APPENDIX A CONNECTION ASSESSMENT

Connection Engineering Study Report for AUC Filing

Irma Wind Power Project Connection

Date: July 26, 2017

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Executive Summary

Project Overview

Irma Wind L.P. (the market participant) has submitted a request for system access service to the Alberta Electric System Operator (AESO) to connect its proposed Irma Wind Power Project[1] (the Facility) to the Alberta interconnected electric system (AIES). The Facility consists of approximately 30 wind turbines and a proposed collector station, to be designated the Kinsella 926S substation. The Facility will be located in the Irma area in the AESO planning area of Wainwright (Area 32).

The request for system access service includes a Rate STS, *Supply Transmission Service*, contract capacity of 90 MW and a Rate DTS, *Demand Transmission Service*, contract capacity of 3 MW for new system access service in the area, and a request for transmission development (collectively, the Project).

The scheduled in-service date (ISD) for the Project is July 1, 2019.

This report details the engineering studies undertaken to assess the impact of the Project on the performance of the Alberta interconnected electric system (AIES).

Existing System

Geographically, the Project is located in the AESO planning area of Wainwright (Area 32), which is part of the AESO Central Planning Region. Wainwright (Area 32) is surrounded by the AESO planning areas of Alliance/Battle River (Area 36), Provost (Area 37), Vegreville (Area 56), and Lloydminster (Area 13).

From a transmission perspective, Wainwright (Area 32) is connected to Lloydminster (Area 13), Alliance/Battle River (Area 36), and Provost (Area 37) through the 138/144 kV transmission system. There is a 240 kV connection to Provost (Area 37) and Alliance/Battle River (Area 36), as well. Wainwright (Area 32) and its surrounding planning areas are mainly load centres. These areas are collectively a generation rich region. There are different types of generation plants that supply those areas. This includes cogeneration facilities in Cold Lake (Area 28); coal generation facilities in Alliance/Battle River (Area 36); and wind generating facilities in Hanna (Area 42) and Provost (Area 37).

There are a number of existing constraints in the area that are mitigated by remedial action schemes (RASs). Following RAS activation, these constraints are managed in accordance with the procedures set out in Section 302.1 of the ISO rules, *Real Time Transmission Constraint Management* (TCM Rule).

Study Summary

Study Area for the Project

The Study Area consists of the following AESO planning areas: Lloydminster (Area 13), Wainwright (Area 32), Alliance/Battle River (Area 36), Hanna (Area 42), Provost (Area 37), Vegreville (Area 56), and Cold Lake (Area 28). The Study Area also includes the tie lines connecting these planning areas to neighbouring planning areas. The Study Area is served by 240 kV, 138/144 kV, and 69/72 kV transmission systems. All transmission facilities within the

[1] Irma Wind Limited Partnership, by its general partner, Irma Wind GP Inc. filed its power plant application for the proposed Irma Wind Power Project with the Alberta Utilities Commission in AUC Proceeding 22722 and Application Number 22722-01, which was registered on June 9, 2017.

Study Area were studied and monitored to assess the impact of the Project on the AIES, including any violations of the Reliability Criteria (as defined in Section 2.1.1).

Analyses Performed for the Project

The following studies were performed in the connection assessment assuming base case generation dispatch (economic coal and high wind) conditions:

- Power flow studies (Category A and Category B): 2017 Summer Peak (SP) and 2017 Summer Light (SL) pre-Project and post-Project scenarios.
- Transient stability studies (Category A and Category B): 2017 SL and 2017 SP post-Project scenarios.
- Short-circuit studies (Category A): 2017 Winter Peak (WP) pre-Project scenario, 2017 WP post-Project, and 2025 WP post-Project scenarios.

In addition, the following sensitivity dispatch scenarios were performed to determine if there were any Reliability Criteria violations under Category A for simultaneous high coal and high wind generation dispatch conditions:

- Power flow studies (Category A): 2017 SP and 2017 SL High Coal pre-Project and post-Project scenarios.

Results of the pre-Project Studies

The following is a summary of the pre-Project study results.

Category A conditions:

Under Category A conditions, no Reliability Criteria violations were observed for the base case study scenario or the sensitivity study scenarios.

Category B conditions:

The pre-Project power flow studies identified a number of system performance issues, namely thermal criteria violations, under Category B conditions as shown in Table E-1 below.

Connection alternatives examined for the Project

The AESO, in consultation with the TFO and the market participant, examined two alternatives to respond to the market participant's request for system access service. All alternatives involve connecting the Facility to the AIES through the market participant's proposed Kinsella 926S substation.

Alternative 1 – In-and-out connection to the 144 kV transmission line 7L50: Connect the proposed Facility to the 144 kV transmission line 7L50 (between the Buffalo Creek 526S substation and the Jarrow 252S tap point) using an in-and-out configuration. This would require the addition of two 144 kV circuits, each approximately 0.2 km long, and a switching station with a minimum of three 144 kV circuit breakers.

Alternative 2 – Radial connection to the Buffalo Creek 526S substation: Connect the proposed Facility to the Buffalo Creek 526S substation. This alternative would require a new 138 kV circuit approximately 16 km long and a 138 kV circuit breaker at the Buffalo Creek 526S substation.

Connection alternatives selected for further examination

Of the two potential transmission connection alternatives examined, only Alternative 2 was selected for further study. If Alternative 1 were chosen, the maximum generation output for the Facility would be 20 MW under Category A conditions. This is much lower than the market participant's requested Rate STS contract capacity of 90 MW.

Results of the post-Project studies

The following is a brief summary of the post-Project studies results.

Category A conditions:

Under Category A conditions, no Reliability Criteria violations were observed for the base case study scenarios or the sensitivity study scenarios.

The short-circuit analysis concludes that the Project connection will not adversely change the short circuit levels at the nearby substations.

Category B conditions:

Under Category B conditions, no voltage criteria violations or voltage deviations were observed in this scenario.

Similar to the pre-Project scenarios, power flow studies identified a number of system performance issues, namely thermal criteria violations. These violations are shown in Table E-1 below.

The results did not indicate any transient stability concerns, and the system remains stable following all studied Category B contingencies in the Study Area.

Conclusions and Recommendation

Analysis and Conclusions

Table E-1 provides analysis of, and conclusions about, the impact of the Project for the Category B conditions where violations were observed, including recommended mitigation measures for the observed Reliability Criteria violations.

Table E – 1 Summary of Reliability Criteria Violations, Project Impact and Mitigation Measures

Reliability Criteria Violations		Scenario	Pre-Project		Post-Project	
Violation	Contingency		Thermal Violation Type	Mitigation Measures	Thermal Violation Type	Mitigation Measures
7L128 (Coyote Lake 963S - Michichi Creek 802S)	9L29 (Oakland 946S - Coyote Lake 963S)	2017 SL and SP	Above short term rating	Planned Suncor Hand Hills and BluEarth Hand Hills RAS	Above short term rating	Planned Suncor Hand Hills and BluEarth Hand Hills RAS
7L159 (Ghost Pine 114S tap point - Heatburg 948S)						
7L16 (Nevis 766S - Heatburg 948S)						
7L85 (Bullpound 803S - Anderson 801S)						
7L85 (Wintering Hills 804S - Bullpound 803S)						
7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	Transformers in North Holden 395S, Edgerton 899S or Nevis 766S	2017 SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	701L (North Holden 395S – Strome 223S)	2017 SP	Above short term rating	Existing RAS (RAS #138)	NA	NA

Reliability Criteria Violations		Scenario	Pre-Project		Post-Project	
Violation	Contingency		Thermal Violation Type	Mitigation Measures	Thermal Violation Type	Mitigation Measures
	749L\749AL (Metiskow 648S – Edgerton 899S)	2017 SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	7L749\749L\7LB749 (Edgerton 899S – Lloydminster 716S)	2017 SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	7L42	2017 SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	7L701\7LA701\701L (Strome 223S – Battle River 757S)	2017 SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	7L77	2017 SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	7L95	2017 SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	912L\9L912	2017 SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	9L20	2017 SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	500 kV HVDC EATL	2017 SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	Mahkeses 889S transformer (5TNSA1 or 5TNSA2)	2017 SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	7L105	2017 SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	7L161	2017 SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	Vegreville 709S Transformer (701T or 702T)	2017 SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	9L960	2017 SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	9L961	2017 SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
7L50 (Jarrow 252S tap point - Battle River 757S)	Tucuman 478S transformer (T1 or T2)	2017 SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
749L (Edgerton 899S - Killarney Lake 267S tap point)	Buffalo Creek 526S transformer (T1 or T2)	2017 SP	Below short term rating	Real time Operational practices	NA	NA
	7L50 (Buffalo Creek 526S – Battle River 757S)	2017 SP	Below short term rating	Real time Operational practices	NA	NA

Reliability Criteria Violations		Scenario	Pre-Project		Post-Project	
Violation	Contingency		Thermal Violation Type	Mitigation Measures	Thermal Violation Type	Mitigation Measures
749L\7L749 (Edgerton 899S - Briker 880S tap point)	7L50 (Buffalo Creek 526S – Battle River 757S)	2017 SP	Below short term rating	Real time Operational practices	NA	NA
7L77 (North Holden 395S - Vegreville 709S)	7L50 (Buffalo Creek 526S – Battle River 757S)	2017 SP	Below short term rating	Real time Operational practices	NA	NA
7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	7L749\749L\7LB749 (Edgerton 899S – Lloydminster 716S)	2017 SP	Below short term rating	Real time Operational practices	Below short term rating	Real time Operational practices
	Edgerton 899S transformer T3	2017 SP	Below short term rating	Real time Operational practices	Above short term rating	New RAS for 7L129
	7L701\7LA701\701L (Strome 223S – Battle River 757S)	2017 SP	Below short term rating	Real time Operational practices	Above short term rating	New RAS for 7L129
	749L\749AL (Metiskow 648S – Edgerton 899S)	2017 SP	Below short term rating	Real time Operational practices	Above short term rating	New RAS for 7L129
	North Holden 395S Transformer 1	2017 SP	Below short term rating	Real time Operational practices	Above short term rating	New RAS for 7L129
	701L(North Holden 395S – Strome 223S)	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	704L\704AL	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	Vegreville 709S Transformer (701T or 702T)	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	Jarrow 252S transformer (T1 or T2)	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	Nevis 766S transformer 901T	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	7L105	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	7L161	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	7L42	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	7L77	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	7L95	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	Mahkeses 889S Transformer 5TNSA1 or 5TNSA2	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	912L\9L912	2017 SP	NA	NA	Below short term rating	Real time Operational practices

Reliability Criteria Violations		Scenario	Pre-Project		Post-Project	
Violation	Contingency		Thermal Violation Type	Mitigation Measures	Thermal Violation Type	Mitigation Measures
	9L20	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	500 kV HVDC EATL	2017 SP	NA	NA	Above short term rating	New RAS for 7L129
7L129 (Bauer 918S Tap point - Vermilion 710S)	Edgerton 899S transformer T3	2017 SP	Below short term rating	Real time Operational practices	Below short term rating	Real time Operational practices
	749L\749AL (Metiskow 648S – Edgerton 899S)	2017 SP	Below short term rating	Real time Operational practices	Above short term rating	New RAS for 7L129
	701L(North Holden 395S – Strome 223S)	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	North Holden 395S Transformer 1	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	Nevis 766S transformer 901T	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	7L701\7LA701\701L (Strome 223S – Battle River 757S)	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	7L749\749L\7LB749 (Edgerton 899S – Lloydminster 716S)	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	7L77	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	7L95	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	912L\9L912	2017 SP	NA	NA	Below short term rating	Real time Operational practices
	500 kV HVDC EATL	2017 SP	NA	NA	Above short term rating	New RAS for 7L129
7L130 (Vermilion 710S - Kitscoty 705S)	749L\749AL (Metiskow 648S – Edgerton 899S)	2017 SP	Above short term rating	Real time Operational practices	Above short term rating	Real time Operational practices
	Edgerton 899S Transformer T3	2017 SP	NA	NA	Above short term rating	Real time Operational practices
7L14 (Kitscoty 705S - Hill 751S)	749L\749AL (Metiskow 648S – Edgerton 899S)	2017 SP	Above short term rating	Real time Operational practices	Above short term rating	Real time Operational practices
Several thermal violations*	Metiskow 648S transformer T1 (648ST1)	2017 SP and SL	Above short term rating	Real time Operational practices	Above short term rating	Real time operational practice

* The Metiskow 648S substation transformer, T1 (648ST1) contingency is a known existing system issue and the violation associated with the contingency will be managed using real-time operational practices. The results for this contingency have not been included in this report. The Project has no impact on these violations.

Based on the study results, Alternative 2 is technically viable. The connection assessment identified a number of pre-Project and post-Project system performance issues.

Real-time operational practices and existing and planned RASs can be used to mitigate most of the pre-Project and post-Project system performance issues. The existing RAS #138, used to address pre-Project system performance issues, will not be needed after the Project is connected.

As shown in Table E-1, a new RAS is required to mitigate the observed thermal criteria violations on the 144 kV transmission line 7L129 under certain Category B conditions. It is anticipated that the requirement for the proposed new RAS will be removed by the Provost to Edgerton and Nilrem to Vermilion Transmission System Reinforcement (PENV) project.[2] The target in-service date for the PENV project is Q1 2021.

The Project connection using Alternative 2 will require the addition of a 138 kV circuit and a 138 kV circuit breaker at the Buffalo Creek 526S substation.

Recommendation

It is recommended to proceed with the Project using Alternative 2 as the preferred alternative to respond to the market participant's request for system access service, and a new RAS for the 144 kV transmission line 7L129.

A new RAS is required to mitigate the observed thermal criteria violations on the 144 kV transmission line 7L129 under certain Category B conditions. It is also recommended that real-time operational practices and the planned Hand Hills RAS be used to mitigate the other identified post-Project system performance issues. The existing RAS #138 will not be needed following the Project connection.

A minimum rating of 100 MVA is recommended for the new 138 kV circuit (between the proposed Facility and the existing Buffalo Creek 526S) and is consistent with good electric industry practice.

[2] The PENV project was filed with the AUC on December 12, 2016 in Proceeding No. 22274 and Application No. 22274-A001.

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1. Introduction

This report details the engineering studies undertaken to assess the impact of the Project (as defined below) on the performance of the Alberta interconnected electric system (AIES).

1.1. Project

1.1.1. Project Overview

Irma Wind L.P. (the market participant) has submitted a request for system access service to the Alberta Electric System Operator (AESO) to connect its proposed Irma Wind Power Project[3] (the Facility) to the Alberta interconnected electric system (AIES). The Facility consists of approximately 30 wind turbines and a proposed collector station, to be designated the Kinsella 926S substation. The Facility will be located in the Irma area in the AESO planning area of Wainwright (Area 32).

The request for system access service includes a Rate STS, *Supply Transmission Service*, contract capacity of 90 MW and a Rate DTS, *Demand Transmission Service*, contract capacity of 3 MW for new system access service in the area, and a request for transmission development (collectively, the Project).

The scheduled in-service date (ISD) for the Project is July 1, 2019.

1.1.2. Load Component

The Project includes a load component:

- Rate DTS requested: 3 MW
- Load type: Substation service and auxiliary load

1.1.3. Generation Component

The Project includes the following generation component:

- Rate STS requested: 90 MW
- Maximum Authorized Real Power (MARP): 90 MW
- Maximum Capability (MC): 90 MW
- Type of generator: Wind
- Power factor assumed: 0.9 power factor (PF) lagging and 0.95 PF leading is assumed for the Facility output as measured at the generating unit terminal, per the technical requirements of Section 502.1 of the ISO rules, *Wind Aggregated Generating Facilities Technical Requirements*

[3] Irma Wind Limited Partnership, by its general partner, Irma Wind GP Inc. filed its power plant application for the proposed Irma Wind Power Project in Proceeding 22722 and Application Number 22722-01, which was registered on June 9, 2017.

- Future expansion planned: the market participant has advised the AESO that it does not currently have future expansion plans for the Facility.

1.2. Study Scope

1.2.1. Study Objectives

The objectives of the studies were as follows:

- Assess the impact of the Project on the performance of the AIES.
- Evaluate the Project connection alternatives based on technical performance.
- Identify any violations of the relevant AESO criteria, standards or requirements, both pre- and post-Project.
- Recommend any mitigation measures to address system performance concerns, if any, to enable the reliable connection of the Project to the AIES.

1.2.2. Study Area

Geographically, the Project is located in the AESO planning area of Wainwright (Area 32), which is in the Central Planning Region. Wainwright (Area 32) is surrounded by the AESO planning areas of Lloydminster (Area 13), Vegreville (Area 56), Provost (Area 37) and Alliance/Battle River (Area 36).

From a transmission perspective, Wainwright (Area 32) is connected to Provost (Area 37), Lloydminster (Area 13), and Alliance/Battle River (Area 36) through the 138/144 kV transmission system. There is a 240 kV connection to Provost (Area 37) and Alliance/Battle River (Area 36), as well.

Wainwright (Area 32) and its surrounding planning areas are mainly load centres. All these areas collectively make the region a generation rich region. There are different types of generation plants that supply those areas. This includes cogeneration facilities in Cold Lake (Area 28); coal generation facilities in Alliance/Battle River (Area 36); and wind generating facilities in Hanna (Area 42) and Provost (Area 37).

1.2.2.1. Study Area Description

The Study Area consists of the following AESO planning areas: Lloydminster (Area 13), Wainwright (Area 32), Provost (Area 37), Alliance/Battle River (Area 36), Vegreville (Area 56), Hanna (Area 42), and Cold Lake (Area 28). The Study Area also includes the tie lines connecting these planning areas to neighbouring planning areas. Figure 1-1 shows the transmission system configuration in the Study Area.

The Study Area is served by 240 kV, 138/144 kV, and 69/72 kV transmission systems.

The AESO has published the *AESO 2015 Long-term Transmission Plan*[4] (2015 LTP) in which a summary of the Central Region plan in the near term is provided. Figure 1-2 and Table 1-1 show the near-term plan in the vicinity of the Study Area. The near-term plans have scheduled ISDs expected by 2020.

[4] The 2015 Long-term Transmission Plan is available on the AESO website.

Figure 1-1: Planning Map of the Study Area

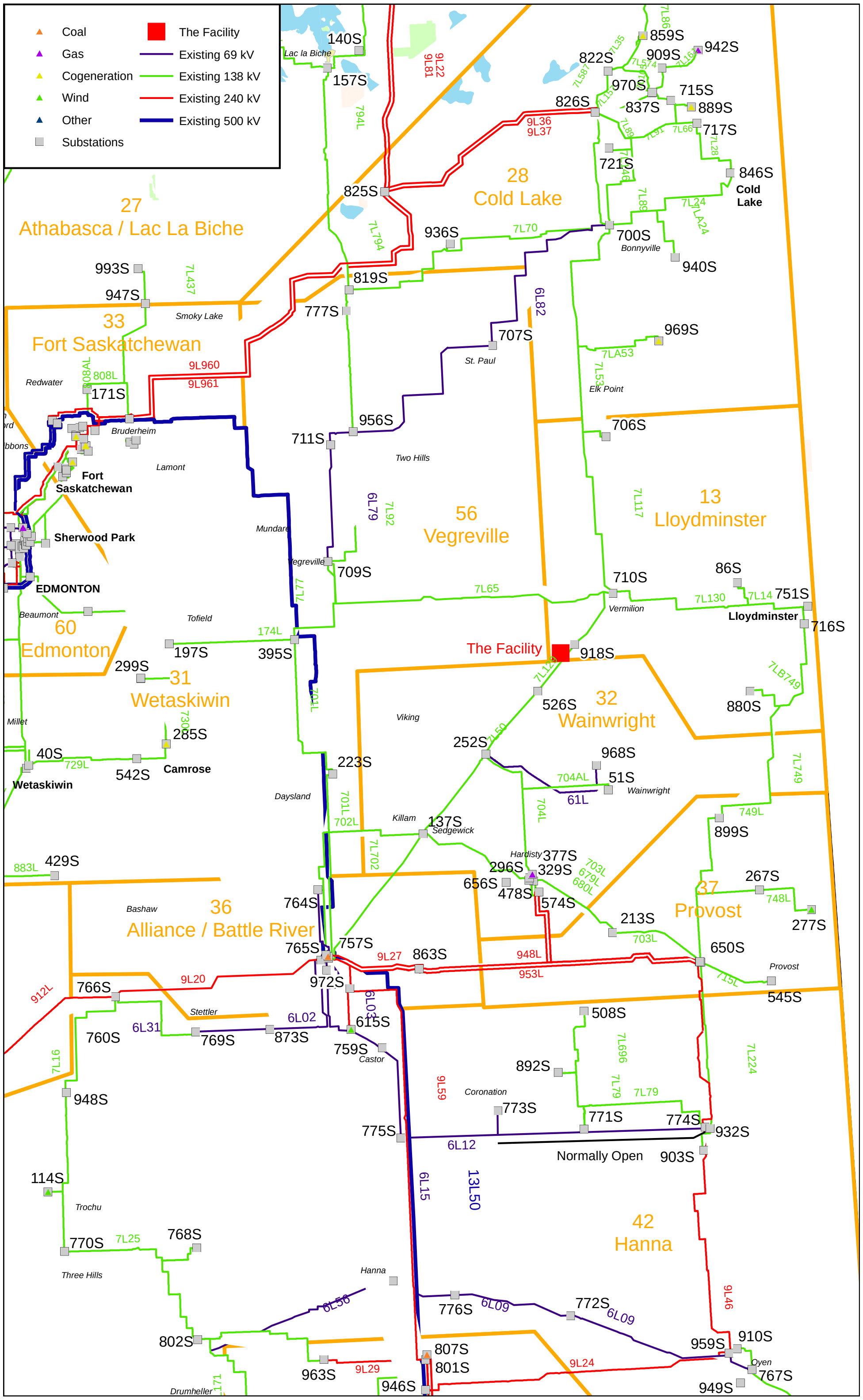
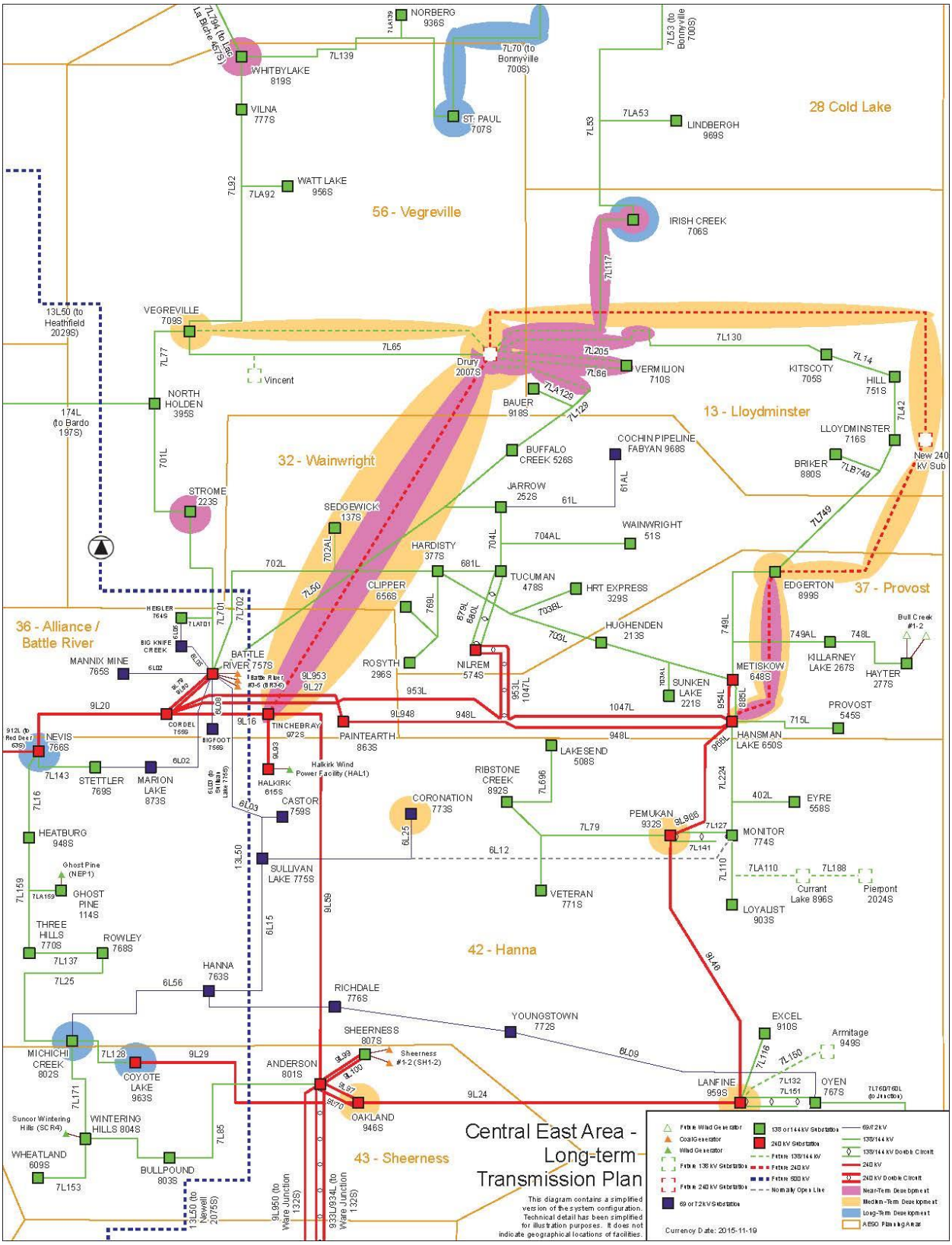


Figure 1-2: Near Term Central Region Plan*



* On this figure, the near term components are shown in purple

1.2.2.2. Existing Constraints

Existing constraints in the Study Area are managed in accordance with Section 302.1 of the ISO rules, *Real Time Constraint Management (*TCM Rule). The remedial action schemes (RASs) that are being used to mitigate certain existing constraints in the Study Area, are listed below:

1. Battle River 7L50 and 7L701 Thermal Protection Scheme (TPS)
2. RAS #134: 174L-395S North Holden overload mitigation scheme
3. RAS #138: 7L50 -526S Buffalo Creek overload mitigation scheme
4. RAS #139: 901T-766S Nevis overload mitigation scheme
5. HVDC RAS: EATL RAS for 912L and 9L20 contingencies

1.2.2.3. AESO Long-Term Transmission Plans

The 2015 LTP identifies system transmission developments in the vicinity of the Study Area in the near-term, medium-term, and long-term. Included for reference, Table 1-1 lists the near-term system developments in the vicinity of the Study Area that are included in the 2015 LTP.[5]

Table 1-1: 2015 LTP near term components in the Vicinity of the Study Area

Time Frame	Development
Near-term	• Add voltage reinforcement at Strome substation east of Camrose, Irish Creek substation north of Kitscoty and Whitby Lake substation near Vilna • Add new 240/144 kV substation near Vermilion • Add new 240 kV line from Tinchebray substation northeast of Halkirk to new substation near Vermilion energized at 144 kV • Reconfigure 144 kV lines in vicinity of Vermilion to terminate at new substation • Add new 240 kV line from Hansman Lake substation southeast of Hughenden to Edgerton substation energized at 144 kV • Rebuild 144 kV line from Vermilion to Irish Creek to higher capacity

1.2.3. Studies Performed

The following studies were performed for pre-Project scenarios:

- Power flow
- Short-circuit

The following studies were performed for post-Project scenarios:

- Power flow
- Transient stability
- Short-circuit

[5] The 2015 LTP identifies the near-term transmission developments in the Study Area on page 44.

1.3. Report Overview

The Executive Summary provides a high-level summary of the assessment and its conclusions. Section 1 provides an introduction of the Project and the Study Area. Section 2 describes the criteria, system data, and other study assumptions used in the studies. Section 3 describes the methodology used for the studies. Section 4 discusses the pre-Project study results. Section 5 presents the connection alternatives that were examined. Section 6 presents the post-Project study results for the alternative that was selected for further study. Section 7 presents the sensitivity study results. Section 8 provides the results of the short-circuit studies and analysis. Section 9 discusses the Project dependencies, if any. Section 10 presents the conclusions and recommendations of the Project connection assessment.

2. Criteria, System Data, and Study Assumptions

2.1. Criteria, Standards, and Requirements

2.1.1. Transmission Planning Standards and Reliability Criteria

The Transmission Planning (TPL) Standards, which are included in the Alberta Reliability Standards, and the AESO's *Transmission Planning Criteria – Basis and Assumptions*[6] (collectively, the Reliability Criteria) were 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-AB-0, have referenced Applicable Ratings when specifying the required system performance under Category A and Category B events. For the purpose of applying the TPL standards to the studies documented in this report, Applicable Ratings are defined as follows:

- Seasonal continuous thermal rating of the line's loading limits.
- Highest specified loading limits for transformers.
- For Category A conditions: Voltage range under normal operating conditions follows the AESO Information Document # 2010-007RS, *General Operating Practices – Voltage Control* (ID #2010-007RS). ID #2010-007RS relates to Section 304.4 of the ISO rules, *Maintaining Network Voltage*. For the busses not listed in ID #2010-007RS, Table 2-1 in the *Transmission Planning Criteria – Basis and Assumptions* applies.
- For Category B conditions: The extreme voltage range values per Table 2-1 in the *Transmission Planning Criteria – Basis and Assumptions*.
- Desired post-contingency voltage change limits for three defined post event timeframes as provided in Table 2-1.

[6] Filed under a separate cover.

Table 2-1: Post Contingency Voltage Deviation Guidelines for POD 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 POD low voltage bus	±10%	±7%	±5%

2.1.2. ISO Rules and Information Documents

AESO ID #2010-007RS was applied to establish pre-contingency voltage profiles in the Study Area. The TCM Rule was followed in setting up the study scenarios and assessing the study results.

The Reliability Criteria is the basis for planning the AIES. In addition, due regard was given to the AESO's Connection Study Requirements Document and the AESO's Generation and Load Interconnection Standard.

2.1.3. Other Requirements

Wind Aggregated Generation Facility (WAGF) Requirements

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

2.2. Study Scenarios

At time of study, the scheduled ISD for the Project was December 31, 2016. As a result, the studies were performed using 2017 study scenarios. The scheduled ISD has since been revised from December 31, 2016 to July 1, 2019. The shift in the scheduled ISD would not materially impact the results of this connection assessment, and would not change the conclusions and recommendations contained in this report.

The Project's requested Rate DTS of 3 MW is not significant compared to the load in the Study Area, which is in a generation rich area, hence it was not considered in this study.

Table 2-2 lists the scenarios considered for the Project connection study's power flow and transient stability analyses. Summer loading scenarios, both summer light (SL) and summer peak (SP), were selected since they provide the most stressed operating condition. This is because the Study Area has low load variation between winter and summer seasons and the transmission facilities in the Study Area have summer ratings that are significantly lower than the winter ratings.

Table 2-2: List of the Connection Study Scenarios

Year/Season	Condition	Project Load (MW)	Project Generation (MW)	System Generation Dispatch Conditions
2017 SL	Pre-Project	0	0	High Wind, Economic Coal
2017 SP	Pre-Project	0	0	High Wind,

Year/Season	Condition	Project Load (MW)	Project Generation (MW)	System Generation Dispatch Conditions
				Economic Coal
2017 SL	Post-Project	0^	90	High Wind , Economic Coal
2017 SP	Post-Project	0	90	High Wind, Economic Coal

^The load component of the Project is not material and; therefore, was not assessed

2.3. Load and Generation Assumptions

2.3.1. Load Assumptions

The relevant AESO regional planning load forecasts used for this connection assessment are shown in Table 2-3. The forecasts are based on the *AESO 2014 Long-term Outlook* (2014 LTO). As part of its planning responsibilities, the AESO updates its corporate forecasts routinely to ensure they reflect the latest economic projects, factors and timing. While the AESO has updated its regional forecasts since the connection studies were performed, the use of the current AESO forecast, the *AESO 2017 Long-term Outlook*, would not materially alter the connection study results or affect the conclusions and recommendations in this report.

For the studies, when loads are modified to align with the load forecast in the 2014 LTO, the active power to reactive power ratio in the base case scenarios were maintained.

Table 2-3: Forecast Area Load *(2014 LTO at Alberta Internal Load (AIL) Peak)*

Area or Region Name	Year/Season Load	Forecast Peak Load (MW)
Central Region	2017 SP	1,632
	2017 SL	1,174
AIL w/o Losses	2017 SP	11,440
	2017 SL	8,245

2.3.2. Generation Assumptions

The existing non-wind generators and their dispatch levels in the Study Area are listed in Table 2-4. This dispatch level was used for the economic coal dispatch condition for the Study Area.

The existing wind generators and their dispatch are listed in Table 2-5. The remaining forecasted wind growth is allocated to planned wind projects in the Central region as identified in Table 2-6. The forecast wind growth is based on the 2014 LTO with a variance to capture an uncertainty around the timing of future wind projects.

The wind dispatch level included all existing and future wind generation dispatched up to their contracted MC level. These dispatch assumptions were used for the high wind dispatch condition for the Study Area.

Table 2-4: Non-Wind Generation (MW) in the Study Area

Existing/ Future	Unit Name	AESO Planning Area	2017 SP Unit Net Generation* (MW)	2017 SL Unit Net Generation (MW)
Existing	Battle River #3	36	122.0	91.4
Existing	Battle River #4	36	128.0	98.0
Existing	Battle River #5	36	307.0	157.0
Existing	Sheerness #1	43	144.3	144.3
Existing	Sheerness #2	43	144.3	144.3
Existing	Foster Creek G1, G2	28	61.4	62.6
Existing	Mahkeses G1, G2	28	137.2	156.8
Existing	Nabiye G1,G2	28	93.2	96.2
Existing	Primrose	28	76.9	79.4

*Unit Net Generation refers to Gross Generating unit MW output less Unit Service Load

Table 2-5: Summary of Existing Wind Generators in Study Area

Generator Name	AESO Planning Area	Pmax (MW)	2017 SP Unit Net Generation (MW)	2017 SL Unit Net Generation (MW)
Ghost Pine	42	81.6	82	82
Halkirk	42	149.4	150	150
BluEarth Bull Creek Wind	37	29.5	29.5	29.5
Total			**261.5**	**261.5**

Table 2-6: Planned Wind Projects in the Study Area including the Facility

Existing/ Future	Generator Name	Project Number	AESO Planning Area	2017 SP Unit Net Gener-ation[6] (MW)	2017 SL Unit Net Generati on (MW)
Future	Wainwright Wind Farm	937 (Facility)	32-Wainwright	90	90
Future	E.ON Grizzly Bear Wind Facility*	1250	13-Lloydminster	0	0
Future	Suncor Hand Hills Wind Energy**	635	42-Hanna	80	80
Future	BluEarth Hand Hills Wind Energy ***	678	42-Hanna	80	80
Total				**250**	**250**

*The *Grizzly Bear Creek Wind Power Connection* NID, as originally approved by AUC Decision 21643-D01-2016 and Approval 21643-D02-2016.

***The Suncor Hand Hills Wind Energy Connection NID, as originally approved by AUC Decision 2482-D01-2015 and Approval 2482-D03-2015.*

***The *BluEarth Hand Hills Wind Energy Connection* NID, as originally approved by AUC Decision 2482-D01-2015 and Approval 2482-D02-2015.

2.3.3. Intertie Flow Assumptions

Intertie assumptions are included for the British Columbia-Alberta (BC-AB), Saskatchewan-Alberta (SK-AB), and Montana-Alberta (MATL) interties. Details on the assumptions can be found in Table 2-7. These export and import assumptions coincide with high export, which is used for 2017 SL pre-Project and post-Project scenarios, and high import, which is used for 2017 SP pre-Project and post-Project scenarios.

Table 2-7: Intertie Assumptions

Scenario	Intertie		
	Import (-) /Export (+) to BC-AB (MW)	Import (-) /Export (+) to SK-AB (MW)	Import (-) /Export (+) to MATL (MW)
2017 SL (High Export)	700	150	300
2017 SP (High Import)	-900	-150	-300

2.3.4. HVDC Power Order

The 500 kV high voltage DC (HVDC) power orders were set based on the reduced system loss assumptions in pre-Project and post-Project study scenarios, as shown in Table 2-8.

Table 2-8: 500 kV HVDC Power Order by Scenario

Scenario	Western Alberta Transmission Line* (MW)	Eastern Alberta Transmission Line** (MW)
2017 SL Pre-Project	475 (S → N)***	Blocked
2017 SP Pre-Project	250 (S → N)	450 (S → N)
2017 SL Post-Project	475 (N → S)	Blocked
2017 SP Post-Project	250 (S → N)	800 (S → N)

*Western Alberta Transmission Line (the west 500 kV HVDC line)

**Eastern Alberta Transmission Line (the east 500 kV HVDC line)

****N → S: HVDC flow direction is North to South, S → N: HVDC flow direction is South to North*

2.4. System Projects

2015 LTP system transmission projects were not considered in the system topology for the study scenarios because these transmission developments are not expected to be in service before the scheduled Project ISD.

2.5. Customer Connection Projects

Customer connection projects within the Study Area that have passed Gate 2 of the AESO Connection Process as of July 2017 were modelled in the study scenarios bases on their positions in the AESO Connection Queue unless otherwise indicated. Table 2-9 summarizes the customer connection project assumptions that were used in the studies. Information in this table is subject to change as projects progress.

Table 2-9: Summary of Customer Connection Projects Included in the Study

AESO Planning Area	Queue Position*	Scheduled ISD	Project Name	AESO Project No.	Generation (MW)	Load (MW)
42	6	Sep 1, 2019	Suncor Hand Hills Wind Energy Project	635	80.0	0.0
42	7	Sep 1, 2019	BluEarth Hand Hills Wind Project	678	80.0	1.0
37	9	Dec 31, 2017	TransCanada Keystone KXL Pump station #2-Eyre	851	0.0	0.0
37	10	Dec 31, 2017	TransCanada Keystone KXL Pump station #2-Eyre Phase 2	851	0.0	25.0
42	11	Dec 31, 2017	TransCanada Keystone KXL Pump station #3-Current	863	0.0	25.0
42	12	Dec 31, 2017	TransCanada Keystone KXL Pump station #4-Armitage	864	0.0	25.0

* Per the AESO Connection Queue posted in July 2017.

2.6. Facility Ratings and Shunt Elements

The legal owner of transmission facilities (TFO) provided the ratings of existing transmission lines and existing transformers in the Study Area. The seasonal continuous ratings and short-term ratings for the key transmission lines in the Study Area are shown in Table 2-10. The key transformers in the Study Area are shown in Table 2-11.

Table 2-10: Summary of Key Transmission Line Ratings in the Study Area (*MVA on 138 kV Base*)

Line ID	Line Description	Voltage Class (kV)#	Seasonable Continuous Rating (MVA)		Short-term^ Rating (MVA)	
			Summer	Winter	Summer	Winter

Line ID	Line Description	Voltage Class (kV)#	Seasonable Continuous Rating (MVA)		Short-term^ Rating (MVA)	
			Summer	Winter	Summer	Winter
704L	Jarrow 252S - Tucuman 478S	138	75.0	79.0	83.0	87.0
704L	Jarrow 252S - Jarrow 252S tap point	138	85.0	90.0	94.0	99.0
7L129	Buffalo Creek 526S - Vermilion 710S	138	109.3	139.0	123.6	142.8 CT (150.5)
7L50	Buffalo Creek 526S - Jarrow 252S tap point	138	109.3	139.0	123.6	150.5
7L701/701L	Strome 223S - Battle River 757S	138	139.9	179.2	160.0	193.5
7L702/702L	Sedgewick 137S - Battle River 757S	138	109.3	138.9	123.6	150.5
748L	Killarney Lake 267S - Hayter 277S	138	119.0	146.0	131.0	161.0
749L	Metiskow 648S - Killarney Lake 267S tap point	138	121.0	149.0	133.0	164.0
749AL	Killarney Lake 267S - Killarney Lake 267S tap point	138	121.0	148.0	133.0	163.0
749L	Edgerton 899S - Killarney Lake 267S tap point	138	88.0	96.0 CT*,** (127.0)	97.0	140.0
749L/7L749	Edgerton 899S – Briker 880S tap point	138	88.0	96.0 CT (127.0)	97.0	140.0
7L749	Lloydminster 716S - Briker 880S tap point	138	109.3	139.0	123.6	142.8 CT (150.5)
7L159	Ghost Pine 114S - Three Hills 770S	138	94.9 CT	94.9 CT (139.0)	94.9 CT	94.9 CT
7L159	Ghost Pine 114S - Heatburg 948S	138	94.9 CT (109.3)	94.9 CT (139.0)	94.9 CT	94.9 CT
7L16	Nevis 766S - Heatburg 948S	138	94.9 CT	94.9 CT	94.9 CT	94.9 CT
7L85	Wintering Hills 804S - Bullpound 803S	138	94.9 CT	94.9 CT	94.9 CT	94.9 CT
7L25	Michichi Creek 802S - Rowley 768S	138	94.9 CT	94.9 CT	94.9 CT	94.9 CT
7L128	Michichi Creek 802S - Coyote Lake 963S	138	94.9 CT (158.1)	94.9 CT (202.2)	94.9 CT	94.9 CT
7L85	Bullpound 803S - Anderson 801S	138	94.9 CT	94.9 CT	94.9 CT	94.9 CT
7L65	Vincent 2019S tap point - Vegreville 709S	138	94.9 CT (109.3)	94.9 CT (139.0)	94.9 CT	94.9 CT
7L53	Irish Creek 706S - Bonnyville 700S	138	71.9	86.3	71.9	86.3
7L117	Vermilion 710S - Irish Creek 706S	138	109.3	139.0	123.6	150.5
7L130	Kitscoty 705S - Vermilion 710S	138	71.9	86.3	71.9	86.3

Line ID	Line Description	Voltage Class (kV)#	Seasonable Continuous Rating (MVA)		Short-term^ Rating (MVA)	
			Summer	Winter	Summer	Winter
7L14	Hill 751S - Kitscoty 705S	138	71.9	86.3	71.9	86.3
9L912/912L***	Red Deer 63S - Nevis 766S	240	350.0	498.0 CT	420.0	498.0 CT
9L20	Nevis 766S - Cordel 755S	240	488.0	498.0 CT (624.0)	498.0 CT	498.0 CT
9L29	Oakland 946S - Coyote Lake 963S	240	332.0 CT (753.0)	332.0 CT (966.0)	432.0 CT	432.0 CT
9L27	Cordel 755S - Paintearth 863S	240	332.0 CT (489.0)	332.0 CT (624.0)	332.0 CT	332.0 CT
9L953	Cordel 755S - Nilrem 574S	240	498.0 CT (520.0)	498.0 CT (663.0)	498.0 CT	498.0 CT

* "CT" indicates that the transmission line is limited by current transformer.

** The values in brackets represent the transmission lines' ratings if the current transformer limits were removed.

*** The line is currently de-rated. The TFO has informed the AESO of the 2017 date to restore the line to its normal rating.

Transmission lines that start with 7Lxx are operated at 144 kV voltage.

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

Table 2-11: Summary of Key Transformer Ratings in the Study Area

Substation Name and Number	Transformer ID	Transformer Voltages (kV)	Rating (MVA)
Battle River 757S	912T	240/144	224
Battle River 757S	701T	144/72	75
Nevis 766S	901T	240/144	100
Nevis 766S	701T	144/72/25	H-M: 33.3 X-M: 33.3 Y-M: 16.6
Nilrem 574S	T1	240/138	400
Nilrem 574S	T2	240/138	400

The details of key shunt elements in the Study Area are given in Table 2-12.

Table 2-12: Summary of Key Shunt Elements in the Study Area

Substation Name and Number	Voltage Class (kV)	Capacitors				Reactors			
		Number of Switched Shunt Blocks	Total at Nominal Voltage (MVAr)	Status in Study (on or off)		Number of Switched Shunt Blocks	Total at Nominal Voltage (MVAr)	Status in Study (on or off)	
				2017 SL (MVAr)	2017 SP (MVAr)			2017 SL (MVAr)	2017 SP (MVAr)
Buffalo Creek 526S	138	1 x 15.00 MVAr	15.00	on	on				
Halkirk 615S	34.5	1 x 6.00 + 3 x 18.00 MVAr	60.00	on	on	2 x -14.00 MVAr	-14.00	on	*on*
	0.5	2 x 12.50 MVAr	25.00	on	on	2 x -12.50 MVAr	-25.00	on	*on*
Hansman Lake 650S	18.0	1 x 200.0 MVAr	200.0	on	on	1 x -100.0 MVAr	-100.0	on	*on*
Hardisty 377S	138	1 x 27.02 + 44.90 MVAr	71.9	on	on				
Hill 751S	138	1 x 18.12 + 1 x 22.96 MVAr	41.08	on	on				
Killarney Lake 267S	138	1 x 9.10 + 2 x 10.90 MVAr	30.90	on	on				
Lloydminster 716S	138	1 x 18.12 MVAr	18.12	on	on				
Tucuman 478S	138	1 x 27.17 MVAr	27.17	on	on				
Vermilion 710S	138	1 x 22.96 MVAr	22.96	on	on				

2.7. Dynamic Data and Assumptions

The Project Data Update Package (PDUP) *Type 3* wind machine generic models were used to model the wind turbines for the Facility. The model details are provided in Attachments E and F.

2.8. Protection Fault Clearing Times

Actual fault clearing times for existing facilities were provided by the TFO and are listed in Table 2-13.

Table 2-13: Summary of Protection Fault Clearing Times

Line	Voltage Class (kV)	Terminal Location			Faulted Location	Total Clearing Time		
		Terminal 1	Terminal 2	Terminal 3		Terminal 1	Terminal 2	Terminal 3
7L701	138	Battle River 757S	Strome 223S	Heisler 764S	Battle River 757S	6 cycles	25 cycles	42 cycles

7L701	138	Strome 223S	Battle River 757S	Heisler 764S	Strome 223S	6 cycles	24 cycles	39 cycles
7L129	138	Vermilion 710S	Buffalo Creek 526S	-	Vermilion 710S	6 cycles	24 cycles	-
7L129	138	Buffalo Creek 526S	Vermilion 710S	-	Buffalo Creek 526S	6 cycles	24 cycles	-
7L50	138	Battle River 757S	Buffalo Creek 526S	Jarrow 252S	Battle River 757S	6 cycles	115 cycles	95 cycles
7L50	138	Buffalo Creek 526S	Battle River 757S	Jarrow 252S	Buffalo Creek 526S	6 cycles	42 cycles	40 cycles
749L/ 7L749	138	Lloydminster 716S	Edgerton 899S	Briker 880S tap point	Lloydminster 716S	6 cycles	95 cycles	No line protection
749L/ 7L749	138	Edgerton 899S	Lloydminster 716S	Briker 880S tap point	Edgerton 899S	6 cycles	24 cycles	No line protection
749L	138	Metiskow 648S	Edgerton 899S	Killarnery Lake 267S tap point	Metiskow 648S	6 cycles	95 cycles	No line protection
749L	138	Edgerton 899S	Metiskow 648S	Killarnery Lake 267S tap point	Edgerton 899S	6 cycles	95 cycles	No line protection
7L65	138	Vegreville 709S	Vermillion 710S	-	Vegreville 709S	6 cycles	42 cycles	-
7L65	138	Vermillion 710S	Vegreville 709S	-	Vermillion 710S	6 cycles	24 cycles	-
7L117	138	Vermillion 710S	Irish Creek 706S	-	Vermillion 710S	6 cycles	24 cycles	-
7L117	138	Irish Creek 706S	Vermillion 710S	-	Irish Creek 706S	6 cycles	24 cycles	-
7L42	138	Hill 751S	Lloydminster 716S	-	Hill 751S	6 cycles	24 cycles	-

7L42	138	Lloydminster 716S	Hill 751S	-	Lloydminster 716S	6 cycles	24 cycles	-
7L53	138	Bonnyville 700S	Irish Creek 706S	-	Bonnyville 700S	6 cycles	24 cycles	-
7L53	138	Irish Creek 706S	Bonnyville 700S	-	Irish Creek 706S	6 cycles	24 cycles	-
7L70	138	Bonnyville 700S	St. Paul 707S	-	Bonnyville 700S	6 cycles	42 cycles	-
7L70	138	St. Paul 707S	Bonnyville 700S	-	St. Paul 707S	6 cycles	42 cycles	-
9L20	240	Cordel 755S	Nevis 766S	-	Cordel 755S	5 cycles	6 cycles	-
9L20	240	Nevis 766S	Cordel 755S	-	Nevis 766S	5 cycles	6 cycles	-
912L	240	Red Deer 63S	Nevis 766S	-	Red Deer 63S	5 cycles	6 cycles	-
912L	240	Nevis 766S	Red Deer 63S	-	Nevis 766S	5 cycles	6 cycles	-
9L59	240	Halkirk 401S (Switch H)	Anderson 801S	-	Halkirk 401S (Switch H)	5 cycles	6 cycles	-
9L59	240	Anderson 801S	Halkirk 401S (Switch H)	-	Anderson 801S	5 cycles	6 cycles	-

2.9. Voltage Profile Assumptions

AESO ID #2010-007RS was used to establish normal system (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 all the busses not included in the AESO ID #2010-007RS. These voltages were used to set the voltage profile for the study base cases prior to power flow studies.

3. Study Methodology

3.1. Connection Studies Carried Out

The studies to be carried out for this connection study are identified below in Table 3-1. All studies were performed using PSS/E v33.

Table 3-1: Summary of Studies Performed

Scenario	Project		System Conditions	Power flow	Transient Stability	Short-circuit
	Load (MW)	Generation (MW)				
2017 SL Pre-Project	0	0	Category A and Category B	X		
2017 SP Pre-Project	0	0	Category A and Category B	X		
2017 SL Post-Project	0	90	Category A and Category B	X	X	
2017 SP Post-Project	0	90	Category A and Category B	X	X	
2017 SL High Coal Pre-Project*	0	0	Category A	X		
2017 SP High Coal Pre-Project*	0	0	Category A	X		
2017 SL High Coal Post-Project*	0	90	Category A	X		
2017 SP High Coal Post-Project*	0	90	Category A	X		
2017 Winter Peak (WP) Pre-Project**	0	0	Category A			X
2017 WP Post-Project**	0	90	Category A			X
2025 WP Post-Project**	0	90	Category A			X

* Sensitivity studies (as discussed in Section 3.4)
**Short-circuit study methodology is described in Section 3.5

3.2. Power Flow Analysis

Pre-Project and post-Project power flow studies were conducted to identify and compare study scenario thermal and voltage criteria violations as per the Reliability Criteria in the Study Area, and to identify any POD low voltage bus deviations from the limits listed in Table 2-1.

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

POD low voltage bus deviations were 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 were 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 were allowed to adjust, and voltage deviations above 5% would be reported.

3.2.1. Contingencies Studied

Power flow analysis was performed for the Category A conditions and all Category B contingencies in the Study Area for all pre- and post-Project scenarios.

3.3. Transient Stability Analysis

Transient stability analysis for selected Category B contingencies was performed using the 2017 SL and SP post-Project scenarios. The contingency list and the fault clearing times are shown in Table 2-13. These disturbances cover all the major transmission lines in the Study Area. The active power of the generation units, speed, bus voltages, frequencies and angles are monitored for selected busses in the Study Area.

3.4. Sensitivity Studies

To assess whether there are any Reliability Criteria violations under Category A conditions assuming simultaneous high dispatch of both wind and coal generation in the Study Area, a sensitivity study was performed using a high wind, high coal and high import (for 2017 High Coal SP) or high export (for 2017 High Coal SL) pre-Project and post-Project scenarios. In this sensitivity scenario the coal units in the Central Planning Region are dispatched to their MCs (net-to-grid) as shown in Table 3-2, and the list of sensitivity scenario cases are as shown in Table 3-3.

Table 3-2: High Coal Generation (MW) in the Study Cases

Existing/Future	Unit Name	AESO Planning Area	2017 SP Unit Net Generation (MW)	2017 SL Unit Net Generation (MW)
Existing	Battle River #3	36	149.0	149.0
Existing	Battle River #4	36	155.0	155.0
Existing	Battle River #5	36	385.0	385.0
Existing	Sheerness #1	43	390.0	390.0
Existing	Sheerness #2	43	390.0	390.0

Table 3-3: High Coal Scenario Cases

Scenario	Project Load (MW)	Project Generation (MW)	System Generation Dispatch Conditions
2017 SL High Coal Pre-Project	0	0	High Wind , High Coal
2017 SP High Coal Pre-Project	0	0	High Wind , High Coal
2017 SL High Coal Post-Project	0	90	High Wind , High Coal
2017 SP High Coal Post-Project	0	90	High Wind , High Coal

3.5. Short-Circuit Analysis

Short-circuit analysis was performed for the 2017 WP pre-Project and post-Project scenarios, as well as for the future ten-year system using the 2025 WP post-Project scenario. Winter peak scenarios were used for short-circuit analysis because winter peak scenarios produce higher short-circuit current levels than summer peak scenarios.

A maximum fault level is 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 fault was simulated. Polar coordinates and per unit values was used for reporting the results.

Maximum fault level was provided for the following substations:

- Battle River 757S
- Buffalo Creek 526S
- Irish Creek 706S
- Proposed Kinsella 926S
- Lloydminster 716S
- Vermillion 710S
- Vincent 2019S
- Vegreville 709S

4. Pre-Project System Assessment

4.1. Pre-Project Power Flow Studies

This section provides the results for the pre-Project power flow studies. The analysis of these results, including mitigations for observed Reliability Criteria violations, is provided in Section 10. All power flows are based on 138 kV system voltage. The results of the steady state analysis are illustrated by the plots in Attachments A and B, respectively. The pre-Project constraint summary table is provided in Attachment H.

4.1.1. 2017 Summer Light (2017 SL pre-Project)

The 2017 SL pre-Project scenario study results are summarized below and the related power flow diagrams are provided in Attachment A.

Category A Condition

No Reliability Criteria violations were observed in this scenario under the Category A condition.

Category B Conditions

Neither voltage criteria violations nor POD (low voltage) bus voltage deviations were observed in this scenario under Category B conditions.

Thermal loading above seasonal continuous ratings and short-term ratings were observed as shown in Table 4-1. The red shaded cells show the loading above the short-term rating.

Table 4-1: Summary of Thermal Criteria Violations Under Category B Conditions for 2017 SL Pre-Project

Contingency	Limiting Branch	Seasonal Continuous Rating (MVA)	Short-term Rating (MVA)	Pre-Project	
				Power flow (MVA)	% Loading
9L29 (Oakland 946S - Coyote Lake 963S)	7L128 (Coyote Lake 963S - Michichi Creek 802S)	94.9	94.9	153.3	161.5
	7L159 (Ghost Pine 114S tap point - Heatburg 948S)	94.9	94.9	118.7	125.1
	7L16 (Nevis 766S - Heatburg 948S)	94.9	94.9	114.5	120.7
	7L85 (Bullpound 803S - Anderson 801S)	94.9	94.9	120.7	127.1
	7L85 (Wintering Hills 804S - Bullpound 803S)	94.9	94.9	126.9	133.7

4.1.2. 2017 Summer Peak (2017 SP pre-Project)

The 2017 SP pre-Project power flow study results are summarized below and the related power flow diagrams are provided in Attachment B.

Category A Condition

No voltage criteria violations or thermal criteria violations were observed in this scenario under the Category A condition.

Category B Conditions

No voltage criteria violations or voltage deviations were observed in this scenario under Category B conditions.

Thermal loading above seasonal continuous ratings and short-term ratings were observed. All observed thermal criteria violations are listed in Table 4-2. The red shaded cells show the loading above the short-term rating and the green shaded cells show the loading above the seasonal continuous rating and below the short-term rating.

Table 4-2: Summary of Thermal Criteria Violations Under Category B Conditions for 2017 SP Pre-Project

Contingency	Limiting Branch	Seasonal Continuous Line Rating (MVA)	Short-term Rating (MVA)	Pre-Project	
				Power flow (MVA)	% Loading
North Holden 395S Transformer 1 (295ST1) *	7L129 (Buffalo Creek 526S - Bauer 918S tap point)	109.2	123.6	113.2	103.6
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	134.9	123.5
Tucuman 478S transformer T1 or T2 (478ST1* or 478ST2*)	7L50 (Jarrow 252S tap point - Battle River 757S)	109.2	123.6	109.4	100.1
Buffalo Creek 526S transformer T1 or T2 (526ST1* or 526ST2*)	749L (Edgerton 899S - Killarney Lake 267S tap point)	88.0	97.0	89.8	102.0
701L (North Holden 395S - Strome 223S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	127.9	117.1
Vegreville 709S Transformer 701T or 702T (709S701T* or 709S702T*)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	117.2	107.3
749L\749AL (Metiskow 648S - Edgerton 899S)	7L129 (Buffalo Creek 526S - Bauer 918S tap point)	109.2	123.6	121.5	111.3
	7L129 (Bauer 918S tap point - Vermilion 710S)	109.2	123.6	114.9	105.2
	7L130 (Vermilion 710S - Kitscoty 705S)	71.9	71.9	76.7	106.7
	7L14 (Kitscoty 705S - Hill 751S)	71.9	71.9	72.4	100.7
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	143.4	131.3
Nevis 766S transformer 901T (766S901T*)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	128.2	117.4
7L105 (Mahihkan 837S - Mahno 909S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	117.7	107.8
7L161 (Mahno 909S - Nabiye 942S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	117.7	107.8
7L42 (Hill 751S - Lloydminster 716S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	126.0	115.3
7L50 (Buffalo Creek 526S - Battle River 757S)	749L (Edgerton 899S - Killarney Lake 267S tap point)	88.0	97.0	94.4	107.3
	749L\7L749 (Edgerton 899S - Briker 880S tap point)	88.0	97.0	88.2	100.3
	7L77 (North Holden 395S - Vegreville 709S)	96.0	123.6	97.4	101.5
7L701\7LA701\701L (Strome 223S - Battle River 757S)	7L129 (Buffalo Creek 526S - Bauer 918S tap	109.2	123.6	112.0	102.6

	point)				
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	133.8	122.5
7L749\749L\7LB749 (Edgerton 899S - Lloydminster 716S)	7L129 (Buffalo Creek 526S - Bauer 918S tap point)	109.2	123.6	114.1	104.4
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	135.8	124.3
7L77 (North Holden 395S - Vegreville 709S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	128.9	118.0
7L95 (Mahkeses 889S - Leming Lake 715S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	120.9	110.7
Mahkeses 889S transformer 5TNSA1 (889S-5TNSA1)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	115.9	106.1
Mahkeses 889S transformer 5TNSA2 (889S-5TNSA2)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	115.9	106.1
Edgerton 899S transformer T3 (899ST3a*)	7L129 (Buffalo Creek 526S - Bauer 918S tap point)	109.2	123.6	117.6	107.6
	7L129 (Bauer 918S tap point - Vermilion 710S)	109.2	123.6	111.1	101.7
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	139.4	127.6
912L\9L912 (Red Deer 63S - Nevis 766S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	128.1	117.3
9L20 (Nevis 766S -Cordel 755S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	123.0	112.6
9L29 (Oakland 946S - Coyote Lake 963S)	7L128 (Coyote Lake 963S - Michichi Creek 802S)	94.9	94.9	151.2	159.4
	7L159 (Ghost Pine 114S tap point - Heatburg 948S)	94.9	94.9	115.5	121.7
	7L16 (Nevis 766S - Heatburg 948S)	94.9	94.9	110.4	116.3
	7L85 (Bullpound 803S - Anderson 801S)	94.9	94.9	111.5	117.5
	7L85 (Wintering Hills 804S - Bullpound 803S)	94.9	94.9	122.3	128.9
9L960 (Deerland 13S - Whitefish Lake 825S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	113.7	104.1
9L961 (Deerland 13S - Whitefish Lake 825S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	113.7	104.1
500 kV HVDC EATL	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	128.3	117.4

*Lack of transformer breaker will trip the lines connected to this transformer

5. Connection Alternatives

5.1. Overview

The AESO, in consultation with the TFO and the market participant, examined two connection alternatives to respond to the market participant's request for system access service. Details of these alternatives are presented below.

The proposed Facility will include a 34.5/138 kV collector substation, to be designated the Kinsella 926S substation.

5.2. Connection Alternatives Identified

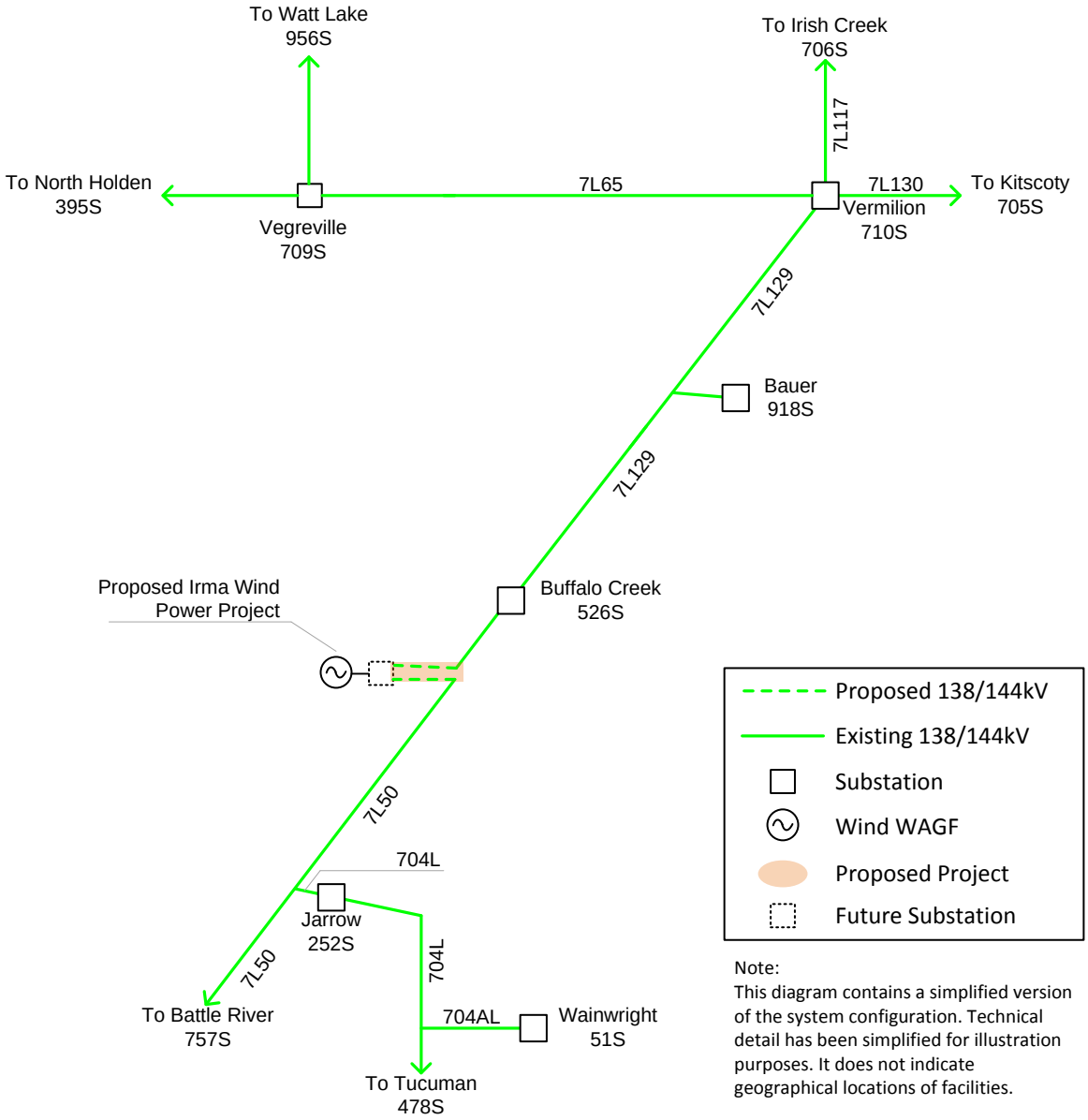
The major transmission development required for the two connection alternatives examined are described below.

Alternative 1 – In-and-out connection to the 144 kV transmission line 7L50:

Connect the proposed Facility to the 144 kV transmission line 7L50 (between the Buffalo Creek 526S substation and the Jarrow 252S tap point) using an in-and-out configuration as shown in Figure 5-1. This alternative would require the addition of two 144 kV circuits, each approximately 0.2 km long, and a switching station with a minimum of three 144 kV circuit breakers.

As a result of existing capacity limits on the 138/144 kV system in the area, the maximum generation output for the Facility would be 20 MW under Category A conditions for this connection alternative. This is much lower than the market participant's Rate STS request of 90 MW.

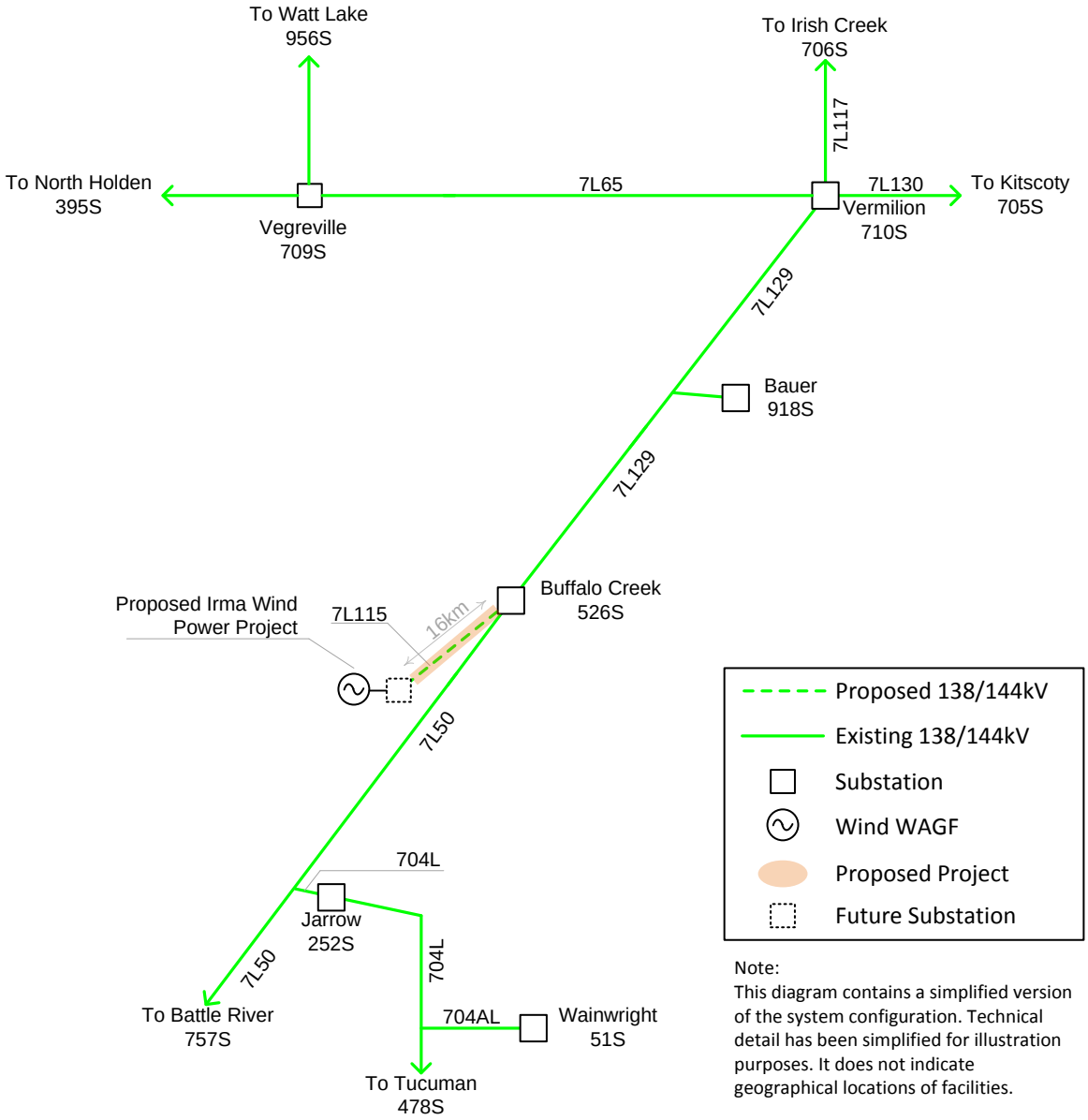
Figure 5-1: Connection Alternative 1



Alternative 2 – Radial connection to the Buffalo Creek 526S substation:

Connect the proposed Facility to the Buffalo Creek 526S substation as shown in Figure 5-2. This alternative would require the addition of a 138 kV circuit approximately 10 to 16 km long and a 138 kV circuit breaker at the Buffalo Creek 526S substation. Under this connection alternative, the market participant's requested Rate STS contract capacity of 90 MW could be supported under Category A conditions.

Figure 5-2: Connection Alternative 2



5.2.1. Connection Alternatives Selected for Further Studies

Alternative 2 is the only alternative that can meet market participant's request for a Rate STS contract capacity of 90 MW. Therefore, Alternative 2 is the only alternative selected for further study.

5.2.2. Connection Alternatives Not Selected for Further Studies

Alternative 1 was not selected for further studies because it cannot meet the market participant's requested Rate STS contract capacity of 90 MW under Category A conditions.

6. Post-Project System Assessment

This section provides the results of the post-Project studies for Alternative 2, which was described in Section 5.

6.1. Power Flow Studies

This section provides the results for the post-Project power flow studies. The analysis of these results, including mitigations for observed Reliability Criteria violations, is provided in Section 10. All power flows are based on 138 kV system voltage.

6.1.1.1. 2017 Summer Light (2017 SL post-Project)

The 2017 SL post-Project power flow results are presented below and the related power flow diagrams are provided in Attachment C.

Category A Condition

No voltage criteria violations or thermal violations were observed in this scenario under the Category A condition.

Category B Conditions

No voltage criteria violations or voltage deviations were observed in this scenario under Category B conditions.

Thermal loadings above seasonal continuous and short-term ratings were observed and are listed in Table 6-1. The red shaded cells show the loading above short-term rating.

Table 6-1: Summary of Thermal Criteria Violations under Category B Conditions for 2017 SL Post-Project

Contingency	Limiting Branch	Seasonal Continuous Rating (MVA)	Short-term Rating (MVA)	Pre- Project		Post- Project		% Loading Difference
				Power flow (MVA)	% Loading	Power flow (MVA)	% Loading	Post-Pre
9L29 (Oakland 946S - Coyote Lake 963S)	7L128 (Coyote Lake 963S - Michichi Creek 802S)	94.9	94.9	153.3	161.5	153.3	161.5	0.0
	7L159 (Ghost Pine 114S Tap point - Heatburg 948S)	94.9	94.9	118.7	125.1	117.7	124.0	-1.0
	7L16 (Nevis 766S - 948S Heatburg)	94.9	94.9	114.5	120.7	113.5	119.6	-1.0
	7L85 (Bullpound 803S - Anderson 801S)	94.9	94.9	120.7	127.1	122.3	128.9	1.7
	7L85 (Wintering Hills 804S - Bullpound 803S)	94.9	94.9	126.9	133.7	128.5	135.4	1.7

6.1.1.2. 2017 Summer Peak (2017 SP post-Project)

The 2017 SP post-Project power flow results are presented below and the related power flow diagrams are provided in Attachment D.

Category A Condition

No voltage criteria violations or thermal violations were observed in this scenario under the Category A condition.

Category B Conditions

No voltage criteria violations or voltage deviations were observed in this scenario under Category B conditions.

Thermal loading above the seasonal continuous and short-term ratings was observed for a number of contingencies and are listed in Table 6-2. The red shaded cells show the loading above the short-term rating and the green shaded cells show the loading above the seasonal continuous rating and below the short-term rating.

Table 6-2: Summary of Thermal Criteria Violations Under Category B Conditions for 2017 SP Post-Project

Contingency	Limiting Branch	Seasonal Continuous Rating (MVA)	Short-term Rating (MVA)	Pre- Project		Post- Project		% Loading Difference
				Power flow (MVA)	% (Loading)	Power Flow (MVA)	% Loading	Post-Pre
Jarrow 252S transformer T1 or T2 (252ST1* or 252ST2*)	7L129 (Buffalo Creek 526S – Bauer 918S Tap point)	109.2	123.6	65.3	59.8	110.6	101.2	41.4
North Holden transformer T1 (395ST1*)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	113.2	103.6	125.1	114.6	11.0
	7L129 (Bauer 918S Tap point – Vermilion 710S)	109.2	123.6	90.1	82.5	118.7	108.7	26.2
	7L50 (Buffalo Creek 526S - Jarrow 252S Tap point)	109.2	123.6	134.9	123.5	66.9	61.3	-62.2
Tucuman 478S transformer T1 or T2 (478ST1* or 478ST2*)	7L50 (Jarrow 252S tap point - Battle River 757S)	109.2	123.6	109.4	100.1	62.2	57.0	-43.1
Buffalo Creek Transformer T1 or T2 (526ST1* or 526ST2*)	749L (Edgerton 899S - Killarney Lake 267S tap point)	88.0	97.0	89.8	102.0	47.5	54.0	-48.0
701L (North Holden 395S - Strome 223S)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	86.5	79.2	118.5	108.5	29.3
	7L129 (Bauer 918S Tap point – Vermilion 710S)	109.2	123.6	80.2	73.5	112.0	102.6	29.1
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	127.9	117.1	55	53.1	-64.0
704L\704AL (Jarrow 252S - Tucuman 478S)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	64.5	59.1	109.6	100.4	41.3
Vegreville 709S Transformer 70T or 702T (709S701T* or 709S702T*)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	83.9	76.8	109.6	100.3	23.5
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	117.2	107.3	42.8	39.2	-68.1

749L\749AL (Metiskow 648S - Edgerton 899S)	7L129 (Buffalo Creek 526S – Bauer 918S Tap point)	109.2	123.6	121.5	111.3	130.1	119.1	7.8
	7L129 (Bauer 918S Tap point – Vermilion 710S)	109.2	123.6	114.9	105.2	123.6	113.2	8.0
	7L130 (Vermilion 710S - Kitscoty 705S)	71.9	71.9	76.8	106.8	77.5	107.8	1.0
	7L14 (Kitscoty 705S – Hill 751S)	71.9	71.9	72.4	100.7	73.2	101.8	1.0
	7L50 (Buffalo Creek 526S - Jarrow 252S Tap point)	109.2	123.6	143.4	131.3	71.6	65.6	-65.7
Nevis 766S transformer 901T (766S901T*)	7L129 (Buffalo Creek 526S to Bauer 918S Tap point)	109.2	123.6	83.6	76.5	117.8	107.8	31.3
	7L129 (Bauer 918S Tap point – Vermilion 710S)	109.2	123.6	77.4	70.8	111.3	101.9	31.1
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	128.2	117.4	37.6	42.0	-75.4
7L105 (Mahihkan 837S - Mahno 909S)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	80.9	74.0	113.0	103.4	29.4
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	117.7	107.8	64.3	58.9	-48.9
7L161 (Mahno 909S - Nabiye 942S)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	80.9	74.1	113.0	103.4	29.4
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	117.7	107.8	64.3	58.9	-48.9
7L42 (Hill 751S - Lloydminster 716S)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	84.9	77.7	112.7	103.2	25.5
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	126.0	115.3	45.8	41.9	-73.4
7L50 (Buffalo Creek 526S - Battle River 757S)	749L (Edgerton 899S - Killarney Lake 267S tap point)	88.0	97.0	94.4	107.3	53.5	60.8	-46.5
	749L\7L749 (Edgerton 899S - Briker 880S tap point)	88.0	97.0	88.2	100.3	45.5	51.7	-48.6
	7L77 (North Holden 395S - Vegreville 709S)	96.0	123.6	97.4	101.5	58.8	61.3	-40.2
7L701\7LA701\701L (Strome 223S - Battle River 757S)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	112.0	102.6	124.5	114.0	11.4
	7L129 (Bauer 918S Tap point – Vermilion 710S)	109.2	123.6	86.0	78.8	117.9	108.0	29.2
	7L50 (Buffalo Creek 526S - Jarrow 252S Tap point)	109.2	123.6	133.8	122.5	65.4	59.9	-62.6
7L749\749L\7LB749 (Edgerton 899S - Lloydminster 716S)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	114.1	104.4	122.6	112.3	7.9
	7L129 (Bauer 918S Tap point - Vermilion 710S)	109.2	123.6	88.7	81.2	116.4	106.5	25.3
	7L50 (Buffalo Creek 526S - Jarrow 252S Tap point)	109.2	123.6	135.8	124.3	64.9	59.4	-64.9
7L77 (North Holden 395S - Vegreville 709S)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	92.5	84.7	120.8	110.6	25.9

	7L129 (Bauer 918S Tap point – Vermilion 710S)	109.2	123.6	86.3	79.0	114.4	104.8	25.8
	7L50 (Buffalo Creek 526S - Jarrow 252S Tap point)	109.2	123.6	128.9	118.0	62.6	57.3	-60.7
7L95 (Mahkeses 889S - Leming Lake 715S)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	84.0	76.9	116.1	106.3	29.4
	7L129 (Bauer 918S Tap point – Vermilion 710S)	109.2	123.6	77.5	71.0	109.6	100.3	29.3
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	120.9	106.1	51.4	48.1	-58.0
Mahkeses 889S Transformer T1 (5TNSA1)	7L129 (526S Buffalo Creek to Bauer 918S Tap)	109.2	123.6	79.1	72.4	111.2	101.8	29.4
	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	115.9	106.1	57.0	52.2	-53.9
Mahkeses 889S Transformer T2 (5TNSA2)	7L129 (526S Buffalo Creek to Bauer 918S Tap)	109.2	123.6	79.1	72.4	111.2	101.8	29.4
	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	115.9	106.1	57.0	52.2	-53.9
Edgerton Transformer T3 (899ST3a*)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	117.6	107.6	126.1	115.4	7.8
	7L129 (Bauer 918S Tap point – Vermilion 710S)	109.2	123.6	111.1	101.7	119.8	109.7	8.0
	7L130 (Vermilion 710S - Kitscoty 705S)	71.9	71.9	71.7	99.7	72.8	101.2	1.5
	7L50 (Buffalo Creek 526S - Jarrow 252S Tap point)	109.2	123.6	139.4	127.6	68.1	62.3	-65.3
912L\9L912 (Red Deer 63S – Nevis 766S)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	83.5	76.5	117.6	107.7	31.2
	7L129 (Bauer 918S Tap point – Vermilion 710S)	109.2	123.6	77.3	70.7	111.2	101.8	31.1
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	128.1	117.3	52.4	50.0	-67.3
9L20 (Nevis 766S - Cordel 755S)	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	80.5	73.7	114.4	104.7	31.0
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	123.0	112.6	48.9	44.8	-67.8
9L29 (Oakland 946S - Coyote Lake 963S)	7L128 (Coyote Lake 963S - Michichi Creek 802S)	94.9	94.9	151.2	159.4	151.2	159.4	0.0
	7L159 (Ghost Pine 114S Tap point - Heatburg 948S)	94.9	94.9	115.5	121.7	106.2	111.9	-9.8
	7L16 (Nevis 766S – Heatburg 948S)	94.9	94.9	110.4	116.3	101.1	106.5	-9.8
	7L85 (Bullpound 803S – Anderson 801S)	94.9	94.9	111.5	117.5	122.0	128.6	11.1
	7L85 (Wintering Hills 804S - Bullpound 803S)	94.9	94.9	122.3	128.9	132.8	140.0	11.1
9L960 (Deerland 13S - Whitefish Lake 825S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	113.7	104.1	43.5	39.8	-64.3
9L961 (Deerland 13S - Whitefish Lake 825S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	113.7	104.1	43.5	39.8	-64.3

EATL	7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	109.2	123.6	106.5	97.5	138.6	126.9	29.4
	7L129 (Bauer 918S Tap point – Vermilion 710S)	109.2	123.6	100.1	91.6	132.0	120.9	29.3
	7L50 (Buffalo Creek 526S - Jarrow 252S Tap point)	109.2	123.6	128.3	117.4	79.7	72.9	-44.5

* Lack of transformer breaker will trip the lines connected to this transformer

6.2. Transient Stability Studies

Transient stability assessment was performed for the 2017 SL and 2017 SP post-Project scenarios. Bus voltages, generator's rotor angle, and active power were monitored for the contingencies listed in Table 2-13. Generator response plots for 2017 SL and 2017 SP post-Project are included in Attachments E and F, respectively.

The results did not indicate any transient stability concerns, and the system remains stable following all studied Category B contingency conditions in the Study Area.

7. Sensitivity Studies

As discussed in Section 3.4, a sensitivity study was performed under Category A conditions.

The 500 kV HVDC power orders were set based on the reduced loss assumptions in pre-Project and post-Project study scenarios, as shown in Table 7-1.

Table 7-1: HVDC Power Orders with Reduced Loss Assumptions

Scenario	WATL(MW)	EATL(MW)
2017 SL High Coal Pre-Project	475 (N → S)	400 (S → N)
2017 SP High Coal Pre-Project	250 (S → N)	750 (S → N)
2017 SL High Coal Post-Project	500 (N → S)	375 (S → N)
2017 SP High Coal Post-Project	250 (S → N)	725 (S → N)

In the 2017 SL High Coal pre-Project Scenario a thermal criteria violation of 106% was observed on the 240 kV transmission line 912L (between Red Deer 63S and Nevis 766S).

In the 2017 SP High Coal pre-Project Scenario a thermal criteria violation of 111% was observed on the 144 kV transmission line 7L50 (between Buffalo Creek 526S and Jarrow 252S Tap Point).

In the 2017 SL High Coal post-Project Scenario a thermal criteria violation of 113% was observed on the 240 kV transmission line 912L (between Red Deer 63S to Nevis 766S).

In the 2017 SL High Coal post-Project Scenario a thermal criteria violation of 123% was observed on the 144 kV transmission line 7L129 (between Buffalo Creek 526S and Vermillion 710S).

Changing the 500 kV HVDC power orders to the values in Table 7-2 would completely alleviate these observed thermal violations. No voltage criteria violations were observed for these scenarios.

Table 7-2: HVDC Power Orders for Sensitivity Scenarios

Scenario	WATL (MW)	EATL (MW)
2017 SL High Coal Pre-Project	475 (N → S)	525 (S → N)
2017 SP High Coal Pre-Project	300 (S → N)	1000 (S → N)
2017 SL High Coal Post-Project	*550 (N → S)*	*600 (S → N)*
2017 SP High Coal Post-Project	*725 (S → N)*	*1000 (S → N)*

8. Short-Circuit Analysis

8.1. Pre-Project

Table 8-1 provides the 2017 WP pre-Project short circuit levels.

Table 8-1: Summary of Short-Circuit Current Levels – 2017 WP Pre-Project

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
Battle River 757S	240	1.06	10.9	0.004346+j0.023486	11.5	0.002269+j0.019572
	138	1.07	12.6	0.005565+j0.035443	13.3	0.002698+j0.030488
Buffalo Creek 526S	138	1.02	3.9	0.050785+j0.097966	3.1	0.065526+j0.192225
Irish Creek 706S	138	1.02	3.0	0.068053+j0.127623	2.8	0.024080+j0.179000
Vermillion 710S	138	1.02	4.0	0.053768+j0.095083	5.0	0.003374+j0.045021
Vegreville 709S	138	1.01	3.7	0.049752+j0.104769	4.7	0.005485+j0.044561
Vincent 2019S	138	1.01	3.1	0.059806+j0.124371	2.8	0.044312+j0.175231
Lloydminster 716S	138	1.04	2.1	0.113028+j0.175791	1.9	0.065669+j0.293284

Note: 1) per unit (p.u.) quantities are on 100MVA base and system voltage base.

8.2. Post-Project

Table 8-2 provides the 2017 WP post-Project short circuit levels.

Table 8-2: Summary of Short-Circuit Current Levels – 2017 WP Post-Project

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
Battle River 757S	240	1.06	11.0	0.004182+j0.023285	11.6	0.002269+j0.019572
	138	1.07	12.8	0.005328+j0.035043	13.3	0.002698+j0.030488
Buffalo Creek 526S	138	1.04	4.4	0.041942+j0.090997	3.2	0.065538+j0.192190
Irish Creek 706S	138	1.01	3.2	0.059510+j0.121280	2.9	0.024082+j0.178977
Vermillion 710S	138	1.04	5.2	0.033644+j0.078104	6.0	0.003335+j0.044813
Vegreville 709S	138	1.01	3.8	0.046030+j0.101658	4.8	0.005485+j0.044560
Vincent 2019S	138	1.02	3.3	0.053101+j0.118704	2.9	0.044313+j0.175224
Lloydminster 716S	138	1.05	2.2	0.101860+j0.170290	1.9	0.066761+j0.296354
Kinsella 926S	138	1.06	3.6	0.039904+j0.118267	2.0	0.088166+j0.391820
Grizzly Bear 708S/ Steele 2016S	138	1.06	4.9	0.036179+j0.083075	3.3	0.047245+j0.210822

Note: 1) per unit (p.u.) quantities are on 100MVA base and system voltage base.

Table 8-3 provides the 2025 WP post-Project short circuit levels.

Table 8-3: Summary of Short-Circuit Current Levels – 2025 WP Post-Project

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
Battle River 757S	240	1.07	11.6	0.004138+j0.021632	12.2	0.002248+j0.018474
	138	1.08	12.9	0.005371+j0.034811	13.4	0.002769+j0.030479
Buffalo Creek 526S	138	1.05	5.0	0.034457+j0.080913	3.5	0.066297+j0.188038
Irish Creek 706S	138	1.03	3.4	0.057746+j0.113411	3.0	0.026618+j0.183980
Vermillion 710S	138	1.06	6.9	0.021184+j0.060286	8.6	0.002252+j0.024477
Vegreville 709S	138	1.00	4.1	0.042570+j0.094069	5.1	0.005488+j0.041643
Vincent 2019S	138	1.02	3.7	0.046493+j0.106600	3.1	0.043495+j0.168548
Lloydminster 716S	138	1.05	2.6	0.070666+j0.152365	1.8	0.112230+j0.398135
Kinsella 926S	138	1.08	4.5	0.027928+j0.095181	2.2	0.089972+j0.378032
Grizzly Bear 708S/ Steele 2016S	138	1.08	7.5	0.021186+j0.056527	4.1	0.049054+j0.197071
Drury 2007S	240	1.04	4.8	0.012858+j0.050936	4.3	0.011261+j0.064888
	138	1.06	8.0	0.016912+j0.053064	8.0	0.010875+j0.049986
Tinchebray 972S	240	1.07	10.8	0.004400+j0.023372	10.6	0.003790+j0.024389

Note: 1) per unit (p.u.) quantities are on 100MVA base and system voltage base.

The short-circuit analysis concludes that the Project connection will not adversely change the short circuit levels in the nearby substations.

9. Project Dependencies

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

10. Conclusion and Recommendation

The connection assessment observed pre-Project and post-Project system performance issues, as is shown in Table 10-1.

The power flow results showed that pre-Project thermal criteria violations on the 144 kV transmission line 7L50 were alleviated in the post-Project scenarios. As a result, the RAS #138 will not be needed after the Project is connected.

The post-Project power flow studies identified thermal criteria violations on the transmission line 7L129 under certain Category B contingencies. These violations include thermal loading above the short term rating under certain Category B contingencies and thermal loading above the seasonal continuous rating under other Category B contingencies.

Studies showed that these system performance issues were mitigated through application of a proposed new RAS and real-time operational practices, respectively.

The requirement for the proposed new RAS will be removed by the Provost to Edgerton and Nilrem to Vermilion Transmission System Reinforcement (PENV) project.[7] The target in-service date for the PENV project is Q1 2021.

The power flow diagrams and effectiveness factors are included in Attachment G, H and I.

The Project connection did not impact the transient stability performance of the AIES or the short-circuit levels of the surrounding substations.

Table 10-1 provides further analysis of and conclusions about the impact of the Project, including mitigation measures for the observed Reliability Criteria violations.

Table 10-1: Summary of Reliability Criteria Violations, Project Impact and Mitigation Measures

Reliability Criteria Violations		Scenario	Pre-Project		Post-Project	
Violation	Contingency		Thermal Violation Type	Mitigation Measures	Thermal Violation Type	Mitigation Measures
7L128 (Coyote Lake 963S - Michichi Creek 802S)	9L29 (Oakland 946S - Coyote Lake 963S)	2017 SL and SP	Above short term rating	Planned Suncor Hand Hills and BluEarth Hand Hills RAS	Above short term rating	Planned Suncor Hand Hills and BluEarth Hand Hills RAS
7L159 (Ghost Pine 114S tap point - Heatburg 948S)						
7L16 (Nevis 766S - Heatburg 948S)						
7L85 (Bullpound 803S - Anderson 801S)						
7L85 (Wintering Hills 804S - Bullpound 803S)						
7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	Transformers in North Holden 395S, Edgerton 899S or Nevis 766S	2017SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	701L	2017SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	749L\749AL	2017SP	Above short term rating	Existing RAS (RAS #138)	NA	NA

[7] The PENV project was filed with the AUC on December 12, 2016 in Proceeding No. 22274 and Application No. 22274-A001.

	7L42	2017SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	7L701\7LA701\701L	2017SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	7L77	2017SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	7L95	2017SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	912L\9L912	2017SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	9L20	2017SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	500 kV HVDC EATL	2017SP	Above short term rating	Existing RAS (RAS #138)	NA	NA
	Mahkeses 889S transformer (T1 or T2)	2017SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	7L105	2017SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	7L161	2017SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	Vegreville 709S Transformer (T1 or T2)	2017SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	9L960	2017SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
	9L961	2017SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
7L50 (Jarrow 252S tap point - Battle River 757S)	Tucuman 478S transformer (T1 or T2)	2017SP	Below short term rating	Existing RAS (RAS #138)	NA	NA
749L (Edgerton 899S - Killarney Lake 267S tap point)	Buffalo Creek 526S transformer T1 or T2	2017SP	Below short term rating	Real time Operational practices	NA	NA
	7L50	2017SP	Below short term rating	Real time Operational practices	NA	NA
749L\7L749 (Edgerton 899S - Briker 880S tap point)	7L50	2017SP	Below short term rating	Real time Operational practices	NA	NA
7L77 (North Holden 395S - Vegreville 709S)	7L50	2017SP	Below short term rating	Real time Operational practices	NA	NA
7L129 (Buffalo Creek 526S - Bauer 918S Tap point)	7L749\749L\7LB749	2017SP	Below short term rating	Real time Operational practices	Below short term rating	Real time Operational practices

	Edgerton 899S transformer T3	2017SP	Below short term rating	Real time Operational practices	Above short term rating	New RAS for 7L129
	7L701\7LA701\701L	2017SP	Below short term rating	Real time Operational practices	Above short term rating	New RAS for 7L129
	749L\749AL	2017SP	Above short term rating	Existing RAS (RAS #138)	Above short term rating	New RAS for 7L129
	North Holden 395S Transformer 1	2017SP	Below short term rating	Real time Operational practices	Above short term rating	New RAS for 7L129
	701L	2017SP	NA	NA	Below short term rating	Real time Operational practices
	704L\704AL	2017SP	NA	NA	Below short term rating	Real time Operational practices
	Vegreville 709S Transformer (T1 or T2)	2017SP	NA	NA	Below short term rating	Real time Operational practices
	Jarrow 252S transformer (T1 or T2)	2017SP	NA	NA	Below short term rating	Real time Operational practices
	Nevis 766S transformer T1	2017SP	NA	NA	Below short term rating	Real time Operational practices
	7L105	2017SP	NA	NA	Below short term rating	Real time Operational practices
	7L161	2017SP	NA	NA	Below short term rating	Real time Operational practices
	7L42	2017SP	NA	NA	Below short term rating	Real time Operational practices
	7L77	2017SP	NA	NA	Below short term rating	Real time Operational practices
	7L95	2017SP	NA	NA	Below short term rating	Real time Operational practices
	Mahkeses 889S Transformer T1	2017SP	NA	NA	Below short term rating	Real time Operational practices
	912\9L912	2017SP	NA	NA	Below short term rating	Real time Operational practices
	9L20	2017SP	NA	NA	Below short term rating	Real time Operational practices
	500 kV HVDC EATL	2017SP	NA	NA	Above short term rating	New RAS for 7L129
7L129 (Bauer 918S Tap point - Vermilion 710S)	Edgerton 899S transformer T3	2017SP	Below short term rating	Real time Operational practices	Below short term rating	Real time Operational practices
	749L\749AL	2017SP	Below short term rating	Real time Operational practices	Above short term rating	New RAS for 7L129

	701L	2017SP	NA	NA	Below short term rating	Real time Operational practices
	North Holden 395S Transformer 1	2017SP	NA	NA	Below short term rating	Real time Operational practices
	Nevis 766S transformer T1	2017SP	NA	NA	Below short term rating	Real time Operational practices
	7L701\7LA701\701L	2017SP	NA	NA	Below short term rating	Real time Operational practices
	7L749\749L\7LB749	2017SP	NA	NA	Below short term rating	Real time Operational practices
	7L77	2017SP	NA	NA	Below short term rating	Real time Operational practices
	7L95	2017SP	NA	NA	Below short term rating	Real time Operational practices
	912\9L912	2017SP	NA	NA	Below short term rating	Real time Operational practices
	500 kV HVDC EATL	2017SP	NA	NA	Above short term rating	New RAS for 7L129
7L130 (Vermilion 710S - Kitscoty 705S)	749L\749AL	2017SP	Above short term rating	Real time Operational practices	Above short term rating	Real time Operational practices
	Edgerton Transformer T3	2017SP	NA	NA	Above short term rating	Real time Operational practices
7L14 (Kitscoty 705S - Hill 751S)	749L\749AL	2017SP	Above short term rating	Real time Operational practices	Above short term rating	Real time Operational practices
Several thermal violation*	Metiskow 648S transformer T1 (648ST1)	2017SP and SL	Above short term rating	Real time Operational practices	Above short term rating	Real time operational practice

*The Metiskow 648S substation transformer, T1 (648ST1) contingency is a known existing system issue and the violation associated with the contingency will be managed using real-time operational practices. The results for this contingency have not been included in this report. The Project has no impact on these violations.

Recommendations

It is recommended to proceed with the Project using Alternative 2 as the preferred alternative to respond to the market participant's request for system access service and a proposed new RAS for the 144 kV transmission line 7L129.

A new RAS for transmission line 7L129 is required to mitigate the observed thermal criteria violation under certain Category B conditions. It is also recommended that real-time operational practices and the planned Hand Hills RAS be used to mitigate the identified post-Project system performance issues. The existing RAS #138 will not be needed following the Project connection.

A minimum rating of 100 MVA is recommended for the new 138 kV circuit (between the proposed Facility and the existing Buffalo Creek 526S) and is consistent with good electric industry practice.

ATTACHMENT A

2017SL Pre-Project

Power Flow Diagrams

Table A-1: Summary of 2017SL Pre-Project Power Flow Diagrams

Figure #	System Condition	Contingency
A-1	N-0	Base Case
A-2	N-1	9L29 (946S Oakland to 963S Coyote Lake)

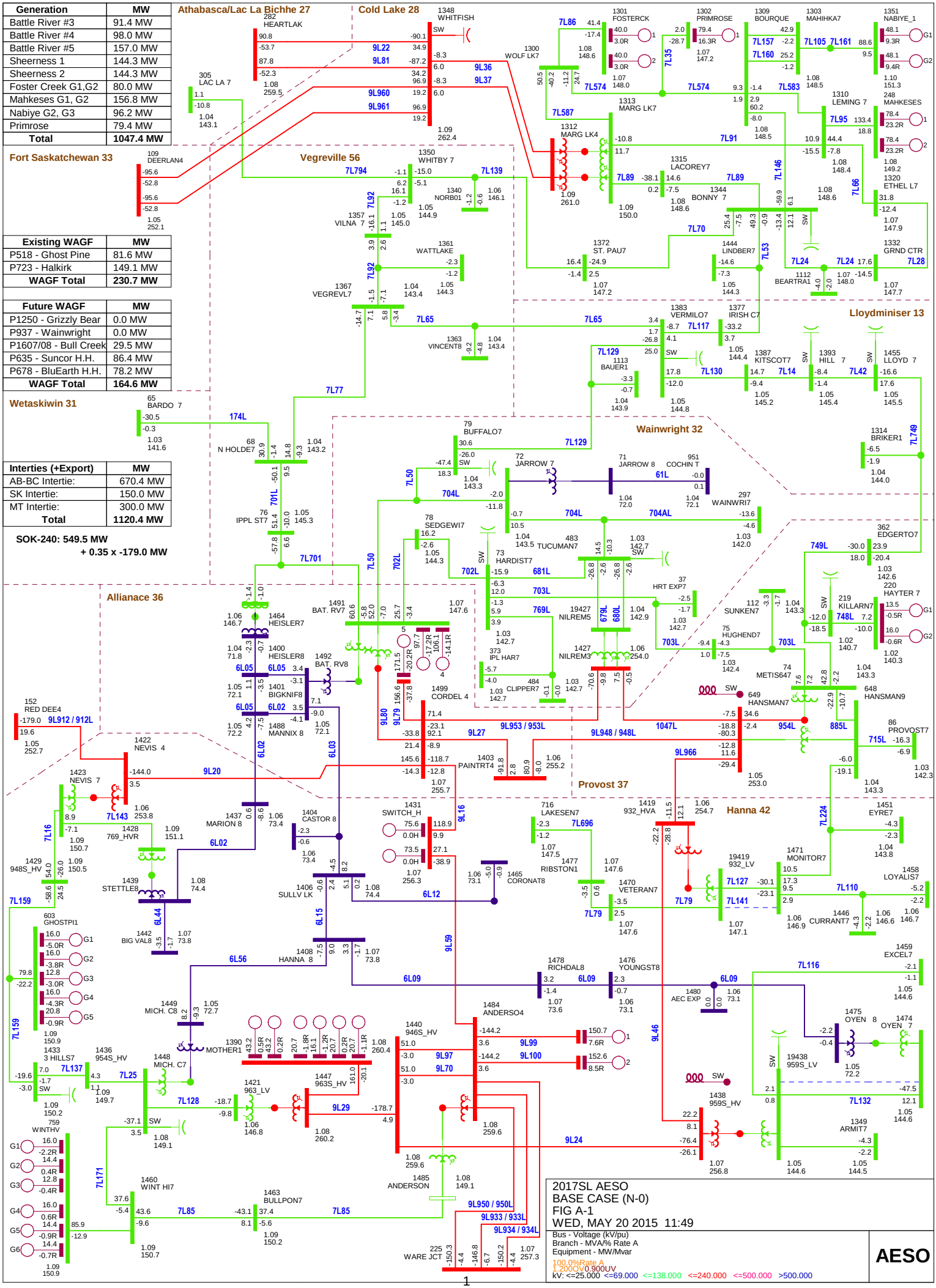
Generation	MW
Battle River #3	91.4 MW
Battle River #4	98.0 MW
Battle River #5	157.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	156.8 MW
Nabiye G2, G3	96.2 MW
Primrose	79.4 MW
Total	**1047.4 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	670.4 MW
SK Intertie:	150.0 MW
MT Intertie:	300.0 MW
Total	**1120.4 MW**

SOK-240: 549.5 MW
+ 0.35 x -179.0 MW



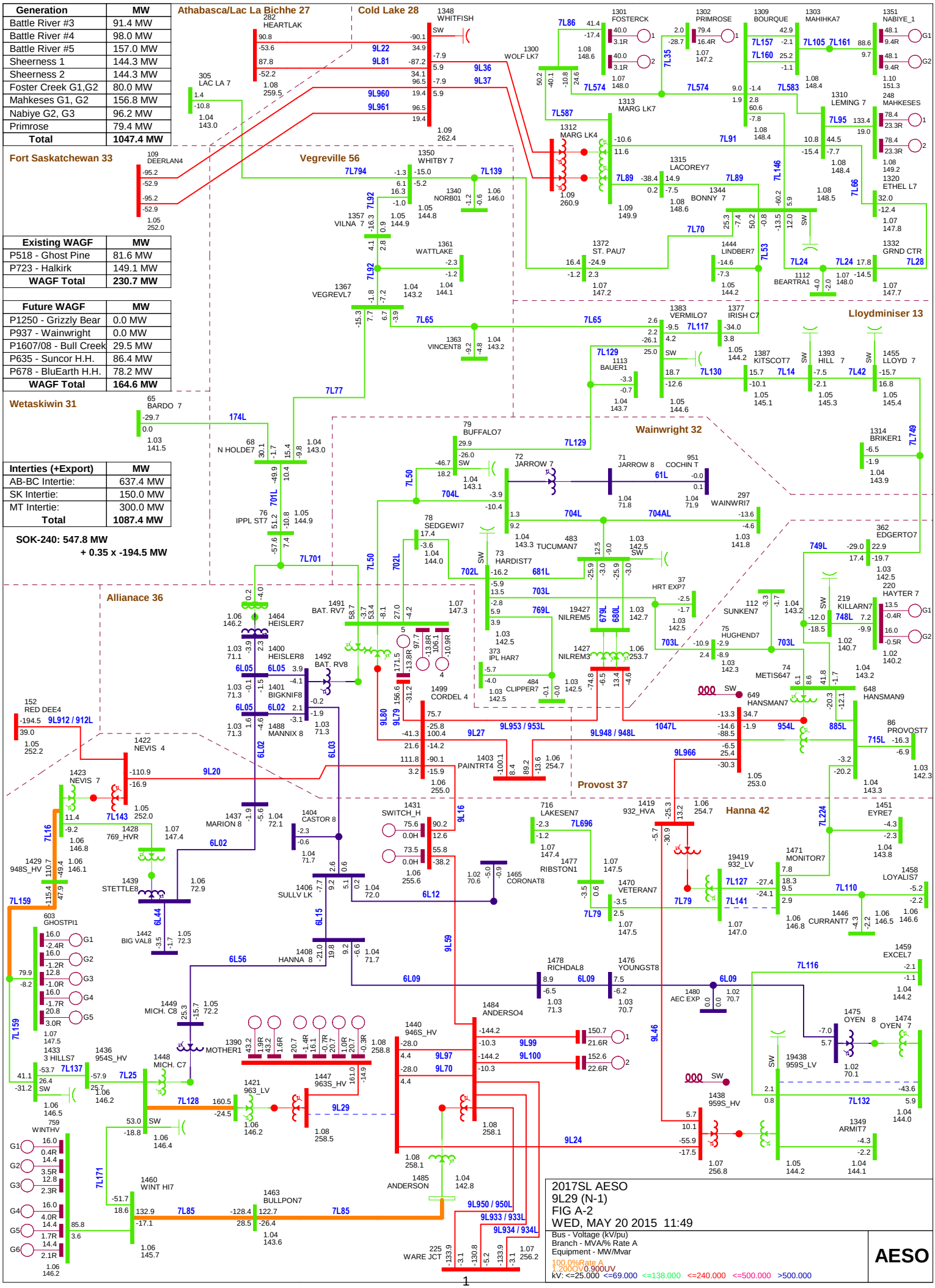
Generation	MW
Battle River #3	91.4 MW
Battle River #4	98.0 MW
Battle River #5	157.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	156.8 MW
Nabiye G2, G3	96.2 MW
Primrose	79.4 MW
Total	**1047.4 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	637.4 MW
SK Intertie:	150.0 MW
MT Intertie:	300.0 MW
Total	**1087.4 MW**

SOK-240: 547.8 MW
+ 0.35 x -194.5 MW



ATTACHMENT B

2017SP Pre-Project

Power Flow Diagrams

Table B-1: Summary of 2017SP Pre-Project Power Flow Diagrams

Figure #	System Condition	Contingency
B-1	N-0	Base Case
B-2	N-1	395ST1* (395S North Holden)
B-3	N-1	478ST1* or 478ST2* (478S Tucuman)
B-4	N-1	526ST1* or 526ST2* (526S Buffalo Creek)
B-5	N-1	701L (395S North Holden to 223S Strome)
B-6	N-1	709S701T* or 709S702T* (709S Vegreville)
B-7	N-1	749L\749AL (648S Metiskow to 899S Edgerton)
B-8	N-1	766S901T* (766S Nevis)
B-9	N-1	7L105 (837S Mahihkan to 909S Mahno)
B-10	N-1	7L161 (909S Mahno to 942S Nabiye)
B-11	N-1	7L42 (751S Hill to 716S Lloydminster)
B-12	N-1	7L50 (526S Buffalo Creek to 757S Battle River)
B-13	N-1	7L701\7LA701\701L (223S Strome to 757S Battle River)
B-14	N-1	7L749\749L\7LB749 (899S Edgerton to 716S Lloydminster)
B-15	N-1	7L77 (395S North Holden to 709S Vegreville)
B-16	N-1	7L95 (889S Mahkeses to 715S Leming Lake)
B-17	N-1	889S-5TNSA1 (889S Mahkeses)
B-18	N-1	889S-5TNSA2 (889S Mahkeses)
B-19	N-1	899ST3a* (899S Edgerton)
B-20	N-1	912L\9L912 (63S Red Deer to 766S Nevis)
B-21	N-1	9L20 (766S Nevis to 755S Cordel)

Figure #	System Condition	Contingency
B-22	N-1	9L29 (946S Oakland to 963S Coyote Lake)
B-23	N-1	9L960 (13S Deerland to 825S Whitefish Lake)
B-24	N-1	9L961 (13S Deerland to 825S Whitefish Lake)
B-25	N-1	EATL

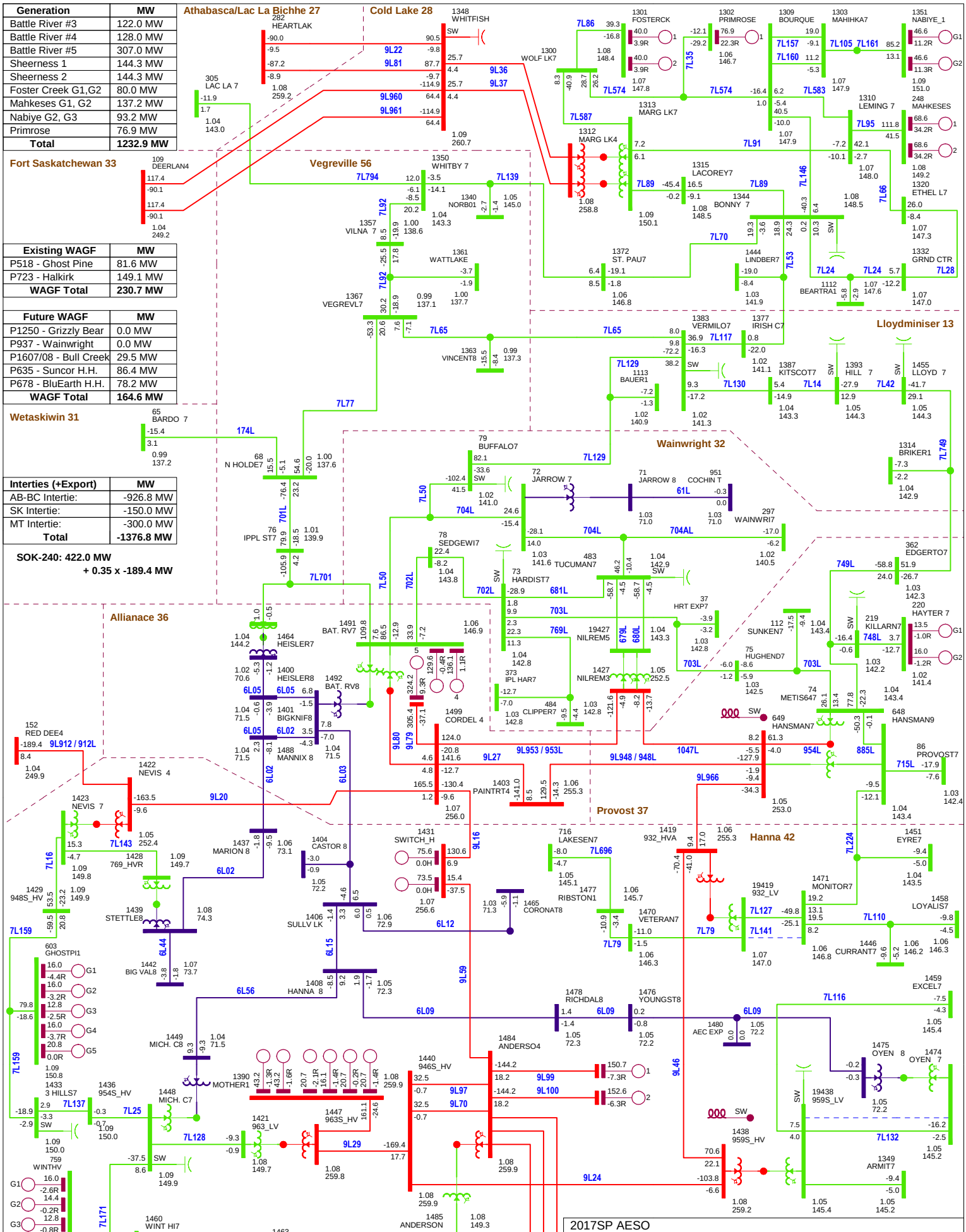
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-926.8 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1376.8 MW**

SOK-240: 422.0 MW
+ 0.35 x -189.4 MW



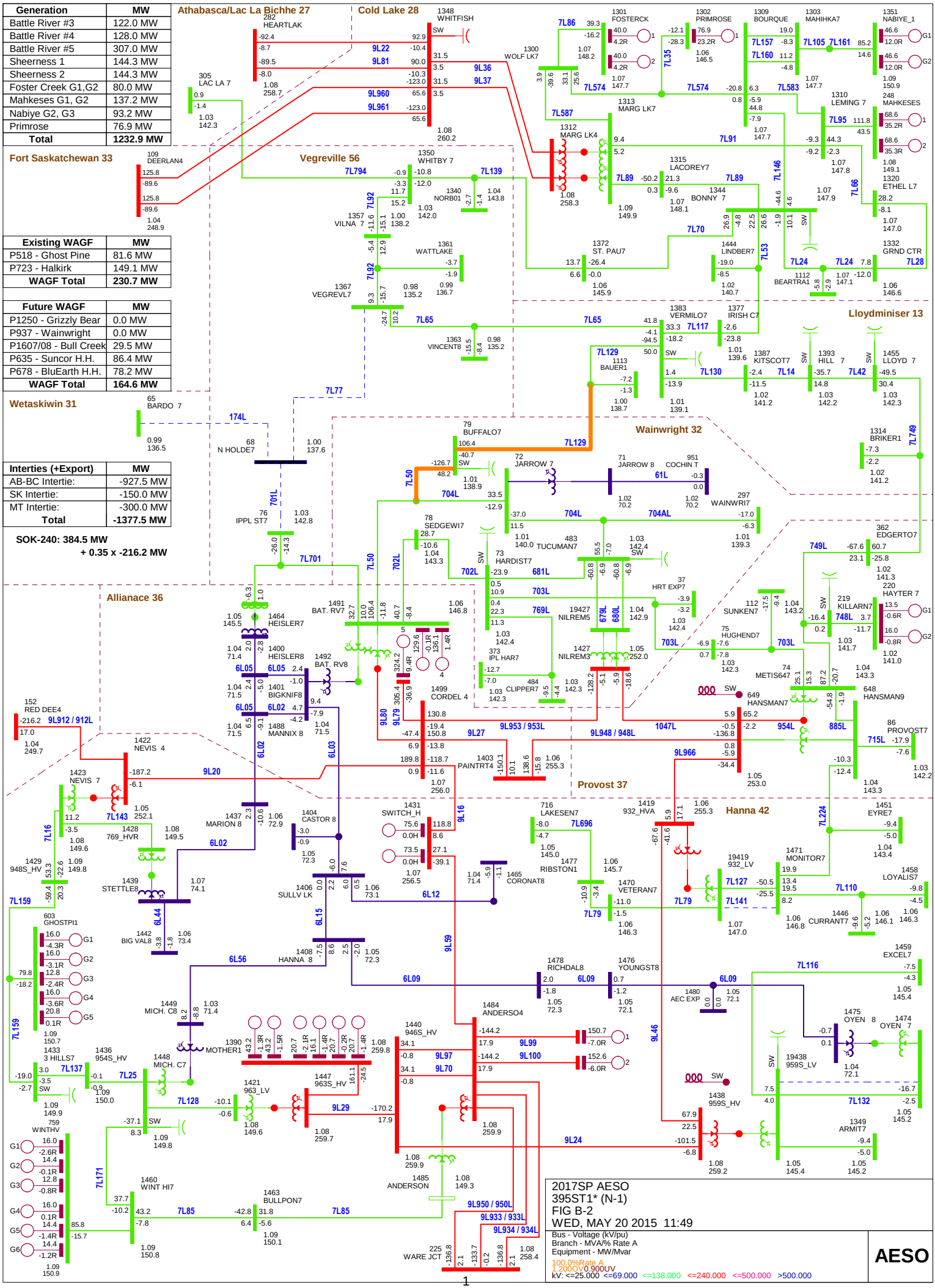
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-927.5 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1377.5 MW**

SOK-240: 384.5 MW
+ 0.35 x -216.2 MW



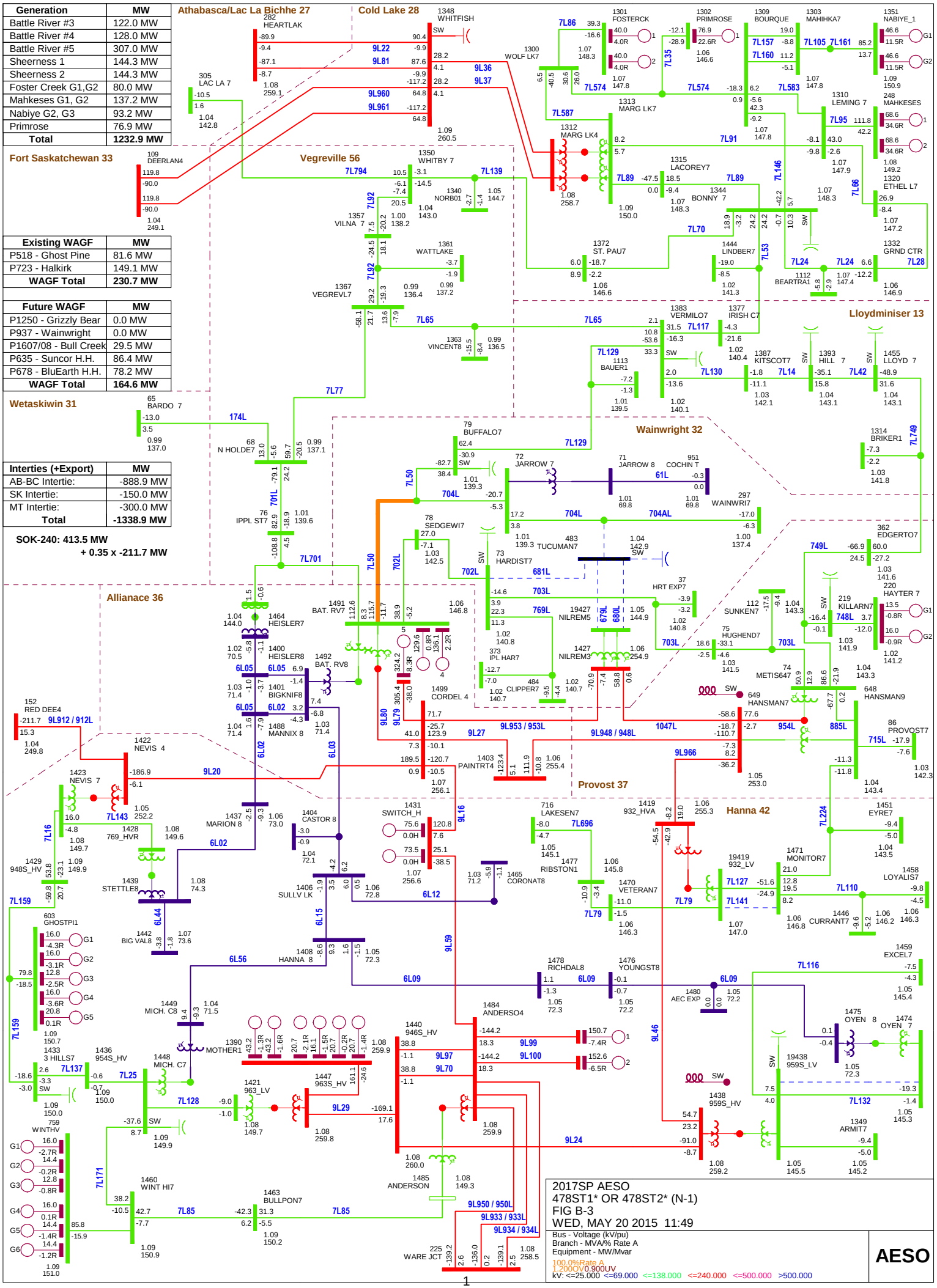
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-888.9 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1338.9 MW**

SOK-240: 413.5 MW
+ 0.35 x -211.7 MW



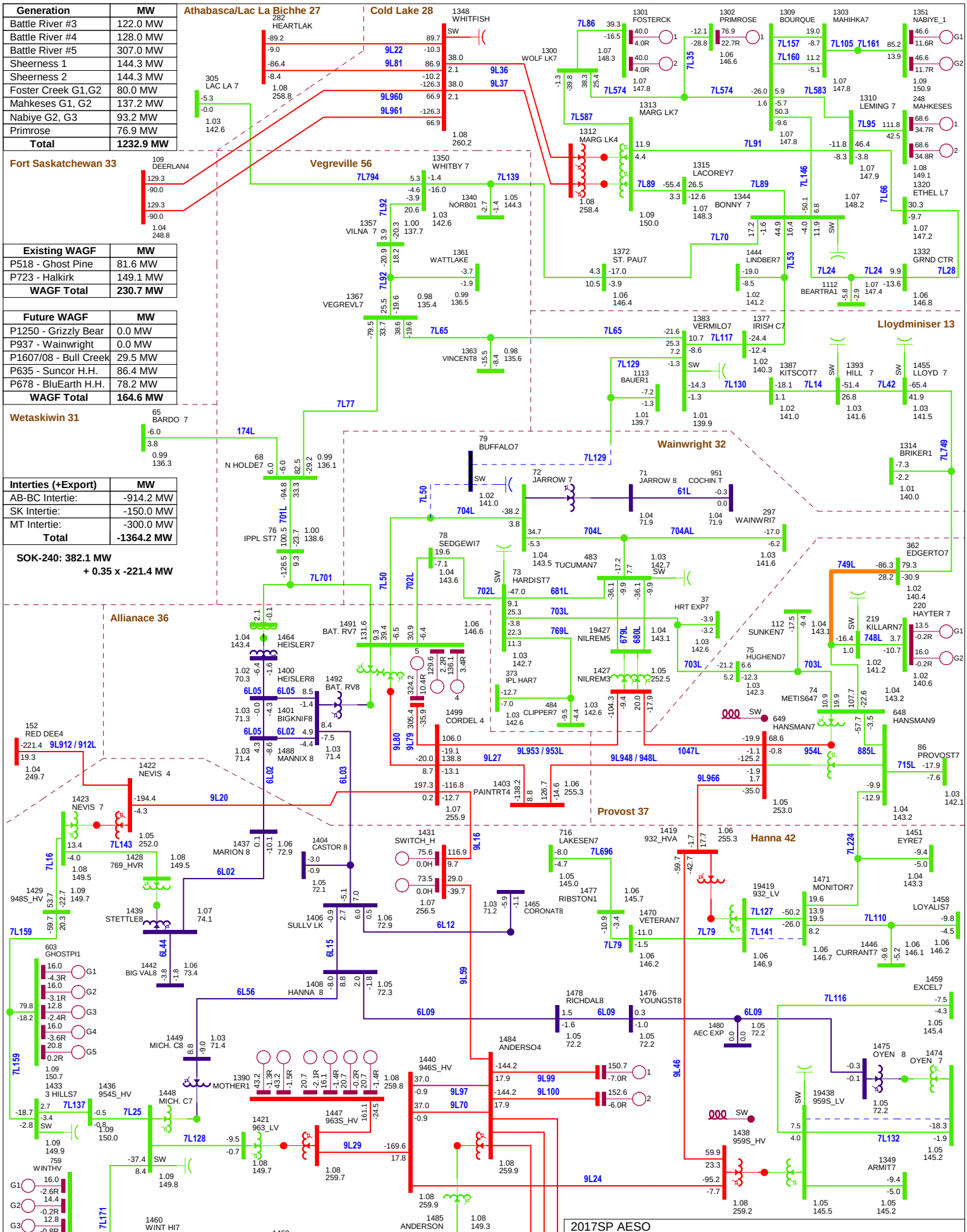
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-914.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1364.2 MW**

SOK-240: 382.1 MW
+ 0.35 x -221.4 MW



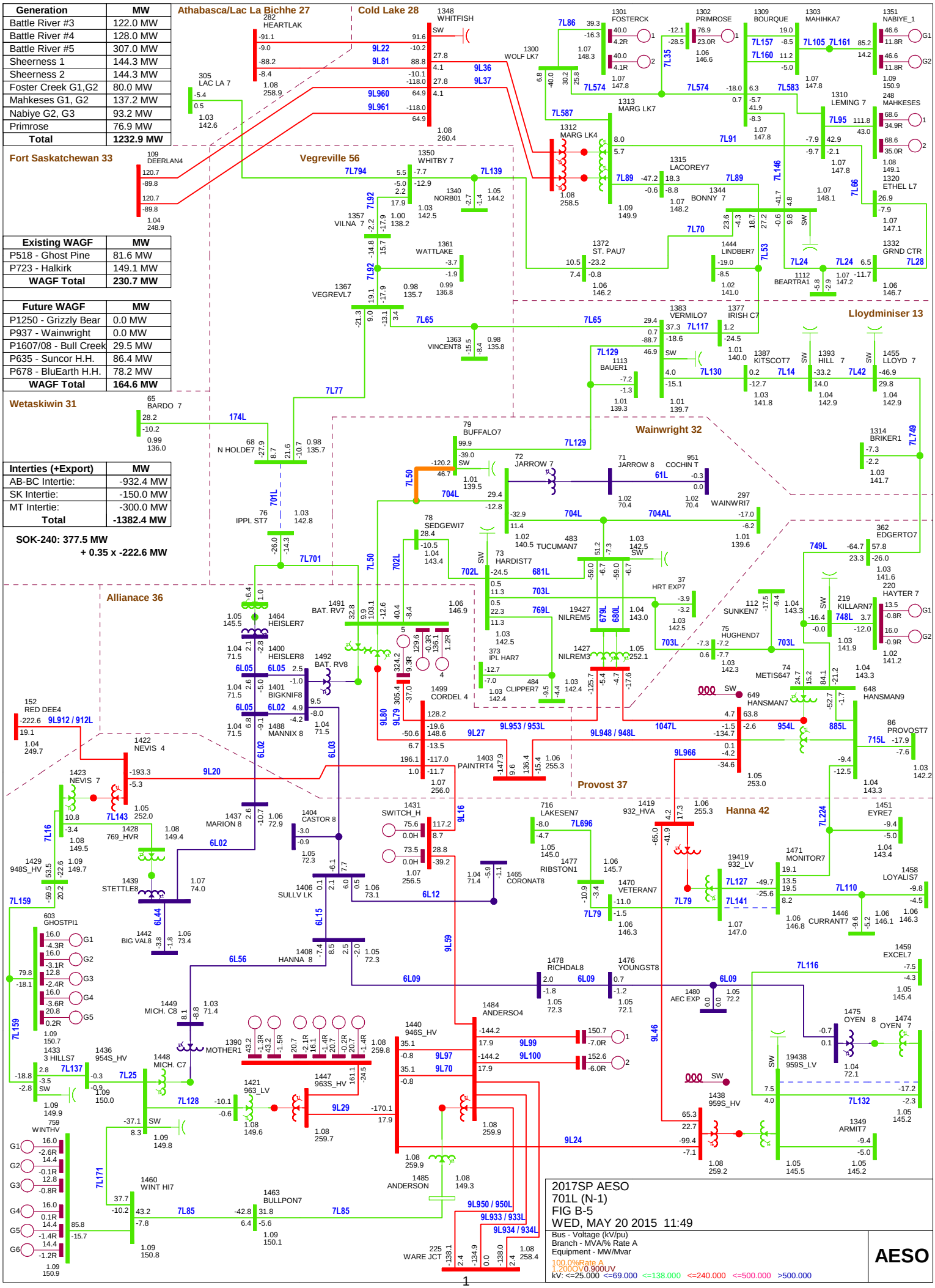
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-932.4 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1382.4 MW**

SOK-240: 377.5 MW
+ 0.35 x -222.6 MW



2017SP AESO
701L (N-1)
FIG B-5
WED, MAY 20 2015 11:49

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

100.0%Rate A
1.200OV0.900UV
kV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

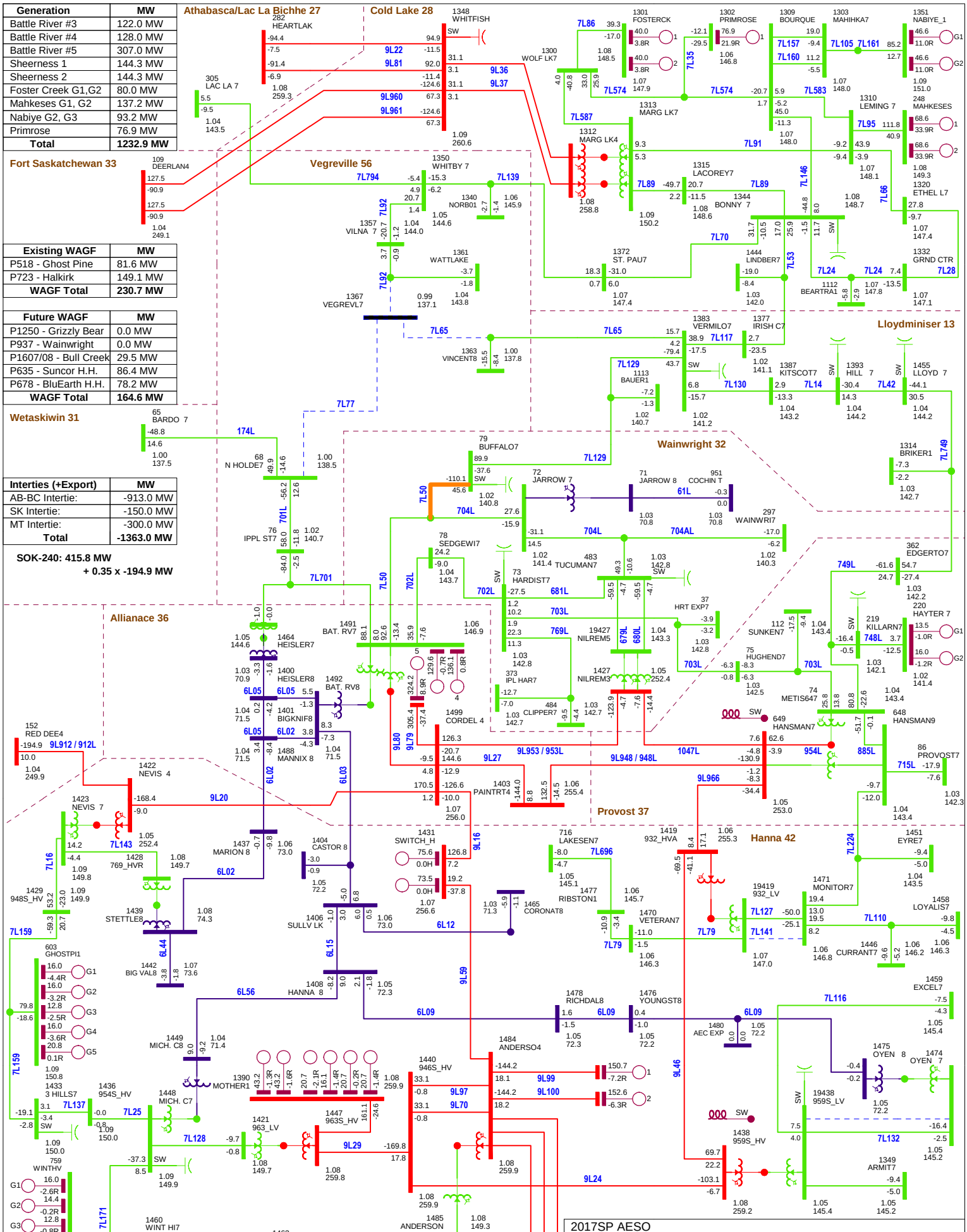
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-913.0 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1363.0 MW**

SOK-240: 415.8 MW
+ 0.35 x -194.9 MW



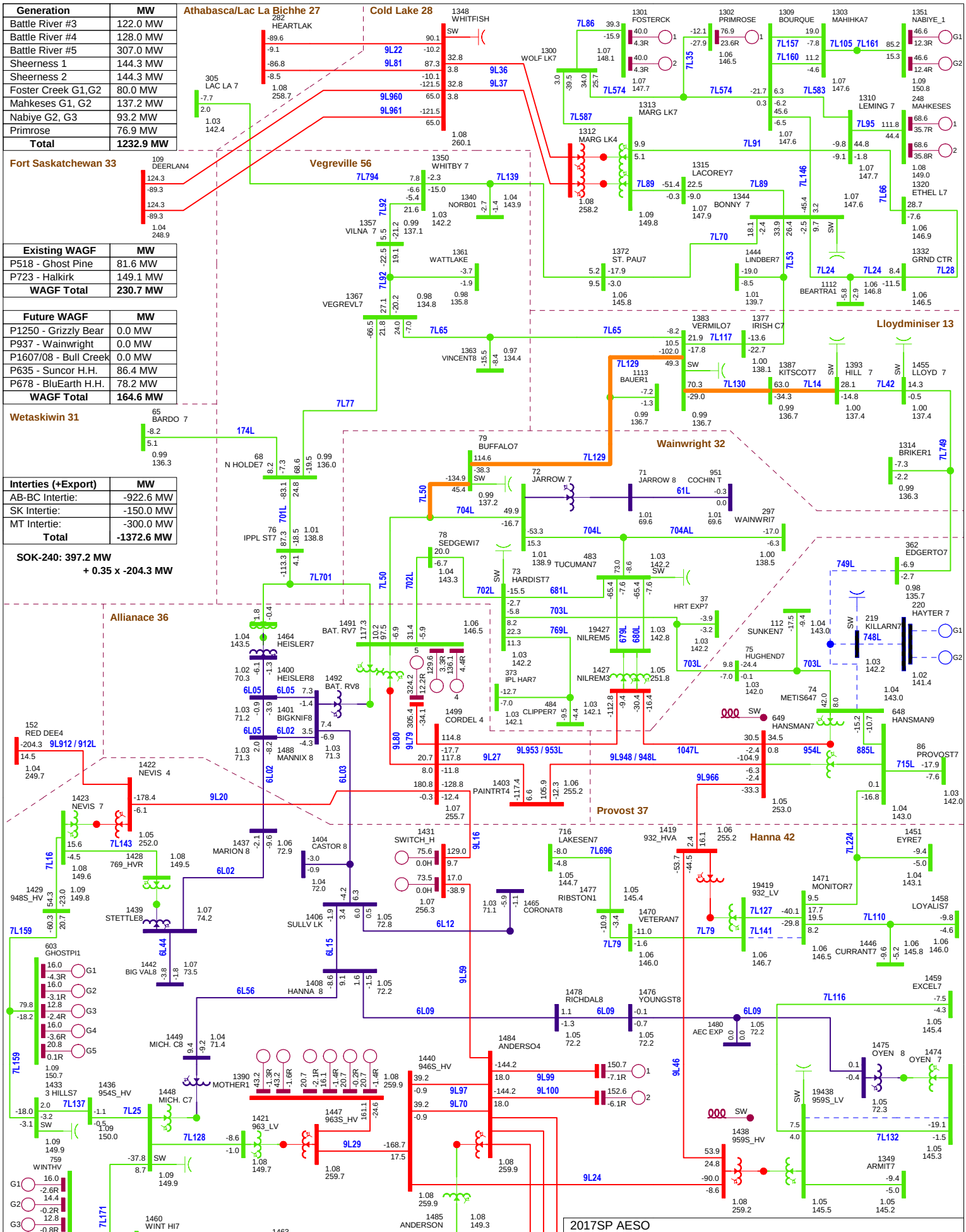
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	0.0 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-922.6 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1372.6 MW**

SOK-240: 397.2 MW
+ 0.35 x -204.3 MW



2017SP AESO
749L (N-1)
FIG B-7
WED, MAY 20 2015 11:50

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

100.0%Rate A
1.200OV0.900UV
kV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

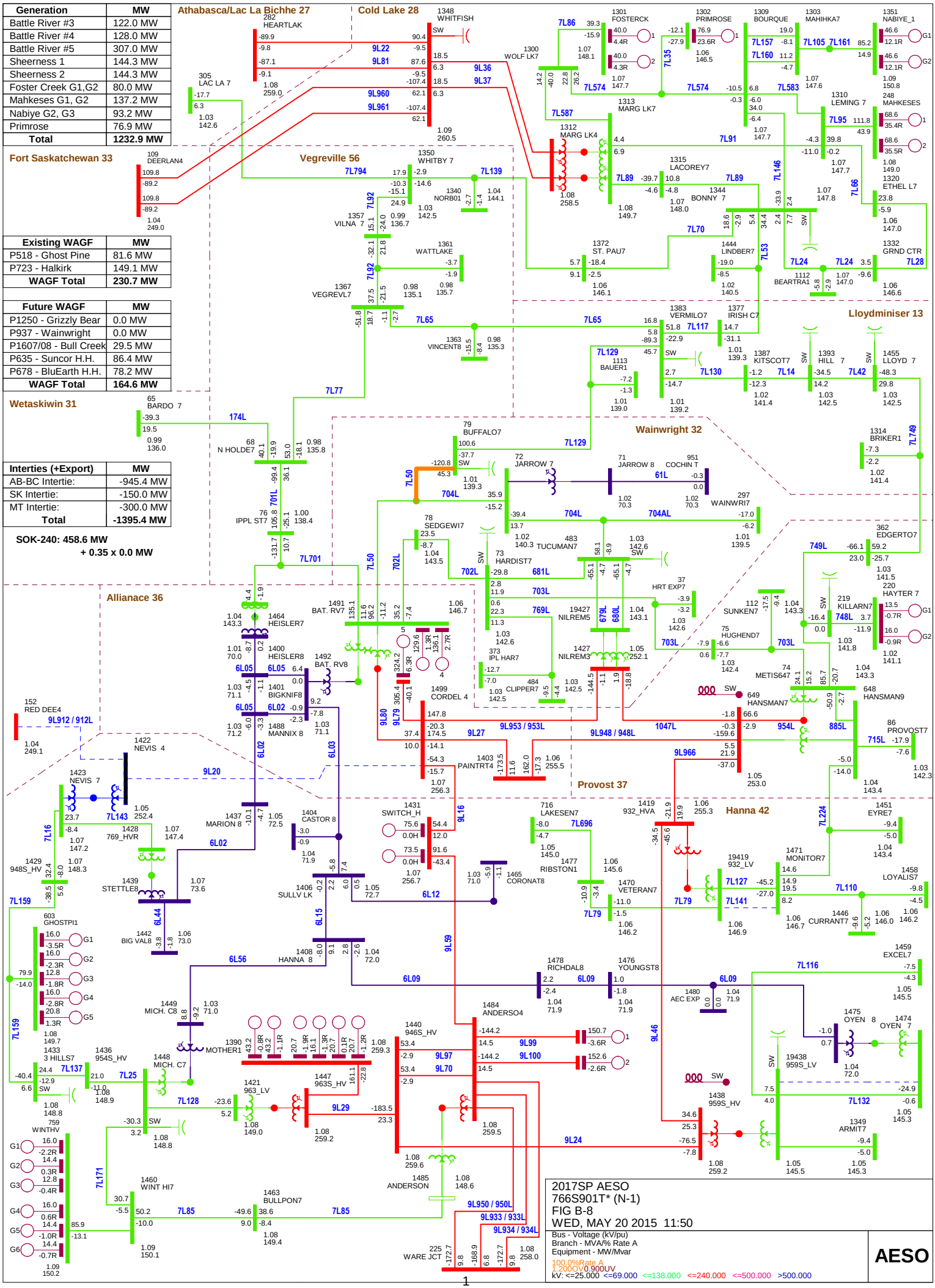
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-945.4 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1395.4 MW**

SOK-240: 458.6 MW
+ 0.35 x 0.0 MW



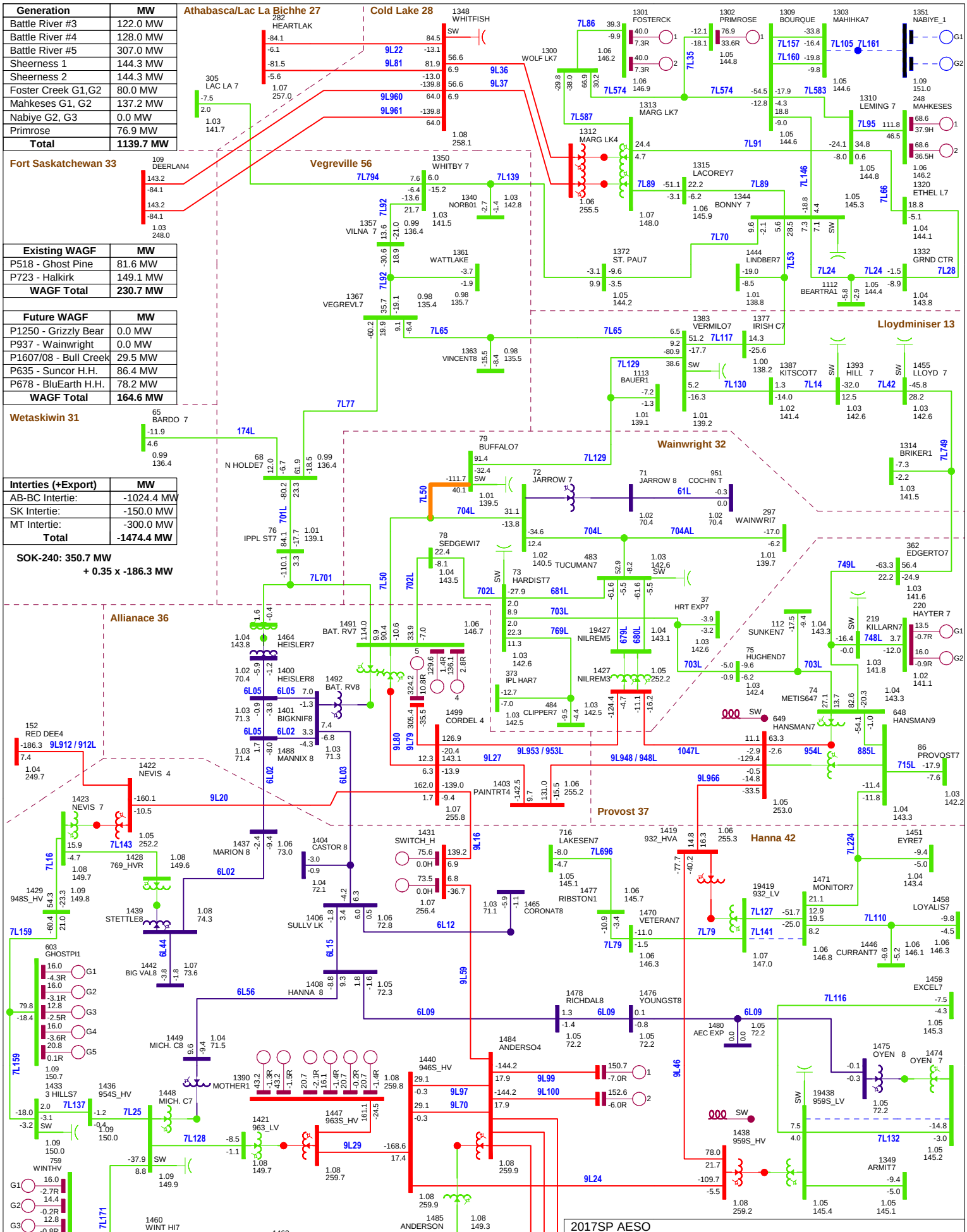
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	0.0 MW
Primrose	76.9 MW
Total	**1139.7 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1024.4 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1474.4 MW**

SOK-240: 350.7 MW
+ 0.35 x -186.3 MW



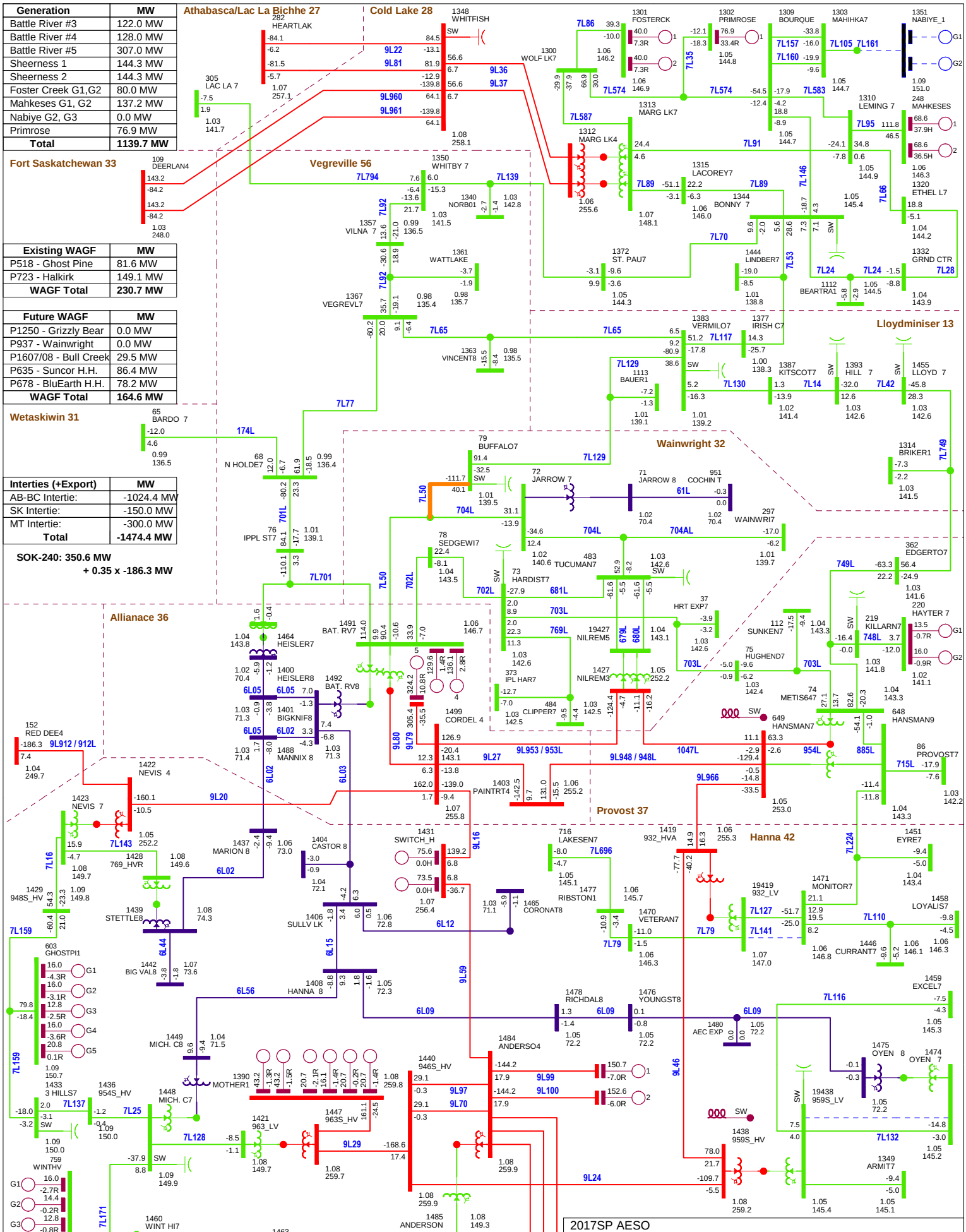
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	0.0 MW
Primrose	76.9 MW
Total	**1139.7 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1024.4 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1474.4 MW**

SOK-240: 350.6 MW
+ 0.35 x -186.3 MW



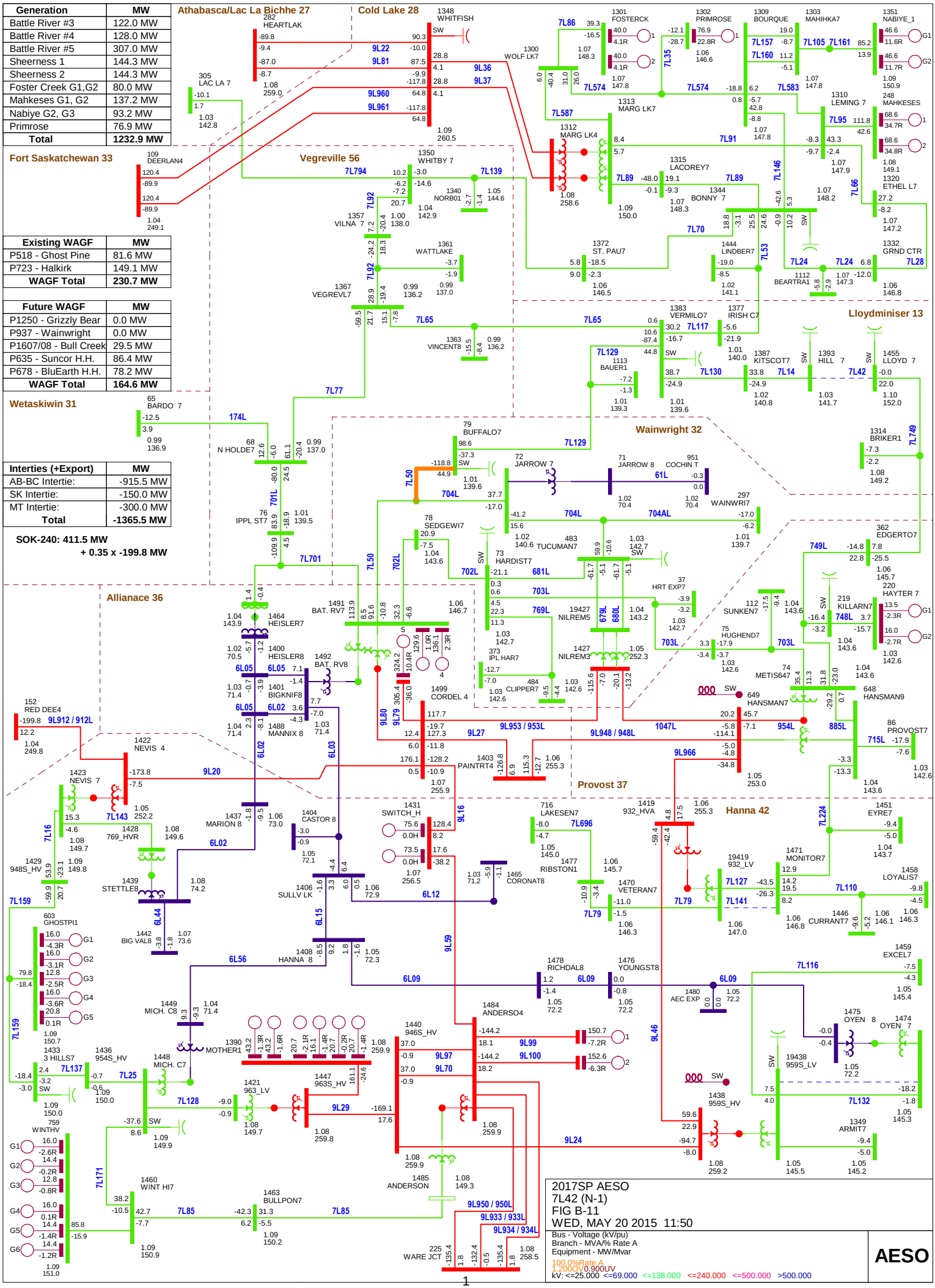
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-915.5 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1365.5 MW**

SOK-240: 411.5 MW
+ 0.35 x -199.8 MW



2017SP AESO
7L42 (N-1)
FIG B-11
WED, MAY 20 2015 11:50

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

100.0%Rate A
1.200OV0.900UV
kV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

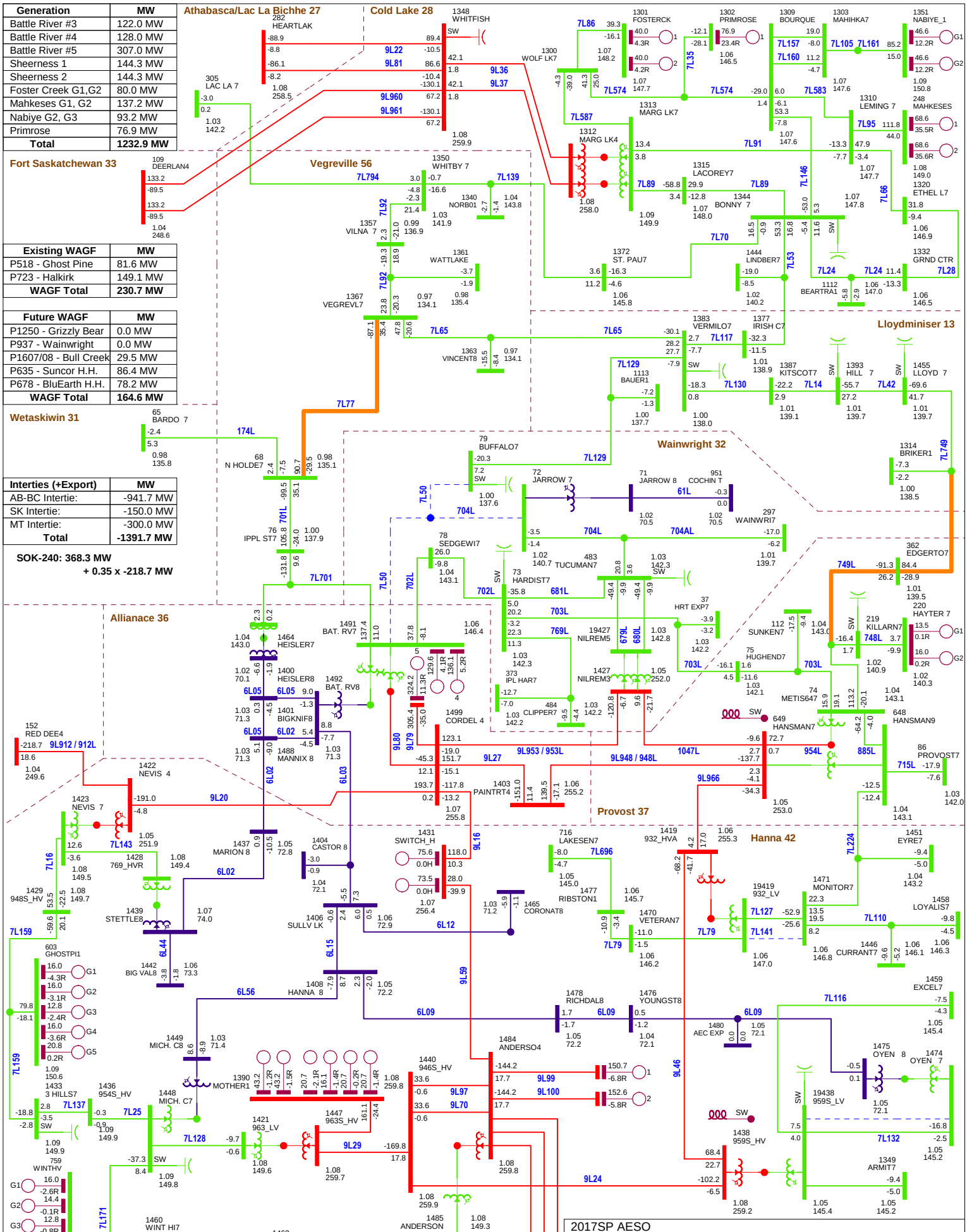
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-941.7 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1391.7 MW**

SOK-240: 368.3 MW
+ 0.35 x -218.7 MW



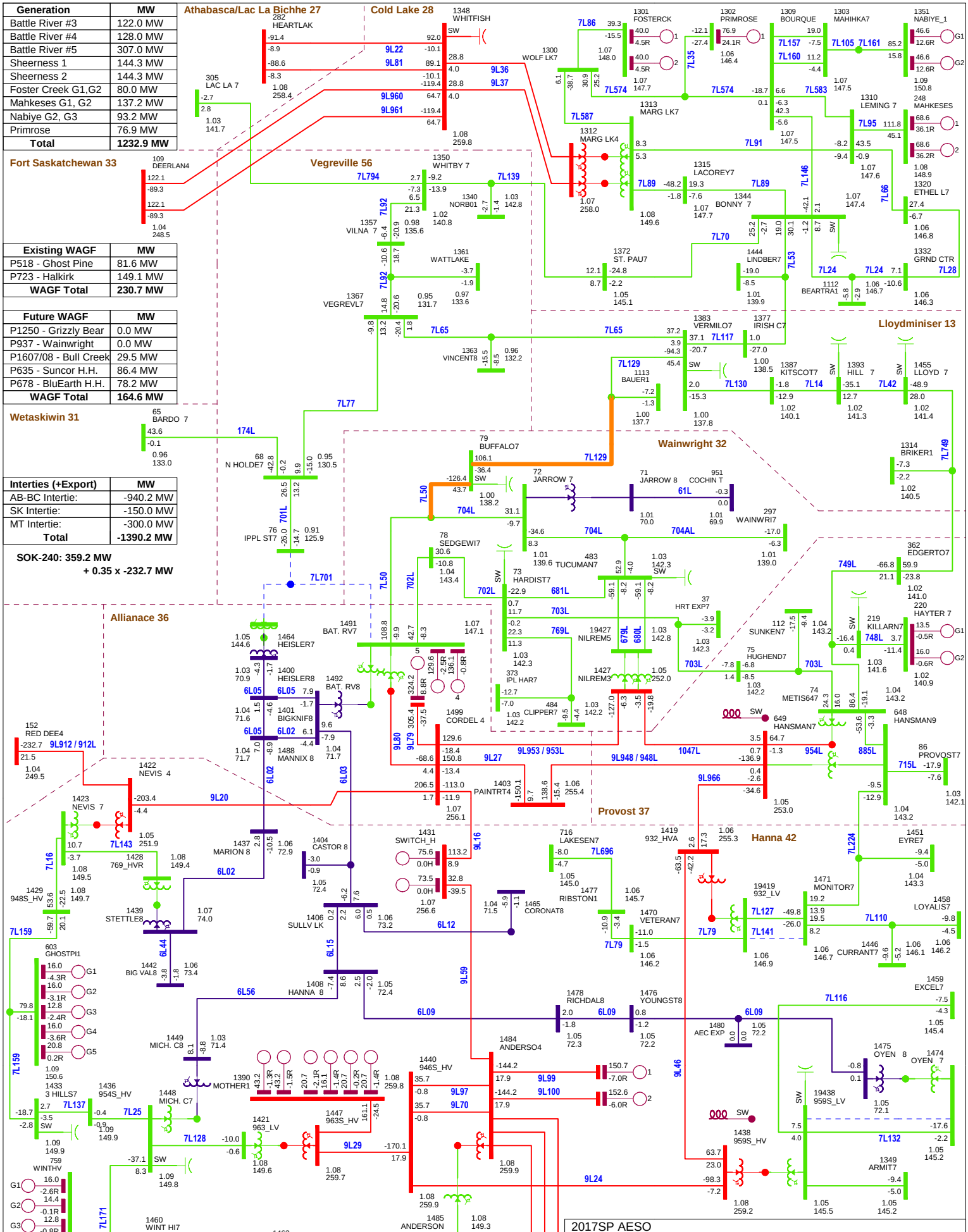
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-940.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1390.2 MW**

SOK-240: 359.2 MW
+ 0.35 x -232.7 MW



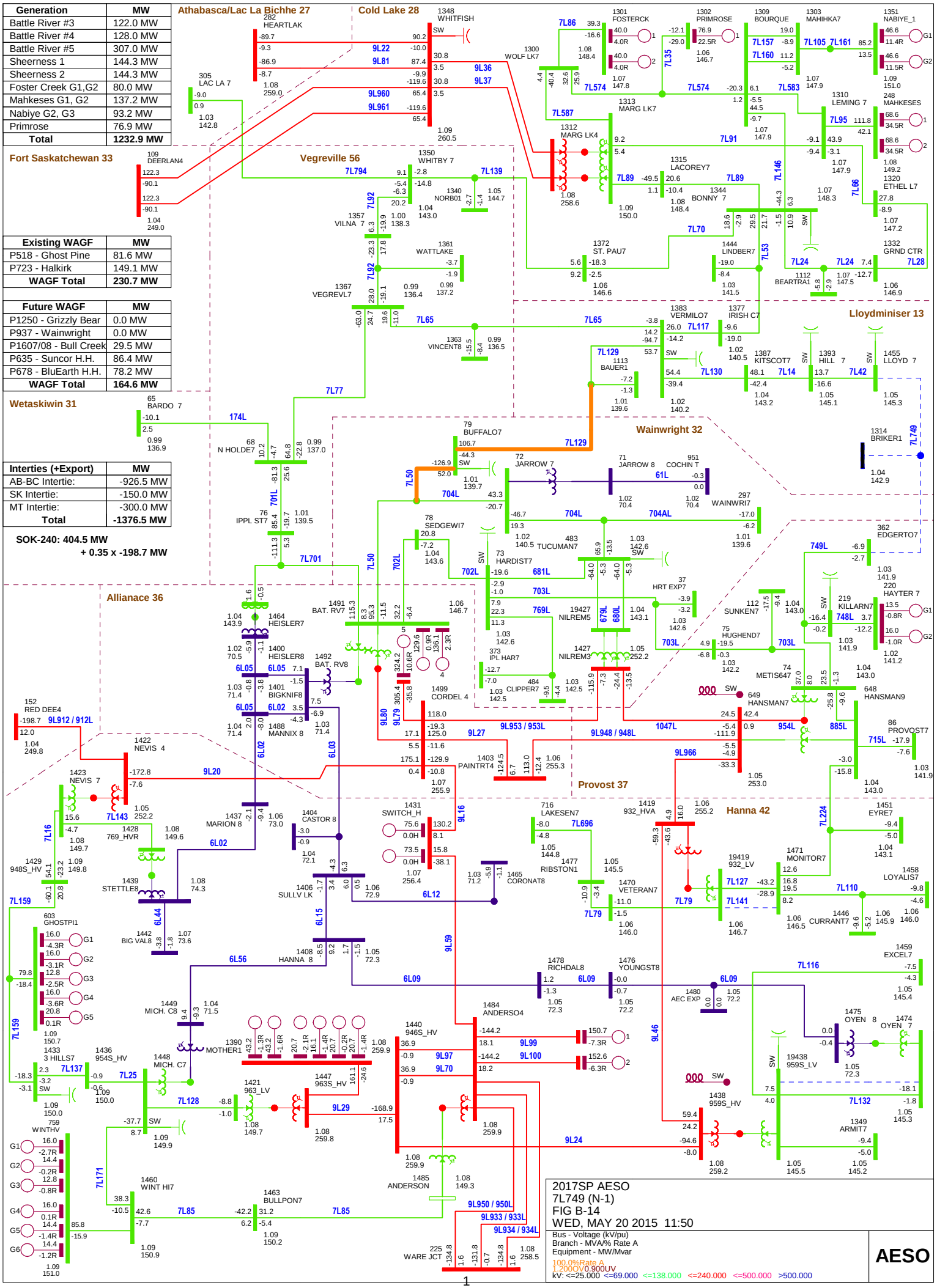
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-926.5 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1376.5 MW**

SOK-240: 404.5 MW
+ 0.35 x -198.7 MW



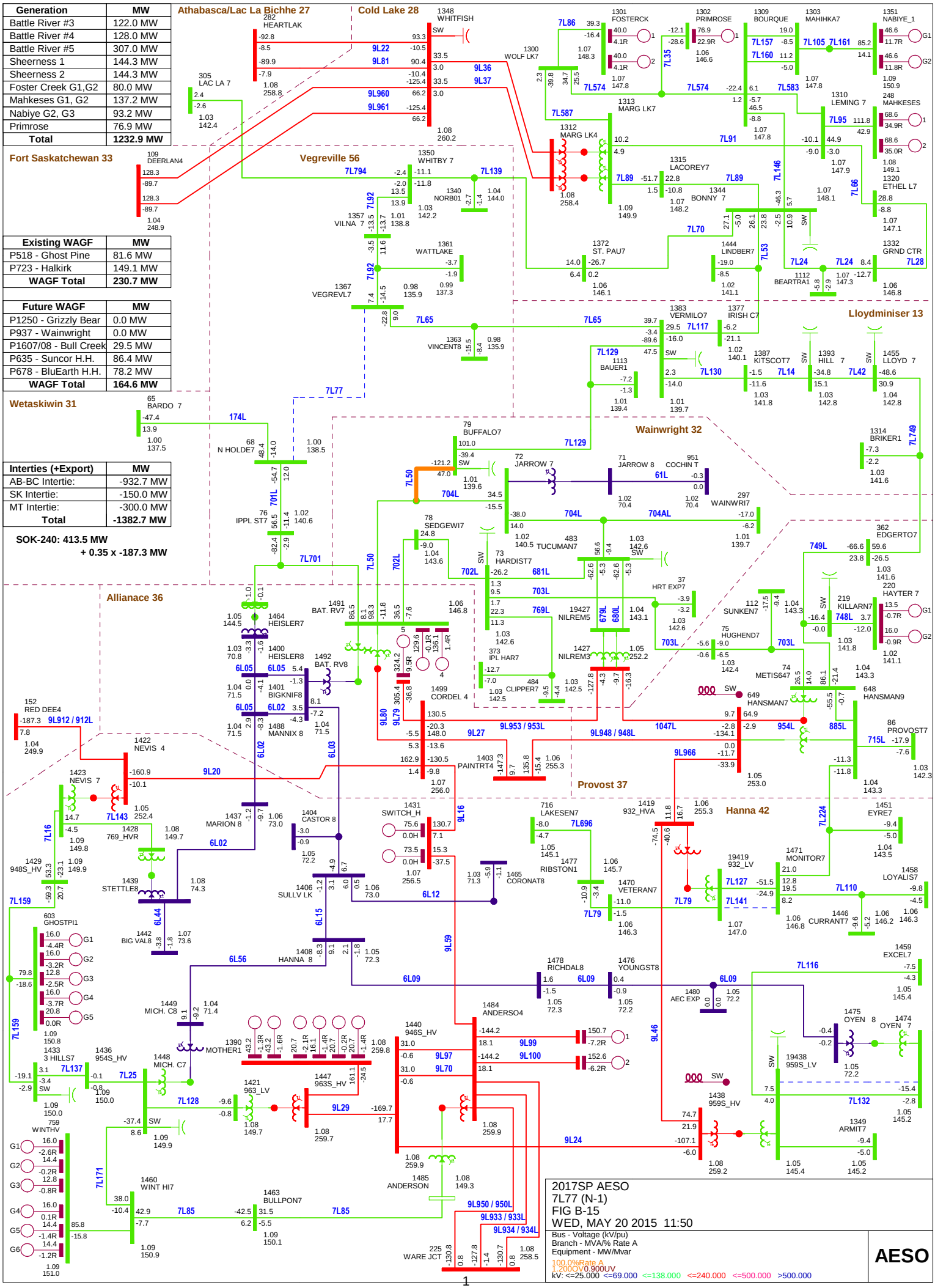
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-932.7 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1382.7 MW**

SOK-240: 413.5 MW
+ 0.35 x -187.3 MW



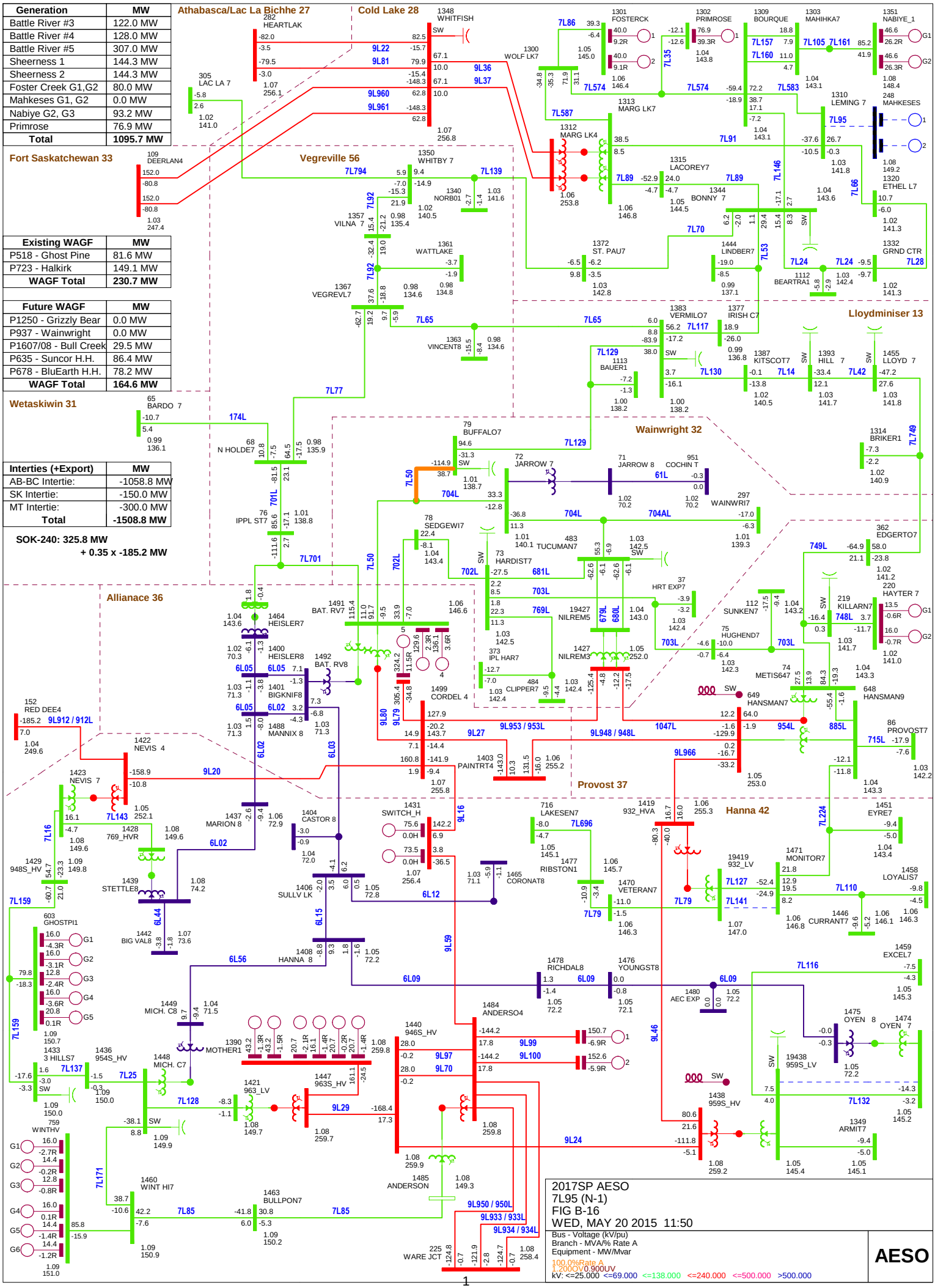
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	0.0 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1095.7 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1058.8 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1508.8 MW**

SOK-240: 325.8 MW
+ 0.35 x -185.2 MW



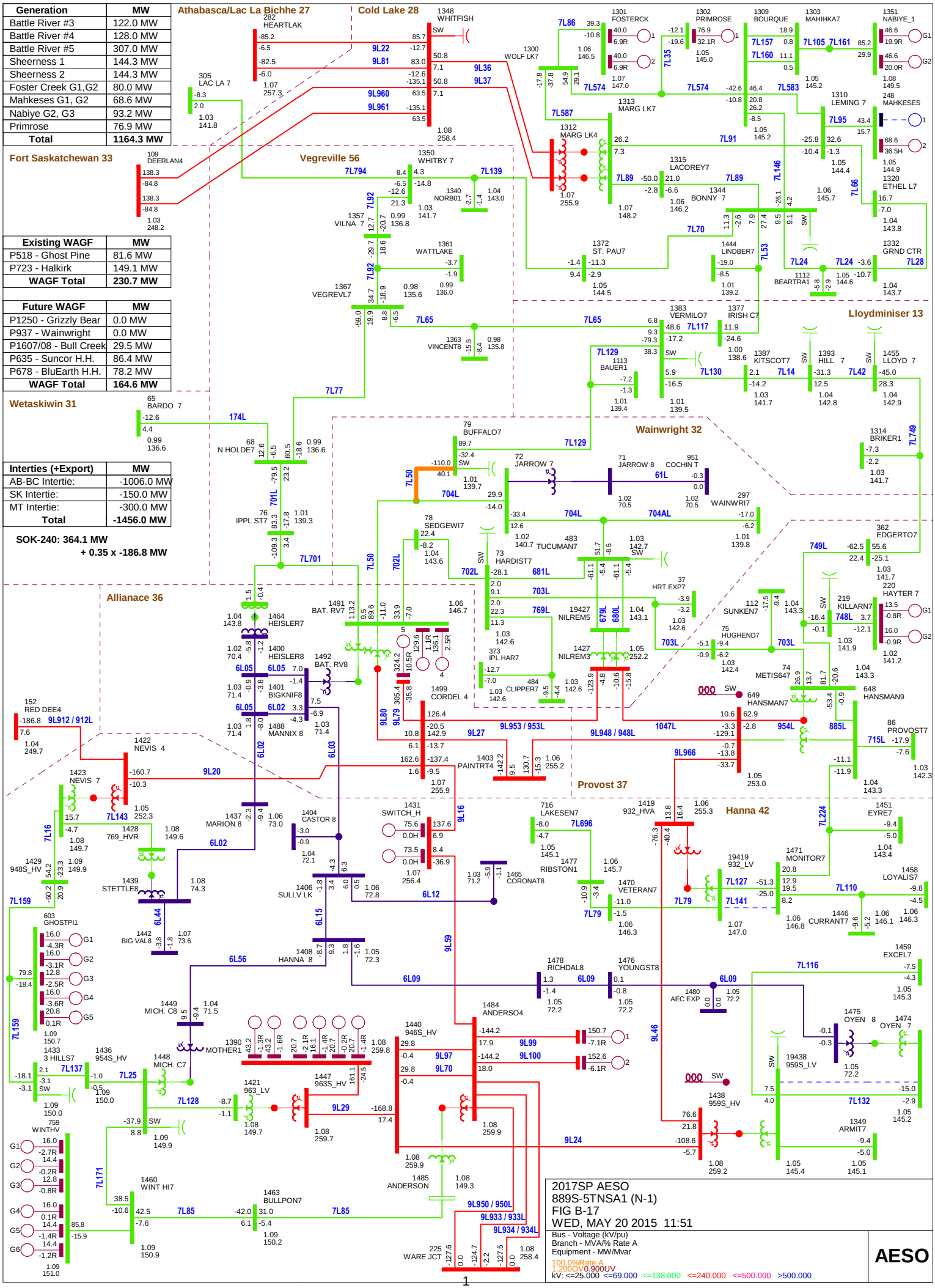
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	68.6 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1164.3 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1006.0 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1456.0 MW**

SOK-240: 364.1 MW
+ 0.35 x -186.8 MW



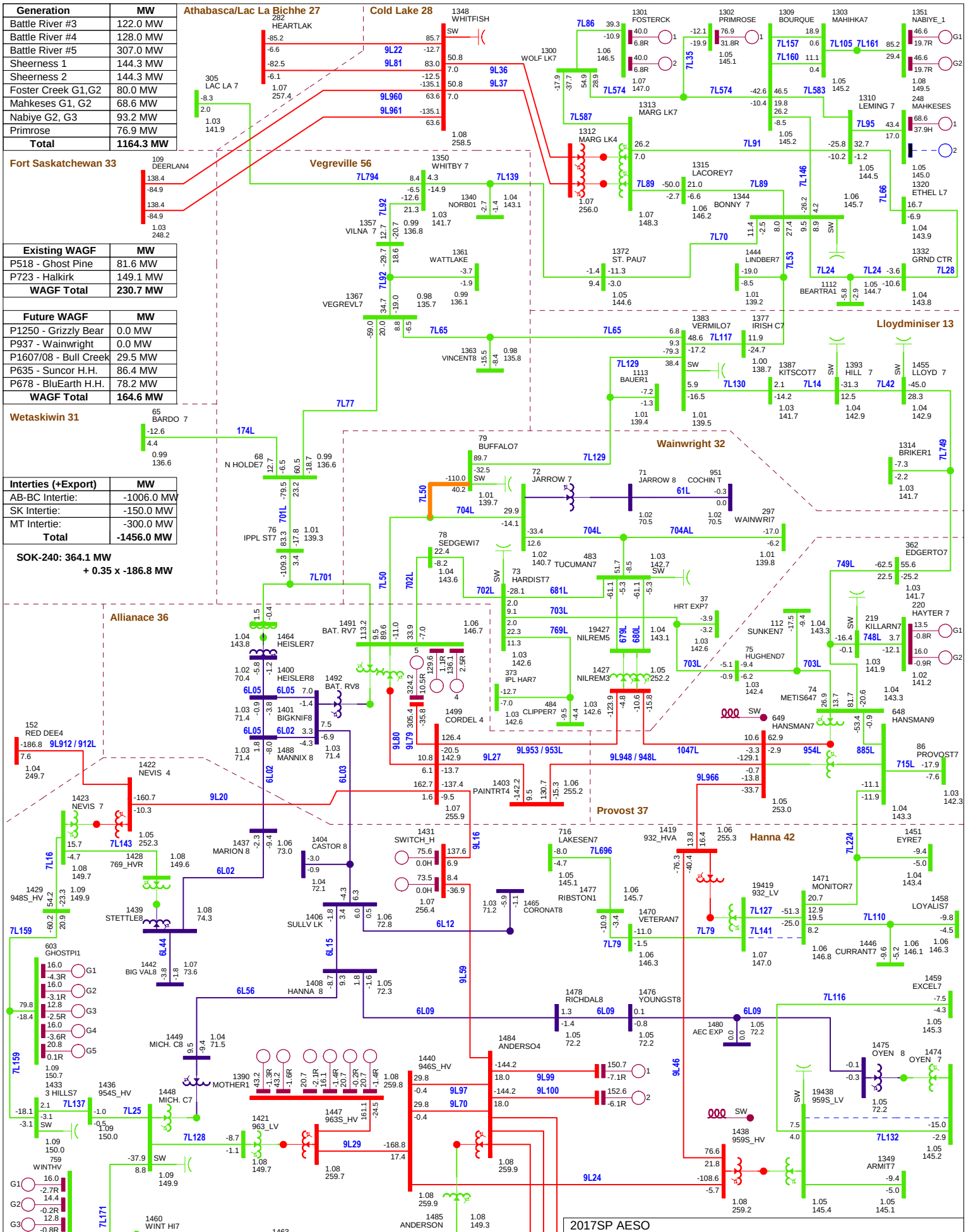
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	68.6 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1164.3 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1006.0 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1456.0 MW**

