Connection Engineering Study Report for Filing

Calgary Energy Centre Peaking Plant Connection

AESO Project Number: 1566

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Executive Summary

Project Overview

Calgary Energy Centre No. 2 Inc. (the market participant) has submitted a system access service request to the Alberta Electric System Operator (AESO) to connect its proposed Calgary Energy Centre Expansion (the Facility) to the Alberta interconnected electric system (AIES). The Facility consists of a 155 MW gas-fired, simple-cycle, generating facility to be operated as a peaking unit. The Facility will be located at the site of the existing Calgary Energy Centre.

The request for system access service includes a request for a Rate STS, *Supply Transmission Service,* contract capacity of 150 MW for new system access service in the area, and a request for transmission development (collectively, the Project).

The scheduled in-service date (ISD) for this Project is July 31, 2019.

This report presents the results of the engineering studies conducted to assess the impact of the Project on the performance of the AIES.

Existing System

Geographically, the Project is located in the AESO planning area of Calgary (Area 6), which is part of the AESO Calgary Planning Region. Calgary (Area 6) is adjacent to the planning areas of Seebe (Area 44), Airdrie (Area 57), Strathmore / Blackie (Area 45), and High River (Area 46).

From a transmission system perspective, Calgary(Area 6) consists primarily of 138 kV and 240 kV transmission systems.

The existing Calgary Energy Centre generating units are connected to the AIES via the SS-162 substation. The SS-162 substation currently includes two 240/138 kV transformers and one 138/25 kV transformer. The SS-162 substation is connected to the Janet 74S and Benalto 17S substations by the 240 kV transmission lines 932L and 918L, respectively. The SS-162 substation is also connected to the SS-39 substation by the 138 kV transmission line 39.82L; the SS-11 substation by the 138 kV transmission line 11.83L; the Balzac 391S substation by the 138 kV transmission line 162.81L; and the SS- 47 substation by the 138 kV transmission line 771L.

Existing constraints in the Calgary Planning Region are managed in accordance with the procedures set out in Section 302.1 of the ISO rules, *Real Time Transmission Constraint Management*. An existing remedial action scheme (RAS), referred to as the Beddington RAS, is currently being used to mitigate the transmission constraints associated with thermal criteria violations on the existing 138 kV transmission line 11.83L (between the SS-11 and SS-162 substations) and the 138 kV transmission line 39.82L (between the SS-39 and SS-162 substations).

Study Summary

Study Area for the Project

The Study Area for the Project is defined as the AESO planning areas of Calgary (Area 6) and Airdrie (Area 57), including the tie lines connecting these planning areas to the rest of the AIES. All transmission facilities rated at 69 kV and above within the Study Area were studied and monitored to assess the impact of the Project on the performance of the AIES, including any violations of the Reliability Criteria (as defined in Section 2.1.1).

Studies Performed for the Project

Power flow studies were performed for the 2019 summer peak (SP) and 2019 summer light (SL) pre-Project and post-Project scenarios. Transient stability studies were performed for the 2019 SP and 2019 SL post-Project scenarios. Short-circuit studies were performed for the 2019 SP pre-Project and post-Project scenarios and for the 2026 SP post-Project scenario.

Results of the Pre-Project Studies

Under the Category A condition, no Reliability Criteria violations were observed for any of the pre-Project scenarios.

Under Category B conditions, no voltage criteria violations or point-of-delivery (POD) bus voltage deviations were observed. Under certain Category B conditions, thermal criteria violations were observed for the 2019 SP pre-Project scenario.

Connection Alternatives Examined for the Project

The AESO, in consultation with the legal owner of transmission facilities and the market participant, examined two transmission alternatives to meet the market participant's request for system access service. Both alternatives require a new switching substation, to be designated as the SS-70 substation, which will connect the Facility to the AIES.

Alternative 1 – Radial connection to the 138 kV transmission system via the SS-162 substation:

- add a 138 kV switching substation, which includes three 138 kV circuit breakers and associated equipment,
- add a 138 kV circuit to connect the proposed SS-70 substation and the existing SS-162 substation using a radial configuration, and
- modify the existing SS-162 substation by adding one 138 kV circuit breaker and associated equipment.

Alternative 2 – Radial connection to the 240 kV transmission system via the SS-162 substation:

- add a 240 kV switching substation, which includes three 240 kV circuit breakers and associated equipment,

- add a 240 kV circuit to connect the proposed SS-70 substation and the existing SS-162 substation using a radial configuration, and
- modify the existing SS-162 substation by adding one 240 kV circuit breaker and associated equipment, and expanding the 240 kV bus.

Alternatives Selected for Further Examination

Alternative 1 is considered technically feasible and was selected for further study. Alternative 2 would involve increased transmission development and hence, increased cost, compared to Alternative 1. Therefore, Alternative 2 was not selected for further study.

Results of the Post-Project Studies

Under the Category A condition, no Reliability Criteria violations were observed for any of the post-Project scenarios.

Under Category B conditions, no voltage criteria violations or POD bus voltage deviations were observed. The post-Project power flow studies identified the same system performance issues under Category B contingency conditions that were identified in the pre-Project power flow studies. The observed thermal criteria violations on the 138 kV transmission lines 39.82L and 11.83L were exacerbated after connection of the Project. Thermal criteria violations on the 138 kV transmission line 688L were reduced after connection of the Project.

No transient stability concerns were identified and the system showed acceptable dynamic response to all studied Category B contingencies.

Post-Project short-circuit fault levels are not significantly higher than pre-Project levels.

Mitigation Measures

Real-time operational practices can be used to manage the thermal criterial violation that was observed on the 138 kV transmission line 688L following certain Category B contingencies.

The existing Beddington RAS can be used to mitigate the thermal criteria violations that were observed on the 138 kV transmission lines 11.83L and 39.82L following certain Category B contingencies.

Conclusions and Recommendations

The connection assessment identified a number of pre-Project and post-Project system performance issues under certain Category B conditions. Table E-1 provides analysis of, and conclusions about, all identified Reliability Criteria violations, including mitigation measures.

Table E-1: Overview of Observed Violations and Mitigation Measures

Reliability Criteria Violations		Occur in Pre- and/or Post-Project	Year/Season Load	Project Impact	Mitigation Measure
Violation	Contingency				
138 kV transmission line 688L (Summit 653S - 688AL)	138 kV transmission line 752L (West Crossfield 316S - East Crossfield 64S - Summit 653S)	Pre-Project and post-Project	2019 SP	Reduced thermal loading	Real-time operational practices
138 kV transmission line 11.83L (SS-162 - SS-11)	138 kV transmission line 39.82L (SS-162 - SS-39)	Pre-Project and post-Project	2019 SP	Significantly Exacerbated thermal loading	Existing Beddington RAS
138 kV transmission line 39.82L (SS-162 - SS-39)	138 kV transmission line 11.83L (SS-162 - SS-11)	Pre-Project and post-Project	2019 SP	Significantly Exacerbated thermal loading	Existing Beddington RAS

Based on the study results, Alternative 1 is technically acceptable.

It is recommended to proceed with the Project using Alternative 1 as the preferred option to respond to the market participant's request for system access service. It is also recommended to use real-time operational practices and the existing Beddington RAS to mitigate the identified system performance issues.

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1. Introduction

This report presents the results of the engineering studies conducted to assess the impact of the Project (as defined below) on the performance of the Alberta interconnected electrical system (AIES).

1.1. Project

1.1.1. Project Overview

Calgary Energy Centre No. 2 Inc. (the market participant) has submitted a system access service request to the Alberta Electric System Operator (AESO) to connect its proposed Calgary Energy Centre Expansion (the Facility) to the AIES. The Facility consists of a 155 MW gas-fired, simple-cycle, generating facility to be operated as a peaking unit. The Facility will be located at the site of the existing Calgary Energy Centre.

The request for system access service includes a request for a Rate STS, *Supply Transmission Service,* contract capacity of 150 MW for new system access service in the area, and a request for transmission development (collectively, the Project).

The scheduled in-service date (ISD) for this Project is July 31, 2019.

1.1.2. Load Component

The load component associated with the Project has not yet been finalized by the market participant and is expected to be minimal. The load component of the Project was not included in the studies.

1.1.3. Generation Component

The market participant plans to install three LM6000PF or PH natural gas turbine generators. Additional details about the generation component of the Project are as follows:

- Unit maximum authorized real power (MARP): 51.7 MW
- Unit seasonal maximum capability (MC):
  - Approximately 51 MW at -20 degrees Celsius
  - Approximately 42 MW at +30 degrees Celsius
- Unit reactive power capability:
  - 22 MVAr, 0.9 power factor lagging at MARP
  - 17 MVAr, 0.95 power factor leading at MARP
- The requested Rate STS, *Supply Transmission* Service contract capacity is 150 MW

There are no future expansion plans for the generation facility indicated in the request for system access service.

1.2. Study Scope

1.2.1. Study Objectives

The objectives of the study are as follows:

- Assess the impact of the Project on the performance of the AIES.
- Identify any violations of the relevant AESO criteria, standards, or requirements, both pre-Project and post-Project.
- Recommend mitigation measures, if required, to reliably connect the Project to the AIES.

1.2.2. Study Area

1.2.2.1. Study Area Description

Geographically, the Project is located in the AESO planning area of Calgary (Area 6), which is part of the AESO Calgary Planning Region. Calgary (Area 6) is adjacent to the planning areas of Seebe (Area 44), Airdrie (Area 57), Strathmore / Blackie (Area 45), and High River (Area 46).

From a transmission system perspective, Calgary (Area 6) consists primarily of 138 kV and 240 kV transmission systems.

The Study Area for the Project is defined as the AESO planning areas of Calgary (Area 6) and Airdrie (Area 57), including the tie lines connecting these planning areas to the rest of the AIES. The tie lines connecting the Study Area to the rest of the AIES are the 138 kV transmission lines 150L, 3L, 860L and 765L; the 240 kV transmission lines 906L, 928L, 918L, 1106L, 1107L, 927L, 924L, 901L, 925L and 929L; and the 500 kV transmission line 1201L.

The existing Calgary Energy Centre generating units are connected to the AIES via the SS-162 substation. The SS-162 substation currently includes two 240/138 kV transformers and one 138/25 kV transformer. The SS-162 substation is connected to the Janet 74S substation and the Benalto 17S substation by the 240 kV transmission lines 932L and 918L, respectively. The SS-162 substation is also connected to the SS-39 substation by the 138 kV transmission line 39.82L; the SS-11 substation by the 138 kV transmission line 11.83L; the Balzac 391S substation by the 138 kV transmission line 162.81L; and the SS-47 substation by the 138 kV transmission line 771L.

All transmission facilities rated at 69 kV and above within the Study Area were studied and monitored to assess the impact of the Project on the performance of the AIES, including any violations of the Reliability Criteria (as defined in Section 2.1.1).

Figure 1-1 shows the existing transmission system in the Study Area.

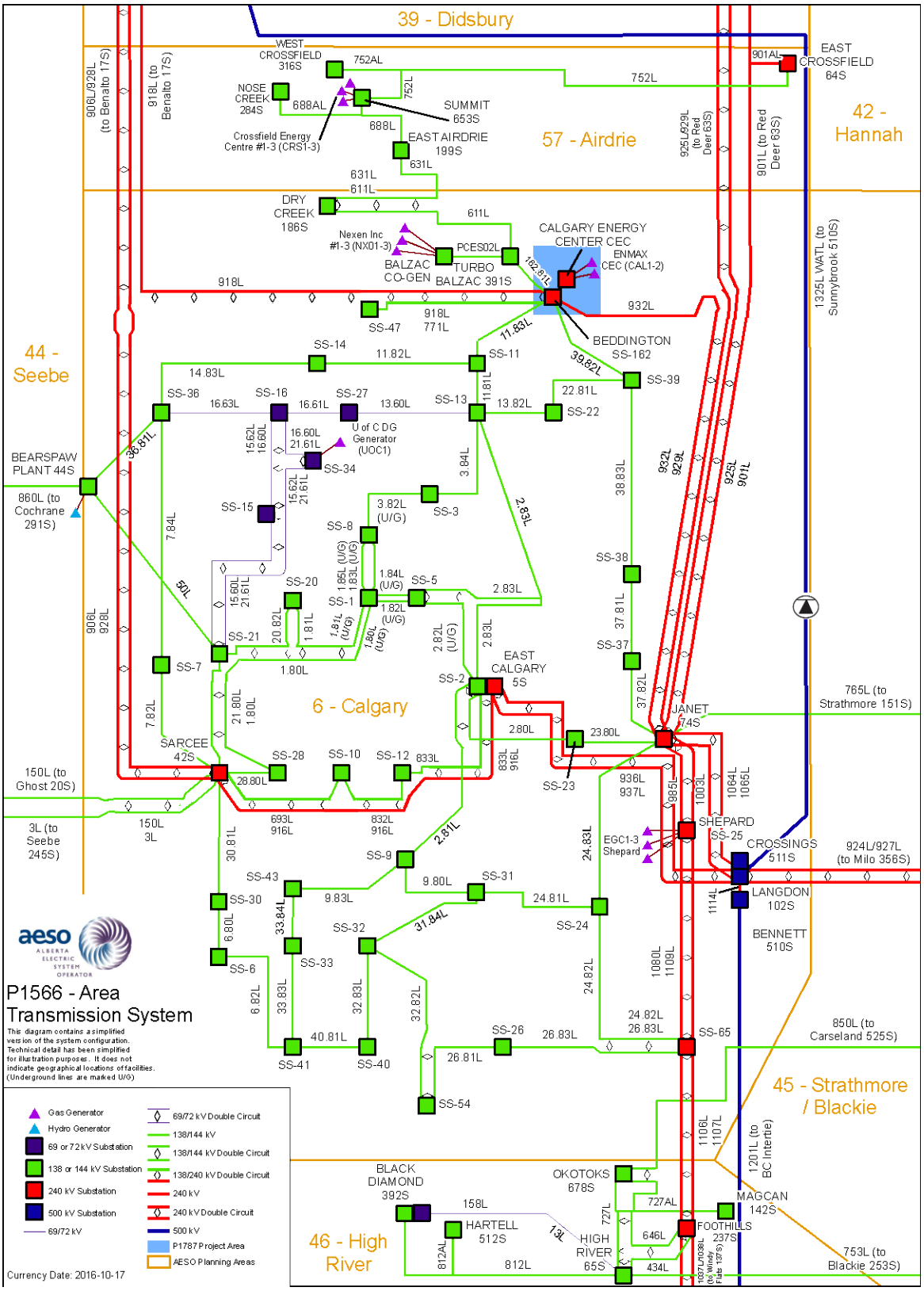


Figure 1-1: Study Area Existing Transmission System

1.2.1.1. Existing Constraints

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

An existing remedial action scheme (RAS), referred to in this report as the Beddington RAS, is currently being used to mitigate the transmission constraints associated with thermal criteria violations on the existing 138 kV transmission line 11.83L (between the SS-11 and SS-162 substations) and the 138 kV transmission line 39.82L (between the SS-39 and SS-162 substations).

There is also an existing RAS that is used to mitigate the transmission constraints associated with thermal criteria violations on the existing 138 kV transmission line 752L (between the Summit 653S and East Crossfield 64S substations), which may be triggered by the loss of 138 kV transmission line 162.81L (between the SS-162 and Balzac 391S substations). This RAS trips or curtails generation in Airdrie (Area 57) to mitigate transmission constraints associated with thermal criteria violations on the 138 kV transmission line 752L.

1.2.1.2. AESO Long-Term Plans

The *AESO 2015 Long-term Transmission Plan* (2015 LTP)[1] includes the following system transmission developments in the Study Area in the near term (to 2020):[2]

- Build new 240 kV line from East Calgary substation in Highfield industrial area to SS-8substation in northwest corner of downtown Calgary
- Convert SS-8 to 240/138 kV substation
- Add new 138 kV line between SS-47 substation north of Calgary airport and SS-36substation in northwest Calgary
- Add new 138 kV line from SS-22 substation south of Calgary airport to SS-23 substation in Valleyfield industrial area of Calgary
- Build 240 kV double-circuit line to connect Beddington (SS-162) substation in northeast Calgary to one of the 240 kV lines between Red Deer and Calgary in an in/out configuration

As described in the 2015 LTP, near term system developments in Calgary (Area 6) and Airdrie (Area 57) are expected to relieve the existing transmission constraints in the Calgary Planning Region.

1.2.3. Studies Performed

The following studies were performed for the pre-Project scenarios:

- Power flow studies

[1] The 2015 LTP document is available on the AESO website.

[2] The 2015 LTP identifies the transmission developments in the City of Calgary sub-region on page 36.

- Short-circuit studies

The following studies were performed for the post-Project scenarios:

- Power flow studies
- Transient stability studies
- Short-circuit studies

1.1. Report Overview

The Executive Summary provides a high-level summary of the reportand its conclusions. Section 1 provides an introduction of the Project. Section 2 describes the criteria, system data, and study assumptions used in the studies. Section 3 presents the methodology used in the studies. Section 4 discusses the pre-Project system assessment. Section 5 presents the connection alternatives that were examined and the alternatives that were studied. Section 6 presents the post-Project system assessment for the alternative that was selected for further study. Section 7 contains the short circuit study results. Section 8 discusses the mitigation measures, if any, required to enable the reliable connection of the Project to the AIES. Section 9 identifies project dependencies, if any. 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. AESO 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* [3] (collectively, the Reliability Criteria) were applied to evaluate system performance under Category A system conditions (i.e., all elements in-service) and following Category B contingencies (i.e., single element outage), prior to and following the studied alternatives. Below is a summary of Category A and Category B system conditions.

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

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

The Alberta Reliability Standards include the Transmission Planning (TPL) standards that specify the desired system performance under different contingency categories with respect to the Applicable Ratings. The transmission system performance under various system conditions is defined in Appendix 1 of the TPL standards. For the purpose of applying the TPL standards to the studies documented in this report, Applicable Ratings are defined as follows:

- Seasonal continuous thermal rating of transmission lines.
- Highest specified loading limit for transformers.
- For Category A conditions: Voltage range under normal operating condition should follow the AESO Information Document ID# 2010-007RS. For the buses not listed in ID #2010-007RS, Table 2-1 in the *Transmission Planning Criteria – Basis and Assumptions* applies.

[3] Filed under a separate cover.

- 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 (below).

Table 2-1: Post Contingency Voltage Deviation Guidelines for Low Voltage Busses

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

2.1.2. AESO Rules and IDs

AESO ID #2010-007RS, *General Operating Practices – Voltage Control*, relates to Section 304.4 of the ISO rules, *Maintaining Network Voltage*. ID #2010-007RS was used to establish system normal (i.e., pre-contingency) voltage profiles in the Study Area.

The TCM Rule was followed to set up the study scenarios and assess the impact of the Project. In addition, due regard was given to the AESO's Connection Study Requirements and the AESO's Generation and Load Interconnection Standard.

2.2. Study Scenarios

Table 2-2 lists the study scenarios that were used to assess the Project. Both summer light (SL) and summer peak (SP) loading scenarios were selected for study since these scenarios represent the most stressed operating condition in the Study Area.[4] The 2019 study year was selected based on the Project ISD.

Table 2-2: List of the Connection Study Scenarios*

Scenario	Year/Season Load	Pre-Project/Post-Project	Project Generation (MW)	System Generation Dispatch Conditions
1	2019 SP	Pre-Project	0	Zero intertie and high thermal generation in Calgary (Area 6)
2	2019 SL	Pre-Project	0	
3	2019 SP	Post-Project	150	
4	2019 SL	Post-Project	150	
5	2026 SP	Post-project	150	N/A (Used for long-term short-circuit assessment)

* The Project load was not included in the study scenarios. Consideration of the Project load will not materially impact the results of this connection assessment, and does not change the conclusions and recommendations contained in this report.

2.3. Load and Generation Assumptions

2.3.1. Load Assumptions

The relevant AESO planning areas and regional planning load forecasts used for this connection assessment are shown in Table 2-3. The forecasts are based on the *AESO 2016 Long Term Outlook* (2016 LTO).

Table 2-3: Forecast Area Load (2016 LTO at Alberta Internal Load (AIL) Peak)

Planning Area or Region Name	Year/Season Load	Forecast Peak Load (MW)
Calgary (Area 6)	2019 SP	1,692
	2019 SL	764
Calgary Region	2019 SP	1,800
	2019 SL	815
AIL w/o Losses	2019 SP	11,575
	2019 SL	8,049

[4] 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.

2.3.2. Generation Assumptions

The generation assumptions for the studies are described in Table 2-4 below.

Table 2-4: Generation Dispatch for the Calgary Planning Area

Existing/Future	Unit Name	Bus Number	Pmax (MW)	2019 SL Unit Net Generation (MW)	2019 SP Unit Net Generation (MW)
Existing	Calgary Energy Centre GT	4187	320	287	182
Existing	Calgary Energy Centre ST	3187			
Existing	Shepard GT1	774	860	770	552
Existing	Shepard GT2	775			
Existing	Shepard ST1	773			
Existing	Balzac GT1	4290	120	107	88
Existing	Balzac GT1	3290			
Existing	Balzac ST1	4290			

2.3.3. Intertie Flow Assumptions

The Alberta-BC, Alberta-Montana, and Alberta-Saskatchewan intertie points were deemed to have no material effect on the assessment of the Project's impact on the performance of the AIES.

2.3.4. HVDC Line Flow Assumptions

The HVDC power orders were set based on the minimum loss per the assumptions in pre-Project and post-Project scenarios. The power orders used in the study scenarios are shown in Table 2-5.

Table 2-5: HVDC Power Order for each Study Scenario

Scenario No.	Scenario Name	Power Order Settings (MW)	
		EATL	WATL
1	2019 SP Pre-Project	Blocked	450 N → S*
2	2019 SL Pre-Project	250 N → S	275 N → S
3	2019 SP Post-Project	Blocked	350 N → S
4	2019 SL Post-Project	Blocked	275

Scenario No.	Scenario Name	Power Order Settings (MW)	
		EATL	WATL
			N → S

* N → S indicates HVDC flow direction is from North to South

The MVAr exchange between the HVDC terminals and the adjacent AC systems for the Western Alberta Transmission Line (WATL) and Eastern Alberta Transmission Line (EATL) were maintained within the reactive power limits shown in Table 2-6.

Table 2-6: HVDC to Adjacent AC System MVAr Exchange Limits

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

2.4. System Projects

Table 2-7 lists the in-service system transmission projects in or near the Study Area that were modelled in the study scenarios.

Table 2-7: In-Service System Projects Included in the Studies

Project No.	Subproject	Subproject Name
719	1	East Calgary Transmission Project
1117	All	Foothills Area Transmission Development – East
961/737	All	Eastern Alberta Transmission Line (EATL)
962/737	3	Western Alberta Transmission Line (WATL)
787	1	911L Replacement
787	11	Blackie Area Upgrade

The Downtown Calgary 138 kV Transmission Reinforcement[5] is not expected to be in service until 2021 and was not considered in the 2019 studies for the Project. It is included in the 2026 short circuit levels study case.

[5] *The Downtown Calgary 138 kV Transmission System Reinforcement Needs Identification Document* was approved by the Alberta Utilities Commission on June 1, 2016 in Decision 21038-D01-2016 and Approval 21038-D02-2016.

2.5. Customer Connection Projects

Customer connection projects in the study area that have passed Gate 2 of the AESO Connection Process as of January 2017 were modelled in the study scenarios based on their respective positions in the AESO Connection Queue. Table 2-8 summarizes the customer connection project assumptions that were used in the studies. Information in this table is subject to change as projects progress.

Table 2-8: Customer Connection Projects Included in the Studies

AESO Planning Area	Queue Position*	Scheduled In-Service Date	Project Name	AESO Project No.	Gen (MW)	Load (MW)
6	51	Q4 2017	ENMAX 162 Substation 138-25 KV 2nd Transformer Addition	1644	0.0	14.0

*Per the AESO Connection Queue posted in January 2017. Customer connection projects that have queue positions after the Project are not listed in this table and were not included in the study cases.

2.6. Facility Ratings and Shunt Elements

The legal owner of transmission facilities (TFO) provided the seasonal continuous thermal ratings and the short-term emergency ratings for the key transmission lines in the Study Area, as shown in Table 2-9.

Table 2-9: Key Transmission Line Ratings in the Study Area

Line ID	Line Description	Voltage Class (kV)	Line Rating (Summer)	
			Seasonal Continuous Rating (MVA)	Short-term Emergency Rating (MVA)
936L	East Calgary 5S – Langdon 102S	240	481	577
937L	East Calgary 5S – Langdon 102S	240	481	577
1064L	Langdon 102S - Janet 74S	240	974	1039
1065L	Langdon 102S - Janet 74S	240	974	1169
916L	East Calgary 5S - Sarcee 42S	240	408	490
1106L	Foothills 237S - SS-65	240	971	1071
1107L	Foothills 237S - SS-65	240	971	1071
1080L	SS-65 - SS-25	240	487	584
1003L	SS-25 - Janet 74S	240	973	1017
611L	Balzac 391S - Dry Creek 186S	138	119	131
23.80L	Janet 74S - SS-23	138	285	287

Line ID	Line Description	Voltage Class (kV)	Line Rating (Summer)	
			Seasonal Continuous Rating (MVA)	Short-term Emergency Rating (MVA)
2.80L	SS-23 - SS-2	138	285	287
24.83L	Janet 74S - SS-24	138	322	341
37.82L	Janet 74S - SS-37	138	287	287
24.81L	SS-24 - SS-31	138	287	287
9.80L	SS-9 - SS-31	138	287	316
26.81L	SS-26 - SS-54	138	287	290
24.82L	SS-65 - SS-24	138	285	285
26.83L	SS-65 - SS-26	138	285	285
11.83L	SS-11 - SS-162	138	305	335
162.81L	SS-162 - Balzac 391S	138	287	287
39.82L	SS-162 - SS-39	138	287	316
2.83L	SS-5 – 2.83 Tap point	138	287	316
2.83L	SS-13 – 2.83 Tap point	138	287	316
2.83L	SS-2 – 2.83 Tap point	138	338	372
2.82L	SS-2 - SS-5	138	322	354
11.81L	SS-11 - SS-13	138	287	316
13.82L	SS-13 - SS-22	138	161	177
22.81L	SS-39 - SS-22	138	260	287
631L	Dry Creek 186S – East Airdrie 199S	138	106	117
688L	East Airdrie 199S – Summit 653S tap	138	121	133
752L	Summit 653S – 752L tap	138	121	133
752L	East Crossfield 64S – 752L tap	138	119	131

The TFO also provided the facility ratings for the key transformers in the Study Area. The ratings of the key transformers are shown in Table 2-10.

Table 2-10: Key Transformer Ratings in the Study Region

Station Name and Number	Transformer	Rating (MVA)
SS-162	T1 - 240/138 kV	400

	T2 - 240/138 kV	400
East Calgary 5S	T1 – 240/138 kV	400
	T2 – 240/138 kV	400
Janet 74S	T1 - 240/138 kV	400
	T2 - 240/138 kV	400
Sarcee 42S	T1 - 240/138 kV	400
	T2 - 240/138 kV	400

The details of shunt elements in the Study Area are given in Table 2-11.

Table 2-11: Shunt Elements in the Study Area

Substation Name and Number	Voltage (kV)	Capacitors		Reactors	
		Number of Switched Shunt Blocks	Total at nominal voltage (MVAr)	Number of Switched Shunt Blocks	Total at nominal voltage (MVAr)
Janet 74S	240	2	268.80	--	--
	138	2	162.00	--	--
Sarcee 42S	240	2	201.60	--	--
	138	1	54.00	--	--
SS-14	138	2	48.91	--	--
SS-21	138	1	48.91	--	--
SS-2	138	2	160.00	--	--
SS-31	138	1	48.11	--	--
SS-38	138	1	48.11	--	--
SS-41	138	1	53.96	--	--
Langdon 102S	138	2	108.14	2	148.10
Chapel Rock 491S	138	2	100.00	1	45.00
Chapel Rock 491S	138	1	200.00	1	100.00

2.7. Voltage Profile Assumptions

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

The static VAr Compensator (SVC) at the Langdon 102S substation was set in the range -80 to +40 MVAr under Category A conditions.

2.8. Protection Fault Clearing Times

Dynamic studies were performed using the actual fault clearing times of the existing transmission lines as shown in Table 2-12.

Table 2-12: Stated Protection Fault Clearing Times

Transmission Line	Voltage Level (kV)	Fault Clearing Times (Cycles)	
		Close End	Far End
11.83L (SS-11 to SS-162)	138	6	8
39.82L (SS-162 to SS-39)	138	6	8
162.81L (SS-162 to Balzac 391S)	138	6	8
38.83L (SS-38 to SS-39)	138	6	8
22.81L (SS-39 to SS-22)	138	6	8
11.81L (SS-13 to SS-11)	138	6	8
11.82L (SS-11 to SS-14)	138	6	8
771L (SS-162 to SS-47)	138	6	8
932L (SS-162 to Janet 74S)	240	5	6
918L (SS-162 to Benalto 17S)	240	5	6
1201L (Bennett 520S to Cranbrook)	500	4	5

2.9. Dynamic Data and Assumptions

Dynamic data for the Facility are provided by the market participant, and are listed in Attachment A.

3. Study Methodology

All of the studies for this connection assessment were performed using PSS/E software Version 33.

3.1. Connection Studies Carried Out

Table 3-1 shows the studies that were carried out.

Table 3-1: Studies Performed

Scenario No.	Year and Season	Power Flow	Transient Stability	Short Circuit
Pre-Project				
1	2019 SP	Category A, B	No	Yes
2	2019 SL	Category A, B	No	No
Post-Project				
3	2019 SP	Category A, B	Selected Category B	Yes
4	2019 SL	Category A, B	Selected Category B	No
5	2026 SP	No	No	Yes

3.2. Power Flow Analysis

Pre-Project and post-Project power flow studies were performed to identify thermal and voltage criteria violations as per the Reliability Criteria, and any deviations from the limits listed in Table 2-12. The purpose of the power flow analysis is to quantify any incremental violations in the Study Area after the Project is connected. For the Category B power flow studies, the transformer taps and switched shunt reactive compensation devices such as shunt capacitors and reactors were locked, and continuous shunt devices were enabled.

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

3.2.1. Contingencies Studied

Power flow analysis was completed for all Category B contingencies (69 kV facilities and above) within the Study Area. All transmission facilities in the Study Area were monitored for voltage criteria violations and thermal criteria violations under Category A conditions and under Category B contingency conditions.

3.3. Transient Stability Analysis

Transient stability analysis was performed for the selected Category B contingencies listed in Table 3-2. Near-end and far-end three-phase–to-ground faults were applied to the transmission lines stated Table 3-2 to assess the stability of the system in the post-Project scenarios. The applied faults were cleared by opening the respective near-end and far-end line breakers using the fault clearing times as stated in Section 2.8.

Selected bus voltages, generators' active power and angle, transmission line and transformer active and reactive power were monitored for the contingencies listed in Table 3-3.

The transient stability performance of the Facility generators was monitored in terms of rotor angle and bus voltage at the connection point. Key generators in Calgary were also monitored for rotor angle stability.

In all the studied scenarios, the faults were applied at 2 seconds and the simulation was plotted to 20 seconds.

A system dynamic response was considered acceptable if the following conditions were met after a disturbance:

- All the generators remained stable and connected to the AIES,
- The BC intertie did not trip,
- The post-transient voltage did not differ from the pre-fault voltage by more than 10%, and
- All oscillations in the system were damped successfully as per Western Electricity Coordinating Council (WECC) and the Reliability Criteria.

Table 3-2: Contingencies Studied for Transient Stability Analysis

Contingency Description	Category
3-phase fault on 70.80L (proposed SS-70 - SS-162)	B
3-phase fault on 39.82L (SS-39 - SS-162)	B
3-phase fault on 162.81L (SS-162 - Balzac 391S)	B
3-phase fault on 771L (SS-162 - SS-47)	B
3-phase fault on 11.83L (SS-162 - SS-11)	B
3-phase fault on 918L (SS-162 - Benalto 17S)	B
3-phase fault on 932L (Janet 74S - SS-162)	B
3-phase fault on 11.82L (SS-11 - SS-14)	B
3-phase fault on 11.81L (SS-11 - SS-13)	B

Contingency Description	Category
3-phase fault on 22.81L (SS-39 - SS-22)	B
3-phase fault on 38.83L (SS-39 - SS-38)	B

3.4. Short-Circuit Analysis

Short-circuit analysis was performed for the 2019 SP pre-Project and the 2019 SP post-Project study scenarios, as well as for the long-term assessment using the 2026 SP post-Project scenario. For the short-circuit studies, all transmission elements in the Study Area were assumed to be in service, and all the generators in and around the Study Area were switched on to evaluate the maximum fault current under three-phase-to-ground faults and single-line-to-ground faults.

