

APPENDIX A CONNECTION ASSESSMENT

Connection Engineering Study Report for Filing

E.ON Grizzly Bear Creek Wind Power Plant Facility Connection

Date: May 25, 2016

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Version: 0

APEGA
Permit-to-Practice
P-8200




May 25
2016

Executive Summary

Project Overview

E. ON Climate and Renewables Canada Ltd. (E. ON) submitted a System Access Service Request (SASR) to the Alberta Electric System Operator (AESO) to connect its 120 MW wind aggregated generating facility (WAGF) near the Town of Vermilion, named the Grizzly Bear Creek Wind Power Project¹ (the Facility) to the Alberta interconnected electric system (AIES) in the AESO Planning area of Lloydminster (Area 13). The Facility includes E. ON's approved Grizzly Bear 708S substation.

E. ON's request includes a Rate STS, *Supply Transmission Service*, contract capacity of 120 MW, a Rate DTS, *Demand Transmission Service*, contract capacity of 1.5 MW, and request to connect the E.ON Grizzly Bear WAGF to the AIES in Lloydminster (Area 13) (collectively, the Project). The scheduled in-service date (ISD) for the Project is December 31, 2017.

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

Existing System

Geographically, the Project is located in the AESO planning area of Lloydminster (Area 13), which is part of the AESO Central Planning Region. The Lloydminster area (Area 13) is surrounded by the AESO planning areas of Cold Lake (Area 28), Vegreville (Area 56) and Wainwright (Area 32).

From a transmission perspective, Lloydminster (Area 13) is connected to Cold Lake (Area 28), Vegreville (Area 56), and Wainwright (Area 32) through the 138/144 kV transmission system. Lloydminster and its surrounding planning areas are mainly load centres. There are different types of generation plants that supply those areas. This includes the cogeneration facilities in the Cold Lake (Area 28); the coal generation facilities in the Alliance/Battle River planning area (Area 36); and the wind generating facilities in the AESO planning areas of 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 covers 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 Study Area were

¹ The *Grizzly Bear Creek Wind Power Project*, as originally approved by AUC Decision 3329-D01-2016 and Power Plant Approval No. 3329-D03-2016.

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 analyses were performed in the connection study assuming economic coal and high wind conditions:

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

In addition to the analyses listed above, a power flow sensitivity analysis was performed for 2017 SP and 2017 SL pre- and post-Project scenarios conditions to assess whether there is any transmission congestion under normal condition (Category A) assuming simultaneous high dispatch of both wind and coal generation in the Study Area.

Results of the pre-Project Studies

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

Category A (N-0) conditions

Under Category A conditions, no Reliability Criteria violations were observed for this scenario. For the sensitivity study, no Reliability Criteria violations were observed.

Category B (N-1) conditions

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

Connection alternatives examined for the Project

Four alternatives to connect the Facility and meet E.ON's request for system access service were examined. All alternatives require a switching station, to be designated the Steele 2016S substation, which will connect the approved E. ON Grizzly Bear 708S substation to the AIES.

Alternative 1 – In-and-out connection to the 144 kV transmission line 7L129:

Connect the proposed Steele 2016S substation to the 144 kV transmission line 7L129 (between the Buffalo Creek 526S substation and the Bauer 918S substation tap point) through an in-and-out configuration. This would require approximately 5 km of new 144 kV circuit.

Alternative 2 – In-and-out connection to the 144 kV transmission line 7L129 with line rebuild:

Connect the proposed Steele 2016S substation to the 144 kV transmission line 7L129 using an in-and-out configuration. This involves replacing the existing 144 kV transmission line 7L129 with a line of higher capacity. In total, approximately 40 km of new 144 kV circuit would be required.

Alternative 3 – T-tap connection to the 144 kV transmission line 7L65:

Connect the proposed Steele 2016S substation to the 144 kV transmission line 7L65 (between the Vermilion 710S substation and the approved Vincent 2019S

substation tap point) using a T-tap configuration. Because of AESO's current T-tap practice, this would involve turning the approved Vincent 2019S substation T-tap connection into an in-and-out connection. It would require approximately 20 km of new 144 kV circuit.

Alternative 4 – Radial connection to the Buffalo Creek 526S substation: Connect the proposed Steele 2016S substation radially to the Buffalo Creek 526S substation through a 144 kV transmission line. This would require approximately 10 km of new 144 kV circuit.

Connection alternatives selected for further examination

Of the four potential transmission connection alternatives examined, only Alternative 3 was selected for further study. Alternatives 1 and 4 were not selected for further study because they do not meet the E. ON's Rate STS request. Alternative 2 was not selected for further study because it involves increased transmission development and hence, increased cost compared to Alternative 3.

Results of the post-Project studies

The following is a brief summary of the post-Project studies results. Results and applicable mitigation measures for selected post-Project contingencies are shown in greater detail in Table E-1 below.

Category A (N-0 Condition):

Under Category A conditions, no Reliability Criteria violations were observed for this scenario.

For the sensitivity study, no Reliability Criteria violations were observed.

Short-circuit analysis for pre-Project and post-Project system topology was conducted using 2017 WP pre- and post-Project scenarios and 2025 WP scenarios. The short circuit analysis concludes that the Project connection will not adversely change the short circuit levels in the nearby substations.

Category B (N-1 Condition):

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

Similar to the pre-Project scenarios, power flow analysis identified a number of thermal violations. These are shown in Table E-1 below.

Transient stability assessment was performed using the 2017 SL and SP post-Project scenario for the Alternative 3. The results did not indicate any transient stability concerns, and the system remains stable following all studied Category B (N-1) contingencies in the Study Area.

Project Dependency

A number of 144 kV transmission lines have been de-rated in the Project area and are limited by current transformers (CT), including the 144 kV transmission line 7L65. Restoring the line's capacity and removing its CT limits will mitigate the observed thermal criteria violations (as shown in Table E-1).

Restoring 7L65 is part of the TFO capital maintenance and is outside the scope of the Project. AESO has been advised by the TFO that the 7L65 will be restored by Q3 2017.

Conclusions and Recommendation

Analysis and Conclusions

Table E-1 provides analysis of, and conclusions about, the impact of the Project for Category B contingencies, including mitigations for observed Reliability Criteria violations.

Table E – 1 Project Impact and Mitigation Measures

Identified Reliability Violation		Occurs in Pre- and Post-Project	Impact Level	System Condition	Mitigation Measures
Violation	Contingency				
174L	Nevis 766S transformer 901T	Post-Project Only	Significant	2017 SL	Existing 174L RAS
	912L\9L912				
7L65 (Vermilion 710S - Grizzly Bear 708S / Steele 2016S tap point)	Vegreville 709S transformer	Post-Project Only	Significant	2017 SL, 2017 SP	Removal of the CT limits of 7L65
	Buffalo Creek 526S transformer			2017 SP	
	7L134			2017 SL, 2017 SP	
7L128	9L29	Yes	No change	2017 SL, 2017 SP	Planned Suncor Hand Hill and BluEarth Hand Hill RAS
7L159 (Ghost Pine 114S tap point - Heatburg 948S)			Reduced		
7L16			Reduced		
7L85 (Bullpound 803S to Anderson 801S)			Marginal		
7L85 (Wintering Hills 804S - Bullpound 803S)			Marginal		
7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	Any transformer in North Holden 395S, Vegreville 709S, Nevis 766S, Mahkeses 889S and Edgerton 899S	Pre-Project Only	Reduced	2017 SP	Not required
	701L				
	749L\749AL				
	7L105				
	7L161				
	7L42				
	7L701\7LA701				
	7L749\7LB749				
	7L77				
	7L95				
	9L20				
	912L\9L912				
	Either 9L960 or 9L961				
	500 kV HVDC EATL				
7L50 (Jarrow 252S tap point - Battle River 757S)	Tucuman 478S, transformers T1 or T2	Pre-Project Only	Reduced	2017 SP	

Identified Reliability Violation		Occurs in Pre- and Post-Project	Impact Level	System Condition	Mitigation Measures
Violation	Contingency				
7L129 (Buffalo Creek 526S - Bauer 918S tap point)	Any transformer in North Holden 395S and Edgerton 899S	Pre-Project Only	Reduced	2017 SP	Not required
	749L\749AL	Pre-Project Only			Not required
	7L65\7LA65	Post-Project Only	significant		Real time operating practices
	7L701\7LA701	Pre-Project Only	Reduced		Not required
	7L749\7LB749	Pre-Project Only			Not required
7L129 (Bauer 918S tap point - Vermilion 710S)	749L\749AL	Pre-Project Only	Reduced	2017 SP	Not required
	Edgerton 899S transformer	Pre-Project Only			Not required
7L130	749L\749AL	Yes	Marginal	2017 SP	Real time operating practices
	Edgerton 899S transformer	Only Post-Project			
7L14	749L\749AL	Yes	Marginal	2017 SP	
749L (Edgerton 899S – Killarney Lake 267S Tap)	Buffalo Creek 526S transformer	Pre-Project Only	Reduced	2017 SP	Not required
	7L50 (Buffalo Creek 526S-Battle River 757S)				
749L\7L749 (Edgerton 899S - Briker 880S Tap)	7L50 (Buffalo Creek 526S-Battle River 757S)	Pre-Project Only	Reduced	2017 SP	Not required
7L77	7L50 (Buffalo Creek 526S-Battle River 757S)	Pre-Project Only	Reduced	2017 SP	Not required
Several thermal violation ²	Metiskow 648S transformer,	Yes	No change	2017SP,	Real time

² 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 operating practices. The results for this contingency have not been included in this report.

Identified Reliability Violation		Occurs in Pre- and Post-Project	Impact Level	System Condition	Mitigation Measures
Violation	Contingency				
	T1 (648ST1)			2017SL	operating practices

Based on the study results, Alternative 3 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- and post-Project system performance issues. The Project does not impact the effectiveness of existing RASs in the Study Area, nor does the Project create new RASs in the Study Area.

The Project connection using Alternative 3 will require the line restoration for transmission line 7L65 and removal of the CT limits to bring it up to its designed thermal rating. In this instance the new line would need to be rated as 130 MVA (summer) and 162 MVA (winter).

Recommendation

It is recommended to proceed with the Project using Alternative 3 as the preferred alternative to respond to E. ON's request for system access service. It is also recommended to use real time operational practices and existing and planned RASs to mitigate the identified system performance issues. A minimum rating of 134 MVA is recommended for the new 144 kV circuit (between the Steele 2016S and Grizzly Bear Tap point) and is consistent with good electric industry practice. The dependencies identified in this report (i.e., restoration of the seasonal continuous thermal rating for the 144 kV transmission lines 7L65) need to be in service prior to energization of the Project.

The connection of the Project does not adversely impact the performance of the AIES. It is recommended that the Project be connected using Alternative 3.

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1. Introduction

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

1.1. Project

1.1.1. Project Overview

E. ON Climate and Renewables Canada Ltd. (E. ON) submitted a System Access Service Request (SASR) to the Alberta Electric System Operator (AESO) to connect its 120 MW wind aggregated generating facility (WAGF) near the Town of Vermilion, named the Grizzly Bear Creek Wind Power Project (the Facility) to the Alberta interconnected electric system (AIES) in the AESO Planning area of Lloydminster (Area 13). E. ON's request includes a Rate STS, *Supply Transmission Service*, contract capacity of 120 MW, a Rate DTS, *Demand Transmission Service*, contract capacity of 1.5 MW, and request to connect the E.ON Grizzly Bear WAGF to the AIES at LSD NW-10-49-8-4 in the AESO Lloydminster planning area (Area 13) (collectively, the Project). The Facility includes E. ON's approved Grizzly Bear 708S substation.

The scheduled in-service date (ISD) for the Project is December 31, 2017

1.1.2. Load Component

The Project includes a load component:

- Rate DTS Requested: 1.5 MW
- Load type: Substation service and auxiliary load. This load will only be present when the generator is supplying power.

1.1.3. Generation Component

The Project includes the following generation component:

- Rate STS Requested: 120 MW
- Maximum Authorized Real Power(MARP): 120 MW
- Maximum Capability (MC): 120 MW
- Type of generator: Wind
- Number and size of generator(s): 50 – 2.4 MW wind turbines
- 0.9 power factor (PF) lagging and 0.95 PF leading is assumed at the Facility output as measured at the generator unit terminal, per the technical requirements of Section 502.1 of the ISO Rules, *Wind Aggregated Generation Facilities Technical Requirements*
- Future expansion planned: E.ON does not currently have future expansion plans.

1.2. Study Scope

1.2.1. Study Objectives

The objective of the study is as follows:

1. Assess the impact of the Project on the performance of the AIES.
2. Evaluate the Project connection alternatives based on technical performance.
3. Assess any violations of the relevant criteria, standards or requirements of the AESO, both pre- and post-Project.
4. Recommend the Project connection alternative and 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 Lloydminster (Area 13), which is in the Central Planning Region. The Lloydminster area (Area 13) is surrounded by the AESO planning areas of Cold Lake (Area 28), Vegreville (Area 56), and Wainwright (Area 32).

From a transmission perspective, Lloydminster (Area 13) is connected to Cold Lake (Area 28), Vegreville (Area 56), and Wainwright (Area 32) through the 138/144 kV transmission system.

Lloydminster and its surrounding planning areas are mainly load centres. There are different types of generation plants that supply those areas. This includes the cogeneration facilities in the Cold Lake (Area 28); the coal generation facilities in the Alliance/Battle River planning area (Area 36); and the wind generating facilities in the AESO planning areas of 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 Study Area includes the Central East Region Transmission Development (CETD)³. Most of these developments are approved and already in service or will be in service by 2017. The remaining CETD sub-projects are described in Table 1-1.

The AESO has published its 2015 Long-term Transmission Plan⁴ in which a summary of the Central Region⁵ plan in near term is provided. Figure 1-2 and Table 1-2 shows the near-term plan in the vicinity of the Study Area. The near-term plans have ISDs expected by 2020.

³ *The Central East Region Transmission Development NID*, as originally approved by AUC Decision 2011-048 and Approval No. U2011-57.

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

Figure 1-1: Planning Map of the Study Area

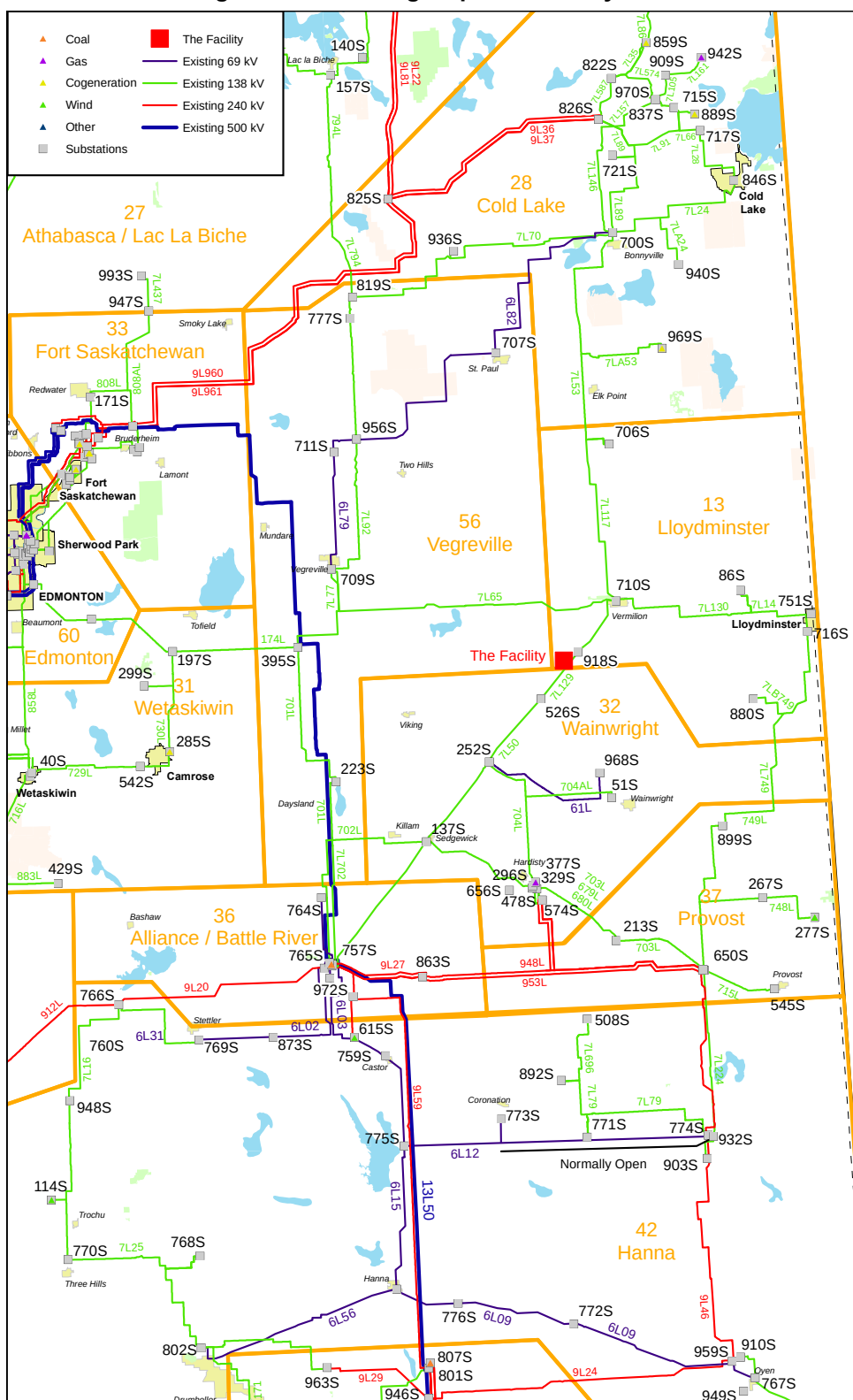
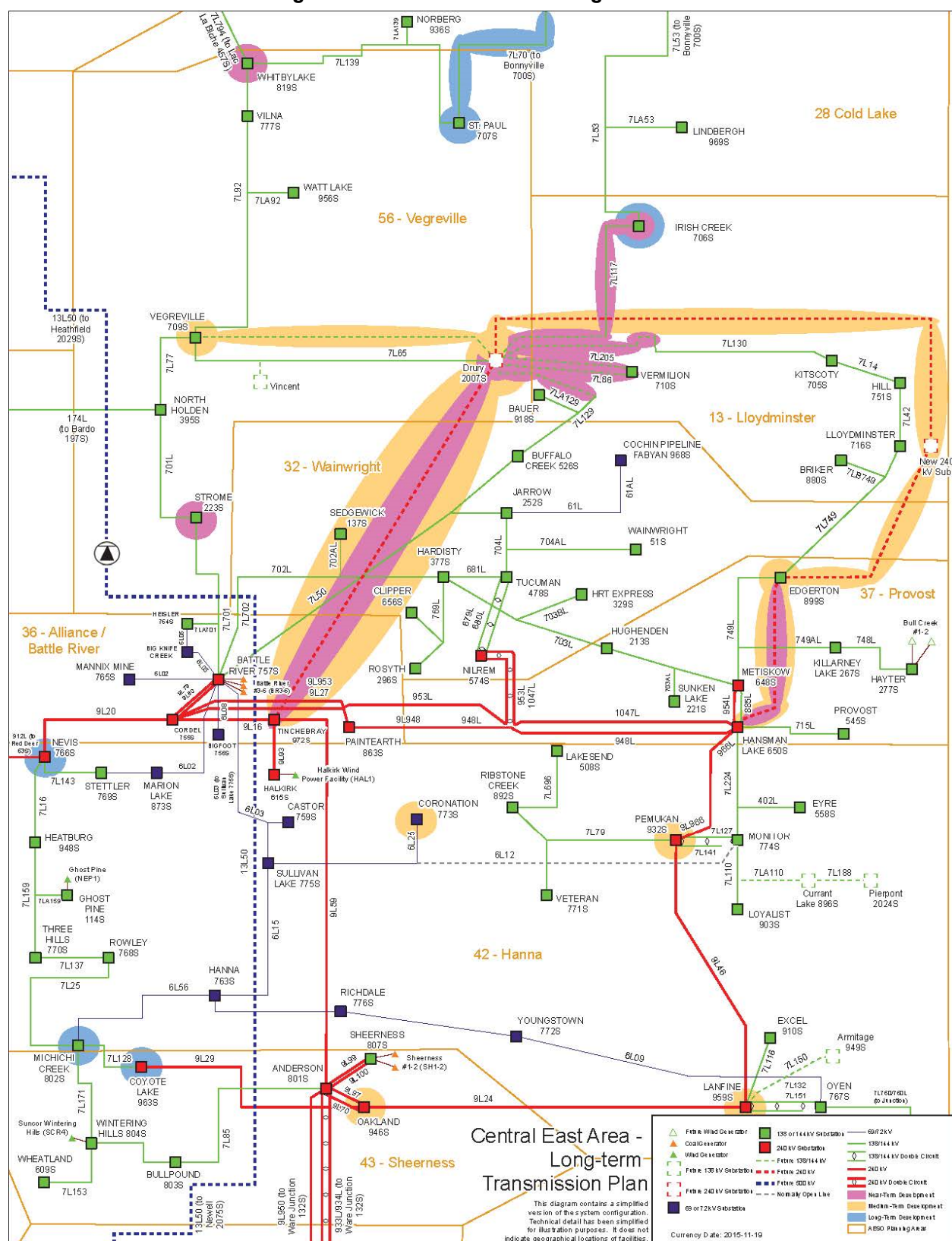


Figure 1-2: Near Term Central Region Plan*



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

1.2.2.2. Existing Constraints

The existing constraints in the Study Area are currently managed by the following planned and installed Remedial Action Schemes (RASs):

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: EATL RAS for 912L and 9L20 contingencies

The existing constraints in the Study Area are managed in accordance with Section 302.1 of the ISO Rules, *Real Time Constraint Management* (TCM). A brief description can be found in the Information Document (ID) for the Central East Area TCM rule (ID# 2012-018R).

1.2.2.3. AESO Long-Term Transmission Plans (LTP)

The *AESO 2015 Long-term Transmission Plan* (2015 LTP) includes the following system developments in the vicinity of the Study Area that are considered in this assessment and listed in Table 1-1.

Table 1-1: Summary of Future Approved Central East Transmission Developments

Project	Subproject	Subproject Name	Scheduled In-Service Date
811	4	St. Paul Upgrades St. Paul 707S, 7L139/7L70	August 2016
811	25	EN-25 - Bonnyville 700S Transformer Addition	February 2017

Table 1-2 shows the AESO 2015 Long-term Transmission Plan's near term components for Central East region.⁶

Table 1-2: 2015 Long-term Transmission Plan's near term components

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

⁶ The 2015 LTP identifies the near-term transmission developments in the Study Area on page 51.

Time Frame	Development
	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 in the connection study:

- Power flow analysis (Category A conditions and Category B contingencies) for pre-and post-Project.
- Transient stability analysis (Category A conditions and Category B contingencies) for post-Project.
- Short-circuit analysis (Category A conditions) for pre-Project and post-Project.

In addition to the analyses listed above, a power flow sensitivity analysis was performed for 2017 SP and 2017 SL pre- and post-Project scenarios conditions to assess whether there is any transmission congestion under normal condition (Category A) assuming simultaneous high dispatch of both wind and coal generation in the Study Area.

1.3. Report Overview

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

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*⁷ (collective, 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 this study, the Applicable Ratings shall mean:

- 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 condition should follow the AESO Information Document ID# 2010-007RS, *General Operating Practices – Voltage Control*, which 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.

⁷ Filed under a separate cover.

Table 2-1: Post Contingency Voltage Deviation Guidelines

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. AESO Rules

The AESO *Voltage Control Practice* ID # 2010-007RS will be applied to establish pre-contingency voltage profiles in the Study Area. The Section 302.1 of the ISO Rules, *Real Time Transmission Constraint Management* (TCM) will be followed in setting up the study scenarios and assessment of the impact of the Project connection.

The Reliability Criteria is the basis for planning the AIES. The transmission system will normally be designed to meet or exceed the Reliability Criteria under credible worst-case loading and generation conditions.

2.1.3. Other Requirements

Wind Aggregated Generation Facility (WAGF) Requirements

The Facility should meet the technical requirements of ISO Rules Section 502.1, *Wind Aggregated Generation Facilities Technical Requirements*.

2.2. Study Scenarios

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.

The scheduled ISD for the Project was revised from December 31, 2016 to December 31, 2017 after the studies were performed. The shift in the ISD does not materially impact the results of this connection assessment, and does not change the conclusions and recommendations contained in this report.

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, High Export
2017 SP	Pre-Project	0	0	High Wind, Economic Coal,

Year/Season	Condition	Project Load (MW)	Project Generation (MW)	System Generation Dispatch Conditions
				High Import
2017 SL	Post-Project	0 ⁸	120	High Wind, Economic Coal, High Export
2017 SP	Post-Project	0	120	High Wind, Economic Coal, High Import

2.3. Load and Generation Assumptions

2.3.1. Load Assumptions

The load forecasts used for this study are shown in Table 2-3 and are from 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 2016 Long-term Outlook*, would not materially alter the connection study results or affect the conclusions and recommendations in this report.

In this study the active power to reactive power ratio in the base case scenarios were maintained when modifying the planning area loads.

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

Region Name and Season		Forecast Peak Load (MW)
		2017
Central Region	SP	1632
	SL	1174
South Region	SP	2878
	SL	1890
AIL w/o Losses	SP	11,440
	SL	8245

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 condition for the Study Area.

⁸ The load component of the Project is not material and; therefore, was not assessed.

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 facilities dispatched up to their contracted MC level. These dispatch assumptions were used for the high wind 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 ⁹ (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

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

Unit 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

⁹ Unit Net Generation refers to Gross Generating unit MW output less Unit Service Load.

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

Existing /Future	Unit Name	Project Number	AESO Planning Area	2017 SP Unit Net Generation ⁶ (MW)	2017 SL Unit Net Generation (MW)
Future	Wainwright Wind Farm	937	32-Wainwright	90	90
Future	E.ON Grizzly Bear Wind Facility	1250 (Facility)	13-Lloydminster	120	120
Future	Suncor Hand Hills Wind Energy ¹⁰	635	42-Hanna	80	80
Future	BluEarth Hand Hills Wind Energy ¹¹	678	42-Hanna	80	80
Total				370	370

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 (SL) and high import (SP) conditions for the Study Area.

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 Pre-Project (High Export)	700	150	300
2017 SP Pre-Project (High Import)	-900	-150	-300
2017 SL Post-Project (High Export)	700	150	300

¹⁰ The *Suncor Hand Hills Wind Energy Connection* NID, as originally approved by AUC Decision 2482-D01-2015 and Approval 2482-D03-2015.

¹¹ The *BluEarth Hand Hills Wind Energy Connection* NID, as originally approved by AUC Decision 2482-D01-2015 and Approval 2482-D02-2015.

Scenario	Intertie		
	Import (-) /Export (+) to BC-AB (MW)	Import (-) /Export (+) to SK-AB (MW)	Import (-) /Export (+) to MATL (MW)
2017 SP Post-Project (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 ¹² (MW)	Eastern Alberta Transmission Line ¹³ (MW)
2017SL Pre- Project	475 (S → N)	Blocked
2017SP Pre- Project	250 (S → N)	450 (S → N)
2017SL Post- Project	475 (N → S) ¹⁴	Blocked
2017SP Post- Project	250 (S → N)	450 (S → N)

2.4. System Projects

The future system projects in the Study Area that are considered in this assessment are listed in Table 2-9.

Table 2-9: Summary of System Projects Included in the Study Cases

Project	Subproject	Subproject Name	Scheduled In-Service Date
811	4	St. Paul Upgrades St. Paul 707S, 7L139/7L70	August 2016
811	25	EN-25 - Bonnyville 700S Transformer addition	February 2017

2015 LTP system projects were not considered in this Study.

¹² Western Alberta Transmission Line (the west 500 kV HVDC line)

¹³ Eastern Alberta Transmission Line (the east 500 kV HVDC line)

¹⁴ N → S: HVDC flow direction is North to South

S → N: HVDC flow direction is South to North

2.5. Customer Connection Projects

The list of the customer projects included in the study is shown in Table 2-10.

Table 2-10: Summary of Customer Connection Assumptions

Planning Area	Queue Position *	Planned In-Service Date	Project Name	AESO Project #	Gen (MW)	Load (MW)	Included/Excluded from Studies
42	6	Dec 31, 2018	Suncor Hand Hills Wind Energy Project	635	80.0	0.0	<i>Included</i>
42	7	Dec 31, 2018	BluEarth Hand Hills Wind Project	678	80.0	1.0	<i>Included</i>
37	9	Jul 1, 2016	TransCanada Keystone KXL Pump station #2-Eyre	851	0.0	0.0	<i>Included</i>
37	10	Jan 1, 2017	TransCanada Keystone KXL Pump station #2-Eyre Phase 2	851	0.0	25.0	<i>Included</i>
42	11	Jul 1, 2016	TransCanada Keystone KXL Pump station #3-Current	863	0.0	25.0	<i>Included</i>
42	12	Jul 1, 2016	TransCanada Keystone KXL Pump station #4-Armitage	864	0.0	25.0	<i>Included</i>
32	15	Sep 30, 2018	Wainwright Wind Farm Project	937	90.0	0.0	<i>Included</i>

* Per the AESO Connection Queue posted in May 2016.

2.6. Facility Ratings and Shunt Elements

The Transmission Facility Owner (TFO) provided the ratings of the key existing transmission lines (Table 2-11) and the existing transformers (Table 2-12) in the Study Area.

Table 2-11: Summary of Key Transmission Line Ratings in the Study Area (MVA on 138 kV Base)

Line ID	Line Description	Voltage Class (kV)	Nominal Rating (MVA)		Short-term ¹⁵ Rating (MVA)	
			Summer	Winter	Summer	Winter
704L	Jarrow 252S - Tucuman 478S	138	75	79	83	87
704L	Jarrow 252S - Jarrow 252S substation tap point	138	85	90	94	99
7L129	Buffalo Creek 526S - Vermilion 710S	138	109.3	139.0	123.6	142.8 CT (150.5)

¹⁵ When line loading in post Category B contingency is observed to exceed nominal rating and is less than the short-term emergency rating, it is assumed that AESO and TFO real time operating practices can manage the constraint within the time requirements of TFO short time emergency rating.

Line ID	Line Description	Voltage Class (kV)	Nominal Rating (MVA)		Short-term ¹⁵ Rating (MVA)	
			Summer	Winter	Summer	Winter
7L50	Buffalo Creek 526S - Jarrow 252S substation 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 substation tap point	138	121.0	149.0	133.0	164.0
749AL	Killarney Lake 267S - Killarney Lake 267S substation tap point	138	121.0	148.0	133.0	163.0
749L	Edgerton 899S - Killarney Lake 267S substation tap point	138	88.0	96.0 CT*,** (127.0)	97.0	140.0
749L/7L749	Edgerton 899S - Paradise Valley (PV) tap point	138	88.0	96.0 CT (127.0)	97.0	140.0
7L749	Lloydminster 716S PV tap	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
7L14	Hill 751S - Kitscoty 705S	138	71.9	86.3	71.9	86.3
9L912/912L	Red Deer 63S - Nevis 766S	240	488.0	498.0 CT (624.0)	498.0 CT	498.0 CT
9L20	Nevis 766S - Cordel 755S	240	488.0	498.0 CT (624.0)	498.0 CT	498.0 CT

Line ID	Line Description	Voltage Class (kV)	Nominal Rating (MVA)		Short-term ¹⁵ Rating (MVA)	
			Summer	Winter	Summer	Winter
9L29	Oakland 946S - Coyote Lake 963S	240	332 CT (753.0)	332 CT (966.0)	432 CT	432 CT
9L27	Cordel 755S - Paintearth 863S	240	332 CT (489.0)	332 CT (624.0)	332 CT	332 CT
9L953	Cordel 755S - Nilrem 574S	240	498 CT (520.0)	498 CT (663.0)	498 CT	498 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.

Table 2-12: Summary of Key Transformer Ratings in the Study Area

Substation Name and Number	Transformer ID	Transformer Voltages (kV)	MVA Rating
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 shunt elements in the Study Area are given in Table 2-13.

Table 2-13: Summary of 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 MVar	27.02	on	on				

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)
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

Fault clearing times for existing facilities were provided by the TFO and are listed in Table 2-14.

Table 2-14: Summary of Protection Fault Clearing Times

Line	Nominal Bus Voltage (kV)	Terminal Location			Faulted Location	Total Clearing Time			State if it is calculated (specific) or estimated (generic) Faulted Location
		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	Actual
7L701	138	Strome 223S	Battle River 757S	Heisler 764S	Strome 223S	6 cycles	24 cycles	39 cycles	Actual
7L129	138	Vermilion 710S	Buffalo Creek 526S	-	Vermilion 710S	6 cycles	24 cycles	-	Actual
7L129	138	Buffalo Creek 526S	Vermilion 710S	-	Buffalo Creek 526S	6 cycles	24 cycles	-	Actual

7L50	138	Battle River 757S	Buffalo Creek 526S	Jarrow 252S	Battle River 757S	6 cycles	115 cycles	95 cycles	Actual
7L50	138	Buffalo Creek 526S	Battle River 757S	Jarrow 252S	Buffalo Creek 526S	6 cycles	42 cycles	40 cycles	Actual
749L/ 7L749	138	Lloydminster 716S	Edgerton 899S	Briker 880S tap point	Lloydminster 716S	6 cycles	95 cycles	No line protection	Actual
749L/ 7L749	138	Edgerton 899S	Lloydminster 716S	Briker 880S tap point	Edgerton 899S	6 cycles	24 cycles	No line protection	Actual
749L	138	Metiskow 648S	Edgerton 899S	Killarnery Lake 267S tap point	Metiskow 648S	6 cycles	95 cycles	No line protection	Actual
749L	138	Edgerton 899S	Metiskow 648S	Killarnery Lake 267S tap point	Edgerton 899S	6 cycles	95 cycles	No line protection	Actual
7L65	138	Vegreville 709S	Vermillion 710S	-	Vegreville 709S	6 cycles	42 cycles	-	Actual
7L65	138	Vermillion 710S	Vegreville 709S	-	Vermillion 710S	6 cycles	24 cycles	-	Actual
7L117	138	Vermillion 710S	Irish Creek 706S	-	Vermillion 710S	6 cycles	24 cycles	-	Actual
7L117	138	Irish Creek 706S	Vermillion 710S	-	Irish Creek 706S	6 cycles	24 cycles	-	Actual
7L42	138	Hill 751S	Lloydminster 716S	-	Hill 751S	6 cycles	24 cycles	-	Actual
7L42	138	Lloydminster 716S	Hill 751S	-	Lloydminster 716S	6 cycles	24 cycles	-	Actual
7L53	138	Bonnyville 700S	Irish Creek 706S	-	Bonnyville 700S	6 cycles	24 cycles	-	Actual
7L53	138	Irish Creek 706S	Bonnyville 700S	-	Irish Creek 706S	6 cycles	24 cycles	-	Actual

7L70	138	Bonnyville 700S	St. Paul 707S	-	Bonnyville 700S	6 cycles	42 cycles	-	Actual
7L70	138	St. Paul 707S	Bonnyville 700S	-	St. Paul 707S	6 cycles	42 cycles	-	Actual
9L20	240	Cordell 755S	Nevis 766S	-	Cordell 755S	5 cycles	6 cycles	-	Actual
9L20	240	Nevis 766S	Cordell 755S	-	Nevis 766S	5 cycles	6 cycles	-	Actual
912L	240	Red Deer 63S	Nevis 766S	-	Red Deer 63S	5 cycles	6 cycles	-	Actual
912L	240	Nevis 766S	Red Deer 63S	-	Nevis 766S	5 cycles	6 cycles	-	Actual
9L59	240	Halkirk 401S (Switch H)	Anderson 801S	-	Halkirk 401S (Switch H)	5 cycles	6 cycles	-	Actual
9L59	240	Anderson 801S	Halkirk 401S (Switch H)	-	Anderson 801S	5 cycles	6 cycles	-	Actual

2.9. Voltage Profile Assumptions

The 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 ID# 2010-007RS. These voltages were utilized to set the voltage profile for the study base cases prior to power flow analysis.

3. Study Methodology

3.1. Connection Studies Carried Out

The studies to be carried out for this connection study were identified in Table 3-1.

Table 3-1: Summary of Studies Performed

Scenario	Project		System Conditions	Power flow	Transient Stability	Short-circuit ¹⁶
	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	120	Category A and Category B	X	X	
2017 SP Post-Project*	0	120	Category A and Category B	X	X	
2017 WP Pre-Project**	0	120	Category A			X
2017 WP Post-Project**	0	120	Category A			X
2025 WP Post-Project**	0	120	Category A			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	120	Category A	X		
2017 SP High-Coal Post-Project*	0	120	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

Power flow analysis was performed using PSS/E v33 for the pre-Project and post-Project conditions as outlined in Table 3-1.

¹⁶ Only Category A with all generators on.

The objective of the power flow analysis was to check for thermal and voltage Reliability Criteria violations in the Study Area for the pre-Project and post-Project scenarios.

3.2.1. Contingencies Studied

Power flow analysis was performed for the Category A condition 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 2-14. 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 is any transmission congestion under normal condition (Category A), a sensitivity study was performed using a high wind, high coal and high import (for 2017 SP) or high export (for 2017 SL) scenarios. Pre-Project and post-Project cases were assessed to ensure the Project addition will not impose any transmission congestion. In this sensitivity scenario the coal units in 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	Area	2017 SP Unit Net Genera tion (MW)	2017 SL Unit Net Genera tion (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-	0	0	High Wind, High

Scenario	Project Load (MW)	Project Generation (MW)	System Generation Dispatch Conditions
Project			Coal, High Export
2017 SP High Coal Pre-Project	0	0	High Wind, High Coal, High Import
2017 SL High Coal Post-Project	0	120	High Wind, High Coal, High Export
2017 SP High Coal Post-Project	0	120	High Wind, High Coal, High Import

3.5. Short-Circuit Analysis

Short circuit analysis was performed for 2017 pre-Project and post-Project WP 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
- Proposed Project/Facility substations

4. Pre-Project System Assessment

4.1. Pre-Project Power Flow Analysis

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)

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

Category A Condition

No Reliability Criteria violations were observed under Category A conditions.

Category B Contingency Condition

Neither voltage criteria violations nor voltage deviations were observed in this scenario.

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

Table 4-1: Summary of System Performance (Element Loading) 2017 SL Pre-Project Category B

Contingency	Limiting Branch	Continuous Line 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 to 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)

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

Category A Condition

No voltage criteria violations or thermal violations were observed in this scenario.

Category B Contingency Condition

No voltage criteria violations or voltage deviations were observed in this scenario.

Thermal loading above nominal continuous ratings and short term ratings have been observed. All observed thermal criteria violations are listed in Table 4-2.

Table 4-2: Summary of System Performance (Element Loading) 2017 SP Pre-Project Category B

Contingency	Limiting Branch	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

Contingency	Limiting Branch	Continuous Line Rating (MVA)	Short-term Rating (MVA)	Pre-Project	
				Power flow (MVA)	% Loading
	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 point)	109.2	123.6	112.0	102.6
	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 5TNSA1 (889S-5TNSA1)	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 (63S Red Deer 63S - 766S Nevis 766S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	128.1	117.3
9L20 (766S 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

Contingency	Limiting Branch	Continuous Line Rating (MVA)	Short-term Rating (MVA)	Pre-Project	
				Power flow (MVA)	% Loading
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

Four 144 kV connection alternatives were examined to meet E. ON's request for system access service. Details of these alternatives are as follows.

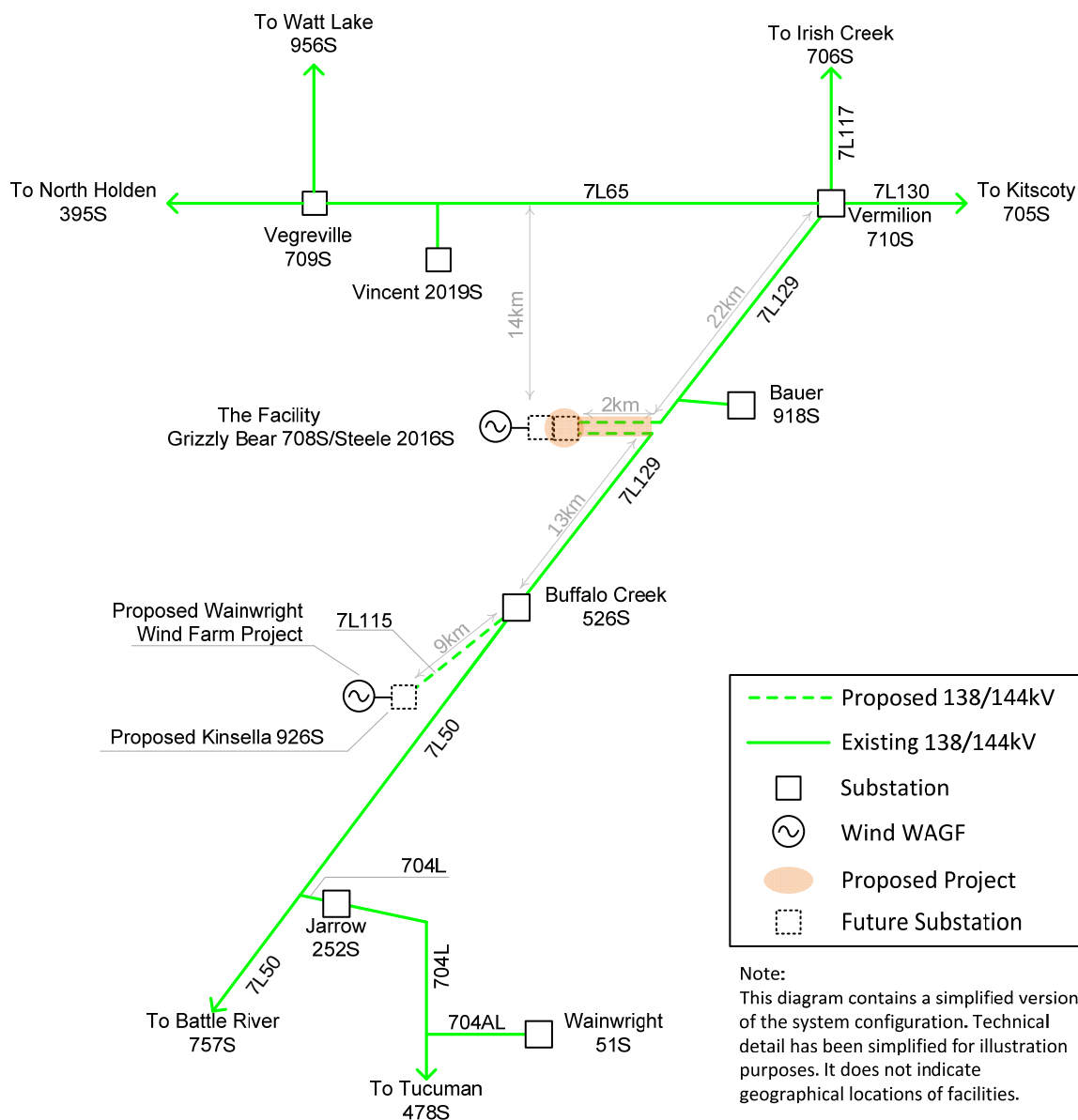
The approved Facility will include a 34.5/144 kV collector substation to be designated the E. ON Grizzly Bear 708S substation. The TFO has requested that the E. ON Grizzly Bear 708S substation connect through a switching station, to be designated as the Steele 2016S substation for all alternatives examined. All alternatives will also require a 144 kV circuit with a minimum rating of 134 MVA.

5.2. Connection Alternatives Identified

The major transmission development required for the four connection alternatives examined and its ability to meet E. ON's request for a Rate STS of 120 MW is described below.

Alternative 1 – In-and-out connection to the 144 kV transmission line 7L129:

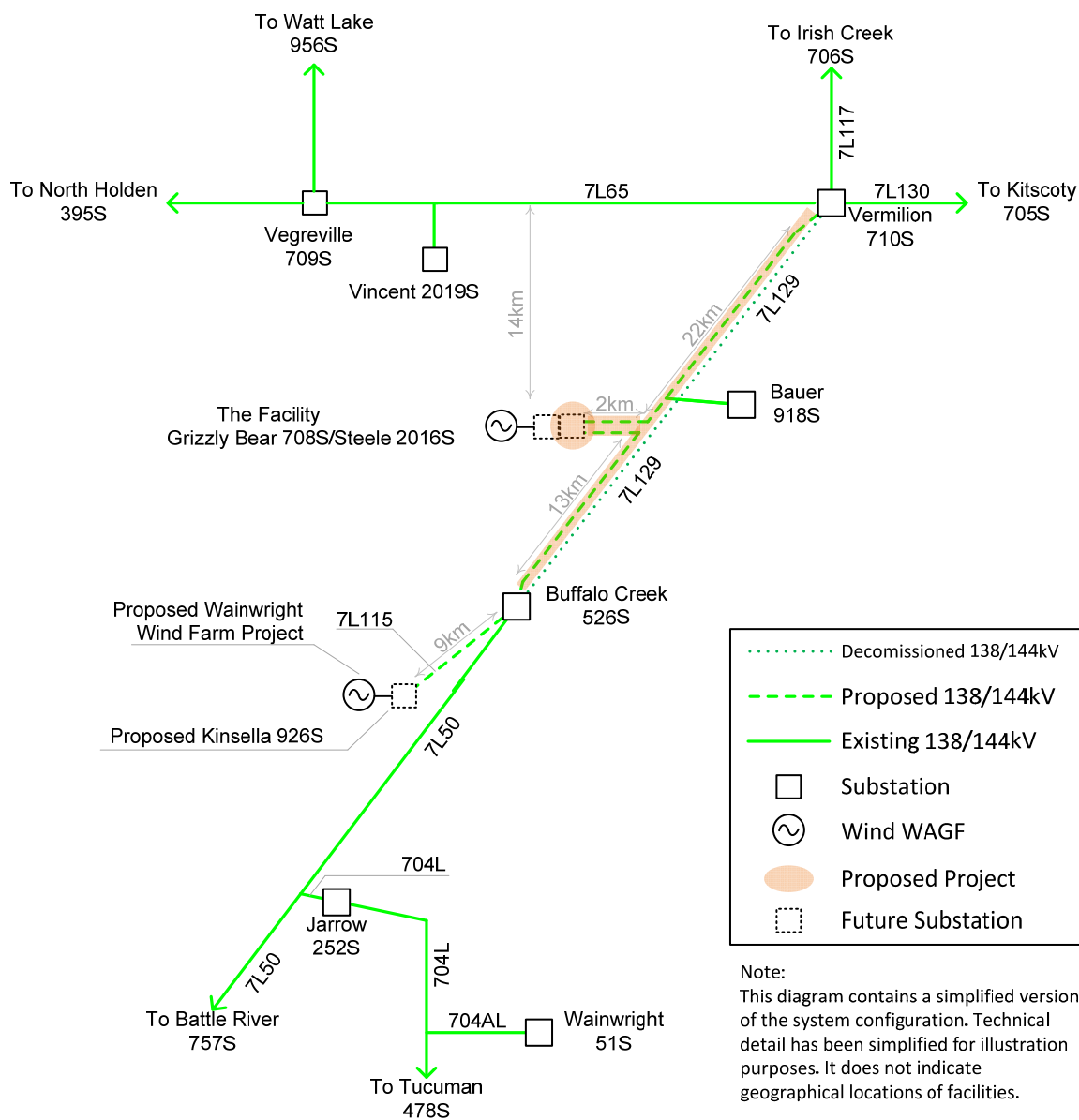
Add the Steele 2016S substation and connect it to the 144 kV transmission line 7L129 (between the Buffalo Creek 526S substation and the Bauer 918S substation tap point) through an in-and-out configuration as shown in Figure 5-1. This alternative would require a new 144 kV circuit approximately 5 km long. 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 55 MW under normal condition (Category A) for this connection alternative. This is much lower than the Rate STS request of 120 MW, and therefore is not acceptable.

Figure 5-1: Connection Alternative 1

Alternative 2 – In-and-out connection to the 144 kV transmission line 7L129 with line rebuild:

Rebuild the 144 kV transmission line 7L129 with a transmission line of high capacity. Add the Steele 2016S substation and connect it to the new 144 kV transmission line 7L129 using an in-and-out connection between the Buffalo Creek 526S substation and the Bauer 918S substation tap point (shown in Figure 5-2). This alternative would require a new 144 kV circuit approximately 40 km long. This connection alternative would support E. ON's request for a Rate STS of 120 MW under normal condition (Category A).

Figure 5-2: Connection Alternative 2



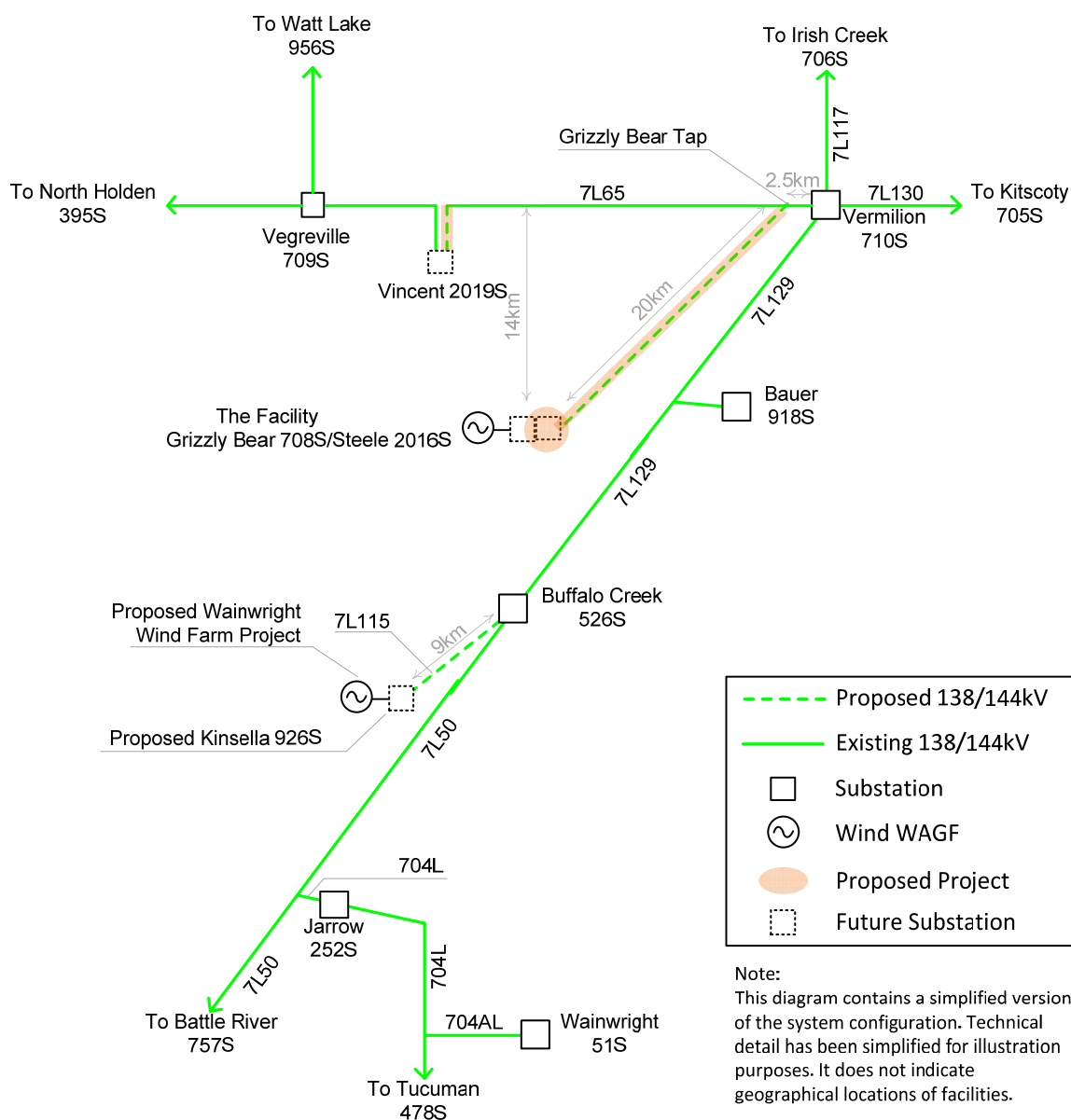
Alternative 3 – T-tap connection to the 144 kV transmission line 7L65:

Add the Steele 2016S substation and connect it to the 144 kV transmission line 7L65 using a T-tap configuration (between the Vermilion 710S substation and the approved Vincent 2019S substation tap point) as shown in Figure 5-3.

Current AESO practice is to limit new taps on transmission lines to one for the sake of reliability to new and existing customers. This is consistent with the current Section 502.3 of the ISO Rules, *Interconnected Electric System Protection Requirements*. Therefore, the approved Vincent 2019S substation connection will need to be converted from a T-tap to an in-and-out configuration for this alternative.

It is estimated that the 144 kV circuit would be approximately 20 km in length. This alternative would support E. ON's request for a Rate STS of 120 MW under normal condition (Category A, N-0).

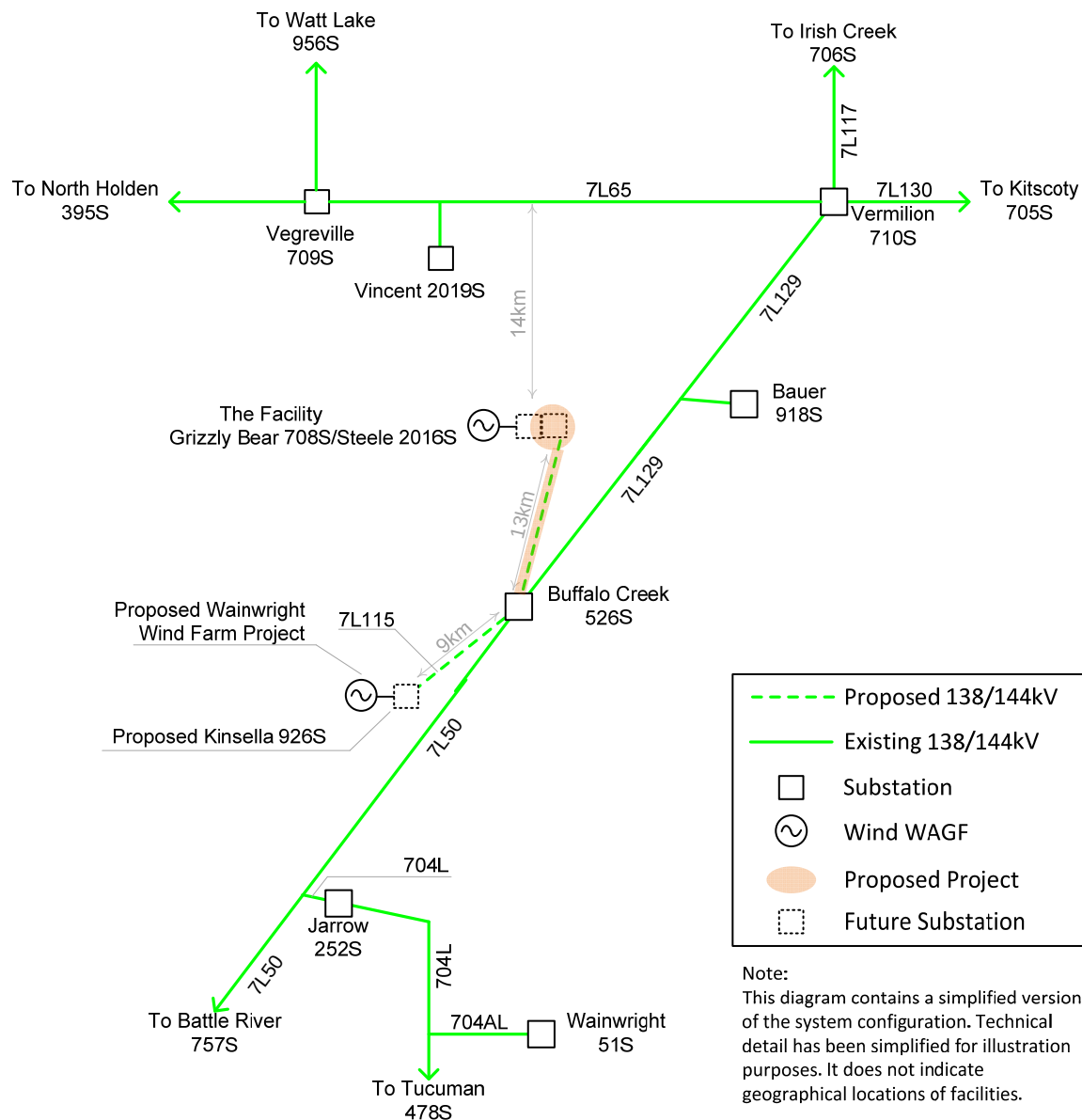
Figure 5-3: Connection Alternative 3



Alternative 4 – Radial connection to the Buffalo Creek 526S substation:

Add the Steele 2016S substation and connect it to the Buffalo Creek 526S substation as shown in Figure 5-4. This alternative would require a new 144 kV circuit approximately 10 km long. As a result of existing capacity limits on the 138/144 kV system in the area, the Facility would not be able to supply electricity under system normal (Category A, N-0) conditions.

Figure 5-4: Connection Alternative 4



5.2.1. Connection Alternatives Selected for Further Studies

Alternative 2 and 3 are the only alternatives that are able to meet E. ON's request for a 120 MW Rate STS. Alternative 3 requires less transmission development than Alternative 2. Therefore, Alternative 3 is the only alternative considered for further study.

5.2.2. Connection Alternatives Not Selected for Further Studies

Alternatives 1 and 4 were not considered for further studies because they do not provide E. ON with the requested Rate STS of 120 MW under Category A condition.

Alternative 2 is technically feasible, but would require increased transmission development and hence, increase cost compared to Alternative 3. Therefore, it was not considered for further study.

6. Technical Analysis of the Connection Alternatives

6.1. Power Flow

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)

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

Category A (N-0 Condition):

No voltage criteria violations or thermal violations were observed in this scenario.

Category B (N-1 Condition):

No voltage criteria violations or voltage deviations were observed in this scenario.

Several thermal loadings above nominal 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 and the green shaded cells show the loading above seasonal rating and below short-term rating.

Table 6-1: Summary of System Performance (Element Loading) 2017 SL Post-Project Category B

Contingency	Limiting Branch	Continuous Line Rating (MVA)	Short-term Rating (MVA)	Pre- Project		Post- Project		% Loading Difference
				Power flow (MVA)	% Loading	Power flow (MVA)	% Loading	Post-Pre
Vegreville 709S, transformer 701T or 702T (Vegreville 709S701T* or 709S702T*)	7L65 (Vermilion 710S - Grizzly Bear 708S tap point)	94.9	94.9	8.9	9.3	106.1	111.8	102.4
Nevis 766S transformer 901T (766901T*)	174L (Bardo 197S - North Holden 395S)	85.0	94.0	56.8	66.8	89.0	104.7	38.0
7L134 (Vincent 2019S - Vegreville 709S)	7L65 (Vermilion 710S - Grizzly Bear 708S tap point)	94.9	94.9	15.8	17.0	106.1	111.8	111.8
912L\9L912 (Red Deer 63S - Nevis 766S)	174L (Bardo 197S - North Holden 395S)	85.0	94.0	57.0	67.0	89.1	104.8	37.8
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	116.2	122.5	-2.6
	7L16 (Nevis 766S -	94.9	94.9	114.5	120.7	112.0	118.1	-2.6

Contingency	Limiting Branch	Continuous Line Rating (MVA)	Short-term Rating (MVA)	Pre- Project		Post- Project		% Loading Difference
				Power flow (MVA)	% Loading	Power flow (MVA)	% Loading	Post-Pre
	Heatburg 948S)							
	7L85 (Bullpound 803S - Anderson 801S)	94.9	94.9	120.7	127.1	124.5	131.2	4.0
	7L85 (Wintering Hills 804S - Bullpound 803S)	94.9	94.9	126.9	133.7	130.7	137.7	4.0

* Lack of transformer breaker will trip the 144 kV lines connected to this transformer

6.1.1.2. 2017 Summer Peak (2017 SP)

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

Category A (N-0 Condition):

No voltage criteria violations or thermal violations were observed in this scenario.

Category B (N-1 Condition):

No voltage criteria violations or voltage deviations were observed in this scenario.

Power flow results show that the connection of the Project will eliminate the thermal loading and violations observed in pre-Project scenario on the 138/144 kV transmission lines 7L50, 749L, and 7L77.

Thermal loadings above nominal continuous and short term ratings were observed for a number of contingencies and are listed in Table 6-2.

Table 6-2: Summary of System Performance (Element Loading) 2017 SP Post-Project Category B

Contingency	Limiting Branch	Continuous Line Rating (MVA)	Short-term Rating (MVA)	Pre- Project		Post- Project		% Loading Difference
				Power flow (MVA)	% Loading	Power flow (MVA)	% Loading	Post-Pre
(North Holden 395S transformer T1 (395ST1*))	7L129 (Buffalo Creek 526S - Bauer 918S tap point)	109.2	123.6	113.2	103.6	90.1	82.5	-21.1
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	134.9	123.5	33.4	30.6	-93.0
Tucuman 478S, transformers T1 or T2 (478ST1* or 478ST2*)	7L50 (Jarrow 252S tap point to Battle River 757S)	109.2	123.6	109.4	100.1	37.5	34.4	-65.8
Buffalo Creek 526S transformers T1 or T2 (526ST1* or 526ST2*)	7L65 (Vermilion 710S - Grizzly Bear 708S tap point)	94.9	94.9	33.0	34.8	97.6	102.8	68.0
	749L (Edgerton 899S - Killarney Lake 267S tap point)	88.0	97.0	89.8	102.0	58.6	66.6	-35.4
701L (North Holden 395S - Strome 223S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	127.9	117.1	35.5	32.5	-84.5

Contingency	Limiting Branch	Continuous Line Rating (MVA)	Short-term Rating (MVA)	Pre- Project		Post- Project		% Loading Difference
				Power flow (MVA)	% Loading	Power flow (MVA)	% Loading	Post-Pre
Vegreville 709S transformer T1 or T2 (709S701T* or 709S702T*) ()	7L65 (Vermilion 710S - Grizzly Bear 708S tap point)	94.9	94.9	15.9	16.8	100.9	106.3	89.5
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	117.2	107.3	17.0	15.6	-91.7
749L\749AL (Metiskow 648S - Edgerton 899S)	7L129 (Buffalo Creek 526S - Bauer 918S tap point)	109.2	123.6	121.5	111.3	95.5	87.4	-23.8
	7L129 (Bauer 918S tap point - Vermilion 710S)	109.2	123.6	114.9	105.2	89.2	81.7	-23.5
	7L130 (Vermilion 710S - Kitscoty 705S)	71.9	71.9	76.7	106.7	78.0	108.5	1.8
	7L14 (Kitscoty 705S - Hill 751S)	71.9	71.9	72.4	100.7	73.7	102.6	1.9
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	143.4	131.3	38.7	35.4	-95.9
Nevis 766S transformer 901T (766901T*)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	128.2	117.4	40.7	37.2	-80.1
7L105 (Mahihkan 837S - Mahno 909S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	117.7	107.8	26.9	24.6	-83.1
7L134 (Vincent 2019S - Vegreville 709S)	7L65 (Vermilion 710S - Grizzly Bear 708S tap point)	94.9	94.9	15.8	17.0	101.0	106.4	106.4
7L161 (Mahno 909S - Nabiye 942S)	7L50 (Buffalo Creek 526S to Jarrow 252S tap point)	109.2	123.6	117.7	107.8	26.9	24.6	-83.1
7L42 (Hill 751S - Lloydminster 716S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	126.0	115.3	22.7	20.8	-94.5
7L50 (Buffalo Creek 526S - Battle River 757S)	749L (Edgerton 899S - Killarney Lake 267S tap point)	88.0	97.0	94.4	107.3	40.3	45.8	-61.5
	749L\7L749 (Edgerton 899S - Briker 880S tap point)	88.0	97.0	88.2	100.3	35.9	40.8	-59.5
	7L77 (North Holden 395S - Vegreville 709S)	96.0	123.6	97.4	101.5	30.0	31.2	-70.3
7L65\7LA65 (Vincent 2019S - Vermilion 710S)	7L129 (Buffalo Creek 526S to Bauer 918S tap point)	109.2	123.6	31.5	33.0	110.2	100.9	100.9
7L701\7LA701\701L (Strome 223S - Battle River 757S)	7L129 (Buffalo Creek 526S - Bauer 918S tap point)	109.2	123.6	112.0	102.6	98.5	90.2	-12.3
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	133.8	122.5	40.3	36.9	-85.6
7L749\749L\7LB749 (Edgerton 899S - Lloydminster 716S)	7L129 (Buffalo Creek 526S - Bauer 918S tap point)	109.2	123.6	114.1	104.4	87.7	80.2	-24.2
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	135.8	124.3	32.5	29.8	-94.6
7L77 (North Holden 395S - Vegreville 709S)	7L50 (Buffalo Creek 526S - Jarrow 252S)	109.2	123.6	128.9	118.0	27.3	25.0	-93.0

Contingency	Limiting Branch	Continuous Line Rating (MVA)	Short-term Rating (MVA)	Pre- Project		Post- Project		% Loading Difference
				Power flow (MVA)	% Loading	Power flow (MVA)	% Loading	Post-Pre
	tap point)							
7L95 (Mahkeses 889S - Leming Lake 715S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	120.9	110.7	29.2	26.7	-83.9
Mahkeses 889S transformer, 5TNSA1(889S-5TNSA1)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	115.9	106.1	25.4	23.3	-82.8
Mahkeses 889S transformer, 5TNSA1(889S-5TNSA1)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	115.9	106.1	25.5	23.3	-82.8
Edgerton 899S transformer, T3a (899ST3a*)	7L129 (Buffalo Creek 526S to Bauer 918S tap point)	109.2	123.6	117.6	107.6	91.3	83.6	-24.0
	7L129 (Bauer 918S tap point to Vermilion 710S)	109.2	123.6	111.1	101.7	85.1	78.0	-23.8
	7L130 (Vermilion 710S - Kitscoty 705S)	71.9	71.9	71.4	99.3	73.3	102.0	2.8
	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	139.4	127.6	35.4	32.4	-95.2
912L9L912 (Red Deer 63S - Nevis 766S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	128.1	117.3	40.4	37.0	-80.3
9L20 (Nevis 766S - Cordel 755S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	123.0	112.6	35.1	32.2	-80.4
9L29 (Oakland 946S - Coyote Lake 963S)	7L128 (Coyote Lake 963S - Michichi Creek 802S)	94.9	94.9	151.2	159.4	151.3	159.4	0.0
	7L159 (Ghost Pine 114S tap point - Heatburg 948S)	94.9	94.9	115.5	121.7	113.2	119.2	-2.5
	7L16 (Nevis 766S - Heatburg 948S)	94.9	94.9	110.4	116.3	108.0	113.8	-2.5
	7L85 (Bullpound 803S - Anderson 801S)	94.9	94.9	111.5	117.5	115.3	121.5	3.9
	7L85 (Wintering Hills 804S - Bullpound 803S)	94.9	94.9	122.3	128.9	126.1	132.8	4.0
9L960 (Deerland 13S - Whitefish Lake 825S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	113.7	104.1	23.7	21.7	-82.4
9L961 (Deerland 13S - Whitefish Lake 825S)	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	113.7	104.1	23.7	21.7	-82.4
500 kV HVDC EATL	7L50 (Buffalo Creek 526S - Jarrow 252S tap point)	109.2	123.6	128.3	117.4	37.0	33.8	-83.6

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

6.2. Transient Stability

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 2-14. 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 (N-1) contingencies in the Study Area.

7. Sensitivity Studies

To assess whether there is any transmission congestion under normal condition (Category A) assuming simultaneous high dispatch of both wind and coal generation in the Study Area, a sensitivity study was performed. Pre-Project and post-Project scenarios were assessed to ensure the Project addition will not impose any transmission congestion even under these very unlikely system 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	275 (S → N)	400 (S → N)
2017 SP High- Coal Pre- Project	450 (S → N)	400 (S → N)
2017 SL High- Coal Post- Project	500 (S → N)	375 (S → N)
2017 SP High- Coal Post- Project	250 (S → N)	725 (S → N)

Category A (N-0) thermal violations were noted on the 144 kV transmission line 7L50 of 109.2%. Changing the 500 kV HVDC power orders to the values in Table 7-2 would completely alleviate these 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	450 (S → N)	400 (S → N)
2017 SP High- Coal Pre- Project	500 (S → N)	900 (S → N)
2017 SL High- Coal Post- Project	500 (S → N)	400 (S → N)
2017 SP High- Coal Post- Project	250 (S → N)	725 (S → N)

The table shows that the Project reduces the power flow on the 7L50.

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

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)
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

A number of 144 kV transmission lines have been de-rated in the Project area and are limited by current transformers (CT), including the 144 kV transmission line 7L65. Restoring the line's capacity and removing its CT limits will mitigate the observed thermal criteria violations. Restoring 7L65 is part of the TFO capital maintenance and is outside the scope of the Project. AESO has been advised by the TFO that the 7L65 will be restored by Q3 2017.

The Project is not dependent on any other plans of the AESO to expand or enhance the transmission system including those outlined in the 2015 LTP.

10. Conclusion and Recommendation

The studies showed that the Project connection did not worsen the existing thermal violations; hence did not require any modification to the existing and planned RAS for the approved BluEarth Hand Hills and the Suncor Hand Hills WAGFs or addition of a new RAS. Power flow analysis was performed with the RASs in place. The application of these RASs in alleviating the thermal violations, and the associated power flow diagrams are included in Attachment G and H.

The studies also identified thermal violations on the 144 kV transmission line 7L65 (between the Vermilion 710S substation and the Grizzly Bear 708S substation tap point). These violations will be mitigated by restoring the line's capacity and removing its CT limits.

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

Table 10-1 provides analysis of and conclusion about the impact of the Project, including mitigation for observed Reliability Criteria violation.

Table 10-1: Project Impact and Mitigation Measures

Identified Reliability Violation		Occurs in Pre- and Post-Project	Impact Level	System Condition	Mitigation Measures
Violation	Contingency				
174L (Bardo 197S - North Holden 395S)	Nevis 766S transformer 901T	Post-Project Only	Significant	2017 SL	Existing 174L RAS
	912L\9L912				
7L65 (Vermilion 710S - Grizzly Bear 708S tap point)	Vegreville 709S transformer	Post-Project Only	Significant	2017 SL, 2017 SP	Removal of the CT limits of 7L65
	Buffalo Creek 526S transformer			2017 SP	
	7L134			2017 SL, 2017 SP	
7L128 (Coyote Lake 963S - Michichi Creek 802S)	9L29 (Oakland 946S - Coyote Lake 963S)	Yes	No change	2017 SL, 2017 SP	Planned Suncor Hand Hill and BluEarth Hand Hill RAS
7L159 (Ghost Pine 114S tap point - Heatburg 948S)			Reduced		
7L16 (Nevis 766S - Heatburg 948S)			Reduced		
7L85 (Bullpound 803S to Anderson 801S)			Marginal		
7L85 (Wintering Hills 804S - Bullpound 803S)			Marginal		
7L50 (Buffalo Creek 526S substation and the Jarrow 252S substation tap point)	Any transformer in North Holden 395S, Vegreville 709S, Nevis 766S, Mahkeses 889S and Edgerton 899S	Pre-Project Only	Reduced	2017 SP	Not required
	701L				
	749L\749AL				

Identified Reliability Violation		Occurs in Pre- and Post-Project	Impact Level	System Condition	Mitigation Measures
Violation	Contingency				
	7L105				
	7L161				
	7L42				
	7L701\7LA701				
	7L749\7LB749				
	7L77				
	7L95				
	9L20				
	912L\9L912				
	Either 9L960 or 9L961				
	500 kV HVDC EATL				
7L50 (Jarrow 252S tap point to Battle River 757S)	Tucuman 478S, transformers T1 or T2	Pre-Project Only	Reduced	2017 SP	
7L129 (Buffalo Creek 526S substation and the Bauer 918S substation tap point)	Any transformer in North Holden 395S and Edgerton 899S	Pre-Project Only	Reduced	2017 SP	Not required
	749L\749AL	Pre-Project Only			Not required
	7L65\7LA65	Post-Project Only	significant		Real time operating practices
	7L701\7LA701	Pre-Project Only	Reduced		Not required
	7L749\7LB749	Pre-Project Only			Not required
7L129 (Bauer 918S tap point - Vermilion 710S)	749L\749AL	Pre-Project Only	Reduced	2017 SP	Not required
	Edgerton 899S transformer	Pre-Project Only			Not required
7L130 (Vermilion 710S substation and the Kitscoty 705S substation)	749L\749AL	Yes	Marginal	2017 SP	Real time operating practices
	Edgerton 899S transformer	Only Post-Project			
7L14 (Kitscoty 705S substation and the Hill 751S substation)	749L\749AL	Yes	Marginal	2017 SP	

Identified Reliability Violation		Occurs in Pre- and Post-Project	Impact Level	System Condition	Mitigation Measures
Violation	Contingency				
749L (Edgerton 899S – Killarney Lake 267S Tap)	Buffalo Creek 526S transformer	Pre-Project Only	Reduced	2017 SP	Not required
	7L50 (Buffalo Creek 526S-Battle River 757S)				
749L\7L749 (Edgerton 899S to Briker 880S Tap)	7L50 (Buffalo Creek 526S-Battle River 757S)	Pre-Project Only	Reduced	2017 SP	Not required
7L77 (North Holden 395S – Vegreville 709S)	7L50 (Buffalo Creek 526S-Battle River 757S)	Pre-Project Only	Reduced	2017 SP	Not required
Several thermal violation ¹⁷	Metiskow 648S transformer, T1 (648ST1)	Yes	No change	2017SP, 2017SL	Real time operating practices

It is recommended to proceed with the Project using Alternative 3 as the preferred alternative to respond to E. ON's request for system access service. It is also recommended to use real time operational practices and existing and planned RASs to mitigate the identified system performance issues. A minimum rating of 134 MVA is recommended for the new 144 kV circuit (between the Steele 2016S and the Grizzly Bear 708S Tap point) and is consistent with good electric industry practice. The dependencies identified in this report (i.e., restoration of the seasonal continuous thermal rating for the 144 kV transmission lines 7L65) need to be in service prior to energization of the Project. AESO has been advised by the TFO that the 7L65 will be restored by Q3 2017.

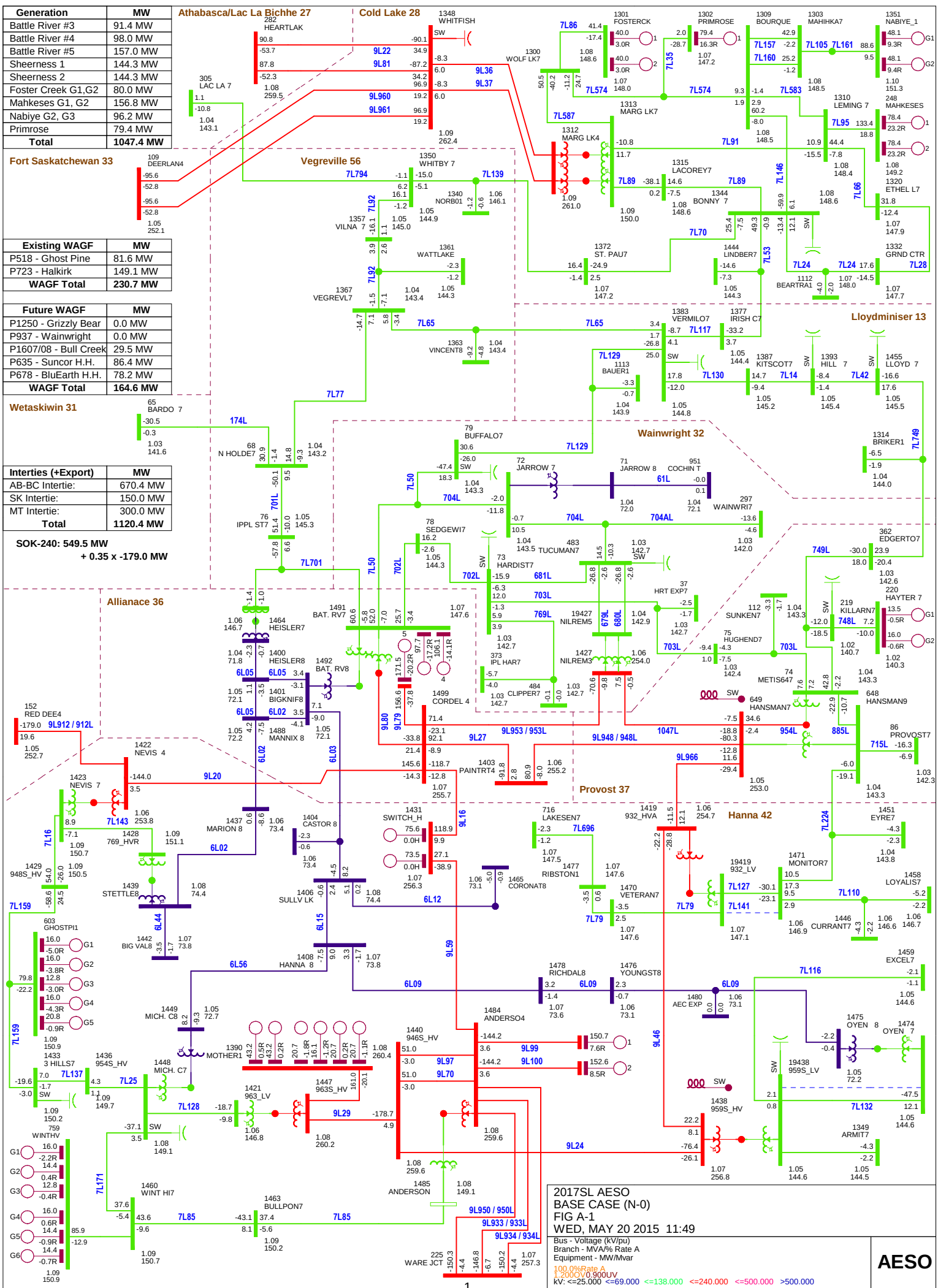
The connection of the Project does not adversely impact the performance of the AIES. It is recommended that the Project be connected using Alternative 3.

¹⁷ 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 operating practices. The results for this contingency have not been included in this report.

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 - BlueEarth H.H.	78.2 MW
WAGF Total	164.6 MW

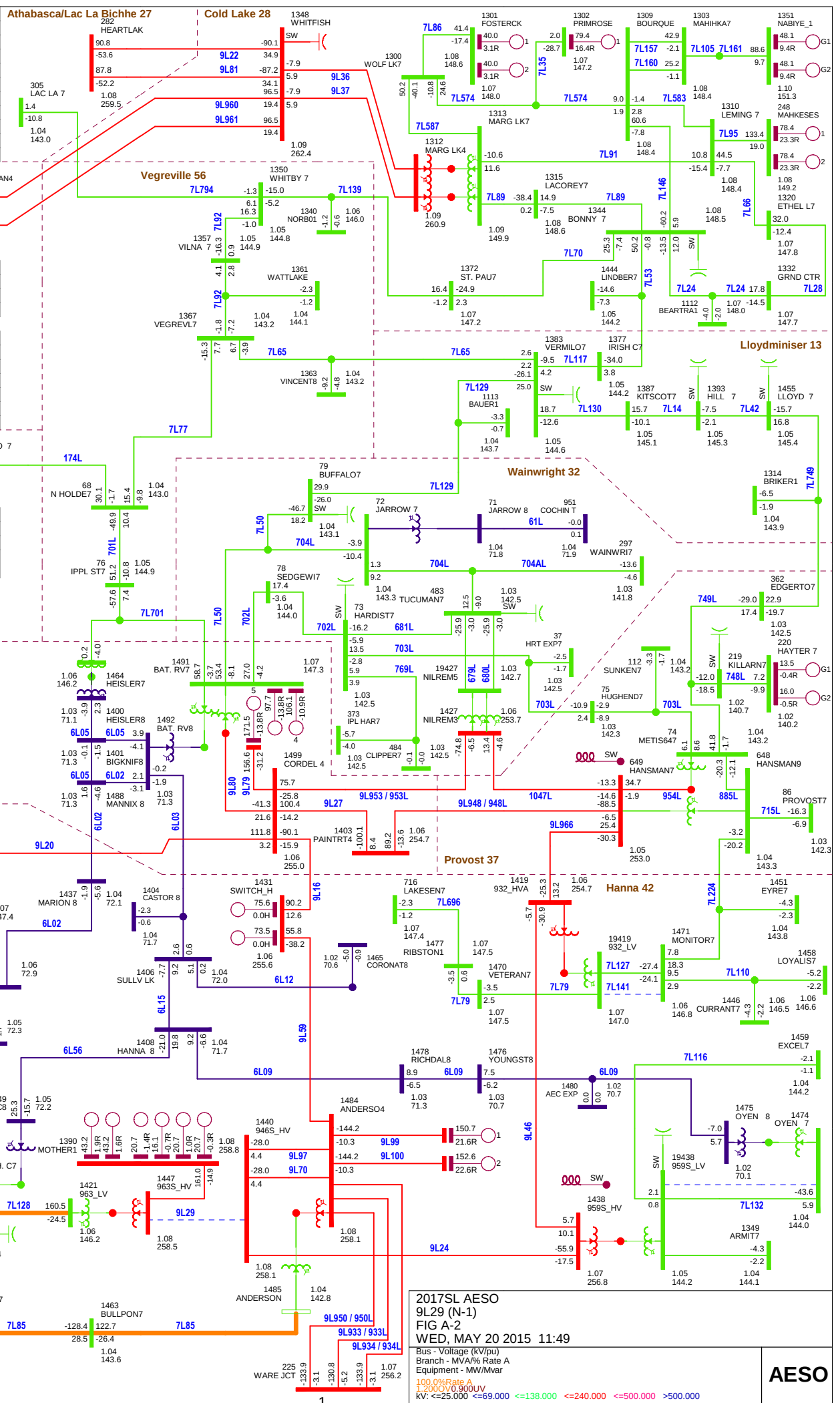
Interties (+Export)	MW
AB-BC Intertie:	637.4 MW
SK Intertie:	150.0 MW
MT Intertie:	300.0 MW
Total	1087.4 MW

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

Wetaskiwin 31	MW
65 BARDO 7	29.7
0.0	0.0
1.03	141.5

Alliance 36	MW
152 RED DEE4	194.5
91.92L / 912L	39.0
1.05	252.2

Fort Saskatchewan 33	MW
109 DEERLAN4	95.2
-52.9	-52.9
1.05	252.0



2017SL AESO
 9L29 (N-1)
 FIG A-2
 WED, MAY 20 2015 11:49

Bus - Voltage (kV/pu)
 Branch - MVA/% Rate A
 Equipment - MW/Mvar
 100.0%Rate A
 1-2000V 0.900UV
 kv: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

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)
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

Fort Saskatchewan 33	
109 DEERLAN4	117.4
	-90.1
	117.4
	-90.1
	1.04
	249.2

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

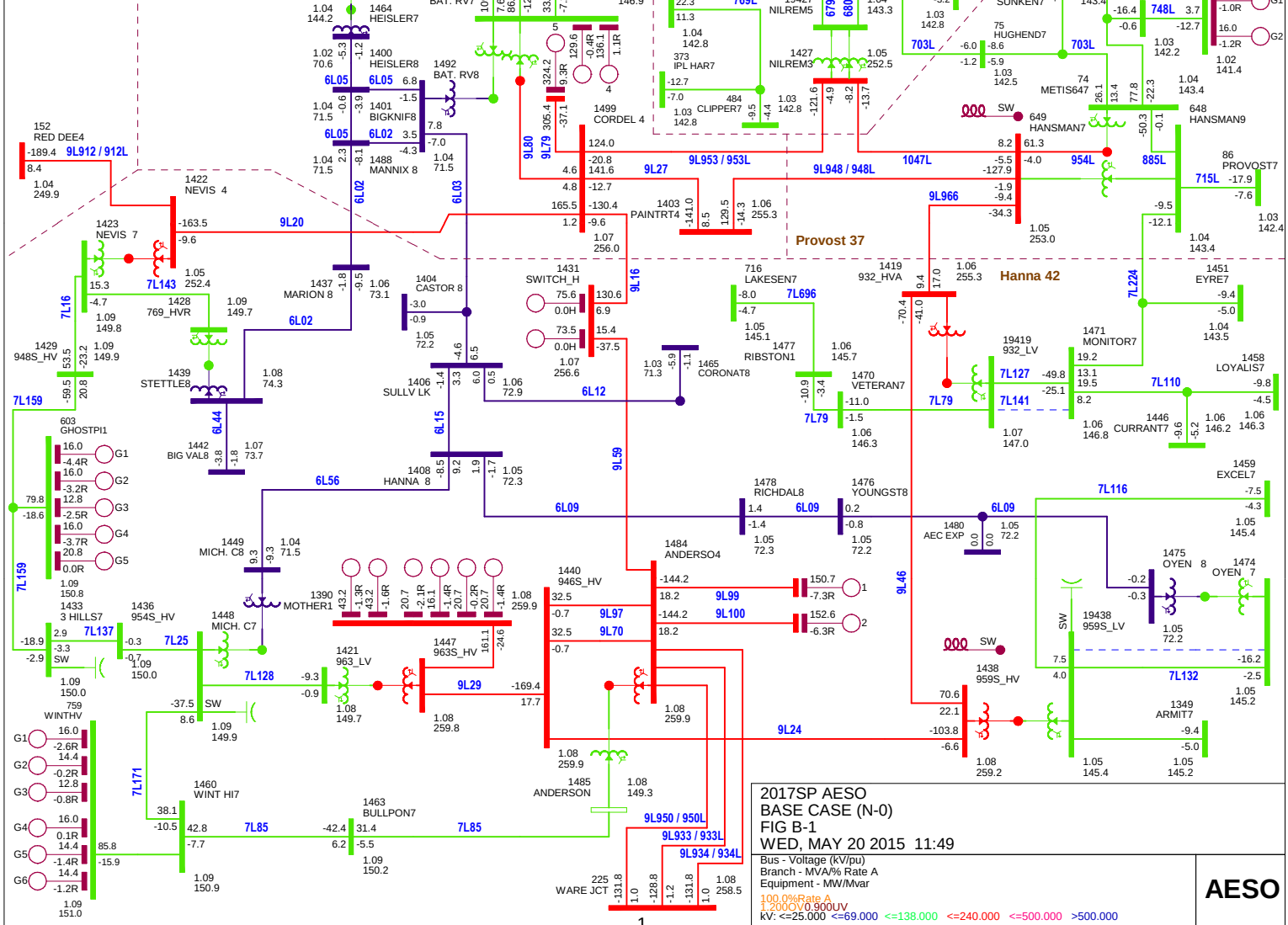
Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BlueEarth H.H.	78.2 MW
WAGF Total	164.6 MW

Wetaskiwin 31	
65 BARDO 7	15.4
	3.1
	0.99
	137.2

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

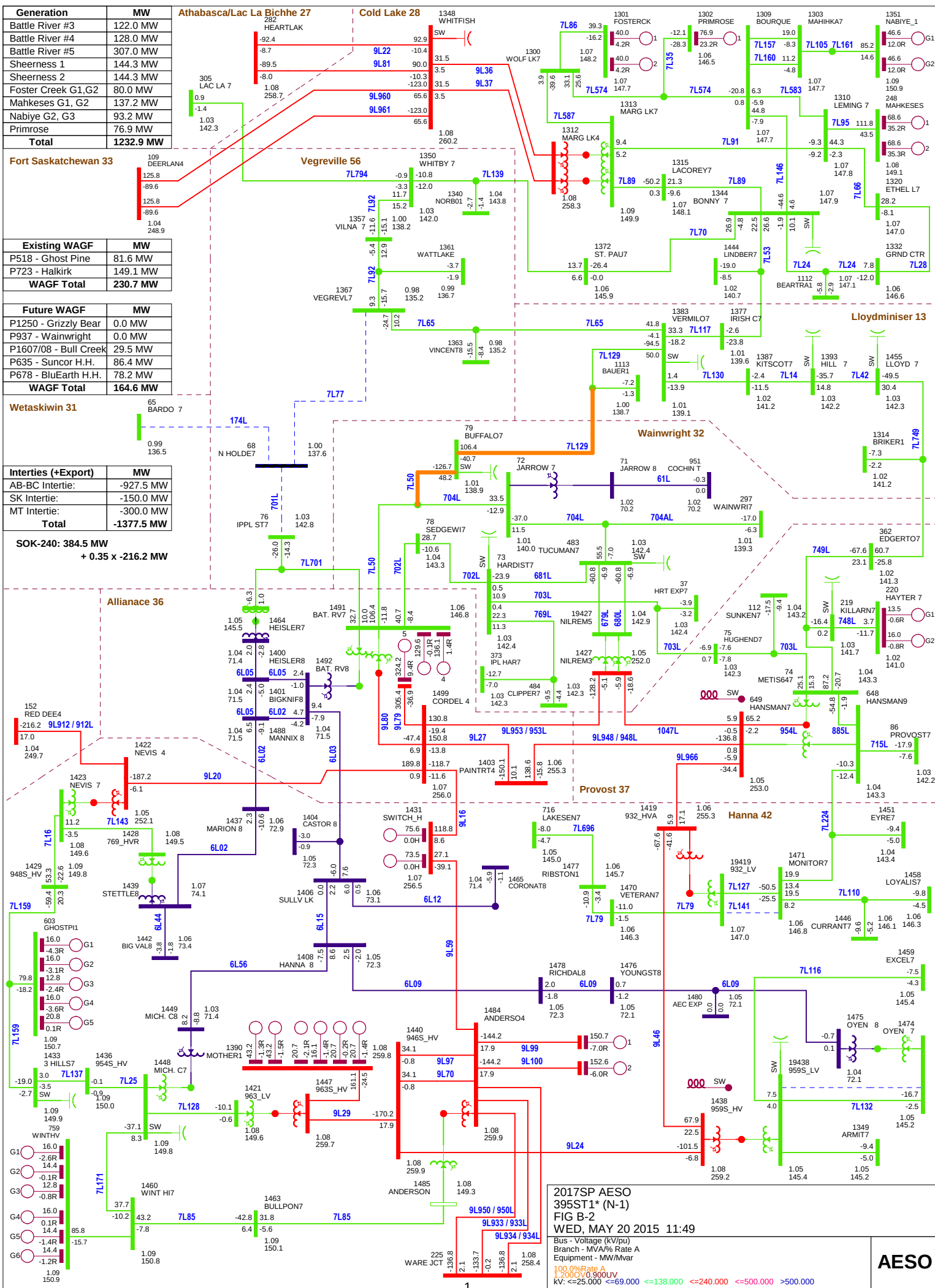
Alliance 36	
152 RED DEE4	-189.4
	9.12L / 912L
	8.4
	1.04
	249.9



2017SP AESO
BASE CASE (N-0)
FIG B-1
WED, MAY 20 2015 11:49

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
1-2000V 0.900UV
KV: <25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

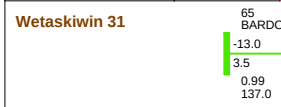


Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	1232.9 MW



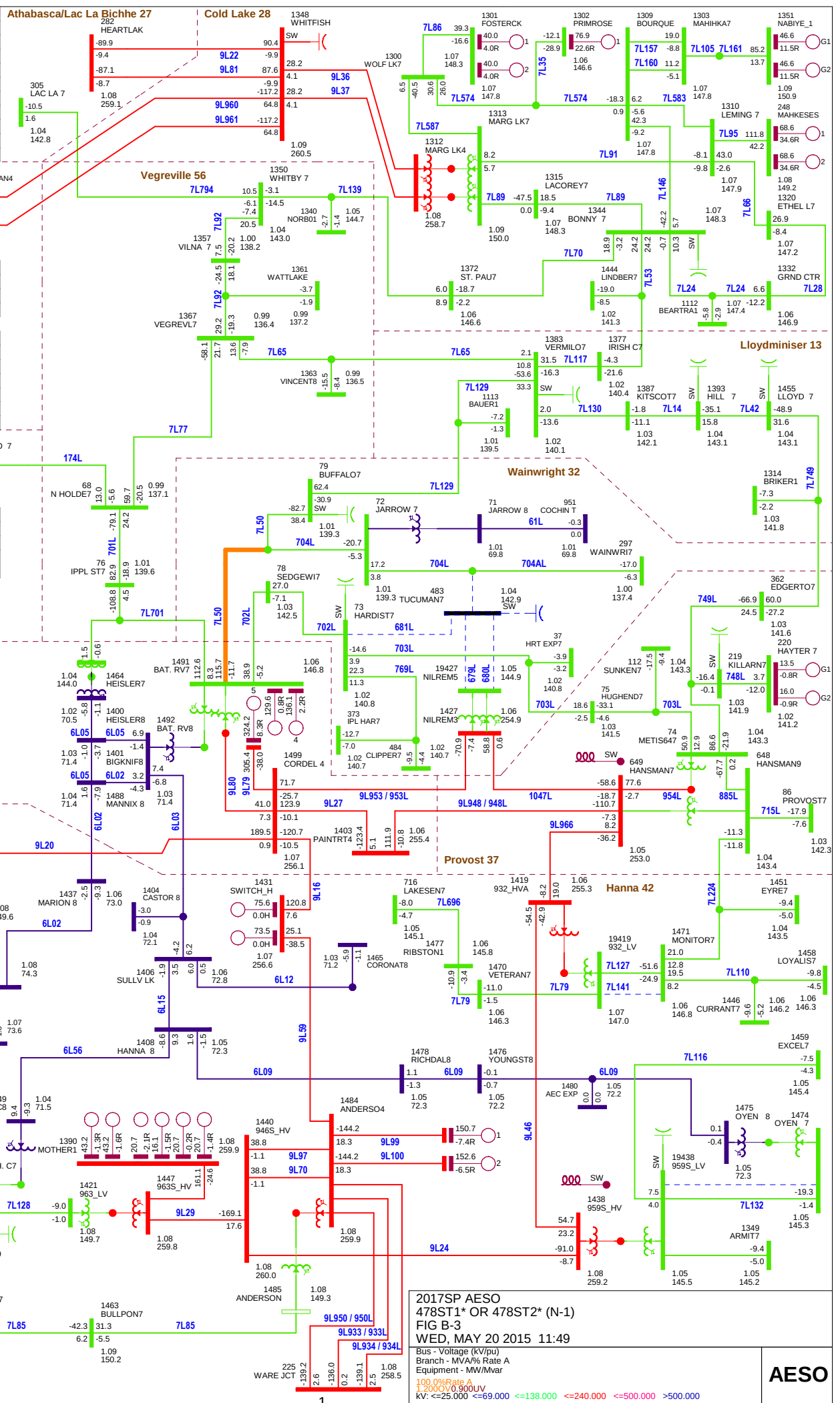
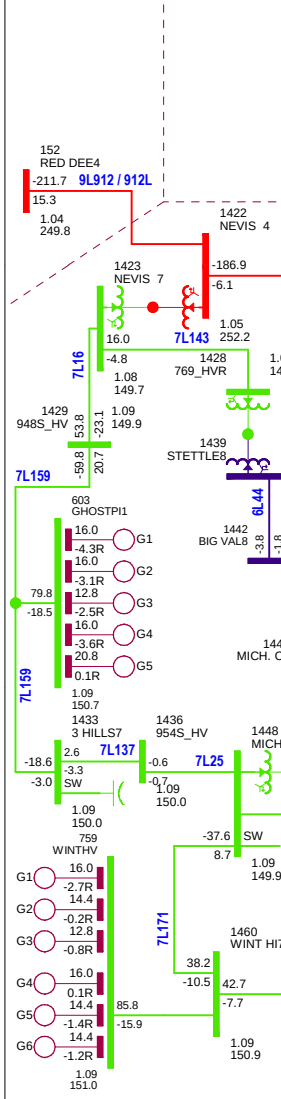
Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	230.7 MW

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 - BlueEarth 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



2017SP AESO
478ST1* OR 478ST2* (N-1)
FIG B-3
WED, MAY 20 2015 11:49

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
1-2000V,0-900UV
KV: <25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

Athabasca/Lac La Poudre

Bichhe 27

282
HEARTLAK

-89.2
-9.0
-86.4
-8.4

305
LAC LA 7

-5.3
-0.0
1.03
142.6

1.08
258.8



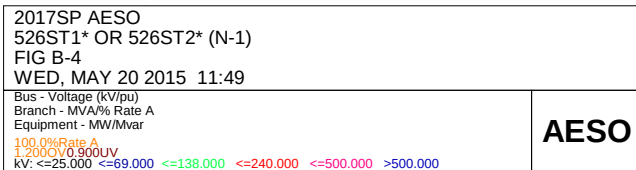
174L

68
N HOLDE7 0

6.0
2.5
9.2
0.9
136

IPPL ST7	76	701L	80	6
138.6	33.7	94.8	33.3	1.00

9.3



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

Fort Saskatchewan 33	
109 DEERLAN4	120.7
	-98.8
	120.7
	-98.8
	1.04
	248.9

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

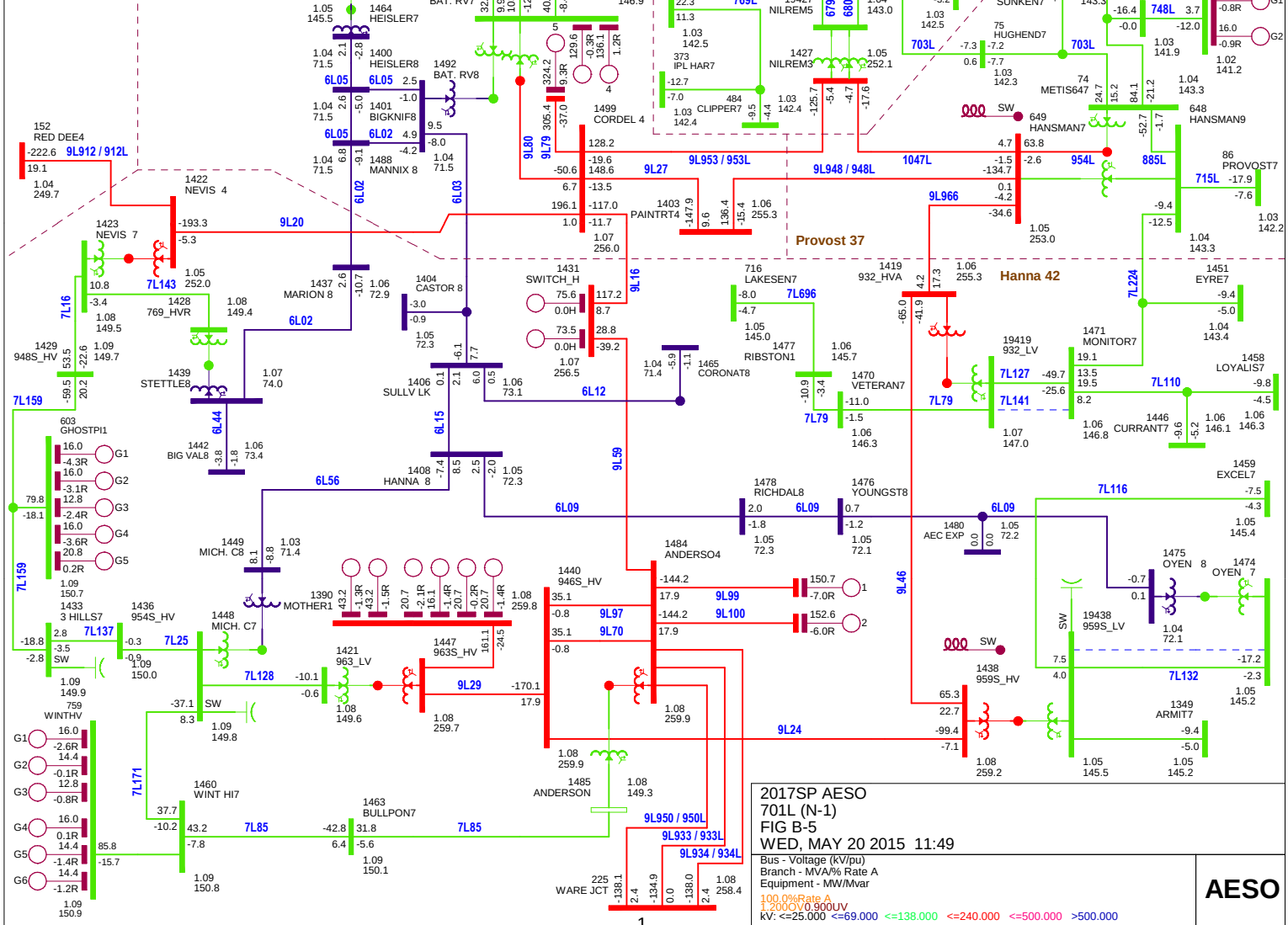
Future WAGF	
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BlueEarth H.H.	78.2 MW
WAGF Total	164.6 MW

Wetaskiwin 31	
65 BARDO 7	28.2
	-10.2
	0.99
	136.0

Interties (+Export)	
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

Alliance 36	
152 RED DEE4	-222.6
	91.92 / 91.2L
	19.1
	1.04
	249.7



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
1-2000V,0.900UV
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

Fort Saskatchewan 33

Wetaskiwin 31

Alliance 36

Provost 37

Hanna 42

Lloydminster 13

Wainwright 32

Vegreville 56

Cold Lake 28

Athabasca/Lac La Biche 27

Fort Saskatchewan 33

Wetaskiwin 31

Alliance 36

Provost 37

Hanna 42

Lloydminster 13

Wainwright 32

Vegreville 56

Cold Lake 28

Athabasca/Lac La Biche 27

Fort Saskatchewan 33

Wetaskiwin 31

Alliance 36

Provost 37

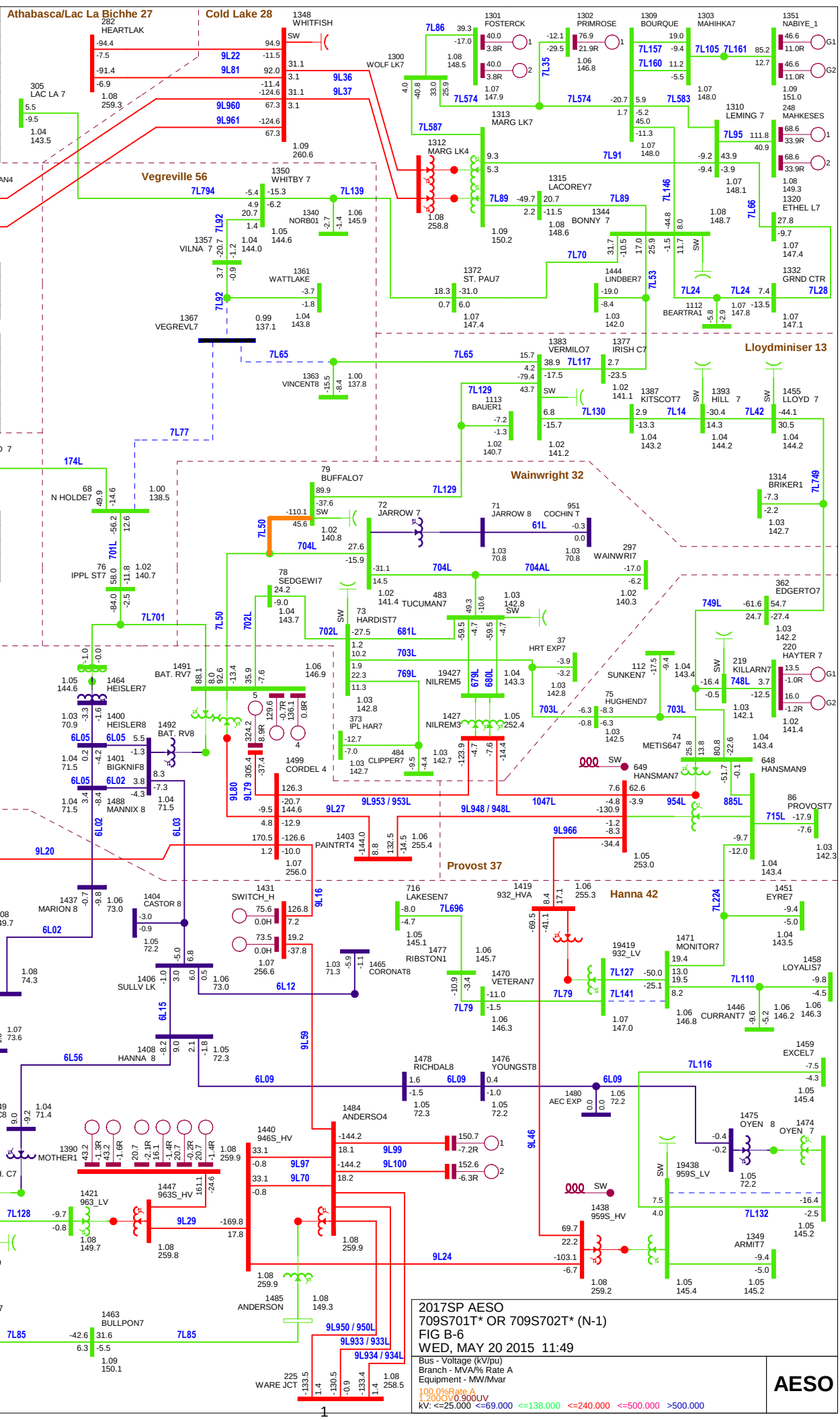
Hanna 42

Lloydminster 13

Wainwright 32

Vegreville 56

Cold Lake 28



2017SP AESO
709S701T* OR 709S702T* (N-1)
FIG B-6
WED, MAY 20 2015 11:49

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
1200V/0.900UV
KV: <25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

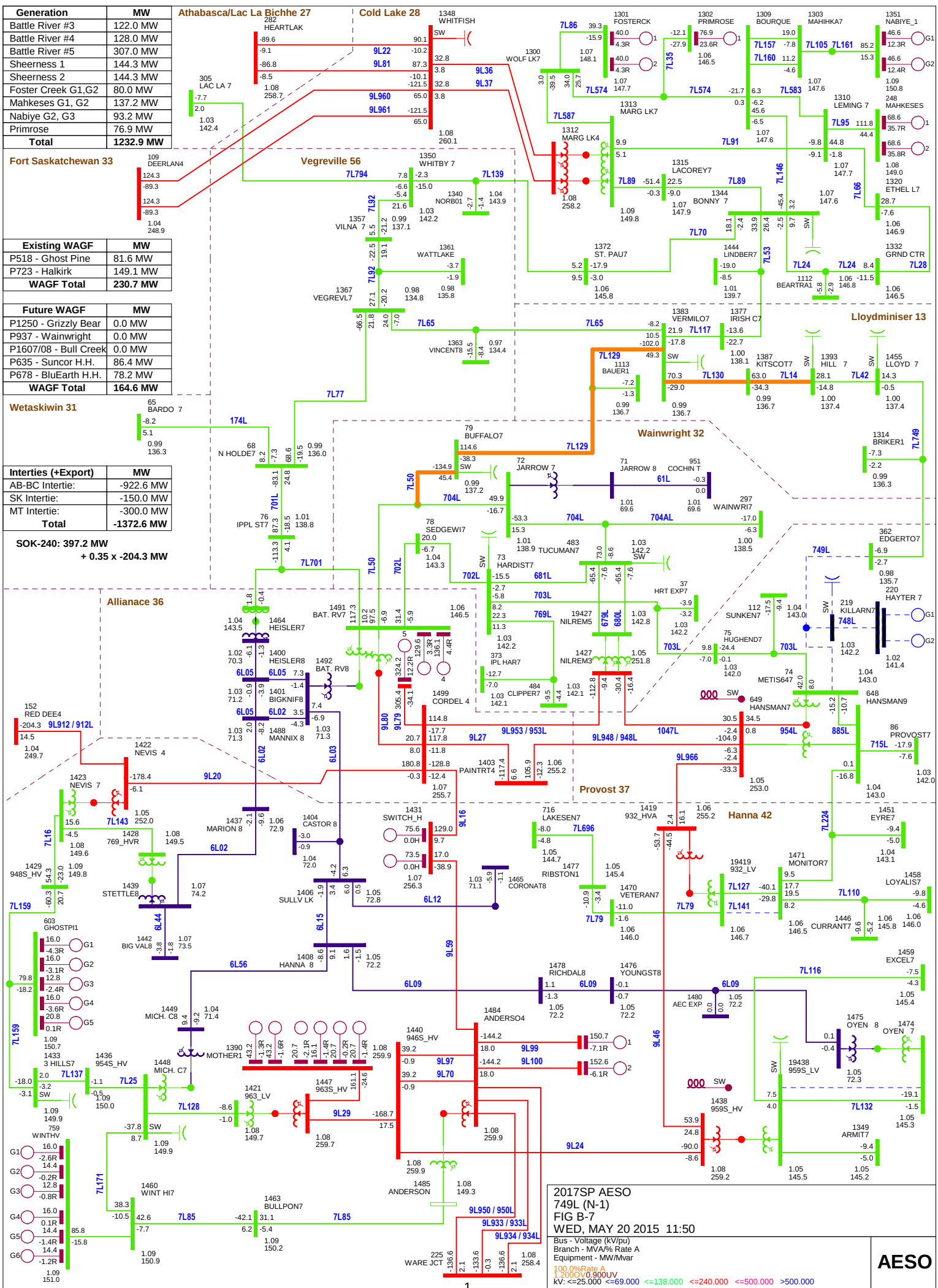
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	1232.9 MW

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	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
1-2000V 0-9000V
kV: <25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

Athabasca/Lac La Biche 27

Metric	HEARTLAK	LAC LA 7
282	282	
-89.9	-89.9	
-9.8	-9.8	
-87.1	-87.1	
-9.1	-9.1	
1.08	1.08	
259.0	259.0	
305		305
-17.7		-17.7
6.3		6.3
1.03		1.03
142.6		142.6

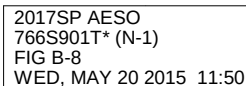
174L

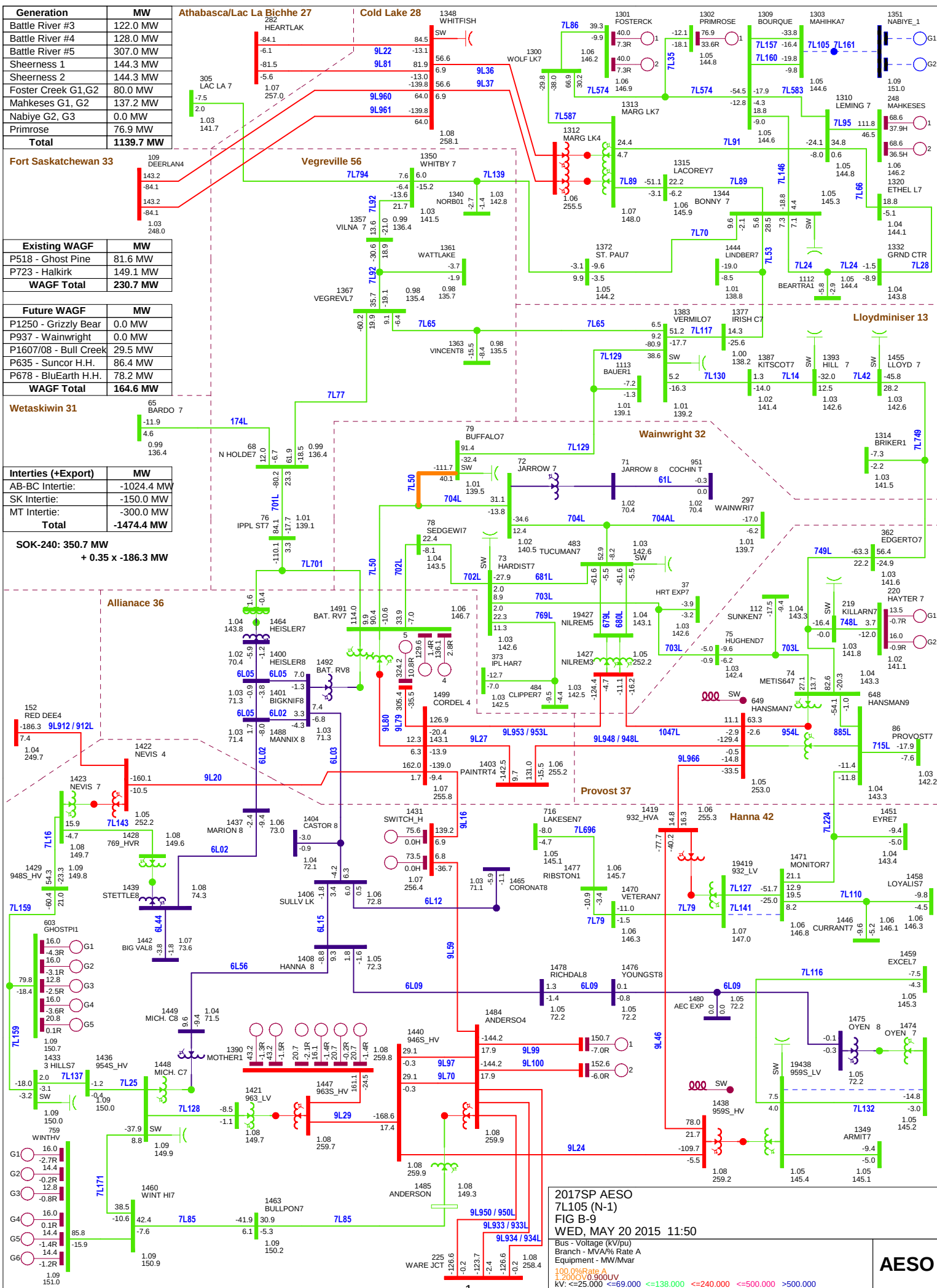
68
N HOLDE7

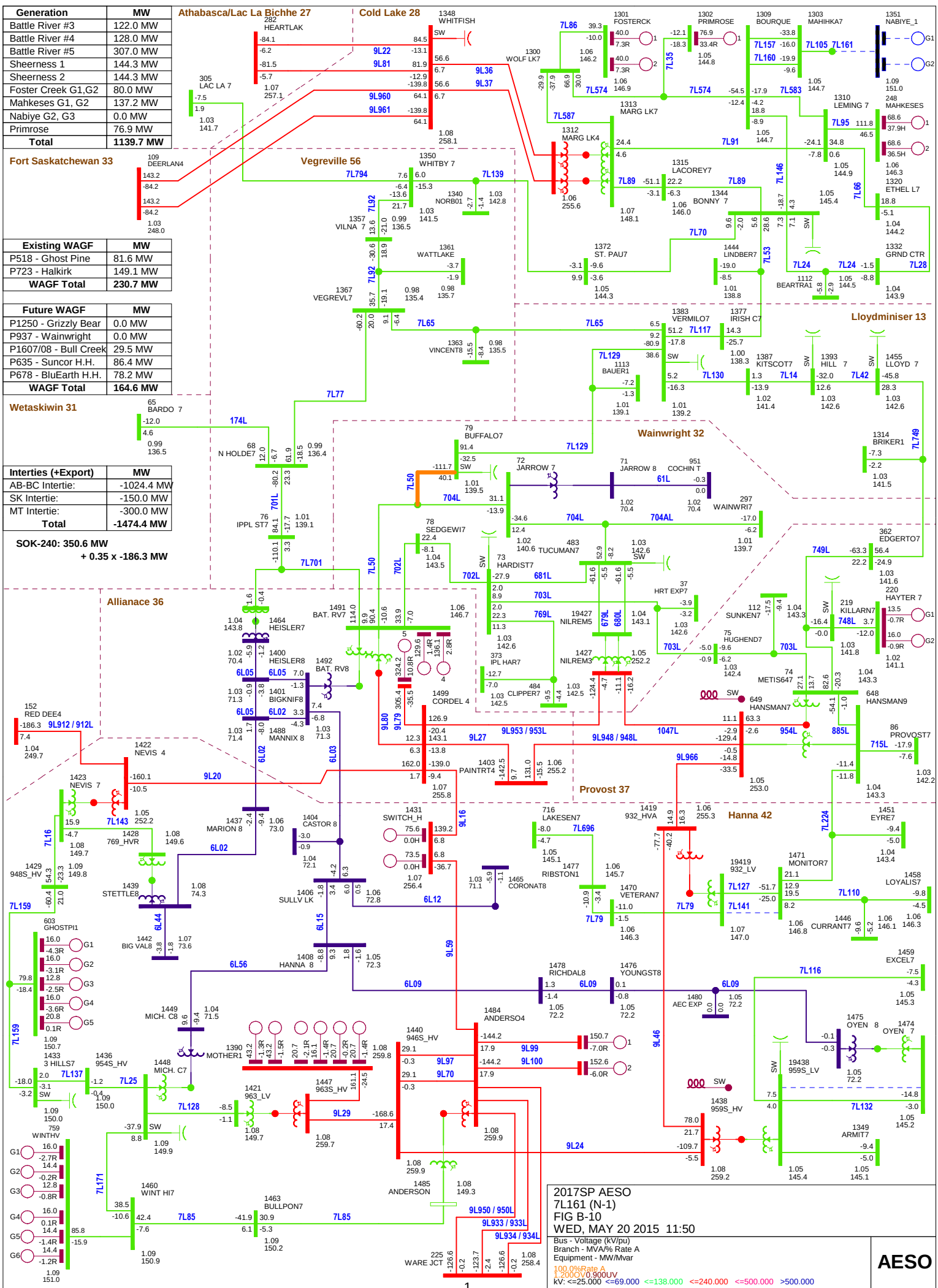
40.1
19.9
33.0
18.1
0.9
13

76	701L	-99.4	36.1
IPPL ST7	05.8	15.1	1.00
			138.4

131.7	10.7

**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

Fort Saskatchewan 33	
109 DEERLAN4	120.4
	-89.9
	120.4
	-89.9
	1.04
	249.1

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

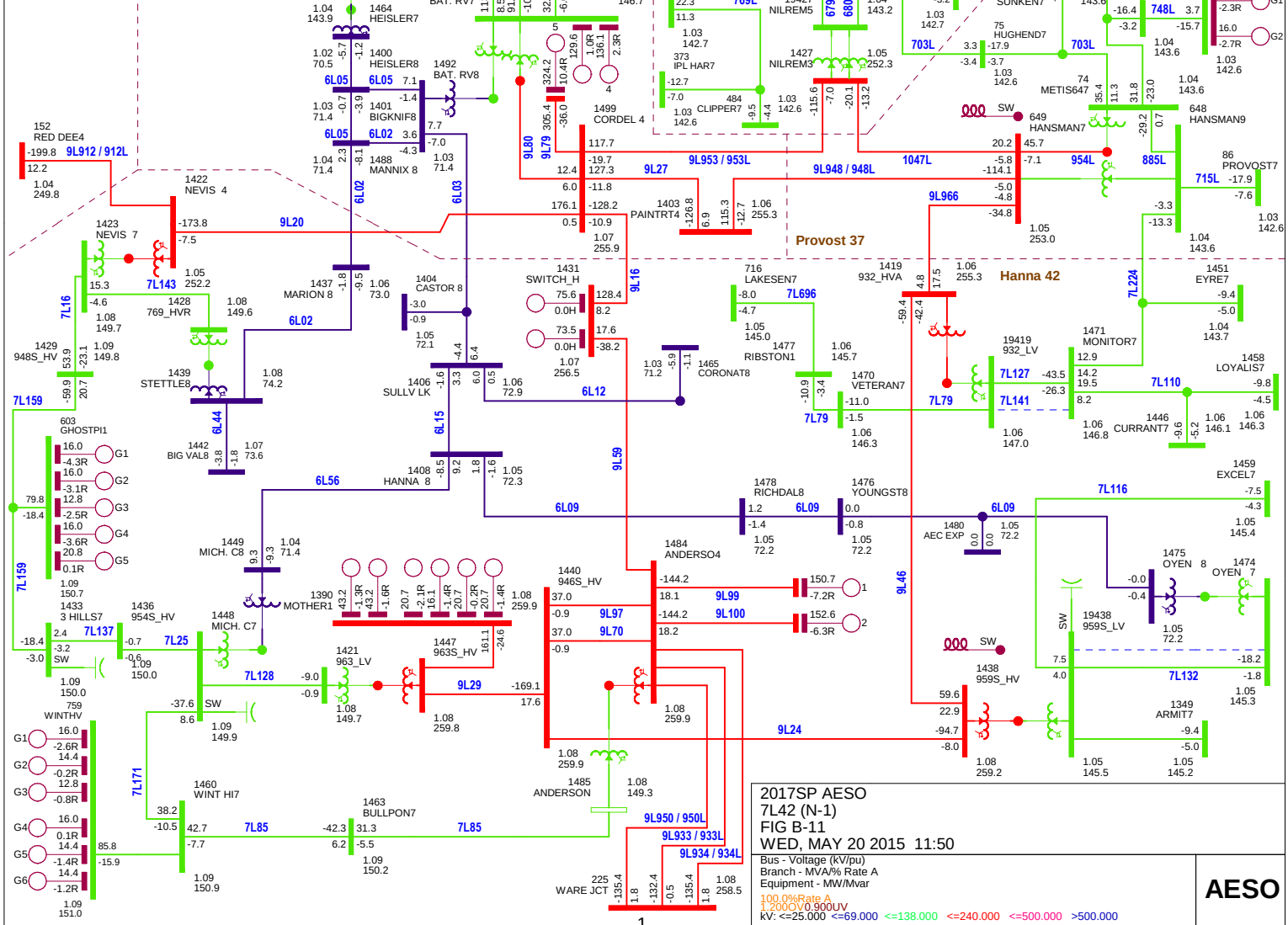
Future WAGF	
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BlueEarth H.H.	78.2 MW
WAGF Total	164.6 MW

Wetaskiwin 31	
65 BARDO 7	-12.5
	3.9
	0.99
	136.9

Interties (+Export)	
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

Alliance 36



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

Fort Saskatchewan 33	
133.2	
-89.5	
133.2	
-89.5	
1.04	248.6

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

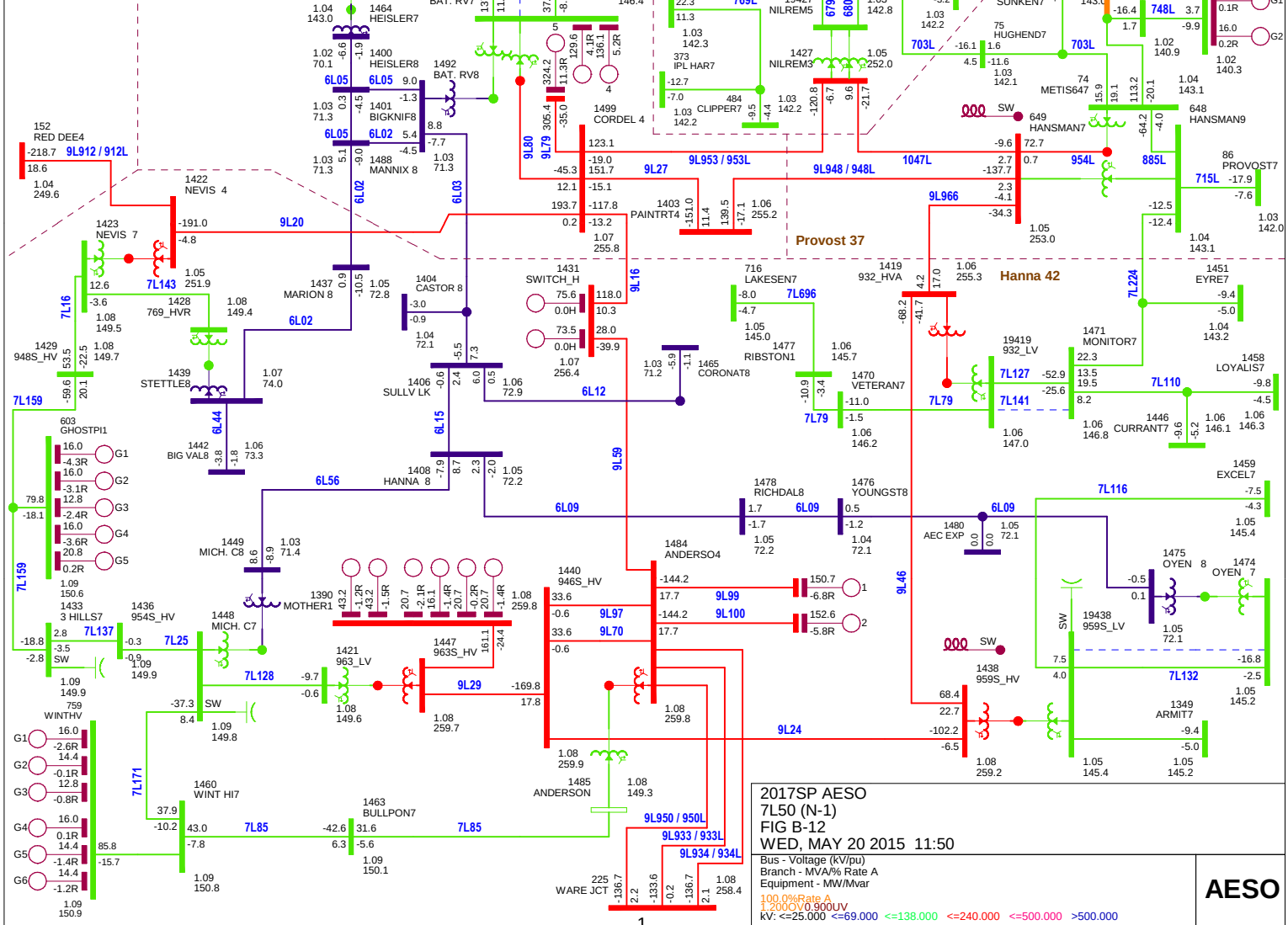
Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	164.6 MW

Wetaskiwin 31	
65	BARDO 7
-2.4	
5.3	
0.98	135.8

Interties (+Export)	
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

Alliance 36	
152	RED DEE4
-218.7	91912 / 912L
18.6	
1.04	249.6



2017SP AESO
7L50 (N-1)
FIG B-12
WED, MAY 20 2015 11:50

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
1:2000V 0.900UV
KV: <25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

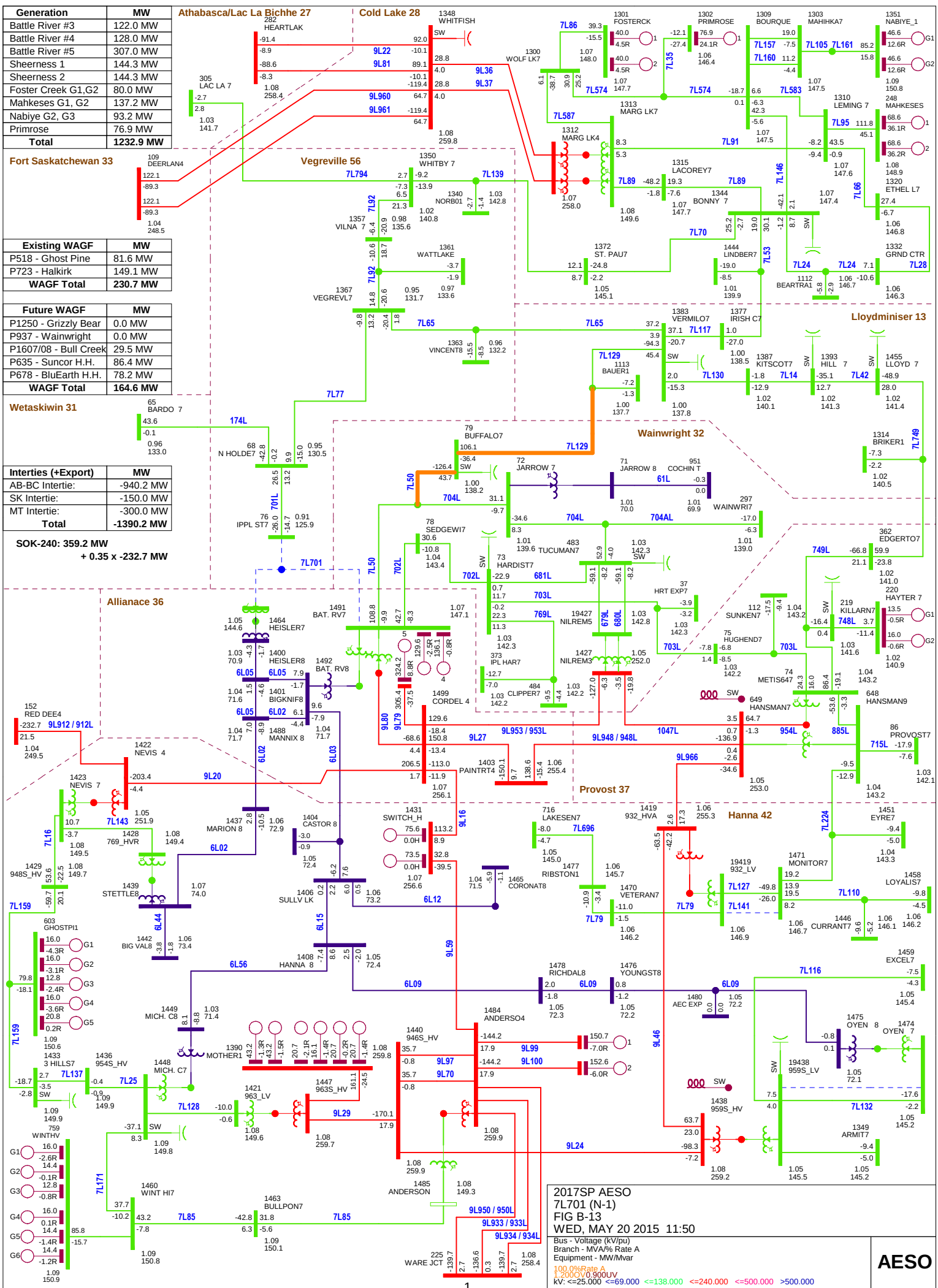
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheerness 1	144.3 MW
Sheerness 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	1232.9 MW

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 - BlueEarth 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



2017SP AESO
7L701 (N-1)
FIG B-13
WED, MAY 20 2015 11:50

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
1-2000V 0.900UV
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

Fort Saskatchewan 33	
109 DEERLAN4	122.3
	-90.1
	122.3
	-90.1
	1.04
	249.0

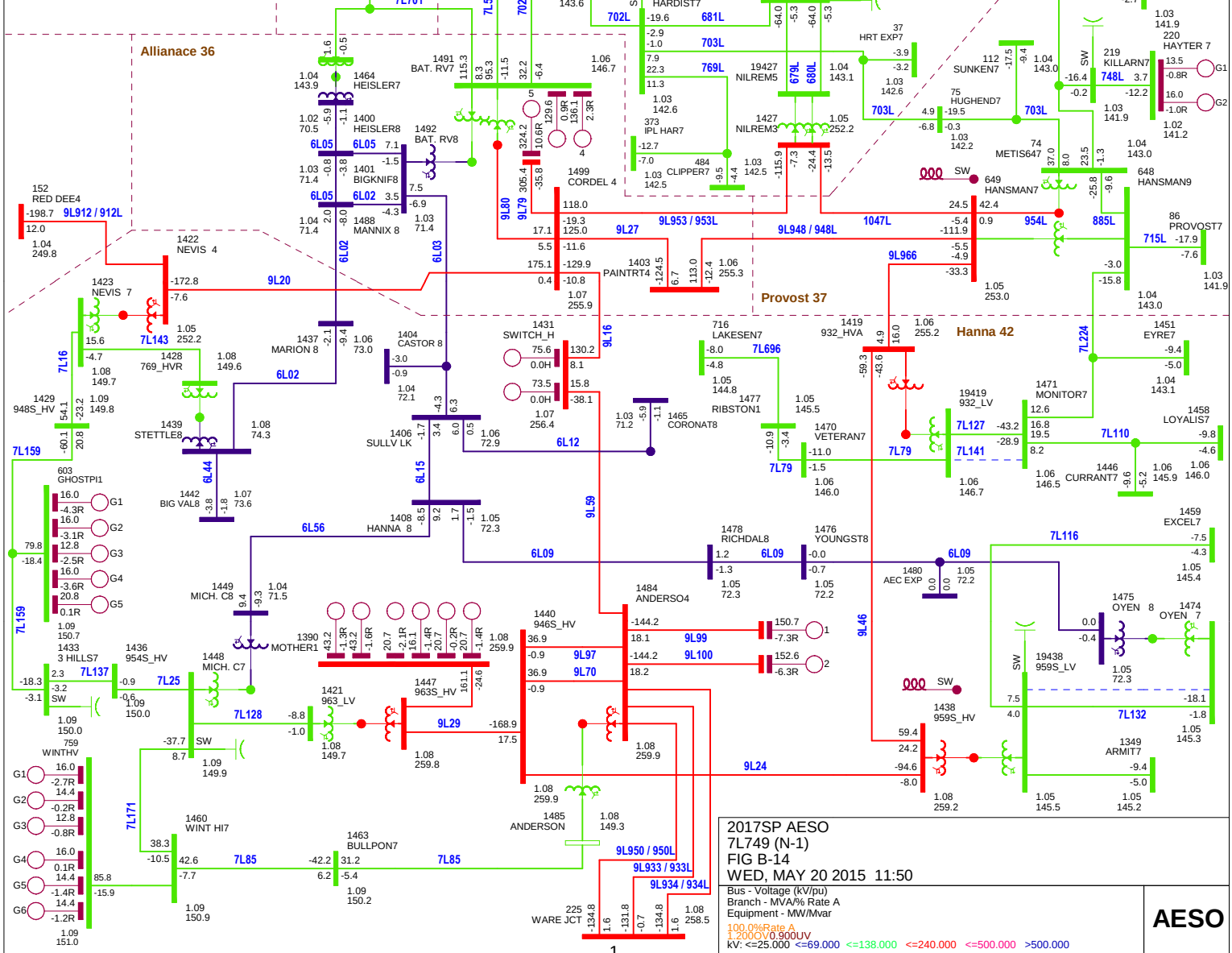
Existing WAGF	
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	230.7 MW

Future WAGF	
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 - BlueEarth H.H.	78.2 MW
WAGF Total	164.6 MW

Wetaskiwin 31	
65 BARDO 7	-10.1
	2.5
	0.99
	136.9

Interties (+Export)	
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



2017SP AESO
7L749 (N-1)
FIG B-14
WED, MAY 20 2015 11:50

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
1-2000V,0.900UV
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:	-932.7 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1382.7 MW

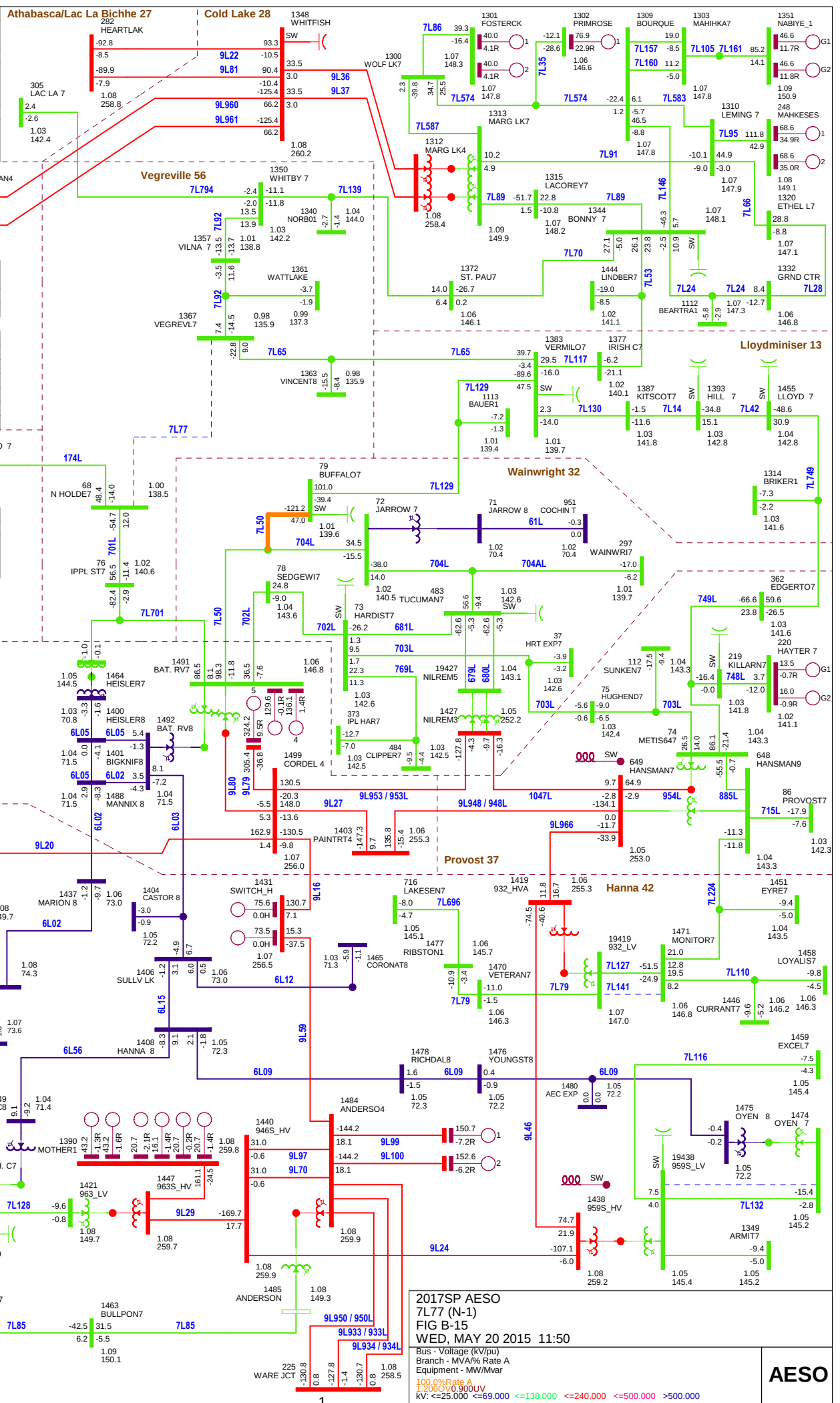
SOK-240: 413.5 MW + 0.35 x -187.3 MW

Fort Saskatchewan 33
109 DEERLAN4
128.3
-89.7
128.3
-89.7
1.04
248.9

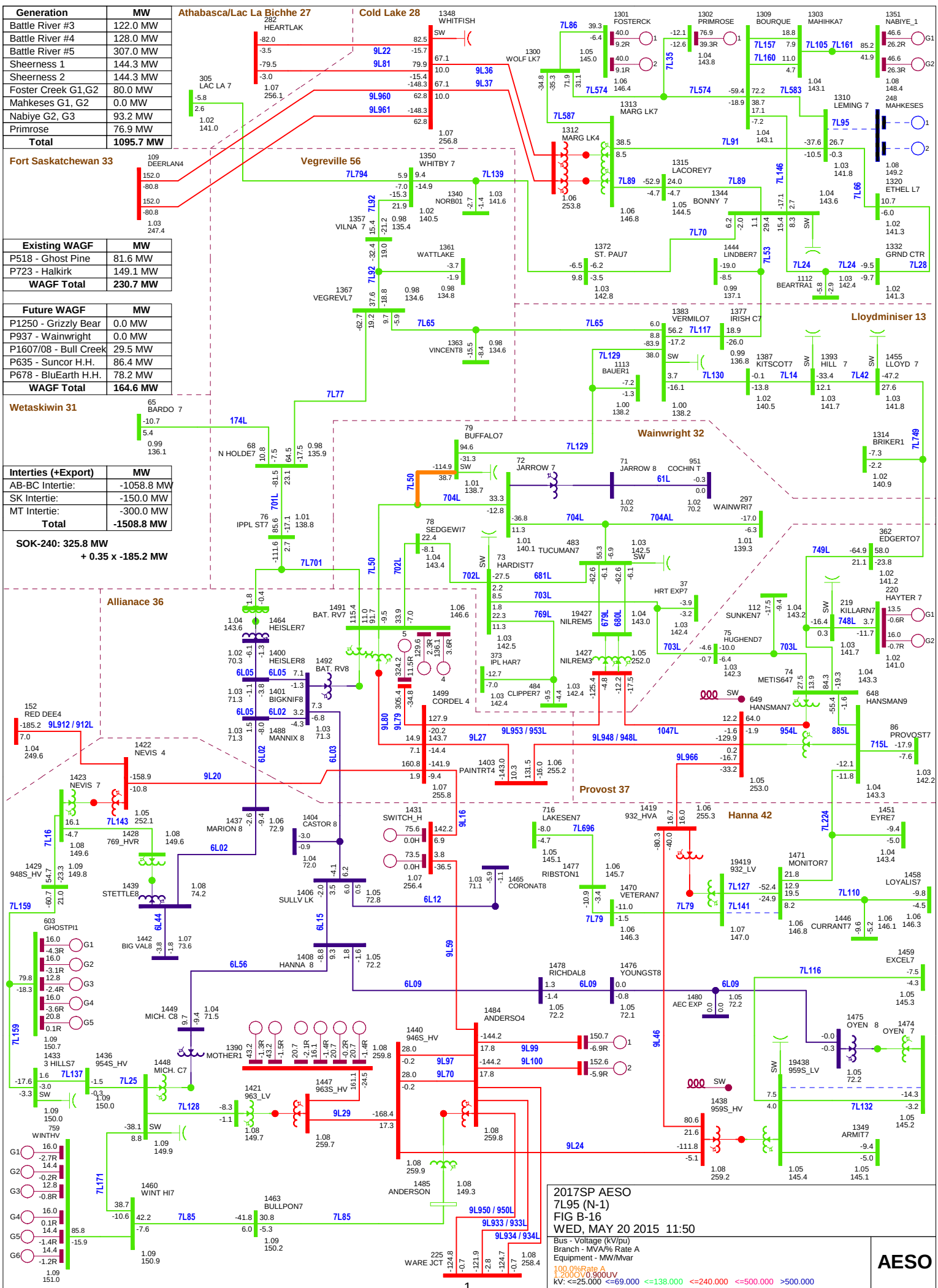
Wetaskiwin 31
65 BARDO 7
-47.4
13.9
1.00
137.5

Alliance 36
152 RED DEE4
-187.3
7.8
1.04
249.9

Wainwright 32
71 JARROW 8
951
-0.3
0.0
1.02
70.4



2017SP AESO
FIG B-15
WED, MAY 20 2015 11:50
Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
12000V.0.900UV
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	68.6 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	1164.3 MW

Fort Saskatchewan 33	
109 DEERLAN4	138.3
	-84.8
	138.3
	-84.8
	1.03
	248.2

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

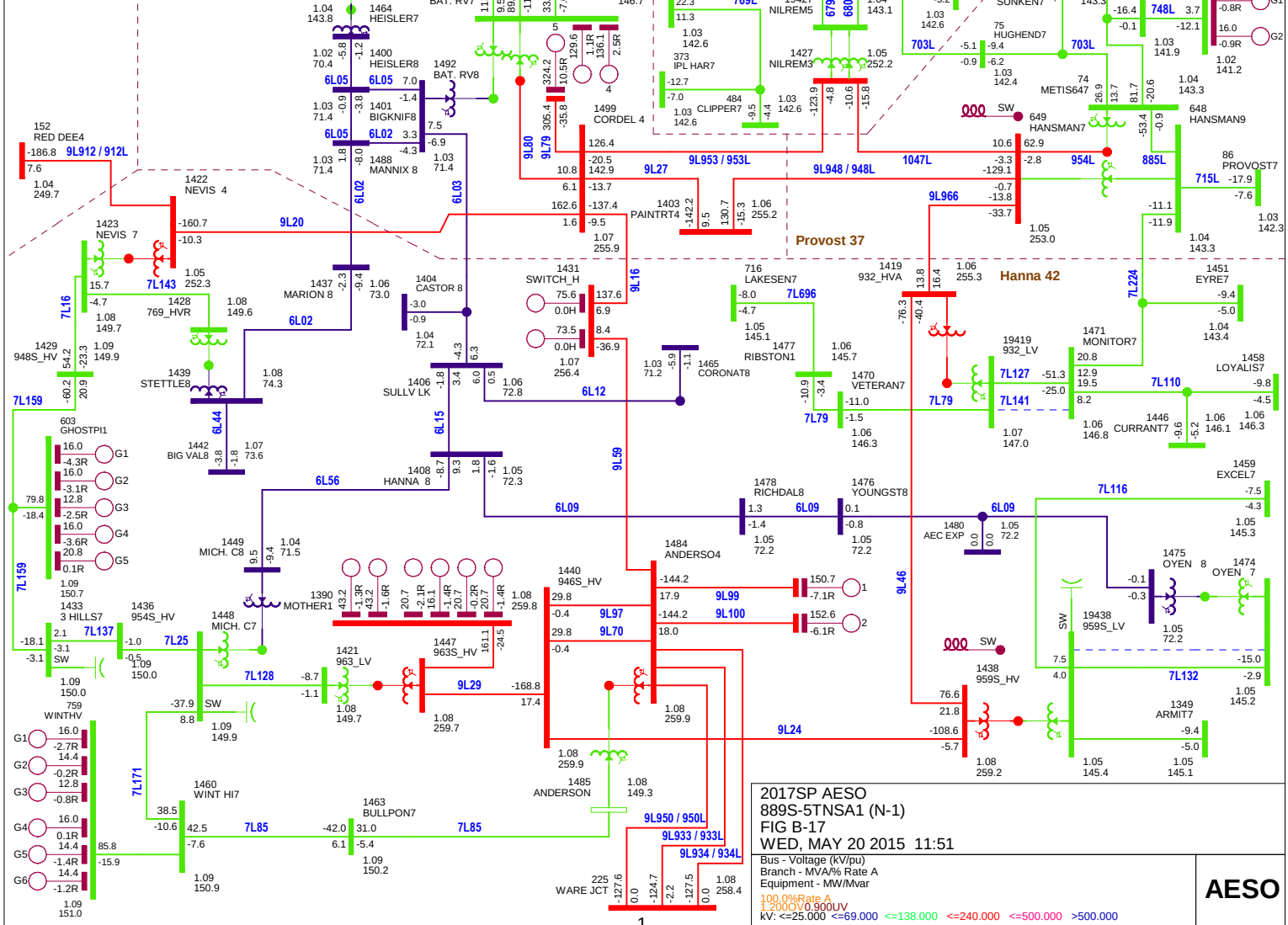
Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	164.6 MW

Wetaskiwin 31	
65 BARDO 7	-12.6
	4.4
	0.99
	136.6

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

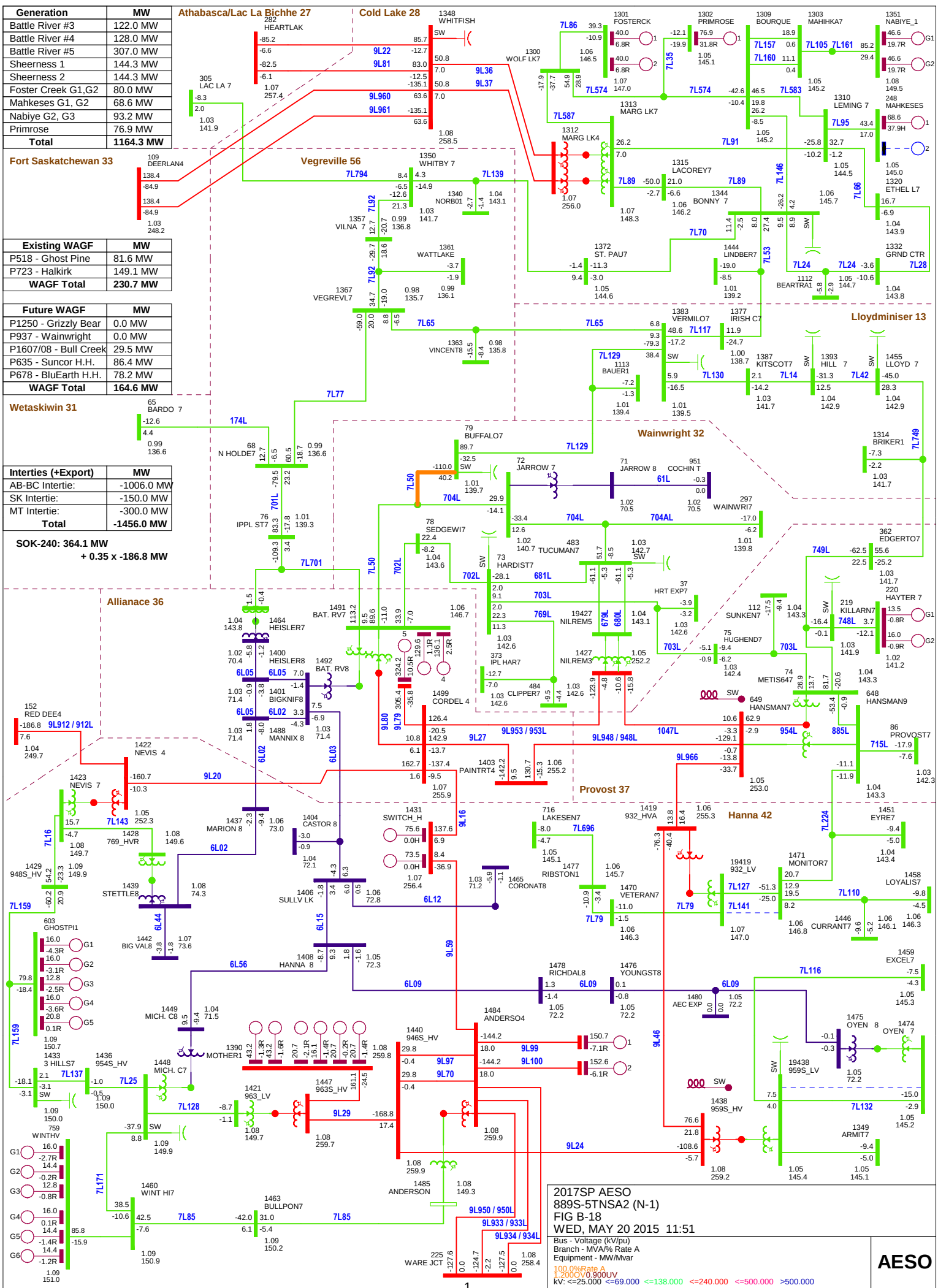
Alliance 36	
152 RED DEE4	-186.8
	91.92 / 912L
	7.6
	1.04
	249.7



2017SP AESO
8895-5TNSA1 (N-1)
FIG B-17
WED, MAY 20 2015 11:51

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.00%Rate A
1-2000V,0.900UV
KV: <25.000V <69.000V <138.000V <240.000V <500.000V >500.000V

AESO



Athabasca/Lac La Biche 27

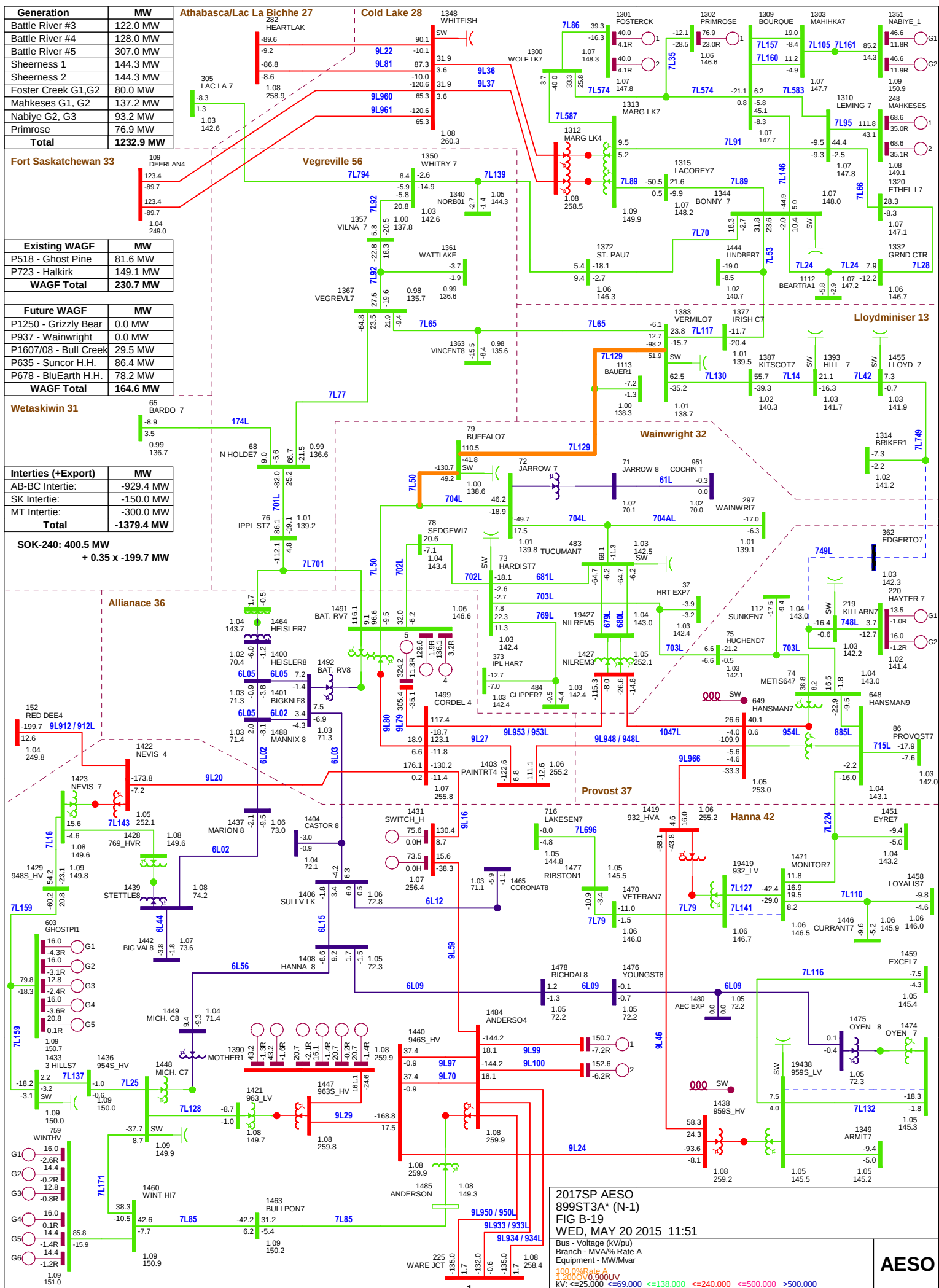
Year	LAC LA 7	HEARTLAK
2005	-8.3	-89.6
2006	1.3	-9.2
2007	1.03	-86.8
2008	142.6	-8.6

Partial view of a graph showing two red lines and a green box. The lines appear to be linear functions. The green box is labeled 'Ve'.

174L

[illegible]

112.1
4.8



Bus - Voltage (kV/pu) Branch - MVA/% Rate A Equipment - MW/Mvar 100.0%Rate A 12000V0.900UV 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

Fort Saskatchewan 33	
109 DEERLAN4	109.7
	-89.3
	109.7
	-89.3
	1.04
	249.0

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

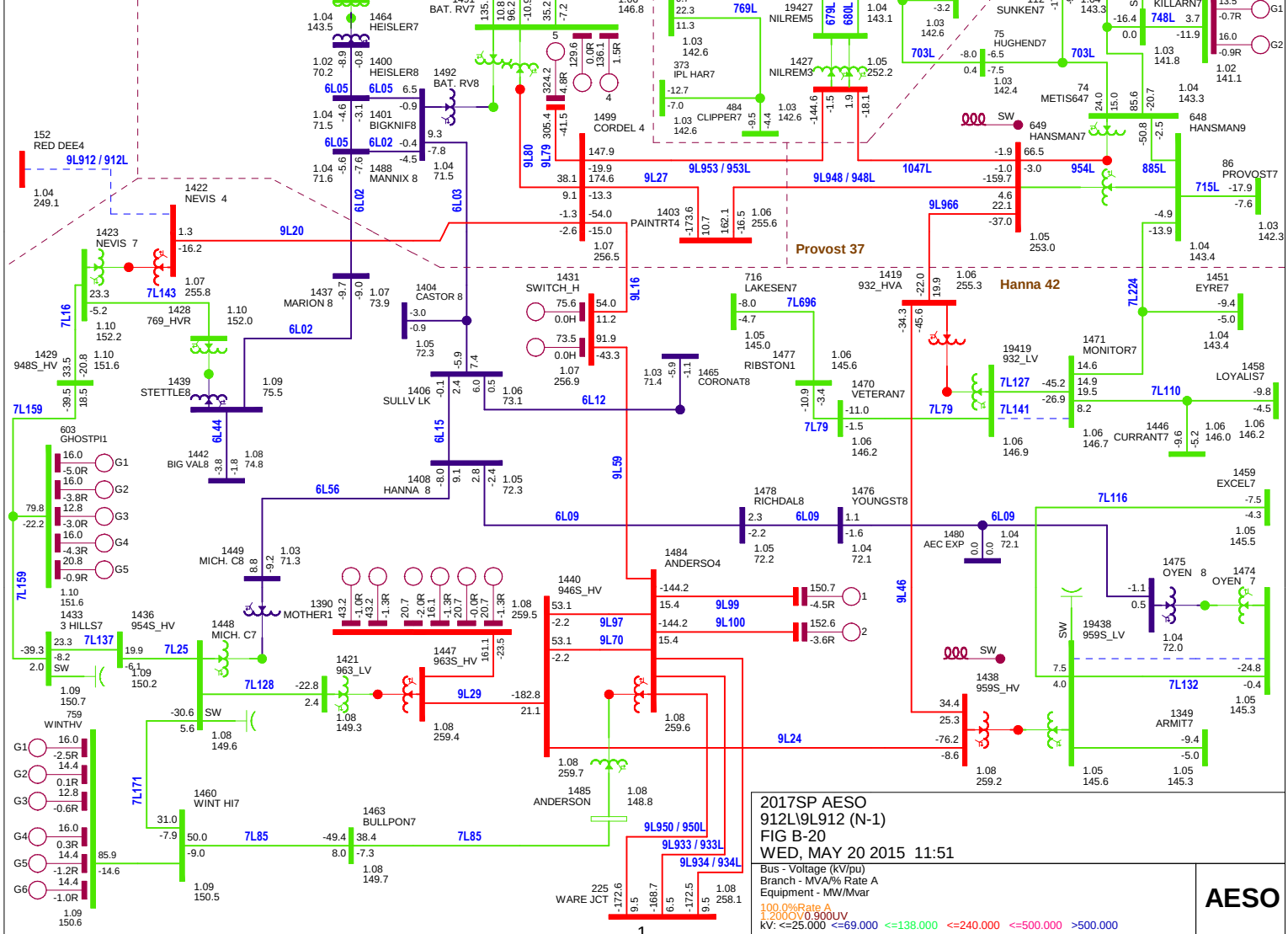
Future WAGF	MW
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BlueEarth H.H.	78.2 MW
WAGF Total	164.6 MW

Wetaskiwin 31	
65 BARDO 7	39.4
	19.2
	0.99
	136.1

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

Alliance 36



Athabasca/Lac La Biche 27

Year	HEARTLAK (%)	LAC LA 7 (%)
1980	89.9	16.1
1981	9.7	4.9
1982	87.1	1.03
1983	9.0	142.7
1984	259.0	142.7

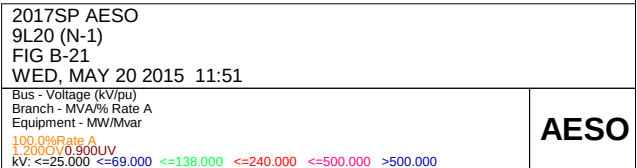
the β phase. The β phase is a solid solution of Cu_2O in Cu_2S and is stable at high temperatures. The β phase is a solid solution of Cu_2O in Cu_2S and is stable at high temperatures.

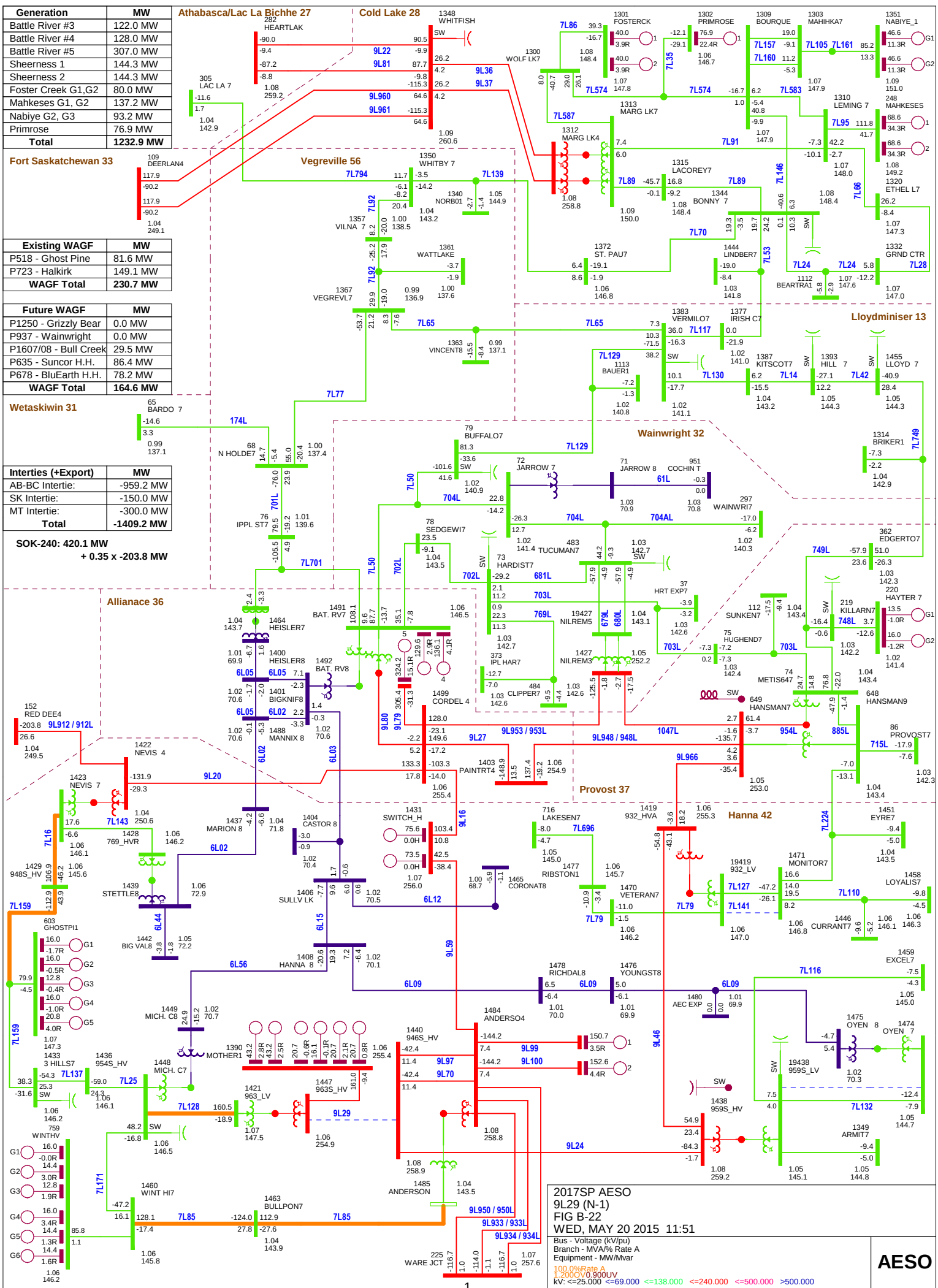
174L

N HOLDE7 68 3.1 15.3 3.0 18.4 0.9 136

	76	-92.5	318	
IPPL ST7	7.9	22.9	1.01	139.0

123.9	8.6





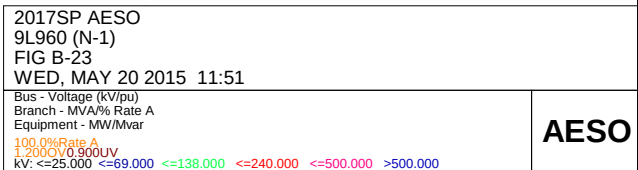
Category	Value 1	Value 2	Value 3	Value 4	Value 5
Athabasca/Lac La Biche 27	305	13.5	3.1	1.04	143.1
HEARTLAK	282	76.5	15.7	74.2	15.0

1000 JOURNAL OF CLIMATE

174L

11	1.3	76	1.01
5.3	701L	7.7	139.6
66		22.7	
2.2			

107.3	
3.4	



Athabasca/Lac La Biche 27

HEARTLAK

282
260.3

1.08

15.7
74.2
76.5
15.0

305
LAC LA 7

13.5
3.1
1.04
143.1

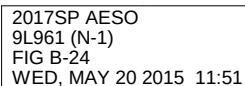
1000 JOURNAL OF CLIMATE

174L

	76	-77.7	22.7	
IPPL ST7	1.3	701L	7.7	1.01
				139.