SOK-240: 364.1 MW
+ 0.35 x -186.8 MW



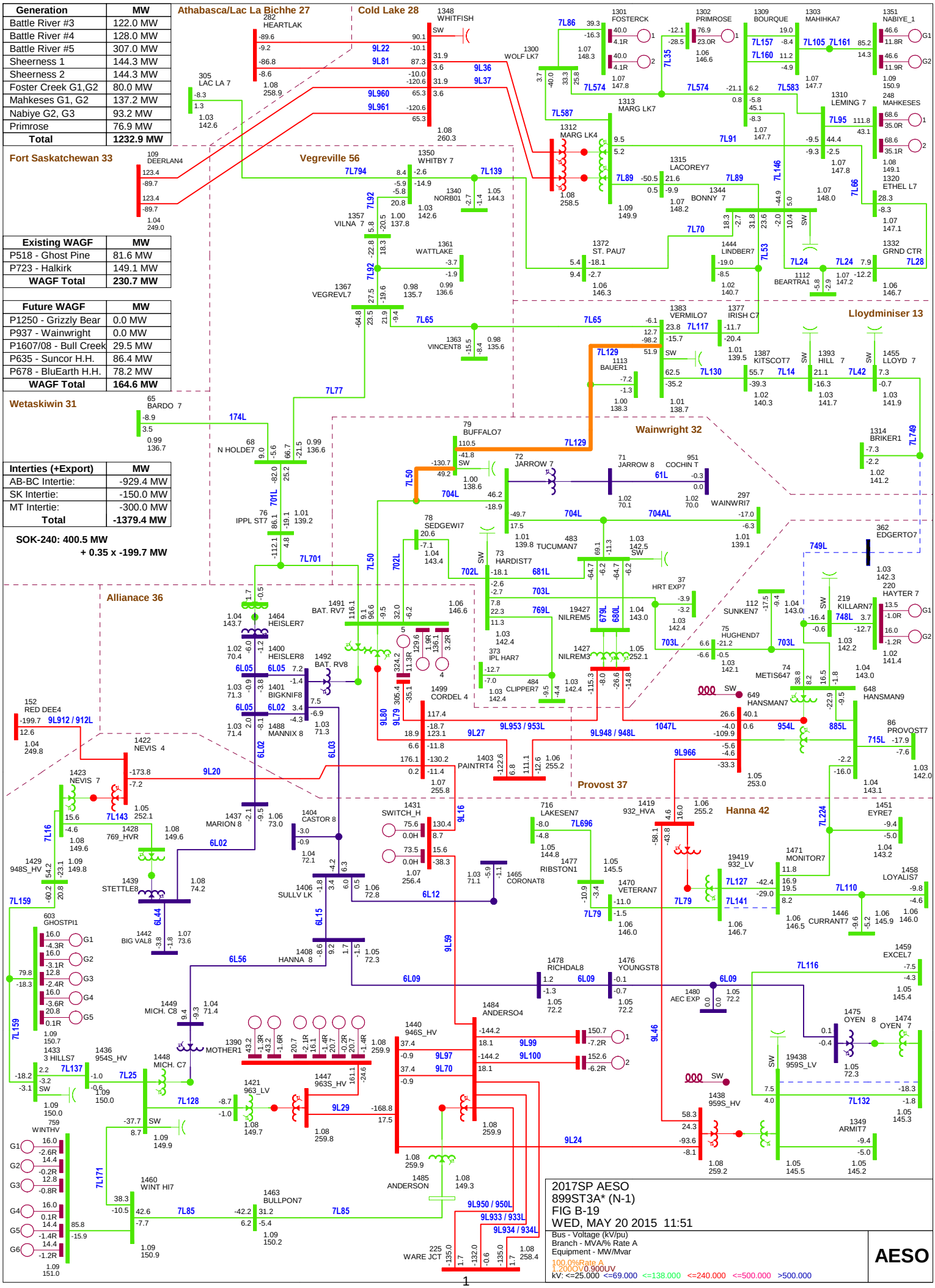
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-929.4 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1379.4 MW**

SOK-240: 400.5 MW
+ 0.35 x -199.7 MW



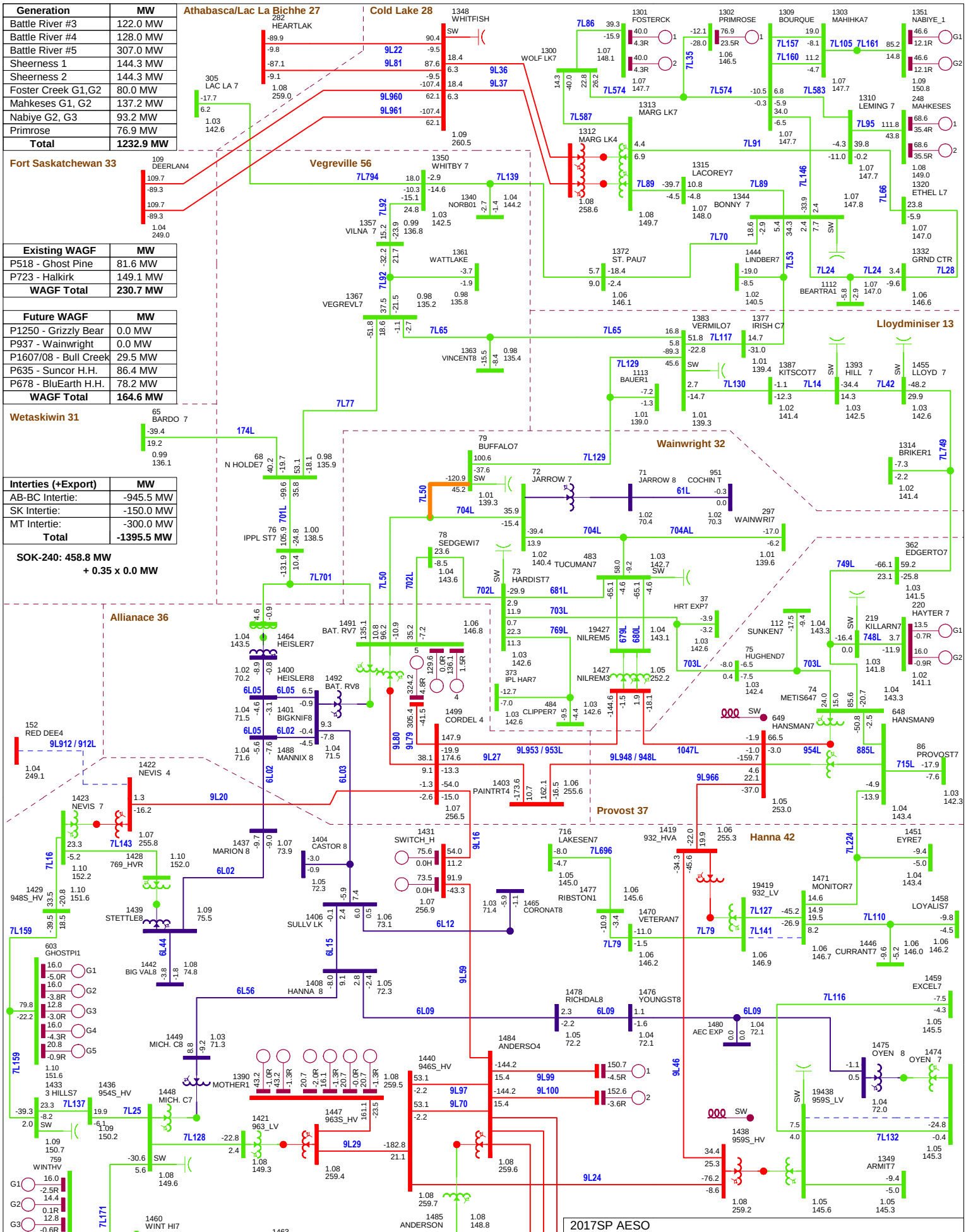
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-945.5 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1395.5 MW**

SOK-240: 458.8 MW
+ 0.35 x 0.0 MW



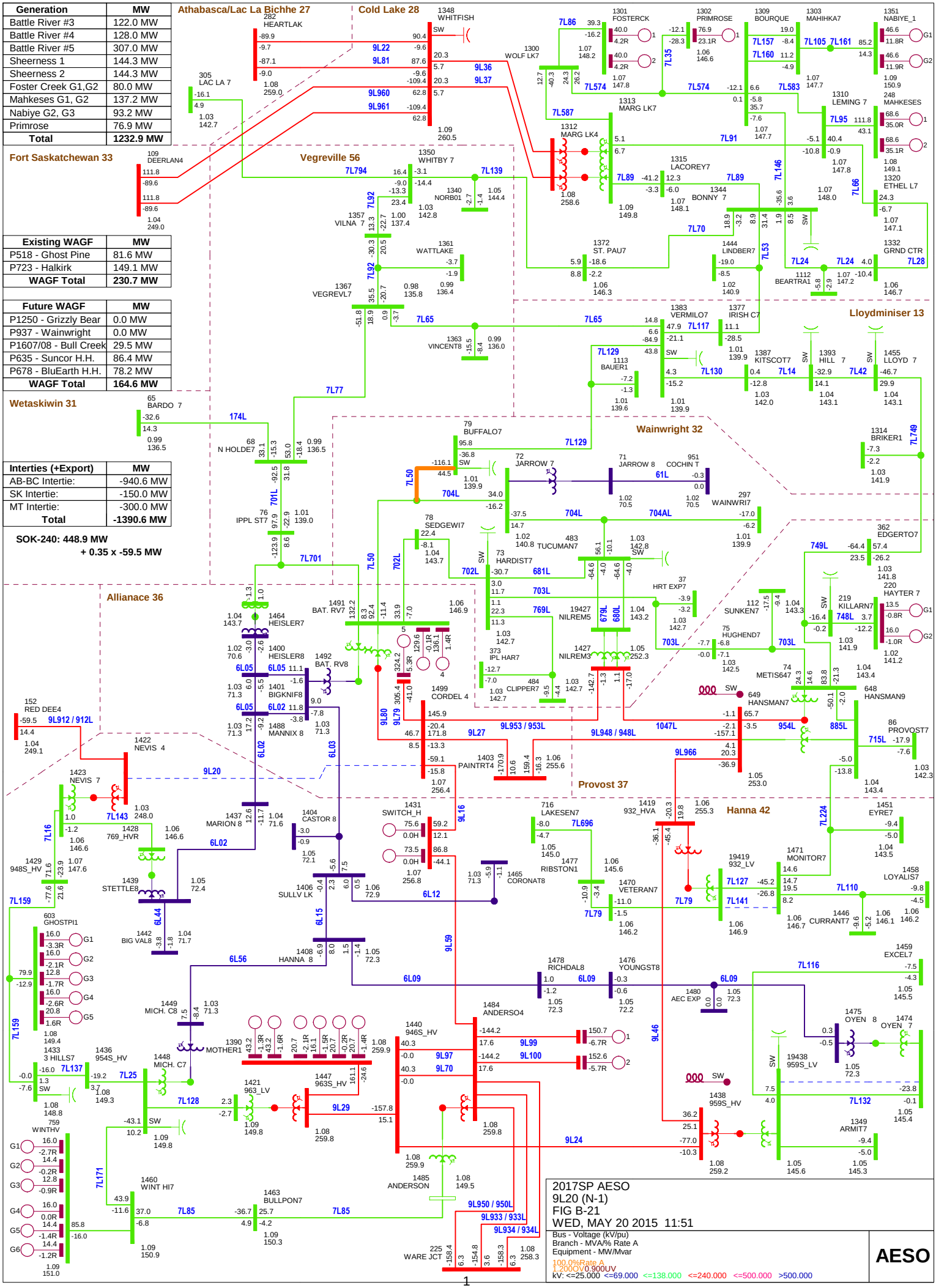
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-940.6 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1390.6 MW**

SOK-240: 448.9 MW
+ 0.35 x -59.5 MW



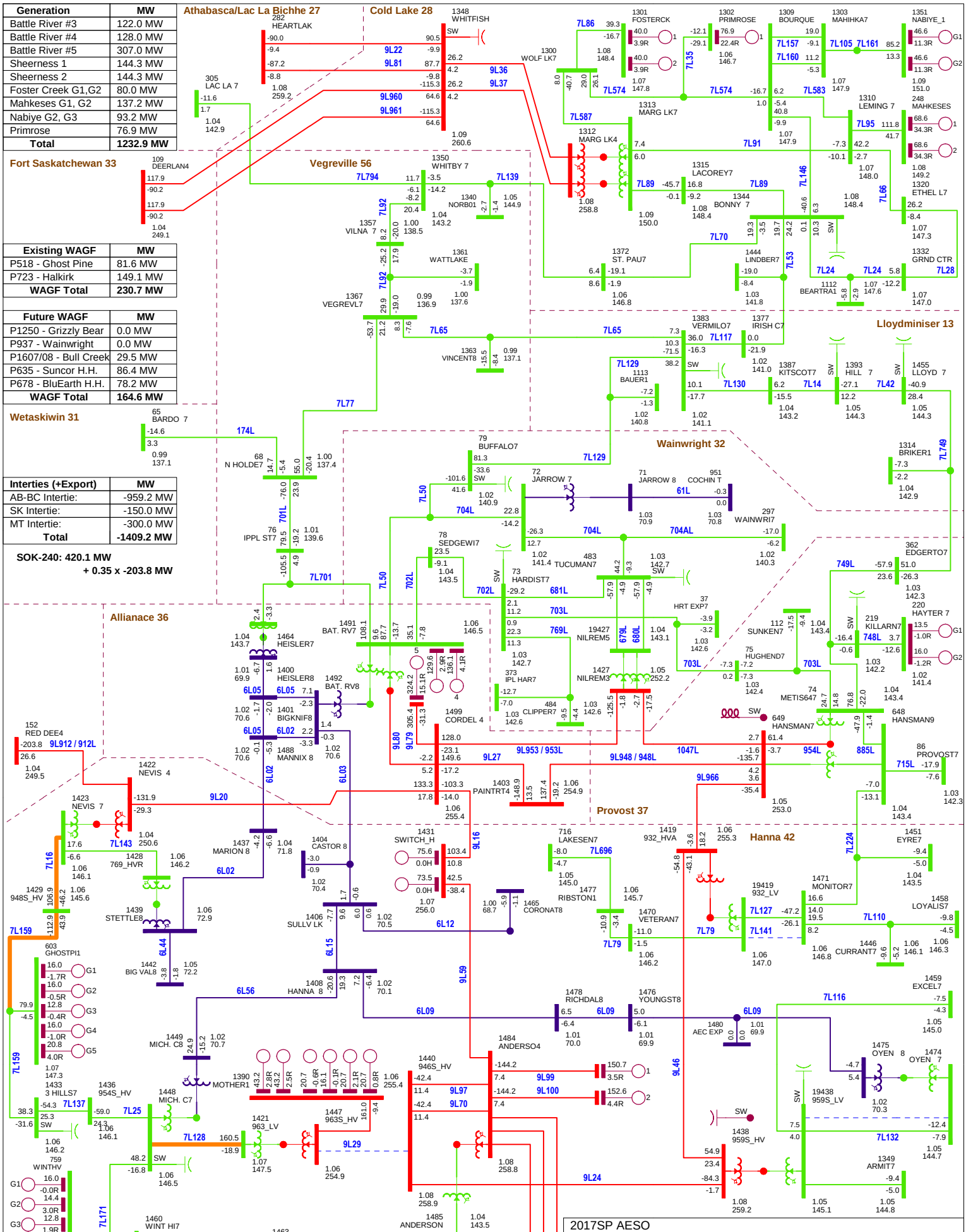
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-959.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1409.2 MW**

SOK-240: 420.1 MW
+ 0.35 x -203.8 MW



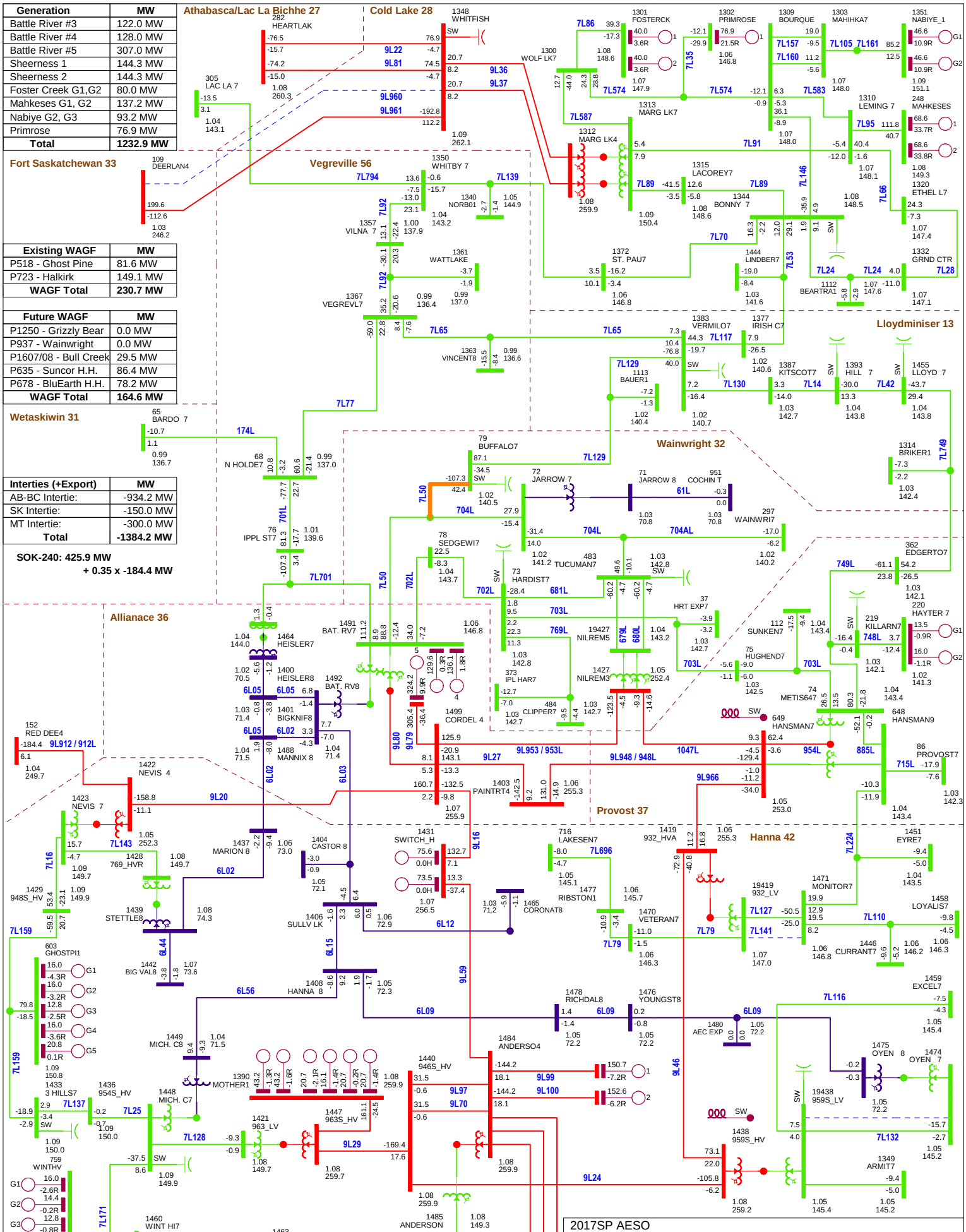
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-934.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1384.2 MW**

SOK-240: 425.9 MW
+ 0.35 x -184.4 MW



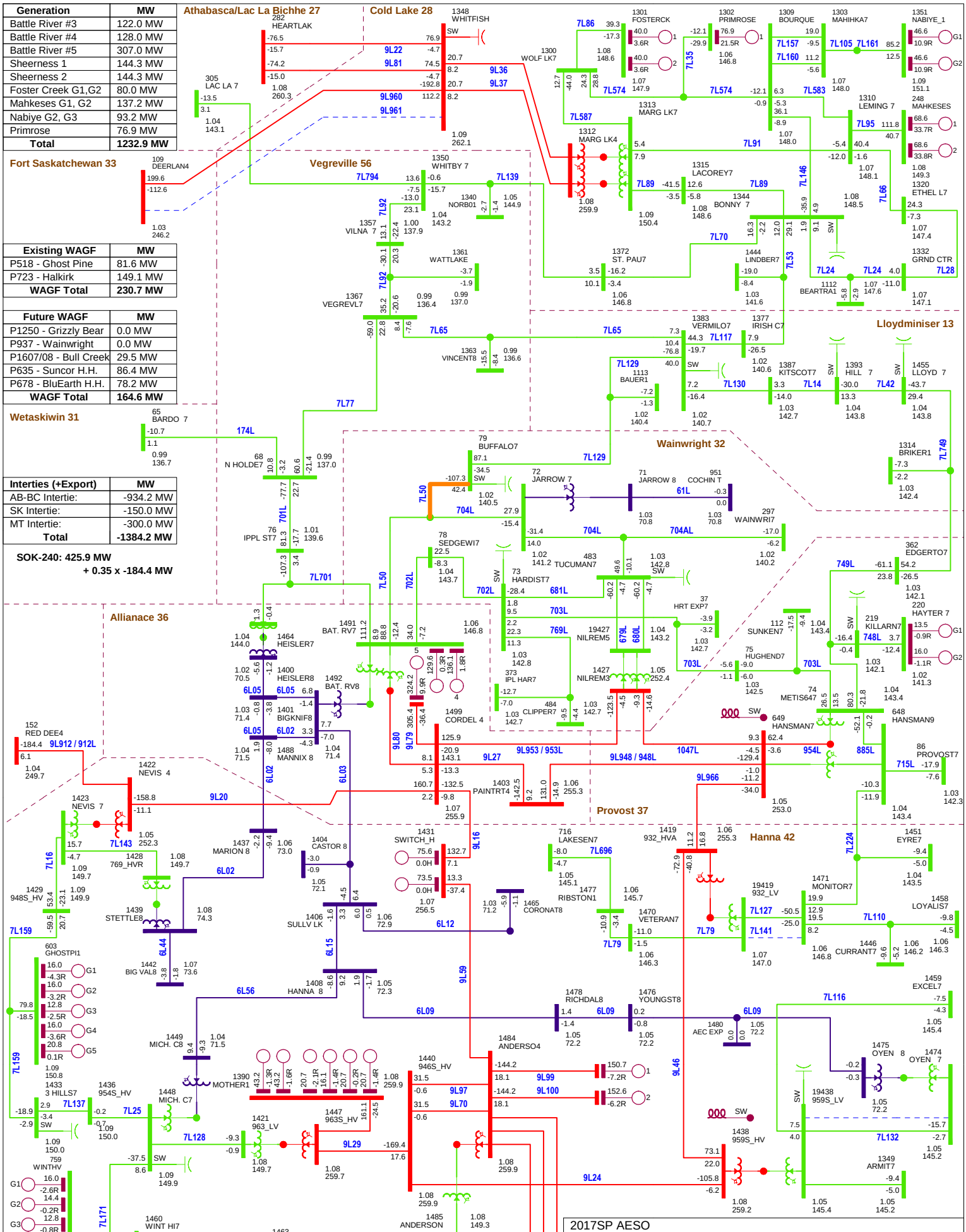
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-934.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1384.2 MW**

SOK-240: 425.9 MW
+ 0.35 x -184.4 MW



2017SP AESO
9L961 (N-1)
FIG B-24
WED, MAY 20 2015 11:51

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

100.0%Rate A
1.200OV0.900UV
kV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

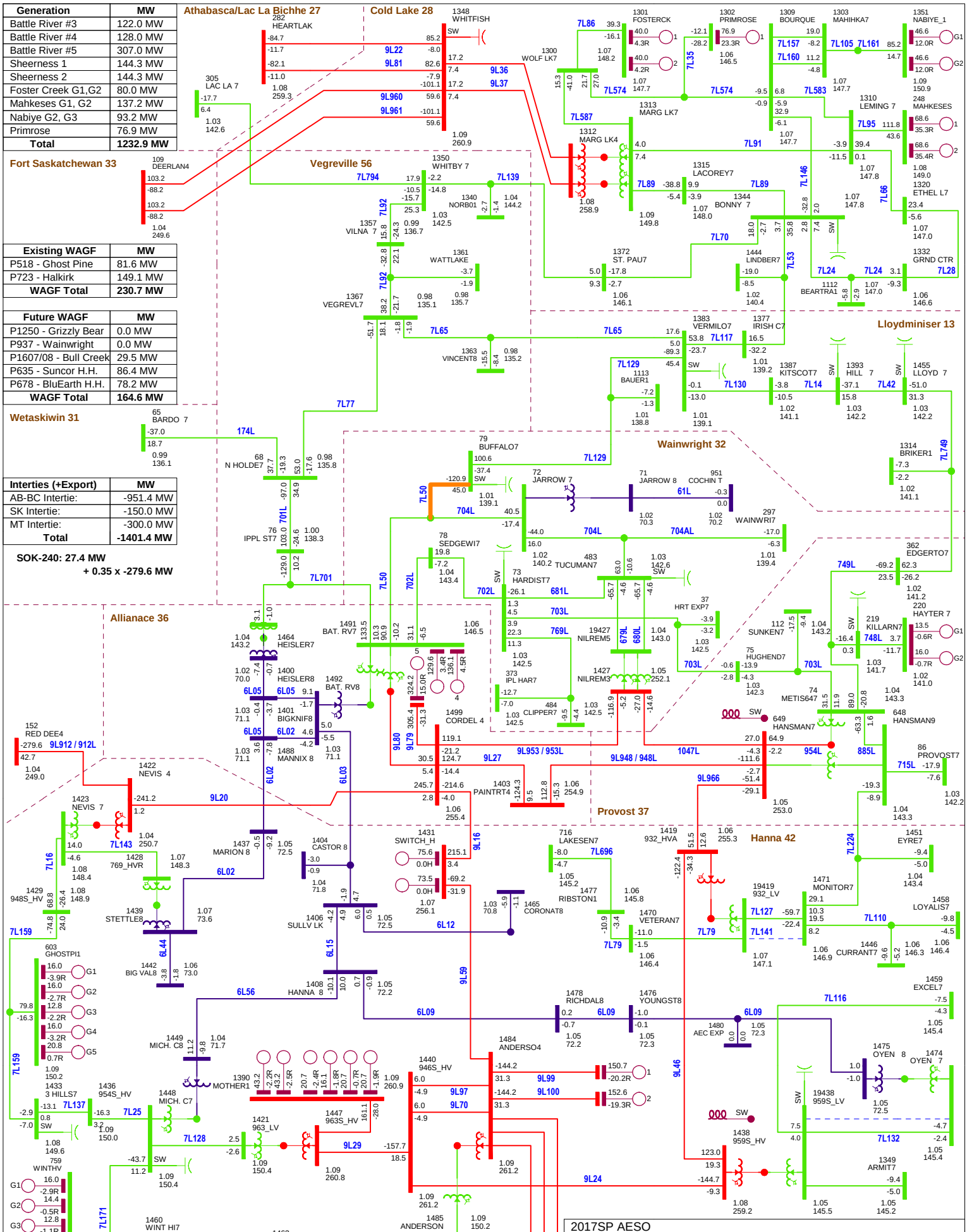
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-951.4 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1401.4 MW**

SOK-240: 27.4 MW
+ 0.35 x -279.6 MW



2017SP AESO
EATL (N-1)
FIG B-25
WED, MAY 20 2015 11:51

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

100.0%Rate A
1.200OV0.900UV
kV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

ATTACHMENT C

2017SL Post-Connection

Power Flow Diagrams

Table C-1: Summary of 2017SL Post-Connection Power Flow Diagrams

Figure #	System Condition	Contingency
Alt 2, Only Mainstream Wainwright WAGF Proceeds		
C-1	N-0	Base Case
C-2	N-1	9L29 (946S Oakland to 963S Coyote Lake)

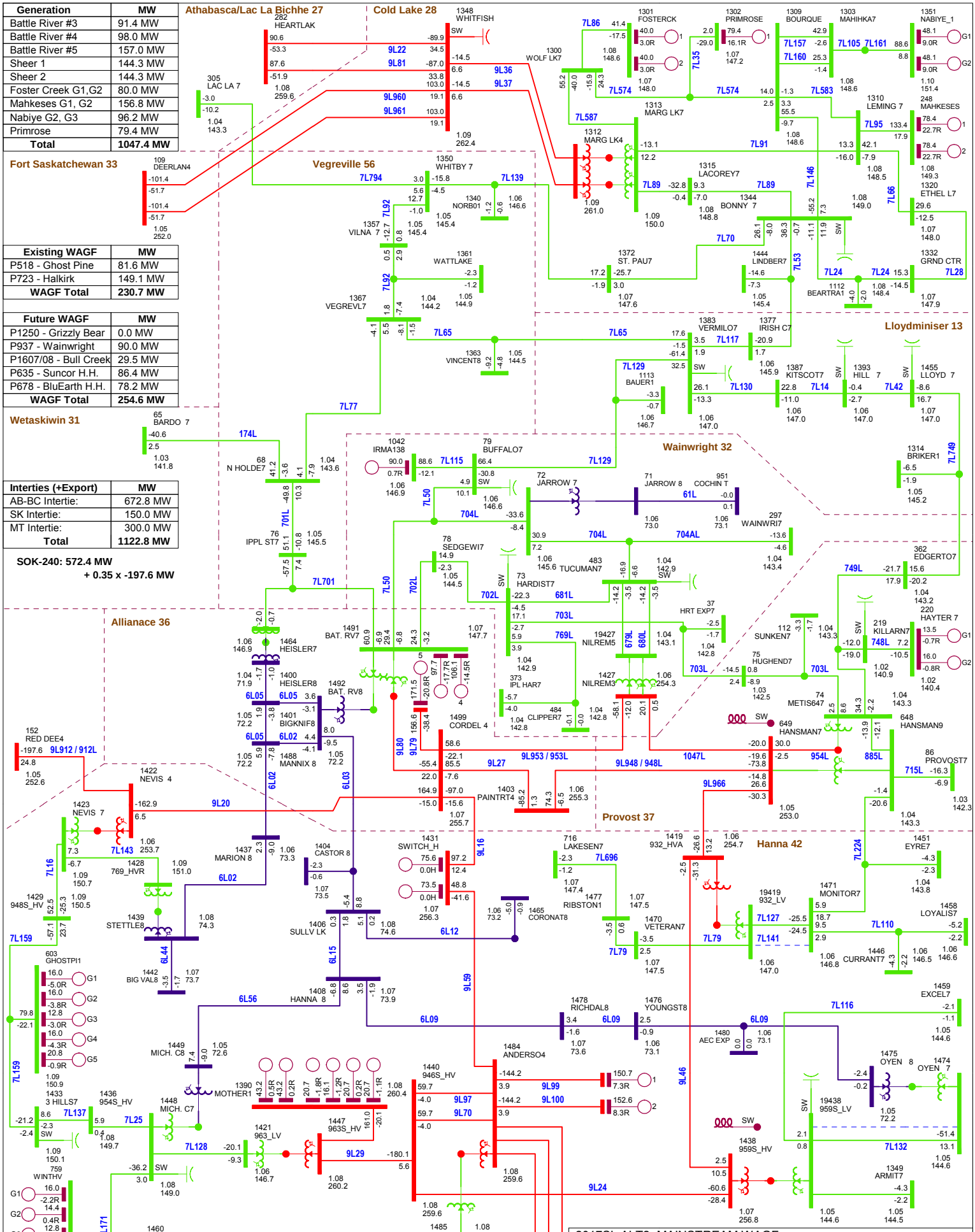
Generation	MW
Battle River #3	91.4 MW
Battle River #4	98.0 MW
Battle River #5	157.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	156.8 MW
Nabiye G2, G3	96.2 MW
Primrose	79.4 MW
Total	**1047.4 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	672.8 MW
SK Intertie:	150.0 MW
MT Intertie:	300.0 MW
Total	**1122.8 MW**

SOK-240: 572.4 MW
+ 0.35 x -197.6 MW



2017SL ALT2, MAINSTREAM WAGF
BASE CASE (N-0)
FIG C-1
WED, MAY 20 2015 11:53

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

100.0%Rate A
1.200OV0.900UV
kV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

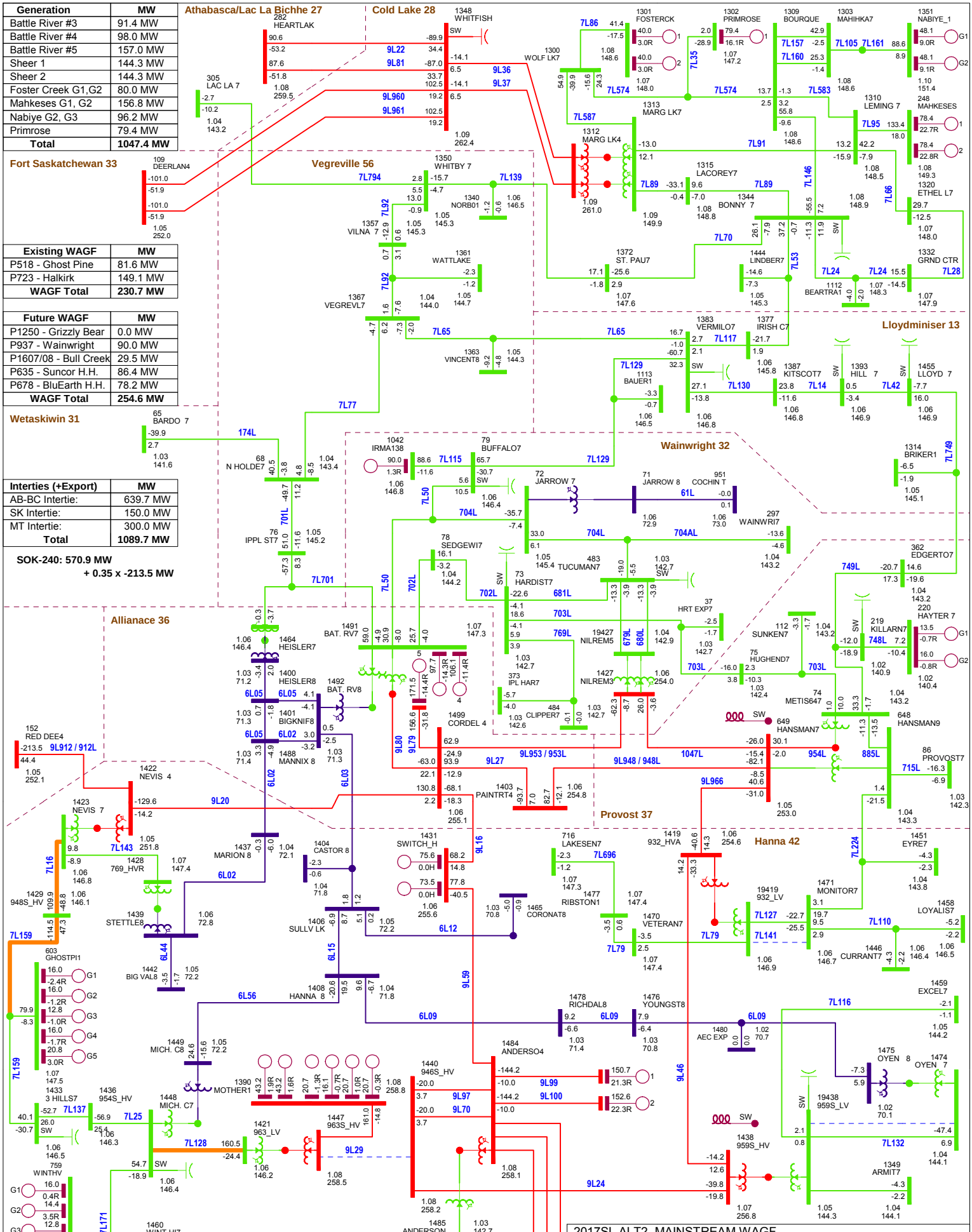
Generation	MW
Battle River #3	91.4 MW
Battle River #4	98.0 MW
Battle River #5	157.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	156.8 MW
Nabiye G2, G3	96.2 MW
Primrose	79.4 MW
Total	**1047.4 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	639.7 MW
SK Intertie:	150.0 MW
MT Intertie:	300.0 MW
Total	**1089.7 MW**

SOK-240: 570.9 MW
+ 0.35 x -213.5 MW



ATTACHMENT D

2017SP Post-Connection

Power Flow Diagrams

Table D-1: Summary of 2017SP Post-Connection Power Flow Diagrams

Figure #	System Condition	Contingency
Alt 2, Mainstream Wainwright WAGF		
D-1	N-0	Base Case
D-2	N-1	252ST1* or 252ST2* (252S Jarrow)
D-3	N-1	395ST1* (395S North Holden)
D-4	N-1	701L (395S North Holden to 223S Strome)
D-5	N-1	704L\704AL (252S Jarrow to 478S Tucuman)
D-6	N-1	709S701T* or 709S702T* (709S Vegreville)
D-7	N-1	749L\749AL (648S Metiskow to 899S Edgerton)
D-8	N-1	766S901T* (766S Nevis)
D-9	N-1	7L105 (837S Mahihkan to 909S Mahno)
D-10	N-1	7L161 (909S Mahno to 942S Nabiye)
D-11	N-1	7L42 (751S Hill to 716S Lloydminster)
D-12	N-1	7L701\7LA701\701L (223S Strome to 757S Battle River)
D-13	N-1	7L749\749L\7LB749 (899S Edgerton to 716S Lloydminster)
D-14	N-1	7L77 (395S North Holden to 709S Vegreville)
D-15	N-1	7L95 (889S Mahkeses to 715S Leming Lake)
D-16	N-1	889S-5TNSA1 (889S Mahkeses)
D-17	N-1	889S-5TNSA2 (889S Mahkeses)
D-18	N-1	899ST3a* (899S Edgerton)
D-19	N-1	912L\9L912 (63S Red Deer to 766S Nevis)
D-20	N-1	9L20 (766S Nevis to 755S Cordel)
D-21	N-1	9L29 (946S Oakland to 963S Coyote Lake)
D-22	N-1	EATL

* Lack of transformer breaker will trip the lines connected to this transformer

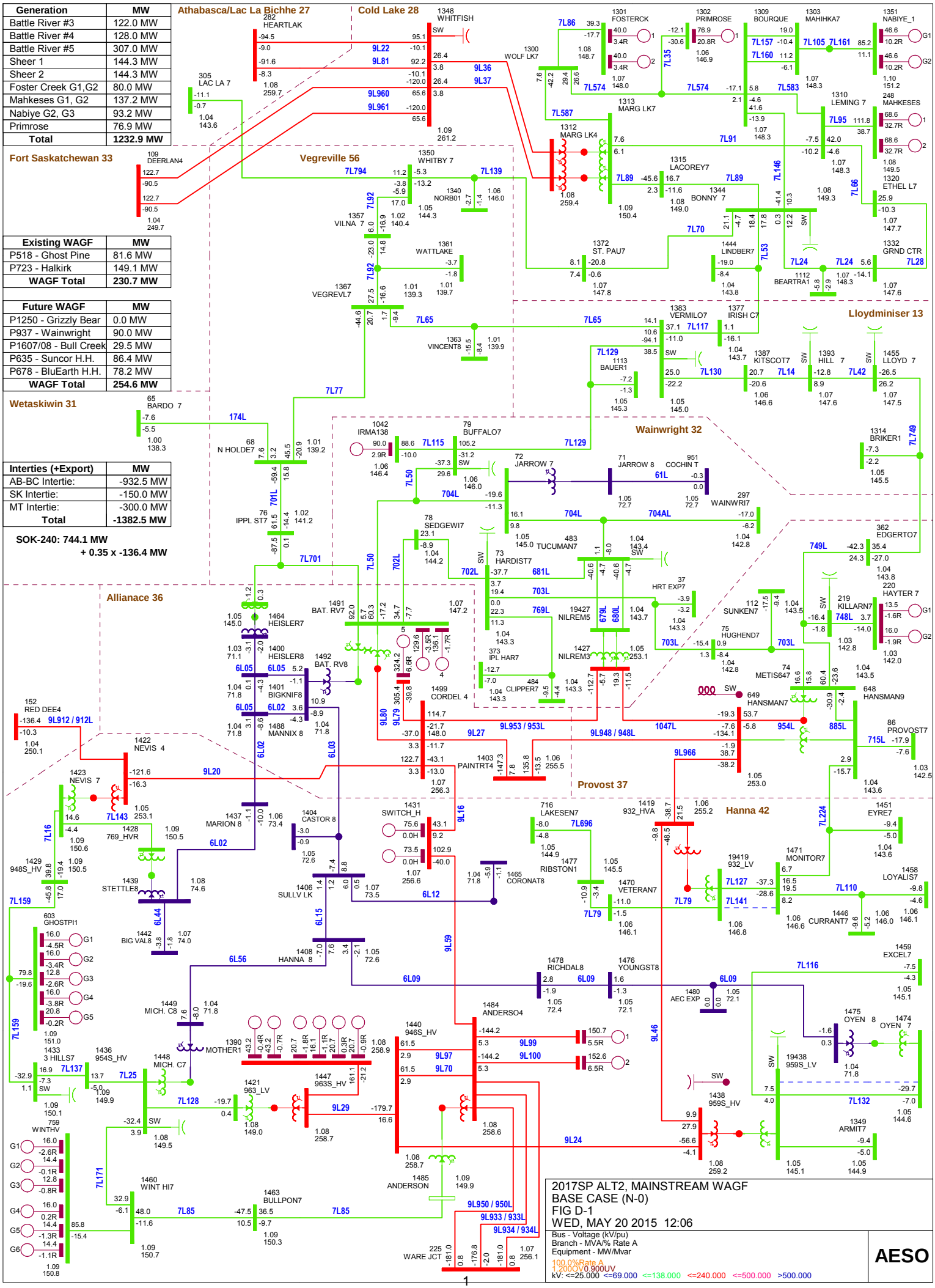
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-932.5 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1382.5 MW**

SOK-240: 744.1 MW
+ 0.35 x -136.4 MW



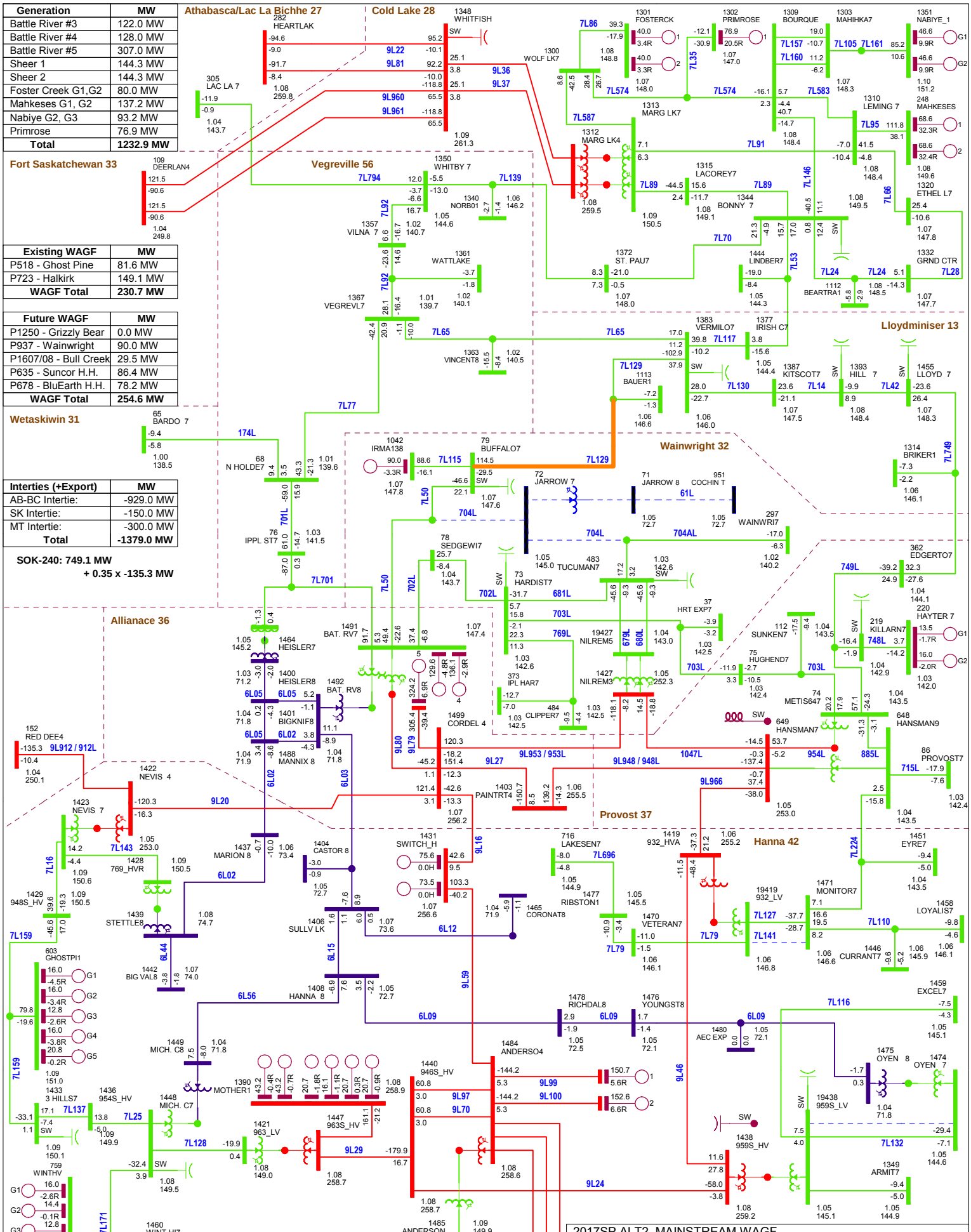
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-929.0 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1379.0 MW**

SOK-240: 749.1 MW
+ 0.35 x -135.3 MW



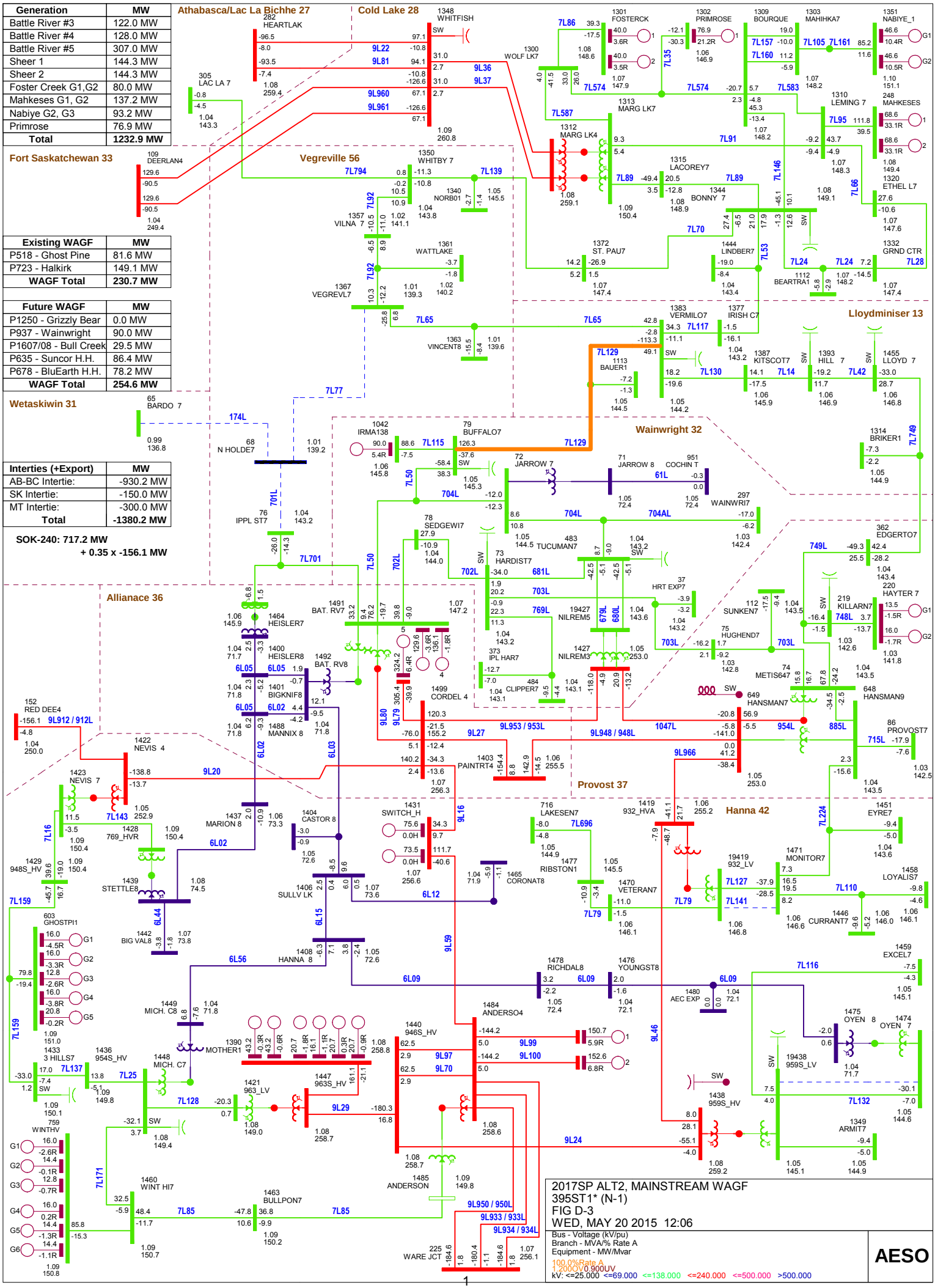
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-930.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1380.2 MW**

SOK-240: 717.2 MW
+ 0.35 x -156.1 MW



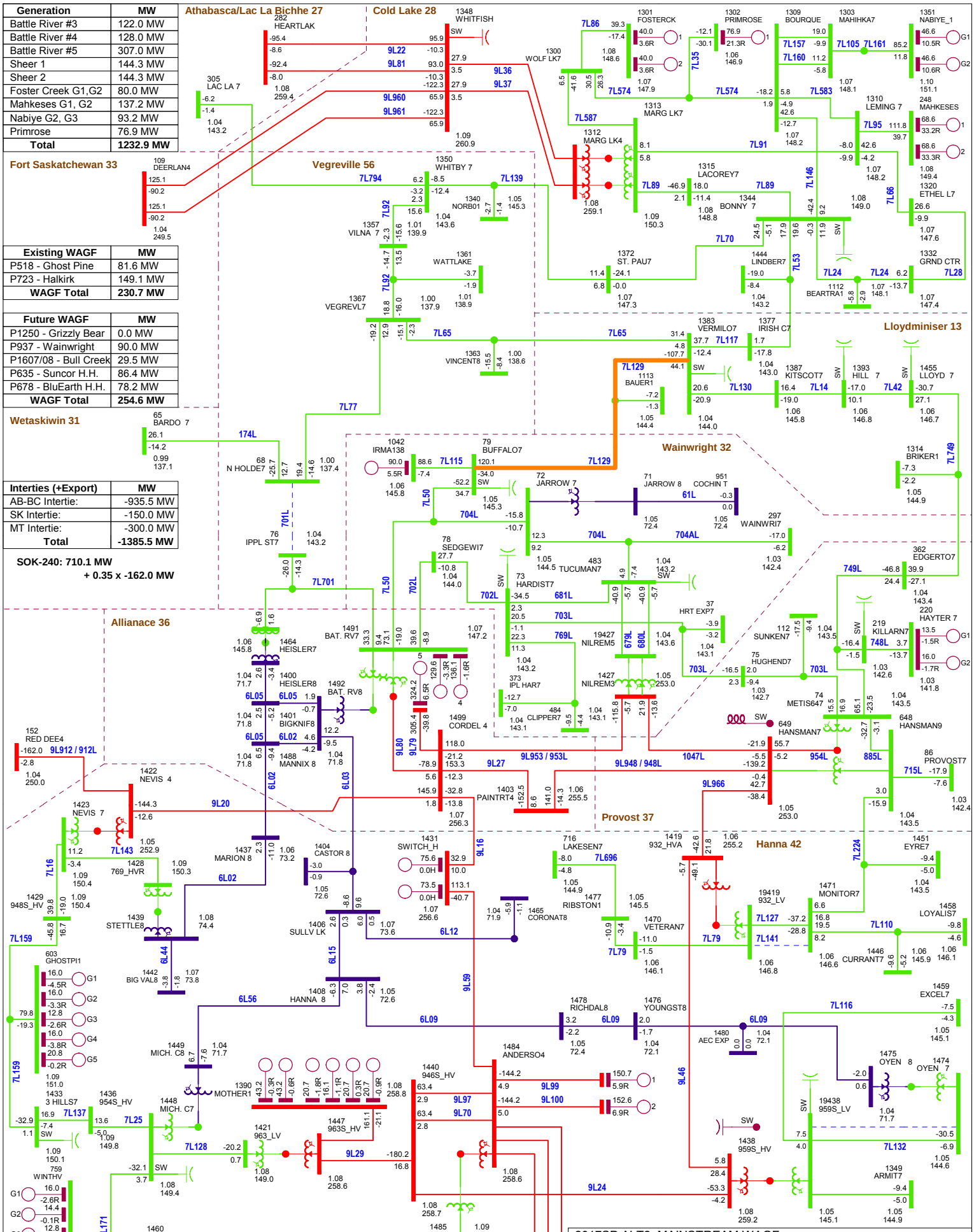
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-935.5 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1385.5 MW**

SOK-240: 710.1 MW
+ 0.35 x -162.0 MW



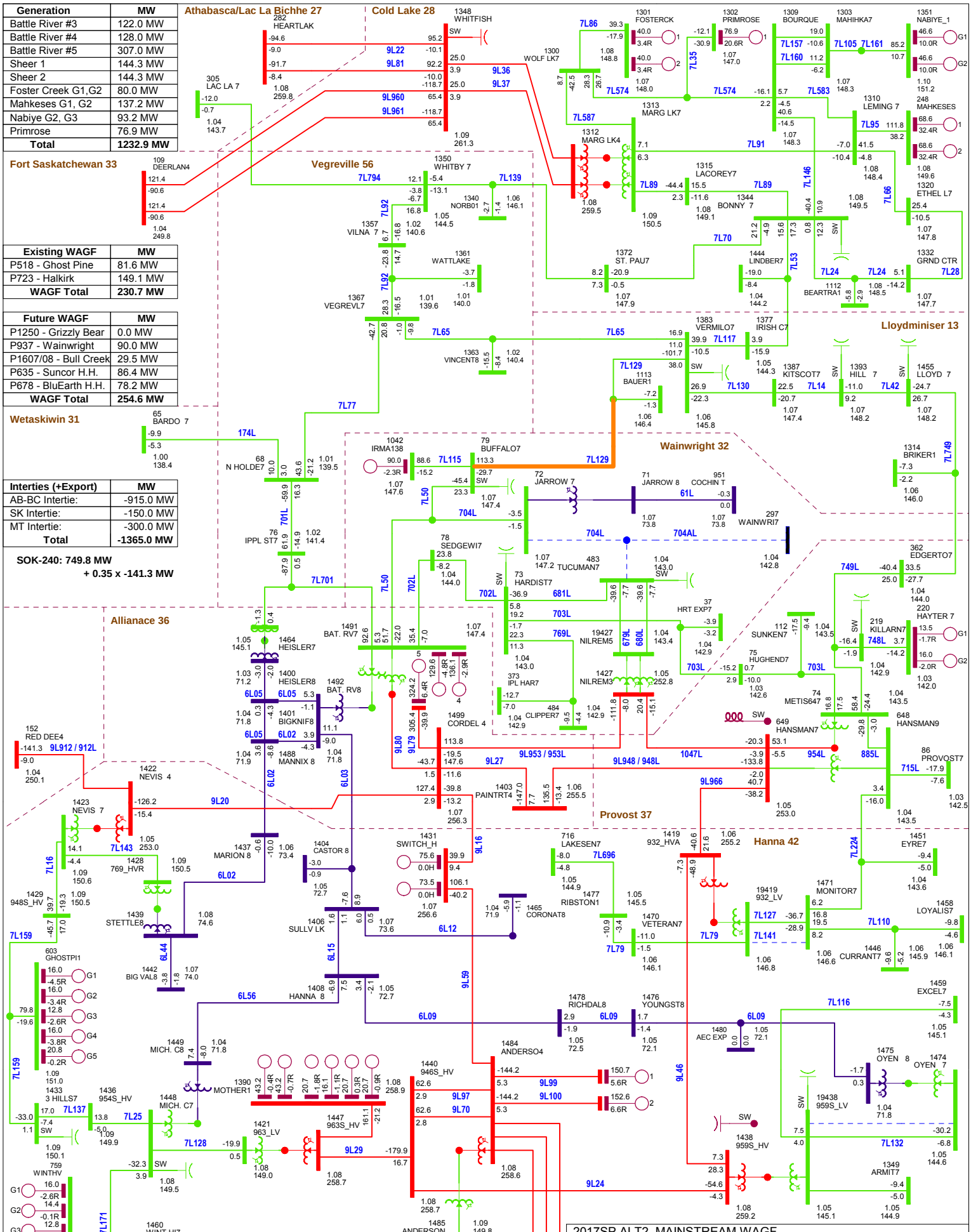
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-915.0 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1365.0 MW**

SOK-240: 749.8 MW
+ 0.35 x -141.3 MW



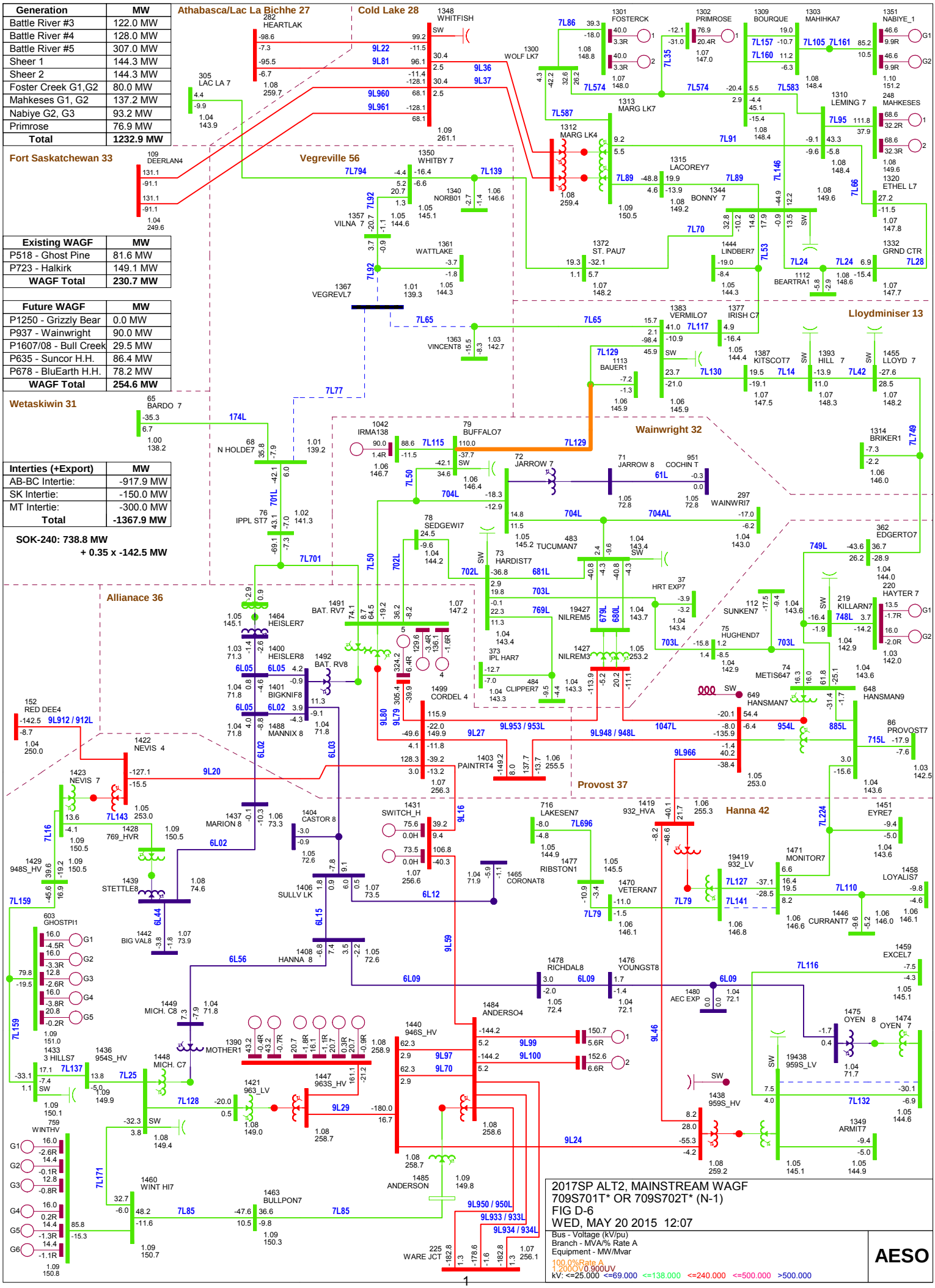
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-917.9 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1367.9 MW**

SOK-240: 738.8 MW
+ 0.35 x -142.5 MW



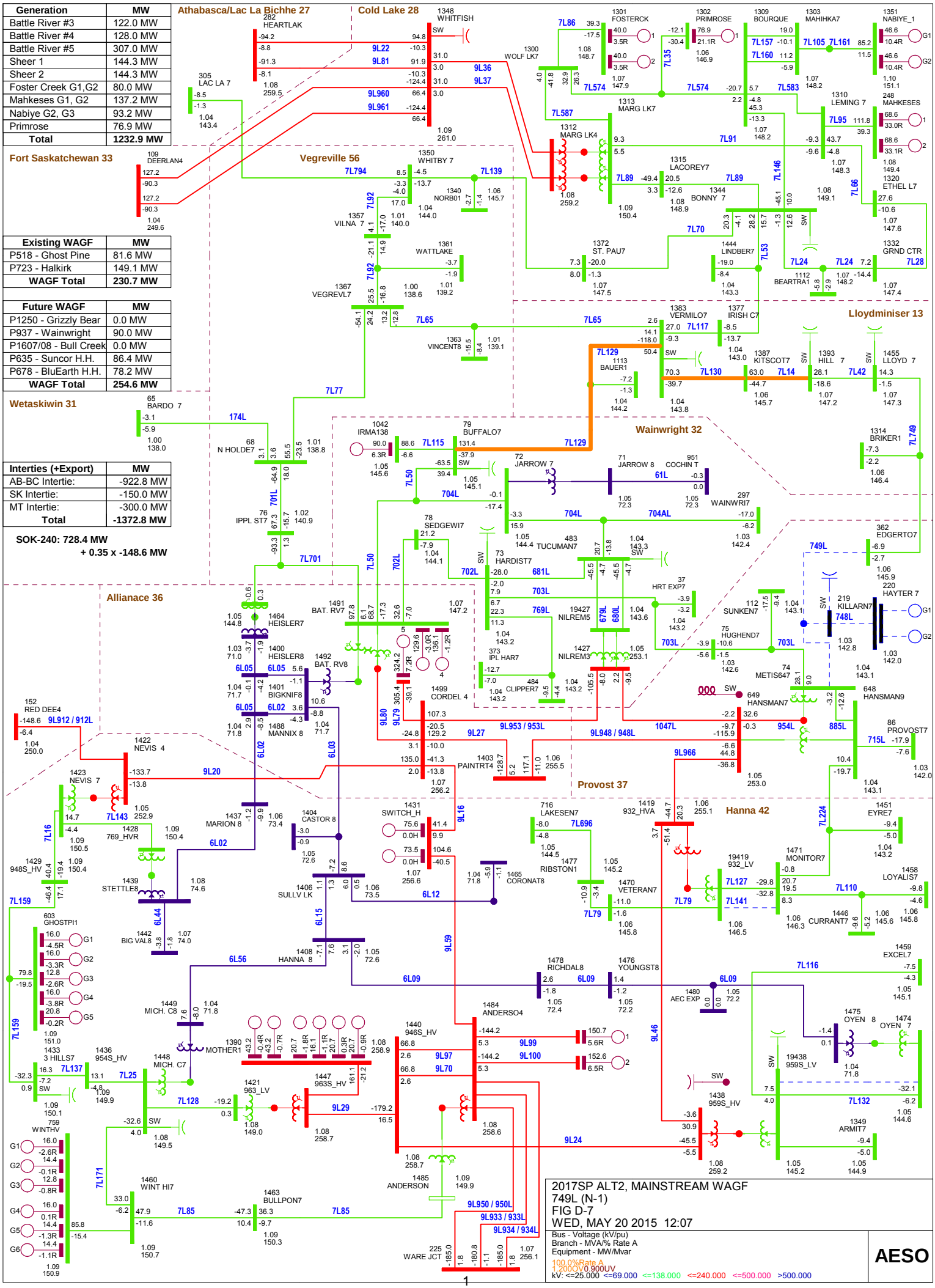
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	0.0 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-922.8 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1372.8 MW**

SOK-240: 728.4 MW
+ 0.35 x -148.6 MW



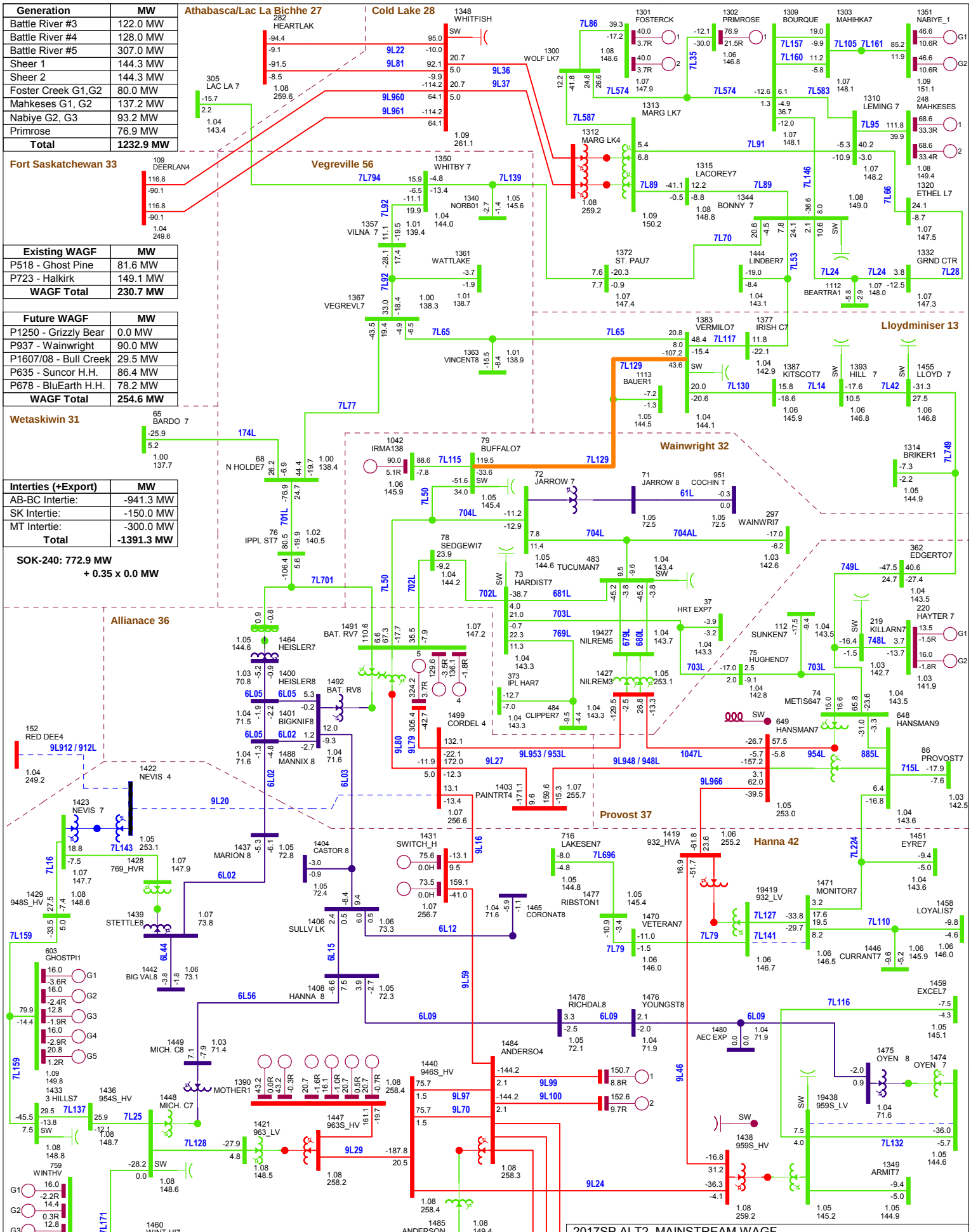
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-941.3 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1391.3 MW**

SOK-240: 772.9 MW
+ 0.35 x 0.0 MW



2017SP ALT2, MAINSTREAM WAGF
766S901T* (N-1)
FIG D-8
WED, MAY 20 2015 12:07

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

100.0%Rate A
1.200OV0.900UV
kV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

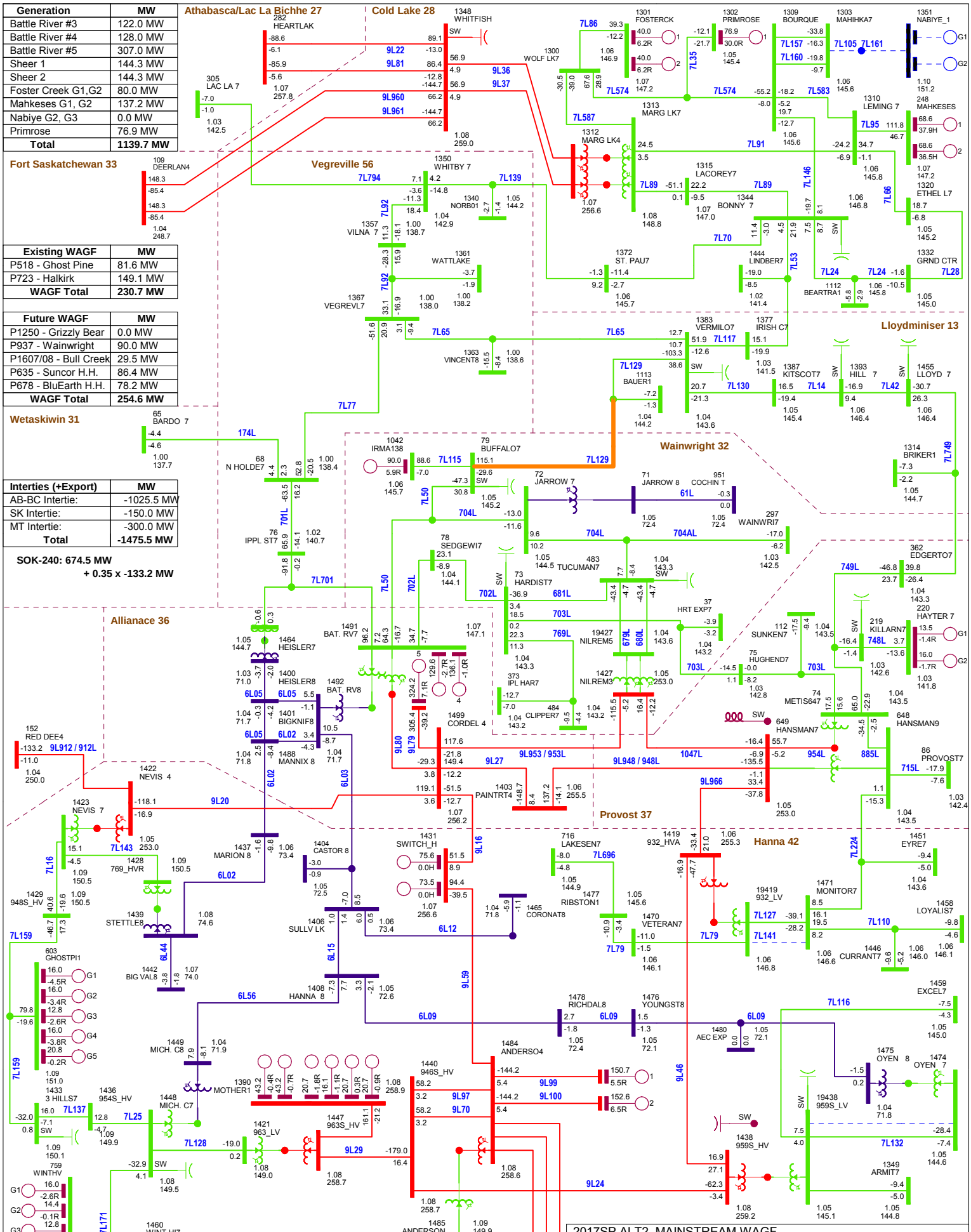
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	0.0 MW
Primrose	76.9 MW
Total	**1139.7 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1025.5 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1475.5 MW**

SOK-240: 674.5 MW
+ 0.35 x -133.2 MW



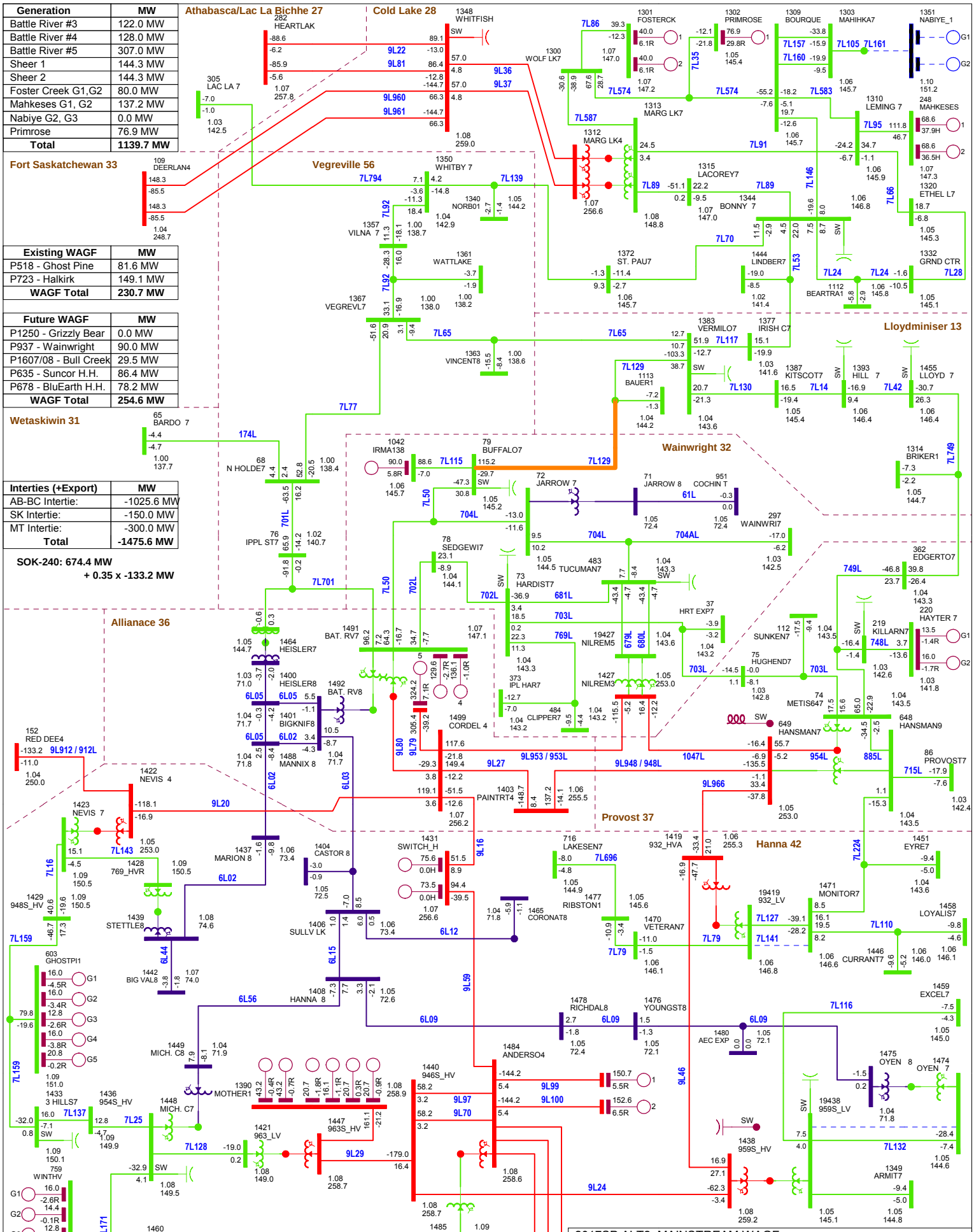
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	0.0 MW
Primrose	76.9 MW
Total	**1139.7 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1025.6 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1475.6 MW**

SOK-240: 674.4 MW
+ 0.35 x -133.2 MW


Athabasca/Lac La Bichhe 27
Cold Lake 28
Fort Saskatchewan 33
Vegreville 56
Lloydminiser 13
Wetaskiwin 31
Wainwright 32
Allianace 36
Provost 37
Hanna 42
1348 WHITFISH
282 HEARTLAK
305 LAC LA 7
109 DEERLAN4
1350 WHITBY 7
1340 NORB01
1357 VILNA 7
1361 WATTLAKE
1367 VEGREVL7
1363 VINCENT8
1300 WOLF LK7
1301 FOSTERCK
1302 PRIMROSE
1309 BOURQUE
1303 MAHIHKA7
1351 NABIYE_1
1310 LEMING 7
248 MAHKESES
1313 MARG LK7
1312 MARG LK4
1315 LACOREY7
1320 ETHEL L7
1344 BONNY 7
1372 ST. PAU7
1444 LINDBER7
1332 GRND CTR
1112 BEARTRA1
1383 VERMILO7
1377 IRISH C7
1387 KITSCOT7
1393 HILL 7
1455 LLOYD 7
1113 BAUER1
65 BARDO 7
68 N HOLDE7
76 IPPL ST7
1042 IRMA138
79 BUFFALO7
72 JARROW 7
71 JARROW 8
951 COCHIN T
297 WAINWRI7
1314 BRIKER1
78 SEDGEWI7
483 TUCUMAN7
73 HARDIST7
37 HRT EXP7
362 EDGERTO7
220 HAYTER 7
219 KILLARN7
112 SUNKEN7
75 HUGHEND7
74 METIS647
649 HANSMAN7
648 HANSMAN9
86 PROVOST7
1491 BAT. RV7
1464 HEISLER7
1400 HEISLER8
1492 BAT. RV8
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1488 MANNIX 8
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1427 NILREM3
373 IPL HAR7
484 CLIPPER7
1499 CORDEL 4
1403 PAINTRT4
152 RED DEE4
1422 NEVIS 4
1423 NEVIS 7
1428 769_HVR
1437 MARION 8
1404 CASTOR 8
1431 SWITCH_H
716 LAKESEN7
1419 932_HVA
1451 EYRE7
1429 948S_HV
1439 STETTLE8
1406 SULLV LK
1465 CORONAT8
1477 RIBSTON1
1470 VETERAN7
19419 932_LV
1471 MONITOR7
1458 LOYALIS7
1446 CURRANT7
603 GHOSTPI1
1442 BIG VAL8
1408 HANNA 8
1478 RICHDAL8
1476 YOUNGST8
1459 EXCEL7
1449 MICH. C8
1390 MOTHER1
1484 ANDERSO4
1480 AEC EXP
1475 OYEN 8
1474 OYEN 7
1433 3 HILLS7
1436 954S_HV
1448 MICH. C7
1440 946S_HV
1421 963_LV
1447 963S_HV
19438 959S_LV
1438 959S_HV
759 WINTHV
1460 WINT HI7
1463 BULLPON7
1485 ANDERSON
1349 ARMIT7
225 WARE JCT
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9L81
9L36
9L37
9L960
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680L
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715L
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1.07 256.6
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1.00 138.0
1.00 138.2
1.00 137.7
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1.03 142.5
1.04 143.6
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1.04 250.0
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1.07 256.2
1.06 255.3
1.06 146.1
1.05 145.6
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1.06 146.1
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1.03 142.5
1.04 143.2
1.04 143.3
1.04 143.2
1.04 143.6
1.05 253.0
1.04 143.5
1.03 142.4

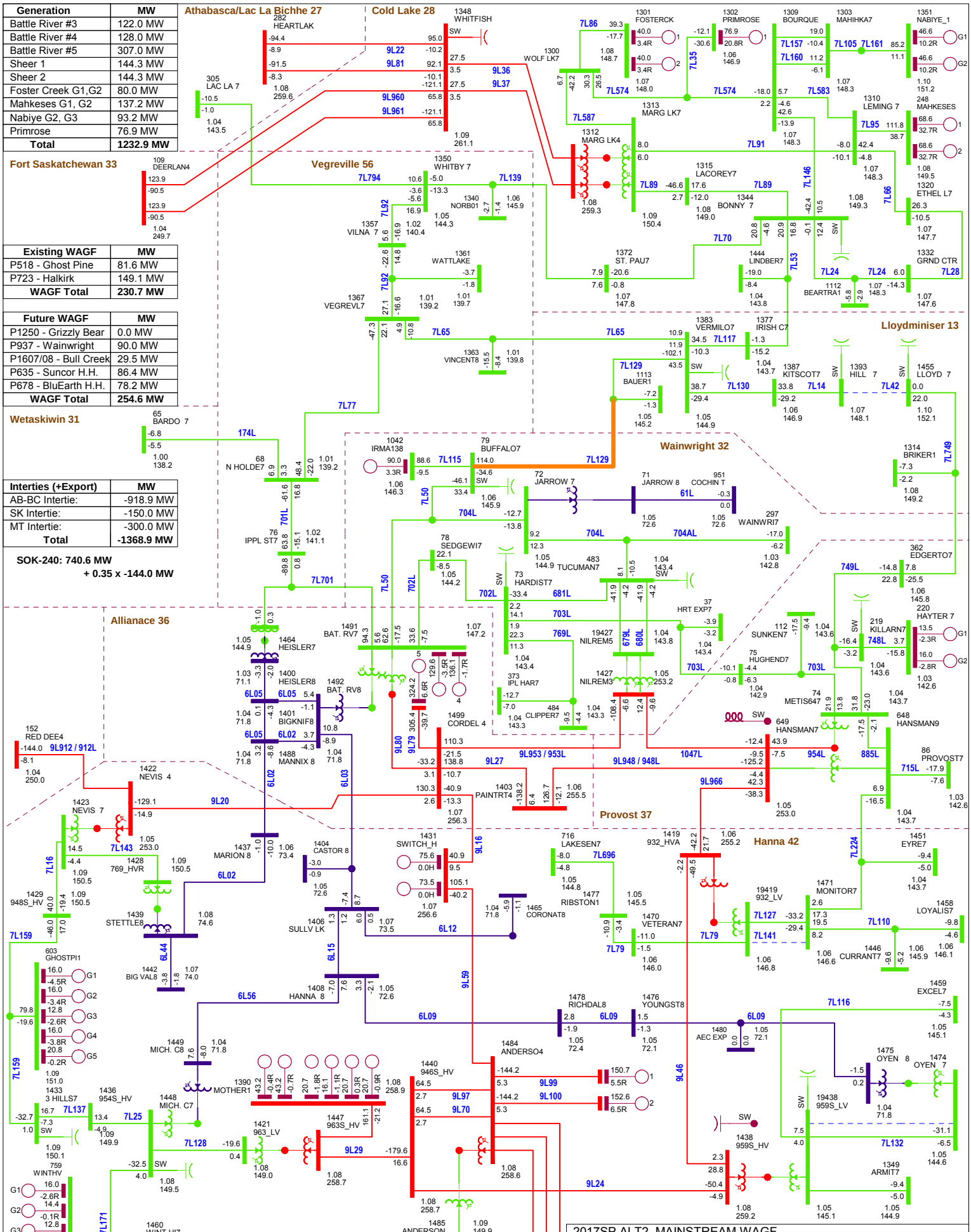
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-918.9 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1368.9 MW**

SOK-240: 740.6 MW
+ 0.35 x -144.0 MW



2017SP ALT2, MAINSTREAM WAGF
7L42 (N-1)
FIG D-11
WED, MAY 20 2015 12:08

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

100.0%Rate A
1.200OV0.900UV
kV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

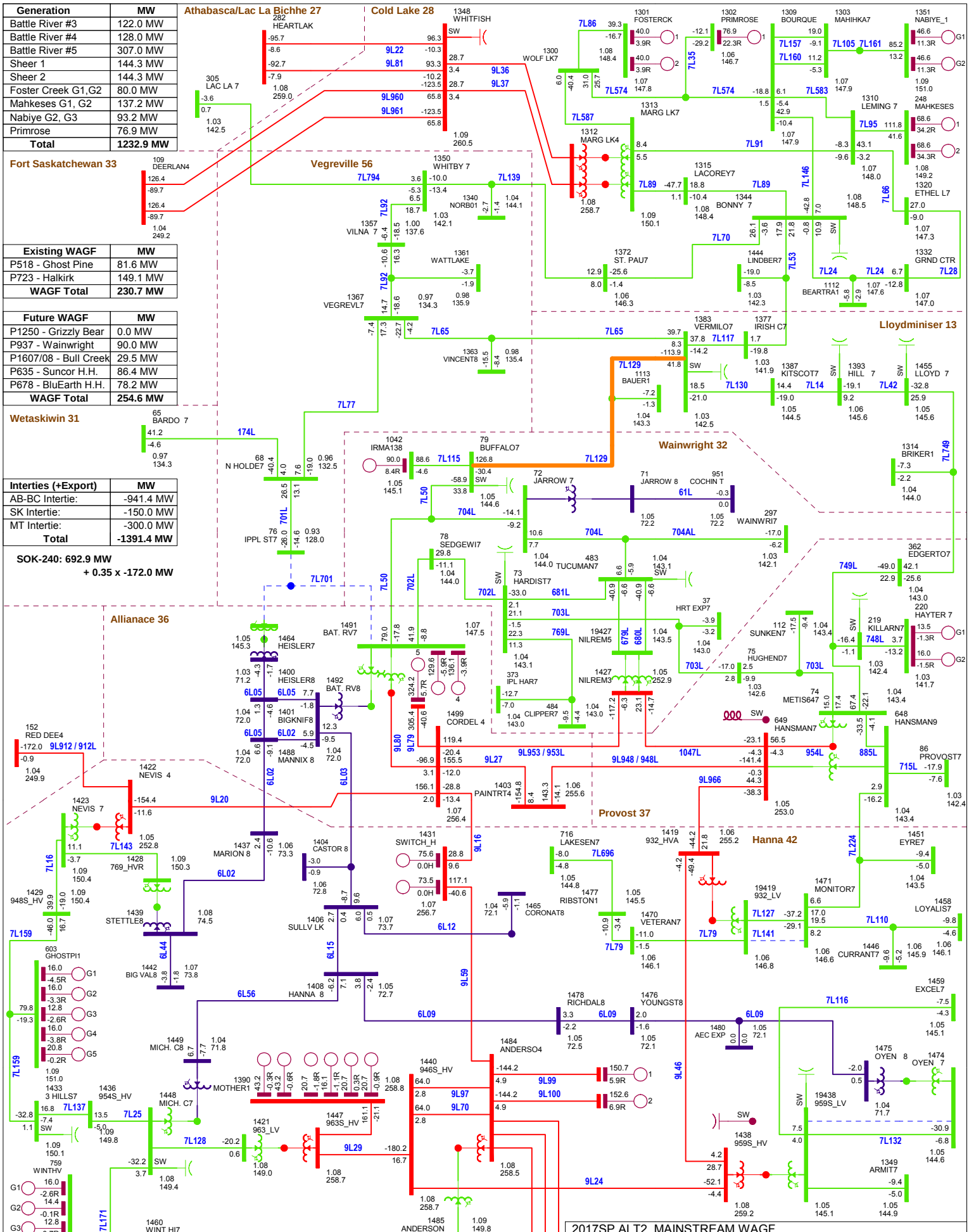
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-941.4 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1391.4 MW**

SOK-240: 692.9 MW
+ 0.35 x -172.0 MW



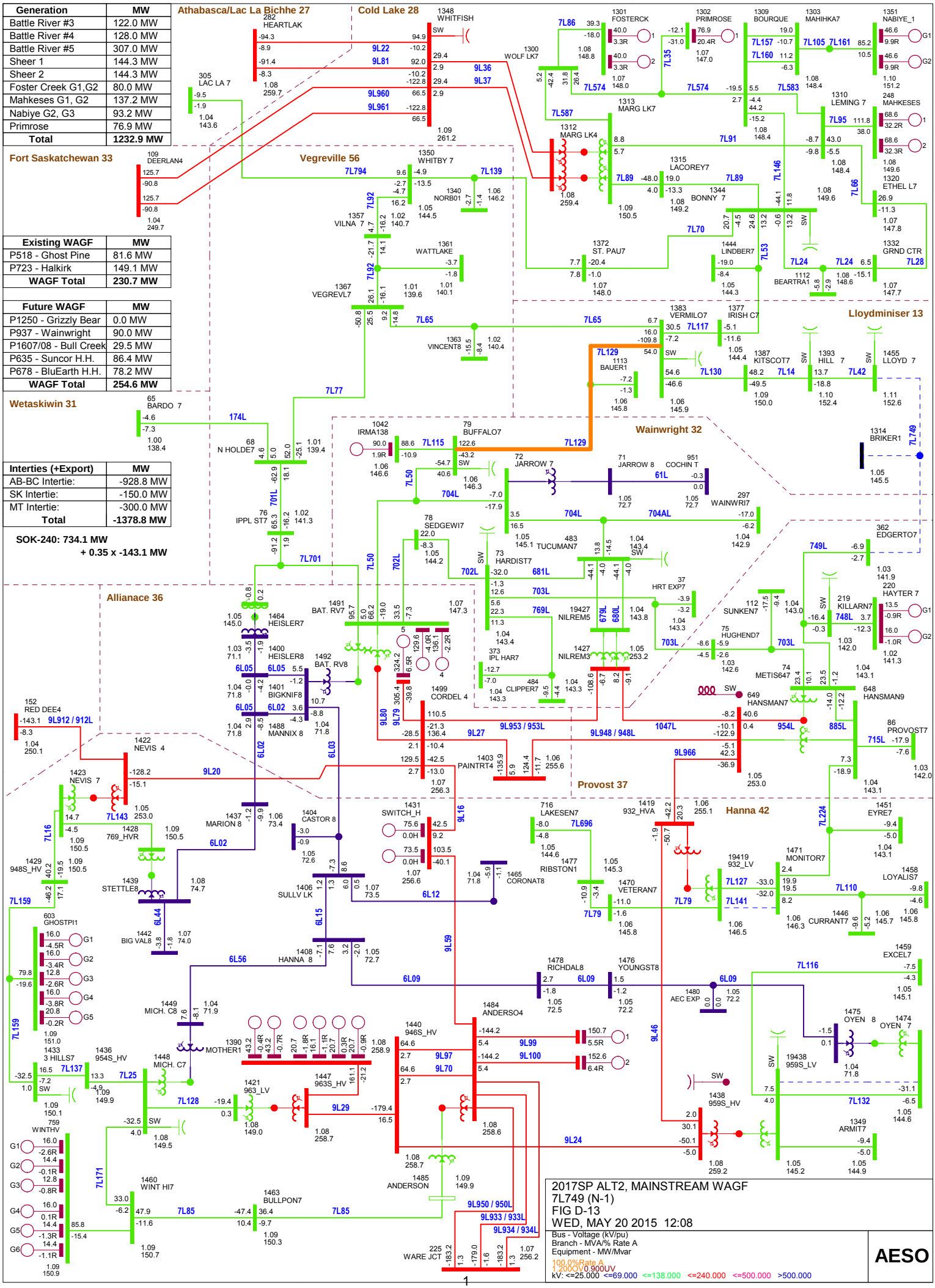
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-928.8 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1378.8 MW**

SOK-240: 734.1 MW
+ 0.35 x -143.1 MW



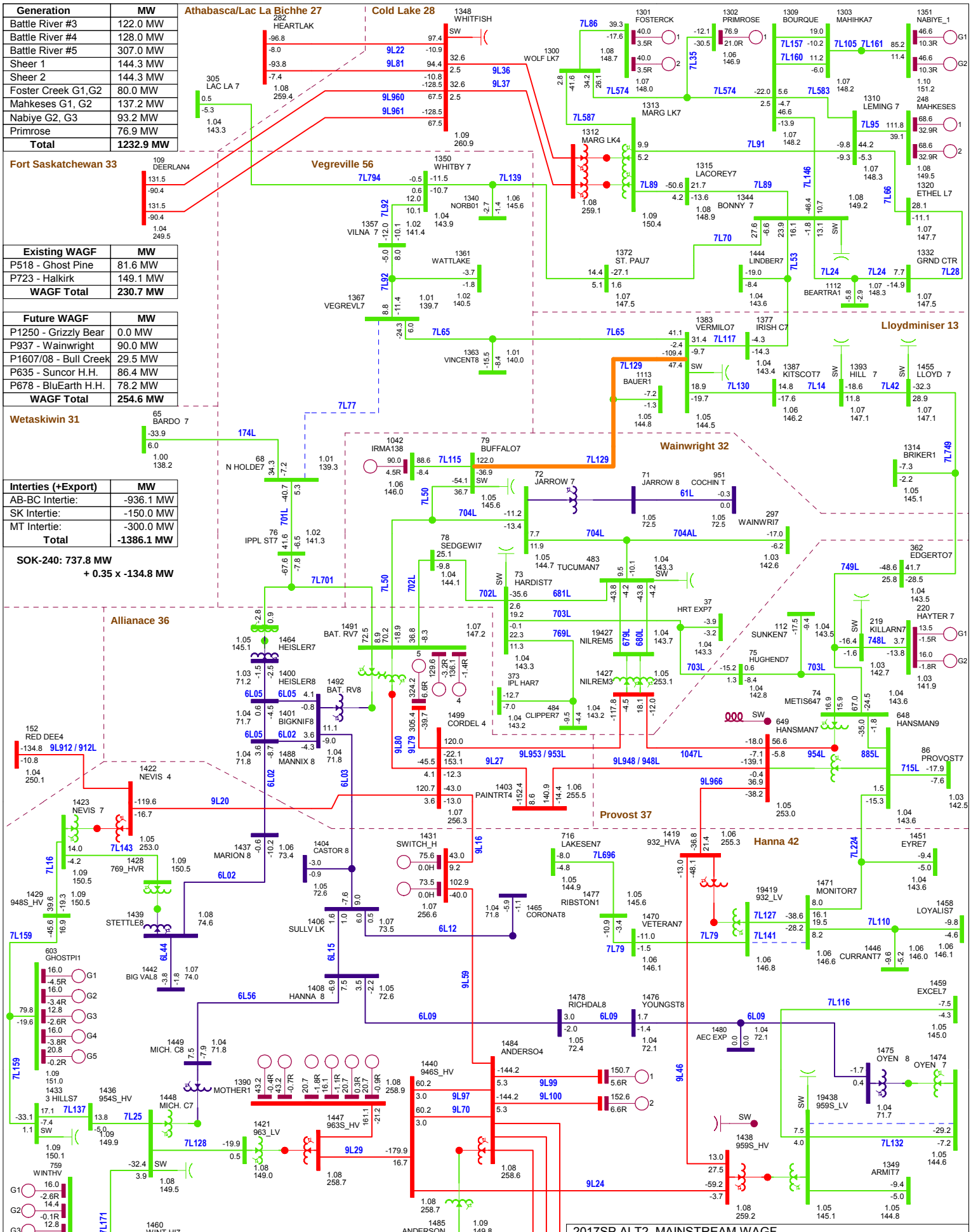
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-936.1 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1386.1 MW**

SOK-240: 737.8 MW
+ 0.35 x -134.8 MW



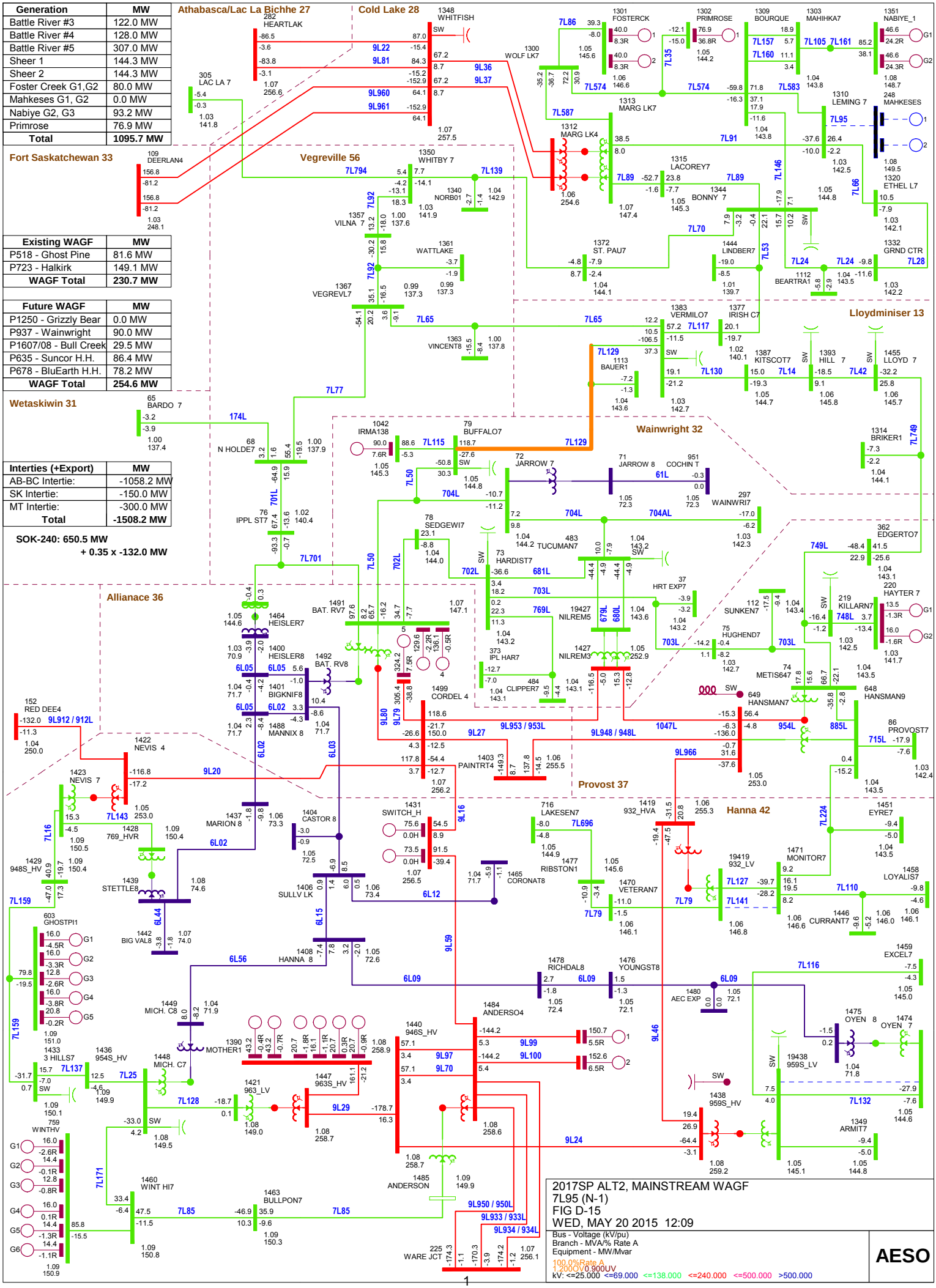
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	0.0 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1095.7 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1058.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1508.2 MW**

SOK-240: 650.5 MW
+ 0.35 x -132.0 MW



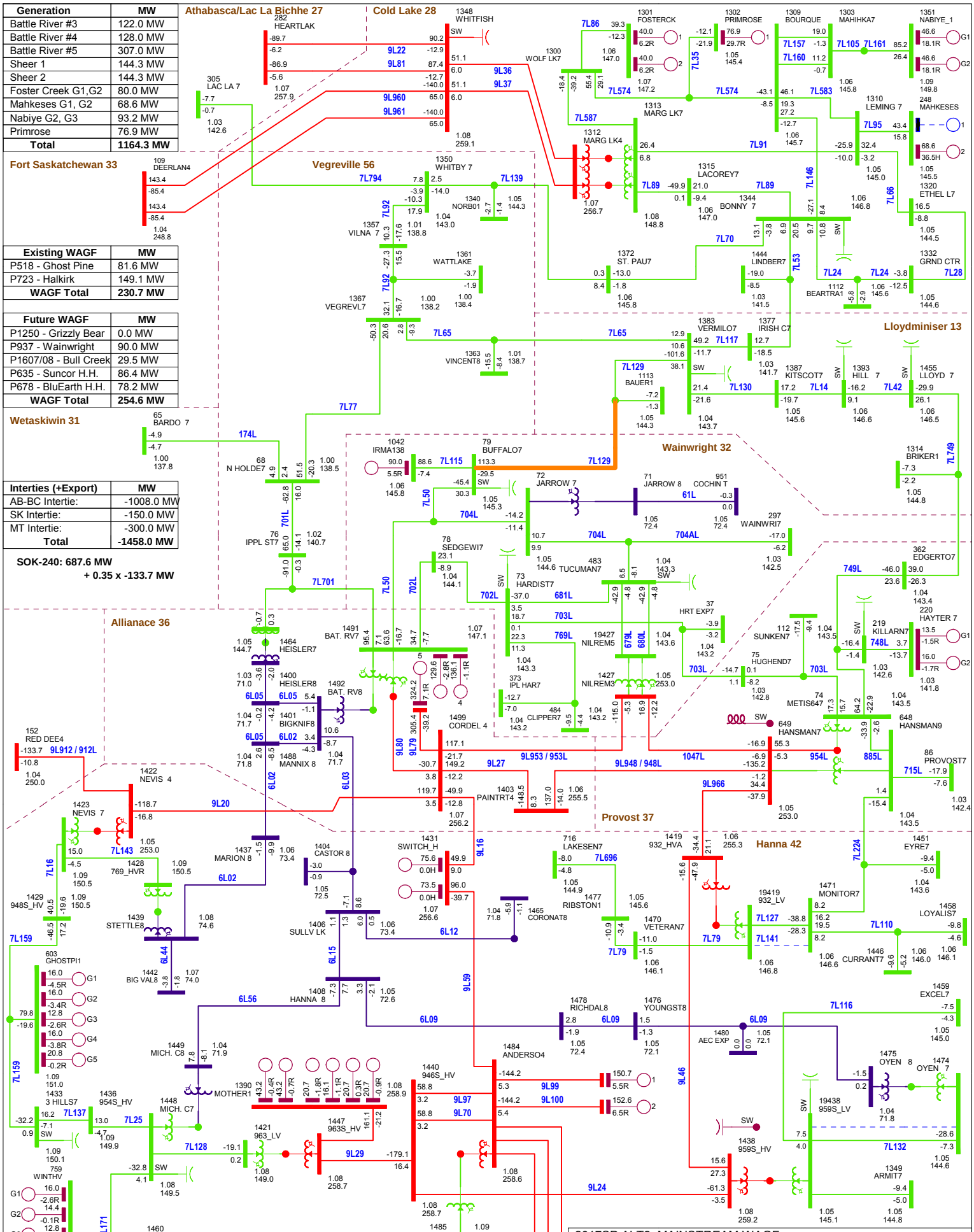
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	68.6 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1164.3 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1008.0 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1458.0 MW**

SOK-240: 687.6 MW
+ 0.35 x -133.7 MW



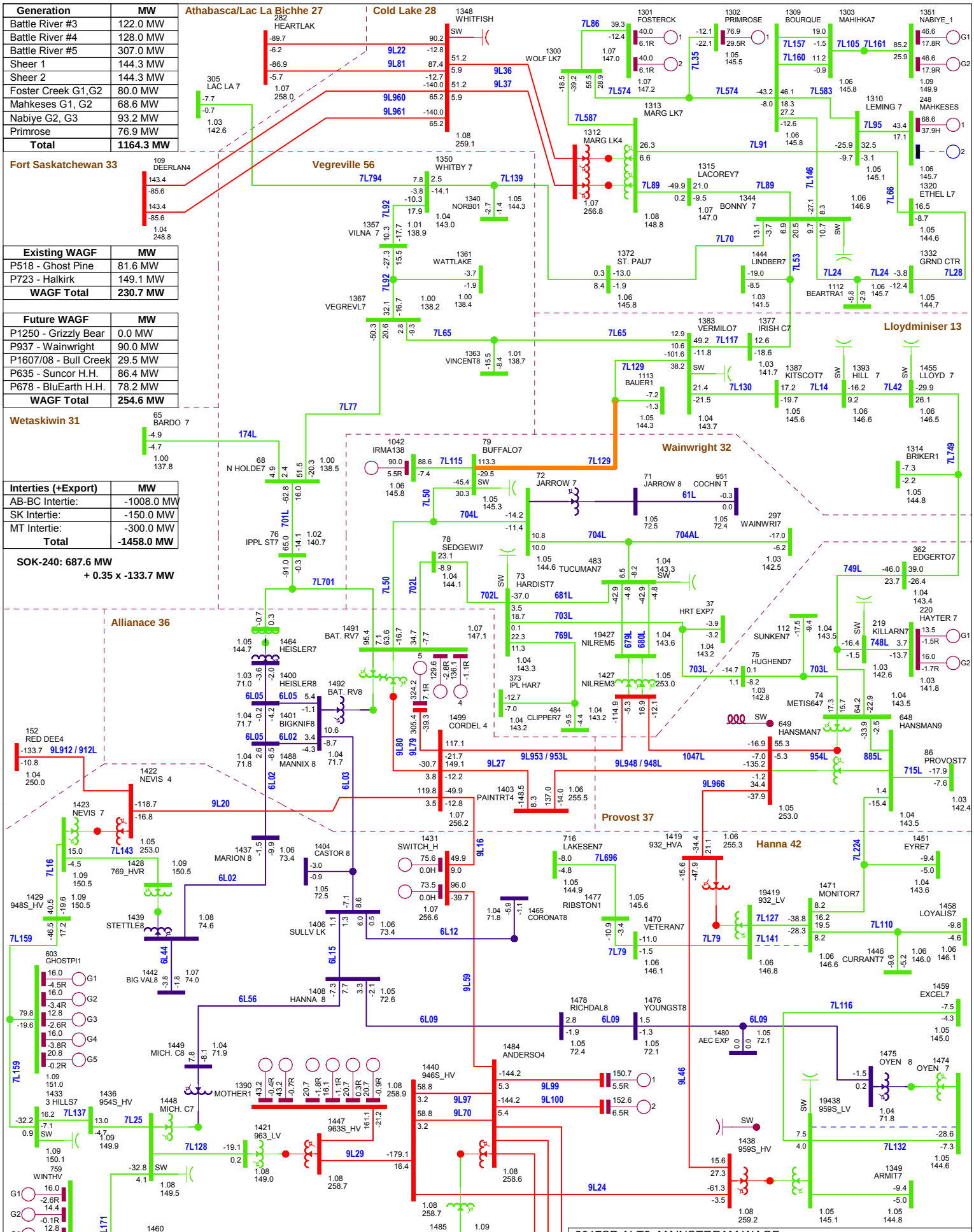
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	68.6 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1164.3 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1008.0 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1458.0 MW**

SOK-240: 687.6 MW
+ 0.35 x -133.7 MW



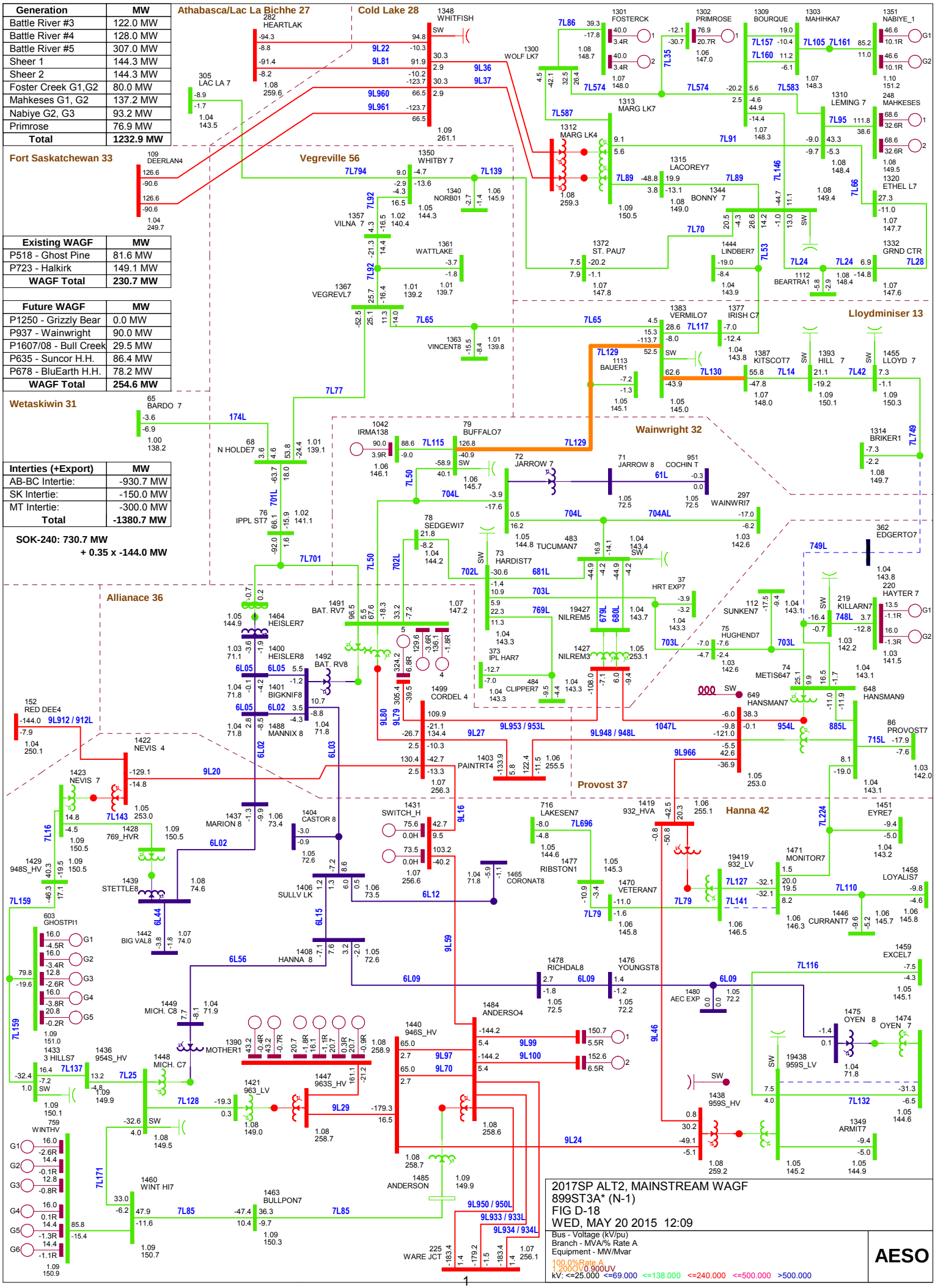
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-930.7 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1380.7 MW**

SOK-240: 730.7 MW
+ 0.35 x -144.0 MW



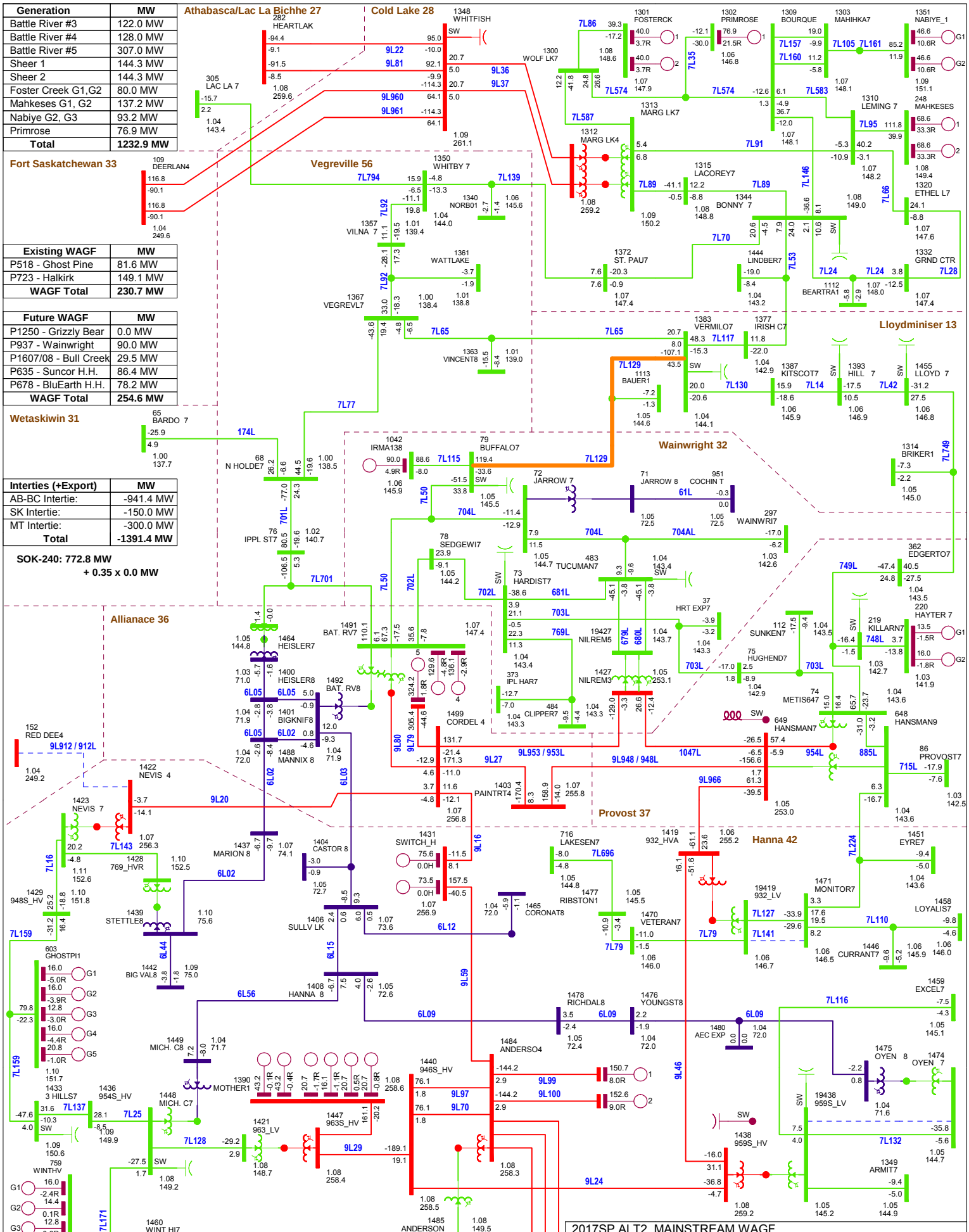
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-941.4 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1391.4 MW**

SOK-240: 772.8 MW
+ 0.35 x 0.0 MW



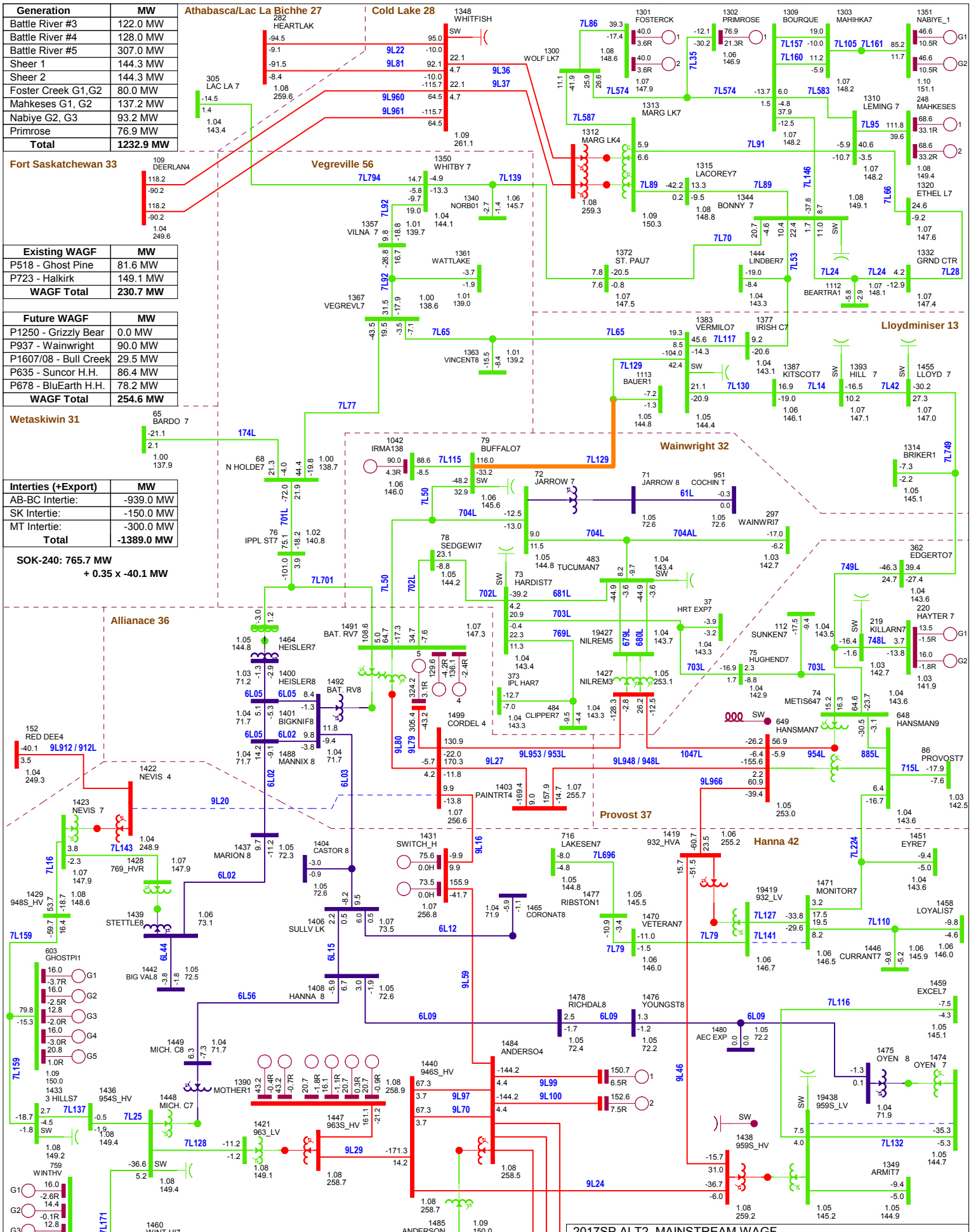
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-939.0 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1389.0 MW**

SOK-240: 765.7 MW
+ 0.35 x -40.1 MW



2017SP ALT2, MAINSTREAM WAGF
9L20 (N-1)
FIG D-20
WED, MAY 20 2015 12:10

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

100.0%Rate A
1.200OV0.900UV
kV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

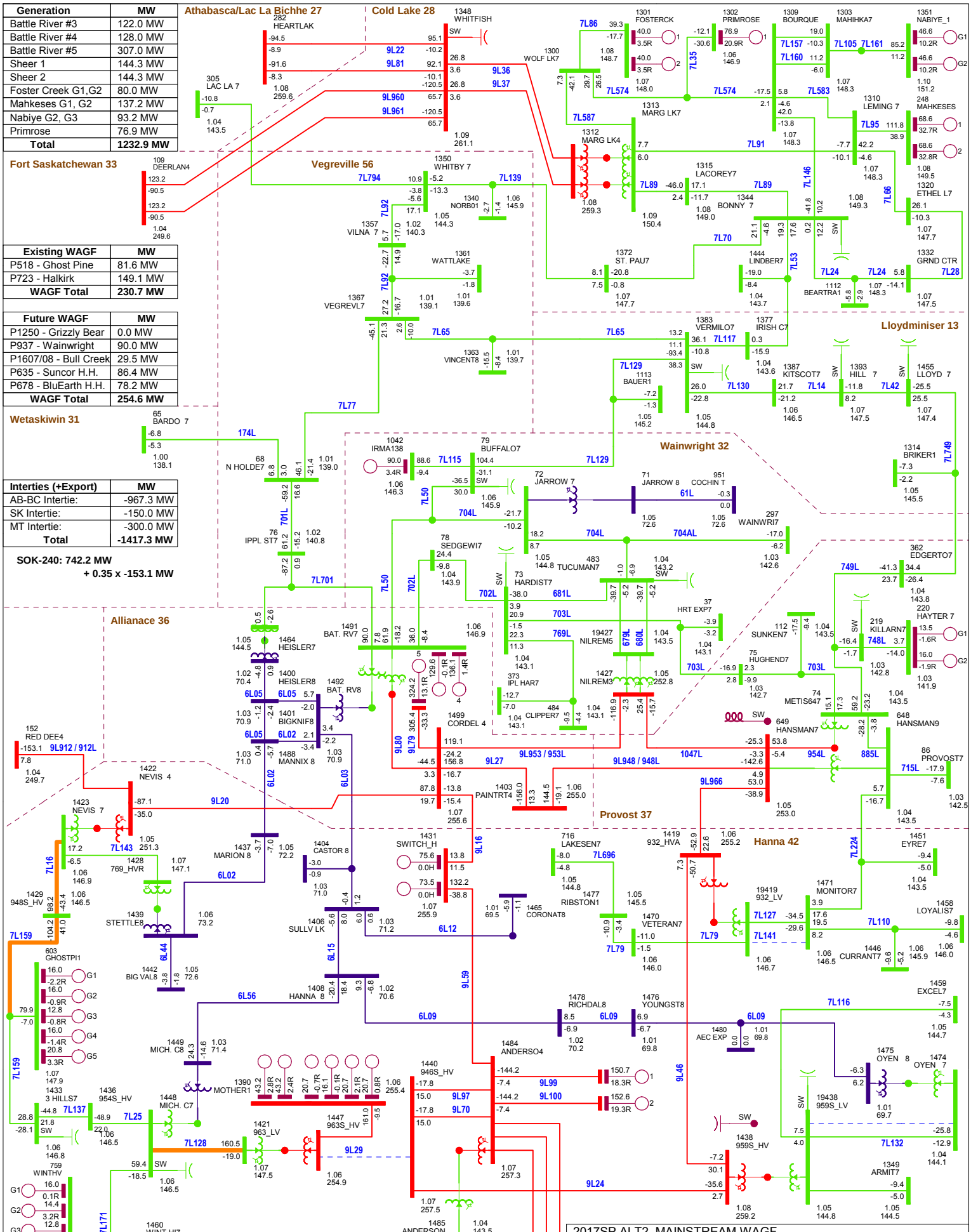
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-967.3 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1417.3 MW**

SOK-240: 742.2 MW
+ 0.35 x -153.1 MW



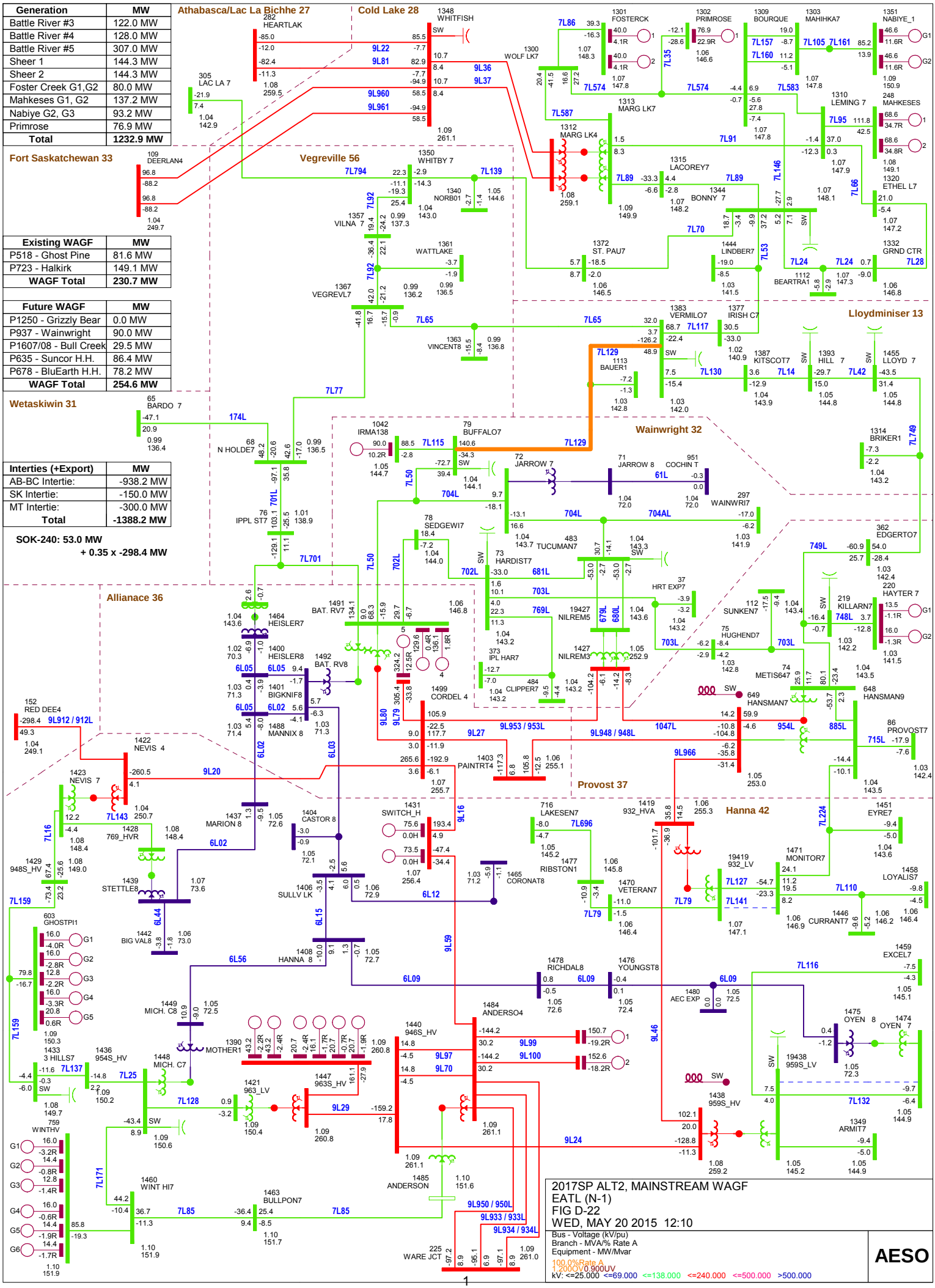
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**254.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-938.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1388.2 MW**

SOK-240: 53.0 MW
+ 0.35 x -298.4 MW



ATTACHMENT E

2017SL Transient Stability Diagrams

Table E-1: Summary of Transient Stability Diagrams for 2017SL, Alt3, Mainstream Wainwright WAGF Proceeds

Figure #	Contingency	From Substation	T-Tap	To substation	Fault Location
E-1	7L42	751S Hill		716S Lloydminster	751S Hill
E-2					716S Lloydminster
E-3	7L50	757S Battle River	252S Jarrow	526S Buffalo Creek	757S Battle River
E-4					526S Buffalo Creek
E-5	7L53	700S Bonnyville	Lindbergh Tap	706S Irish Creek	700S Bonnyville
E-6					706S Irish Creek
E-7	7L65	709S Vegreville		710S Vermilion	709S Vegreville
E-8					710S Vermilion
E-9	7L70	700S Bonnyville		707S St.Paul	700S Bonnyville
E-10					707S St.Paul
E-11	7L115	526S Buffalo Creek		926S Kinsella (Mainstream)	526S Buffalo Creek
E-12					926S Kinsella
E-13	7L117	706S Irish Creek		710S Vermilion	706S Irish Creek
E-14					710S Vermilion
E-15	7L129	526S Buffalo Creek	Bauer Tap	710S Vermilion	526S Buffalo Creek
E-16					710S Vermilion
E-17	701L/7L701	757S Battle River	764S Heisler	223S Strome	757S Battle River
E-18					223S Strome
E-19	749L	899S Edgerton	Killarney Tap	648S Metiskow	899S Edgerton
E-20					648S Metiskow
E-21	749L/7L749	899S Edgerton	Briker Tap	716S Lloydminster	899S Edgerton
E-22					716S Lloydminster
E-23	9L20	755S Cordel		766S Nevis	755S Cordel
E-24					766S Nevis
E-25	9L59	801S Anderson		972S Tinchebray	801S Anderson
E-26					972S Tinchebray
E-27	912L	766S Nevis		63S Red Deer	766S Nevis
E-28					63S Red Deer

FIGURE E-1B
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

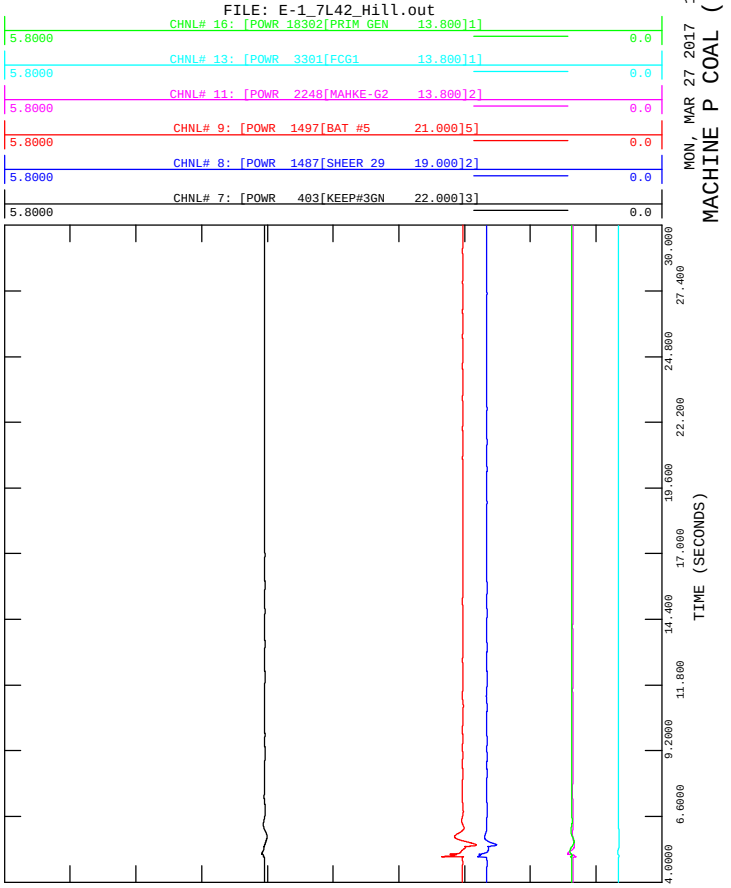


FIGURE E-1D
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

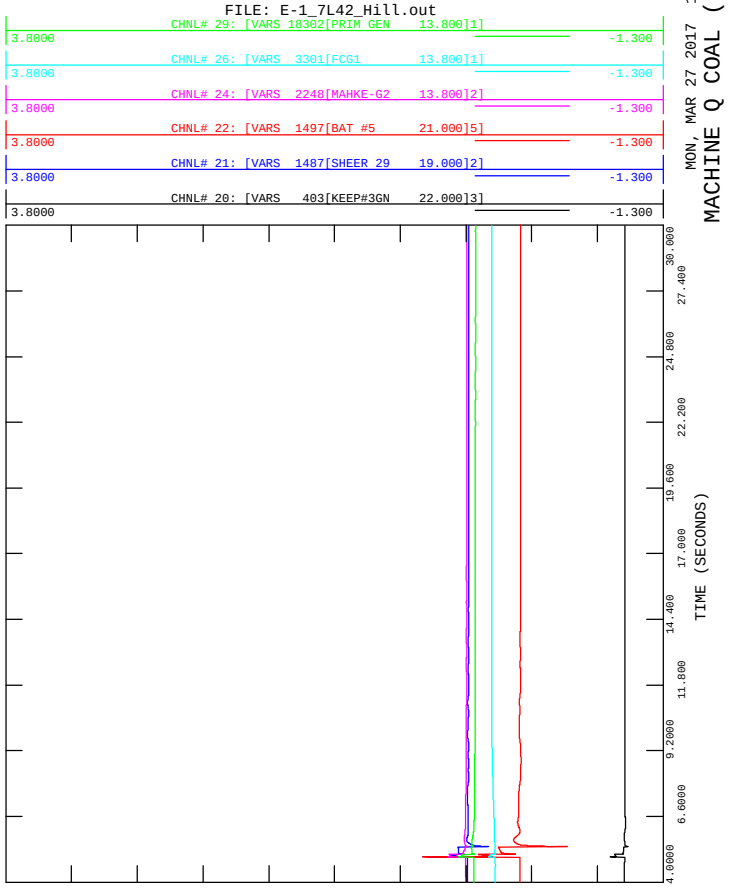


FIGURE E-1A
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

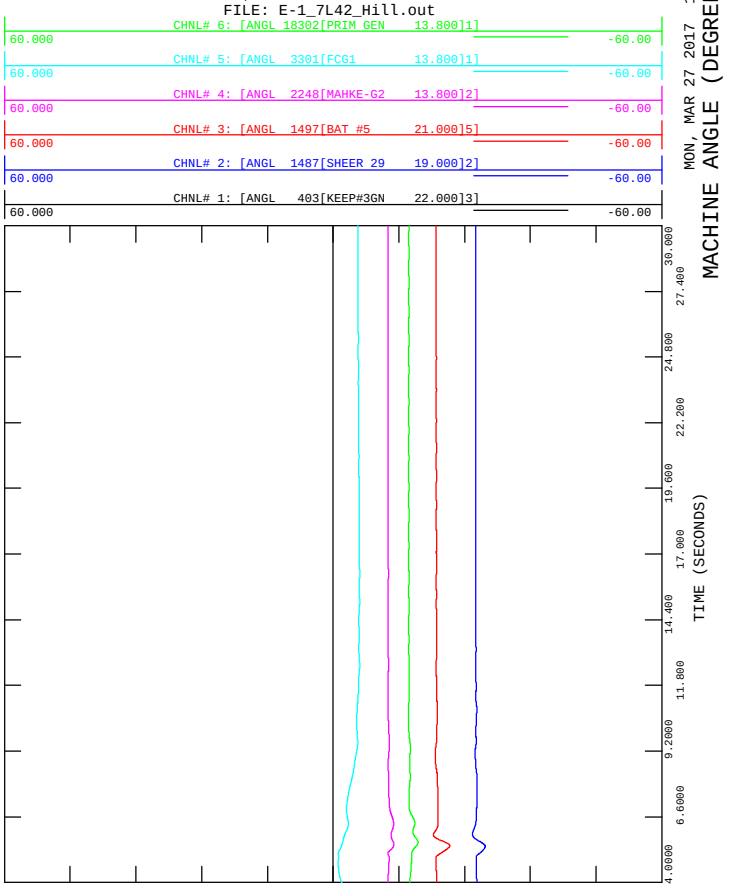


FIGURE E-1C
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

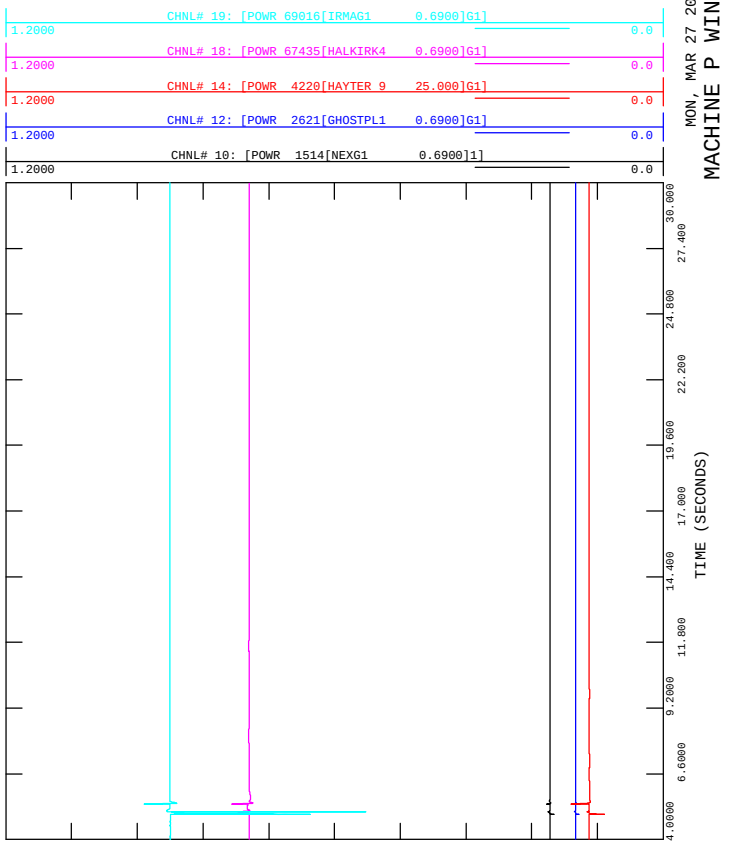


FIGURE E-1F
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

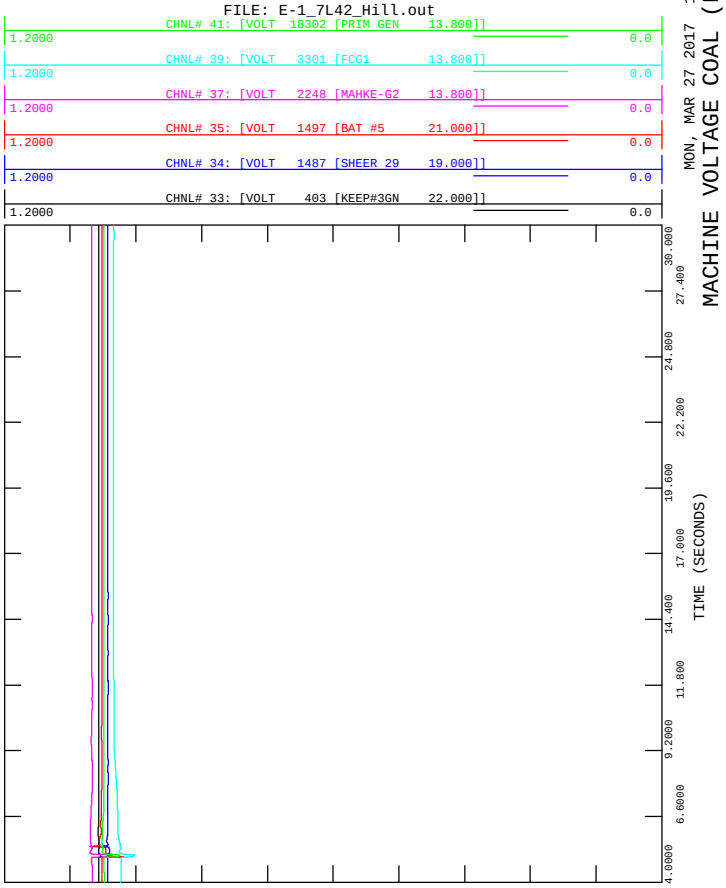


FIGURE E-1H
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

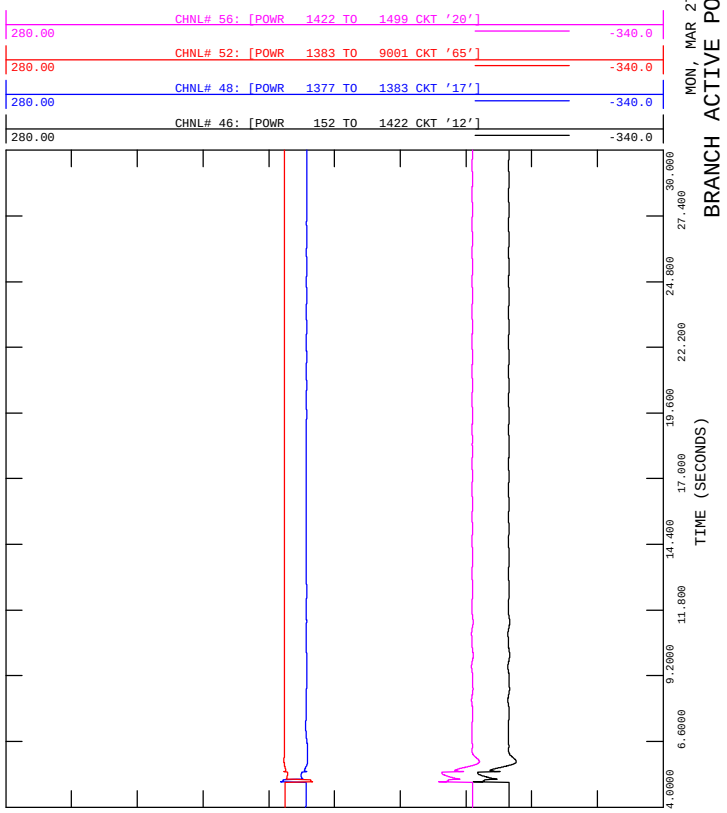


FIGURE E-1E
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

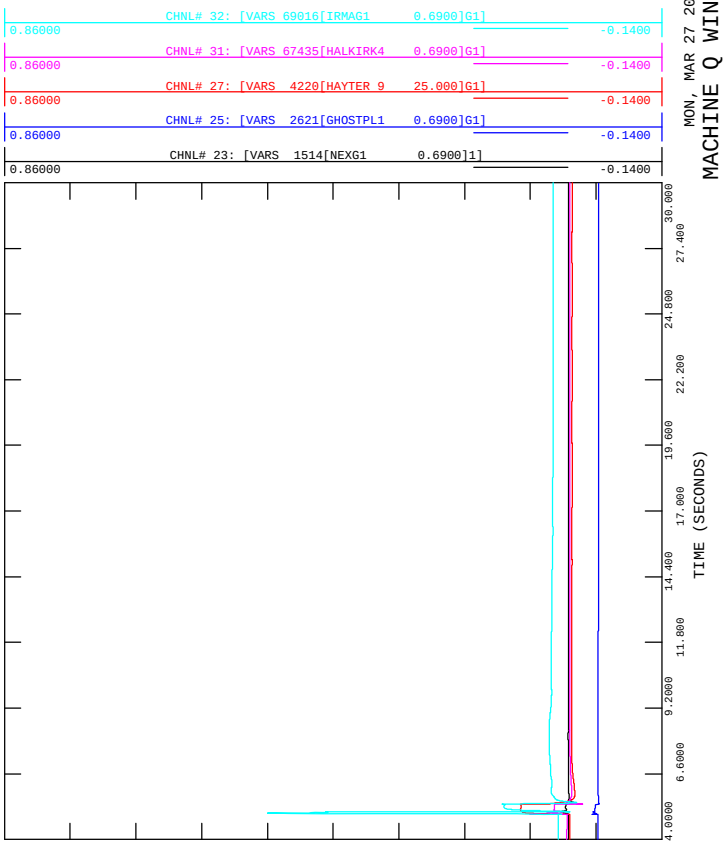


FIGURE E-1G
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

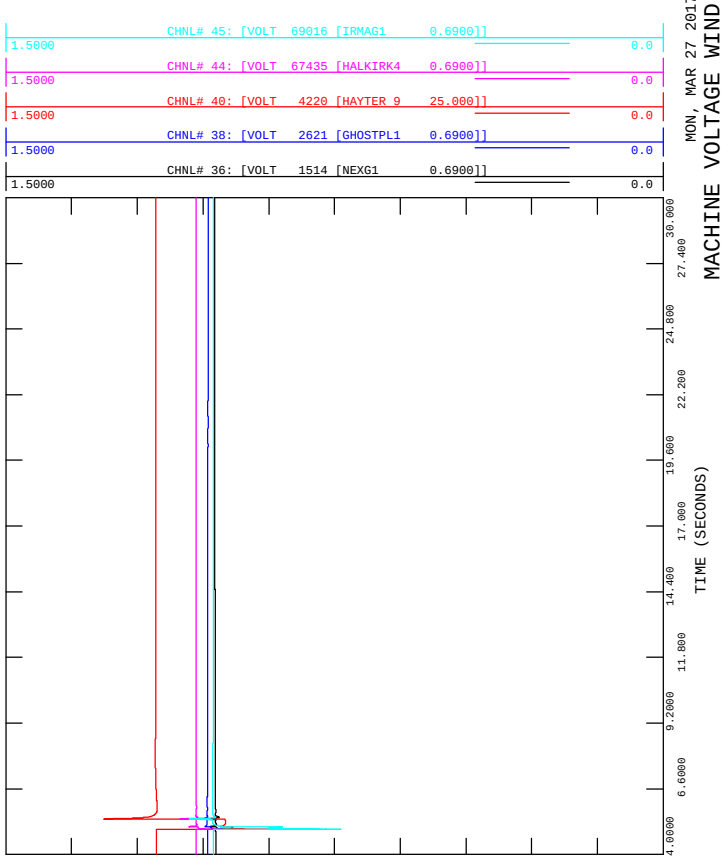


FIGURE E-1I
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

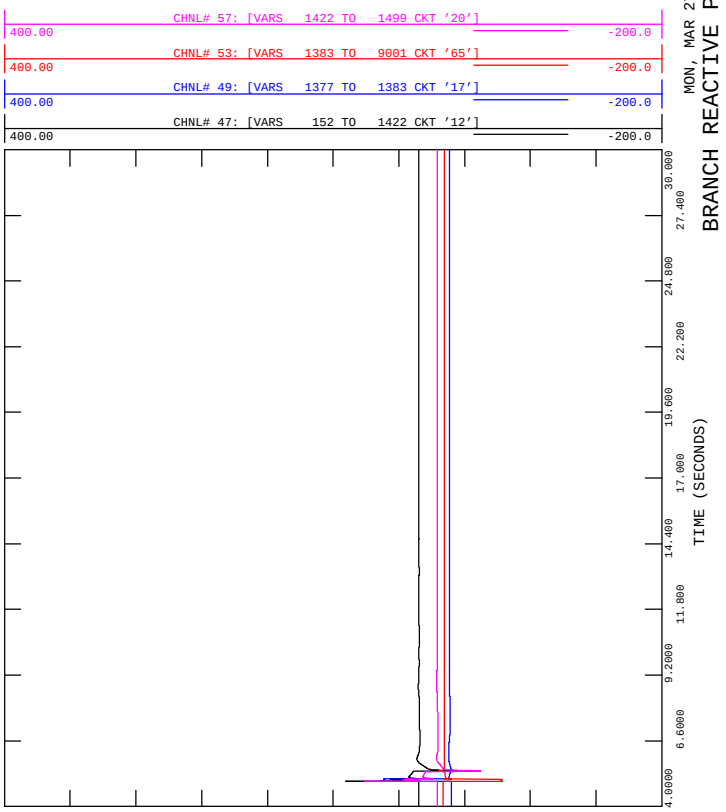


FIGURE E-2B
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-2_7L42_Lloydminster.out

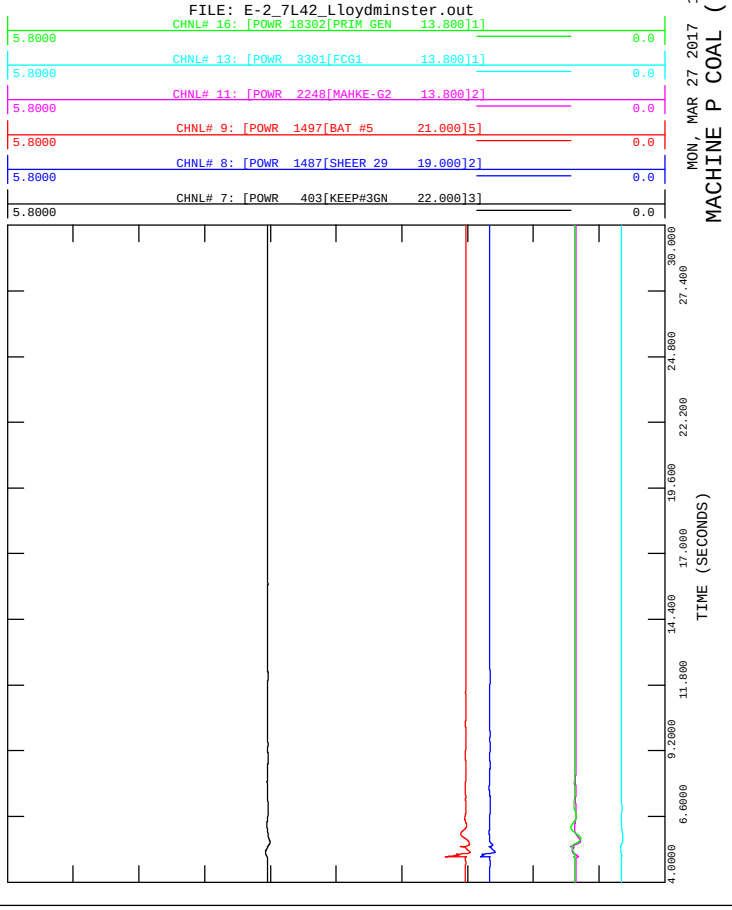


FIGURE E-2D
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-2_7L42_Lloydminster.out

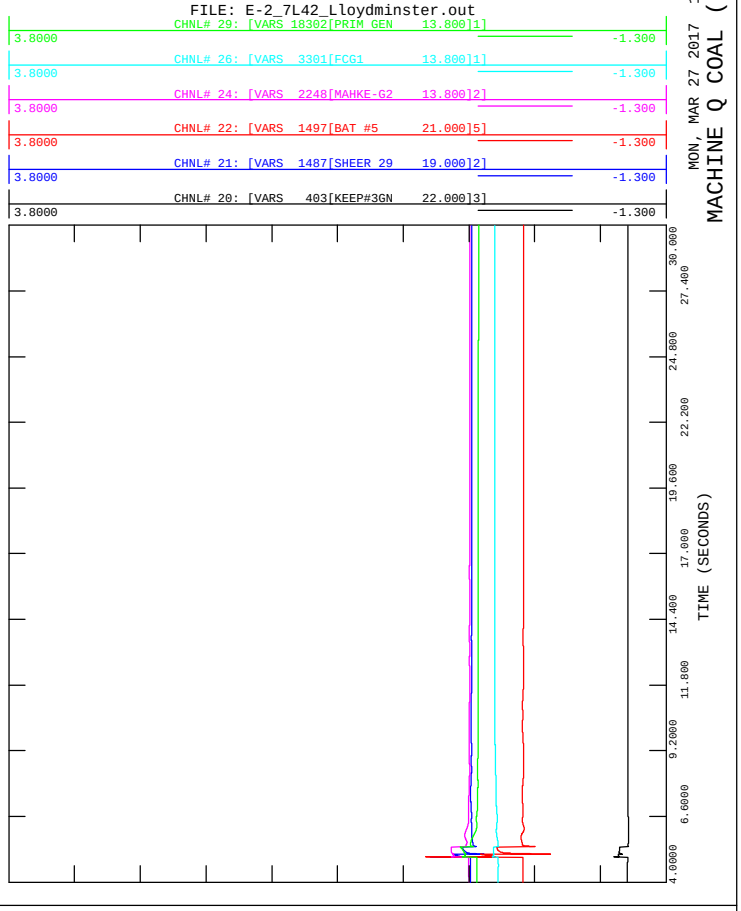


FIGURE E-2A
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-2_7L42_Lloydminster.out

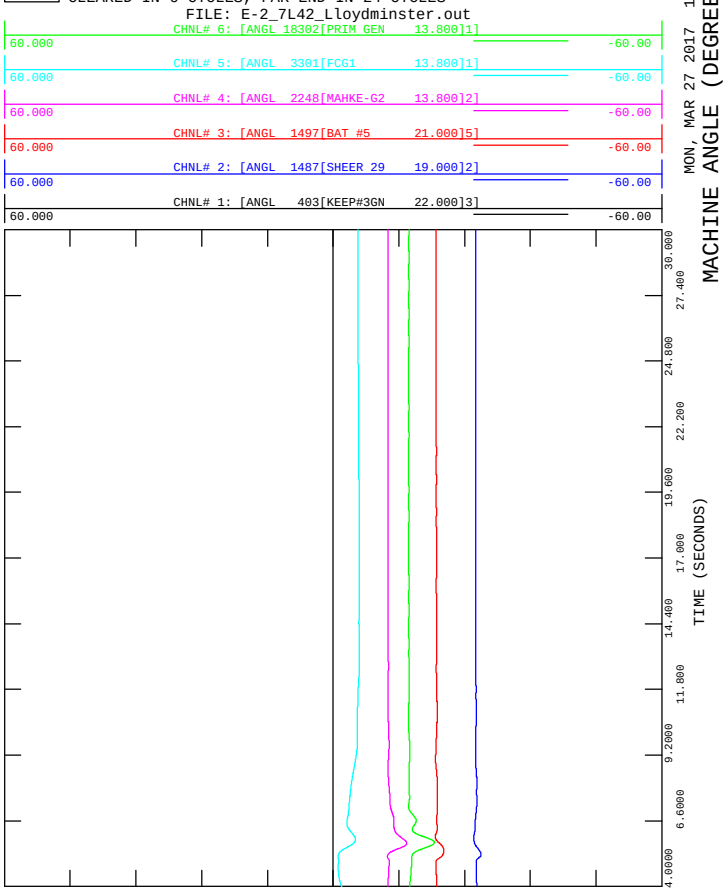


FIGURE E-2C
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-2_7L42_Lloydminster.out

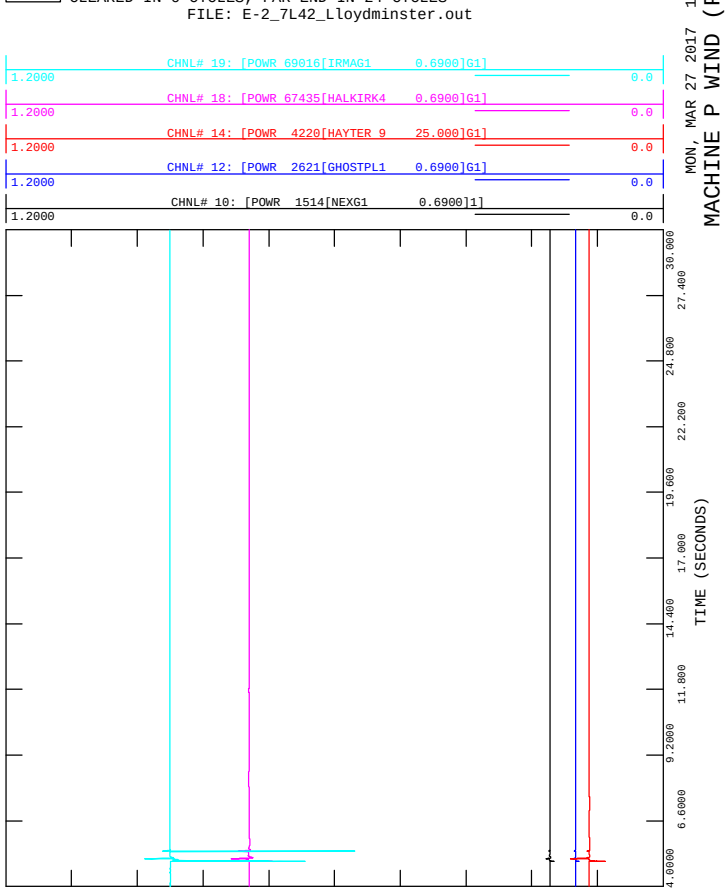


FIGURE E-2F
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-2_7L42_Lloydminster.out

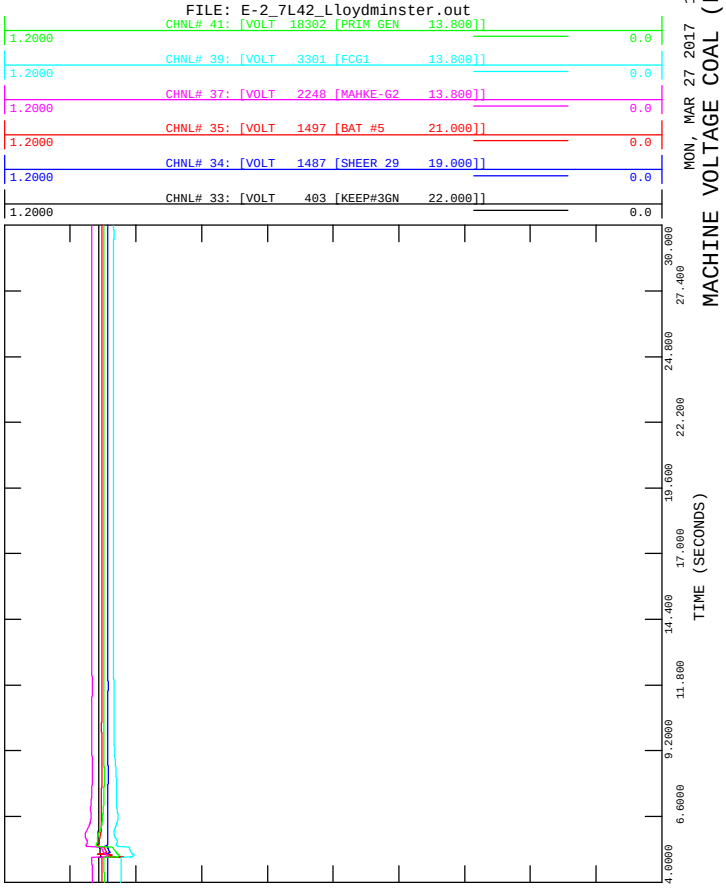


FIGURE E-2H
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-2_7L42_Lloydminster.out

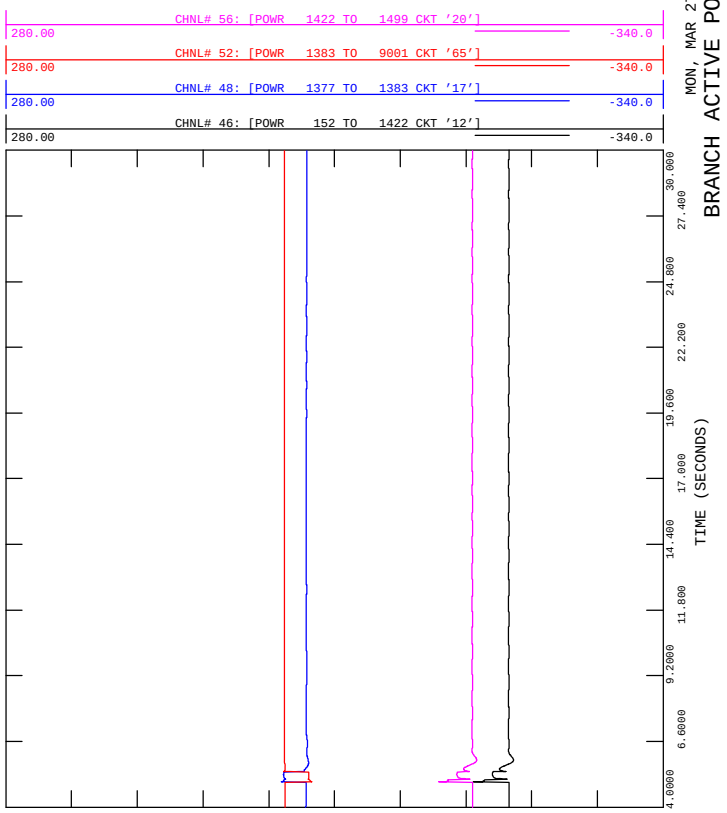


FIGURE E-2E
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-2_7L42_Lloydminster.out

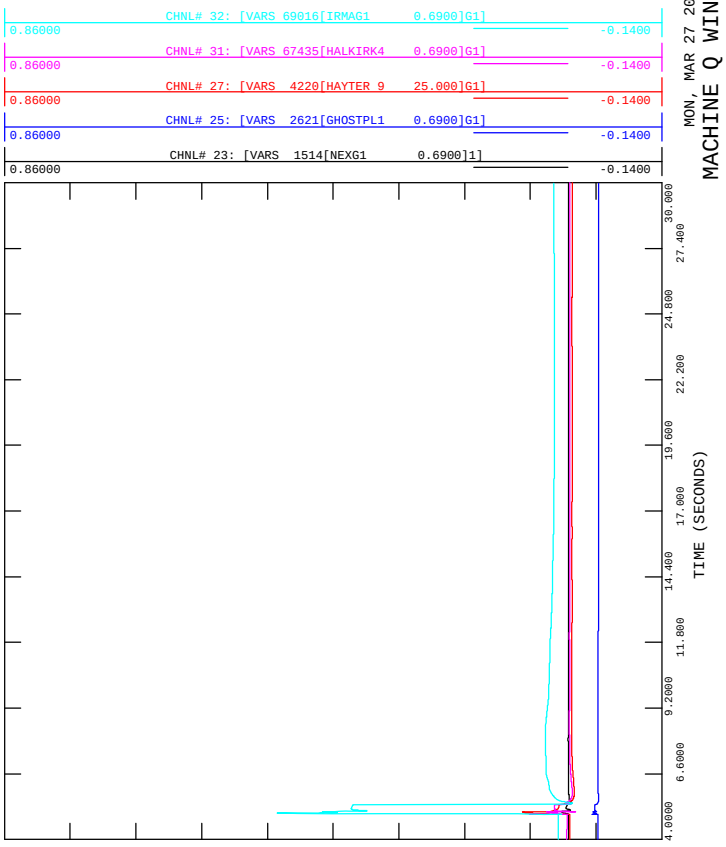


FIGURE E-2G
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-2_7L42_Lloydminster.out

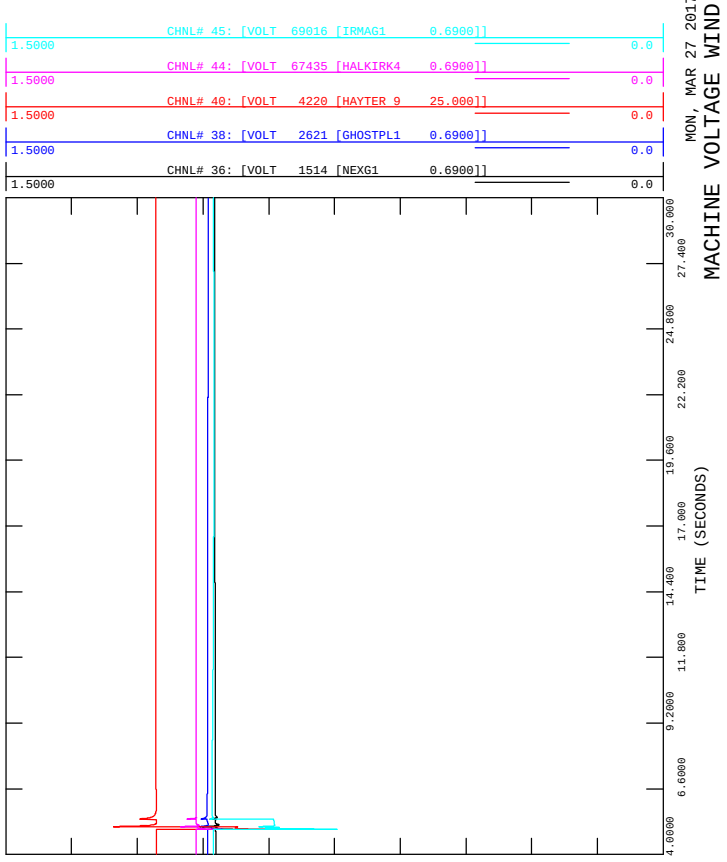


FIGURE E-2I
2017SL, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-2_7L42_Lloydminster.out

