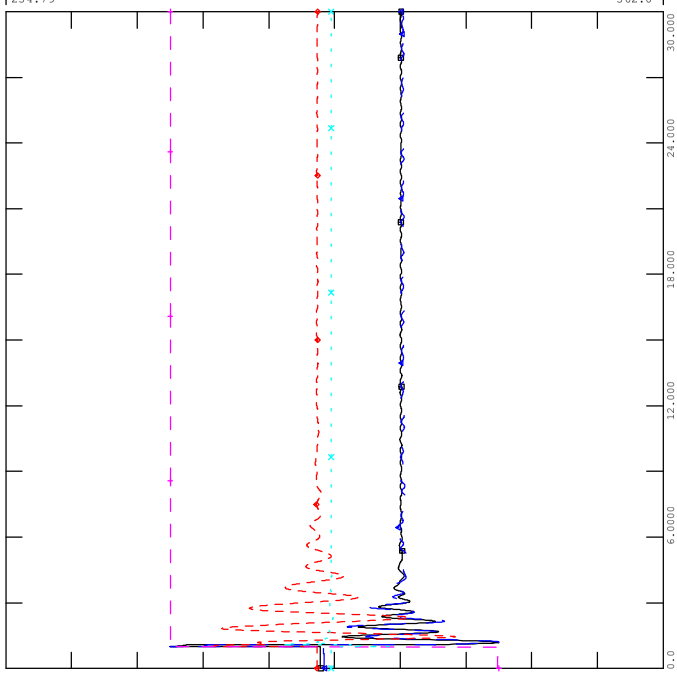


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_03_921L_CLOVERBAR

FILE: scn5_SL_03_921L_CloverBar.out

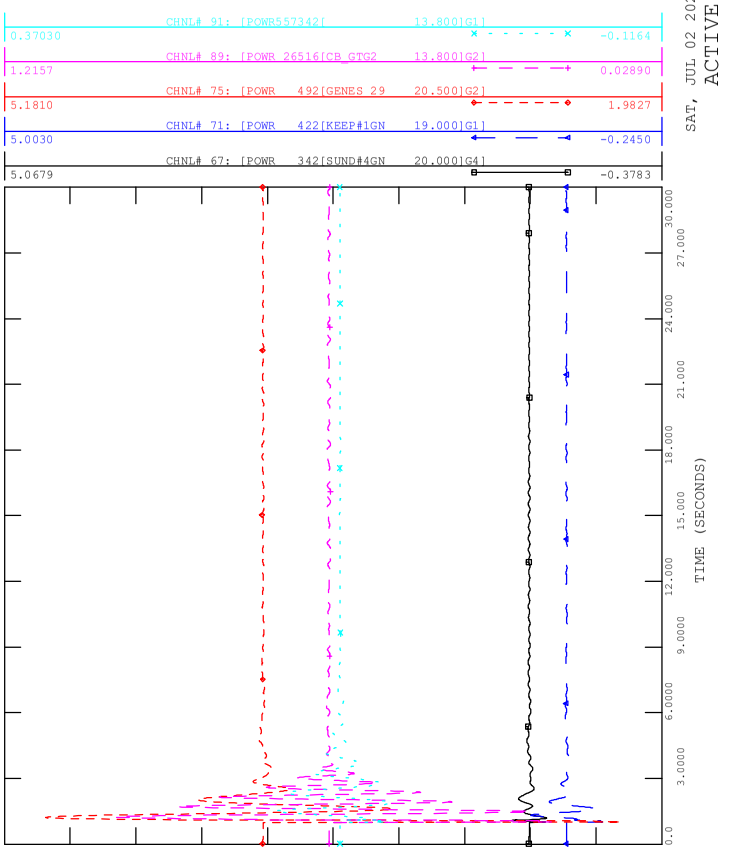
SAT, JUL 02 2022 15:00 BRANCH P

CHNL# 235: [T8 P]
61.224 -34.60
CHNL# 233: [921L P]
54.416 -163.2
CHNL# 231: [NEWLINE P]
39.894 -86.49
CHNL# 229: [947L P]
174.94 -112.3
CHNL# 227: [915L P]
234.79 -362.0



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_04_921L_LAMOUREUX

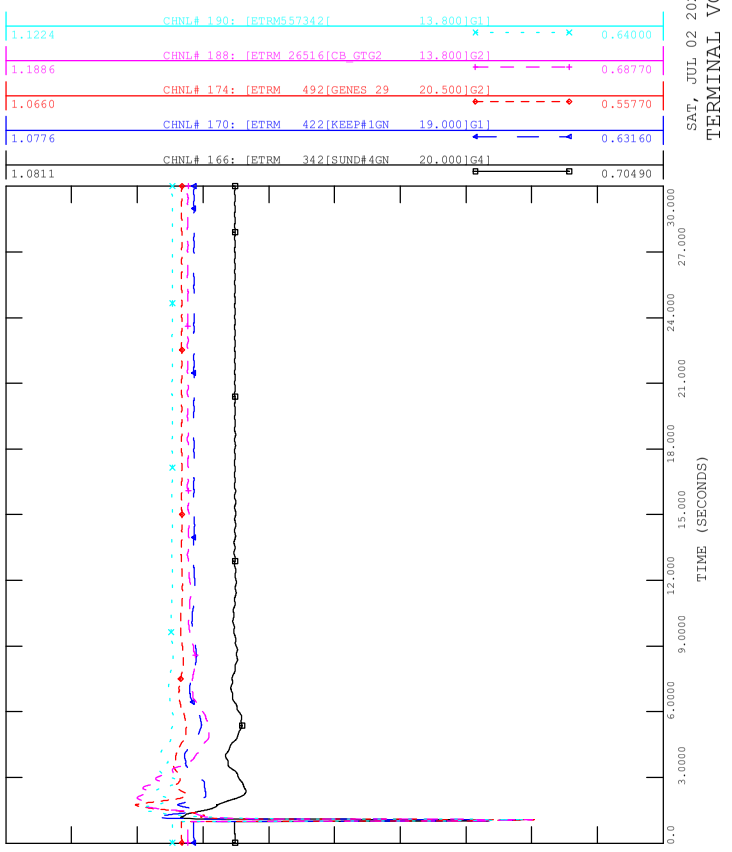
FILE: scn5_SL_04_921L_Lamoureux.out



SAT, JUL 02 2022 15:00
ACTIVE POWER

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_04_921L_LAMOUREUX

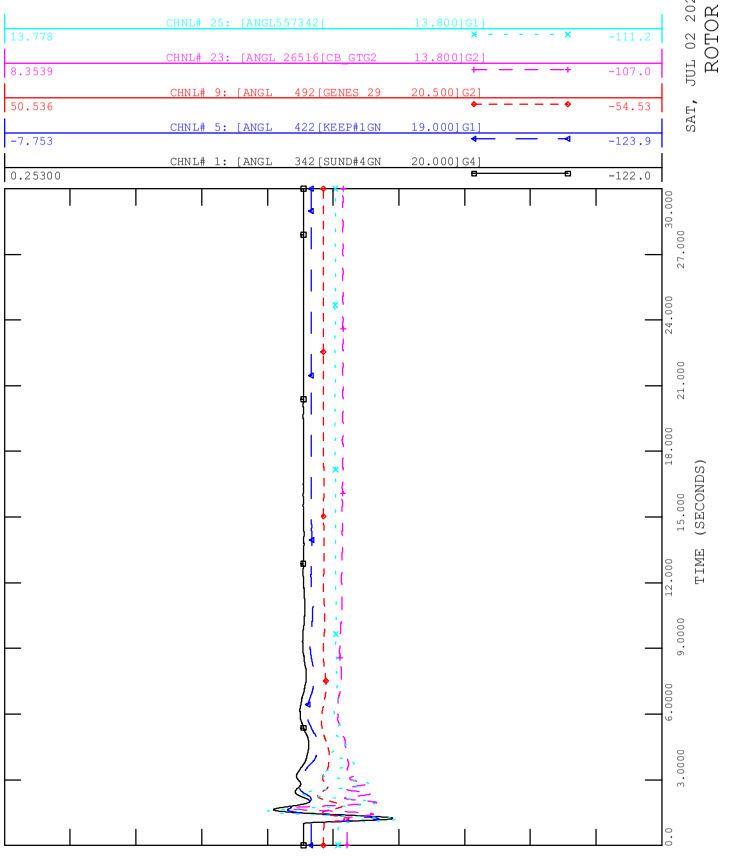
FILE: scn5_SL_04_921L_Lamoureux.out



SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_04_921L_LAMOUREUX

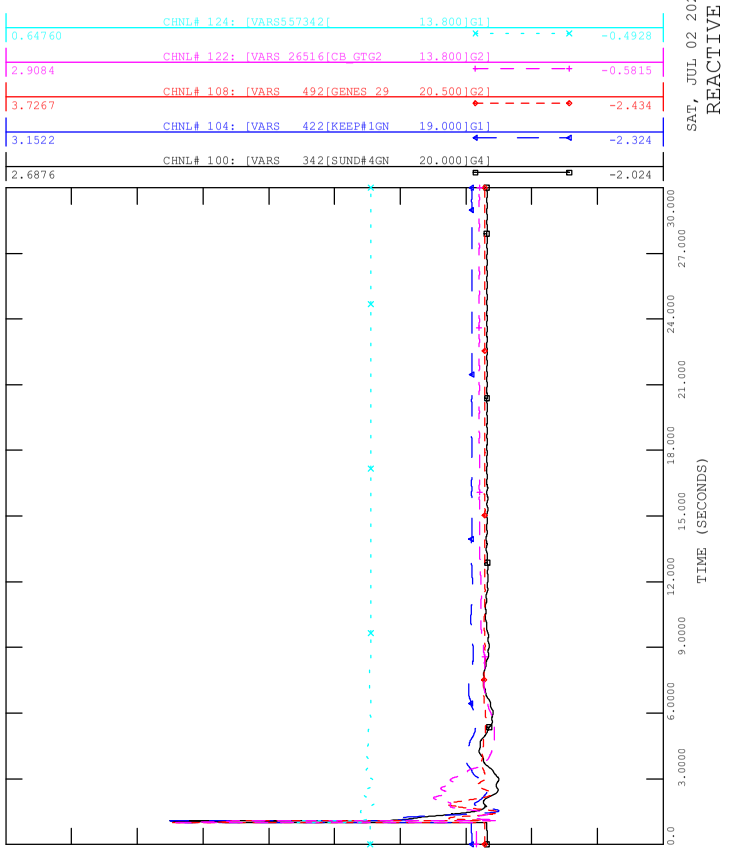
FILE: scn5_SL_04_921L_Lamoureux.out



SAT, JUL 02 2022 15:00
ROTOR ANGLE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_04_921L_LAMOUREUX

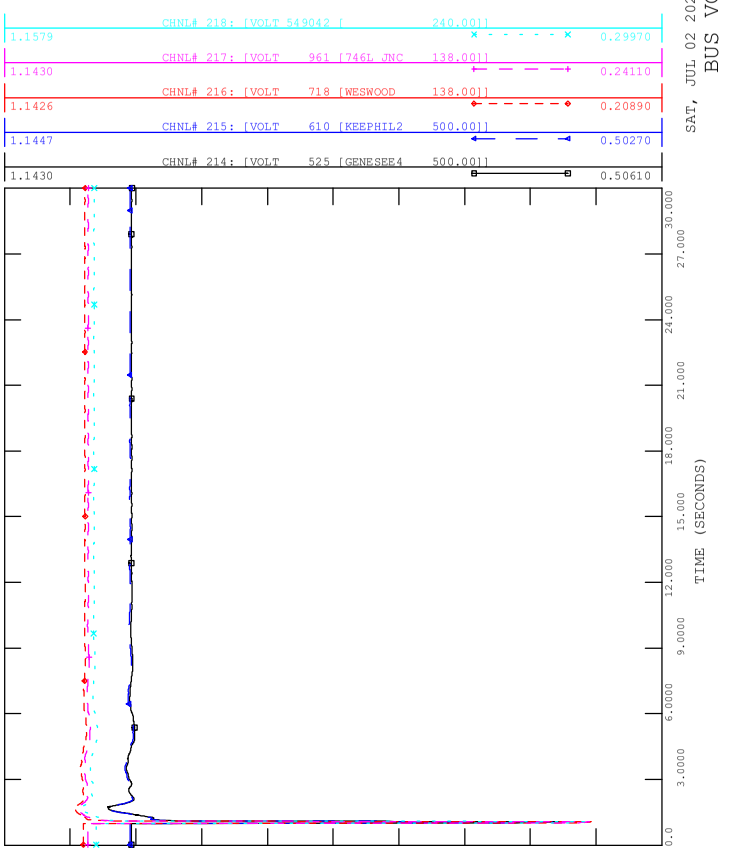
FILE: scn5_SL_04_921L_Lamoureux.out



SAT, JUL 02 2022 15:00
REACTIVE POWER

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_04_921L_LAMOUREUX

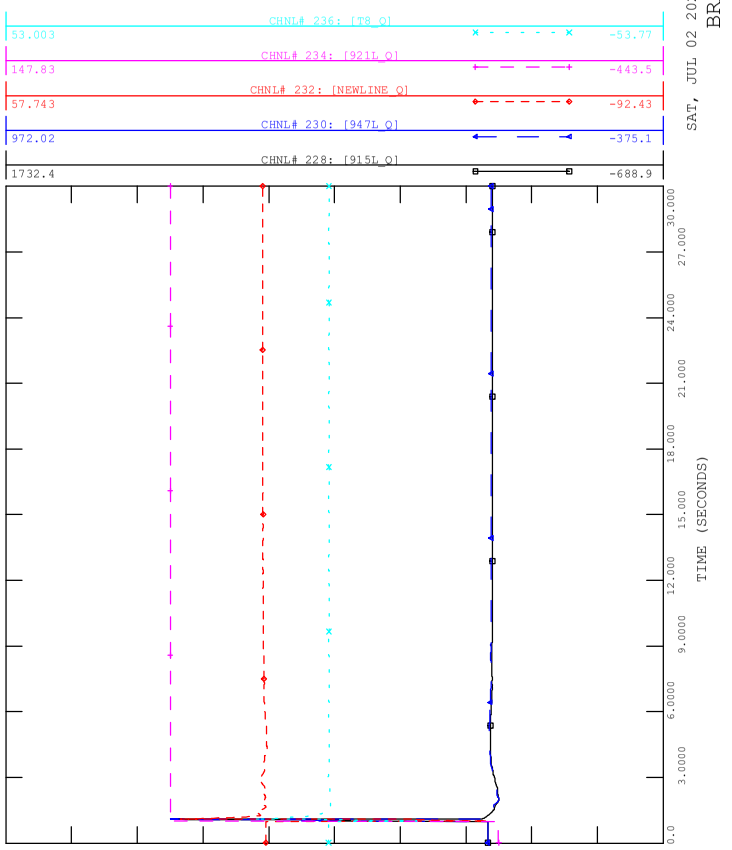
FILE: scn5_SL_04_921L_Lamoureux.out



SAT, JUL 02 2022 15:00
BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_04_921L_LAMOUREUX

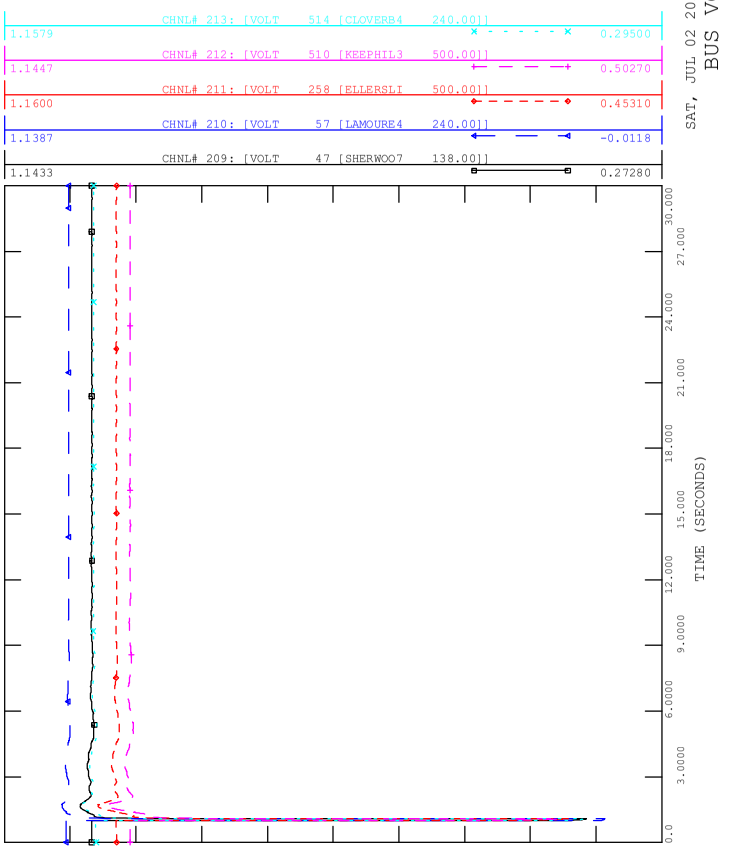
FILE: scn5_SL_04_921L_Lamoureux.out



SAT, JUL 02 2022 15:00
BRANCH Q

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_04_921L_LAMOUREUX

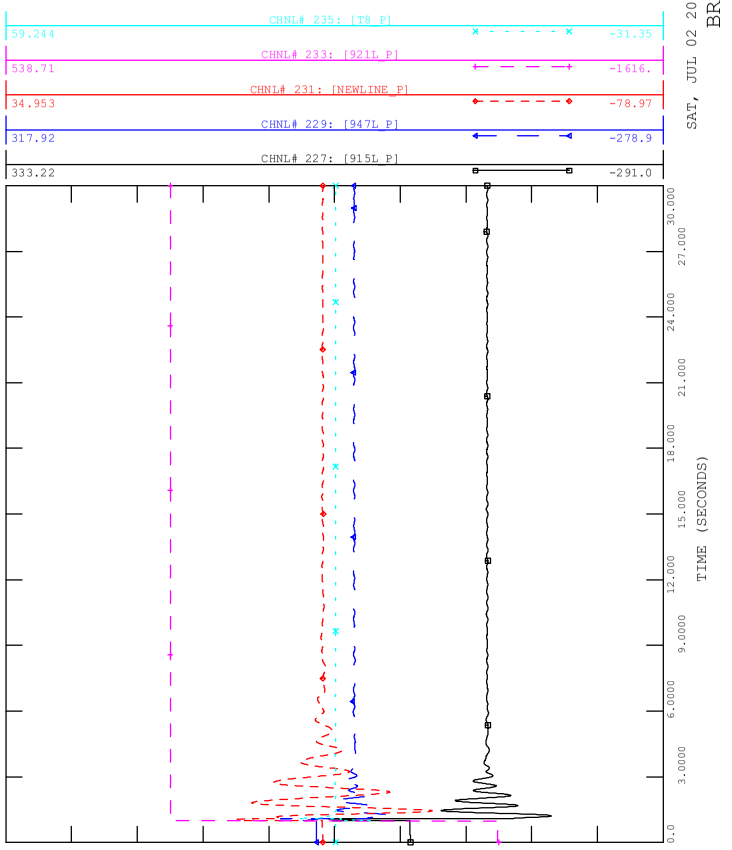
FILE: scn5_SL_04_921L_Lamoureux.out



SAT, JUL 02 2022 15:00
BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_04_921L_LAMOUREUX

FILE: scn5_SL_04_921L_Lamoureux.out



SAT, JUL 02 2022 15:00
BRANCH P

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_05_947L_CLOVERBAR

FILE: scn5_SL_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

CHNL# 91: [POWR557342[13.800]G1]
0.38460 -0.1321
CHNL# 89: [POWR 26516[CB_GTG2 13.800]G2]
1.3333 -0.1987
CHNL# 75: [POWR 492[GENES 29 20.500]G2]
5.7990 1.4095
CHNL# 71: [POWR 422[KEEP#1GN 19.000]G1]
5.1354 -0.2920
CHNL# 67: [POWR 342[SUND#4GN 20.000]G4]
5.0670 -0.3281

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_05_947L_CLOVERBAR

FILE: scn5_SL_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

CHNL# 190: [ETRM557342[13.800]G1]
1.1222 0.47020
CHNL# 188: [ETRM 26516[CB_GTG2 13.800]G2]
1.1894 0.52830
CHNL# 174: [ETRM 492[GENES 29 20.500]G2]
1.0863 0.52110
CHNL# 170: [ETRM 422[KEEP#1GN 19.000]G1]
1.0762 0.58440
CHNL# 166: [ETRM 342[SUND#4GN 20.000]G4]
1.0853 0.67410

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_05_947L_CLOVERBAR

FILE: scn5_SL_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

CHNL# 25: [ANGL557342[13.800]G1]
22.355 -117.7
CHNL# 23: [ANGL 26516[CB_GTG2 13.800]G2]
17.192 -111.7
CHNL# 9: [ANGL 492[GENES 29 20.500]G2]
52.872 -56.16
CHNL# 5: [ANGL 422[KEEP#1GN 19.000]G1]
-1.381 -131.1
CHNL# 1: [ANGL 342[SUND#4GN 20.000]G4]
7.9136 -131.6

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_05_947L_CLOVERBAR

FILE: scn5_SL_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00

REACTIVE POWER

CHNL# 124: [VARS557342[13.800]G1]
0.70370 -0.4941
CHNL# 122: [VARS 26516[CB_GTG2 13.800]G2]
3.9915 -1.042
CHNL# 108: [VARS 492[GENES 29 20.500]G2]
4.4814 -2.848
CHNL# 104: [VARS 422[KEEP#1GN 19.000]G1]
3.6170 -2.611
CHNL# 100: [VARS 342[SUND#4GN 20.000]G4]
3.0262 -2.169

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_05_947L_CLOVERBAR

FILE: scn5_SL_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1588 -0.0831
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1489 0.23610
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1497 0.28120
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1581 0.43790
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1566 0.44680

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_05_947L_CLOVERBAR

FILE: scn5_SL_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8 Q] 59.419 -59.78
CHNL# 234: [921L Q] 1048.7 -410.0
CHNL# 232: [NEWLINE Q] 67.710 -58.26
CHNL# 230: [947L Q] 40.000 -55.47
CHNL# 228: [915L Q] 1268.2 -870.7

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_05_947L_CLOVERBAR

FILE: scn5_SL_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1587 -0.0903
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1581 0.43790
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1709 0.36450
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1494 0.23440
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1481 0.19160

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_05_947L_CLOVERBAR

FILE: scn5_SL_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH P

CHNL# 235: [T8 P] 61.199 -34.65
CHNL# 233: [921L P] 165.00 -257.7
CHNL# 231: [NEWLINE P] 39.754 -85.72
CHNL# 229: [947L P] 76.503 -40.00
CHNL# 227: [915L P] 188.14 -208.9

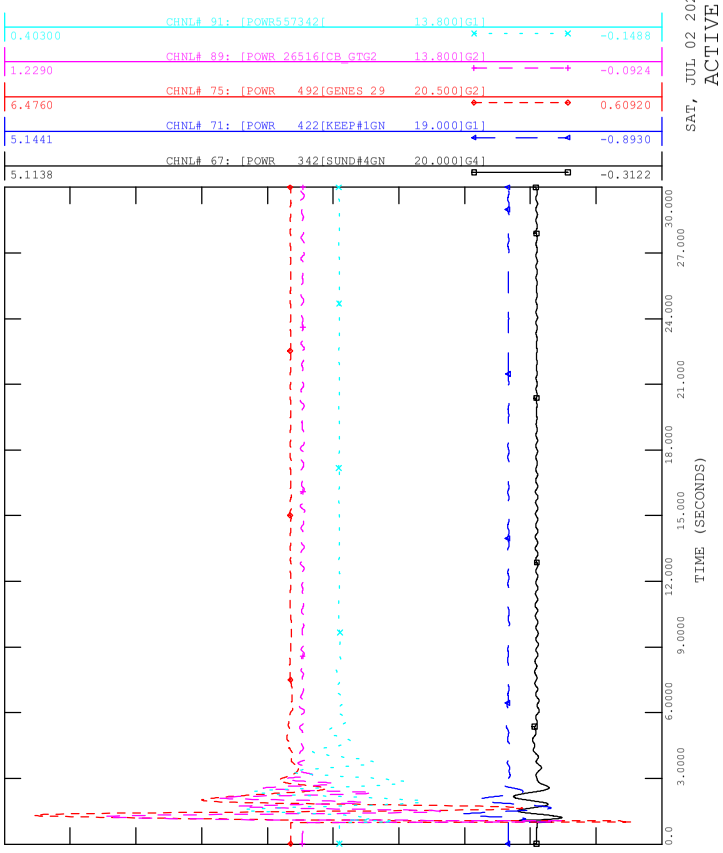
TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_06_947L_ELLERSLIE

FILE: scn5_SL_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

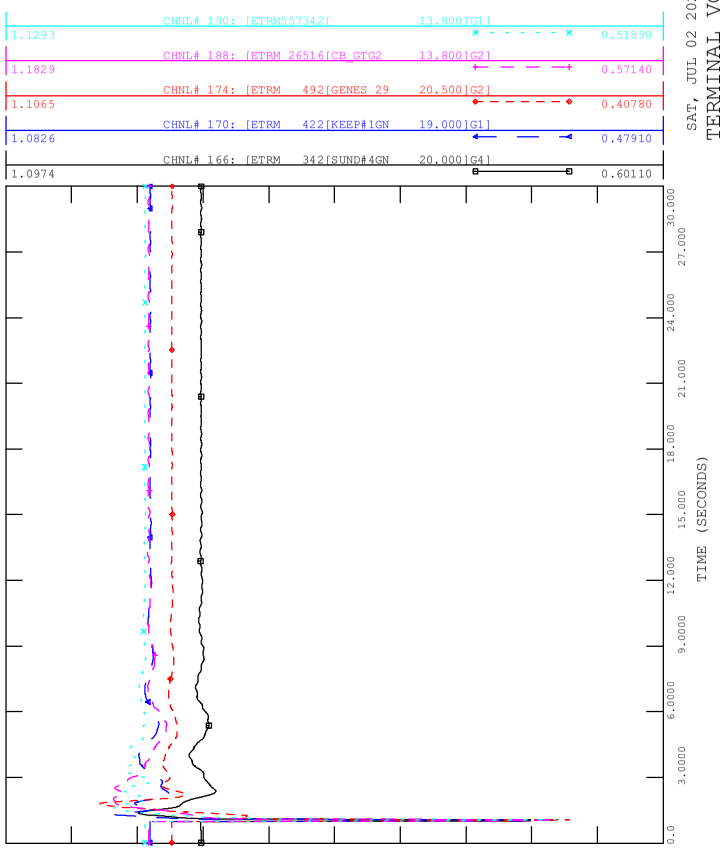


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_06_947L_ELLERSLIE

FILE: scn5_SL_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

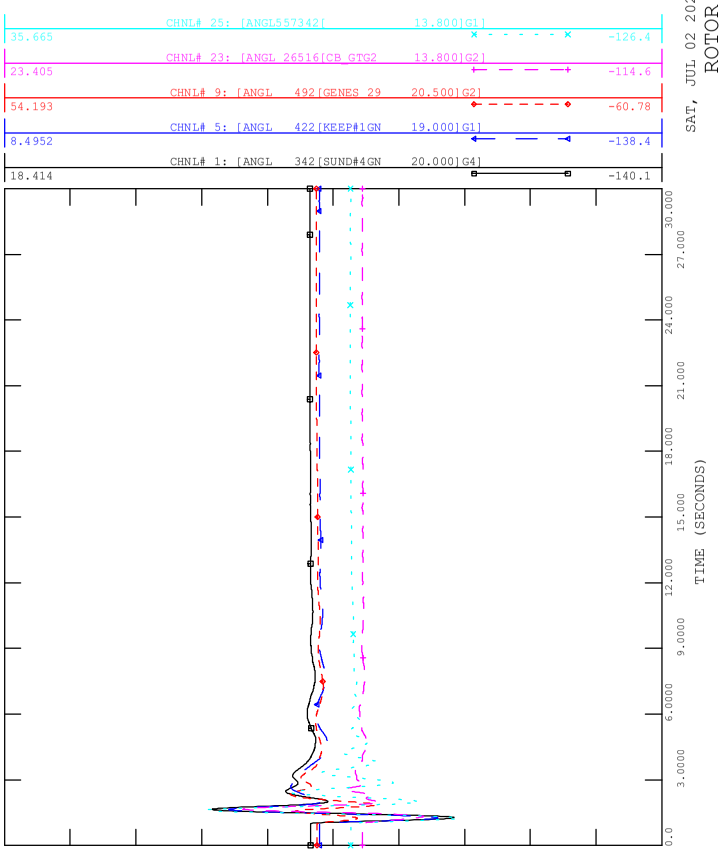


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_06_947L_ELLERSLIE

FILE: scn5_SL_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

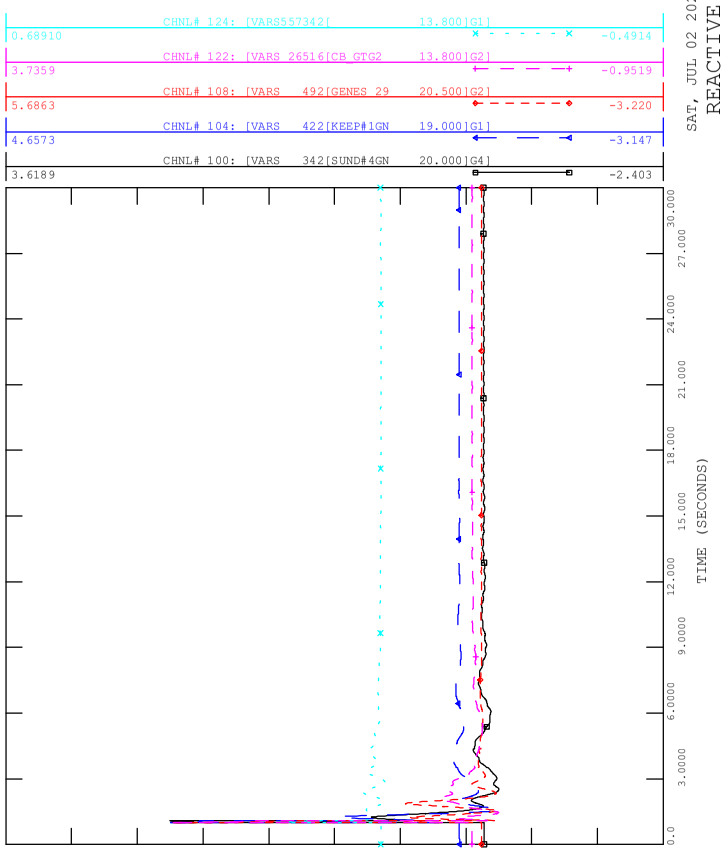


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_06_947L_ELLERSLIE

FILE: scn5_SL_06_947L_Ellerslie.out

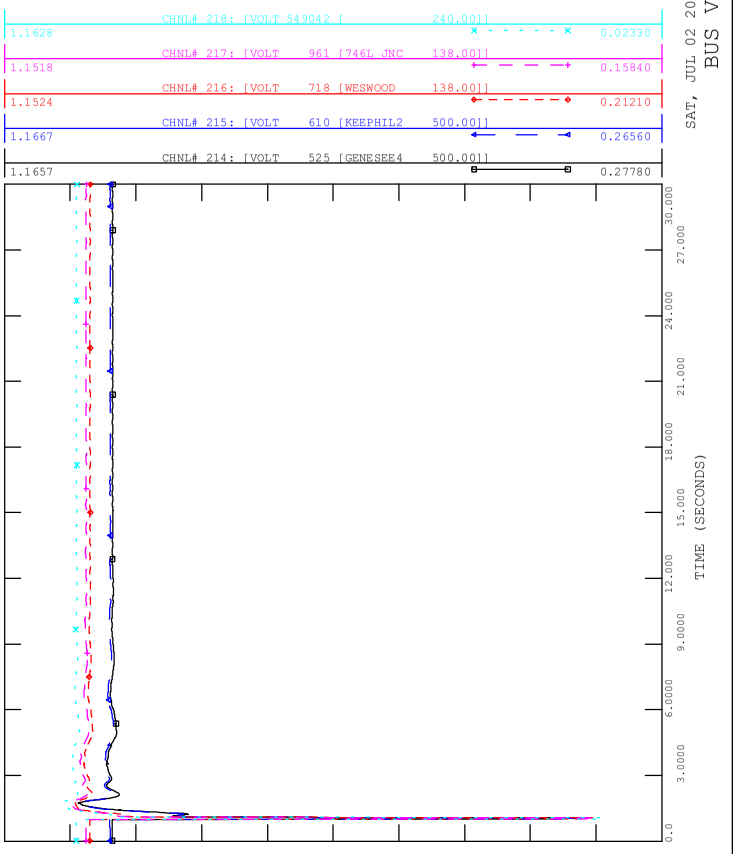
SAT, JUL 02 2022 15:00

REACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_06_947L_ELLERSLIE

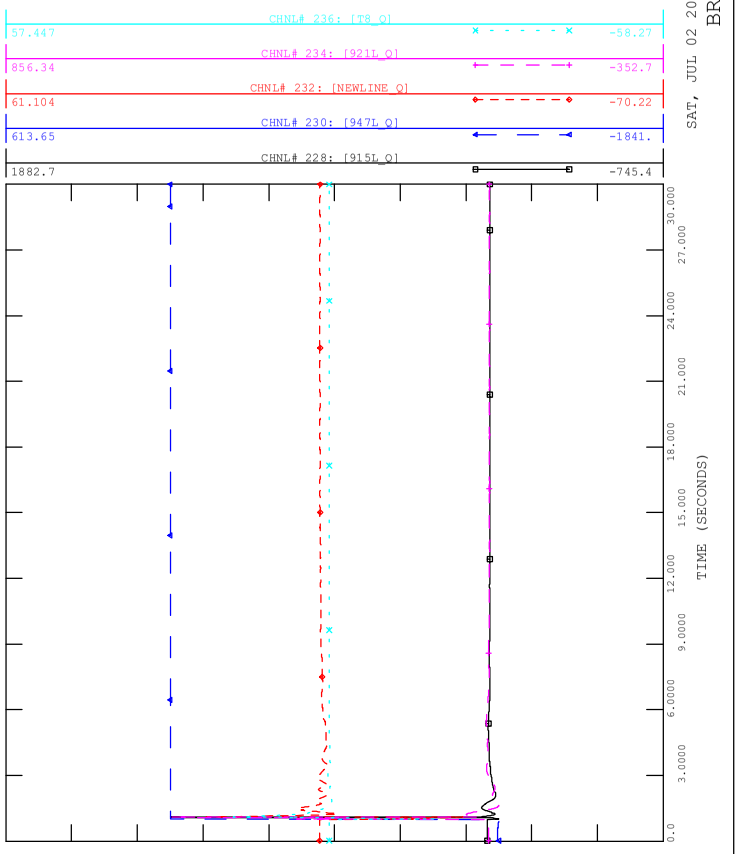
FILE: scn5_SL_06_947L_Ellerslie.out



SAT, JUL 02 2022 15:00
BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_06_947L_ELLERSLIE

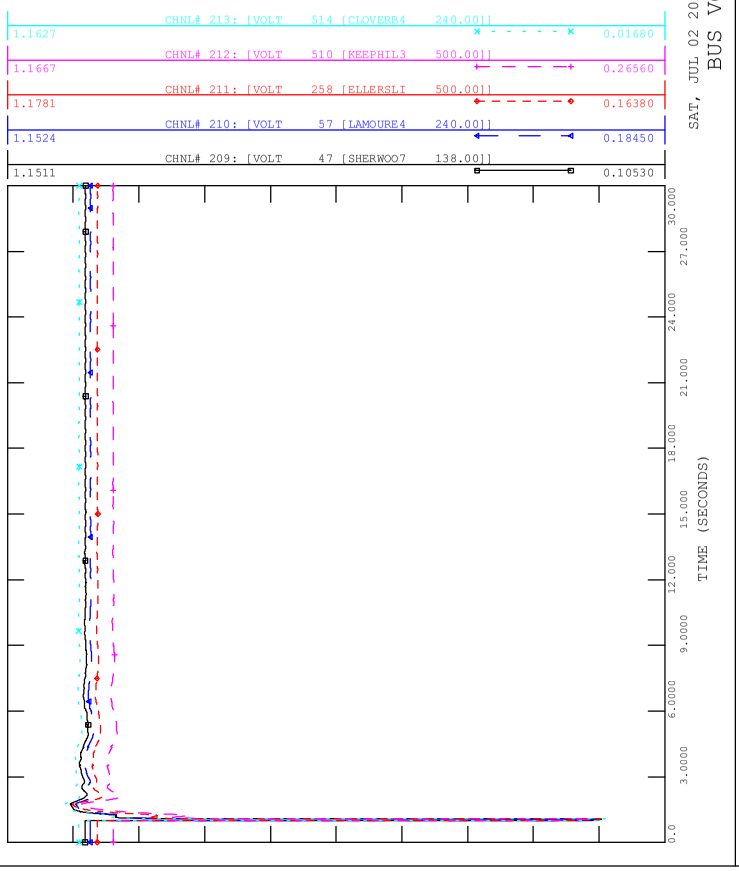
FILE: scn5_SL_06_947L_Ellerslie.out



SAT, JUL 02 2022 15:00
BRANCH Q

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_06_947L_ELLERSLIE

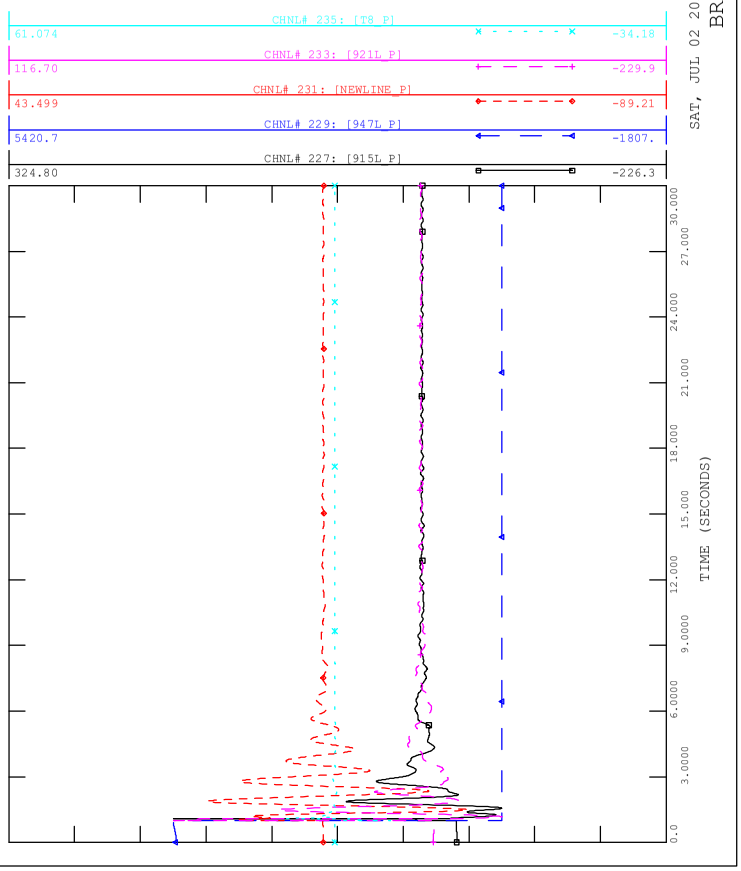
FILE: scn5_SL_06_947L_Ellerslie.out



SAT, JUL 02 2022 15:00
BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_06_947L_ELLERSLIE

FILE: scn5_SL_06_947L_Ellerslie.out

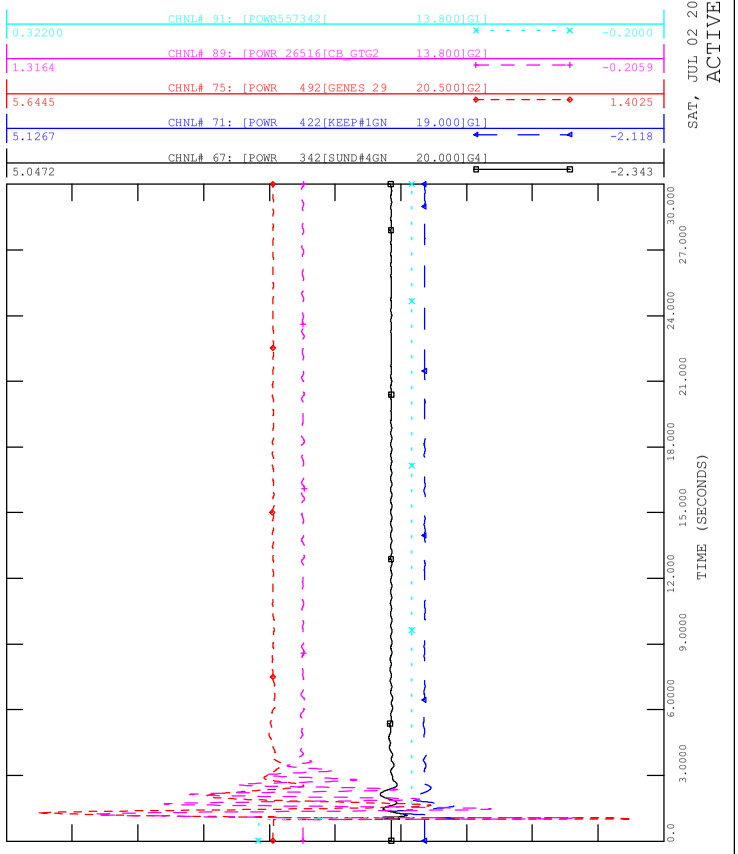


SAT, JUL 02 2022 15:00
BRANCH P

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_07_NL_CLOVERBAR

FILE: scn5_SL_07_NL_CloverBar.out

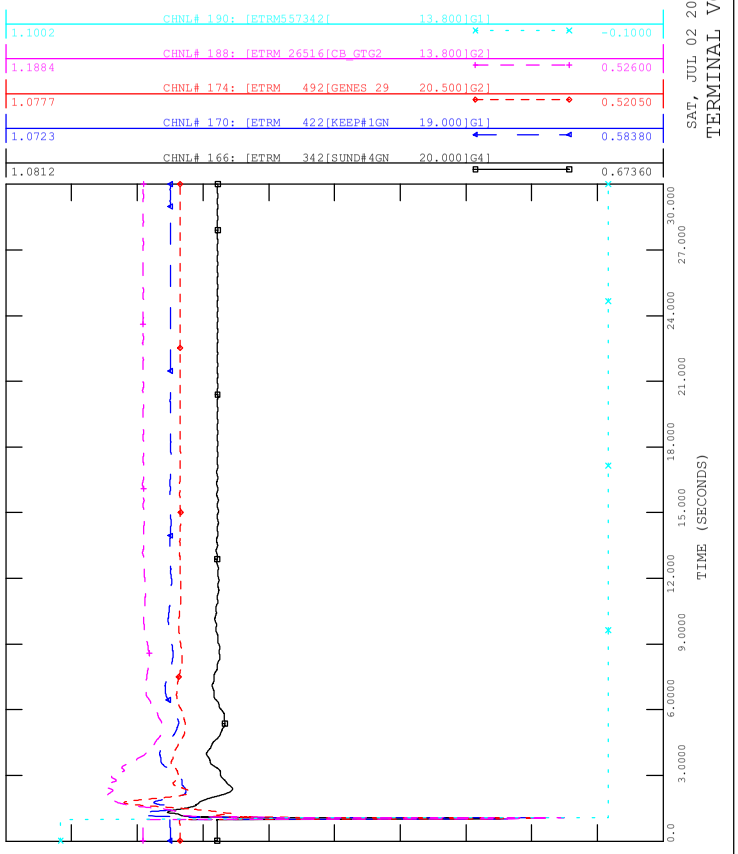
SAT, JUL 02 2022 15:00
ACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_07_NL_CLOVERBAR

FILE: scn5_SL_07_NL_CloverBar.out

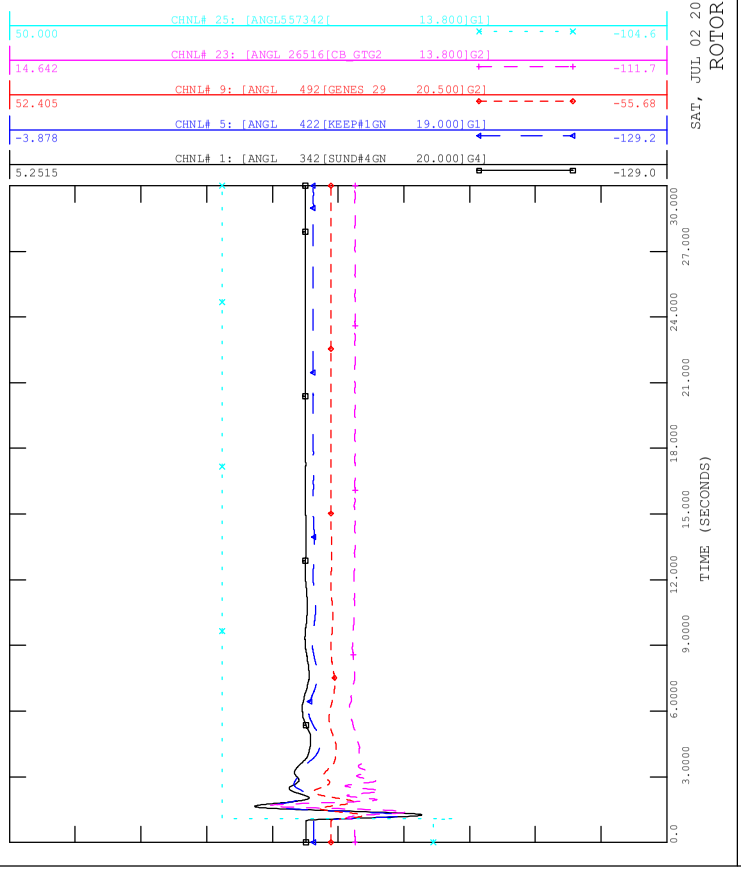
SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_07_NL_CLOVERBAR

FILE: scn5_SL_07_NL_CloverBar.out

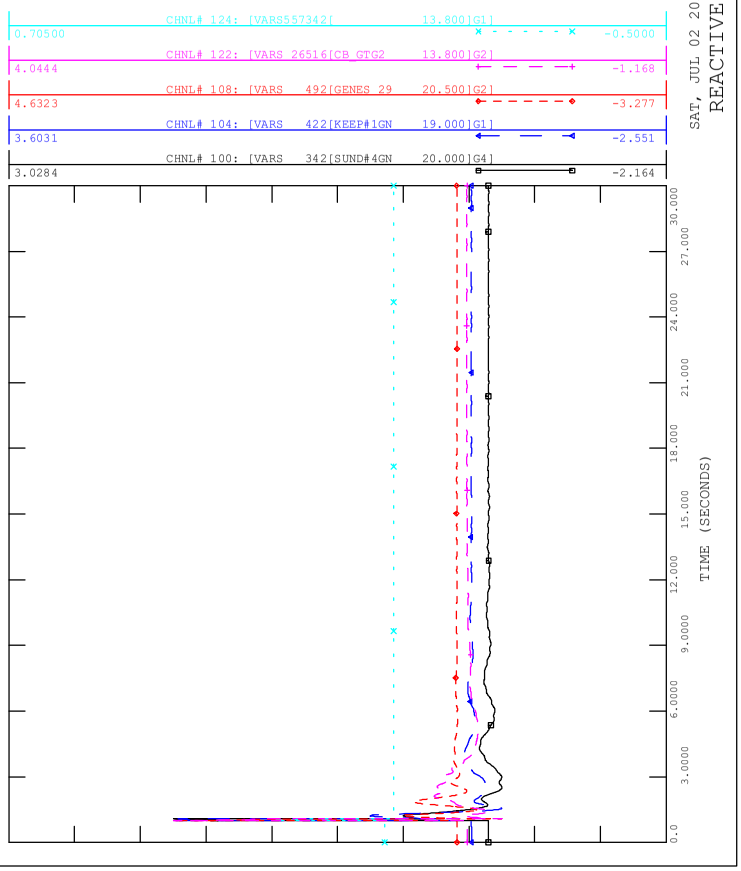
SAT, JUL 02 2022 15:00
ROTOR ANGLE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_07_NL_CLOVERBAR

FILE: scn5_SL_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00
REACTIVE POWER

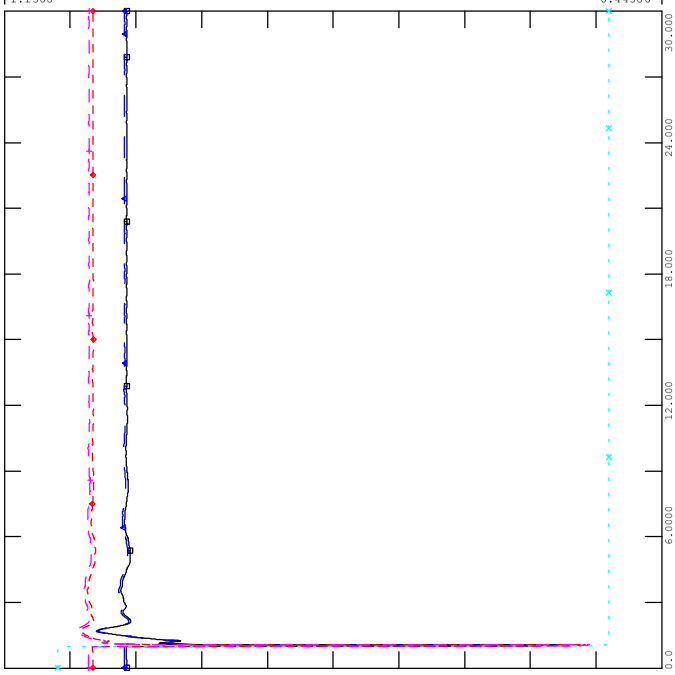


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_07_NL_CLOVERBAR

FILE: scn5_SL_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1382 -0.1000
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1460 0.23330
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1469 0.27850
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1526 0.43680
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1508 0.44580

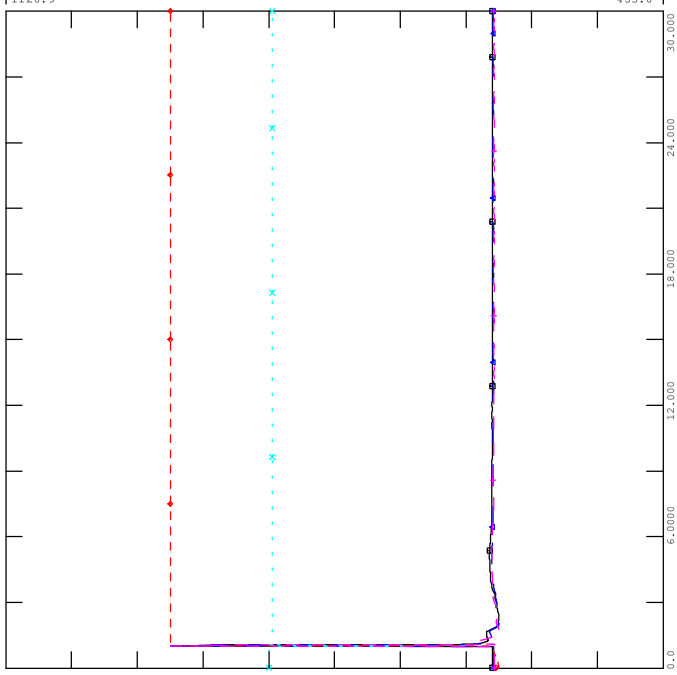


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_07_NL_CLOVERBAR

FILE: scn5_SL_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8 Q] 40.857 -59.90
CHNL# 234: [921L Q] 1047.8 -405.6
CHNL# 232: [NEWLINE Q] 47.159 -141.5
CHNL# 230: [947L Q] 985.06 -363.9
CHNL# 228: [915L Q] 1126.9 -453.6

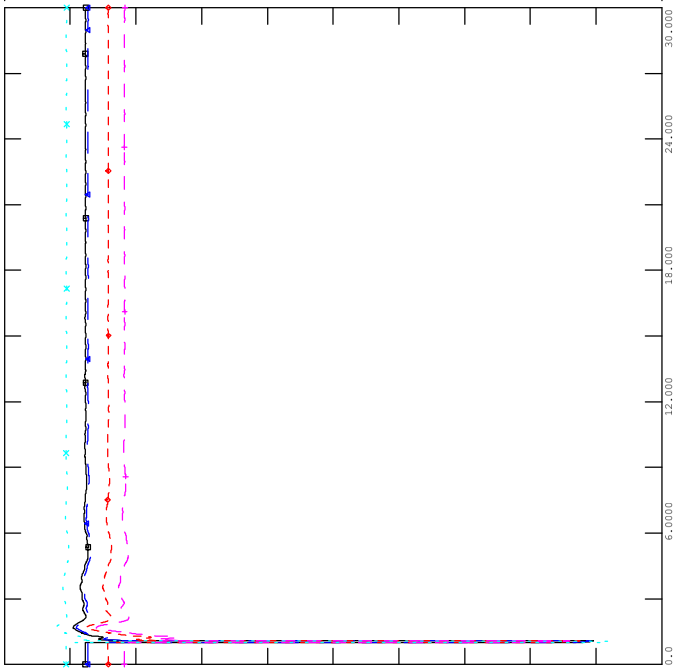


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_07_NL_CLOVERBAR

FILE: scn5_SL_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1555 -0.0962
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1526 0.43680
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1662 0.36330
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1464 0.23130
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1450 0.18870

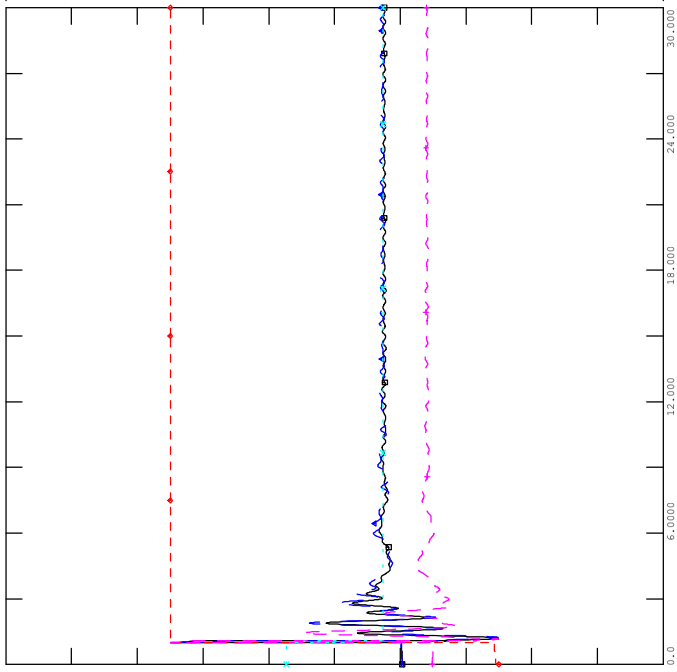


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_07_NL_CLOVERBAR

FILE: scn5_SL_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH P

CHNL# 235: [T8 P] 53.827 -40.00
CHNL# 233: [921L P] 162.60 -253.1
CHNL# 231: [NEWLINE P] 1009.4 -3028.
CHNL# 229: [947L P] 151.81 -40.71
CHNL# 227: [915L P] 182.21 -204.2

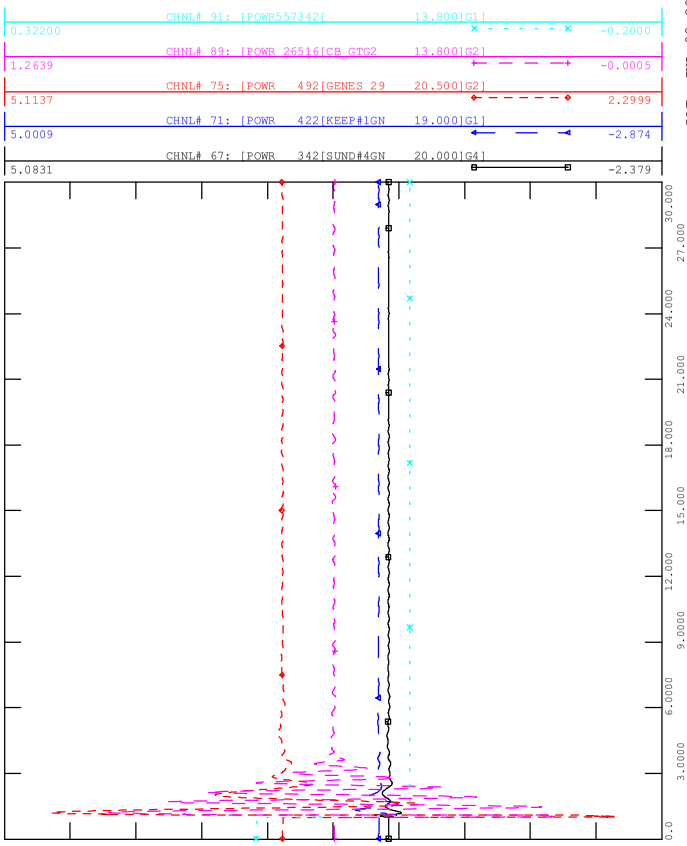


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_08_NL_H2PLNAT

FILE: scn5_SL_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

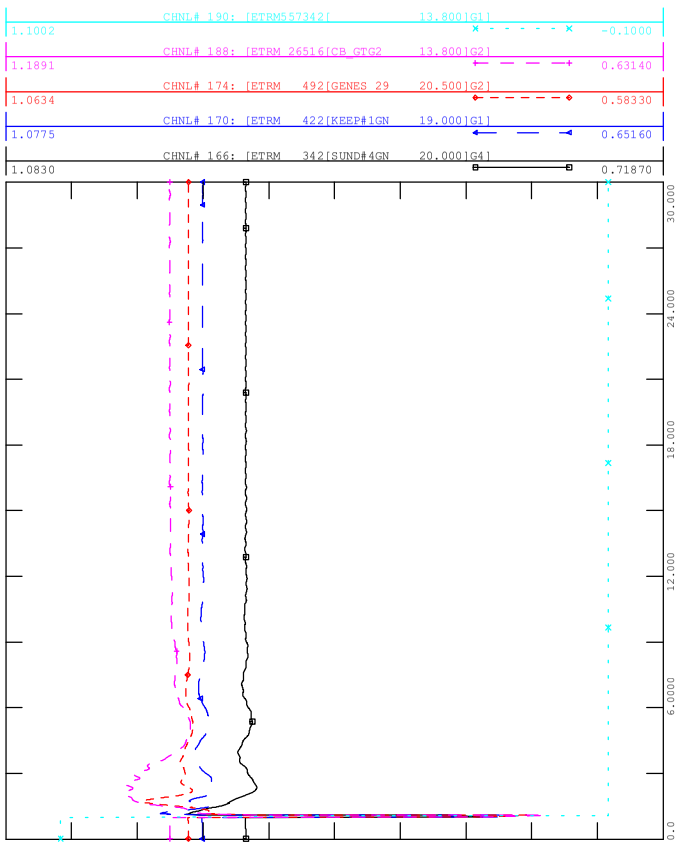


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_08_NL_H2PLNAT

FILE: scn5_SL_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

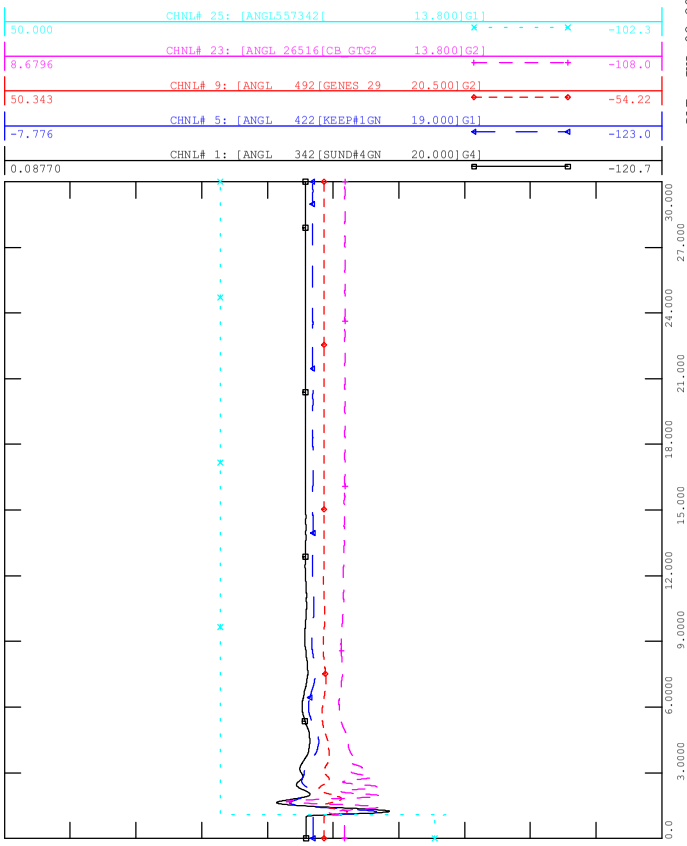


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_08_NL_H2PLNAT

FILE: scn5_SL_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

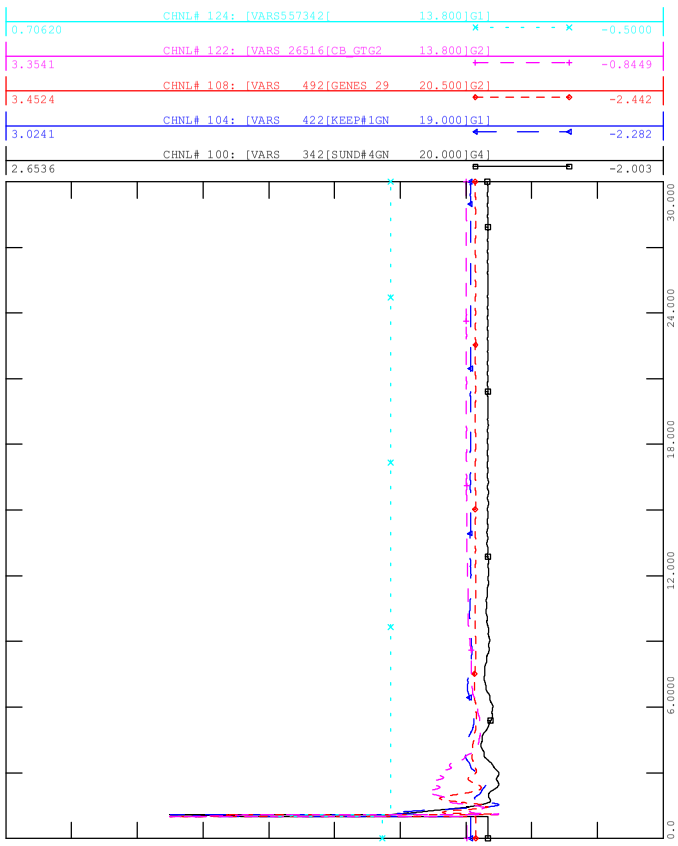


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_08_NL_H2PLNAT

FILE: scn5_SL_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00

REACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_08_NL_H2PLNAT

FILE: scn5_SL_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1382 -0.1000
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1440 0.41430
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1449 0.44840
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1448 0.54310
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1430 0.54620

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_08_NL_H2PLNAT

FILE: scn5_SL_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8 Q] 40.917 -60.00
CHNL# 234: [921L Q] 1112.5 -425.6
CHNL# 232: [NEWLINE Q] 40.000 -41.61
CHNL# 230: [947L Q] 1101.0 -403.8
CHNL# 228: [915L Q] 1733.6 -658.0

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_08_NL_H2PLNAT

FILE: scn5_SL_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1532 0.17360
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1448 0.54310
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1600 0.50030
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1443 0.41260
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1430 0.38050

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_08_NL_H2PLNAT

FILE: scn5_SL_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00 BRANCH P

CHNL# 235: [T8 P] 53.827 -40.00
CHNL# 233: [921L P] 106.75 -226.0
CHNL# 231: [NEWLINE P] 40.000 -60.39
CHNL# 229: [947L P] 158.12 -35.05
CHNL# 227: [915L P] 215.96 -204.5

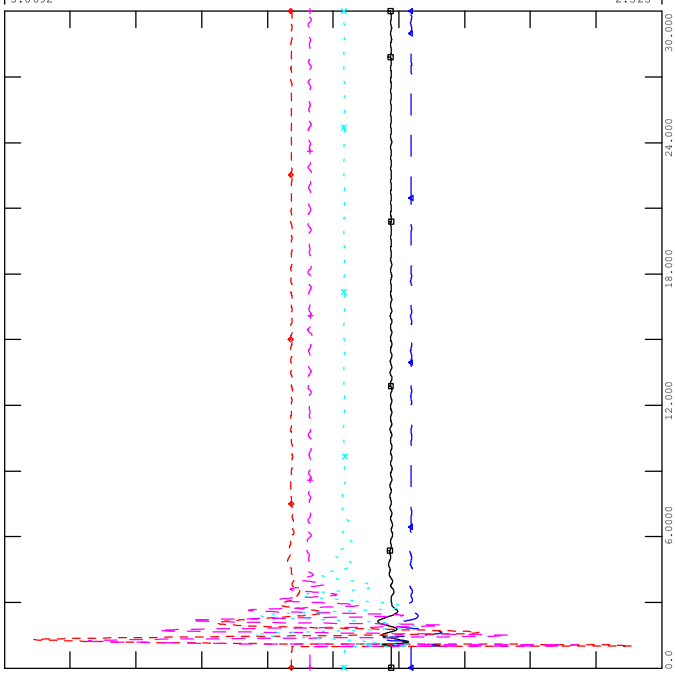
TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_09_915L_947L_CLOVERBAR

FILE: scn5_SL_09_915L_947L_CloverBar.out

SAT, JUL 02 2022 15:00
ACTIVE POWER

CHNL# 91: [POWR557342[13.800]G1]
0.39650 -0.1348
CHNL# 89: [POWR 26516[CB_GTG2 13.800]G2]
1.3554 -0.2071
CHNL# 75: [POWR 492[GENES 29 20.500]G2]
5.8848 1.3910
CHNL# 71: [POWR 422[KEEP#1GN 19.000]G1]
5.1278 -2.326
CHNL# 67: [POWR 342[SUND#4GN 20.000]G4]
5.0692 -2.325

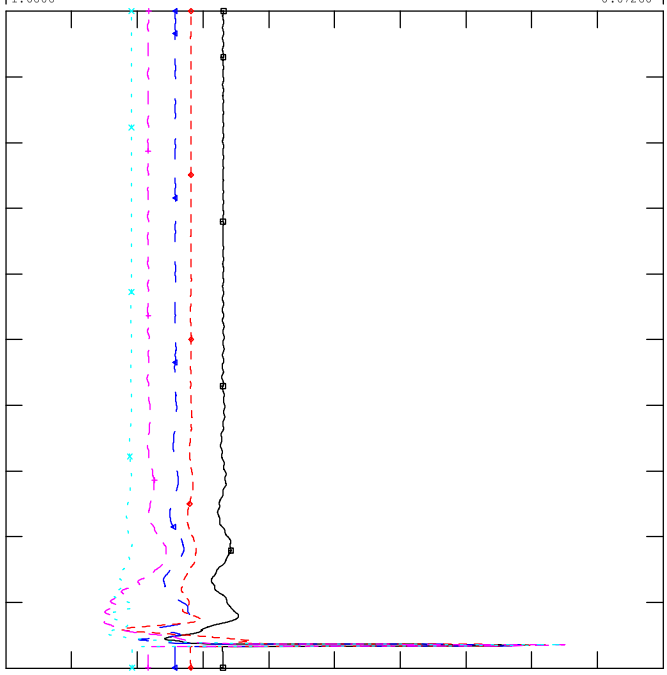


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_09_915L_947L_CLOVERBAR

FILE: scn5_SL_09_915L_947L_CloverBar.out

SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE

CHNL# 190: [ETRM557342[13.800]G1]
1.1271 0.46680
CHNL# 188: [ETRM 26516[CB_GTG2 13.800]G2]
1.1948 0.52530
CHNL# 174: [ETRM 492[GENES 29 20.500]G2]
1.0907 0.51920
CHNL# 170: [ETRM 422[KEEP#1GN 19.000]G1]
1.0775 0.58270
CHNL# 166: [ETRM 342[SUND#4GN 20.000]G4]
1.0868 0.67280