107.3	
3.4	

1.3
-0.4
1.04 1464



Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
1.2000V 0.9000UV
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

Fort Saskatchewan 33	
109 DEERLAN4	103.2
	-88.2
	103.2
	-88.2
	1.04
	249.6

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

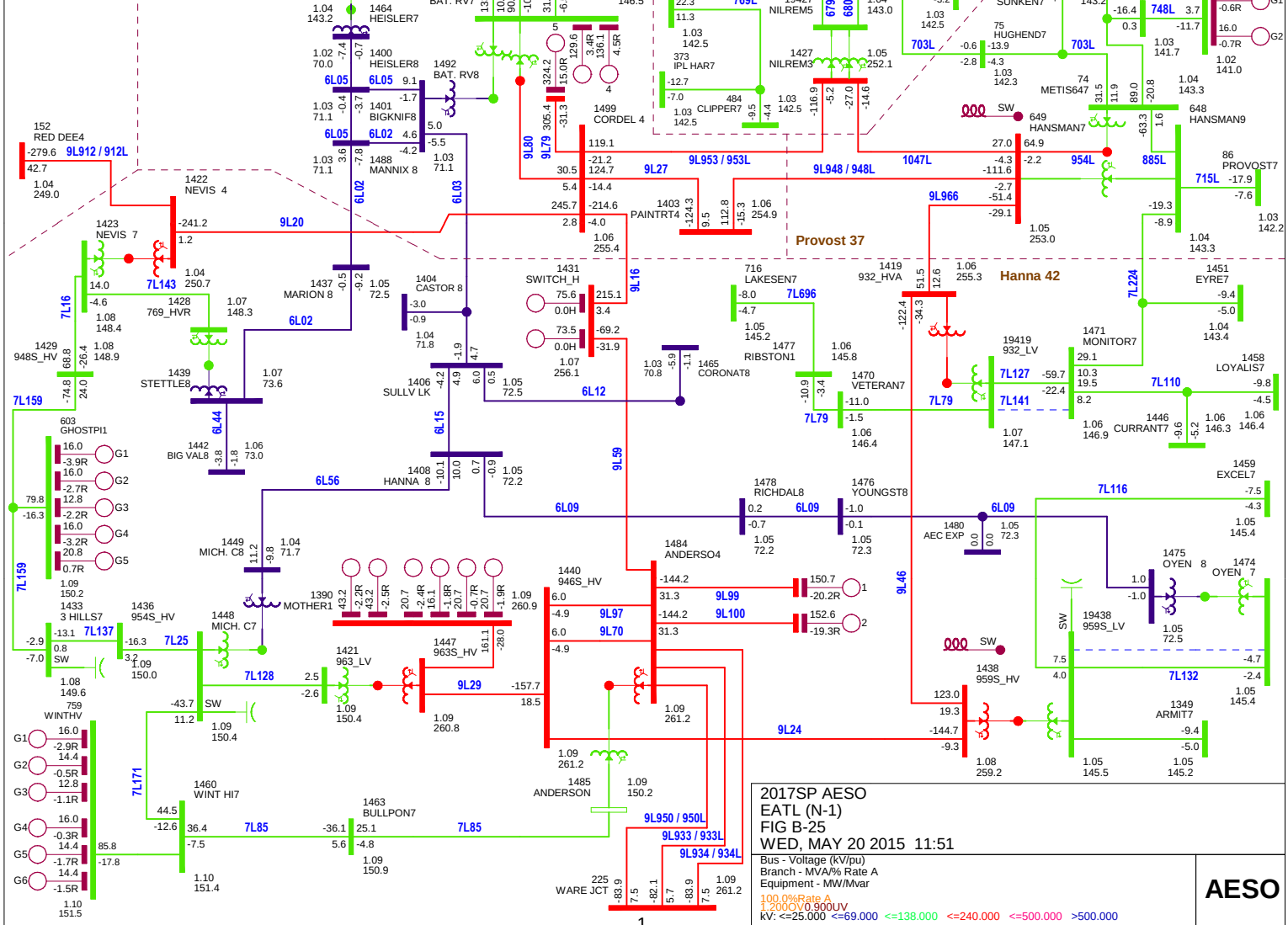
Future WAGF	
P1250 - Grizzly Bear	0.0 MW
P937 - Wainwright	0.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BlueEarth H.H.	78.2 MW
WAGF Total	164.6 MW

Wetaskiwin 31	
65 BARDO 7	-37.0
	18.7
	0.99
	136.1

Interties (+Export)	
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

Alliance 36



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
1-2000V 0.900UV
KV: <25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

ATTACHMENT C
2017SL Post-Project
Power Flow Diagrams

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

Figure #	System Condition	Contingency
C-1	N-0	Base Case
C-2	N-1	709S701T* or 709S702T* (709S Vegreville)
C-3	N-1	766S901T* (766S Nevis)
C-4	N-1	7L134 (2019S Vincent to 709S Vegreville)
C-5	N-1	912L\9L912 (63S Red Deer to 766S Nevis)
C-6	N-1	9L29 (946S Oakland to 963S Coyote Lake)

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

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

Fort Saskatchewan 33

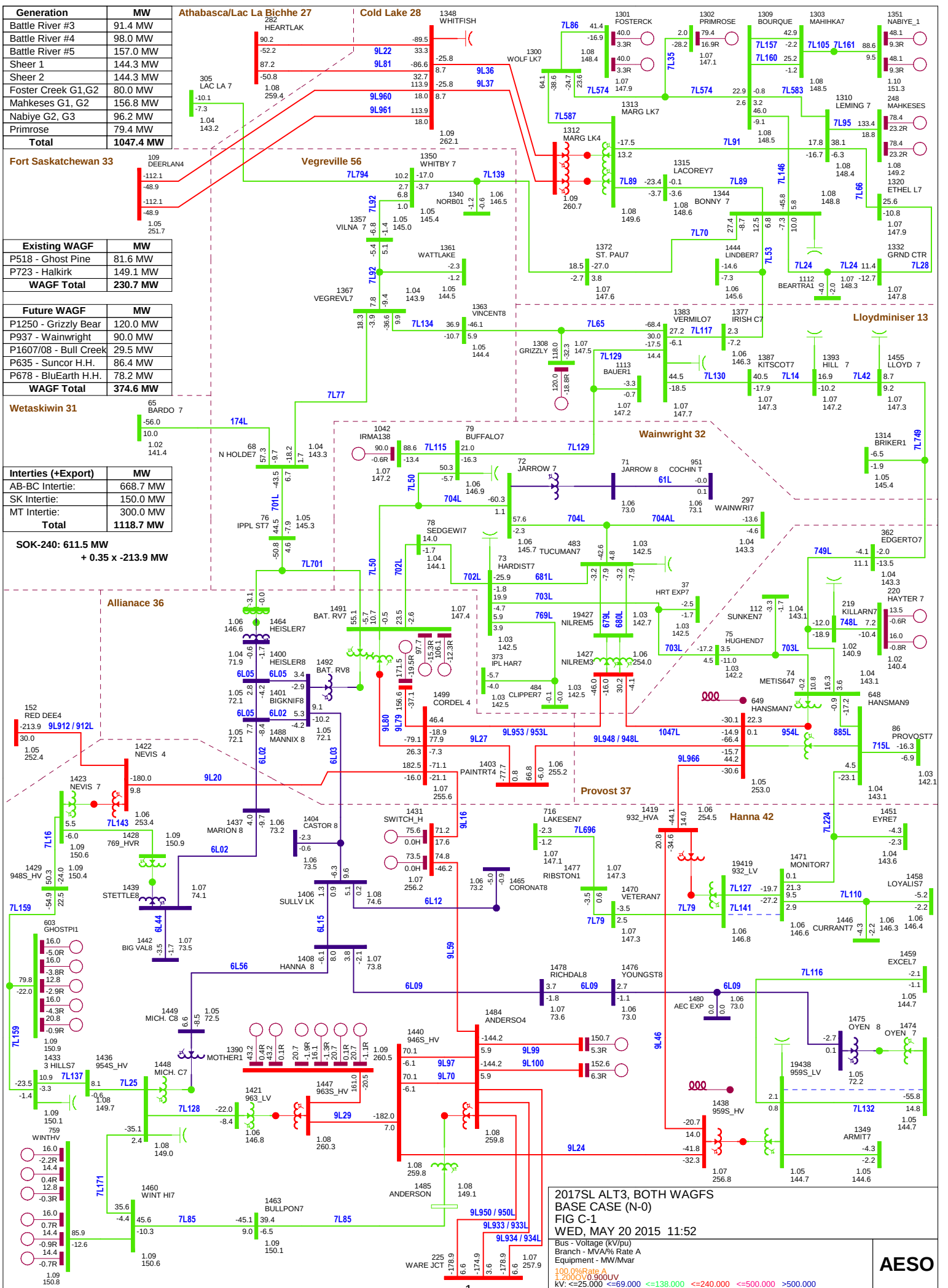
Existing WAGF	MW
P518 - Ghost Pine	81.6 MW
P723 - Halkirk	149.1 MW
WAGF Total	230.7 MW

Future WAGF	MW
P1250 - Grizzly Bear	120.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BlueEarth H.H.	78.2 MW
WAGF Total	374.6 MW

Wetaskiwin 31

Interties (+Export)	MW
AB-BC Intertie:	668.7 MW
SK Intertie:	150.0 MW
MT Intertie:	300.0 MW
Total	1118.7 MW

SOK-240: 611.5 MW
+ 0.35 x -213.9 MW



2017SL ALT3, BOTH WAGS
BASE CASE (N-0)
FIG C-1
WED, MAY 20 2015 11:52

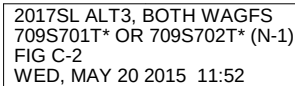
Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
12000V.0.900UV
kv: <25.000 <69.000 <138.000 <240.000 <500.000 >500.000

AESO

Category	Athabasca/Lac La Biche 27	LAC LA 7
HEARTLAK	282	305
88.6	88.6	-7.1
-51.5	-51.5	-10.1
85.7	85.7	1.04
-50.1	-50.1	143.5

Partial view of a graph showing two red lines and a green line. The red lines are labeled 'AN4' and 'Ve'. The green line is labeled 'Ve'.

5.7



1

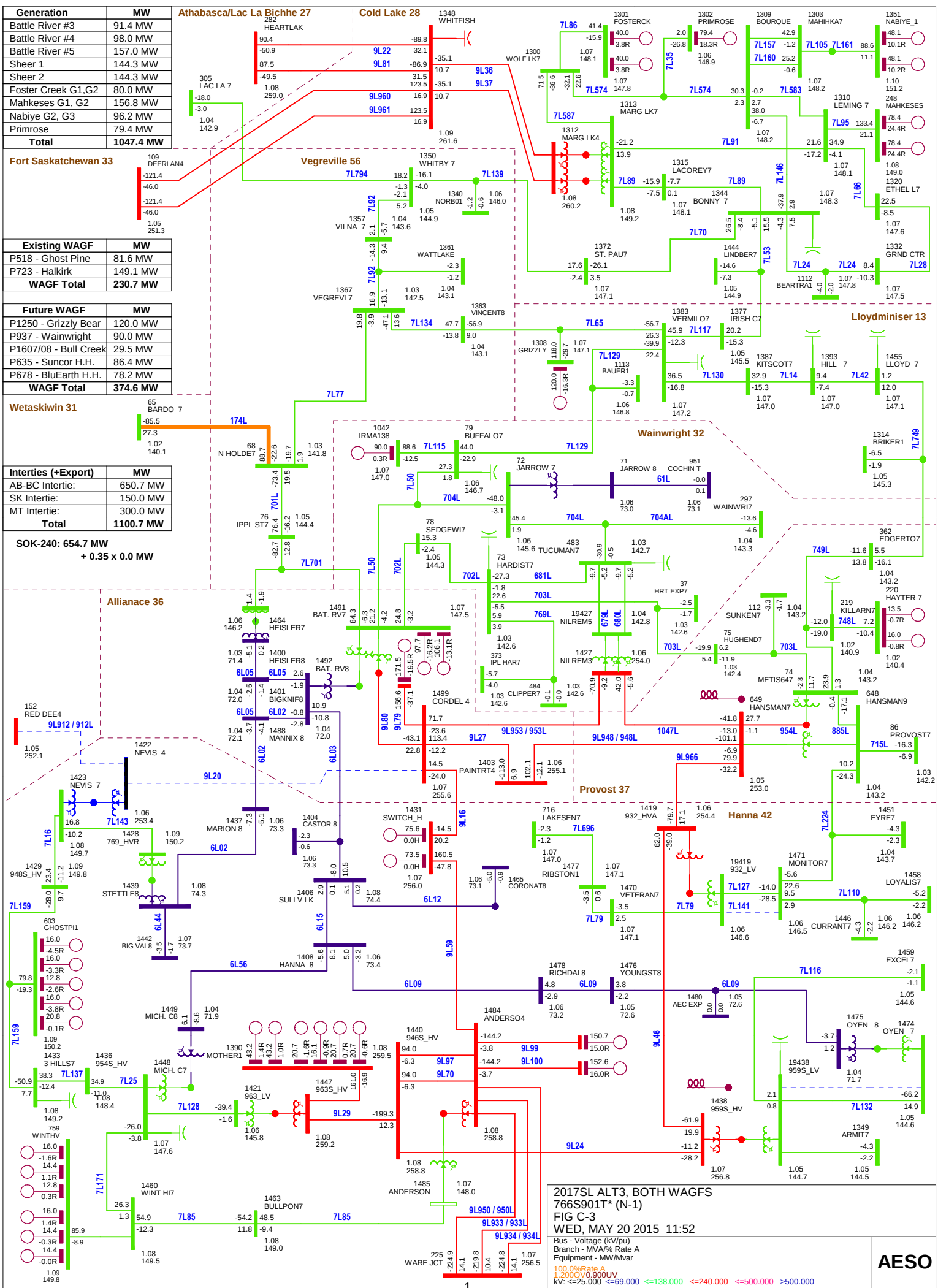
Generation	MW
Battle River #3	91.4 MW
Battle River #4	98.0 MW
Battle River #5	157.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	156.8 MW
Nabiye G2, G3	96.2 MW
Primrose	79.4 MW
Total	1047.4 MW

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	120.0 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	374.6 MW

Interties (+Export)	MW
AB-BC Intertie:	650.7 MW
SK Intertie:	150.0 MW
MT Intertie:	300.0 MW
Total	1100.7 MW

SOK-240: 654.7 MW
+ 0.35 x 0.0 MW



2017SL ALT3, BOTH WAGFS
766S901T* (N-1)
FIG C-3
WED, MAY 20 2015 11:52

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
kv: <25.000 <69.000 <138.000 <240.000 <500.000 >500.000

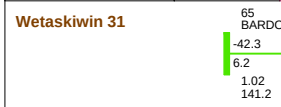
AESO

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

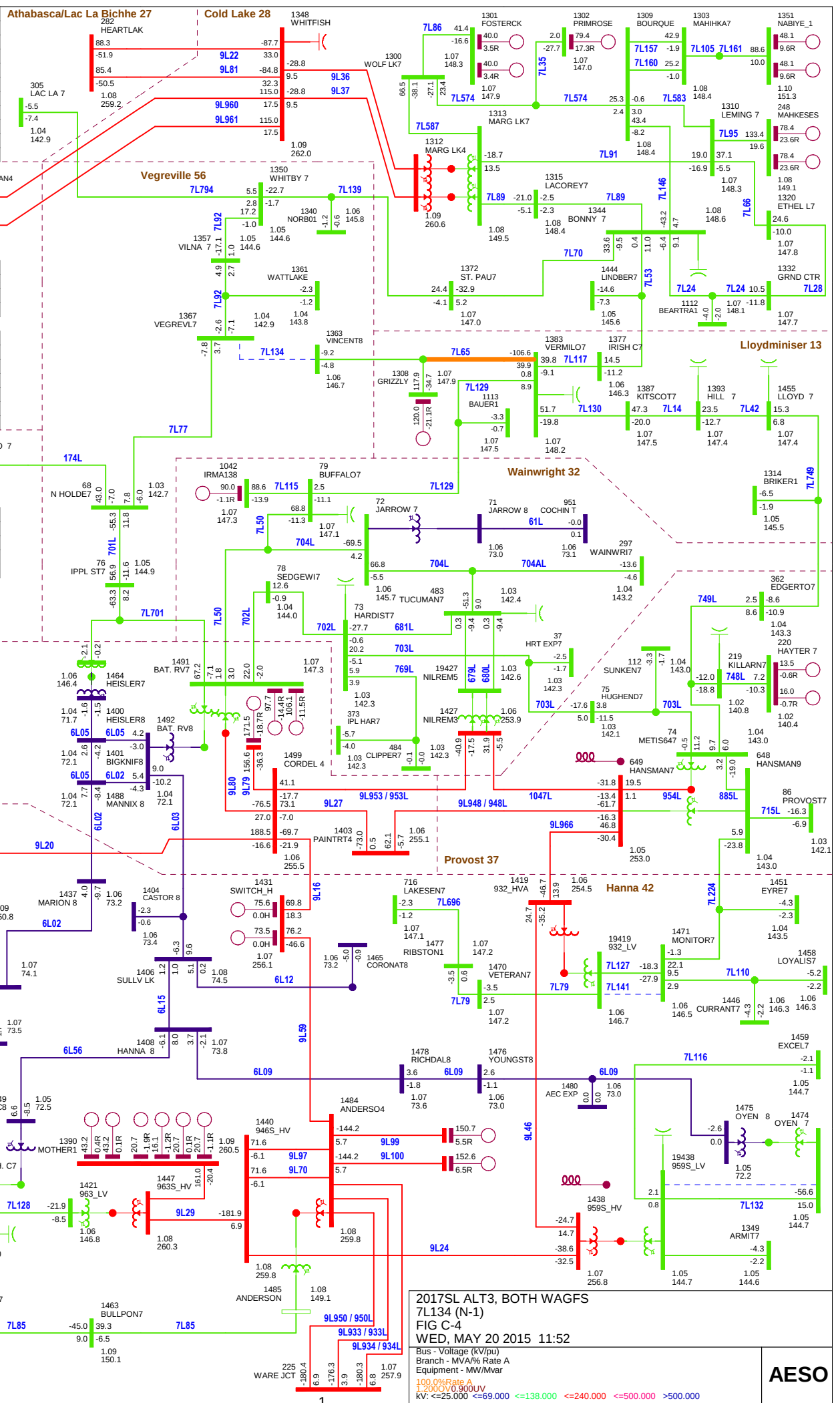
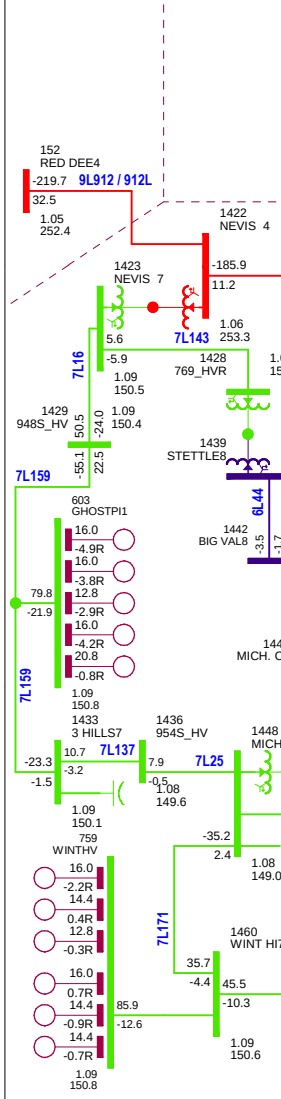
Future WAGF	MW
P1250 - Grizzly Bear	120.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BlueEarth H.H.	78.2 MW
WAGF Total	374.6 MW



Interties (+Export)	MW
AB-BC Intertie:	667.1 MW
SK Intertie:	150.0 MW
MT Intertie:	300.0 MW
Total	1117.1 MW

SOK-240: 603.1 MW
+ 0.35 x -219.7 MW

Alliance 36



2017SL ALT3, BOTH WAGFS
7L134 (N-1)
FIG C-4
WED, MAY 20 2015 11:52

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
12000V 0.900UV
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

Fort Saskatchewan 33	
109 DEERLAN4	-121.4
	-46.0
	-121.4
	-46.0
	1.05
	251.3

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

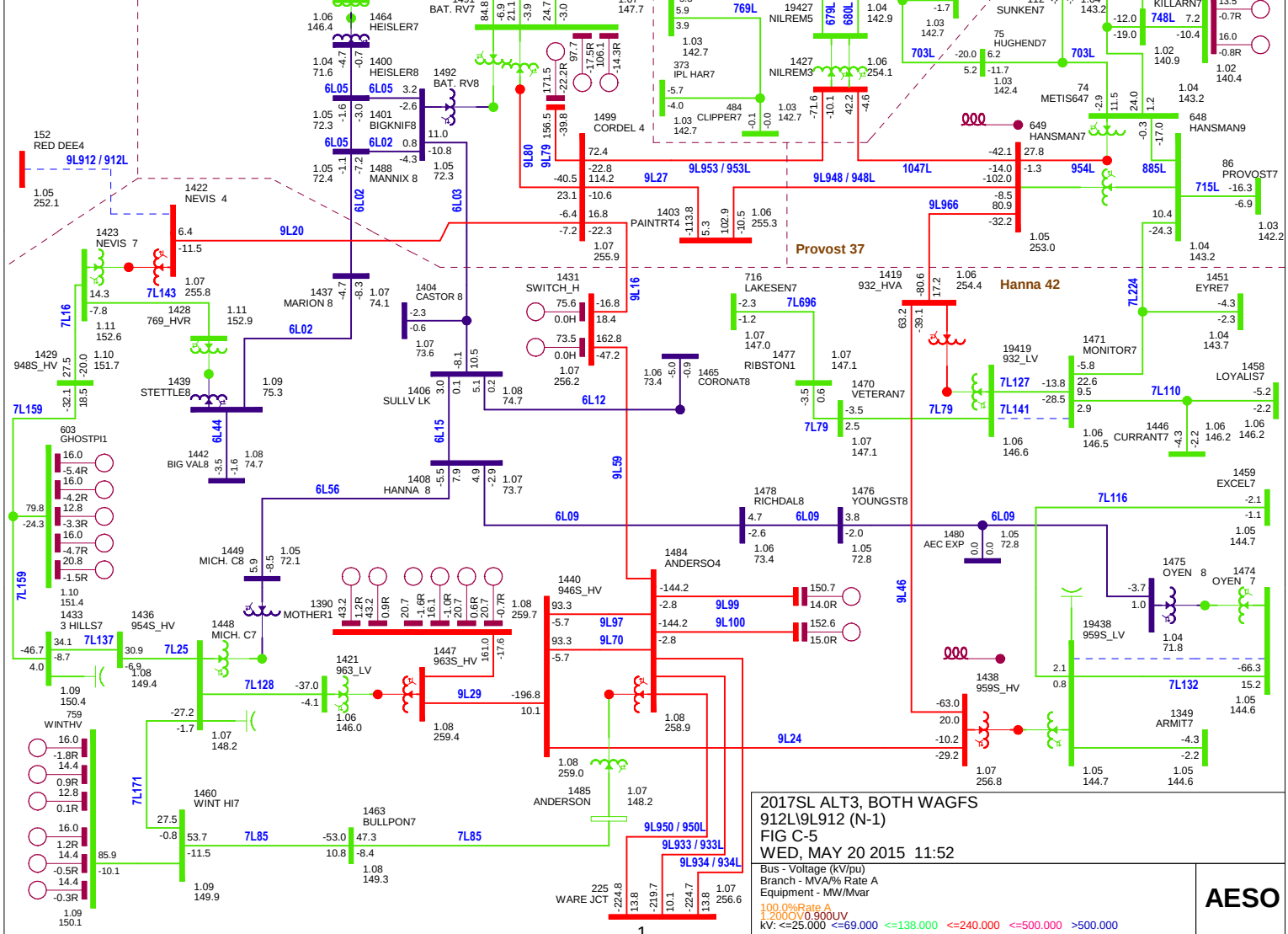
Future WAGF	MW
P1250 - Grizzly Bear	120.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BluEarth H.H.	78.2 MW
WAGF Total	374.6 MW

Wetaskiwin 31	
65 BARDO 7	-85.6
	27.1
	1.02
	140.2

Interties (+Export)	MW
AB-BC Intertie:	650.7 MW
SK Intertie:	150.0 MW
MT Intertie:	300.0 MW
Total	1100.7 MW

SOK-240: 655.0 MW
+ 0.35 x 0.0 MW

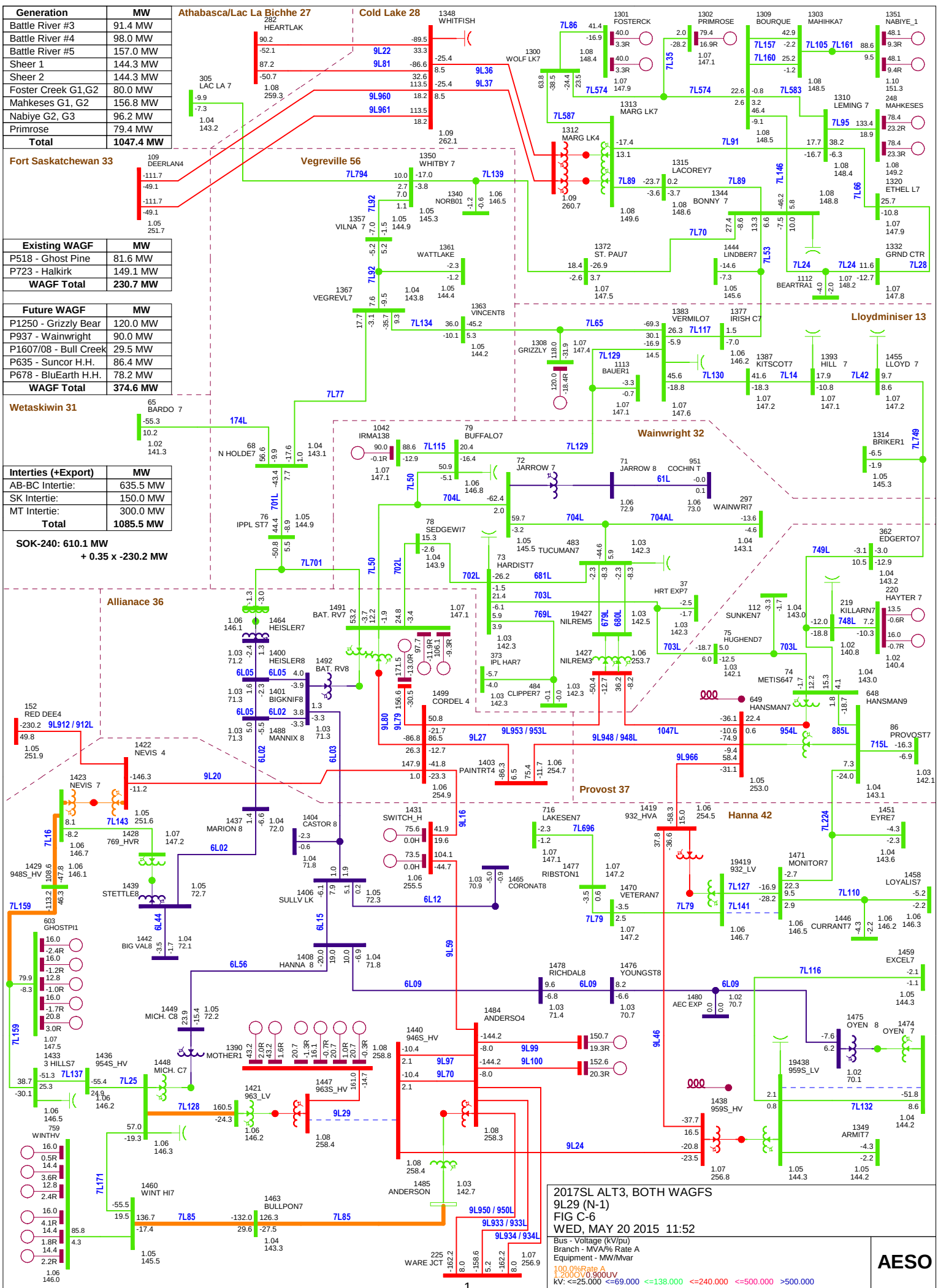
Alliance 36



2017SL ALT3, BOTH WAGFS
912L/9L912 (N-1)
FIG C-5
WED, MAY 20 2015 11:52

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
1-2000V 0.900UV
kv: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO



ATTACHMENT D
2017SP Post-Project
Power Flow Diagrams

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

Figure #	System Condition	Contingency
D-1	N-0	Base Case
D-2	N-1	526ST1* or 526ST2* (526S Buffalo Creek)
D-3	N-1	709S701T* or 709S702T* (709S Vegreville)
D-4	N-1	749L\749AL (648S Metiskow to 899S Edgerton)
D-5	N-1	7L134 (2019S Vincent to 709S Vegreville)
D-6	N-1	7L65\7LA65 (2019S Vincent to 710S Vermilion)
D-7	N-1	766S901T* (766S Nevis)
D-8	N-1	899ST3a* (899S Edgerton)
D-9	N-1	912L\9L912 (63S Red Deer to 766S Nevis)
D-10	N-1	9L29 (946S Oakland to 963S Coyote Lake)

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

Athabasca/Lac La Biche 27

HEARTLAK

282

-90.9

-10.2

-88.1

-9.5

1.08

259.6

305

LAC LA 7

-23.2

5.5

1.04

143.4

Metric	Athabasca/Lac La Biche 27	LAC LA 7
282	282	-23.2
-90.9	-90.9	5.5
-10.2	-10.2	1.04
-88.1	-88.1	143.4
-9.5	-9.5	
1.08	1.08	
259.6	259.6	

Partial view of a graph showing two red lines and a green line. The red lines are labeled 'AN4' and 'Ve'. The green line is labeled 'Ve'.

Figure 1. The effect of the number of trials on the number of correct responses. The number of correct responses was significantly higher than the number of incorrect responses for all conditions. The number of correct responses was significantly higher than the number of incorrect responses for all conditions. The number of correct responses was significantly higher than the number of incorrect responses for all conditions.

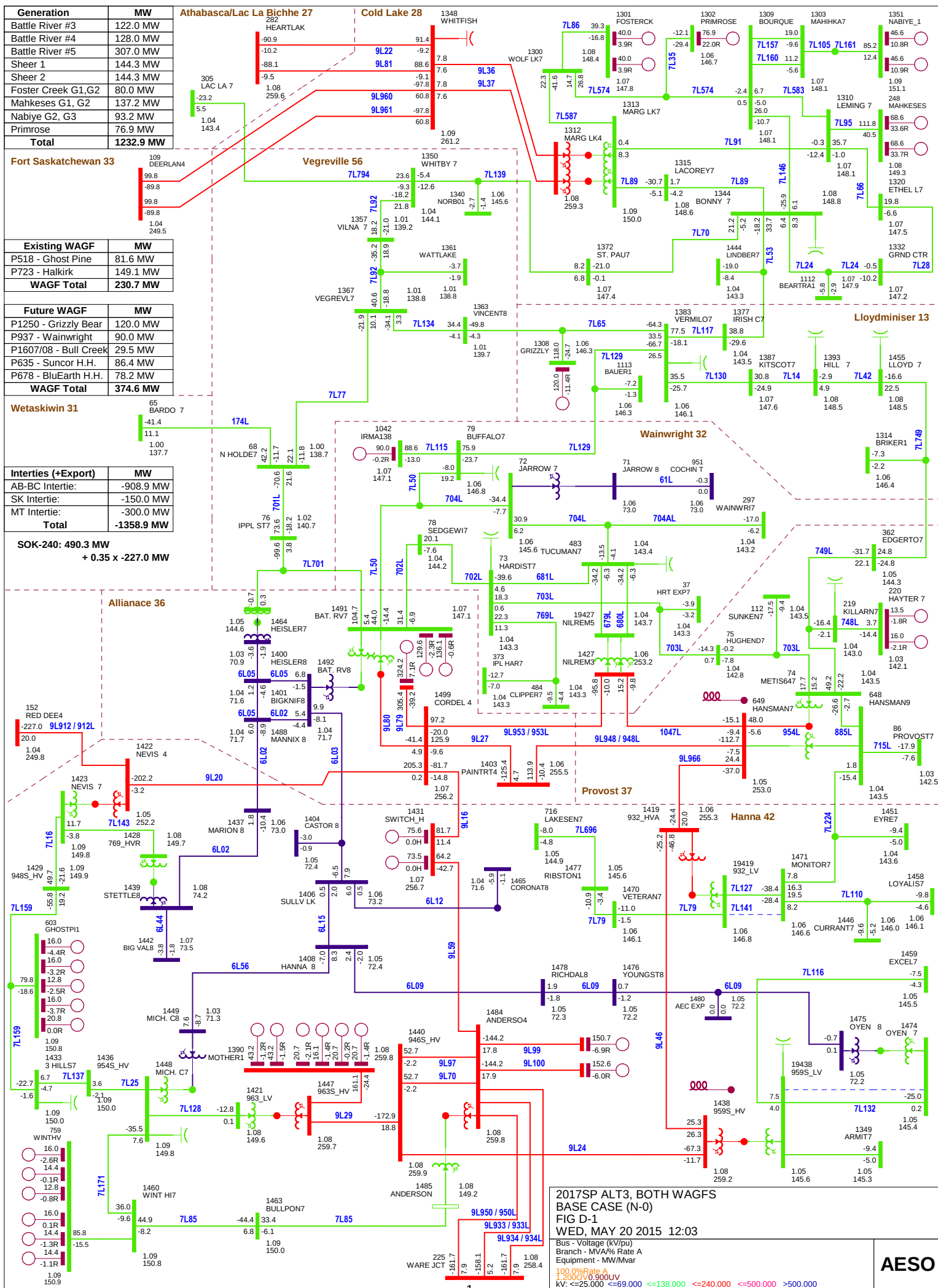
174L

68
N HOLDE

42.2 -11.7 22.1 -11.8

76
IPPL ST7 3.6 18.2 1.02 140.1

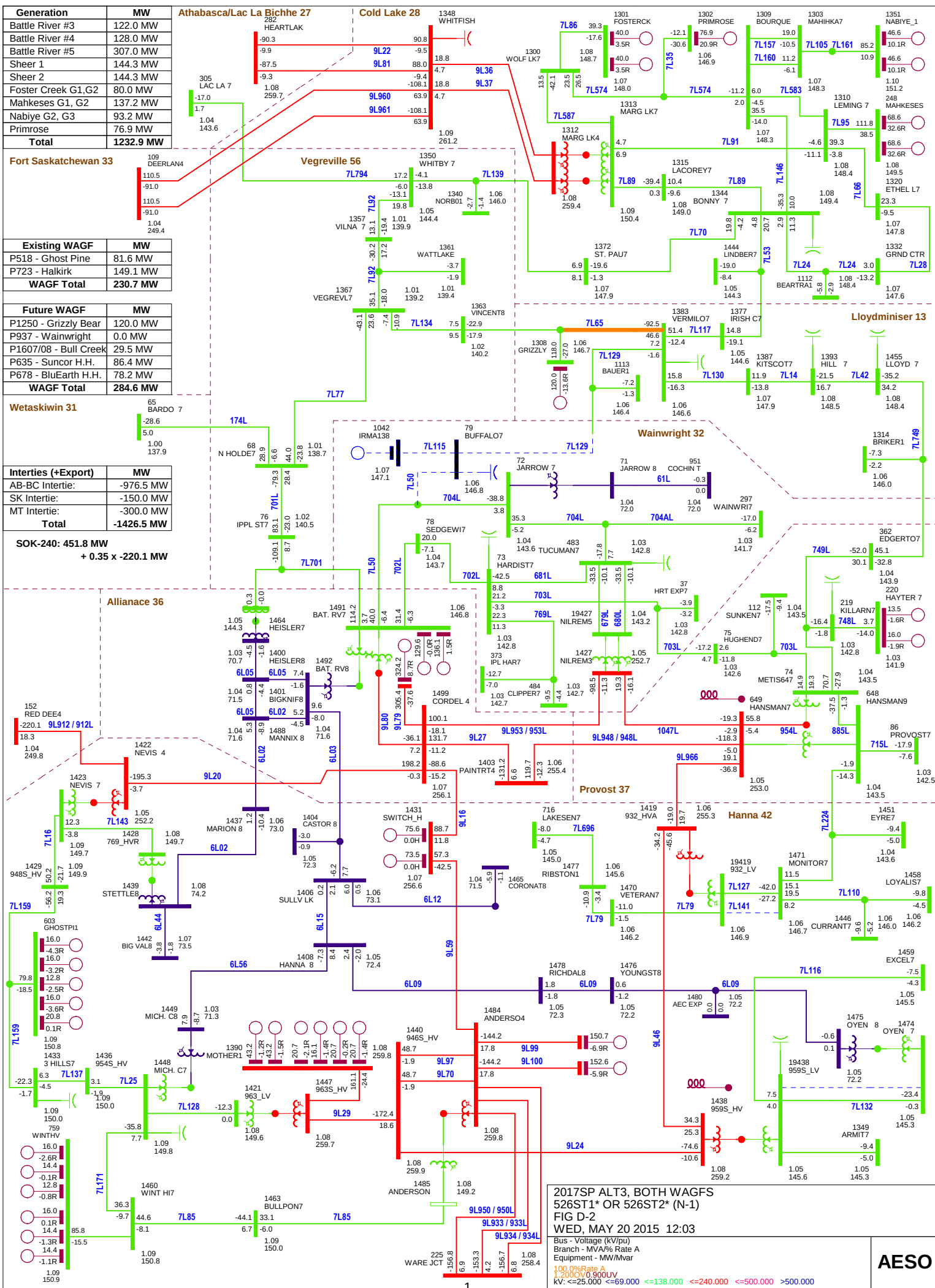
7.5	3.8	-99.6	
			-



2017SP ALT3, BOTH WAGFS
BASE CASE (N-0)
FIG D-1
WED, MAY 20 2015 12:03

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
1.200OV.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	120.0 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	374.6 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

SOK-240: 474.5 MW
+ 0.35 x -239.9 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

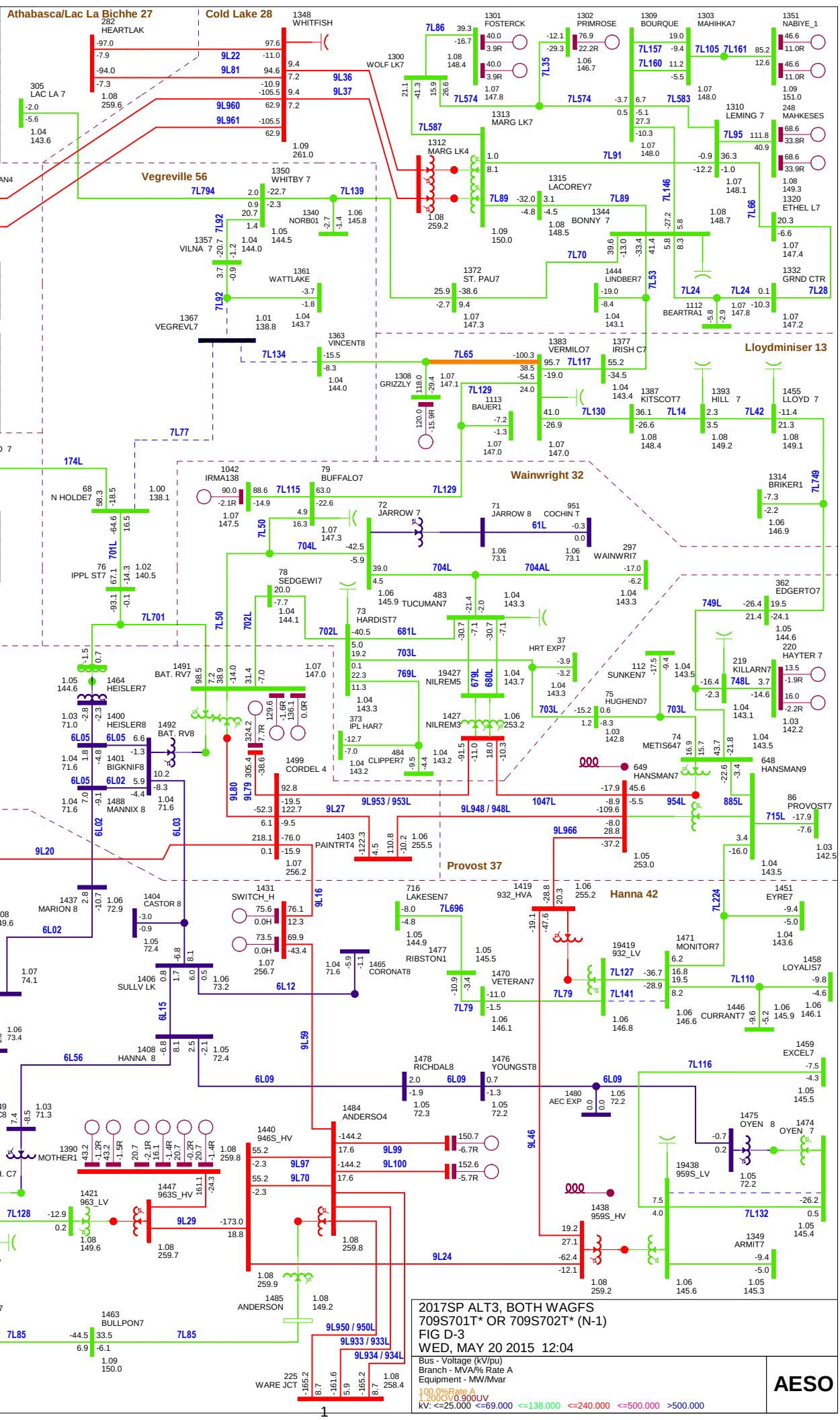
Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 MW

Interties (+Export)	MW
AB-BC Intertie:	-896.2 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1346.2 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	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	120.0 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	374.6 MW

Interties (+Export)	MW
AB-BC Intertie:	-910.6 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1360.6 MW

SOK-240: 481.0 MW
+ 0.35 x -233.3 MW

Fort Saskatchewan 33
109 DEERLAN4
98.8
-89.3
98.8
-89.3
1.04
249.4

Wetaskiwin 31
65 BARDO 7
-28.0
10.7
0.99
136.9

Alliance 36
152 RED DEE4
-233.3
22.5
1.04
249.8

Provost 37
1431 SWITCH_H
75.6
80.2
12.2
73.5
65.8
0.0H
1.07
256.6

Hanna 42
1478 RICHDA8
1.8
-1.8
1.05
72.3

Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

Lloydminster 13
1455 LLOYD 7
-10.4
20.9
1.08
149.2

Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

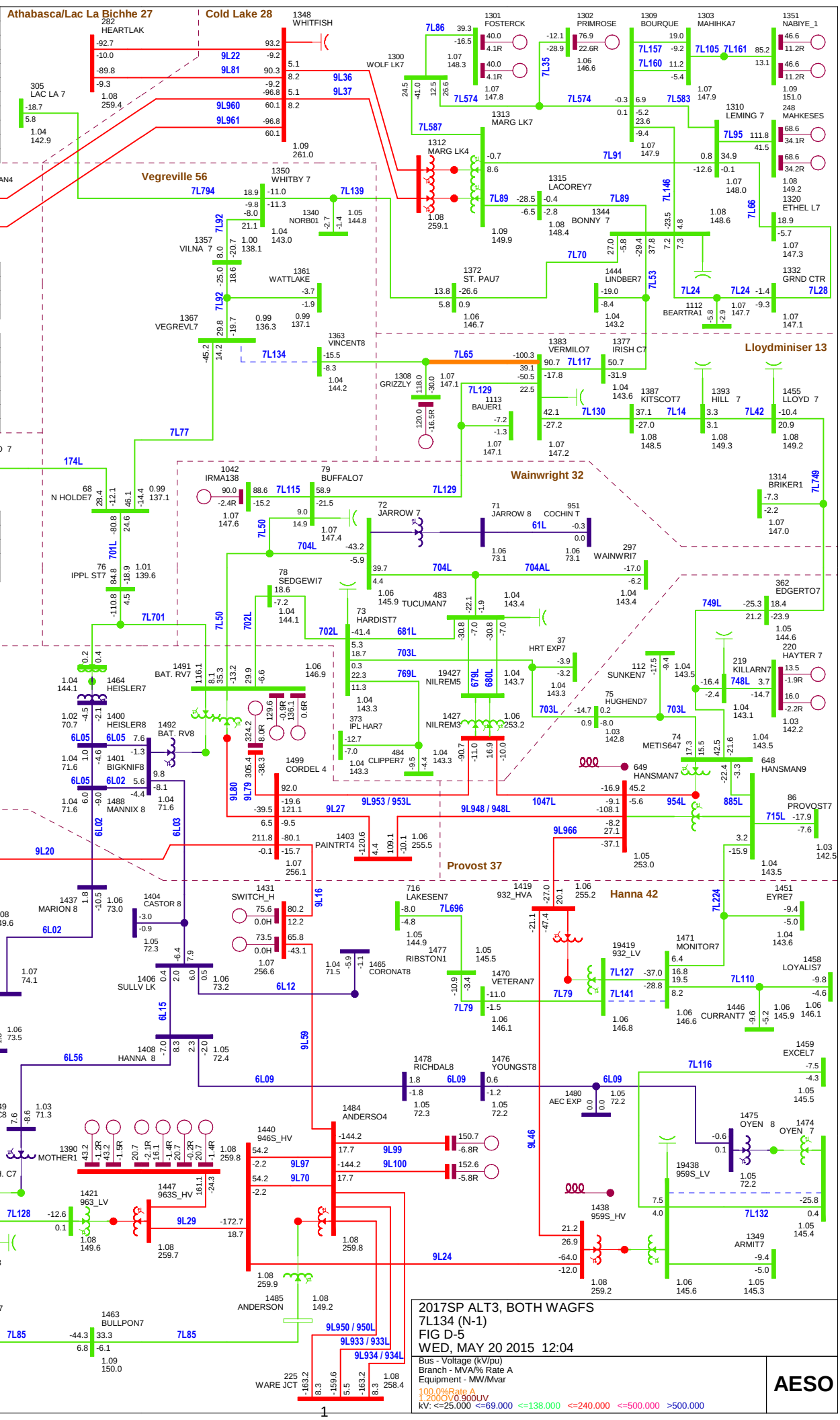
Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

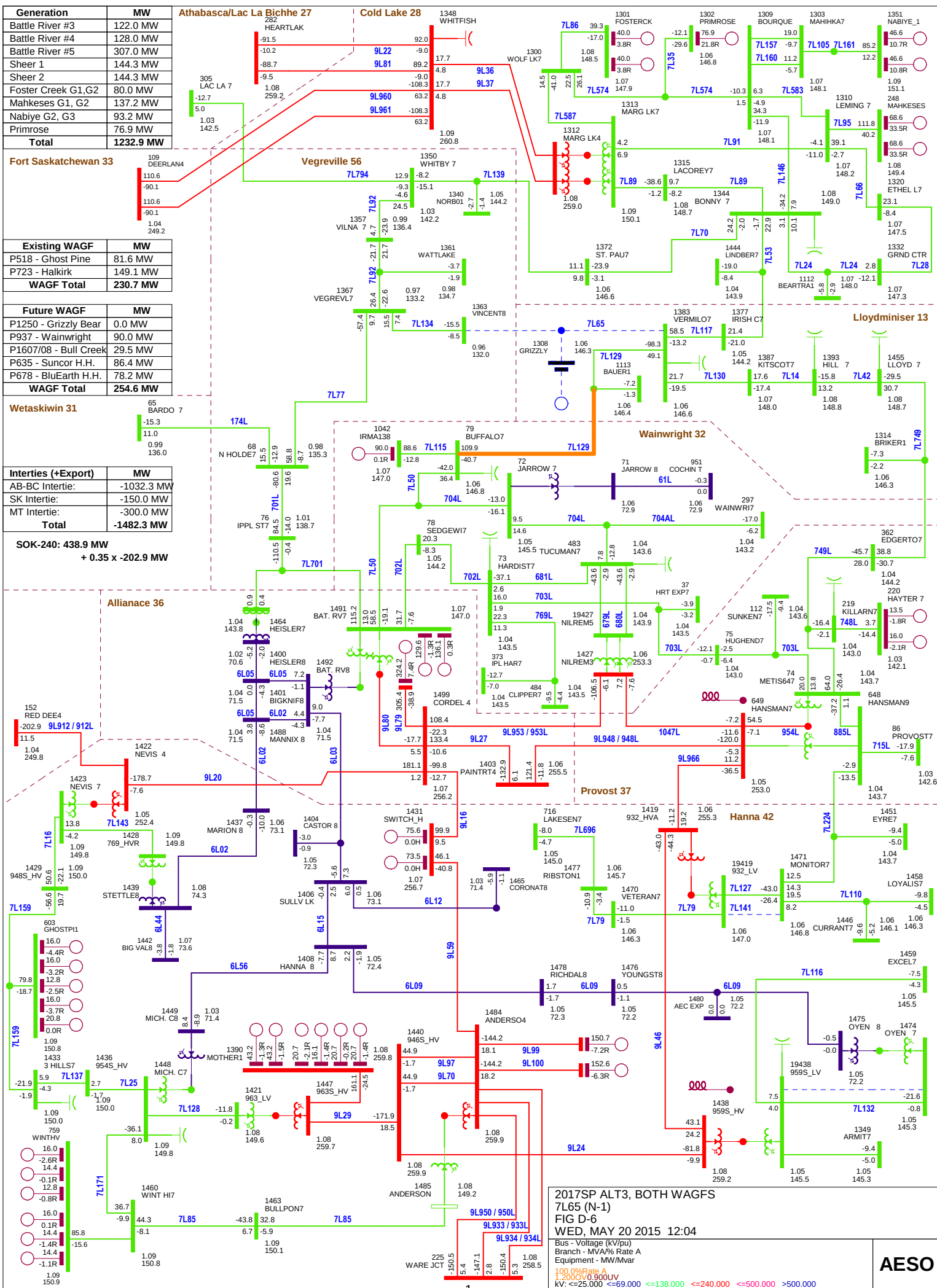
Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1

Wainwright 32
71 JARROW 8
1.06
73.1
1.06
73.1



2017SP ALT3, BOTH WAGFS
FIG D-5
WED, MAY 20 2015 12:04
Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
+2000V to 9000V
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

Fort Saskatchewan 33	
109 DEERLAN4	90.7
	-88.2
	90.7
	-88.2
	1.04
	249.2

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

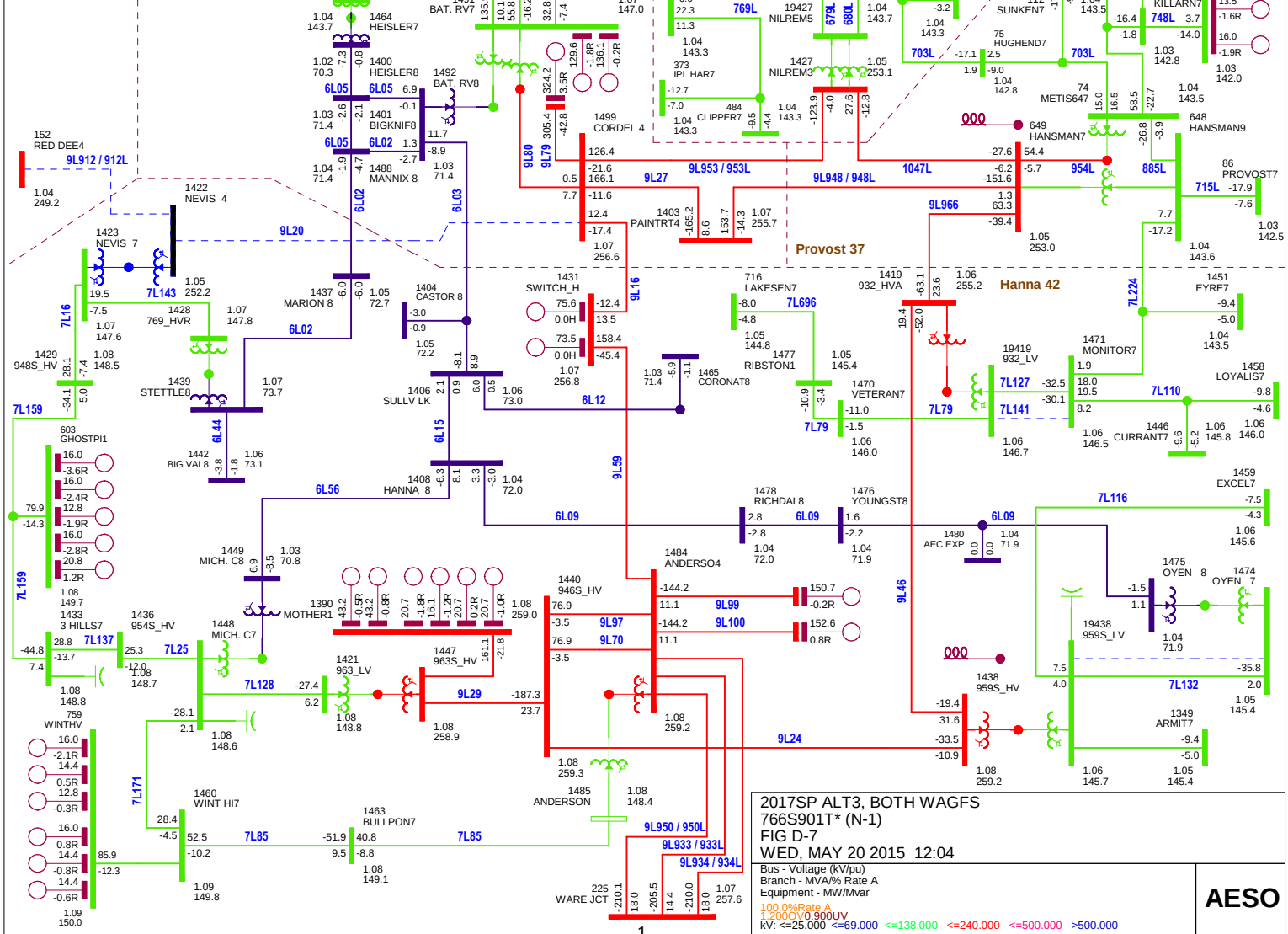
Future WAGF	MW
P1250 - Grizzly Bear	120.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BlueEarth H.H.	78.2 MW
WAGF Total	374.6 MW

Wetaskiwin 31	
65 BARDO 7	69.8
	30.9
	0.99
	136.1

Interties (+Export)	MW
AB-BC Intertie:	-934.3 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1384.3 MW

SOK-240: 532.8 MW
+ 0.35 x 0.0 MW

Alliance 36



2017SP ALT3, BOTH WAGFS
766S901T* (N-1)
FIG D-7
WED, MAY 20 2015 12:04

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
12000V.0.900UV
kv: <25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO

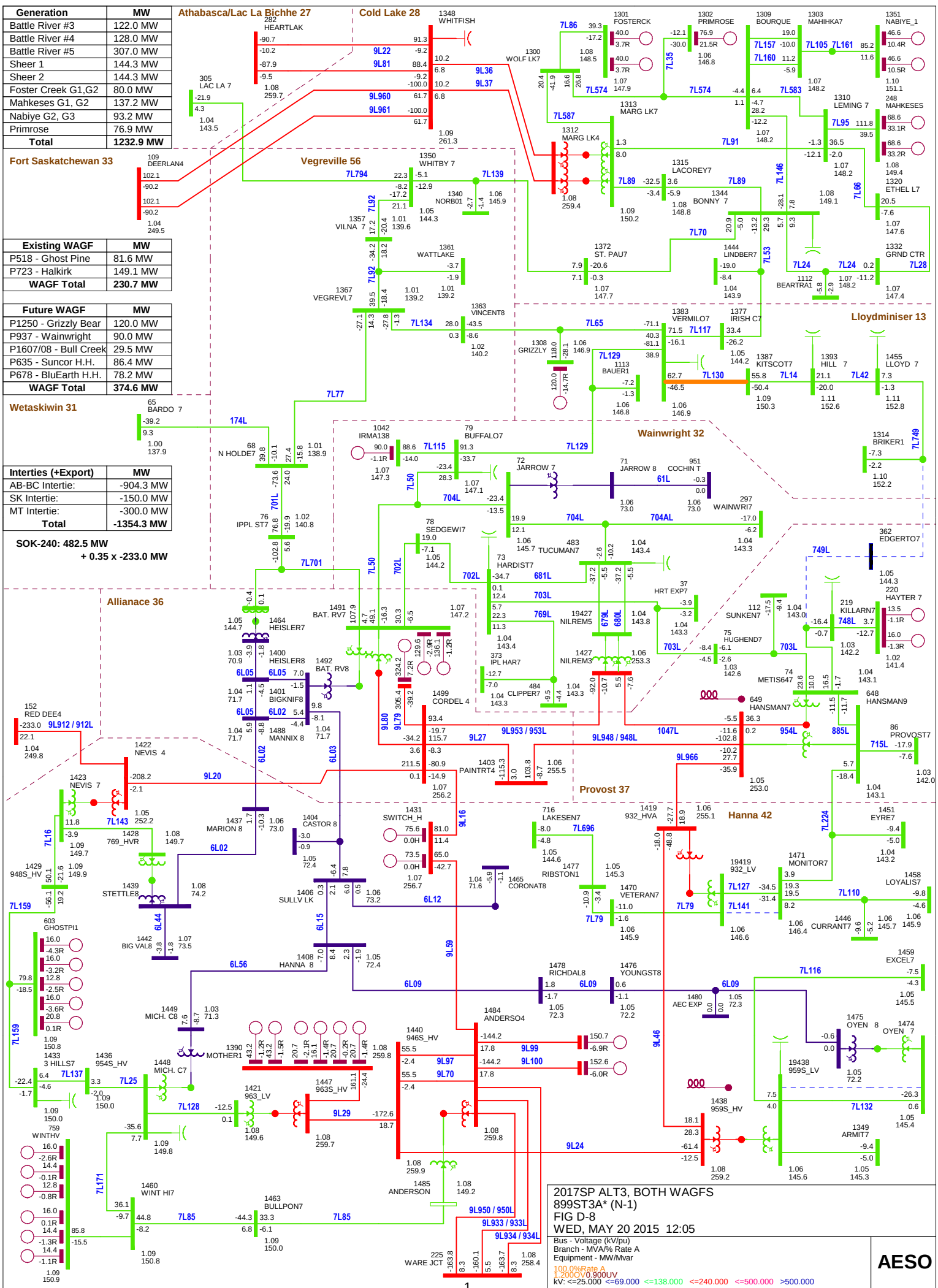
Generation	MW
Battle River #3	122.0 MW
Battle River #4	128.0 MW
Battle River #5	307.0 MW
Sheer 1	144.3 MW
Sheer 2	144.3 MW
Foster Creek G1,G2	80.0 MW
Mahkeses G1, G2	137.2 MW
Nabiye G2, G3	93.2 MW
Primrose	76.9 MW
Total	1232.9 MW

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	120.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	86.4 MW
P678 - BlueEarth H.H.	78.2 MW
WAGF Total	374.6 MW

Interties (+Export)	MW
AB-BC Intertie:	-904.3 MW
SK Intertie:	-150.0 MW
MT Intertie:	-300.0 MW
Total	-1354.3 MW

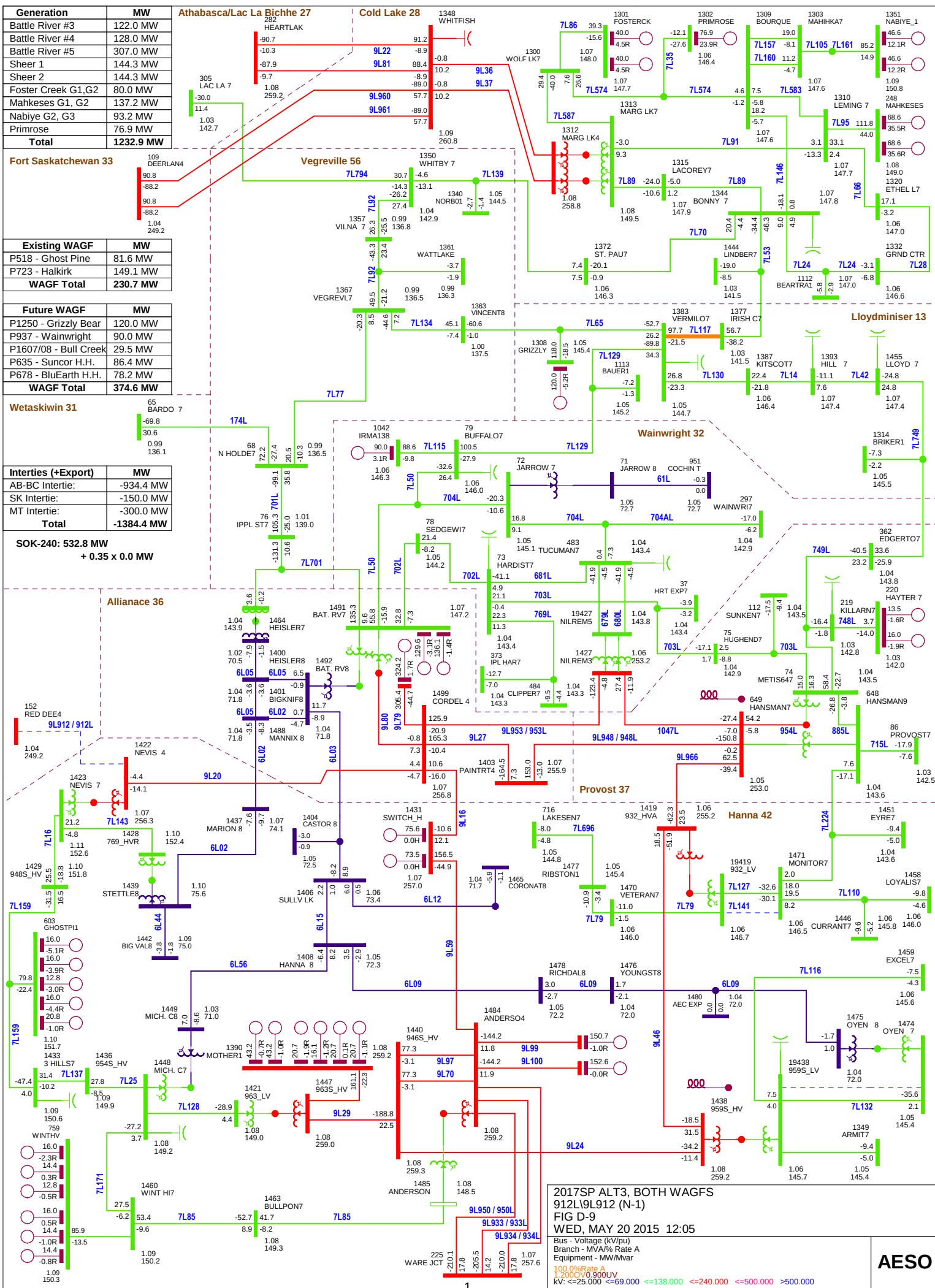
SOK-240: 482.5 MW + 0.35 x -233.0 MW

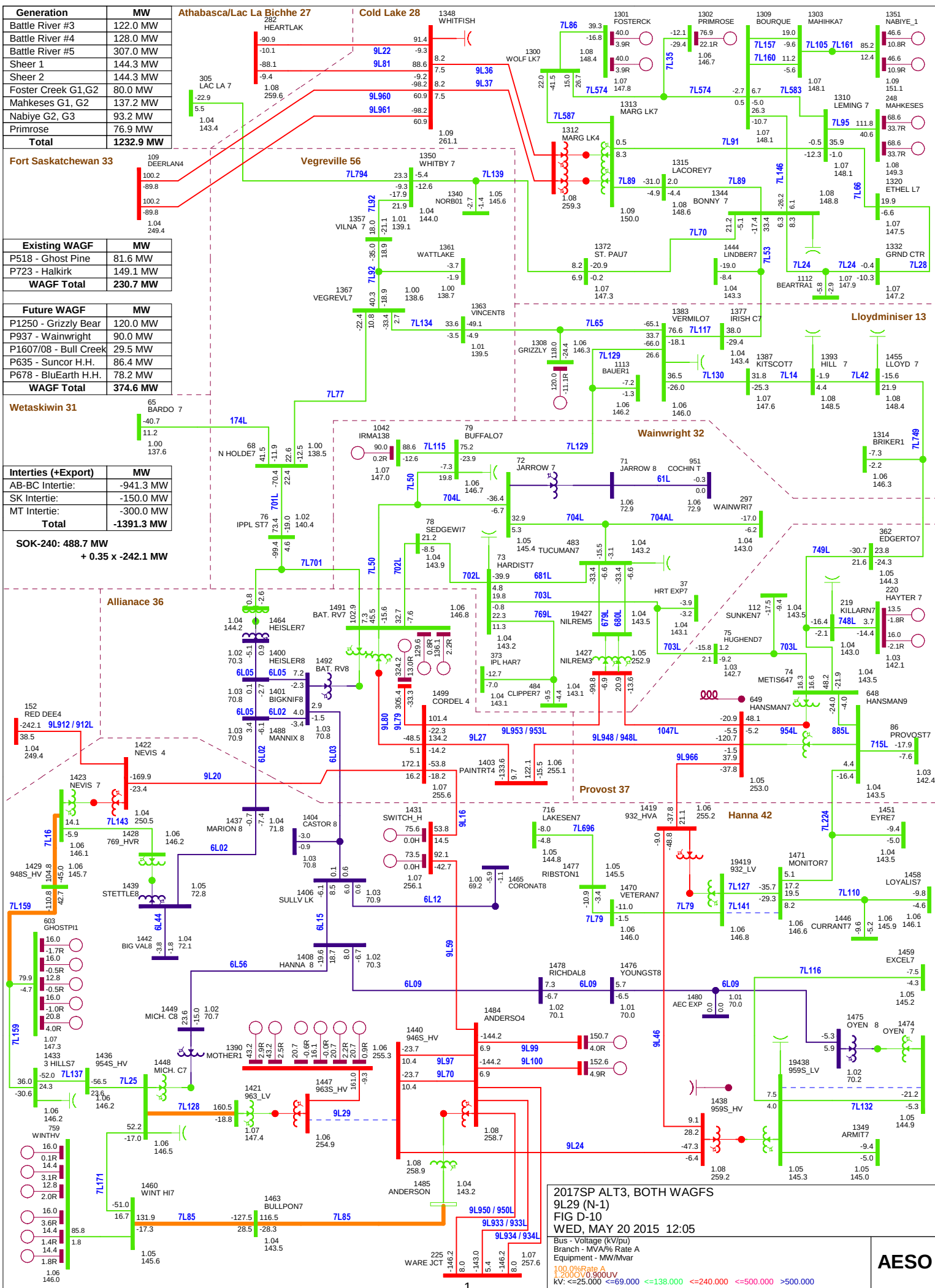


2017SP ALT3, BOTH WAGFS
899ST3A* (N-1)
FIG D-8
WED, MAY 20 2015 12:05

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

100.0%Rate A
100.0%Rate B
100.0%Rate C
100.0%Rate D
100.0%Rate E
100.0%Rate F
100.0%Rate G
100.0%Rate H
100.0%Rate I
100.0%Rate J
100.0%Rate K
100.0%Rate L
100.0%Rate M
100.0%Rate N
100.0%Rate O
100.0%Rate P
100.0%Rate Q
100.0%Rate R
100.0%Rate S
100.0%Rate T
100.0%Rate U
100.0%Rate V
100.0%Rate W
100.0%Rate X
100.0%Rate Y
100.0%Rate Z
100.0%Rate AA
100.0%Rate AB
100.0%Rate AC
100.0%Rate AD
100.0%Rate AE
100.0%Rate AF
100.0%Rate AG
100.0%Rate AH
100.0%Rate AI
100.0%Rate AJ
100.0%Rate AK
100.0%Rate AL
100.0%Rate AM
100.0%Rate AN
100.0%Rate AO
100.0%Rate AP
100.0%Rate AQ
100.0%Rate AR
100.0%Rate AS
100.0%Rate AT
100.0%Rate AU
100.0%Rate AV
100.0%Rate AW
100.0%Rate AX
100.0%Rate AY
100.0%Rate AZ
100.0%Rate BA
100.0%Rate BB
100.0%Rate BC
100.0%Rate BD
100.0%Rate BE
100.0%Rate BF
100.0%Rate BG
100.0%Rate BH
100.0%Rate BI
100.0%Rate BJ
100.0%Rate BK
100.0%Rate BL
100.0%Rate BM
100.0%Rate BN
100.0%Rate BO
100.0%Rate BP
100.0%Rate BQ
100.0%Rate BR
100.0%Rate BS
100.0%Rate BT
100.0%Rate BU
100.0%Rate BV
100.0%Rate BW
100.0%Rate BX
100.0%Rate BY
100.0%Rate BZ
100.0%Rate CA
100.0%Rate CB
100.0%Rate CC
100.0%Rate CD
100.0%Rate CE
100.0%Rate CF
100.0%Rate CG
100.0%Rate CH
100.0%Rate CI
100.0%Rate CJ
100.0%Rate CK
100.0%Rate CL
100.0%Rate CM
100.0%Rate CN
100.0%Rate CO
100.0%Rate CP
100.0%Rate CQ
100.0%Rate CR
100.0%Rate CS
100.0%Rate CT
100.0%Rate CU
100.0%Rate CV
100.0%Rate CW
100.0%Rate CX
100.0%Rate CY
100.0%Rate CZ
100.0%Rate DA
100.0%Rate DB
100.0%Rate DC
100.0%Rate DD
100.0%Rate DE
100.0%Rate DF
100.0%Rate DG
100.0%Rate DH
100.0%Rate DI
100.0%Rate DJ
100.0%Rate DK
100.0%Rate DL
100.0%Rate DM
100.0%Rate DN
100.0%Rate DO
100.0%Rate DP
100.0%Rate DQ
100.0%Rate DR
100.0%Rate DS
100.0%Rate DT
100.0%Rate DU
100.0%Rate DV
100.0%Rate DW
100.0%Rate DX
100.0%Rate DY
100.0%Rate DZ
100.0%Rate EA
100.0%Rate EB
100.0%Rate EC
100.0%Rate ED
100.0%Rate EE
100.0%Rate EF
100.0%Rate EG
100.0%Rate EH
100.0%Rate EI
100.0%Rate EJ
100.0%Rate EK
100.0%Rate EL
100.0%Rate EM
100.0%Rate EN
100.0%Rate EO
100.0%Rate EP
100.0%Rate EQ
100.0%Rate ER
100.0%Rate ES
100.0%Rate ET
100.0%Rate EU
100.0%Rate EV
100.0%Rate EW
100.0%Rate EX
100.0%Rate EY
100.0%Rate EZ
100.0%Rate FA
100.0%Rate FB
100.0%Rate FC
100.0%Rate FD
100.0%Rate FE
100.0%Rate FF
100.0%Rate FG
100.0%Rate FH
100.0%Rate FI
100.0%Rate FJ
100.0%Rate FK
100.0%Rate FL
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100.0%Rate HO
100.0%Rate HP
100.0%Rate HQ
100.0%Rate HR
100.0%Rate HS
100.0%Rate HT
100.0%Rate HU
100.0%Rate HV
100.0%Rate HW
100.0%Rate HX
100.0%Rate HY
100.0%Rate HZ
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100.0%Rate ID
100.0%Rate IE
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100.0%Rate IG
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100.0%Rate IJ
100.0%Rate IK
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100.0%Rate IM
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ATTACHMENT E
2017SL Transient Stability Diagrams

Table E-1: Summary of Transient Stability Diagrams for 2017SL, Alt3

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	2019S Vincent	708S Grizzly Bear	710S Vermilion	2019S Vincent
E-8					708S Grizzly Bear
E-9					710S Vermilion
E-10	7L70	700S Bonnyville		707S St.Paul	700S Bonnyville
E-11					707S St.Paul
E-12	7L115	526S Buffalo Creek		926S Kinsella (Mainstream)	526S Buffalo Creek
E-13					926S Kinsella
E-14	7L117	706S Irish Creek		710S Vermilion	706S Irish Creek
E-15					710S Vermilion
E-16	7L129	526S Buffalo Creek	Bauer Tap	710S Vermilion	526S Buffalo Creek
E-17					710S Vermilion
E-18	7L134	709S Vegreville		2019S Vincent	709S Vegreville
E-19					2019S Vincent
E-20	701L/7L701	757S Battle River	764S Heisler	223S Strome	757S Battle River
E-21					223S Strome
E-22	749L	899S Edgerton	Killarney Tap	648S Metiskow	899S Edgerton
E-23					648S Metiskow
E-24	749L/7L749	899S Edgerton	Briker Tap	716S Lloydminster	899S Edgerton
E-25					716S Lloydminster
E-26	9L20	755S Cordel		766S Nevis	755S Cordel
E-27					766S Nevis
E-28	9L59	801S Anderson		972S Tinchebray	801S Anderson
E-29					972S Tinchebray
E-30	912L	766S Nevis		63S Red Deer	766S Nevis
E-31					63S Red Deer
E-32	7L53+7L70	700S Bonnyville		707S St.Paul 706S Irish Creek	700S Bonnyville
E-33	9L29+9L953	755S Cordel		766S Nevis 863S Paintearth	755S Cordel
E-34	9L36+9L37	825S Whitefish Lake		826S Marguerite Lake	825S Whitefish Lake

Table E-2: Summary of Channels

Channel	Measurement	Unit
ANGL 403[KEEP#3GN 22.000]3	Machine Angle (degrees)	Keephills 3
ANGL 1487[SHEER 29 19.000]2	Machine Angle (degrees)	Sheerness 2
ANGL 1497[BAT #5 21.000]5	Machine Angle (degrees)	Battle River 5
ANGL 2248[MAHKE-G2 13.800]2	Machine Angle (degrees)	Mahkeses 2
ANGL 3301[FCG1 13.800]1	Machine Angle (degrees)	Foster Creek 1
ANGL 18302[PRIM GEN 13.800]1	Machine Angle (degrees)	Primrose
POWR 403[KEEP#3GN 22.000]3	Machine P (pu)	Keephills 3
POWR 1487[SHEER 29 19.000]2	Machine P (pu)	Sheerness 2
POWR 1497[BAT #5 21.000]5	Machine P (pu)	Battle River 5
POWR 2248[MAHKE-G2 13.800]2	Machine P (pu)	Mahkeses 2
POWR 3301[FCG1 13.800]1	Machine P (pu)	Foster Creek 1
POWR 18302[PRIM GEN 13.800]1	Machine P (pu)	Primrose
POWR 1514[NEXG1 0.6900]1	Machine P (pu)	BluEarth Hand Hills 1
POWR 2621[GHOSTPL1 0.6900]G1	Machine P (pu)	Ghost Pine G1
POWR 4220[HAYTER 9 25.000]G1	Machine P (pu)	Bull Creek G1
POWR 67308[GRIZZ_G 0.6900]1	Machine P (pu)	EON Grizzly Bear
POWR 67435[HALKIRK4 0.6900]G1	Machine P (pu)	Halkirk G1
POWR 69016[IRMAG1 0.6900]G1	Machine P (pu)	Mainstream Wainwright
VARS 403[KEEP#3GN 22.000]3	Machine Q (pu)	Keephills 3
VARS 1487[SHEER 29 19.000]2	Machine Q (pu)	Sheerness 2
VARS 1497[BAT #5 21.000]5	Machine Q (pu)	Battle River 5
VARS 2248[MAHKE-G2 13.800]2	Machine Q (pu)	Mahkeses 2
VARS 3301[FCG1 13.800]1	Machine Q (pu)	Foster Creek 1
VARS 18302[PRIM GEN 13.800]1	Machine Q (pu)	Primrose
VARS 1514[NEXG1 0.6900]1	Machine Q (pu)	BluEarth Hand Hills 1
VARS 2621[GHOSTPL1 0.6900]G1	Machine Q (pu)	Ghost Pine G1
VARS 4220[HAYTER 9 25.000]G1	Machine Q (pu)	Bull Creek G1
VARS 67308[GRIZZ_G 0.6900]1	Machine Q (pu)	EON Grizzly Bear
VARS 67435[HALKIRK4 0.6900]G1	Machine Q (pu)	Halkirk G1
VARS 69016[IRMAG1 0.6900]G1	Machine Q (pu)	Mainstream Wainwright
VOLT 403 [KEEP#3GN 22.000]	Machine Voltage (pu)	Keephills 3
VOLT 1487 [SHEER 29 19.000]	Machine Voltage (pu)	Sheerness 2
VOLT 1497 [BAT #5 21.000]	Machine Voltage (pu)	Battle River 5
VOLT 2248 [MAHKE-G2 13.800]	Machine Voltage (pu)	Mahkeses 2
VOLT 3301 [FCG1 13.800]	Machine Voltage (pu)	Foster Creek 1
VOLT 18302 [PRIM GEN 13.800]	Machine Voltage (pu)	Primrose
VOLT 1514 [NEXG1 0.6900]	Machine Voltage (pu)	BluEarth Hand Hills 1
VOLT 2621 [GHOSTPL1 0.6900]	Machine Voltage (pu)	Ghost Pine G1
VOLT 4220 [HAYTER 9 25.000]	Machine Voltage (pu)	Bull Creek G1

VOLT 67308 [GRIZZ_G 0.6900]	Machine Voltage (pu)	EON Grizzly Bear
VOLT 67435 [HALKIRK4 0.6900]	Machine Voltage (pu)	Halkirk G1
VOLT 69016 [IRMAG1 0.6900]	Machine Voltage (pu)	Mainstream Wainwright
POWR 152 TO 1422 CKT '12'	Branch Active Power (MW)	912L (63S Red Deer to 766S Nevis)
POWR 1377 TO 1383 CKT '17'	Branch Active Power (MW)	7L117 (706S Irish Creek to 710S Vermilion)
POWR 1383 TO 9001 CKT '65'	Branch Active Power (MW)	7L65 (710S Vermilion to Grizzly Bear Tap)
POWR 1422 TO 1499 CKT '20'	Branch Active Power (MW)	9L20 (766S Nevis to 755S Cordel)
VARS 152 TO 1422 CKT '12'	Branch Reactive Power (MVar)	912L (63S Red Deer to 766S Nevis)
VARS 1377 TO 1383 CKT '17'	Branch Reactive Power (MVar)	7L117 (706S Irish Creek to 710S Vermilion)
VARS 1383 TO 9001 CKT '65'	Branch Reactive Power (MVar)	7L65 (710S Vermilion to Grizzly Bear Tap)
VARS 1422 TO 1499 CKT '20'	Branch Reactive Power (MVar)	9L20 (766S Nevis to 755S Cordel)



FIGURE E-1B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

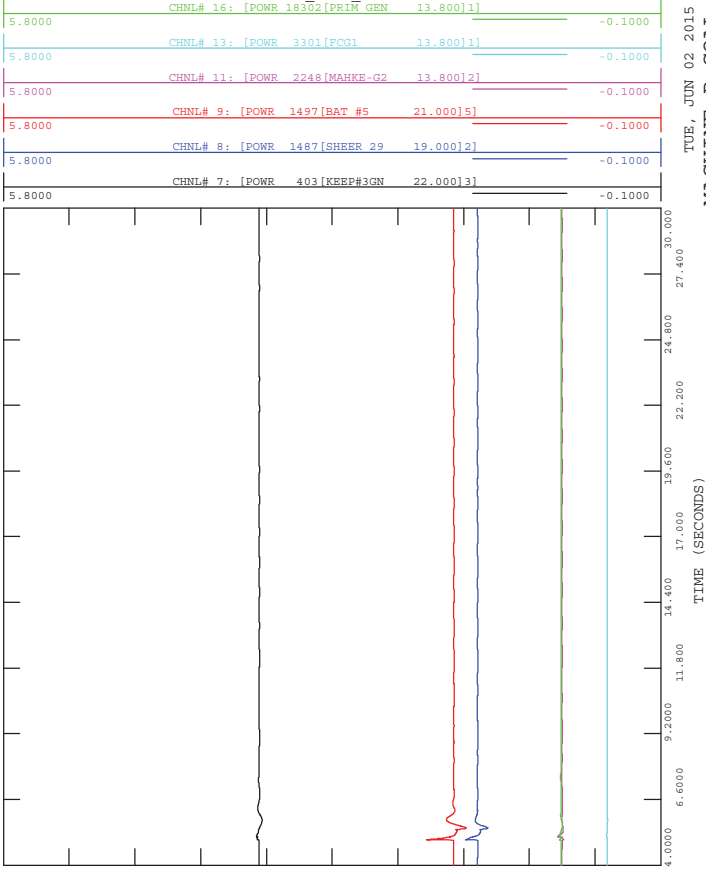


FIGURE E-1D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

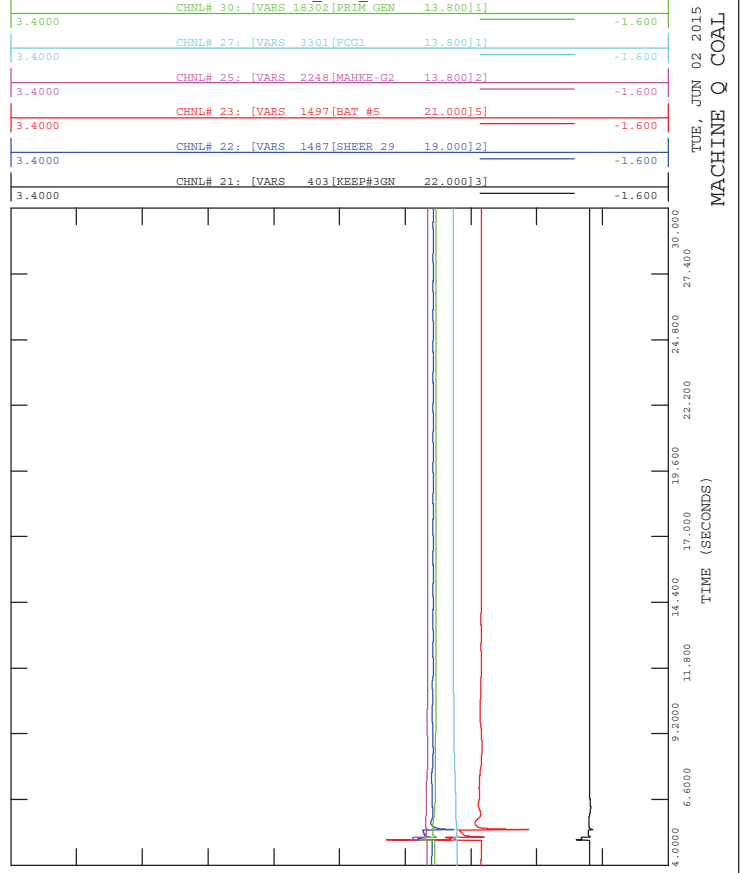


FIGURE E-1A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

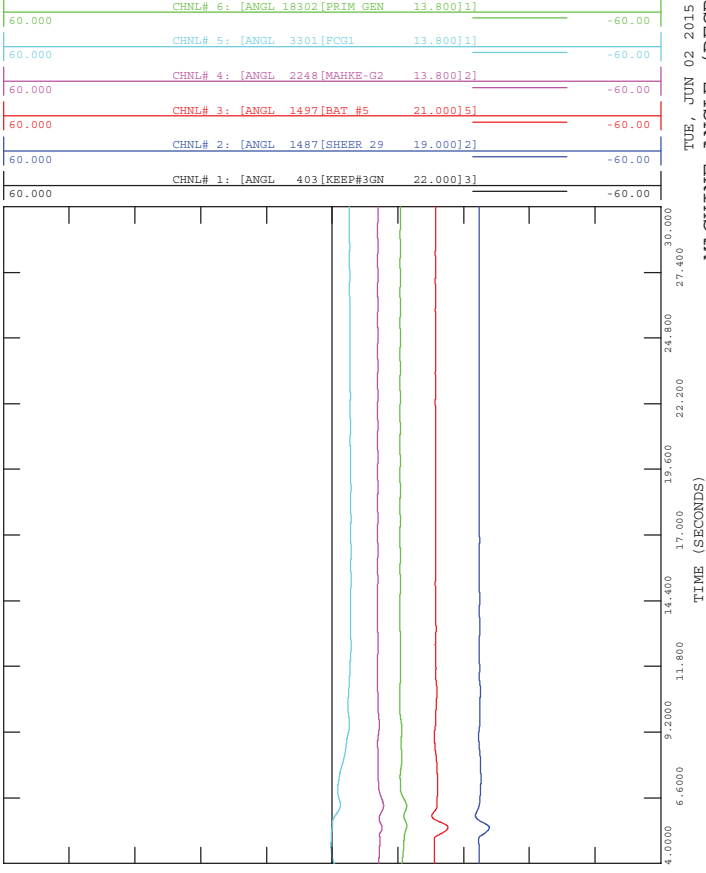


FIGURE E-1C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out

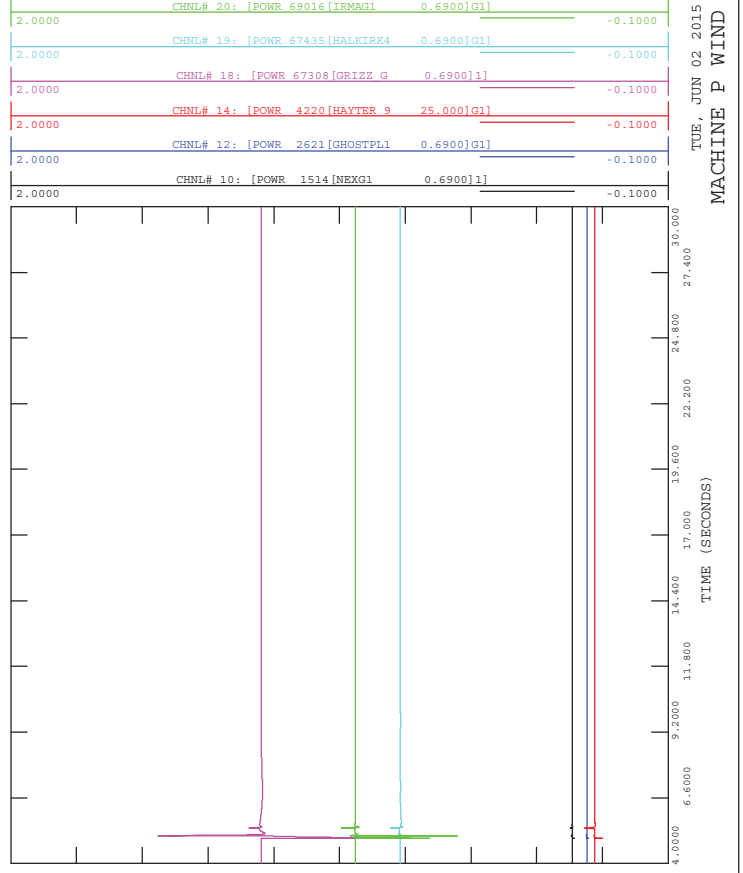
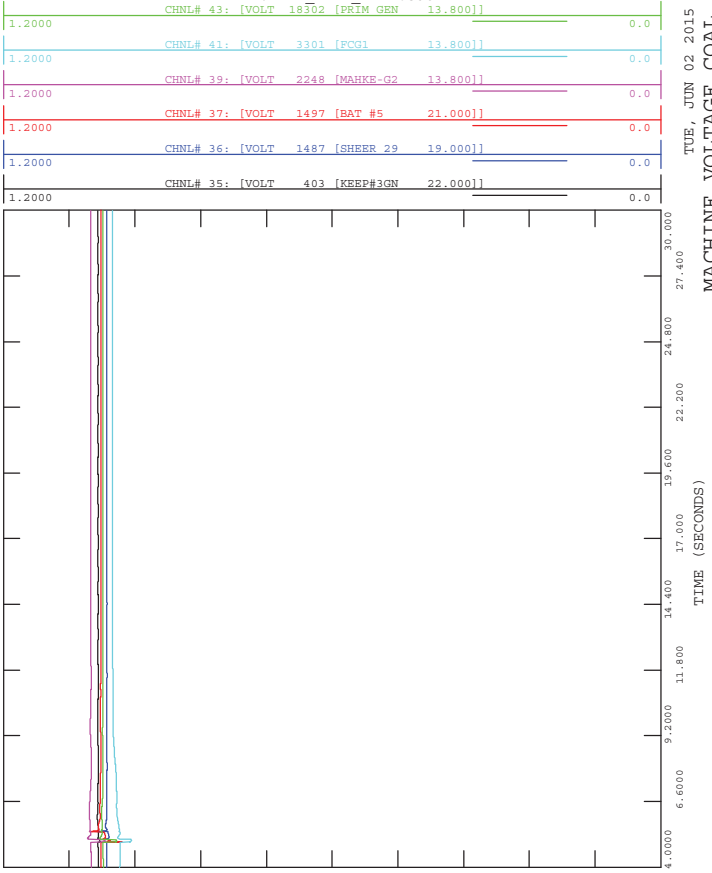




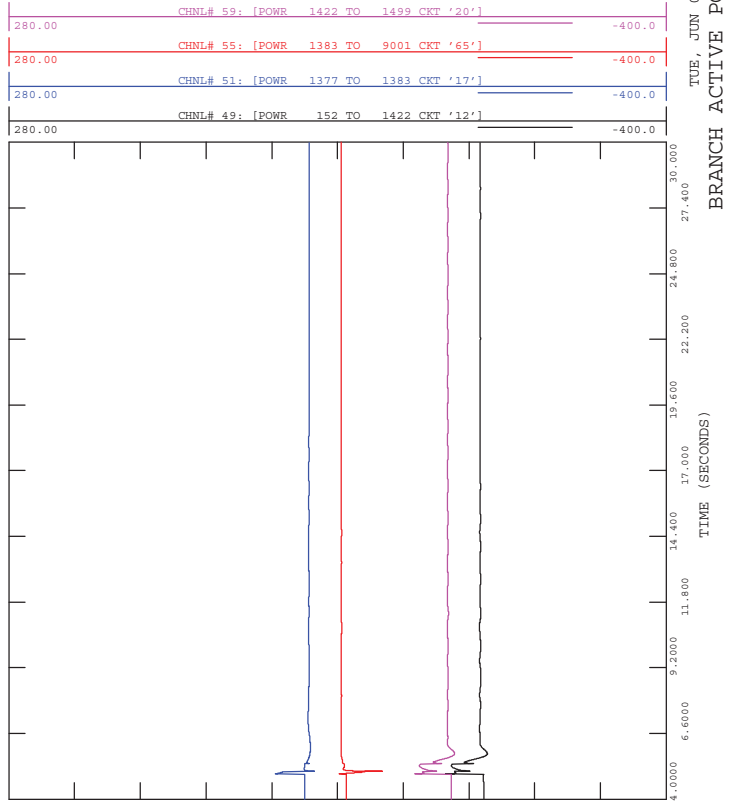
FIGURE E-1F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out



TUE, JUN 02 2015 18:09
MACHINE VOLTAGE COAL (PU)



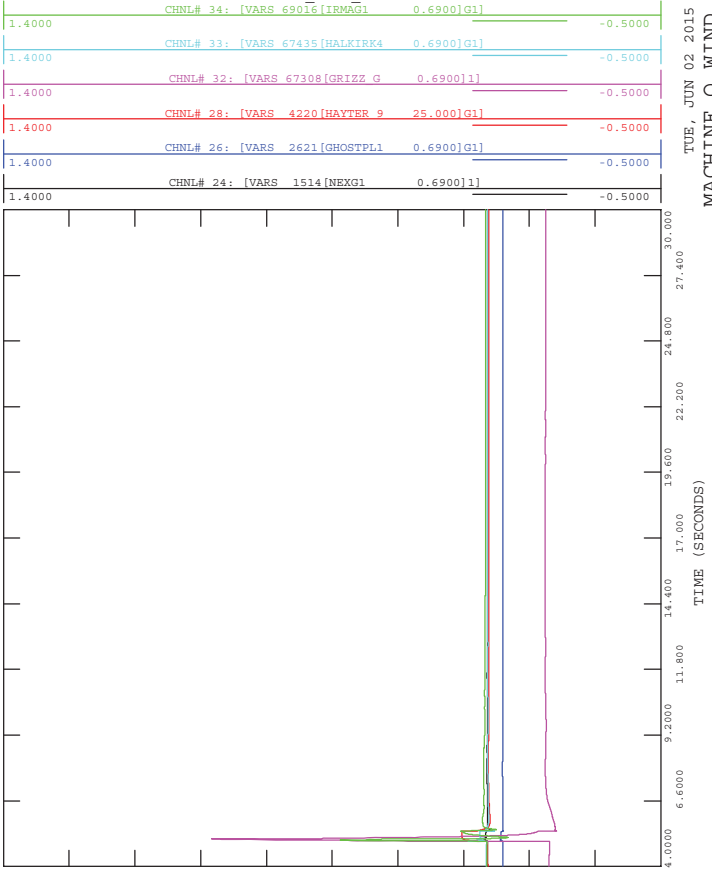
FIGURE E-1H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out



TUE, JUN 02 2015 18:09
BRANCH ACTIVE POWER (MW)



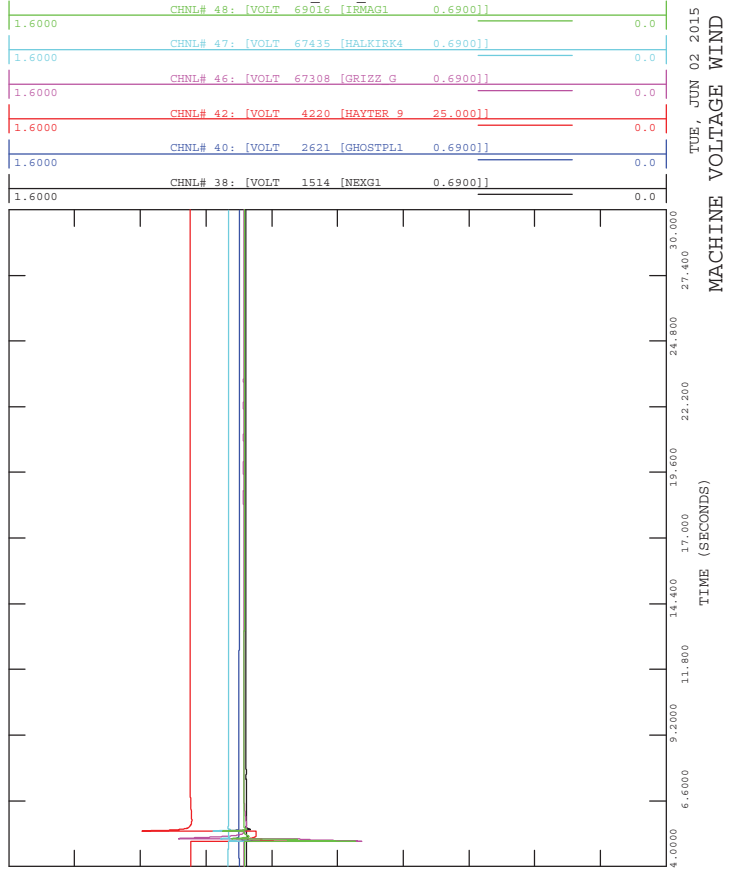
FIGURE E-1E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out



TUE, JUN 02 2015 18:09
MACHINE Q WIND (PU)



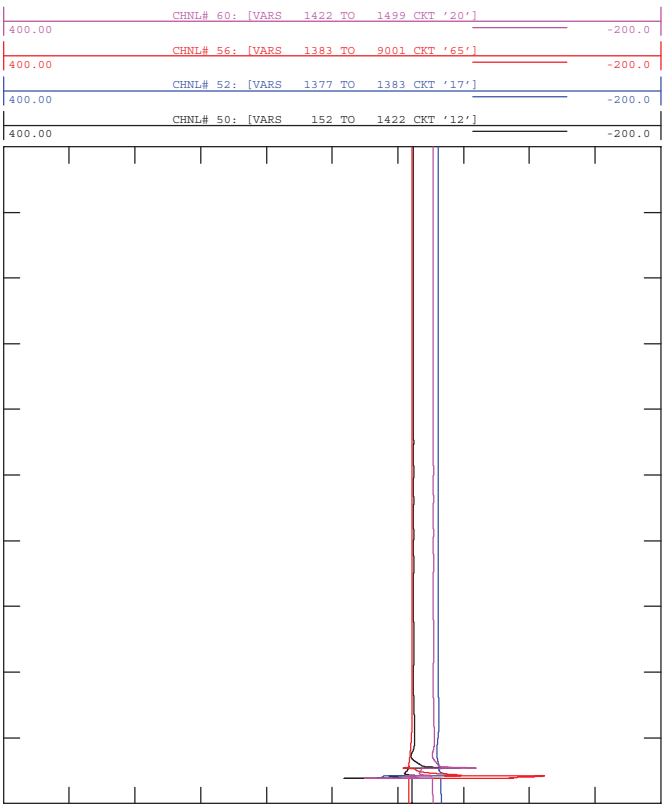
FIGURE E-1G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out



TUE, JUN 02 2015 18:09
MACHINE VOLTAGE WIND (PU)



FIGURE E-11
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-1_7L42_Hill.out



TUE, JUN 02 2015 18:09
BRANCH REACTIVE PWR (MVR)

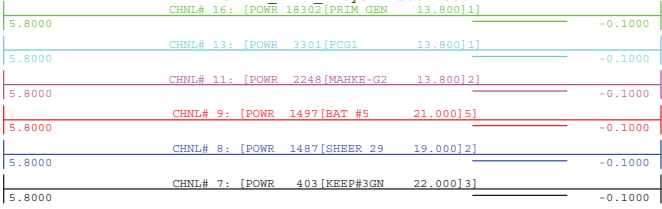


FIGURE E-2B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-2_7L42_Lloydminster.out

CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:09
MACHINE P COAL (PU)

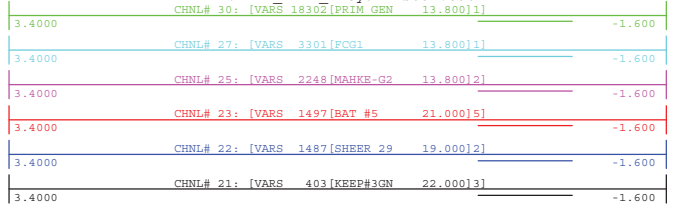


FIGURE E-2D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-2_7L42_Lloydminster.out

CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:09
MACHINE Q COAL (PU)

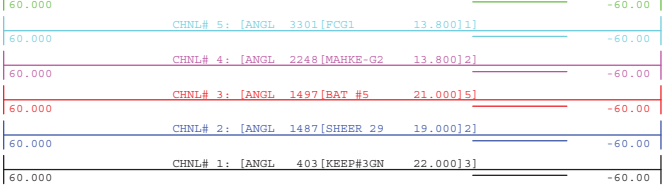


FIGURE E-2A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-2_7L42_Lloydminster.out

CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:09
MACHINE ANGLE (DEGREES)

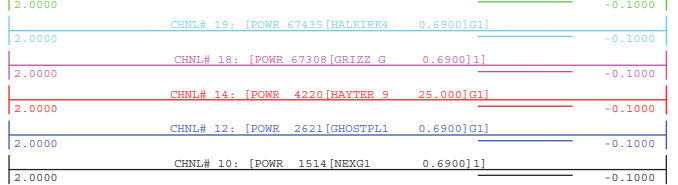


FIGURE E-2C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-2_7L42_Lloydminster.out

CHNL# 20: [POWR 63016[IRWAG1 0.6900]G1]



TUE, JUN 02 2015 18:09
MACHINE P WIND (PU)



FIGURE E-2F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-2_7L42_Lloydminster.out

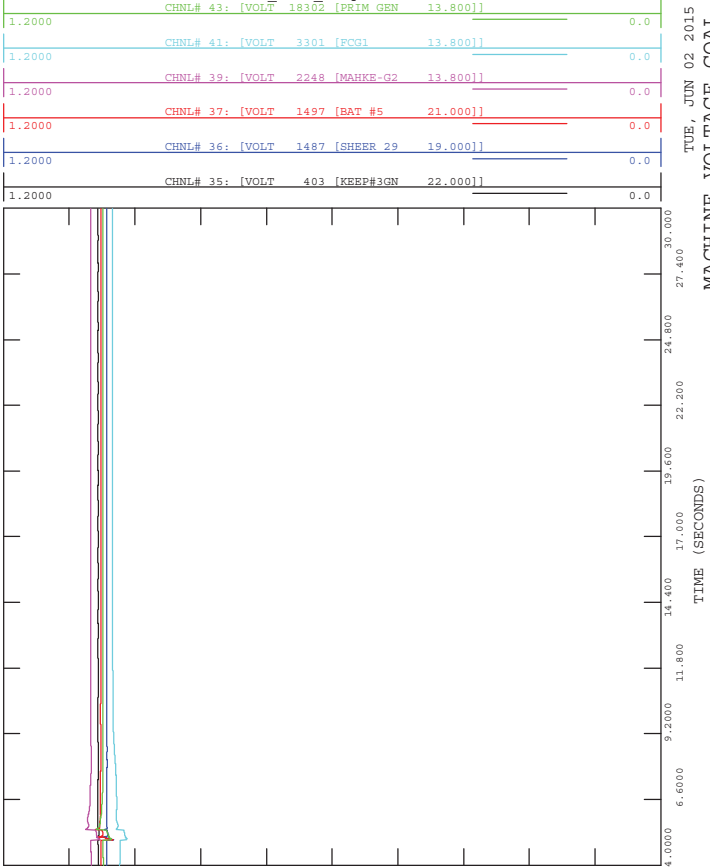


FIGURE E-2H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-2_7L42_Lloydminster.out

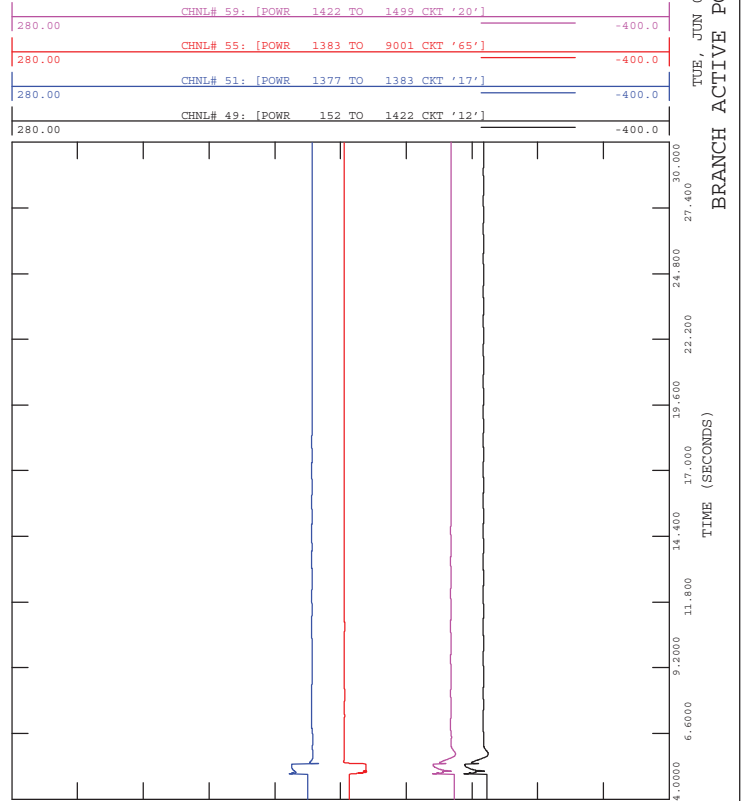


FIGURE E-2E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-2_7L42_Lloydminster.out

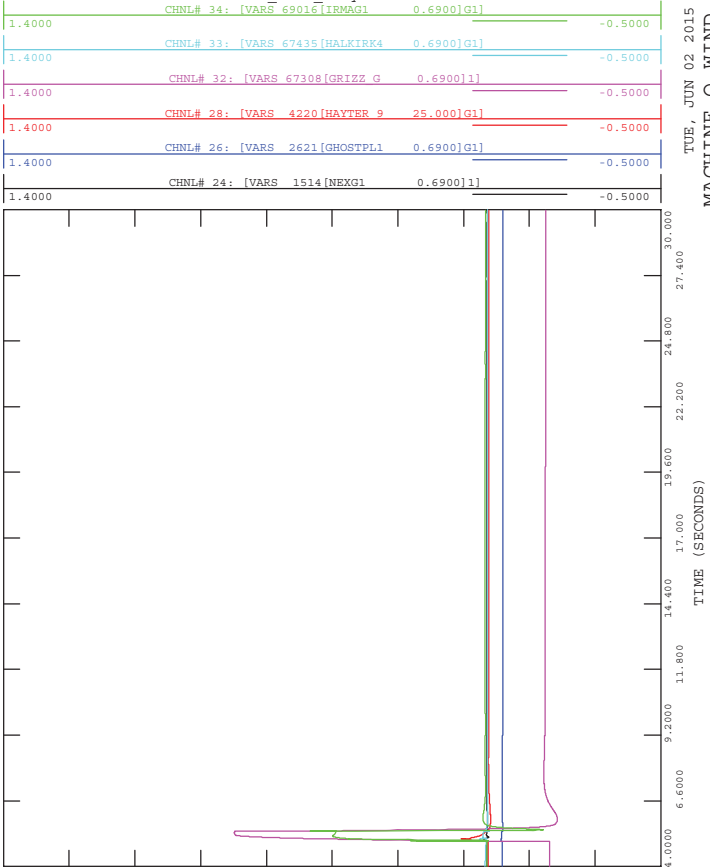


FIGURE E-2G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-2_7L42_Lloydminster.out

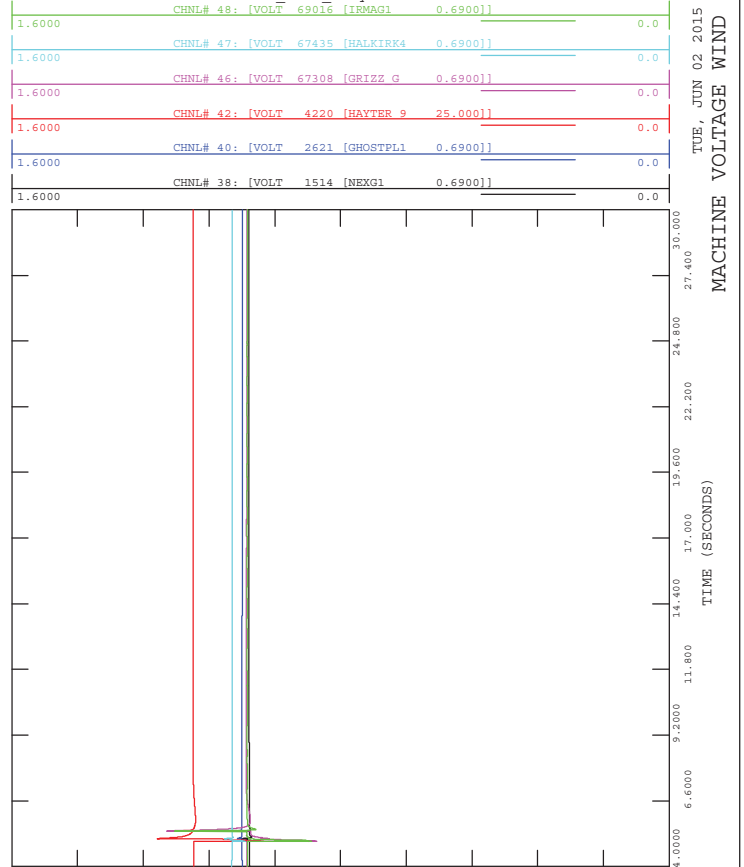




FIGURE E-2I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-2_7L42_Lloydminster.out

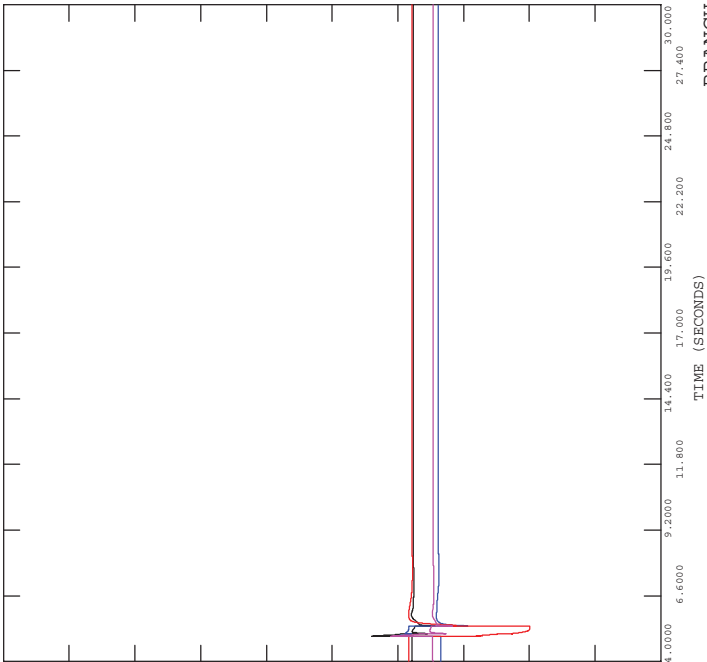
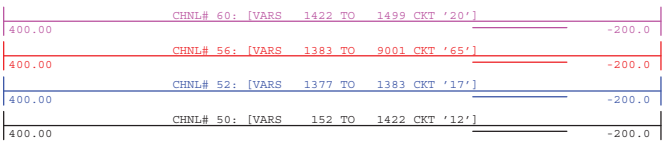




FIGURE E-3B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

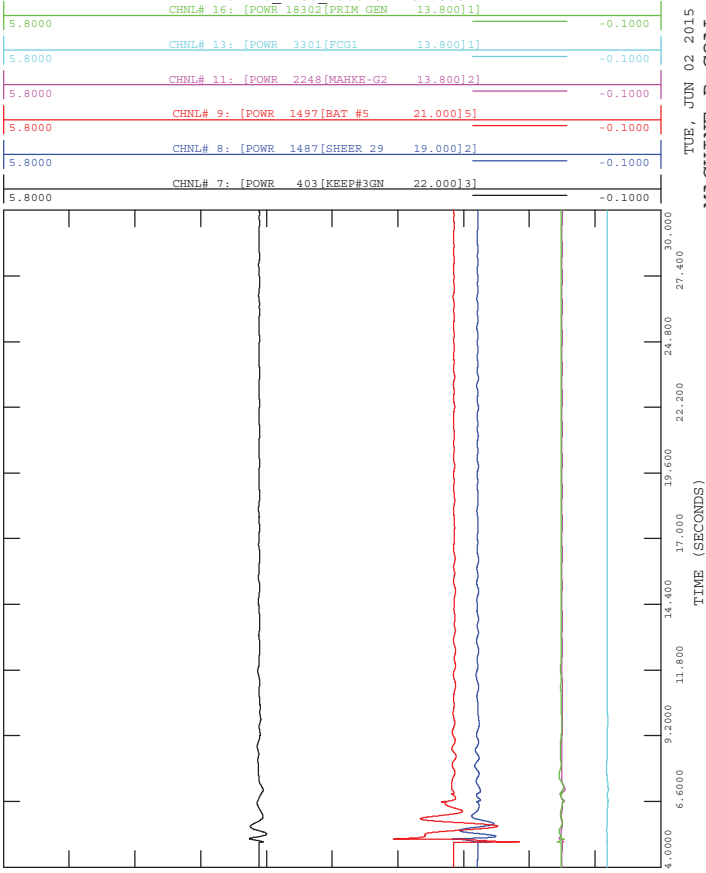


FIGURE E-3D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

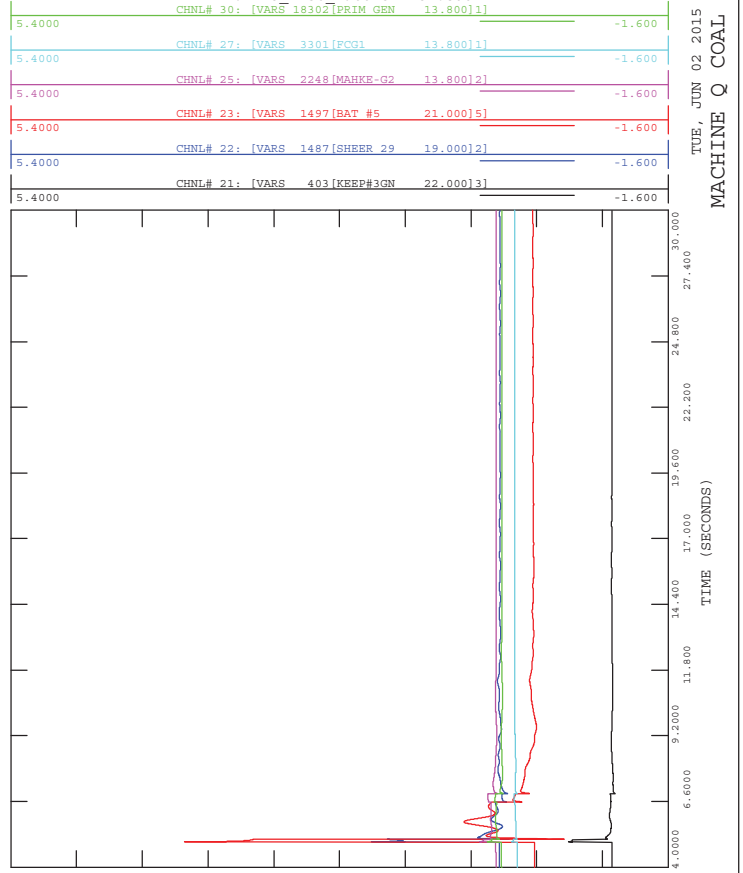


FIGURE E-3A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

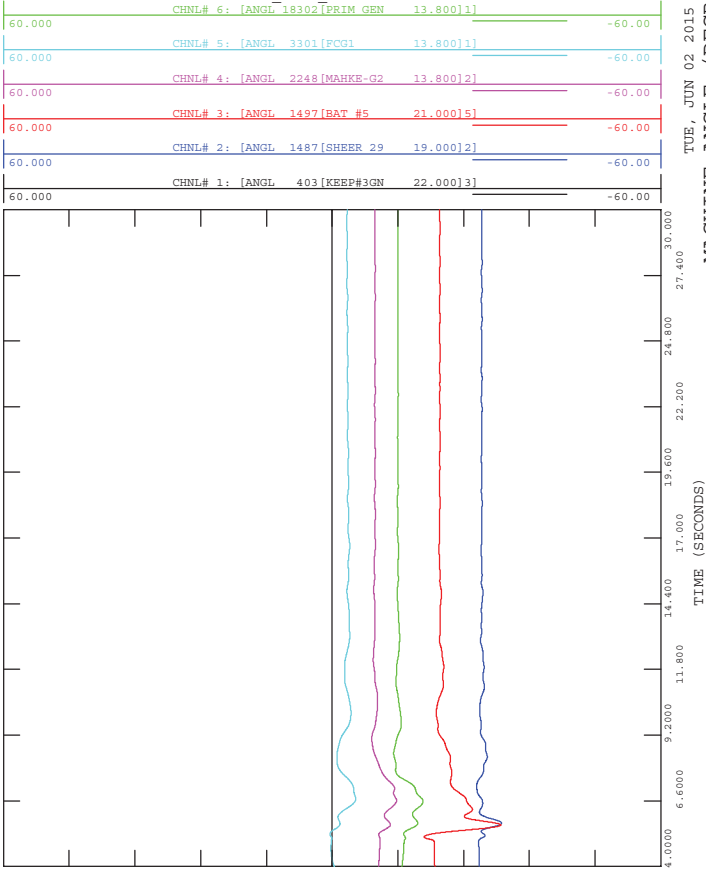


FIGURE E-3C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out

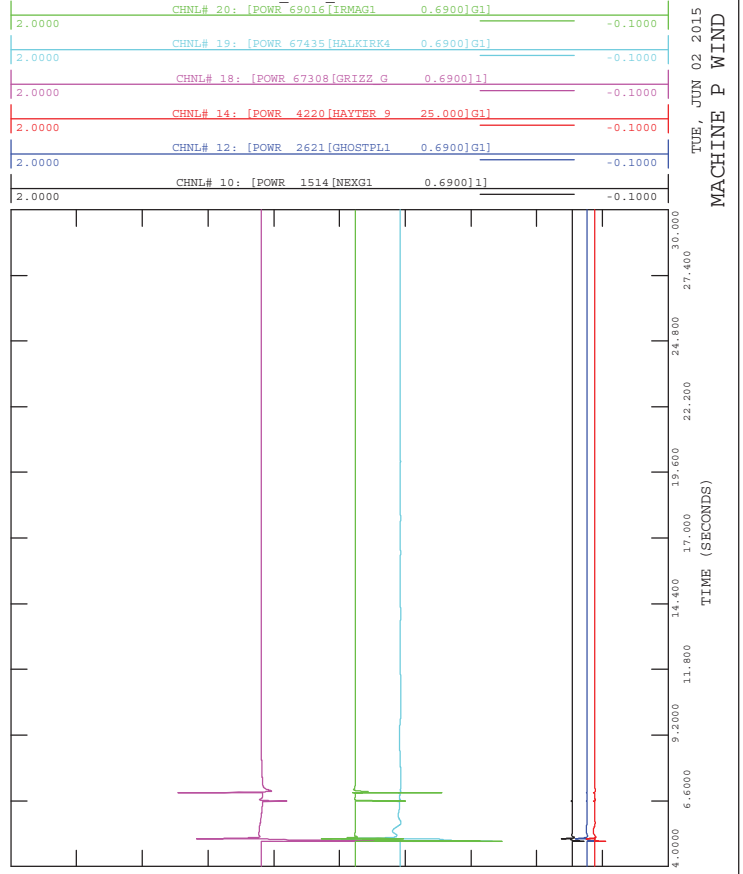
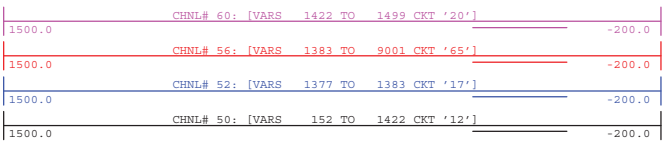




FIGURE E-3I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: E-3_7L50_BattleRiver.out



TUE, JUN 02 2015 18:10
BRANCH REACTIVE PWR (MVR)

TIME (SECONDS)

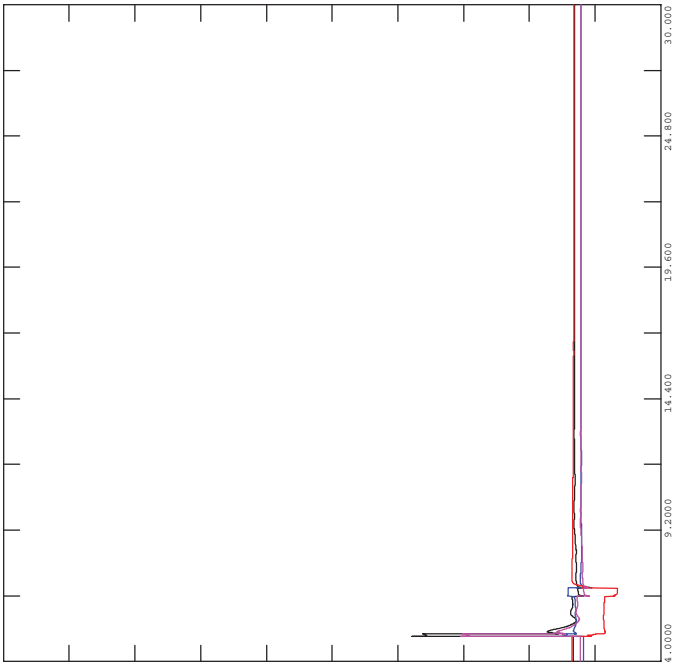
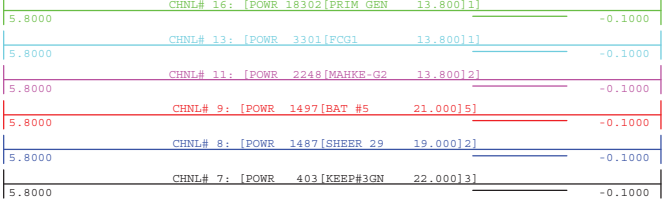




FIGURE E-4B

2017SL, ALT3, BOTH WAGFS PROCEED
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
CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



18:10
TUE, JUN 02 2015
MACHINE P COAL (PU)

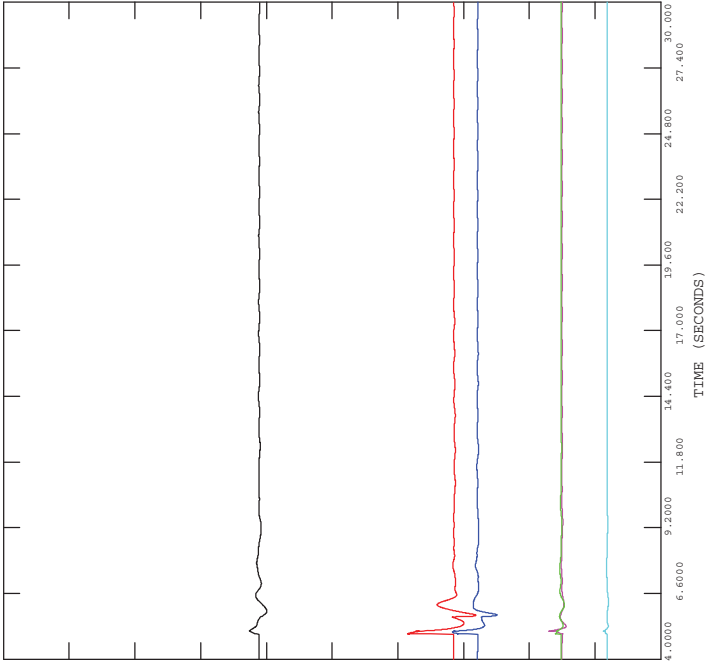
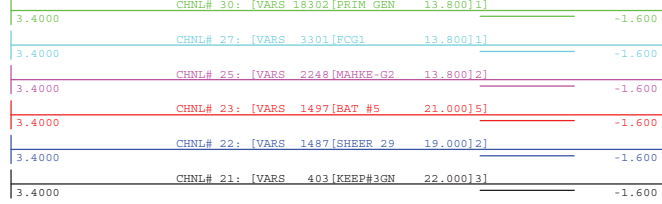


FIGURE E-4D

2017SL, ALT3, BOTH WAGFS PROCEED
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
CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



18:10
TUE, JUN 02 2015
MACHINE Q COAL (PU)

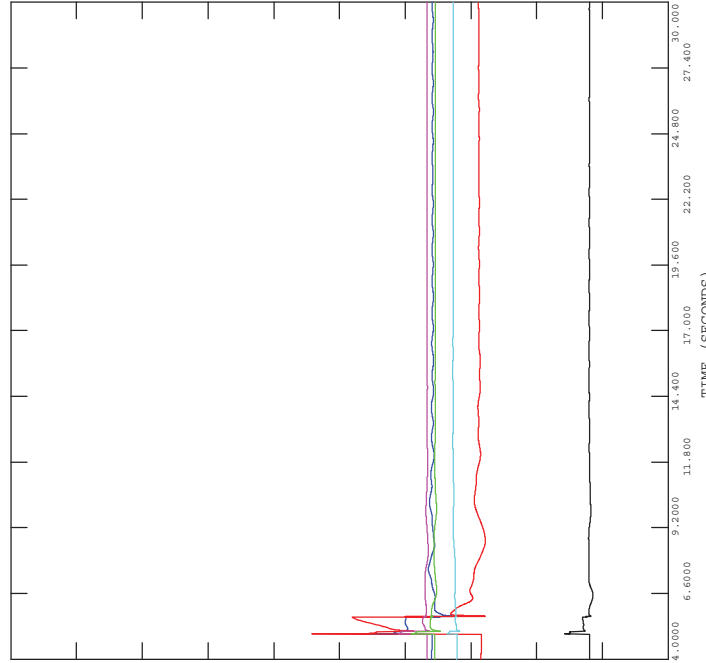
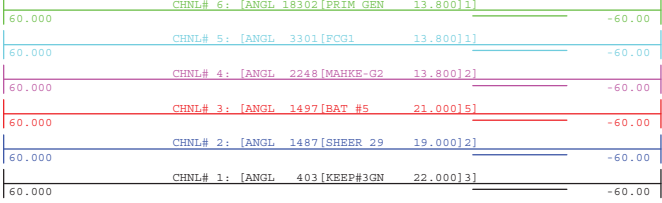


FIGURE E-4A

2017SL, ALT3, BOTH WAGFS PROCEED
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
CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



18:10
TUE, JUN 02 2015
MACHINE ANGLE (DEGREES)

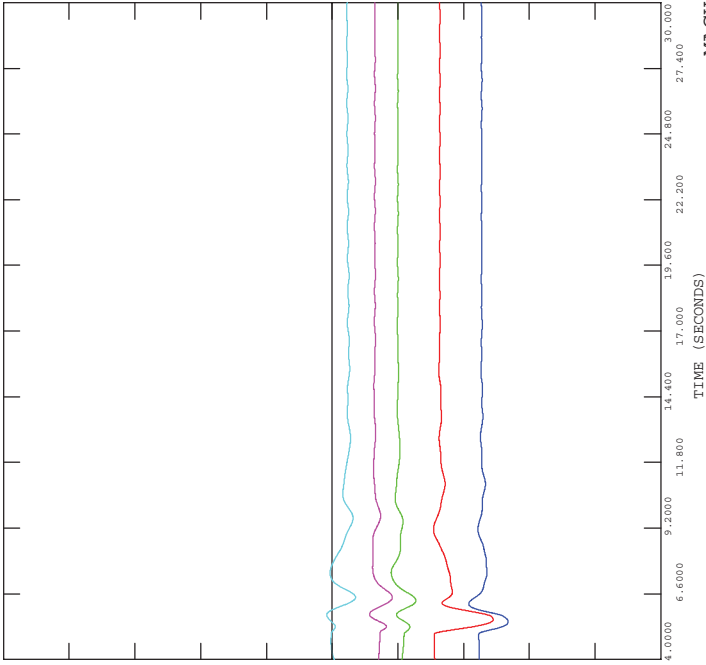
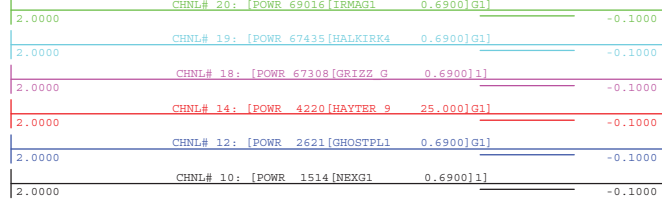


FIGURE E-4C

2017SL, ALT3, BOTH WAGFS PROCEED
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
CHNL# 20: [POWR 69016[IRMAG1 0.6900]G1]



18:10
TUE, JUN 02 2015
MACHINE P WIND (PU)

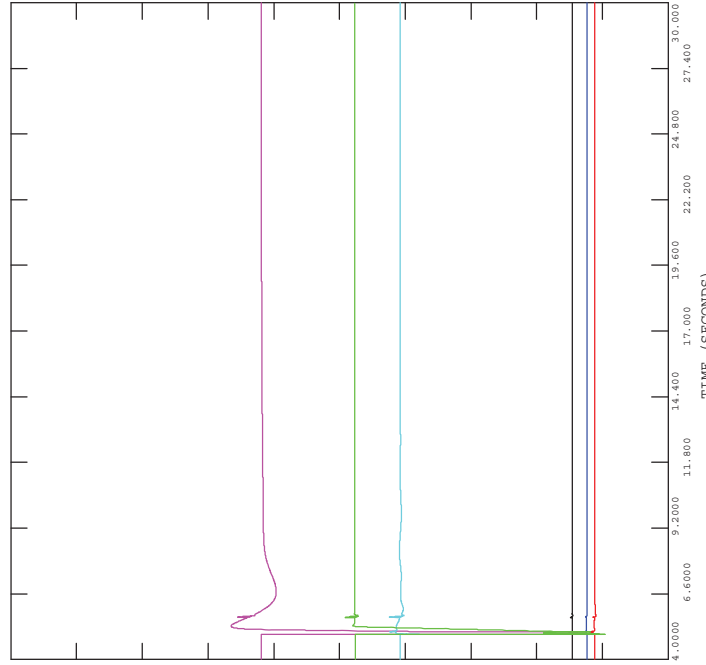




FIGURE E-4F

2017SL, ALT3, BOTH WAGFS PROCEED
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

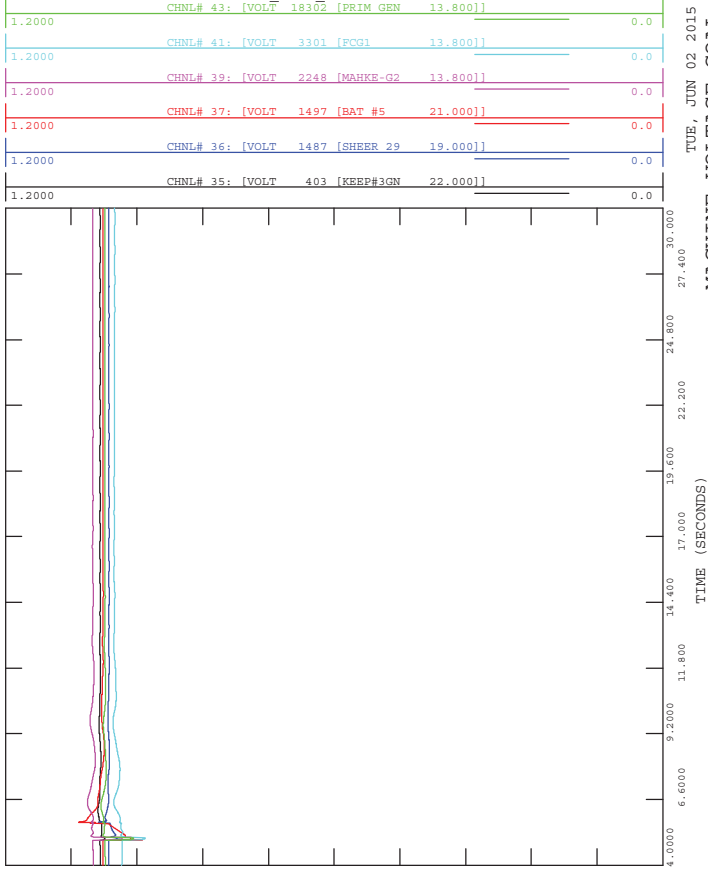


FIGURE E-4H

2017SL, ALT3, BOTH WAGFS PROCEED
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

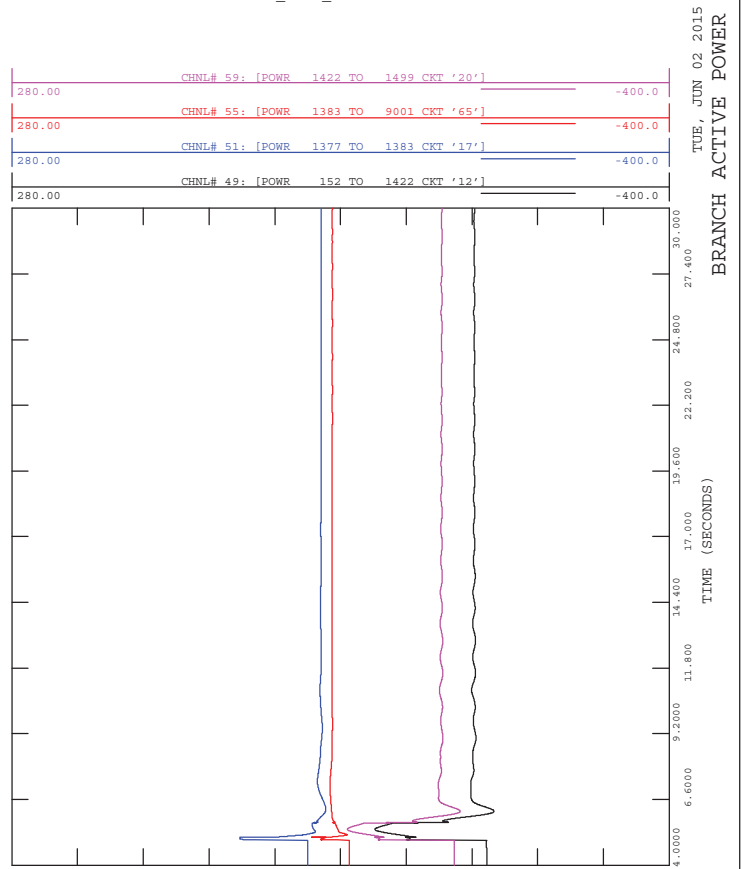


FIGURE E-4E

2017SL, ALT3, BOTH WAGFS PROCEED
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

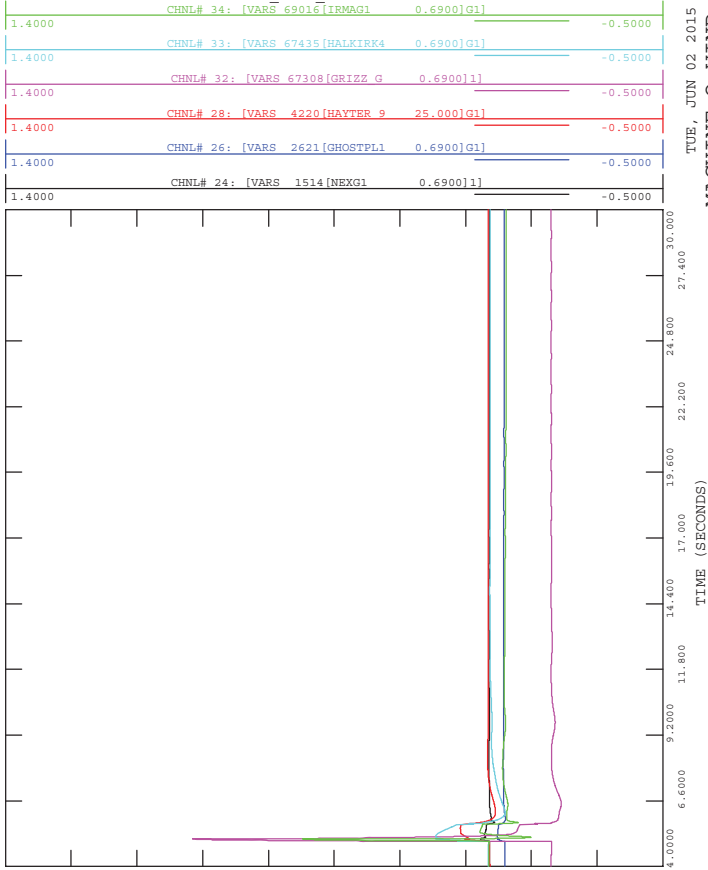


FIGURE E-4G

2017SL, ALT3, BOTH WAGFS PROCEED
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

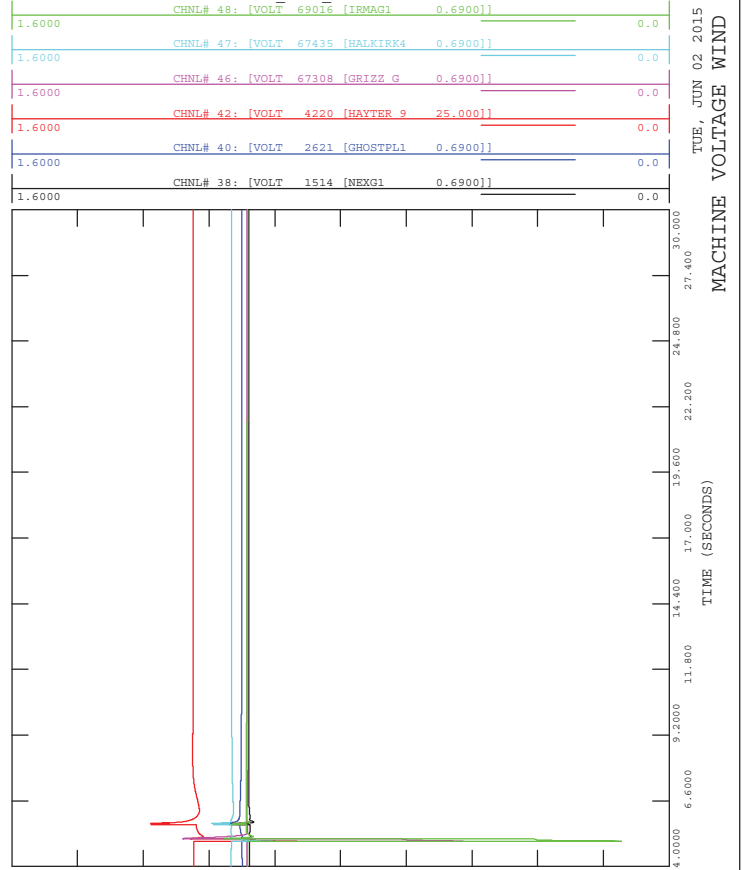
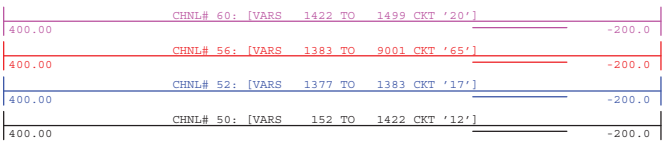




FIGURE E-4I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: E-4_7L50_BuffaloCreek.out



TUE, JUN 02 2015 18:10
BRANCH REACTIVE PWR (MVR)

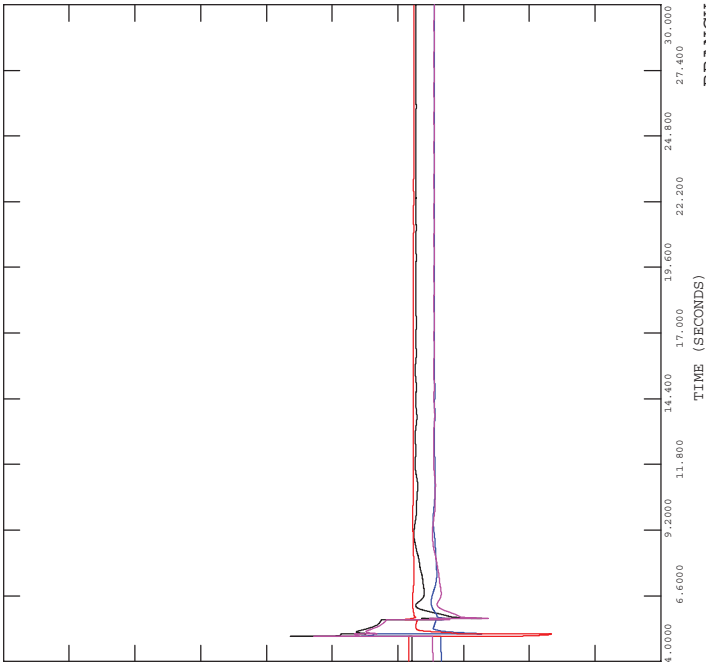




FIGURE E-5B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5 7L53 Bonnyville.out

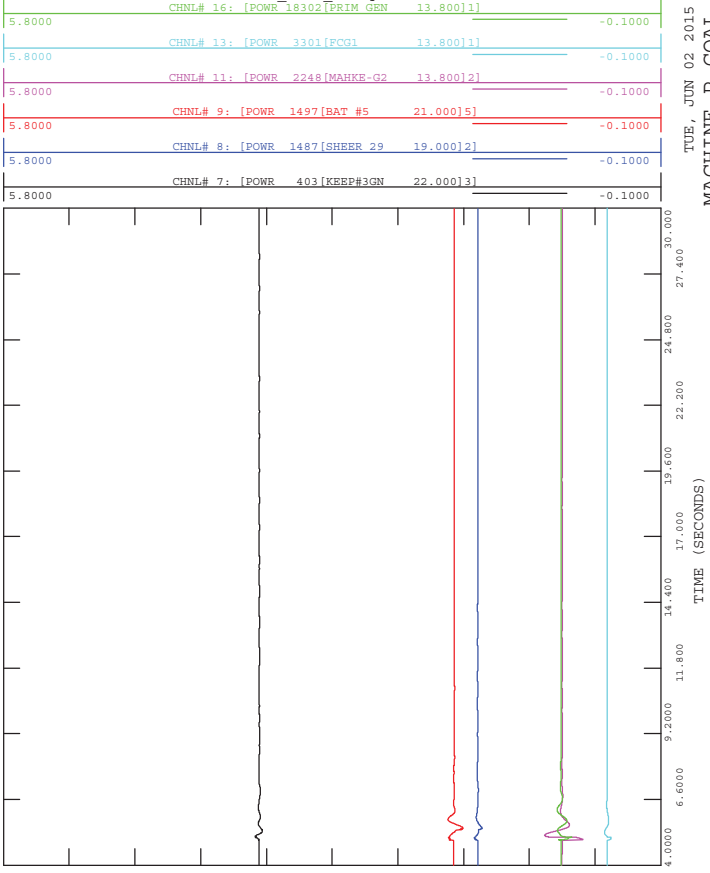


FIGURE E-5D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5 7L53 Bonnyville.out

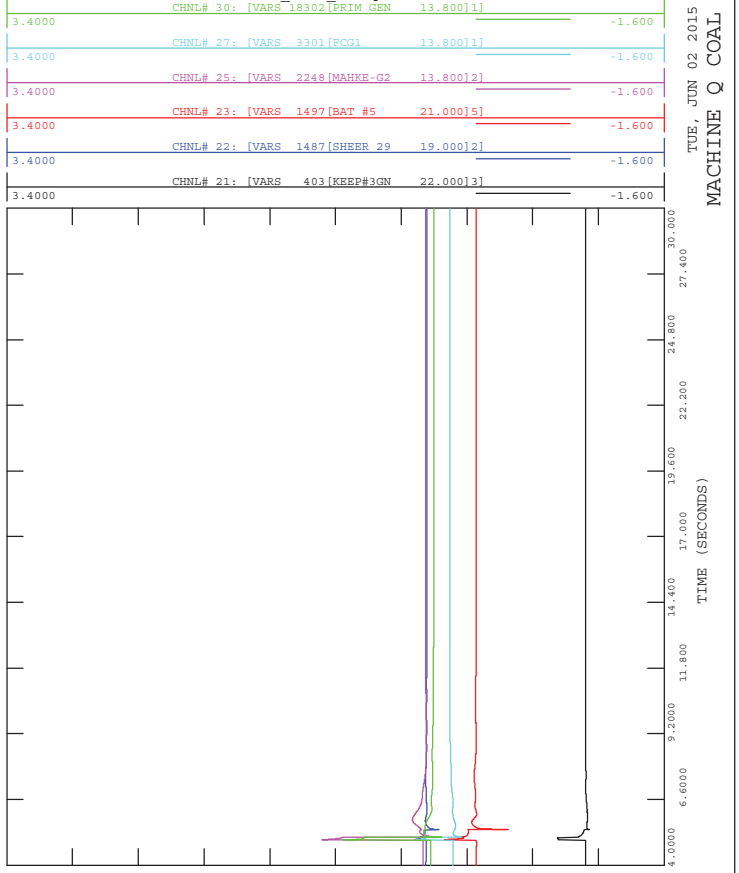


FIGURE E-5A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5 7L53 Bonnyville.out

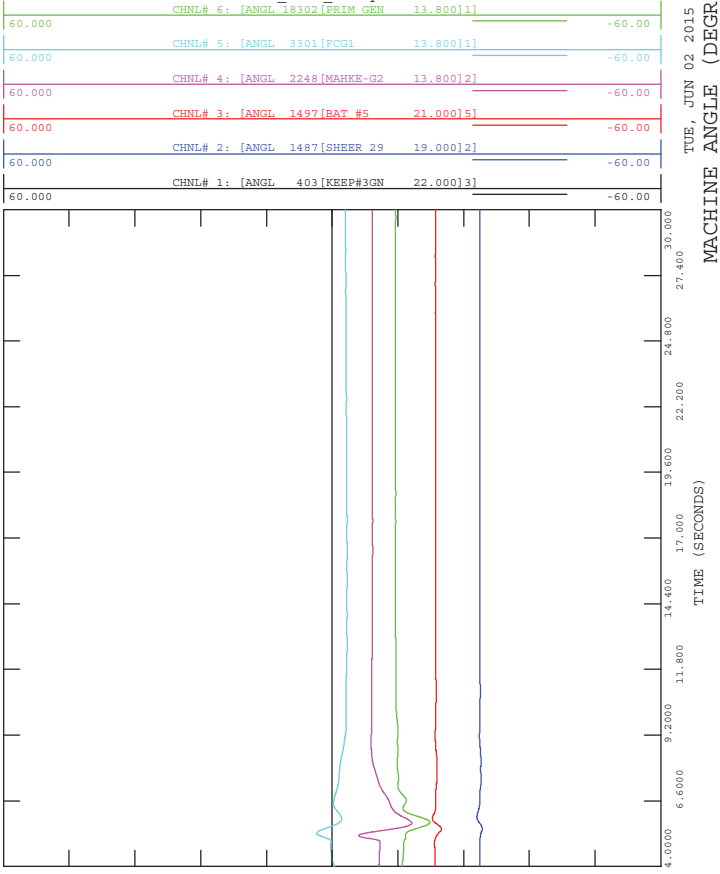


FIGURE E-5C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5 7L53 Bonnyville.out

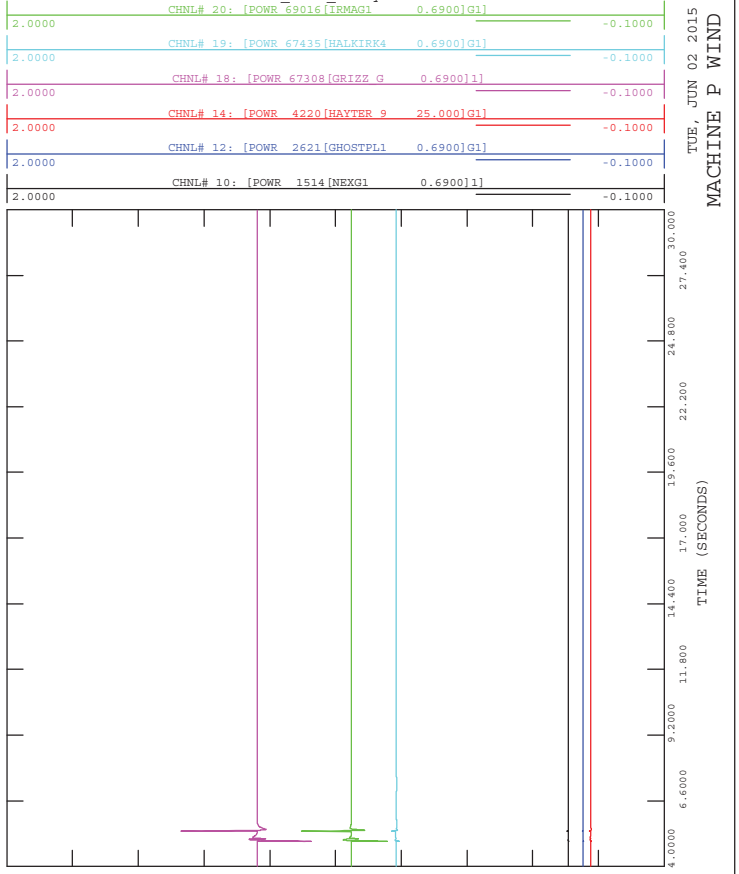




FIGURE E-5F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

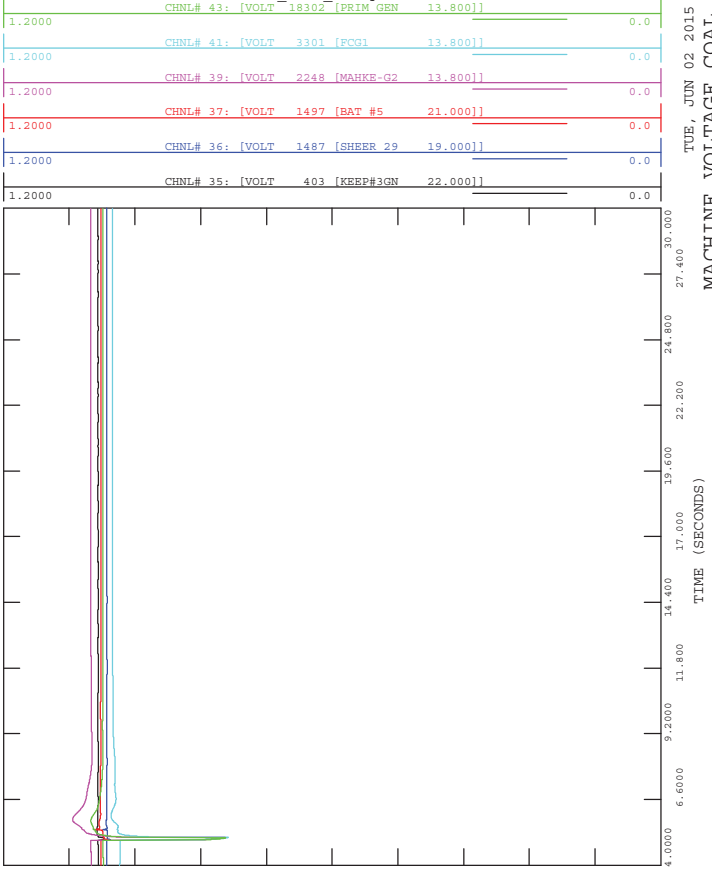


FIGURE E-5H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

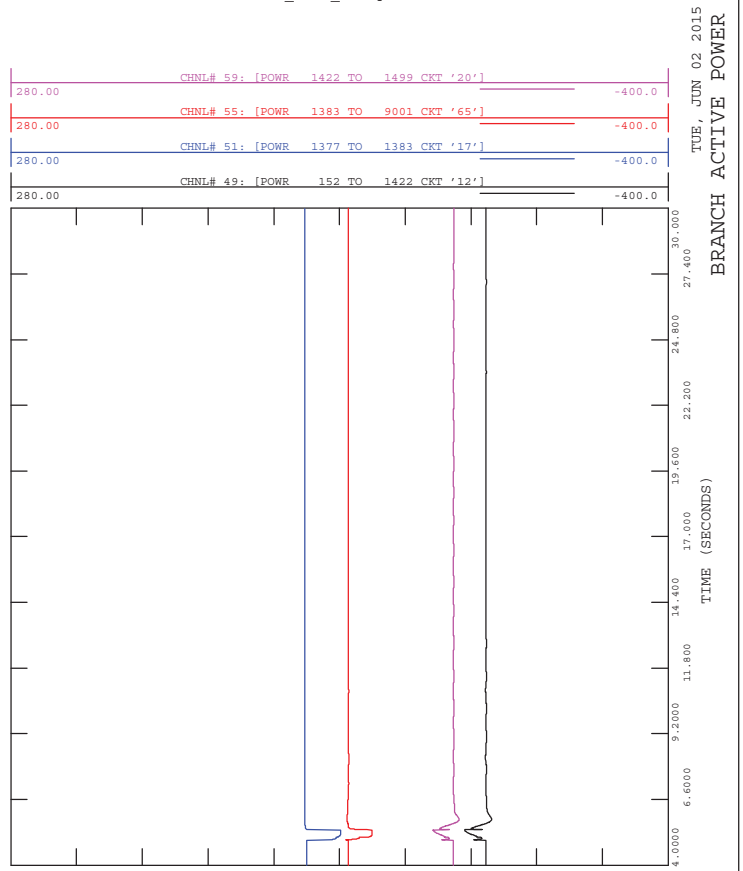


FIGURE E-5E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

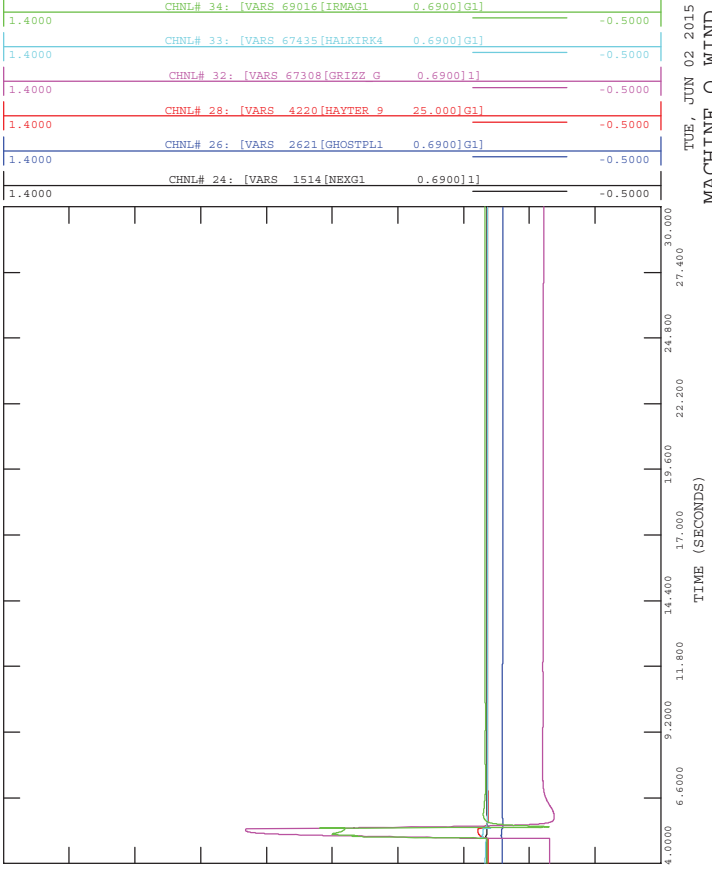


FIGURE E-5G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

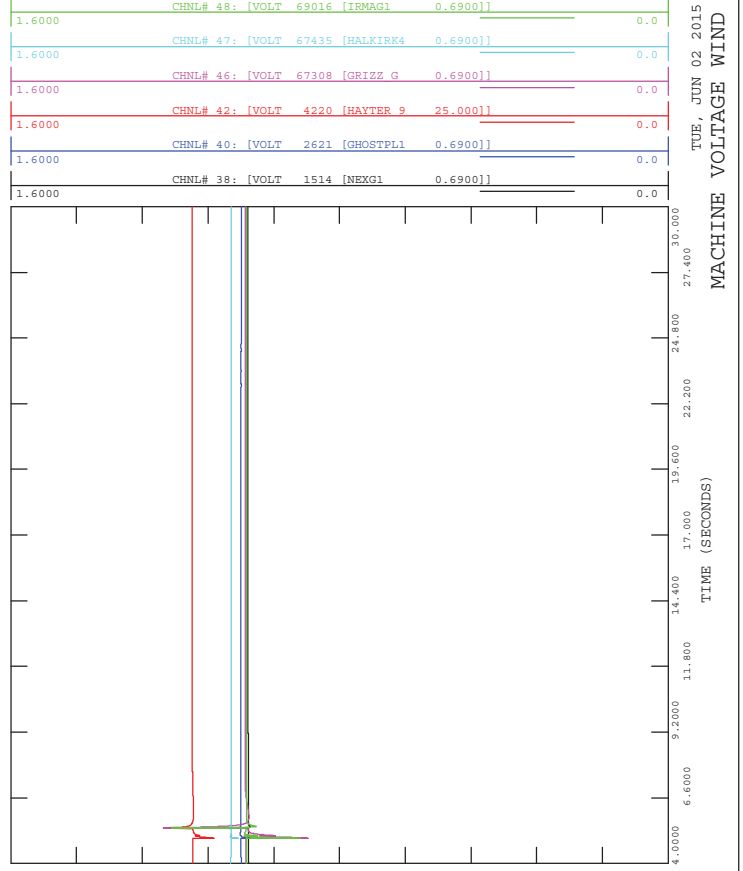




FIGURE E-5I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-5_7L53_Bonnyville.out

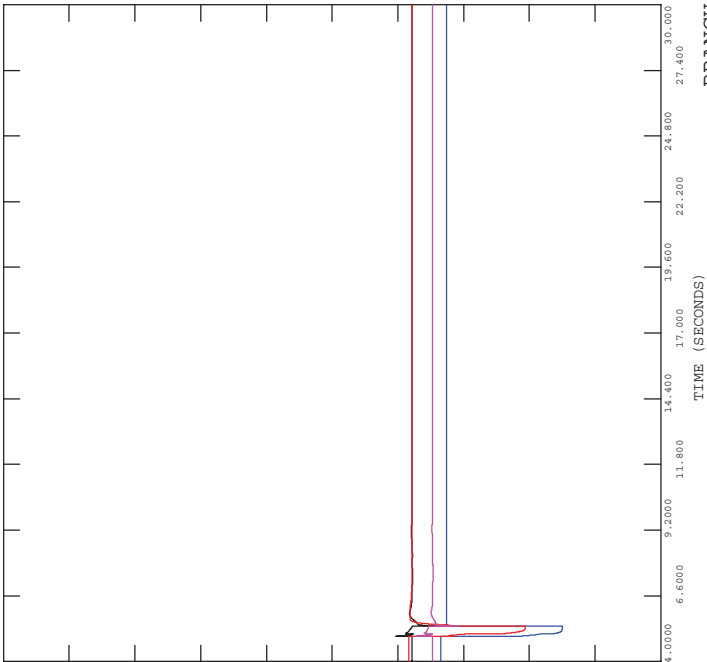
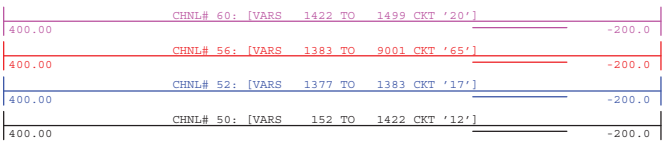




FIGURE E-6B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6 7L53 IrishCreek.out

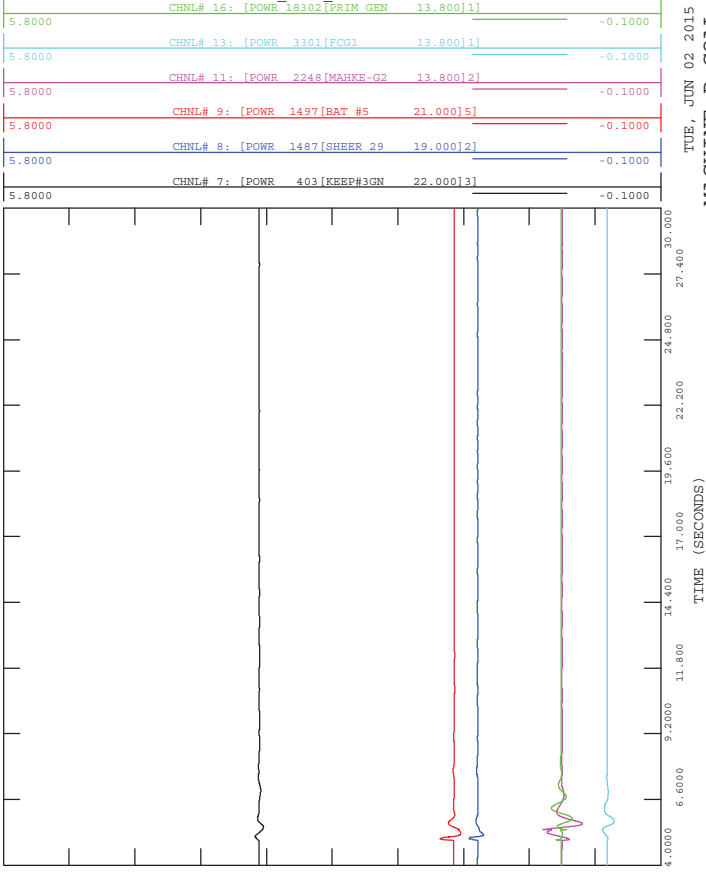


FIGURE E-6D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6 7L53 IrishCreek.out

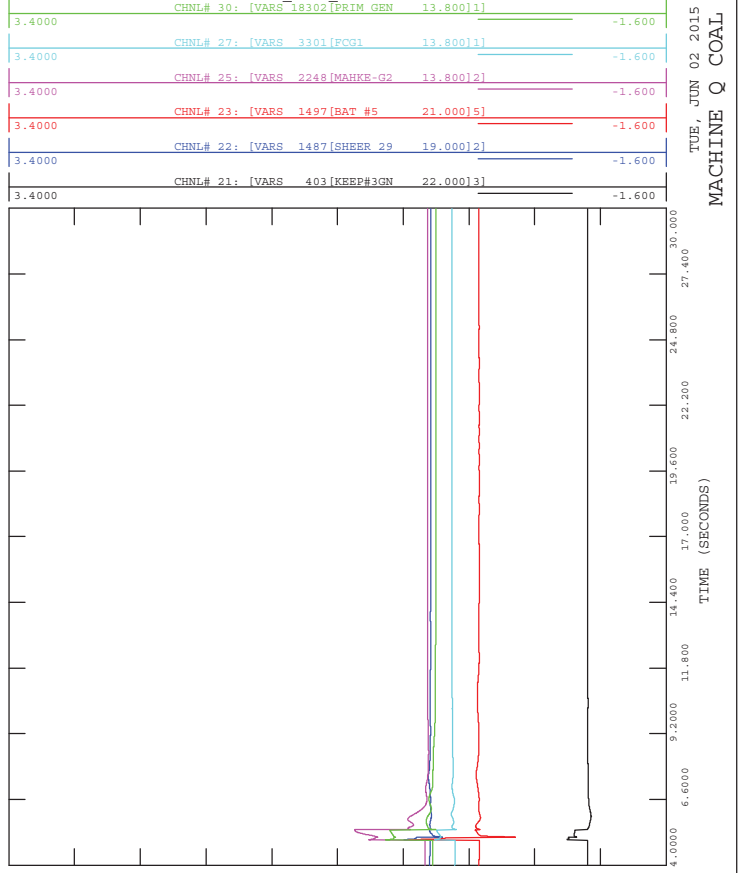


FIGURE E-6A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6 7L53 IrishCreek.out