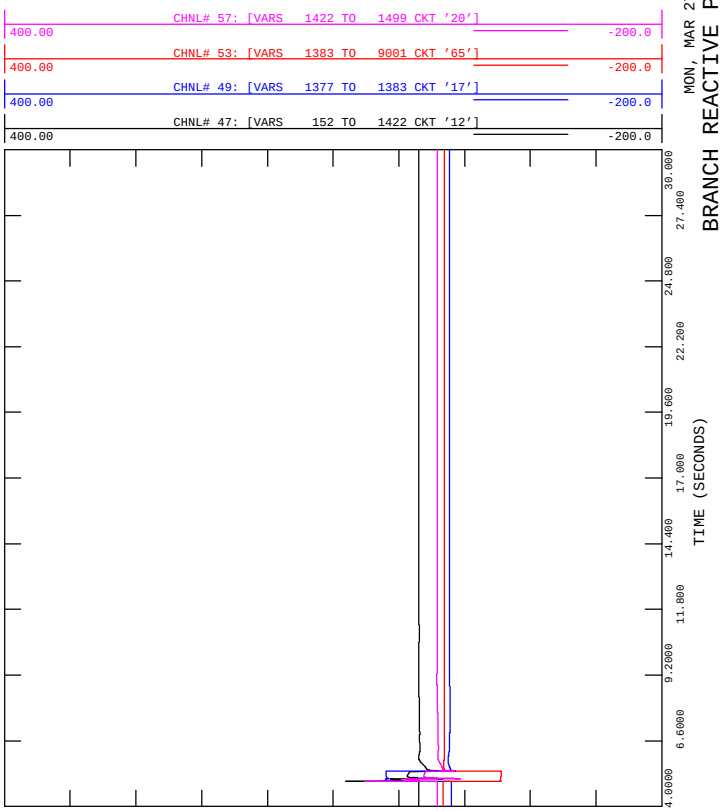


FIGURE E-3B
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

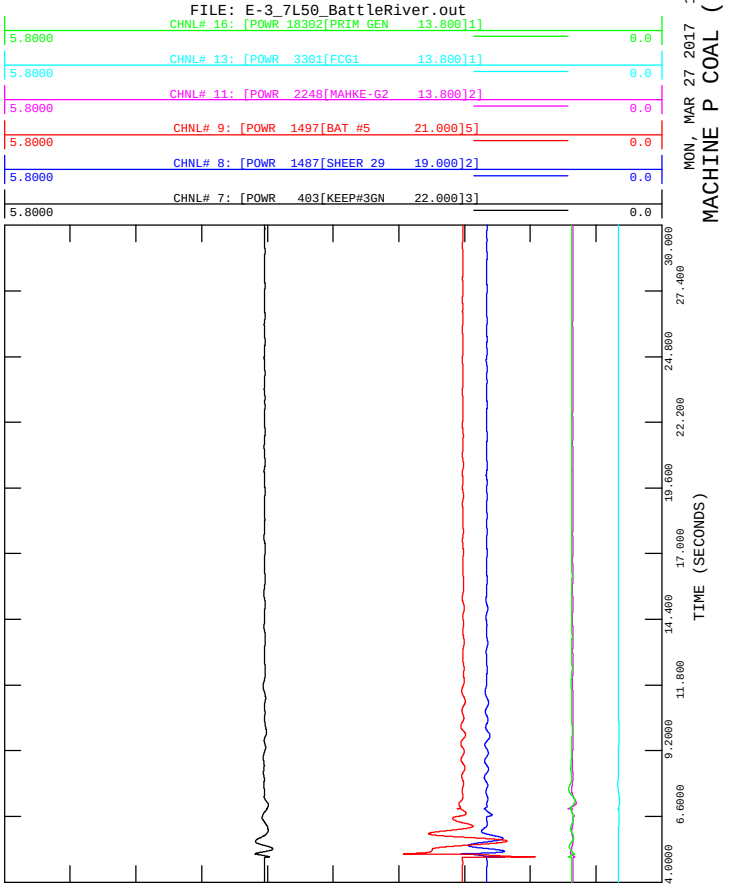


FIGURE E-3D
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

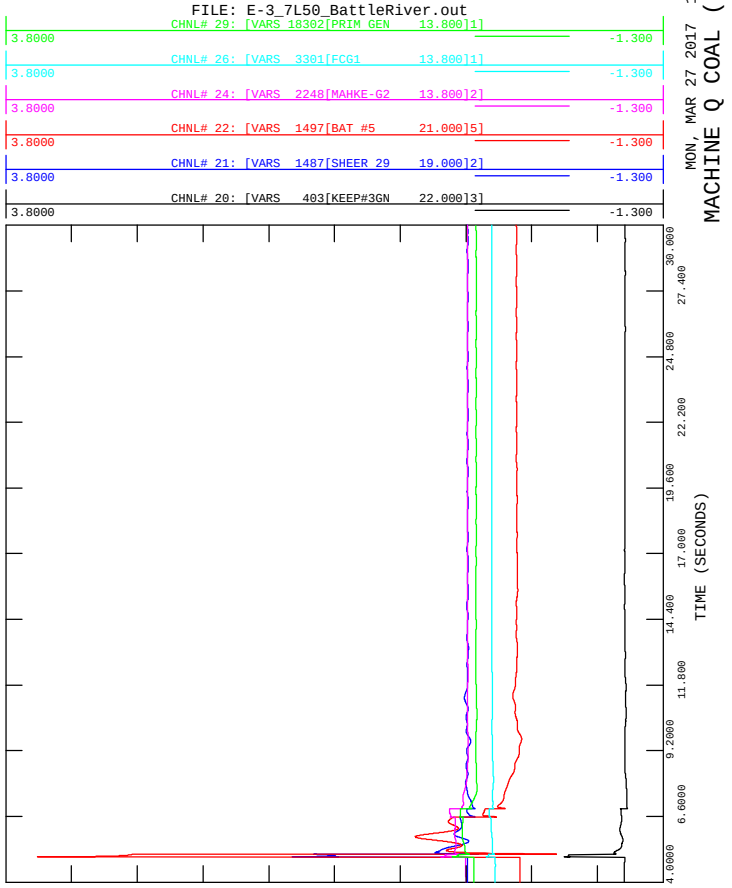


FIGURE E-3A
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

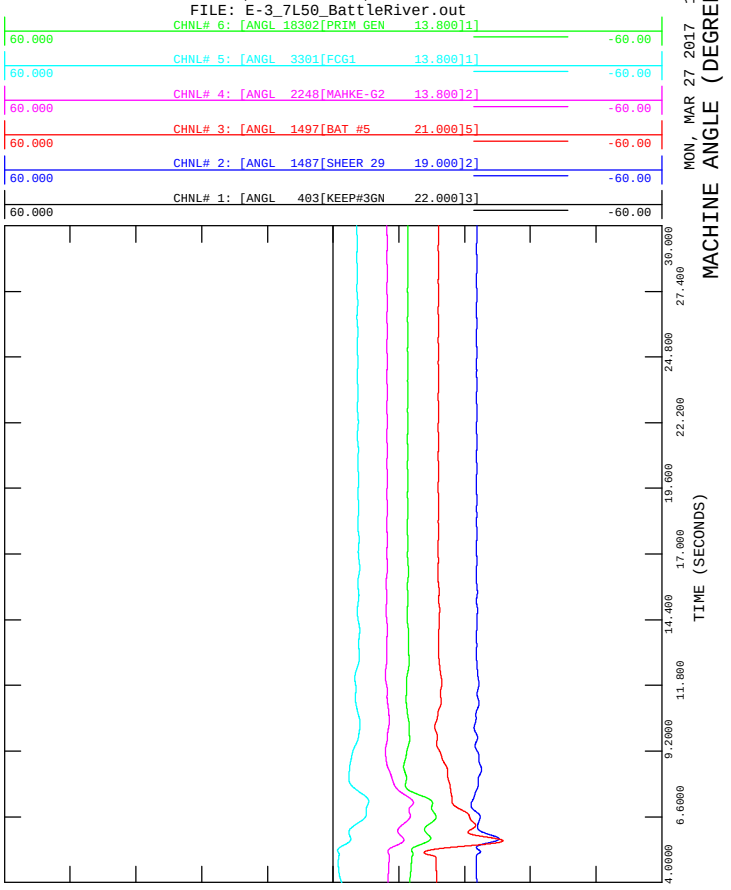


FIGURE E-3C
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

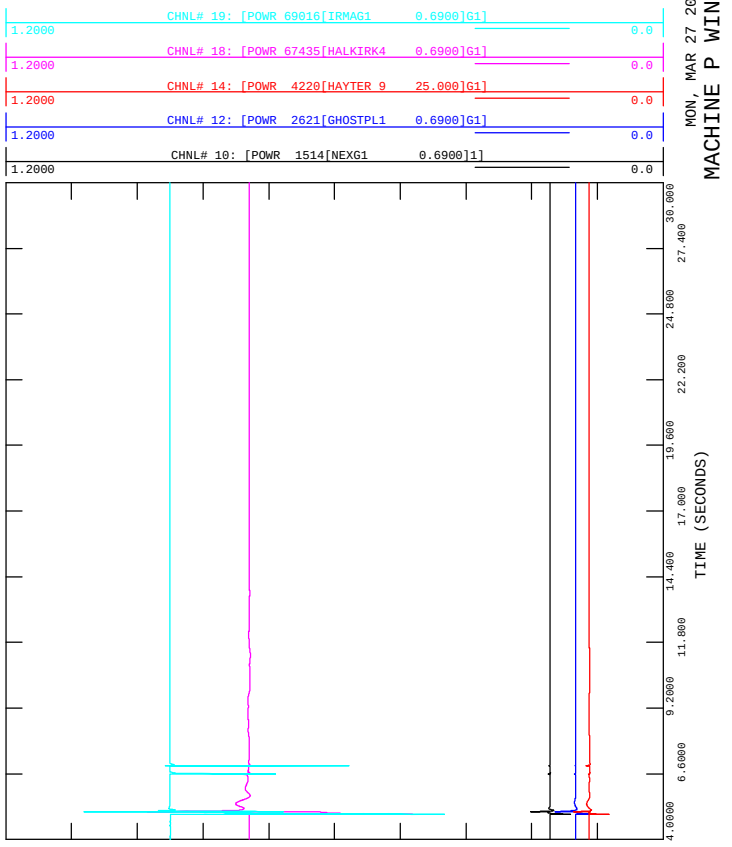


FIGURE E-3F
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

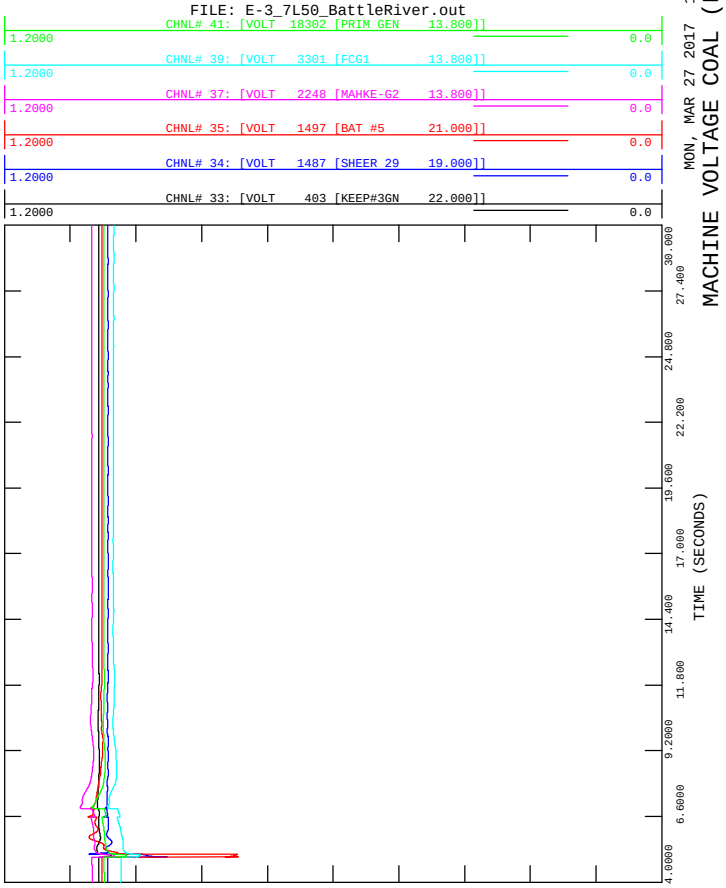


FIGURE E-3H
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

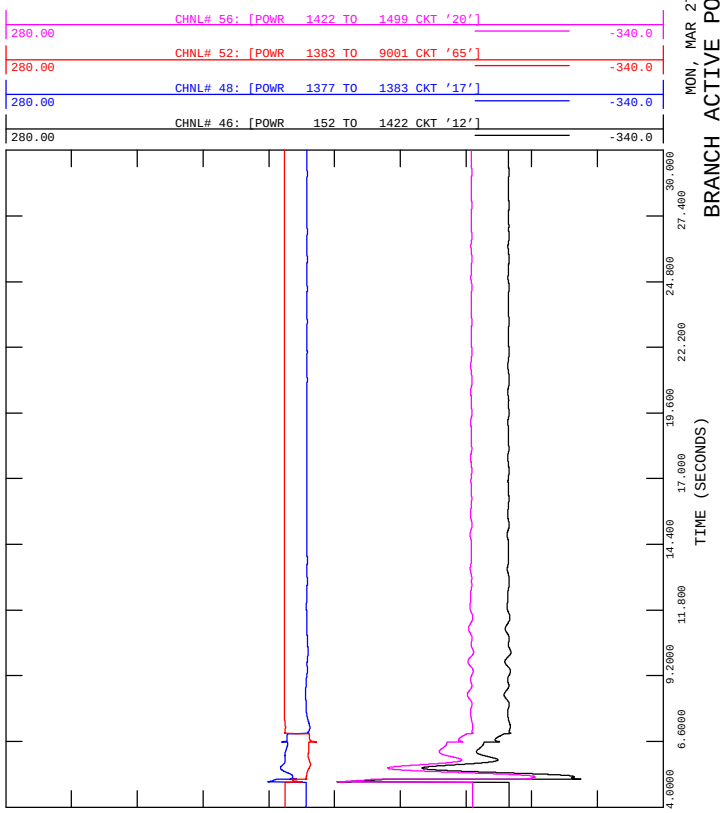


FIGURE E-3E
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

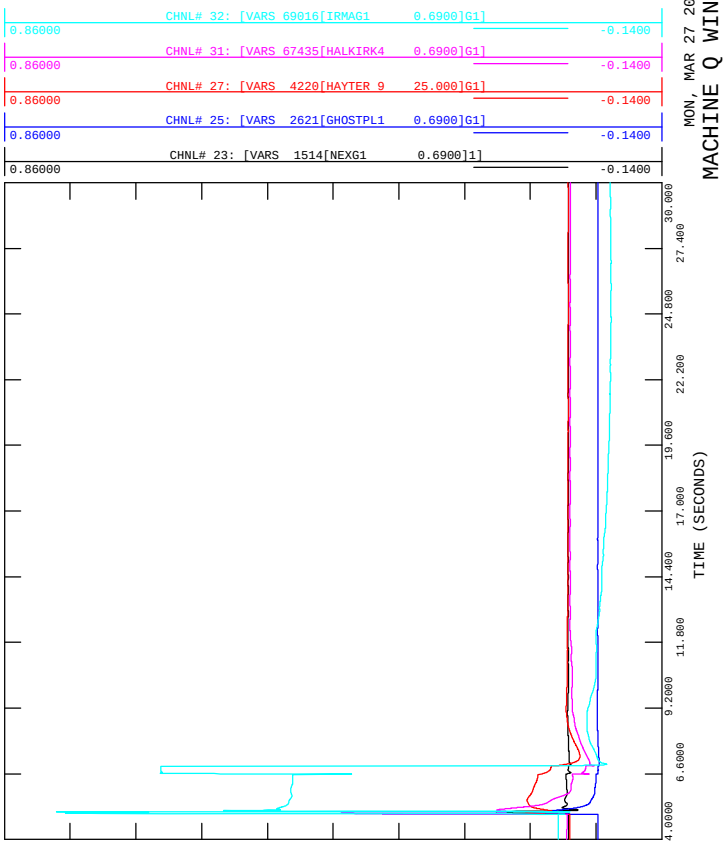


FIGURE E-3G
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

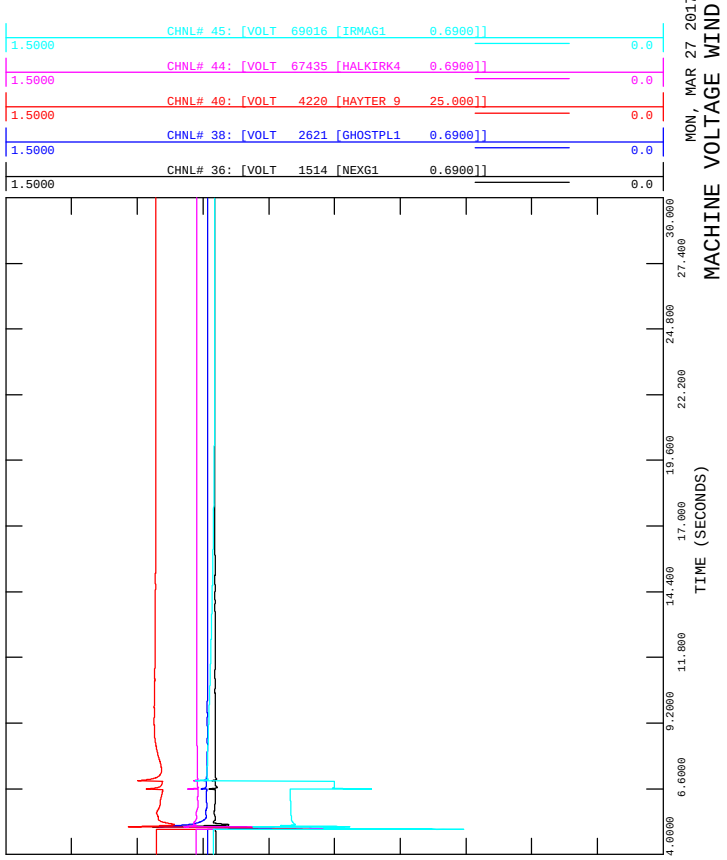


FIGURE E-3I
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

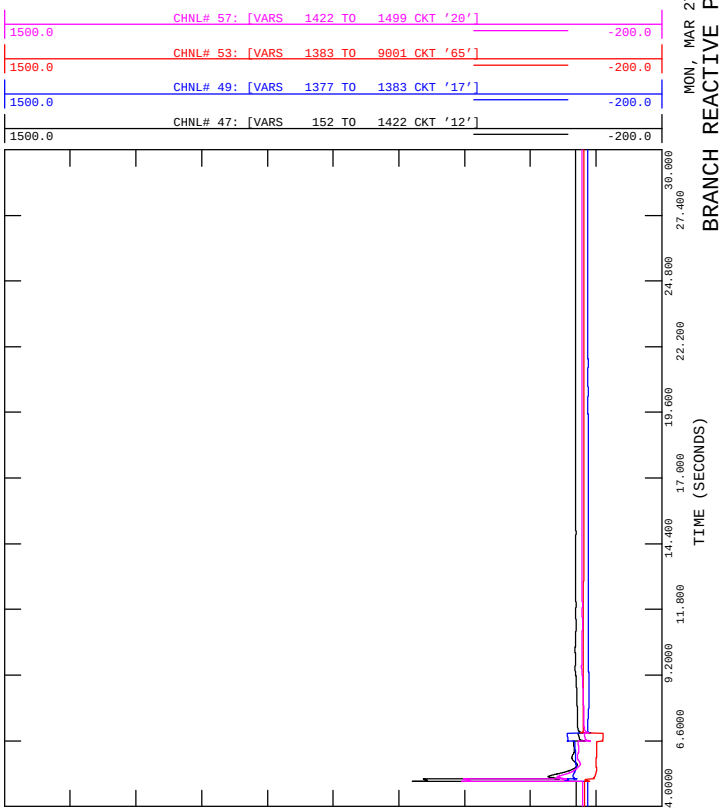


FIGURE E-4B
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: E-4_7L50_BuffaloCreek.out

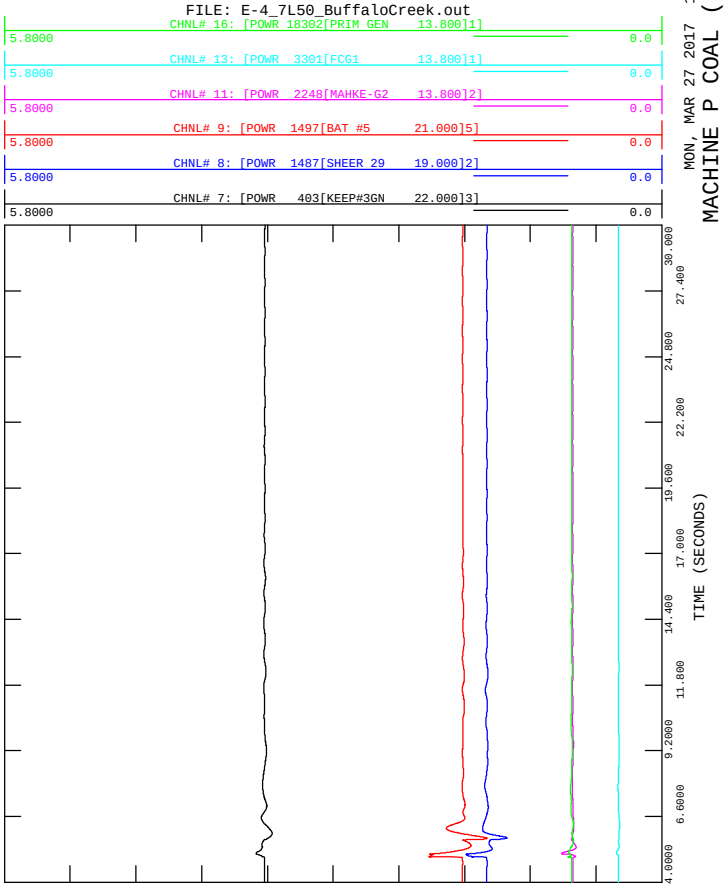


FIGURE E-4D
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: E-4_7L50_BuffaloCreek.out

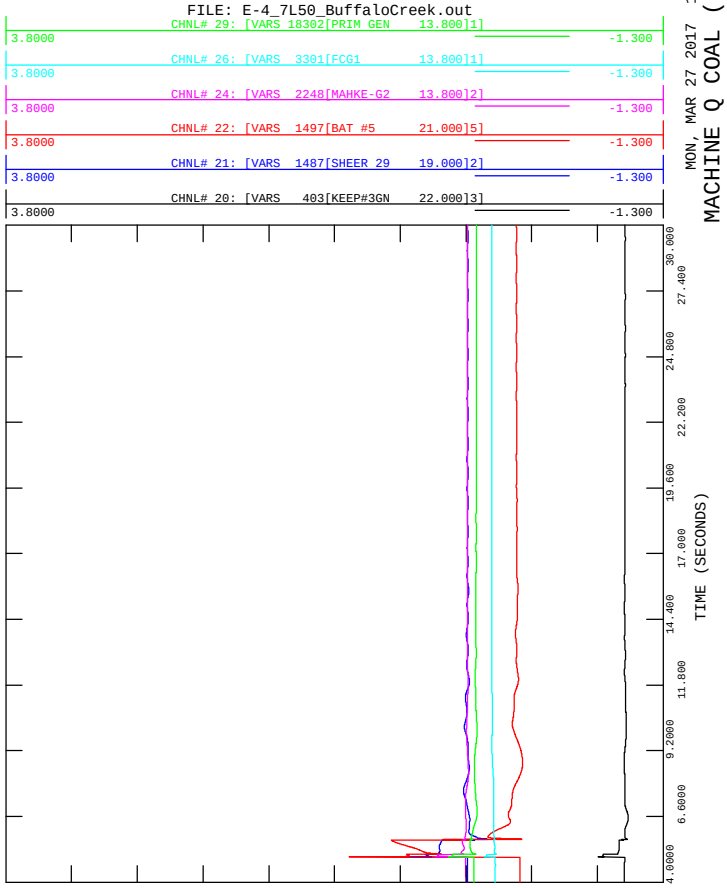


FIGURE E-4A
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: E-4_7L50_BuffaloCreek.out

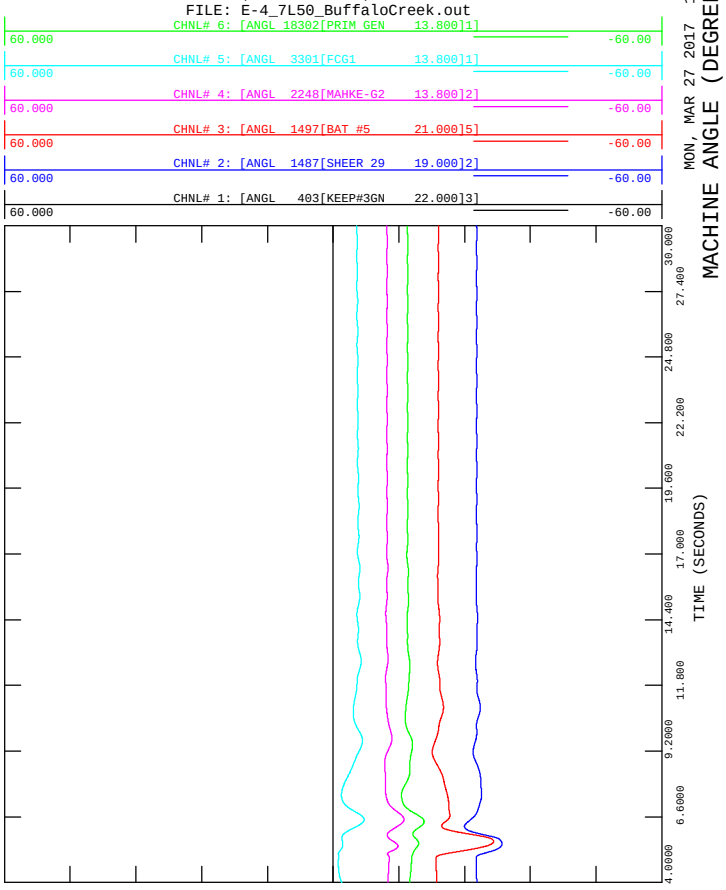


FIGURE E-4C
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: E-4_7L50_BuffaloCreek.out

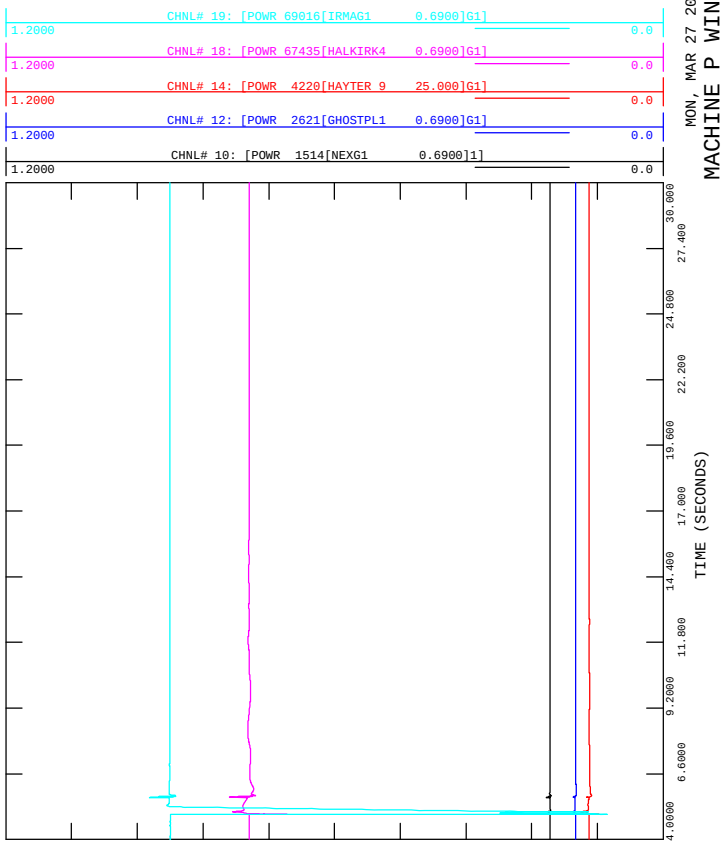


FIGURE E-4F
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: E-4_7L50_BuffaloCreek.out

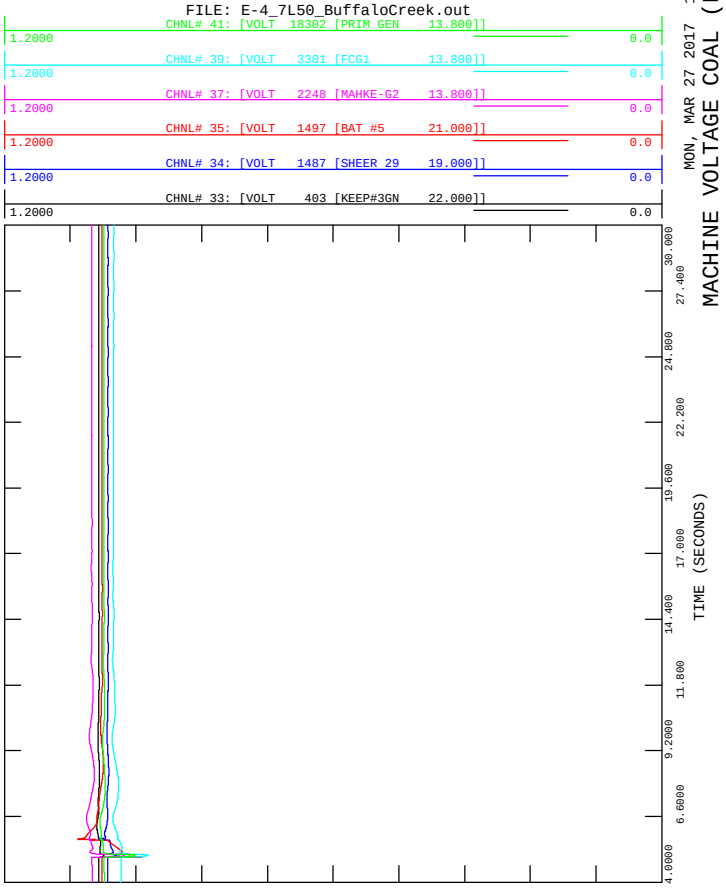


FIGURE E-4H
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: E-4_7L50_BuffaloCreek.out

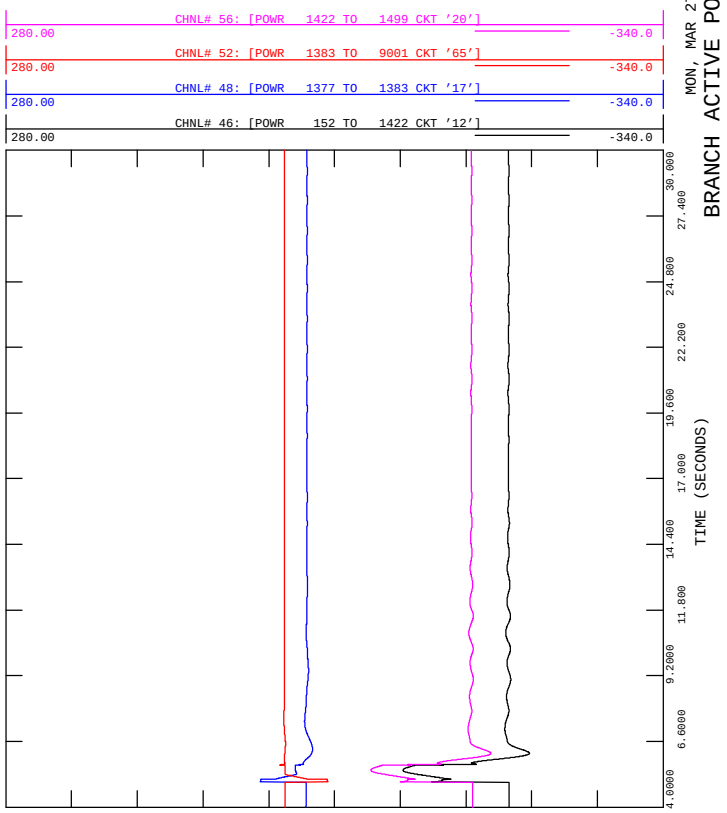


FIGURE E-4E
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: E-4_7L50_BuffaloCreek.out

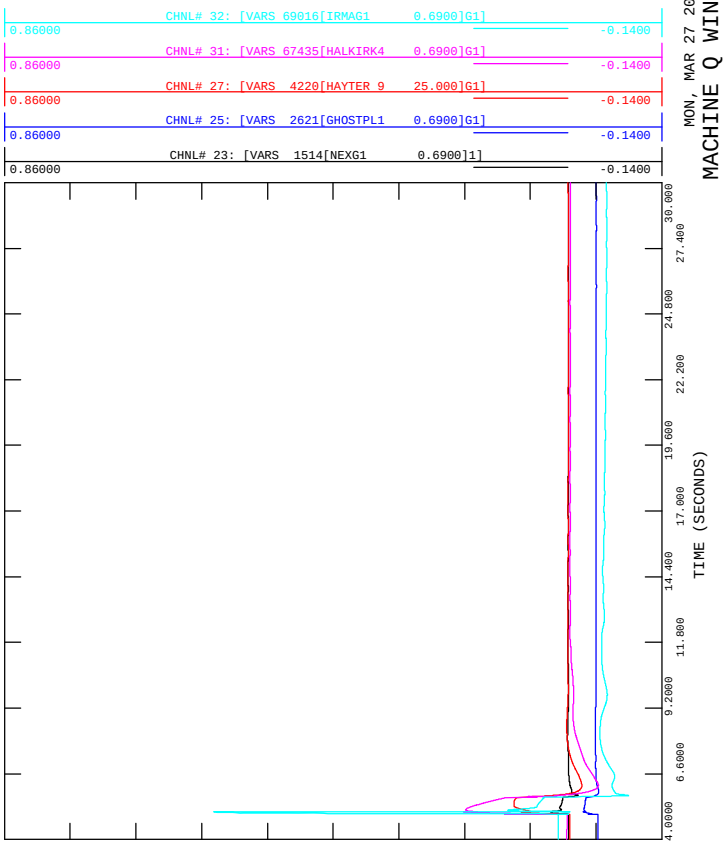


FIGURE E-4G
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: E-4_7L50_BuffaloCreek.out

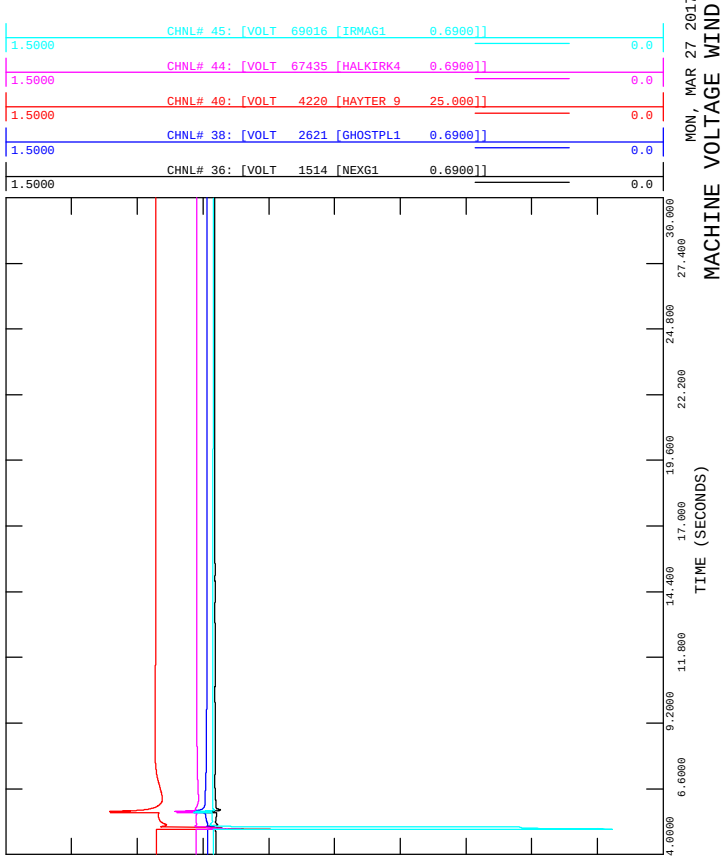


FIGURE E-4I
2017SL, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: E-4_7L50_BuffaloCreek.out

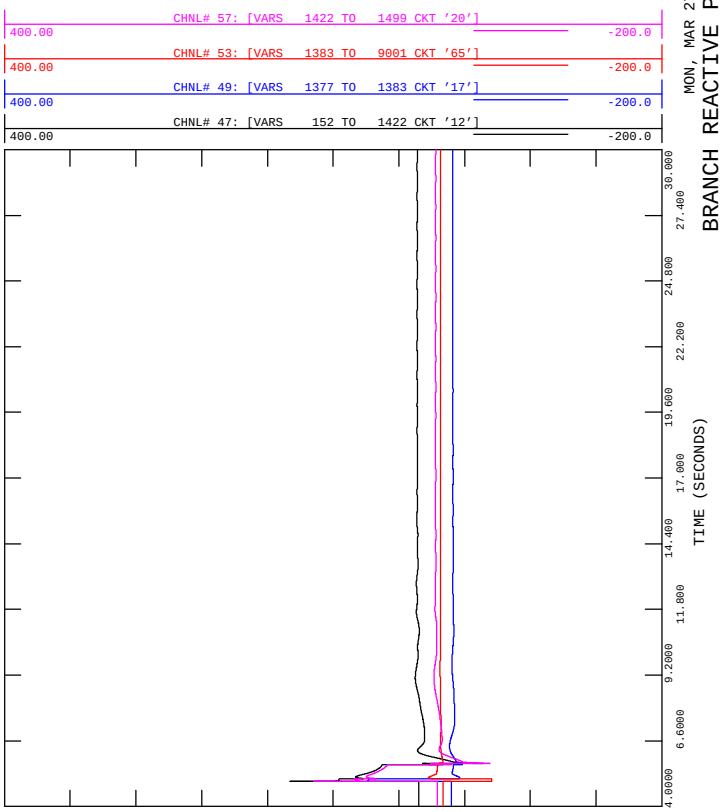


FIGURE E-5B
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

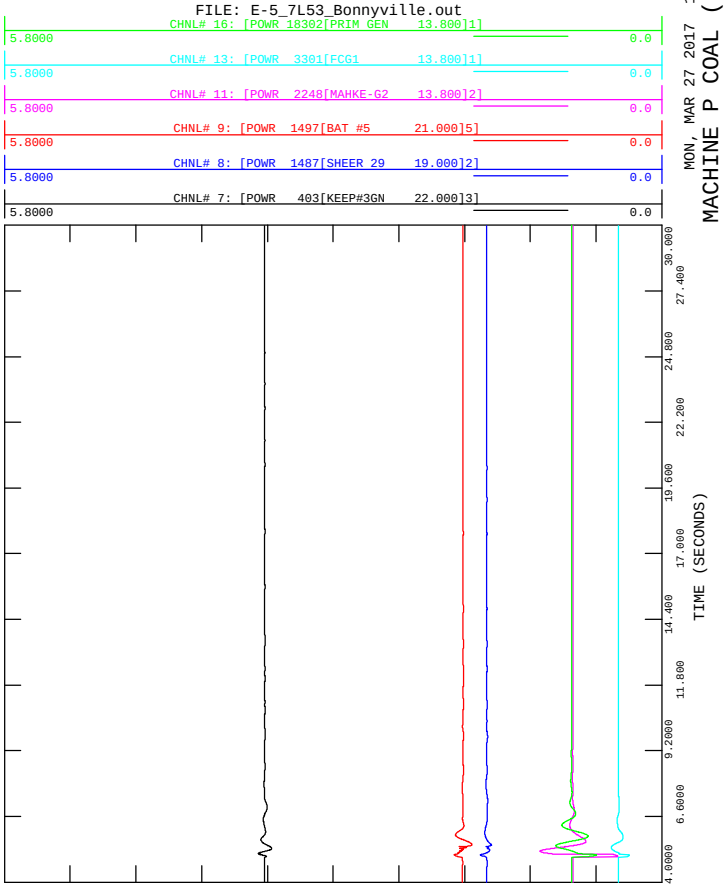


FIGURE E-5D
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

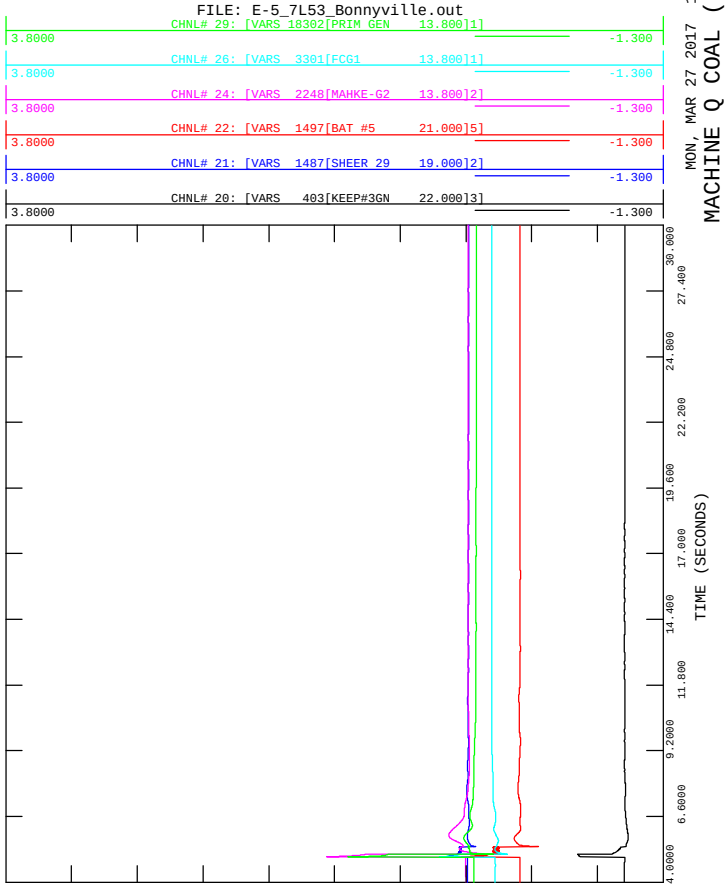


FIGURE E-5A
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

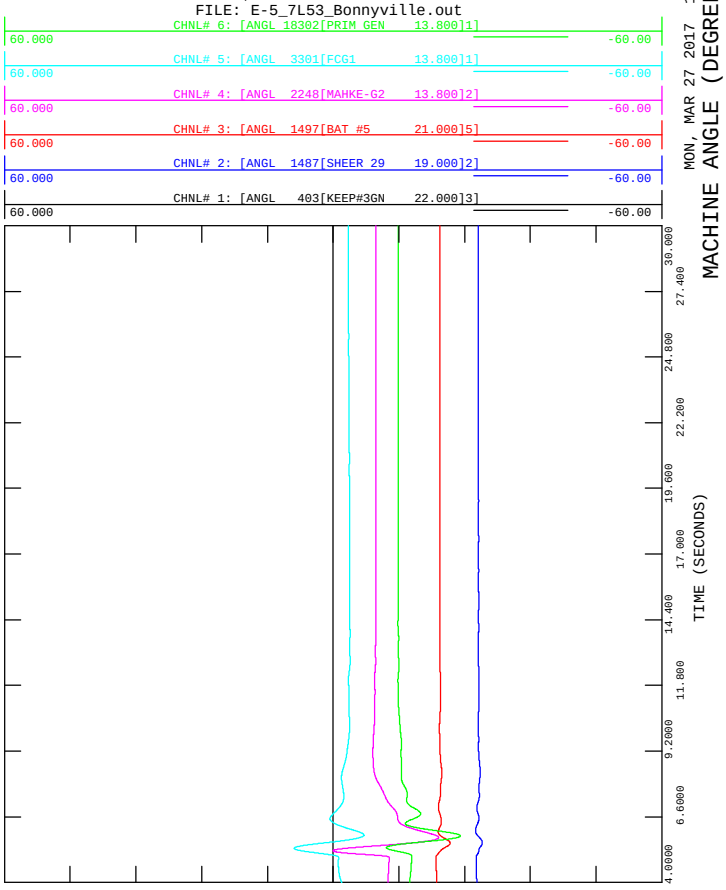


FIGURE E-5C
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

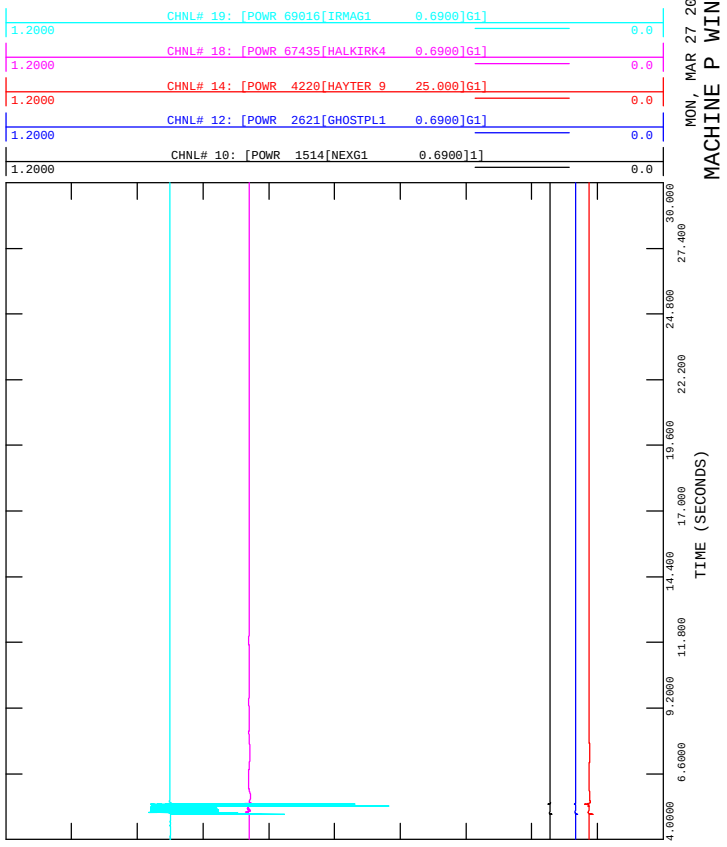


FIGURE E-5F
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

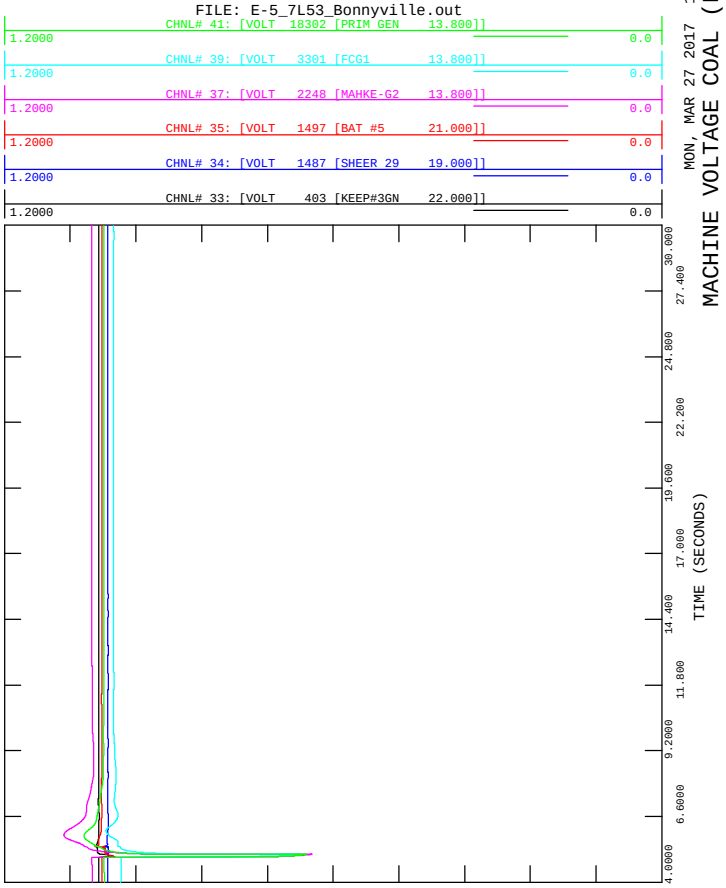


FIGURE E-5H
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

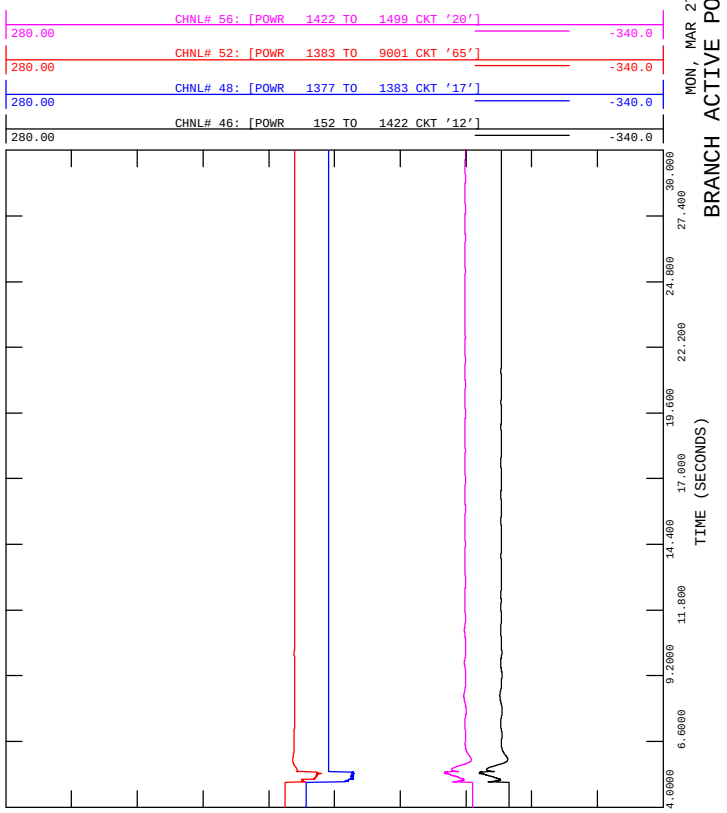


FIGURE E-5E
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

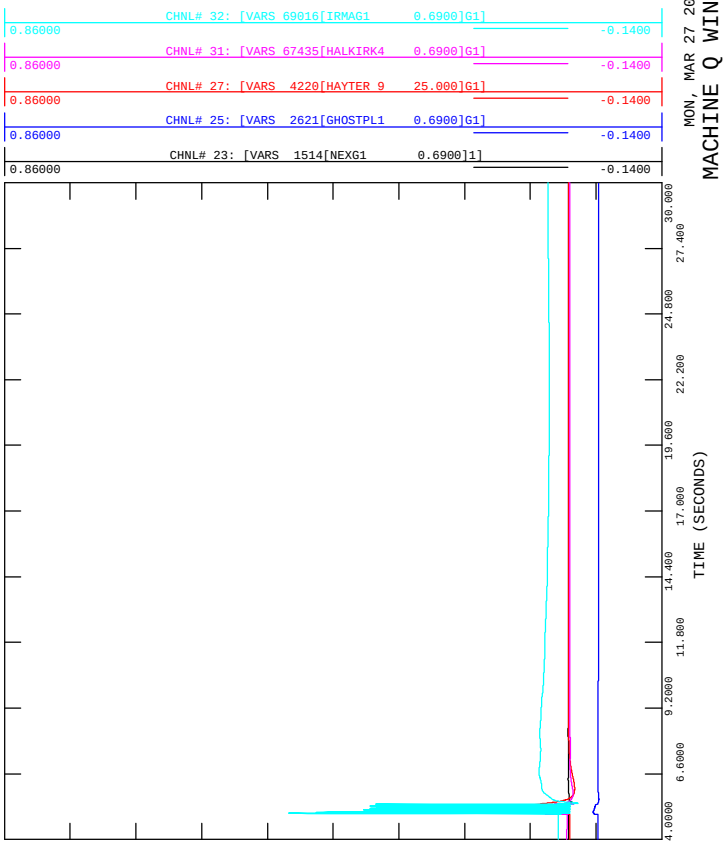


FIGURE E-5G
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

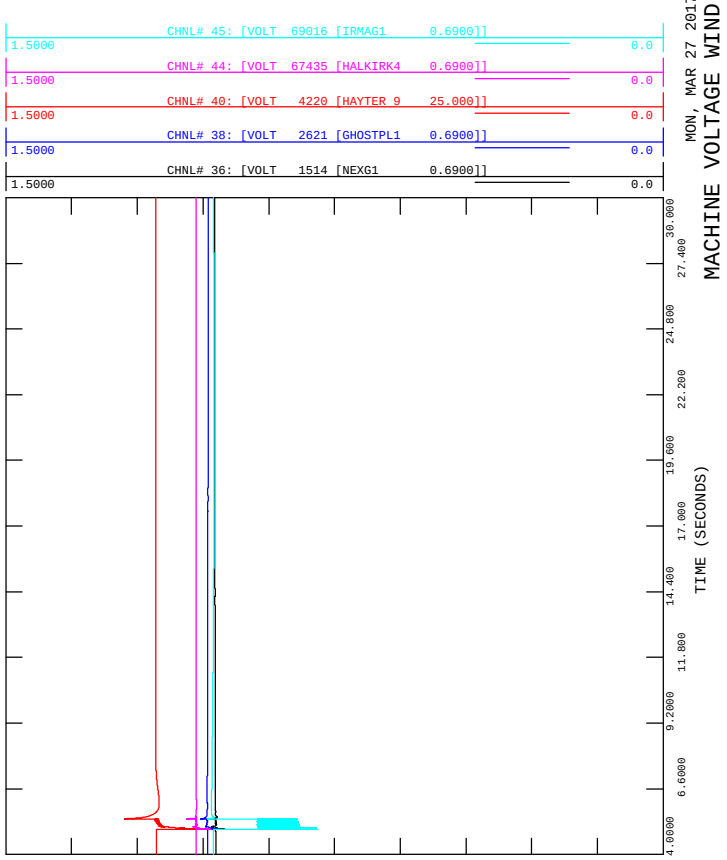


FIGURE E-5I
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

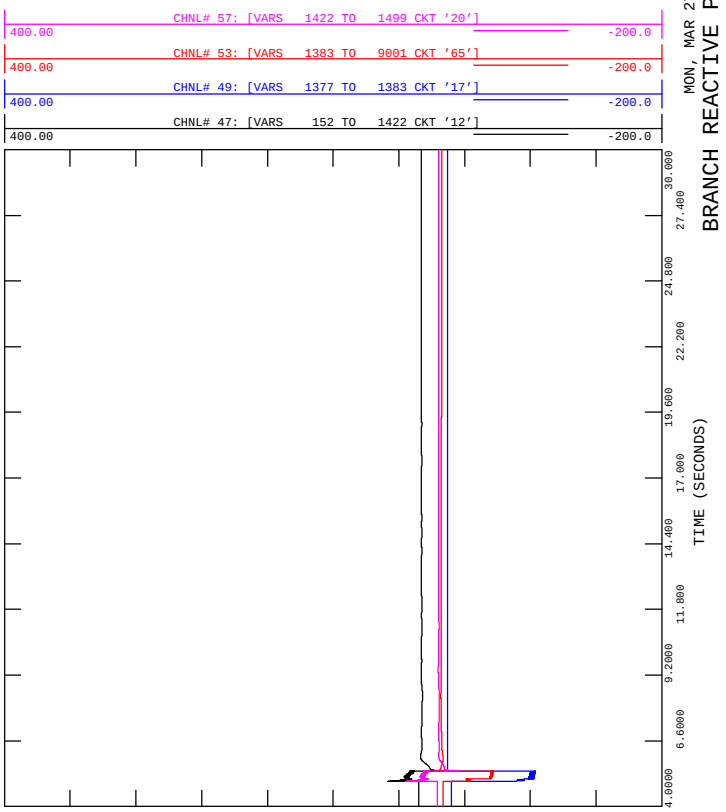


FIGURE E-6B
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6_7L53_IrishCreek.out

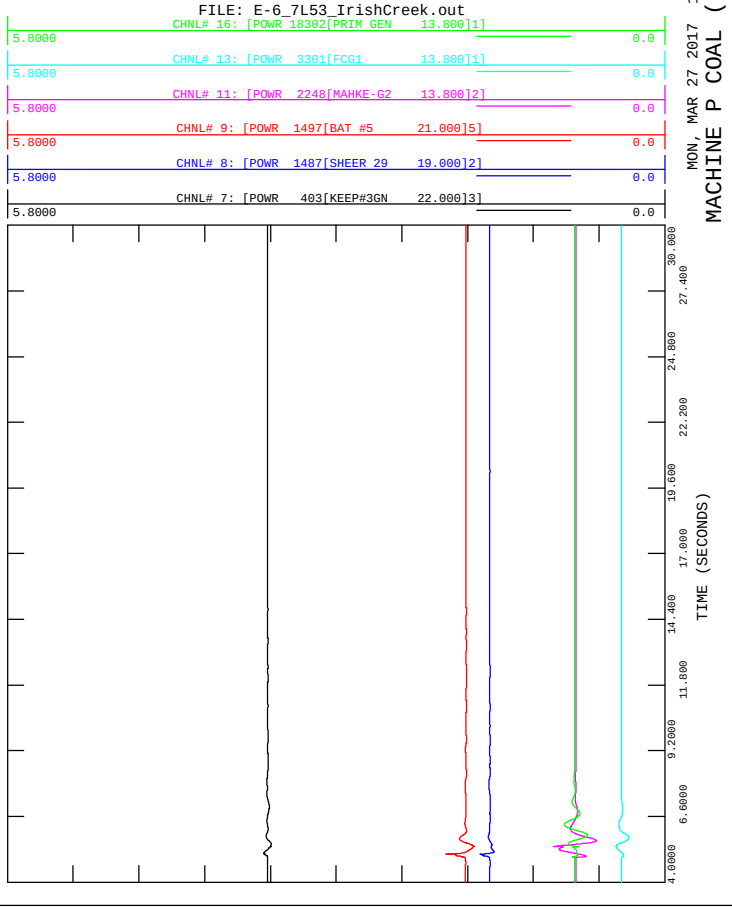


FIGURE E-6D
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6_7L53_IrishCreek.out

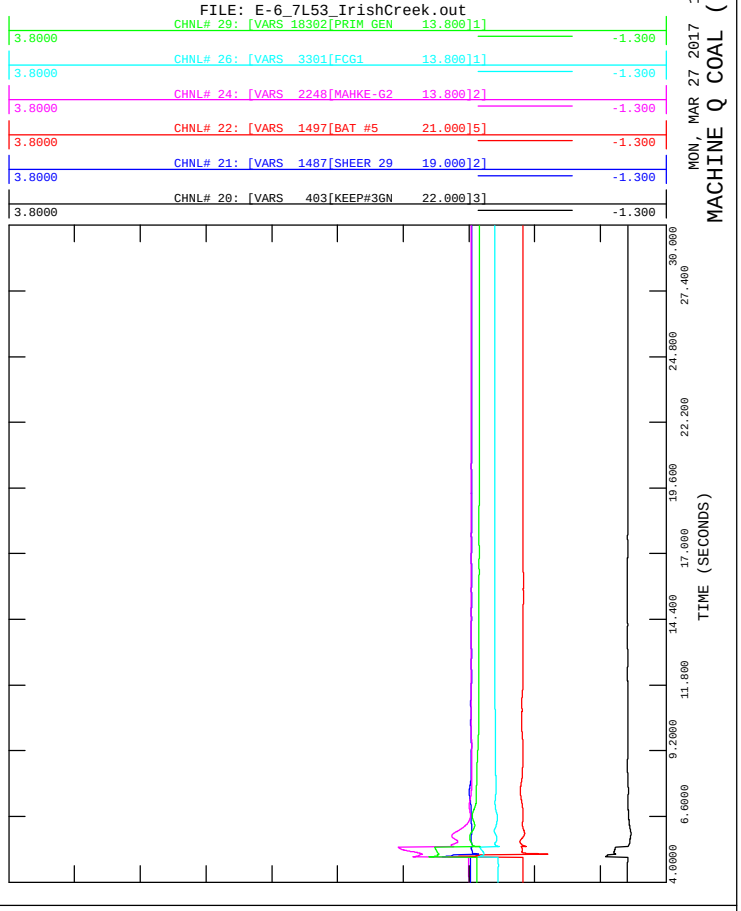


FIGURE E-6A
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6_7L53_IrishCreek.out

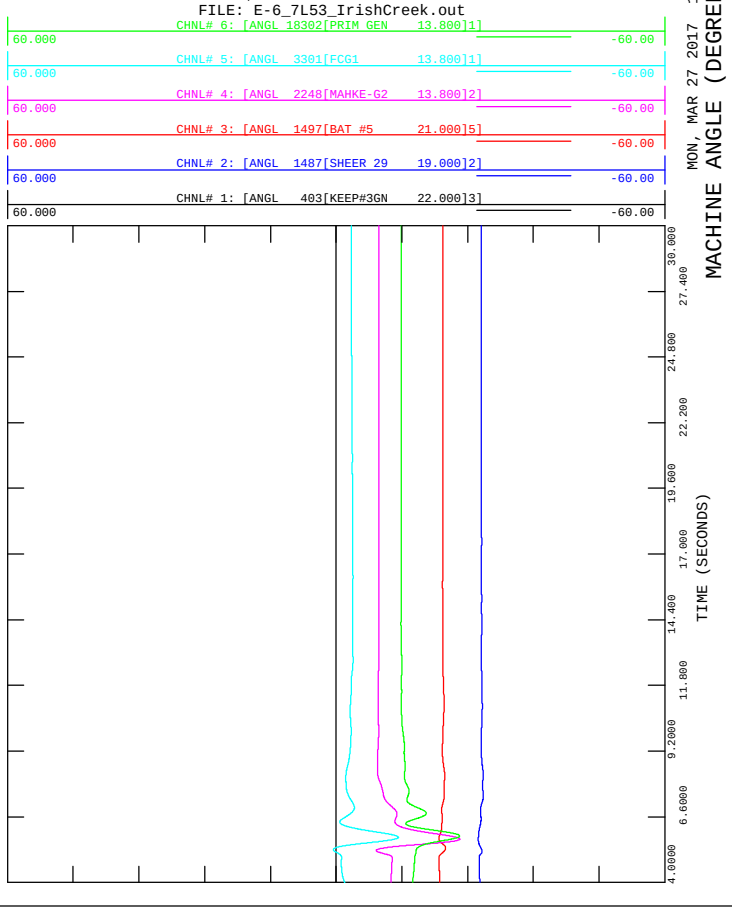


FIGURE E-6C
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6_7L53_IrishCreek.out

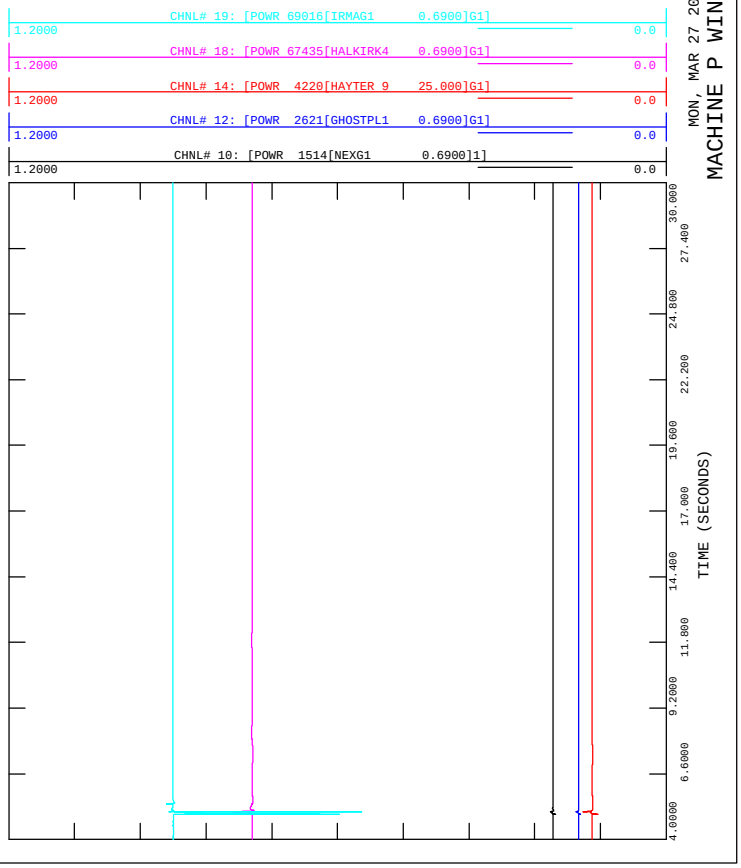


FIGURE E-6F
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6_7L53_IrishCreek.out

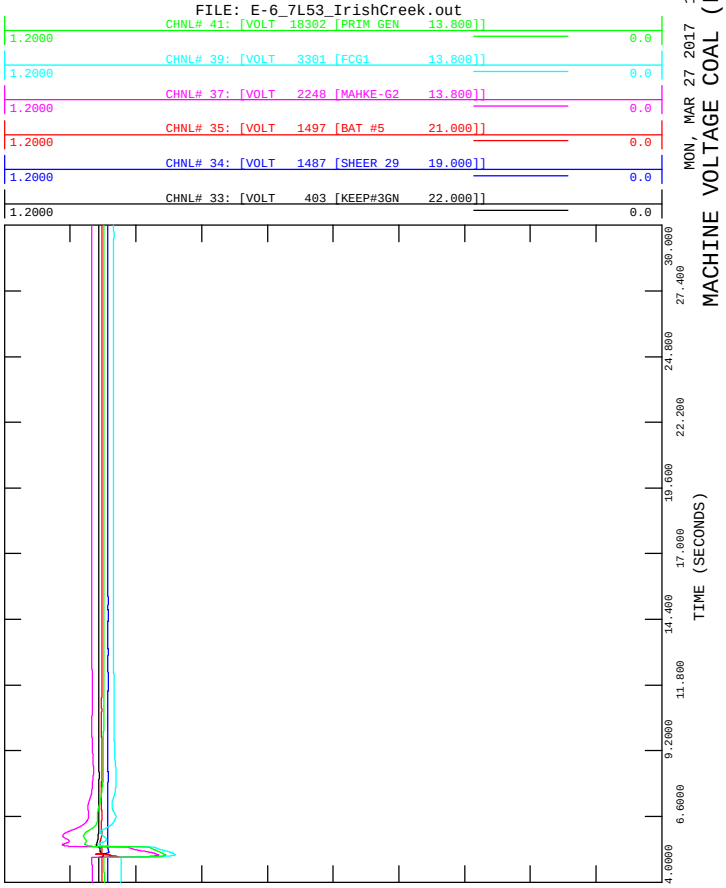


FIGURE E-6H
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6_7L53_IrishCreek.out

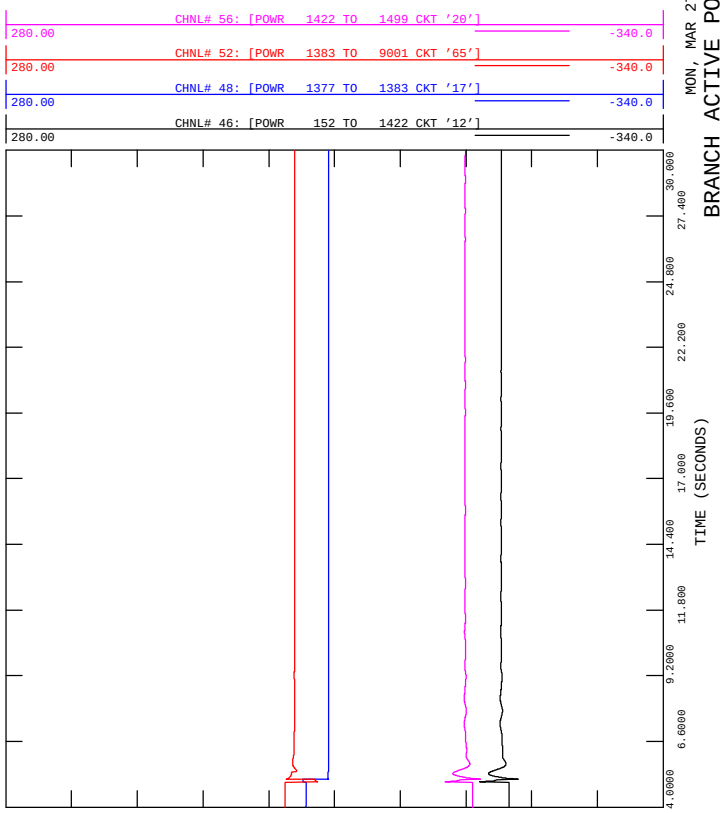


FIGURE E-6E
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6_7L53_IrishCreek.out

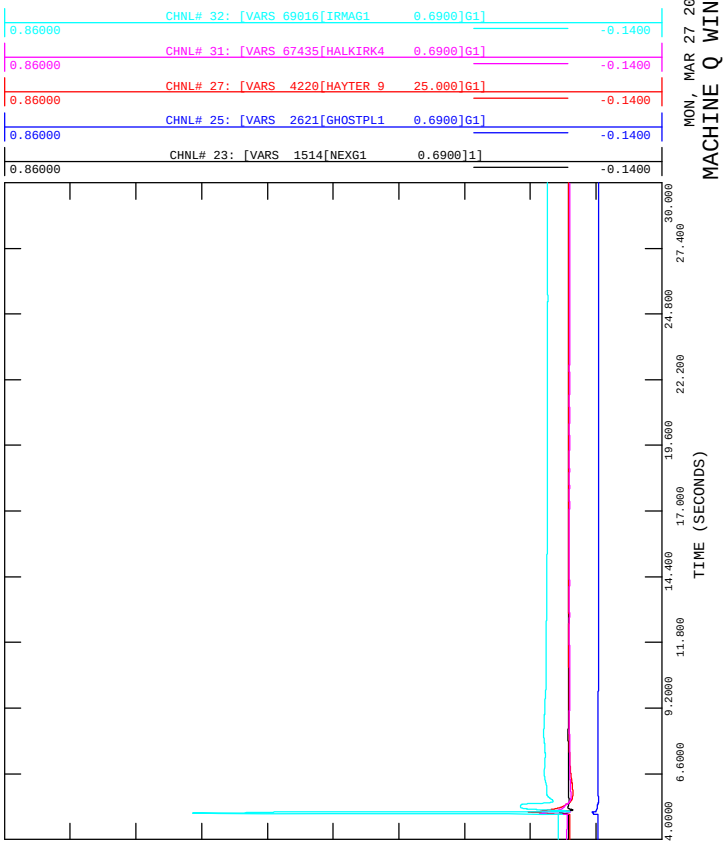


FIGURE E-6G
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6_7L53_IrishCreek.out

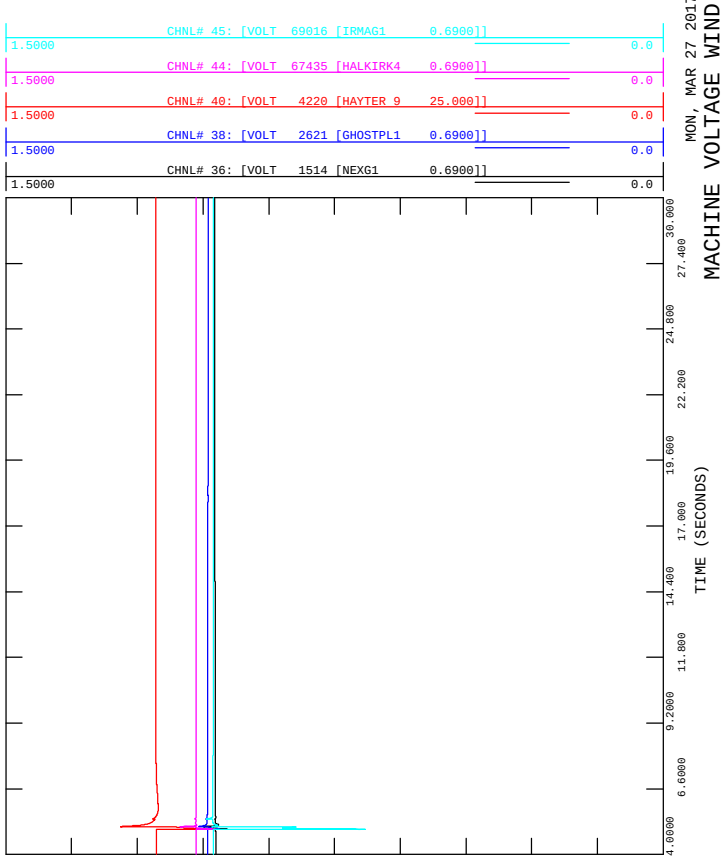


FIGURE E-6I
2017SL, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6_7L53_IrishCreek.out

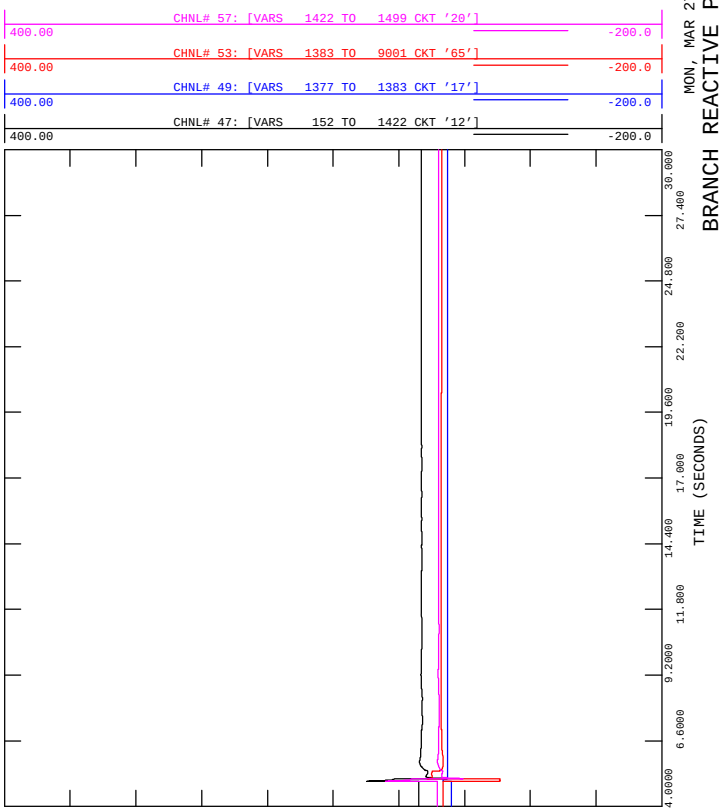


FIGURE E-7B
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vegreville.out

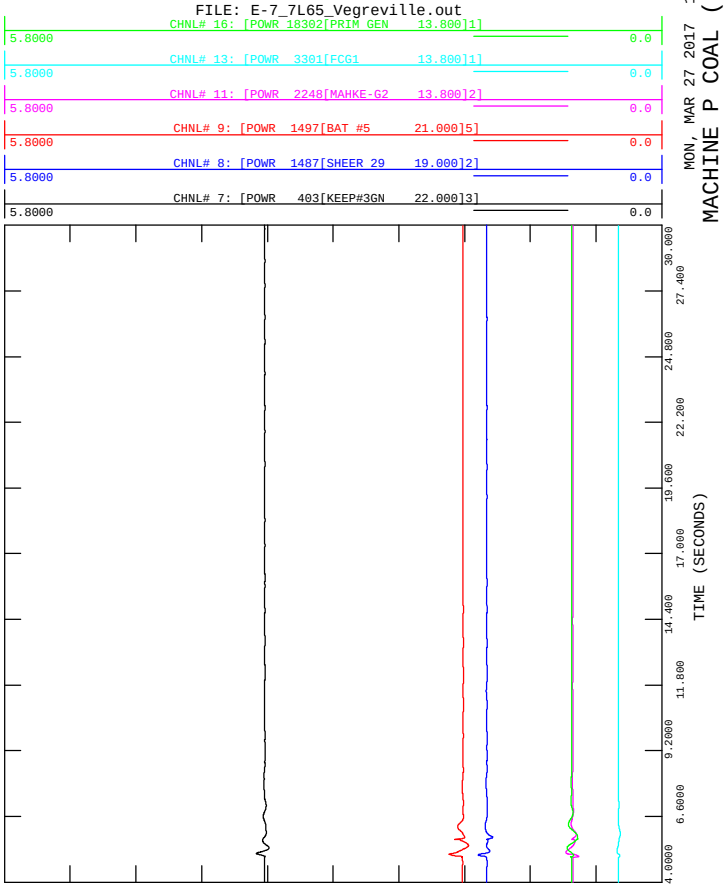


FIGURE E-7D
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vegreville.out

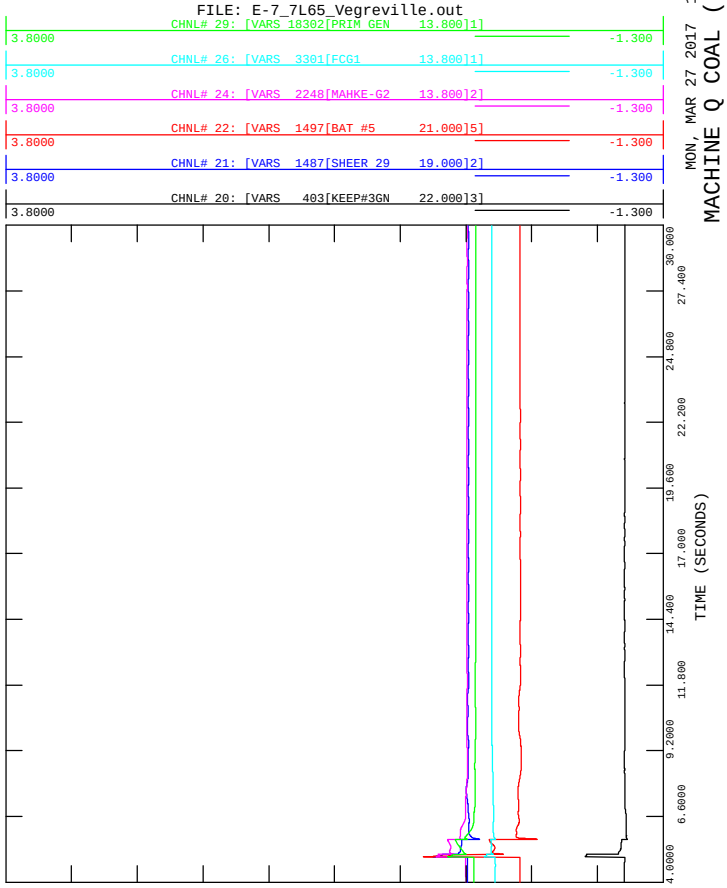


FIGURE E-7A
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vegreville.out

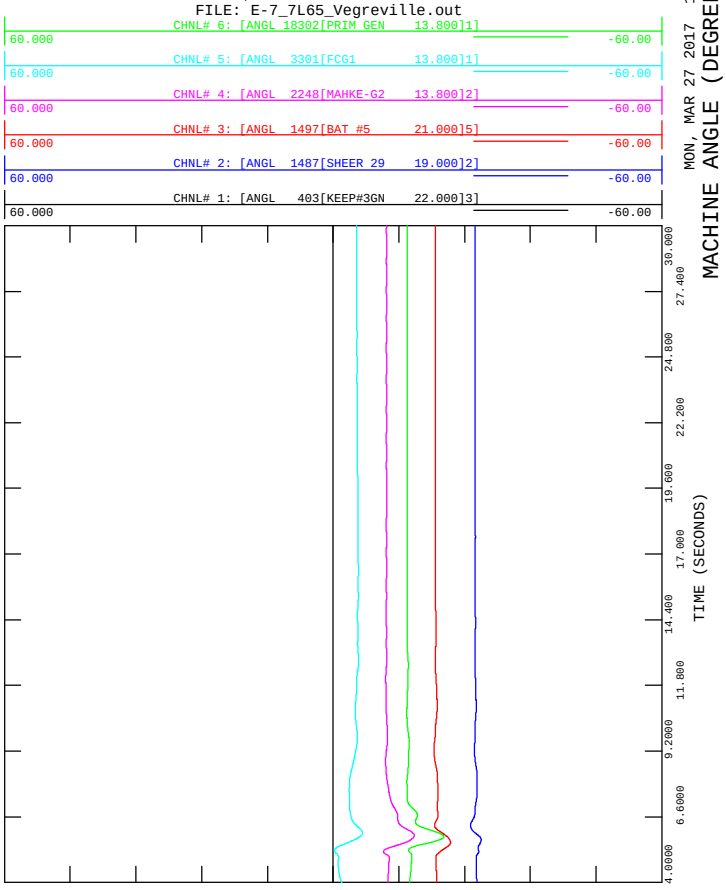


FIGURE E-7C
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vegreville.out

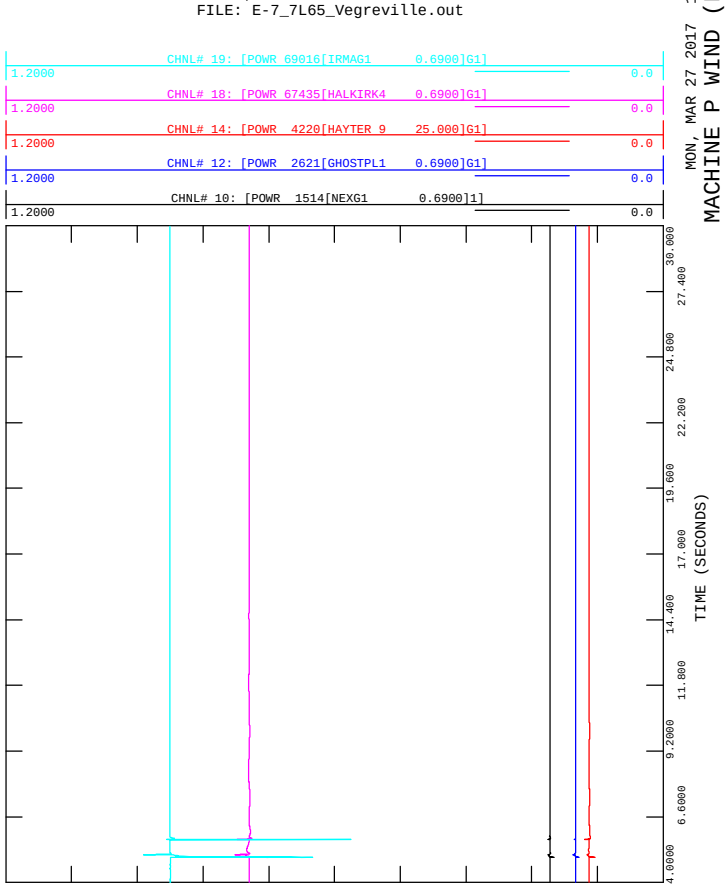


FIGURE E-7F
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vegreville.out

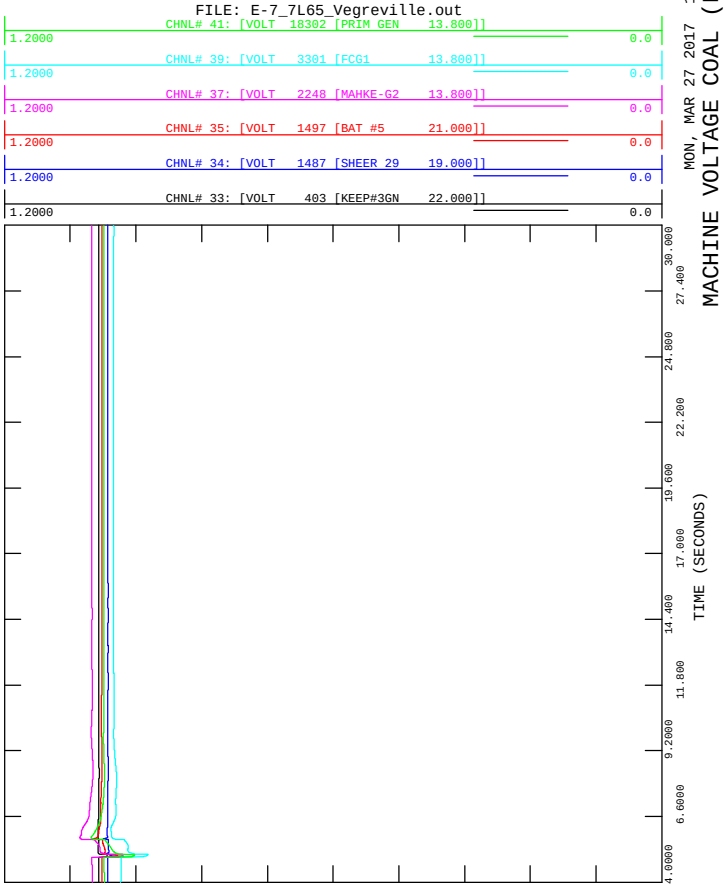


FIGURE E-7H
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vegreville.out

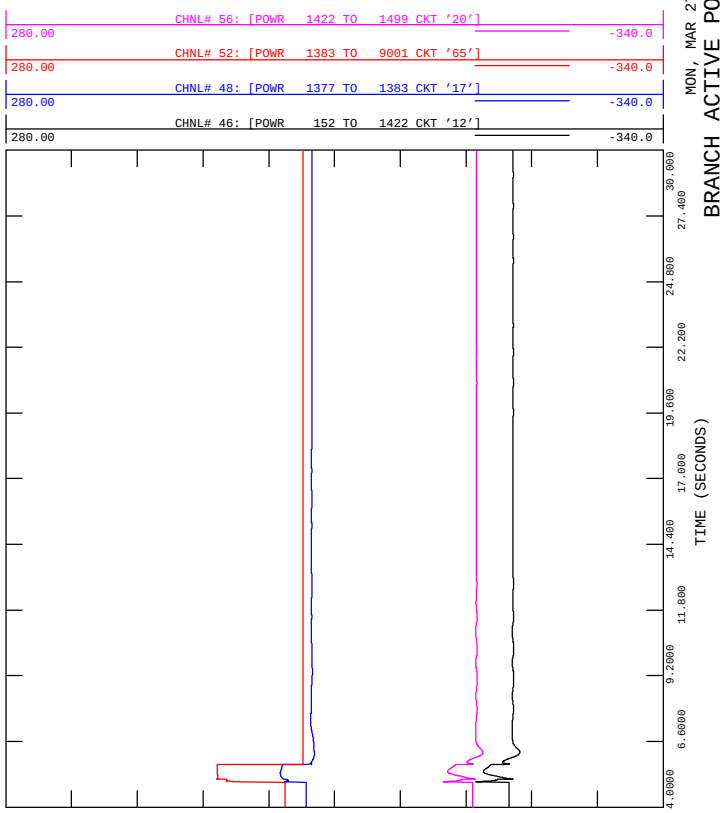


FIGURE E-7E
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vegreville.out

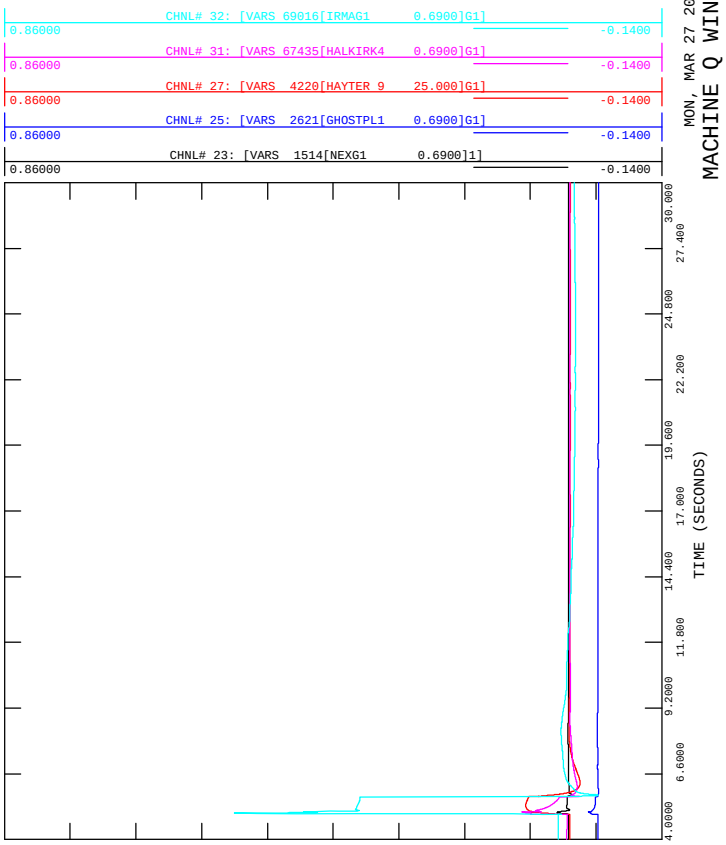


FIGURE E-7G
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vegreville.out

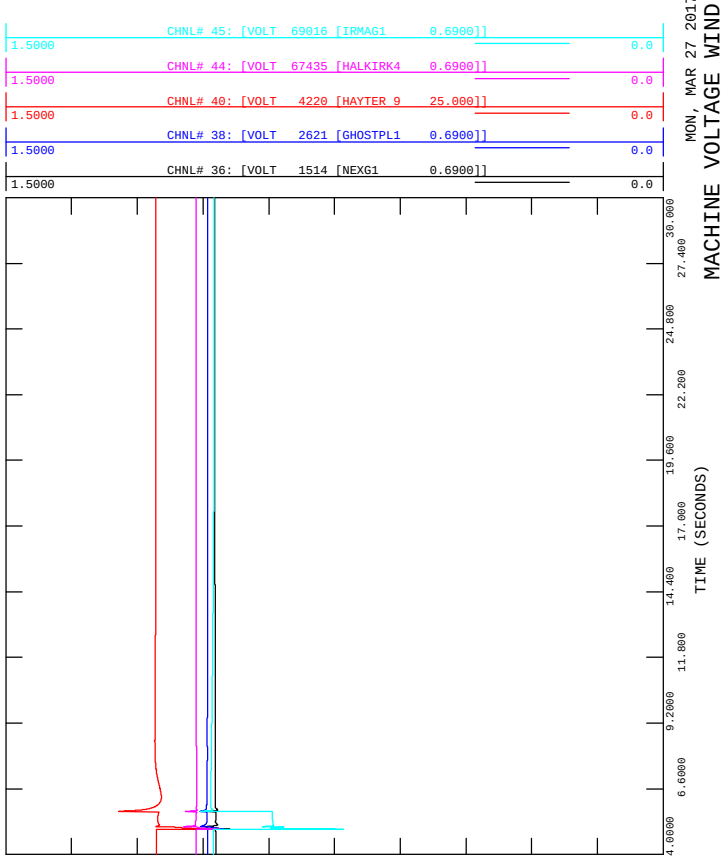


FIGURE E-7I
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vegreville.out

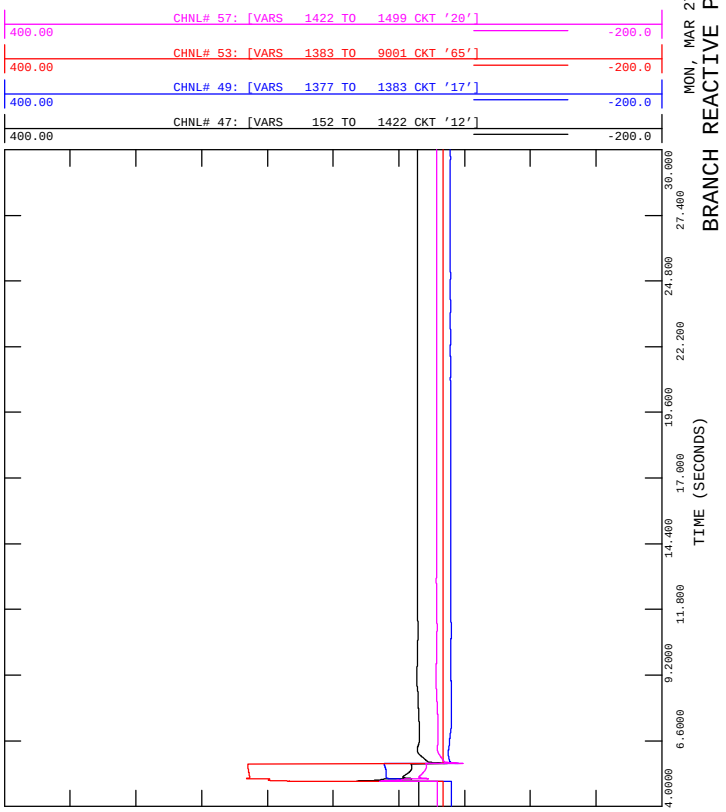


FIGURE E-8B
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_Vermilion.out

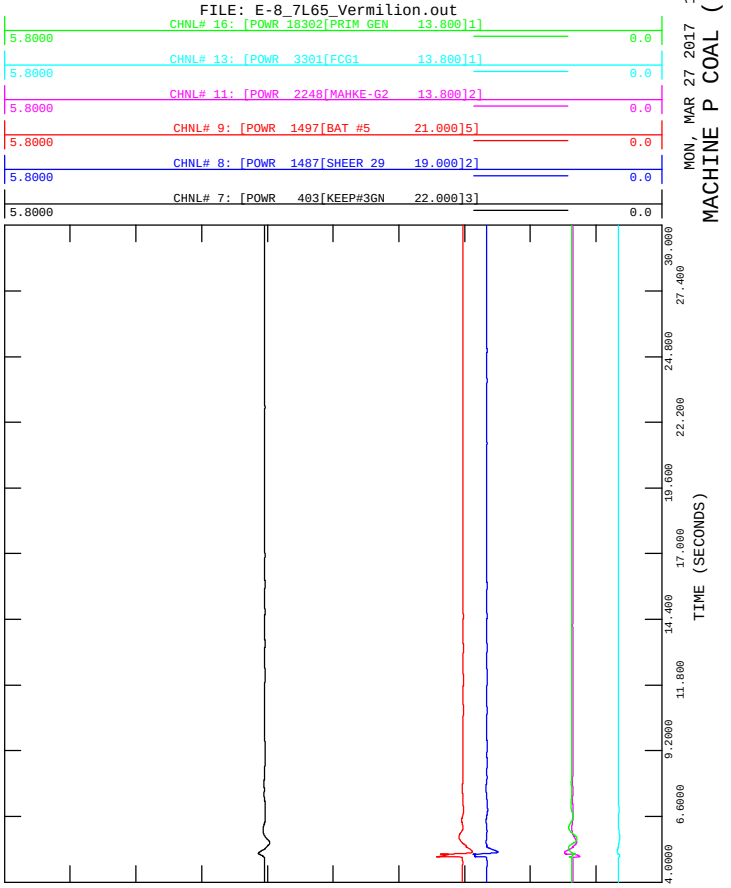


FIGURE E-8D
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_Vermilion.out

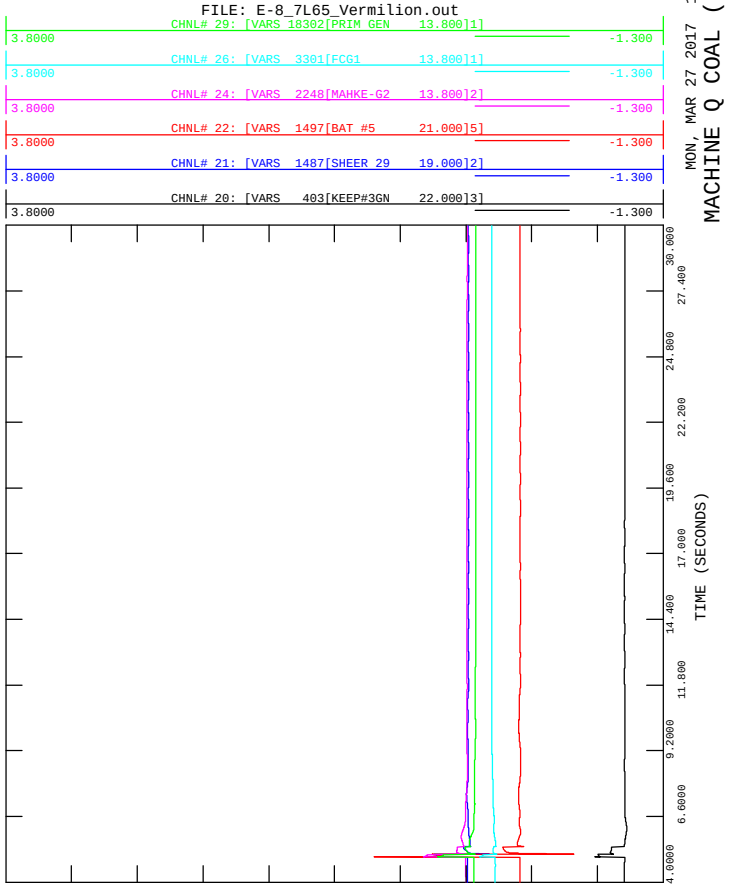


FIGURE E-8A
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_Vermilion.out

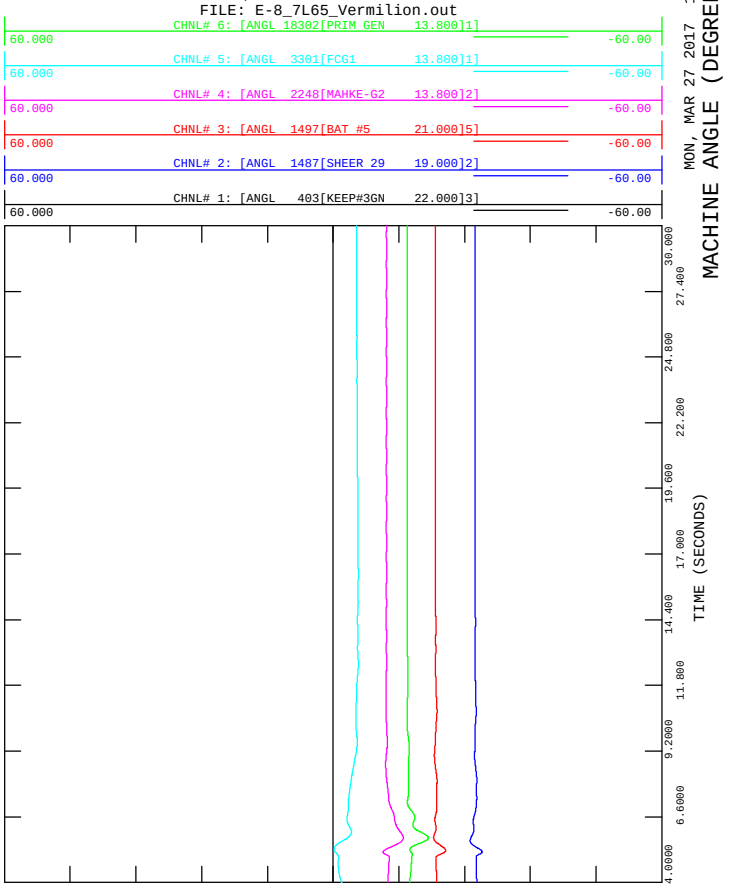


FIGURE E-8C
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_Vermilion.out

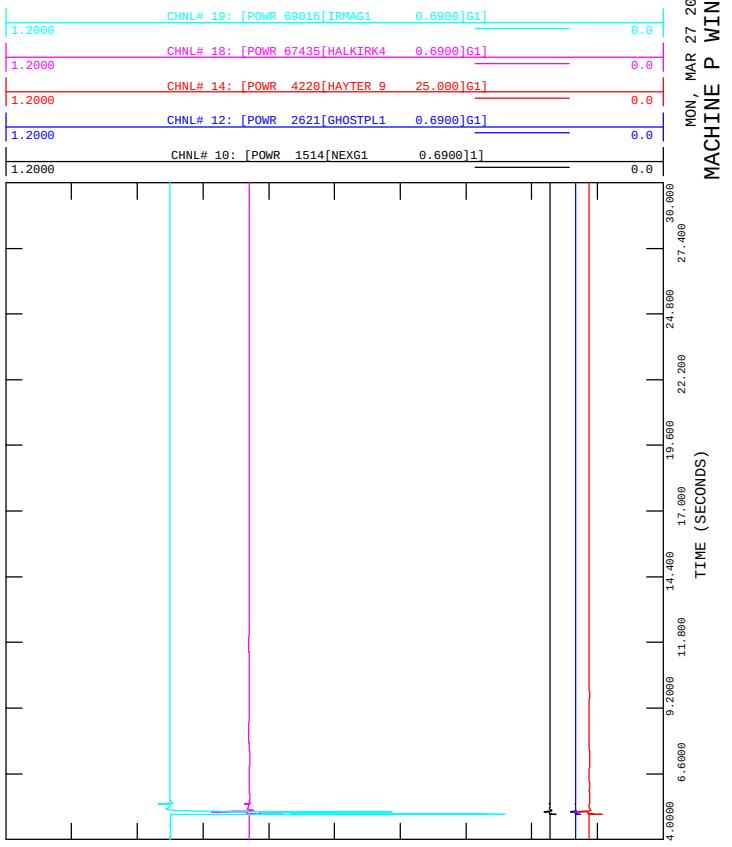


FIGURE E-8F
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_Vermilion.out

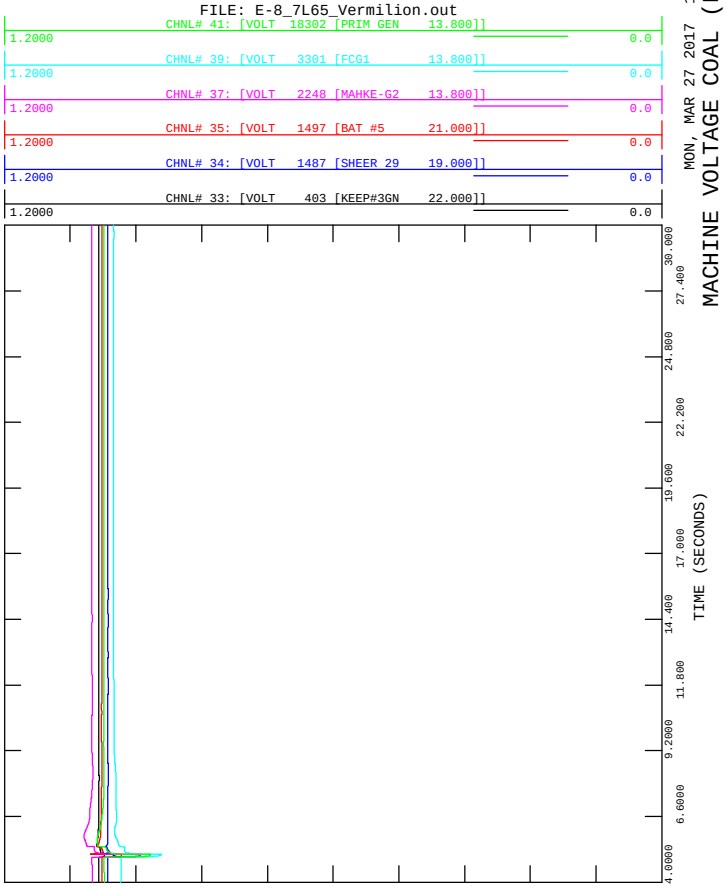


FIGURE E-8H
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_Vermilion.out

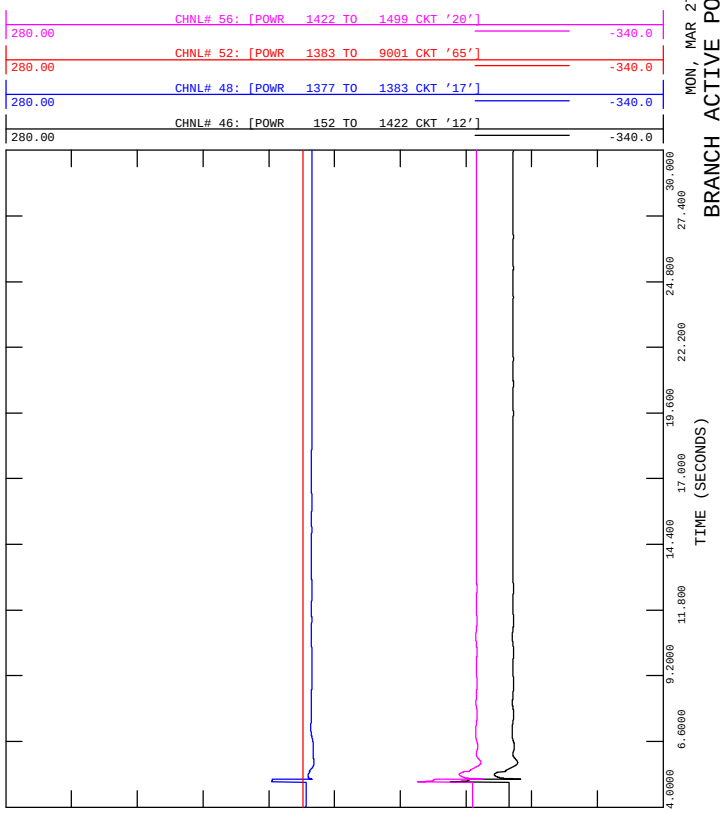


FIGURE E-8E
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_Vermilion.out

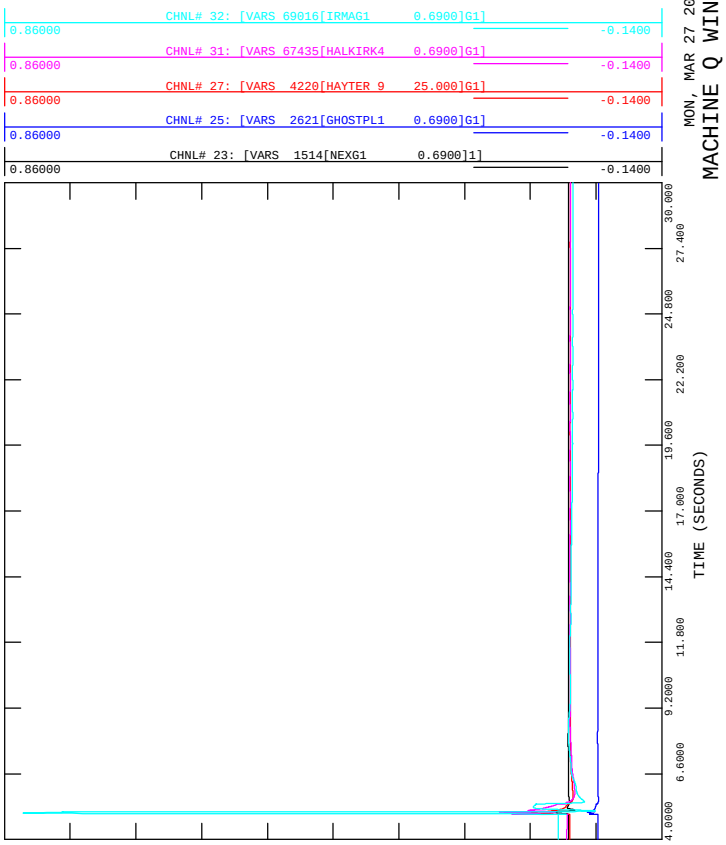


FIGURE E-8G
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_Vermilion.out

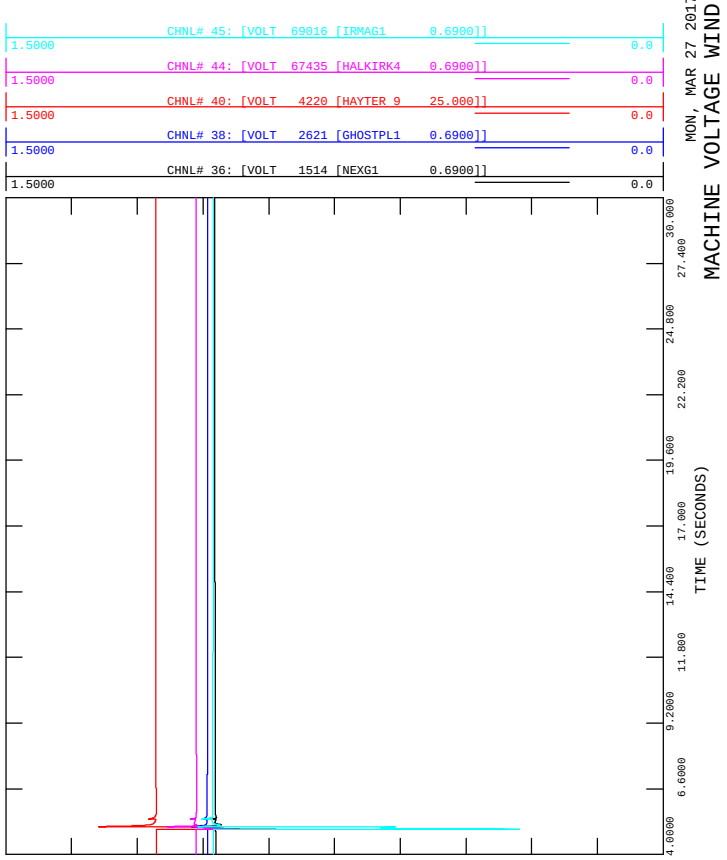


FIGURE E-8I
2017SL, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_Vermilion.out

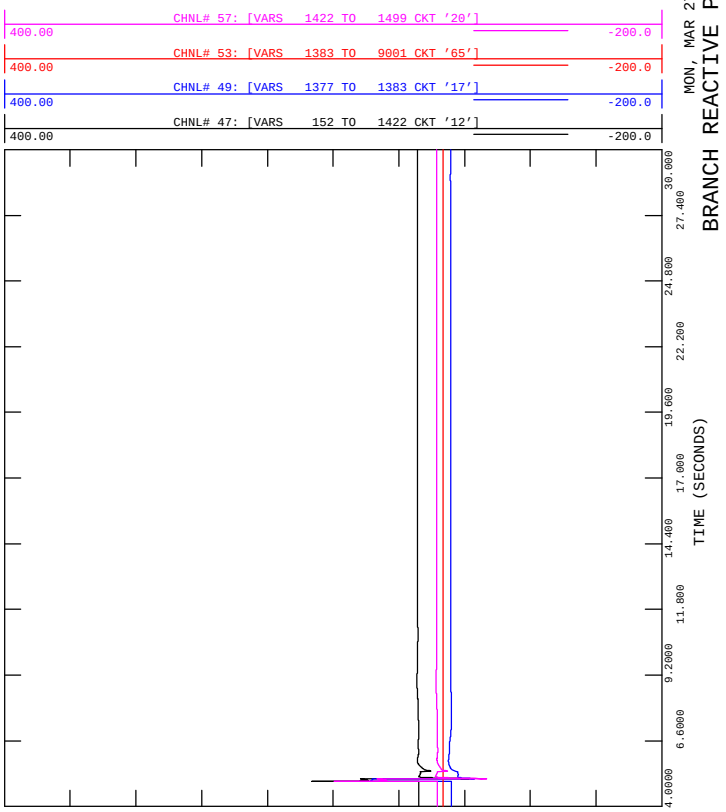


FIGURE E-9B
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-9_7L70_Bonnyville.out

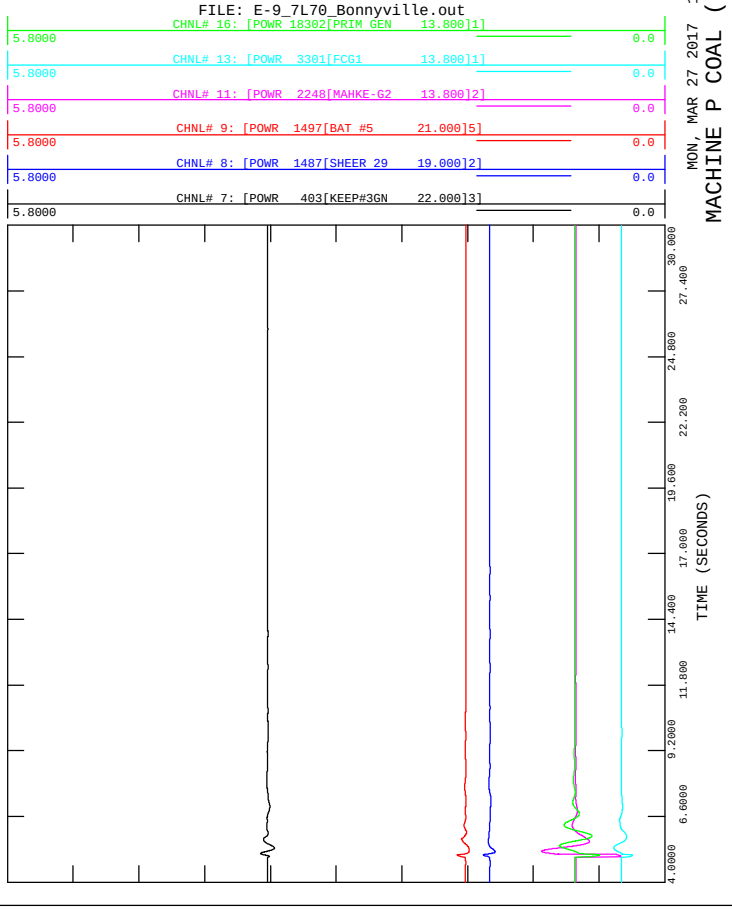


FIGURE E-9D
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-9_7L70_Bonnyville.out

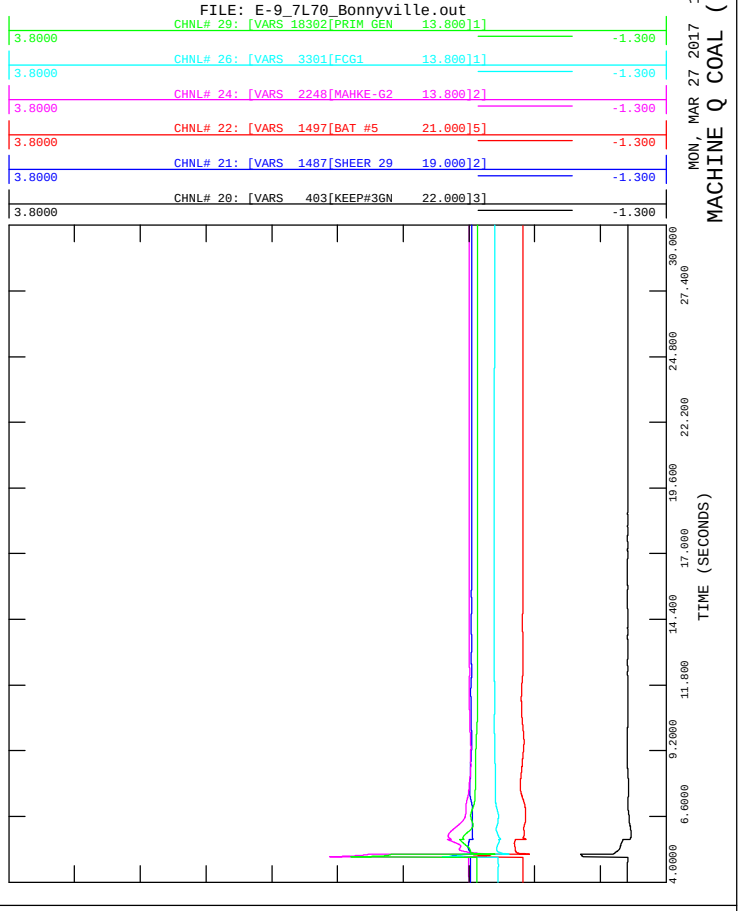


FIGURE E-9A
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-9_7L70_Bonnyville.out

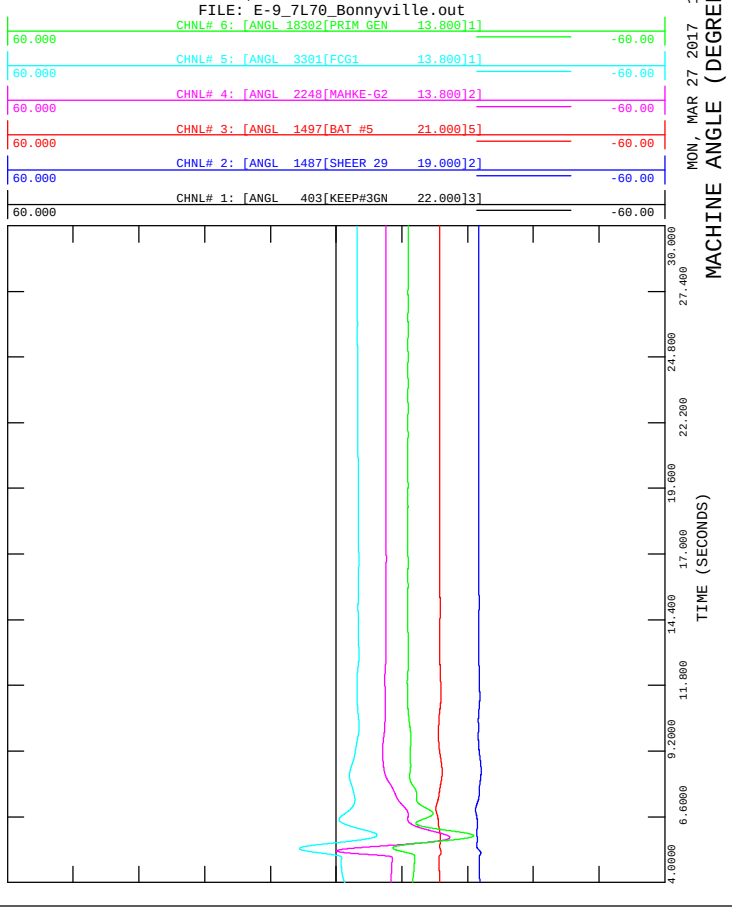


FIGURE E-9C
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-9_7L70_Bonnyville.out

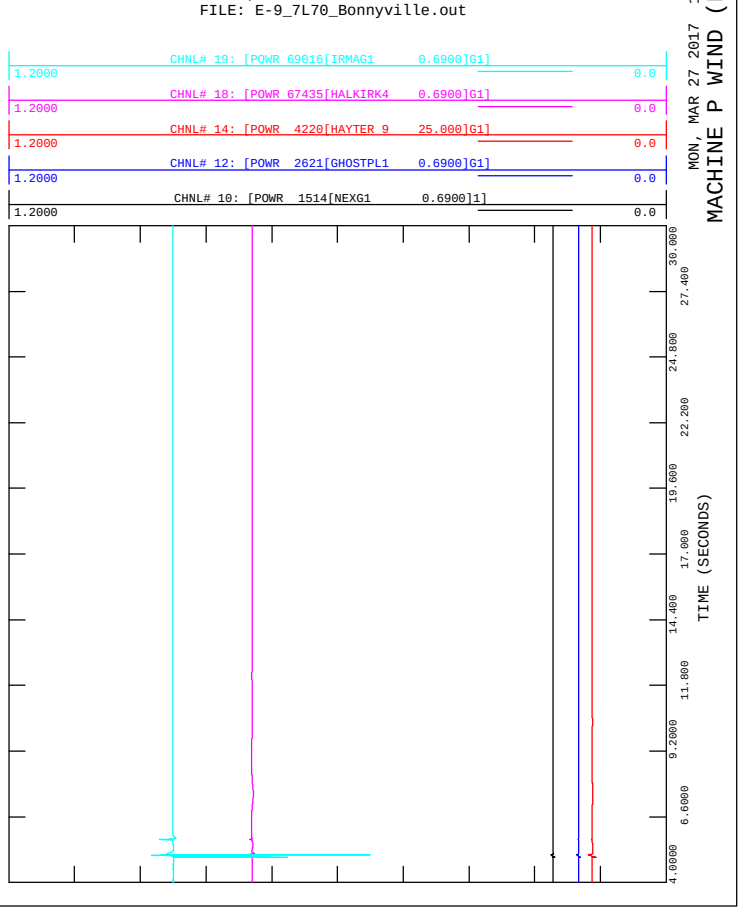


FIGURE E-9F
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-9_7L70_Bonnyville.out

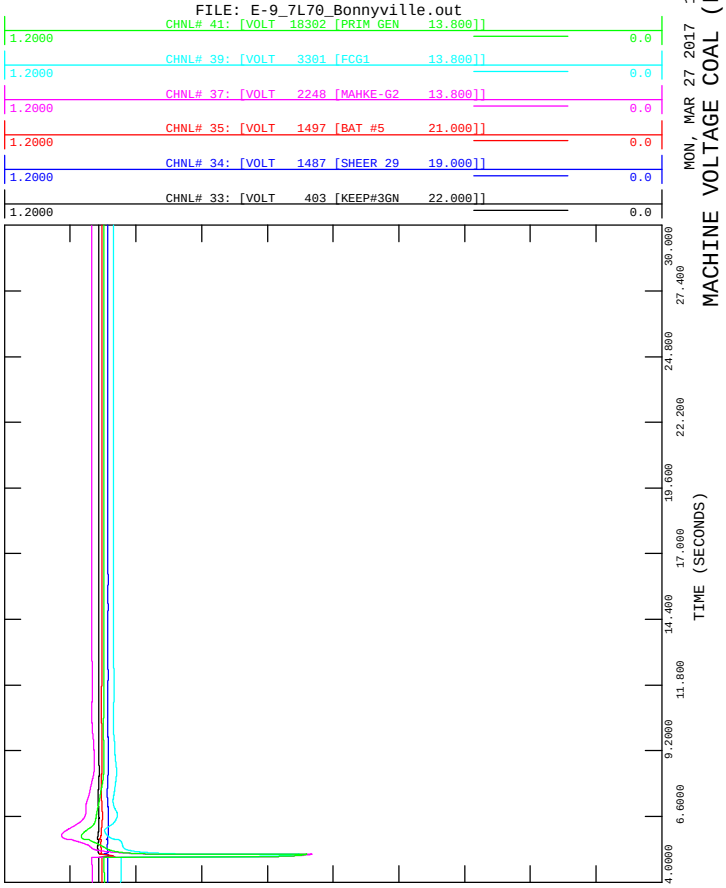


FIGURE E-9H
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-9_7L70_Bonnyville.out

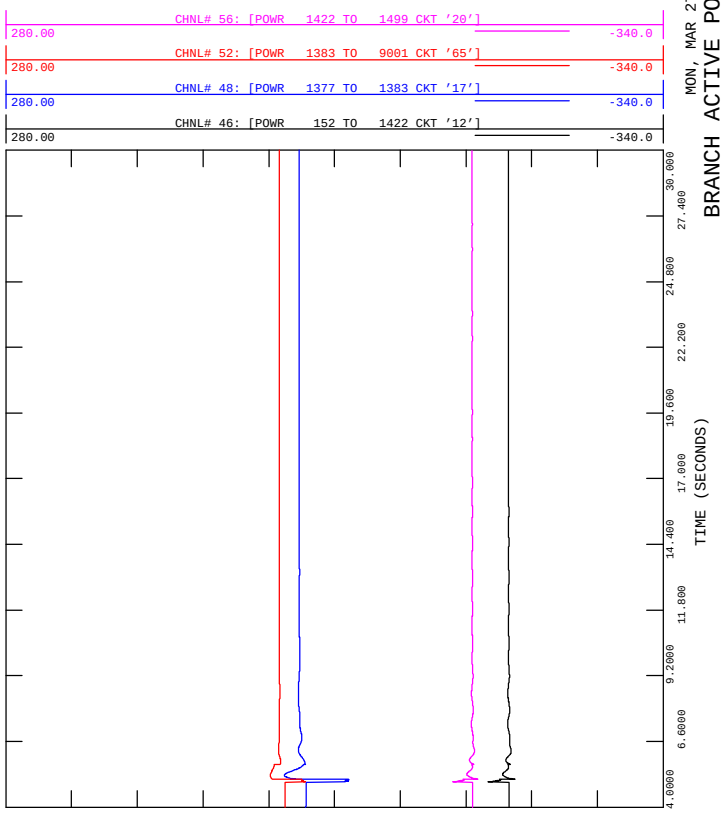


FIGURE E-9E
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-9_7L70_Bonnyville.out

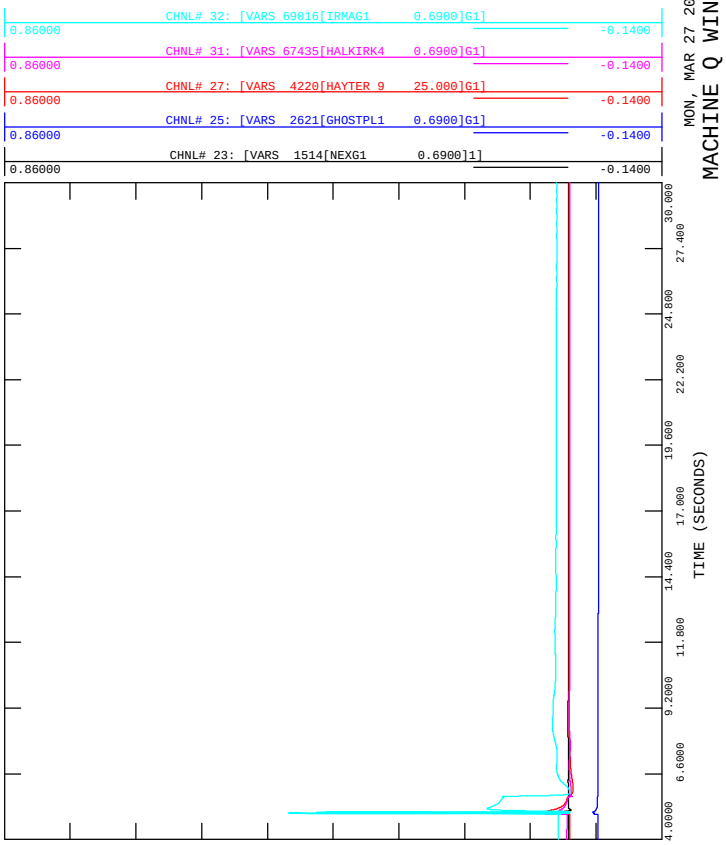


FIGURE E-9G
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-9_7L70_Bonnyville.out

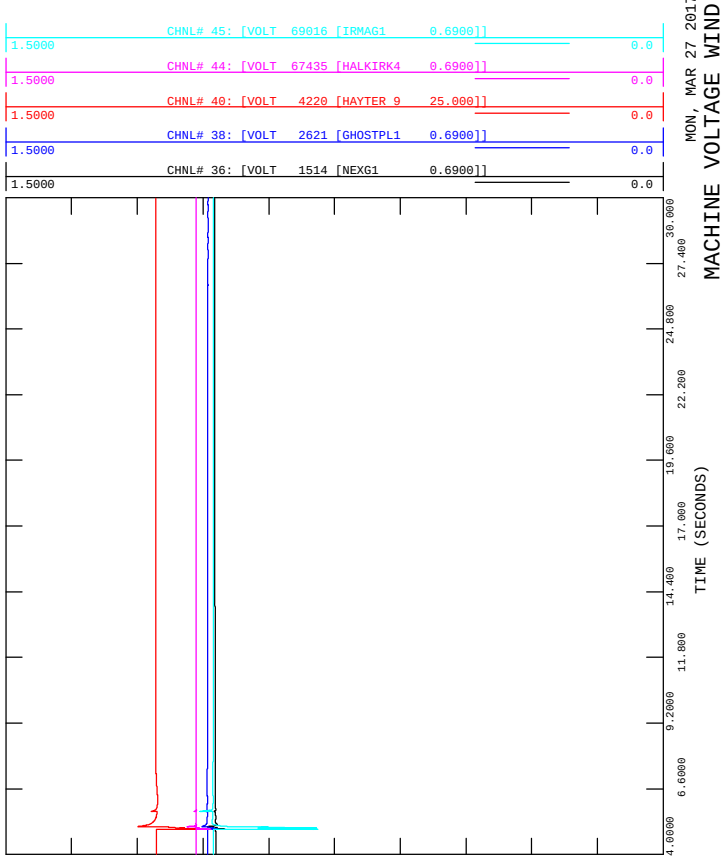


FIGURE E-9I
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-9_7L70_Bonnyville.out

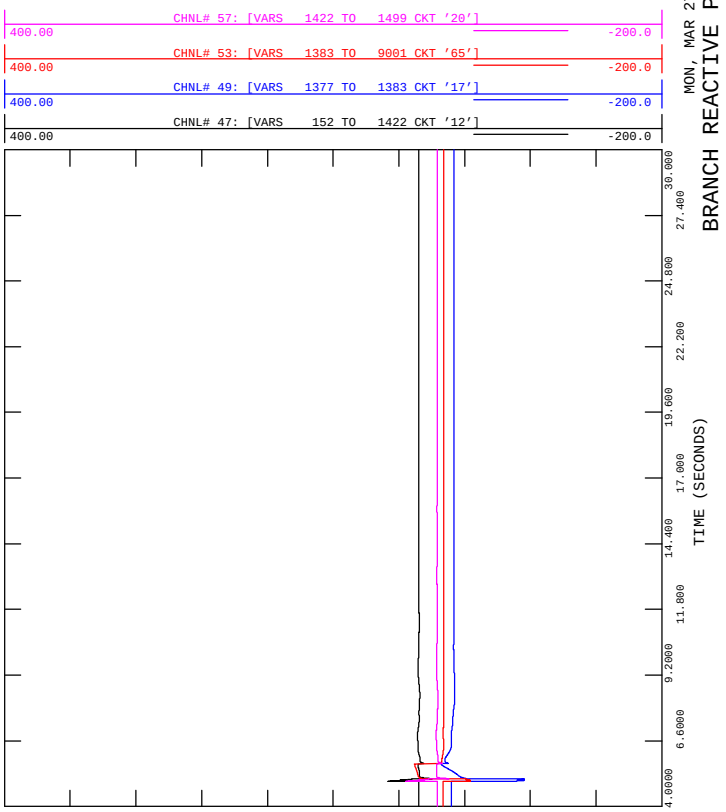


FIGURE E-10B
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_St.Paul.out

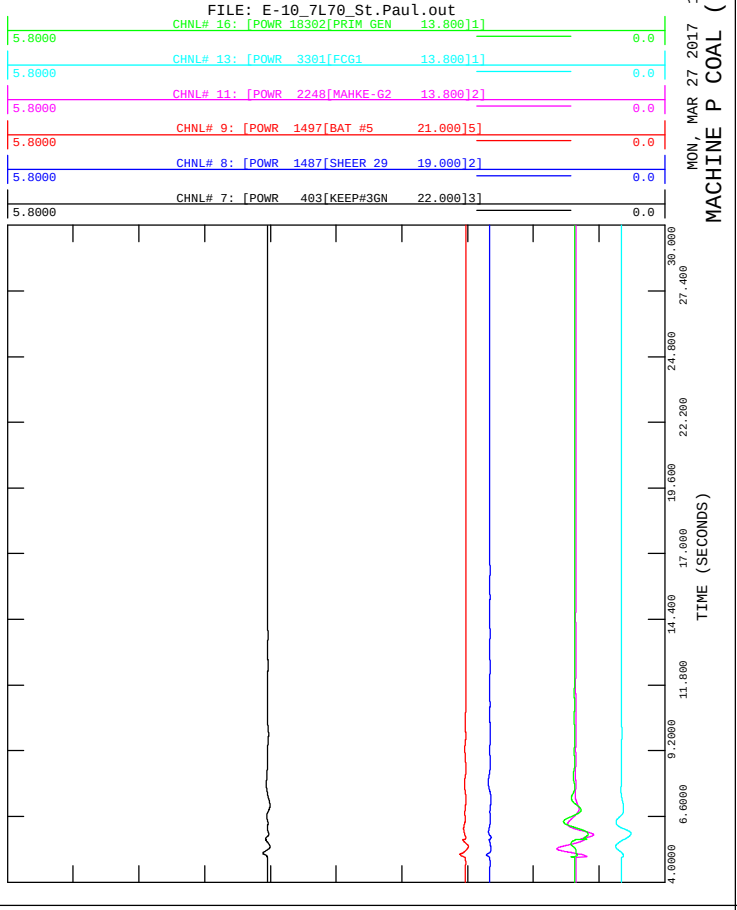


FIGURE E-10D
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_St.Paul.out

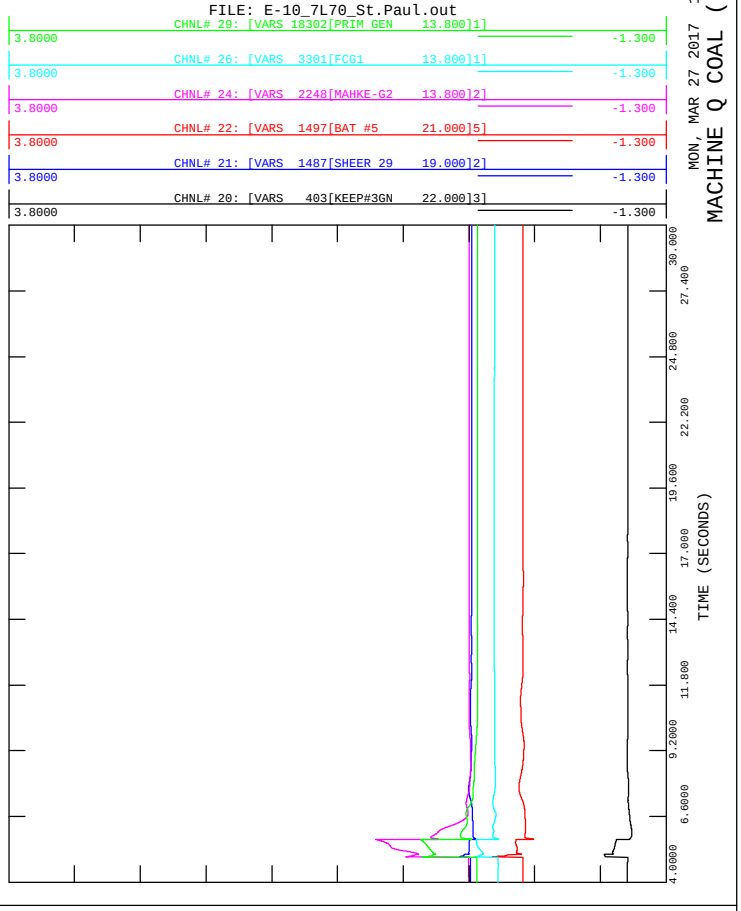


FIGURE E-10A
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_St.Paul.out

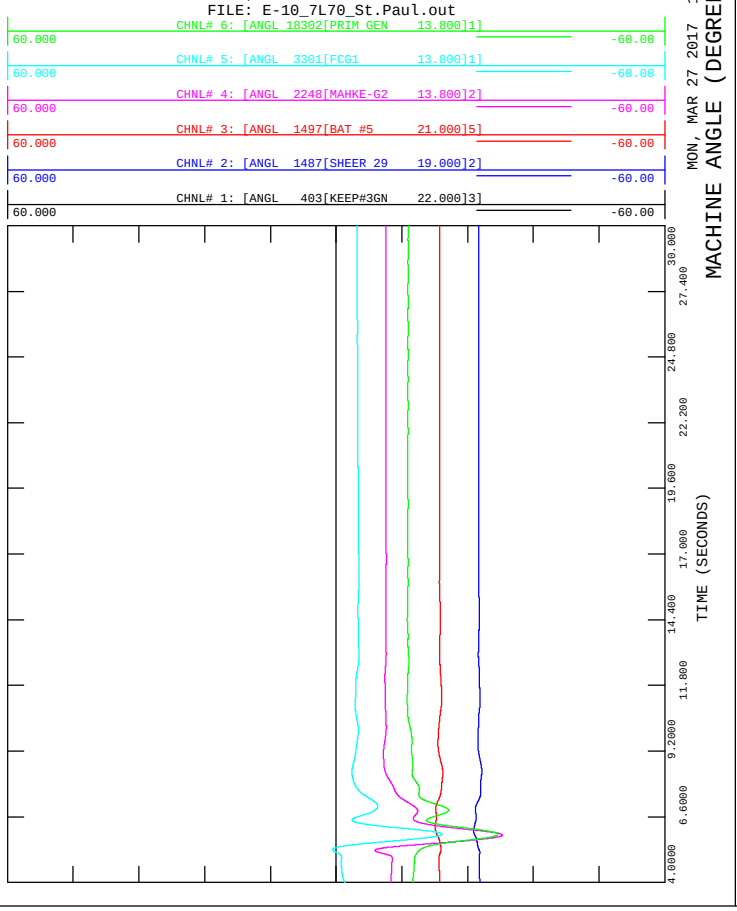


FIGURE E-10C
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_St.Paul.out

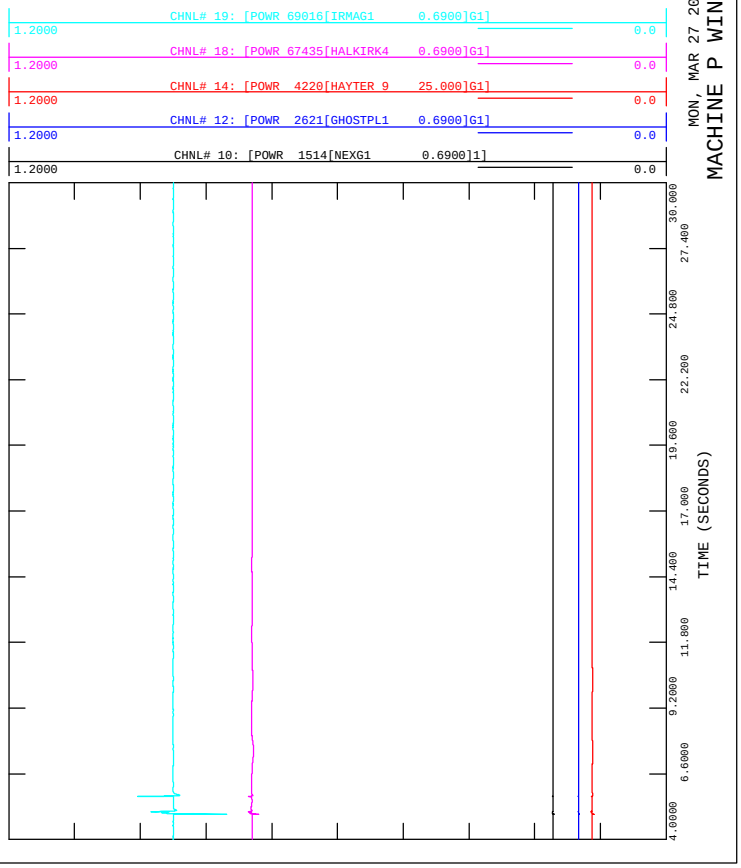


FIGURE E-10F
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_St.Paul.out

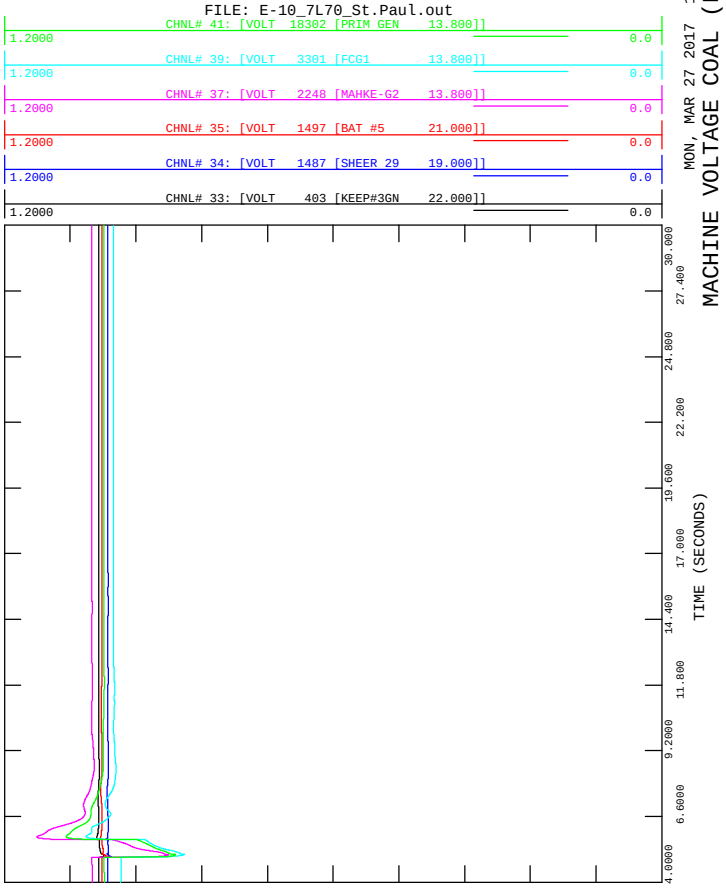


FIGURE E-10H
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_St.Paul.out

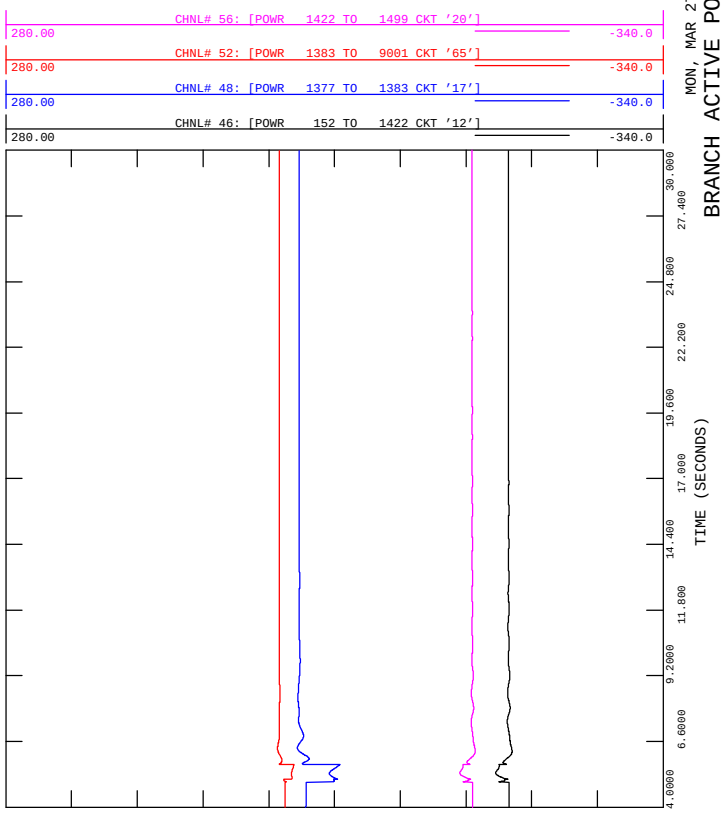


FIGURE E-10E
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_St.Paul.out

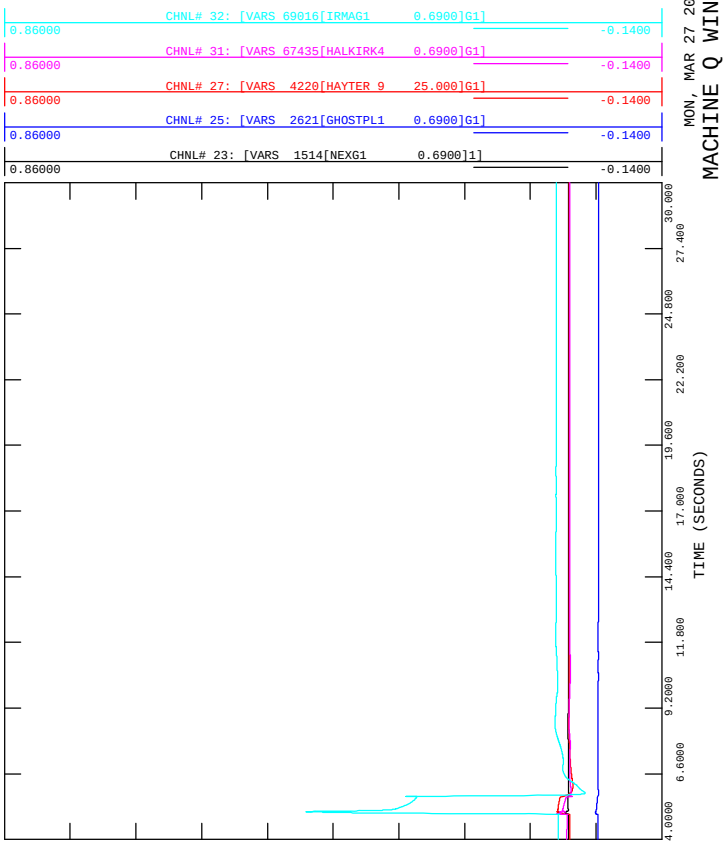


FIGURE E-10G
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_St.Paul.out

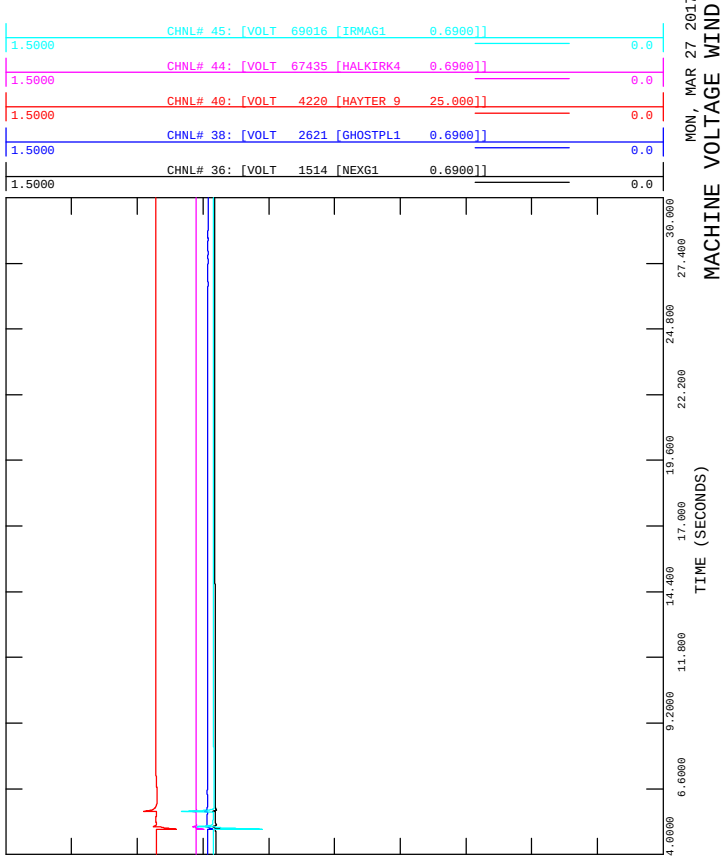


FIGURE E-10I
2017SL, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_St.Paul.out

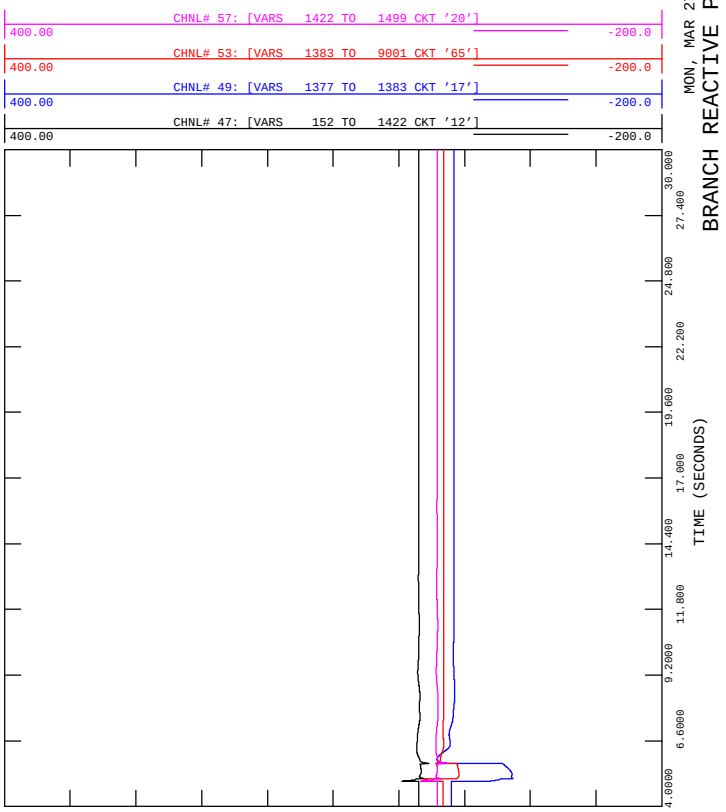


FIGURE E-11B
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-11_7L115_BuffaloCreek.out

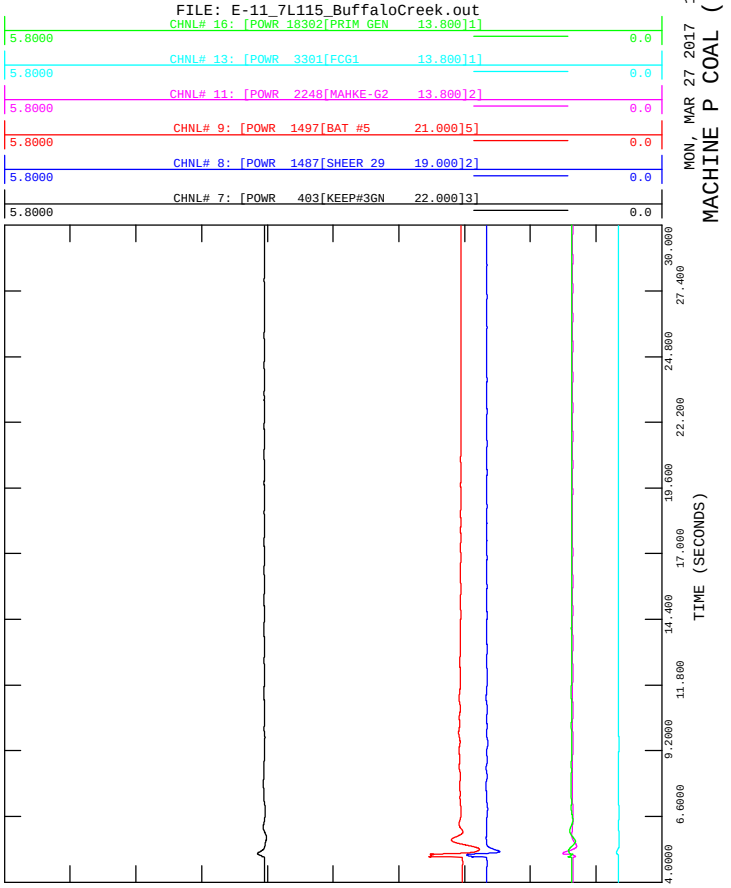


FIGURE E-11D
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-11_7L115_BuffaloCreek.out

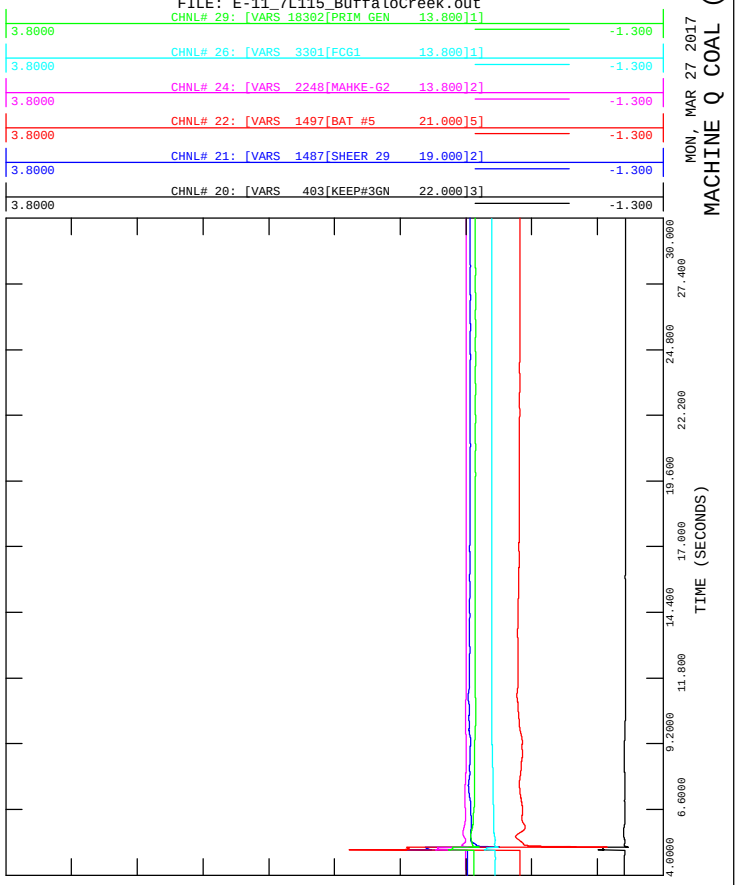


FIGURE E-11A
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-11_7L115_BuffaloCreek.out

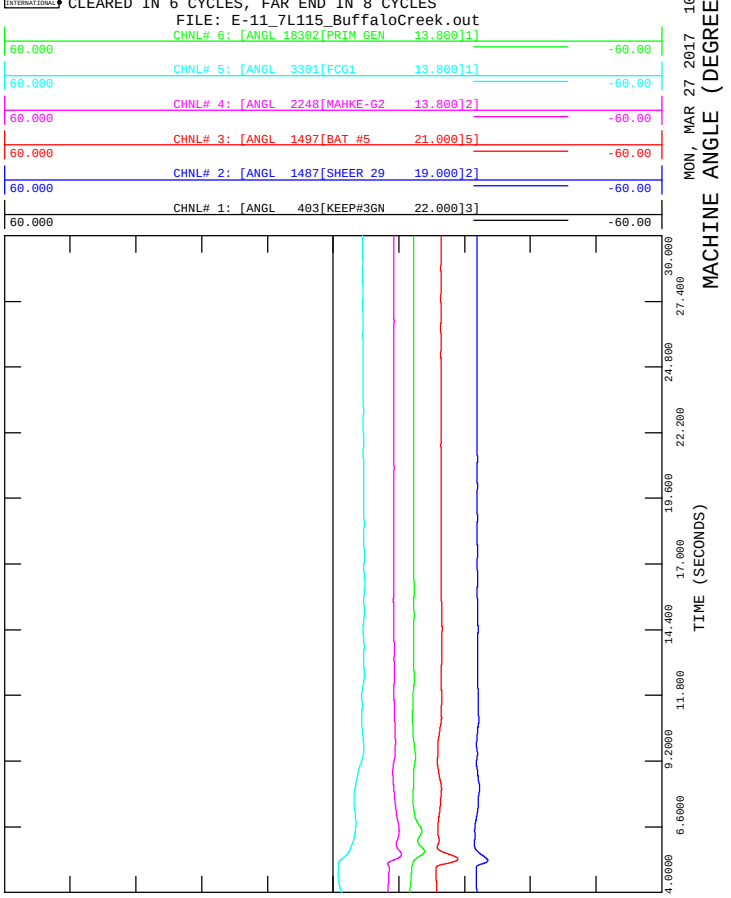


FIGURE E-11C
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-11_7L115_BuffaloCreek.out

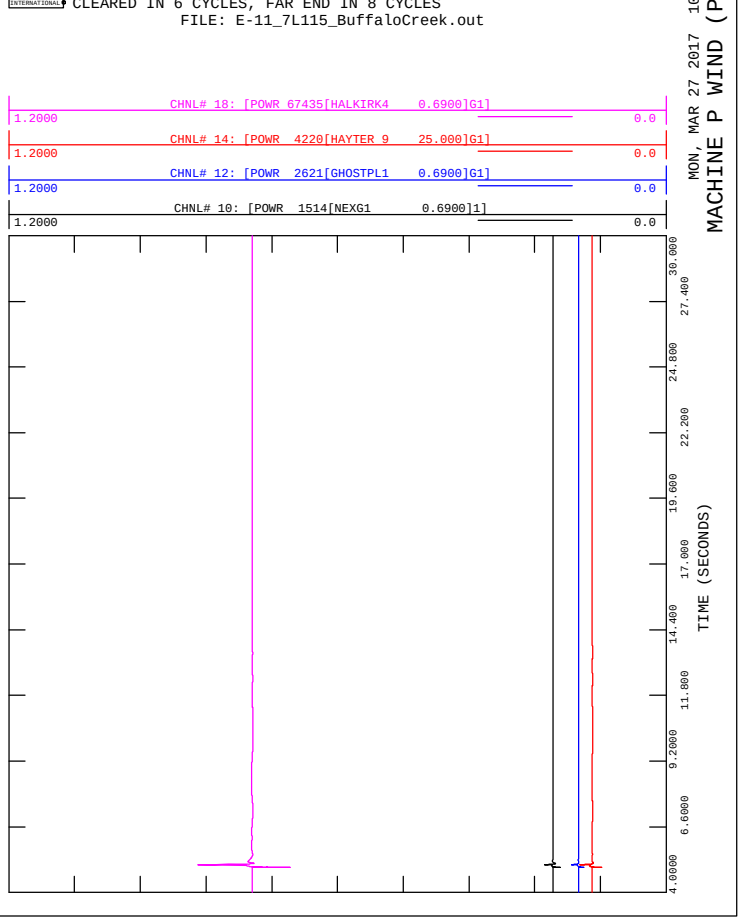


FIGURE E-11F
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-11_7L115_BuffaloCreek.out

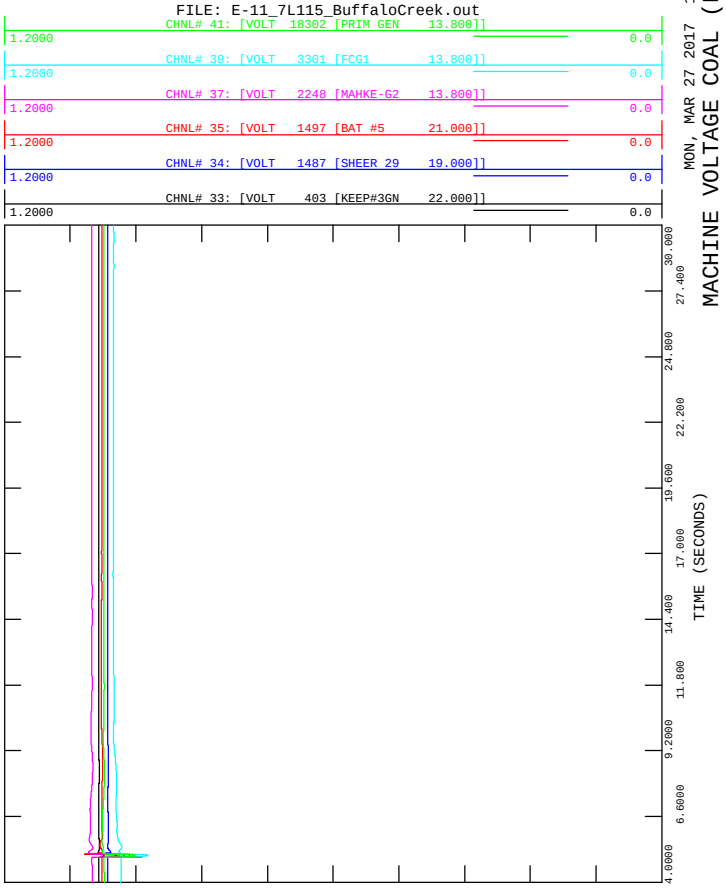


FIGURE E-11H
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-11_7L115_BuffaloCreek.out

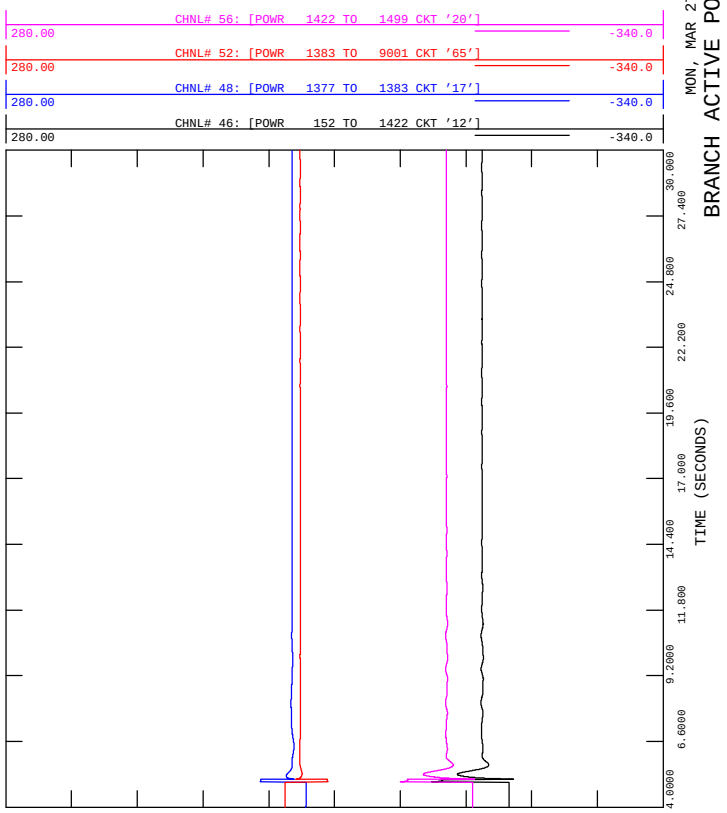


FIGURE E-11E
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-11_7L115_BuffaloCreek.out

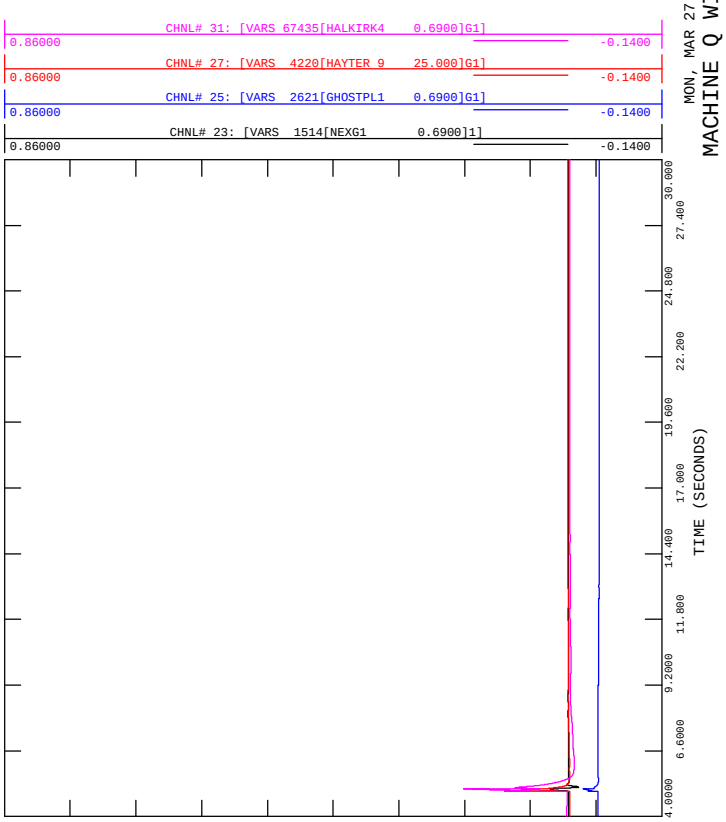


FIGURE E-11G
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-11_7L115_BuffaloCreek.out

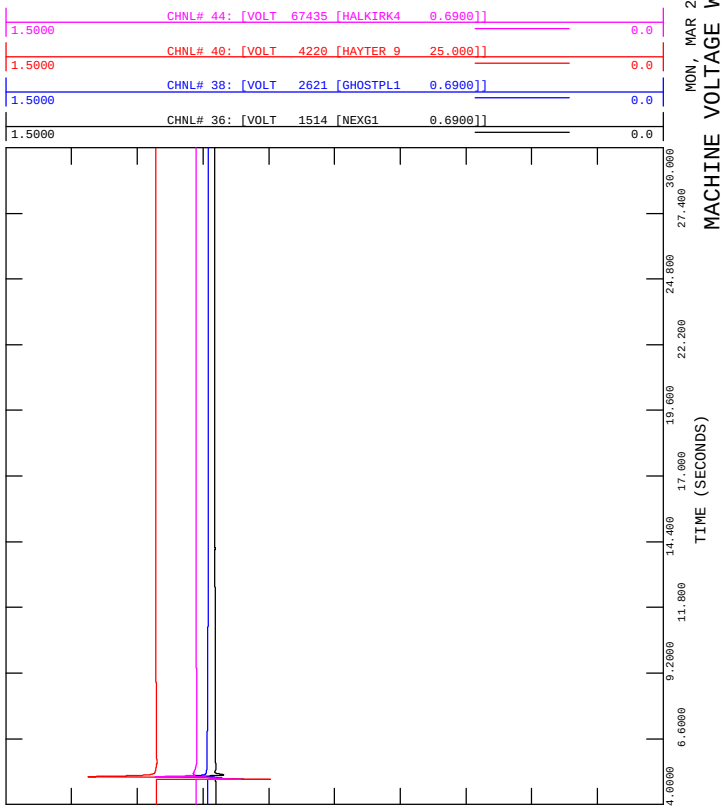


FIGURE E-11I
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-11_7L115_BuffaloCreek.out

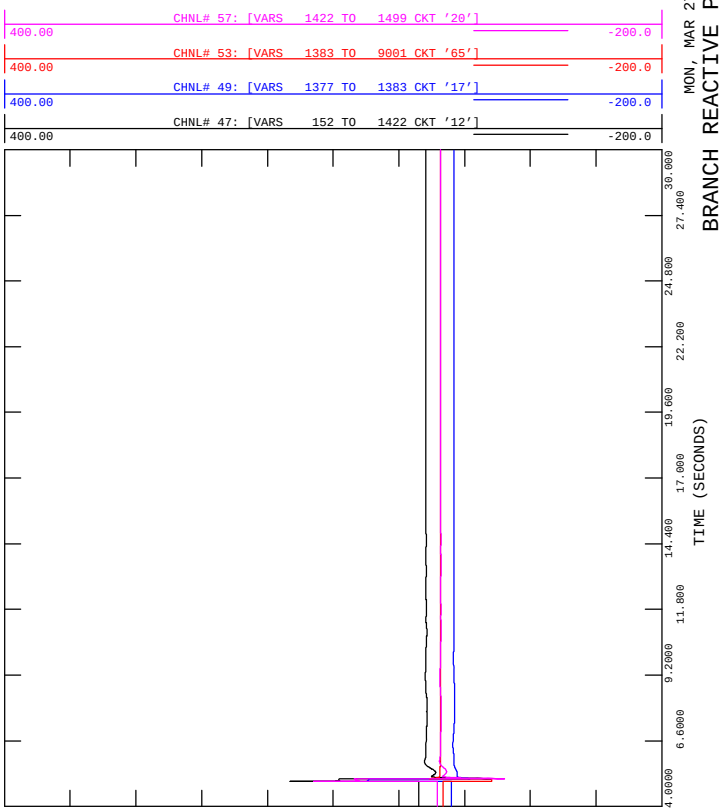


FIGURE E-12B
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-12_7L115_Kinsella.out

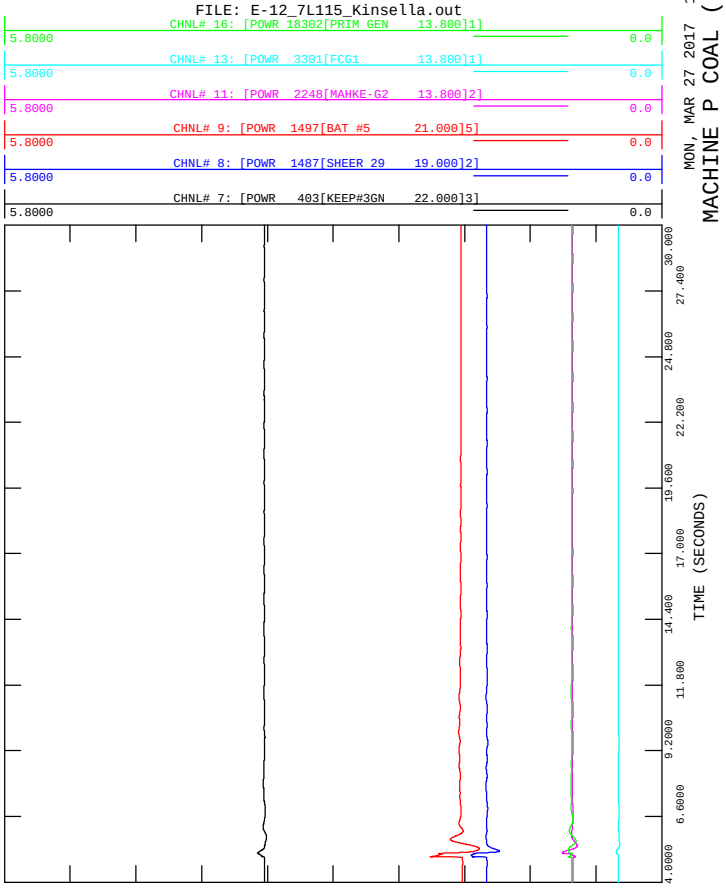


FIGURE E-12D
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-12_7L115_Kinsella.out

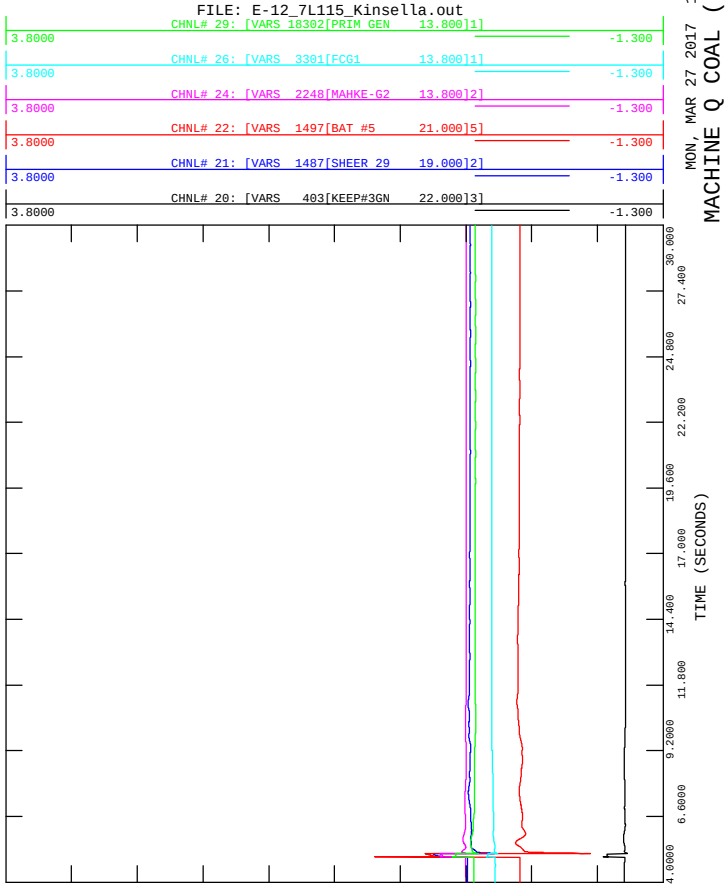


FIGURE E-12A
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-12_7L115_Kinsella.out

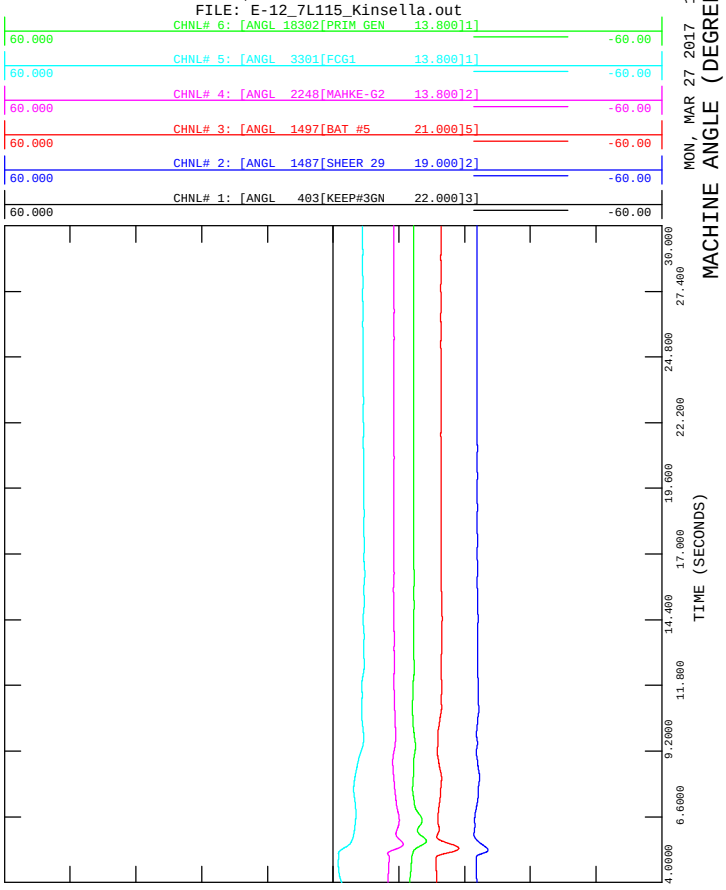


FIGURE E-12C
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-12_7L115_Kinsella.out

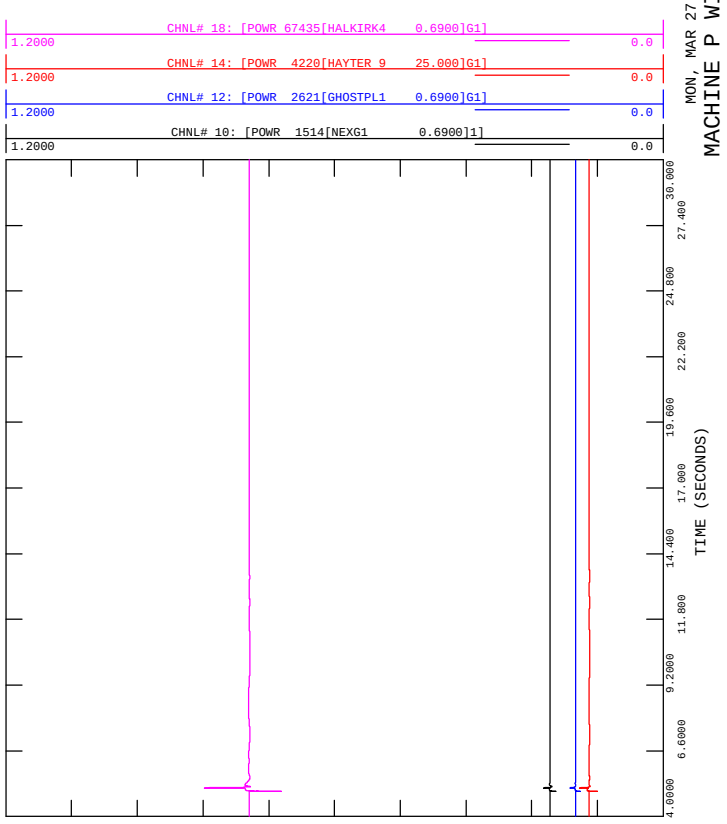


FIGURE E-12F
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-12_7L115_Kinsella.out

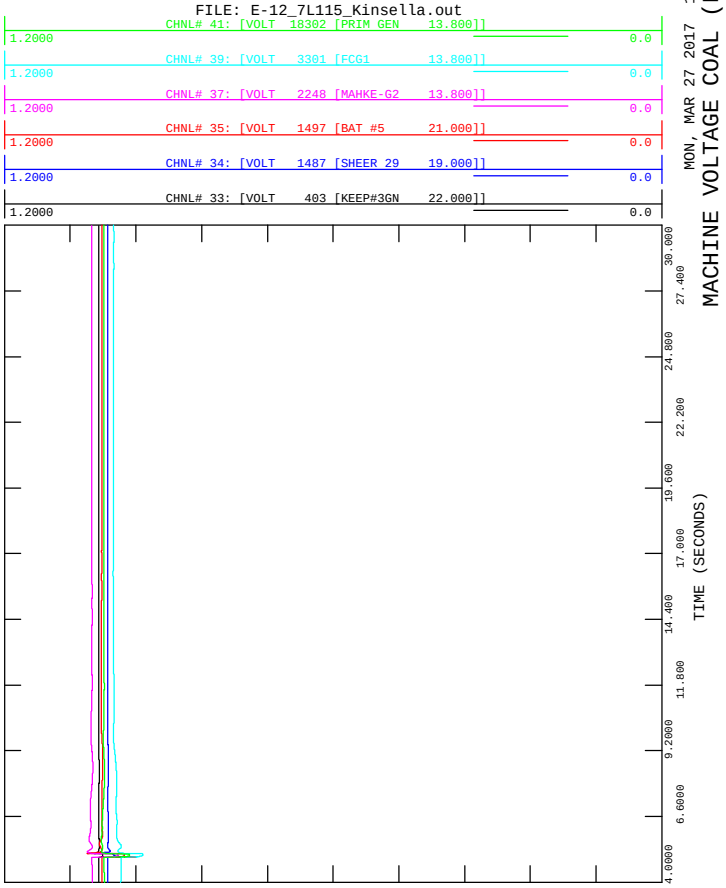


FIGURE E-12H
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-12_7L115_Kinsella.out

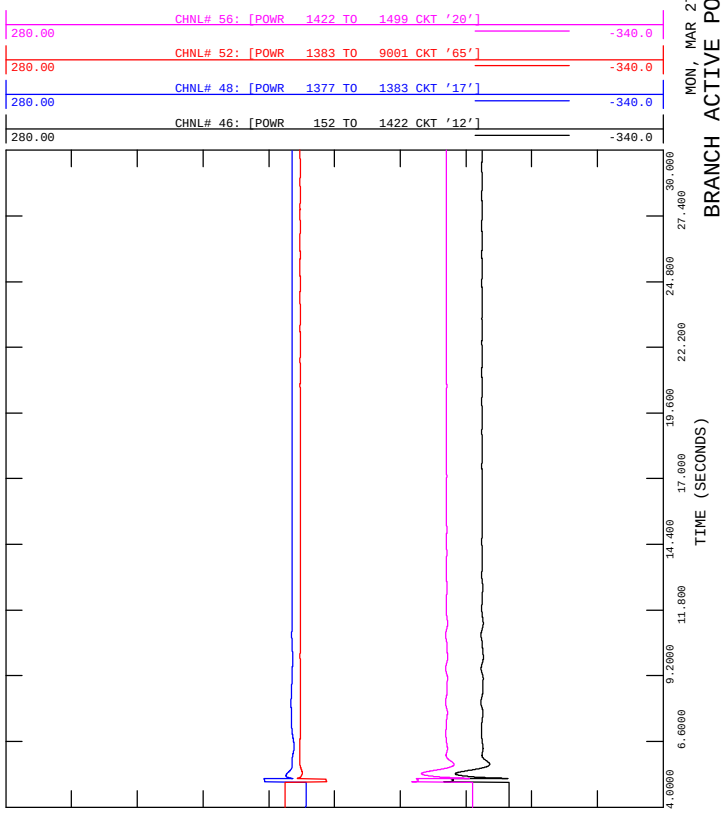


FIGURE E-12E
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-12_7L115_Kinsella.out

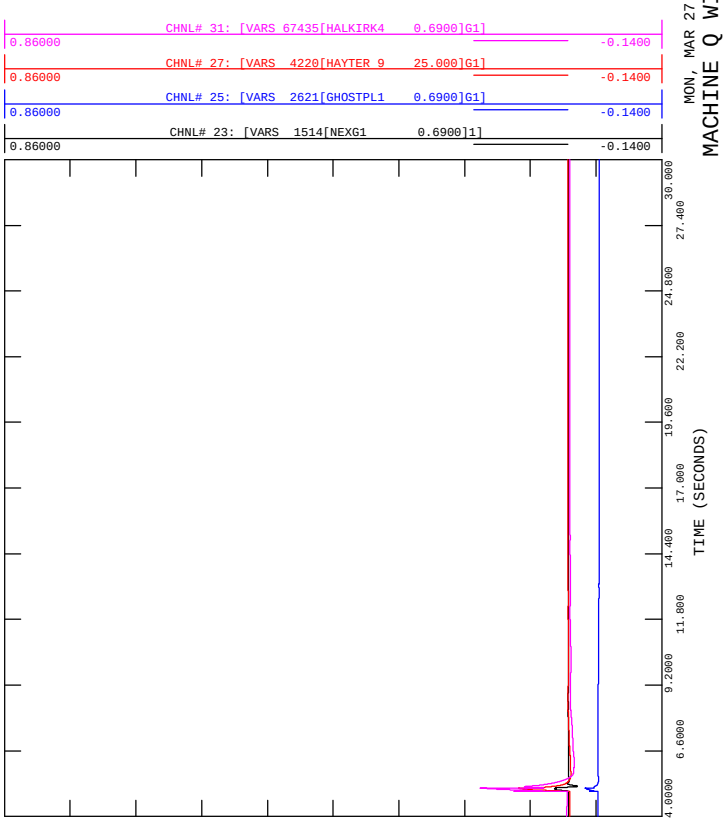


FIGURE E-12G
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-12_7L115_Kinsella.out

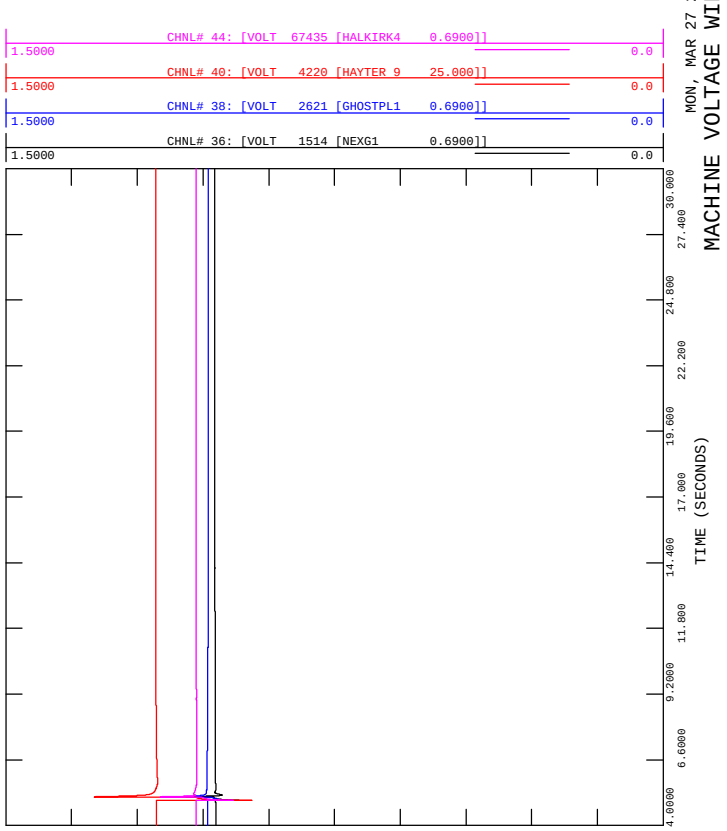


FIGURE E-12I
2017SL, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-12_7L115_Kinsella.out