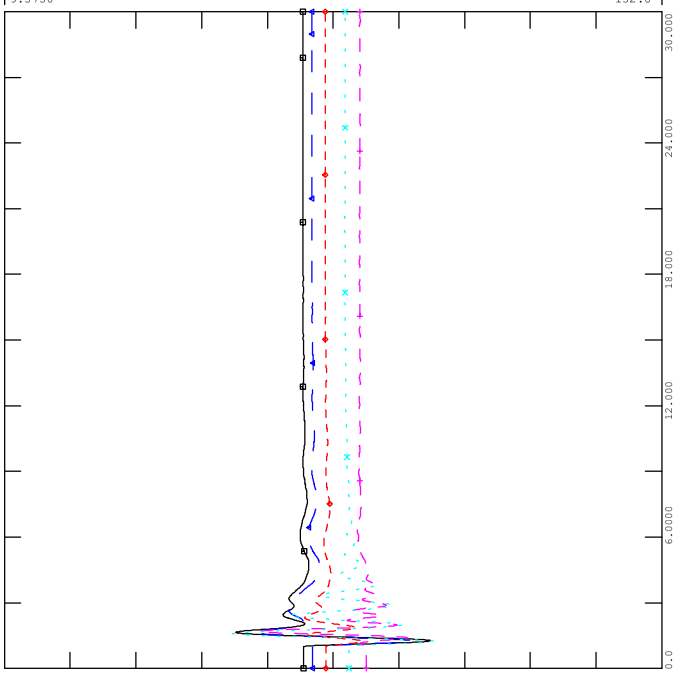


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_09_915L_947L_CLOVERBAR

FILE: scn5_SL_09_915L_947L_CloverBar.out

SAT, JUL 02 2022 15:00
ROTOR ANGLE

CHNL# 25: [ANGL557342[13.800]G1]
25.897 -118.2
CHNL# 23: [ANGL 26516[CB_GTG2 13.800]G2]
19.482 -109.9
CHNL# 9: [ANGL 492[GENES 29 20.500]G2]
53.101 -56.40
CHNL# 5: [ANGL 422[KEEP#1GN 19.000]G1]
-0.0650 -132.1
CHNL# 1: [ANGL 342[SUND#4GN 20.000]G4]
9.3736 -132.8

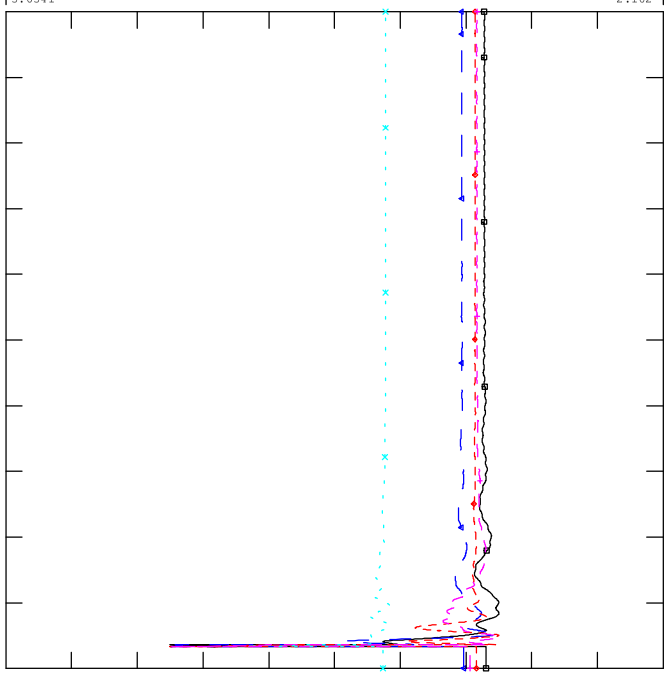


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_09_915L_947L_CLOVERBAR

FILE: scn5_SL_09_915L_947L_CloverBar.out

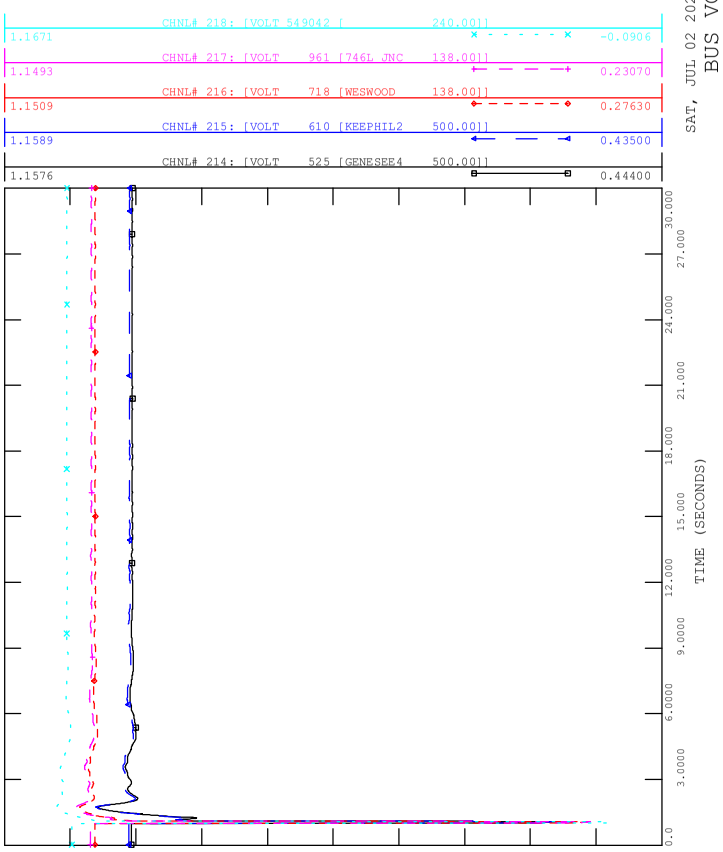
SAT, JUL 02 2022 15:00
REACTIVE POWER

CHNL# 124: [VARS557342[13.800]G1]
0.70470 -0.4964
CHNL# 122: [VARS 26516[CB_GTG2 13.800]G2]
4.0207 -1.089
CHNL# 108: [VARS 492[GENES 29 20.500]G2]
4.5030 -2.849
CHNL# 104: [VARS 422[KEEP#1GN 19.000]G1]
3.6411 -2.633
CHNL# 100: [VARS 342[SUND#4GN 20.000]G4]
3.0341 -2.162



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_09_915L_947L_CLOVERBAR

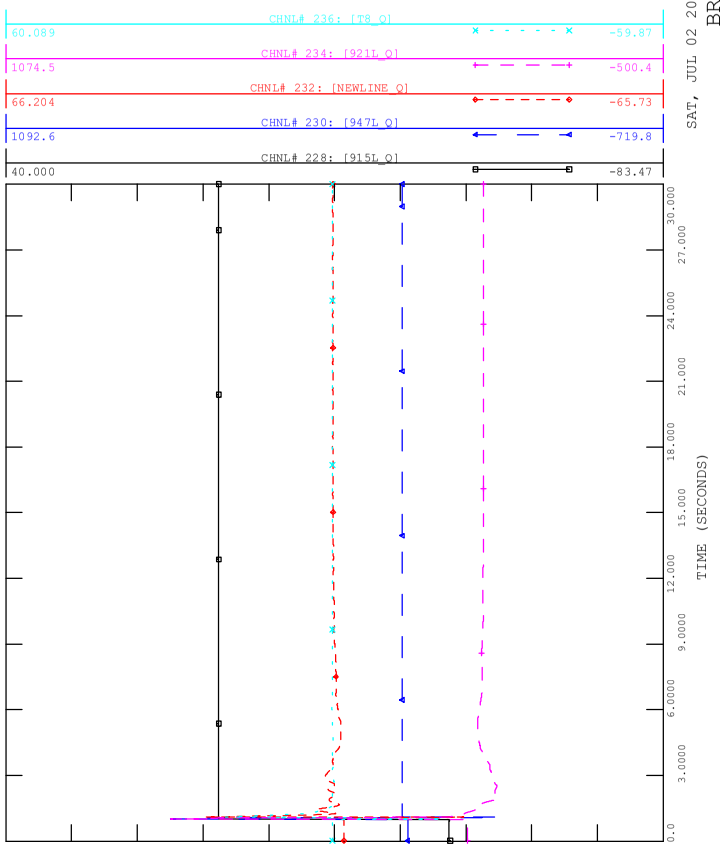
FILE: scn5_SL_09_915L_947L_CloverBar.out



SAT, JUL 02 2022 15:00 BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_09_915L_947L_CLOVERBAR

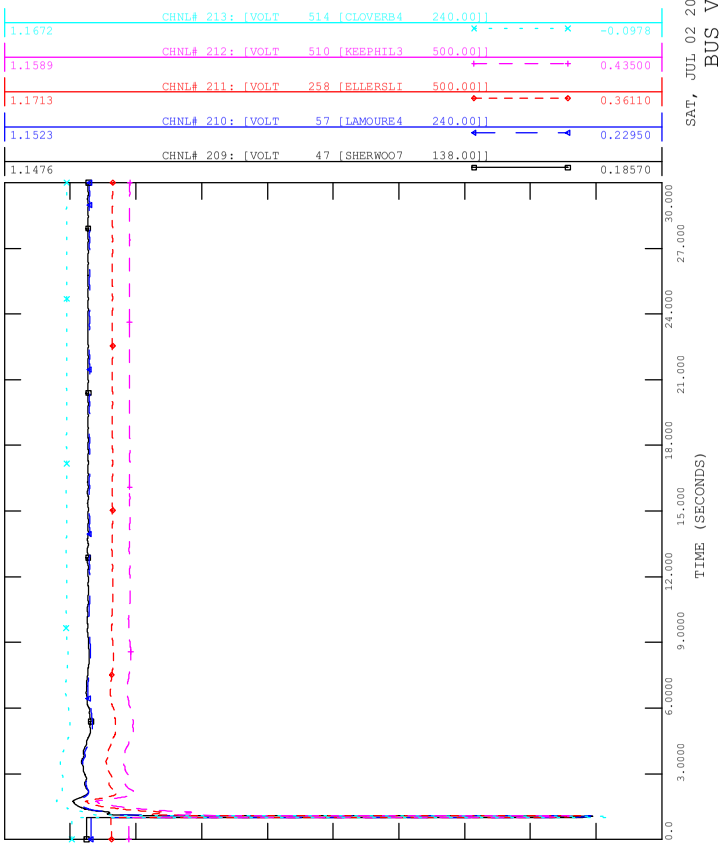
FILE: scn5_SL_09_915L_947L_CloverBar.out



SAT, JUL 02 2022 15:00 BRANCH Q

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_09_915L_947L_CLOVERBAR

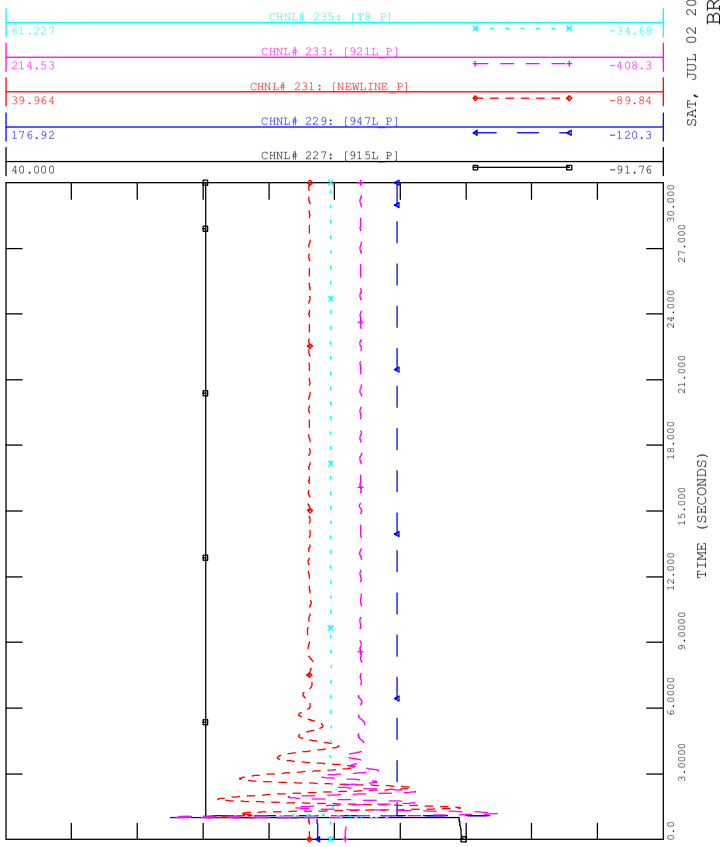
FILE: scn5_SL_09_915L_947L_CloverBar.out



SAT, JUL 02 2022 15:00 BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5_SL_09_915L_947L_CLOVERBAR

FILE: scn5_SL_09_915L_947L_CloverBar.out

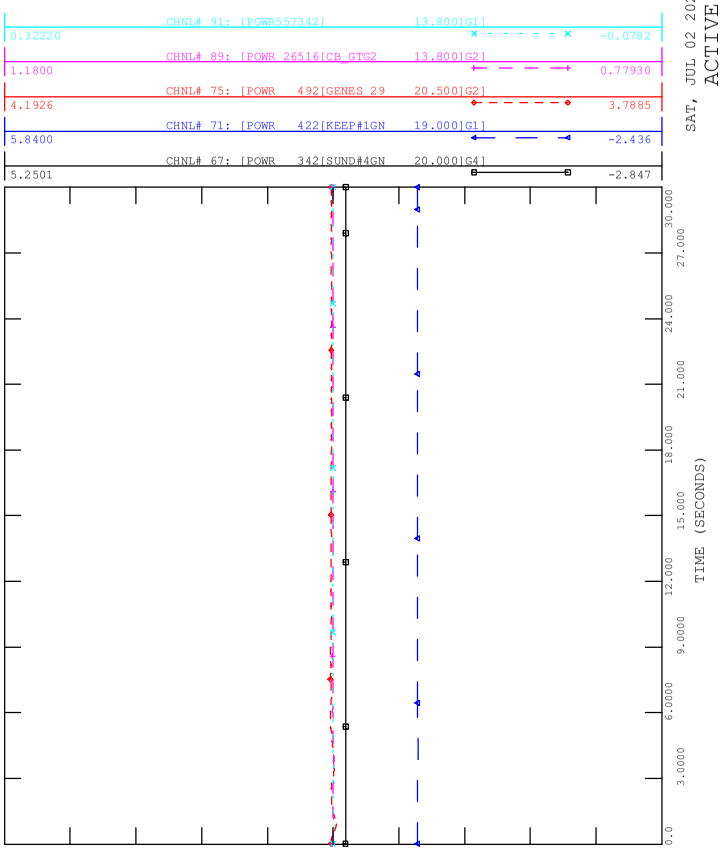


SAT, JUL 02 2022 15:00 BRANCH P

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_NOFAULT

FILE: scn6_SP_nofault.out

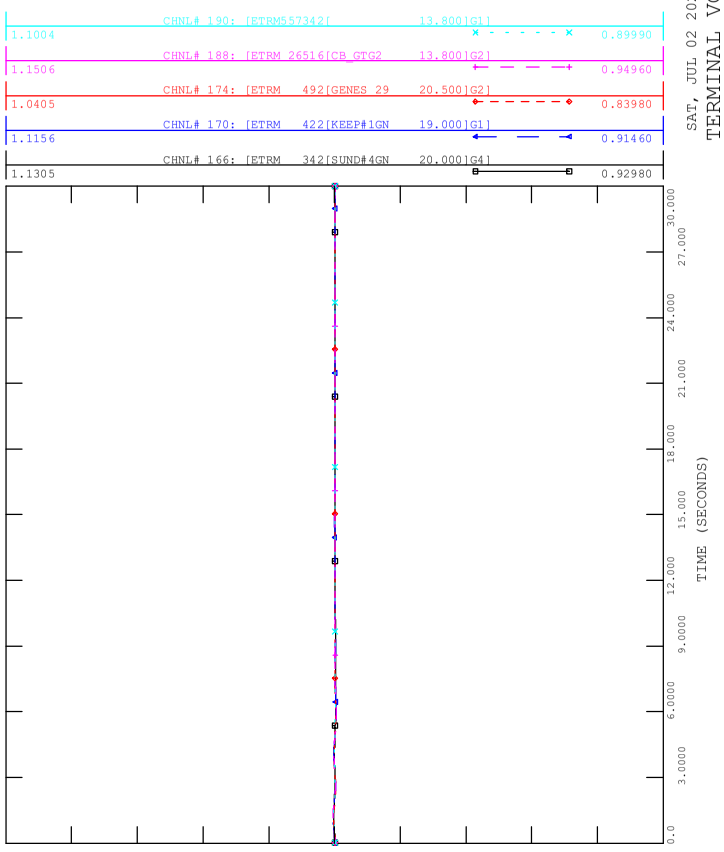
SAT, JUL 02 2022 15:00
ACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_NOFAULT

FILE: scn6_SP_nofault.out

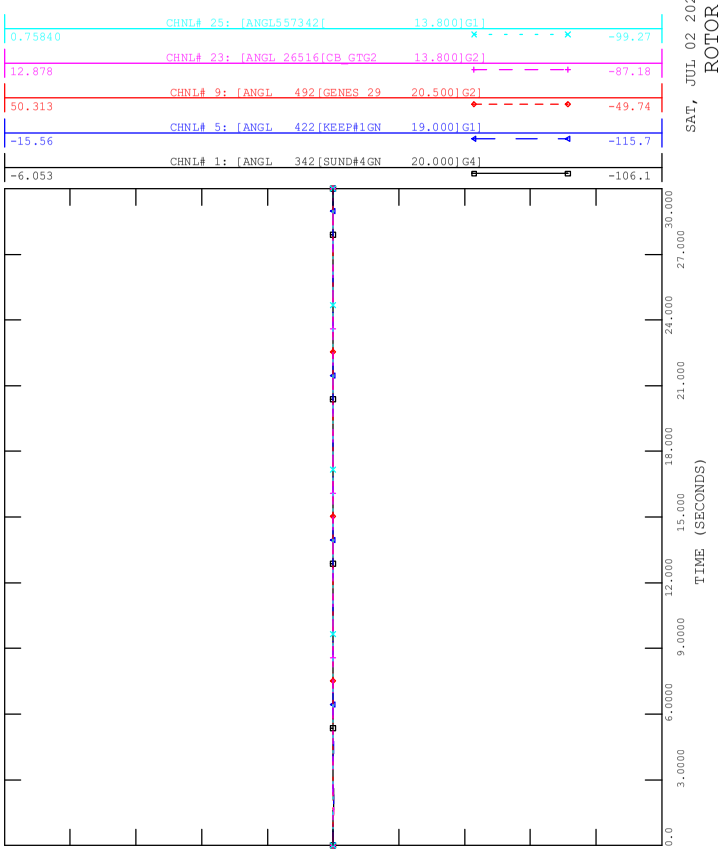
SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_NOFAULT

FILE: scn6_SP_nofault.out

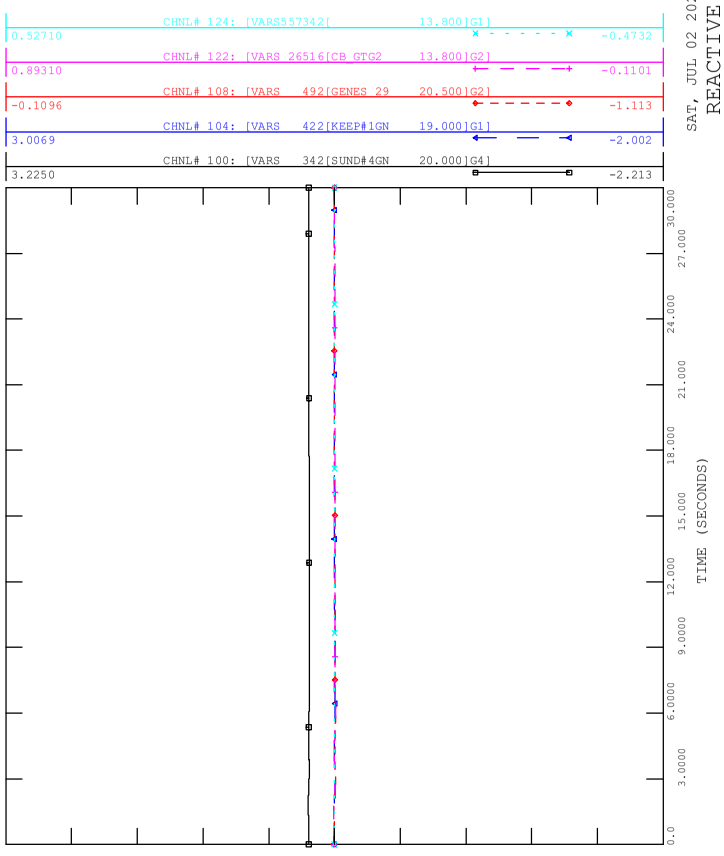
SAT, JUL 02 2022 15:00
ROTOR ANGLE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_NOFAULT

FILE: scn6_SP_nofault.out

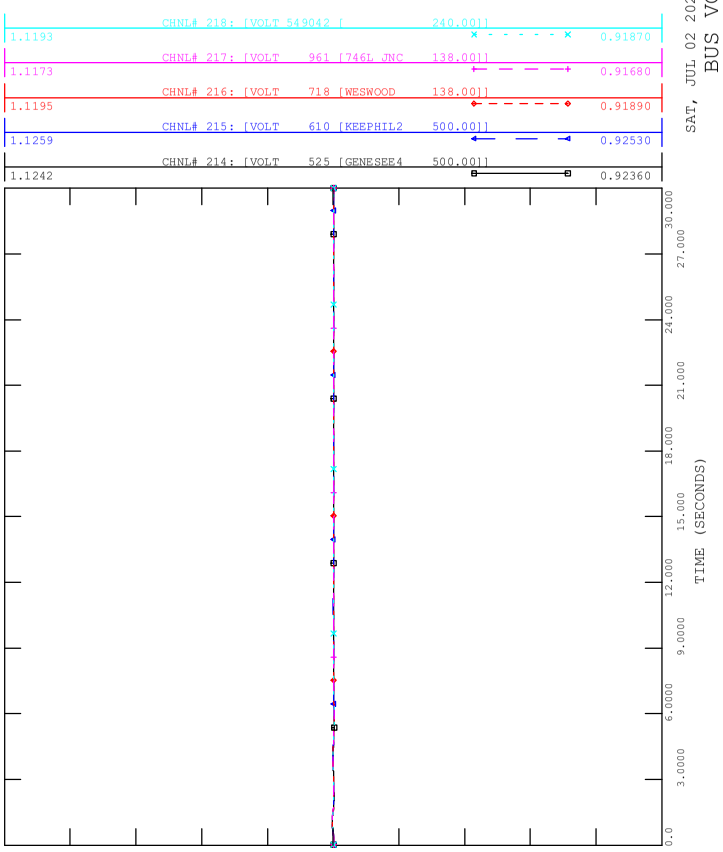
SAT, JUL 02 2022 15:00
REACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_NOFAULT

FILE: scn6_SP_nofault.out

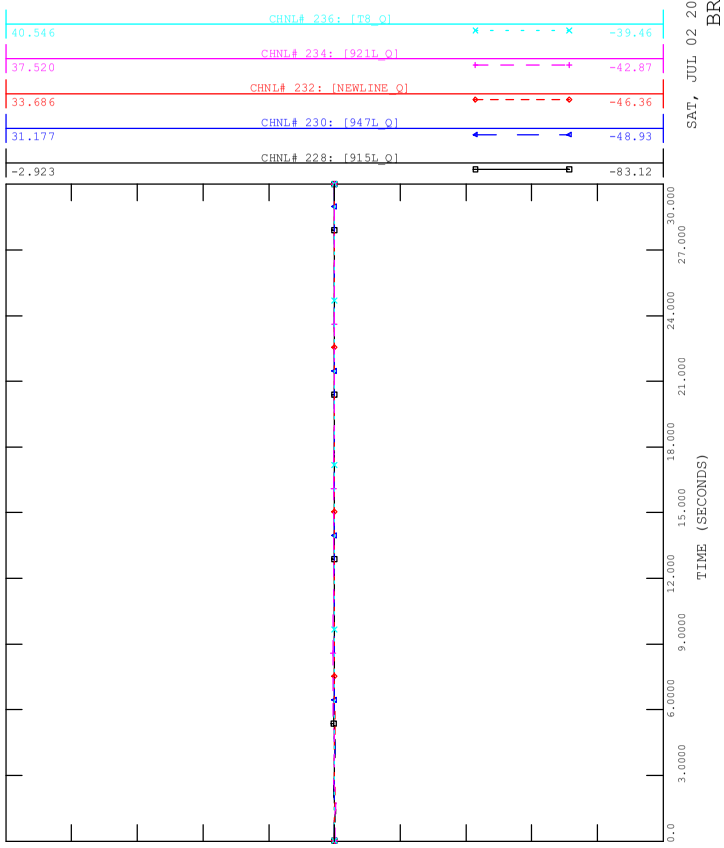
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_NOFAULT

FILE: scn6_SP_nofault.out

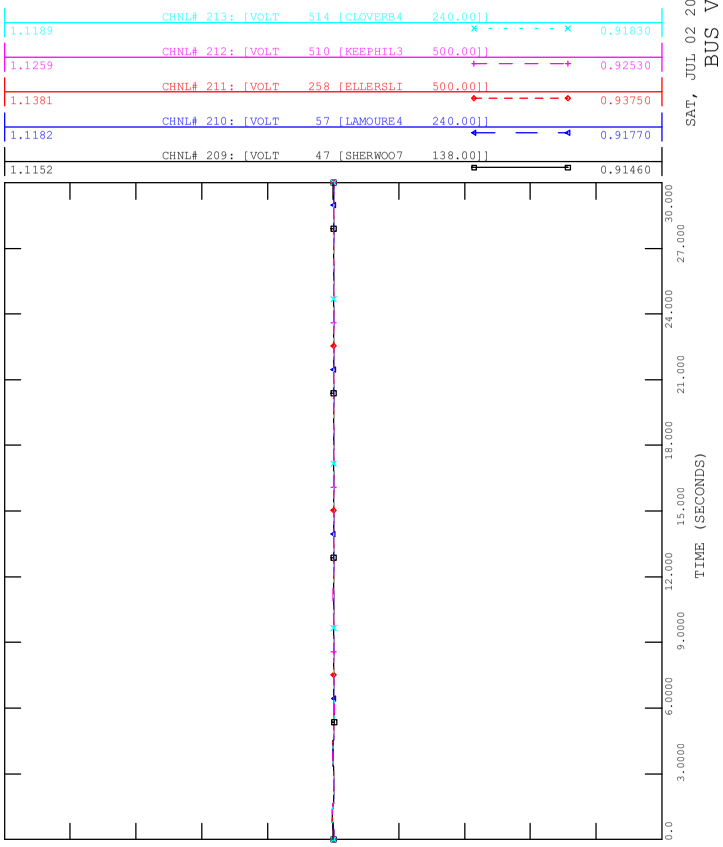
SAT, JUL 02 2022 15:00 BRANCH Q



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_NOFAULT

FILE: scn6_SP_nofault.out

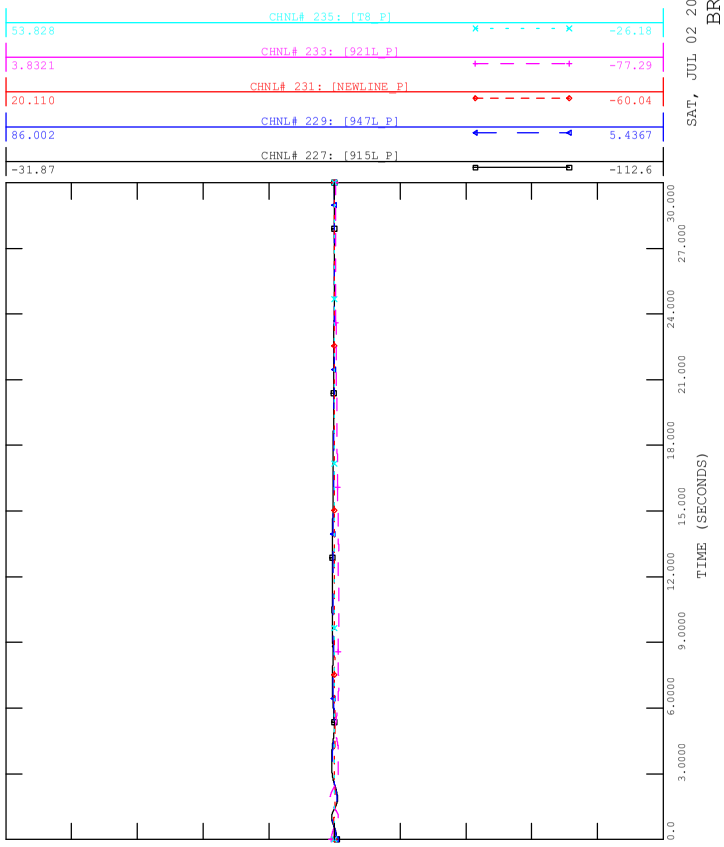
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_NOFAULT

FILE: scn6_SP_nofault.out

SAT, JUL 02 2022 15:00 BRANCH P



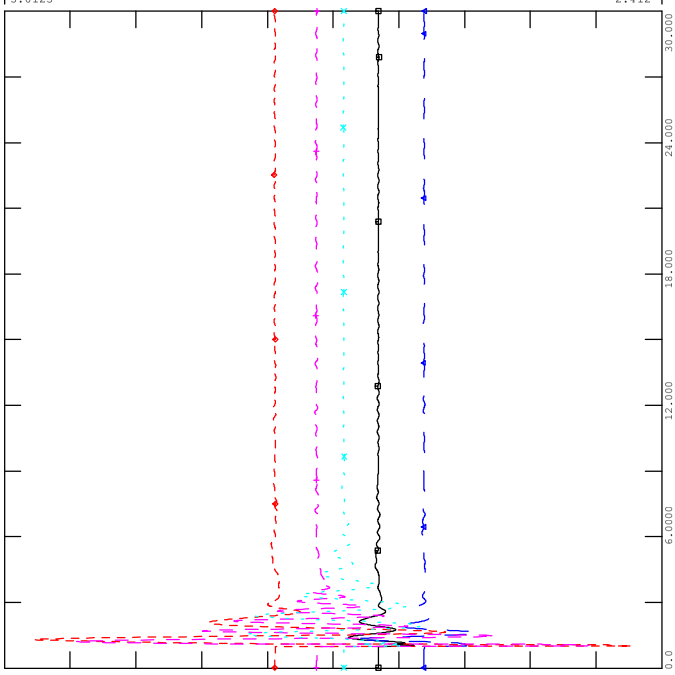
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_01_915L_EASTEDMONTON

FILE: scn6_SP_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

CHNL# 91: [POWR557342[13.800]G1]
0.40430 -0.1428
CHNL# 89: [POWR 26516[CB_GTG2 13.800]G2]
1.8403 0.02830
CHNL# 75: [POWR 492[GENES 29 20.500]G2]
6.0729 1.0111
CHNL# 71: [POWR 422[KEEP#1GN 19.000]G1]
5.6911 -2.224
CHNL# 67: [POWR 342[SUND#4GN 20.000]G4]
5.6125 -2.412



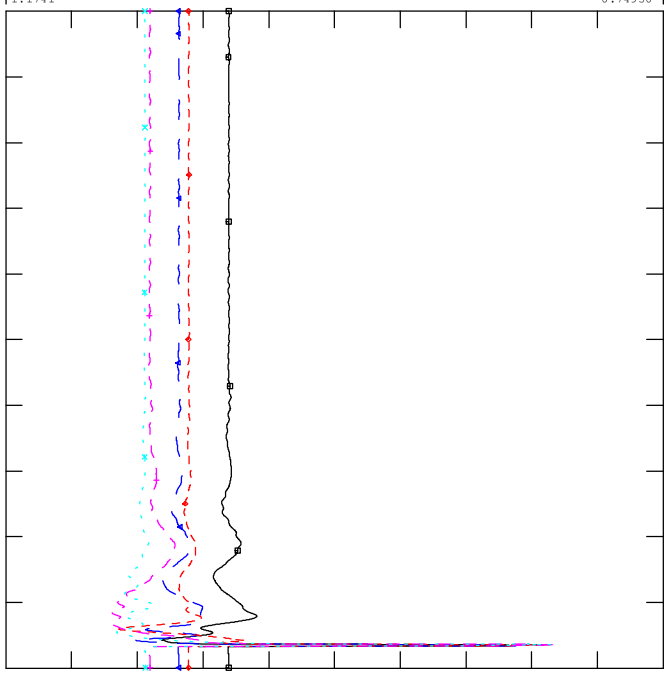
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_01_915L_EASTEDMONTON

FILE: scn6_SP_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

CHNL# 190: [ETRM557342[13.800]G1]
1.1258 0.53330
CHNL# 188: [ETRM 26516[CB_GTG2 13.800]G2]
1.1866 0.56340
CHNL# 174: [ETRM 492[GENES 29 20.500]G2]
1.1022 0.51920
CHNL# 170: [ETRM 422[KEEP#1GN 19.000]G1]
1.1519 0.63180
CHNL# 166: [ETRM 342[SUND#4GN 20.000]G4]
1.1741 0.74930



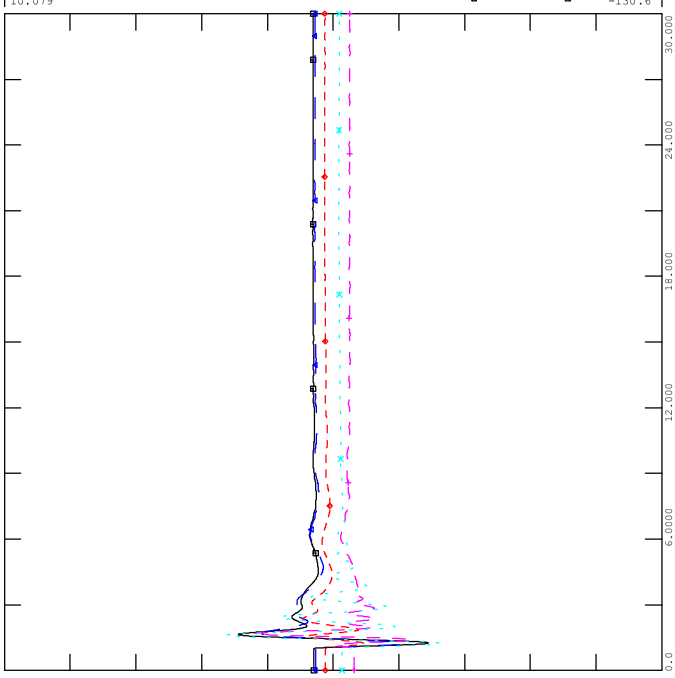
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_01_915L_EASTEDMONTON

FILE: scn6_SP_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

CHNL# 25: [ANGL557342[13.800]G1]
27.122 -121.6
CHNL# 23: [ANGL 26516[CB_GTG2 13.800]G2]
33.128 -98.88
CHNL# 9: [ANGL 492[GENES 29 20.500]G2]
54.098 -56.10
CHNL# 5: [ANGL 422[KEEP#1GN 19.000]G1]
-5.157 -132.9
CHNL# 1: [ANGL 342[SUND#4GN 20.000]G4]
10.079 -130.6



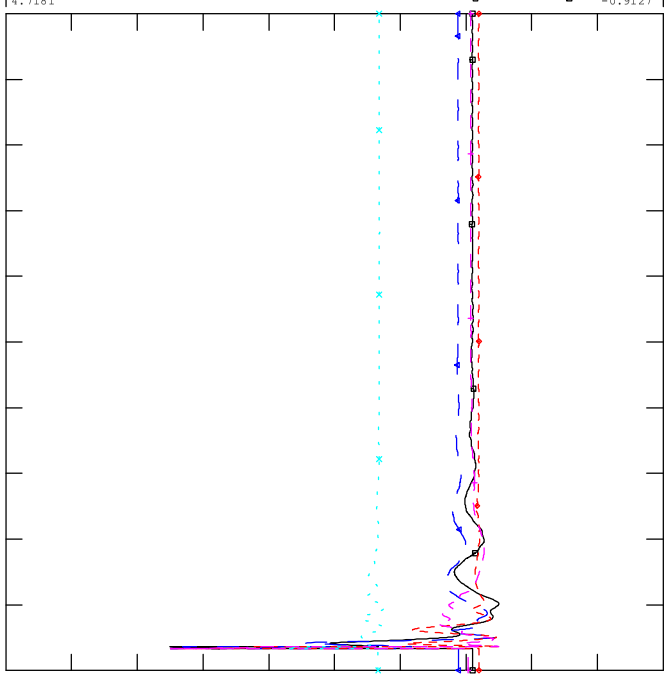
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_01_915L_EASTEDMONTON

FILE: scn6_SP_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

REACTIVE POWER

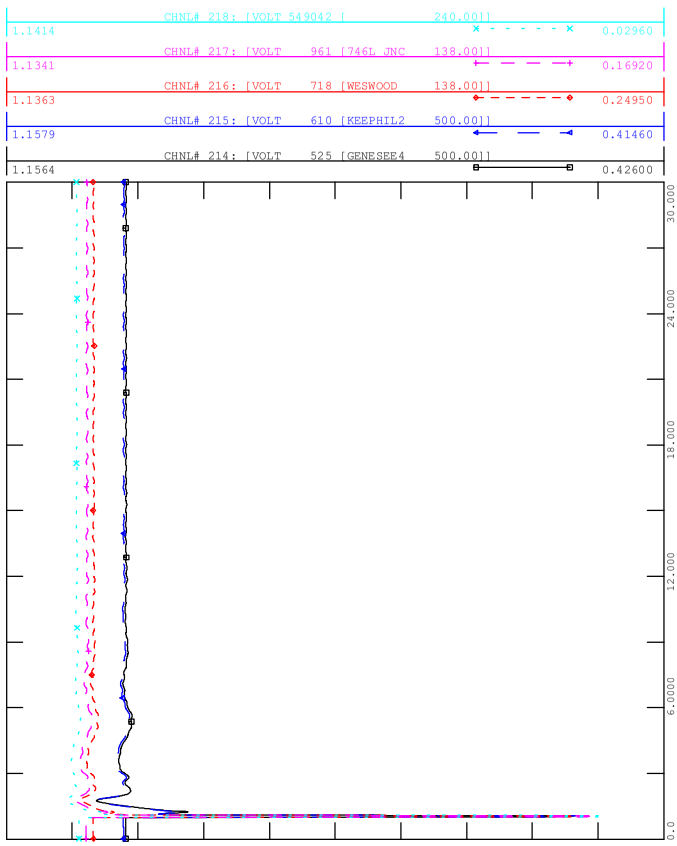
CHNL# 124: [VARS557342[13.800]G1]
0.69530 -0.4850
CHNL# 122: [VARS 26516[CB_GTG2 13.800]G2]
3.7724 -1.038
CHNL# 108: [VARS 492[GENES 29 20.500]G2]
4.8940 -2.754
CHNL# 104: [VARS 422[KEEP#1GN 19.000]G1]
5.0084 -1.534
CHNL# 100: [VARS 342[SUND#4GN 20.000]G4]
4.7181 -0.9127



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_01_915L_EASTEDMONTON

FILE: scn6_SP_01_915L_EastEdmonton.out

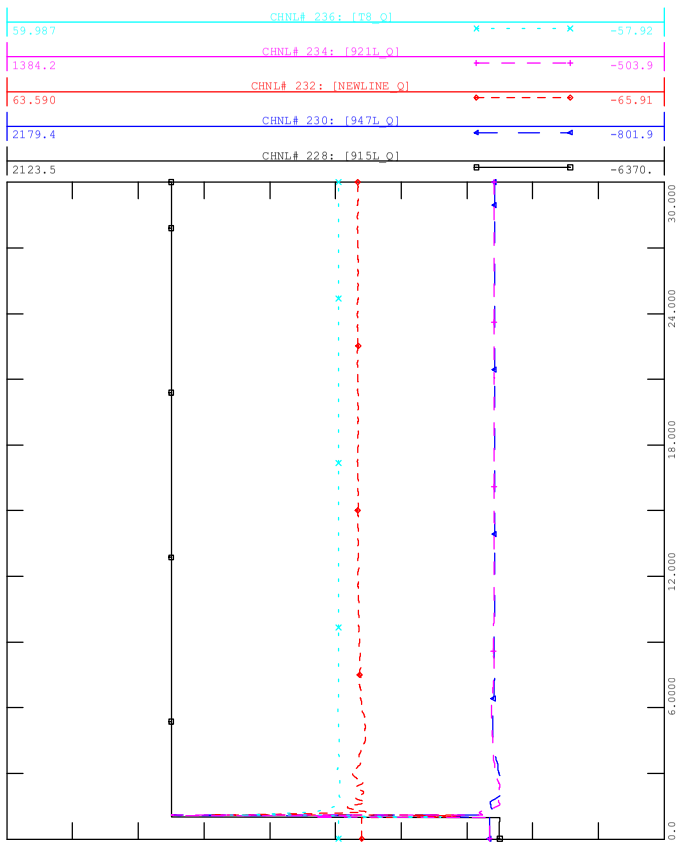
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_01_915L_EASTEDMONTON

FILE: scn6_SP_01_915L_EastEdmonton.out

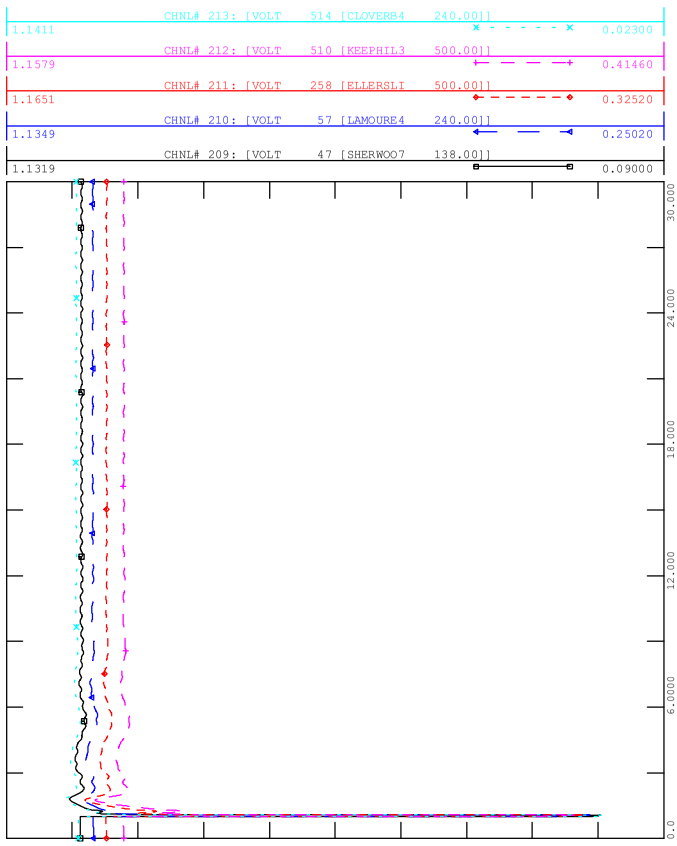
SAT, JUL 02 2022 15:00 BRANCH Q



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_01_915L_EASTEDMONTON

FILE: scn6_SP_01_915L_EastEdmonton.out

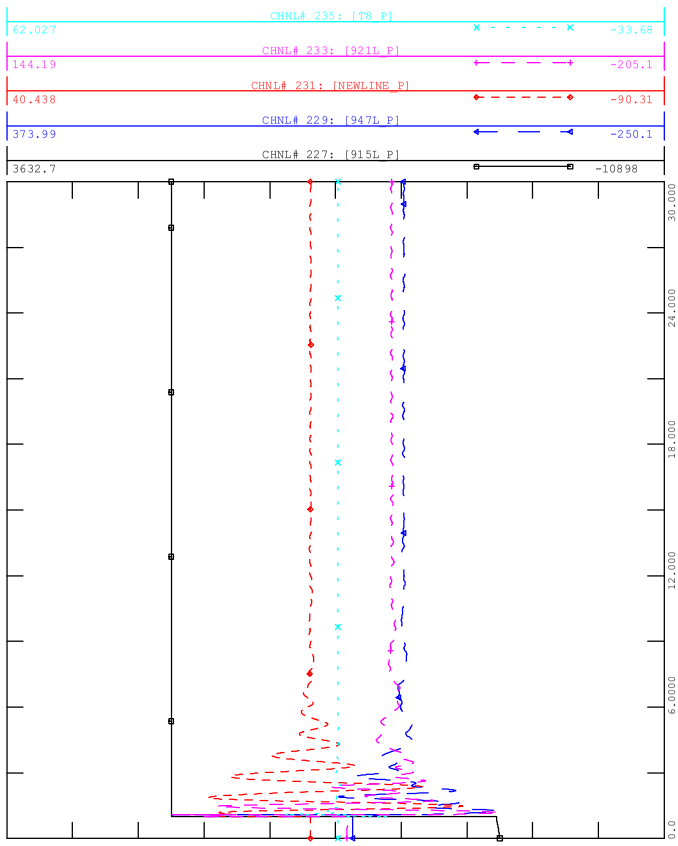
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_01_915L_EASTEDMONTON

FILE: scn6_SP_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00 BRANCH P

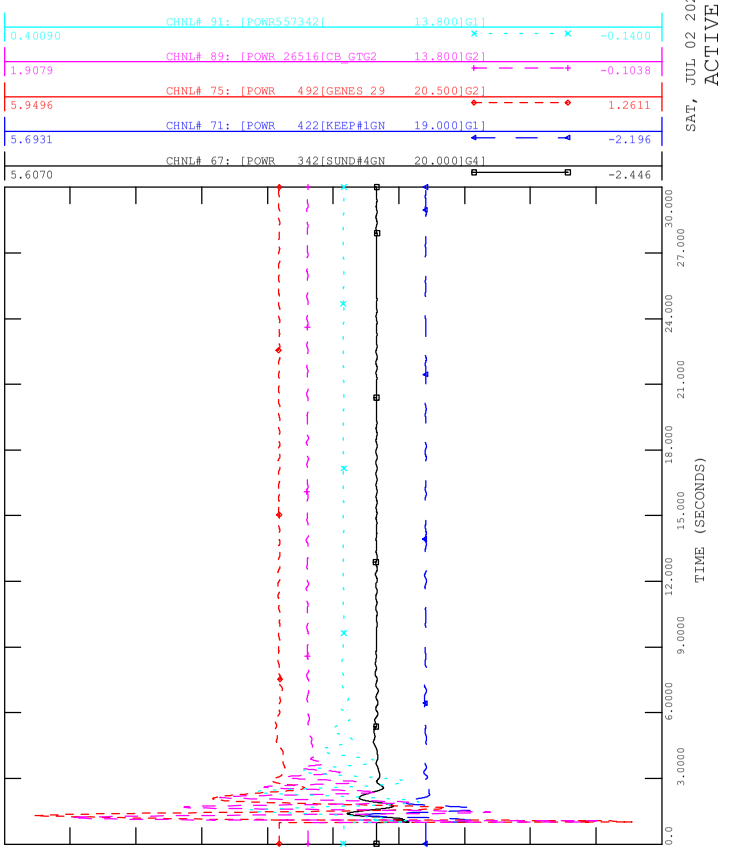


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_02_915L_CLOVERBAR

FILE: scn6_SP_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

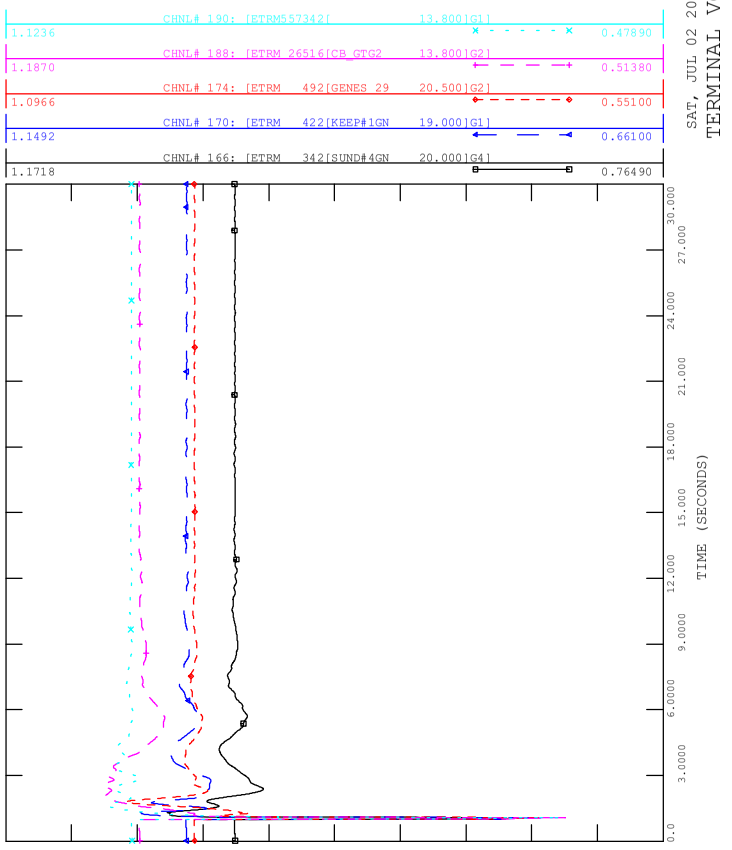


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_02_915L_CLOVERBAR

FILE: scn6_SP_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

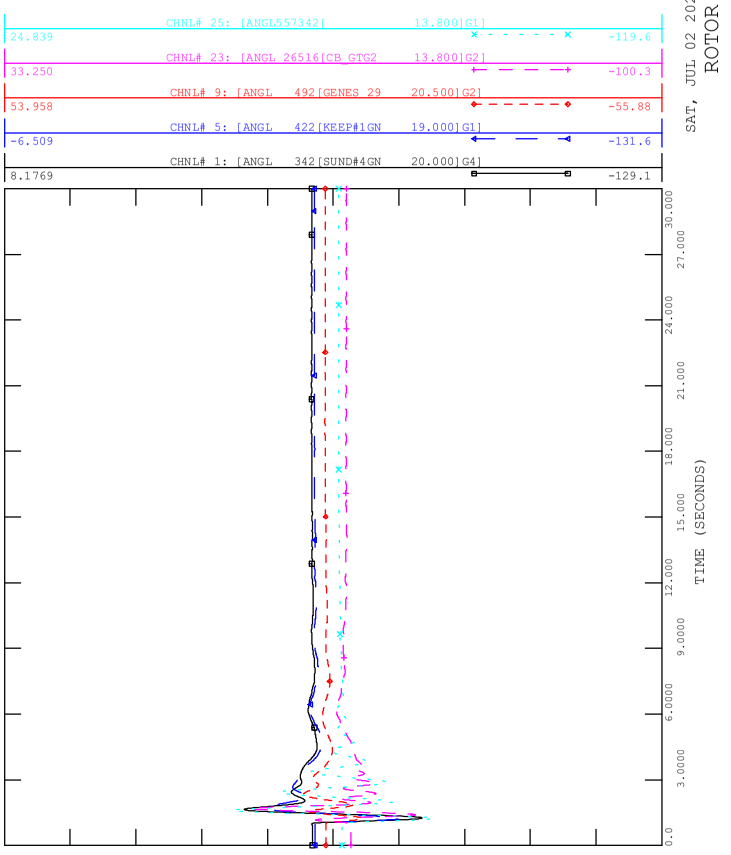


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_02_915L_CLOVERBAR

FILE: scn6_SP_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

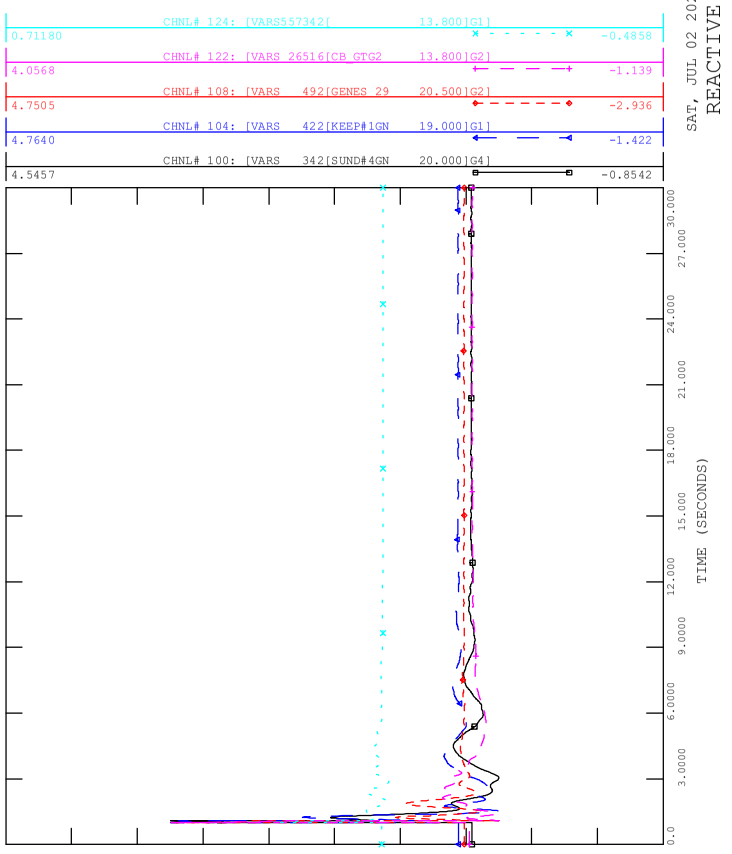


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_02_915L_CLOVERBAR

FILE: scn6_SP_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

REACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_02_915L_CLOVERBAR

FILE: scn6_SP_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1402 -0.0904
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1334 0.23810
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1356 0.28920
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1559 0.46300
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1543 0.47330

TIME (SECONDS)

0.0 3.0000 6.0000 9.0000 12.000 15.000 18.000 21.000 24.000 27.000 30.000

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_02_915L_CLOVERBAR

FILE: scn6_SP_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

BRANCH Q

CHNL# 236: [T8 Q] 60.386 -59.56
CHNL# 234: [921L Q] 1087.1 -404.8
CHNL# 232: [NEWLINE Q] 63.910 -67.85
CHNL# 230: [947L Q] 1075.0 -715.2
CHNL# 228: [915L Q] 40.000 -83.49

TIME (SECONDS)

0.0 3.0000 6.0000 9.0000 12.000 15.000 18.000 21.000 24.000 27.000 30.000

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_02_915L_CLOVERBAR

FILE: scn6_SP_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1399 -0.0978
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1559 0.46300
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1634 0.38190
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1340 0.24120
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1312 0.18780

TIME (SECONDS)

0.0 3.0000 6.0000 9.0000 12.000 15.000 18.000 21.000 24.000 27.000 30.000

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_02_915L_CLOVERBAR

FILE: scn6_SP_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00

BRANCH P

CHNL# 235: [T8 P] 61.659 -34.54
CHNL# 233: [921L P] 155.95 -220.6
CHNL# 231: [NEWLINE P] 39.979 -89.79
CHNL# 229: [947L P] 200.05 -197.6
CHNL# 227: [915L P] 40.000 -113.4

TIME (SECONDS)

0.0 3.0000 6.0000 9.0000 12.000 15.000 18.000 21.000 24.000 27.000 30.000

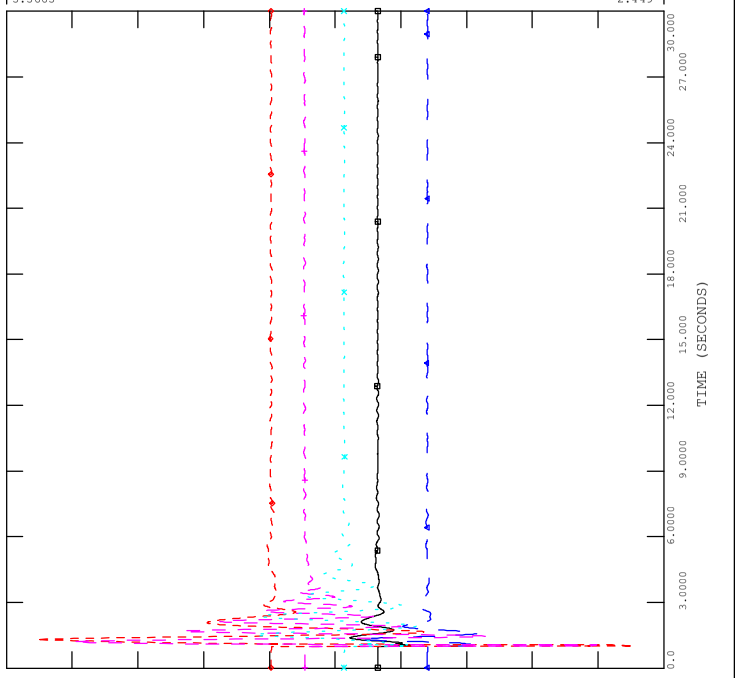
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_03_921L_CLOVERBAR

FILE: scn6_SP_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

CHNL# 91: [POWR557342[13.800]G1]
0.39470 -0.1364
CHNL# 89: [POWR 26516[CB_GTG2 13.800]G2]
1.8709 -0.0931
CHNL# 75: [POWR 492[GENES 29 20.500]G2]
5.8066 1.2941
CHNL# 71: [POWR 422[KEEP#1GN 19.000]G1]
5.6750 -2.191
CHNL# 67: [POWR 342[SUND#4GN 20.000]G4]
5.5885 -2.449



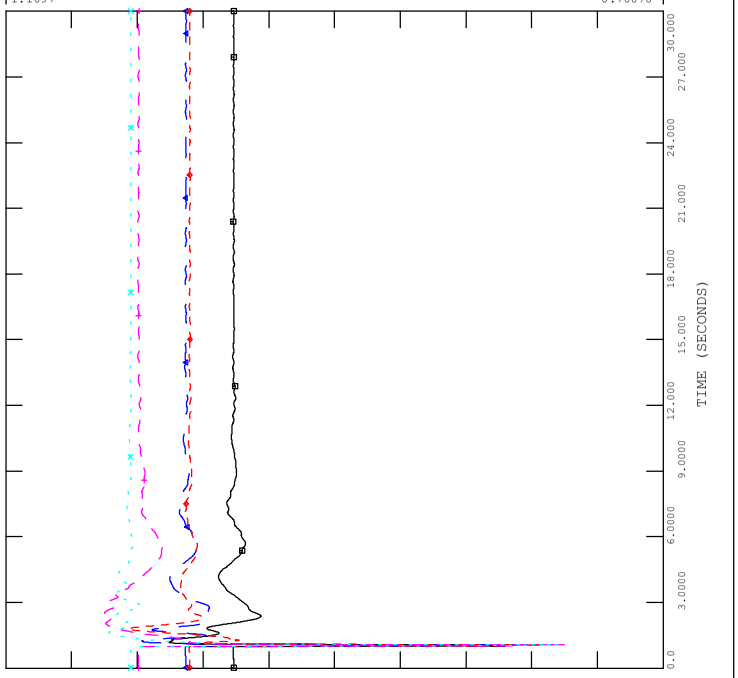
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_03_921L_CLOVERBAR

FILE: scn6_SP_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

CHNL# 190: [ETRM557342[13.800]G1]
1.1213 0.48330
CHNL# 188: [ETRM 26516[CB_GTG2 13.800]G2]
1.1847 0.51770
CHNL# 174: [ETRM 492[GENES 29 20.500]G2]
1.0899 0.55410
CHNL# 170: [ETRM 422[KEEP#1GN 19.000]G1]
1.1475 0.66370
CHNL# 166: [ETRM 342[SUND#4GN 20.000]G4]
1.1697 0.76670



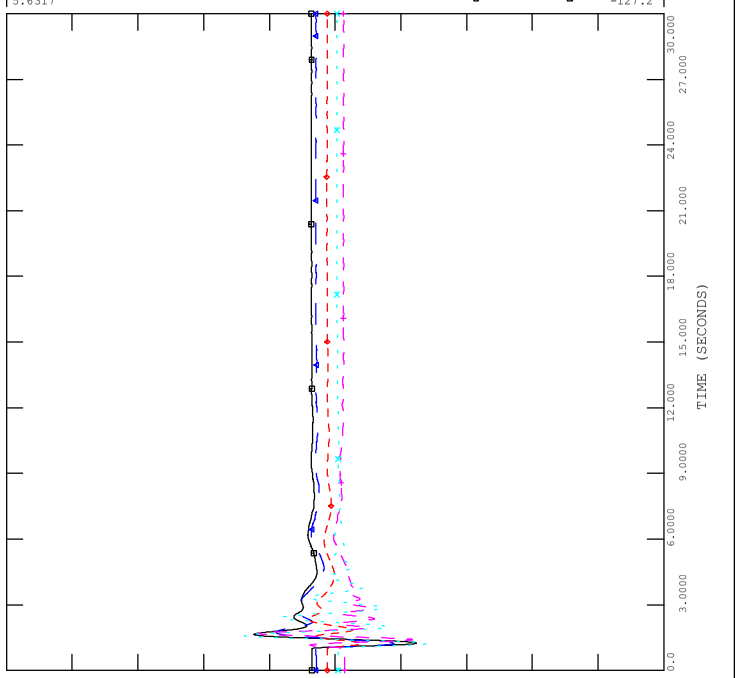
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_03_921L_CLOVERBAR

FILE: scn6_SP_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

CHNL# 25: [ANGL557342[13.800]G1]
20.698 -117.9
CHNL# 23: [ANGL 26516[CB_GTG2 13.800]G2]
30.227 -100.7
CHNL# 9: [ANGL 492[GENES 29 20.500]G2]
53.440 -55.45
CHNL# 5: [ANGL 422[KEEP#1GN 19.000]G1]
-8.188 -130.0
CHNL# 1: [ANGL 342[SUND#4GN 20.000]G4]
5.6317 -127.2



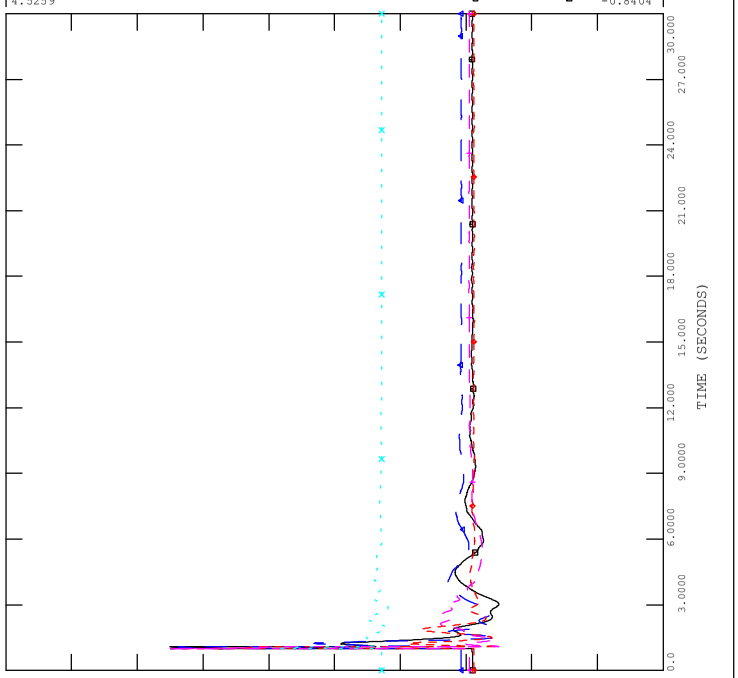
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_03_921L_CLOVERBAR

FILE: scn6_SP_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

REACTIVE POWER

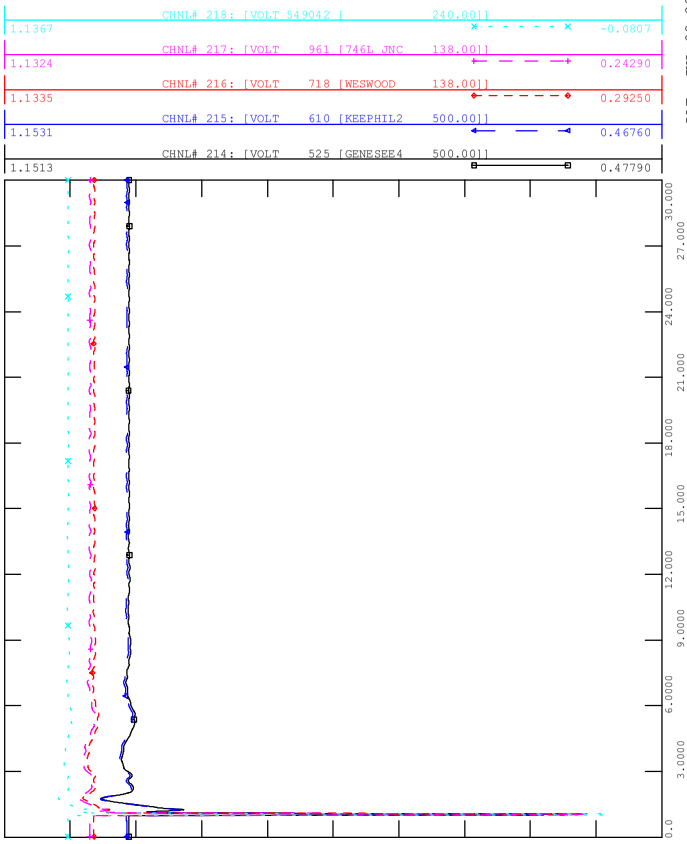
CHNL# 124: [VARS557342[13.800]G1]
0.71000 -0.4853
CHNL# 122: [VARS 26516[CB_GTG2 13.800]G2]
4.0384 -1.137
CHNL# 108: [VARS 492[GENES 29 20.500]G2]
4.6516 -2.740
CHNL# 104: [VARS 422[KEEP#1GN 19.000]G1]
4.7192 -1.366
CHNL# 100: [VARS 342[SUND#4GN 20.000]G4]
4.5259 -0.8404