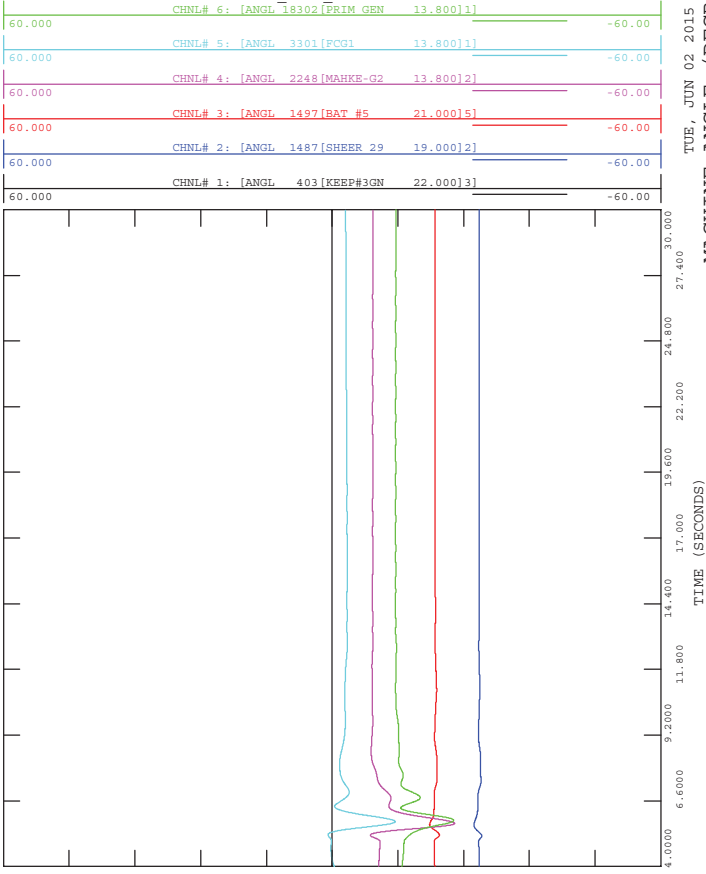


FIGURE E-6C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6 7L53 IrishCreek.out

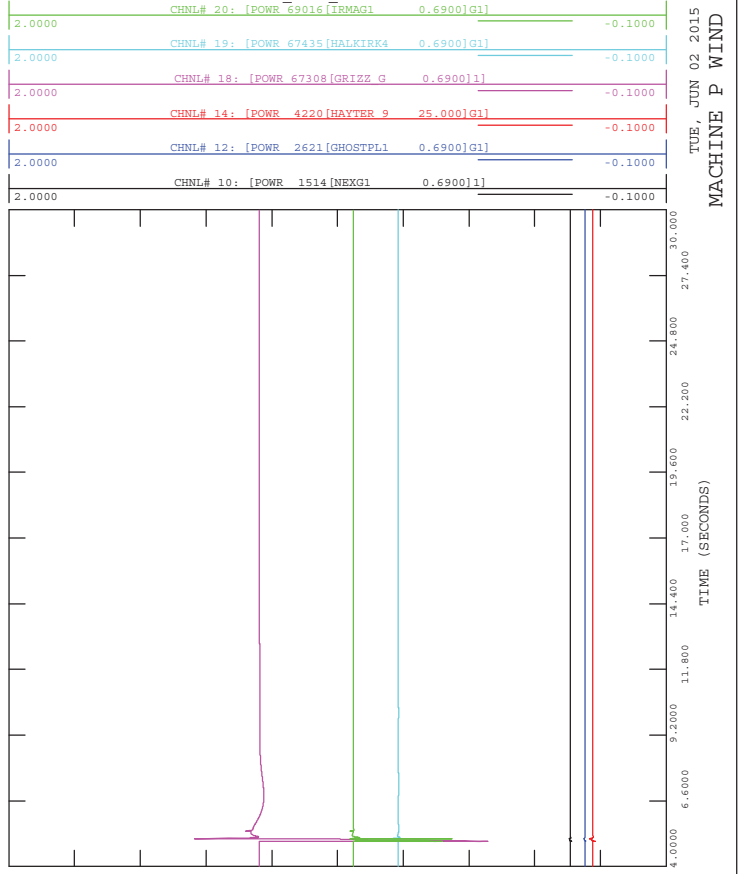
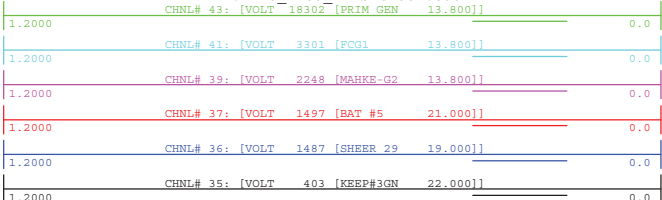




FIGURE E-6F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-6_7L53_IrishCreek.out



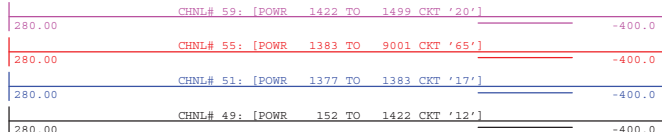
18:10
TUE, JUN 02 2015
MACHINE VOLTAGE COAL (PU)

TIME (SECONDS)



FIGURE E-6H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-6_7L53_IrishCreek.out



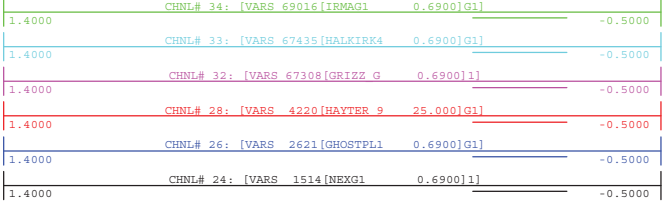
18:10
TUE, JUN 02 2015
BRANCH ACTIVE POWER (MW)

TIME (SECONDS)



FIGURE E-6E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-6_7L53_IrishCreek.out



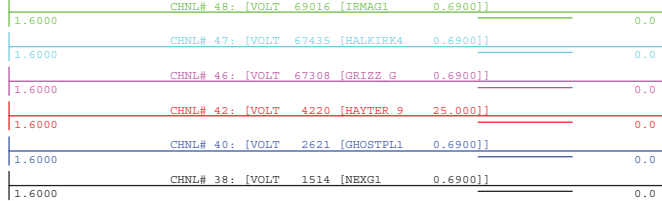
18:10
TUE, JUN 02 2015
MACHINE Q WIND (PU)

TIME (SECONDS)



FIGURE E-6G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-6_7L53_IrishCreek.out



18:10
TUE, JUN 02 2015
MACHINE VOLTAGE WIND (PU)

TIME (SECONDS)



FIGURE E-6I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-6_7L53_IrishCreek.out

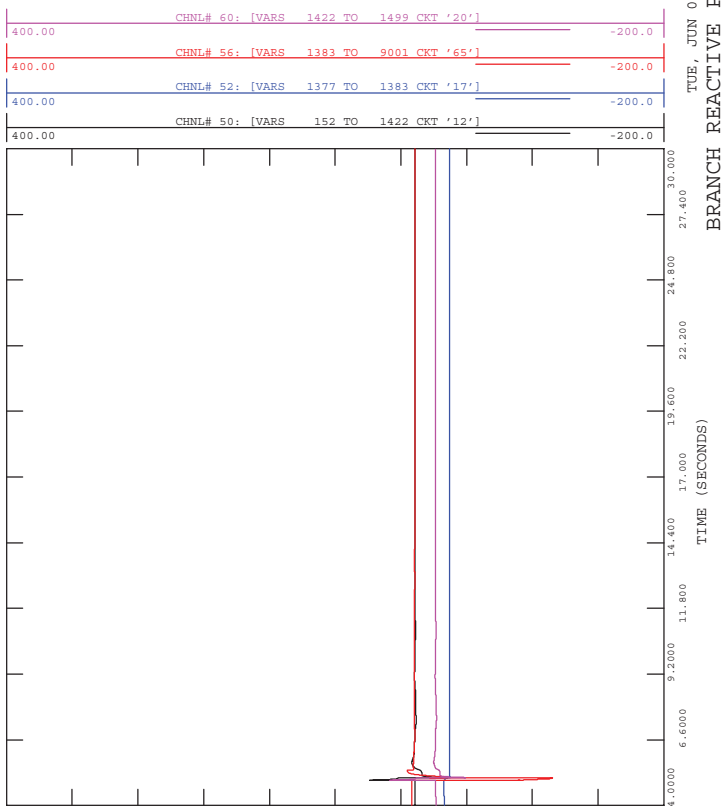




FIGURE E-7B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vincent.out

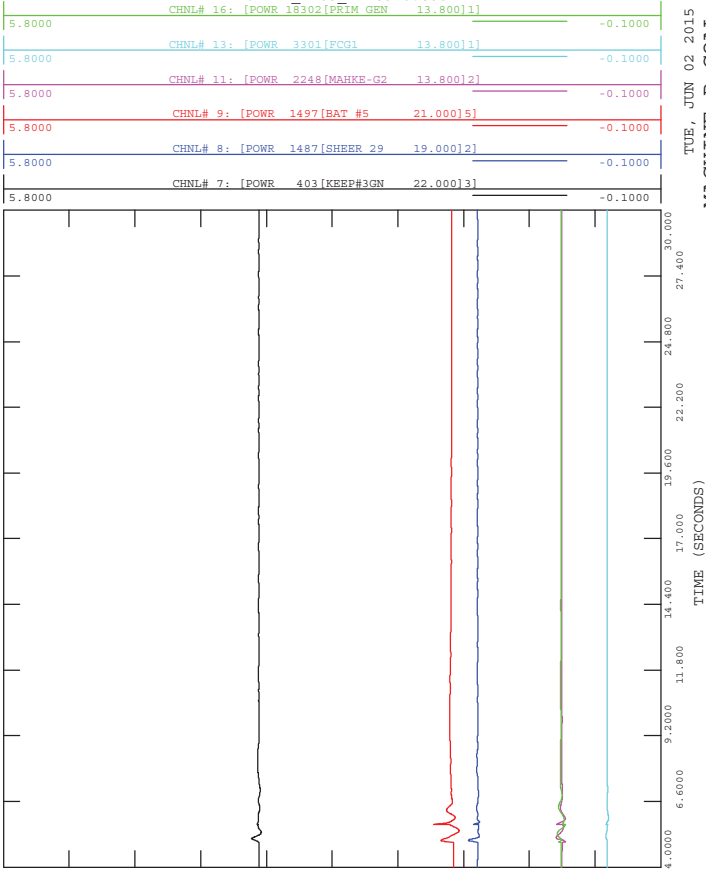


FIGURE E-7D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vincent.out

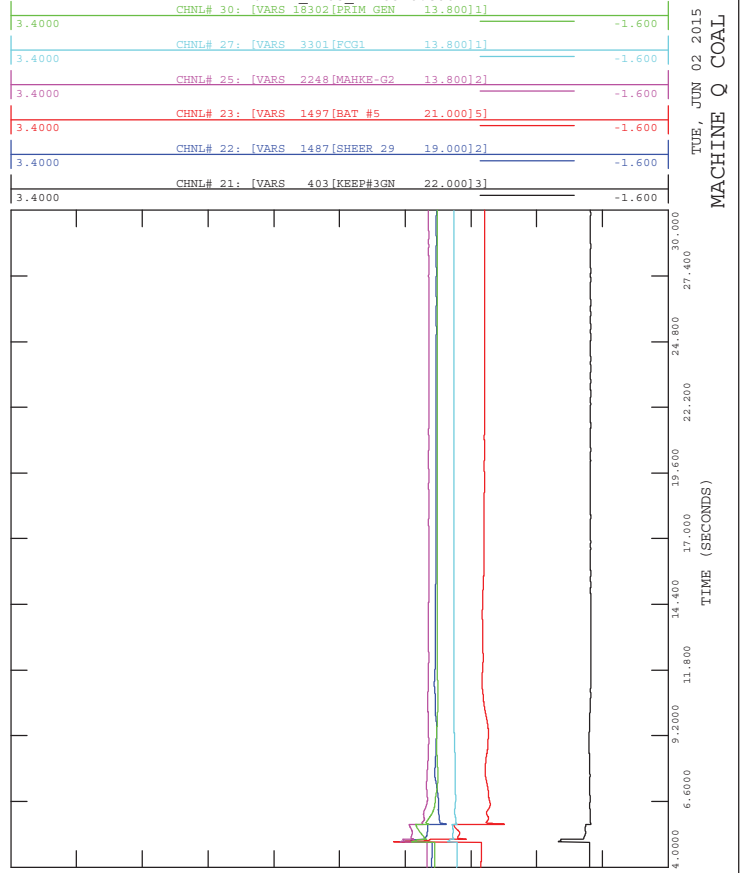


FIGURE E-7A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vincent.out

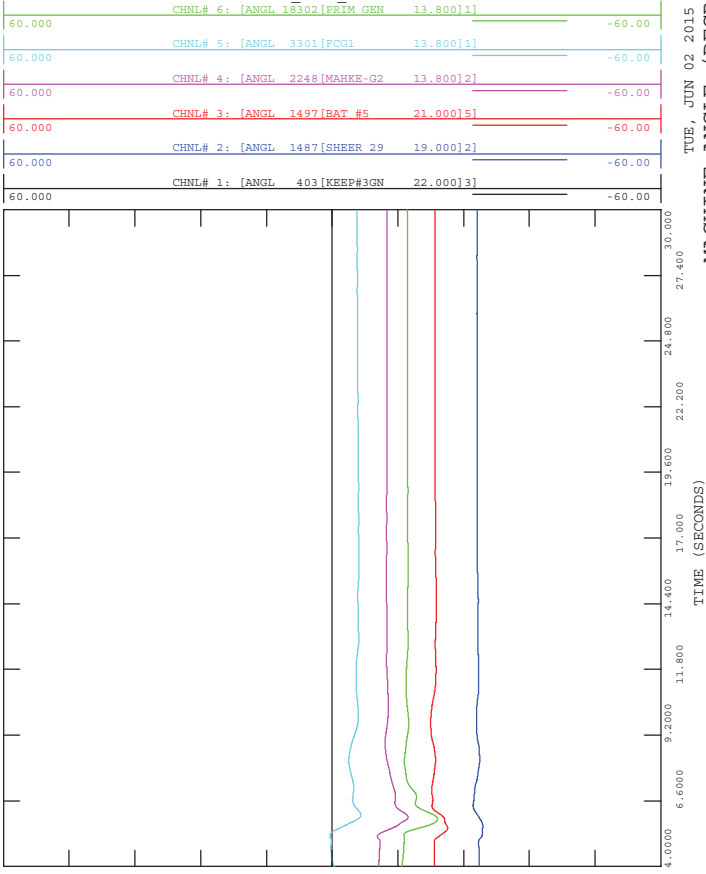


FIGURE E-7C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vincent.out

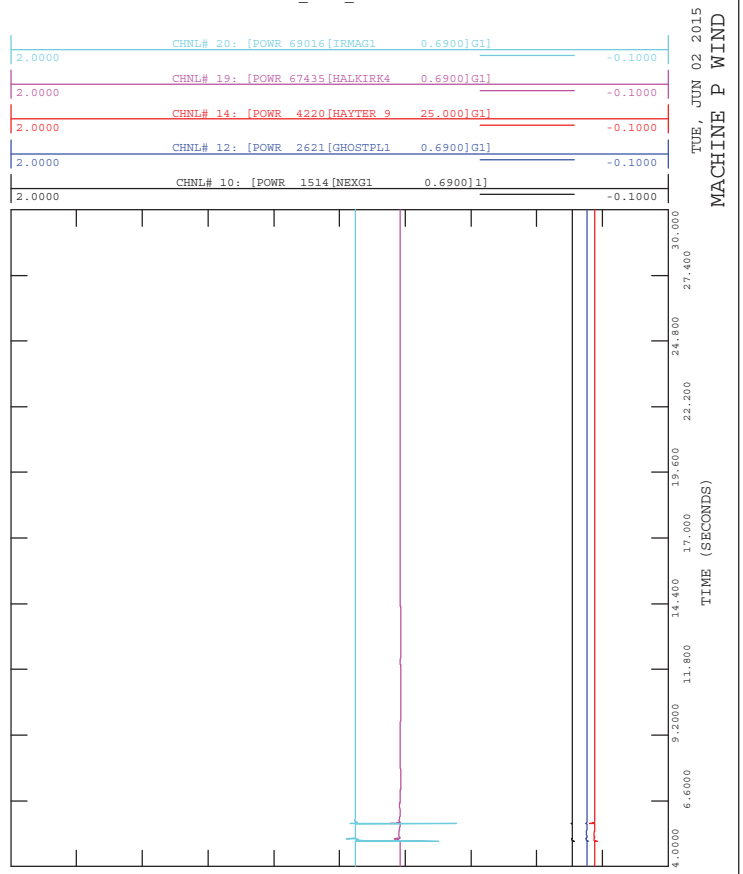
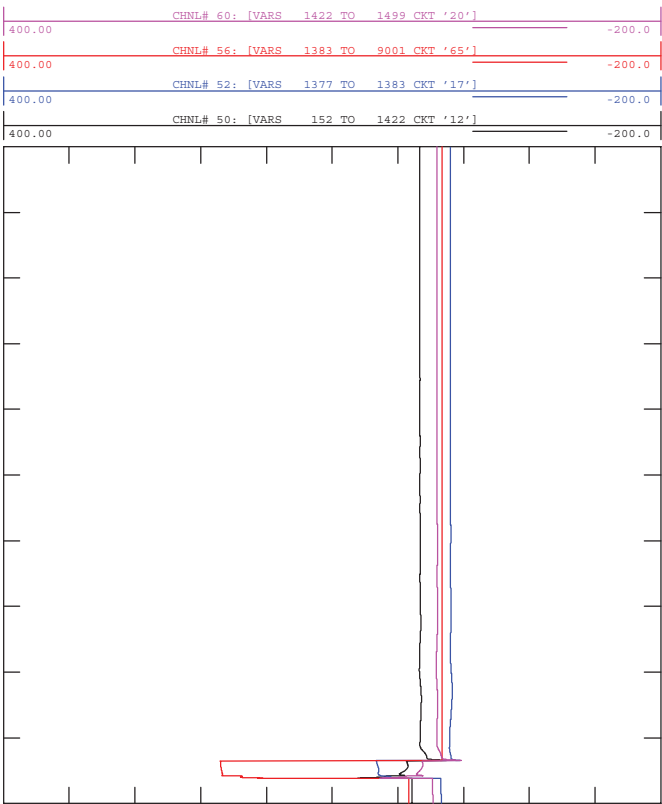




FIGURE E-7I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: E-7_7L65_Vincent.out



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FIGURE E-8B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: E-8_7L65_GrizzlyBear.out

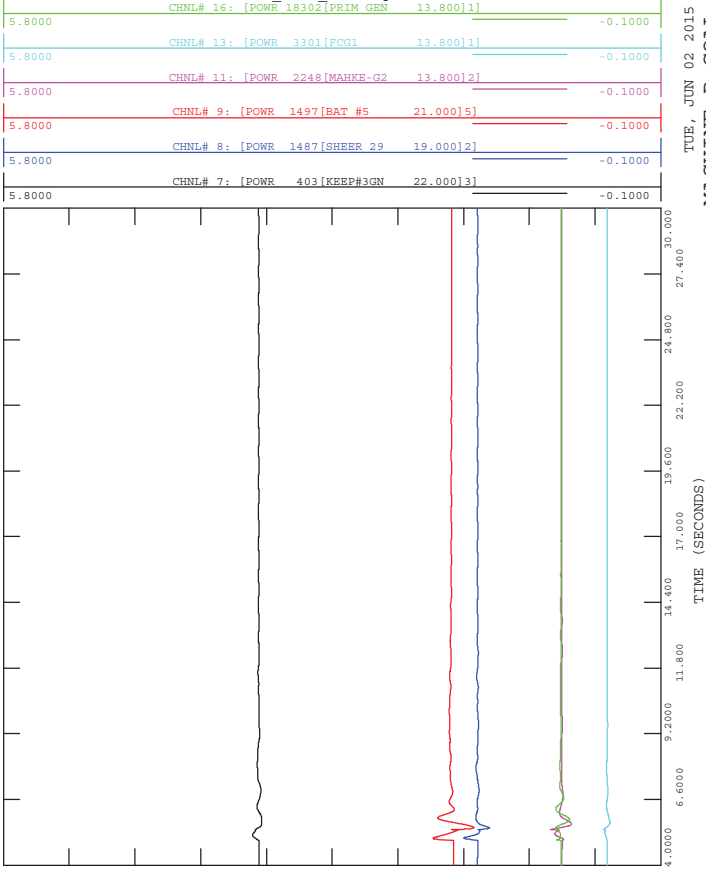


FIGURE E-8D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: E-8_7L65_GrizzlyBear.out

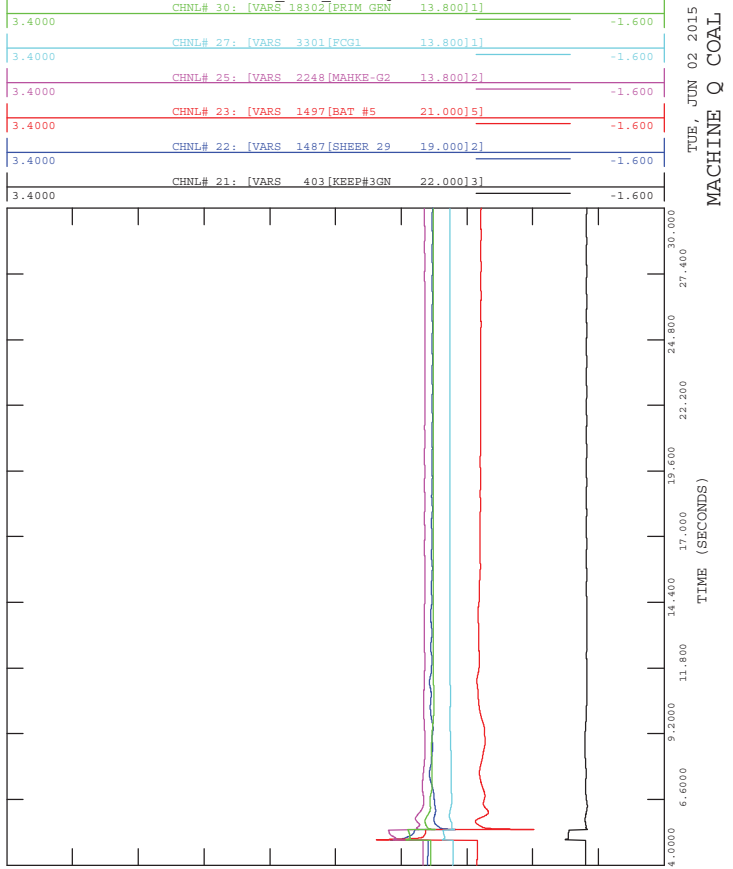


FIGURE E-8A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: E-8_7L65_GrizzlyBear.out

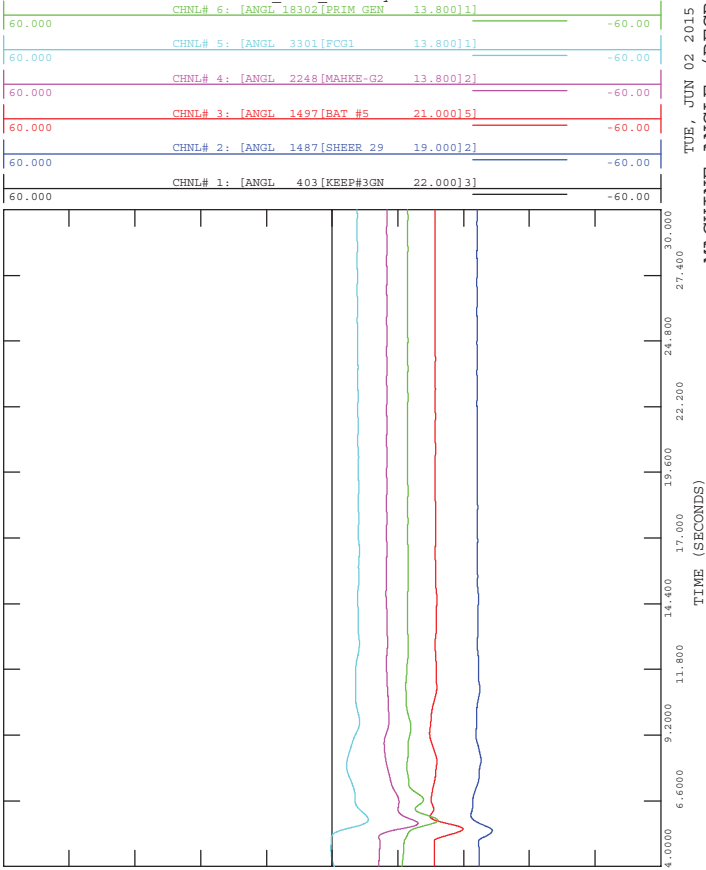


FIGURE E-8C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: E-8_7L65_GrizzlyBear.out

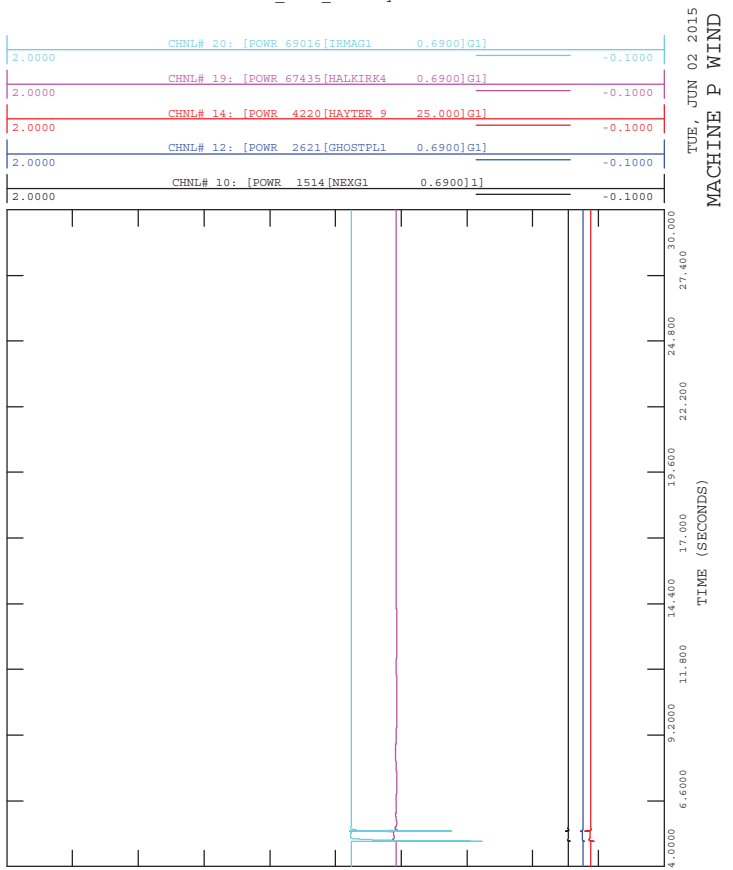




FIGURE E-8F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_GrizzlyBear.out

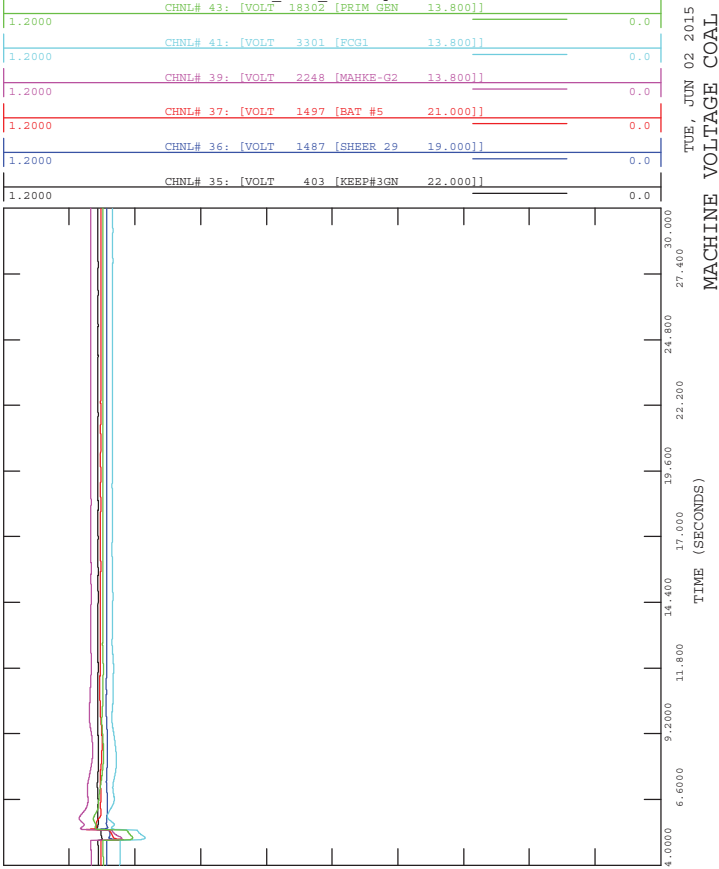


FIGURE E-8H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_GrizzlyBear.out

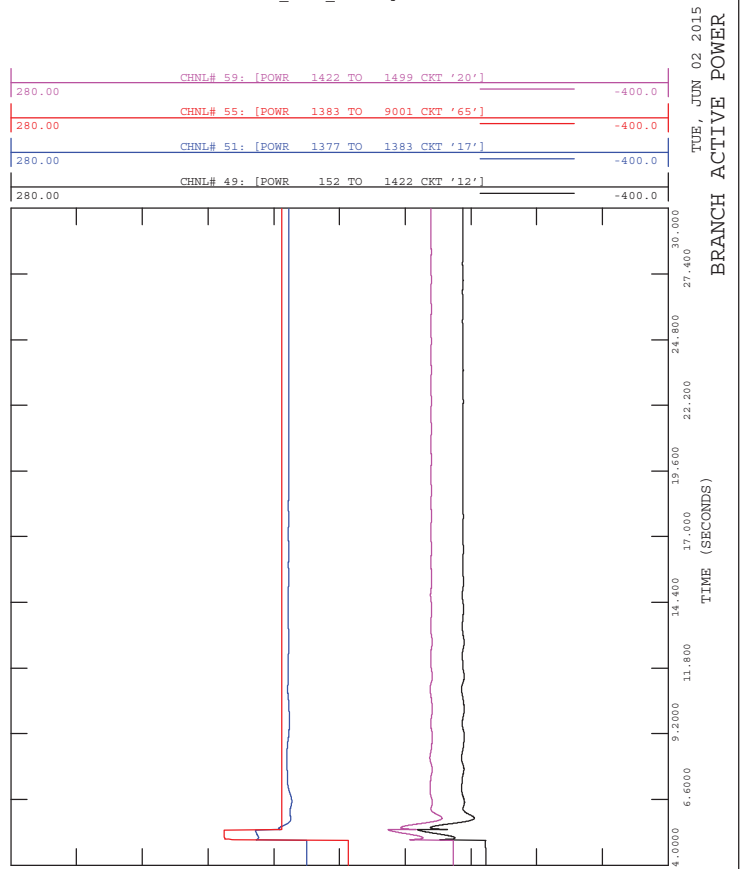


FIGURE E-8E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_GrizzlyBear.out

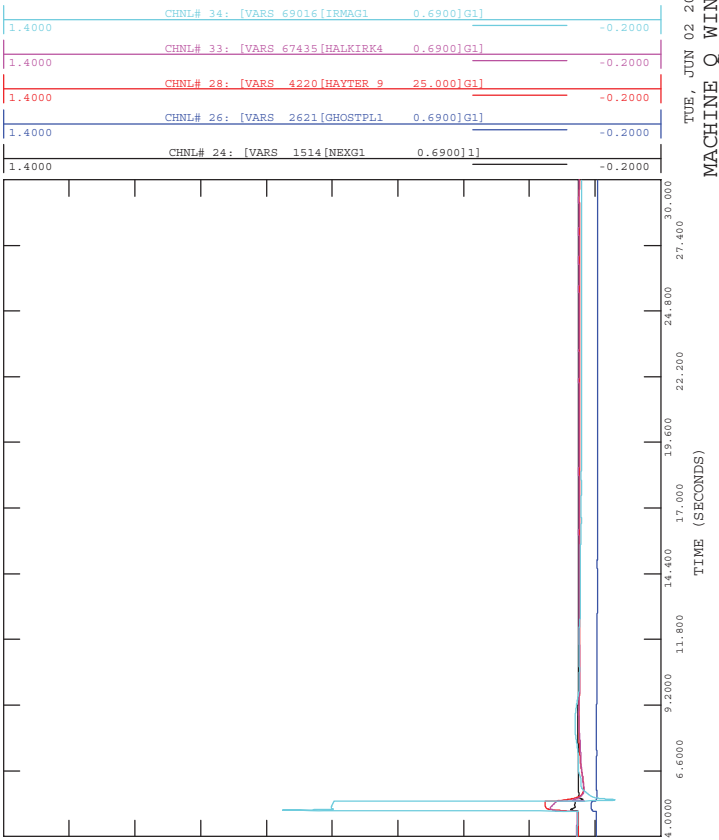


FIGURE E-8G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_GrizzlyBear.out

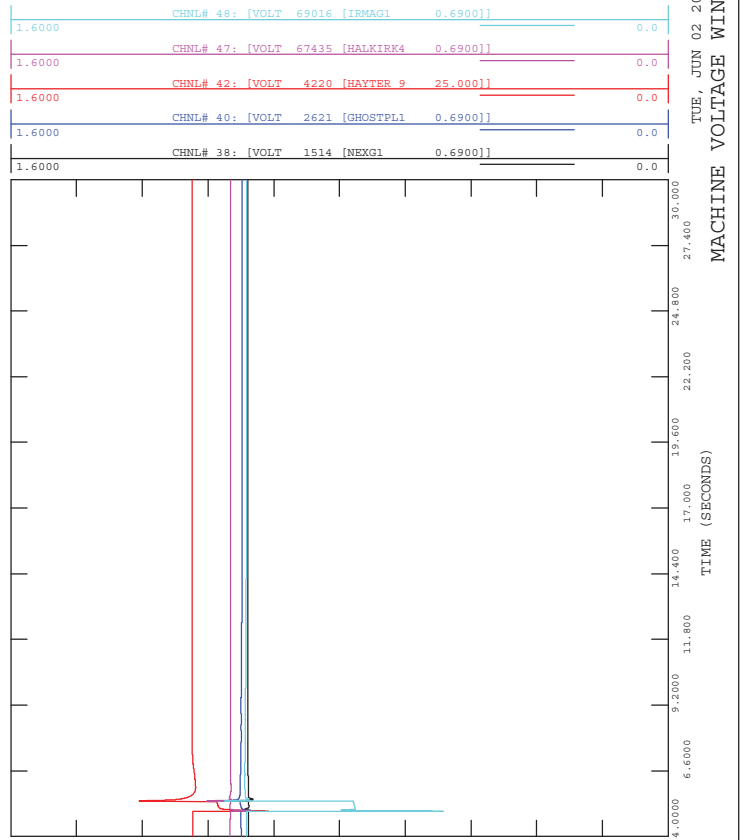




FIGURE E-8I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-8_7L65_GrizzlyBear.out

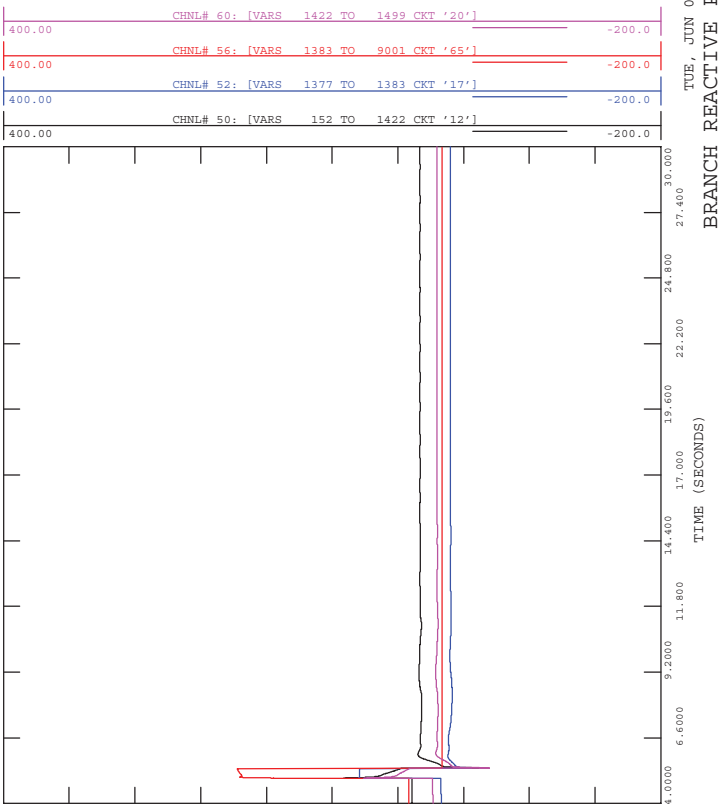




FIGURE E-9B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: E-9_7L65_Vermilion.out

5.8000	CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]	-0.1000
5.8000	CHNL# 13: [POWR 3301[FCG1 13.800]1]	-0.1000
5.8000	CHNL# 11: [POWR 2248[MAHKE-G2 13.800]2]	-0.1000
5.8000	CHNL# 9: [POWR 1497[BAT #5 21.000]5]	-0.1000
5.8000	CHNL# 8: [POWR 1487[SHEER 29 19.000]2]	-0.1000
5.8000	CHNL# 7: [POWR 403[KEEP#3GN 22.000]3]	-0.1000

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MACHINE P COAL (PU)

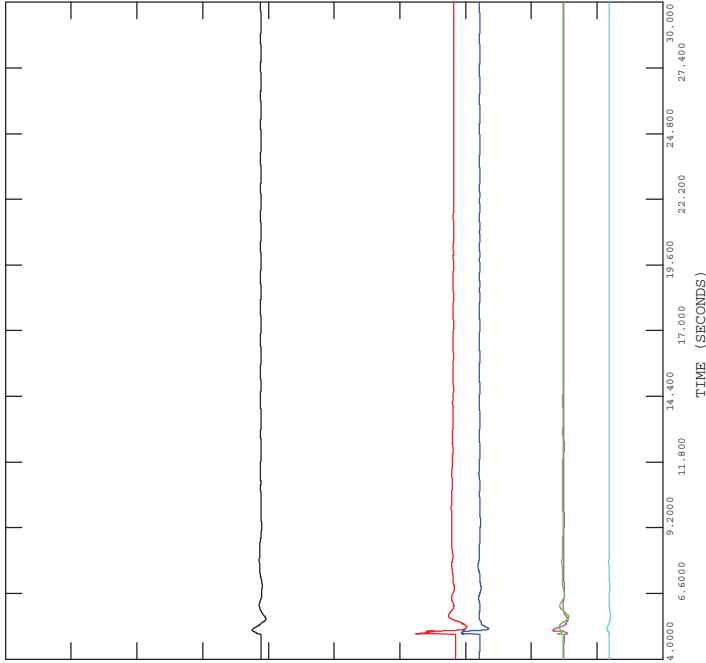


FIGURE E-9D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: E-9_7L65_Vermilion.out

3.4000	CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]	-1.6000
3.4000	CHNL# 27: [VARS 3301[FCG1 13.800]1]	-1.6000
3.4000	CHNL# 25: [VARS 2248[MAHKE-G2 13.800]2]	-1.6000
3.4000	CHNL# 23: [VARS 1497[BAT #5 21.000]5]	-1.6000
3.4000	CHNL# 22: [VARS 1487[SHEER 29 19.000]2]	-1.6000
3.4000	CHNL# 21: [VARS 403[KEEP#3GN 22.000]3]	-1.6000

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MACHINE Q COAL (PU)

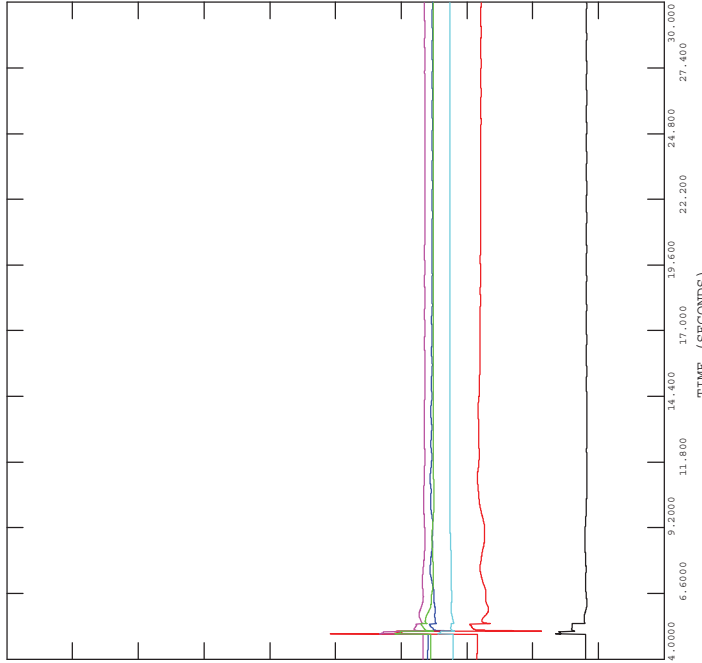


FIGURE E-9A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: E-9_7L65_Vermilion.out

60.000	CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]	-60.000
60.000	CHNL# 5: [ANGL 3301[FCG1 13.800]1]	-60.000
60.000	CHNL# 4: [ANGL 2248[MAHKE-G2 13.800]2]	-60.000
60.000	CHNL# 3: [ANGL 1497[BAT #5 21.000]5]	-60.000
60.000	CHNL# 2: [ANGL 1487[SHEER 29 19.000]2]	-60.000
60.000	CHNL# 1: [ANGL 403[KEEP#3GN 22.000]3]	-60.000

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MACHINE ANGLE (DEGREES)

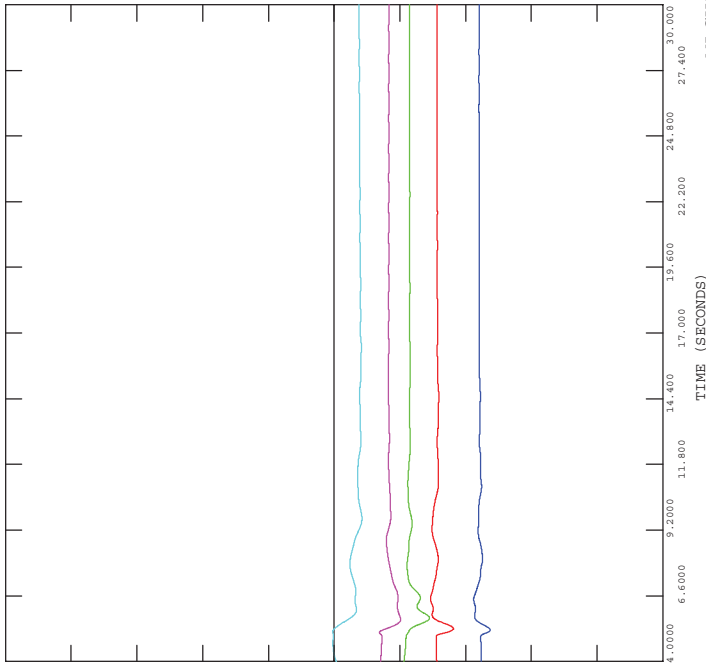


FIGURE E-9C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: E-9_7L65_Vermilion.out

2.0000	CHNL# 20: [POWR 69016[IRMAG1 0.6900]G1]	-0.1000
2.0000	CHNL# 19: [POWR 67435[HALKIRK4 0.6900]G1]	-0.1000
2.0000	CHNL# 14: [POWR 4220[HAYTER 9 25.000]G1]	-0.1000
2.0000	CHNL# 12: [POWR 2621[GHOSTPL1 0.6900]G1]	-0.1000
2.0000	CHNL# 10: [POWR 1514[NEXG1 0.6900]1]	-0.1000

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MACHINE P WIND (PU)

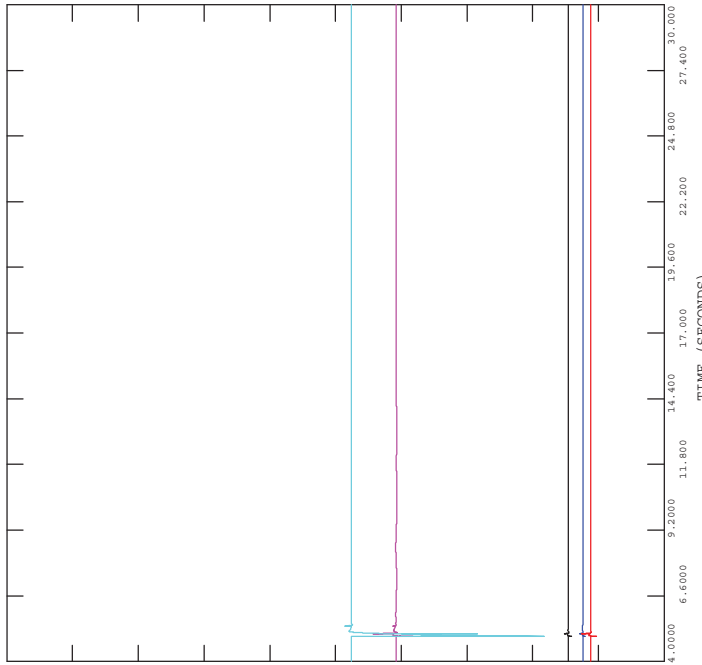




FIGURE E-9F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-9_7L65_Vermilion.out

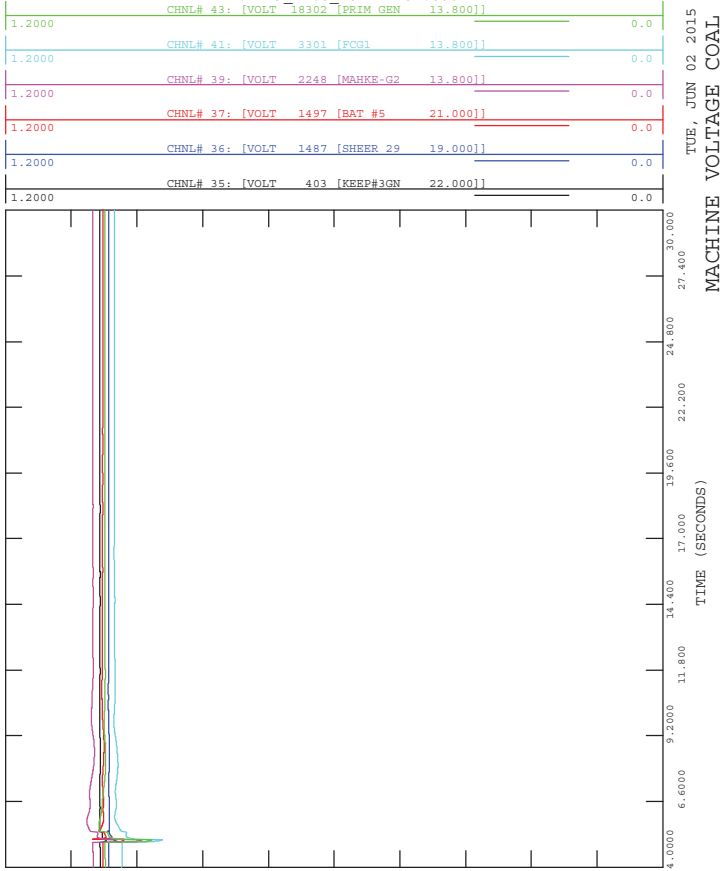


FIGURE E-9H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-9_7L65_Vermilion.out

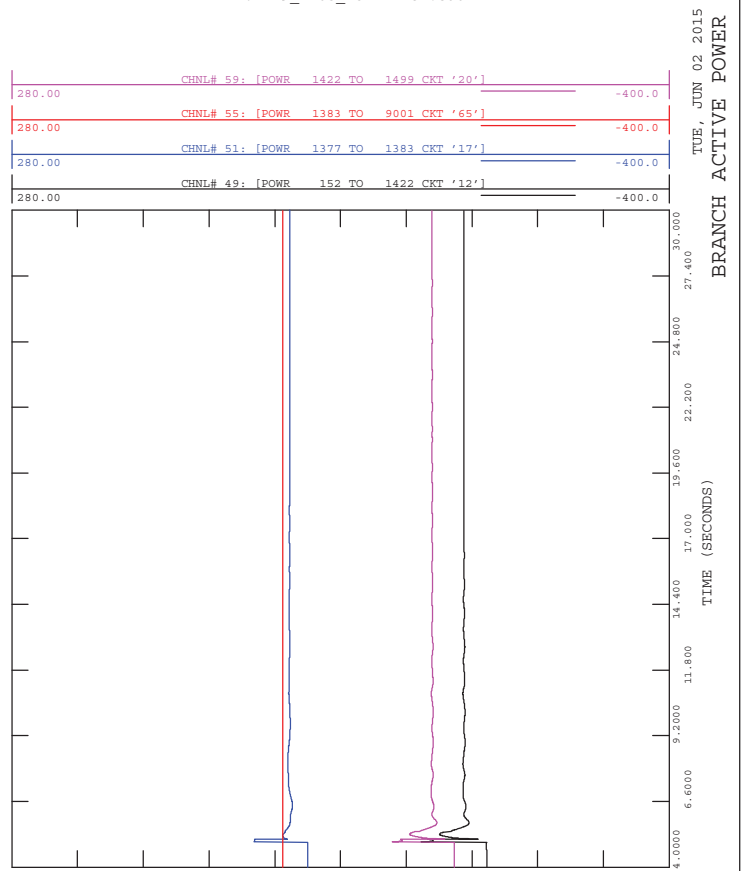


FIGURE E-9E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-9_7L65_Vermilion.out

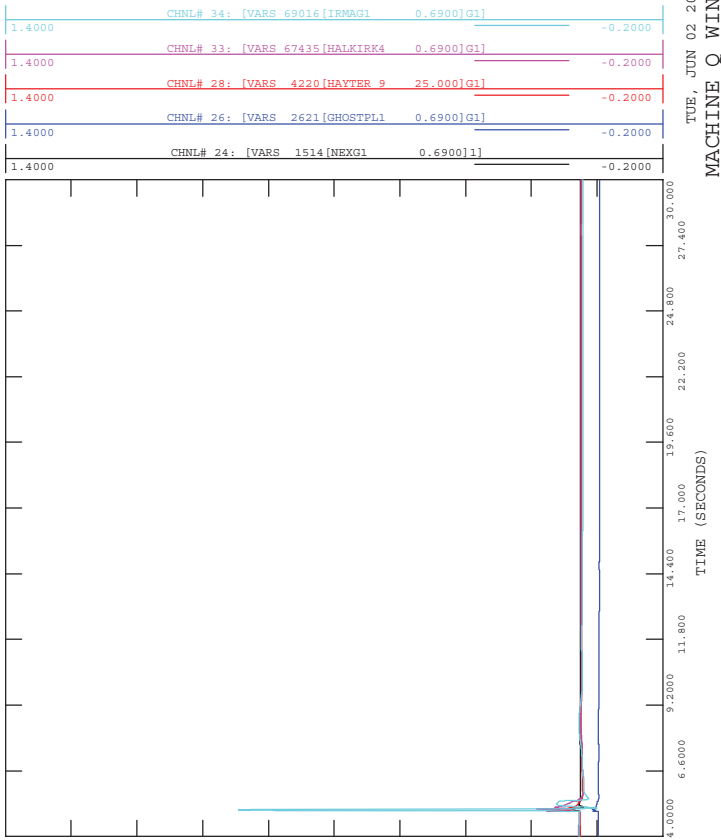


FIGURE E-9G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-9_7L65_Vermilion.out

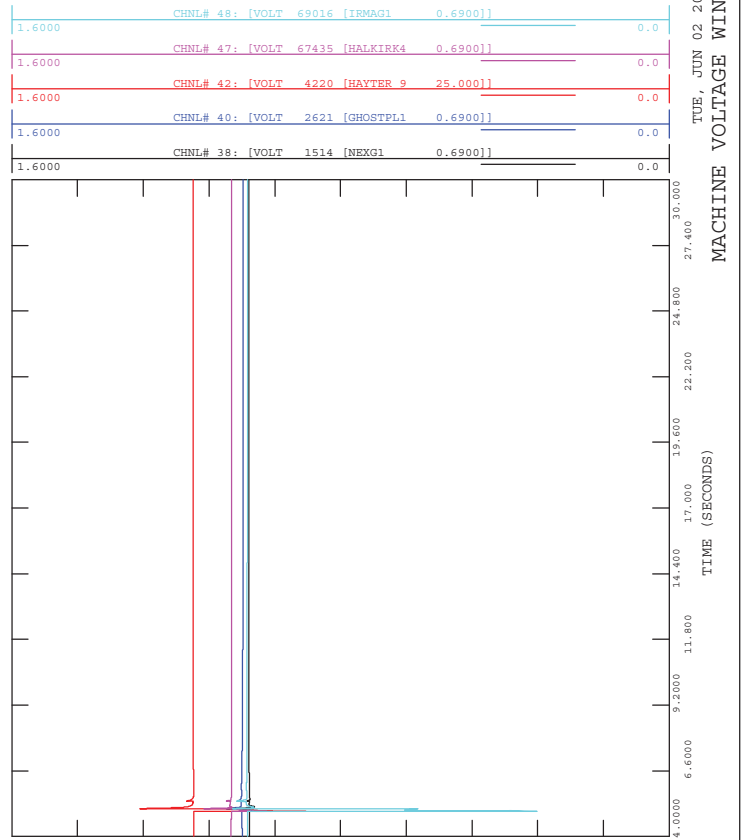
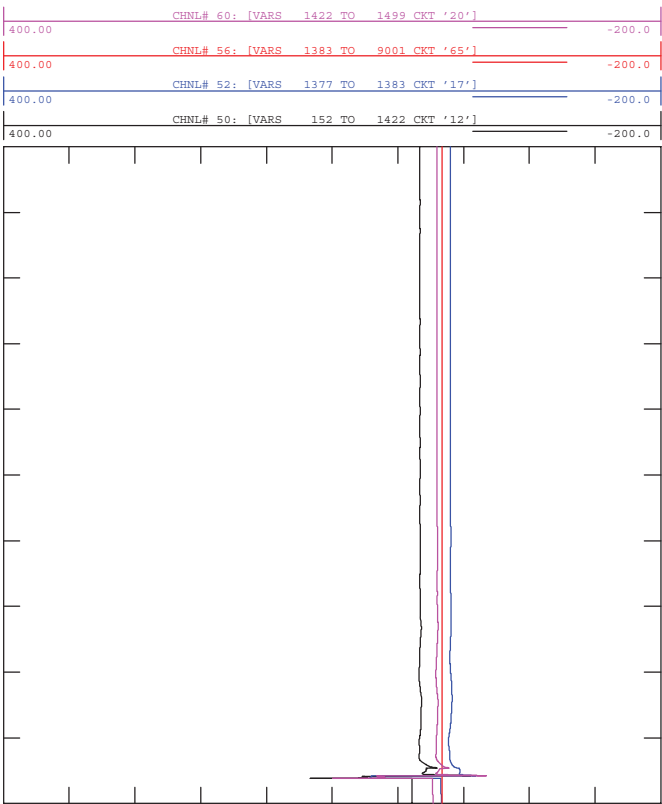




FIGURE E-9I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: E-9_7L65_Vermilion.out



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FIGURE E-10B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_Bonnyville.out

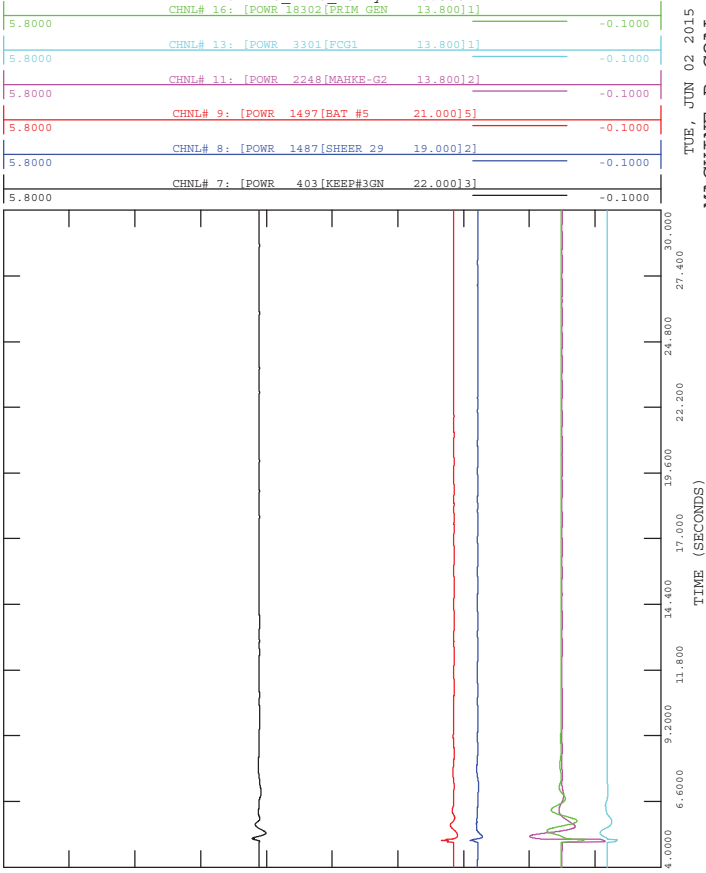


FIGURE E-10D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_Bonnyville.out

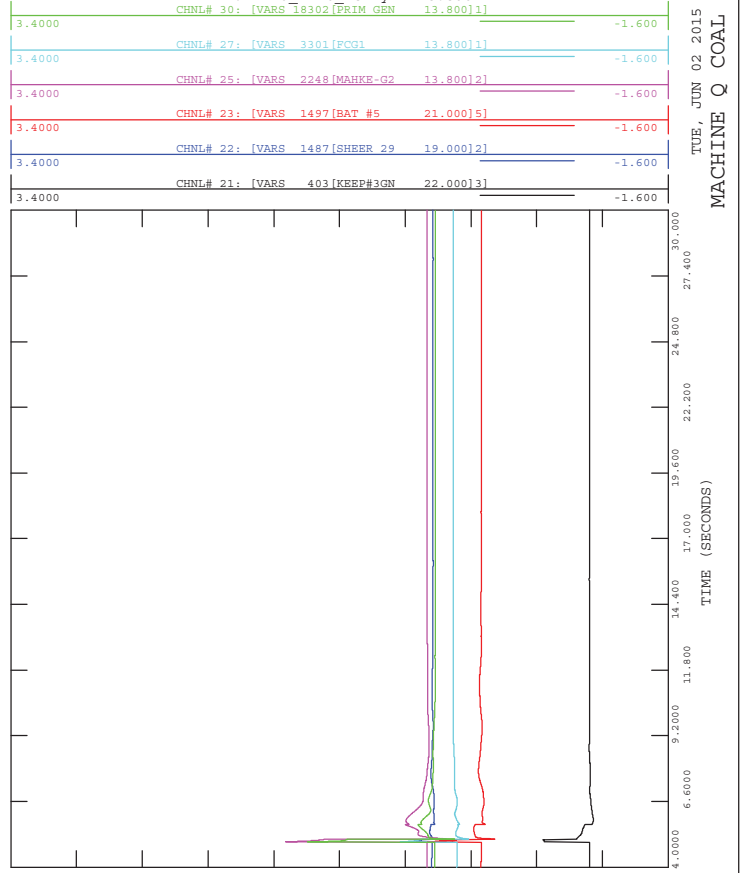


FIGURE E-10A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_Bonnyville.out

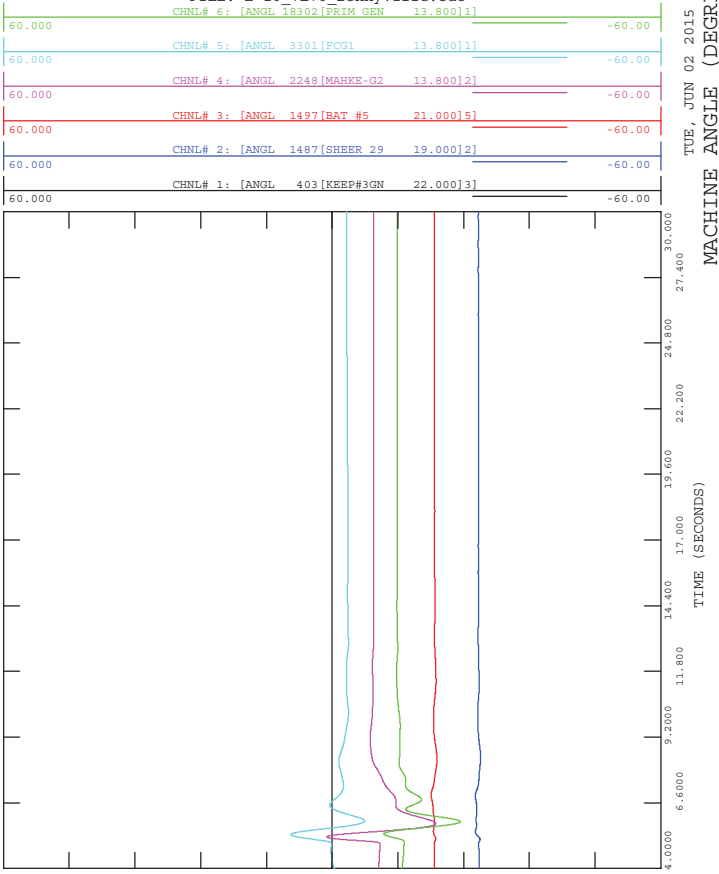


FIGURE E-10C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_Bonnyville.out

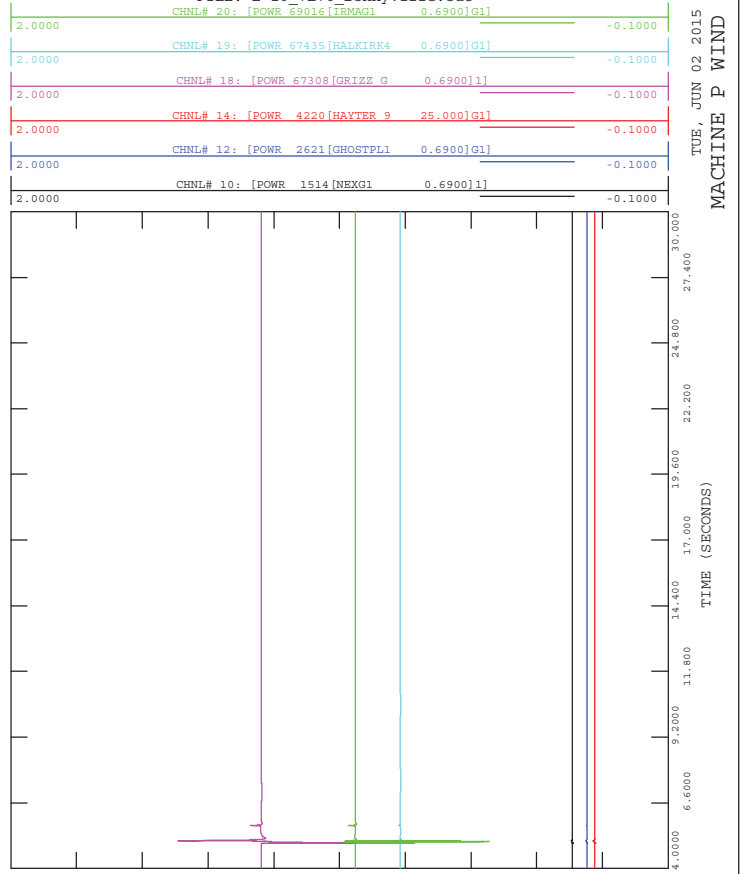




FIGURE E-10F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: E-10_7L70_Bonnyville.out

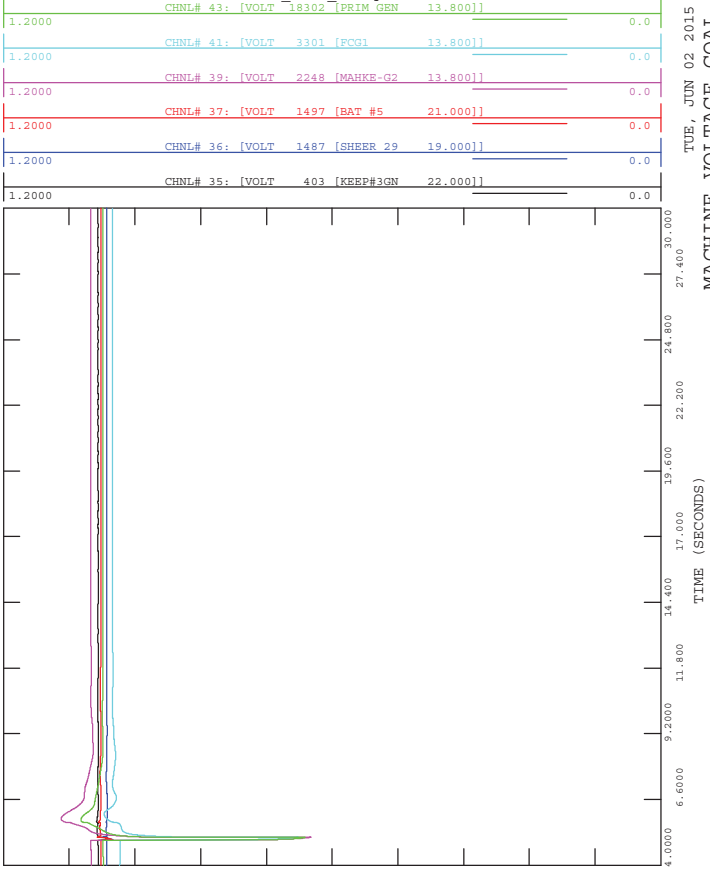


FIGURE E-10H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: E-10_7L70_Bonnyville.out

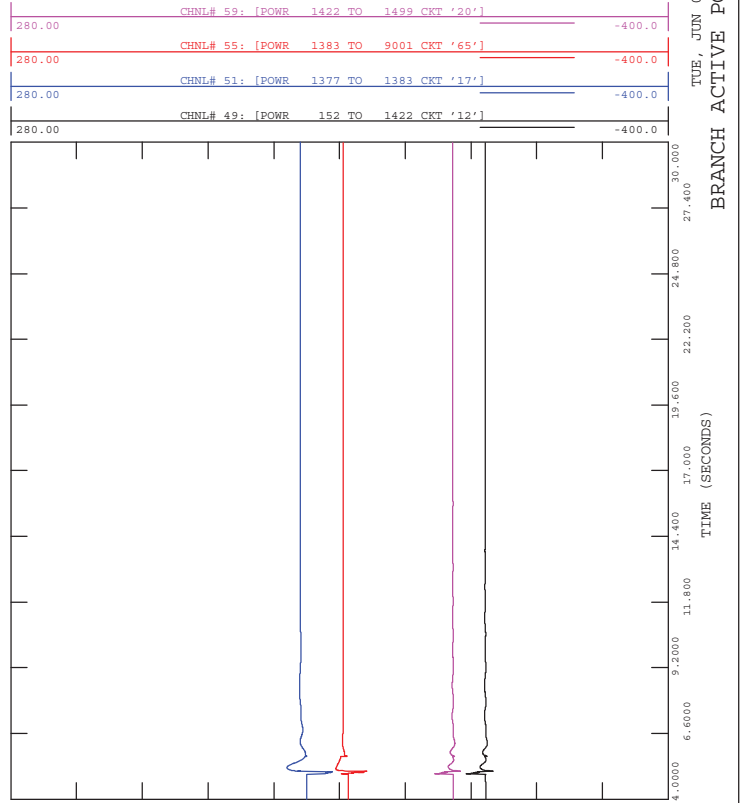


FIGURE E-10B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: E-10_7L70_Bonnyville.out

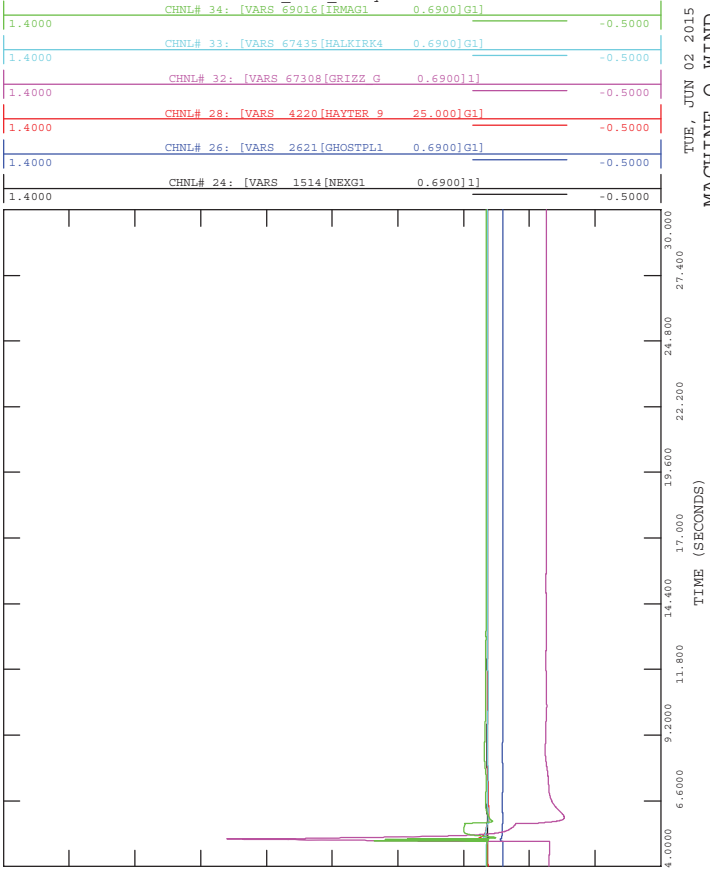


FIGURE E-10G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: E-10_7L70_Bonnyville.out

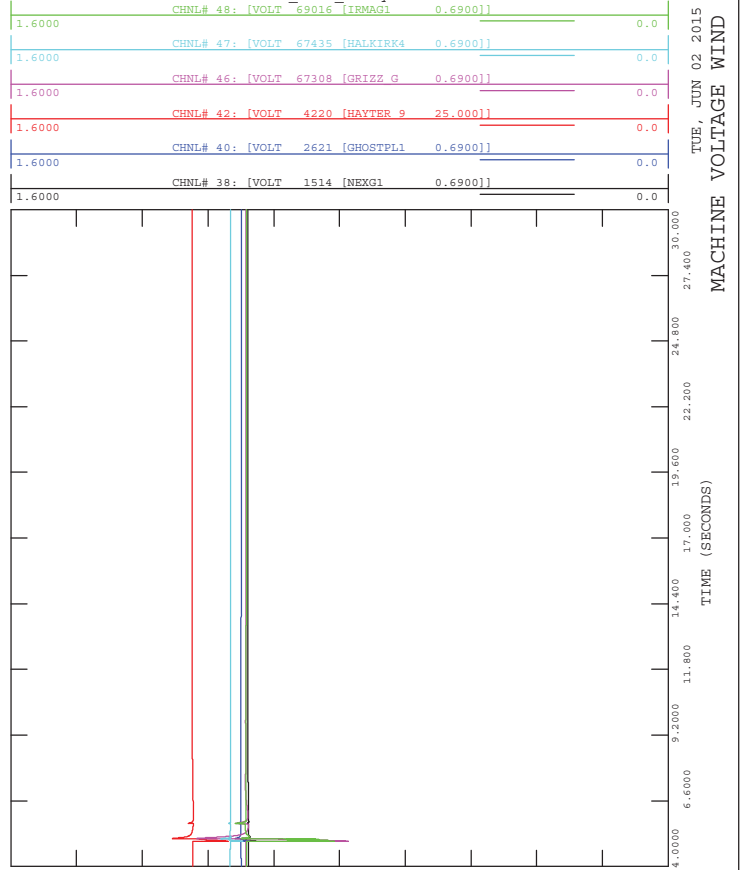
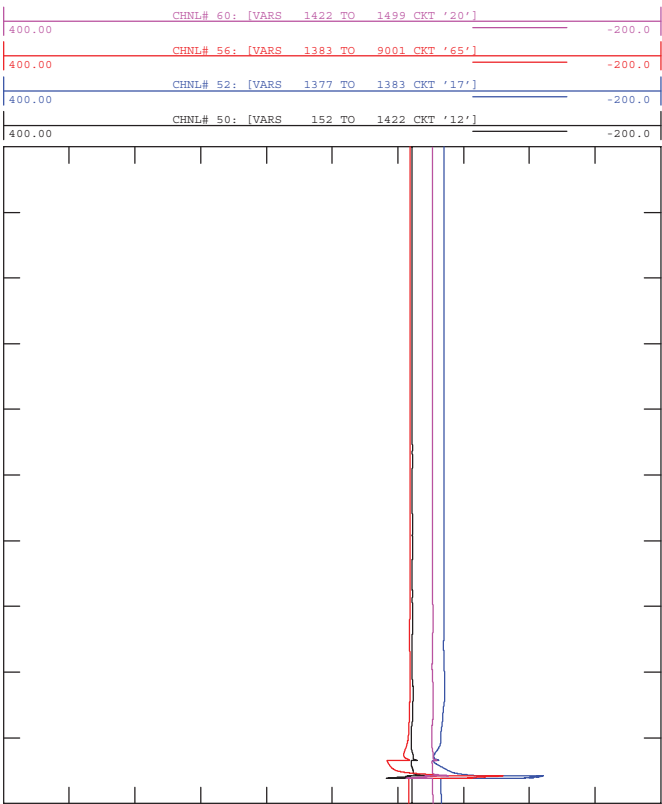




FIGURE E-101
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-10_7L70_Bonnyville.out



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TIME (SECONDS)



FIGURE E-11B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-11 7L70 St.Paul.out

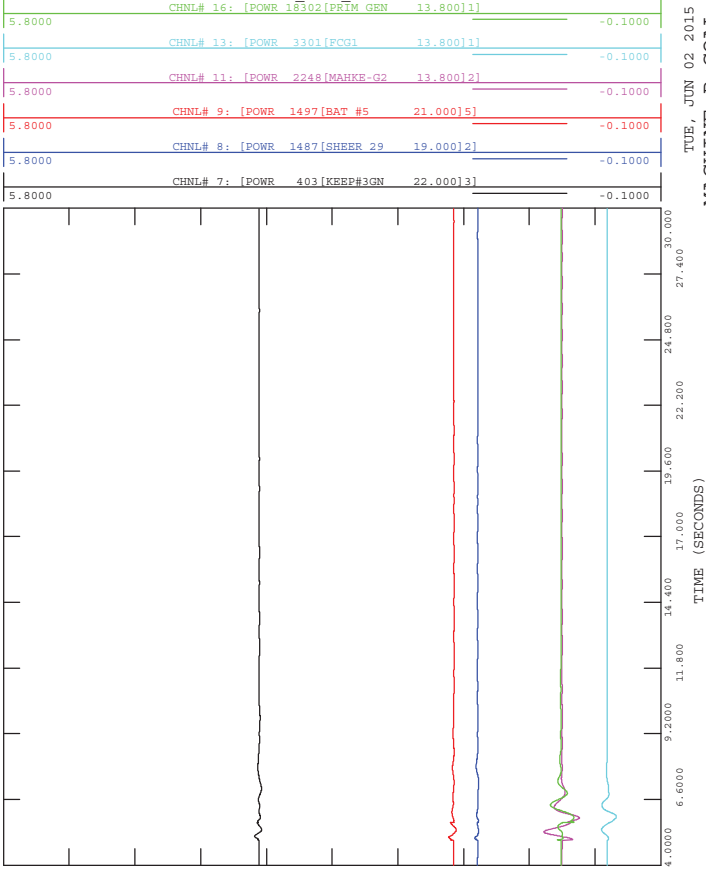


FIGURE E-11D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-11 7L70 St.Paul.out

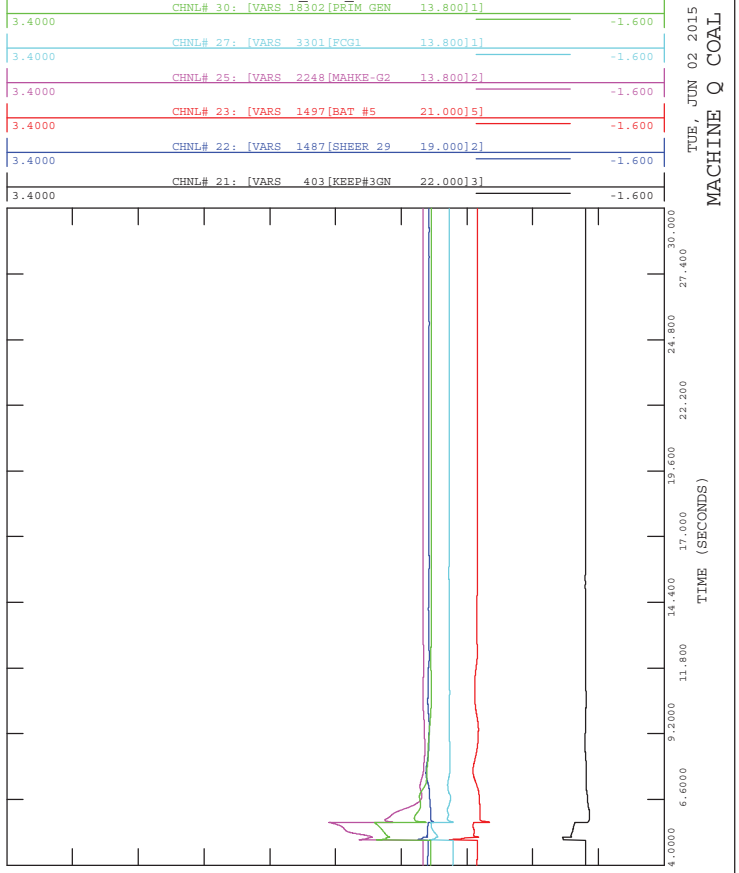


FIGURE E-11A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-11 7L70 St.Paul.out

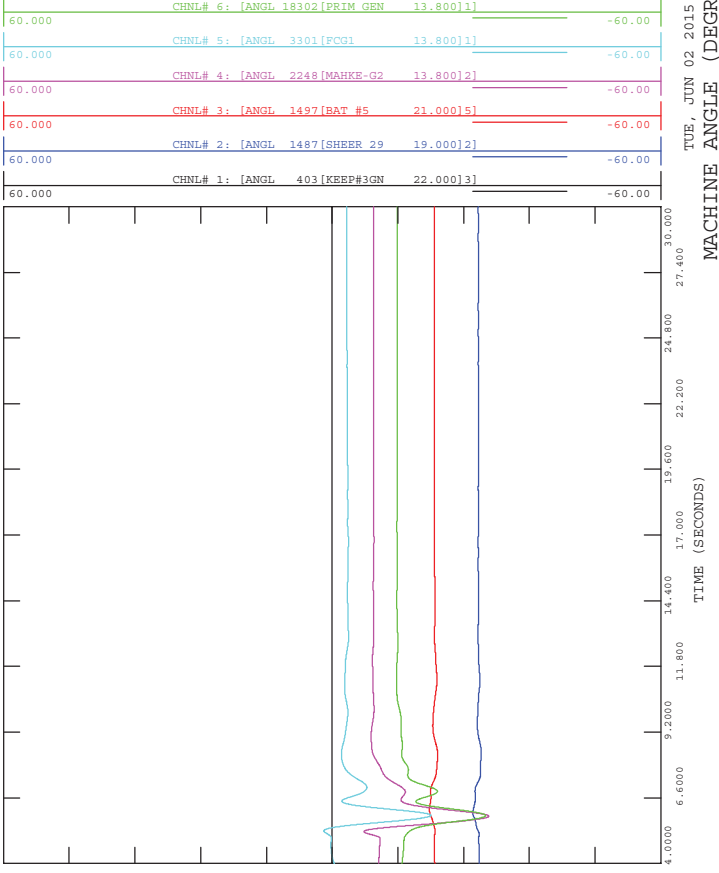


FIGURE E-11C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-11 7L70 St.Paul.out

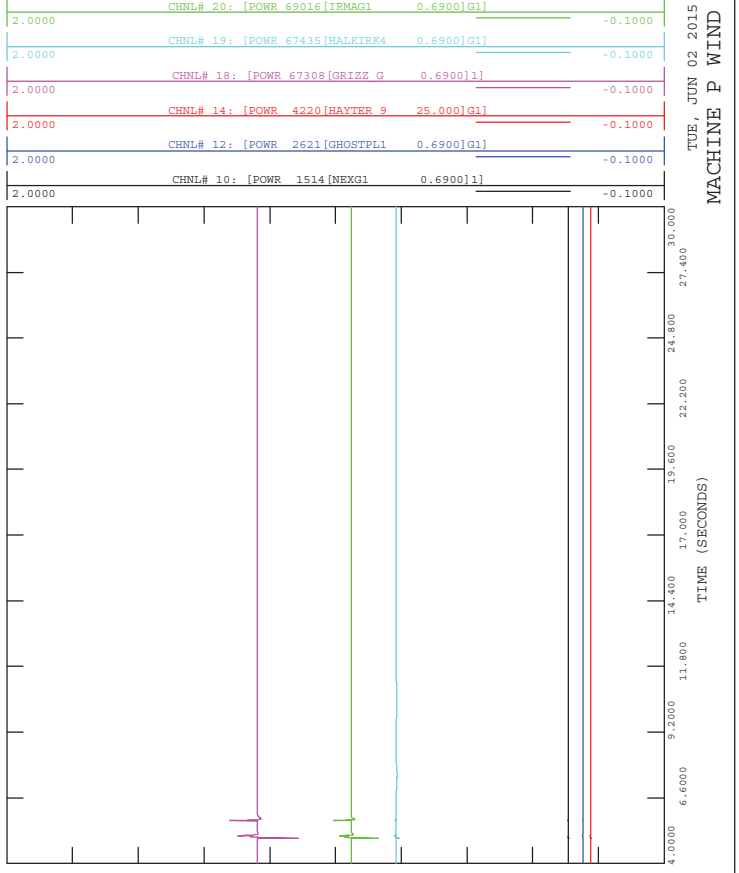
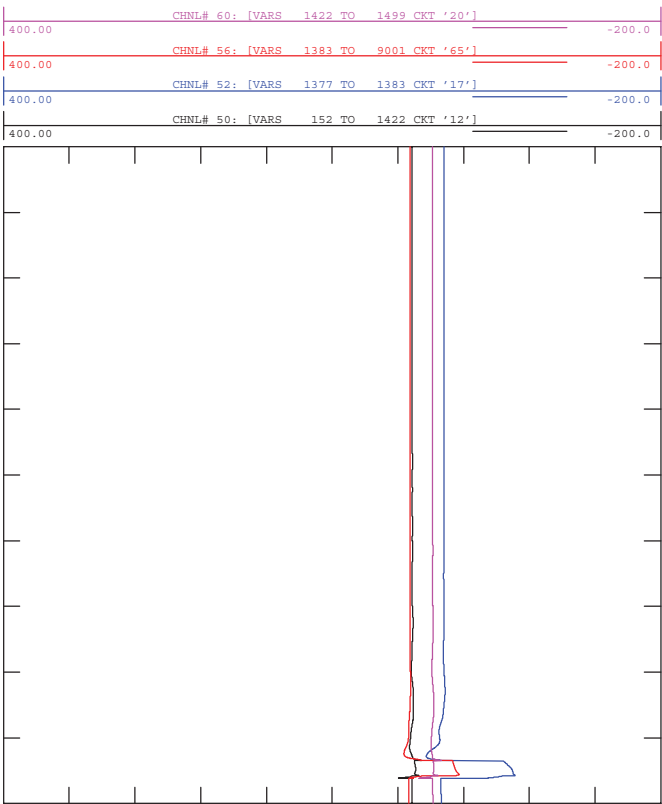




FIGURE E-111
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-11_7L70_St.Paul.out



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FIGURE E-12B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-12_7L115_BuffaloCreek.out
CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]

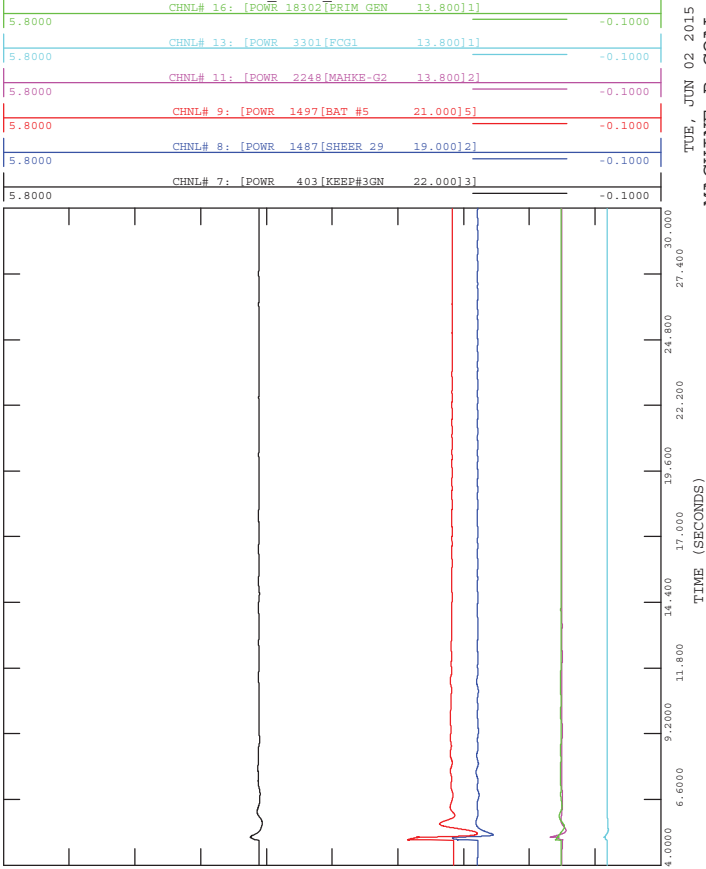


FIGURE E-12D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-12_7L115_BuffaloCreek.out
CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]

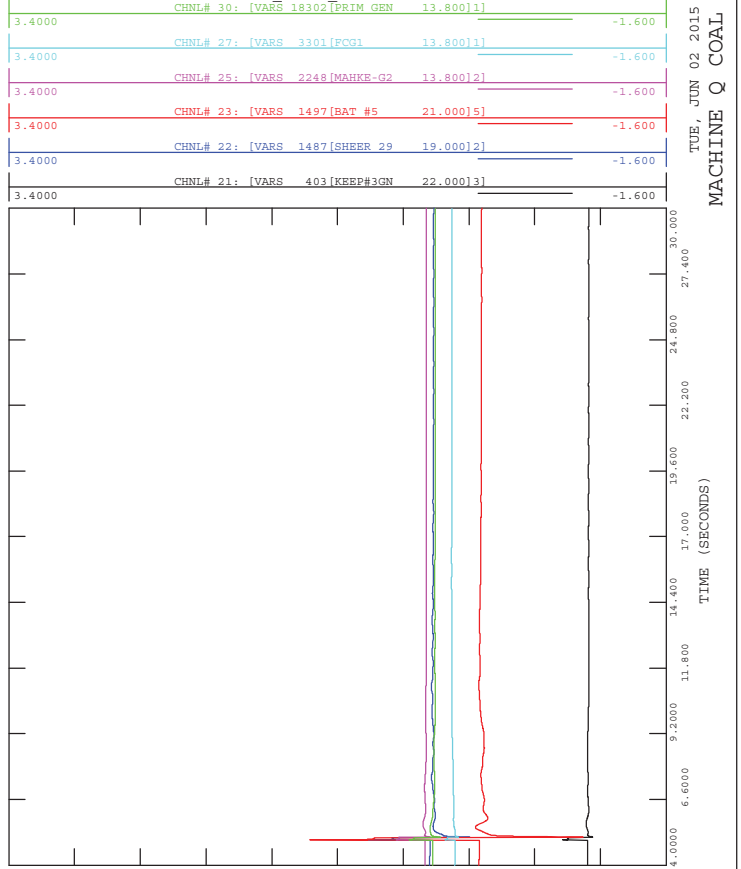


FIGURE E-12A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-12_7L115_BuffaloCreek.out
CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]

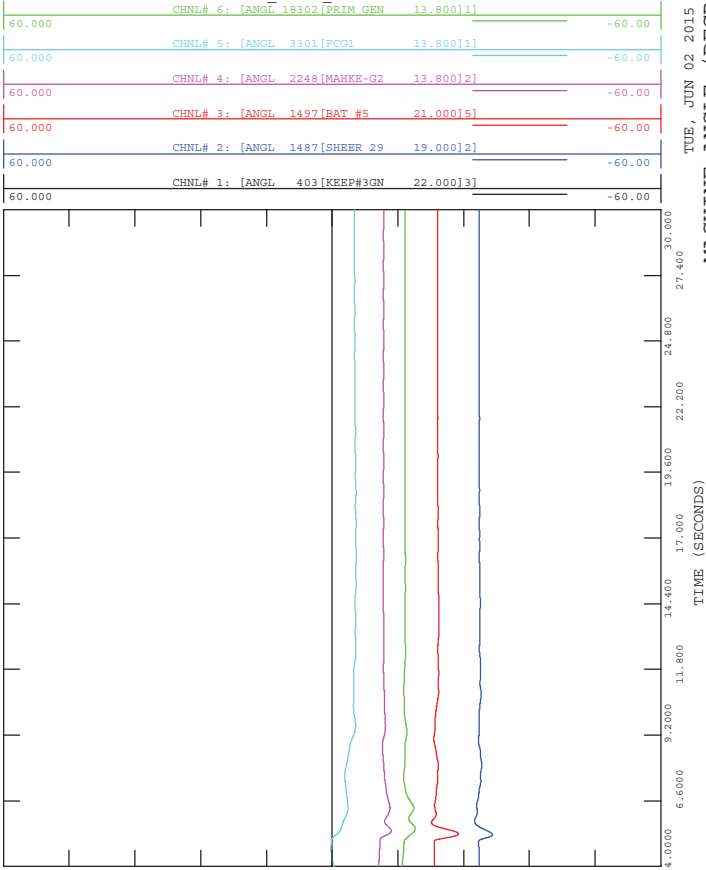


FIGURE E-12C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-12_7L115_BuffaloCreek.out

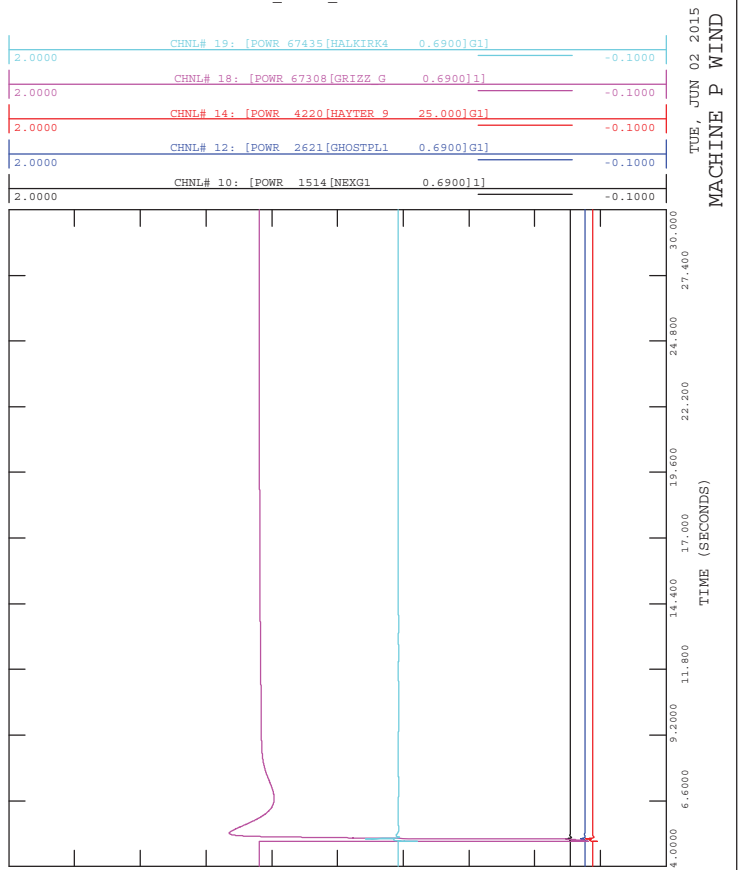




FIGURE E-12F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-12_7L115_BuffaloCreek.out

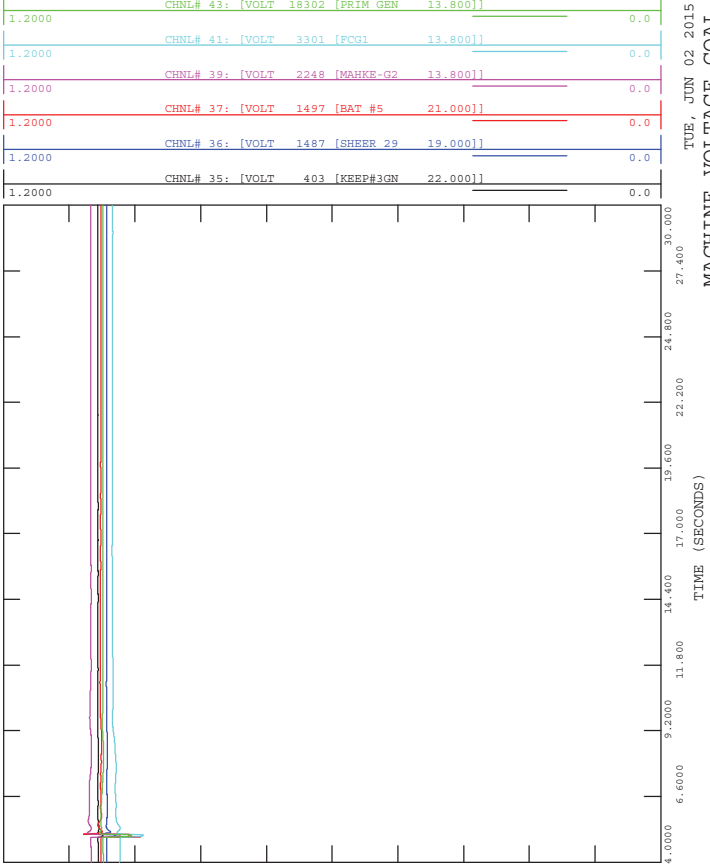


FIGURE E-12H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-12_7L115_BuffaloCreek.out

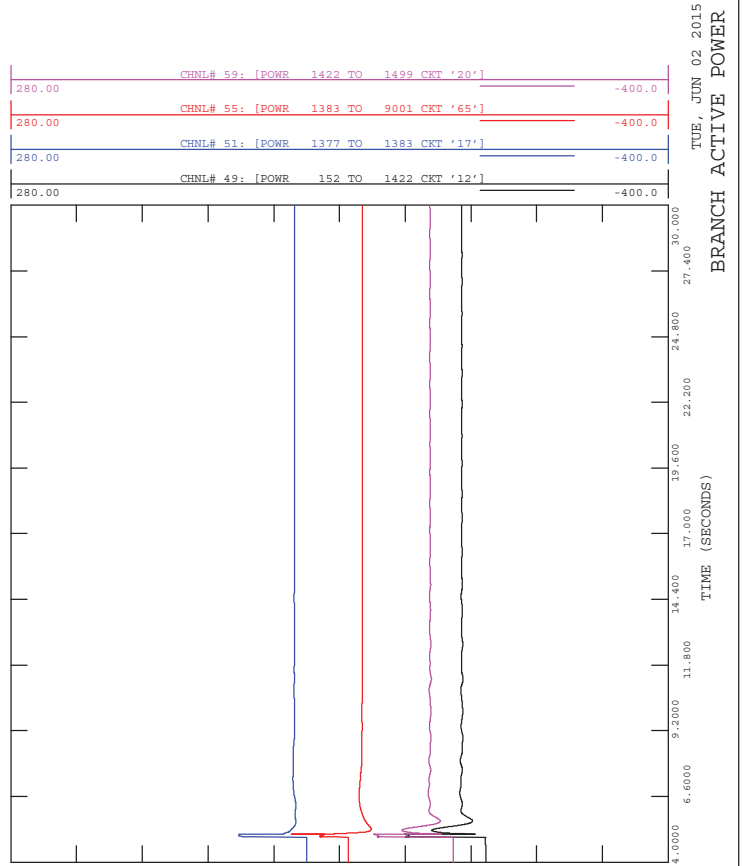


FIGURE E-12E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-12_7L115_BuffaloCreek.out

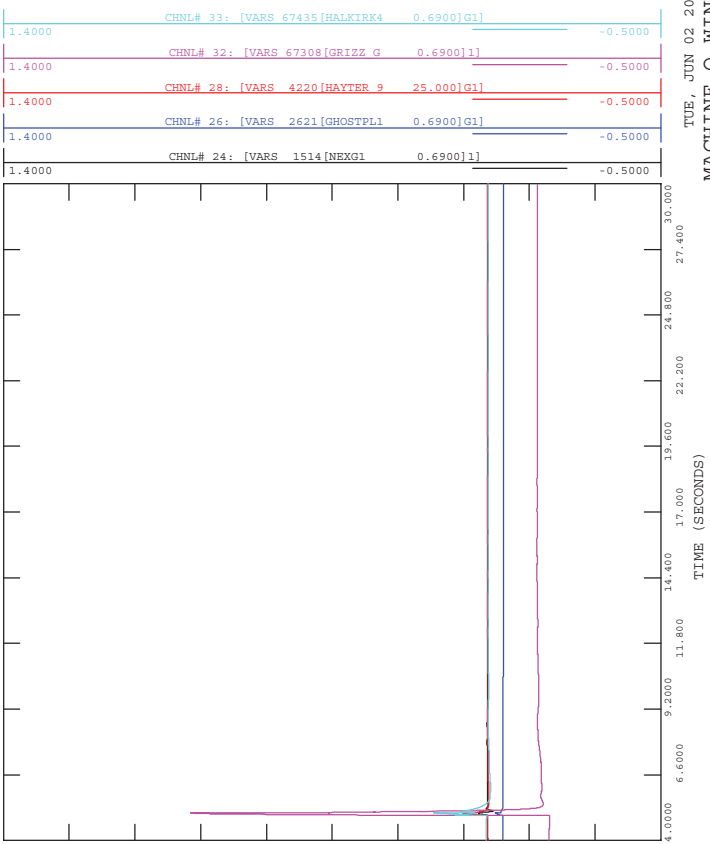


FIGURE E-12G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-12_7L115_BuffaloCreek.out

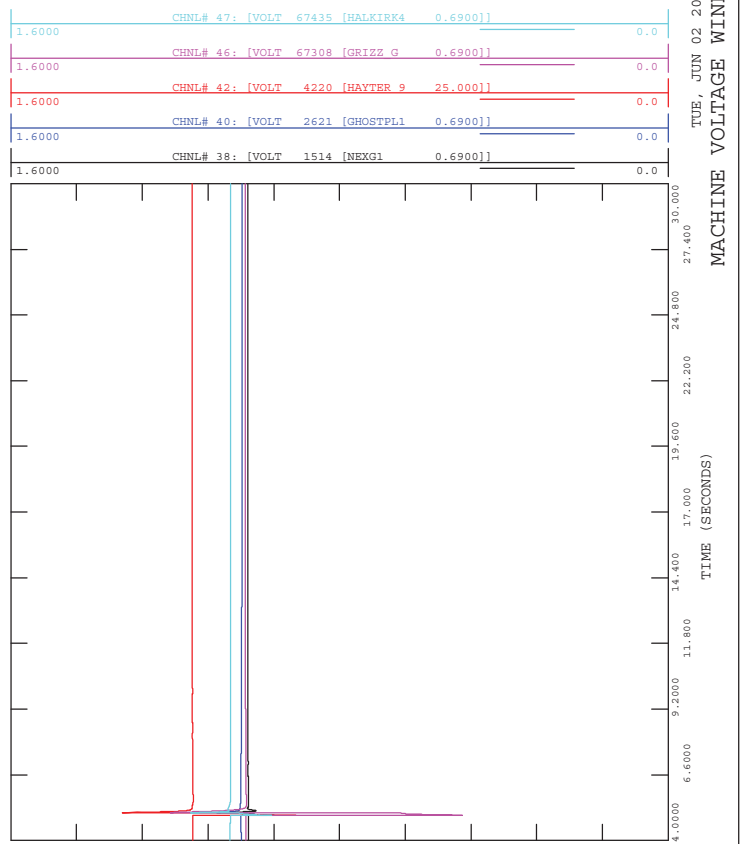




FIGURE E-12I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-12_7L115_BuffaloCreek.out

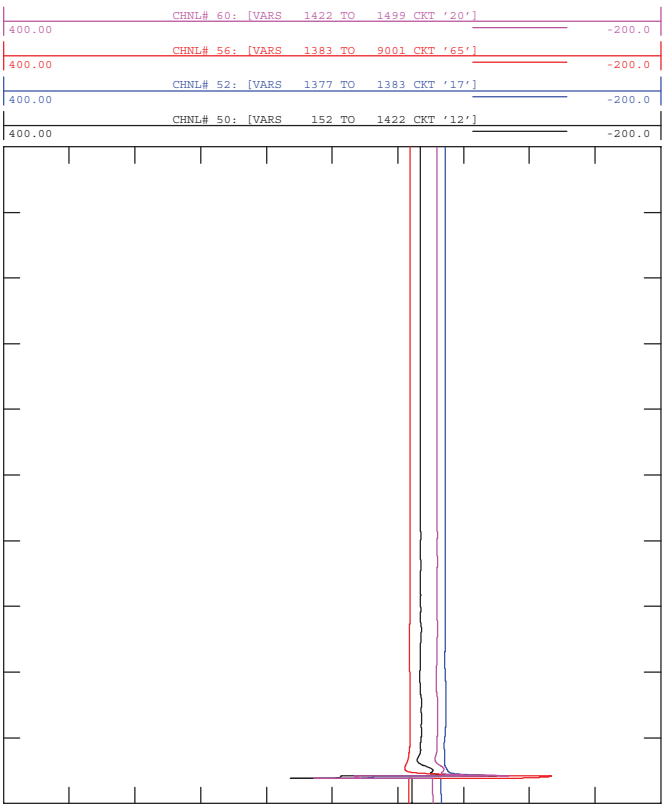




FIGURE E-13B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-13_7L115_Kinsella.out

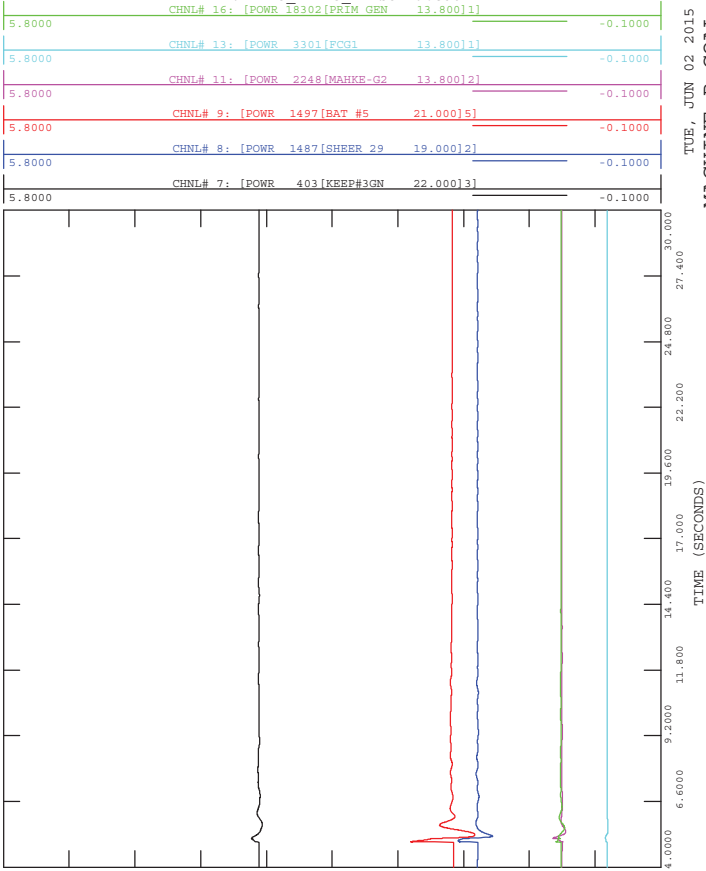


FIGURE E-13D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-13_7L115_Kinsella.out

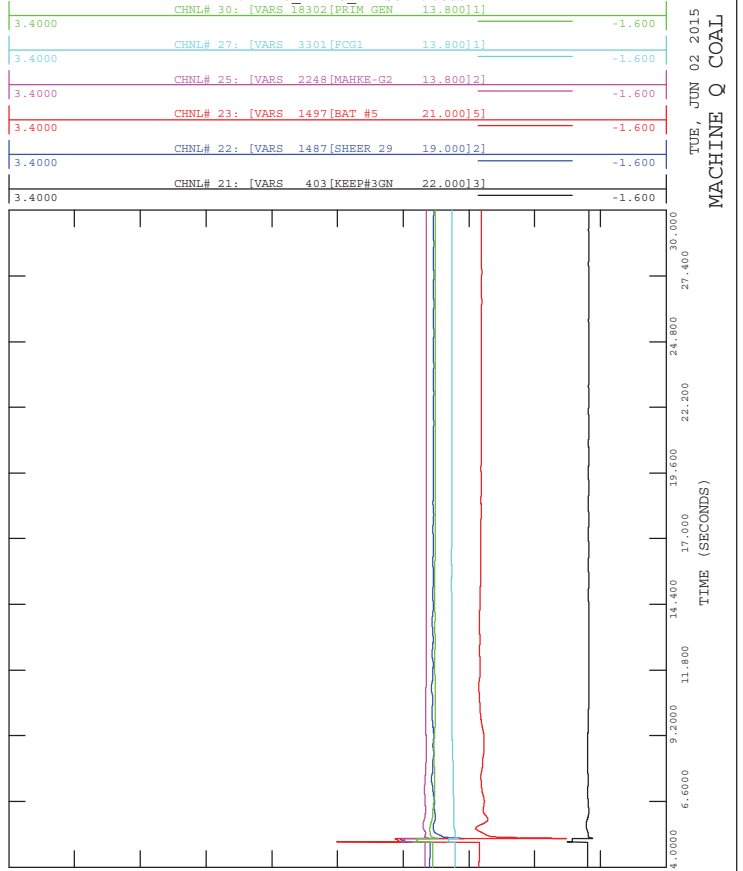


FIGURE E-13A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-13_7L115_Kinsella.out

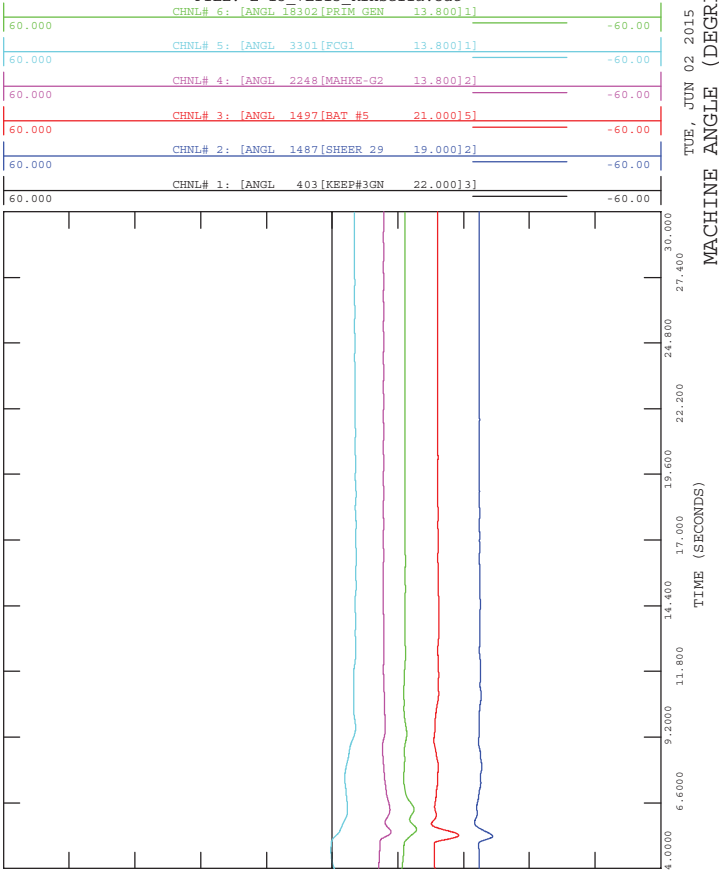


FIGURE E-13C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-13_7L115_Kinsella.out

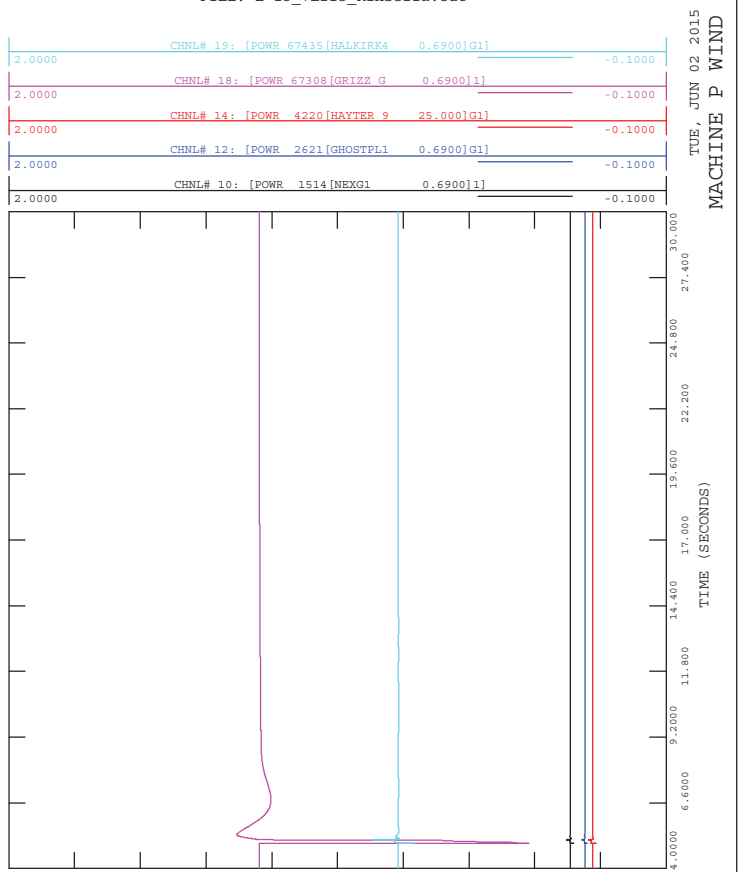




FIGURE E-13F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-13_7L115_Kinsella.out

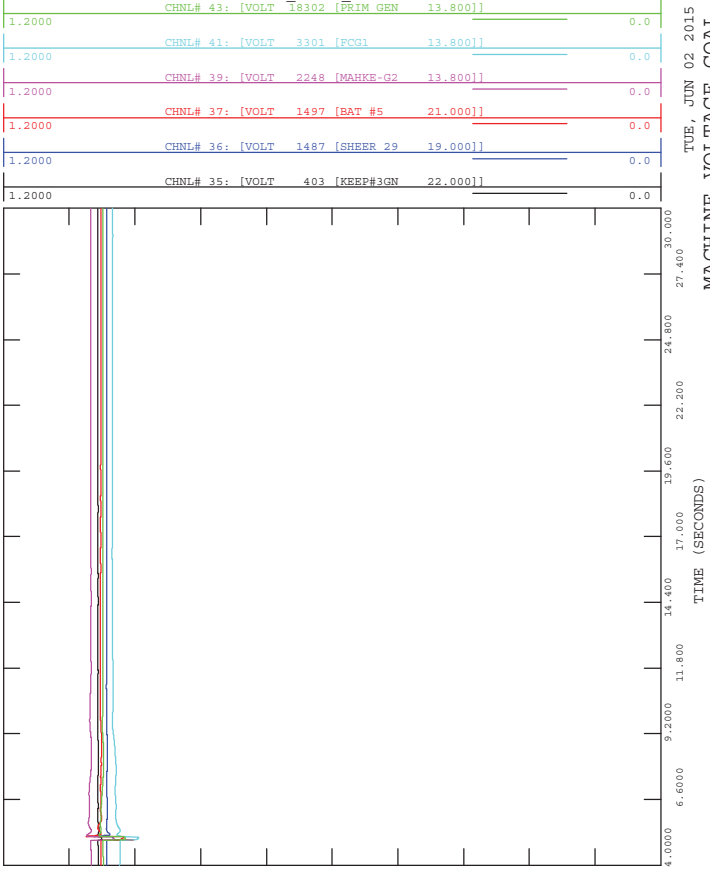


FIGURE E-13H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-13_7L115_Kinsella.out

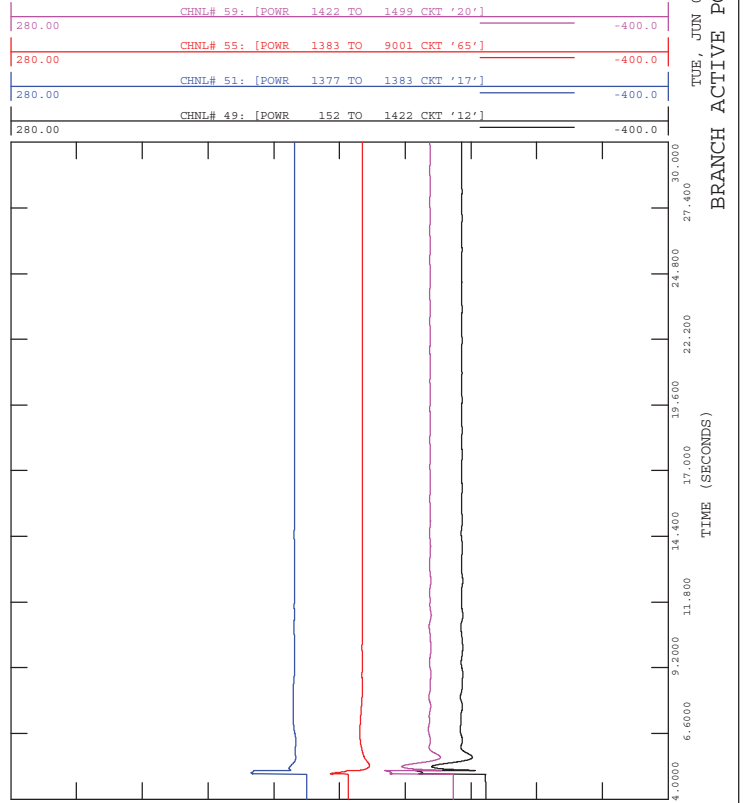


FIGURE E-13E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-13_7L115_Kinsella.out

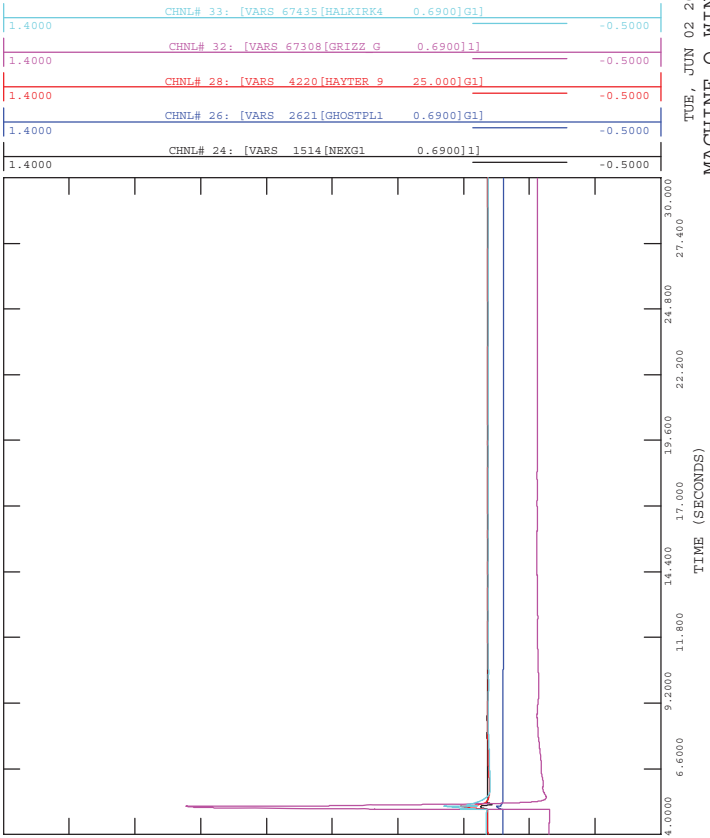


FIGURE E-13G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: E-13_7L115_Kinsella.out

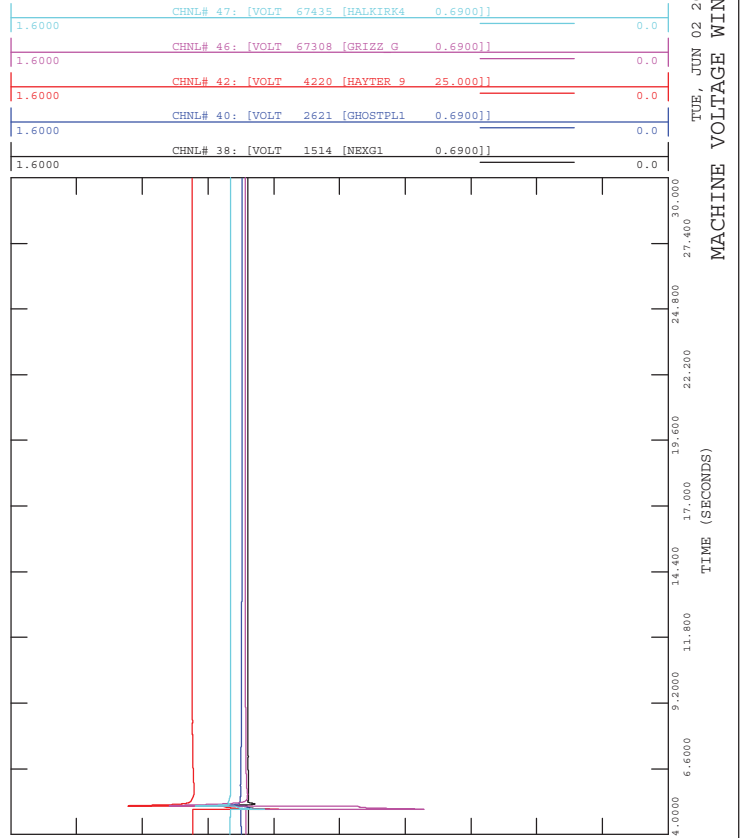
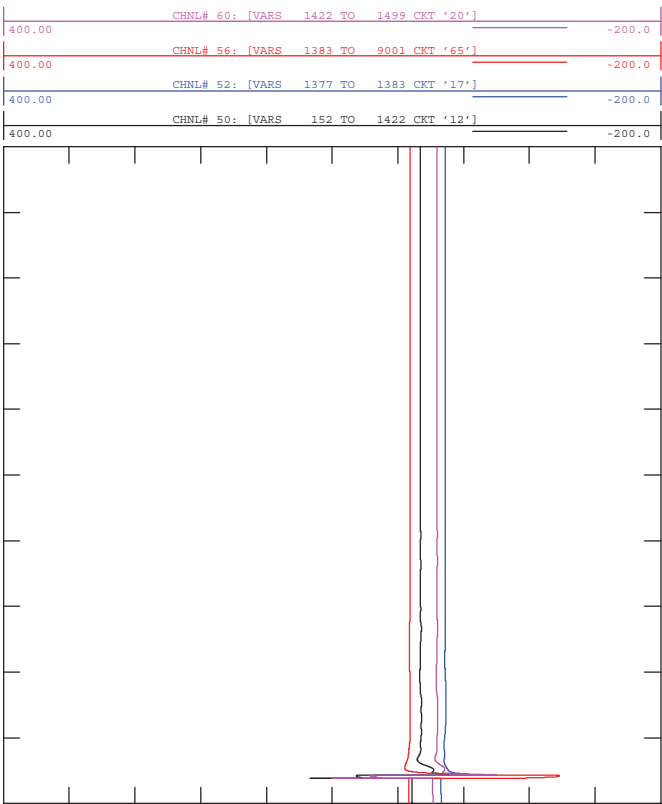




FIGURE E-131
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: E-13_7L115_Kinsella.out



TUE, JUN 02 2015 18:10
BRANCH REACTIVE PWR (MVR)

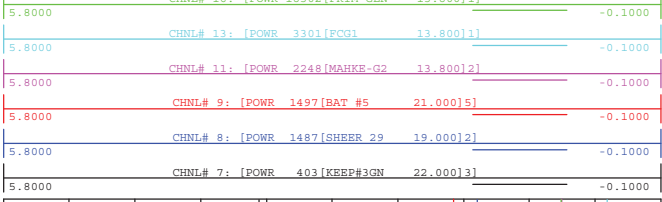


FIGURE E-14B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-14 7L117 IrishCreek.out

CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:10
MACHINE P COAL (PU)

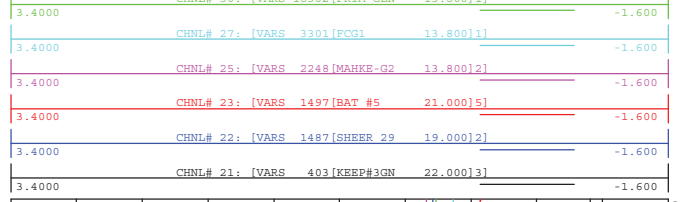


FIGURE E-14D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-14 7L117 IrishCreek.out

CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:10
MACHINE Q COAL (PU)

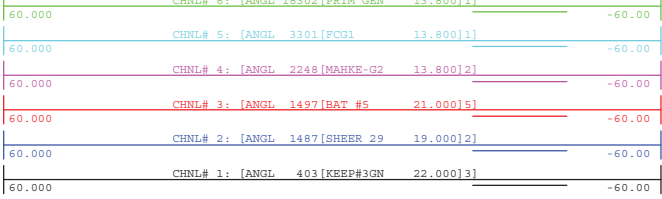


FIGURE E-14A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-14 7L117 IrishCreek.out

CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:10
MACHINE ANGLE (DEGREES)

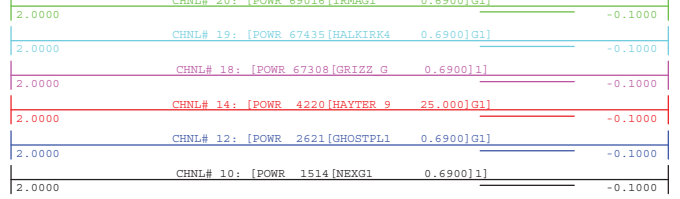


FIGURE E-14C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-14 7L117 IrishCreek.out

CHNL# 20: [POWR 69016[TRMAG1 0.6900]G1]



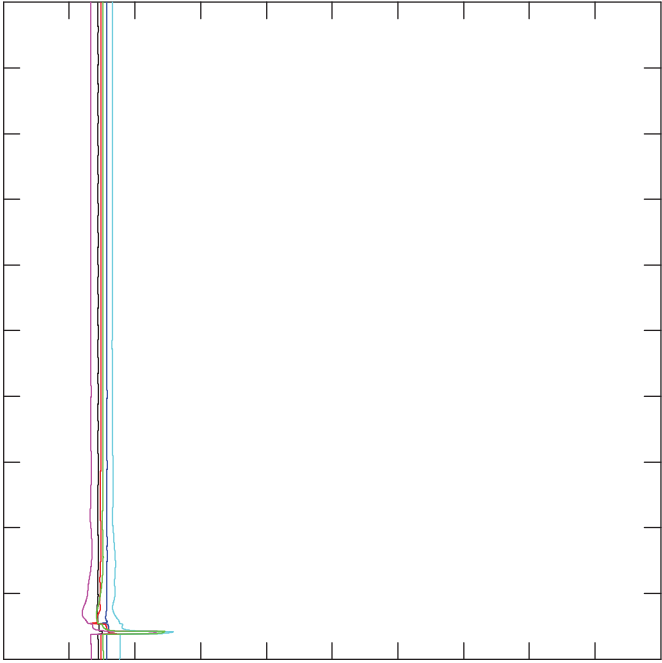
TUE, JUN 02 2015 18:10
MACHINE P WIND (PU)



FIGURE E-14F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-14_7L117_IrishCreek.out

1.2000	CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]	0.0
1.2000	CHNL# 41: [VOLT 3301 [PCG1 13.800]]	0.0
1.2000	CHNL# 39: [VOLT 2248 [MAHKE-G2 13.800]]	0.0
1.2000	CHNL# 37: [VOLT 1497 [BAT #5 21.000]]	0.0
1.2000	CHNL# 36: [VOLT 1487 [SHEER 29 19.000]]	0.0
1.2000	CHNL# 35: [VOLT 403 [KEEP#3GN 22.000]]	0.0



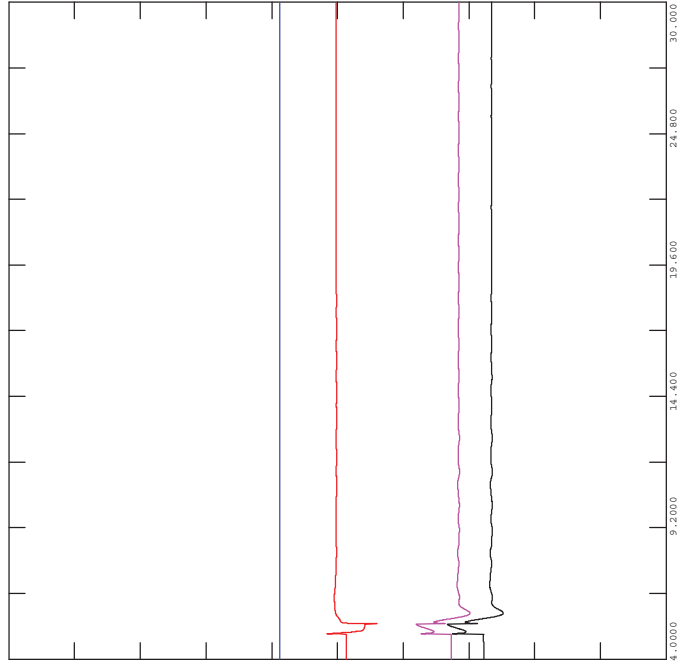
18:10
TUE, JUN 02 2015
MACHINE VOLTAGE COAL (PU)



FIGURE E-14H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-14_7L117_IrishCreek.out

280.00	CHNL# 59: [POWR 1422 TO 1499 CKT '20']	-400.0
280.00	CHNL# 55: [POWR 1383 TO 9001 CKT '65']	-400.0
280.00	CHNL# 51: [POWR 1377 TO 1383 CKT '17']	-400.0
280.00	CHNL# 49: [POWR 152 TO 1422 CKT '12']	-400.0



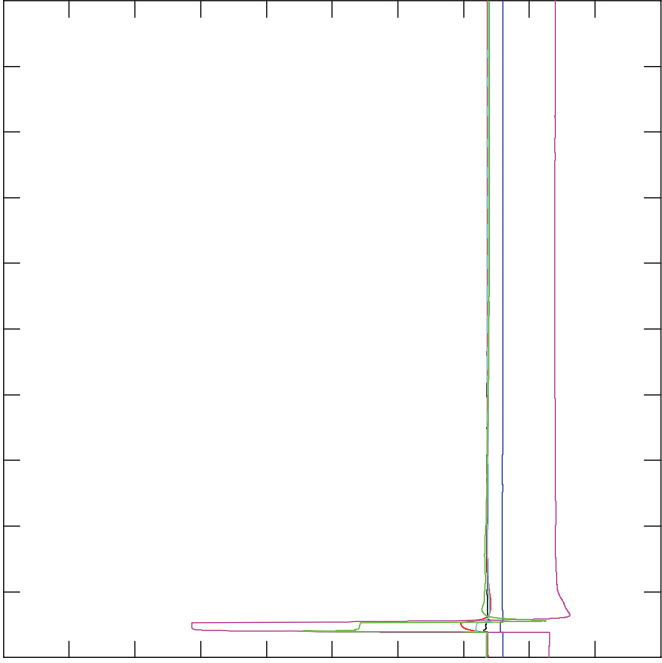
18:10
TUE, JUN 02 2015
BRANCH ACTIVE POWER (MW)



FIGURE E-14E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-14_7L117_IrishCreek.out

1.4000	CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]	-0.5000
1.4000	CHNL# 33: [VARS 67435 [HALKIRK4 0.6900]G1]	-0.5000
1.4000	CHNL# 32: [VARS 67308 [GRIZZ G 0.6900]1]	-0.5000
1.4000	CHNL# 28: [VARS 4220 [HAYTER 9 25.000]G1]	-0.5000
1.4000	CHNL# 26: [VARS 2621 [GHOSTPL1 0.6900]G1]	-0.5000
1.4000	CHNL# 24: [VARS 1514 [NEXG1 0.6900]1]	-0.5000



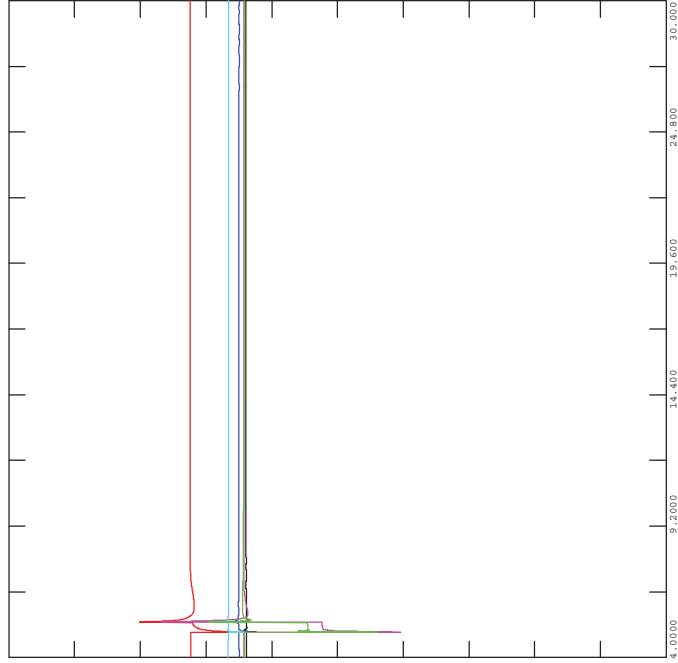
18:10
TUE, JUN 02 2015
MACHINE Q WIND (PU)



FIGURE E-14G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-14_7L117_IrishCreek.out

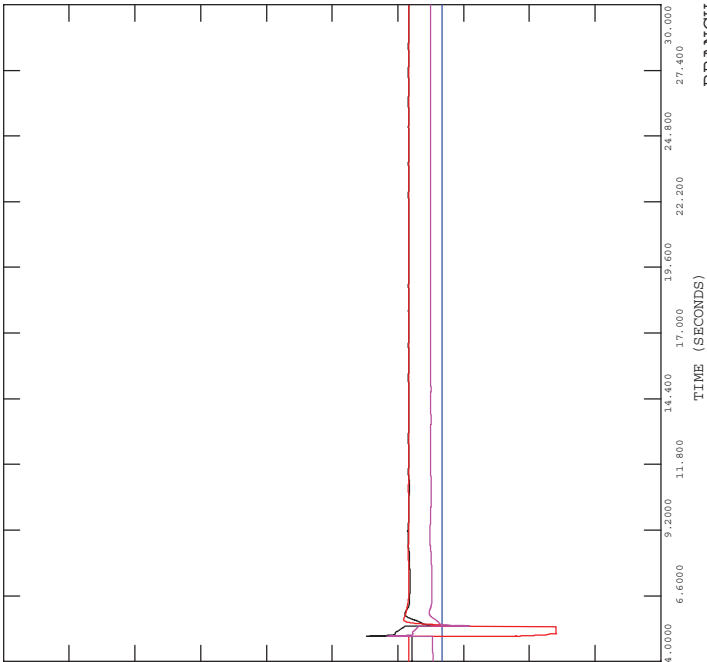
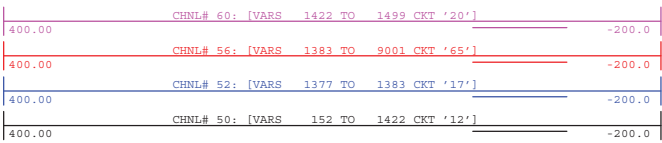
1.6000	CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]	0.0
1.6000	CHNL# 47: [VOLT 67435 [HALKIRK4 0.6900]]	0.0
1.6000	CHNL# 46: [VOLT 67308 [GRIZZ G 0.6900]]	0.0
1.6000	CHNL# 42: [VOLT 4220 [HAYTER 9 25.000]]	0.0
1.6000	CHNL# 40: [VOLT 2621 [GHOSTPL1 0.6900]]	0.0
1.6000	CHNL# 38: [VOLT 1514 [NEXG1 0.6900]]	0.0



18:10
TUE, JUN 02 2015
MACHINE VOLTAGE WIND (PU)



FIGURE E-14I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-14_7L117_IrishCreek.out



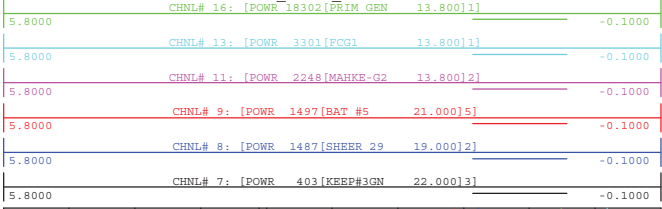
TUE, JUN 02 2015 18:11
BRANCH REACTIVE PWR (MVR)



FIGURE E-15B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-15 7L117 Vermillion.out



TUE, JUN 02 2015 18:11
MACHINE P COAL (PU)

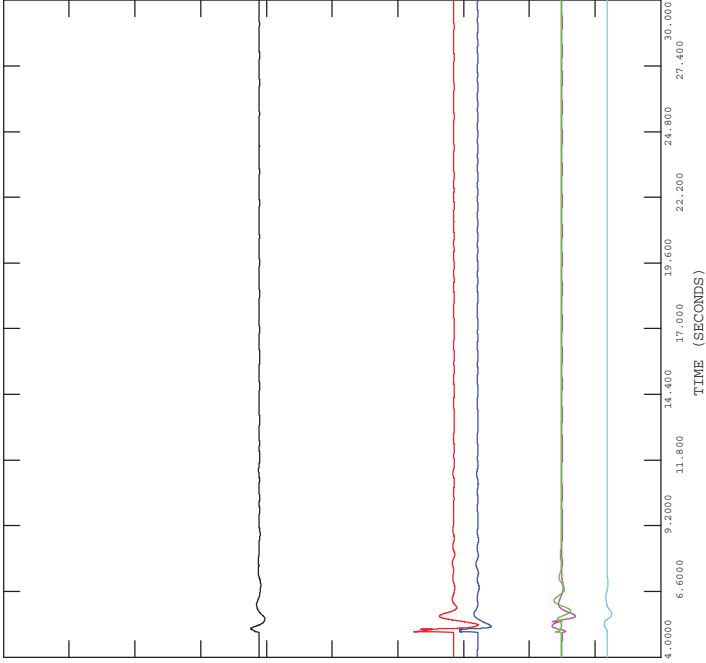
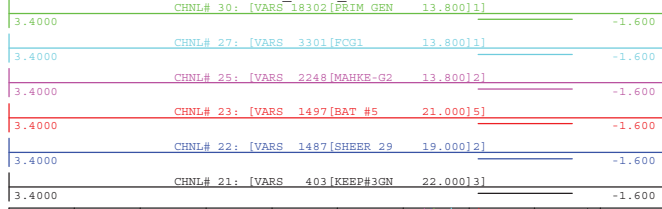


FIGURE E-15D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-15 7L117 Vermillion.out



TUE, JUN 02 2015 18:11
MACHINE Q COAL (PU)

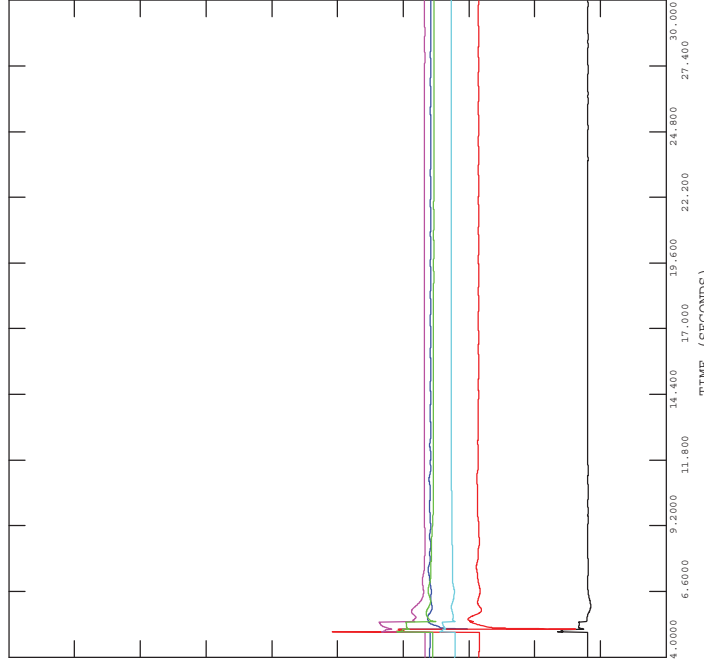
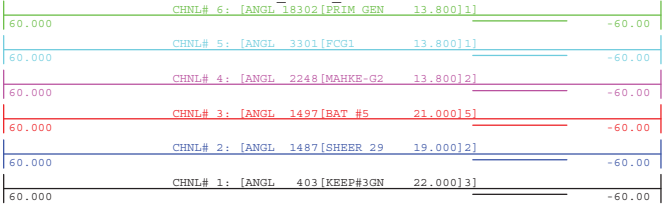


FIGURE E-15A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-15 7L117 Vermillion.out



TUE, JUN 02 2015 18:11
MACHINE ANGLE (DEGREES)

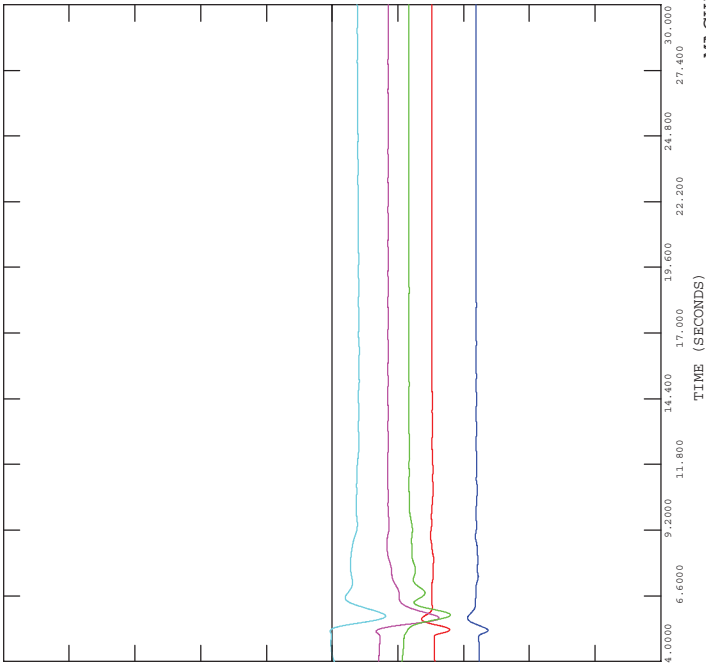
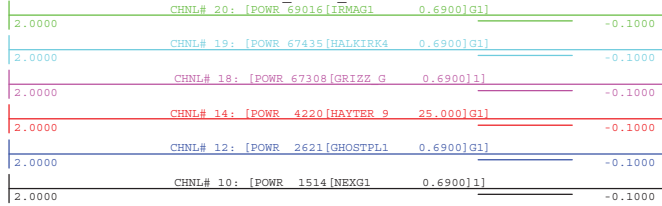


FIGURE E-15C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-15 7L117 Vermillion.out



TUE, JUN 02 2015 18:11
MACHINE P WIND (PU)

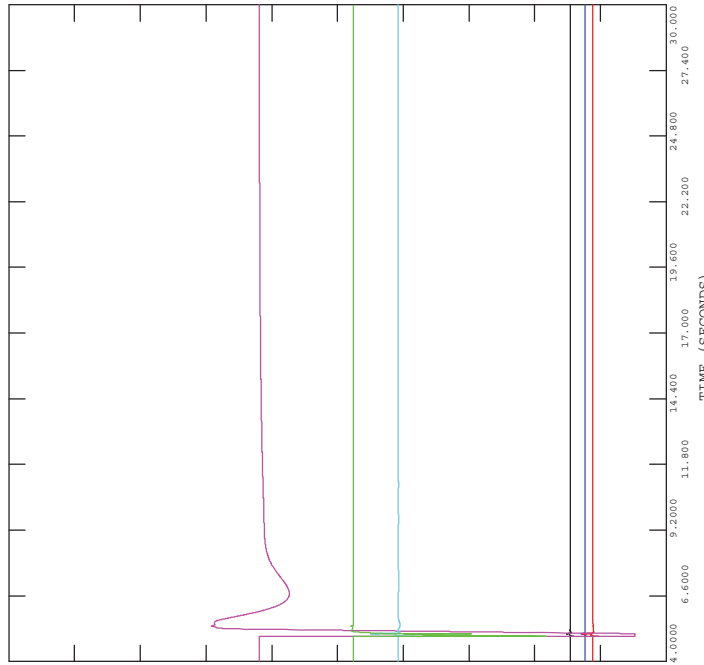




FIGURE E-15F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L117_Vermillion.out

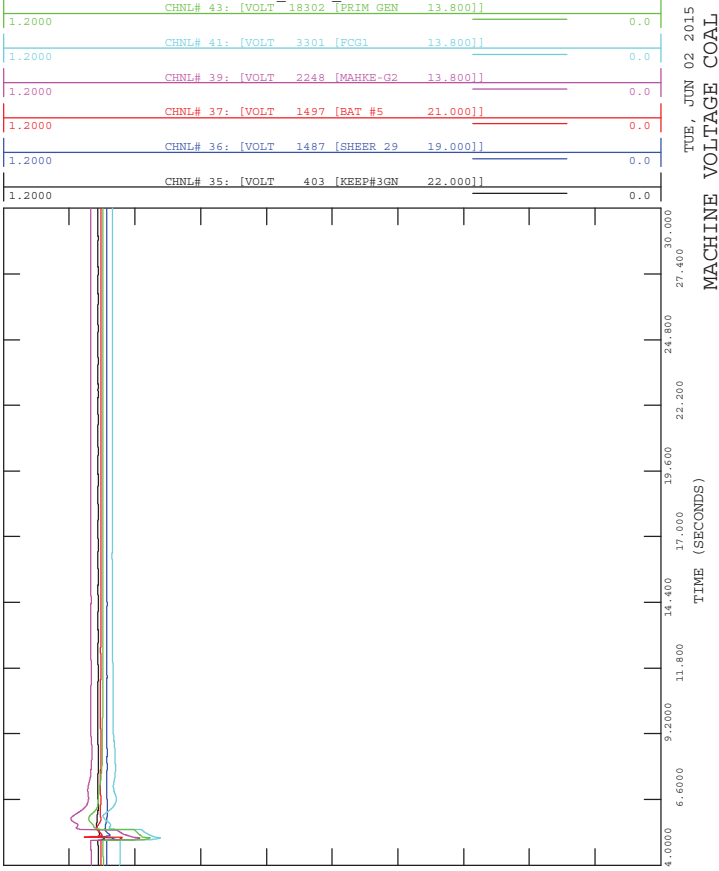


FIGURE E-15H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L117_Vermillion.out

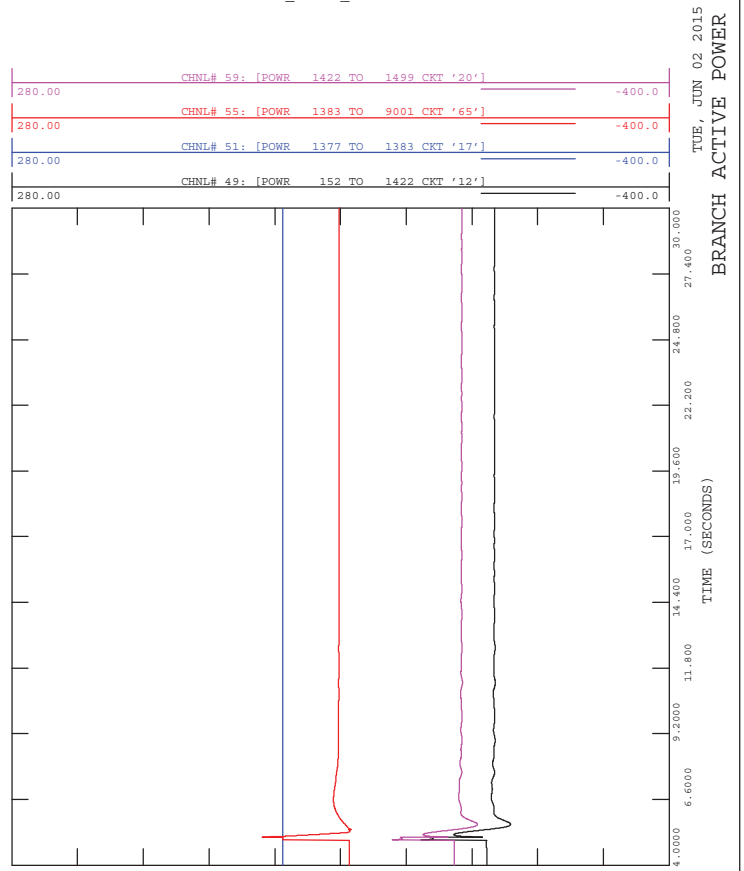


FIGURE E-15E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L117_Vermillion.out

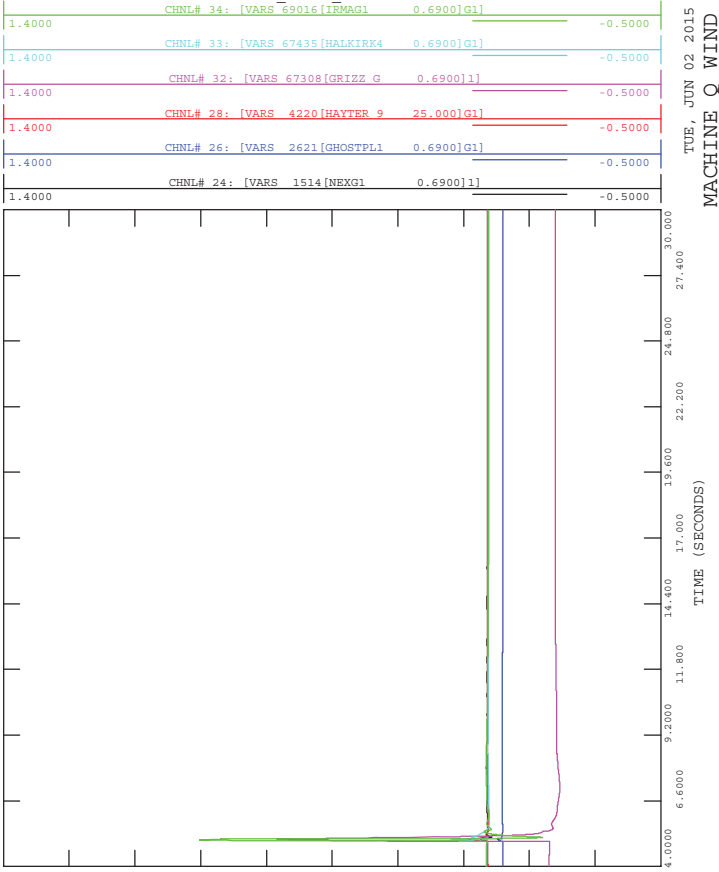


FIGURE E-15G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L117_Vermillion.out

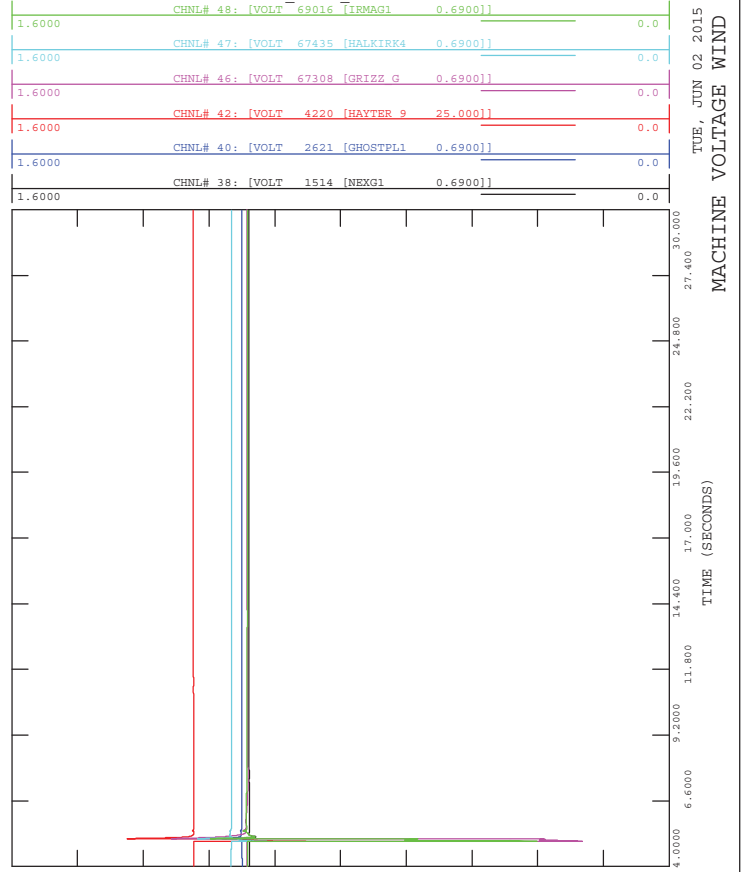
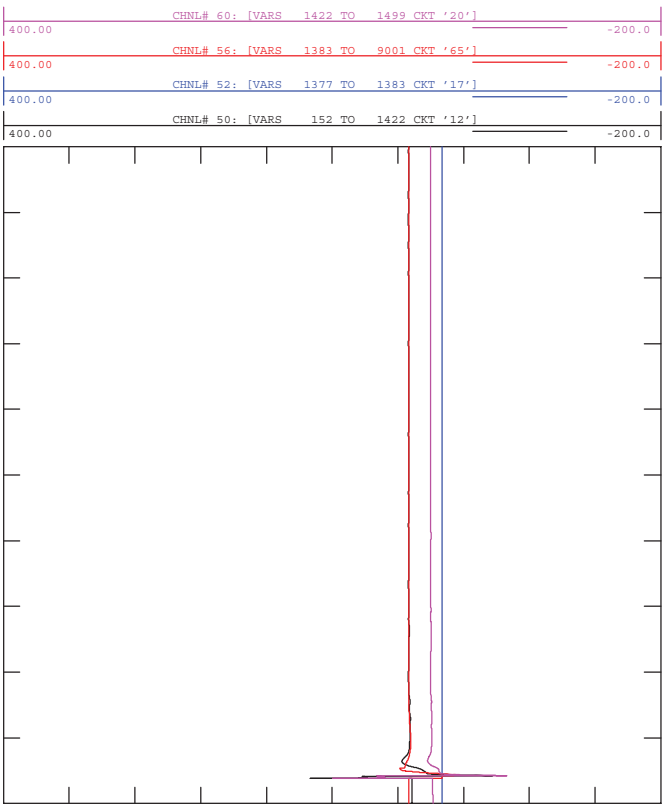




FIGURE E-151
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-15_7L117_Vermillion.out



TUE, JUN 02 2015 18:11
BRANCH REACTIVE PWR (MVR)



FIGURE E-16B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-16 7L129_Buffalo.out

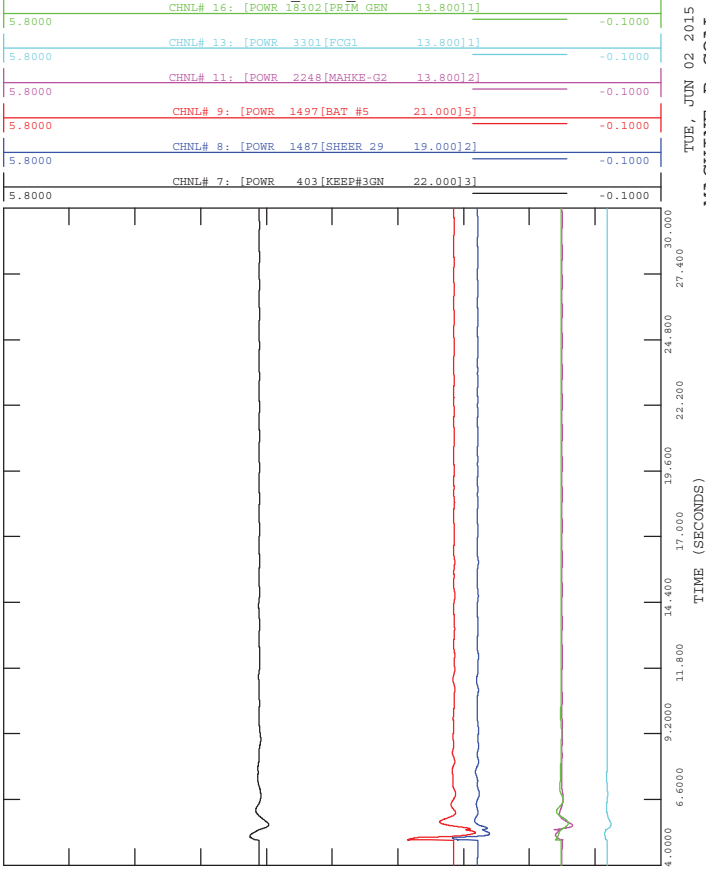


FIGURE E-16D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-16 7L129_Buffalo.out

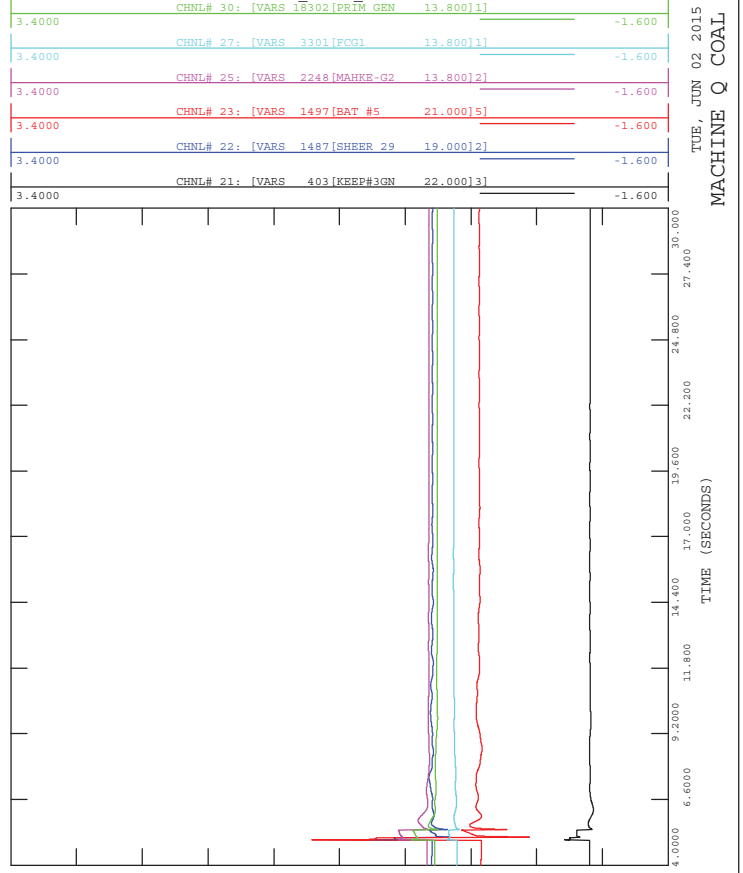


FIGURE E-16A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-16 7L129_Buffalo.out

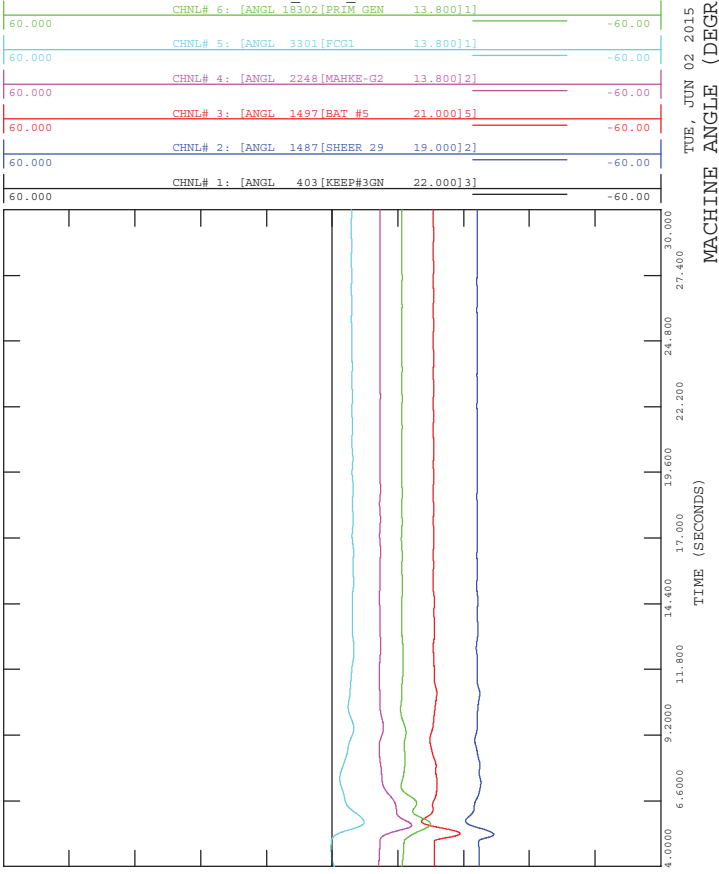


FIGURE E-16C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-16 7L129_Buffalo.out

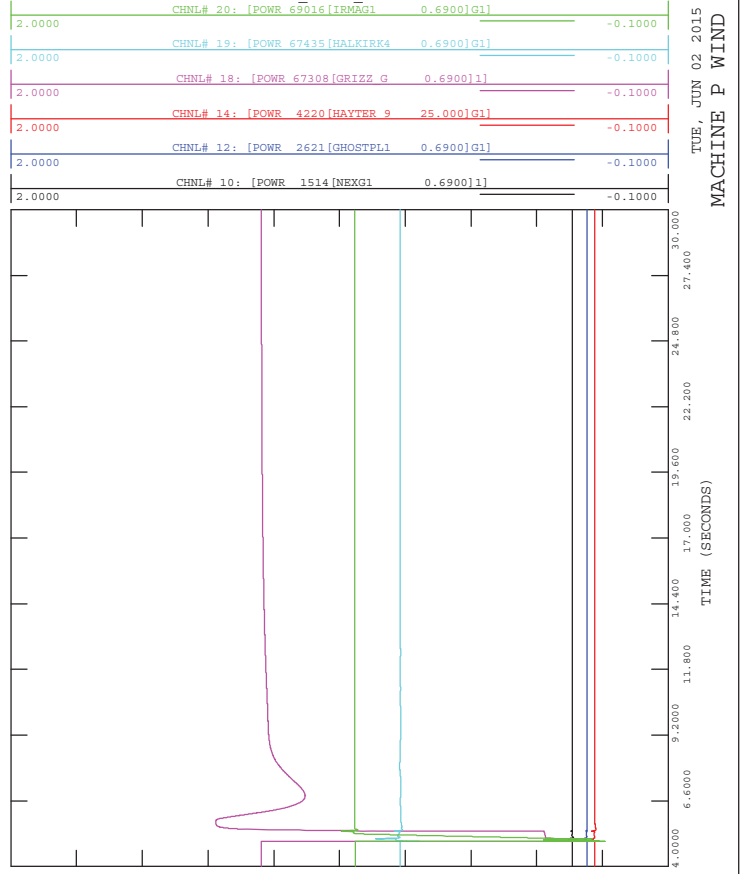




FIGURE E-16F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-16_7L129_Buffalo.out

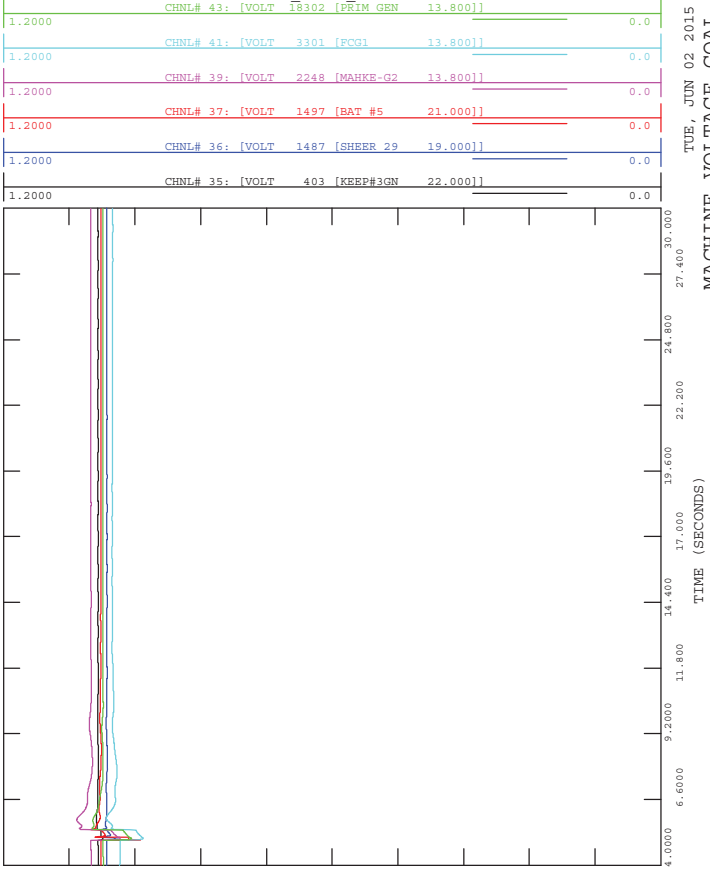


FIGURE E-16H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-16_7L129_Buffalo.out

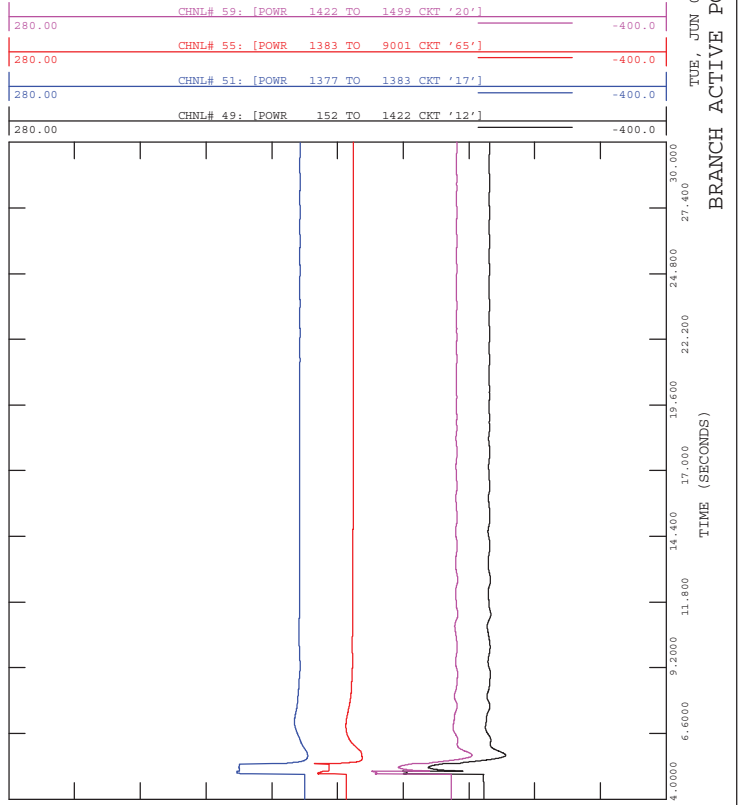


FIGURE E-16E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-16_7L129_Buffalo.out