The maximum three-phase-to-ground and single-line-to-ground fault levels were simulated and the results reported using polar co-ordinates and physical values for the substations stated in Table 3-3.

Table 3-3: Applicable Substations for Short-circuit Level Analysis

Substation	Rated Voltage Level (kV)
SS-162	138
	240
Janet 74S	138
	240
Balzac 391S	138
SS-47	138
SS-39	138
SS-11	138
East Crossfield 64S	138
	240
Benalto 17S	138
	240

4. Pre-Connection System Assessment

4.1. Power Flow Analysis

This section describes the results of the pre-Project power flow studies. Single line diagrams (SLDs) illustrating the pre-Project power flow studies results for Category A conditions and selected Category B conditions in the Study Area are included in Attachment B.

4.1.1. Scenario 1 – 2019 SP Pre-Project

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

Under Category B conditions, no voltage criteria violations or POD bus voltage deviations were observed. Thermal criteria violations were observed for the 2019 SP Scenario under Category B conditions, as shown in Table 4-1. Thermal loading above the seasonal continuous rating, but below the short-term emergency rating, were observed on the 138 kV transmission lines 688L and 11.83L under certain Category B contingencies. Thermal loading above the short-term emergency rating of the 138 kV transmission line 39.82L was observed following the loss of the 138 kV transmission line 11.83L.

Table 4-1: Summary of Thermal Criteria Violations for the 2019 SP Pre-Project Scenario Under Category B

Contingency	Limiting Facilities	Line Ratings		Details of Reliability Criteria Violations	
		Seasonal Continuous Rating (MVA)	Short-term Emergency Rating (MVA)	Power Flow (MVA)	% (Loading)
752L (West Crossfield 316S - East Crossfield 64S - Summit 653S)	688L (Summit 653S - 688AL tap)	121	133	126.8	103.4
11.83L (SS-162 - SS-11)	39.82L (SS-162 - SS-39)	287	316	295.1	102.3
39.82L (SS-162 - SS-39)	11.83L (SS-162 - SS-11)	305	335	308.9	101.2

Mitigation measures for the above-noted Reliability Criteria violations are described in Section 8.

4.1.2. Scenario 2 – 2019 SL Pre-Project

No Reliability Criteria violations were observed under the Category A condition or Category B conditions.

5. Connection Alternatives

5.1. Overview

The AESO, in consultation with the TFO and the market participant, examined two transmission alternatives and meet the market participant's request for system access service. Both alternatives require a new switching substation, to be designated as the SS-70 substation, which will connect the Facility to the AIES.

5.2. Connection Alternatives Identified

The developments associated with each connection alternative are described below.

Alternative 1 – Radial connection to the 138 kV transmission system via the SS-162 substation

Alternative 1 includes:

- adding a 138 kV switching substation, which includes three 138 kV circuit breakers and associated equipment,
- adding a 138 kV circuit to connect the proposed SS-70 substation and the existing SS-162 substation using a radial configuration, and
- modifying the existing SS-162 substation by adding one 138 kV circuit breaker and associated equipment.

Alternative 2 – Radial connection to the 240 kV transmission system via the SS-162 substation

Alternative 2 includes:

- adding a 240 kV switching substation, which includes three 240 kV circuit breakers and associated equipment,
- adding a 240 kV circuit to connect the proposed SS-70 substation and the existing SS-162 substation in a radial configuration, and
- modifying the existing SS-162 substation by adding one 240 kV circuit breaker and associated equipment, and expanding the 240 kV bus.

5.2.1. Connection Alternatives Selected for Further Studies

Alternative 1 is considered technically feasible and was selected for further study.

5.2.2. Connection Alternatives Not Selected for Further Studies

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

6. Technical Analysis of Alternative 1

This section provides the post-Project study results for Alternative 1, which was described in Section 5.

6.1. Power Flow Analysis

The post-Project power flow diagrams are provided in Attachment C.

6.1.1. Scenario 3 – 2019 SP Post-Project

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

Under Category B conditions, no voltage criteria violations or POD bus voltage deviations were observed. Similar to the 2019 SP pre-Project scenario, thermal criteria violations were observed for the 2019 SP post-Project Scenario under Category B conditions, as shown in Table 6-1. Thermal loading above the seasonal continuous rating, but below the short-term emergency rating, were observed on the 138 kV transmission lines 688L and 11.83L under certain Category B contingencies. Thermal loading above the short-term emergency rating of the 138 kV transmission line 39.82L was observed following the loss of 138 kV transmission line 11.83L. The observed thermal criteria violations on the 138 kV transmission lines 39.82L and 11.83L were exacerbated after connection of the Project. Thermal criteria violations on the 138 kV transmission line 688L were reduced after connection of the Project.

Table 6-1: Summary of Thermal Criteria Violations for the 2019 SP Post-Project Scenario Under Category B Conditions

Contingency	Limiting Facilities	Line Ratings		Details of Reliability Criteria Violations				% Difference of Line Loading
		Seasonal Continuous Rating (MVA)	Short-term Emergency Rating (MVA)	2019 SP Pre-Project		2019 SP Post-Project		
				Power Flow (MVA)	% (Loading)	Power Flow (MVA)	% (Loading)	
752L (West Crossfield 316S - East Crossfield 64S - Summit 653S)	688L (Summit 653S-688AL tap)	121	133	126.8	103.4	123.1	100.4	-3.0
11.83L (SS-162 - SS-11)	39.82L (SS-162 - SS-39)	287	316	295.1	102.3	346.1	119.9	17.6
39.82L (SS-162 - SS-39)	11.83L (SS-162 - SS-11)	305	335	308.9	101.2	359.1	117.5	16.3

Mitigation measures for the above-noted Reliability Criteria violations are described in Section 8.

6.1.2. Scenario 4 – 2019 SL Post-Project

No Reliability Criteria violations were observed under the Category A condition or Category B conditions.

6.2. Transient Stability Analysis

Transient stability studies were performed for both the 2019 SP and the 2019 SL post-Project scenarios.

The results did not indicate any transient stability concerns, and the system showed acceptable dynamic response to all studied Category B contingencies. Detailed stability plots are provided in Attachment D.

Table 6.3-1: Summary of Transient Stability Results

System Condition	Contingency	Fault Description (fault location)	Results
Category B (N-1)	70.80L (proposed SS-70 - SS-162)	3-phase fault at SS-70	Stable
Category B (N-1)	39.82L (SS-39 - SS-162)	3-phase fault at SS-39	Stable
Category B (N-1)	162.81L (SS-162 - Balzac 391S)	3-phase fault at SS-162	Stable
Category B (N-1)	771L (SS-162 - SS-47)	3-phase fault at SS-162	Stable
Category B (N-1)	11.83L (SS-162 - SS-11)	3-phase fault at SS-162	Stable
Category B (N-1)	918L (SS-162 - Benalto 17S)	3-phase fault at SS-162	Stable
Category B (N-1)	932L (Janet 74S - SS-162)	3-phase fault at Janet 74S	Stable
Category B (N-1)	11.82L (SS-11 - SS-14)	3-phase fault at SS-11	Stable
Category B (N-1)	11.81L (SS-11 - SS-13)	3-phase fault at SS-11	Stable
Category B (N-1)	22.81L (SS-39 - SS-22)	3-phase fault at SS-39	Stable
Category B (N-1)	38.83L (SS-39 - SS-38)	3-phase fault at SS-39	Stable
Category B (N-1)	70.80L (proposed SS-70 - SS-162)	3-phase fault at SS-162	Stable
Category B (N-1)	39.82L (SS-39 - SS-162)	3-phase fault at SS-162	Stable
Category B (N-1)	162.81L (SS-162 - Balzac 391S)	3-phase fault at Balzac 391S	Stable
Category B (N-1)	771L (SS-162 - SS-47)	3-phase fault at SS-47	Stable
Category B (N-1)	11.83L (SS-162 - SS-11)	3-phase fault at SS-11	Stable

System Condition	Contingency	Fault Description (fault location)	Results
Category B (N-1)	918L (SS-162 - Benalto 17S)	3-phase fault at Benalto 17S	Stable
Category B (N-1)	932L (Janet 74S - SS-162)	3-phase fault at SS-162	Stable
Category B (N-1)	11.82L (SS-11 - SS-14)	3-phase fault at SS-14	Stable
Category B (N-1)	11.81L (SS-11 - SS-13)	3-phase fault at SS-13	Stable
Category B (N-1)	22.81L (SS-39 - SS-22)	3-phase fault at SS-38	Stable
Category B (N-1)	38.83L (SS-39 - SS-38)	3-phase fault at SS-38	Stable

7. Short-Circuit Analysis

Short-circuit analysis was performed using the 2019 SP and 2026 SP scenarios to determine the expected system short circuit levels[6] in the vicinity of the Project. Single phase and three phase fault currents were calculated at the existing SS-162 substation and additional substations in electric proximity to the Project.

7.1. Pre-Project

The 2019 SP short circuit levels before the Project are provided in Table 7-1.

7.2. Post-Project

The 2019 SP and 2026 SP short-circuit levels after the Project are provided in Table 7-2 and Table 7.3.

Post-Project short-circuit fault levels are not significantly higher than pre-Project levels.

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

Table 7-1: Short-Circuit Current Levels for the 2019 SP Pre-Project Scenario

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
SS-162	138	141.25	1.02	25.5	0.73+3.15j	0.004+0.017j	24.4	0.43+3.63j	0.002+0.019j
	240	246.15	1.03	15.6	1.56+9.02j	0.003+0.016j	15.3	1.01+9.83j	0.002+0.017j
Benalto 17S	138	141.9	1.03	15.2	0.76+5.39j	0.004+0.028j	12.2	1.77+9.16j	0.009+0.048j
	240	254.05	1.06	21.2	1.37+6.84j	0.002+0.012j	13.5	4.89+18.17j	0.008+0.032j
East Crossfield 64S	138	139.96	1.01	8.2	1.85+9.77j	0.010+0.051j	7.2	2.68+14.00j	0.014+0.074j
	240	252.43	1.05	9.3	2.79+15.56j	0.005+0.027j	6.5	8.44+35.21j	0.015+0.061j
Balzac 391S	138	141.31	1.02	22.9	0.80+3.50j	0.004+0.018j	20.9	0.62+4.61j	0.003+0.024j
Janet 74S	240	253.11	1.05	25.4	1.27+5.67j	0.002+0.010j	25.9	1.35+5.44j	0.002+0.009j
	138	139.65	1.01	29.5	0.67+2.68j	0.003+0.014j	26.8	0.52+3.59j	0.003+0.019j
SS-11	138	138.23	1	23	0.97+3.36j	0.005+0.018j	16.3	1.43+7.71j	0.008+0.040j
SS-39	138	138.75	1.01	22.7	0.92+3.43j	0.005+0.018j	15.7	1.46+8.26j	0.008+0.043j
SS-47	138	141.19	1.02	10.5	1.52+7.71j	0.008+0.040j	6.8	4.27+20.14j	0.022+0.106j

Table 7-2: Short-Circuit Current Levels for the 2019 SP Post-Project Scenario

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
SS-162	138	141.14	1.02	27.8	0.62+2.88j	0.003+0.015j	25.8	0.43+3.64j	0.002+0.019j
	240	246.19	1.03	16.2	1.39+8.69j	0.002+0.015j	15.6	1.01+9.83j	0.002+0.017j
CEC #2	138	140.59	1.02	14.5	0.99+5.52j	0.005+0.029j	12.6	0.97+8.18j	0.005+0.043j
Benalto 17S	138	141.88	1.03	15.2	0.75+5.38j	0.004+0.028j	12.2	1.77+9.16j	0.009+0.048j
	240	254.04	1.06	21.3	1.34+6.80j	0.002+0.012j	13.6	4.89+18.17j	0.008+0.032j
East Crossfield 64S	138	139.7	1.01	8.2	1.84+9.72j	0.010+0.051j	7.1	2.68+14.00j	0.014+0.074j
	240	252.25	1.05	9.3	2.74+15.45j	0.005+0.027j	6.5	8.44+35.21j	0.015+0.061j
Balzac 391S	138	141.21	1.02	24.7	0.69+3.25j	0.004+0.017j	21.8	0.62+4.62j	0.003+0.024j
Janet 74S	240	252.9	1.05	26	1.19+5.53j	0.002+0.010j	26.3	1.35+5.43j	0.002+0.009j
	138	140.4	1.02	30.1	0.64+2.64j	0.003+0.014j	26.9	0.53+3.65j	0.003+0.019j
SS-11	138	138.48	1	23.8	0.91+3.26j	0.005+0.017j	16.5	1.43+7.71j	0.008+0.041j
SS-39	138	139.05	1.01	23.6	0.86+3.31j	0.005+0.017j	15.9	1.46+8.27j	0.008+0.043j
SS-47	138	141.08	1.02	10.8	1.42+7.45j	0.007+0.039j	6.9	4.27+20.14j	0.022+0.106j

Table 7-3: Short-Circuit Current Levels for the 2026 SP Post-Project Scenario

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
SS-162	138	142.62	1.03	29.5	0.56+2.76j	0.003+0.014j	27.8	0.36+3.31j	0.002+0.017j
	240	250.99	1.05	17.7	1.20+8.15j	0.002+0.014j	17.3	0.82+8.80j	0.001+0.015j
CEC #2	138	142.64	1.03	19.7	0.77+4.14j	0.004+0.022j	16.6	0.81+6.48j	0.004+0.034j
Benalto 17S	138	141.93	1.03	15.3	0.75+5.34j	0.004+0.028j	12.3	1.77+9.16j	0.009+0.048j
	240	254.44	1.06	21.6	1.32+6.71j	0.002+0.012j	13.7	4.89+18.15j	0.008+0.032j
East Crossfield 64S	138	140.17	1.02	8.3	1.82+9.67j	0.010+0.051j	7.2	2.68+14.00j	0.014+0.073j
	240	252.63	1.05	9.5	2.65+15.25j	0.005+0.026j	6.6	8.44+35.19j	0.015+0.061j
Balzac 391S	138	142.63	1.03	26	0.64+3.12j	0.003+0.016j	23	0.58+4.40j	0.003+0.023j
Janet 74S	240	253.39	1.06	27.8	1.04+5.21j	0.002+0.009j	27.6	1.32+5.36j	0.002+0.009j
	138	141.41	1.02	31.4	0.59+2.56j	0.003+0.013j	27.8	0.52+3.62j	0.003+0.019j
SS-11	138	140.15	1.02	24.7	0.86+3.19j	0.005+0.017j	16.9	1.44+7.70j	0.008+0.040j
SS-39	138	140.76	1.02	24.5	0.81+3.24j	0.004+0.017j	16.3	1.48+8.27j	0.008+0.043j
SS-47	138	142.55	1.03	11.1	1.36+7.32j	0.007+0.038j	7.1	4.22+19.86j	0.022+0.104j

8. Mitigation Measures

Real-time operational practices can be used to manage the thermal criterial violation that was observed on the 138 kV transmission line 688L following certain Category B contingencies in the pre-Project assessment. Real-time operational practices can also be used to manage the thermal criterial violation that was observed on the 138 kV transmission line 688L following certain Category B contingencies after connection of the Project.

The existing Beddington RAS is currently being used to mitigate the thermal criteria violations that were observed on the 138 kV transmission lines 11.83L and 39.82L following certain Category B contingencies in the pre-Project assessment. The existing Beddington RAS can also be used to mitigate the thermal criteria violations that were observed on the 138 kV transmission lines 11.83L and 39.82L following certain Category B contingencies post-Project, as shown in Table 8-1.

Table 8-1: Summary of Power Flows for the 2019 SP Post-Project Scenario after Beddington RAS Action

Contingency	Limiting Facilities	Line Ratings		Details of Reliability Criteria Violations			
		Seasonal Continuous Rating (MVA)	Short-term Emergency Rating (MVA)	2019 SP Post-Project		2019 SP Post-Project, Post-RAS	
				Power Flow (MVA)	% (Loading)	Power Flow (MVA)	% (Loading)
11.83L (SS-162 - SS-11)	39.82L (SS-162 - SS-39)	287	316	346.1	119.9	250.6	86.9
39.82L (SS-162 - SS-39)	11.83L (SS-162 - SS-11)	305	335	359.1	117.5	264.4	86.6

9. Project Interdependencies

The Project is not dependent on other AESO plans to expand or enhance the transmission system.

10. Conclusions and Recommendations

The connection assessment identified a number of pre-Project and post-Project system performance issues under certain Category B conditions. Table 10-1 provides analysis of, and conclusions about, all identified Reliability Criteria violations, including mitigation measures.

Table 10-1: Overview of Observed Violations and Mitigation Measures

Reliability Criteria Violations		Occur in Pre- and/or Post-Project	Year/Season Load	Project Impact	Mitigation Measure
Violation	Contingency				
138 kV transmission line 688L (Summit 653S - 688AL)	138 kV transmission line 752L (West Crossfield 316S - East Crossfield 64S - Summit 653S)	Pre-Project and post-Project	2019 SP	Reduced thermal loading	Real-time operational practices
138 kV transmission line 11.83L (SS-162 - SS-11)	138 kV transmission line 39.82L (SS-162 - SS-39)	Pre-Project and post-Project	2019 SP	Significantly Exacerbated thermal loading	Existing Beddington RAS
138 kV transmission line 39.82L (SS-162 - SS-39)	138 kV transmission line 11.83L (SS-162 - SS-11)	Pre-Project and post-Project	2019 SP	Significantly Exacerbated thermal loading	Existing Beddington RAS

Based on the study results, Alternative 1 is technically acceptable.

It is recommended to proceed with the Project using Alternative 1 as the preferred option to response to the market participant's request for system access service. It is also recommended to use real-time operational practices and the existing Beddington RAS. to mitigate the identified system performance issues.

Attachment A
Dynamic Data of All Equipment Proposed for Connection

The following tables list the dynamic data used to model all of the equipment proposed for connection.

Table A-1: Generator Dynamic (Example)

Generator Dynamic Data (GENROU model)											
T'do	**T"do**	**T'qo**	**T"qo**	**H**	**D**	**Xd**	**Xq**	**X'd**	**X'q**	**X"d**	**Xl**
8.6	0.05	2.89	0.05	1.8	0	2.02	1.84	0.23	0.33	0.17	0.12
S(1.0)	**S(1.2)**										
0.143	0.332										

Table A-2: Exciter Dynamic Data (Example)

Exciter Dynamic Data (ESAC8B model)											
TR	**KP**	**KI**	**KD**	**TD**	**KA**	**TA**	**VR MAX**	**VR MIN**	**TE**	**KE**	**E1**
0.02	35	8	10	0.1	1	0.02	7.8	-0.9	1.2	1.0	5.9
SE(E1)	**E2**	**SE(E2)**									
0.41	7.8	4.01									

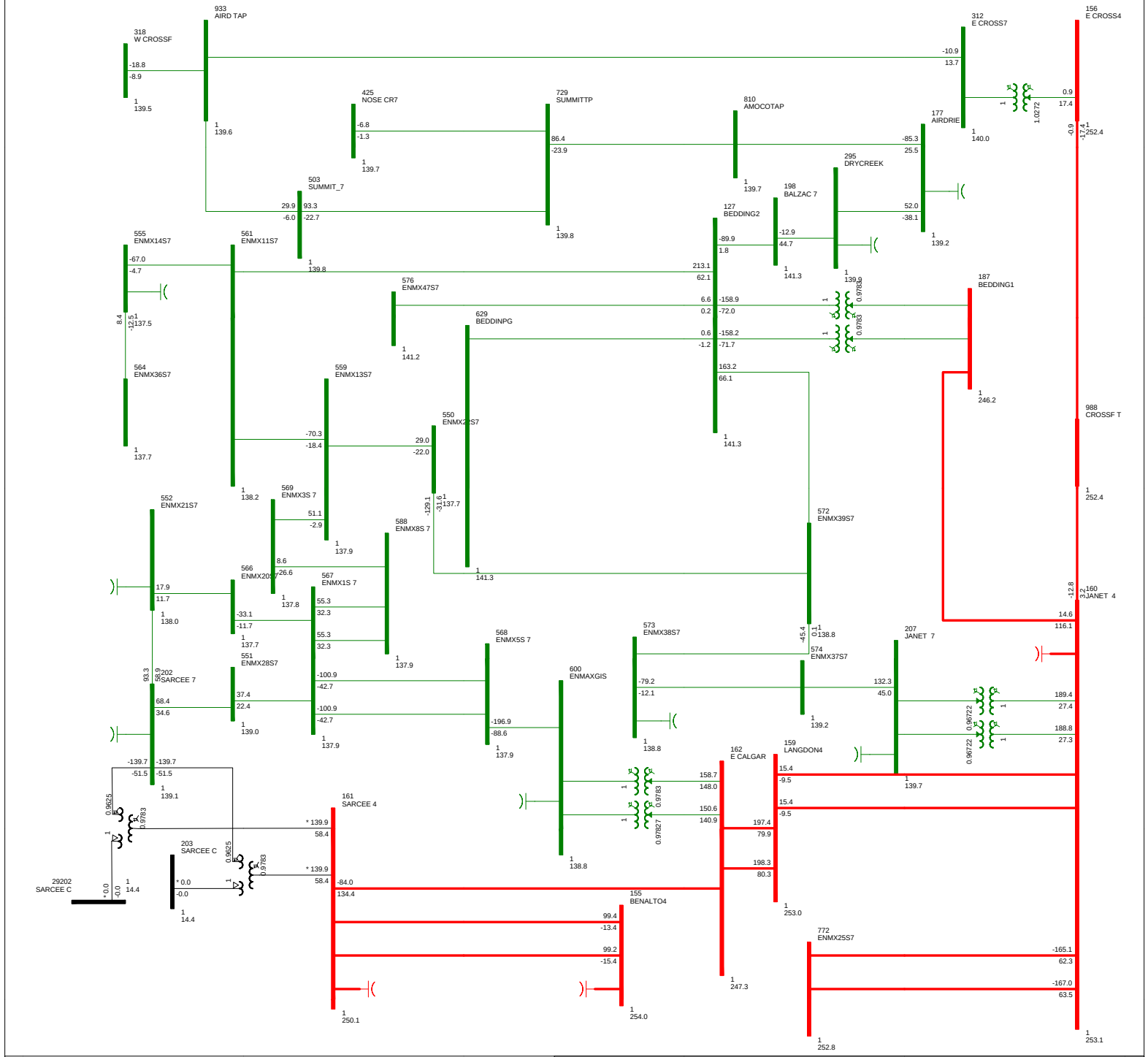
Table A-3: Stabilizer Dynamic Data (Example)

Stabilizer Dynamic Data (PSS2A model)											
Tw1	**Tw2**	**T6**	**Tw3**	**Tw4**	**T7**	**KS2**	**KS3**	**T8**	**T9**	**KS1**	**T1**
5.0	5.0	0.0	5.0	0.0	5.0	1.39	1.0	0.5	0.1	0.5	0.2
T2	**T3**	**T4**	**VSTMAX**	**VSTMIN**	**IC1**	**REMBUS1**	**IC2**	**REMBUS2**	**M**	**N**	
0.02	0.2	0.02	0.05	-0.05	1	0	3	0	5	1	

Table A-4: Governor Dynamic Data (Example)

Governor Dynamic Data (GGOV1 model)											
R	**Tpelec**	**Maxerr**	**Minerr**	**Kpgov**	**Kigov**	**Kdgov**	**Tdgov**	**Vmax**	**Vmin**	**Tact**	**Kturb**
0.068	0.22	0.017	-0.017	1.4	0.4	0.0	0.1	1.0	0.15	0.886	1.292
Wfnl	**Tb**	**Tc**	**Teng**	**Tfload**	**Kpload**	**kiload**	**Ldref**	**Dm**	**Ropen**	**Rclose**	**Kimw**
0.2	0.56	0.35	0.0	3.0	2.0	0.67	1.0	0.0	99	-99	0.0
Aset	**Ka**	**Ta**	**Trate**	**db**	**Tsa**	**Tsb**	**Rup**	**Rdown**	**Rselect**	**Flag**	
9	10.0	0.1	58.0	0.0	1.0	1.0	99	-99.0	1	0	

Attachment B
Pre-Project Power Flow Diagrams



SCENARIO 1 2019 SP (PRE CONNECTION)
BASE CASE
FIG A-1
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/>500.000

BC-AB: 20.7 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

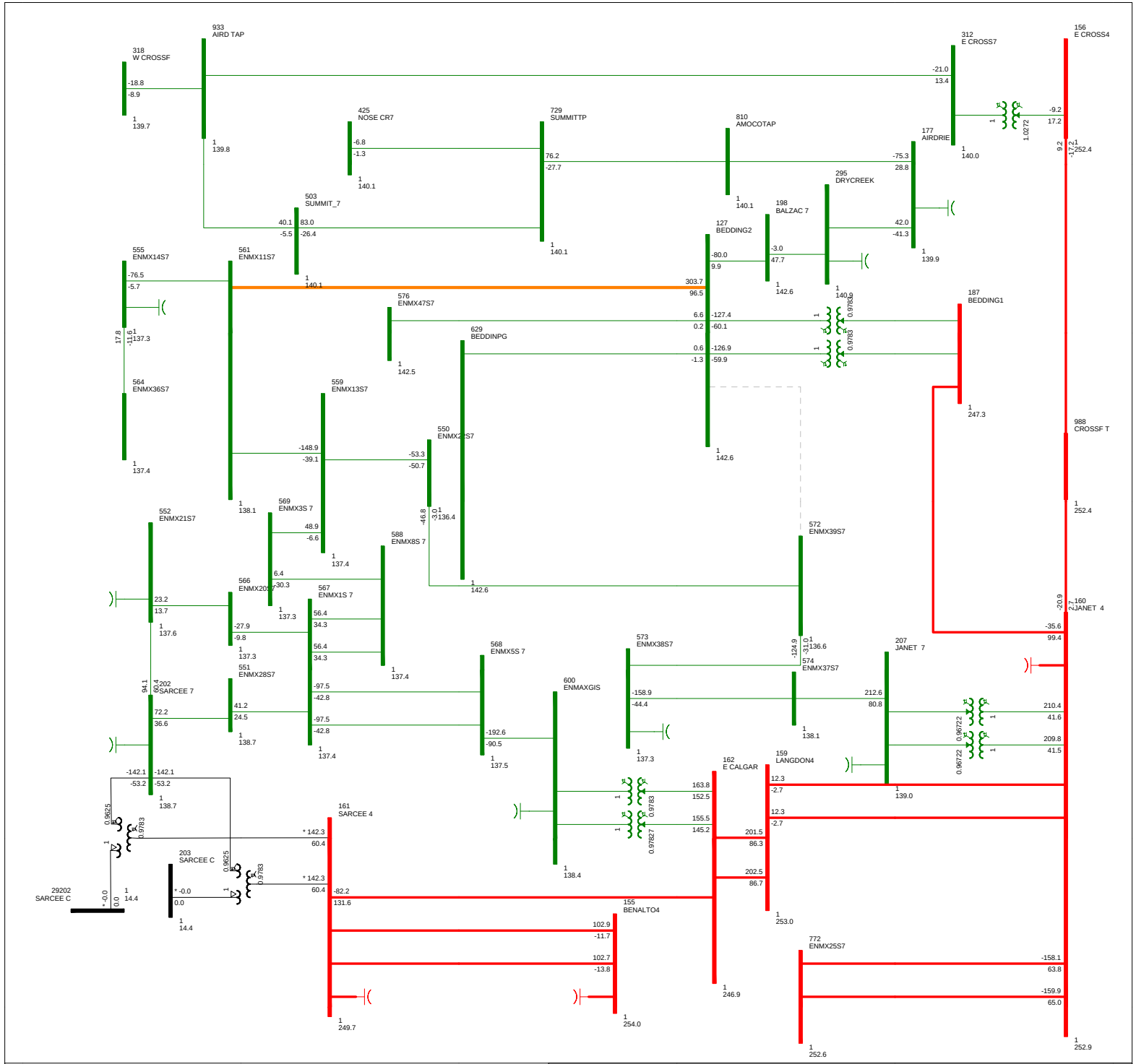
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 442.7 MW

EATL: -0.8 MW



SCENARIO 1 2019 SP (PRE CONNECTION)
11.83L
FIG A-2
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/500.000

BC-AB: 22.7 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

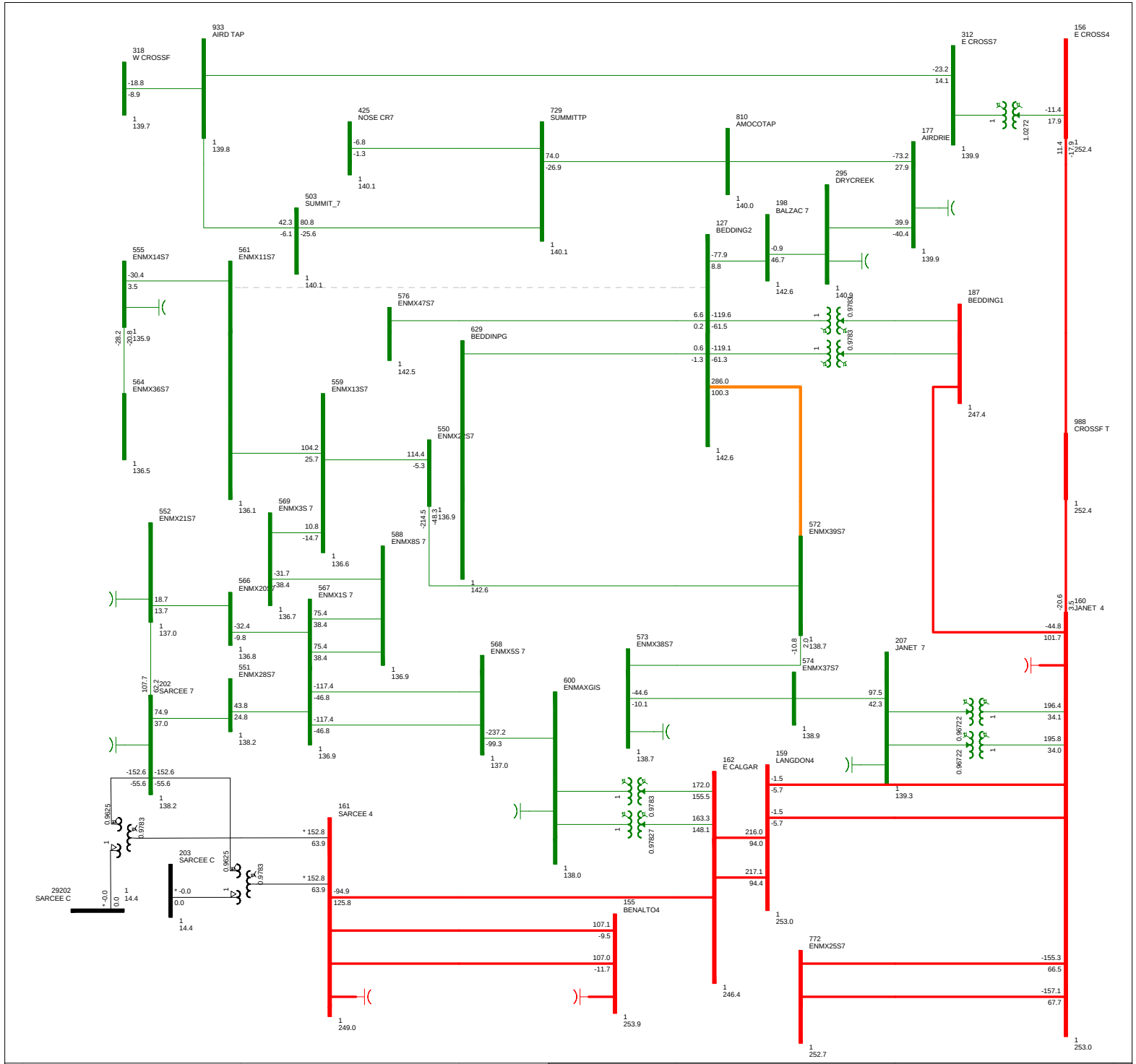
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 442.7 MW