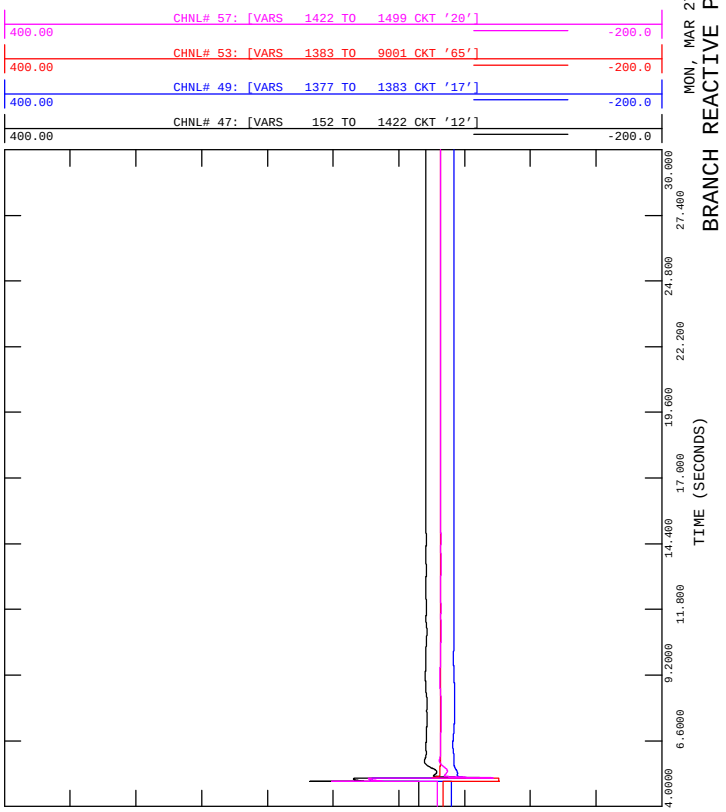


FIGURE E-13B
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-13_7L117_IrishCreek.out

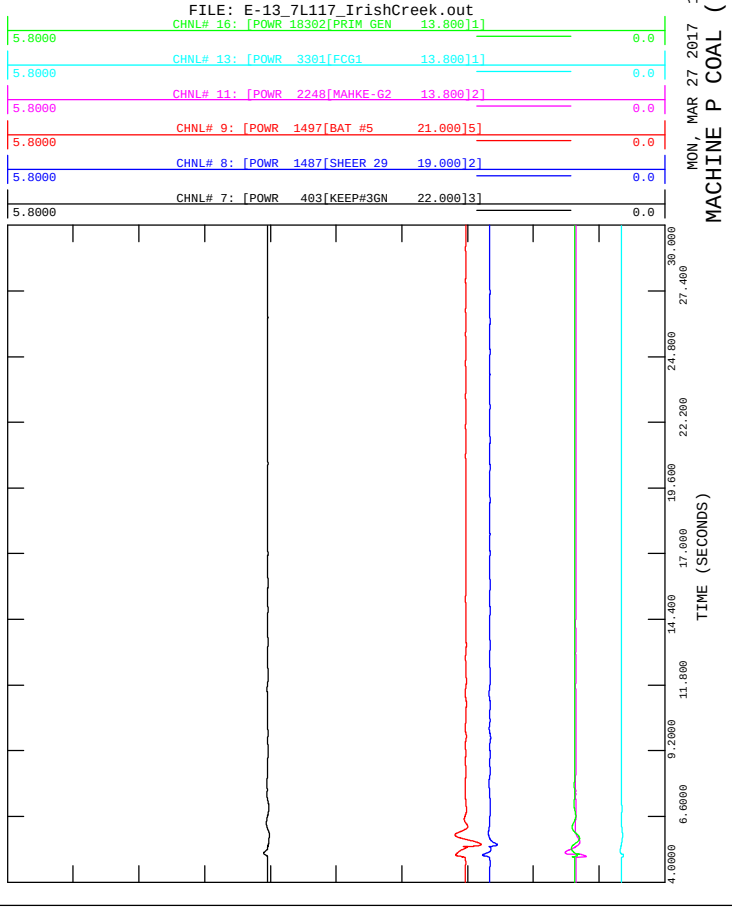


FIGURE E-13D
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-13_7L117_IrishCreek.out

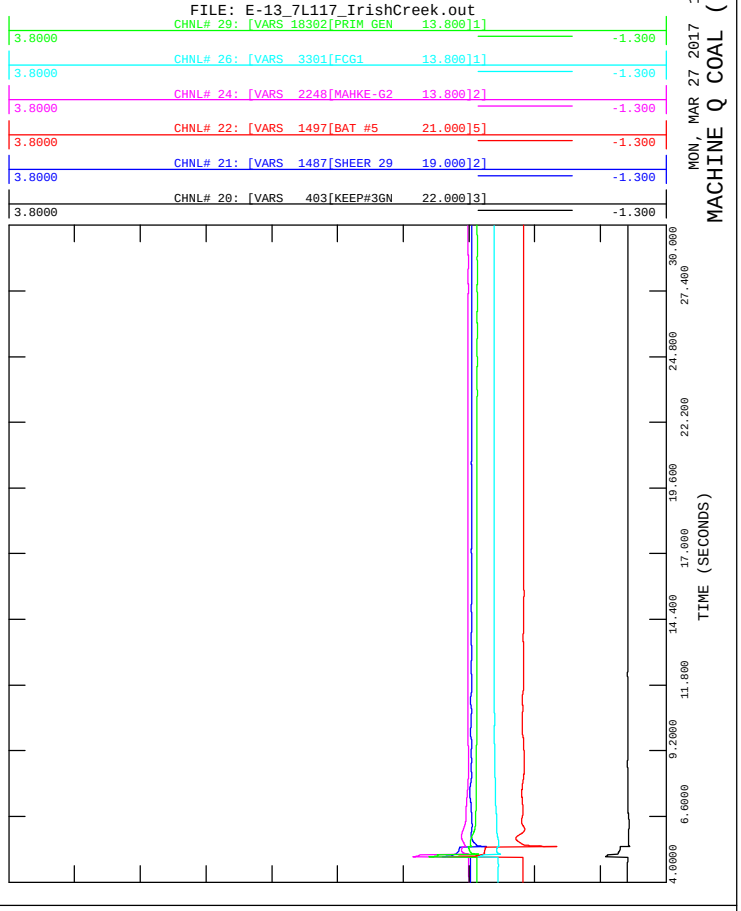


FIGURE E-13A
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-13_7L117_IrishCreek.out

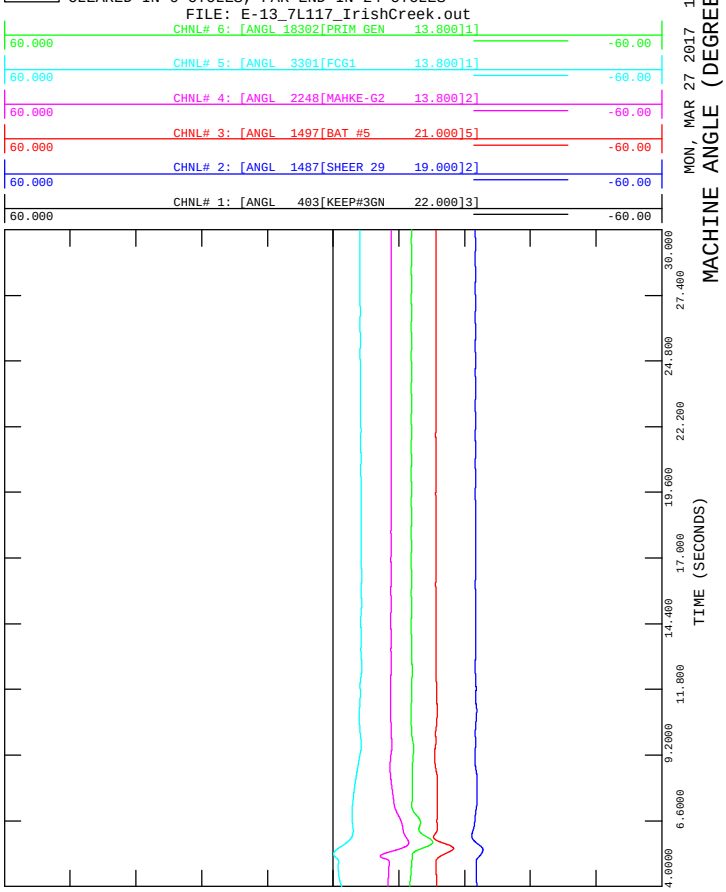


FIGURE E-13C
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-13_7L117_IrishCreek.out

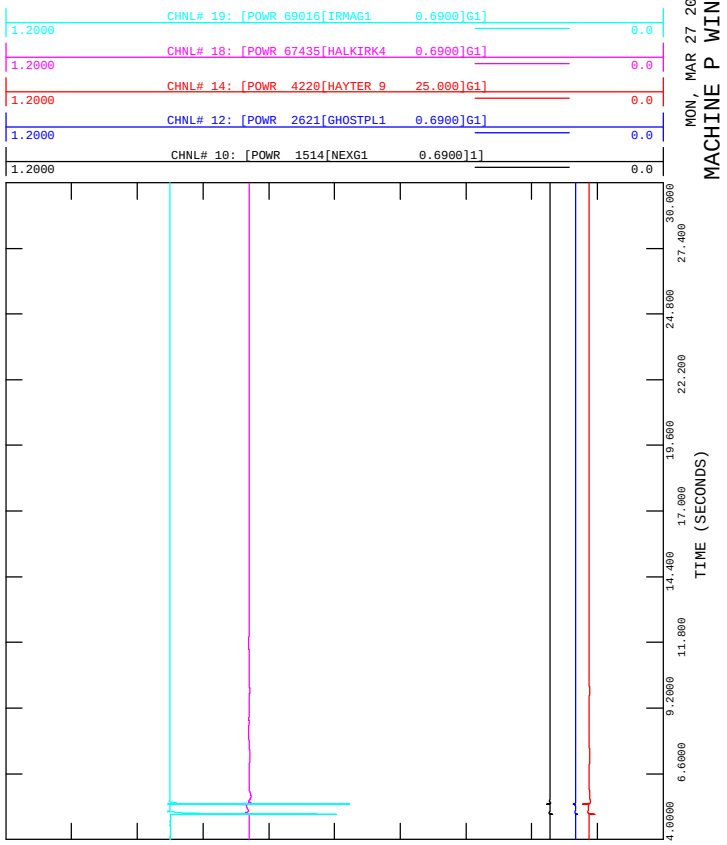


FIGURE E-13F
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-13_7L117_IrishCreek.out

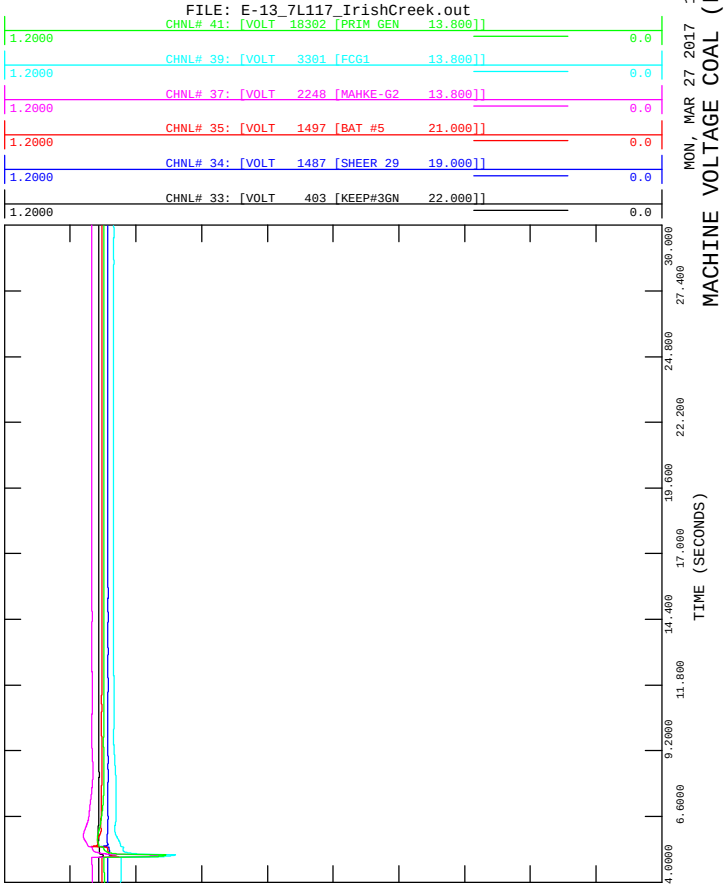


FIGURE E-13H
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-13_7L117_IrishCreek.out

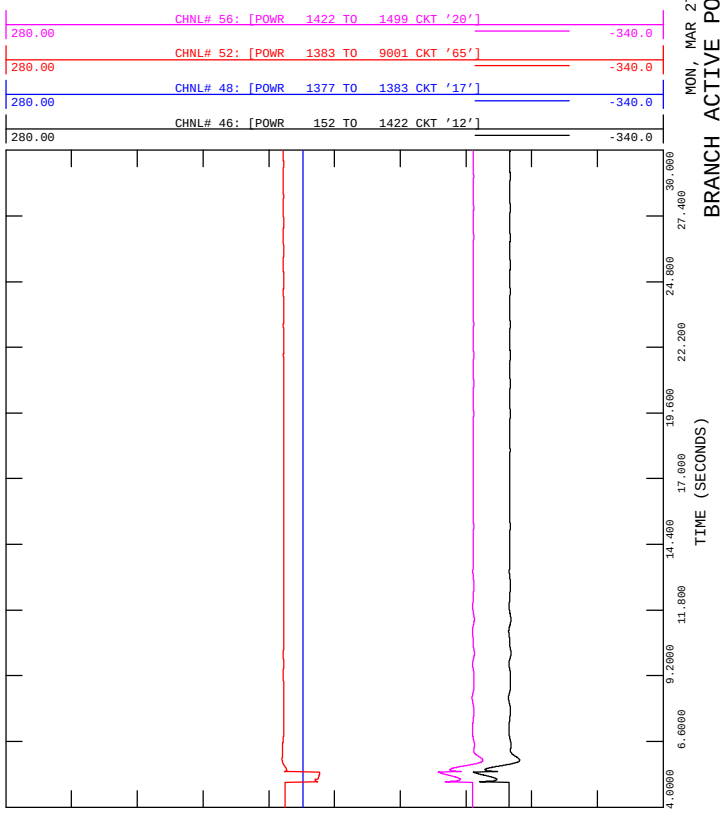


FIGURE E-13E
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-13_7L117_IrishCreek.out

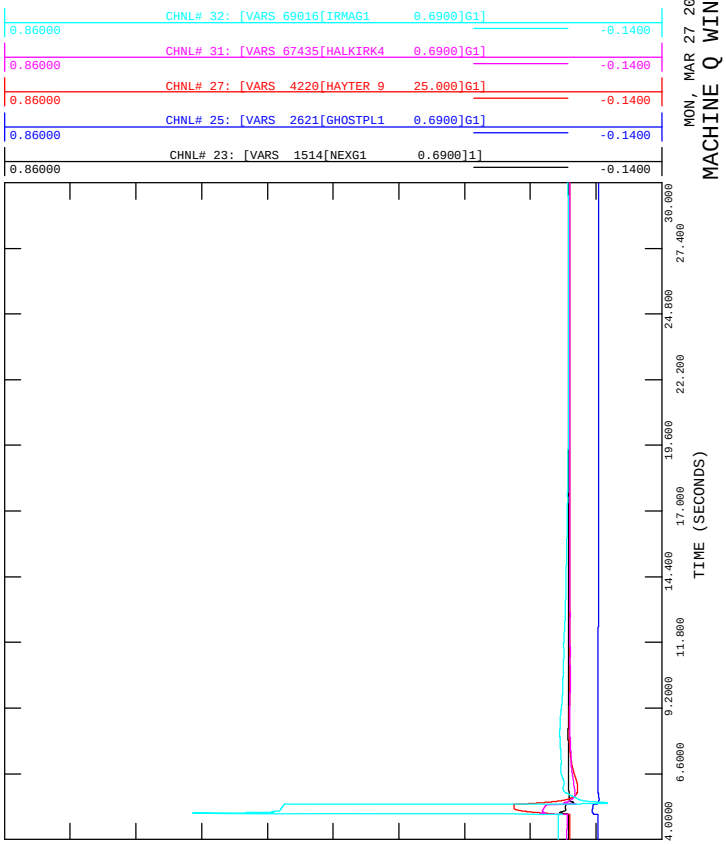


FIGURE E-13G
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-13_7L117_IrishCreek.out

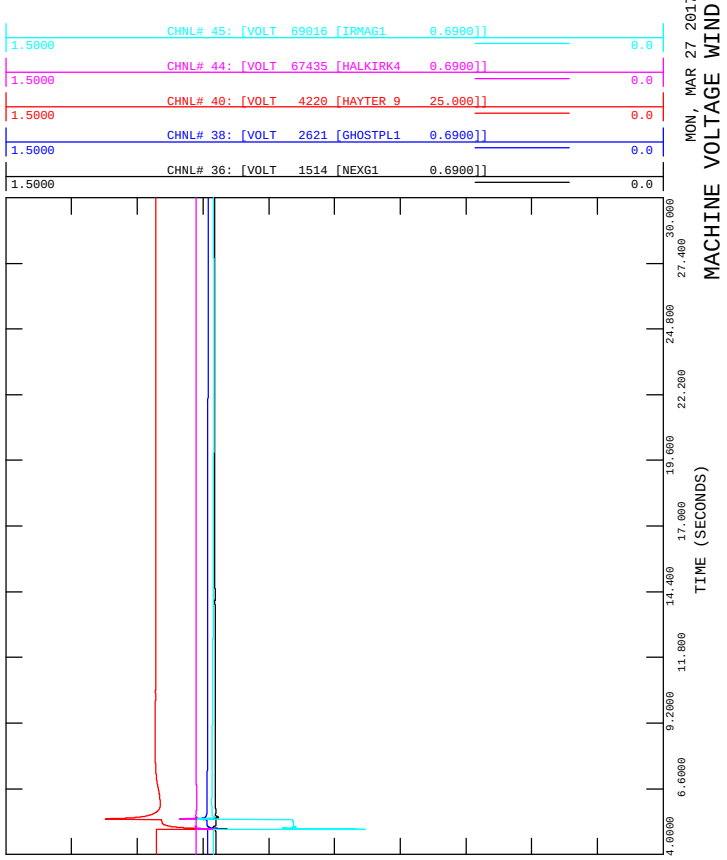


FIGURE E-13I
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-13_7L117_IrishCreek.out

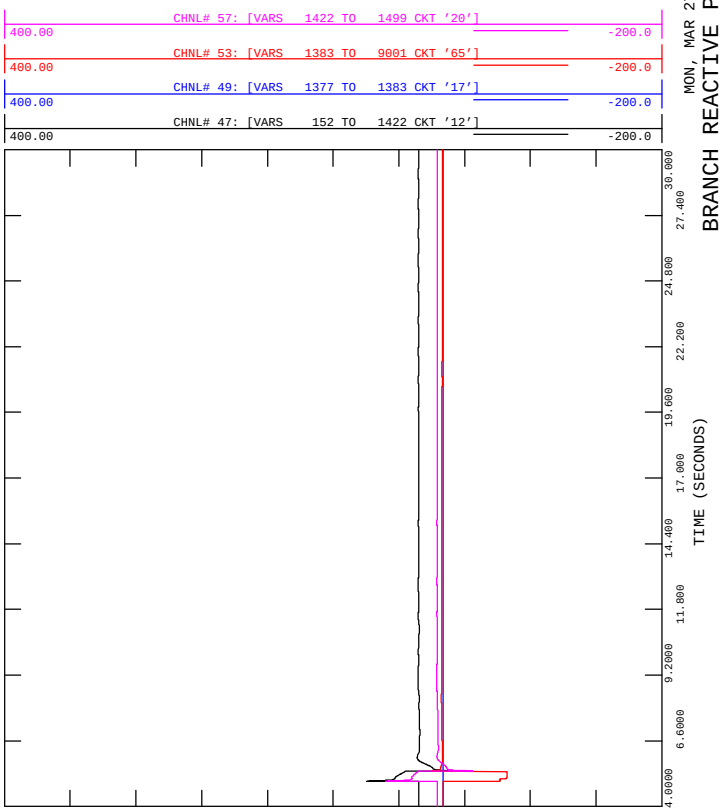


FIGURE E-14B
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-14_7L117_Vermillion.out

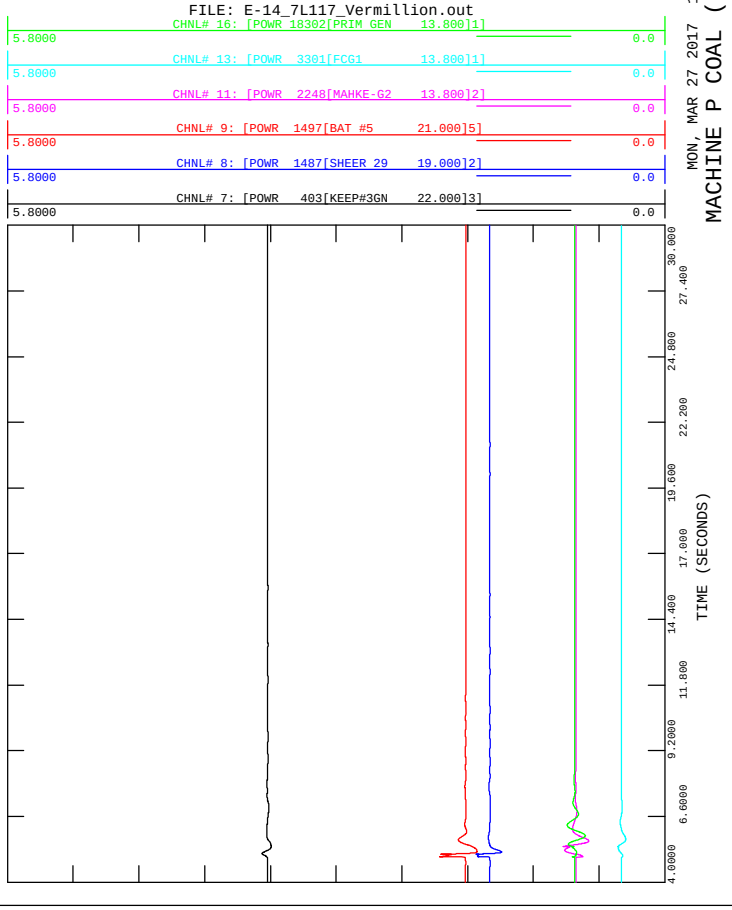


FIGURE E-14D
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-14_7L117_Vermillion.out

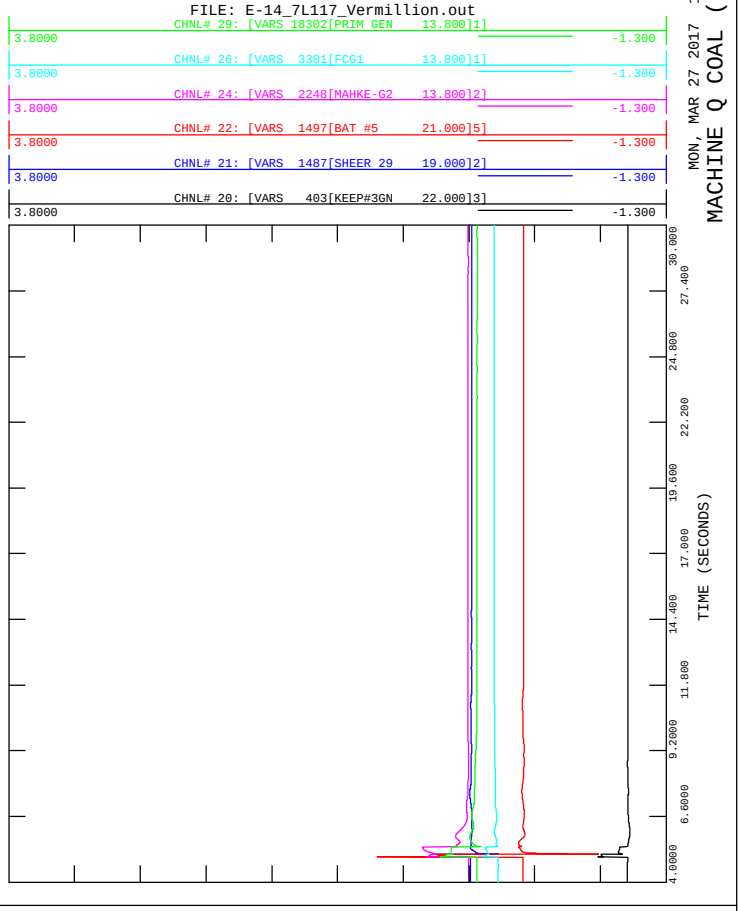


FIGURE E-14A
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-14_7L117_Vermillion.out

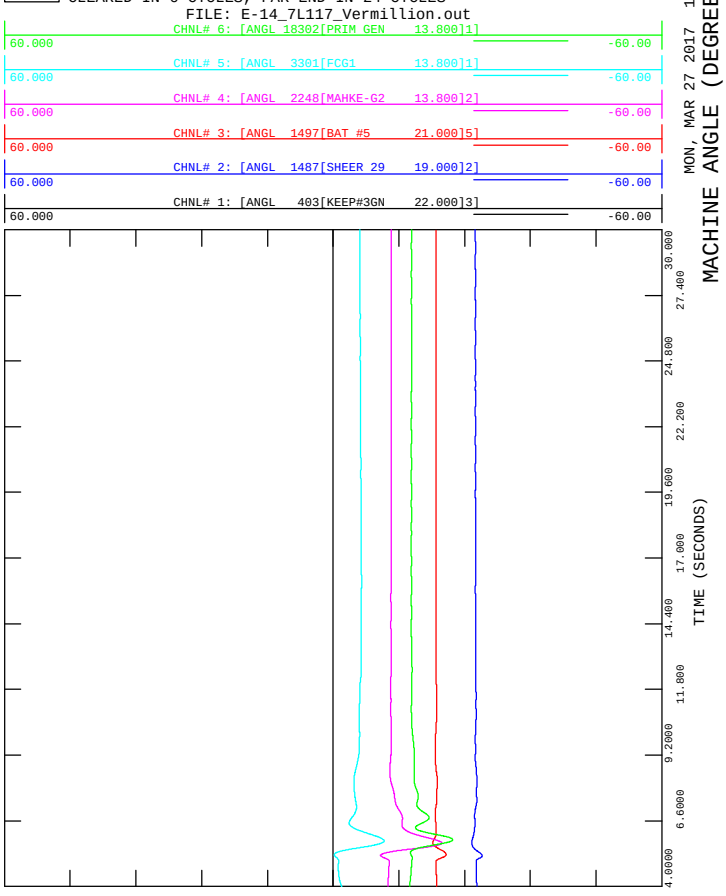


FIGURE E-14C
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-14_7L117_Vermillion.out

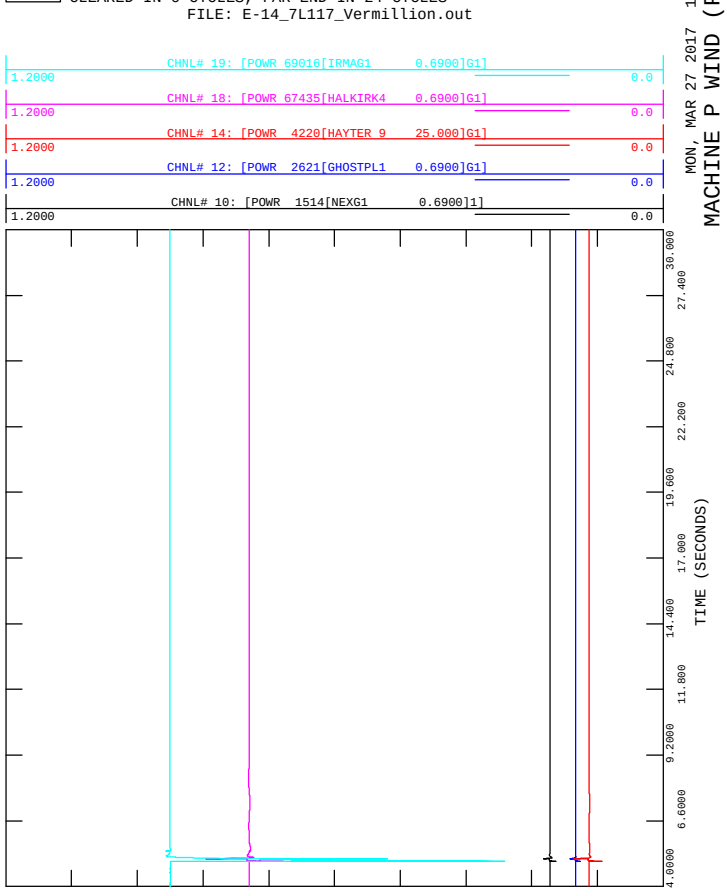


FIGURE E-14F
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-14_7L117_Vermillion.out

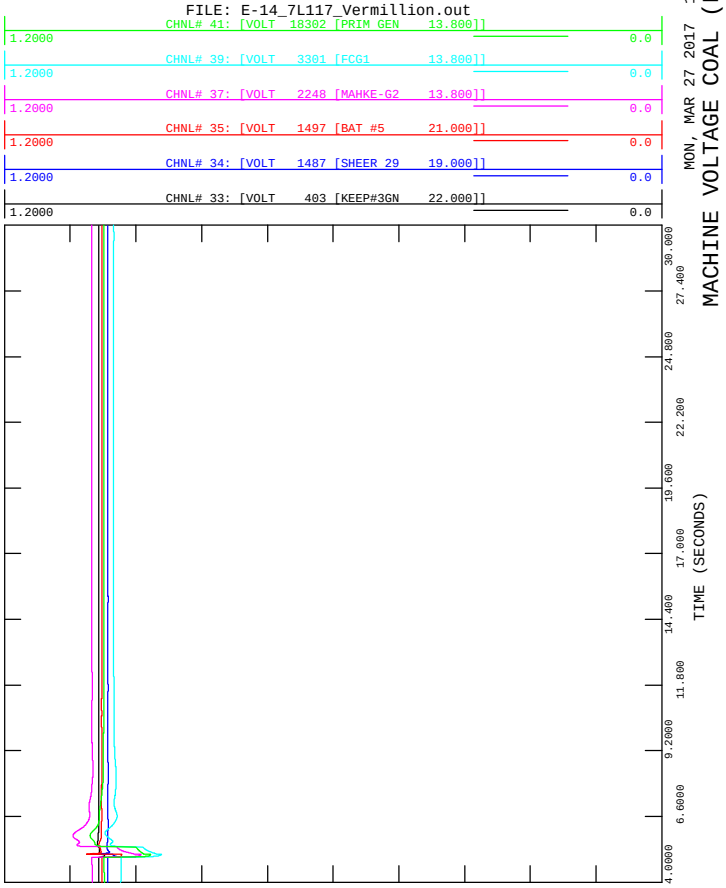


FIGURE E-14H
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-14_7L117_Vermillion.out

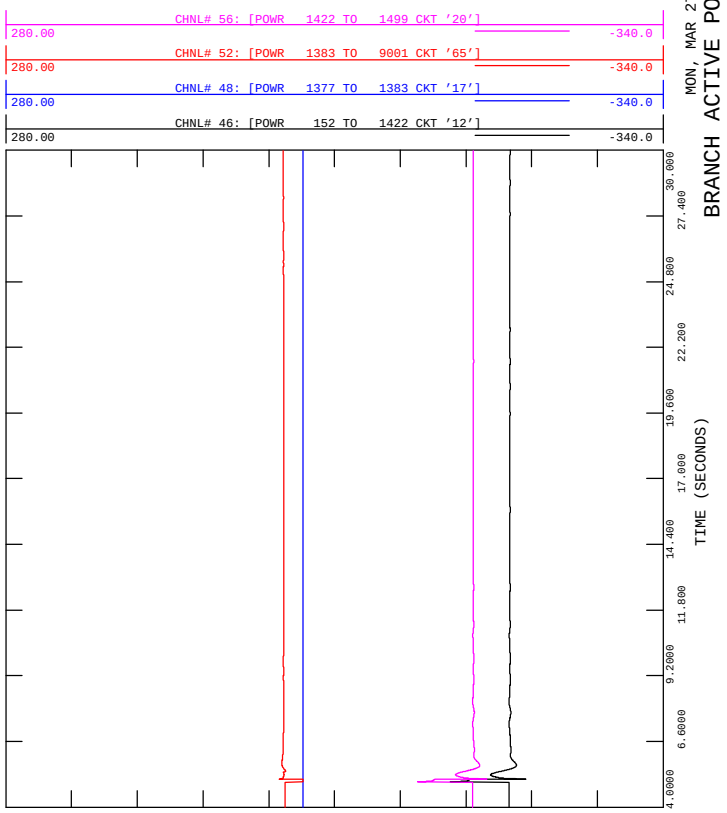


FIGURE E-14E
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-14_7L117_Vermillion.out

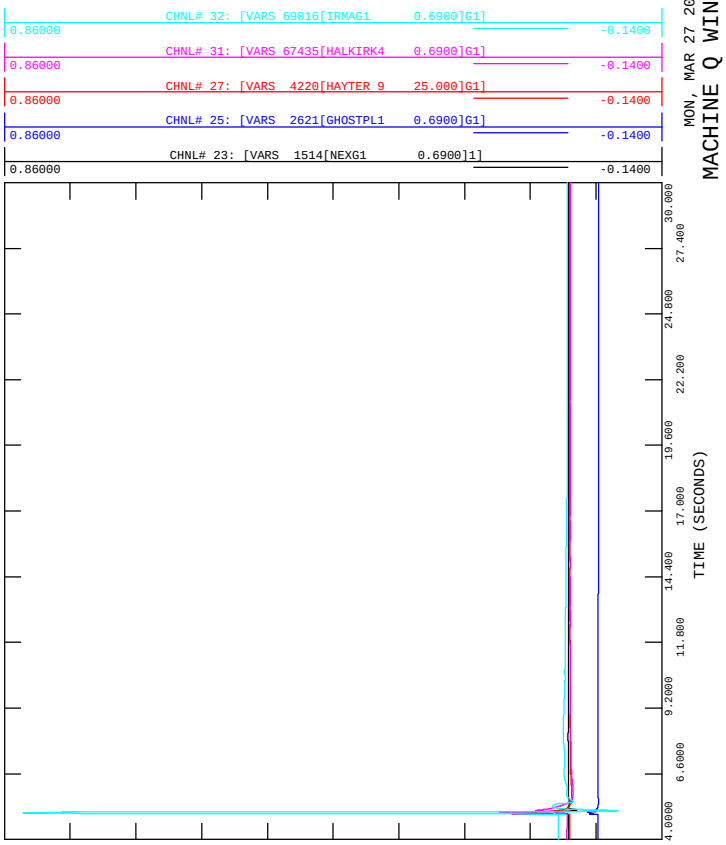


FIGURE E-14G
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-14_7L117_Vermillion.out

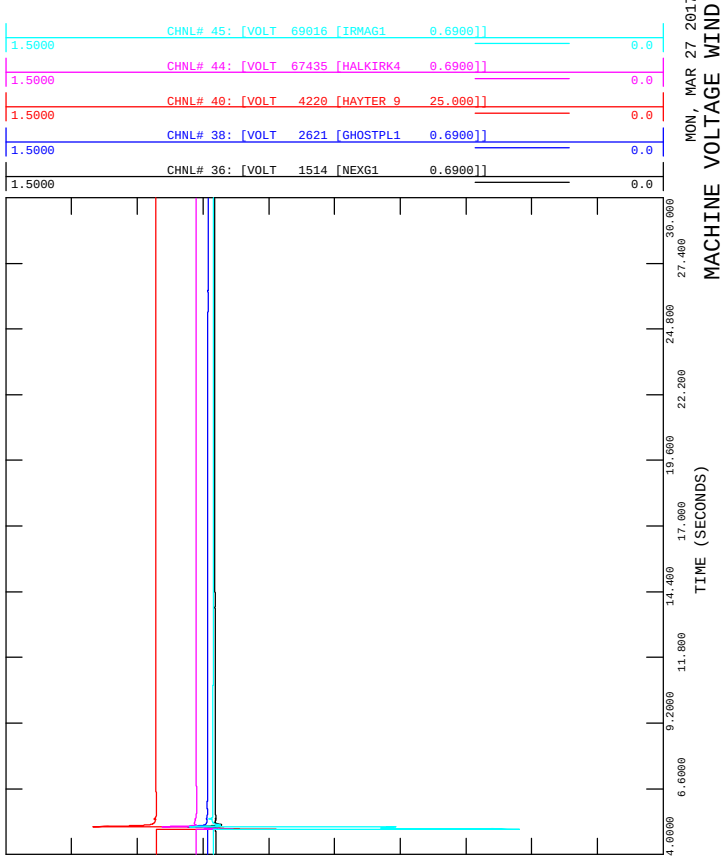


FIGURE E-14I
2017SL, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-14_7L117_Vermillion.out

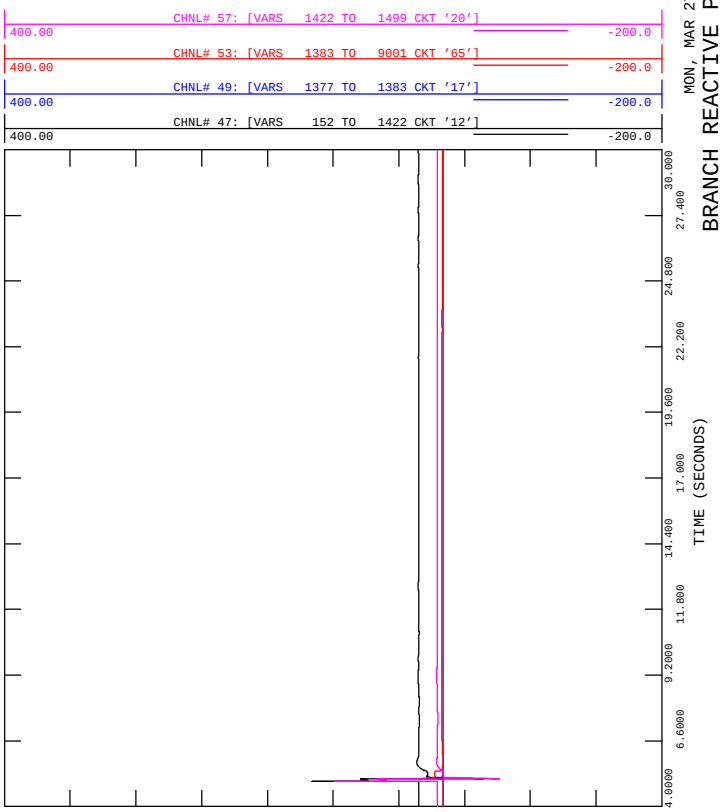


FIGURE E-15B
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L129_Buffalo.out

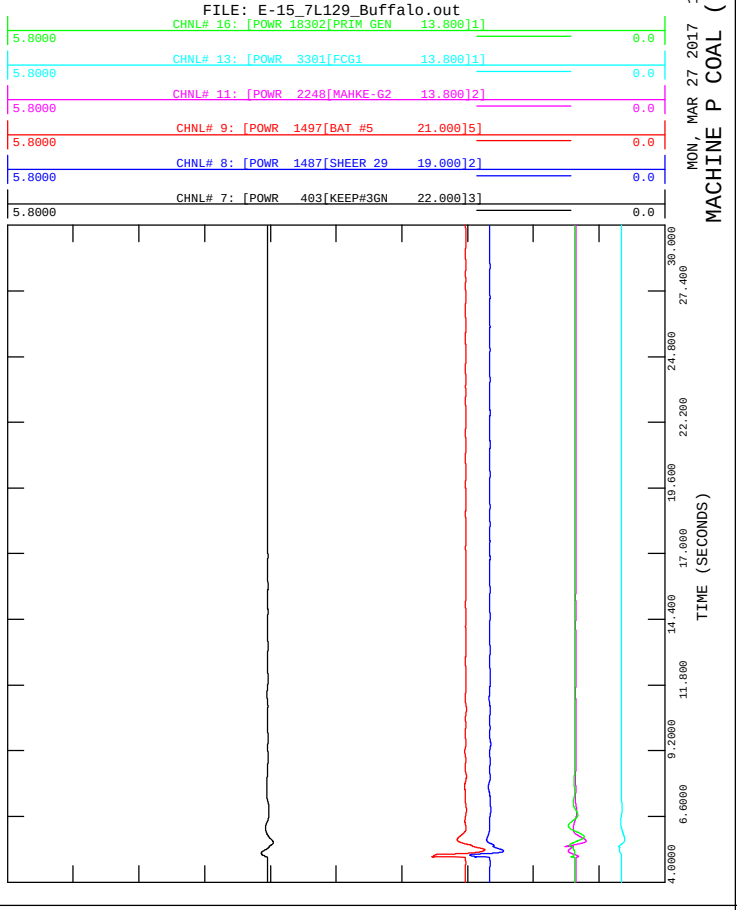


FIGURE E-15D
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L129_Buffalo.out

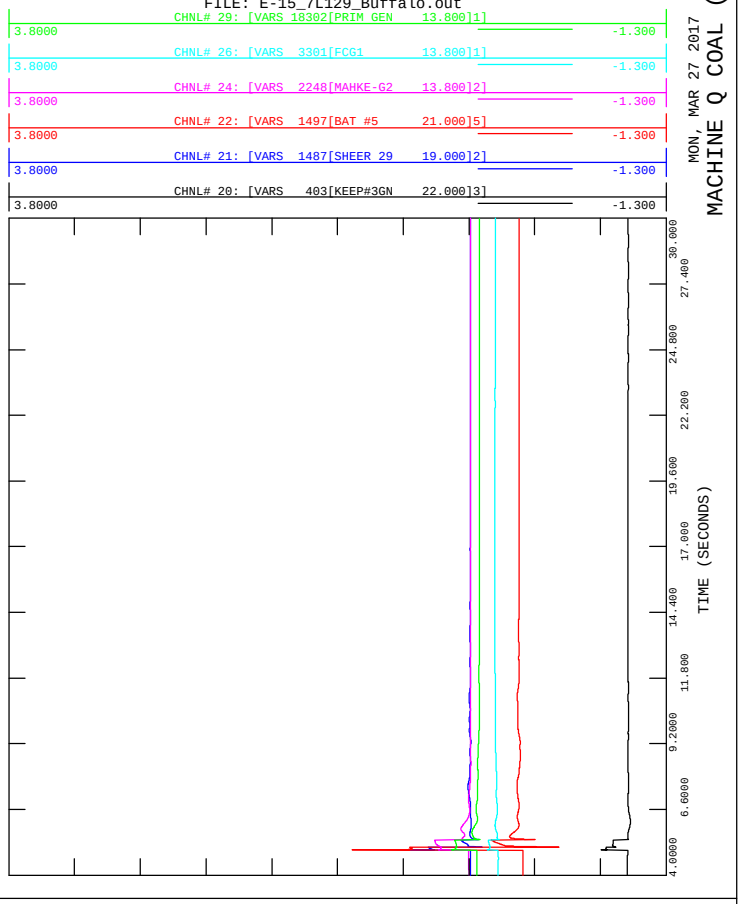


FIGURE E-15A
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L129_Buffalo.out

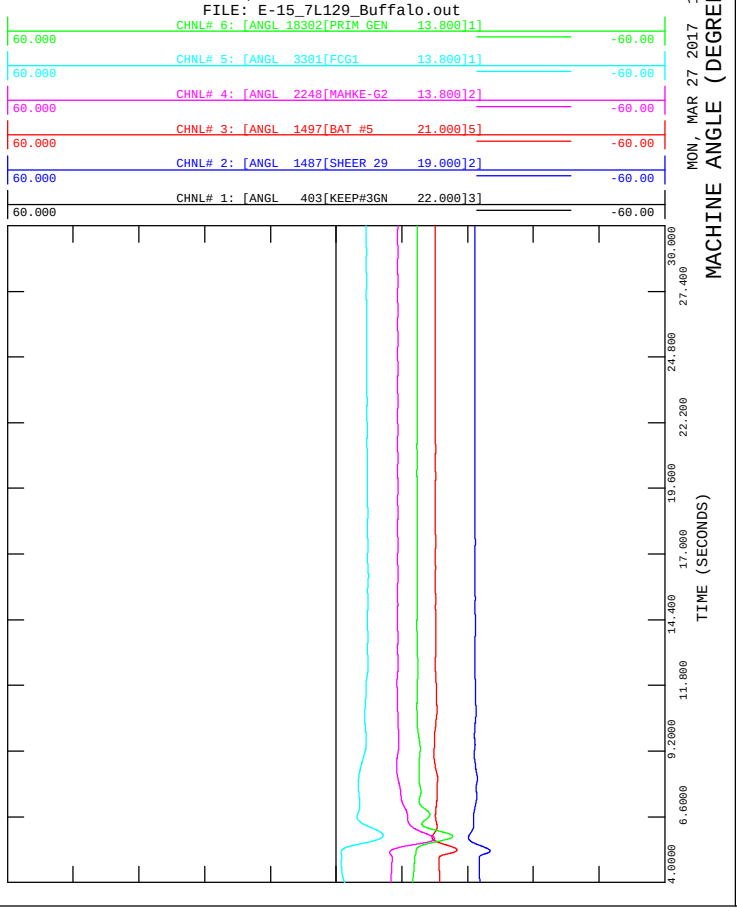


FIGURE E-15C
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L129_Buffalo.out

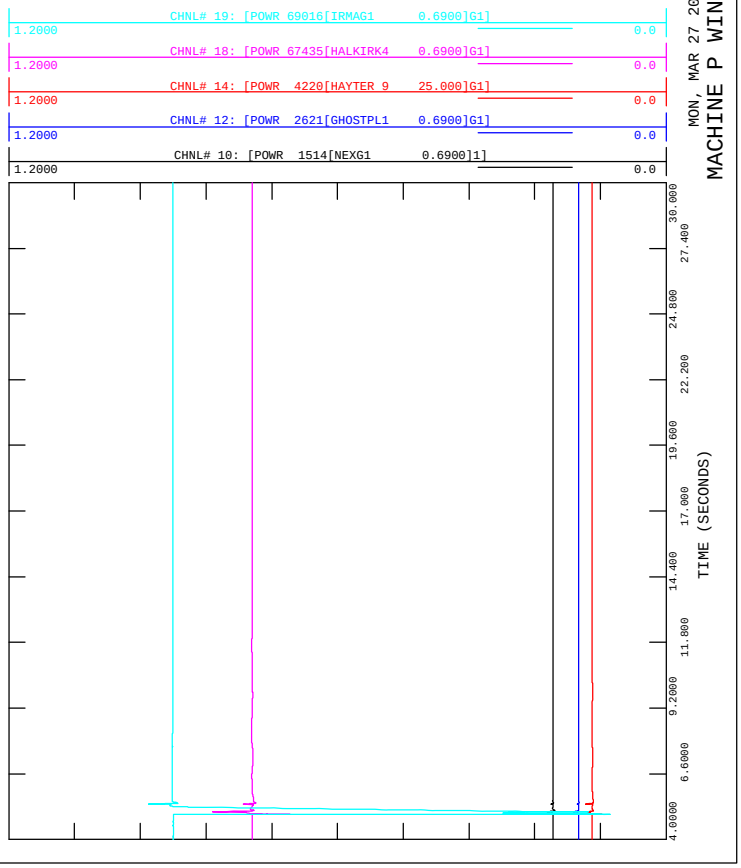


FIGURE E-15F
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L129_Buffalo.out

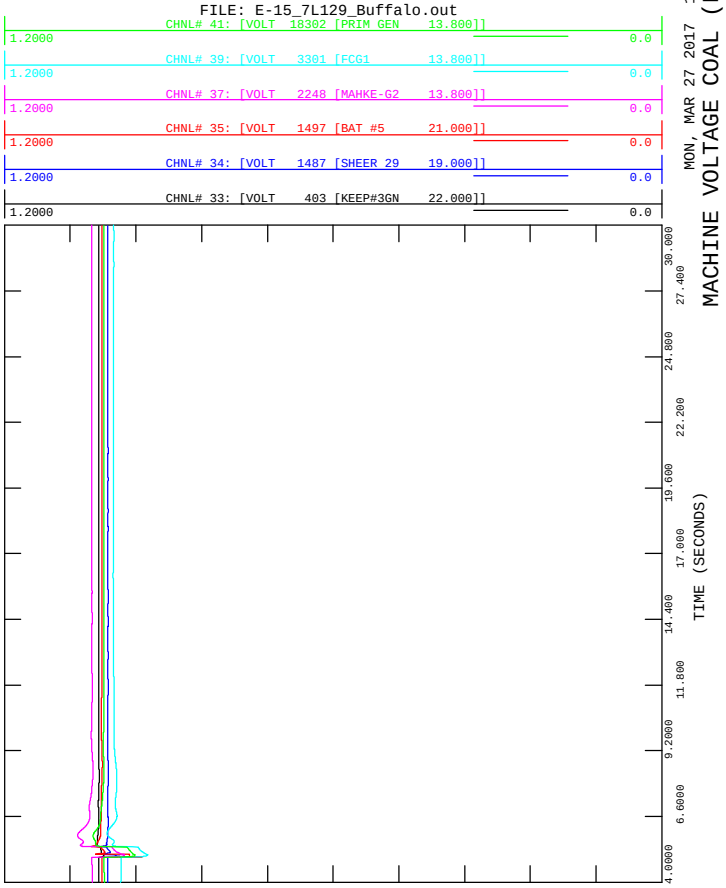


FIGURE E-15H
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L129_Buffalo.out

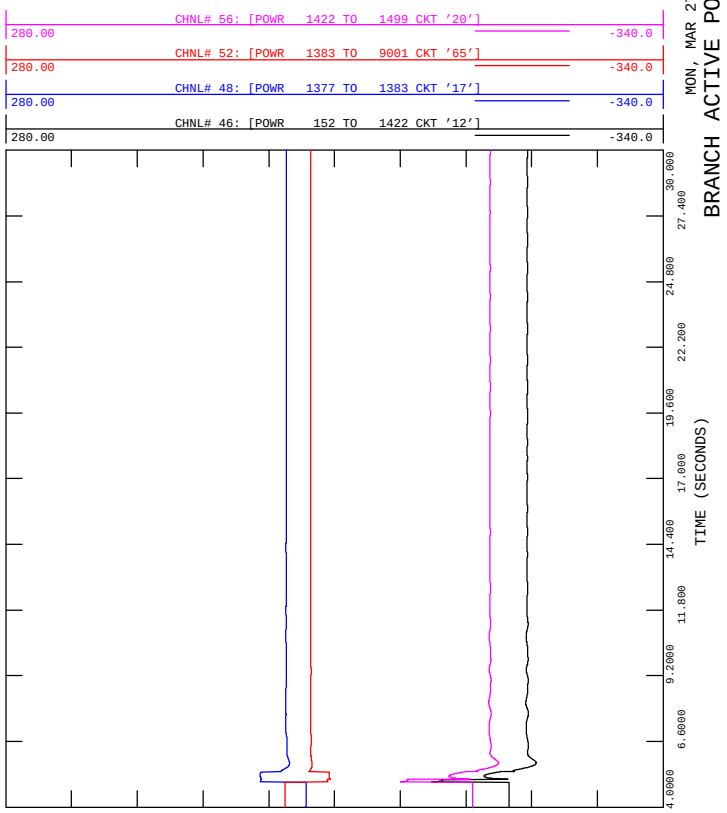


FIGURE E-15E
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L129_Buffalo.out

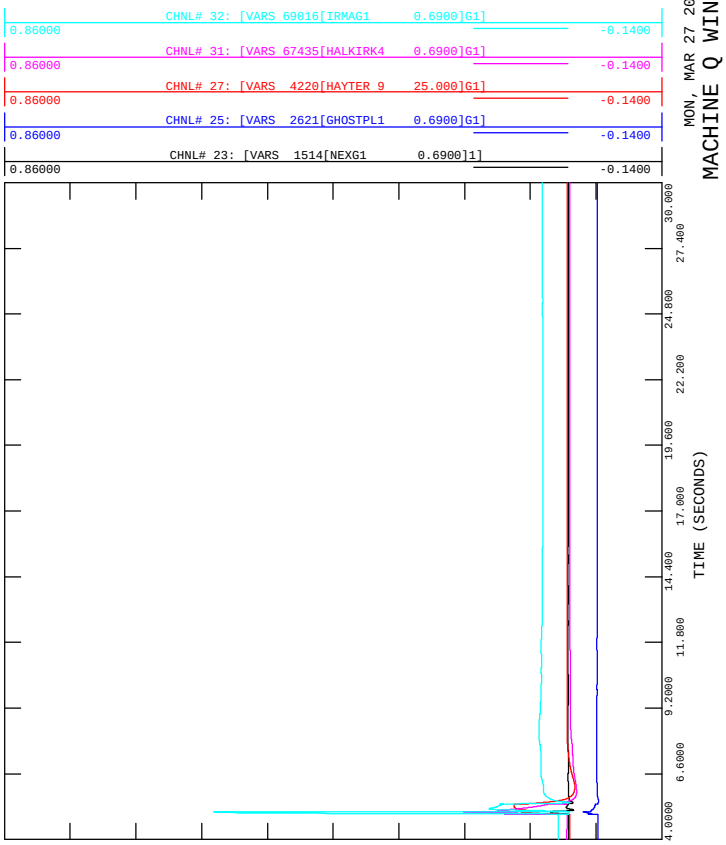


FIGURE E-15G
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L129_Buffalo.out

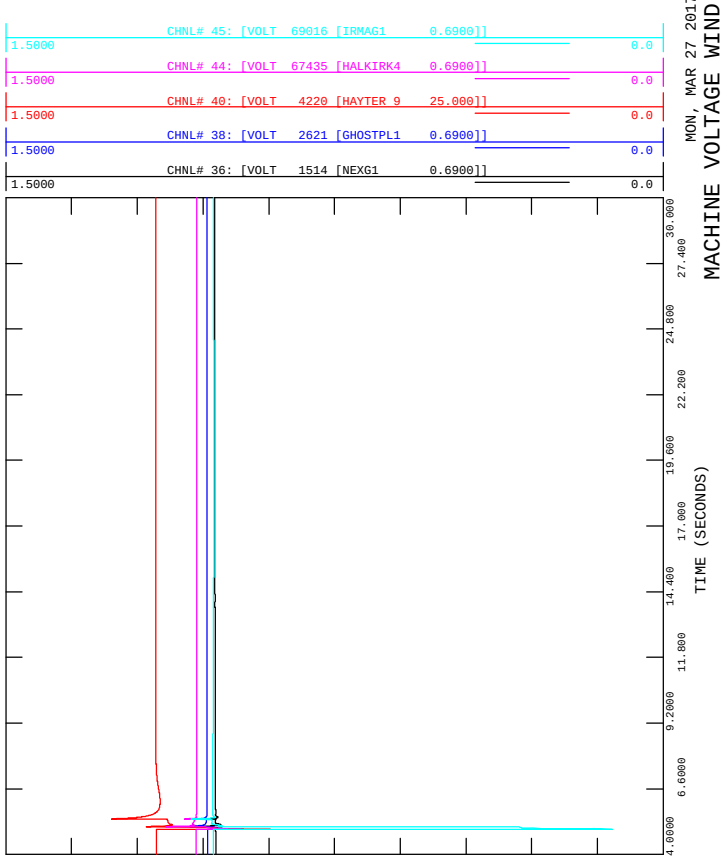


FIGURE E-15I
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L129_Buffalo.out

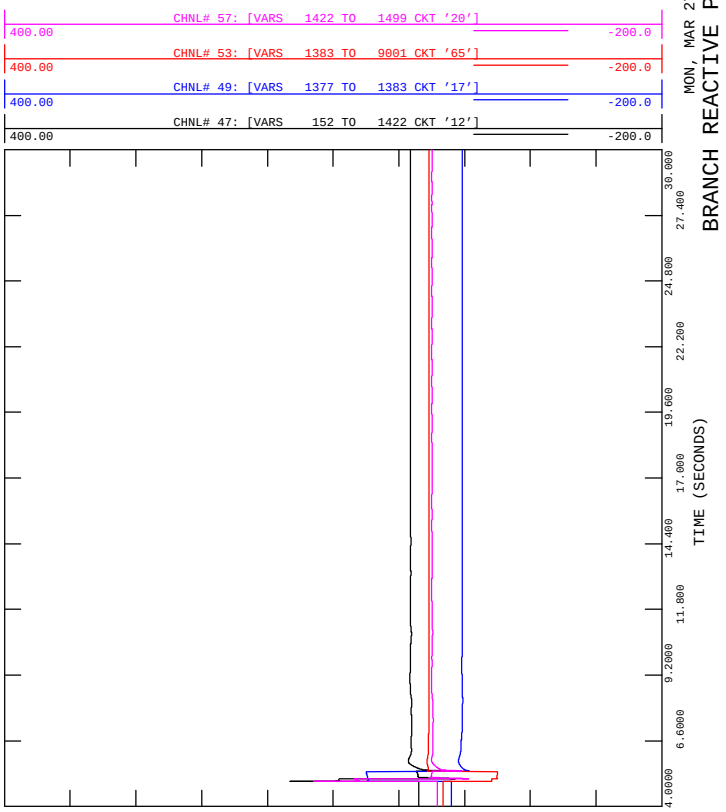


FIGURE E-16B
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: E-16_7L129_Vermilion.out

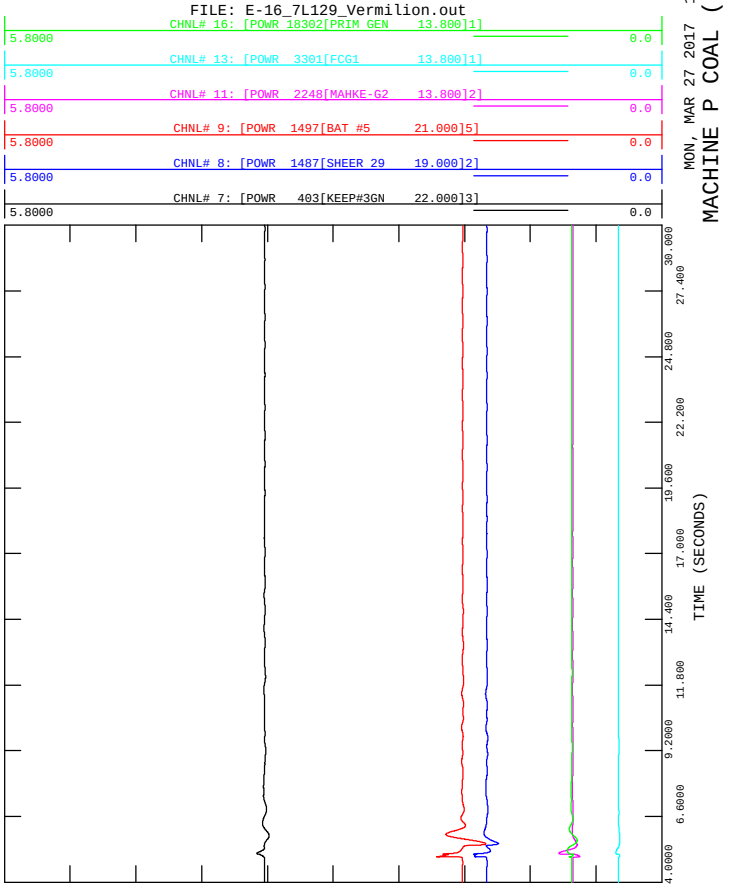


FIGURE E-16D
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: E-16_7L129_Vermilion.out

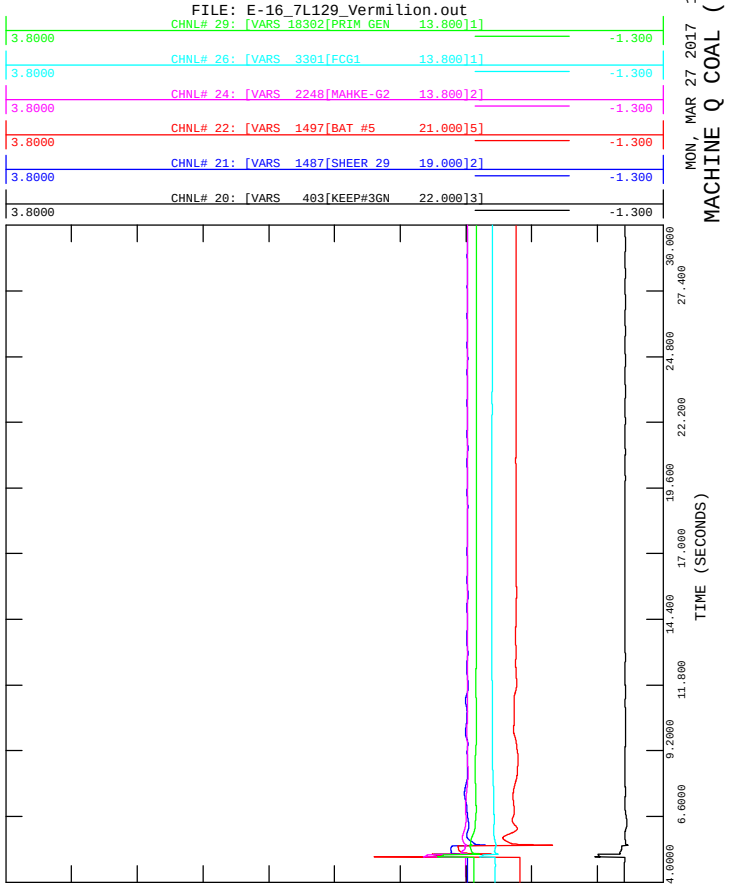


FIGURE E-16A
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: E-16_7L129_Vermilion.out

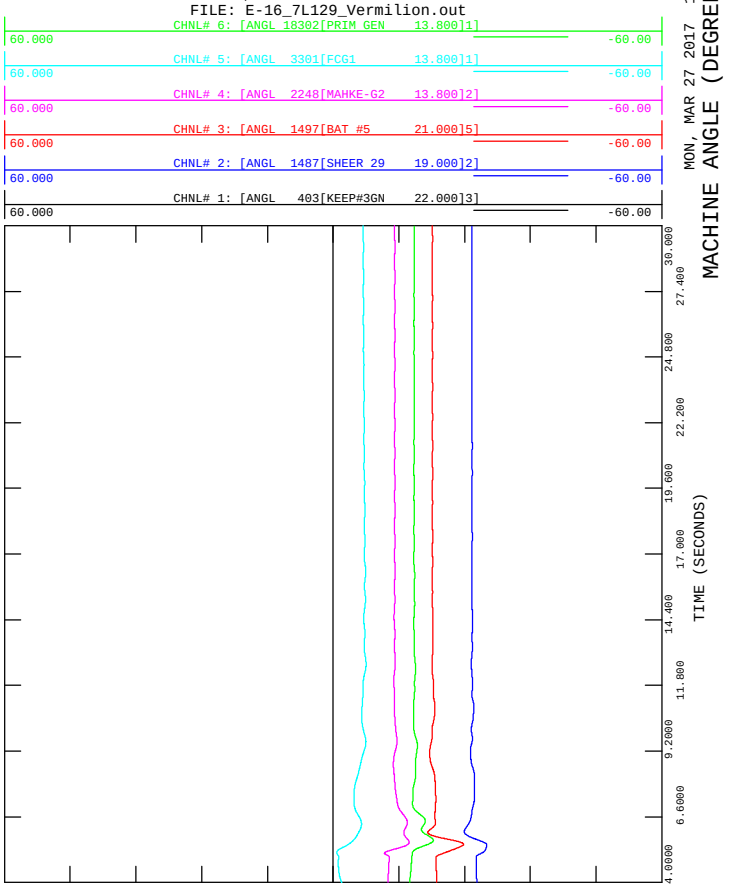


FIGURE E-16C
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: E-16_7L129_Vermilion.out

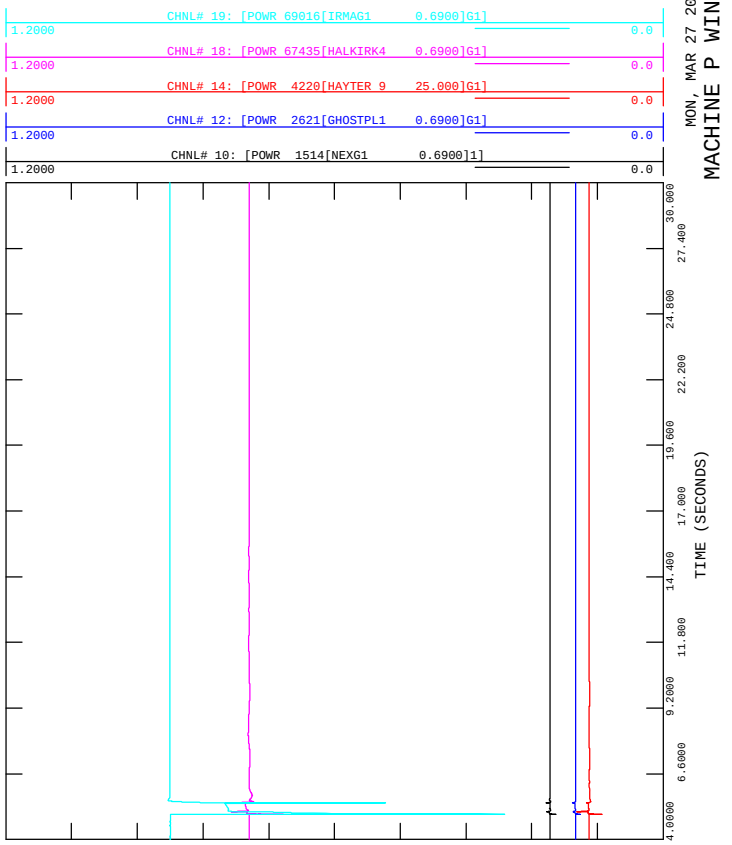


FIGURE E-16F
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: E-16_7L129_Vermilion.out

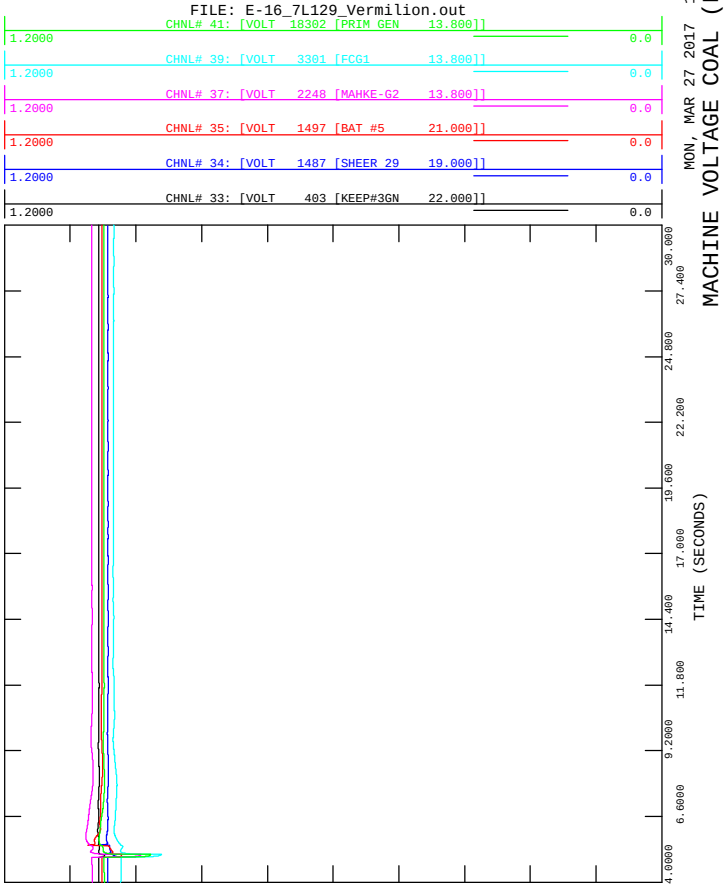


FIGURE E-16H
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: E-16_7L129_Vermilion.out

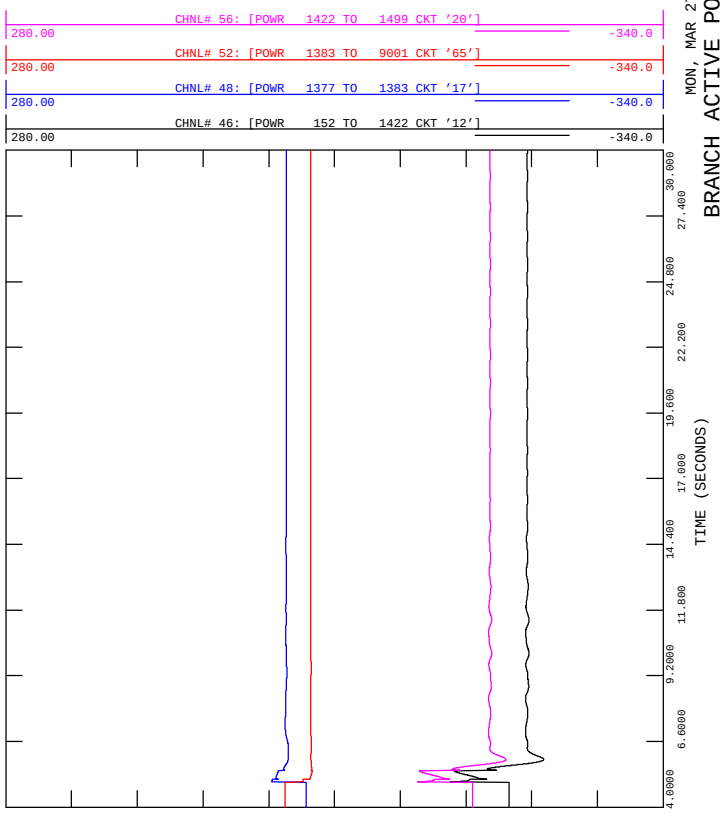


FIGURE E-16E
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: E-16_7L129_Vermilion.out

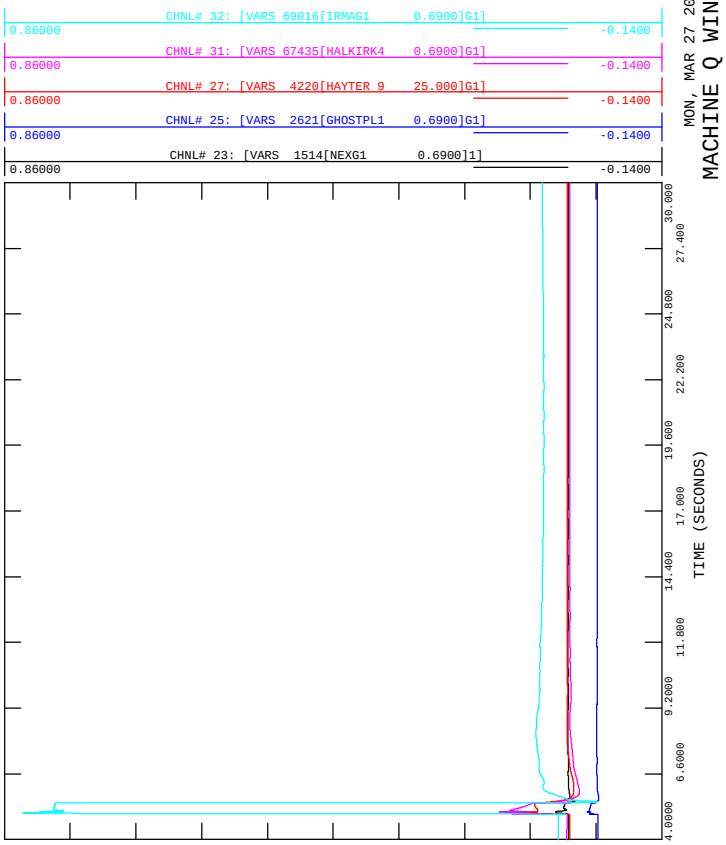


FIGURE E-16G
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: E-16_7L129_Vermilion.out

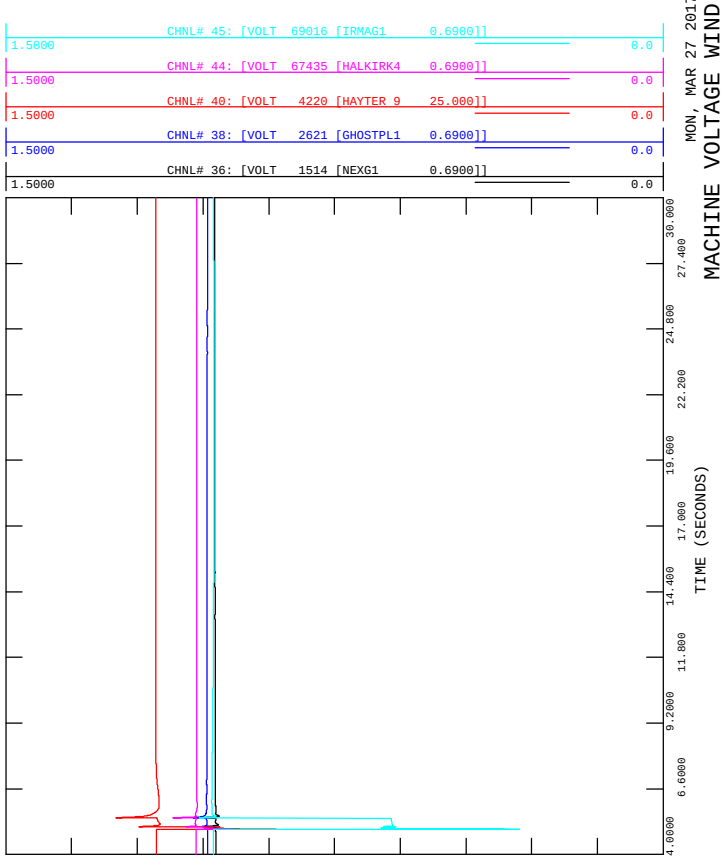


FIGURE E-16I
2017SL, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: E-16_7L129_Vermilion.out

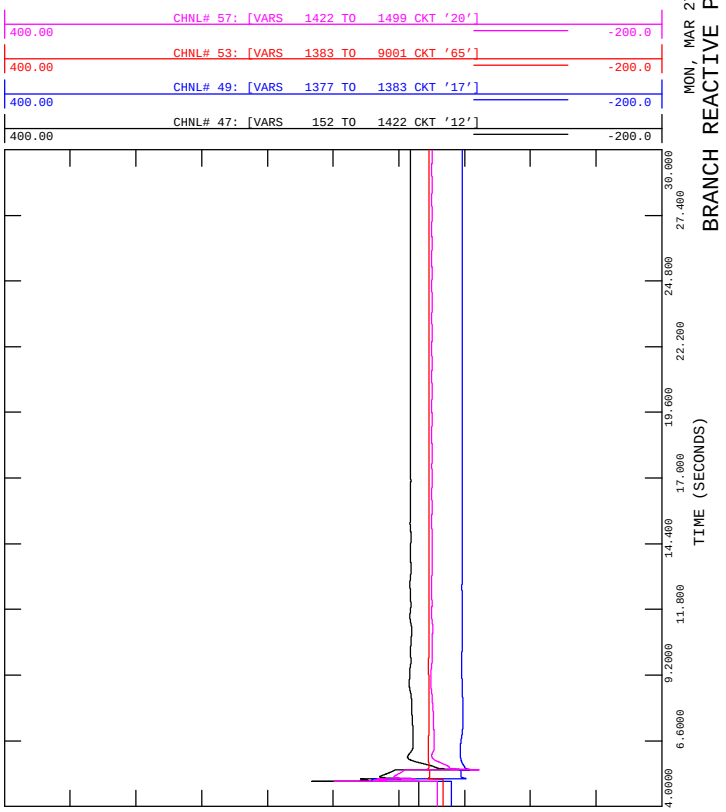


FIGURE E-17B
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: E-17_7L701_BattleRiver.out

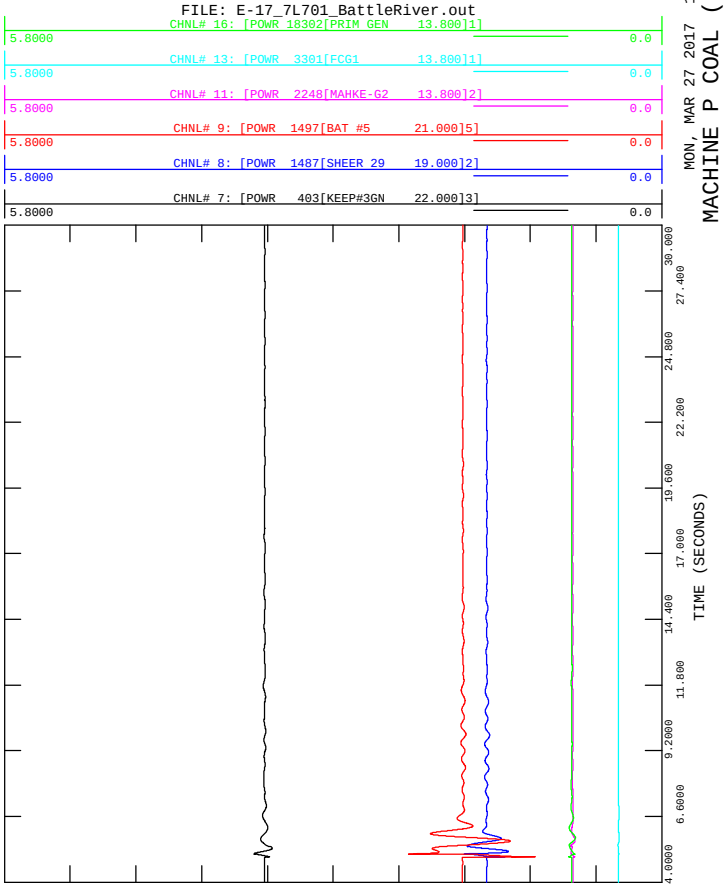


FIGURE E-17D
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: E-17_7L701_BattleRiver.out

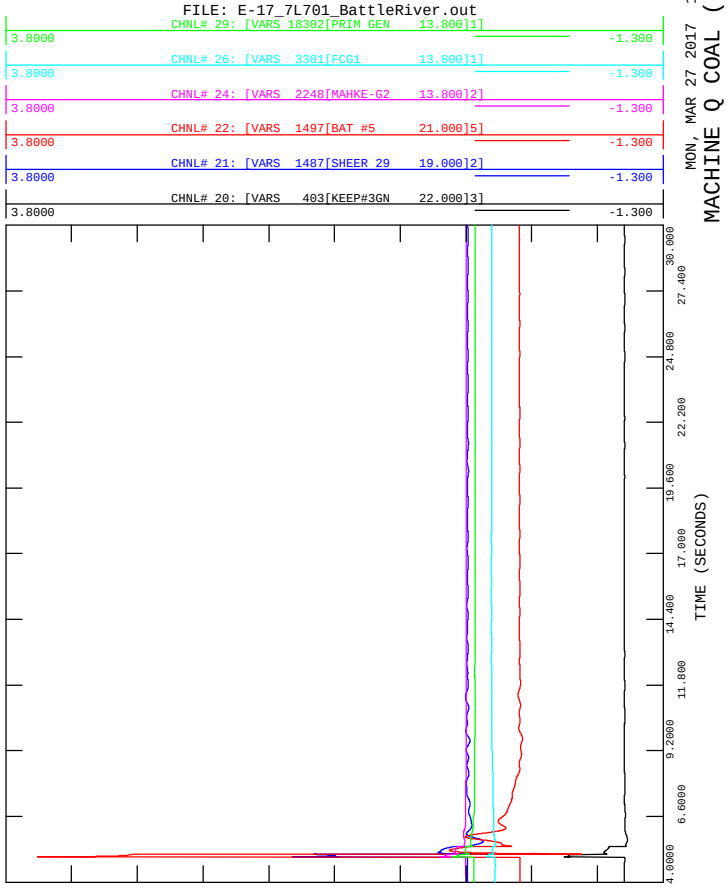


FIGURE E-17A
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: E-17_7L701_BattleRiver.out

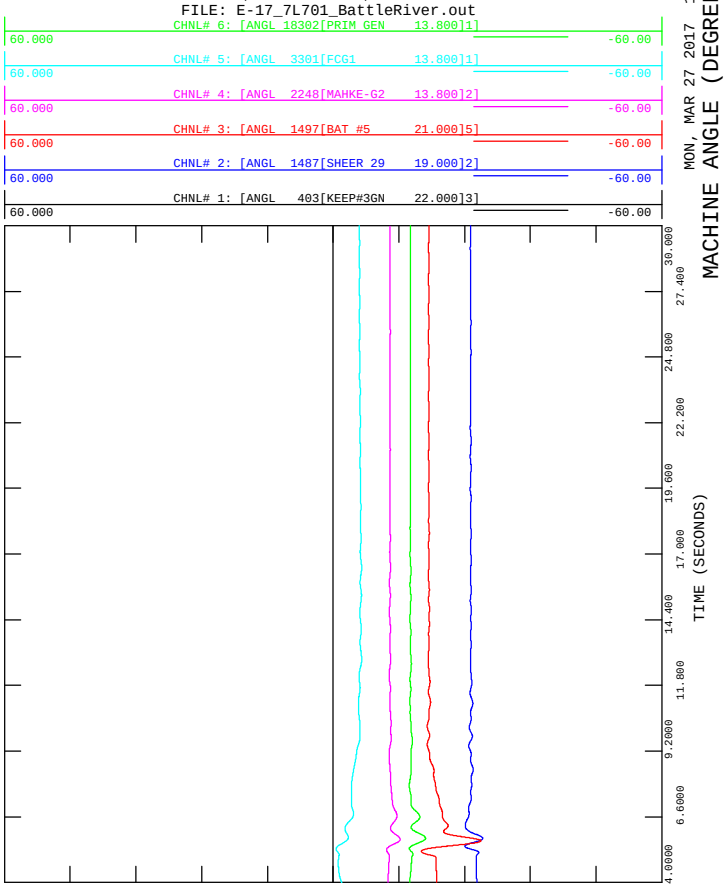


FIGURE E-17C
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: E-17_7L701_BattleRiver.out

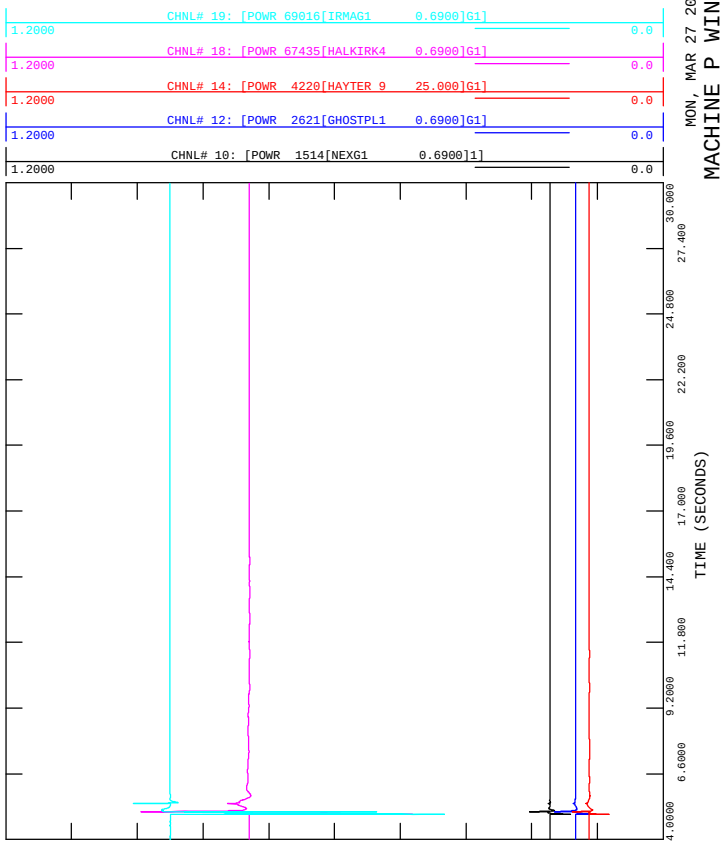


FIGURE E-17F
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: E-17_7L701_BattleRiver.out

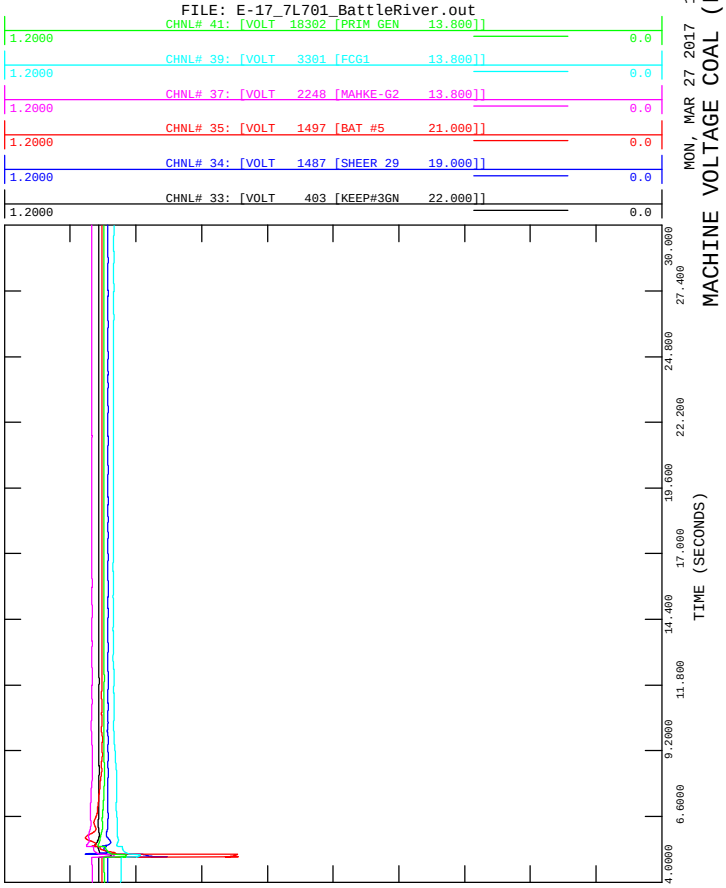


FIGURE E-17H
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: E-17_7L701_BattleRiver.out

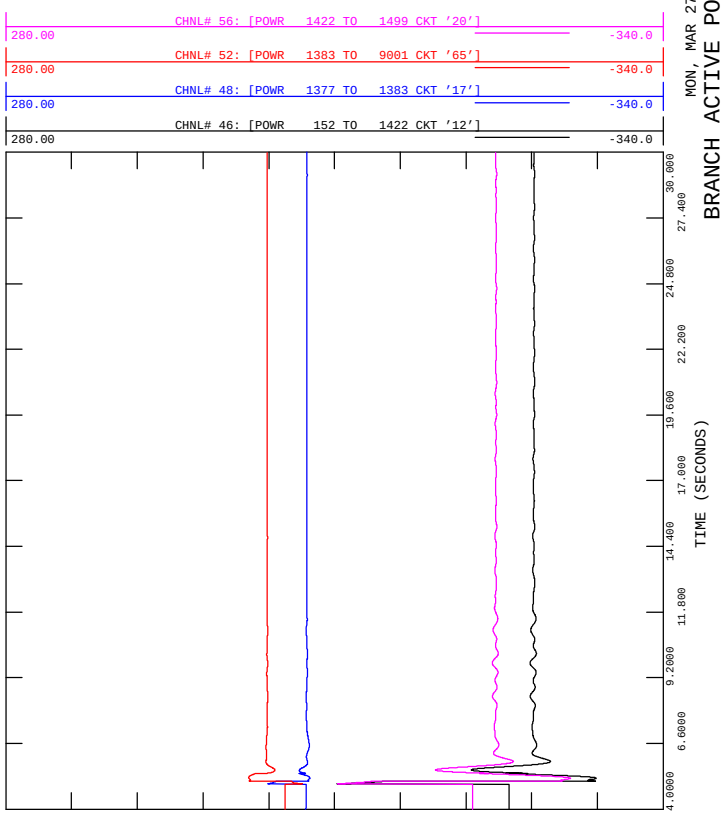


FIGURE E-17E
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: E-17_7L701_BattleRiver.out

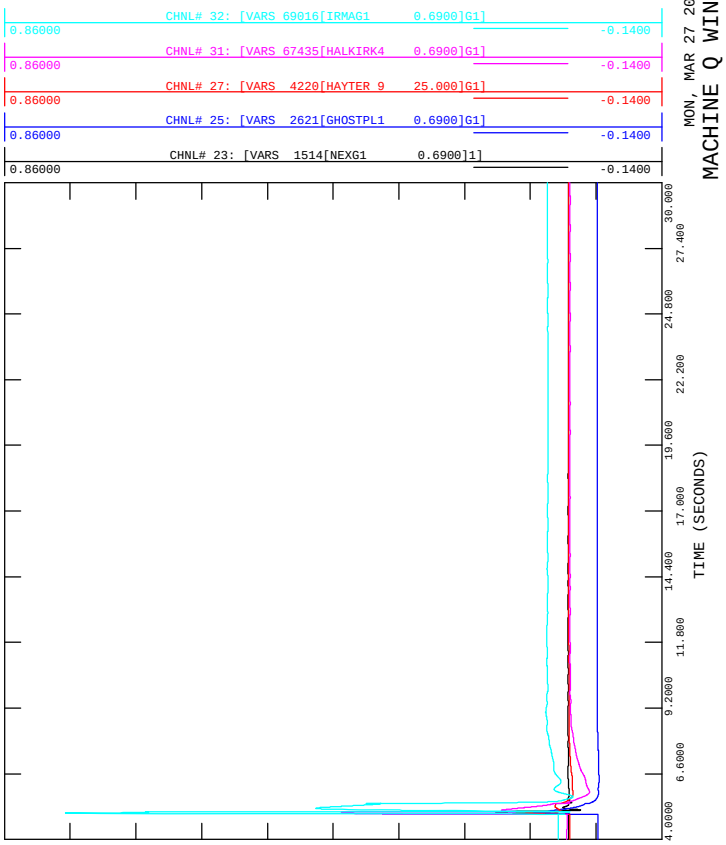


FIGURE E-17G
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: E-17_7L701_BattleRiver.out

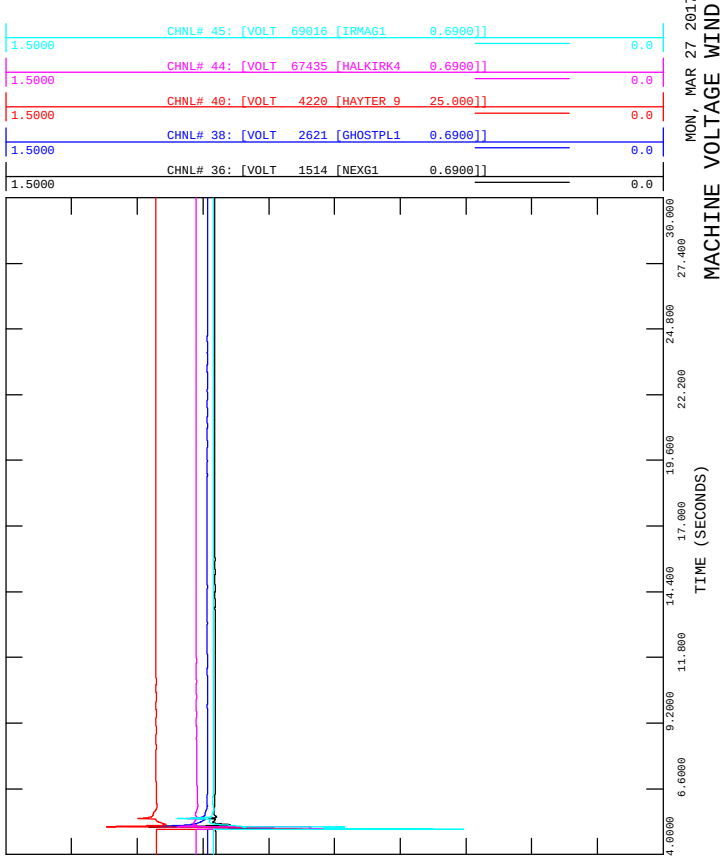


FIGURE E-17I
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: E-17_7L701_BattleRiver.out

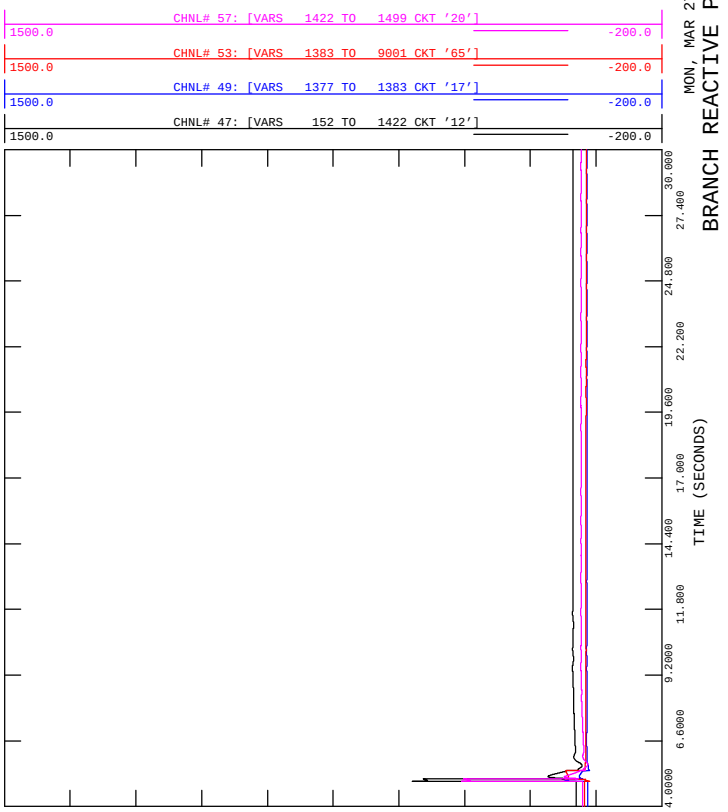


FIGURE E-18B
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: E-18_7L701_Stome.out

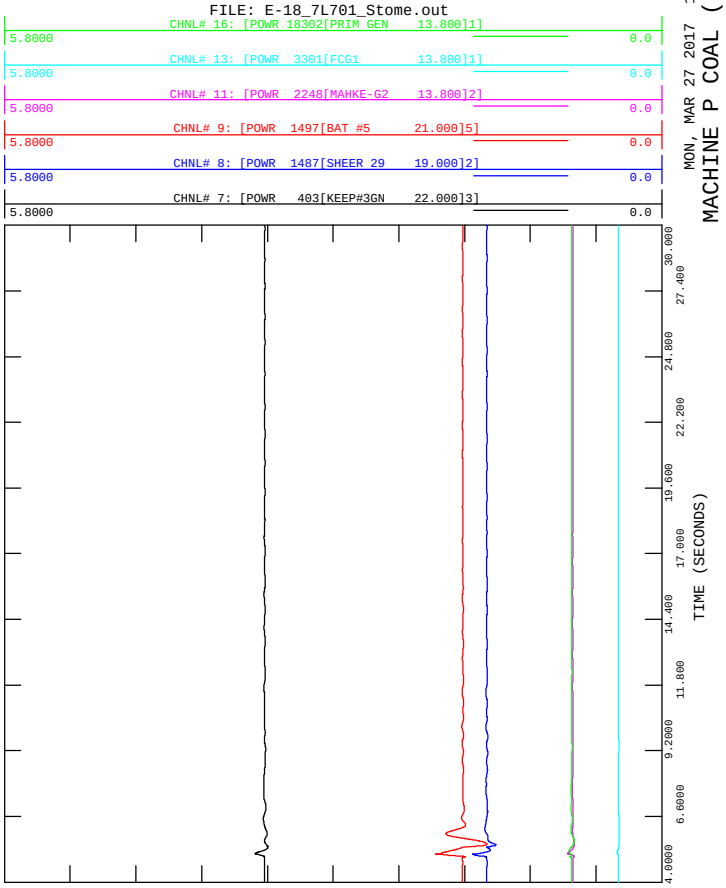


FIGURE E-18D
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: E-18_7L701_Stome.out

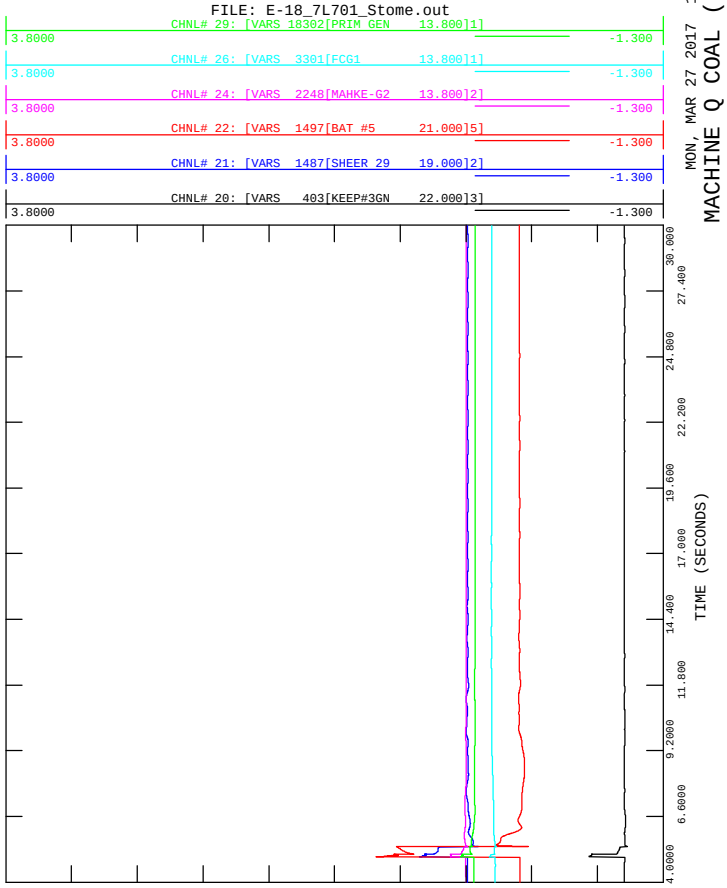


FIGURE E-18A
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: E-18_7L701_Stome.out

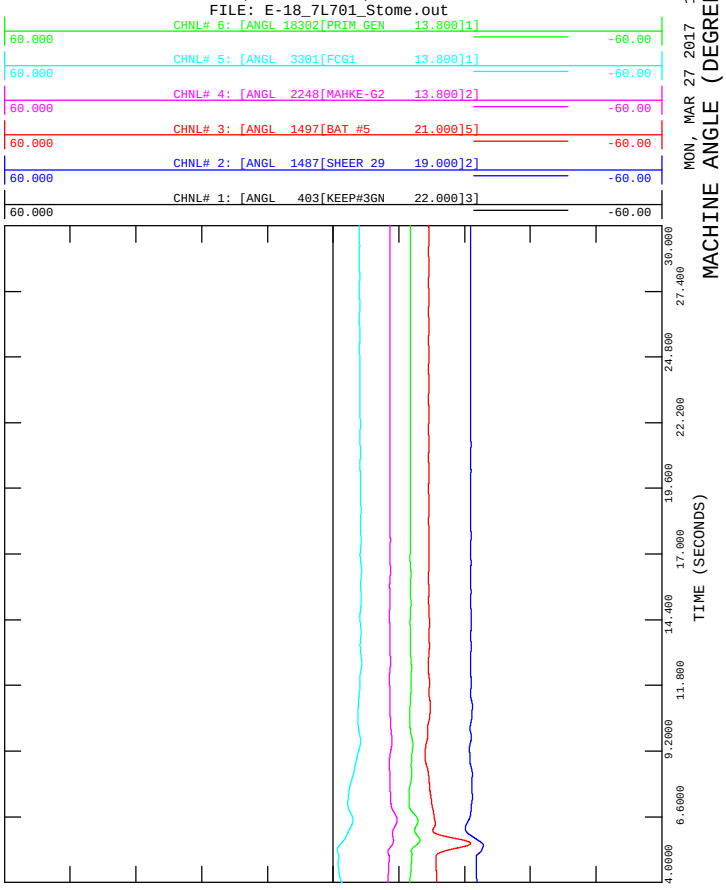


FIGURE E-18C
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: E-18_7L701_Stome.out

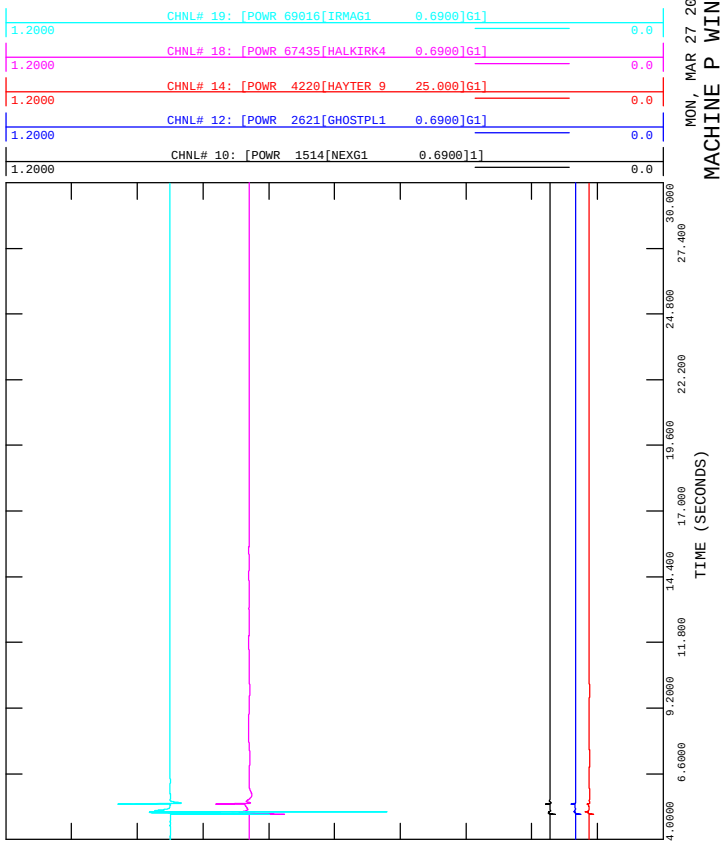


FIGURE E-18F
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: E-18_7L701_Stome.out

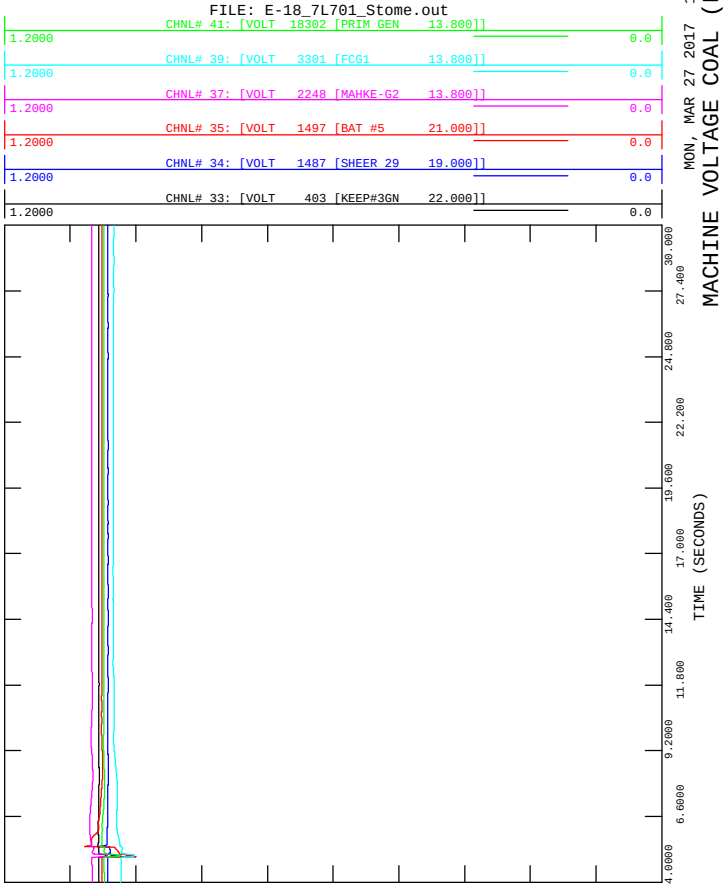


FIGURE E-18H
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: E-18_7L701_Stome.out

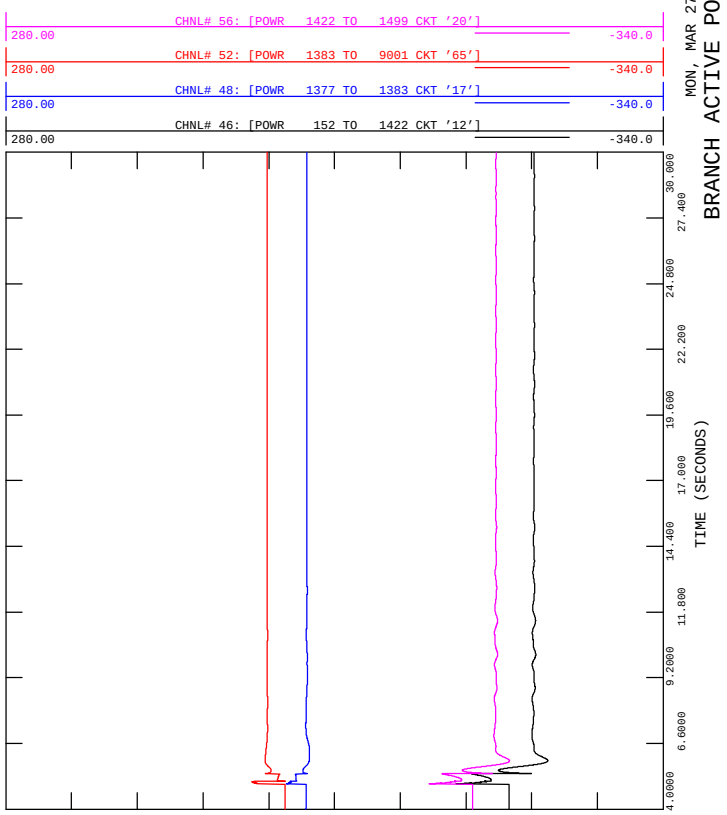


FIGURE E-18E
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: E-18_7L701_Stome.out

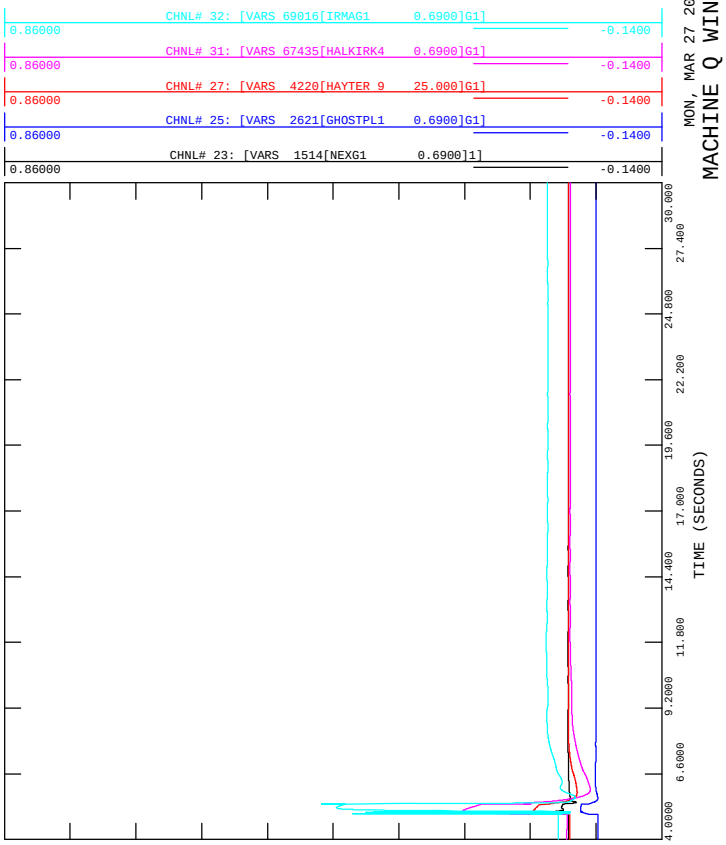


FIGURE E-18G
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: E-18_7L701_Stome.out

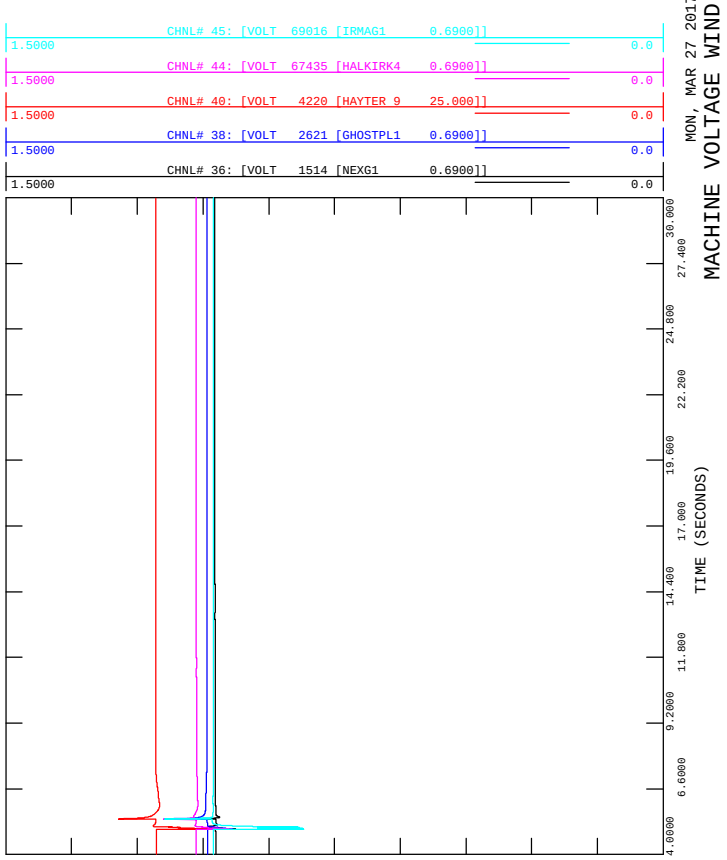


FIGURE E-18I
2017SL, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: E-18_7L701_Stome.out

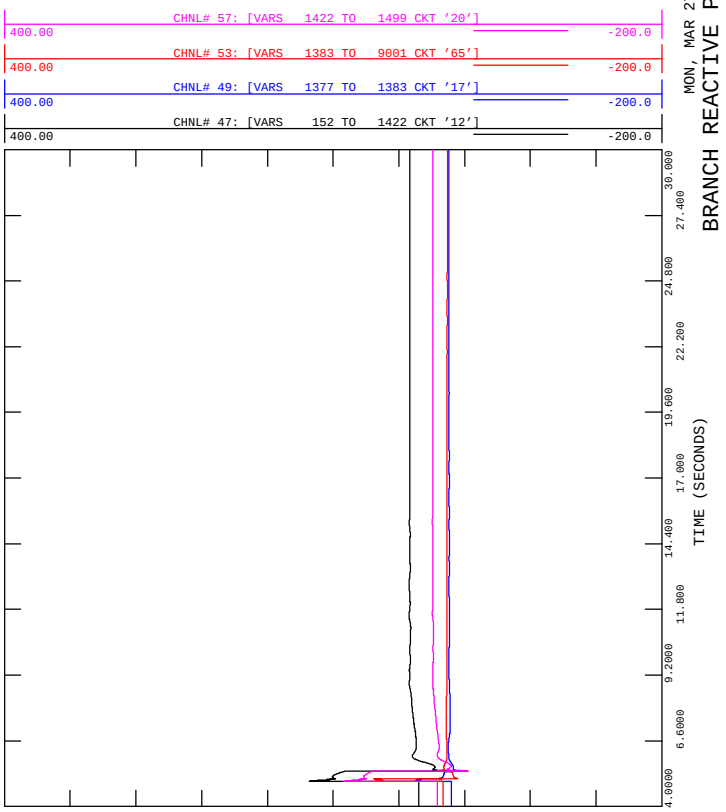


FIGURE E-19B
2017SL, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-19_749L_Edgerton.out

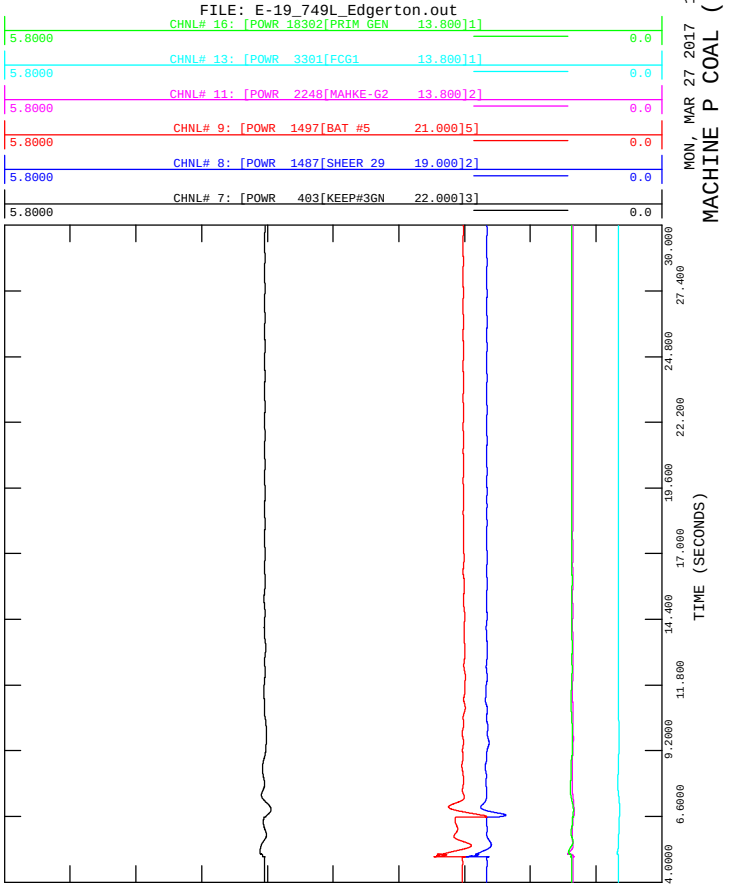


FIGURE E-19D
2017SL, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-19_749L_Edgerton.out

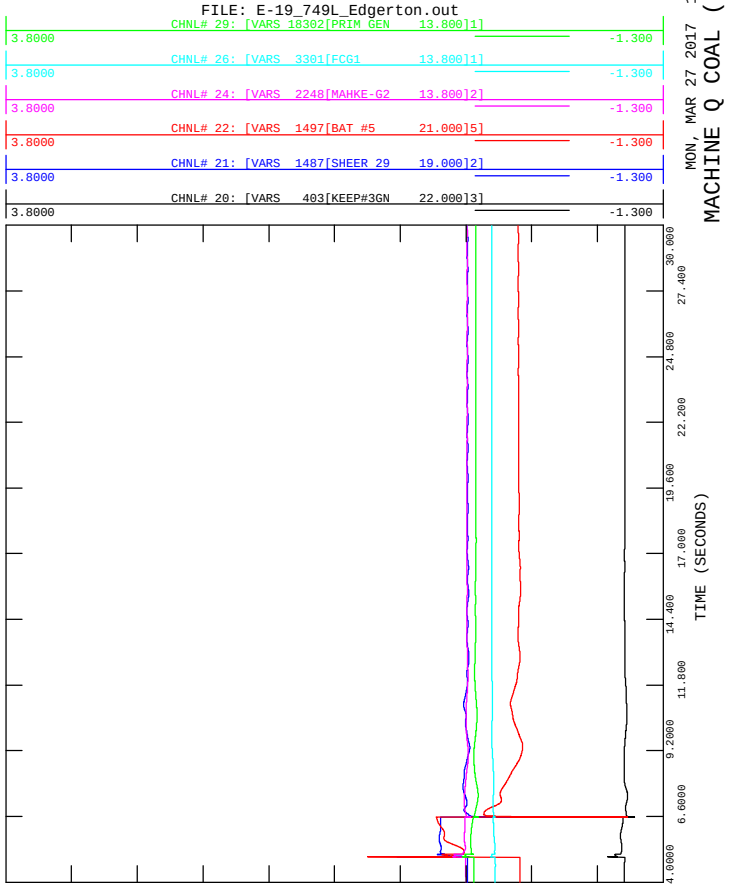


FIGURE E-19A
2017SL, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-19_749L_Edgerton.out

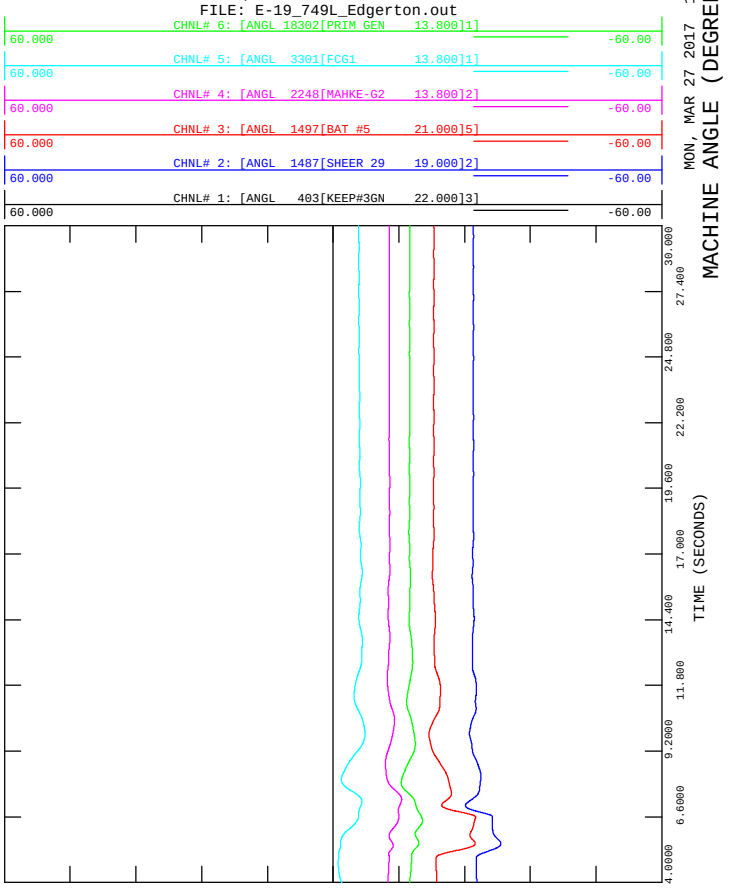


FIGURE E-19C
2017SL, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-19_749L_Edgerton.out

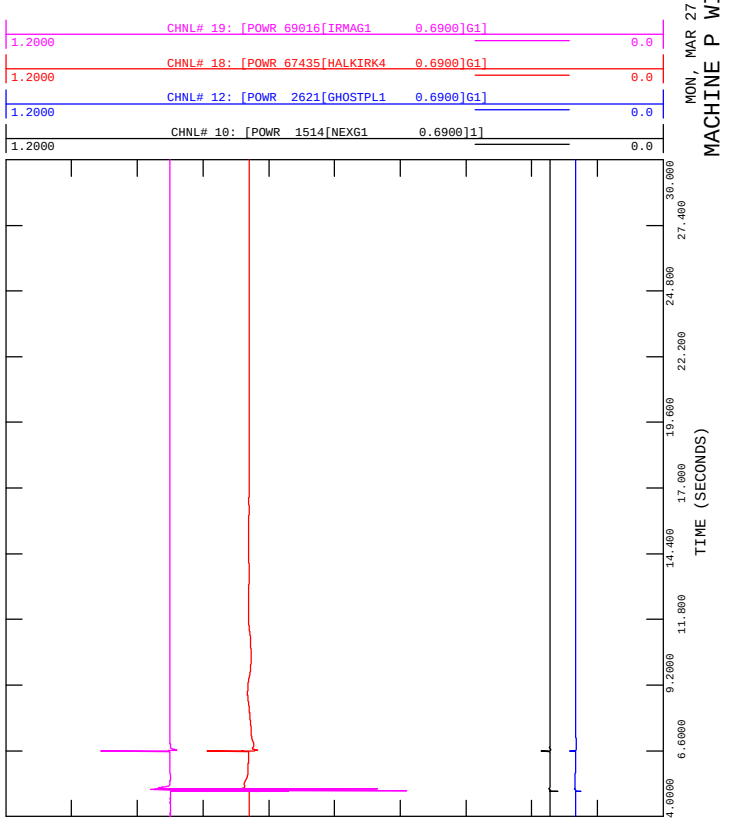


FIGURE E-19F
2017SL, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-19_749L_Edgerton.out

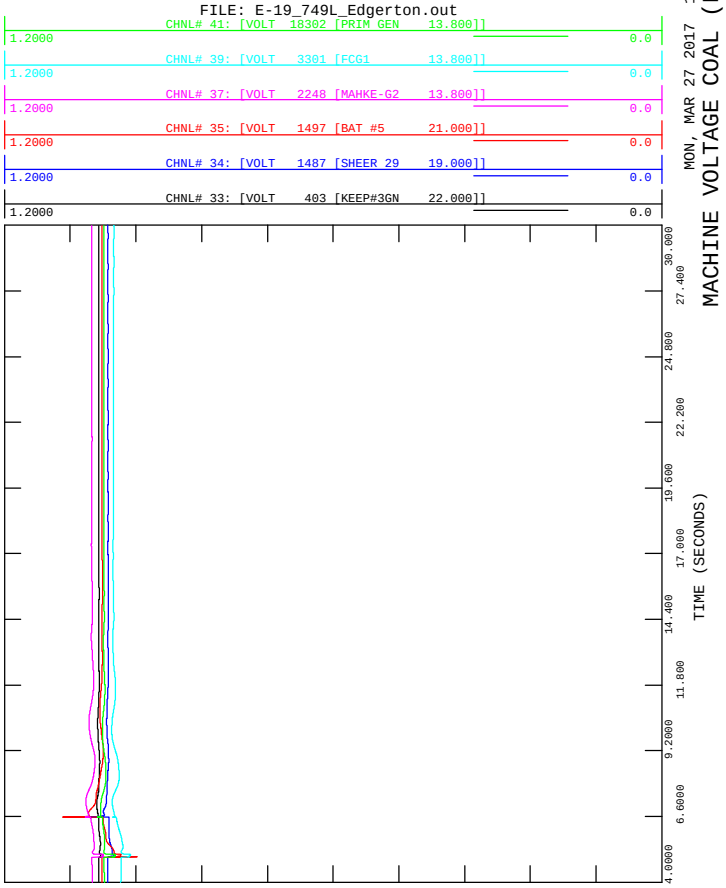


FIGURE E-19H
2017SL, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-19_749L_Edgerton.out

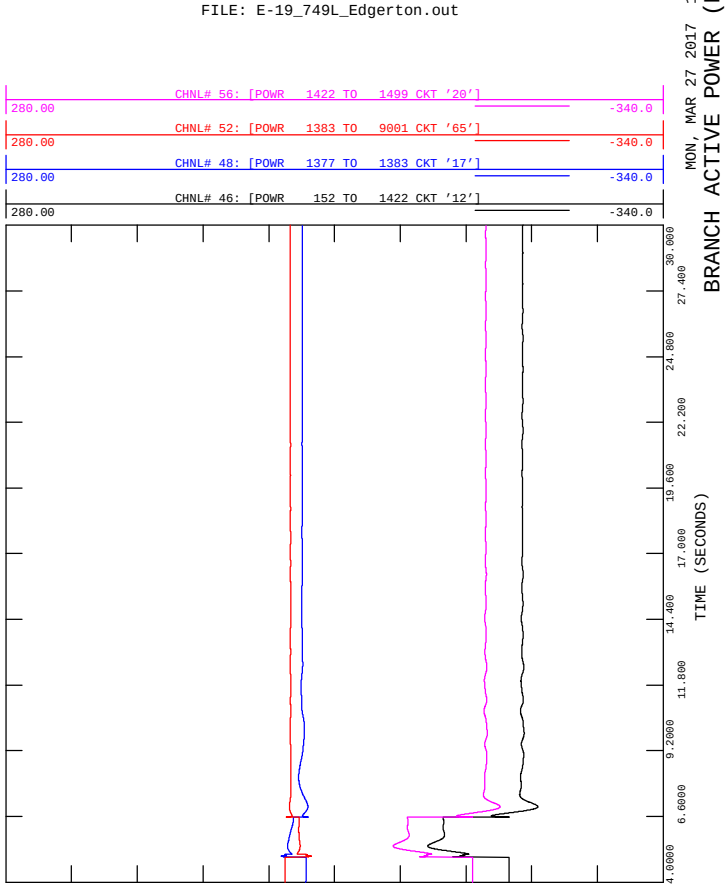


FIGURE E-19E
2017SL, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-19_749L_Edgerton.out

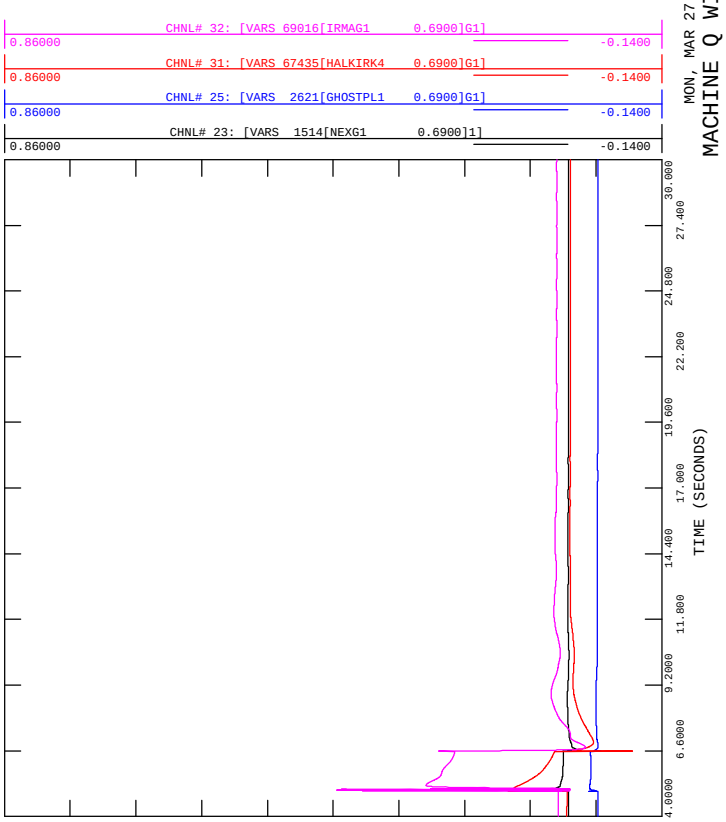


FIGURE E-19G
2017SL, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-19_749L_Edgerton.out

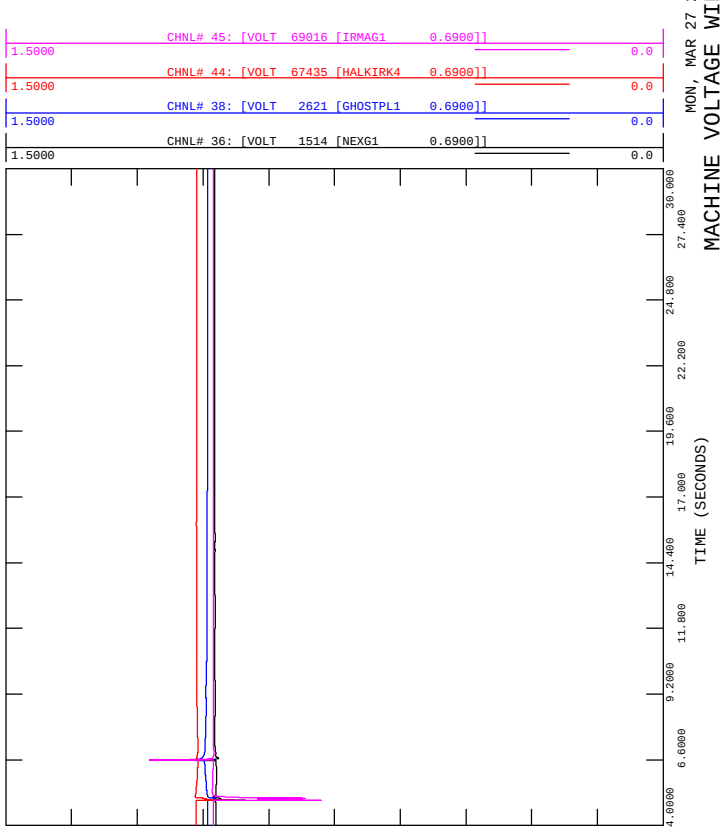


FIGURE E-19I
2017SL, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-19_749L_Edgerton.out

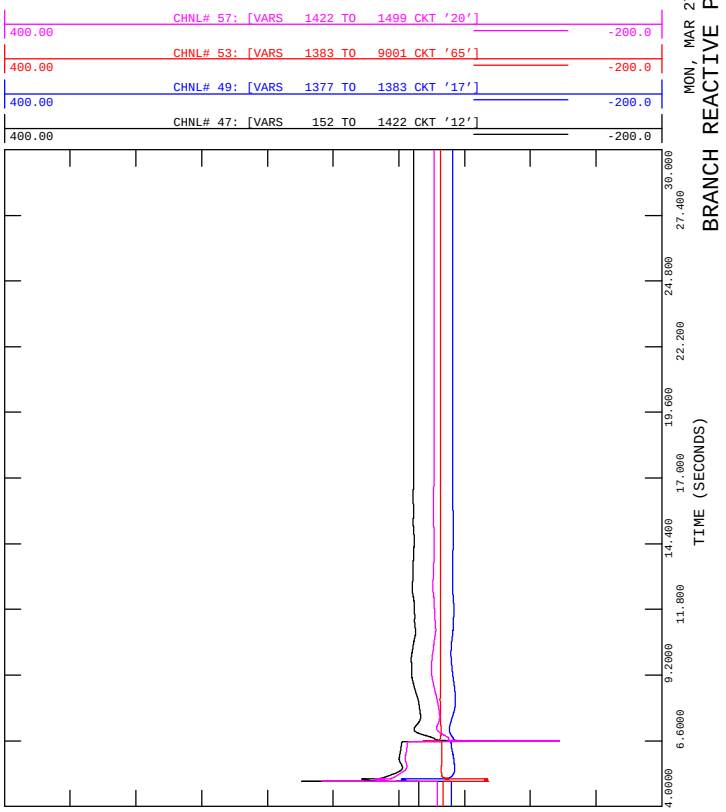


FIGURE E-20B
2017SL, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-20_749L_Metiskow.out

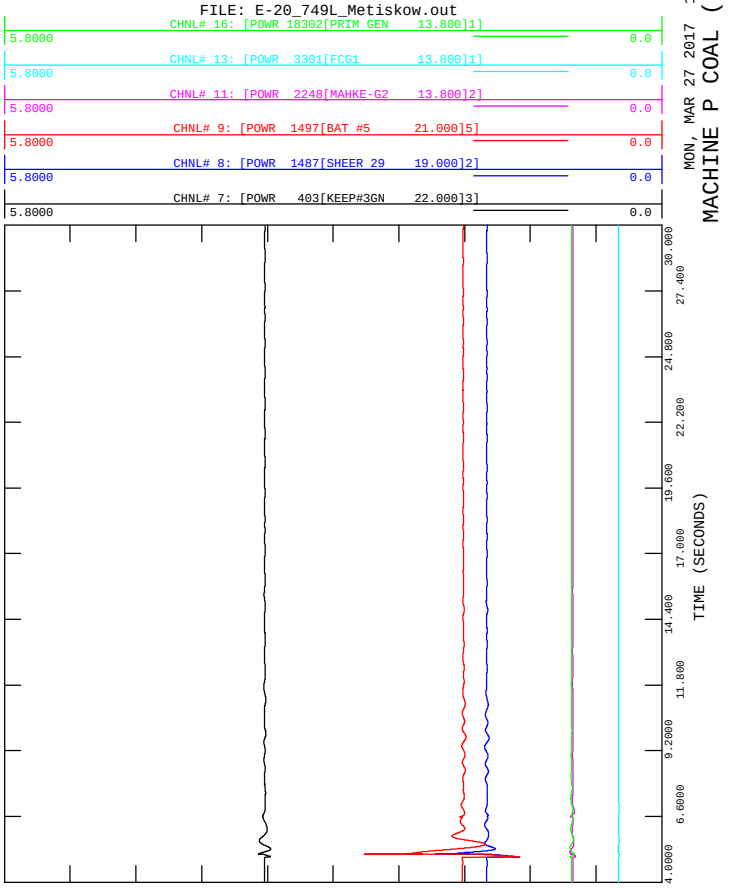


FIGURE E-20D
2017SL, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-20_749L_Metiskow.out

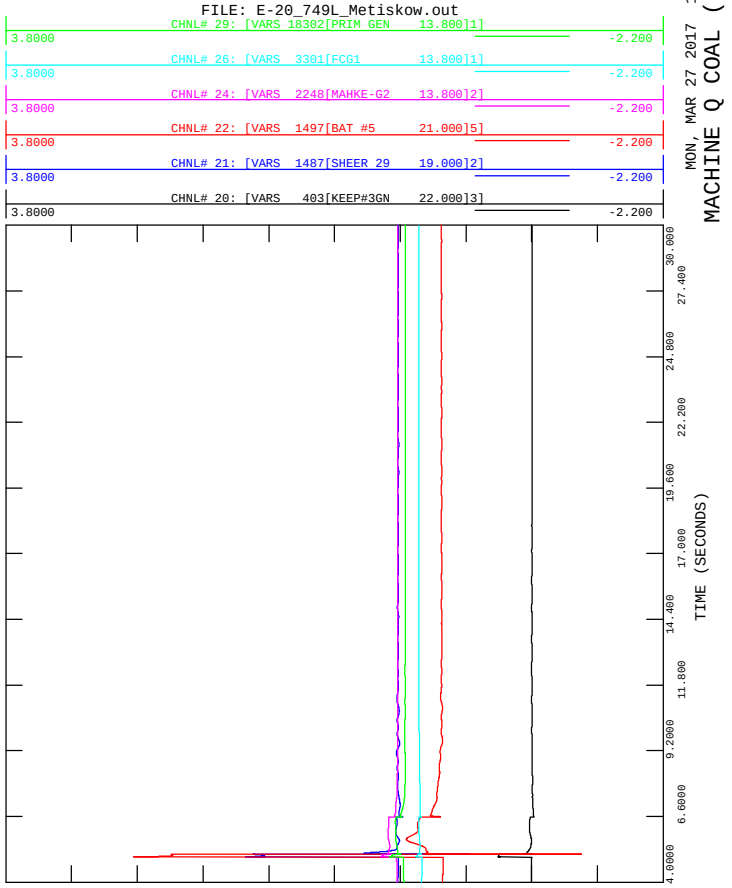


FIGURE E-20A
2017SL, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-20_749L_Metiskow.out

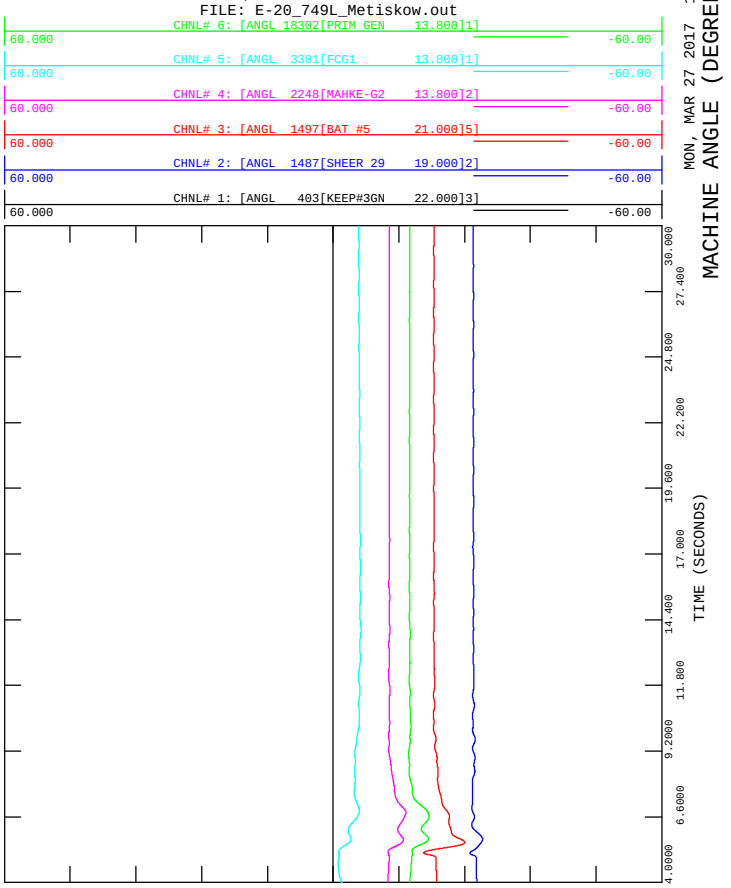


FIGURE E-20C
2017SL, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-20_749L_Metiskow.out

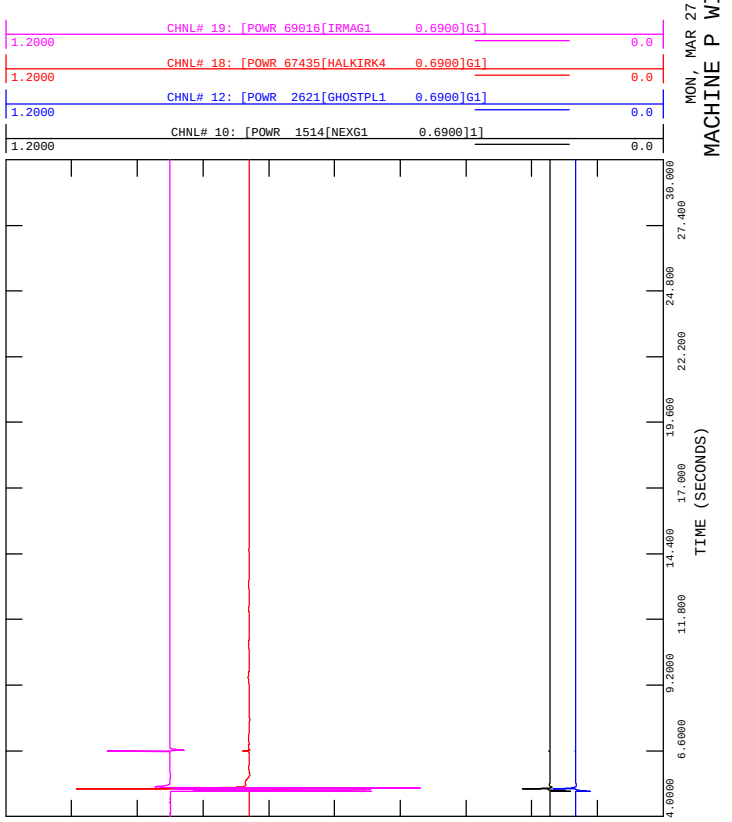


FIGURE E-20F
2017SL, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-20_749L_Metiskow.out

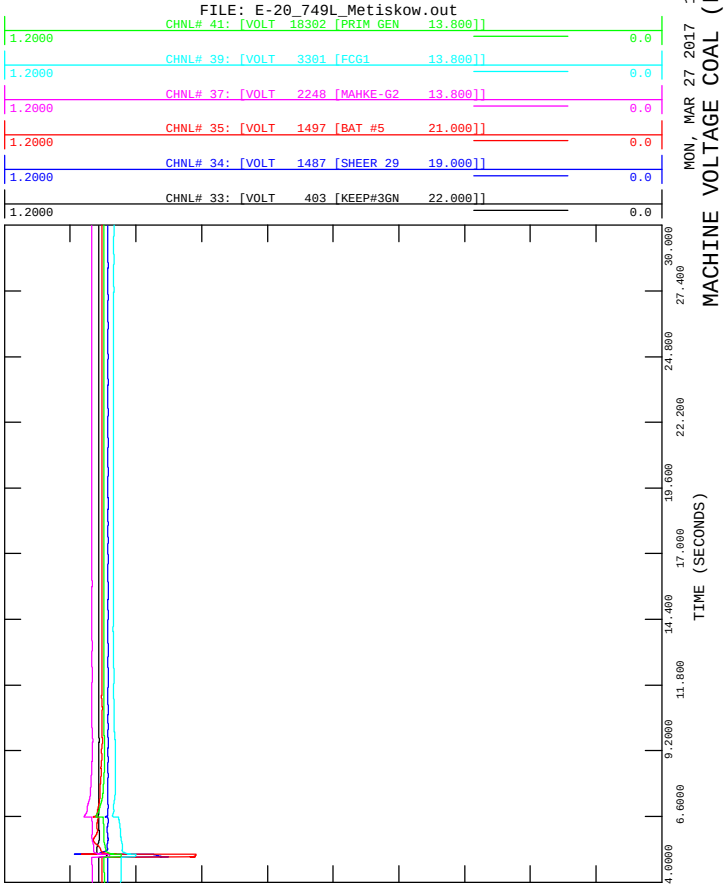


FIGURE E-20H
2017SL, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-20_749L_Metiskow.out

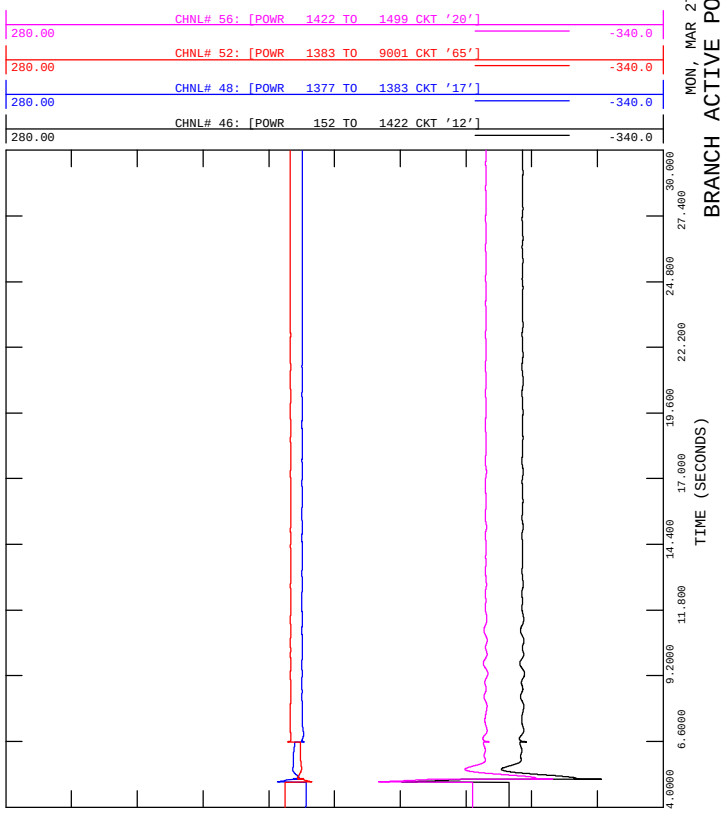


FIGURE E-20E
2017SL, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-20_749L_Metiskow.out

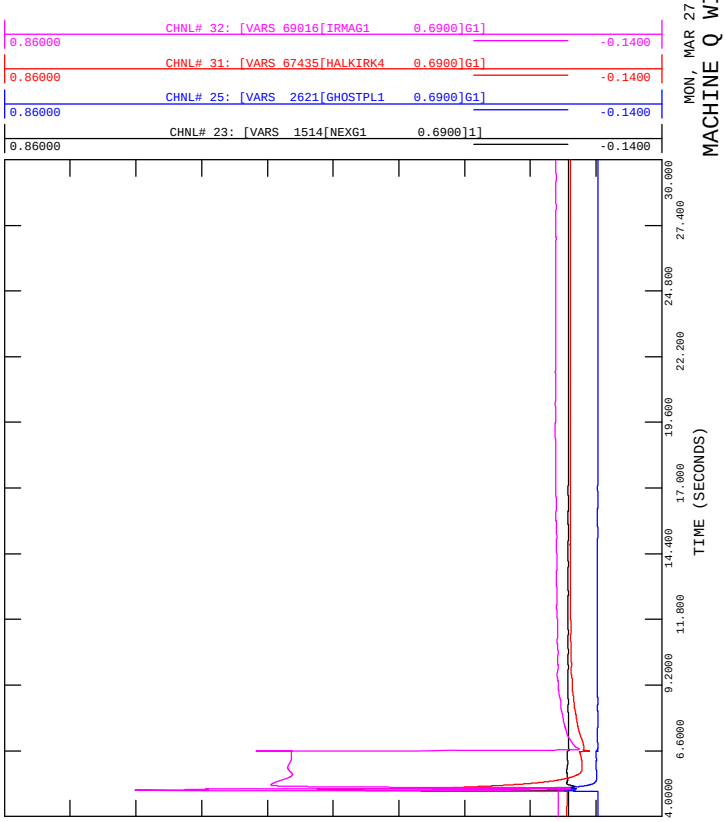


FIGURE E-20G
2017SL, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-20_749L_Metiskow.out

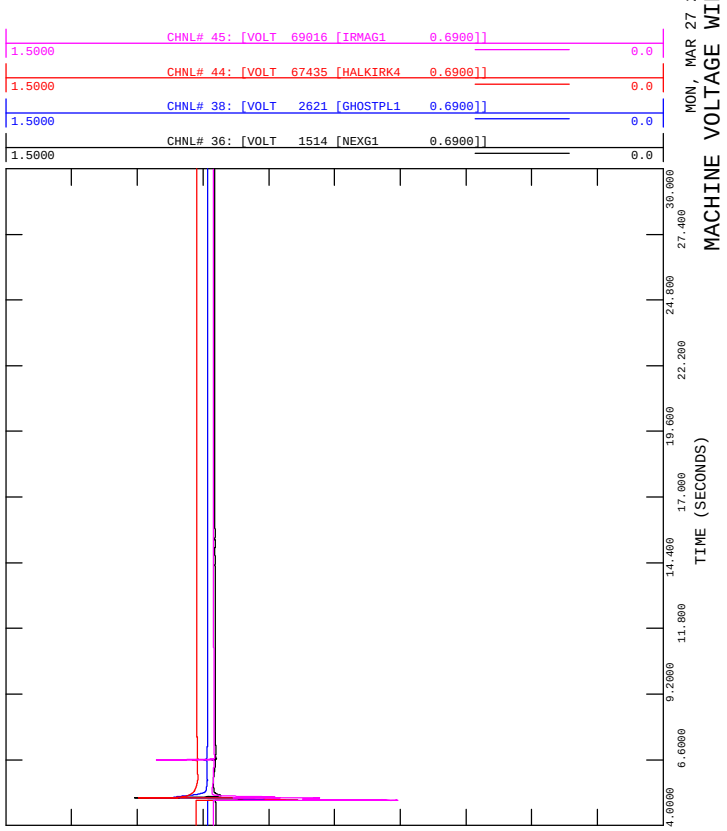


FIGURE E-20I
2017SL, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-20_749L_Metiskow.out

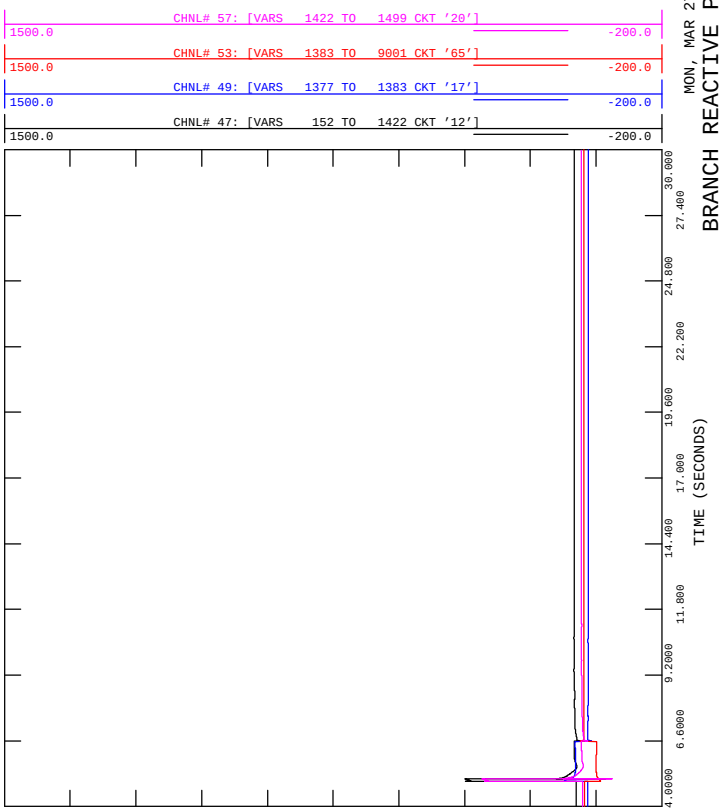


FIGURE E-21B
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-21_749L~7L749_Edgerton.out

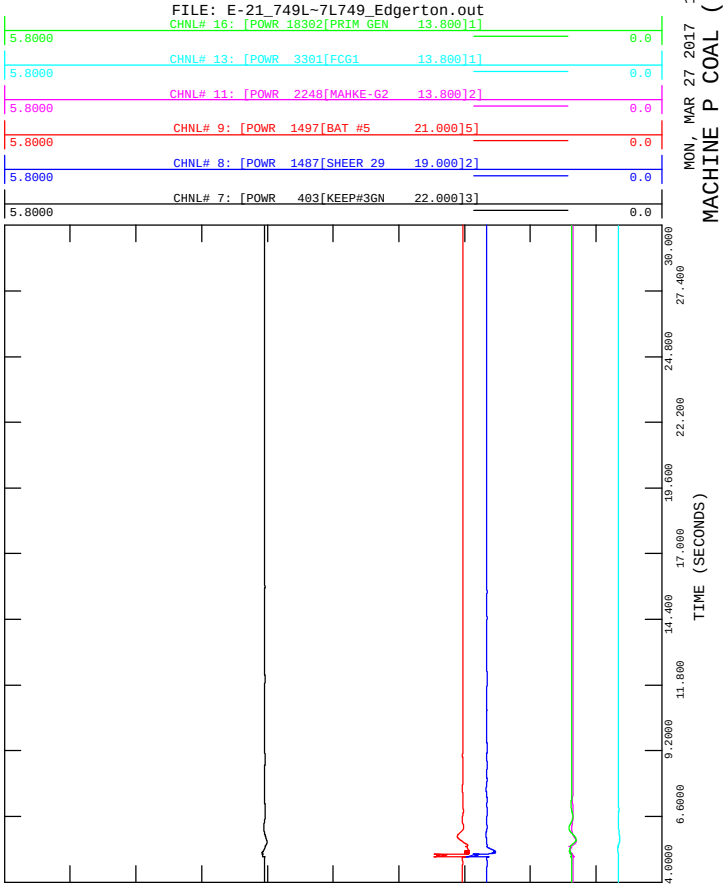


FIGURE E-21D
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-21_749L~7L749_Edgerton.out

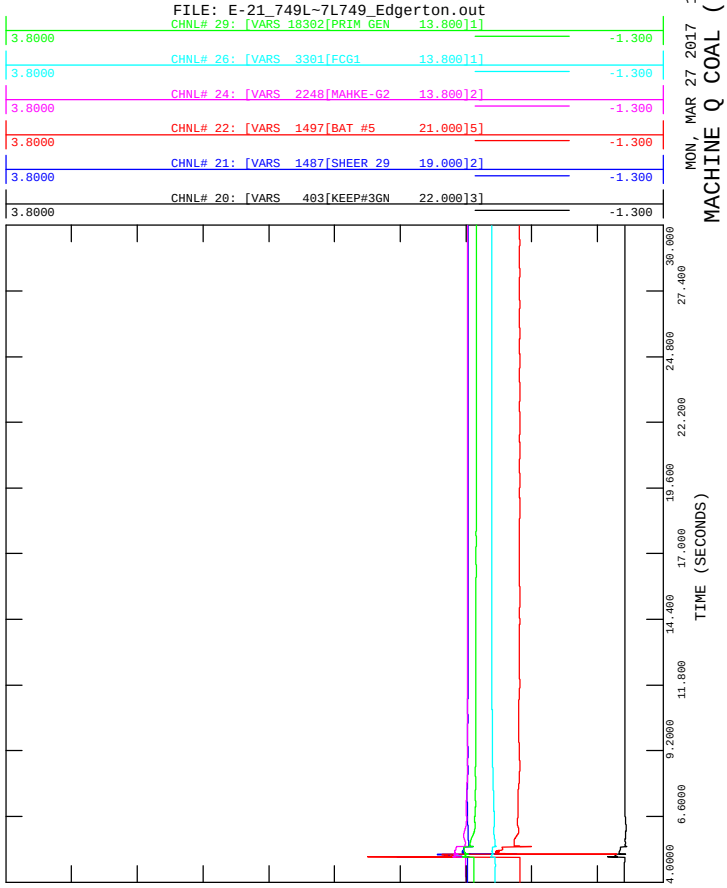


FIGURE E-21A
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-21_749L~7L749_Edgerton.out

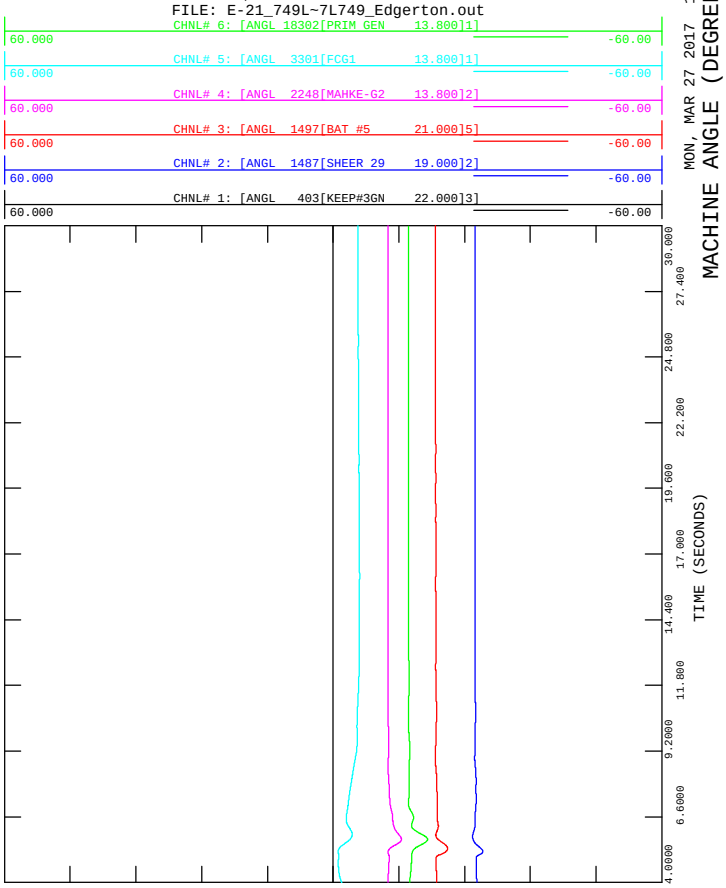


FIGURE E-21C
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-21_749L~7L749_Edgerton.out

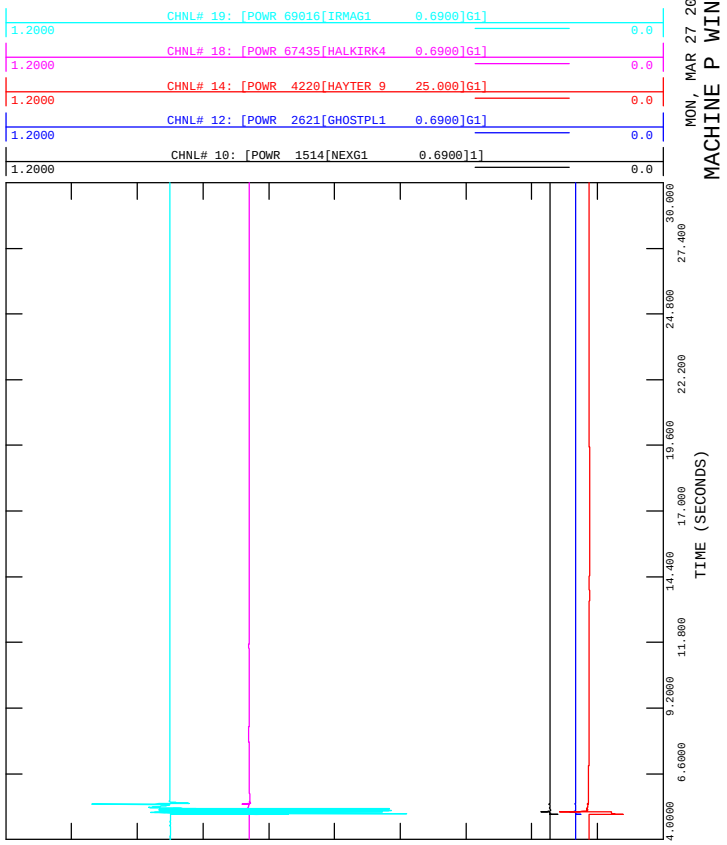


FIGURE E-21F
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-21_749L~7L749_Edgerton.out

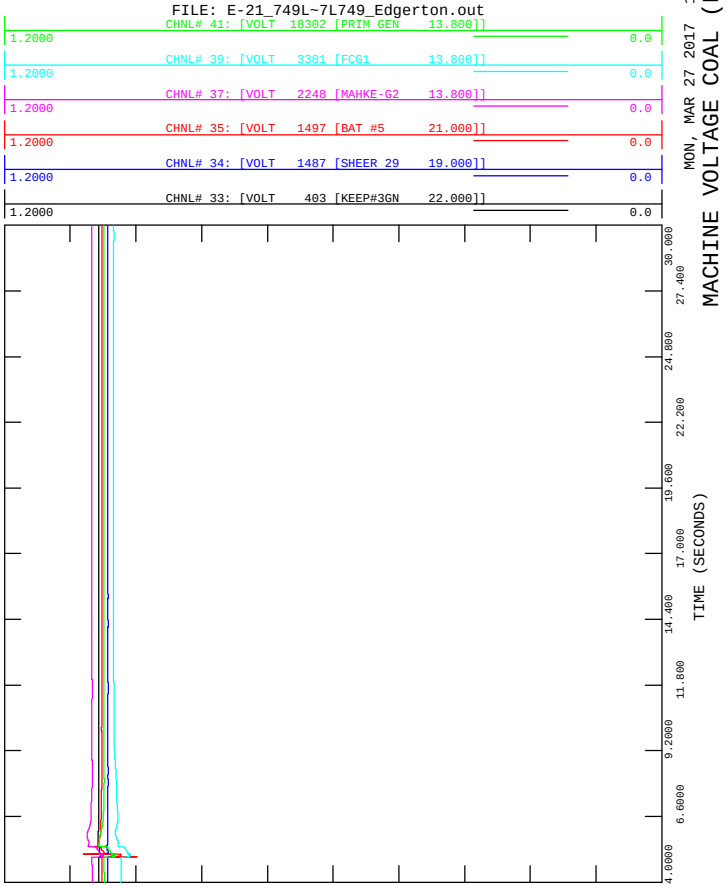


FIGURE E-21H
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-21_749L~7L749_Edgerton.out

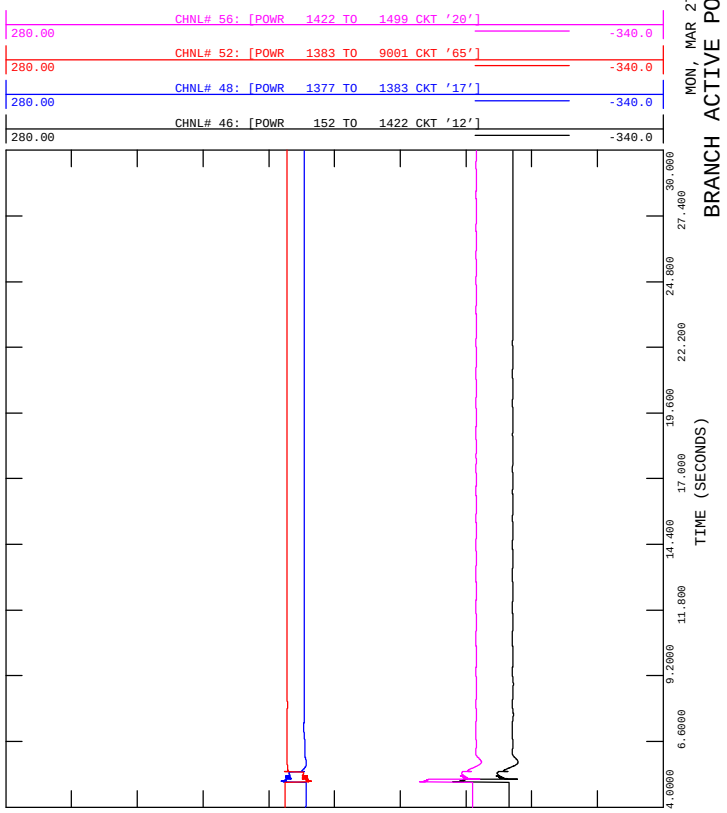


FIGURE E-21E
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-21_749L~7L749_Edgerton.out

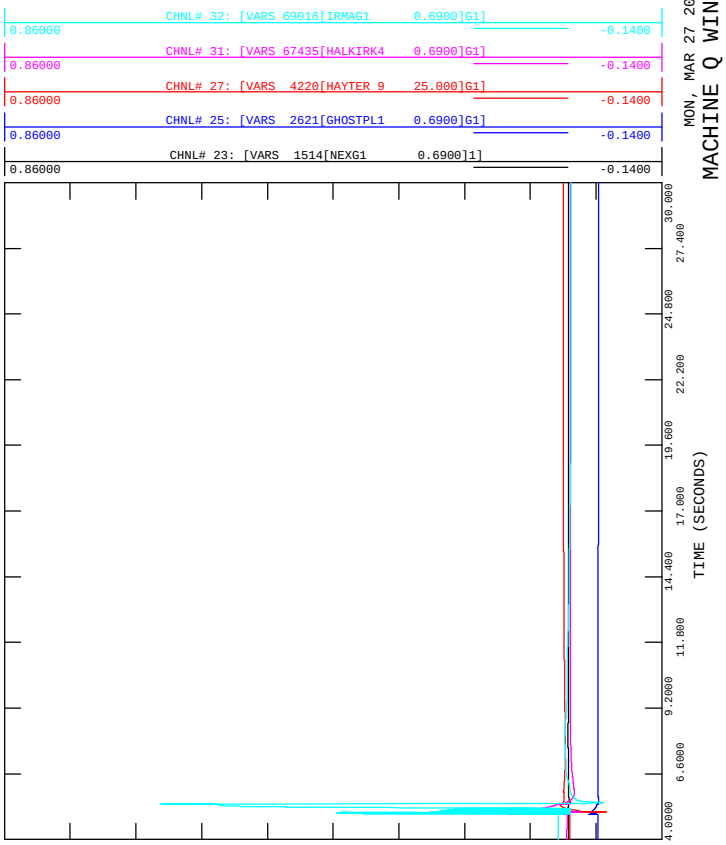


FIGURE E-21G
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-21_749L~7L749_Edgerton.out

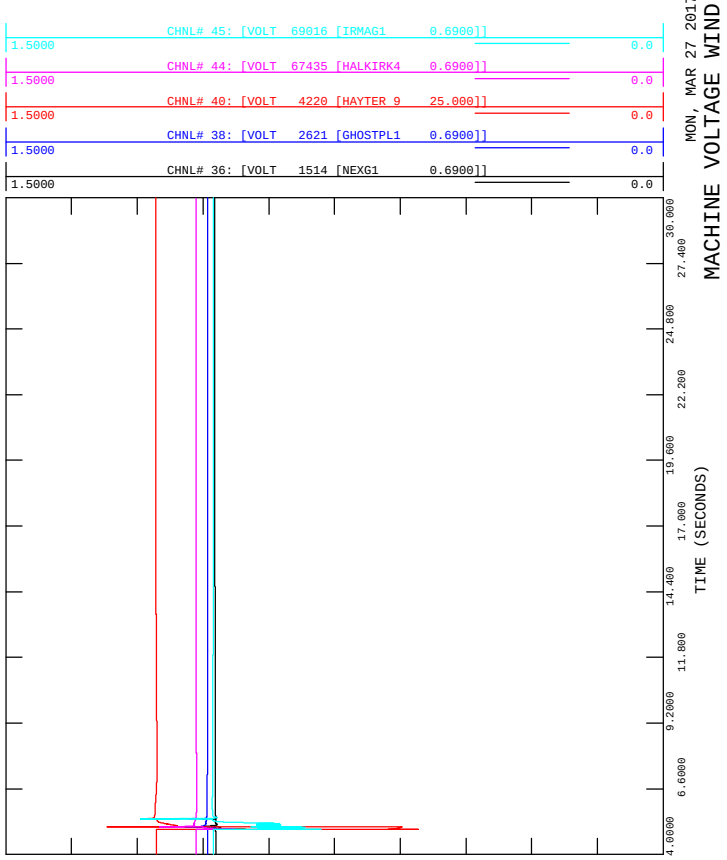


FIGURE E-21I
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-21_749L~7L749_Edgerton.out

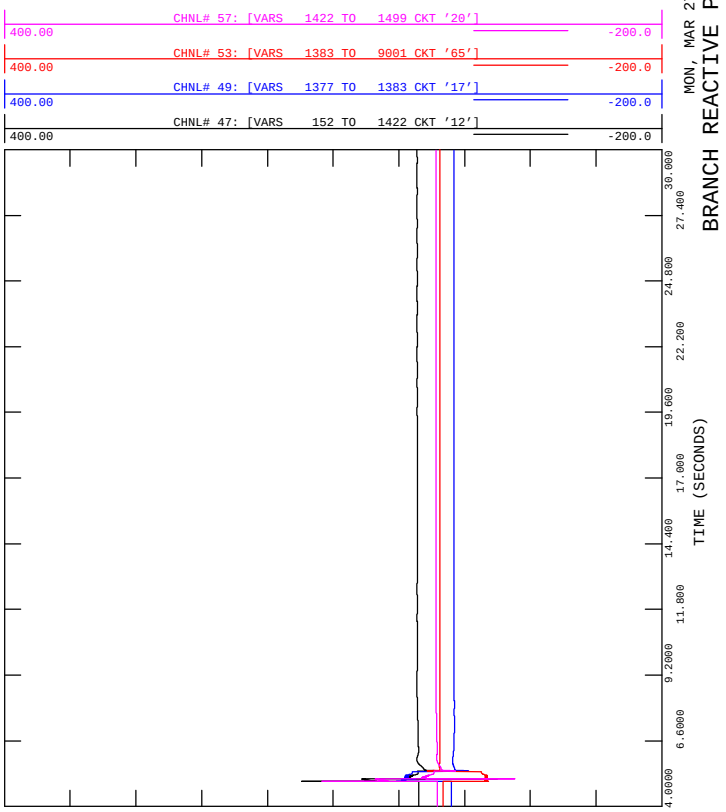


FIGURE E-22B
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L~7L749_Lloydminster.out

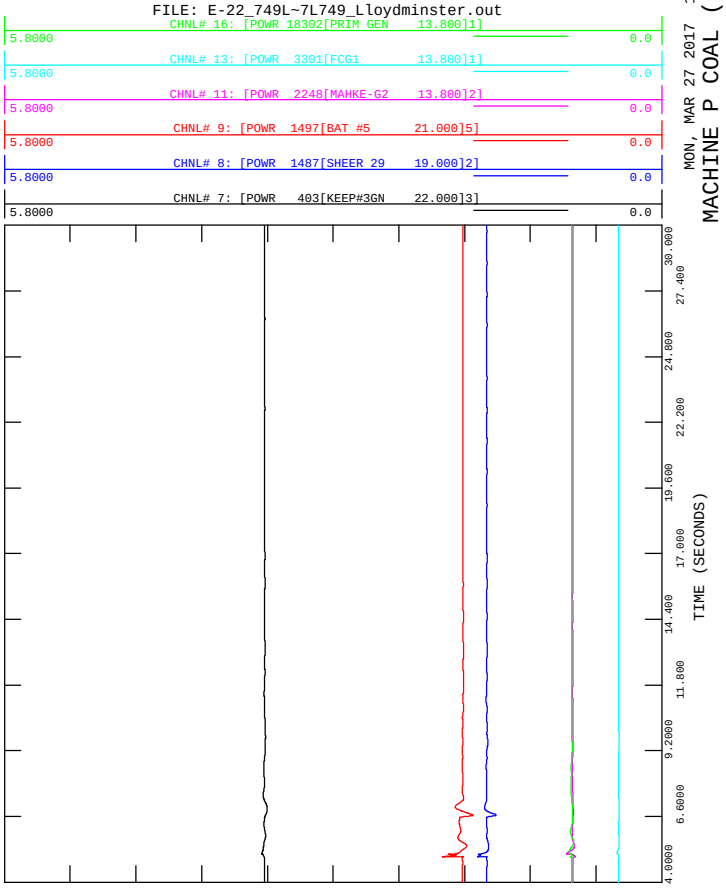


FIGURE E-22D
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L~7L749_Lloydminster.out

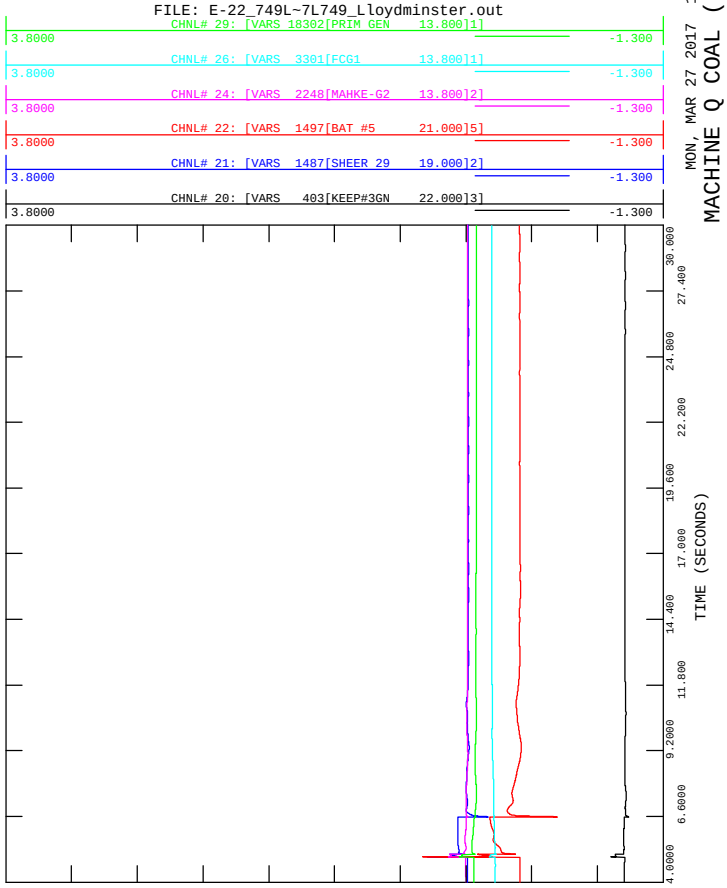


FIGURE E-22A
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L~7L749_Lloydminster.out

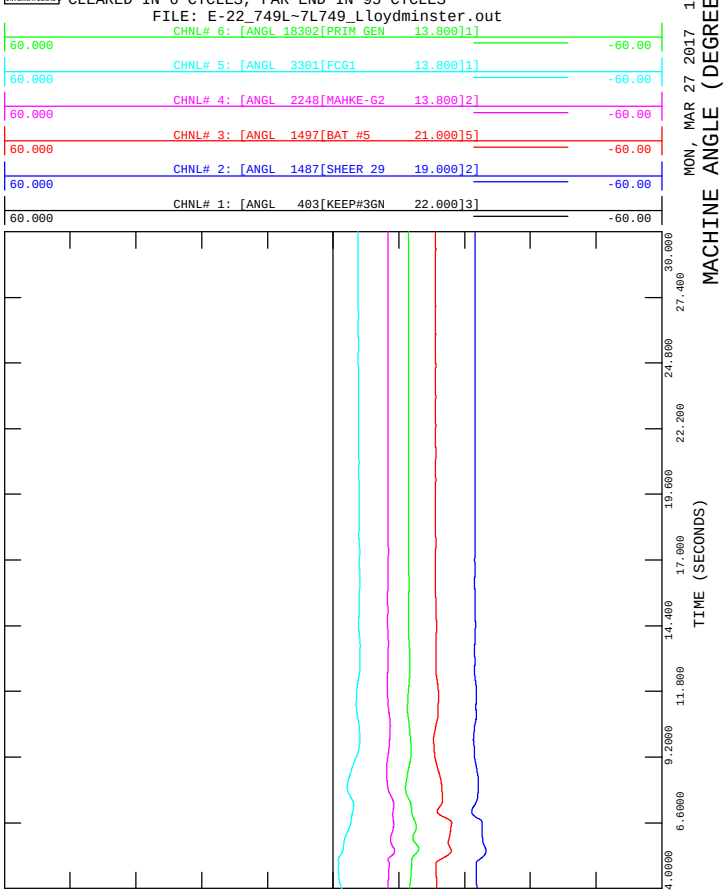


FIGURE E-22C
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L~7L749_Lloydminster.out

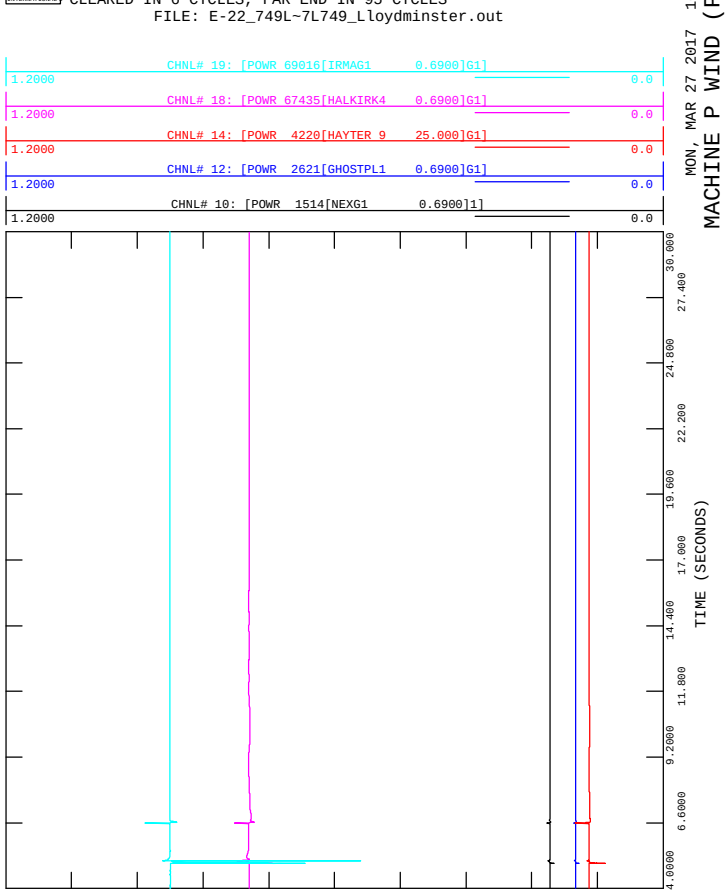


FIGURE E-22F
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L~7L749_Lloydminster.out