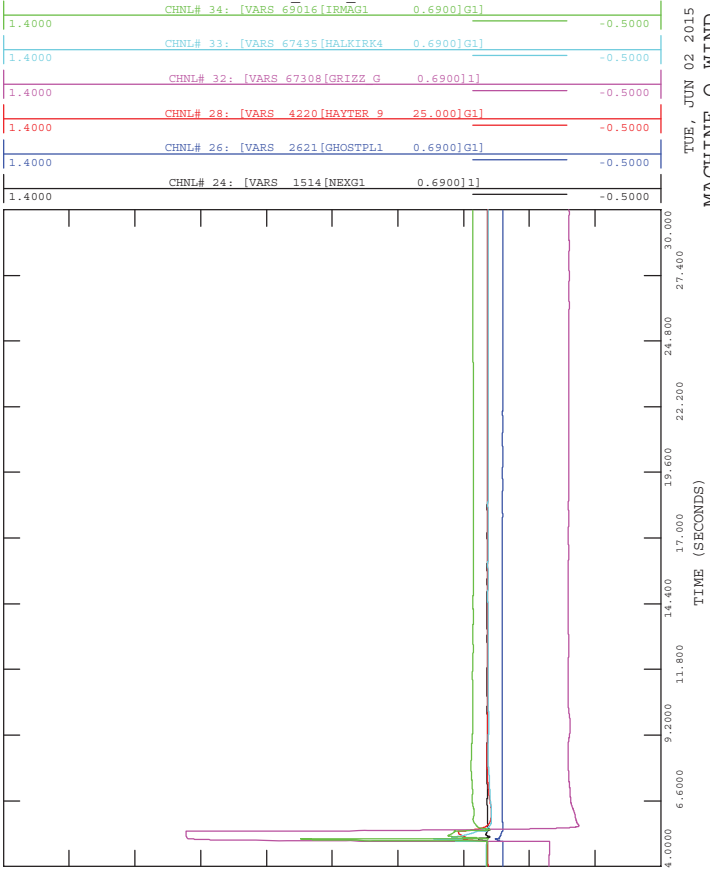


FIGURE E-16G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-16_7L129_Buffalo.out

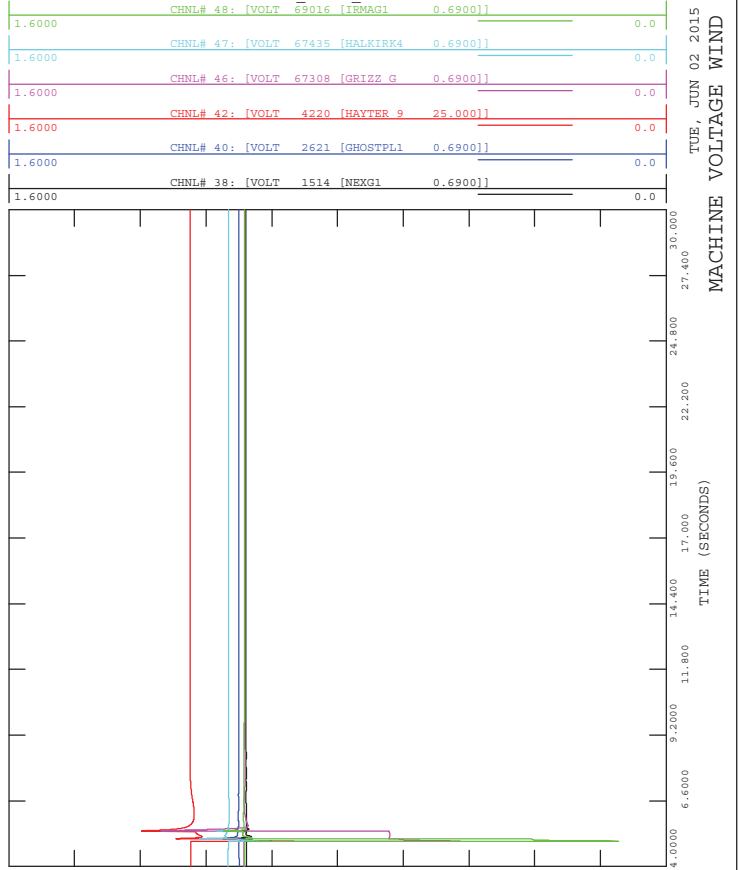
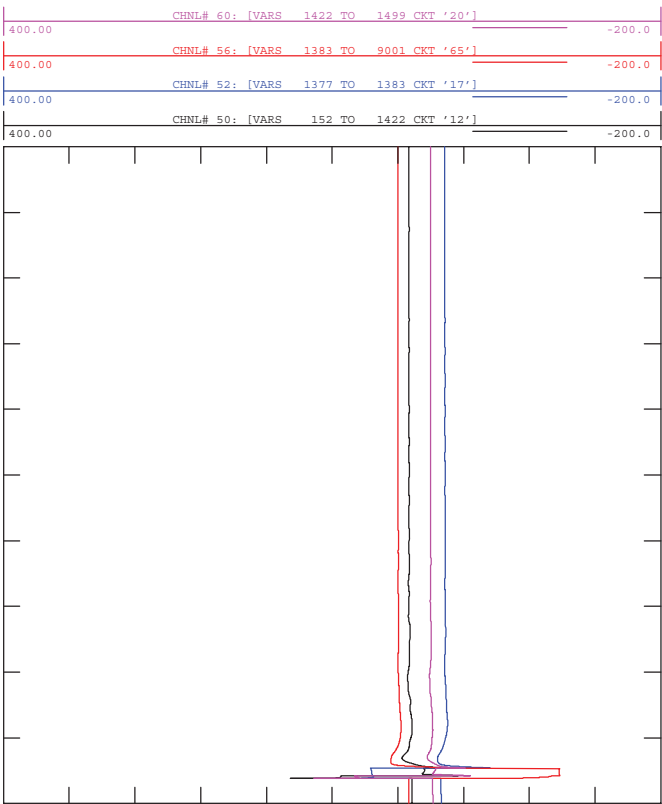




FIGURE E-16I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-16_7L129_Buffalo.out



TUE, JUN 02 2015 18:11
BRANCH REACTIVE PWR (MVR)



FIGURE E-17B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES

FILE: E-17_7L129_Vermilion.out

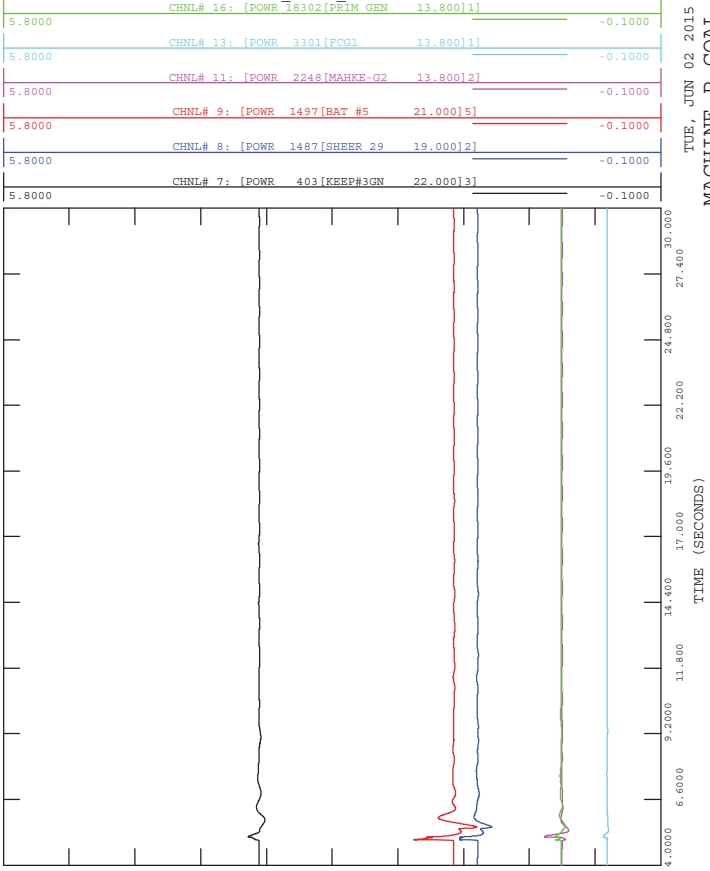


FIGURE E-17D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES

FILE: E-17_7L129_Vermilion.out

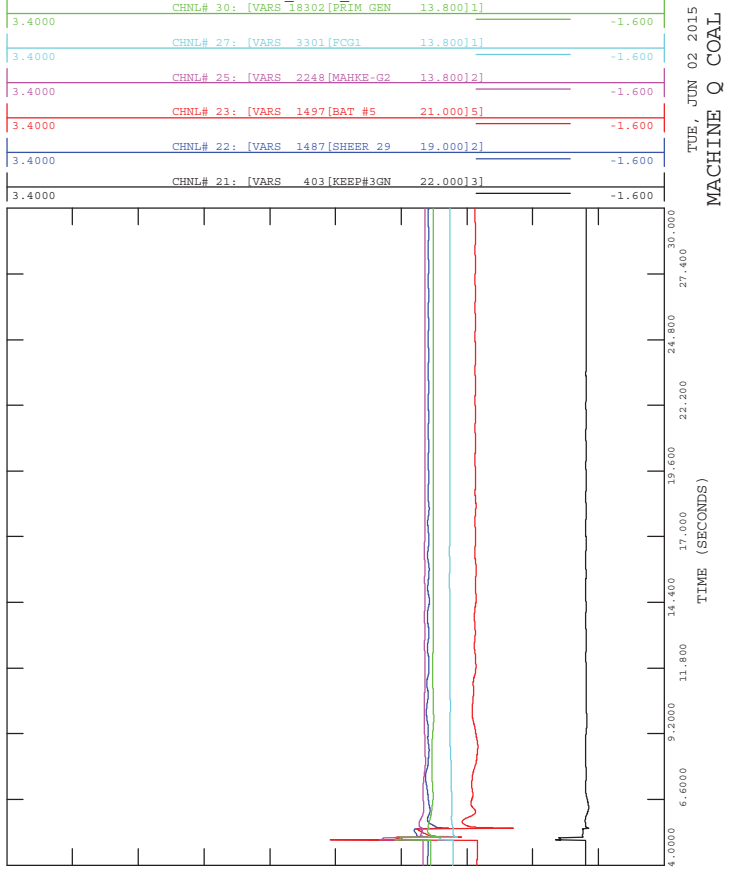


FIGURE E-17A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES

FILE: E-17_7L129_Vermilion.out

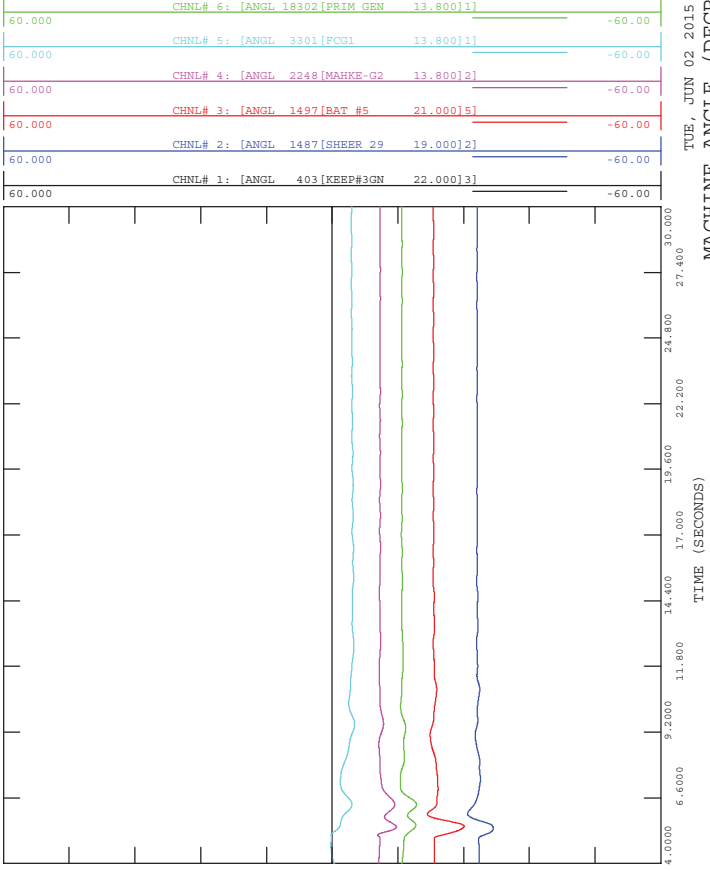


FIGURE E-17C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES

FILE: E-17_7L129_Vermilion.out

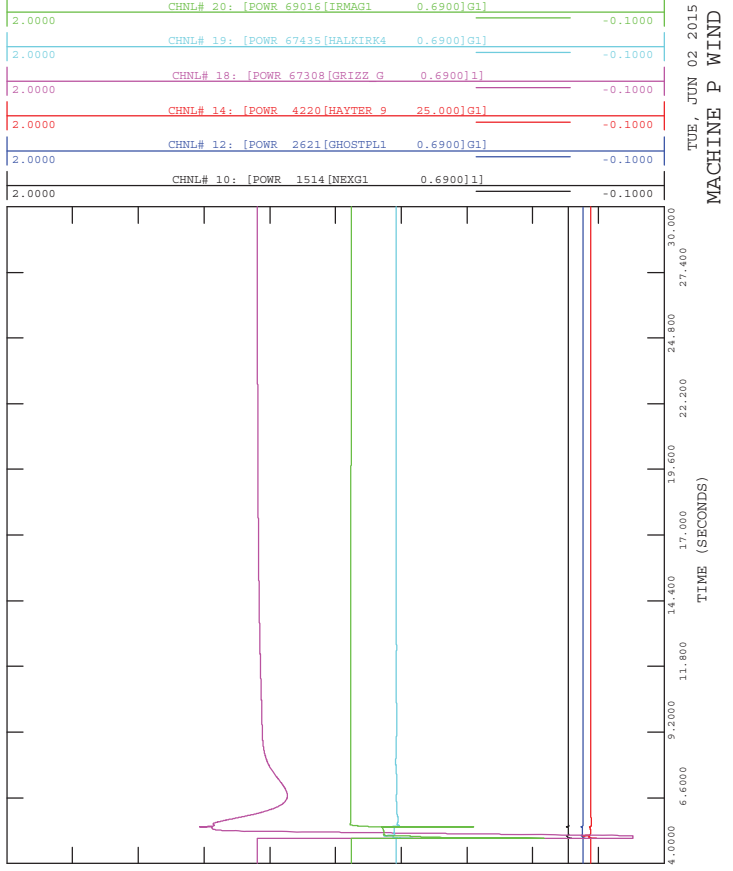




FIGURE E-171
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: E-17_7L129_Vermilion.out

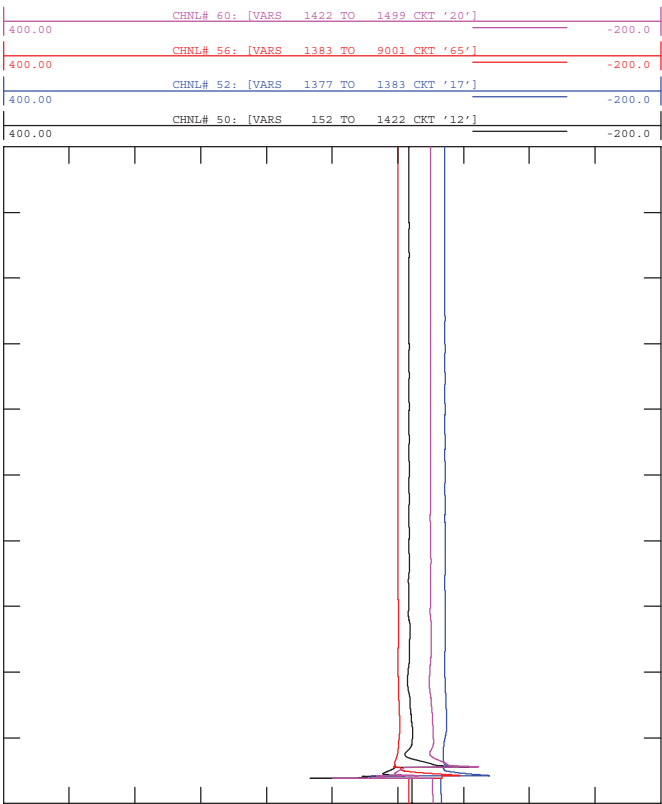


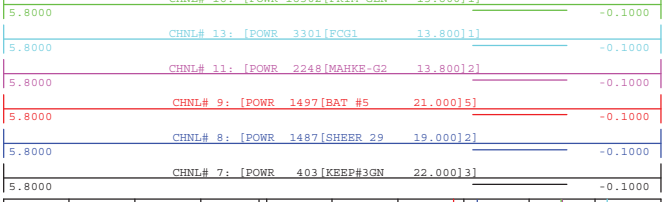


FIGURE E-18B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: E-18 7L134 Vegreville.out

CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:11
MACHINE P COAL (PU)

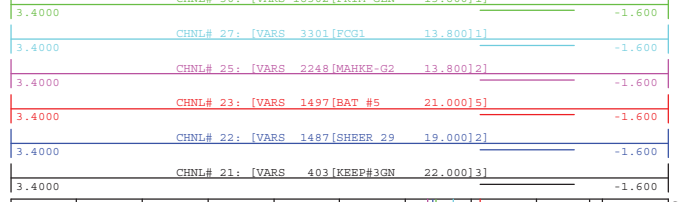


FIGURE E-18D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: E-18 7L134 Vegreville.out

CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:11
MACHINE Q COAL (PU)

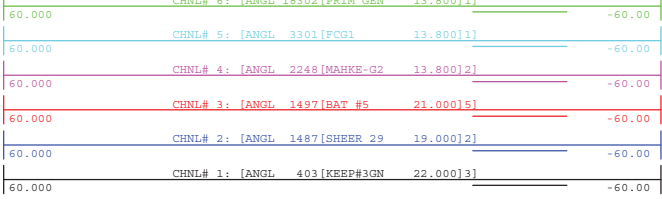


FIGURE E-18A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: E-18 7L134 Vegreville.out

CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:11
MACHINE ANGLE (DEGREES)

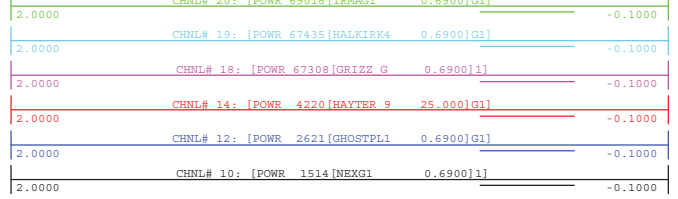


FIGURE E-18C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: E-18 7L134 Vegreville.out

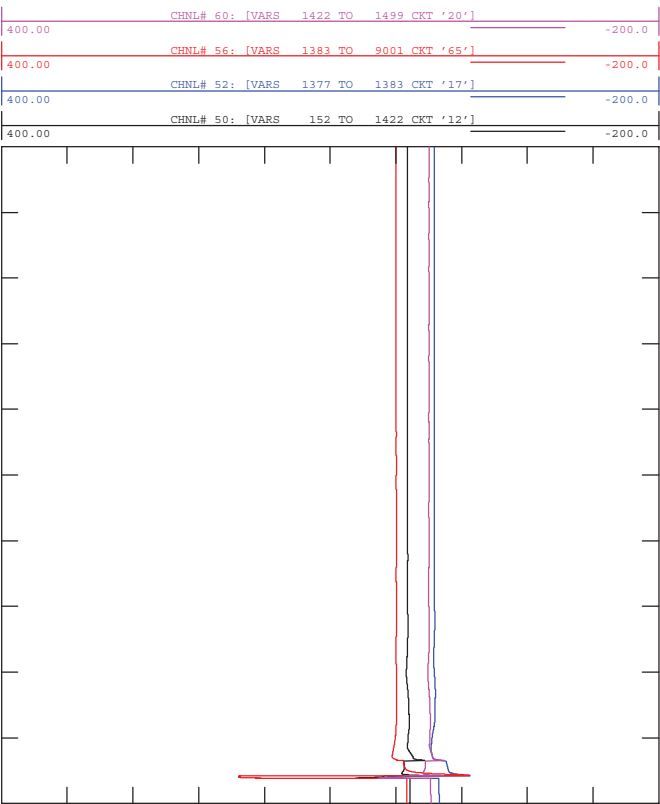
CHNL# 20: [POWR 69016[IRWAG 0.6900]G1]



TUE, JUN 02 2015 18:11
MACHINE P WIND (PU)



FIGURE E-181
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: E-18_7L134_Vegreville.out



TUE, JUN 02 2015 18:11
BRANCH REACTIVE PWR (MVR)



FIGURE E-19B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-19_7L134_Vincent.out

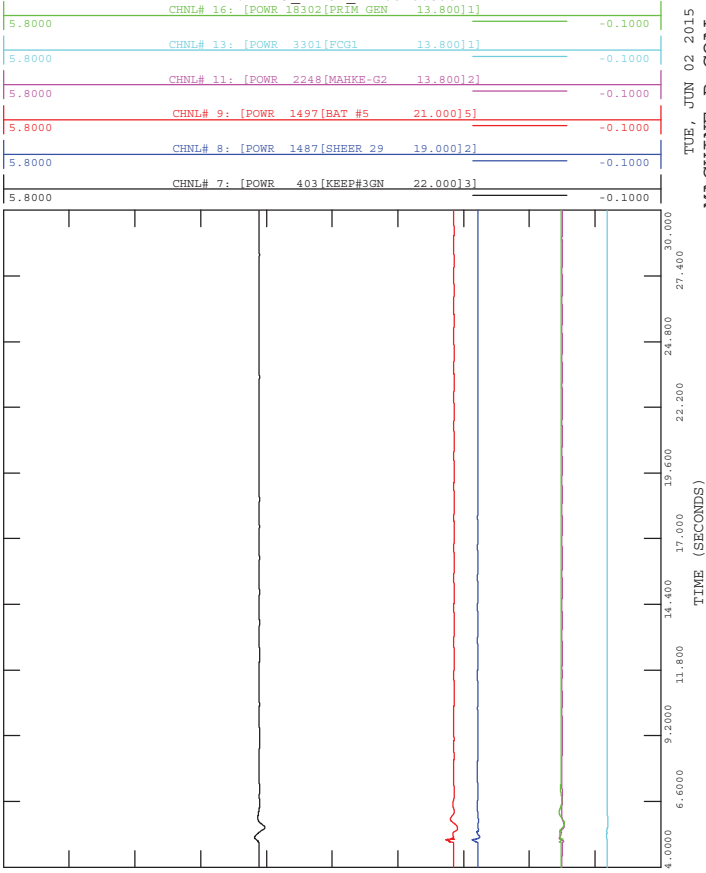


FIGURE E-19D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-19_7L134_Vincent.out

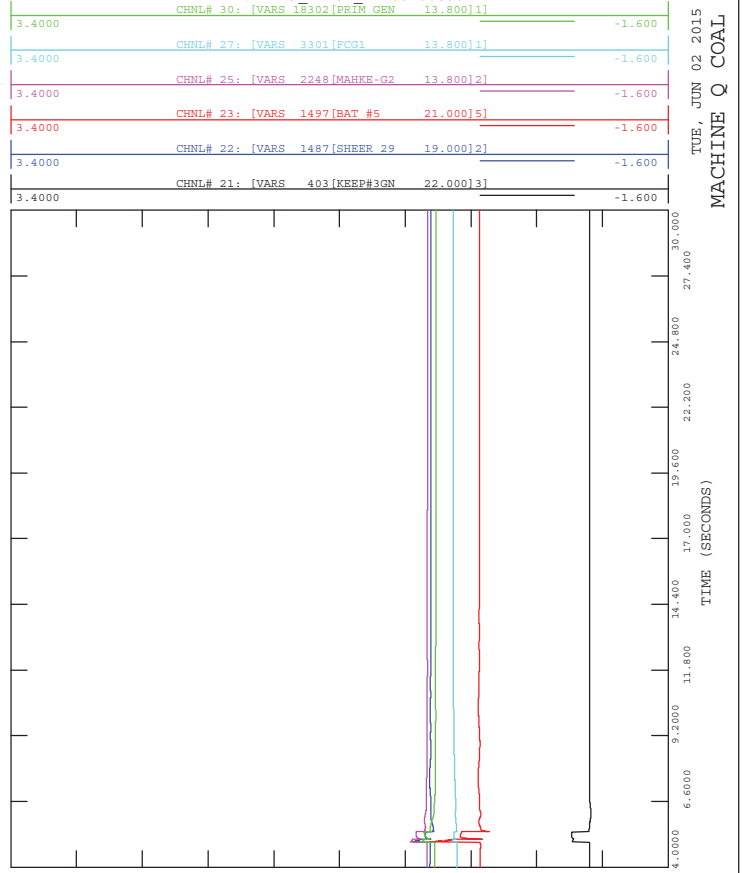


FIGURE E-19A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-19_7L134_Vincent.out

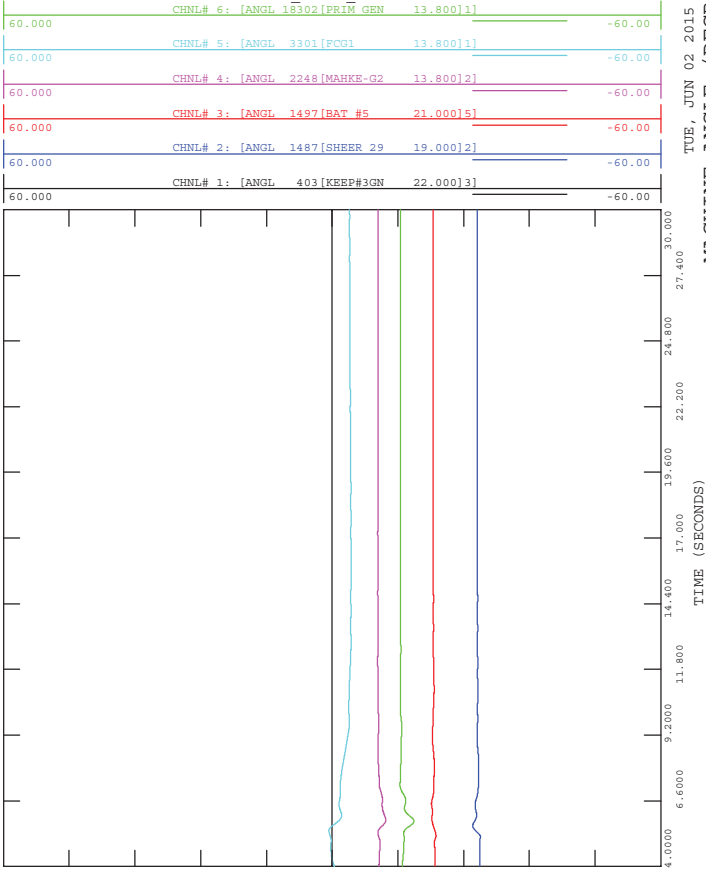


FIGURE E-19C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-19_7L134_Vincent.out

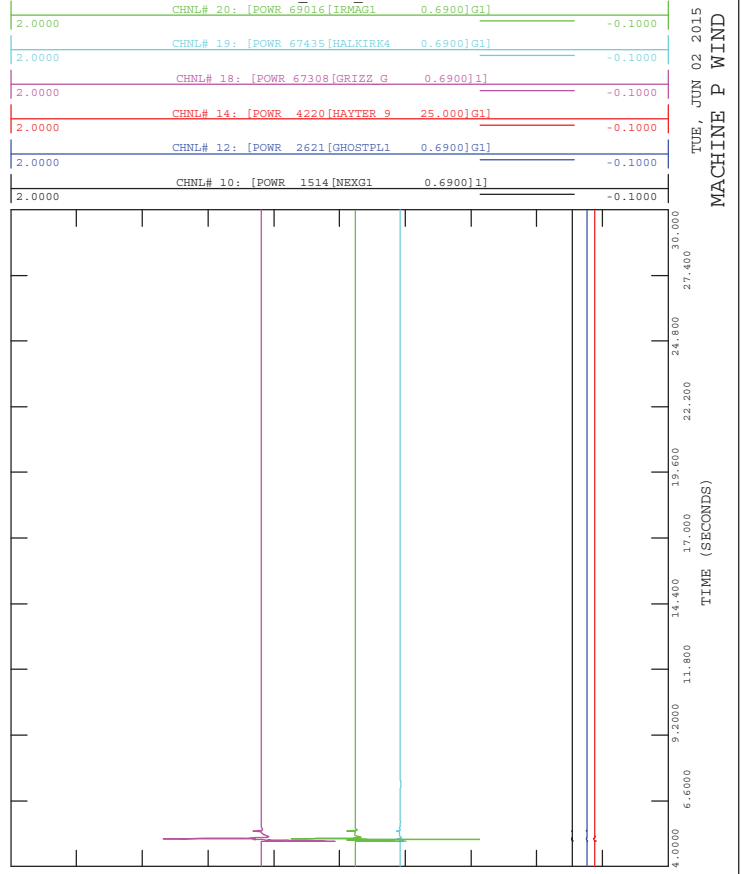




FIGURE E-19I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-19_7L134_Vincent.out

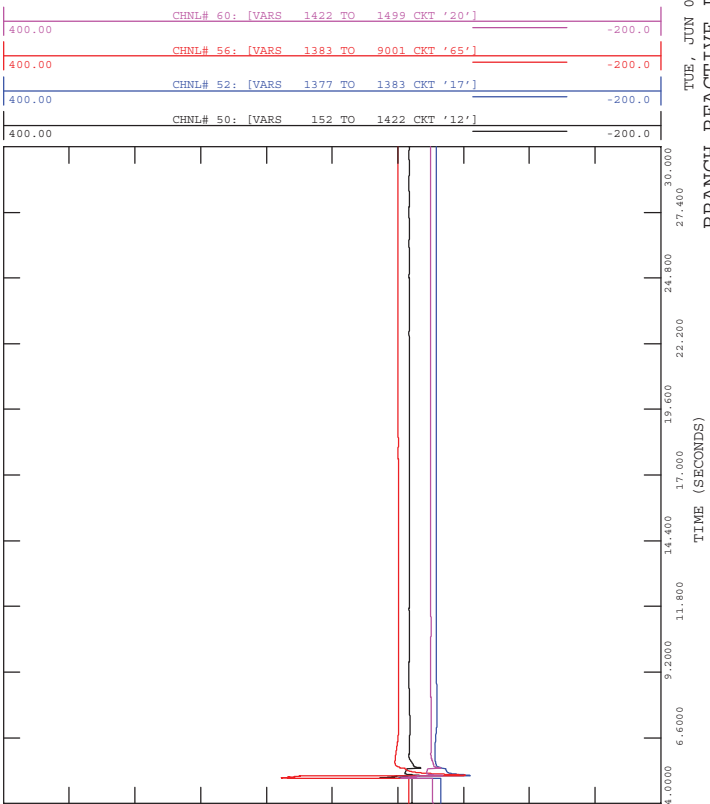
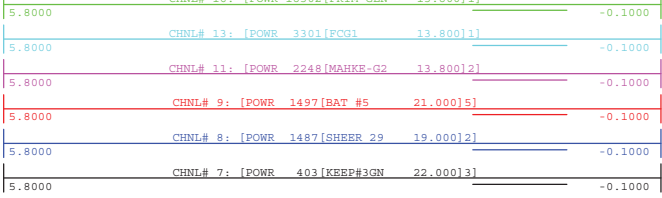




FIGURE E-20B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: E-20_7L701_BattleRiver.out
CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



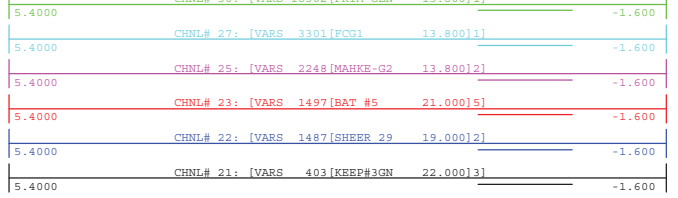
TUE, JUN 02 2015 18:11
MACHINE P COAL (PU)



FIGURE E-20D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: E-20_7L701_BattleRiver.out
CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



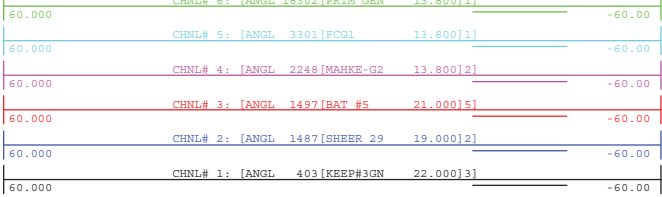
TUE, JUN 02 2015 18:11
MACHINE Q COAL (PU)



FIGURE E-20A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: E-20_7L701_BattleRiver.out
CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



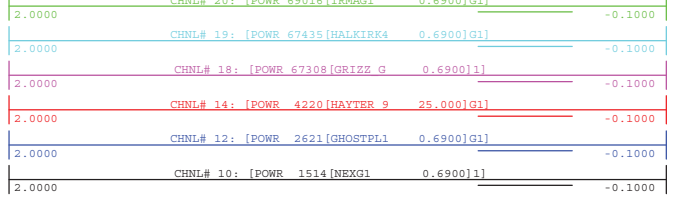
TUE, JUN 02 2015 18:11
MACHINE P (DEGREES)



FIGURE E-20C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: E-20_7L701_BattleRiver.out
CHNL# 20: [POWR 69016[TRWAG1 0.6900]G1]



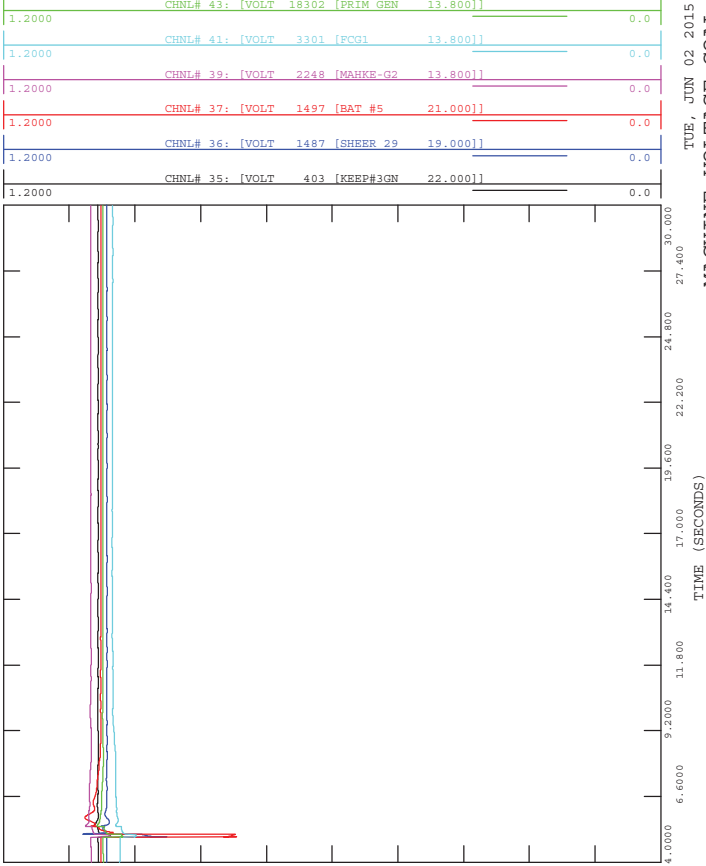
TUE, JUN 02 2015 18:11
MACHINE P WIND (PU)



FIGURE E-20F

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: E-20_7L701_BattleRiver.out
CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]



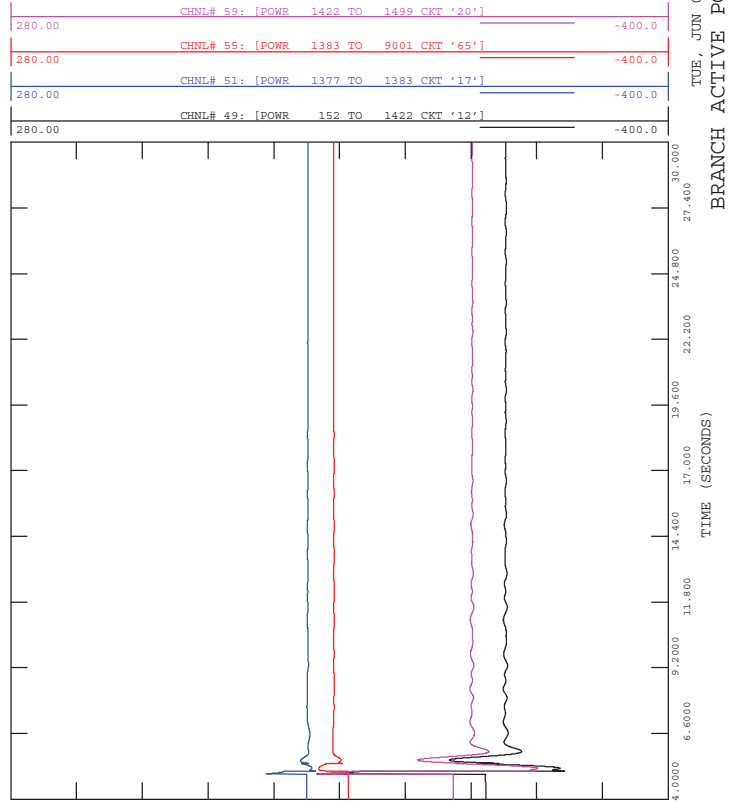
TUE, JUN 02 2015 18:11
MACHINE VOLTAGE COAL (PU)



FIGURE E-20H

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: E-20_7L701_BattleRiver.out



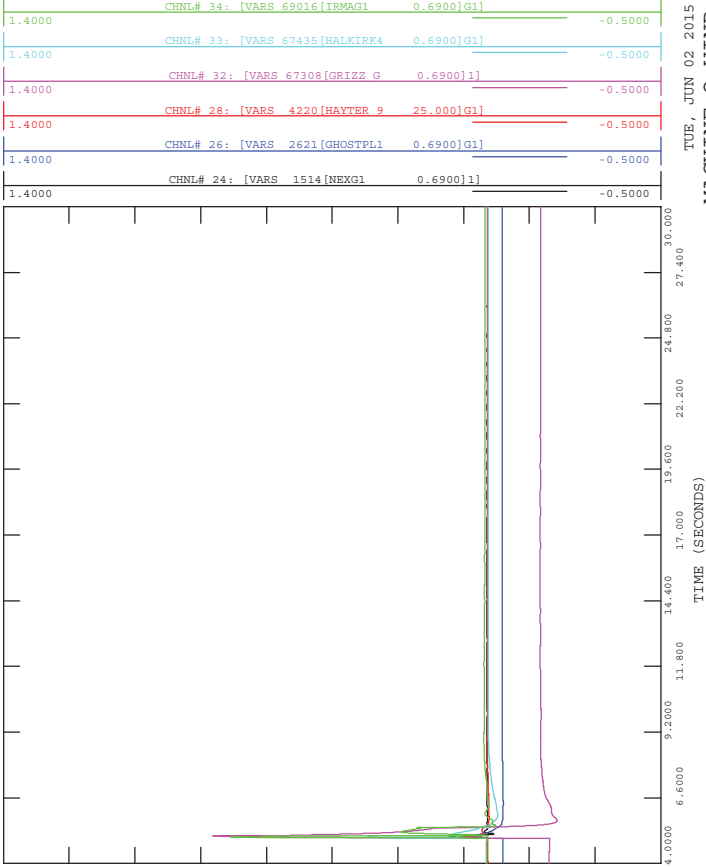
TUE, JUN 02 2015 18:11
BRANCH ACTIVE POWER (MW)



FIGURE E-20B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: E-20_7L701_BattleRiver.out
CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]



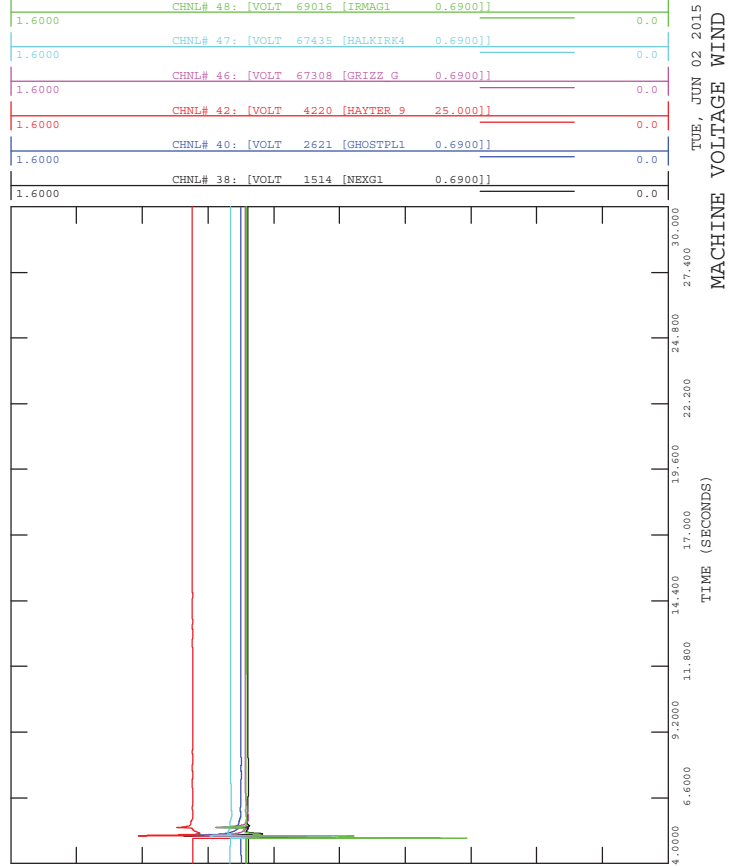
TUE, JUN 02 2015 18:11
MACHINE Q WIND (PU)



FIGURE E-20G

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

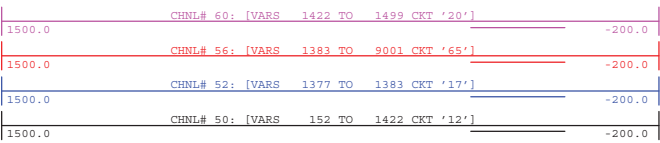
FILE: E-20_7L701_BattleRiver.out
CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]



TUE, JUN 02 2015 18:11
MACHINE VOLTAGE WIND (PU)



FIGURE E-201
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: E-20_7L701_BattleRiver.out



TUE, JUN 02 2015 18:11
BRANCH REACTIVE PWR (MVR)

TIME (SECONDS)

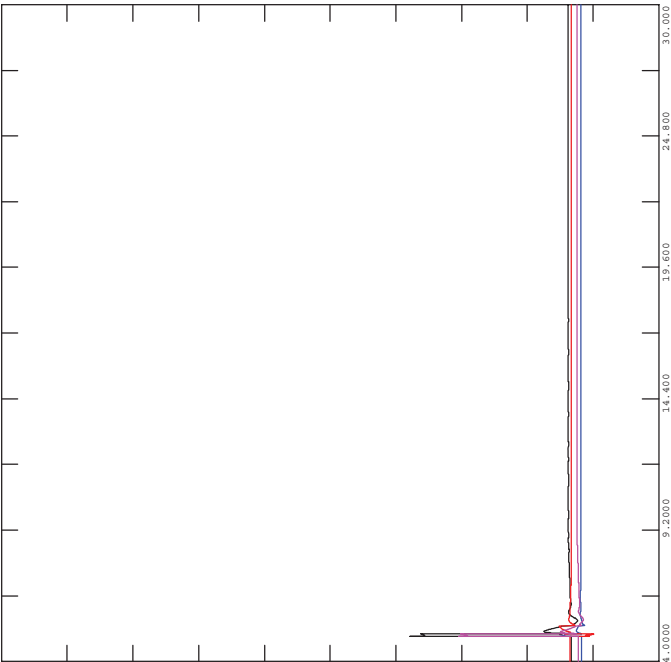




FIGURE E-21B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: E-21_7L701_Stome.out

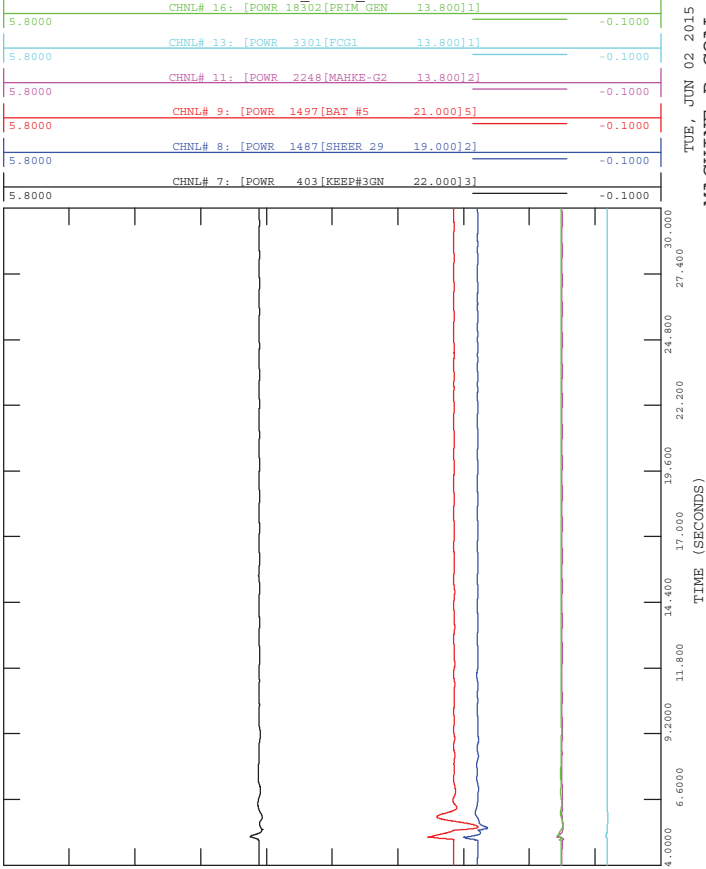


FIGURE E-21D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: E-21_7L701_Stome.out

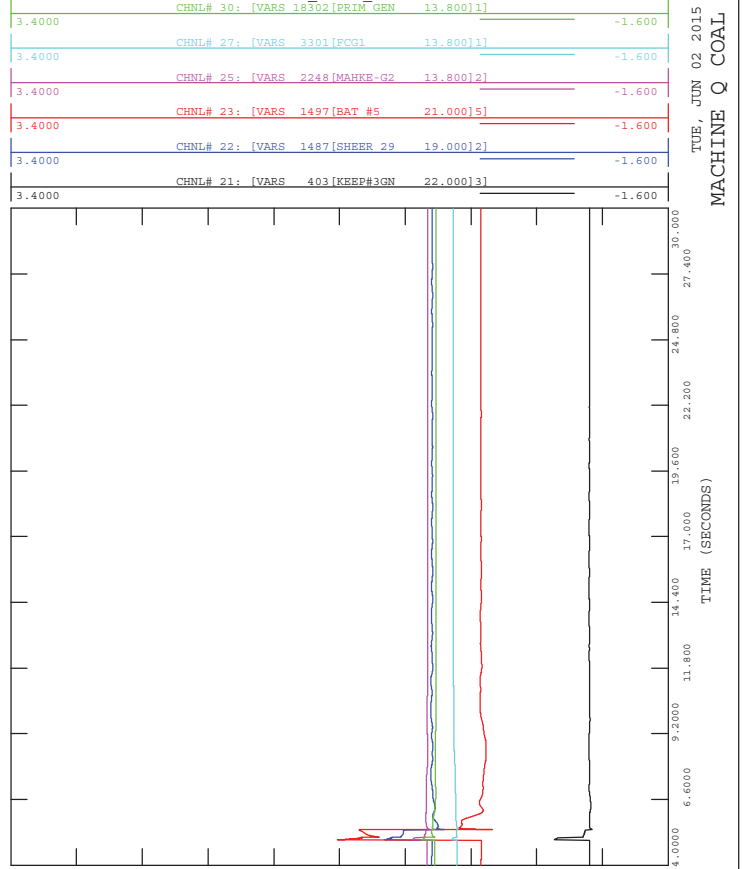


FIGURE E-21A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: E-21_7L701_Stome.out

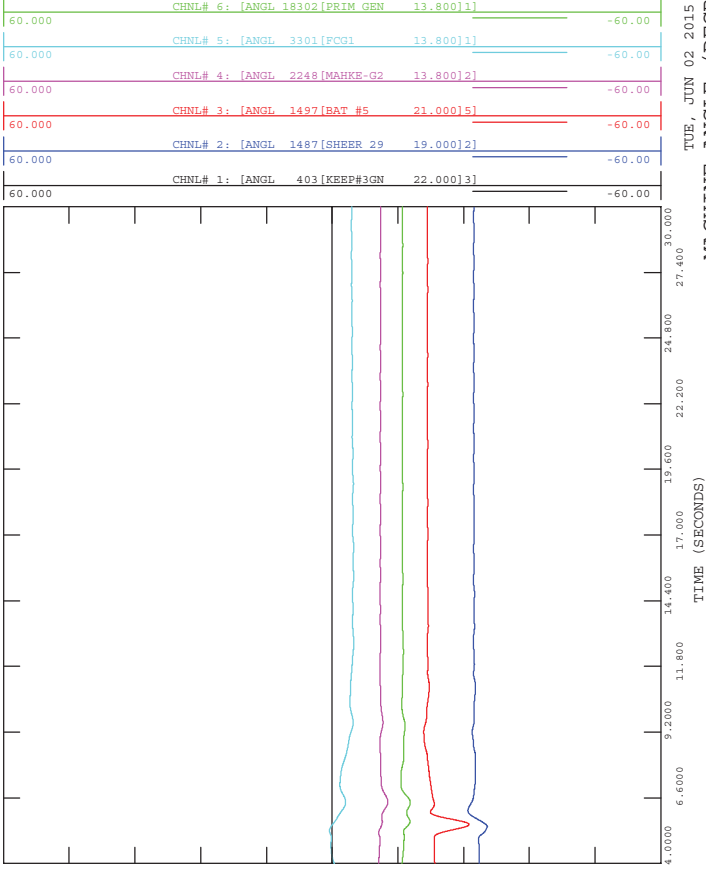


FIGURE E-21C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: E-21_7L701_Stome.out

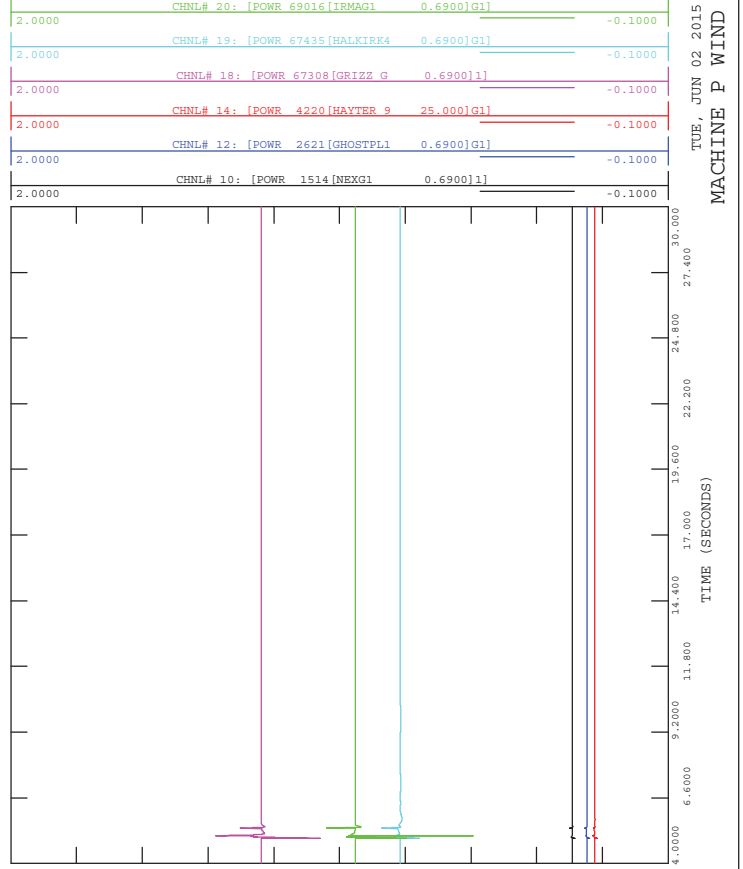
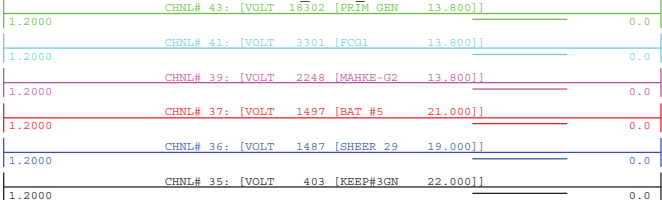




FIGURE E-21F

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: E-21_7L701_Stome.out



18:11
TUE, JUN 02 2015
MACHINE VOLTAGE COAL (PU)

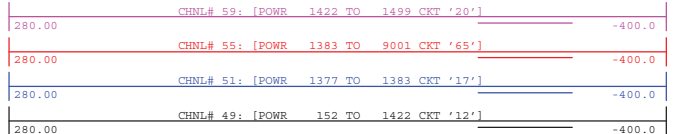
TIME (SECONDS)



FIGURE E-21H

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: E-21_7L701_Stome.out



18:11
TUE, JUN 02 2015
BRANCH ACTIVE POWER (MW)

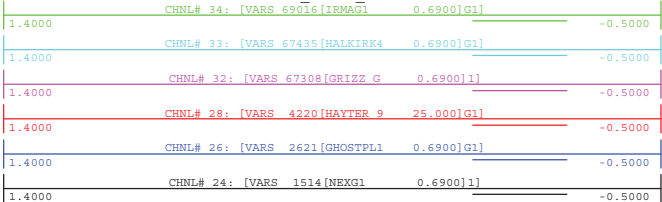
TIME (SECONDS)



FIGURE E-21B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: E-21_7L701_Stome.out



18:11
TUE, JUN 02 2015
MACHINE Q WIND (PU)

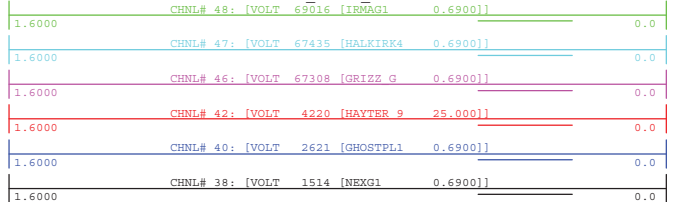
TIME (SECONDS)



FIGURE E-21G

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: E-21_7L701_Stome.out

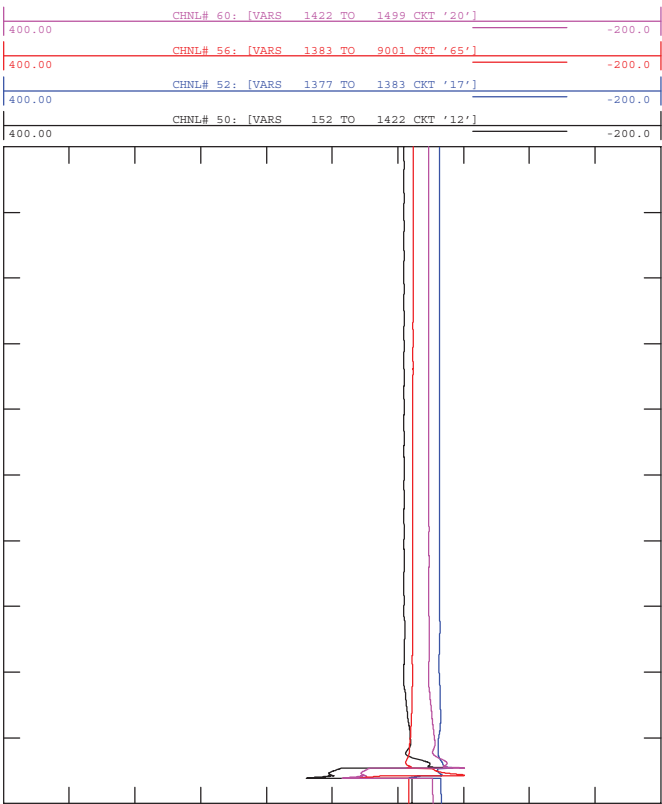


18:11
TUE, JUN 02 2015
MACHINE VOLTAGE WIND (PU)

TIME (SECONDS)



FIGURE E-211
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: E-21_7L701_Stome.out



TUE, JUN 02 2015 18:11
BRANCH REACTIVE PWR (MVR)



FIGURE E-22B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L_Edgerston.out

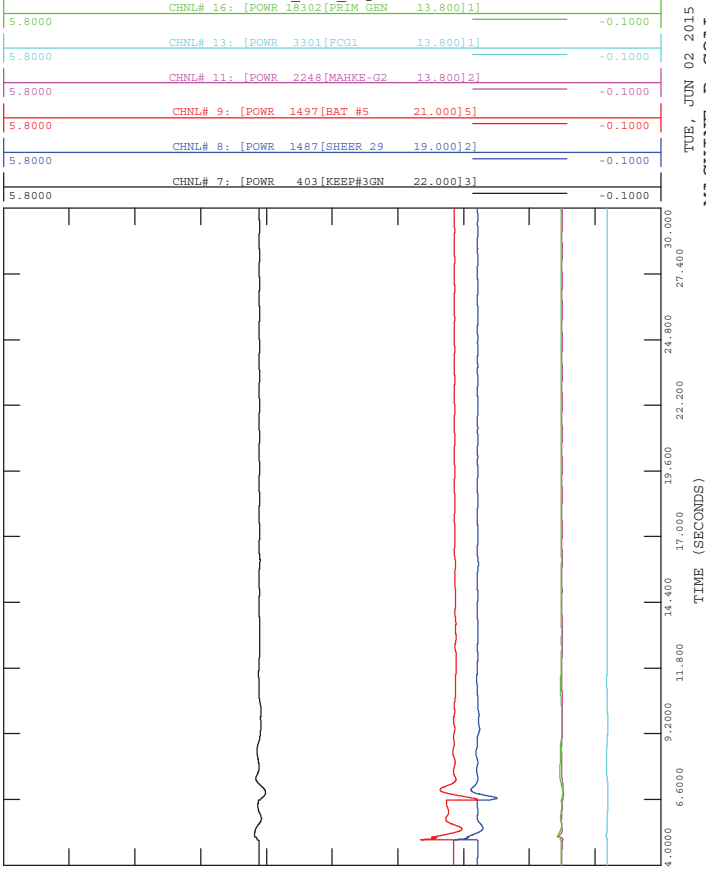


FIGURE E-22D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L_Edgerston.out

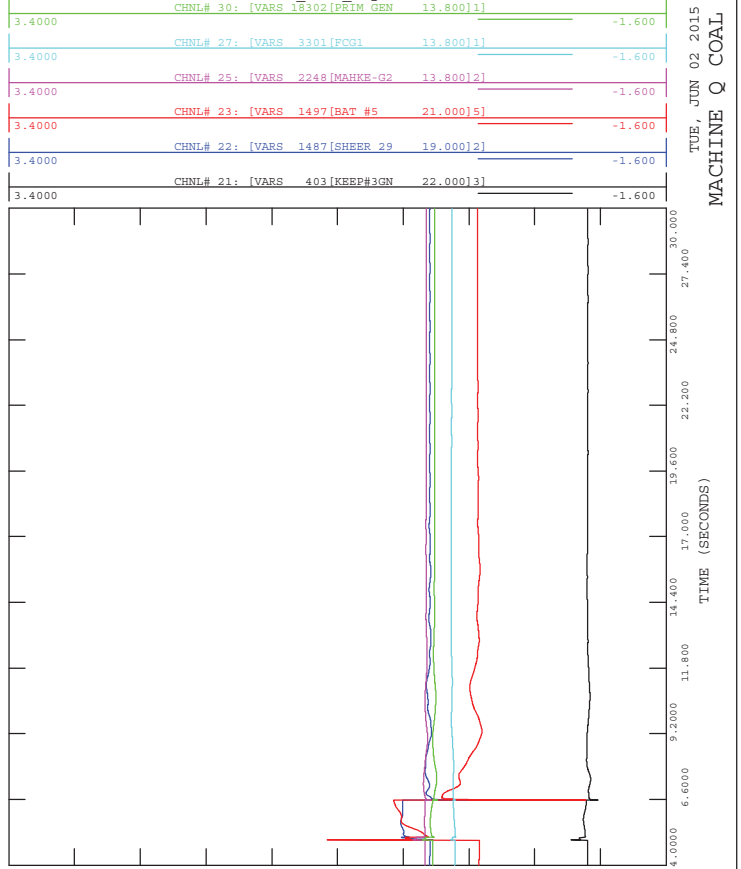


FIGURE E-22A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L_Edgerston.out

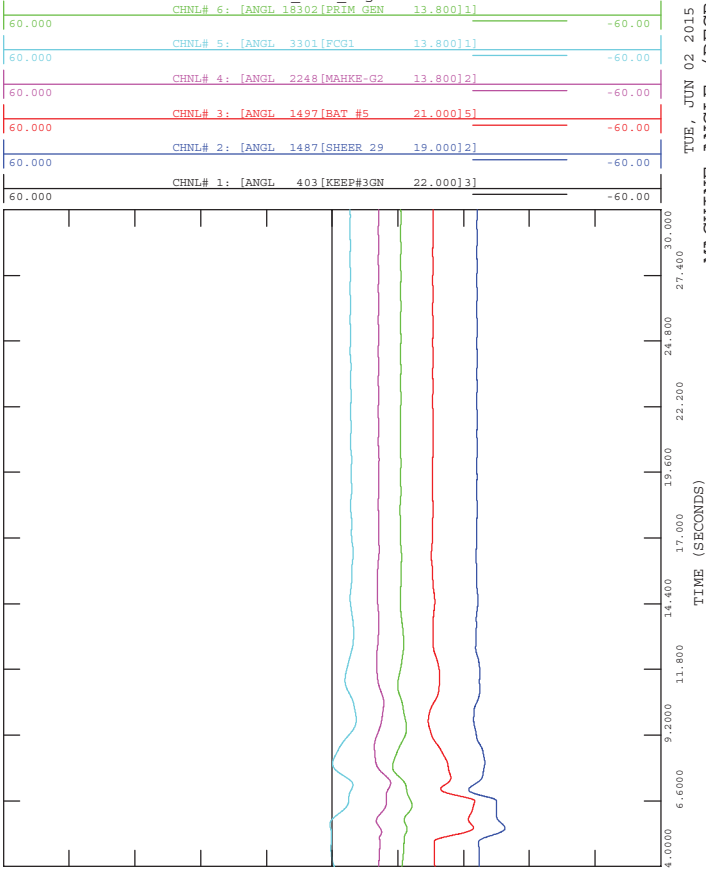


FIGURE E-22C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L_Edgerston.out

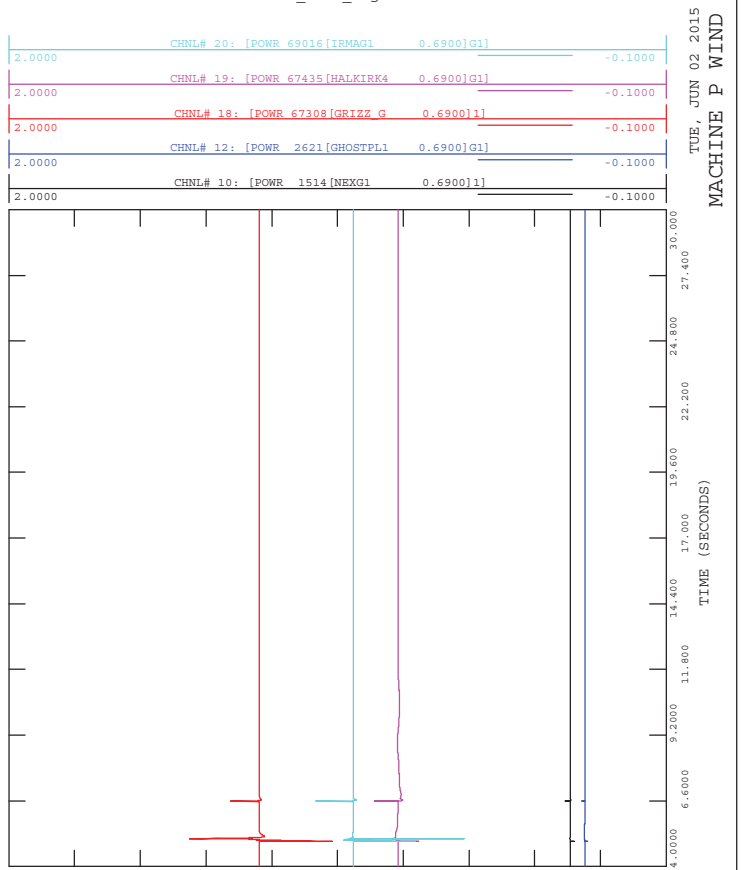




FIGURE E-22F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L_Edgerston.out

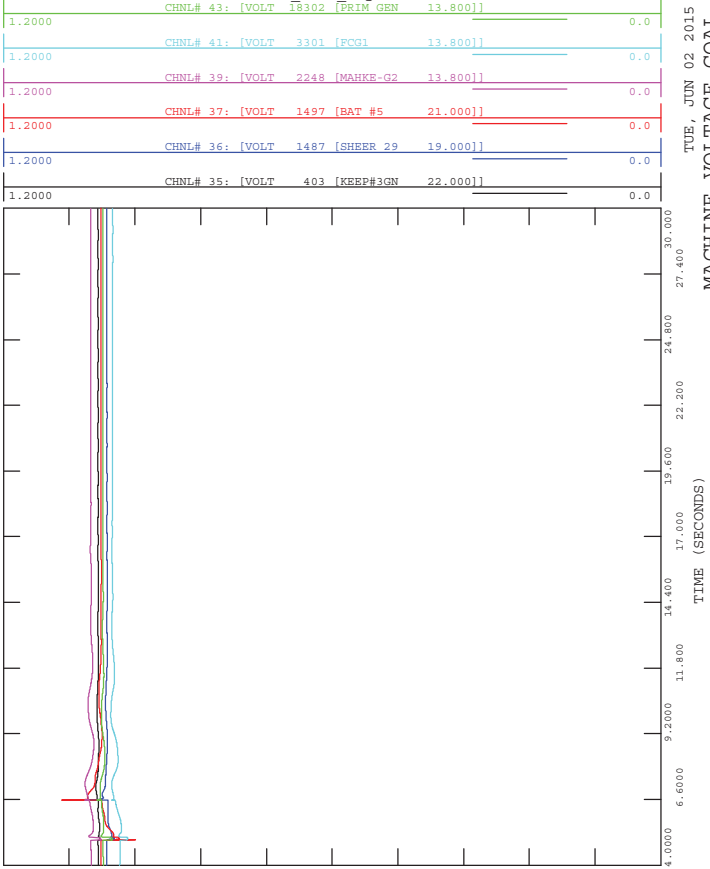


FIGURE E-22H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L_Edgerston.out

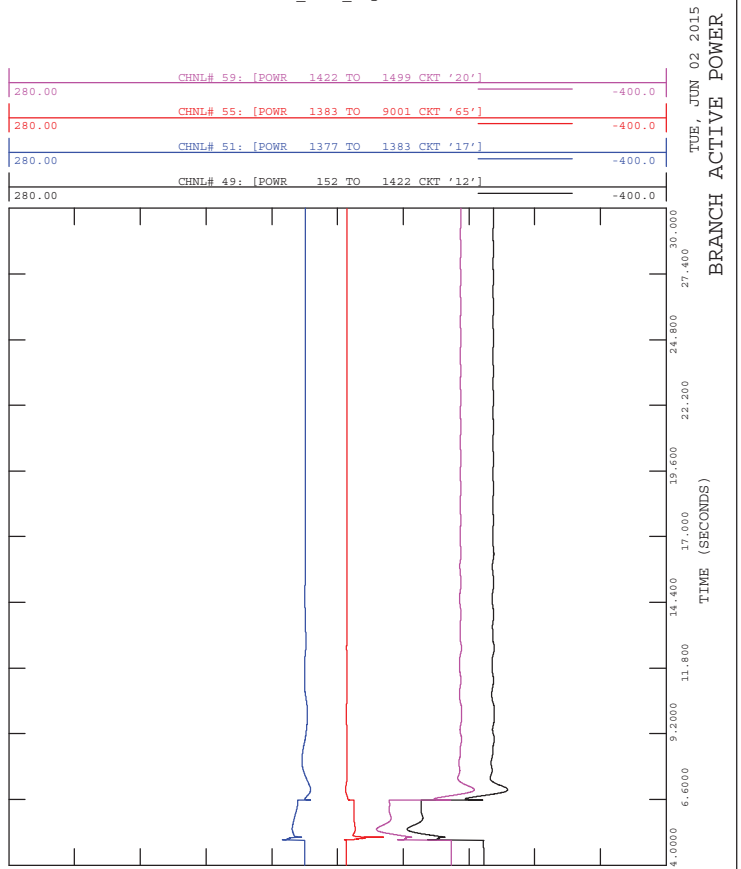


FIGURE E-22E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L_Edgerston.out

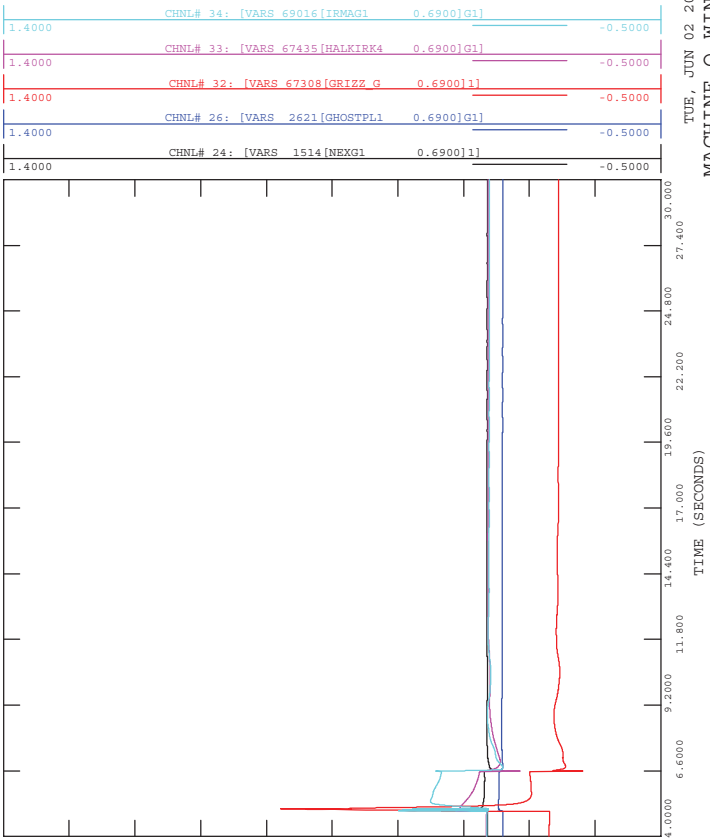


FIGURE E-22G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L_Edgerston.out

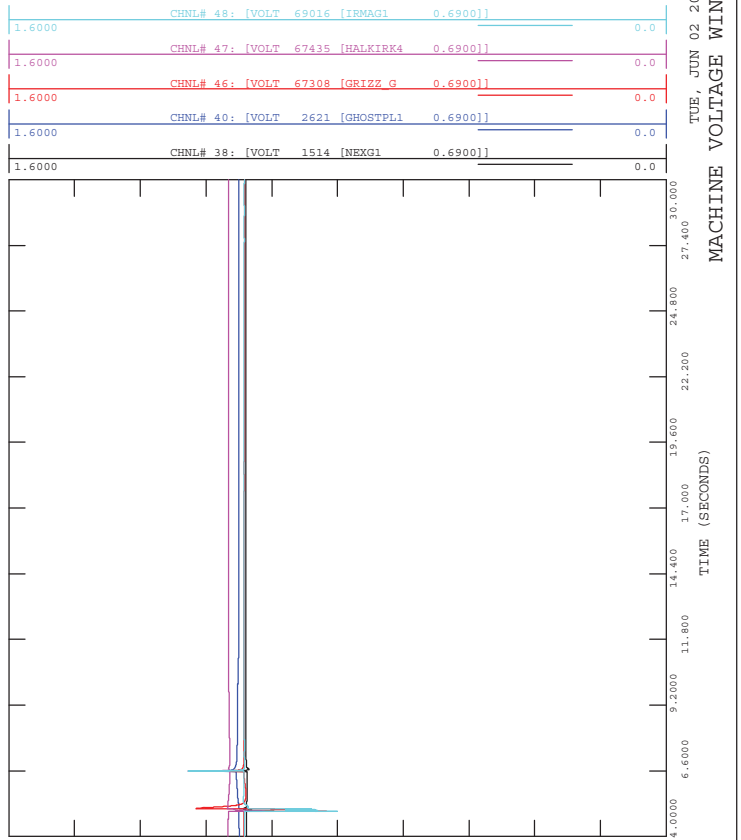
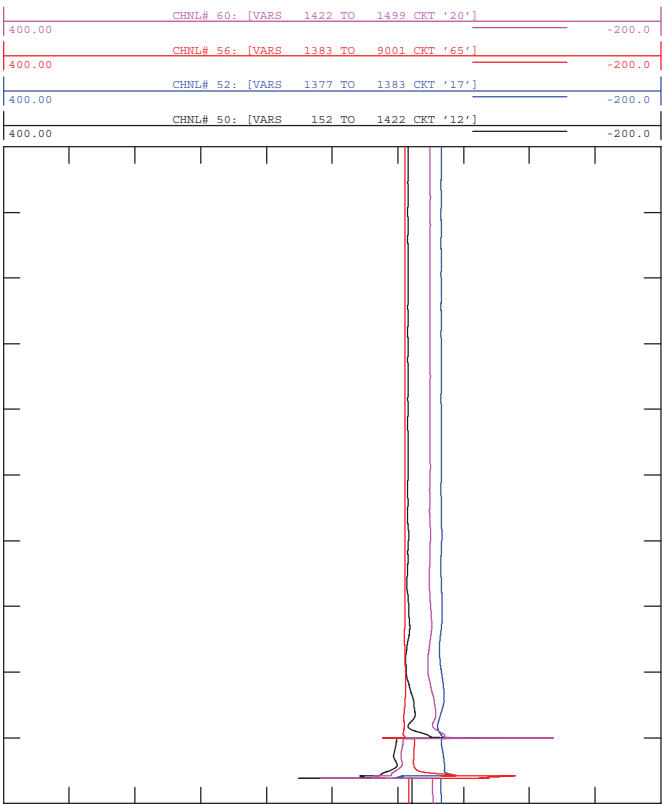




FIGURE E-22I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-22_749L_Edgerton.out



TUE, JUN 02 2015 18:11
BRANCH REACTIVE PWR (MVR)



FIGURE E-23B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-23_749L_Metiskow.out

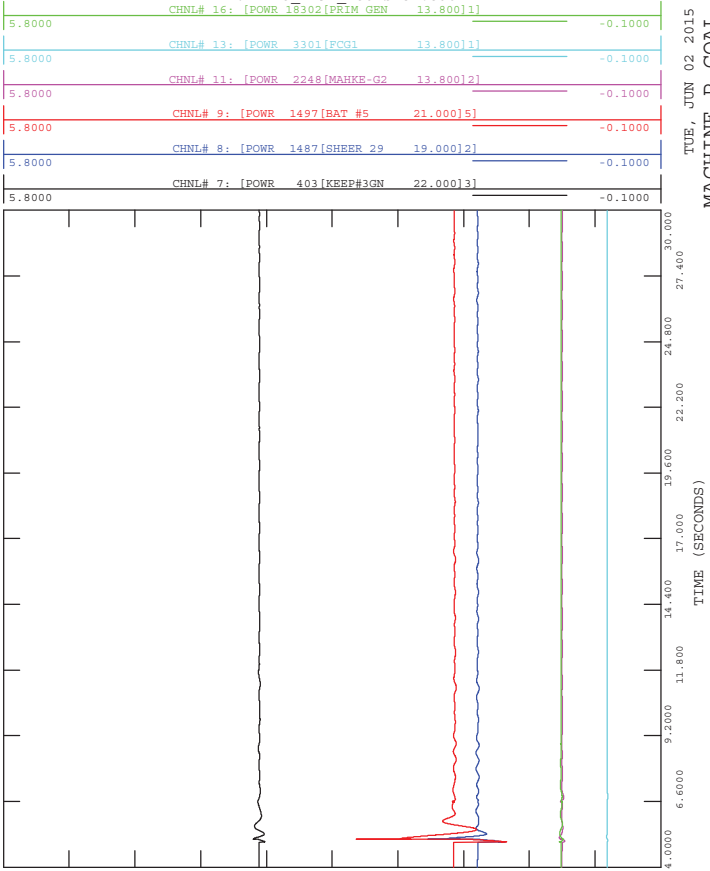


FIGURE E-23D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-23_749L_Metiskow.out

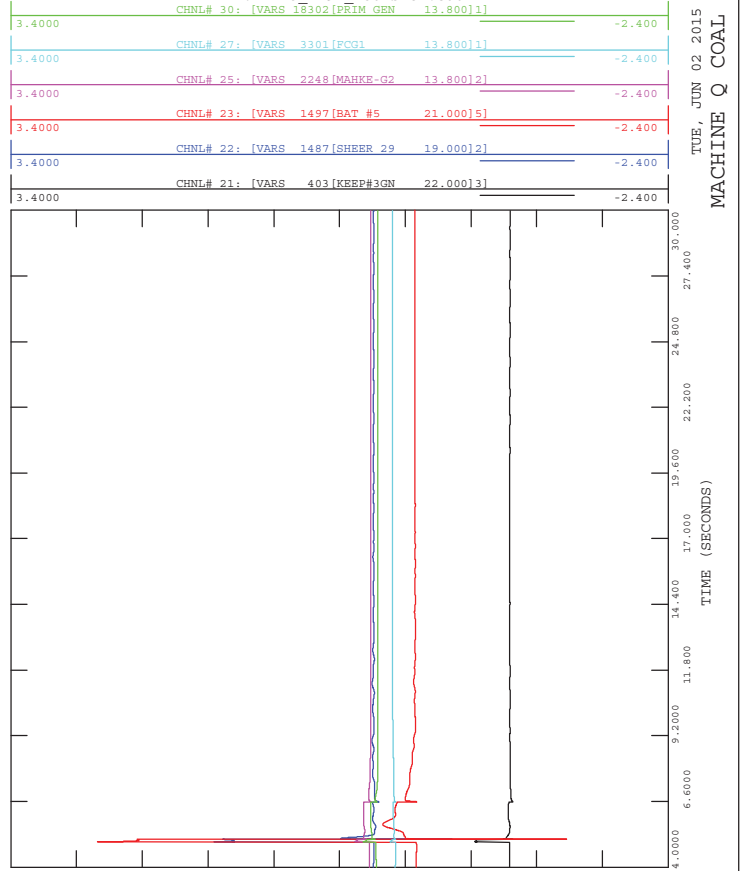


FIGURE E-23A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-23_749L_Metiskow.out

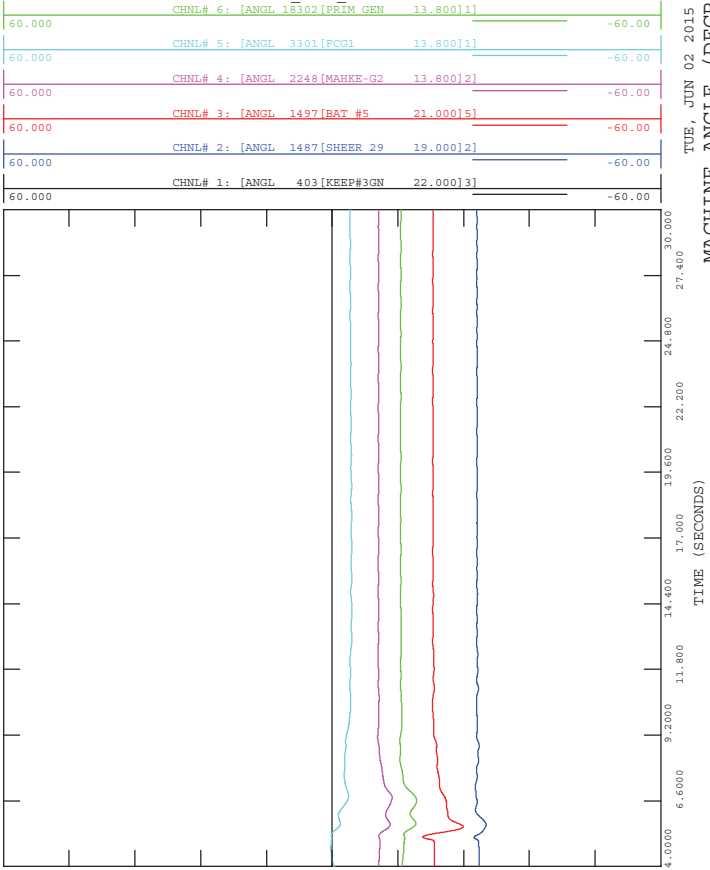


FIGURE E-23C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-23_749L_Metiskow.out

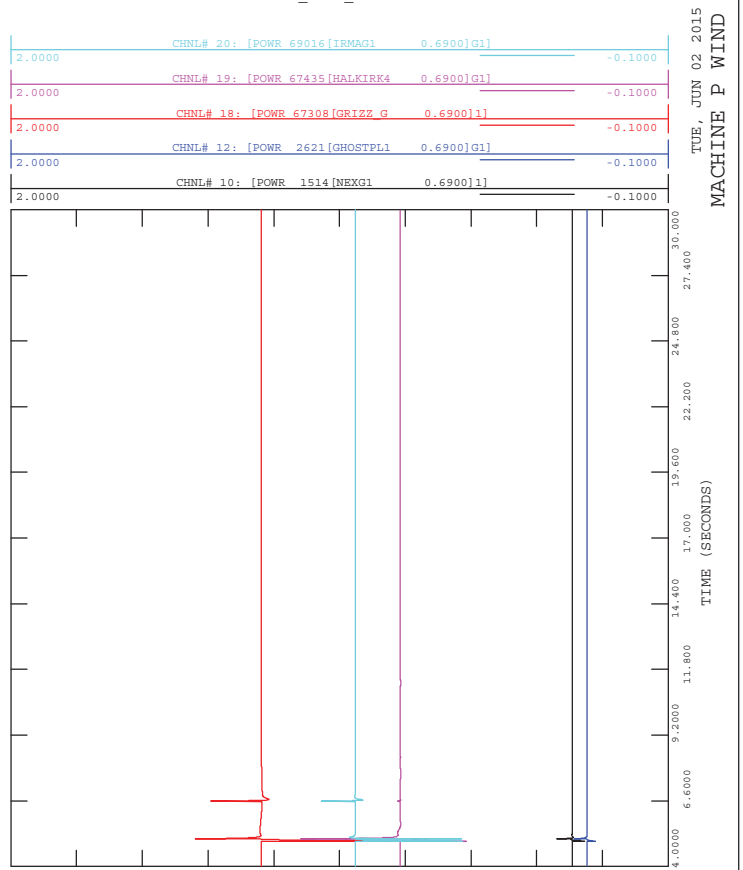




FIGURE E-23F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-23_749L_Metiskow.out

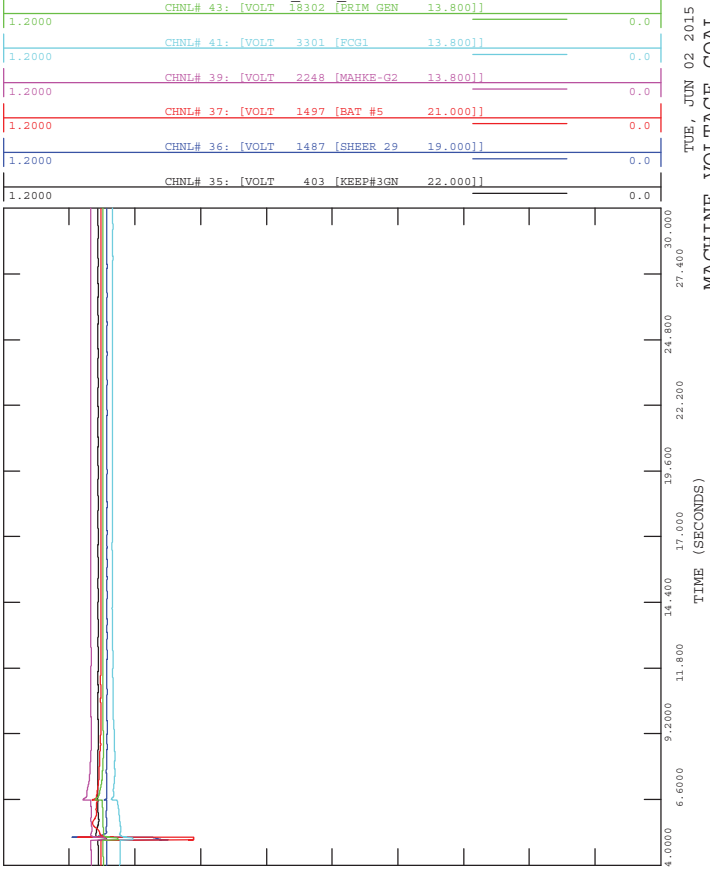


FIGURE E-23H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-23_749L_Metiskow.out

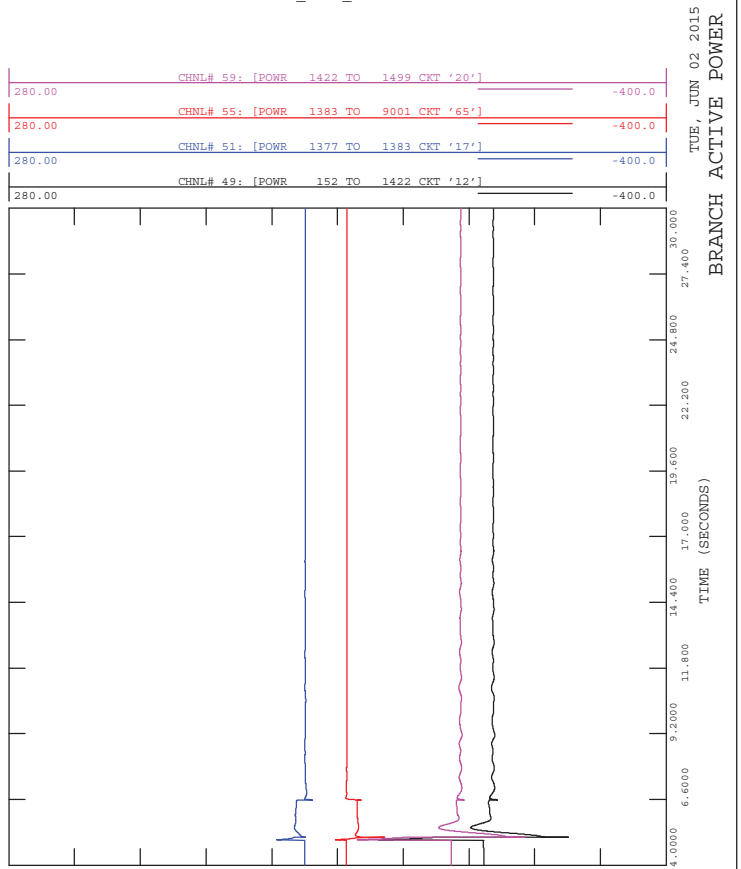


FIGURE E-23E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-23_749L_Metiskow.out

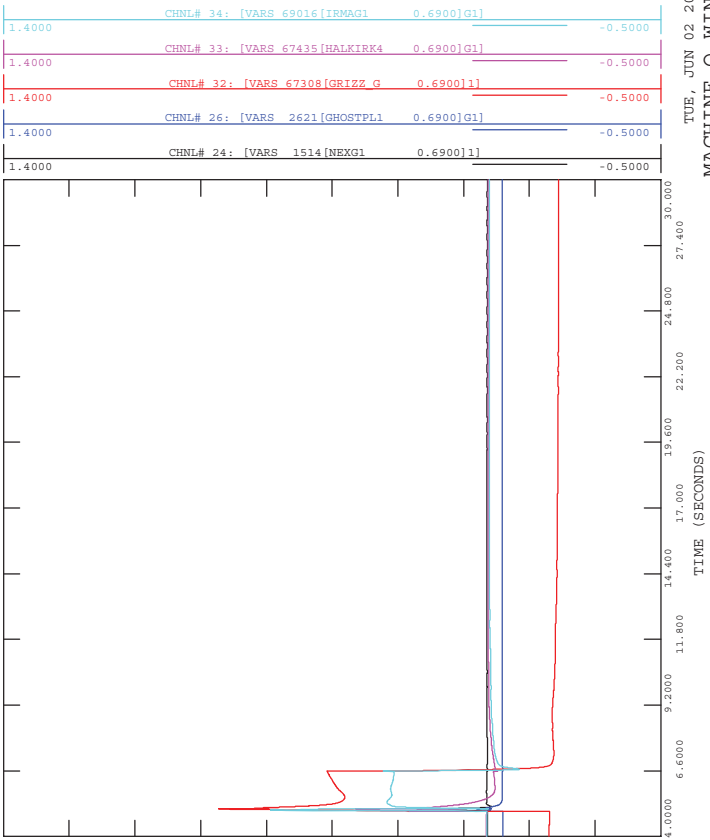


FIGURE E-23G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-23_749L_Metiskow.out

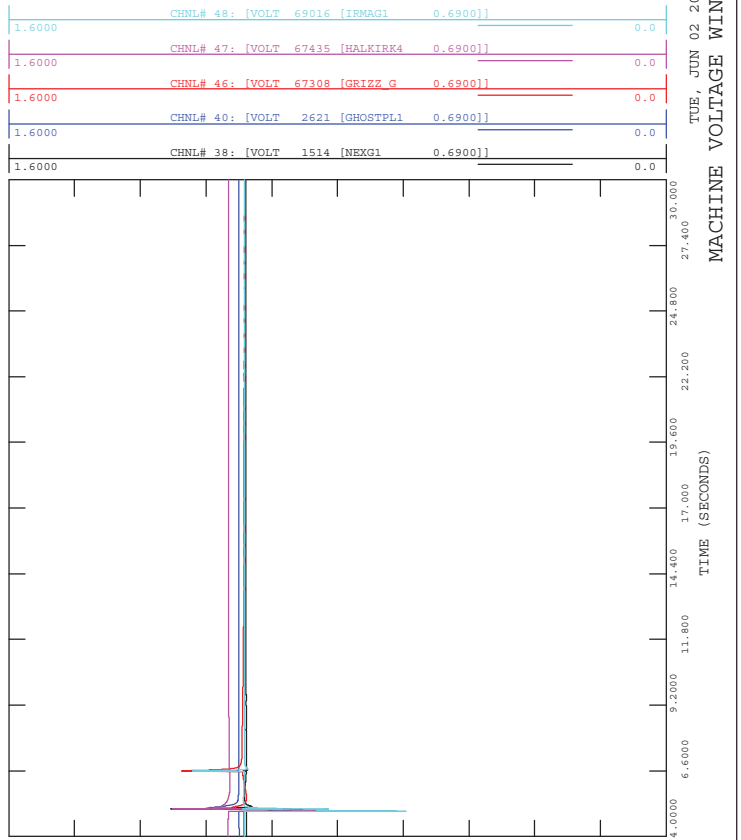




FIGURE E-23I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-23_749L_Metiskow.out

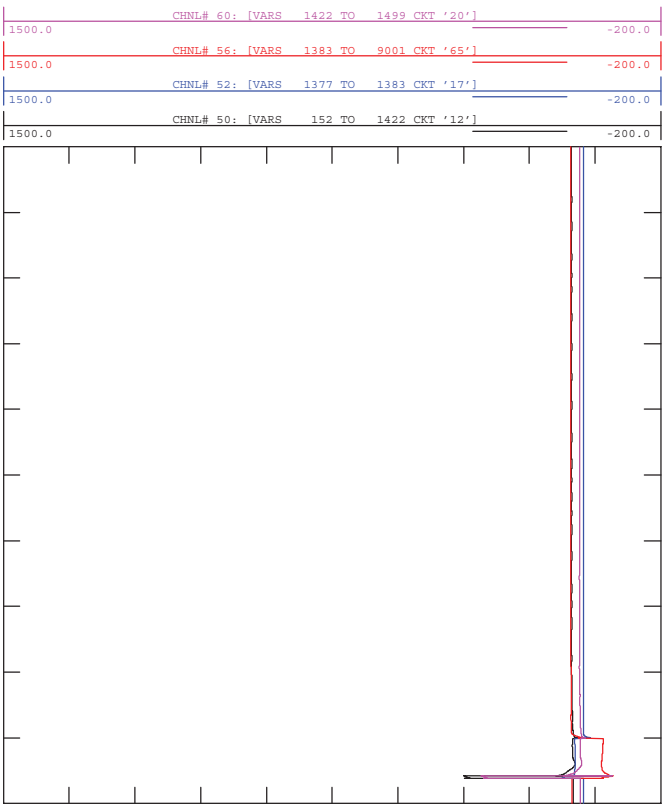


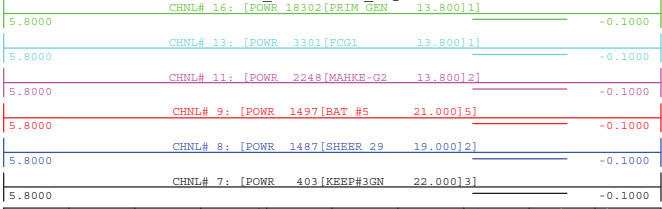


FIGURE E-24B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-24 749L~7L749_Edgeron.out

CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:11
MACHINE P COAL (PU)

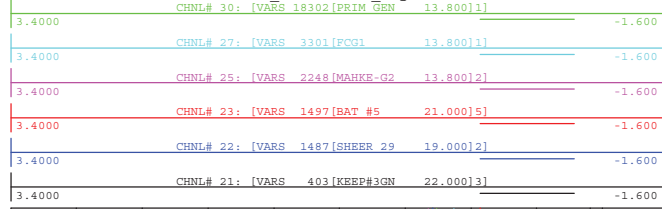


FIGURE E-24D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-24 749L~7L749_Edgeron.out

CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:11
MACHINE Q COAL (PU)

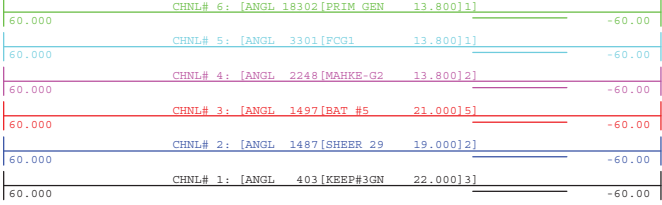


FIGURE E-24A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-24 749L~7L749_Edgeron.out

CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:11
MACHINE ANGLE (DEGREES)

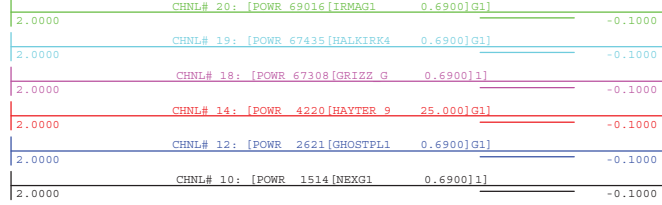


FIGURE E-24C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-24 749L~7L749_Edgeron.out

CHNL# 20: [POWR 69016[IRWAGI 0.6900]G1]



TUE, JUN 02 2015 18:11
MACHINE P WIND (PU)

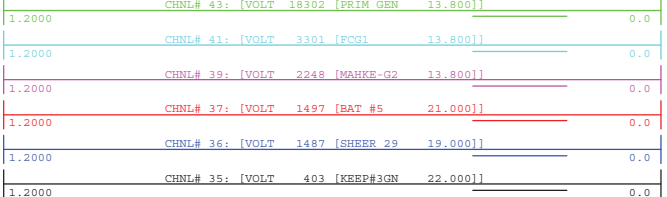


FIGURE E-24F

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-24_749L~7L749_Edgerton.out

CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]



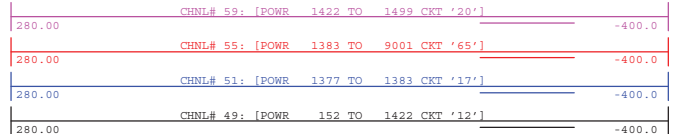
TUE, JUN 02 2015 18:11
MACHINE VOLTAGE COAL (PU)



FIGURE E-24H

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-24_749L~7L749_Edgerton.out



TUE, JUN 02 2015 18:11
BRANCH ACTIVE POWER (MW)

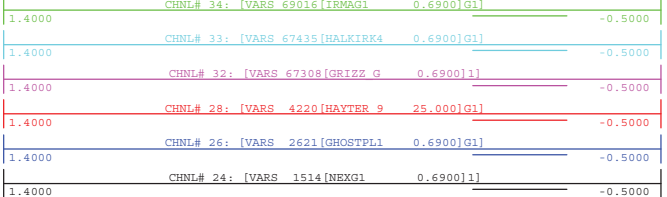


FIGURE E-24E

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-24_749L~7L749_Edgerton.out

CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]



TUE, JUN 02 2015 18:11
MACHINE Q WIND (PU)

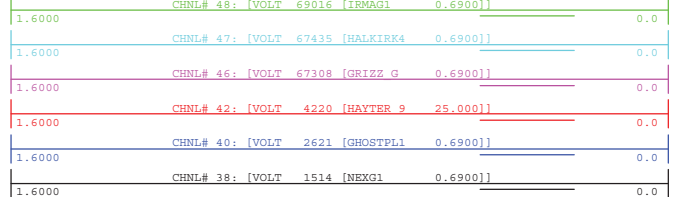


FIGURE E-24G

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: E-24_749L~7L749_Edgerton.out

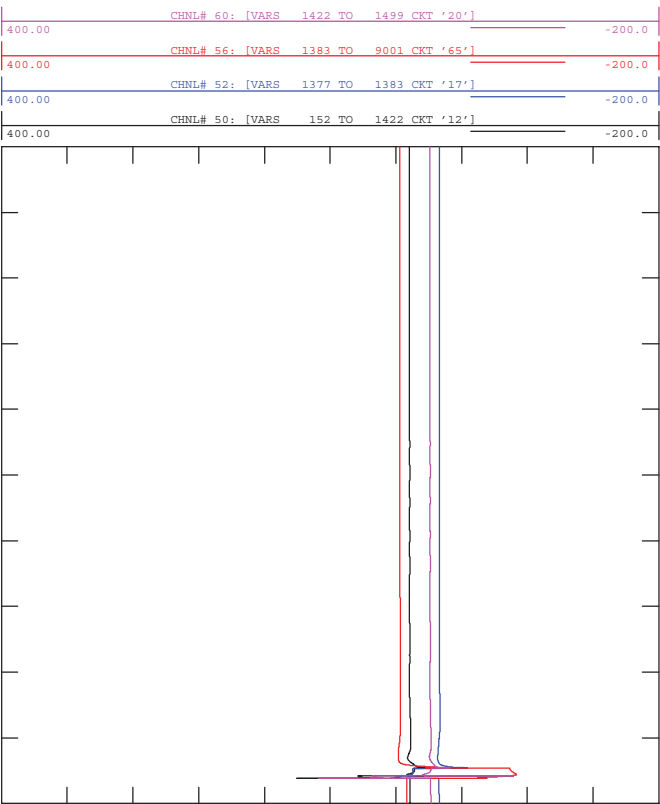
CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]



TUE, JUN 02 2015 18:11
MACHINE VOLTAGE WIND (PU)



FIGURE E-24I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: E-24_749L-7L749_Edgeron.out



TUE, JUN 02 2015 18:11
BRANCH REACTIVE PWR (MVR)

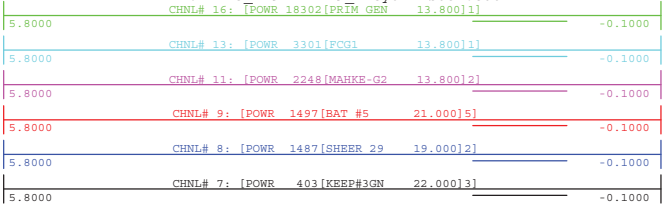


FIGURE E-25B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: E-25 749L~7L749_Lloydminster.out

CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:11
MACHINE P COAL (PU)

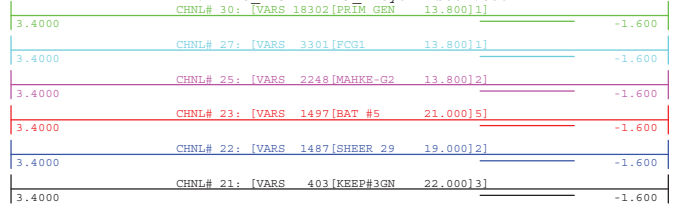


FIGURE E-25D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: E-25 749L~7L749_Lloydminster.out

CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:11
MACHINE Q COAL (PU)

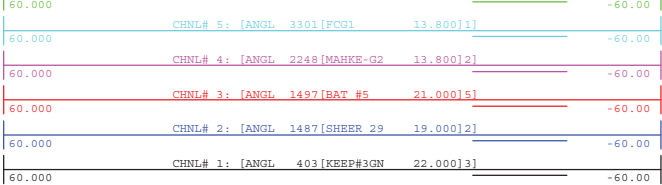


FIGURE E-25A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: E-25 749L~7L749_Lloydminster.out

CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:11
MACHINE ANGLE (DEGREES)

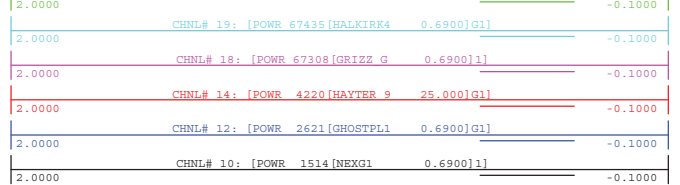


FIGURE E-25C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: E-25 749L~7L749_Lloydminster.out

CHNL# 20: [POWR 69016[TRMAG1 0.6900]G1]



TUE, JUN 02 2015 18:11
MACHINE P WIND (PU)

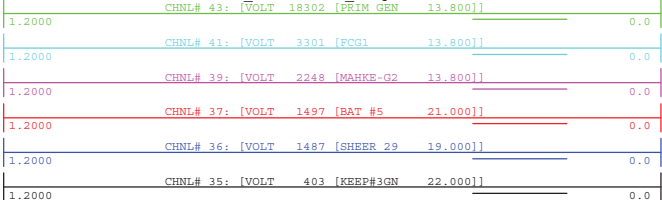


FIGURE E-25F

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: E-25_749L~7L749_Lloydminster.out

CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]



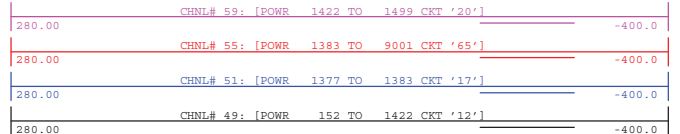
MACHINE VOLTAGE COAL (PU)
TUE, JUN 02 2015 18:11



FIGURE E-25H

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: E-25_749L~7L749_Lloydminster.out



BRANCH ACTIVE POWER (MW)
TUE, JUN 02 2015 18:11

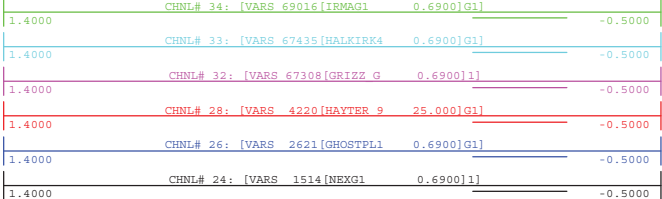


FIGURE E-25E

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: E-25_749L~7L749_Lloydminster.out

CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]



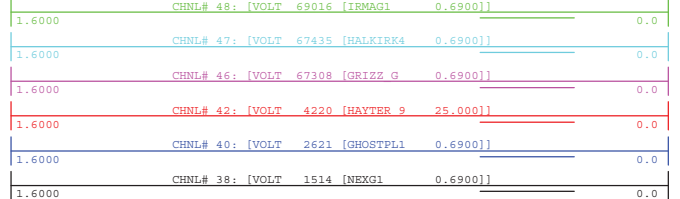
MACHINE Q WIND (PU)
TUE, JUN 02 2015 18:11



FIGURE E-25G

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: E-25_749L~7L749_Lloydminster.out



MACHINE VOLTAGE WIND (PU)
TUE, JUN 02 2015 18:11



FIGURE E-25I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: E-25_749L-7L749_Lloydminster.out

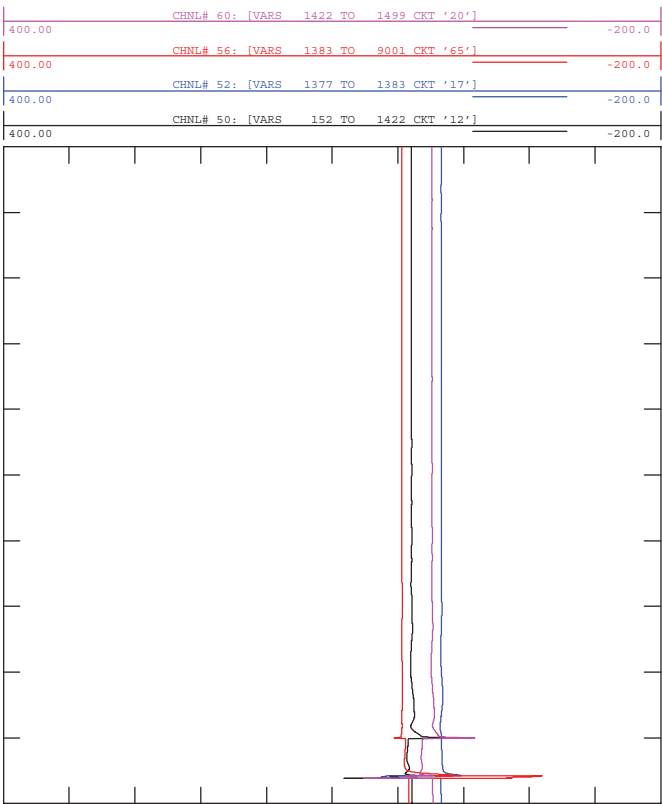




FIGURE E-26B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-26_9L20_Cordel.out

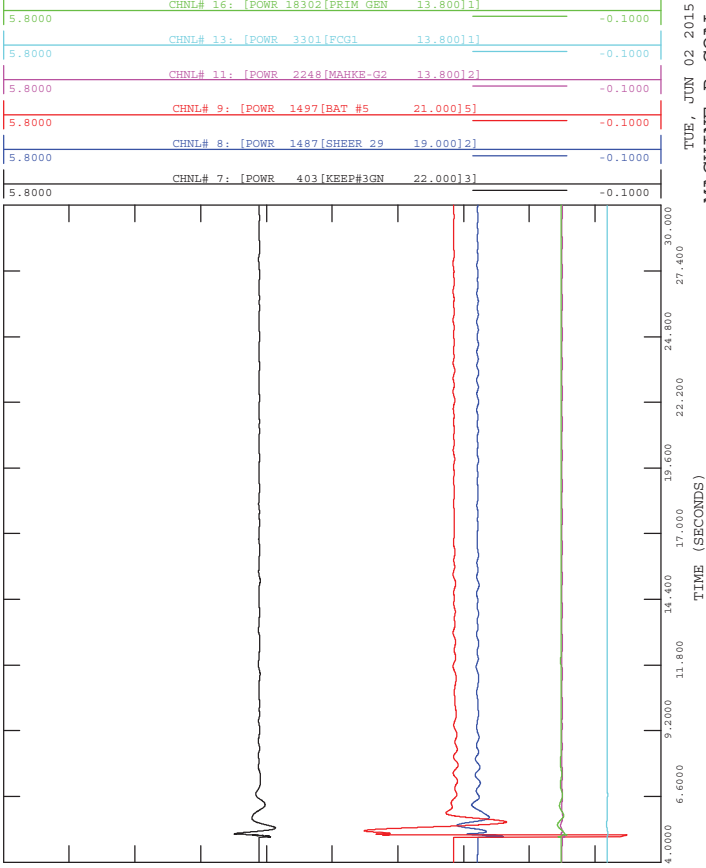


FIGURE E-26D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-26_9L20_Cordel.out

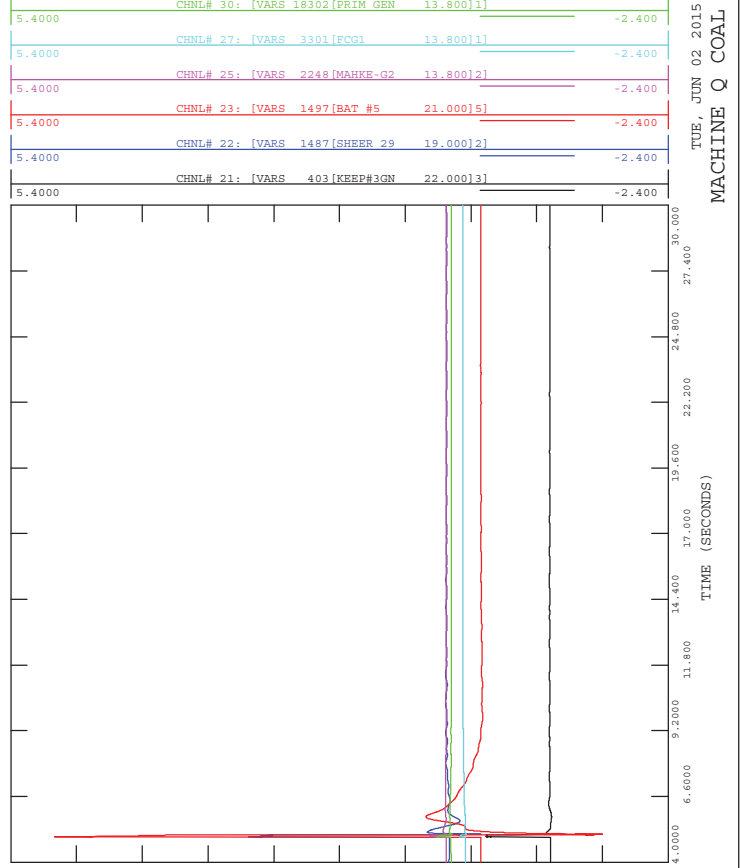


FIGURE E-26A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-26_9L20_Cordel.out

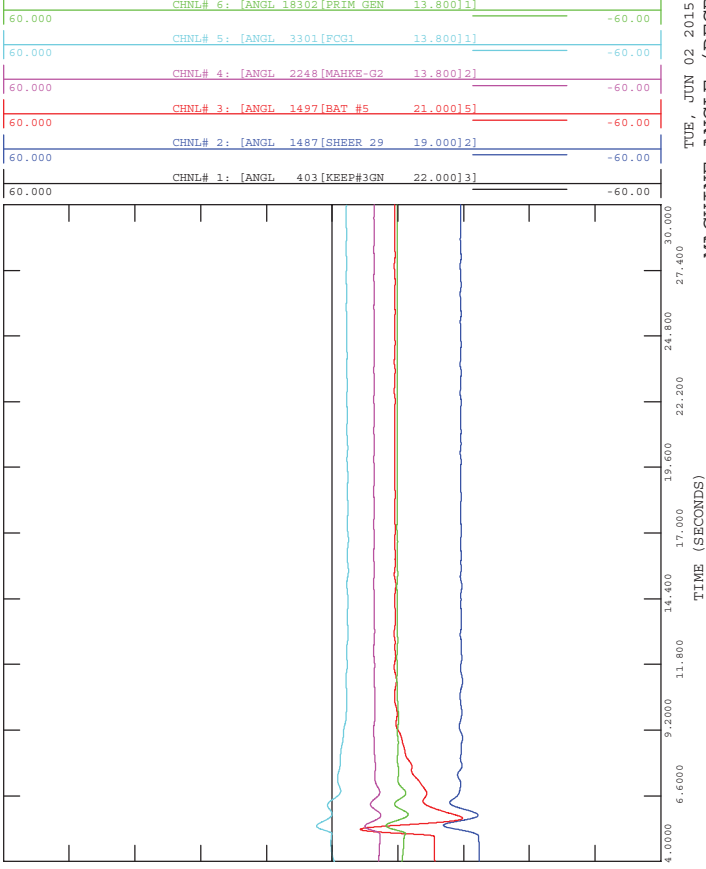


FIGURE E-26C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-26_9L20_Cordel.out

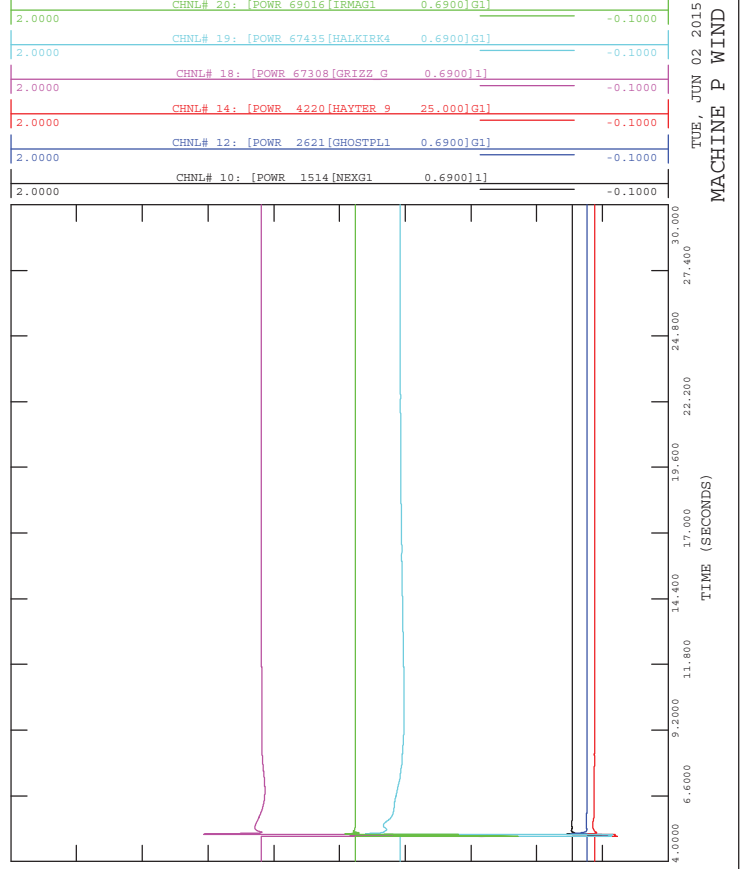




FIGURE E-26I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-26_9L20_Cordel.out

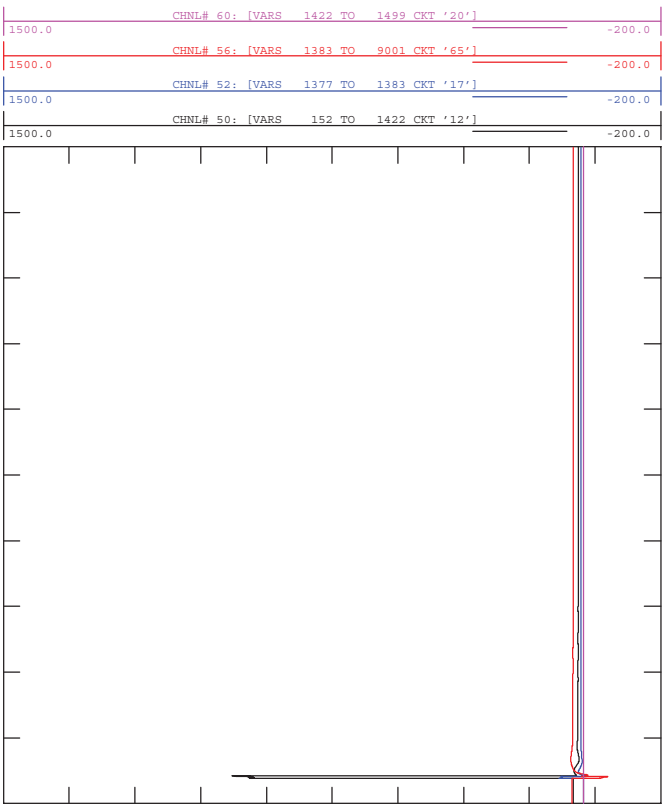




FIGURE E-27B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-27_9L20_Nevis.out

5.8000	CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]	-0.1000
5.8000	CHNL# 13: [POWR 3301[FCG1 13.800]1]	-0.1000
5.8000	CHNL# 11: [POWR 2248[MAHKE-G2 13.800]2]	-0.1000
5.8000	CHNL# 9: [POWR 1497[BAT #5 21.000]5]	-0.1000
5.8000	CHNL# 8: [POWR 1487[SHEER 29 19.000]2]	-0.1000
5.8000	CHNL# 7: [POWR 403[KEEP#3GN 22.000]3]	-0.1000

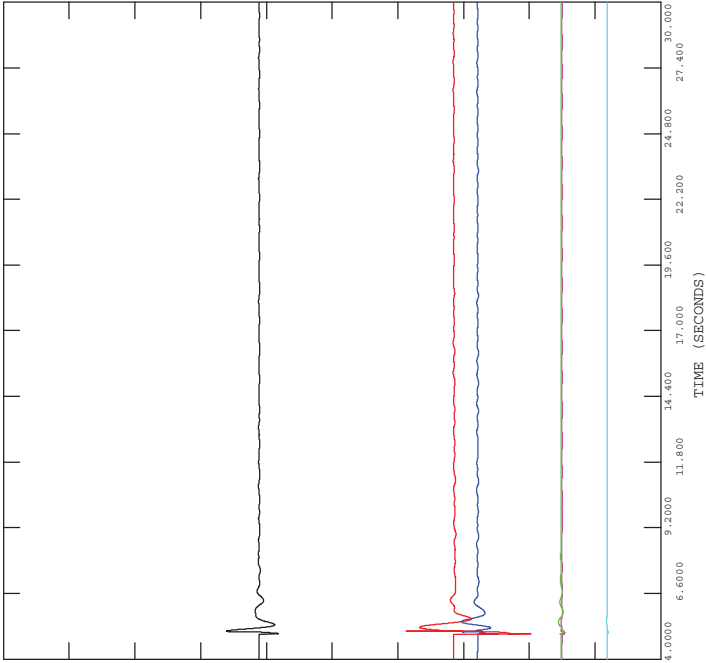


FIGURE E-27D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-27_9L20_Nevis.out

5.4000	CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]	-2.4000
5.4000	CHNL# 27: [VARS 3301[FCG1 13.800]1]	-2.4000
5.4000	CHNL# 25: [VARS 2248[MAHKE-G2 13.800]2]	-2.4000
5.4000	CHNL# 23: [VARS 1497[BAT #5 21.000]5]	-2.4000
5.4000	CHNL# 22: [VARS 1487[SHEER 29 19.000]2]	-2.4000
5.4000	CHNL# 21: [VARS 403[KEEP#3GN 22.000]3]	-2.4000

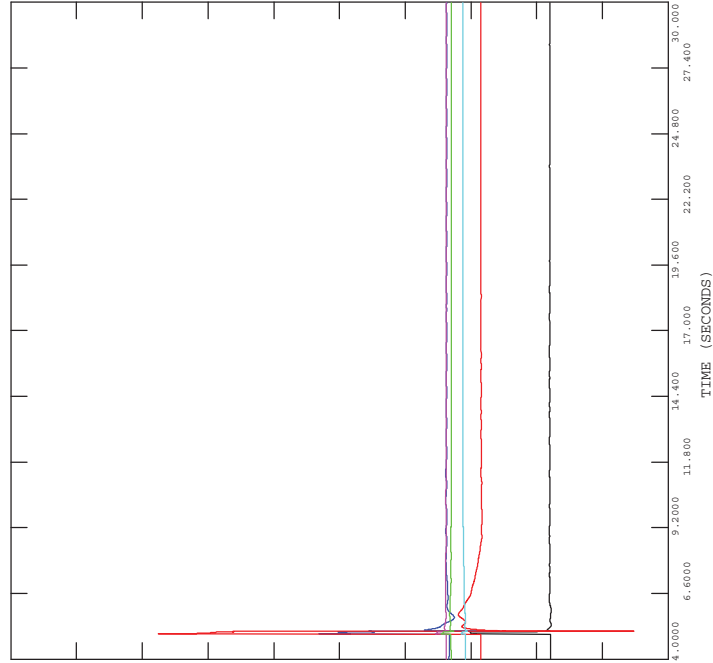


FIGURE E-27A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-27_9L20_Nevis.out

60.0000	CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]	-60.0000
60.0000	CHNL# 5: [ANGL 3301[FCG1 13.800]1]	-60.0000
60.0000	CHNL# 4: [ANGL 2248[MAHKE-G2 13.800]2]	-60.0000
60.0000	CHNL# 3: [ANGL 1497[BAT #5 21.000]5]	-60.0000
60.0000	CHNL# 2: [ANGL 1487[SHEER 29 19.000]2]	-60.0000
60.0000	CHNL# 1: [ANGL 403[KEEP#3GN 22.000]3]	-60.0000

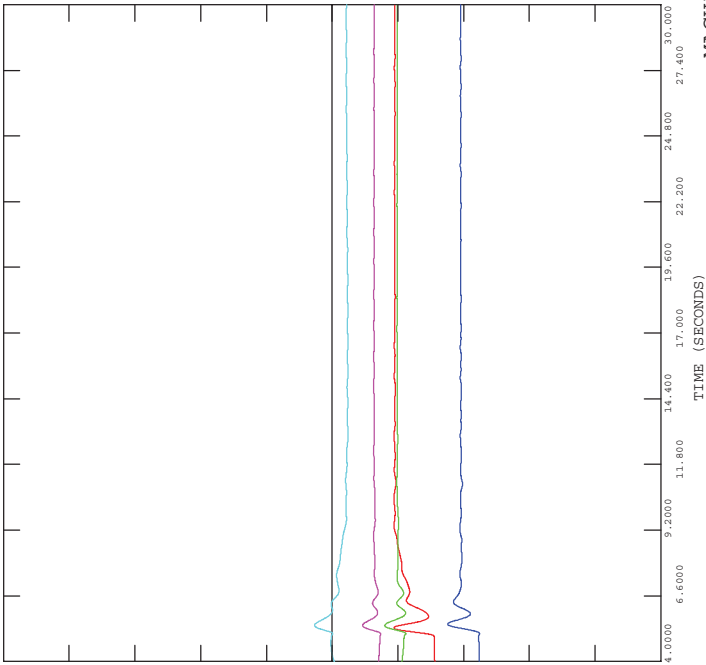


FIGURE E-27C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-27_9L20_Nevis.out

2.0000	CHNL# 20: [POWR 69016[IRWAG1 0.6900]G1]	-0.1000
2.0000	CHNL# 19: [POWR 67435[HALKIRK4 0.6900]G1]	-0.1000
2.0000	CHNL# 18: [POWR 67308[GRIZZ G 0.6900]1]	-0.1000
2.0000	CHNL# 14: [POWR 4220[HAYTER 9 25.000]G1]	-0.1000
2.0000	CHNL# 12: [POWR 2621[GHOSTPL1 0.6900]G1]	-0.1000
2.0000	CHNL# 10: [POWR 1514[NEXG1 0.6900]1]	-0.1000

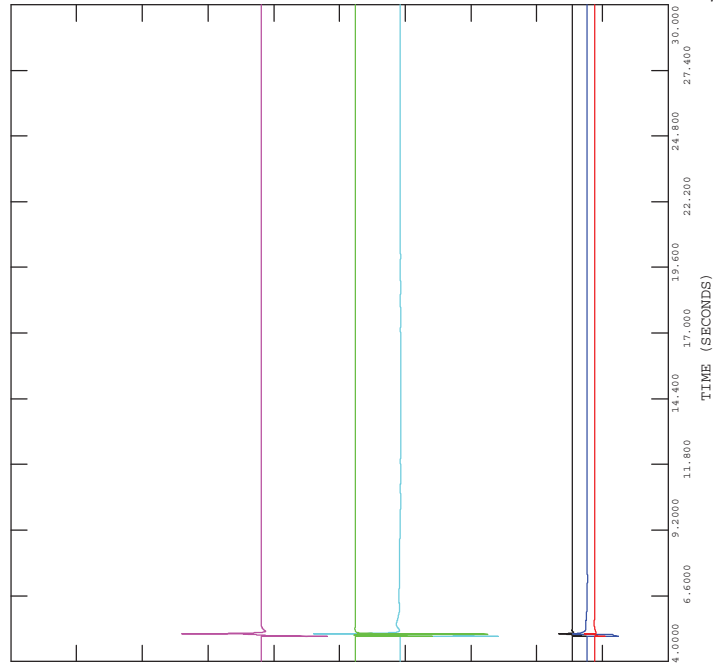




FIGURE E-27I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-27_9L20_Nevis.out

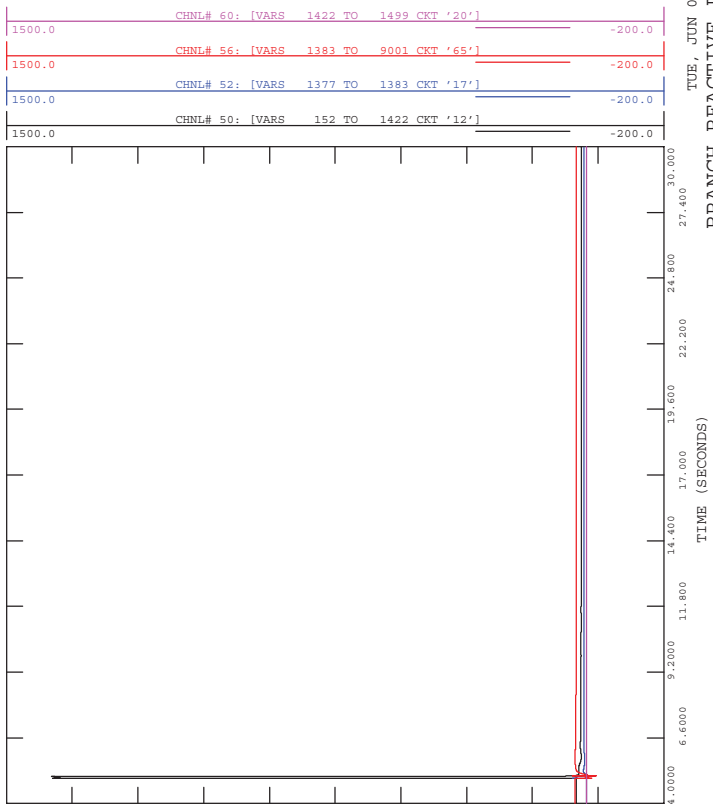




FIGURE E-28B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-28 9L59 Anderson.out

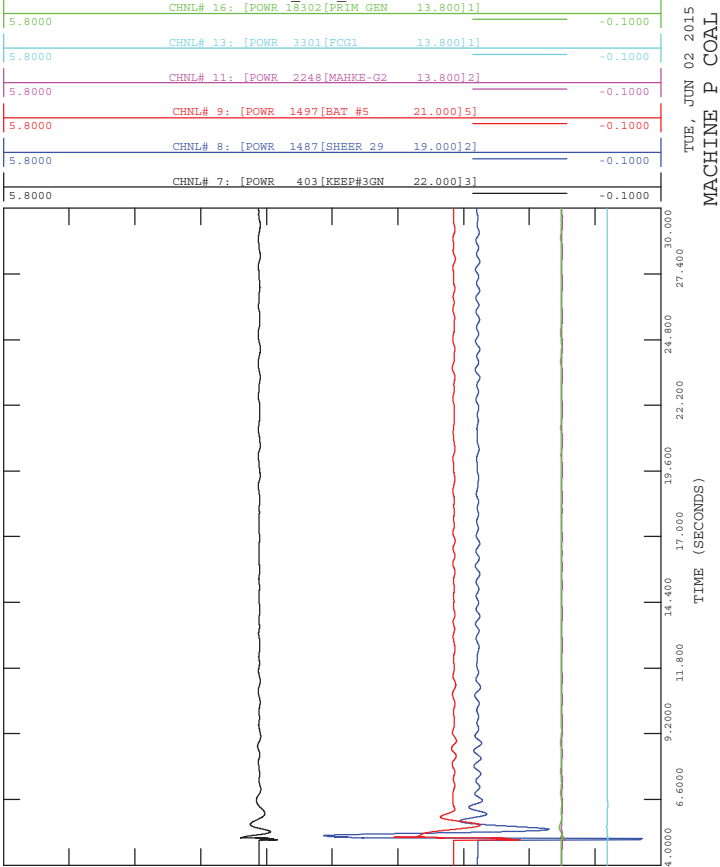


FIGURE E-28D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-28 9L59 Anderson.out

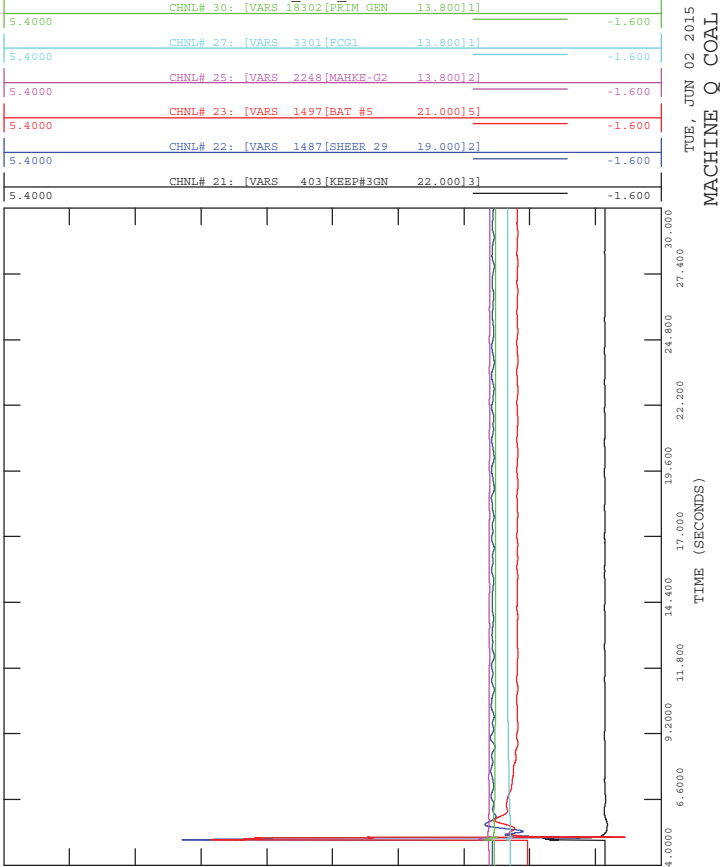


FIGURE E-28A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-28 9L59 Anderson.out

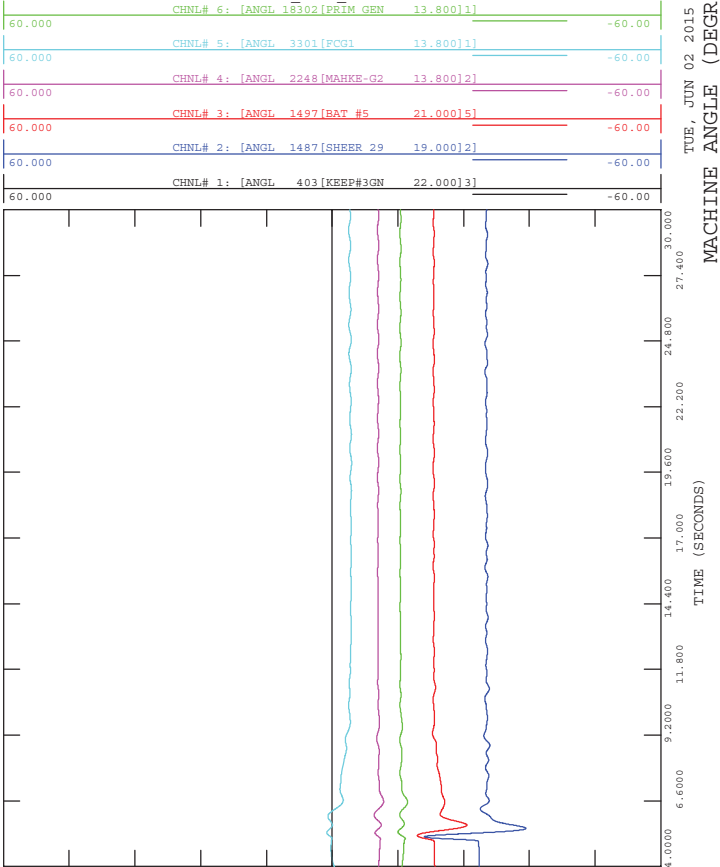


FIGURE E-28C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-28 9L59 Anderson.out

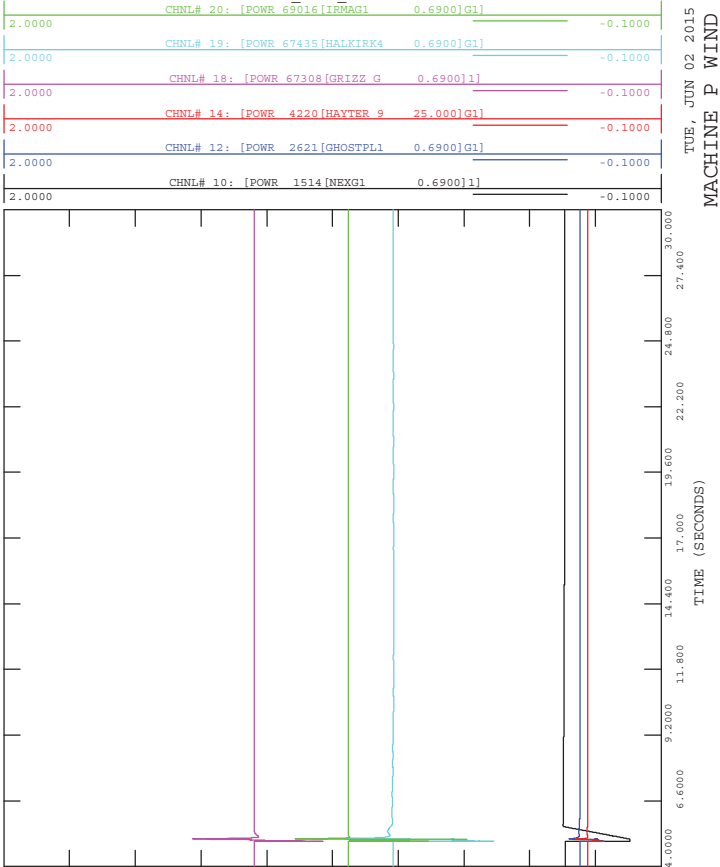
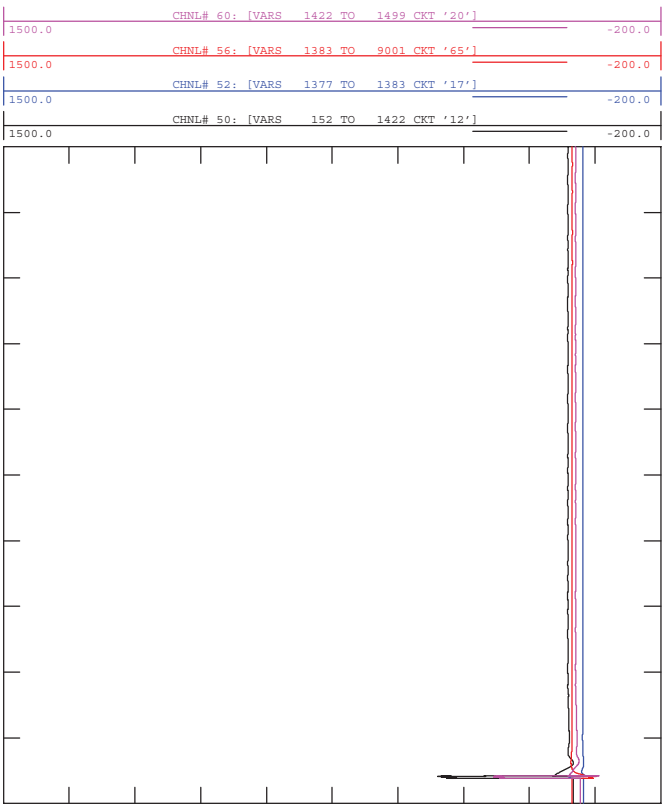




FIGURE E-28I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-28_9L59_Anderson.out



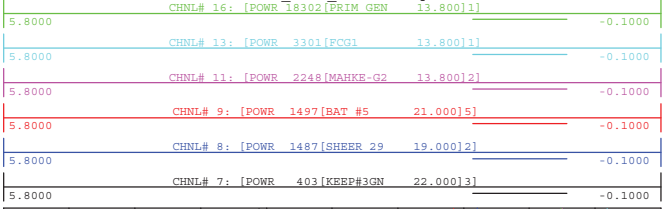
TUE, JUN 02 2015 18:12
BRANCH REACTIVE PWR (MVR)



FIGURE E-29B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-29_9L59_Tinchebray.out



TUE, JUN 02 2015 18:12
MACHINE P COAL (PU)

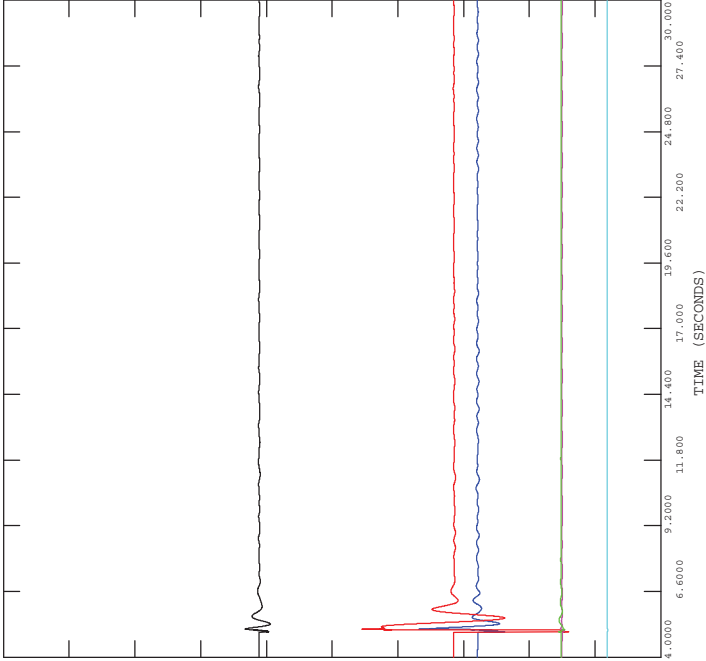
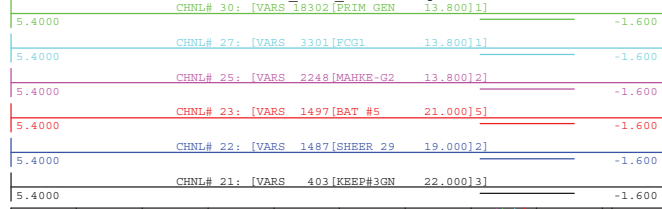


FIGURE E-29D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-29_9L59_Tinchebray.out



TUE, JUN 02 2015 18:12
MACHINE Q COAL (PU)

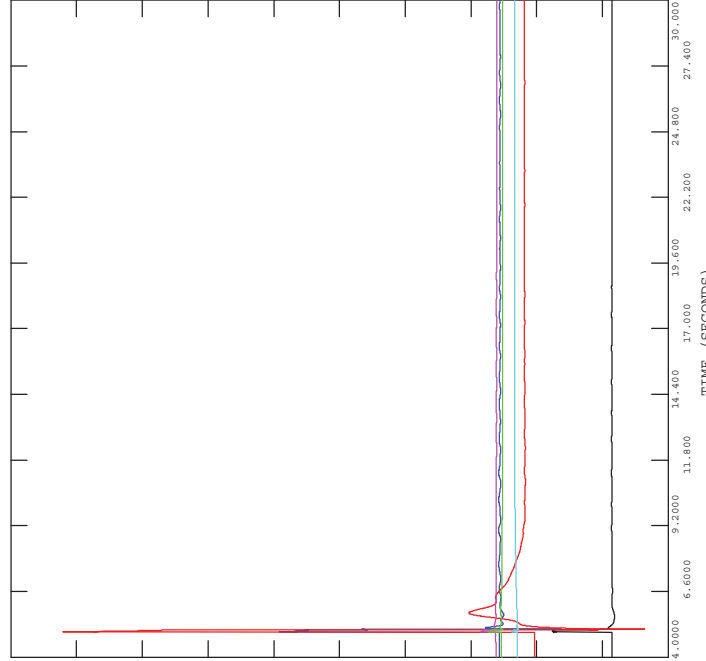
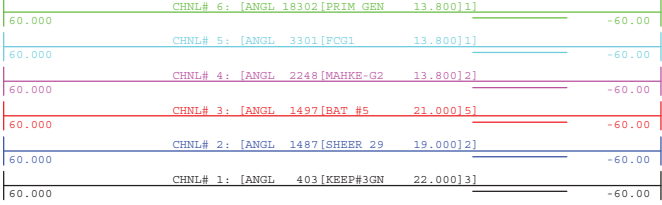


FIGURE E-29A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-29_9L59_Tinchebray.out



TUE, JUN 02 2015 18:12
MACHINE ANGLE (DEGREES)

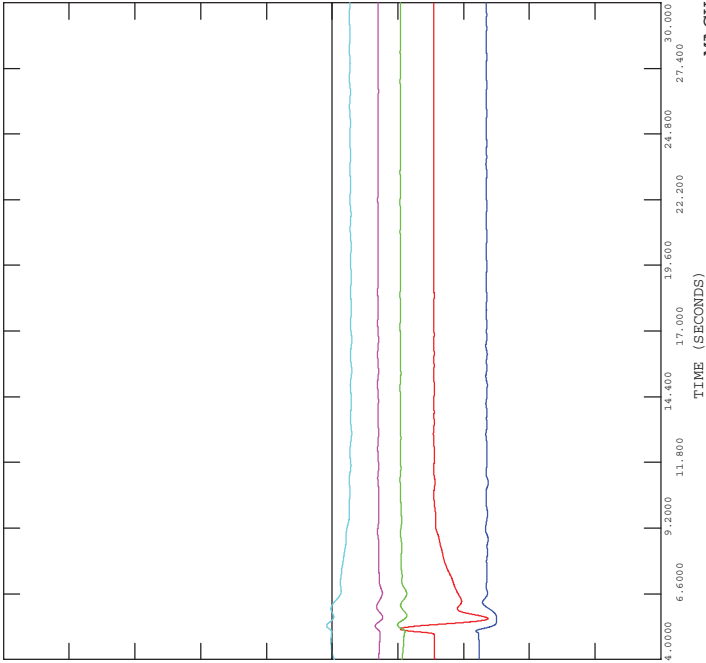
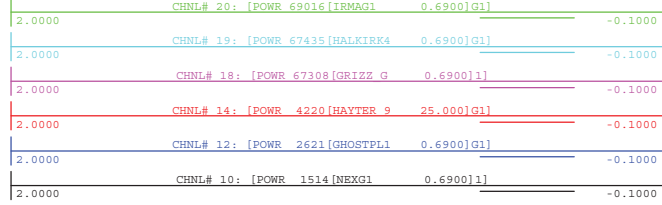


FIGURE E-29C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-29_9L59_Tinchebray.out



TUE, JUN 02 2015 18:12
MACHINE P WIND (PU)

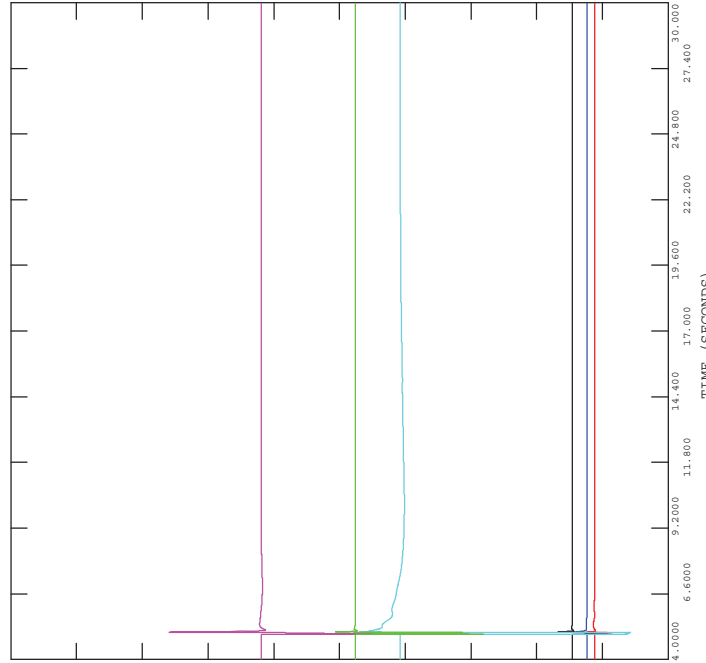
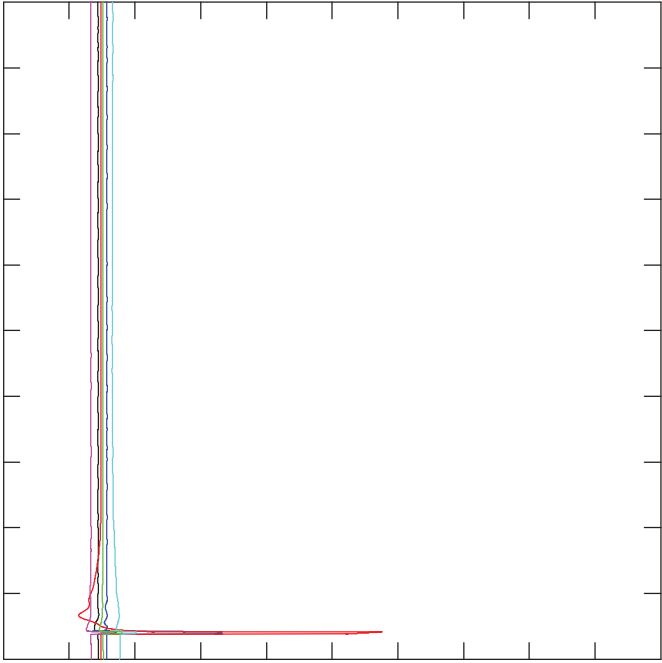




FIGURE E-29F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-29_9L59_Tinchebray.out

1.2000	CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]	0.0
1.2000	CHNL# 41: [VOLT 3301 [PCG1 13.800]]	0.0
1.2000	CHNL# 39: [VOLT 2248 [MAHKE-G2 13.800]]	0.0
1.2000	CHNL# 37: [VOLT 1497 [BAT #5 21.000]]	0.0
1.2000	CHNL# 36: [VOLT 1487 [SHEER 29 19.000]]	0.0
1.2000	CHNL# 35: [VOLT 403 [KEEP#3GN 22.000]]	0.0



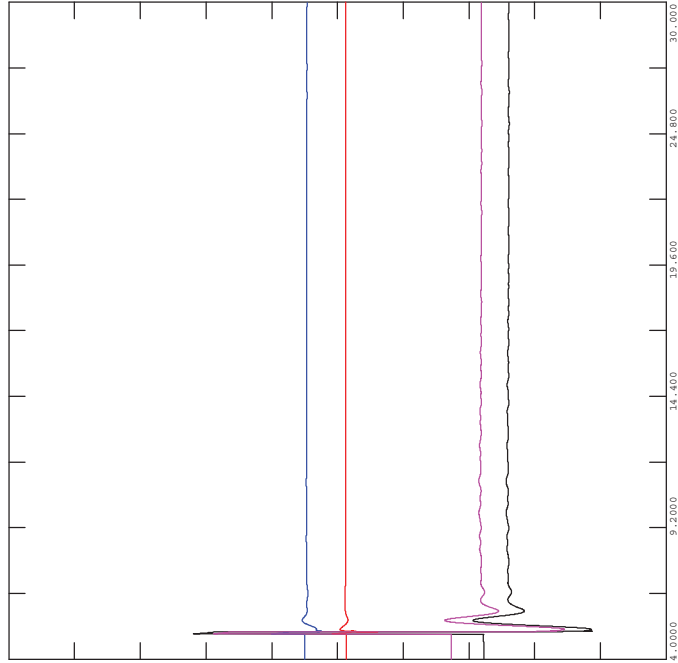
18:12
TUE, JUN 02 2015
MACHINE VOLTAGE COAL (PU)



FIGURE E-29H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-29_9L59_Tinchebray.out

280.00	CHNL# 59: [POWR 1422 TO 1499 CKT '20']	-400.0
280.00	CHNL# 55: [POWR 1383 TO 9001 CKT '65']	-400.0
280.00	CHNL# 51: [POWR 1377 TO 1383 CKT '17']	-400.0
280.00	CHNL# 49: [POWR 152 TO 1422 CKT '12']	-400.0



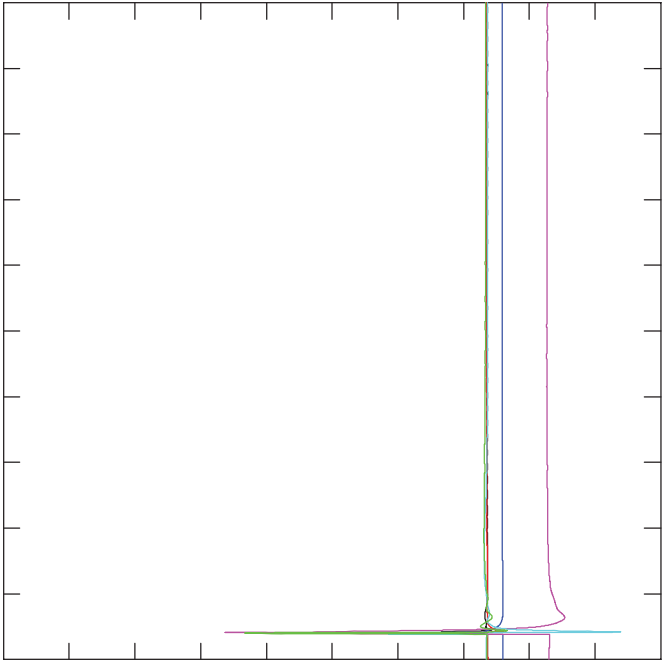
18:12
TUE, JUN 02 2015
BRANCH ACTIVE POWER (MW)



FIGURE E-29E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-29_9L59_Tinchebray.out

1.4000	CHNL# 34: [VARS 59016 [IRWAG1 0.6900]G]]	-0.5000
1.4000	CHNL# 33: [VARS 67435 [HALKIRK4 0.6900]G]]	-0.5000
1.4000	CHNL# 32: [VARS 67308 [GRIZZ G 0.6900]I]]	-0.5000
1.4000	CHNL# 28: [VARS 4220 [HAYTER 9 25.000]G]]	-0.5000
1.4000	CHNL# 26: [VARS 2621 [GHOSTPL1 0.6900]G]]	-0.5000
1.4000	CHNL# 24: [VARS 1514 [NEXG1 0.6900]I]]	-0.5000



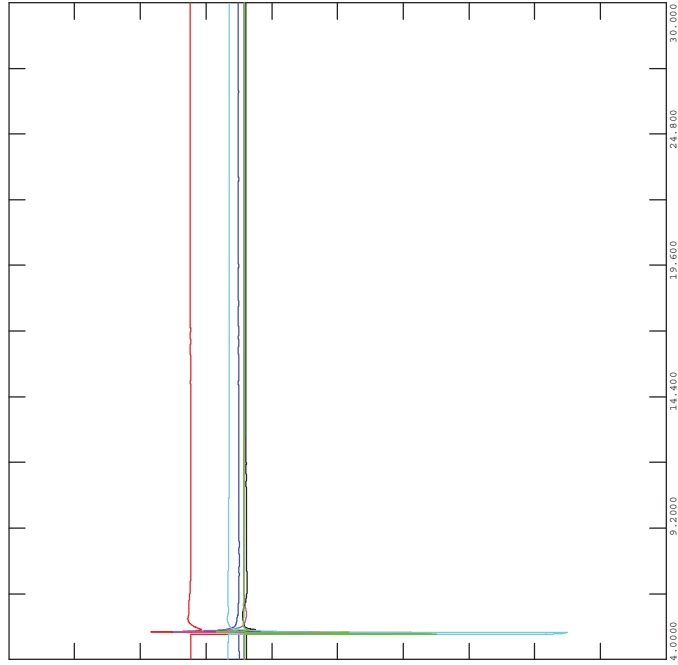
18:12
TUE, JUN 02 2015
MACHINE Q WIND (PU)



FIGURE E-29G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-29_9L59_Tinchebray.out

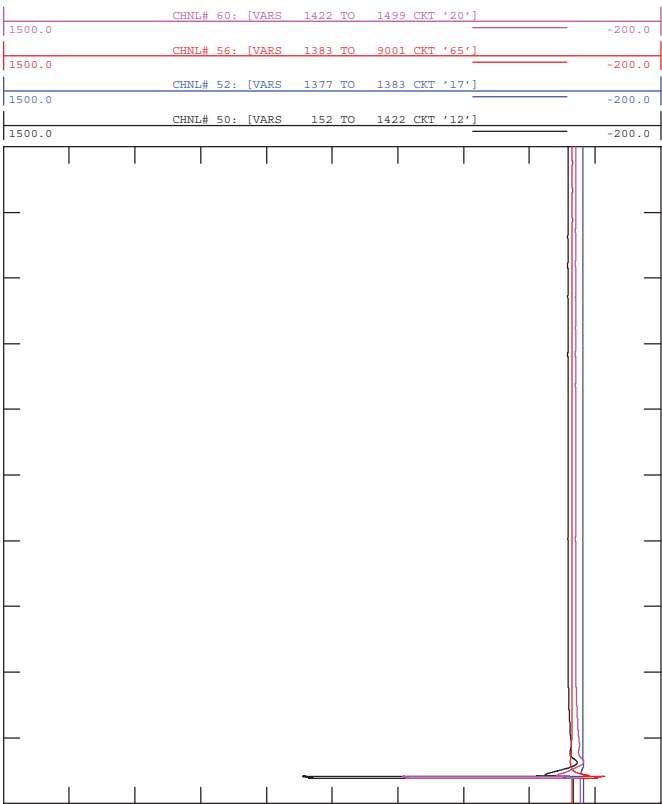
1.6000	CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]	0.0
1.6000	CHNL# 47: [VOLT 67435 [HALKIRK4 0.6900]]	0.0
1.6000	CHNL# 46: [VOLT 67308 [GRIZZ G 0.6900]]	0.0
1.6000	CHNL# 42: [VOLT 4220 [HAYTER 9 25.000]]	0.0
1.6000	CHNL# 40: [VOLT 2621 [GHOSTPL1 0.6900]]	0.0
1.6000	CHNL# 38: [VOLT 1514 [NEXG1 0.6900]]	0.0



18:12
TUE, JUN 02 2015
MACHINE VOLTAGE WIND (PU)



FIGURE E-29I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-29_9L59_Tinchebray.out



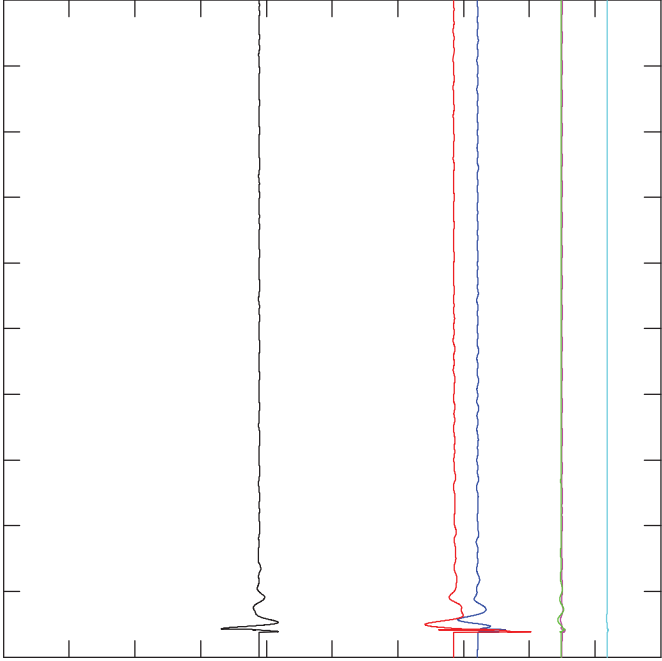
TUE, JUN 02 2015 18:12
BRANCH REACTIVE PWR (MVR)



FIGURE E-30B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-30_912L_Nevis.out

5.8000	CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]	-0.1000
5.8000	CHNL# 13: [POWR 3301[FCG1 13.800]1]	-0.1000
5.8000	CHNL# 11: [POWR 2248[MAHKE-G2 13.800]2]	-0.1000
5.8000	CHNL# 9: [POWR 1497[BAT #5 21.000]5]	-0.1000
5.8000	CHNL# 8: [POWR 1487[SHEER 29 19.000]2]	-0.1000
5.8000	CHNL# 7: [POWR 403[KEEP#3GN 22.000]3]	-0.1000



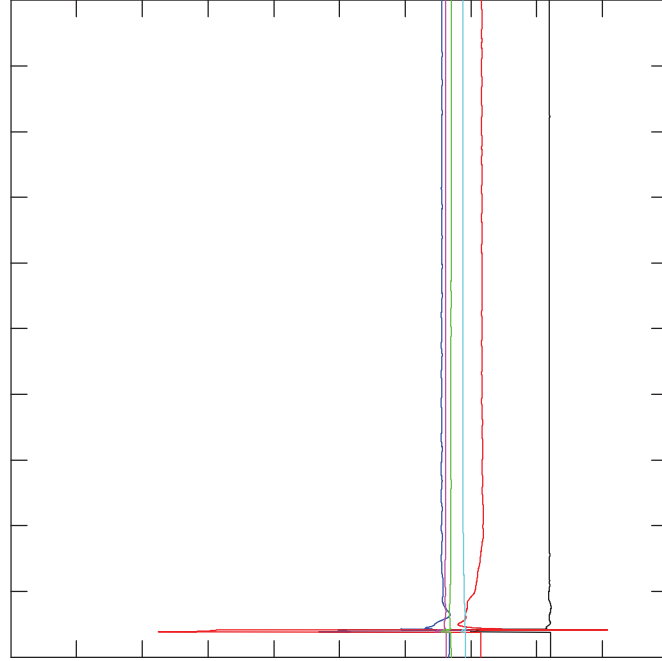
TUE, JUN 02 2015 18:12
MACHINE P COAL (PU)



FIGURE E-30D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-30_912L_Nevis.out

5.4000	CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]	-2.4000
5.4000	CHNL# 27: [VARS 3301[FCG1 13.800]1]	-2.4000
5.4000	CHNL# 25: [VARS 2248[MAHKE-G2 13.800]2]	-2.4000
5.4000	CHNL# 23: [VARS 1497[BAT #5 21.000]5]	-2.4000
5.4000	CHNL# 22: [VARS 1487[SHEER 29 19.000]2]	-2.4000
5.4000	CHNL# 21: [VARS 403[KEEP#3GN 22.000]3]	-2.4000



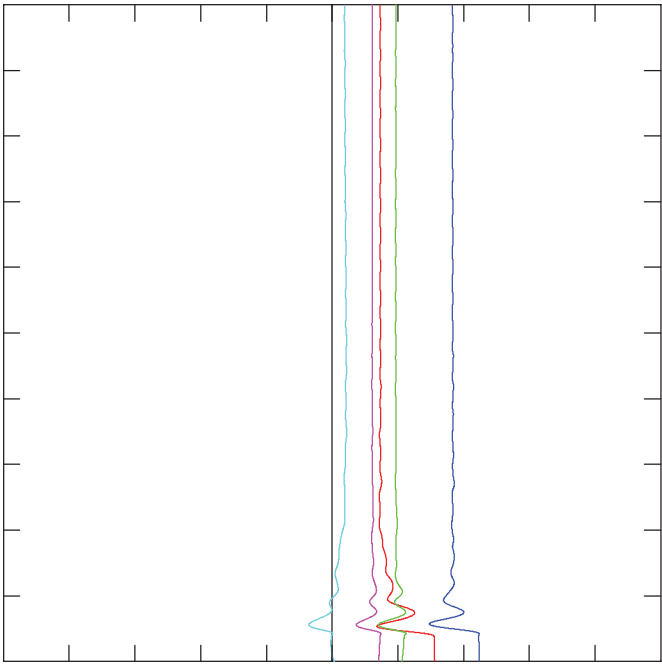
TUE, JUN 02 2015 18:12
MACHINE Q COAL (PU)



FIGURE E-30A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-30_912L_Nevis.out

60.0000	CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]	-60.0000
60.0000	CHNL# 5: [ANGL 3301[FCG1 13.800]1]	-60.0000
60.0000	CHNL# 4: [ANGL 2248[MAHKE-G2 13.800]2]	-60.0000
60.0000	CHNL# 3: [ANGL 1497[BAT #5 21.000]5]	-60.0000
60.0000	CHNL# 2: [ANGL 1487[SHEER 29 19.000]2]	-60.0000
60.0000	CHNL# 1: [ANGL 403[KEEP#3GN 22.000]3]	-60.0000



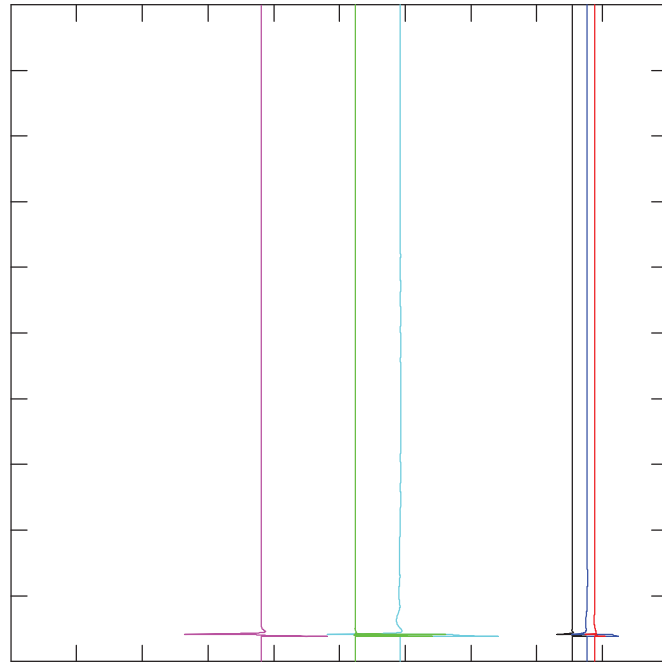
TUE, JUN 02 2015 18:12
MACHINE P WIND (DEGREES)



FIGURE E-30C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-30_912L_Nevis.out

2.0000	CHNL# 20: [POWR 69016[IRWAG1 0.6900]G1]	-0.1000
2.0000	CHNL# 19: [POWR 67435[HALKIRK4 0.6900]G1]	-0.1000
2.0000	CHNL# 18: [POWR 67308[GRIZZ G 0.6900]1]	-0.1000
2.0000	CHNL# 14: [POWR 4220[HAYTER 9 25.000]G1]	-0.1000
2.0000	CHNL# 12: [POWR 2621[GHOSTPL1 0.6900]G1]	-0.1000
2.0000	CHNL# 10: [POWR 1514[NEXG1 0.6900]1]	-0.1000



TUE, JUN 02 2015 18:12
MACHINE P WIND (PU)



FIGURE E-30F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-30_912L_Nevis.out