EATL: -0.8 MW



SCENARIO 1 2019 SP (PRE CONNECTION)
39.82L
FIG A-3
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/500.000

BC-AB: 24.1 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

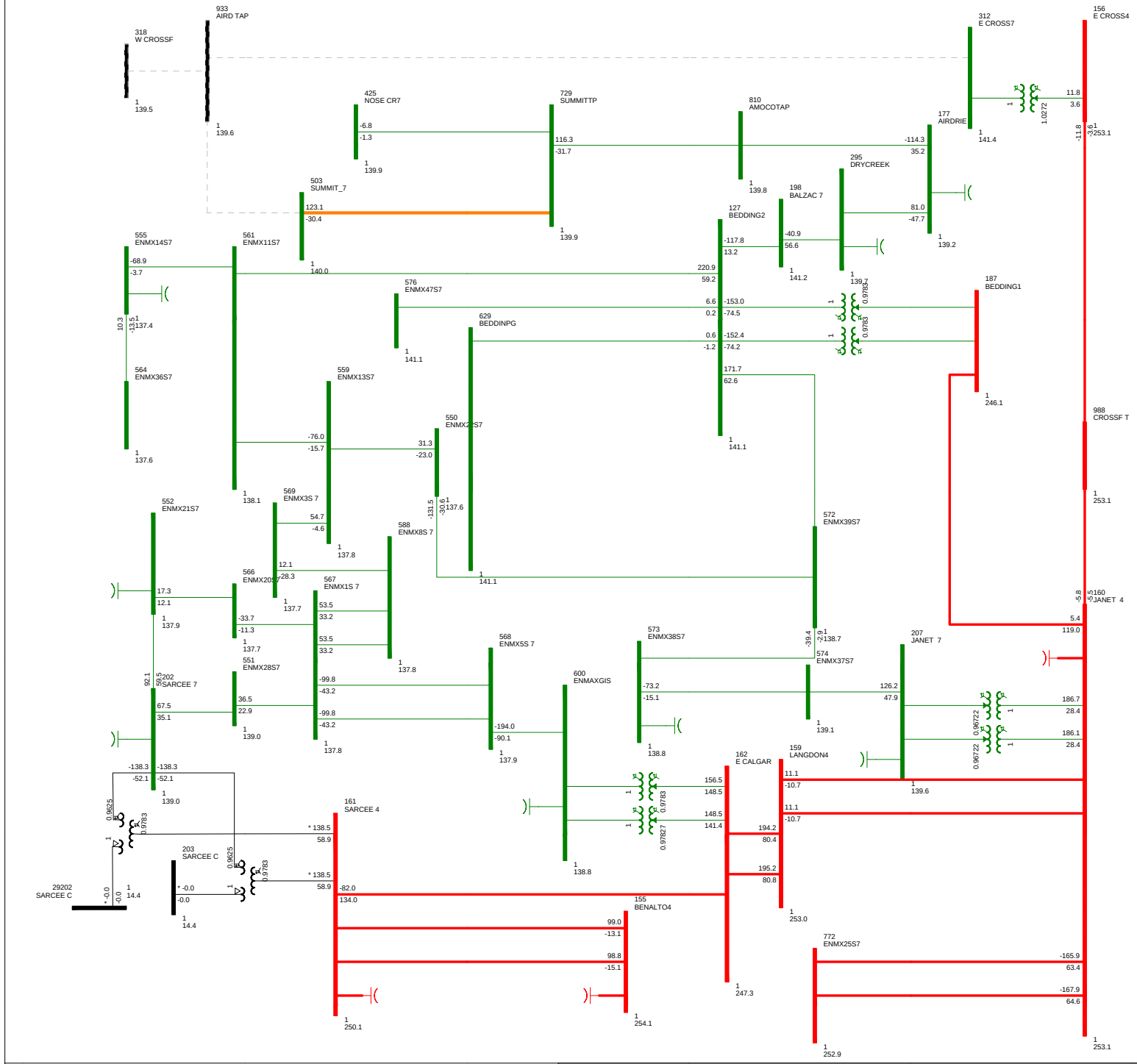
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 442.7 MW

EATL: -0.8 MW



SCENARIO 1 2019 SP (PRE CONNECTION)
752L
FIG A-4
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/500.000

BC-AB: 3.8 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

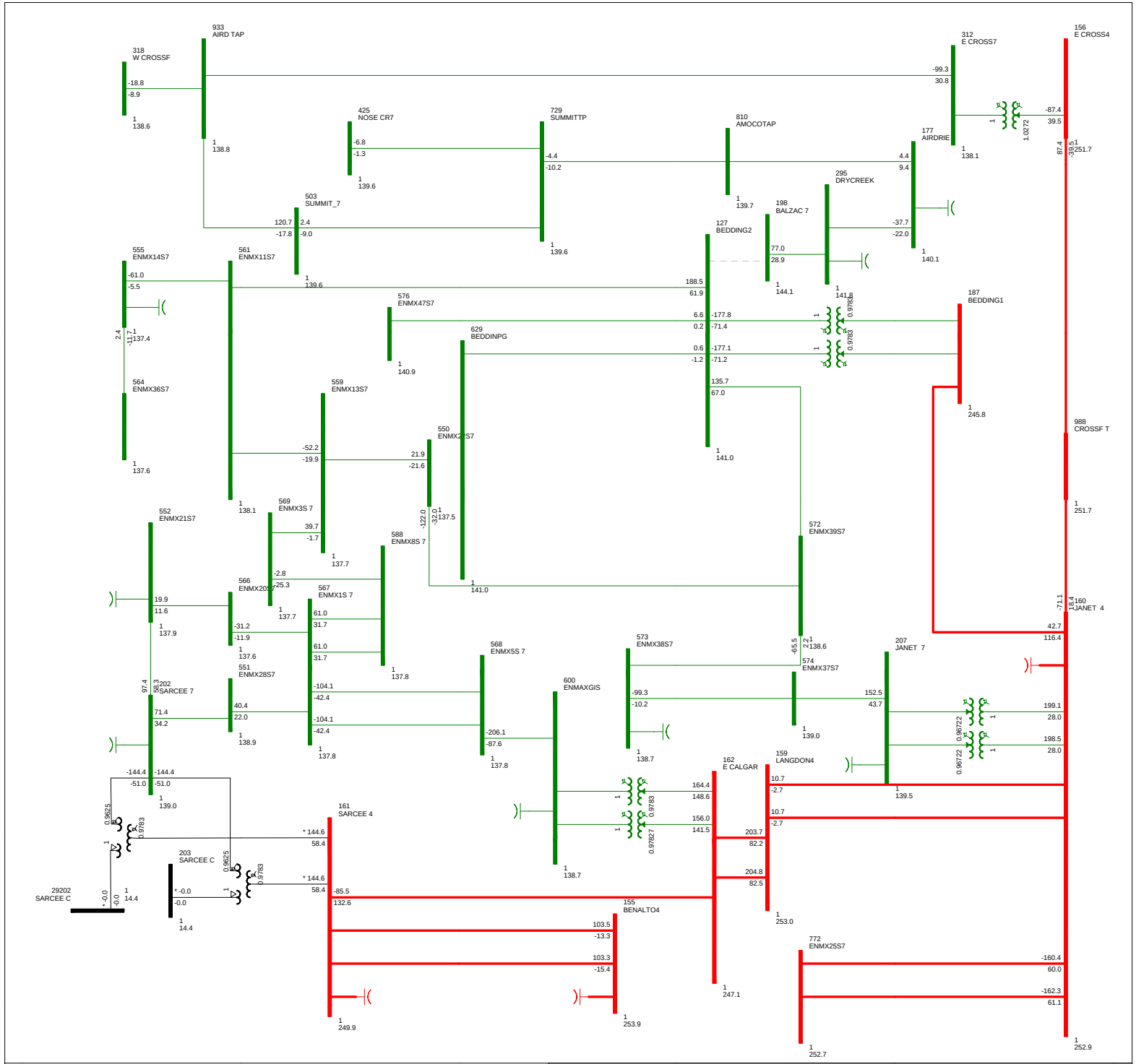
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 442.7 MW

EATL: -0.8 MW



SCENARIO 1 2019 SP (PRE CONNECTION)
162.81L
FIG A-5
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.100O 0.950U
kV: <=4.160 <=13.800 <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000

BC-AB: 22.8 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

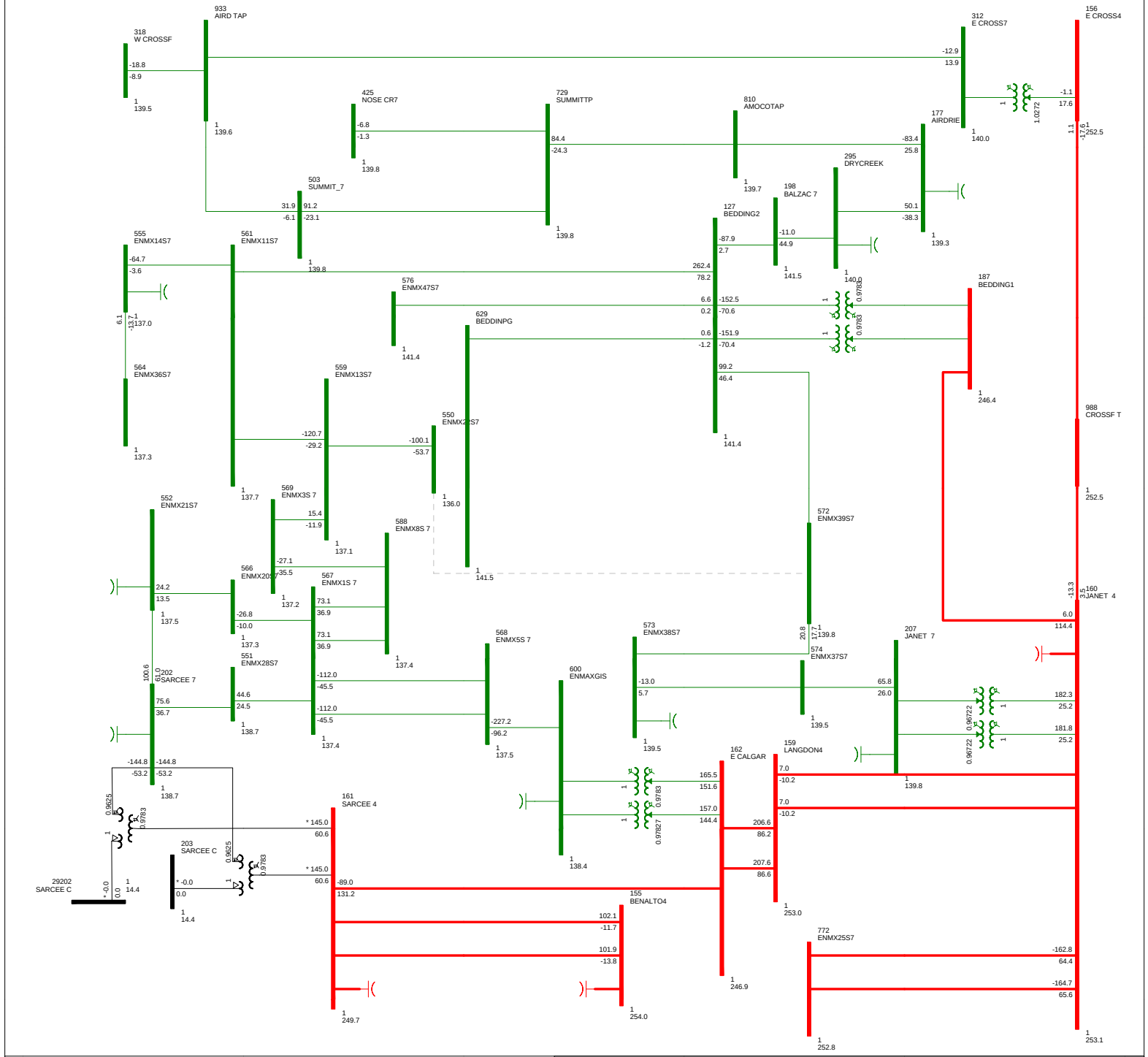
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 442.7 MW

EATL: -0.8 MW



SCENARIO 1 2019 SP (PRE CONNECTION)
22.81L
FIG A-6
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/500.000

BC-AB: 22.2 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

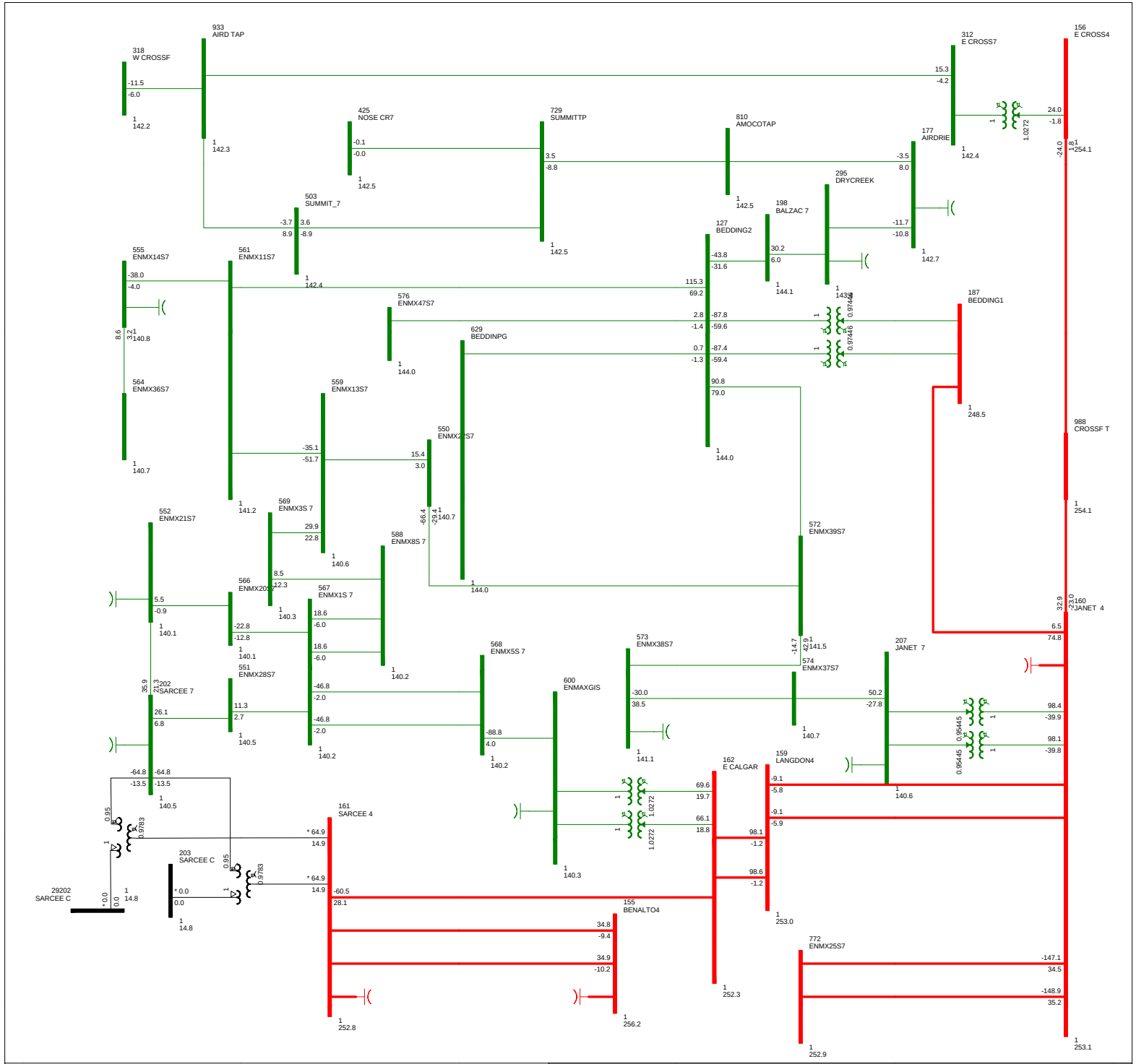
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 442.7 MW

EATL: -0.8 MW



SCENARIO 2 2019 SL (PRE CONNECTION)
BASE CASE
FIG A-7
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/<=500.000

BC-AB: -39.2 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

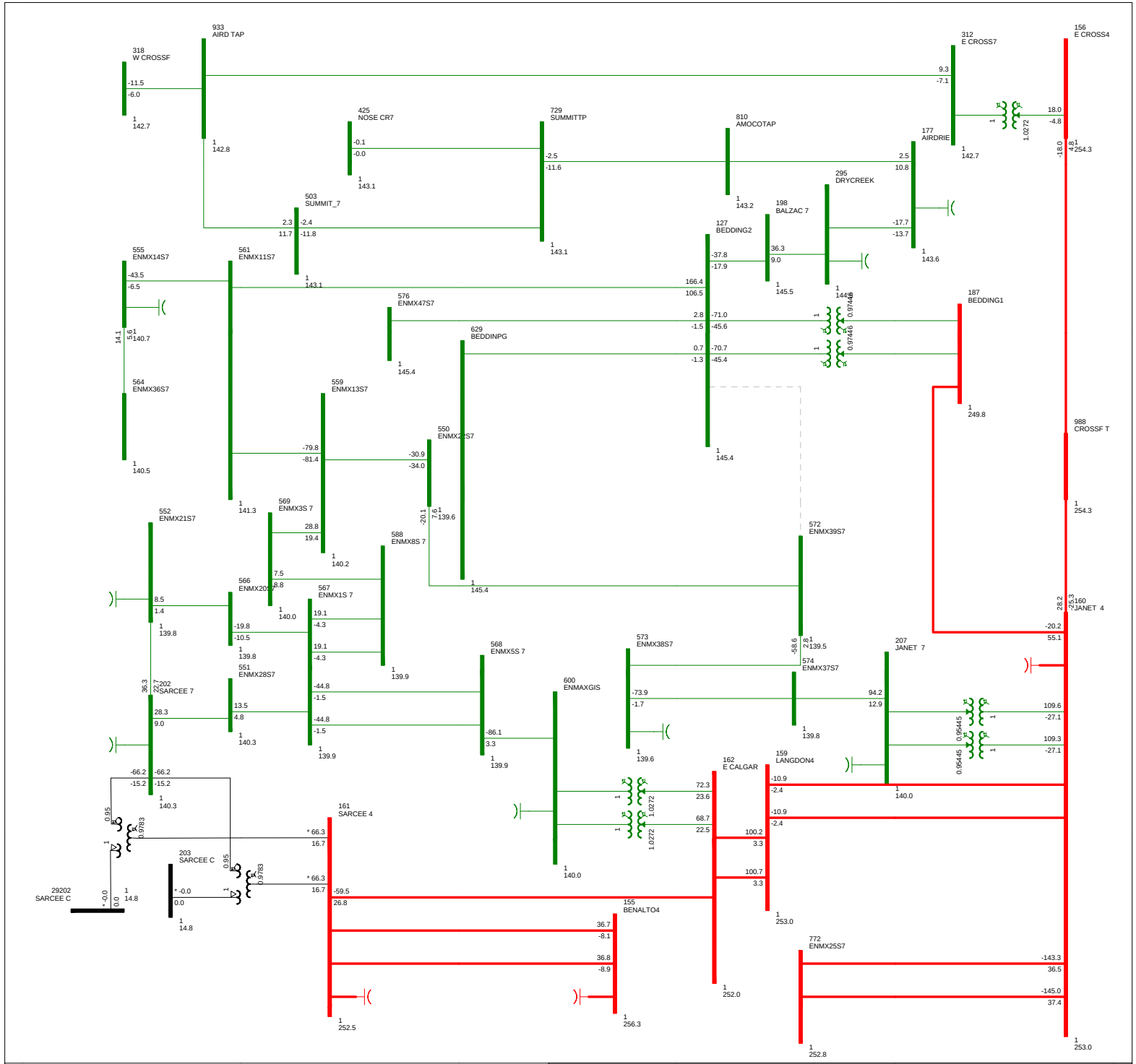
CEC #1: 182.5 MW

Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 270.9 MW

EATL: 245.8 MW



SCENARIO 2 2019 SL (PRE CONNECTION)
11.83L
FIG A-8
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.100U 0.950UV
kV: <=4.160 <=13.800 <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC-AB: -38.6 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

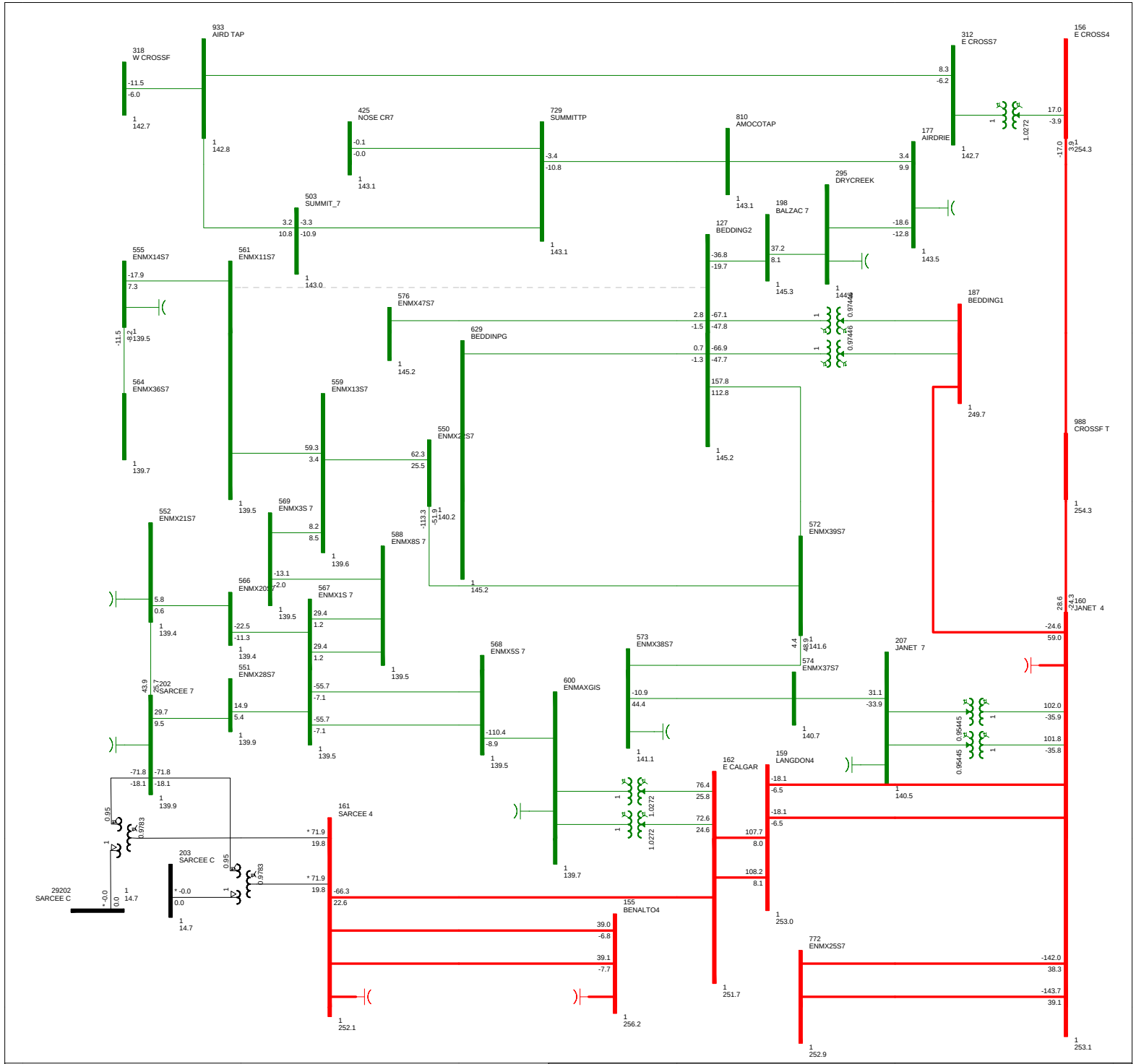
CEC #1: 182.5 MW

Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 270.9 MW

EATL: 245.8 MW



SCENARIO 2 2019 SL (PRE CONNECTION)
39.82L
FIG A-9
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/>500.000

BC-AB: -38.2 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

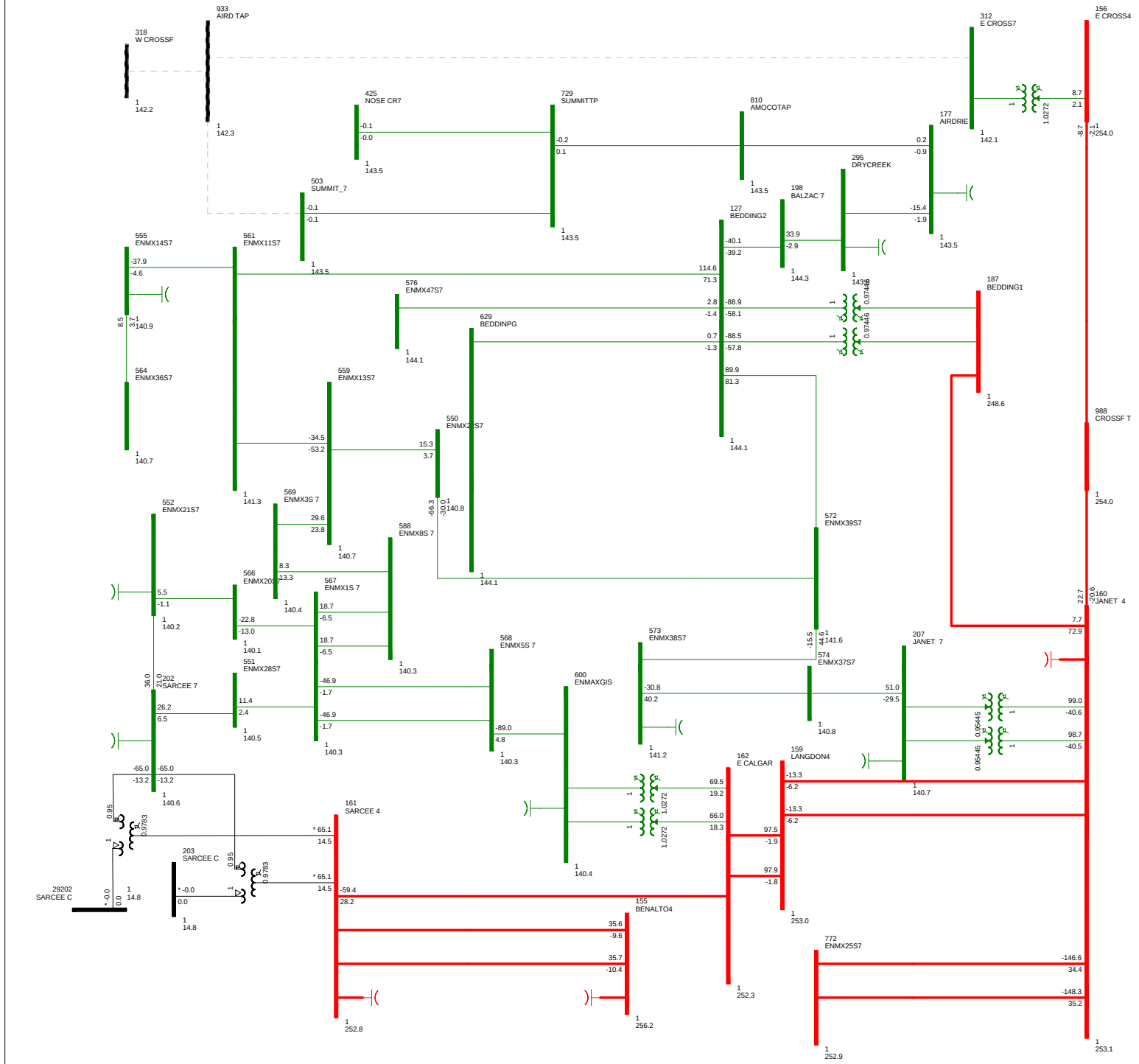
CEC #1: 182.5 MW

Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 270.9 MW

EATL: 245.8 MW



SCENARIO 2 2019 SL (PRE CONNECTION)
752L
FIG A-10
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/500.000

BC-AB: -50.7 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

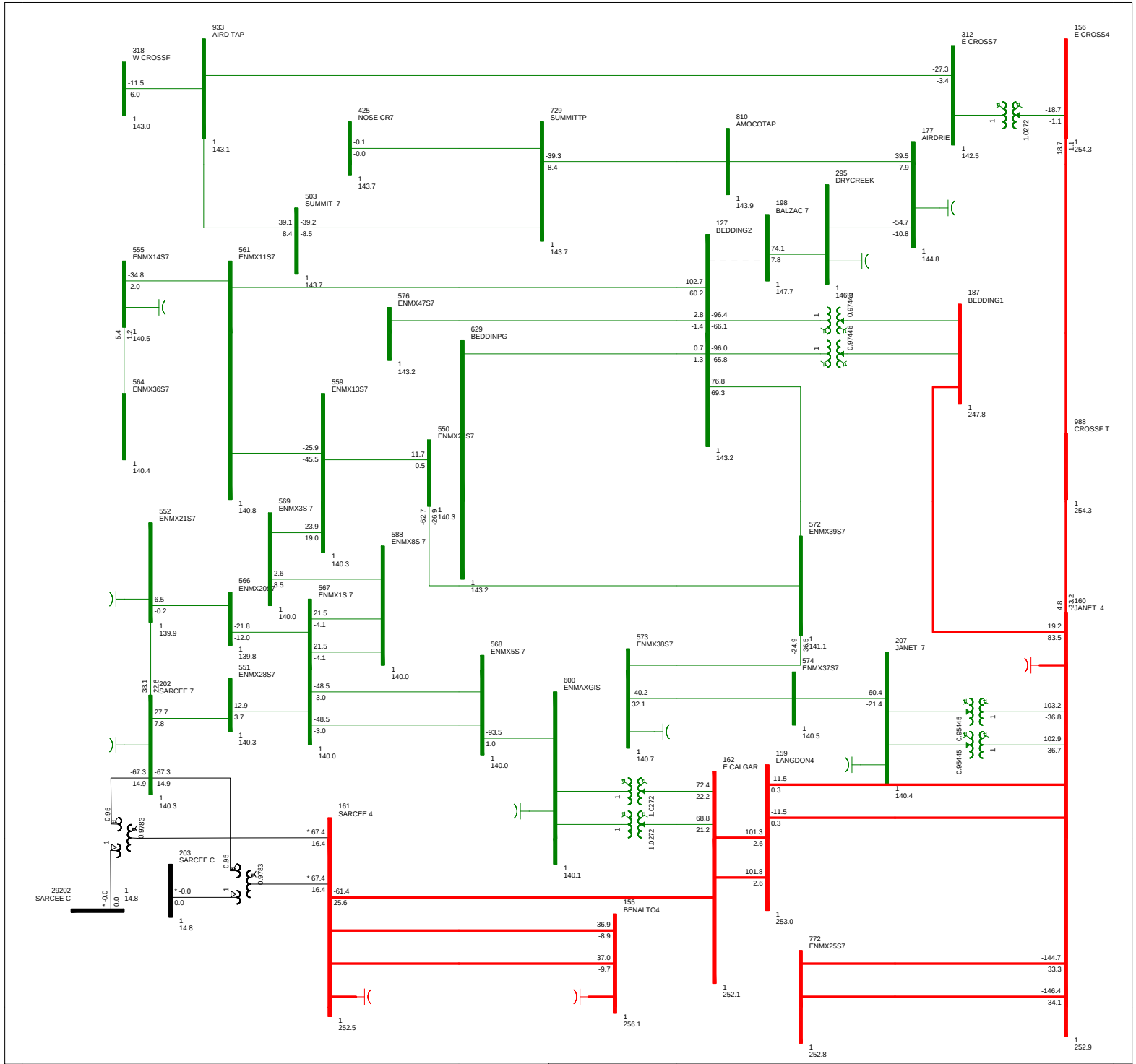
CEC #1: 182.5 MW

Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 270.9 MW

EATL: 245.8 MW



SCENARIO 2 2019 SL (PRE CONNECTION)
162.81L
FIG A-11
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.100UV 0.950UV
kV: <=4.160 <=13.800 <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000