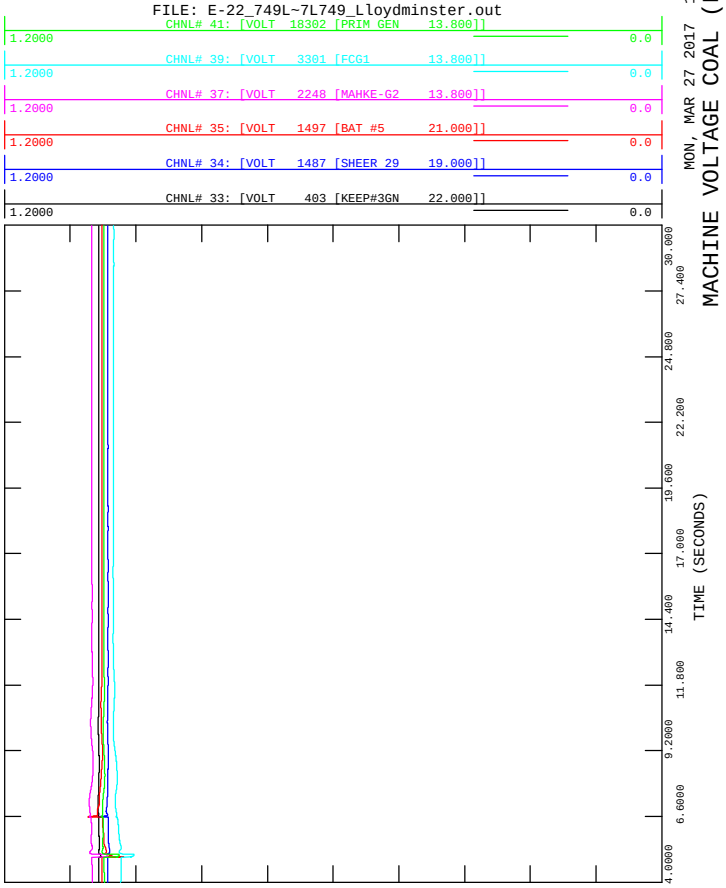


FIGURE E-22H
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L~7L749_Lloydminster.out

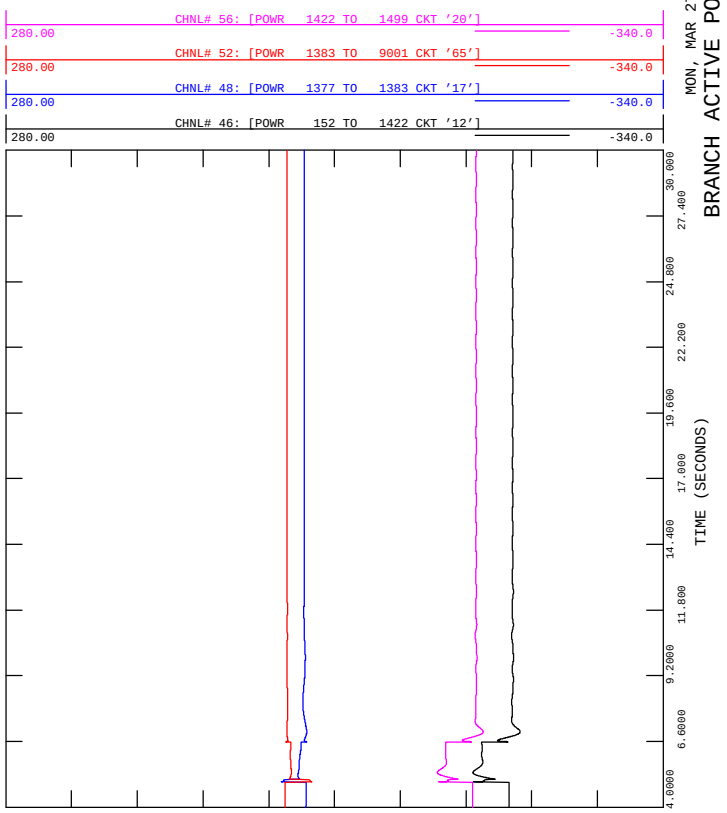


FIGURE E-22E
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L~7L749_Lloydminster.out

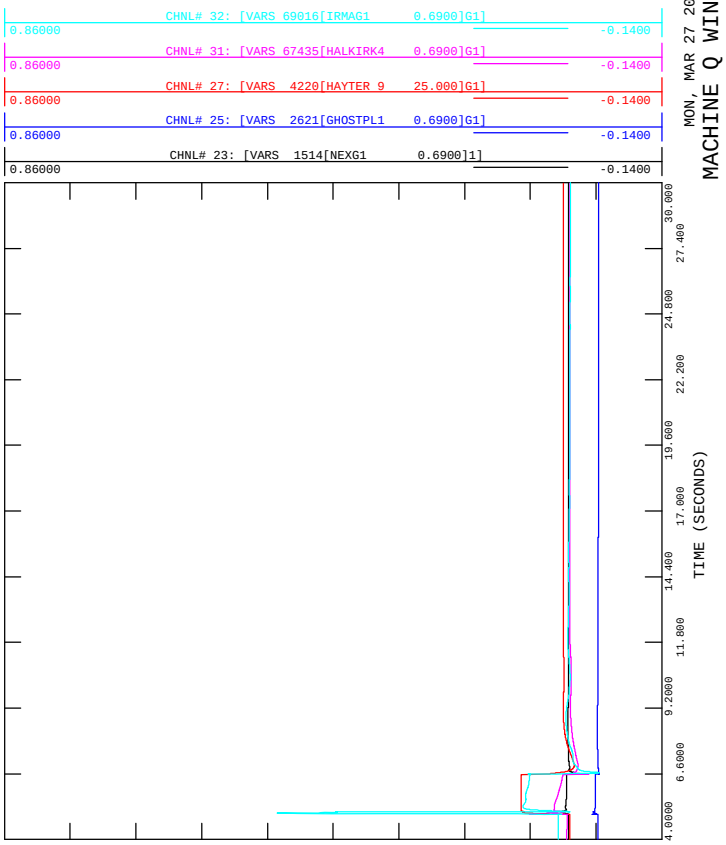


FIGURE E-22G
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L~7L749_Lloydminster.out

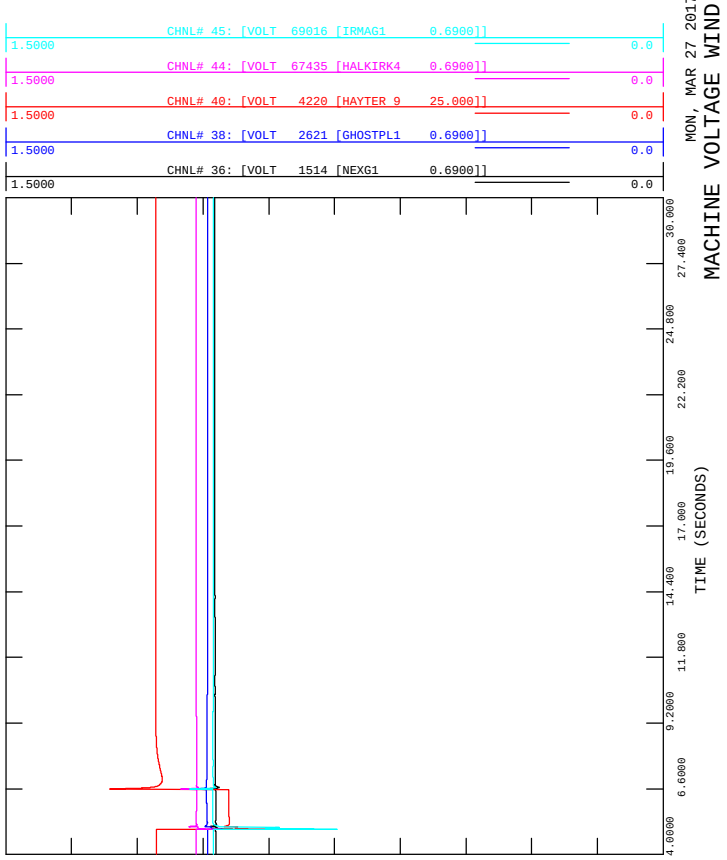


FIGURE E-22I
2017SL, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L~7L749_Lloydminster.out

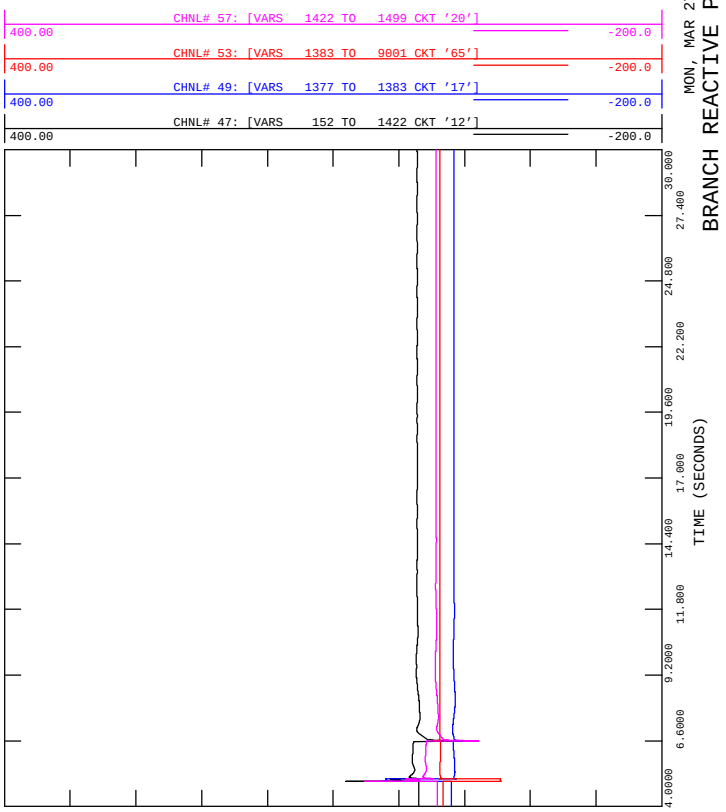


FIGURE E-23B
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-23_9L20_Cordel.out

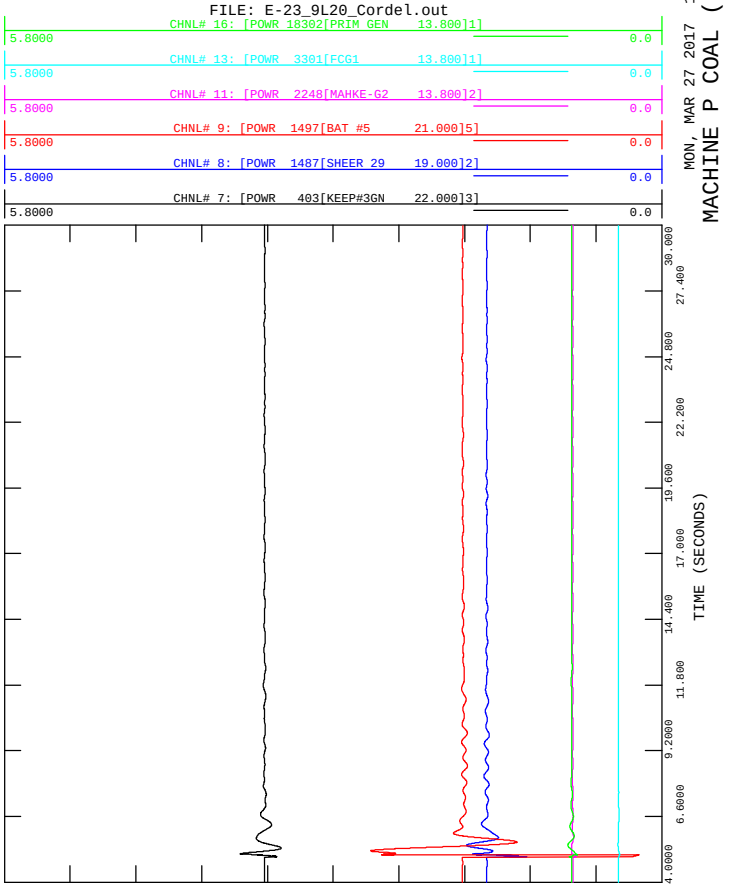


FIGURE E-23D
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-23_9L20_Cordel.out

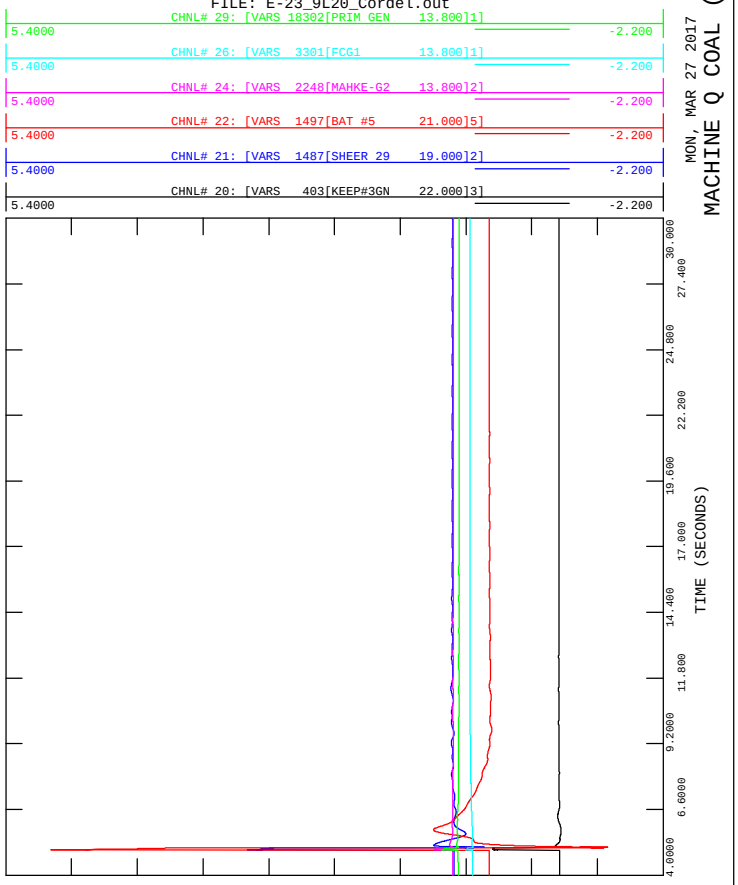


FIGURE E-23A
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-23_9L20_Cordel.out

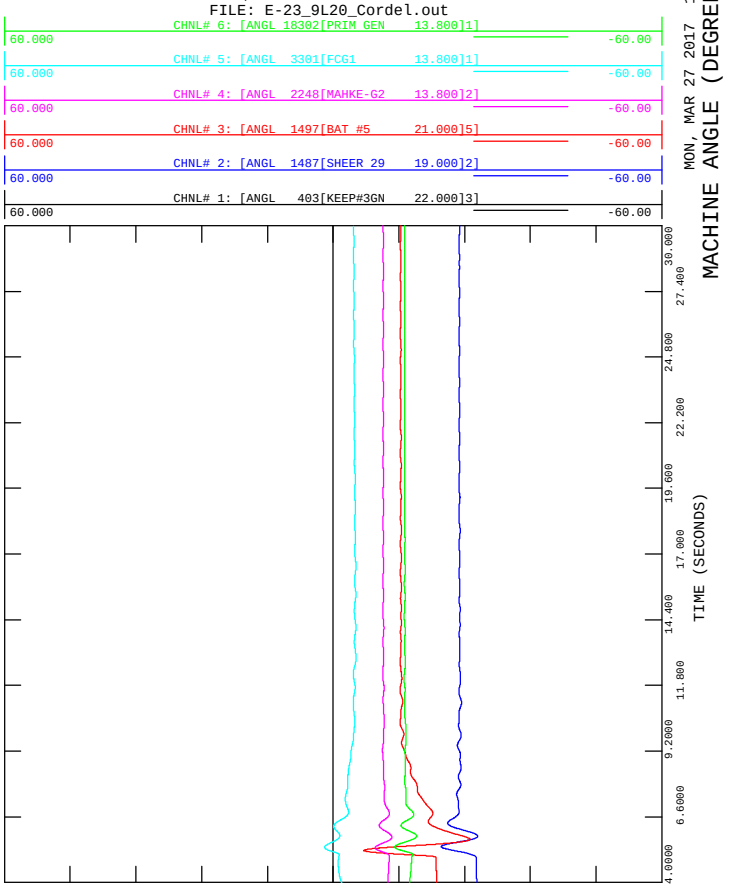


FIGURE E-23C
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-23_9L20_Cordel.out

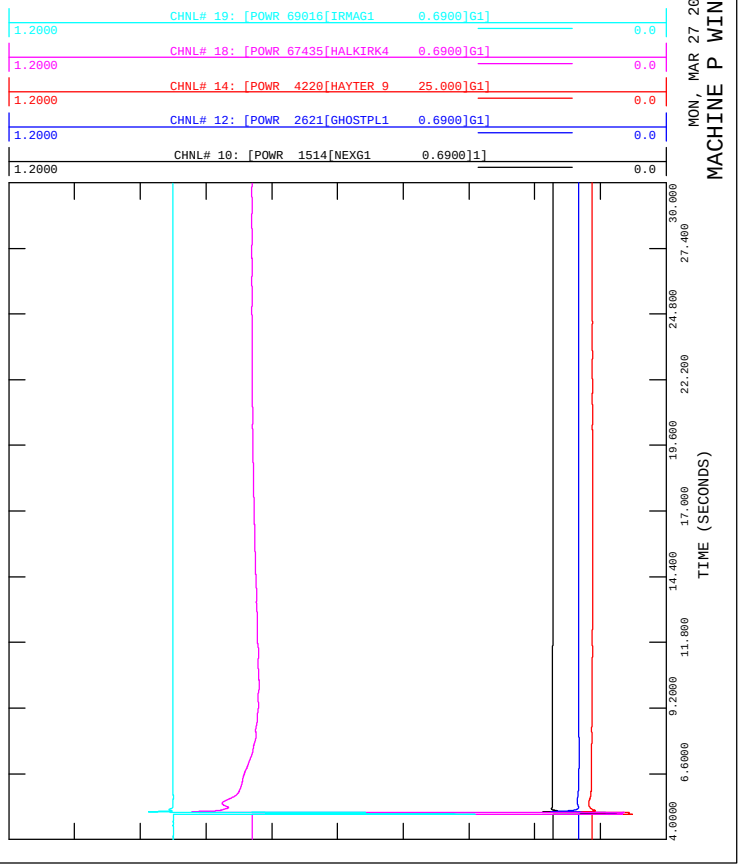


FIGURE E-23F
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-23_9L20_Cordel.out

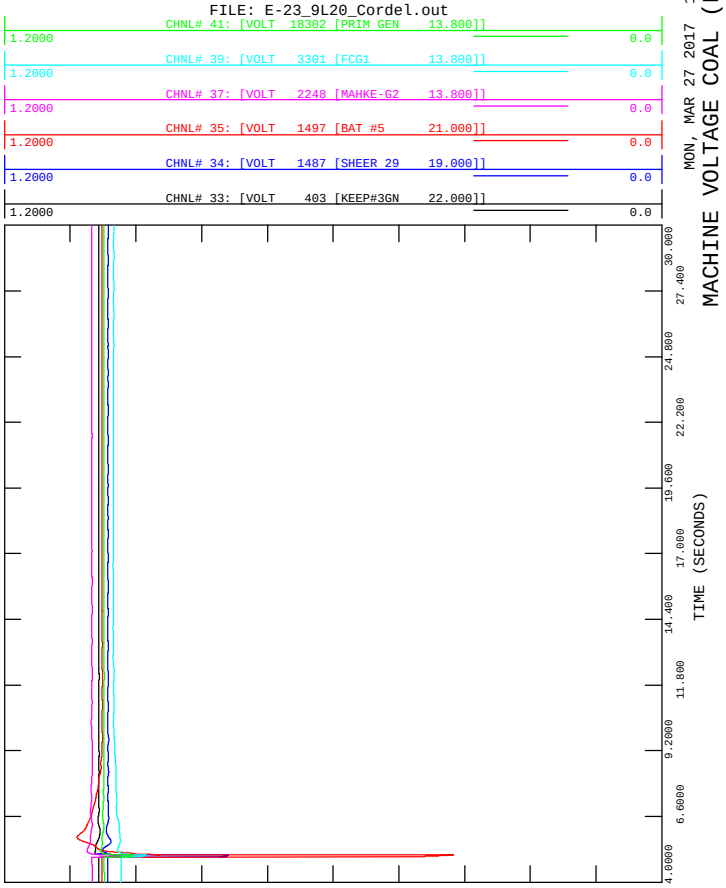


FIGURE E-23H
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-23_9L20_Cordel.out

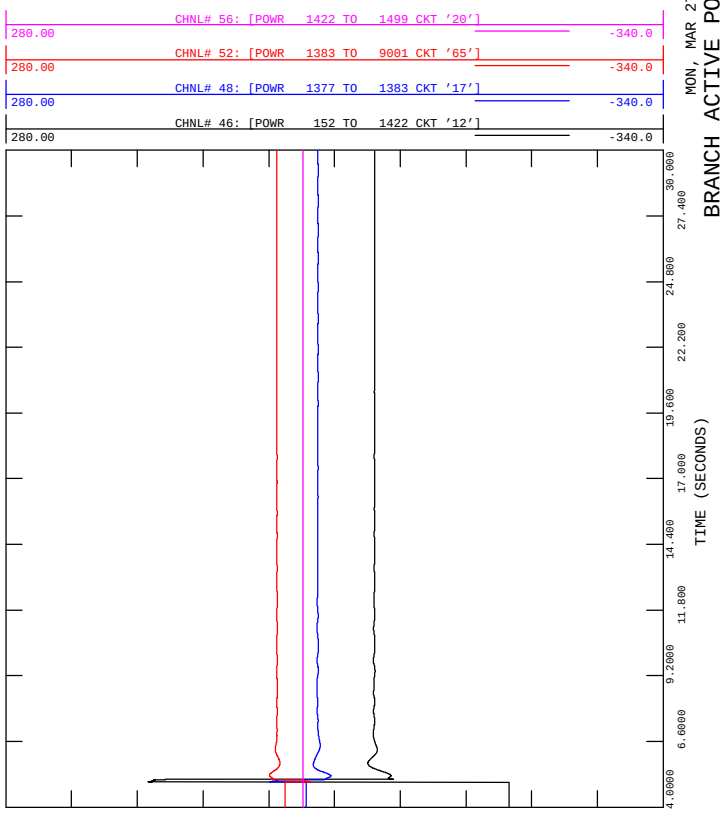


FIGURE E-23E
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-23_9L20_Cordel.out

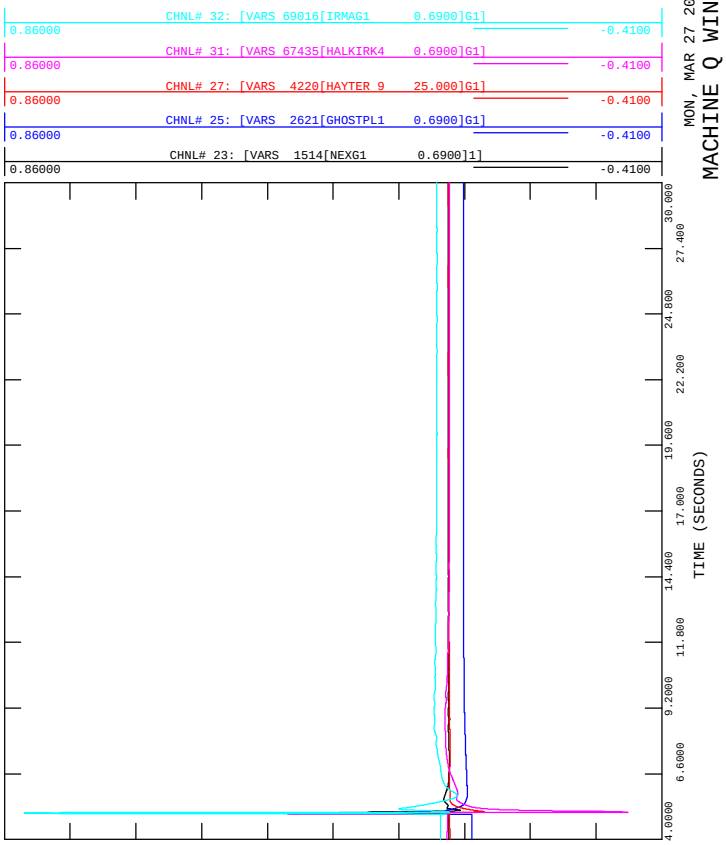


FIGURE E-23G
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-23_9L20_Cordel.out

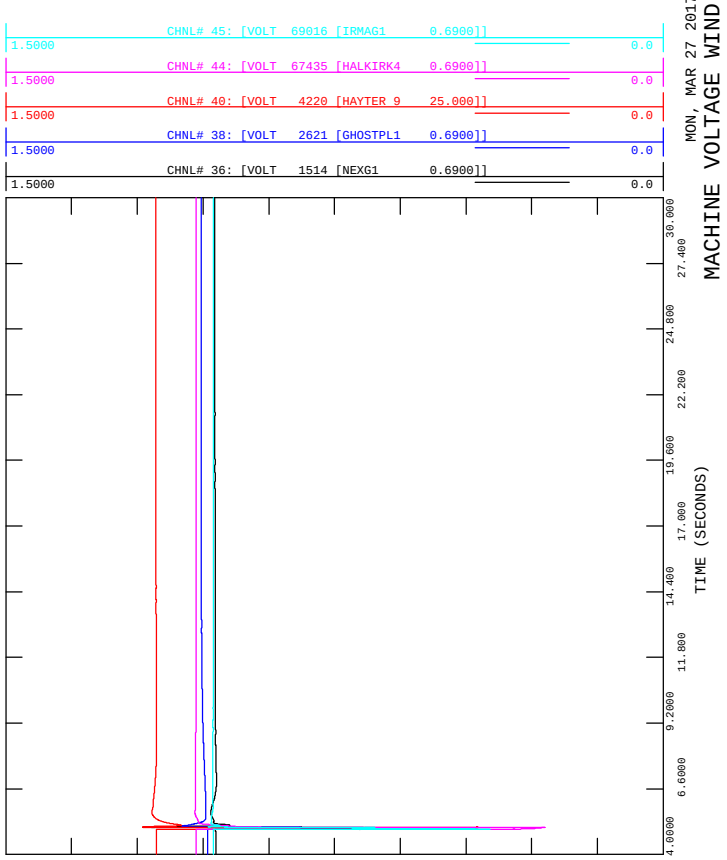


FIGURE E-23I
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-23_9L20_Cordel.out

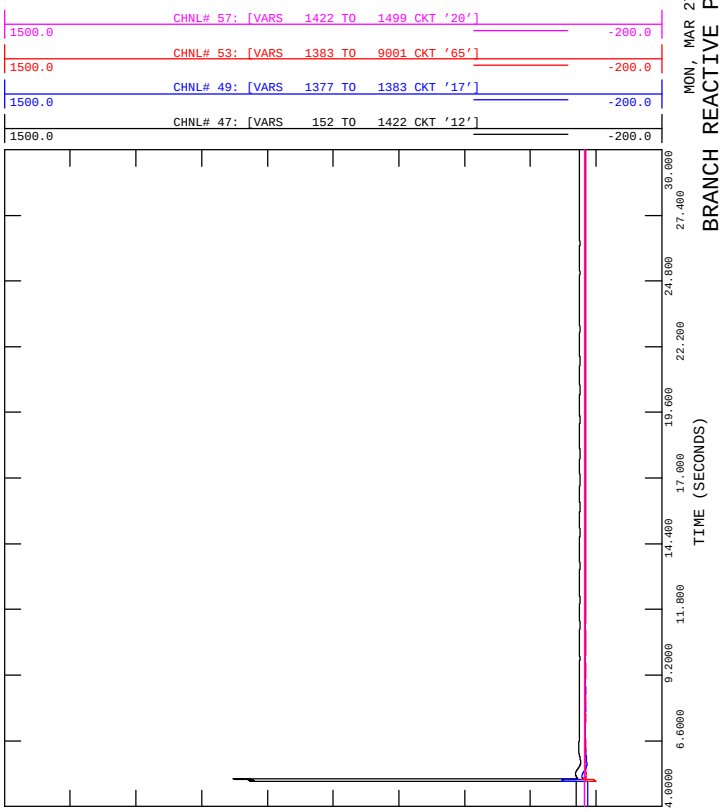


FIGURE E-24B
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-24_9L20_Nevis.out

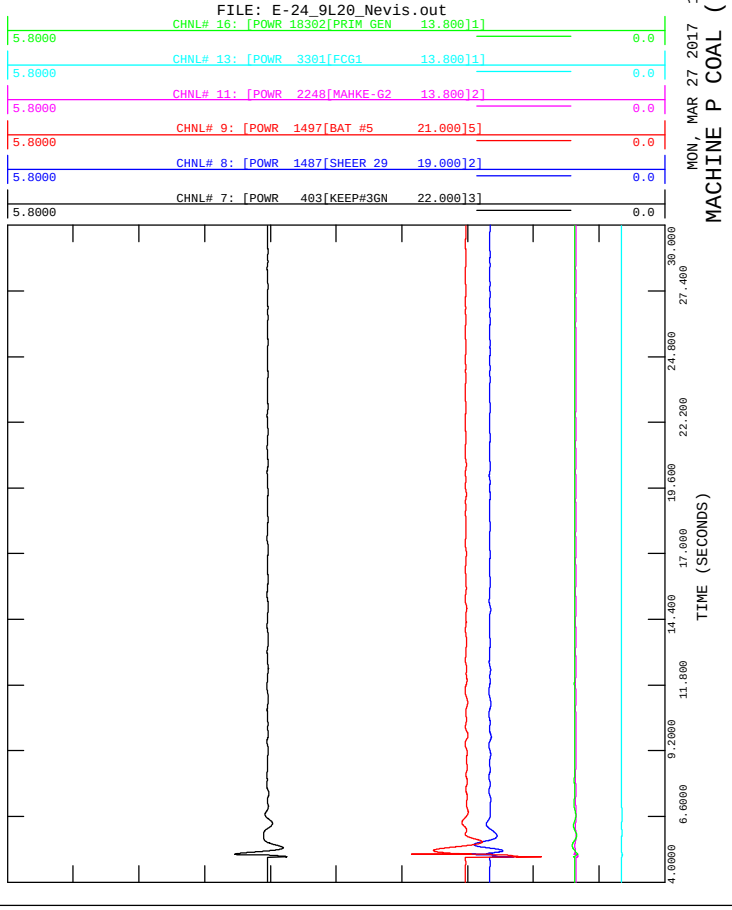


FIGURE E-24D
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-24_9L20_Nevis.out

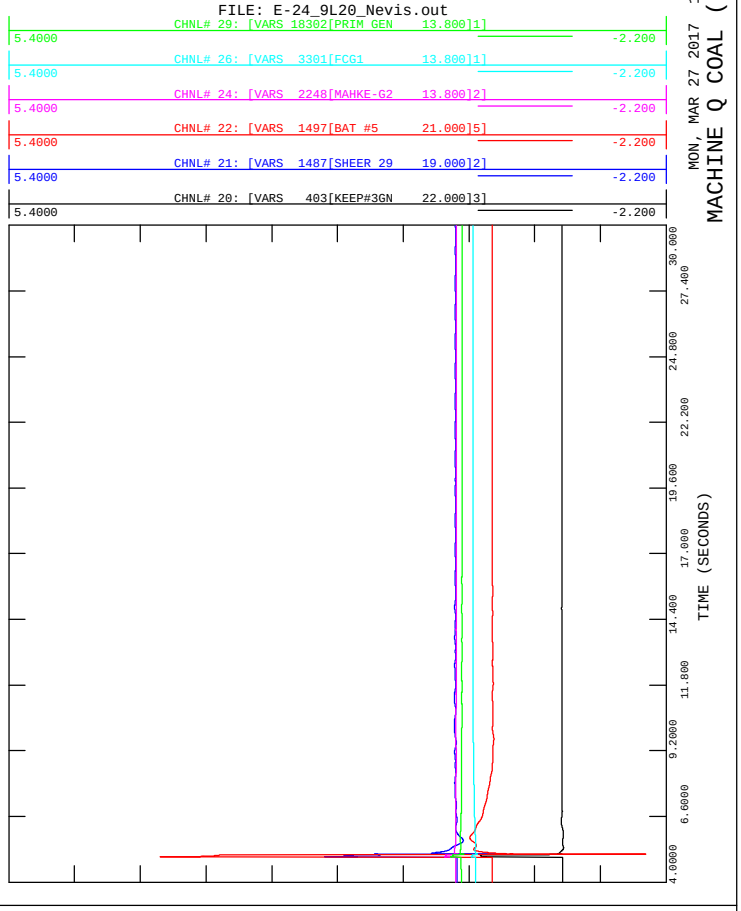


FIGURE E-24A
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-24_9L20_Nevis.out

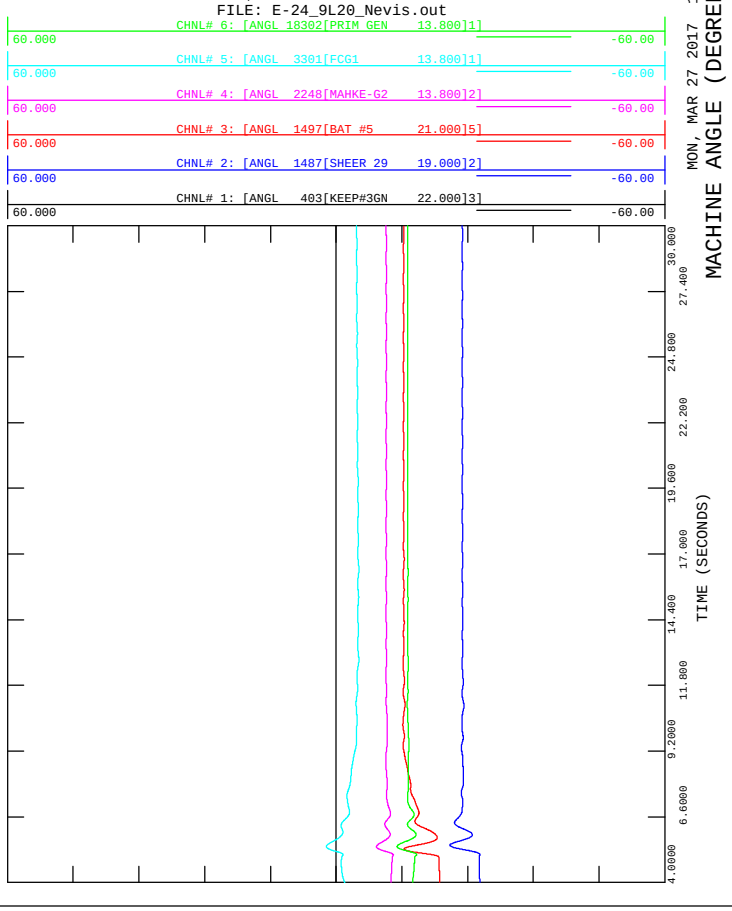


FIGURE E-24C
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-24_9L20_Nevis.out

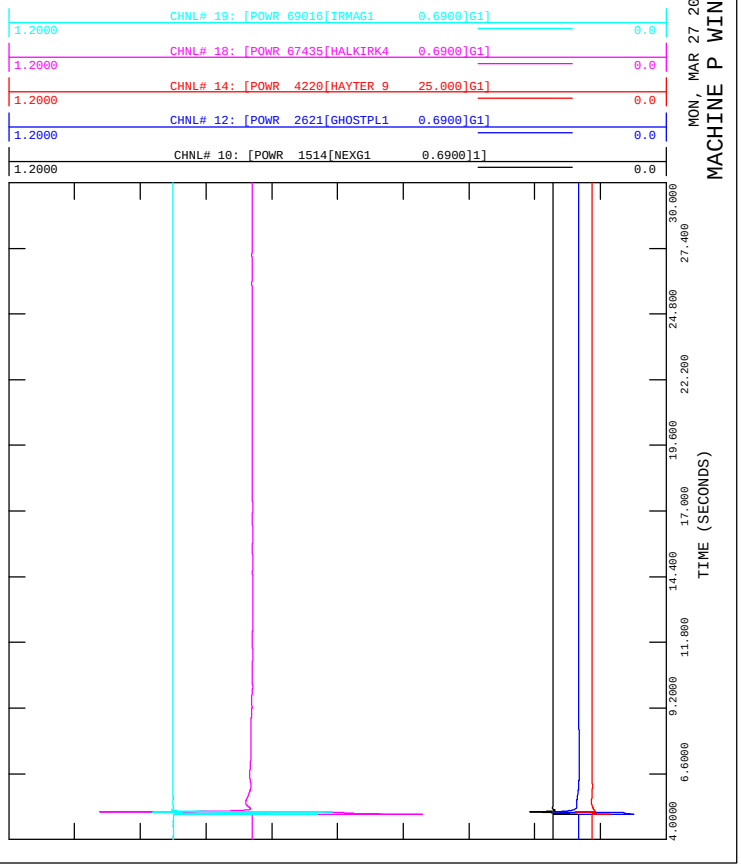


FIGURE E-24F
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-24_9L20_Nevis.out

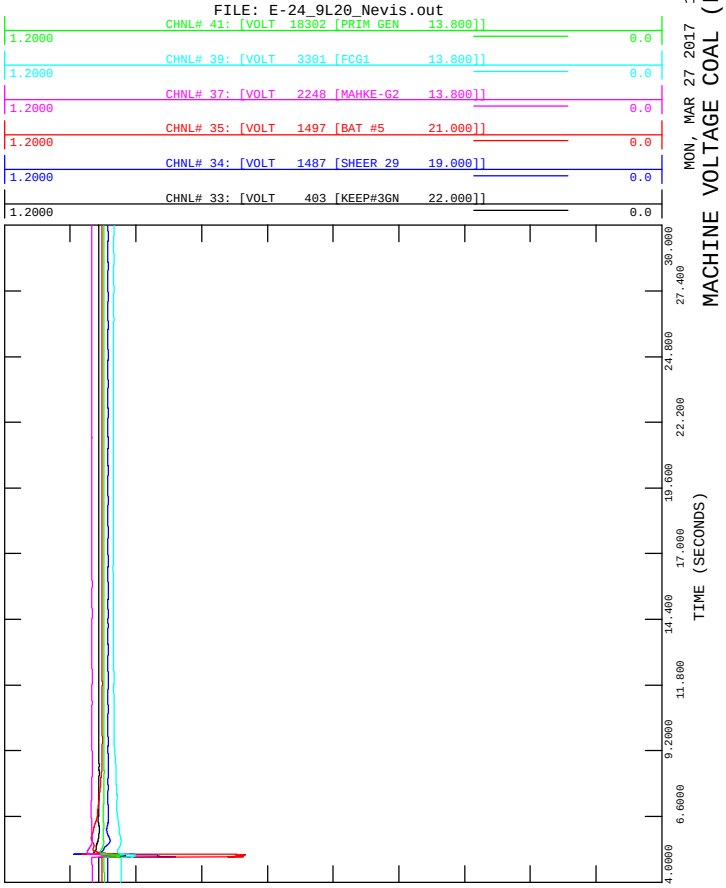


FIGURE E-24H
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-24_9L20_Nevis.out

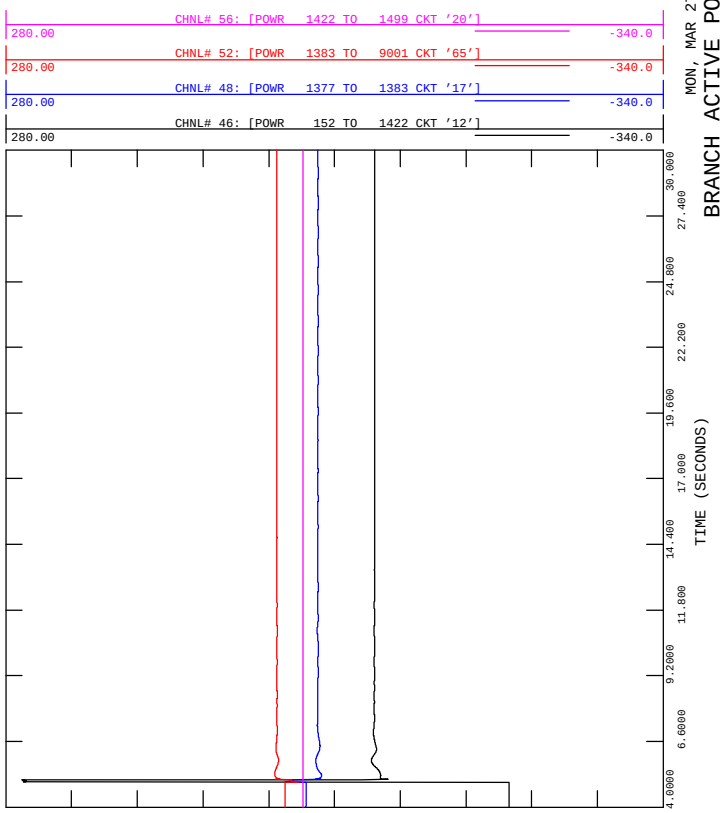


FIGURE E-24E
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-24_9L20_Nevis.out

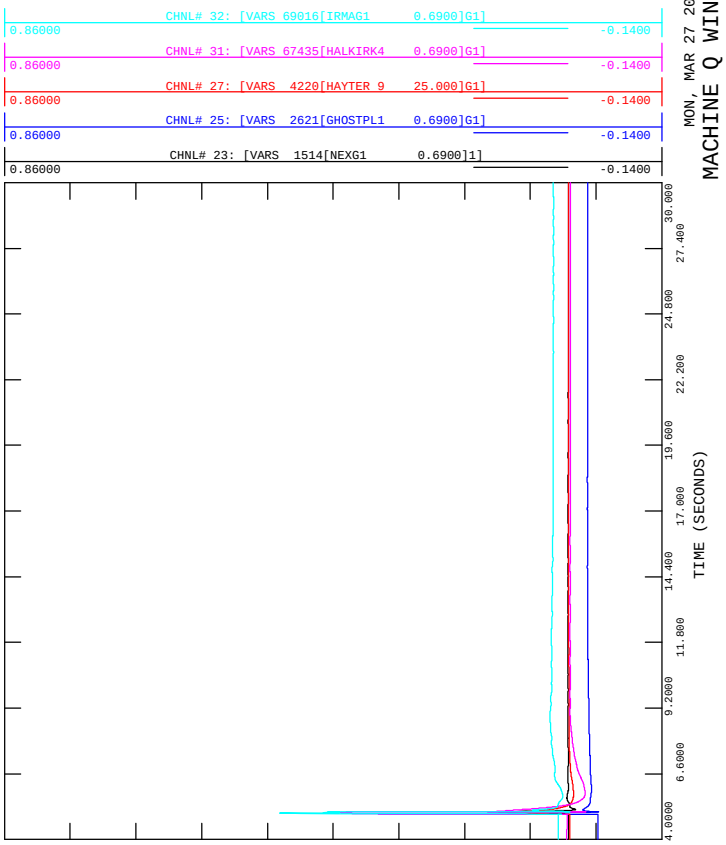


FIGURE E-24G
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-24_9L20_Nevis.out

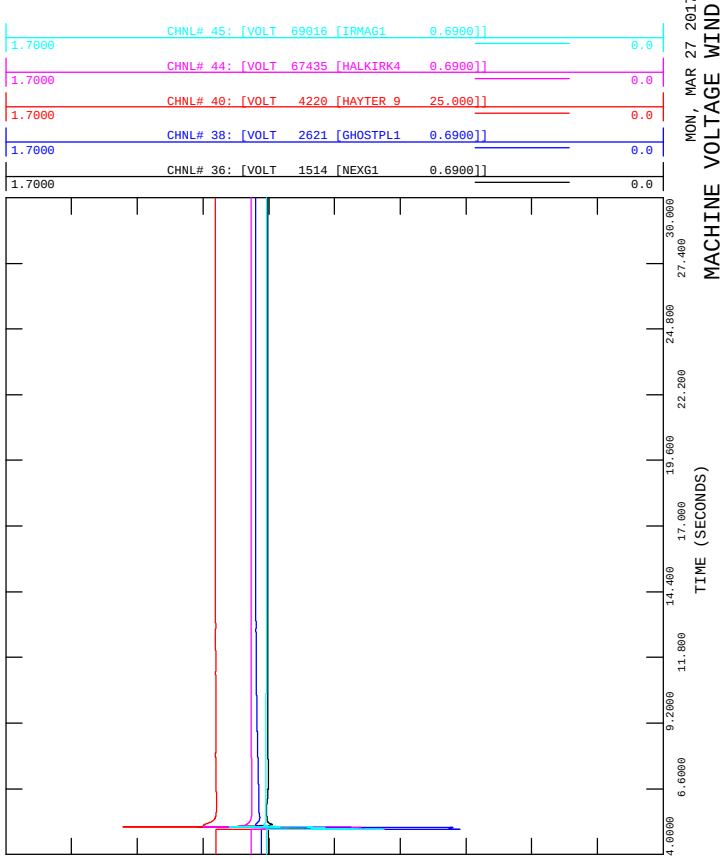


FIGURE E-24I
2017SL, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-24_9L20_Nevis.out

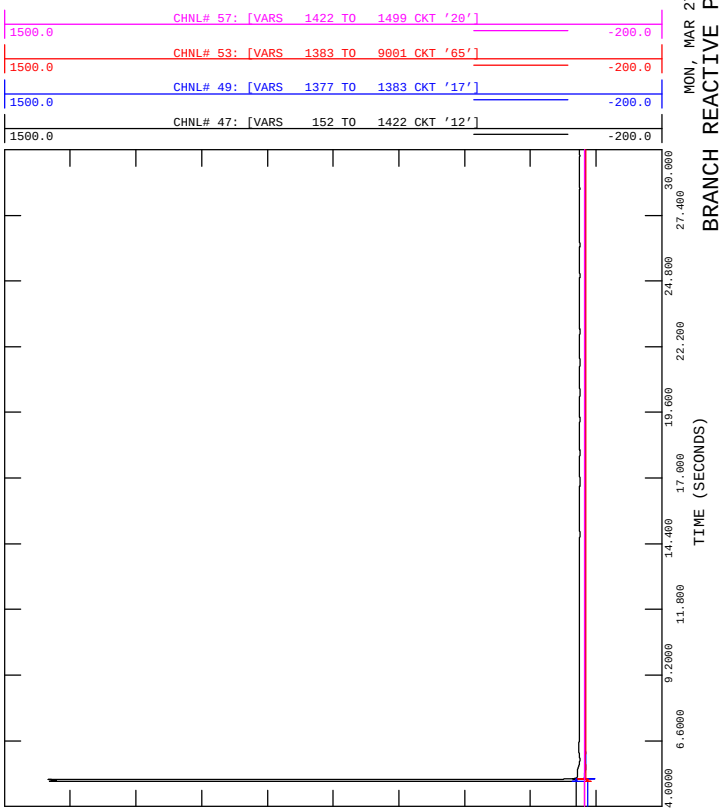


FIGURE E-25B
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-25_9L59_Anderson.out

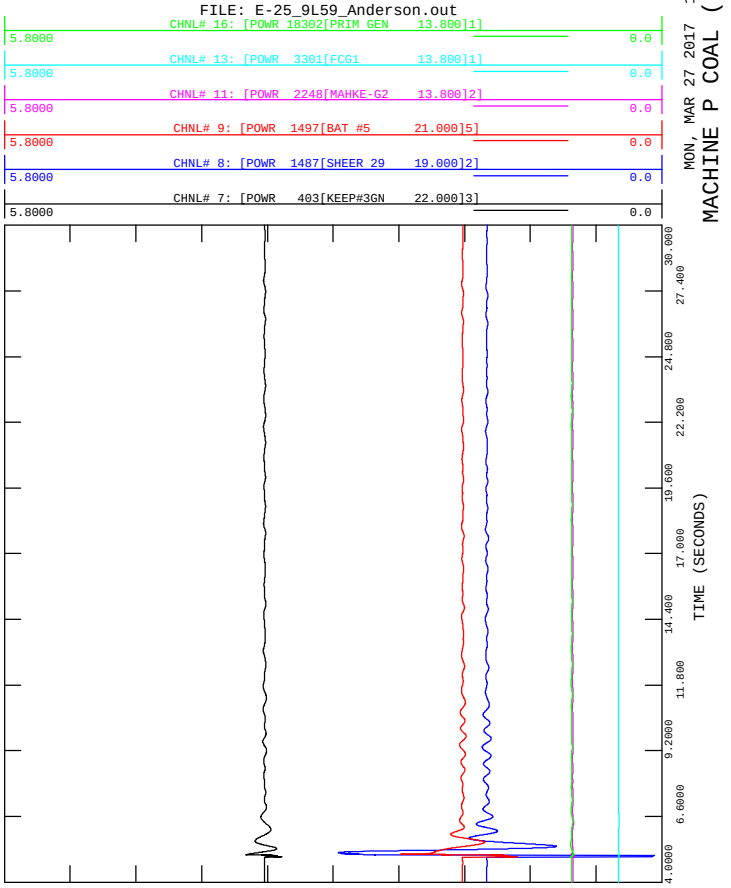


FIGURE E-25D
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-25_9L59_Anderson.out

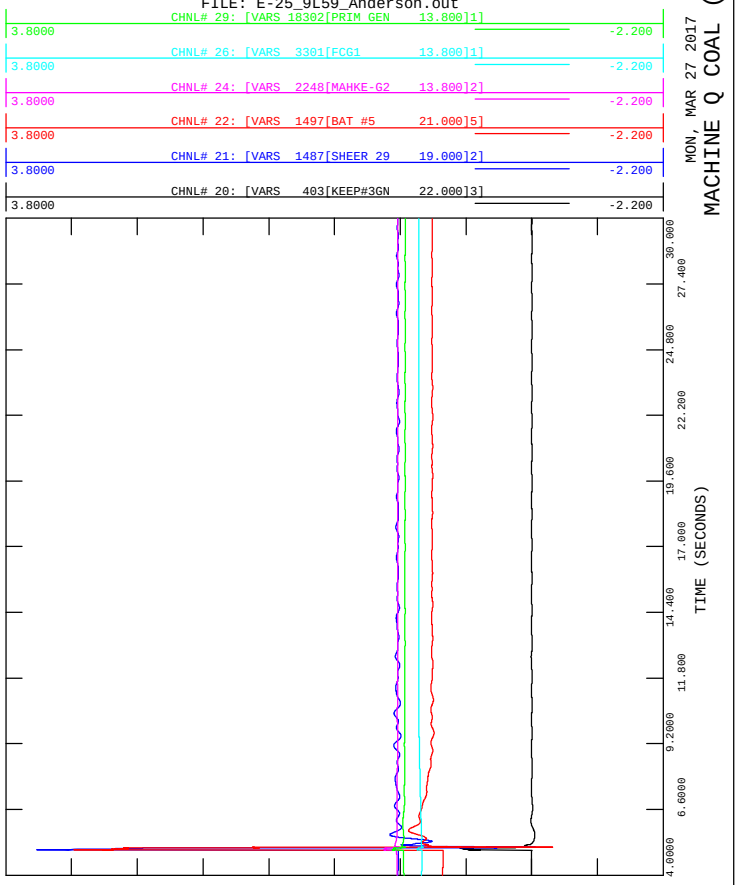


FIGURE E-25A
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-25_9L59_Anderson.out

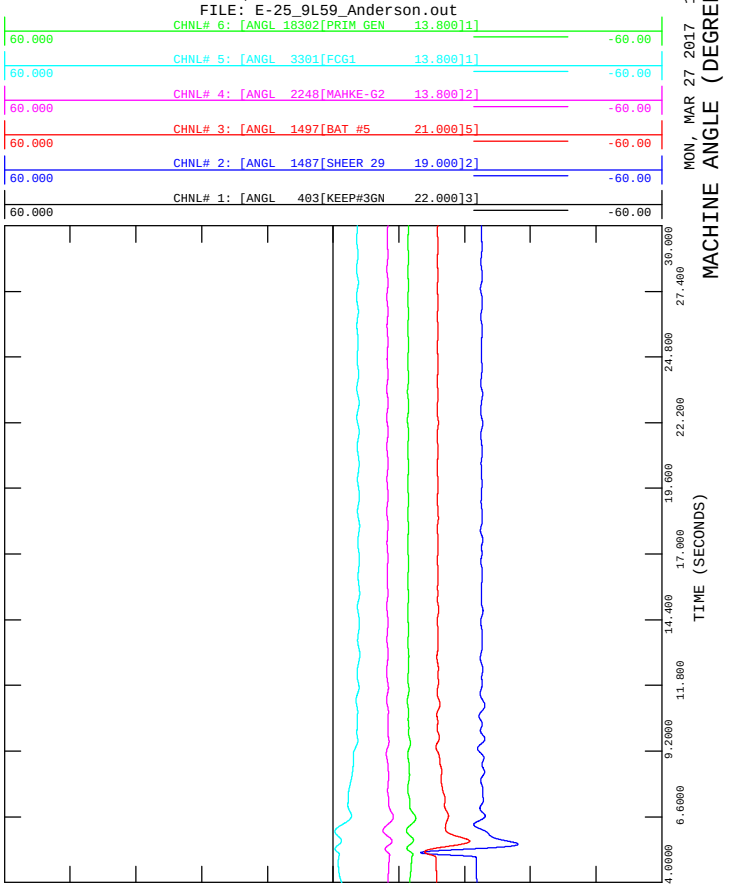


FIGURE E-25C
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-25_9L59_Anderson.out

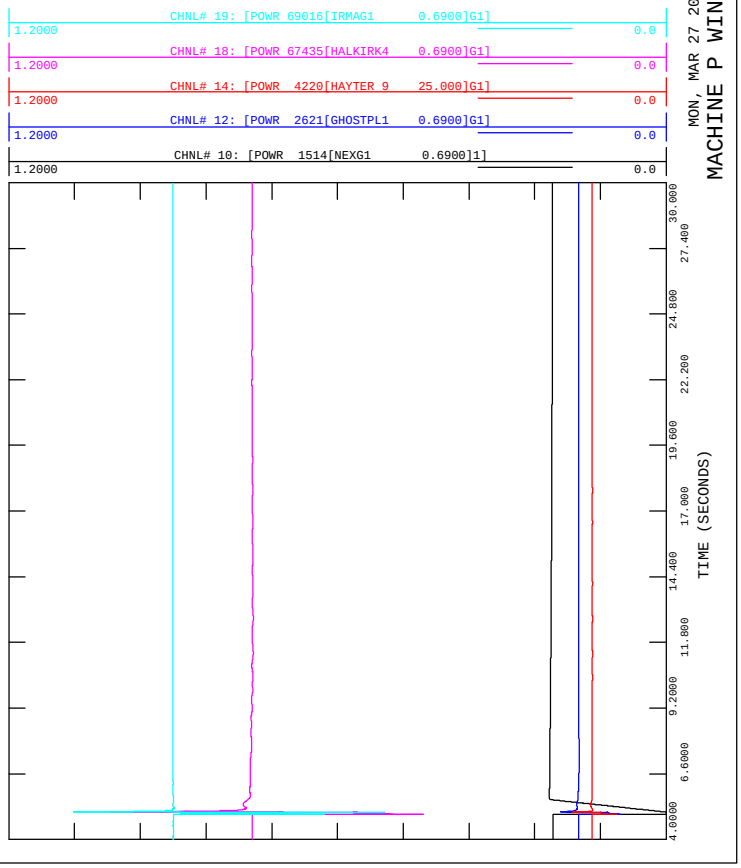


FIGURE E-25F
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-25_9L59_Anderson.out

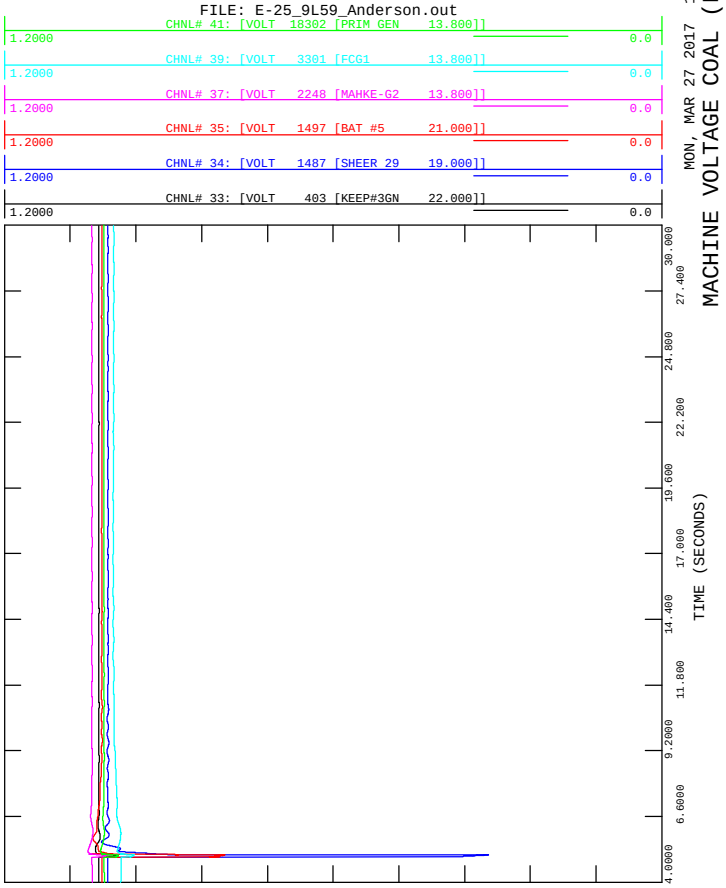


FIGURE E-25H
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-25_9L59_Anderson.out

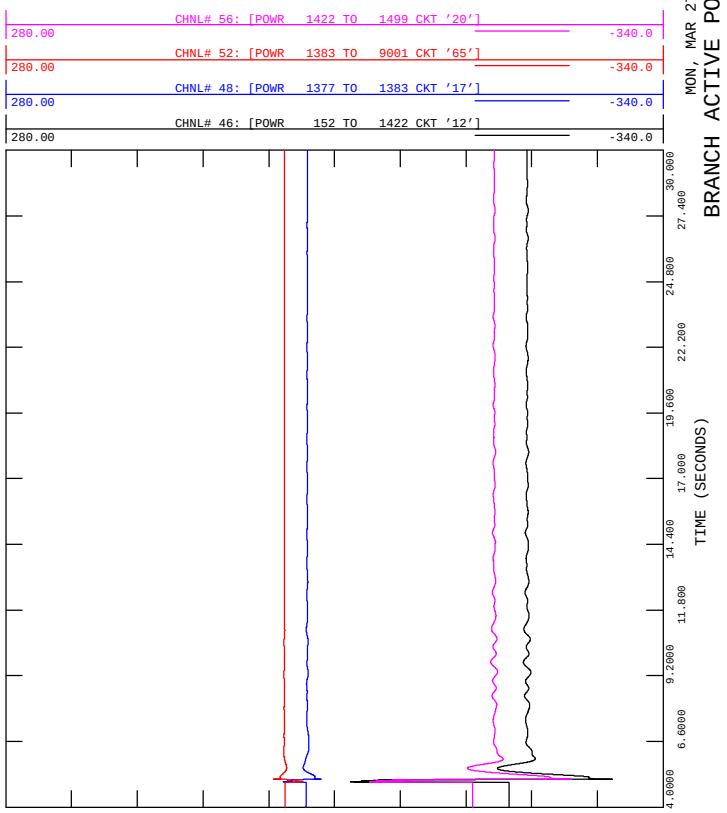


FIGURE E-25E
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-25_9L59_Anderson.out

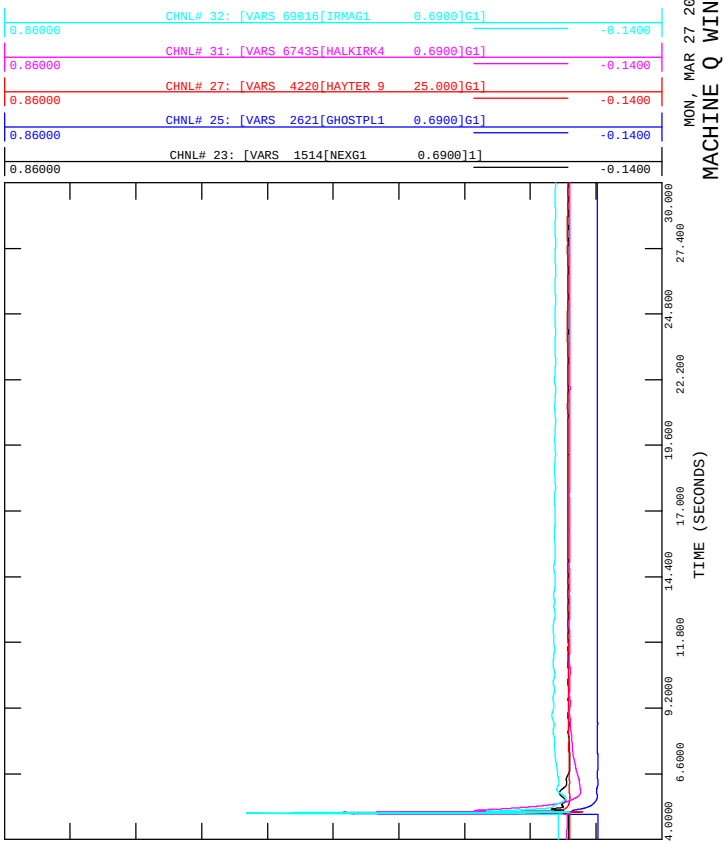


FIGURE E-25G
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-25_9L59_Anderson.out

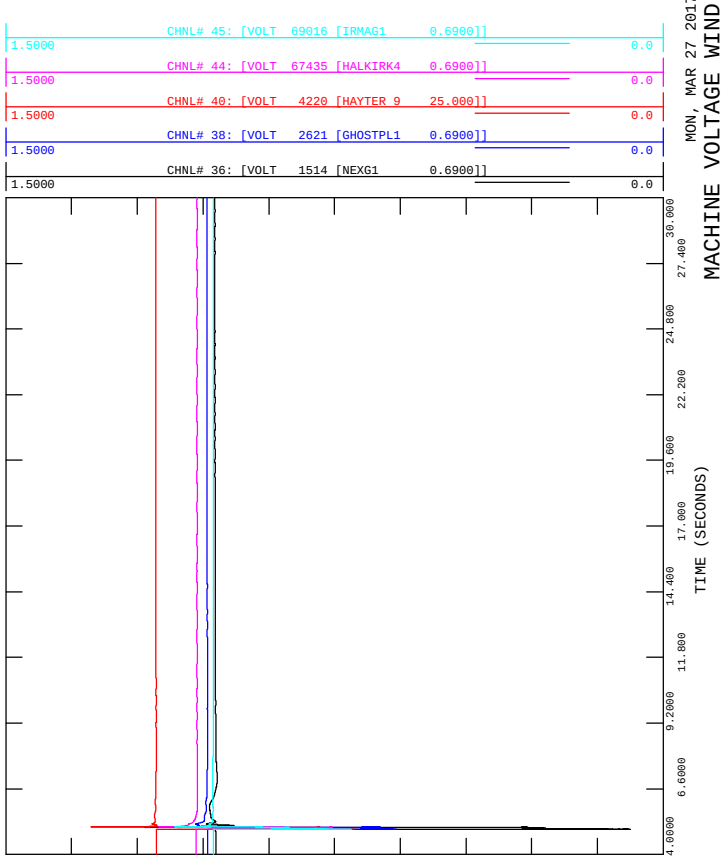


FIGURE E-25I
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-25_9L59_Anderson.out

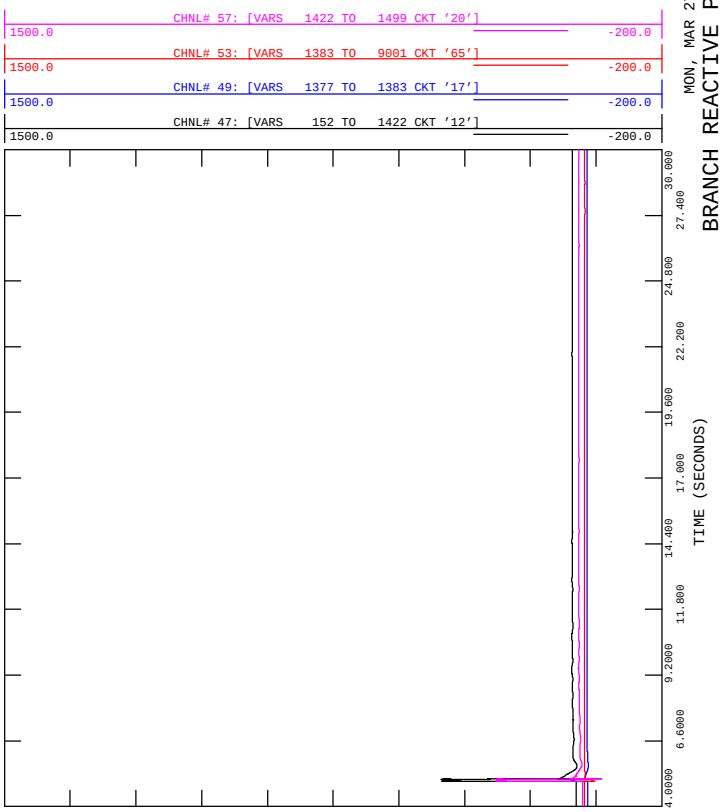


FIGURE E-26B
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-26_9L59_Tinchebray.out

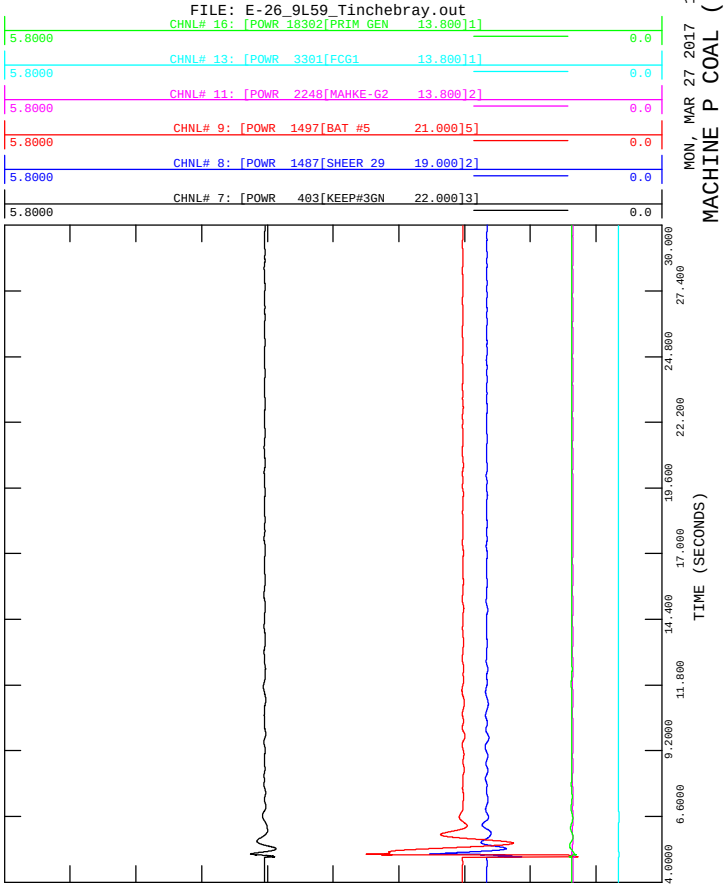


FIGURE E-26D
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-26_9L59_Tinchebray.out

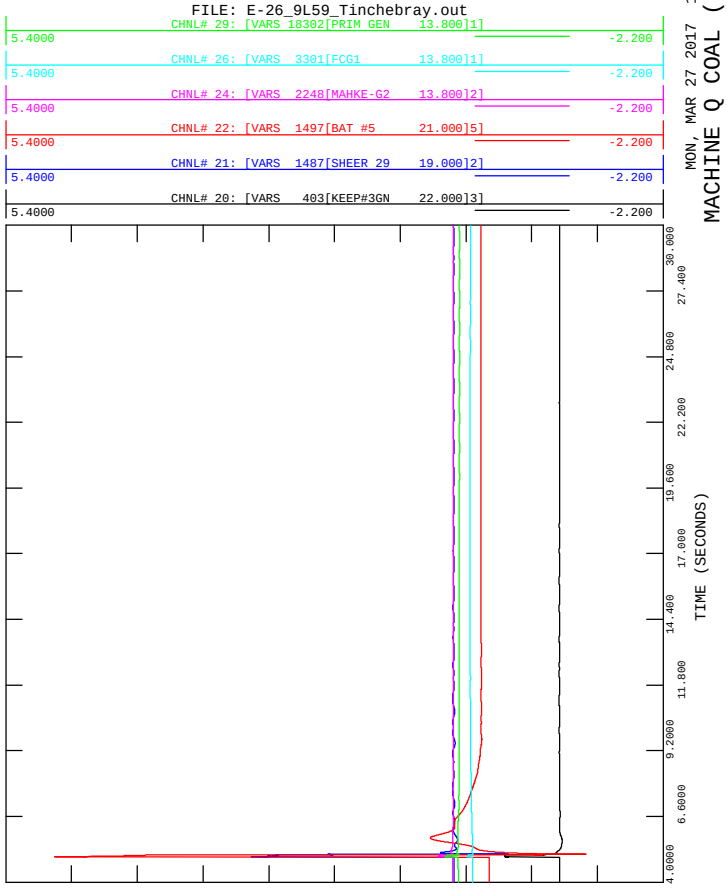


FIGURE E-26A
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-26_9L59_Tinchebray.out

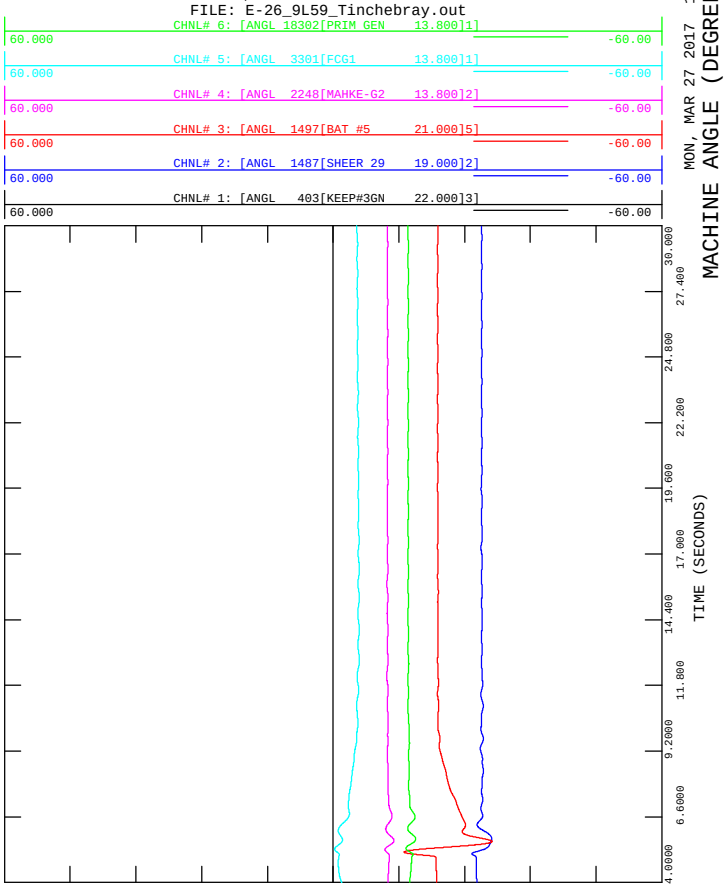


FIGURE E-26C
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-26_9L59_Tinchebray.out

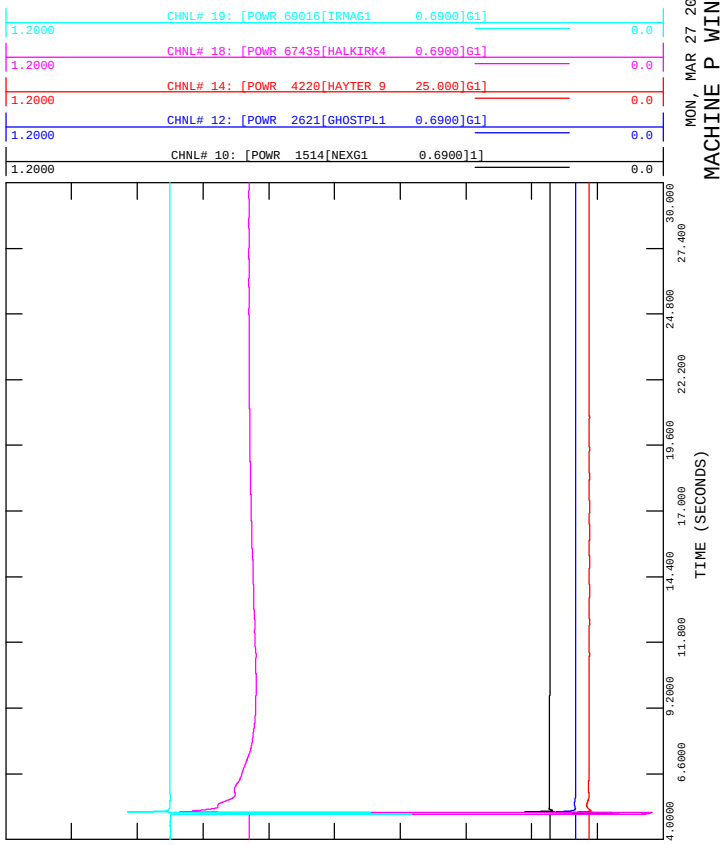


FIGURE E-26F
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-26_9L59_Tinchebray.out

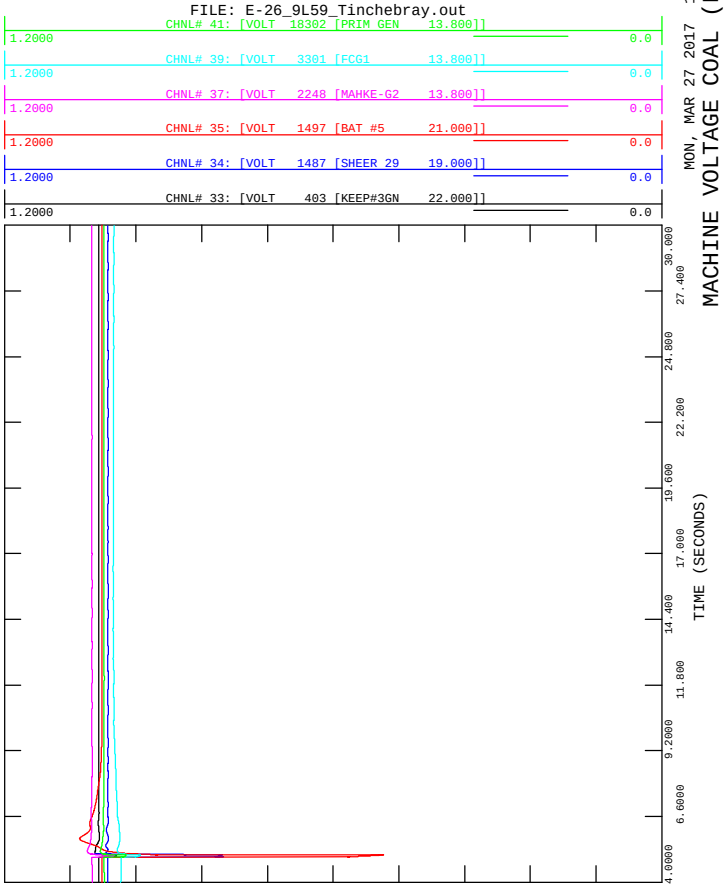


FIGURE E-26H
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-26_9L59_Tinchebray.out

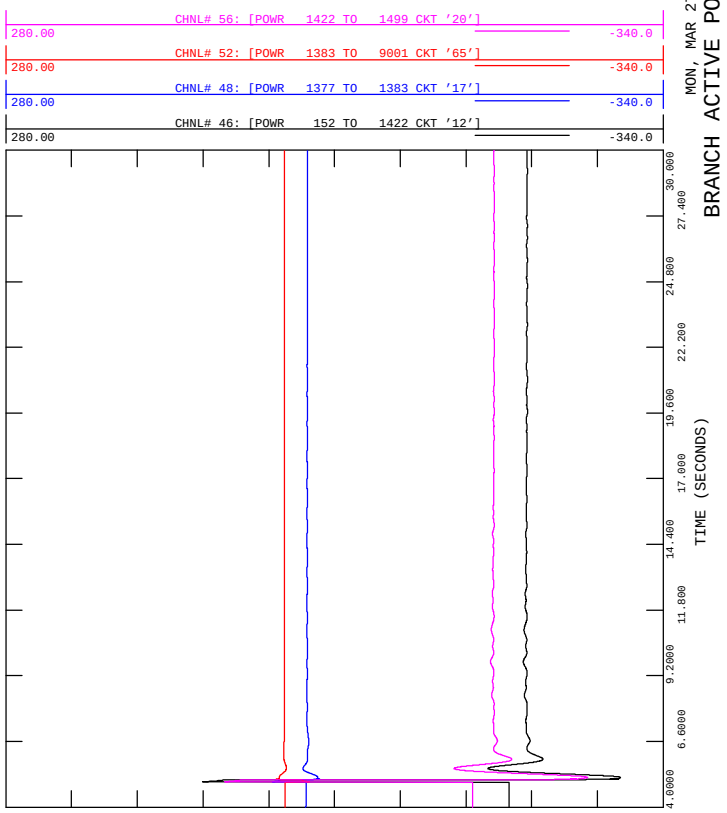


FIGURE E-26E
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-26_9L59_Tinchebray.out

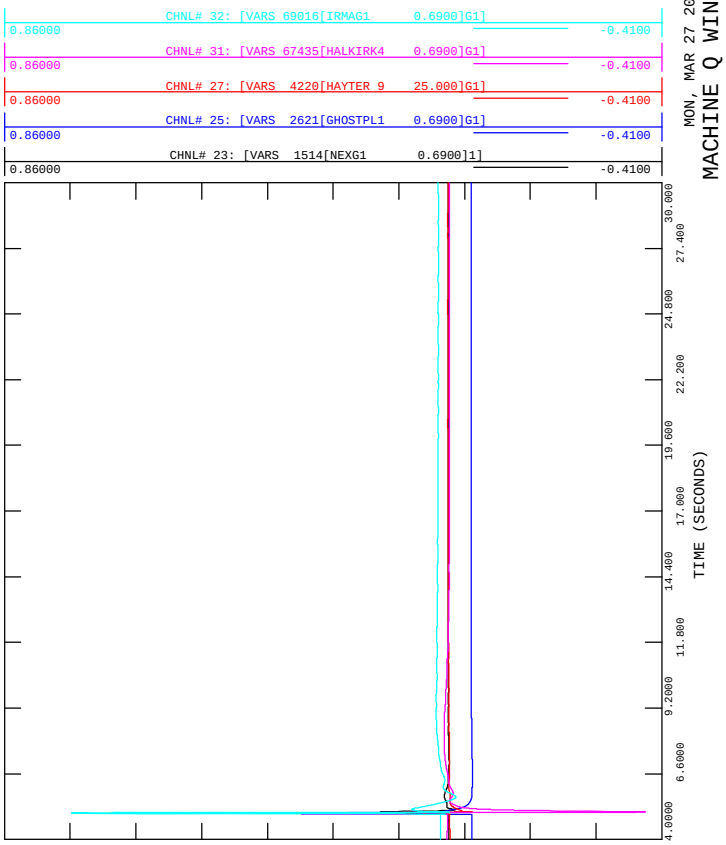


FIGURE E-26G
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-26_9L59_Tinchebray.out

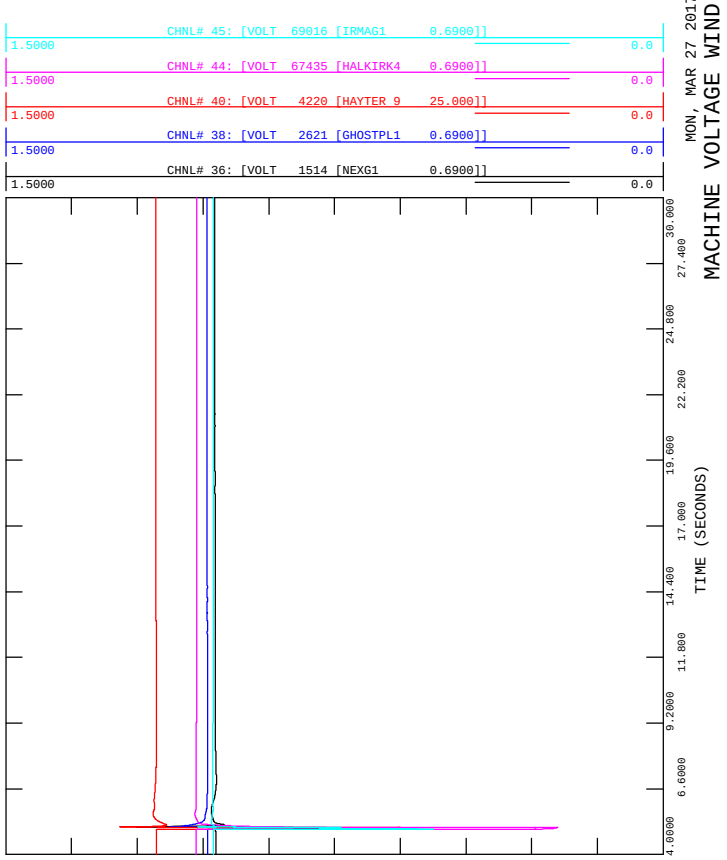


FIGURE E-26I
2017SL, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-26_9L59_Tinchebray.out

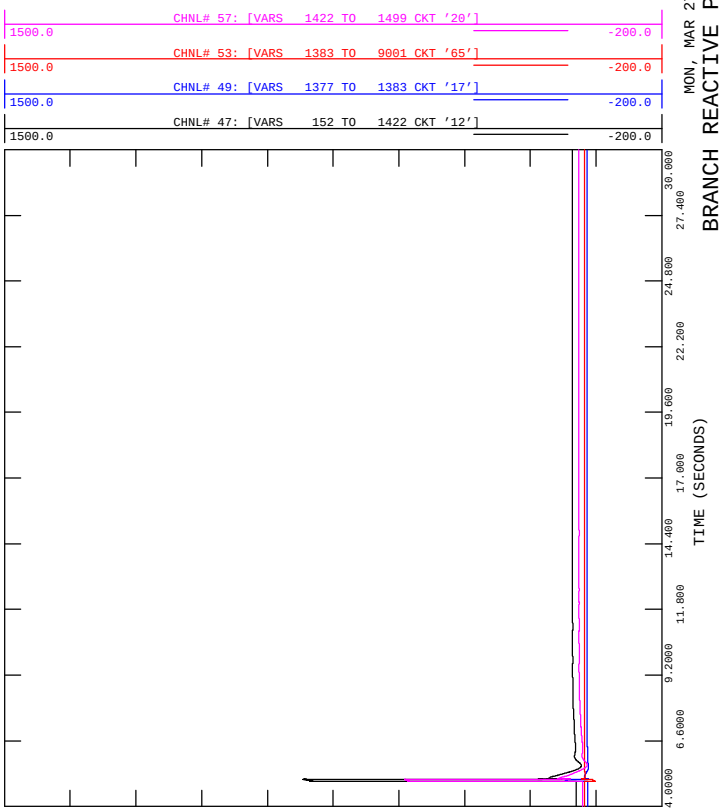


FIGURE E-27B
2017SL, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-27_912L_Nevis.out

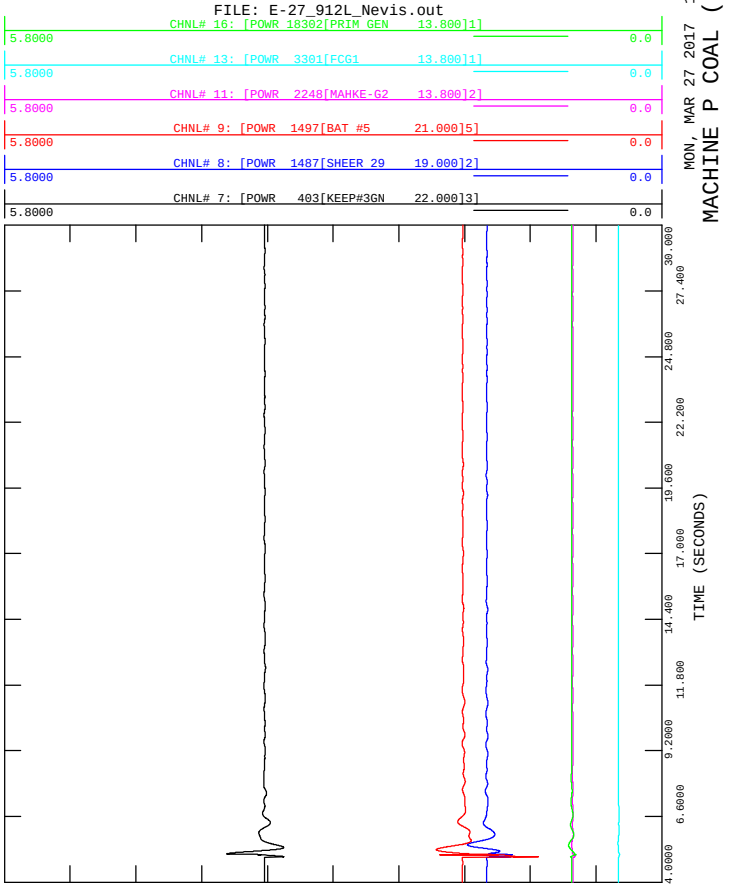


FIGURE E-27D
2017SL, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-27_912L_Nevis.out

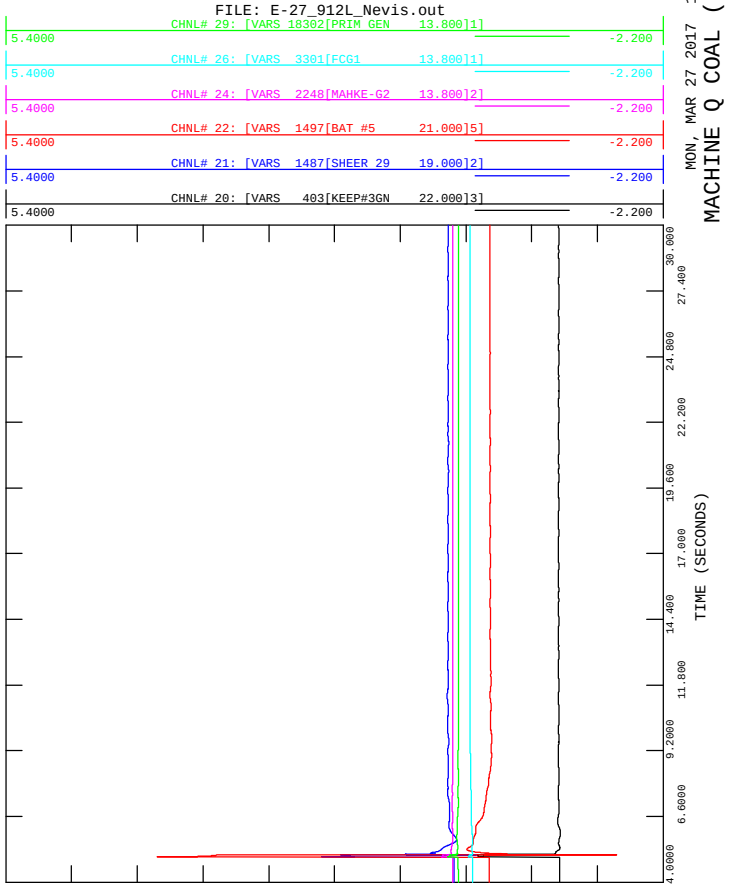


FIGURE E-27A
2017SL, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-27_912L_Nevis.out

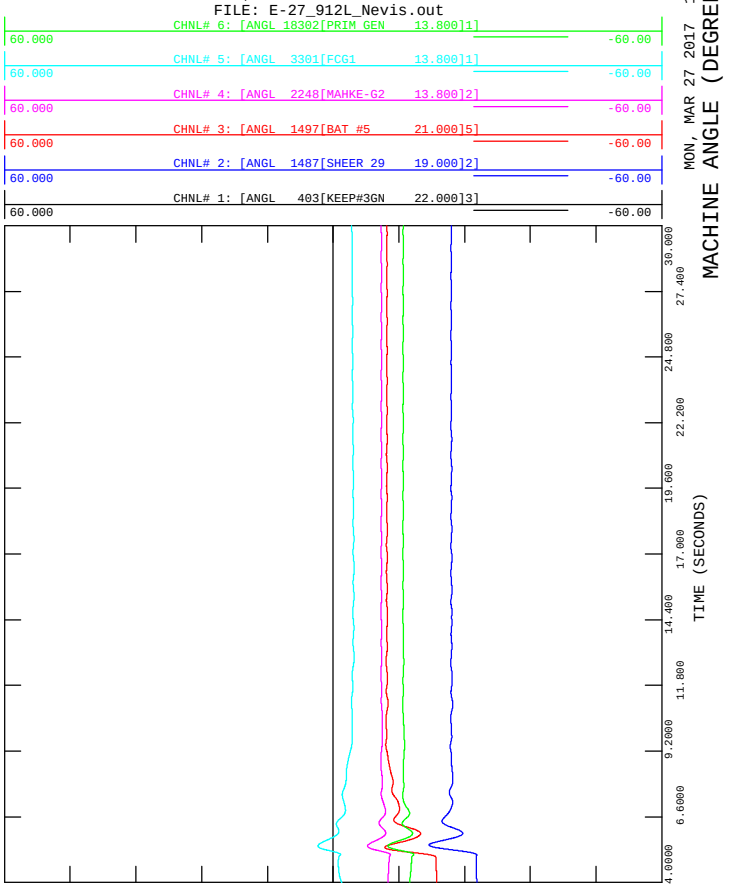


FIGURE E-27C
2017SL, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-27_912L_Nevis.out

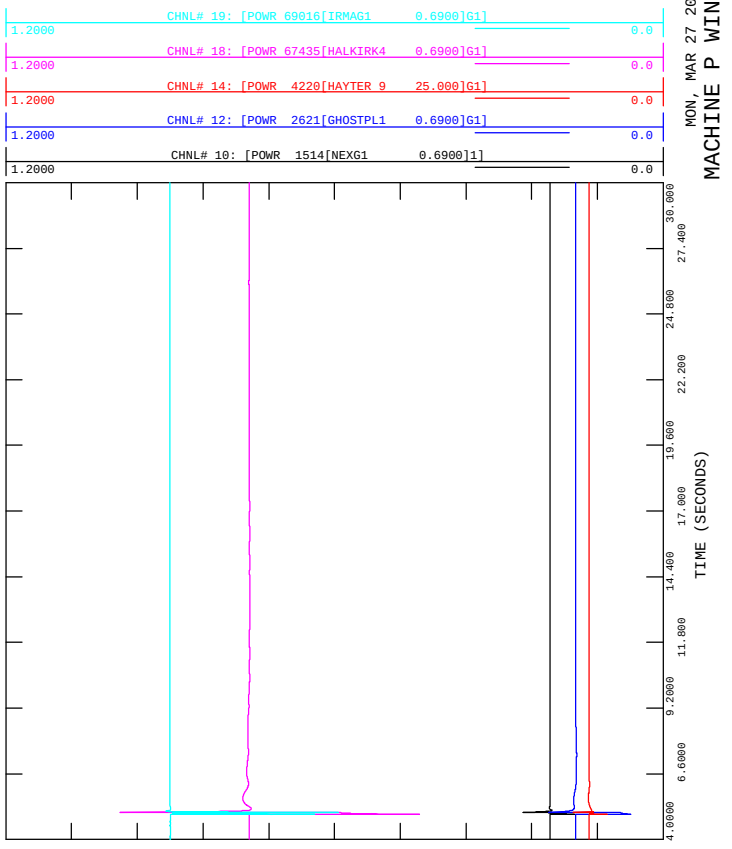


FIGURE E-27F
2017SL, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-27_912L_Nevis.out

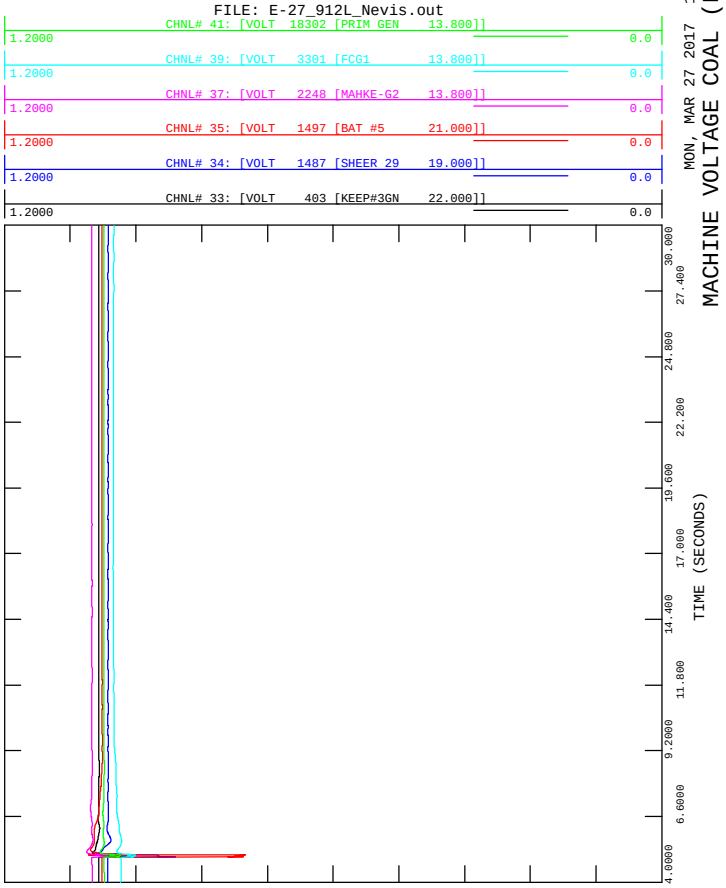


FIGURE E-27H
2017SL, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-27_912L_Nevis.out

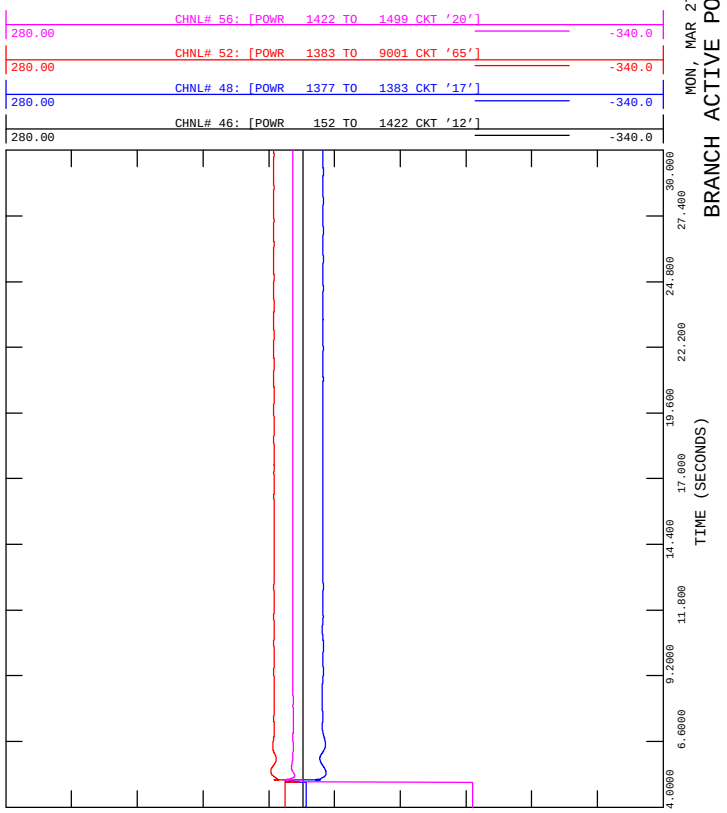


FIGURE E-27E
2017SL, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-27_912L_Nevis.out

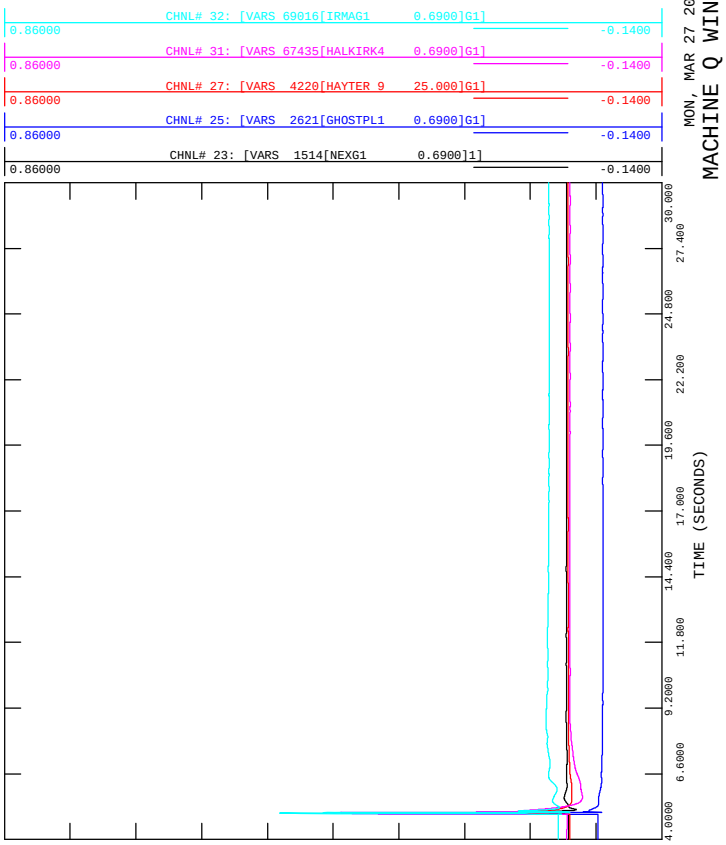


FIGURE E-27G
2017SL, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-27_912L_Nevis.out

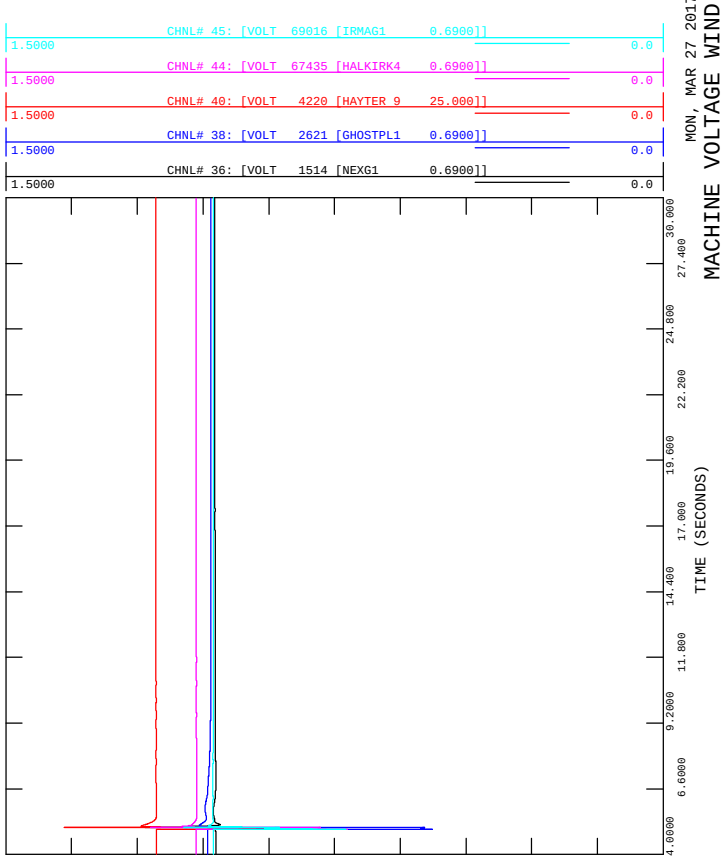


FIGURE E-27I
2017SL, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-27_912L_Nevis.out

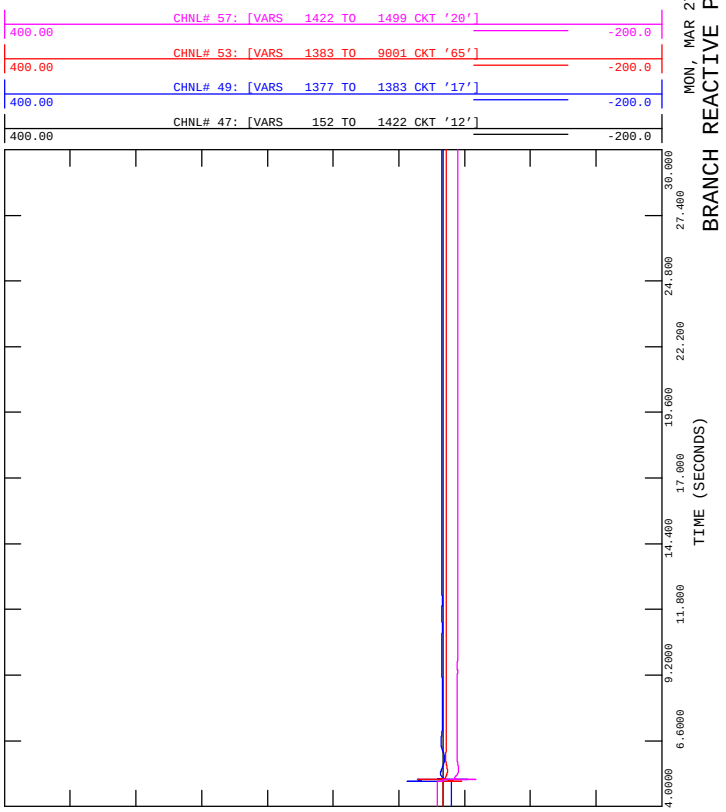


FIGURE E-28B
2017SL, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-28_912L_RedDeer.out

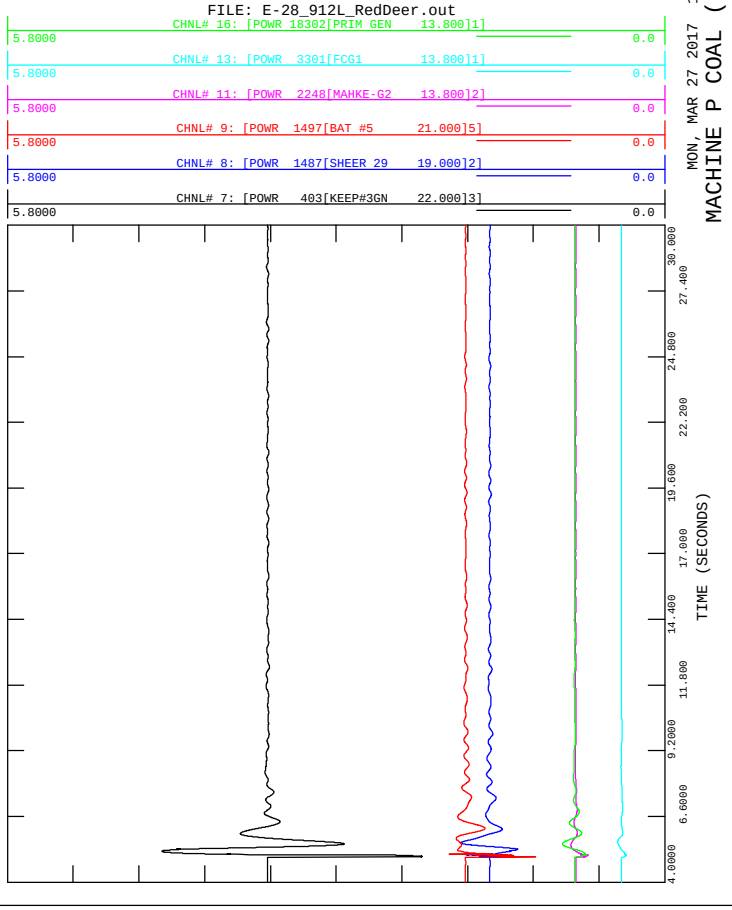


FIGURE E-28D
2017SL, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-28_912L_RedDeer.out

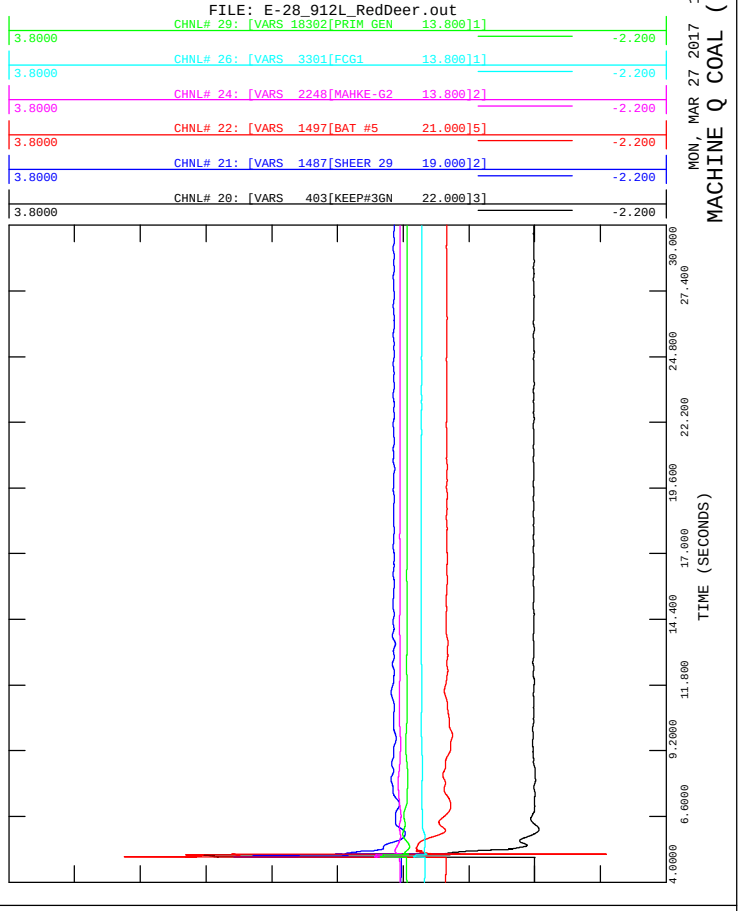


FIGURE E-28A
2017SL, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-28_912L_RedDeer.out

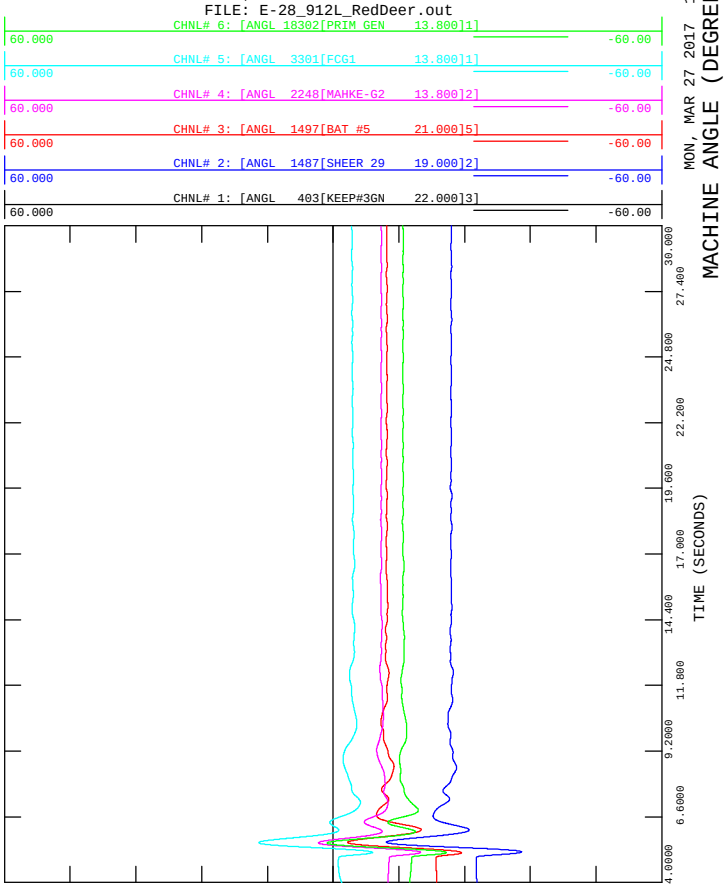


FIGURE E-28C
2017SL, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-28_912L_RedDeer.out

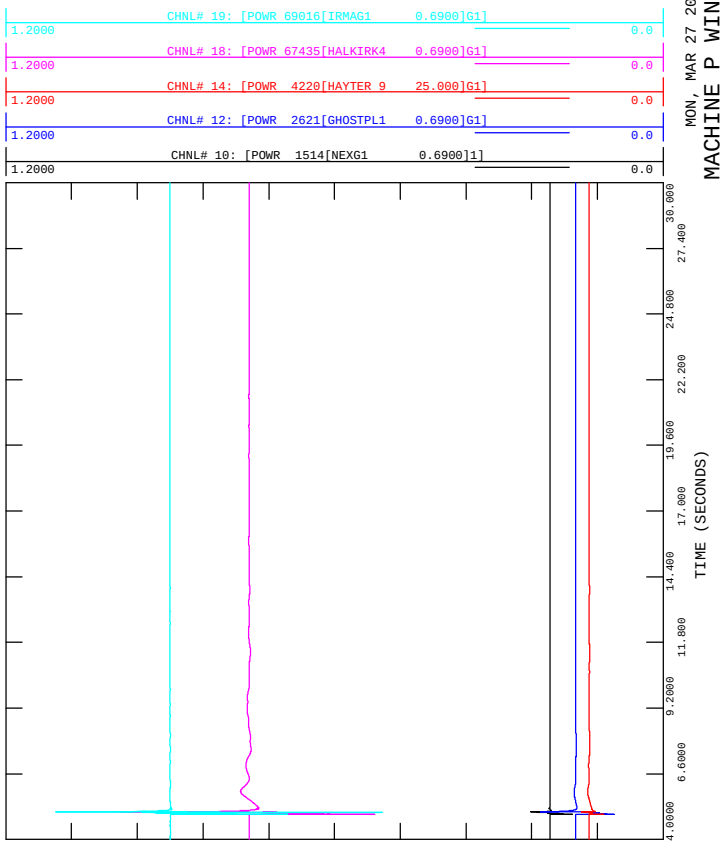


FIGURE E-28F
2017SL, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-28_912L_RedDeer.out

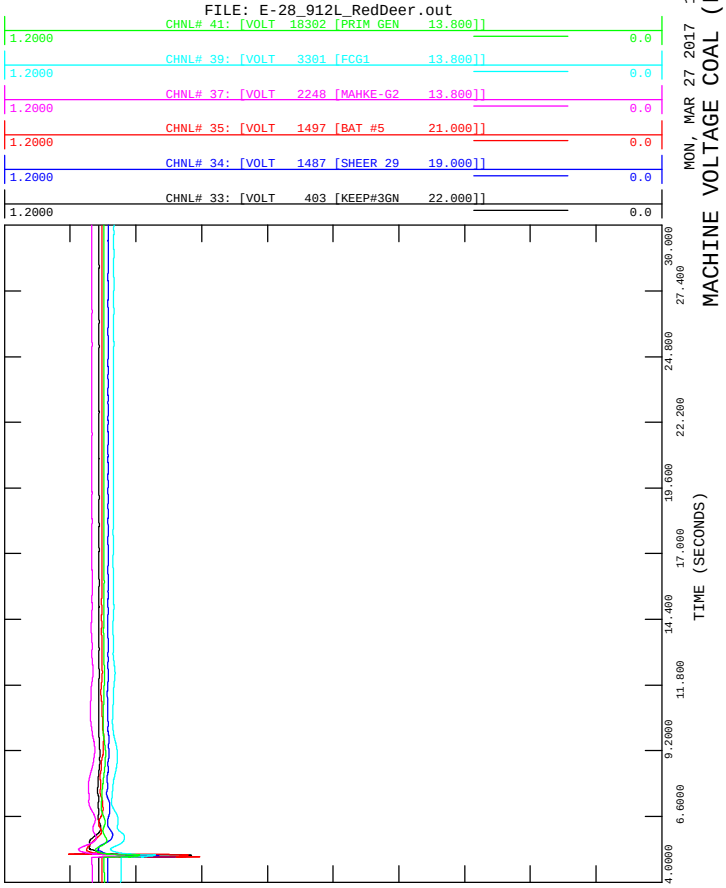


FIGURE E-28H
2017SL, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-28_912L_RedDeer.out

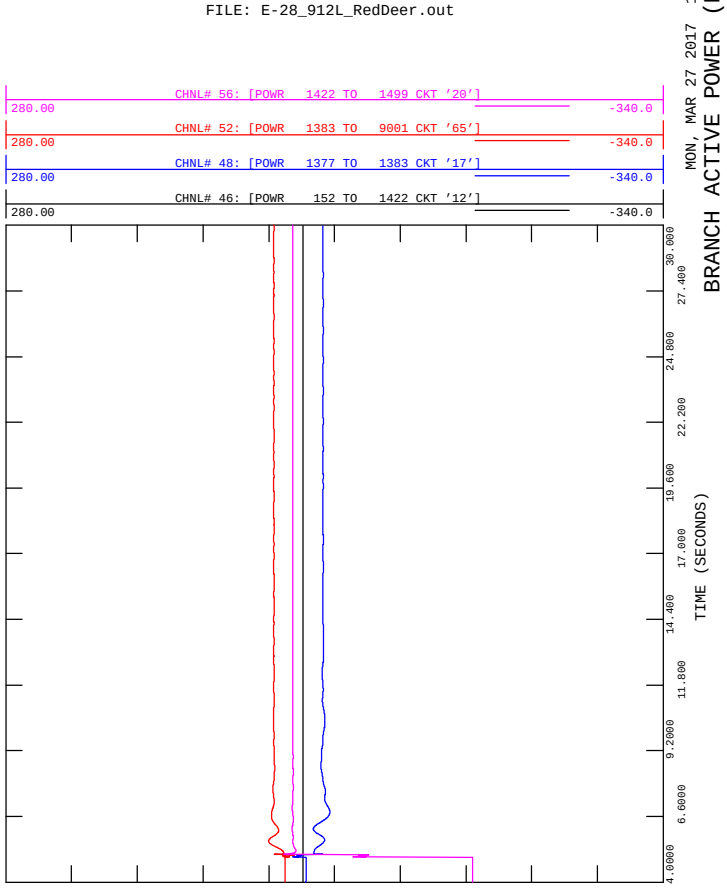


FIGURE E-28E
2017SL, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-28_912L_RedDeer.out

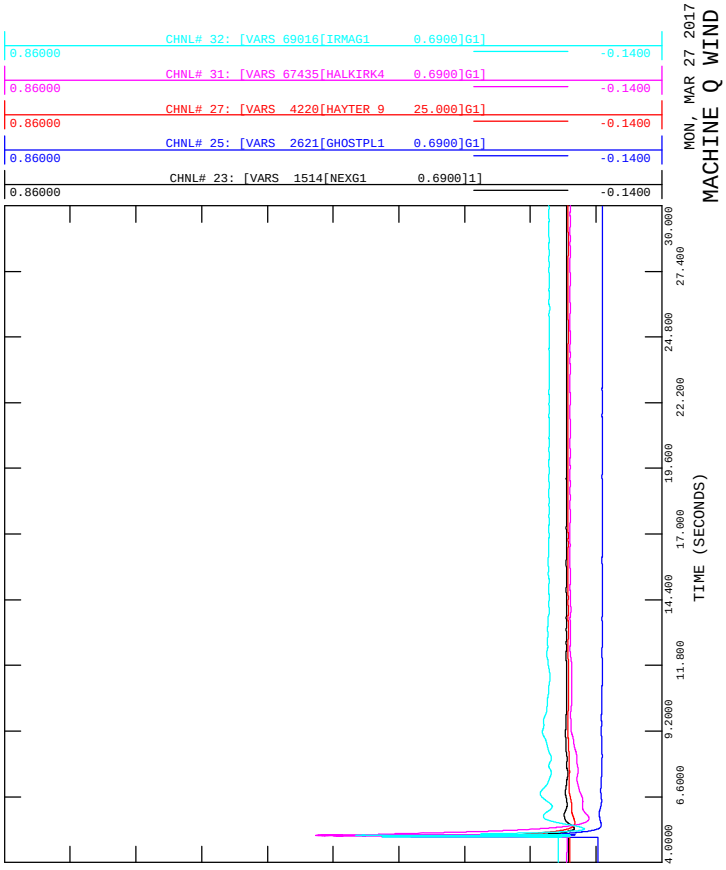


FIGURE E-28G
2017SL, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-28_912L_RedDeer.out

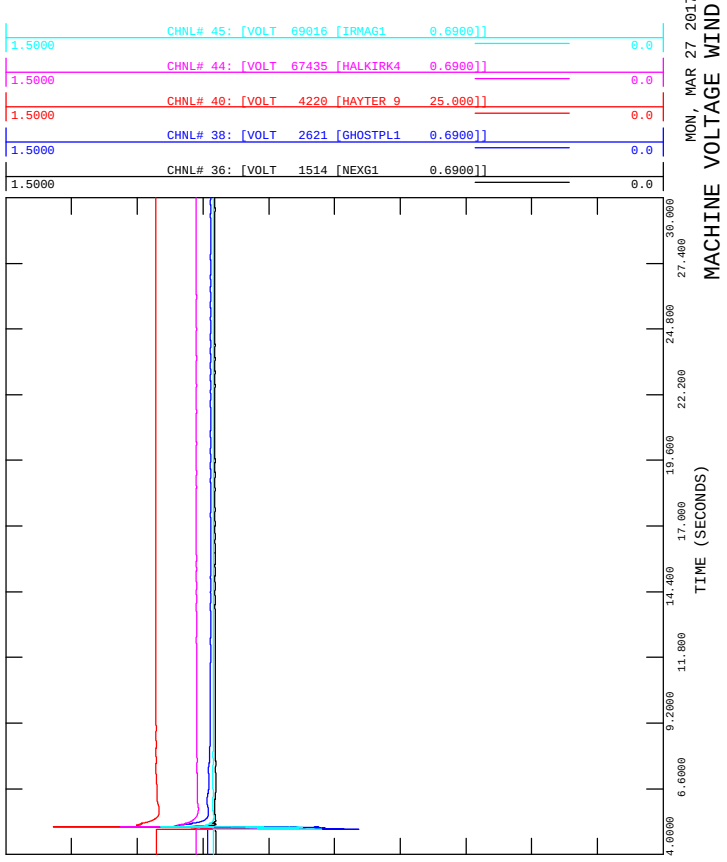
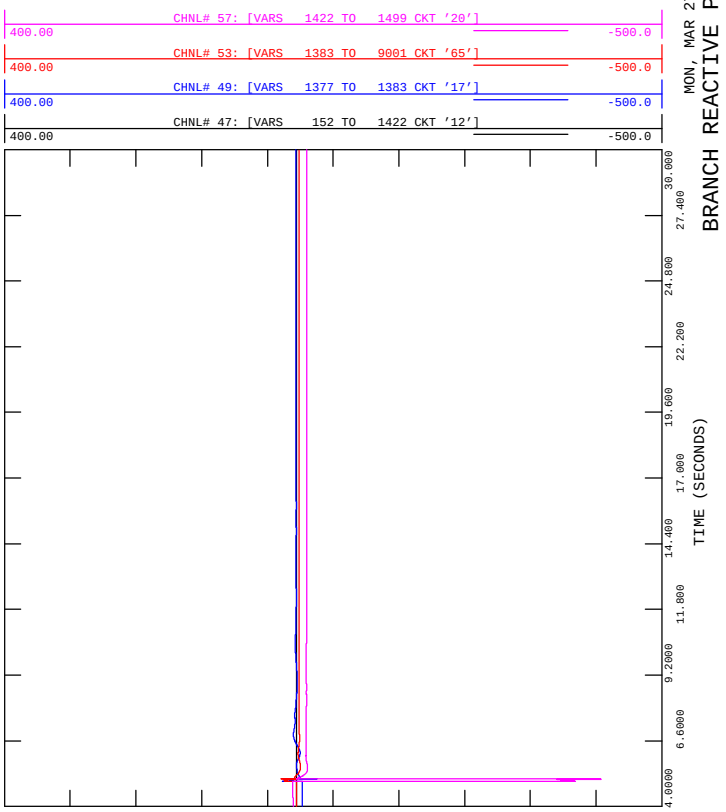


FIGURE E-28I
2017SL, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-28_912L_RedDeer.out



ATTACHMENT F

2017SP Transient Stability Diagrams

Table F-2: Summary of Transient Stability Diagrams for 2017SP, Alt3, Mainstream Wainwright WAGF Proceeds

Figure #	Contingency	From Substation	T-Tap	To substation	Fault Location
F-1	7L42	751S Hill		716S Lloydminster	751S Hill
F-2					716S Lloydminster
F-3	7L50	757S Battle River	252S Jarrow	526S Buffalo Creek	757S Battle River
F-4					526S Buffalo Creek
F-5	7L53	700S Bonnyville	Lindbergh Tap	706S Irish Creek	700S Bonnyville
F-6					706S Irish Creek
F-7	7L65	709S Vegreville		710S Vermilion	709S Vegreville
F-8					710S Vermilion
F-9	7L70	700S Bonnyville		707S St.Paul	700S Bonnyville
F-10					707S St.Paul
F-11	7L115	526S Buffalo Creek		926S Kinsella (Mainstream)	526S Buffalo Creek
F-12					926S Kinsella
F-13	7L117	706S Irish Creek		710S Vermilion	706S Irish Creek
F-14					710S Vermilion
F-15	7L129	526S Buffalo Creek	Bauer Tap	710S Vermilion	526S Buffalo Creek
F-16					710S Vermilion
F-17	701L/7L701	757S Battle River	764S Heisler	223S Strome	757S Battle River
F-18					223S Strome
F-19	749L	899S Edgerton	Killarney Tap	648S Metiskow	899S Edgerton
F-20					648S Metiskow
F-21	749L/7L749	899S Edgerton	Briker Tap	716S Lloydminster	899S Edgerton
F-22					716S Lloydminster
F-23	9L20	755S Cordel		766S Nevis	755S Cordel
F-24					766S Nevis
F-25	9L59	801S Anderson		972S Tinchebray	801S Anderson
F-26					972S Tinchebray
F-27	912L	766S Nevis		63S Red Deer	766S Nevis
F-28					63S Red Deer

FIGURE F-1B
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

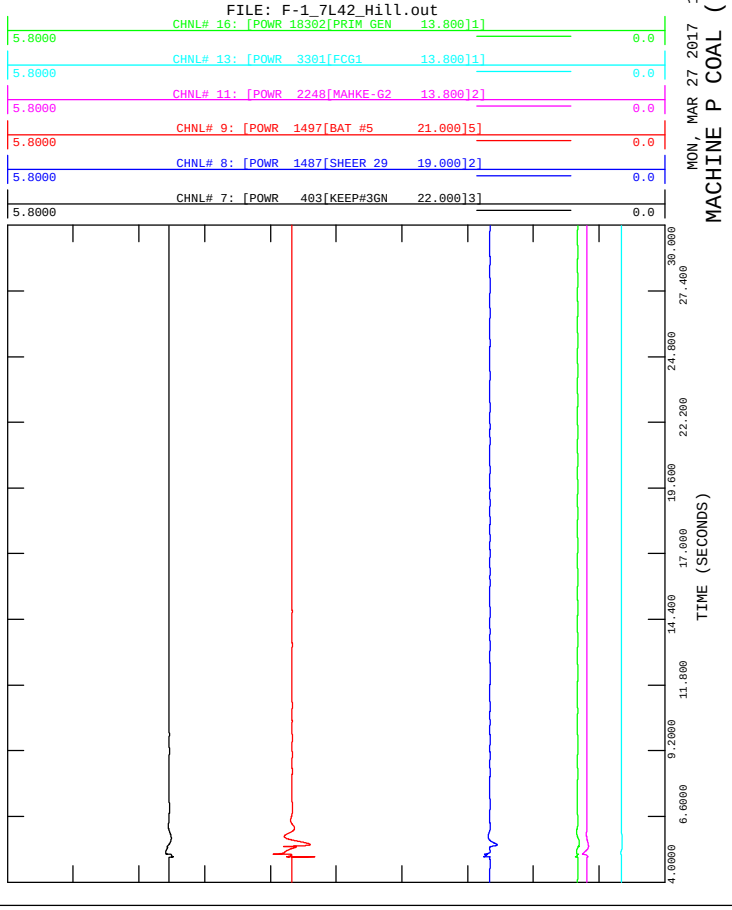


FIGURE F-1D
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

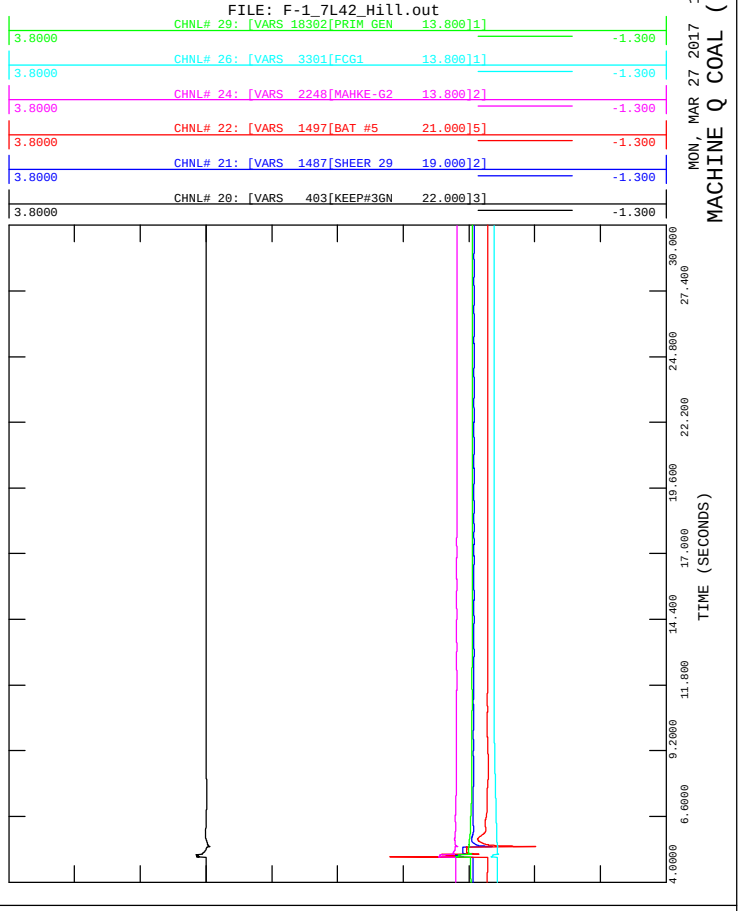


FIGURE F-1A
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

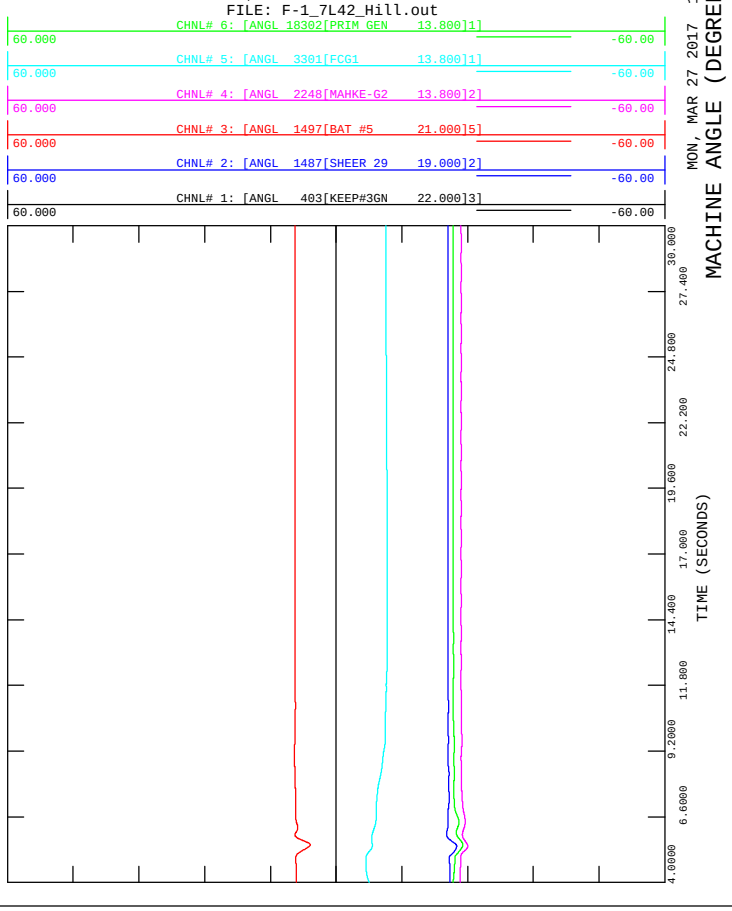


FIGURE F-1C
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

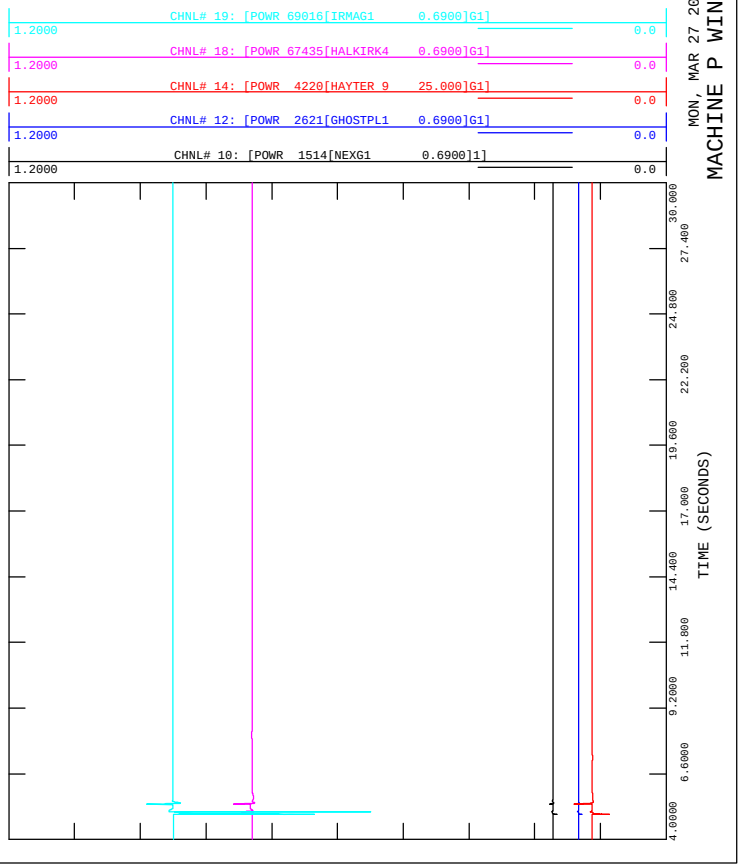


FIGURE F-1F
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

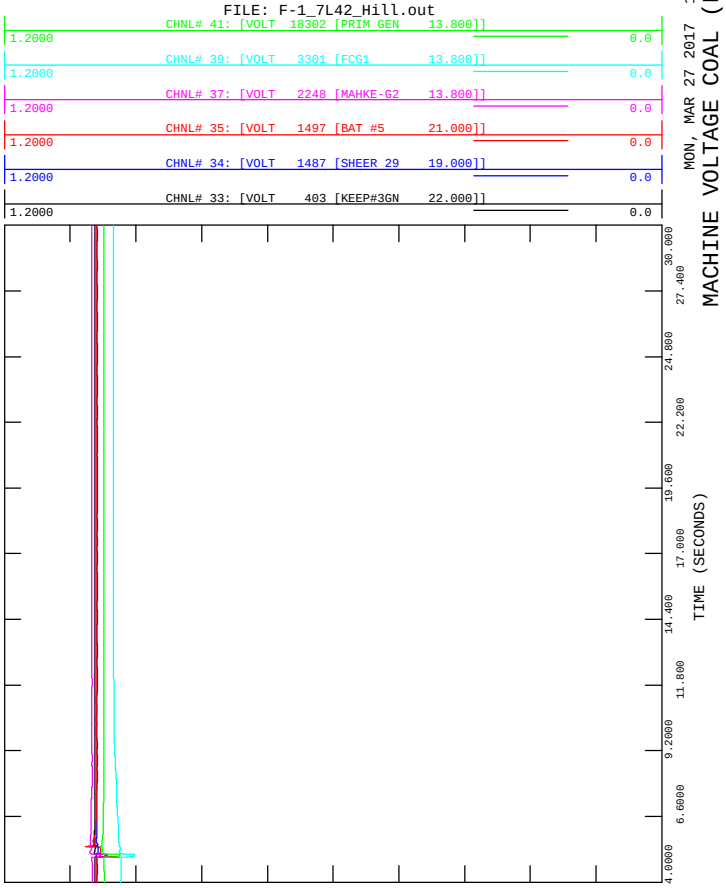


FIGURE F-1H
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

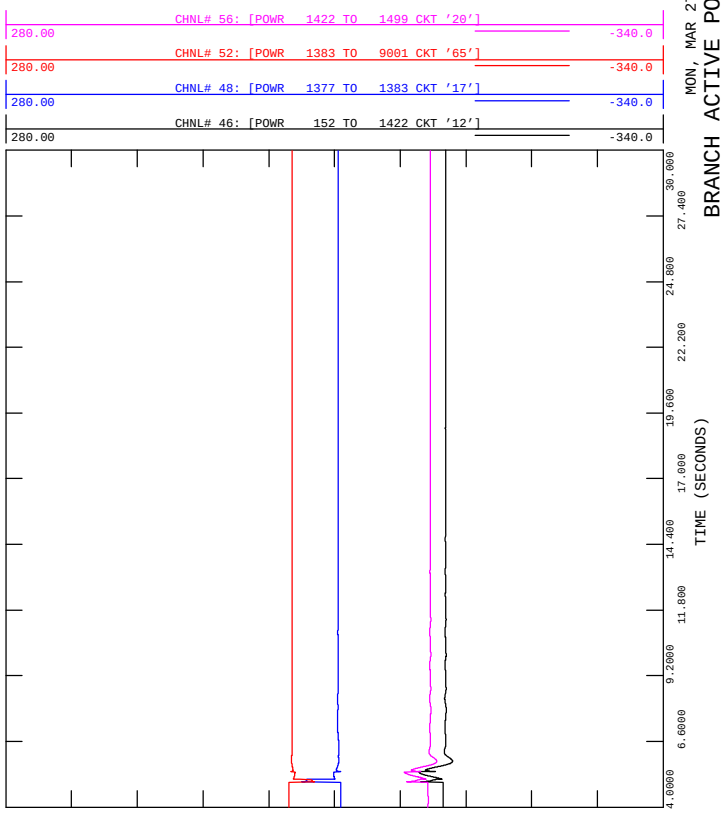


FIGURE F-1E
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

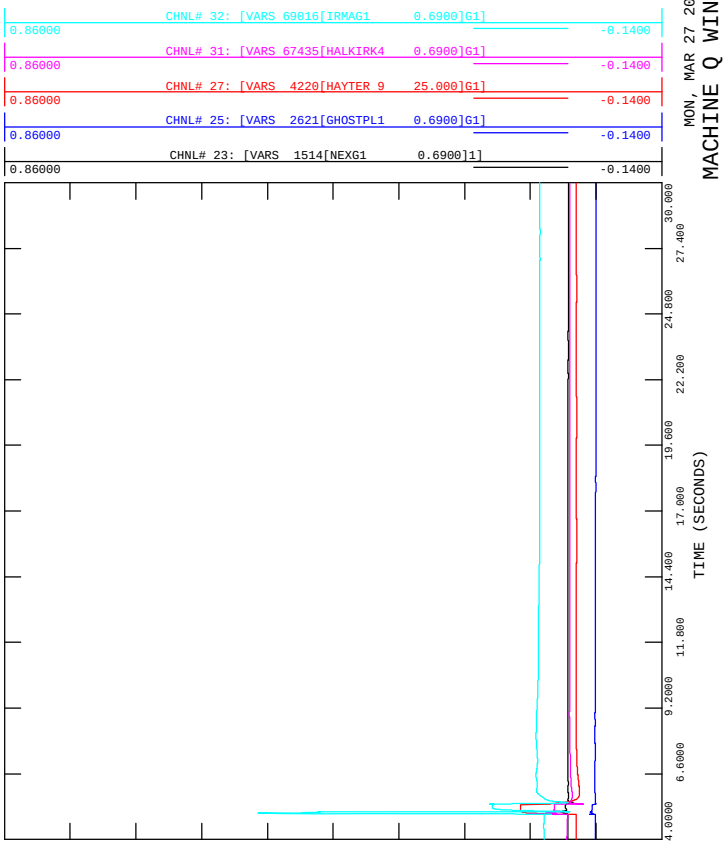


FIGURE F-1G
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

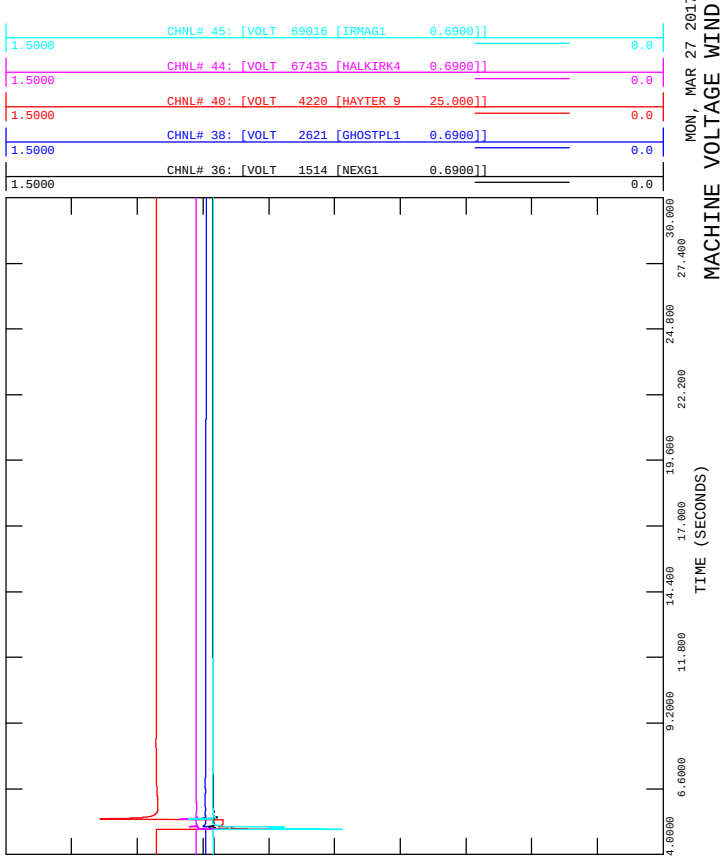


FIGURE F-1I
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

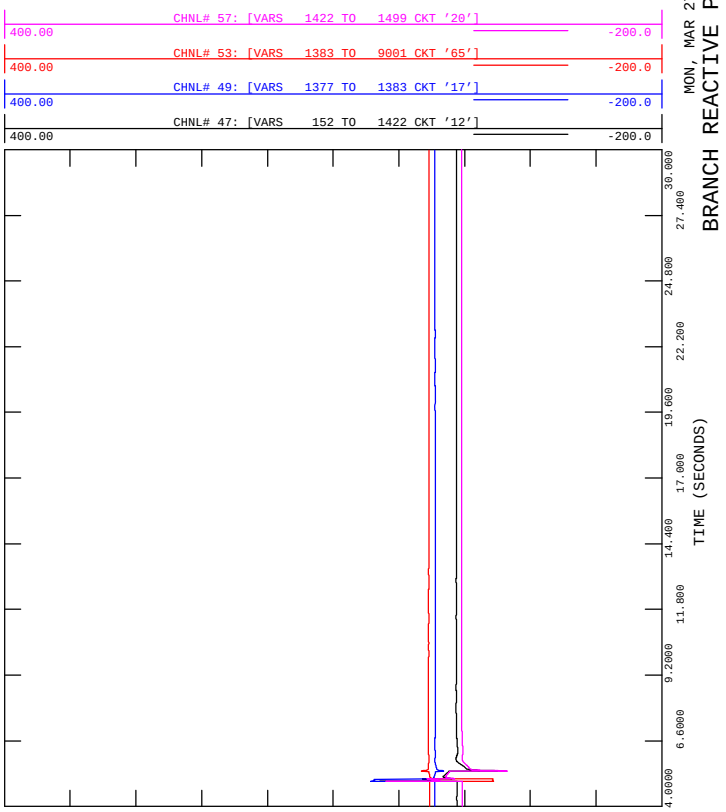


FIGURE F-2B
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

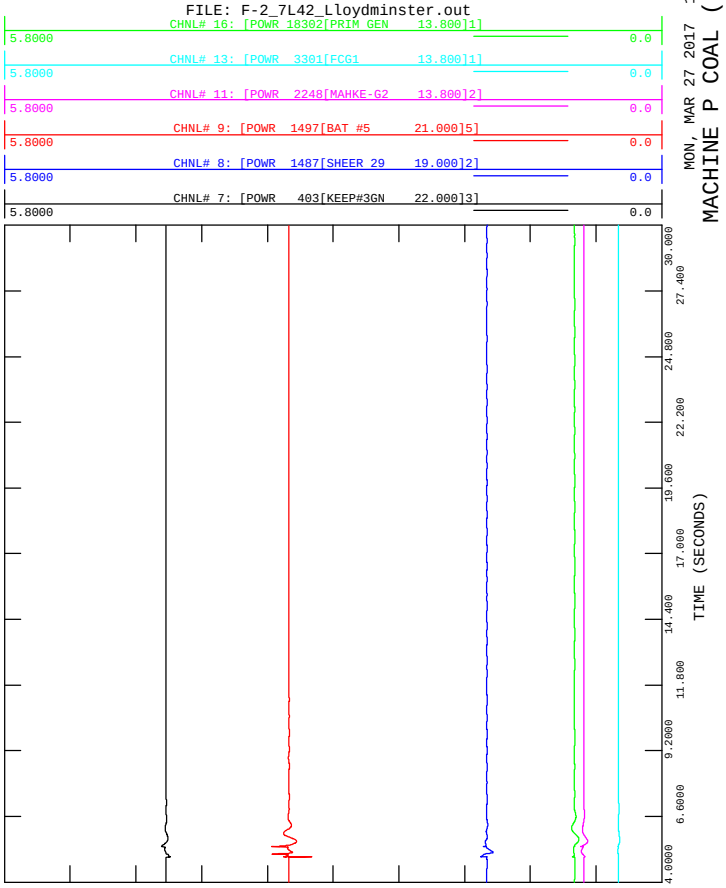


FIGURE F-2D
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

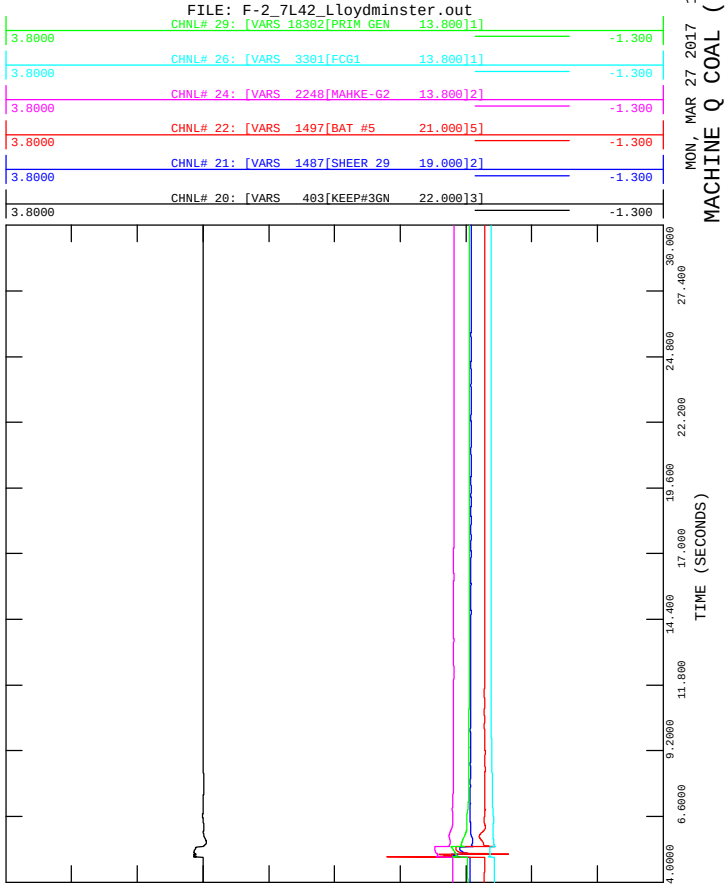


FIGURE F-2A
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

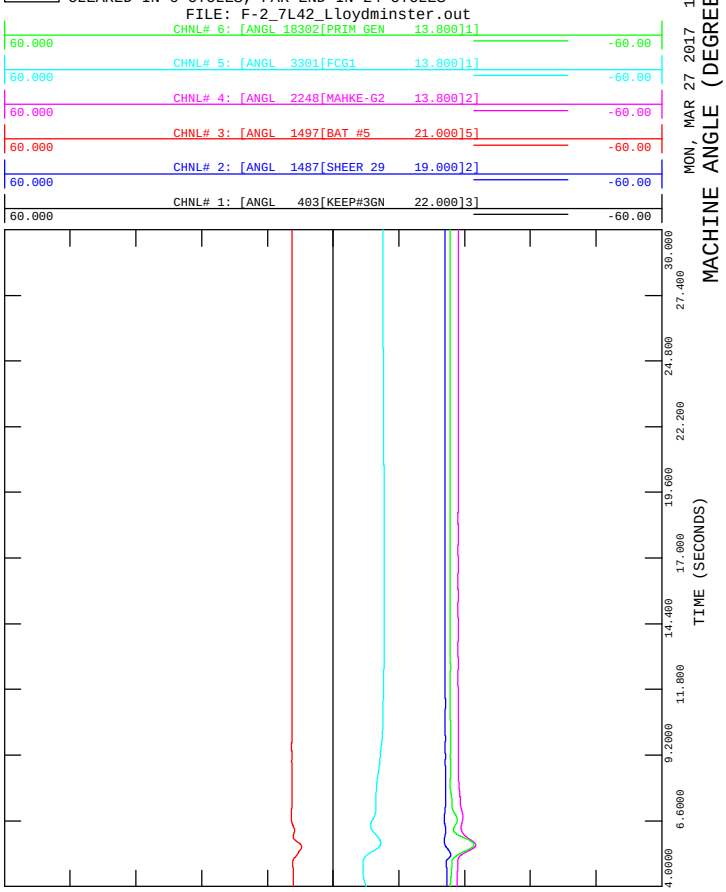


FIGURE F-2C
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

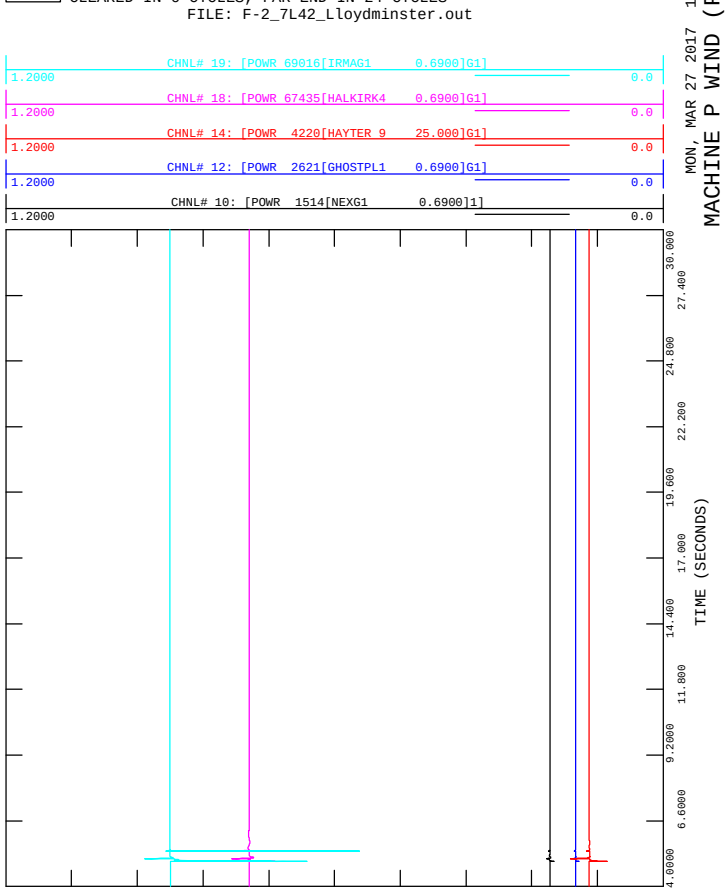


FIGURE F-2F
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

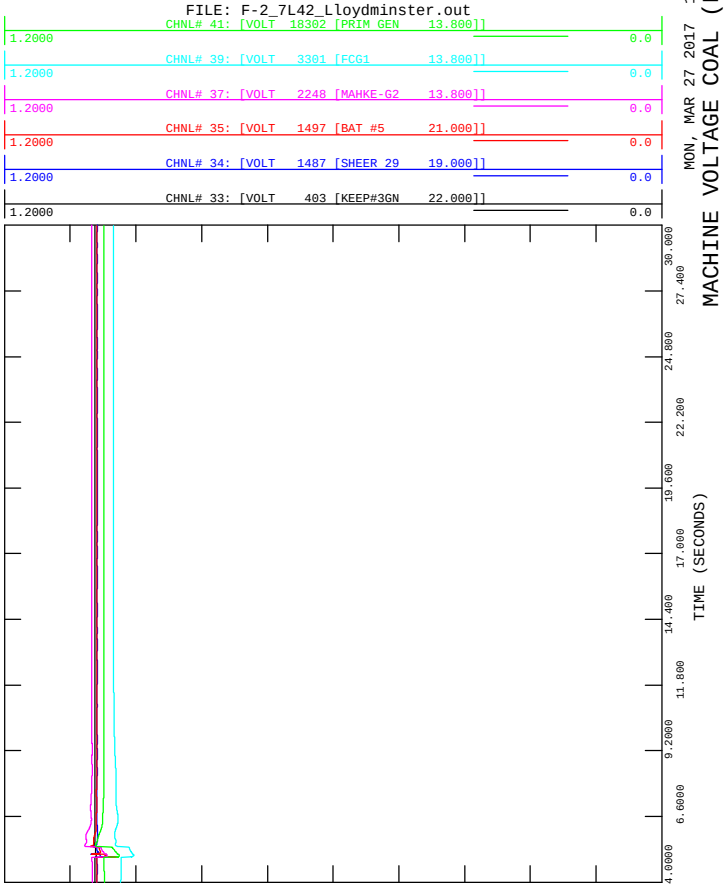


FIGURE F-2H
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

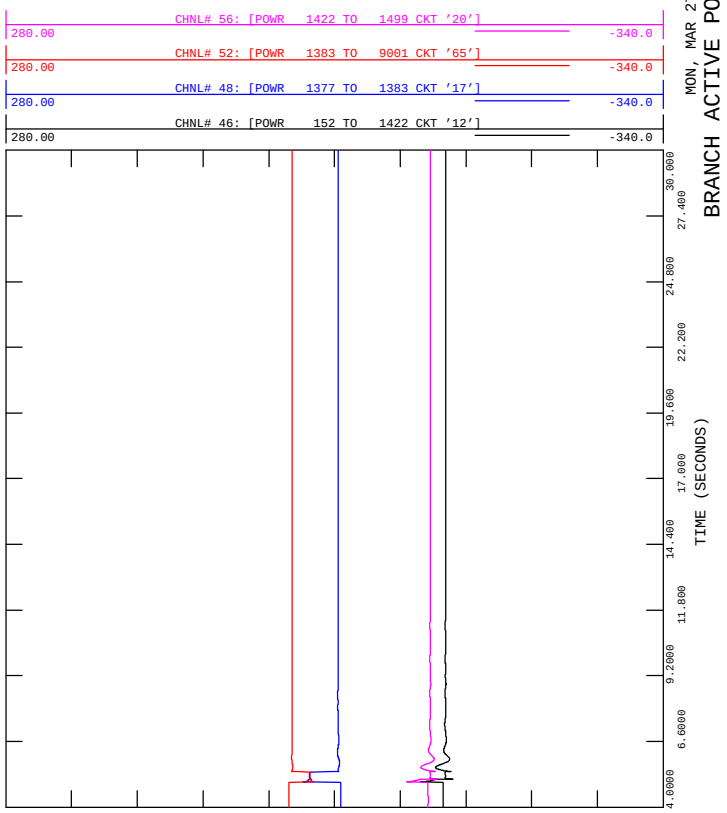


FIGURE F-2E
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

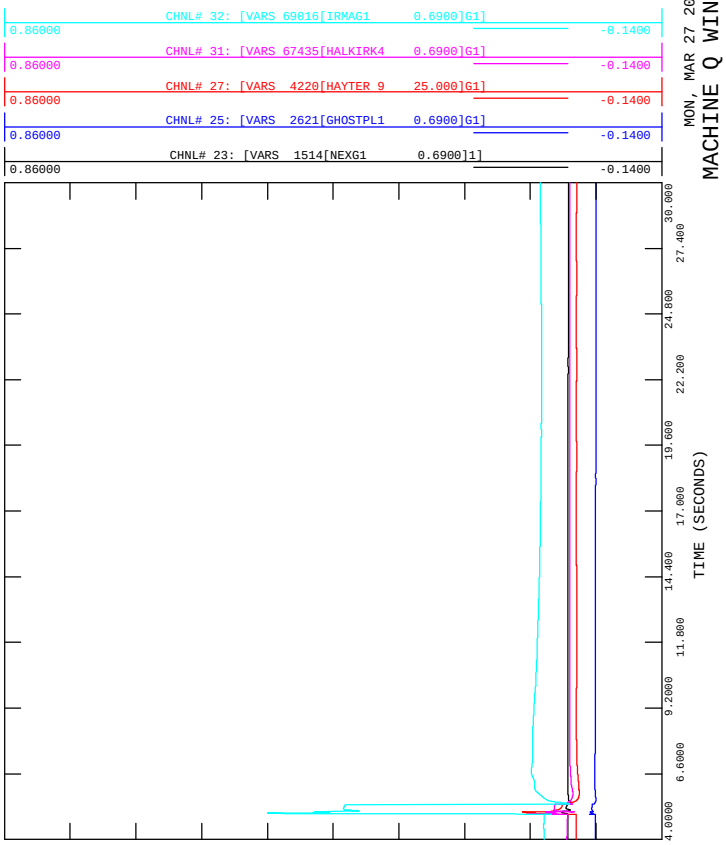


FIGURE F-2G
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

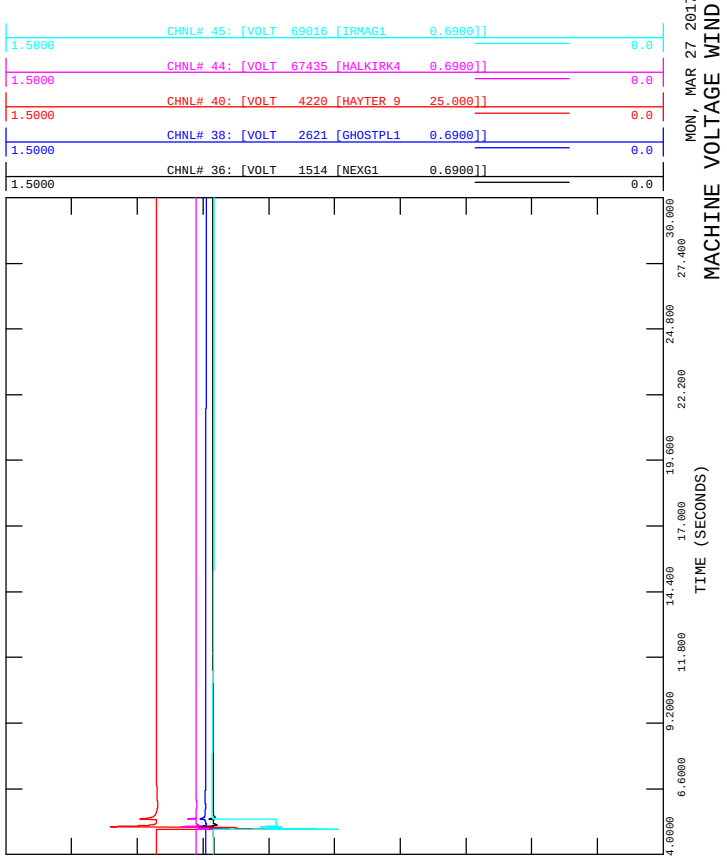


FIGURE F-2I
2017SP, ALT2
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

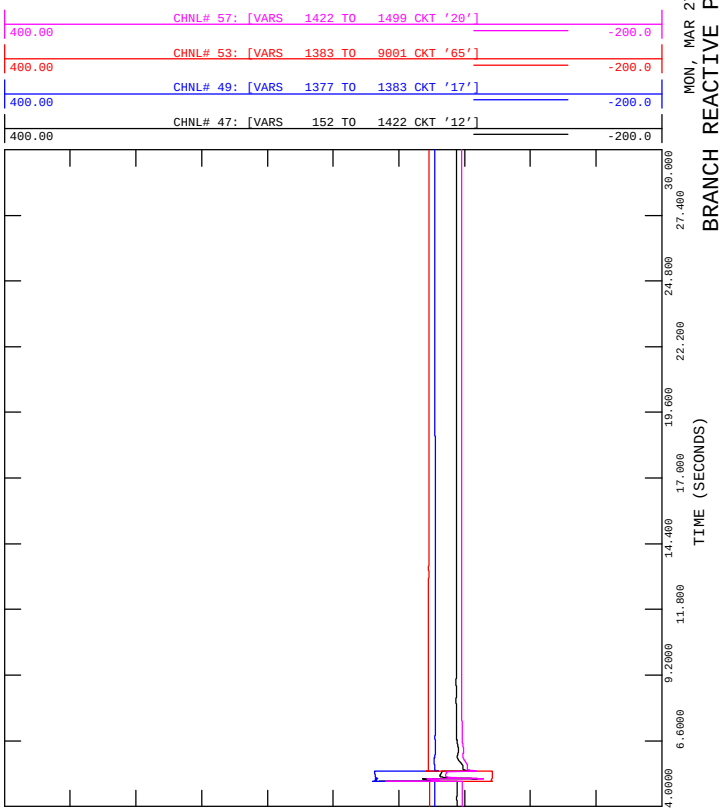


FIGURE F-3B
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

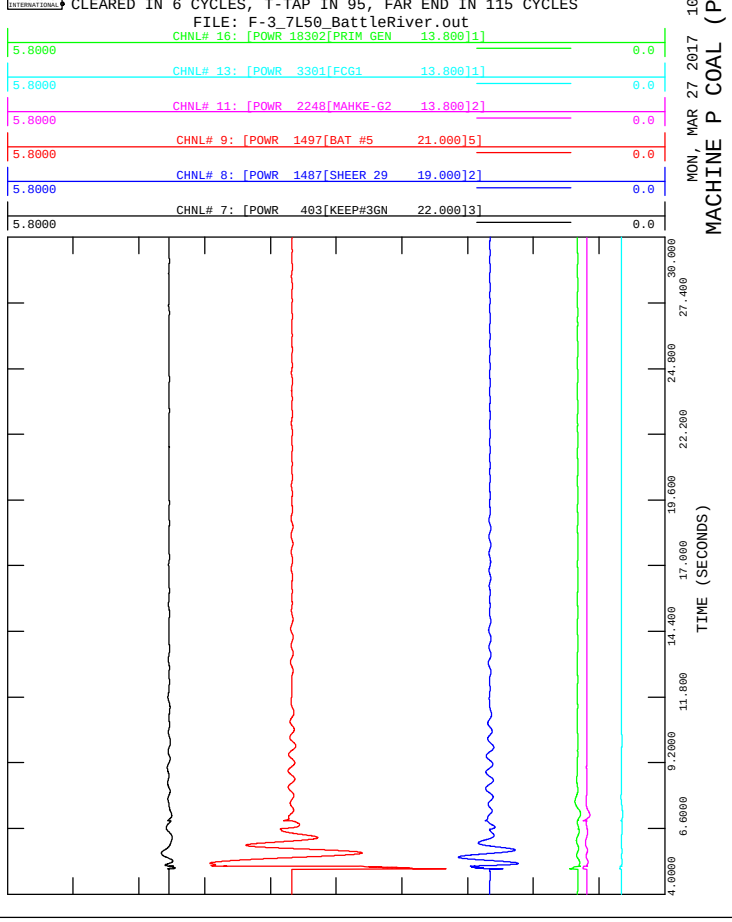


FIGURE F-3D
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

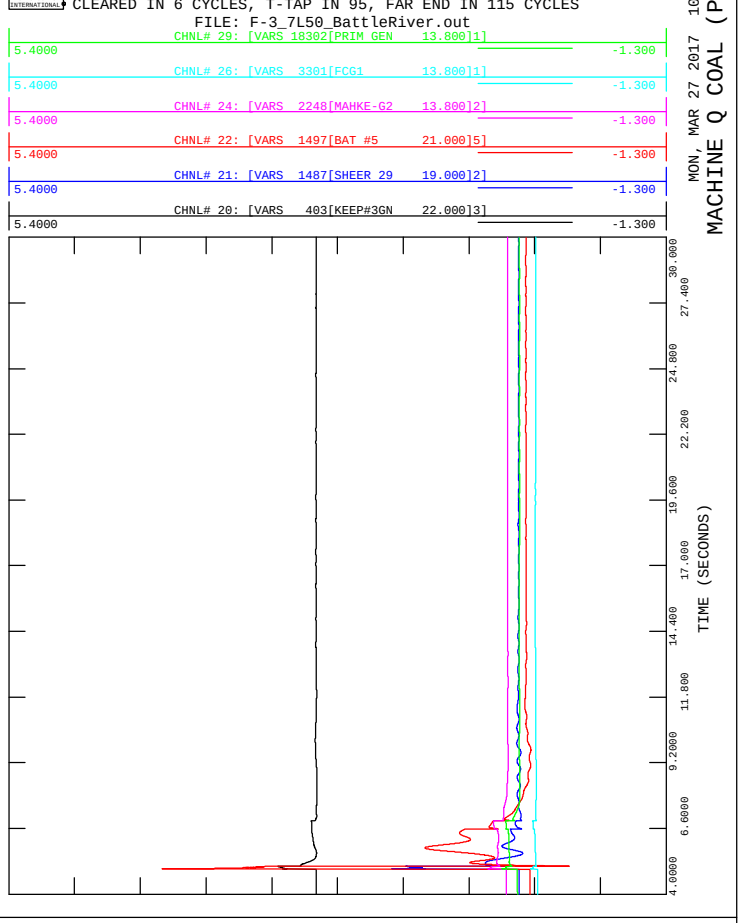


FIGURE F-3A
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

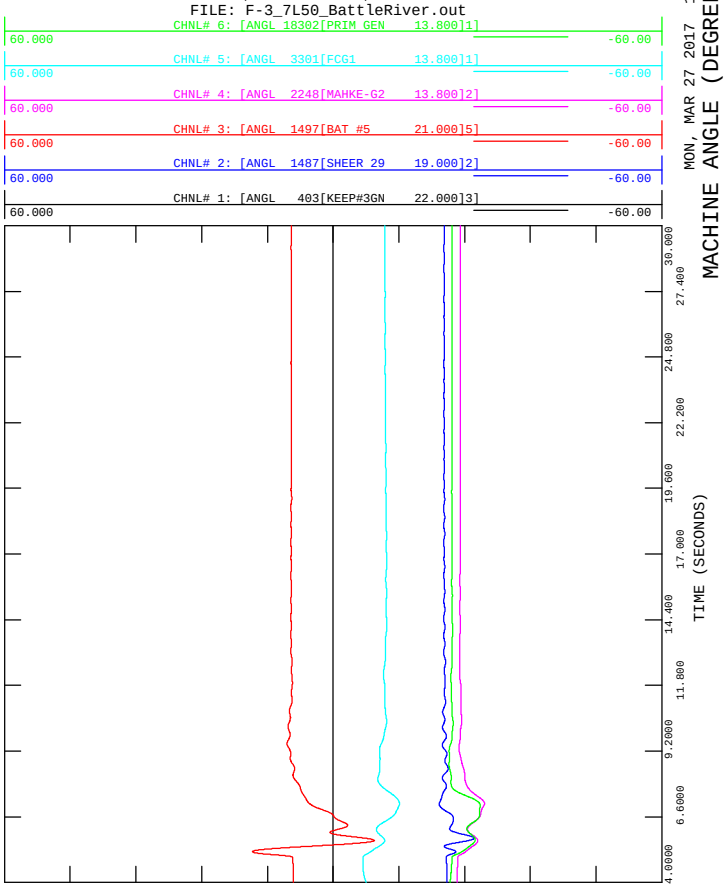


FIGURE F-3C
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

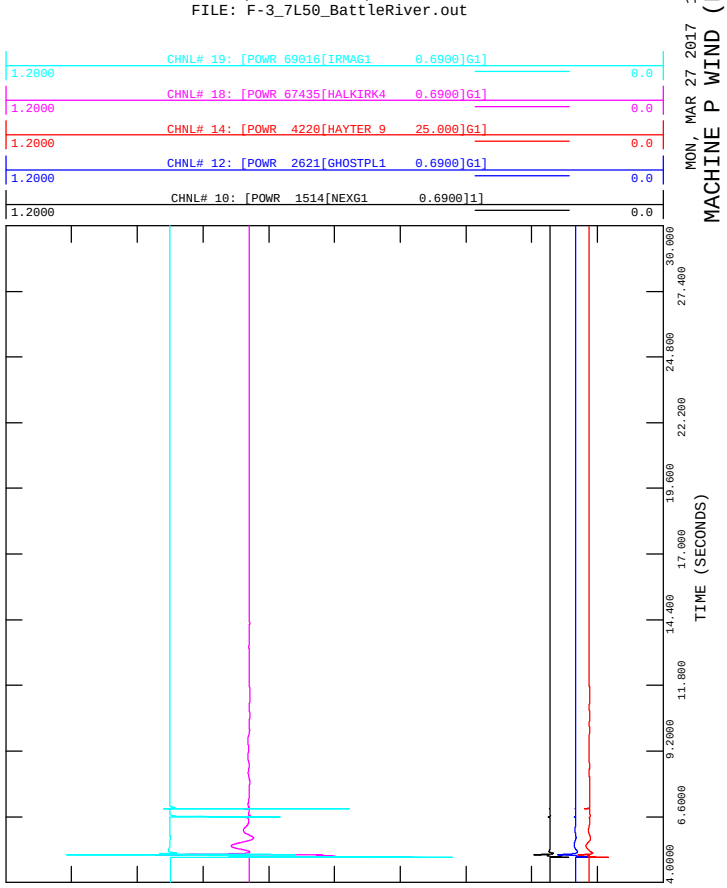


FIGURE F-3F
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

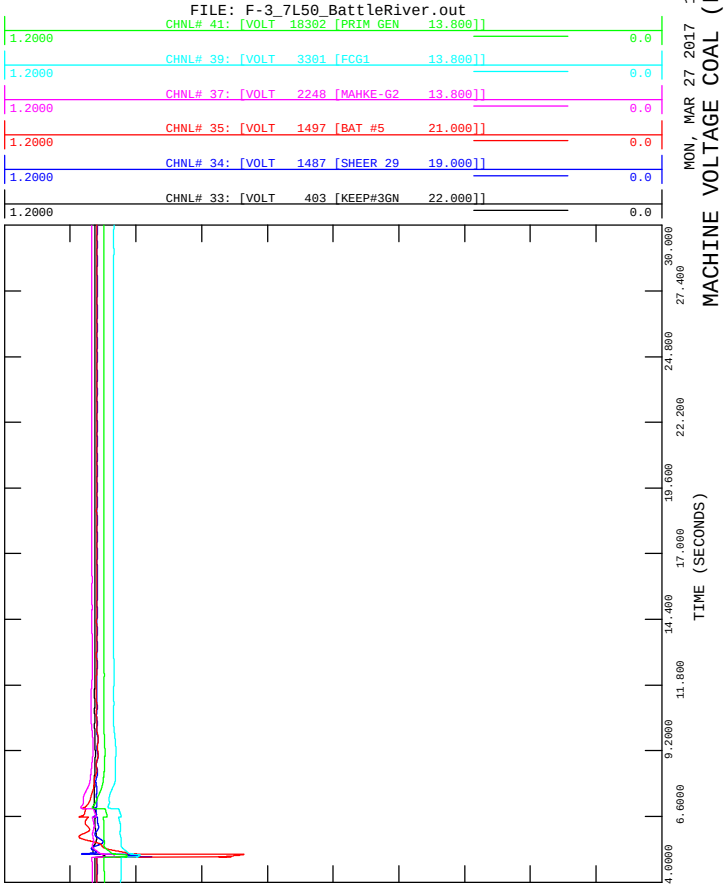


FIGURE F-3H
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

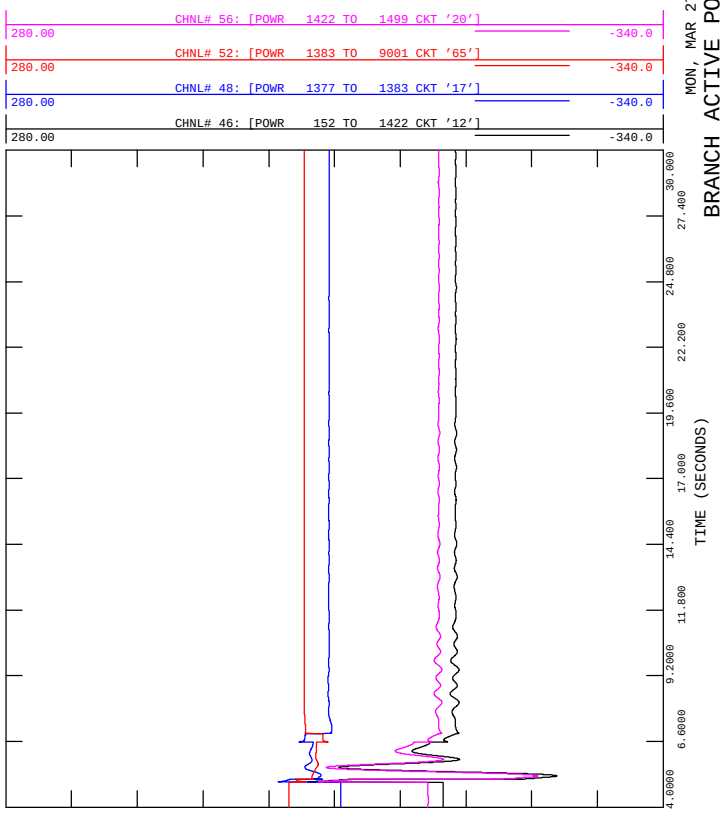


FIGURE F-3E
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

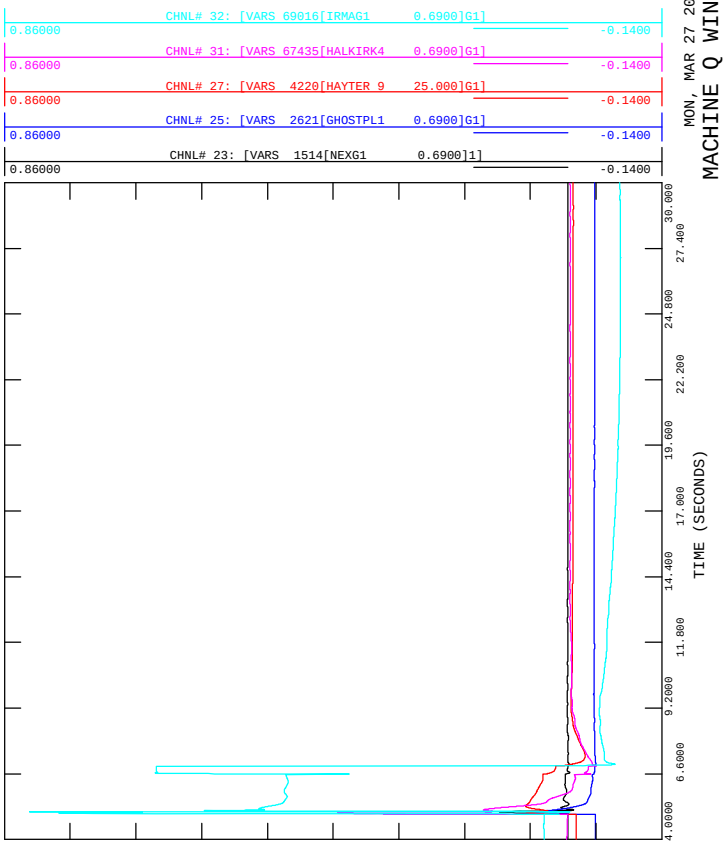


FIGURE F-3G
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

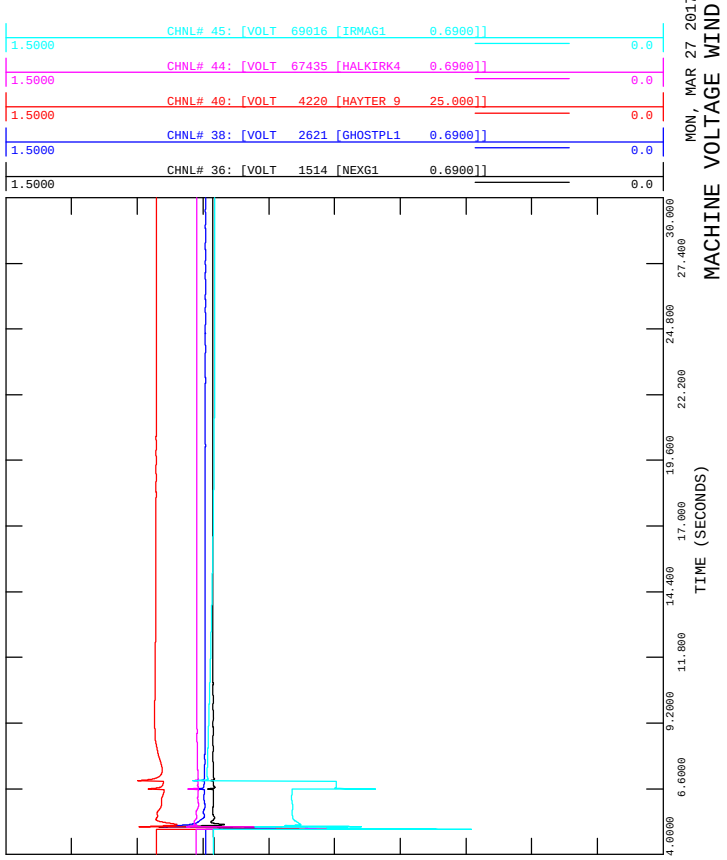


FIGURE F-3I
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

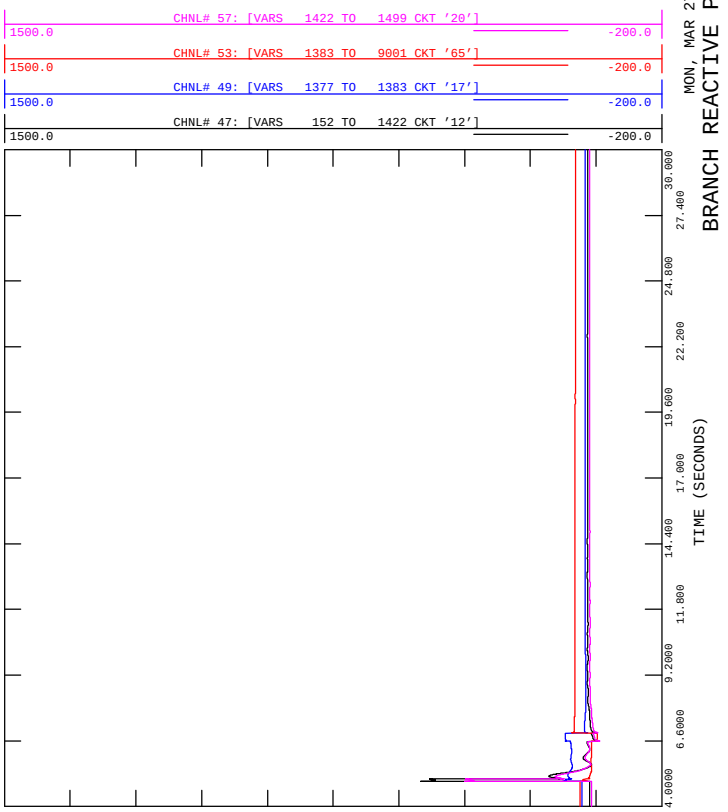


FIGURE F-4B
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: F-4_7L50_BuffaloCreek.out