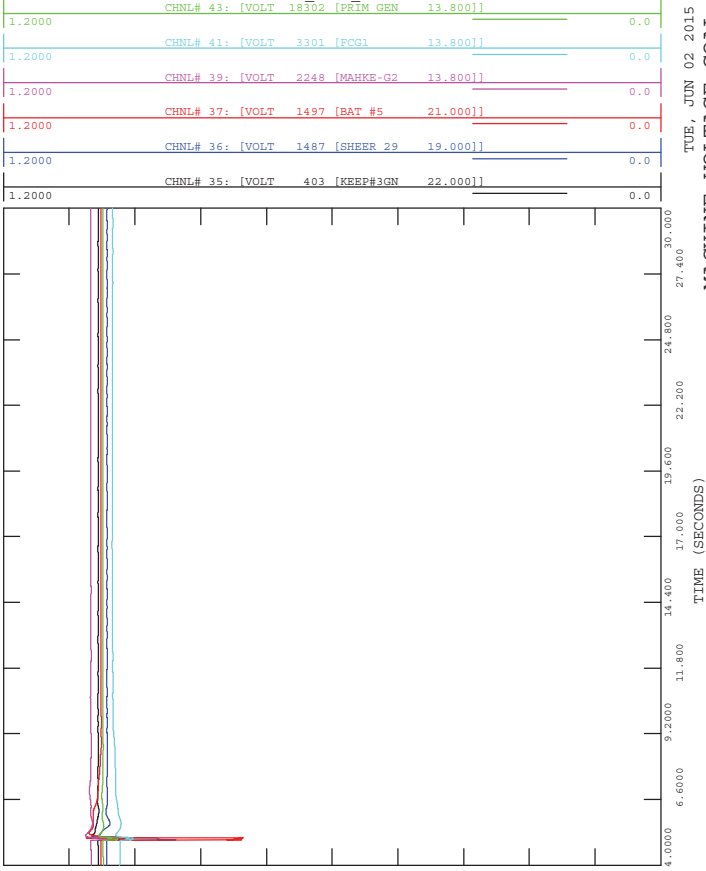


FIGURE E-30H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-30_912L_Nevis.out

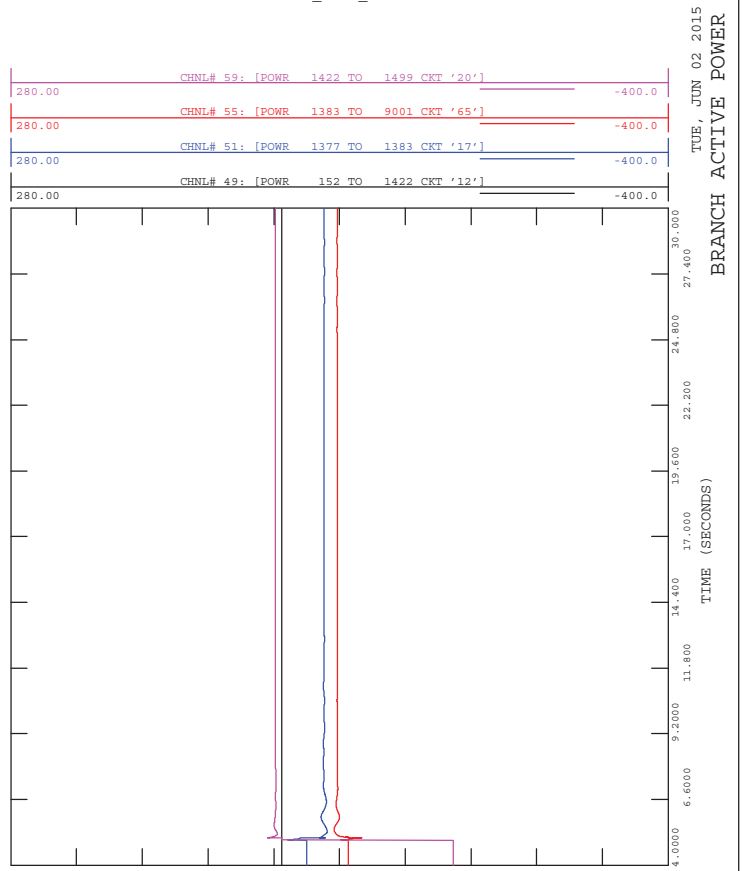


FIGURE E-30B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-30_912L_Nevis.out

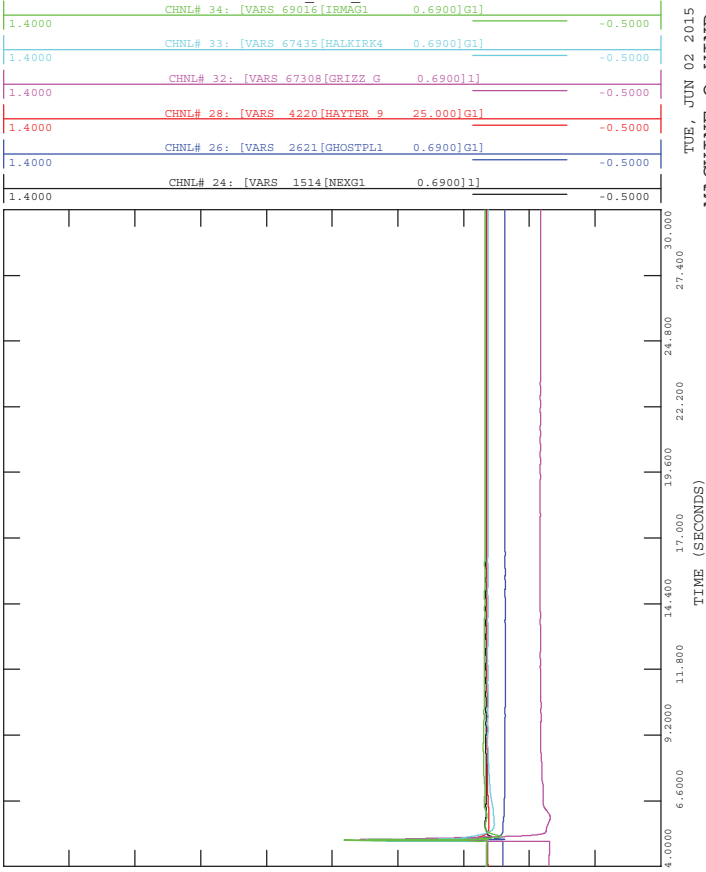


FIGURE E-30G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-30_912L_Nevis.out

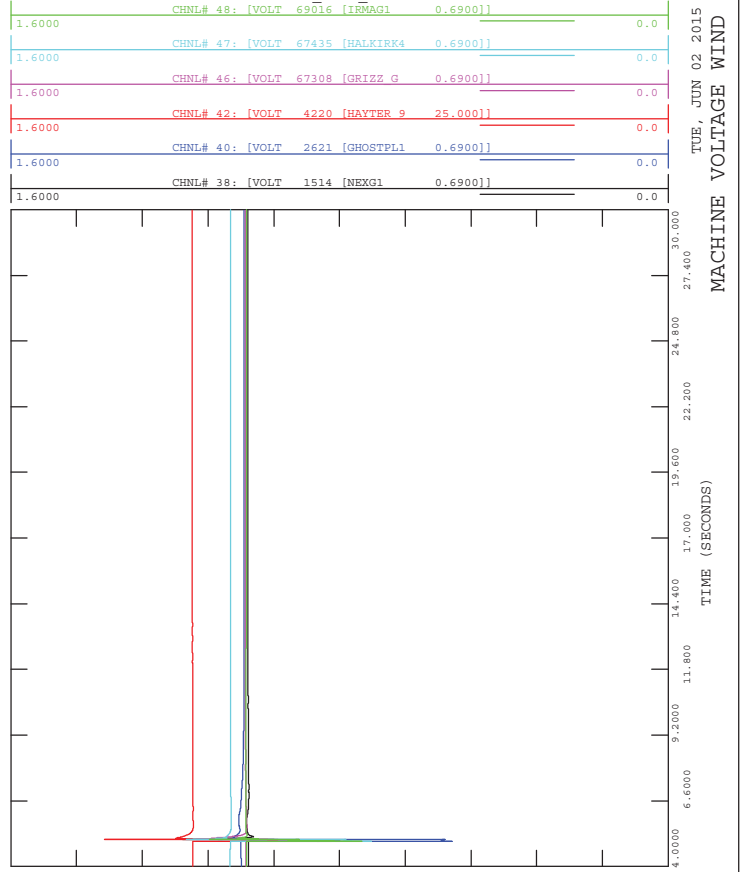




FIGURE E-301
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-30_912L_Nevis.out

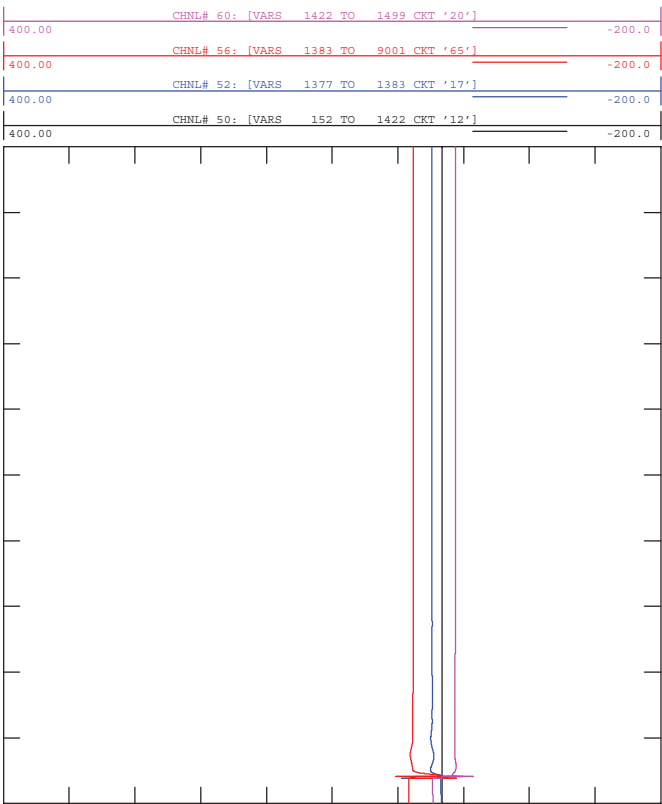




FIGURE E-31B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-31_912L RedDeer.out

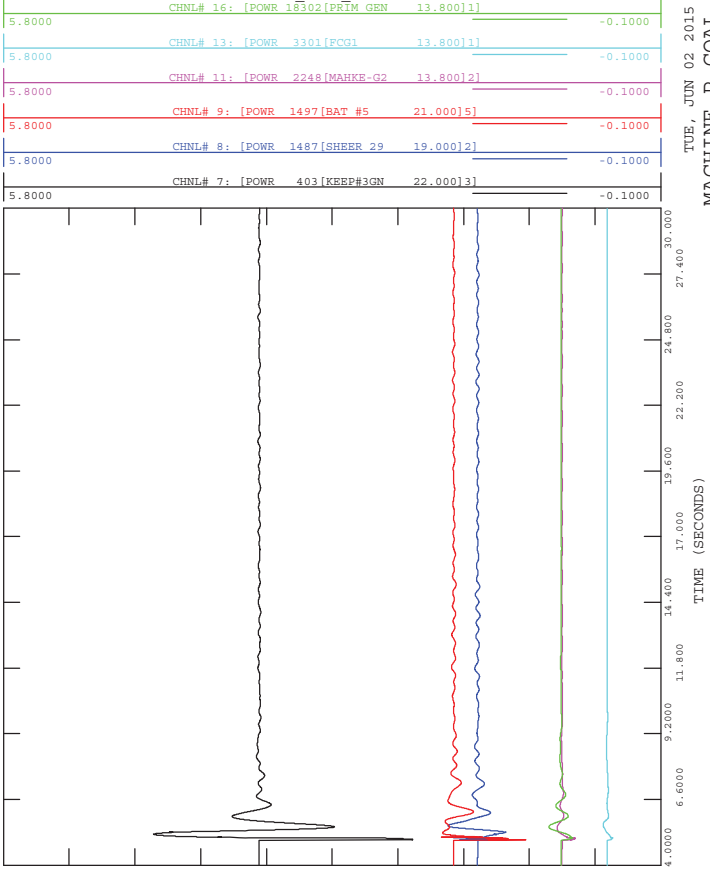


FIGURE E-31D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-31_912L RedDeer.out

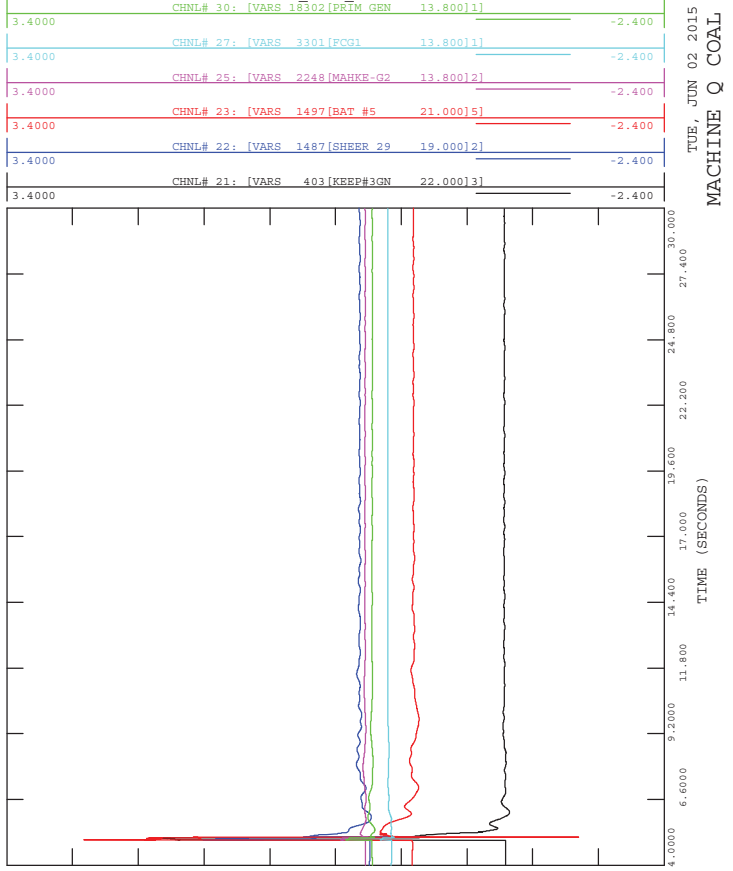


FIGURE E-31A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-31_912L RedDeer.out

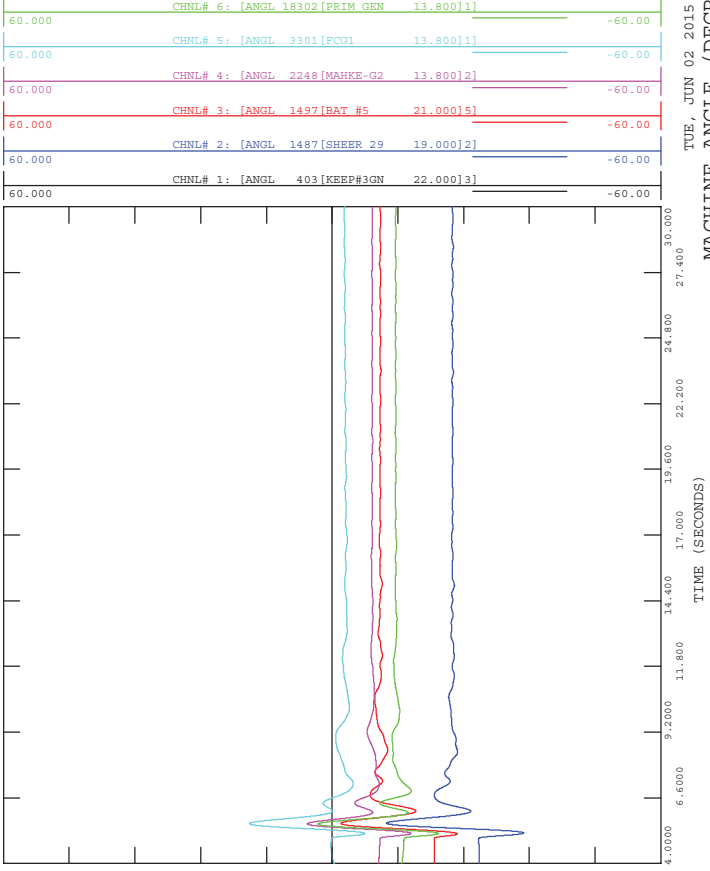


FIGURE E-31C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-31_912L RedDeer.out

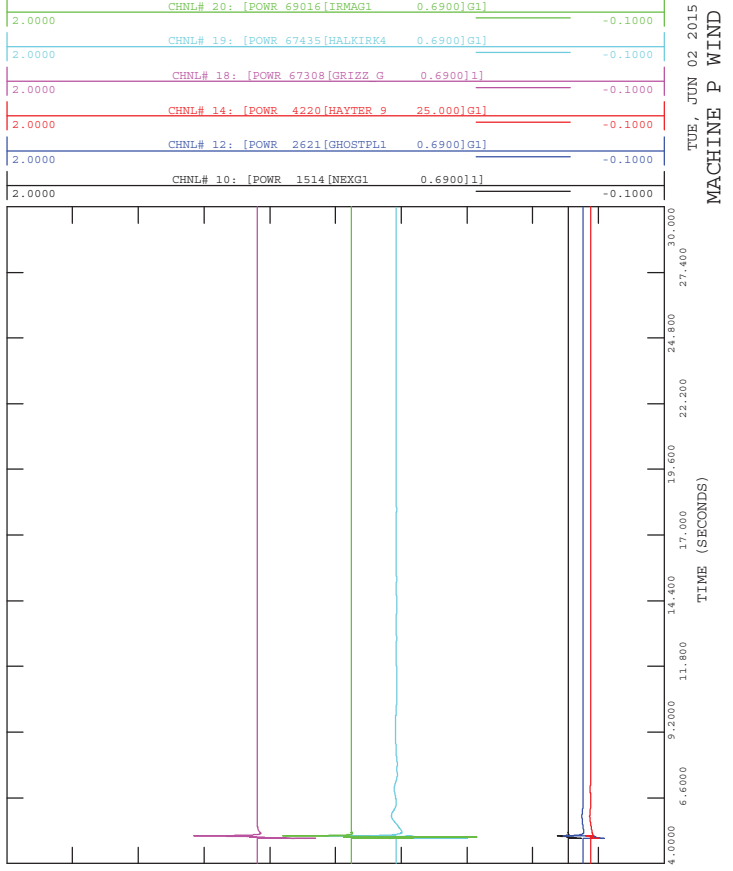




FIGURE E-31F
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-31_912L_RedDeer.out

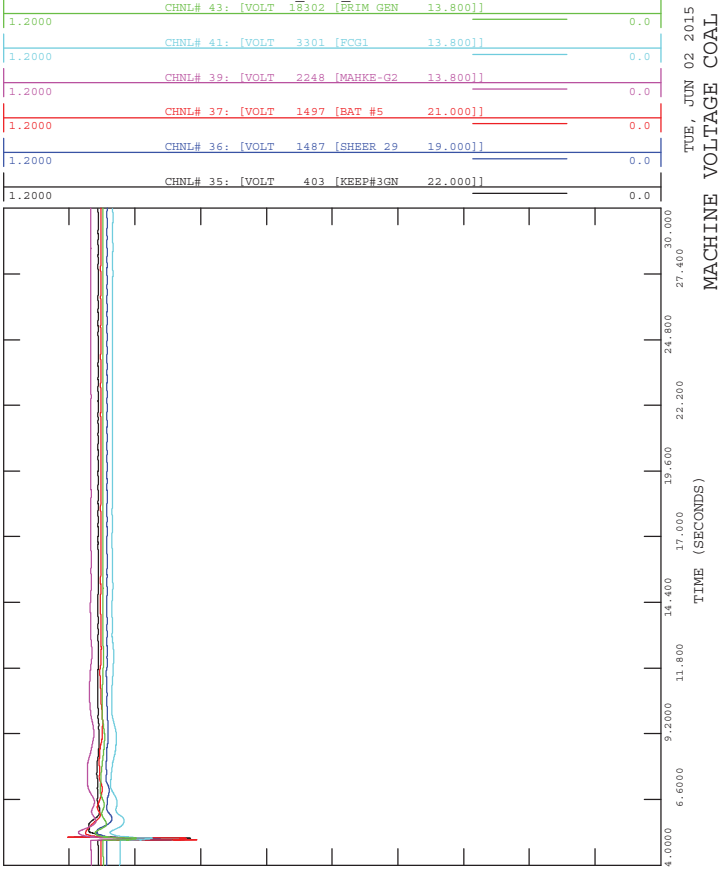


FIGURE E-31H
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-31_912L_RedDeer.out

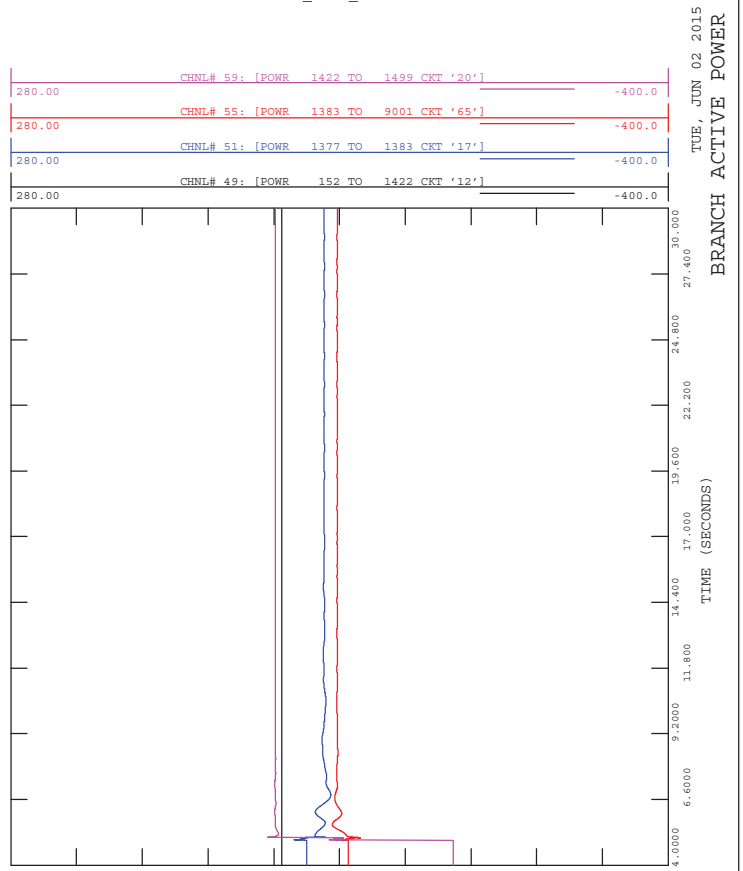


FIGURE E-31E
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-31_912L_RedDeer.out

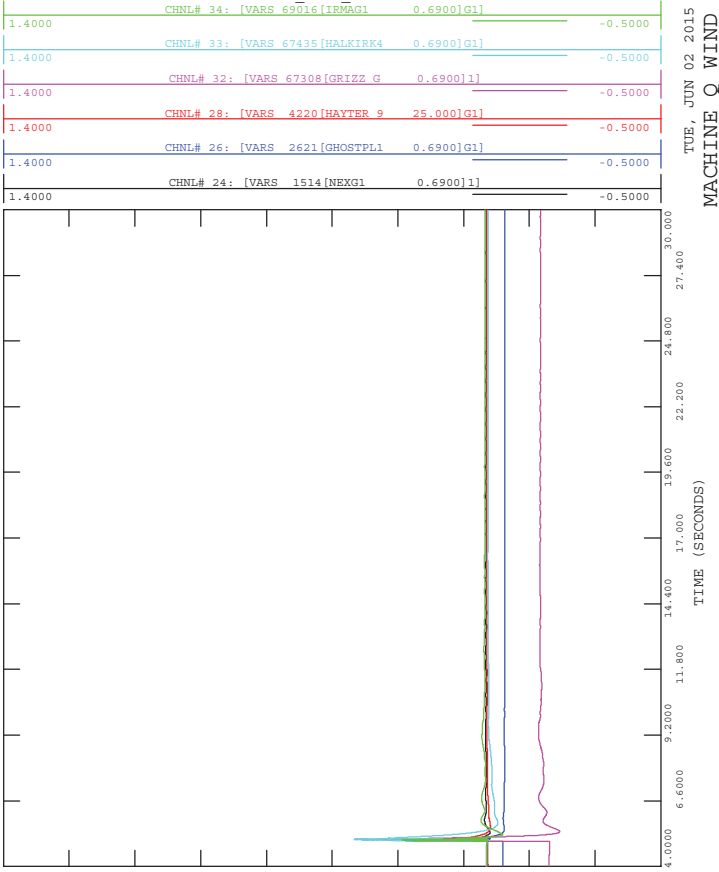


FIGURE E-31G
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-31_912L_RedDeer.out

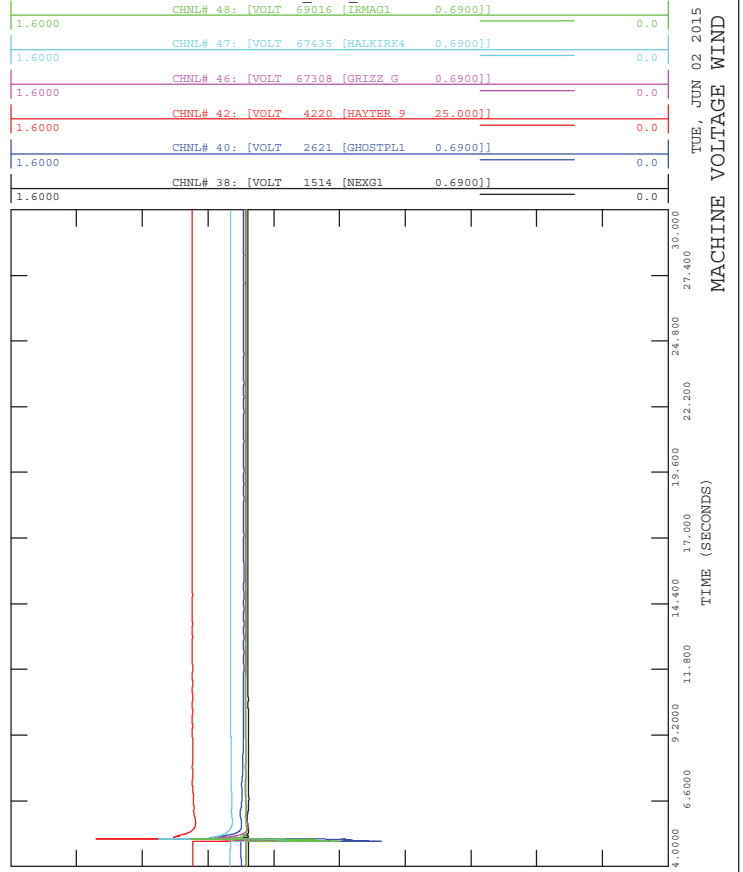
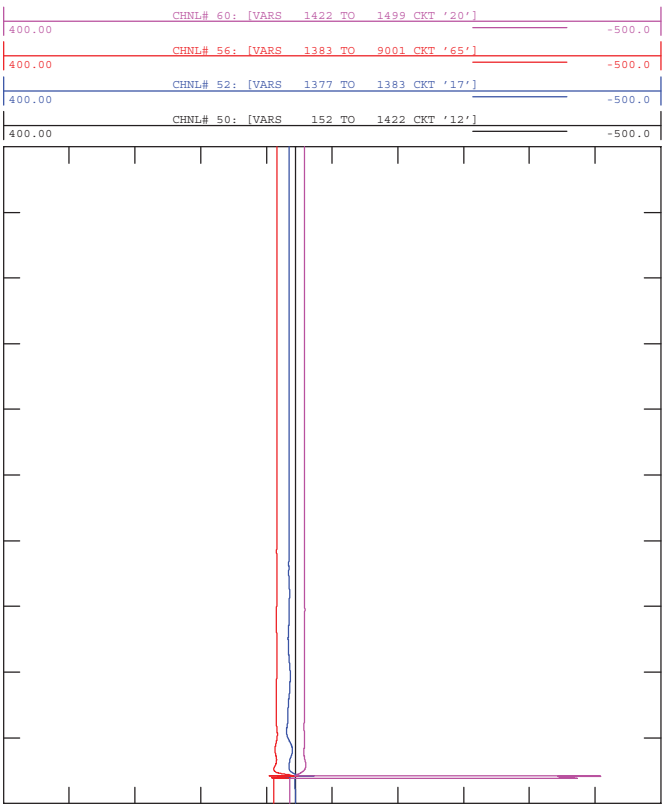




FIGURE E-31I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-31_912L_RedDeer.out



TUE, JUN 02 2015 18:12
BRANCH REACTIVE PWR (MVR)

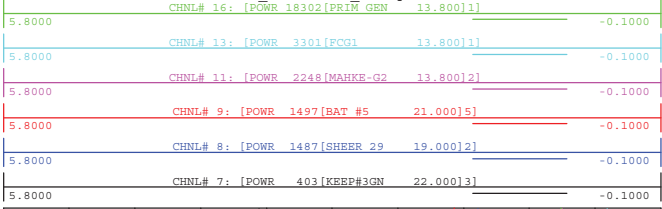


FIGURE E-32B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: E-32_7L53+7L70_Bonnyville.out

CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:12
MACHINE P COAL (PU)

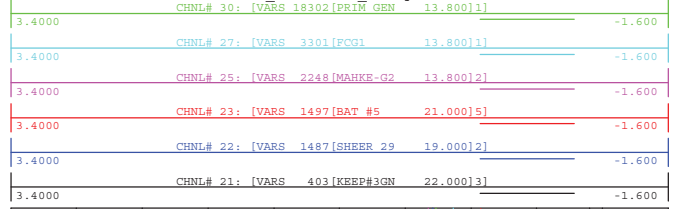


FIGURE E-32D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: E-32_7L53+7L70_Bonnyville.out

CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:12
MACHINE Q COAL (PU)

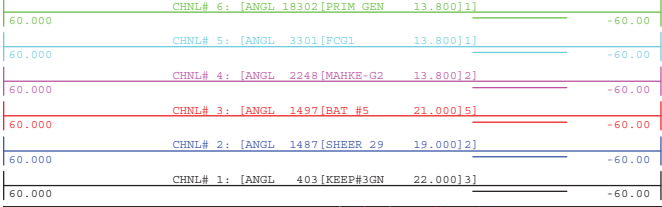


FIGURE E-32A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: E-32_7L53+7L70_Bonnyville.out

CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



TUE, JUN 02 2015 18:12
MACHINE ANGLE (DEGREES)

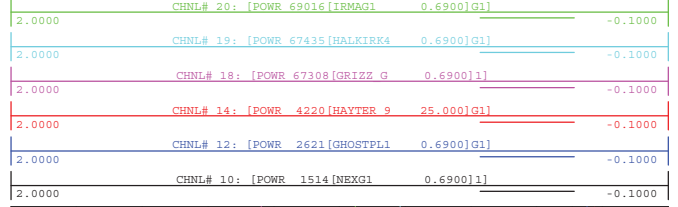


FIGURE E-32C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: E-32_7L53+7L70_Bonnyville.out

CHNL# 20: [POWR 69016[IRMAG1 0.6900]G1]



TUE, JUN 02 2015 18:12
MACHINE P WIND (PU)



FIGURE E-32F

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: E-32_7L53+7L70_Bonnyville.out

CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]

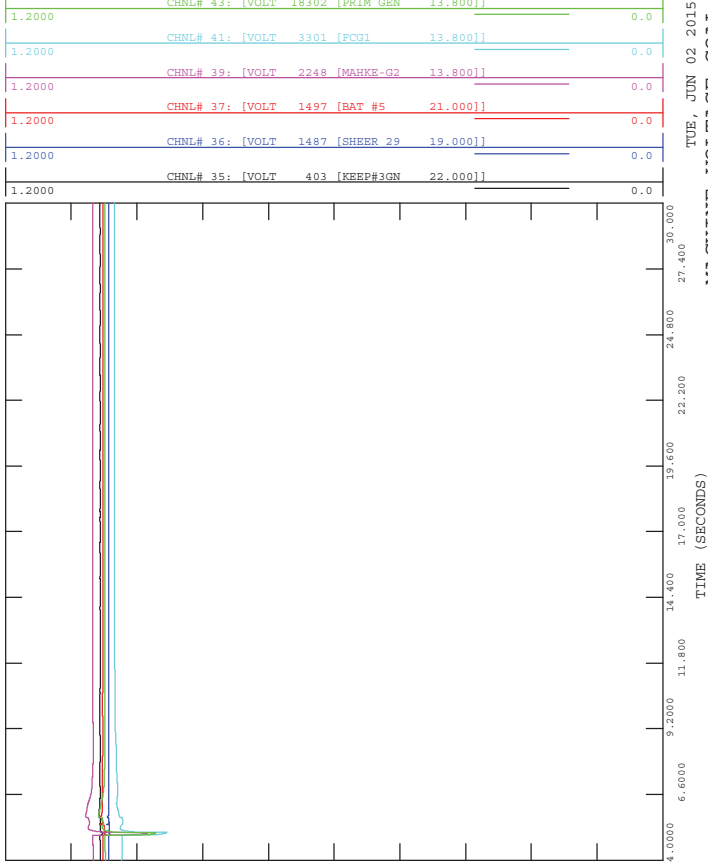


FIGURE E-32H

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: E-32_7L53+7L70_Bonnyville.out

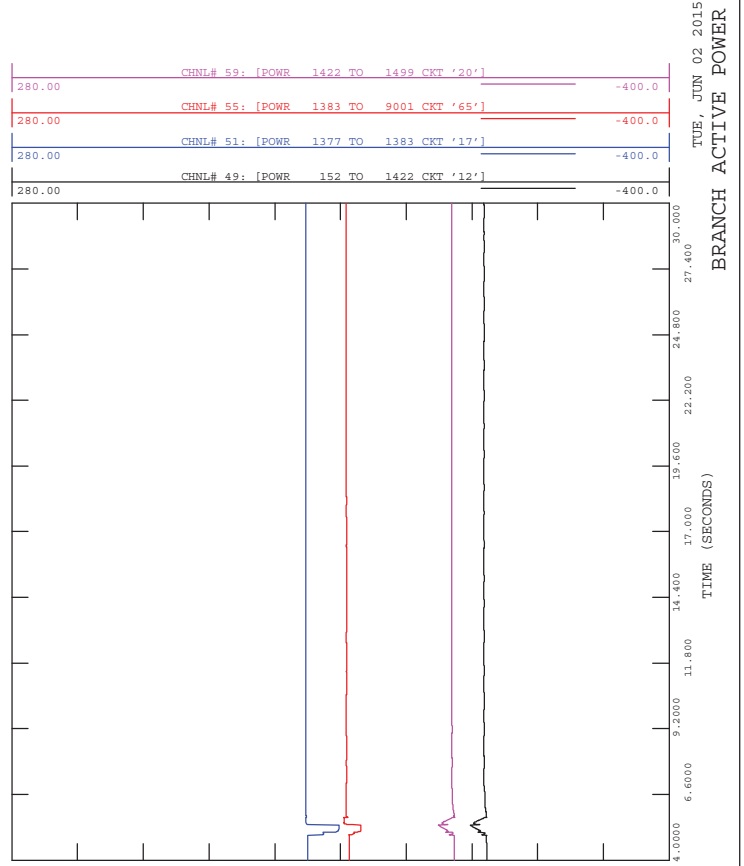


FIGURE E-32E

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: E-32_7L53+7L70_Bonnyville.out

CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]

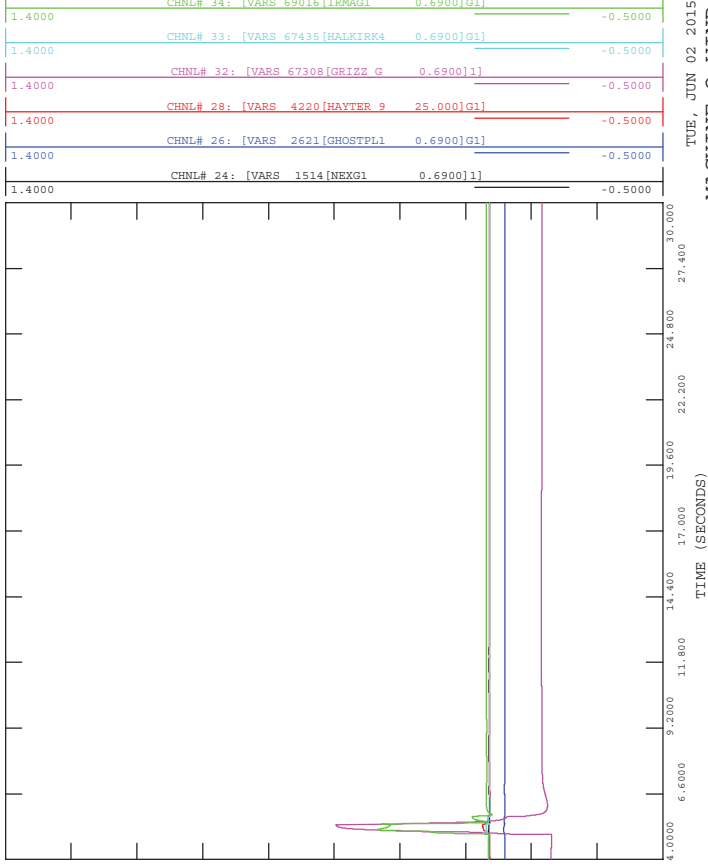


FIGURE E-32G

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: E-32_7L53+7L70_Bonnyville.out

CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]

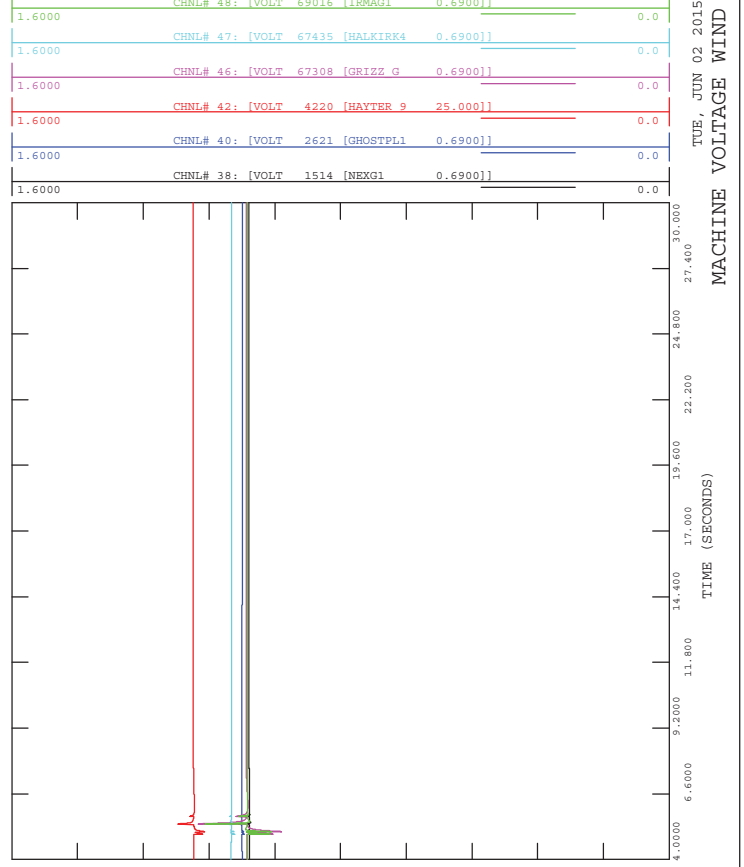
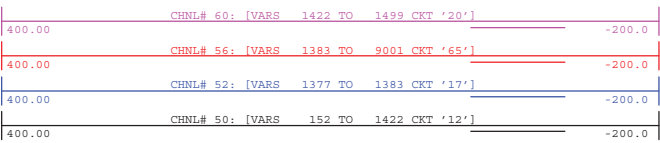




FIGURE E-32I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES
FILE: E-32_7L53+7L70_Bonnyville.out



TUE, JUN 02 2015 18:12
BRANCH REACTIVE PWR (MVR)

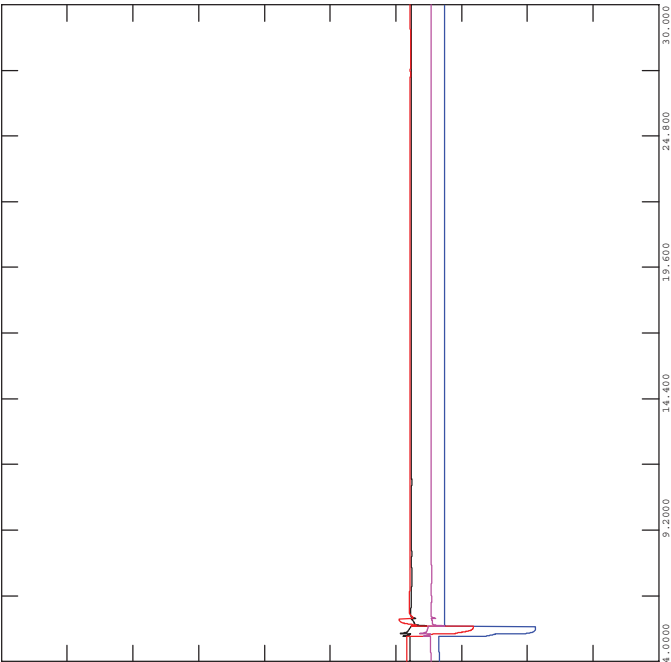
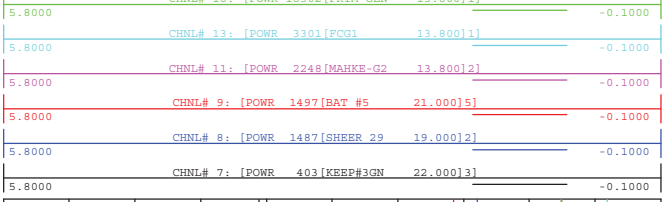




FIGURE E-33B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-33_9L27+9L953_Cordel.out
CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



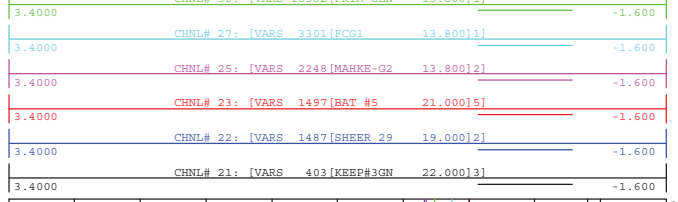
TUE, JUN 02 2015 18:12
MACHINE P COAL (PU)



FIGURE E-33D

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-33_9L27+9L953_Cordel.out
CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



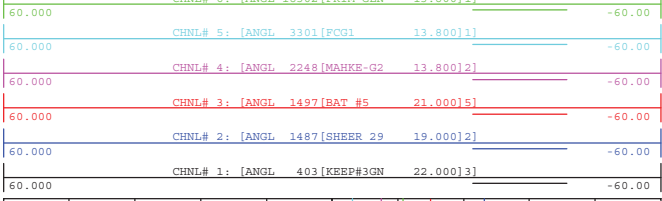
TUE, JUN 02 2015 18:12
MACHINE Q COAL (PU)



FIGURE E-33A

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-33_9L27+9L953_Cordel.out
CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



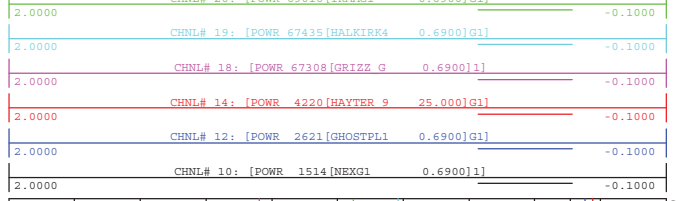
TUE, JUN 02 2015 18:12
MACHINE ANGLE (DEGREES)



FIGURE E-33C

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-33_9L27+9L953_Cordel.out
CHNL# 20: [POWR 69016[TRWAG1 0.6900]G1]



TUE, JUN 02 2015 18:12
MACHINE P WIND (PU)



FIGURE E-33F

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-33_9L27+9L953_Cordel.out

1.2000	CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]	0.0
1.2000	CHNL# 41: [VOLT 3301 [PCG1 13.800]]	0.0
1.2000	CHNL# 39: [VOLT 2248 [MAHKE-G2 13.800]]	0.0
1.2000	CHNL# 37: [VOLT 1497 [BAT #5 21.000]]	0.0
1.2000	CHNL# 36: [VOLT 1487 [SHEER 29 19.000]]	0.0
1.2000	CHNL# 35: [VOLT 403 [KEEP#3GN 22.000]]	0.0

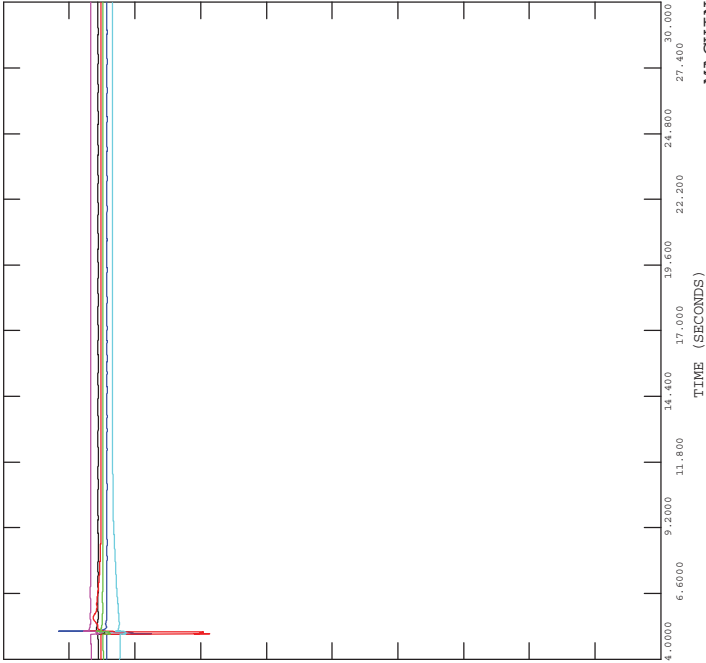


FIGURE E-33H

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-33_9L27+9L953_Cordel.out

280.00	CHNL# 59: [POWR 1422 TO 1499 CKT '20']	-400.0
280.00	CHNL# 55: [POWR 1383 TO 9001 CKT '65']	-400.0
280.00	CHNL# 51: [POWR 1377 TO 1383 CKT '17']	-400.0
280.00	CHNL# 49: [POWR 152 TO 1422 CKT '12']	-400.0

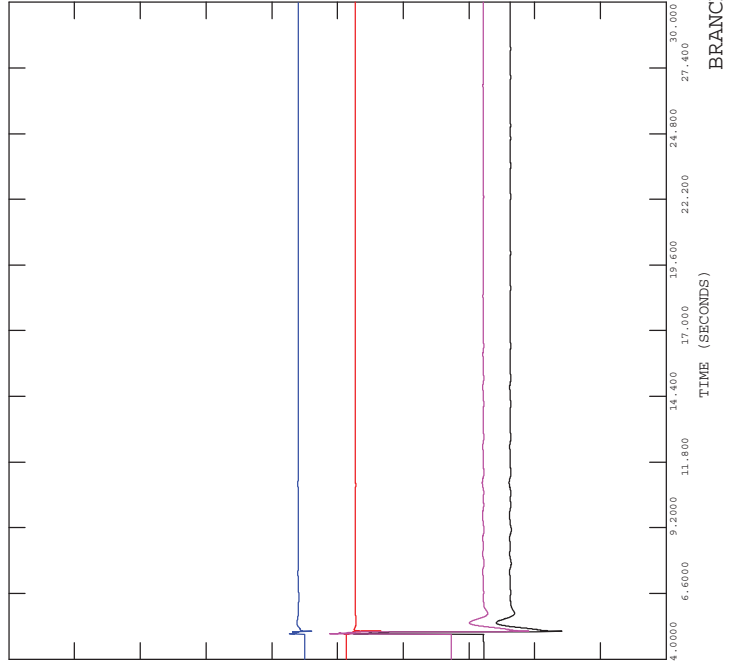


FIGURE E-33B

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-33_9L27+9L953_Cordel.out

1.4000	CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]	-0.5000
1.4000	CHNL# 33: [VARS 67435 [HALKIRK4 0.6900]G1]	-0.5000
1.4000	CHNL# 32: [VARS 67308 [GRIZZ G 0.6900]1]	-0.5000
1.4000	CHNL# 28: [VARS 4220 [HAYTER 9 25.000]G1]	-0.5000
1.4000	CHNL# 26: [VARS 2621 [GHOSTPL1 0.6900]G1]	-0.5000
1.4000	CHNL# 24: [VARS 1514 [NEXG1 0.6900]1]	-0.5000

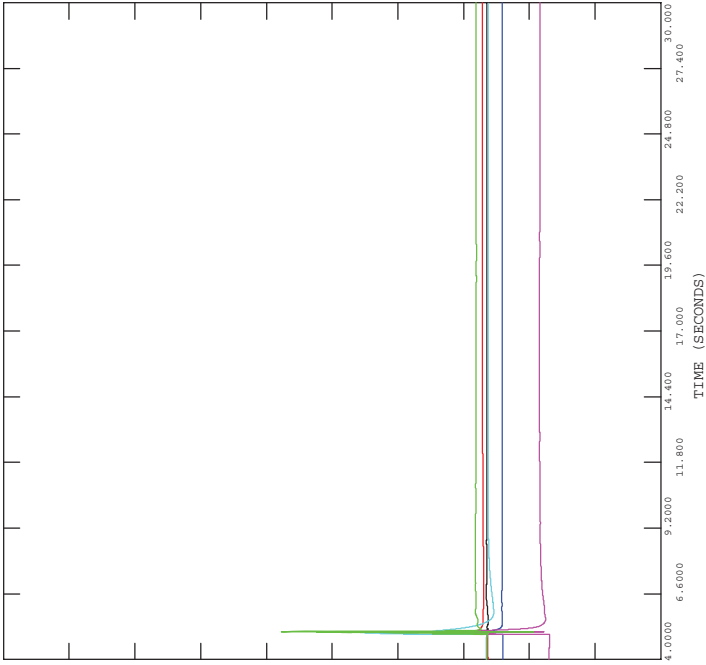


FIGURE E-33G

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-33_9L27+9L953_Cordel.out

1.7000	CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]	0.0
1.7000	CHNL# 47: [VOLT 67435 [HALKIRK4 0.6900]]	0.0
1.7000	CHNL# 46: [VOLT 67308 [GRIZZ G 0.6900]]	0.0
1.7000	CHNL# 42: [VOLT 4220 [HAYTER 9 25.000]]	0.0
1.7000	CHNL# 40: [VOLT 2621 [GHOSTPL1 0.6900]]	0.0
1.7000	CHNL# 38: [VOLT 1514 [NEXG1 0.6900]]	0.0

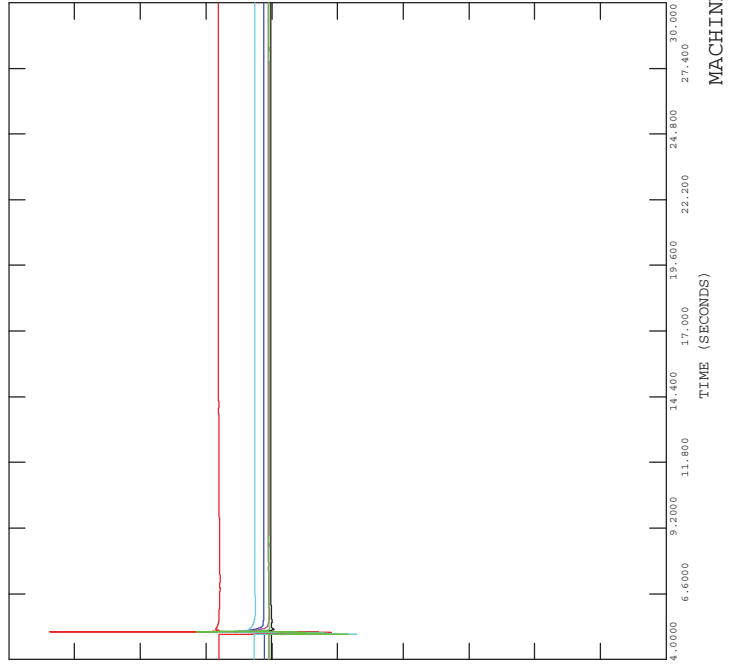
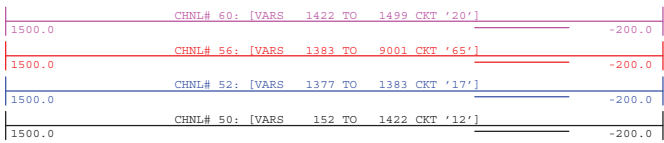




FIGURE E-331
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-33_9L27+9L953_Cordel.out



TUE, JUN 02 2015 18:12
BRANCH REACTIVE PWR (MVR)

TIME (SECONDS)



FIGURE E-34B
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-34 9L36+9L37 WhitefishLake.out

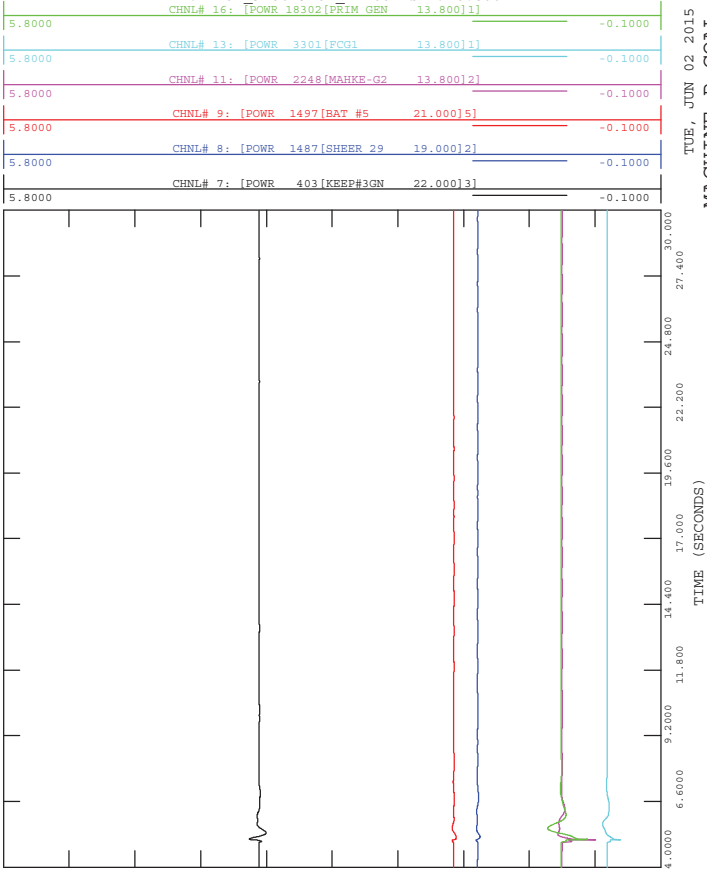


FIGURE E-34D
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-34 9L36+9L37 WhitefishLake.out

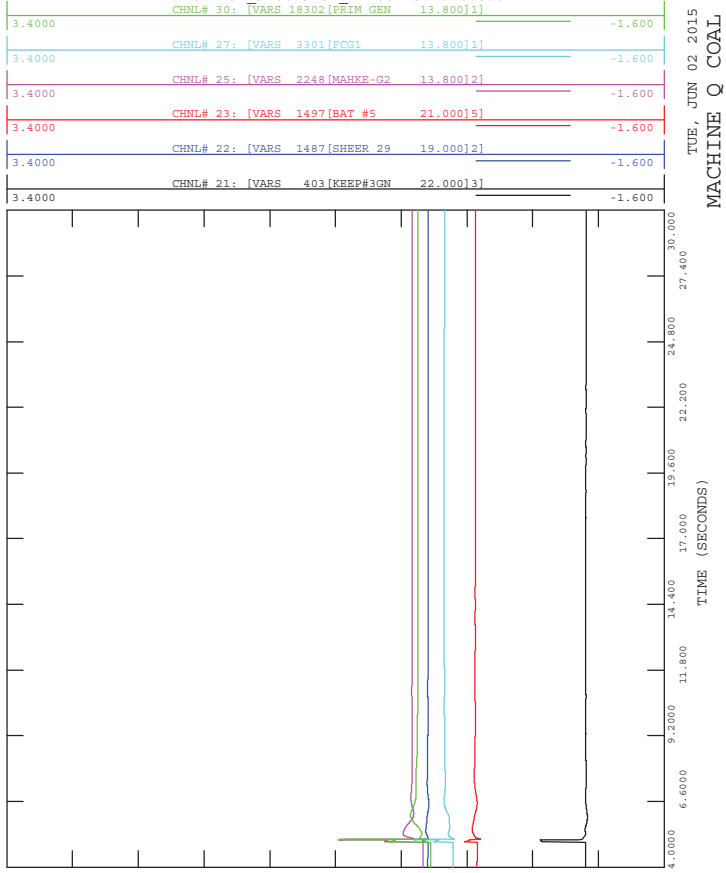


FIGURE E-34A
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-34 9L36+9L37 WhitefishLake.out

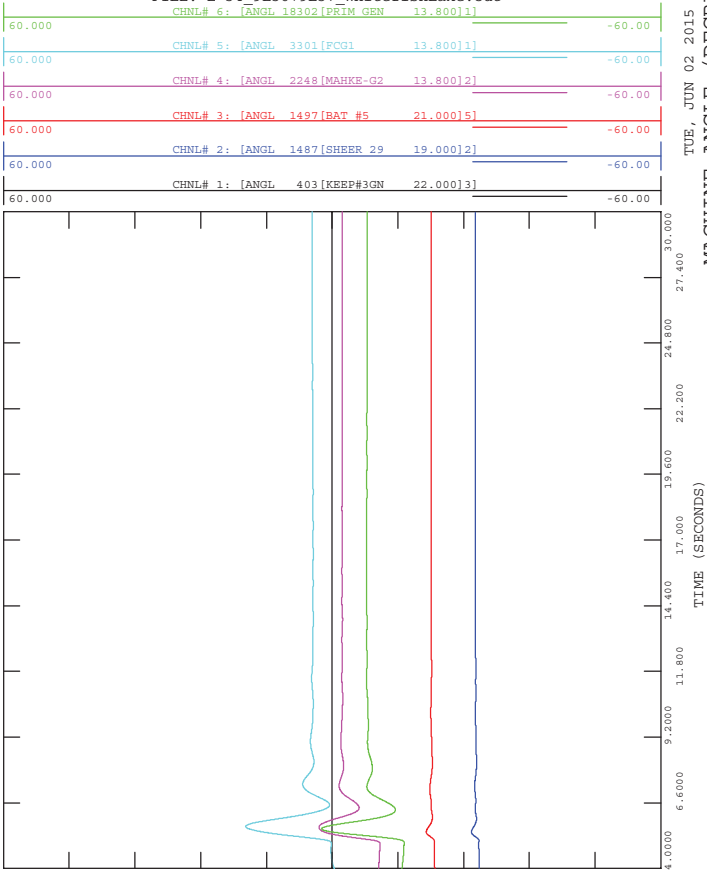


FIGURE E-34C
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-34 9L36+9L37 WhitefishLake.out

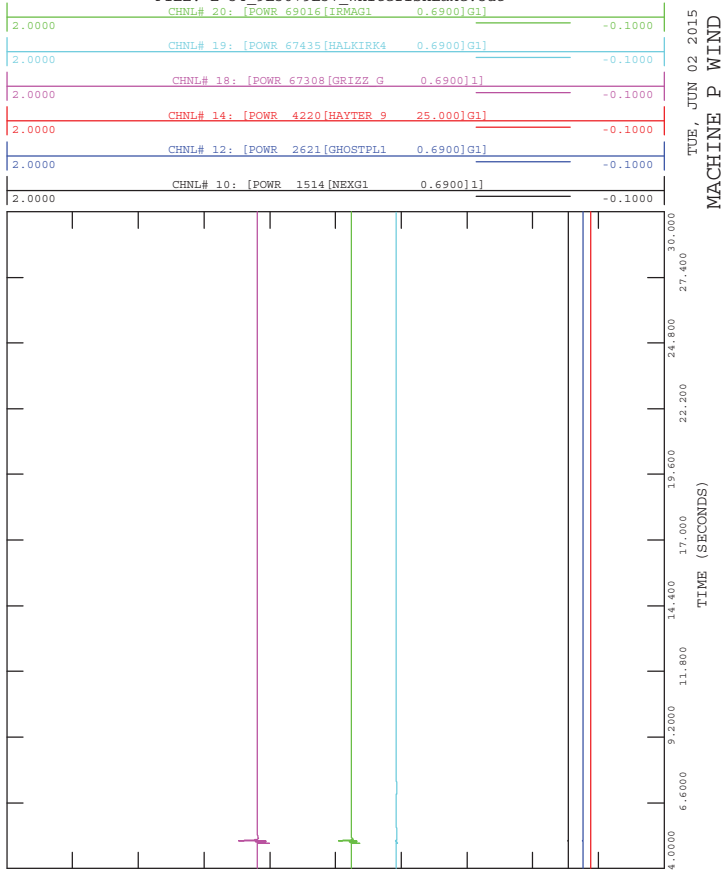


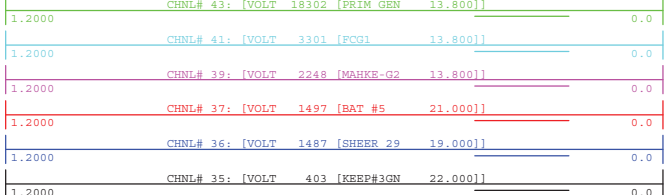


FIGURE E-34F

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-34_9L36+9L37_WhitefishLake.out

CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]



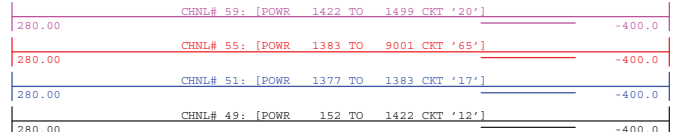
MACHINE VOLTAGE COAL (PU)
TUE, JUN 02 2015 18:12



FIGURE E-34H

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-34_9L36+9L37_WhitefishLake.out



BRANCH ACTIVE POWER (MW)
TUE, JUN 02 2015 18:12

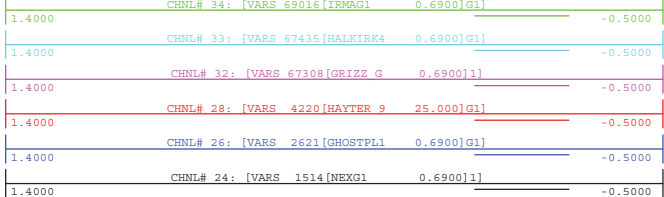


FIGURE E-34E

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-34_9L36+9L37_WhitefishLake.out

CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]



MACHINE Q WIND (PU)
TUE, JUN 02 2015 18:12

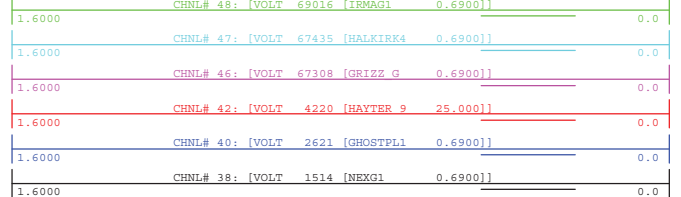


FIGURE E-34G

2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: E-34_9L36+9L37_WhitefishLake.out

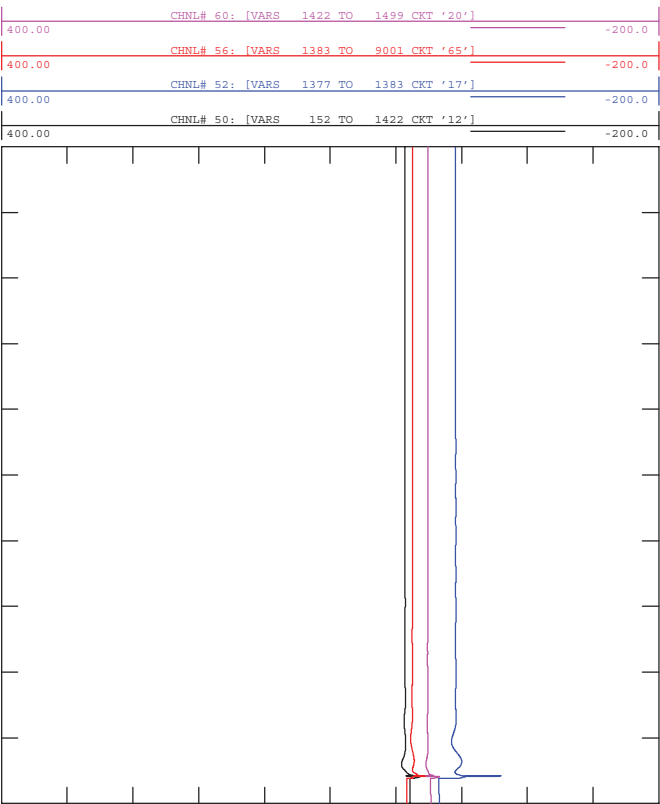
CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]



MACHINE VOLTAGE WIND (PU)
TUE, JUN 02 2015 18:12



FIGURE E-34I
2017SL, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: E-34_9L36+9L37_WhitefishLake.out



TUE, JUN 02 2015 18:12
BRANCH REACTIVE PWR (MVR)

ATTACHMENT F
2017SP Transient Stability Diagrams

Table F-1: Summary of Transient Stability Diagrams for 2017SP, Alt3

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	2019S Vincent	708S Grizzly Bear	710S Vermilion	2019S Vincent
F-8					708S Grizzly Bear
F-9					710S Vermilion
F-10	7L70	700S Bonnyville		707S St.Paul	700S Bonnyville
F-11					707S St.Paul
F-12	7L115	526S Buffalo Creek		926S Kinsella (Mainstream)	526S Buffalo Creek
F-13					926S Kinsella
F-14	7L117	706S Irish Creek		710S Vermilion	706S Irish Creek
F-15					710S Vermilion
F-16	7L129	526S Buffalo Creek	Bauer Tap	710S Vermilion	526S Buffalo Creek
F-17					710S Vermilion
F-18	7L134	709S Vegreville		2019S Vincent	709S Vegreville
F-19					2019S Vincent
F-20	701L/7L701	757S Battle River	764S Heisler	223S Strome	757S Battle River
F-21					223S Strome
F-22	749L	899S Edgerton	Killarney Tap	648S Metiskow	899S Edgerton
F-23					648S Metiskow
F-24	749L/7L749	899S Edgerton	Briker Tap	716S Lloydminster	899S Edgerton
F-25					716S Lloydminster
F-26	9L20	755S Cordel		766S Nevis	755S Cordel
F-27					766S Nevis
F-28	9L59	801S Anderson		972S Tinchebray	801S Anderson
F-29					972S Tinchebray
F-30	912L	766S Nevis		63S Red Deer	766S Nevis
F-31					63S Red Deer
F-32	7L53+7L70	700S Bonnyville		707S St.Paul 706S Irish Creek	700S Bonnyville
F-33	9L29+9L953	755S Cordel		766S Nevis 863S Paintearth	755S Cordel
F-34	9L36+9L37	825S Whitefish Lake		826S Marguerite Lake	825S Whitefish Lake

Table F-2: Summary of Channels

Channel	Measurement	Unit
ANGL 403[KEEP#3GN 22.000]3	Machine Angle (degrees)	Keephills 3
ANGL 1487[SHEER 29 19.000]2	Machine Angle (degrees)	Sheerness 2
ANGL 1497[BAT #5 21.000]5	Machine Angle (degrees)	Battle River 5
ANGL 2248[MAHKE-G2 13.800]2	Machine Angle (degrees)	Mahkeses 2
ANGL 3301[FCG1 13.800]1	Machine Angle (degrees)	Foster Creek 1
ANGL 18302[PRIM GEN 13.800]1	Machine Angle (degrees)	Primrose
POWR 403[KEEP#3GN 22.000]3	Machine P (pu)	Keephills 3
POWR 1487[SHEER 29 19.000]2	Machine P (pu)	Sheerness 2
POWR 1497[BAT #5 21.000]5	Machine P (pu)	Battle River 5
POWR 2248[MAHKE-G2 13.800]2	Machine P (pu)	Mahkeses 2
POWR 3301[FCG1 13.800]1	Machine P (pu)	Foster Creek 1
POWR 18302[PRIM GEN 13.800]1	Machine P (pu)	Primrose
POWR 1514[NEXG1 0.6900]1	Machine P (pu)	BluEarth Hand Hills 1
POWR 2621[GHOSTPL1 0.6900]G1	Machine P (pu)	Ghost Pine G1
POWR 4220[HAYTER 9 25.000]G1	Machine P (pu)	Bull Creek G1
POWR 67308[GRIZZ_G 0.6900]1	Machine P (pu)	EON Grizzly Bear
POWR 67435[HALKIRK4 0.6900]G1	Machine P (pu)	Halkirk G1
POWR 69016[IRMAG1 0.6900]G1	Machine P (pu)	Mainstream Wainwright
VARS 403[KEEP#3GN 22.000]3	Machine Q (pu)	Keephills 3
VARS 1487[SHEER 29 19.000]2	Machine Q (pu)	Sheerness 2
VARS 1497[BAT #5 21.000]5	Machine Q (pu)	Battle River 5
VARS 2248[MAHKE-G2 13.800]2	Machine Q (pu)	Mahkeses 2
VARS 3301[FCG1 13.800]1	Machine Q (pu)	Foster Creek 1
VARS 18302[PRIM GEN 13.800]1	Machine Q (pu)	Primrose
VARS 1514[NEXG1 0.6900]1	Machine Q (pu)	BluEarth Hand Hills 1
VARS 2621[GHOSTPL1 0.6900]G1	Machine Q (pu)	Ghost Pine G1
VARS 4220[HAYTER 9 25.000]G1	Machine Q (pu)	Bull Creek G1
VARS 67308[GRIZZ_G 0.6900]1	Machine Q (pu)	EON Grizzly Bear
VARS 67435[HALKIRK4 0.6900]G1	Machine Q (pu)	Halkirk G1
VARS 69016[IRMAG1 0.6900]G1	Machine Q (pu)	Mainstream Wainwright
VOLT 403 [KEEP#3GN 22.000]	Machine Voltage (pu)	Keephills 3
VOLT 1487 [SHEER 29 19.000]	Machine Voltage (pu)	Sheerness 2
VOLT 1497 [BAT #5 21.000]	Machine Voltage (pu)	Battle River 5
VOLT 2248 [MAHKE-G2 13.800]	Machine Voltage (pu)	Mahkeses 2
VOLT 3301 [FCG1 13.800]	Machine Voltage (pu)	Foster Creek 1
VOLT 18302 [PRIM GEN 13.800]	Machine Voltage (pu)	Primrose
VOLT 1514 [NEXG1 0.6900]	Machine Voltage (pu)	BluEarth Hand Hills 1
VOLT 2621 [GHOSTPL1 0.6900]	Machine Voltage (pu)	Ghost Pine G1

VOLT 4220 [HAYTER 9 25.000]	Machine Voltage (pu)	Bull Creek G1
VOLT 67308 [GRIZZ_G 0.6900]	Machine Voltage (pu)	EON Grizzly Bear
VOLT 67435 [HALKIRK4 0.6900]	Machine Voltage (pu)	Halkirk G1
VOLT 69016 [IRMAG1 0.6900]	Machine Voltage (pu)	Mainstream Wainwright
POWR 152 TO 1422 CKT '12'	Branch Active Power (MW)	912L (63S Red Deer to 766S Nevis)
POWR 1377 TO 1383 CKT '17'	Branch Active Power (MW)	7L117 (706S Irish Creek to 710S Vermilion)
POWR 1383 TO 9001 CKT '65'	Branch Active Power (MW)	7L65 (710S Vermilion to Grizzly Bear Tap)
POWR 1422 TO 1499 CKT '20'	Branch Active Power (MW)	9L20 (766S Nevis to 755S Cordel)
VARS 152 TO 1422 CKT '12'	Branch Reactive Power (MVar)	912L (63S Red Deer to 766S Nevis)
VARS 1377 TO 1383 CKT '17'	Branch Reactive Power (MVar)	7L117 (706S Irish Creek to 710S Vermilion)
VARS 1383 TO 9001 CKT '65'	Branch Reactive Power (MVar)	7L65 (710S Vermilion to Grizzly Bear Tap)
VARS 1422 TO 1499 CKT '20'	Branch Reactive Power (MVar)	9L20 (766S Nevis to 755S Cordel)



FIGURE F-1B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

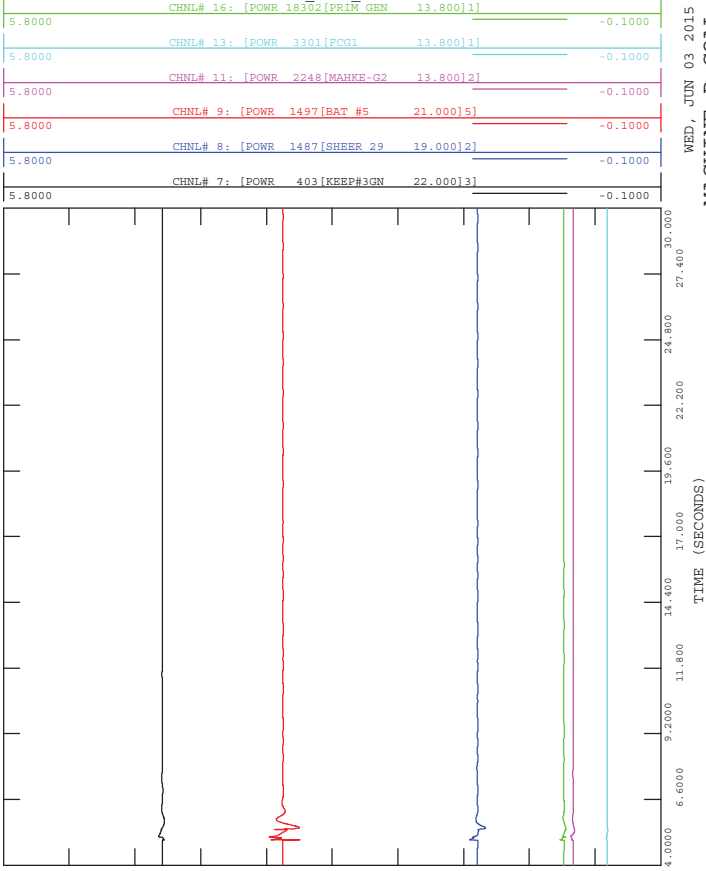


FIGURE F-1D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

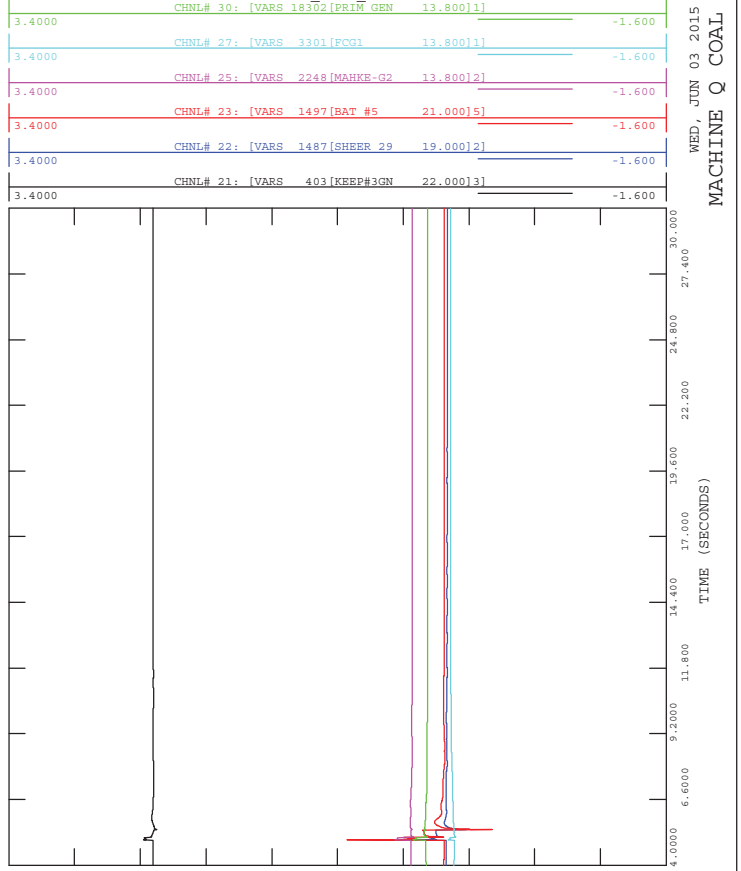


FIGURE F-1A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

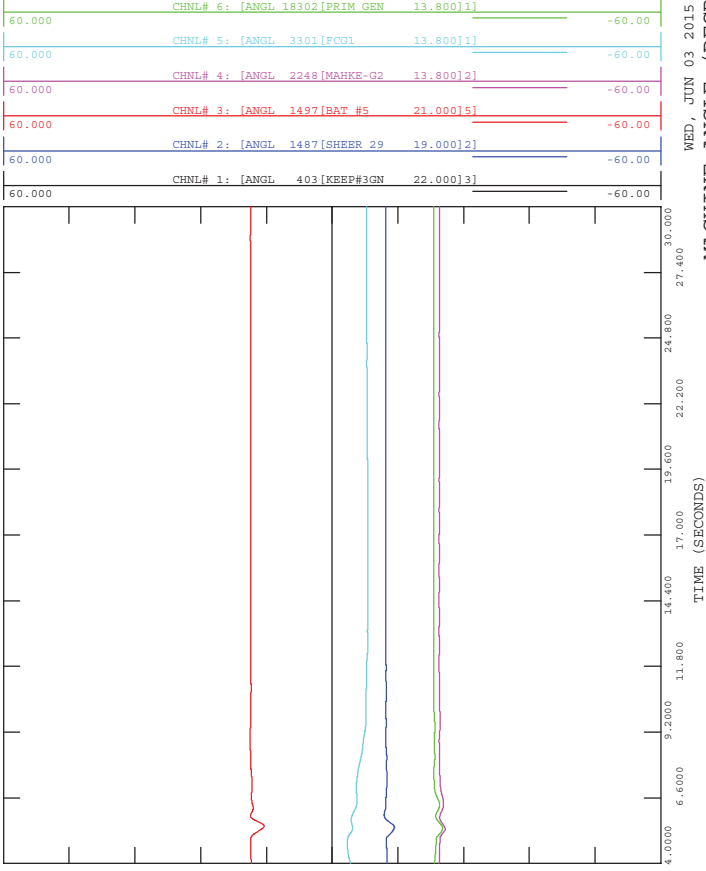


FIGURE F-1C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

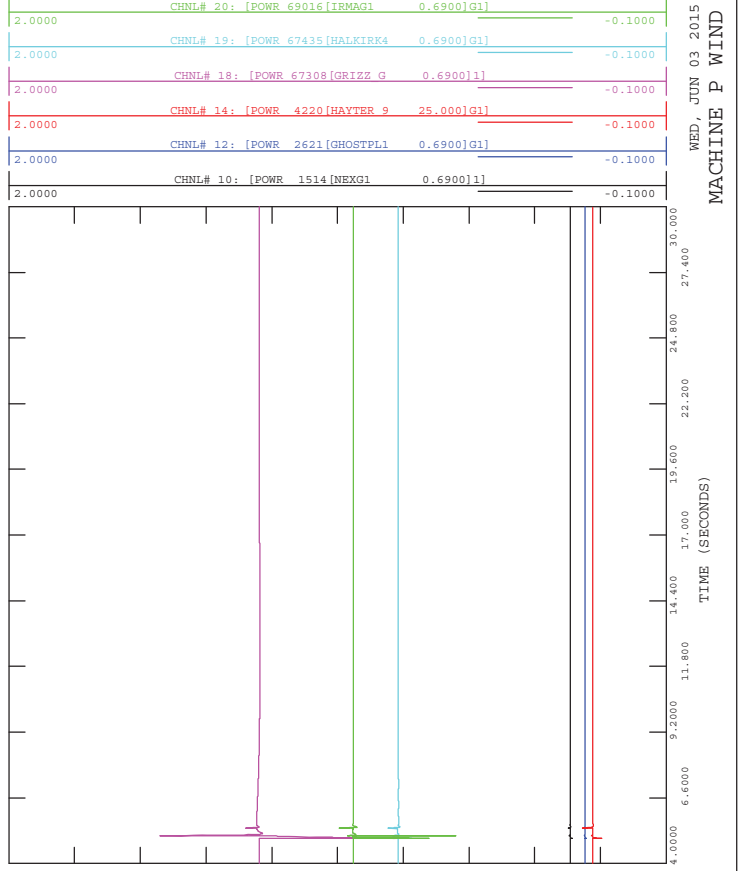
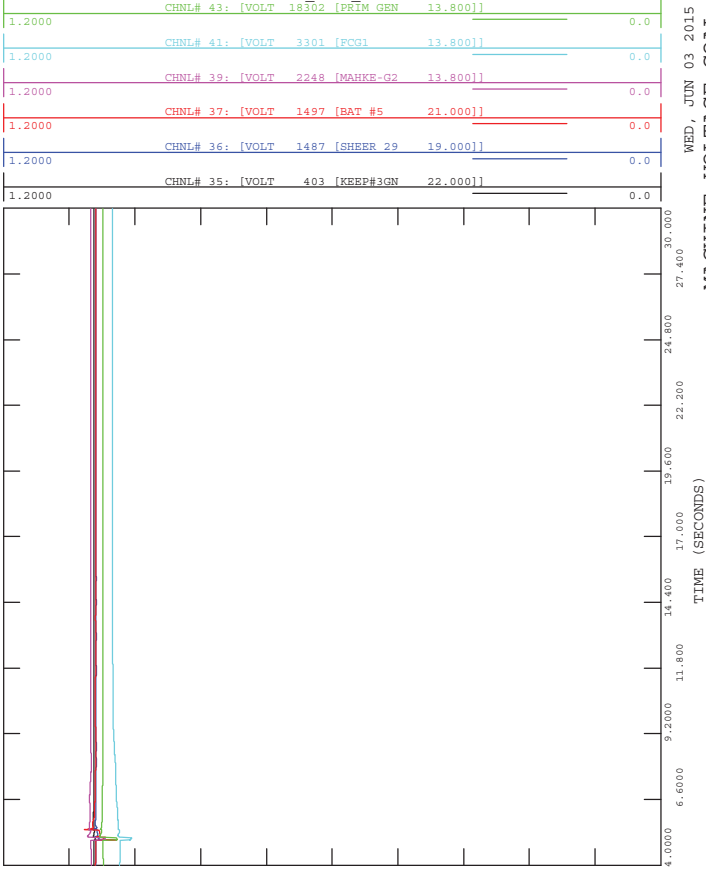




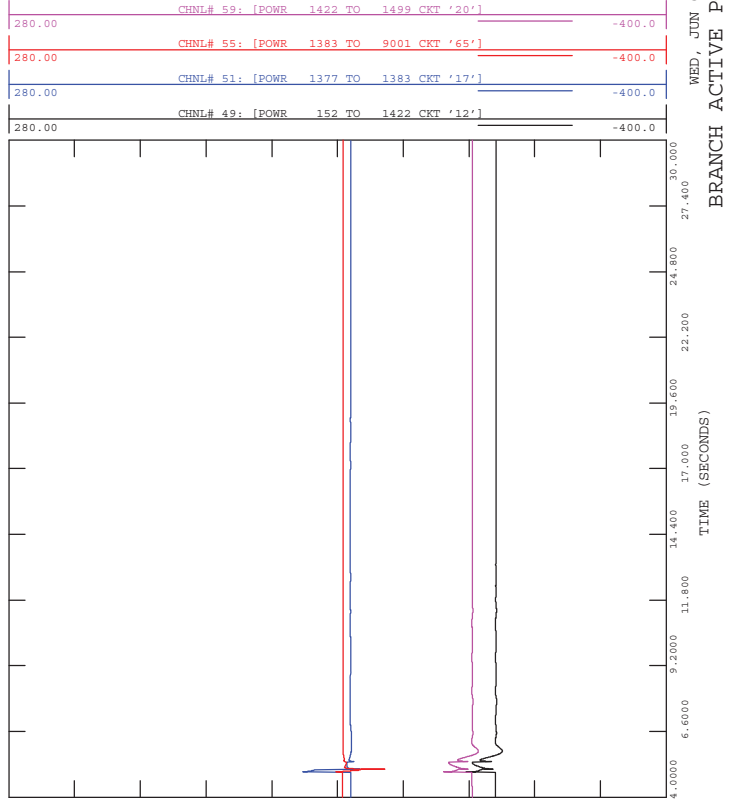
FIGURE F-1F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out



WED, JUN 03 2015 11:24
MACHINE VOLTAGE COAL (PU)



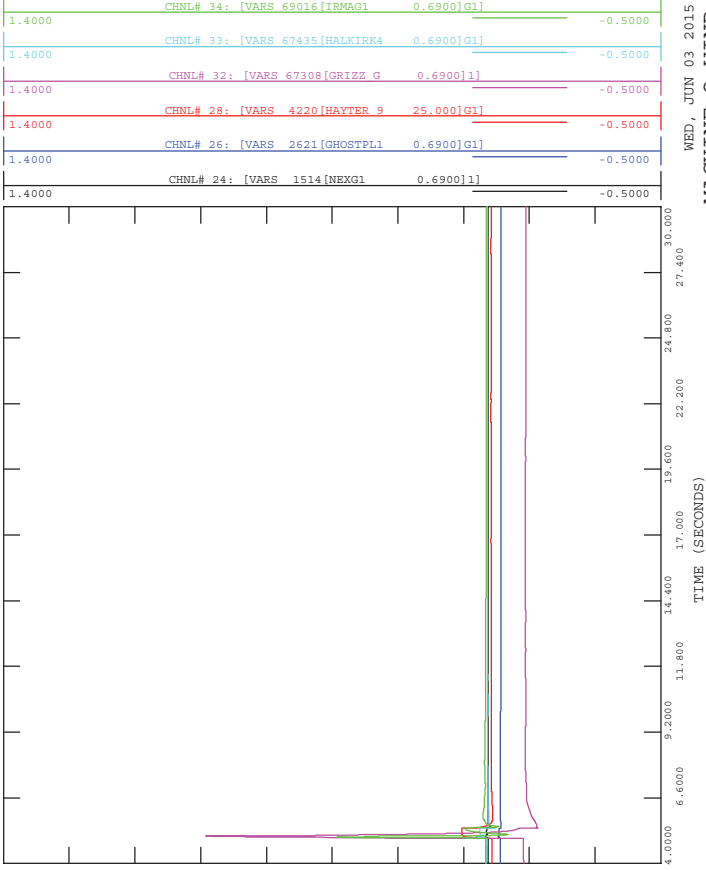
FIGURE F-1H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out



WED, JUN 03 2015 11:24
BRANCH ACTIVE POWER (MW)



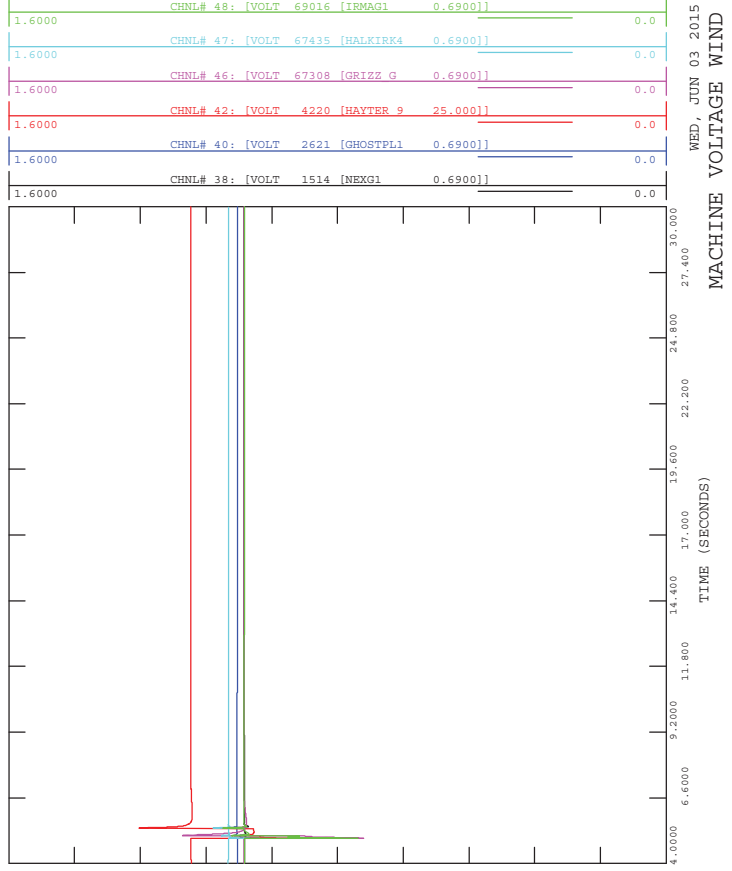
FIGURE F-1E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out



WED, JUN 03 2015 11:24
MACHINE Q WIND (PU)



FIGURE F-1G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out



WED, JUN 03 2015 11:24
MACHINE VOLTAGE WIND (PU)



FIGURE F-11
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 751S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-1_7L42_Hill.out

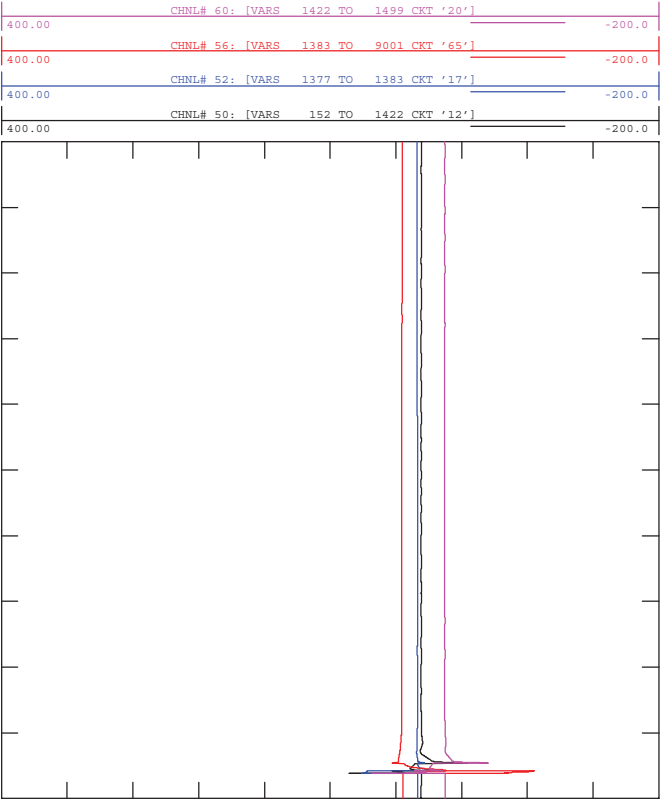




FIGURE F-2B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

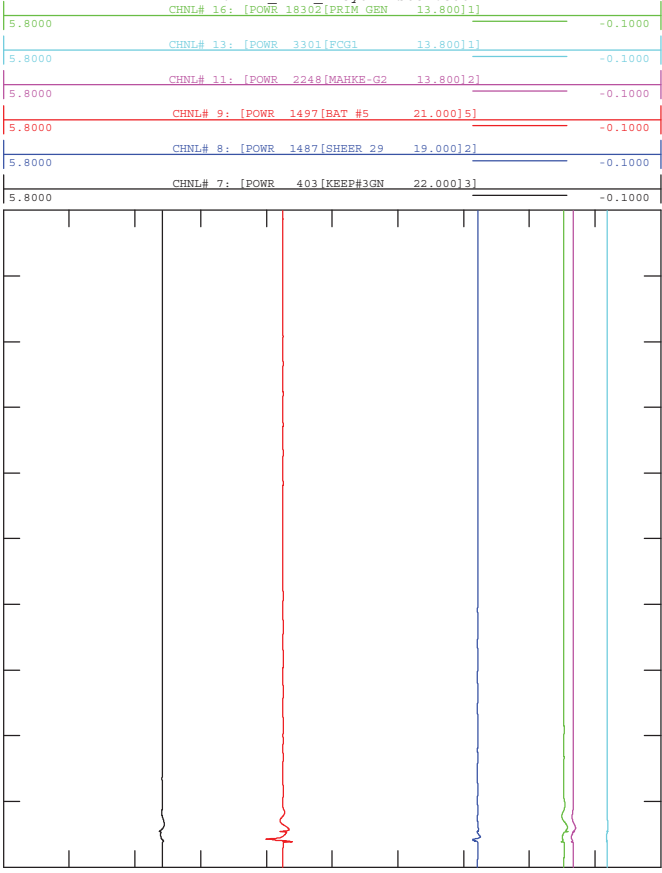


FIGURE F-2D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

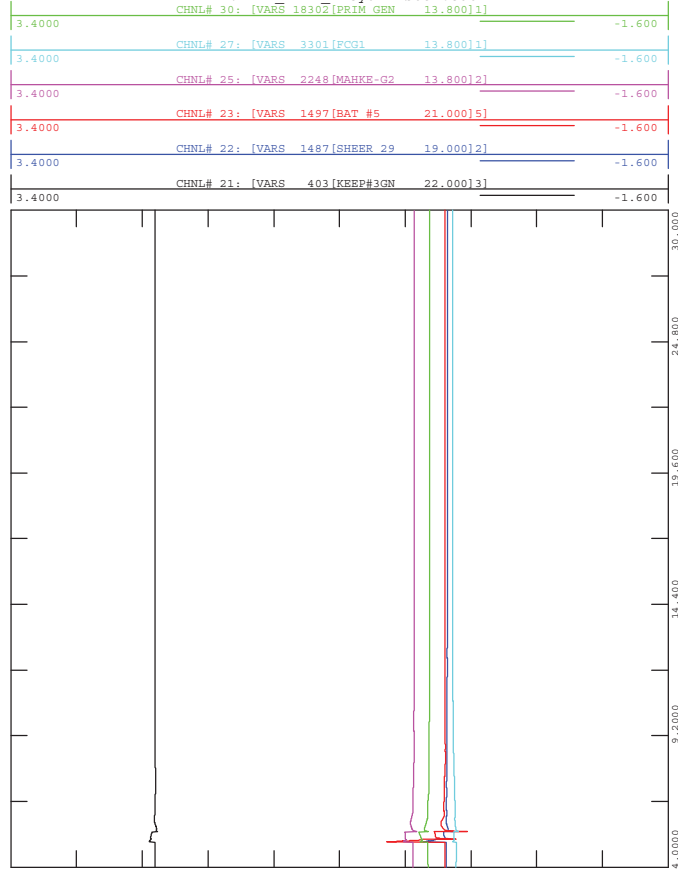


FIGURE F-2A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

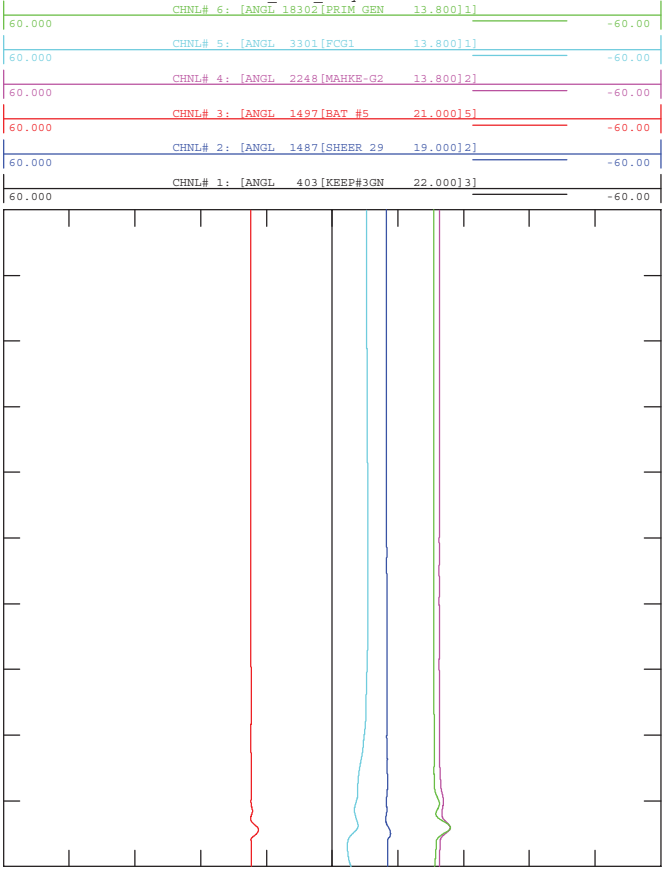


FIGURE F-2C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

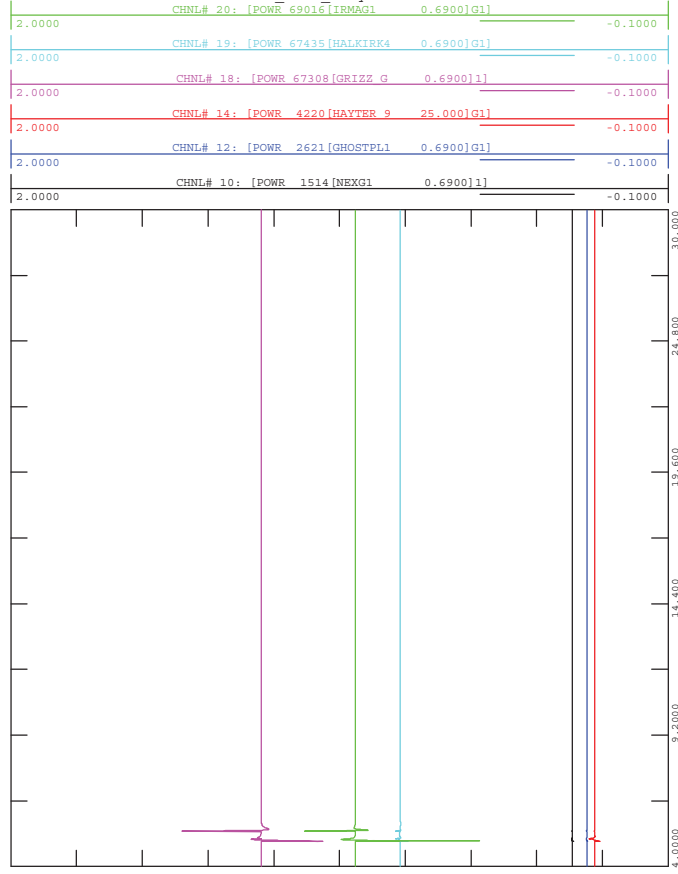




FIGURE F-2F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-2_7L42_Lloydminster.out

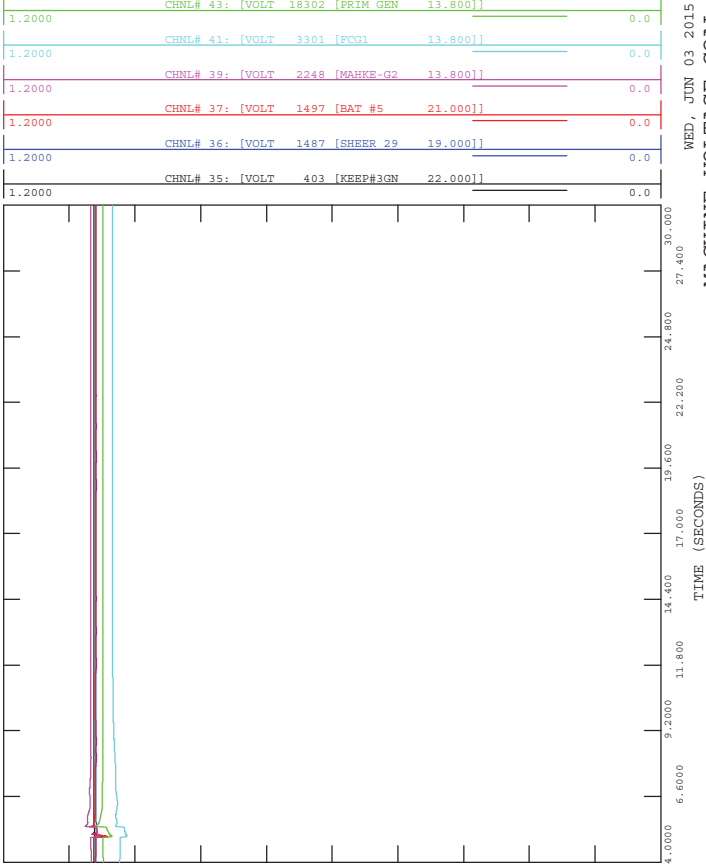


FIGURE F-2H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-2_7L42_Lloydminster.out

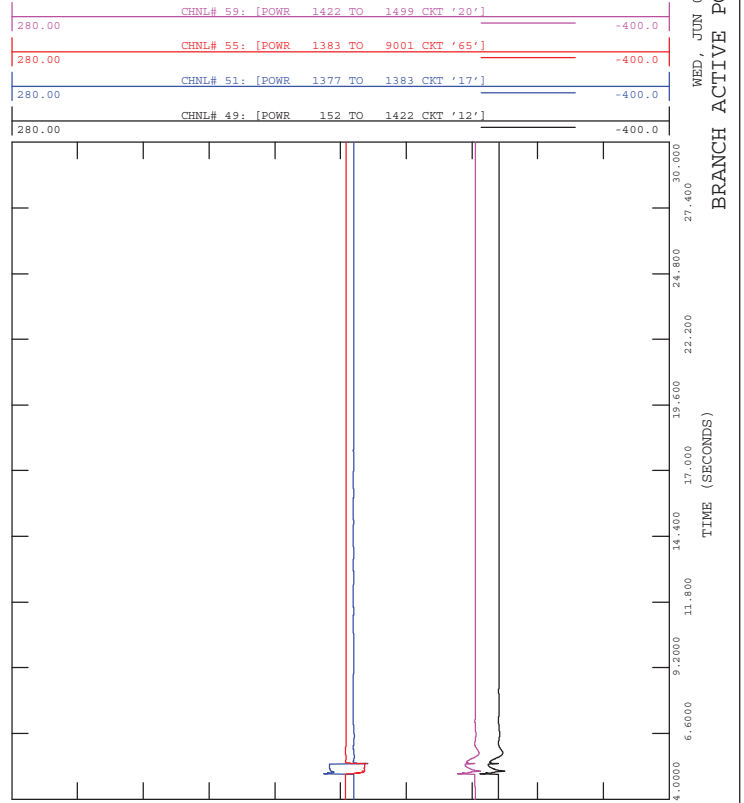


FIGURE F-2E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-2_7L42_Lloydminster.out

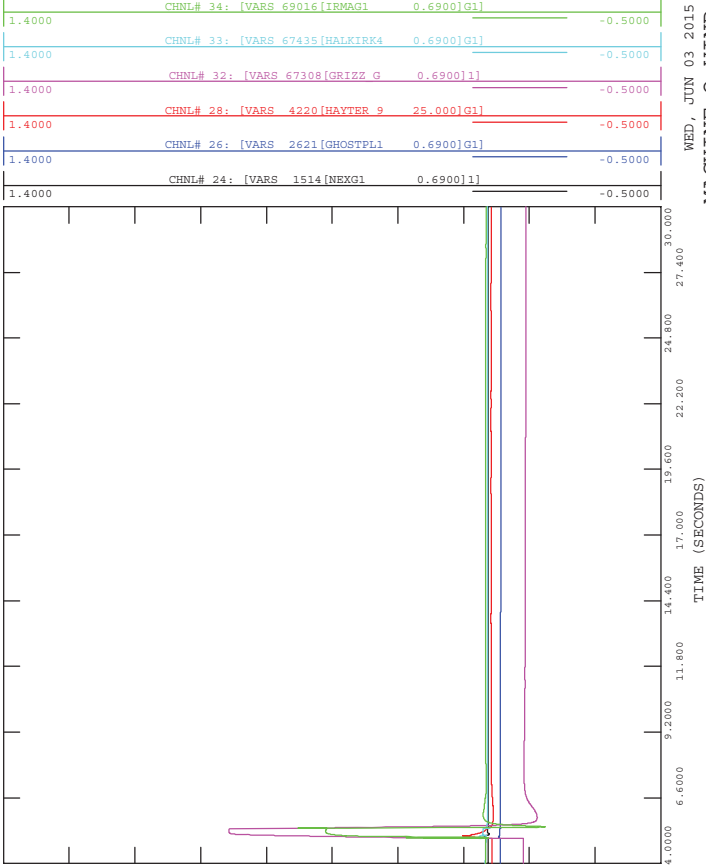


FIGURE F-2G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-2_7L42_Lloydminster.out

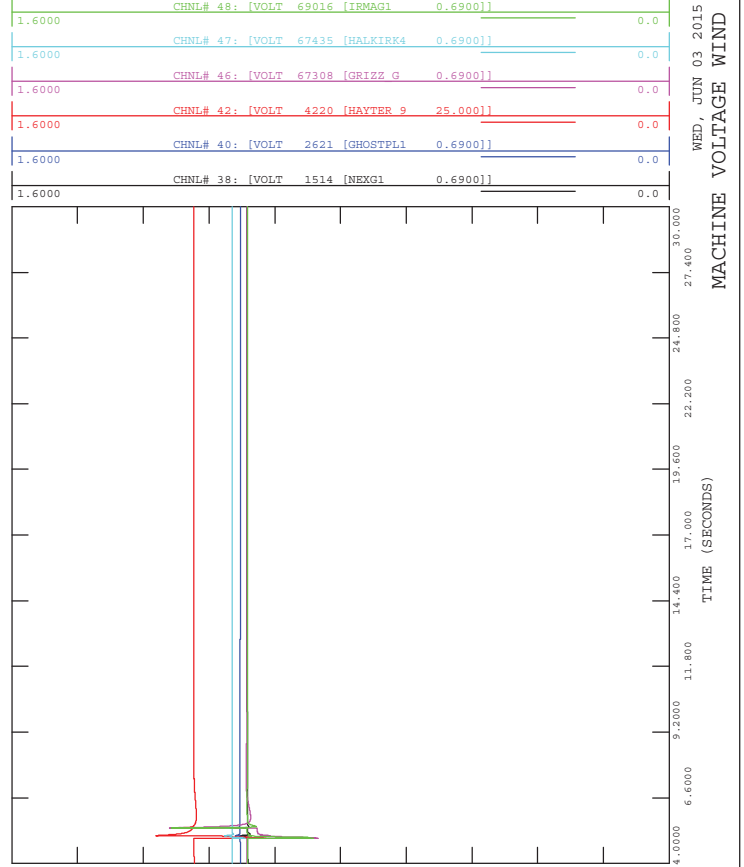




FIGURE F-2I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L42 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-2_7L42_Lloydminster.out

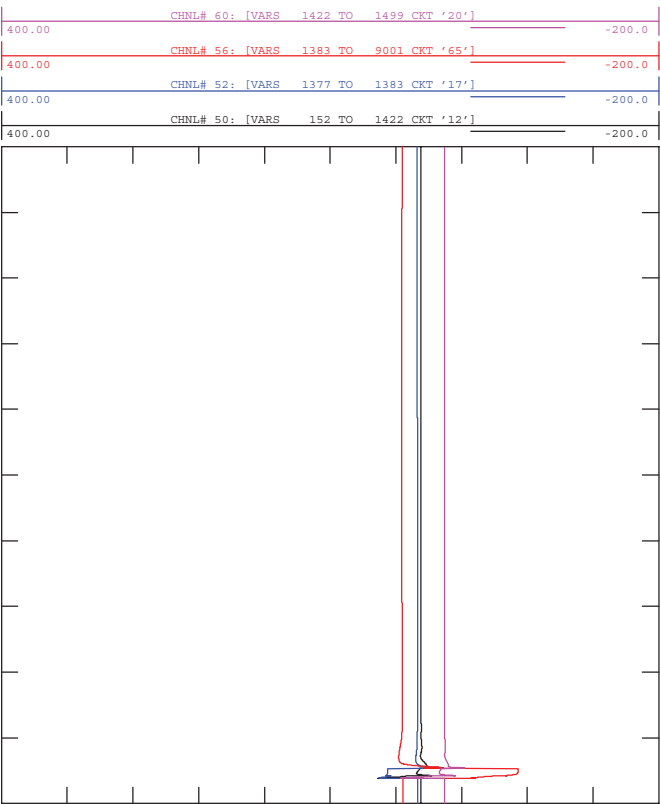




FIGURE F-3B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

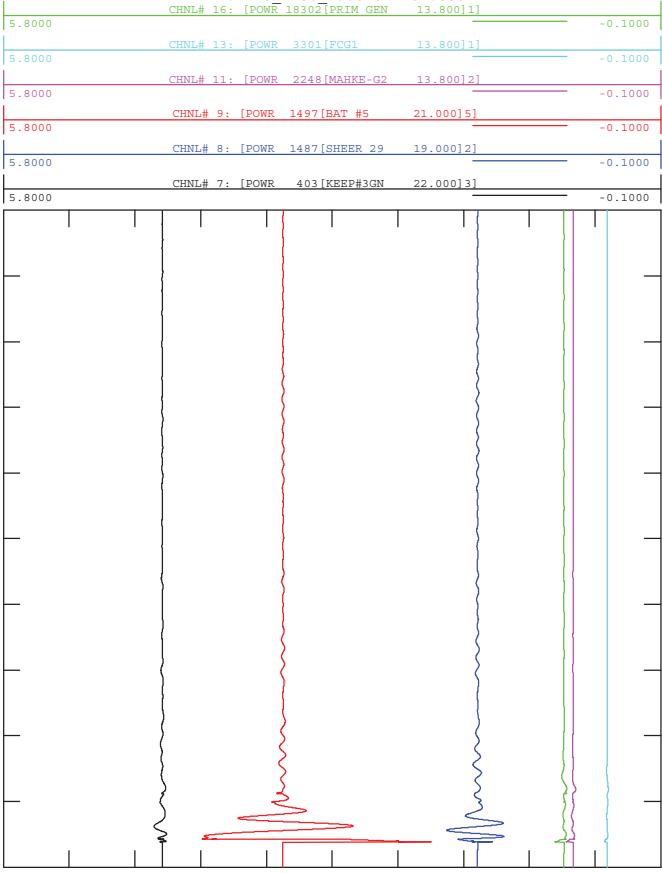


FIGURE F-3D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

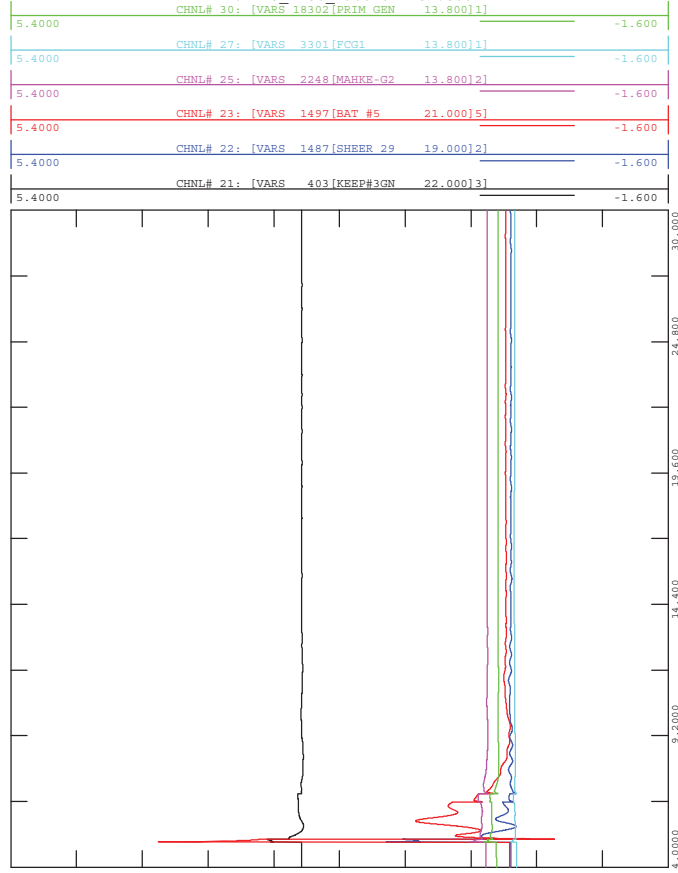


FIGURE F-3A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

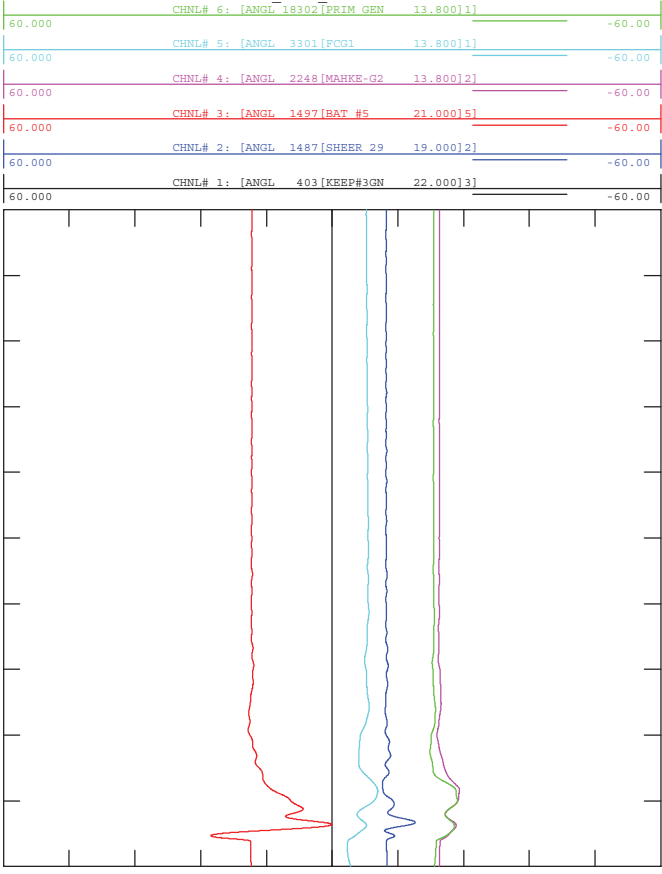


FIGURE F-3C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

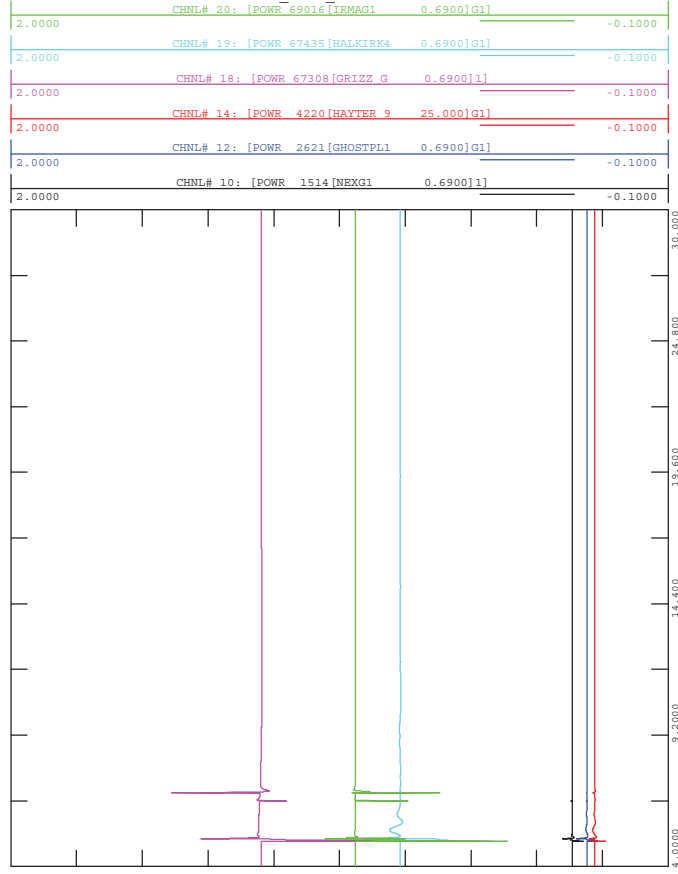




FIGURE F-3F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

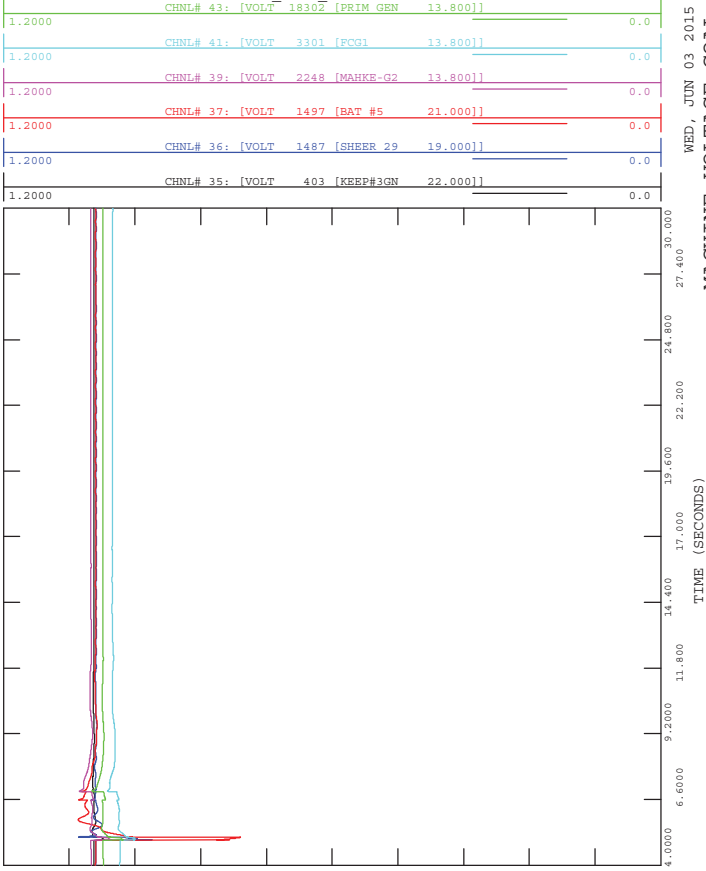


FIGURE F-3H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

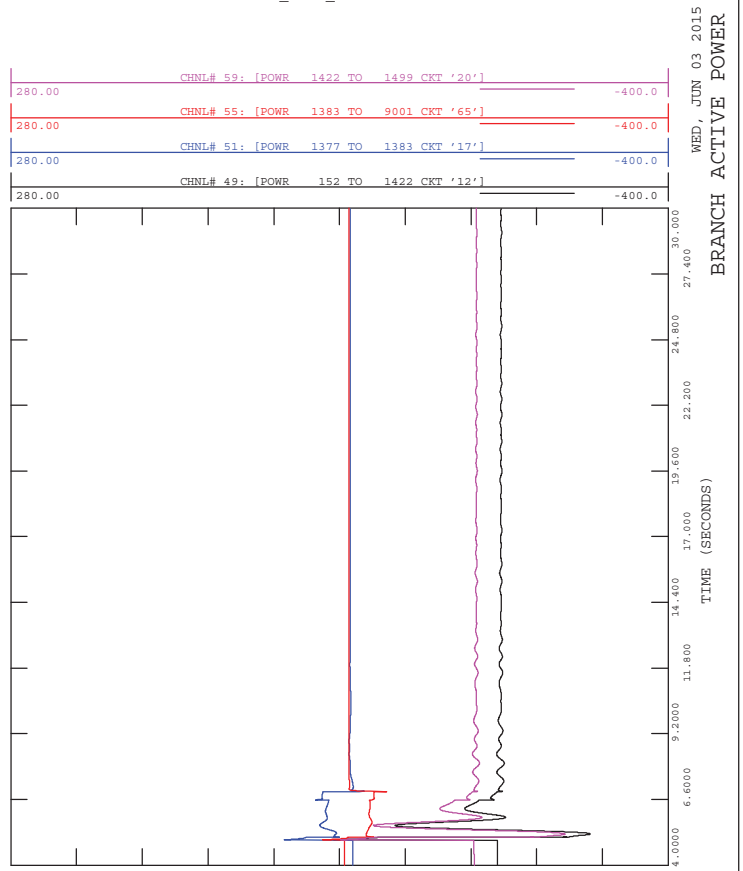


FIGURE F-3E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

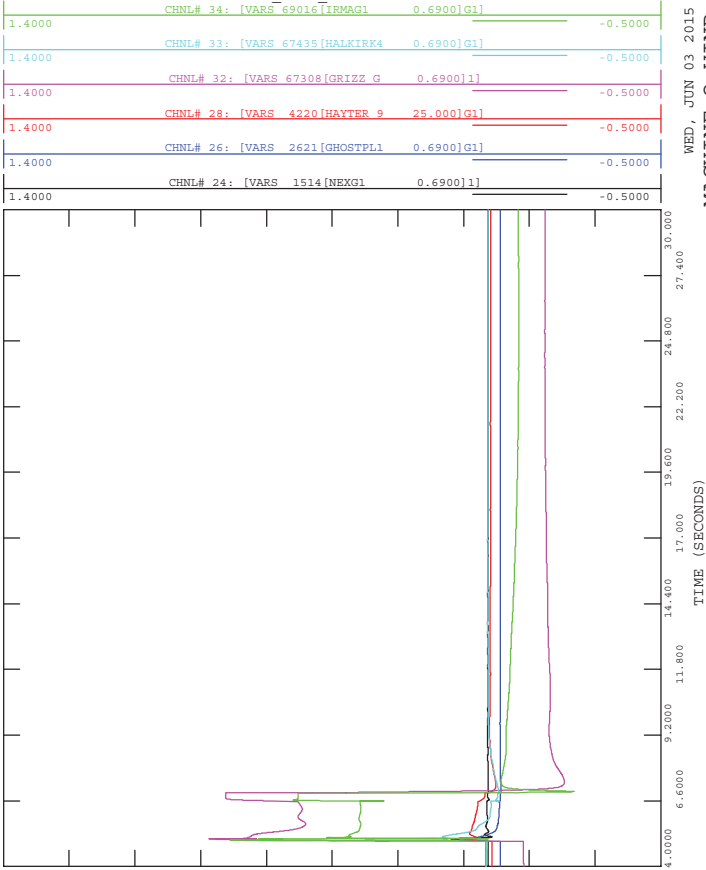


FIGURE F-3G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out

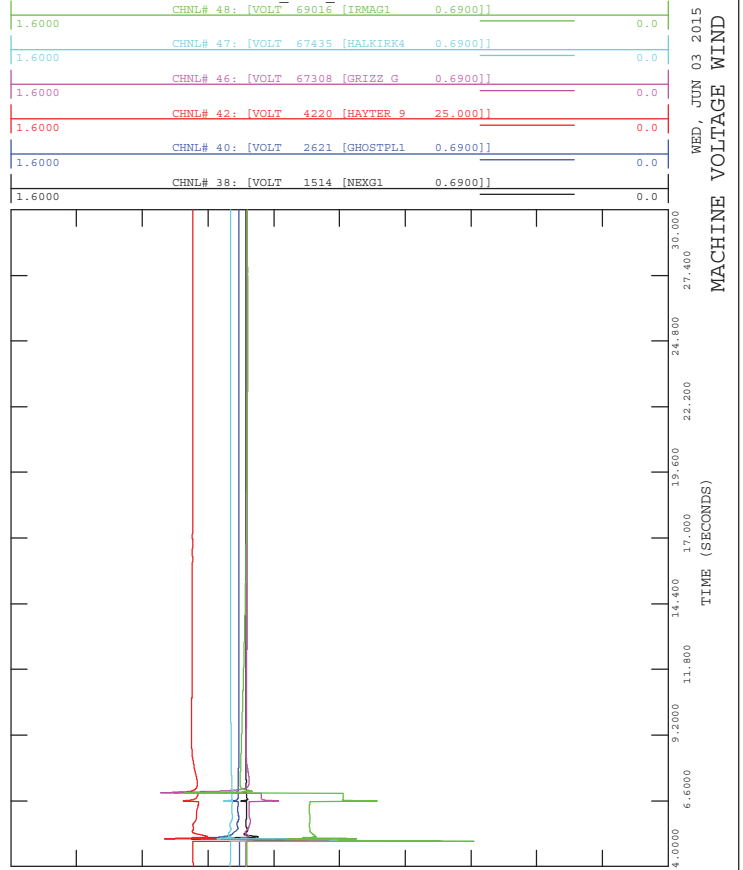
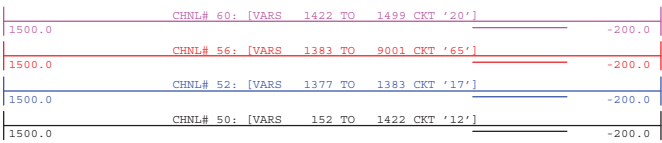




FIGURE F-3I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 95, FAR END IN 115 CYCLES
FILE: F-3_7L50_BattleRiver.out



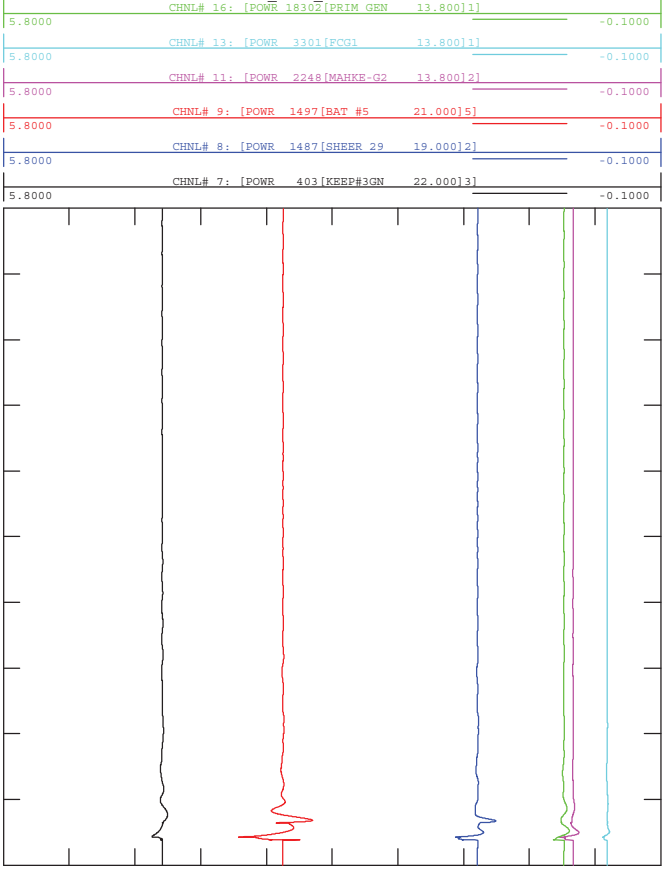
WED, JUN 03 2015 11:24
BRANCH REACTIVE PWR (MVR)

TIME (SECONDS)



FIGURE F-4B

2017SP, ALT3, BOTH WAGFS PROCEED
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
CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]

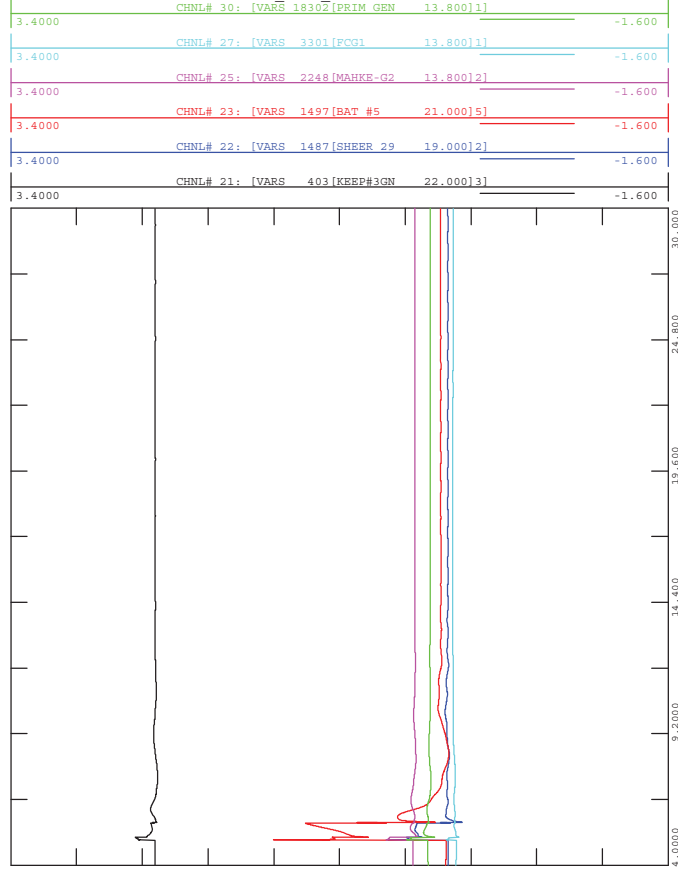


WED, JUN 03 2015 11:24
MACHINE P COAL (PU)



FIGURE F-4D

2017SP, ALT3, BOTH WAGFS PROCEED
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
CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]

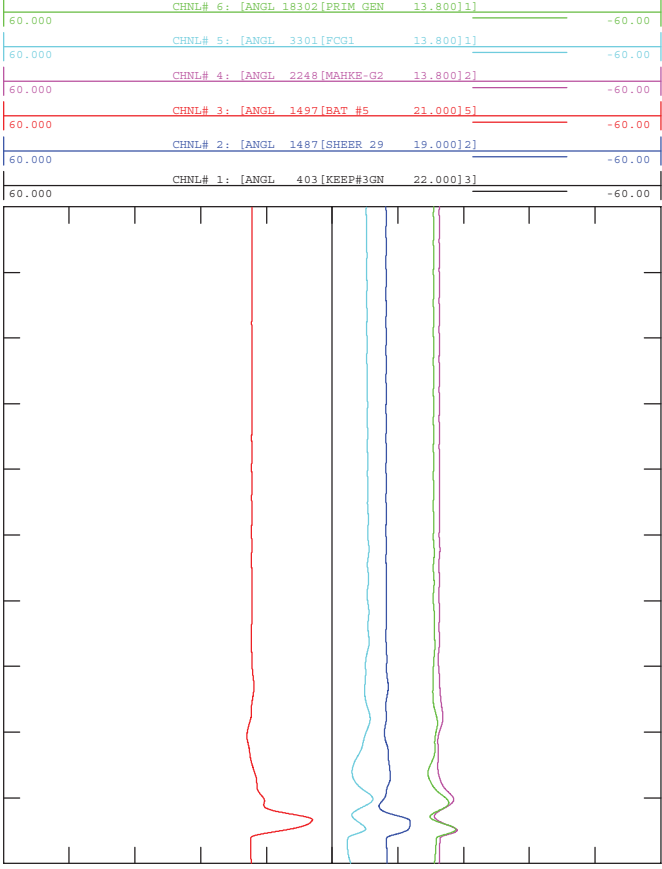


WED, JUN 03 2015 11:24
MACHINE Q COAL (PU)



FIGURE F-4A

2017SP, ALT3, BOTH WAGFS PROCEED
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
CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]

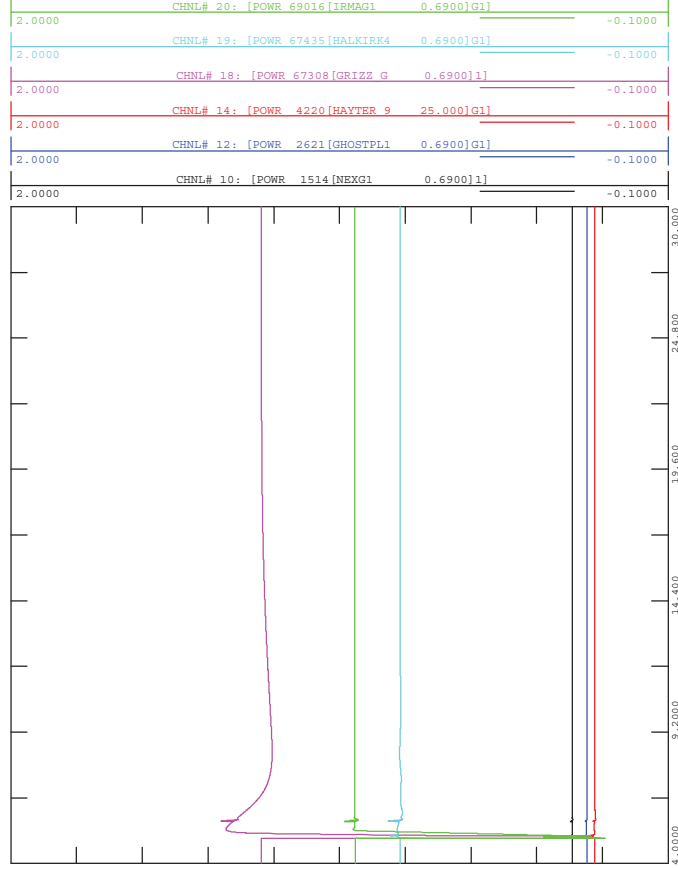


WED, JUN 03 2015 11:24
MACHINE ANGLE (DEGREES)



FIGURE F-4C

2017SP, ALT3, BOTH WAGFS PROCEED
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
CHNL# 20: [POWR 69016[IRMAG1 0.6900]G1]



WED, JUN 03 2015 11:24
MACHINE P WIND (PU)



FIGURE F-4F

2017SP, ALT3, BOTH WAGFS PROCEED
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

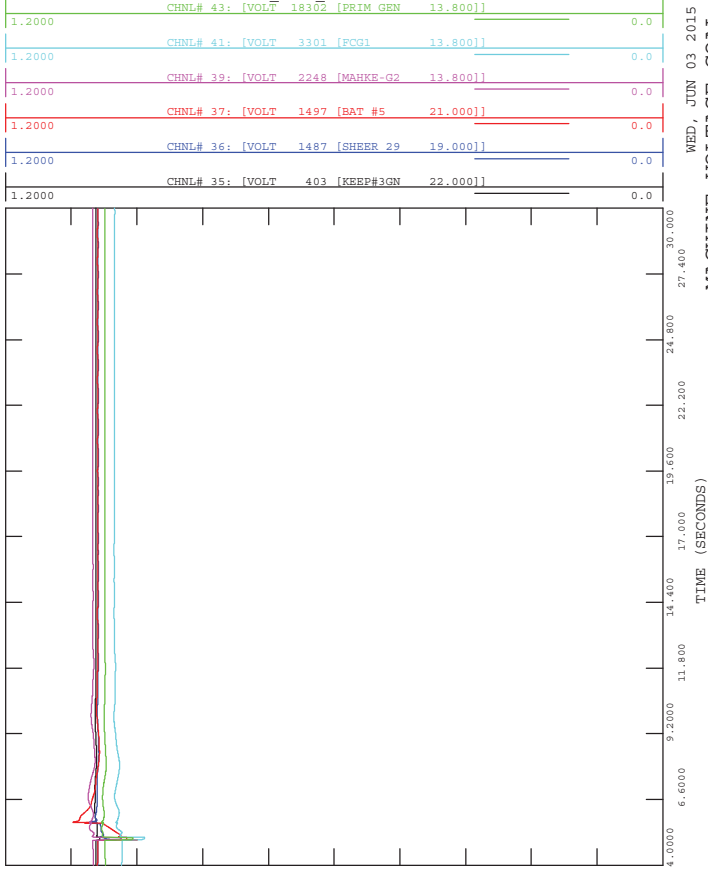


FIGURE F-4H

2017SP, ALT3, BOTH WAGFS PROCEED
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

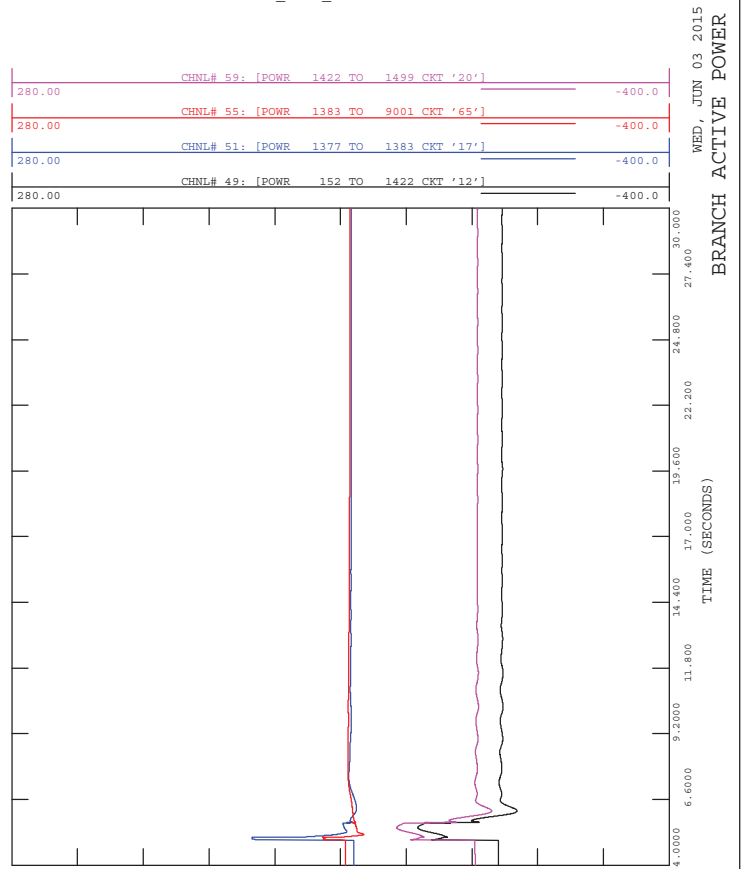


FIGURE F-4E

2017SP, ALT3, BOTH WAGFS PROCEED
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

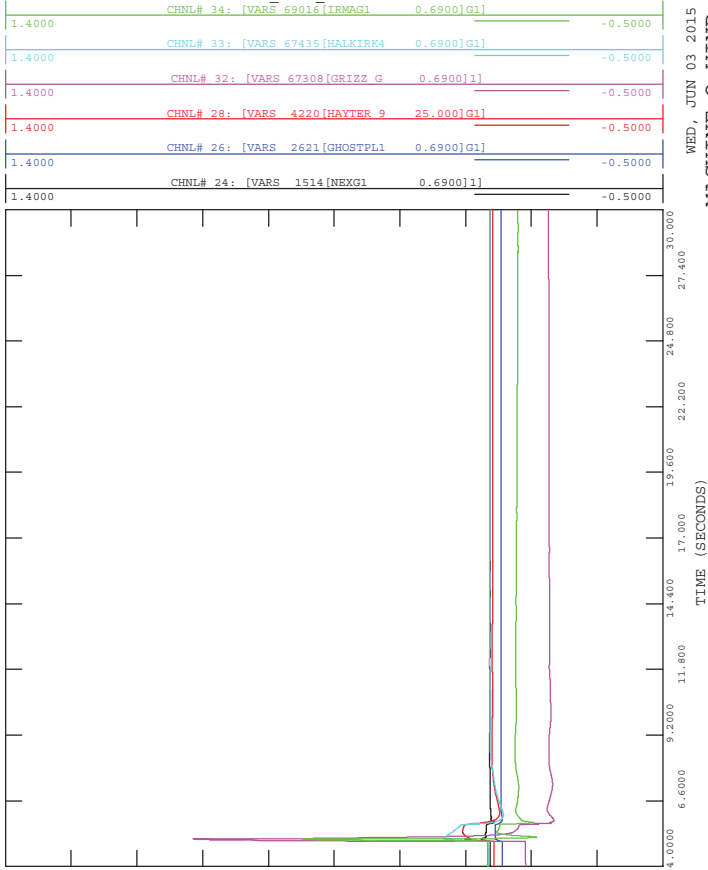


FIGURE F-4G

2017SP, ALT3, BOTH WAGFS PROCEED
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

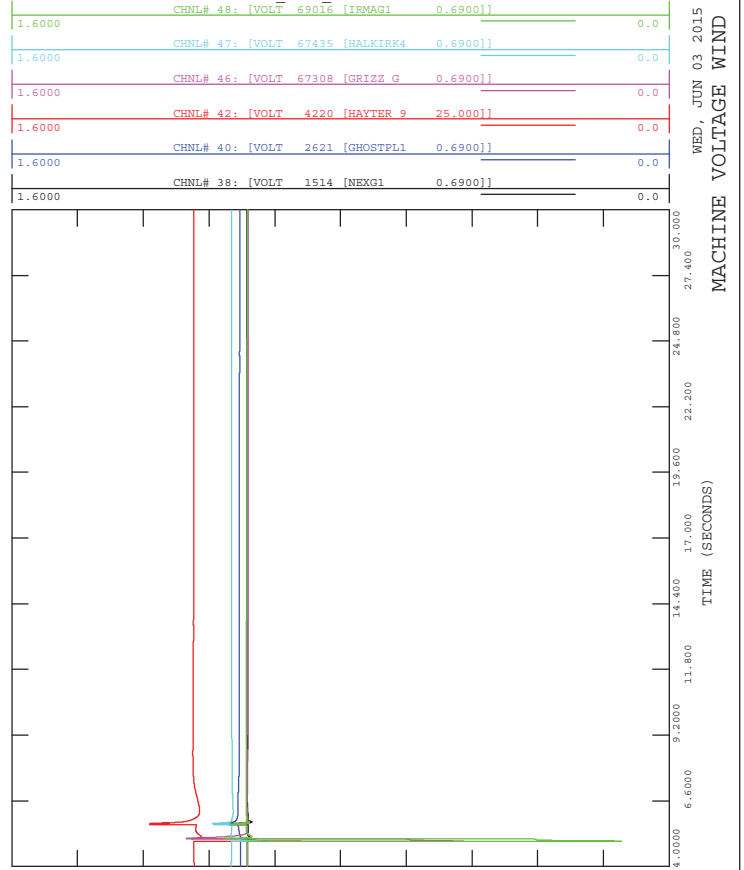
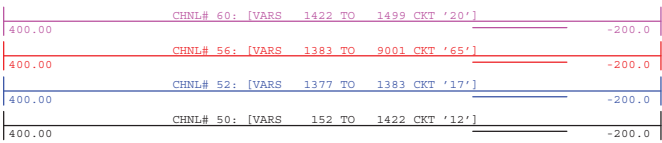




FIGURE F-4I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L50 AT 526S
CLEARED IN 6 CYCLES, T-TAP IN 40, FAR END IN 42 CYCLES
FILE: F-4_7L50_BuffaloCreek.out



WED, JUN 03 2015 11:24
BRANCH REACTIVE PWR (MVR)

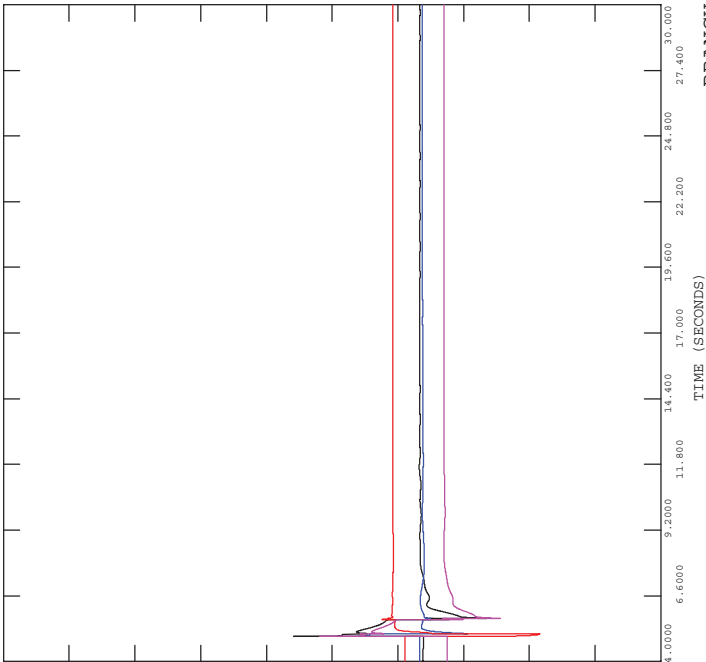




FIGURE F-5B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5 7L53 Bonnyville.out

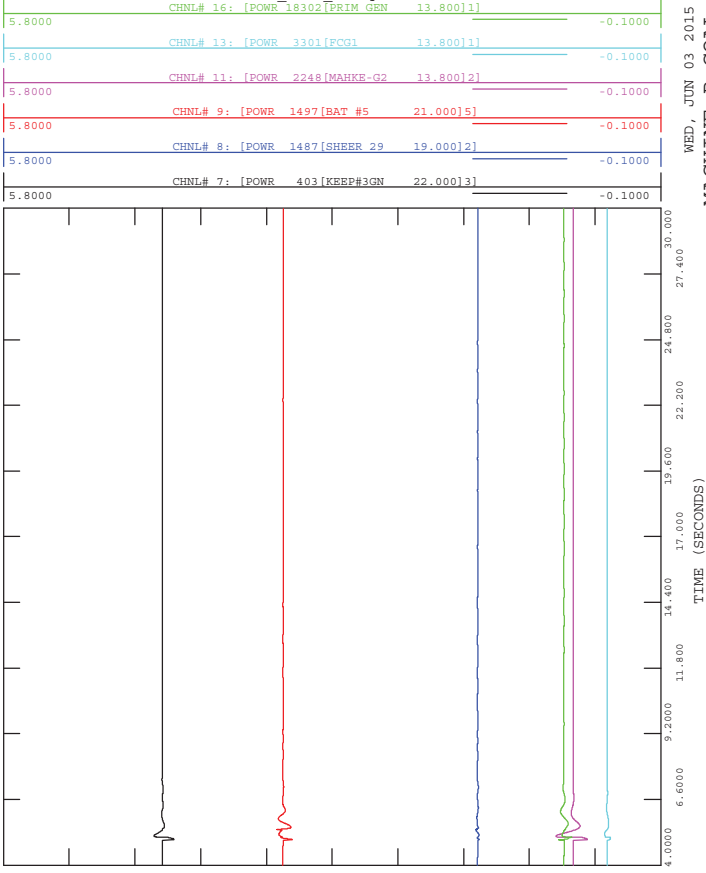


FIGURE F-5D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5 7L53 Bonnyville.out

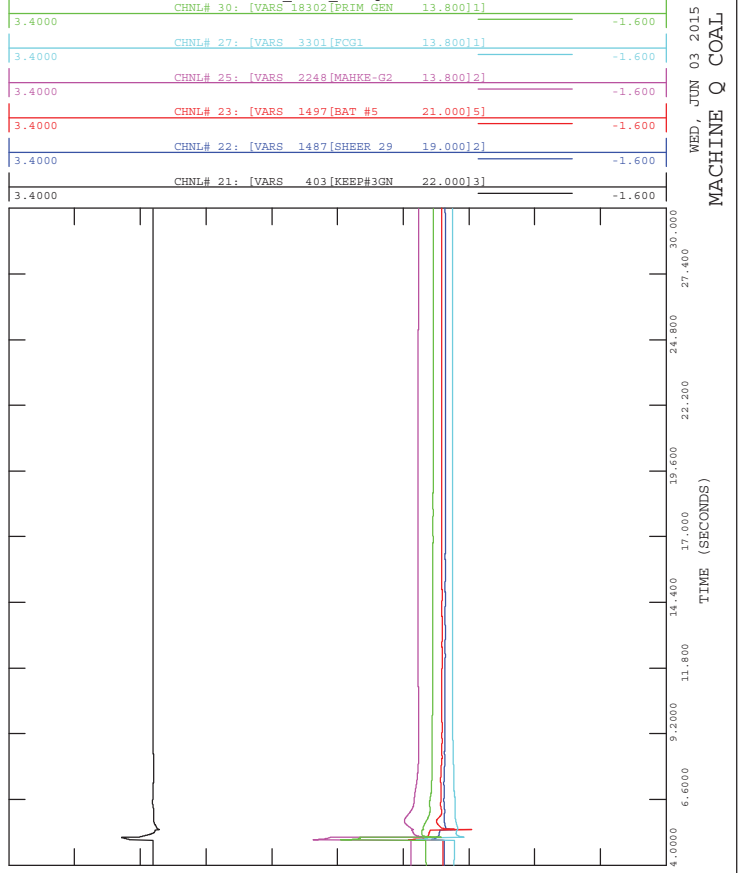


FIGURE F-5A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5 7L53 Bonnyville.out

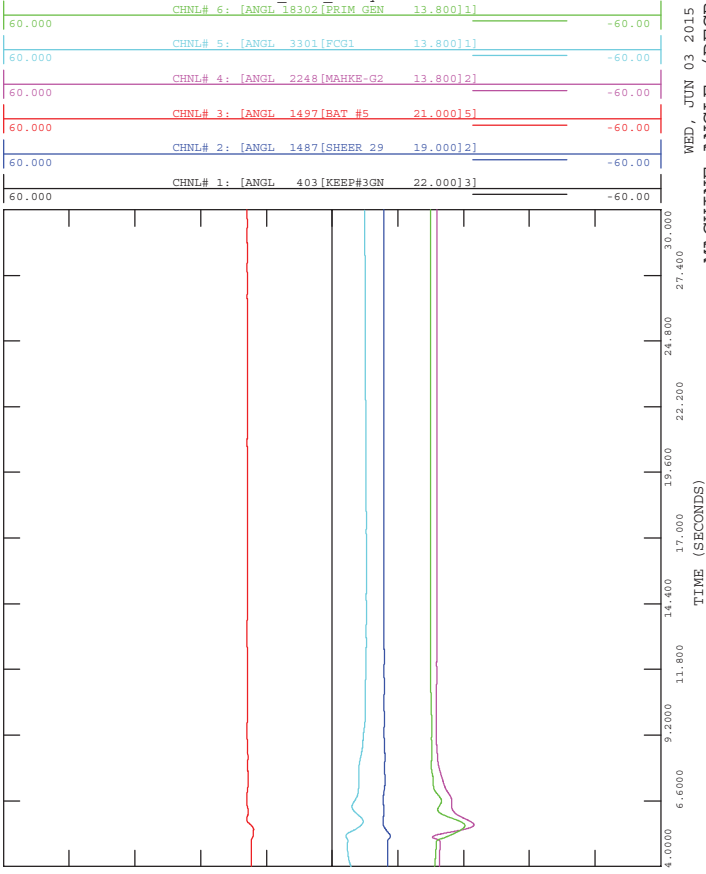


FIGURE F-5C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5 7L53 Bonnyville.out

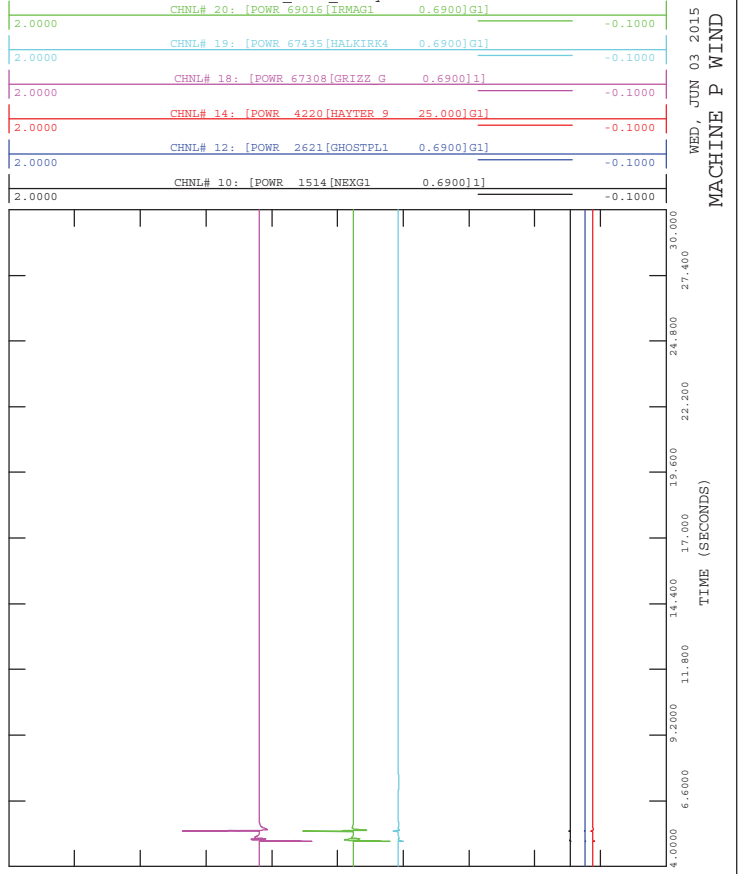
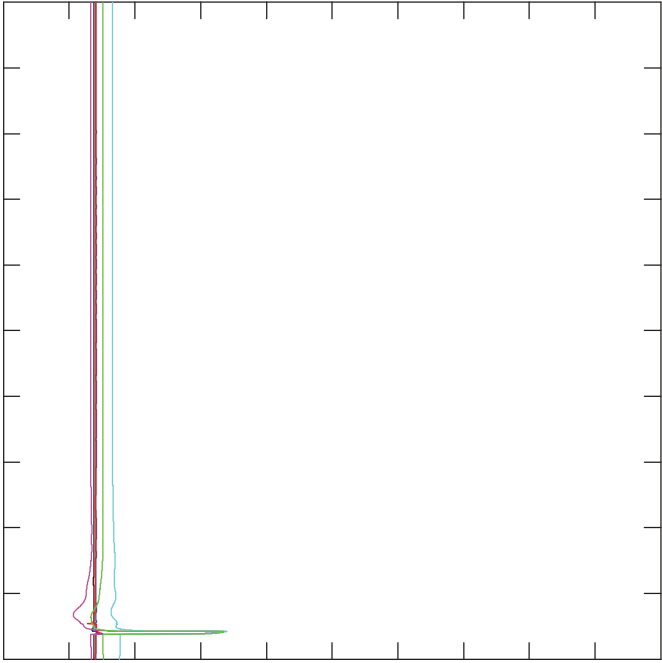




FIGURE F-5F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-5_7L53_Bonnyville.out

1.2000	CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]	0.0
1.2000	CHNL# 41: [VOLT 3301 [PCG1 13.800]]	0.0
1.2000	CHNL# 39: [VOLT 2248 [MAHKE-G2 13.800]]	0.0
1.2000	CHNL# 37: [VOLT 1497 [BAT #5 21.000]]	0.0
1.2000	CHNL# 36: [VOLT 1487 [SHEER 29 19.000]]	0.0
1.2000	CHNL# 35: [VOLT 403 [KEEP#3GN 22.000]]	0.0



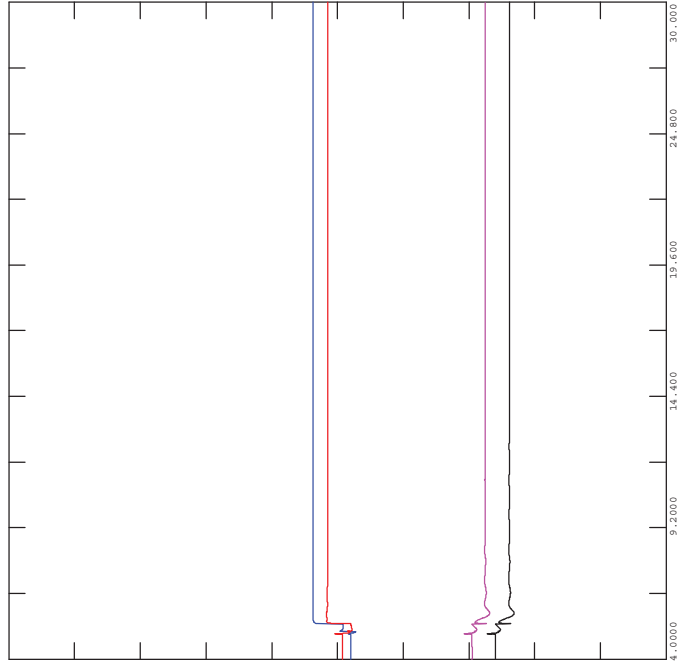
WED, JUN 03 2015 11:24
MACHINE VOLTAGE COAL (PU)



FIGURE F-5H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-5_7L53_Bonnyville.out

280.00	CHNL# 59: [POWR 1422 TO 1499 CKT '20']	-400.0
280.00	CHNL# 55: [POWR 1383 TO 9001 CKT '65']	-400.0
280.00	CHNL# 51: [POWR 1377 TO 1383 CKT '17']	-400.0
280.00	CHNL# 49: [POWR 152 TO 1422 CKT '12']	-400.0



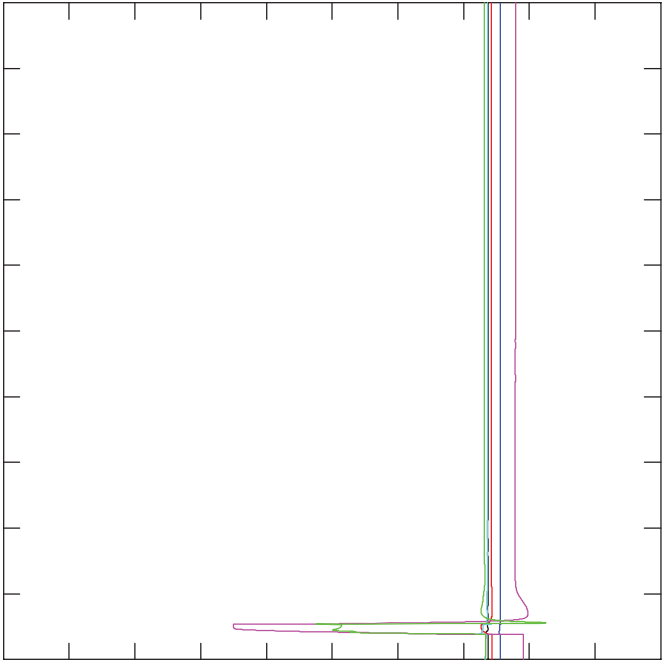
WED, JUN 03 2015 11:24
BRANCH ACTIVE POWER (MW)



FIGURE F-5E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-5_7L53_Bonnyville.out

1.4000	CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]	-0.5000
1.4000	CHNL# 33: [VARS 67435 [HALKIRK4 0.6900]G1]	-0.5000
1.4000	CHNL# 32: [VARS 67308 [GRIZZ G 0.6900]1]	-0.5000
1.4000	CHNL# 28: [VARS 4220 [HAYTER 9 25.000]G1]	-0.5000
1.4000	CHNL# 26: [VARS 2621 [GHOSTPL1 0.6900]G1]	-0.5000
1.4000	CHNL# 24: [VARS 1514 [NEXG1 0.6900]1]	-0.5000



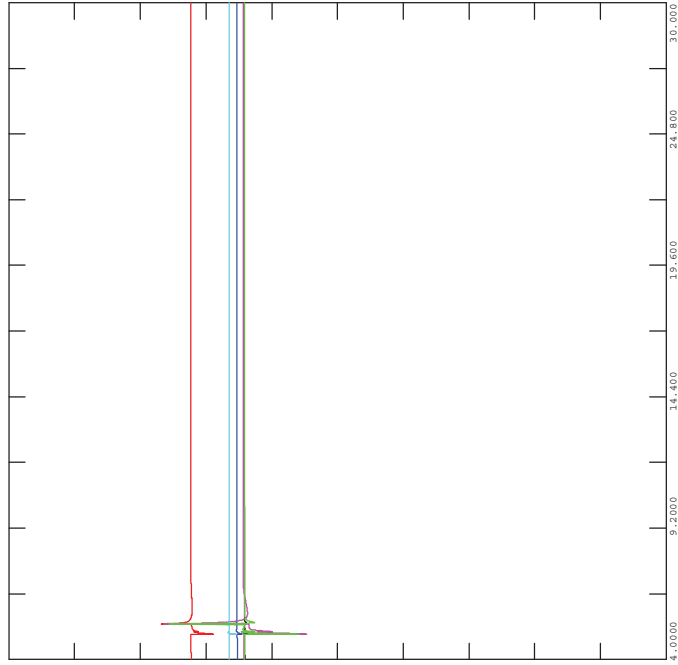
WED, JUN 03 2015 11:24
MACHINE Q WIND (PU)



FIGURE F-5G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-5_7L53_Bonnyville.out

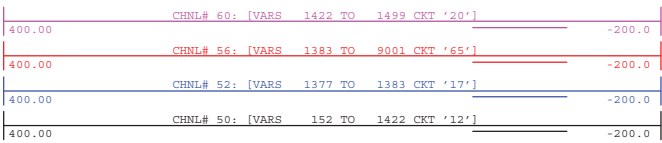
1.6000	CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]	0.0
1.6000	CHNL# 47: [VOLT 67435 [HALKIRK4 0.6900]]	0.0
1.6000	CHNL# 46: [VOLT 67308 [GRIZZ G 0.6900]]	0.0
1.6000	CHNL# 42: [VOLT 4220 [HAYTER 9 25.000]]	0.0
1.6000	CHNL# 40: [VOLT 2621 [GHOSTPL1 0.6900]]	0.0
1.6000	CHNL# 38: [VOLT 1514 [NEXG1 0.6900]]	0.0



WED, JUN 03 2015 11:24
MACHINE VOLTAGE WIND (PU)



FIGURE F-5I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-5_7L53_Bonnyville.out



WED, JUN 03 2015 11:24
BRANCH REACTIVE PWR (MVR)

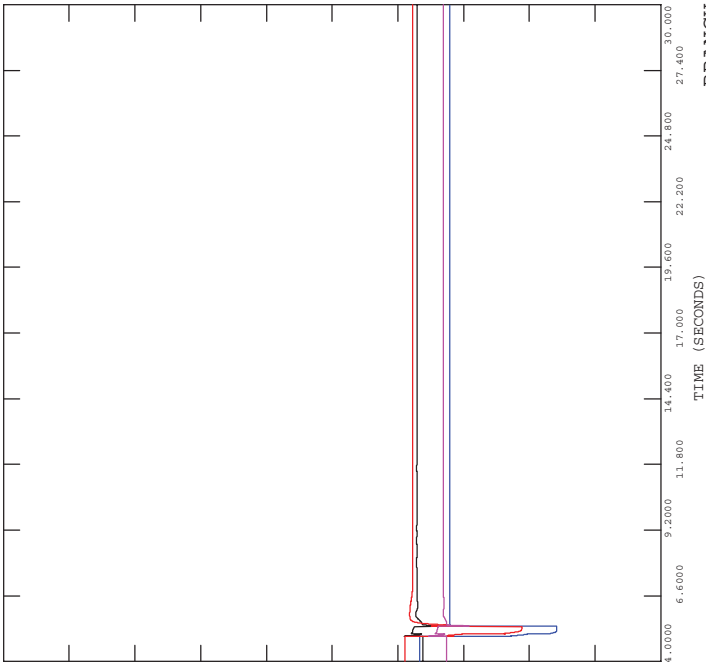




FIGURE F-6B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6 7L53 IrishCreek.out