BC-AB: -38.1 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

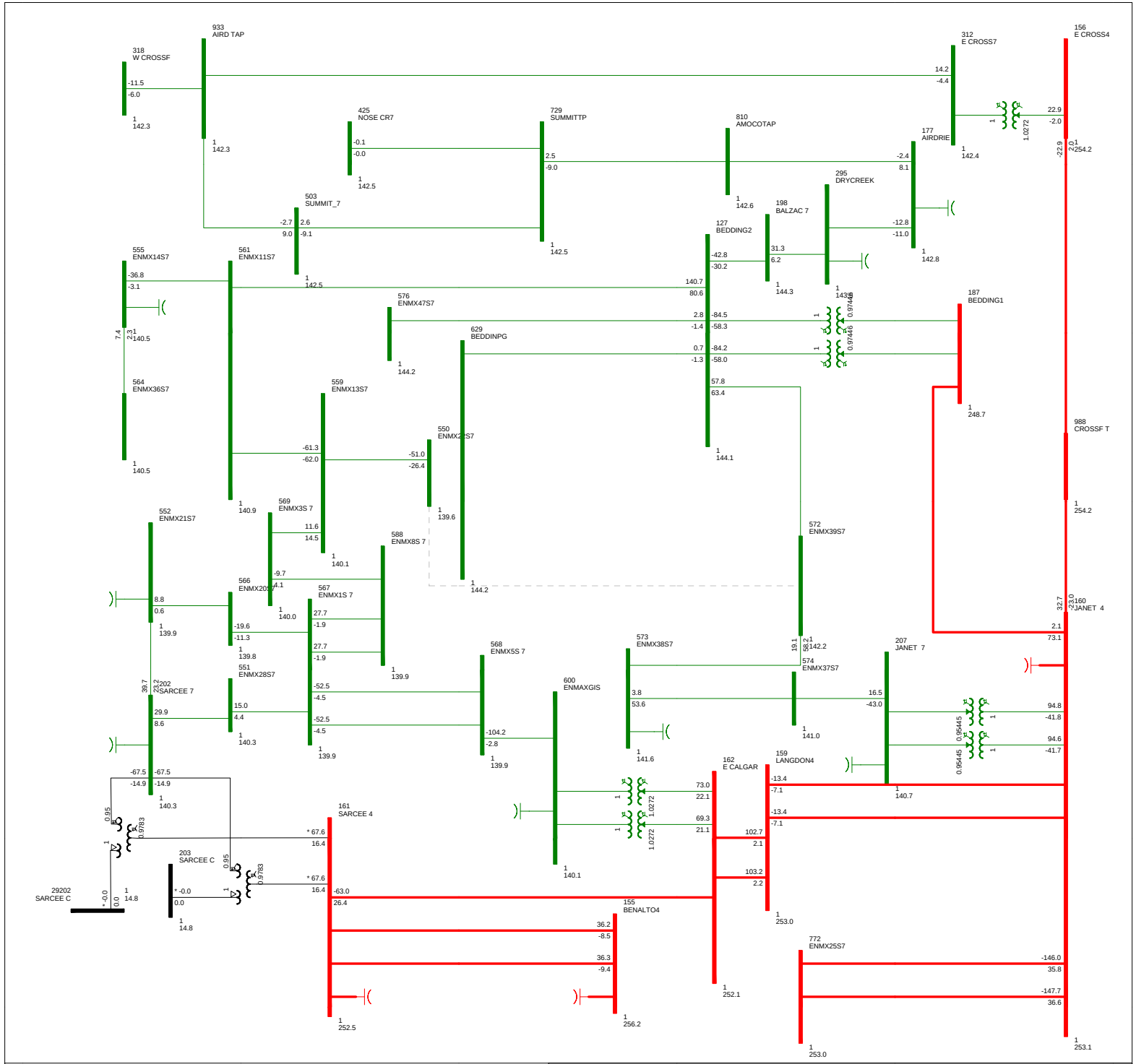
CEC #1: 182.5 MW

Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 270.9 MW

EATL: 245.8 MW



SCENARIO 2 2019 SL (PRE CONNECTION)
22.81L
FIG A-12
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.100O 0.950UV
kV: <=4.160 <=13.800 <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000

BC-AB: -38.8 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 0.0 MW

CEC #1: 182.5 MW

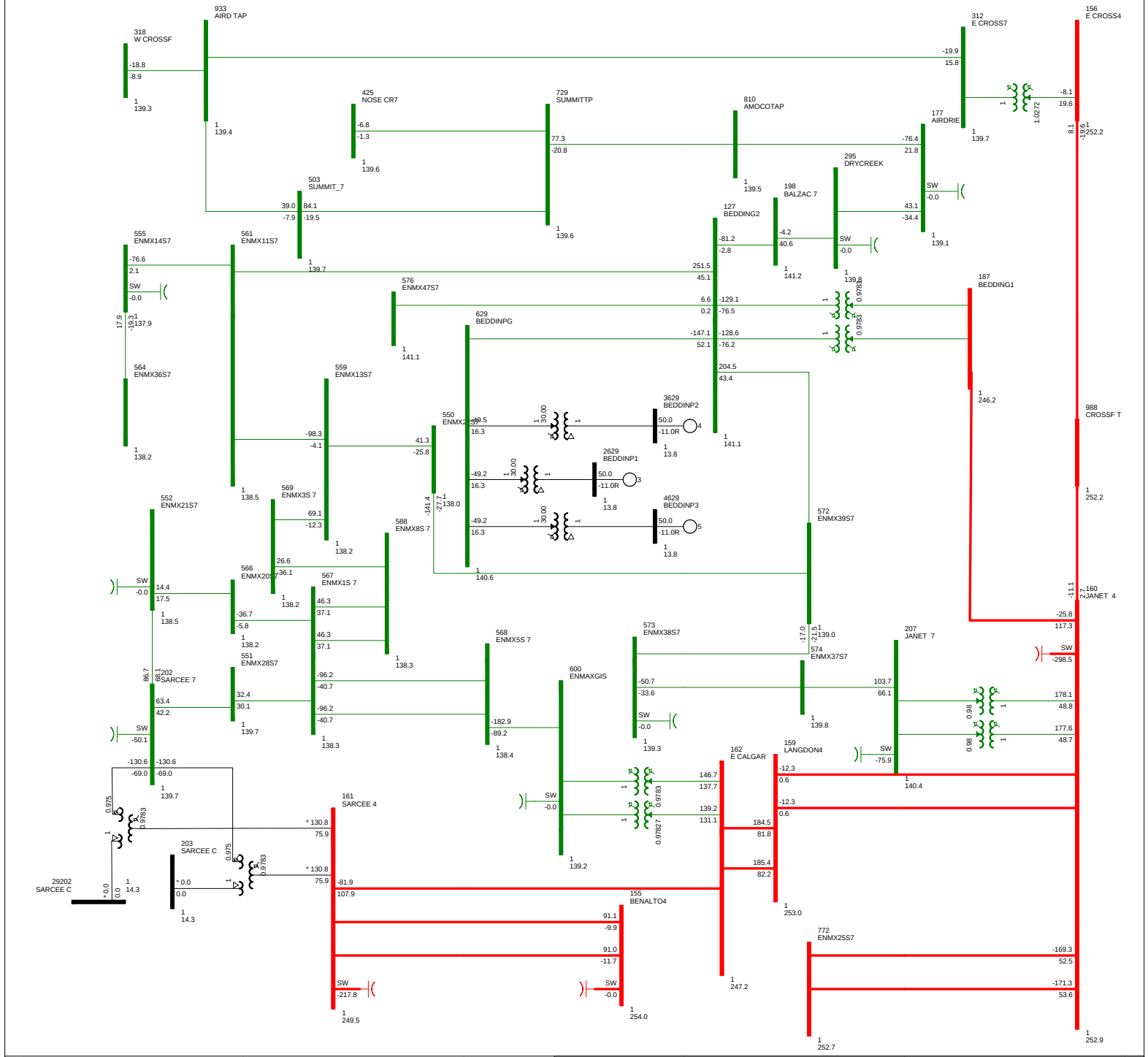
Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 270.9 MW

EATL: 245.8 MW

Attachment C
Post-Project Power Flow Diagrams



SCENARIO 3 2019 SP (POST CONNECTION)
BASE CASE
FIG B-1
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/500.000

BC-AB: 37.9 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

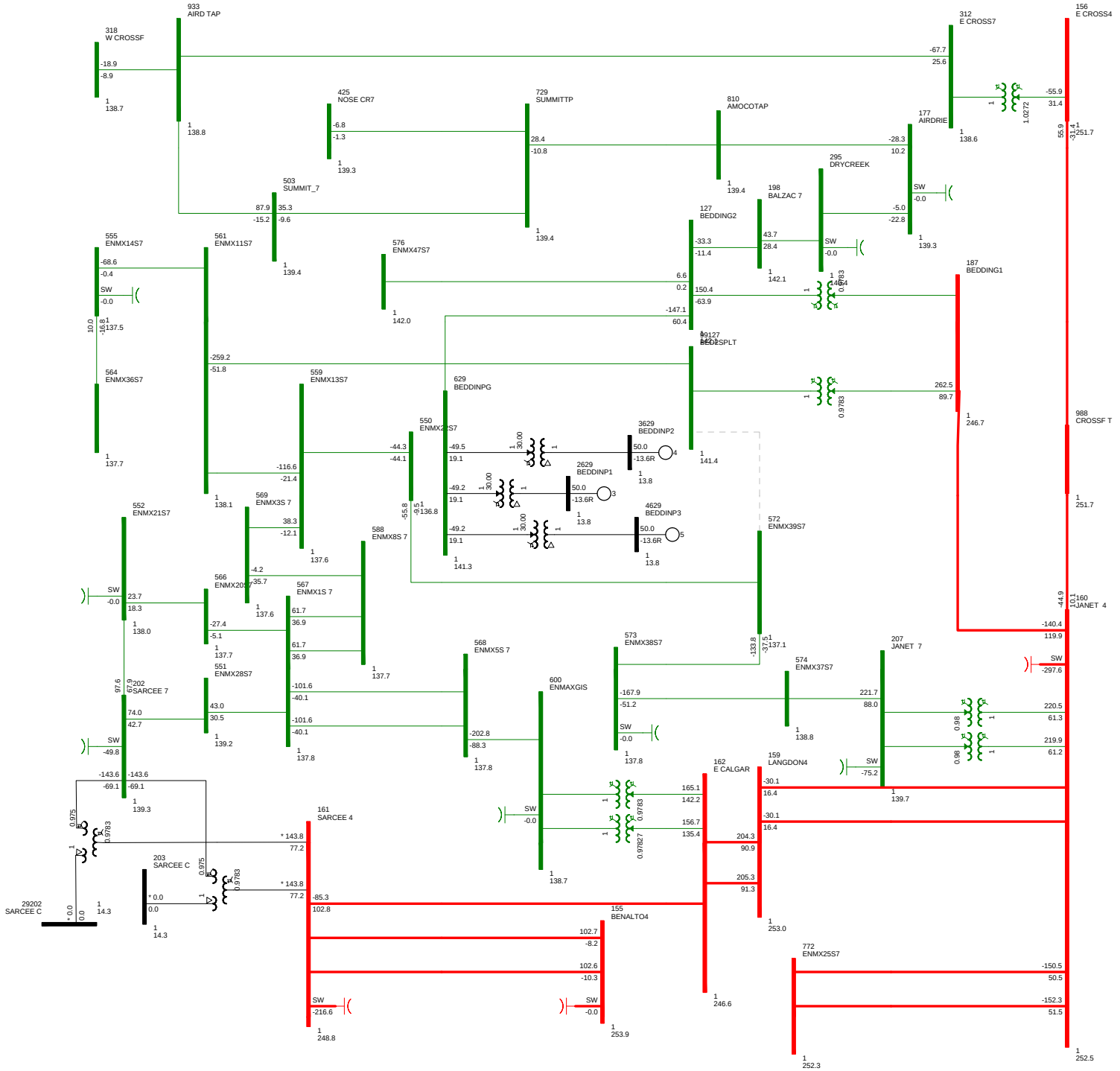
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 344.7 MW

EATL: -0.8 MW



SCENARIO 3 2019 SP (POST CONNECTION)
11.83L (AFTER SS-162 RAS)
FIG B-2
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/<=500.000

BC-AB: 40.7 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

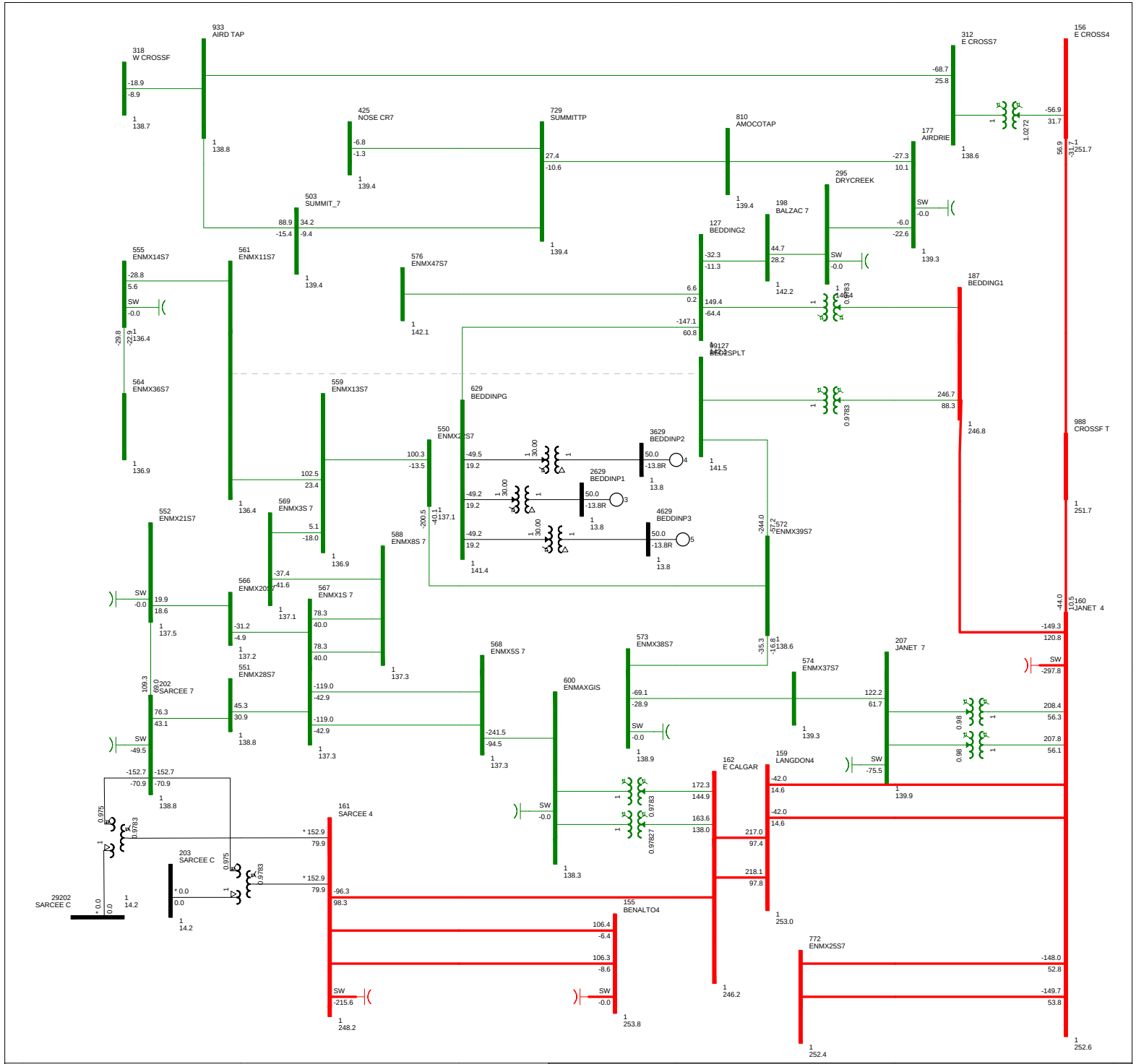
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 344.7 MW

EATL: -0.8 MW



SCENARIO 3 2019 SP (POST CONNECTION)
39.82L (AFTER SS-162 RAS)
FIG B-3
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/<=500.000

BC-AB: 42.3 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

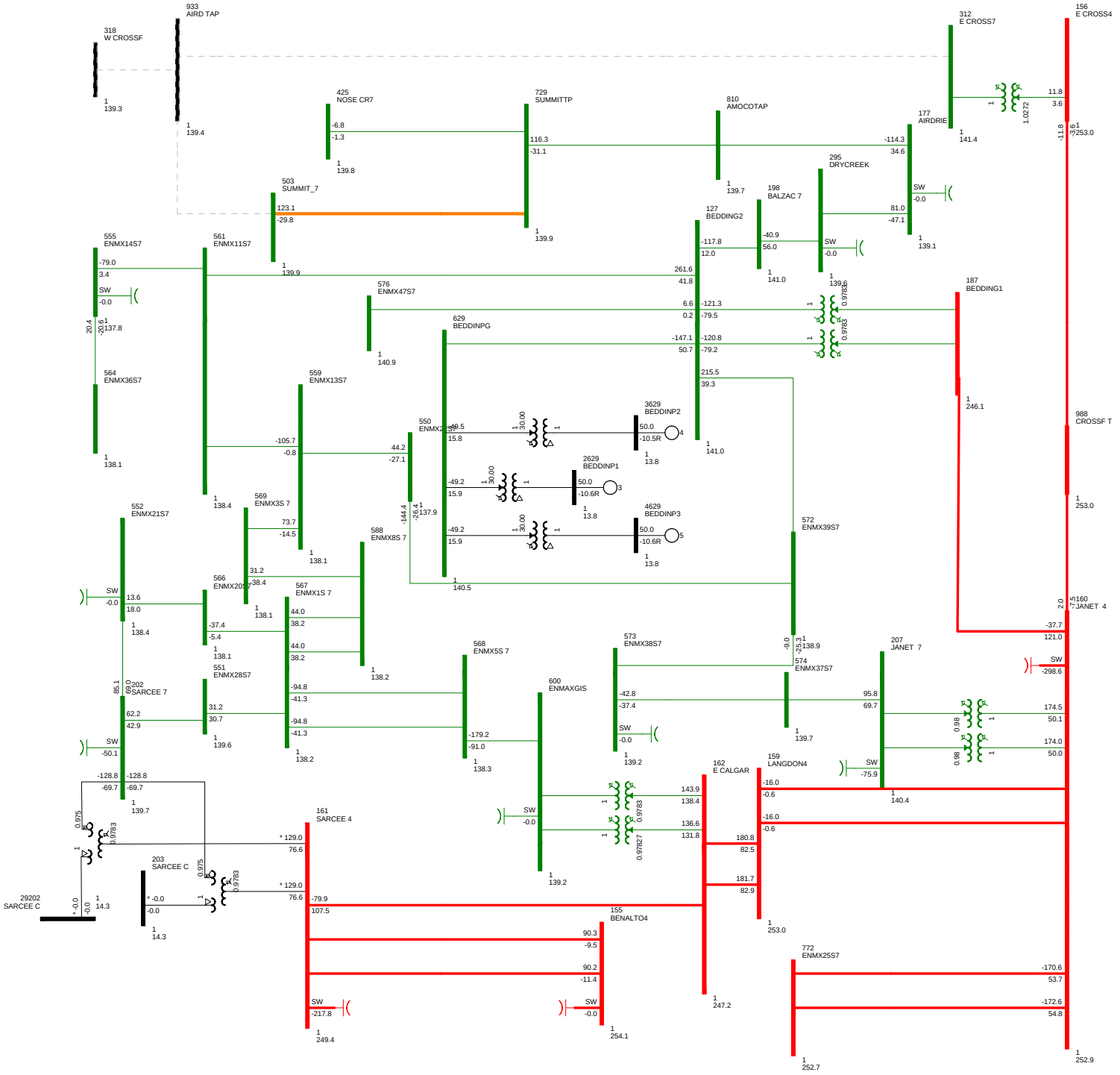
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 344.7 MW

EATL: -0.8 MW



SCENARIO 3 2019 SP (POST CONNECTION)
752L
FIG B-4
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.100O/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/500.000

BC-AB: 21.5 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

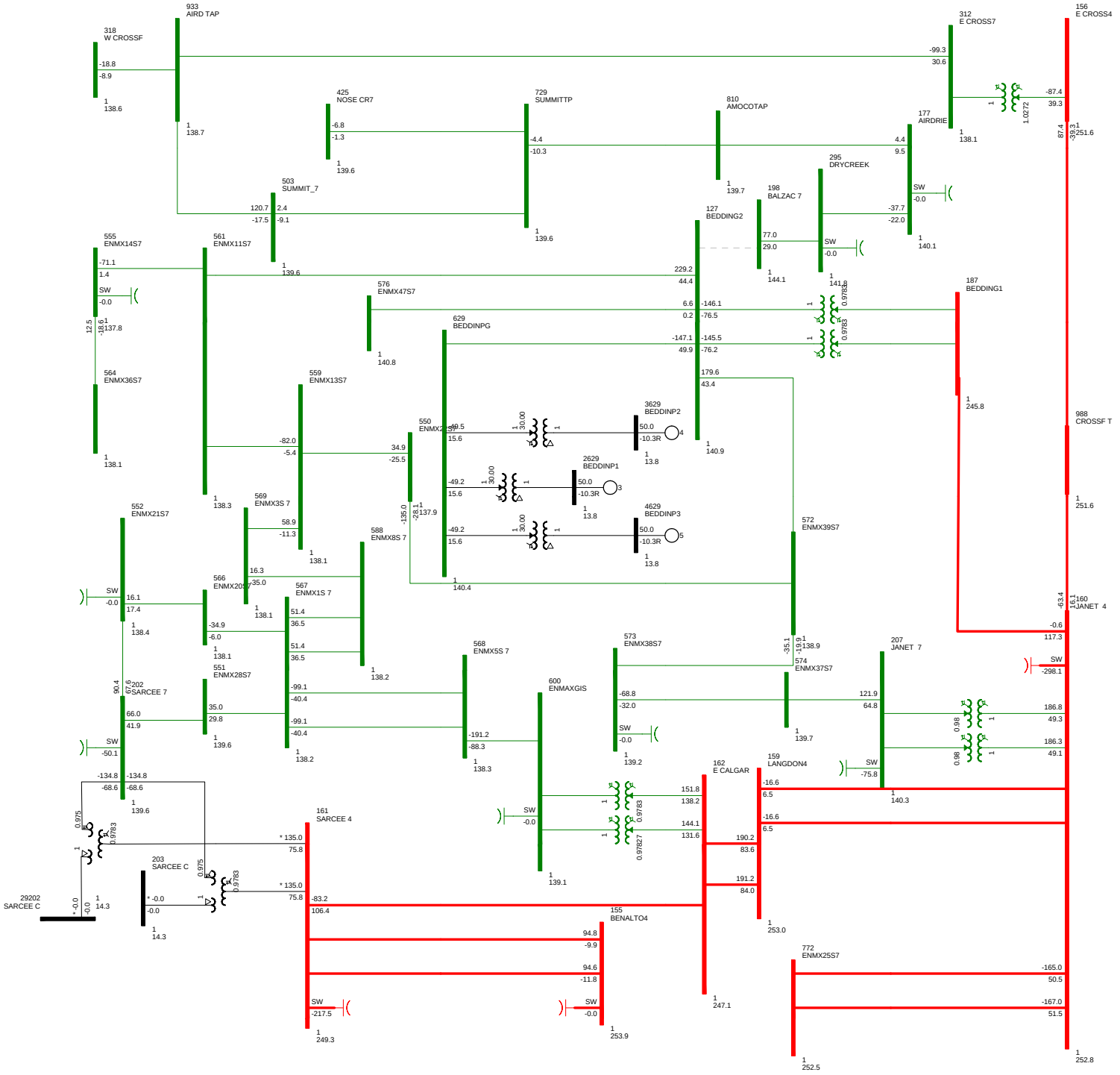
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 344.7 MW

EATL: -0.8 MW



SCENARIO 3 2019 SP (POST CONNECTION)
162.81L
FIG B-5
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.100/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/<=500.000

BC-AB: 39.8 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

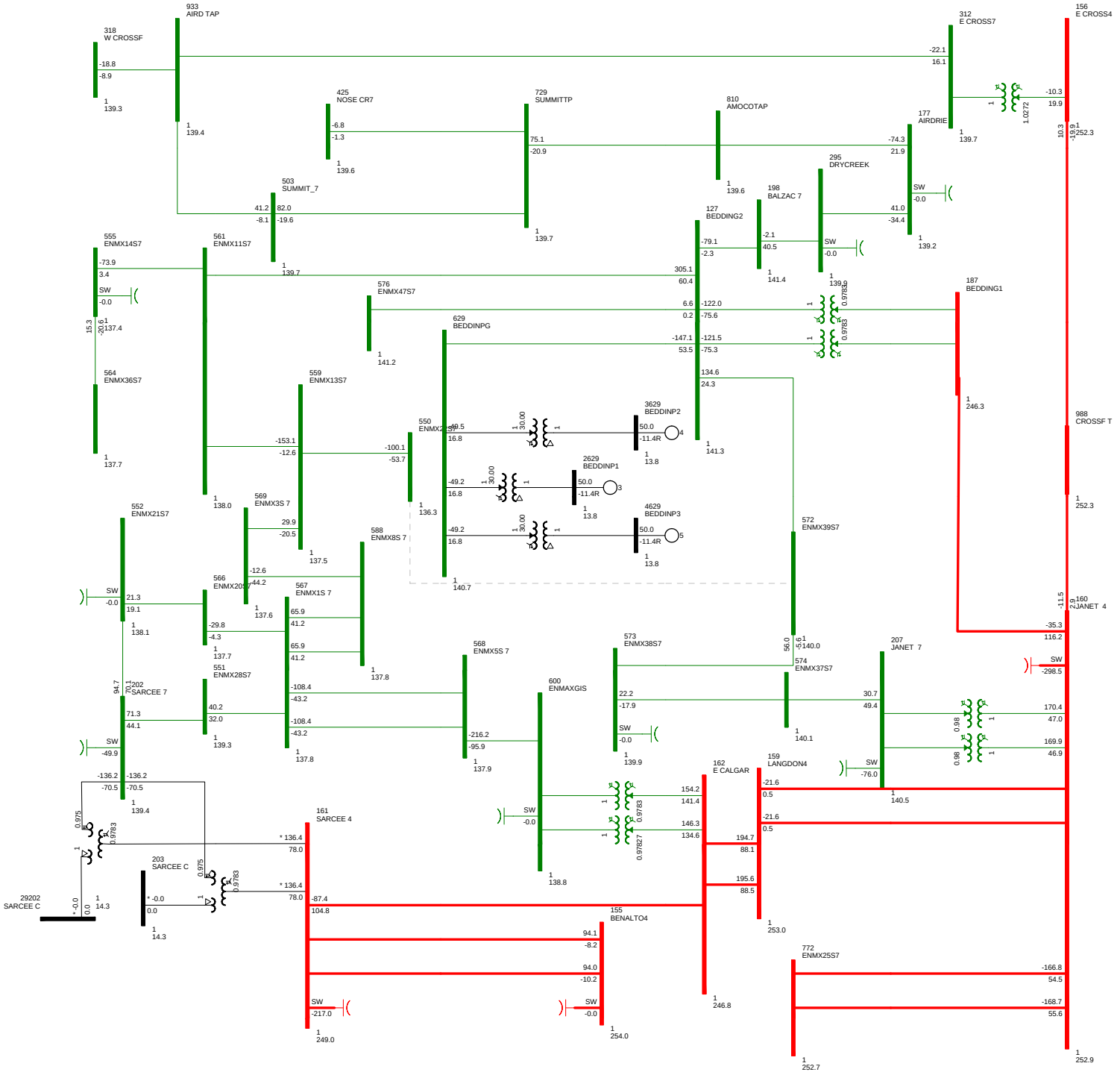
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 344.7 MW

EATL: -0.8 MW



SCENARIO 3 2019 SP (POST CONNECTION)
22.81L
FIG B-6
THU, OCT 13 2016 16:10

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.100U 0.950UV
kV: <=4.160 <=13.800 <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC-AB: 39.6 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