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_03_921L_CLOVERBAR

FILE: scn6_SP_03_921L_CloverBar.out

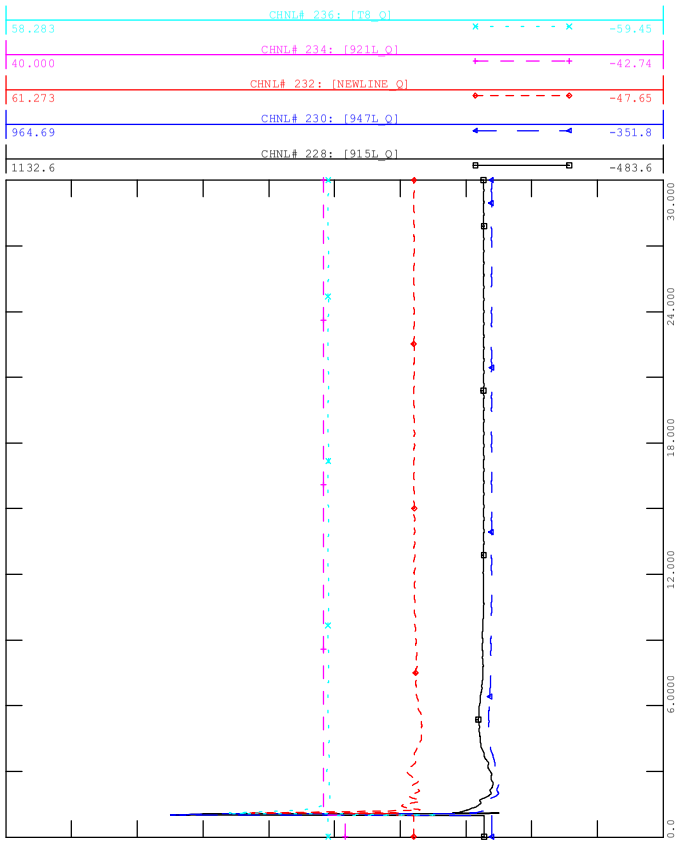
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_03_921L_CLOVERBAR

FILE: scn6_SP_03_921L_CloverBar.out

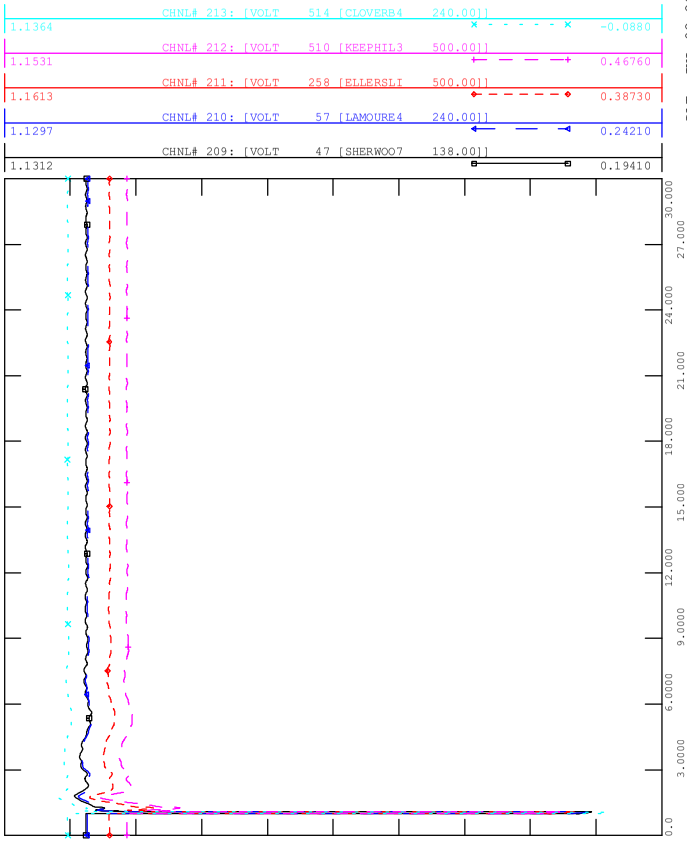
SAT, JUL 02 2022 15:00 BRANCH Q



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_03_921L_CLOVERBAR

FILE: scn6_SP_03_921L_CloverBar.out

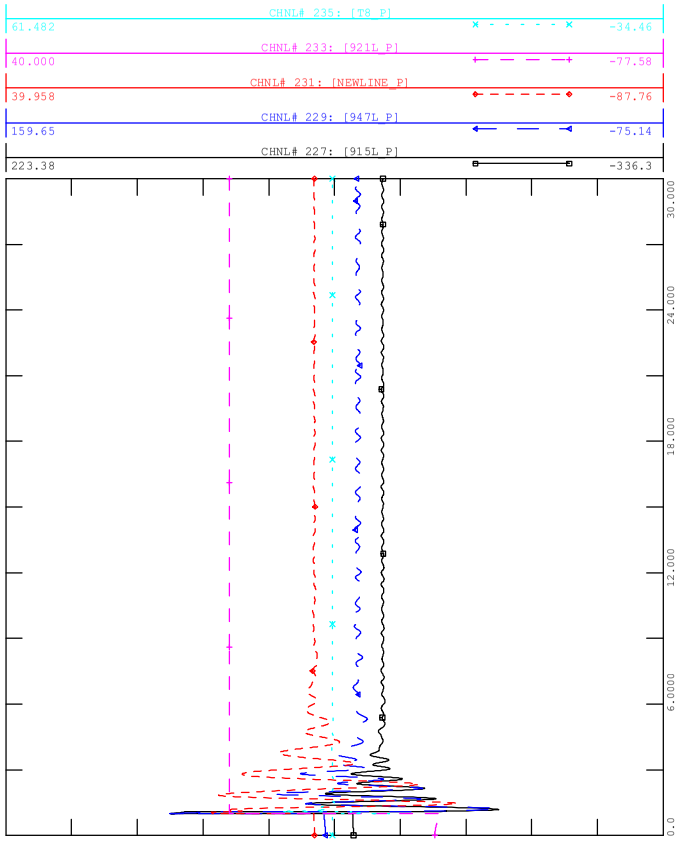
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_03_921L_CLOVERBAR

FILE: scn6_SP_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH P



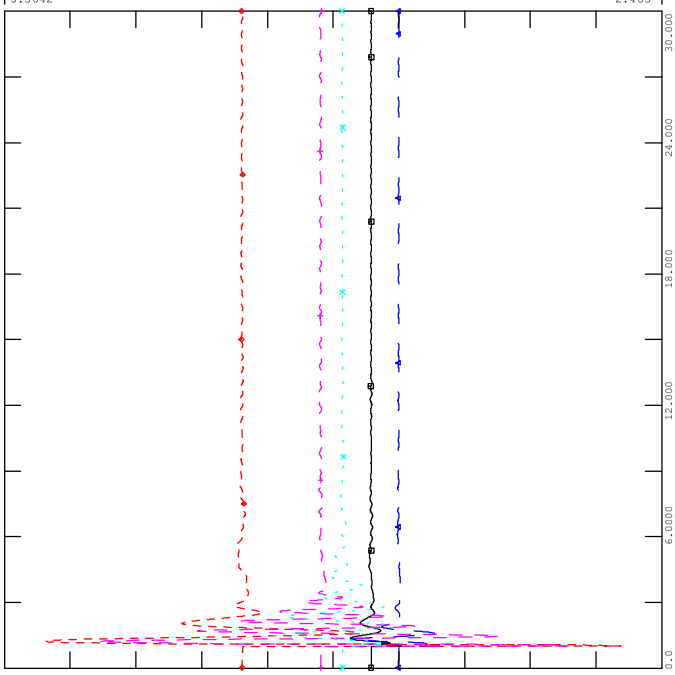
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_04_921L_LAMOUREUX

FILE: scn6_SP_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

CHNL# 91: [POWR557342[13.800]G1]
0.37440 -0.1166
CHNL# 89: [POWR 26516[CB_GTG2 13.800]G2]
1.6558 0.25070
CHNL# 75: [POWR 492[GENES 29 20.500]G2]
5.1470 1.9479
CHNL# 71: [POWR 422[KEEP#1GN 19.000]G1]
5.4487 -2.574
CHNL# 67: [POWR 342[SUND#4GN 20.000]G4]
5.5042 -2.483



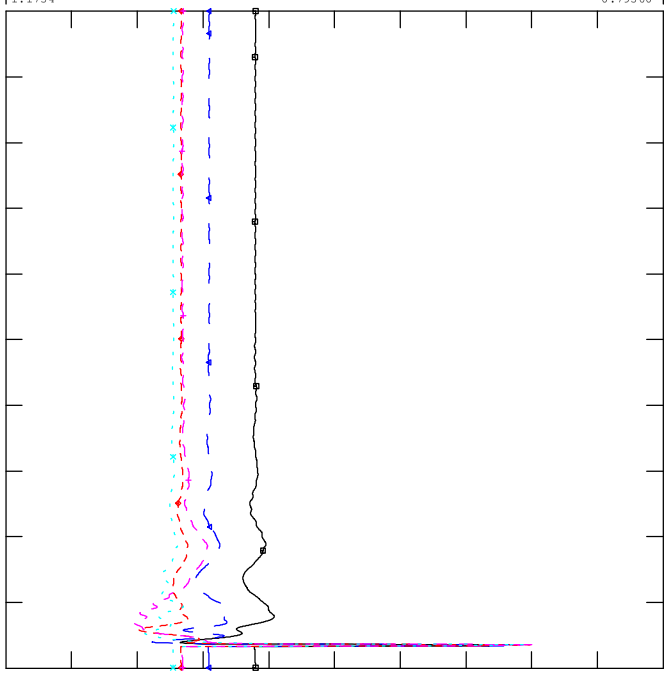
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_04_921L_LAMOUREUX

FILE: scn6_SP_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

CHNL# 190: [ETRM557342[13.800]G1]
1.1205 0.64740
CHNL# 188: [ETRM 26516[CB_GTG2 13.800]G2]
1.1870 0.67740
CHNL# 174: [ETRM 492[GENES 29 20.500]G2]
1.0718 0.57750
CHNL# 170: [ETRM 422[KEEP#1GN 19.000]G1]
1.1542 0.70400
CHNL# 166: [ETRM 342[SUND#4GN 20.000]G4]
1.1734 0.79560



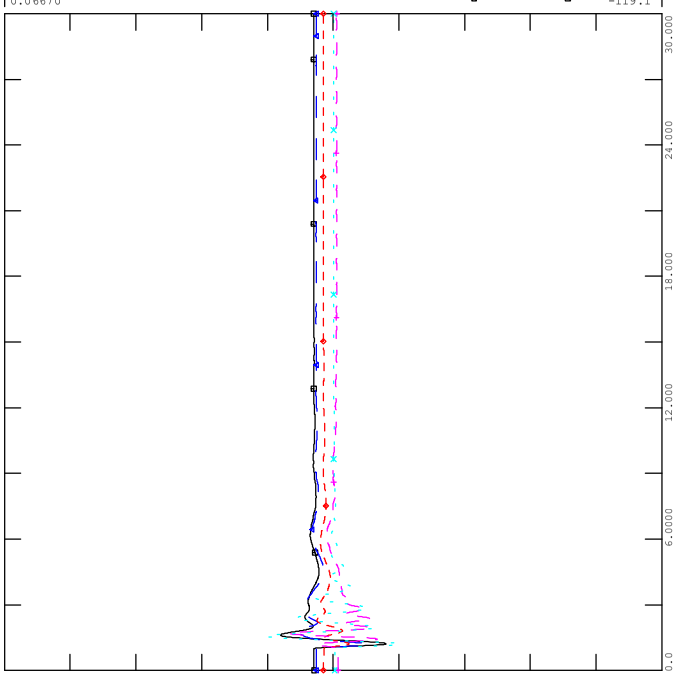
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_04_921L_LAMOUREUX

FILE: scn6_SP_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

CHNL# 25: [ANGL557342[13.800]G1]
13.541 -111.5
CHNL# 23: [ANGL 26516[CB_GTG2 13.800]G2]
21.440 -94.03
CHNL# 9: [ANGL 492[GENES 29 20.500]G2]
51.360 -53.81
CHNL# 5: [ANGL 422[KEEP#1GN 19.000]G1]
-12.19 -124.8
CHNL# 1: [ANGL 342[SUND#4GN 20.000]G4]
0.06670 -119.1



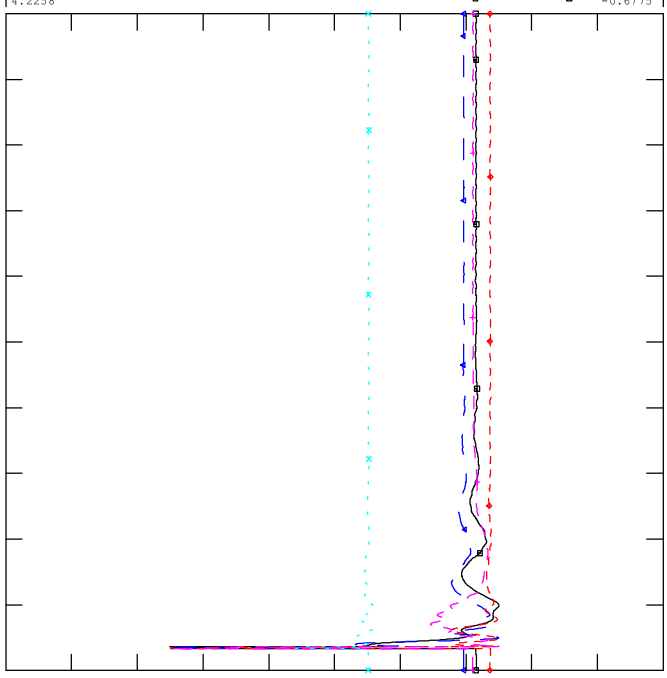
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_04_921L_LAMOUREUX

FILE: scn6_SP_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00

REACTIVE POWER

CHNL# 124: [VARS557342[13.800]G1]
0.65480 -0.4834
CHNL# 122: [VARS 26516[CB_GTG2 13.800]G2]
2.9331 -0.6449
CHNL# 108: [VARS 492[GENES 29 20.500]G2]
3.7612 -2.173
CHNL# 104: [VARS 422[KEEP#1GN 19.000]G1]
4.2889 -1.145
CHNL# 100: [VARS 342[SUND#4GN 20.000]G4]
4.2258 -0.6775

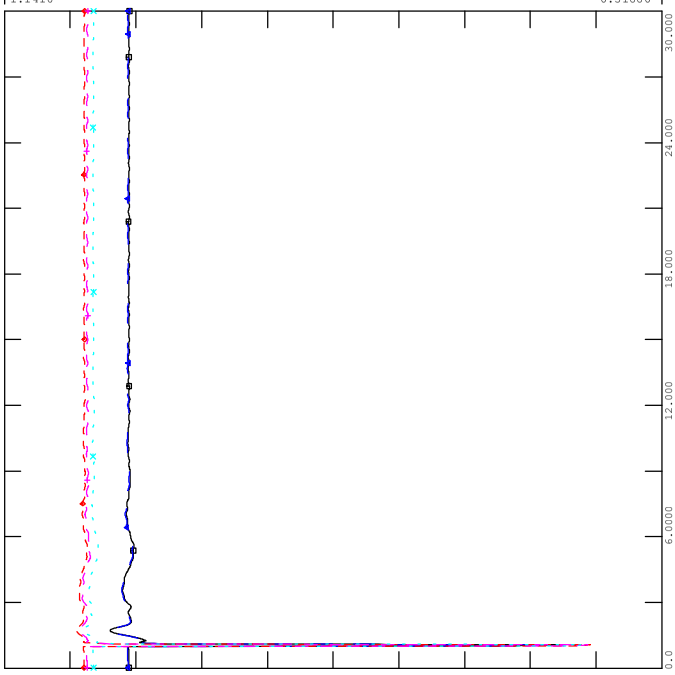


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_04_921L_LAMOUREUX

FILE: scn6_SP_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]]
1.1324 0.29290
CHNL# 217: [VOLT 961 [746L JNC 138.00]]
1.1280 0.24240
CHNL# 216: [VOLT 718 [WESWOOD 138.00]]
1.1295 0.21570
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]]
1.1434 0.51530
CHNL# 214: [VOLT 525 [GENESEE4 500.00]]
1.1416 0.51880

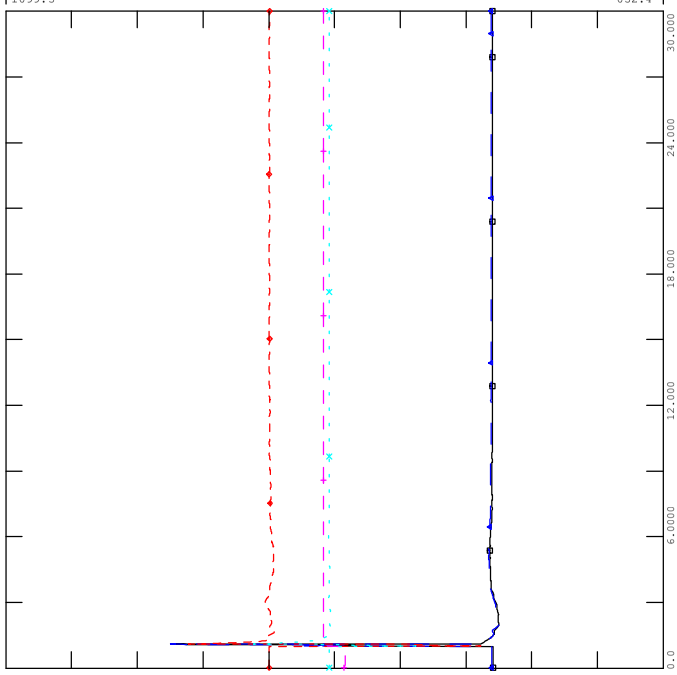


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_04_921L_LAMOUREUX

FILE: scn6_SP_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8_Q]
52.738 -53.43
CHNL# 234: [921L_Q]
40.000 -42.75
CHNL# 232: [NEWLINE_Q]
51.366 -92.62
CHNL# 230: [947L_Q]
960.22 -351.4
CHNL# 228: [915L_Q]
1699.3 -652.4

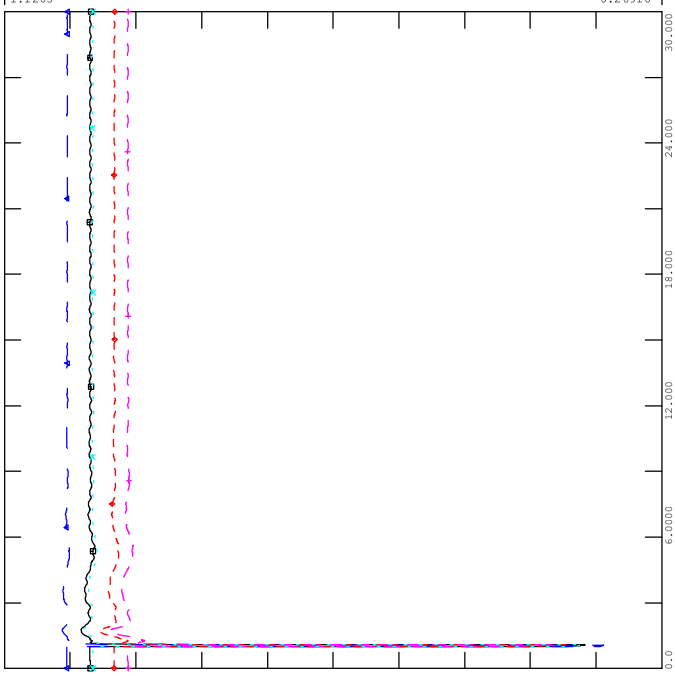


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_04_921L_LAMOUREUX

FILE: scn6_SP_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]]
1.1320 0.28800
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]]
1.1434 0.51530
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]]
1.1533 0.46060
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]]
1.1256 -0.0097
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]]
1.1265 0.26910

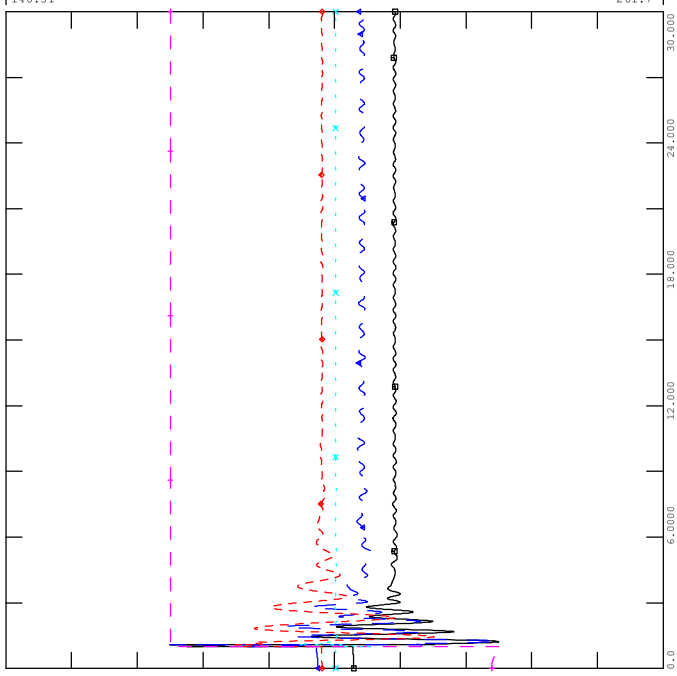


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_04_921L_LAMOUREUX

FILE: scn6_SP_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00 BRANCH P

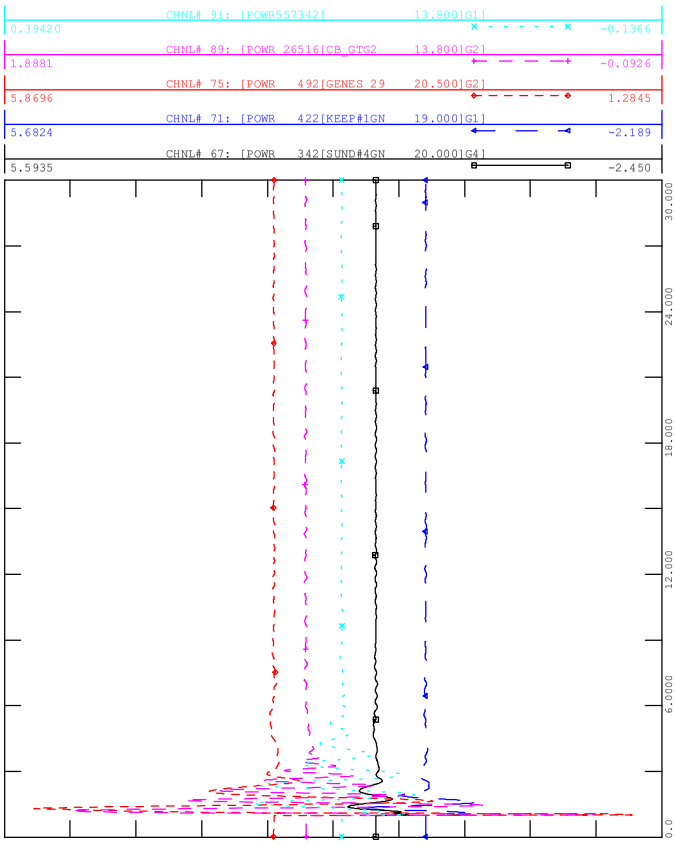
CHNL# 235: [T8_P]
59.298 -31.29
CHNL# 233: [921L_P]
186.00 -558.0
CHNL# 231: [NEWLINE_P]
35.195 -79.54
CHNL# 229: [947L_P]
127.93 -45.61
CHNL# 227: [915L_P]
140.31 -261.7



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_05_947L_CLOVERBAR

FILE: scn6_SP_05_947L_CloverBar.out

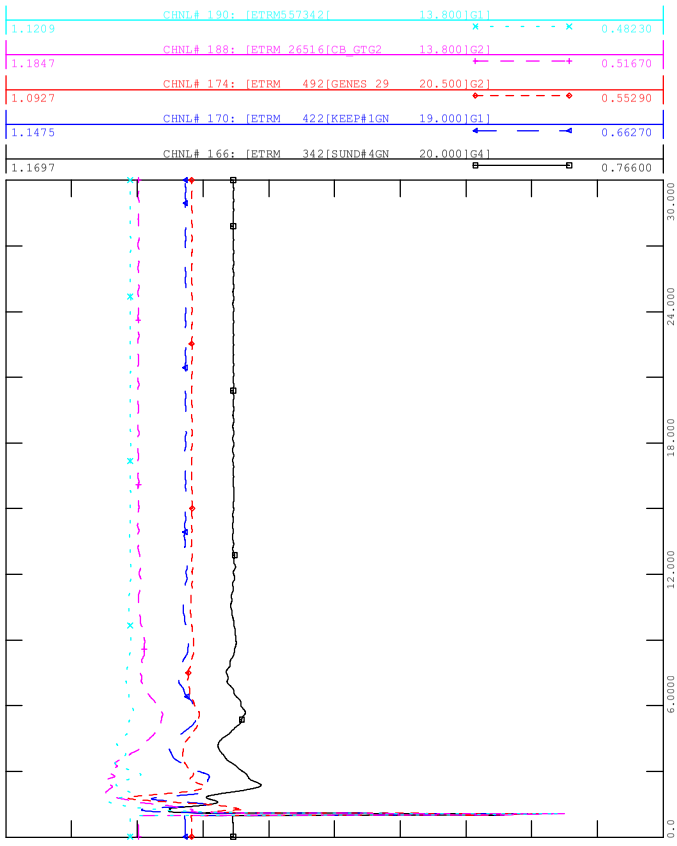
SAT, JUL 02 2022 15:00 ACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_05_947L_CLOVERBAR

FILE: scn6_SP_05_947L_CloverBar.out

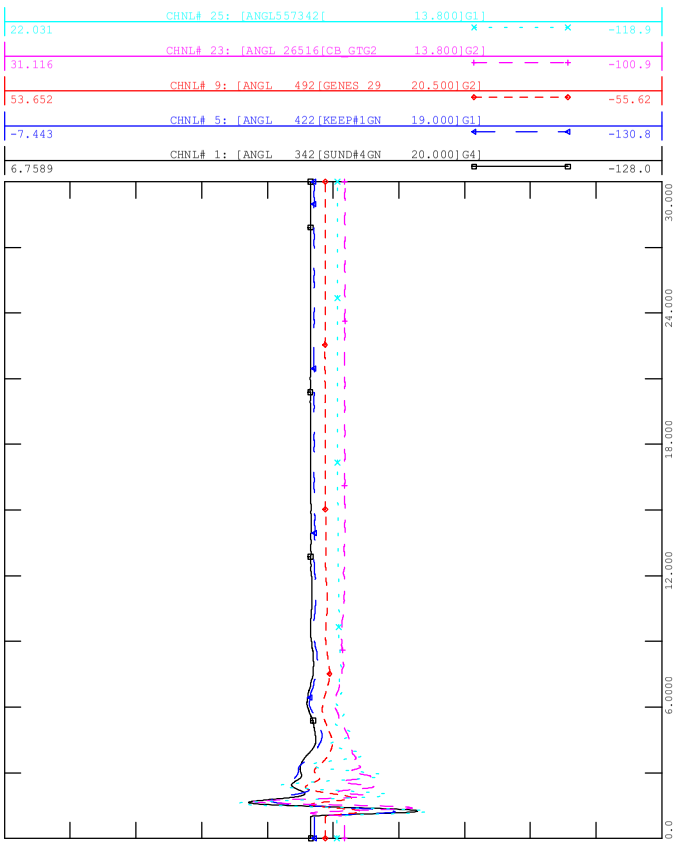
SAT, JUL 02 2022 15:00 TERMINAL VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_05_947L_CLOVERBAR

FILE: scn6_SP_05_947L_CloverBar.out

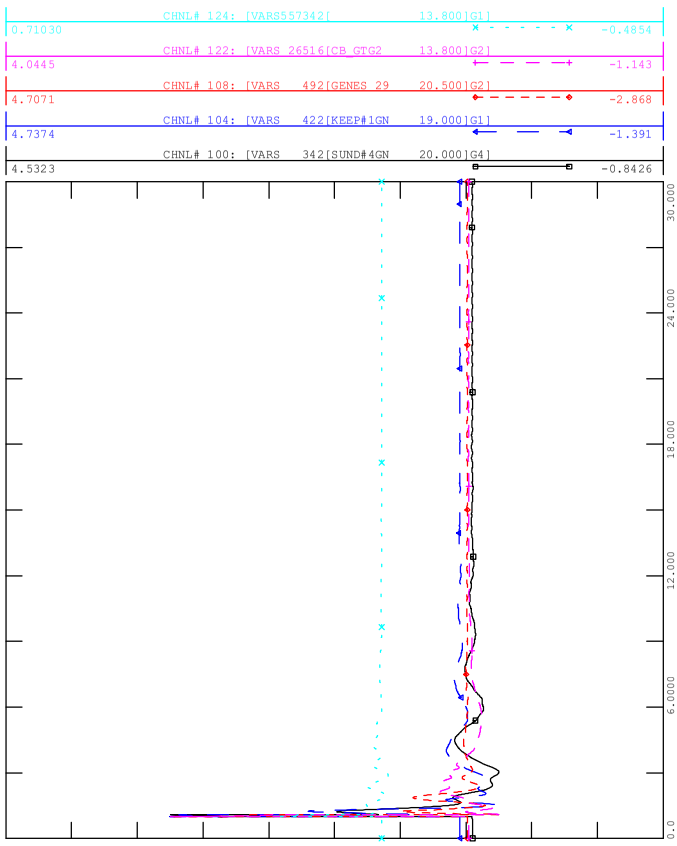
SAT, JUL 02 2022 15:00 ROTOR ANGLE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_05_947L_CLOVERBAR

FILE: scn6_SP_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00 REACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_05_947L_CLOVERBAR

FILE: scn6_SP_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1351 -0.0828
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1328 0.24340
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1345 0.29390
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1542 0.46580
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1525 0.47610

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_05_947L_CLOVERBAR

FILE: scn6_SP_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8 Q] 59.429 -59.47
CHNL# 234: [921L Q] 1084.3 -385.1
CHNL# 232: [NEWLINE Q] 63.261 -61.06
CHNL# 230: [947L Q] 40.000 -48.93
CHNL# 228: [915L Q] 1237.5 -854.0

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_05_947L_CLOVERBAR

FILE: scn6_SP_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1348 -0.0902
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1542 0.46580
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1621 0.38520
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1319 0.24610
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1311 0.19360

TIME (SECONDS)

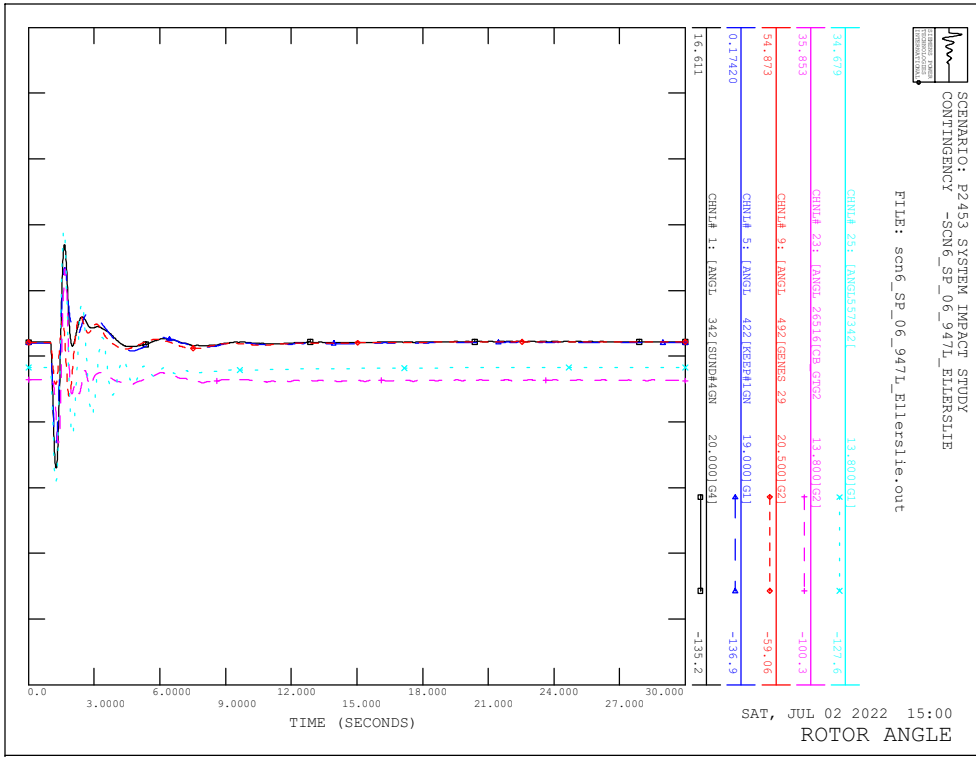
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_05_947L_CLOVERBAR

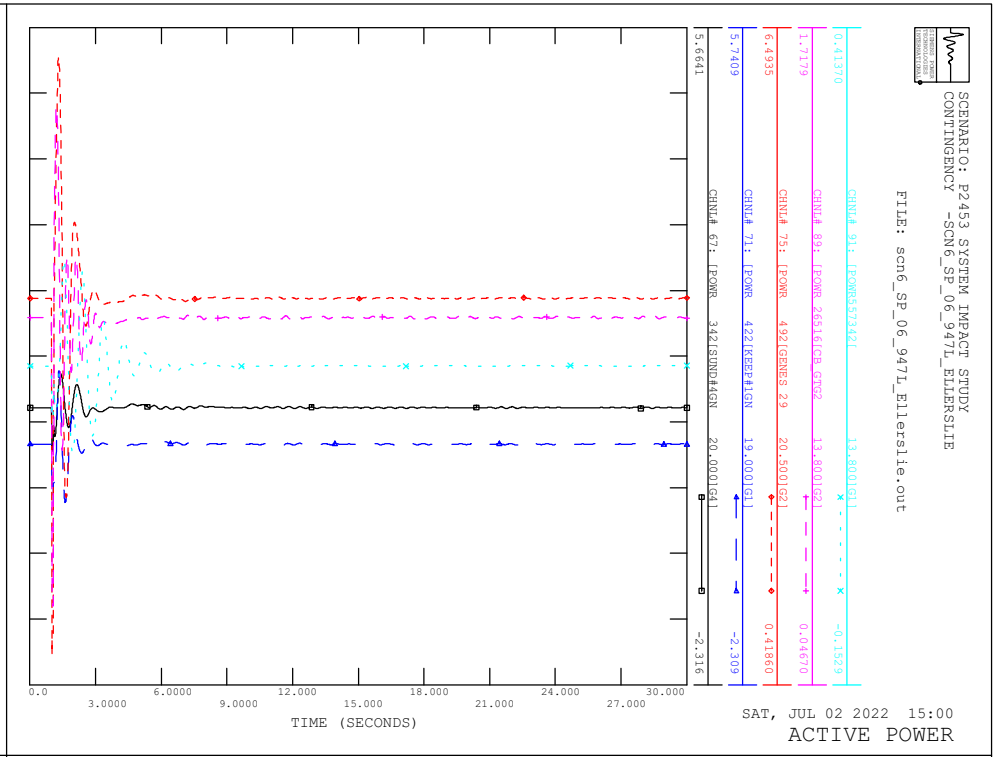
FILE: scn6_SP_05_947L_CloverBar.out

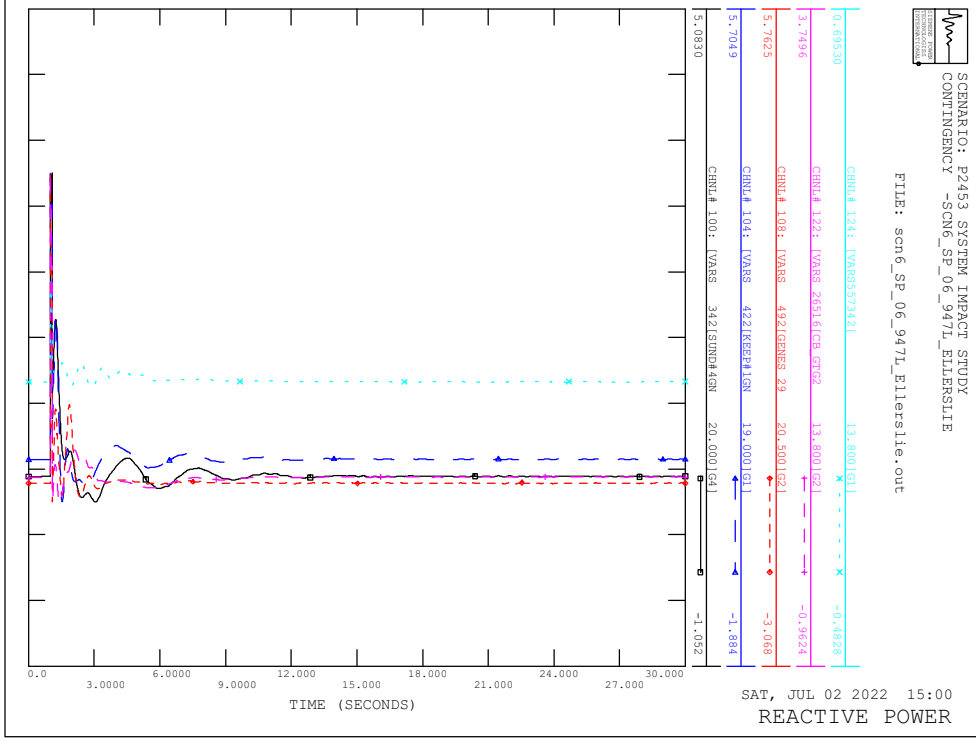
SAT, JUL 02 2022 15:00 BRANCH P

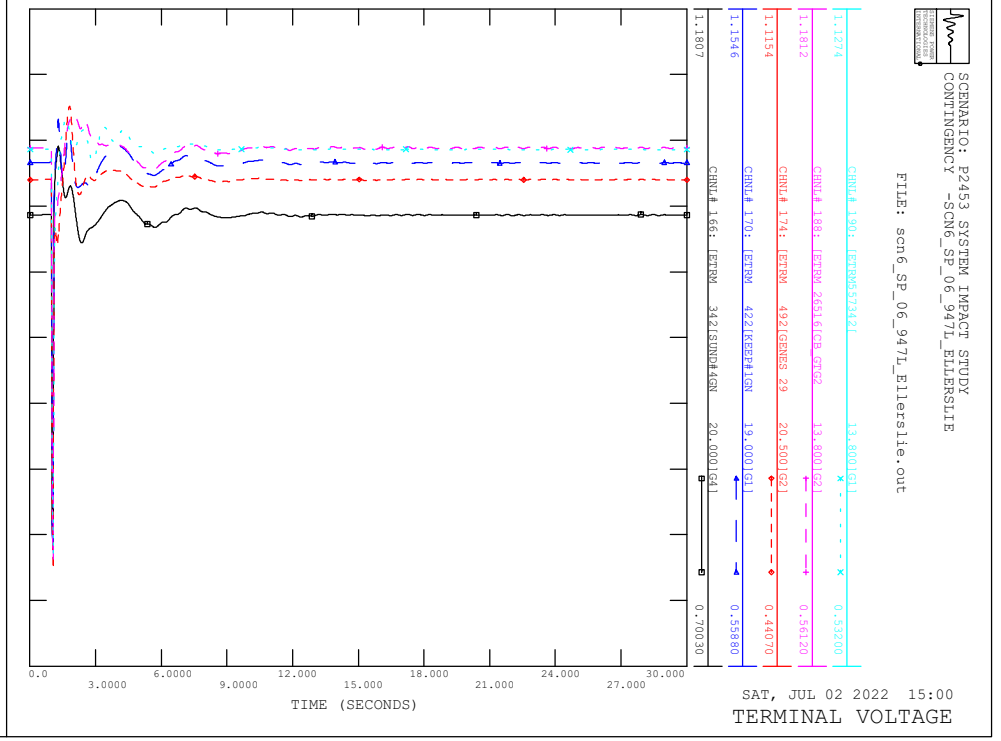
CHNL# 235: [T8 P] 61.577 -34.51
CHNL# 233: [921L P] 131.94 -144.6
CHNL# 231: [NEWLINE P] 39.811 -87.48
CHNL# 229: [947L P] 86.466 -40.00
CHNL# 227: [915L P] 202.53 -262.2

TIME (SECONDS)


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_06_947L_ELLERSLIE
FILE: scn6_SP_06_947L_Ellerslie.out
TIME (SECONDS)
SAT, JUL 02 2022 15:00
ROTOR ANGLE


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_06_947L_ELLERSLIE
FILE: scn6_SP_06_947L_Ellerslie.out
TIME (SECONDS)
SAT, JUL 02 2022 15:00
ACTIVE POWER


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_06_947L_ELLERSLIE
FILE: scn6_SP_06_947L_Ellerslie.out
TIME (SECONDS)
SAT, JUL 02 2022 15:00
REACTIVE POWER

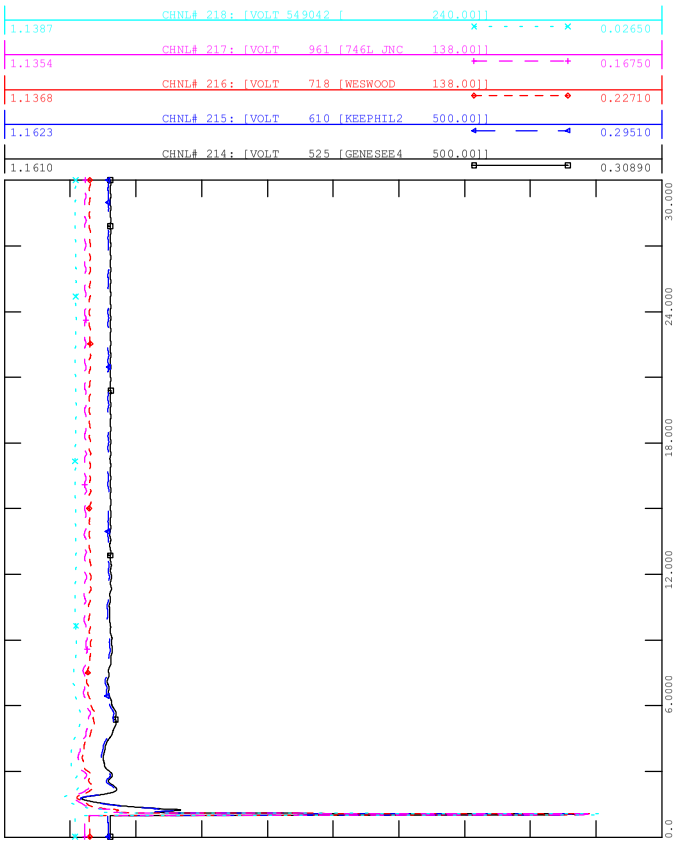

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_06_947L_ELLERSLIE
FILE: scn6_SP_06_947L_Ellerslie.out
TIME (SECONDS)
SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_06_947L_ELLERSLIE

FILE: scn6_SP_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

BUS VOLTAGE

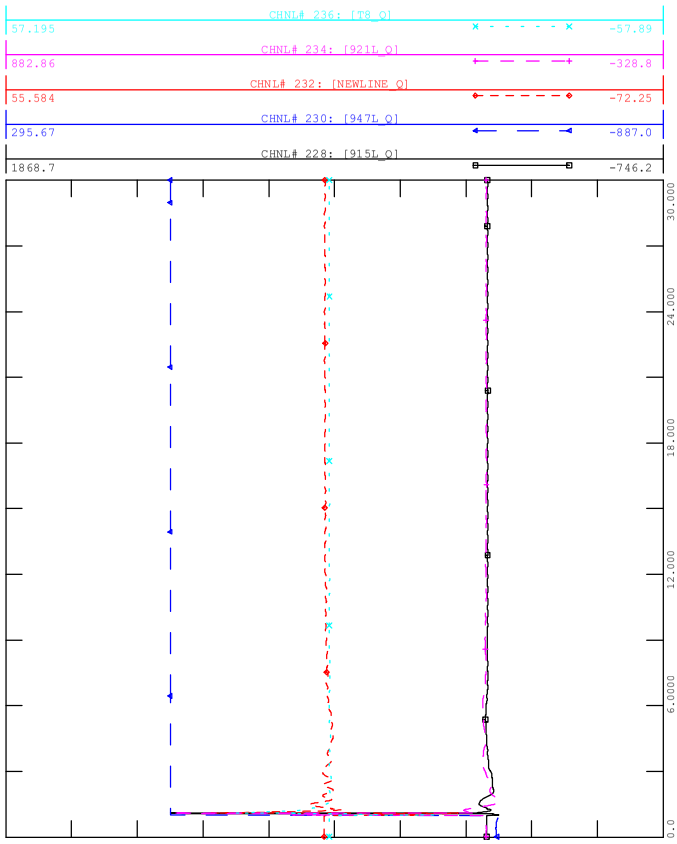


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_06_947L_ELLERSLIE

FILE: scn6_SP_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

BRANCH Q

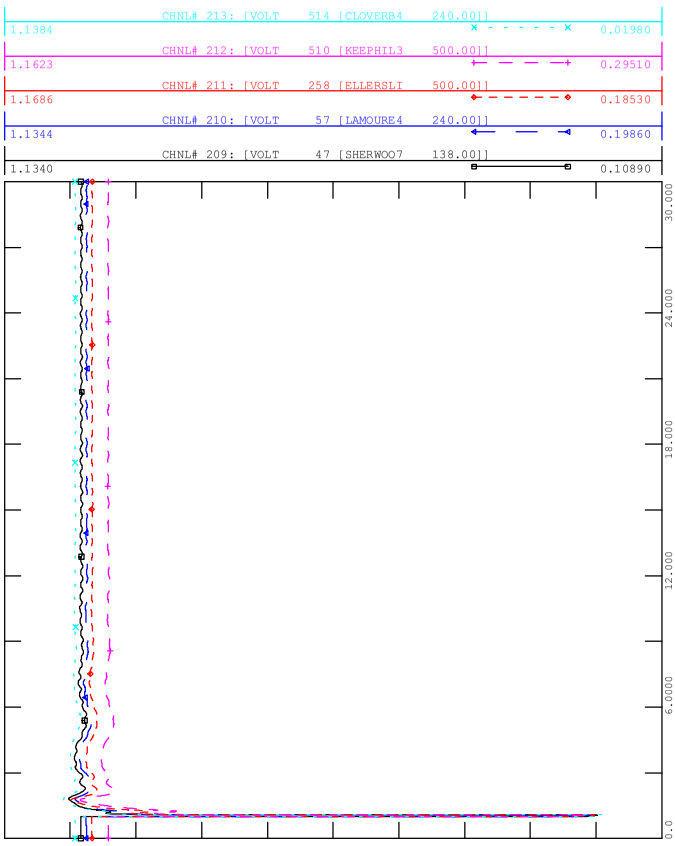


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_06_947L_ELLERSLIE

FILE: scn6_SP_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

BUS VOLTAGE

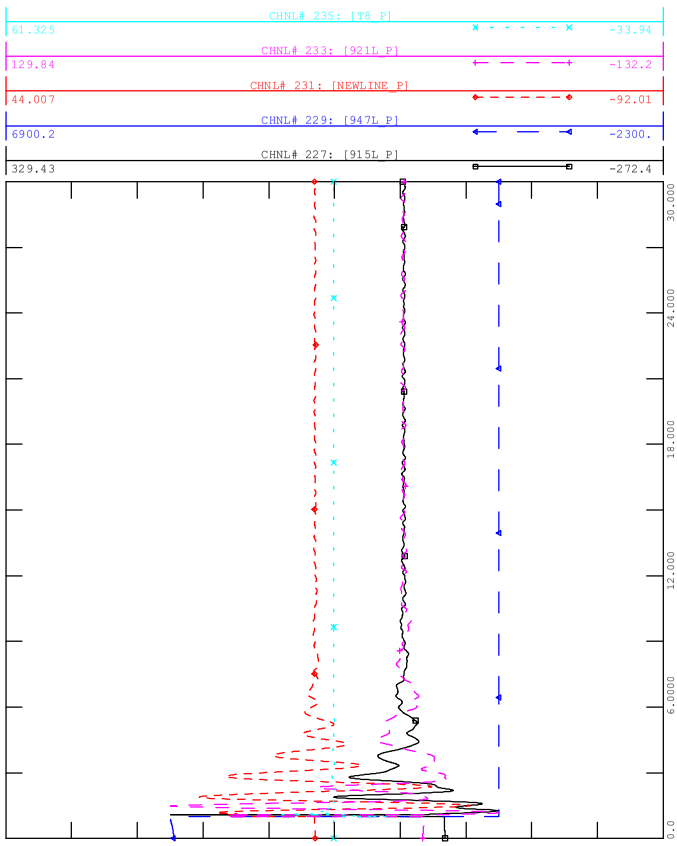


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_06_947L_ELLERSLIE

FILE: scn6_SP_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

BRANCH P

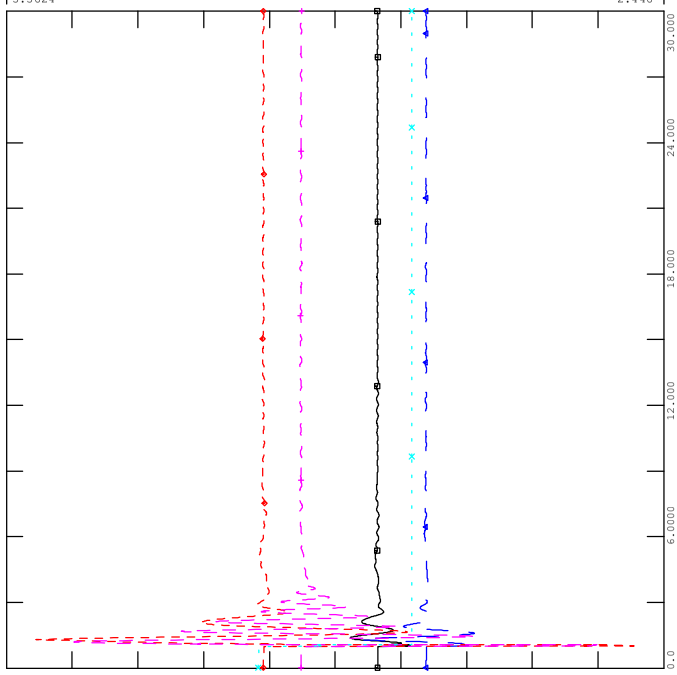


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_07_NL_CLOVERBAR

FILE: scn6_SP_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00
ACTIVE POWER

CHNL# 91: [POWR557342[13.800]G1]
0.32200 -0.2000
CHNL# 89: [POWR 26516[CB_GTG2 13.800]G2]
1.8593 -0.1020
CHNL# 75: [POWR 492[GENES 29 20.500]G2]
5.7295 1.2821
CHNL# 71: [POWR 422[KEEP#1GN 19.000]G1]
5.6366 -2.191
CHNL# 67: [POWR 342[SUND#4GN 20.000]G4]
5.5824 -2.448

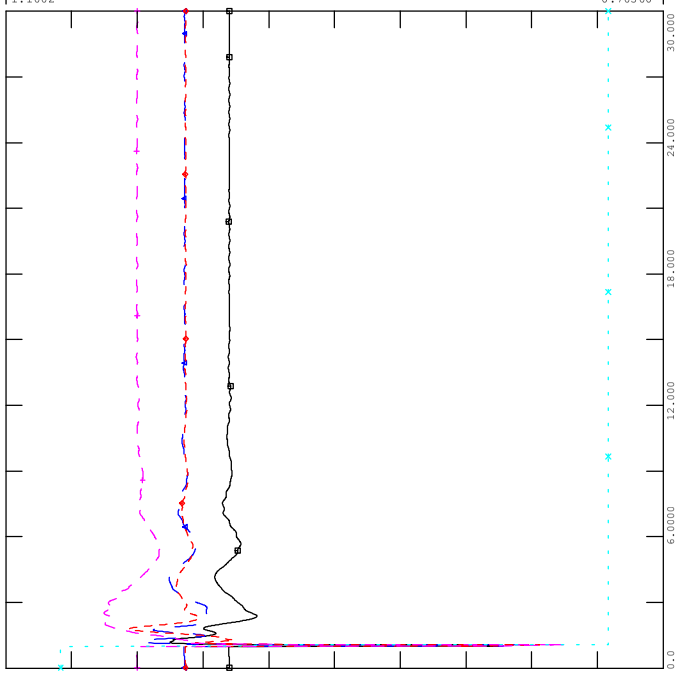


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_07_NL_CLOVERBAR

FILE: scn6_SP_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE

CHNL# 190: [ETRM557342[13.800]G1]
1.1003 -0.1000
CHNL# 188: [ETRM 26516[CB_GTG2 13.800]G2]
1.1836 0.51440
CHNL# 174: [ETRM 492[GENES 29 20.500]G2]
1.0859 0.55230
CHNL# 170: [ETRM 422[KEEP#1GN 19.000]G1]
1.1468 0.66210
CHNL# 166: [ETRM 342[SUND#4GN 20.000]G4]
1.1662 0.76560

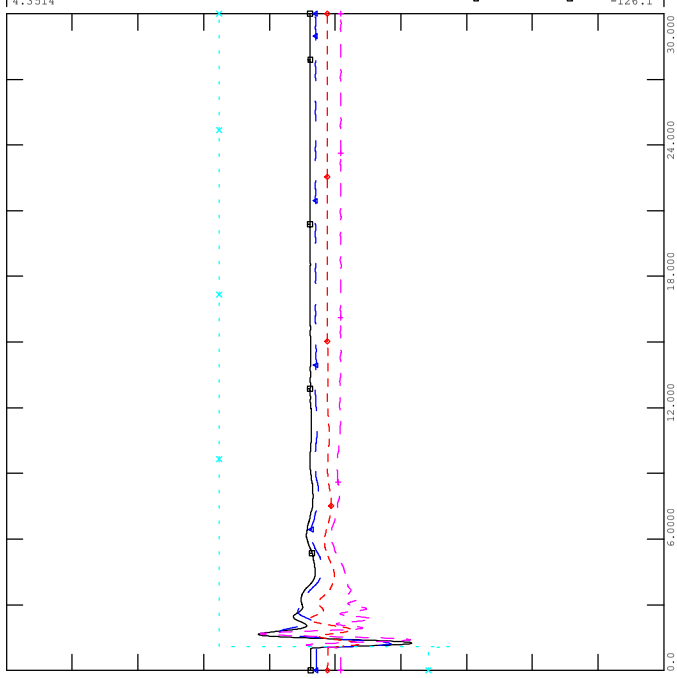


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_07_NL_CLOVERBAR

FILE: scn6_SP_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00
ROTOR ANGLE

CHNL# 25: [ANGL557342[13.800]G1]
50.000 -104.6
CHNL# 23: [ANGL 26516[CB_GTG2 13.800]G2]
28.785 -100.9
CHNL# 9: [ANGL 492[GENES 29 20.500]G2]
53.254 -55.15
CHNL# 5: [ANGL 422[KEEP#1GN 19.000]G1]
-8.787 -129.3
CHNL# 1: [ANGL 342[SUND#4GN 20.000]G4]
4.3514 -126.1

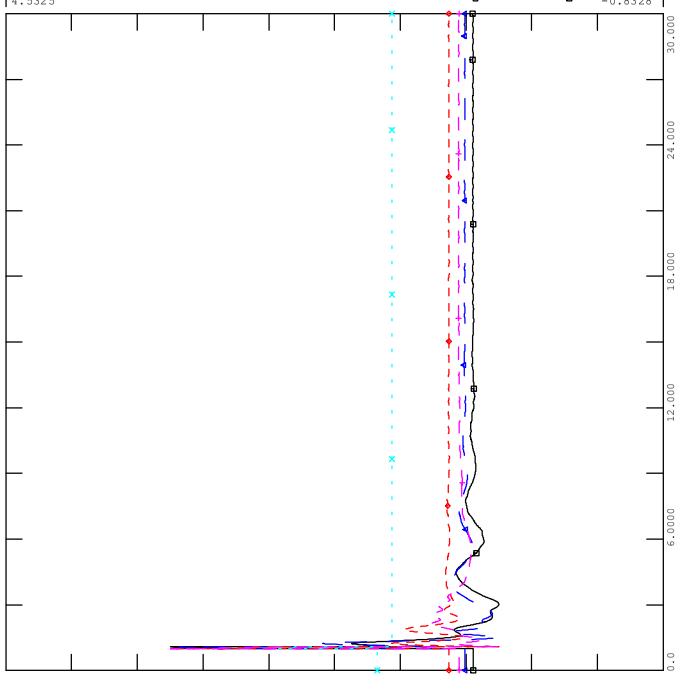


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_07_NL_CLOVERBAR

FILE: scn6_SP_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00
REACTIVE POWER

CHNL# 124: [VARS557342[13.800]G1]
0.71160 -0.5000
CHNL# 122: [VARS 26516[CB_GTG2 13.800]G2]
4.0997 -1.277
CHNL# 108: [VARS 492[GENES 29 20.500]G2]
4.8398 -3.244
CHNL# 104: [VARS 422[KEEP#1GN 19.000]G1]
4.7181 -1.316
CHNL# 100: [VARS 342[SUND#4GN 20.000]G4]
4.5325 -0.8328



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_07_NL_CLOVERBAR

FILE: scn6_SP_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1192 -0.1000
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1314 0.24060
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1330 0.29130
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1505 0.46480
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1487 0.47520

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_07_NL_CLOVERBAR

FILE: scn6_SP_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8 Q] 40.805 -59.59
CHNL# 234: [921L Q] 1084.5 -382.9
CHNL# 232: [NEWLINE Q] 286.13 -858.4
CHNL# 230: [947L Q] 960.60 -346.0
CHNL# 228: [915L Q] 1099.0 -444.3

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_07_NL_CLOVERBAR

FILE: scn6_SP_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1332 -0.0962
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1505 0.46480
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1589 0.38410
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1304 0.24300
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1297 0.19080

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_07_NL_CLOVERBAR

FILE: scn6_SP_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH P

CHNL# 235: [T8 P] 53.828 -40.00
CHNL# 233: [921L P] 129.88 -142.5
CHNL# 231: [NEWLINE P] 1001.4 -3004.
CHNL# 229: [947L P] 149.07 -41.42
CHNL# 227: [915L P] 197.71 -259.9

TIME (SECONDS)

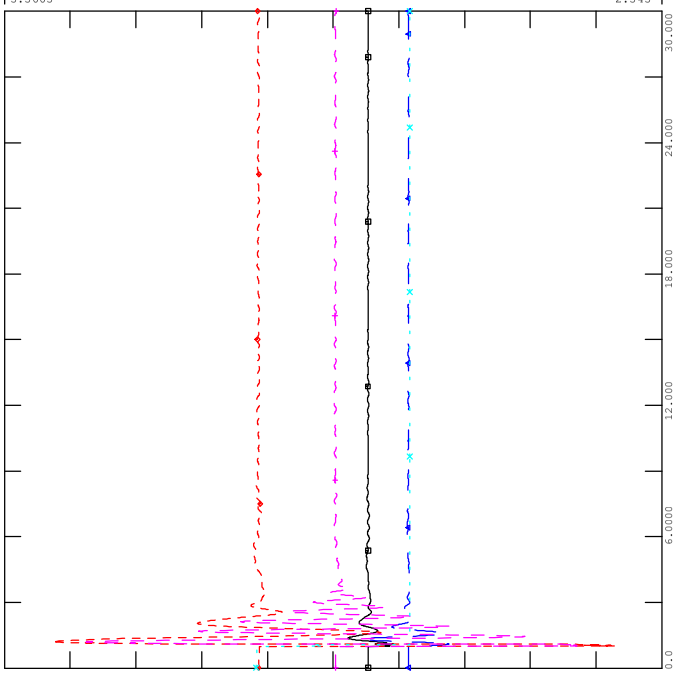
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_08_NL_H2PLNAT

FILE: scn6_SP_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

CHNL# 91: [POWR557342[13.800]G1]
0.32200 -0.2000
CHNL# 89: [POWR 26516[CB_GTG2 13.800]G2]
1.7909 0.18070
CHNL# 75: [POWR 492[GENES 29 20.500]G2]
5.0623 2.2919
CHNL# 71: [POWR 422[KEEP#1GN 19.000]G1]
5.4109 -2.352
CHNL# 67: [POWR 342[SUND#4GN 20.000]G4]
5.5005 -2.545



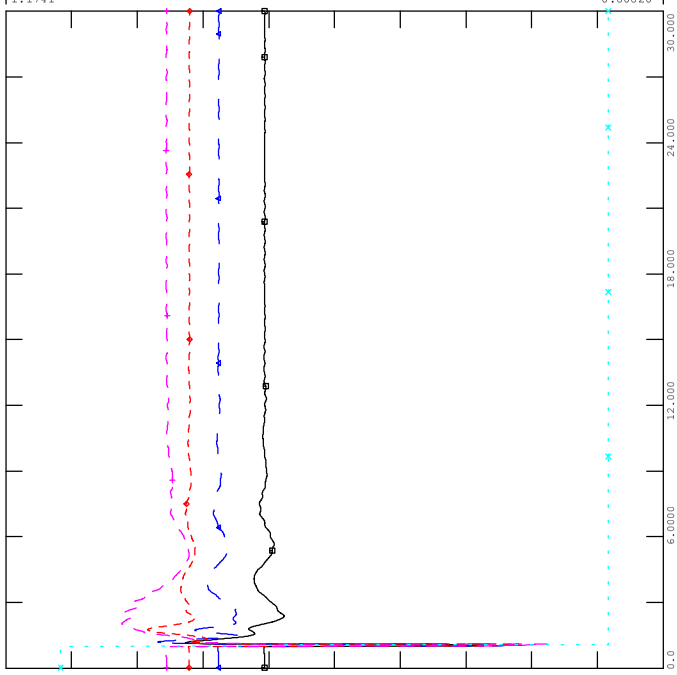
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_08_NL_H2PLNAT

FILE: scn6_SP_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

CHNL# 190: [ETRM557342[13.800]G1]
1.1003 -0.1000
CHNL# 188: [ETRM 26516[CB_GTG2 13.800]G2]
1.1889 0.62070
CHNL# 174: [ETRM 492[GENES 29 20.500]G2]
1.0694 0.60580
CHNL# 170: [ETRM 422[KEEP#1GN 19.000]G1]
1.1554 0.72200
CHNL# 166: [ETRM 342[SUND#4GN 20.000]G4]
1.1741 0.80820



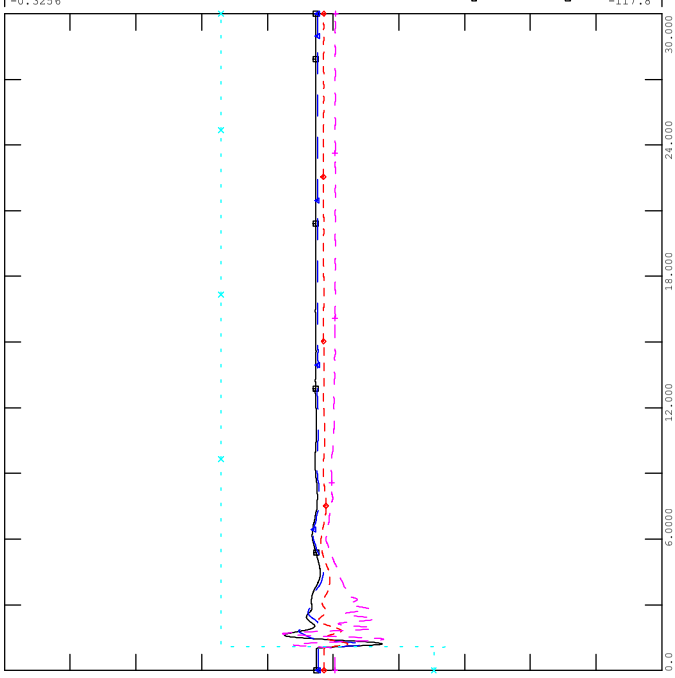
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_08_NL_H2PLNAT

FILE: scn6_SP_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

CHNL# 25: [ANGL557342[13.800]G1]
50.000 -102.0
CHNL# 23: [ANGL 26516[CB_GTG2 13.800]G2]
22.381 -95.99
CHNL# 9: [ANGL 492[GENES 29 20.500]G2]
51.147 -53.49
CHNL# 5: [ANGL 422[KEEP#1GN 19.000]G1]
-12.24 -124.0
CHNL# 1: [ANGL 342[SUND#4GN 20.000]G4]
-0.3256 -117.8



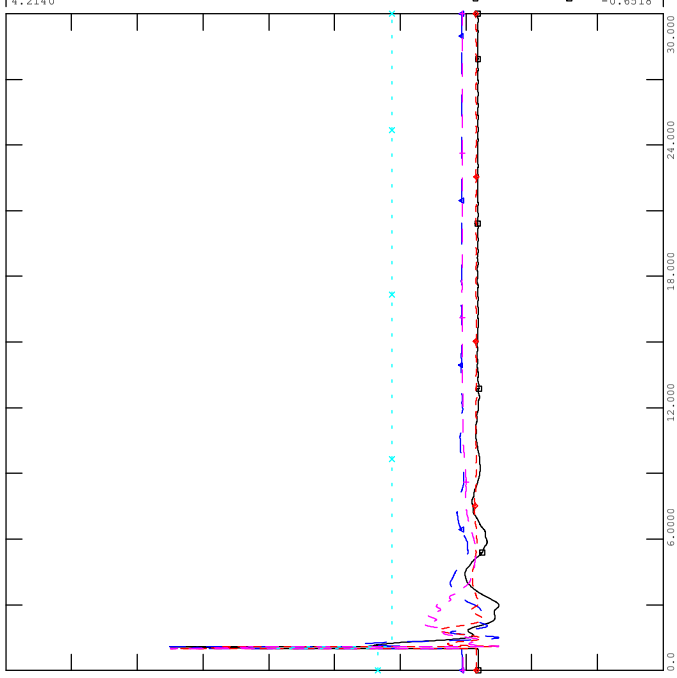
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_08_NL_H2PLNAT

FILE: scn6_SP_08_NL_H2Plnat.out

SAT, JUL 02 2022 15:00

REACTIVE POWER

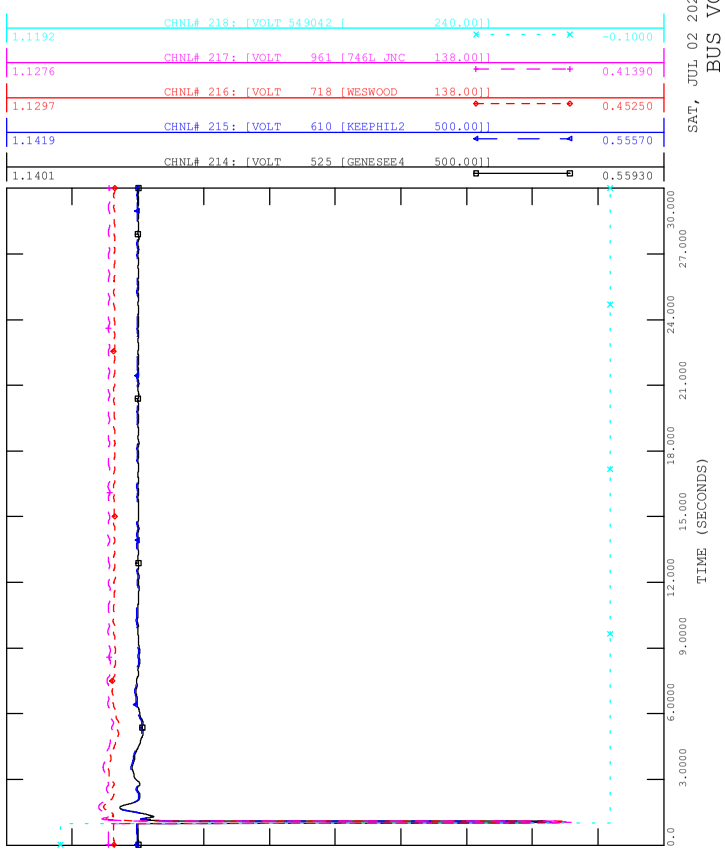
CHNL# 124: [VARS557342[13.800]G1]
0.71280 -0.5000
CHNL# 122: [VARS 26516[CB_GTG2 13.800]G2]
3.3869 -0.9220
CHNL# 108: [VARS 492[GENES 29 20.500]G2]
3.5096 -2.246
CHNL# 104: [VARS 422[KEEP#1GN 19.000]G1]
4.1586 -1.108
CHNL# 100: [VARS 342[SUND#4GN 20.000]G4]
4.2140 -0.6518