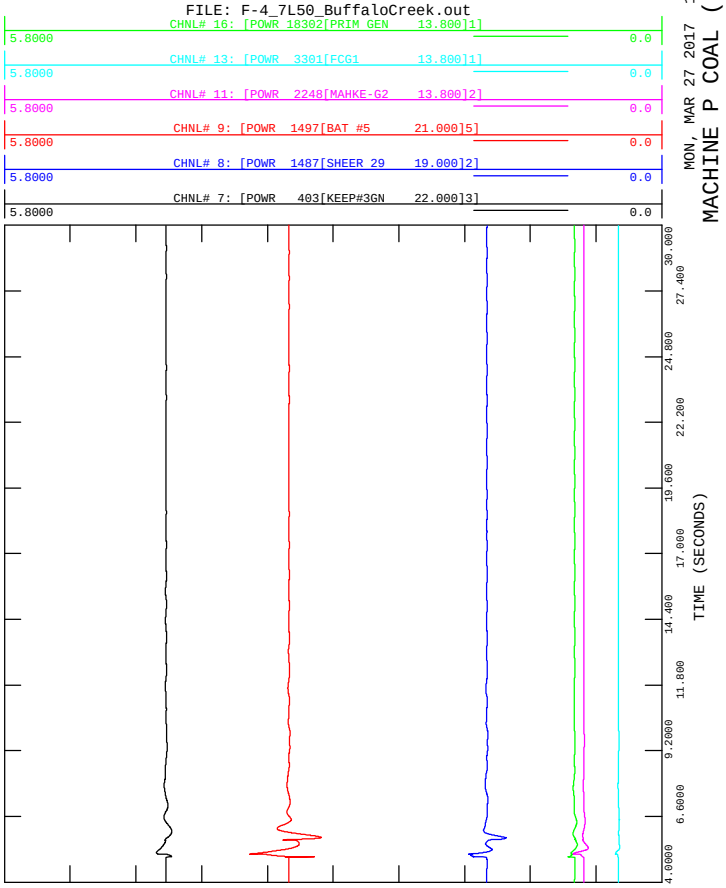


FIGURE F-4D
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: F-4_7L50_BuffaloCreek.out

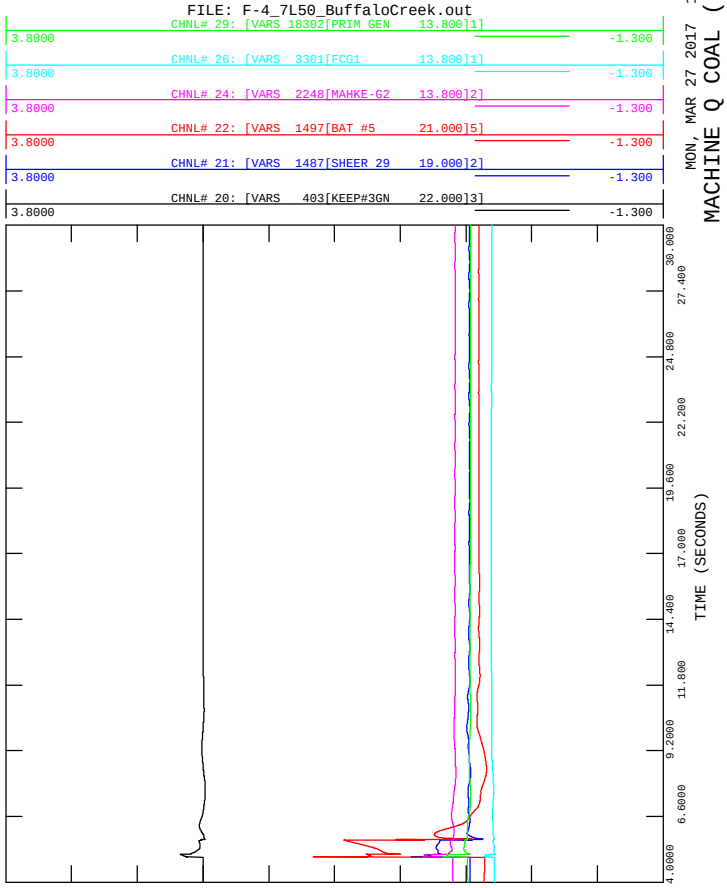


FIGURE F-4A
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: F-4_7L50_BuffaloCreek.out

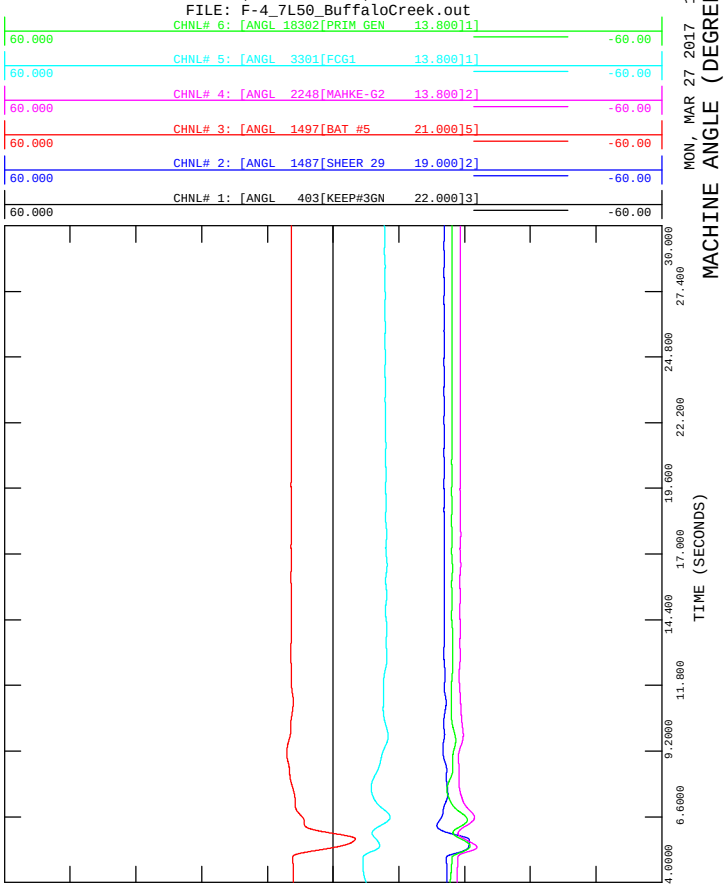


FIGURE F-4C
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: F-4_7L50_BuffaloCreek.out

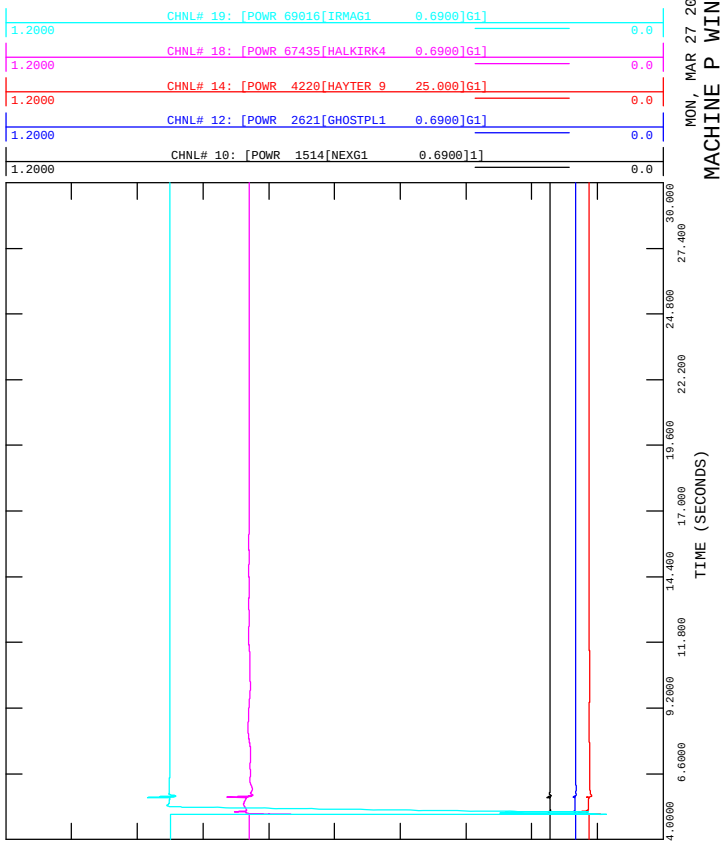


FIGURE F-4F
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: F-4_7L50_BuffaloCreek.out

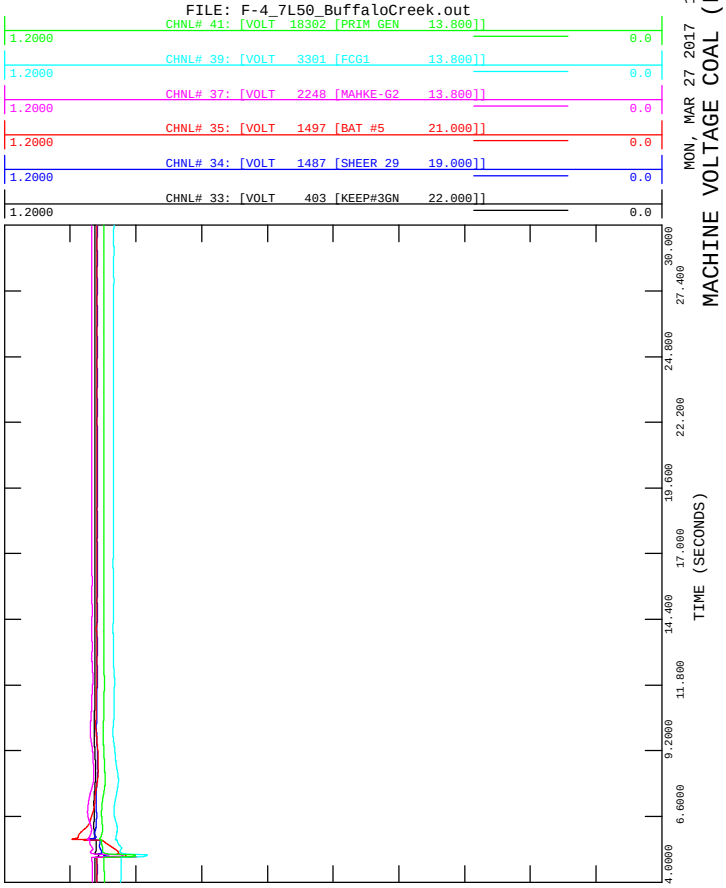


FIGURE F-4H
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: F-4_7L50_BuffaloCreek.out

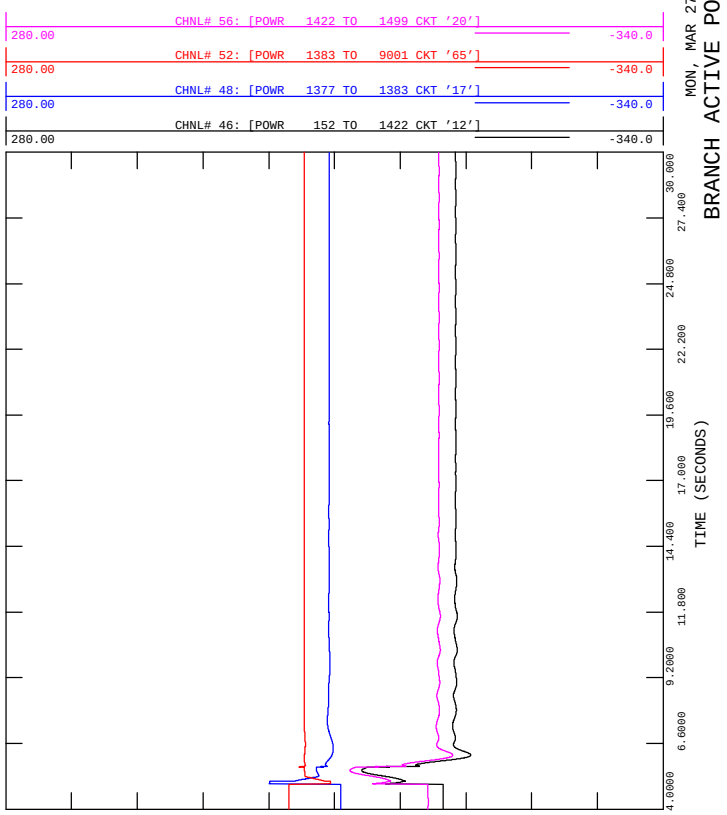


FIGURE F-4E
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: F-4_7L50_BuffaloCreek.out

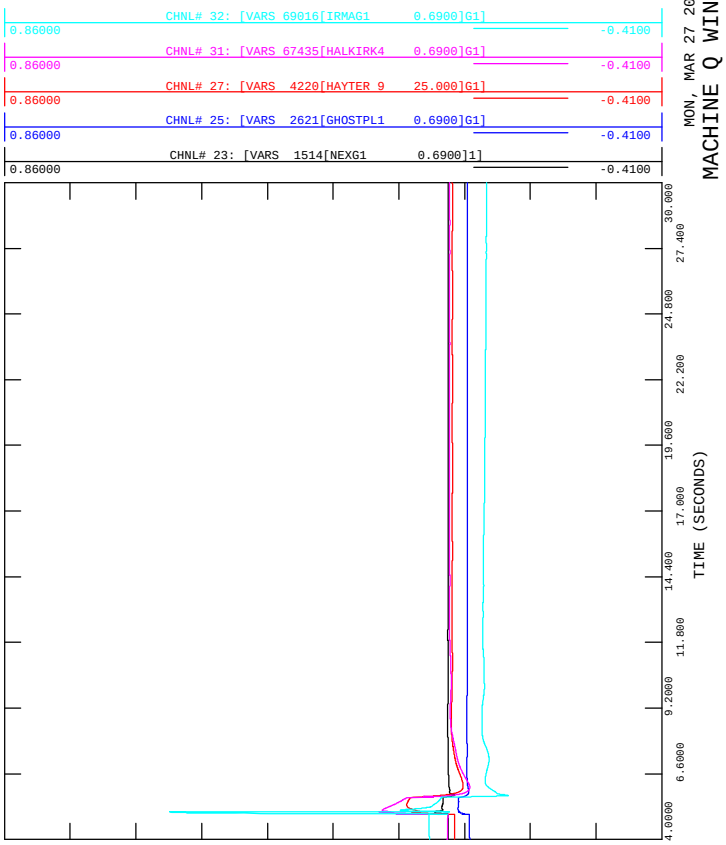


FIGURE F-4G
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: F-4_7L50_BuffaloCreek.out

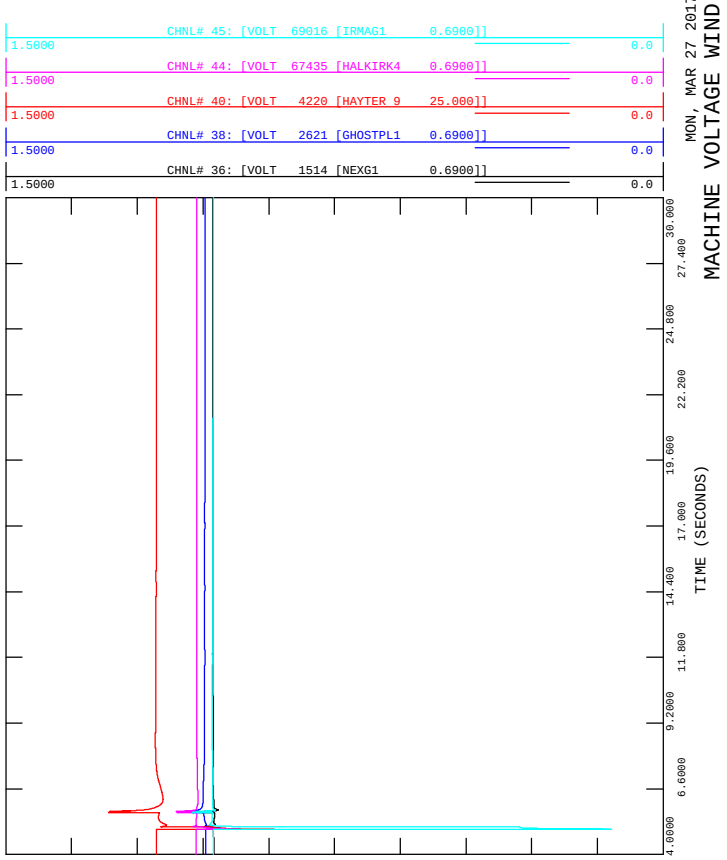


FIGURE F-4I
2017SP, ALT2
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: F-4_7L50_BuffaloCreek.out

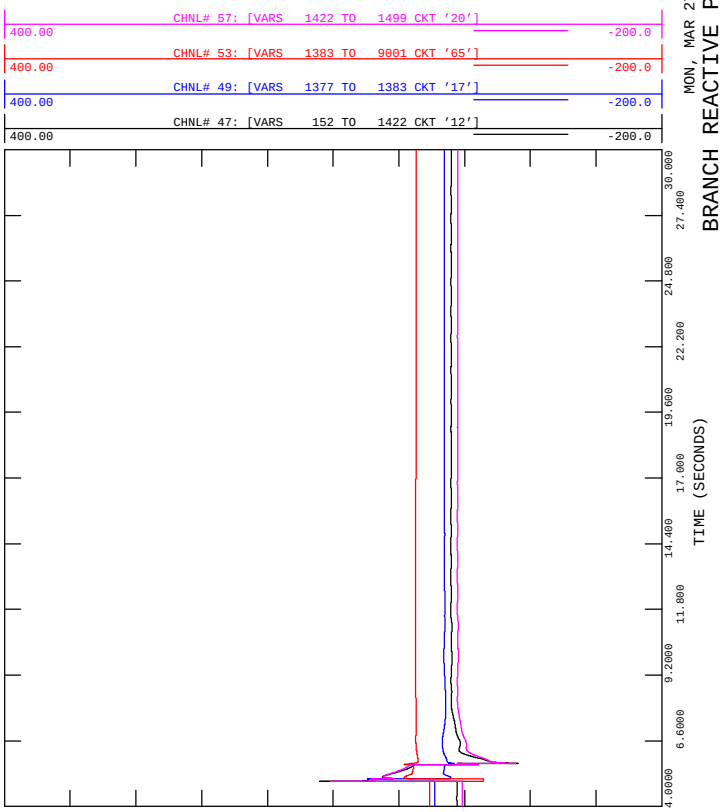


FIGURE F-5B
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5_7L53_Bonnyville.out

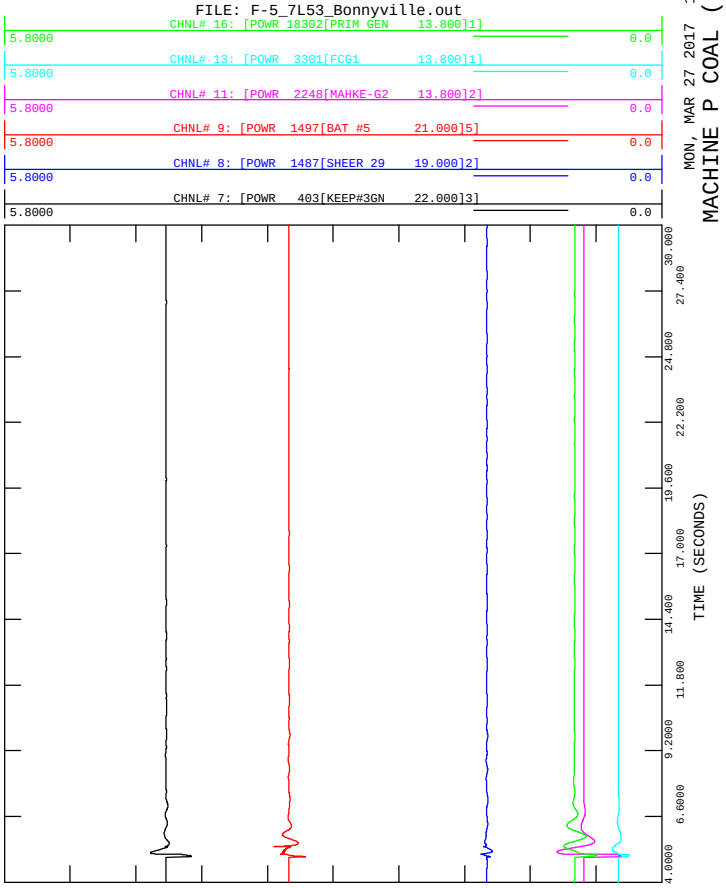


FIGURE F-5D
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5_7L53_Bonnyville.out

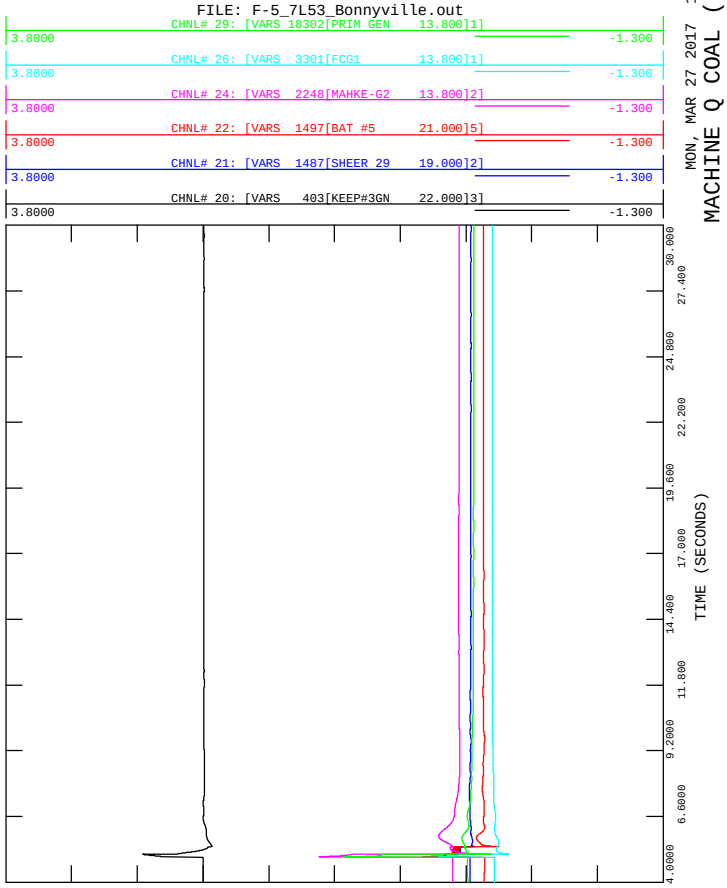


FIGURE F-5A
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5_7L53_Bonnyville.out

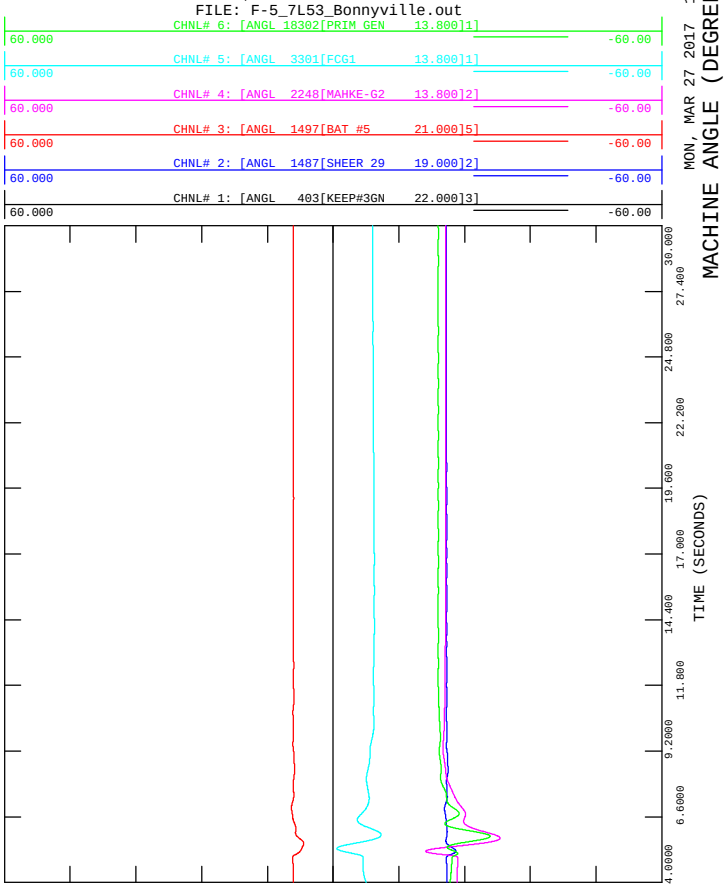


FIGURE F-5C
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5_7L53_Bonnyville.out

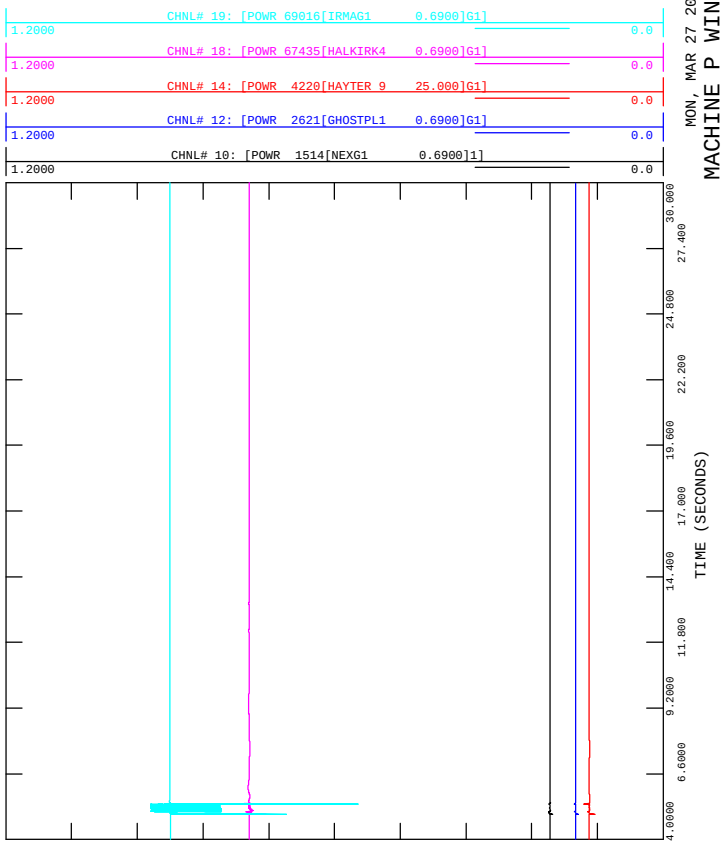


FIGURE F-5F
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5_7L53_Bonnyville.out

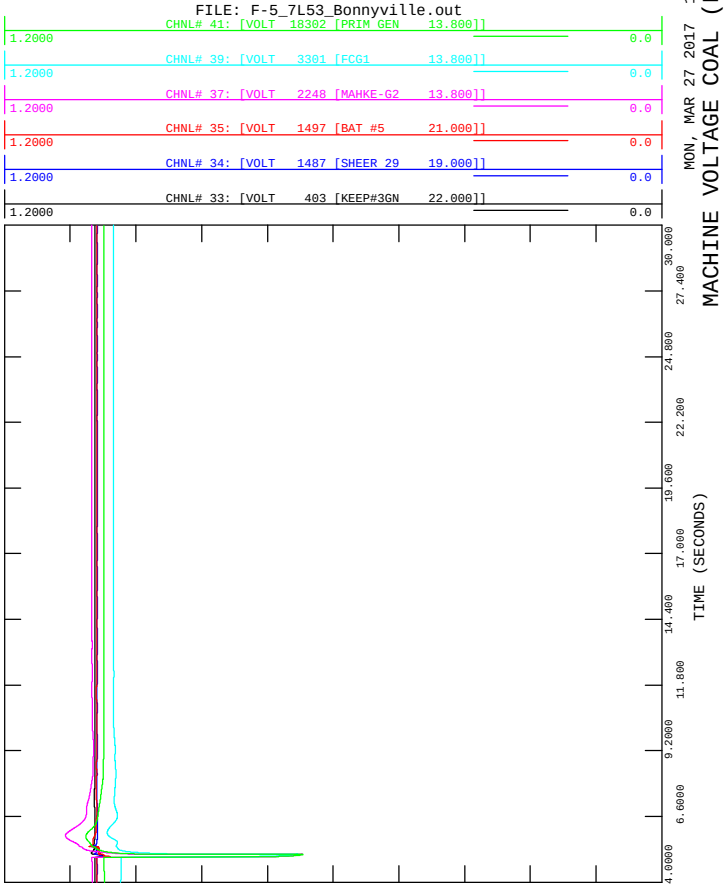


FIGURE F-5H
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5_7L53_Bonnyville.out

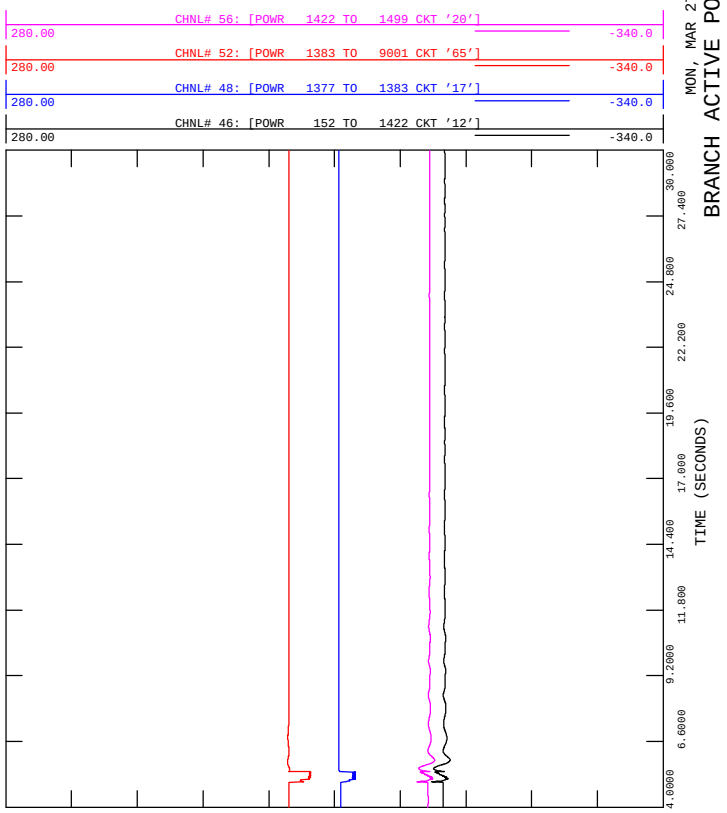


FIGURE F-5E
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5_7L53_Bonnyville.out

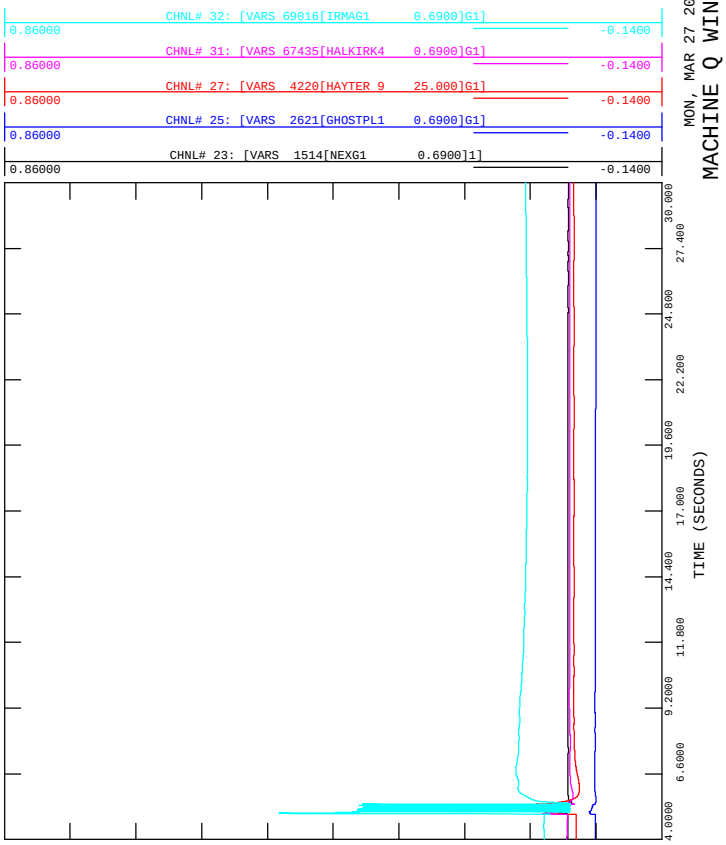


FIGURE F-5G
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5_7L53_Bonnyville.out

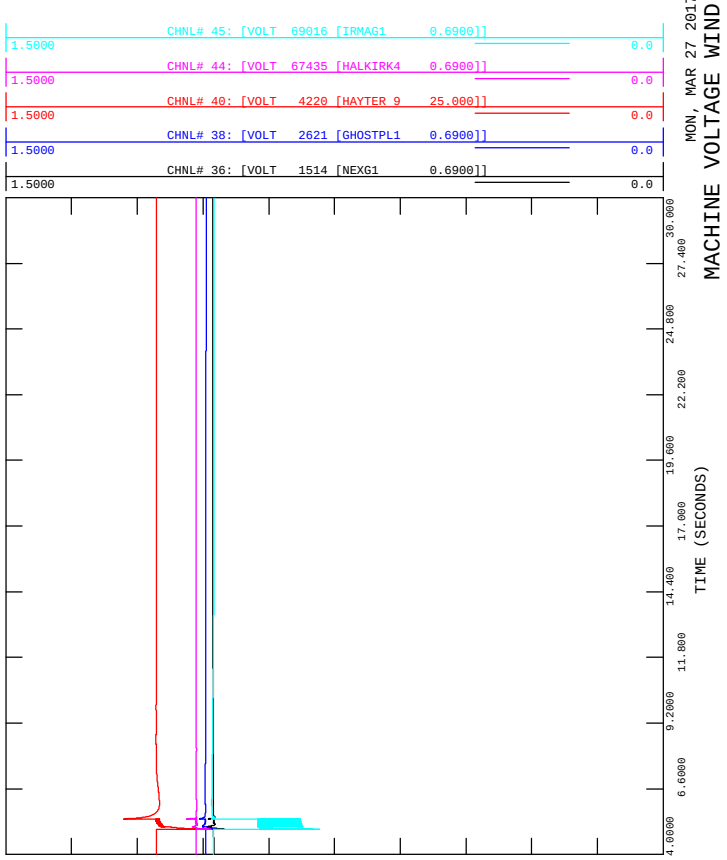


FIGURE F-5I
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5_7L53_Bonnyville.out

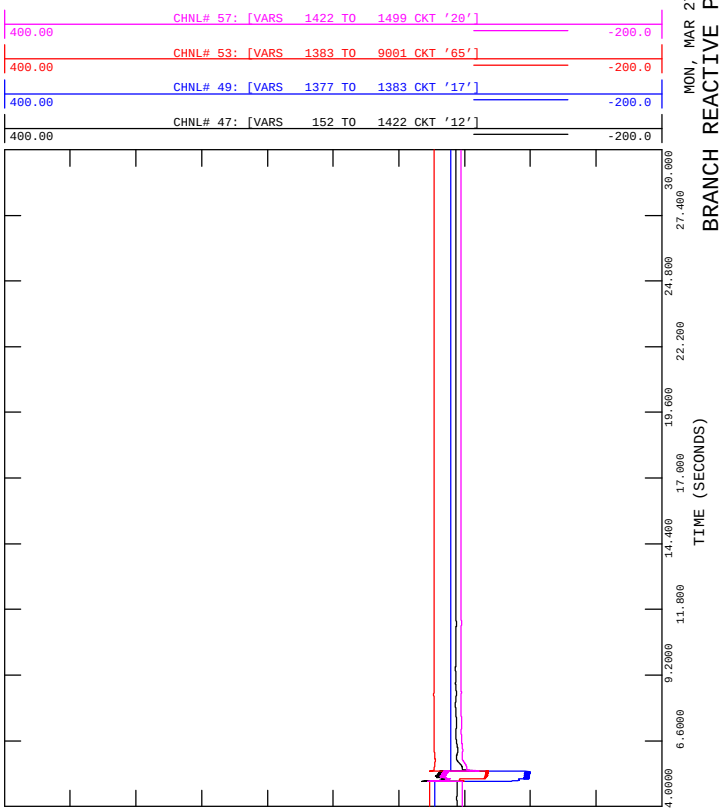


FIGURE F-6B
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6_7L53_IrishCreek.out

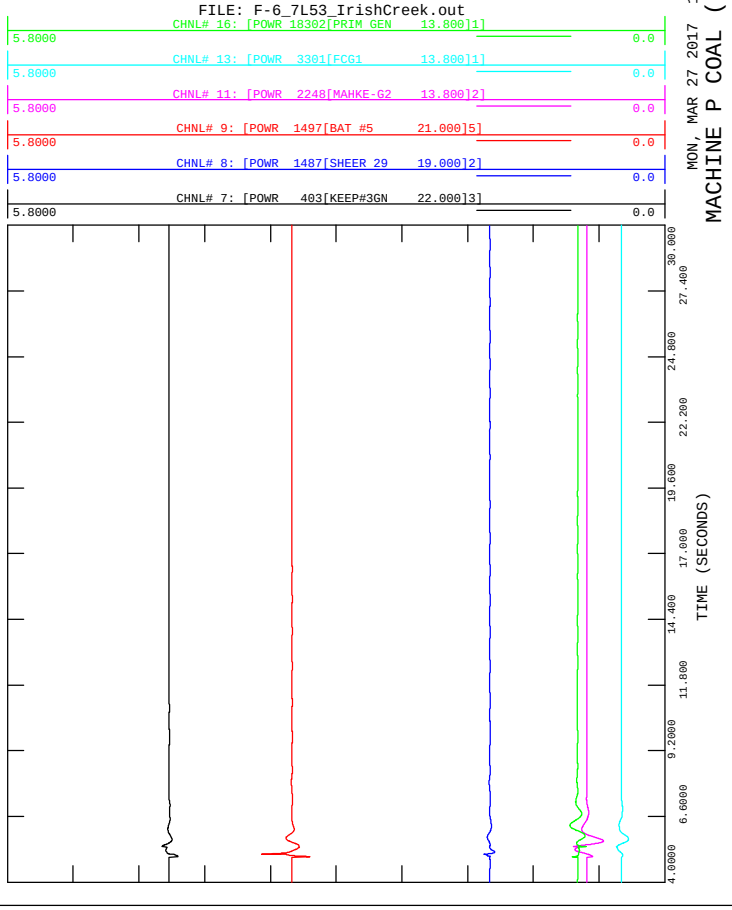


FIGURE F-6D
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6_7L53_IrishCreek.out

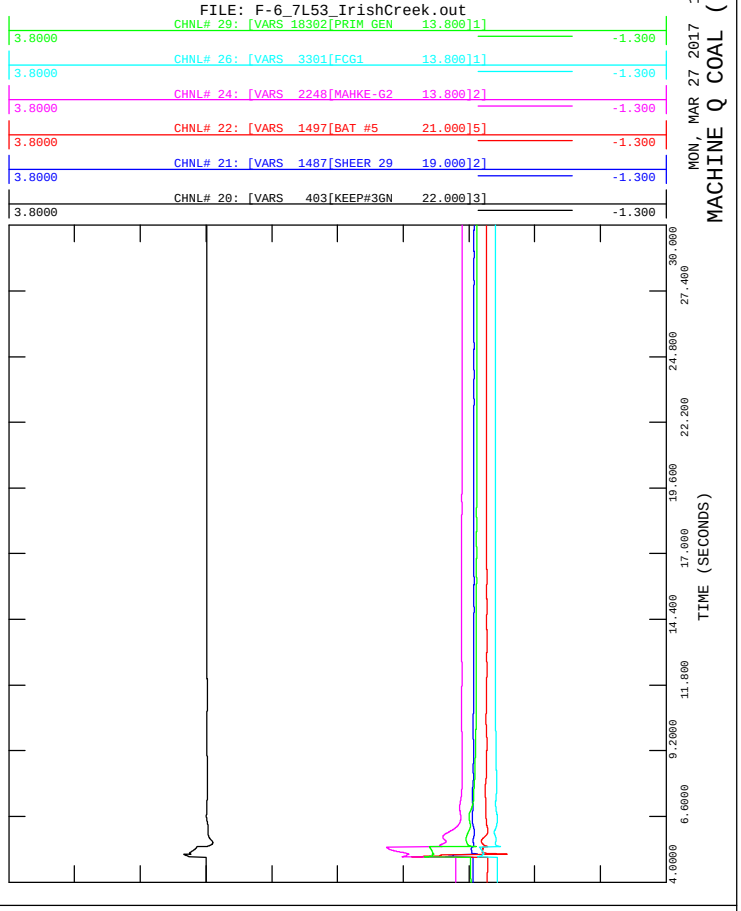


FIGURE F-6A
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6_7L53_IrishCreek.out

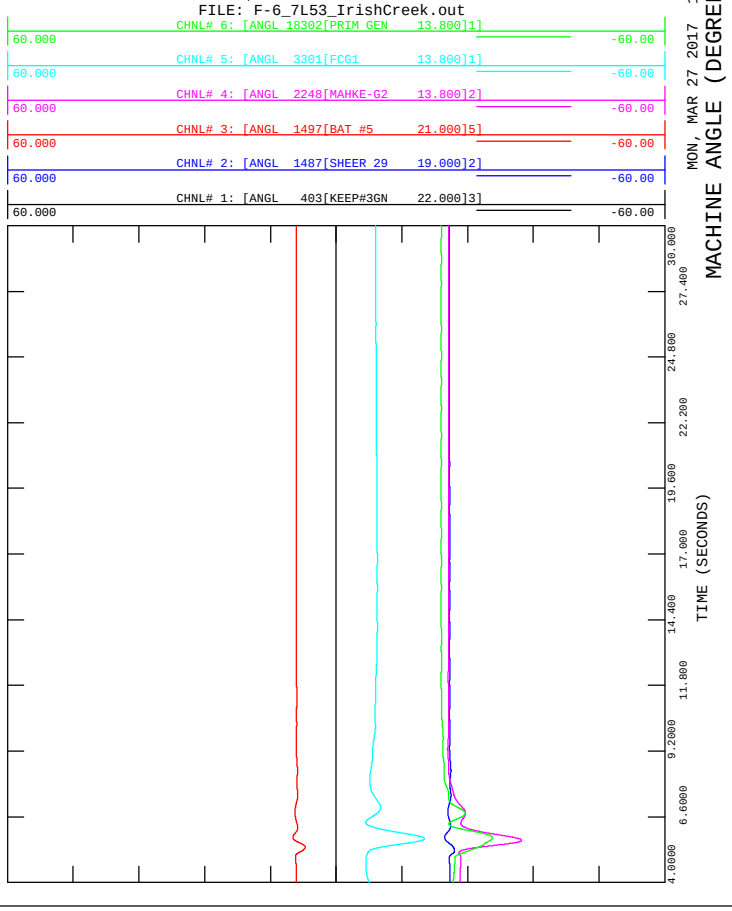


FIGURE F-6C
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6_7L53_IrishCreek.out

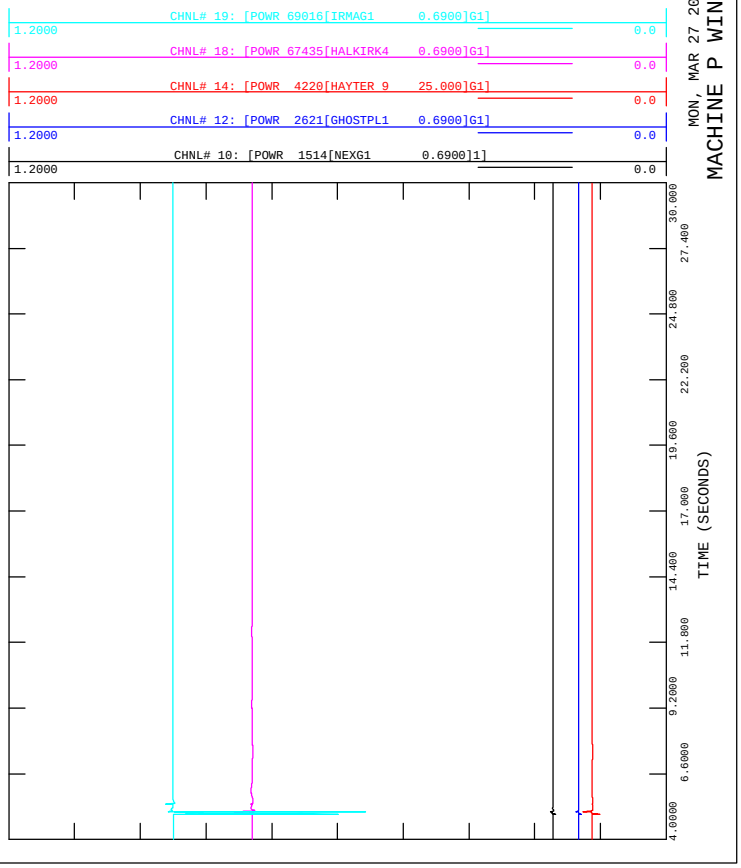


FIGURE F-6F
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6_7L53_IrishCreek.out

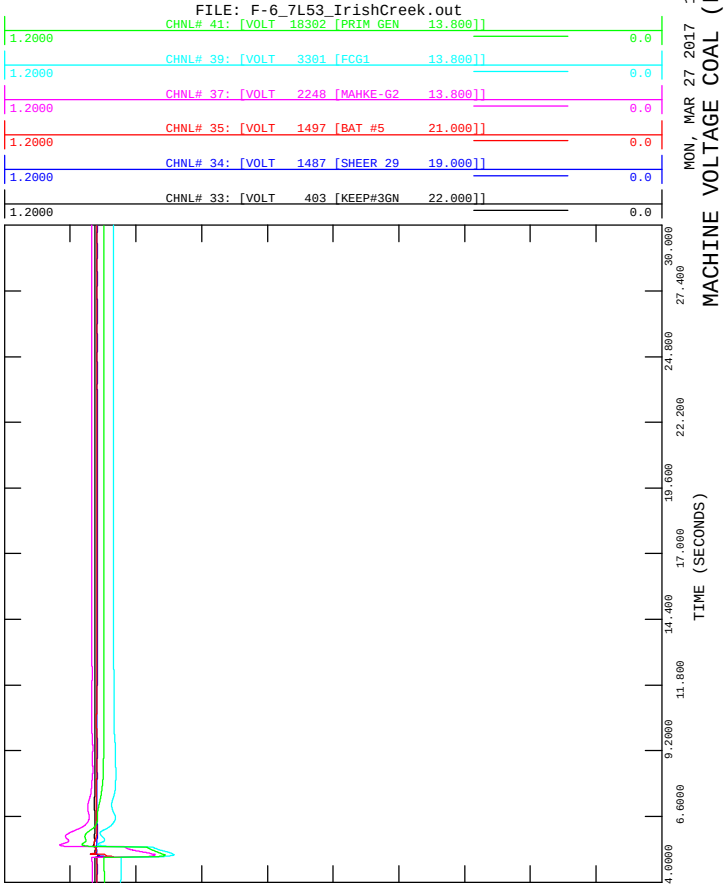


FIGURE F-6H
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6_7L53_IrishCreek.out

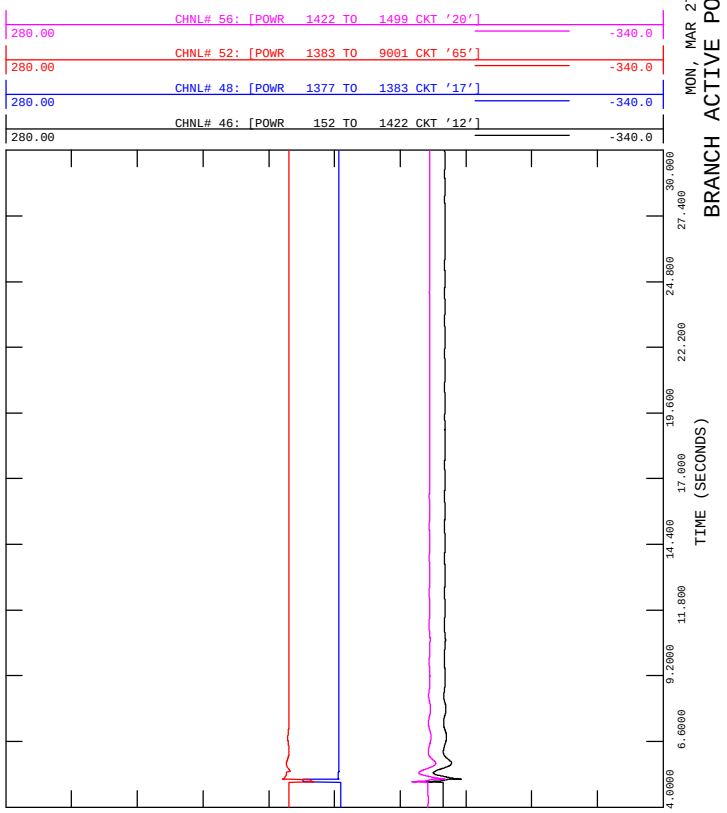


FIGURE F-6E
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6_7L53_IrishCreek.out

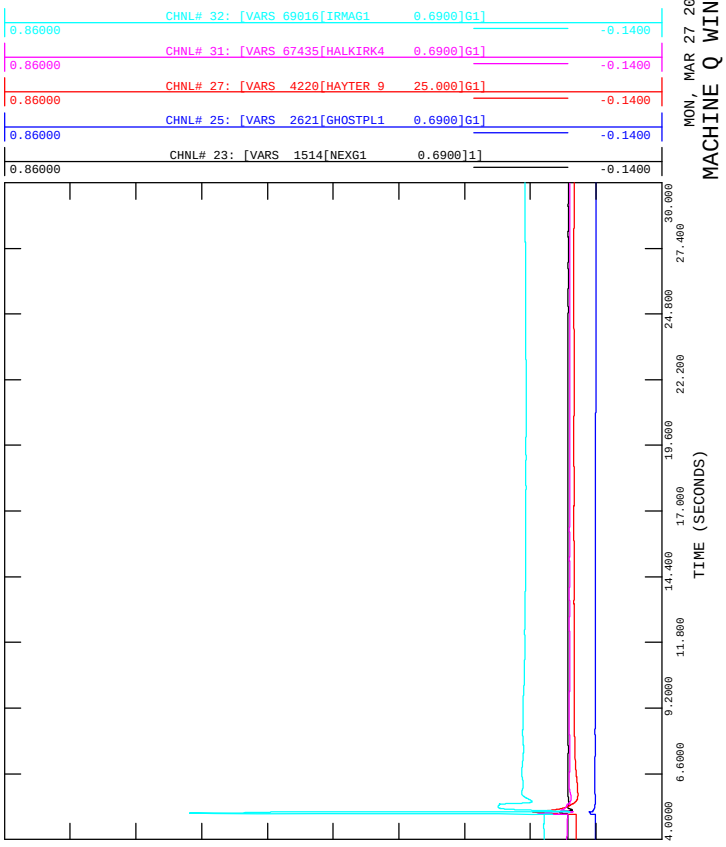


FIGURE F-6G
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6_7L53_IrishCreek.out

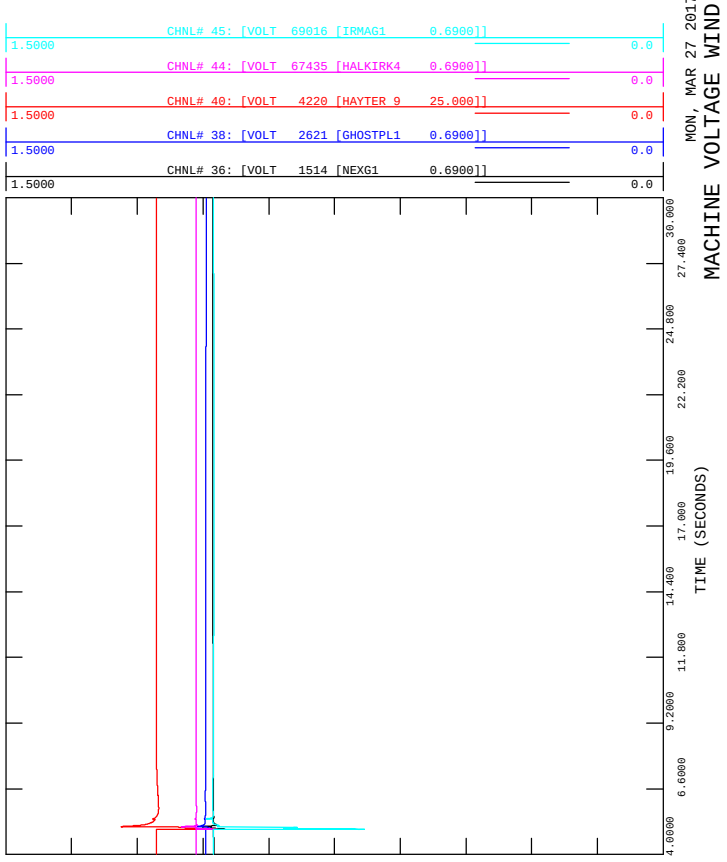


FIGURE F-6I
2017SP, ALT2
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6_7L53_IrishCreek.out

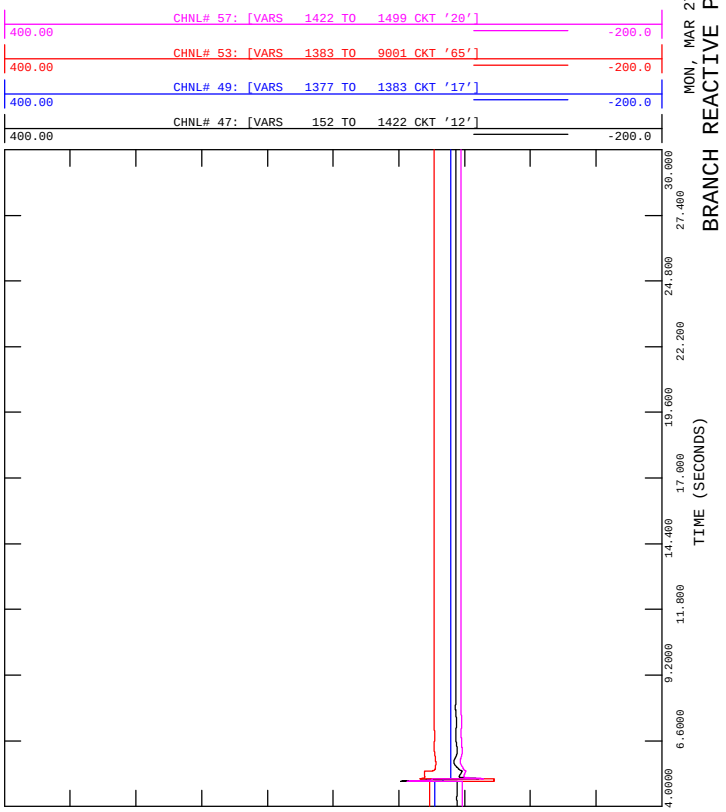


FIGURE F-7B
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vegreville.out

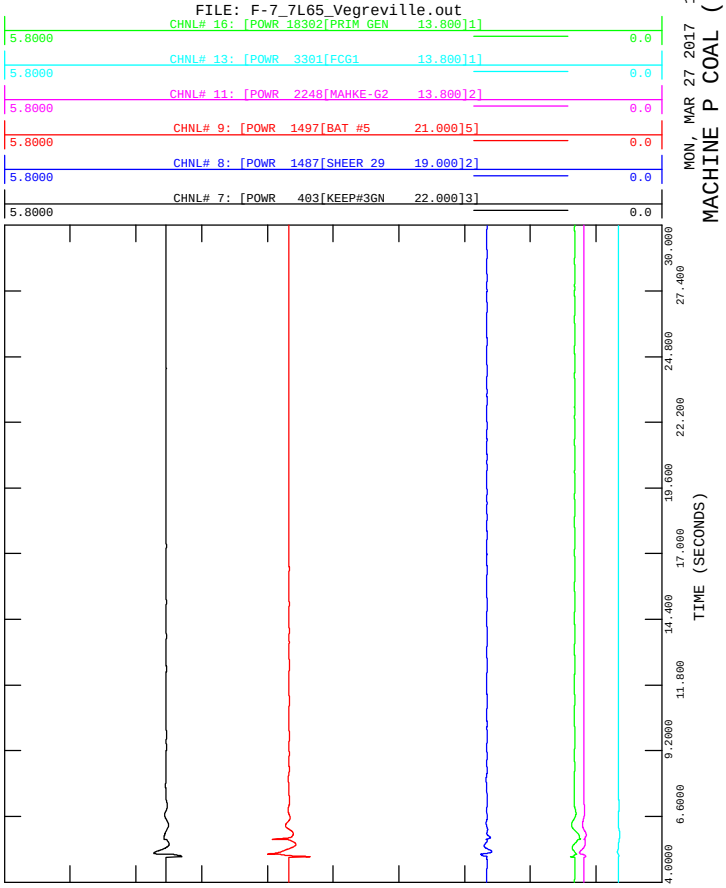


FIGURE F-7D
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vegreville.out

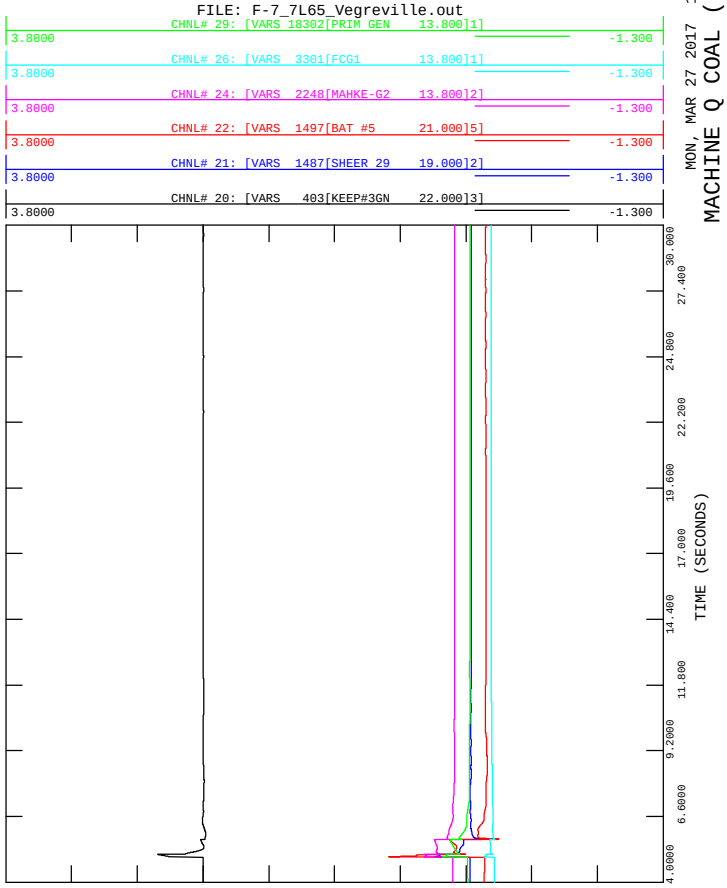


FIGURE F-7A
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vegreville.out

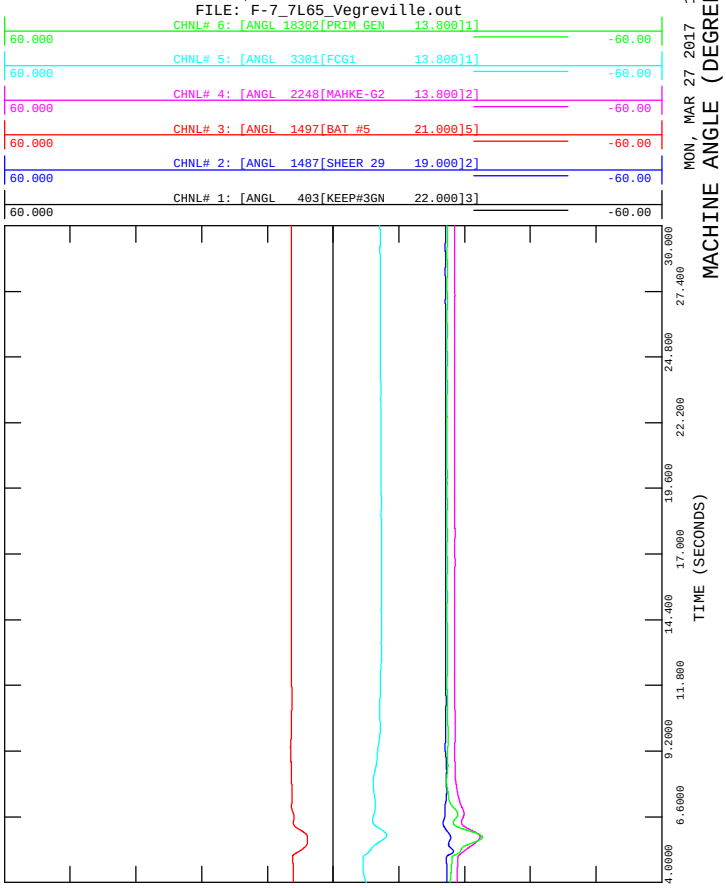


FIGURE F-7C
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vegreville.out

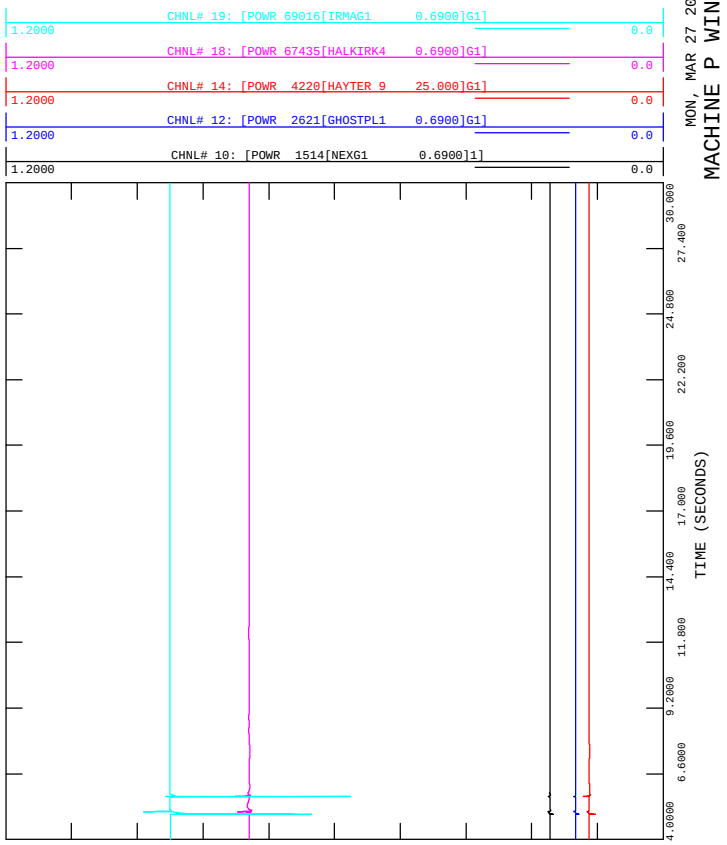


FIGURE F-7F
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vegreville.out

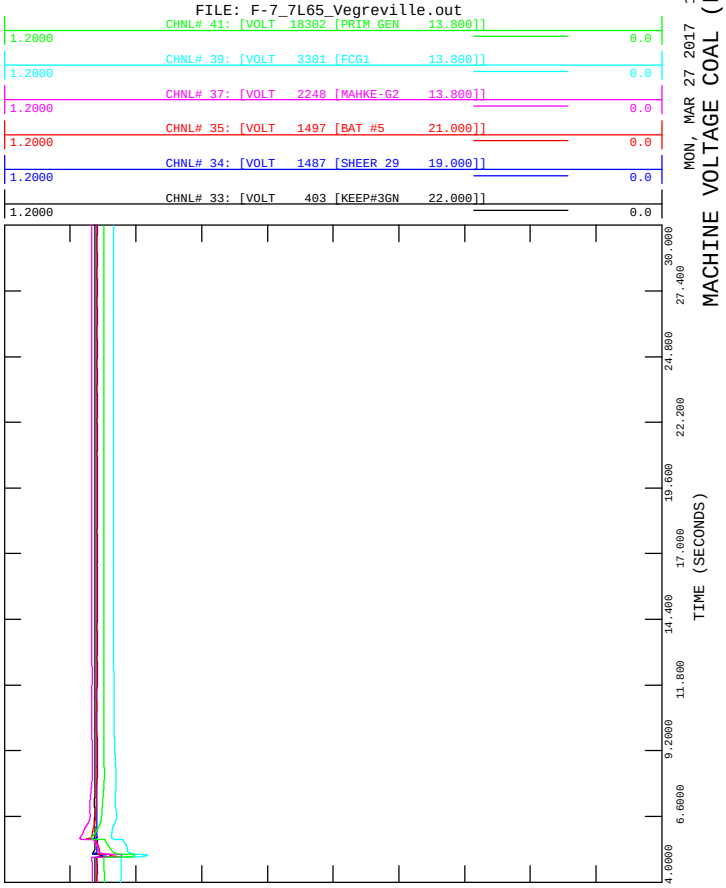


FIGURE F-7H
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vegreville.out

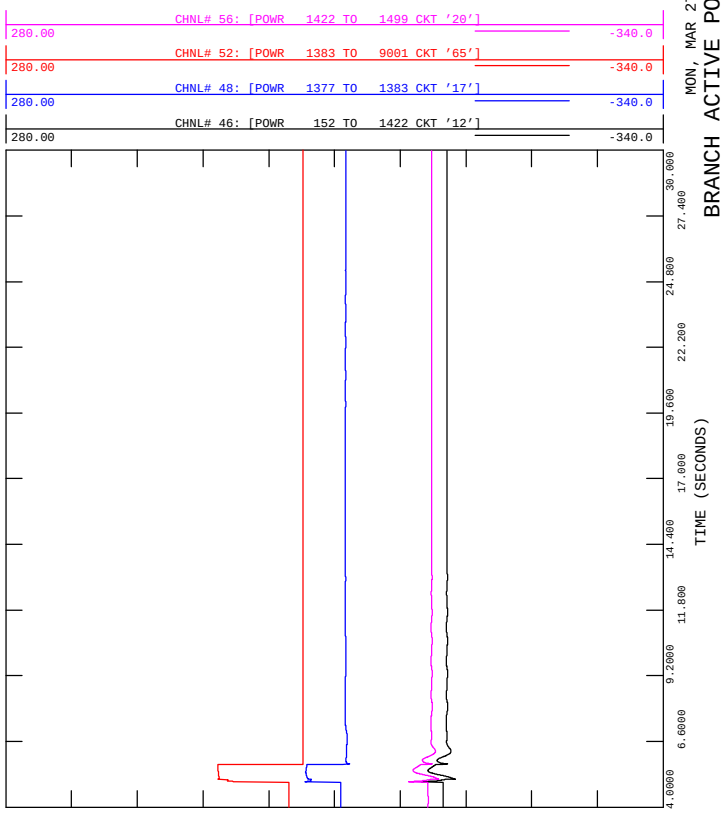


FIGURE F-7E
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vegreville.out

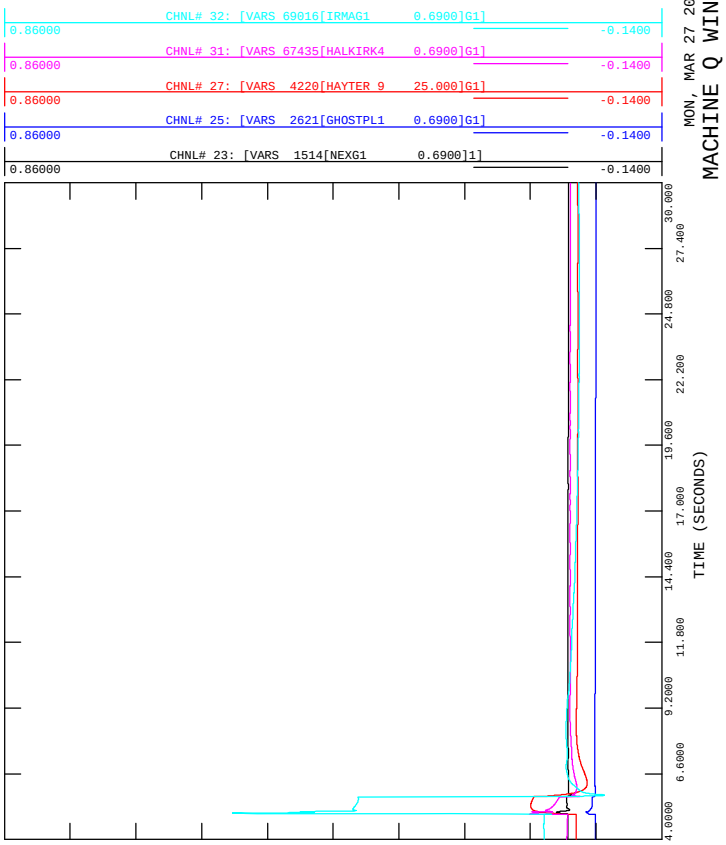


FIGURE F-7G
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vegreville.out

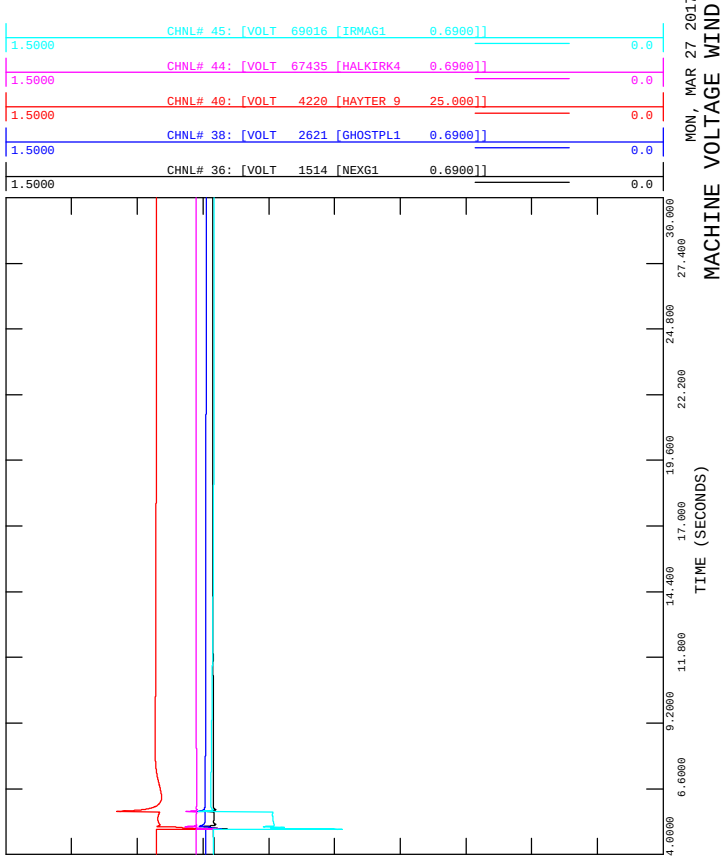


FIGURE F-7I
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 709S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vegreville.out

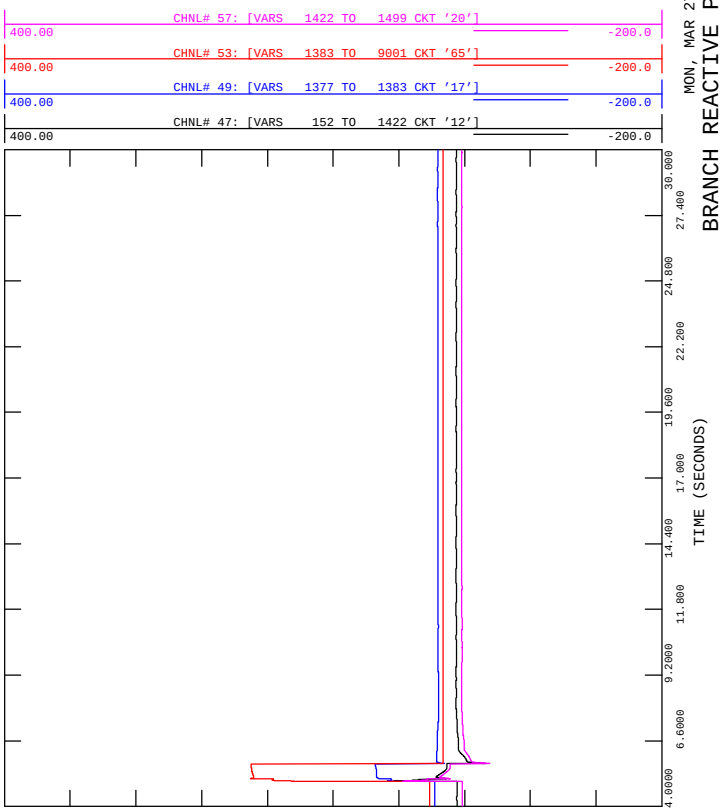


FIGURE F-8B
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_Vermilion.out

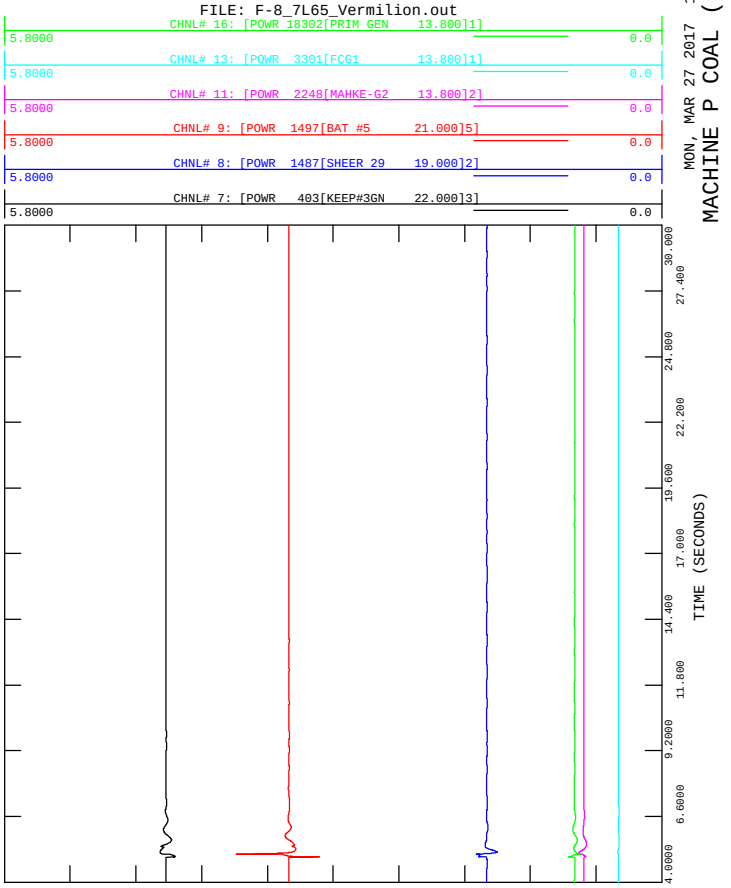


FIGURE F-8D
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_Vermilion.out

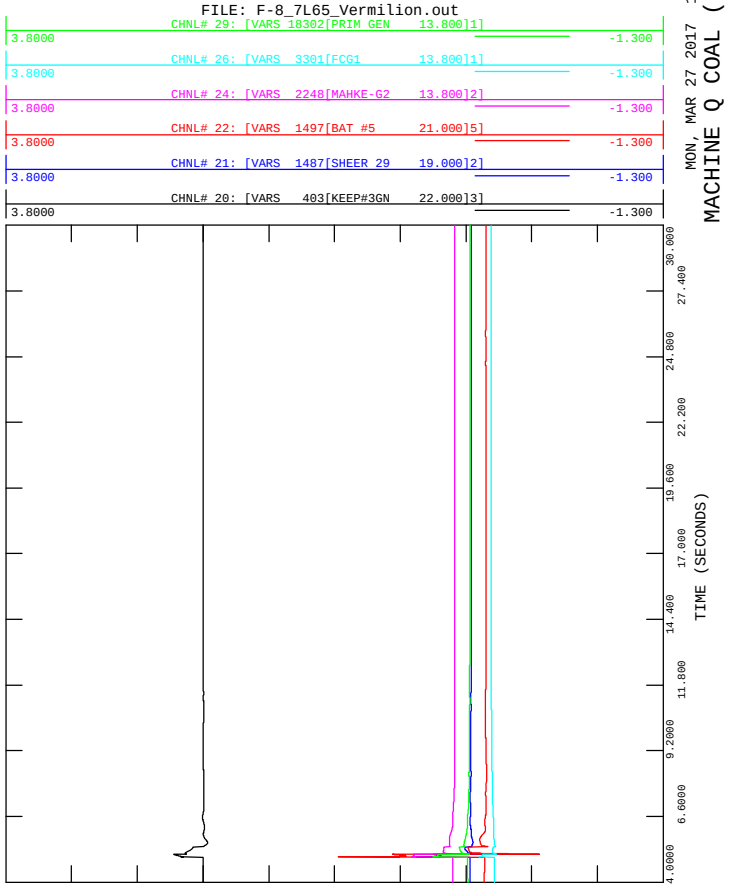


FIGURE F-8A
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_Vermilion.out

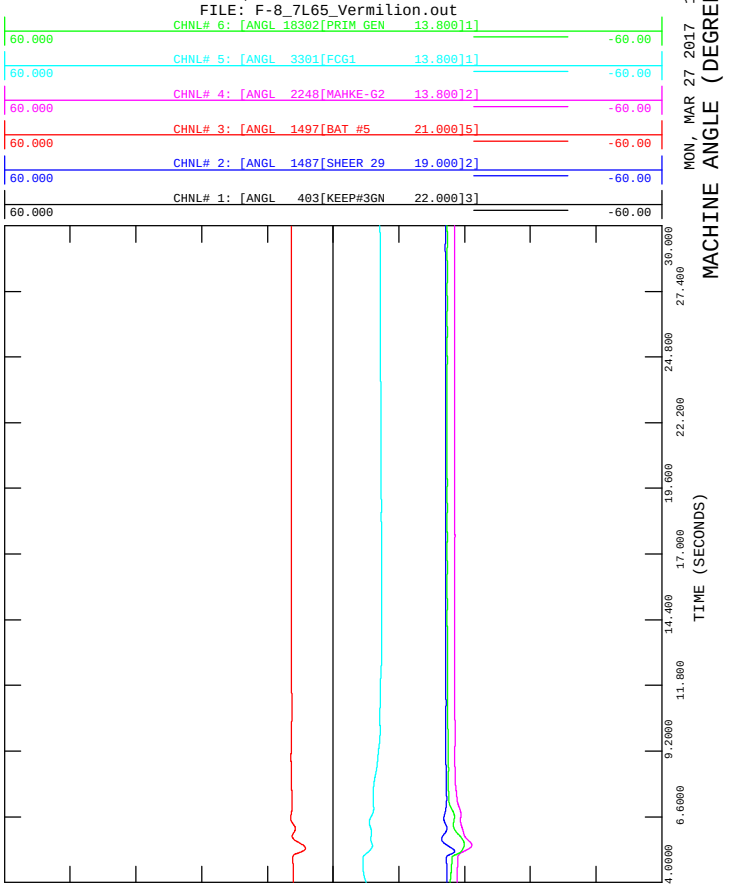


FIGURE F-8C
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_Vermilion.out

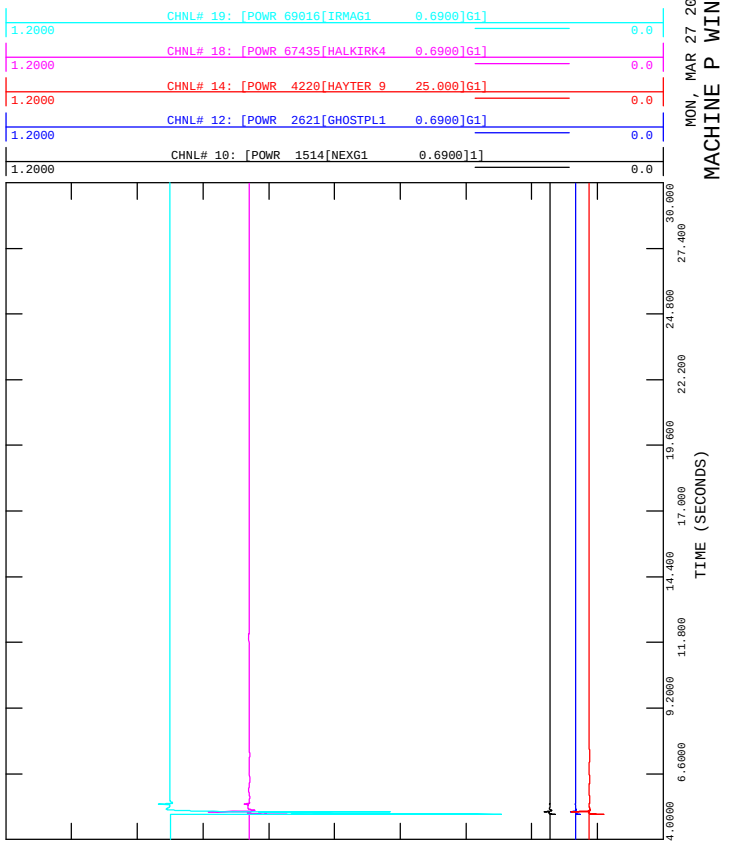


FIGURE F-8F
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_Vermilion.out

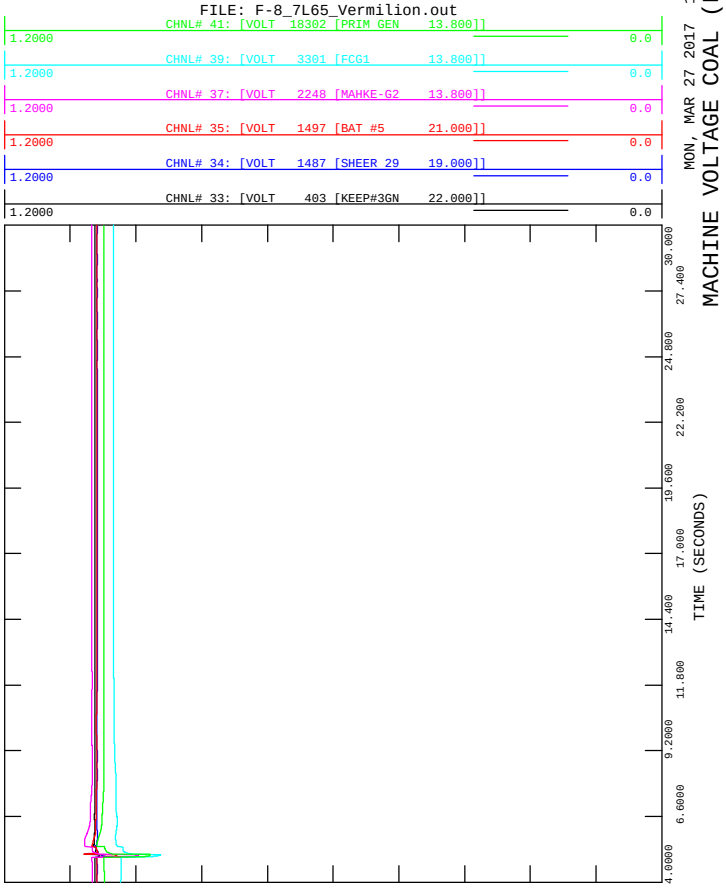


FIGURE F-8H
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_Vermilion.out

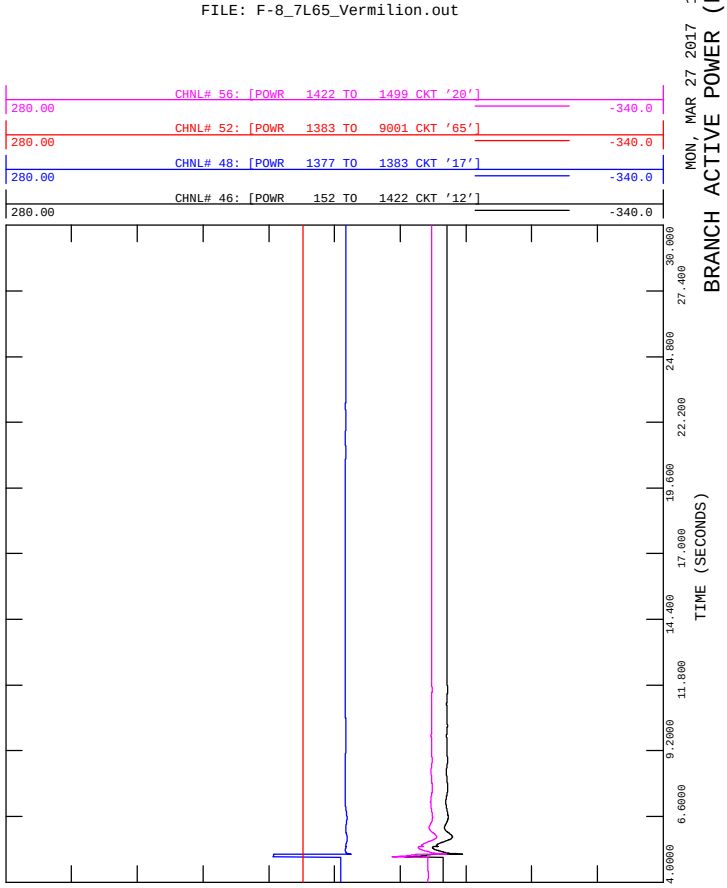


FIGURE F-8E
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_Vermilion.out

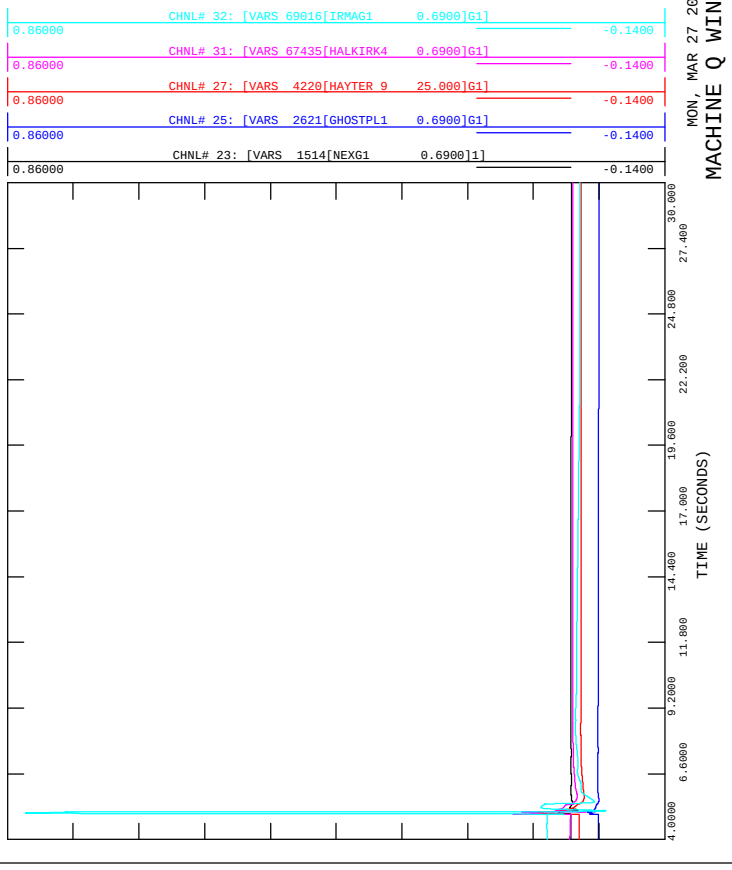


FIGURE F-8G
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_Vermilion.out

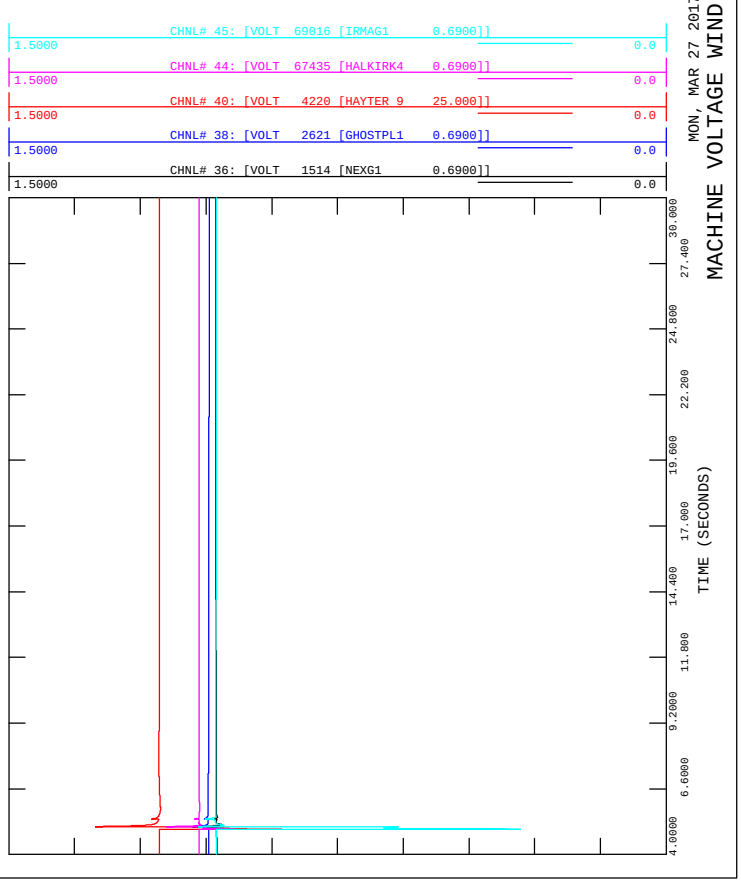


FIGURE F-8I
2017SP, ALT2
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_Vermilion.out

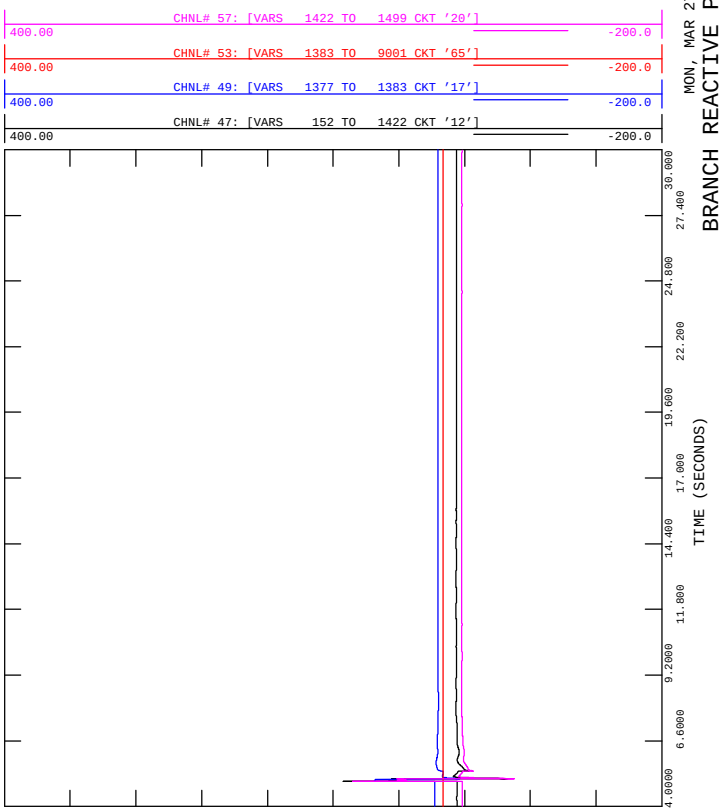


FIGURE F-9B
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-9_7L70_Bonnyville.out

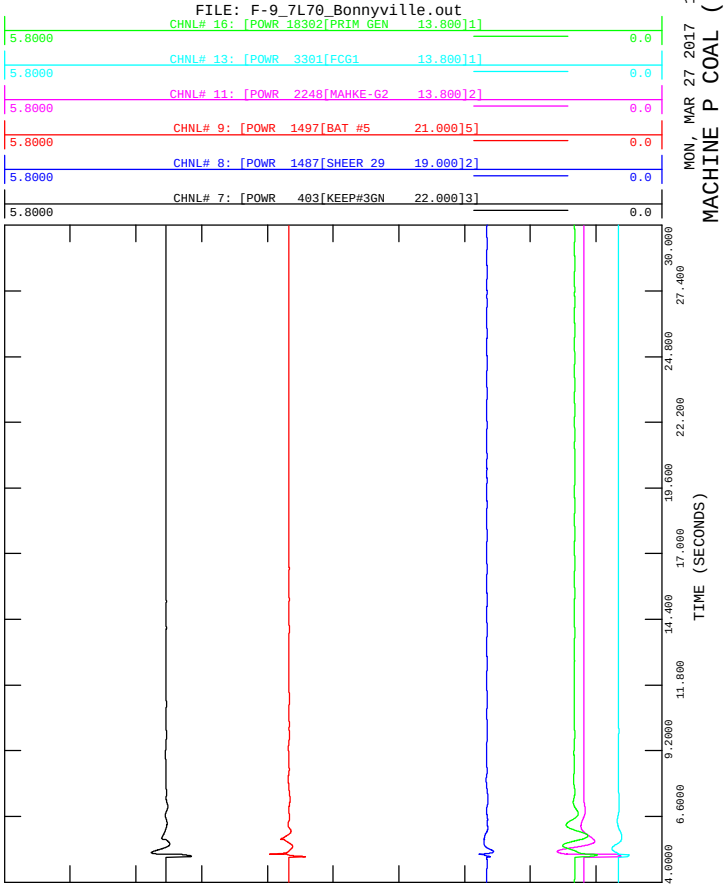


FIGURE F-9D
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-9_7L70_Bonnyville.out

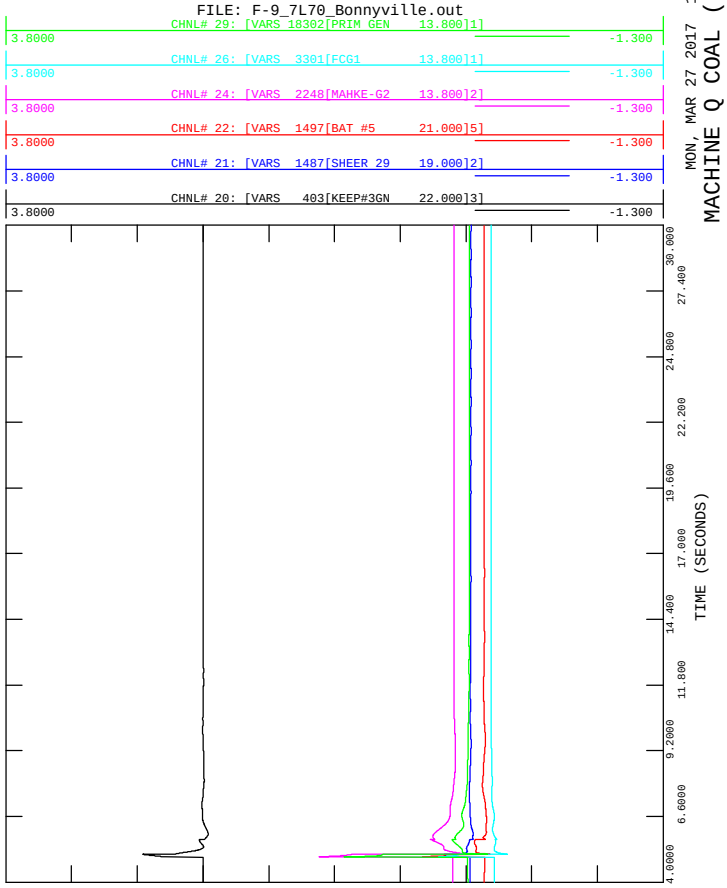


FIGURE F-9A
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-9_7L70_Bonnyville.out

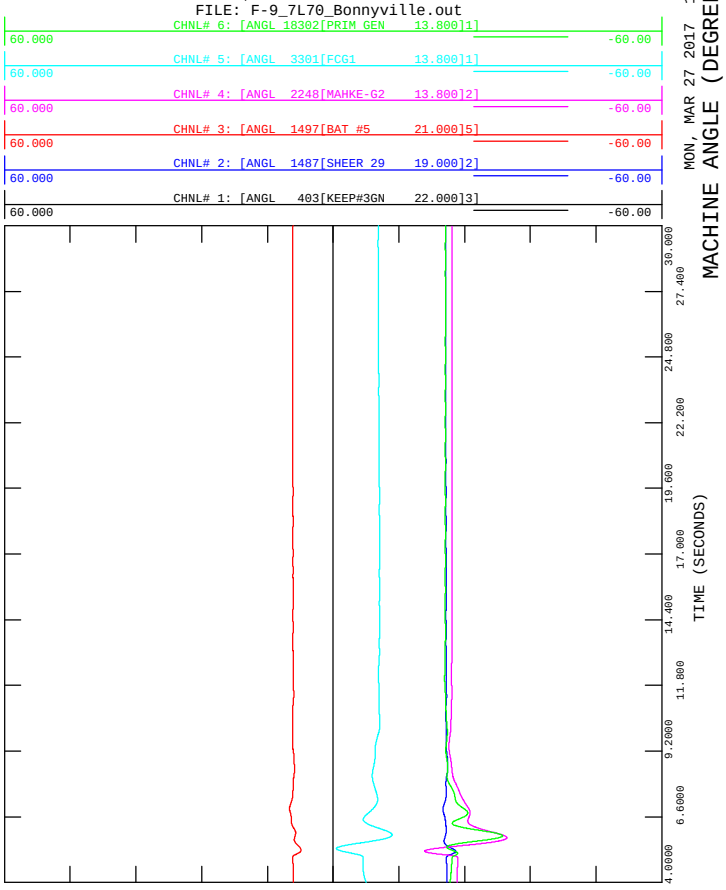


FIGURE F-9C
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-9_7L70_Bonnyville.out

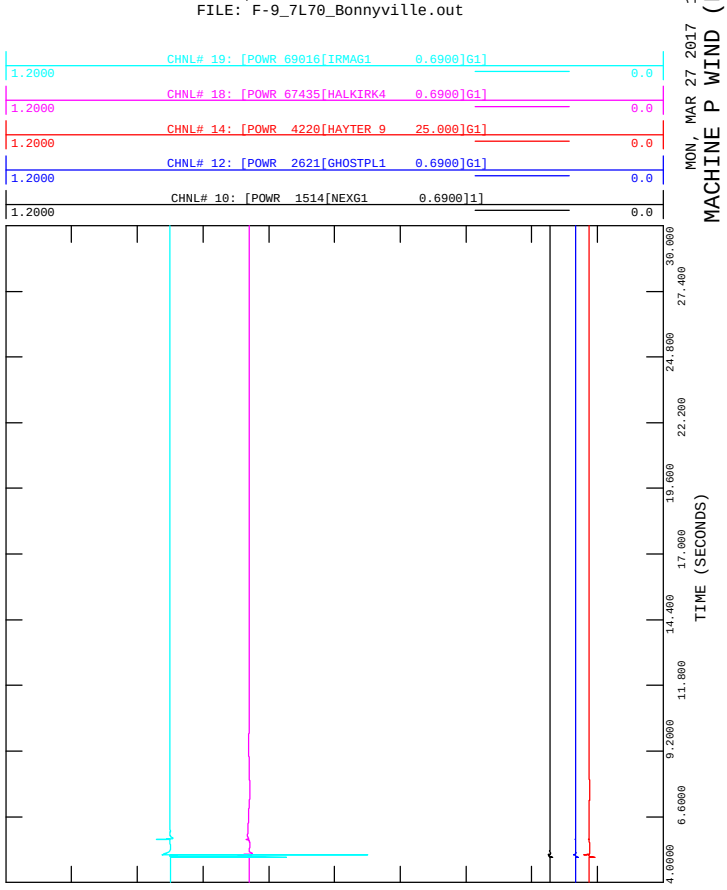


FIGURE F-9F
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-9_7L70_Bonnyville.out

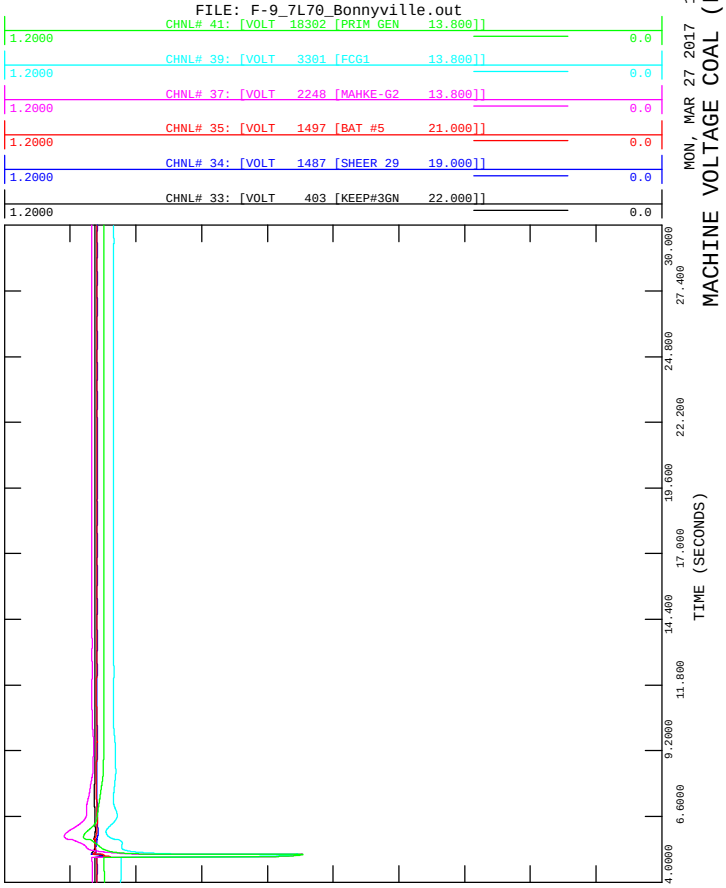


FIGURE F-9H
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-9_7L70_Bonnyville.out

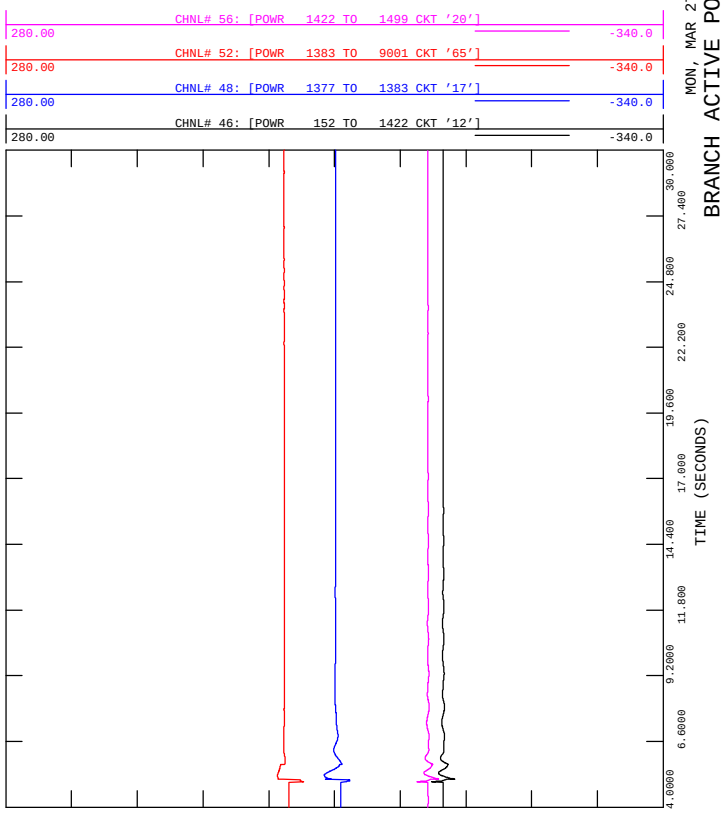


FIGURE F-9E
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-9_7L70_Bonnyville.out

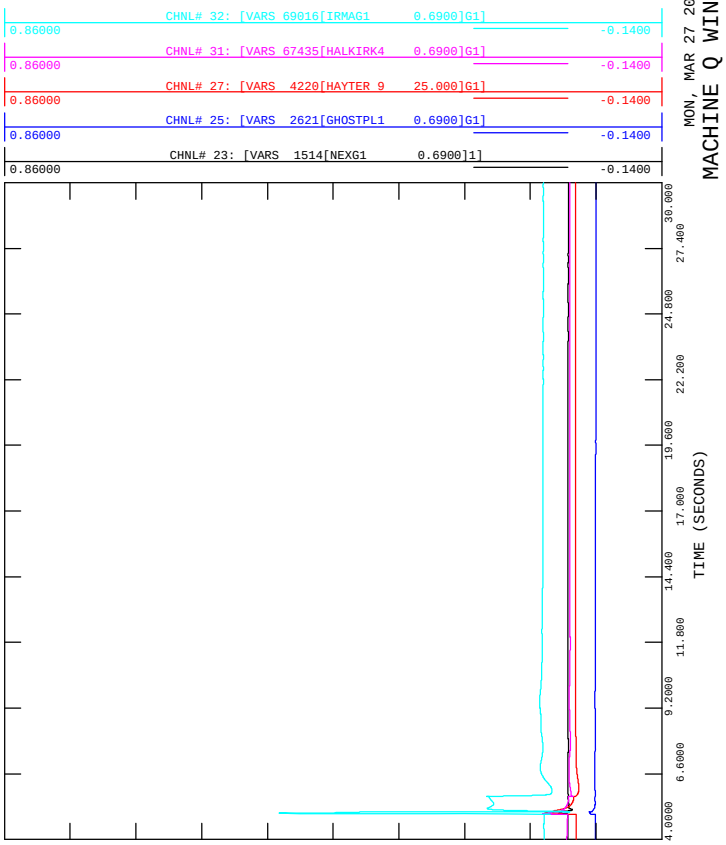


FIGURE F-9G
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-9_7L70_Bonnyville.out

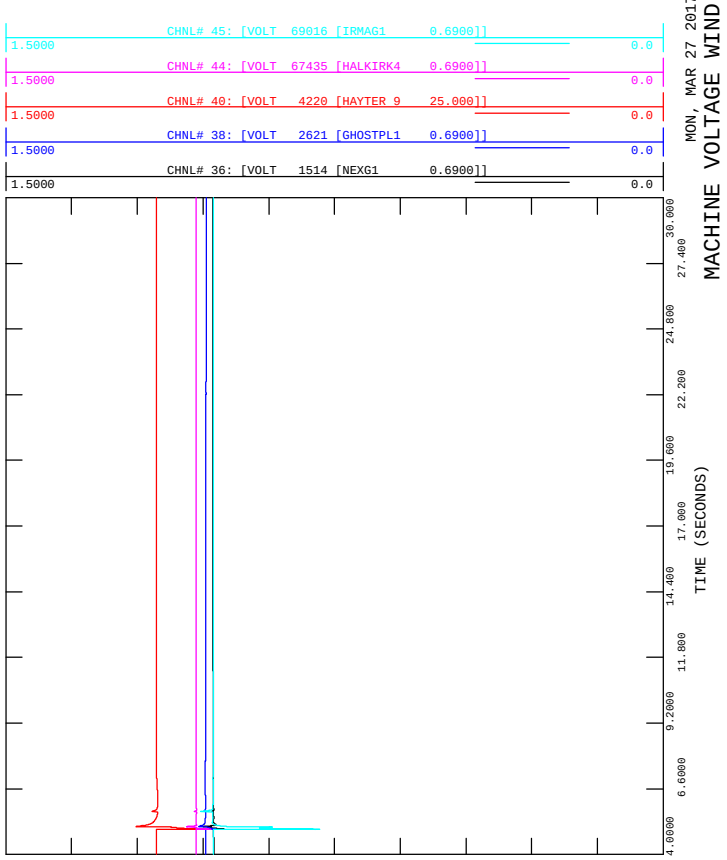


FIGURE F-9I
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-9_7L70_Bonnyville.out

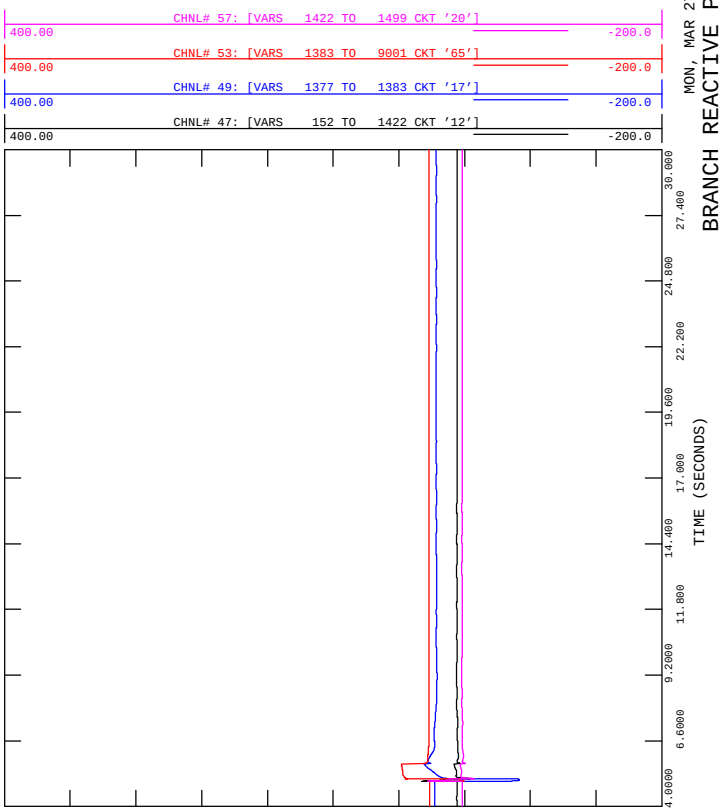


FIGURE F-10B
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_St.Paul.out

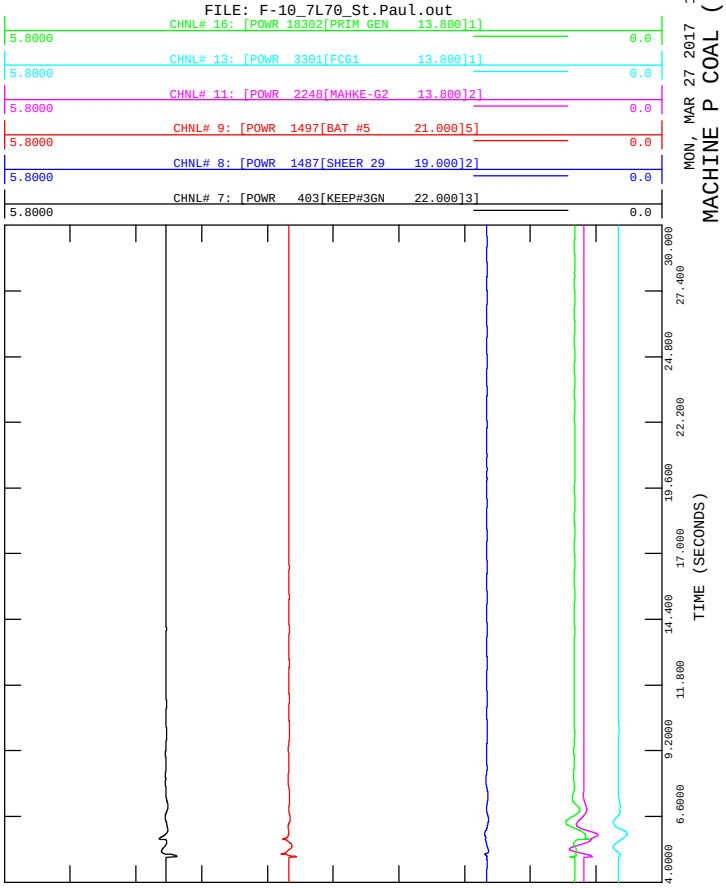


FIGURE F-10D
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_St.Paul.out

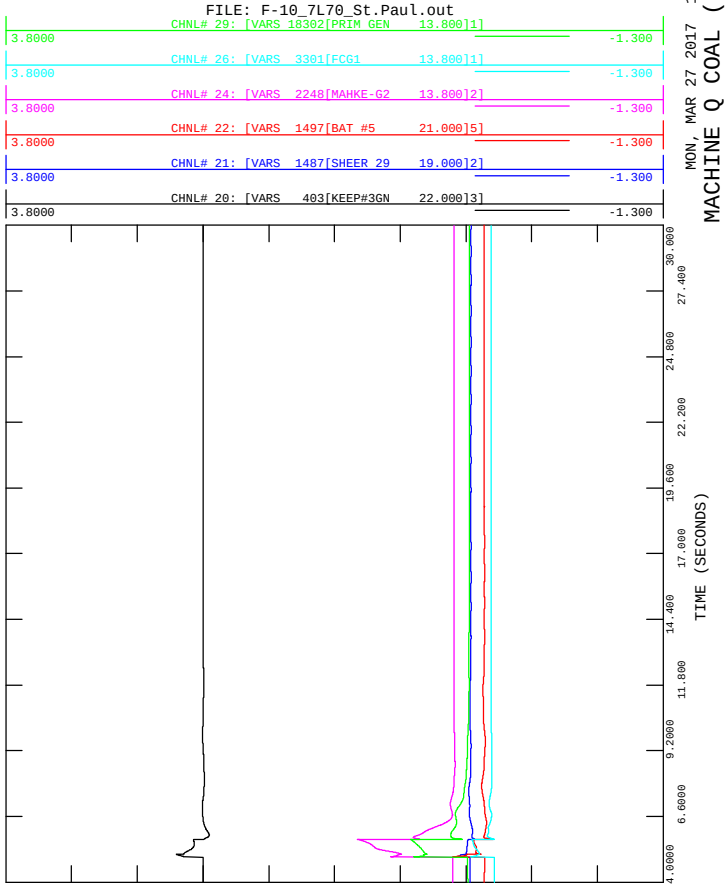


FIGURE F-10A
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_St.Paul.out

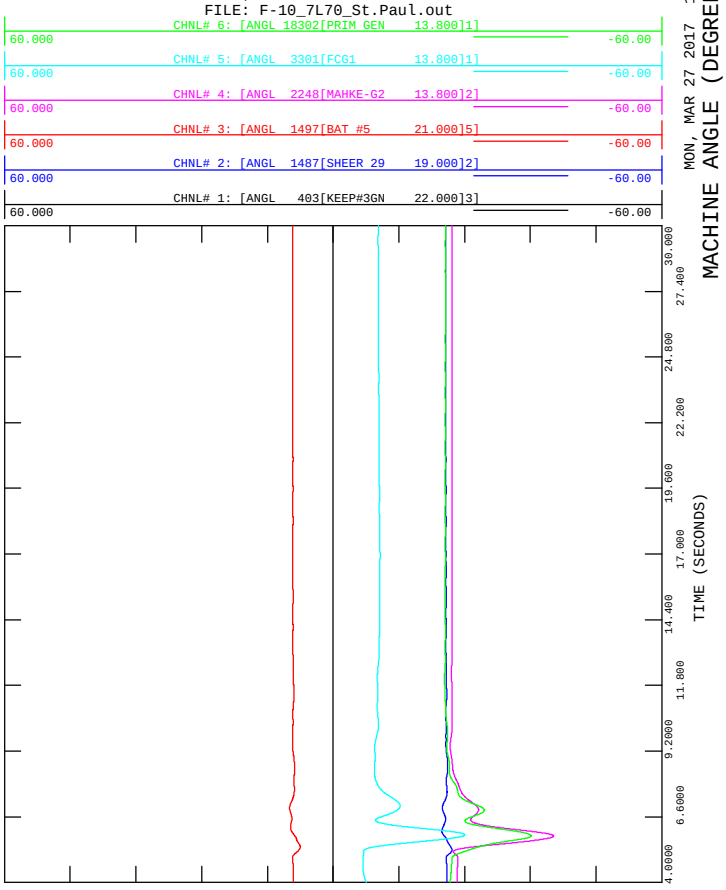


FIGURE F-10C
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_St.Paul.out

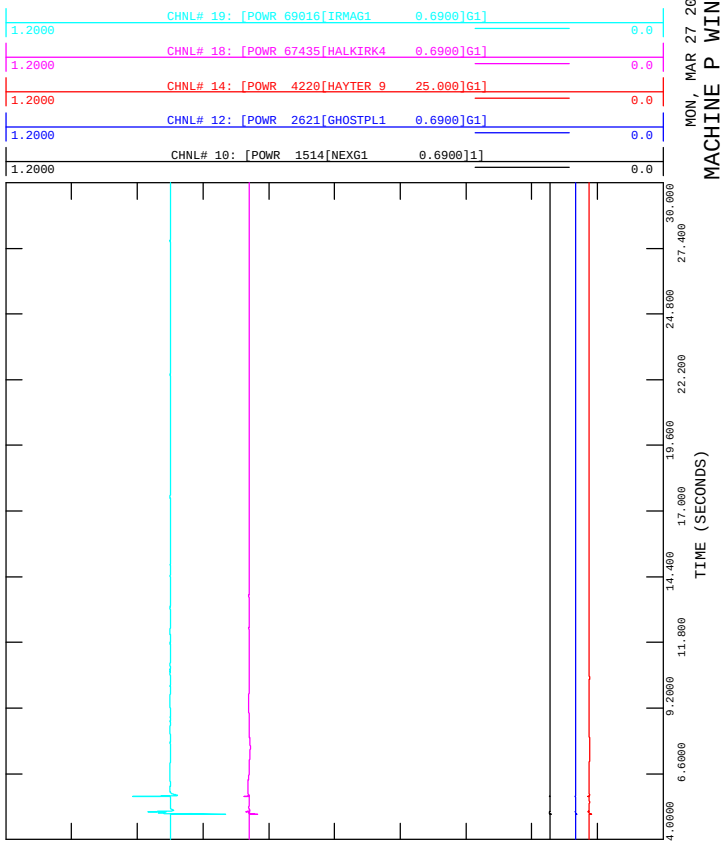


FIGURE F-10F
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_St.Paul.out

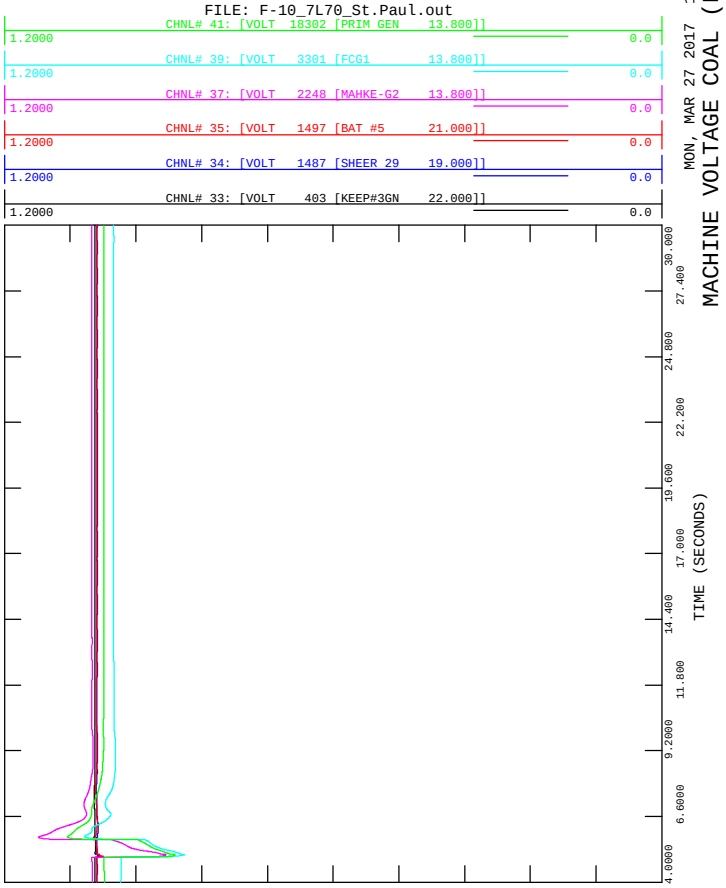


FIGURE F-10H
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_St.Paul.out

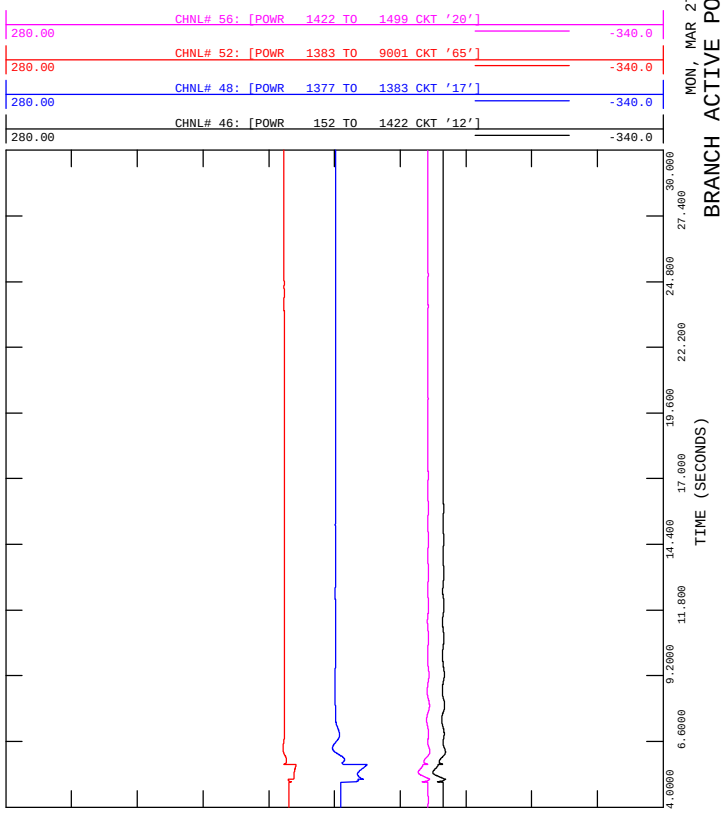


FIGURE F-10E
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_St.Paul.out

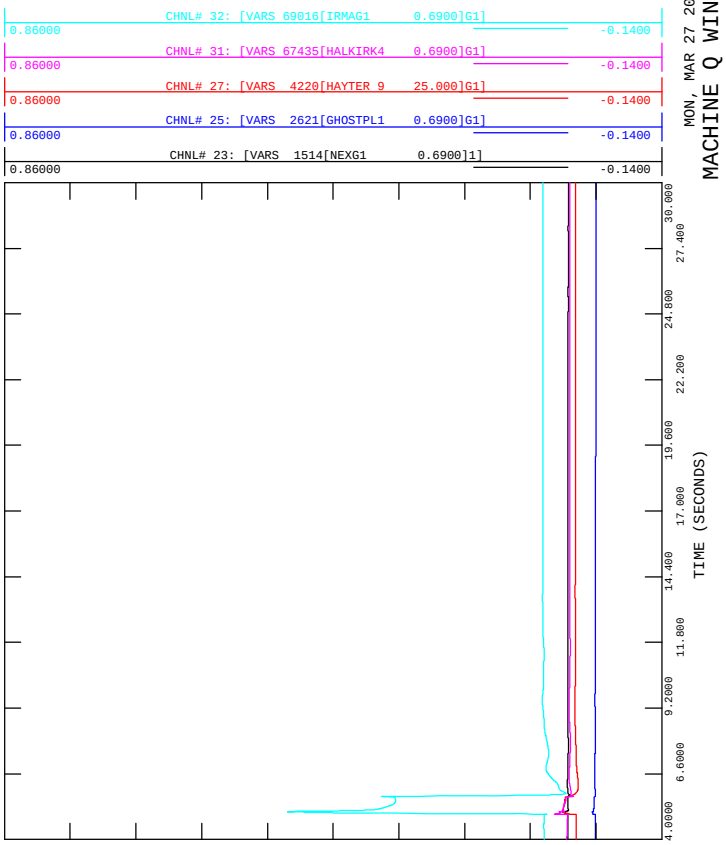


FIGURE F-10G
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_St.Paul.out

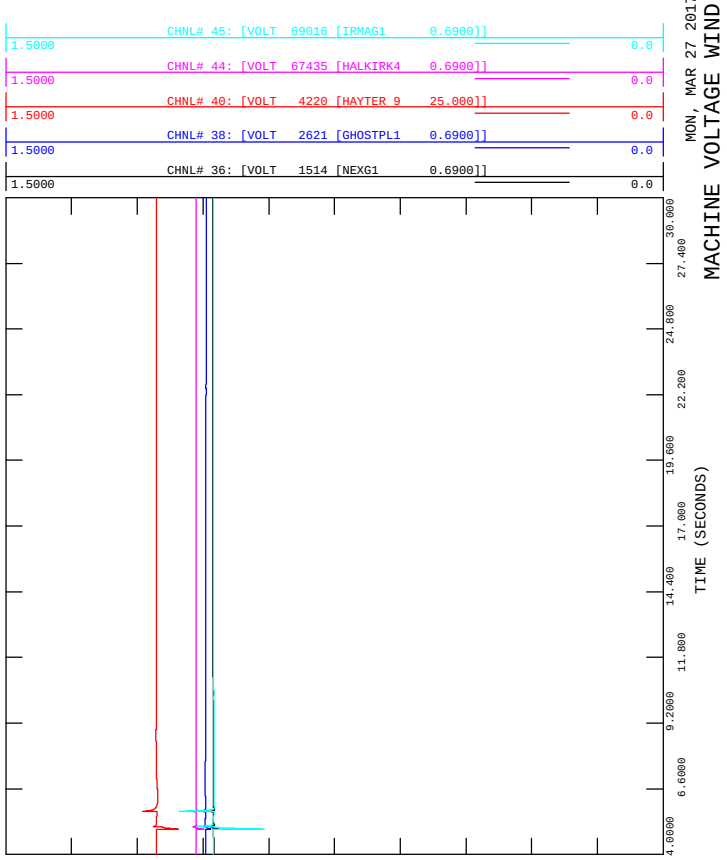


FIGURE F-10I
2017SP, ALT2
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_St.Paul.out

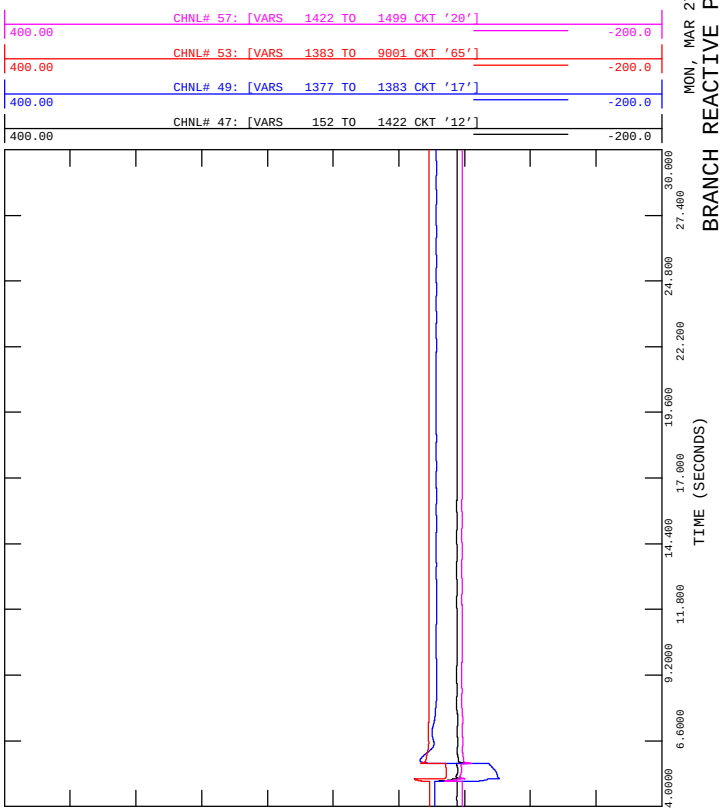


FIGURE F-11B
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-11_7L115_BuffaloCreek.out

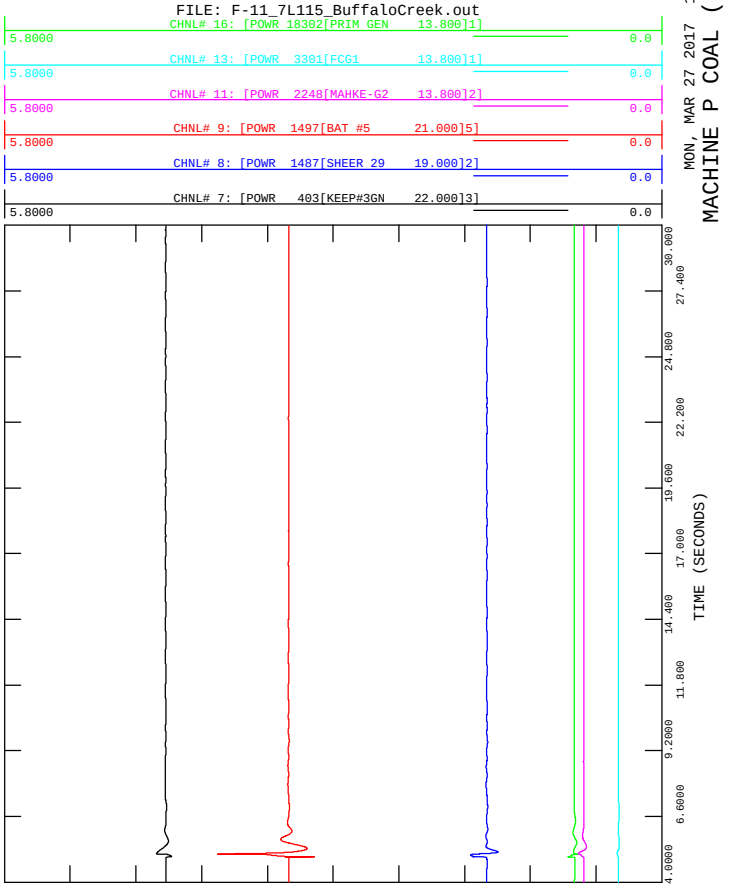


FIGURE F-11D
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-11_7L115_BuffaloCreek.out

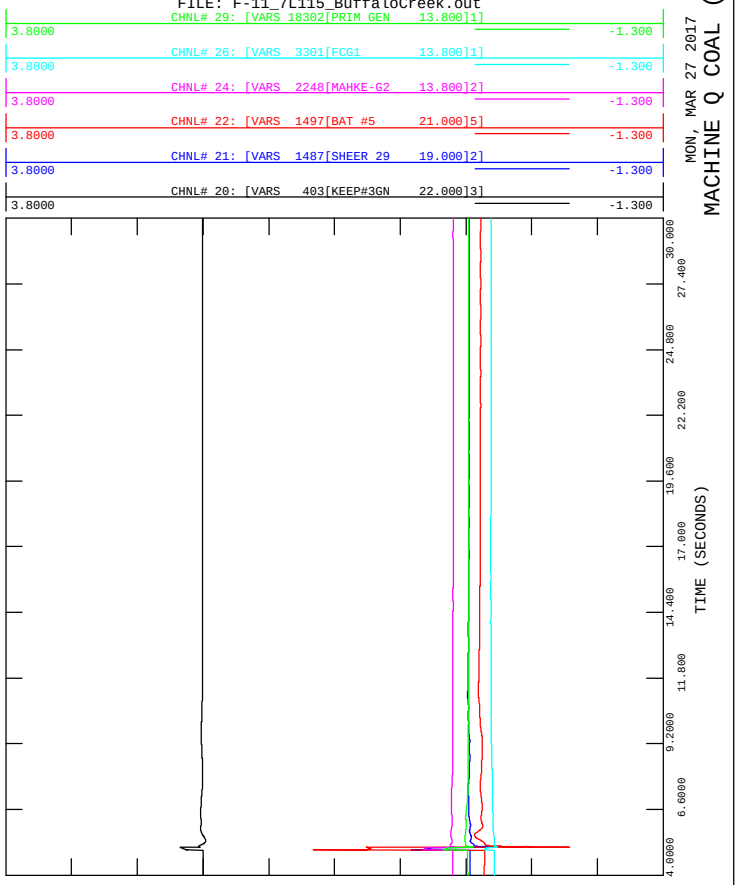


FIGURE F-11A
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-11_7L115_BuffaloCreek.out

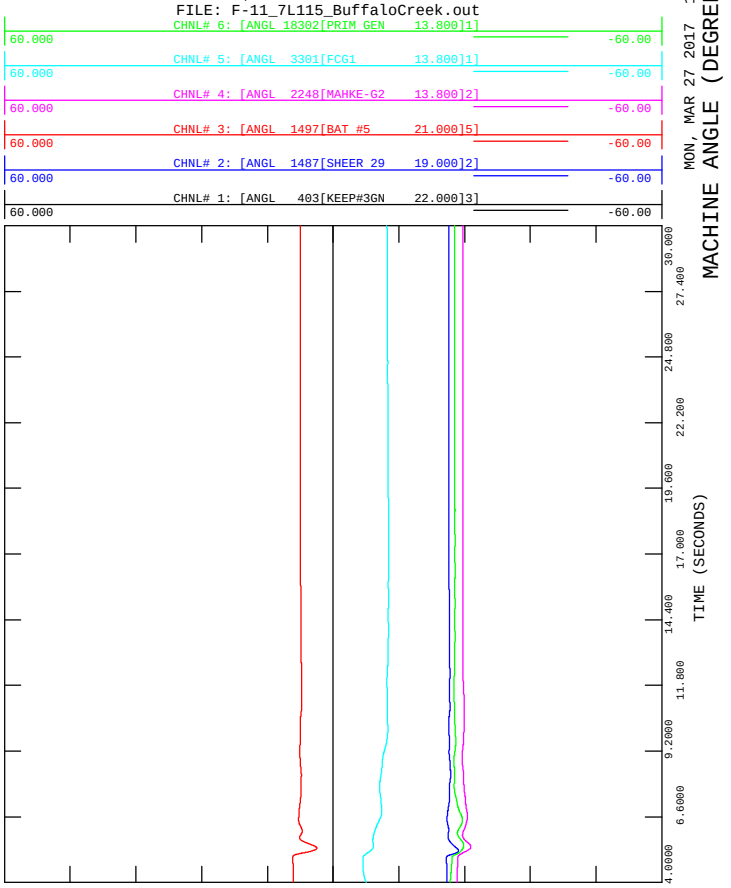


FIGURE F-11C
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-11_7L115_BuffaloCreek.out

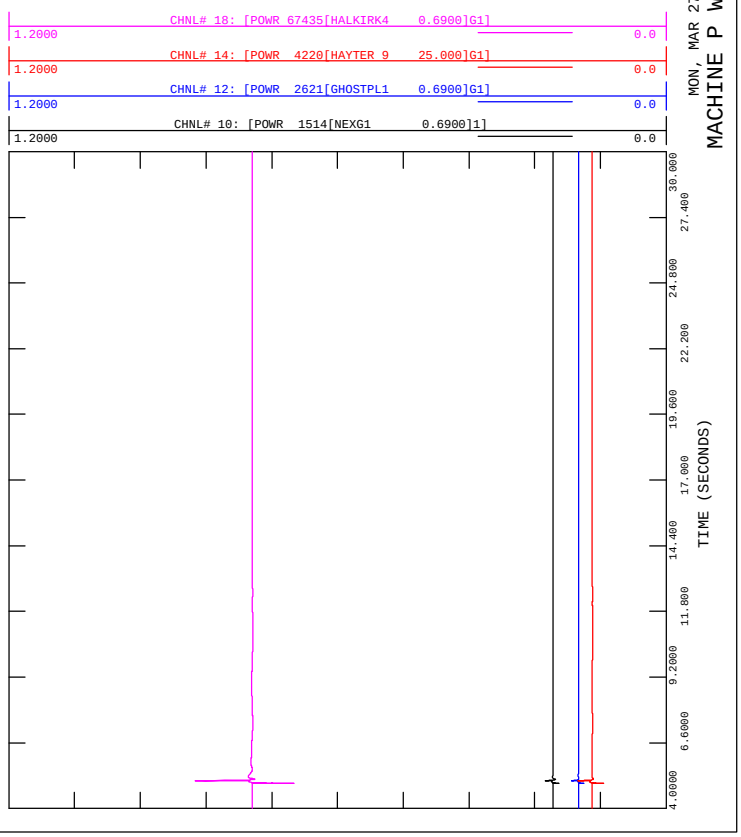


FIGURE F-11F
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-11_7L115_BuffaloCreek.out

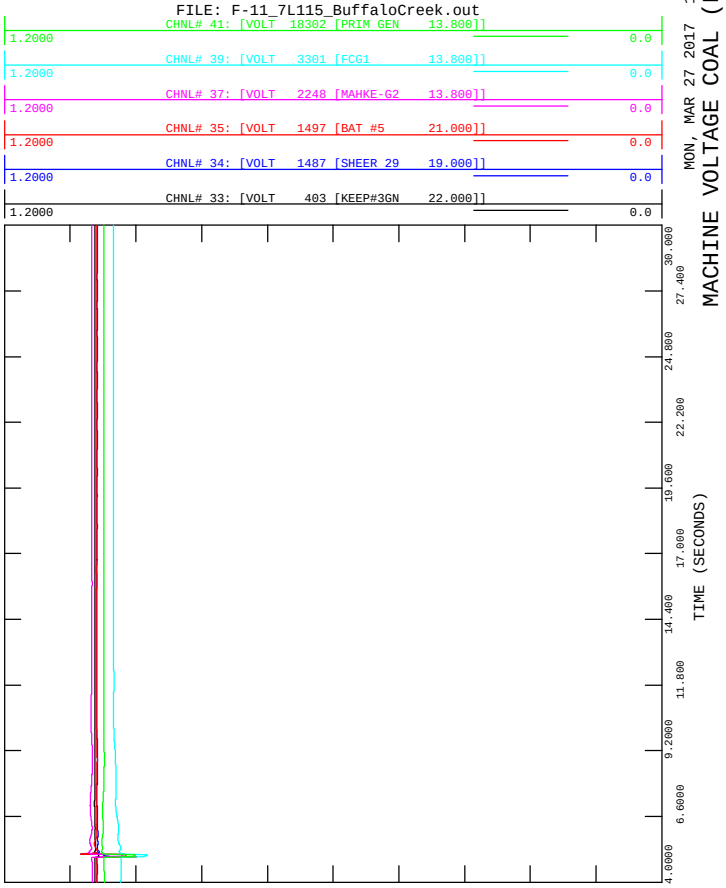


FIGURE F-11H
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-11_7L115_BuffaloCreek.out

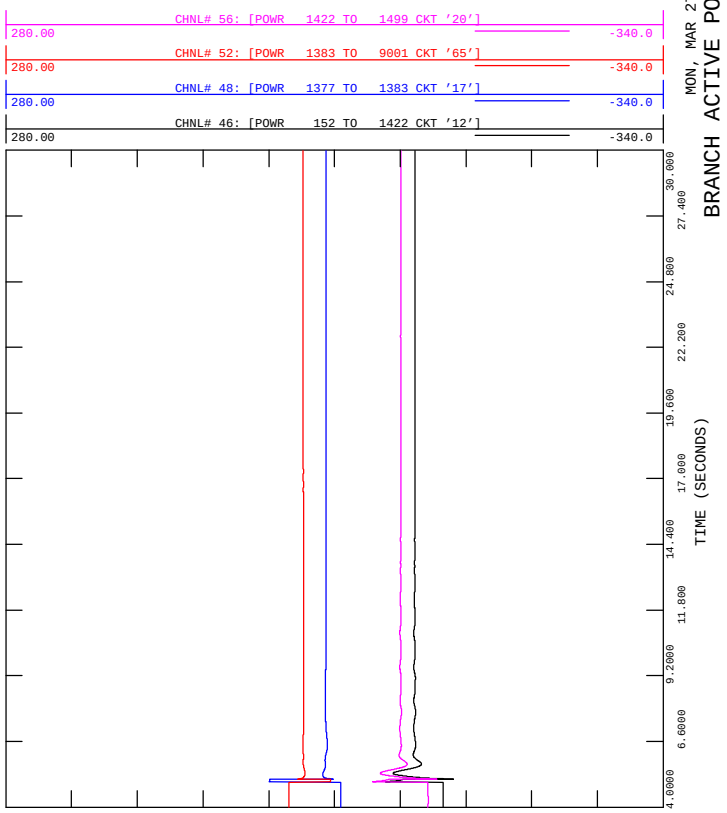


FIGURE F-11E
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-11_7L115_BuffaloCreek.out

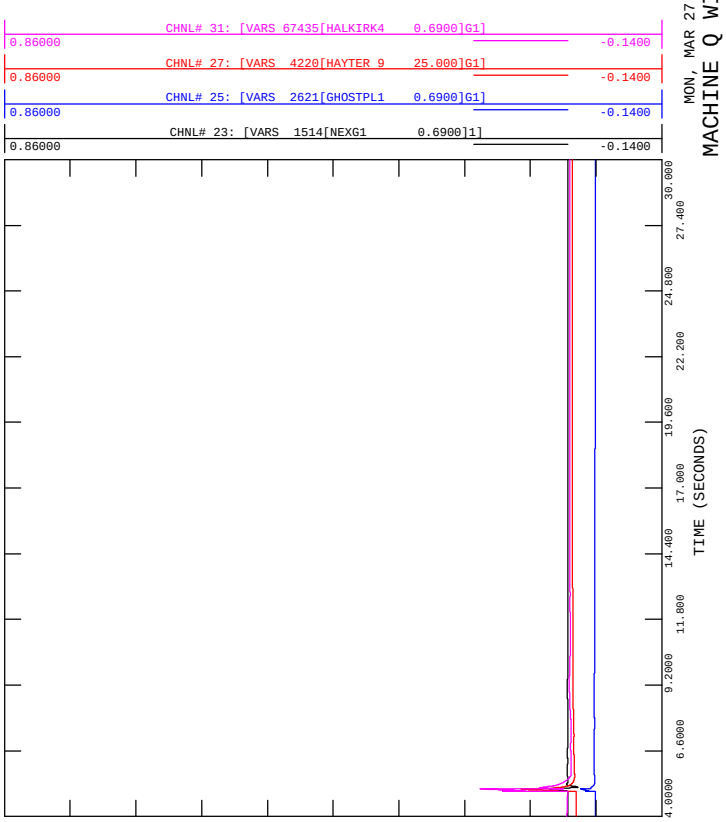


FIGURE F-11G
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-11_7L115_BuffaloCreek.out

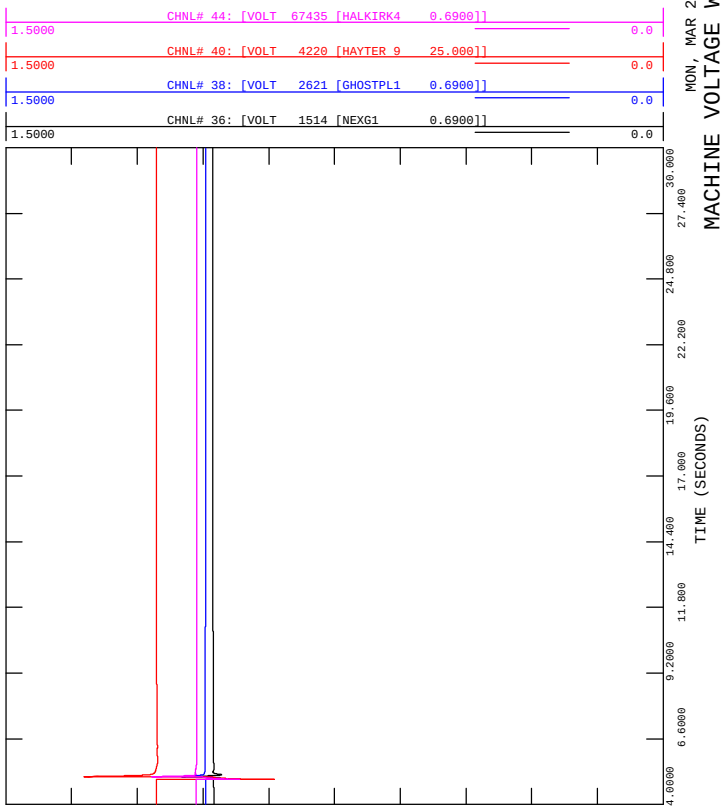


FIGURE F-11I
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-11_7L115_BuffaloCreek.out

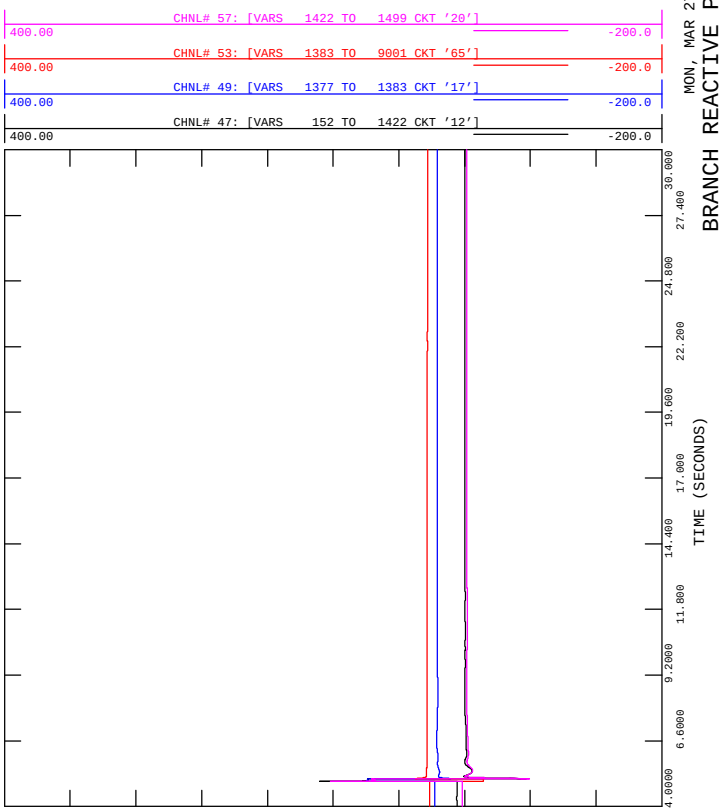


FIGURE F-12B
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-12_7L115_Kinsella.out

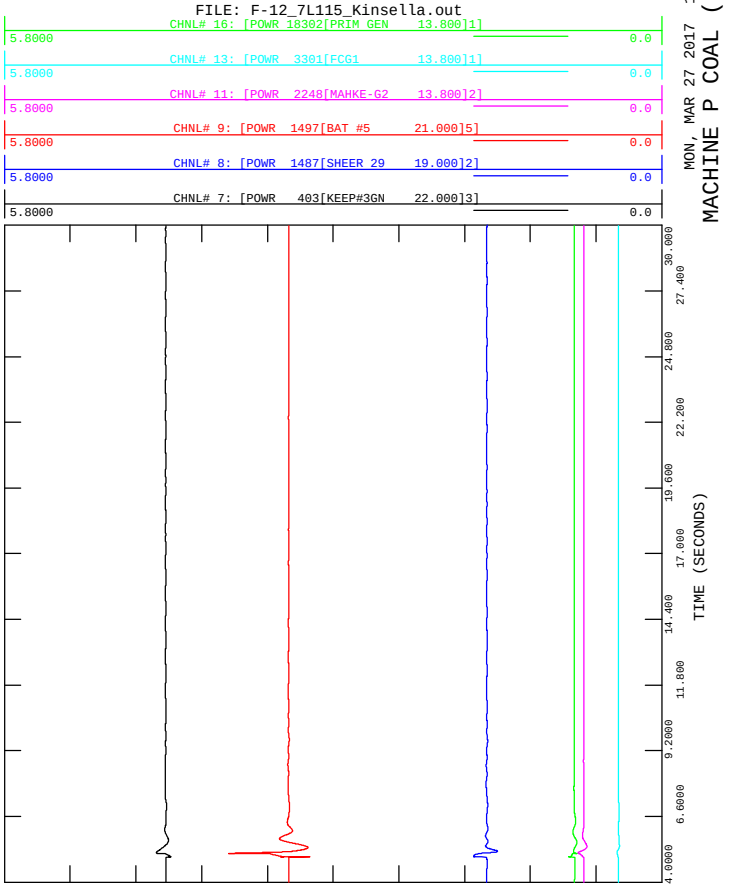


FIGURE F-12D
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-12_7L115_Kinsella.out

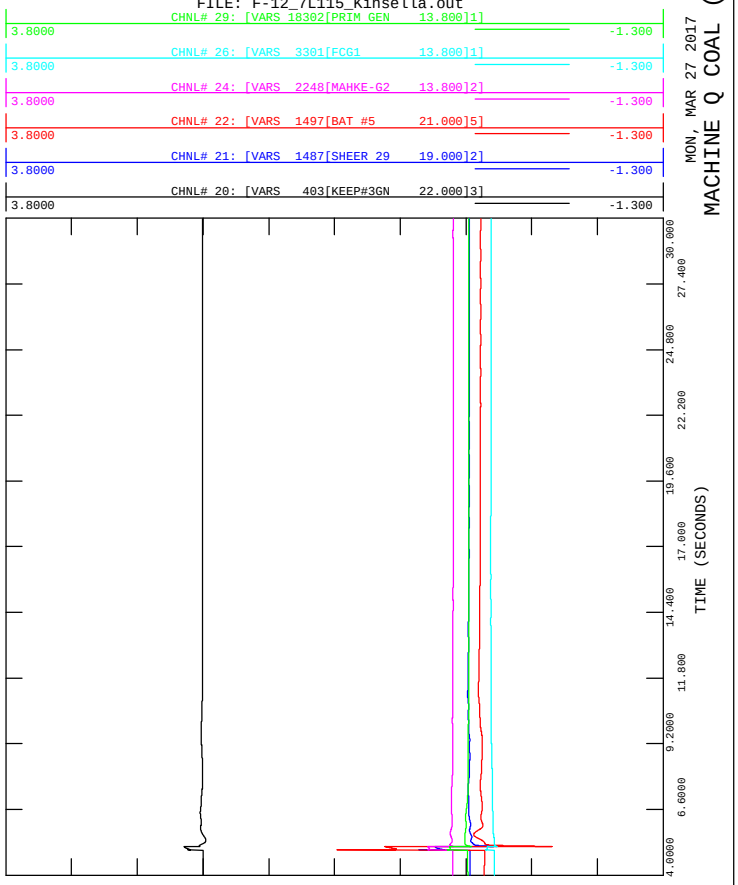


FIGURE F-12A
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-12_7L115_Kinsella.out

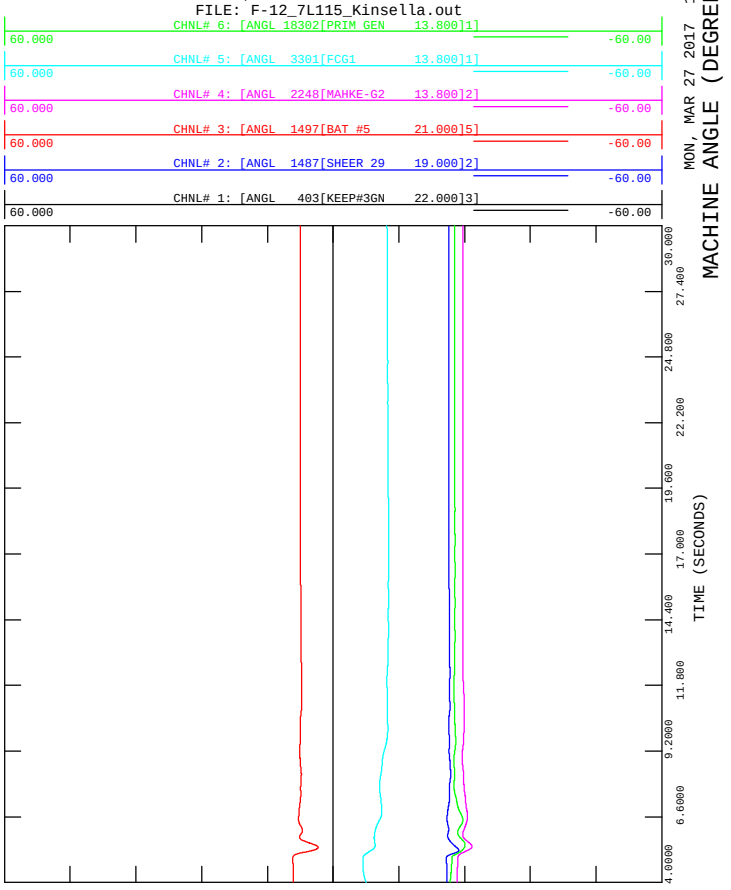


FIGURE F-12C
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-12_7L115_Kinsella.out

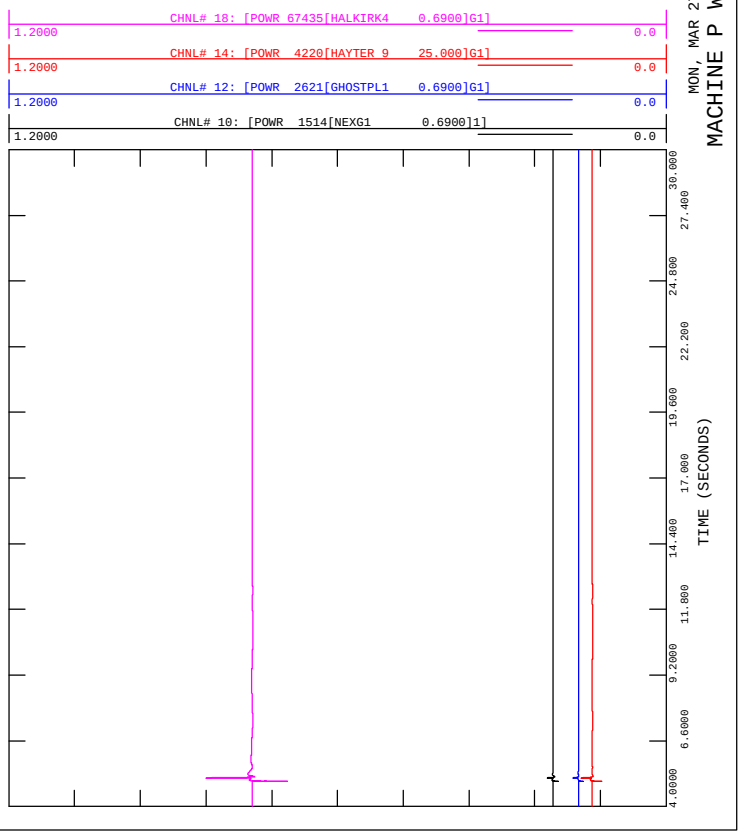


FIGURE F-12F
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-12_7L115_Kinsella.out

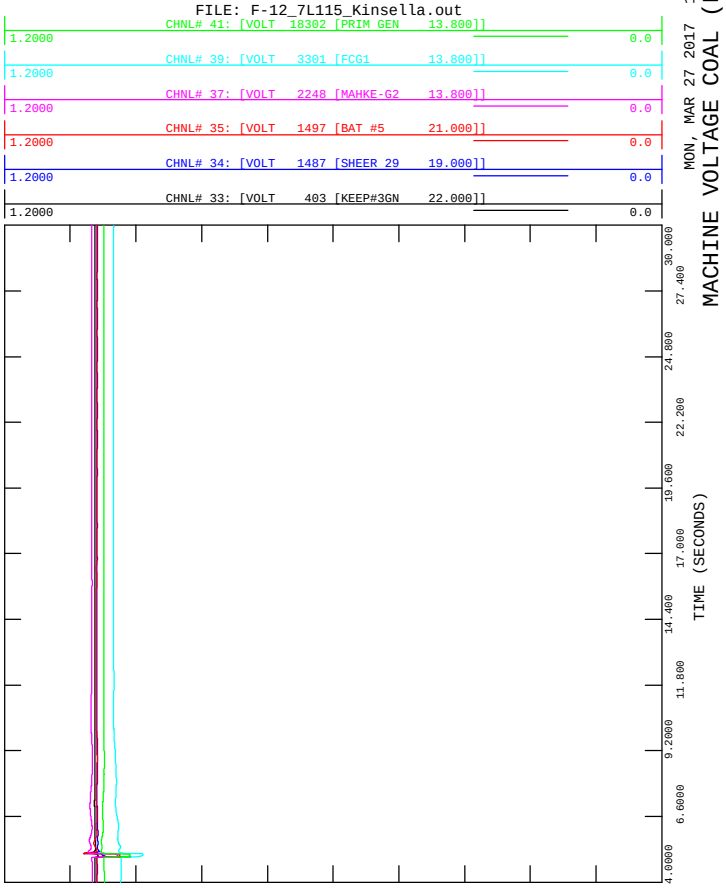


FIGURE F-12H
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-12_7L115_Kinsella.out

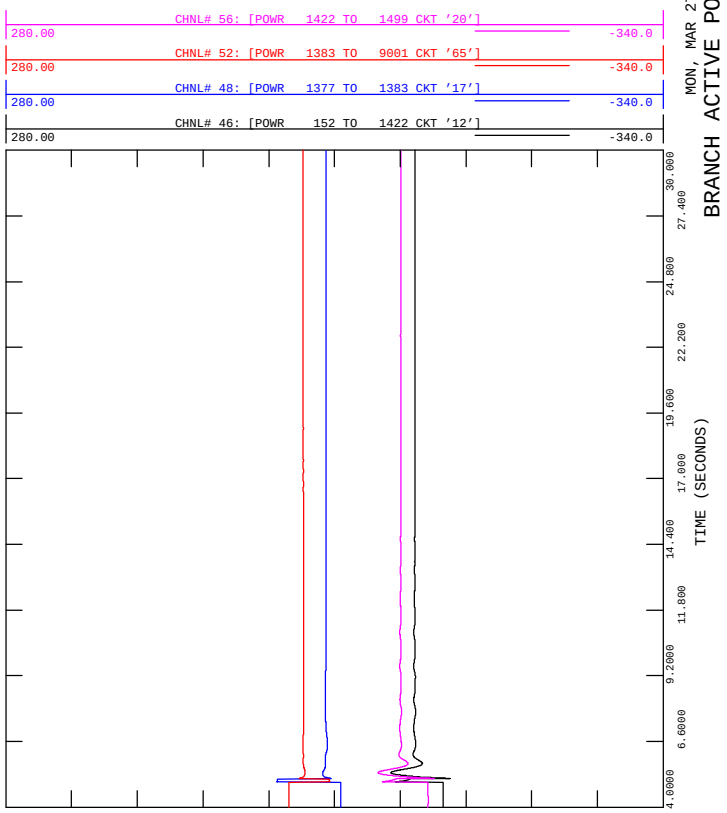


FIGURE F-12E
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-12_7L115_Kinsella.out

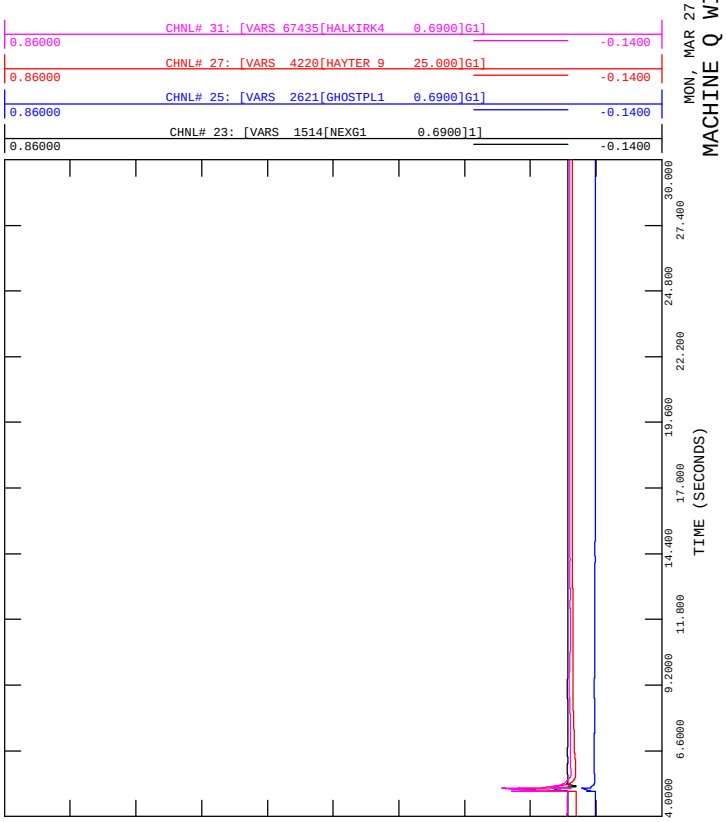


FIGURE F-12G
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-12_7L115_Kinsella.out

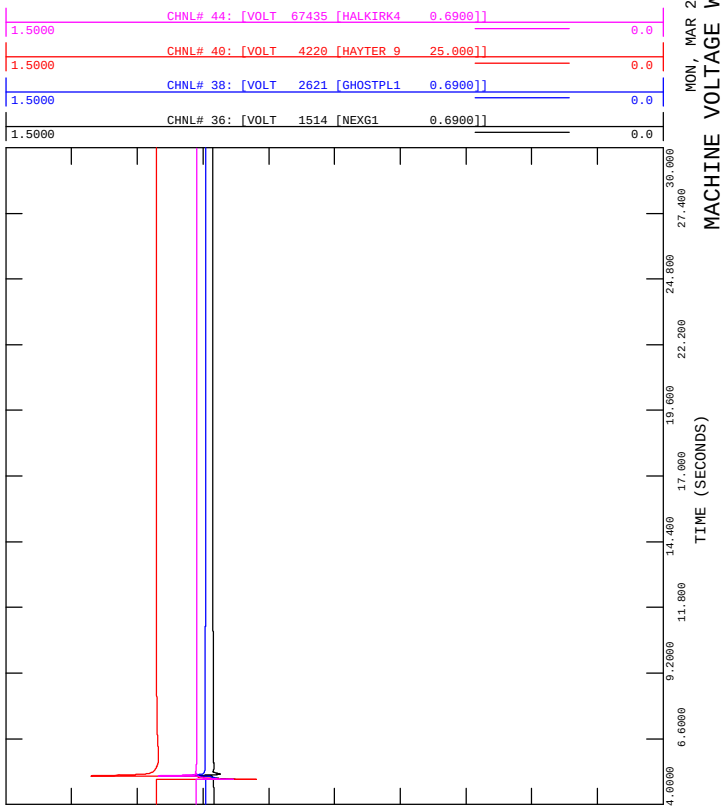


FIGURE F-12I
2017SP, ALT2
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-12_7L115_Kinsella.out

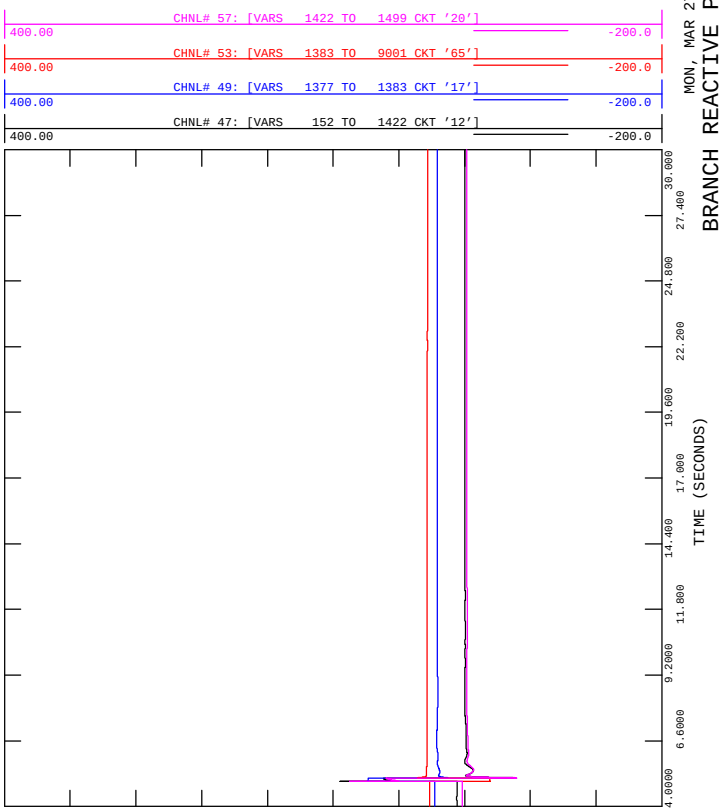


FIGURE F-13B
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-13_7L117_IrishCreek.out

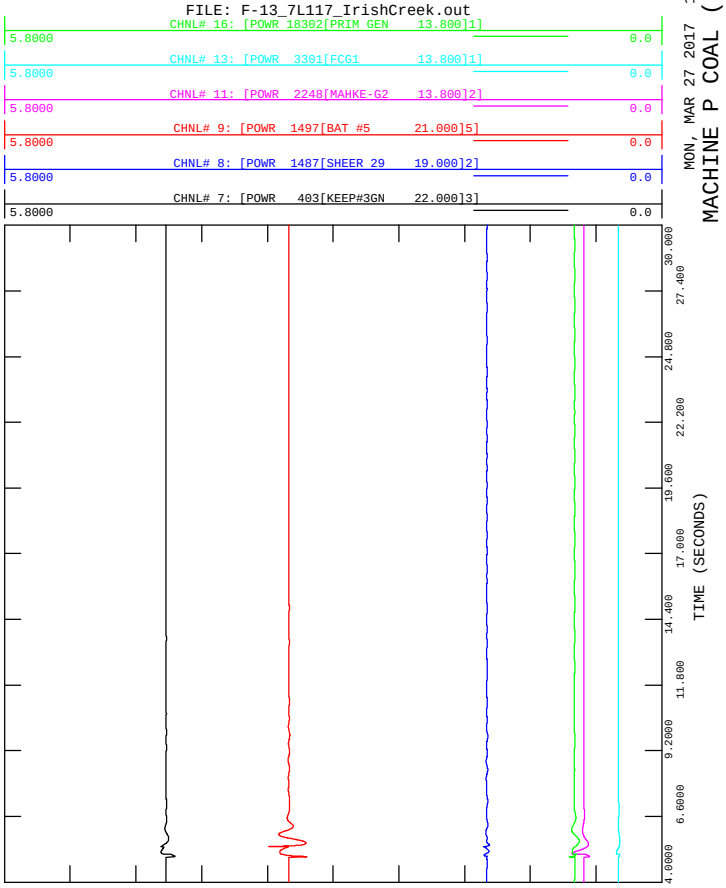


FIGURE F-13D
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-13_7L117_IrishCreek.out

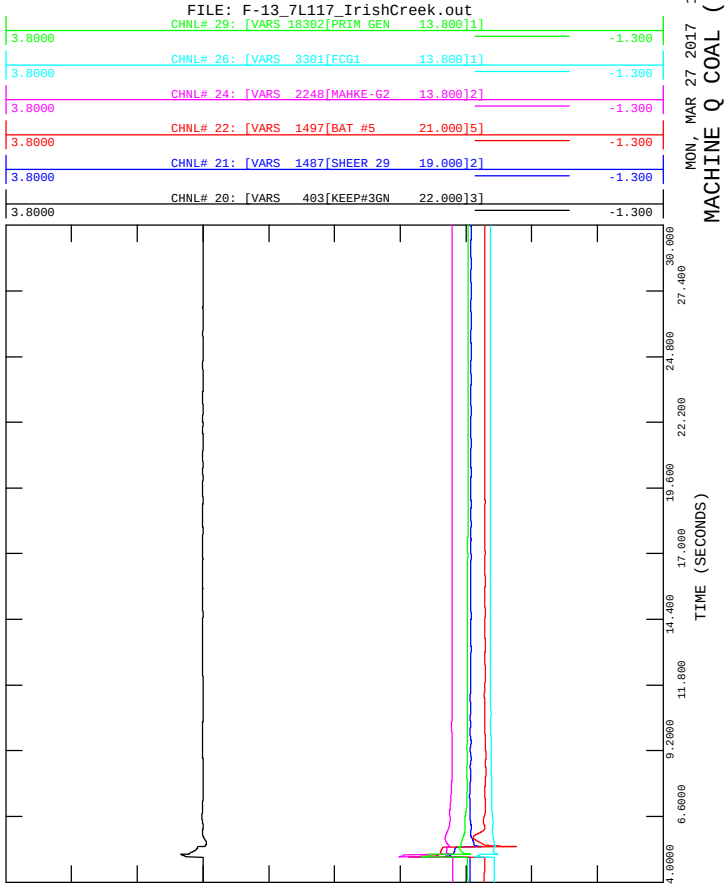


FIGURE F-13A
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-13_7L117_IrishCreek.out

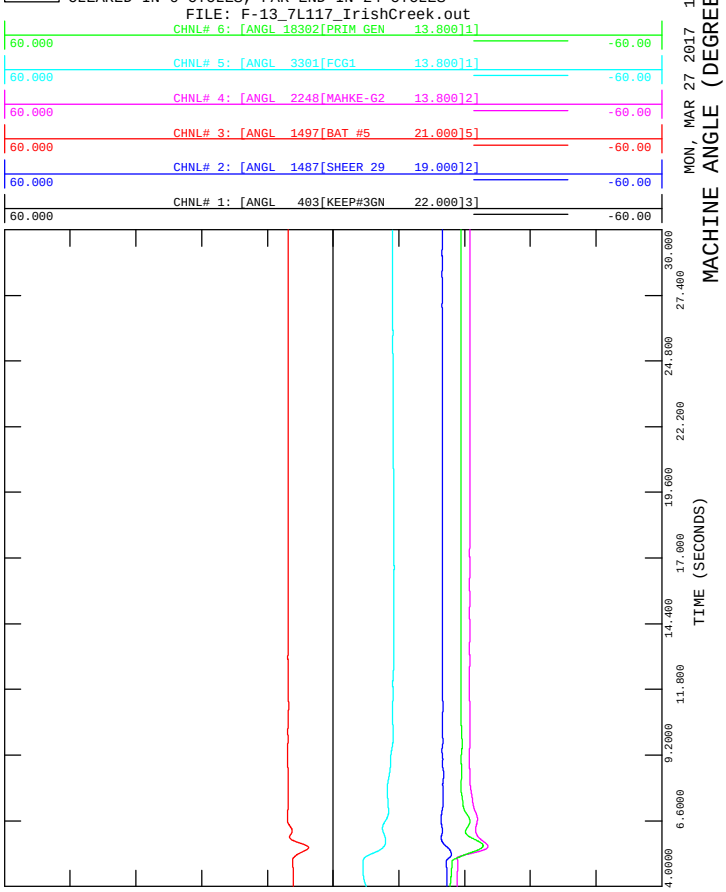


FIGURE F-13C
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-13_7L117_IrishCreek.out