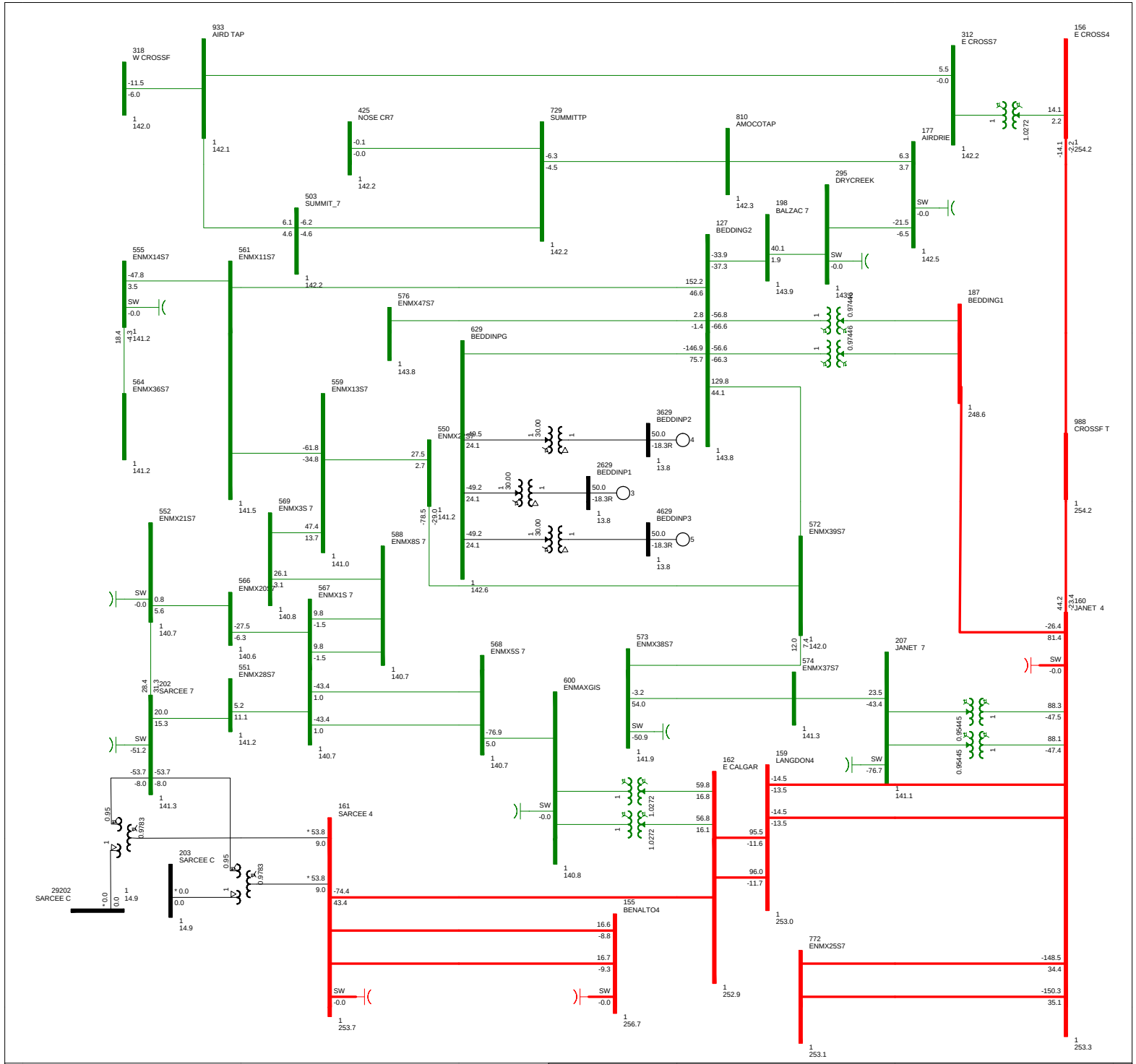
CEC #1: 286.5 MW

Balzac: 106.6 MW

SEC: 770.0 MW

WATL: 344.7 MW

EATL: -0.8 MW



SCENARIO 4 2019 SL (POST CONNECTION)
BASE CASE
FIG B-7
THU, OCT 13 2016 16:11

Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/>500.000

BC-AB: 19.1 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

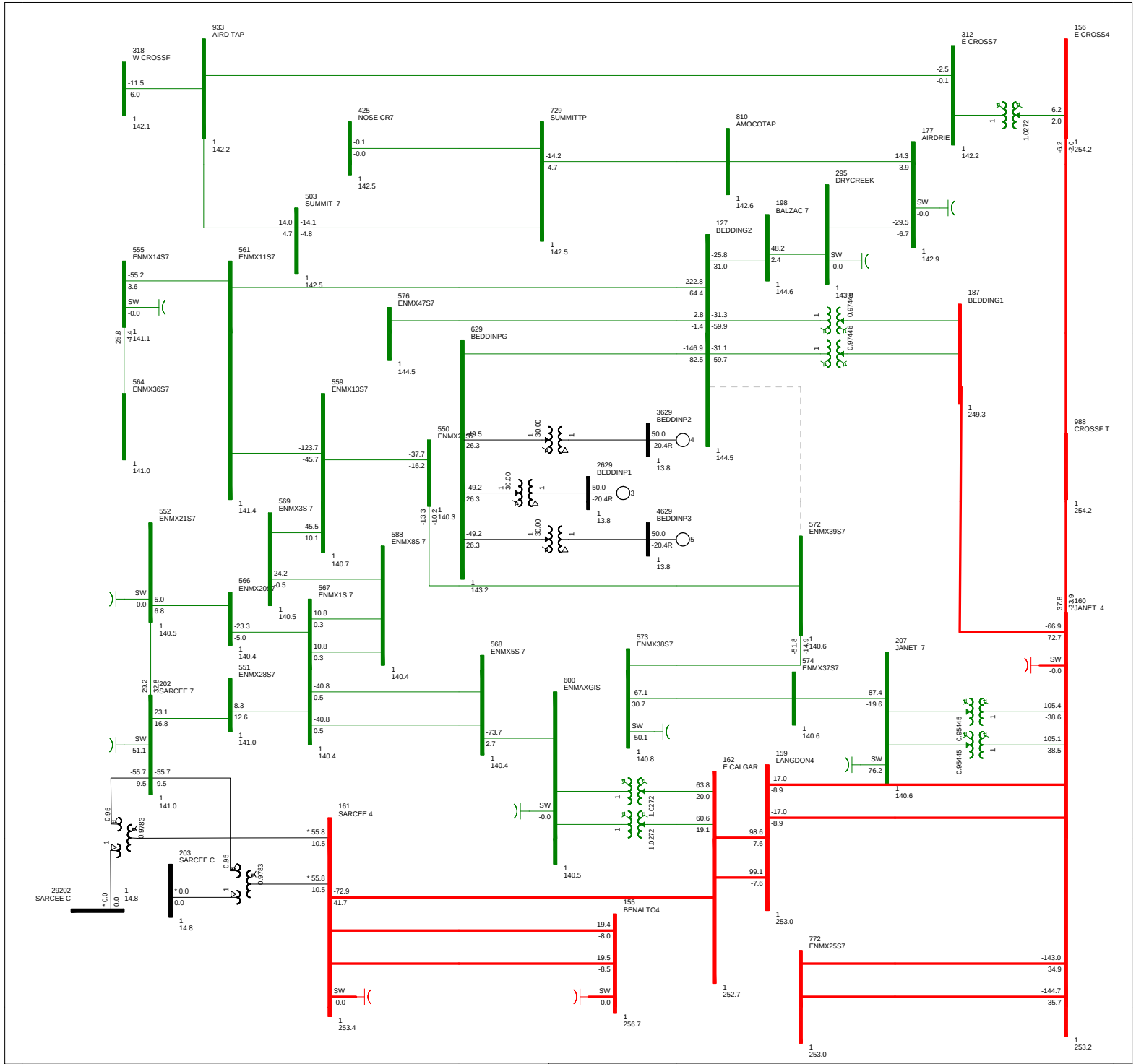
CEC #1: 182.5 MW

Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 221.4 MW

EATL: 221.0 MW



SCENARIO 4 2019 SL (POST CONNECTION)
11.83L
FIG B-8
THU, OCT 13 2016 16:11

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.100U 0.950UV
kV: <=4.160 <=13.800 <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC-AB: 20.1 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

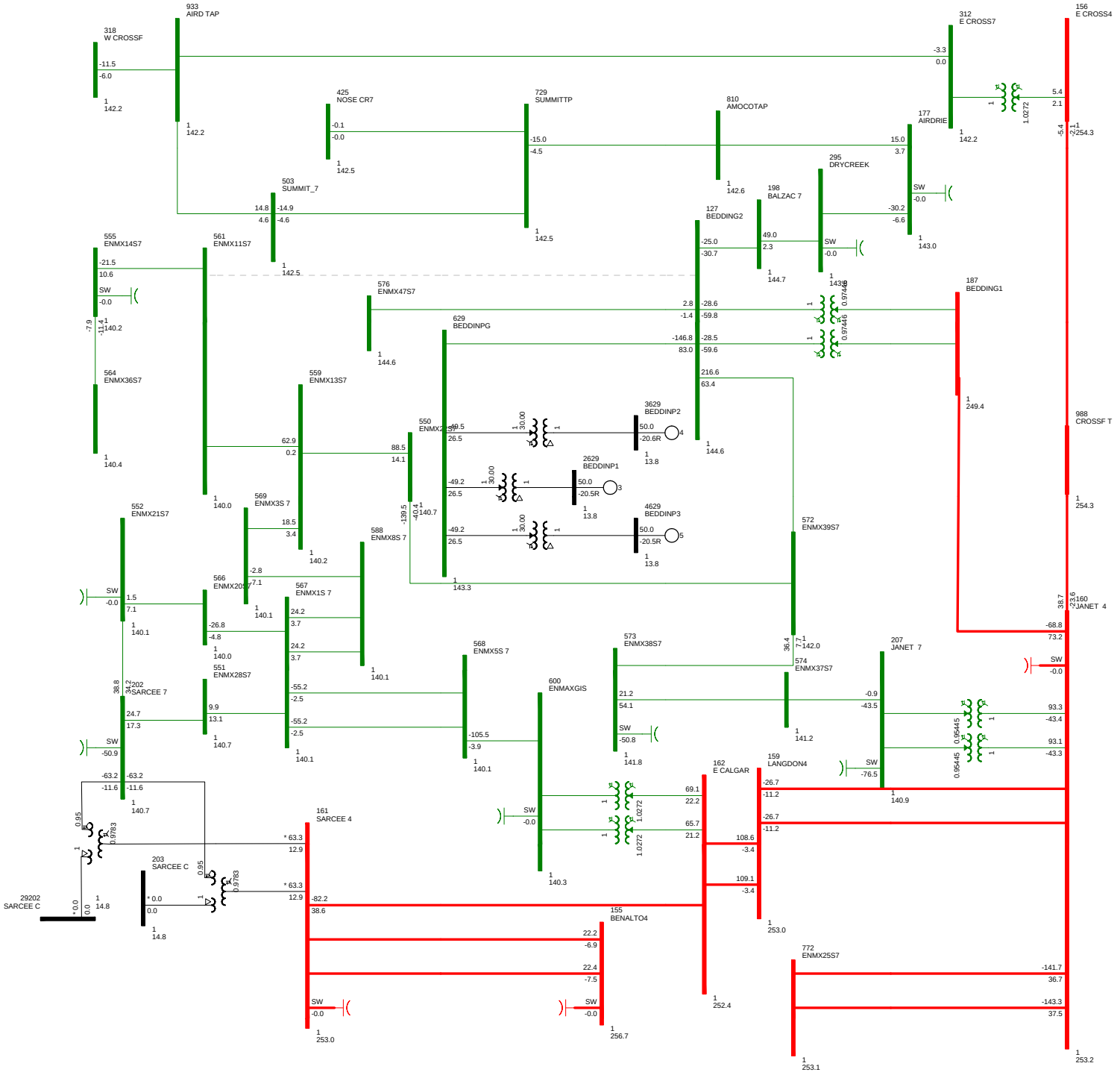
CEC #1: 182.5 MW

Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 221.4 MW

EATL: 221.0 MW



SCENARIO 4 2019 SL (POST CONNECTION)
39.82L
FIG B-9
THU, OCT 13 2016 16:11

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.1000/0.950UV
kV: <=4.160/<=13.800/<=25.000 <=69.000/<=138.000 <=240.000 <=500.000/500.000

BC-AB: 20.7 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

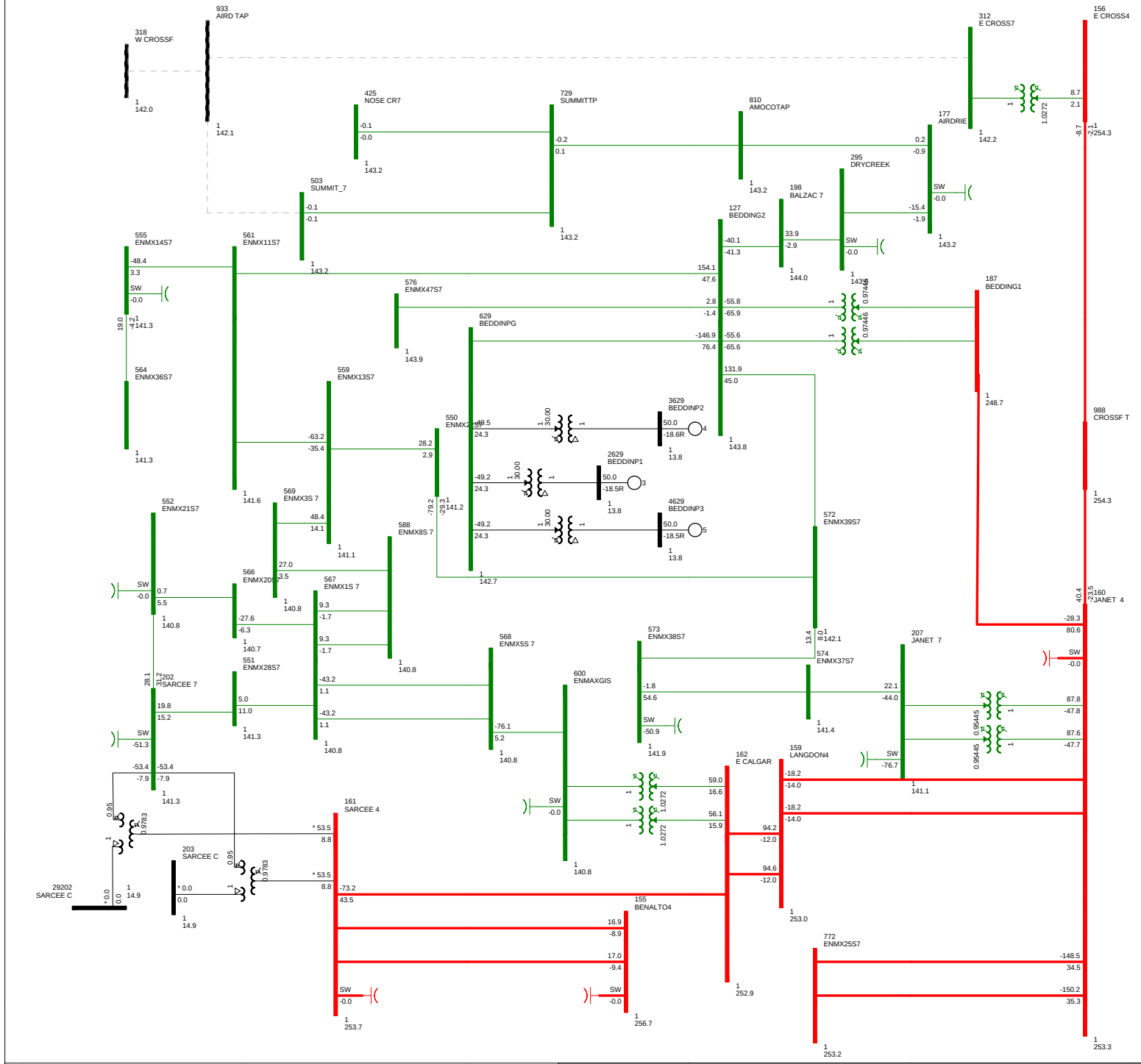
CEC #1: 182.5 MW

Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 221.4 MW

EATL: 221.0 MW



SCENARIO 4 2019 SL (POST CONNECTION)
752L
FIG B-10
THU, OCT 13 2016 16:11

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.050UV 0.950UV
kV: <=4.160<=13.800<=25.000 <=69.000<=138.000 <=240.000 <=500.000<=800.000

BC-AB: 7.5 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

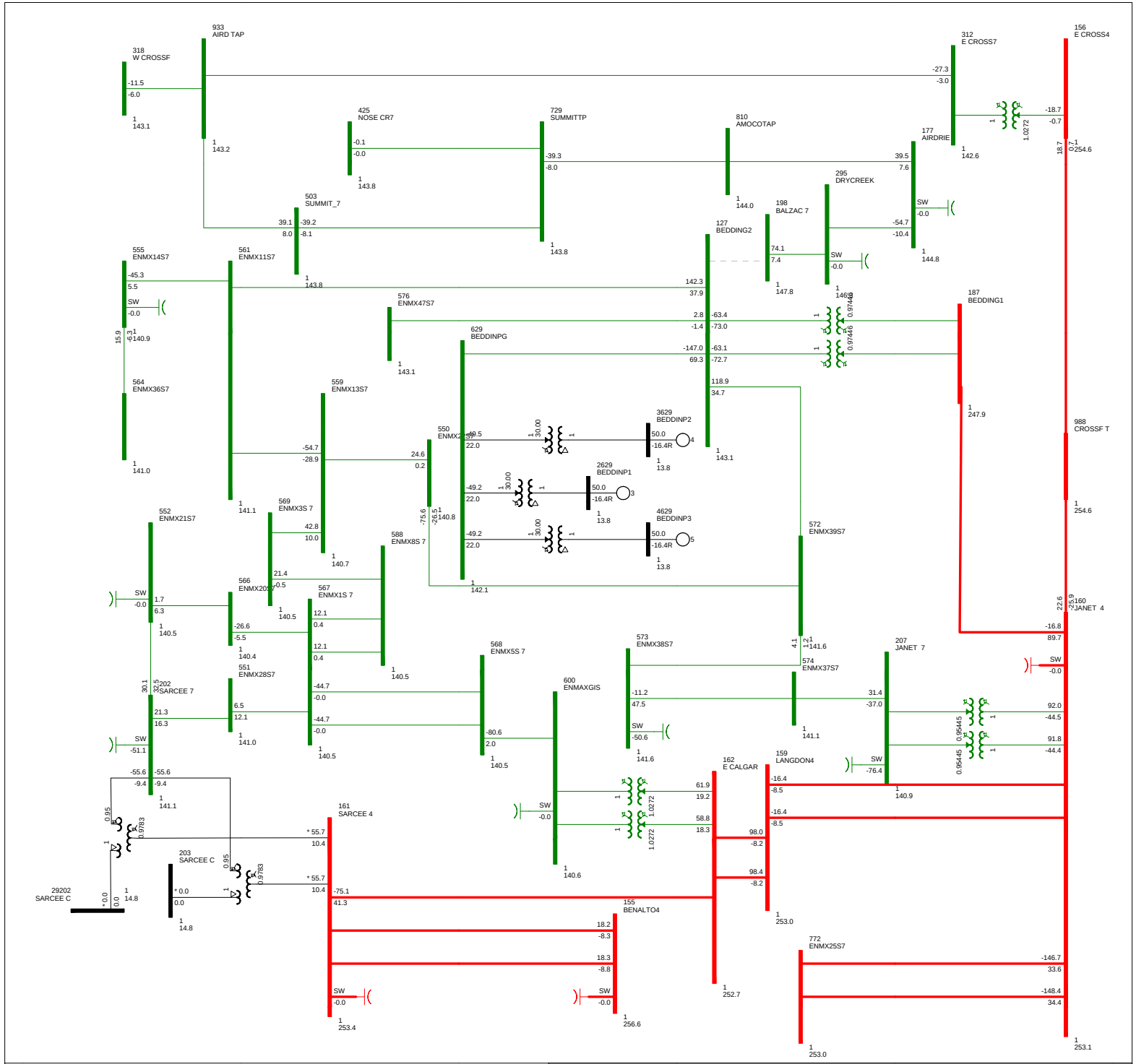
CEC #1: 182.5 MW

Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 221.4 MW

EATL: 221.0 MW



SCENARIO 4 2019 SL (POST CONNECTION)
162.81L
FIG B-11
THU, OCT 13 2016 16:11

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.100pu 0.950pu
kV: <=4.160<=13.800<=25.000 <=69.000<=138.000 <=240.000 <=500.000<=500.000

BC-AB: 19.9 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

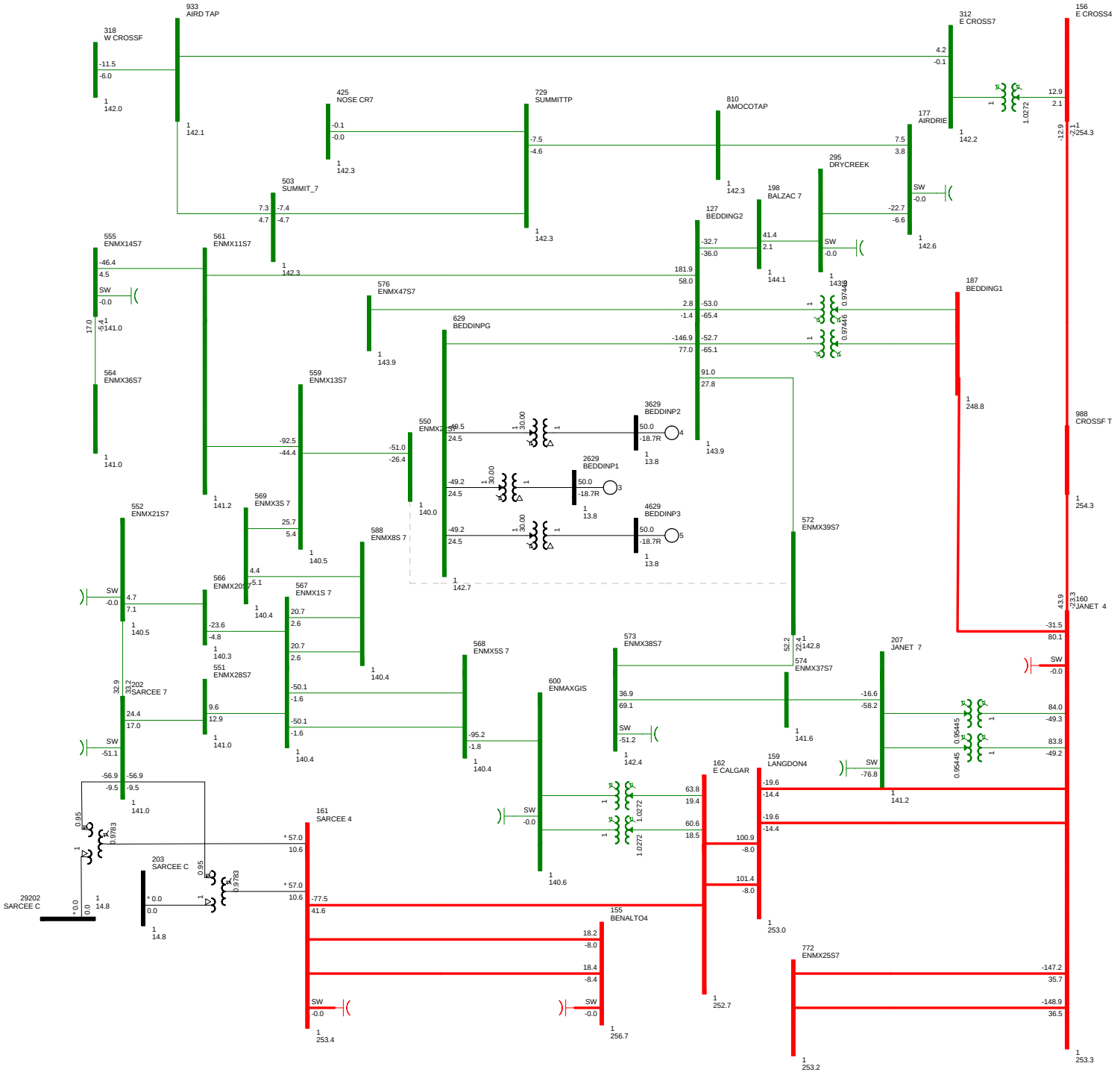
CEC #1: 182.5 MW

Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 221.4 MW

EATL: 221.0 MW



SCENARIO 4 2019 SL (POST CONNECTION)
22.81L
FIG B-12
THU, OCT 13 2016 16:11

Bus - Voltage (kV/pu)
Branch - MW/MVar
Equipment - MW/MVar
100.0%Rate A
1.100pu 0.950pu
kV: <=4.160 <=13.800 <=25.000 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000

BC-AB: 19.6 MW

MATL import: 0.0 MW

Sask. Import: -0.1 MW

CEC #2: 150.0 MW

CEC #1: 182.5 MW

Balzac: 88.0 MW

SEC: 552.0 MW

WATL: 221.4 MW

EATL: 221.0 MW

Attachment D
Post-Project Transient Stability Diagrams

FIGURE D-1B
2018SP, POST-PROJECT
3 PHASE FAULT ON 70.80L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-1_70.80L_NE_Beddington.out

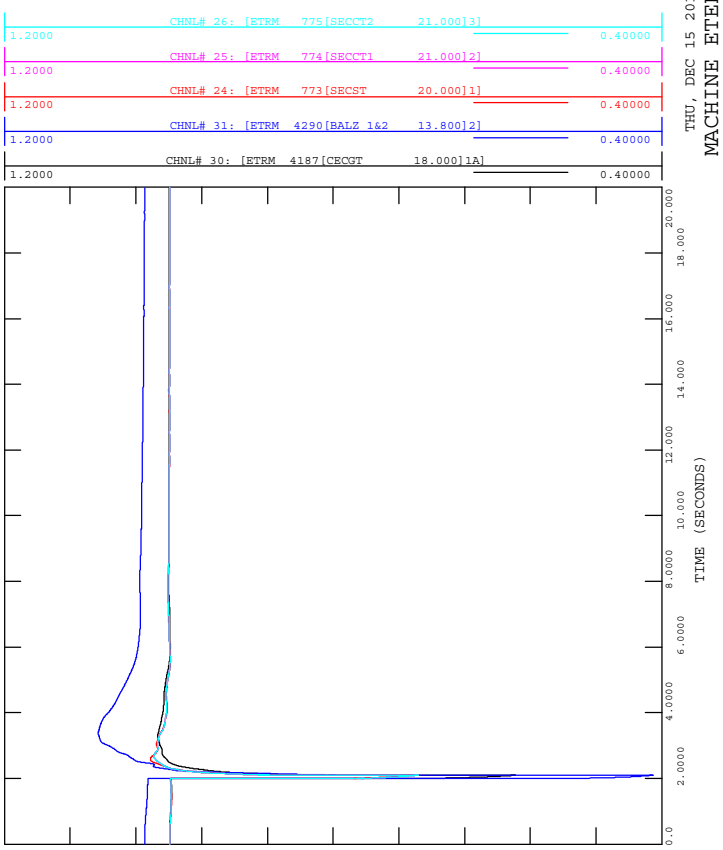


FIGURE D-1D
2018SP, POST-PROJECT
3 PHASE FAULT ON 70.80L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-1_70.80L_NE_Beddington.out

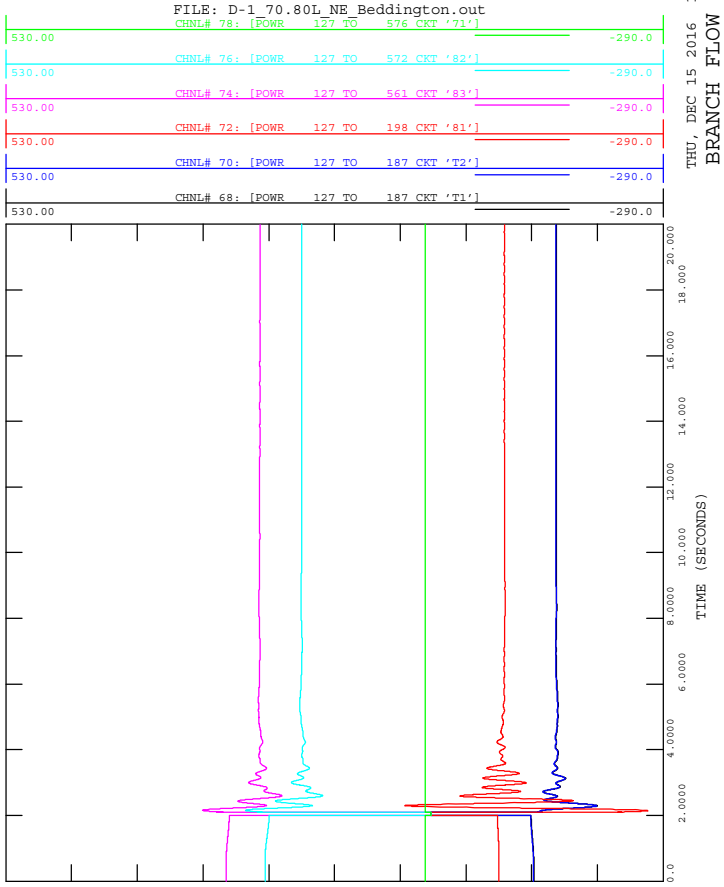


FIGURE D-1A
2018SP, POST-PROJECT
3 PHASE FAULT ON 70.80L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-1_70.80L_NE_Beddington.out

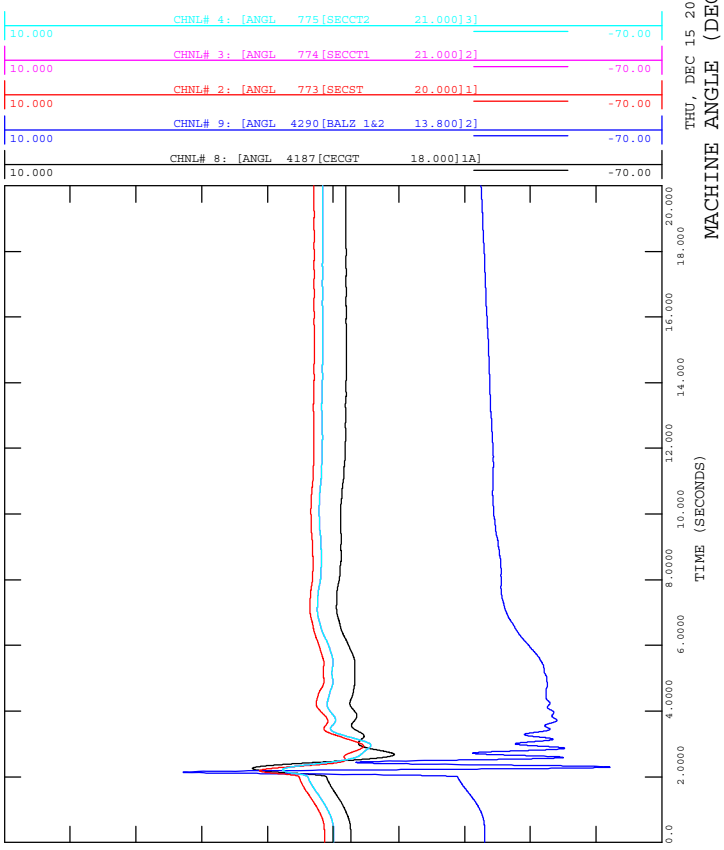
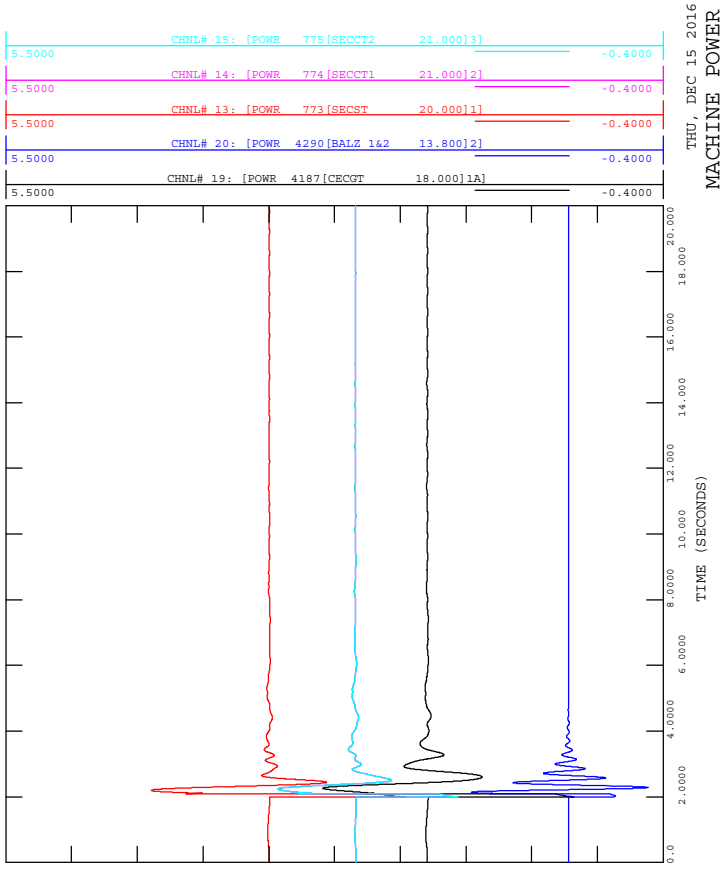


FIGURE D-1C
2018SP, POST-PROJECT
3 PHASE FAULT ON 70.80L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-1_70.80L_NE_Beddington.out



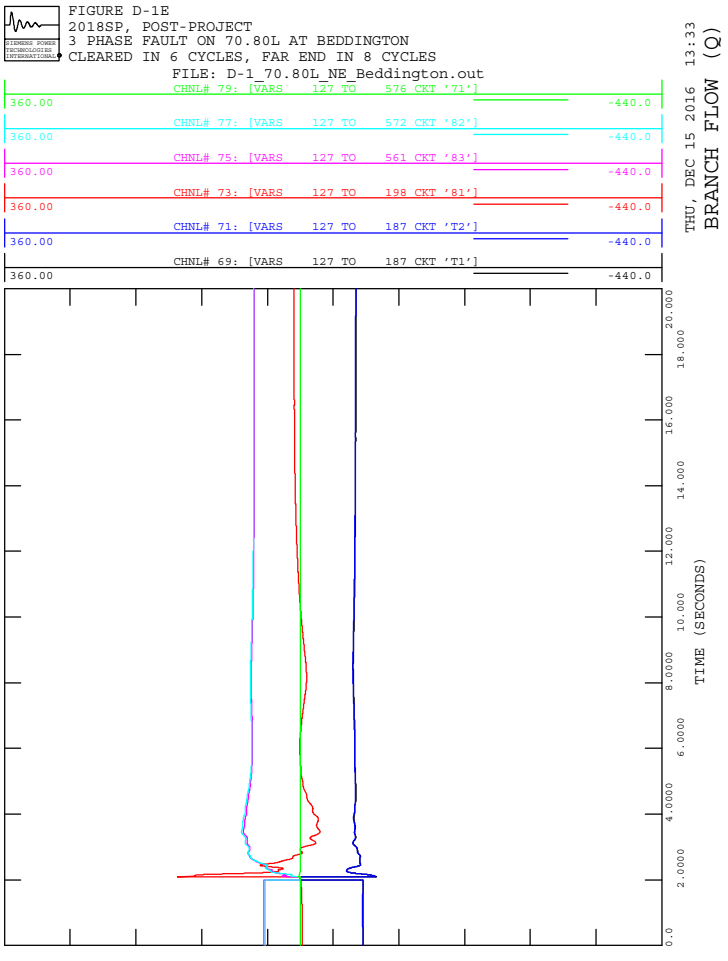


FIGURE D-1E
2018SP, POST-PROJECT
3 PHASE FAULT ON 70.80L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-1_70.80L_NE_Beddington.out
CHNL# 79: [VARS 127 TO 576 CKT '71']
360.00
-440.0
CHNL# 77: [VARS 127 TO 572 CKT '82']
360.00
-440.0
CHNL# 75: [VARS 127 TO 561 CKT '83']
360.00
-440.0
CHNL# 73: [VARS 127 TO 198 CKT '81']
360.00
-440.0
CHNL# 71: [VARS 127 TO 187 CKT 'T2']
360.00
-440.0
CHNL# 69: [VARS 127 TO 187 CKT 'T1']
360.00
-440.0
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)
THU, DEC 15 2016 13:33
BRANCH FLOW (Q)