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_08_NL_H2PLNAT

FILE: scn6_SP_08_NL_H2Plnat.out

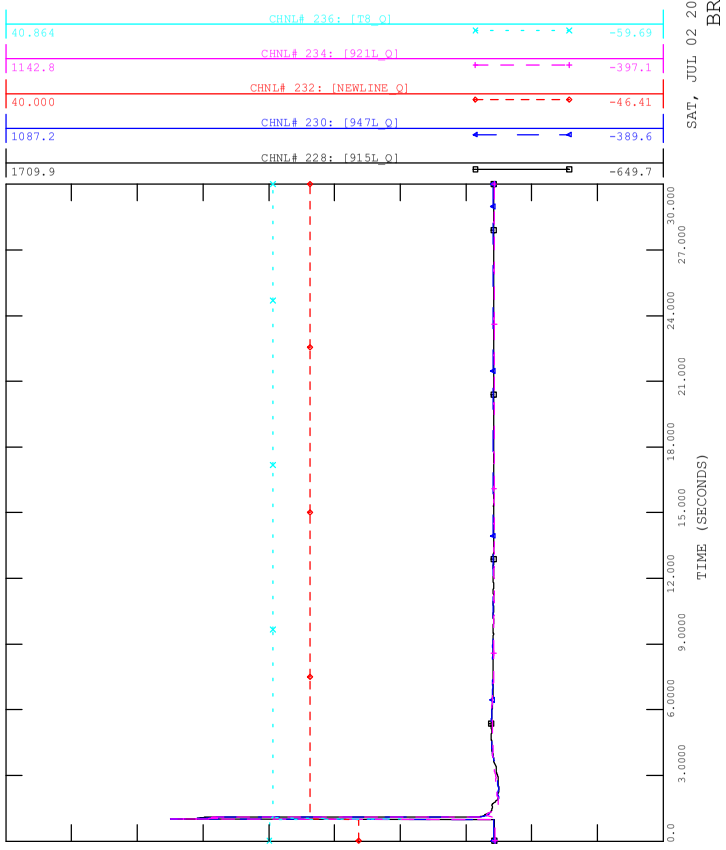
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_08_NL_H2PLNAT

FILE: scn6_SP_08_NL_H2Plnat.out

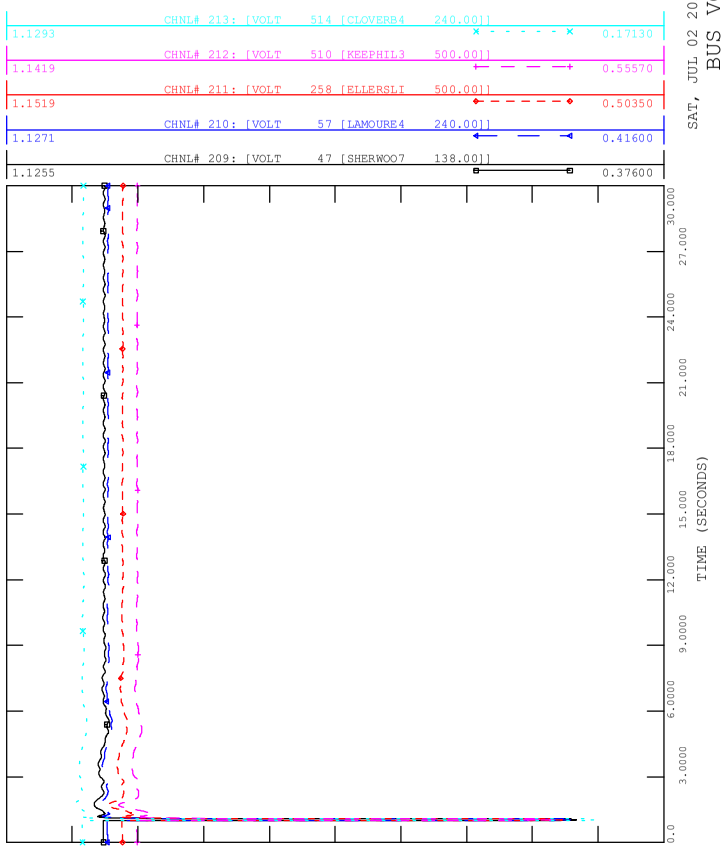
SAT, JUL 02 2022 15:00 BRANCH Q



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_08_NL_H2PLNAT

FILE: scn6_SP_08_NL_H2Plnat.out

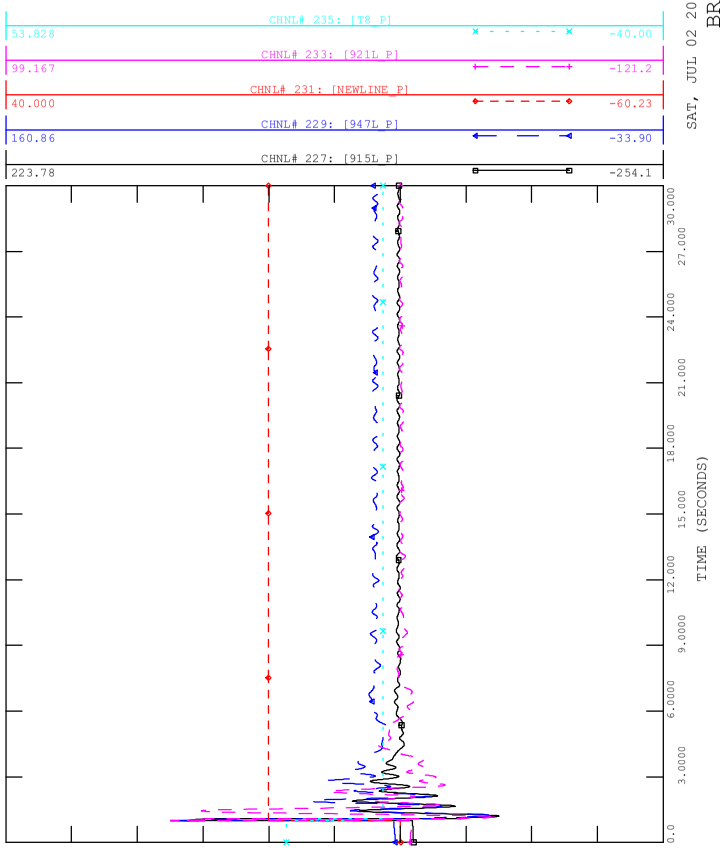
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_08_NL_H2PLNAT

FILE: scn6_SP_08_NL_H2Plnat.out

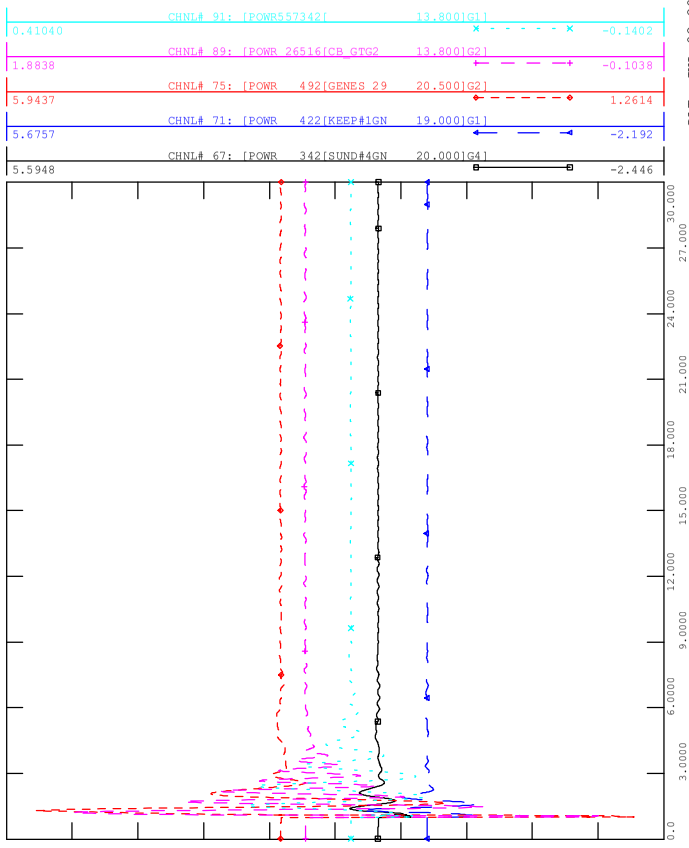
SAT, JUL 02 2022 15:00 BRANCH P



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_09_915L_947L_CLOVERBAR

FILE: scn6_SP_09_915L_947L_CloverBar.out

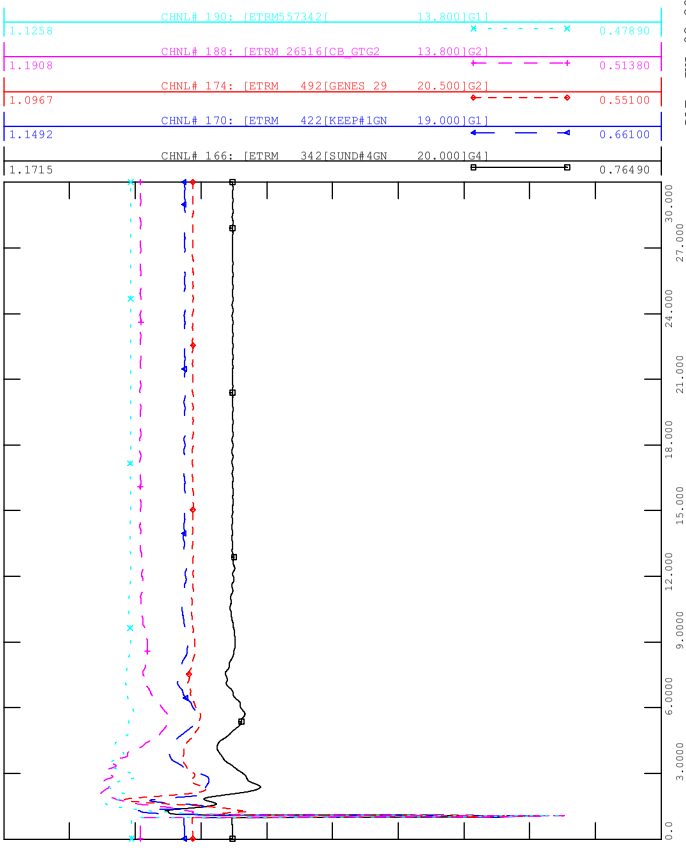
SAT, JUL 02 2022 15:00
ACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_09_915L_947L_CLOVERBAR

FILE: scn6_SP_09_915L_947L_CloverBar.out

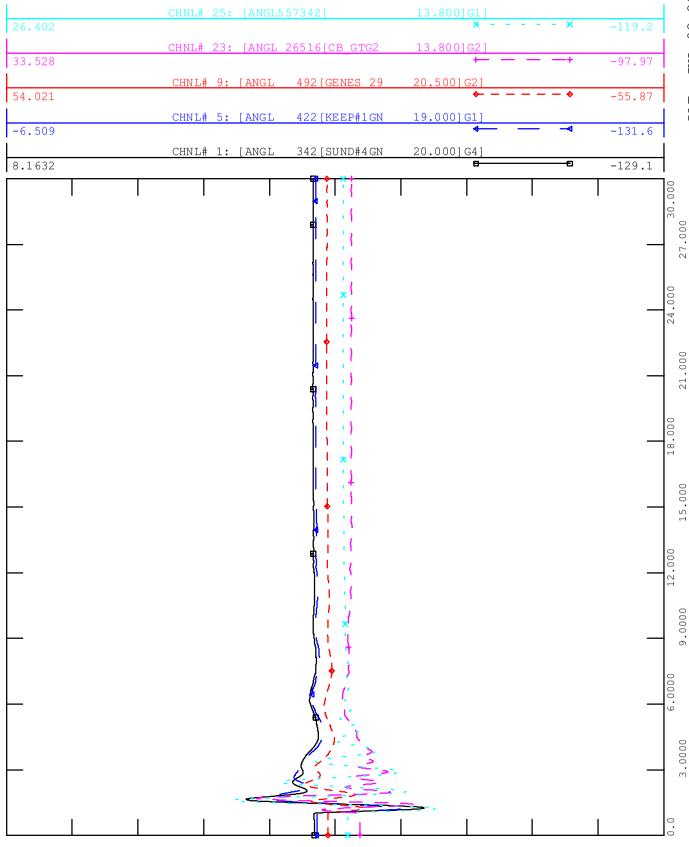
SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_09_915L_947L_CLOVERBAR

FILE: scn6_SP_09_915L_947L_CloverBar.out

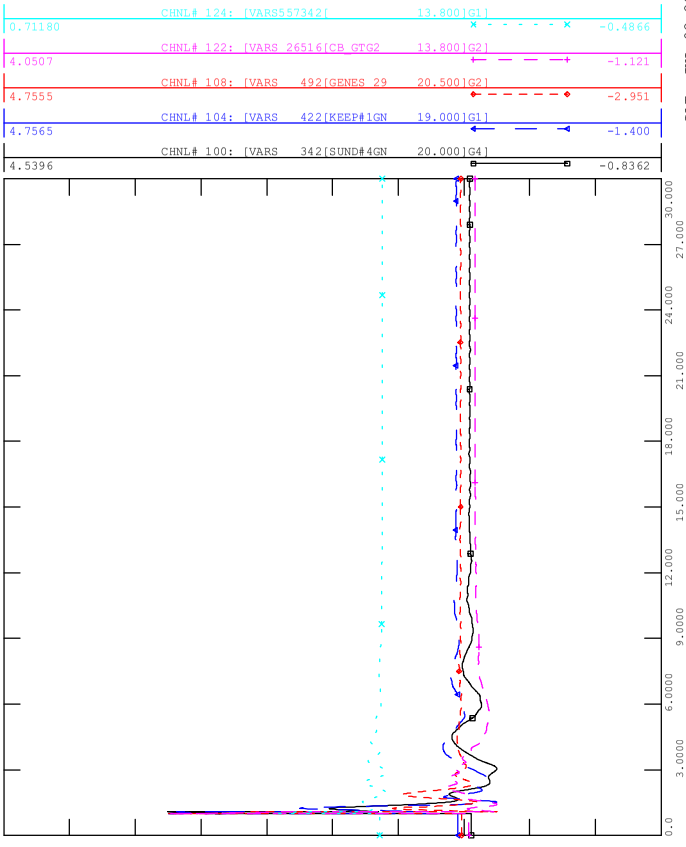
SAT, JUL 02 2022 15:00
ROTOR ANGLE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_09_915L_947L_CLOVERBAR

FILE: scn6_SP_09_915L_947L_CloverBar.out

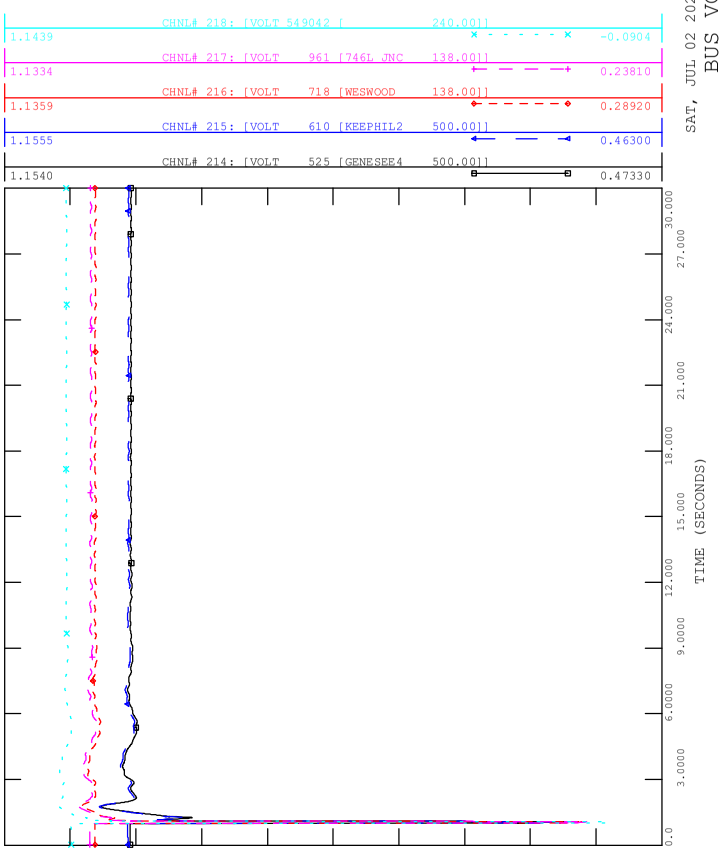
SAT, JUL 02 2022 15:00
REACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_09_915L_947L_CLOVERBAR

FILE: scn6_SP_09_915L_947L_CloverBar.out

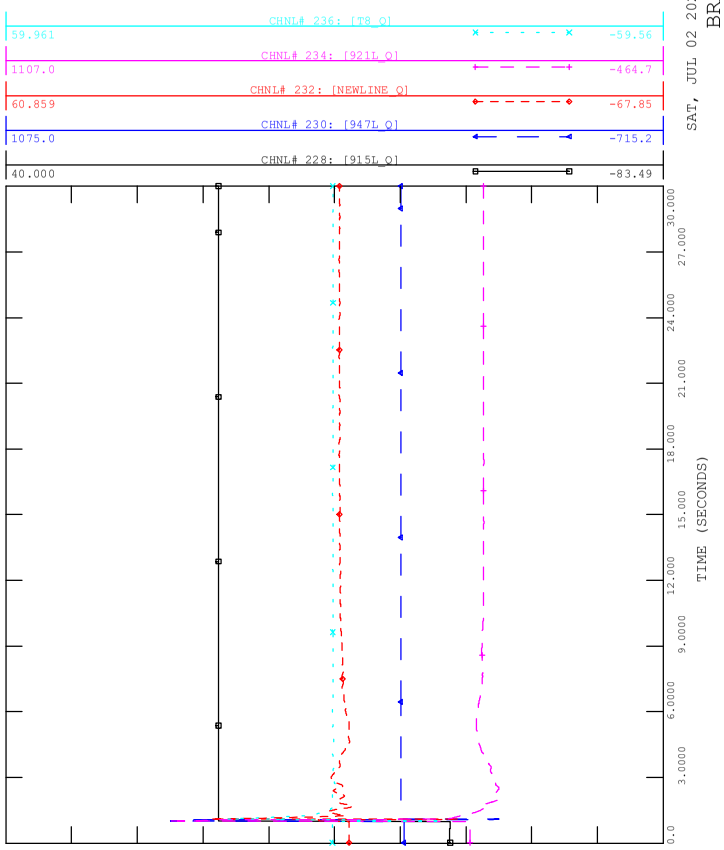
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_09_915L_947L_CLOVERBAR

FILE: scn6_SP_09_915L_947L_CloverBar.out

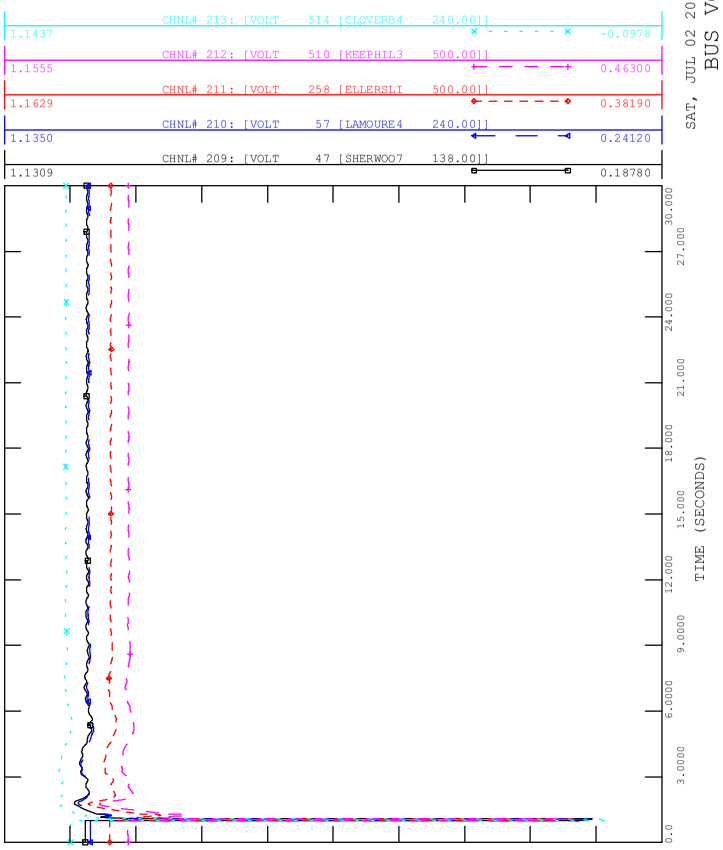
SAT, JUL 02 2022 15:00 BRANCH Q



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_09_915L_947L_CLOVERBAR

FILE: scn6_SP_09_915L_947L_CloverBar.out

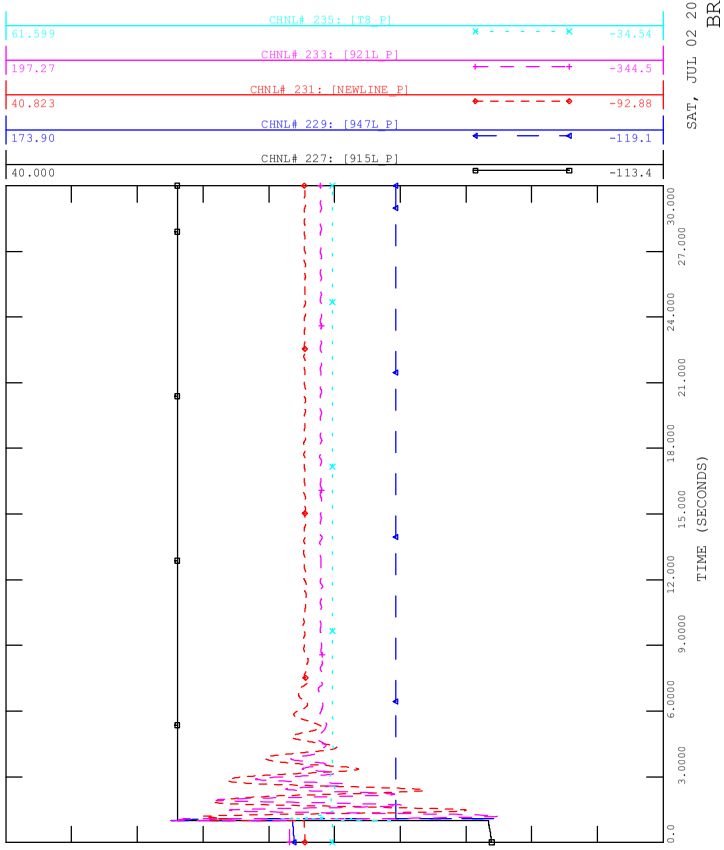
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN6_SP_09_915L_947L_CLOVERBAR

FILE: scn6_SP_09_915L_947L_CloverBar.out

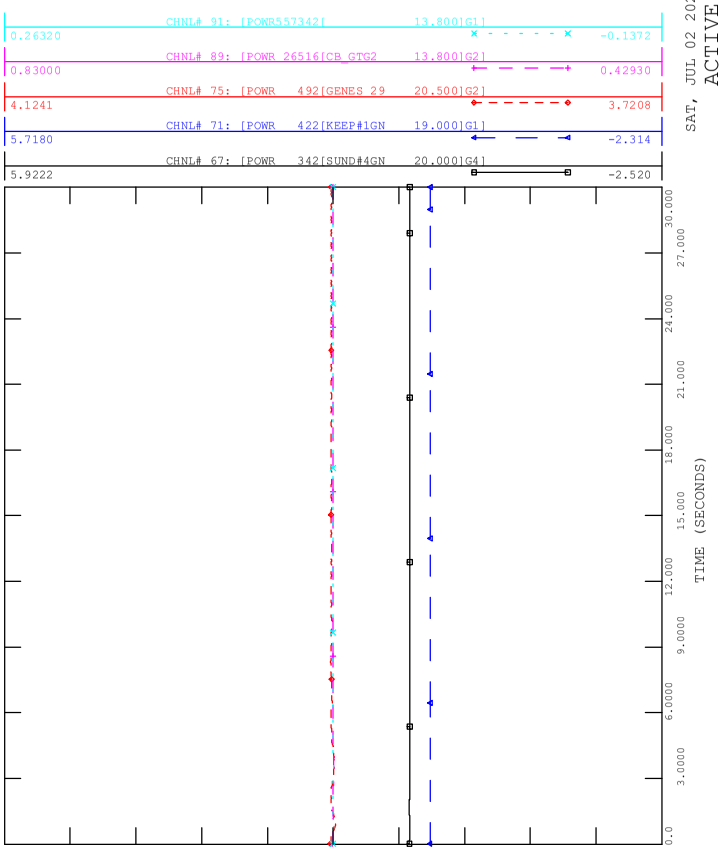
SAT, JUL 02 2022 15:00 BRANCH P



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_NOFAULT

FILE: scn5a_SL_nofault.out

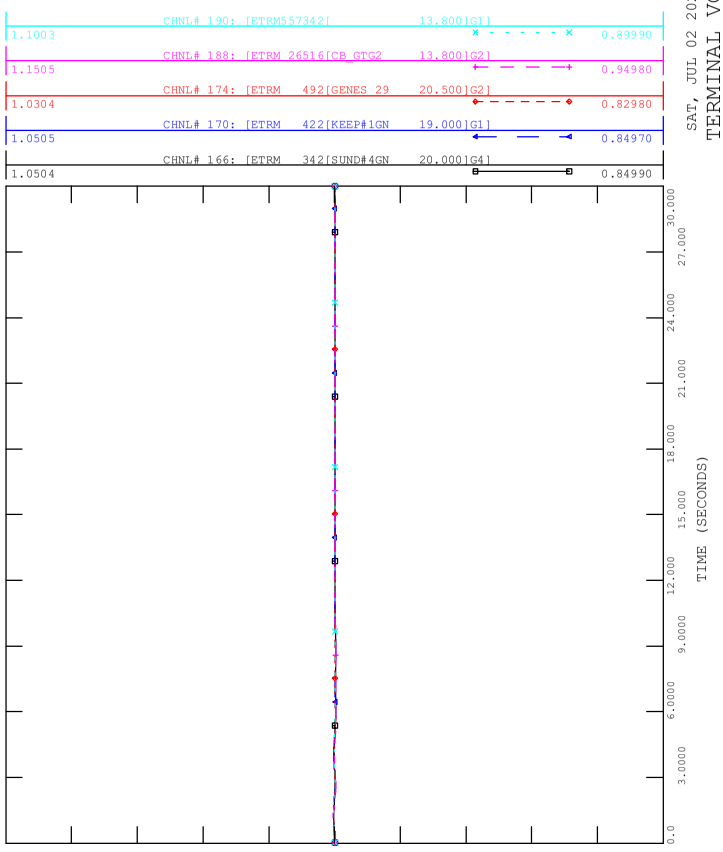
SAT, JUL 02 2022 15:00
ACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_NOFAULT

FILE: scn5a_SL_nofault.out

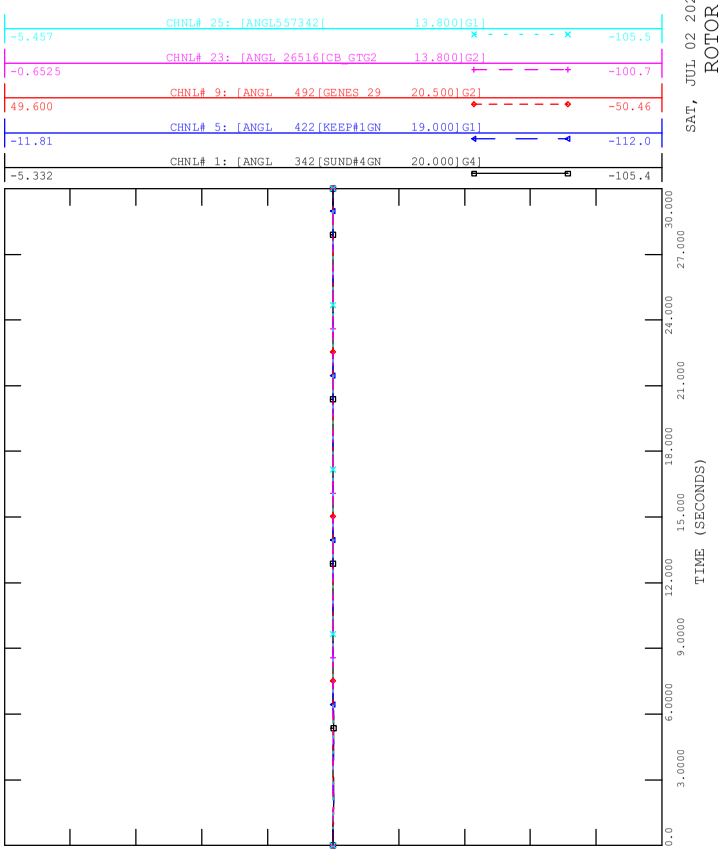
SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_NOFAULT

FILE: scn5a_SL_nofault.out

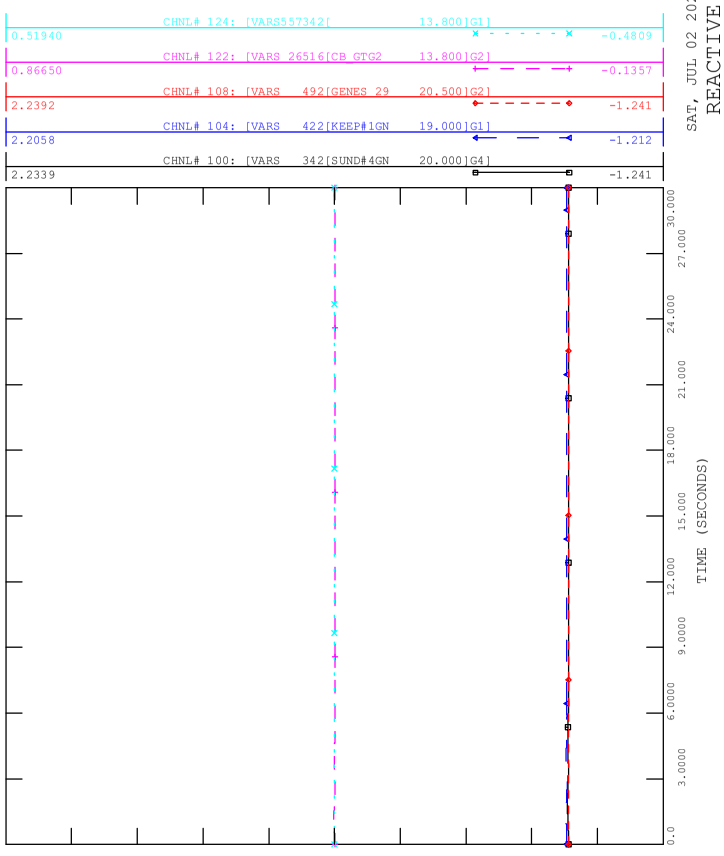
SAT, JUL 02 2022 15:00
ROTOR ANGLE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_NOFAULT

FILE: scn5a_SL_nofault.out

SAT, JUL 02 2022 15:00
REACTIVE POWER

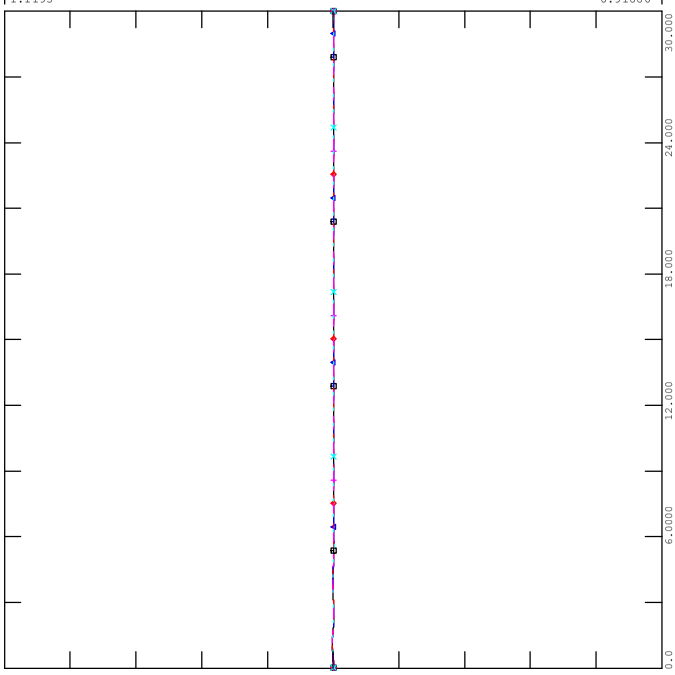


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_NOFAULT

FILE: scn5a_SL_nofault.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1354 0.93490
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1270 0.92650
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1286 0.92810
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1214 0.92100
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1193 0.91880

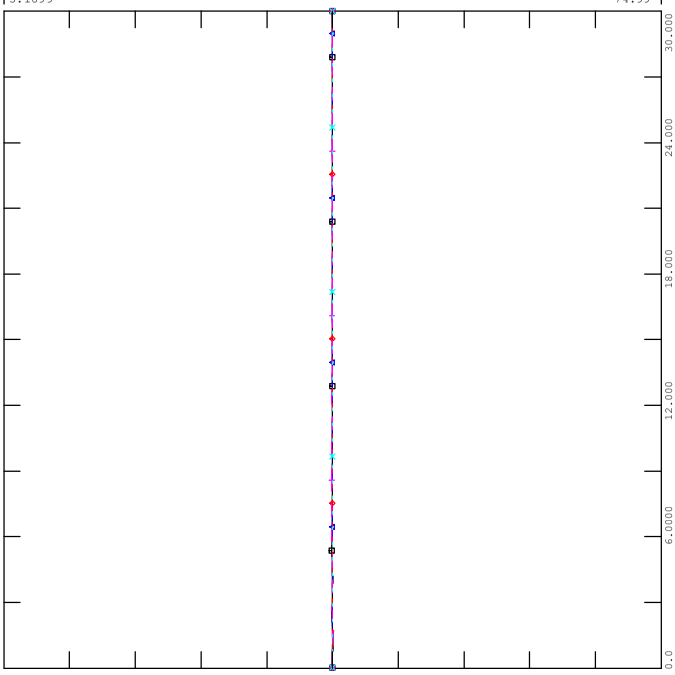


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_NOFAULT

FILE: scn5a_SL_nofault.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8 Q] 40.000 -40.00
CHNL# 234: [921L Q] 13.097 -67.10
CHNL# 232: [NEWLINE Q] 44.618 -35.41
CHNL# 230: [947L Q] 29.737 -50.36
CHNL# 228: [915L Q] 5.1899 -74.99

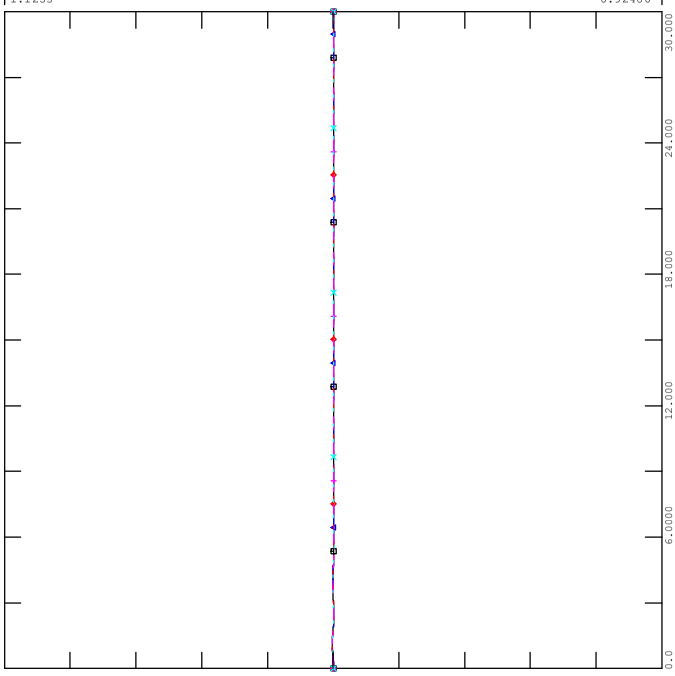


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_NOFAULT

FILE: scn5a_SL_nofault.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1354 0.93490
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1214 0.92100
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1386 0.93810
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1287 0.92820
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1253 0.92480

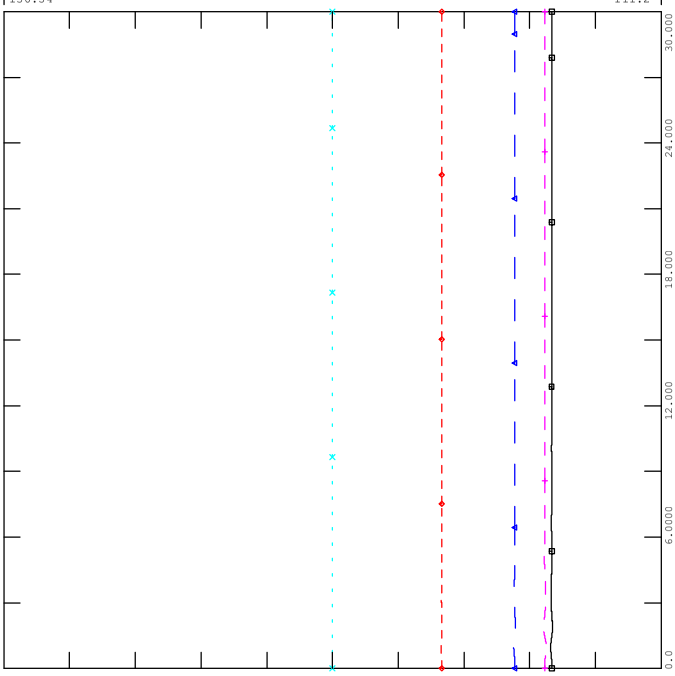


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_NOFAULT

FILE: scn5a_SL_nofault.out

SAT, JUL 02 2022 15:00 BRANCH P

CHNL# 235: [T8 P] 40.000 -40.00
CHNL# 233: [921L P] 73.923 -154.9
CHNL# 231: [NEWLINE P] 19.897 -100.0
CHNL# 229: [947L P] 167.76 -12.74
CHNL# 227: [915L P] 130.54 -111.2

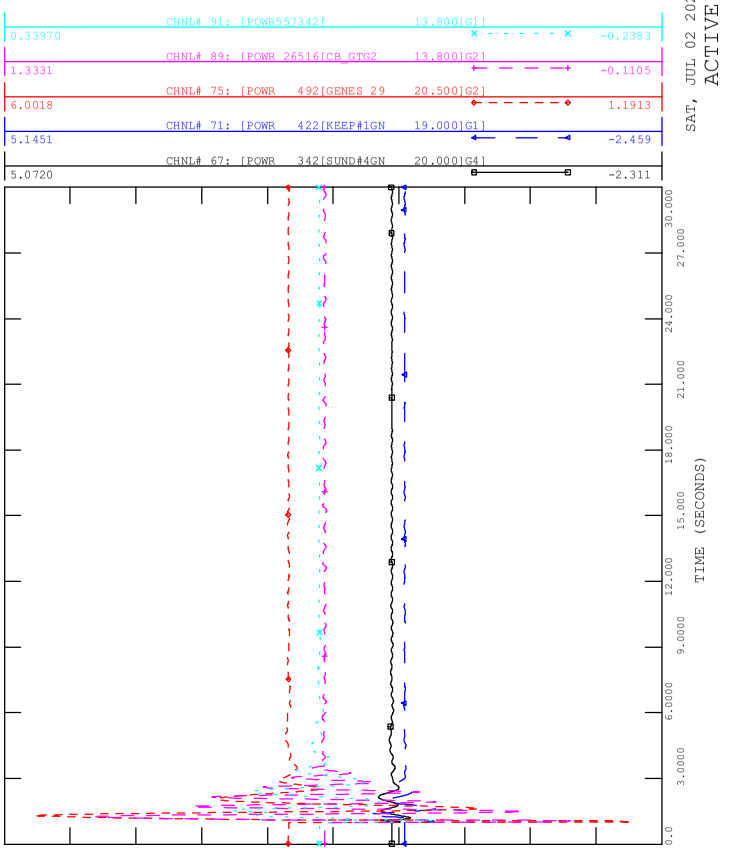


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_01_915L_EASTEDMONTON

FILE: scn5a_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

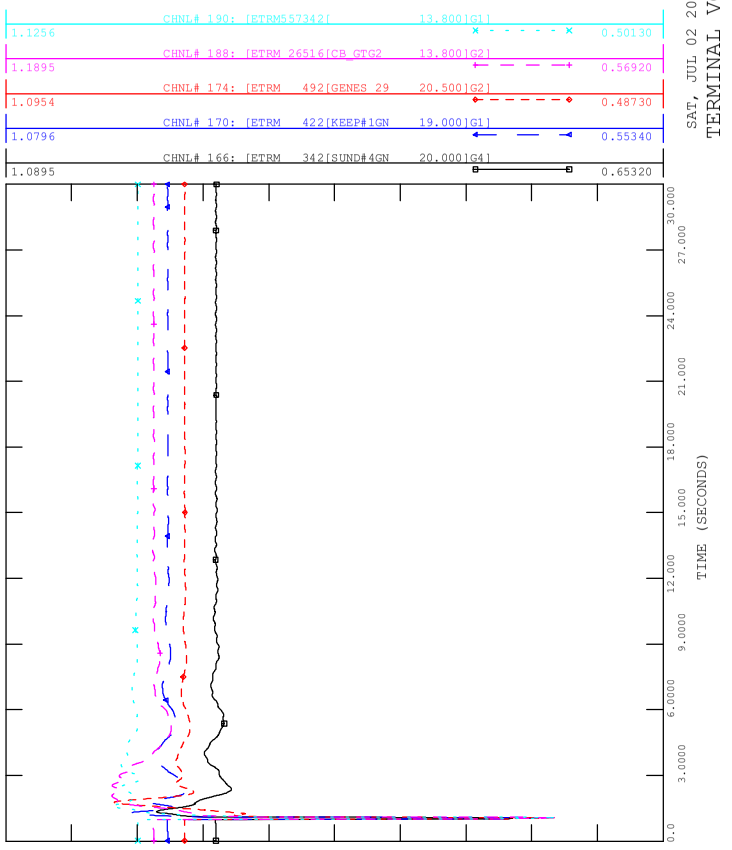


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_01_915L_EASTEDMONTON

FILE: scn5a_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

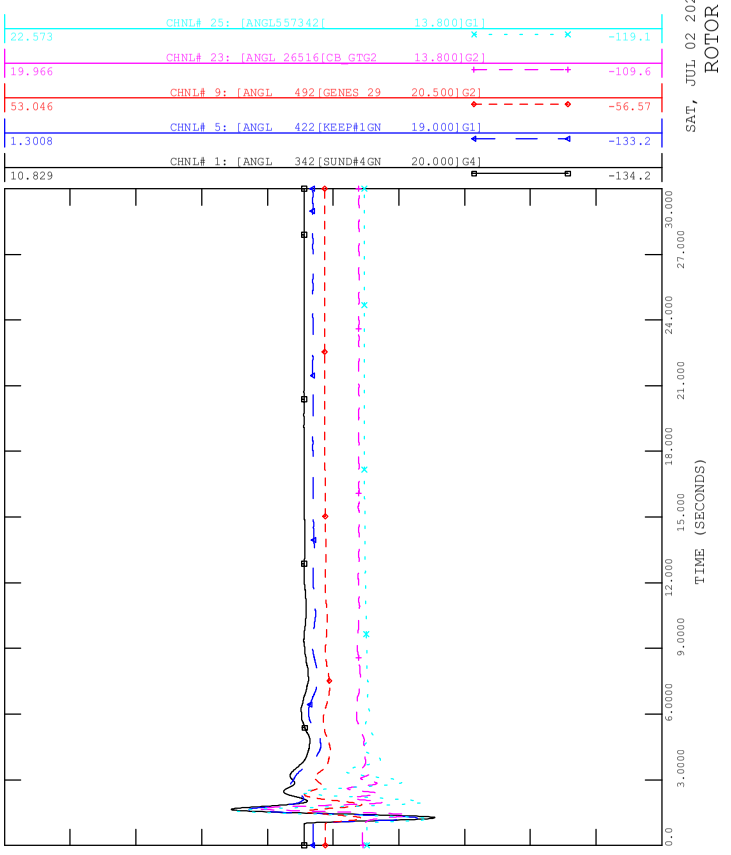


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_01_915L_EASTEDMONTON

FILE: scn5a_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

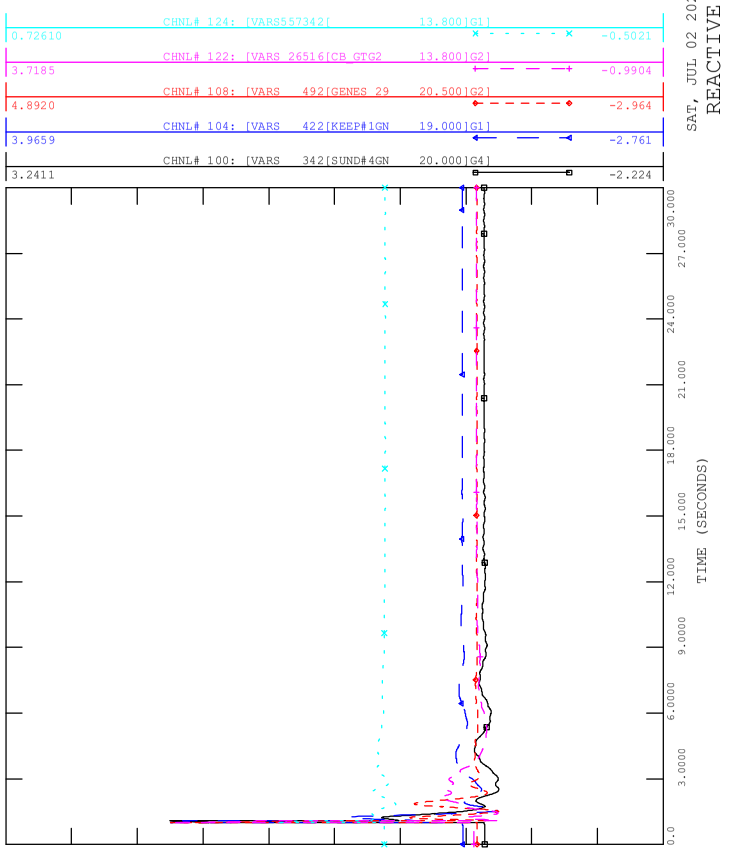


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_01_915L_EASTEDMONTON

FILE: scn5a_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00

REACTIVE POWER



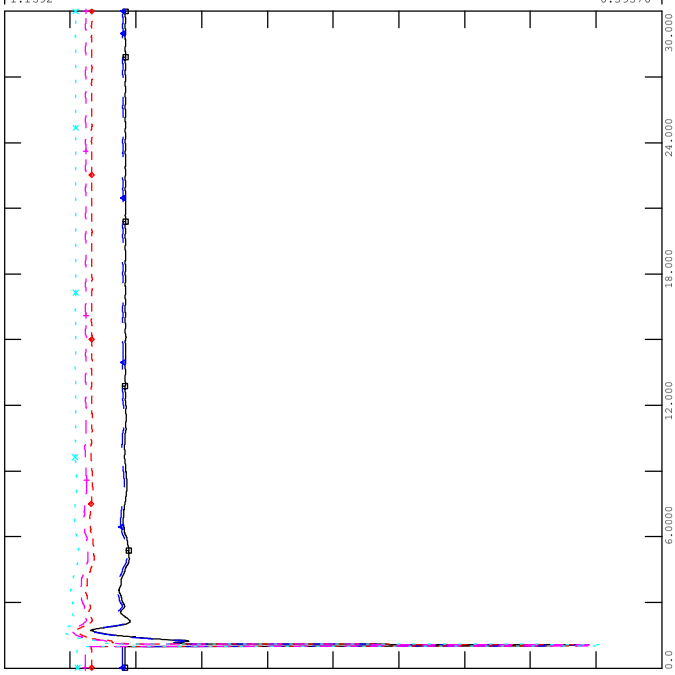
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_01_915L_EASTEDMONTON

FILE: scn5a_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1611 0.02500
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1478 0.16090
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1493 0.23560
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1604 0.38570
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1592 0.39570

TIME (SECONDS)



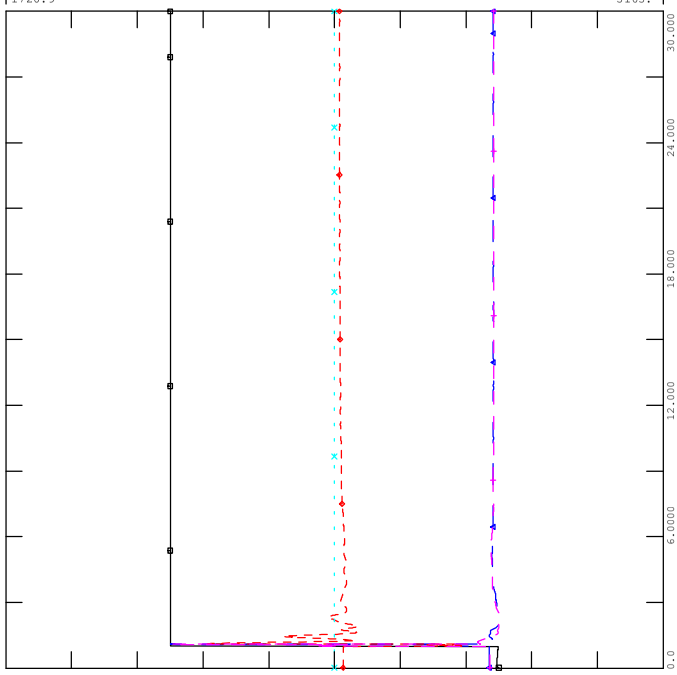
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_01_915L_EASTEDMONTON

FILE: scn5a_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8 Q] 40.000 -40.00
CHNL# 234: [921L Q] 1342.6 -517.0
CHNL# 232: [NEWLINE Q] 71.543 -58.94
CHNL# 230: [947L Q] 2179.6 -798.5
CHNL# 228: [915L Q] 1720.9 -5163.

TIME (SECONDS)



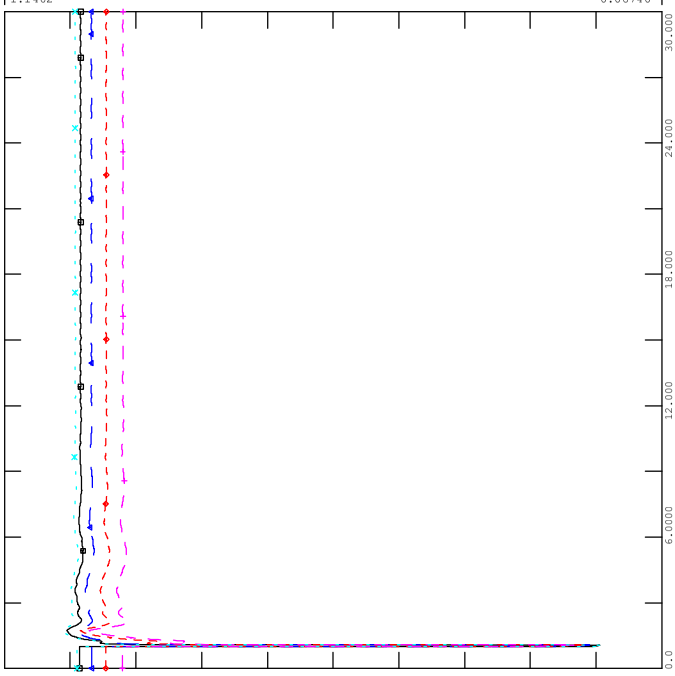
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_01_915L_EASTEDMONTON

FILE: scn5a_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1611 0.01970
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1604 0.38570
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1724 0.30340
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1499 0.23660
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1462 0.08740

TIME (SECONDS)



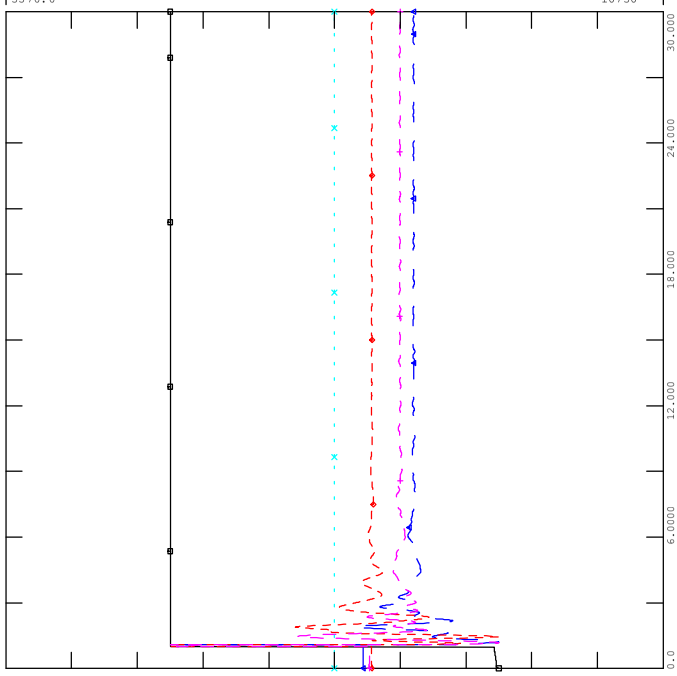
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_01_915L_EASTEDMONTON

FILE: scn5a_SL_01_915L_EastEdmonton.out

SAT, JUL 02 2022 15:00 BRANCH P

CHNL# 235: [T8 P] 40.000 -40.00
CHNL# 233: [921L P] 157.85 -334.6
CHNL# 231: [NEWLINE P] 33.684 -134.5
CHNL# 229: [947L P] 367.12 -257.6
CHNL# 227: [915L P] 3576.6 -10730

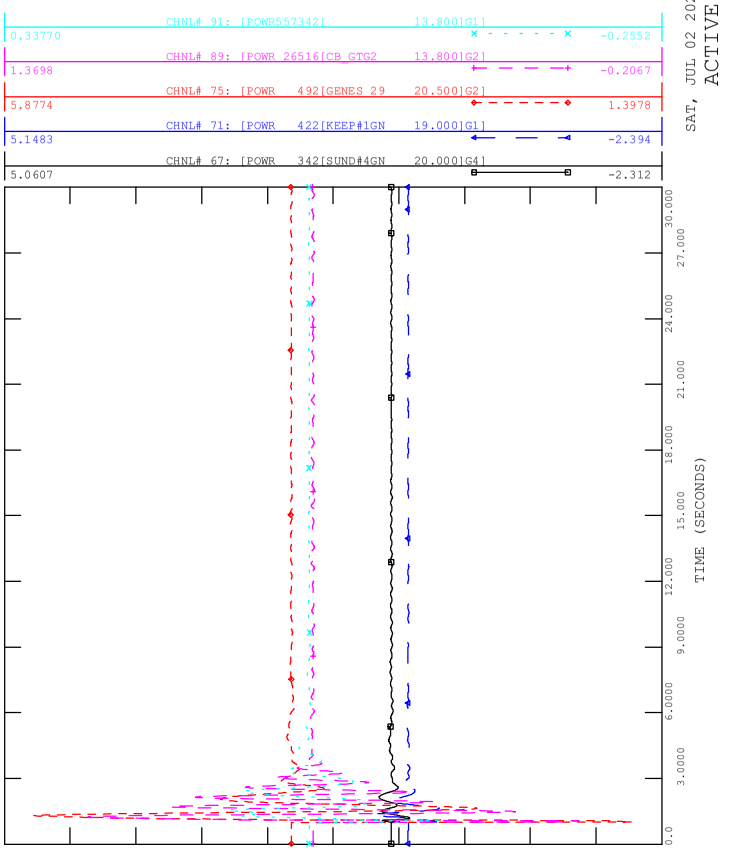
TIME (SECONDS)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_02_915L_CLOVERBAR

FILE: scn5a_SL_02_915L_CloverBar.out

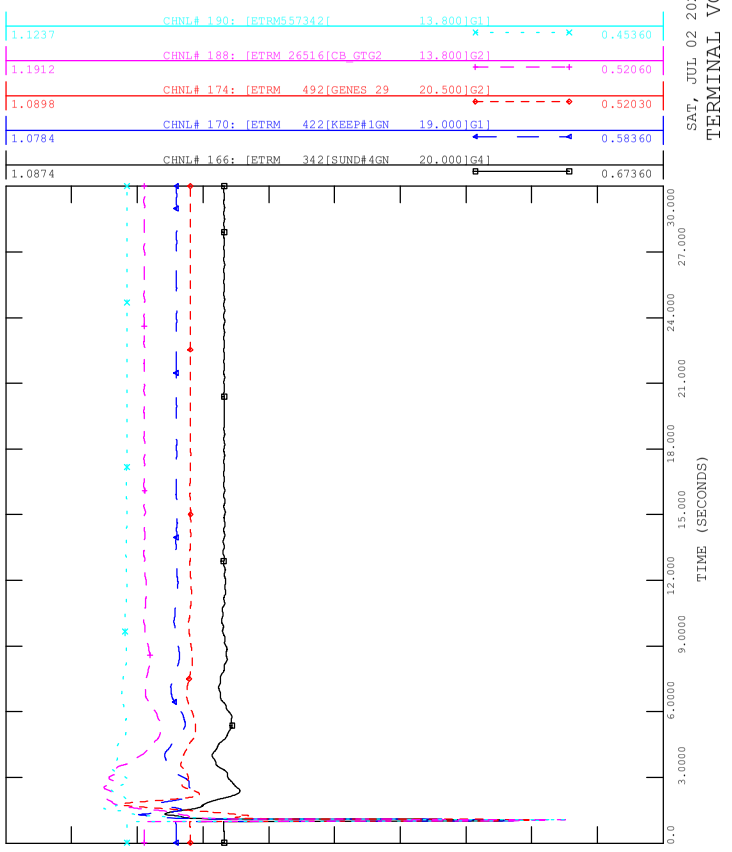
SAT, JUL 02 2022 15:00
ACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_02_915L_CLOVERBAR

FILE: scn5a_SL_02_915L_CloverBar.out

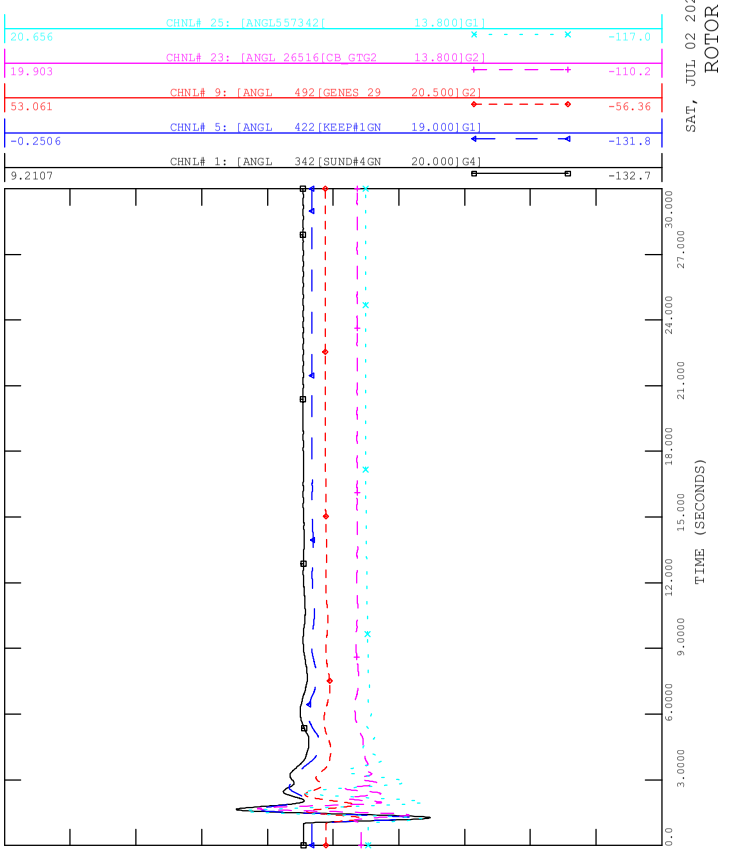
SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_02_915L_CLOVERBAR

FILE: scn5a_SL_02_915L_CloverBar.out

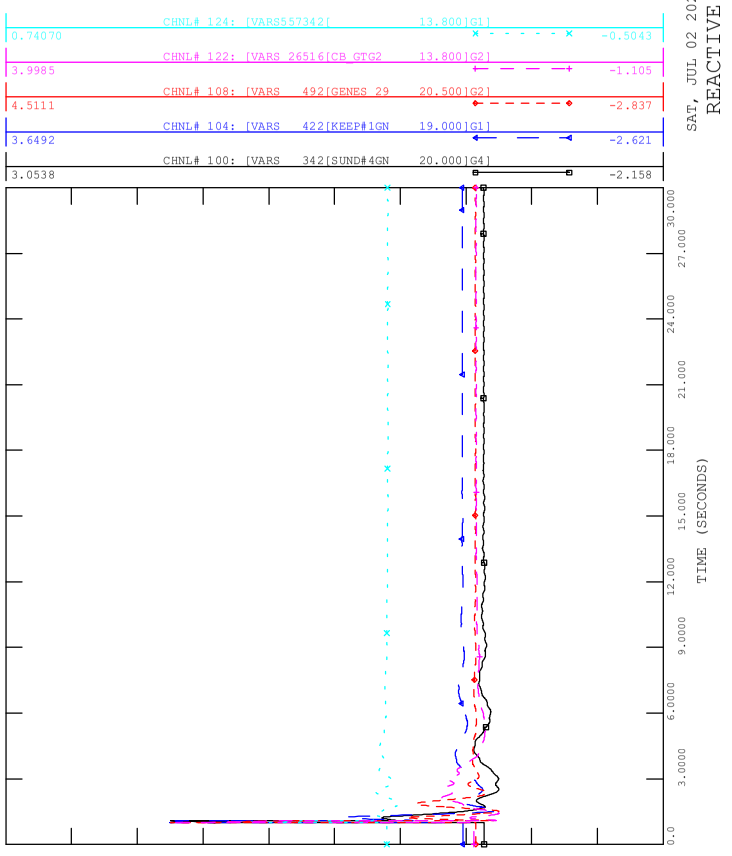
SAT, JUL 02 2022 15:00
ROTOR ANGLE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_02_915L_CLOVERBAR

FILE: scn5a_SL_02_915L_CloverBar.out

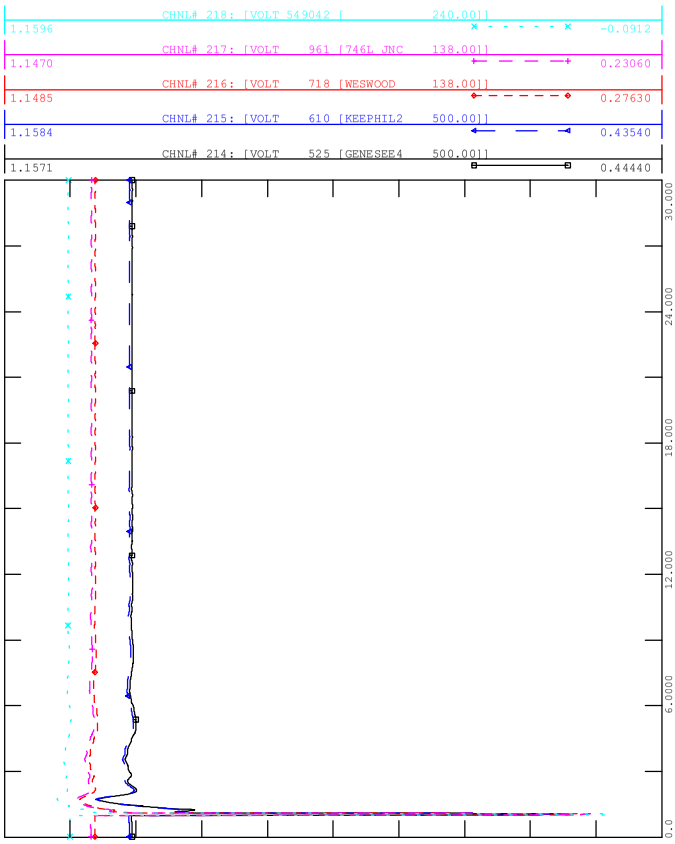
SAT, JUL 02 2022 15:00
REACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_02_915L_CLOVERBAR

FILE: scn5a_SL_02_915L_CloverBar.out

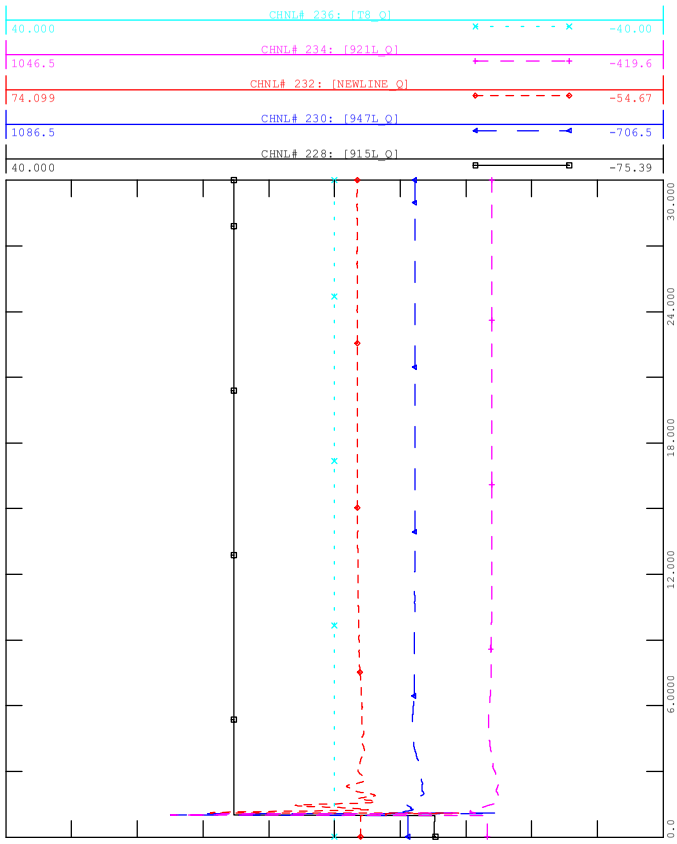
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_02_915L_CLOVERBAR