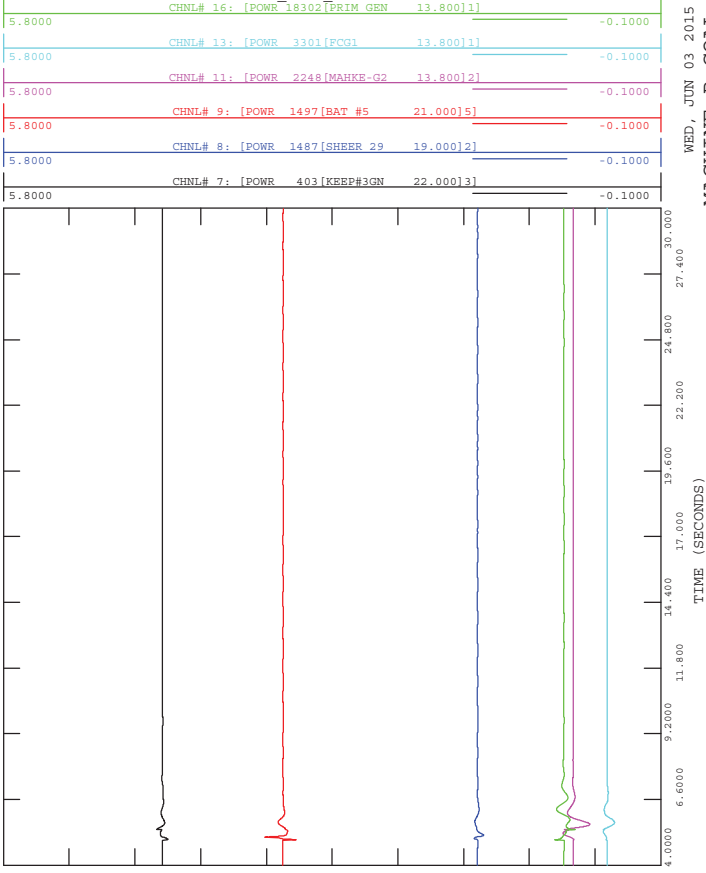


FIGURE F-6D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6 7L53 IrishCreek.out

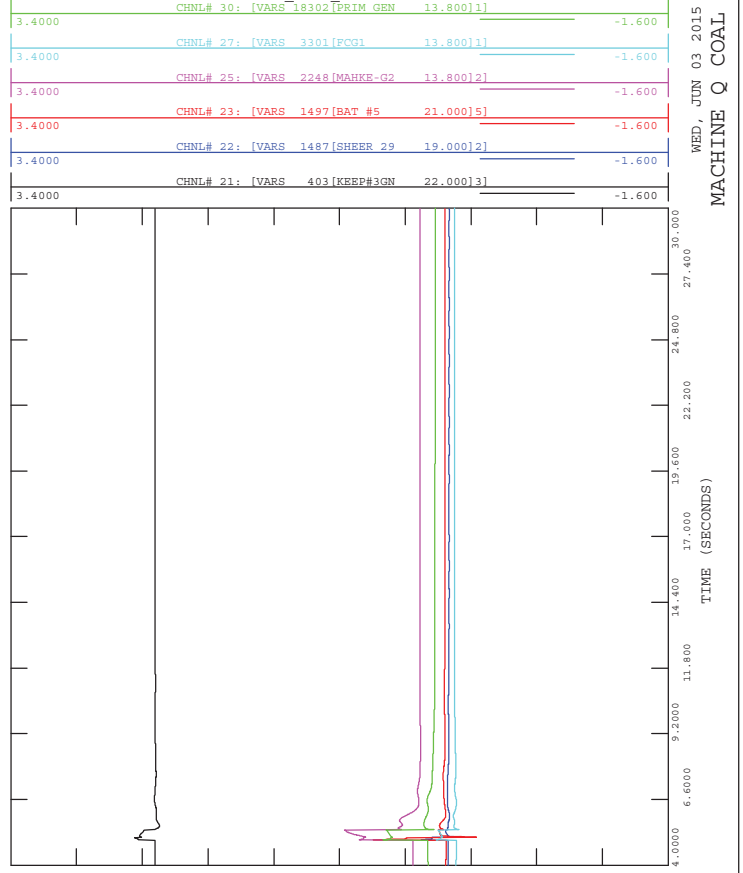


FIGURE F-6A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6 7L53 IrishCreek.out

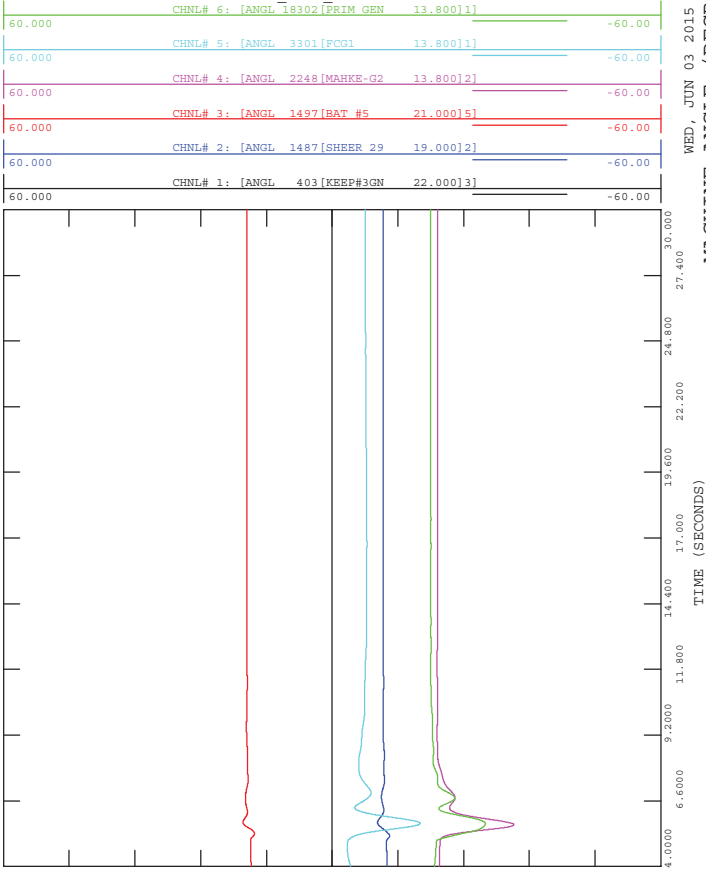


FIGURE F-6C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6 7L53 IrishCreek.out

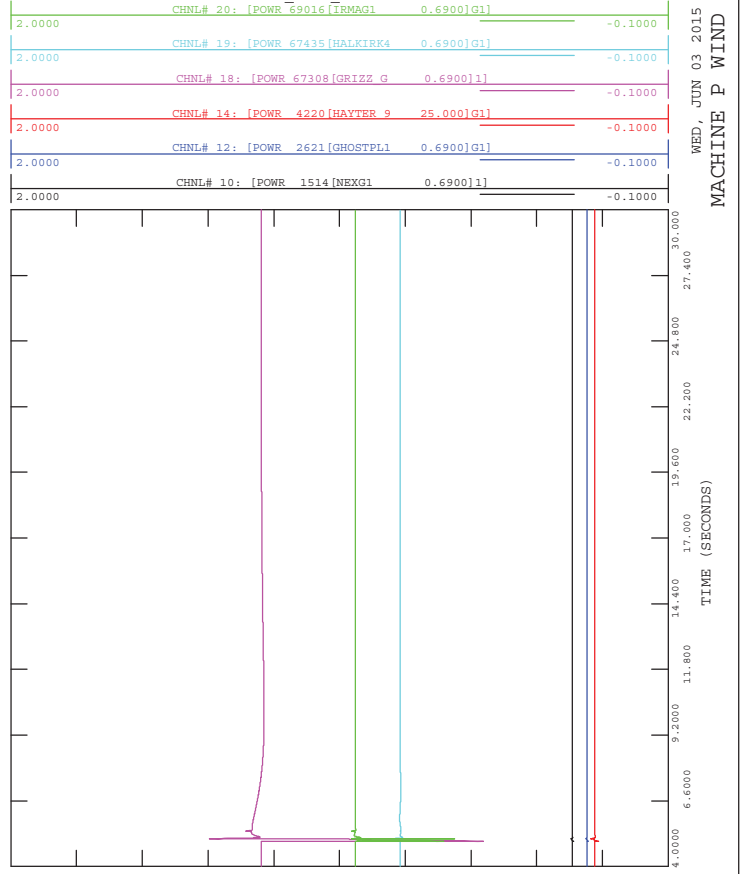
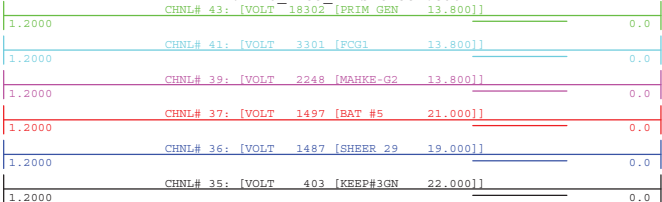




FIGURE F-6F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-6_7L53_IrishCreek.out



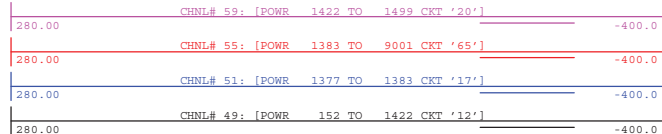
WED, JUN 03 2015 11:24
MACHINE VOLTAGE COAL (PU)

TIME (SECONDS)



FIGURE F-6H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-6_7L53_IrishCreek.out



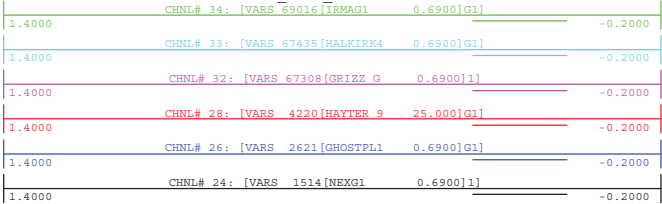
WED, JUN 03 2015 11:24
BRANCH ACTIVE POWER (MW)

TIME (SECONDS)



FIGURE F-6E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-6_7L53_IrishCreek.out



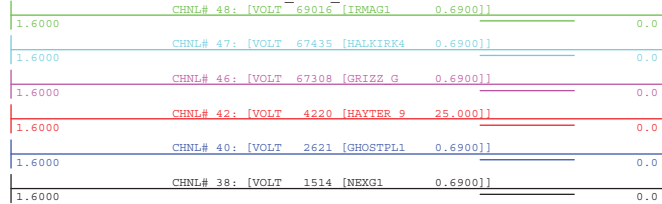
WED, JUN 03 2015 11:24
MACHINE Q WIND (PU)

TIME (SECONDS)



FIGURE F-6G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-6_7L53_IrishCreek.out



WED, JUN 03 2015 11:24
MACHINE VOLTAGE WIND (PU)

TIME (SECONDS)



FIGURE F-6I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-6_7L53_IrishCreek.out

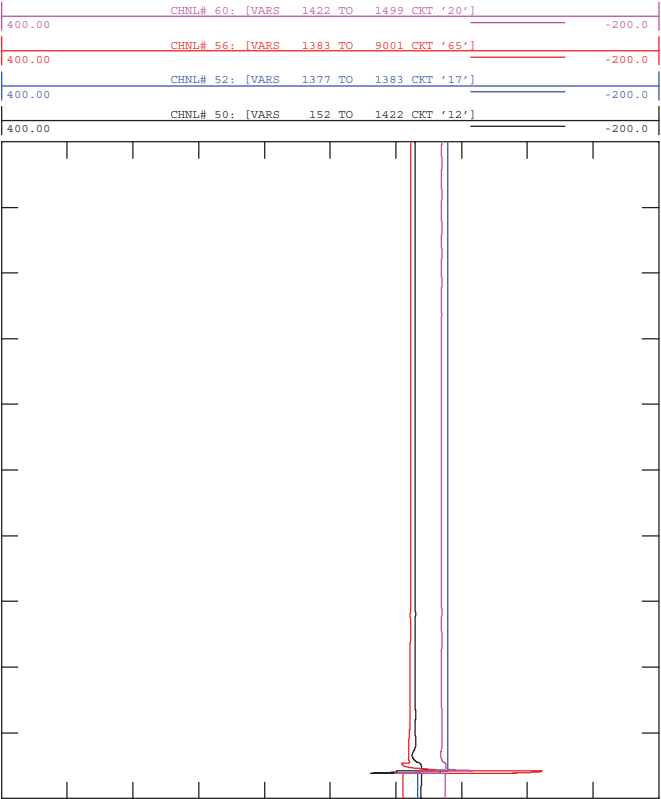




FIGURE F-7B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vincent.out

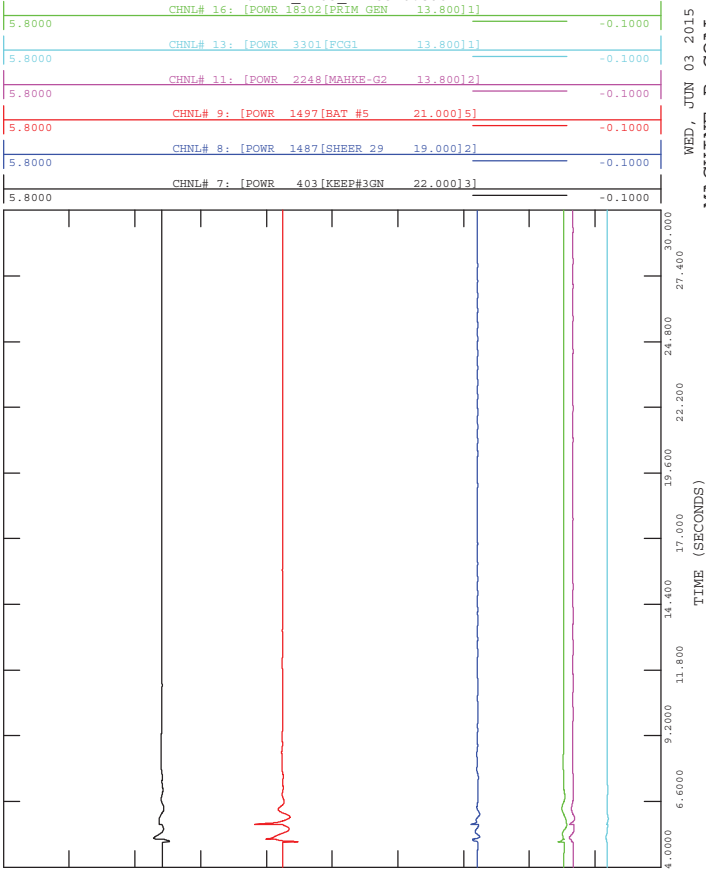


FIGURE F-7D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vincent.out

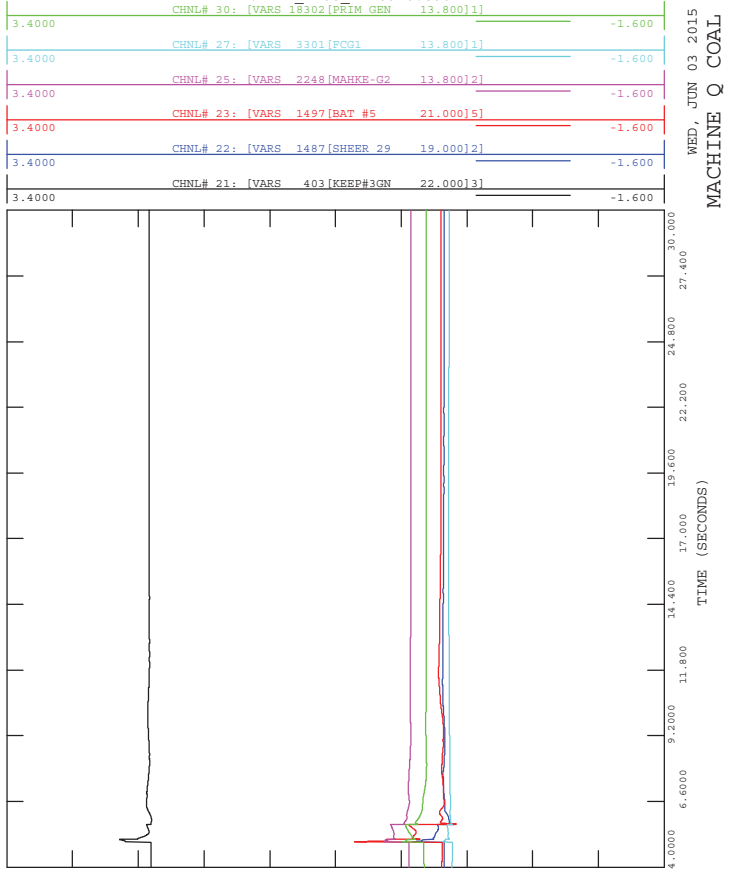


FIGURE F-7A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vincent.out

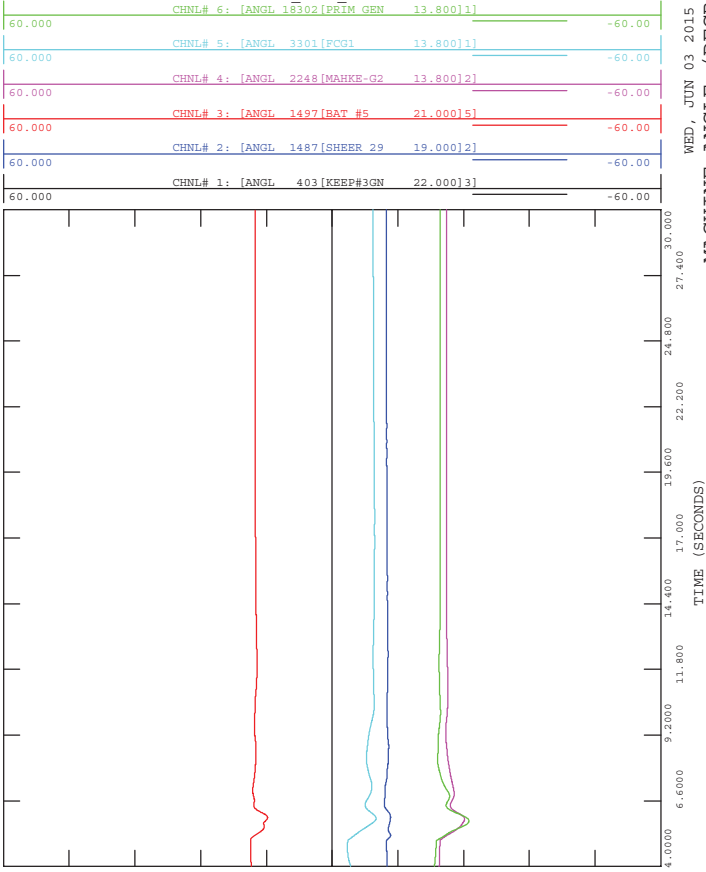


FIGURE F-7C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vincent.out

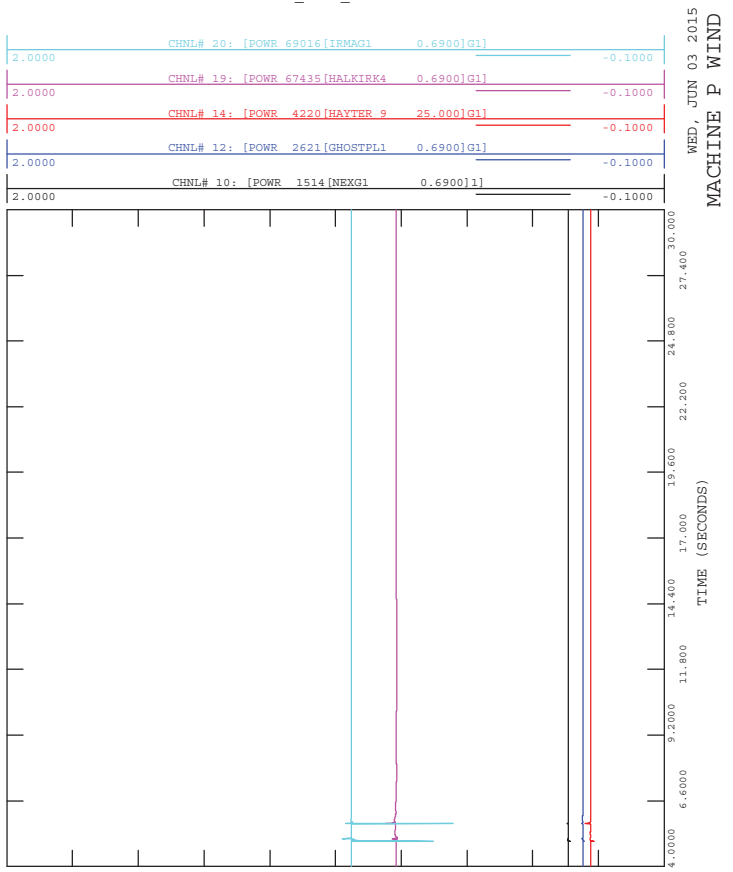




FIGURE F-7F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vincent.out

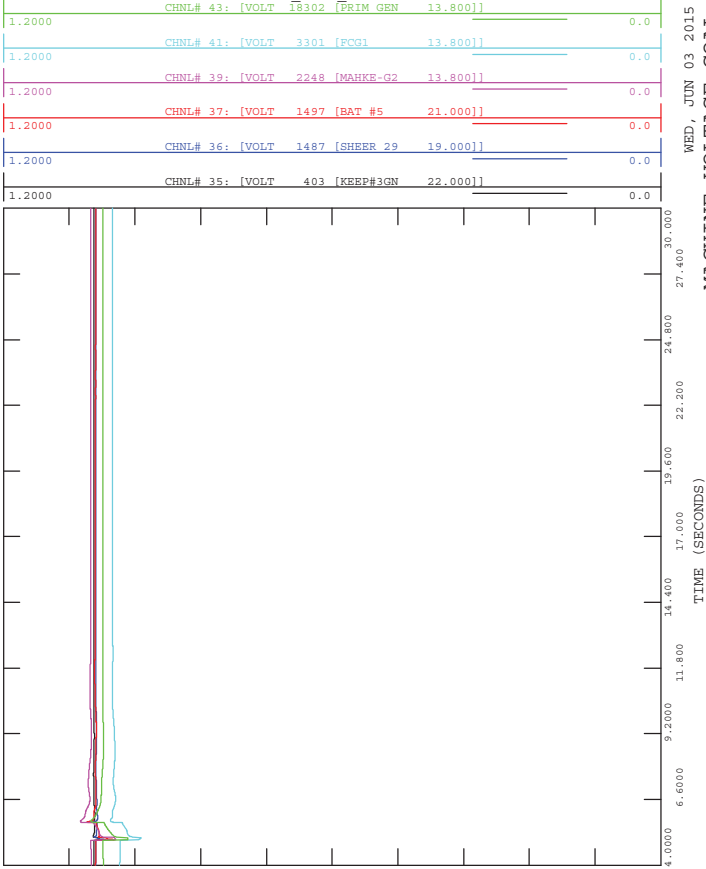


FIGURE F-7H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vincent.out

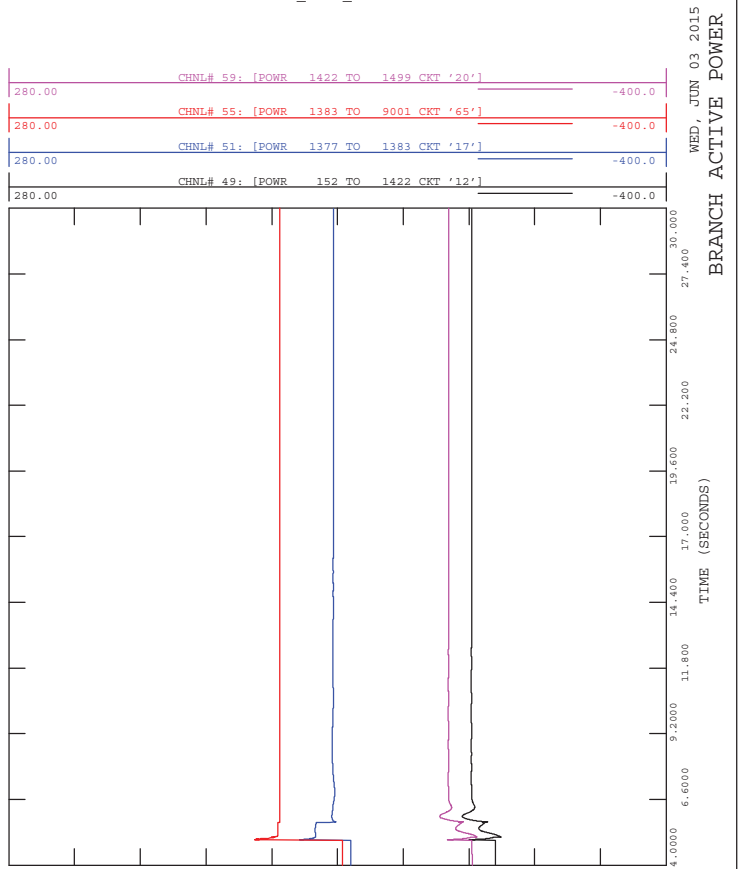


FIGURE F-7E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vincent.out

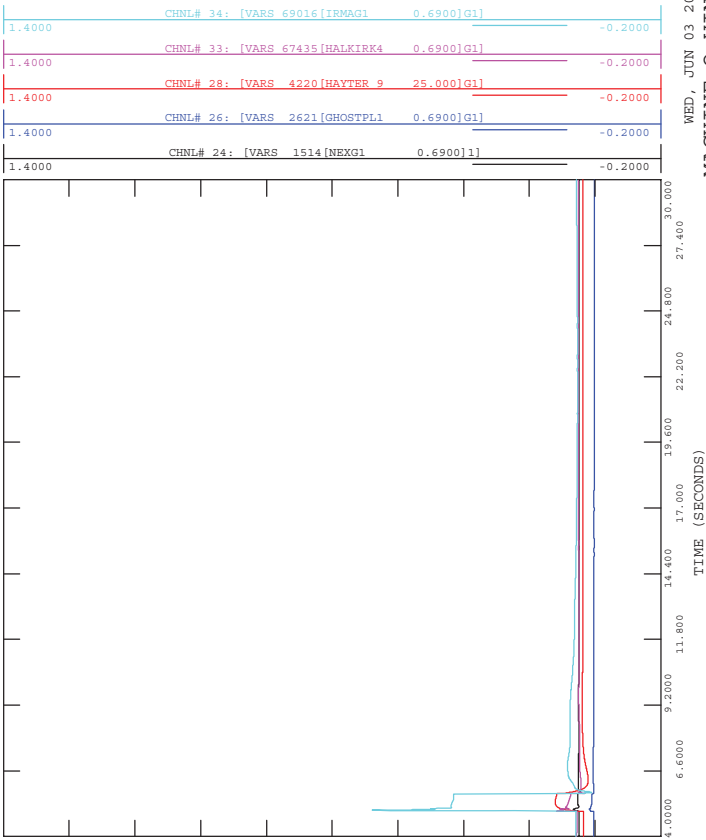


FIGURE F-7G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vincent.out

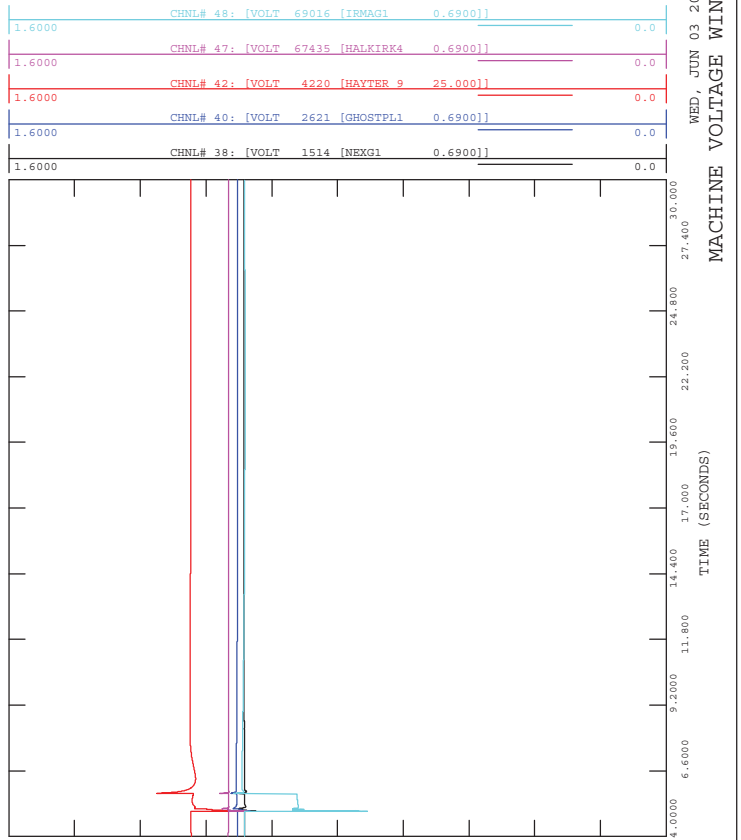
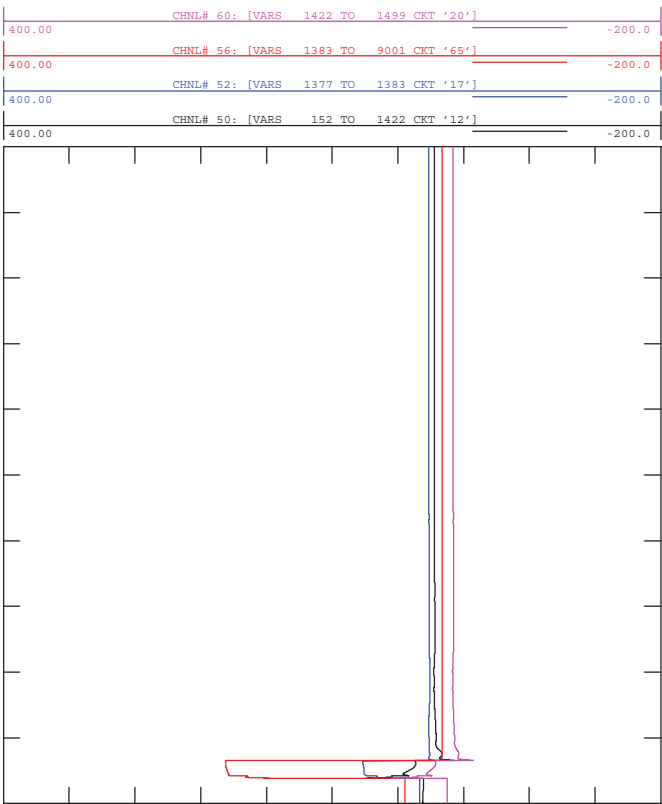




FIGURE F-7I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 2019S
CLEARED IN 6 CYCLES, FAR ENDS IN 42 CYCLES
FILE: F-7_7L65_Vincent.out



WED, JUN 03 2015 11:24
BRANCH REACTIVE PWR (MVR)



FIGURE F-8B

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: F-8_7L65_GrizzlyBear.out

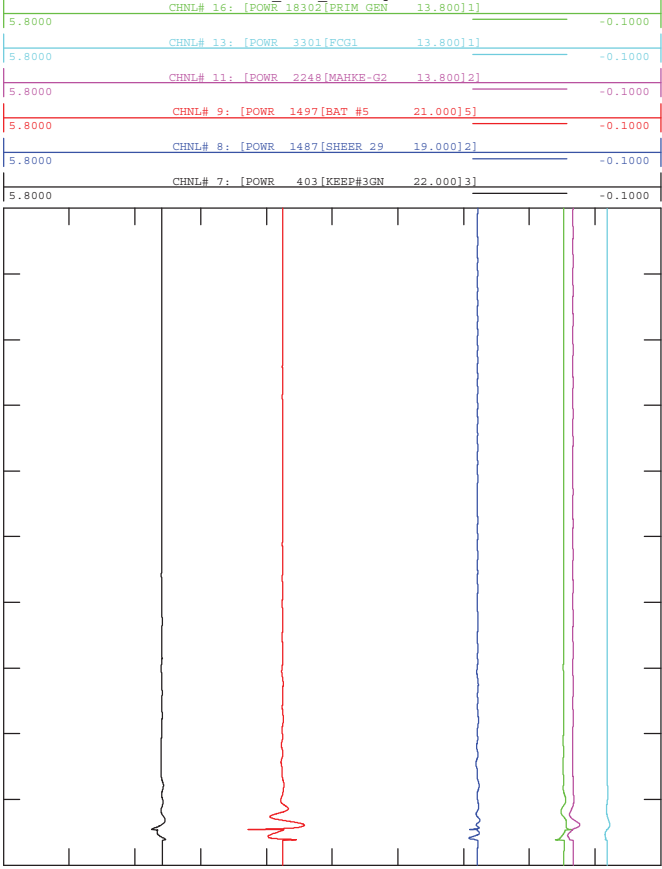


FIGURE F-8D

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: F-8_7L65_GrizzlyBear.out

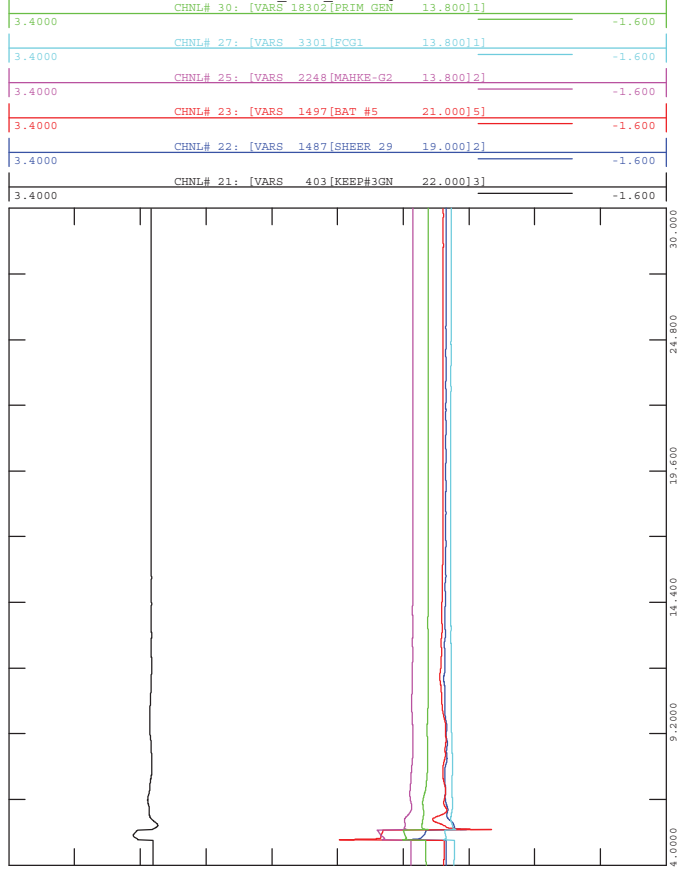


FIGURE F-8A

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: F-8_7L65_GrizzlyBear.out

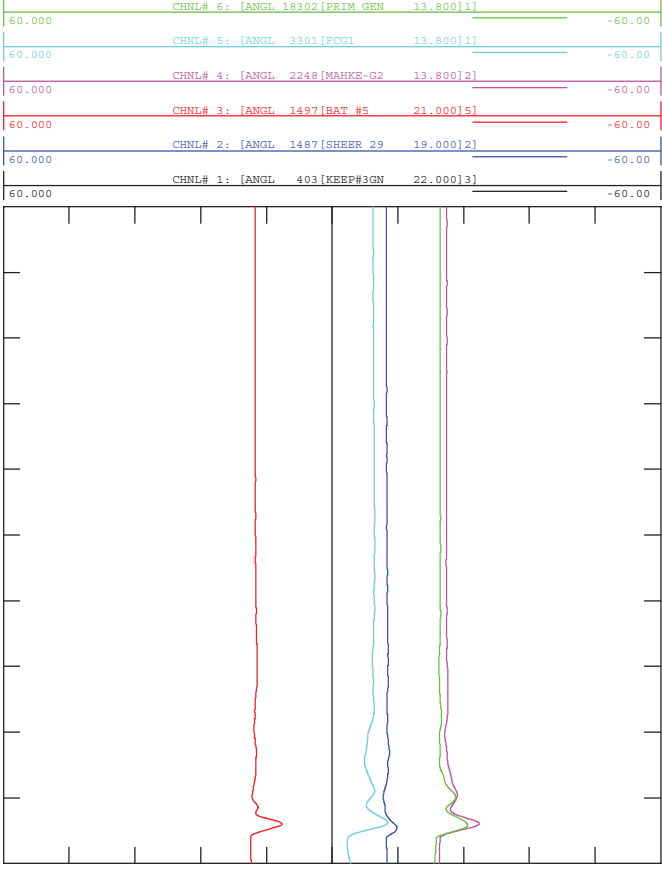


FIGURE F-8C

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES

FILE: F-8_7L65_GrizzlyBear.out

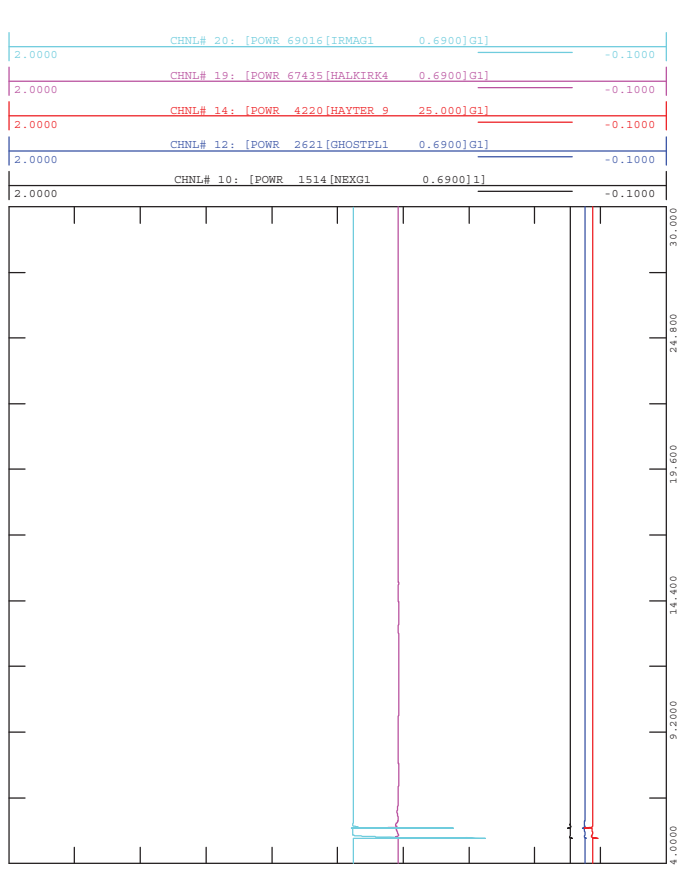




FIGURE F-8F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_GrizzlyBear.out

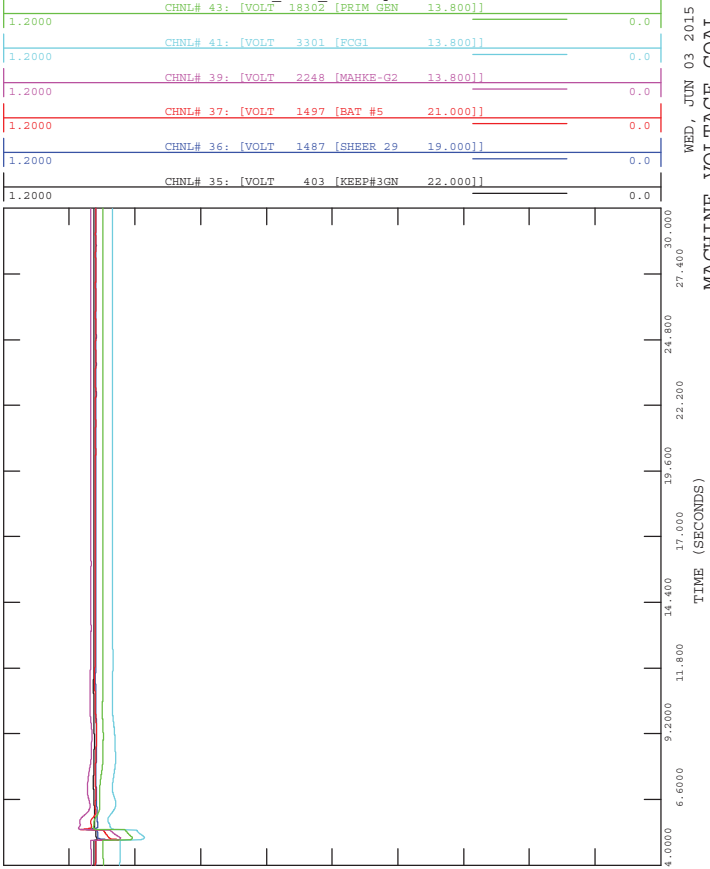


FIGURE F-8H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_GrizzlyBear.out

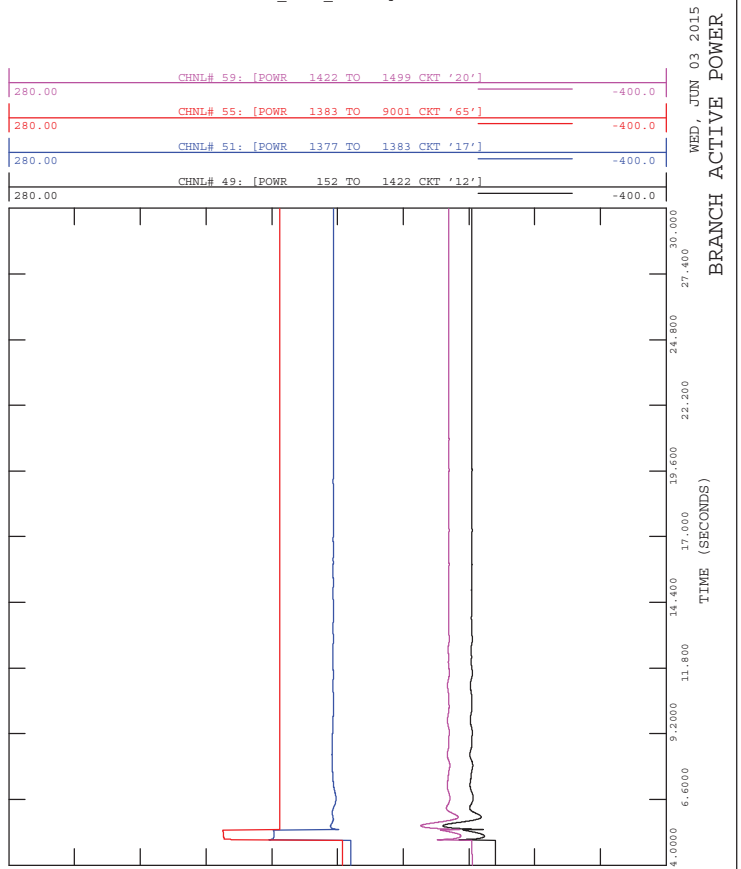


FIGURE F-8E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_GrizzlyBear.out

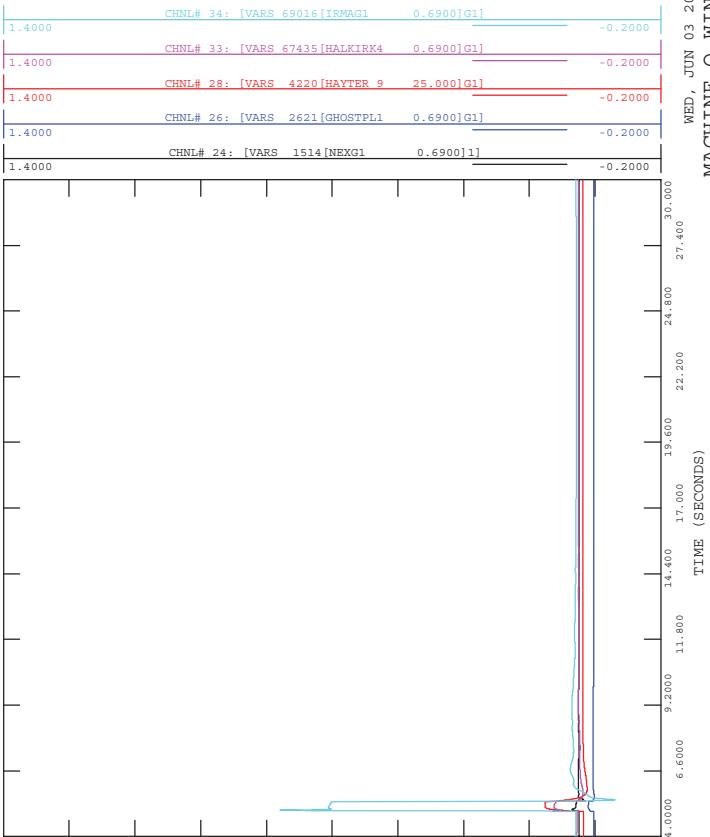


FIGURE F-8G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_GrizzlyBear.out

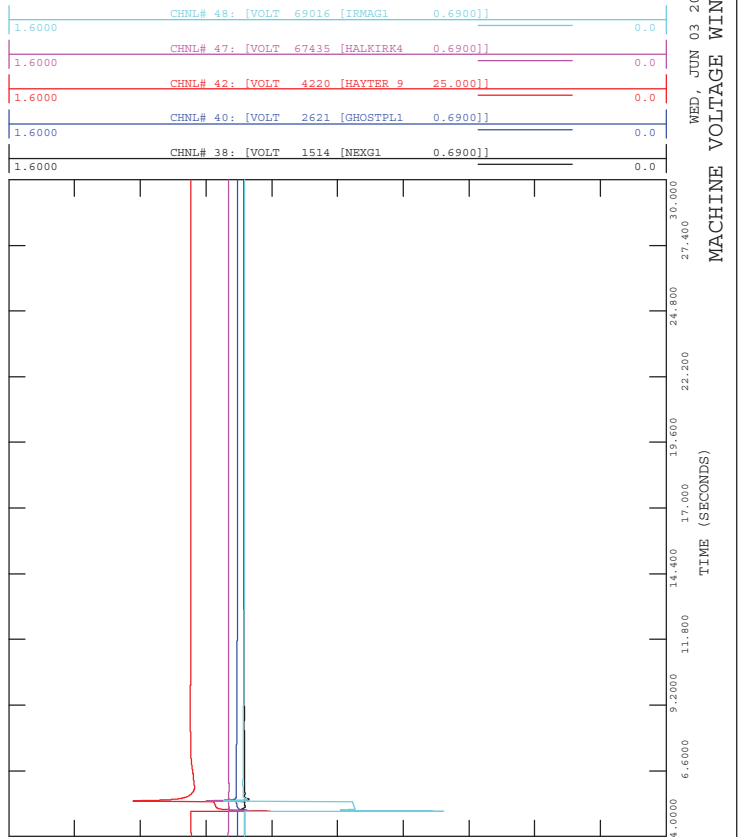




FIGURE F-8I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 708S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-8_7L65_GrizzlyBear.out

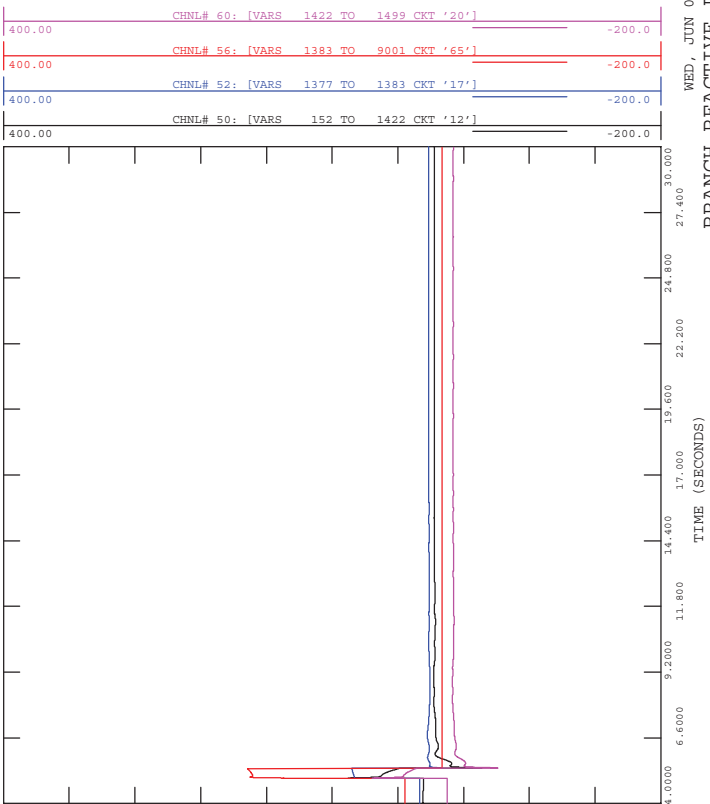




FIGURE F-9B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-9_7L65_Vermilion.out

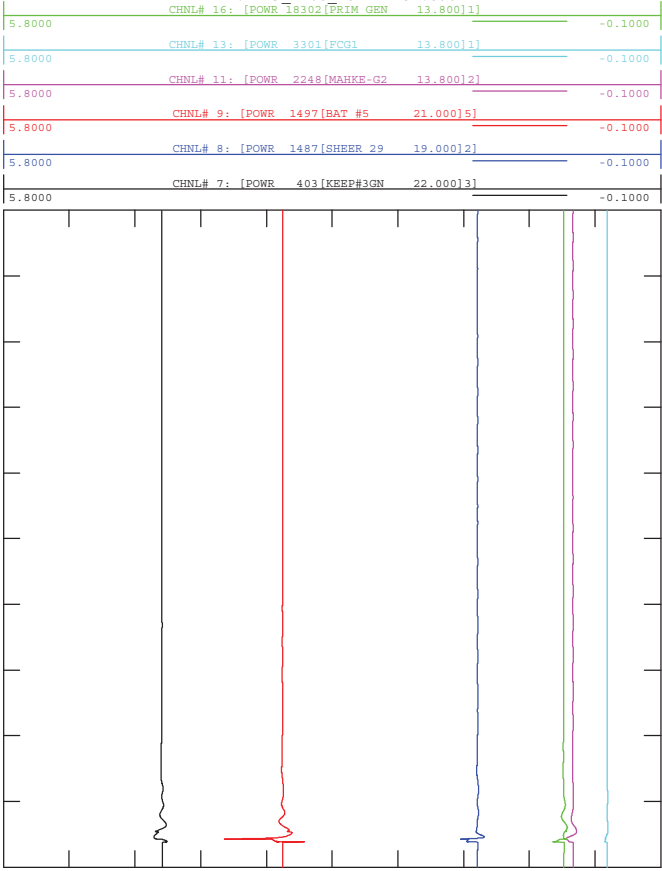


FIGURE F-9D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-9_7L65_Vermilion.out

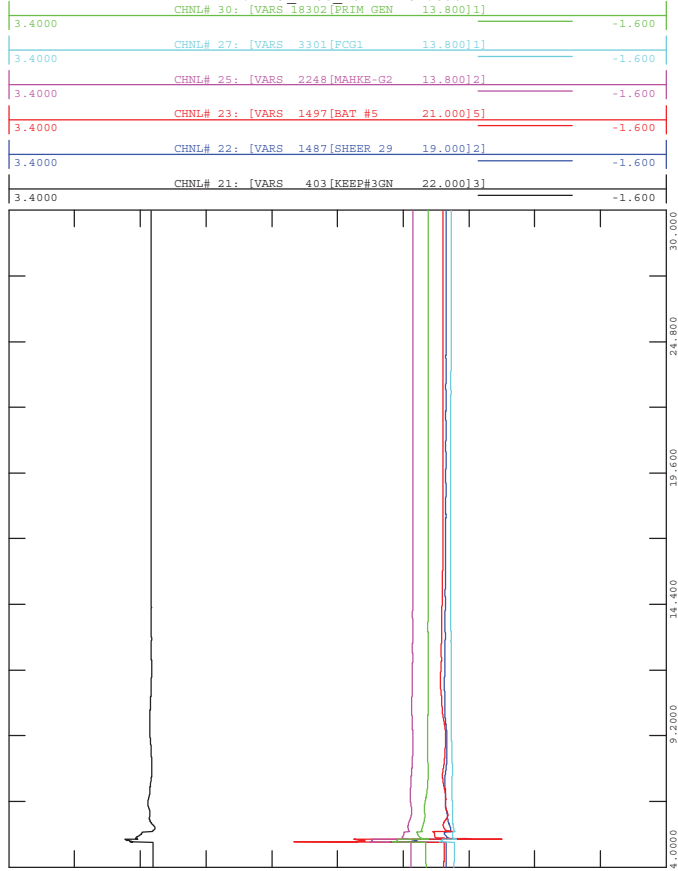


FIGURE F-9A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-9_7L65_Vermilion.out

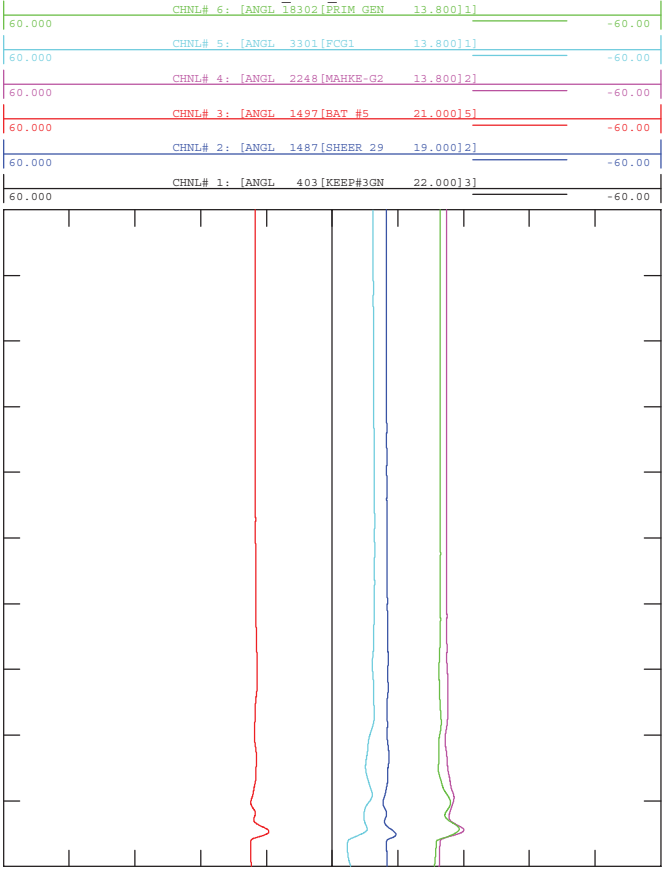


FIGURE F-9C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-9_7L65_Vermilion.out

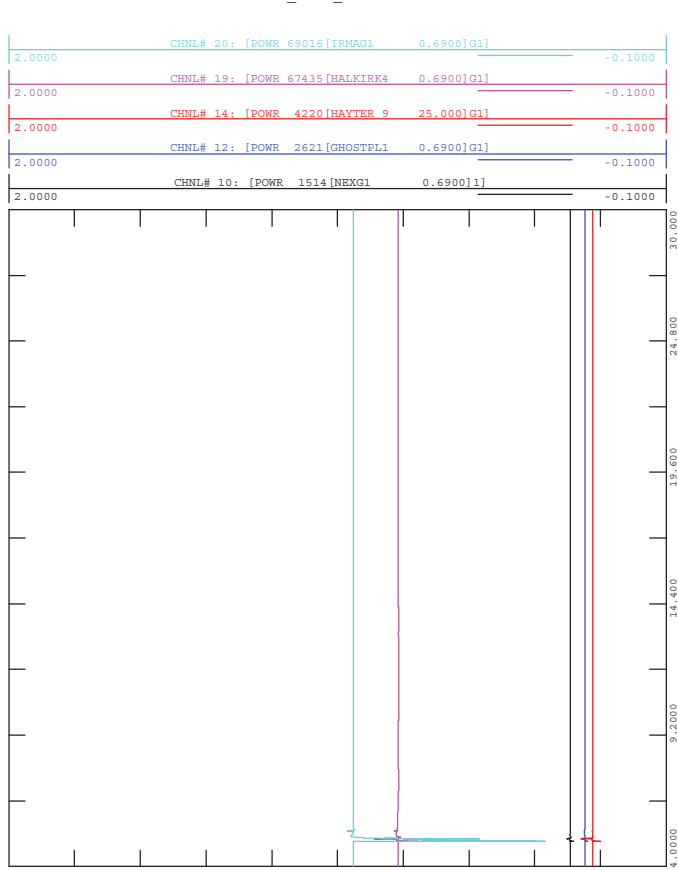




FIGURE F-9F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-9_7L65_Vermilion.out

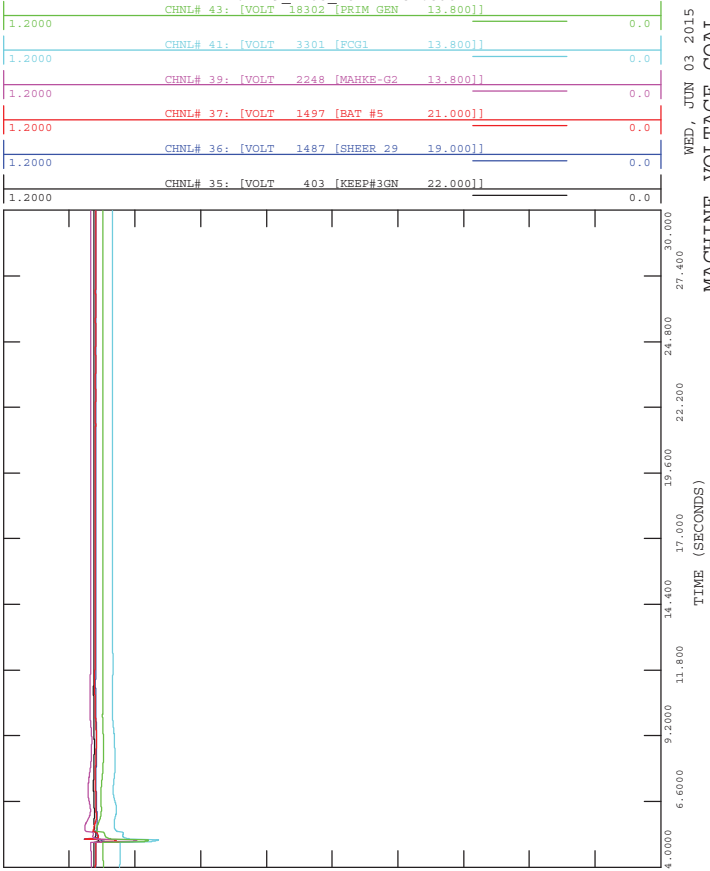


FIGURE F-9H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-9_7L65_Vermilion.out

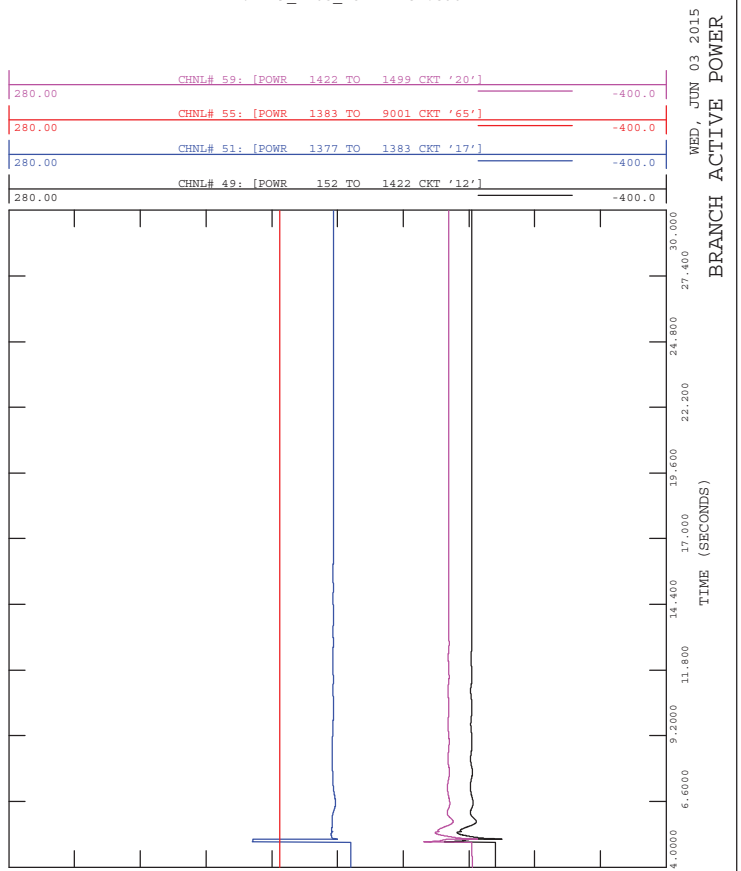


FIGURE F-9E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-9_7L65_Vermilion.out

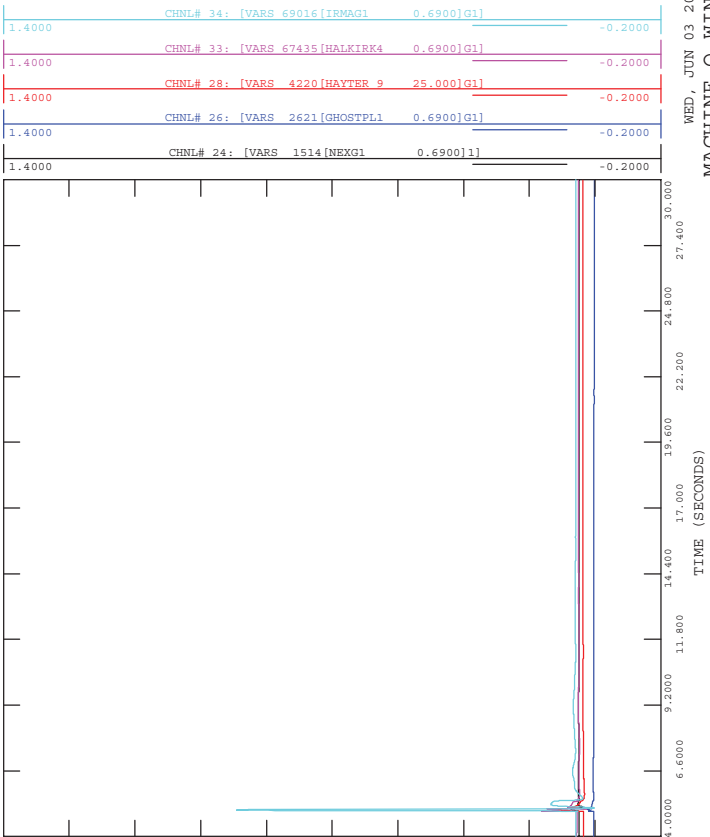


FIGURE F-9G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-9_7L65_Vermilion.out

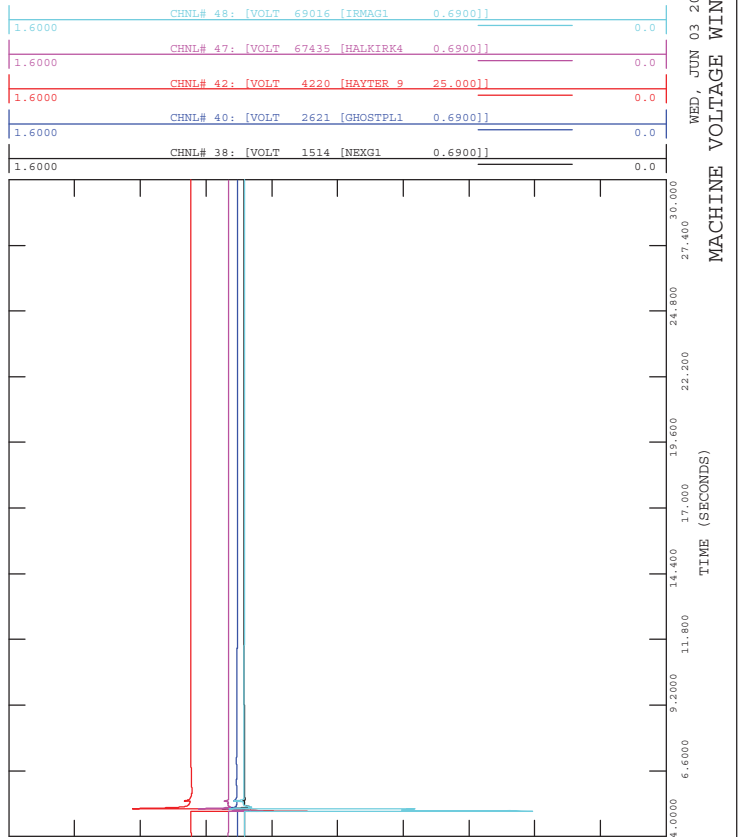
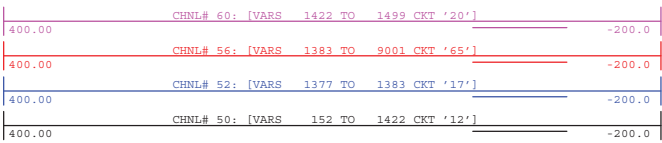




FIGURE F-9I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L65 AT 710S
CLEARED IN 6 CYCLES, FAR ENDS IN 24 CYCLES
FILE: F-9_7L65_Vermilion.out



WED, JUN 03 2015 11:24
BRANCH REACTIVE PWR (MVR)

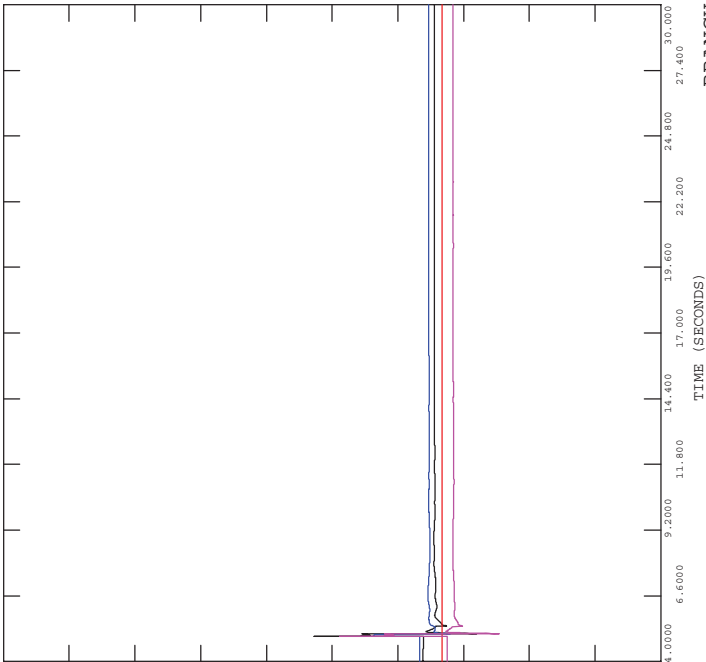




FIGURE F-10B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_Bonnyville.out

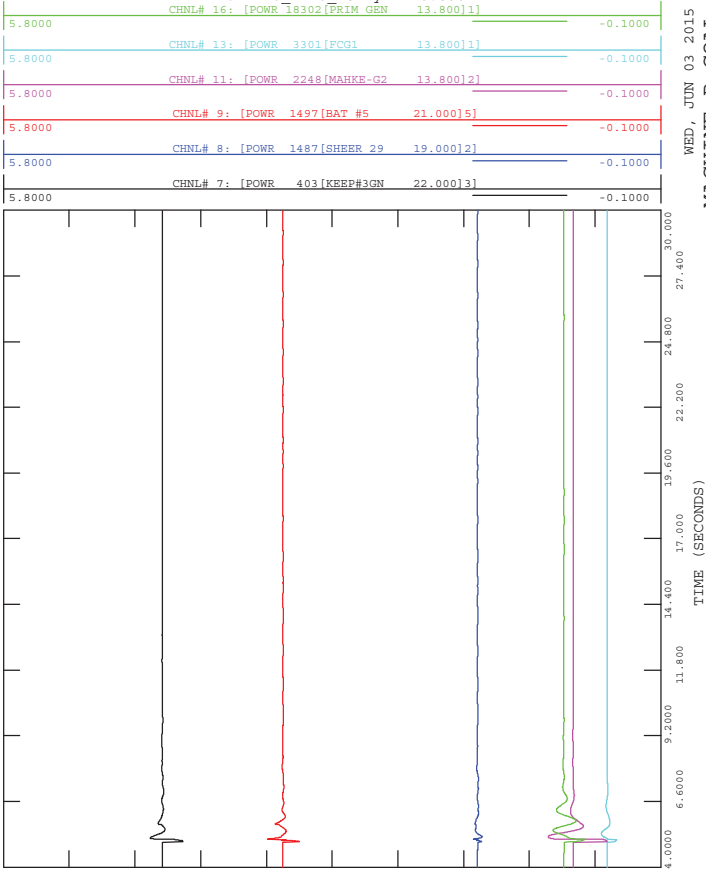


FIGURE F-10D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_Bonnyville.out

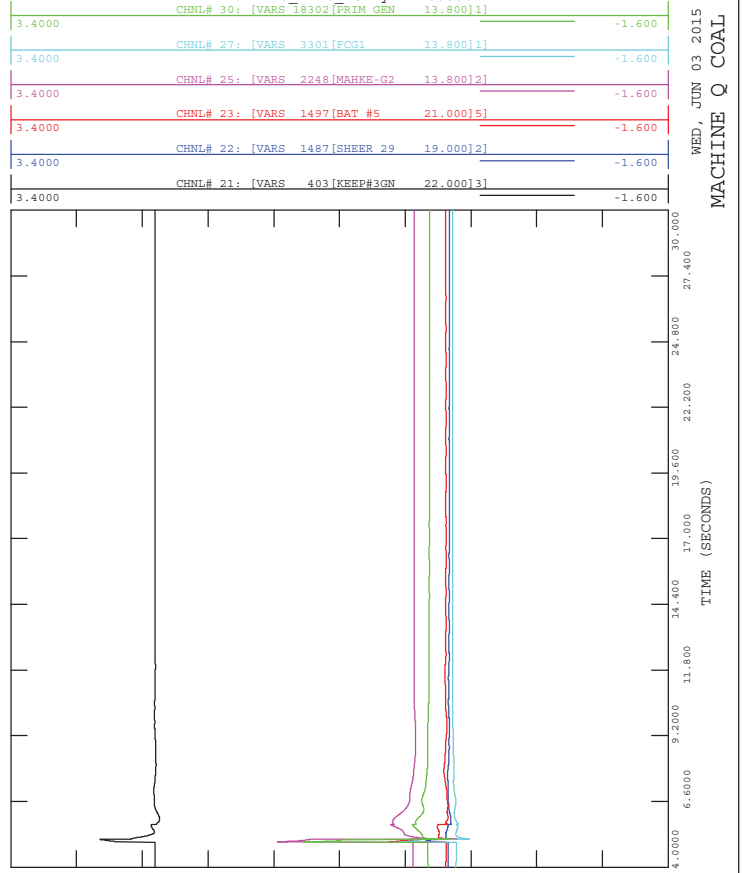


FIGURE F-10A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_Bonnyville.out

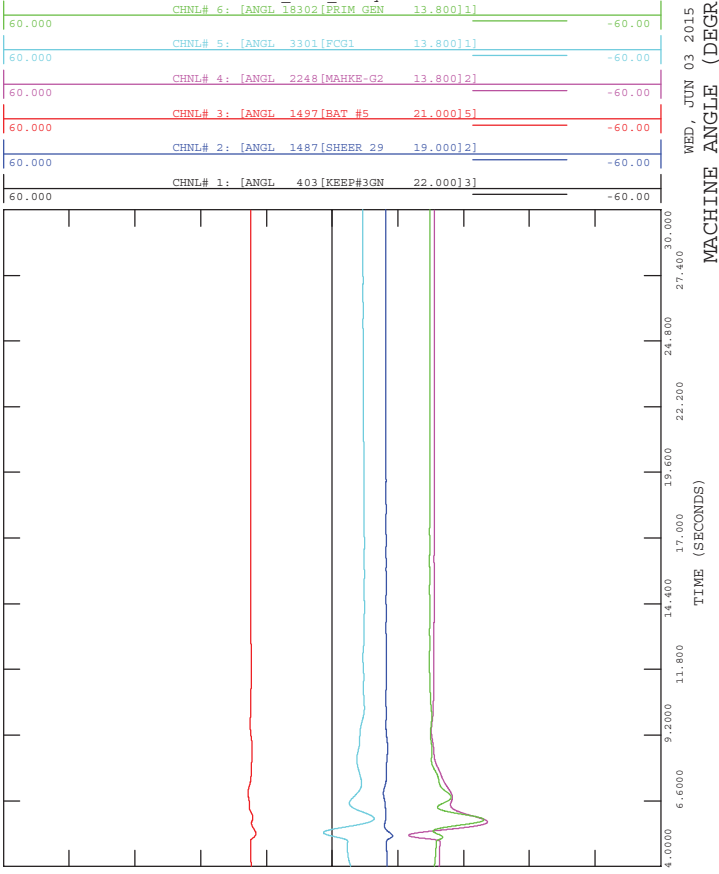


FIGURE F-10C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_Bonnyville.out

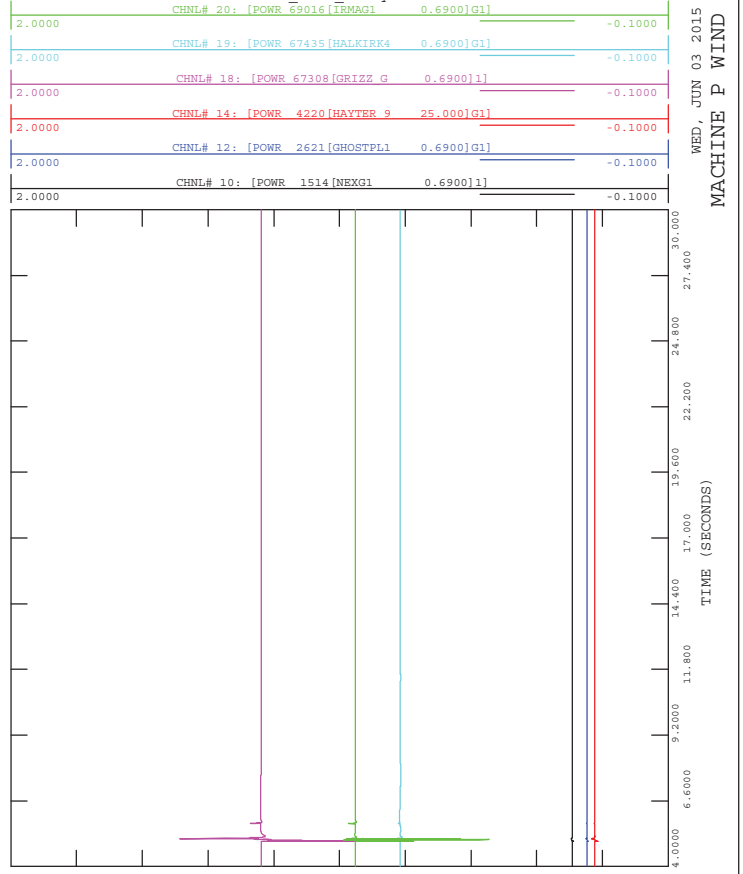
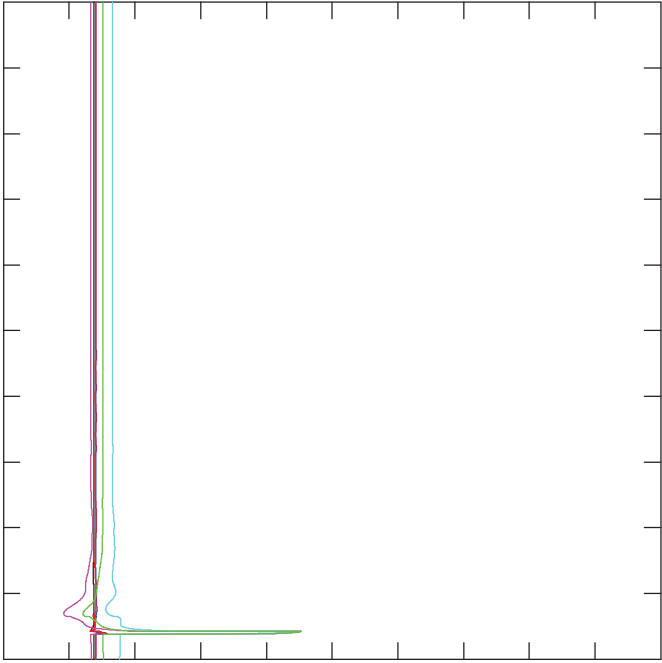




FIGURE F-10F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-10_7L70_Bonnyville.out

1.2000	CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]	0.0
1.2000	CHNL# 41: [VOLT 3301 [PCG1 13.800]]	0.0
1.2000	CHNL# 39: [VOLT 2248 [MAHKE-G2 13.800]]	0.0
1.2000	CHNL# 37: [VOLT 1497 [BAT #5 21.000]]	0.0
1.2000	CHNL# 36: [VOLT 1487 [SHEER 29 19.000]]	0.0
1.2000	CHNL# 35: [VOLT 403 [KEEP#3GN 22.000]]	0.0



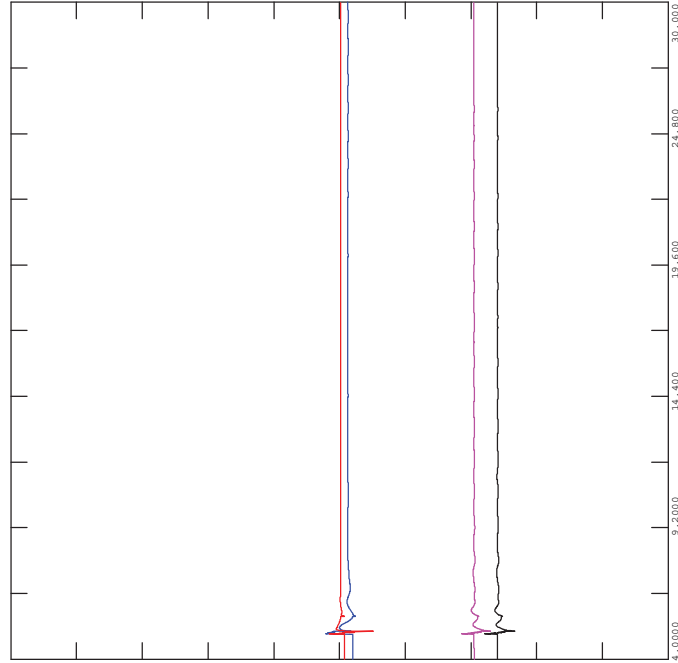
WED, JUN 03 2015 11:24
MACHINE VOLTAGE COAL (PU)



FIGURE F-10H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-10_7L70_Bonnyville.out

280.00	CHNL# 59: [POWR 1422 TO 1499 CKT '20']	-400.0
280.00	CHNL# 55: [POWR 1383 TO 9001 CKT '65']	-400.0
280.00	CHNL# 51: [POWR 1377 TO 1383 CKT '17']	-400.0
280.00	CHNL# 49: [POWR 152 TO 1422 CKT '12']	-400.0



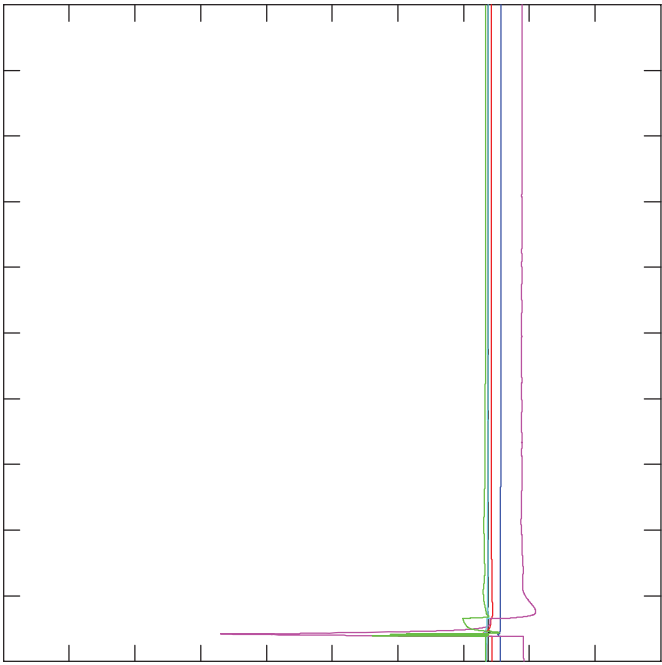
WED, JUN 03 2015 11:25
BRANCH ACTIVE POWER (MW)



FIGURE F-10B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-10_7L70_Bonnyville.out

1.4000	CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]	-0.5000
1.4000	CHNL# 33: [VARS 67435 [HALKIRK4 0.6900]G1]	-0.5000
1.4000	CHNL# 32: [VARS 67308 [GRIZZ G 0.6900]1]	-0.5000
1.4000	CHNL# 28: [VARS 4220 [HAYTER 9 25.000]G1]	-0.5000
1.4000	CHNL# 26: [VARS 2621 [GHOSTPL1 0.6900]G1]	-0.5000
1.4000	CHNL# 24: [VARS 1514 [NEXG1 0.6900]1]	-0.5000



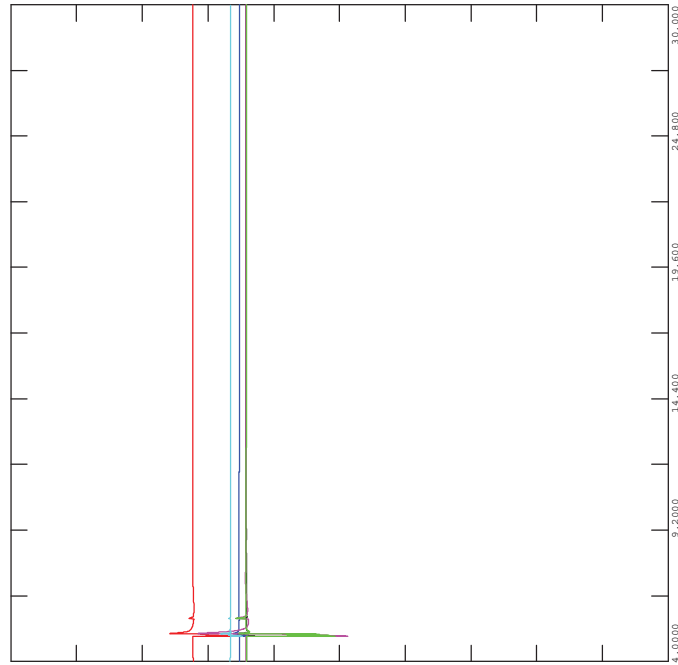
WED, JUN 03 2015 11:24
MACHINE Q WIND (PU)



FIGURE F-10G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-10_7L70_Bonnyville.out

1.6000	CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]	0.0
1.6000	CHNL# 47: [VOLT 67435 [HALKIRK4 0.6900]]	0.0
1.6000	CHNL# 46: [VOLT 67308 [GRIZZ G 0.6900]]	0.0
1.6000	CHNL# 42: [VOLT 4220 [HAYTER 9 25.000]]	0.0
1.6000	CHNL# 40: [VOLT 2621 [GHOSTPL1 0.6900]]	0.0
1.6000	CHNL# 38: [VOLT 1514 [NEXG1 0.6900]]	0.0



WED, JUN 03 2015 11:25
MACHINE VOLTAGE WIND (PU)



FIGURE F-101
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-10_7L70_Bonnyville.out

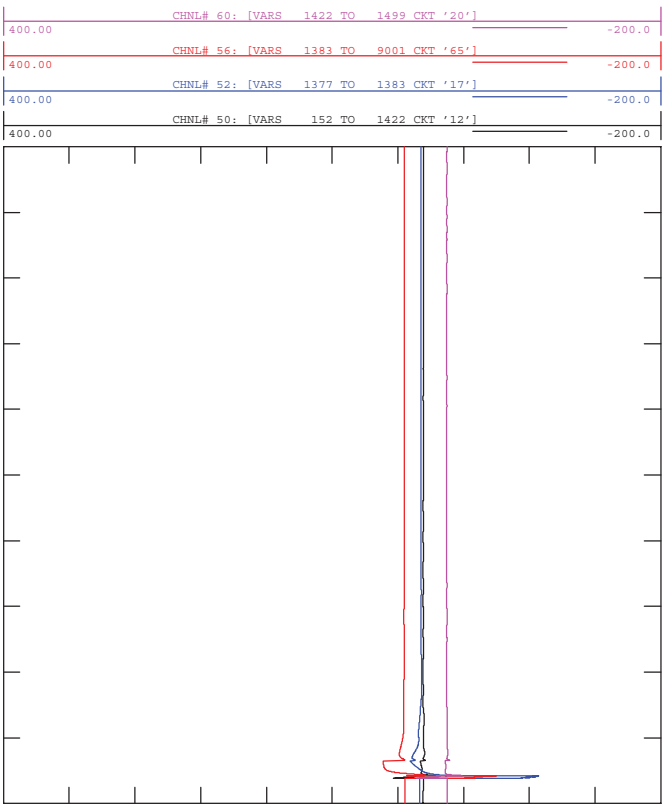




FIGURE F-11B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-11 7L70 St.Paul.out

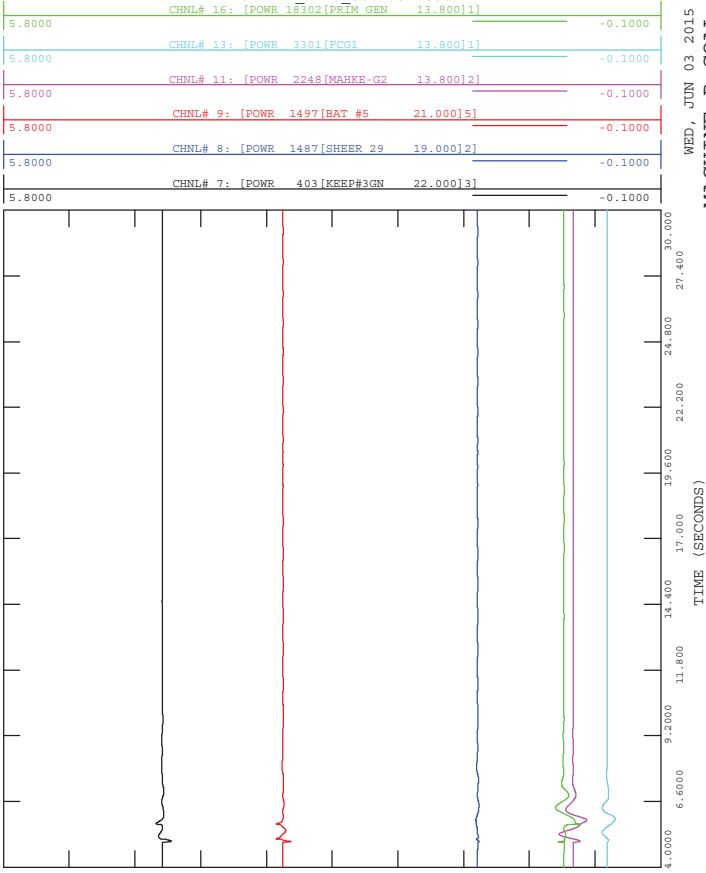


FIGURE F-11D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-11 7L70 St.Paul.out

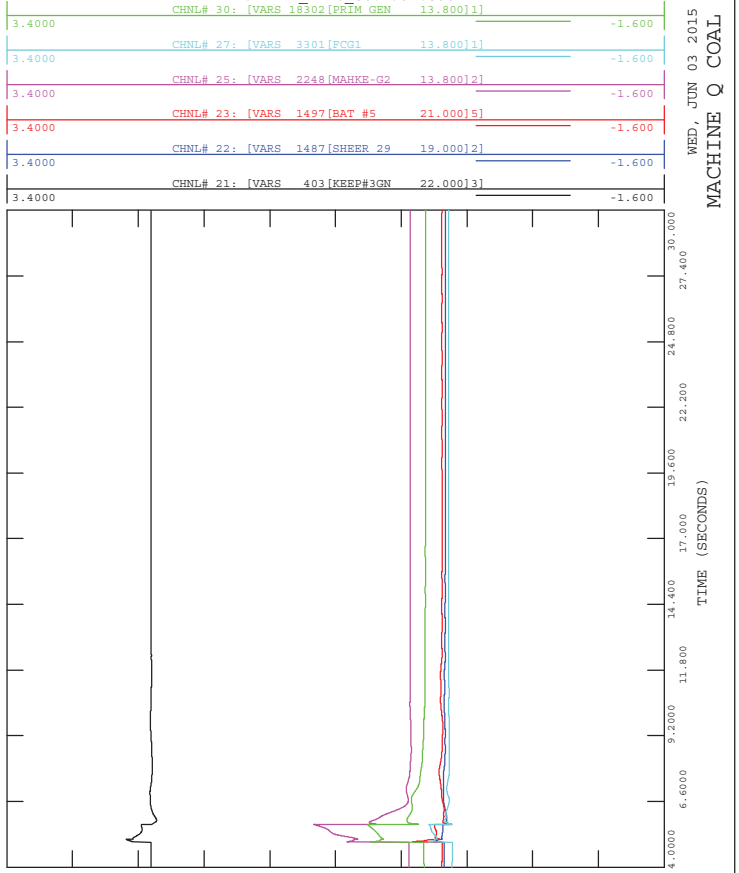


FIGURE F-11A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-11 7L70 St.Paul.out

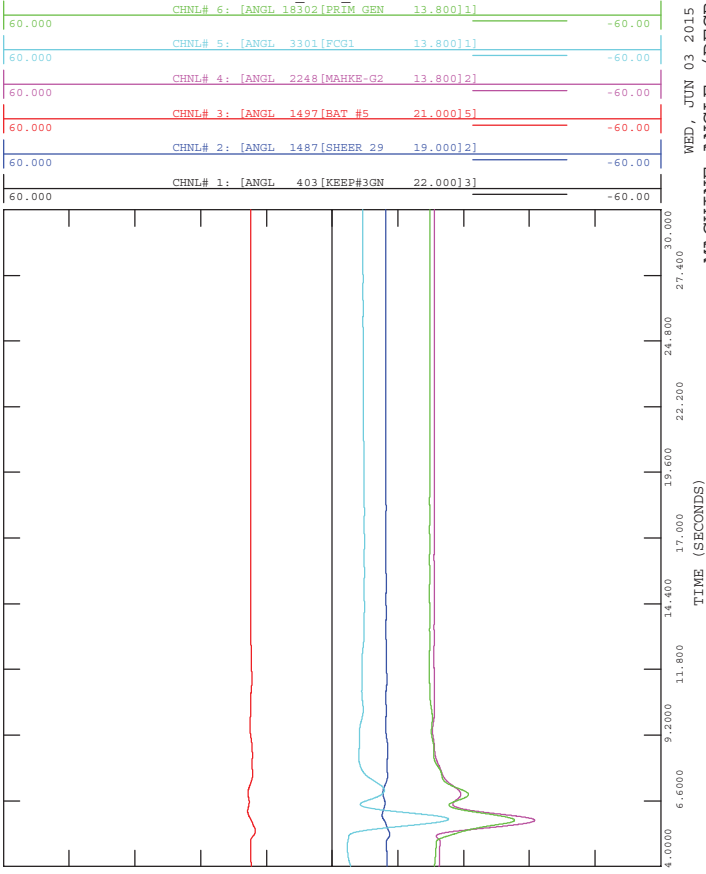


FIGURE F-11C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-11 7L70 St.Paul.out

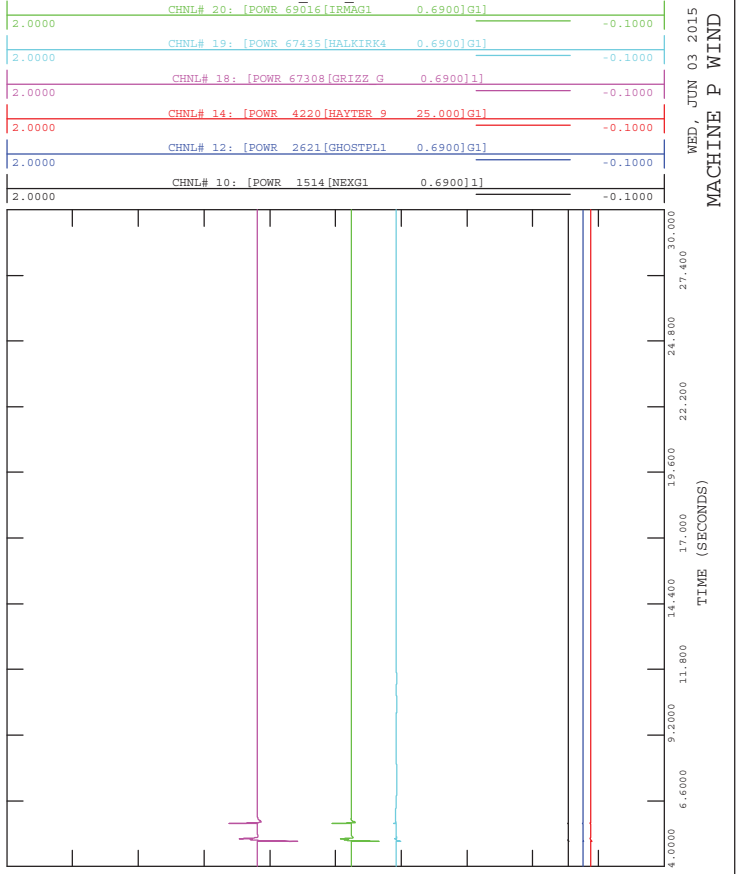




FIGURE F-11F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-11_7L70_St.Paul.out

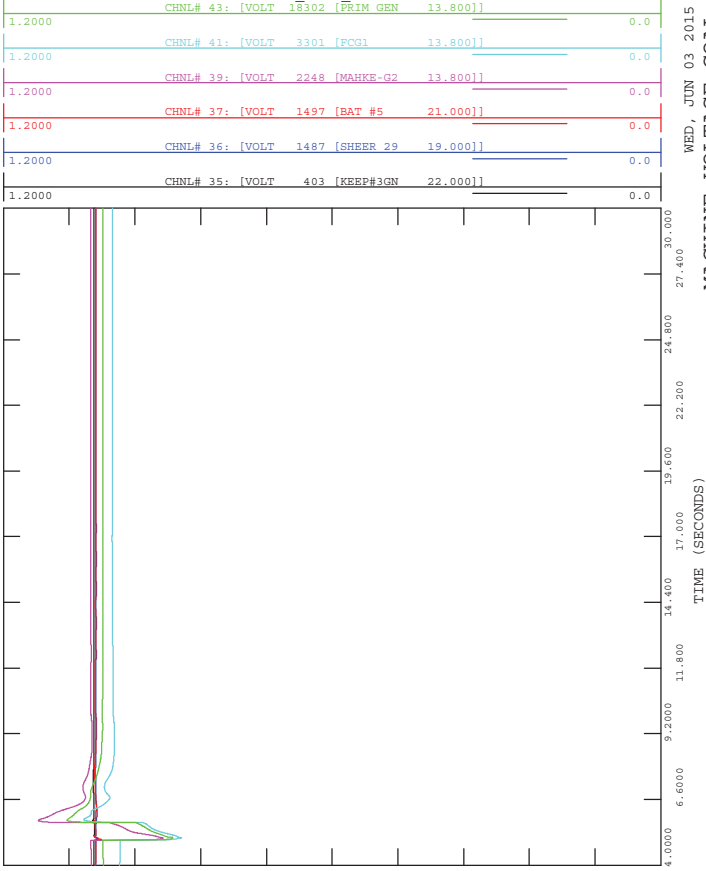


FIGURE F-11H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-11_7L70_St.Paul.out

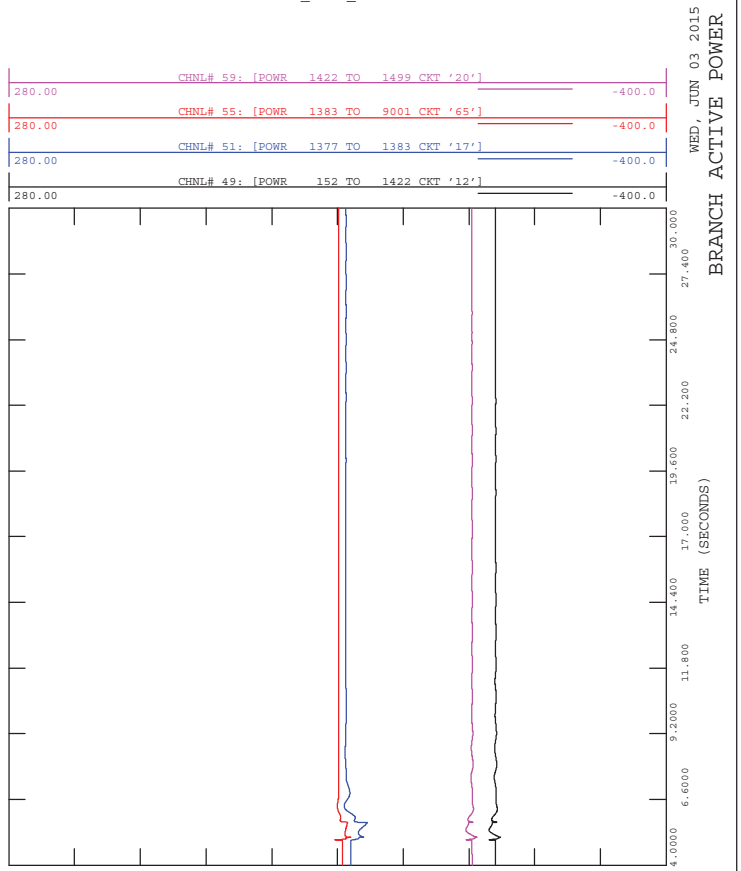


FIGURE F-11E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-11_7L70_St.Paul.out

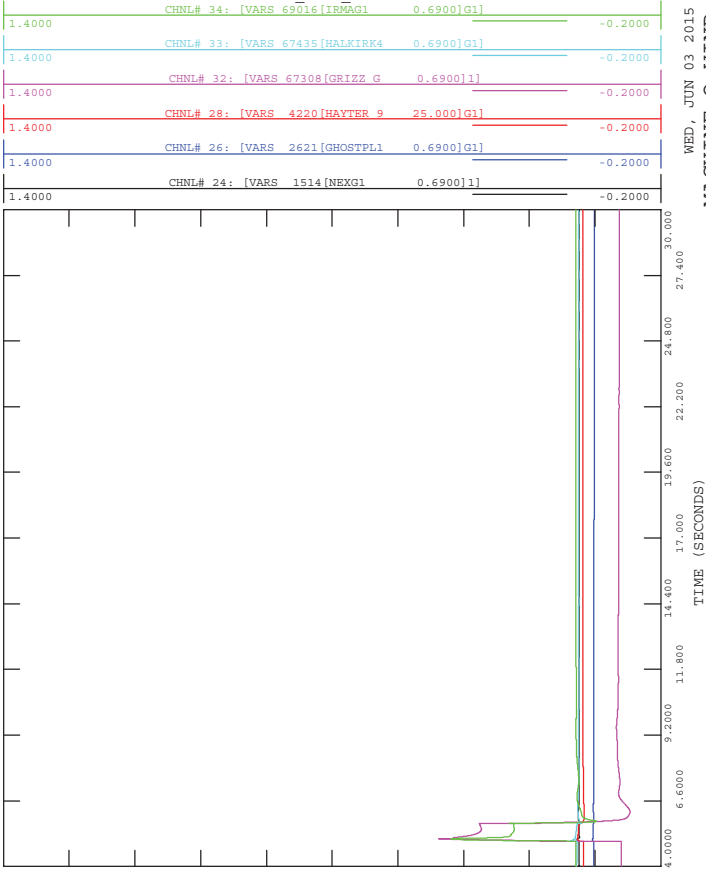


FIGURE F-11G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-11_7L70_St.Paul.out

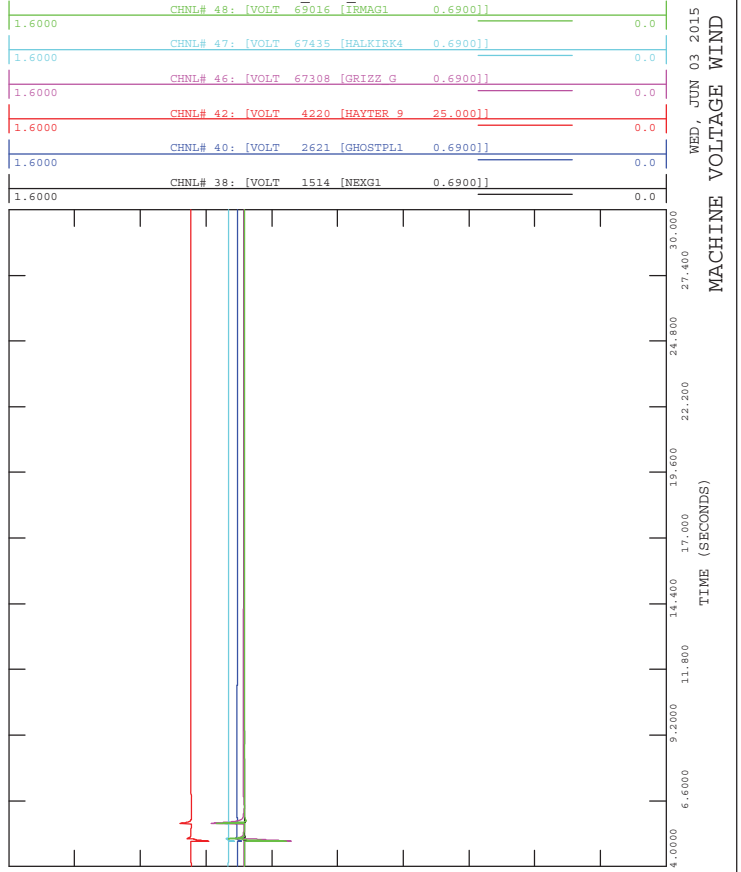
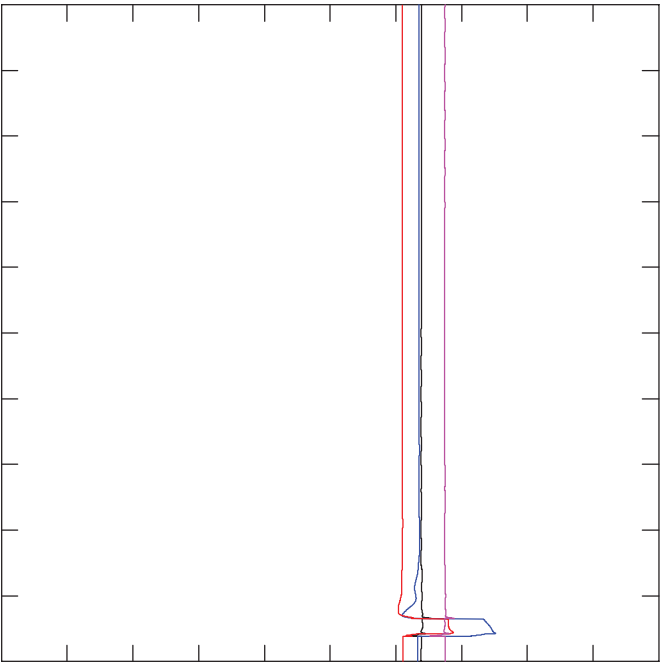
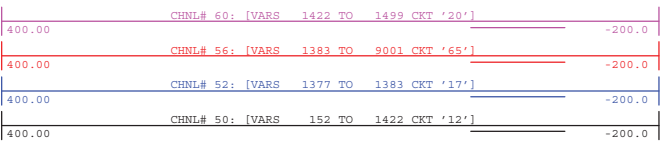




FIGURE F-111
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L70 AT 707S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-11_7L70_St.Paul.out



WED, JUN 03 2015 11:25
BRANCH REACTIVE PWR (MVR)

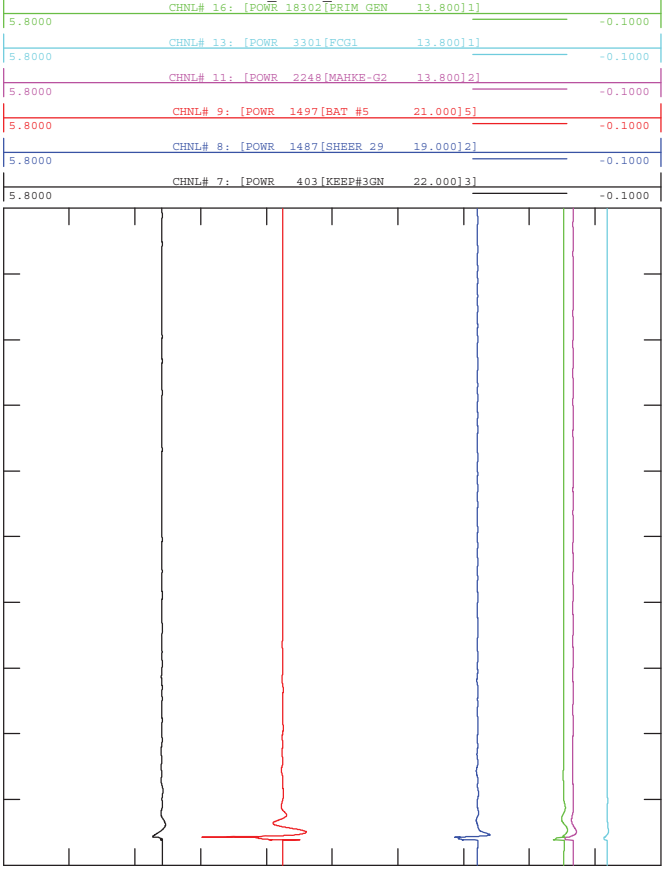


FIGURE F-12B

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-12_7L115_BuffaloCreek.out

CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



WED, JUN 03 2015 11:25
MACHINE P COAL (PU)

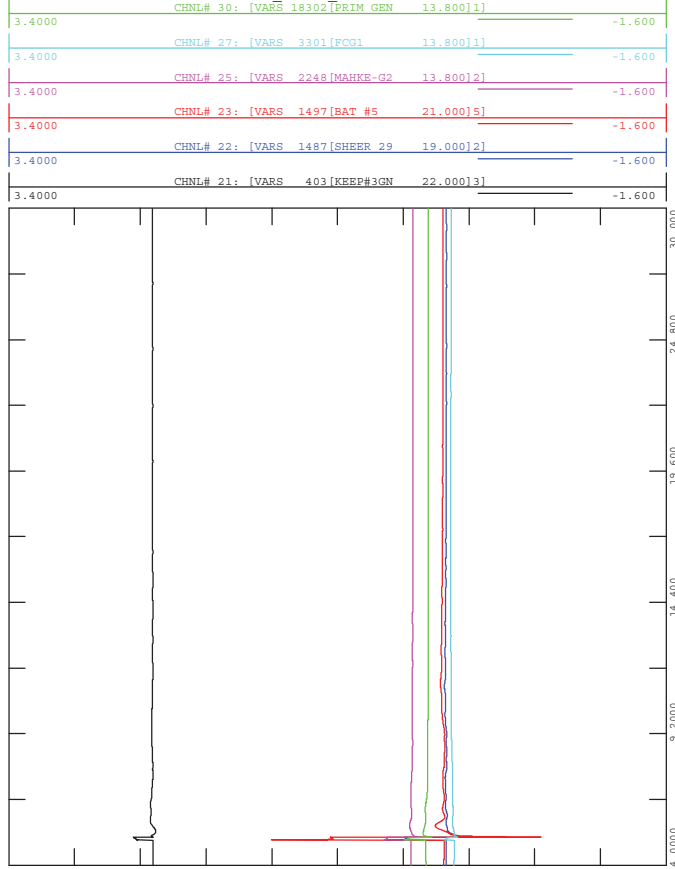


FIGURE F-12D

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-12_7L115_BuffaloCreek.out

CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



WED, JUN 03 2015 11:25
MACHINE Q COAL (PU)

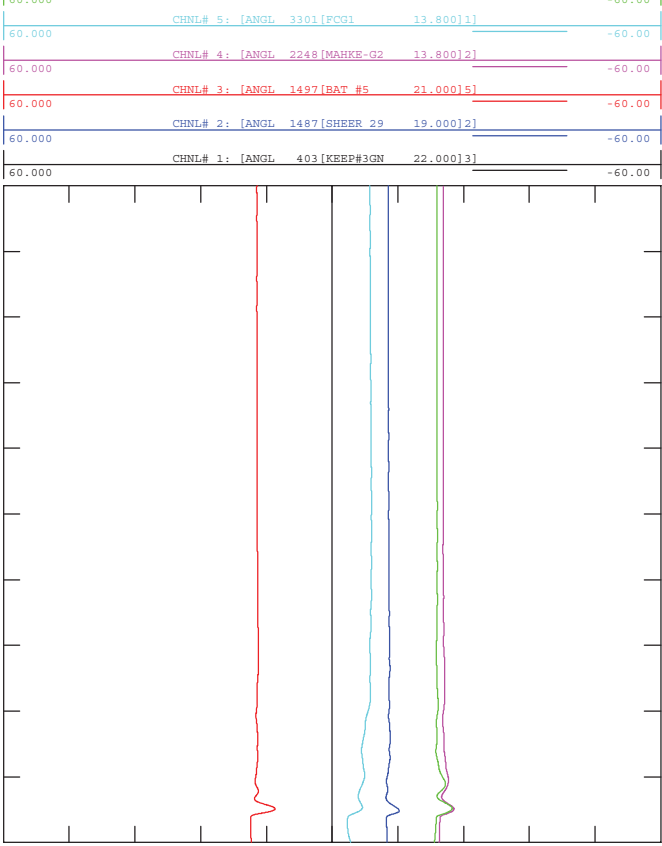


FIGURE F-12A

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-12_7L115_BuffaloCreek.out

CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



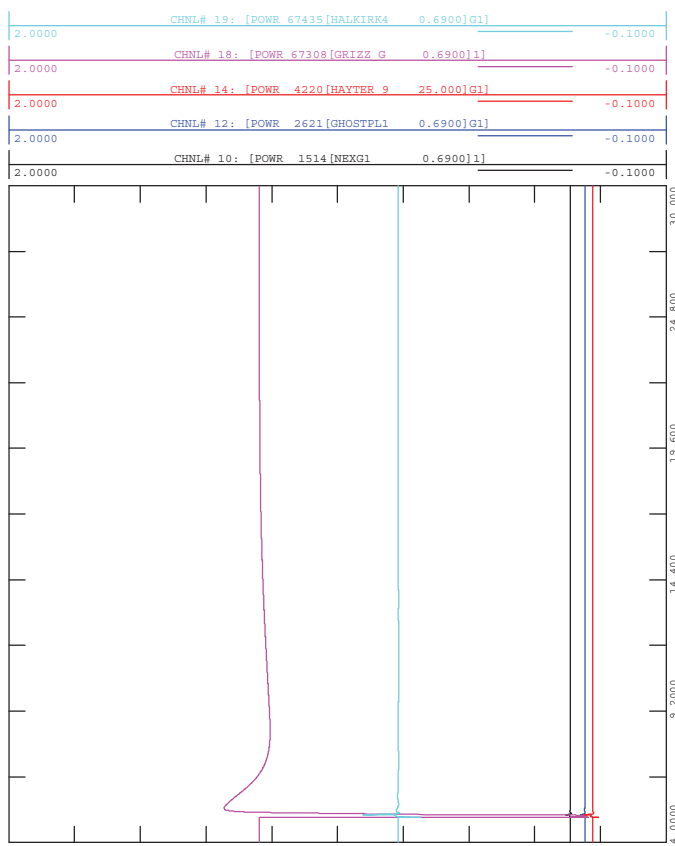
WED, JUN 03 2015 11:25
MACHINE ANGLE (DEGREES)



FIGURE F-12C

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-12_7L115_BuffaloCreek.out



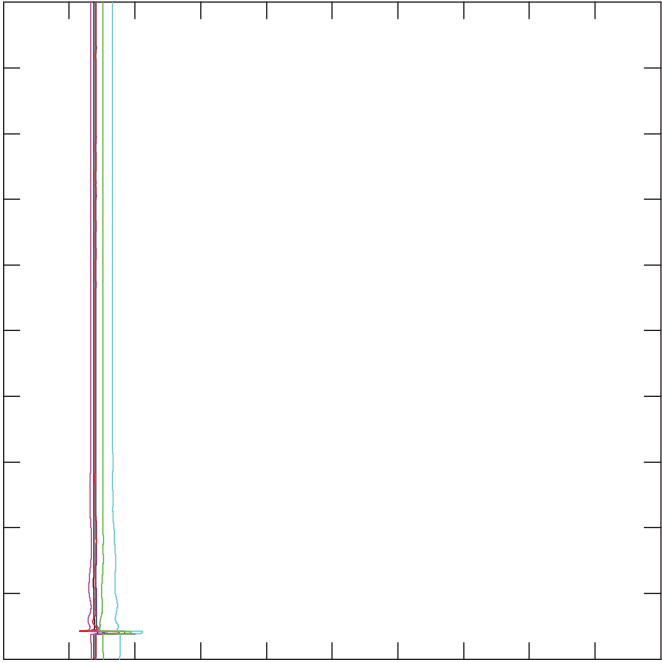
WED, JUN 03 2015 11:25
MACHINE P WIND (PU)



FIGURE F-12F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-12_7L115_BuffaloCreek.out

1.2000	CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]	0.0
1.2000	CHNL# 41: [VOLT 3301 [PCG1 13.800]]	0.0
1.2000	CHNL# 39: [VOLT 2248 [MAHKE-G2 13.800]]	0.0
1.2000	CHNL# 37: [VOLT 1497 [BAT #5 21.000]]	0.0
1.2000	CHNL# 36: [VOLT 1487 [SHEER 29 19.000]]	0.0
1.2000	CHNL# 35: [VOLT 403 [KEEP#3GN 22.000]]	0.0



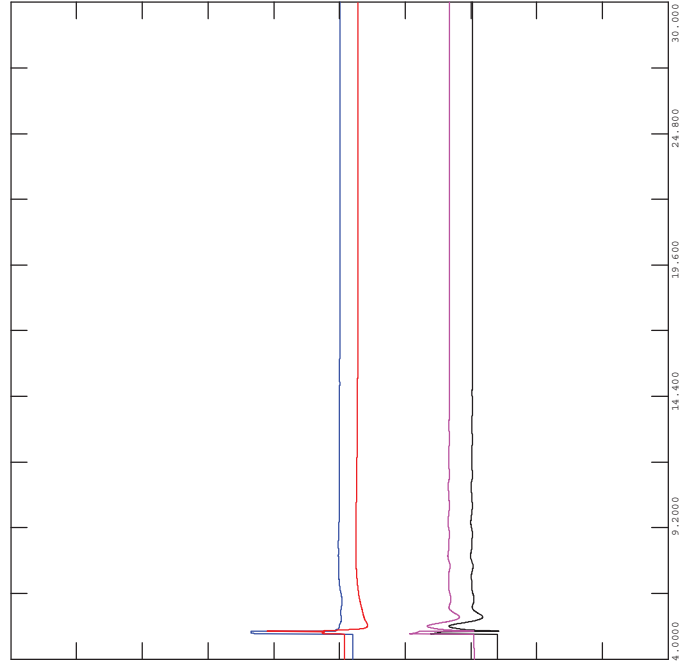
WED, JUN 03 2015 11:25
MACHINE VOLTAGE COAL (PU)



FIGURE F-12H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-12_7L115_BuffaloCreek.out

280.00	CHNL# 59: [POWR 1422 TO 1499 CKT '20']	-400.0
280.00	CHNL# 55: [POWR 1383 TO 9001 CKT '65']	-400.0
280.00	CHNL# 51: [POWR 1377 TO 1383 CKT '17']	-400.0
280.00	CHNL# 49: [POWR 152 TO 1422 CKT '12']	-400.0



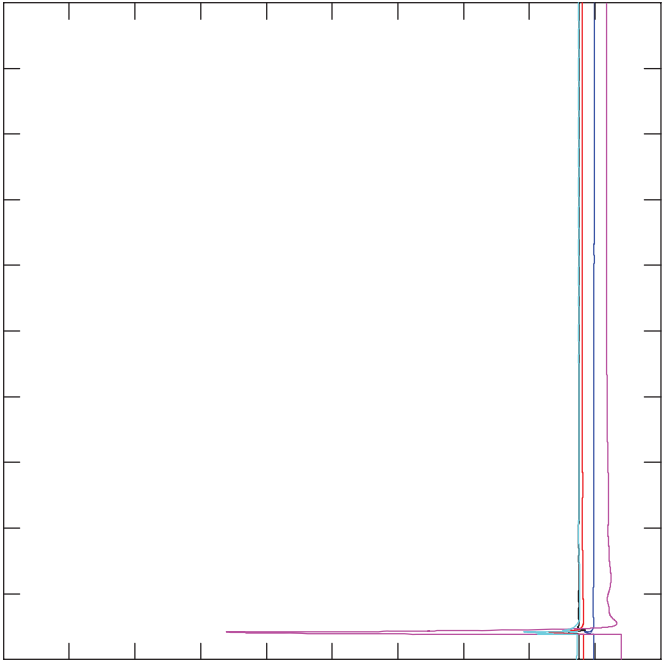
WED, JUN 03 2015 11:25
BRANCH ACTIVE POWER (MW)



FIGURE F-12E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-12_7L115_BuffaloCreek.out

1.4000	CHNL# 33: [VARS 67435 [HALKIRK4 0.6900] G1]	-0.2000
1.4000	CHNL# 32: [VARS 67308 [GRIZZ G 0.6900] I]	-0.2000
1.4000	CHNL# 28: [VARS 4220 [HAYTER 9 25.000] G1]	-0.2000
1.4000	CHNL# 26: [VARS 2621 [GHOSTPL1 0.6900] G1]	-0.2000
1.4000	CHNL# 24: [VARS 1514 [NEXG1 0.6900] I]	-0.2000



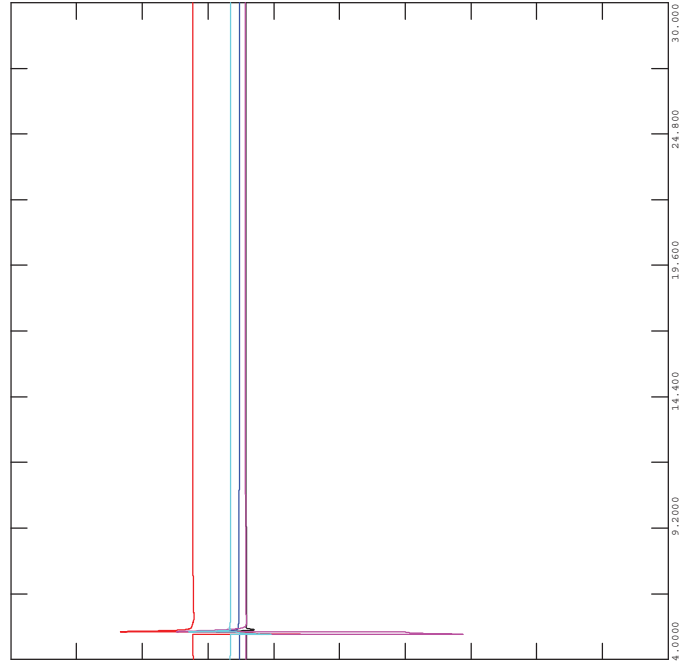
WED, JUN 03 2015 11:25
MACHINE Q WIND (PU)



FIGURE F-12G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-12_7L115_BuffaloCreek.out

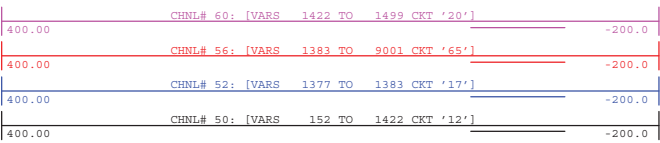
1.6000	CHNL# 47: [VOLT 67435 [HALKIRK4 0.6900]]	0.0
1.6000	CHNL# 46: [VOLT 67308 [GRIZZ G 0.6900]]	0.0
1.6000	CHNL# 42: [VOLT 4220 [HAYTER 9 25.000]]	0.0
1.6000	CHNL# 40: [VOLT 2621 [GHOSTPL1 0.6900]]	0.0
1.6000	CHNL# 38: [VOLT 1514 [NEXG1 0.6900]]	0.0



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MACHINE VOLTAGE WIND (PU)



FIGURE F-12I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-12_7L115_BuffaloCreek.out



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BRANCH REACTIVE PWR (MVR)

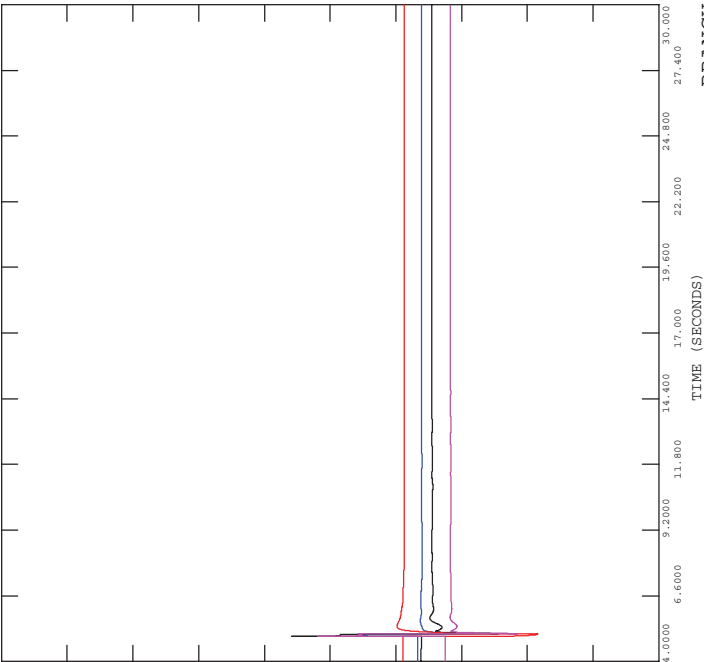




FIGURE F-13B

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-13_7L115_Kinsella.out

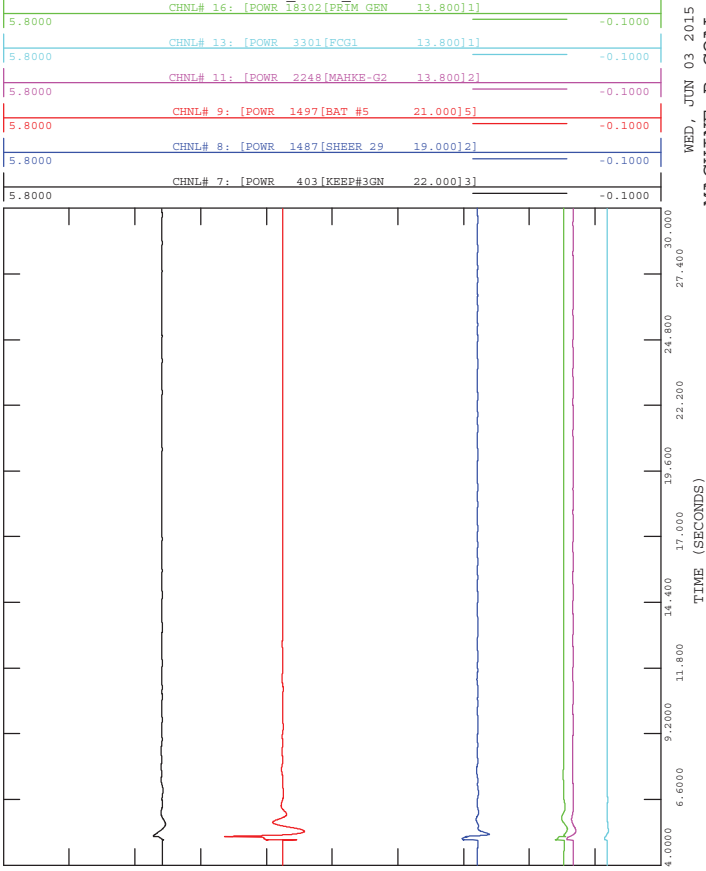


FIGURE F-13D

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-13_7L115_Kinsella.out

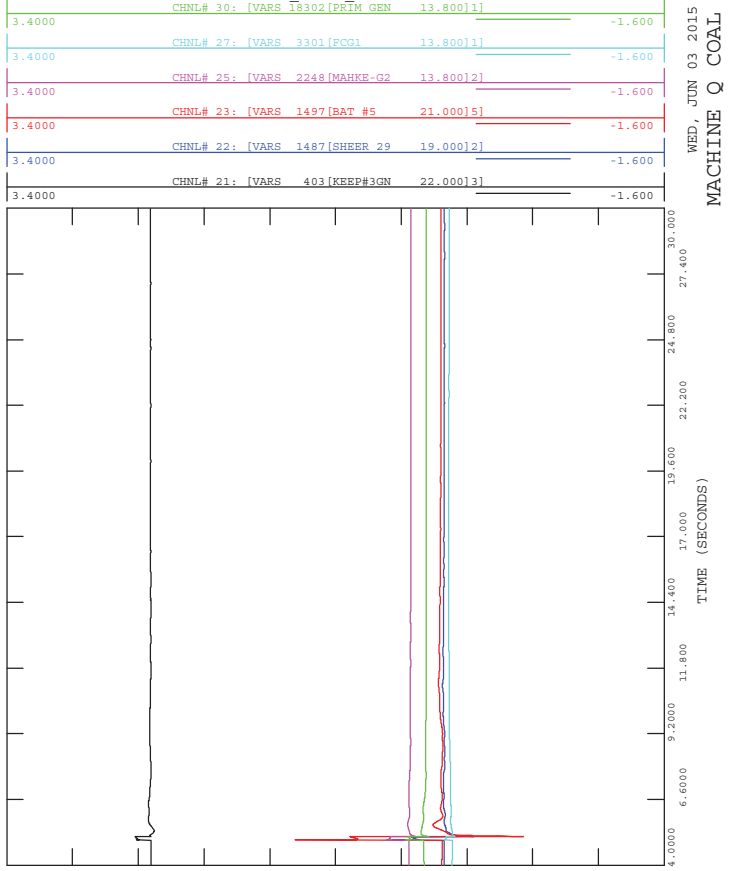


FIGURE F-13A

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-13_7L115_Kinsella.out

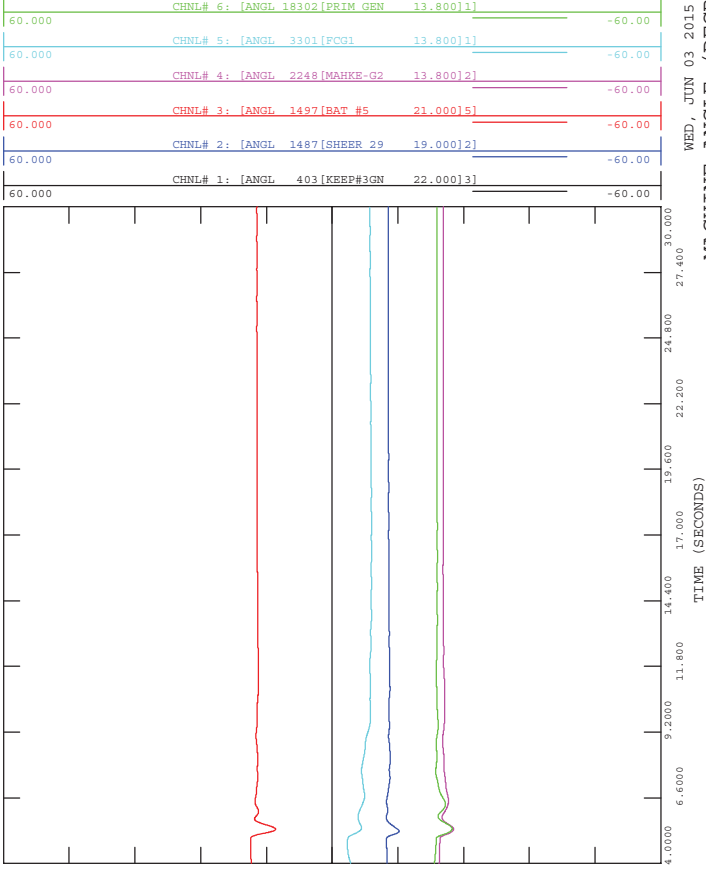


FIGURE F-13C

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-13_7L115_Kinsella.out

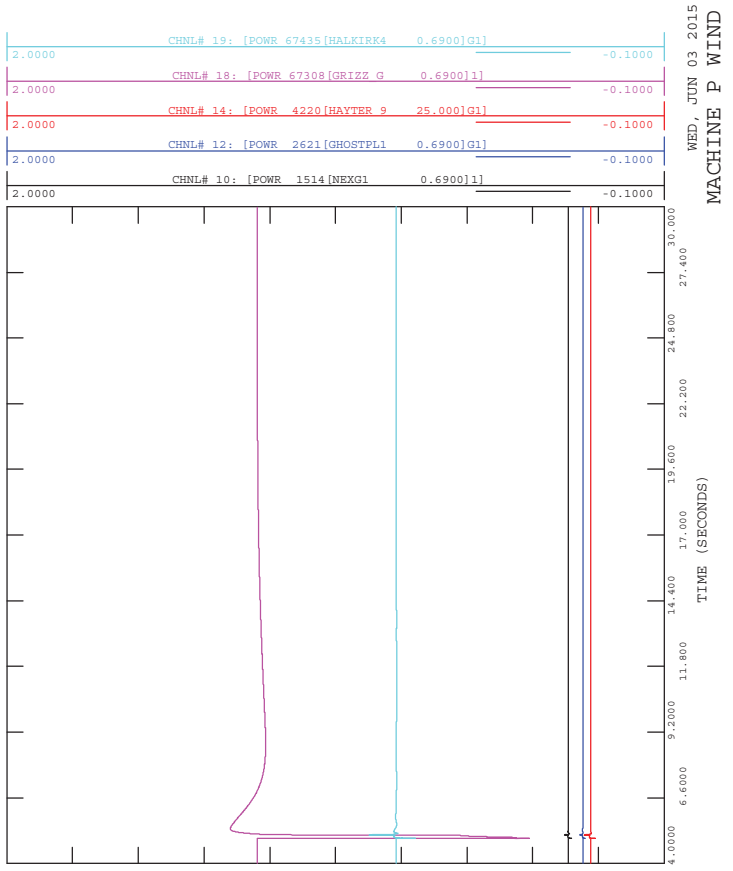
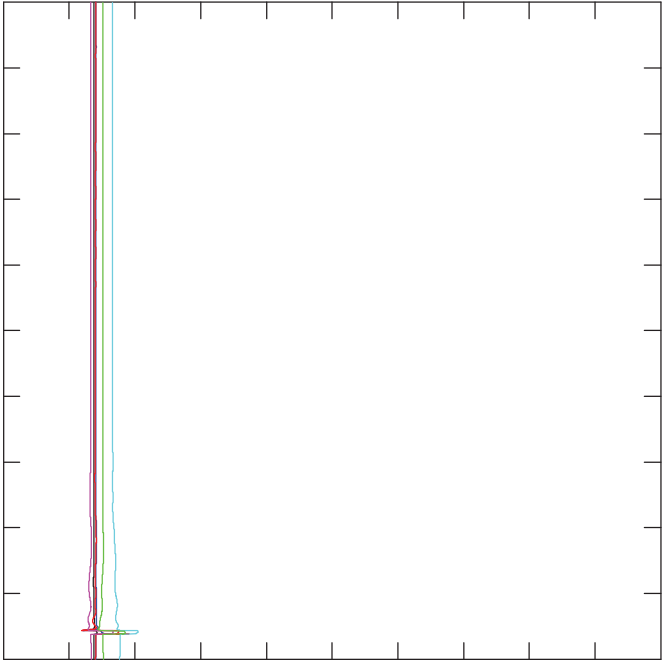




FIGURE F-13F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-13_7L115_Kinsella.out

1.2000	CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]	0.0
1.2000	CHNL# 41: [VOLT 3301 [PCG1 13.800]]	0.0
1.2000	CHNL# 39: [VOLT 2248 [MAHKE-G2 13.800]]	0.0
1.2000	CHNL# 37: [VOLT 1497 [BAT #5 21.000]]	0.0
1.2000	CHNL# 36: [VOLT 1487 [SHEER 29 19.000]]	0.0
1.2000	CHNL# 35: [VOLT 403 [KEEP#3GN 22.000]]	0.0



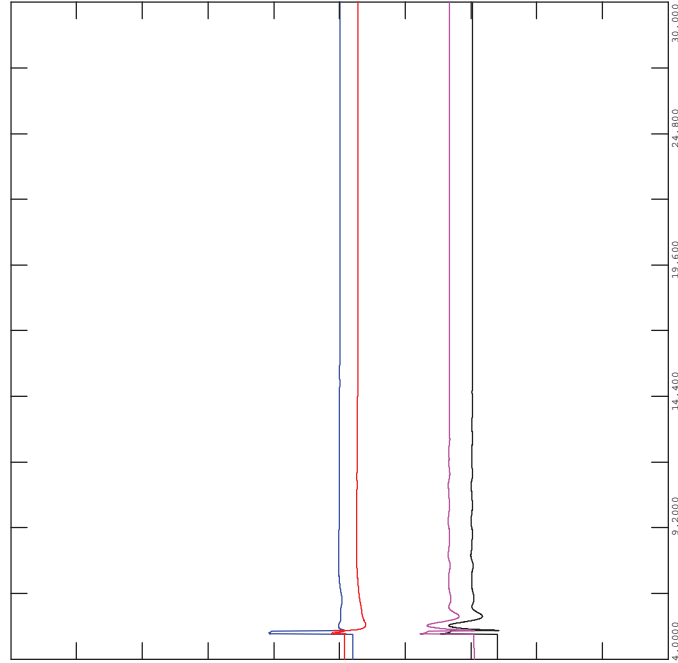
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MACHINE VOLTAGE COAL (PU)



FIGURE F-13H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-13_7L115_Kinsella.out

280.00	CHNL# 59: [POWR 1422 TO 1499 CKT '20']	-400.0
280.00	CHNL# 55: [POWR 1383 TO 9001 CKT '65']	-400.0
280.00	CHNL# 51: [POWR 1377 TO 1383 CKT '17']	-400.0
280.00	CHNL# 49: [POWR 152 TO 1422 CKT '12']	-400.0



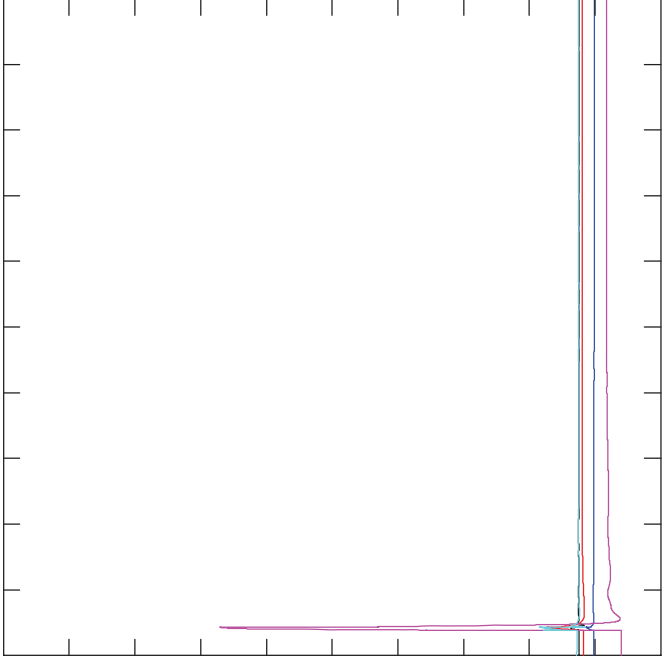
WED, JUN 03 2015 11:25
BRANCH ACTIVE POWER (MW)



FIGURE F-13E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-13_7L115_Kinsella.out

1.4000	CHNL# 33: [VARS 67435 [HALKIRK4 0.6900]G1]	-0.2000
1.4000	CHNL# 32: [VARS 67308 [GRIZZ G 0.6900]1]	-0.2000
1.4000	CHNL# 28: [VARS 4220 [HAYTER 9 25.000]G1]	-0.2000
1.4000	CHNL# 26: [VARS 2621 [GHOSTPL1 0.6900]G1]	-0.2000
1.4000	CHNL# 24: [VARS 1514 [NEXG1 0.6900]1]	-0.2000



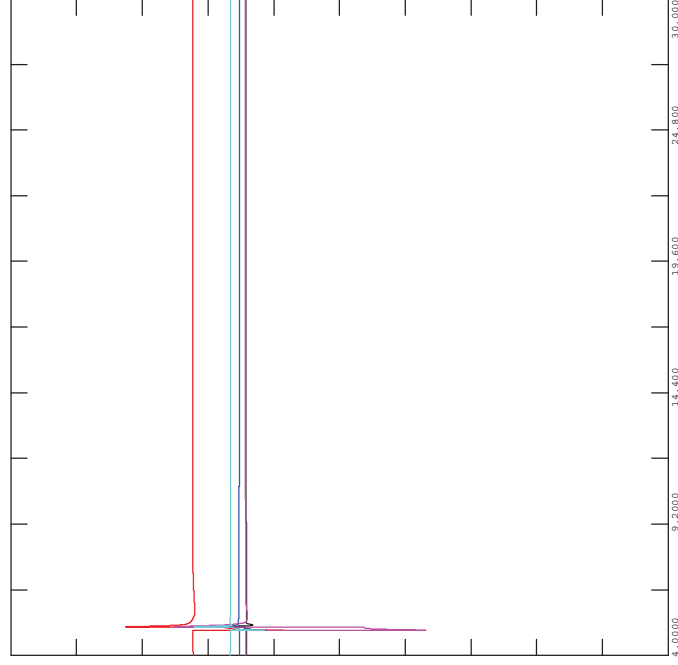
WED, JUN 03 2015 11:25
MACHINE Q WIND (PU)



FIGURE F-13G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES

FILE: F-13_7L115_Kinsella.out

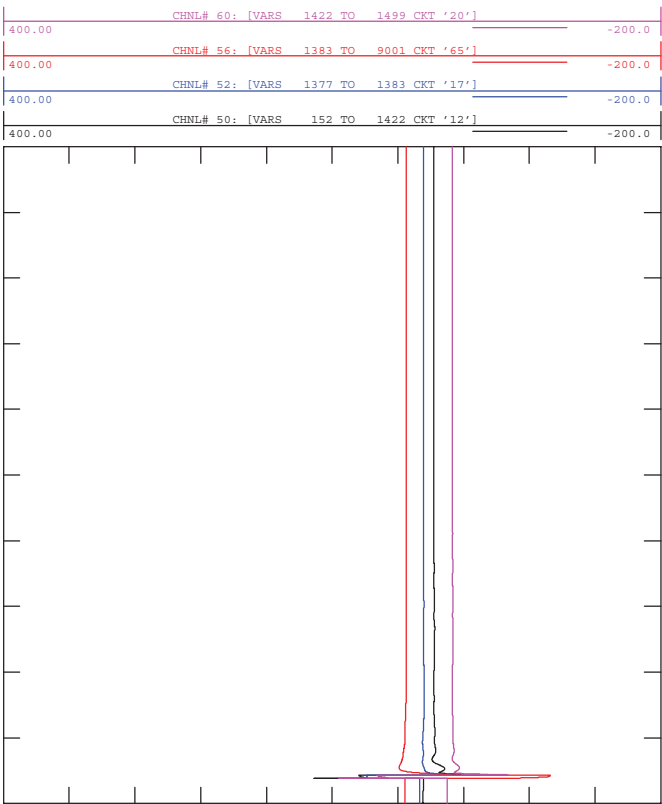
1.6000	CHNL# 47: [VOLT 67435 [HALKIRK4 0.6900]]	0.0
1.6000	CHNL# 46: [VOLT 67308 [GRIZZ G 0.6900]]	0.0
1.6000	CHNL# 42: [VOLT 4220 [HAYTER 9 25.000]]	0.0
1.6000	CHNL# 40: [VOLT 2621 [GHOSTPL1 0.6900]]	0.0
1.6000	CHNL# 38: [VOLT 1514 [NEXG1 0.6900]]	0.0



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MACHINE VOLTAGE WIND (PU)



FIGURE F-13I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L115 AT 926S
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: F-13_7L115_Kinsella.out



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BRANCH REACTIVE PWR (MVR)



FIGURE F-14B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-14 7L117 IrishCreek.out

5.8000	CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]	-0.1000
5.8000	CHNL# 13: [POWR 3301[FCG1 13.800]1]	-0.1000
5.8000	CHNL# 11: [POWR 2248[MAHKE-G2 13.800]2]	-0.1000
5.8000	CHNL# 9: [POWR 1497[BAT #5 21.000]5]	-0.1000
5.8000	CHNL# 8: [POWR 1487[SHEER 29 19.000]2]	-0.1000
5.8000	CHNL# 7: [POWR 403[KEEP#3GN 22.000]3]	-0.1000

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MACHINE P COAL (PU)

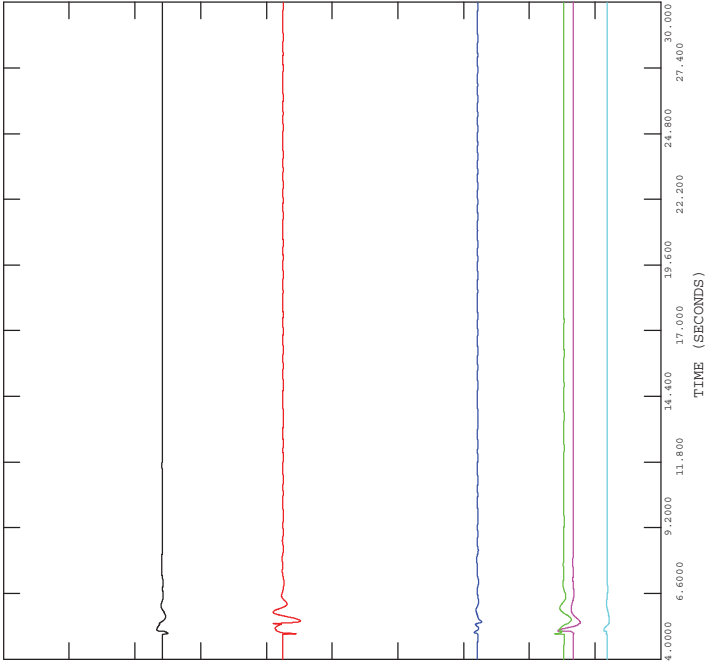


FIGURE F-14D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-14 7L117 IrishCreek.out

3.4000	CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]	-1.6000
3.4000	CHNL# 27: [VARS 3301[FCG1 13.800]1]	-1.6000
3.4000	CHNL# 25: [VARS 2248[MAHKE-G2 13.800]2]	-1.6000
3.4000	CHNL# 23: [VARS 1497[BAT #5 21.000]5]	-1.6000
3.4000	CHNL# 22: [VARS 1487[SHEER 29 19.000]2]	-1.6000
3.4000	CHNL# 21: [VARS 403[KEEP#3GN 22.000]3]	-1.6000

WED, JUN 03 2015 11:25
MACHINE Q COAL (PU)

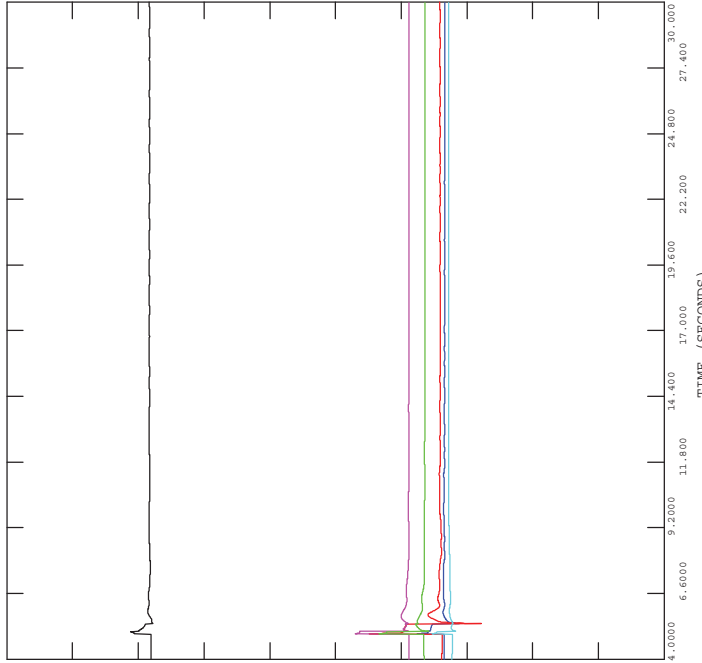


FIGURE F-14A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-14 7L117 IrishCreek.out

60.000	CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]	-60.000
60.000	CHNL# 5: [ANGL 3301[FCG1 13.800]1]	-60.000
60.000	CHNL# 4: [ANGL 2248[MAHKE-G2 13.800]2]	-60.000
60.000	CHNL# 3: [ANGL 1497[BAT #5 21.000]5]	-60.000
60.000	CHNL# 2: [ANGL 1487[SHEER 29 19.000]2]	-60.000
60.000	CHNL# 1: [ANGL 403[KEEP#3GN 22.000]3]	-60.000

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MACHINE ANGLE (DEGREES)

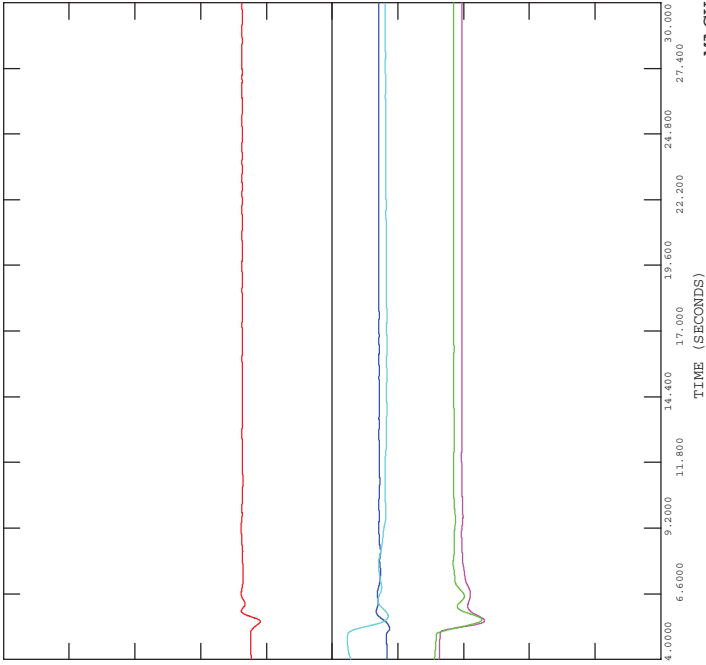


FIGURE F-14C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-14 7L117 IrishCreek.out

2.0000	CHNL# 20: [POWR 69016[TRWAG1 0.6900]G1]	-0.1000
2.0000	CHNL# 19: [POWR 67435[HALKIRK4 0.6900]G1]	-0.1000
2.0000	CHNL# 18: [POWR 67308[GRIZZ G 0.6900]1]	-0.1000
2.0000	CHNL# 14: [POWR 4220[HAYTER 9 25.000]G1]	-0.1000
2.0000	CHNL# 12: [POWR 2621[GHOSTPL1 0.6900]G1]	-0.1000
2.0000	CHNL# 10: [POWR 1514[NEXG1 0.6900]1]	-0.1000

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MACHINE P WIND (PU)

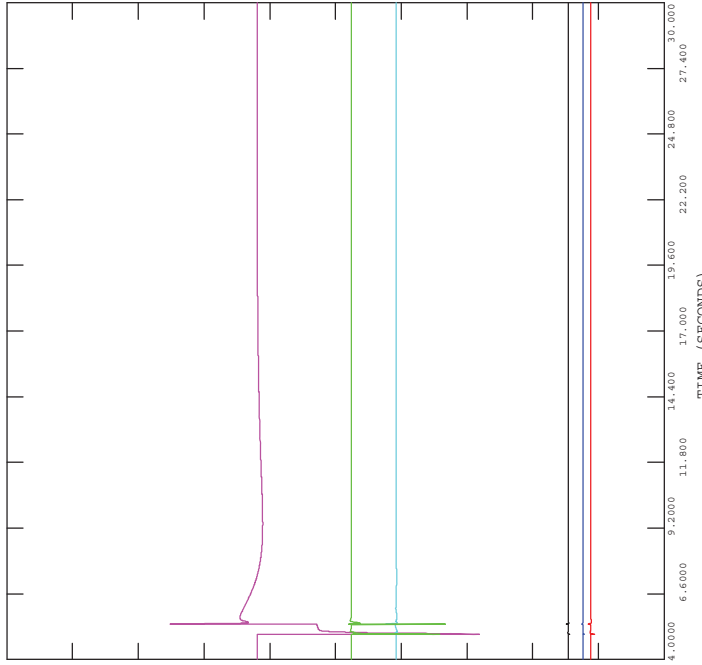
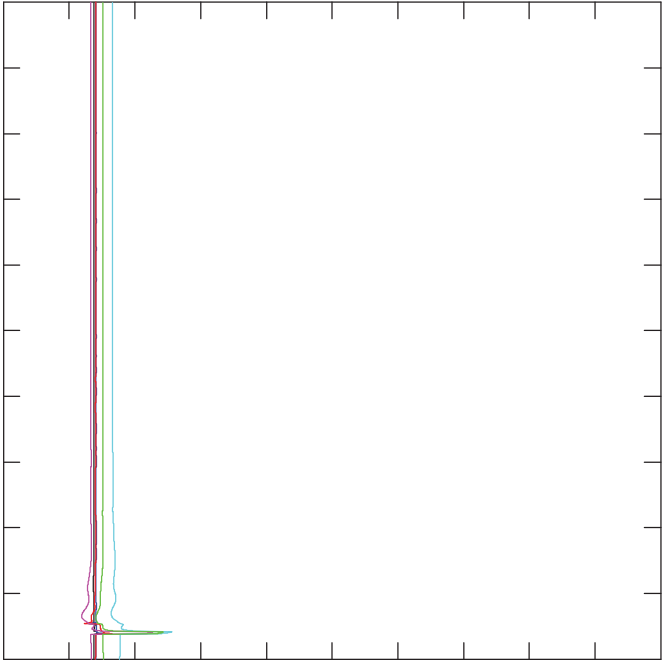




FIGURE F-14F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-14_7L117_IrishCreek.out

1.2000	CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]	0.0
1.2000	CHNL# 41: [VOLT 3301 [PCG1 13.800]]	0.0
1.2000	CHNL# 39: [VOLT 2248 [MAHKE-G2 13.800]]	0.0
1.2000	CHNL# 37: [VOLT 1497 [BAT #5 21.000]]	0.0
1.2000	CHNL# 36: [VOLT 1487 [SHEER 29 19.000]]	0.0
1.2000	CHNL# 35: [VOLT 403 [KEEP#3GN 22.000]]	0.0



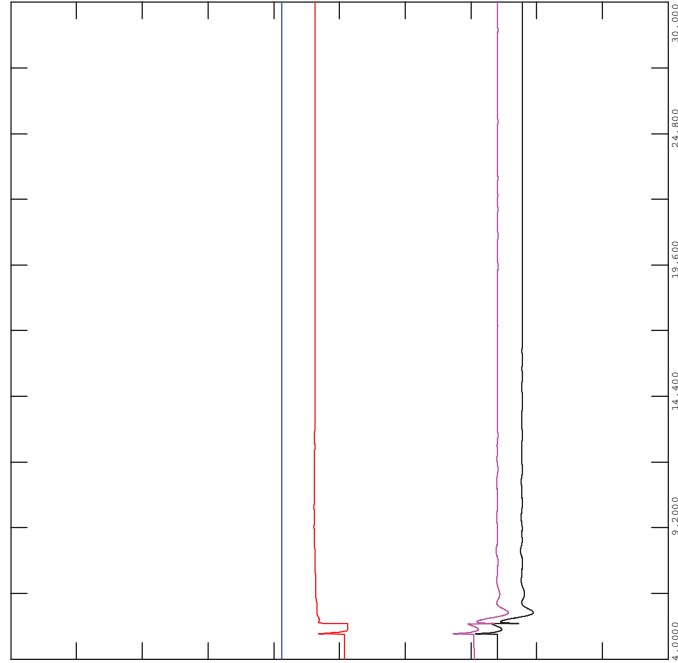
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MACHINE VOLTAGE COAL (PU)



FIGURE F-14H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-14_7L117_IrishCreek.out

280.00	CHNL# 59: [POWR 1422 TO 1499 CKT '20']	-400.0
280.00	CHNL# 55: [POWR 1383 TO 9001 CKT '65']	-400.0
280.00	CHNL# 51: [POWR 1377 TO 1383 CKT '17']	-400.0
280.00	CHNL# 49: [POWR 152 TO 1422 CKT '12']	-400.0



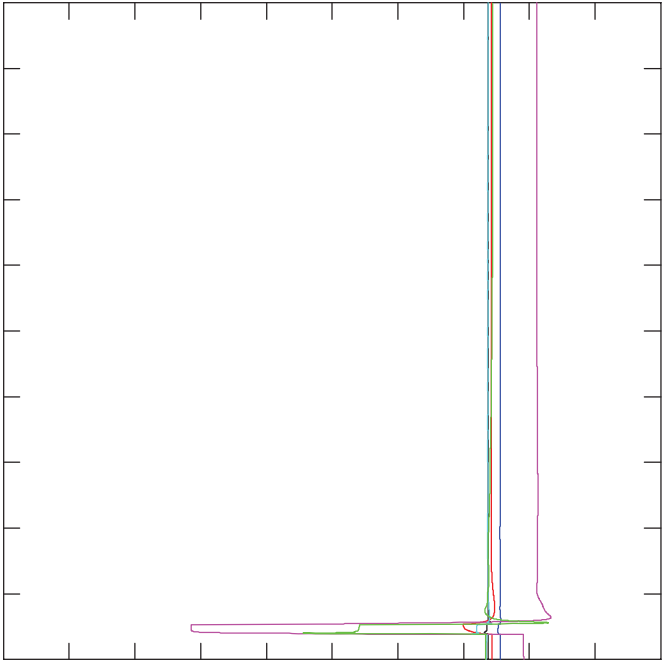
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BRANCH ACTIVE POWER (MW)



FIGURE F-14B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-14_7L117_IrishCreek.out

1.4000	CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G]	-0.5000
1.4000	CHNL# 33: [VARS 67435 [HALKIRK4 0.6900]G]	-0.5000
1.4000	CHNL# 32: [VARS 67308 [GRIZZ G 0.6900]I]	-0.5000
1.4000	CHNL# 28: [VARS 4220 [HAYTER 9 25.000]G]	-0.5000
1.4000	CHNL# 26: [VARS 2621 [GHOSTPL1 0.6900]G]	-0.5000
1.4000	CHNL# 24: [VARS 1514 [NEXG1 0.6900]I]	-0.5000



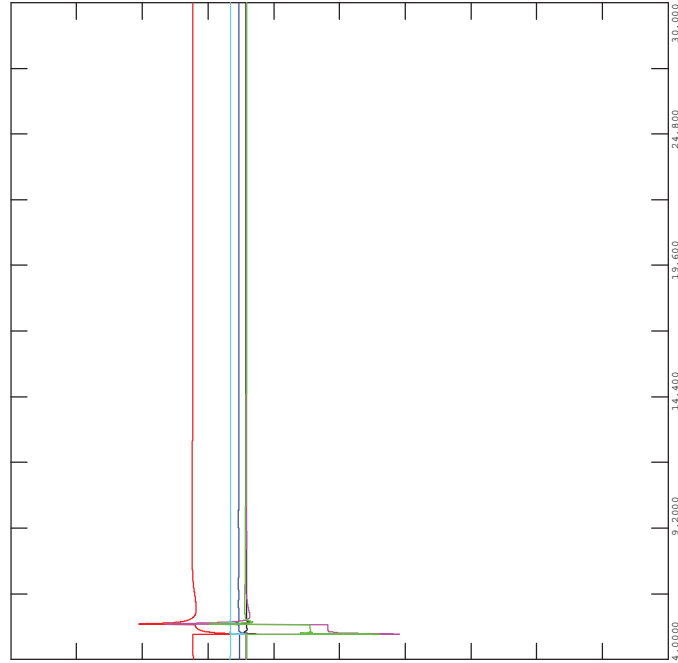
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MACHINE Q WIND (PU)



FIGURE F-14G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-14_7L117_IrishCreek.out

1.6000	CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]	0.0
1.6000	CHNL# 47: [VOLT 67435 [HALKIRK4 0.6900]]	0.0
1.6000	CHNL# 46: [VOLT 67308 [GRIZZ G 0.6900]]	0.0
1.6000	CHNL# 42: [VOLT 4220 [HAYTER 9 25.000]]	0.0
1.6000	CHNL# 40: [VOLT 2621 [GHOSTPL1 0.6900]]	0.0
1.6000	CHNL# 38: [VOLT 1514 [NEXG1 0.6900]]	0.0



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FIGURE F-14I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 706S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-14_7L117_IrishCreek.out

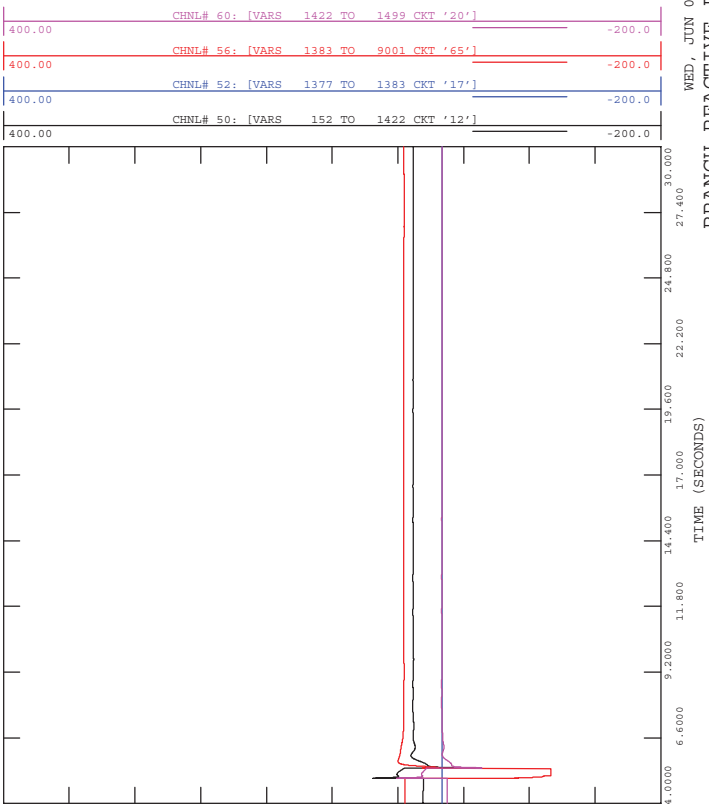




FIGURE F-15B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15 7L117 Vermillion.out

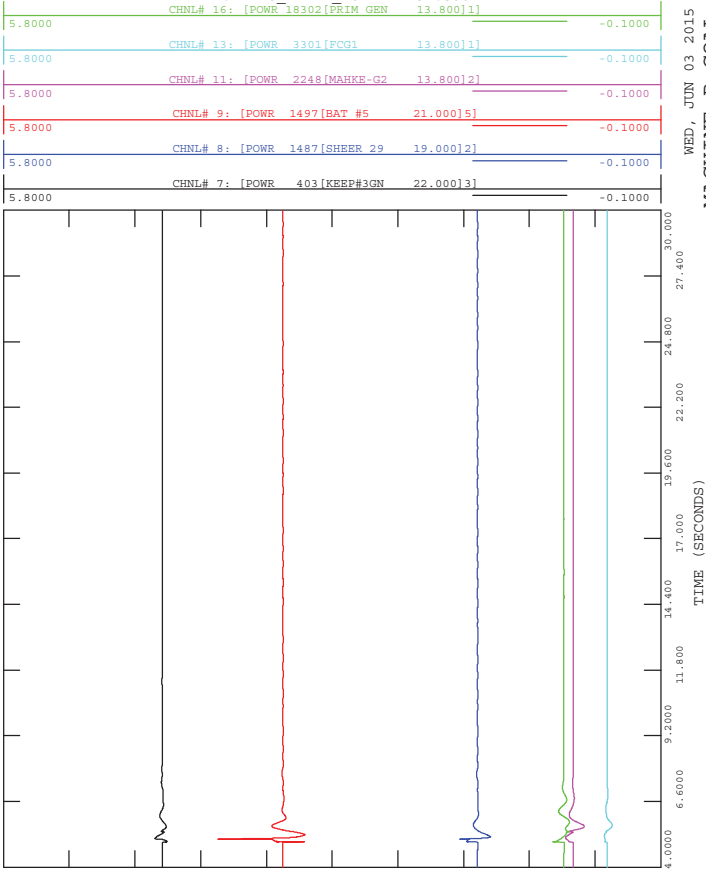


FIGURE F-15D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15 7L117 Vermillion.out

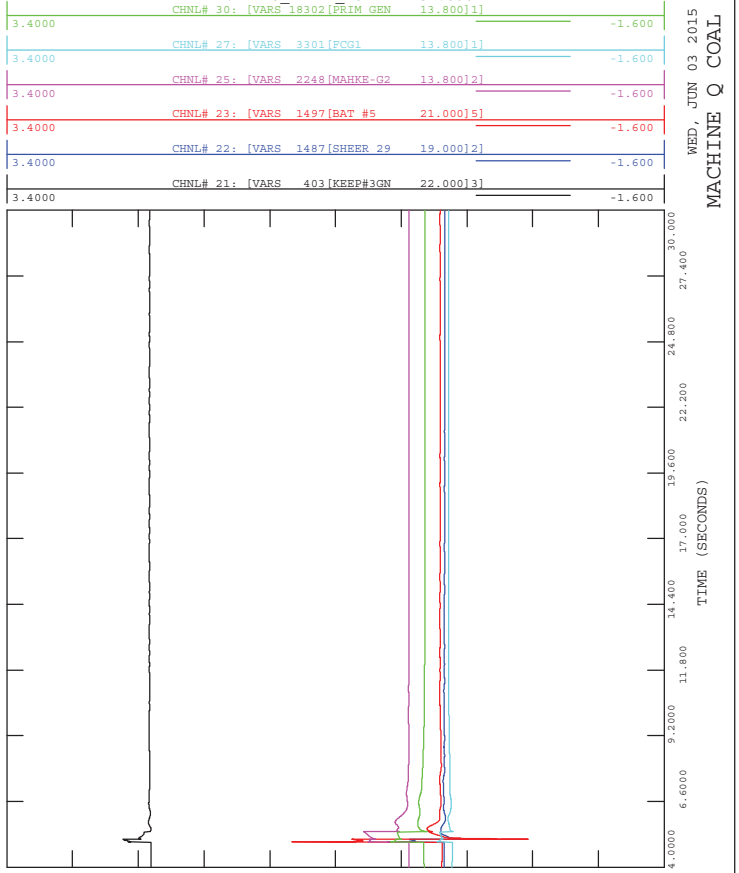


FIGURE F-15A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15 7L117 Vermillion.out

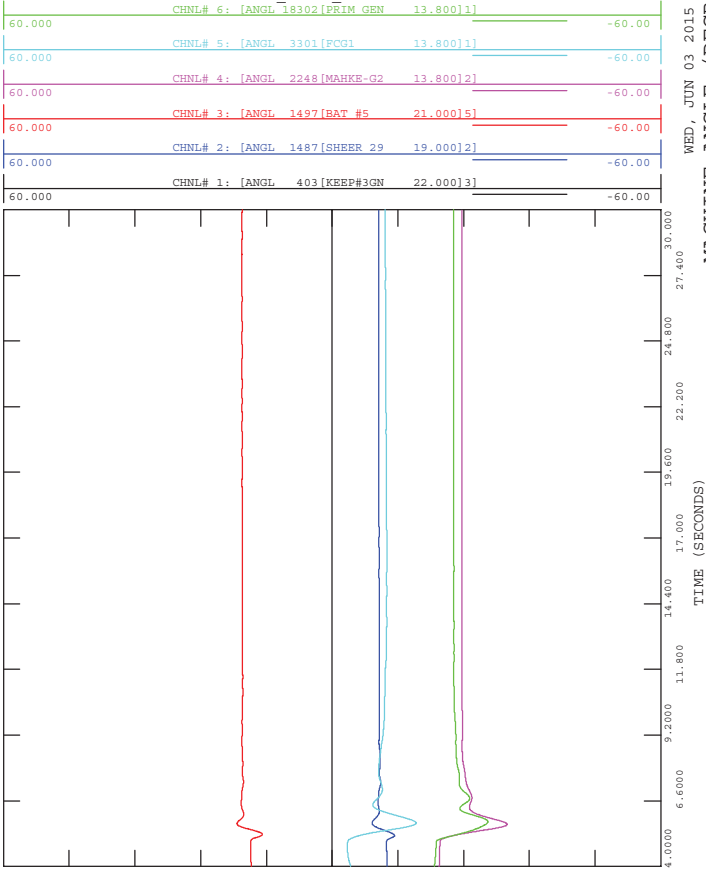


FIGURE F-15C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15 7L117 Vermillion.out