FIGURE D-2B
2018SP, POST-PROJECT
3 PHASE FAULT ON 39.82L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-2_39.82L_NE_Beddington.out

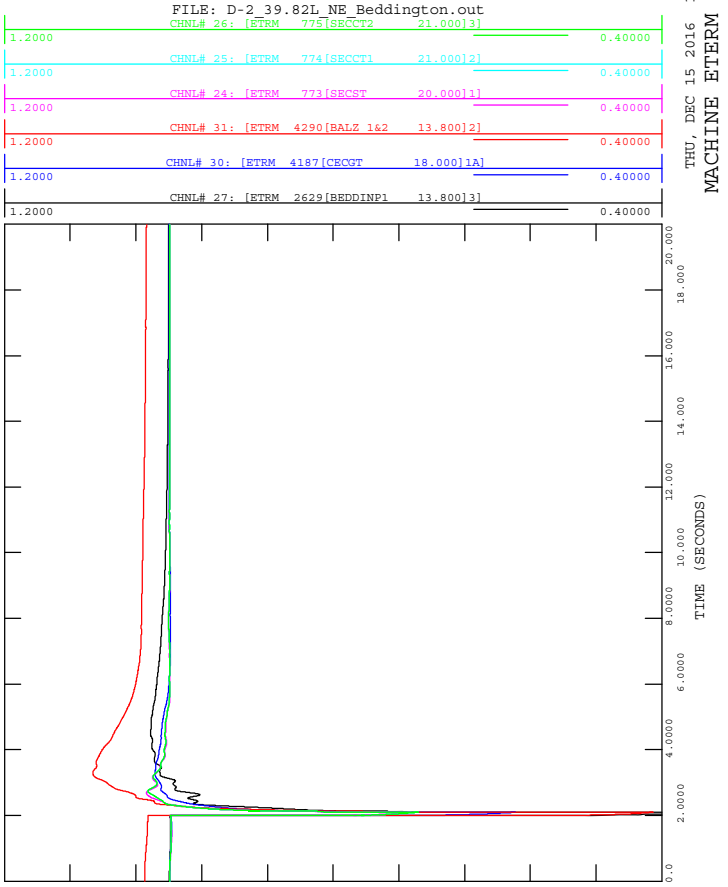


FIGURE D-2D
2018SP, POST-PROJECT
3 PHASE FAULT ON 39.82L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-2_39.82L_NE_Beddington.out

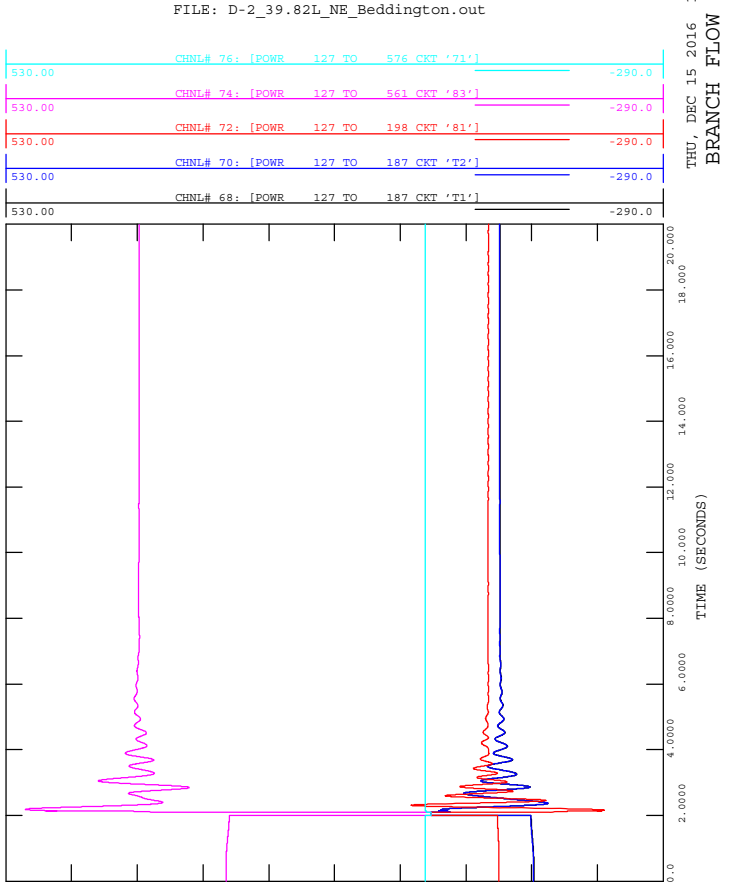


FIGURE D-2A
2018SP, POST-PROJECT
3 PHASE FAULT ON 39.82L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-2_39.82L_NE_Beddington.out

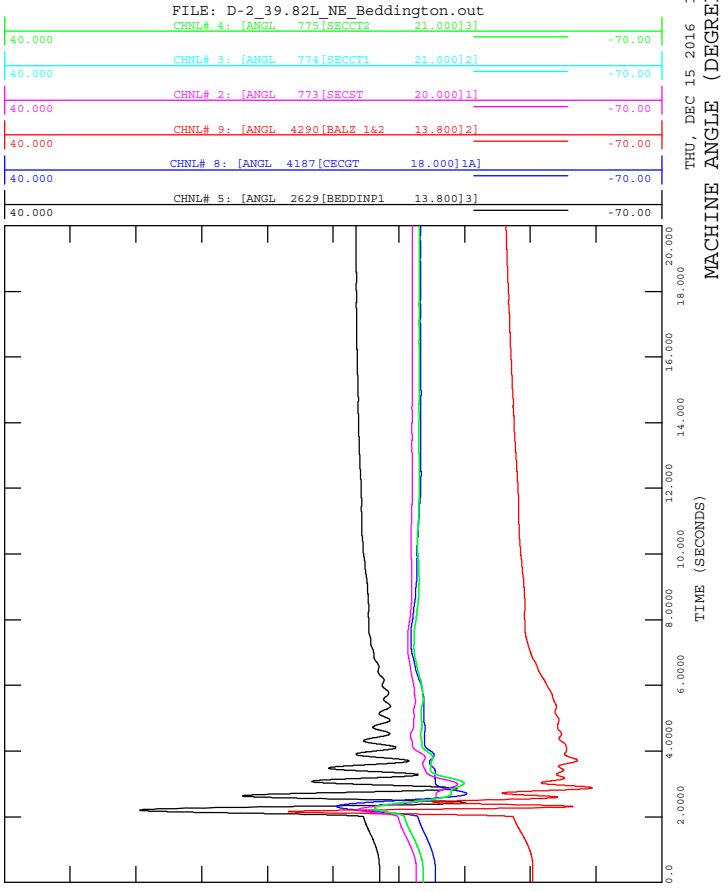


FIGURE D-2C
2018SP, POST-PROJECT
3 PHASE FAULT ON 39.82L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-2_39.82L_NE_Beddington.out

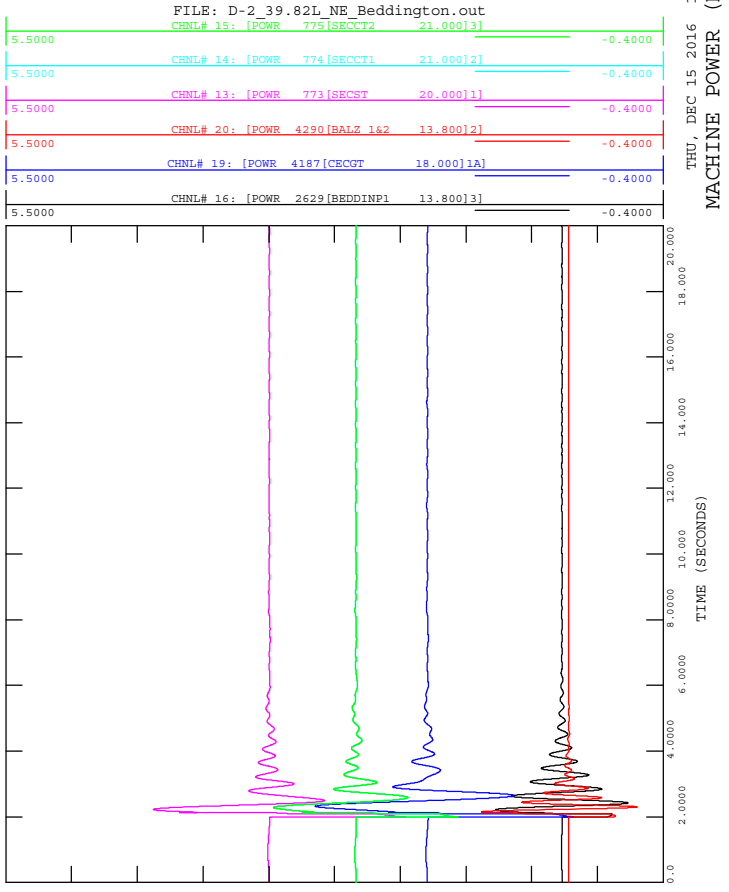
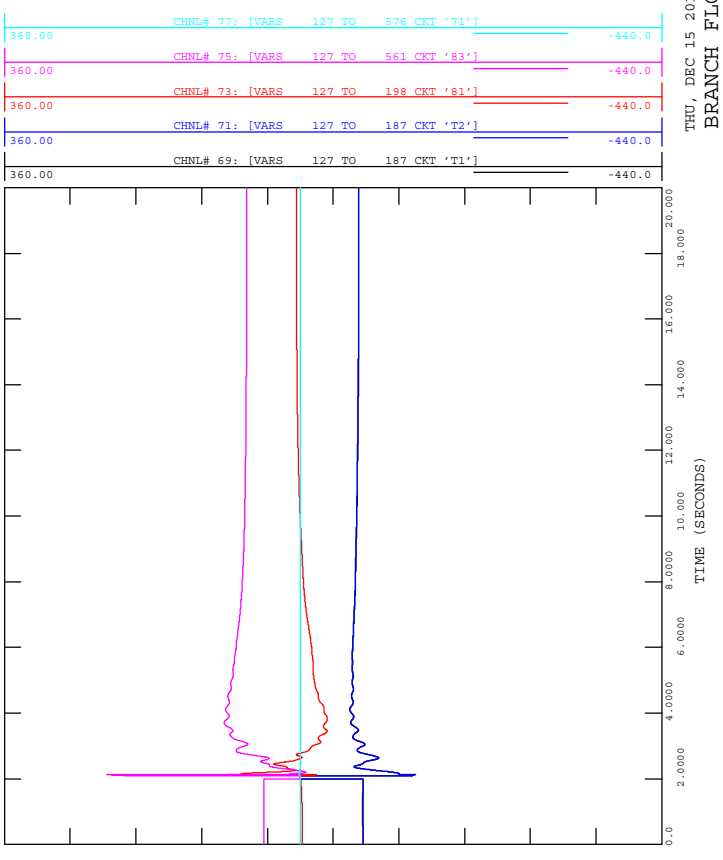
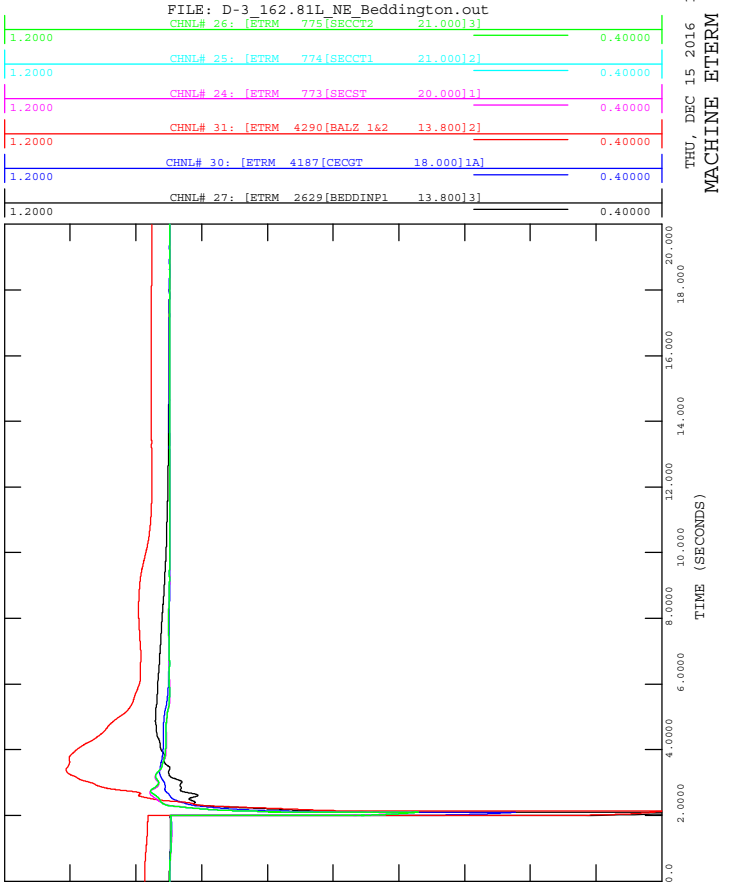


FIGURE D-2E
2018SP, POST-PROJECT
3 PHASE FAULT ON 39.82L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-2_39.82L_NE_Beddington.out



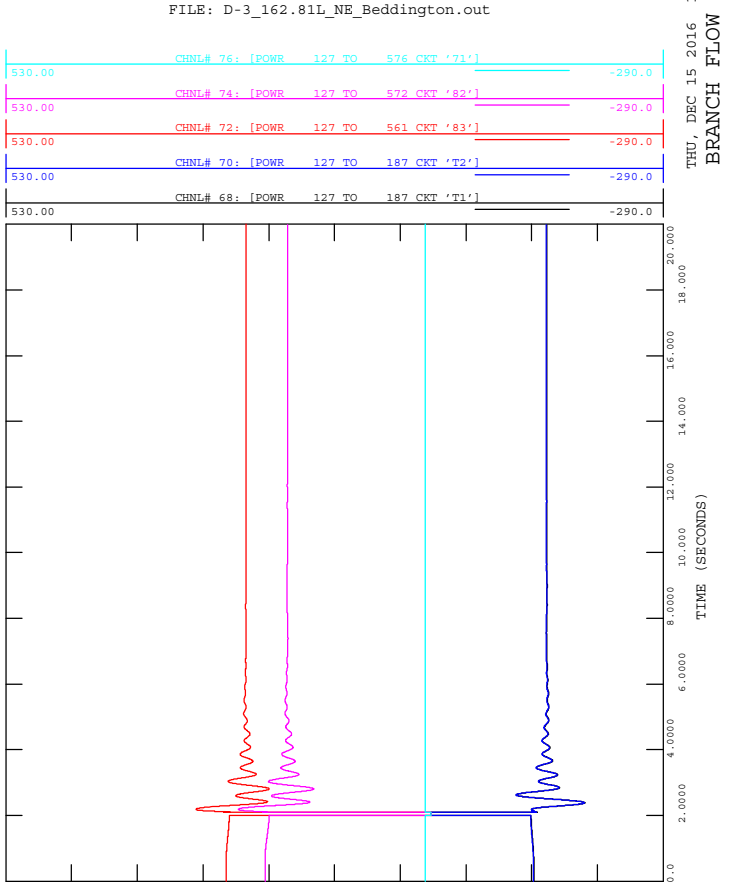
THU, DEC 15 2016 13:33
BRANCH FLOW (Q)

FIGURE D-3B
2018SP, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-3_162.81L_NE_Beddington.out



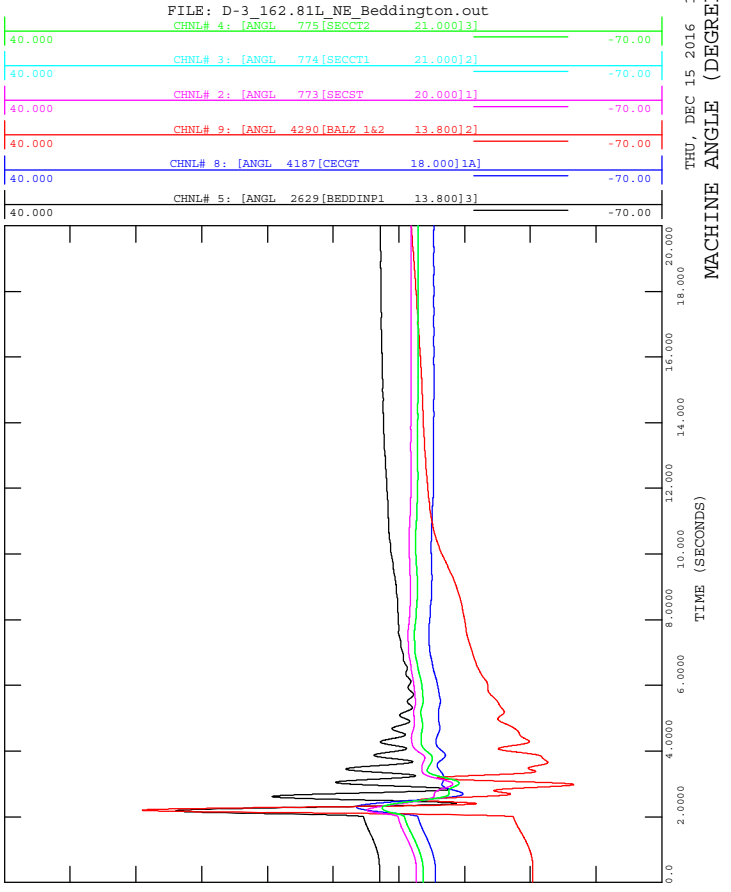
THU, DEC 15 2016 13:33
MACHINE ETERM (V)

FIGURE D-3D
2018SP, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-3_162.81L_NE_Beddington.out



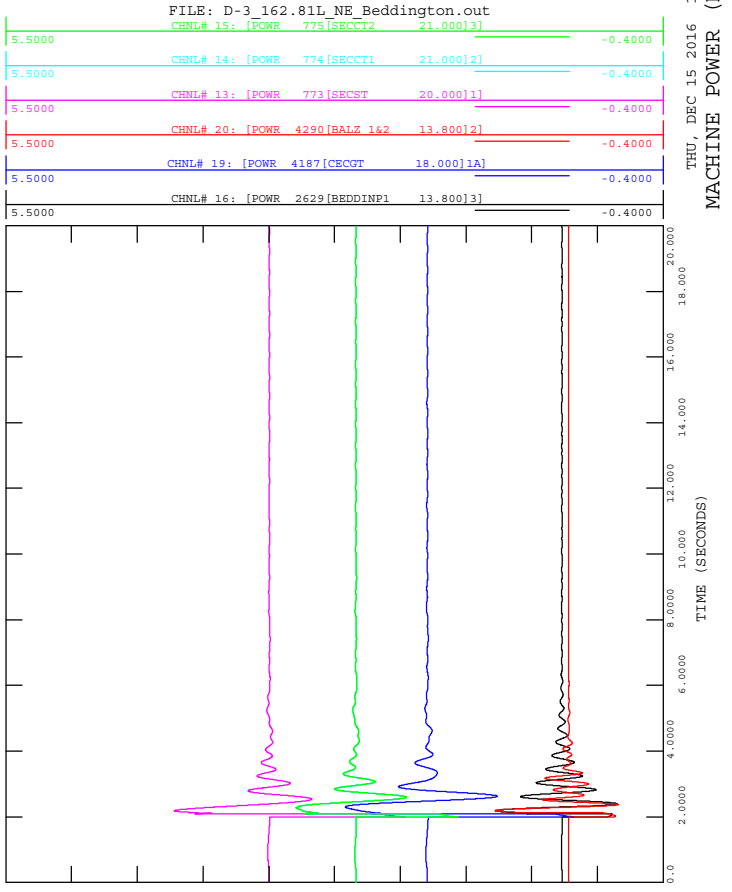
THU, DEC 15 2016 13:33
BRANCH FLOW (P)

FIGURE D-3A
2018SP, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-3_162.81L_NE_Beddington.out



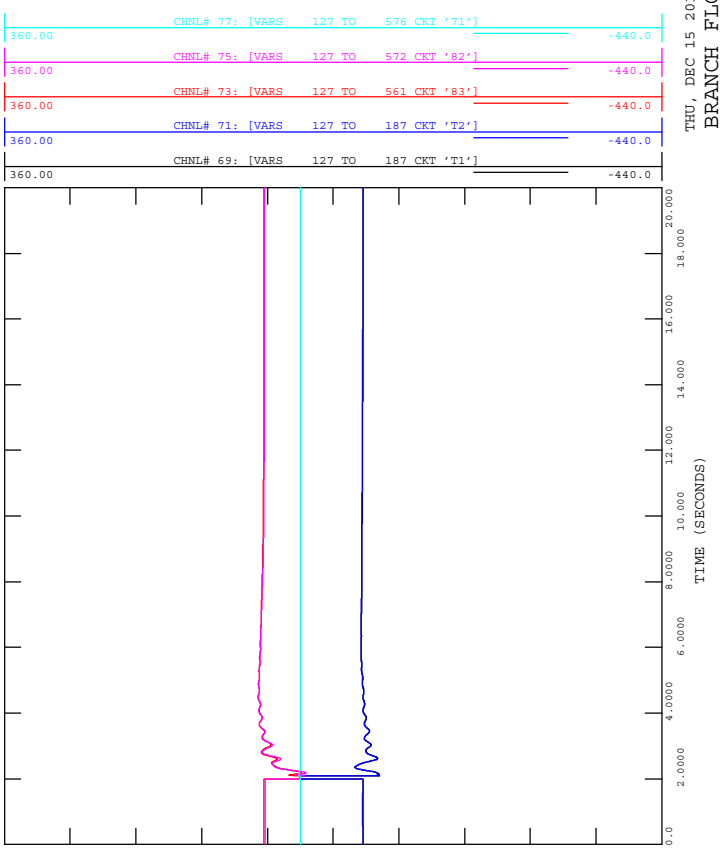
THU, DEC 15 2016 13:33
MACHINE ANGLE (DEGREES)

FIGURE D-3C
2018SP, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-3_162.81L_NE_Beddington.out



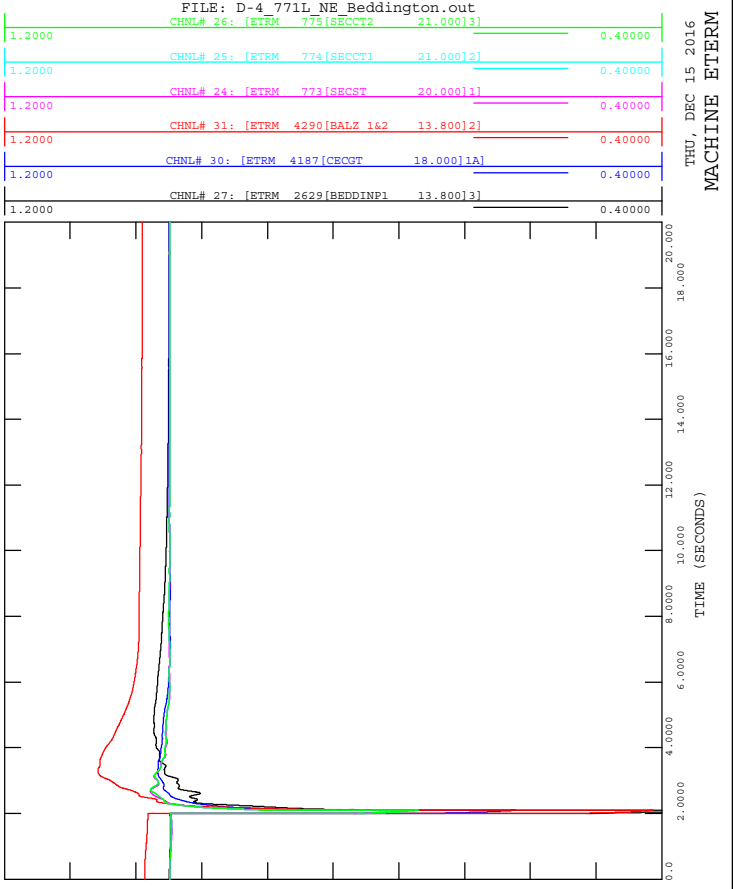
THU, DEC 15 2016 13:33
MACHINE POWER (MW)

FIGURE D-3E
2018SP, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-3_162.81L_NE_Beddington.out



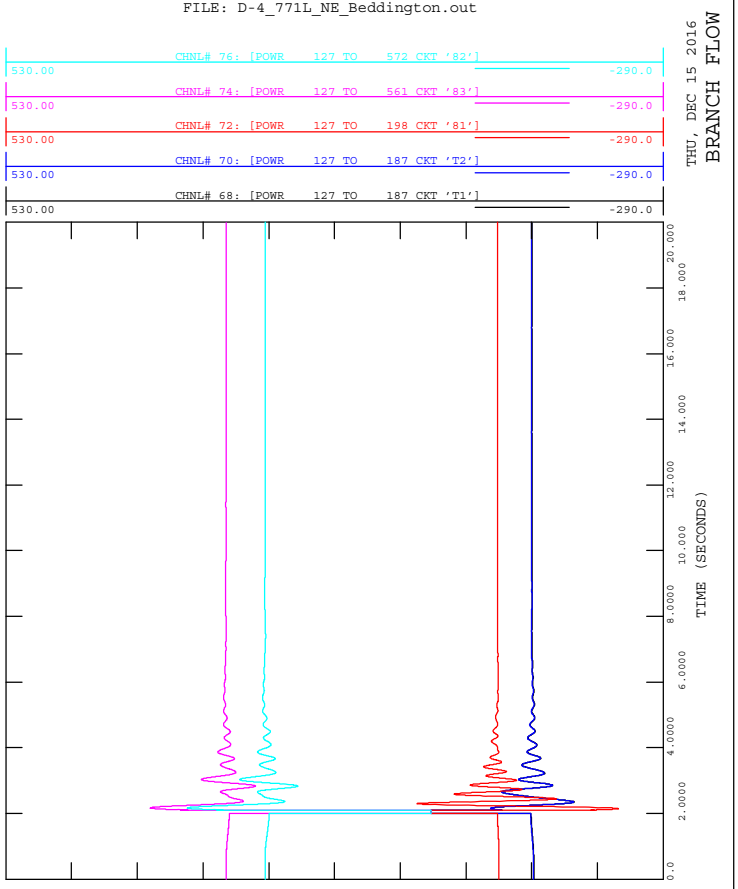
THU, DEC 15 2016 13:33
BRANCH FLOW (Q)

FIGURE D-4B
2018SP, POST-PROJECT
3 PHASE FAULT ON 771L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-4_771L_NE_Beddington.out



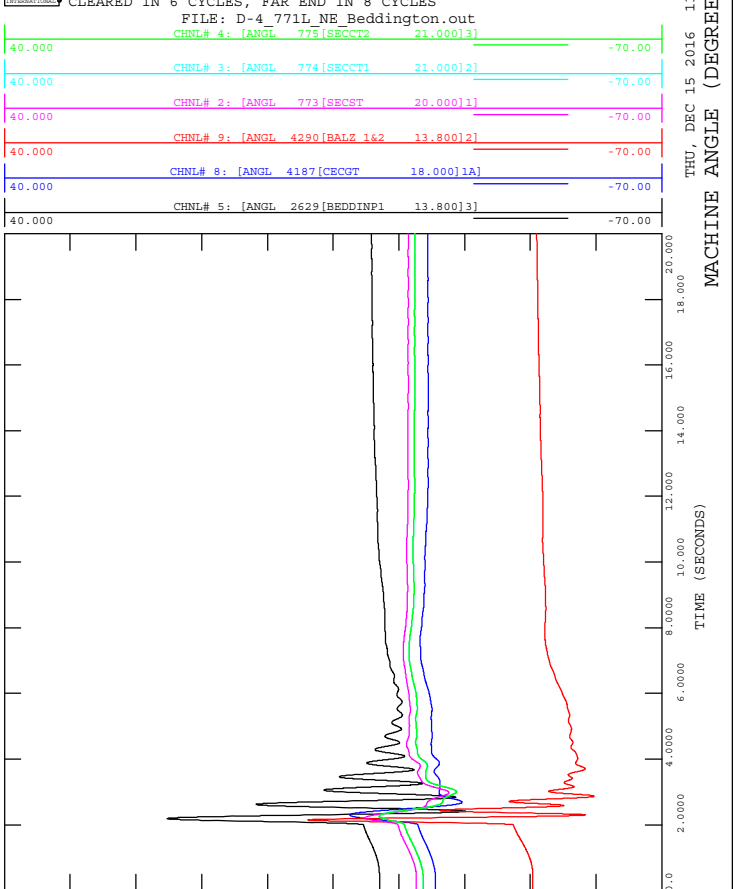
THU, DEC 15 2016 13:33
MACHINE ETERM (V)

FIGURE D-4D
2018SP, POST-PROJECT
3 PHASE FAULT ON 771L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-4_771L_NE_Beddington.out



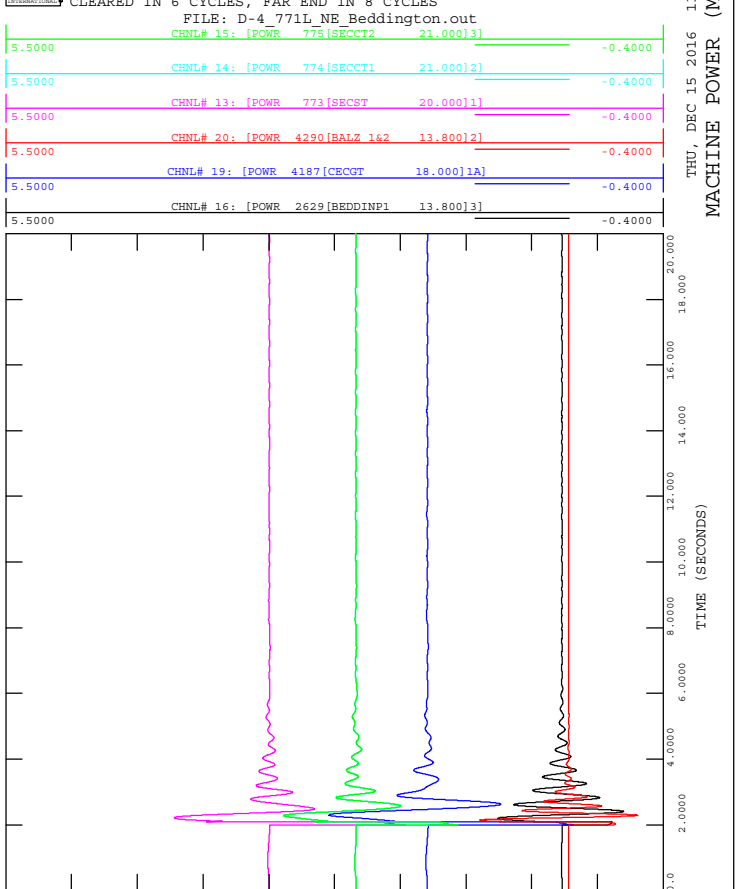
THU, DEC 15 2016 13:33
BRANCH FLOW (P)

FIGURE D-4A
2018SP, POST-PROJECT
3 PHASE FAULT ON 771L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-4_771L_NE_Beddington.out