FILE: scn5a_SL_02_915L_CloverBar.out

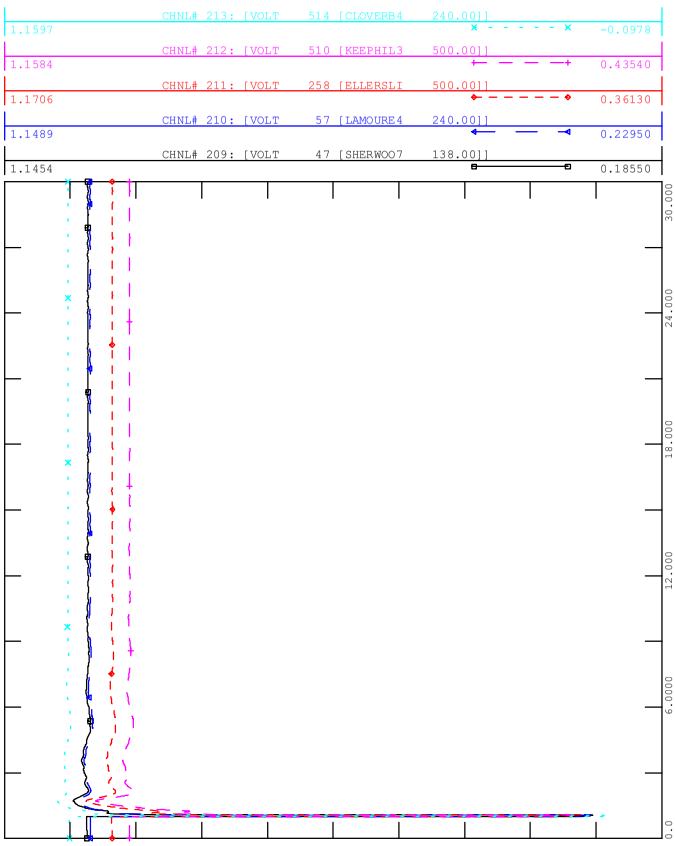
SAT, JUL 02 2022 15:00 BRANCH Q



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_02_915L_CLOVERBAR

FILE: scn5a_SL_02_915L_CloverBar.out

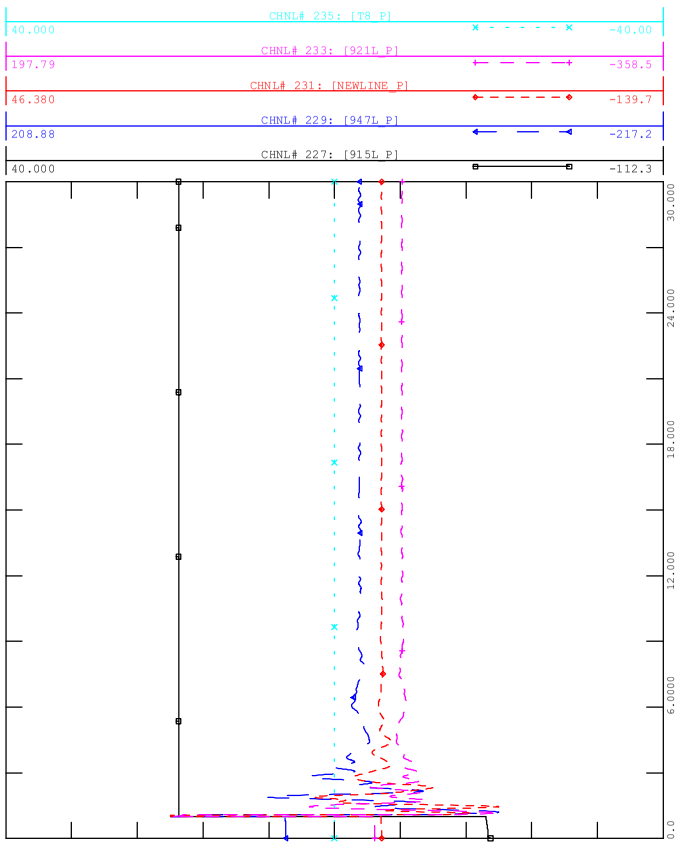
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_02_915L_CLOVERBAR

FILE: scn5a_SL_02_915L_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH P



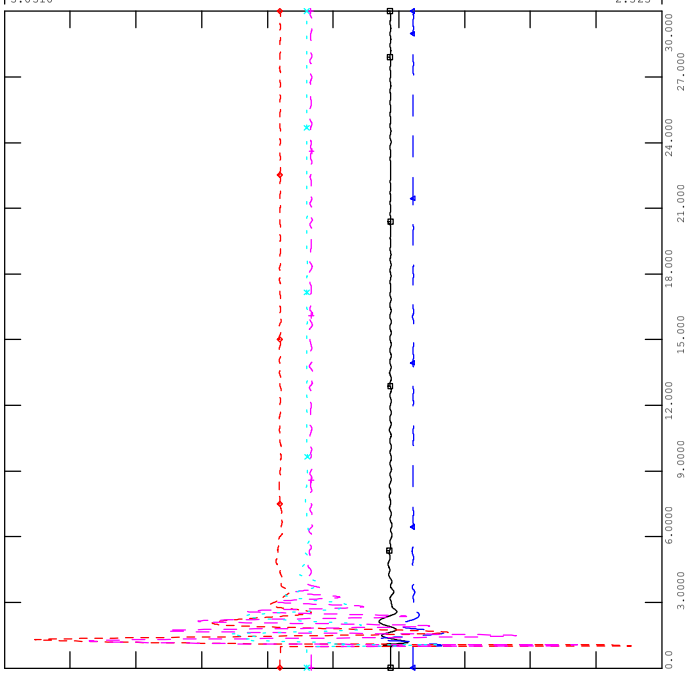
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_03_921L_CLOVERBAR

FILE: scn5a_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

CHNL# 91: [POWR557342[13.800]G1]
0.33290 -0.2539
CHNL# 89: [POWR 26516[CB_GTG2 13.800]G2]
1.3547 -0.2000
CHNL# 75: [POWR 492[GENES 29 20.500]G2]
5.7317 1.4183
CHNL# 71: [POWR 422[KEEP#1GN 19.000]G1]
5.1532 -2.306
CHNL# 67: [POWR 342[SUND#4GN 20.000]G4]
5.0510 -2.323



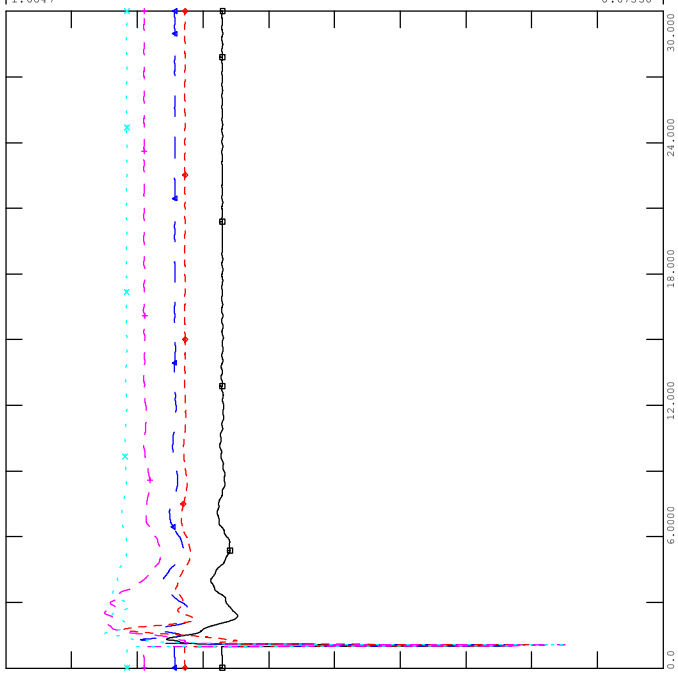
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_03_921L_CLOVERBAR

FILE: scn5a_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

CHNL# 190: [ETRM557342[13.800]G1]
1.1226 0.45720
CHNL# 188: [ETRM 26516[CB_GTG2 13.800]G2]
1.1899 0.52460
CHNL# 174: [ETRM 492[GENES 29 20.500]G2]
1.0822 0.52350
CHNL# 170: [ETRM 422[KEEP#1GN 19.000]G1]
1.0758 0.58640
CHNL# 166: [ETRM 342[SUND#4GN 20.000]G4]
1.0847 0.67550



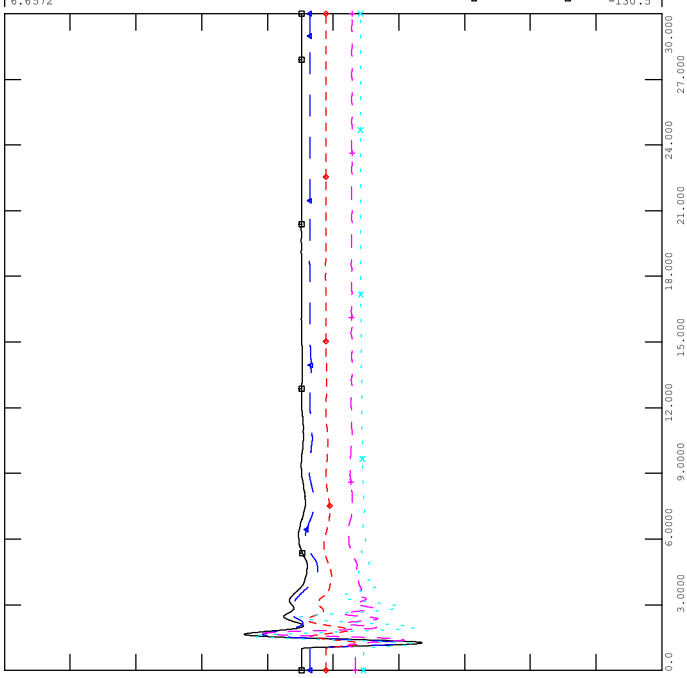
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_03_921L_CLOVERBAR

FILE: scn5a_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

CHNL# 25: [ANGL557342[13.800]G1]
17.263 -116.0
CHNL# 23: [ANGL 26516[CB_GTG2 13.800]G2]
17.435 -110.1
CHNL# 9: [ANGL 492[GENES 29 20.500]G2]
52.711 -55.96
CHNL# 5: [ANGL 422[KEEP#1GN 19.000]G1]
-2.669 -130.0
CHNL# 1: [ANGL 342[SUND#4GN 20.000]G4]
6.6572 -130.5



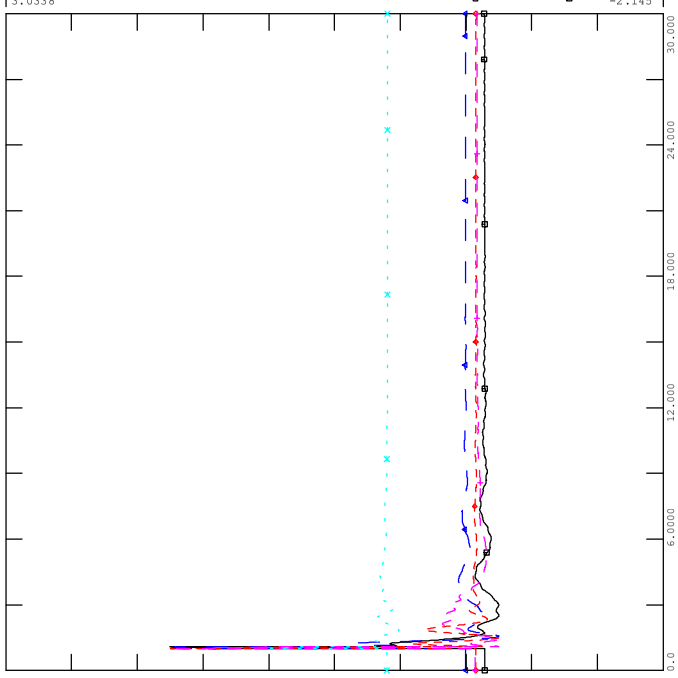
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_03_921L_CLOVERBAR

FILE: scn5a_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

REACTIVE POWER

CHNL# 124: [VARS557342[13.800]G1]
0.73960 -0.5038
CHNL# 122: [VARS 26516[CB_GTG2 13.800]G2]
3.9731 -1.081
CHNL# 108: [VARS 492[GENES 29 20.500]G2]
4.4716 -2.819
CHNL# 104: [VARS 422[KEEP#1GN 19.000]G1]
3.6039 -2.565
CHNL# 100: [VARS 342[SUND#4GN 20.000]G4]
3.0338 -2.145

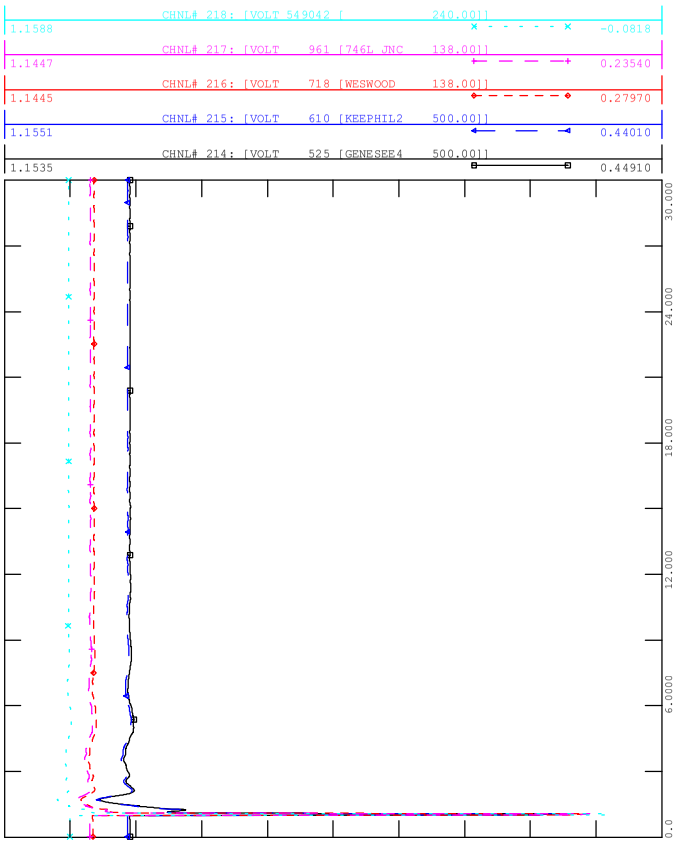


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_03_921L_CLOVERBAR

FILE: scn5a_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

BUS VOLTAGE

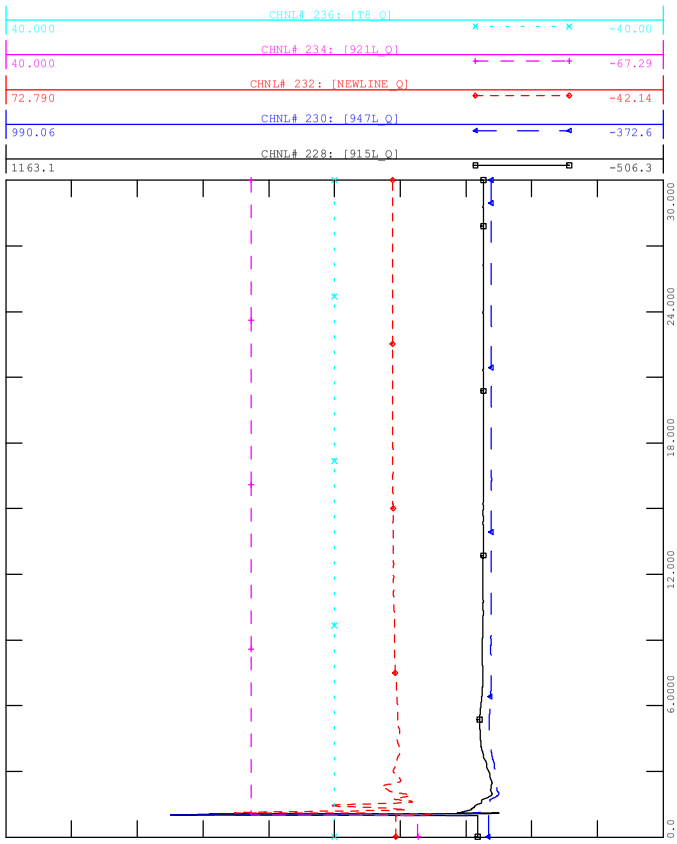


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_03_921L_CLOVERBAR

FILE: scn5a_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

BRANCH Q

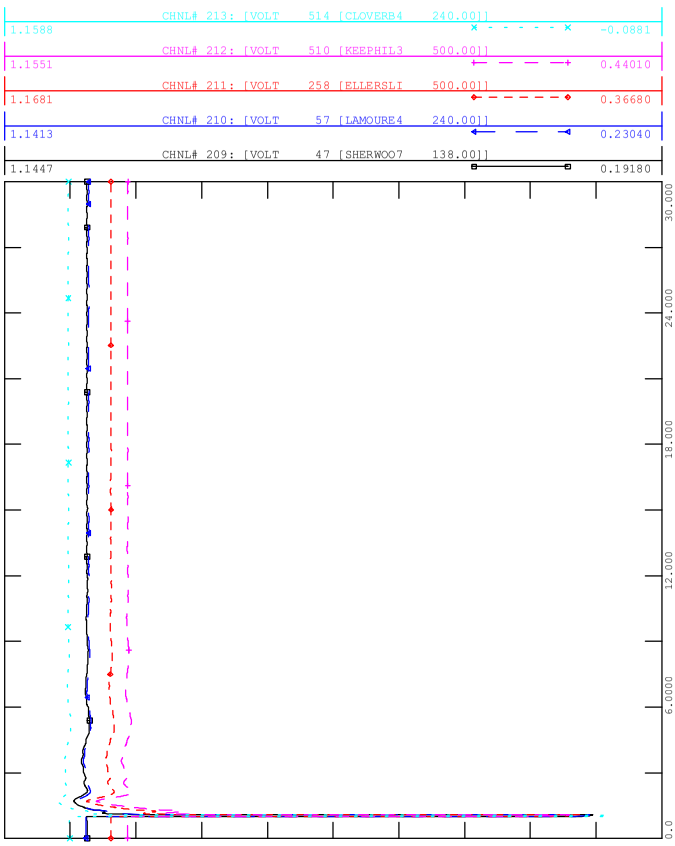


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_03_921L_CLOVERBAR

FILE: scn5a_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

BUS VOLTAGE

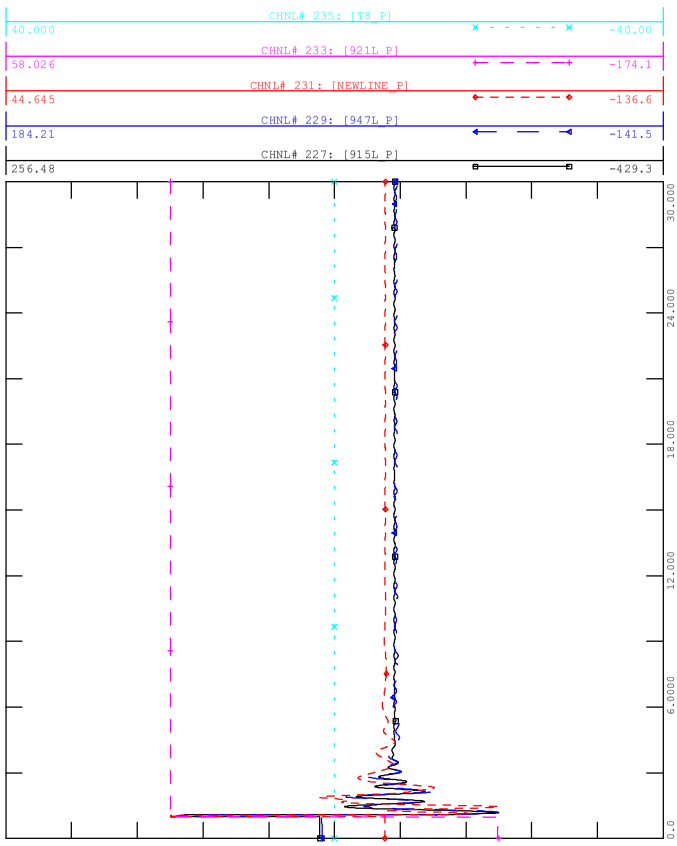


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_03_921L_CLOVERBAR

FILE: scn5a_SL_03_921L_CloverBar.out

SAT, JUL 02 2022 15:00

BRANCH P



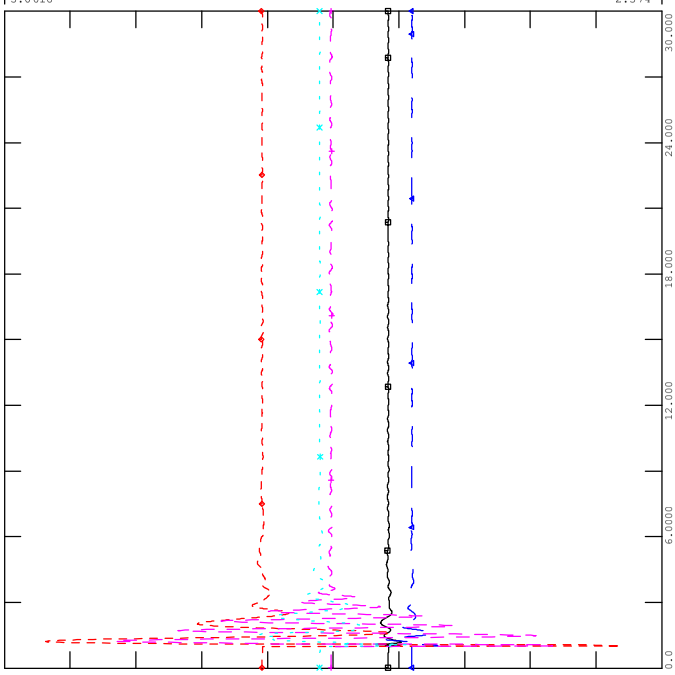
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_04_921L_LAMOUREUX

FILE: scn5a_SL_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

CHNL# 91: [POWR557342[13.800]G1]
0.31120 -0.2065
CHNL# 89: [POWR 26516[CB_GTG2 13.800]G2]
1.2263 0.02520
CHNL# 75: [POWR 492[GENES 29 20.500]G2]
5.1741 1.9824
CHNL# 71: [POWR 422[KEEP#1GN 19.000]G1]
5.0120 -2.241
CHNL# 67: [POWR 342[SUND#4GN 20.000]G4]
5.0618 -2.374



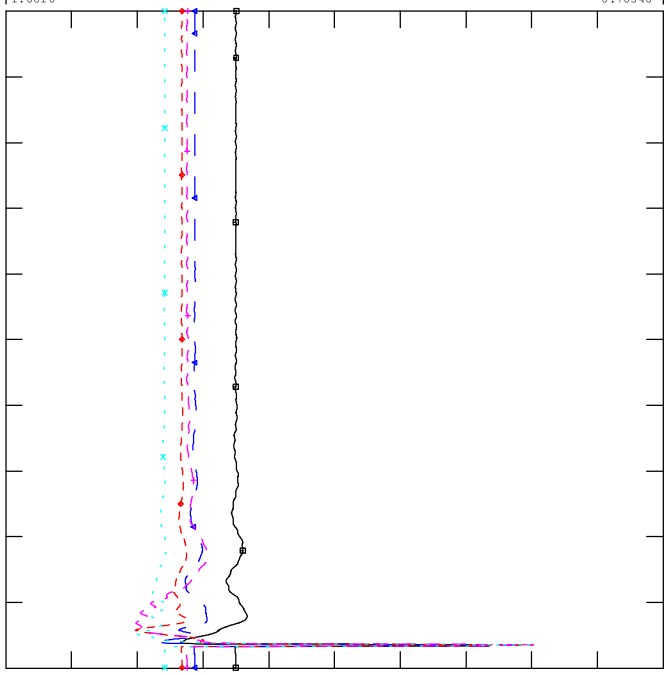
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_04_921L_LAMOUREUX

FILE: scn5a_SL_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

CHNL# 190: [ETRM557342[13.800]G1]
1.1216 0.61930
CHNL# 188: [ETRM 26516[CB_GTG2 13.800]G2]
1.1890 0.68450
CHNL# 174: [ETRM 492[GENES 29 20.500]G2]
1.0658 0.55860
CHNL# 170: [ETRM 422[KEEP#1GN 19.000]G1]
1.0782 0.63220
CHNL# 166: [ETRM 342[SUND#4GN 20.000]G4]
1.0816 0.70540



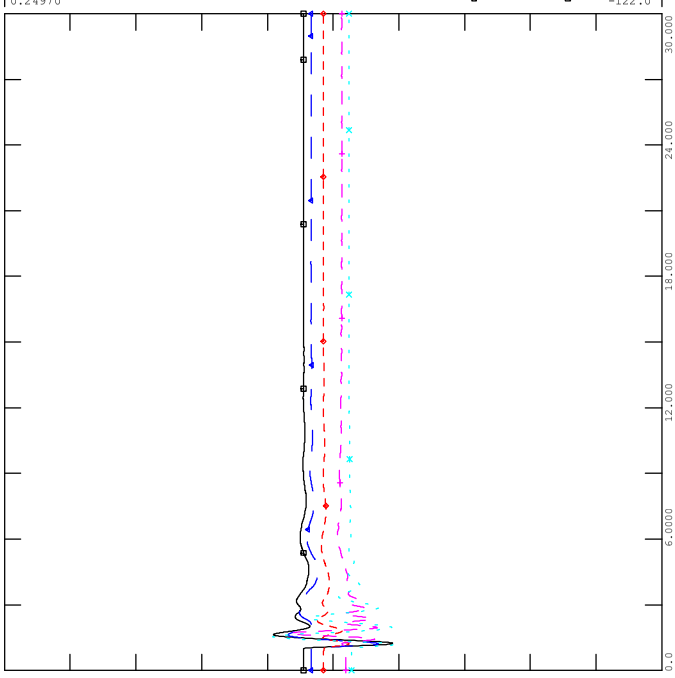
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_04_921L_LAMOUREUX

FILE: scn5a_SL_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

CHNL# 25: [ANGL557342[13.800]G1]
9.2277 -113.3
CHNL# 23: [ANGL 26516[CB_GTG2 13.800]G2]
9.3076 -106.1
CHNL# 9: [ANGL 492[GENES 29 20.500]G2]
50.582 -54.50
CHNL# 5: [ANGL 422[KEEP#1GN 19.000]G1]
-7.742 -123.7
CHNL# 1: [ANGL 342[SUND#4GN 20.000]G4]
0.24970 -122.0



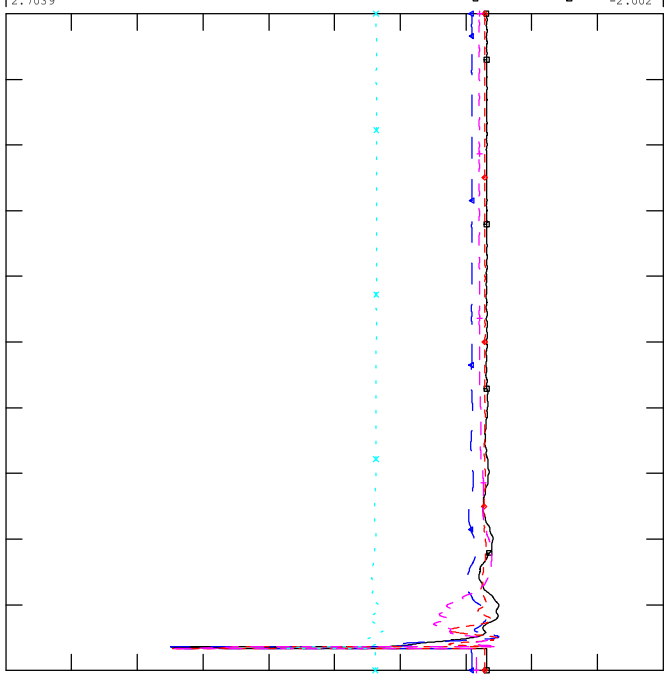
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_04_921L_LAMOUREUX

FILE: scn5a_SL_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00

REACTIVE POWER

CHNL# 124: [VARS557342[13.800]G1]
0.67890 -0.4944
CHNL# 122: [VARS 26516[CB_GTG2 13.800]G2]
2.8950 -0.6381
CHNL# 108: [VARS 492[GENES 29 20.500]G2]
3.7360 -2.409
CHNL# 104: [VARS 422[KEEP#1GN 19.000]G1]
3.1602 -2.300
CHNL# 100: [VARS 342[SUND#4GN 20.000]G4]
2.7039 -2.002

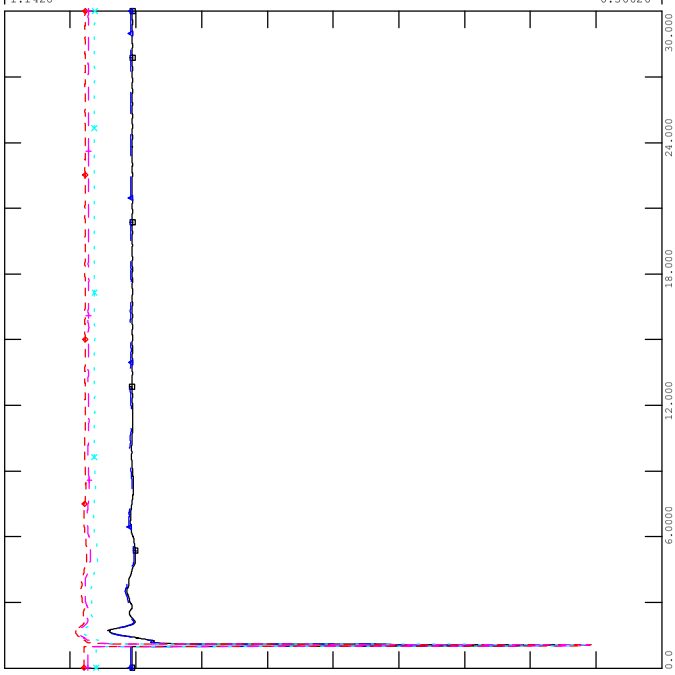


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_04_921L_LAMOUREUX

FILE: scn5a_SL_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1551 0.29700
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1410 0.24030
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1410 0.20850
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1444 0.50280
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1428 0.50620

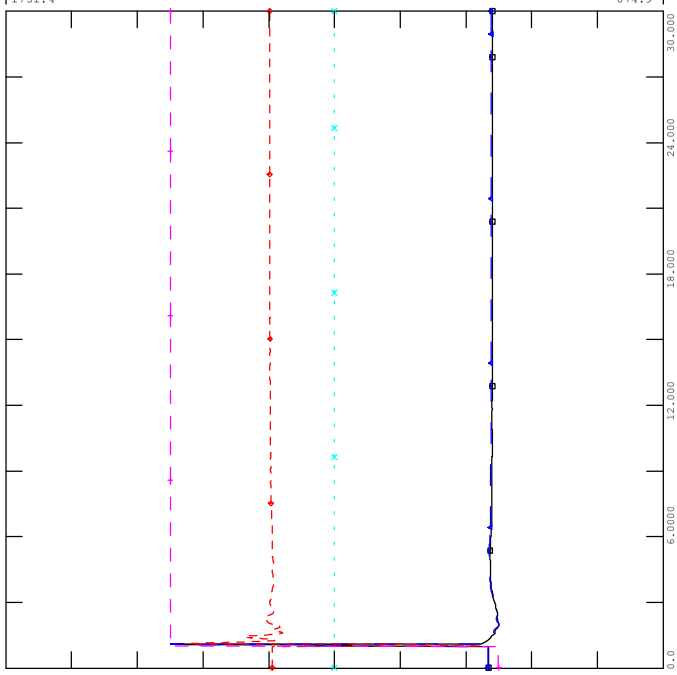


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_04_921L_LAMOUREUX

FILE: scn5a_SL_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00 BRANCH Q

CHNL# 236: [T8_Q] 40.000 -40.00
CHNL# 234: [921L_Q] 122.51 -367.5
CHNL# 232: [NEWLINE_Q] 62.862 -80.80
CHNL# 230: [947L_Q] 972.59 -367.1
CHNL# 228: [915L_Q] 1731.4 -674.9

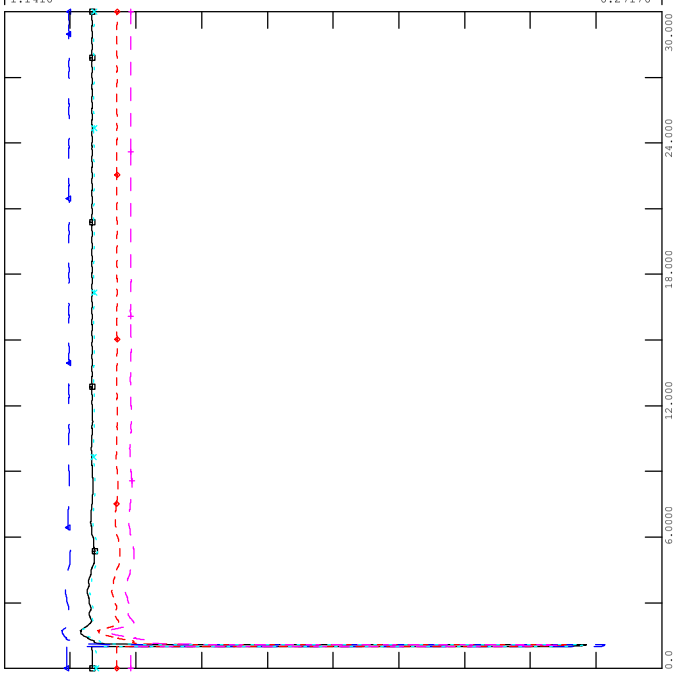


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_04_921L_LAMOUREUX

FILE: scn5a_SL_04_921L_Lamoureux.out

SAT, JUL 02 2022 15:00 BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1551 0.29320
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1444 0.50280
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1592 0.45280
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1373 -0.0118
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1410 0.27170

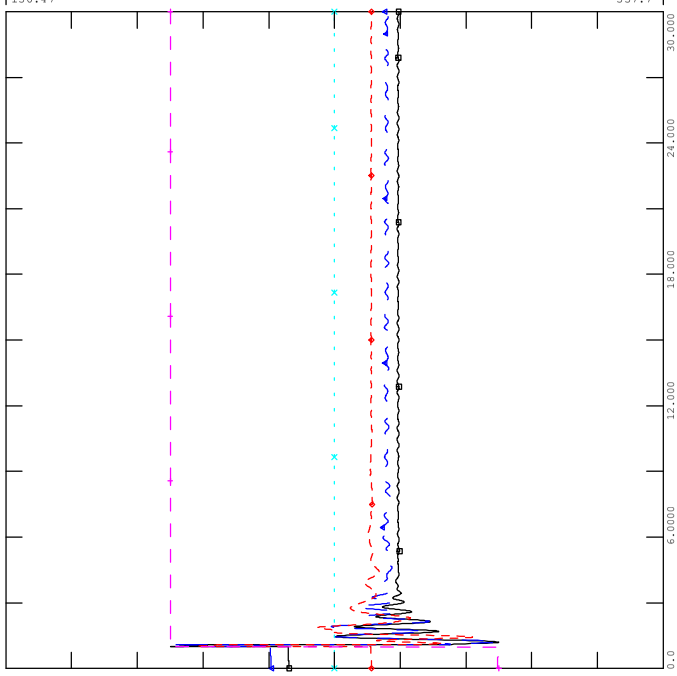


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_04_921L_LAMOUREUX

FILE: scn5a_SL_04_921L_Lamoureux.out

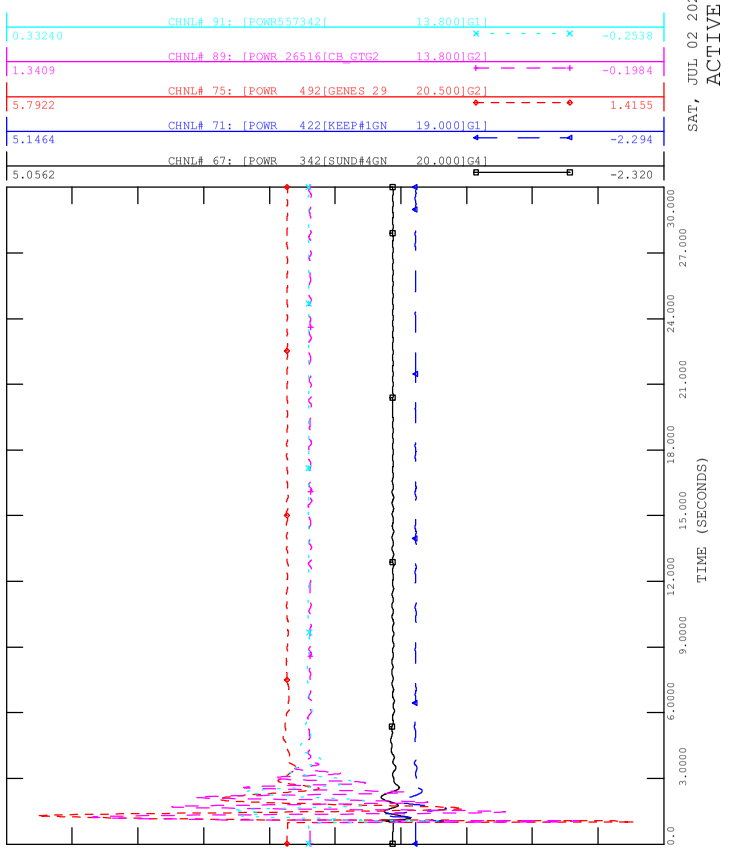
SAT, JUL 02 2022 15:00 BRANCH P

CHNL# 235: [T8_P] 40.000 -40.00
CHNL# 233: [921L_P] 574.44 -1723.
CHNL# 231: [NEWLINE_P] 16.966 -121.4
CHNL# 229: [947L_P] 111.03 -96.12
CHNL# 227: [915L_P] 130.47 -337.7



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_05_947L_CLOVERBAR

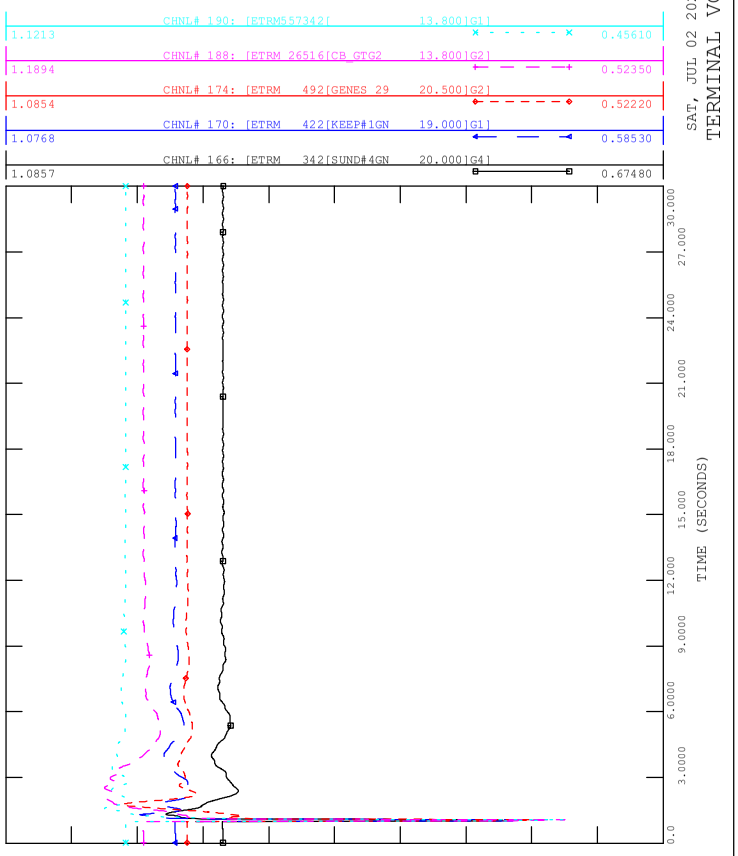
FILE: scn5a_SL_05_947L_CloverBar.out



SAT, JUL 02 2022 15:00
ACTIVE POWER

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_05_947L_CLOVERBAR

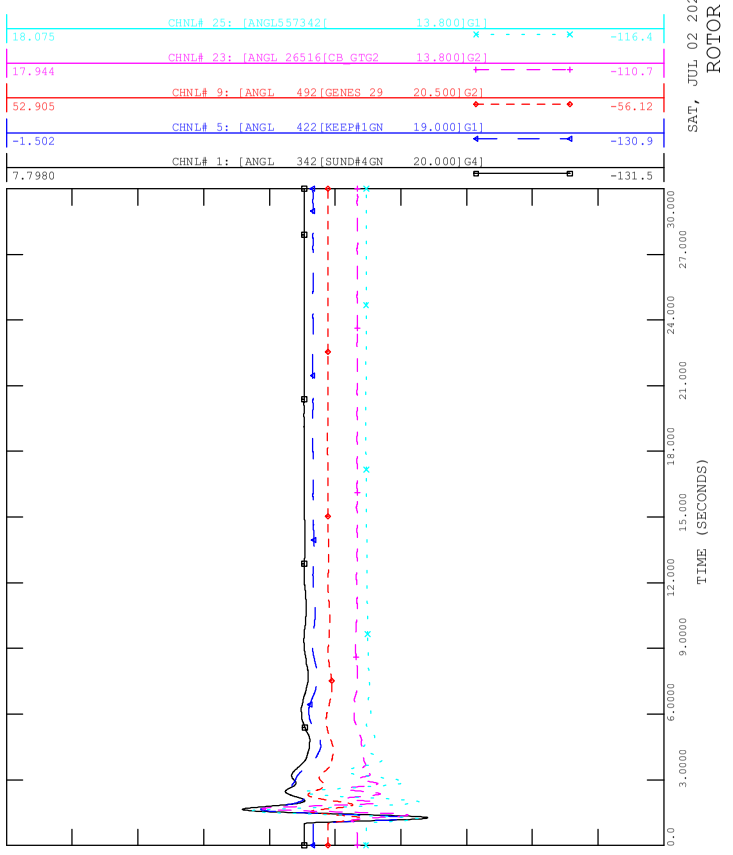
FILE: scn5a_SL_05_947L_CloverBar.out



SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_05_947L_CLOVERBAR

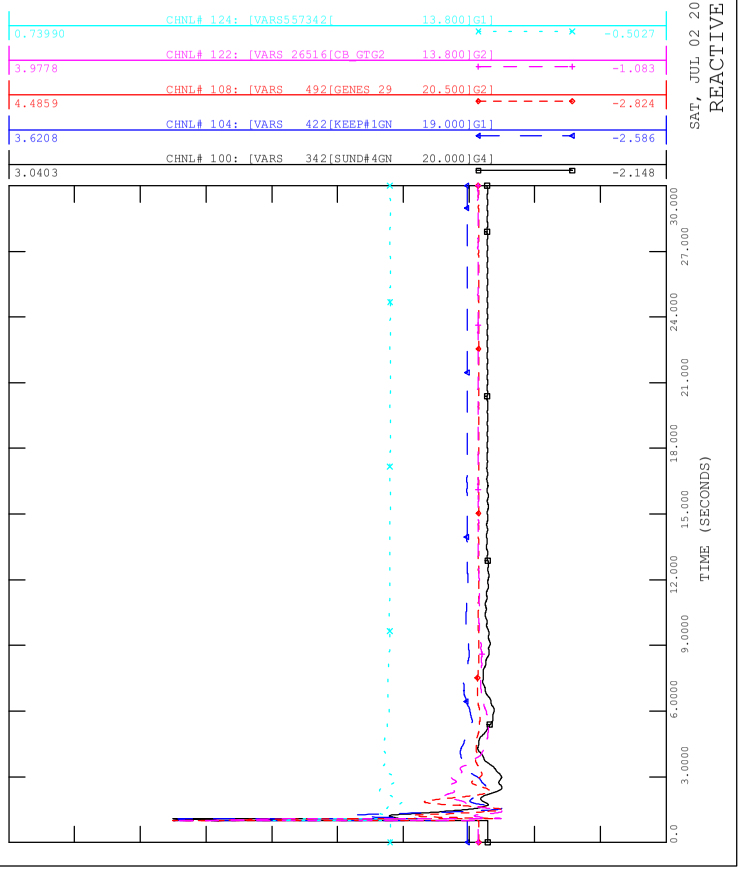
FILE: scn5a_SL_05_947L_CloverBar.out



SAT, JUL 02 2022 15:00
ROTOR ANGLE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_05_947L_CLOVERBAR

FILE: scn5a_SL_05_947L_CloverBar.out

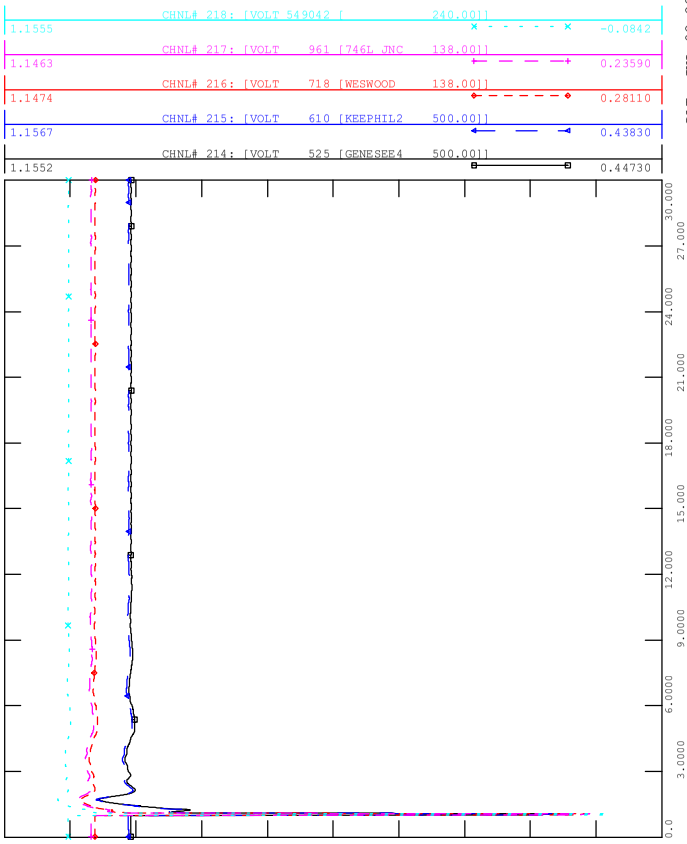


SAT, JUL 02 2022 15:00
REACTIVE POWER

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_05_947L_CLOVERBAR

FILE: scn5a_SL_05_947L_CloverBar.out

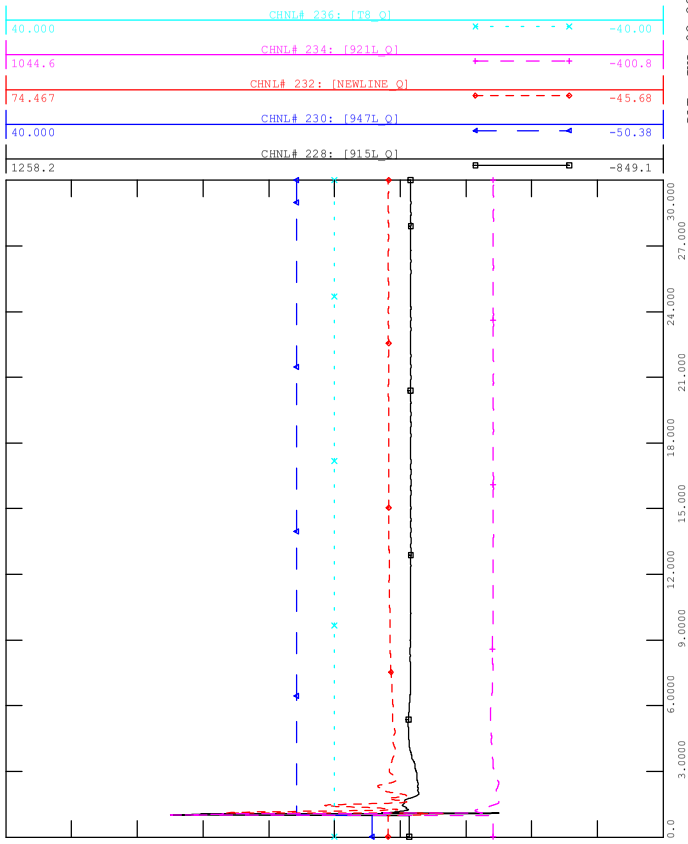
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_05_947L_CLOVERBAR

FILE: scn5a_SL_05_947L_CloverBar.out

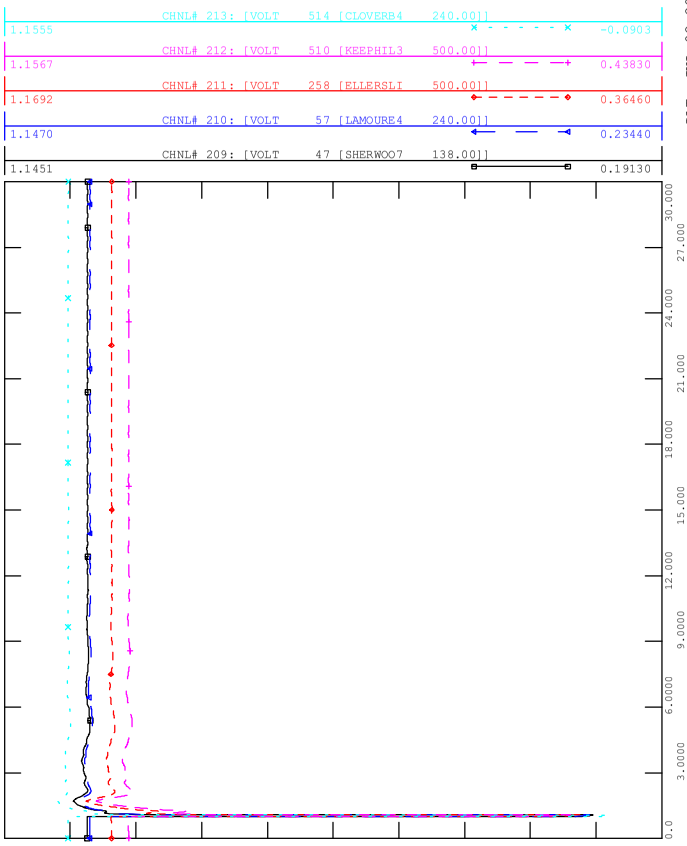
SAT, JUL 02 2022 15:00 BRANCH Q



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_05_947L_CLOVERBAR

FILE: scn5a_SL_05_947L_CloverBar.out

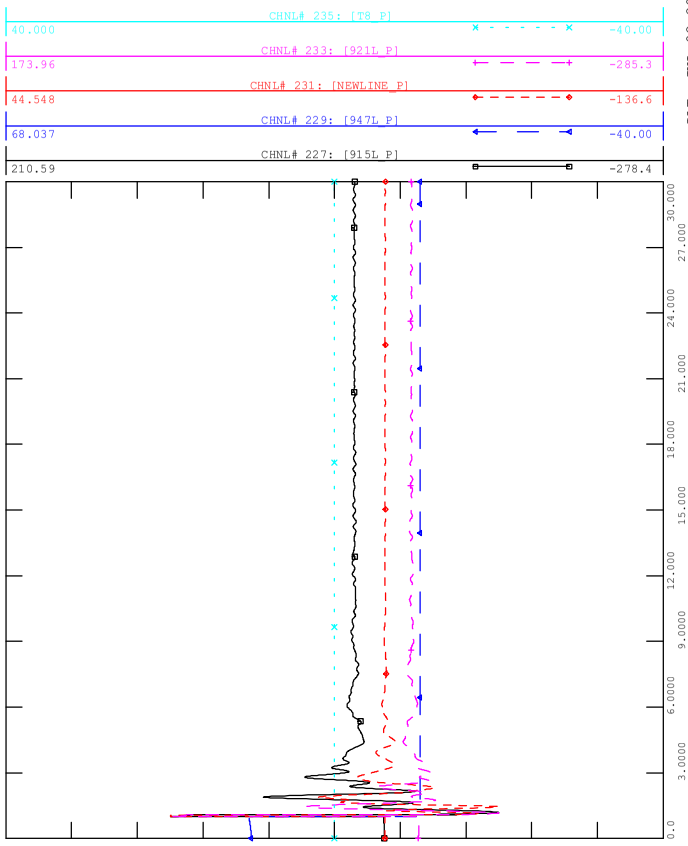
SAT, JUL 02 2022 15:00 BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_05_947L_CLOVERBAR

FILE: scn5a_SL_05_947L_CloverBar.out

SAT, JUL 02 2022 15:00 BRANCH P

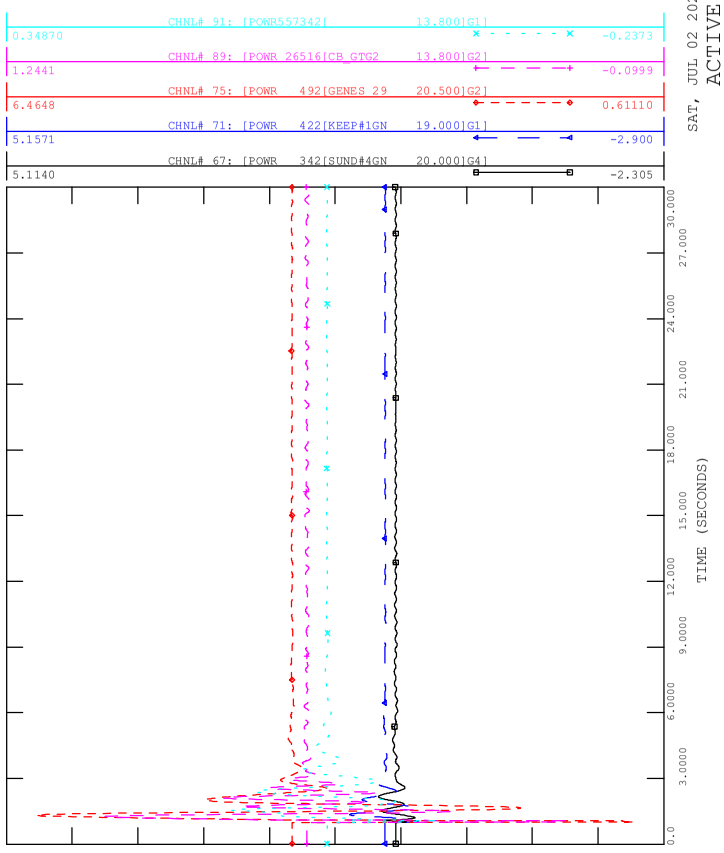


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_06_947L_ELLERSLIE

FILE: scn5a_SL_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

ACTIVE POWER

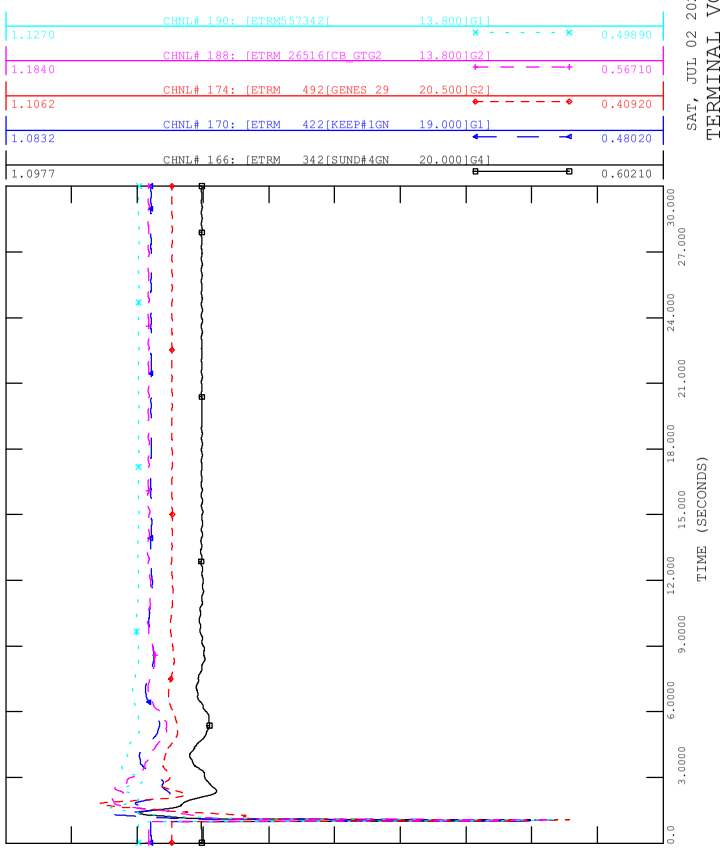


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_06_947L_ELLERSLIE

FILE: scn5a_SL_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

TERMINAL VOLTAGE

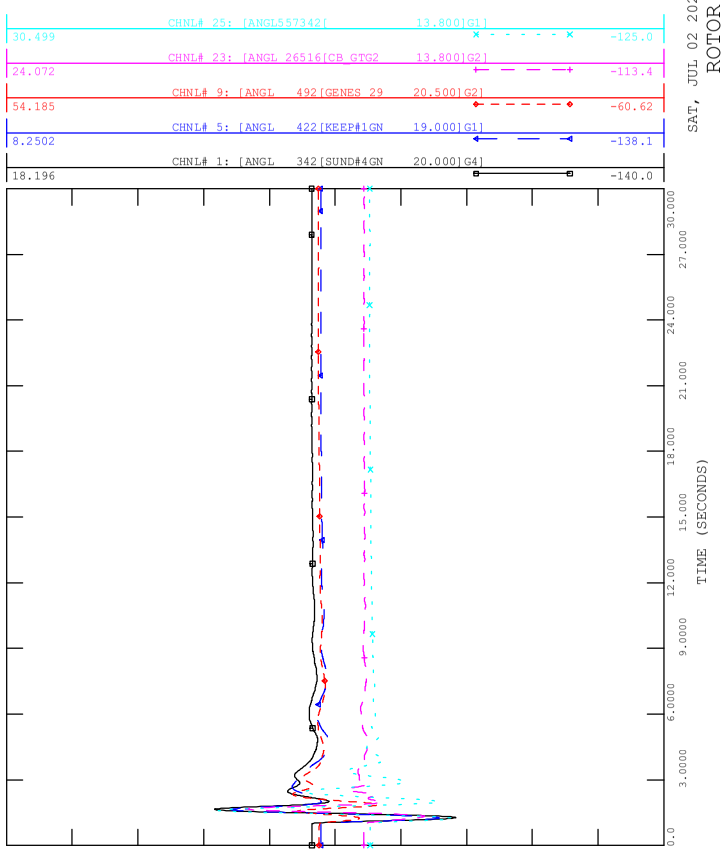


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_06_947L_ELLERSLIE

FILE: scn5a_SL_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

ROTOR ANGLE

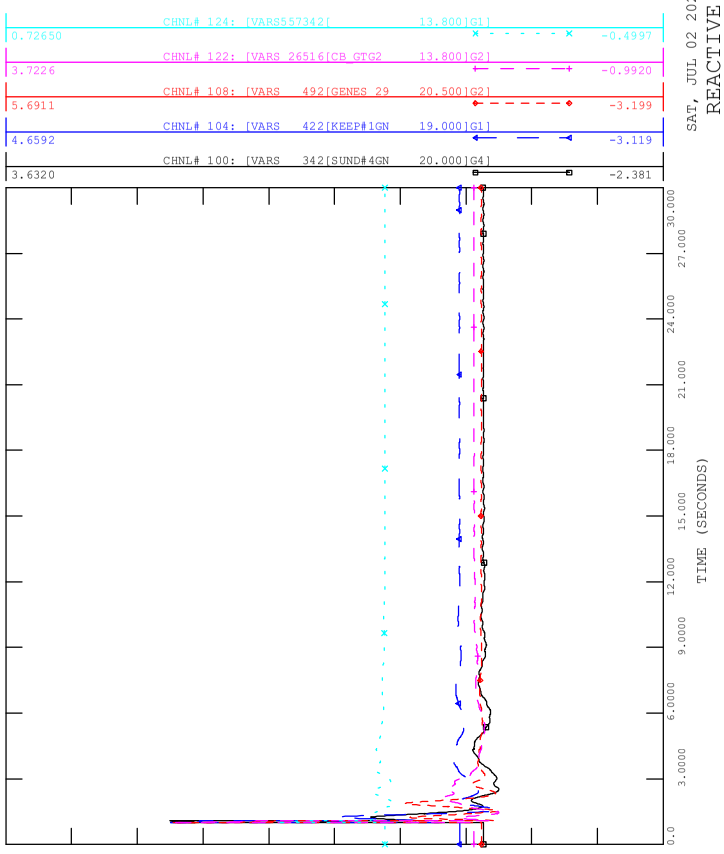


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_06_947L_ELLERSLIE

FILE: scn5a_SL_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

REACTIVE POWER



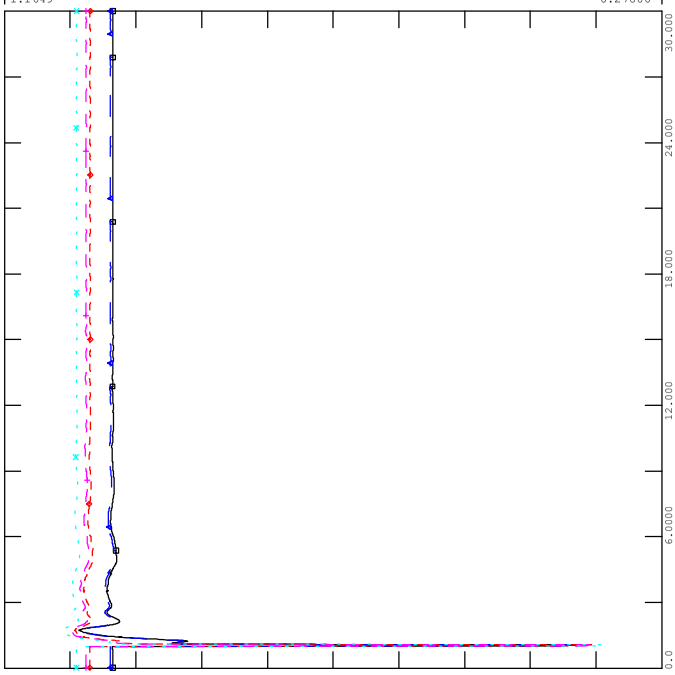
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_06_947L_ELLERSLIE

FILE: scn5a_SL_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

BUS VOLTAGE

CHNL# 218: [VOLT 549042 [240.00]] 1.1597 0.02080
CHNL# 217: [VOLT 961 [746L JNC 138.00]] 1.1493 0.15800
CHNL# 216: [VOLT 718 [WESWOOD 138.00]] 1.1502 0.21190
CHNL# 215: [VOLT 610 [KEEPHIL2 500.00]] 1.1659 0.26640
CHNL# 214: [VOLT 525 [GENESEE4 500.00]] 1.1649 0.27860



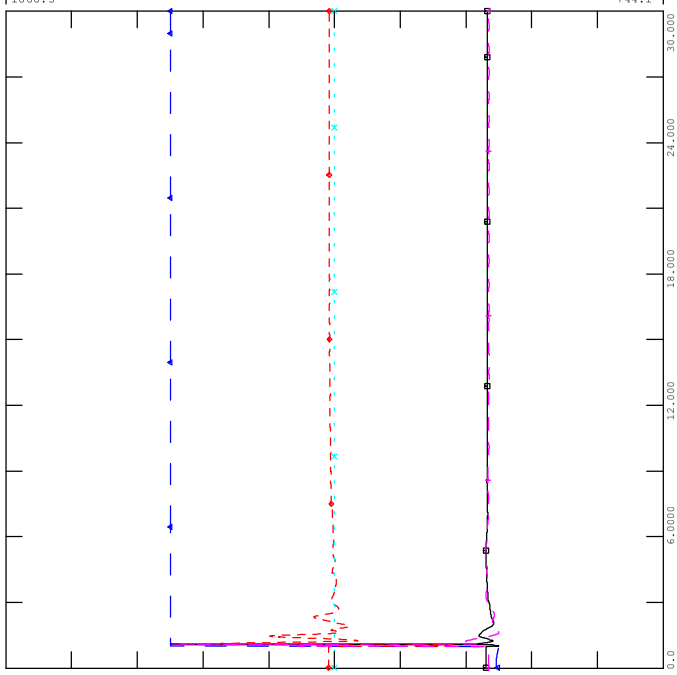
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_06_947L_ELLERSLIE

FILE: scn5a_SL_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

BRANCH Q

CHNL# 236: [T8_Q] 40.000 -40.00
CHNL# 234: [921L_Q] 857.93 -346.6
CHNL# 232: [NEWLINE_Q] 66.291 -59.24
CHNL# 230: [947L_Q] 363.00 -1089.
CHNL# 228: [915L_Q] 1888.3 -744.1



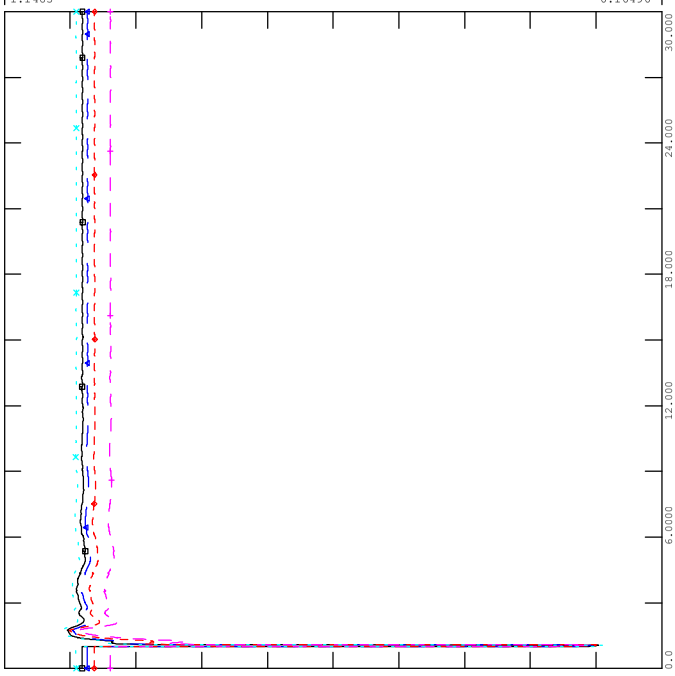
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_06_947L_ELLERSLIE

FILE: scn5a_SL_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

BUS VOLTAGE

CHNL# 213: [VOLT 514 [CLOVERB4 240.00]] 1.1597 0.01560
CHNL# 212: [VOLT 510 [KEEPHIL3 500.00]] 1.1659 0.26640
CHNL# 211: [VOLT 258 [ELLERSLI 500.00]] 1.1768 0.16430
CHNL# 210: [VOLT 57 [LAMOURE4 240.00]] 1.1502 0.18410
CHNL# 209: [VOLT 47 [SHERWOO7 138.00]] 1.1483 0.10490



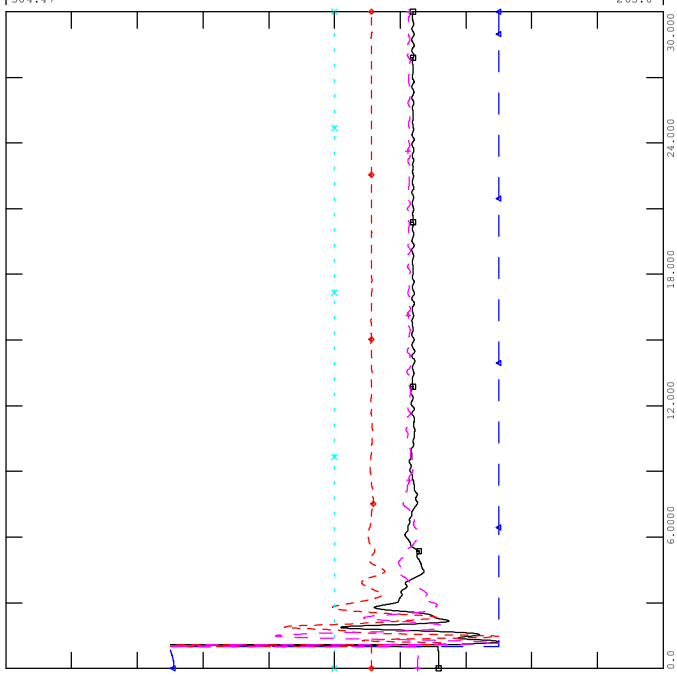
SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_06_947L_ELLERSLIE