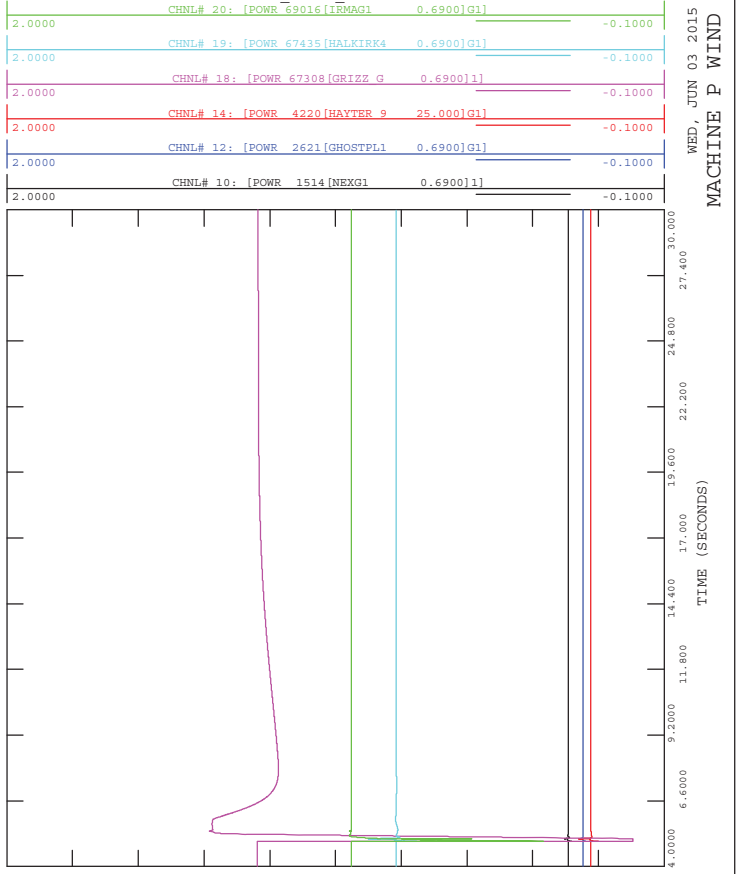
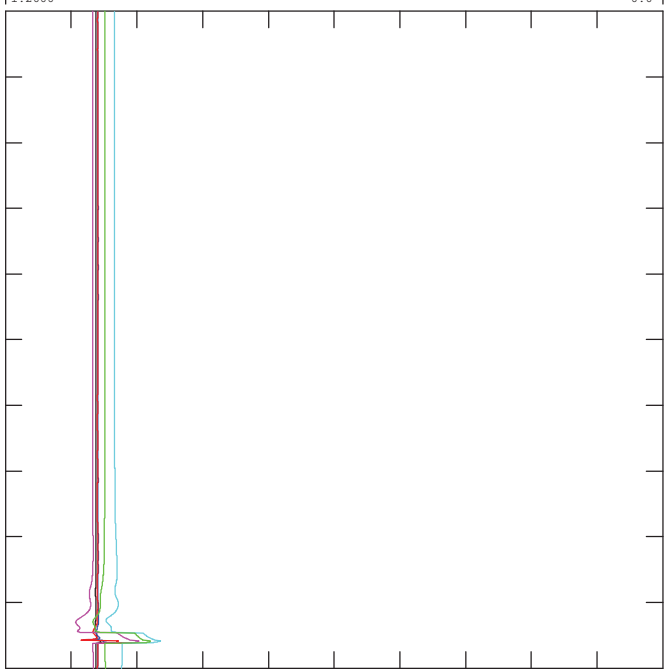




FIGURE F-15F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-15_7L117_Vermillion.out

1.2000	CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]	0.0
1.2000	CHNL# 41: [VOLT 3301 [PCG1 13.800]]	0.0
1.2000	CHNL# 39: [VOLT 2248 [MAHKE-G2 13.800]]	0.0
1.2000	CHNL# 37: [VOLT 1497 [BAT #5 21.000]]	0.0
1.2000	CHNL# 36: [VOLT 1487 [SHEER 29 19.000]]	0.0
1.2000	CHNL# 35: [VOLT 403 [KEEP#3GN 22.000]]	0.0



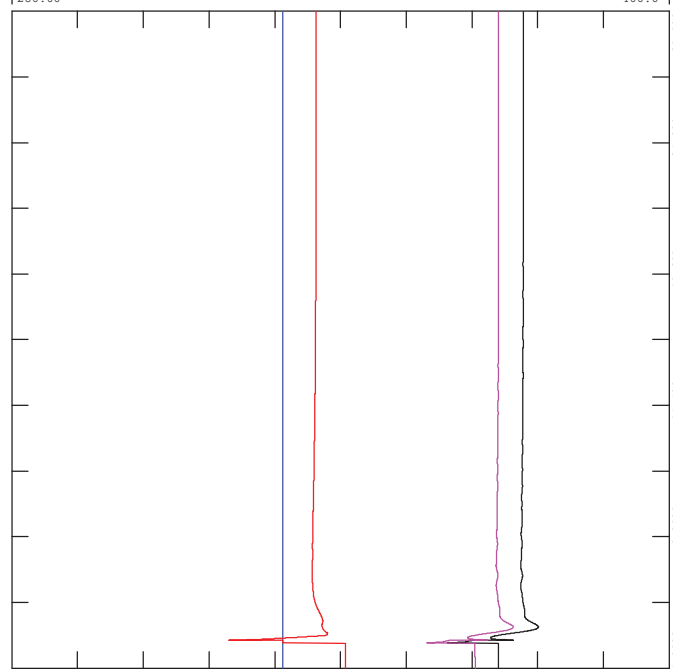
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MACHINE VOLTAGE COAL (PU)



FIGURE F-15H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-15_7L117_Vermillion.out

280.00	CHNL# 59: [POWR 1422 TO 1499 CKT '20']	-400.0
280.00	CHNL# 55: [POWR 1383 TO 9001 CKT '65']	-400.0
280.00	CHNL# 51: [POWR 1377 TO 1383 CKT '17']	-400.0
280.00	CHNL# 49: [POWR 152 TO 1422 CKT '12']	-400.0



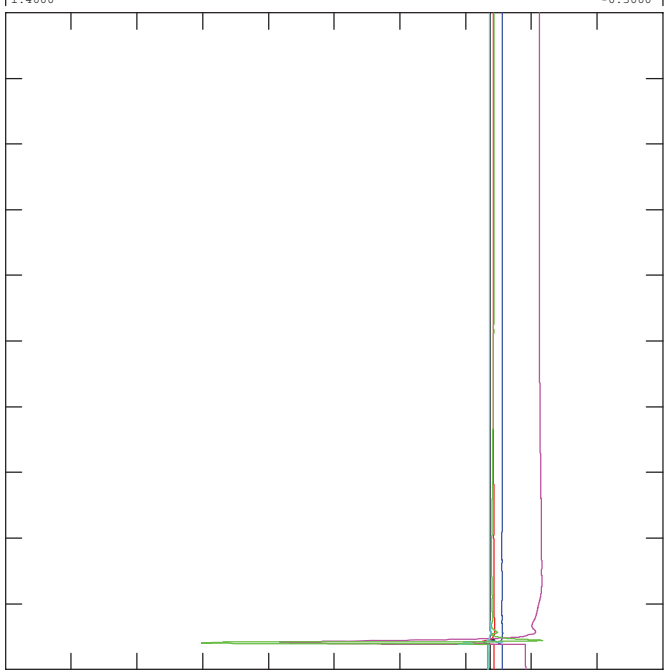
WED, JUN 03 2015 11:25
BRANCH ACTIVE POWER (MW)



FIGURE F-15E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-15_7L117_Vermillion.out

1.4000	CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]	-0.5000
1.4000	CHNL# 33: [VARS 67435 [HALKIRK4 0.6900]G1]	-0.5000
1.4000	CHNL# 32: [VARS 67308 [GRIZZ G 0.6900]1]	-0.5000
1.4000	CHNL# 28: [VARS 4220 [HAYTER 9 25.000]G1]	-0.5000
1.4000	CHNL# 26: [VARS 2621 [GHOSTPL1 0.6900]G1]	-0.5000
1.4000	CHNL# 24: [VARS 1514 [NEXG1 0.6900]1]	-0.5000



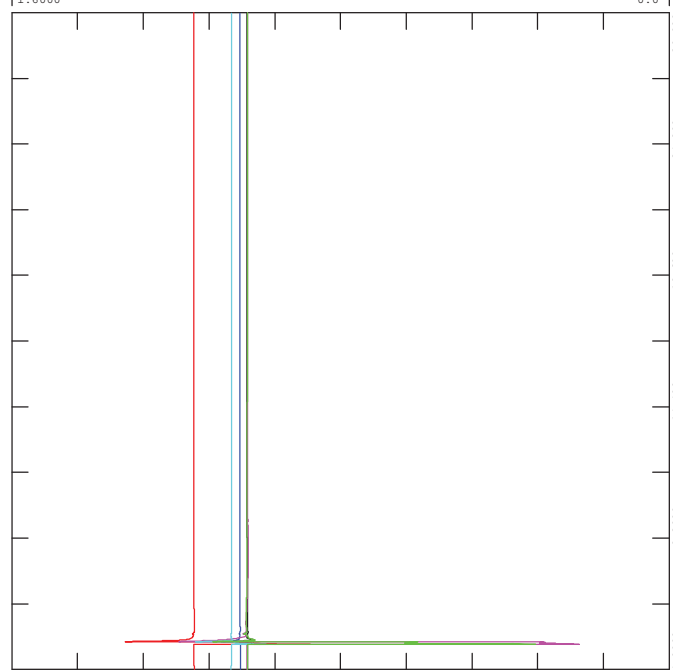
WED, JUN 03 2015 11:25
MACHINE Q WIND (PU)



FIGURE F-15G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-15_7L117_Vermillion.out

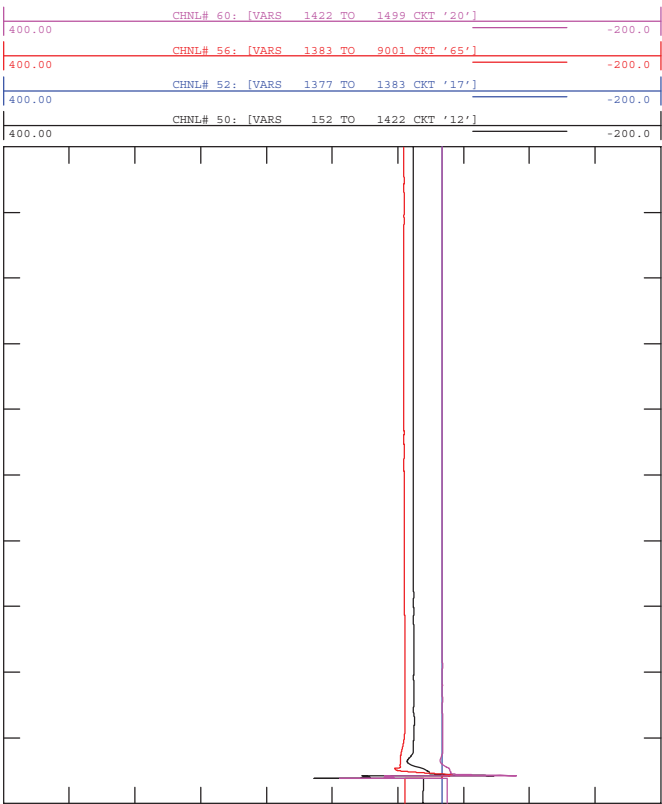
1.6000	CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]	0.0
1.6000	CHNL# 47: [VOLT 67435 [HALKIRK4 0.6900]]	0.0
1.6000	CHNL# 46: [VOLT 67308 [GRIZZ G 0.6900]]	0.0
1.6000	CHNL# 42: [VOLT 4220 [HAYTER 9 25.000]]	0.0
1.6000	CHNL# 40: [VOLT 2621 [GHOSTPL1 0.6900]]	0.0
1.6000	CHNL# 38: [VOLT 1514 [NEXG1 0.6900]]	0.0



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MACHINE VOLTAGE WIND (PU)



FIGURE F-151
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L117 AT 701S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-15_7L117_Vermillion.out



WED, JUN 03 2015 11:25
BRANCH REACTIVE PWR (MVR)



FIGURE F-16B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-16 7L129_Buffalo.out

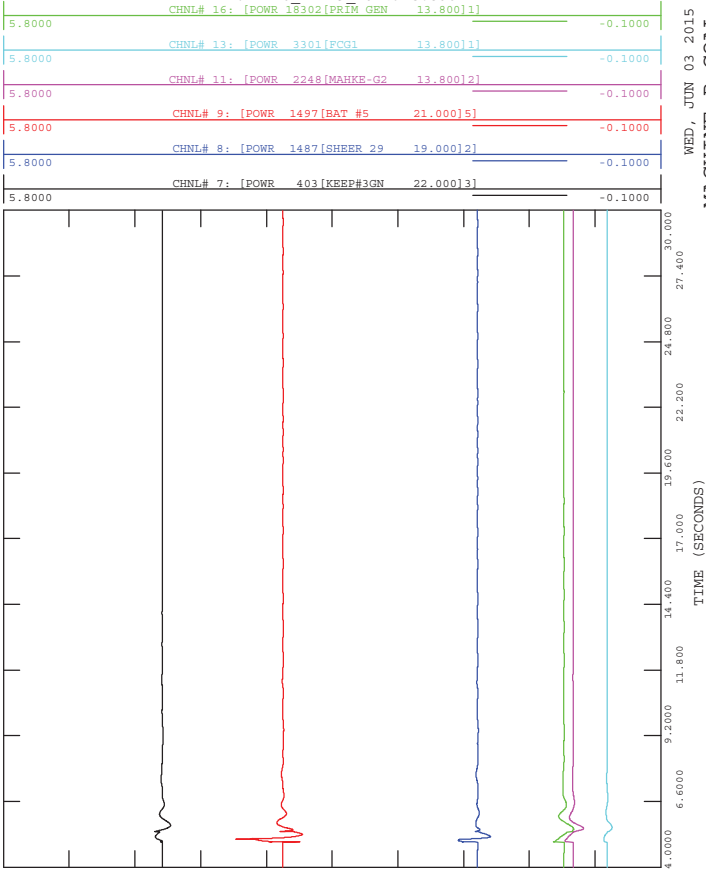


FIGURE F-16D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-16 7L129_Buffalo.out

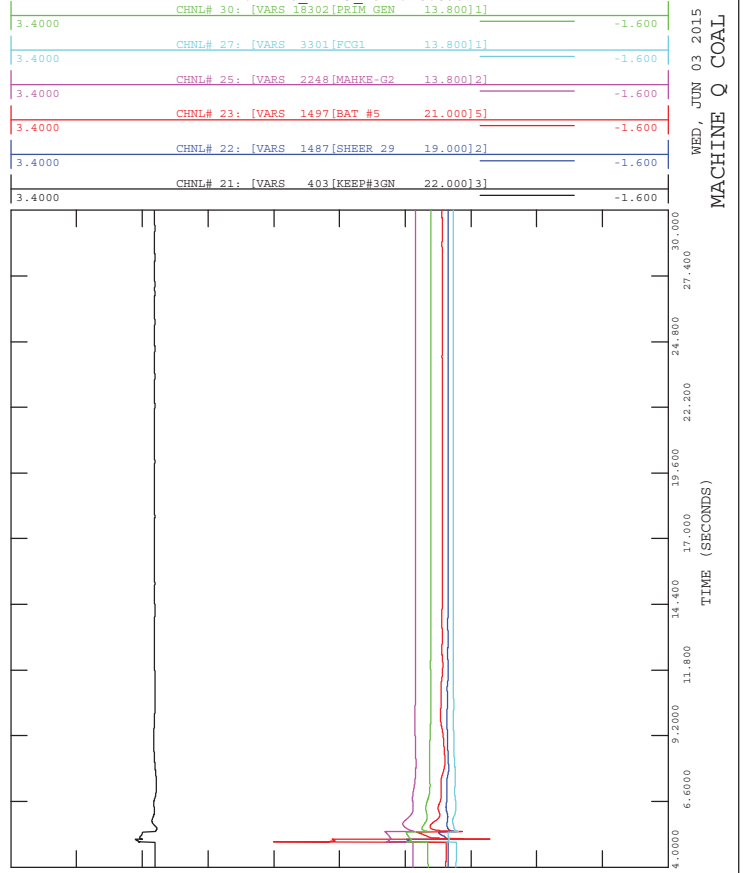


FIGURE F-16A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-16 7L129_Buffalo.out

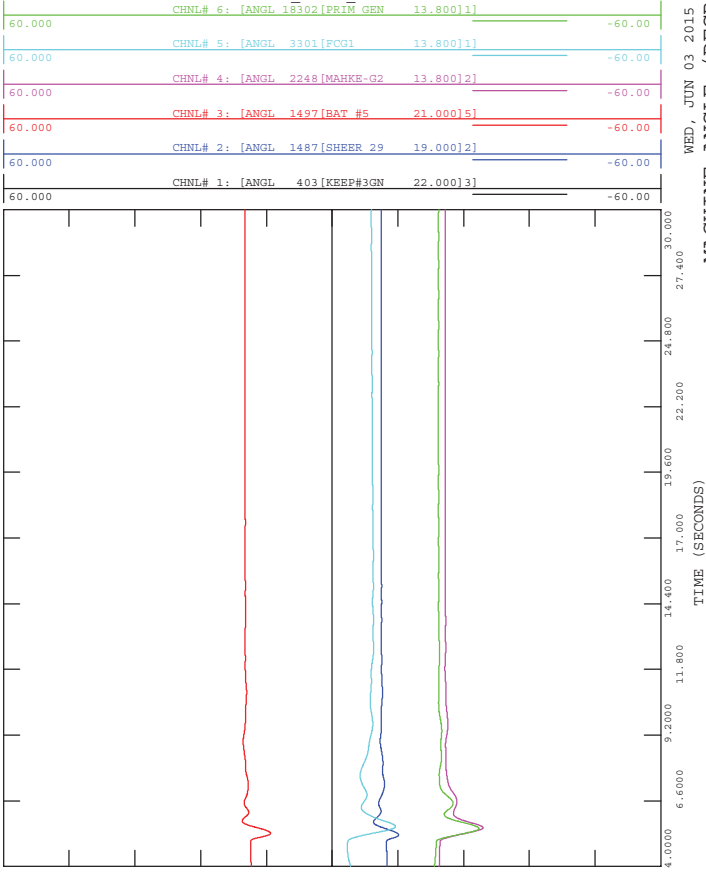


FIGURE F-16C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-16 7L129_Buffalo.out

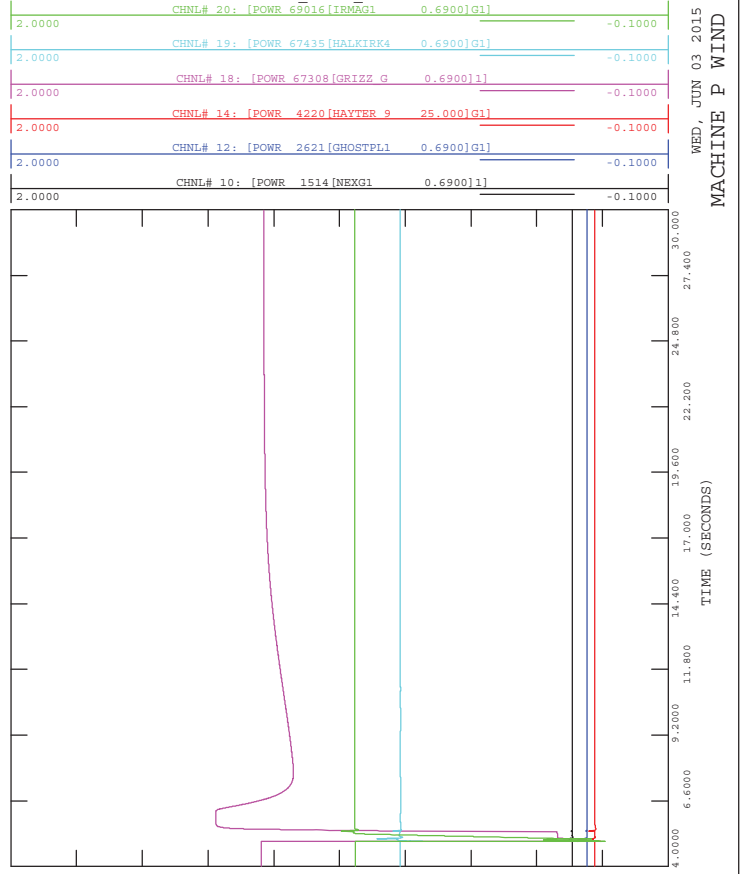
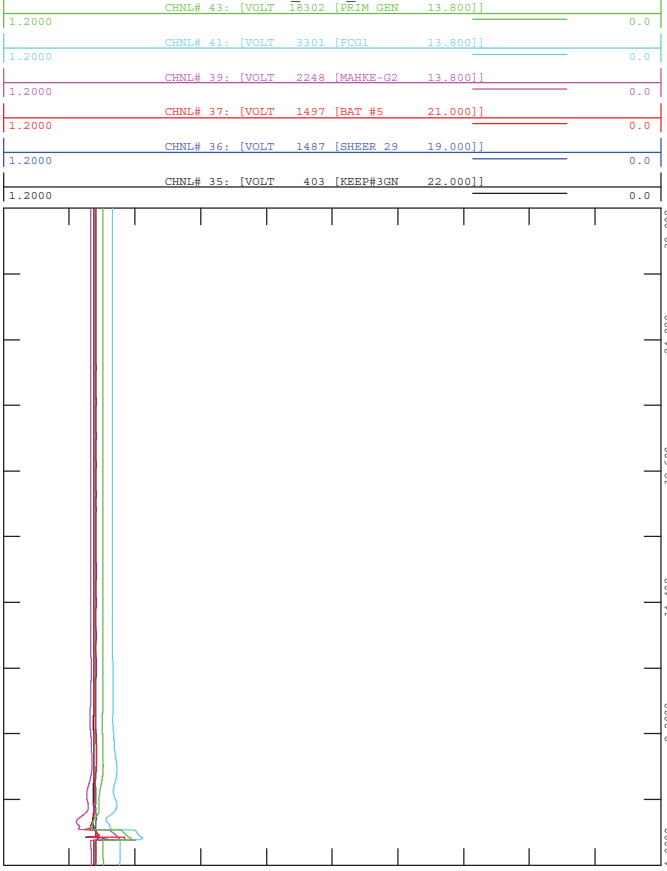




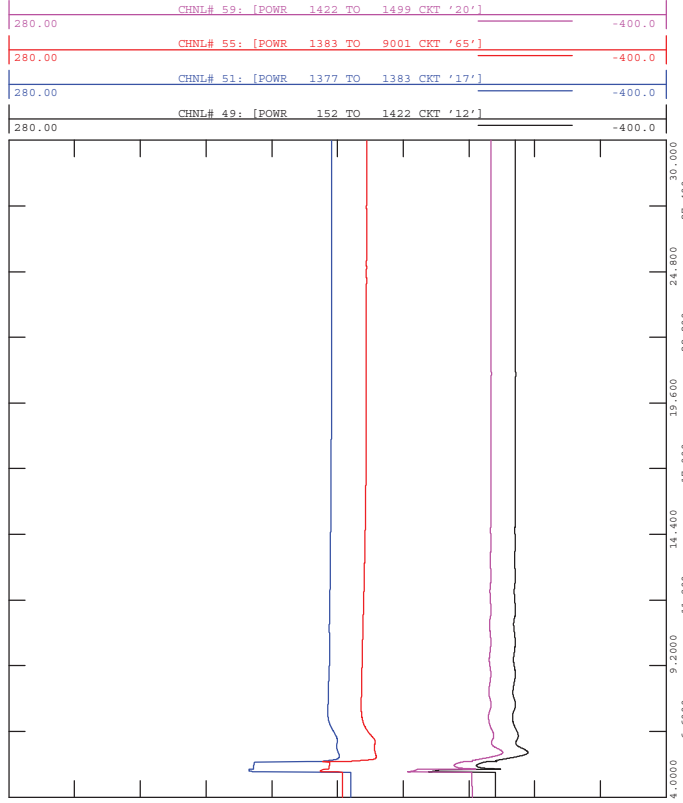
FIGURE F-16F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-16_7L129_Buffalo.out



WED, JUN 03 2015 11:25
MACHINE VOLTAGE COAL (PU)



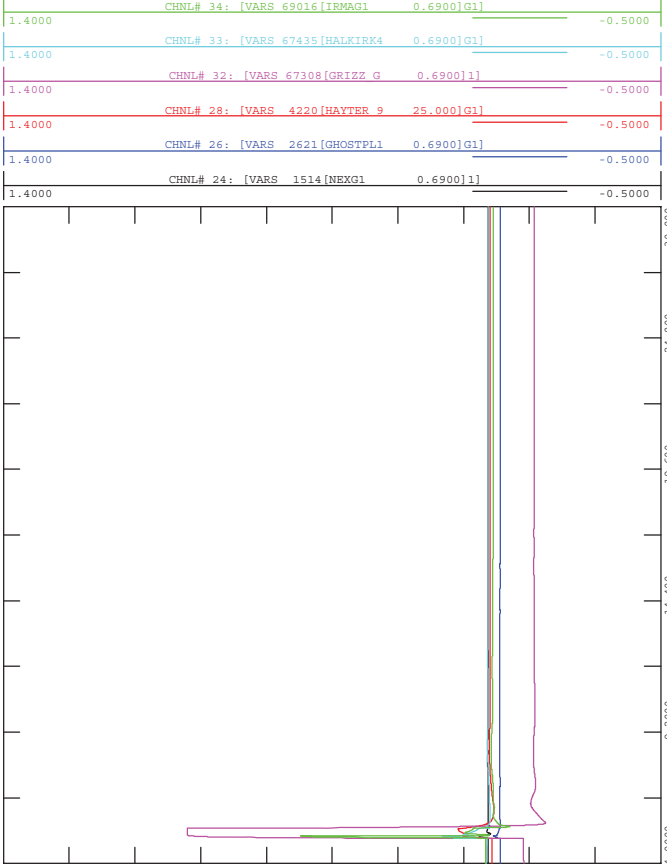
FIGURE F-16H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-16_7L129_Buffalo.out



WED, JUN 03 2015 11:25
BRANCH ACTIVE POWER (MW)



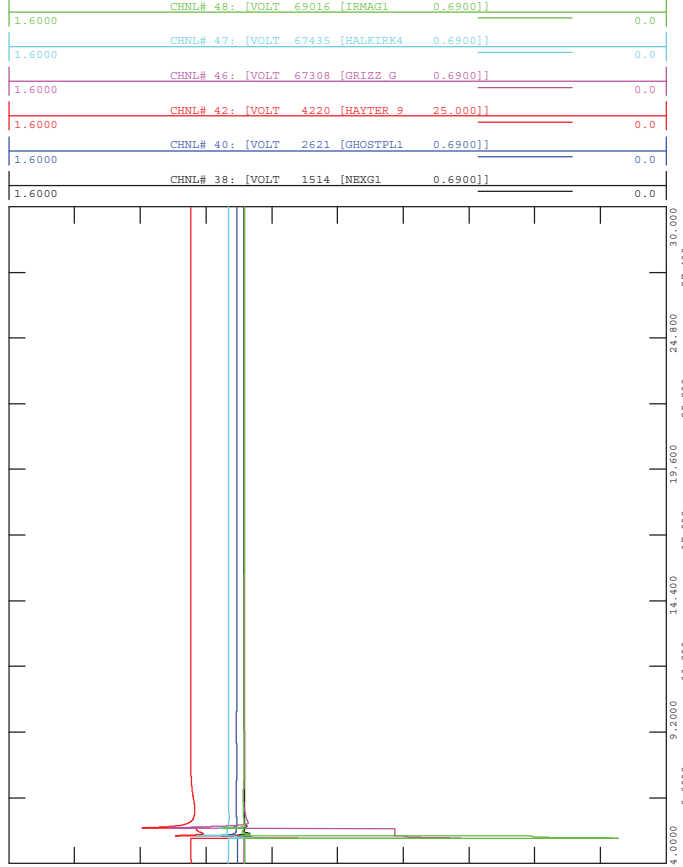
FIGURE F-16E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-16_7L129_Buffalo.out



WED, JUN 03 2015 11:25
MACHINE Q WIND (PU)



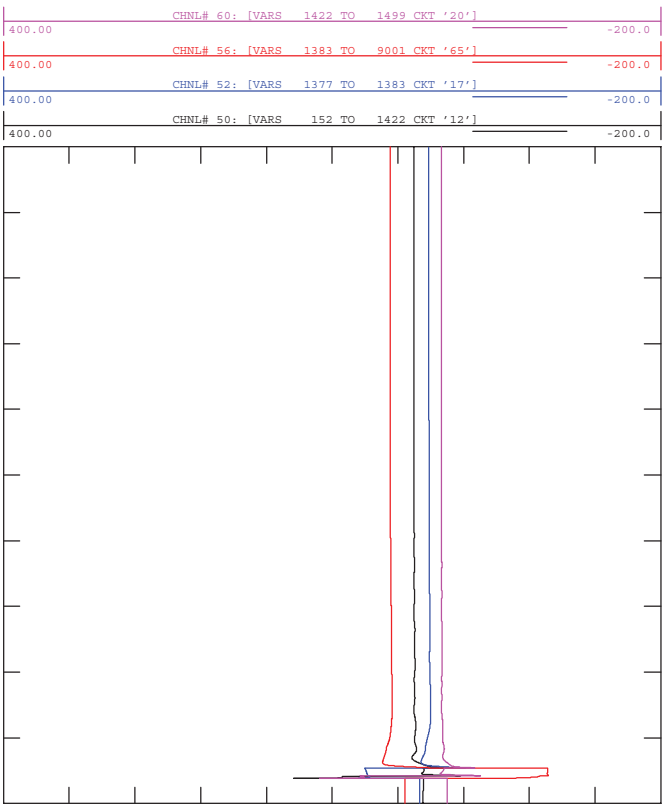
FIGURE F-16G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-16_7L129_Buffalo.out



WED, JUN 03 2015 11:25
MACHINE VOLTAGE WIND (PU)



FIGURE F-16I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 526S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-16_7L129_Buffalo.out



WED, JUN 03 2015 11:25
BRANCH REACTIVE PWR (MVR)



FIGURE F-17B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-17_7L129_Vermilion.out

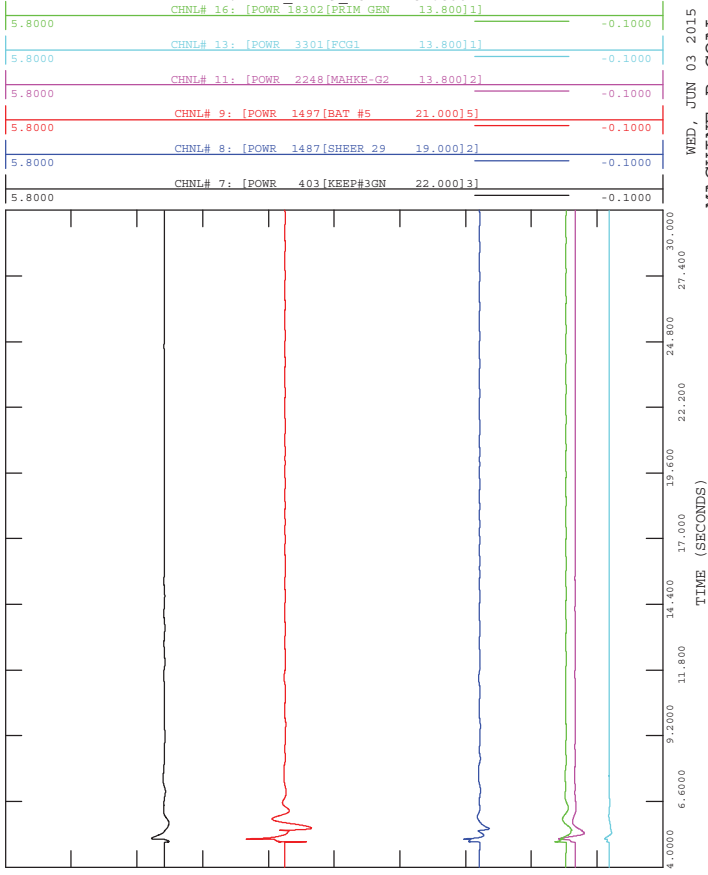


FIGURE F-17D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-17_7L129_Vermilion.out

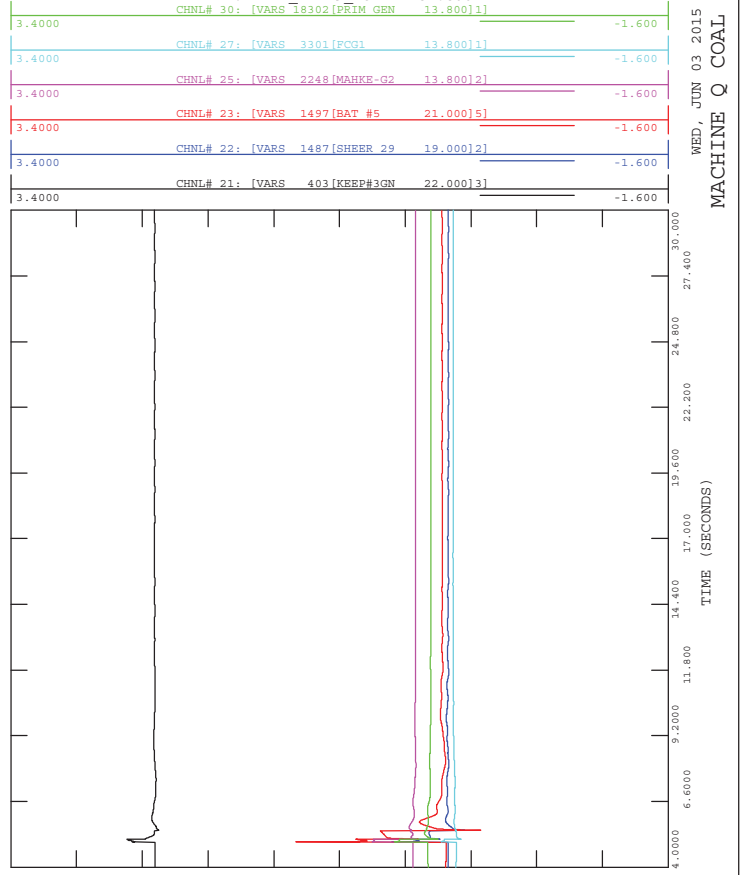


FIGURE F-17A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-17_7L129_Vermilion.out

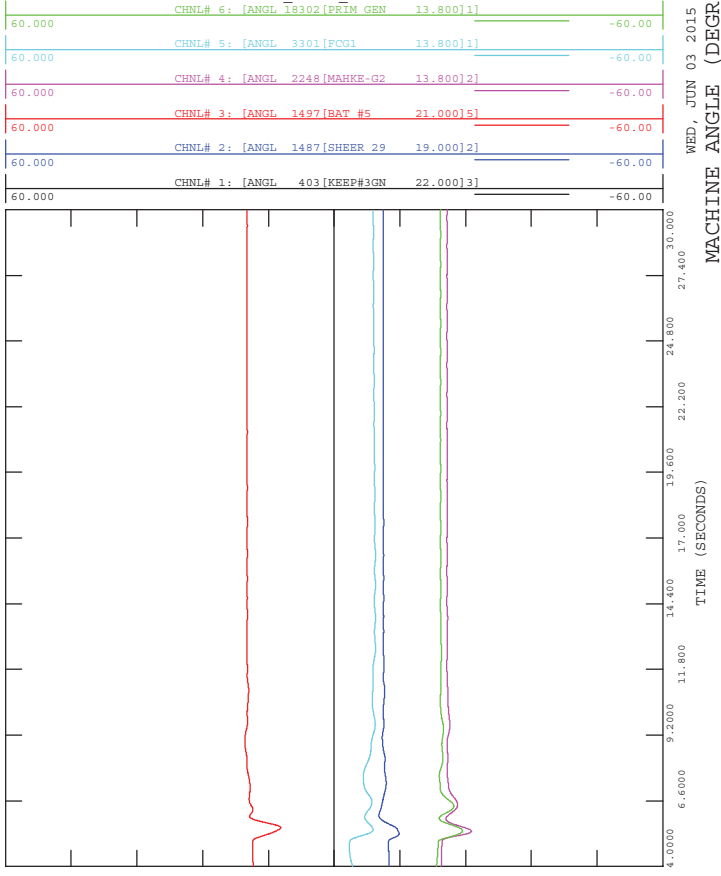


FIGURE F-17C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-17_7L129_Vermilion.out

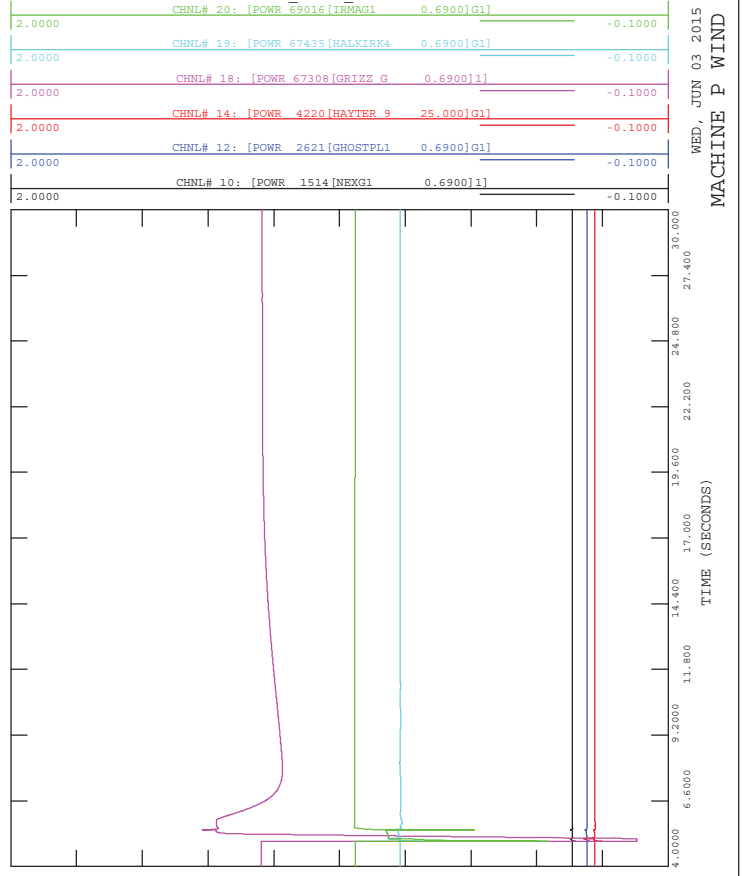
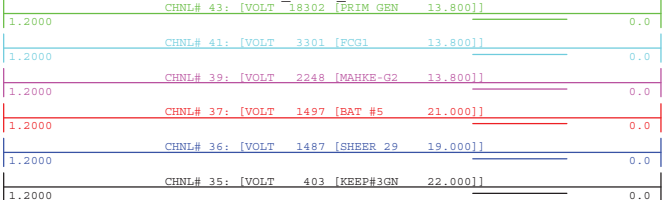




FIGURE F-17F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES

FILE: F-17_7L129_Vermilion.out



WED, JUN 03 2015 11:25
MACHINE VOLTAGE COAL (PU)

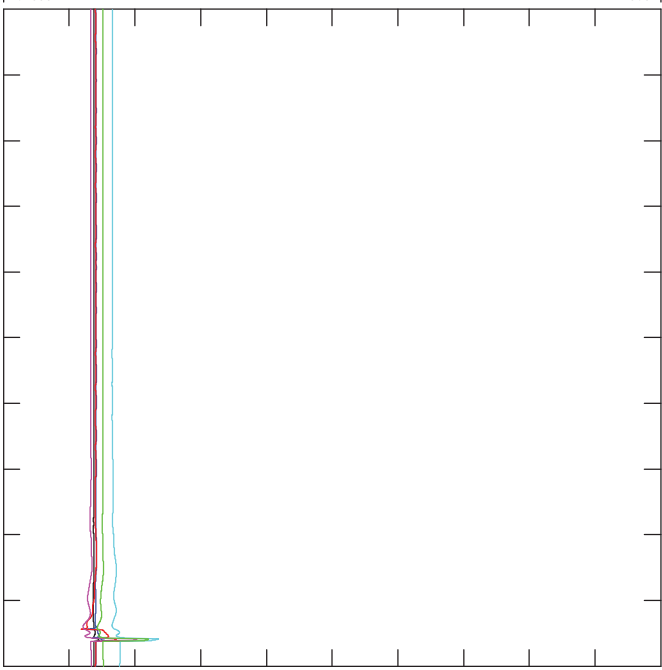
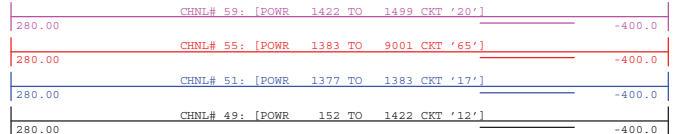


FIGURE F-17H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES

FILE: F-17_7L129_Vermilion.out



WED, JUN 03 2015 11:25
BRANCH ACTIVE POWER (MW)

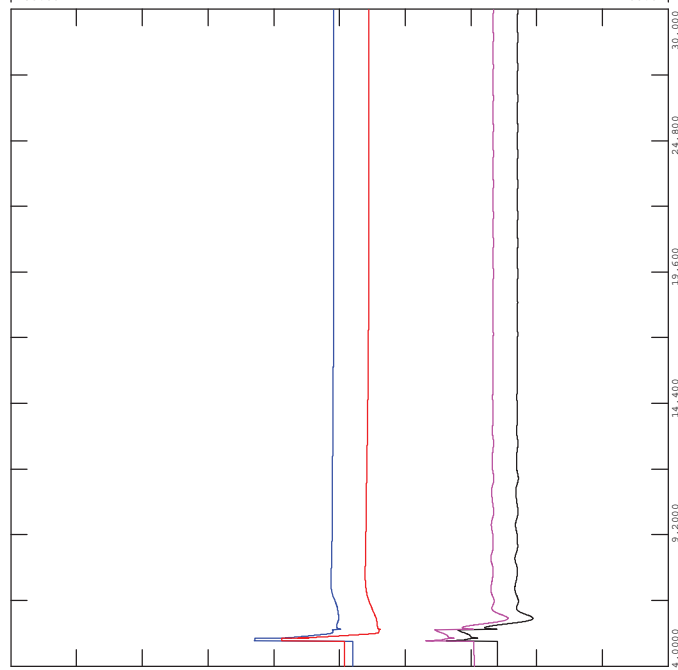
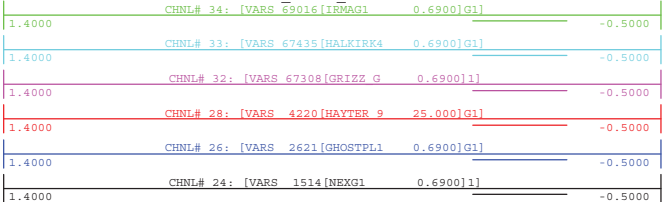


FIGURE F-17E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES

FILE: F-17_7L129_Vermilion.out



WED, JUN 03 2015 11:25
MACHINE Q WIND (PU)

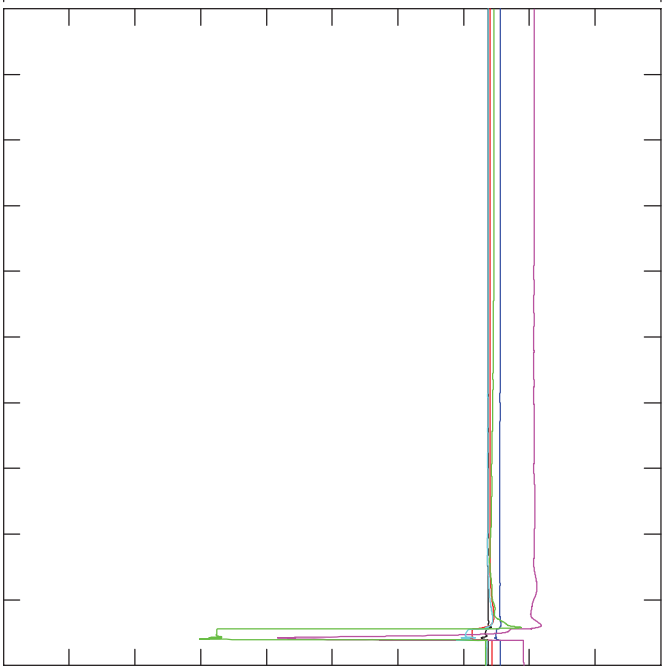
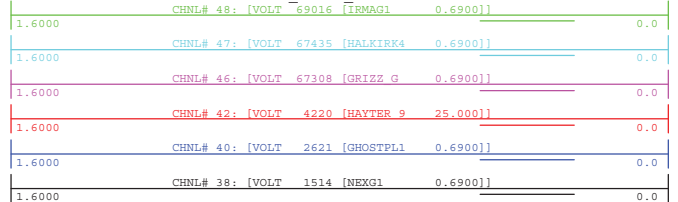


FIGURE F-17G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES

FILE: F-17_7L129_Vermilion.out



WED, JUN 03 2015 11:25
MACHINE VOLTAGE WIND (PU)

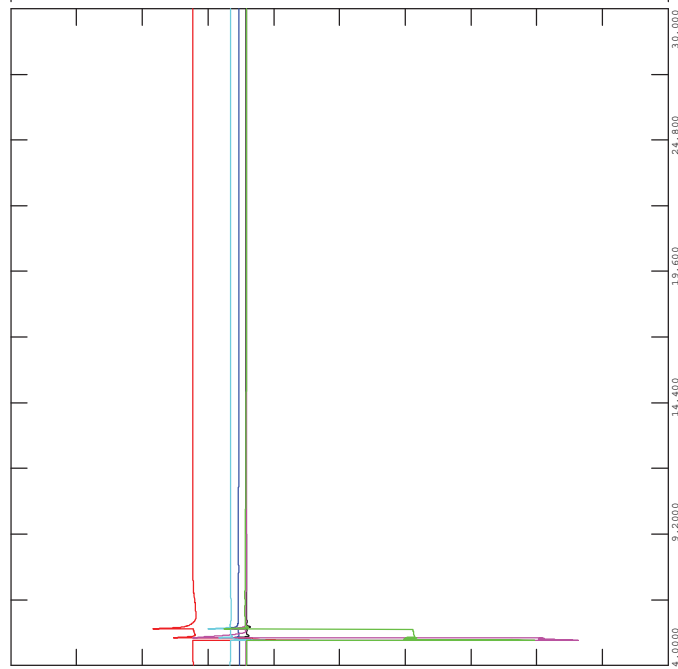




FIGURE F-171
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L129 AT 710S
CLEARED IN 6 CYCLES, FAR END IN 27 CYCLES
FILE: F-17_7L129_Vermilion.out

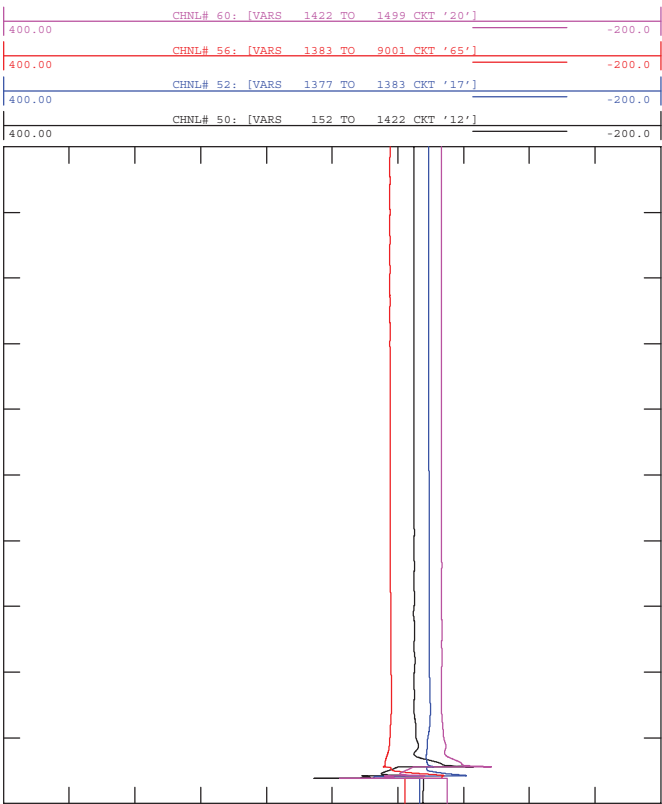


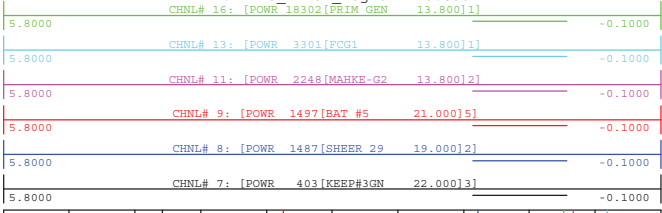


FIGURE F-18B

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-18 7L134 Vegreville.out

CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



WED, JUN 03 2015 11:25
MACHINE P COAL (PU)

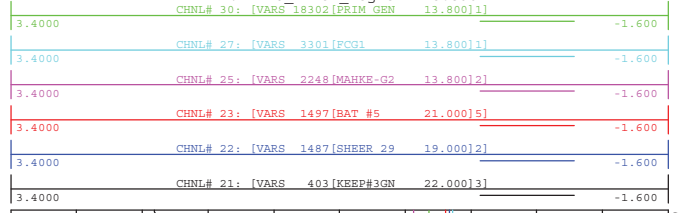


FIGURE F-18D

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-18 7L134 Vegreville.out

CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



WED, JUN 03 2015 11:25
MACHINE Q COAL (PU)

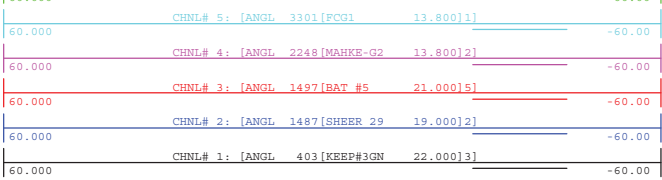


FIGURE F-18A

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-18 7L134 Vegreville.out

CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



WED, JUN 03 2015 11:25
MACHINE P WIND (DEGREES)

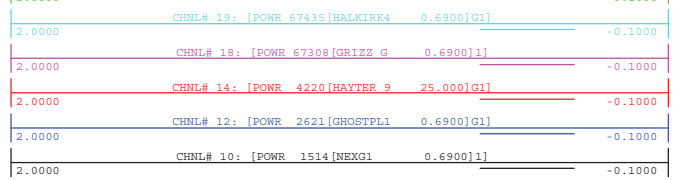


FIGURE F-18C

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-18 7L134 Vegreville.out

CHNL# 20: [POWR 69016[IRWAG] 0.6900]G1]



WED, JUN 03 2015 11:25
MACHINE P WIND (PU)



FIGURE F-18F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-18_7L134_Vegreville.out

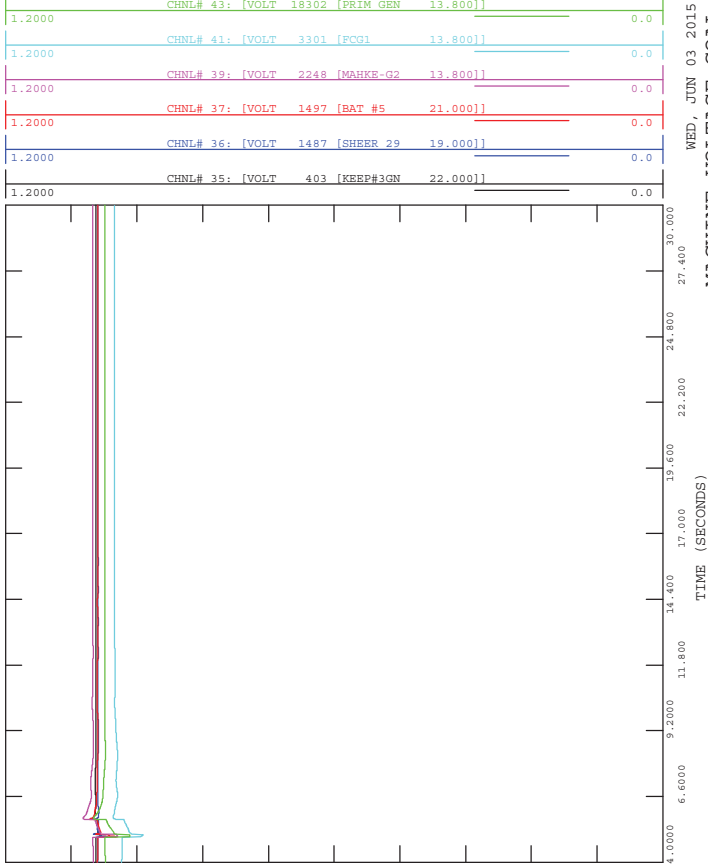


FIGURE F-18H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-18_7L134_Vegreville.out

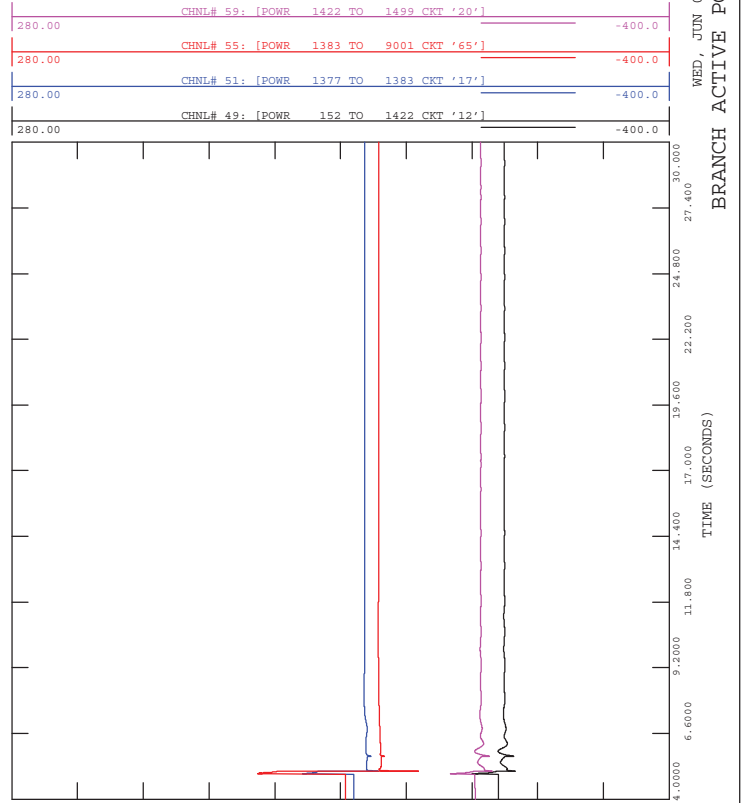


FIGURE F-18E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-18_7L134_Vegreville.out

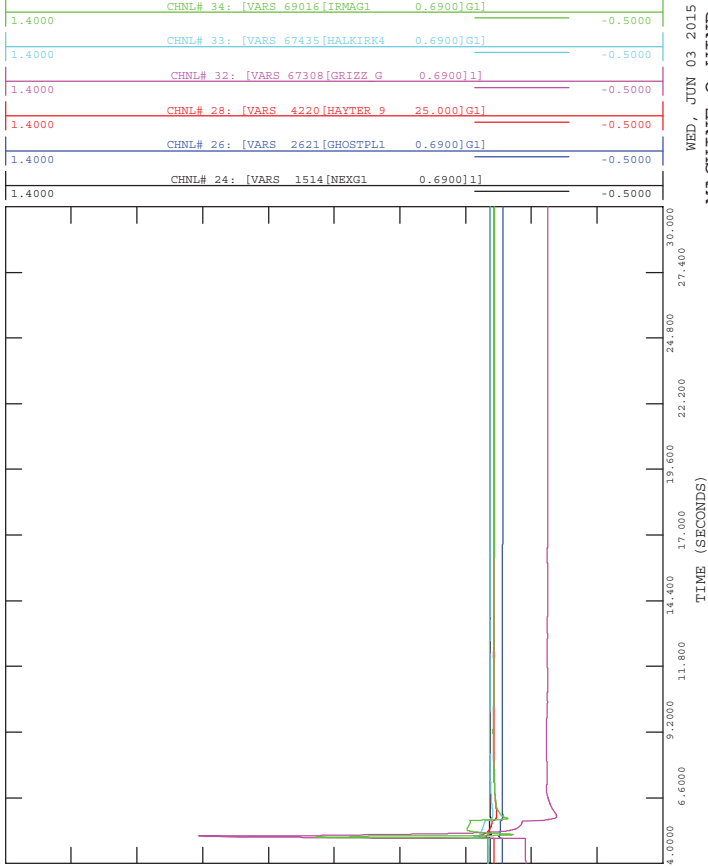


FIGURE F-18G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES

FILE: F-18_7L134_Vegreville.out

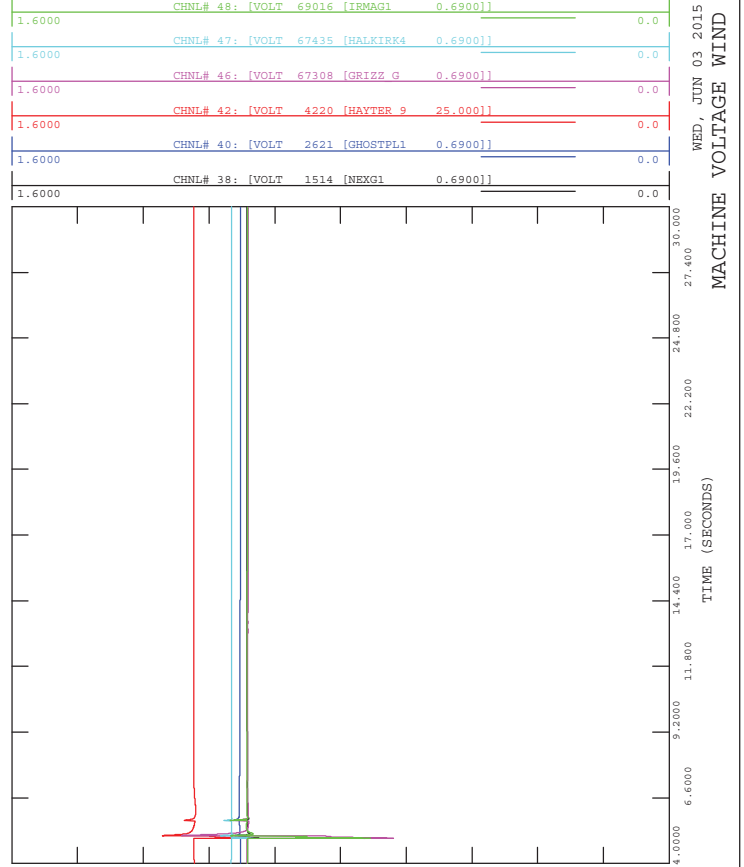
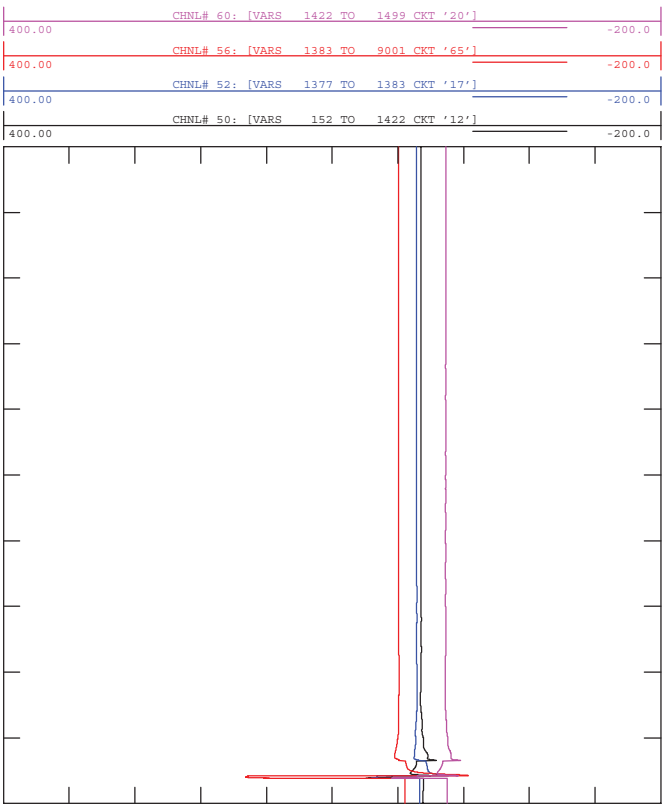




FIGURE F-181
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 709S
CLEARED IN 6 CYCLES, FAR END IN 42 CYCLES
FILE: F-18_7L134_Vegreville.out



WED, JUN 03 2015 11:25
BRANCH REACTIVE PWR (MVR)



FIGURE F-19B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-19_7L134_Vincent.out

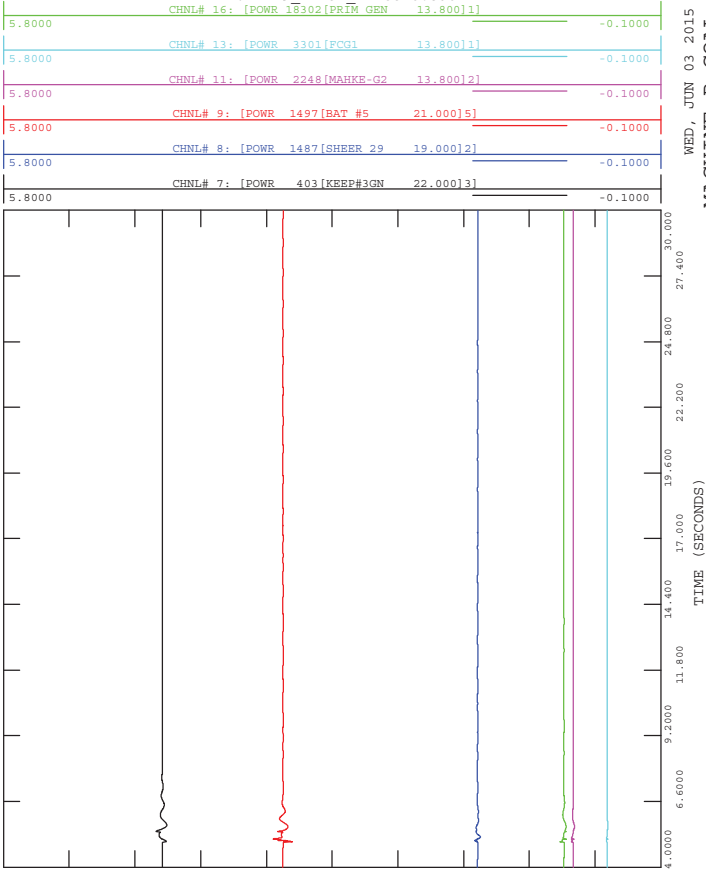


FIGURE F-19D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-19_7L134_Vincent.out

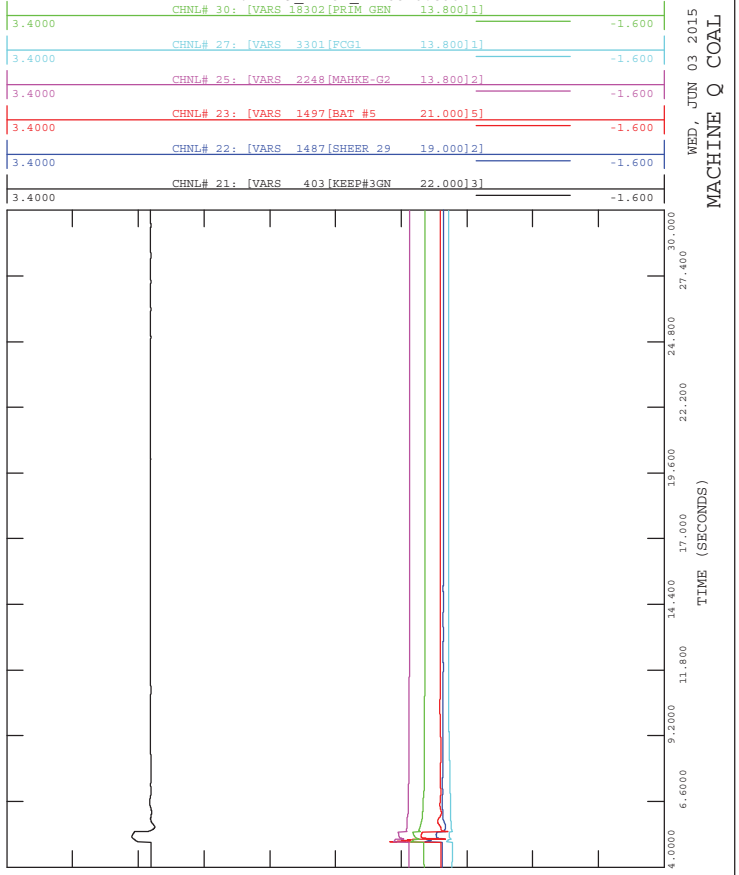


FIGURE F-19A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-19_7L134_Vincent.out

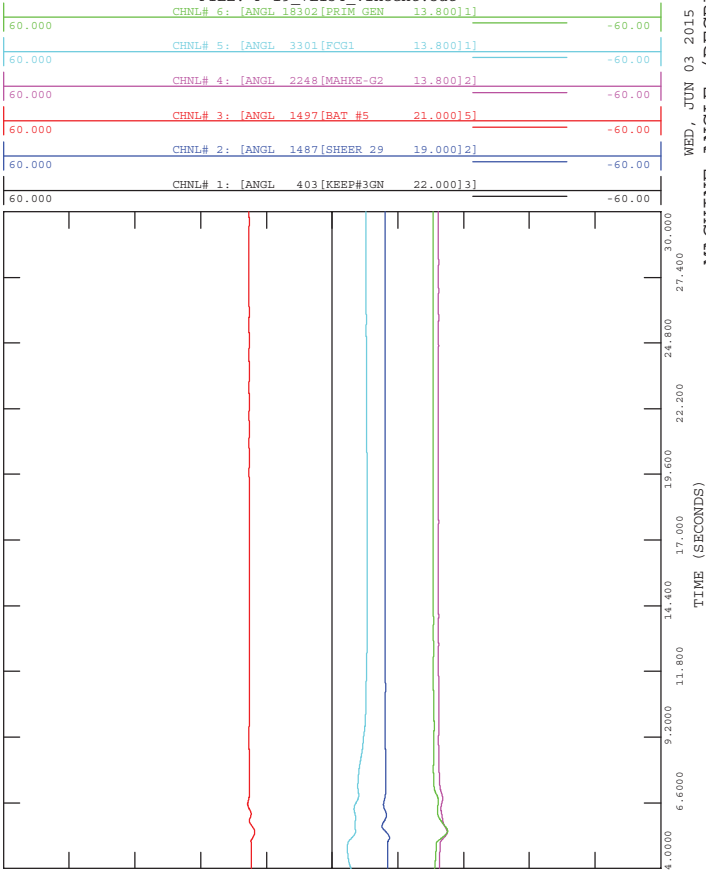


FIGURE F-19C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-19_7L134_Vincent.out

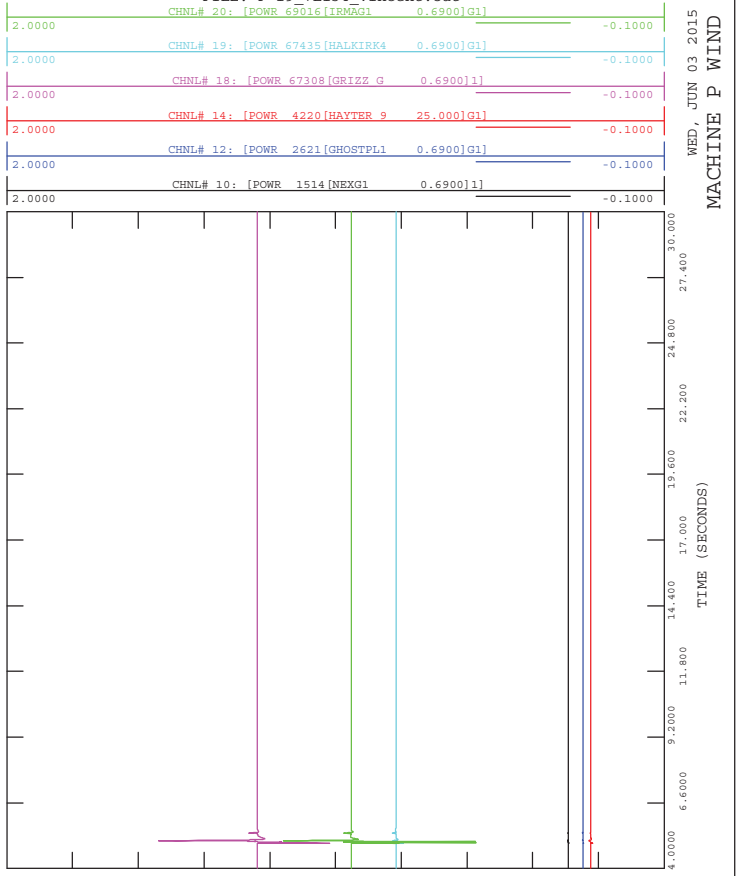




FIGURE F-19F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-19_7L134_Vincent.out

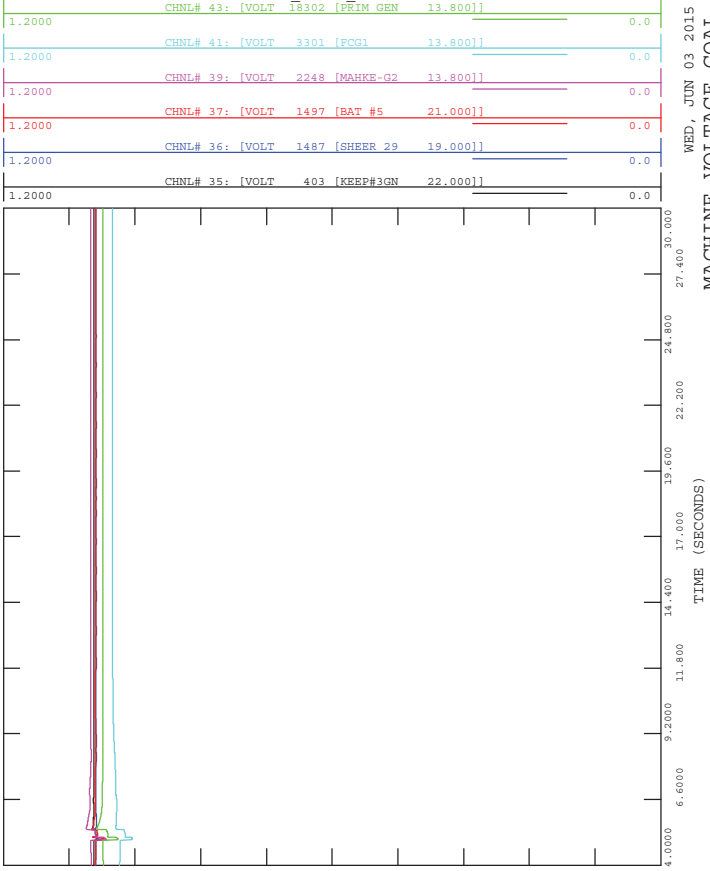


FIGURE F-19H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-19_7L134_Vincent.out

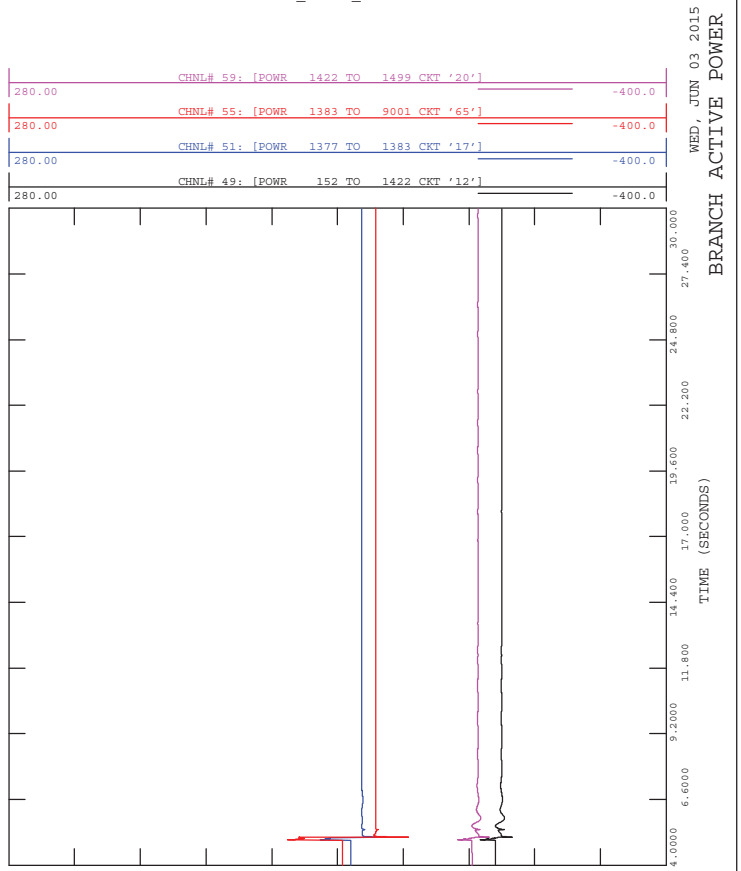


FIGURE F-19E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-19_7L134_Vincent.out

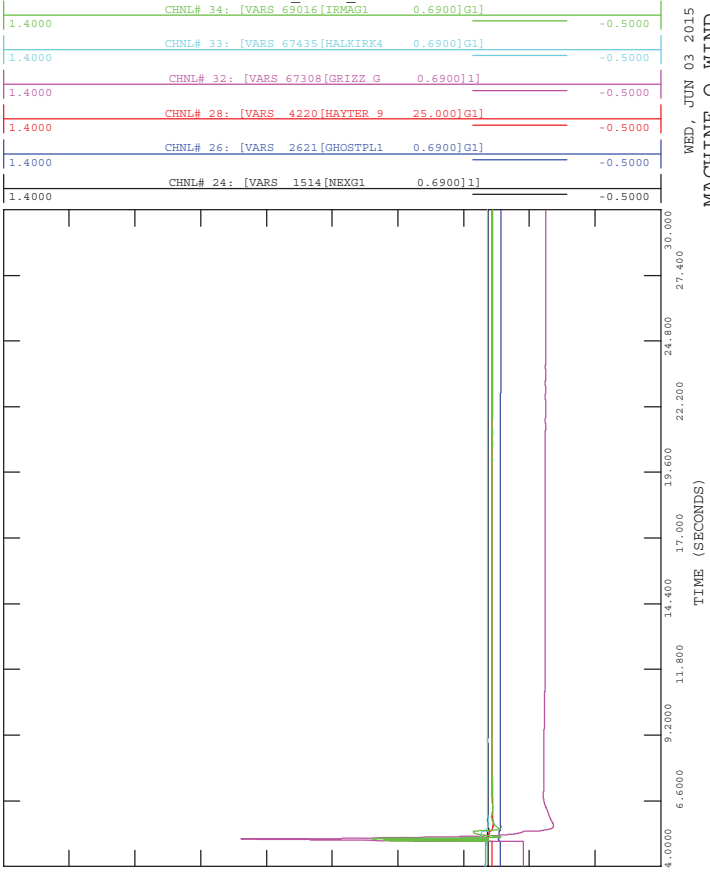


FIGURE F-19G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-19_7L134_Vincent.out

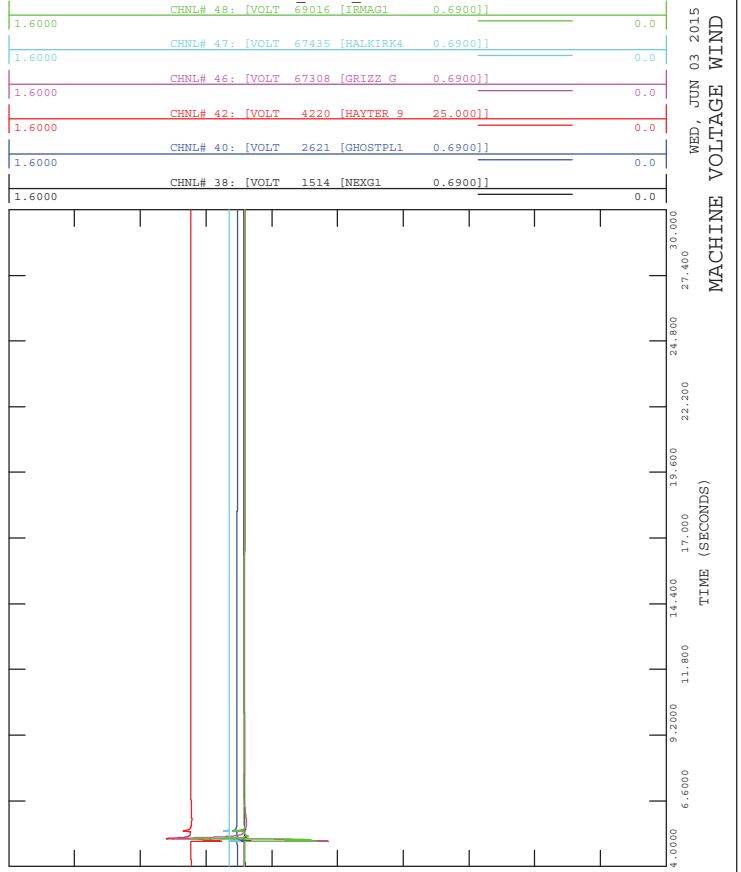
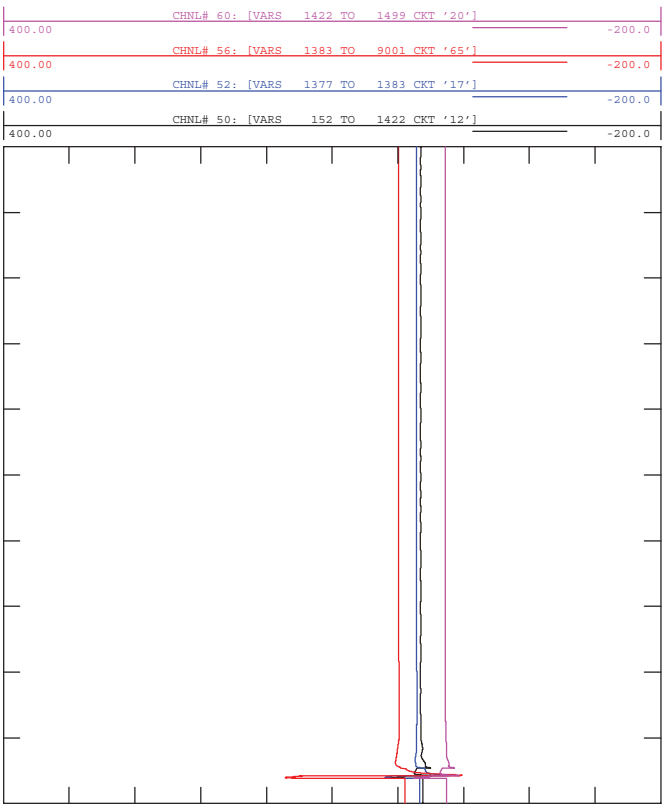




FIGURE F-19I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L134 AT 2019S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-19_7L134_Vincent.out



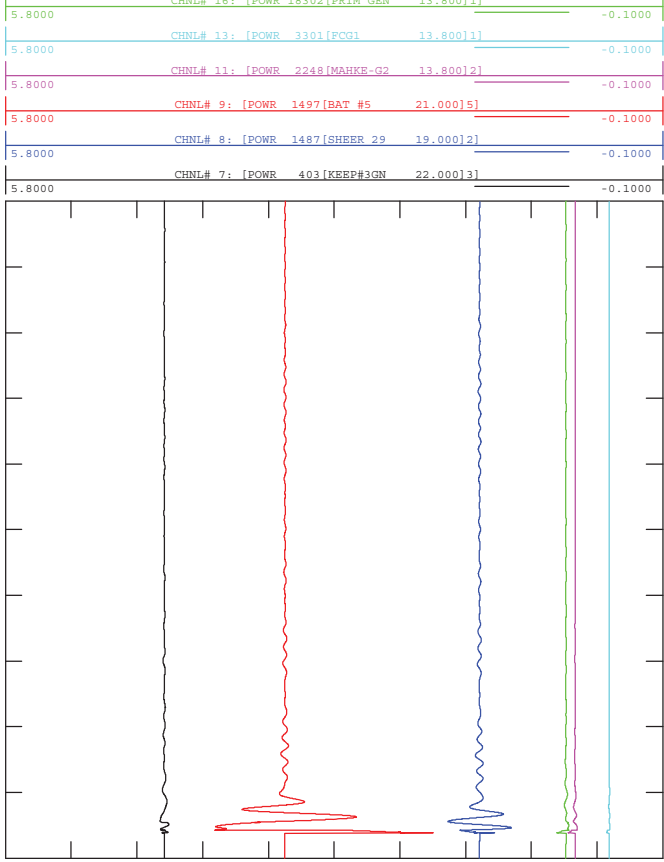
WED, JUN 03 2015 11:25
BRANCH REACTIVE PWR (MVR)



FIGURE F-20B

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: F-20_7L701_BattleRiver.out
CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



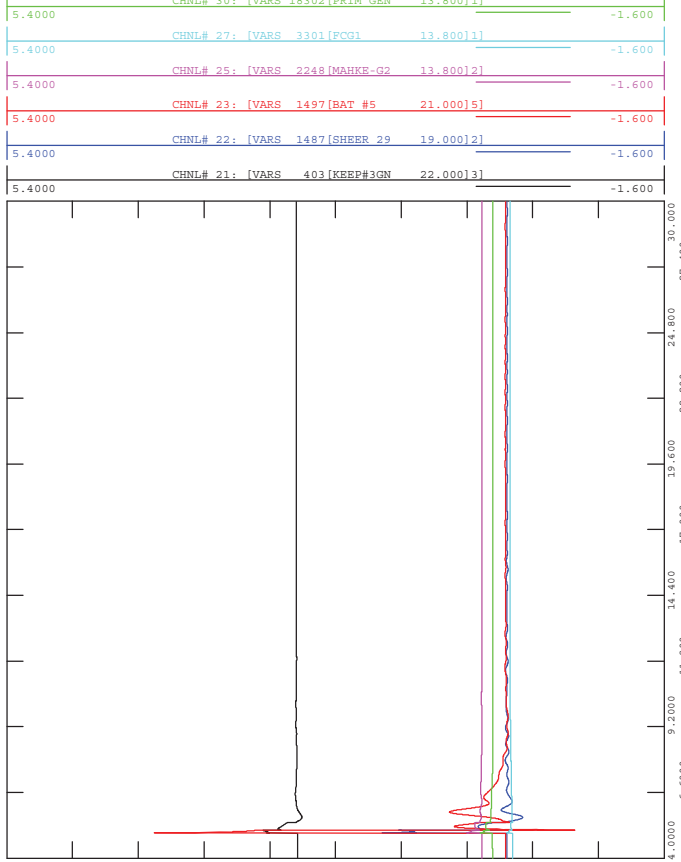
WED, JUN 03 2015 11:25
MACHINE P COAL (PU)



FIGURE F-20D

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: F-20_7L701_BattleRiver.out
CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



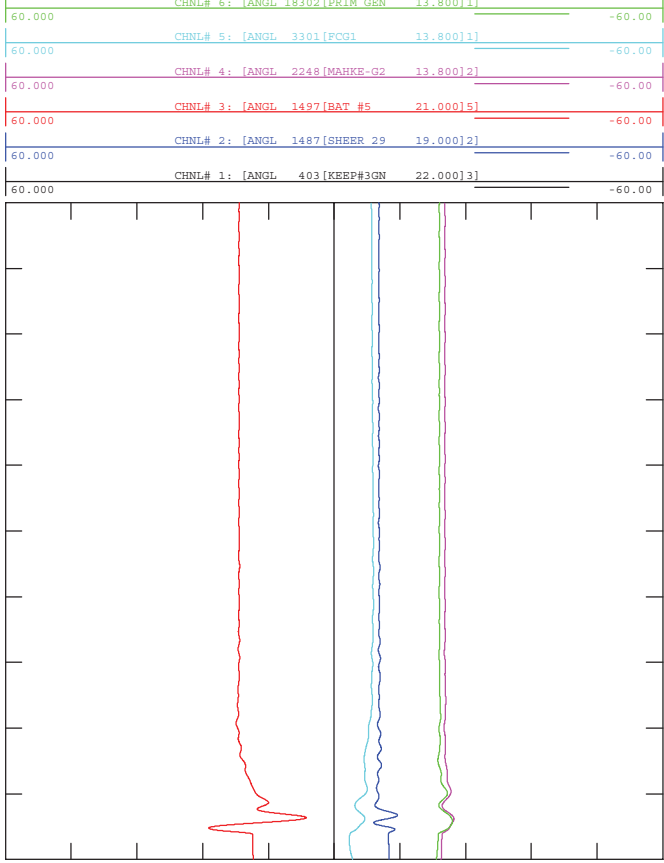
WED, JUN 03 2015 11:25
MACHINE Q COAL (PU)



FIGURE F-20A

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: F-20_7L701_BattleRiver.out
CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



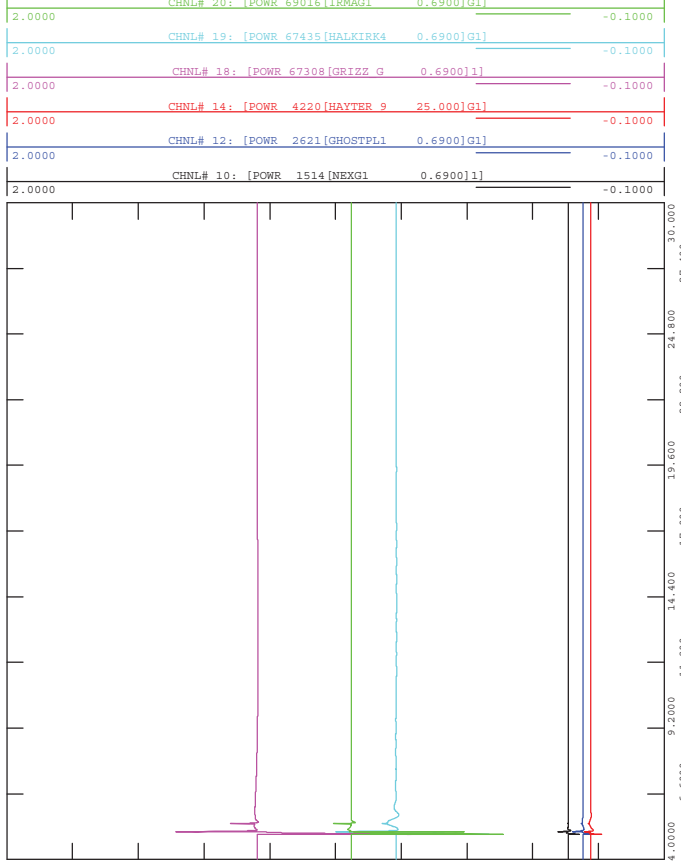
WED, JUN 03 2015 11:25
MACHINE ANGLE (DEGREES)



FIGURE F-20C

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: F-20_7L701_BattleRiver.out
CHNL# 20: [POWR 69016[TRWAG1 0.6900]G1]



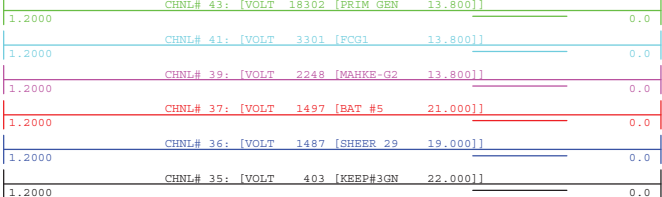
WED, JUN 03 2015 11:25
MACHINE P WIND (PU)



FIGURE F-20F

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: F-20_7L701_BattleRiver.out
CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]



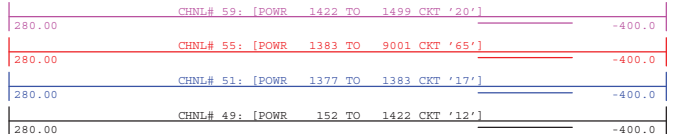
WED, JUN 03 2015 11:26
MACHINE VOLTAGE COAL (PU)



FIGURE F-20H

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: F-20_7L701_BattleRiver.out



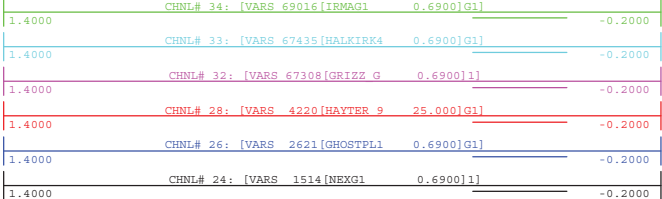
WED, JUN 03 2015 11:26
BRANCH ACTIVE POWER (MW)



FIGURE F-20B

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

FILE: F-20_7L701_BattleRiver.out
CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]



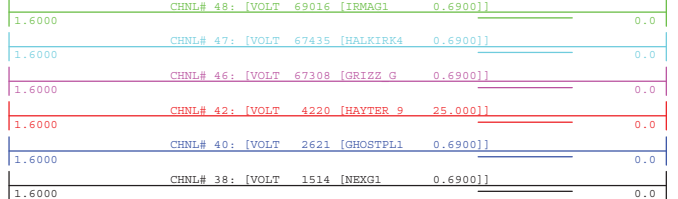
WED, JUN 03 2015 11:25
MACHINE Q WIND (PU)



FIGURE F-20G

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES

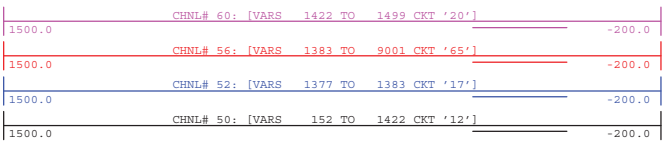
FILE: F-20_7L701_BattleRiver.out
CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]



WED, JUN 03 2015 11:26
MACHINE VOLTAGE WIND (PU)



FIGURE F-201
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 757S
CLEARED IN 6 CYCLES, T-TAP IN 44, FAR END IN 25 CYCLES
FILE: F-20_7L701_BattleRiver.out



WED, JUN 03 2015 11:26
BRANCH REACTIVE PWR (MVR)

TIME (SECONDS)

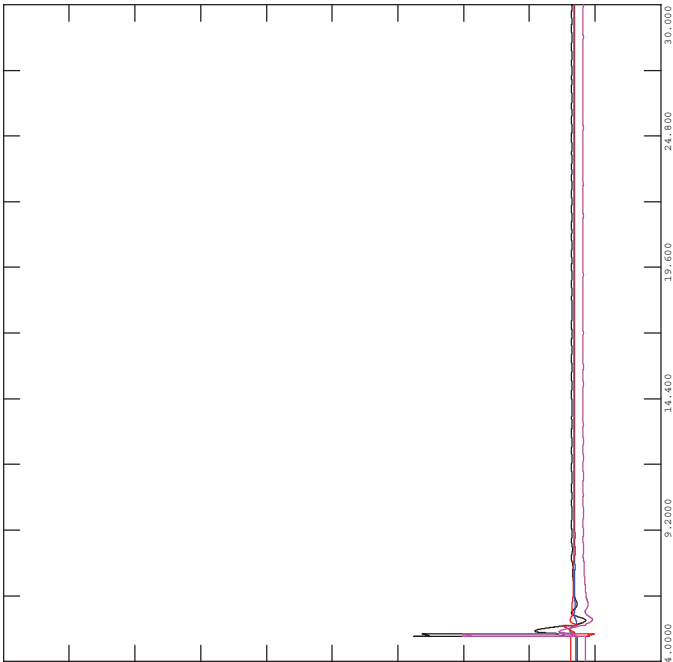
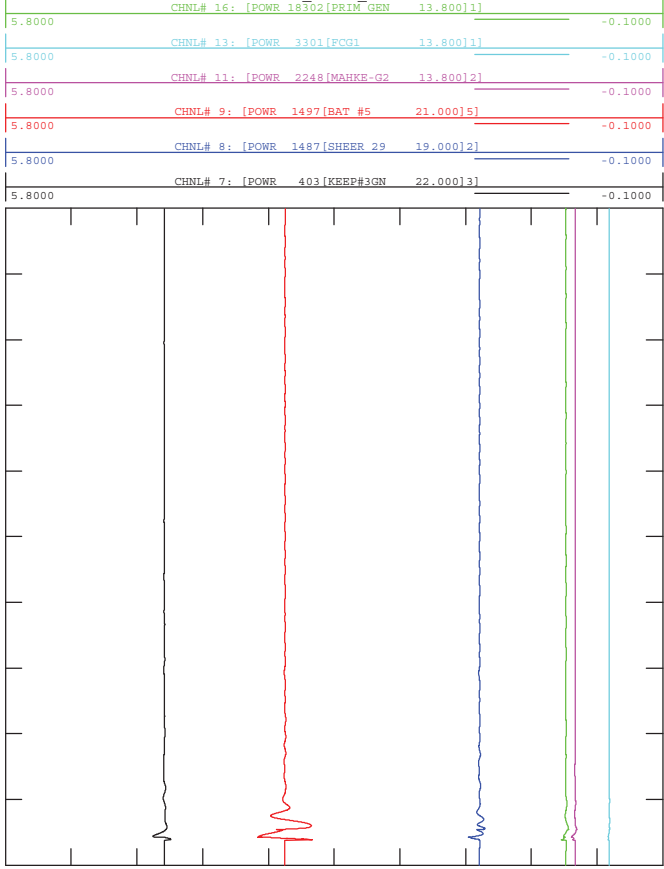




FIGURE F-21B

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: F-21_7L701_Stome.out



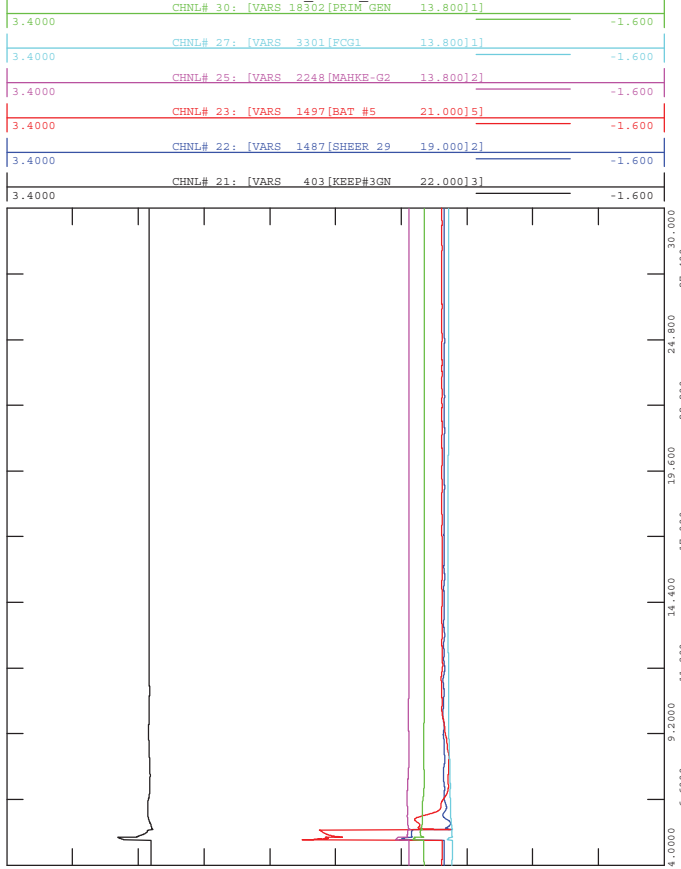
WED, JUN 03 2015 11:26



FIGURE F-21D

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: F-21_7L701_Stome.out



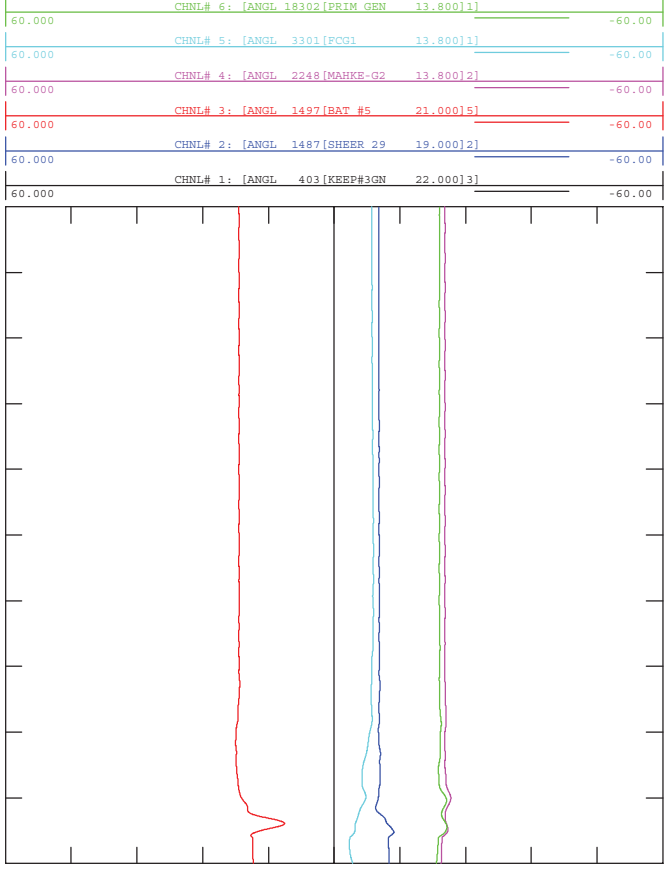
WED, JUN 03 2015 11:26



FIGURE F-21A

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: F-21_7L701_Stome.out



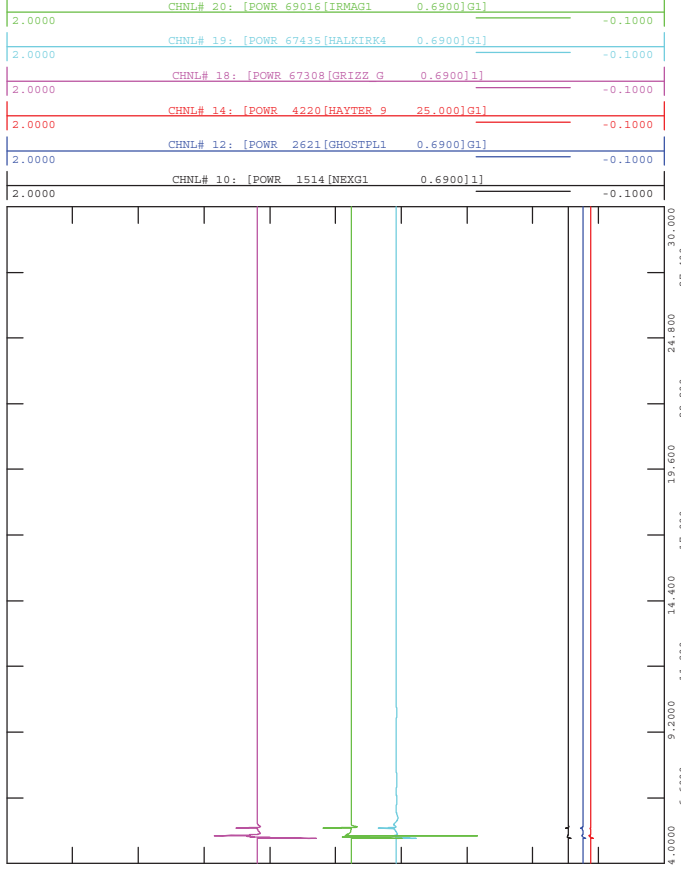
WED, JUN 03 2015 11:26



FIGURE F-21C

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: F-21_7L701_Stome.out



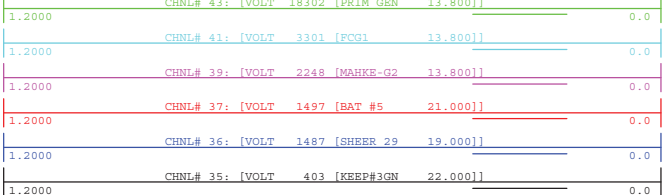
WED, JUN 03 2015 11:26



FIGURE F-21F

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: F-21_7L701_Stome.out



WED, JUN 03 2015 11:26
MACHINE VOLTAGE COAL (PU)

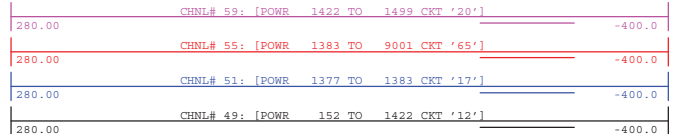
TIME (SECONDS)



FIGURE F-21H

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: F-21_7L701_Stome.out



WED, JUN 03 2015 11:26
BRANCH ACTIVE POWER (MW)

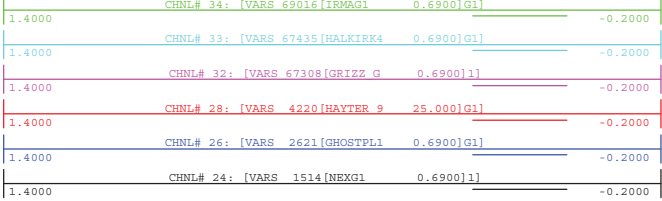
TIME (SECONDS)



FIGURE F-21E

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: F-21_7L701_Stome.out



WED, JUN 03 2015 11:26
MACHINE Q WIND (PU)

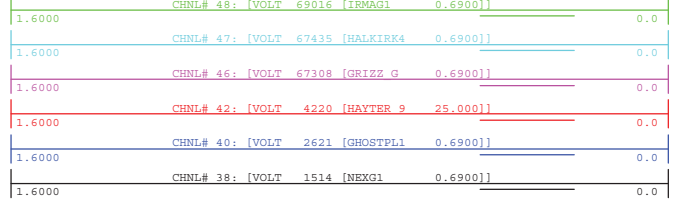
TIME (SECONDS)



FIGURE F-21G

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES

FILE: F-21_7L701_Stome.out

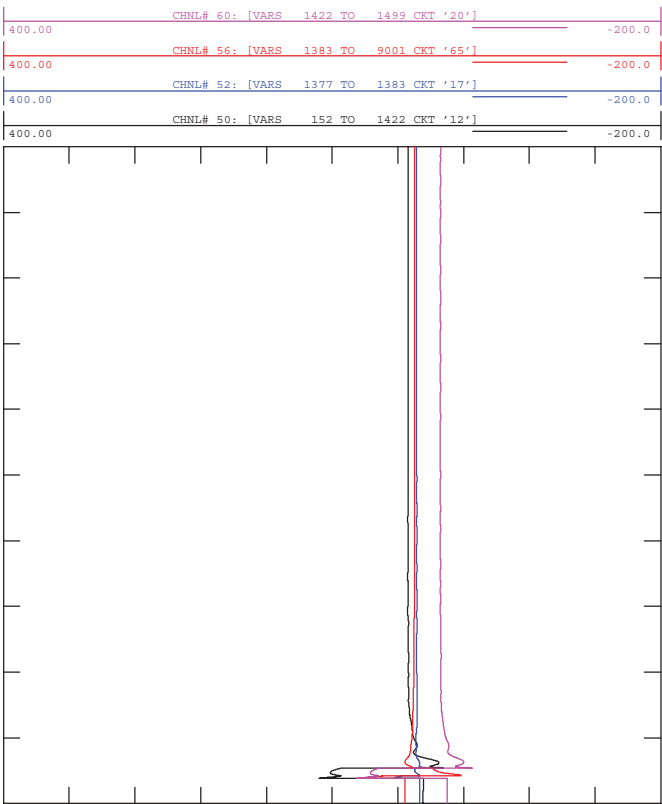


WED, JUN 03 2015 11:26
MACHINE VOLTAGE WIND (PU)

TIME (SECONDS)



FIGURE F-211
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L701 AT 223S
CLEARED IN 6 CYCLES, T-TAP IN 36, FAR END IN 24 CYCLES
FILE: F-21_7L701_Stome.out



WED, JUN 03 2015 11:26
BRANCH REACTIVE PWR (MVR)



FIGURE F-22B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L_Edgeron.out

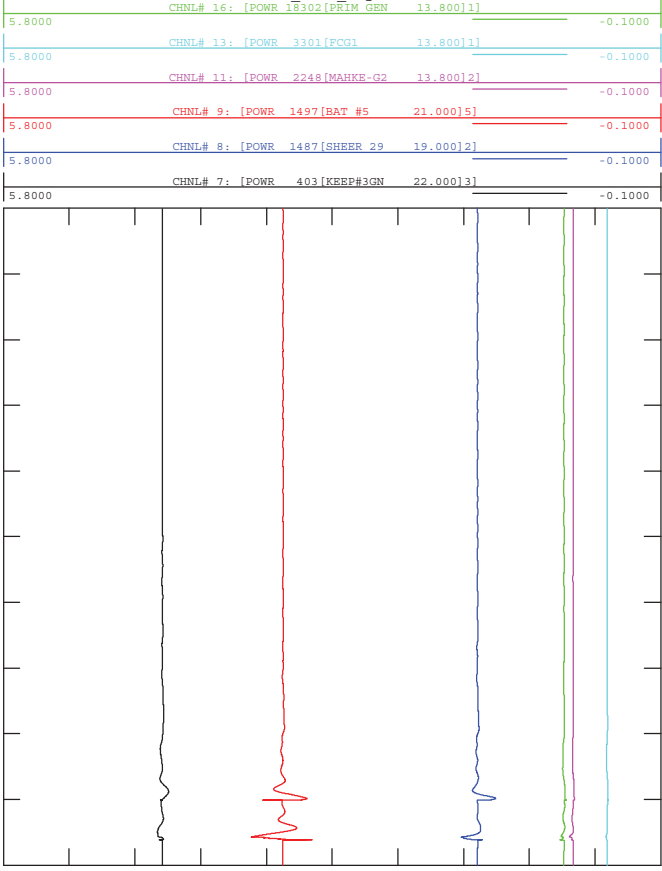


FIGURE F-22D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L_Edgeron.out

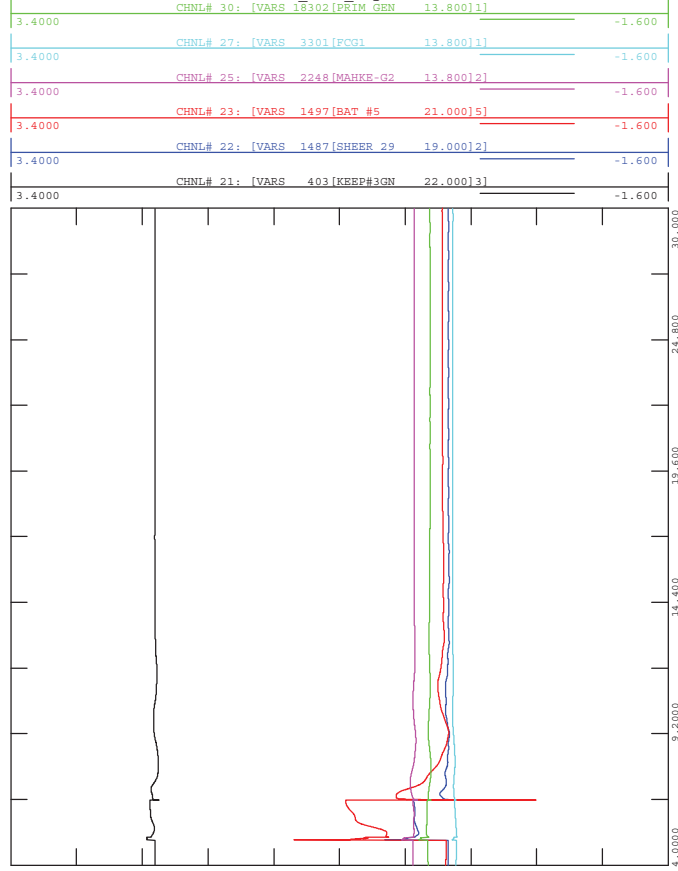


FIGURE F-22A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L_Edgeron.out

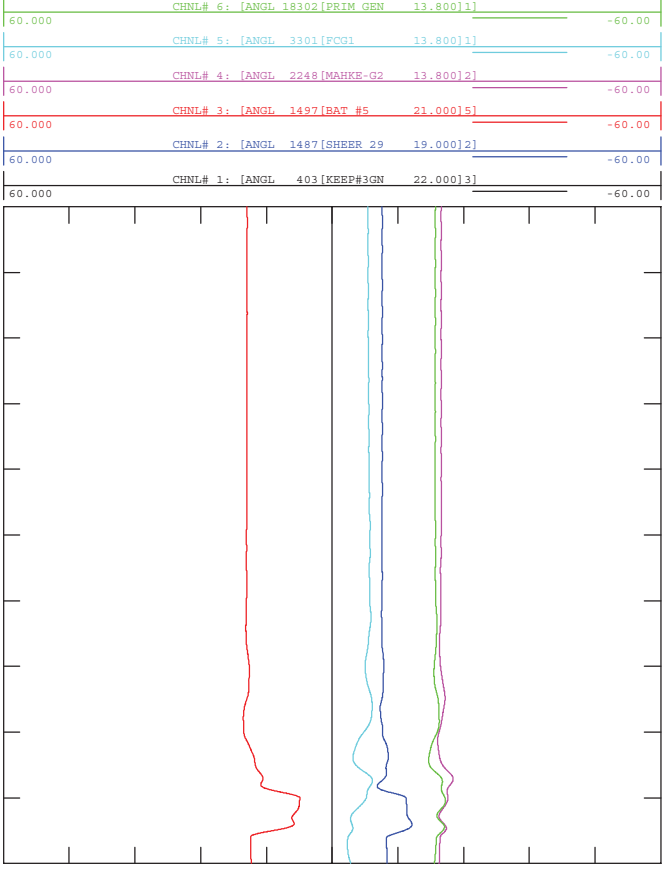


FIGURE F-22C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L_Edgeron.out

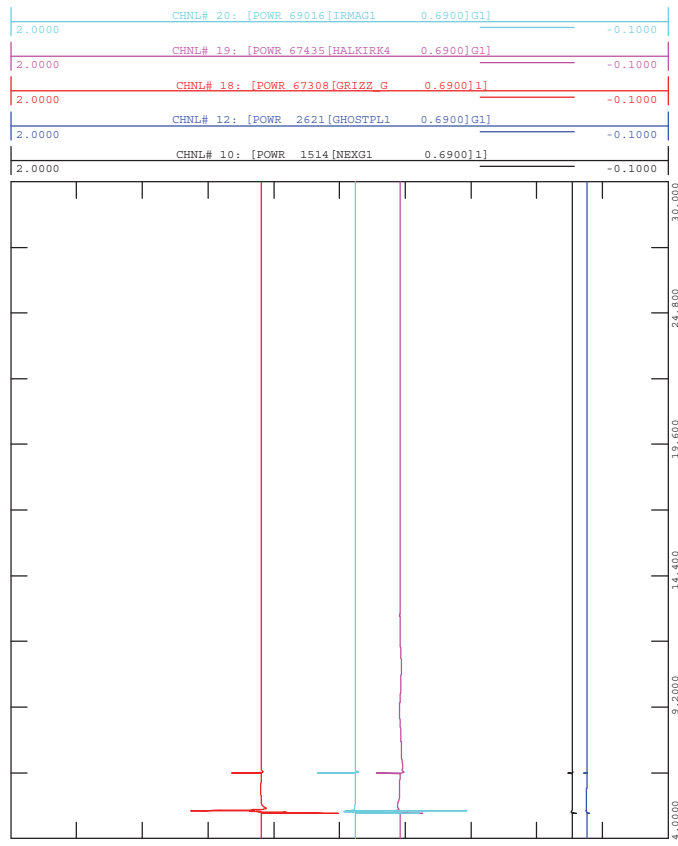




FIGURE F-22F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L_Edgerston.out

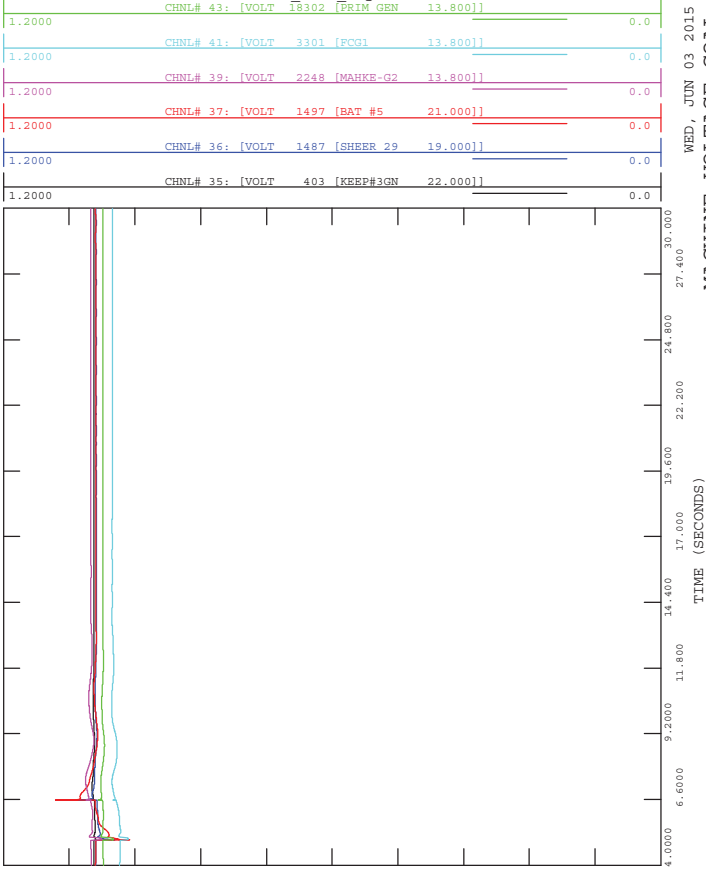


FIGURE F-22H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L_Edgerston.out

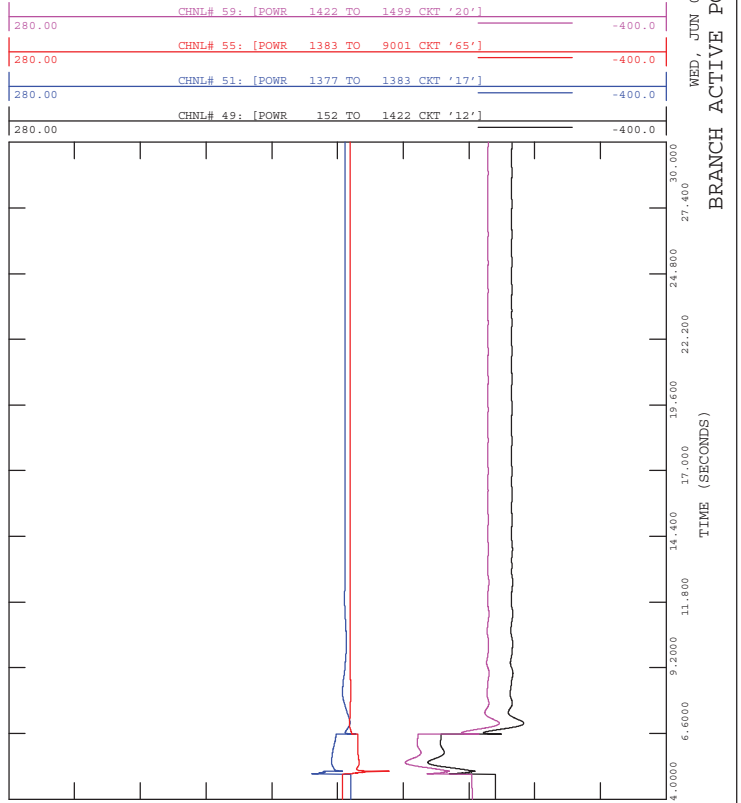


FIGURE F-22E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L_Edgerston.out

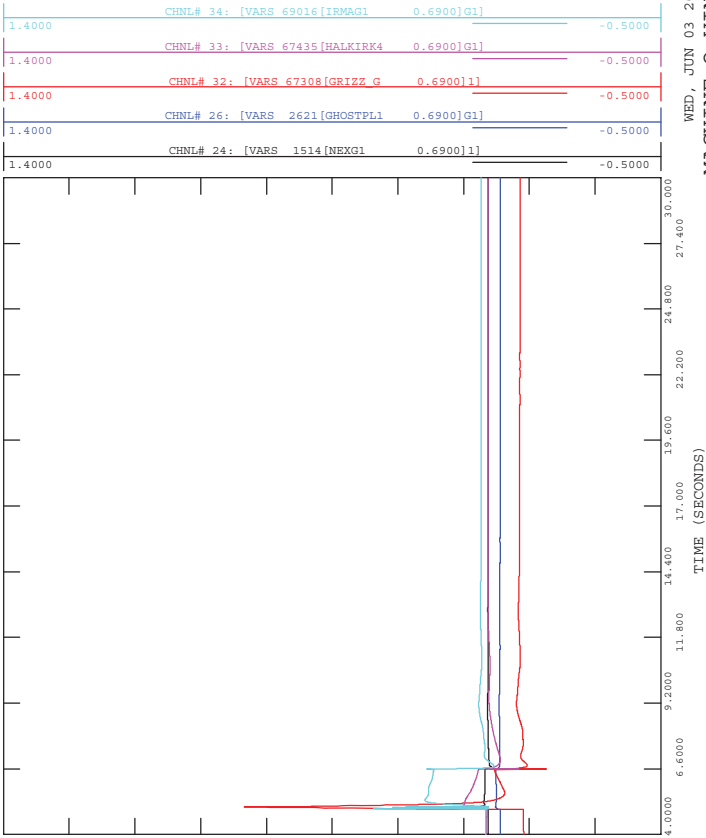


FIGURE F-22G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L_Edgerston.out

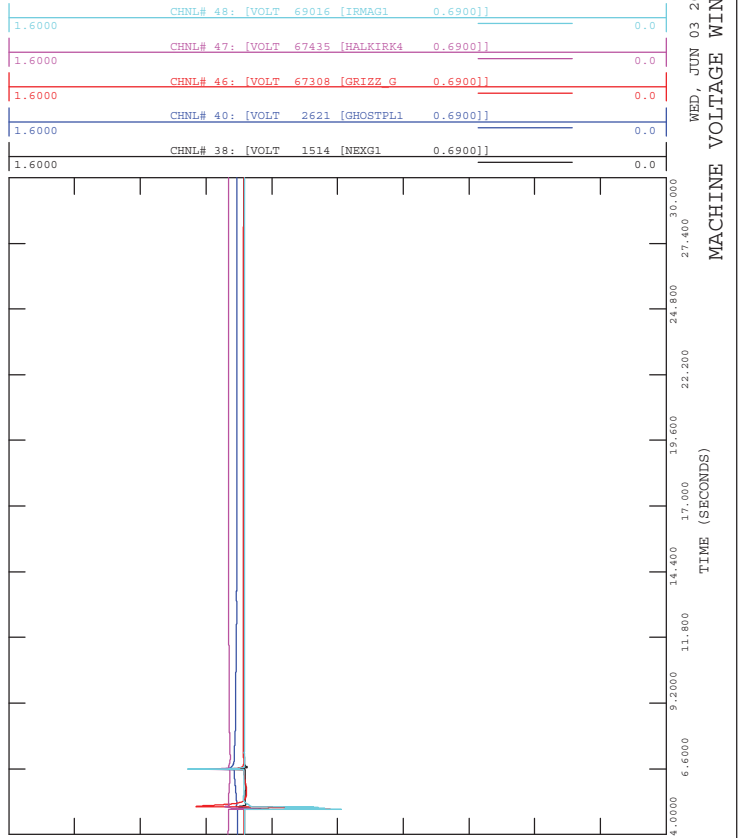




FIGURE F-22I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 899S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-22_749L_Edgerton.out

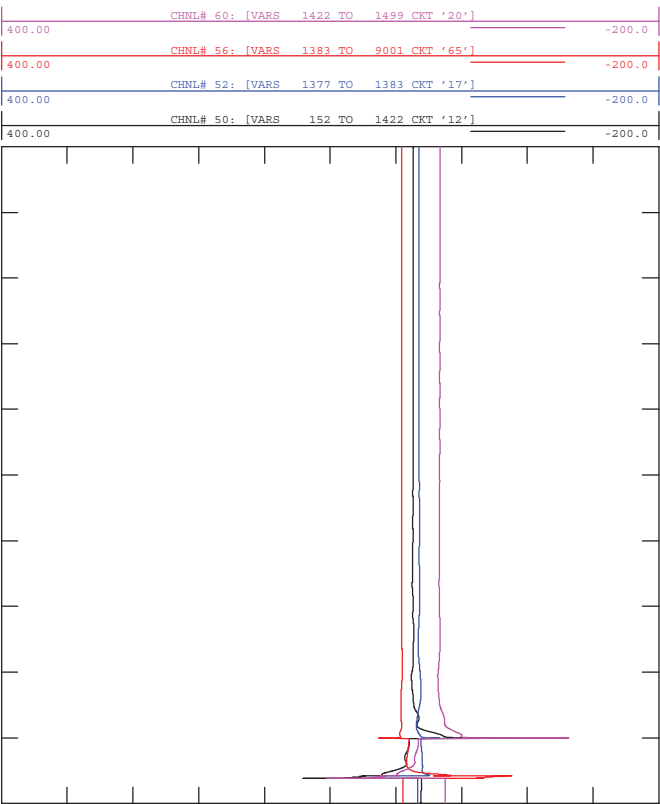




FIGURE F-23B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-23_749L_Metiskow.out

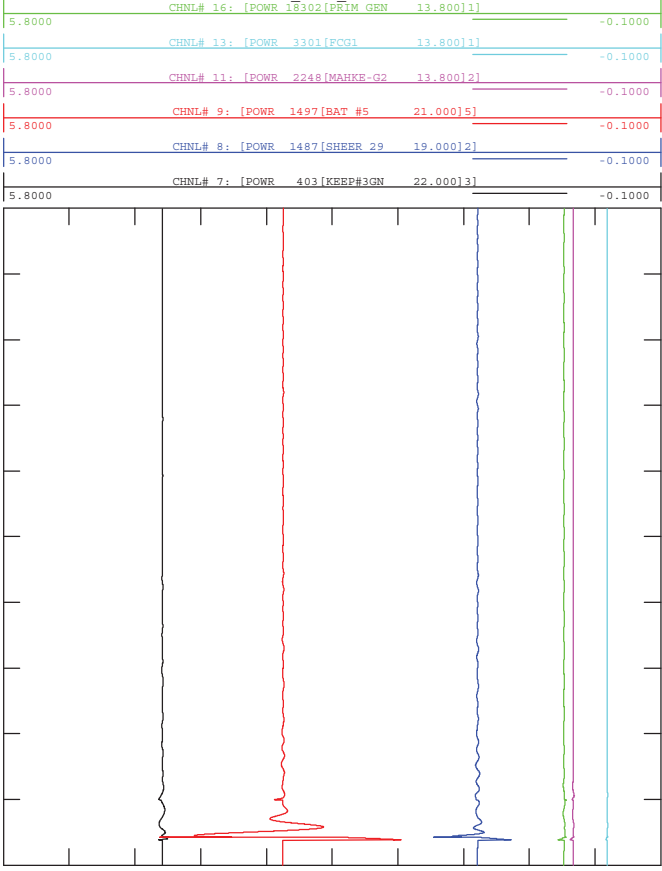


FIGURE F-23D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-23_749L_Metiskow.out

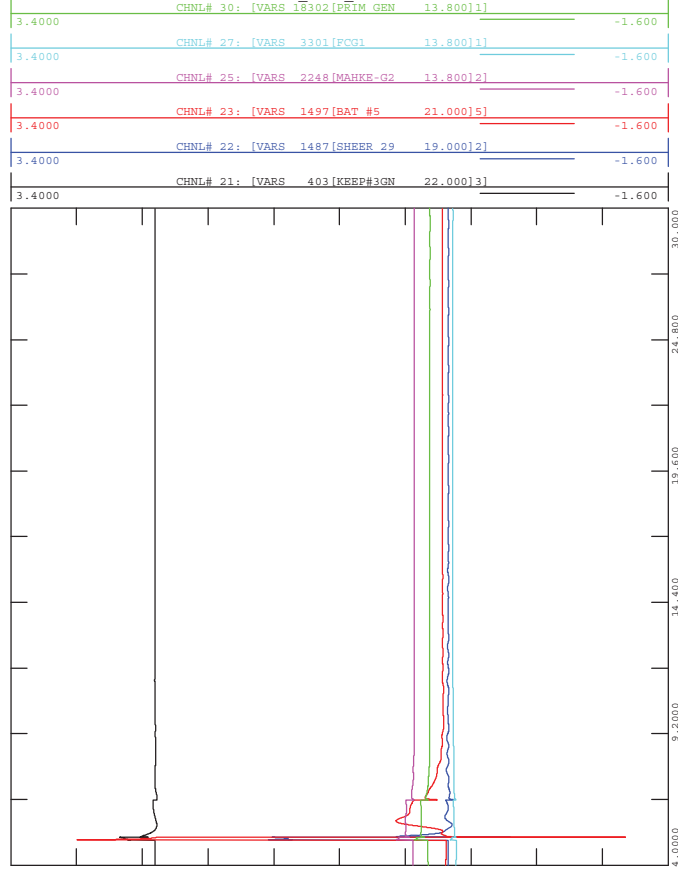


FIGURE F-23A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-23_749L_Metiskow.out

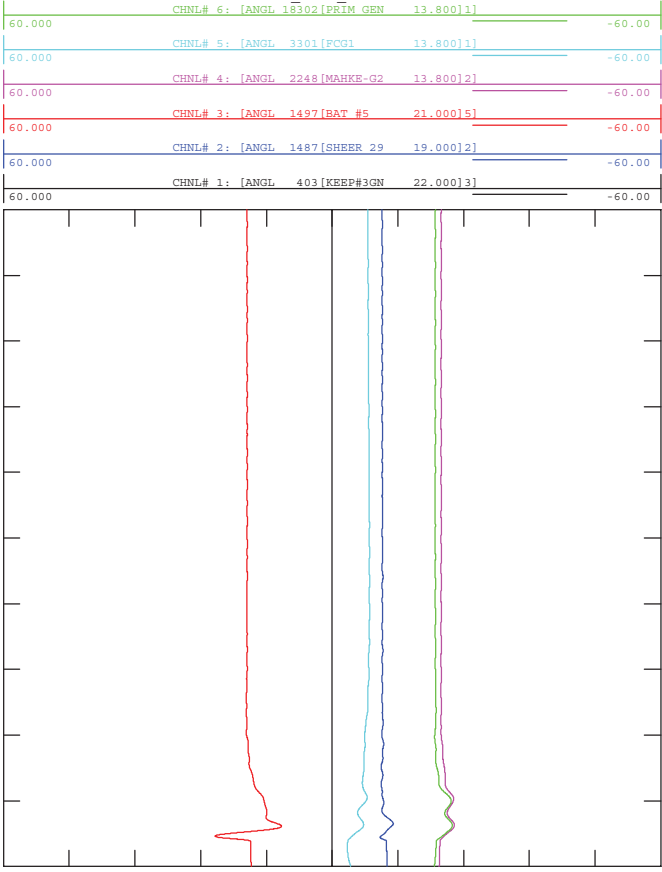


FIGURE F-23C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-23_749L_Metiskow.out

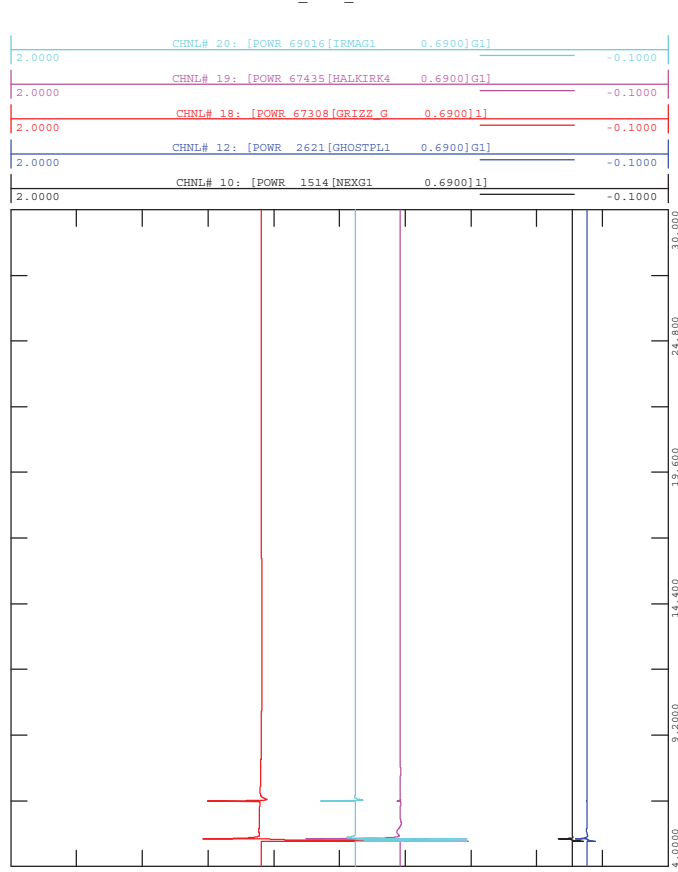




FIGURE F-23F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-23_749L_Metiskow.out

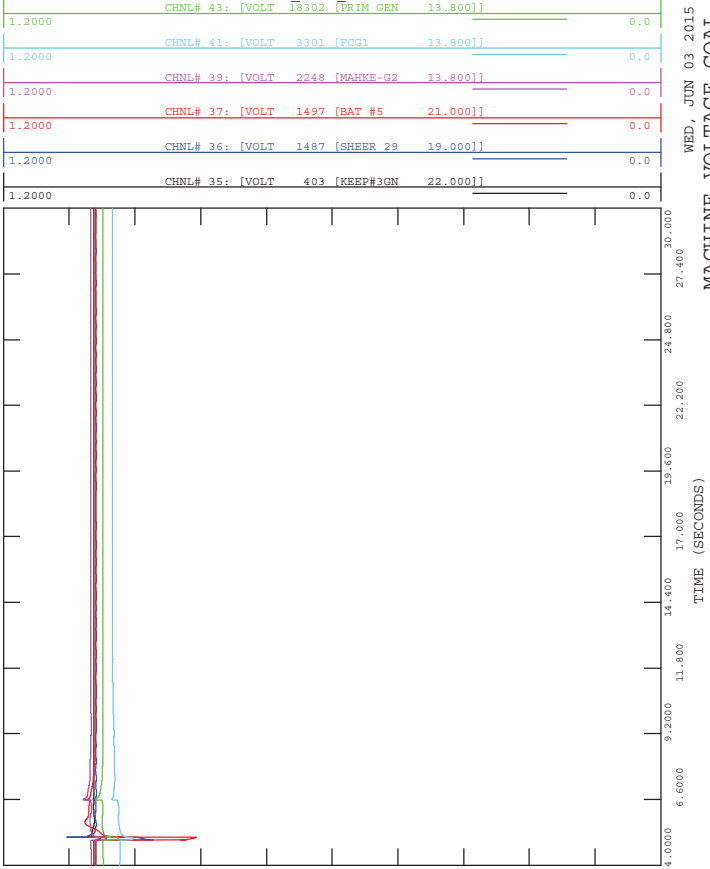


FIGURE F-23H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-23_749L_Metiskow.out

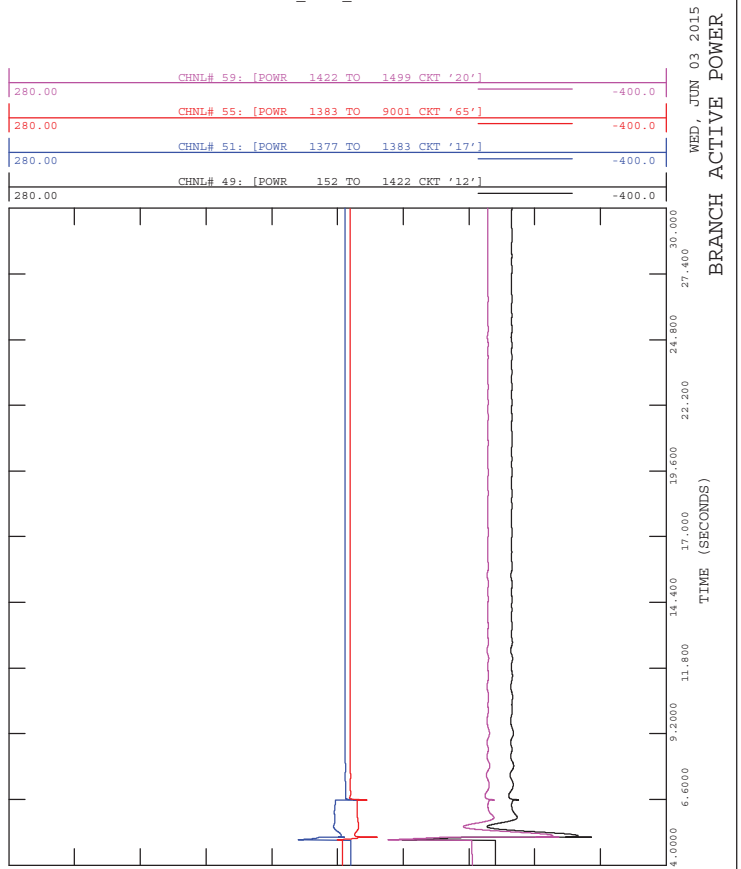


FIGURE F-23E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-23_749L_Metiskow.out

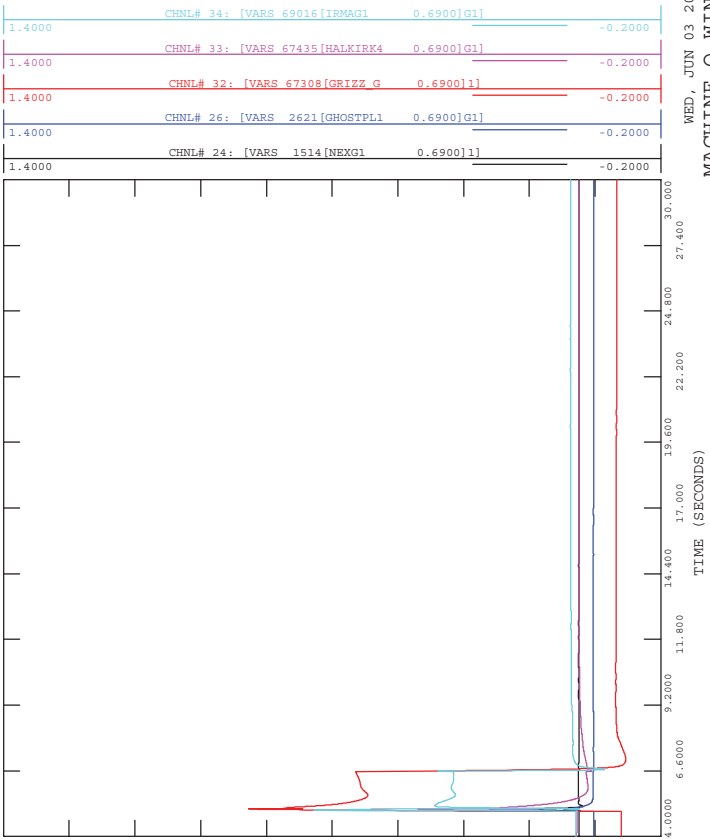


FIGURE F-23G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-23_749L_Metiskow.out

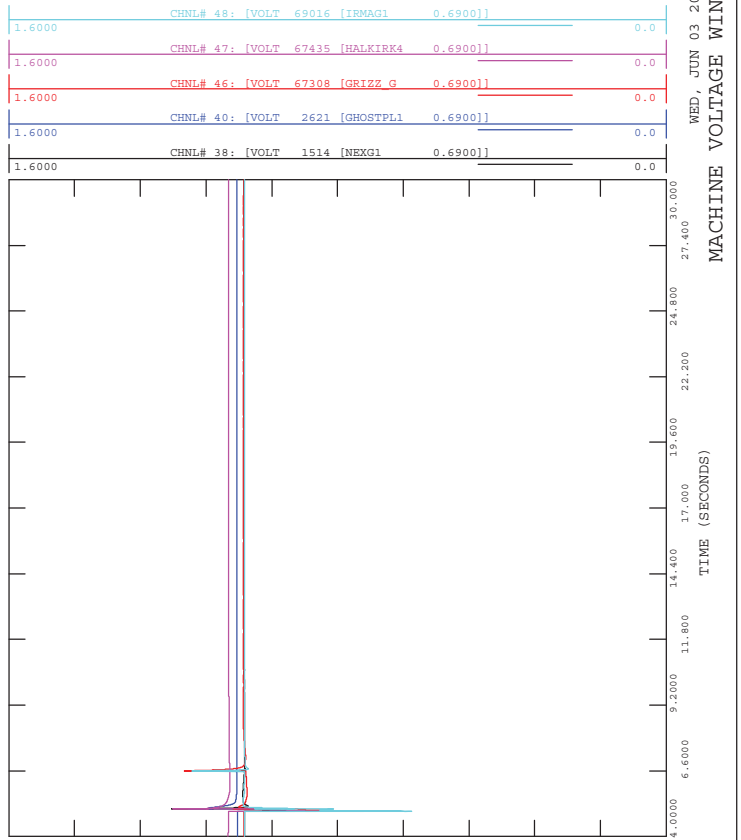
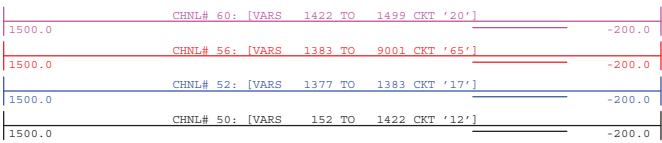




FIGURE F-231
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L AT 648S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-23_749L_Metiskow.out



WED, JUN 03 2015 11:26
BRANCH REACTIVE PWR (MVR)

TIME (SECONDS)



FIGURE F-24B

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-24 749L~7L749_Edgeron.out

CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]

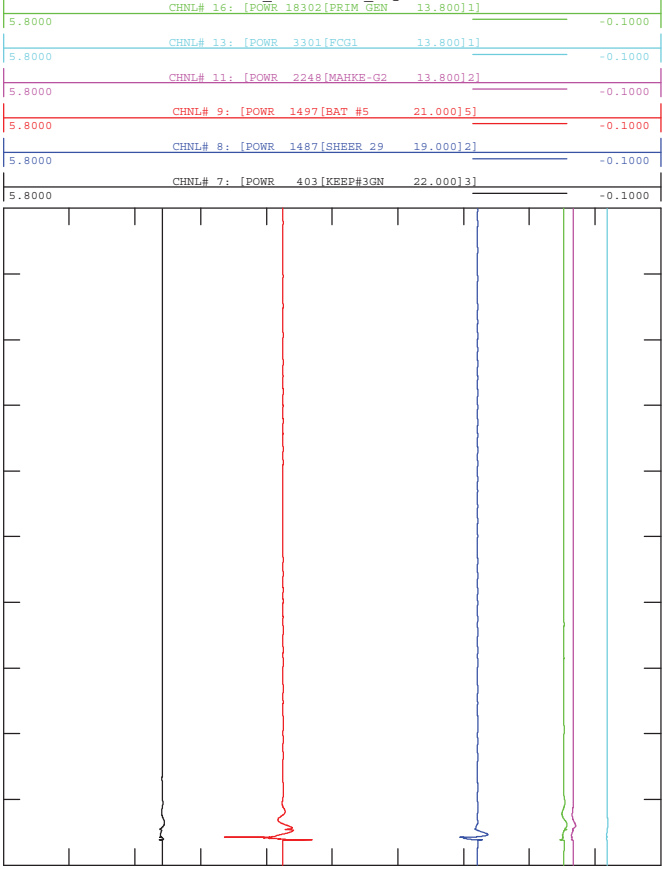


FIGURE F-24D

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-24 749L~7L749_Edgeron.out

CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]

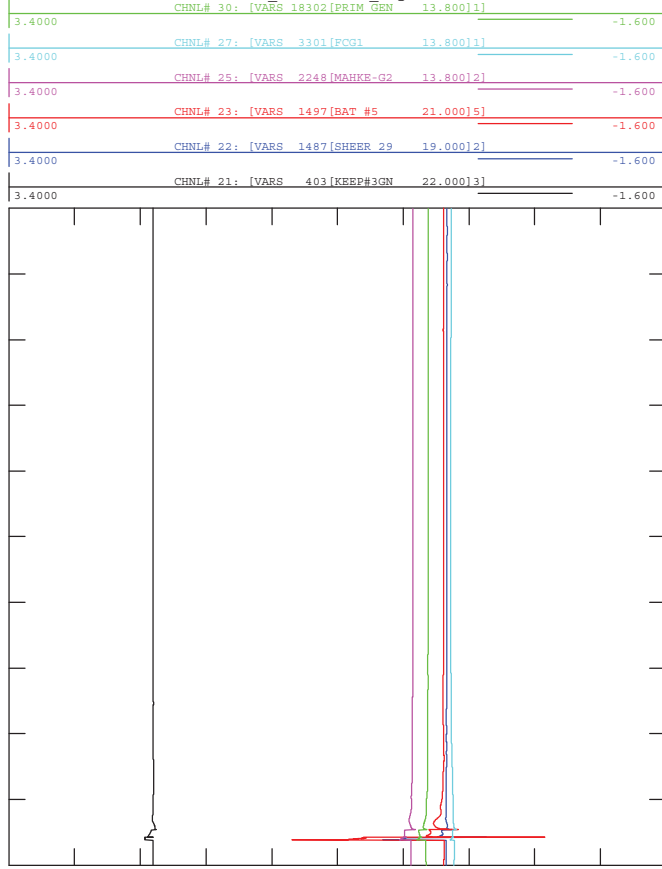


FIGURE F-24A

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-24 749L~7L749_Edgeron.out

CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]

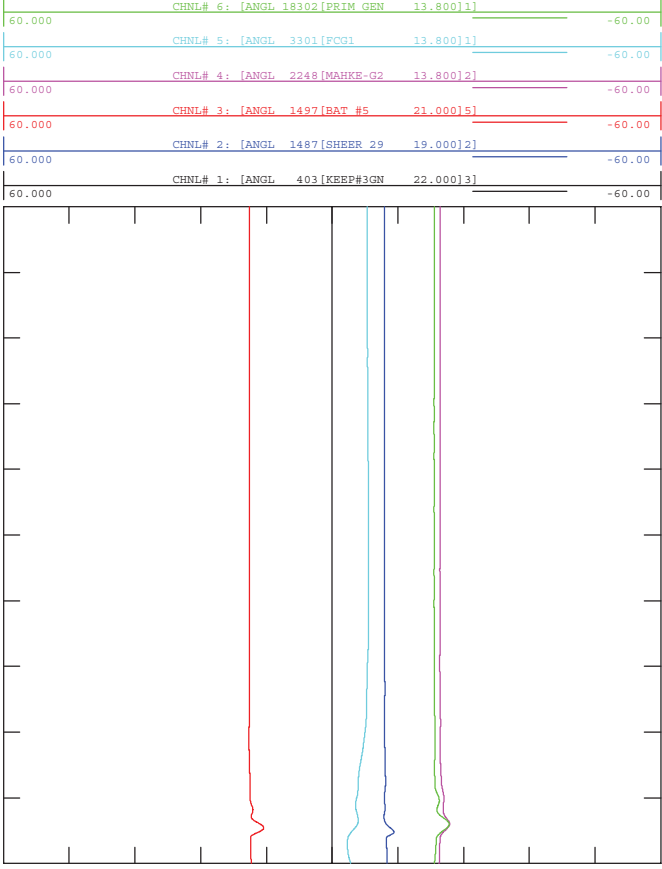


FIGURE F-24C

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-24 749L~7L749_Edgeron.out

CHNL# 20: [POWR 69016[IRWAGI 0.6900]G1]

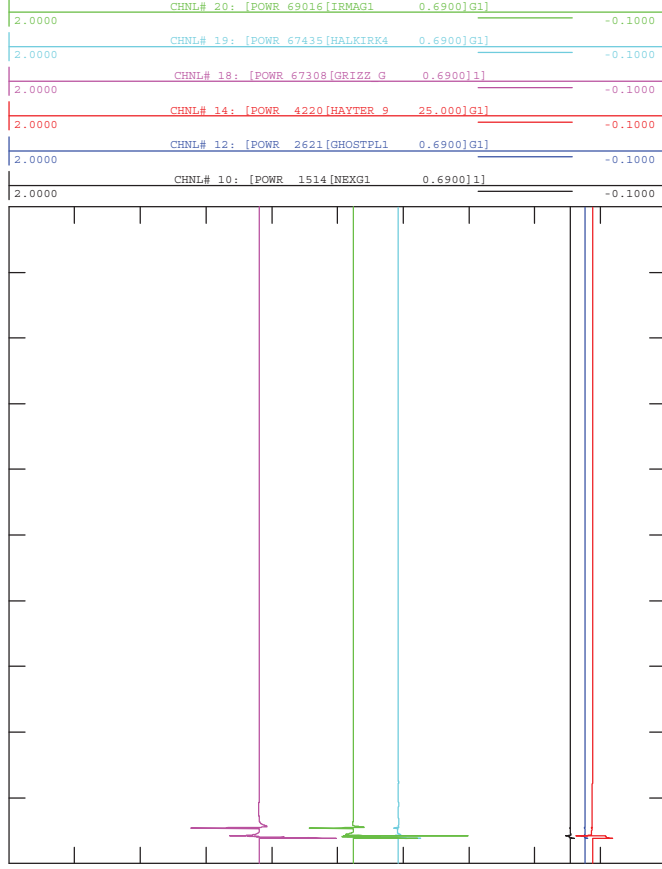


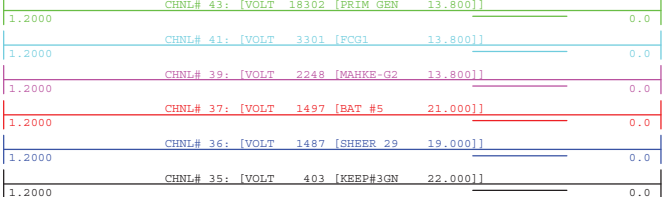


FIGURE F-24F

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-24_749L~7L749_Edgerton.out

CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]



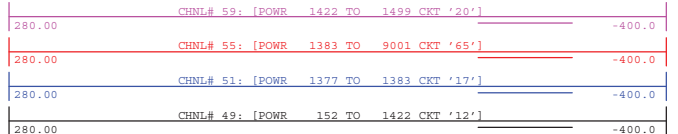
WED, JUN 03 2015 11:26
MACHINE VOLTAGE COAL (PU)



FIGURE F-24H

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-24_749L~7L749_Edgerton.out



WED, JUN 03 2015 11:26
BRANCH ACTIVE POWER (MW)

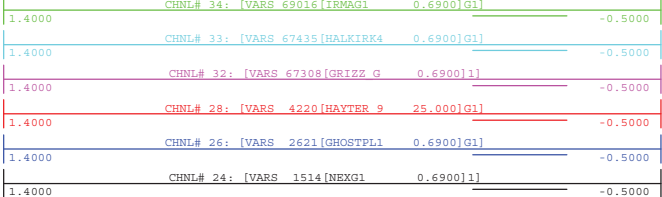


FIGURE F-24B

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-24_749L~7L749_Edgerton.out

CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]



WED, JUN 03 2015 11:26
MACHINE Q WIND (PU)

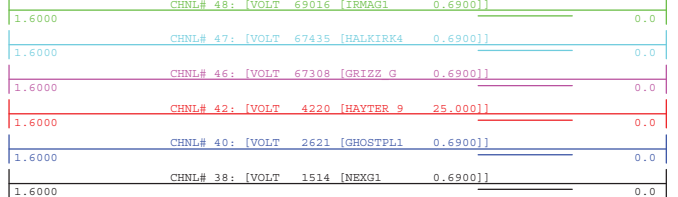


FIGURE F-24G

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES

FILE: F-24_749L~7L749_Edgerton.out

CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]



WED, JUN 03 2015 11:26
MACHINE VOLTAGE WIND (PU)



FIGURE F-24I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 899S
CLEARED IN 6 CYCLES, FAR END IN 24 CYCLES
FILE: F-24_749L-7L749_Edgerton.out

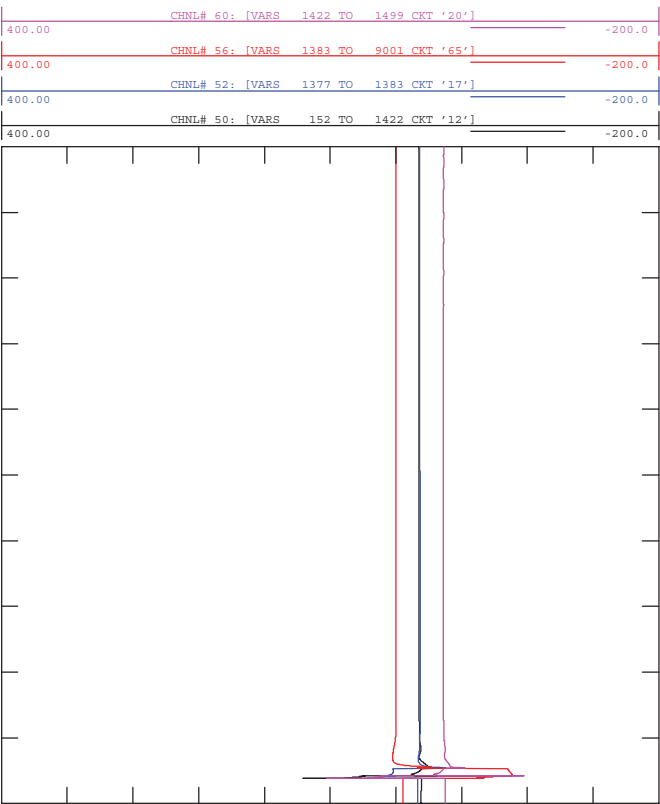




FIGURE F-25B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-25 749L~7L749_Lloydminster.out

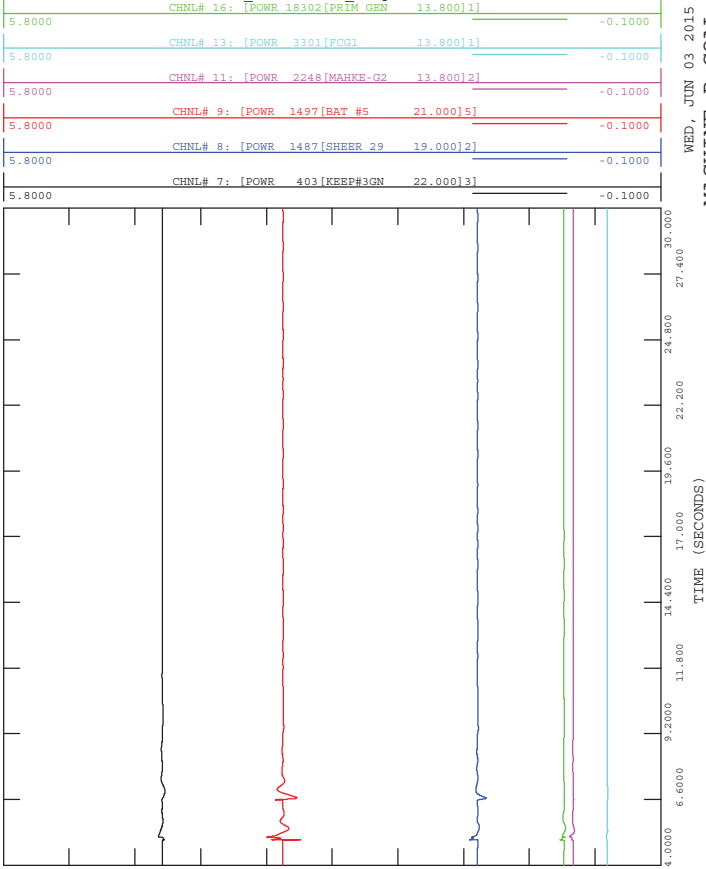


FIGURE F-25D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-25 749L~7L749_Lloydminster.out

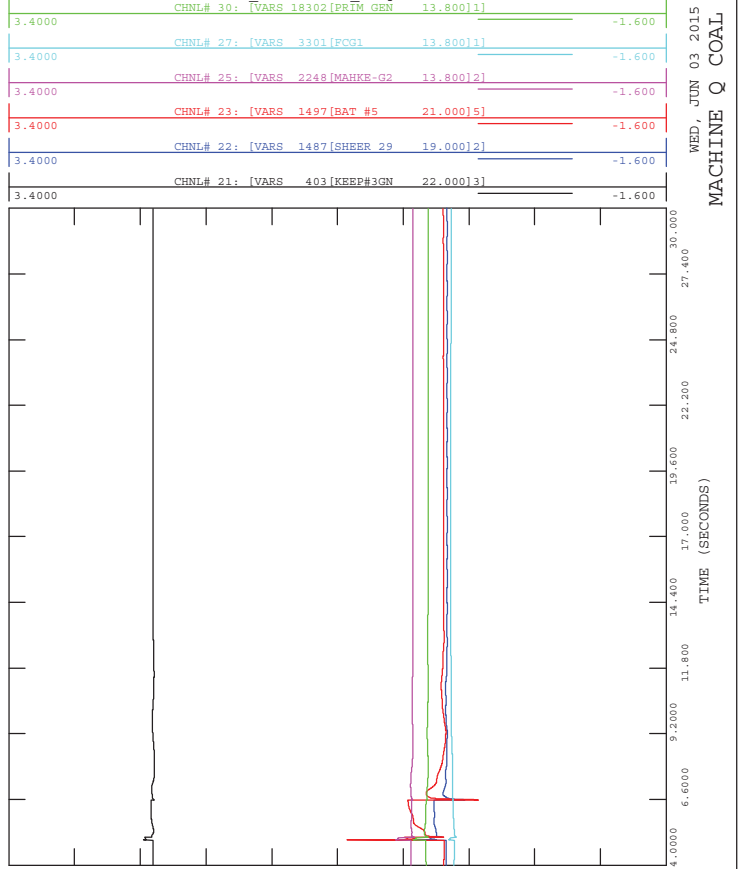


FIGURE F-25A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-25 749L~7L749_Lloydminster.out

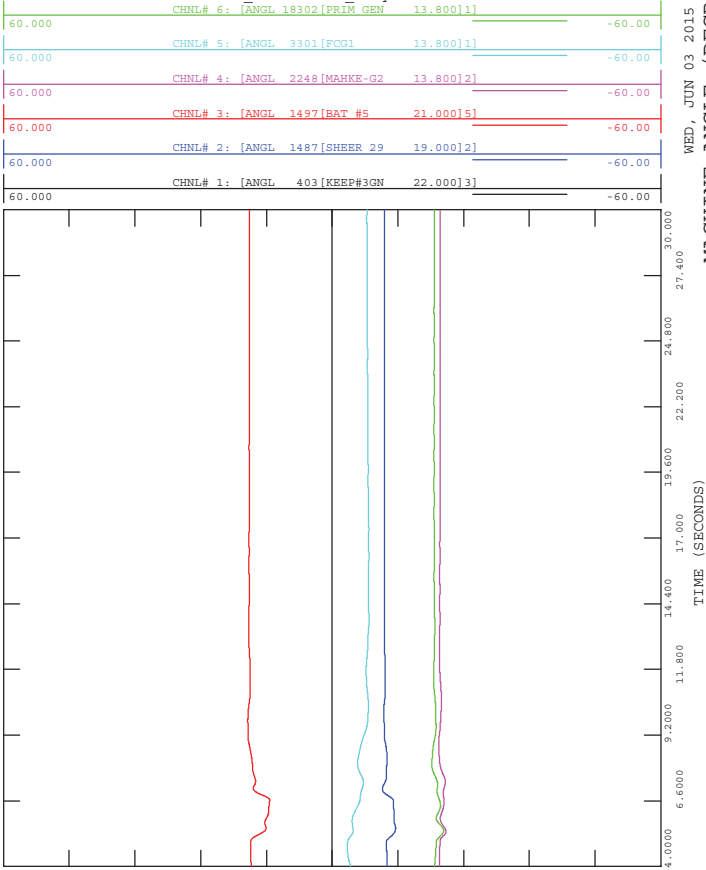


FIGURE F-25C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-25 749L~7L749_Lloydminster.out

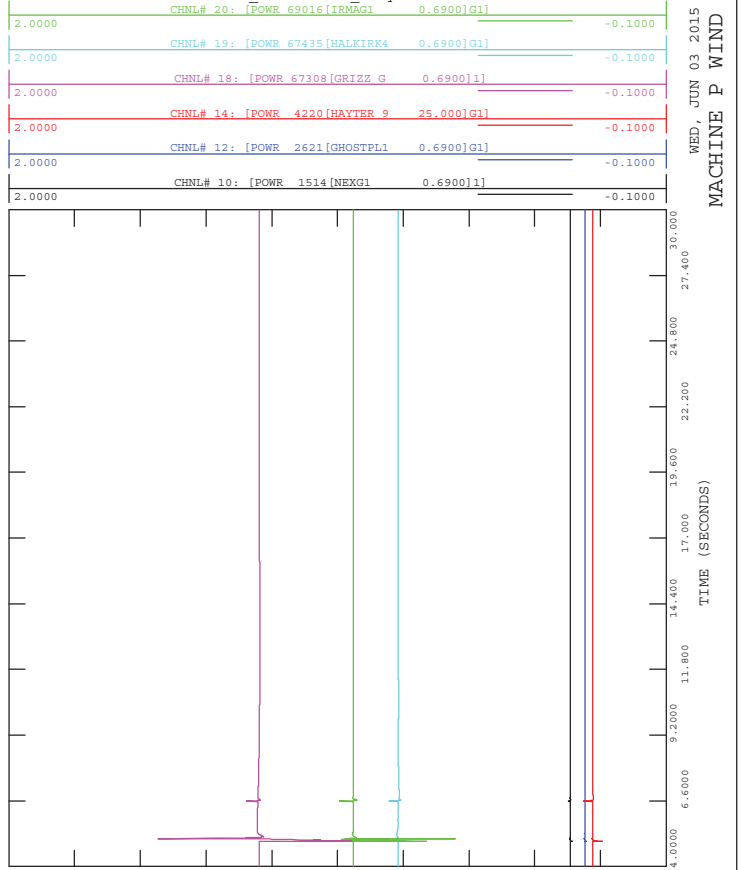


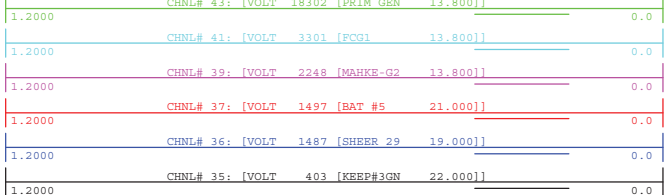


FIGURE F-25F

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: F-25_749L~7L749_Lloydminster.out

CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]



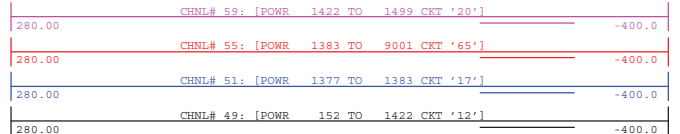
WED, JUN 03 2015 11:26
MACHINE VOLTAGE COAL (PU)



FIGURE F-25H

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: F-25_749L~7L749_Lloydminster.out



WED, JUN 03 2015 11:26
BRANCH ACTIVE POWER (MW)

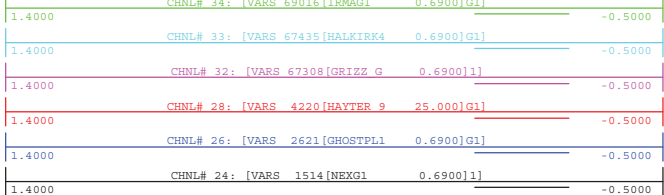


FIGURE F-25E

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: F-25_749L~7L749_Lloydminster.out

CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]



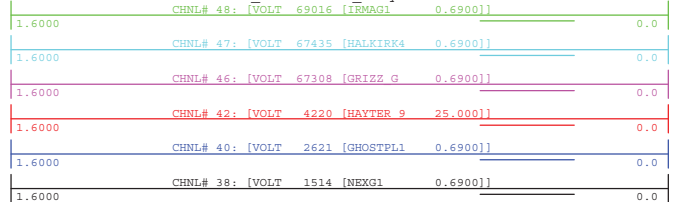
WED, JUN 03 2015 11:26
MACHINE Q WIND (PU)



FIGURE F-25G

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES

FILE: F-25_749L~7L749_Lloydminster.out



WED, JUN 03 2015 11:26
MACHINE VOLTAGE WIND (PU)



FIGURE F-25I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 749L/7L749 AT 716S
CLEARED IN 6 CYCLES, FAR END IN 95 CYCLES
FILE: F-25_749L-7L749_Lloydminster.out

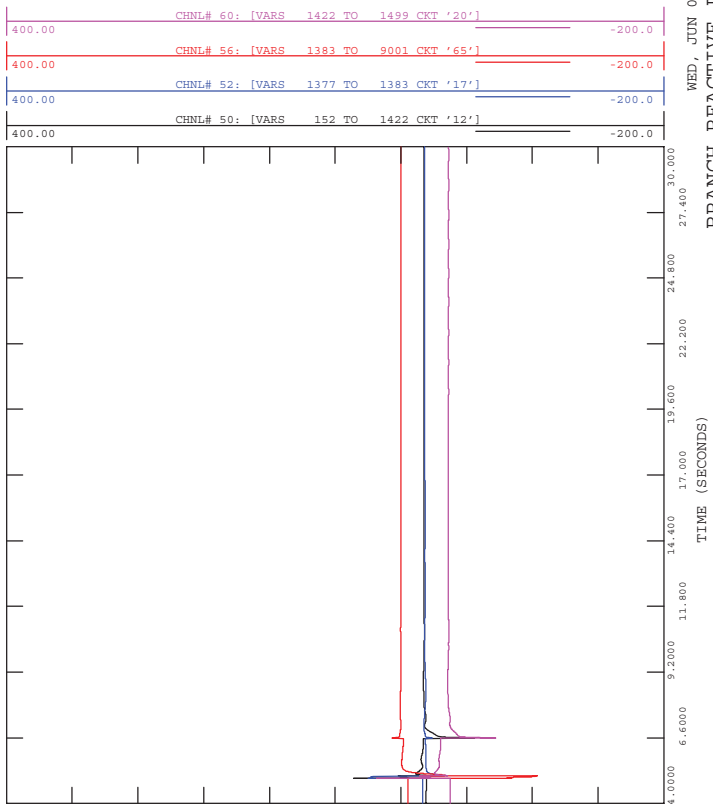




FIGURE F-26B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-26_9L20_Cordel.out