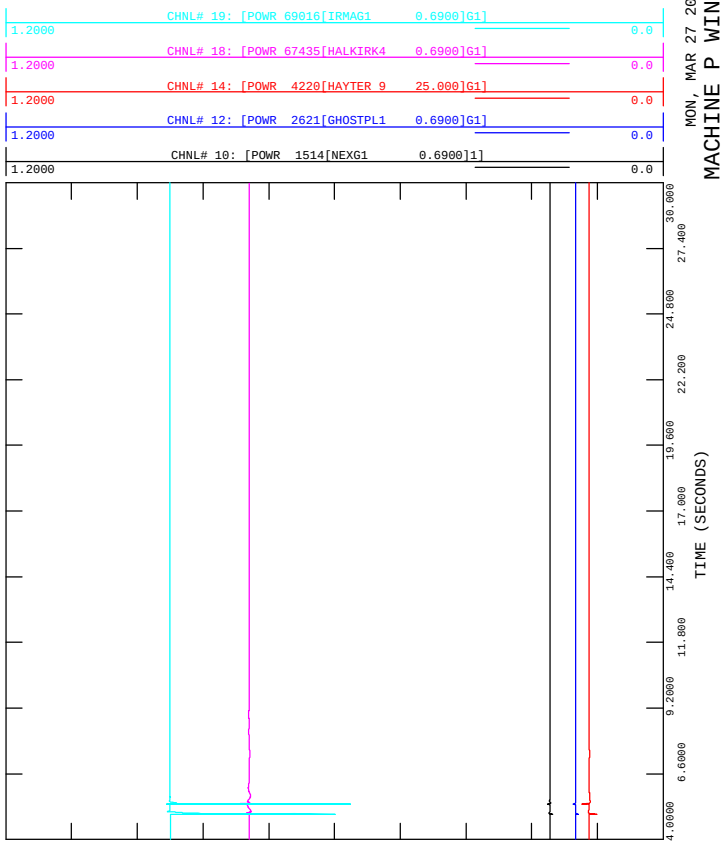


FIGURE F-13F
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-13_7L117_IrishCreek.out

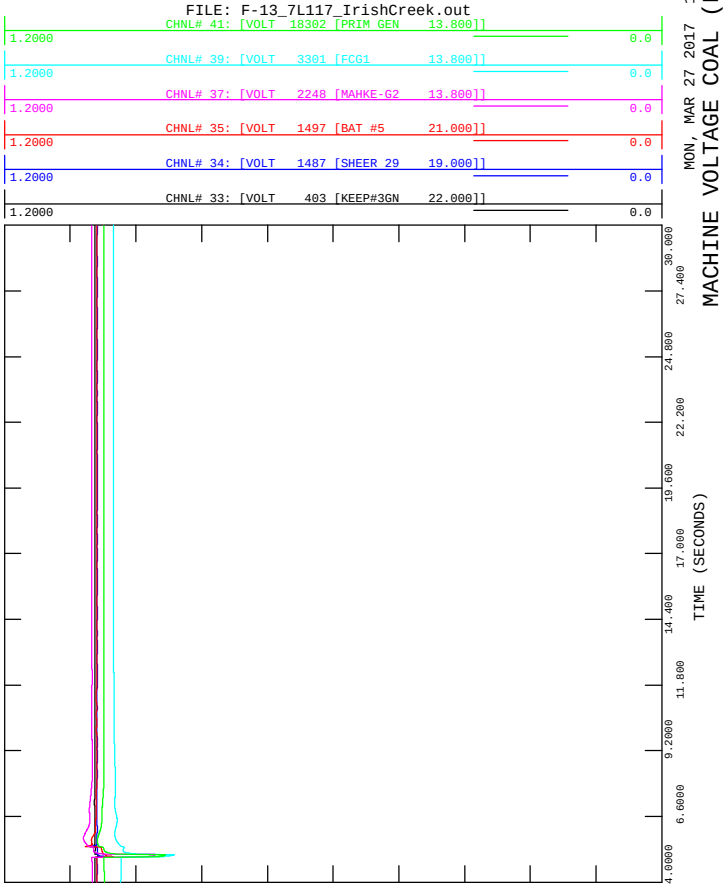


FIGURE F-13H
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-13_7L117_IrishCreek.out

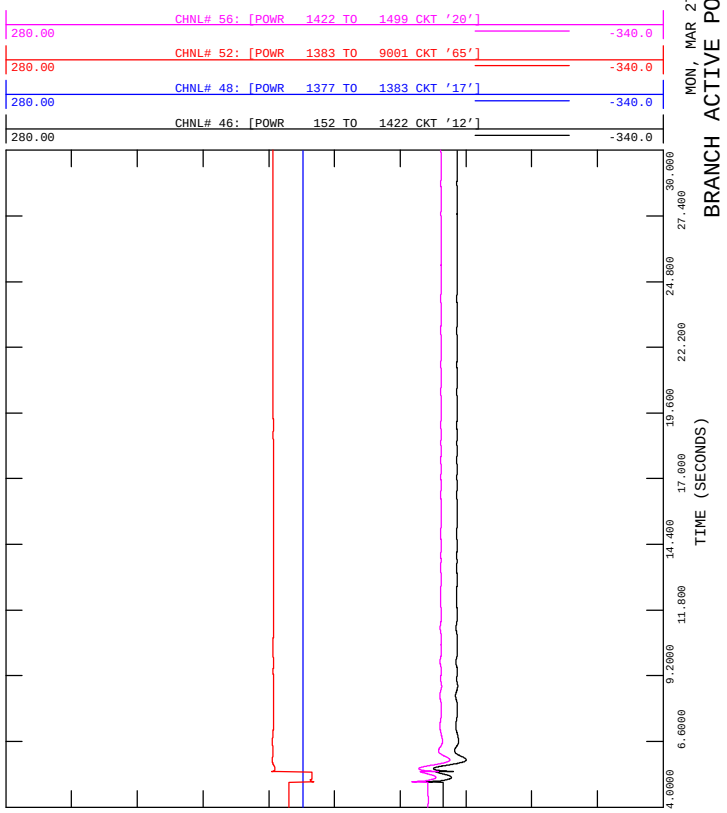


FIGURE F-13E
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-13_7L117_IrishCreek.out

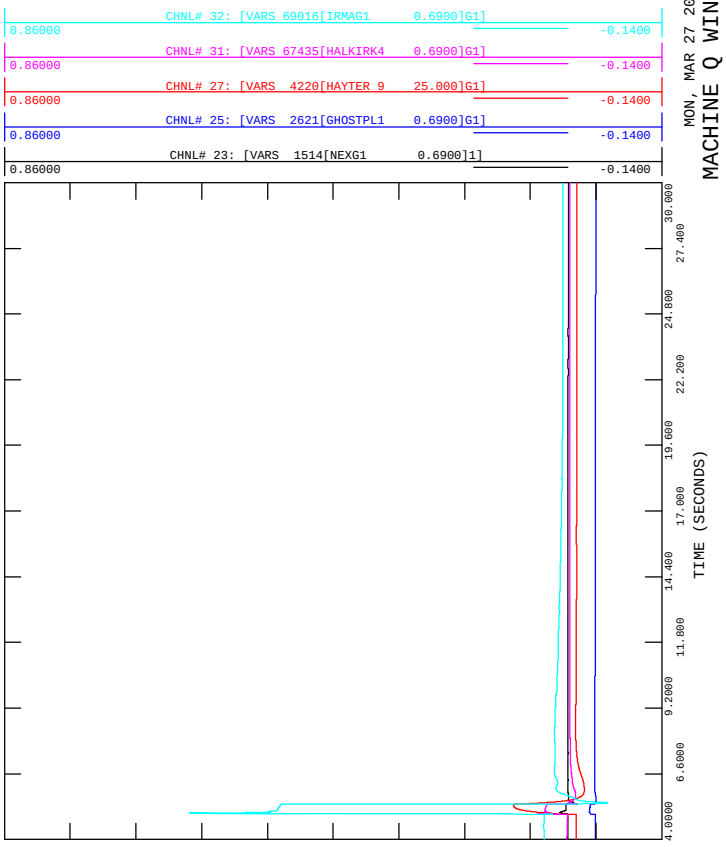


FIGURE F-13G
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-13_7L117_IrishCreek.out

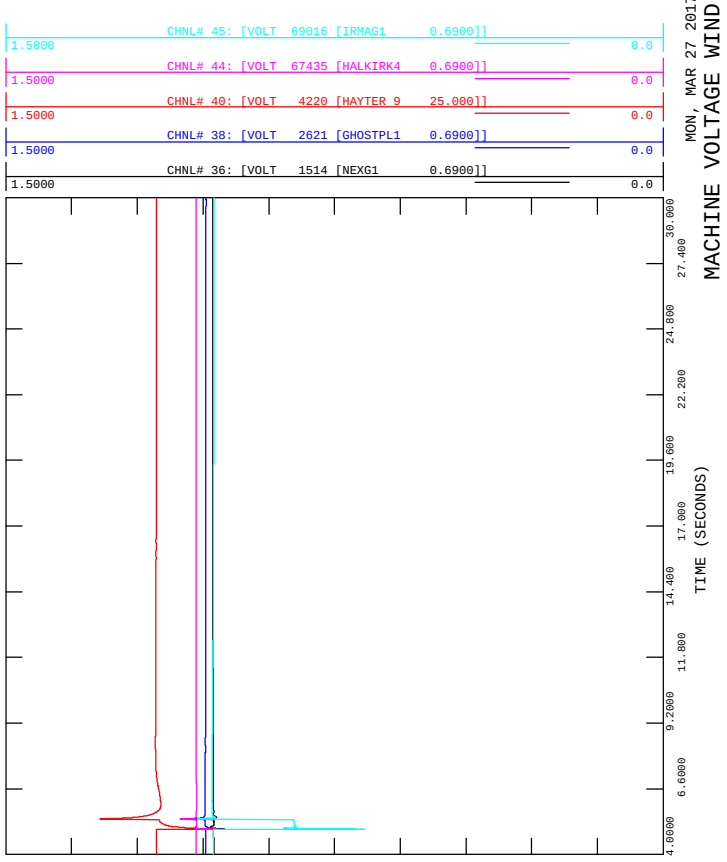


FIGURE F-13I
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-13_7L117_IrishCreek.out

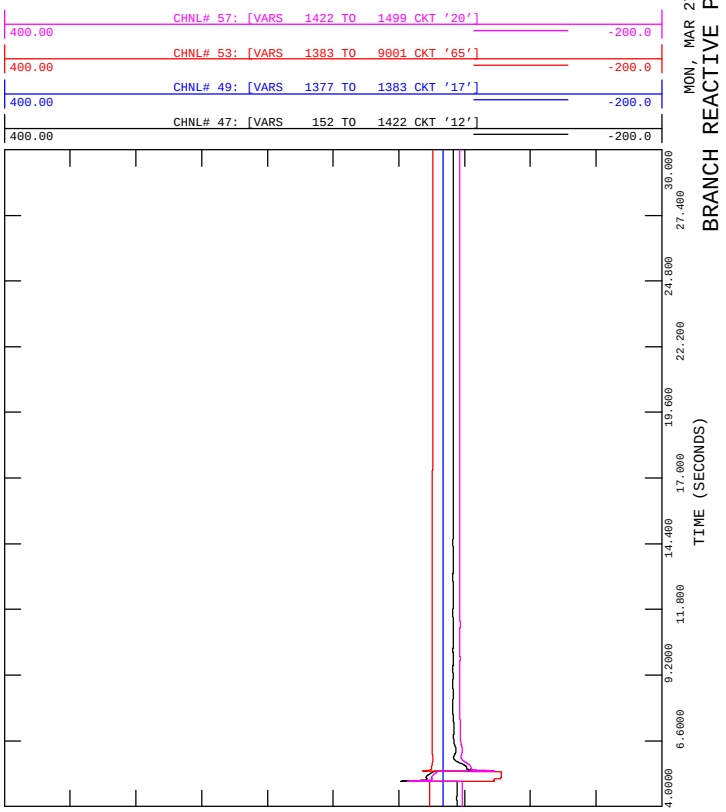


FIGURE F-14B
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-14_7L117_Vermillion.out

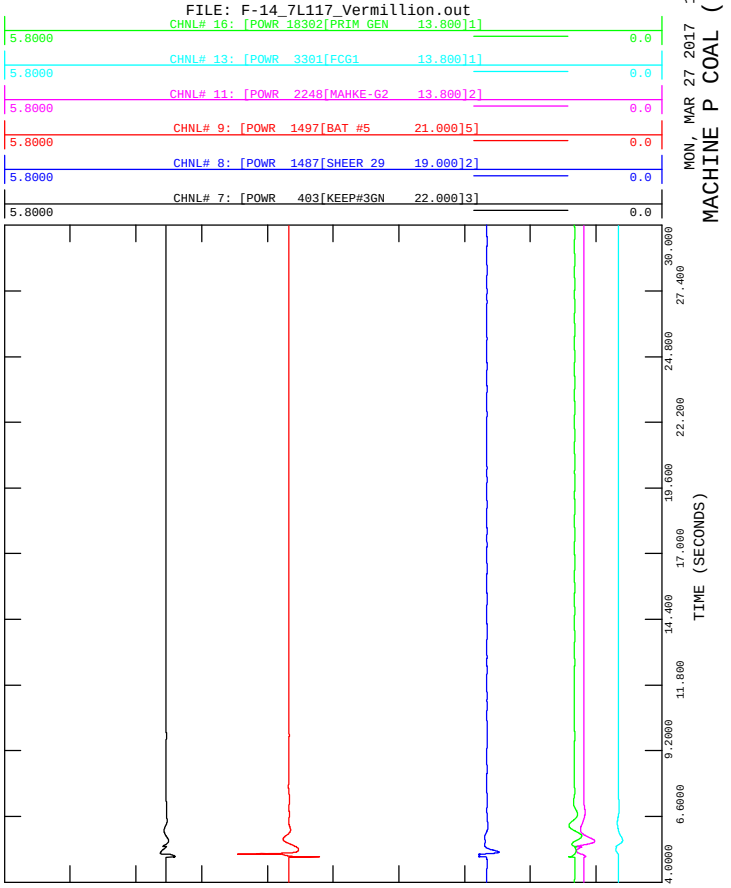


FIGURE F-14D
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-14_7L117_Vermillion.out

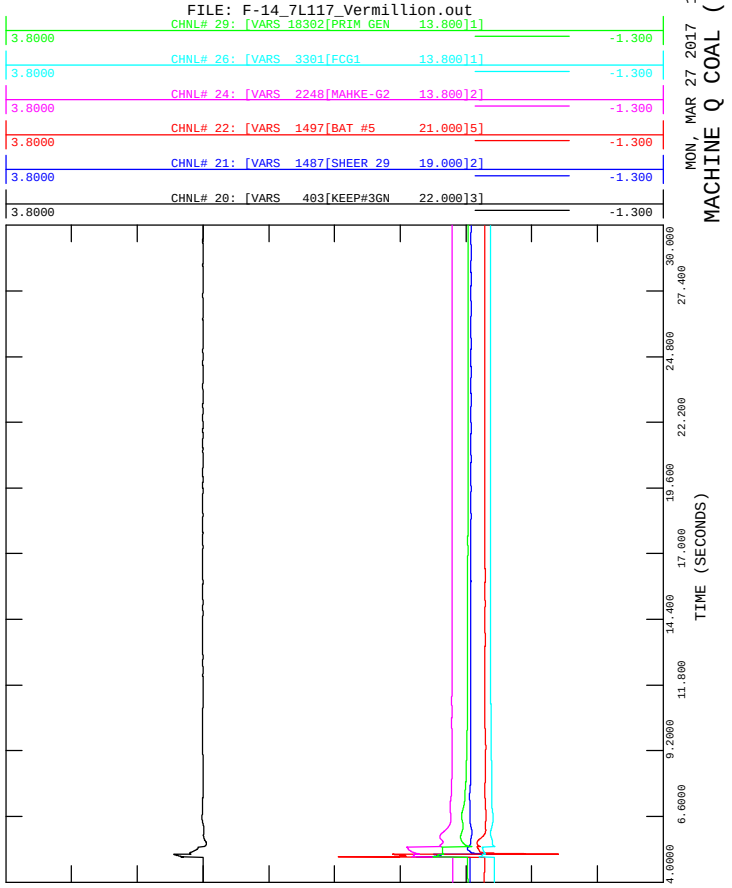


FIGURE F-14A
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-14_7L117_Vermillion.out

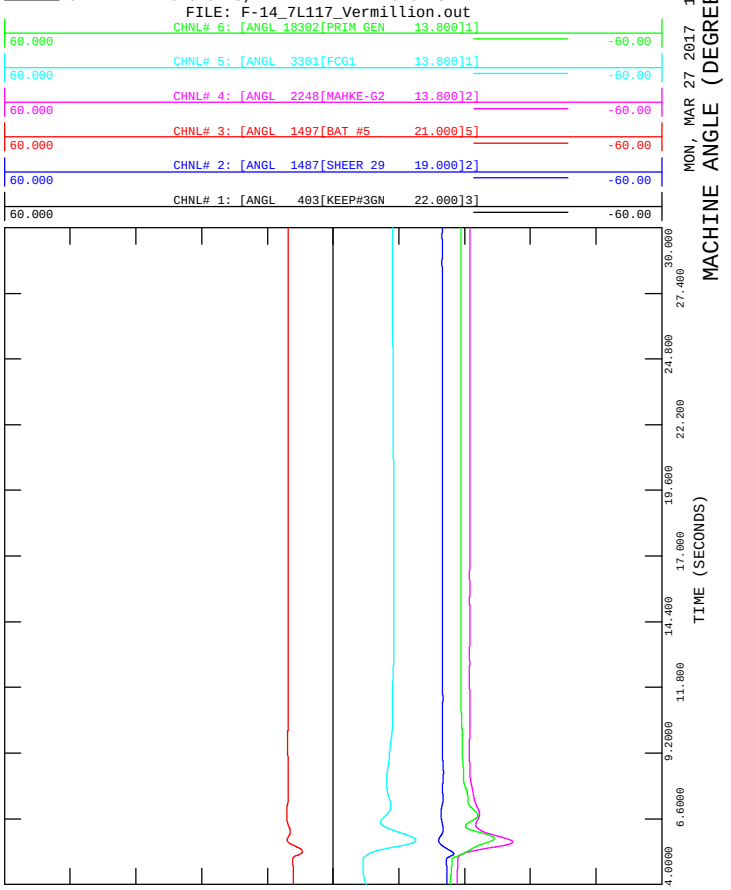


FIGURE F-14C
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-14_7L117_Vermillion.out

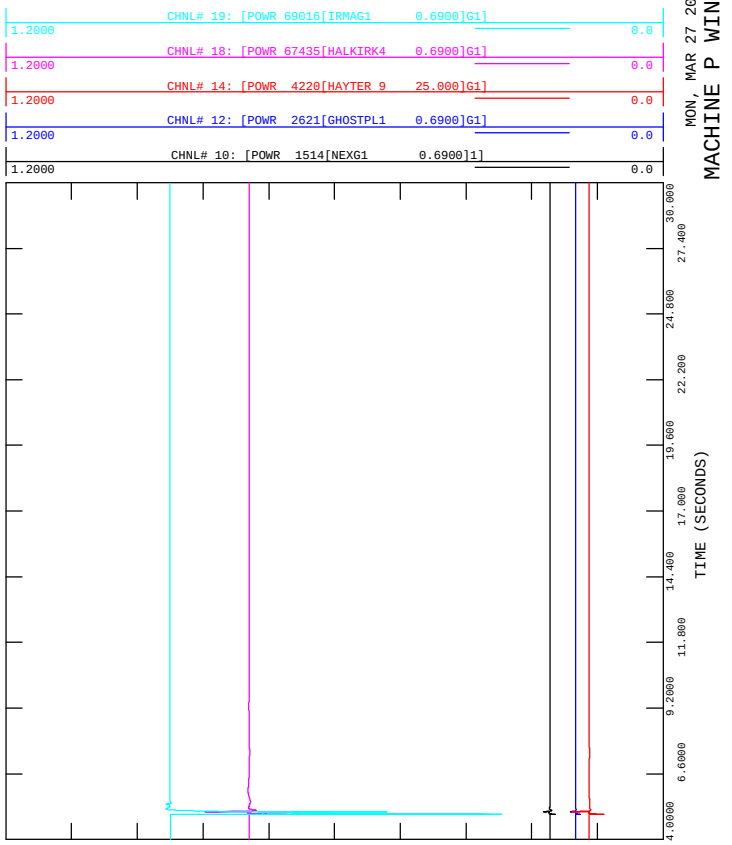


FIGURE F-14F
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-14_7L117_Vermillion.out

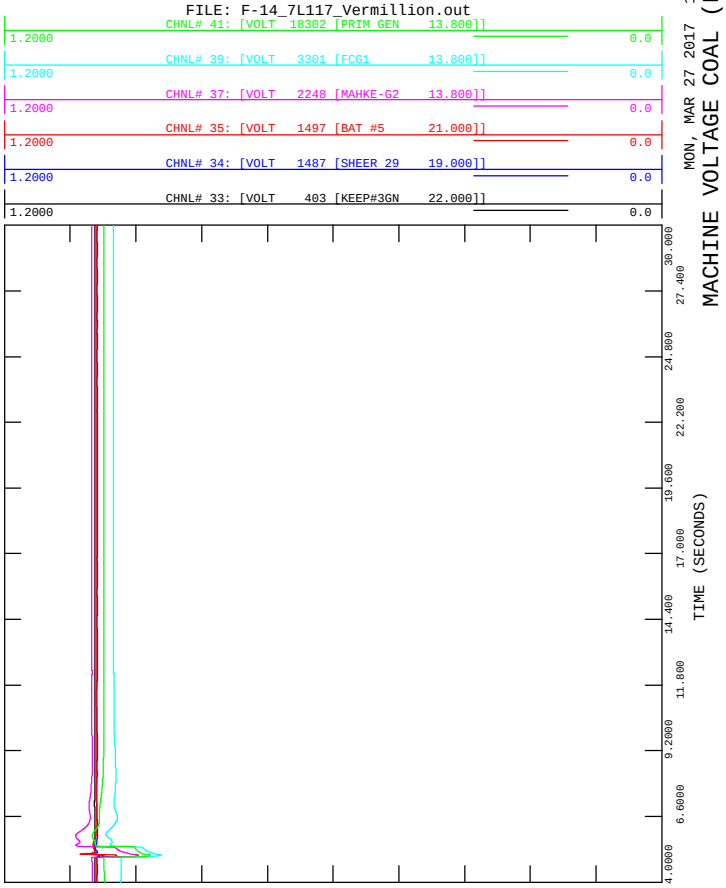


FIGURE F-14H
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-14_7L117_Vermillion.out

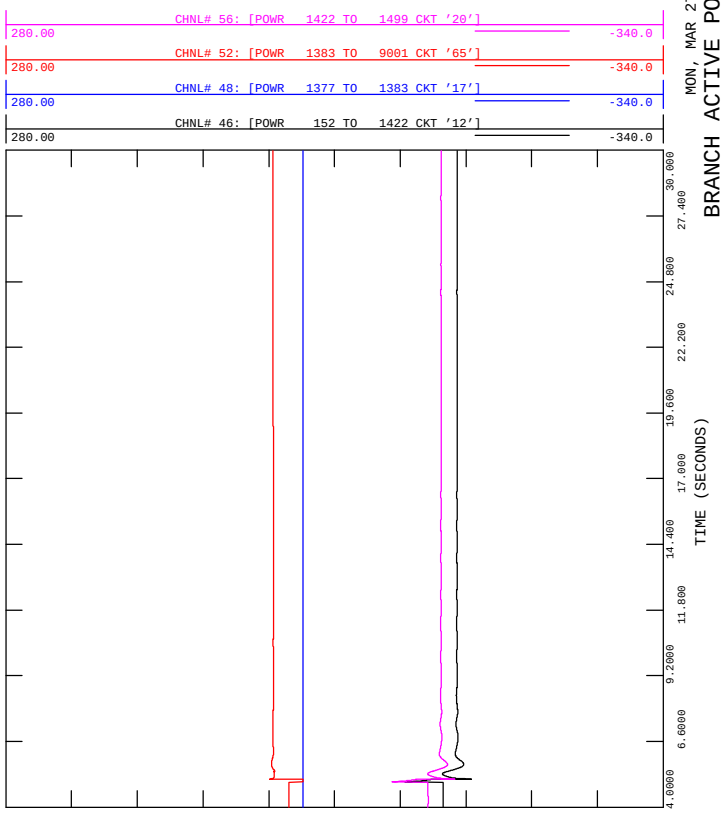


FIGURE F-14E
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-14_7L117_Vermillion.out

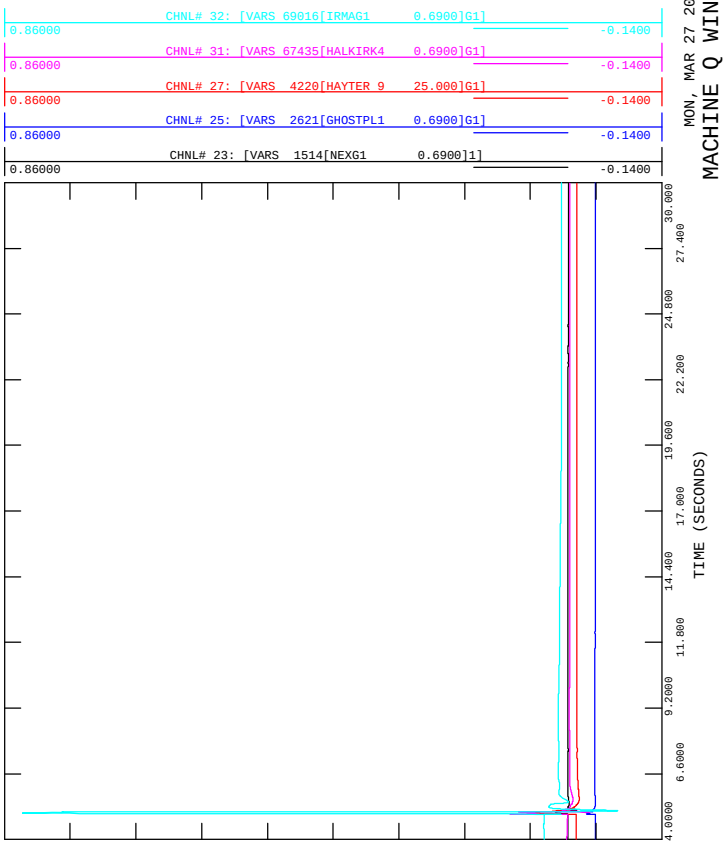


FIGURE F-14G
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-14_7L117_Vermillion.out

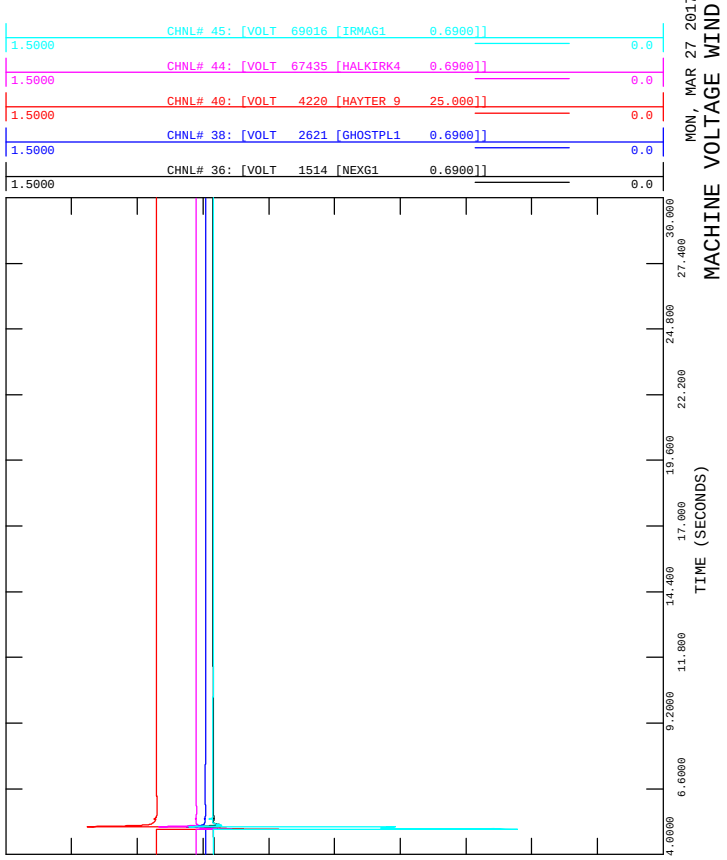


FIGURE F-14I
2017SP, ALT2
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-14_7L117_Vermillion.out

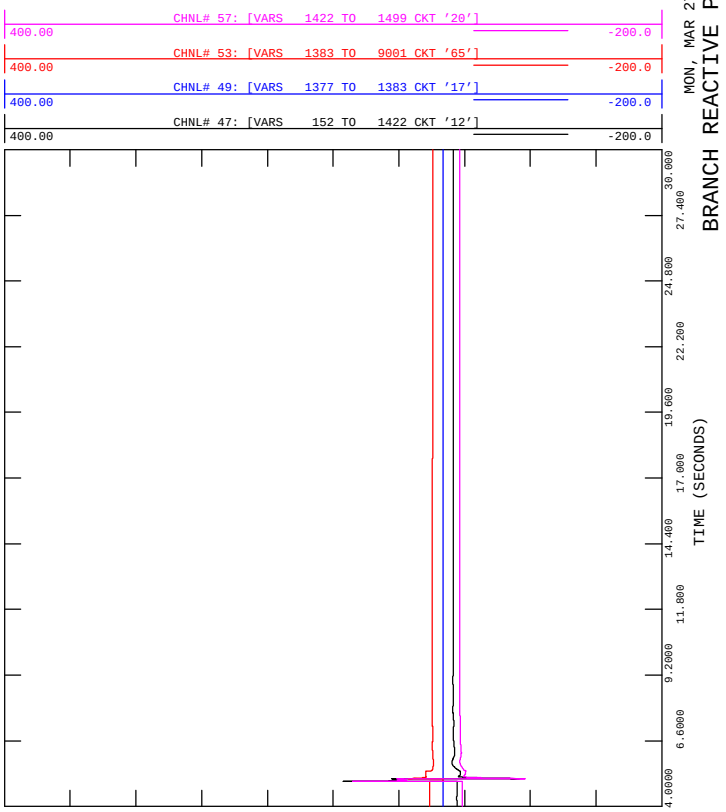


FIGURE F-15B
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15_7L129_Buffalo.out

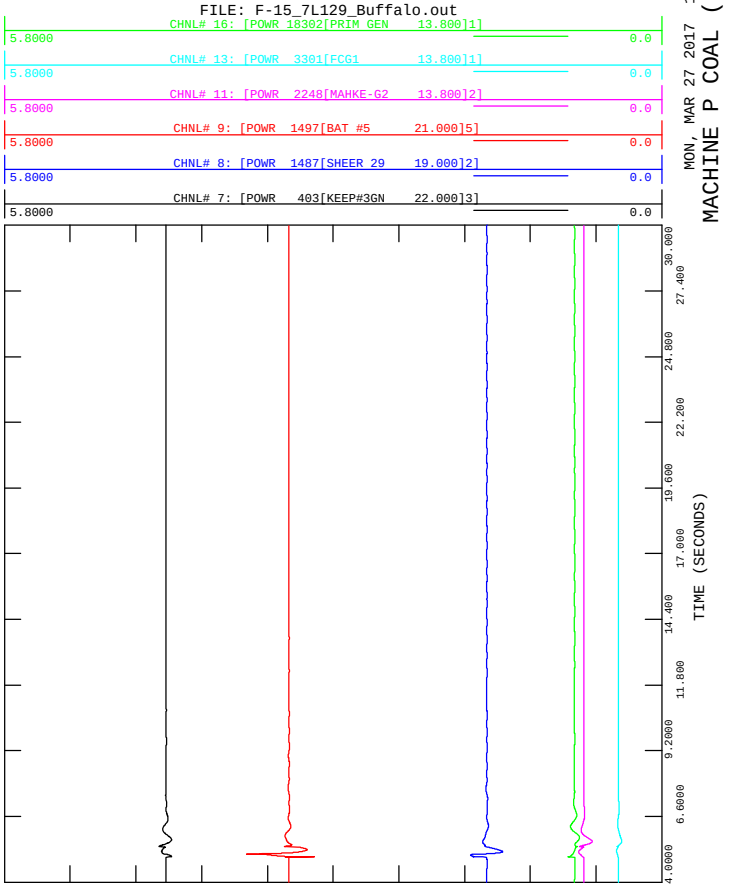


FIGURE F-15D
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15_7L129_Buffalo.out

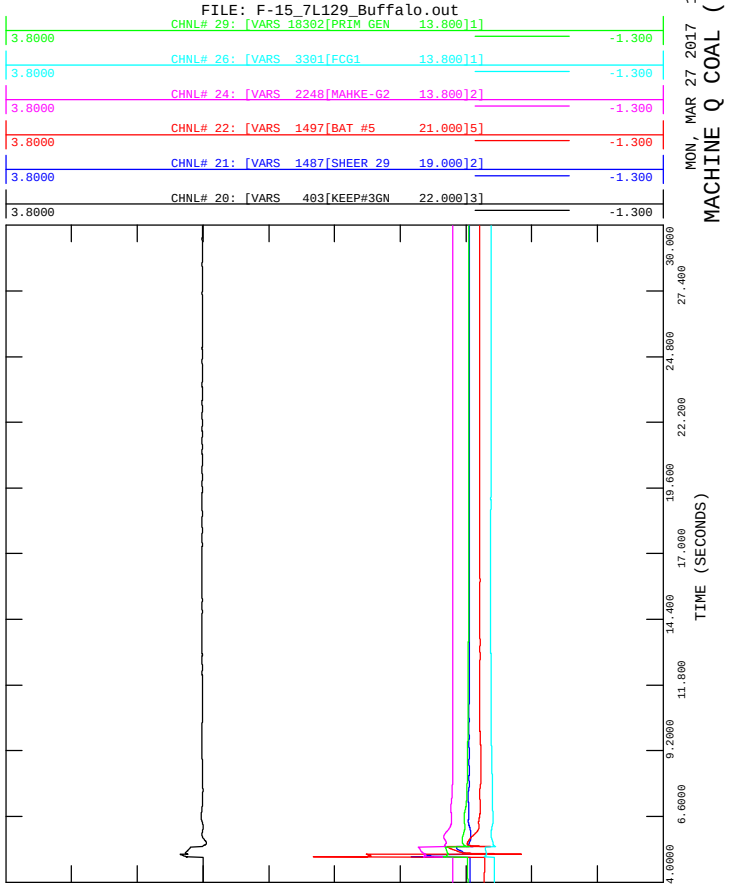


FIGURE F-15A
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15_7L129_Buffalo.out

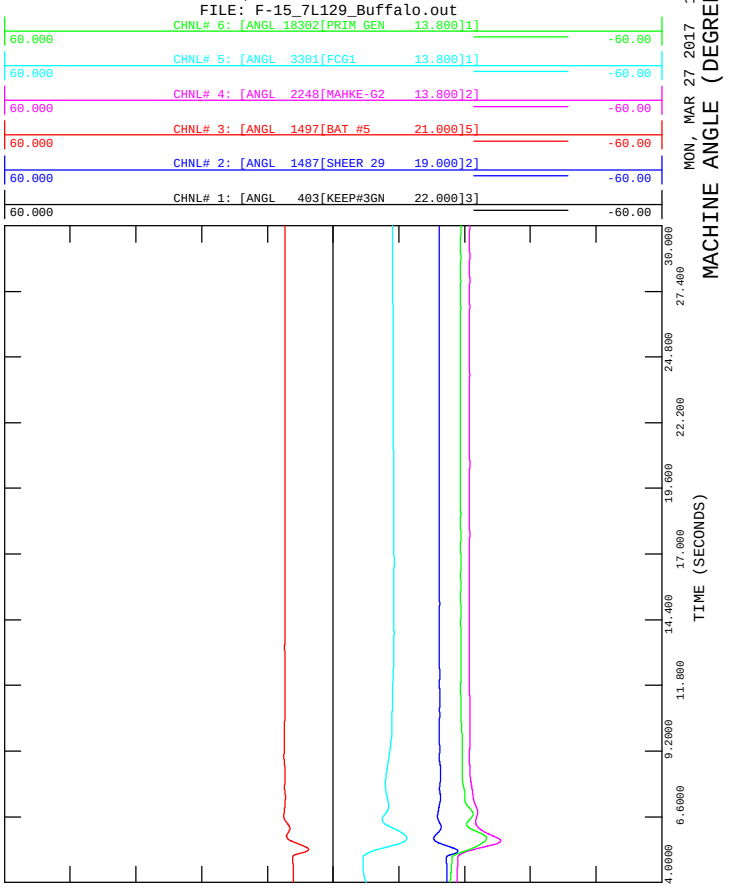


FIGURE F-15C
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15_7L129_Buffalo.out

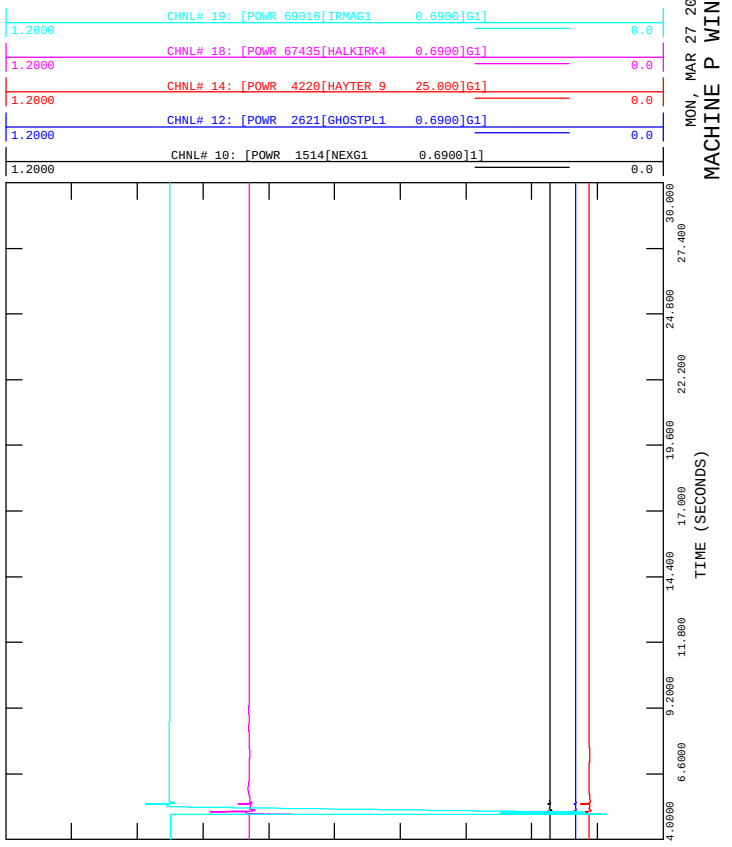


FIGURE F-15F
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15_7L129_Buffalo.out

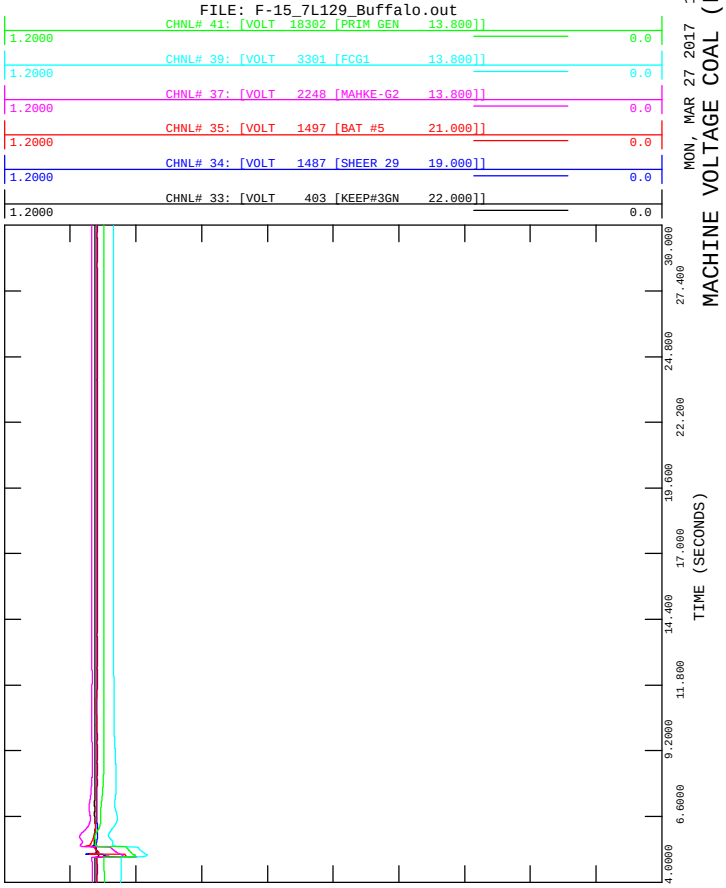


FIGURE F-15H
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15_7L129_Buffalo.out

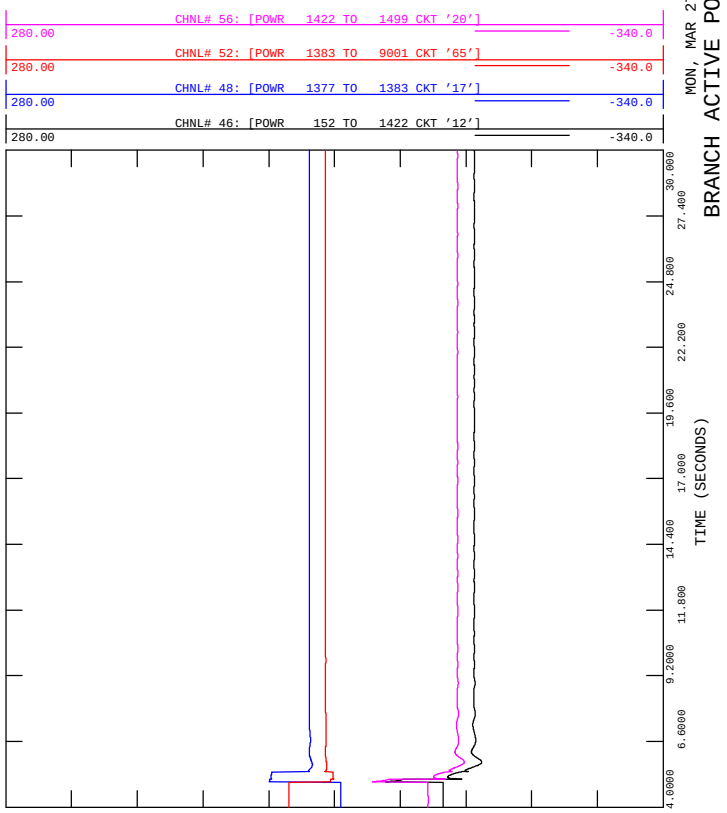


FIGURE F-15E
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15_7L129_Buffalo.out

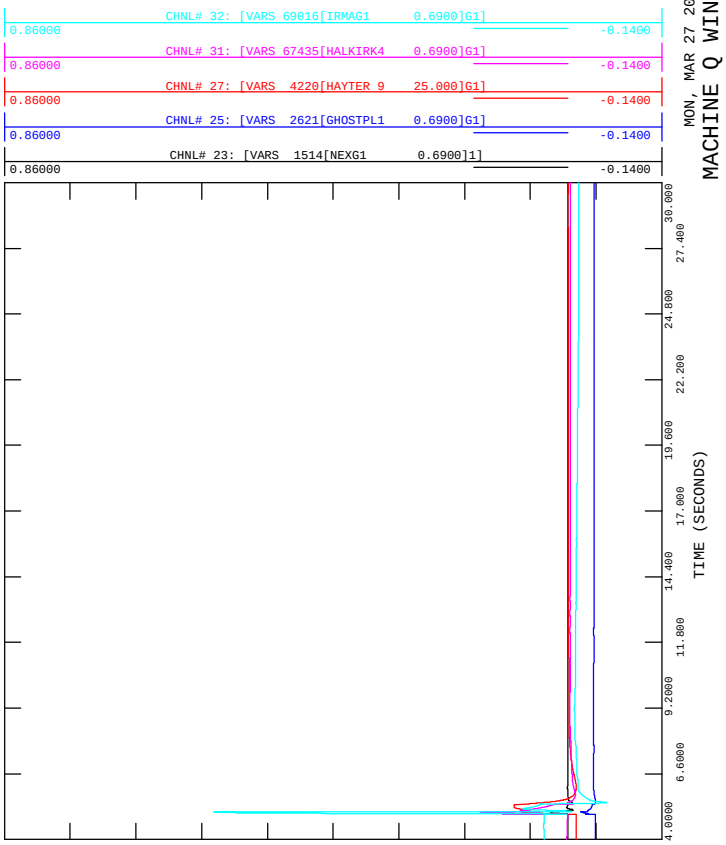


FIGURE F-15G
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15_7L129_Buffalo.out

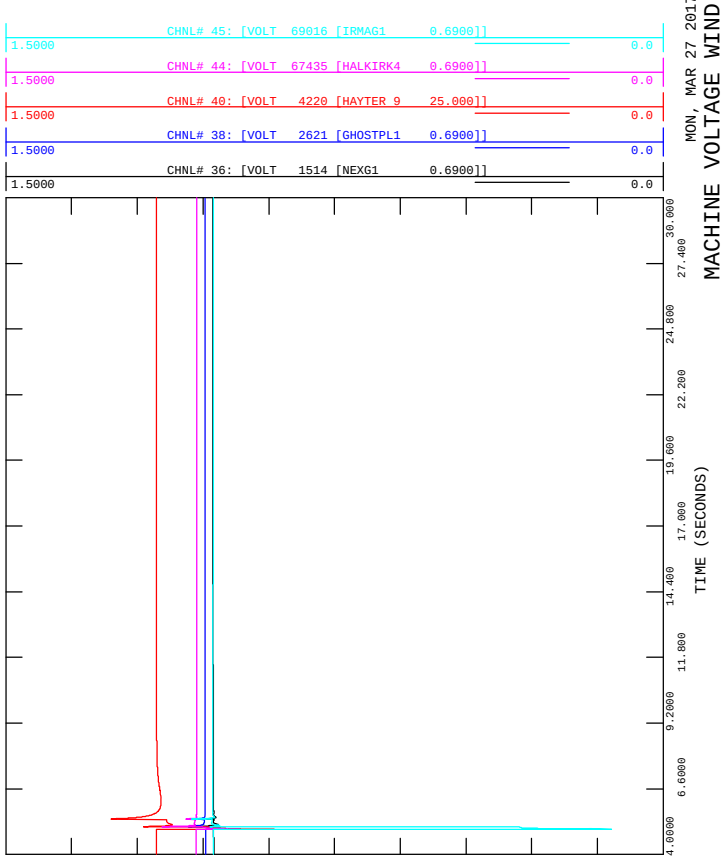


FIGURE F-15I
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15_7L129_Buffalo.out

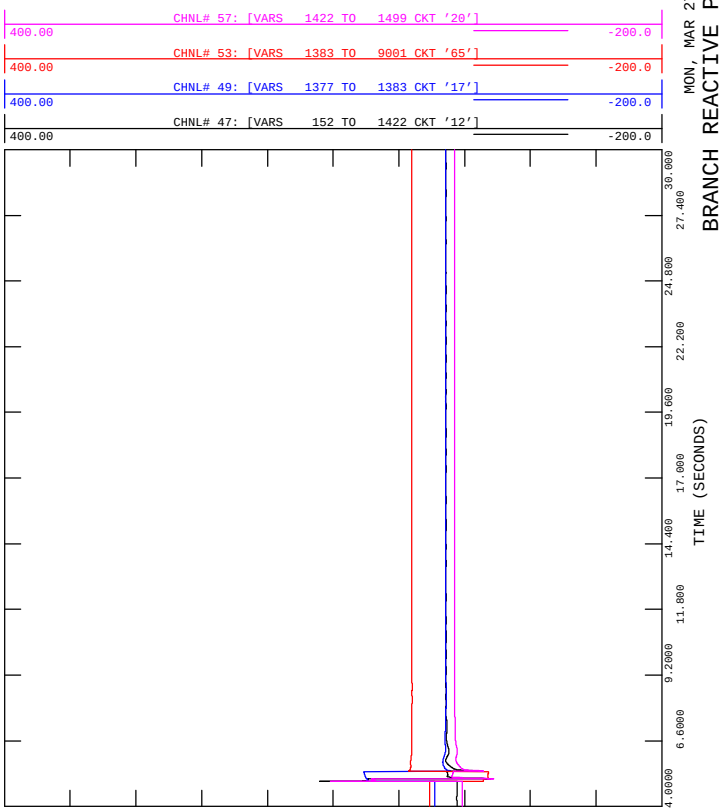


FIGURE F-16B
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-16_7L129_Vermilion.out

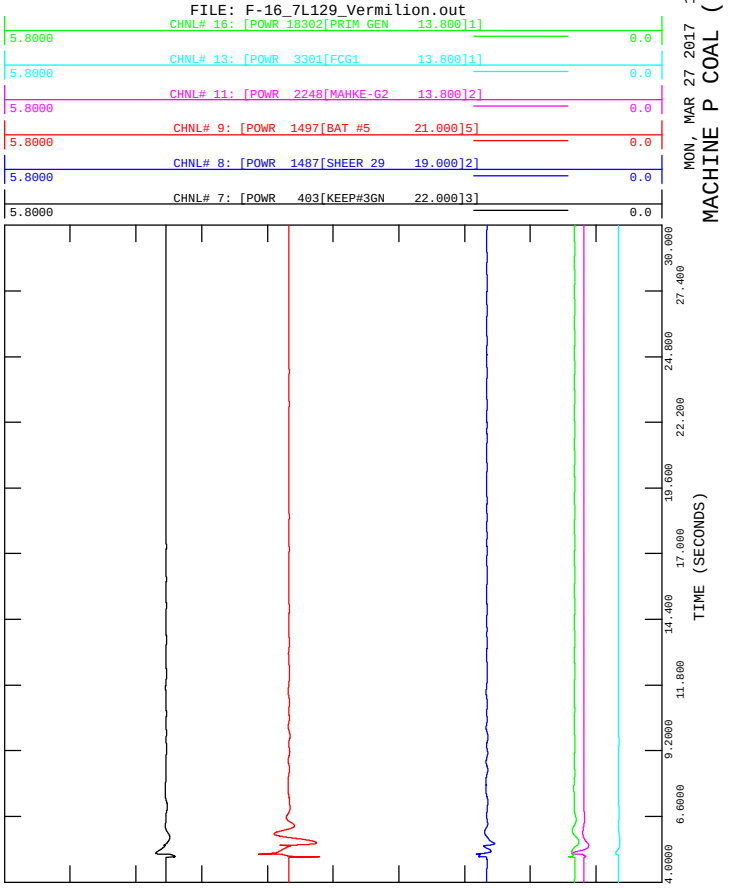


FIGURE F-16D
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-16_7L129_Vermilion.out

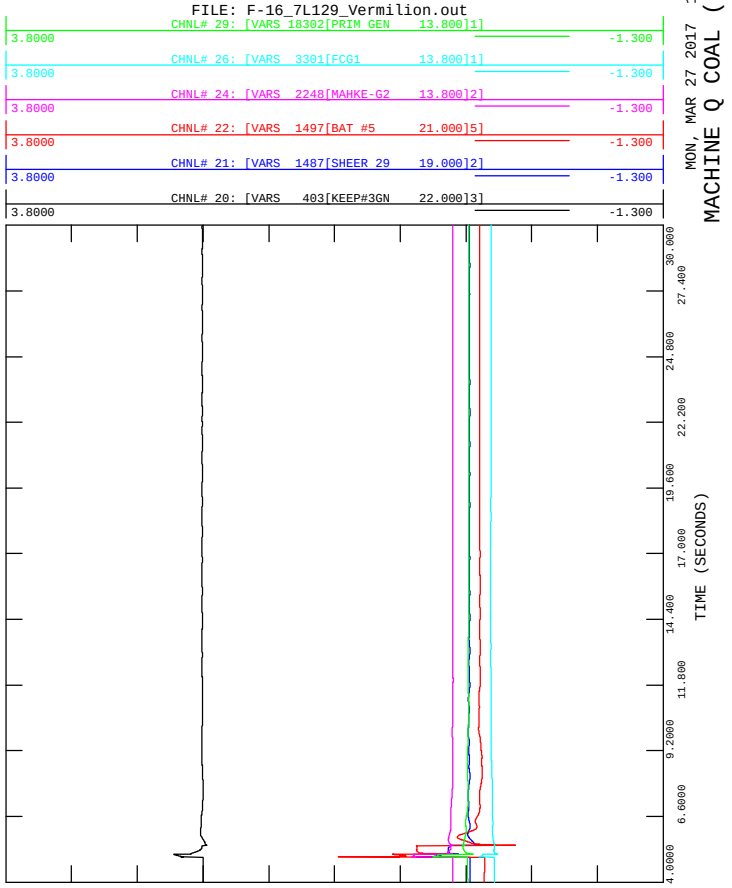


FIGURE F-16A
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-16_7L129_Vermilion.out

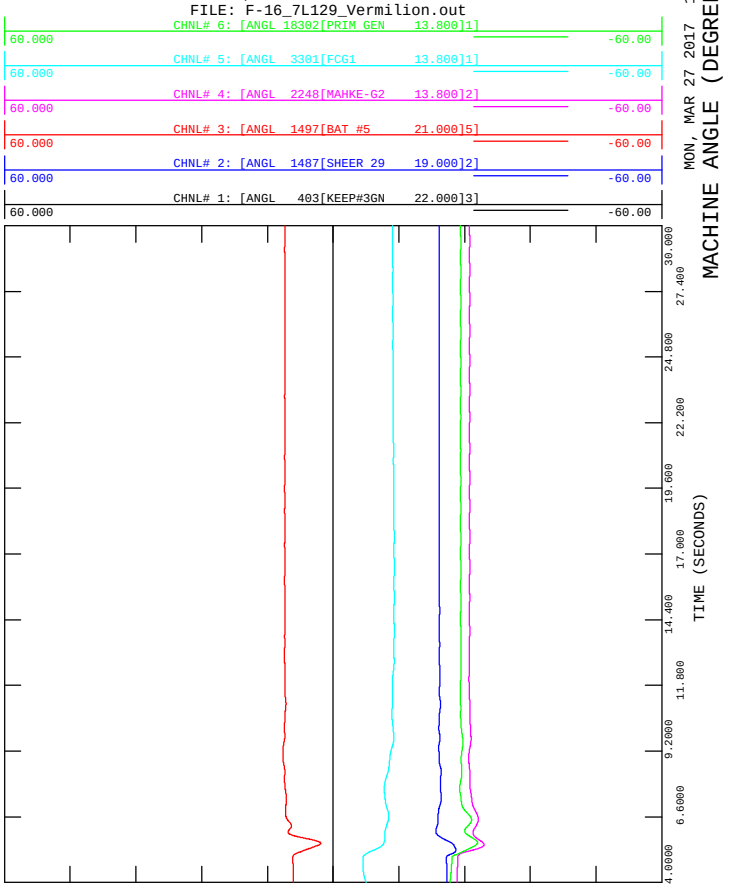


FIGURE F-16C
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-16_7L129_Vermilion.out

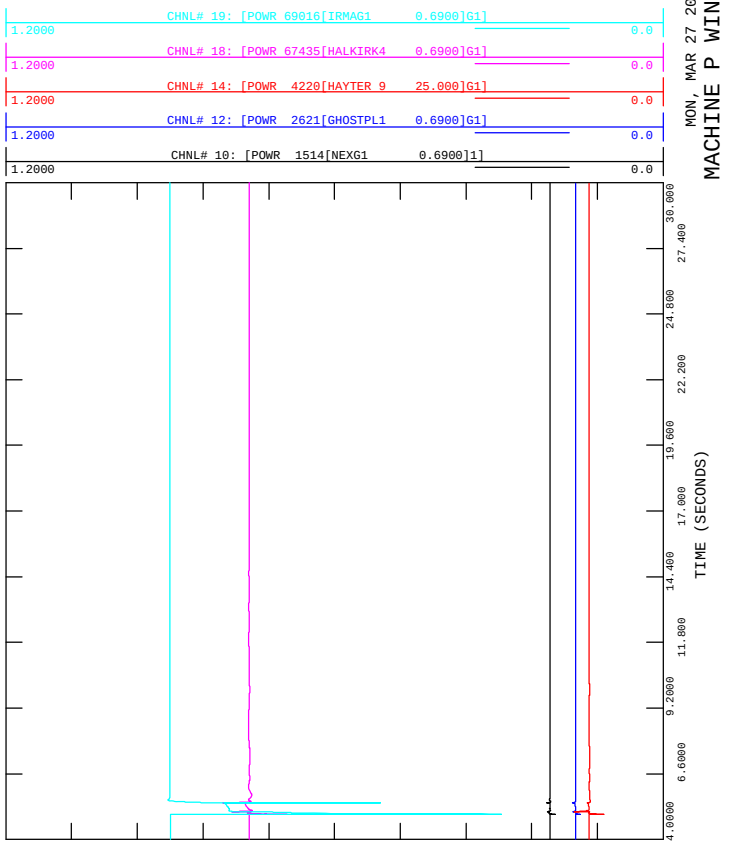


FIGURE F-16F
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-16_7L129_Vermilion.out

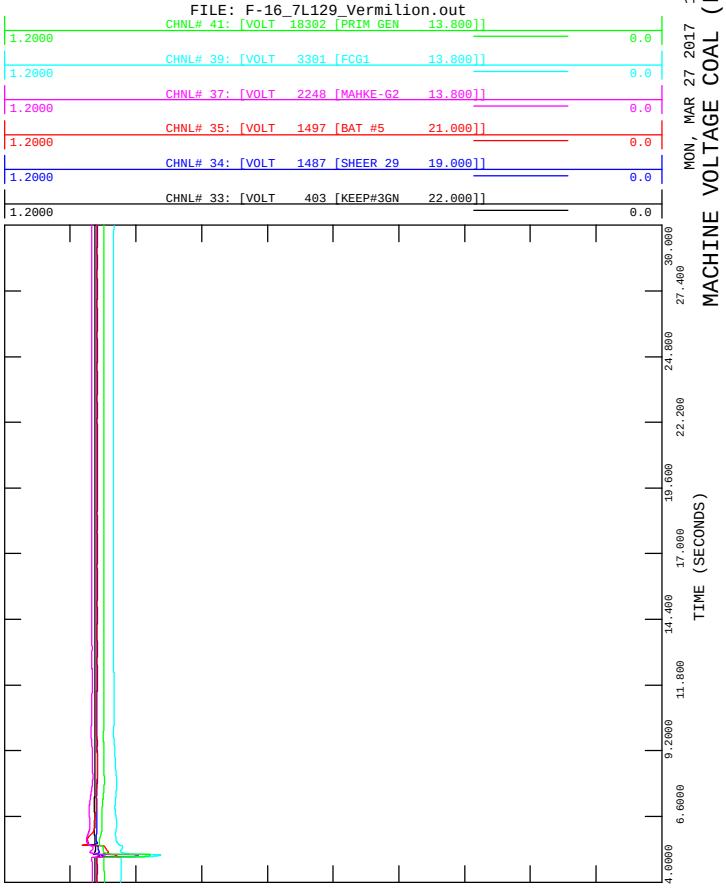


FIGURE F-16H
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-16_7L129_Vermilion.out

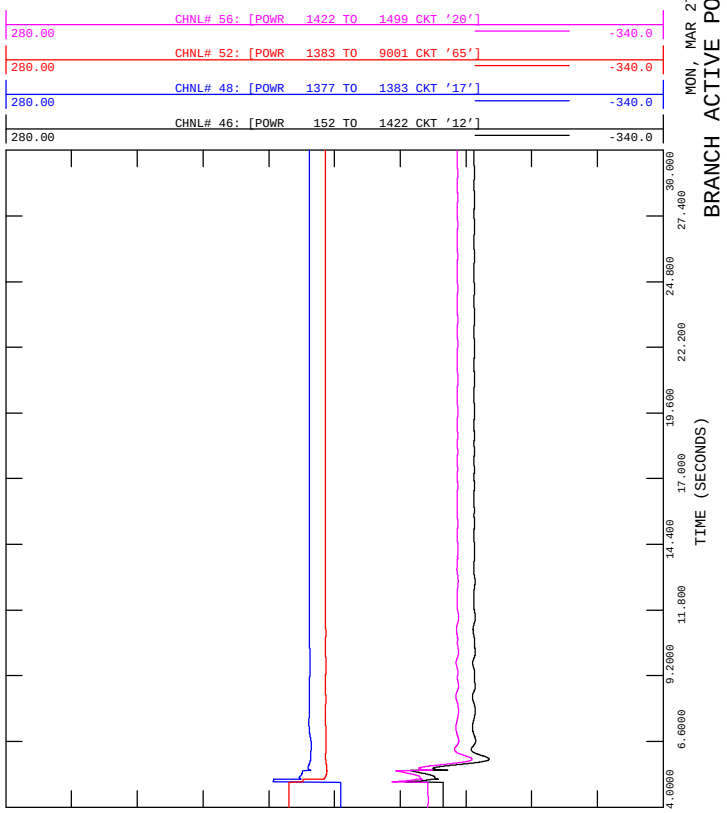


FIGURE F-16E
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-16_7L129_Vermilion.out

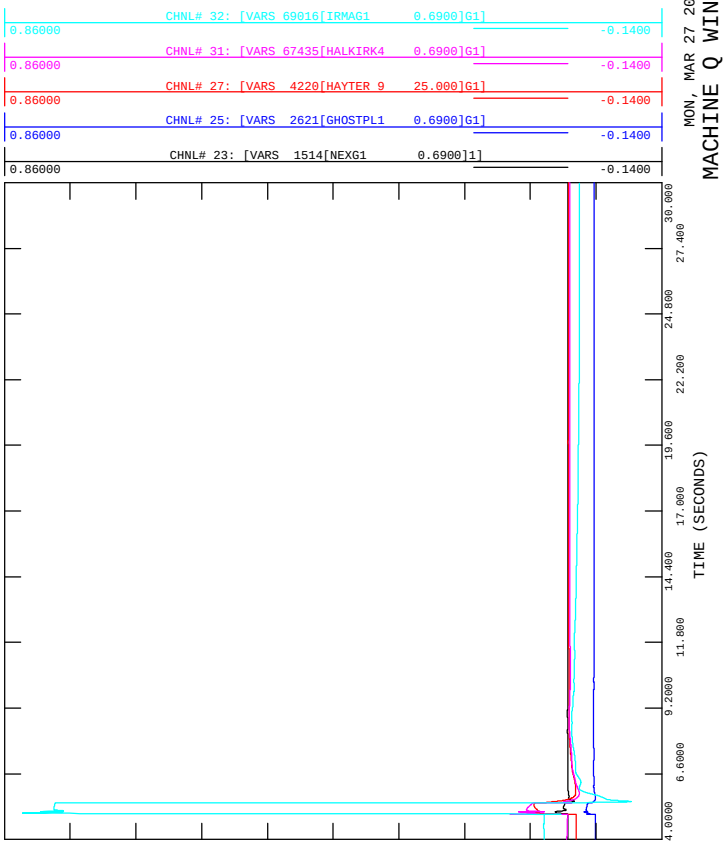


FIGURE F-16G
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-16_7L129_Vermilion.out

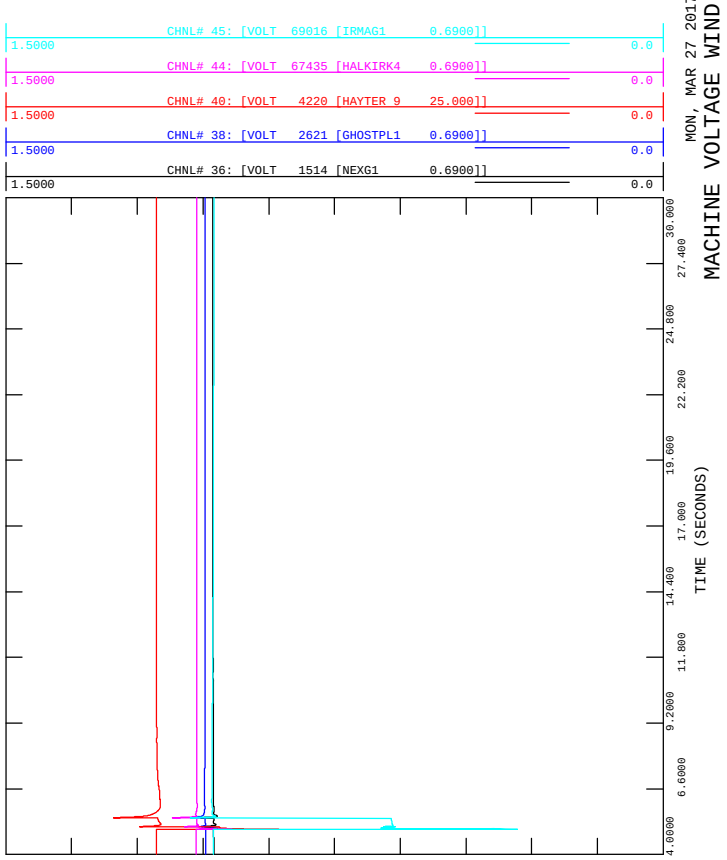


FIGURE F-16I
2017SP, ALT2
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-16_7L129_Vermilion.out

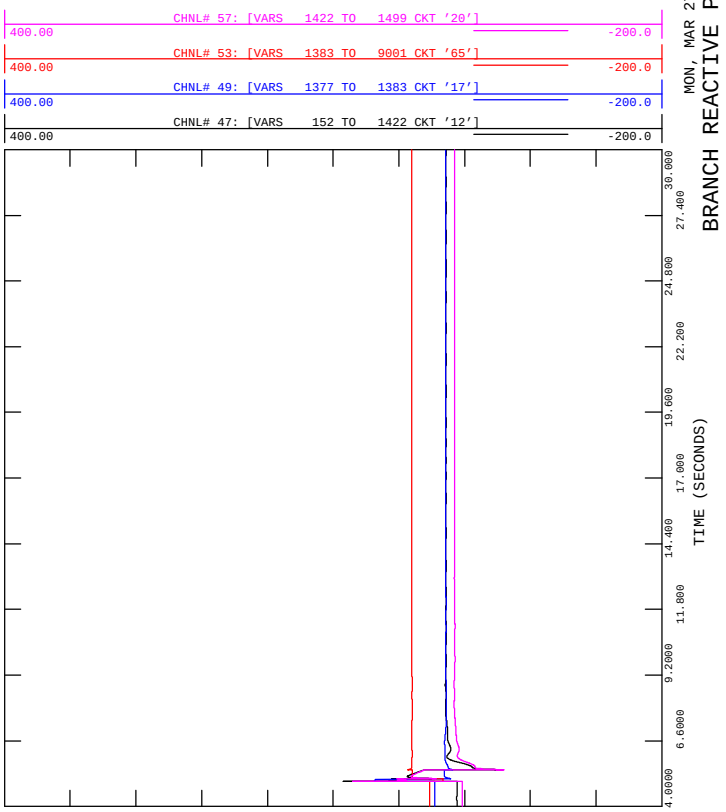


FIGURE F-17B
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: F-17_7L701_BattleRiver.out

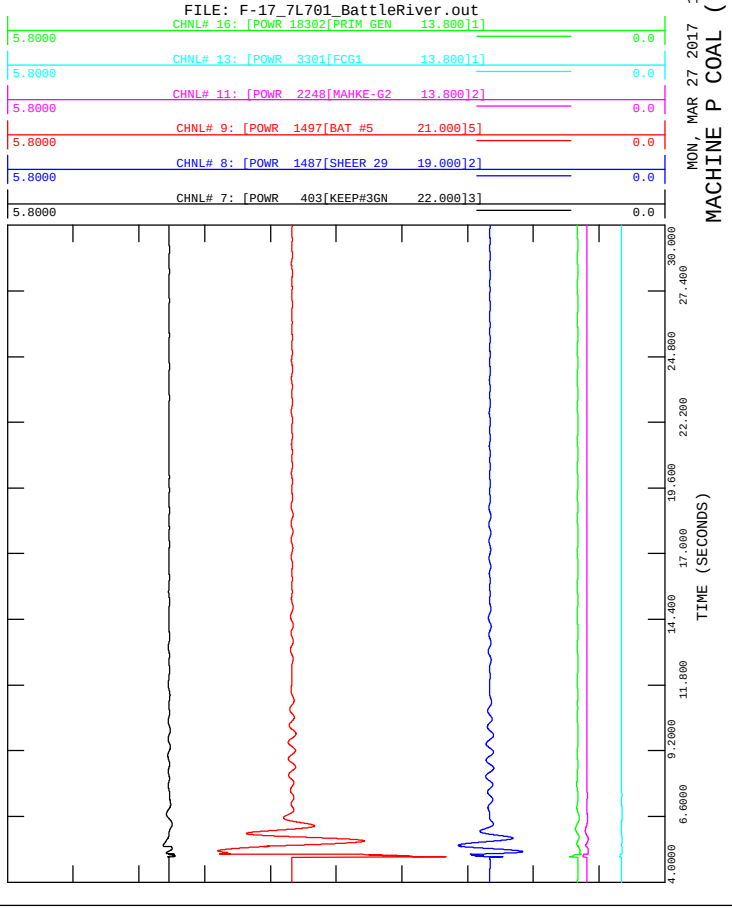


FIGURE F-17D
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: F-17_7L701_BattleRiver.out

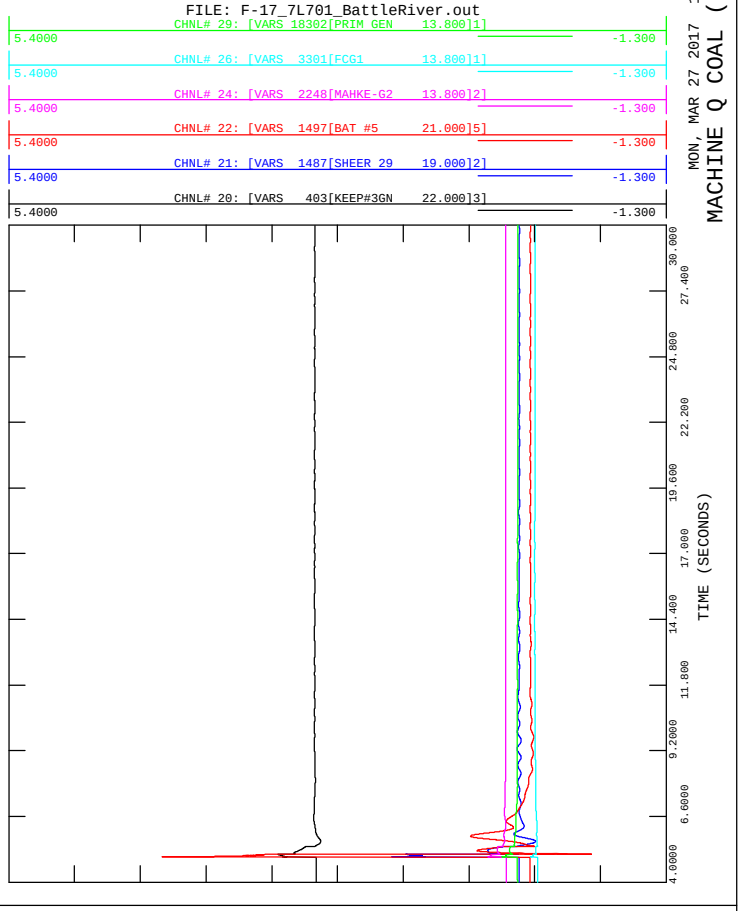


FIGURE F-17A
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: F-17_7L701_BattleRiver.out

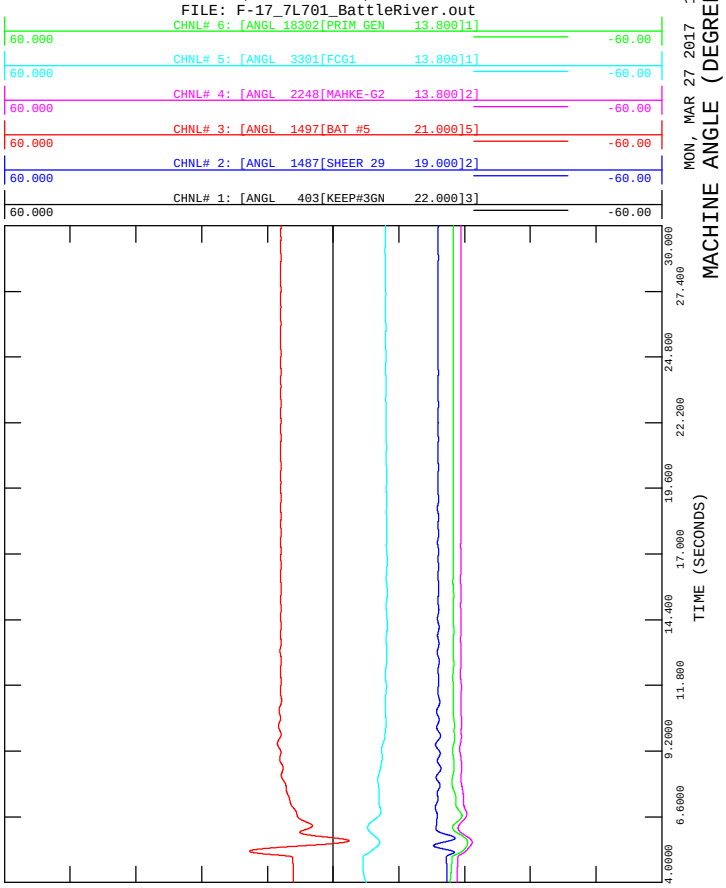


FIGURE F-17C
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: F-17_7L701_BattleRiver.out

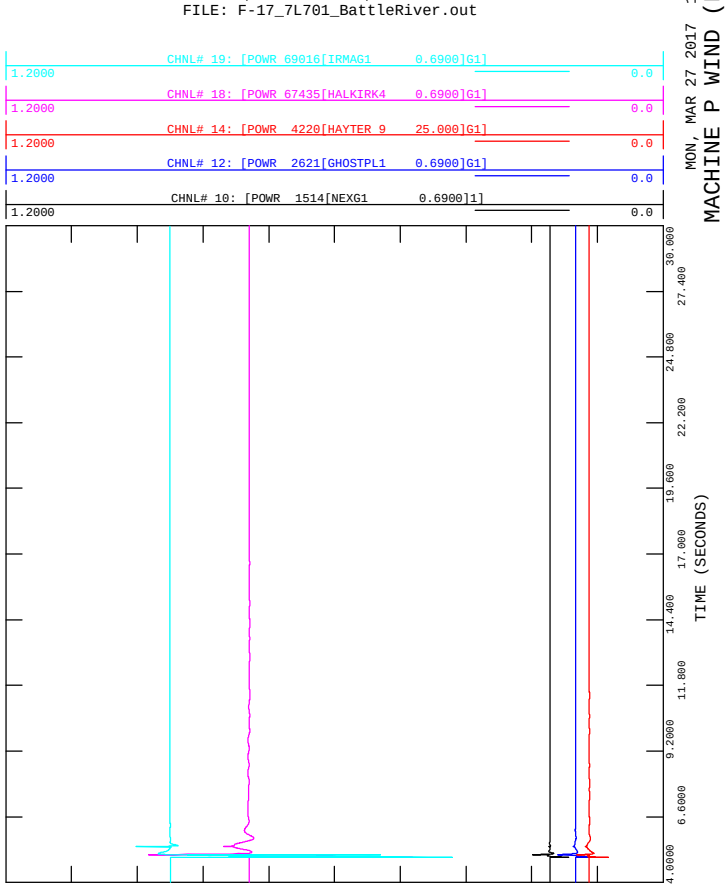


FIGURE F-17F
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: F-17_7L701_BattleRiver.out

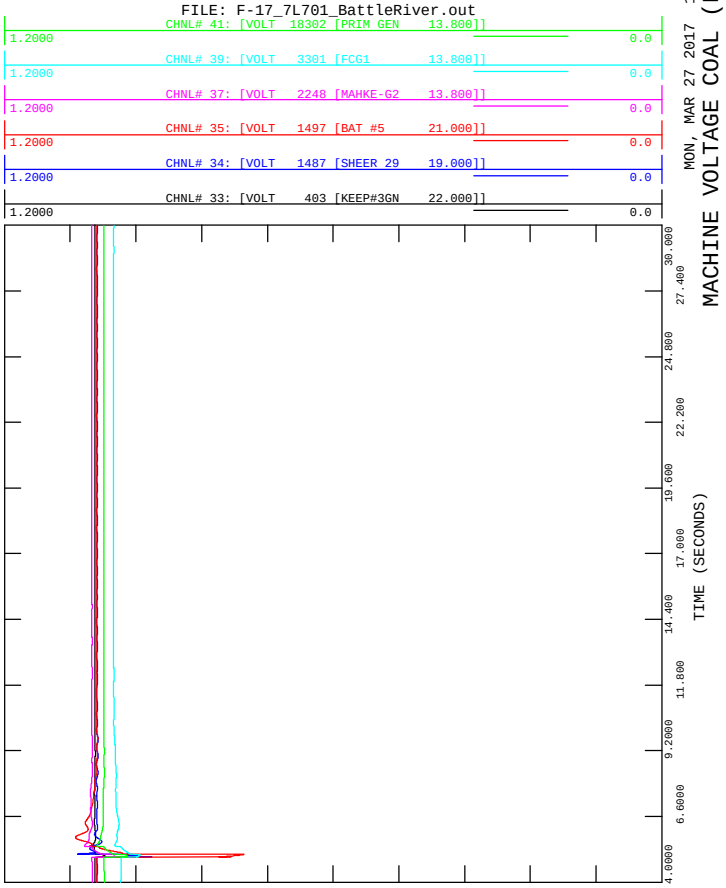


FIGURE F-17H
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: F-17_7L701_BattleRiver.out

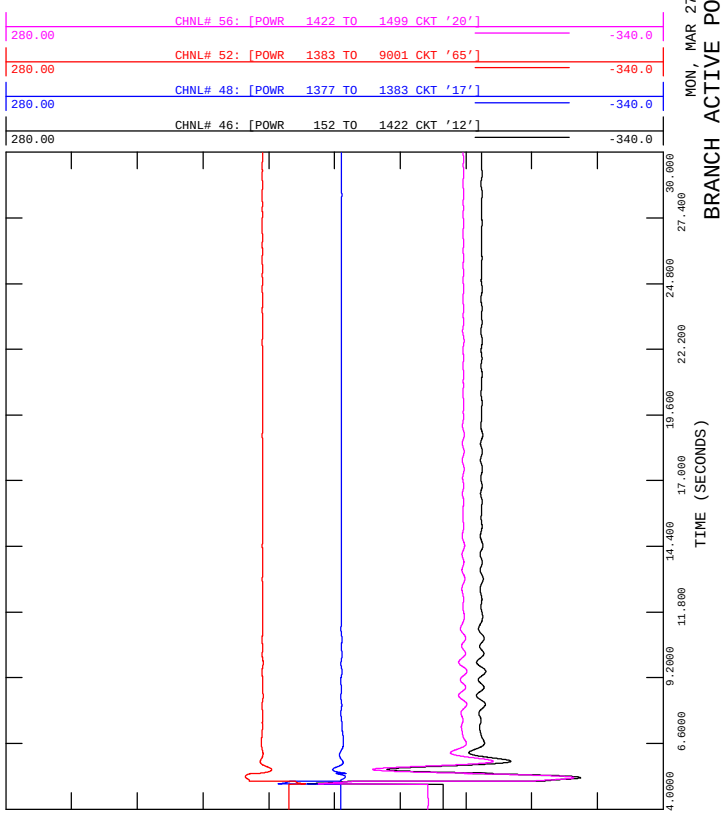


FIGURE F-17E
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: F-17_7L701_BattleRiver.out

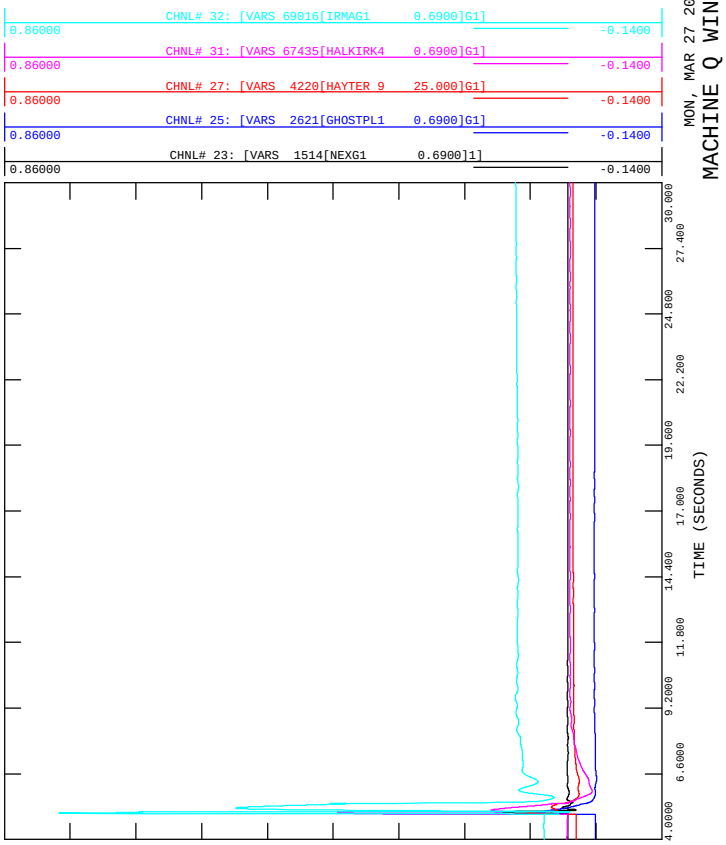


FIGURE F-17G
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: F-17_7L701_BattleRiver.out

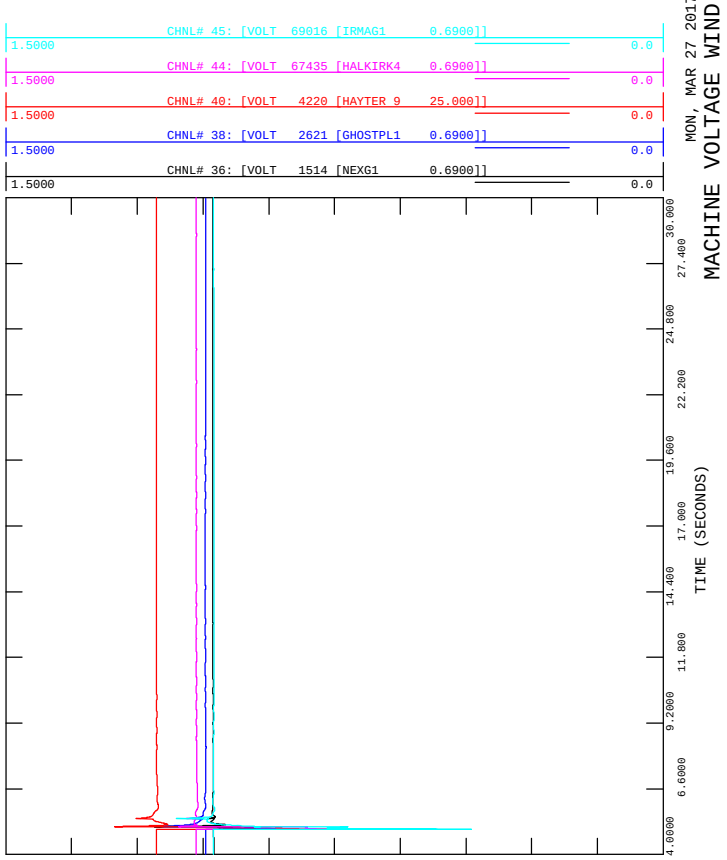


FIGURE F-17I
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: F-17_7L701_BattleRiver.out

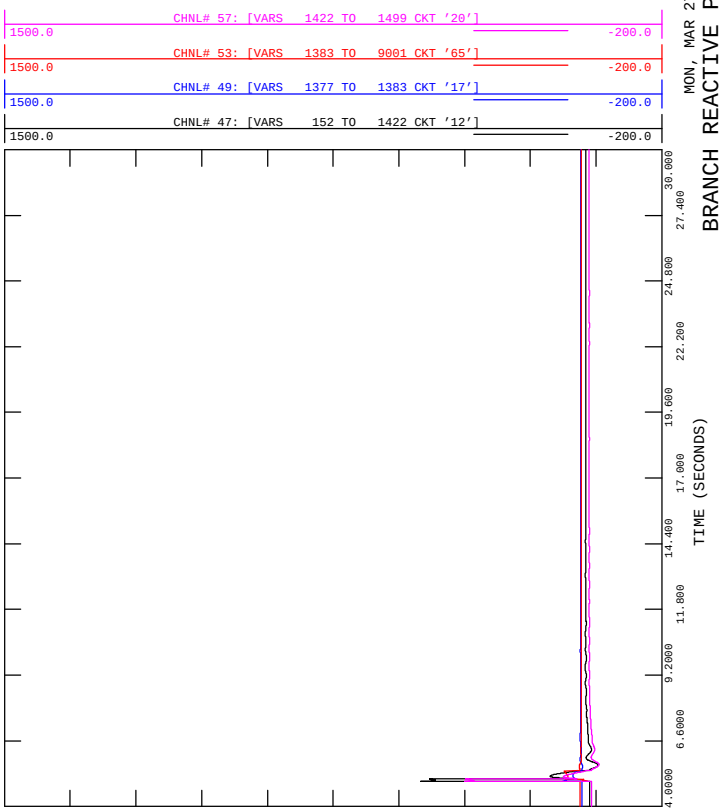


FIGURE F-18B
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: F-18_7L701_Stome.out

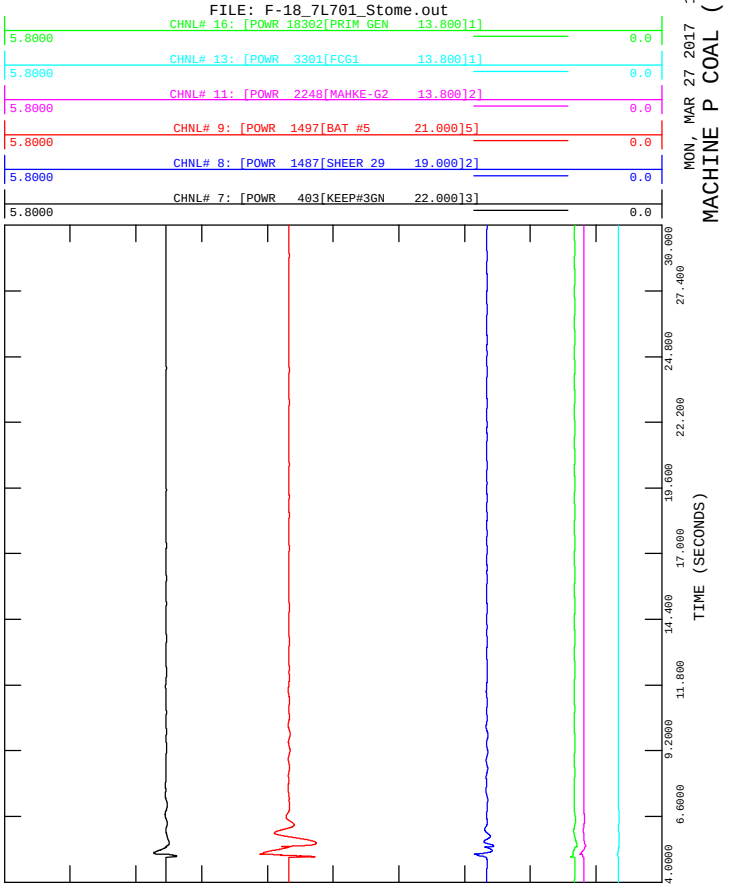


FIGURE F-18D
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: F-18_7L701_Stome.out

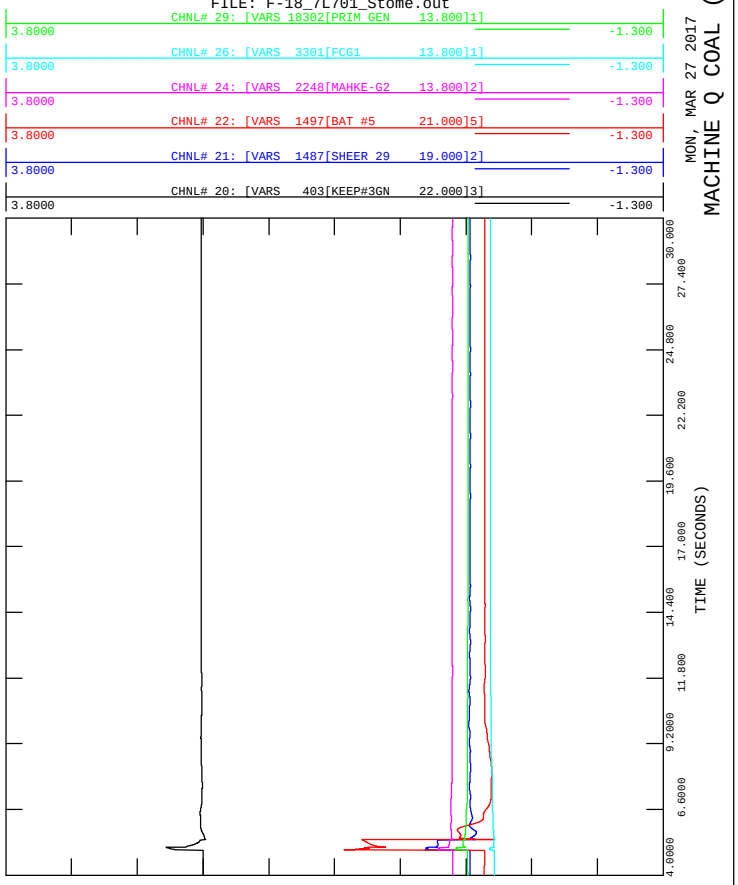


FIGURE F-18A
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: F-18_7L701_Stome.out

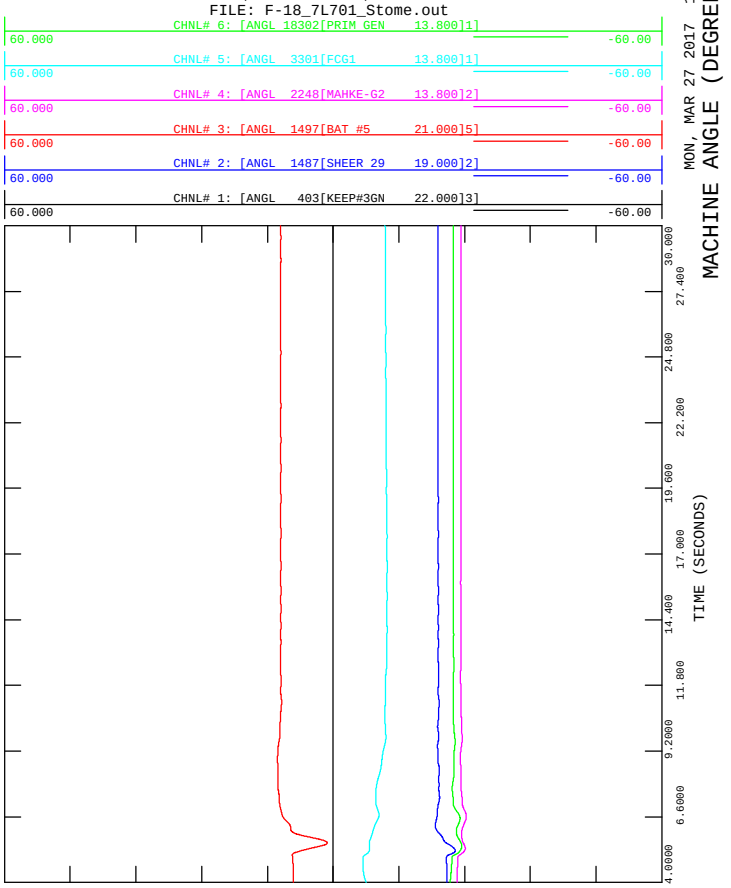


FIGURE F-18C
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: F-18_7L701_Stome.out

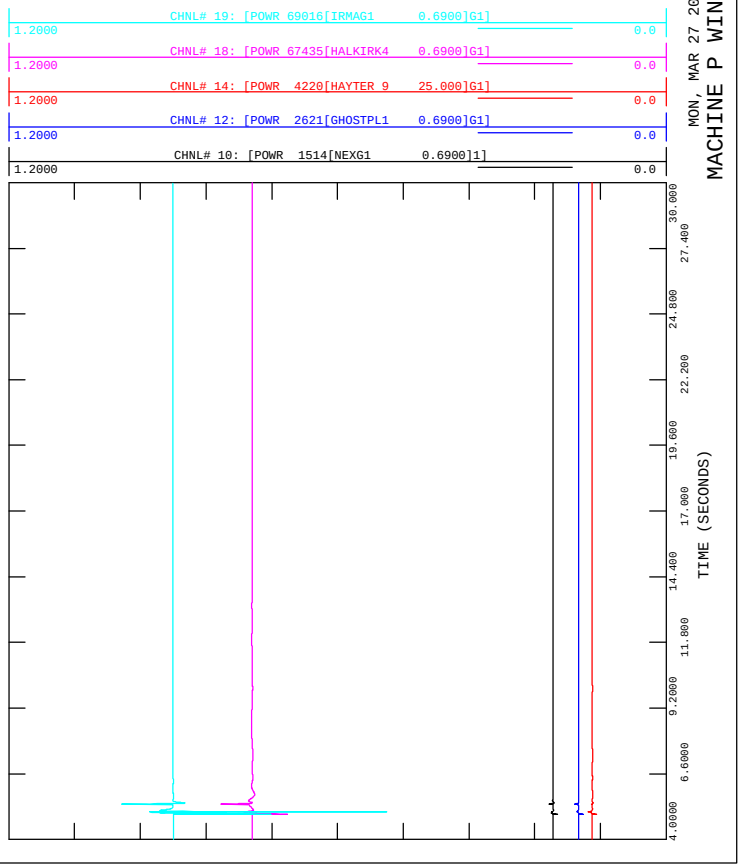


FIGURE F-18F
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: F-18_7L701_Stome.out

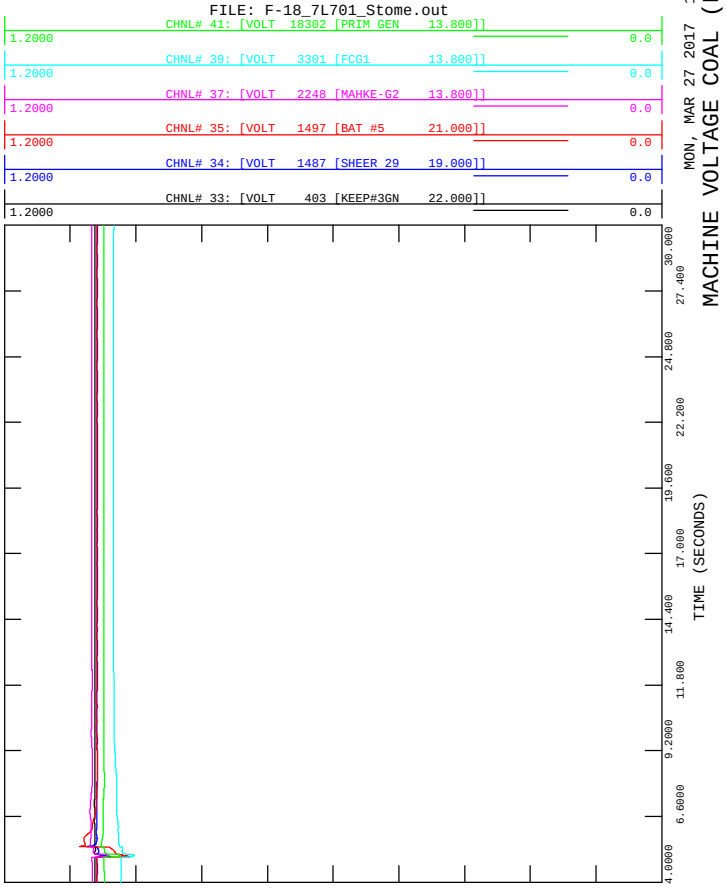


FIGURE F-18H
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: F-18_7L701_Stome.out

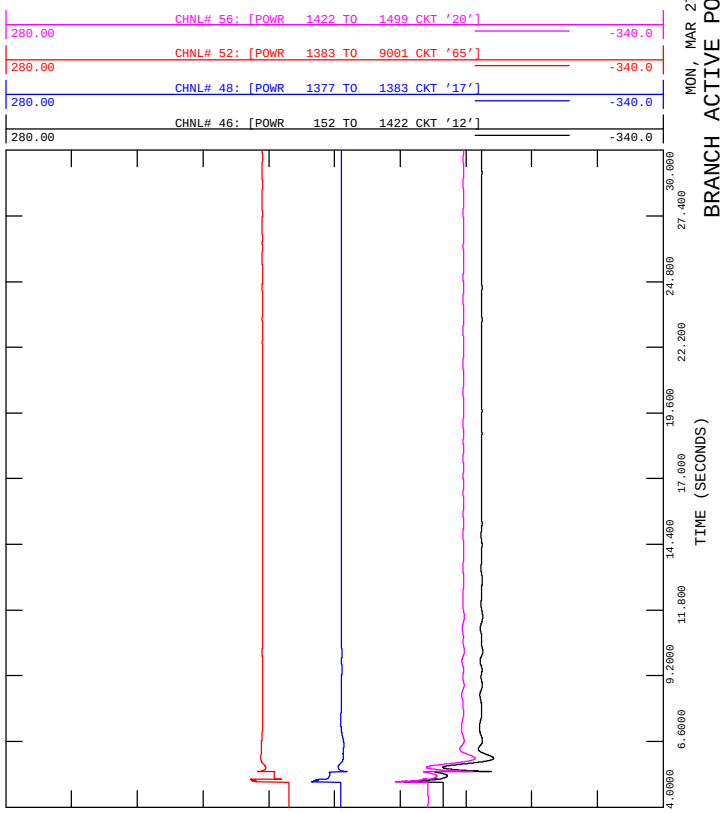


FIGURE F-18E
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: F-18_7L701_Stome.out

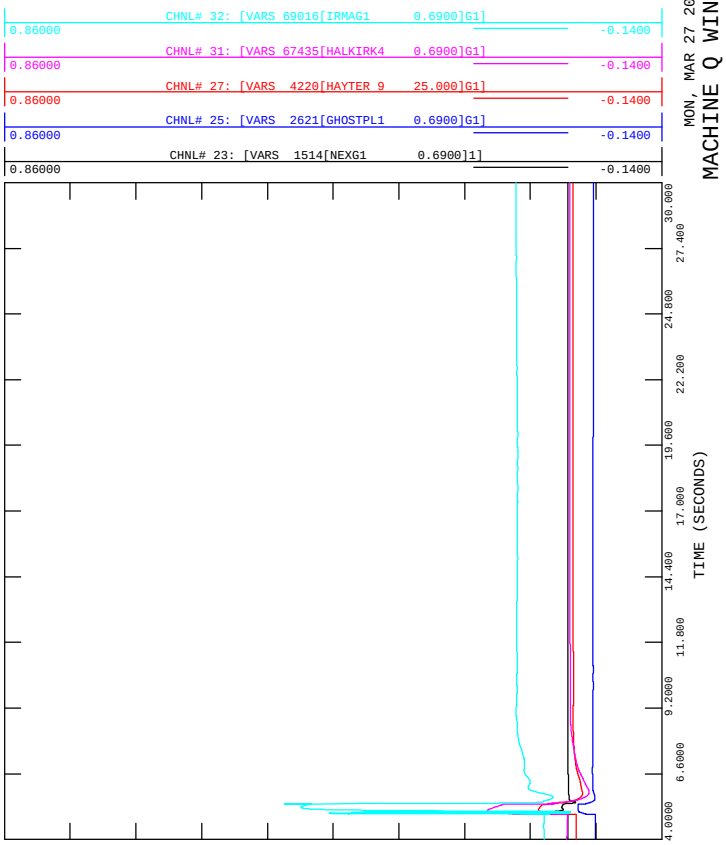


FIGURE F-18G
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: F-18_7L701_Stome.out

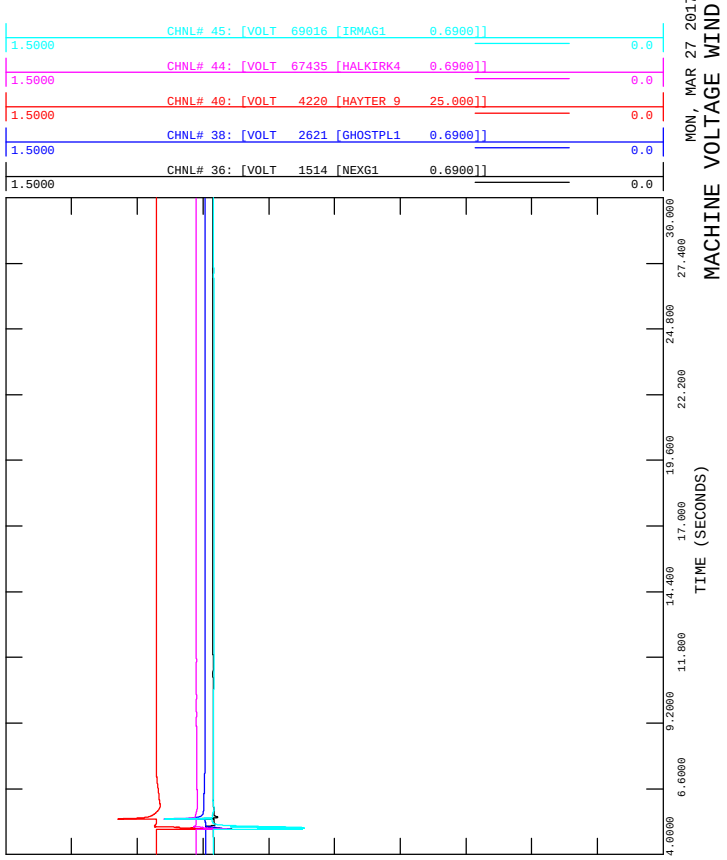


FIGURE F-18I
2017SP, ALT2
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: F-18_7L701_Stome.out

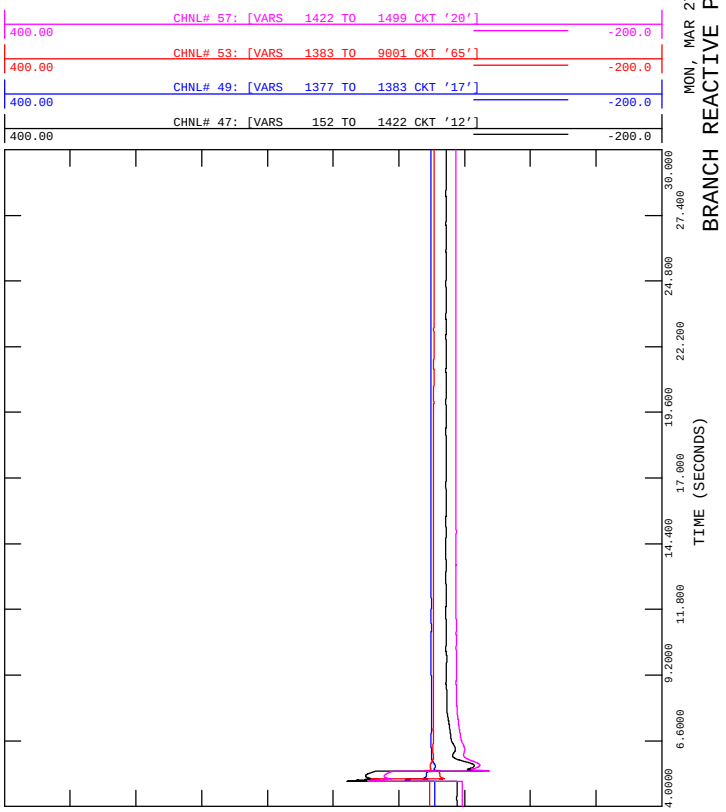


FIGURE F-19B
2017SP, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-19_749L_Edgerton.out

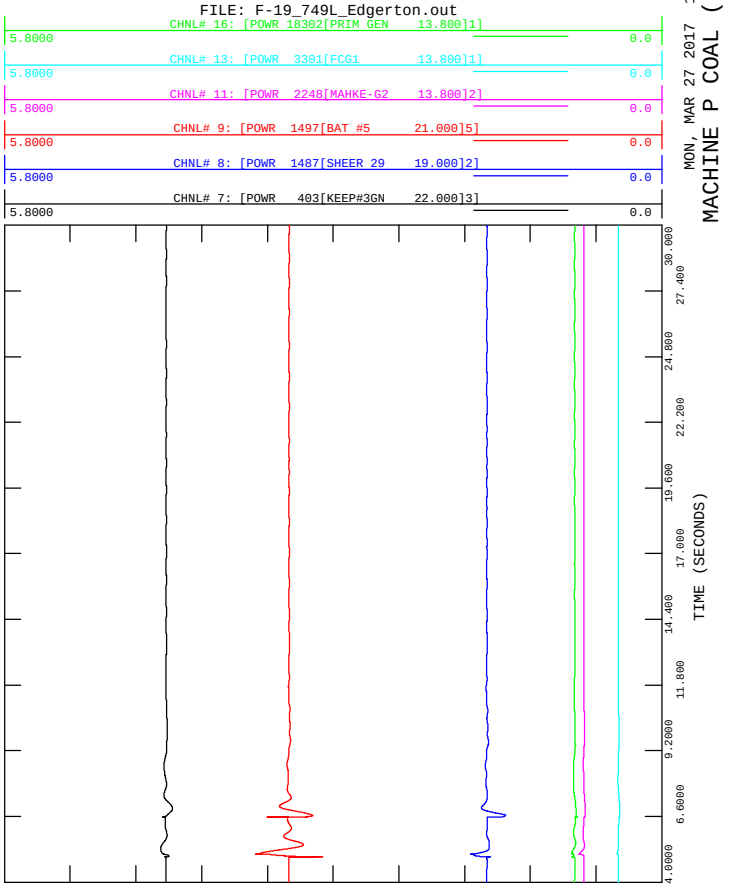


FIGURE F-19D
2017SP, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-19_749L_Edgerton.out

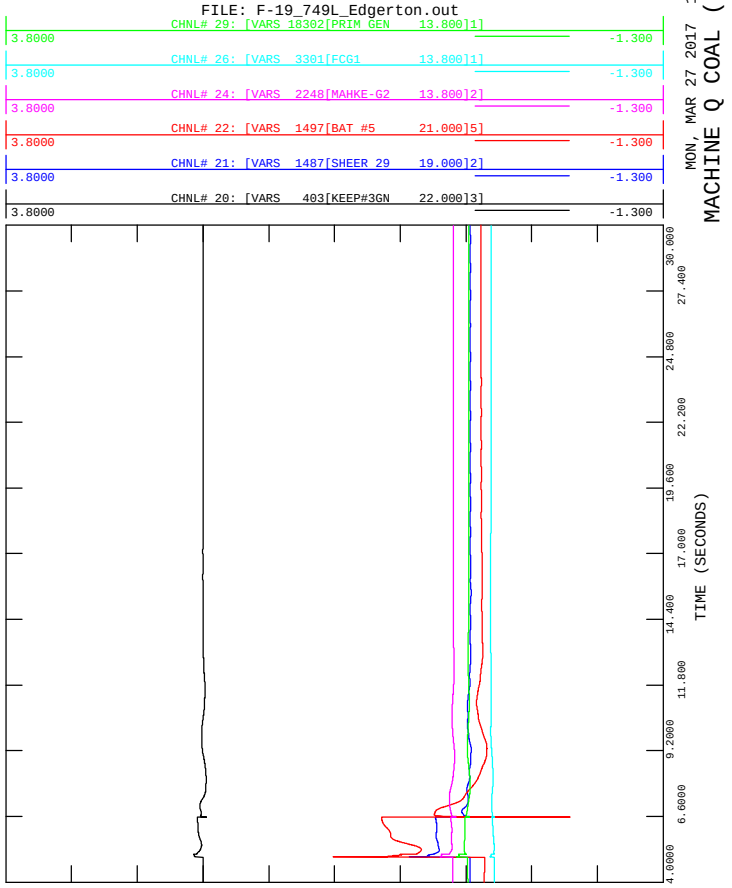


FIGURE F-19A
2017SP, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-19_749L_Edgerton.out

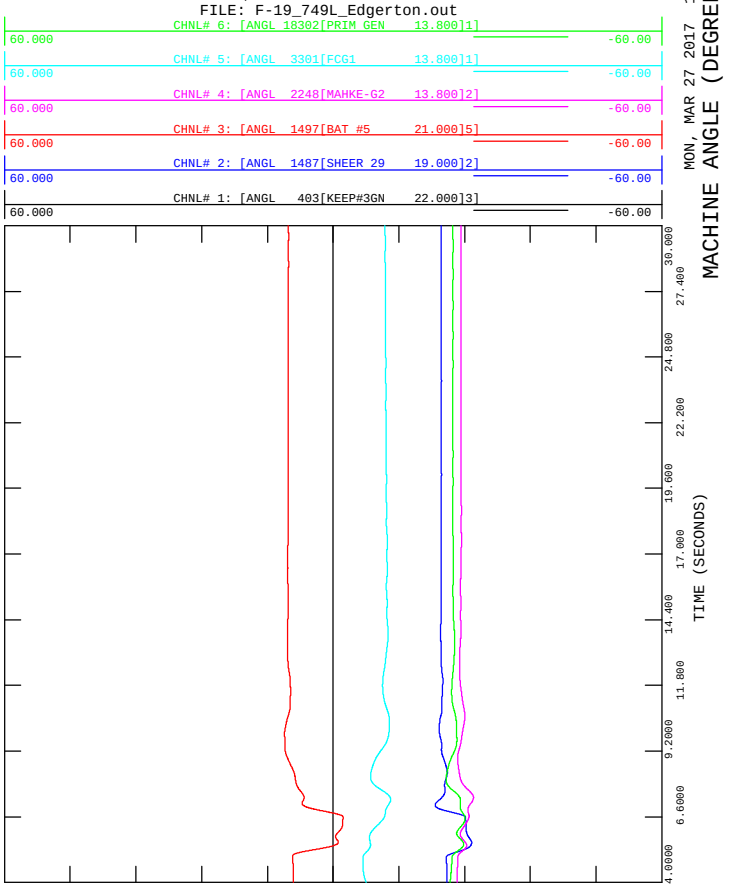


FIGURE F-19C
2017SP, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-19_749L_Edgerton.out

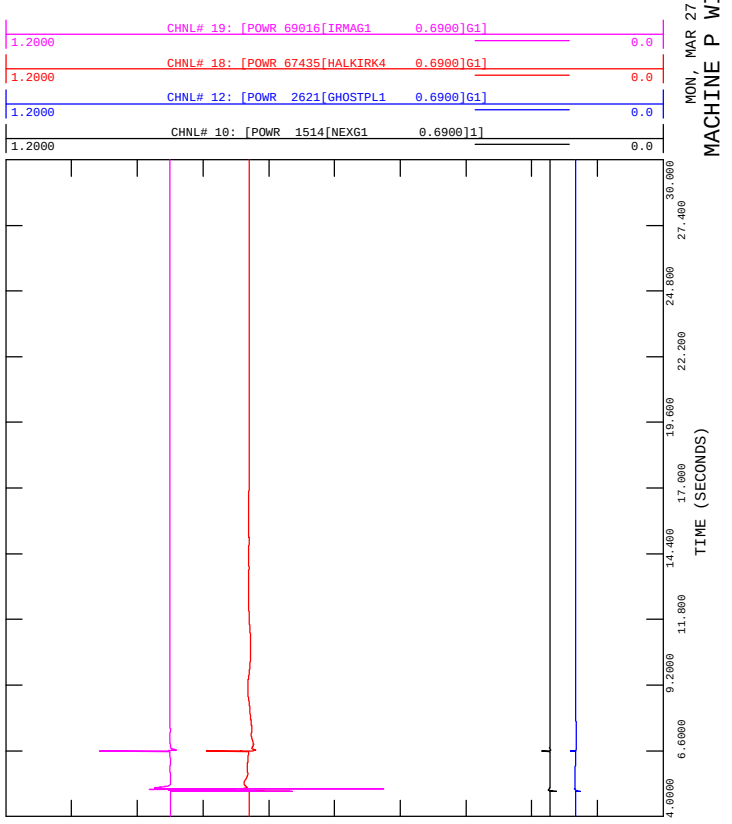


FIGURE F-19F
2017SP, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-19_749L_Edgerton.out

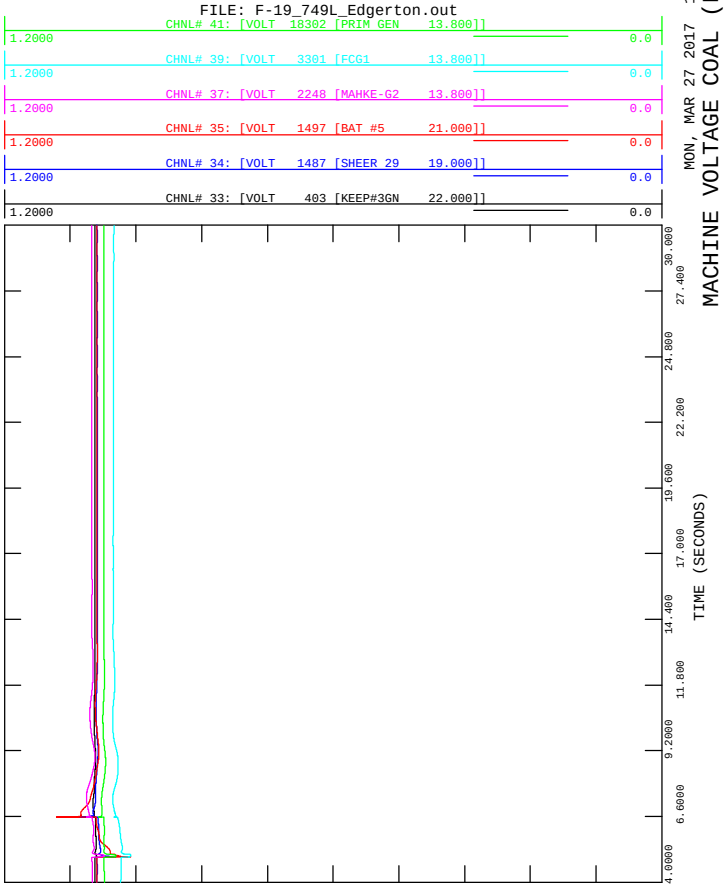


FIGURE F-19H
2017SP, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-19_749L_Edgerton.out

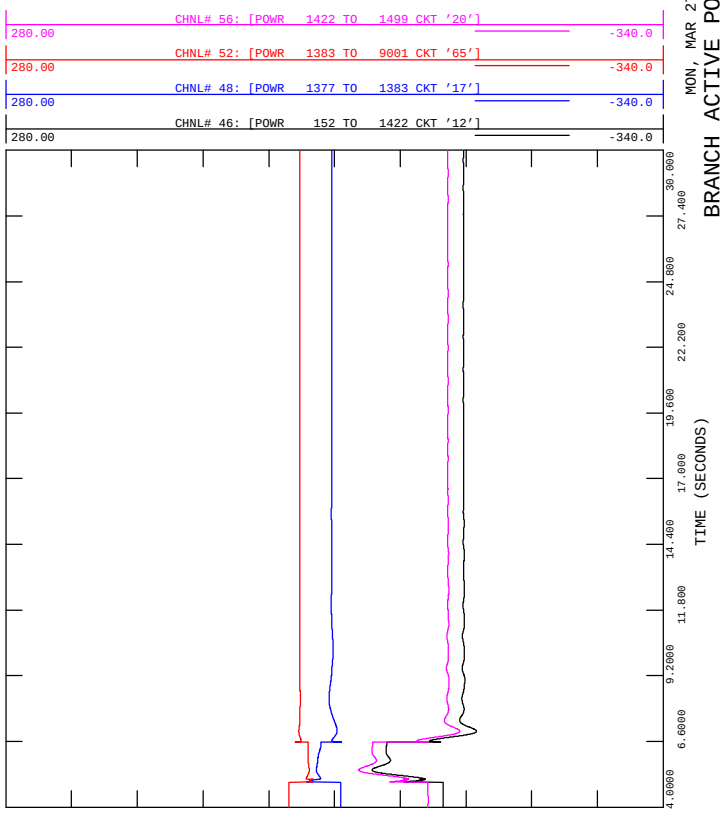


FIGURE F-19E
2017SP, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-19_749L_Edgerton.out

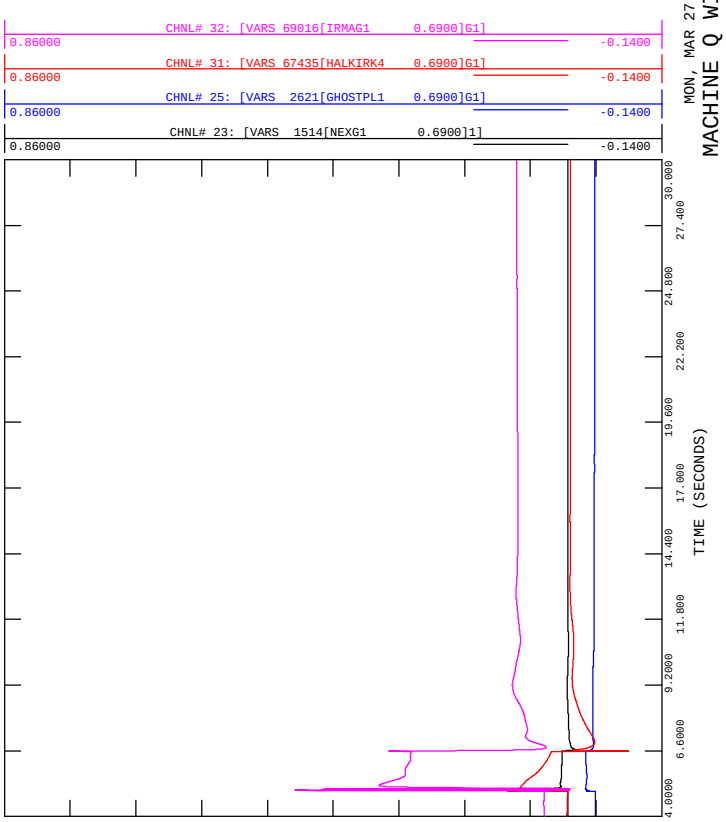


FIGURE F-19G
2017SP, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-19_749L_Edgerton.out

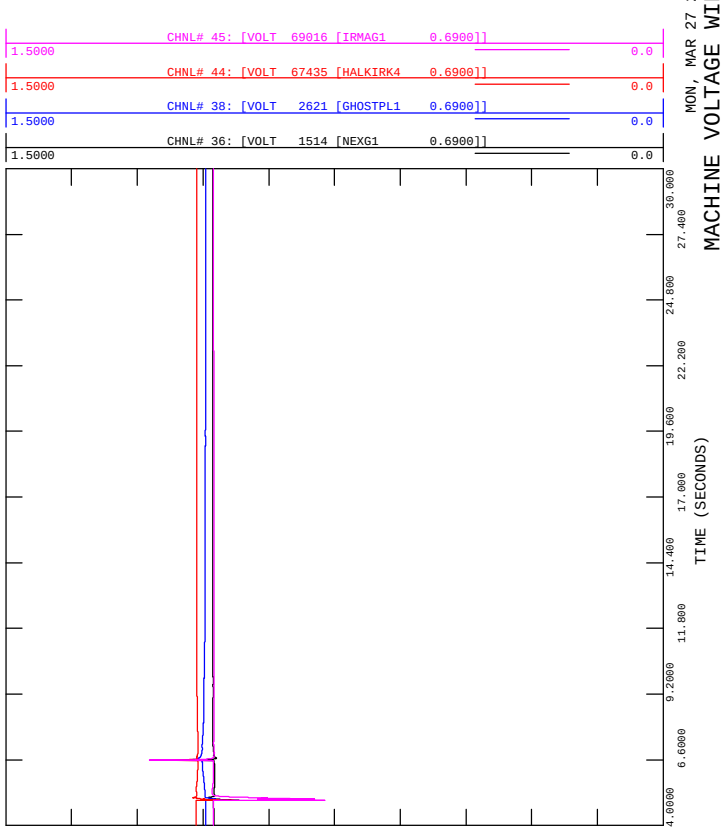


FIGURE F-19I
2017SP, ALT2
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-19_749L_Edgerton.out

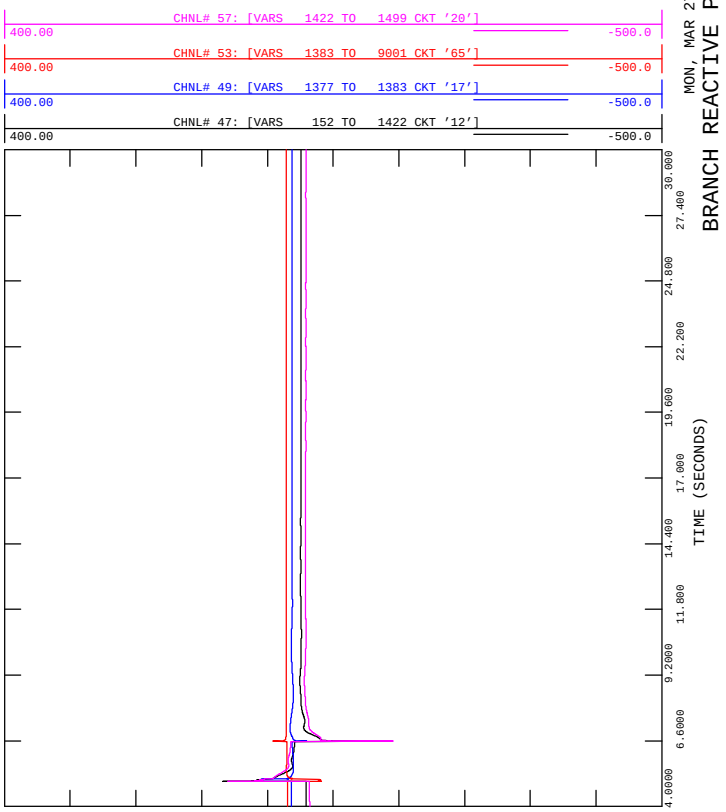


FIGURE F-20B
2017SP, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-20_749L_Metiskow.out

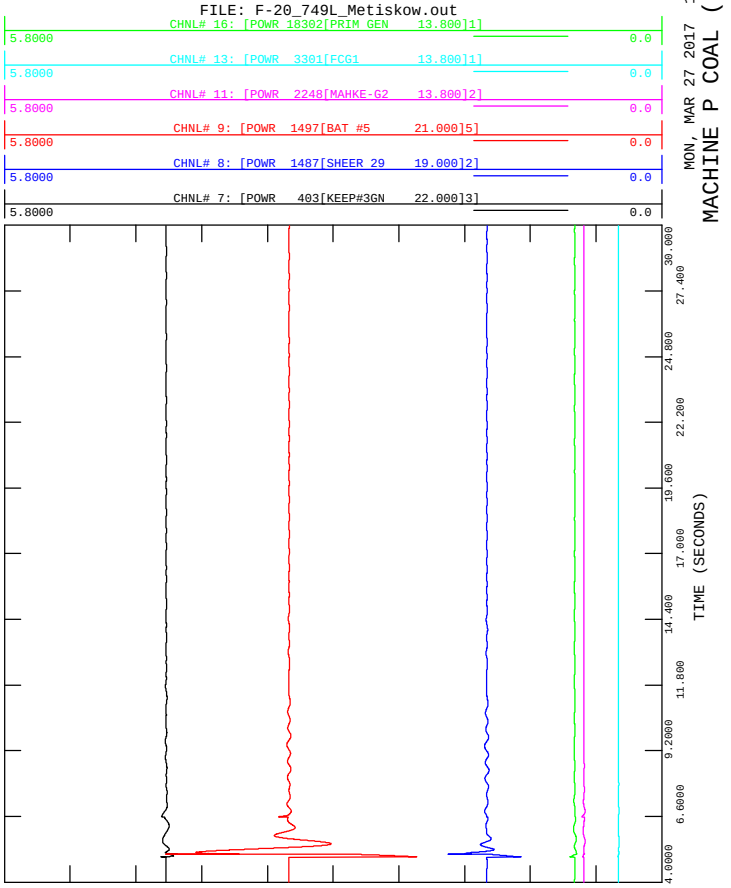


FIGURE F-20D
2017SP, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-20_749L_Metiskow.out

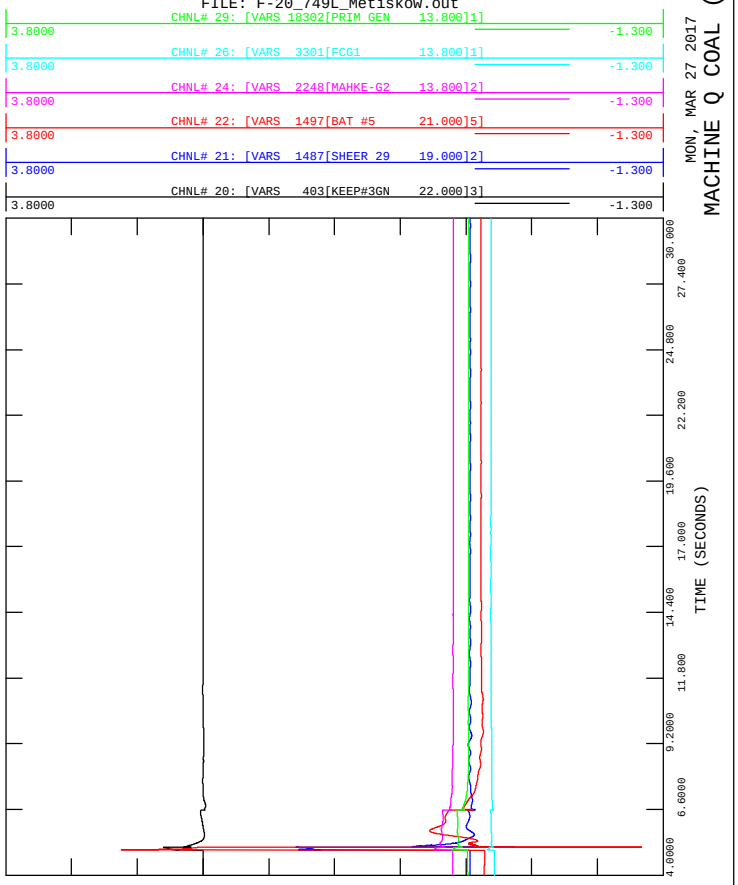


FIGURE F-20A
2017SP, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-20_749L_Metiskow.out

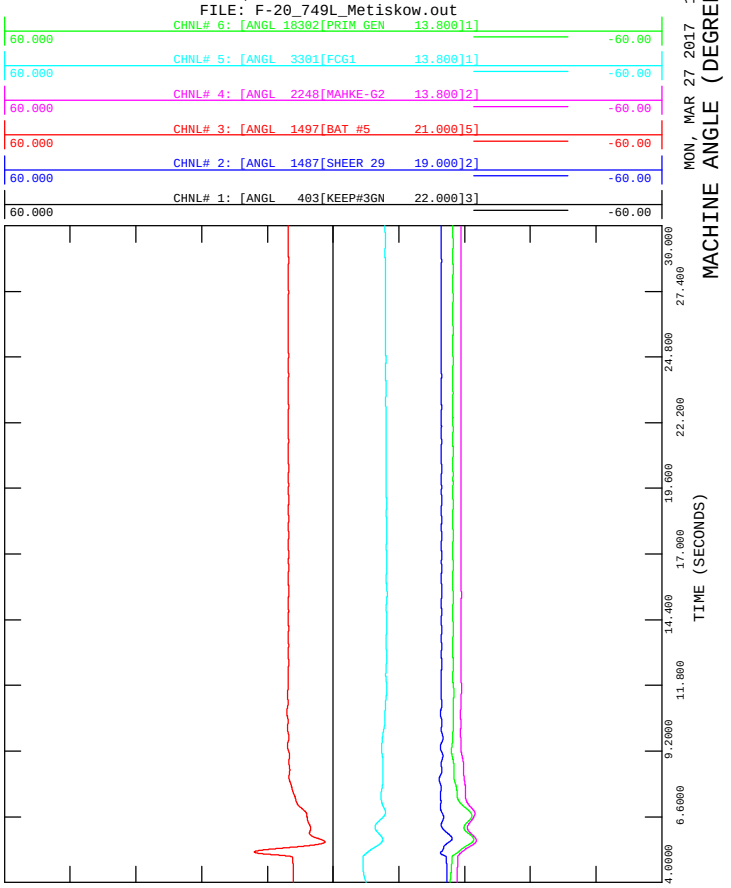


FIGURE F-20C
2017SP, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-20_749L_Metiskow.out

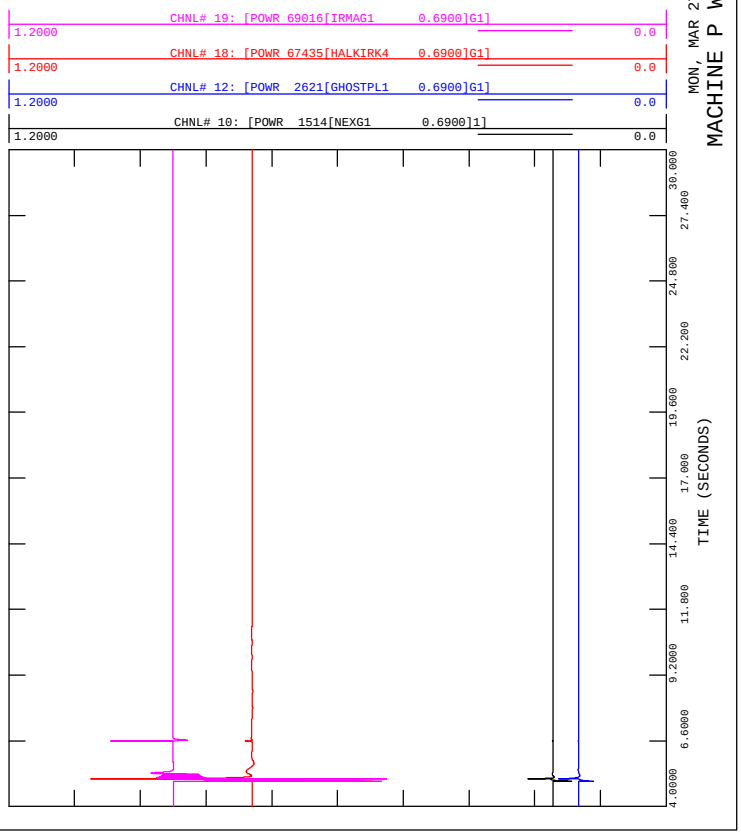


FIGURE F-20F
2017SP, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-20_749L_Metiskow.out

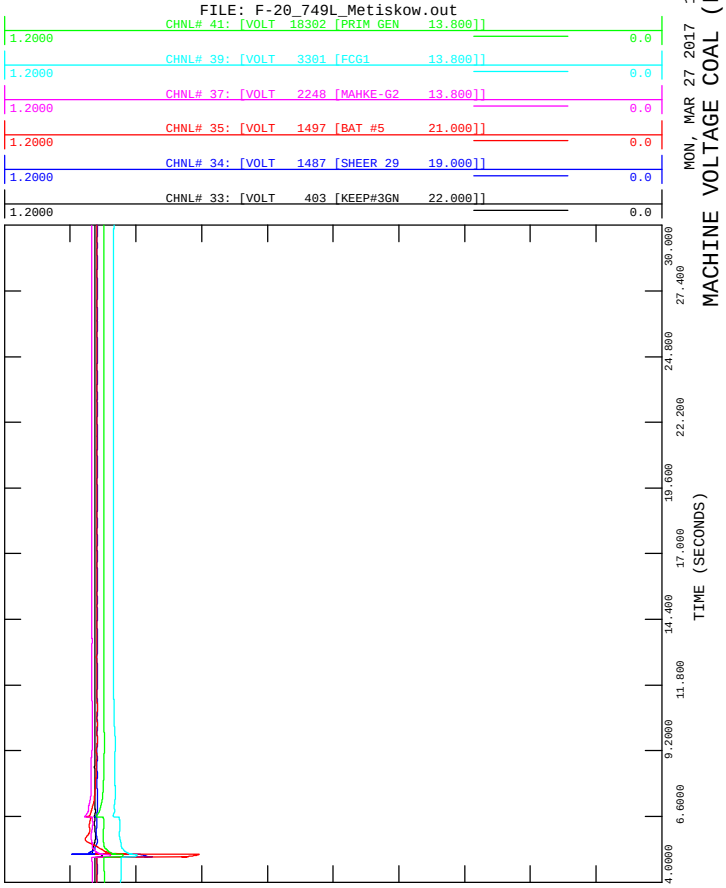


FIGURE F-20H
2017SP, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-20_749L_Metiskow.out

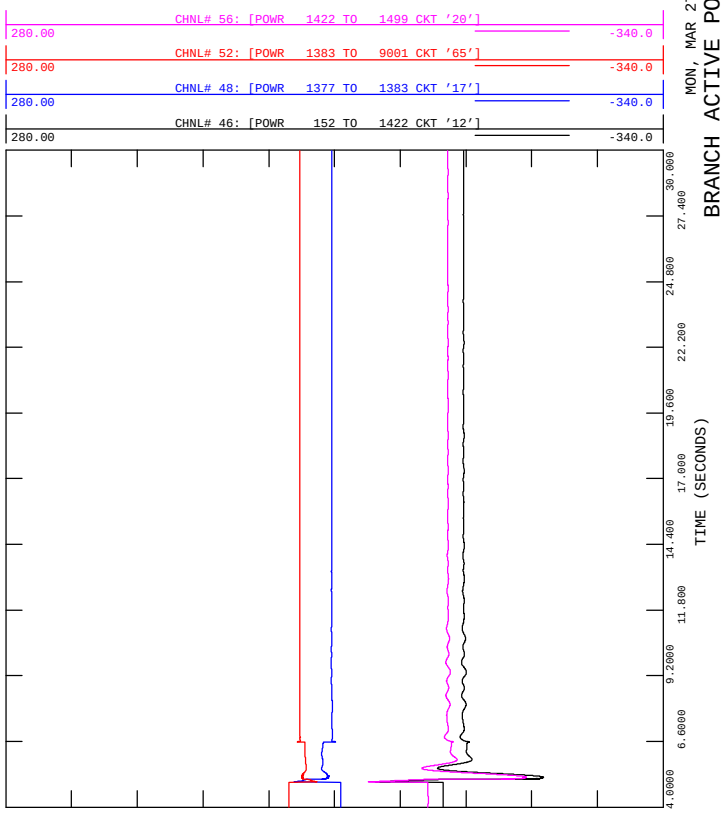


FIGURE F-20E
2017SP, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-20_749L_Metiskow.out

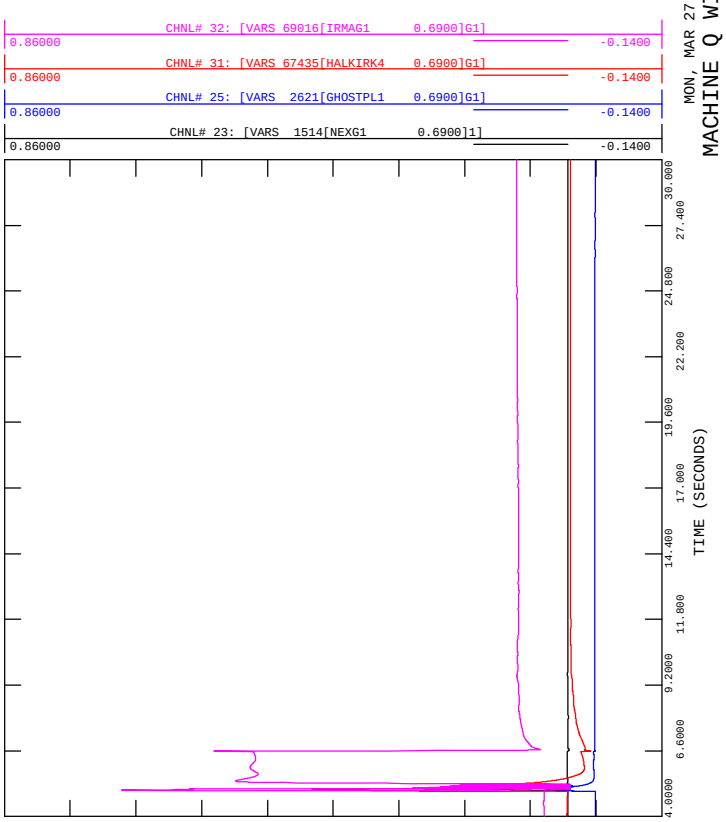


FIGURE F-20G
2017SP, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-20_749L_Metiskow.out

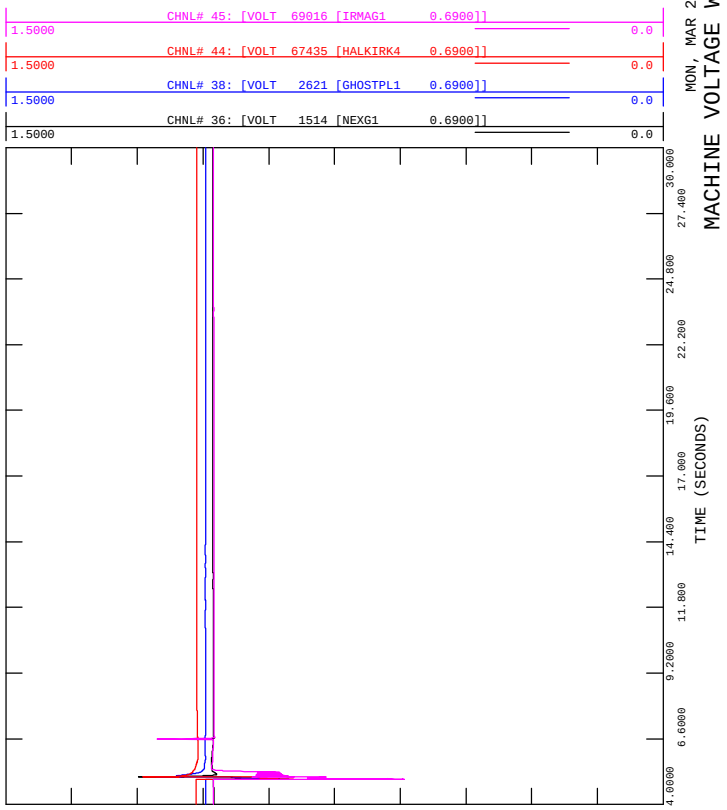


FIGURE F-20I
2017SP, ALT2
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-20_749L_Metiskow.out

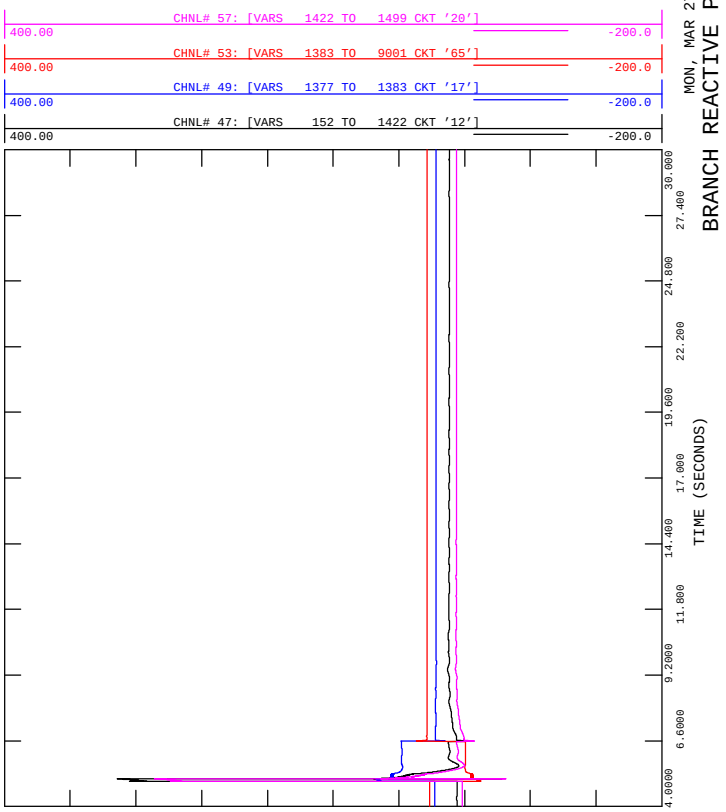


FIGURE F-21B
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-21_749L~7L749_Edgerton.out

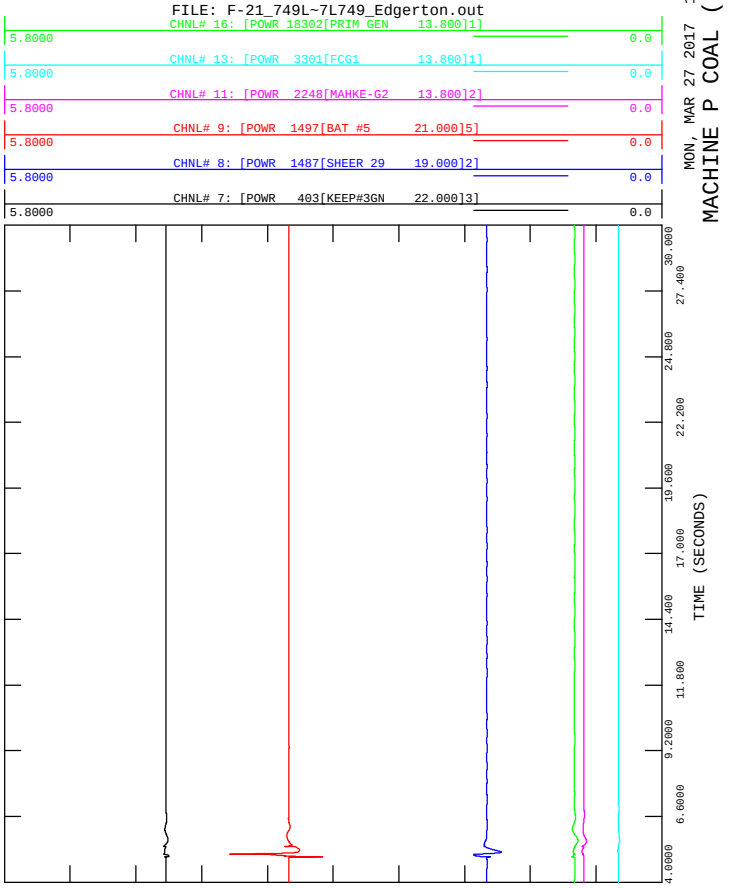


FIGURE F-21D
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-21_749L~7L749_Edgerton.out

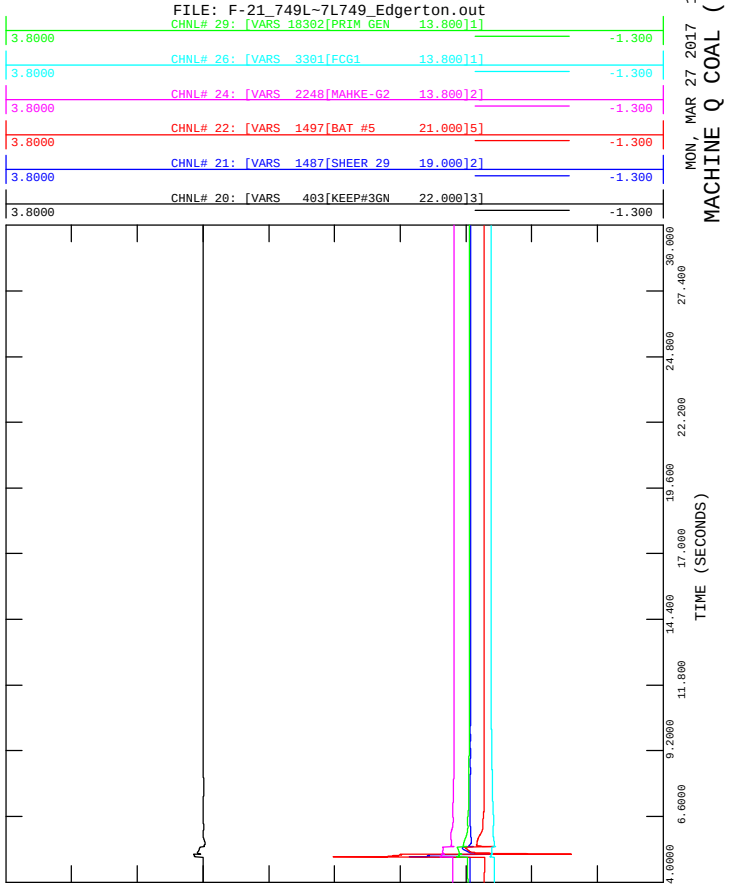


FIGURE F-21A
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-21_749L~7L749_Edgerton.out

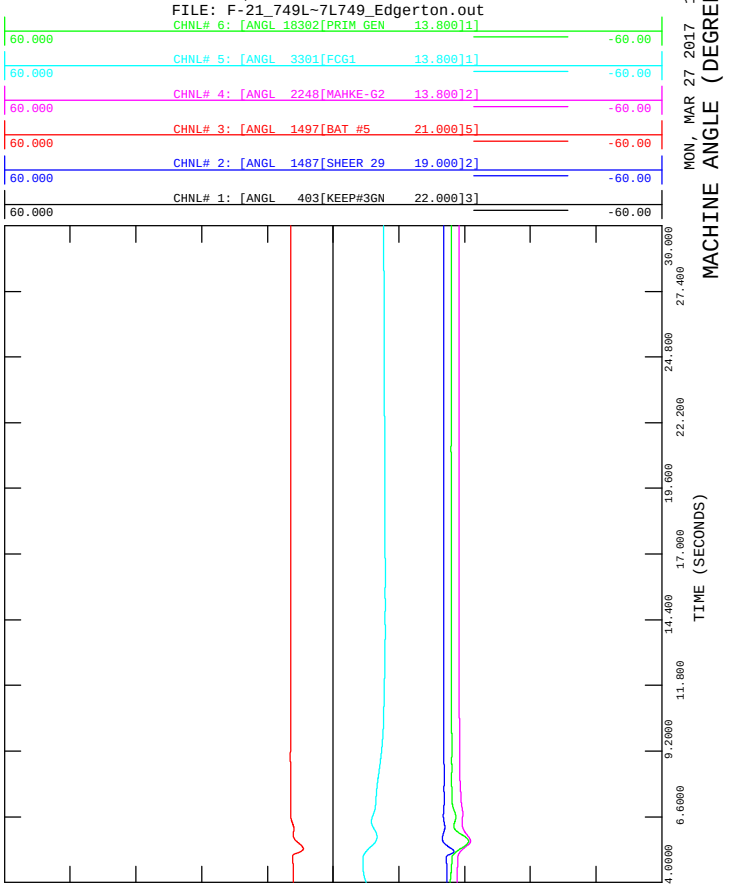


FIGURE F-21C
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-21_749L~7L749_Edgerton.out

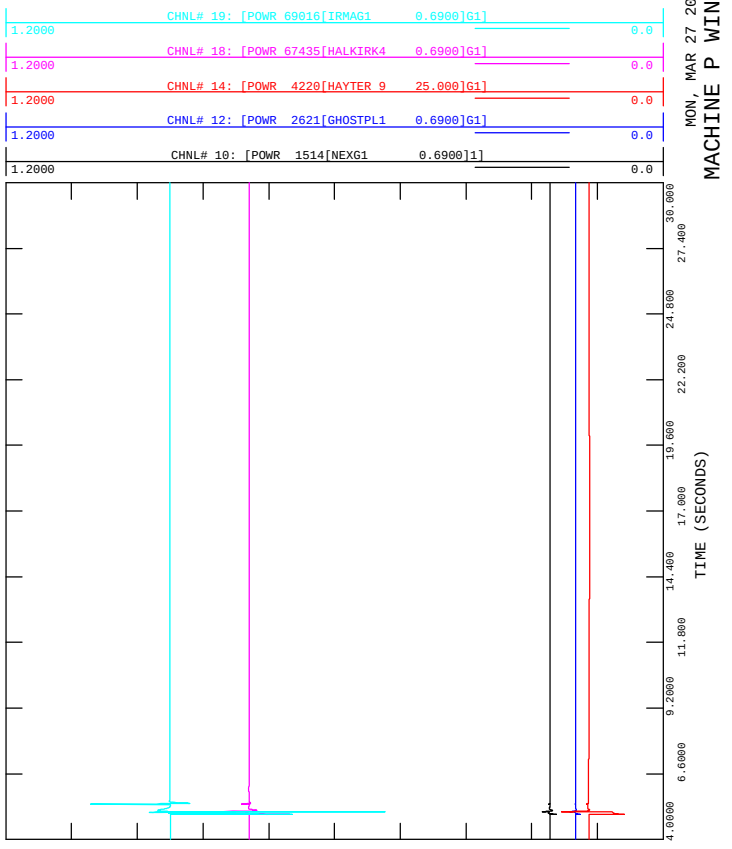


FIGURE F-21F
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-21_749L~7L749_Edgerton.out

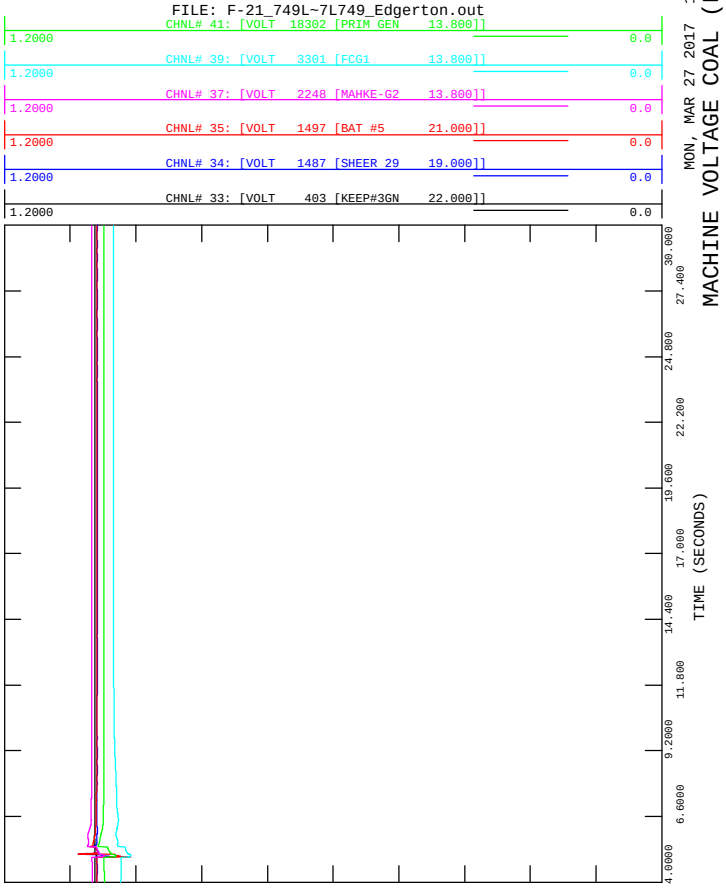


FIGURE F-21H
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-21_749L~7L749_Edgerton.out

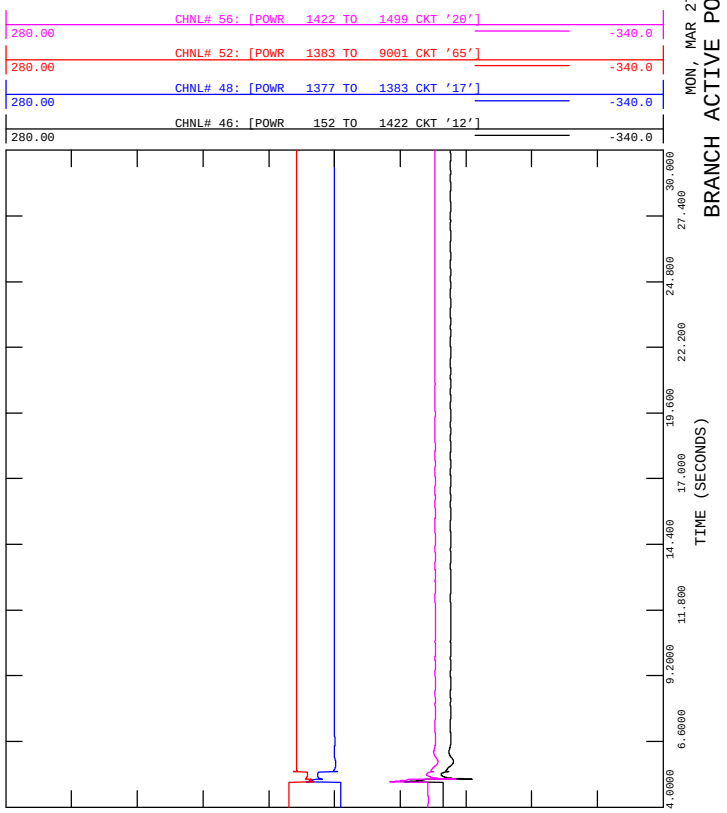


FIGURE F-21E
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-21_749L~7L749_Edgerton.out

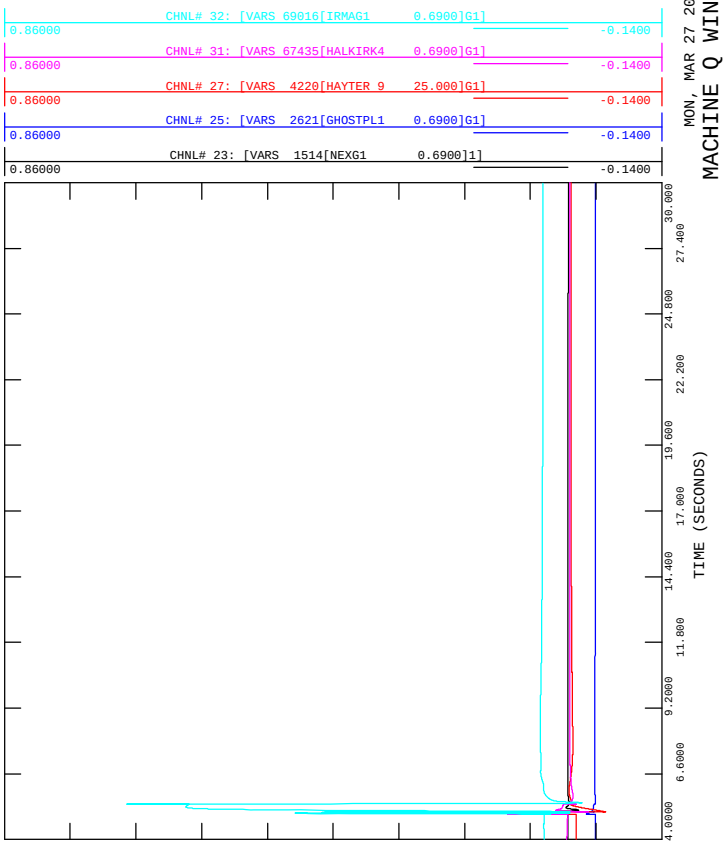


FIGURE F-21G
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-21_749L~7L749_Edgerton.out

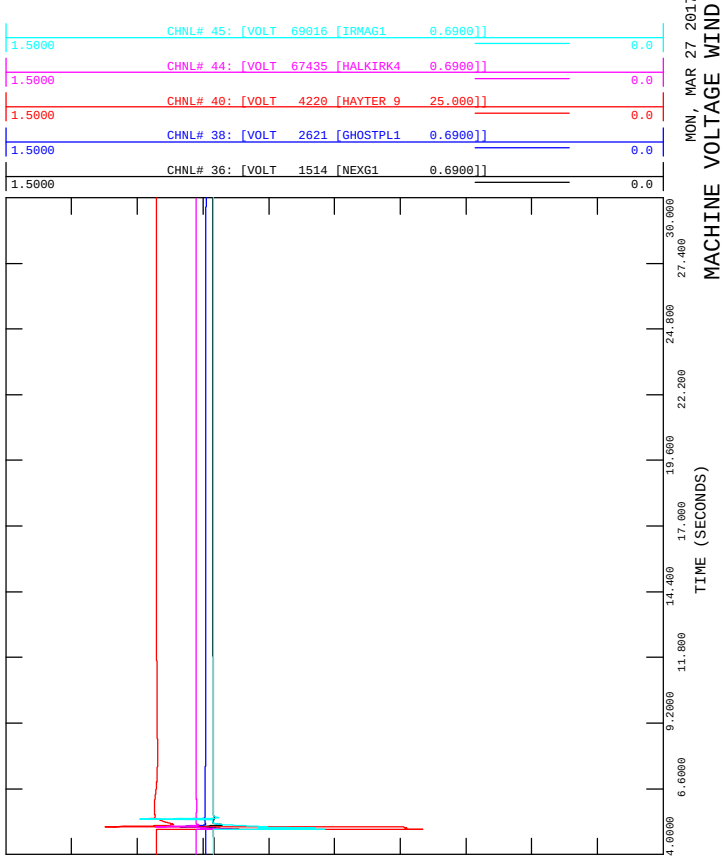


FIGURE F-21I
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-21_749L~7L749_Edgerton.out

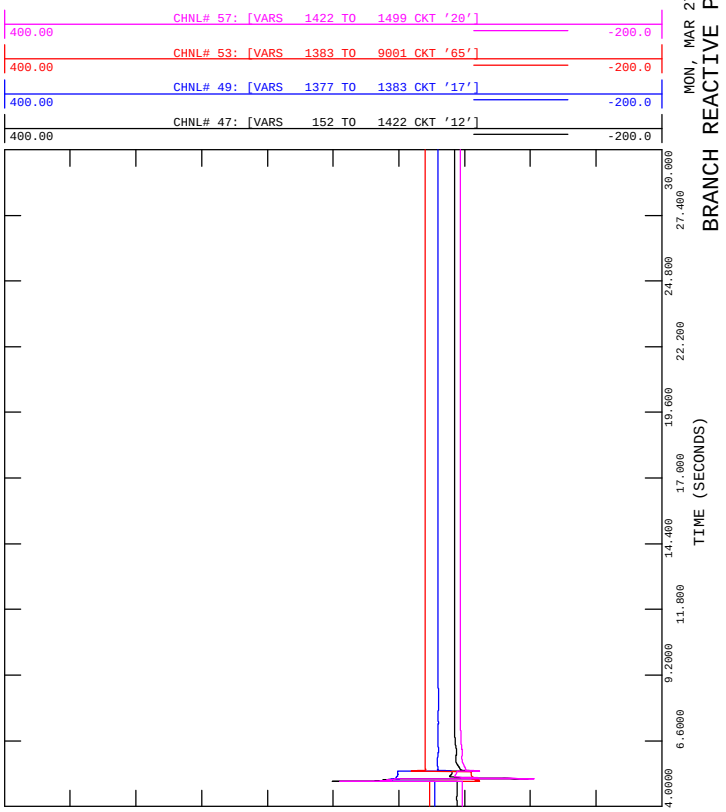


FIGURE F-22B
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L~7L749_Lloydminster.out

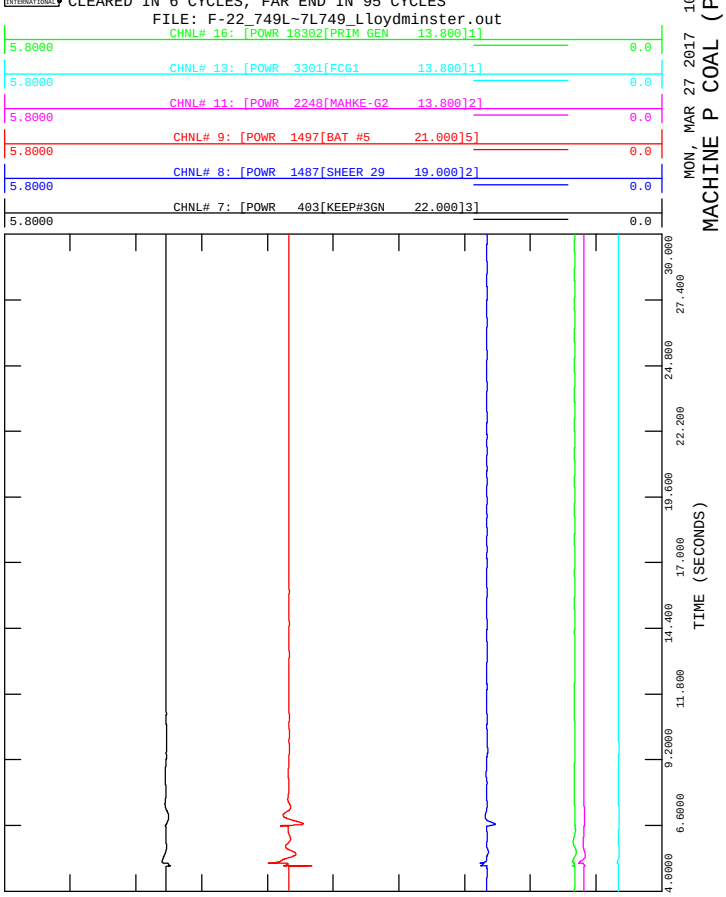


FIGURE F-22D
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L~7L749_Lloydminster.out

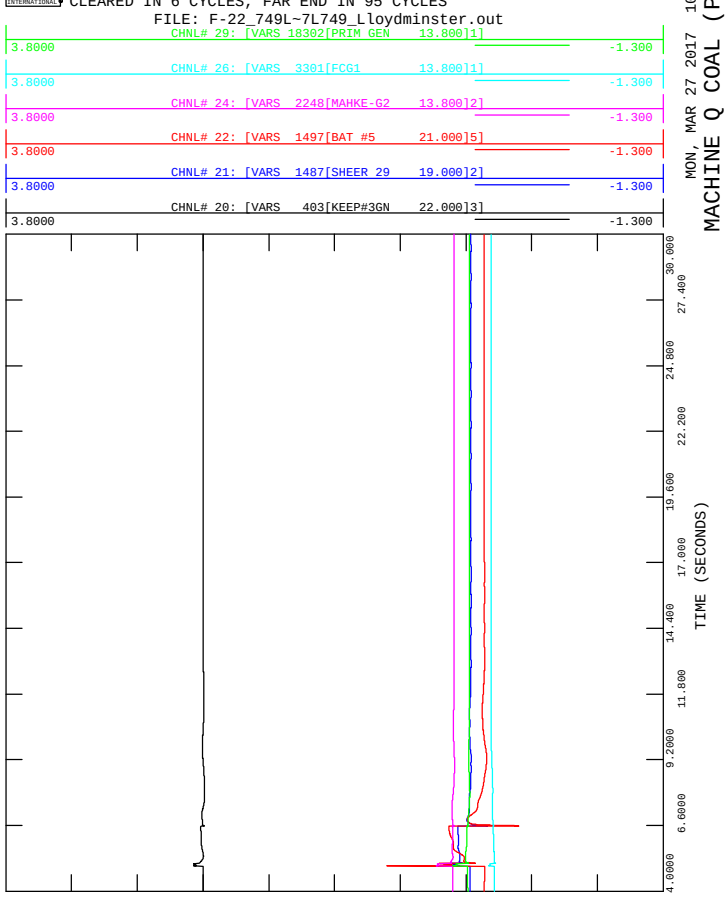


FIGURE F-22A
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L~7L749_Lloydminster.out

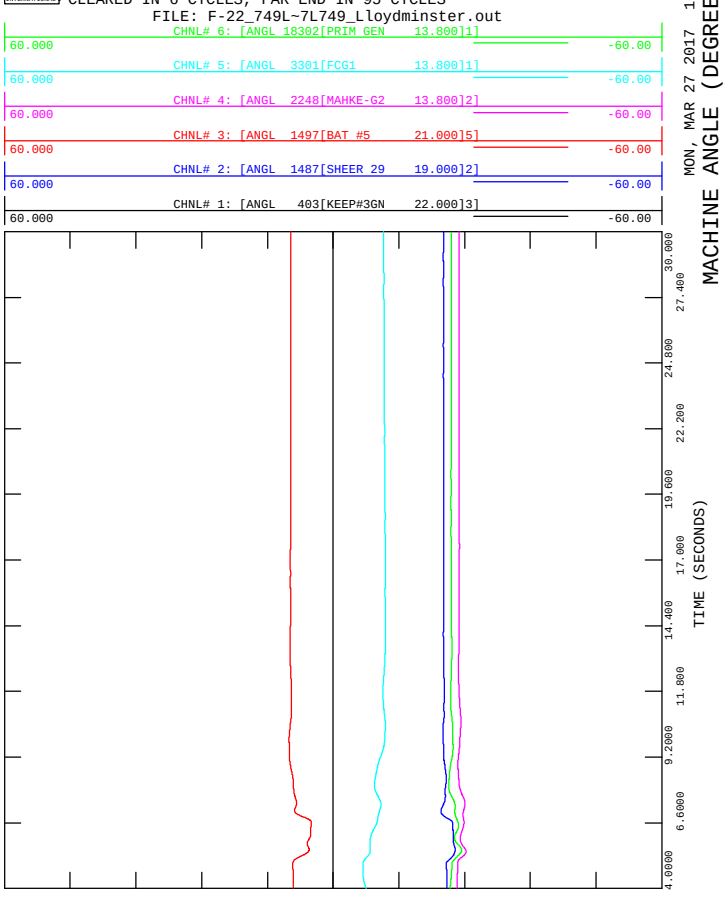


FIGURE F-22C
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L~7L749_Lloydminster.out

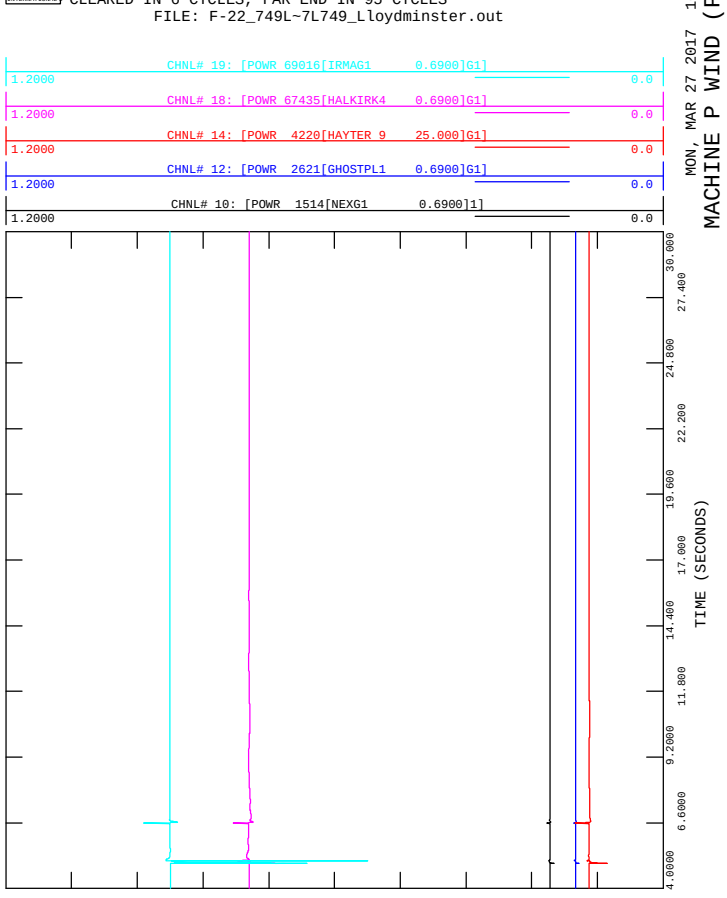


FIGURE F-22F
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L~7L749_Lloydminster.out

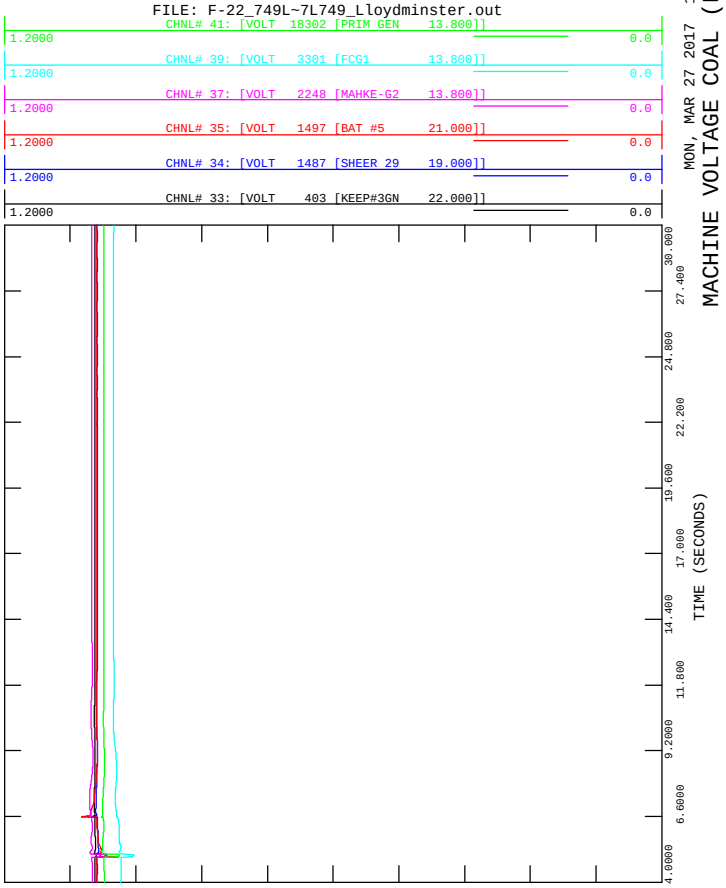


FIGURE F-22H
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L~7L749_Lloydminster.out

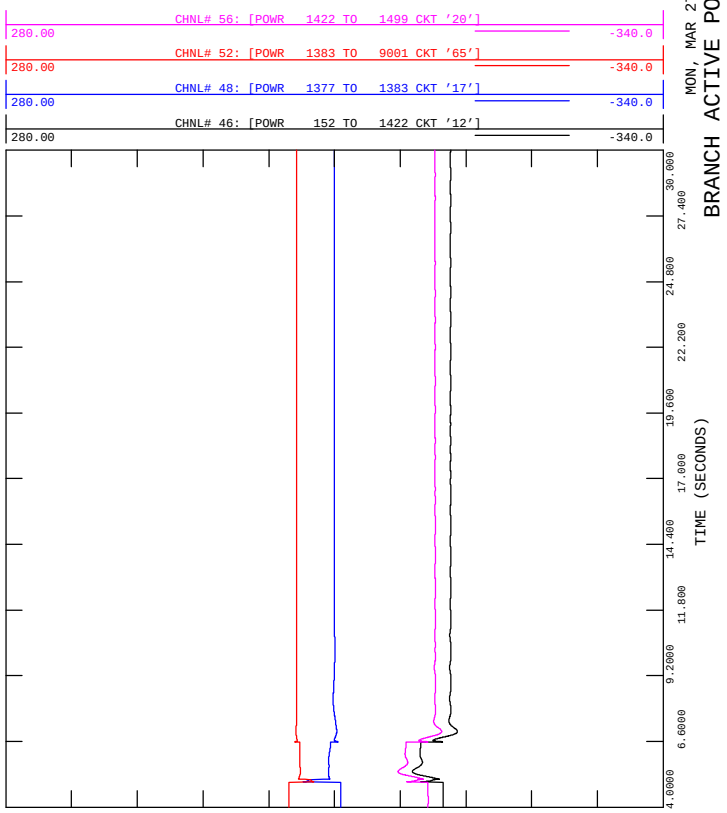


FIGURE F-22E
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L~7L749_Lloydminster.out

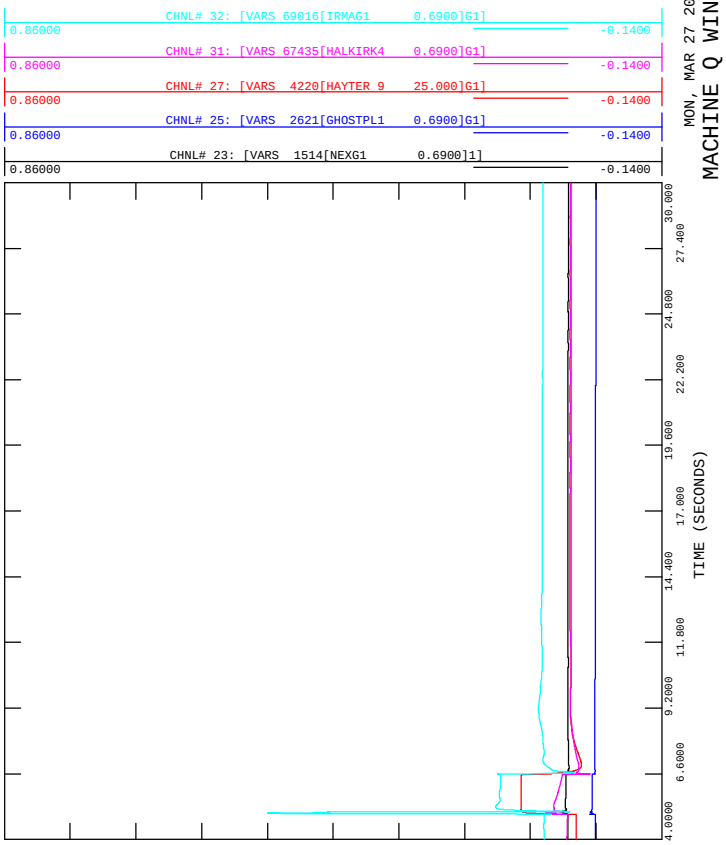


FIGURE F-22G
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L~7L749_Lloydminster.out