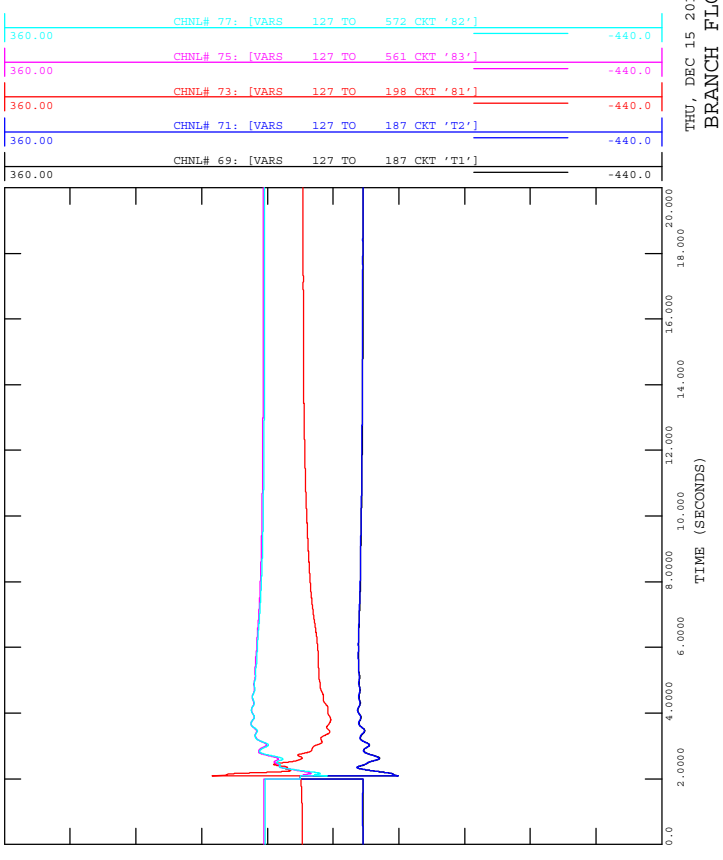
THU, DEC 15 2016 13:33
MACHINE ANGLE (DEGREES)

FIGURE D-4C
2018SP, POST-PROJECT
3 PHASE FAULT ON 771L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-4_771L_NE_Beddington.out



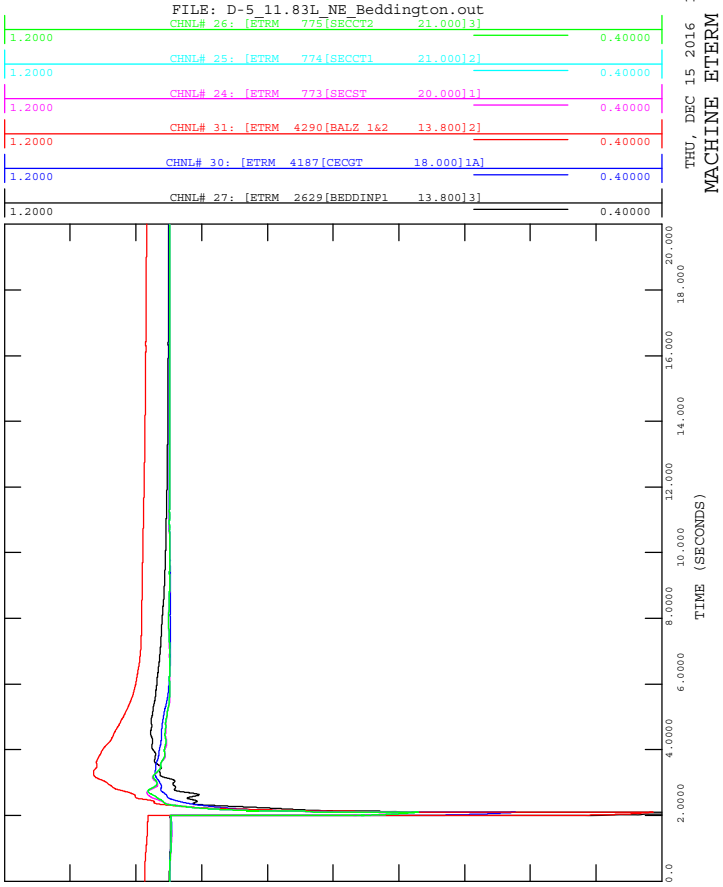
THU, DEC 15 2016 13:33
MACHINE POWER (MW)

FIGURE D-4E
2018SP, POST-PROJECT
3 PHASE FAULT ON 771L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-4_771L_NE_Beddington.out



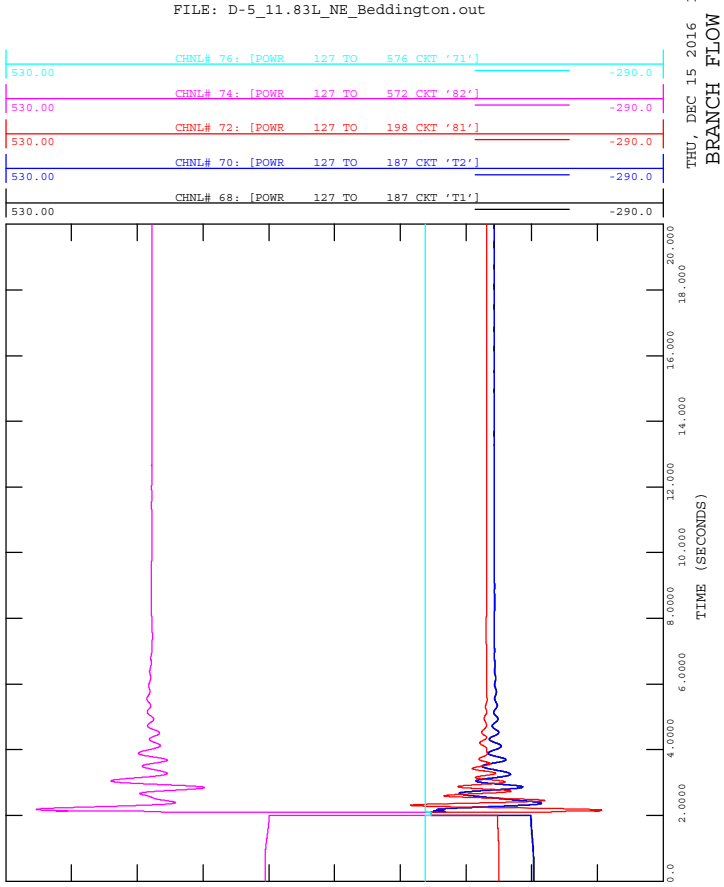
THU, DEC 15 2016 13:33
BRANCH FLOW (Q)

FIGURE D-5B
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.83L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-5_11.83L_NE_Beddington.out



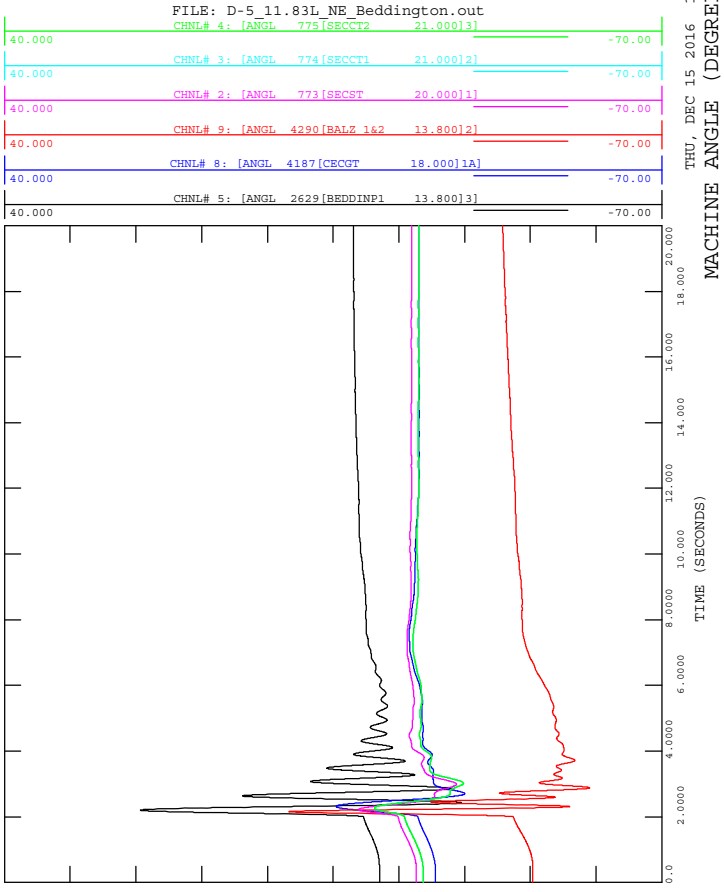
THU, DEC 15 2016 13:34
MACHINE ETERM (V)

FIGURE D-5D
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.83L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-5_11.83L_NE_Beddington.out



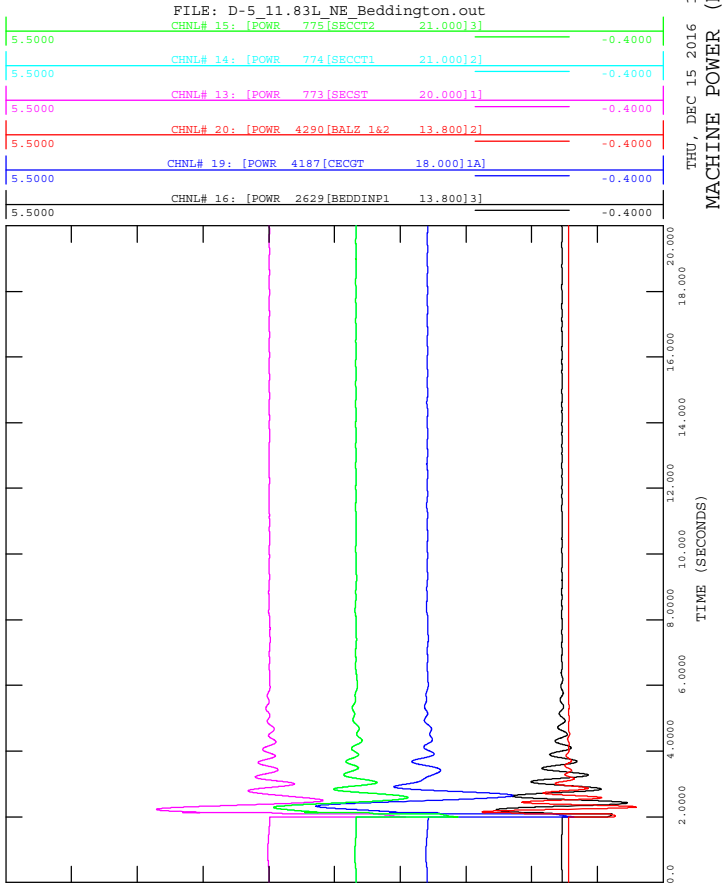
THU, DEC 15 2016 13:34
BRANCH FLOW (P)

FIGURE D-5A
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.83L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-5_11.83L_NE_Beddington.out



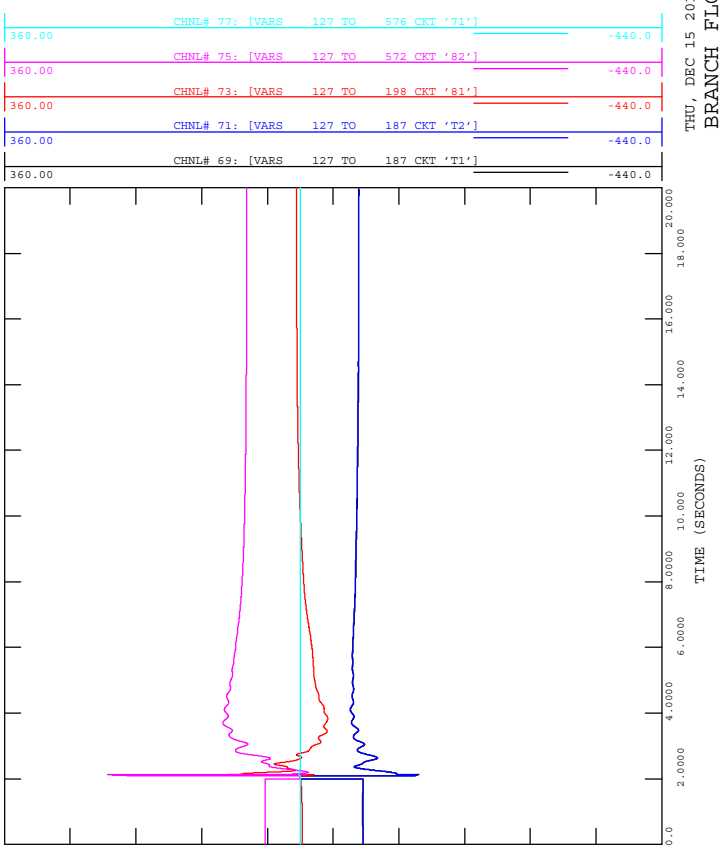
THU, DEC 15 2016 13:34
MACHINE ANGLE (DEGREES)

FIGURE D-5C
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.83L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-5_11.83L_NE_Beddington.out



THU, DEC 15 2016 13:34
MACHINE POWER (MW)

FIGURE D-5E
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.83L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-5_11.83L_NE_Beddington.out



THU, DEC 15 2016 13:34
BRANCH FLOW (Q)

FIGURE D-6B
2018SP, POST-PROJECT
3 PHASE FAULT ON 918L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-6_918L_NE_Beddington.out

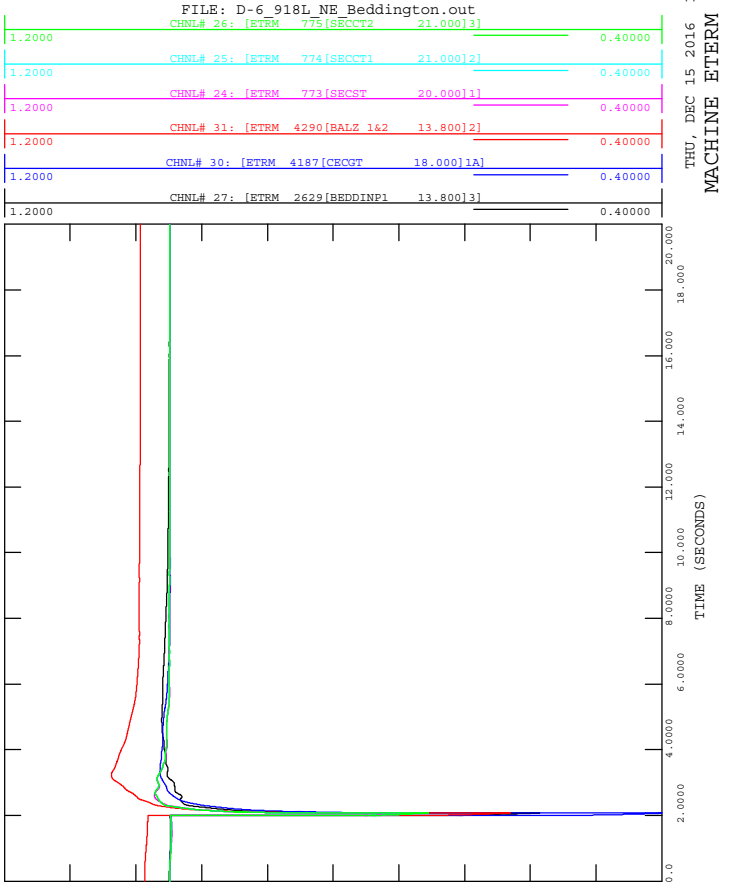


FIGURE D-6D
2018SP, POST-PROJECT
3 PHASE FAULT ON 918L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-6_918L_NE_Beddington.out

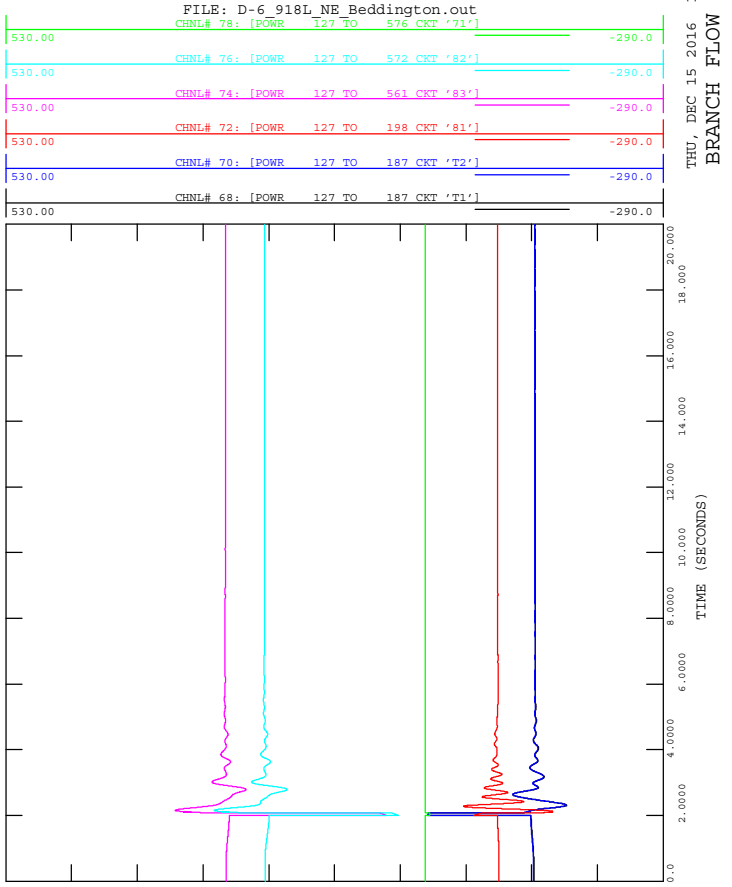


FIGURE D-6A
2018SP, POST-PROJECT
3 PHASE FAULT ON 918L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-6_918L_NE_Beddington.out

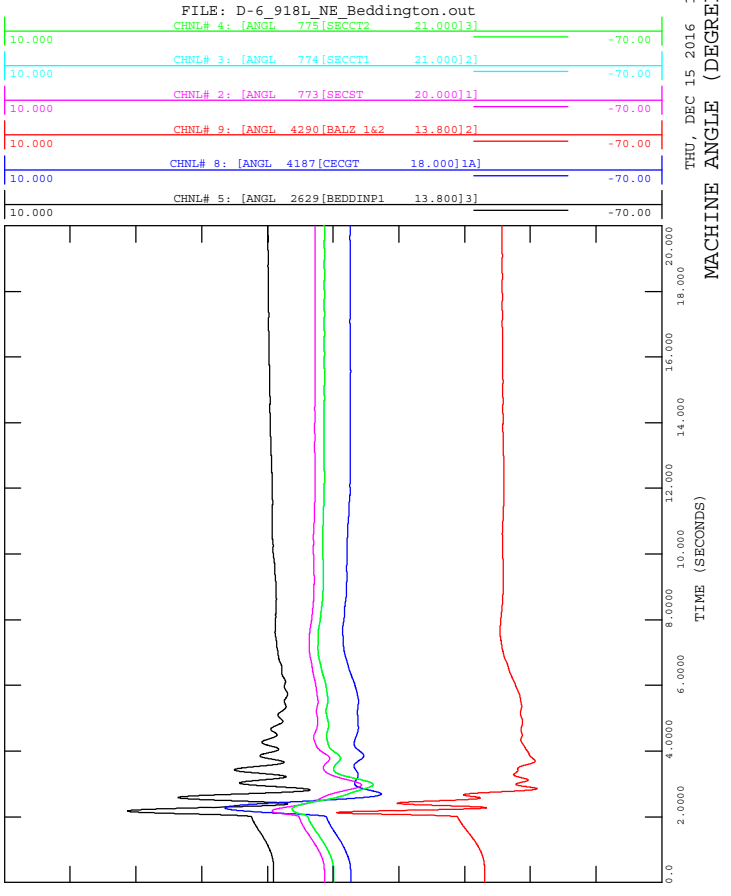


FIGURE D-6C
2018SP, POST-PROJECT
3 PHASE FAULT ON 918L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-6_918L_NE_Beddington.out

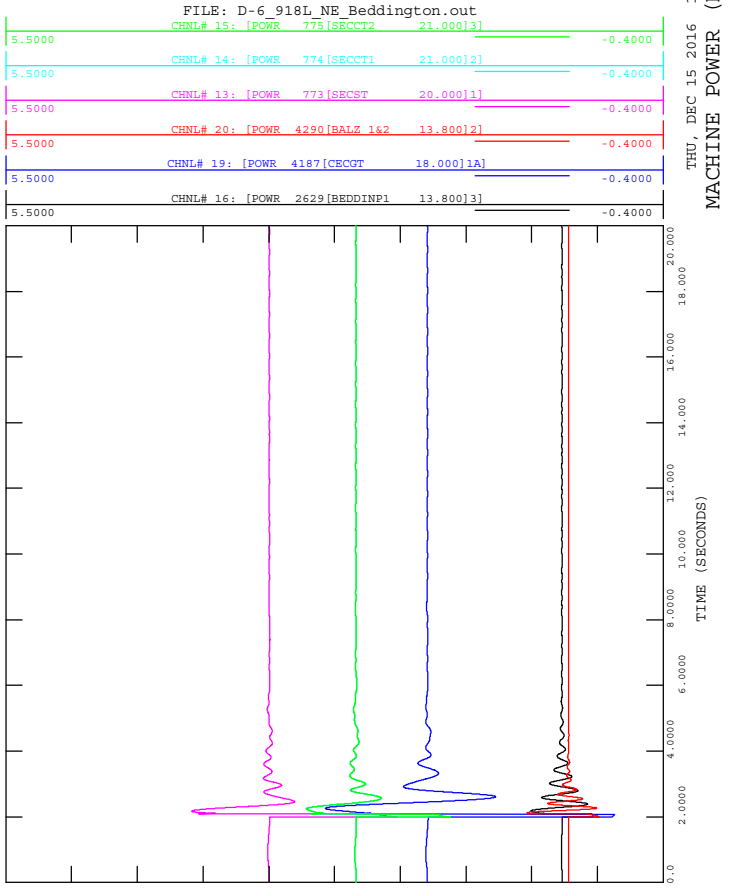
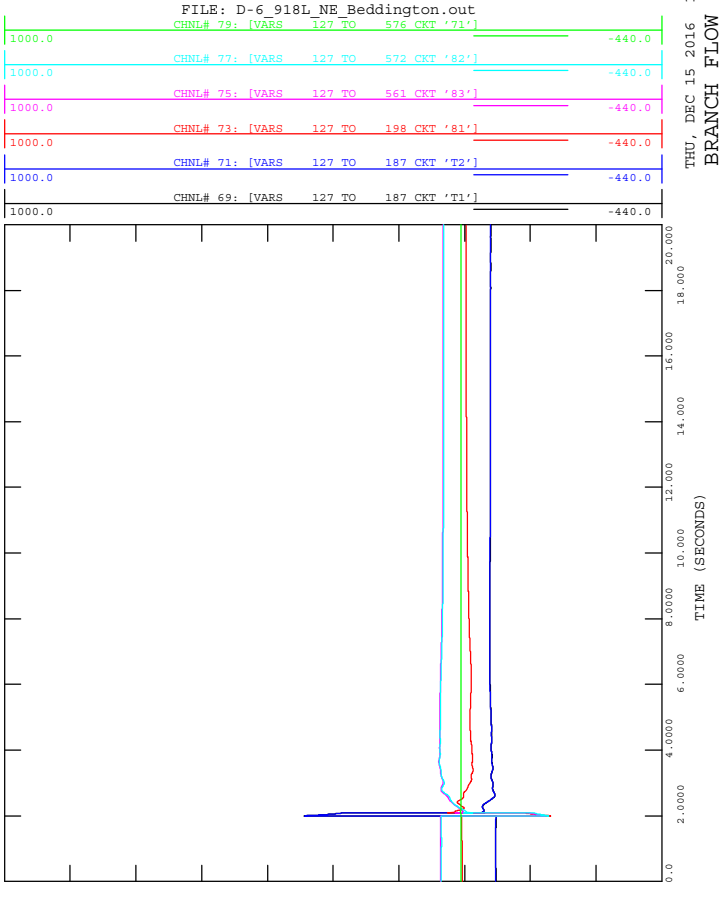
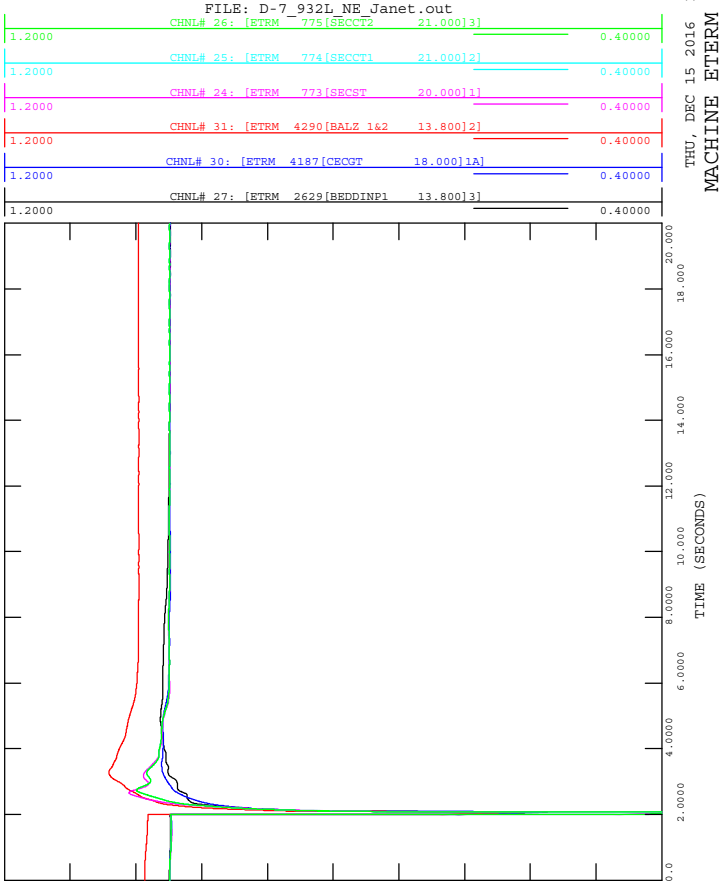


FIGURE D-6E
2018SP, POST-PROJECT
3 PHASE FAULT ON 918L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-6_918L_NE_Beddington.out



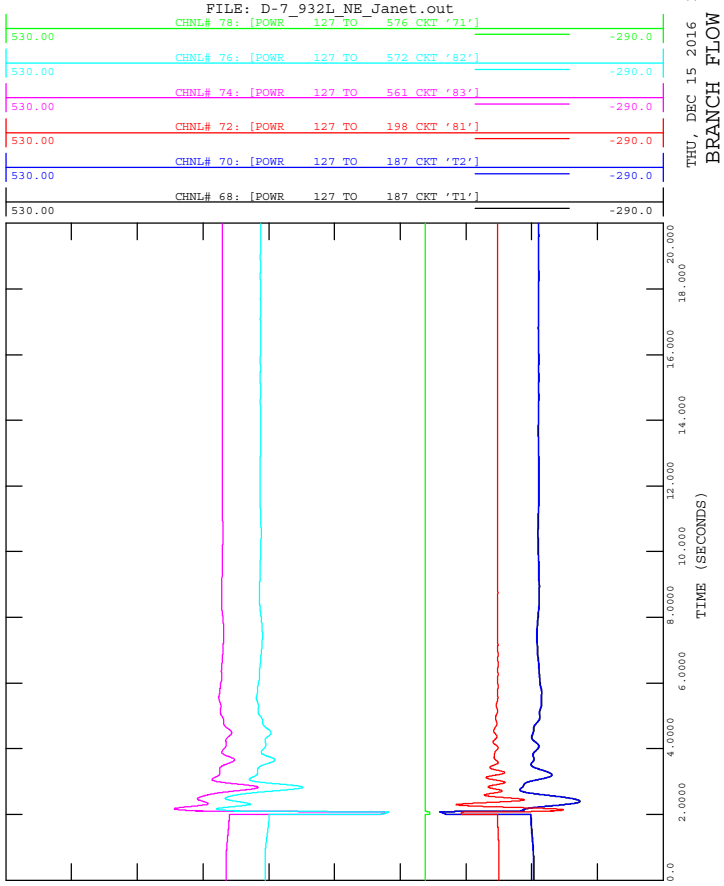
THU, DEC 15 2016 13:34
BRANCH FLOW (Q)

FIGURE D-7B
2018SP, POST-PROJECT
3 PHASE FAULT ON 932L AT JANET
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-7_932L_NE_Janet.out



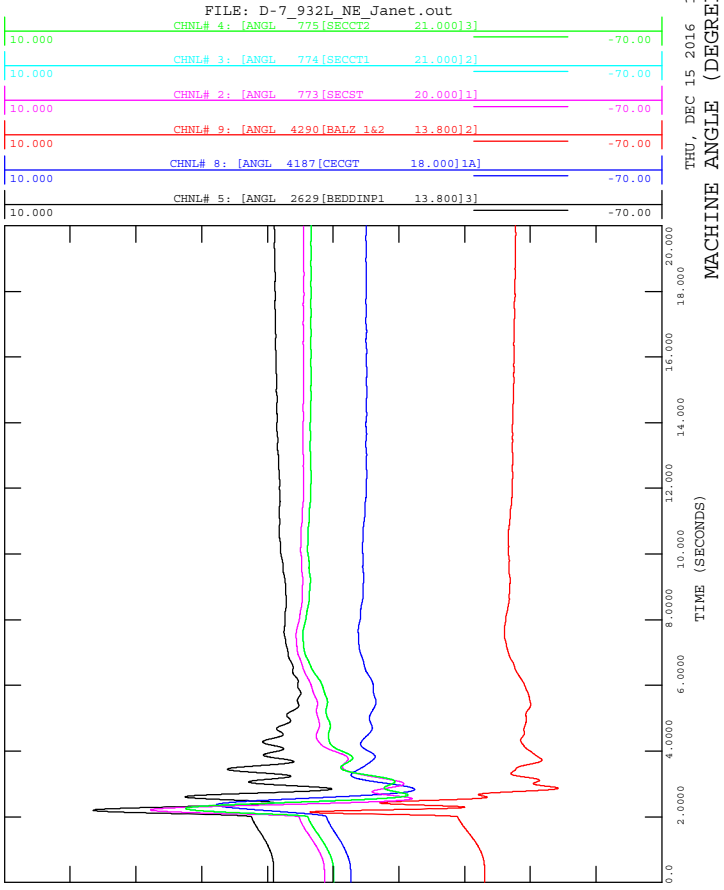
THU, DEC 15 2016 13:34
MACHINE ETERM (V)

FIGURE D-7D
2018SP, POST-PROJECT
3 PHASE FAULT ON 932L AT JANET
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-7_932L_NE_Janet.out



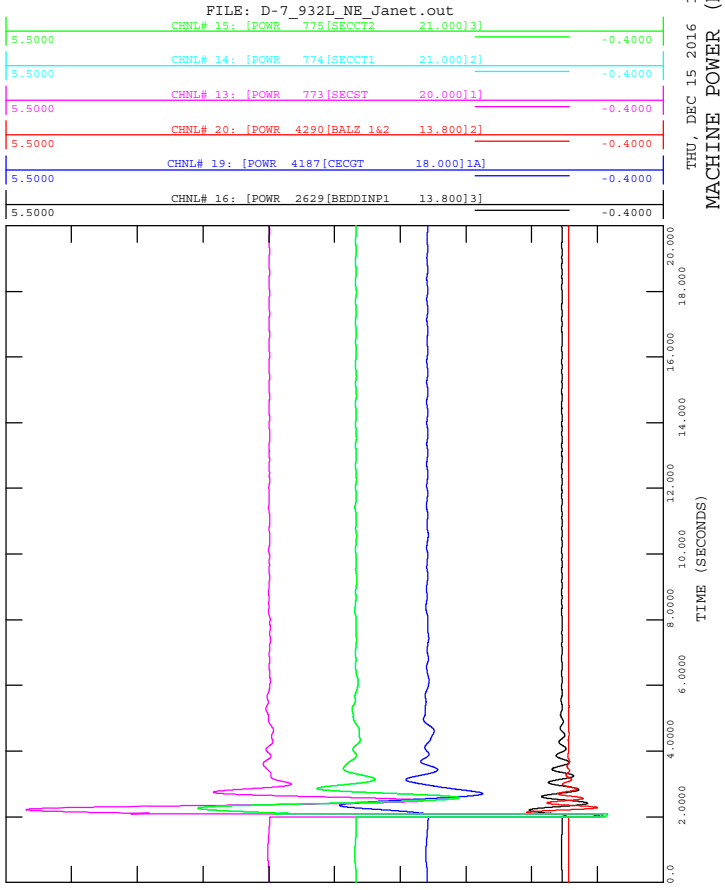
THU, DEC 15 2016 13:34
BRANCH FLOW (P)