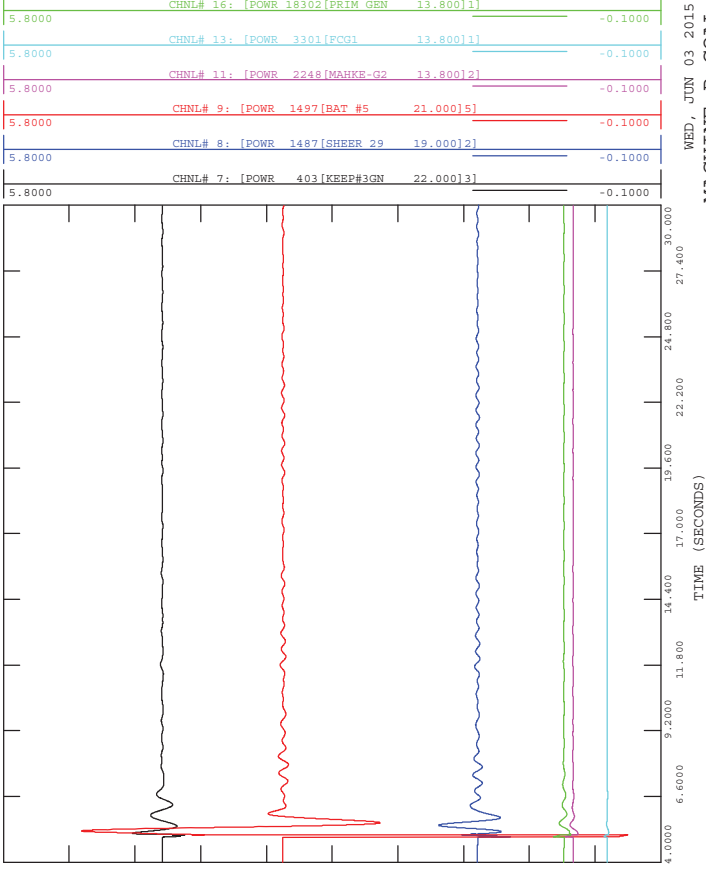


FIGURE F-26D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-26_9L20_Cordel.out

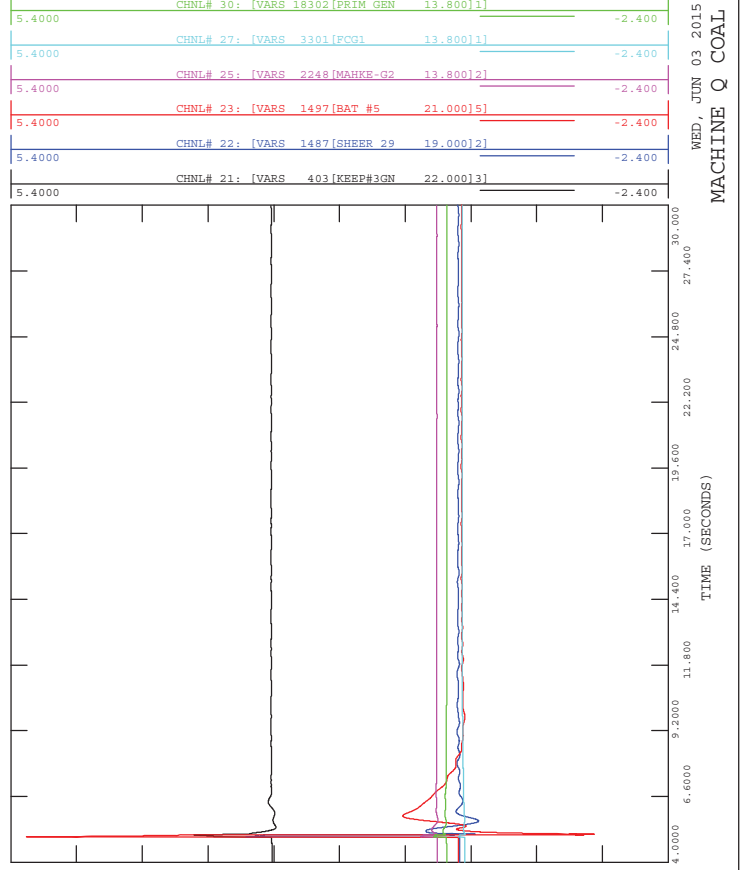


FIGURE F-26A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-26_9L20_Cordel.out

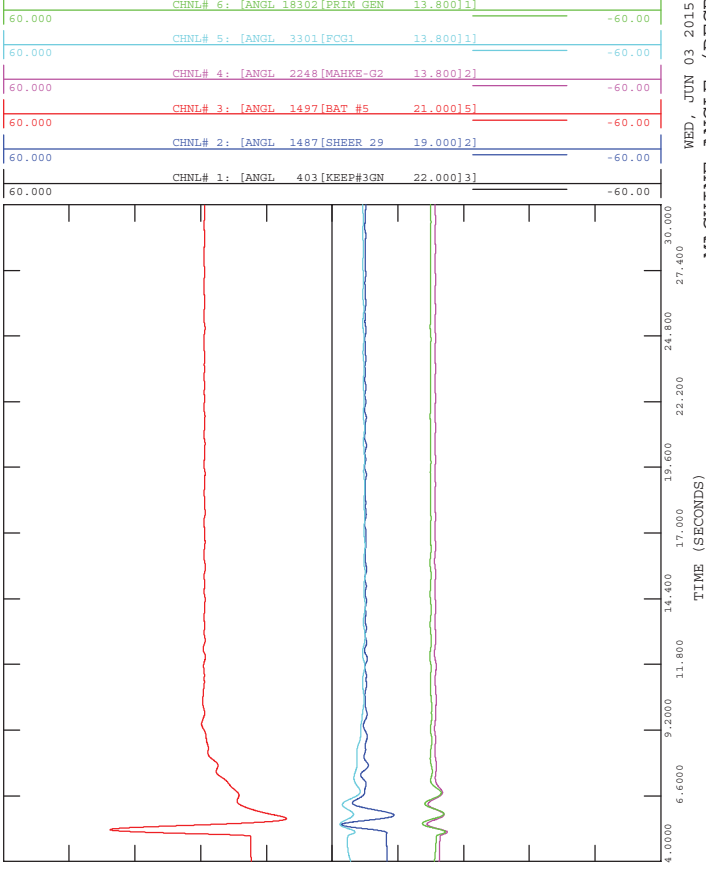


FIGURE F-26C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-26_9L20_Cordel.out

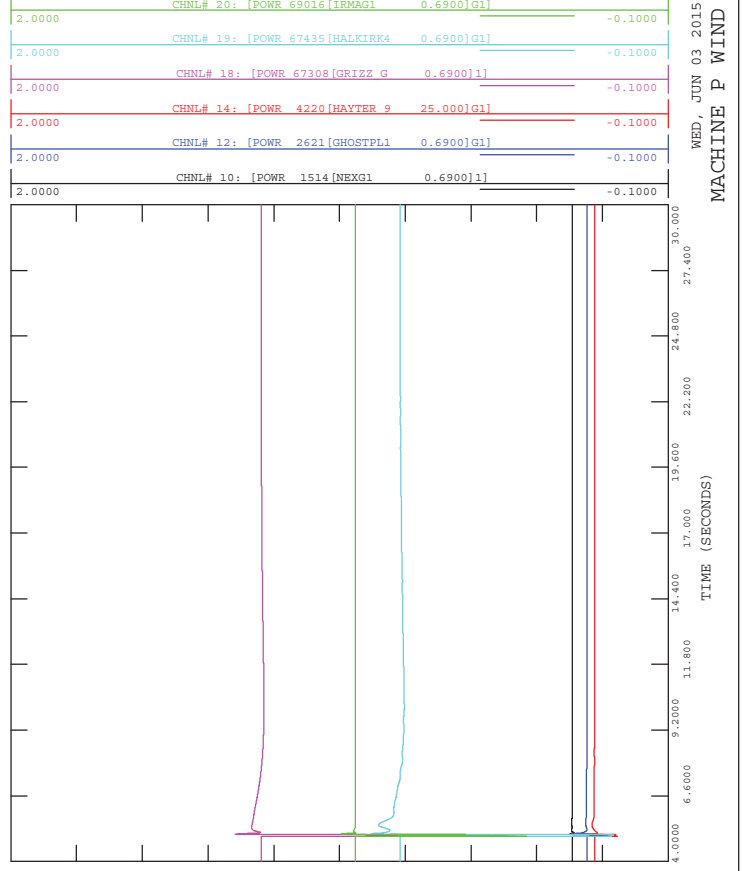




FIGURE F-26F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L20_Cordel.out

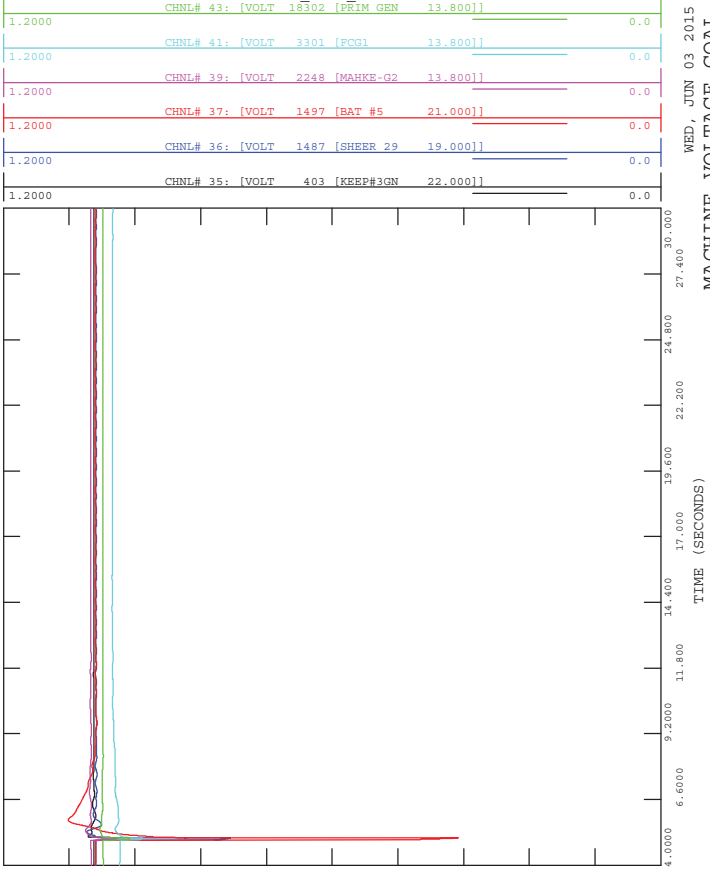


FIGURE F-26H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L20_Cordel.out

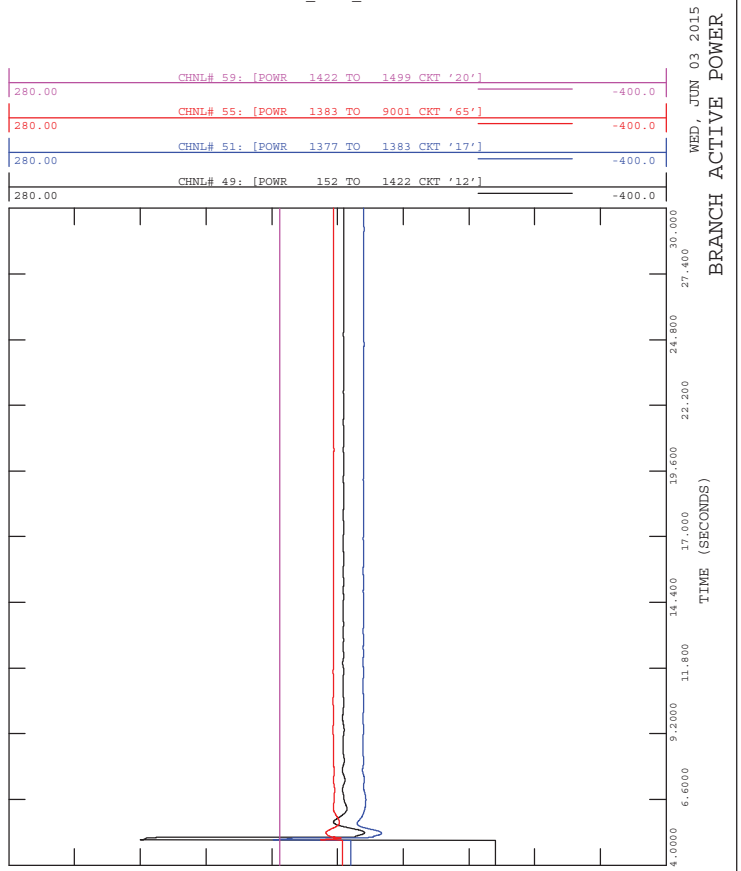


FIGURE F-26E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L20_Cordel.out

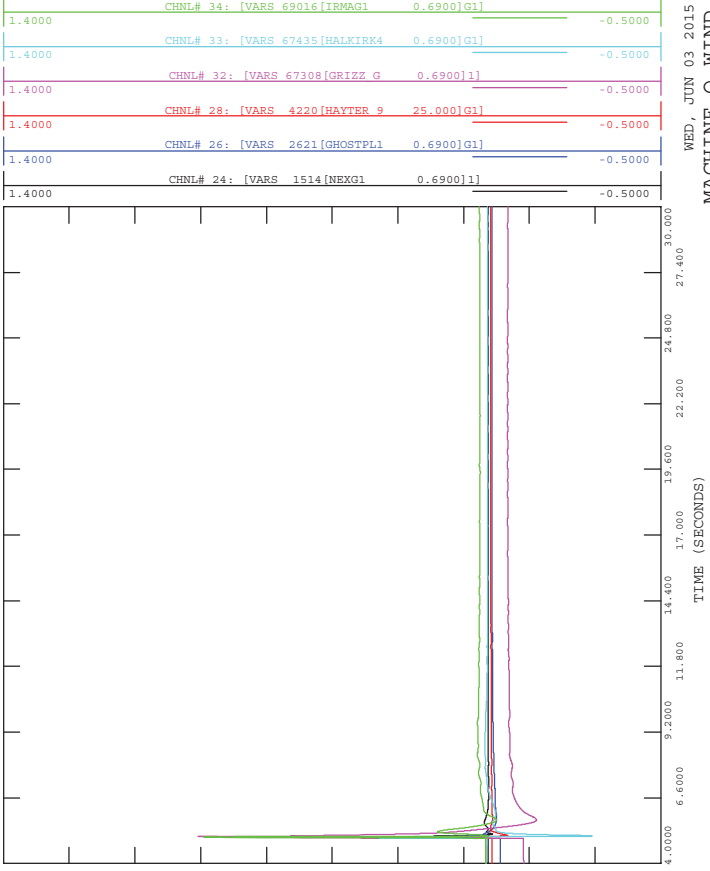


FIGURE F-26G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L20_Cordel.out

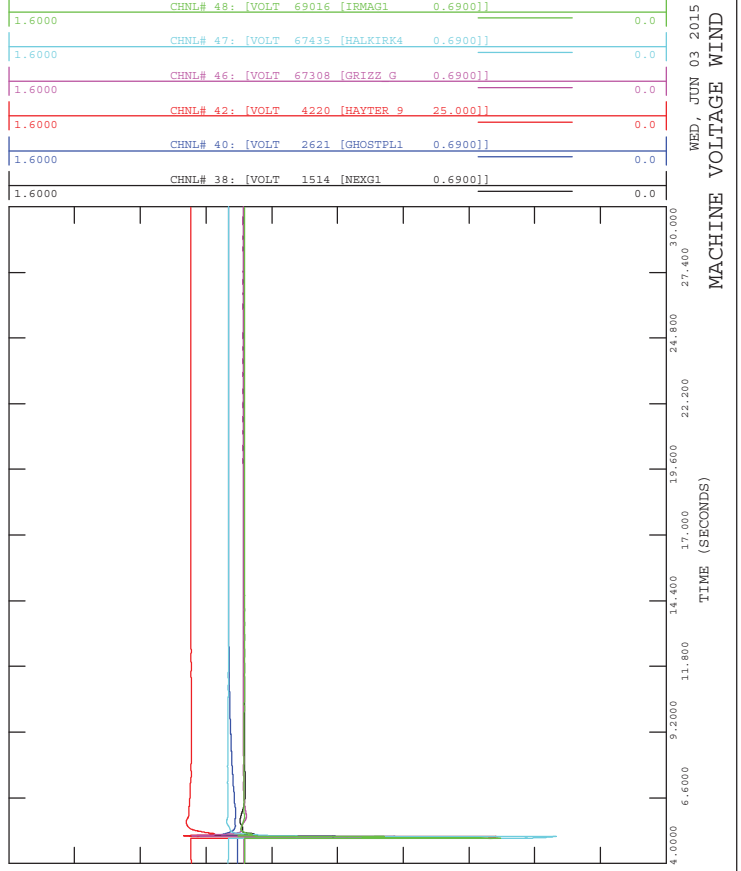
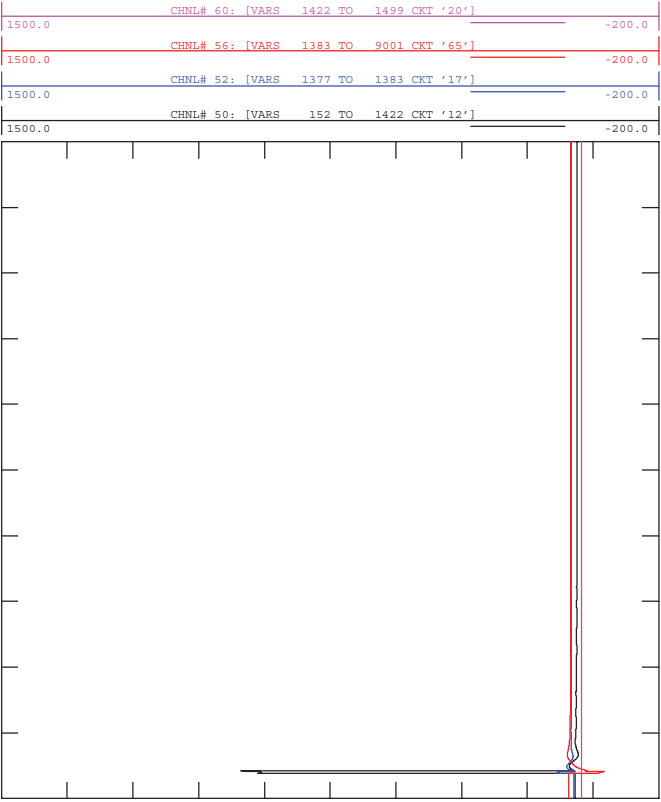




FIGURE F-26I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-26_9L20_Cordel.out



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BRANCH REACTIVE PWR (MVR)



FIGURE F-27B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_9L20_Nevis.out

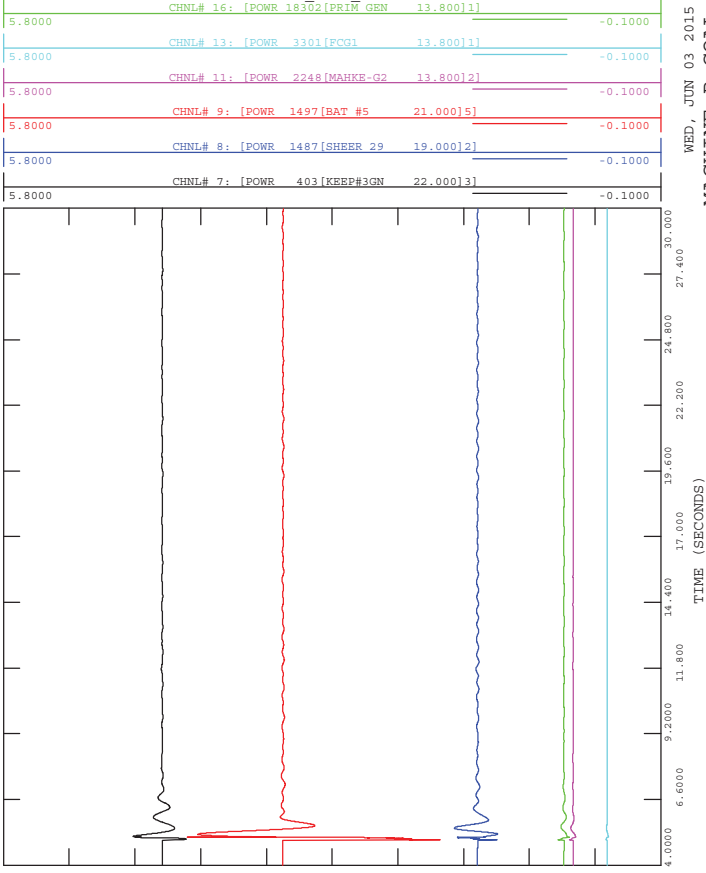


FIGURE F-27D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_9L20_Nevis.out

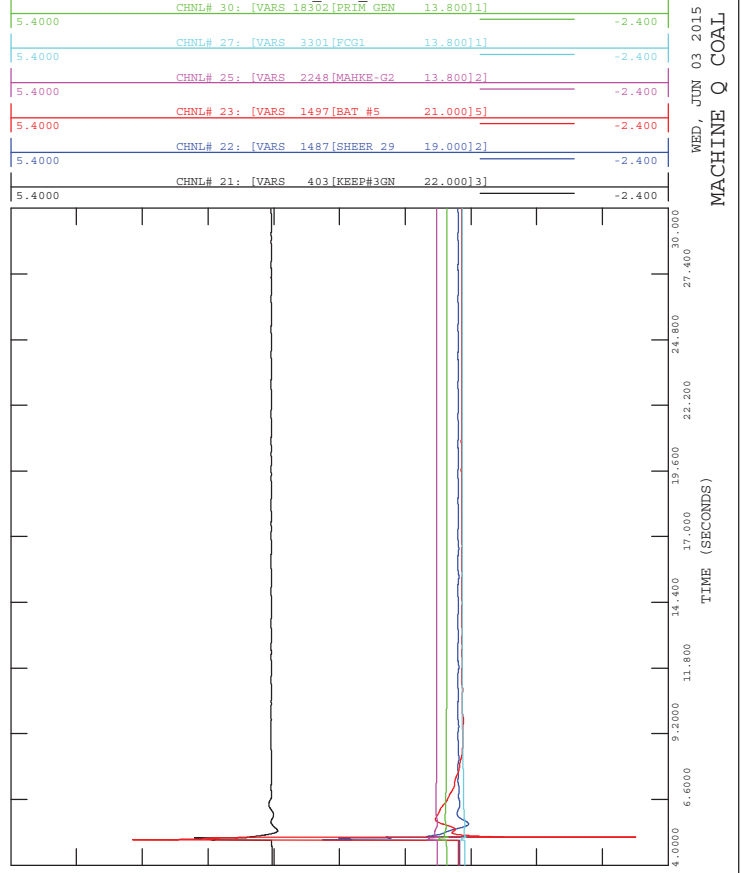


FIGURE F-27A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_9L20_Nevis.out

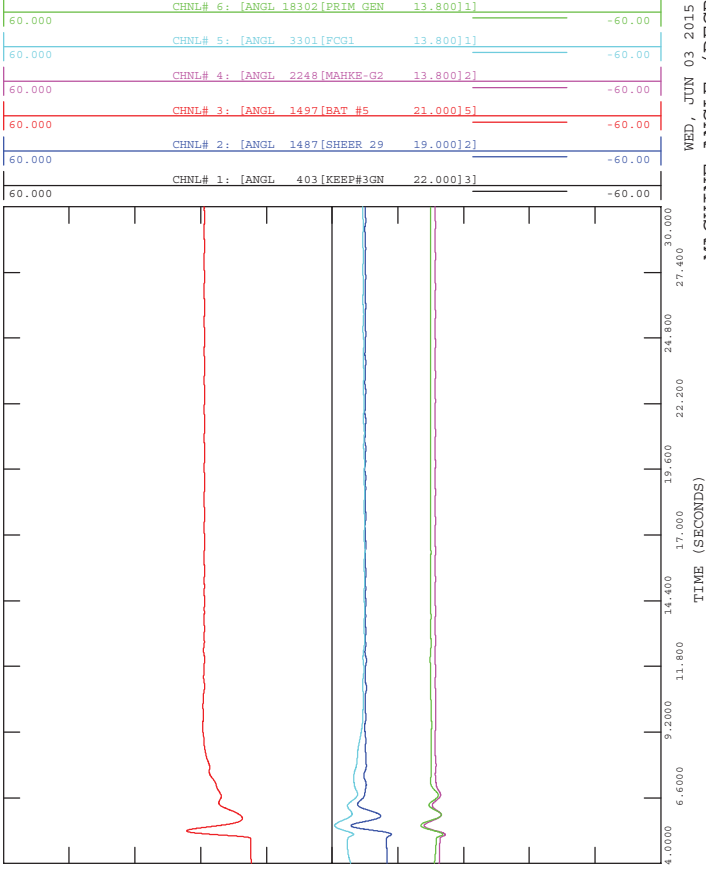


FIGURE F-27C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_9L20_Nevis.out

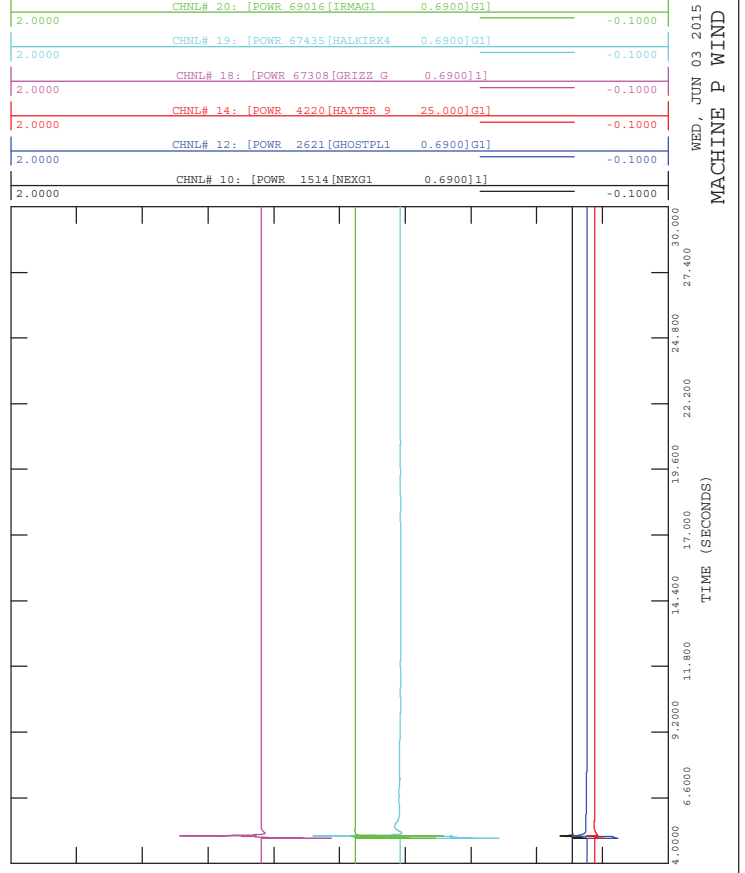




FIGURE F-27F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_9L20_Nevis.out

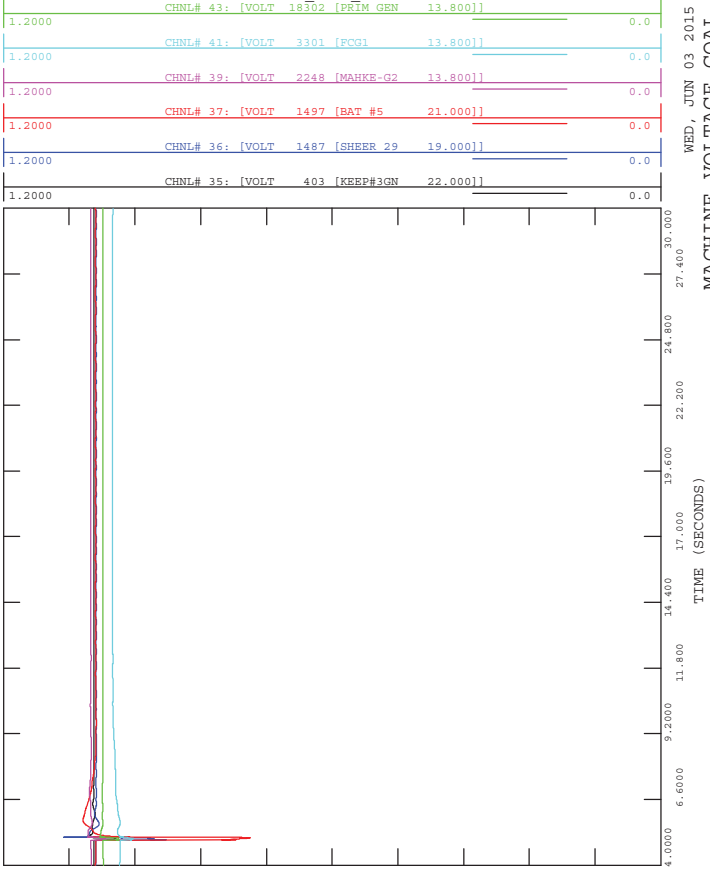


FIGURE F-27H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_9L20_Nevis.out

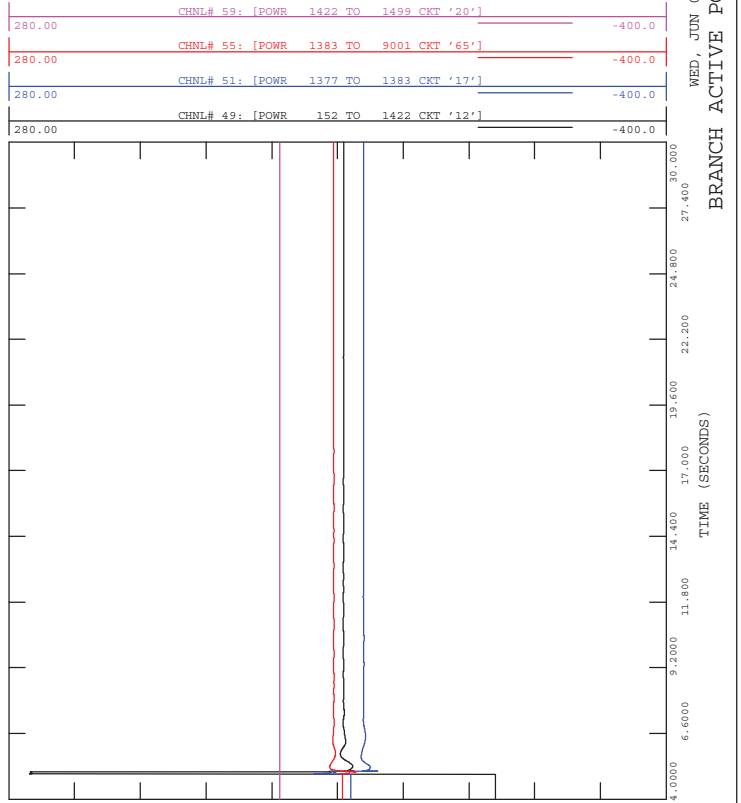


FIGURE F-27E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_9L20_Nevis.out

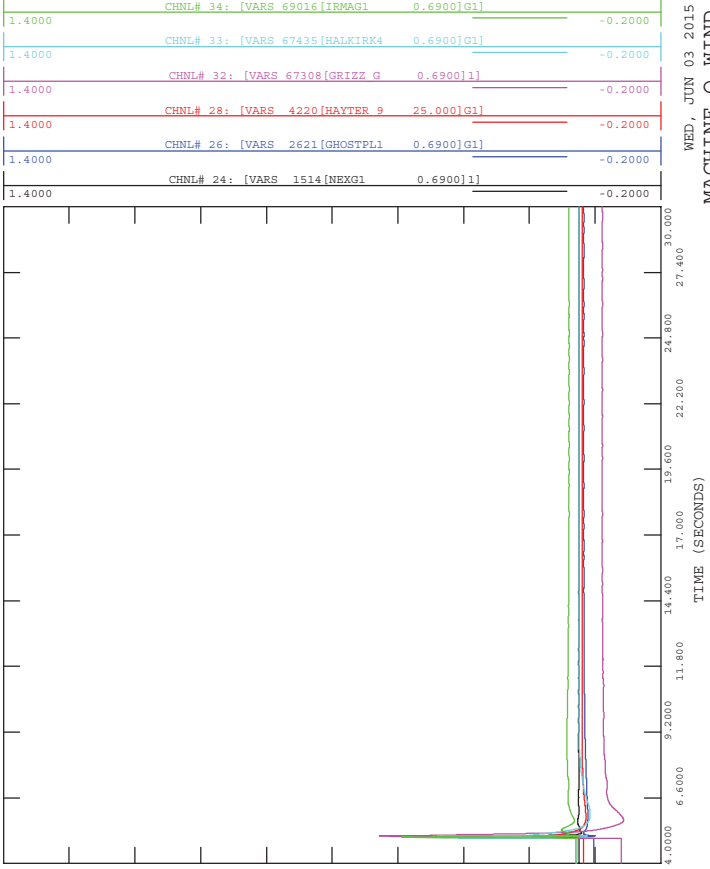


FIGURE F-27G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_9L20_Nevis.out

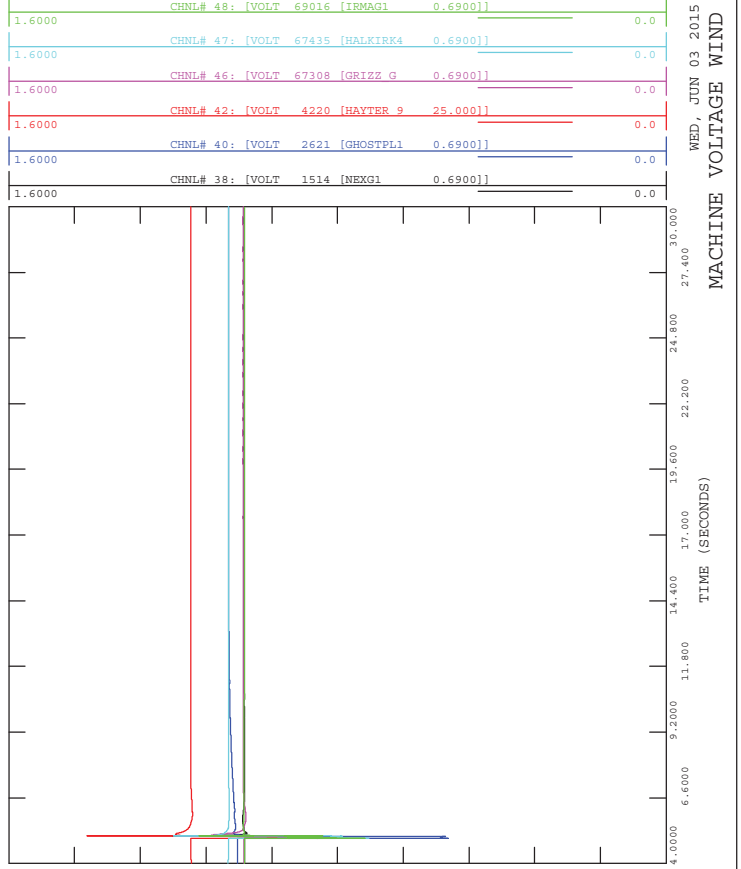
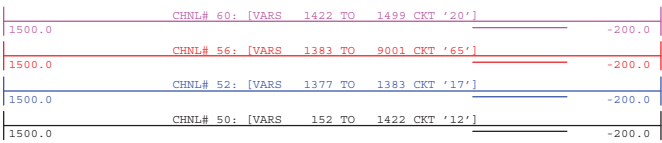




FIGURE F-27I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L20 AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-27_9L20_Nevis.out



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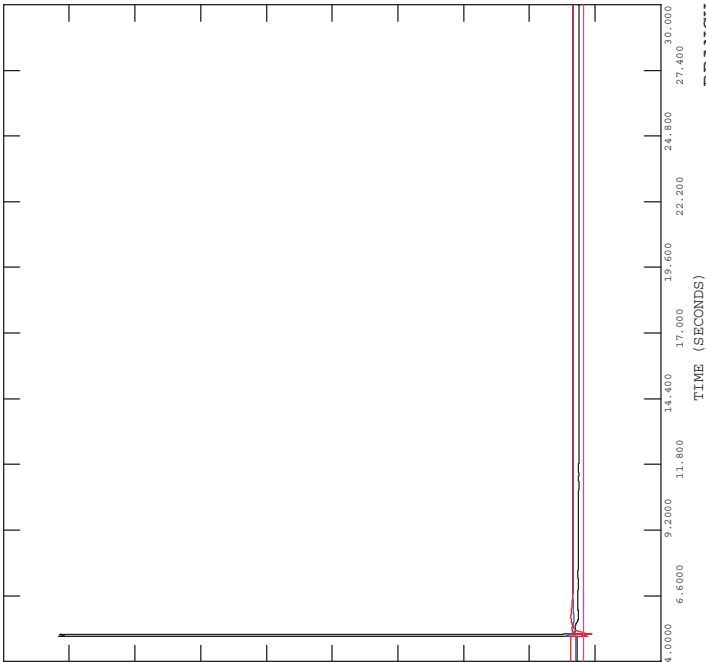




FIGURE F-28B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28 9L59 Anderson.out

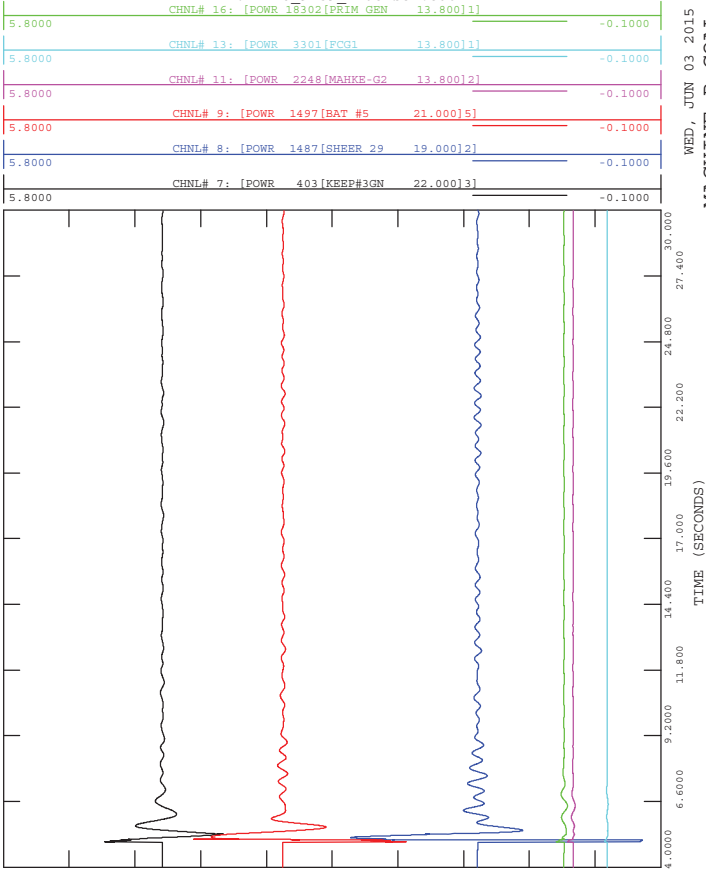


FIGURE F-28D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28 9L59 Anderson.out

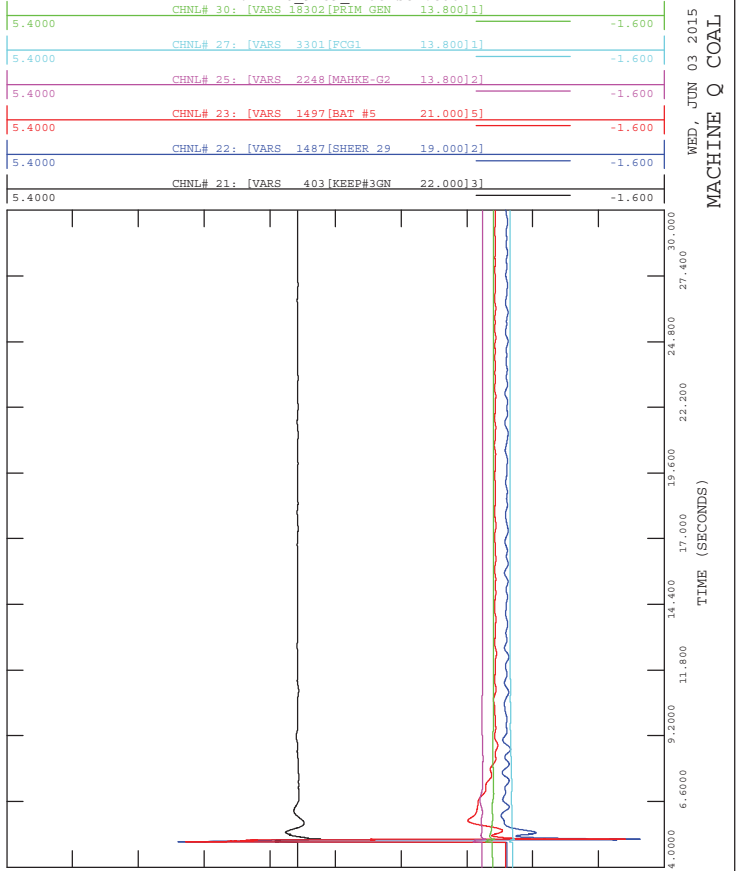


FIGURE F-28A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28 9L59 Anderson.out

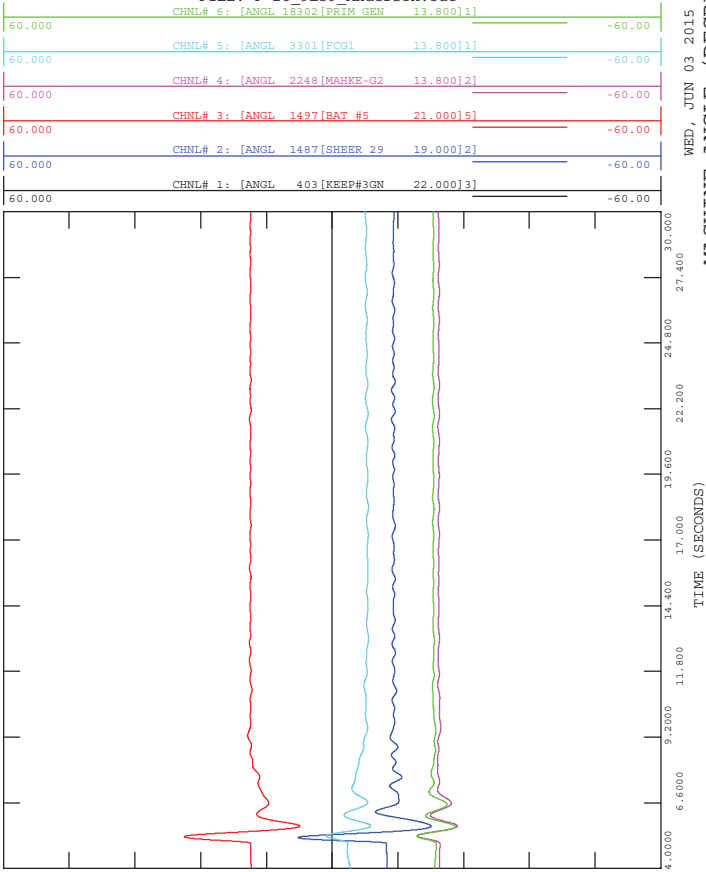


FIGURE F-28C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28 9L59 Anderson.out

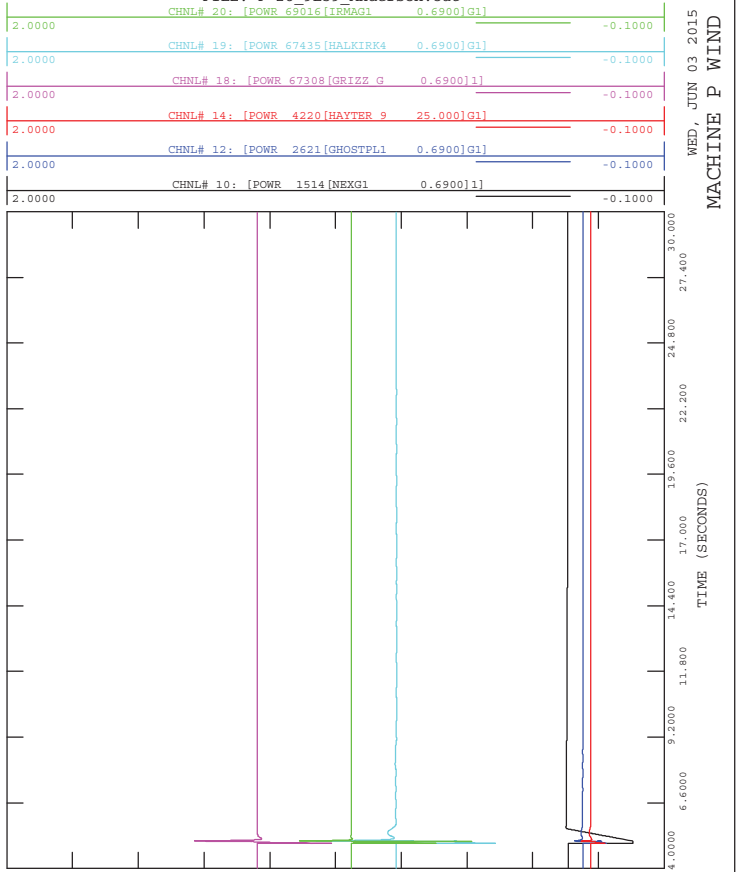




FIGURE F-28F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_9L59_Anderson.out

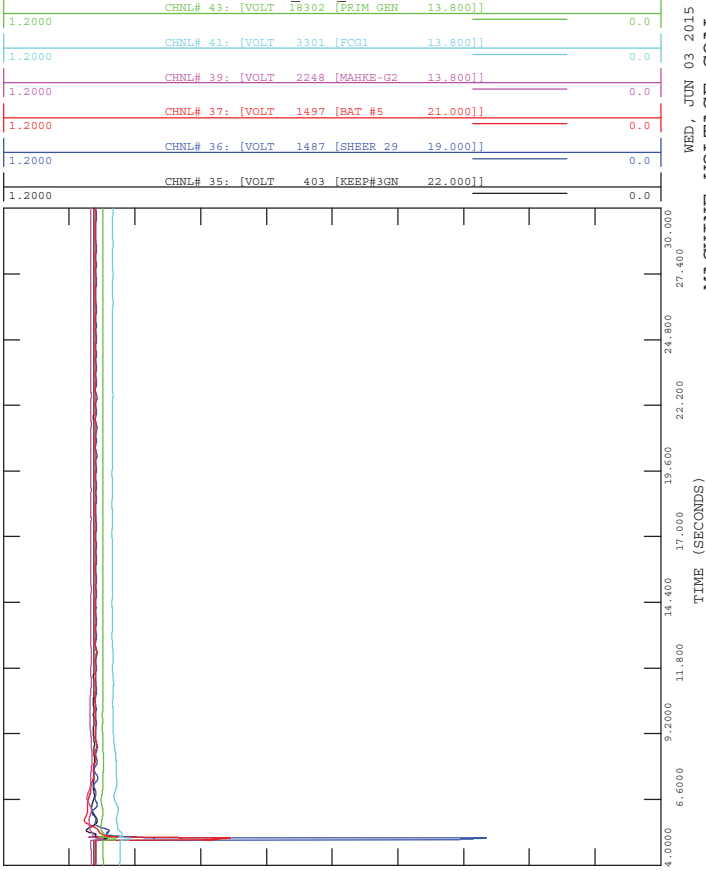


FIGURE F-28H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_9L59_Anderson.out

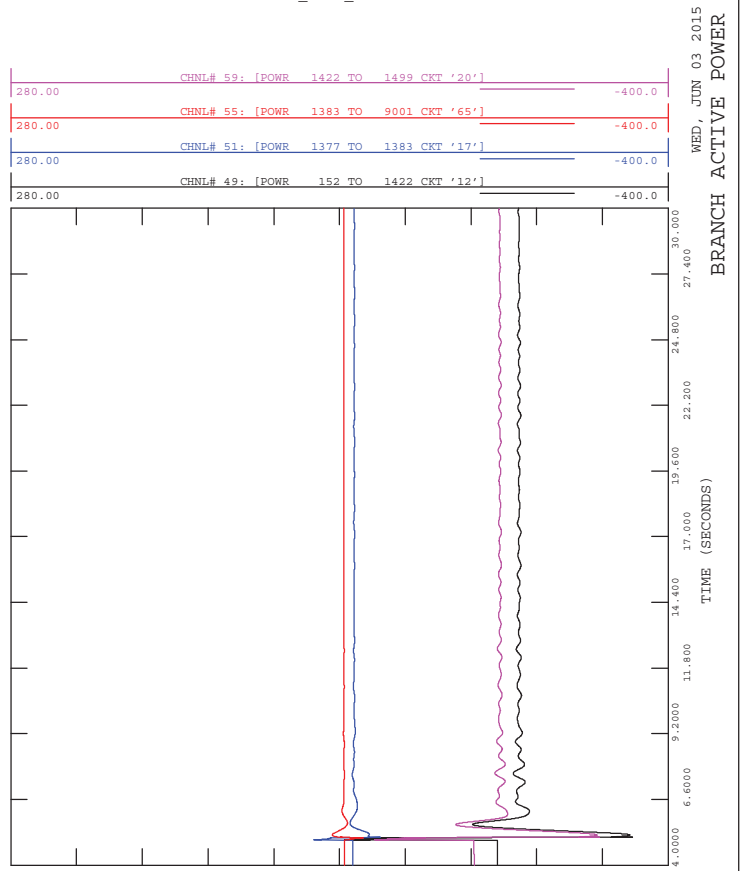


FIGURE F-28E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_9L59_Anderson.out

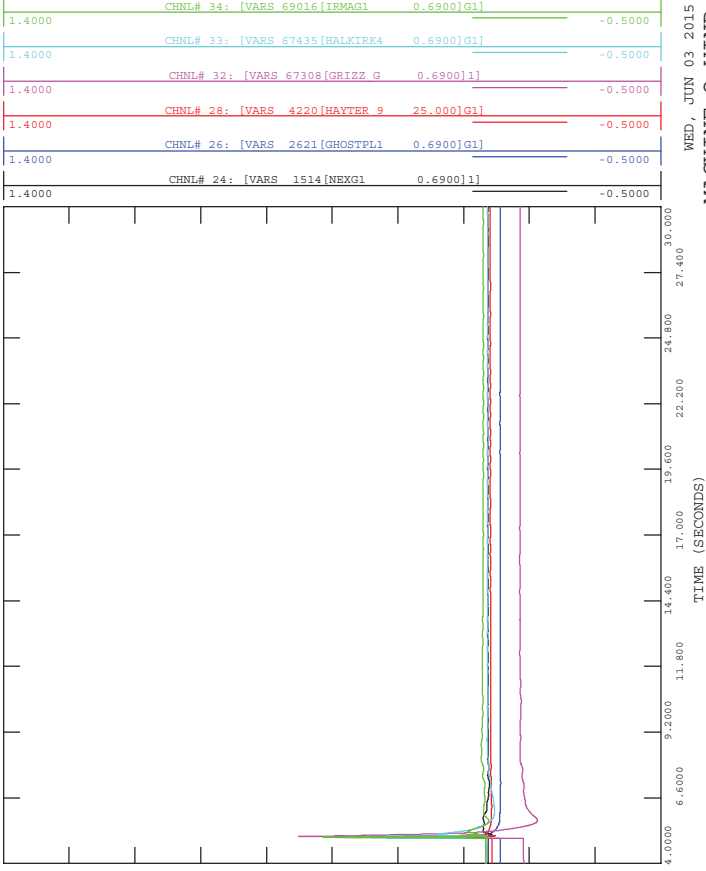


FIGURE F-28G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_9L59_Anderson.out

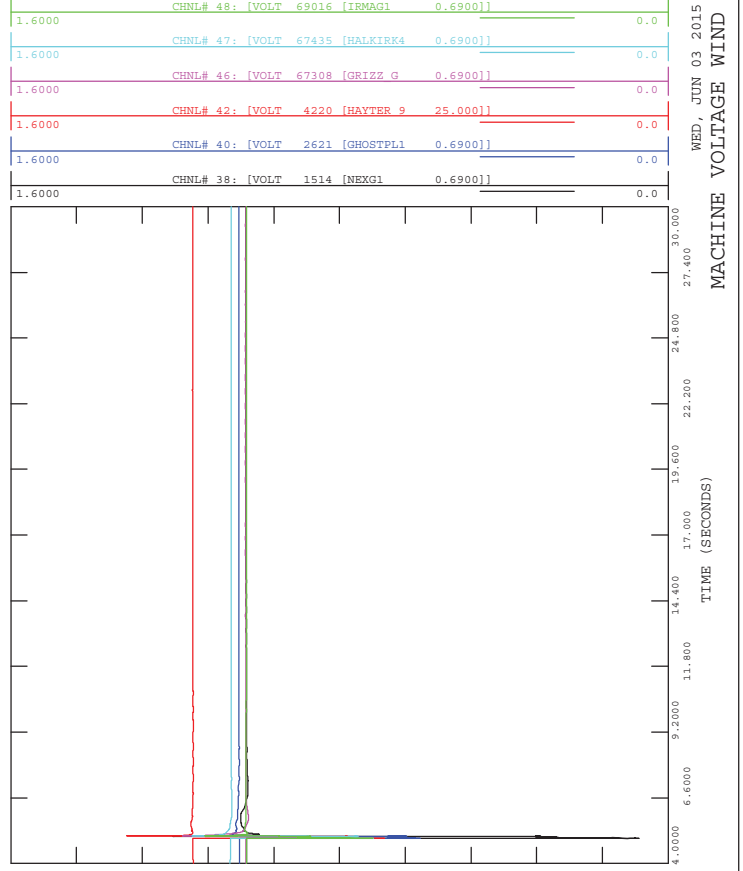
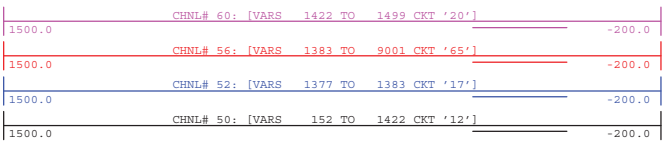




FIGURE F-28I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 801S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-28_9L59_Anderson.out



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BRANCH REACTIVE PWR (MVR)

TIME (SECONDS)

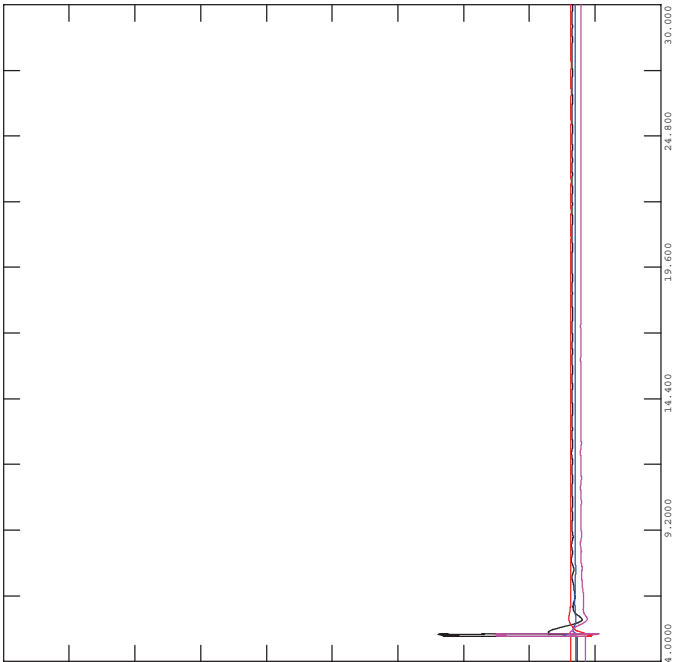




FIGURE F-29B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-29_9L59_Tinchebray.out

5.8000	CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]	-0.1000
5.8000	CHNL# 13: [POWR 3301[FCG1 13.800]1]	-0.1000
5.8000	CHNL# 11: [POWR 2248[MAHKE-G2 13.800]2]	-0.1000
5.8000	CHNL# 9: [POWR 1497[BAT #5 21.000]5]	-0.1000
5.8000	CHNL# 8: [POWR 1487[SHEER 29 19.000]2]	-0.1000
5.8000	CHNL# 7: [POWR 403[KEEP#3GN 22.000]3]	-0.1000

WED, JUN 03 2015 11:26
MACHINE P COAL (PU)

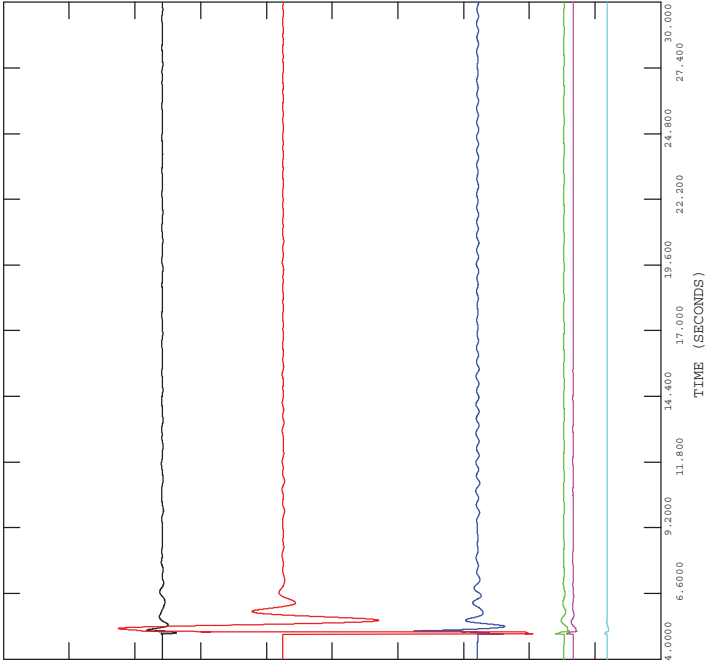


FIGURE F-29D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-29_9L59_Tinchebray.out

5.4000	CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]	-1.600
5.4000	CHNL# 27: [VARS 3301[FCG1 13.800]1]	-1.600
5.4000	CHNL# 25: [VARS 2248[MAHKE-G2 13.800]2]	-1.600
5.4000	CHNL# 23: [VARS 1497[BAT #5 21.000]5]	-1.600
5.4000	CHNL# 22: [VARS 1487[SHEER 29 19.000]2]	-1.600
5.4000	CHNL# 21: [VARS 403[KEEP#3GN 22.000]3]	-1.600

WED, JUN 03 2015 11:26
MACHINE Q COAL (PU)

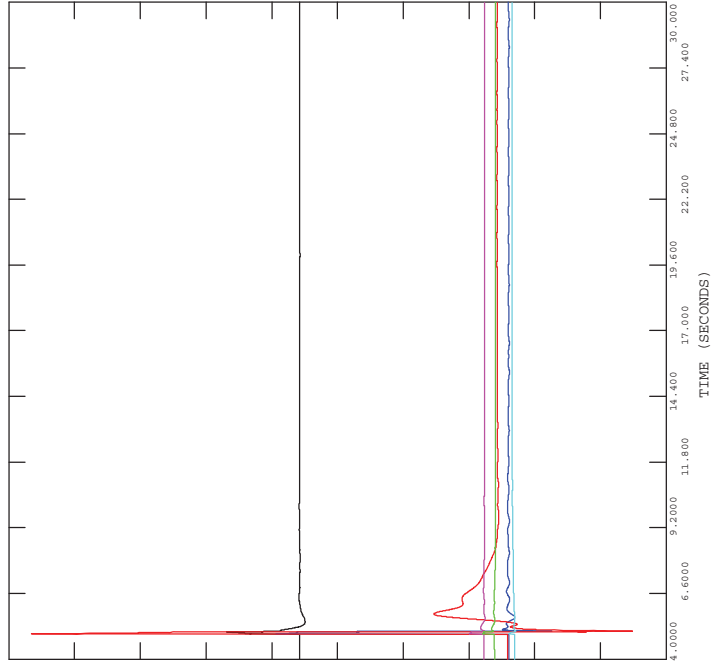


FIGURE F-29A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-29_9L59_Tinchebray.out

60.000	CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]	-60.00
60.000	CHNL# 5: [ANGL 3301[FCG1 13.800]1]	-60.00
60.000	CHNL# 4: [ANGL 2248[MAHKE-G2 13.800]2]	-60.00
60.000	CHNL# 3: [ANGL 1497[BAT #5 21.000]5]	-60.00
60.000	CHNL# 2: [ANGL 1487[SHEER 29 19.000]2]	-60.00
60.000	CHNL# 1: [ANGL 403[KEEP#3GN 22.000]3]	-60.00

WED, JUN 03 2015 11:26
MACHINE ANGLE (DEGREES)

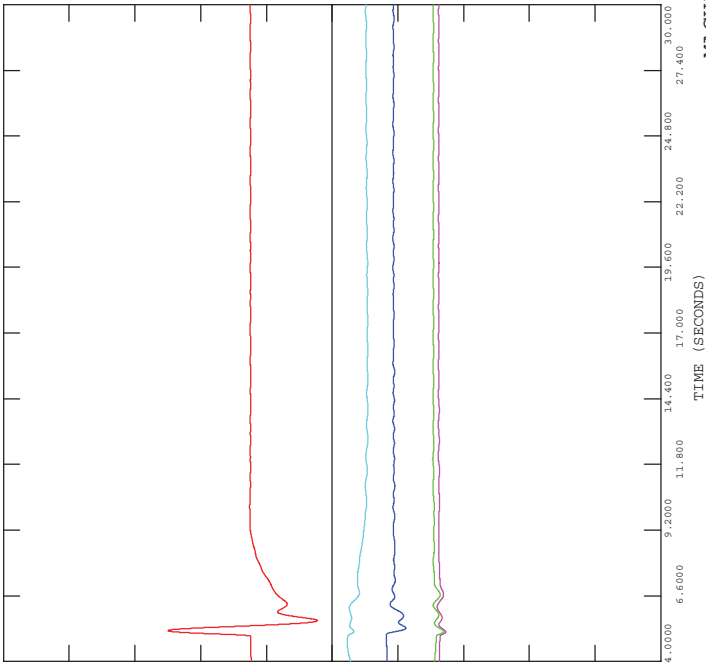


FIGURE F-29C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-29_9L59_Tinchebray.out

2.0000	CHNL# 20: [POWR 69016[TRMAG1 0.6900]G1]	-0.1000
2.0000	CHNL# 19: [POWR 67435[HALKIRK4 0.6900]G1]	-0.1000
2.0000	CHNL# 18: [POWR 67308[GRIZZ G 0.6900]1]	-0.1000
2.0000	CHNL# 14: [POWR 4220[HAYTER 9 25.000]G1]	-0.1000
2.0000	CHNL# 12: [POWR 2621[GHOSTPL1 0.6900]G1]	-0.1000
2.0000	CHNL# 10: [POWR 1514[NEXG1 0.6900]1]	-0.1000

WED, JUN 03 2015 11:26
MACHINE P WIND (PU)

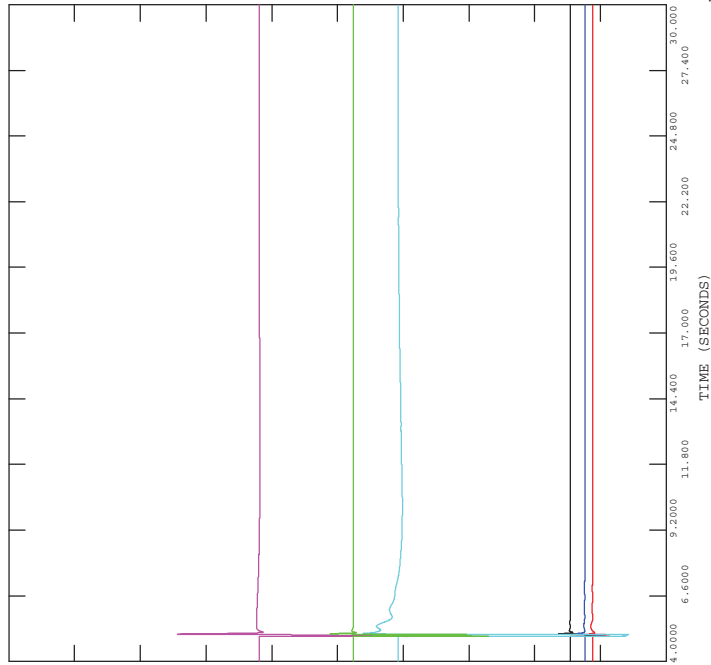
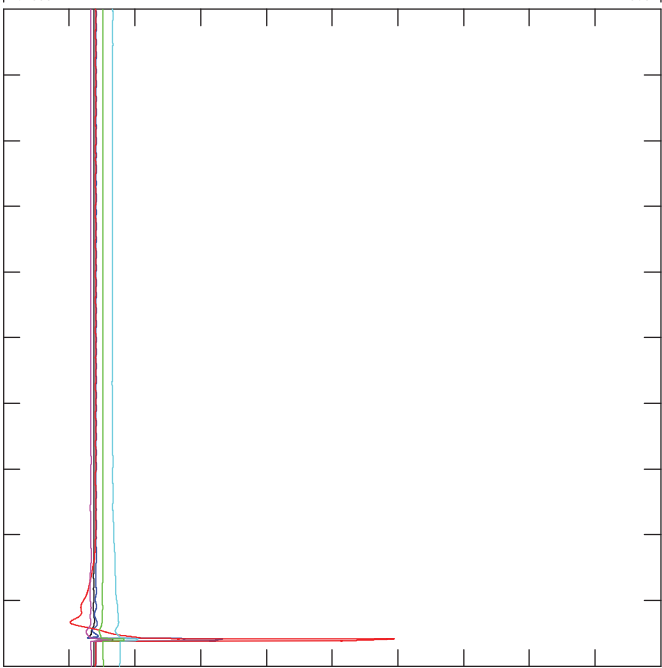




FIGURE F-29F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-29_9L59_Tinchebray.out

1.2000	CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]	0.0
1.2000	CHNL# 41: [VOLT 3301 [PCG1 13.800]]	0.0
1.2000	CHNL# 39: [VOLT 2248 [MAHKE-G2 13.800]]	0.0
1.2000	CHNL# 37: [VOLT 1497 [BAT #5 21.000]]	0.0
1.2000	CHNL# 36: [VOLT 1487 [SHEER 29 19.000]]	0.0
1.2000	CHNL# 35: [VOLT 403 [KEEP#3GN 22.000]]	0.0



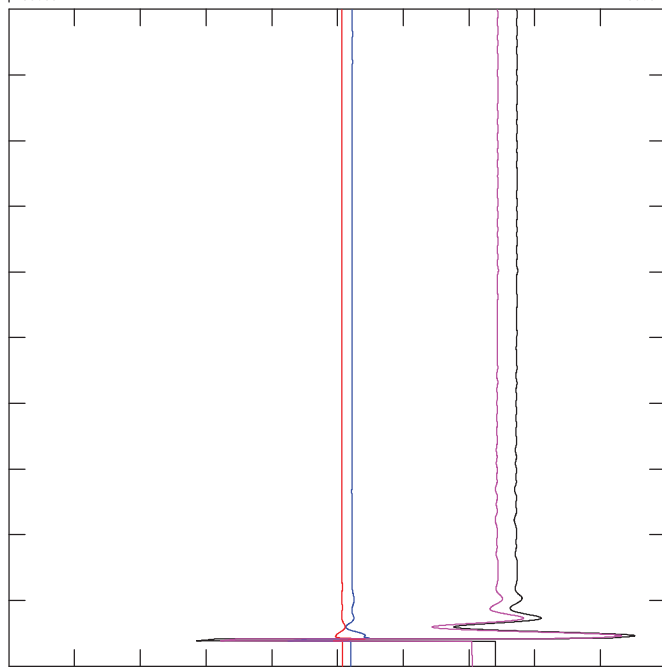
WED, JUN 03 2015 11:26
MACHINE VOLTAGE COAL (PU)



FIGURE F-29H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-29_9L59_Tinchebray.out

280.00	CHNL# 59: [POWR 1422 TO 1499 CKT '20']	-400.0
280.00	CHNL# 55: [POWR 1383 TO 9001 CKT '65']	-400.0
280.00	CHNL# 51: [POWR 1377 TO 1383 CKT '17']	-400.0
280.00	CHNL# 49: [POWR 152 TO 1422 CKT '12']	-400.0



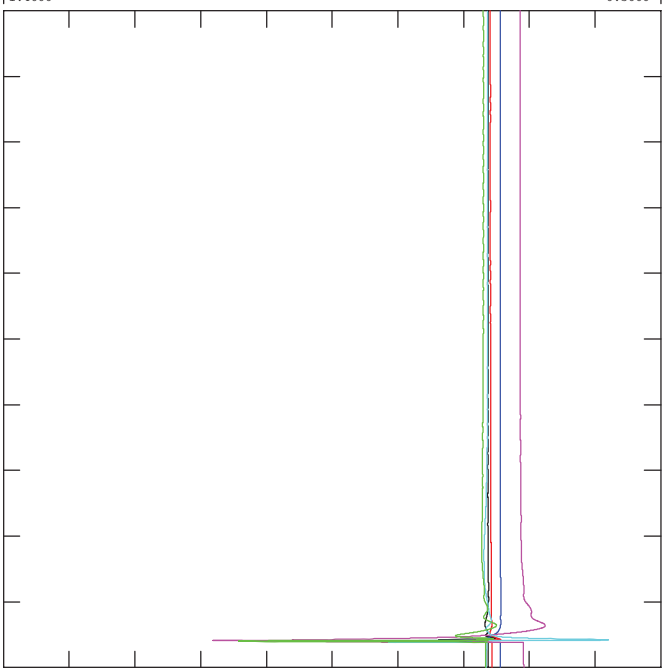
WED, JUN 03 2015 11:26
BRANCH ACTIVE POWER (MW)



FIGURE F-29E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-29_9L59_Tinchebray.out

1.4000	CHNL# 34: [VARS 59016 [IRWAG1 0.6900]G]]	-0.5000
1.4000	CHNL# 33: [VARS 67435 [HALKIRK4 0.6900]G]]	-0.5000
1.4000	CHNL# 32: [VARS 67308 [GRIZZ G 0.6900]I]]	-0.5000
1.4000	CHNL# 28: [VARS 4220 [HAYTER 9 25.000]G]]	-0.5000
1.4000	CHNL# 26: [VARS 2621 [GHOSTPL1 0.6900]G]]	-0.5000
1.4000	CHNL# 24: [VARS 1514 [NEXG1 0.6900]I]]	-0.5000



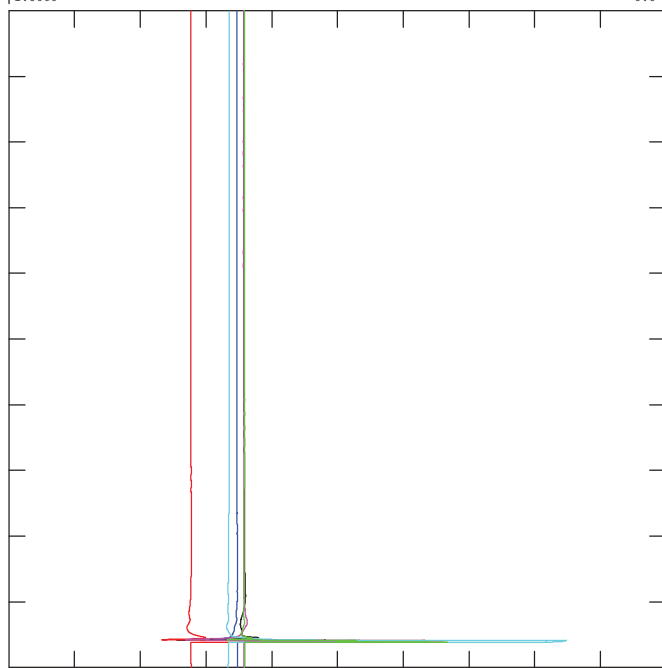
WED, JUN 03 2015 11:26
MACHINE Q WIND (PU)



FIGURE F-29G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-29_9L59_Tinchebray.out

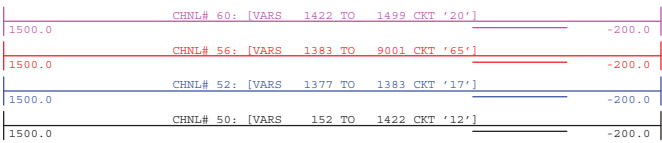
1.6000	CHNL# 48: [VOLT 69016 [IRWAG1 0.6900]]	0.0
1.6000	CHNL# 47: [VOLT 67435 [HALKIRK4 0.6900]]	0.0
1.6000	CHNL# 46: [VOLT 67308 [GRIZZ G 0.6900]]	0.0
1.6000	CHNL# 42: [VOLT 4220 [HAYTER 9 25.000]]	0.0
1.6000	CHNL# 40: [VOLT 2621 [GHOSTPL1 0.6900]]	0.0
1.6000	CHNL# 38: [VOLT 1514 [NEXG1 0.6900]]	0.0



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MACHINE VOLTAGE WIND (PU)



FIGURE F-29I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L59 AT 972S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-29_9L59_Tinchebray.out



WED, JUN 03 2015 11:26
BRANCH REACTIVE PWR (MVR)

TIME (SECONDS)

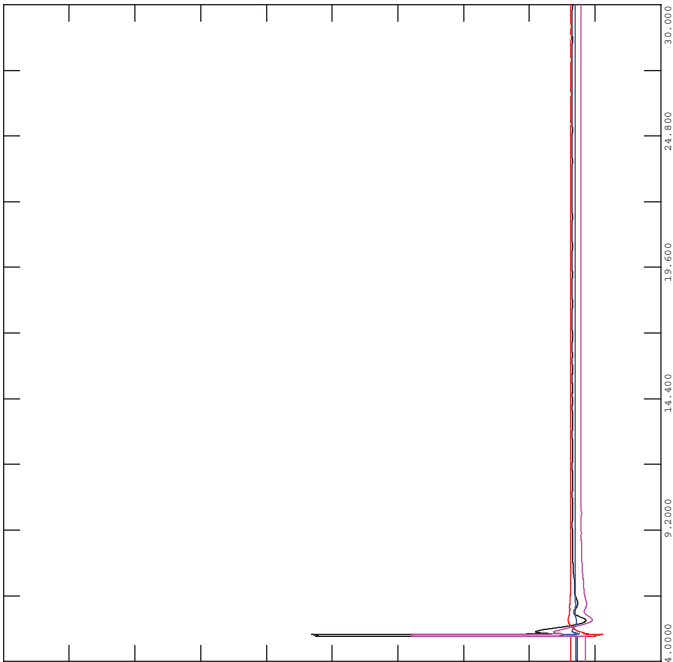




FIGURE F-30B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-30_912L_Nevis.out

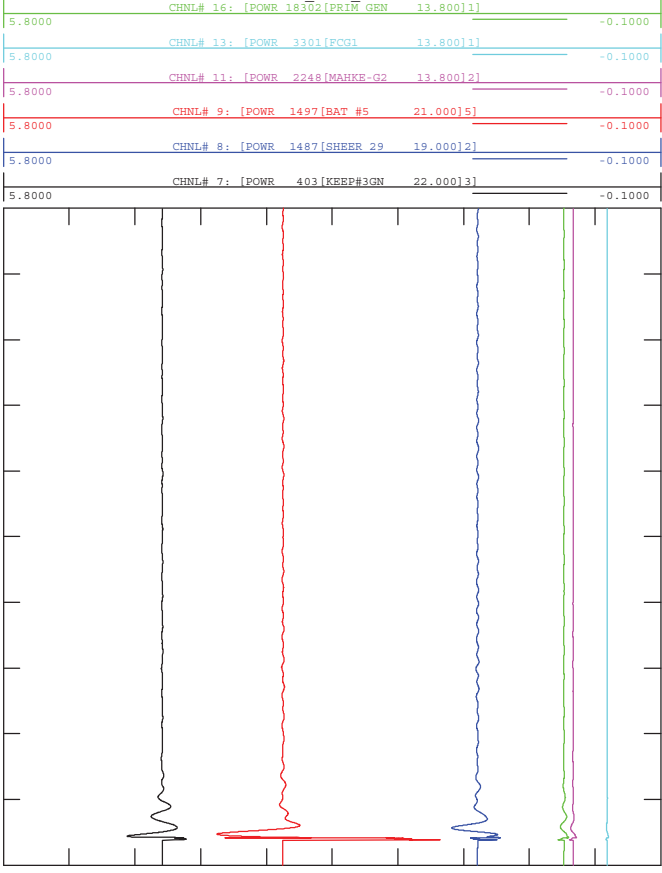


FIGURE F-30D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-30_912L_Nevis.out

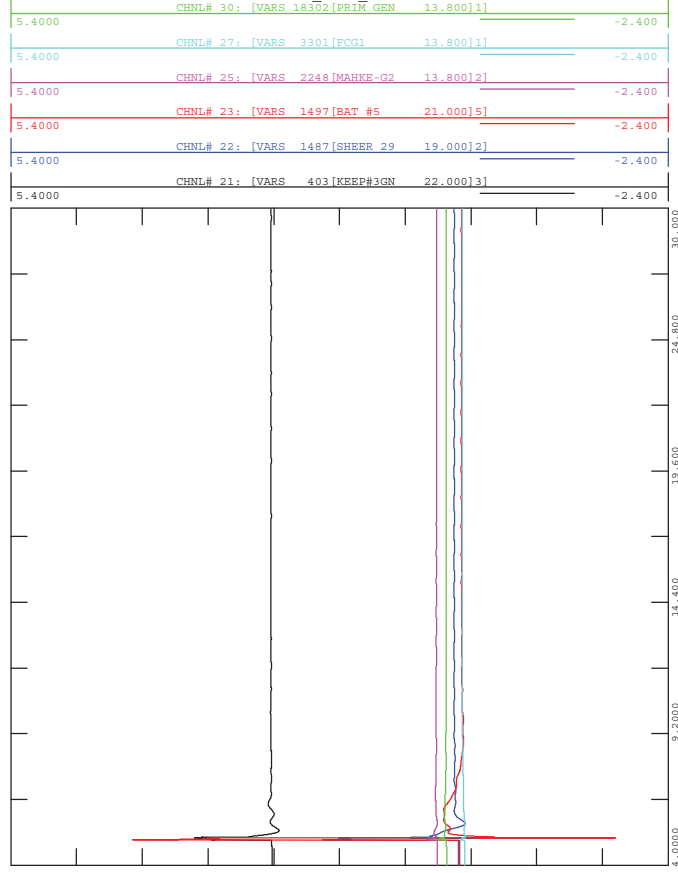


FIGURE F-30A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-30_912L_Nevis.out

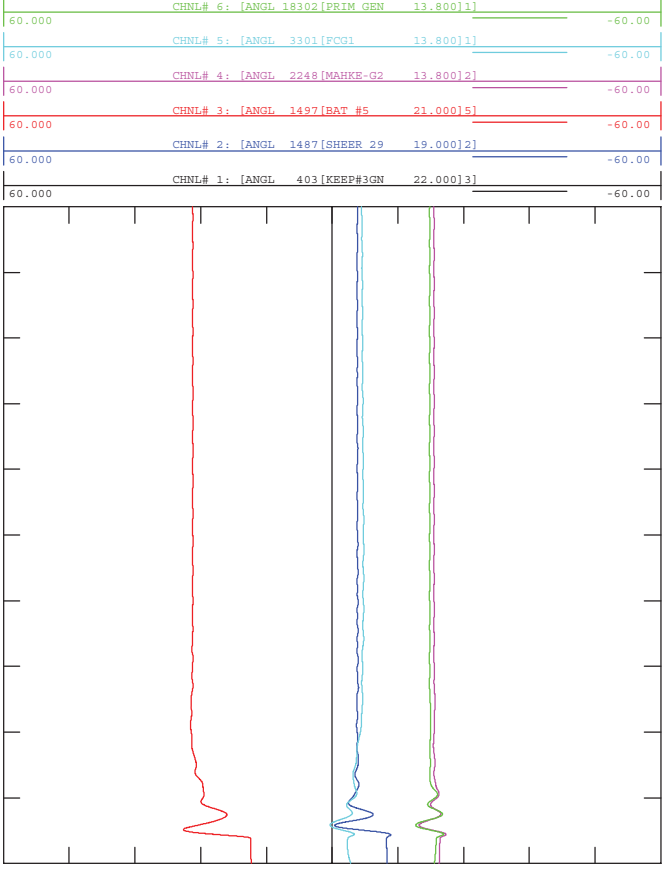


FIGURE F-30C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-30_912L_Nevis.out

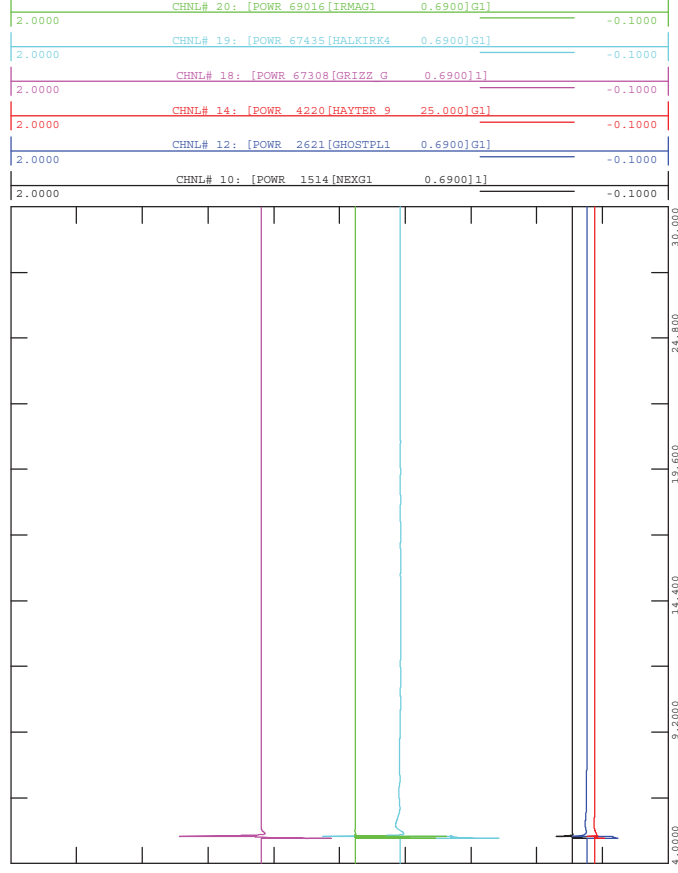
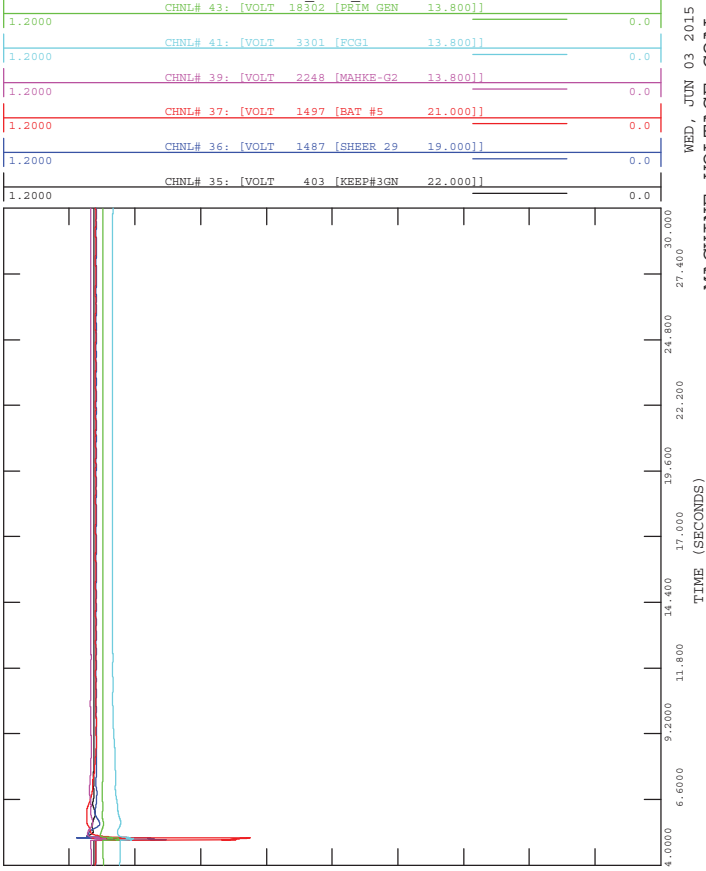




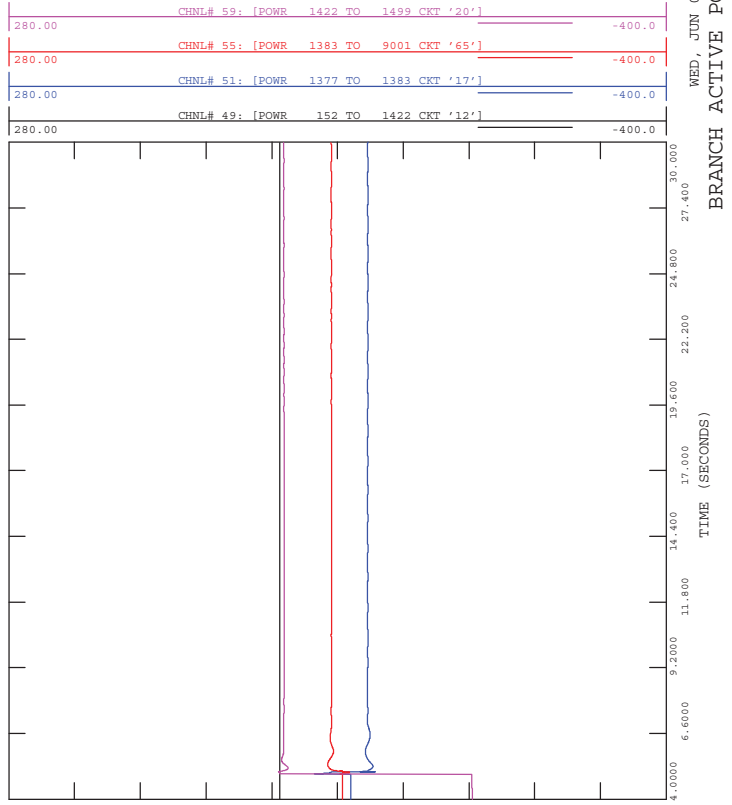
FIGURE F-30F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-30_912L_Nevis.out



WED, JUN 03 2015 11:27
MACHINE VOLTAGE COAL (PU)



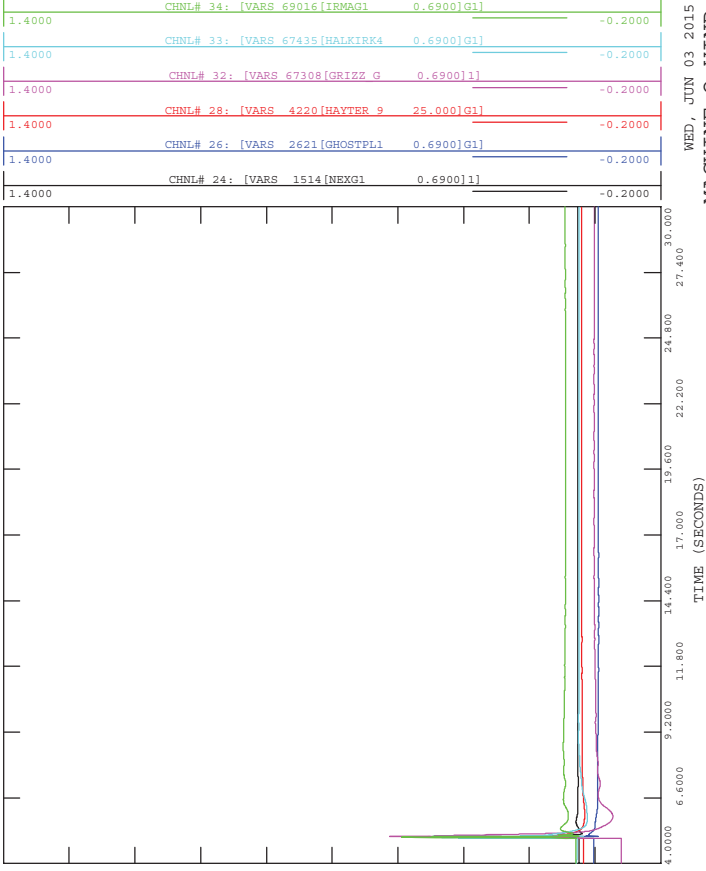
FIGURE F-30H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-30_912L_Nevis.out



WED, JUN 03 2015 11:27
BRANCH ACTIVE POWER (MW)



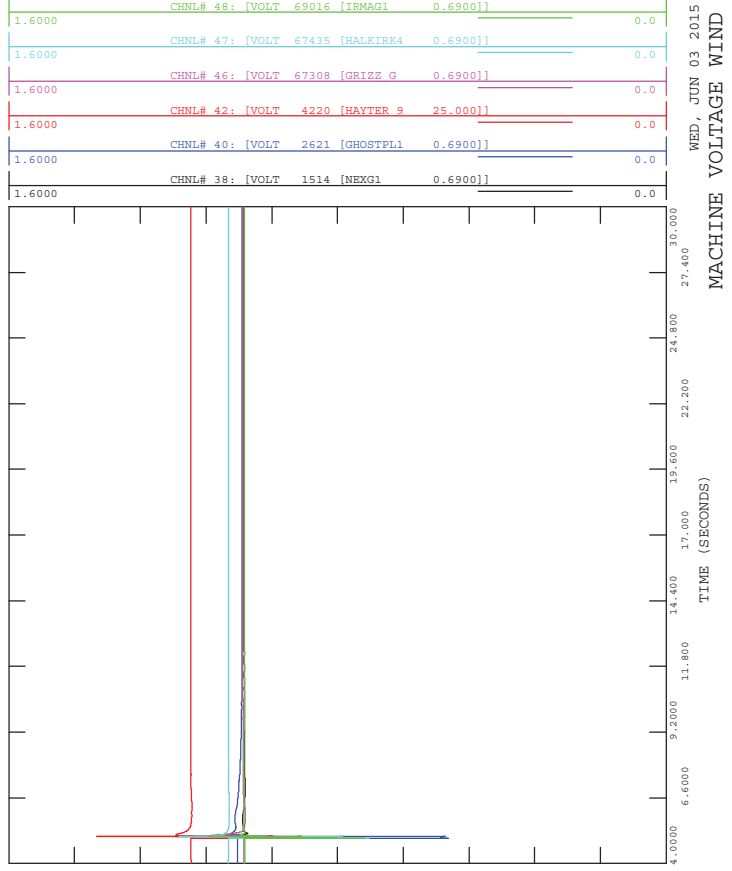
FIGURE F-30B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-30_912L_Nevis.out



WED, JUN 03 2015 11:27
MACHINE Q WIND (PU)



FIGURE F-30G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-30_912L_Nevis.out



WED, JUN 03 2015 11:27
MACHINE VOLTAGE WIND (PU)



FIGURE F-301
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 766S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-30_912L_Nevis.out

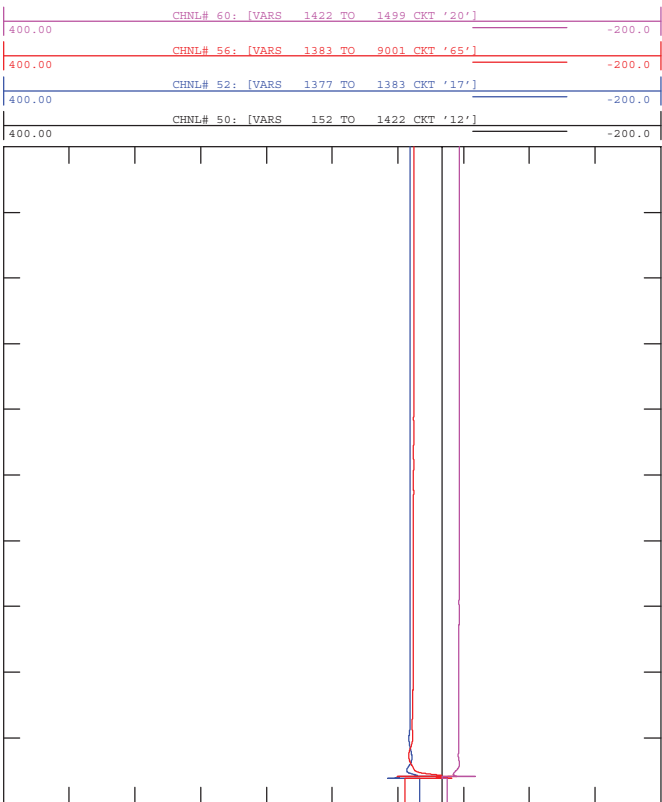




FIGURE F-31B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-31_912L RedDeer.out

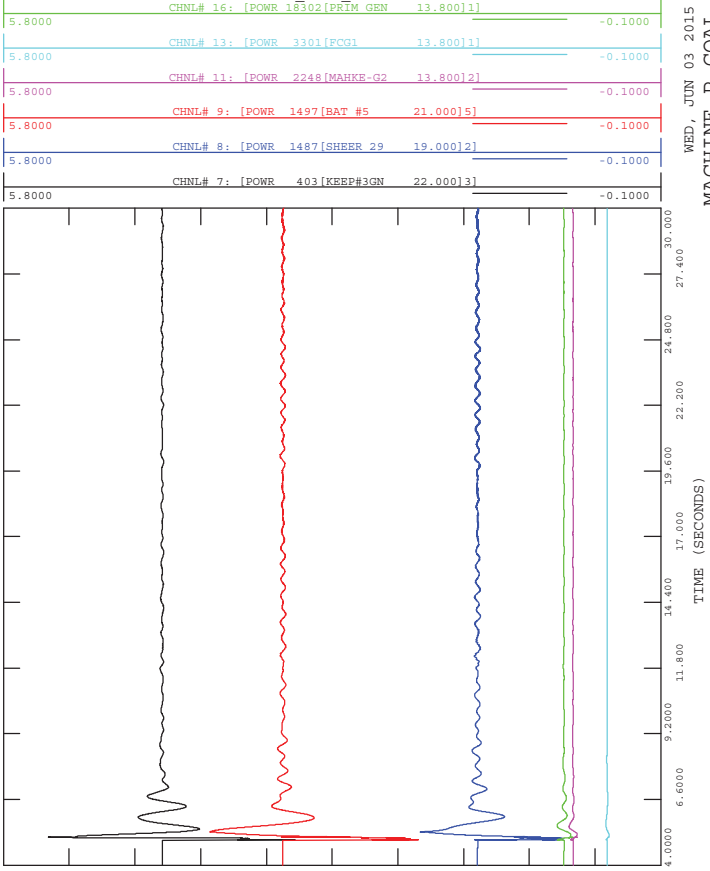


FIGURE F-31D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-31_912L RedDeer.out

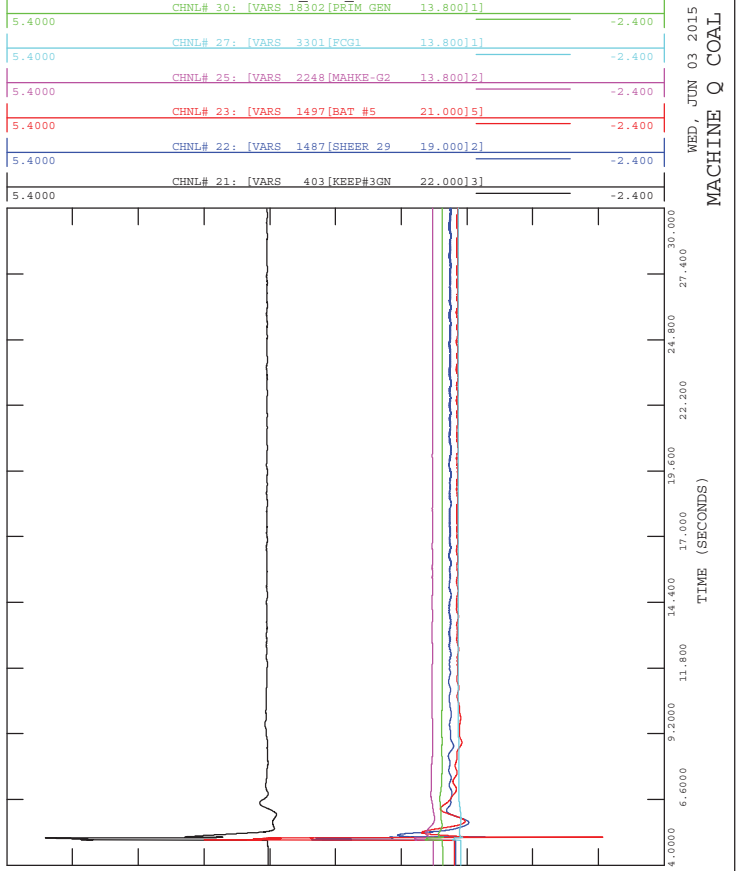


FIGURE F-31A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-31_912L RedDeer.out

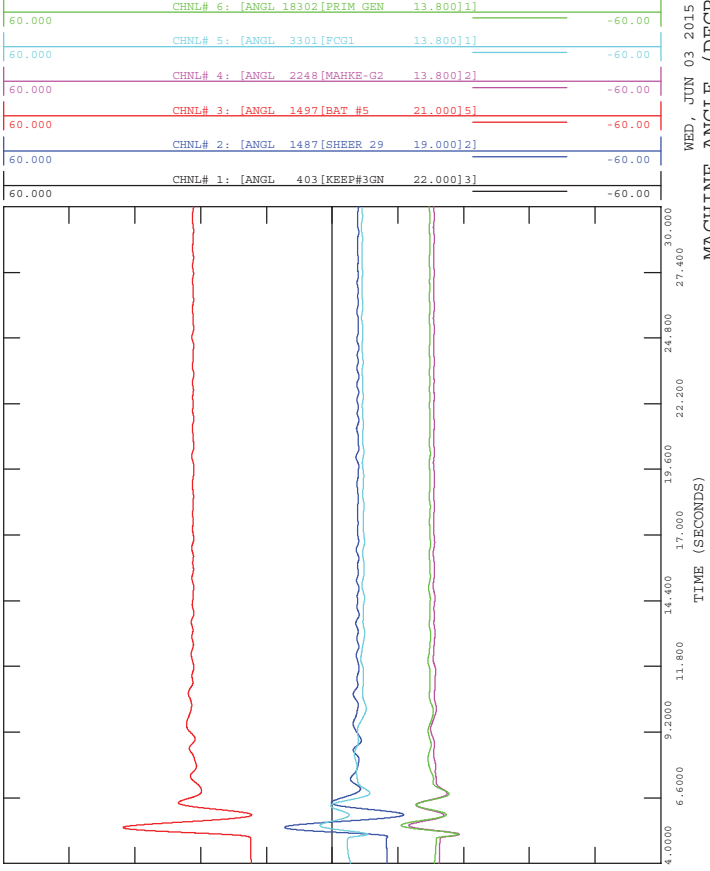


FIGURE F-31C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-31_912L RedDeer.out

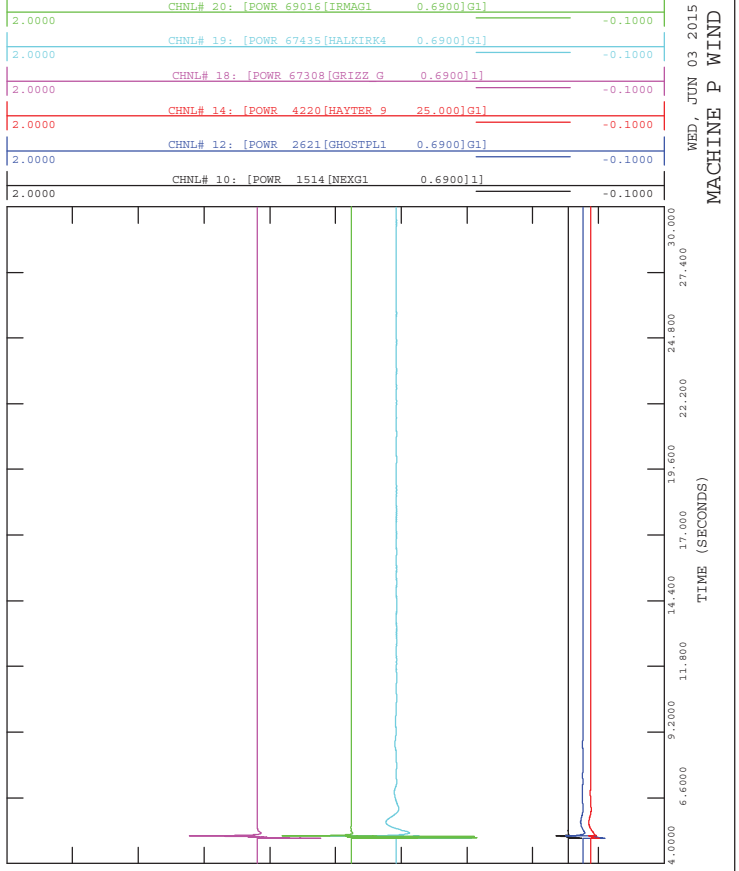




FIGURE F-31F
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-31_912L_RedDeer.out

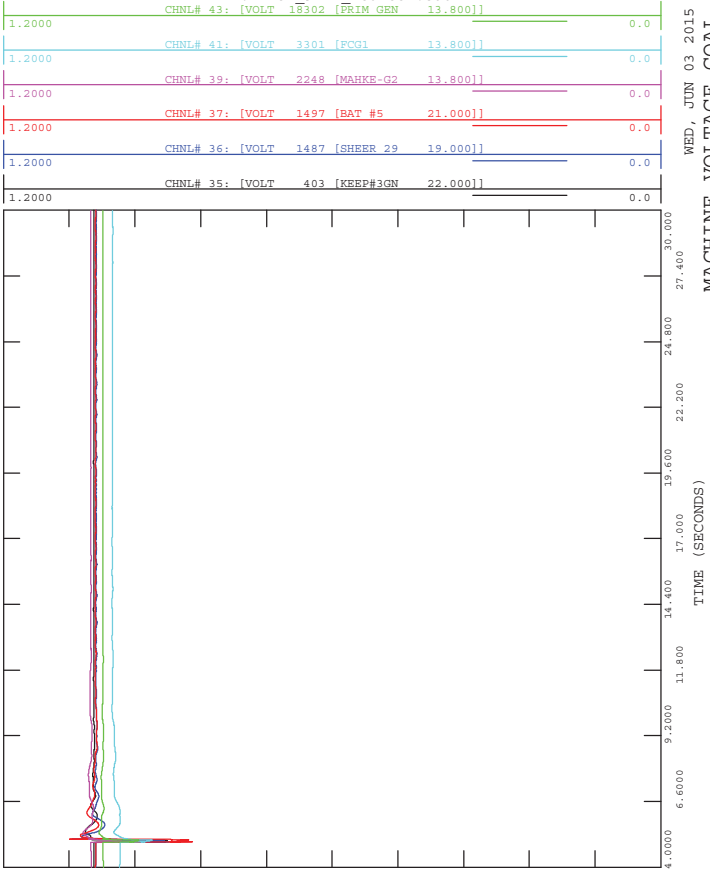


FIGURE F-31H
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-31_912L_RedDeer.out

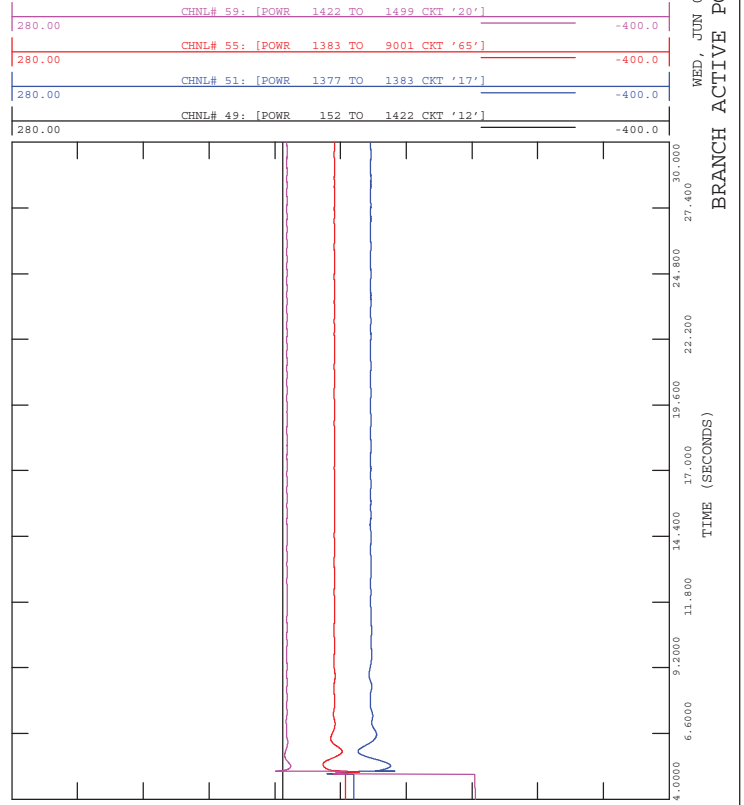


FIGURE F-31E
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-31_912L_RedDeer.out

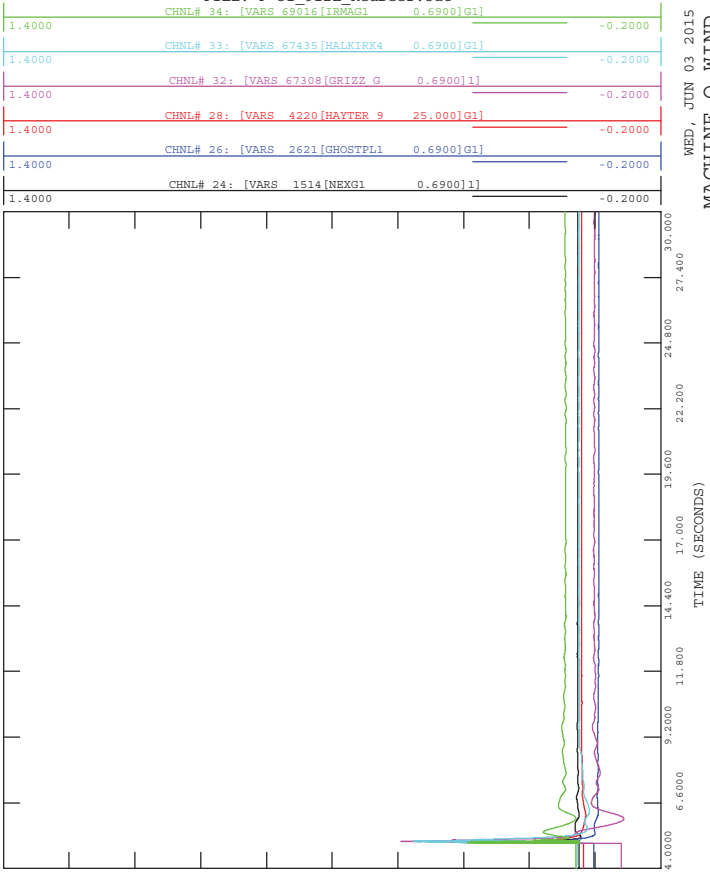


FIGURE F-31G
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-31_912L_RedDeer.out

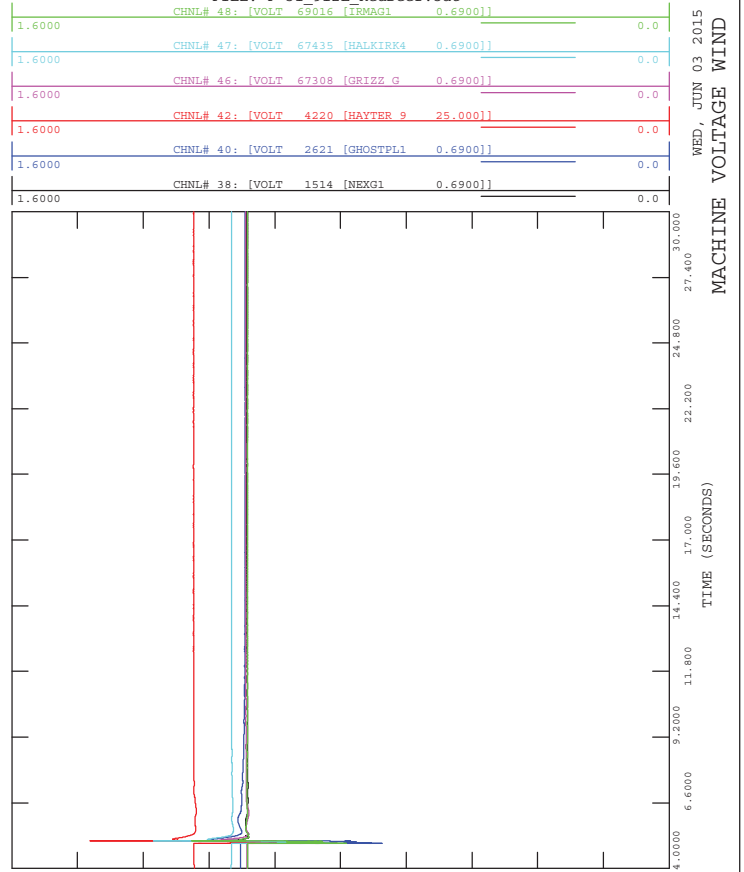
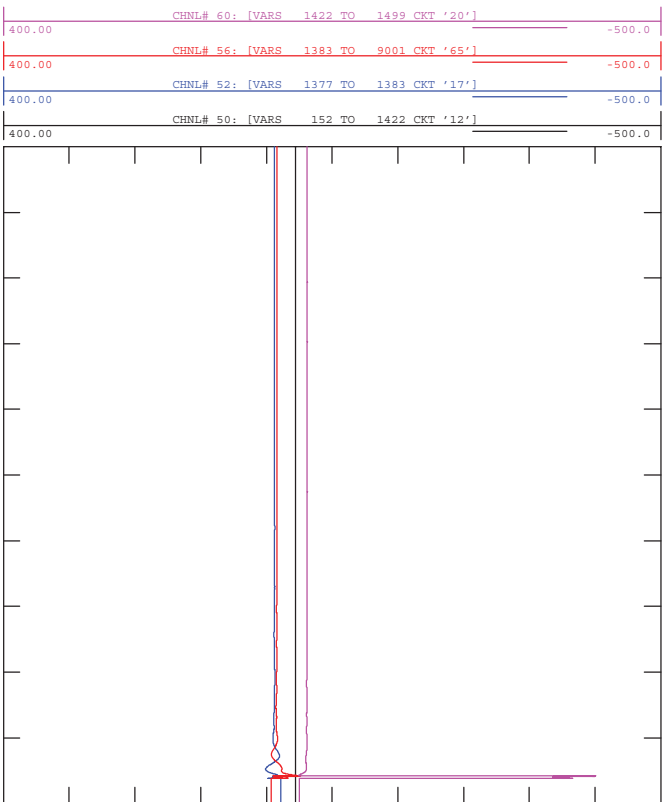




FIGURE F-311
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 912L AT 63S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-31_912L_RedDeer.out



WED, JUN 03 2015 11:27
BRANCH REACTIVE PWR (MVR)

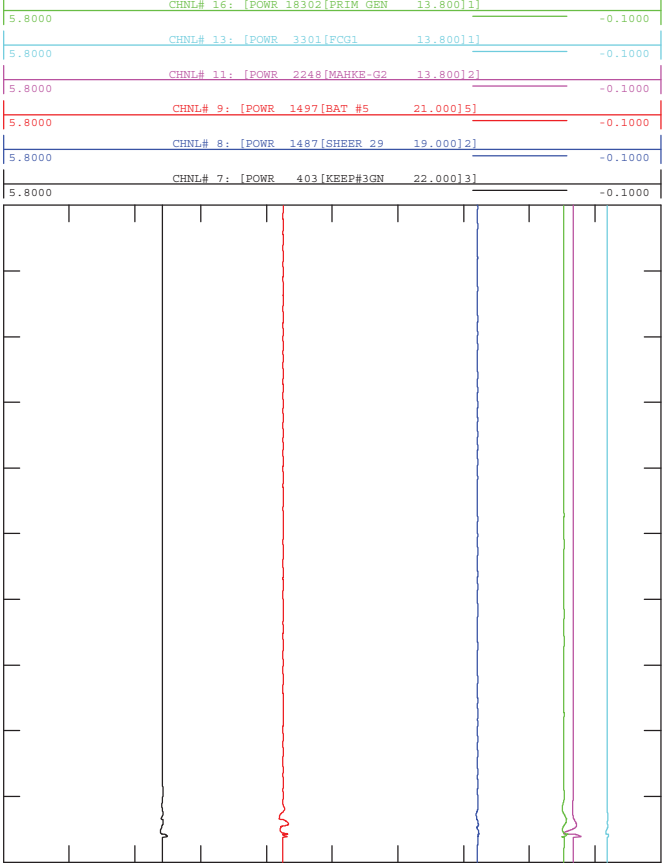


FIGURE F-32B

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: F-32_7L53+7L70_Bonnyville.out

CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]



WED, JUN 03 2015 11:27
MACHINE P COAL (PU)

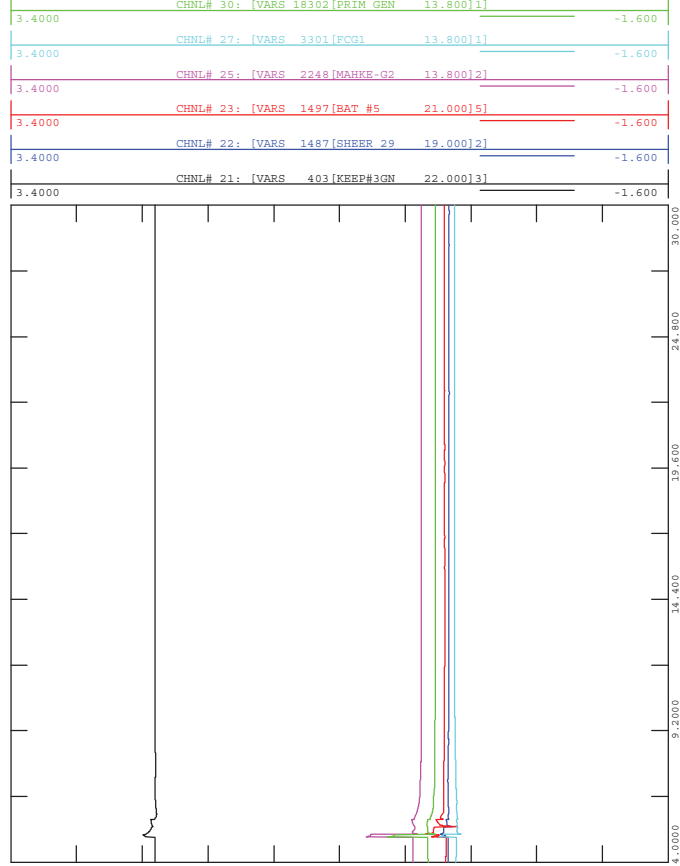


FIGURE F-32D

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: F-32_7L53+7L70_Bonnyville.out

CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]



WED, JUN 03 2015 11:27
MACHINE Q COAL (PU)

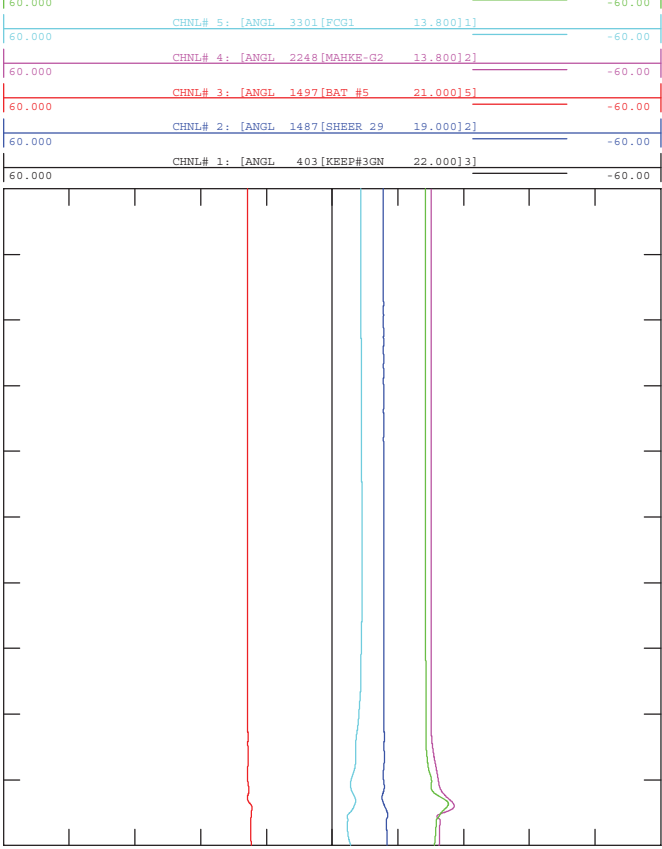


FIGURE F-32A

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: F-32_7L53+7L70_Bonnyville.out

CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]



WED, JUN 03 2015 11:27
MACHINE ANGLE (DEGREES)

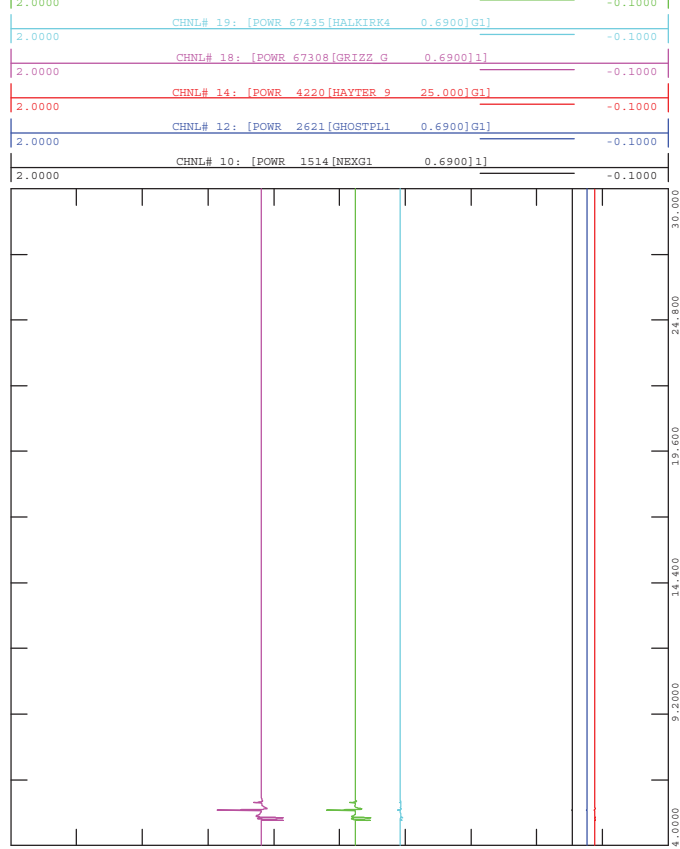


FIGURE F-32C

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES

FILE: F-32_7L53+7L70_Bonnyville.out

CHNL# 20: [POWR 69016[IRMAG1 0.6900]G1]



WED, JUN 03 2015 11:27
MACHINE P WIND (PU)



FIGURE F-32I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 7L53+7L70 AT 700S
CLEARED IN 6 CYCLES, FAR END 24/42 CYCLES
FILE: F-32_7L53+7L70_Bonnyville.out

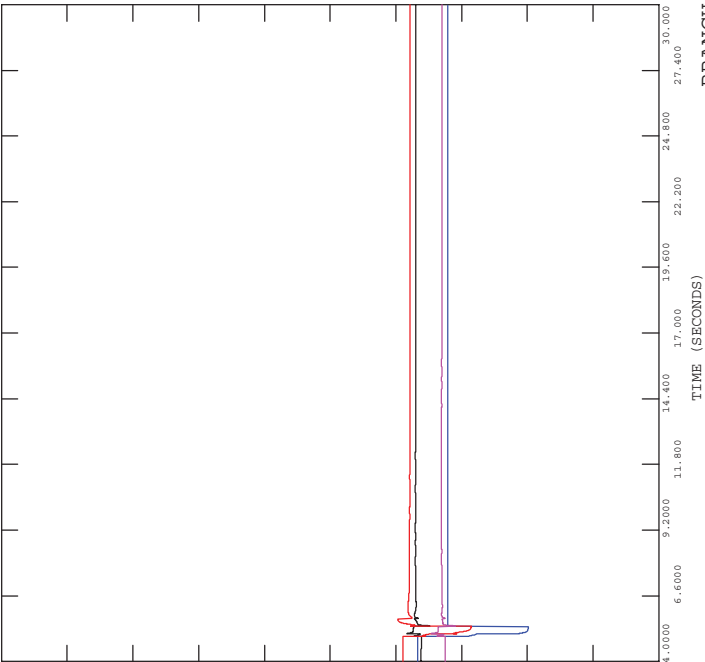
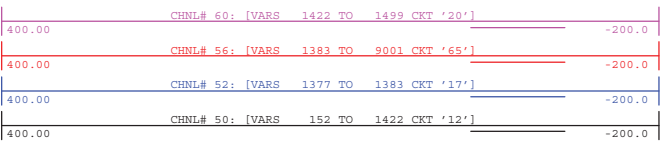
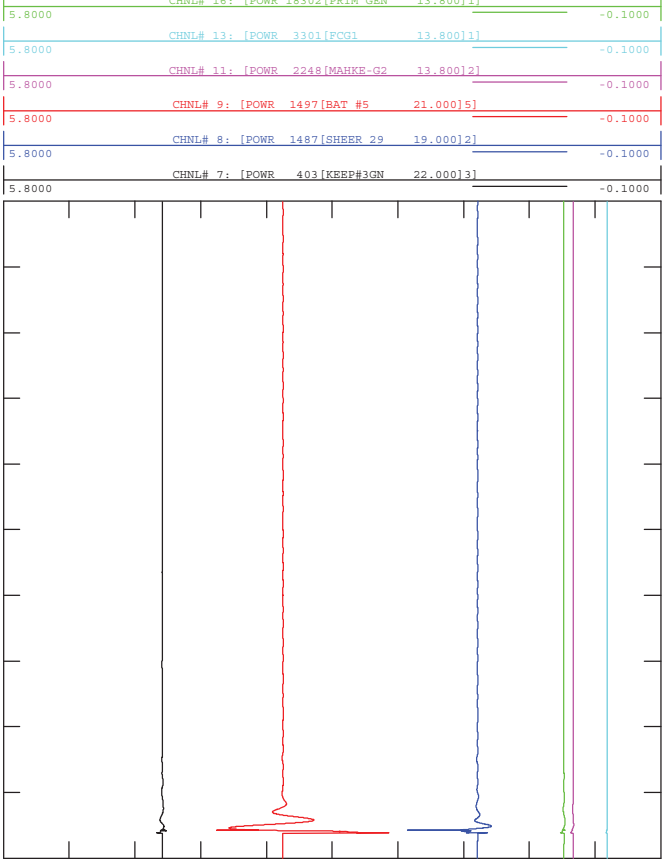




FIGURE F-33B
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-33_9L27+9L953_Cordel.out
CHNL# 16: [POWR 18302[PRIM GEN 13.800]1]

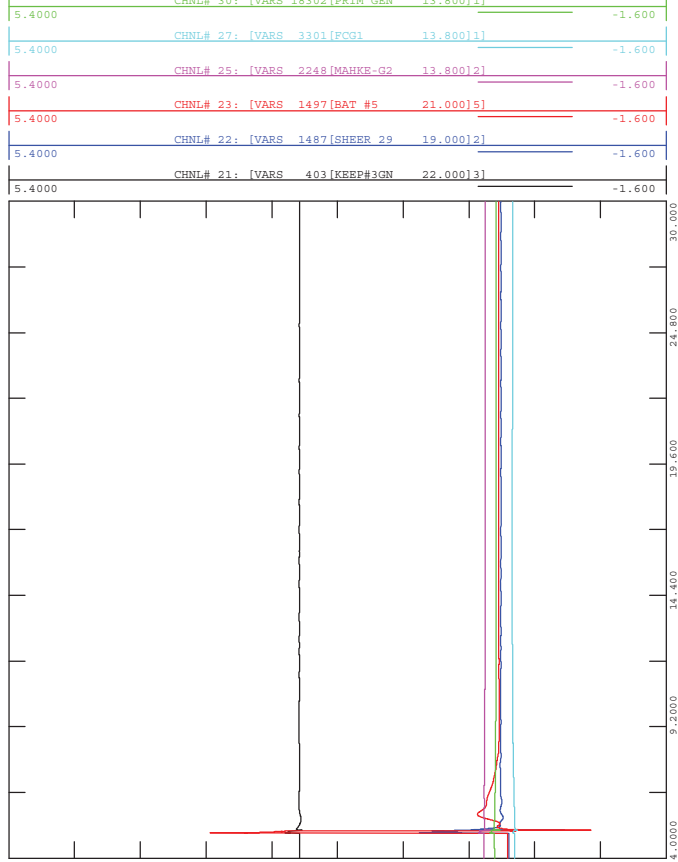


WED, JUN 03 2015 11:27
MACHINE P COAL (PU)



FIGURE F-33D
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-33_9L27+9L953_Cordel.out
CHNL# 30: [VARS 18302[PRIM GEN 13.800]1]

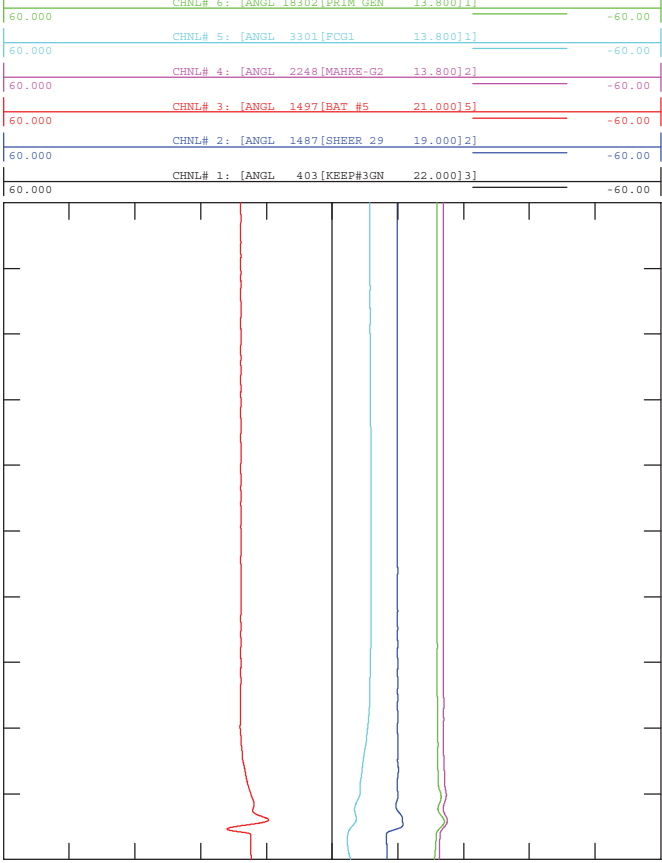


WED, JUN 03 2015 11:27
MACHINE Q COAL (PU)



FIGURE F-33A
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-33_9L27+9L953_Cordel.out
CHNL# 6: [ANGL 18302[PRIM GEN 13.800]1]

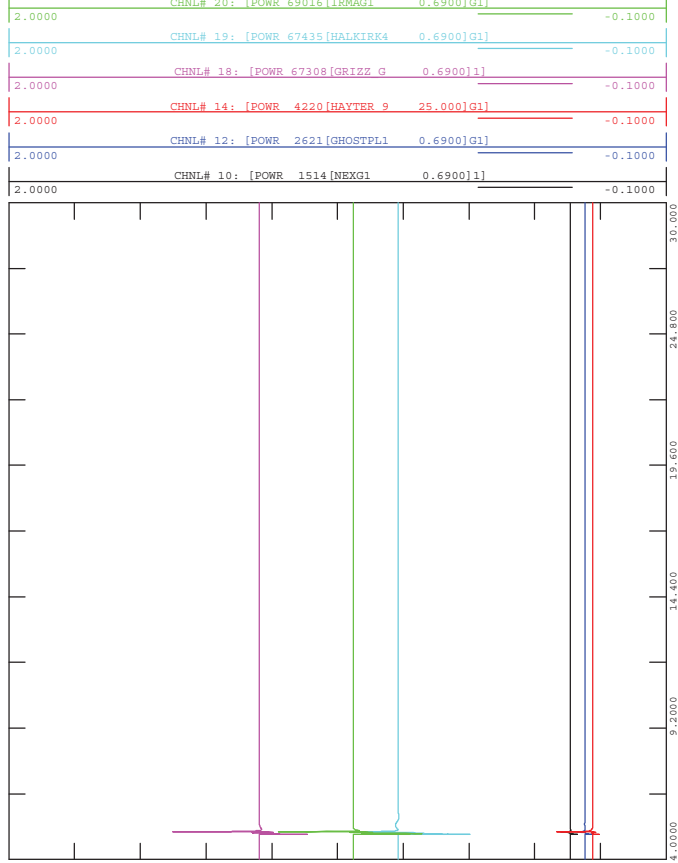


WED, JUN 03 2015 11:27
MACHINE P WIND (DEGREES)



FIGURE F-33C
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-33_9L27+9L953_Cordel.out
CHNL# 20: [POWR 69016[TRWAG1 0.6900]G1]



WED, JUN 03 2015 11:27
MACHINE P WIND (PU)

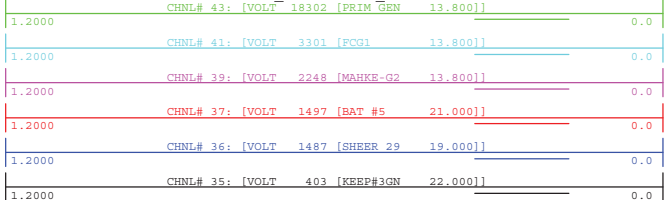


FIGURE F-33F

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-33_9L27+9L953_Cordel.out

CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]



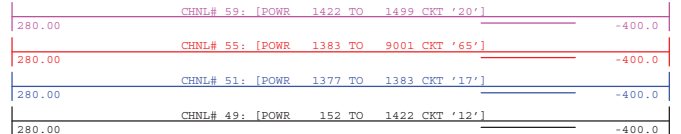
WED, JUN 03 2015 11:27
MACHINE VOLTAGE COAL (PU)



FIGURE F-33H

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-33_9L27+9L953_Cordel.out



WED, JUN 03 2015 11:27
BRANCH ACTIVE POWER (MW)

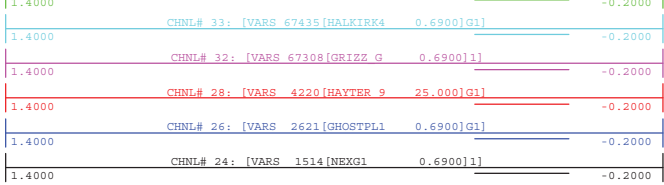


FIGURE F-33E

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-33_9L27+9L953_Cordel.out

CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]



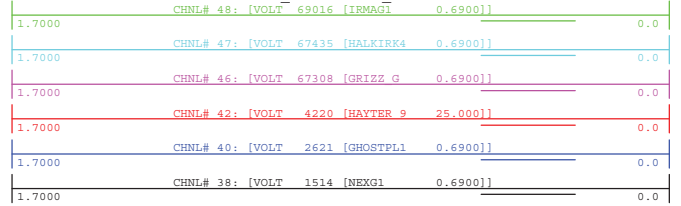
WED, JUN 03 2015 11:27
MACHINE Q WIND (PU)



FIGURE F-33G

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

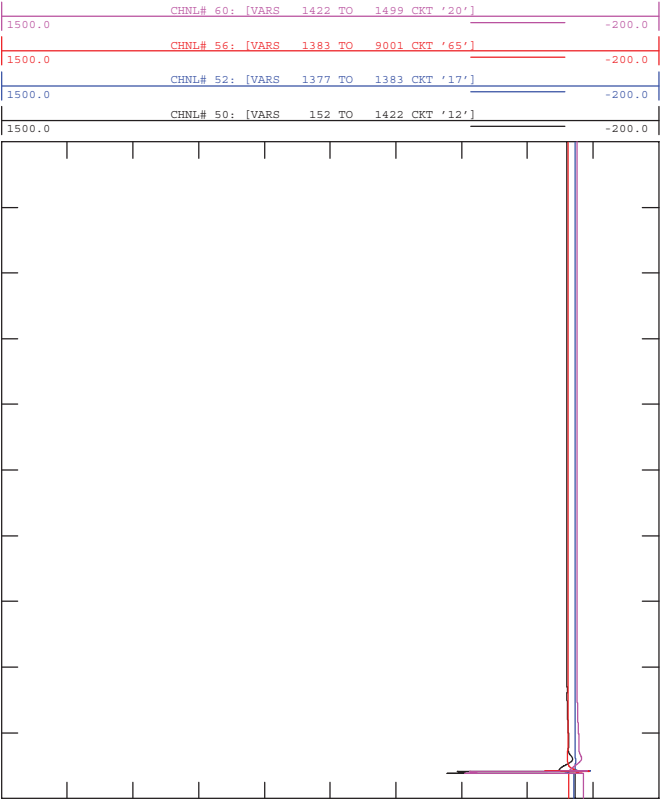
FILE: F-33_9L27+9L953_Cordel.out



WED, JUN 03 2015 11:27
MACHINE VOLTAGE WIND (PU)



FIGURE F-331
2017SP, ALTI3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L27+9L953 AT 755S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-33_9L27+9L953_Cordel.out



WED, JUN 03 2015 11:27
BRANCH REACTIVE PWR (MVR)

TIME (SECONDS)



FIGURE F-34B

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-34 9L36+9L37 WhitefishLake.out

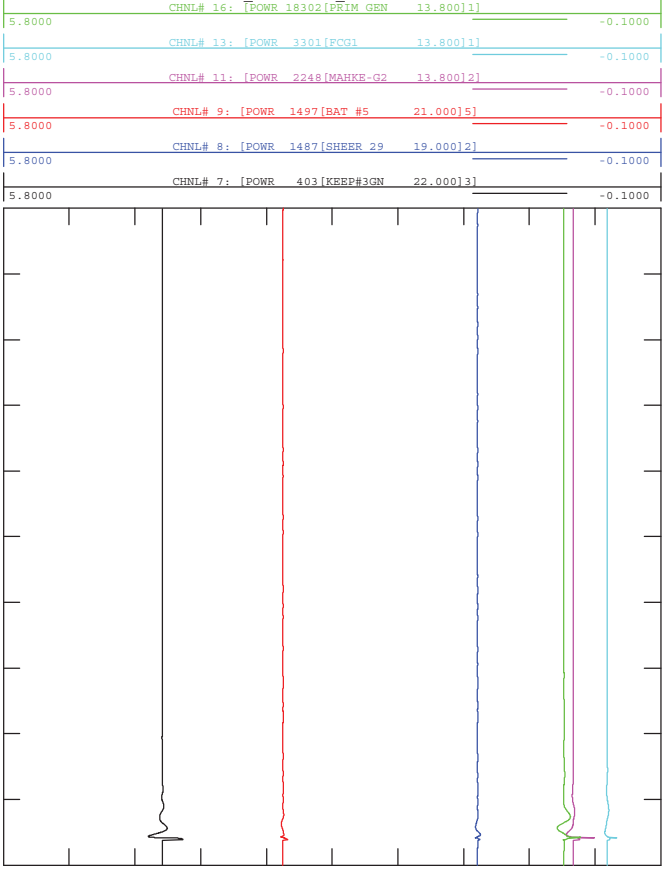


FIGURE F-34D

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-34 9L36+9L37 WhitefishLake.out

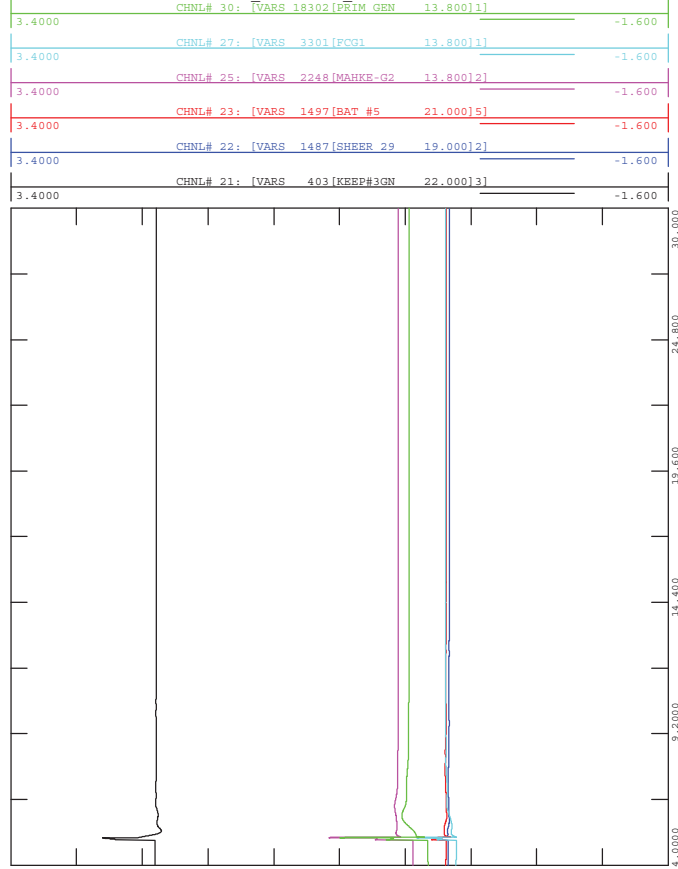


FIGURE F-34A

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-34 9L36+9L37 WhitefishLake.out

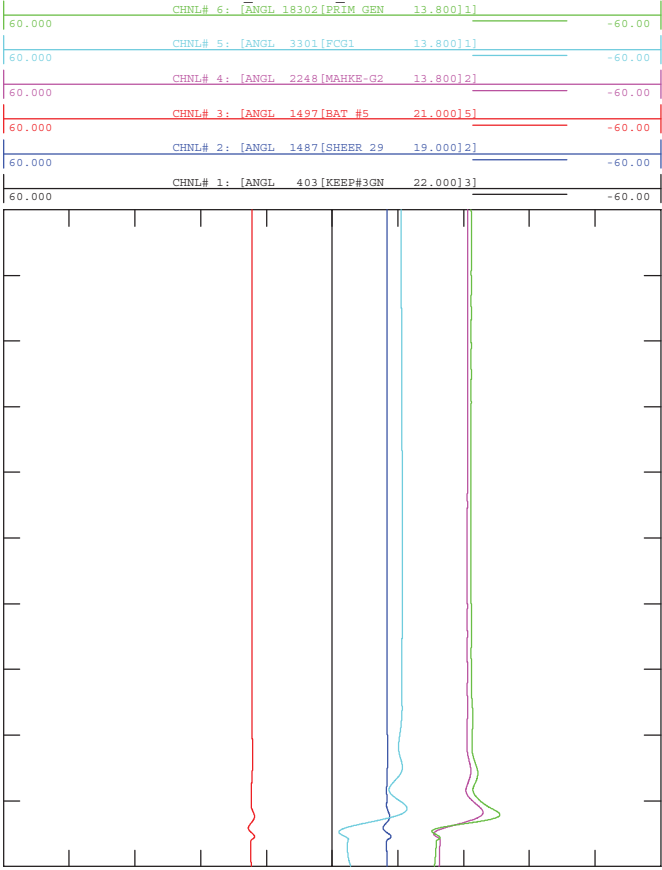


FIGURE F-34C

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-34 9L36+9L37 WhitefishLake.out

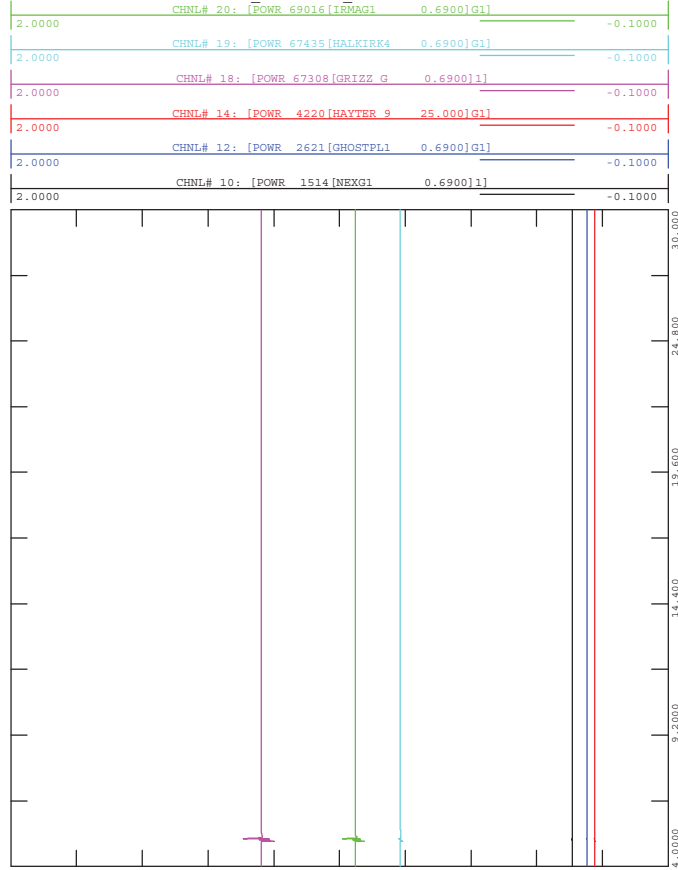


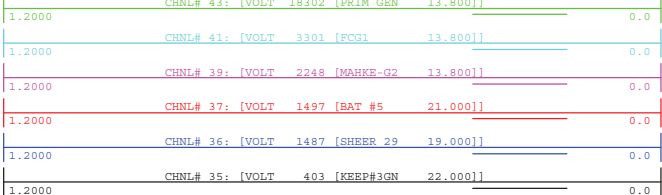


FIGURE F-34F

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-34_9L36+9L37_WhitefishLake.out

CHNL# 43: [VOLT 18302 [PRIM GEN 13.800]]



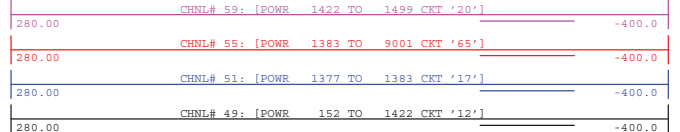
WED, JUN 03 2015 11:27
MACHINE VOLTAGE COAL (PU)



FIGURE F-34H

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-34_9L36+9L37_WhitefishLake.out



WED, JUN 03 2015 11:27
BRANCH ACTIVE POWER (MW)

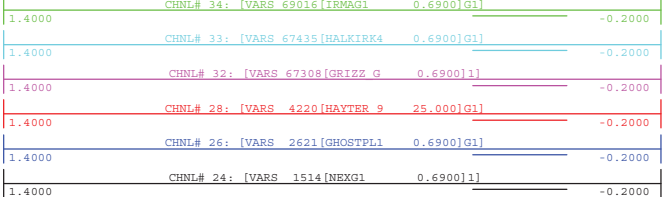


FIGURE F-34E

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

FILE: F-34_9L36+9L37_WhitefishLake.out

CHNL# 34: [VARS 69016 [IRWAG1 0.6900]G1]



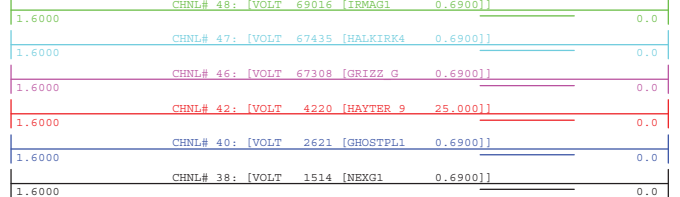
WED, JUN 03 2015 11:27
MACHINE Q WIND (PU)



FIGURE F-34G

2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES

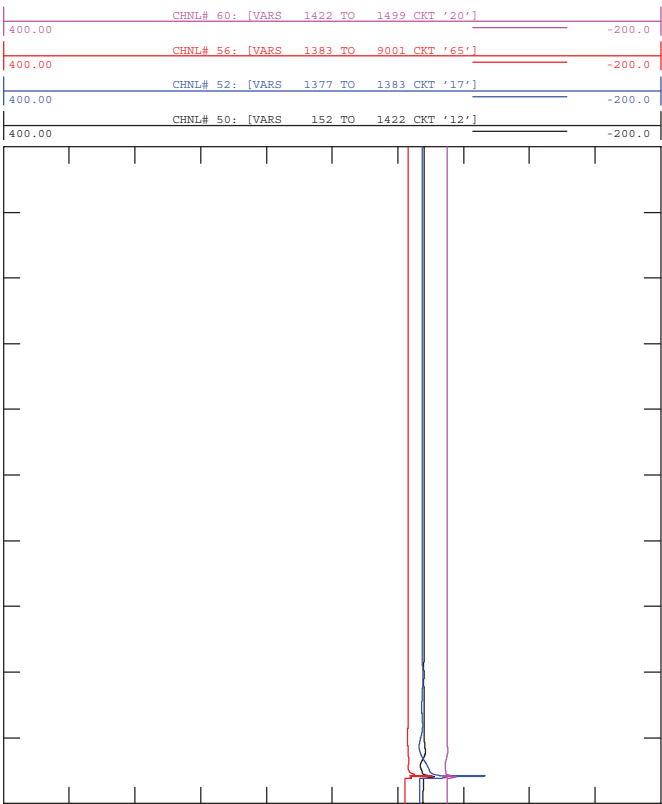
FILE: F-34_9L36+9L37_WhitefishLake.out



WED, JUN 03 2015 11:27
MACHINE VOLTAGE WIND (PU)



FIGURE F-34I
2017SP, ALT3, BOTH WAGFS PROCEED
3 PHASE FAULT ON 9L36+9L37 AT 825S
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: F-34_9L36+9L37_WhitefishLake.out



ATTACHMENT G

Power Flow Diagrams after RAS Action

Table G-1: Summary of Power Flow Diagrams after RAS Action

Figure #	Contingency
2017SL, Alt 3	
G-1	766S901T* (766S Nevis)
G-2	912L\9L912 (63S Red Deer to 766S Nevis)
G-3	9L29 (946S Oakland to 963S Coyote Lake)
2017SP, Alt 3	
G-4	9L29 (946S Oakland to 963S Coyote Lake)

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

Category	Athabasca/Lac La Biche 27	HEARTLAK
1	305	282
2	-34.2	93.7
3	2.4	-50.0
4	1.04	90.6
5	143.0	-48.7

Partial graph showing two red lines with positive slopes and a green L-shaped line. The red lines are labeled AN4 and Ve.

174L

68
N HOLDE7

IPPL ST7	76	701L	25	106
4.4	-33.8	6.9	146.3	

3	-9
-40.8	5.6

1.07 1464
147.1 HEISLER7

1.04
71.9

	6L05	6L05	0.2
	-1.7	-1.8	

1.05	0	2	1401
72.1			BIGKNIF8
6L05			6L02 0.1

1.05
72.2
-1.0
-5.0
1488
MANNIX 8
-2.9

6L02

9L20

Age group	Number of people
13-17	1
18-24	2
25-34	3
35-44	4
45-54	5
55-64	6
65-74	7
75-84	8
85-94	9

Sample	1437	4	6	1.06	CA
MARION 8	73.3				-2.3

6L02

	1.08	
	74.3	1406

SULLIVAN1.07
73.7

6L56 1408
HANNA 8

1. *Journal of the American Medical Association*, 2000; 284: 2689-2695.

49	1.04
C8	71.7
5.0	
-8.0	

1390 3.2 7R 3.2 3R 0.7 4R

H. C7

1421
963_LV

1.05	145.5

1463
BULLPONZ

7L85	-55.5	49.8
	12.0	-9.6

1.08
148.7



Category	Value 1	Value 2	Value 3	Value 4	Value 5
Athabasca/Lac La Biche 27	305	-34.3	2.3	1.04	143.0
HEARTLAK	282	93.7	-50.0	90.6	-48.7

Partial view of a graph showing two red lines and a green box. The lines are labeled 'AN4' and 'Ve'.

174L
68
N HOLDE7

76 1.06
IPPL ST7 4.4 146.5
701L -33.8
6.6

3	-40,8	5,4	-1

6L05 6L05 0.7

1.05	0.00	1401	-2.4
72.4		BIGKNIF8	
6L05		6L02	1.4

1.05
72.4

91.20 6L02

A diagram showing a horizontal red line representing a beam of light. It enters from the left, passes through a vertical purple line representing a lens, and then reflects off a horizontal purple line representing a mirror. The reflected beam is shown as a dashed red line extending to the right.

11
MARION 8 1437 -2.5 -0.9 1.07 141 CA 74.1 -2.3

6L02

1.09	1406
75.3	SULLY LK

Figure 6

1.08
74.7

0690	MANINA 8

49 1.04
C8 4.9 71.9

1390
MOTHER1 43.2 1.5R 43.2 1.2R 20.7 -1.5R

1421

1.06
145.7

7 1463 BULLPON7

7L85	-54.6	48.9
	11.1	-8.7
		1.08

149.0



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

Fort Saskatchewan 33	
109 DEERLAN4	-110.4
	-49.3
	-110.4
	-49.3
	1.05
	251.8

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

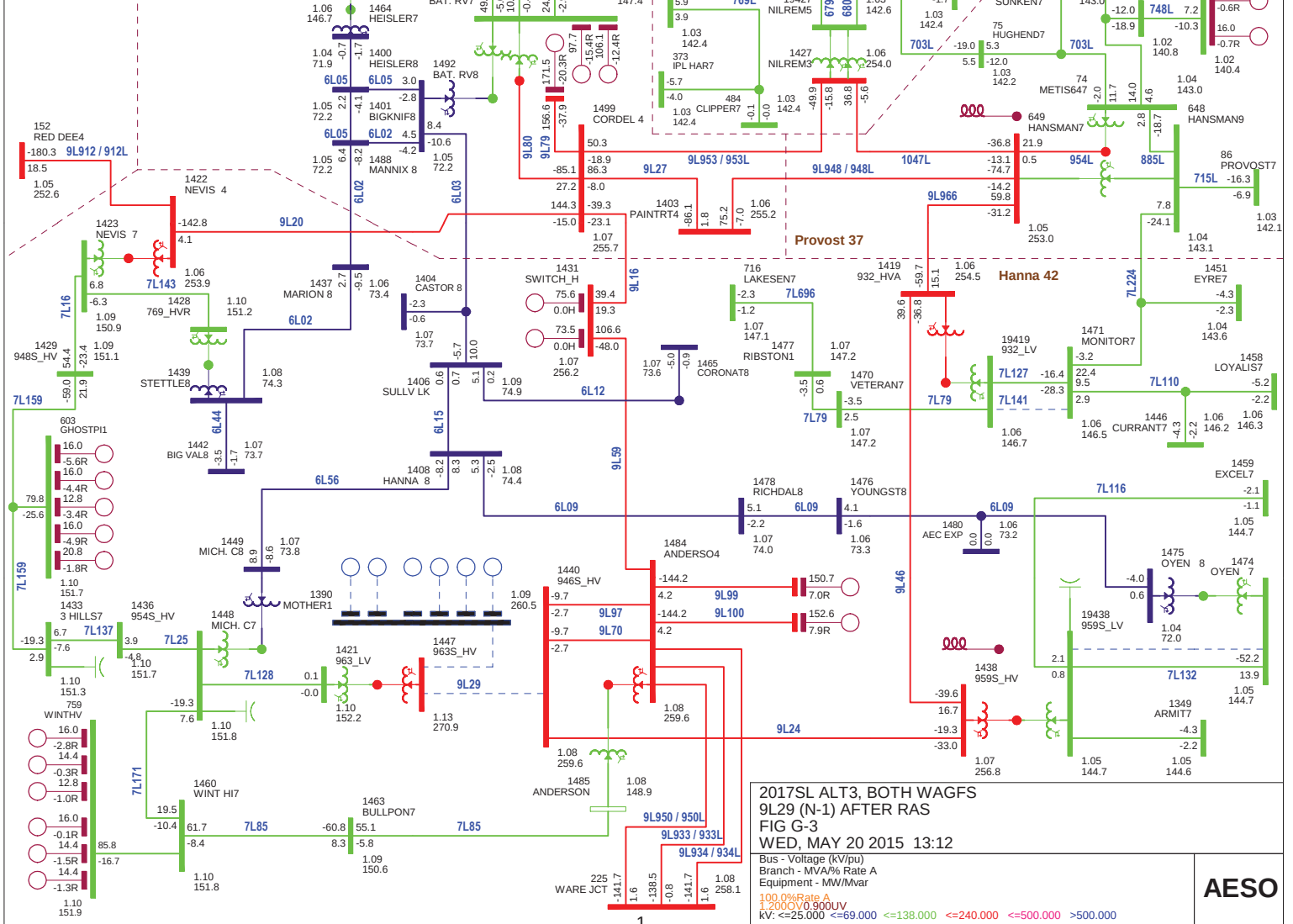
Future WAGF	MW
P1250 - Grizzly Bear	120.0 MW
P937 - Wainwright	90.0 MW
P1607/08 - Bull Creek	29.5 MW
P635 - Suncor H.H.	0.0 MW
P678 - BluEarth H.H.	0.0 MW
WAGF Total	210.0 MW

Wetaskiwin 31	
65 BARDO 7	-50.8
	7.3
	1.03
	141.6

Interties (+Export)	MW
AB-BC Intertie:	515.5 MW
SK Intertie:	150.0 MW
MT Intertie:	300.0 MW
Total	965.5 MW

SOK-240: 602.9 MW
+ 0.35 x -180.3 MW

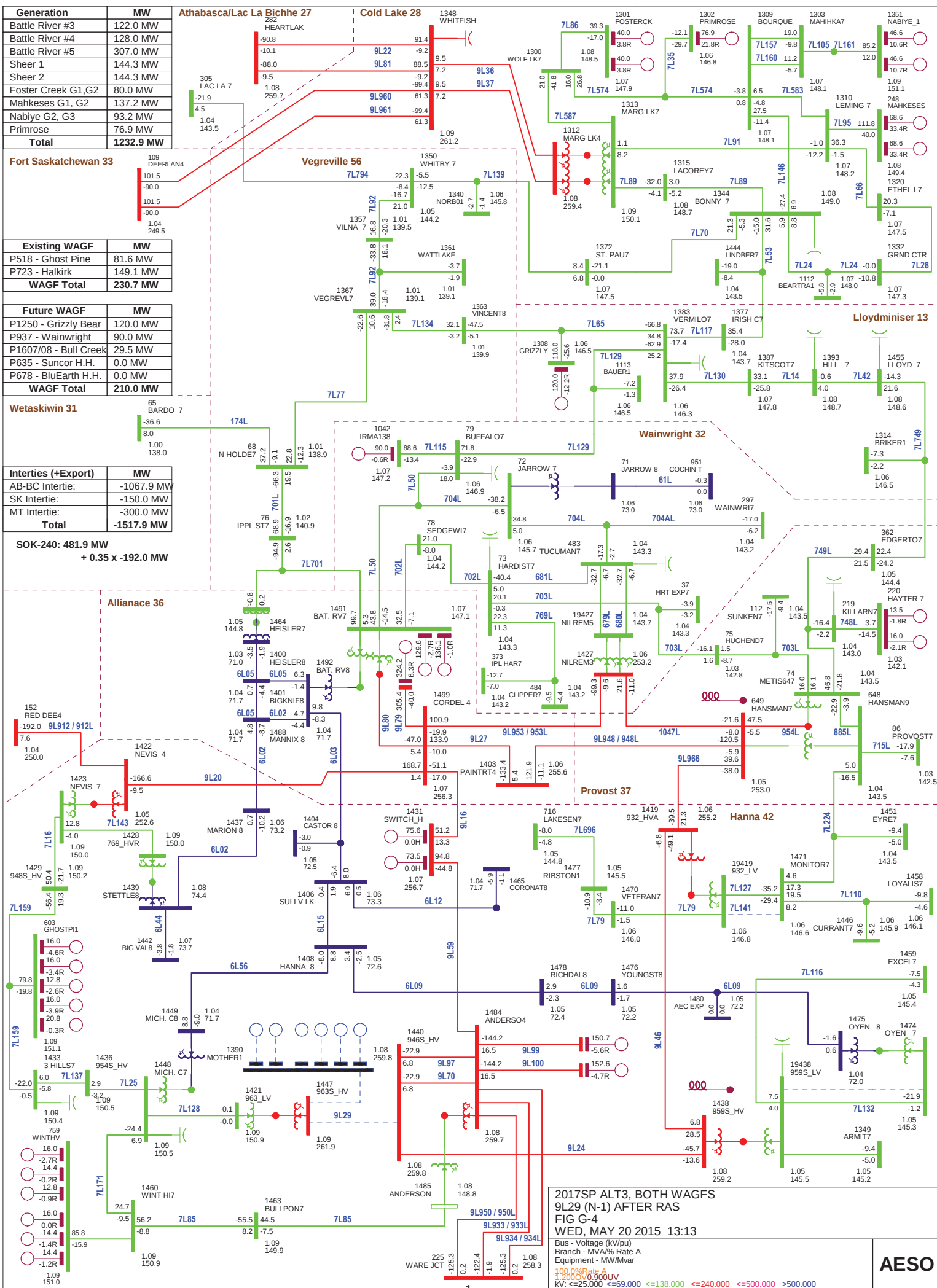
Alliance 36



2017SL ALT3, BOTH WAGFS
9L29 (N-1) AFTER RAS
FIG G-3
WED, MAY 20 2015 13:12

Bus - Voltage (kV/pu)
Branch - MVA/% Rate A
Equipment - MW/Mvar
100.0%Rate A
1:2000V:0.900UV
KV: <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

AESO



ATTACHMENT H

Constraint Summary

Table H-1: Remedial Action Scheme	
RAS Number	RAS Name
32	Battle River 7L50 and 7L701 TPS
134	174L-395S North Holden overload mitigation scheme
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

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			Post RAS Action or Manual Procedure	
			Thermal			Power Flow (MVA)	% of MVA Continuous Rating	Voltage (Steady-State)		Automatic (RAS) OR Real Time Operating Practice	Action 1 % of MVA Continuous Rating	Action 2 % of MVA Continuous Rating
			Overloaded System Element	Nominal Rating (MVA)	Emergency Rating (MVA)			Location	Voltage			
2017SL Alt 3	Coal Economy EATL: Blocked WATL: 475MW N to S Total South Wind: 922.6MW Existing Central East Wind: 230.7MW Future Central East Wind: 404.1MW BC Intertie: 668.7MW Export MATL Intertie: 300.0MW Export SK Intertie: 150.0MW Export	709S701T* or 709S702T* (709S Vegreville)	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	
		766S901T* (766S Nevis)	174L (197S Bardo to 395S North Holden)	85.0	94.0	89.0	104.7			1: RAS #134	-	
		7L134 (709S Vegreville to 2019S Vincent)	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	
		912L91912 (63S Red Deer to 766S Nevis)	174L (197S Bardo to 395S North Holden)	85.0	94.0	89.1	104.8			1: RAS #134	-	
		9L29 (946S Oakland to 963S Coyote Lake)	766S901T (766S Nevis)	100.0	100.0	100.0	100.0				41.9	
			7L128 (963S Coyote Lake to 802S Michichi Creek)	94.9	94.9	153.3	161.5				4.0	
			7L159 (Ghost Pine Tap to 948S Heatburg)	94.9	94.9	116.2	122.5				61.4	
			7L16 (766S Nevis to 948S Heatburg)	94.9	94.9	112.0	118.1			1: RAS #139-R1	57.0	
			7L85 (803S Bullpound to 801S Anderson)	94.9	94.9	124.5	131.2				53.5	
			7L85 (804S Wintering Hills to 803S Bullpound)	94.9	94.9	130.7	137.7				59.7	

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	Action 1 % of MVA Continuous Rating	Action 2 % of MVA Continuous Rating
			Overloaded System Element	Nominal Rating (MVA)	Emergency Rating (MVA)	Power Flow (MVA)	% of MVA Continuous Rating				
2017SP Alt 3	Coal Economy EATL: 450MW S to N WATL: 250MW S to N Total South Wind: 922.6MW Existing Central East Wind: 230.7MW Future Central East Wind: 404.1MW BC Intertie: 908.9MW Import MATL Intertie: 300.0MW Import SK Intertie: 150.0MW Import	526ST1* or 526ST2* (526S Buffalo Creek)	7L65 (710S Vermilion to Grizzly Bear Tap)	94.9	94.9	97.6	102.8			1: Change CT Ratios from 400/5 to 600/5	89.3
		709S701T* or 709S702T* (709S Vegreville)	7L65 (710S Vermilion to Grizzly Bear Tap)	94.9	94.9	100.9	106.3			1: Change CT Ratios from 400/5 to 600/5	92.3
		749L1749AL (648S Meliskow to 899S Edgerton)	7L130 (710S Vermilion to 705S Kitscoy)	71.9	71.9	78.0	108.5			7L130 & 7L14 loadings are driven by load†	
			7L14 (705S Kitscoy to 751S Hill)	71.9	71.9	73.7	102.6				
		7L134 (709S Vegreville to 2019S Vincent)	7L65 (710S Vermilion to Grizzly Bear Tap)	94.9	94.9	101.0	106.4			1: Change CT Ratios from 400/5 to 600/5	92.4
		7L657L1A65 (2019S Vincent to 710S Vermilion)	7L129 (526S Buffalo Creek to Bauer Tap)	109.2	123.6	110.2	100.9			7L129 loading is below emergency rating†	
		766S901T* (766S Nevis)	7L117 (706S Irish Creek to 710S Vermilion)	94.9	94.9	95.5	100.6			1: Change CT Ratio from 400/5 to 600/5 at 710S	87.4
		899ST3a* (899S Edgerton)	7L130 (710S Vermilion to 705S Kitscoy)	71.9	71.9	73.3	102.0			7L130 loading is driven by load†	
		912L1912 (63S Red Deer to 766S Nevis)	7L117 (706S Irish Creek to 710S Vermilion)	94.9	94.9	95.3	100.5			1: Change CT Ratio from 400/5 to 600/5 at 710S	87.3
		9L29 (946S Oakland to 963S Coyote Lake)	7L128 (963S Coyote Lake to 802S Michichi Creek)	94.9	94.9	151.3	159.4				4.0
			7L159 (Ghost Pine Tap to 948S Heatburg)	94.9	94.9	113.2	119.2				58.5
			7L16 (766S Nevis to 948S Heatburg)	94.9	94.9	108.0	113.8			1: RAS #139-R1	53.1
			7L85 (803S Bullpound to 801S Anderson)	94.9	94.9	115.3	121.5				43.8
			7L85 (804S Wintering Hills to 803S Bullpound)	94.9	94.9	126.1	132.8				54.8

Table H-3: Remedial Action Scheme Details		
Monitoring Point	RAS Logic and Settings	Automatic Remedial Action
RAS # 134: 174L (North Holden 395S – Bardo 197S) Overload Mitigation		
At North Holden 395S 174L Terminal • Non Directional	Trip Logic and Settings: • 174L Loading >100% of seasonal line rating in MVA for 10 seconds	• Trip 174L breaker 395S174W at 395S
	• Communication and other RAS Failure	• Send alarm to AltaLink SCC, and AESO SCC

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

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