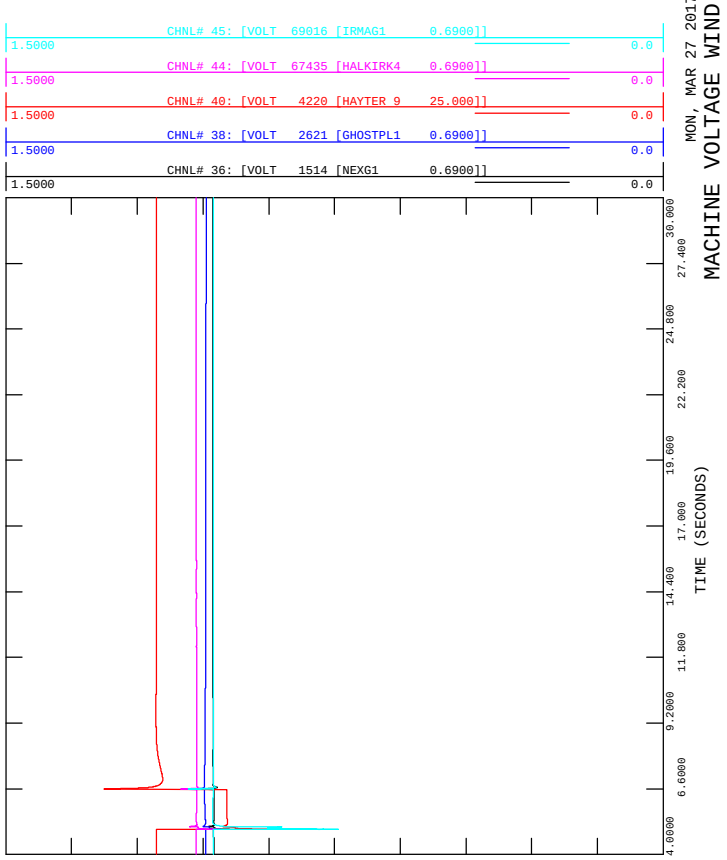


FIGURE F-22I
2017SP, ALT2
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L~7L749_Lloydminster.out

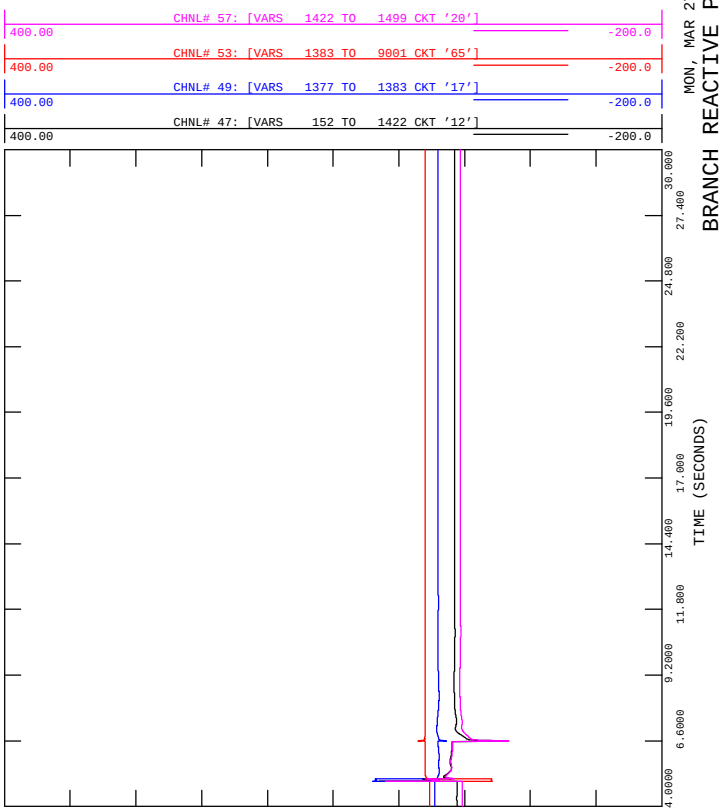


FIGURE F-23B
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-23_9L20_Cordel.out

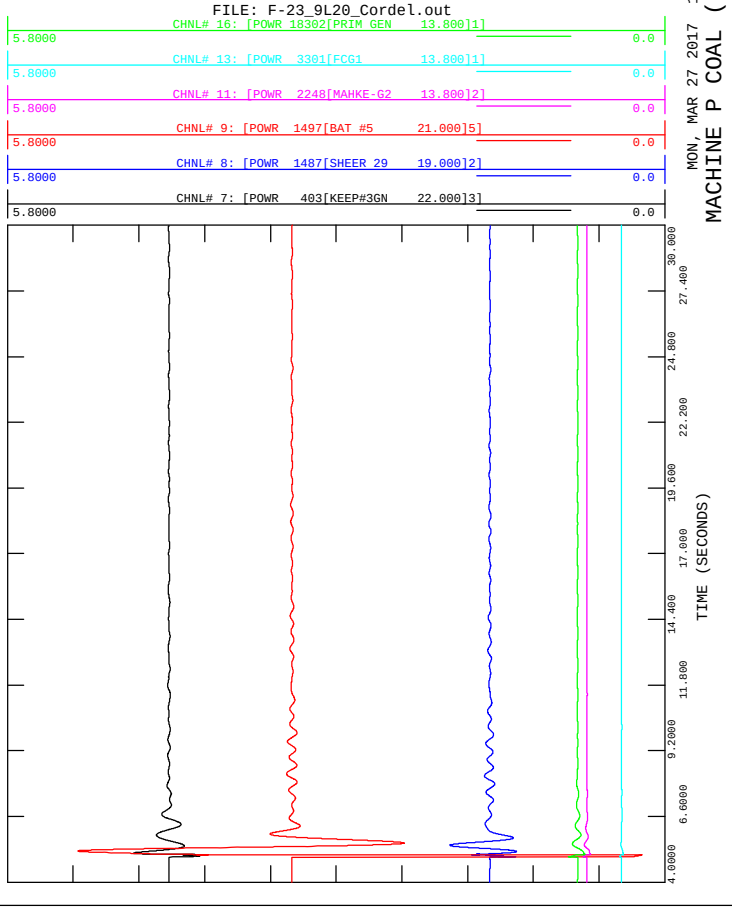


FIGURE F-23D
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-23_9L20_Cordel.out

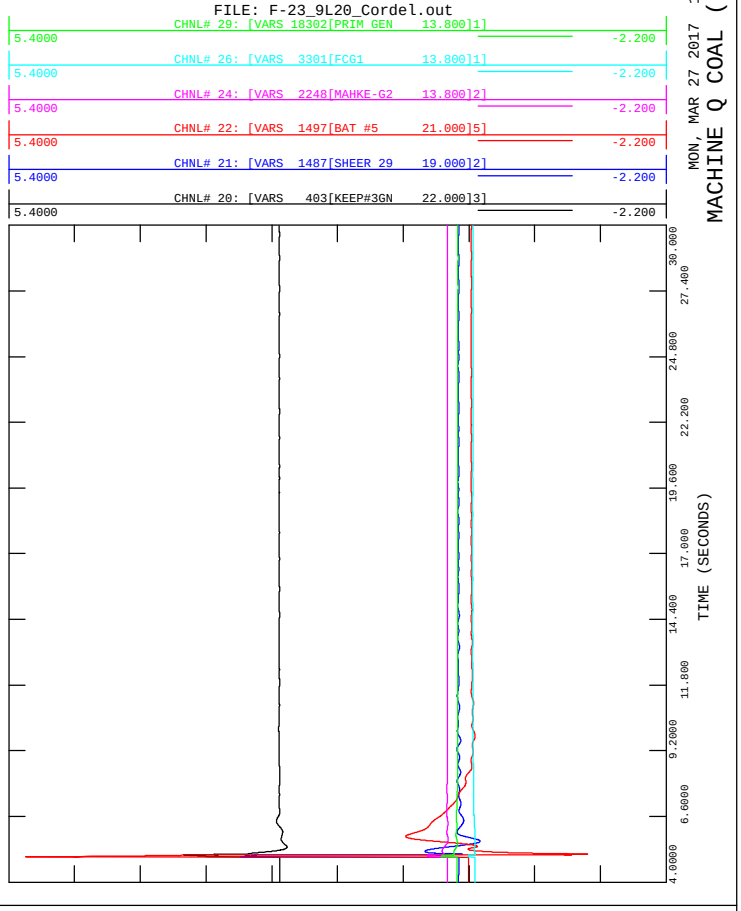


FIGURE F-23A
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-23_9L20_Cordel.out

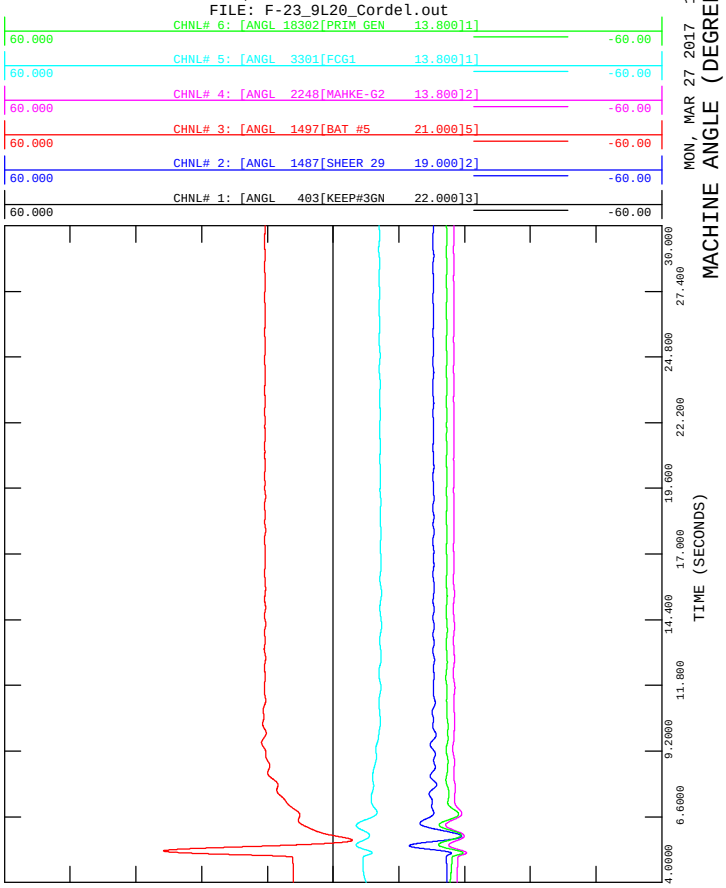


FIGURE F-23C
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-23_9L20_Cordel.out

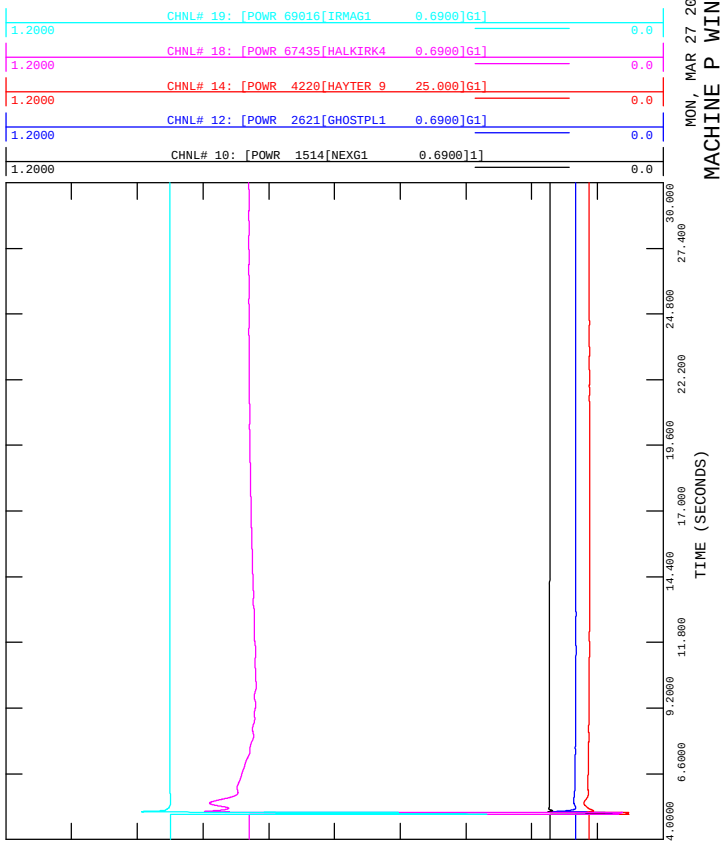


FIGURE F-23F
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-23_9L20_Cordel.out

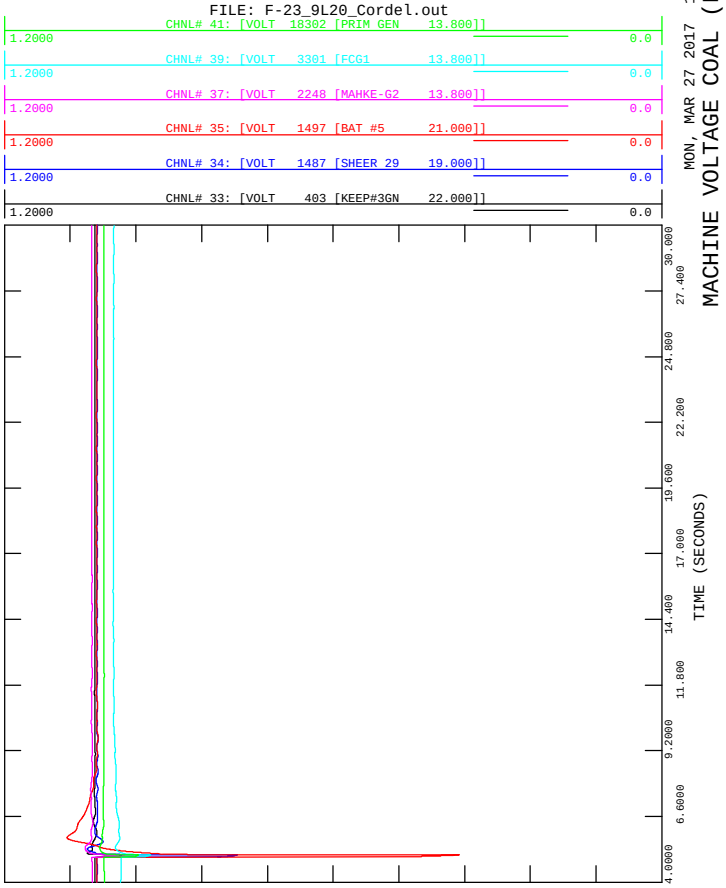


FIGURE F-23H
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-23_9L20_Cordel.out

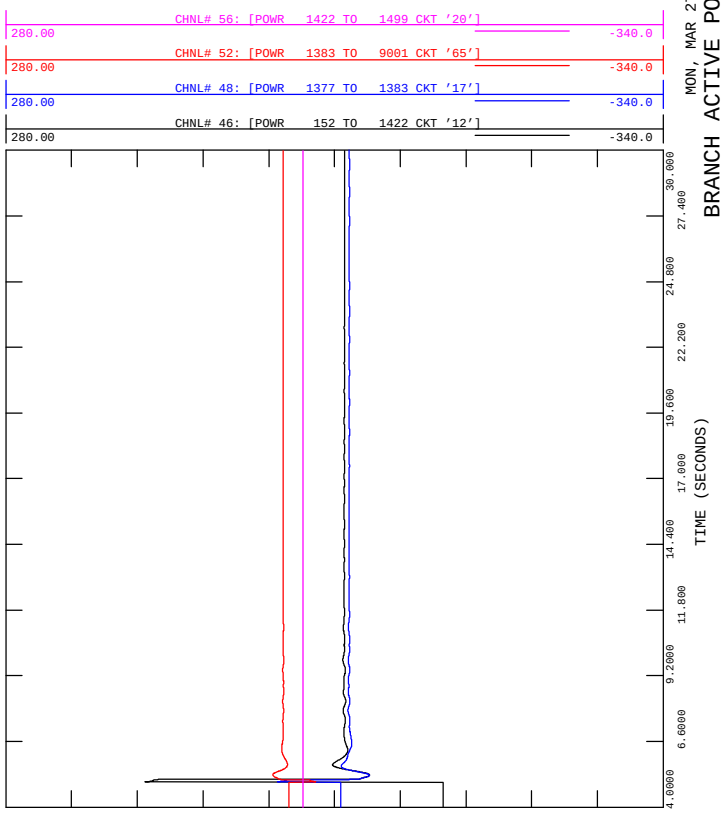


FIGURE F-23E
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-23_9L20_Cordel.out

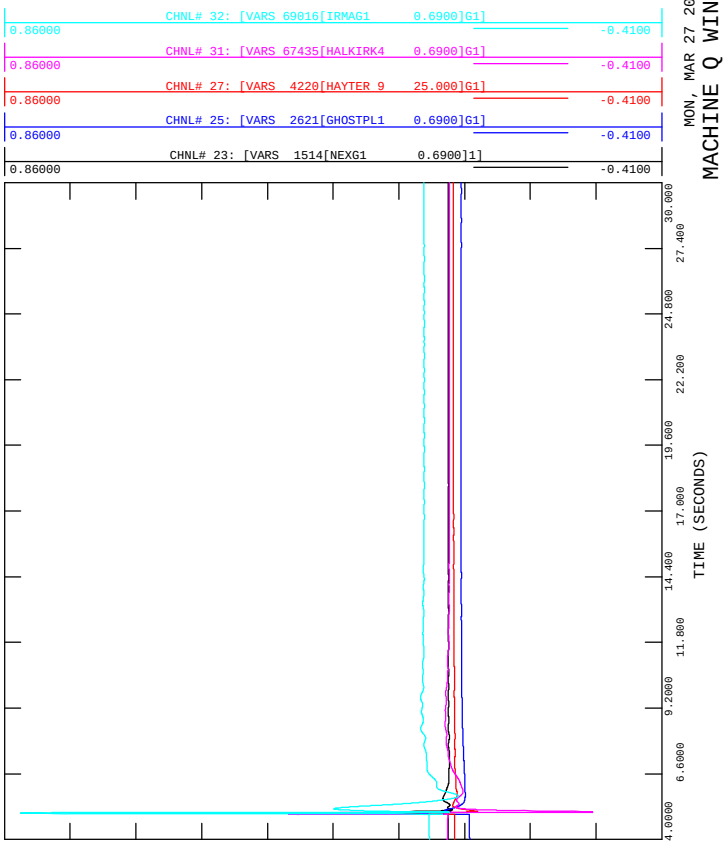


FIGURE F-23G
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-23_9L20_Cordel.out

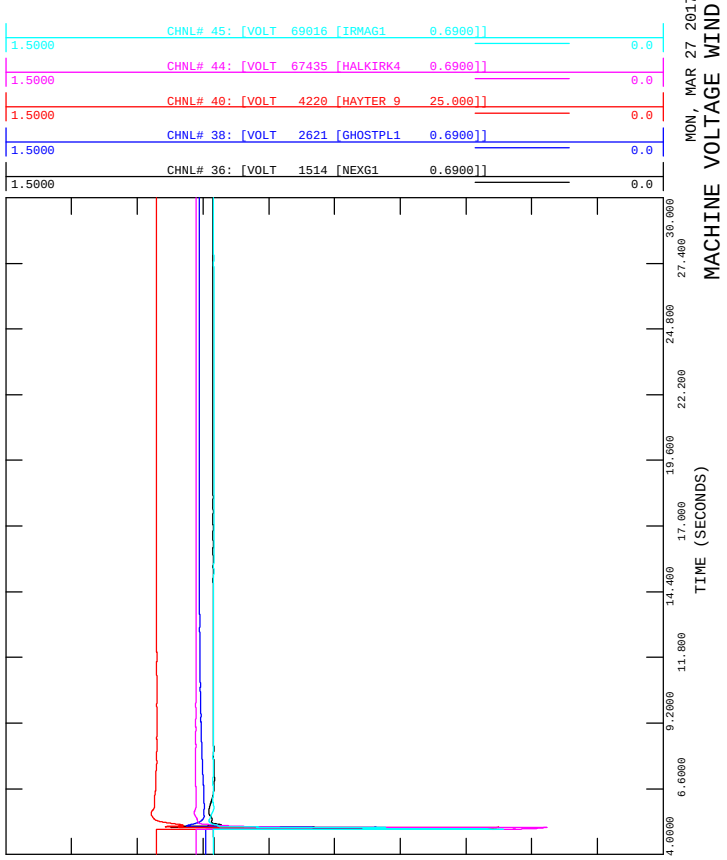


FIGURE F-23I
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-23_9L20_Cordel.out

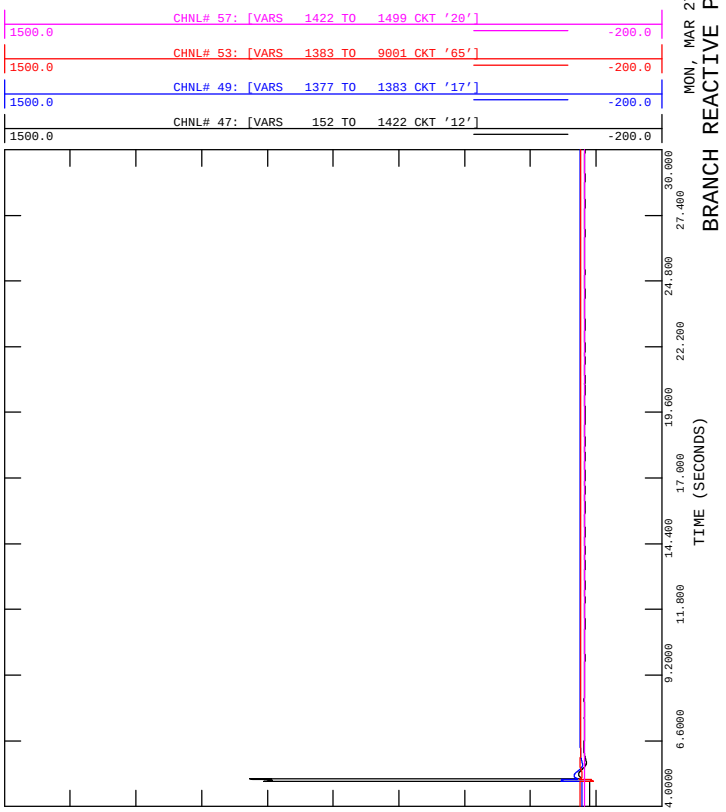


FIGURE F-24B
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-24_9L20_Nevis.out

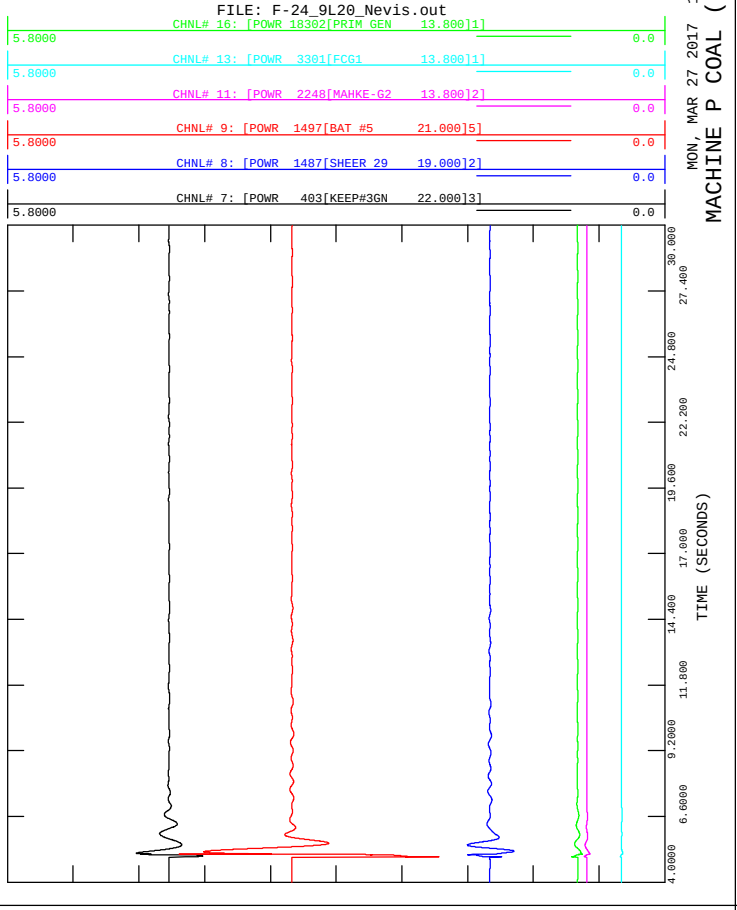


FIGURE F-24D
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-24_9L20_Nevis.out

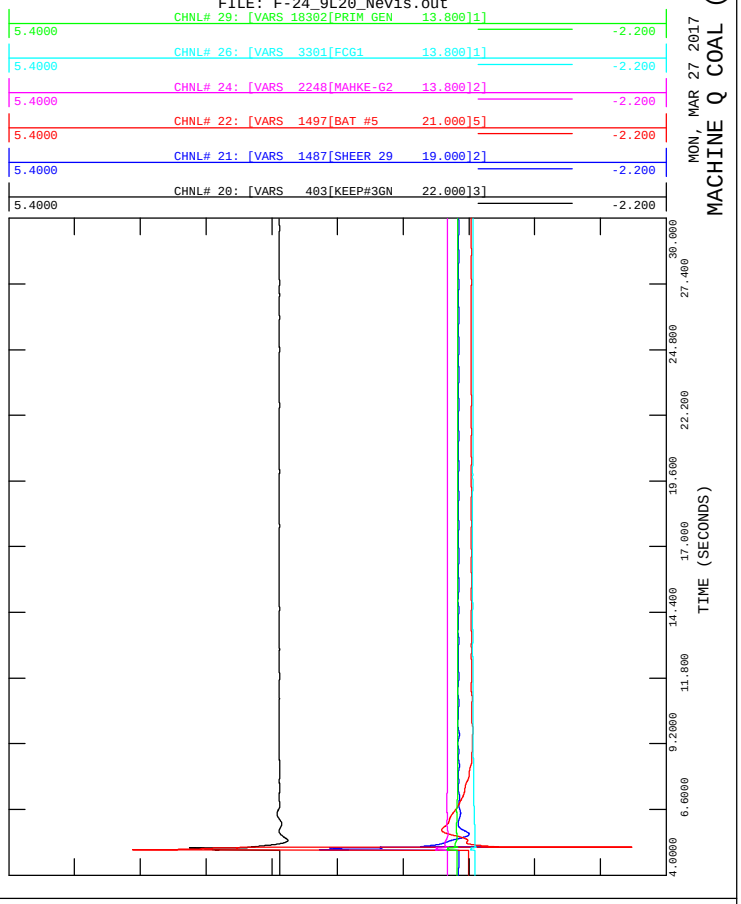


FIGURE F-24A
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-24_9L20_Nevis.out

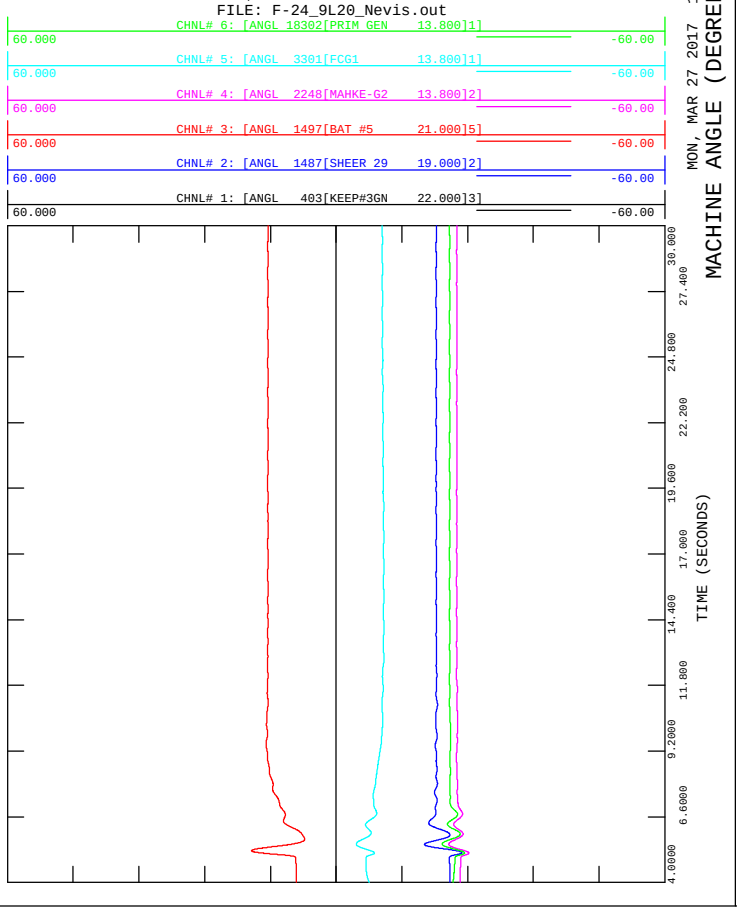


FIGURE F-24C
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-24_9L20_Nevis.out

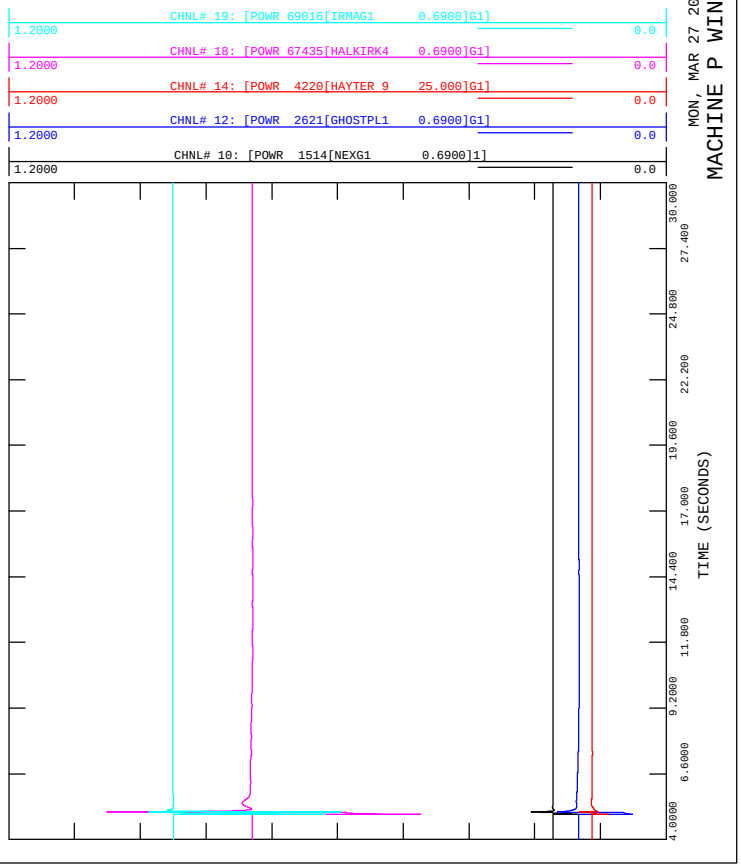


FIGURE F-24F
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-24_9L20_Nevis.out

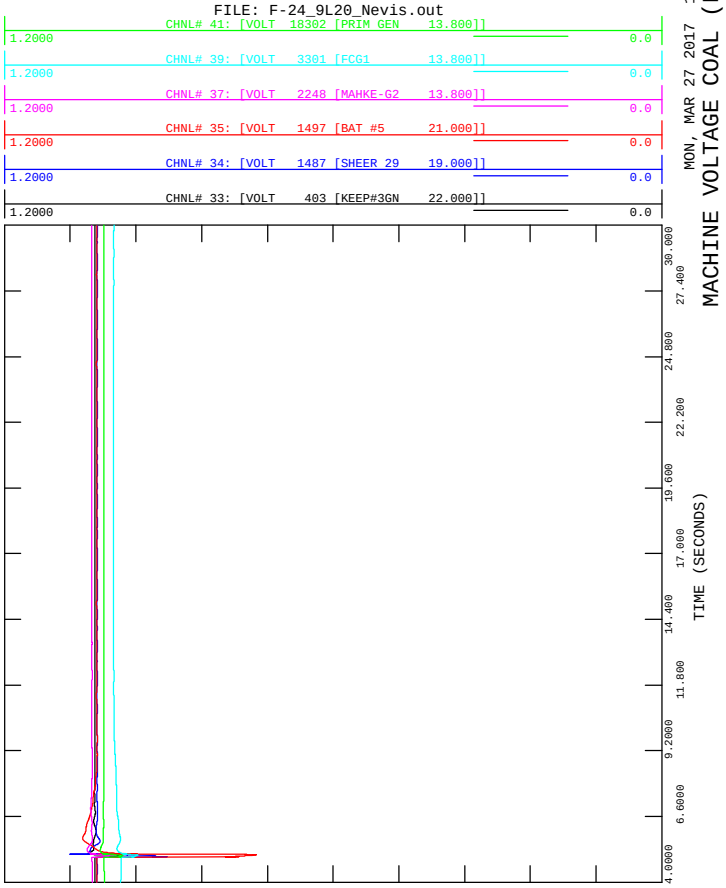


FIGURE F-24H
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-24_9L20_Nevis.out

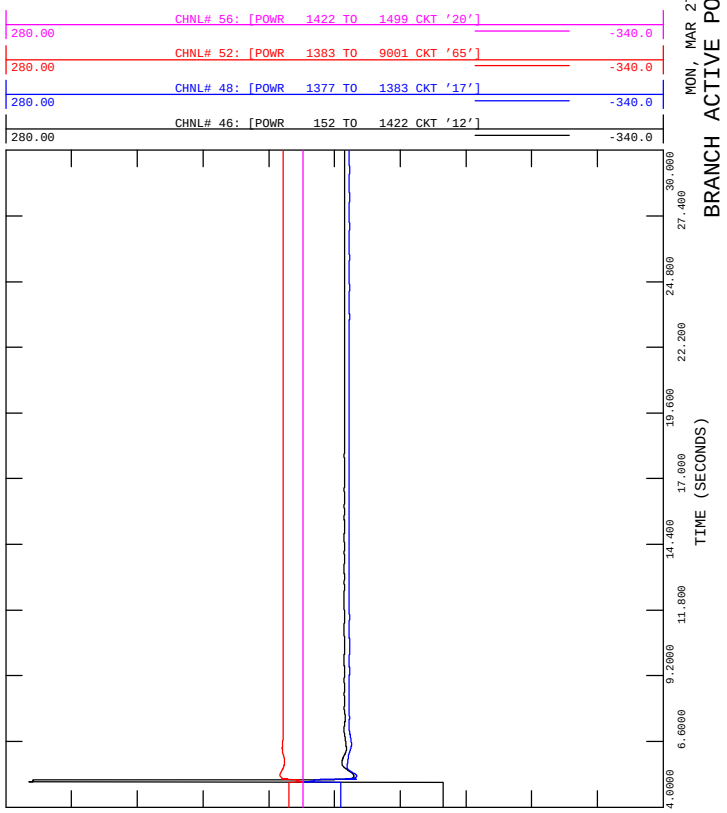


FIGURE F-24E
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-24_9L20_Nevis.out

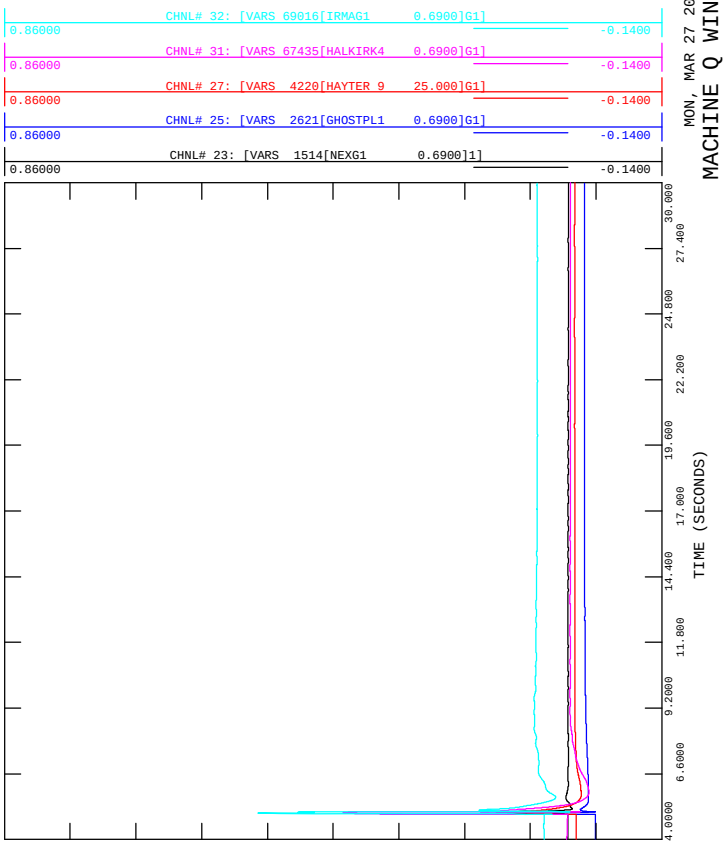


FIGURE F-24G
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-24_9L20_Nevis.out

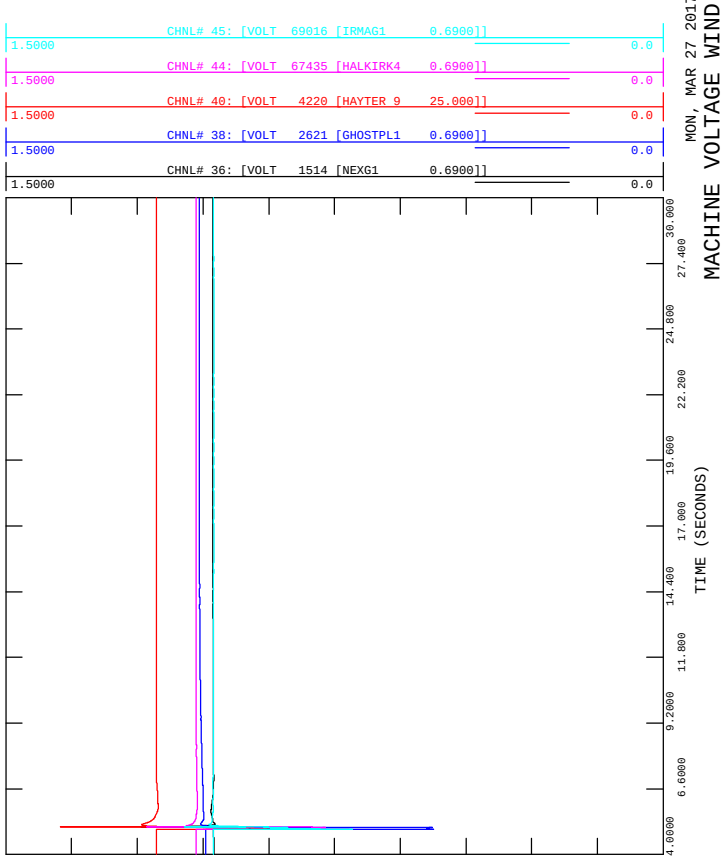


FIGURE F-24I
2017SP, ALT2
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-24_9L20_Nevis.out

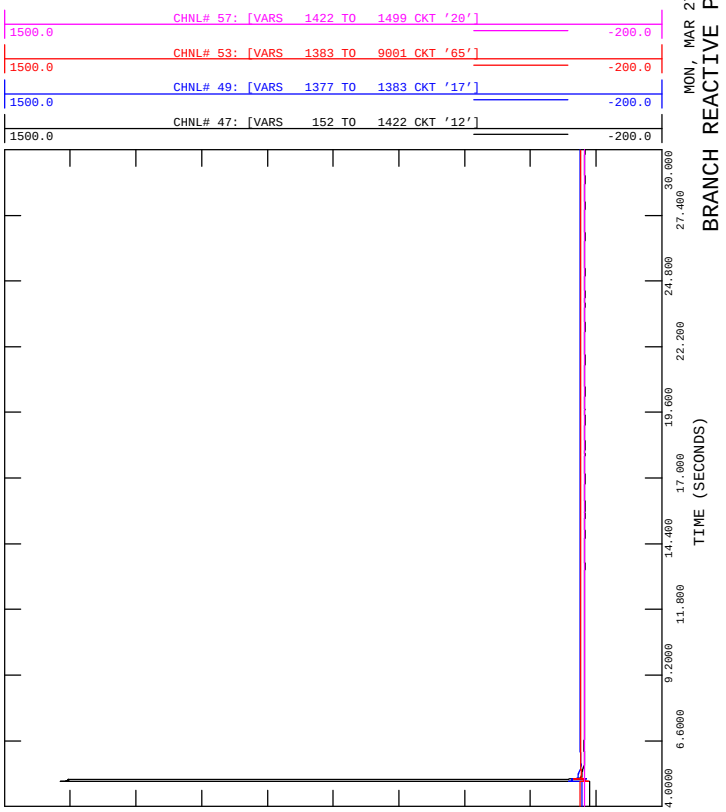


FIGURE F-25B
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-25_9L59_Anderson.out

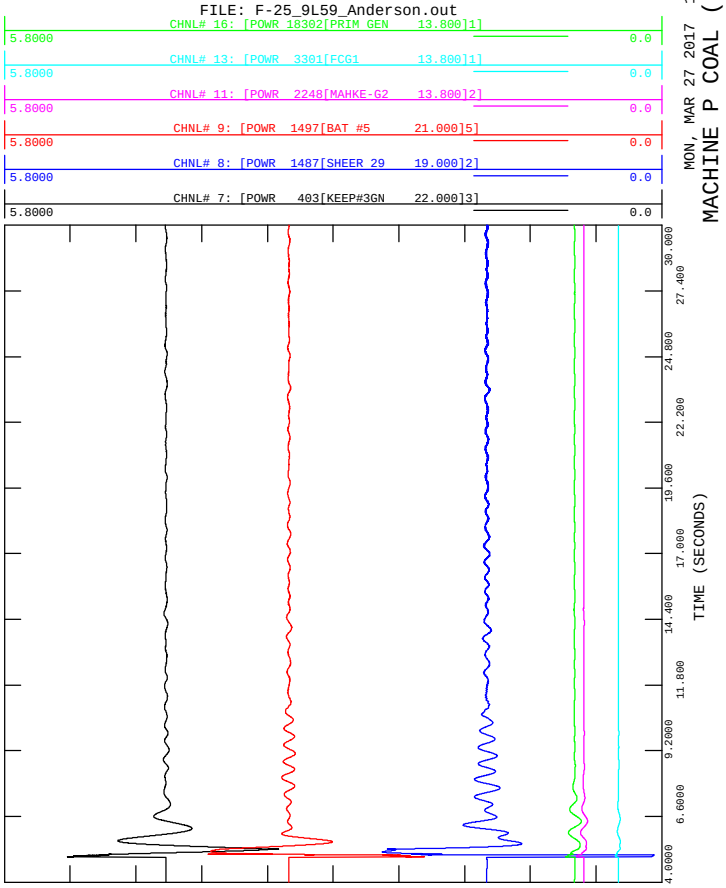


FIGURE F-25D
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-25_9L59_Anderson.out

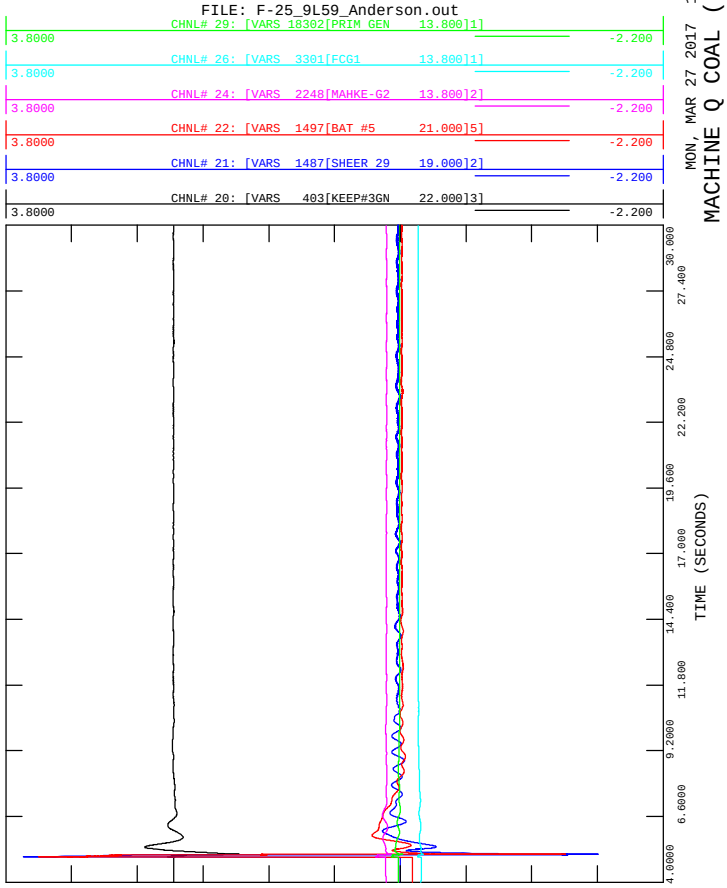


FIGURE F-25A
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-25_9L59_Anderson.out

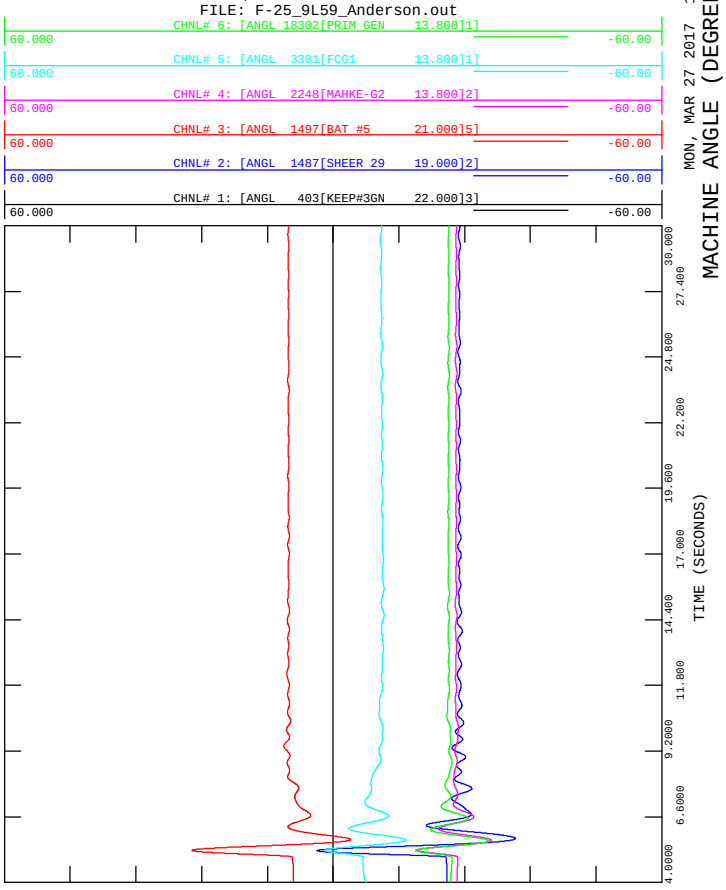


FIGURE F-25C
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-25_9L59_Anderson.out

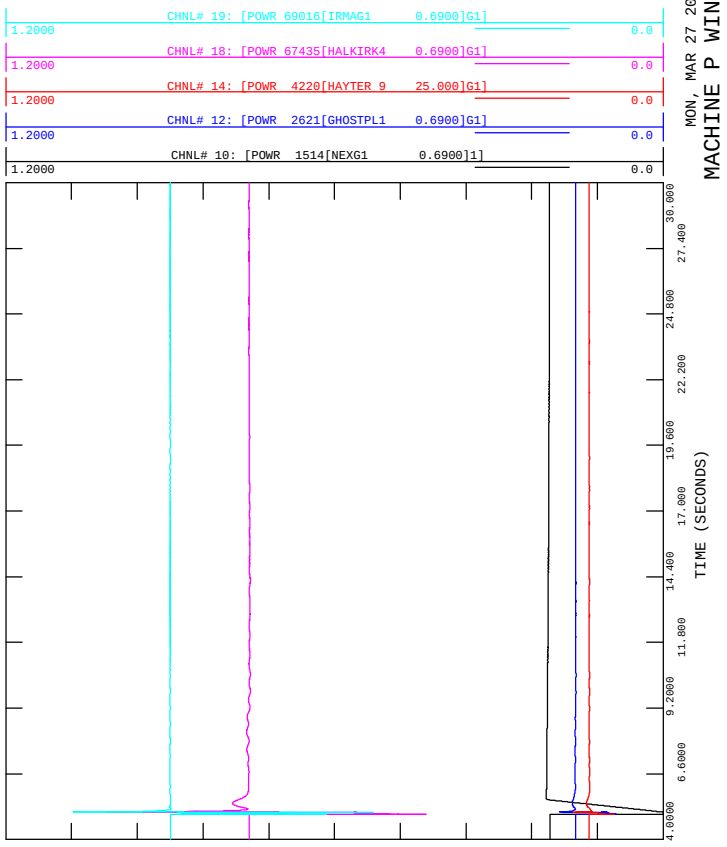


FIGURE F-25F
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-25_9L59_Anderson.out

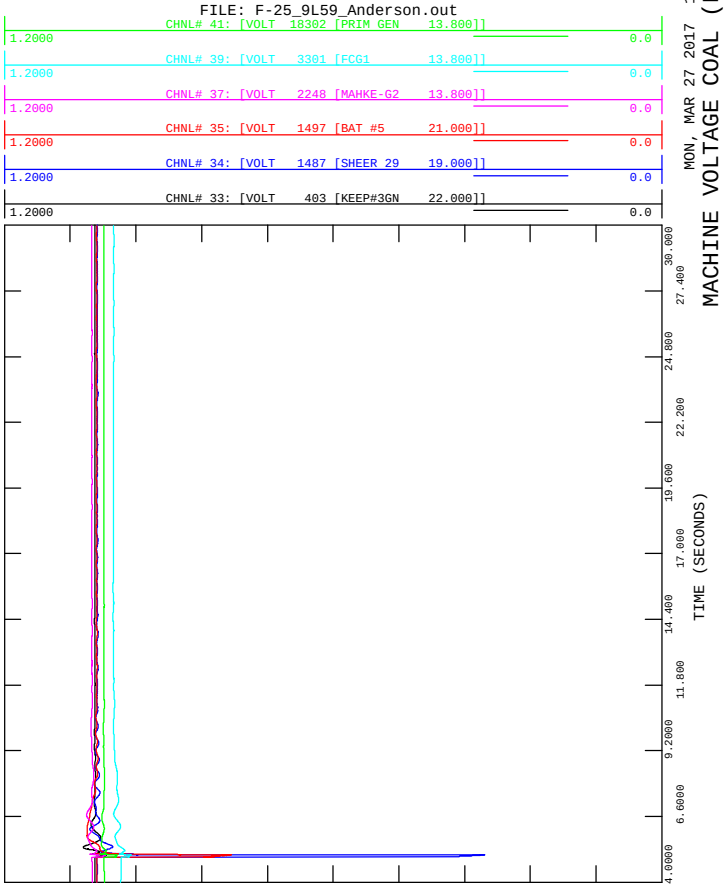


FIGURE F-25H
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-25_9L59_Anderson.out

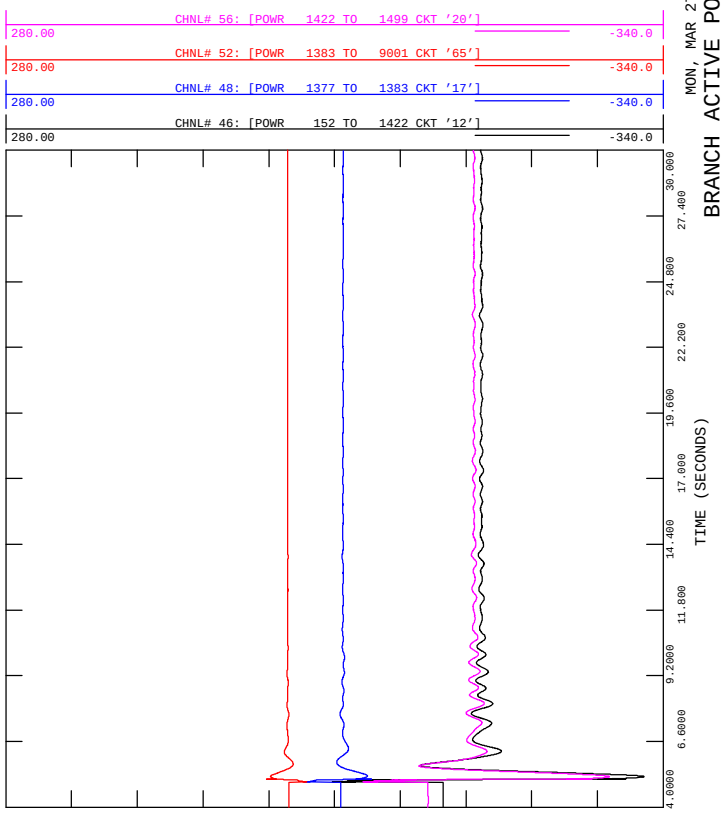


FIGURE F-25E
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-25_9L59_Anderson.out

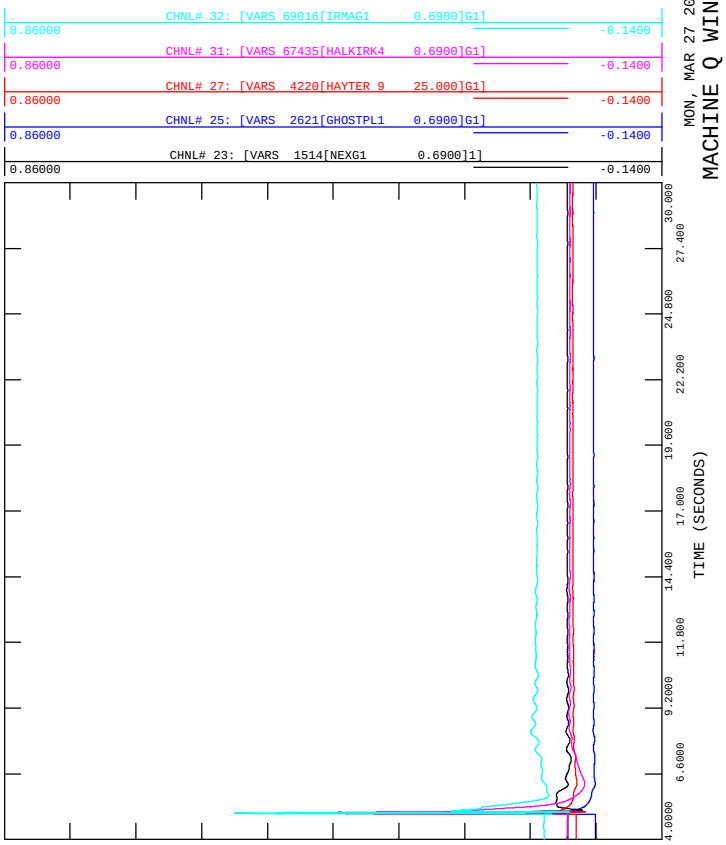


FIGURE F-25G
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-25_9L59_Anderson.out

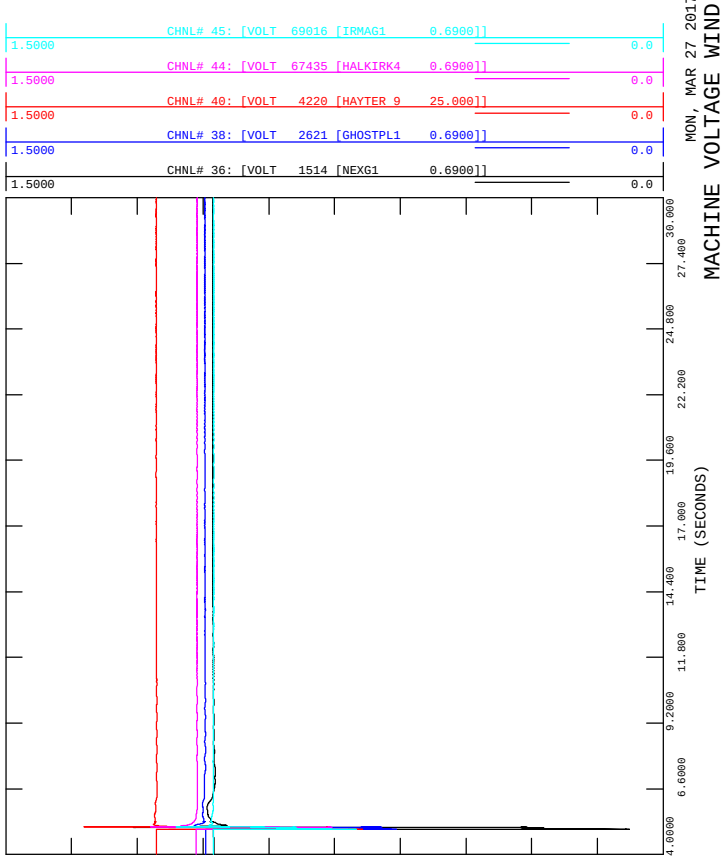


FIGURE F-25I
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-25_9L59_Anderson.out

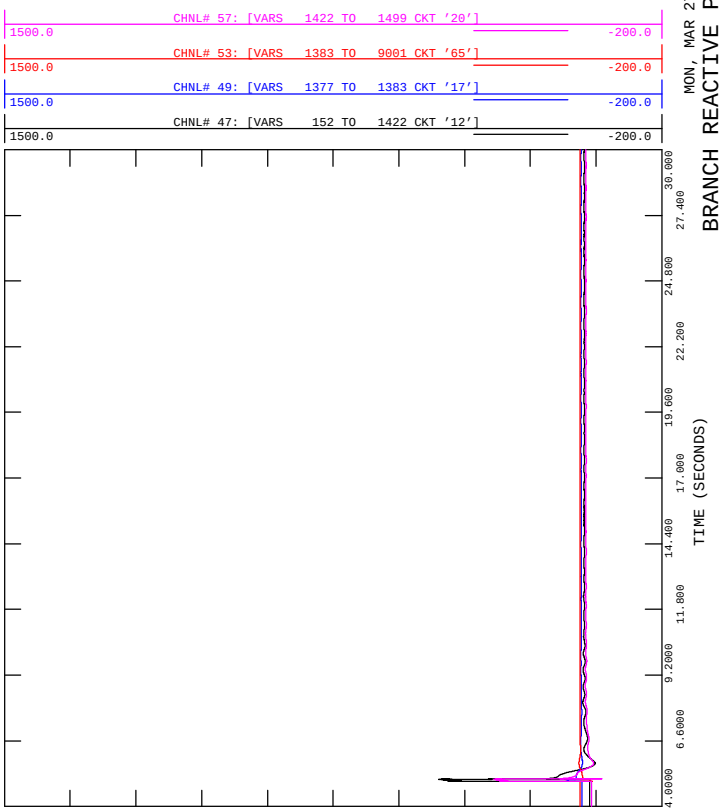


FIGURE F-26B
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L59_Tinchebray.out

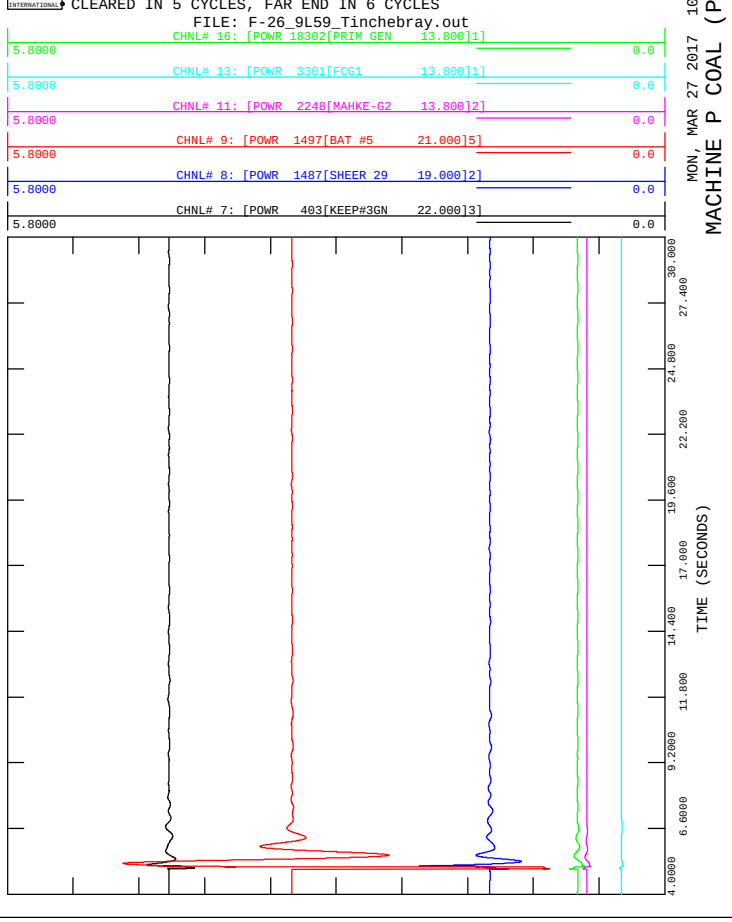


FIGURE F-26D
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L59_Tinchebray.out

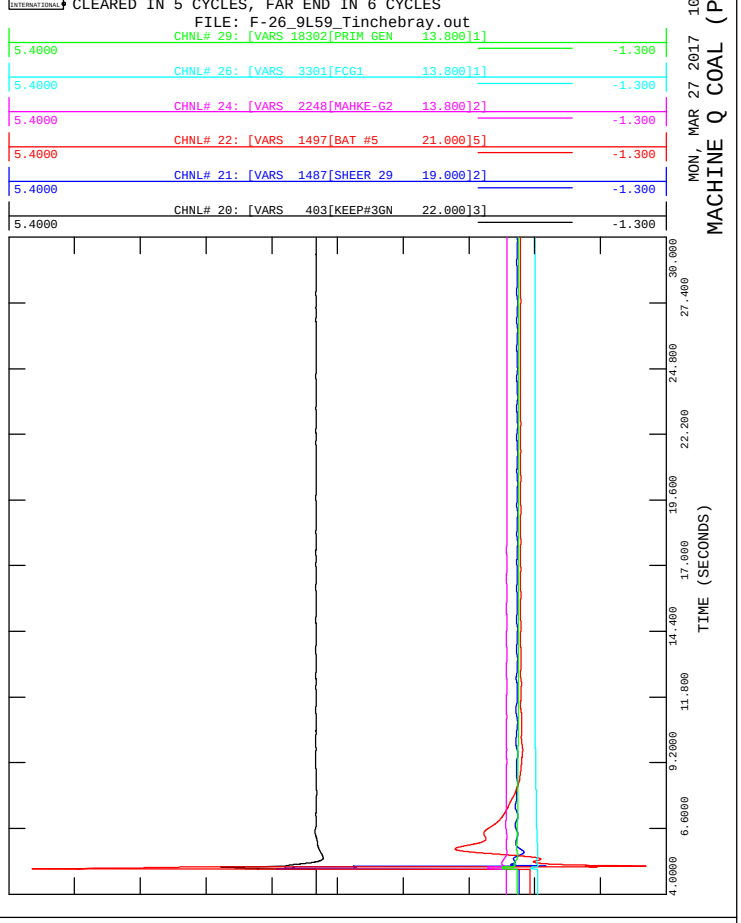


FIGURE F-26A
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L59_Tinchebray.out

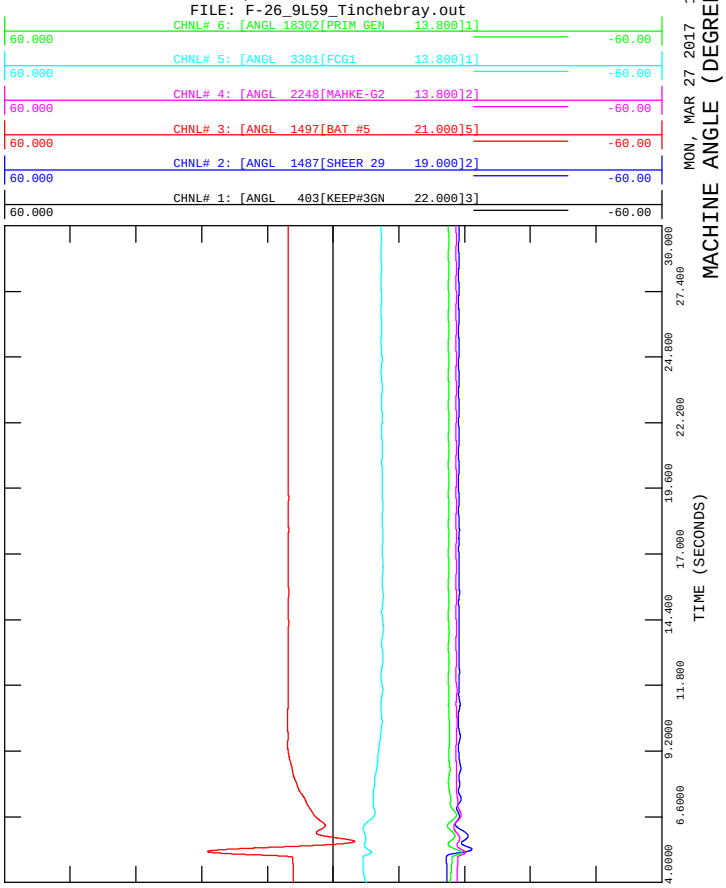


FIGURE F-26C
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L59_Tinchebray.out

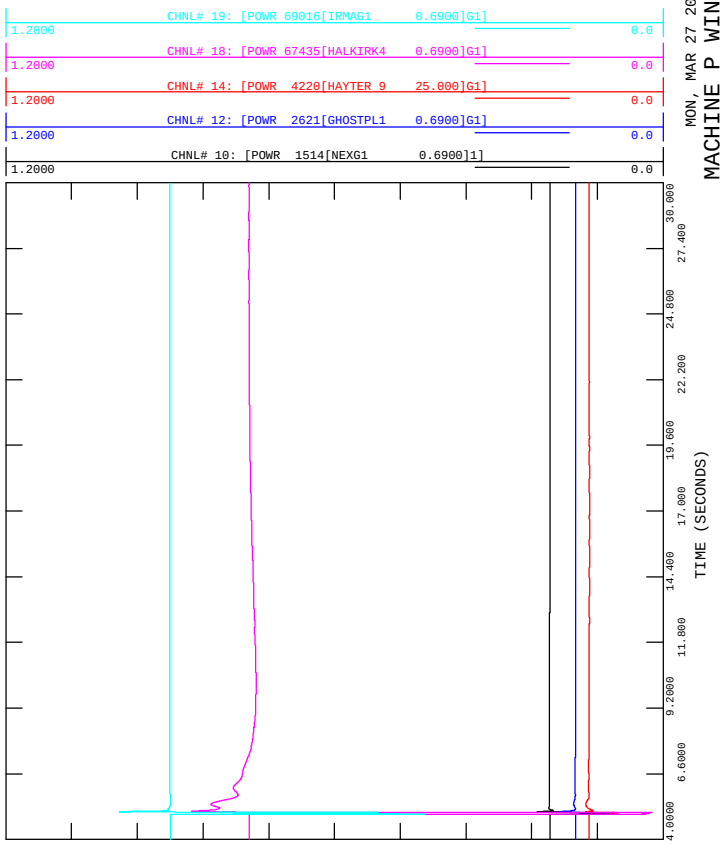


FIGURE F-26F
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L59_Tinchebray.out

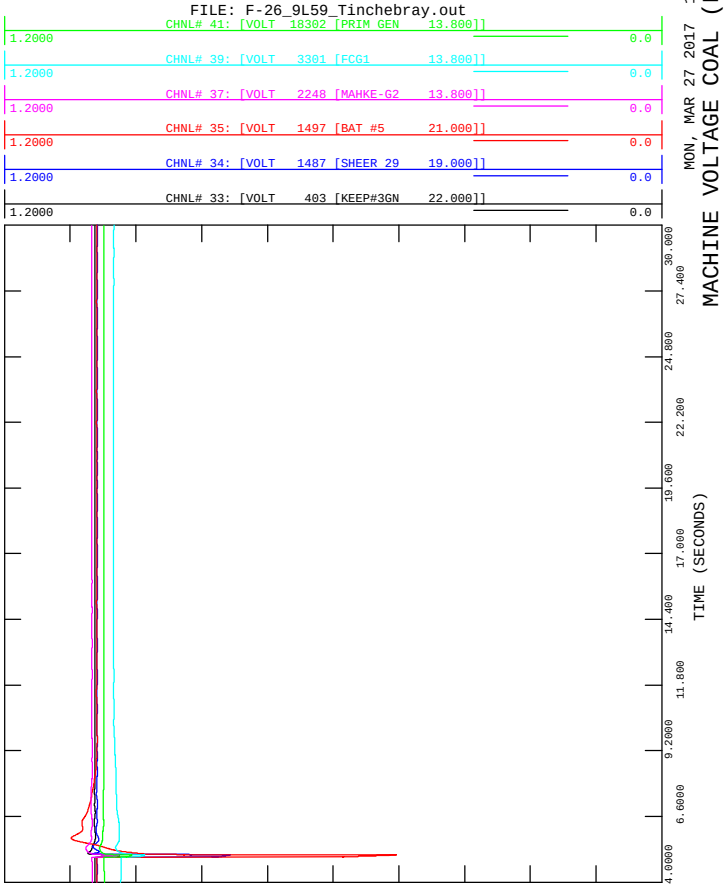


FIGURE F-26H
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L59_Tinchebray.out

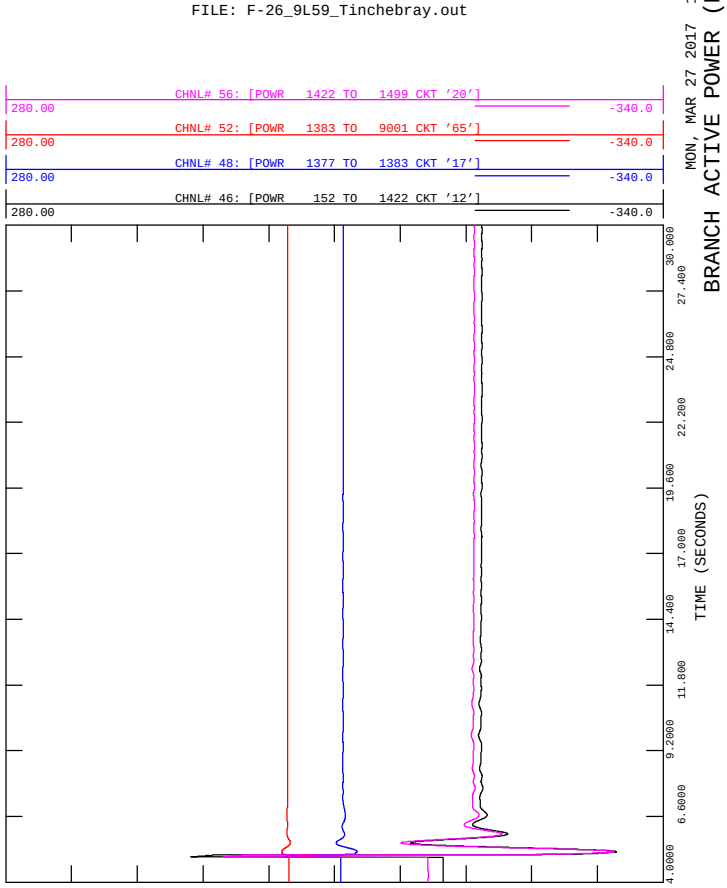


FIGURE F-26E
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L59_Tinchebray.out

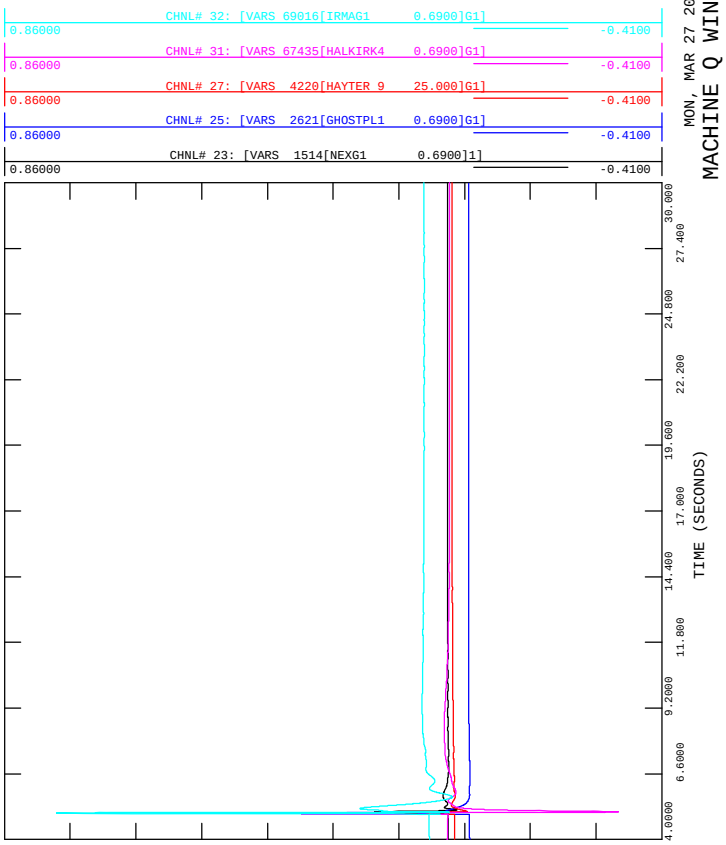


FIGURE F-26G
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L59_Tinchebray.out

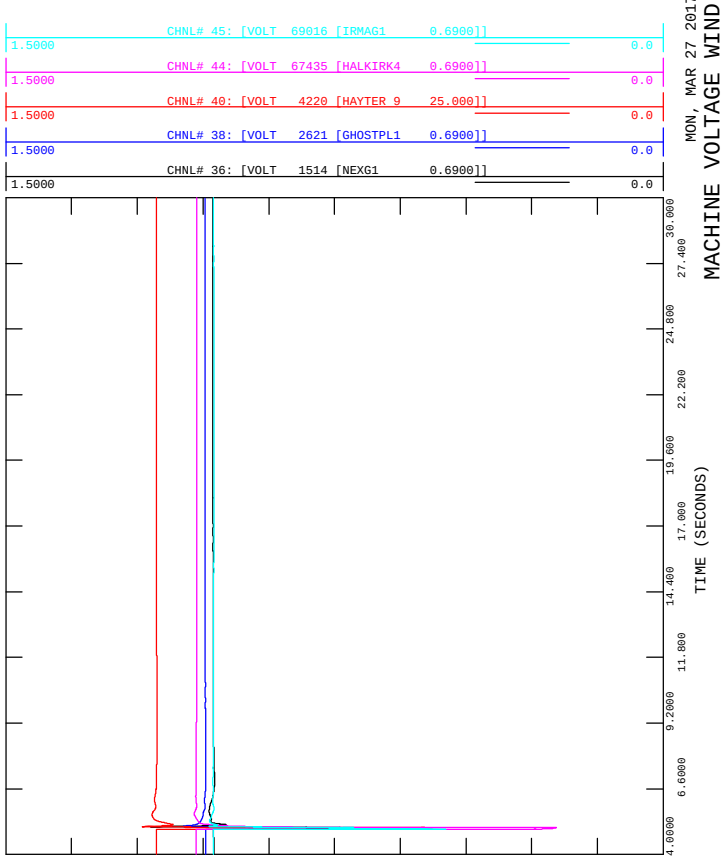


FIGURE F-26I
2017SP, ALT2
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L59_Tinchebray.out

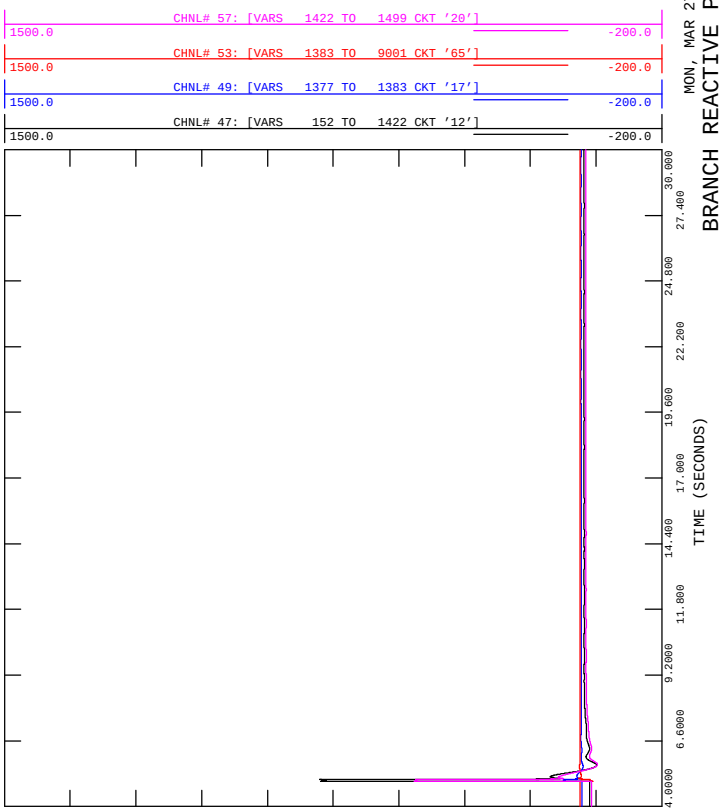


FIGURE F-27B
2017SP, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_912L_Nevis.out

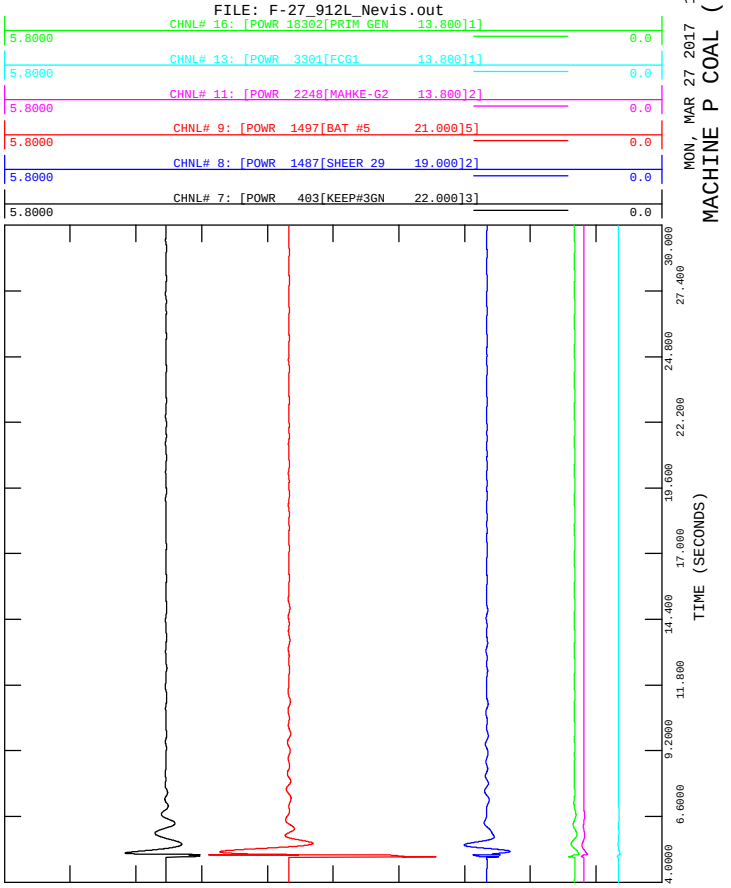


FIGURE F-27D
2017SP, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_912L_Nevis.out

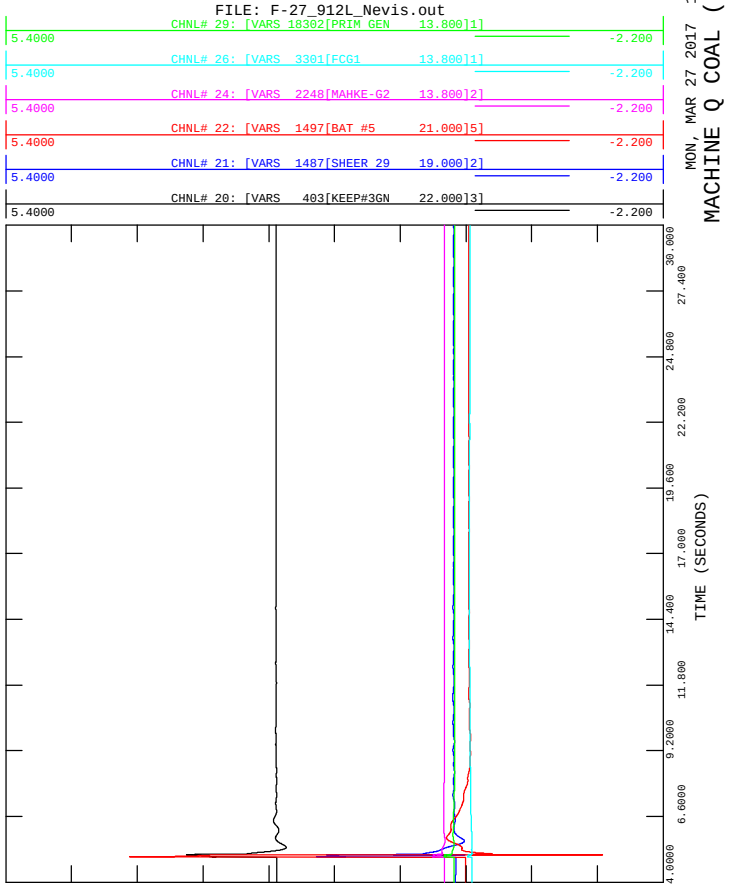


FIGURE F-27A
2017SP, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_912L_Nevis.out

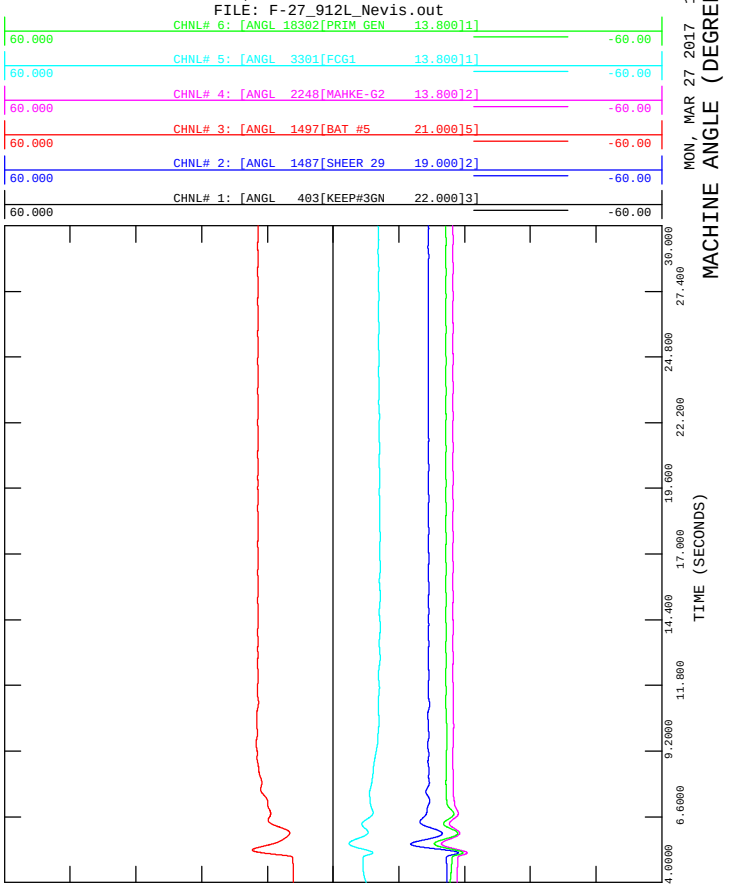


FIGURE F-27C
2017SP, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_912L_Nevis.out

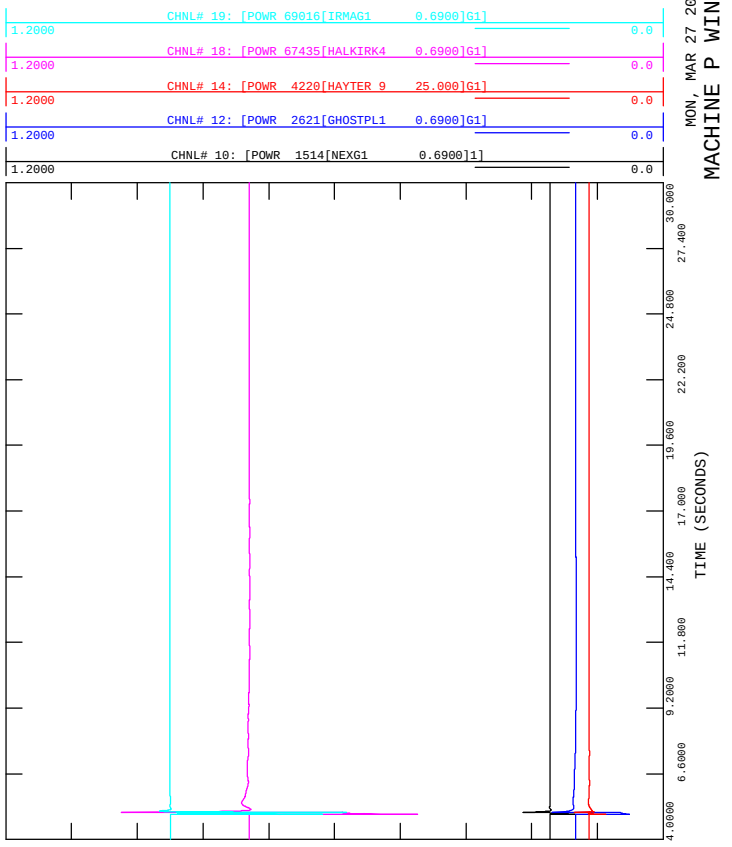


FIGURE F-27F
2017SP, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_912L_Nevis.out

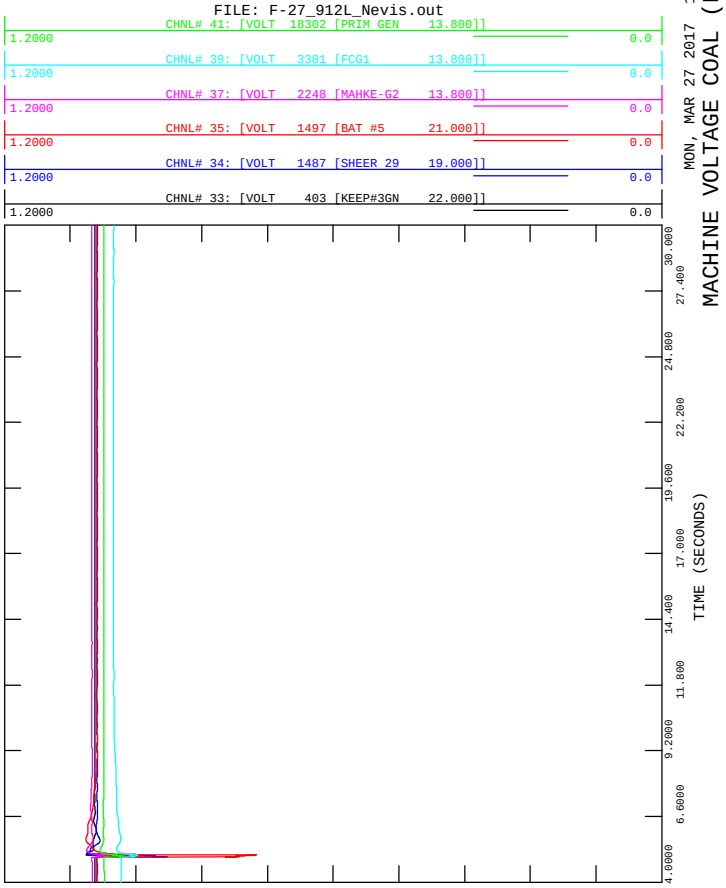


FIGURE F-27H
2017SP, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_912L_Nevis.out

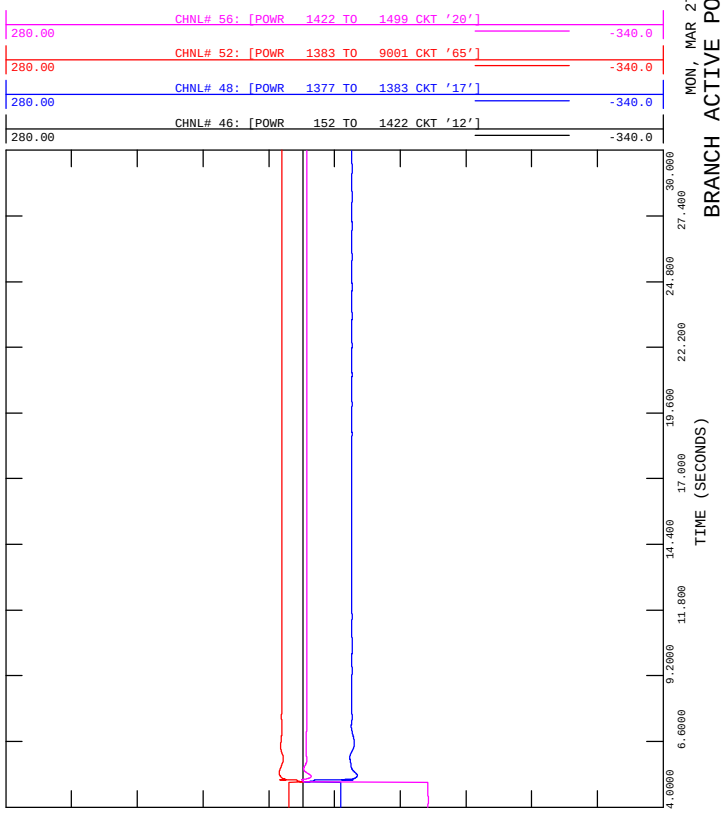


FIGURE F-27E
2017SP, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_912L_Nevis.out

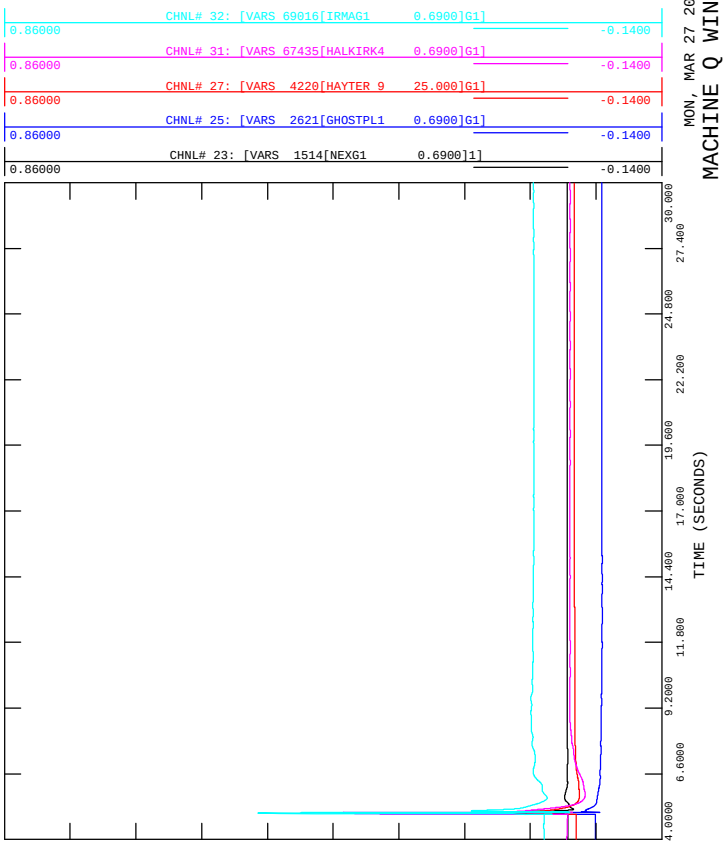


FIGURE F-27G
2017SP, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_912L_Nevis.out

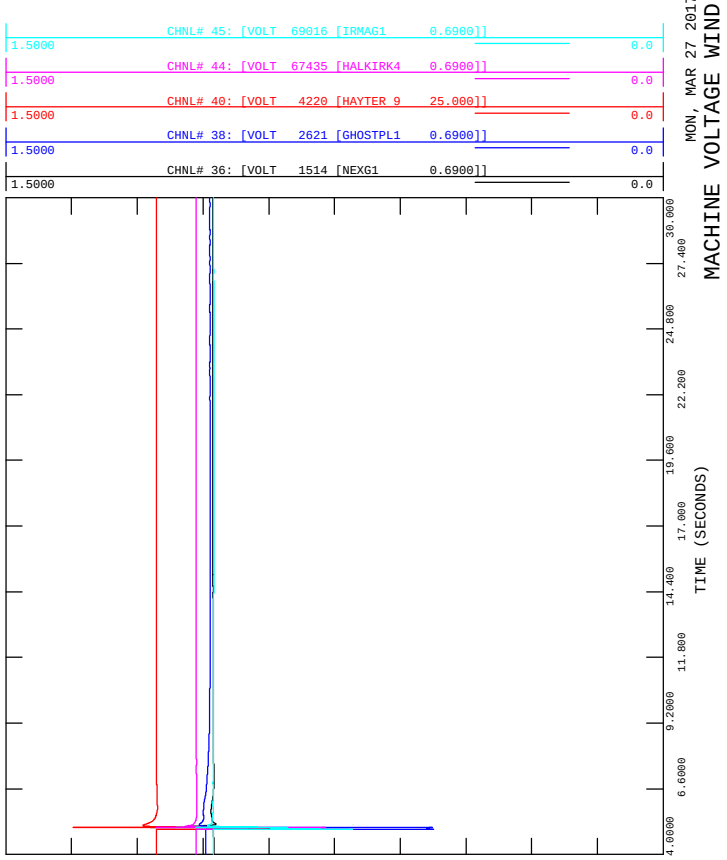


FIGURE F-27I
2017SP, ALT2
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_912L_Nevis.out

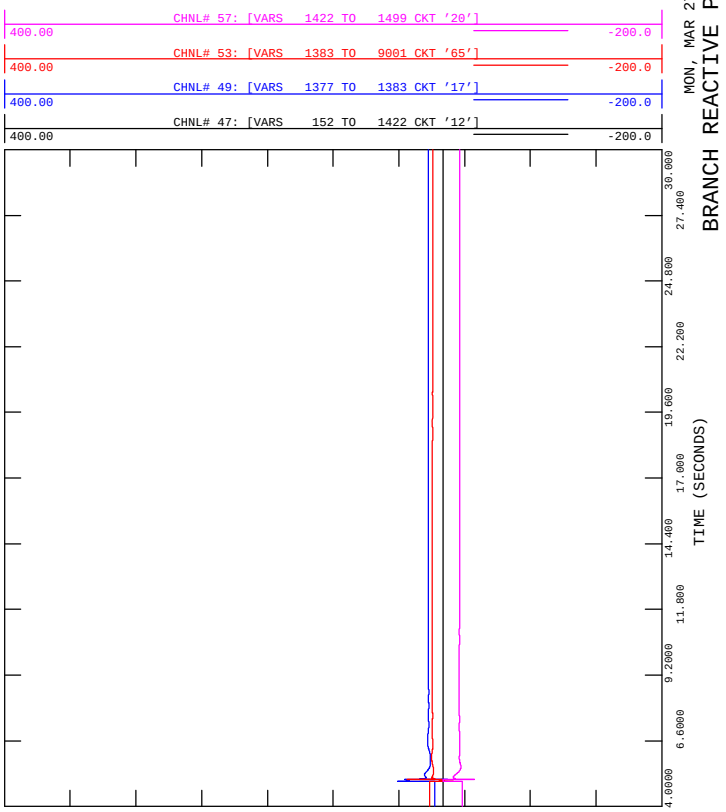


FIGURE F-28B
2017SP, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_912L_RedDeer.out

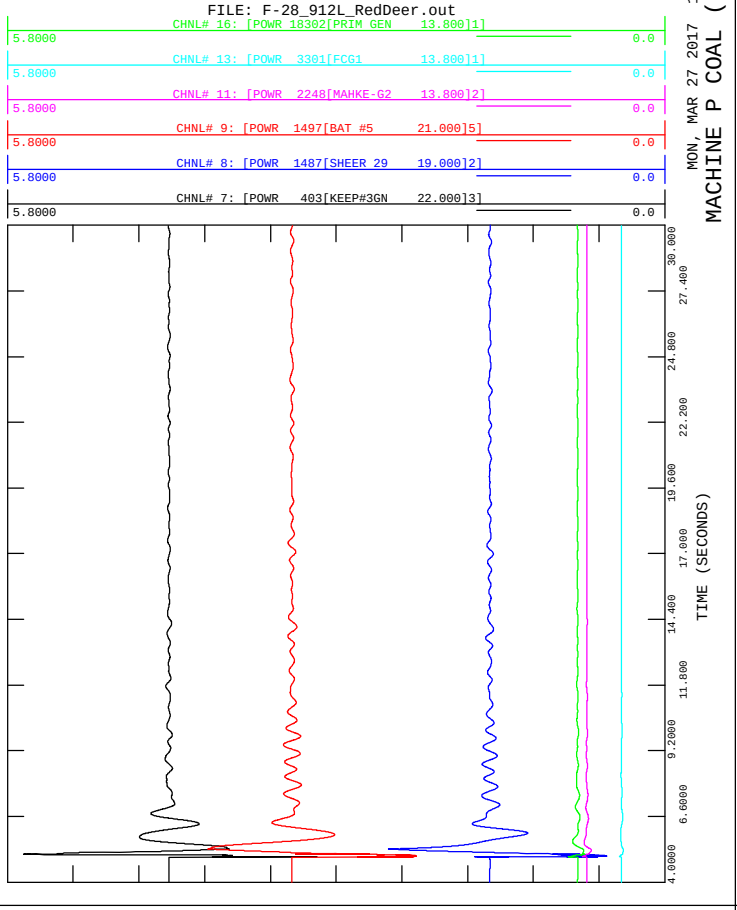


FIGURE F-28D
2017SP, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_912L_RedDeer.out

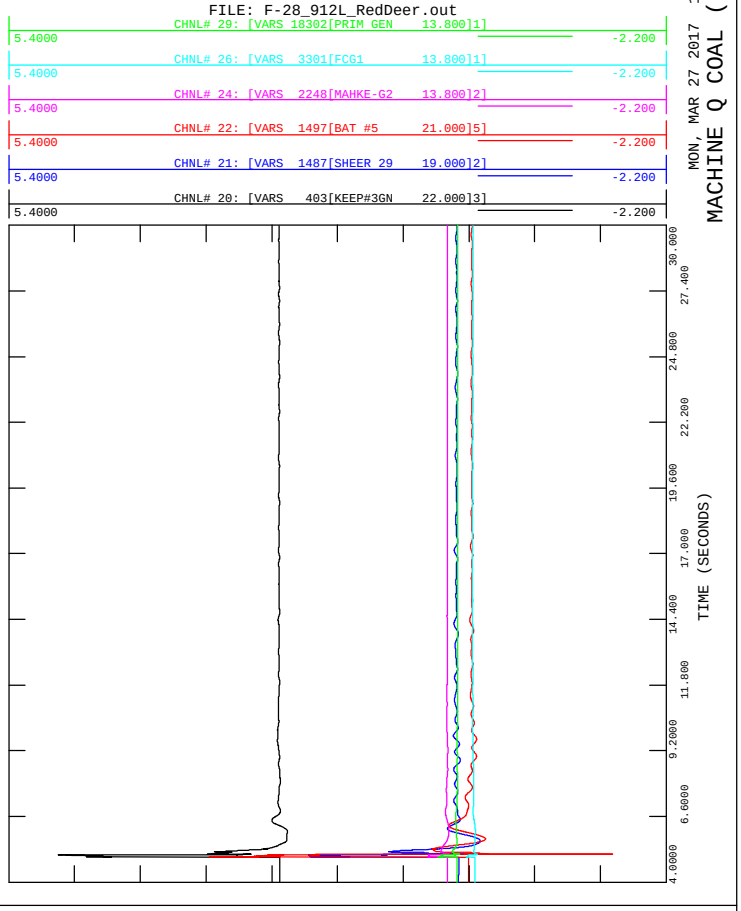


FIGURE F-28A
2017SP, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_912L_RedDeer.out

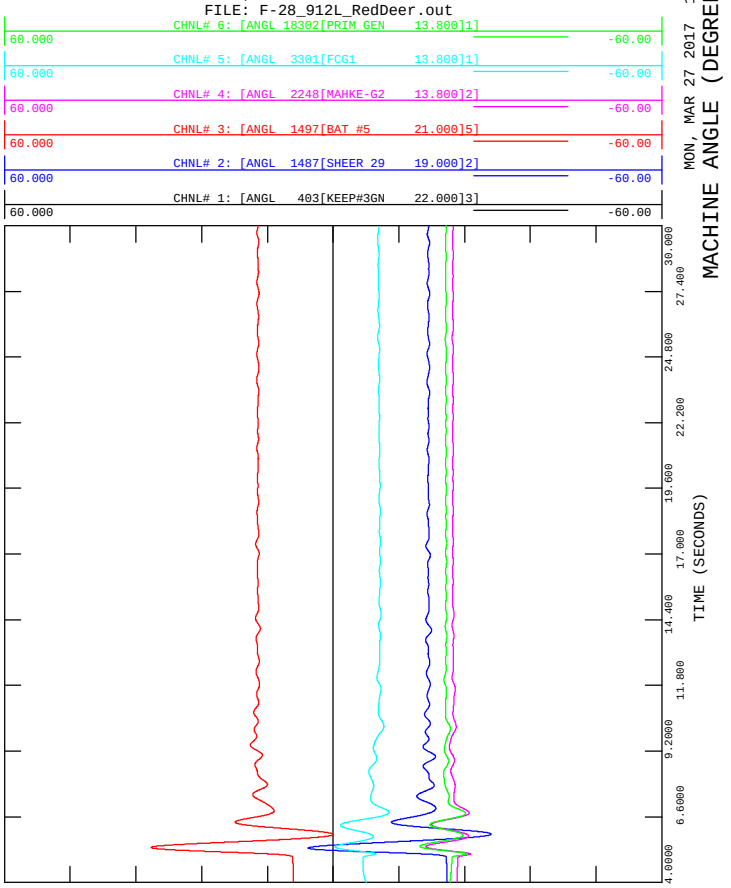


FIGURE F-28C
2017SP, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_912L_RedDeer.out

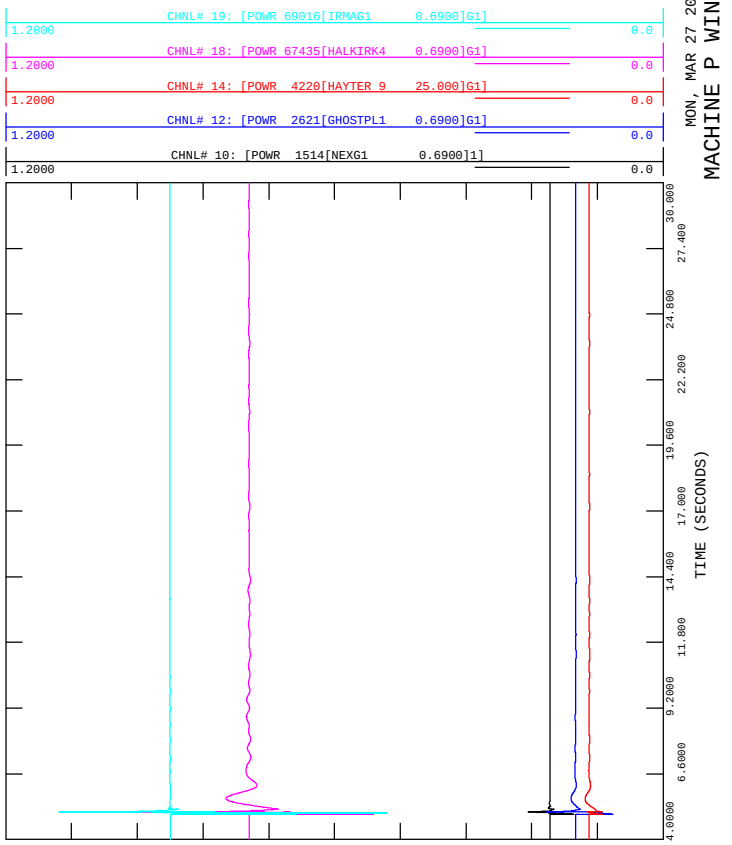


FIGURE F-28F
2017SP, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_912L_RedDeer.out

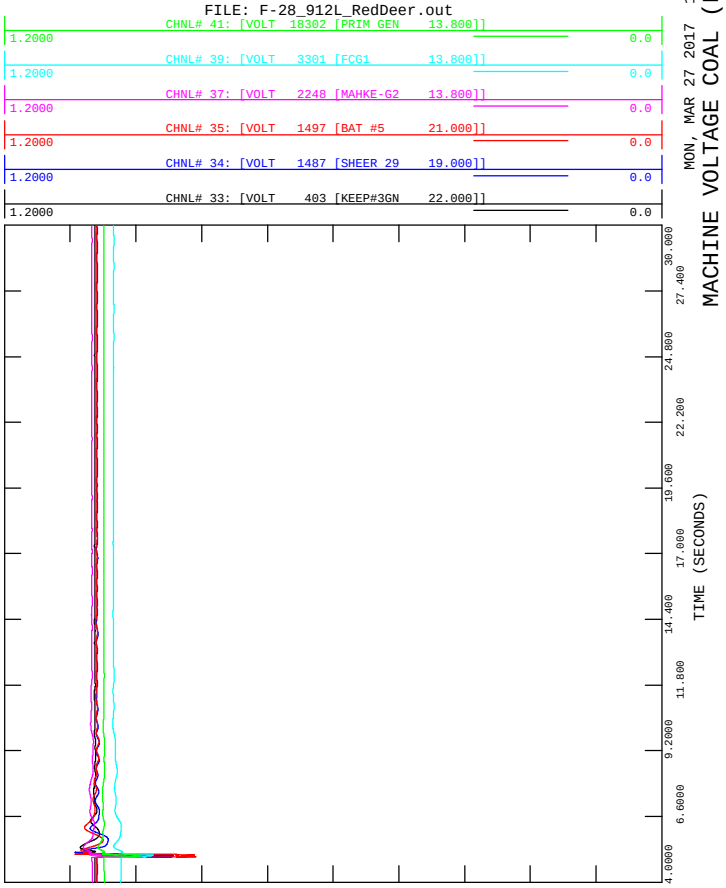


FIGURE F-28H
2017SP, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_912L_RedDeer.out

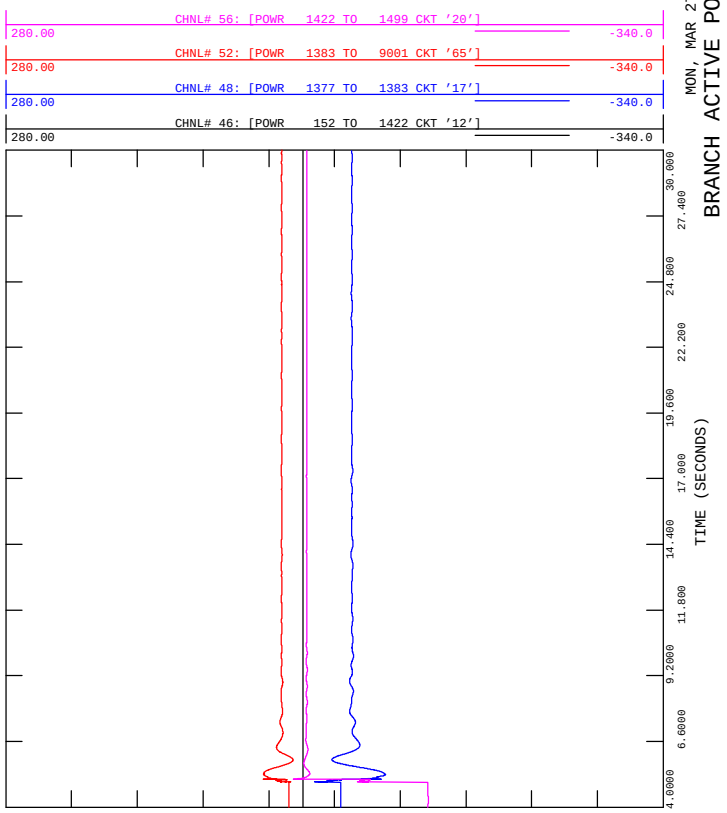


FIGURE F-28E
2017SP, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_912L_RedDeer.out

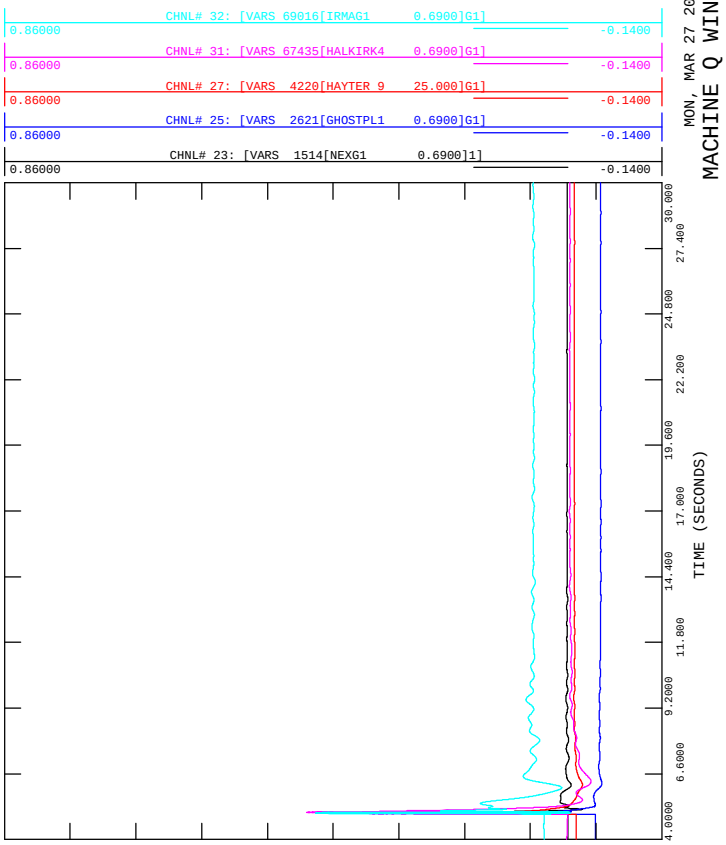


FIGURE F-28G
2017SP, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_912L_RedDeer.out

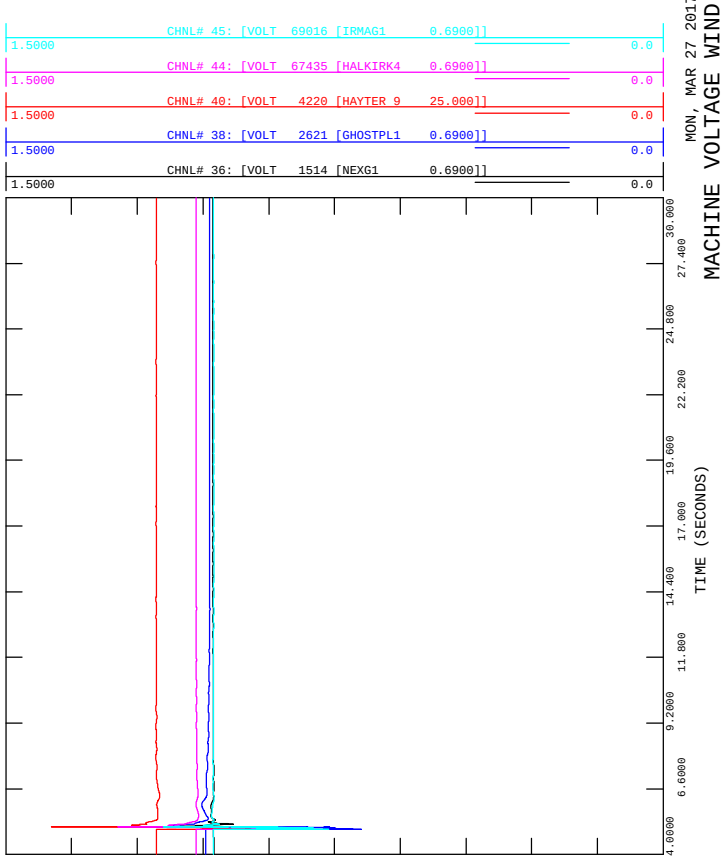
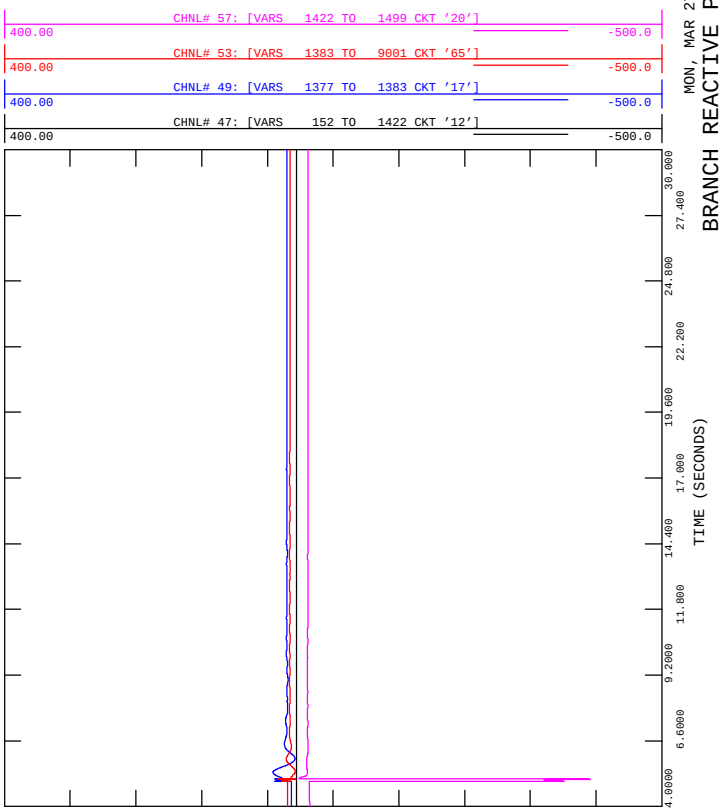


FIGURE F-28I
2017SP, ALT2
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_912L_RedDeer.out



ATTACHMENT G

Power Flow Diagrams

after RAS Action

Table G-1: Summary of Power Flow Diagrams after RAS Action

Figure #	Contingency
2017SL, Alt 2, Only Mainstream Wainwright WAGF Proceeds	
G-1	9L29 (946S Oakland to 963S Coyote Lake)
2017SP, Alt 2, Only Mainstream Wainwright WAGF Proceeds	
G-2	395ST1* (395S North Holden)
G-3	749L\749AL (648S Metiskow to 899S Edgerton)
G-4	7L701\7LA701\701L (223S Strome to 757S Battle River)
G-5	899ST3a* (899S Edgerton)
G-6	9L29 (946S Oakland to 963S Coyote Lake)
G-7	EATL

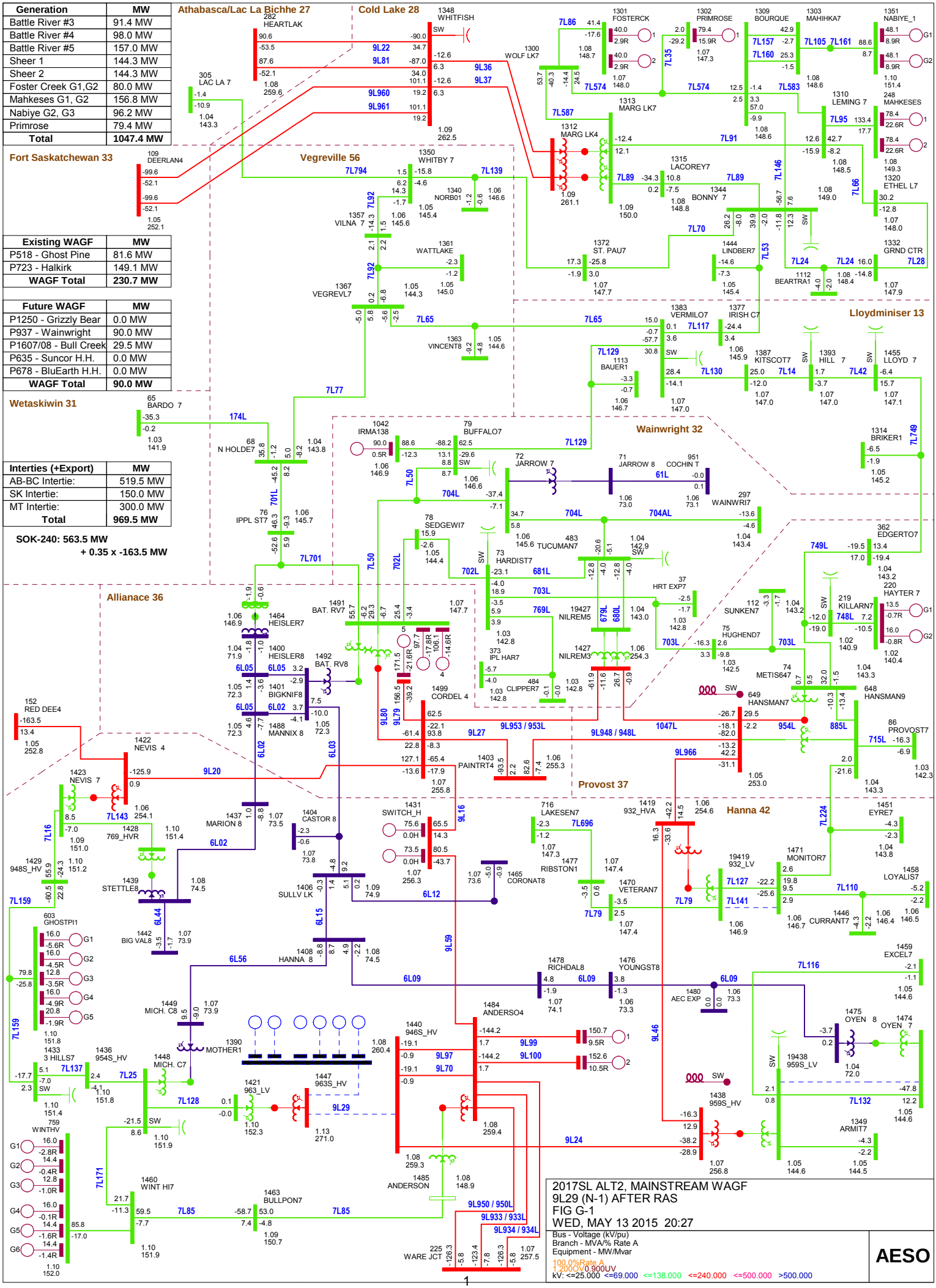
Generation	MW
Battle River #3	91.4 MW
Battle River #4	98.0 MW
Battle River #5	157.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	156.8 MW
Nabiye G2, G3	96.2 MW
Primrose	79.4 MW
Total	**1047.4 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	0.0 MW
P678 - BluEarth H.H.	0.0 MW
WAGF Total	**90.0 MW**

Interties (+Export)	MW
AB-BC Intertie:	519.5 MW
SK Intertie:	150.0 MW
MT Intertie:	300.0 MW
Total	**969.5 MW**

SOK-240: 563.5 MW
+ 0.35 x -163.5 MW



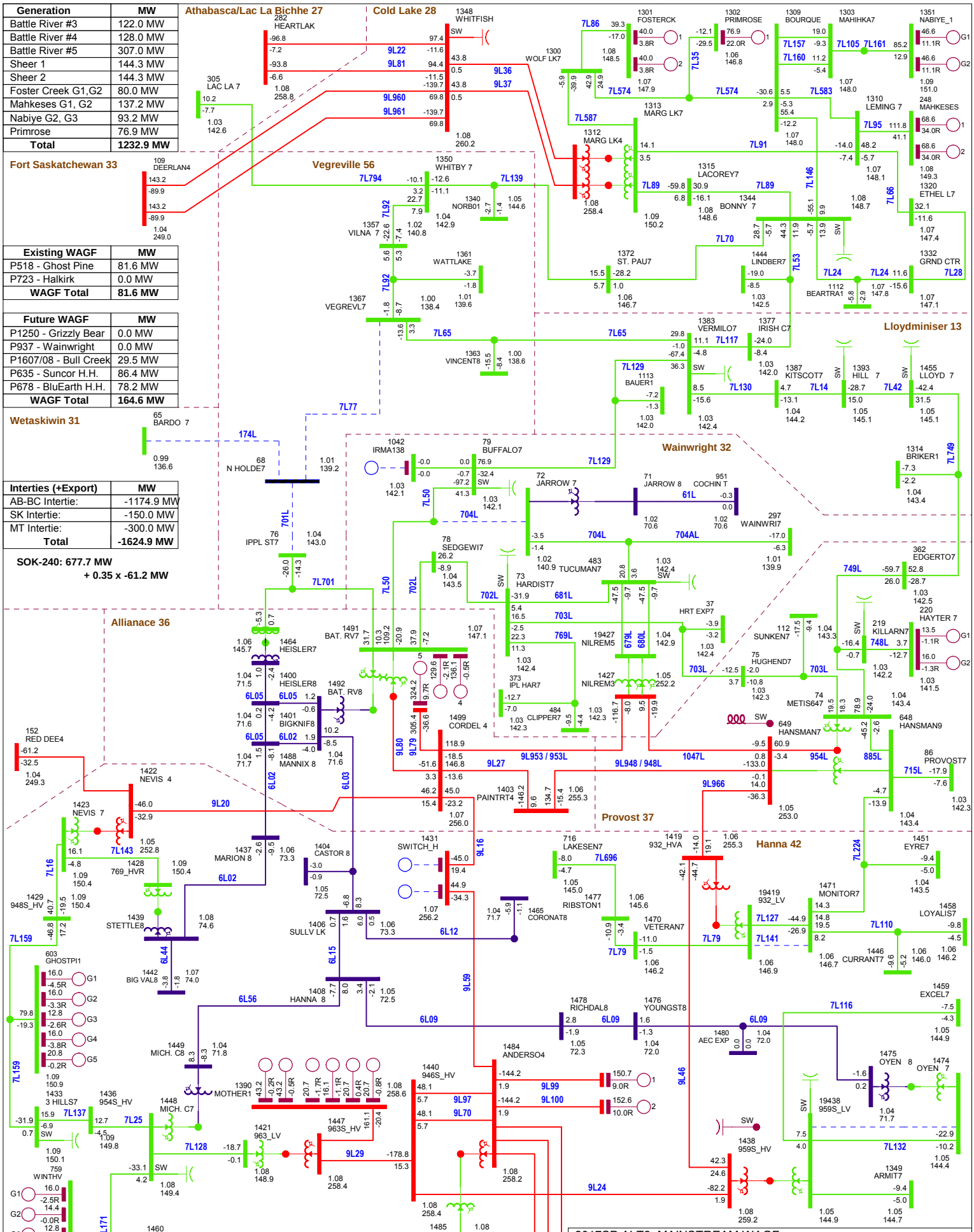
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	0.0 MW
WAGF Total	**81.6 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1174.9 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1624.9 MW**

SOK-240: 677.7 MW
+ 0.35 x -61.2 MW



2017SP ALT2, MAINSTREAM WAGF
395ST1* (N-1) AFTER RAS
FIG G-2
WED, MAY 13 2015 20:27

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
1.200OV0.900UV
kV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

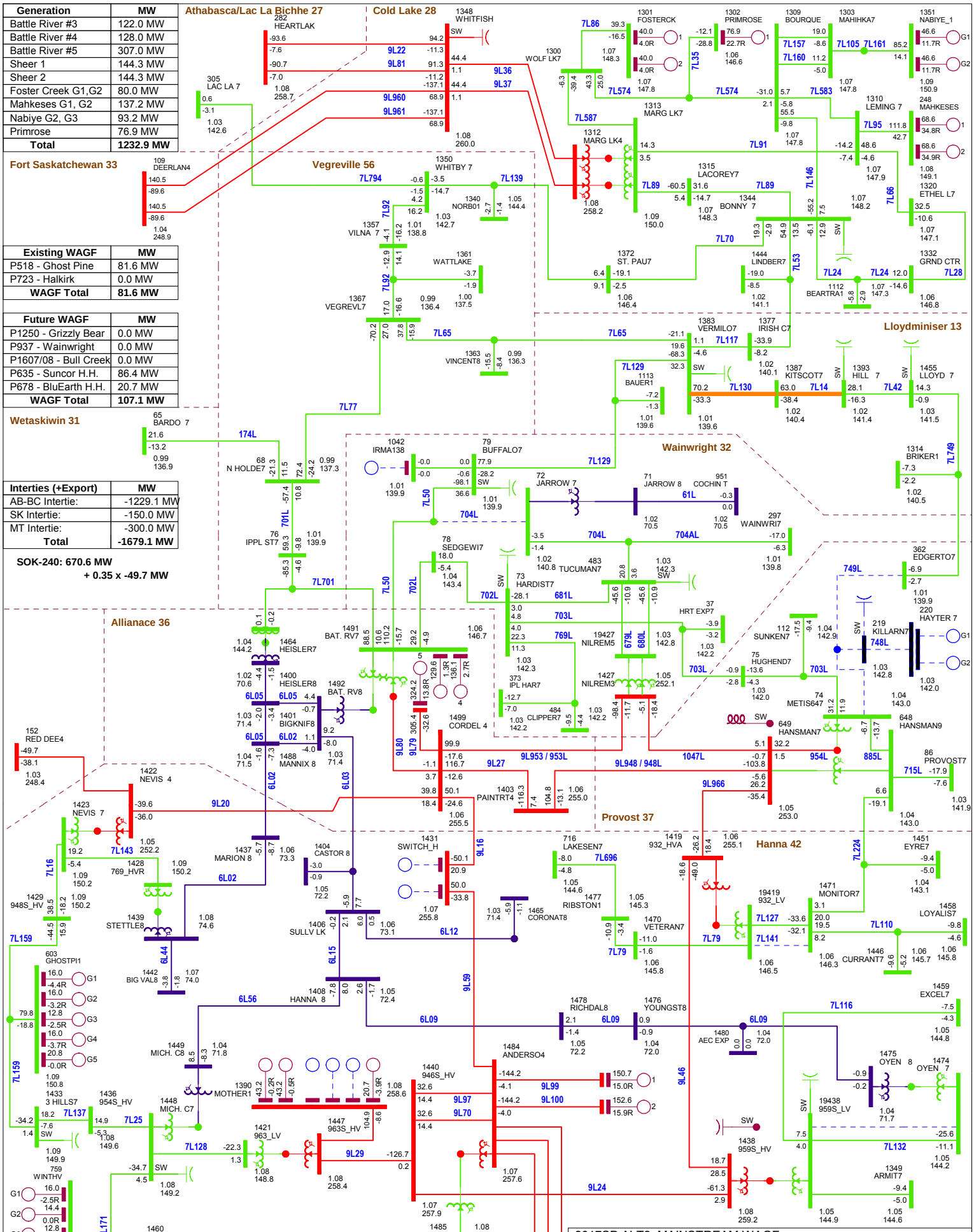
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	0.0 MW
WAGF Total	**81.6 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	0.0 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	20.7 MW
WAGF Total	**107.1 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1229.1 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1679.1 MW**

SOK-240: 670.6 MW
+ 0.35 x -49.7 MW



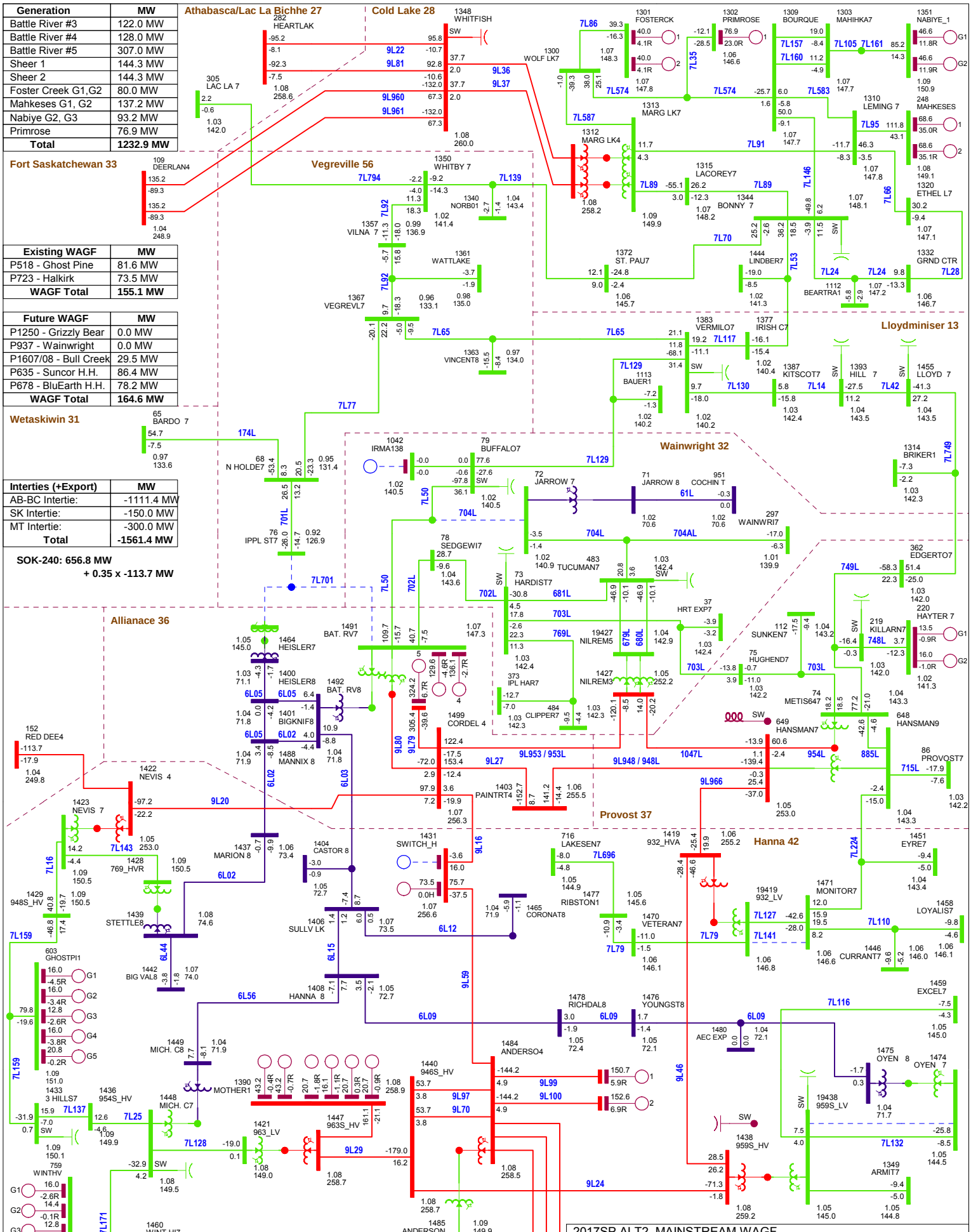
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	73.5 MW
WAGF Total	**155.1 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1111.4 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1561.4 MW**

SOK-240: 656.8 MW
+ 0.35 x -113.7 MW



2017SP ALT2, MAINSTREAM WAGF
7L701 (N-1) AFTER RAS
FIG G-4
WED, MAY 13 2015 20:27

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

100.0%Rate A
1.200OV0.900UV
kV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

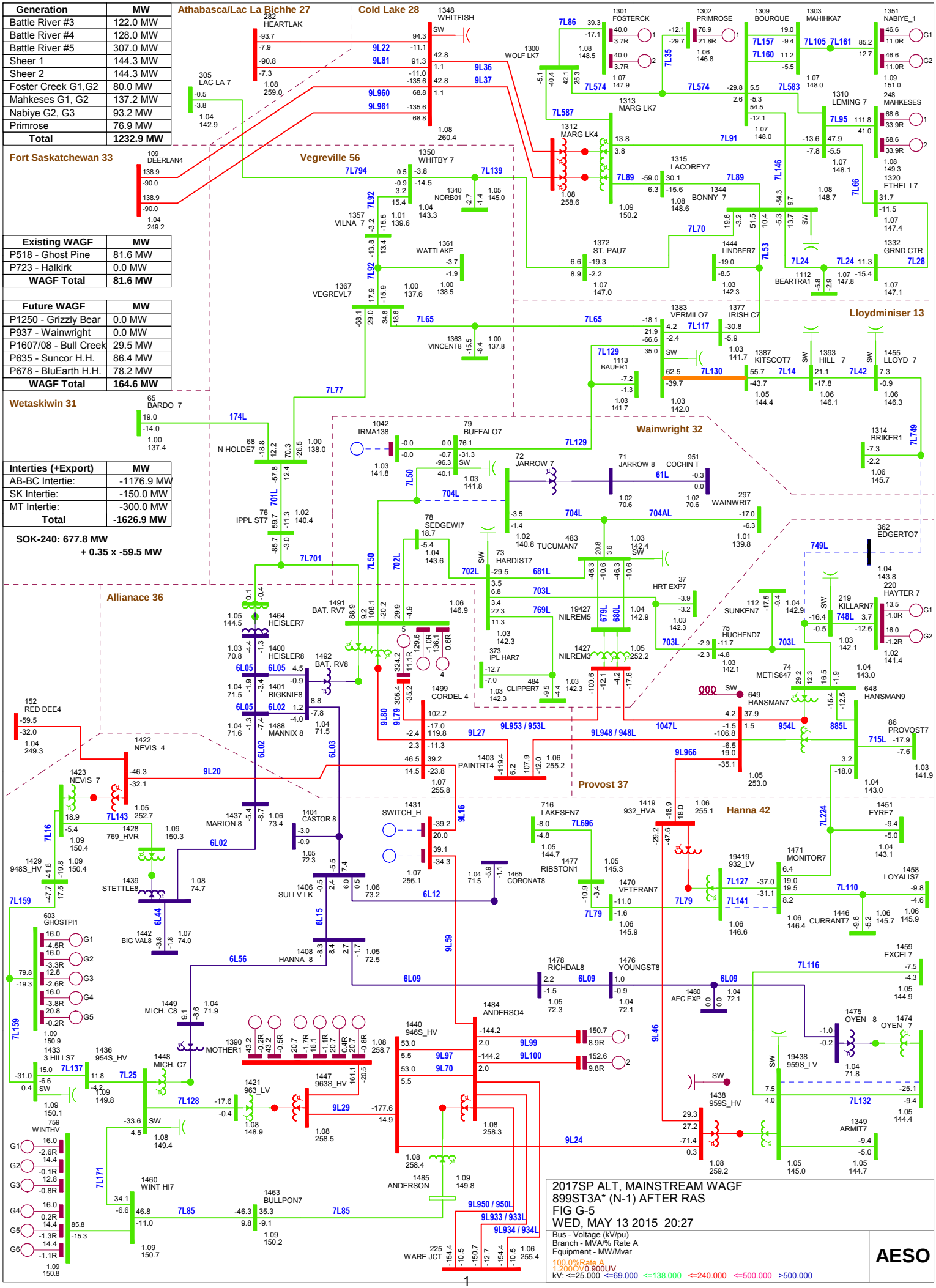
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	0.0 MW
WAGF Total	**81.6 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	**164.6 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1176.9 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1626.9 MW**

SOK-240: 677.8 MW
+ 0.35 x -59.5 MW



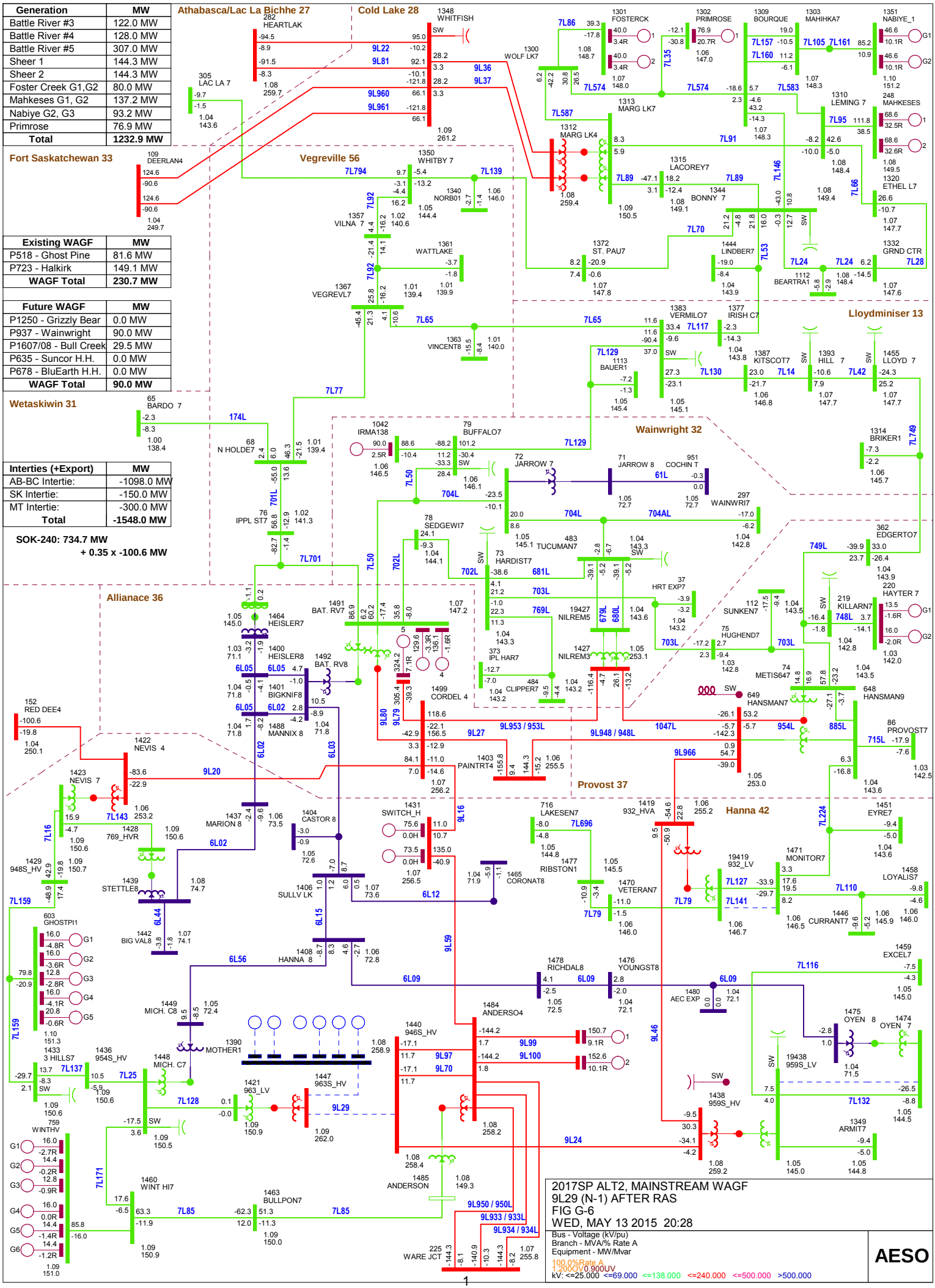
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	**230.7 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	0.0 MW
P678 - BluEarth H.H.	0.0 MW
WAGF Total	**90.0 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1098.0 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1548.0 MW**

SOK-240: 734.7 MW
+ 0.35 x -100.6 MW



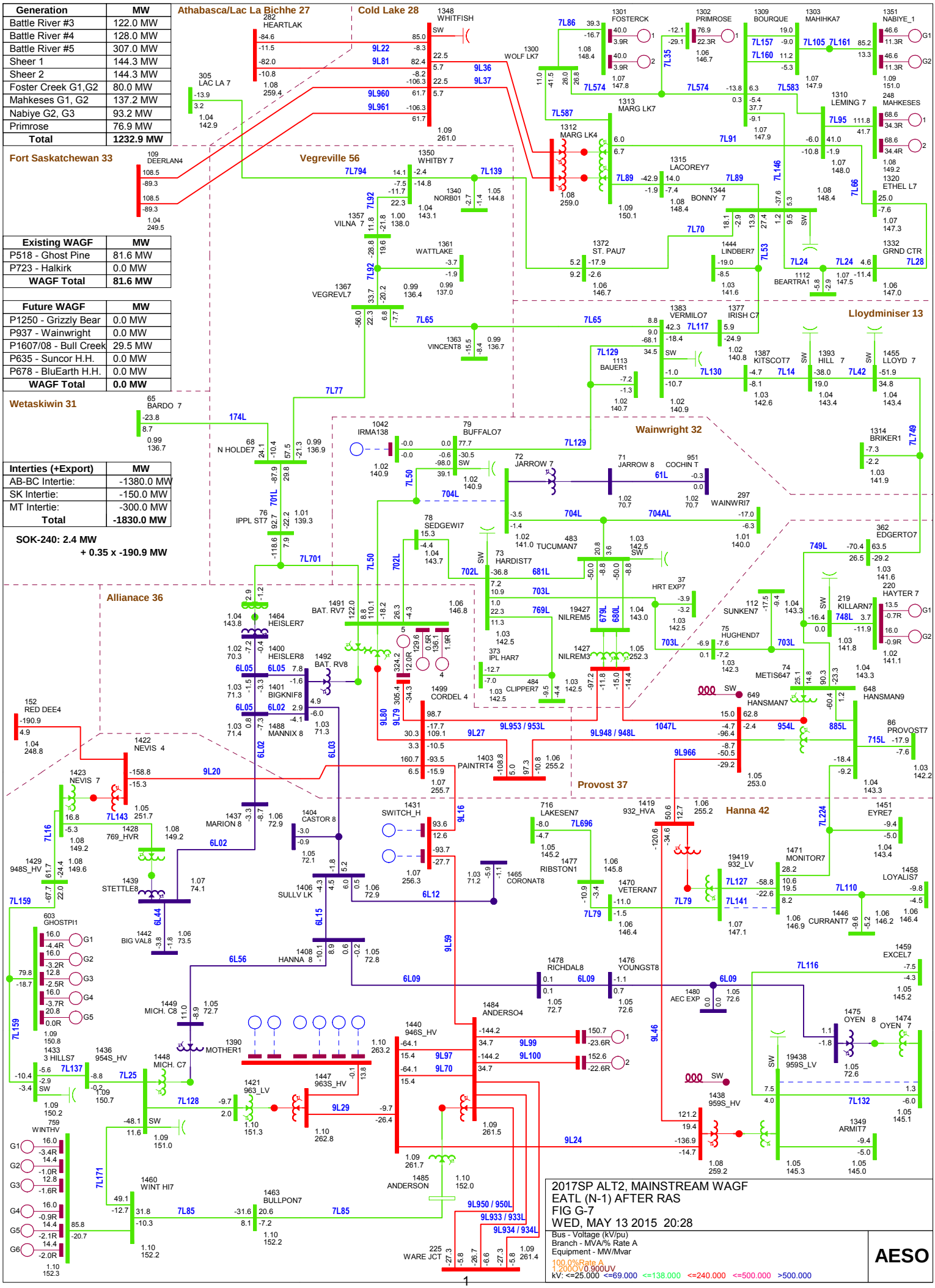
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	**1232.9 MW**

Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	0.0 MW
WAGF Total	**81.6 MW**

Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	0.0 MW
P678 - BluEarth H.H.	0.0 MW
WAGF Total	**0.0 MW**

Interties (+Export)	MW
AB-BC Intertie:	-1380.0 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	**-1830.0 MW**

SOK-240: 2.4 MW
+ 0.35 x -190.9 MW



ATTACHMENT H

Constraint Summary

Table H-1: Remedial Action Scheme	
RAS Number	**RAS Name**
32	Battle River 7L50 and 7L701 TPS
138	7L50-526S Buffalo Creek overload mitigation scheme
139	901T-766S Nevis overload mitigation scheme
138-R1[1]	BluEarth Hand Hills RAS - 7L50 - 526S Buffalo Creek overload mitigation scheme
138-R2[1]	Suncor Hand Hill RAS - 7L50 - 526S Buffalo Creek overload mitigation scheme
139-R1[1]	BluEarth Hand Hill RAS – Various overloads due to 9L29 outage mitigation scheme
139-R2[1]	Suncor Hand Hill RAS – Various overloads due to 9L29 outage mitigation scheme
149	7L129 - 526S Buffalo Creek overload mitigation scheme

[1] Existing RAS logic and settings to be revised to include BluEarth and Suncor Hand Hills WAGF connection projects based on ISD (In-Service Date) of each project

Table H-2: Performance Violations and Potential Mitigation Options													
Initial System Operating Condition	Relevant Project Assumptions in the Study	Contingency	Performance Violation								Potential Mitigation Options		
			Thermal					Voltage (Steady-State)		Stability	Automatic (RAS) OR Real Time Operating Practice	Post RAS Action or Manual Procedure	
			Overloaded System Element	Nominal Rating (MVA)	Emergency Rating (MVA)	Power Flow (MVA)	% of MVA Continuous Rating	Location	Voltage			Action 1 % of MVA Continuous Rating	Action 2 % of MVA Continuous Rating
2017SL Alt 2 Mainstream Wainwright	Coal Economy EATL: Blocked WATL: 475MW N to S Total South Wind: 1043.0MW Existing Central East Wind: 230.7MW Future Central East Wind: 284.1MW BC Intertie: 672.8MW Export MATL Intertie: 300.0MW Export SK Intertie: 150.0MW Export	9L29 (946S Oakland to 963S Coyote Lake)	7L128 (963S Coyote Lake to 802S Michichi Creek)	94.9	94.9	153.3	161.5				1: RAS #139-R1	4.0	
			7L159 (Ghost Pine Tap to 948S Heatburg)	94.9	94.9	117.7	124.0					63.0	
			7L16 (766S Nevis to 948S Heatburg)	94.9	94.9	113.5	119.6					58.6	
			7L85 (803S Bullpound to 801S Anderson)	94.9	94.9	122.3	128.9					51.4	
			7L85 (804S Wintering Hills to 803S Bullpound)	94.9	94.9	128.5	135.4					57.4	

Table H-2: Performance Violations and Potential Mitigation Options													
Initial System Operating Condition	Relevant Project Assumptions in the Study	Contingency	Performance Violation								Potential Mitigation Options		
			Thermal					Voltage (Steady-State)		Stability	Automatic (RAS) OR Real Time Operating Practice	Post RAS Action or Manual Procedure	
			Overloaded System Element	Nominal Rating (MVA)	Emergency Rating (MVA)	Power Flow (MVA)	%I of MVA Continuous Rating	Location	Voltage			Action 1 %I of MVA Continuous Rating	Action 2 %I of MVA Continuous Rating
		252ST1* or 252ST2* (252S Jarrow)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	110.6	101.2				7L129 loading is below emergency rating‡		
		395ST1* (395S North Holden)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	125.1	114.6				1: RAS #149 2: RAS #138	87.7	74.2
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	118.7	108.7					82.0	68.5
			7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	66.9	61.3					107.8	94.3
		701L (395S North Holden to 223S Strome)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	118.5	108.5				7L129 loading is below emergency rating‡		
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	112.0	102.6						
		704L\704AL (252S Jarrow to 478S Tucuman)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	109.6	100.4				7L129 loading is below emergency rating‡		
		709S701T* or 709S702T* (709S Vegreville)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	109.6	100.3				7L129 loading is below emergency rating‡		
		749L\749AL (648S Metiskow to 899S Edgerton)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	130.1	119.1				1: RAS #149 2: RAS #138, 138-R1	92.9	74.8
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	123.6	113.2					87.0	68.9
			7L130 (710S Vermilion to 705S Kitscoty)	71.9	71.9	77.5	107.8				7L130 & 7L14 loadings are driven by load‡	106.8	106.9
			7L14 (705S Kitscoty to 751S Hill)	71.9	71.9	73.2	101.8					100.8	100.9
↓			7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	71.6	65.6					113.0	94.9

Table H-2: Performance Violations and Potential Mitigation Options													
Initial System Operating Condition	Relevant Project Assumptions in the Study	Contingency	Performance Violation								Potential Mitigation Options		
			Thermal					Voltage (Steady-State)		Stability	Automatic (RAS) OR Real Time Operating Practice	Post RAS Action or Manual Procedure	
			Overloaded System Element	Nominal Rating (MVA)	Emergency Rating (MVA)	Power Flow (MVA)	%I of MVA Continuous Rating	Location	Voltage			Action 1 %I of MVA Continuous Rating	Action 2 %I of MVA Continuous Rating
↑	Coal Economy EATL: 800MW S to N WATL: 250MW S to N Total South Wind: 1043.0MW Existing Central East Wind: 230.7MW Future Central East Wind: 284.1MW BC Intertie: 932.5MW Import MATL Intertie: 300.0MW Import SK Intertie: 150.0MW Import	766S901T* (766S Nevis)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	117.8	107.8				7L129 loading is below emergency rating‡		
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	111.3	101.9						
		7L105 (837S Mahihkan to 909S Mahno)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	113.0	103.4				7L129 loading is below emergency rating‡		
		7L161 (909S Mahno to 942S Nabiye)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	113.0	103.5				7L129 loading is below emergency rating‡		
		7L42 (751S Hill to 716S Lloydminster)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	112.7	103.2				7L129 loading is below emergency rating‡		
		7L701\7LA701\701L (223S Strome to 757S Battle River)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	124.5	114.0				1: RAS #149 2: RAS #138	83.9	74.0
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	117.9	108.0					78.0	68.1
			7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	65.4	59.9					104.0	94.0
2017SP Alt 2 Mainstream Wainwright		7L749\749L\7LB749 (899S Edgerton to 716S Lloydminster)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	122.6	112.3				7L129 loading is below emergency rating‡		
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	116.4	106.5						
		7L77 (395S North Holden to 709S Vegreville)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	120.8	110.6				7L129 loading is below emergency rating‡		
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	114.4	104.8						
		7L95 (889S Mahkeses to 715S Leming Lake)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	116.1	106.3				7L129 loading is below emergency rating‡		
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	109.6	100.3						
		889S-5TNSA1 (889S Mahkeses)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	111.2	101.8				7L129 loading is below emergency rating‡		
		889S-5TNSA2 (889S Mahkeses)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	111.2	101.8				7L129 loading is below emergency rating‡		
		899ST3a* (899S Edgerton)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	126.1	115.4				1: RAS #149	89.3	73.3
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	119.8	109.7					83.5	67.6
			7L130 (710S Vermilion to 705S Kitscoty)	71.9	71.9	72.8	101.2				7L130 loading is driven by load‡	99.7	100.1
↓			7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	68.1	62.3				2: RAS #138	109.4	93.3

Table H-2: Performance Violations and Potential Mitigation Options													
Initial System Operating Condition	Relevant Project Assumptions in the Study	Contingency	Performance Violation								Potential Mitigation Options		
			Thermal					Voltage (Steady-State)		Stability	Automatic (RAS) OR Real Time Operating Practice	Post RAS Action or Manual Procedure	
			Overloaded System Element	Nominal Rating (MVA)	Emergency Rating (MVA)	Power Flow (MVA)	%ł of MVA Continuous Rating	Location	Voltage			Action 1 %ł of MVA Continuous Rating	Action 2 %ł of MVA Continuous Rating
↑		912L\9L912 (63S Red Deer to 766S Nevis)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	117.6	107.7				7L129 loading is below emergency rating‡		
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	111.2	101.8						
		9L20 (766S Nevis to 755S Cordel)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	114.4	104.7				7L129 loading is below emergency rating‡		
		9L29 (946S Oakland to 963S Coyote Lake)	7L128 (963S Coyote Lake to 802S Michichi Creek)	94.9	94.9	151.2	159.4				1: RAS #139-R1	4.0	
			7L159 (Ghost Pine Tap to 948S Heatburg)	94.9	94.9	106.2	111.9					50.9	
			7L16 (766S Nevis to 948S Heatburg)	94.9	94.9	101.1	106.5					45.6	
			7L85 (803S Bullpound to 801S Anderson)	94.9	94.9	122.0	128.6					50.9	
			7L85 (804S Wintering Hills to 803S Bullpound)	94.9	94.9	132.8	140.0					62.0	
		EATL	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	138.6	126.9				1: RAS #149 2: RAS #138, 138-R1, 138-R2, 32	96.9	74.8
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	132.0	120.9					91.0	68.4
			7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	79.7	72.9					117.0	94.6

Table H-2: Performance Violations and Potential Mitigation Options													
Initial System Operating Condition	Relevant Project Assumptions in the Study	Contingency	Performance Violation								Potential Mitigation Options		
			Thermal					Voltage (Steady-State)		Stability	Automatic (RAS) OR Real Time Operating Practice	Post RAS Action or Manual Procedure	
			Overloaded System Element	Nominal Rating (MVA)	Emergency Rating (MVA)	Power Flow (MVA)	%I of MVA Continuous Rating	Location	Voltage			Action 1 %I of MVA Continuous Rating	Action 2 %I of MVA Continuous Rating
↑		899ST3a* (899S Edgerton)	7L130 (710S Vermilion to 705S Kitscoty)	71.9	71.9	73.1	101.7				7L130 loading is driven by load‡		
			7L65 (710S Vermilion to Grizzly Bear Tap)	94.9	94.9	108.5	114.4				1: Change CT Ratios from 400/5 to 600/5	99.3	
		948L\9L948 (650S Hansman Lake to 863S Paintearth)	7L65 (710S Vermilion to Grizzly Bear Tap)	94.9	94.9	103.4	108.9				1: Change CT Ratios from 400/5 to 600/5	94.6	
		953L\9L953 (574S Nilrem to 755S Cordel)	7L65 (710S Vermilion to Grizzly Bear Tap)	94.9	94.9	103.6	109.1				1: Change CT Ratios from 400/5 to 600/5	94.8	
		9L29 (946S Oakland to 963S Coyote Lake)	7L128 (963S Coyote Lake to 802S Michichi Creek)	94.9	94.9	151.2	159.4				1: RAS #139-R1	4.0	
			7L159 (Ghost Pine Tap to 948S Heatburg)	94.9	94.9	113.8	119.9					59.3	
			7L16 (766S Nevis to 948S Heatburg)	94.9	94.9	108.7	114.5					53.9	
			7L85 (803S Bullpound to 801S Anderson)	94.9	94.9	114.1	120.3					42.6	
			7L85 (804S Wintering Hills to 803S Bullpound)	94.9	94.9	124.9	131.6					53.6	
		9L79 (757S Battle River to 755S Cordel)	7L65 (710S Vermilion to Grizzly Bear Tap)	94.9	94.9	106.1	111.8				1: Change CT Ratios from 400/5 to 600/5	97.1	
		9L93 (972S Tinchebray to 615S Halkirk)	7L65 (710S Vermilion to Grizzly Bear Tap)	94.9	94.9	102.8	108.3				1: Change CT Ratios from 400/5 to 600/5	94.1	

Table H-2: Performance Violations and Potential Mitigation Options													
Initial System Operating Condition	Relevant Project Assumptions in the Study	Contingency	Performance Violation								Potential Mitigation Options		
			Thermal					Voltage (Steady-State)		Stability	Automatic (RAS) OR Real Time Operating Practice	Post RAS Action or Manual Procedure	
			Overloaded System Element	Nominal Rating (MVA)	Emergency Rating (MVA)	Power Flow (MVA)	% of MVA Continuous Rating	Location	Voltage			Action 1 % of MVA Continuous Rating	Action 2 % of MVA Continuous Rating
2017SL Pre-Connection	Coal Economy EATL: Blocked WATL: 475MW N to S Total South Wind: 1133.0MW Existing Central East Wind: 230.7MW Future Central East Wind: 194.1MW BC Intertie: 670.4MW Export MATL Intertie: 300.0MW Export SK Intertie: 150.0MW Export	9L29 (946S Oakland to 963S Coyote Lake)	7L128 (963S Coyote Lake to 802S Michichi Creek)	94.9	94.9	153.3	161.5				1: RAS #139-R1	4.0	
			7L159 (Ghost Pine Tap to 948S Heatburg)	94.9	94.9	118.7	125.1					64.1	
			7L16 (766S Nevis to 948S Heatburg)	94.9	94.9	114.5	120.7					59.7	
			7L85 (803S Bullpound to 801S Anderson)	94.9	94.9	120.7	127.1					49.7	
			7L85 (804S Wintering Hills to 803S Bullpound)	94.9	94.9	126.9	133.7					55.8	

Table H-2: Performance Violations and Potential Mitigation Options													
Initial System Operating Condition	Relevant Project Assumptions in the Study	Contingency	Performance Violation								Potential Mitigation Options		
			Thermal					Voltage (Steady-State)		Stability	Automatic (RAS) OR Real Time Operating Practice	Post RAS Action or Manual Procedure	
			Overloaded System Element	Nominal Rating (MVA)	Emergency Rating (MVA)	Power Flow (MVA)	%ł of MVA Continuous Rating	Location	Voltage			Action 1 %ł of MVA Continuous Rating	Action 2 %ł of MVA Continuous Rating
		395ST1* (395S North Holden)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	113.2	103.6				1: RAS #138, 138-R1, 138-R2, 32	72.9	
			7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	134.9	123.5					92.4	
		478ST1* or 478ST2* (478S Tucuman)	7L50 (Jarrow Tap to 757S Battle River)	109.2	123.6	109.4	100.1				7L50 loading is below emergency rating‡		
		526ST1* or 526ST2* (526S Buffalo Creek)	749L (899S Edgerton to Killarney Lake Tap)	88.0	97.0	89.8	102.0				749L loading is below emergency rating‡		
		701L (395S North Holden to 223S Strome)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	127.9	117.1				1: RAS #138, 138-R1, 138-R2, 32	90.1	
		709S701T* or 709S702T* (709S Vegreville)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	117.2	107.3				1: RAS #138	93.6	
		749L\749AL (648S Metiskow to 899S Edgerton)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	121.5	111.3				1: RAS #138, 138-R1, 138-R2, 32	78.0	
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	114.9	105.2					71.5	
			7L130 (710S Vermilion to 705S Kitscoty)	71.9	71.9	76.7	106.7				7L130 & 7L14 loadings are driven by load‡	106.8	
			7L14 (705S Kitscoty to 751S Hill)	71.9	71.9	72.4	100.7					100.9	
↓			7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	143.4	131.3					97.7	

Table H-2: Performance Violations and Potential Mitigation Options													
Initial System Operating Condition	Relevant Project Assumptions in the Study	Contingency	Performance Violation								Potential Mitigation Options		
			Thermal					Voltage (Steady-State)		Stability	Automatic (RAS) OR Real Time Operating Practice	Post RAS Action or Manual Procedure	
			Overloaded System Element	Nominal Rating (MVA)	Emergency Rating (MVA)	Power Flow (MVA)	%ł of MVA Continuous Rating	Location	Voltage			Action 1 %ł of MVA Continuous Rating	Action 2 %ł of MVA Continuous Rating
↑	Coal Economy EATL: 450MW S to N WATL: 250MW S to N Total South Wind: 1133.0MW Existing Central East Wind: 230.7MW Future Central East Wind: 194.1MW BC Intertie: 942.5MW Import MATL Intertie: 300.0MW Import SK Intertie: 150.0MW Import	766S901T* (766S Nevis)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	128.2	117.4				1: RAS #138	94.7	
		7L105 (837S Mahihkan to 909S Mahno)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	117.7	107.8				1: RAS #138	93.1	
		7L161 (909S Mahno to 942S Nabiye)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	117.7	107.8				1: RAS #138	93.1	
		7L42 (751S Hill to 716S Lloydminster)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	126.0	115.3				1: RAS #138, 138-R1, 138-R2	94.3	
		7L50 (526S Buffalo Creek to 757S Battle River)	749L (899S Edgerton to Killarney Lake Tap)	88.0	97.0	94.4	107.3				749L, 7L749, & 7L77 loadings are below emergency rating‡		
			749L\7L749 (899S Edgerton to Briker Tap)	88.0	97.0	88.2	100.3						
			7L77 (395S North Holden to 709S Vegreville)	96.0	123.6	97.4	101.5						
2017SP Pre-Connection		7L701\7LA701\701L (223S Strome to 757S Battle River)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	112.0	102.6				1: RAS #138, 138-R1, 138-R2, 32	70.4	
			7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	133.8	122.5					89.9	
		7L749\749L\7LB749 (899S Edgerton to 716S Lloydminster)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	114.1	104.4				1: RAS #138, 138-R1, 138-R2, 32	82.2	
			7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	135.8	124.3					92.3	
		7L77 (395S North Holden to 709S Vegreville)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	128.9	118.0				1: RAS #138, 138-R1, 138-R2, 32	89.2	
		7L95 (889S Mahkeses to 715S Leming Lake)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	120.9	110.7				1: RAS #138	93.4	
		889S-5TNSA1 (889S Mahkeses)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	115.9	106.1				1: RAS #138	93.9	
↓		889S-5TNSA2 (889S Mahkeses)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	115.9	106.1				1: RAS #138	93.9	

Table H-2: Performance Violations and Potential Mitigation Options													
Initial System Operating Condition	Relevant Project Assumptions in the Study	Contingency	Performance Violation								Potential Mitigation Options		
			Thermal					Voltage (Steady-State)		Stability	Automatic (RAS) OR Real Time Operating Practice	Post RAS Action or Manual Procedure	
			Overloaded System Element	Nominal Rating (MVA)	Emergency Rating (MVA)	Power Flow (MVA)	%ł of MVA Continuous Rating	Location	Voltage			Action 1 %ł of MVA Continuous Rating	Action 2 %ł of MVA Continuous Rating
↑		899ST3a* (899S Edgerton)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	117.6	107.6				1: RAS #138, 138-R1, 138-R2, 32	75.4	
			7L129 (Bauer Tap to 710S Vermilion)	109.2	123.6	111.1	101.7					69.0	
			7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	139.4	127.6					94.9	
		912L\9L912 (63S Red Deer to 766S Nevis)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	128.1	117.3				1: RAS #138	94.8	
		9L20 (766S Nevis to 755S Cordel)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	123.0	112.6				1: RAS #138	91.3	
		9L29 (946S Oakland to 963S Coyote Lake)	7L128 (963S Coyote Lake to 802S Michichi Creek)	94.9	94.9	151.2	159.4				1: RAS #139-R1		
			7L159 (Ghost Pine Tap to 948S Heatburg)	94.9	94.9	115.5	121.7						
			7L16 (766S Nevis to 948S Heatburg)	94.9	94.9	110.4	116.3						
			7L85 (803S Bullpound to 801S Anderson)	94.9	94.9	111.5	117.5						
			7L85 (804S Wintering Hills to 803S Bullpound)	94.9	94.9	122.3	128.9						
		9L960 (13S Deerland to 825S Whitefish Lake)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	113.7	104.1				1: RAS #138	92.3	
		9L961 (13S Deerland to 825S Whitefish Lake)	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	113.7	104.1				1: RAS #138	32.3	
		EATL	7L50 (526S Buffalo Creek to Jarrow Tap)	109.2	123.6	128.3	117.4				1: RAS #138, 138-R1, 138-R2	94.6	

* Lack of transformer breaker will trip the lines connected to this transformer
‡ Managed by the AESO and TFO real time operating practise
† See page 19 in http://www.aeso.ca/downloads/Central_LRP_Report_11Apr2014_signed.pdf

Table H-3: Remedial Action Scheme Details		
Monitoring Point	**RAS Logic and Settings**	**Automatic Remedial Action**
RAS # 138: 7L50 (Jarrow Tap – Buffalo Creek 526S) Overload Mitigation (To be modified for BluEarth and Suncor Hand Hills WAGF Connection Projects)		
At Buffalo Creek 526S 7L50 Terminal Direction of flow: • From Jarrow Tap to 526S	Runback/Trip Settings: • Line Loading >= 100% of seasonal line rating in MVA for 10 sec.	• Send DTT to trip 704L breaker 252S2 at 252S • If overload continues, send continuous RAS signal to Halkirk WAGF until line loading is 95% of seasonal line rating • If overload continues after 10 minutes, sequentially trip Halkirk WAGF LV breakers after waiting 5 sec between each trip. • If overload continues sequentially trip BluEarth Hand Hills WAGF LV breakers • If overload continues sequentially trip Suncor Hand Hills WAGF LV breakers
	Trip Logic and Settings: • Line Loading >= 110% of seasonal line rating in MVA for 10 sec	• If overload continues for 5 sec, send DTT to sequentially trip Halkirk WAGF LV breakers after waiting 5 sec between each trip • If overload continues, sequentially trip BluEarth Hand Hills WAGF LV breakers • If overload continues sequentially trip Suncor Hand Hills WAGF LV breakers
	• Communication and other RAS Failure	• Send alarm to AltaLink SCC, ATCO Electric SCC and AESO SC

RAS # 139: Various Overloads due to 9L29 Outage Overload Mitigation – (9L29 LTO status) (To be modified for BluEarth and Suncor Hand Hills WAGF Connection Projects)		
9L29 LTO at 963S and 946S	Trip Logic and Settings: • (9L29 LTO = True at 963S or 946S)	• Send DTT to trip BluEarth Hand Hills and Suncor Hand Hills WAGF LV breakers.
	• Communication and other RAS Failures	• Send alarm to ATCO Electric SCC and AESO SC

RAS # 149: 7L129 (526S Buffalo Creek – 710S Vermilion) Overload Mitigation (To be created for EON Grizzly and Mainstream Wainwright WAGF Connection Projects)		
At Buffalo Creek 526S 7L129 Terminal Direction of flow: • From 526S to 710S	Runback/Trip Settings: • Line Loading >= 100% of seasonal line rating in MVA for 10 sec.	• Send continuous RAS signal to Mainstream Wainwright *(EON Grizzly in Alternative 5c)* WAGF until line loading is 95% of seasonal line rating • If Alternative 5c and overload continues after 10 minutes, sequentially trip EON Grizzly WAGF LV breakers • If overload continues after 10 minutes, sequentially trip Mainstream Wainwright WAGF LV breakers
	Trip Logic and Settings: • Line Loading >= 110% of seasonal line rating in MVA for 10 sec	• If Alternative 5c and overload continues for 5 sec, send DTT to sequentially trip EON Grizzly WAGF LV breakers • If overload continues for 5 sec, send DTT to sequentially trip Mainstream Wainwright WAGF LV breakers
	• Communication and other RAS Failure	• Send alarm to AltaLink SCC, ATCO Electric SCC and AESO SC

Table H-4: Remedial Action Scheme Details				
RAS #32: Battle River Thermal Protection Schemes (TPS) RAS (prior to WAGF Connections) that trips Battle River unit 3 or 4 when both on line				
RAS Number	**RAS Name**	**Location**	**RAS Type**	Battle River Unit 3 or 4 will receive RAS DTT if any one of the following conditions becomes true
32	Battle River 7L701 and 7L50 Thermal Protection Schemes (TPS)	757S	Thermal	Line MVA loading exceeds emergency rating of any of the two lines

ATTACHMENT I

Generator Effectiveness Factors

Table G-0: Generator Types

Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
Type	Wind	Wind	Wind	Wind	Wind	Wind	Wind	Coal	Coal

The sign convention for the following tables is as follows:

+: An increase in generation results in an increased flow, or
A decrease in generation results in a decreased flow

-: An increase in generation results in a decreased flow, or
A decrease in generation results in an increased flow

2017SL General Results for N-1 of 9L29 (946S Oakland to 963S Coyote Lake)

Table G-1: 2017SL Generator Effectiveness Factors under N-1 of 9L29 (946S Oakland to 963S Coyote Lake)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L128 (963S Coyote Lake to 802S Michichi Creek)	0%	0%	0%	0%	95%	94%	0%	0%	0%
7L159 (Ghost Pine Tap to 948S Heatburg)	0%	0%	25%	64%	27%	27%	1%	0%	3%
7L16 (766S Nevis to 948S Heatburg)	0%	0%	22%	57%	24%	24%	1%	0%	2%
7L85 (803S Bullpound to 801S Anderson)	0%	0%	60%	21%	35%	35%	-1%	1%	-3%
7L85 (804S Wintering Hills to 803S Bullpound)	0%	0%	56%	22%	38%	38%	-1%	1%	-3%

2017SP General Results for N-1 of 9L29 (946S Oakland to 963S Coyote Lake)

Table G-2: 2017SP Generator Effectiveness Factors under N-1 of 9L29 (946S Oakland to 963S Coyote Lake)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L128 (963S Coyote Lake to 802S Michichi Creek)	0%	0%	0%	0%	95%	94%	0%	0%	0%
7L159 (Ghost Pine Tap to 948S Heatburg)	0%	0%	25%	64%	29%	28%	1%	0%	3%
7L16 (766S Nevis to 948S Heatburg)	0%	0%	23%	58%	25%	25%	1%	0%	3%
7L85 (803S Bullpound to 801S Anderson)	0%	0%	56%	20%	35%	35%	-1%	0%	-3%
7L85 (804S Wintering Hills to 803S Bullpound)	0%	0%	60%	22%	38%	38%	-1%	0%	-4%

2017SP Pre-Connection

Table G-3: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 395ST1 (395S North Holden)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		12%	10%	10%	10%	10%	8%	15%	10%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-4: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 701L (395S North Holden to 223S Strome)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		12%	10%	10%	10%	10%	8%	15%	10%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-5: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 709S701T or 702T (709S Vegreville)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		10%	9%	9%	9%	9%	4%	12%	9%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-6: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 749L (648S Metiskow to 899S Edgerton)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		11%	10%	10%	10%	10%		13%	10%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-7: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 766S901T (766S Nevis)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		14%	11%	12%	11%	11%	11%	16%	11%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-8: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 7L105 (837S Mahihkan to 909S Mahno)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		8%	6%	6%	6%	6%	5%	10%	7%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-9: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 7L161 (909S Mahno to 942S Nabiye)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		8%	6%	6%	6%	6%	5%	10%	7%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-10: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 7L42 (751S Hill to 716S Lloydminster)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		12%	10%	10%	11%	10%	15%	14%	11%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-11: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 7L701 (223S Strome to 757S Battle River)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		11%	10%	9%	10%	10%	8%	15%	10%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-12:2017SP Pre Connection Generator Effectiveness Factors under N-1 of 7L749 (889S Edgerton to 716S Lloydminster)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		12%	10%	10%	10%	10%	15%	14%	11%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-13: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 7L77 (395S North Holden to 709S Vegreville)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		11%	10%	10%	10%	10%	7%	14%	10%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-14: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 7L95 (889S Mahkeses to 715S Leming Lake)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		9%	7%	7%	7%	7%	6%	11%	8%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-15: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 889S-5TNSA1 or A2 (889S Mahkeses)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		9%	8%	8%	8%	8%	6%	12%	8%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-16: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 899ST3a (899S Edgerton)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		12%	10%	10%	10%	10%	15%	13%	11%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-17: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 912L (83S Red Deer to 766S Nevis)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		14%	11%	12%	11%	11%	11%	16%	11%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-18: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 9L20 (766S Nevis to 755S Cordel)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		13%	10%	8%	10%	10%	10%	15%	11%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-19: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 9L960 (13S Deerland to 825S Whitefish Lake)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		11%	9%	9%	9%	9%	7%	13%	9%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-20: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of 9L961 (13S Deerland to 825S Whitefish Lake)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		11%	9%	9%	9%	9%	7%	13%	9%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-21: 2017SP Pre Connection Generator Effectiveness Factors under N-1 of EATL

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L50† (526S Buffalo Creek to Jarrow Tap)		10%	8%	8%	8%	8%	7%	12%	9%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

2017SP Alternative 2 with Irma Wainwright

Table G-22: 2017SP Alternative 2 Generator Effectiveness Factors under N-1 of 395ST1 (395S North Holden)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L129 (526S Buffalo Creek to Bauer Tap)	46%	12%	10%	10%	10%	10%	7%	15%	11%
7L129 (Bauer Tap to 710S Vermilion)	44%	12%	10%	10%	10%	10%	7%	15%	10%
7L50† (526S Buffalo Creek to Jarrow Tap)	-52%	13%	11%	11%	11%	11%	8%	16%	11%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-23: 2017SP Alternative 2 Generator Effectiveness Factors under N-1 of 749L (648S Metiskow to 899S Edgerton)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L129 (526S Buffalo Creek to Bauer Tap)	44%	12%	11%	10%	11%	11%		14%	11%
7L129 (Bauer Tap to 710S Vermilion)	43%	11%	10%	10%	10%	10%		13%	10%
7L50† (526S Buffalo Creek to Jarrow Tap)	-53%	12%	11%	10%	11%	11%		14%	11%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-24: 2017SP Alternative 2 Generator Effectiveness Factors under N-1 of 7L701 (223S Strome to 757S Battle River)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L129 (526S Buffalo Creek to Bauer Tap)	48%	12%	10%	10%	10%	10%	8%	15%	10%
7L129 (Bauer Tap to 710S Vermilion)	46%	11%	9%	9%	10%	10%	8%	15%	10%
7L50† (526S Buffalo Creek to Jarrow Tap)	-49%	12%	10%	10%	10%	10%	8%	16%	10%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-25: 2017SP Alternative 2 Generator Effectiveness Factors under N-1 of 899ST3a (899S Edgerton)

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L129 (526S Buffalo Creek to Bauer Tap)	44%	12%	11%	10%	11%	11%	15%	14%	11%
7L129 (Bauer Tap to 710S Vermilion)	43%	12%	10%	10%	10%	10%	15%	13%	10%
7L50† (526S Buffalo Creek to Jarrow Tap)	-53%	13%	11%	10%	11%	11%	16%	14%	11%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow

Table G-26: 2017SP Alternative 2 Generator Effectiveness Factors under N-1 of EATL

Line \ Plant	Irma Wainwright	Halkirk	Wintering Hills	Ghost Pine	Suncor Hand Hill	BluEarth Hand Hill	BluEarth BullCreek	Battle River	Sheerness
7L129 (526S Buffalo Creek to Bauer Tap)	46%	10%	9%	8%	9%	9%	12%	12%	9%
7L129 (Bauer Tap to 710S Vermilion)	44%	10%	8%	8%	8%	8%	11%	11%	8%
7L50† (526S Buffalo Creek to Jarrow Tap)	-52%	11%	9%	9%	9%	9%	12%	12%	9%

† Calculated pre RAS #138 action of trip 704L breaker at 252S Jarrow