FILE: scn5a_SL_06_947L_Ellerslie.out

SAT, JUL 02 2022 15:00

BRANCH P

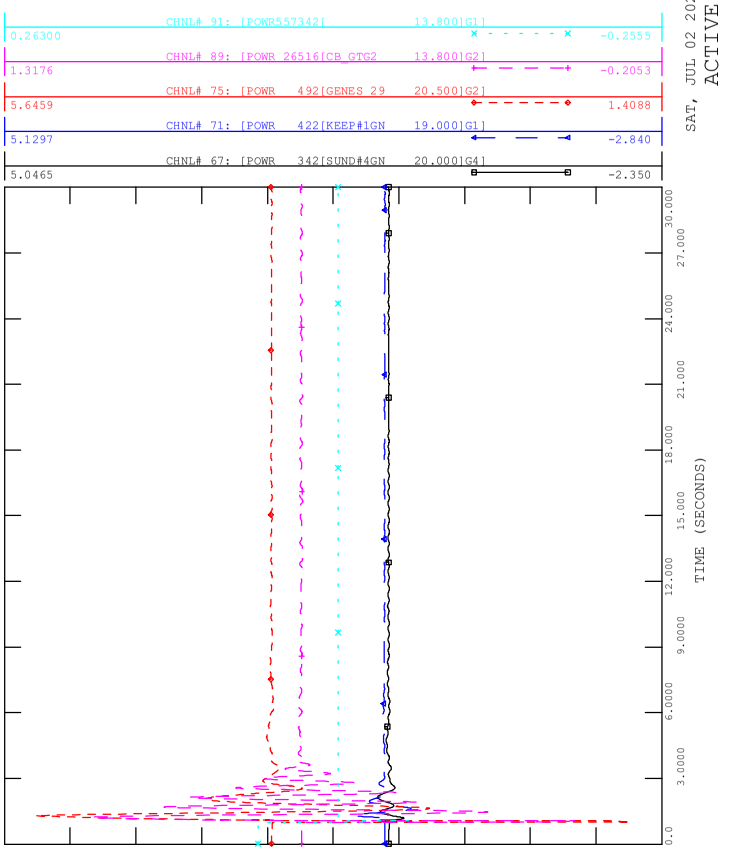
CHNL# 235: [T8_P] 40.000 -40.00
CHNL# 233: [921L_P] 122.17 -255.4
CHNL# 231: [NEWLINE_P] 32.292 -133.5
CHNL# 229: [947L_P] 4163.5 -1388.
CHNL# 227: [915L_P] 304.47 -265.6



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_07_NL_CLOVERBAR

FILE: scn5a_SL_07_NL_CloverBar.out

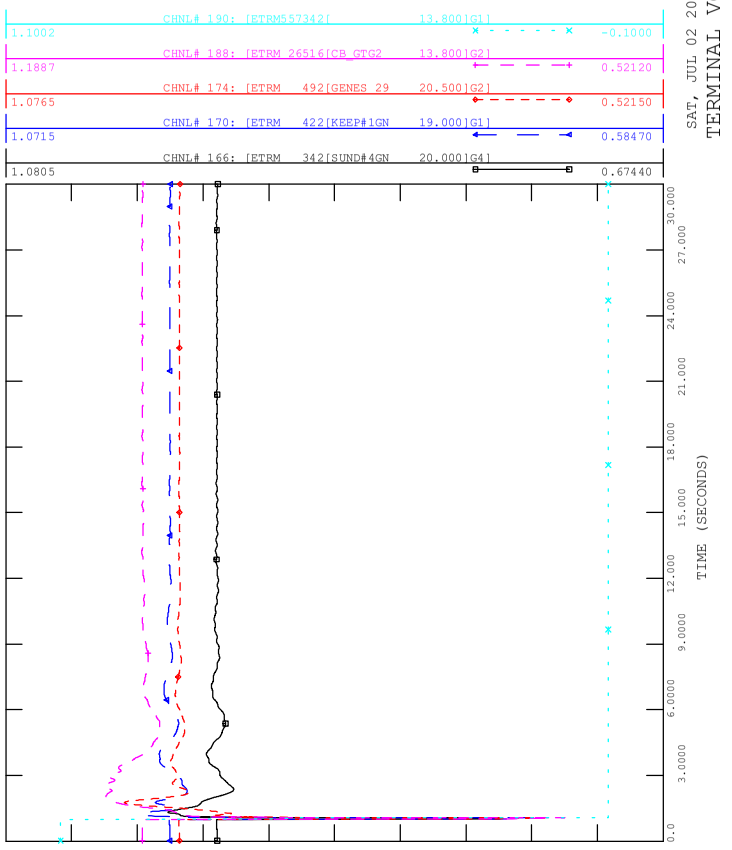
SAT, JUL 02 2022 15:00
ACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_07_NL_CLOVERBAR

FILE: scn5a_SL_07_NL_CloverBar.out

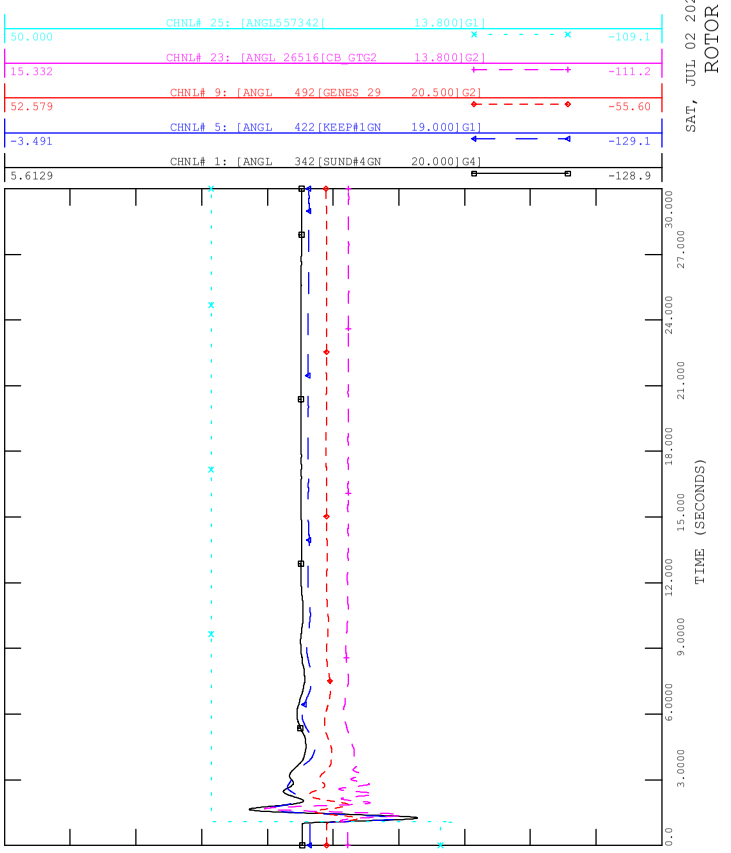
SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_07_NL_CLOVERBAR

FILE: scn5a_SL_07_NL_CloverBar.out

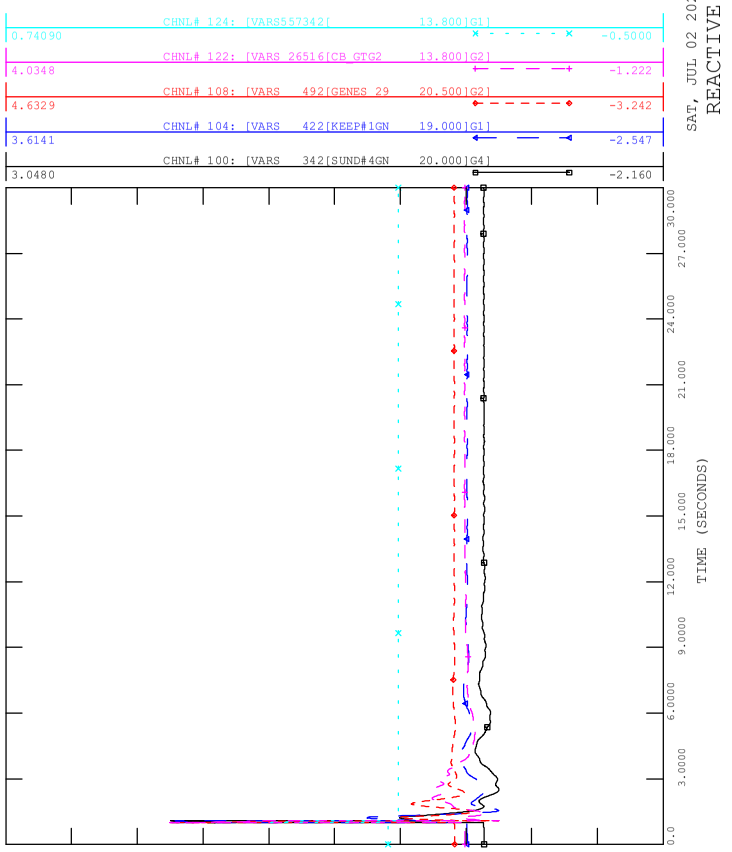
SAT, JUL 02 2022 15:00
ROTOR ANGLE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_07_NL_CLOVERBAR

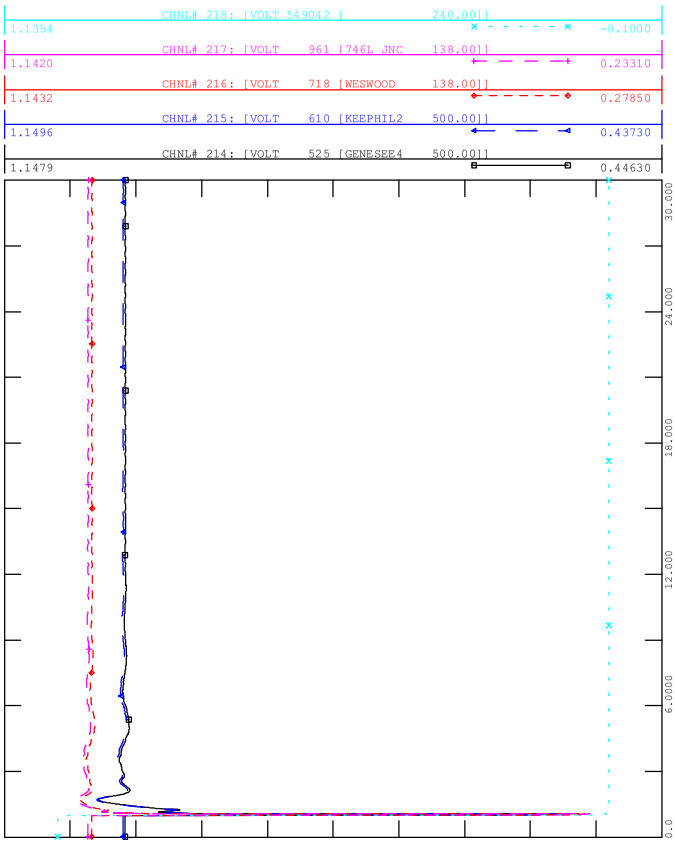
FILE: scn5a_SL_07_NL_CloverBar.out

SAT, JUL 02 2022 15:00
REACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_07_NL_CLOVERBAR

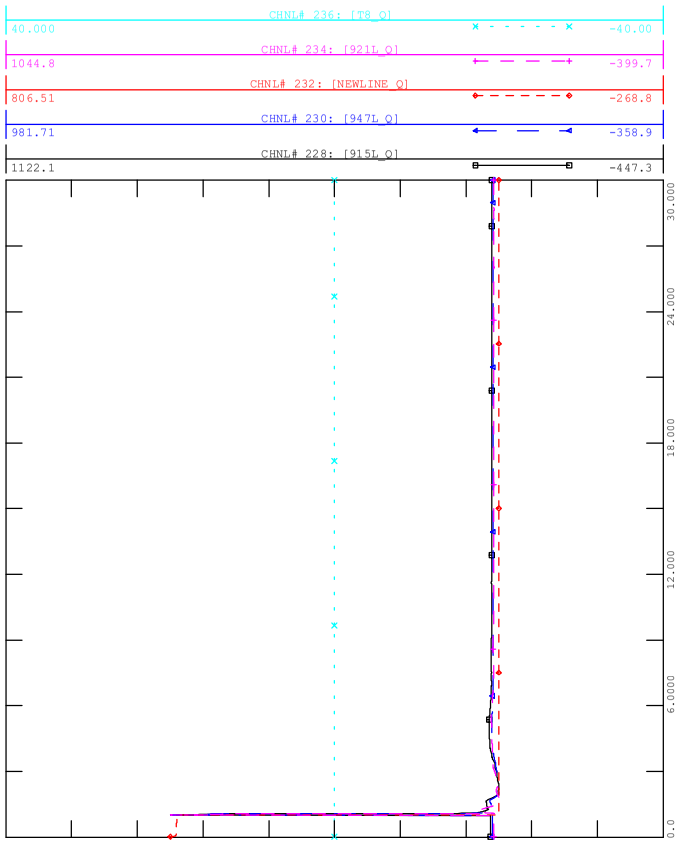
FILE: scn5a_SL_07_NL_CloverBar.out



SAT, JUL 02 2022 15:00 BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_07_NL_CLOVERBAR

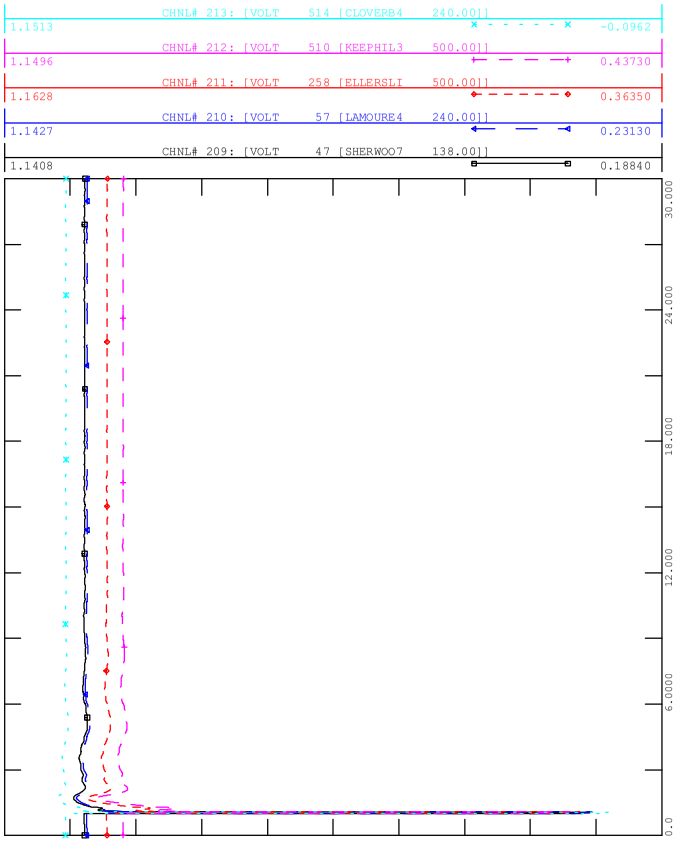
FILE: scn5a_SL_07_NL_CloverBar.out



SAT, JUL 02 2022 15:00 BRANCH Q

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_07_NL_CLOVERBAR

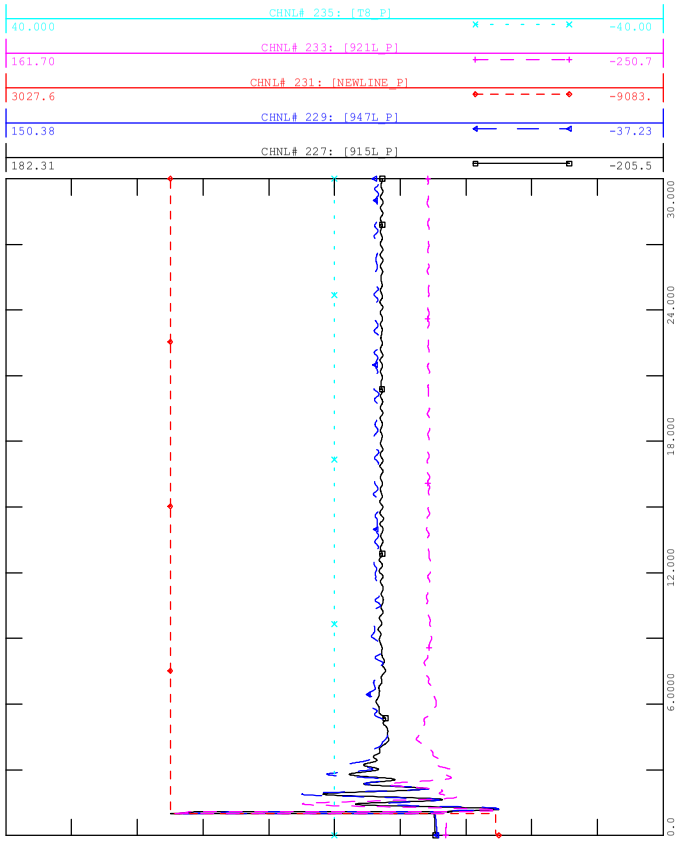
FILE: scn5a_SL_07_NL_CloverBar.out



SAT, JUL 02 2022 15:00 BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_07_NL_CLOVERBAR

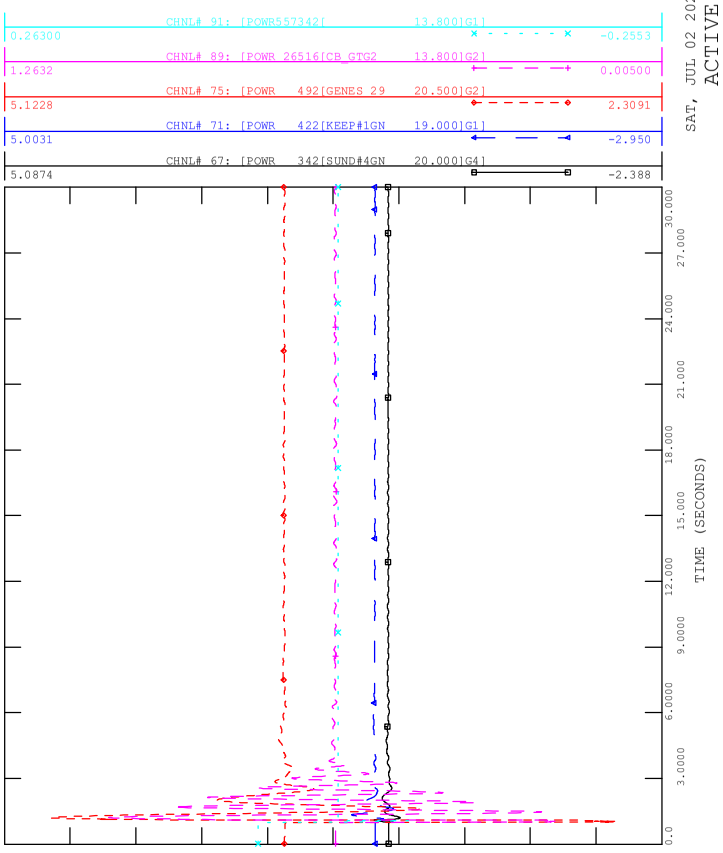
FILE: scn5a_SL_07_NL_CloverBar.out



SAT, JUL 02 2022 15:00 BRANCH P

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_08_NL_H2PLNAT

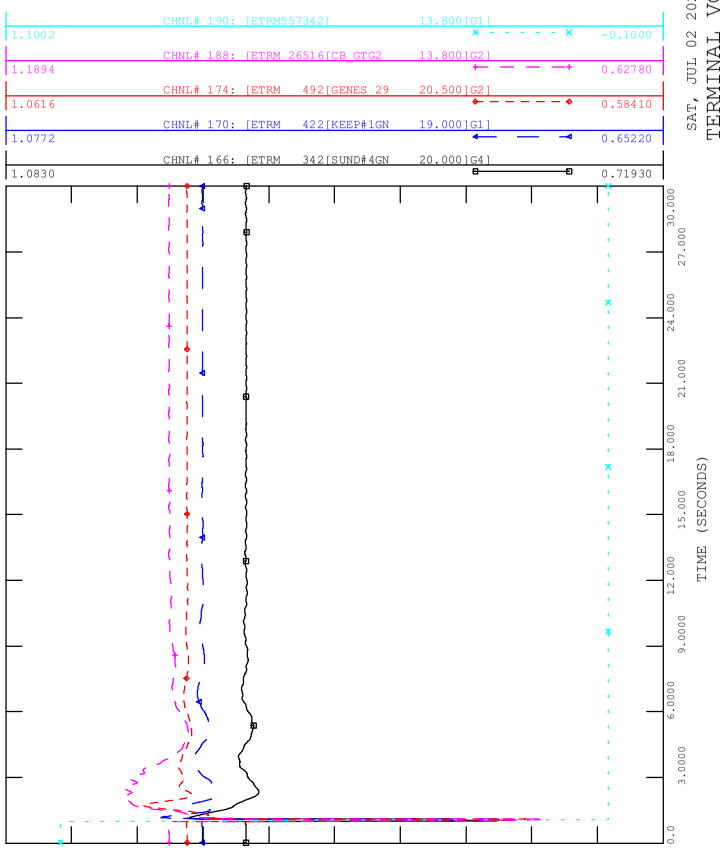
FILE: scn5a_SL_08_NL_H2Plnat.out



SAT, JUL 02 2022 15:00
ACTIVE POWER

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_08_NL_H2PLNAT

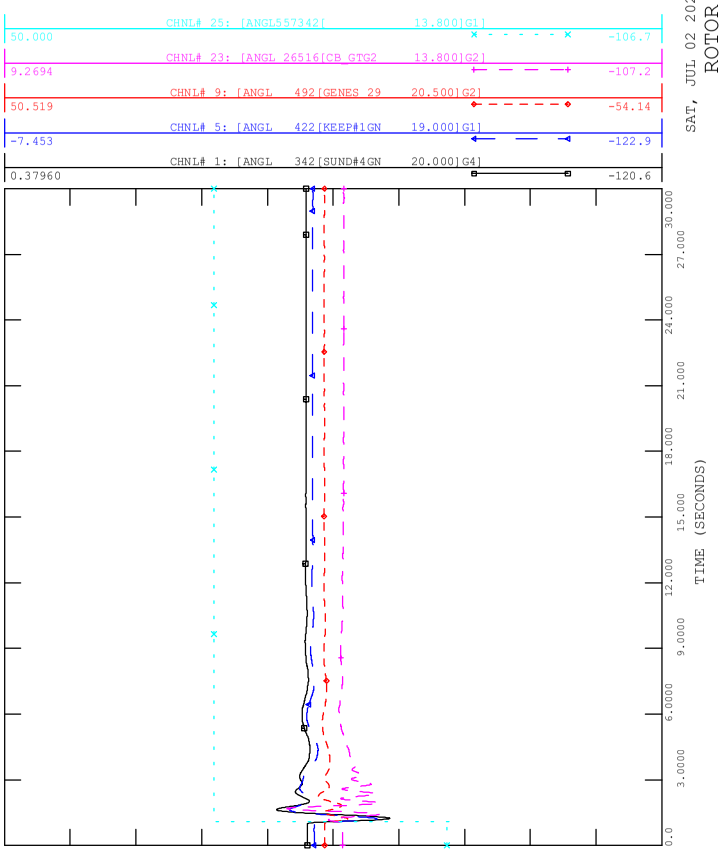
FILE: scn5a_SL_08_NL_H2Plnat.out



SAT, JUL 02 2022 15:00
TERMINAL VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_08_NL_H2PLNAT

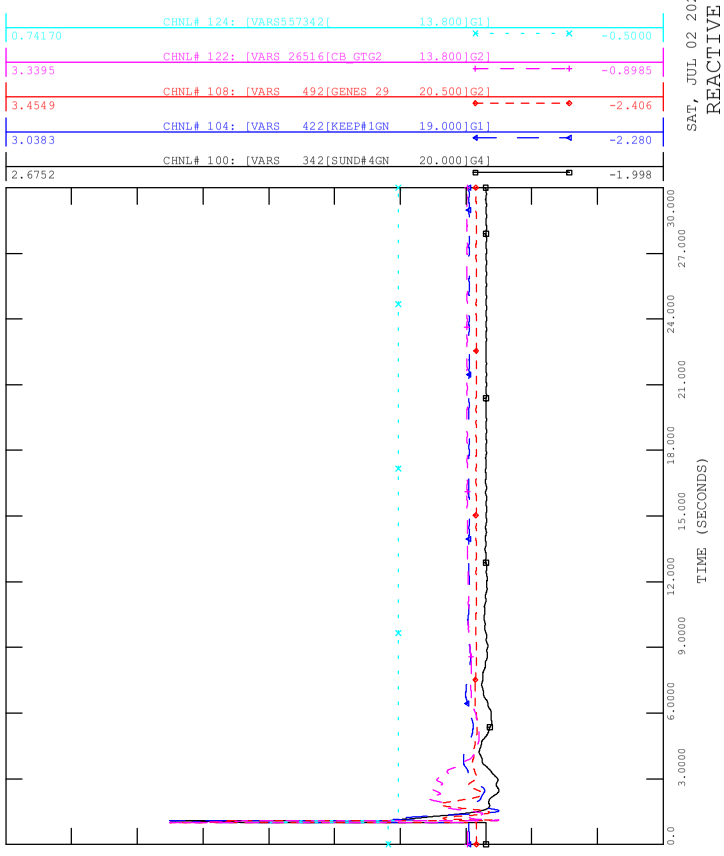
FILE: scn5a_SL_08_NL_H2Plnat.out



SAT, JUL 02 2022 15:00
ROTOR ANGLE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_08_NL_H2PLNAT

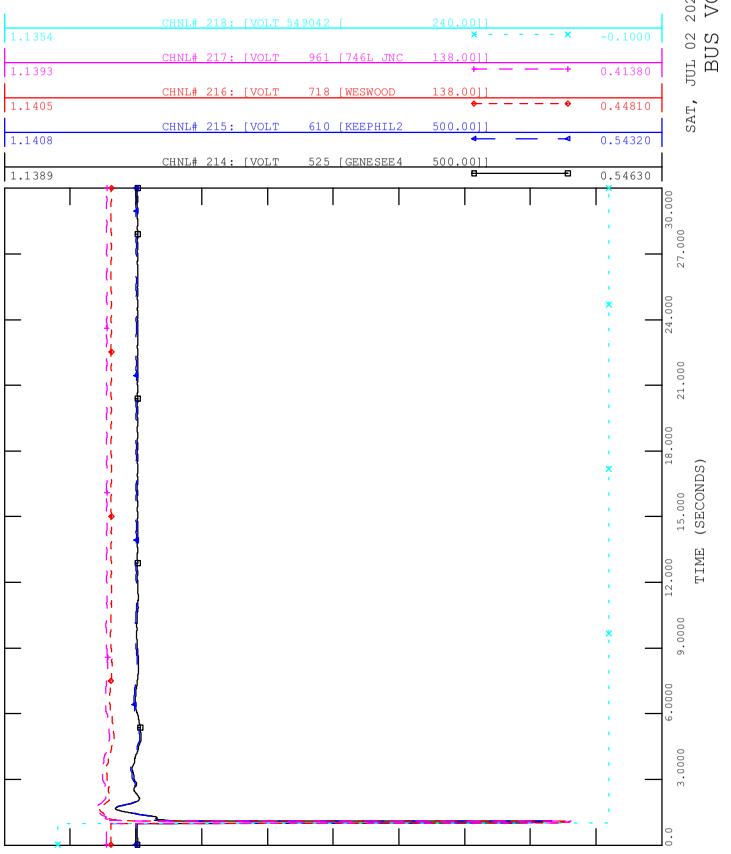
FILE: scn5a_SL_08_NL_H2Plnat.out



SAT, JUL 02 2022 15:00
REACTIVE POWER

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_08_NL_H2PLNAT

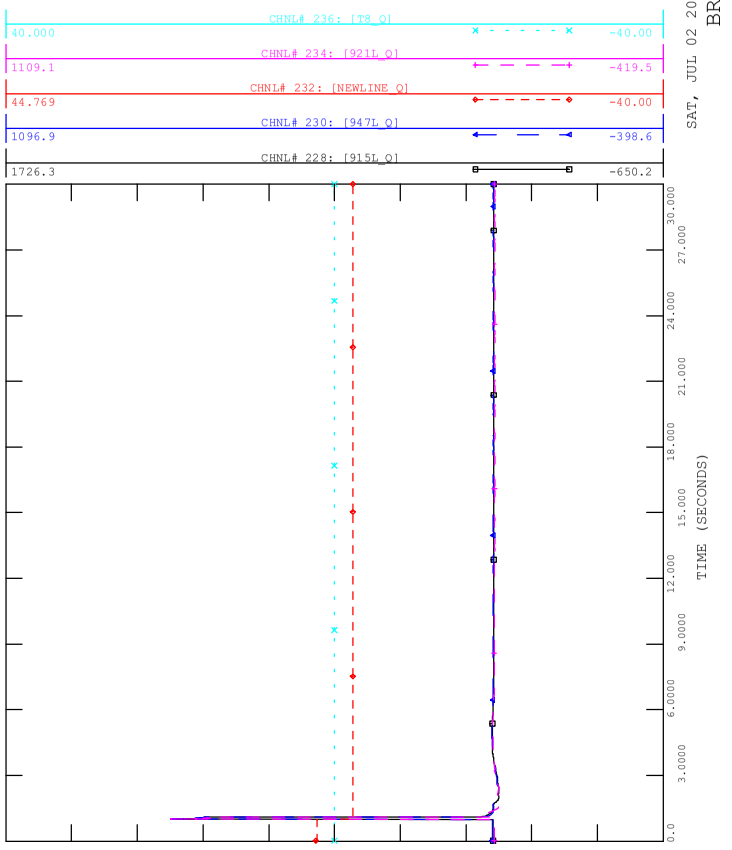
FILE: scn5a_SL_08_NL_H2Plnat.out



SAT, JUL 02 2022 15:00
BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_08_NL_H2PLNAT

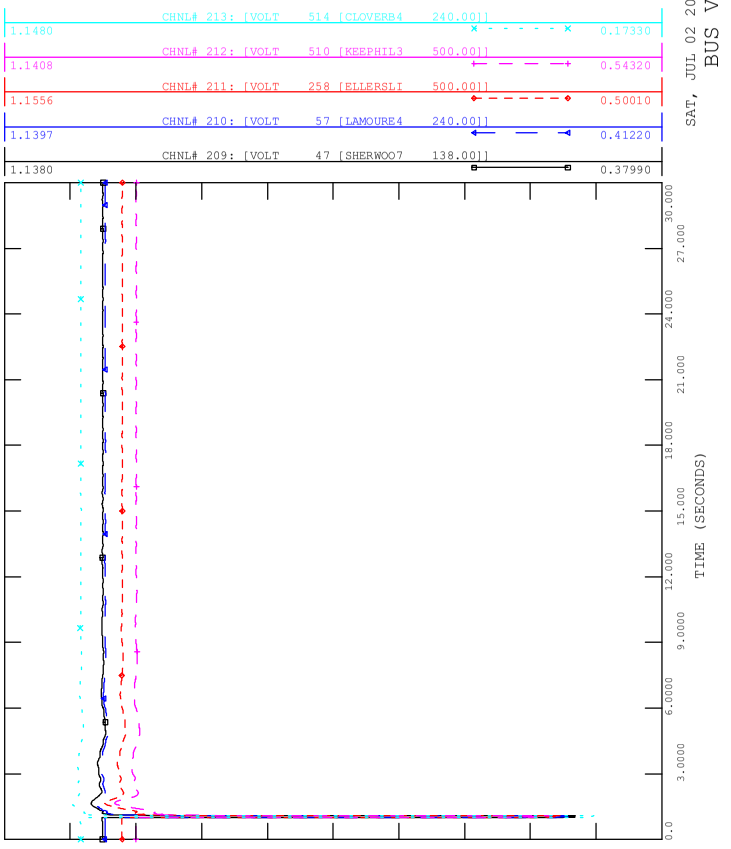
FILE: scn5a_SL_08_NL_H2Plnat.out



SAT, JUL 02 2022 15:00
BRANCH Q

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_08_NL_H2PLNAT

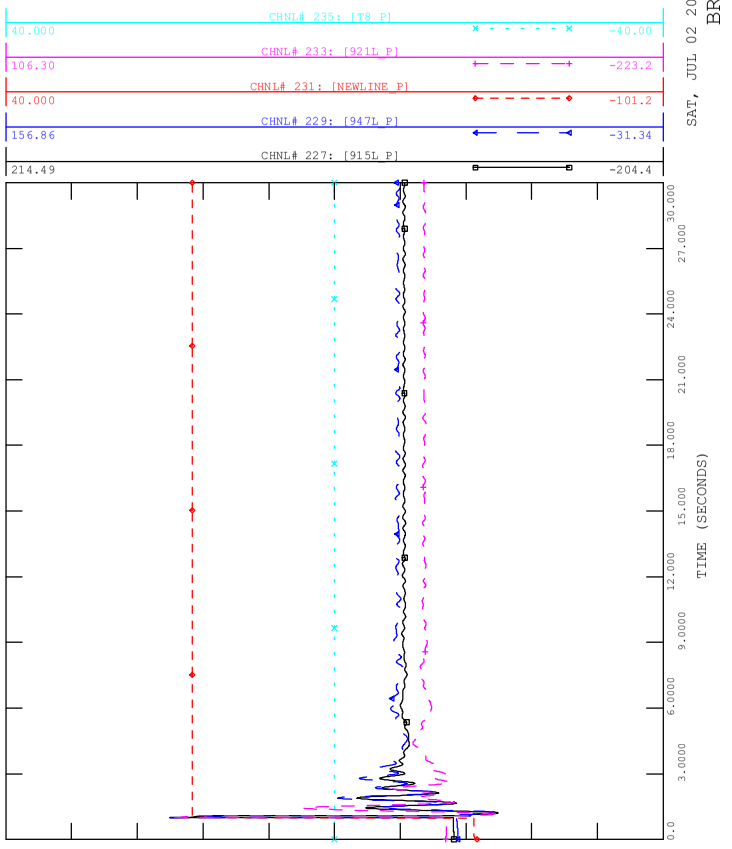
FILE: scn5a_SL_08_NL_H2Plnat.out



SAT, JUL 02 2022 15:00
BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_08_NL_H2PLNAT

FILE: scn5a_SL_08_NL_H2Plnat.out

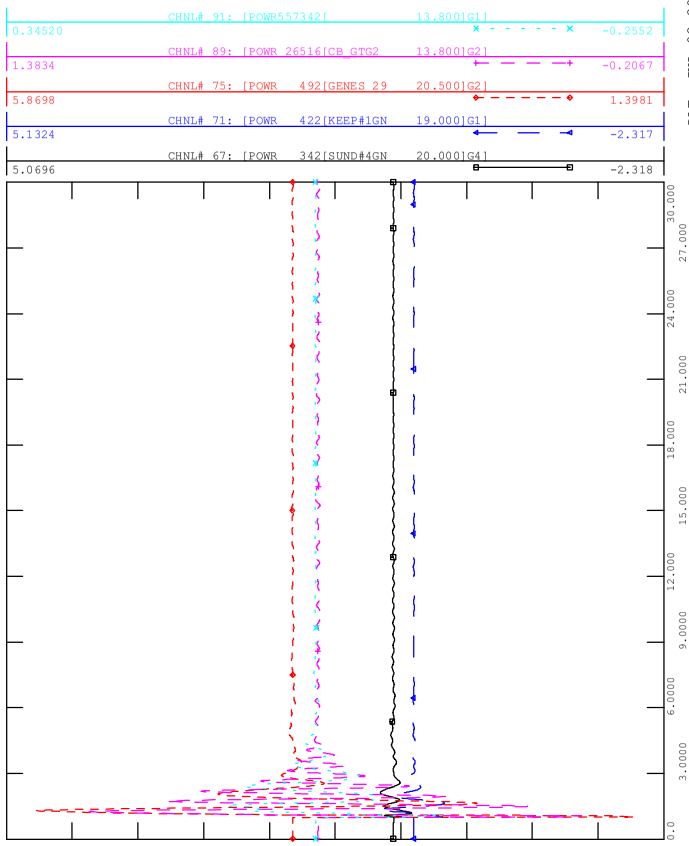


SAT, JUL 02 2022 15:00
BRANCH P

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_09_915L_947L_CLOVERBAR

FILE: scn5a_SL_09_915L_947L_CloverBar.out

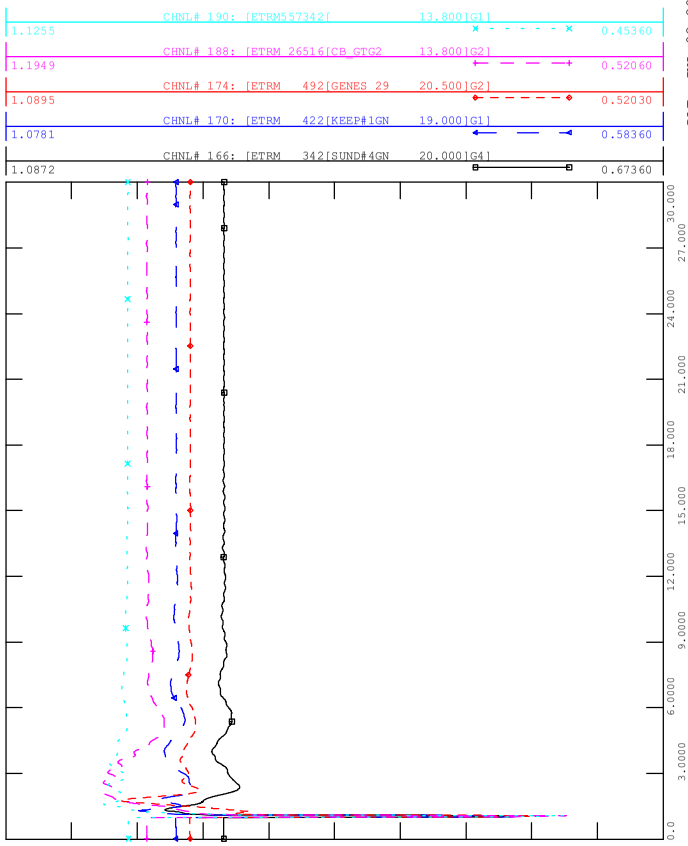
SAT, JUL 02 2022 15:00 ACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_09_915L_947L_CLOVERBAR

FILE: scn5a_SL_09_915L_947L_CloverBar.out

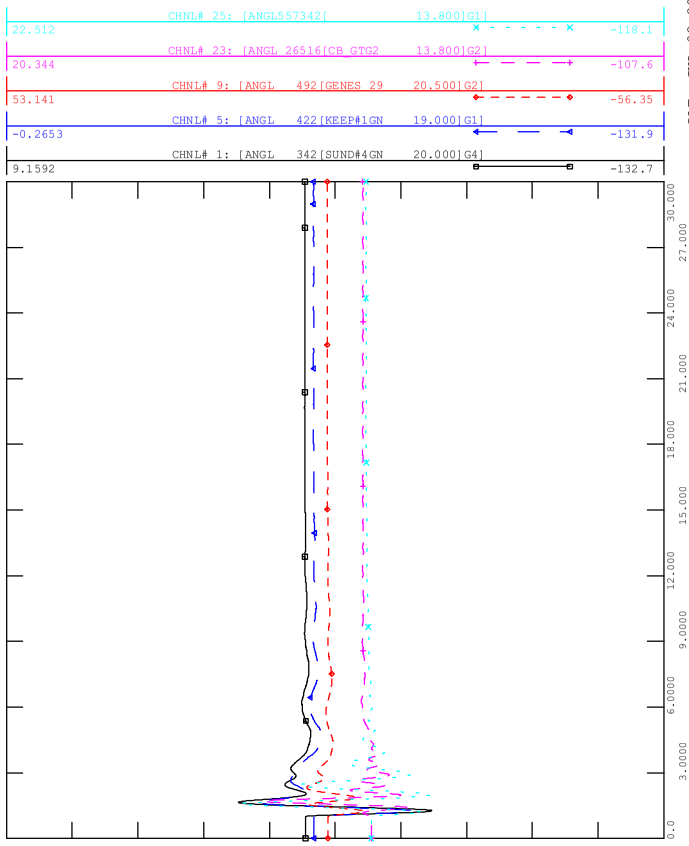
SAT, JUL 02 2022 15:00 TERMINAL VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_09_915L_947L_CLOVERBAR

FILE: scn5a_SL_09_915L_947L_CloverBar.out

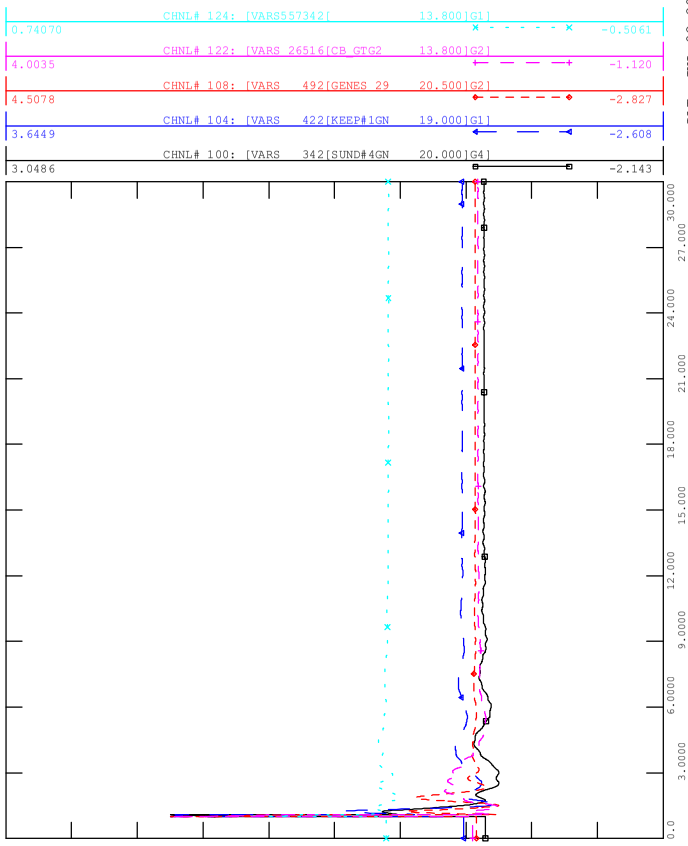
SAT, JUL 02 2022 15:00 ROTOR ANGLE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_09_915L_947L_CLOVERBAR

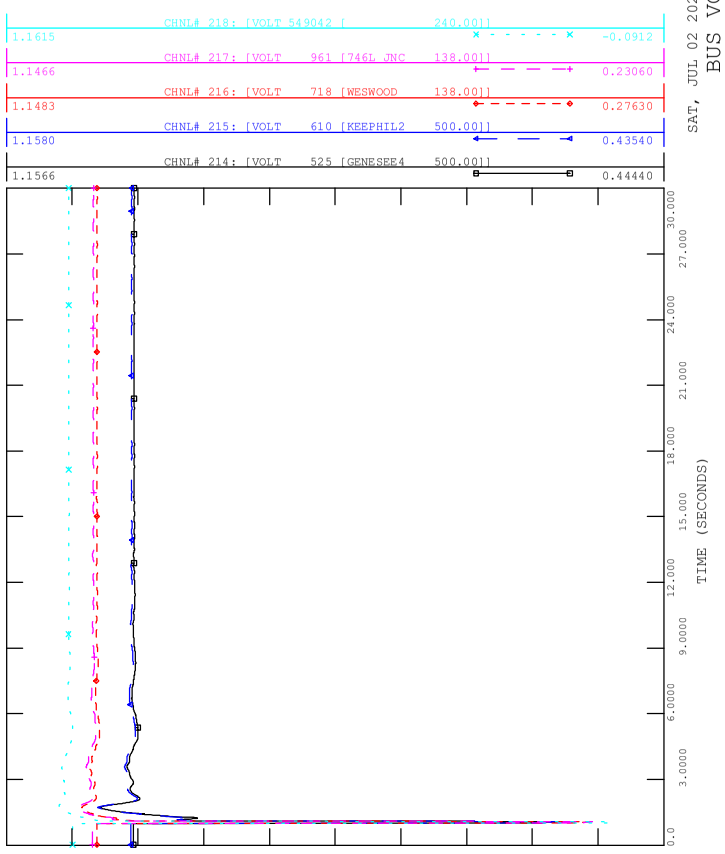
FILE: scn5a_SL_09_915L_947L_CloverBar.out

SAT, JUL 02 2022 15:00 REACTIVE POWER



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_09_915L_947L_CLOVERBAR

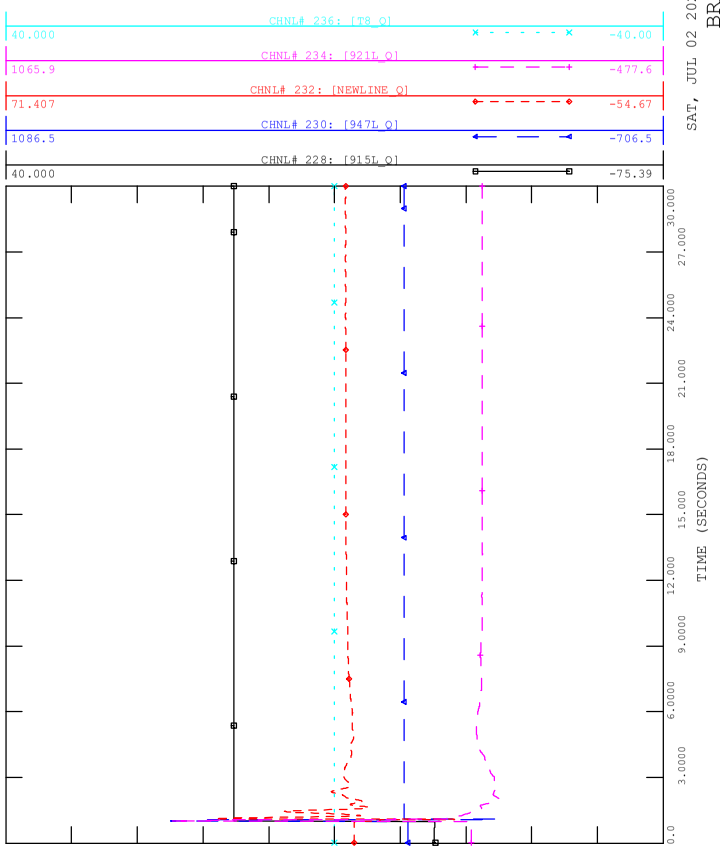
FILE: scn5a_SL_09_915L_947L_CloverBar.out



SAT, JUL 02 2022 15:00 BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_09_915L_947L_CLOVERBAR

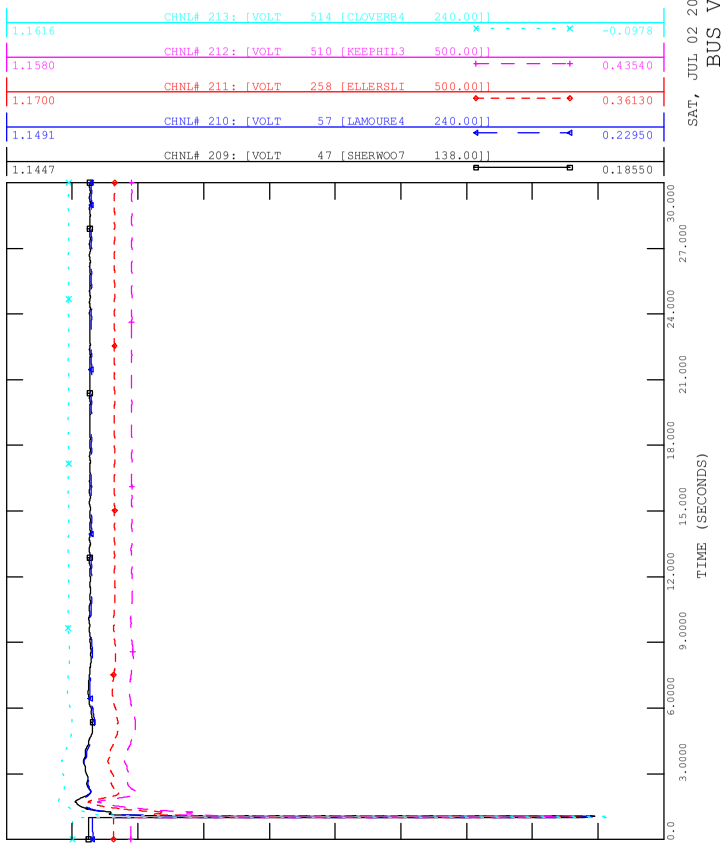
FILE: scn5a_SL_09_915L_947L_CloverBar.out



SAT, JUL 02 2022 15:00 BRANCH Q

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_09_915L_947L_CLOVERBAR

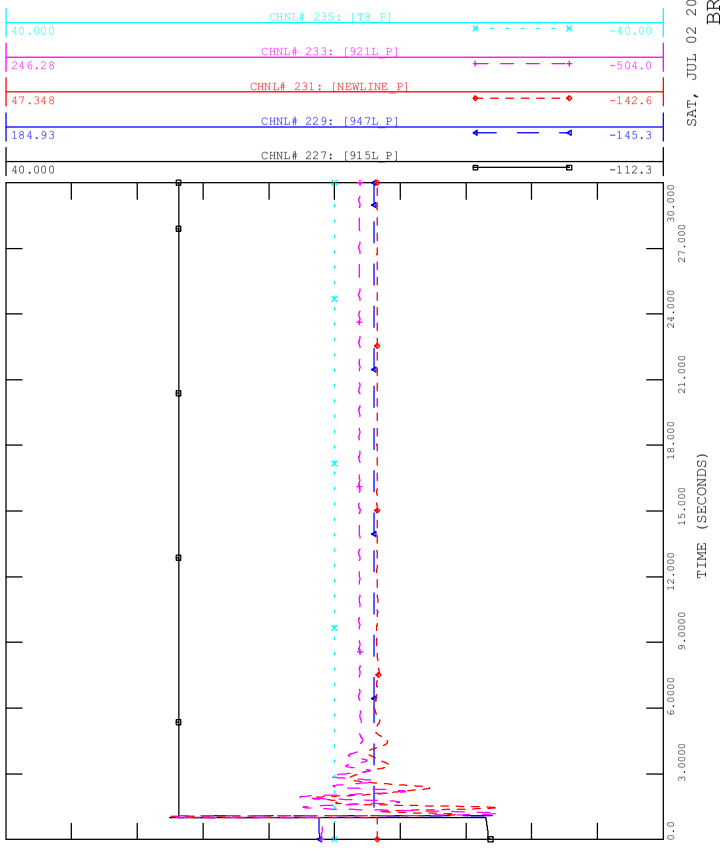
FILE: scn5a_SL_09_915L_947L_CloverBar.out



SAT, JUL 02 2022 15:00 BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -SCN5A_SL_09_915L_947L_CLOVERBAR

FILE: scn5a_SL_09_915L_947L_CloverBar.out



SAT, JUL 02 2022 15:00 BRANCH P

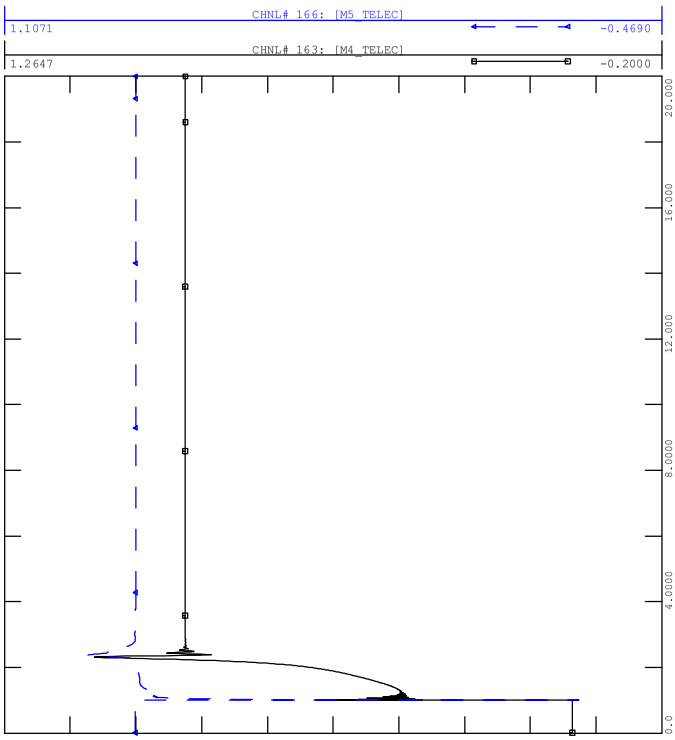
Attachment A6
Motor Start Curves and Voltage Diagrams

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_N0_M4

FILE: 2024SP_N0_M4.out

SAT, JUL 02 2022 15:17

MOTOR ELECTRIC TORQUE

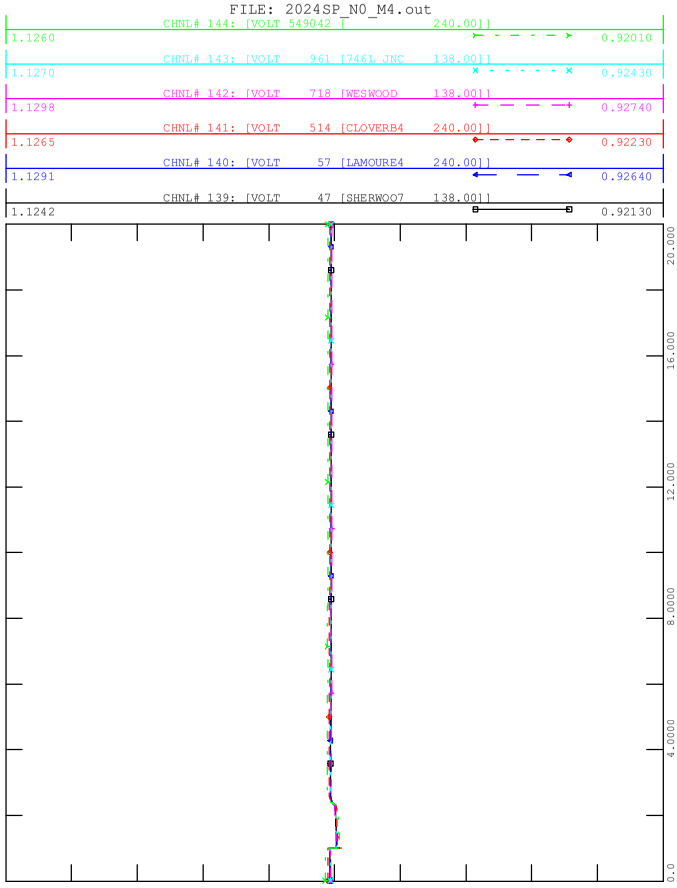


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_N0_M4

FILE: 2024SP_N0_M4.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

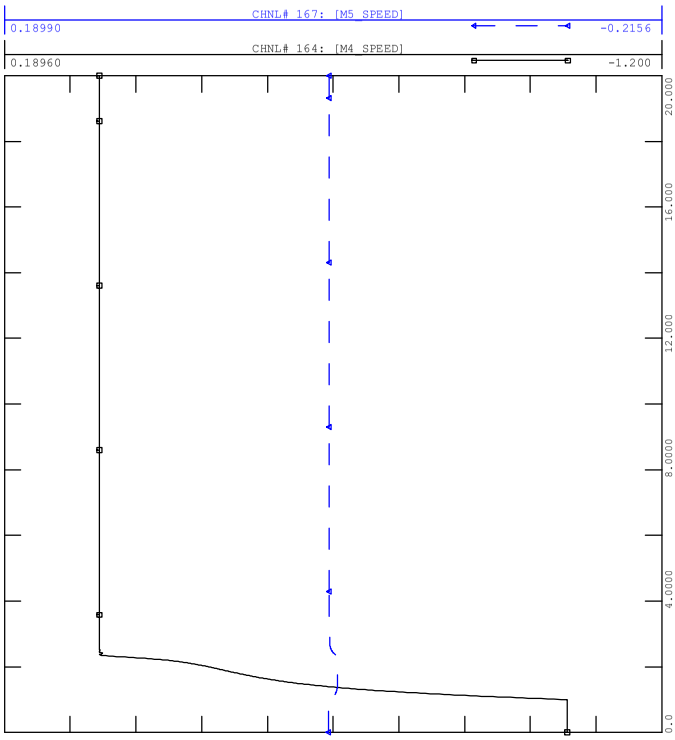


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_N0_M4

FILE: 2024SP_N0_M4.out

SAT, JUL 02 2022 15:17

MOTOR SPEED (DW)

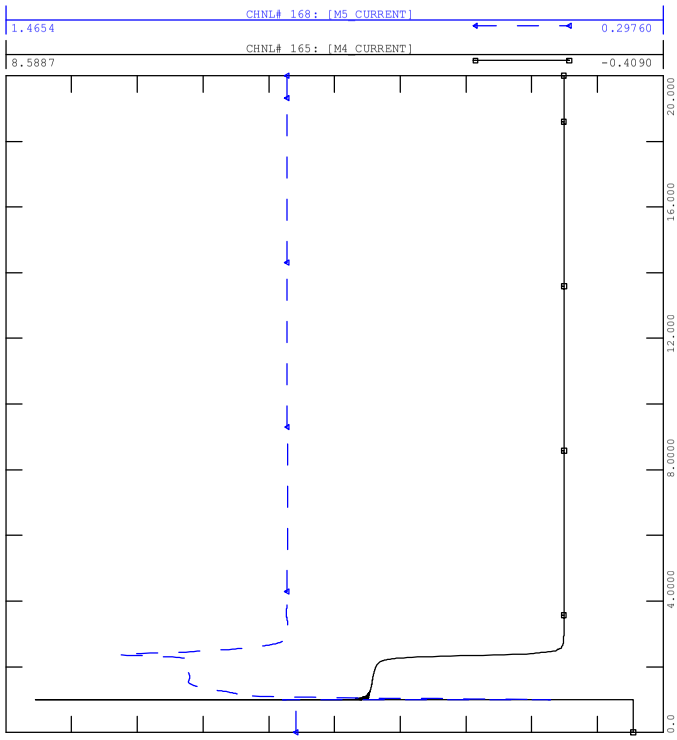


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_N0_M4

FILE: 2024SP_N0_M4.out

SAT, JUL 02 2022 15:17

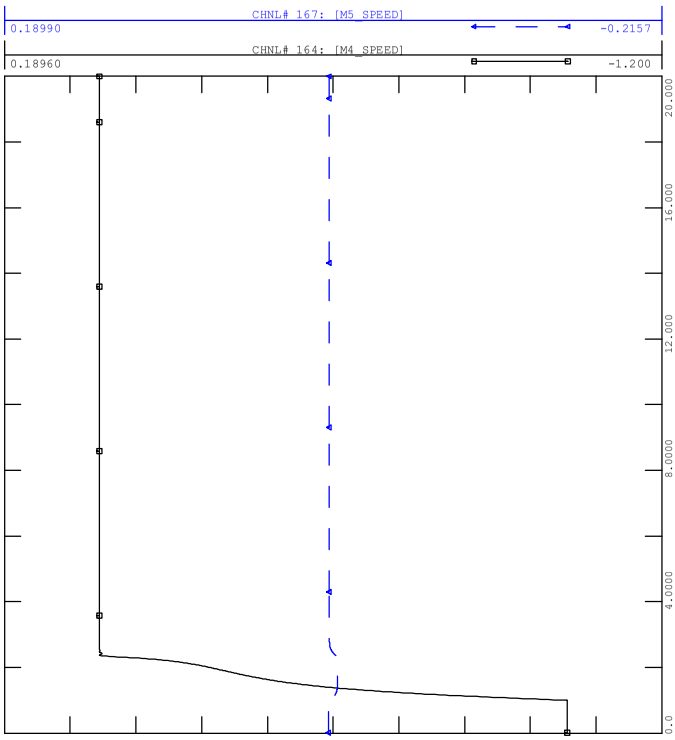
MOTOR CURRENT



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_915L_M4

FILE: 2024SP_915L_M4.out

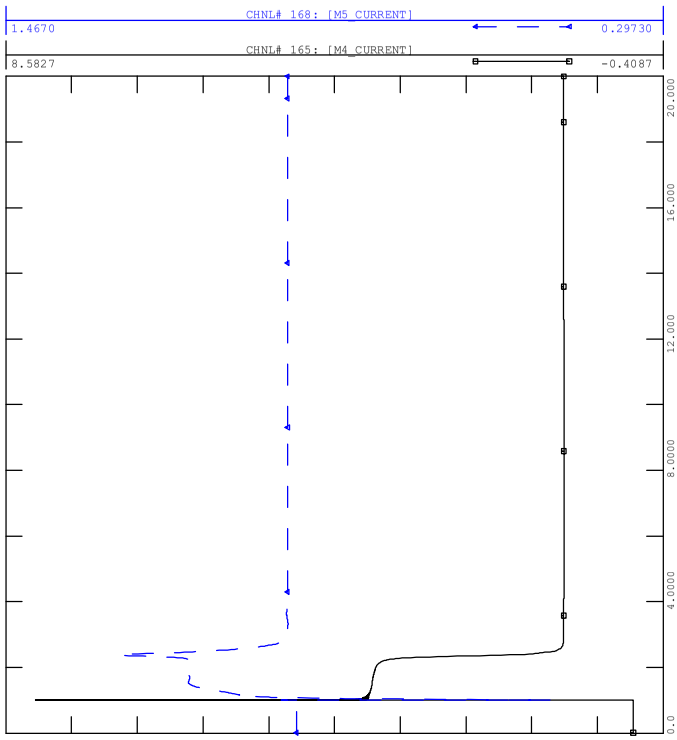
SAT, JUL 02 2022 15:17
MOTOR SPEED (DW)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_915L_M4

FILE: 2024SP_915L_M4.out

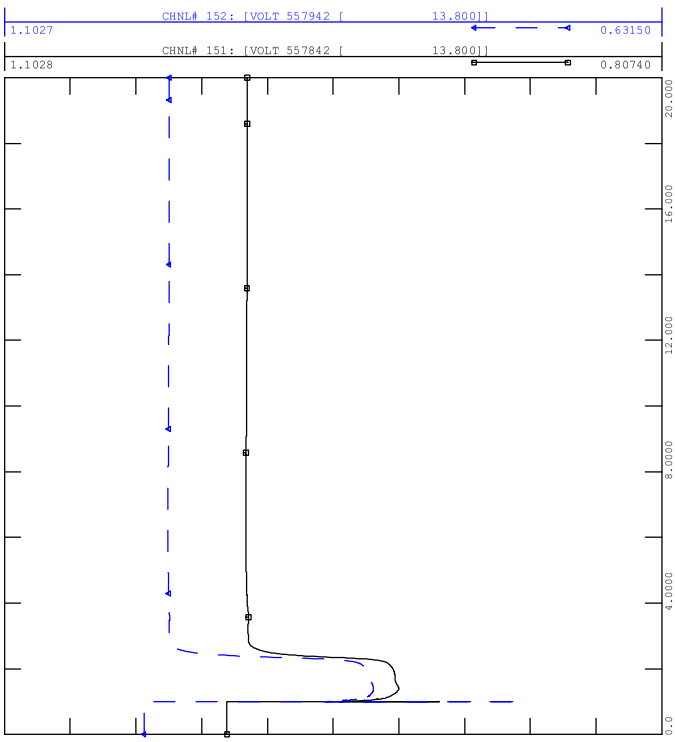
SAT, JUL 02 2022 15:17
MOTOR CURRENT



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_N0_M4

FILE: 2024SP_N0_M4.out

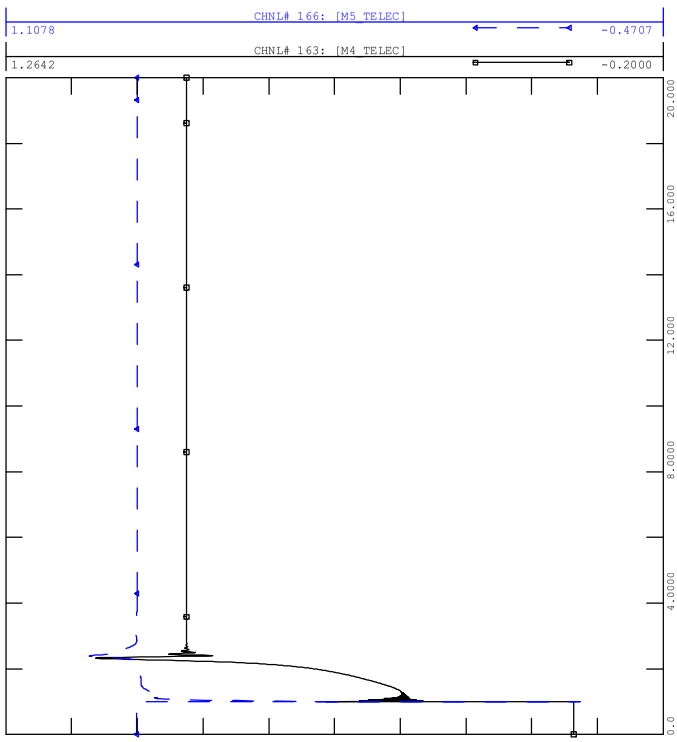
SAT, JUL 02 2022 15:17
BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_915L_M4

FILE: 2024SP_915L_M4.out

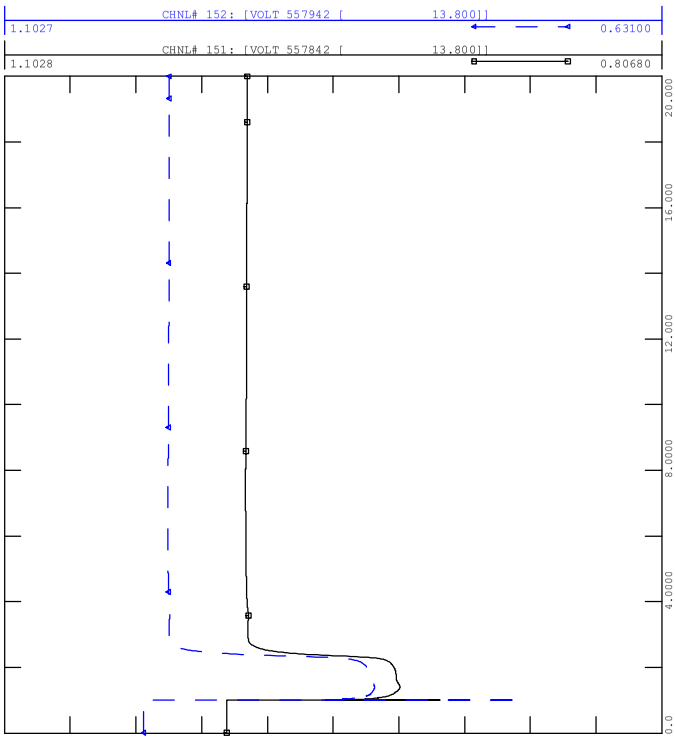
SAT, JUL 02 2022 15:17
MOTOR ELECTRIC TORQUE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_915L_M4

FILE: 2024SP_915L_M4.out

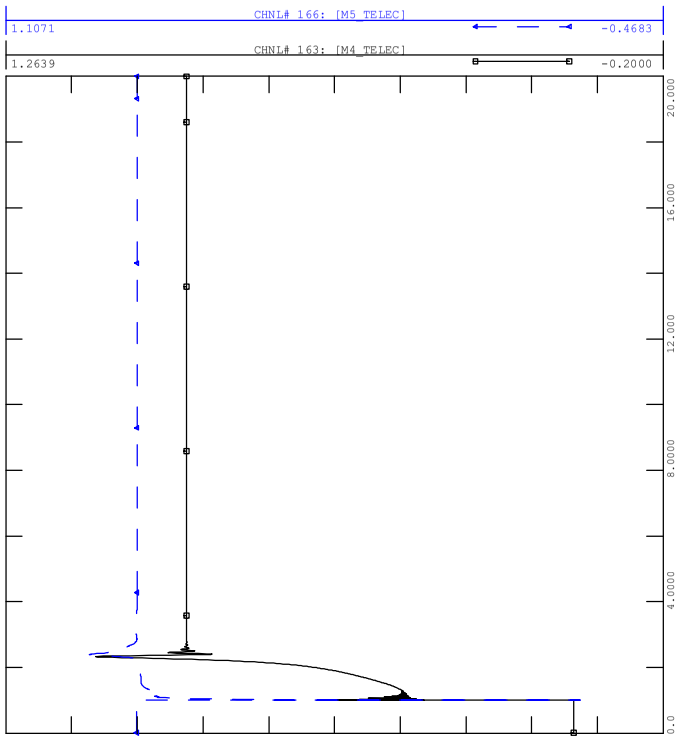
SAT, JUL 02 2022 15:17
BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_921L_M4

FILE: 2024SP_921L_M4.out

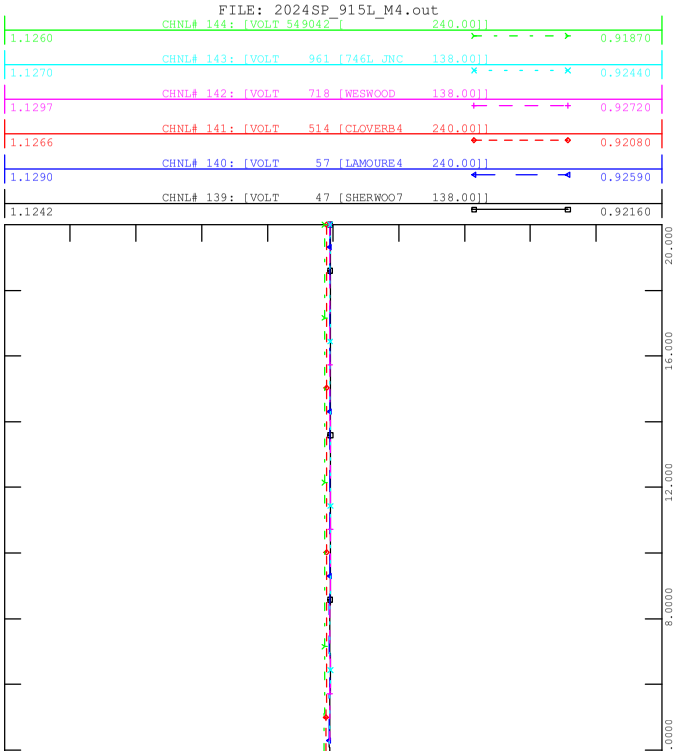
SAT, JUL 02 2022 15:17
MOTOR ELECTRIC TORQUE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_915L_M4

FILE: 2024SP_915L_M4.out

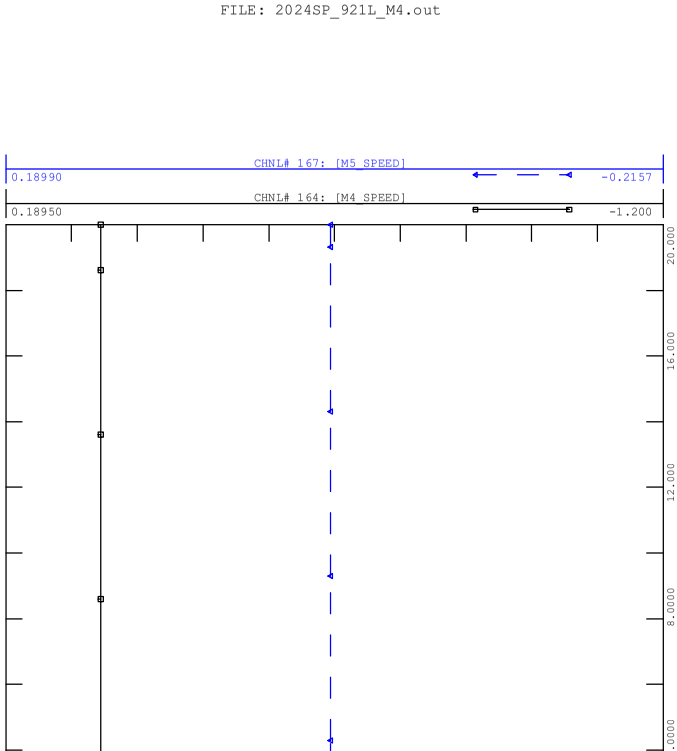
SAT, JUL 02 2022 15:17
BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_921L_M4

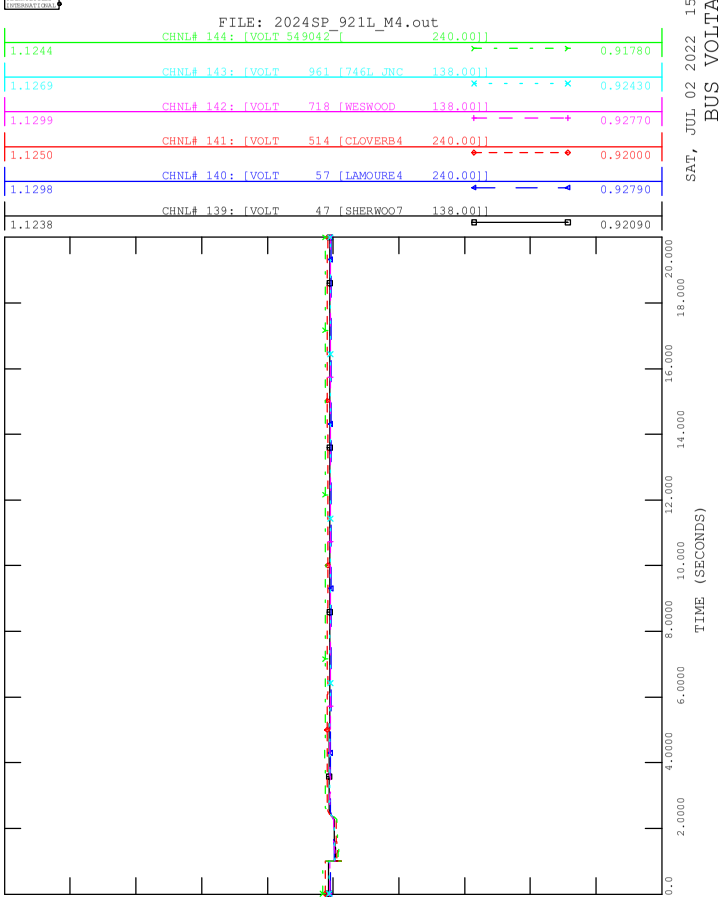
FILE: 2024SP_921L_M4.out

SAT, JUL 02 2022 15:17
MOTOR SPEED (DW)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_921L_M4

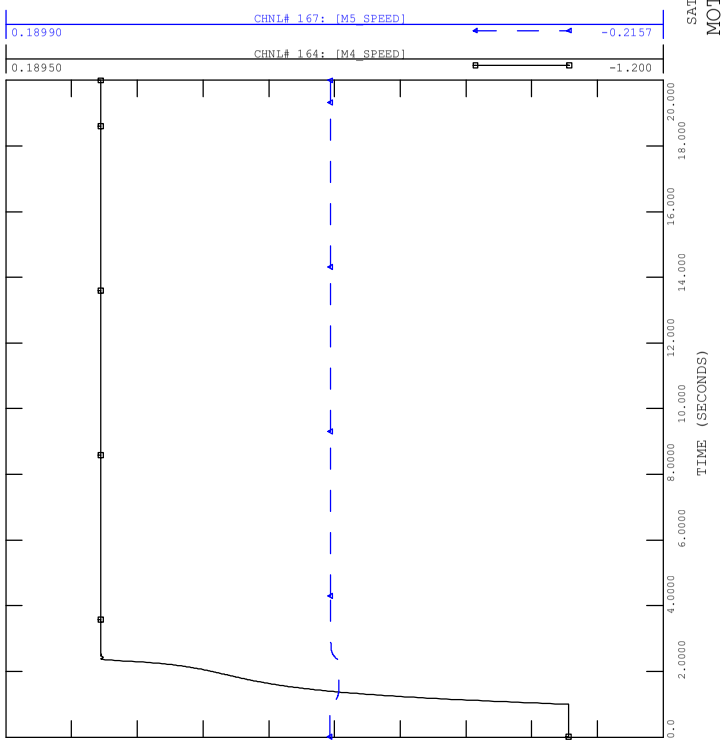
FILE: 2024SP_921L_M4.out



SAT, JUL 02 2022 15:17
BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_947L_M4

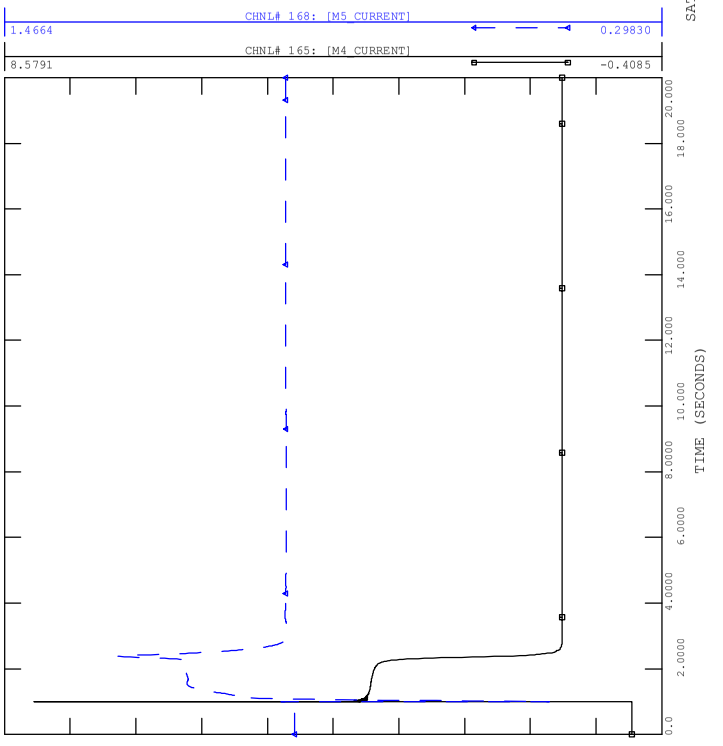
FILE: 2024SP_947L_M4.out



SAT, JUL 02 2022 15:17
MOTOR SPEED (DW)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_921L_M4

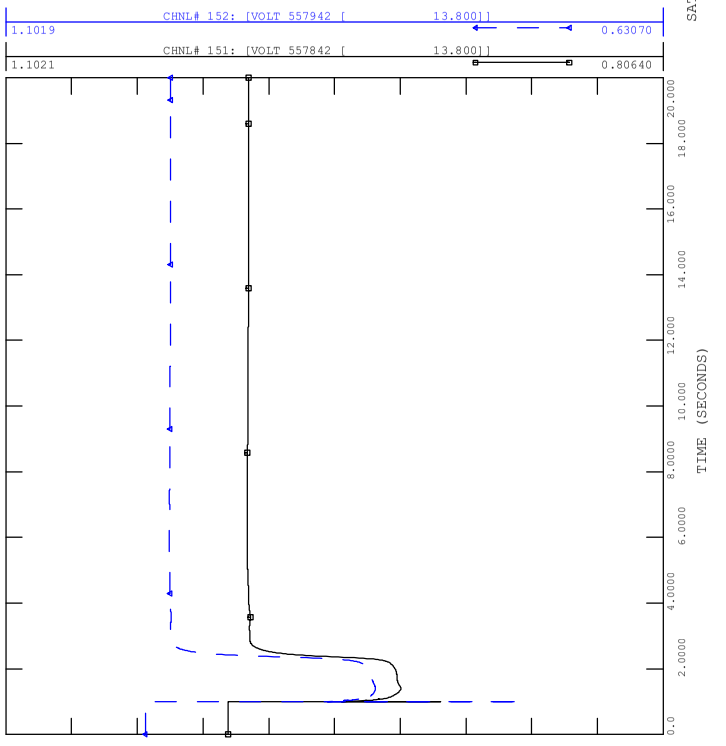
FILE: 2024SP_921L_M4.out



SAT, JUL 02 2022 15:17
MOTOR CURRENT

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_921L_M4

FILE: 2024SP_921L_M4.out



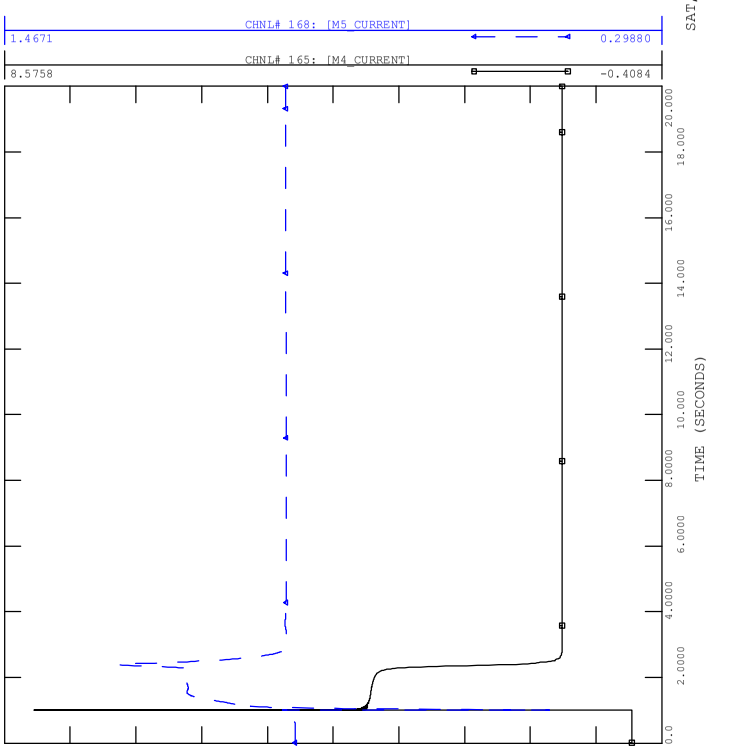
SAT, JUL 02 2022 15:17
BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_947L_M4

FILE: 2024SP_947L_M4.out

SAT, JUL 02 2022 15:17

MOTOR CURRENT

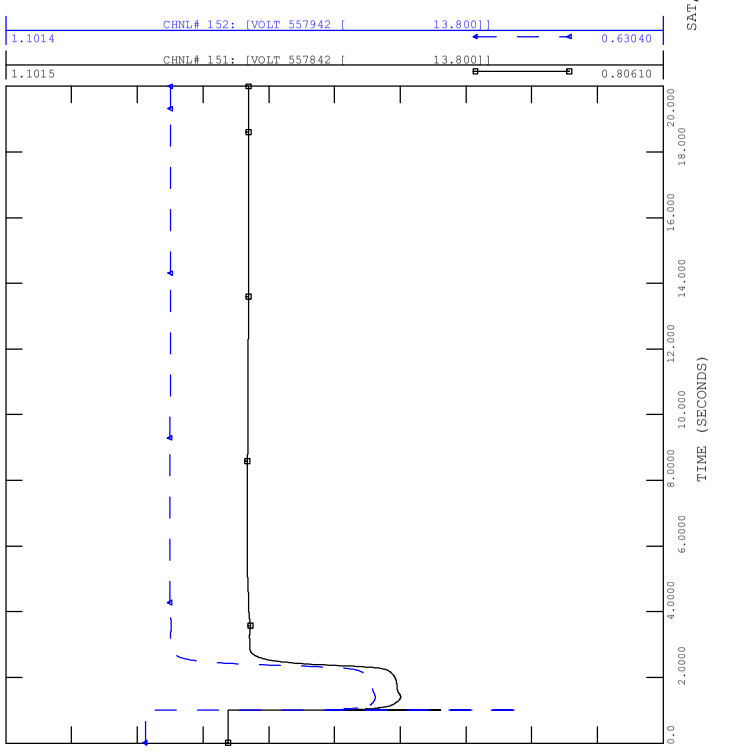


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_947L_M4

FILE: 2024SP_947L_M4.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

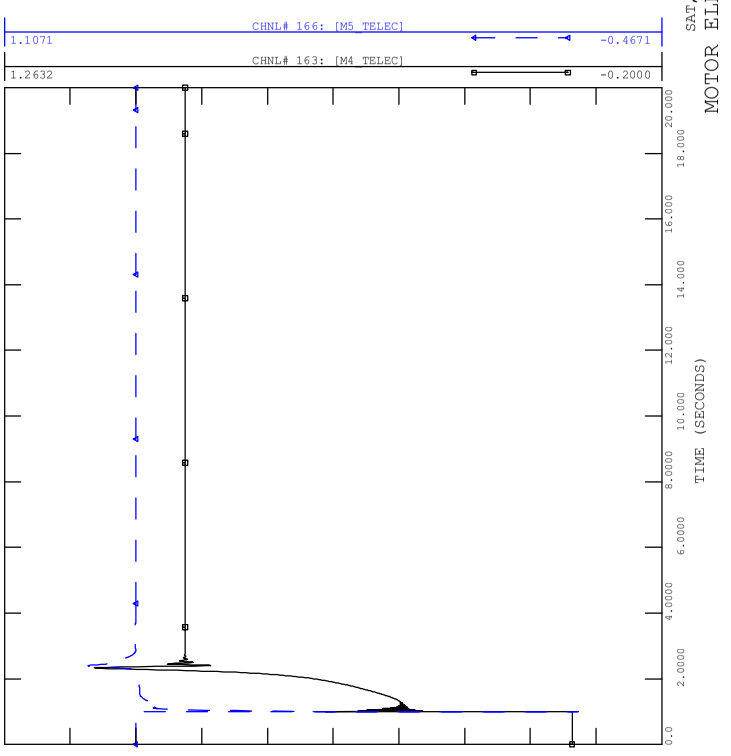


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_947L_M4

FILE: 2024SP_947L_M4.out

SAT, JUL 02 2022 15:17

MOTOR ELECTRIC TORQUE

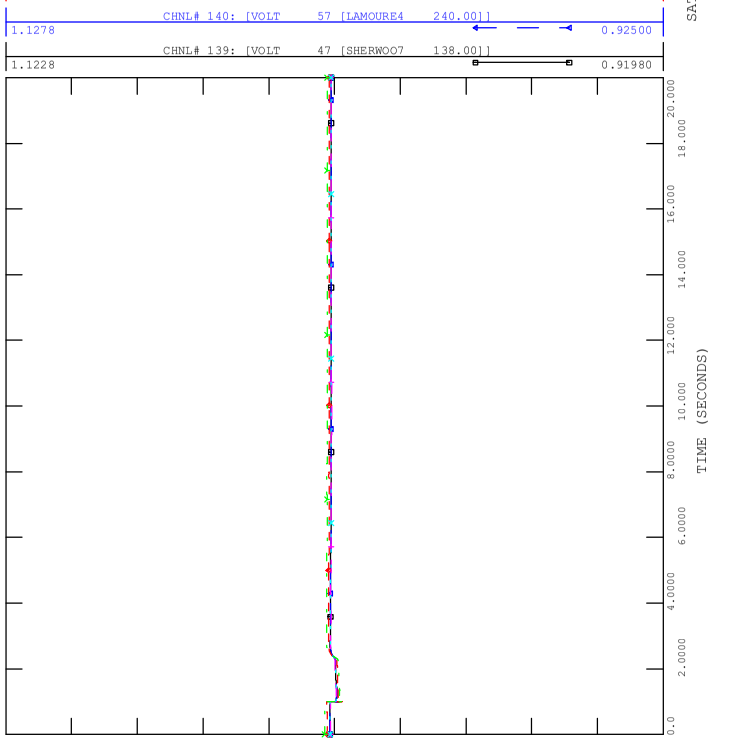


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_947L_M4

FILE: 2024SP_947L_M4.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_N0_M4

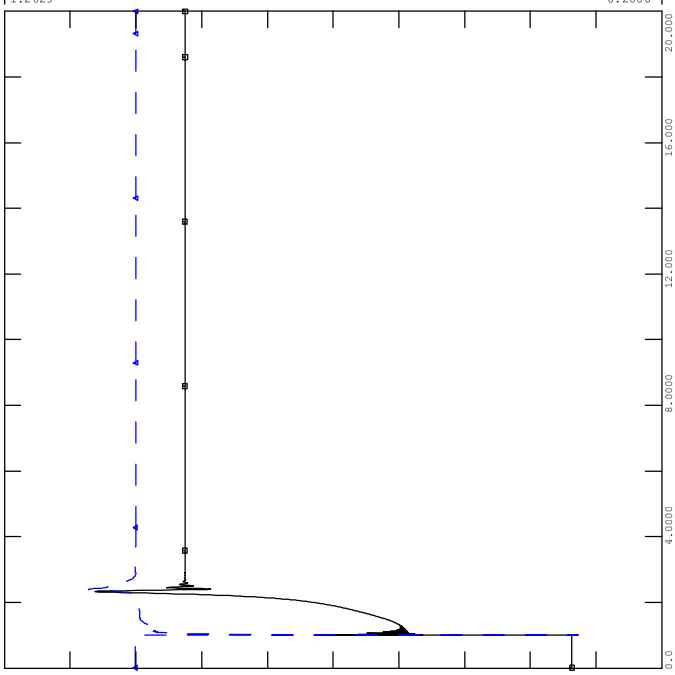
FILE: 2024WP_N0_M4.out

SAT, JUL 02 2022 15:17

MOTOR ELECTRIC TORQUE

CHNL# 166: [M5_TELEC] 1.1068 -0.4665
CHNL# 163: [M4_TELEC] 1.2629 -0.2000

TIME (SECONDS)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_N0_M4

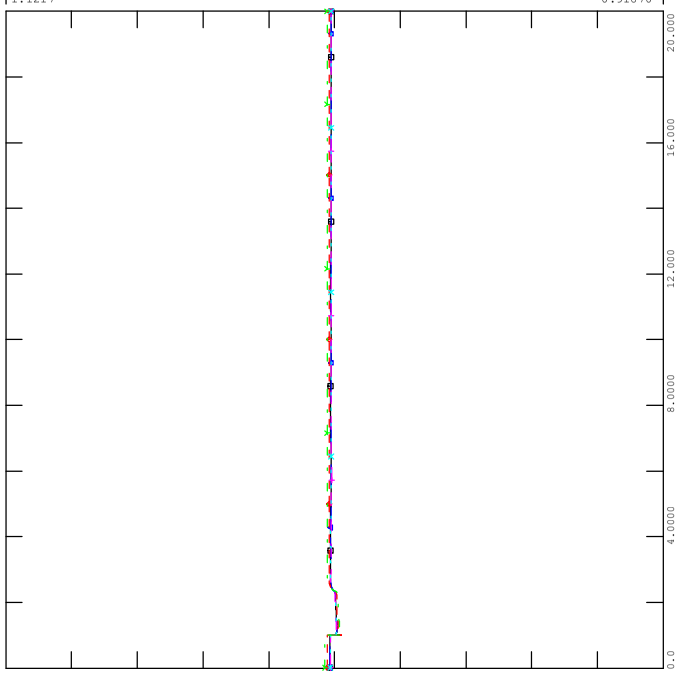
FILE: 2024WP_N0_M4.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

CHNL# 144: [VOLT 549042 [240.00]] 1.1231 0.91710
CHNL# 143: [VOLT 961 [746L JNC 138.00]] 1.1237 0.92100
CHNL# 142: [VOLT 718 [WESWOOD 138.00]] 1.1258 0.92330
CHNL# 141: [VOLT 514 [CLOVERB4 240.00]] 1.1236 0.91930
CHNL# 140: [VOLT 57 [LAMOURE4 240.00]] 1.1258 0.92300
CHNL# 139: [VOLT 47 [SHERWOO7 138.00]] 1.1217 0.91870

TIME (SECONDS)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_N0_M4

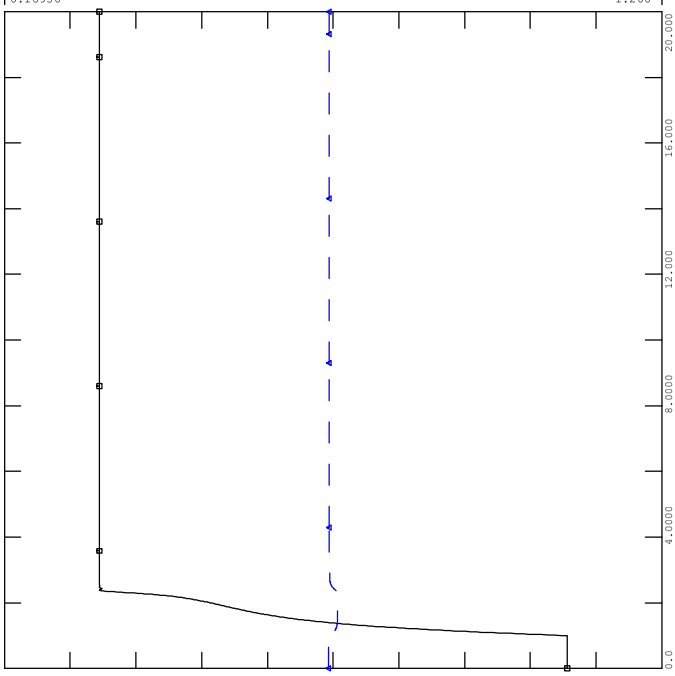
FILE: 2024WP_N0_M4.out

SAT, JUL 02 2022 15:17

MOTOR SPEED (DW)

CHNL# 167: [M5_SPEED] 0.18990 -0.2157
CHNL# 164: [M4_SPEED] 0.18950 -1.200

TIME (SECONDS)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_N0_M4

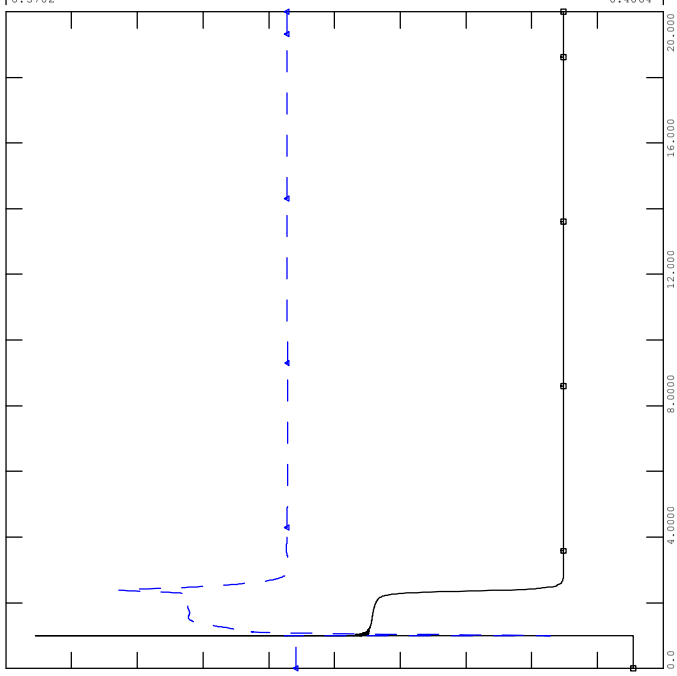
FILE: 2024WP_N0_M4.out

SAT, JUL 02 2022 15:17

MOTOR CURRENT

CHNL# 168: [M5_CURRENT] 1.4668 0.29890
CHNL# 165: [M4_CURRENT] 8.5762 -0.4084

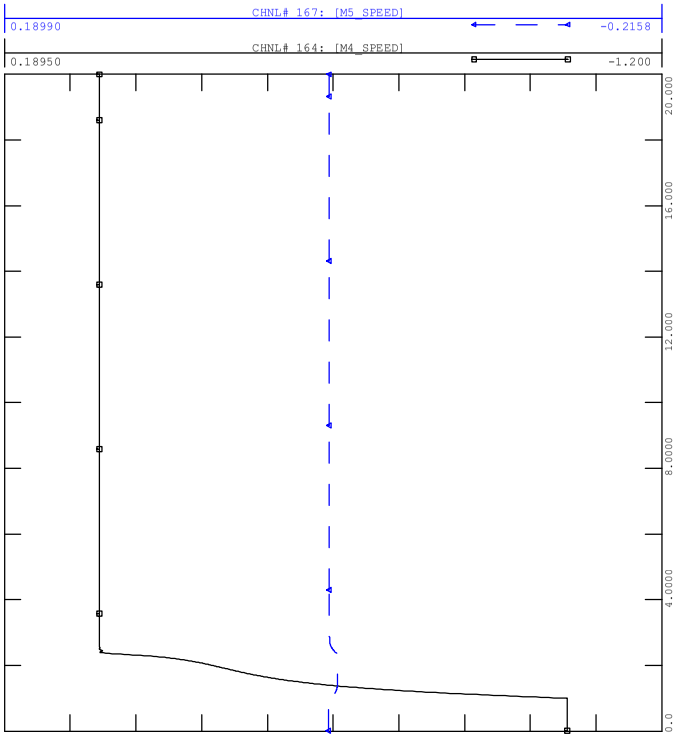
TIME (SECONDS)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_915L_M4

FILE: 2024WP_915L_M4.out

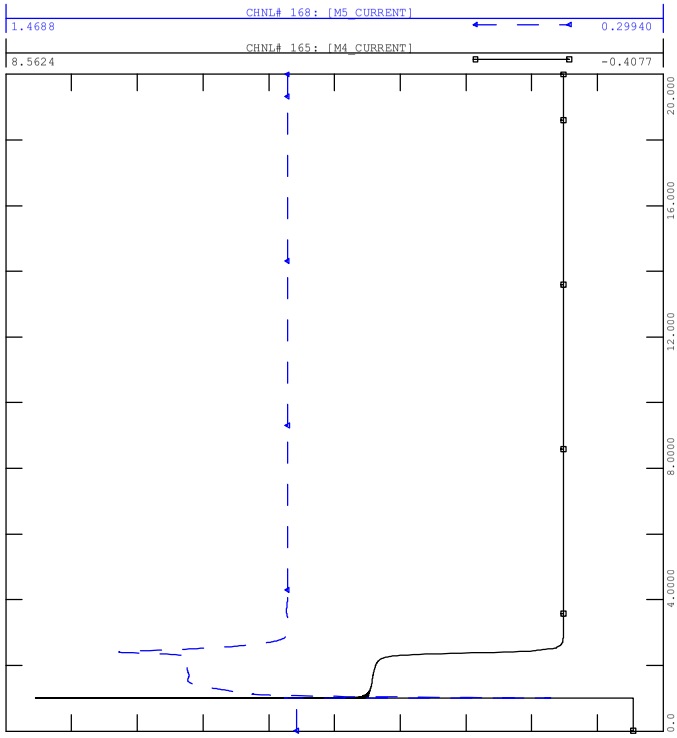
SAT, JUL 02 2022 15:17
MOTOR SPEED (DW)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_915L_M4

FILE: 2024WP_915L_M4.out

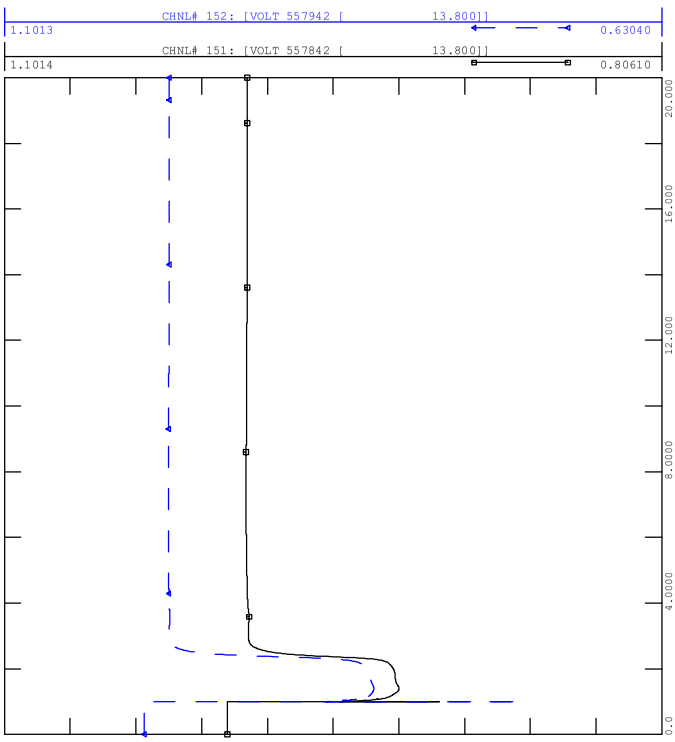
SAT, JUL 02 2022 15:17
MOTOR CURRENT



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_N0_M4

FILE: 2024WP_N0_M4.out

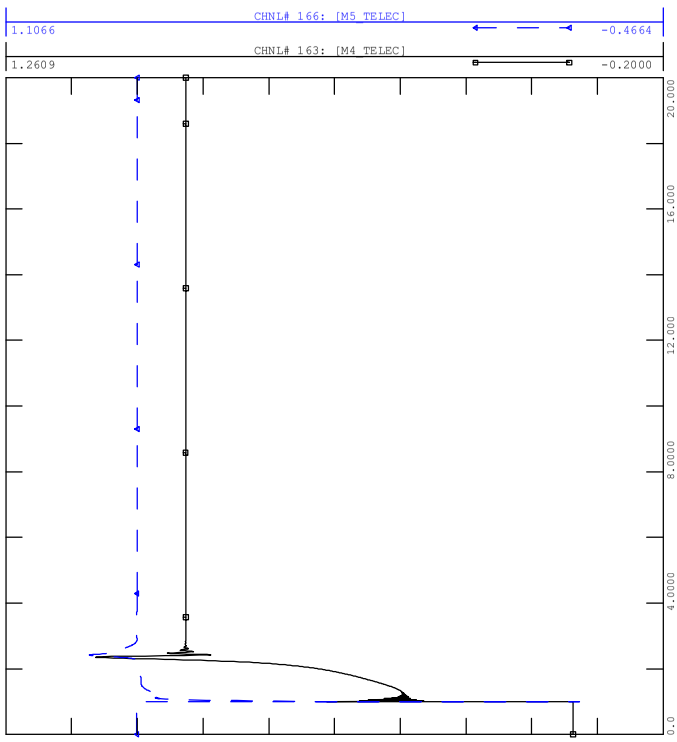
SAT, JUL 02 2022 15:17
BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_915L_M4

FILE: 2024WP_915L_M4.out

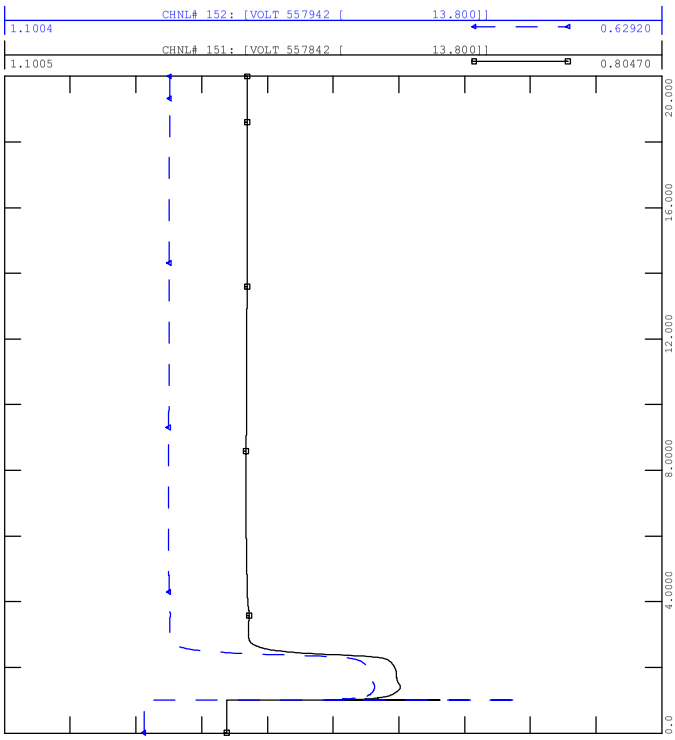
SAT, JUL 02 2022 15:17
MOTOR ELECTRIC TORQUE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_915L_M4

FILE: 2024WP_915L_M4.out

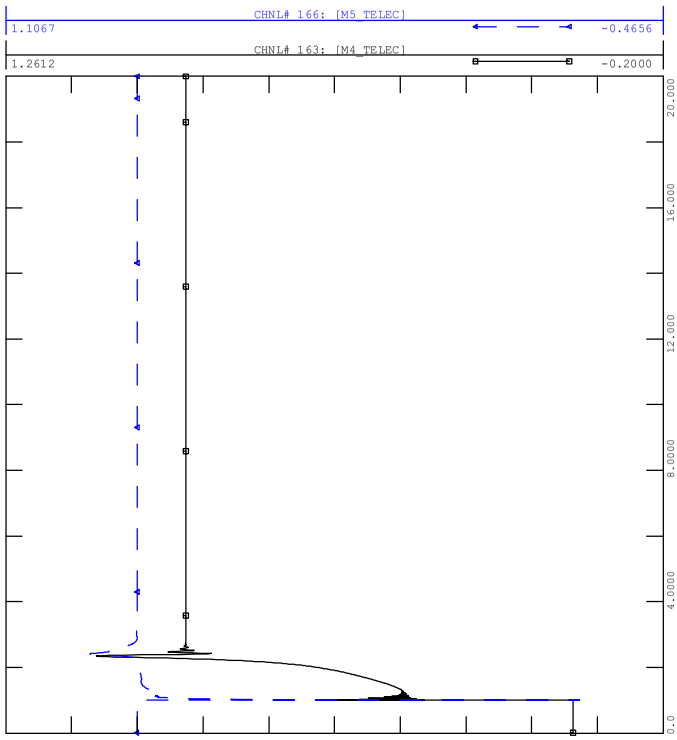
SAT, JUL 02 2022 15:17
BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_921L_M4

FILE: 2024WP_921L_M4.out

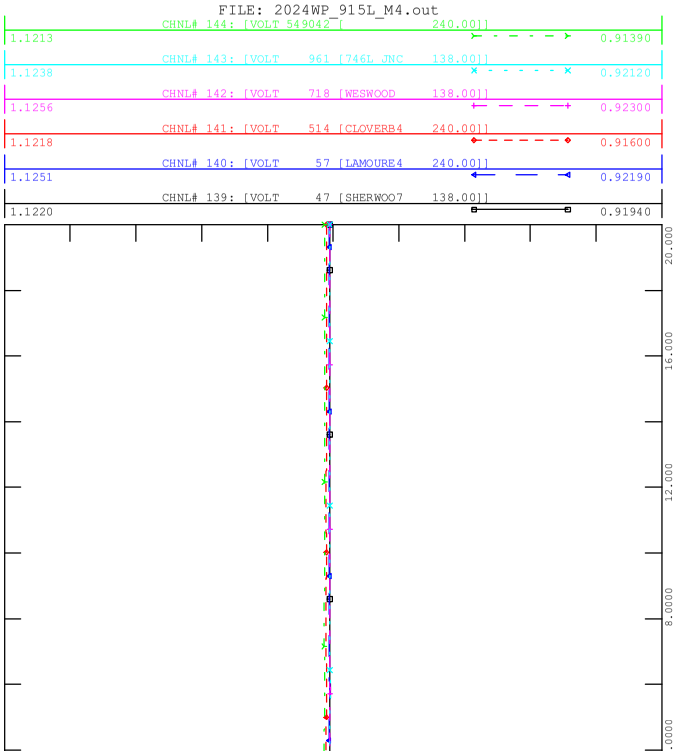
SAT, JUL 02 2022 15:17
MOTOR ELECTRIC TORQUE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_915L_M4

FILE: 2024WP_915L_M4.out

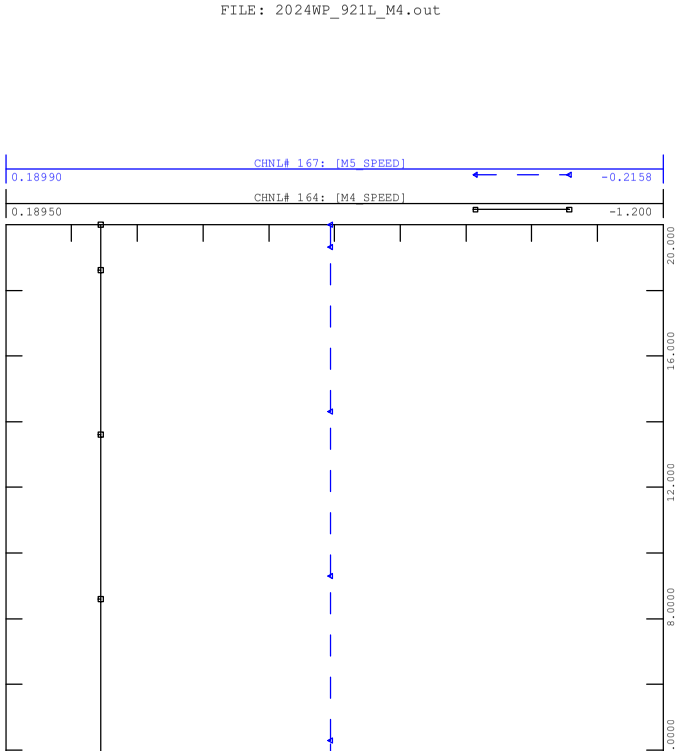
SAT, JUL 02 2022 15:17
BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_921L_M4

FILE: 2024WP_921L_M4.out

SAT, JUL 02 2022 15:17
MOTOR SPEED (DW)

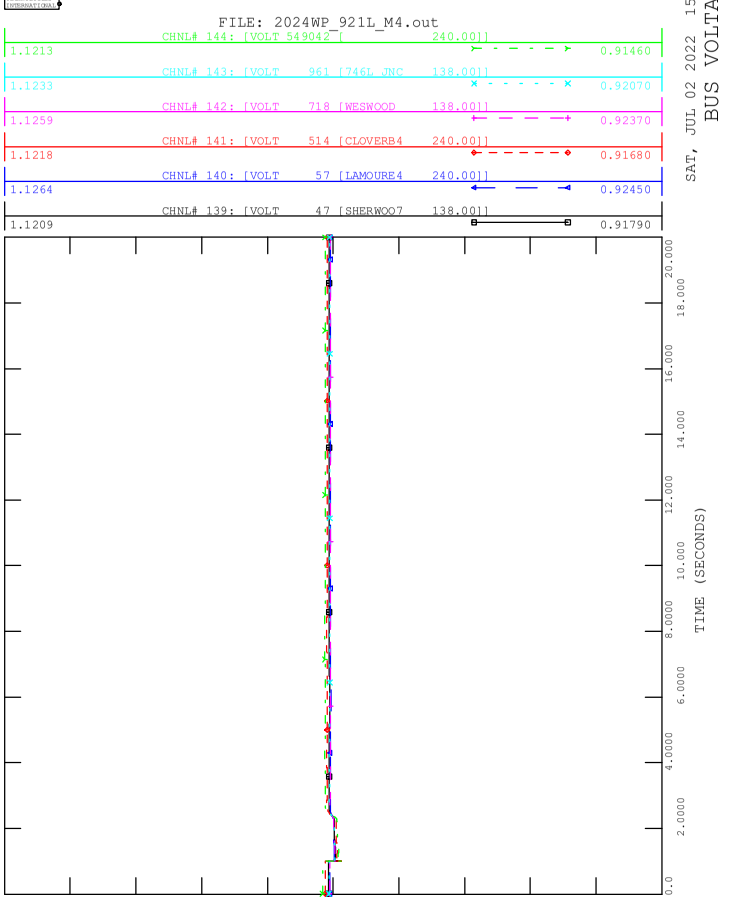


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_921L_M4

FILE: 2024WP_921L_M4.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

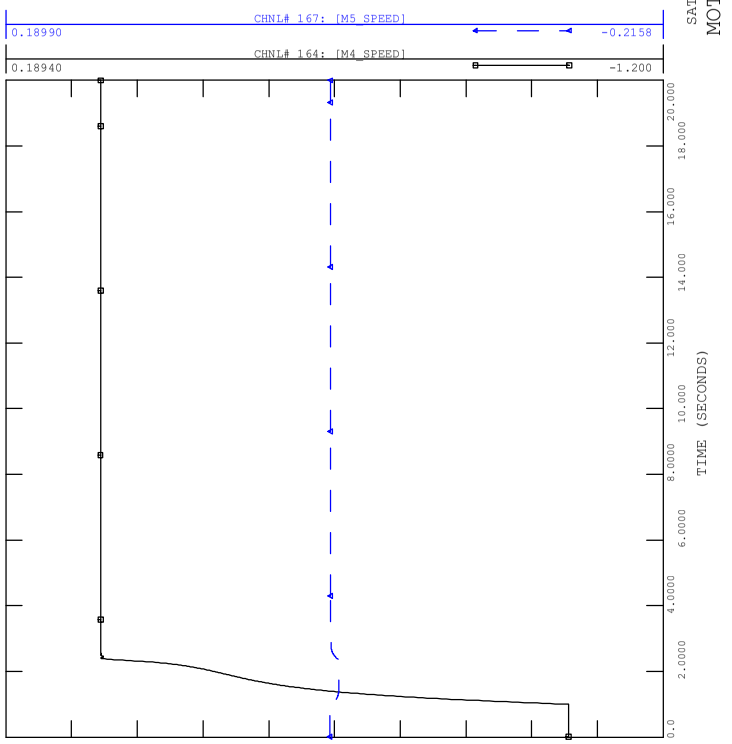


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_947L_M4

FILE: 2024WP_947L_M4.out

SAT, JUL 02 2022 15:17

MOTOR SPEED (DW)

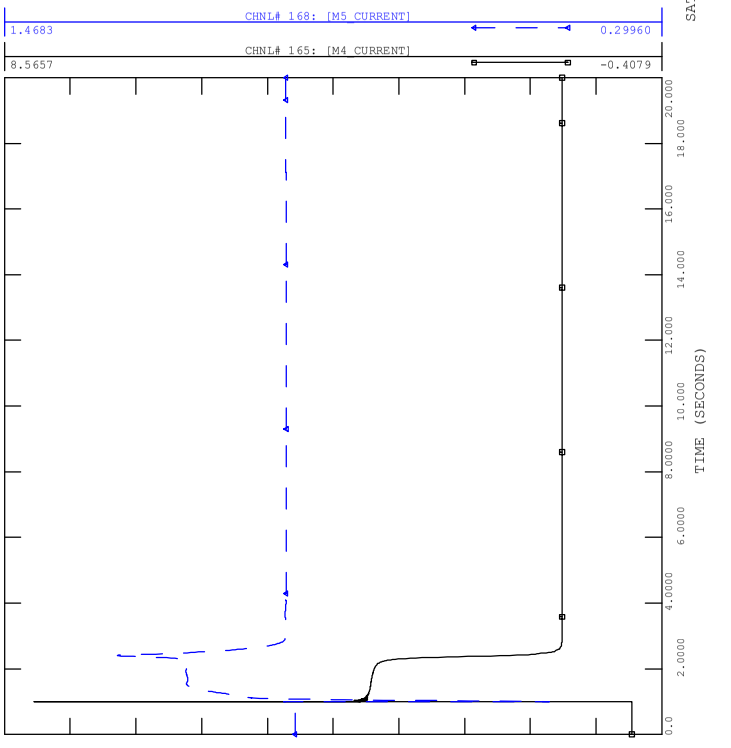


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_921L_M4

FILE: 2024WP_921L_M4.out

SAT, JUL 02 2022 15:17

MOTOR CURRENT

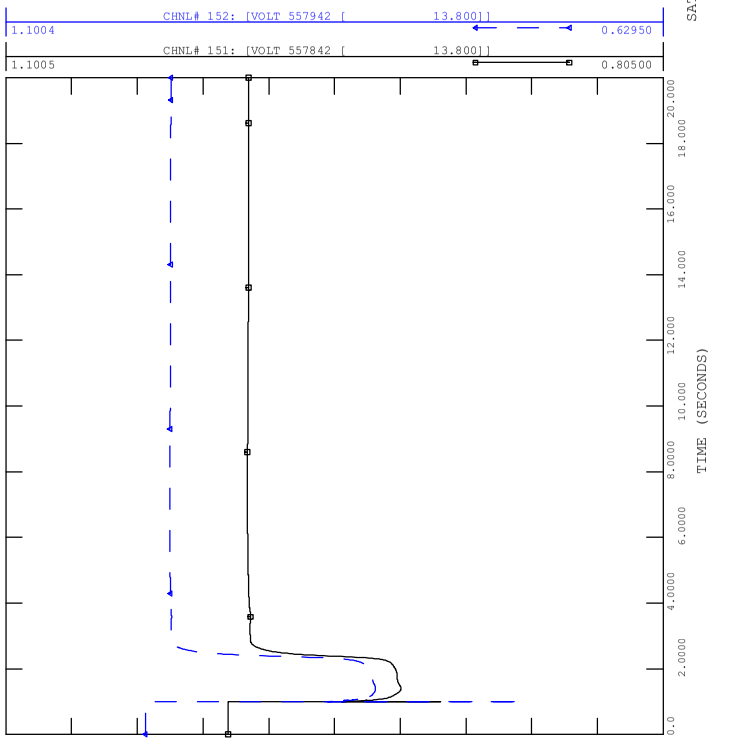


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_921L_M4

FILE: 2024WP_921L_M4.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_947L_M4

FILE: 2024WP_947L_M4.out

SAT, JUL 02 2022 15:17

MOTOR CURRENT

CHNL# 168: [M5_CURRENT]
1.4687 0.30040

CHNL# 165: [M4_CURRENT]
8.5603 -0.4076

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_947L_M4

FILE: 2024WP_947L_M4.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

CHNL# 152: [VOLT 557942 [13.800]]
1.0996 0.62910

CHNL# 151: [VOLT 557842 [13.800]]
1.0997 0.80440

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_947L_M4

FILE: 2024WP_947L_M4.out

SAT, JUL 02 2022 15:17

MOTOR ELECTRIC TORQUE

CHNL# 166: [M5_TELEC]
1.1064 -0.4639

CHNL# 163: [M4_TELEC]
1.2603 -0.2000

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_947L_M4

FILE: 2024WP_947L_M4.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

CHNL# 144: [VOLT 549042 [240.00]]
1.1198 0.91340

CHNL# 143: [VOLT 961 [746L JNC 138.00]]
1.1222 0.91930

CHNL# 142: [VOLT 718 [WESWOOD 138.00]]
1.1243 0.92170

CHNL# 141: [VOLT 514 [CLOVERB4 240.00]]
1.1203 0.91550

CHNL# 140: [VOLT 57 [LAMOURE4 240.00]]
1.1241 0.92120

CHNL# 139: [VOLT 47 [SHERWOO7 138.00]]
1.1200 0.91690

TIME (SECONDS)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_N0_M5

FILE: 2024SP_N0_M5.out

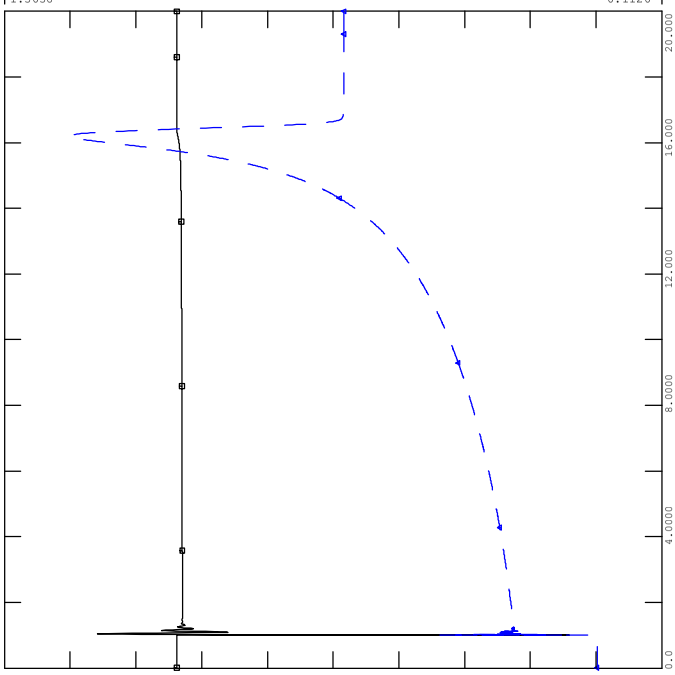
SAT, JUL 02 2022 15:17

MOTOR ELECTRIC TORQUE

CHNL# 166: [M5_TELEC] 1.8291 -0.2000

CHNL# 163: [M4_TELEC] 1.3038 -0.1120

TIME (SECONDS)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_N0_M5

FILE: 2024SP_N0_M5.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

CHNL# 144: [VOLT 549042 [240.00]] 1.1260 0.92050

CHNL# 143: [VOLT 961 [746L JNC 138.00]] 1.1273 0.92450

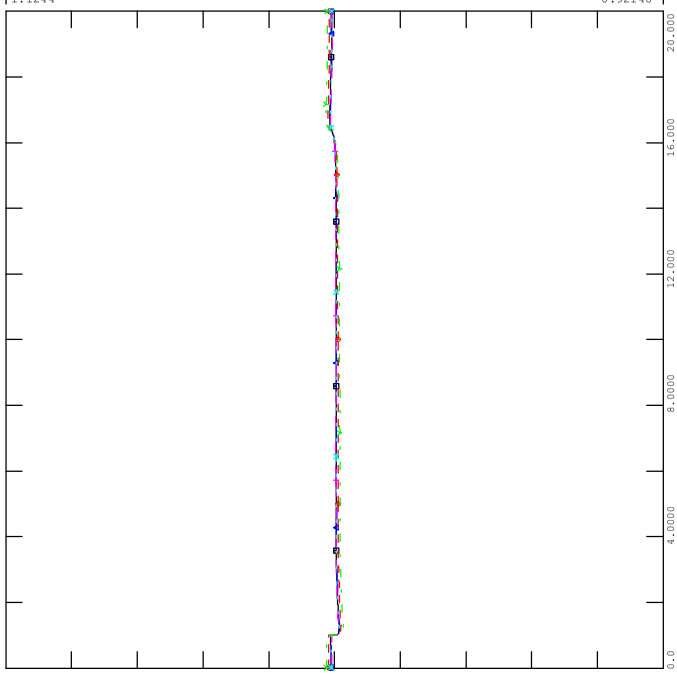
CHNL# 142: [VOLT 718 [WESWOOD 138.00]] 1.1302 0.92750

CHNL# 141: [VOLT 514 [CLOVERB4 240.00]] 1.1266 0.92250

CHNL# 140: [VOLT 57 [LAMOURE4 240.00]] 1.1294 0.92660

CHNL# 139: [VOLT 47 [SHERWOO7 138.00]] 1.1244 0.92140

TIME (SECONDS)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_N0_M5

FILE: 2024SP_N0_M5.out

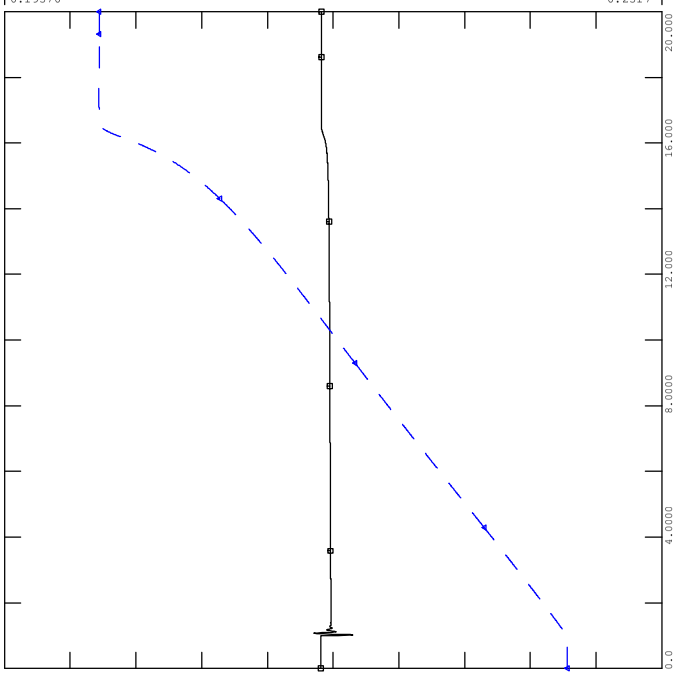
SAT, JUL 02 2022 15:17

MOTOR SPEED (DW)

CHNL# 167: [M5_SPEED] 0.18990 -1.200

CHNL# 164: [M4_SPEED] 0.19370 -0.2317

TIME (SECONDS)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_N0_M5

FILE: 2024SP_N0_M5.out

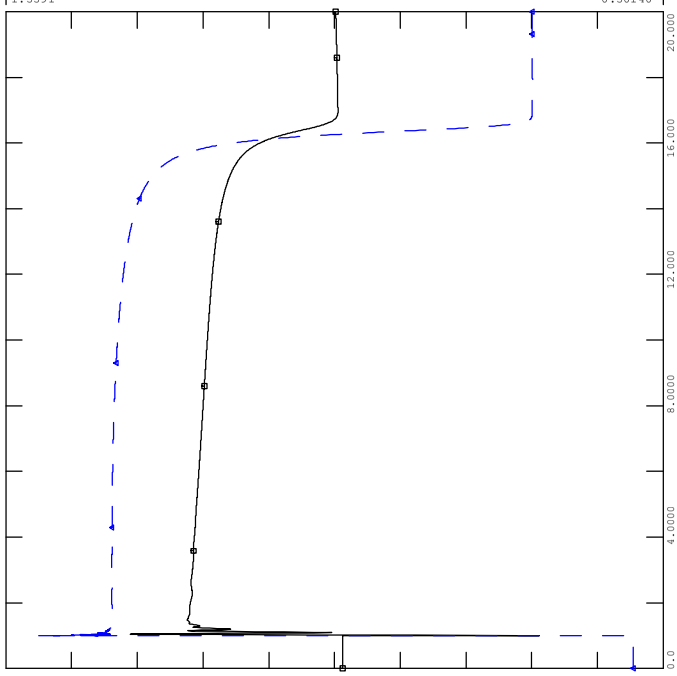
SAT, JUL 02 2022 15:17

MOTOR CURRENT

CHNL# 168: [M5_CURRENT] 5.8660 -0.2793

CHNL# 165: [M4_CURRENT] 1.5591 0.50140

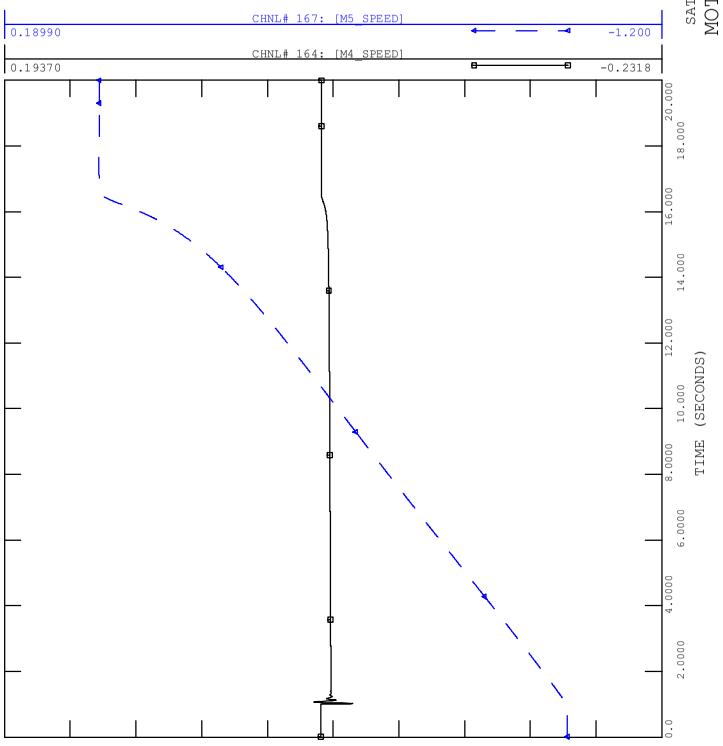
TIME (SECONDS)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_915L_M5

FILE: 2024SP_915L_M5.out

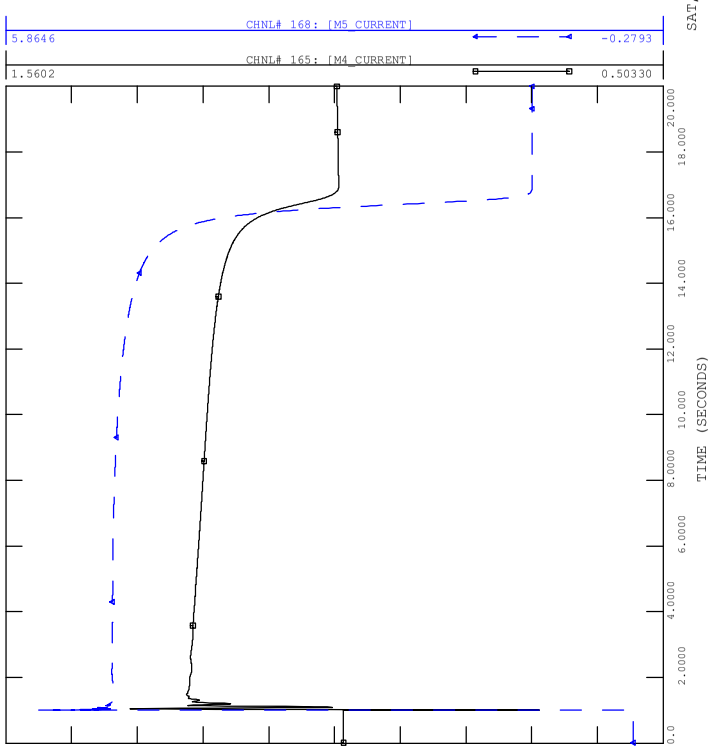
SAT, JUL 02 2022 15:17
MOTOR SPEED (DW)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_915L_M5

FILE: 2024SP_915L_M5.out

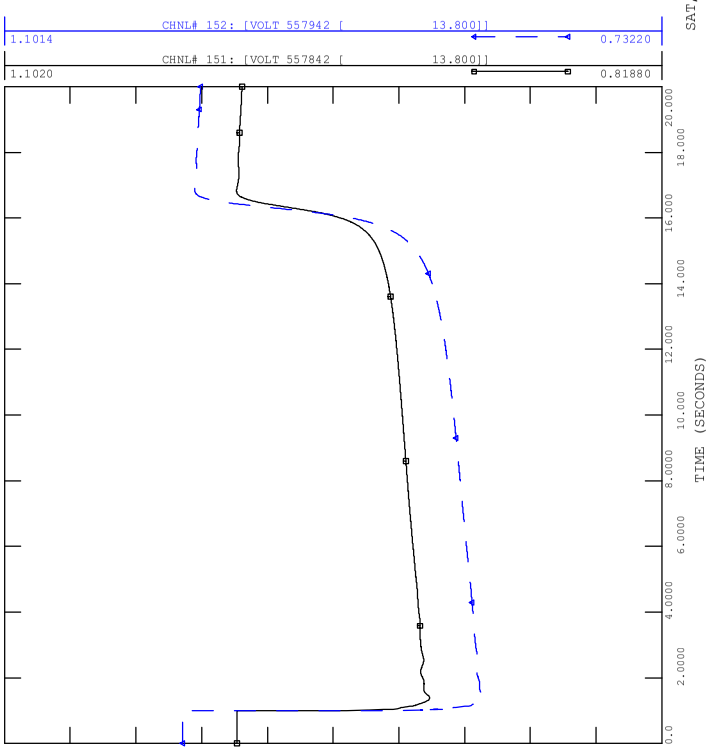
SAT, JUL 02 2022 15:17
MOTOR CURRENT



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_N0_M5

FILE: 2024SP_N0_M5.out

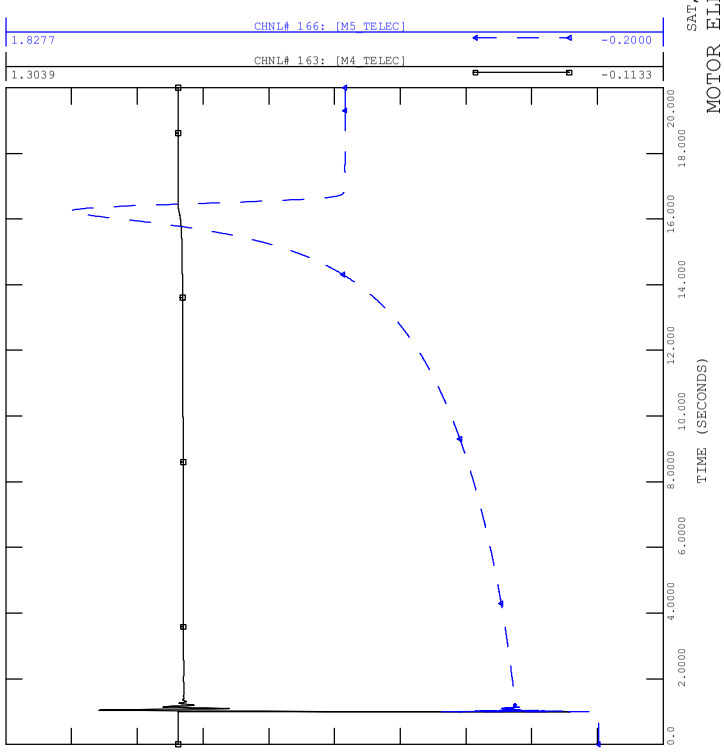
SAT, JUL 02 2022 15:17
BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_915L_M5

FILE: 2024SP_915L_M5.out

SAT, JUL 02 2022 15:17
MOTOR ELECTRIC TORQUE

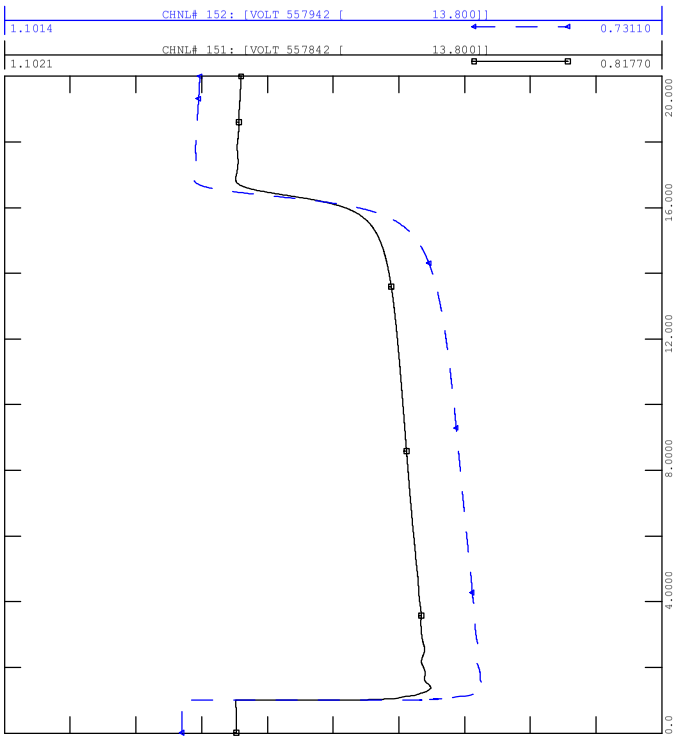


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_915L_M5

FILE: 2024SP_915L_M5.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

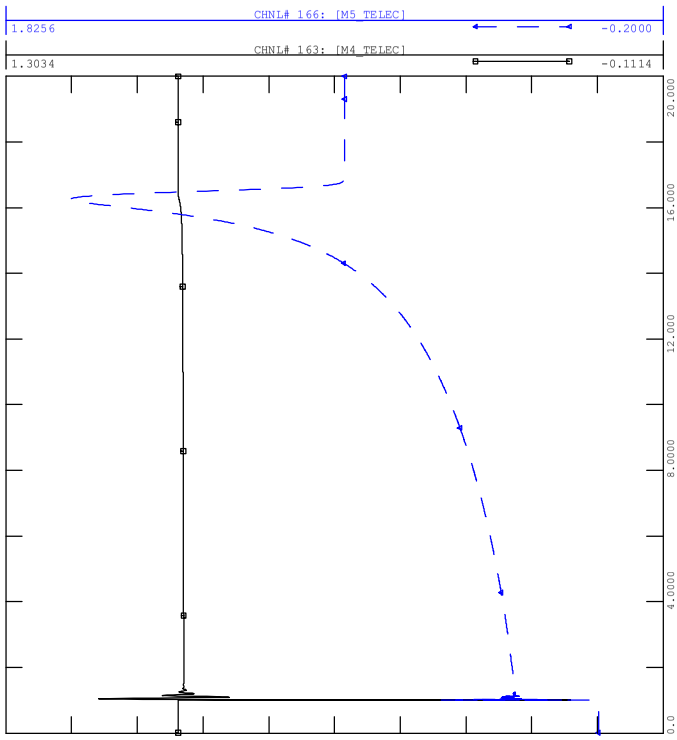


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_921L_M5

FILE: 2024SP_921L_M5.out

SAT, JUL 02 2022 15:17

MOTOR ELECTRIC TORQUE

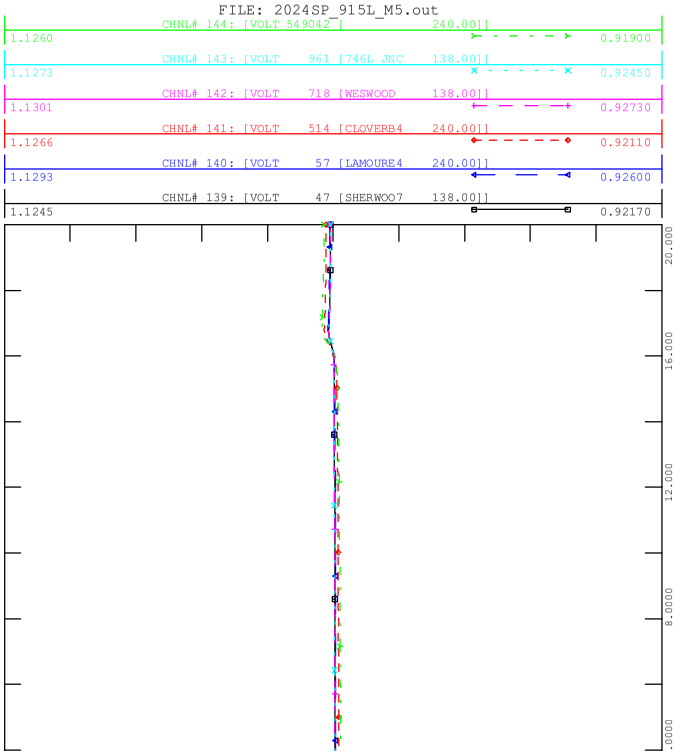


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_915L_M5

FILE: 2024SP_915L_M5.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

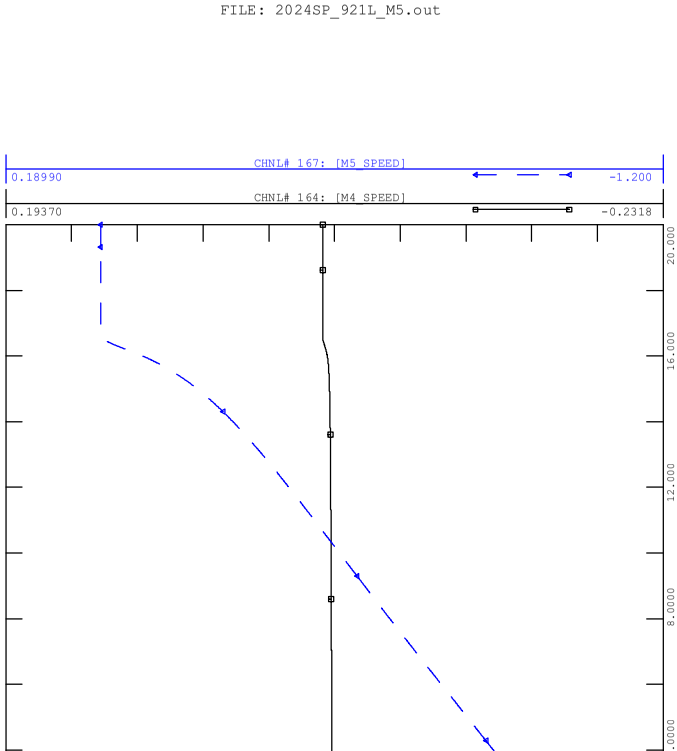


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_921L_M5

FILE: 2024SP_921L_M5.out

SAT, JUL 02 2022 15:17

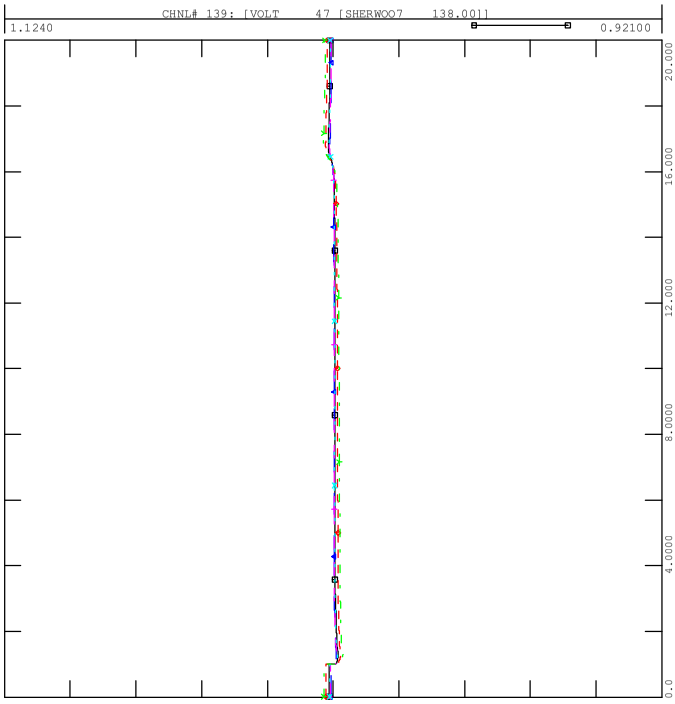
MOTOR SPEED (DW)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_921L_M5

FILE: 2024SP_921L_M5.out

SAT, JUL 02 2022 15:17
BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_947L_M5

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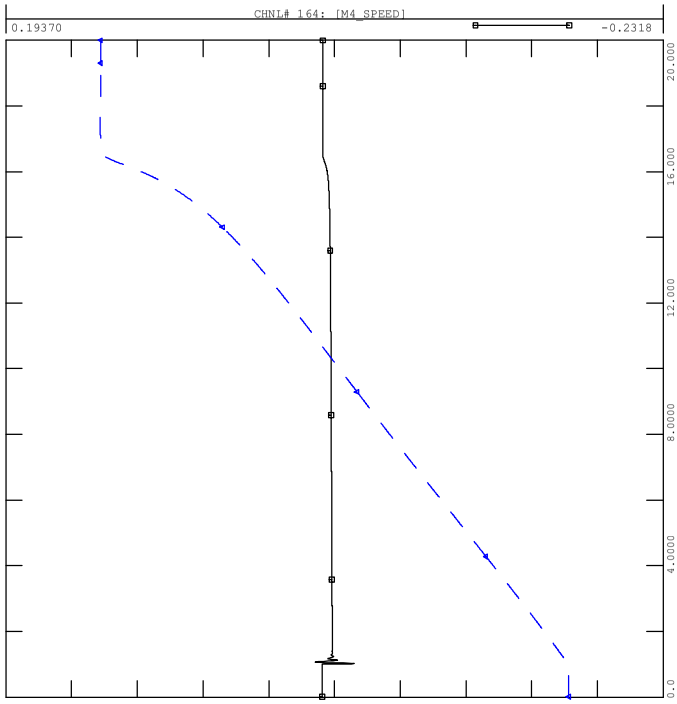
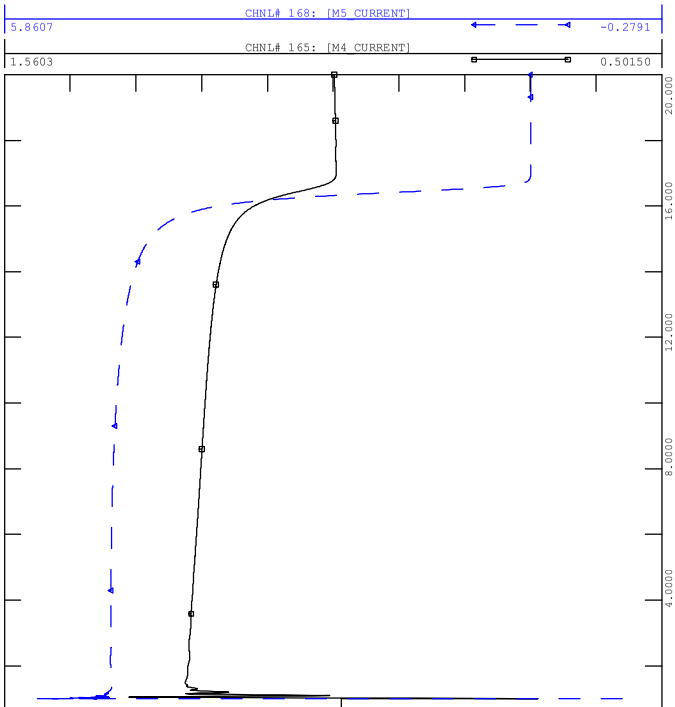
SAT, JUL 02 2022 15:17
MOTOR SPEED (DW)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_921L_M5

FILE: 2024SP_921L_M5.out

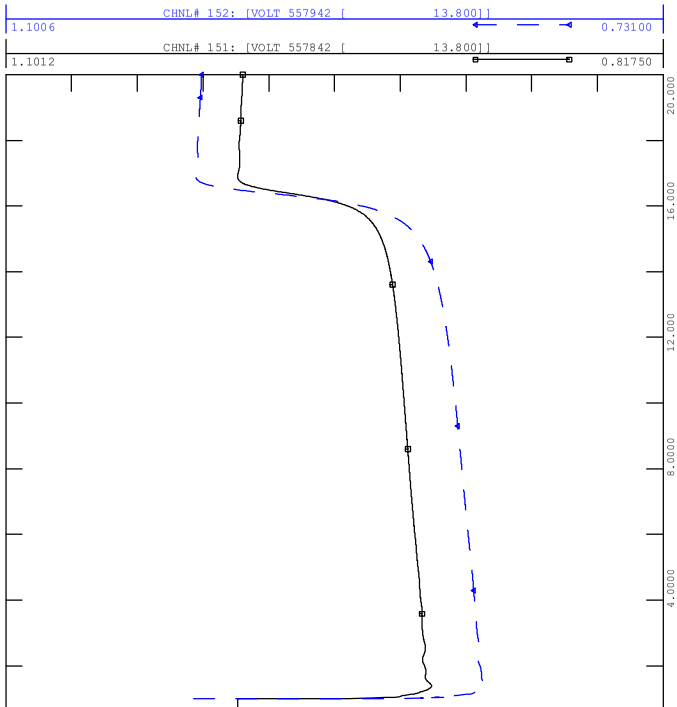
SAT, JUL 02 2022 15:17
MOTOR CURRENT



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_921L_M5

FILE: 2024SP_921L_M5.out

SAT, JUL 02 2022 15:17
BUS VOLTAGE

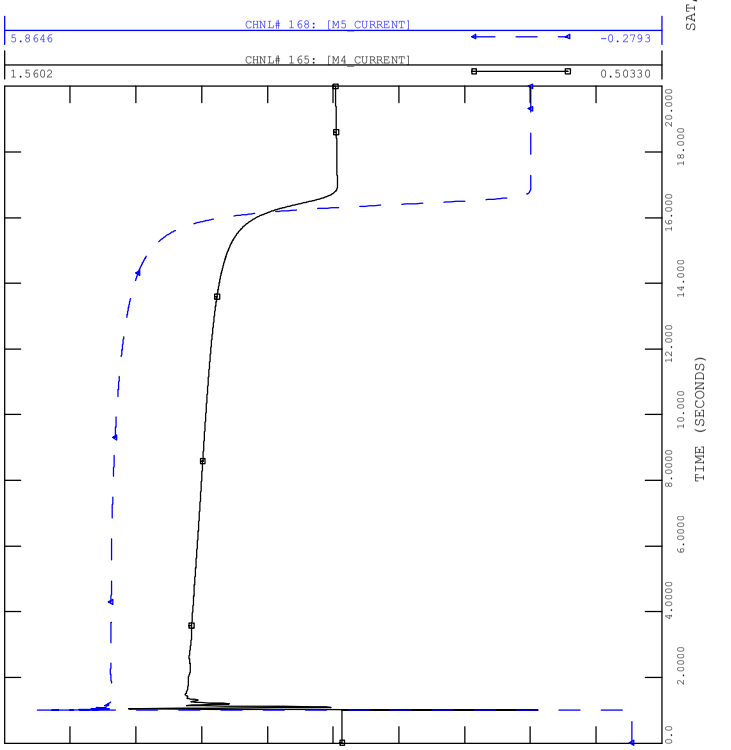


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_947L_M5

FILE: 2024SP_947L_M5.out

SAT, JUL 02 2022 15:17

MOTOR CURRENT

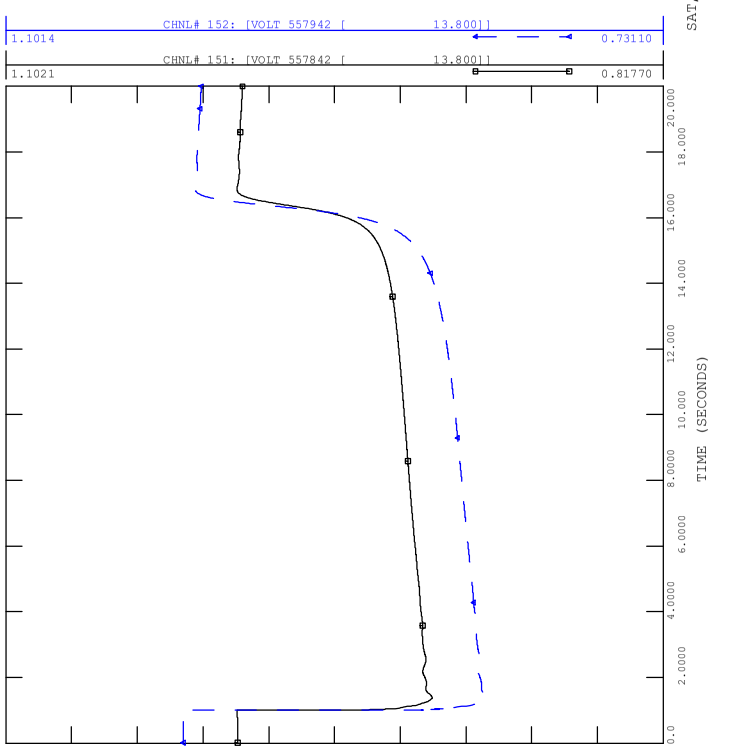


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_947L_M5

FILE: 2024SP_947L_M5.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

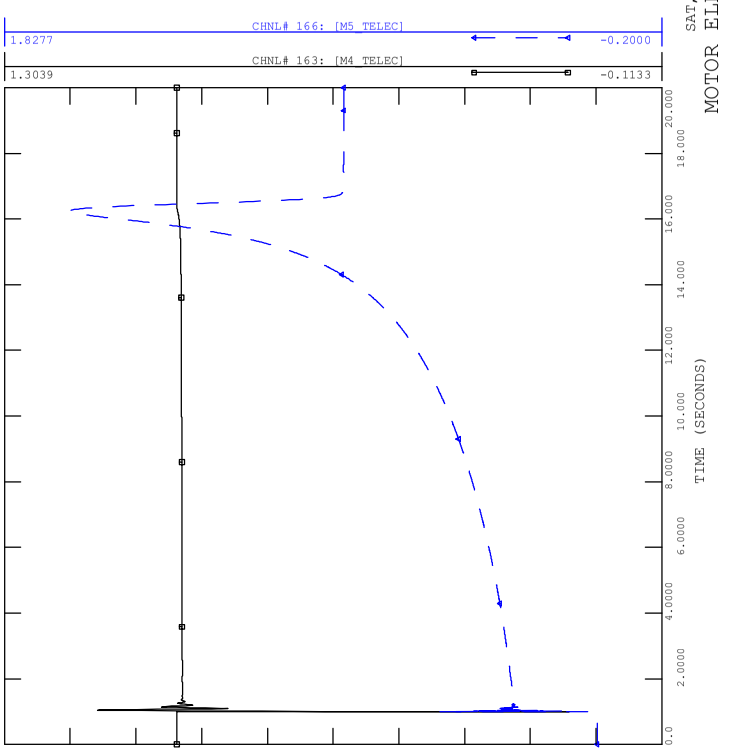


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_947L_M5

FILE: 2024SP_947L_M5.out

SAT, JUL 02 2022 15:17

MOTOR ELECTRIC TORQUE

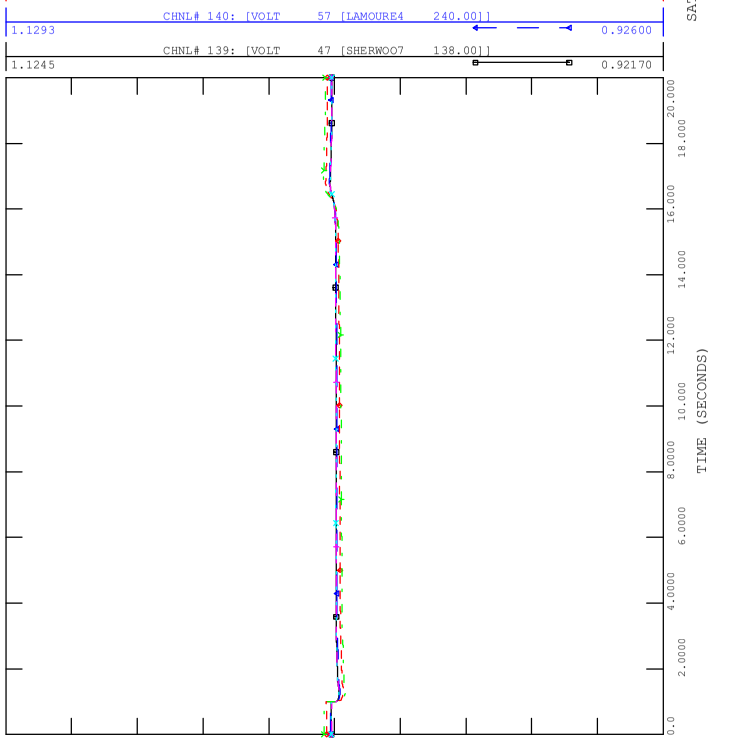


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024SP_947L_M5

FILE: 2024SP_947L_M5.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

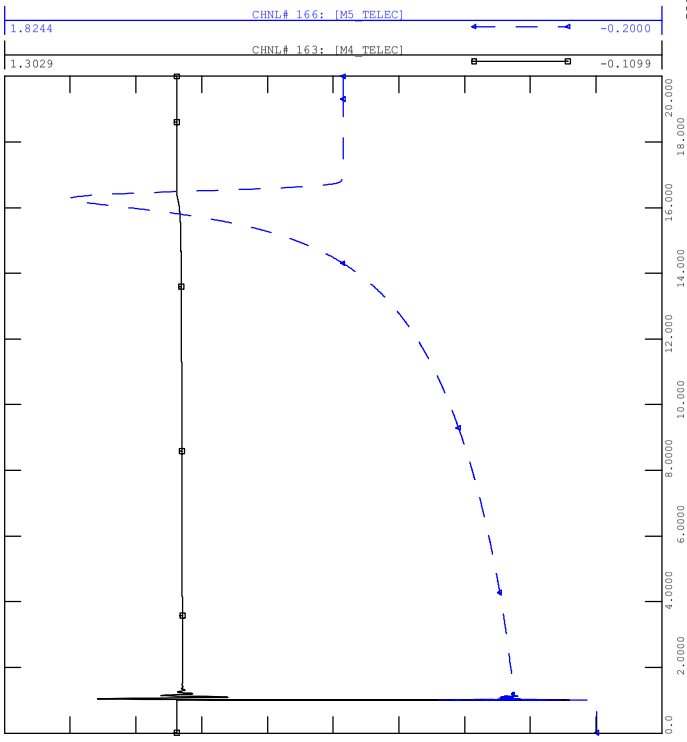


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_N0_M5

FILE: 2024WP_N0_M5.out

SAT, JUL 02 2022 15:17

MOTOR ELECTRIC TORQUE

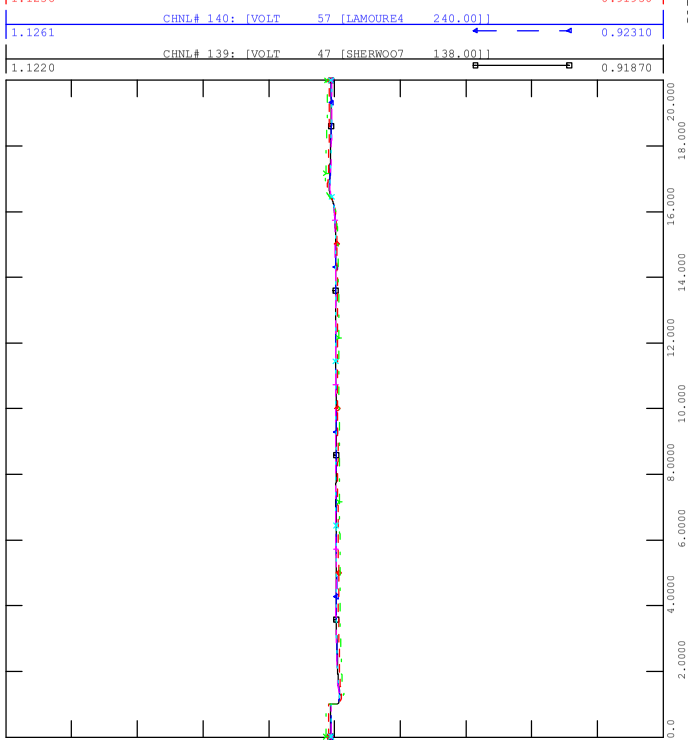


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_N0_M5

FILE: 2024WP_N0_M5.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

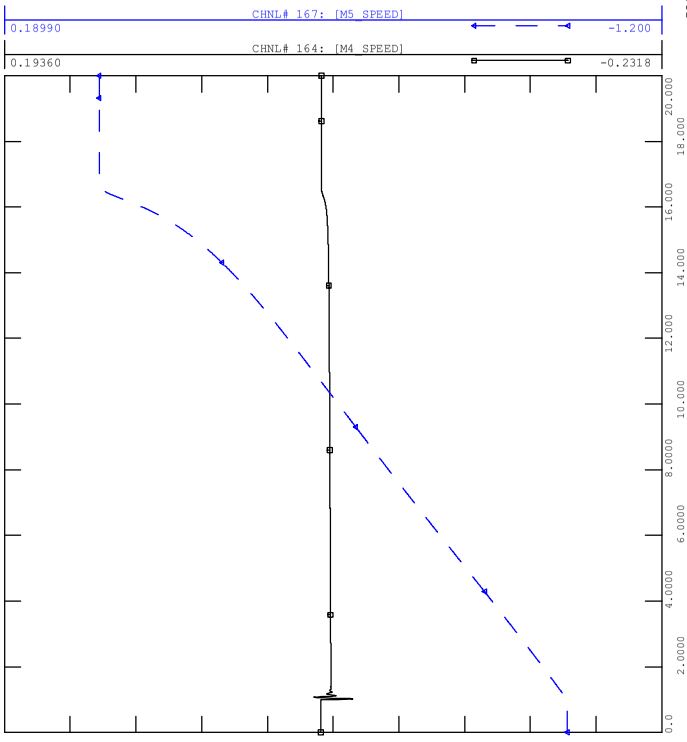


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_N0_M5

FILE: 2024WP_N0_M5.out

SAT, JUL 02 2022 15:17

MOTOR SPEED (DW)

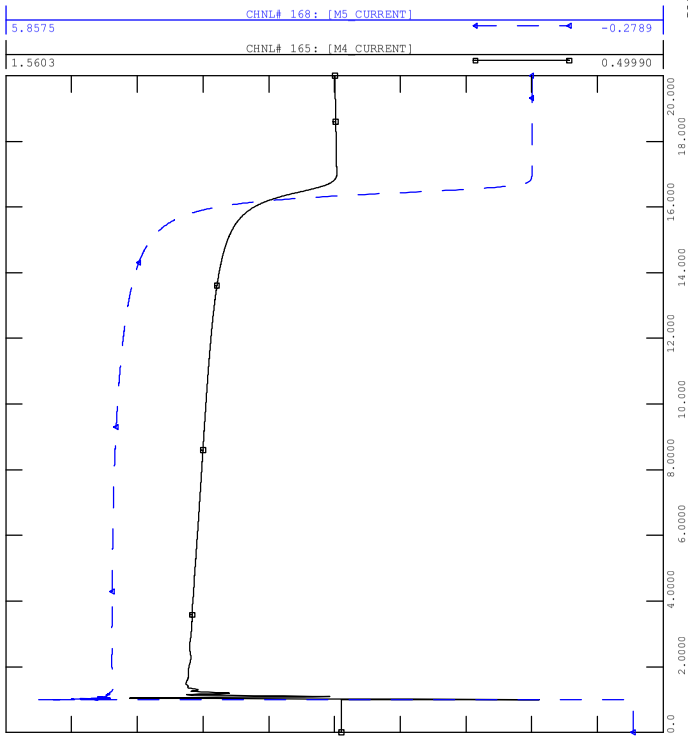


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_N0_M5

FILE: 2024WP_N0_M5.out

SAT, JUL 02 2022 15:17

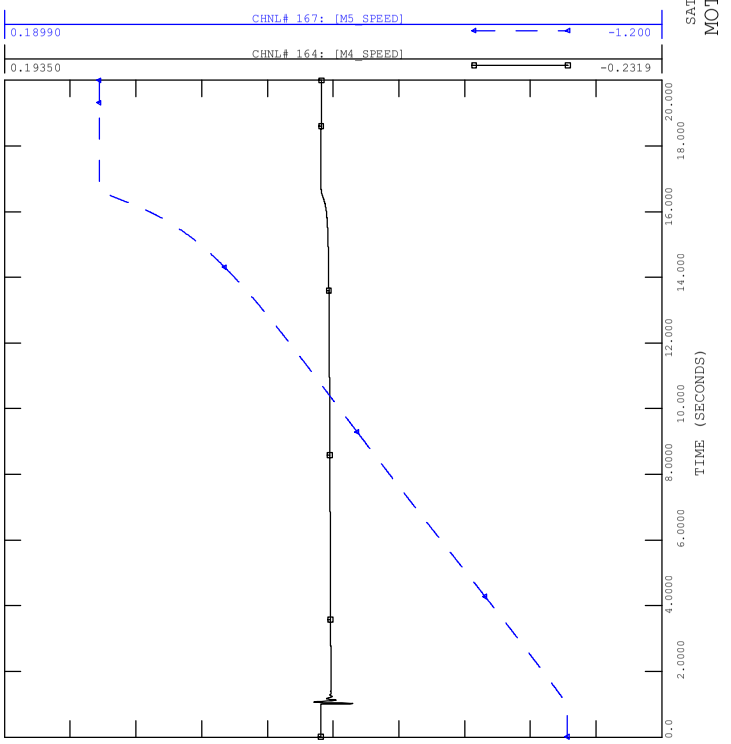
MOTOR CURRENT



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_915L_M5

FILE: 2024WP_915L_M5.out

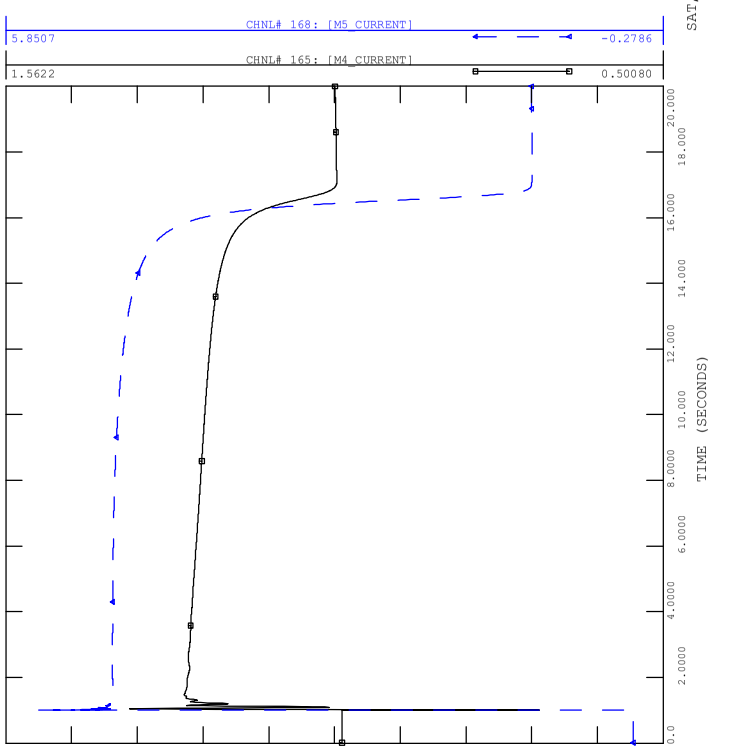
SAT, JUL 02 2022 15:17
MOTOR SPEED (DW)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_915L_M5

FILE: 2024WP_915L_M5.out

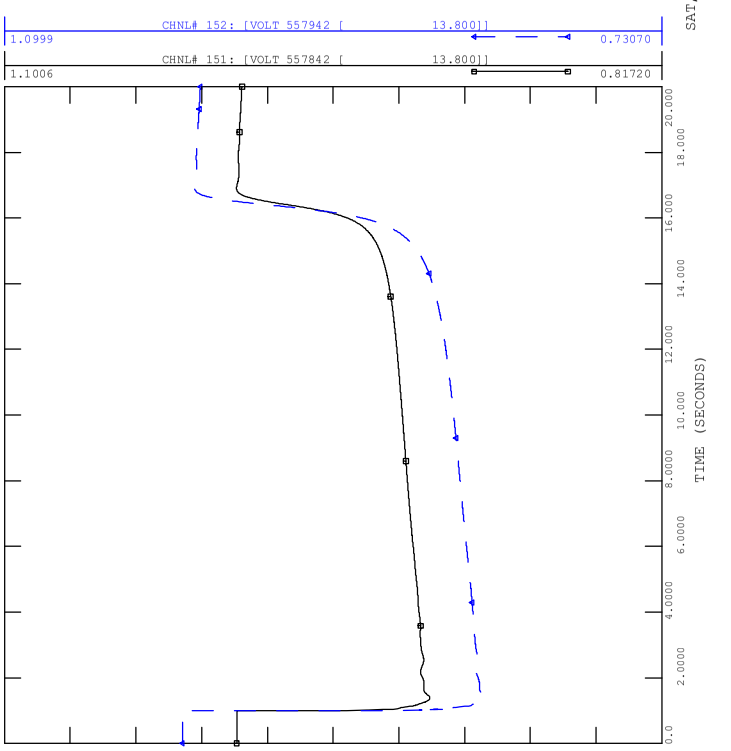
SAT, JUL 02 2022 15:17
MOTOR CURRENT



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_N0_M5

FILE: 2024WP_N0_M5.out

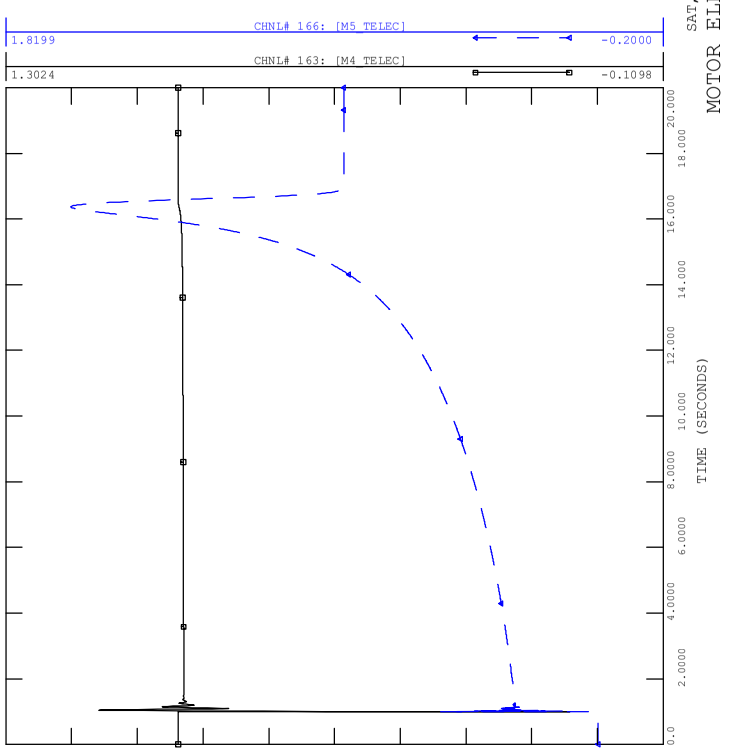
SAT, JUL 02 2022 15:17
BUS VOLTAGE



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_915L_M5

FILE: 2024WP_915L_M5.out

SAT, JUL 02 2022 15:17
MOTOR ELECTRIC TORQUE

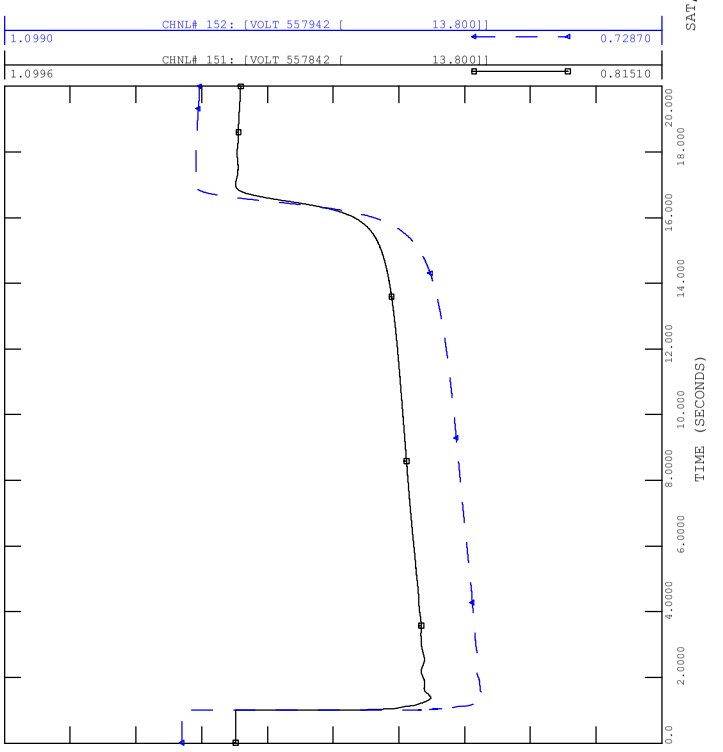


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_915L_M5

FILE: 2024WP_915L_M5.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

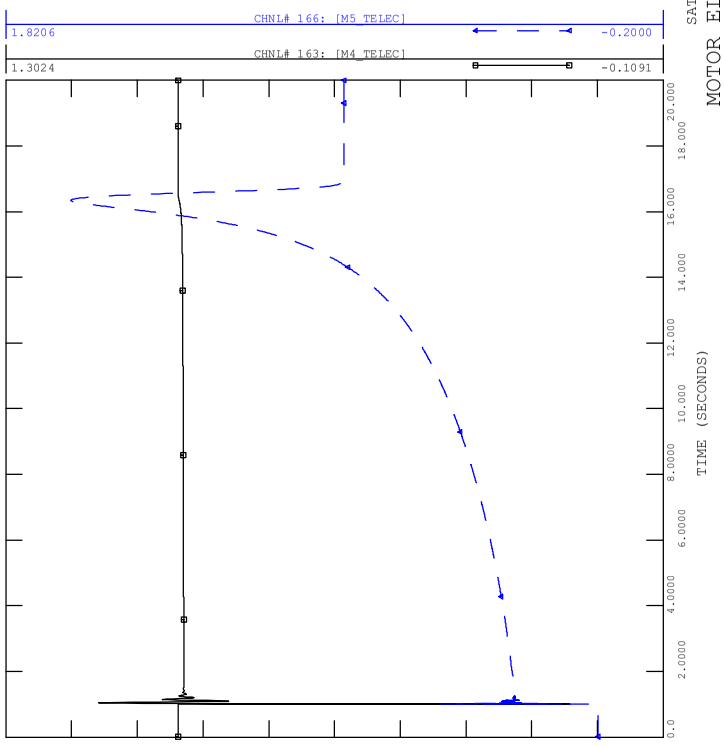


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_921L_M5

FILE: 2024WP_921L_M5.out

SAT, JUL 02 2022 15:17

MOTOR ELECTRIC TORQUE

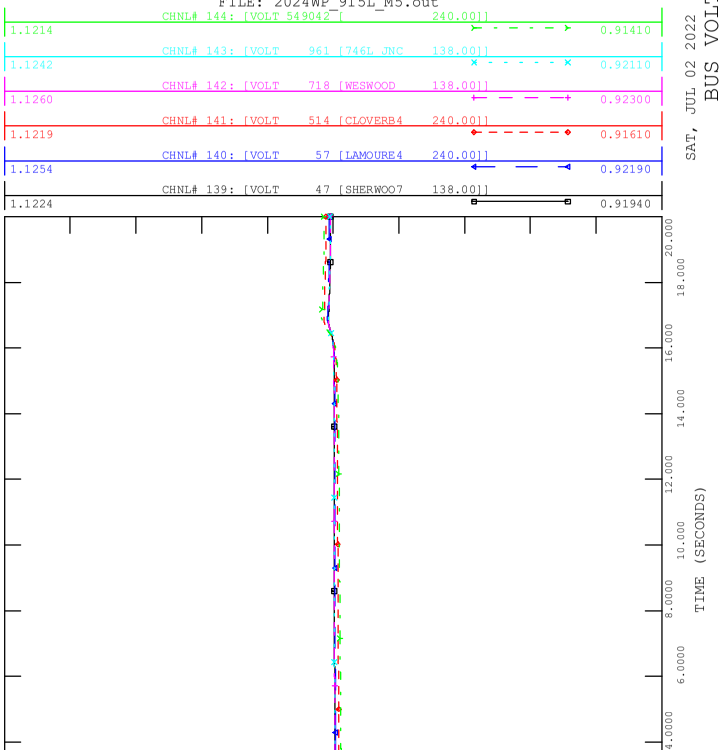


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_915L_M5

FILE: 2024WP_915L_M5.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

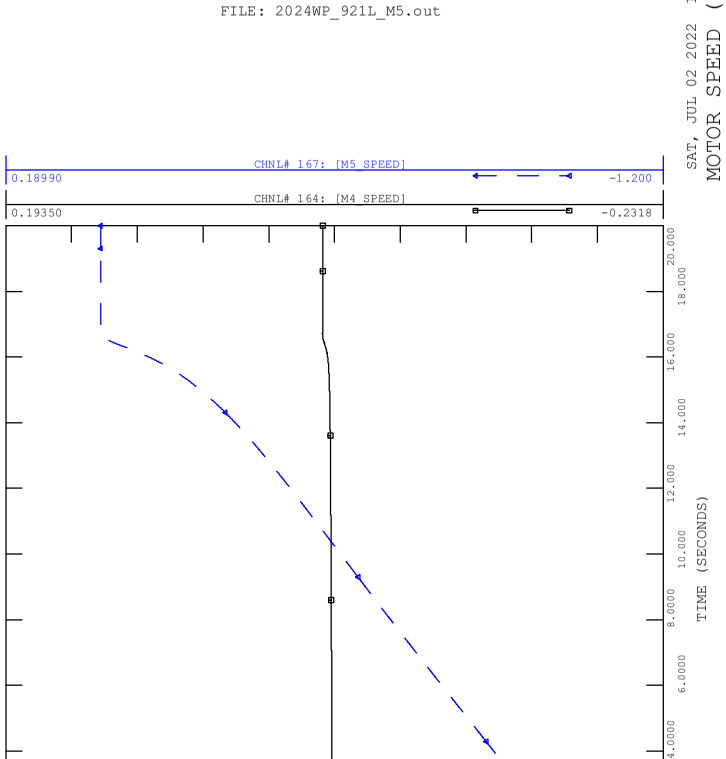


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_921L_M5

FILE: 2024WP_921L_M5.out

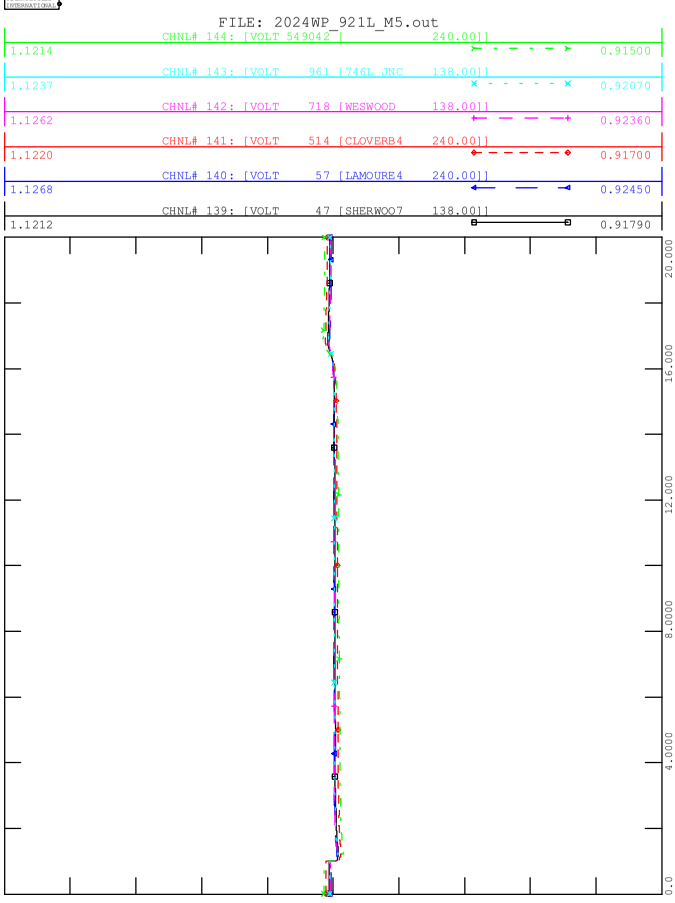
SAT, JUL 02 2022 15:17

MOTOR SPEED (DW)



SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_921L_M5

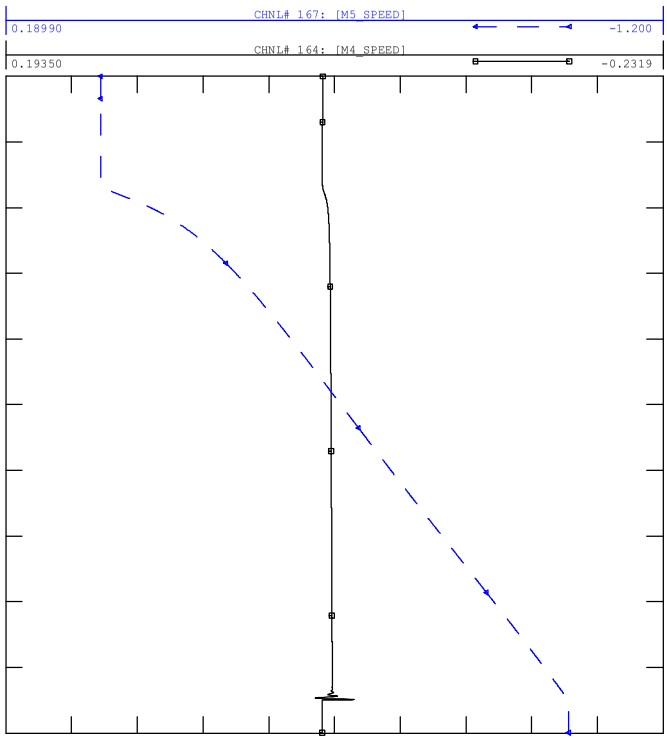
FILE: 2024WP_921L_M5.out



SAT, JUL 02 2022 15:17
BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_947L_M5

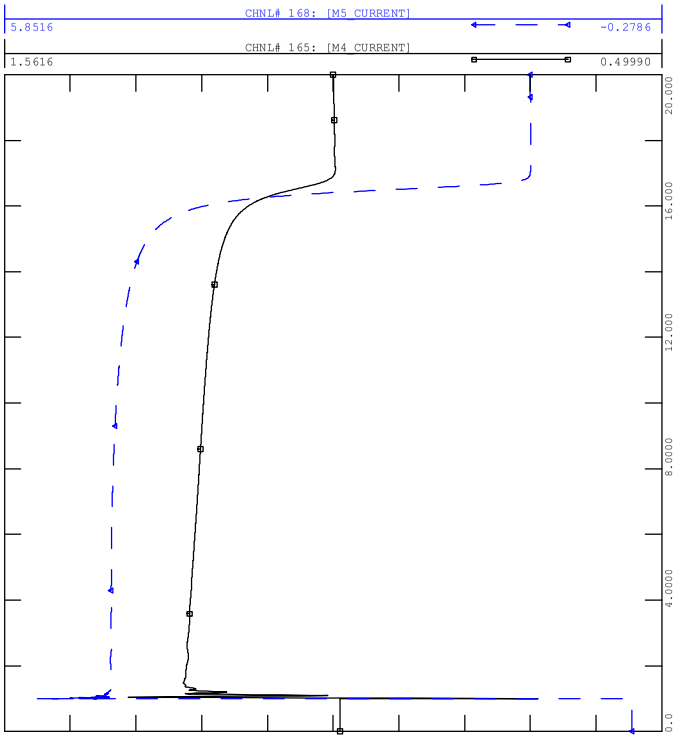
FILE: 2024WP_947L_M5.out



SAT, JUL 02 2022 15:17
MOTOR SPEED (DW)

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_921L_M5

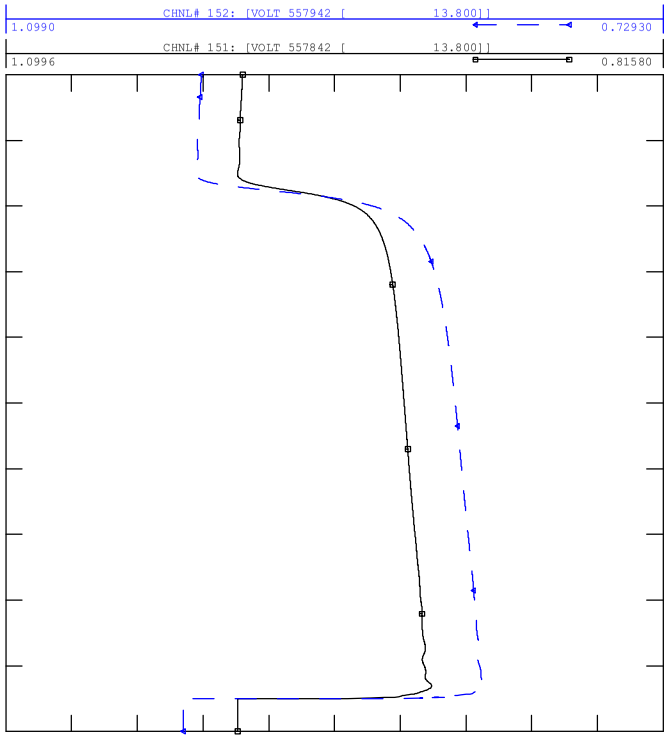
FILE: 2024WP_921L_M5.out



SAT, JUL 02 2022 15:17
MOTOR CURRENT

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_921L_M5

FILE: 2024WP_921L_M5.out



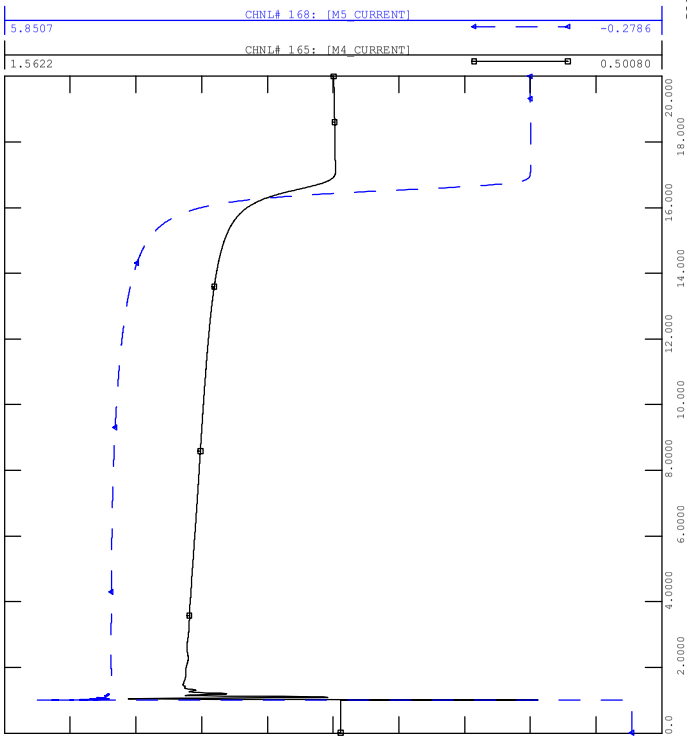
SAT, JUL 02 2022 15:17
BUS VOLTAGE

SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_947L_M5

FILE: 2024WP_947L_M5.out

SAT, JUL 02 2022 15:17

MOTOR CURRENT

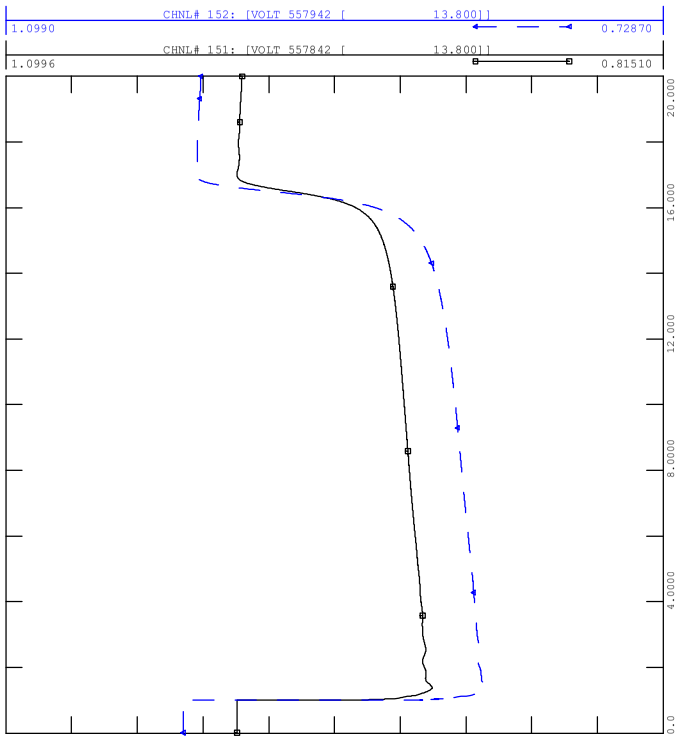


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_947L_M5

FILE: 2024WP_947L_M5.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE

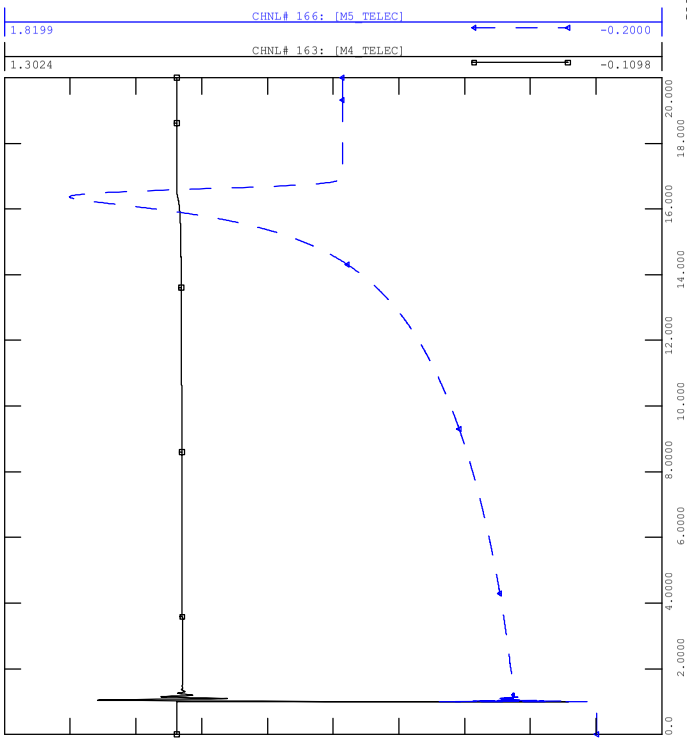


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_947L_M5

FILE: 2024WP_947L_M5.out

SAT, JUL 02 2022 15:17

MOTOR ELECTRIC TORQUE

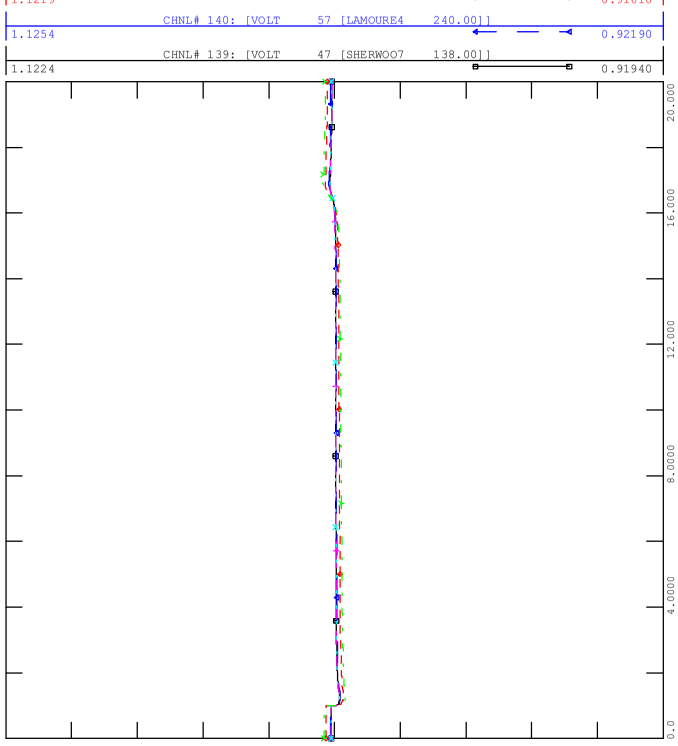


SCENARIO: P2453 SYSTEM IMPACT STUDY
CONTINGENCY -2024WP_947L_M5

FILE: 2024WP_947L_M5.out

SAT, JUL 02 2022 15:17

BUS VOLTAGE



Attachment A7
Dynamic Data and Assumptions

// Project P2453
/
// 'USRMDL', ID, 'GENTPJU1', T'do T''do T'qo T''qo H D Xd Xq X'd X'q X''d X''q Xl S(1.0) S(1.2) Kis/
557342 'USRMDL' G1 'GENTPJU1' 1 1 0 16 6 1 7.8 0.046 0 0.128 5.51 0.5 2.15 1.239 0.34 1.239 0.25 0.25 0.118 0.207 0.48 0.08 /Generator
// COMP Xcomp
557342 'COMP' G1 -0.051 /Compensator
// PSS2A ICS1, REMBUS1, ICS2, REMBUS2, M, N, Tw1, Tw2, T6, Tw3, Tw4, T7, KS2, KS3, T8, T9, KS1, T1, T2, T3, T4, VSTMAX, VSTMIN /
557342 'PSS2A' G1 1 0 3 0 5 1 15.0 15.0 0.0 15.0 0.0 15.0 1.16 1.0 0.5 0.1 10.0 0.3 0.03 0.2 0.02 0.1 -0.1 /Stabilizer
// AC8B Tr Kpr Kir Kdr Tdr Vpidmax Vpidmin KA TA Vrmax Vrmin Kc Kd KE TE Vfemax Vemin E1 SE1 E2 SE2
557342 'AC8B' G1 0.02 19.0 12.0 6.2 0.3 17.3 0 1.0 0 17.3 0 0.1 1.3 1.0 0.7 8.0 0 4.01 0.08 5.35 0.29 /Exciter
/ WSIEG1 I JBUS M K T1 T2 T3 Uo Uc Pmax Pmin T4 K1 K2 T5 K3 K4 T6 K5 K6 T7 K7 K8 db1 Err db2 GV1 Pgv1 GV2 Pgv2 GV3 Pgv3 GV4 Pgv4 GV5 Pgv5 IBLOCK
557342 'WSIEG1' G1 0 0 16.2 3.0 0.0 0.1 0.1 -0.5 1.0 0.0 6.0 1. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.22 0. 0.50 0.18 0.76 0.625 0.962 0.829 1. .932 0 /TurbineGovernor

// 'USRMDL', ID, 'GENTPJU1', T'do T''do T'qo T''qo H D Xd Xq X'd X'q X''d X''q Xl S(1.0) S(1.2) Kis/
557442 'USRMDL' G2 'GENTPJU1' 1 1 0 16 6 1 7.8 0.046 0 0.128 5.51 0.5 2.15 1.239 0.34 1.239 0.25 0.25 0.118 0.207 0.48 0.08 /Generator
// COMP Xcomp
557442 'COMP' G2 -0.051 /Compensator
// PSS2A ICS1, REMBUS1, ICS2, REMBUS2, M, N, Tw1, Tw2, T6, Tw3, Tw4, T7, KS2, KS3, T8, T9, KS1, T1, T2, T3, T4, VSTMAX, VSTMIN /
557442 'PSS2A' G2 1 0 3 0 5 1 15.0 15.0 0.0 15.0 0.0 15.0 1.16 1.0 0.5 0.1 10.0 0.3 0.03 0.2 0.02 0.1 -0.1 /Stabilizer
// AC8B Tr Kpr Kir Kdr Tdr Vpidmax Vpidmin KA TA Vrmax Vrmin Kc Kd KE TE Vfemax Vemin E1 SE1 E2 SE2
557442 'AC8B' G2 0.02 19.0 12.0 6.2 0.3 17.3 0 1.0 0 17.3 0 0.1 1.3 1.0 0.7 8.0 0 4.01 0.08 5.35 0.29 /Exciter
/ WSIEG1 I JBUS M K T1 T2 T3 Uo Uc Pmax Pmin T4 K1 K2 T5 K3 K4 T6 K5 K6 T7 K7 K8 db1 Err db2 GV1 Pgv1 GV2 Pgv2 GV3 Pgv3 GV4 Pgv4 GV5 Pgv5 IBLOCK
557442 'WSIEG1' G2 0 0 16.2 3.0 0.0 0.1 0.1 -0.5 1.0 0.0 6.0 1. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.22 0. 0.50 0.18 0.76 0.625 0.962 0.829 1. .932 0 /TurbineGovernor

// 'USRMDL', ID, 'GENTPJU1', T'do T''do T'qo T''qo H D Xd Xq X'd X'q X''d X''q Xl S(1.0) S(1.2) Kis/
557542 'USRMDL' G3 'GENTPJU1' 1 1 0 16 6 1 7.8 0.046 0 0.128 5.51 0.5 2.15 1.239 0.34 1.239 0.25 0.25 0.118 0.207 0.48 0.08 /Generator
// COMP Xcomp
557542 'COMP' G3 -0.051 /Compensator
// PSS2A ICS1, REMBUS1, ICS2, REMBUS2, M, N, Tw1, Tw2, T6, Tw3, Tw4, T7, KS2, KS3, T8, T9, KS1, T1, T2, T3, T4, VSTMAX, VSTMIN /
557542 'PSS2A' G3 1 0 3 0 5 1 15.0 15.0 0.0 15.0 0.0 15.0 1.16 1.0 0.5 0.1 10.0 0.3 0.03 0.2 0.02 0.1 -0.1 /Stabilizer
// AC8B Tr Kpr Kir Kdr Tdr Vpidmax Vpidmin KA TA Vrmax Vrmin Kc Kd KE TE Vfemax Vemin E1 SE1 E2 SE2
557542 'AC8B' G3 0.02 19.0 12.0 6.2 0.3 17.3 0 1.0 0 17.3 0 0.1 1.3 1.0 0.7 8.0 0 4.01 0.08 5.35 0.29 /Exciter
/ WSIEG1 I JBUS M K T1 T2 T3 Uo Uc Pmax Pmin T4 K1 K2 T5 K3 K4 T6 K5 K6 T7 K7 K8 db1 Err db2 GV1 Pgv1 GV2 Pgv2 GV3 Pgv3 GV4 Pgv4 GV5 Pgv5 IBLOCK

557542 'WSIEG1' G3 0 0 16.2 3.0 0.0 0.1 0.1 -0.5 1.0 0.0 6.0 1. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.22 0. 0.50 0.18 0.76 0.625 0.962 0.829 1. .932 0 /TurbineGovernor

557642 'USRMDL' G4 'GENTPJU1' 1 1 0 16 6 1 6.2 0.05 2.0 0.2 1.25 0.0 2.35 2.085 0.23 1.0 0.19 0.19 0.12 0.136 0.400 0.08 /
557642 'AC7B' G4 0.02 40 5.6 0 0.1 99 -99 100 0 30 -30 0 99 0 0.1 0.005 0.5 0.2 1.7 1.0 2.0 23 0 5.43 0.19 7.24 1.02 /
557642 'PSS2B ' G4 1 0 3 0 5 1 7 7 0 7 0 6 2.8 1 0.5 0.1 0.65 0.1 0.02 0.10 0.02 0.10 0.02 999 -999 999 -999 0.1 -0.1 /
557642 'GGOV1' G4 1 1 0.077 2.0 0.05 -0.05 3.0 0.7 0.5 0.1 1.2 0.05 0.5 1.376 0.273 0.1 0.0 0.0 0.3 1.0 3.3 0.913 0 1.0 -1.0 0.0 99.0 10.0 1.0 53 0.0 4.0 5.0 99.0 -99.0 /
557642 'COMP' G4 -0.05 /

// T'do T''do [T'qo] T''qo H D Xd Xq X'd [X'q] X''d [X''q] Xl S1.0 S1.2 Kis
557742 'USRMDL' M1 'GENTPJU1' 1 1 0 16 6 1 5 0.05 0 0.06 2.5 1 1.5 1.2 0.4 1.2 0.16 0.16 0.12 0.03 0.25 0 /
557742 'USRMDL' M2 'GENTPJU1' 1 1 0 16 6 1 2.95 0.0229 0 0.0534 0.883 0.0 1.13 0.695 0.281 0.695 0.198 0.198 0.153 0.05 0.3 0 /
557842 'USRMDL' M3 'GENTPJU1' 1 1 0 16 6 1 5 0.05 0 0.06 2.5 1 1.5 1.2 0.4 1.2 0.16 0.16 0.12 0.03 0.25 0 /
/ 557942 'USRMDL' M4 'GENTPJU1' 1 1 0 16 6 1 5 0.05 0 0.06 2.5 1 1.5 1.2 0.4 1.2 0.16 0.16 0.12 0.03 0.25 0 /
/ 557942 'USRMDL' M5 'GENTPJU1' 1 1 0 16 6 1 5 0.05 0 0.06 2.5 1 1.5 1.2 0.4 1.2 0.16 0.16 0.12 0.03 0.25 0 /

557942 'CIM5BL' 4 2
0.28000E-01 0.28300E-02 8.9000 0.98500 0.82864E-01
0.10800E-01 0.15000 1.0000 0.90000E-01 1.2000
0.50000 8.5279 0.0000 0.11707 0.0000
0.0000 0.0000 2.0000 0.8800 /
557942 'CIM5BL' 5 2
0.80000E-01 0.76923E-01 2.9800 0.64800E-01 0.62692E-01
0.12266E-01 0.10000E-01 1.0000 0.90000E-01 1.2000
0.50000 6.4702 0.0000 2.5113 0.0000
0.0000 0.0000 2.0000 0.7977 /

Attachment A8
Constraint Effective Factors Table

ECA S04_Post-proj 2024SP_STS_v1.sav		Power Plant									
Contingency	**Line**	**Cloverba**	**UofA**	**Sundance**	**Keephills**	**Genesee**	**Dow**	**Scotford**	**Air Liquid**	**Redwater**	**P2453 Plant**
694L (Westwood 422S to Fort Saskatchewan 54S)	731L (East Edmonton 38S to 746L JCT)	0.0000	-0.0003	0.0000	0.0000	0.0000	-0.0001	0.0000	0.0000	0.0000	0.0000
72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
72CK13 (Clover Bar 987S to Kennedale)	72CK12 (Clover Bar 987S to Kennedale)	0.0001	-0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Rossdale 69kV bus tie (580007-580008)	72RV6 (Victoria 511S to Rossdale)	0.0015	-0.2812	-0.0051	0.0016	0.0016	-0.0129	-0.0131	-0.0130	-0.0130	0.0015
ECA S05_Post-proj 2024SL_STS_v1.sav		**Cloverba**	**UofA**	**Sundance**	**Keephills**	**Genesee**	**Dow**	**Scotford**	**Air Liquid**	**Redwater**	**P2453 Plant**
807L (Josephburg 410S to Beamer 233S)	708L (Lamoureux 71S to 708AL Tap)	0.0027	0.0027	0.0005	-0.0026	-0.0027	0.0351	-0.0149	-0.0153	-0.7509	0.0027
ECA S06_Post-proj 2024WP_STS_v1.sav											
72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
72CK13 (Clover Bar 987S to Kennedale)	72CK12 (Clover Bar 987S to Kennedale)	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ECA S10_Post-proj 2024SP_DTS_v1.sav		**Cloverba**	**UofA**	**Sundance**	**Keephills**	**Genesee**	**Dow**	**Scotford**	**Air Liquid**	**Redwater**	**P2453 Plant**
694L (Westwood 422S to Fort Saskatchewan 54S)	731L (East Edmonton 38S to 746L JCT)	-0.0005	-0.0007	0.0000	0.0000	0.0000	-0.0003	-0.0002	-0.0002	-0.0003	-0.0009
72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	-0.0001	-0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0002
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	-0.0001	-0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0002
72RG7 (Rossdale to Garneau)	72RG1 (Rossdale to Garneau)	-0.0003	-0.9654	0.0000	0.0000	0.0000	-0.0002	-0.0001	-0.0001	-0.0002	-0.0004
Rossdale 69kV bus tie (580007-580008)	72RV6 (Victoria 511S to Rossdale)	0.0020	-0.2917	-0.0053	0.0016	0.0017	-0.0126	-0.0129	-0.0128	-0.0128	0.0024
ECA S11_Post-proj 2024WP_DTS_v1.sav		**Cloverba**	**UofA**	**Sundance**	**Keephills**	**Genesee**	**Dow**	**Scotford**	**Air Liquid**	**Redwater**	**P2453 Plant**
72CH9 (Clover Bar 987S to Hardisty)	72CH11 (Clover Bar 987S to Hardisty)	-0.0002	-0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0002
72CH11 (Clover Bar 987S to Hardisty)	72CH9 (Clover Bar 987S to Hardisty)	-0.0002	-0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0002
Rossdale 69kV bus tie (580007-580008)	72RV6 (Victoria 511S to Rossdale)	0.0019	-0.2934	-0.0058	0.0019	0.0020	-0.0131	-0.0135	-0.0134	-0.0133	0.0021