FIGURE D-7A
2018SP, POST-PROJECT
3 PHASE FAULT ON 932L AT JANET
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-7_932L_NE_Janet.out



THU, DEC 15 2016 13:34
MACHINE ANGLE (DEGREES)

FIGURE D-7C
2018SP, POST-PROJECT
3 PHASE FAULT ON 932L AT JANET
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-7_932L_NE_Janet.out



THU, DEC 15 2016 13:34
MACHINE POWER (MW)

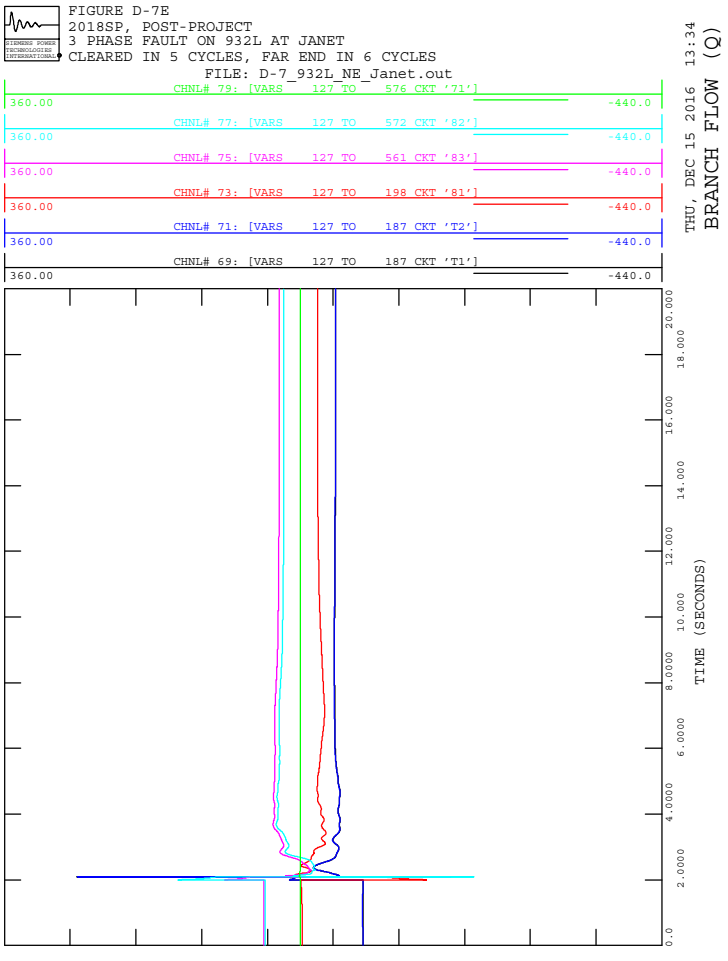


FIGURE D-7E
2018SP, POST-PROJECT
3 PHASE FAULT ON 932L AT JANET
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-7_932L_NE_Janet.out
CHNL# 79: [VARS 127 TO 576 CKT '71']
CHNL# 77: [VARS 127 TO 572 CKT '82']
CHNL# 75: [VARS 127 TO 561 CKT '83']
CHNL# 73: [VARS 127 TO 198 CKT '81']
CHNL# 71: [VARS 127 TO 187 CKT 'T2']
CHNL# 69: [VARS 127 TO 187 CKT 'T1']
360.00
-440.0
THU, DEC 15 2016 13:34
BRANCH FLOW (Q)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)

FIGURE D-8B
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-14
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-8_11.82L_NE_14S.out

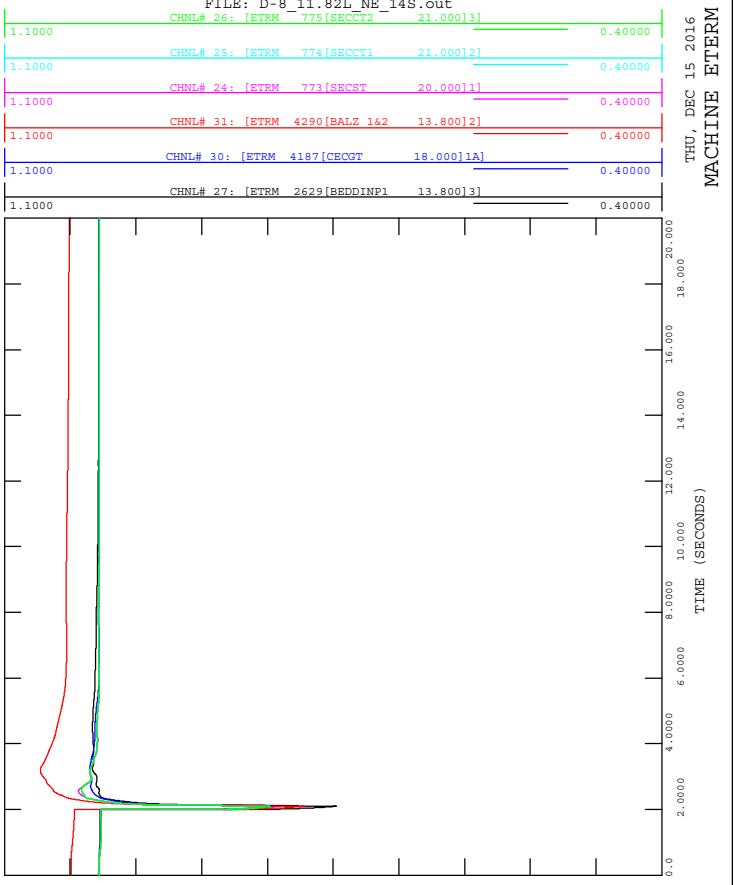


FIGURE D-8D
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-14
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-8_11.82L_NE_14S.out

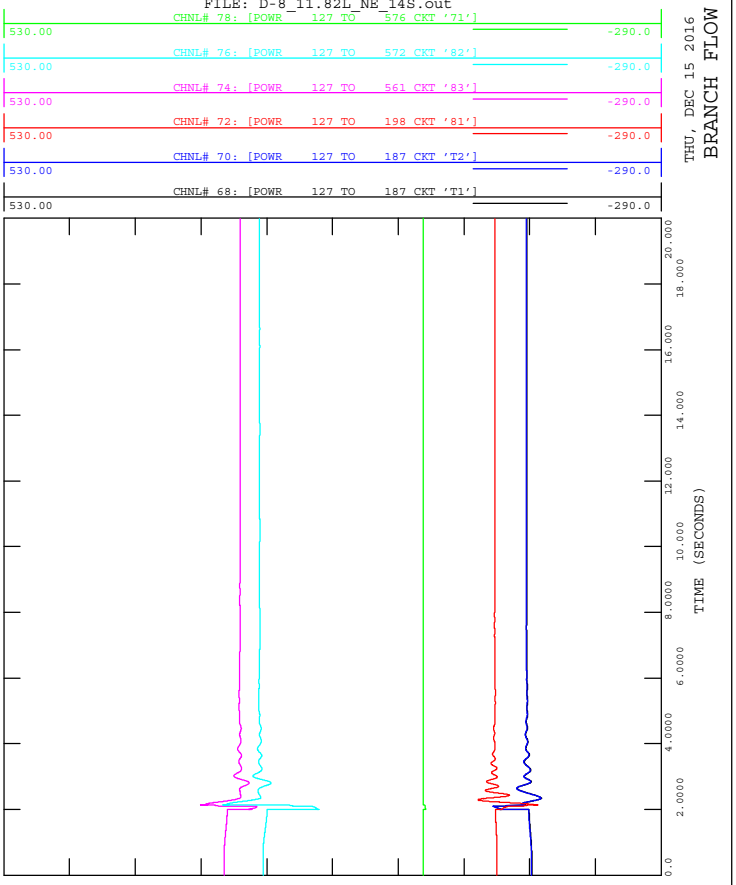


FIGURE D-8A
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-14
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-8_11.82L_NE_14S.out

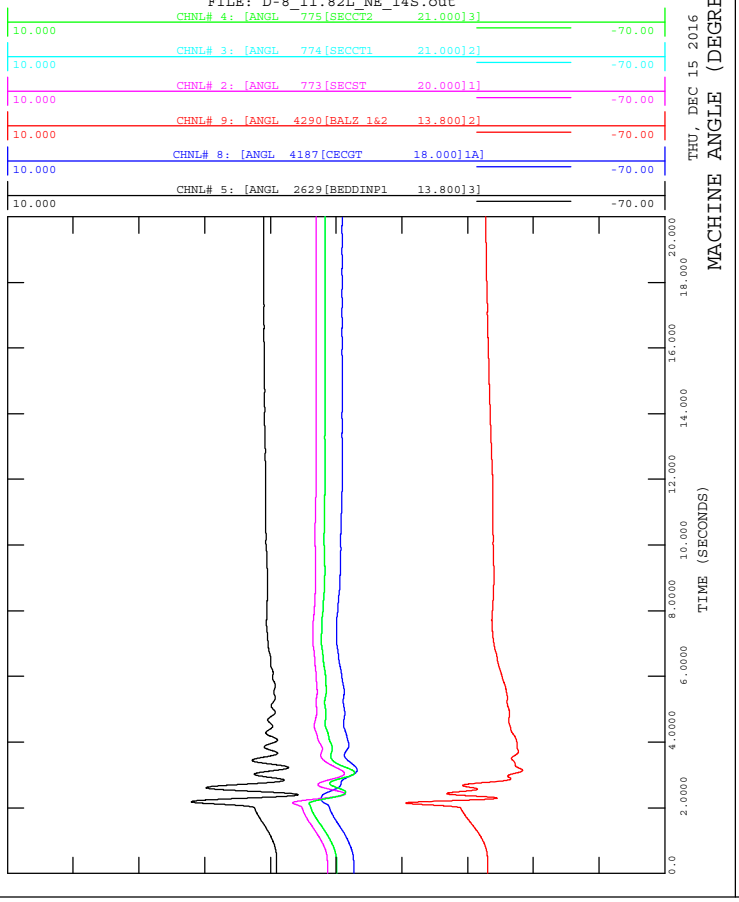


FIGURE D-8C
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-14
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-8_11.82L_NE_14S.out

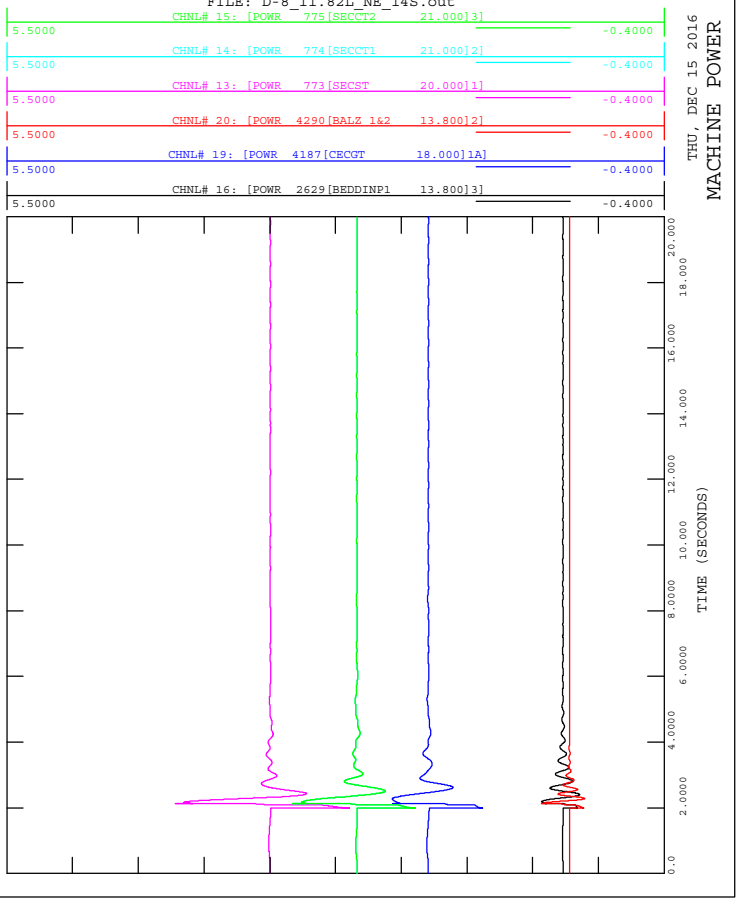
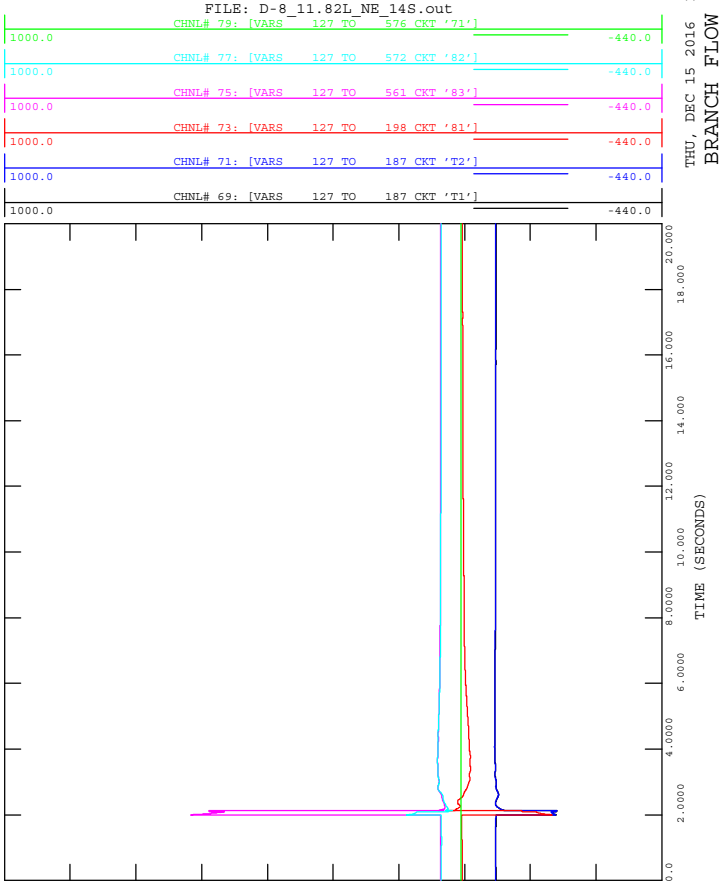
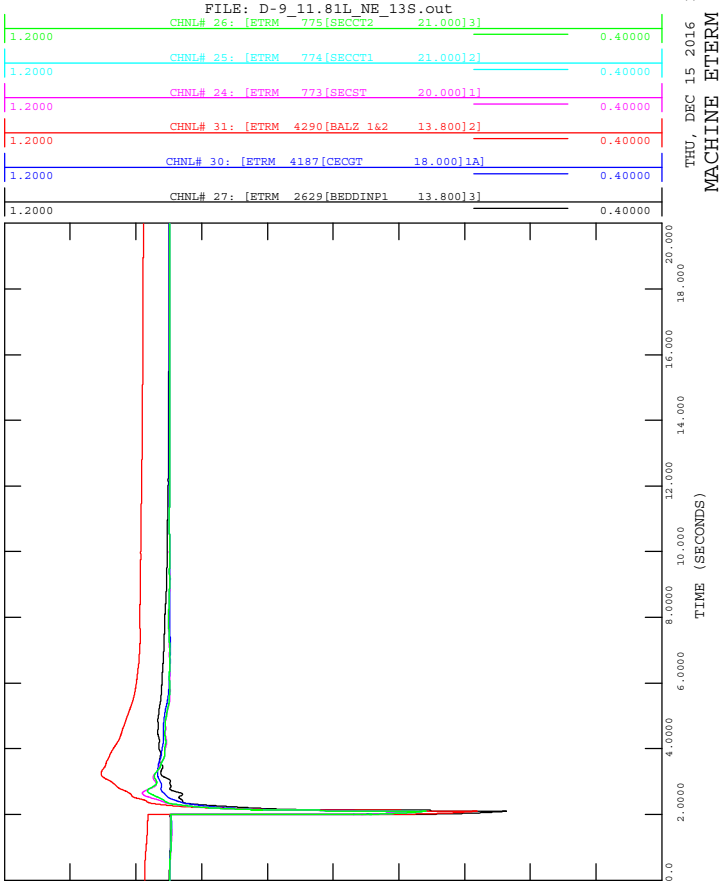


FIGURE D-8E
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-14
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-8_11.82L_NE_14S.out



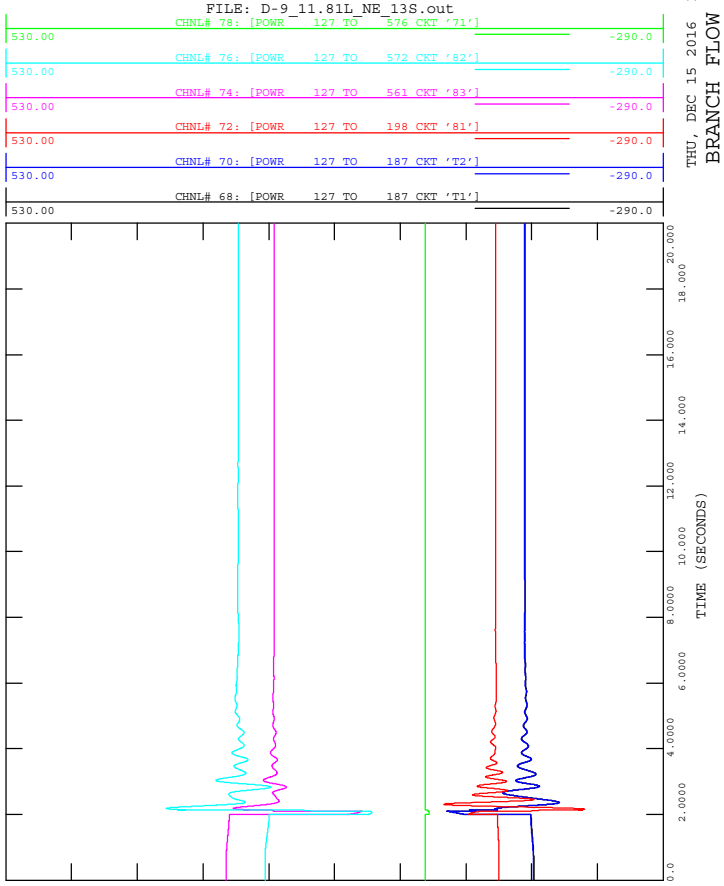
THU, DEC 15 2016 13:34
BRANCH FLOW (Q)

FIGURE D-9B
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-13
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-9_11.81L_NE_13S.out



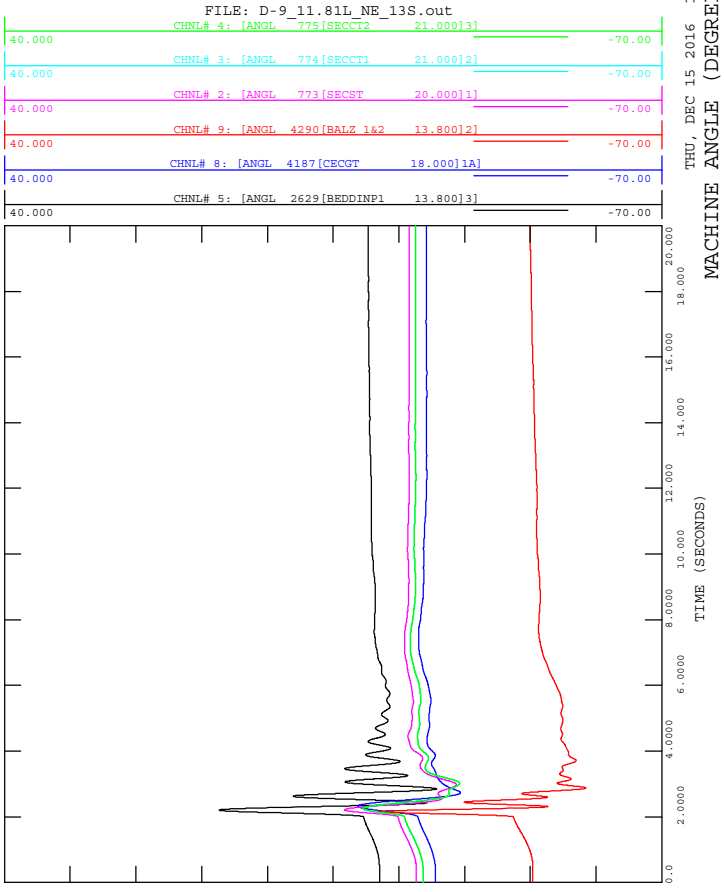
THU, DEC 15 2016 13:34
MACHINE ETERM (V)

FIGURE D-9D
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-13
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-9_11.81L_NE_13S.out



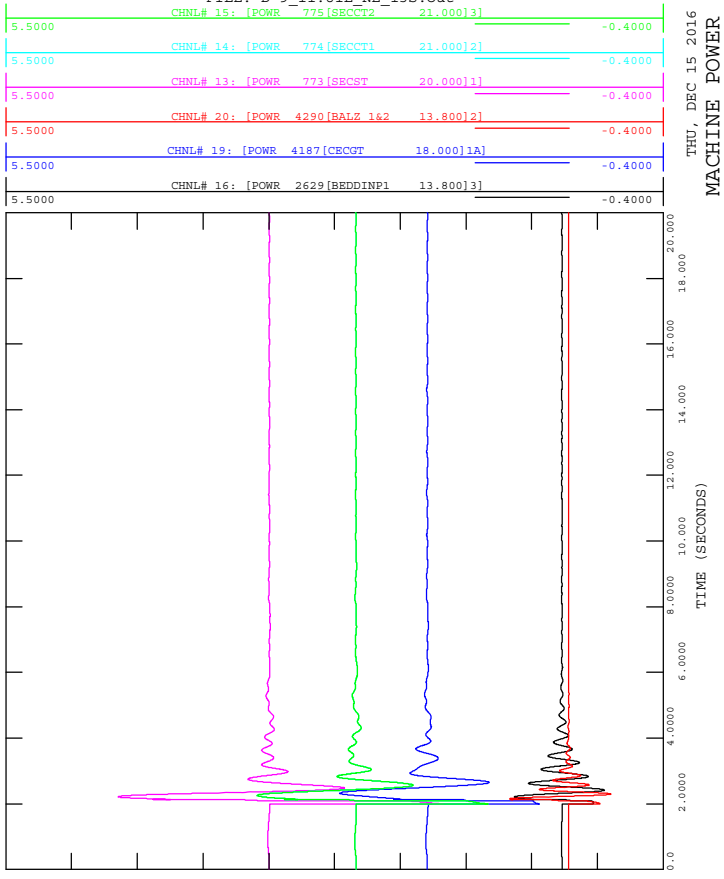
THU, DEC 15 2016 13:34
BRANCH FLOW (P)

FIGURE D-9A
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-13
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-9_11.81L_NE_13S.out



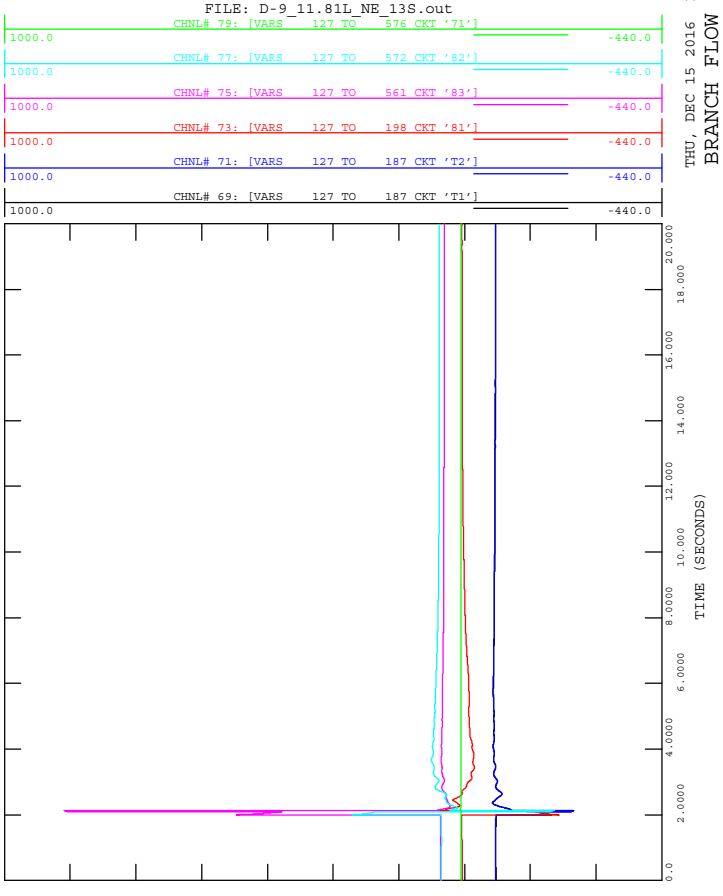
THU, DEC 15 2016 13:34
MACHINE ANGLE (DEGREES)

FIGURE D-9C
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-13
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-9_11.81L_NE_13S.out



THU, DEC 15 2016 13:34
MACHINE POWER (MW)

FIGURE D-9E
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-13
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-9_11.81L_NE_13S.out



THU, DEC 15 2016 13:34
BRANCH FLOW (Q)

FIGURE D-10B
2018SP, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-22
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-10_22.81L_NE_22S.out

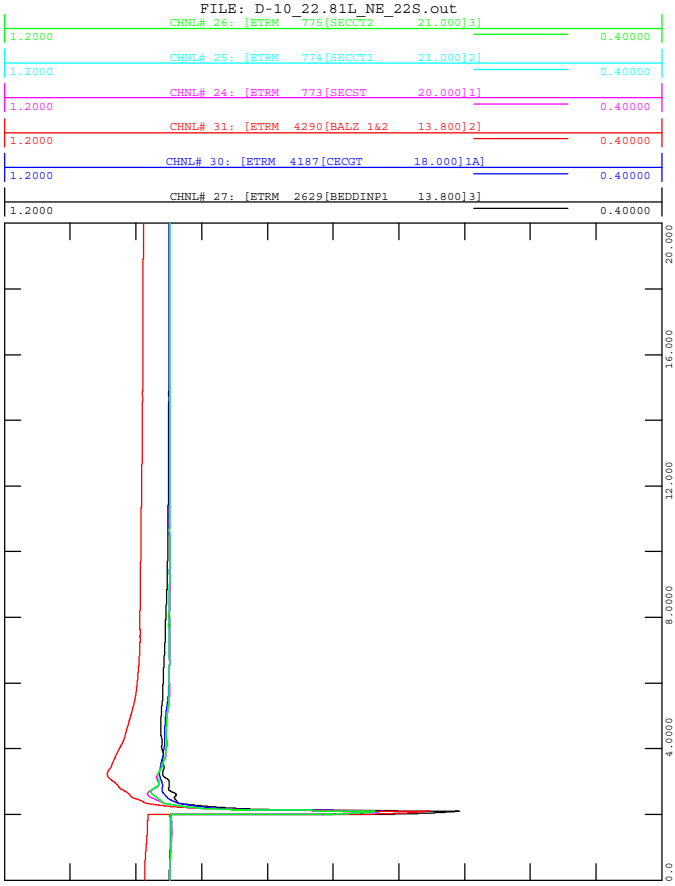


FIGURE D-10D
2018SP, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-22
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-10_22.81L_NE_22S.out

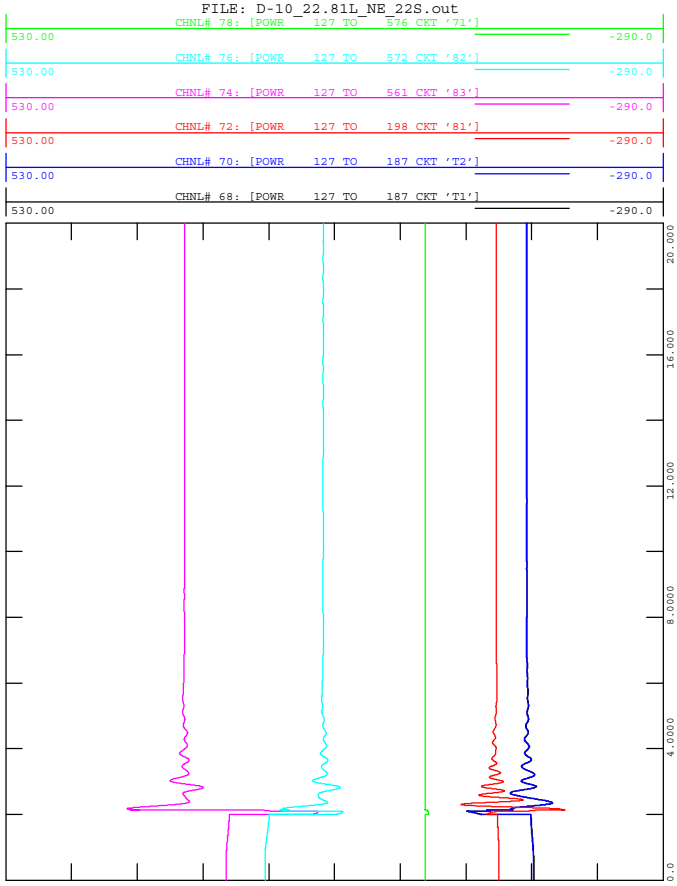


FIGURE D-10A
2018SP, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-22
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-10_22.81L_NE_22S.out

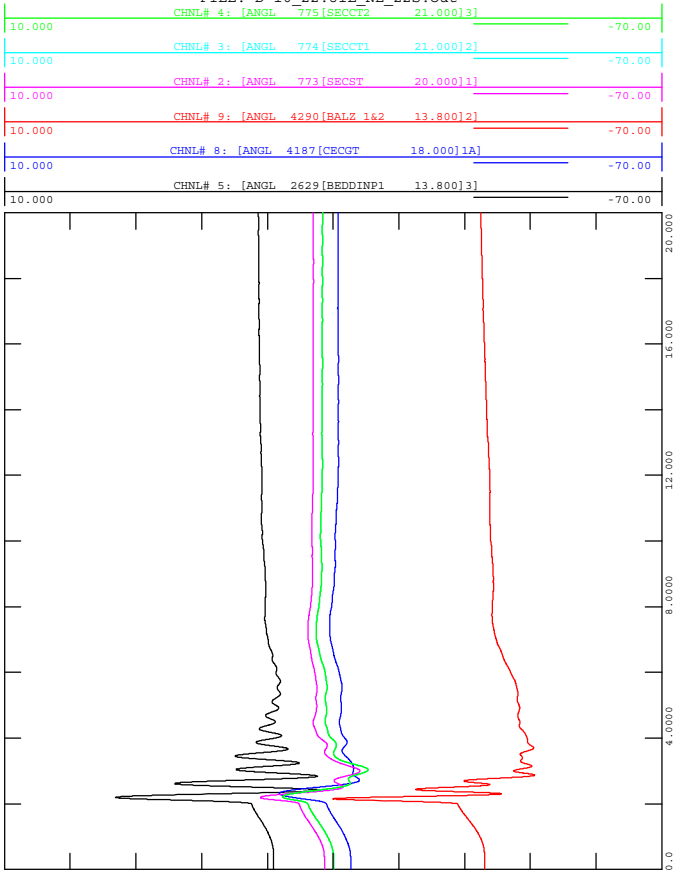


FIGURE D-10C
2018SP, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-22
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-10_22.81L_NE_22S.out

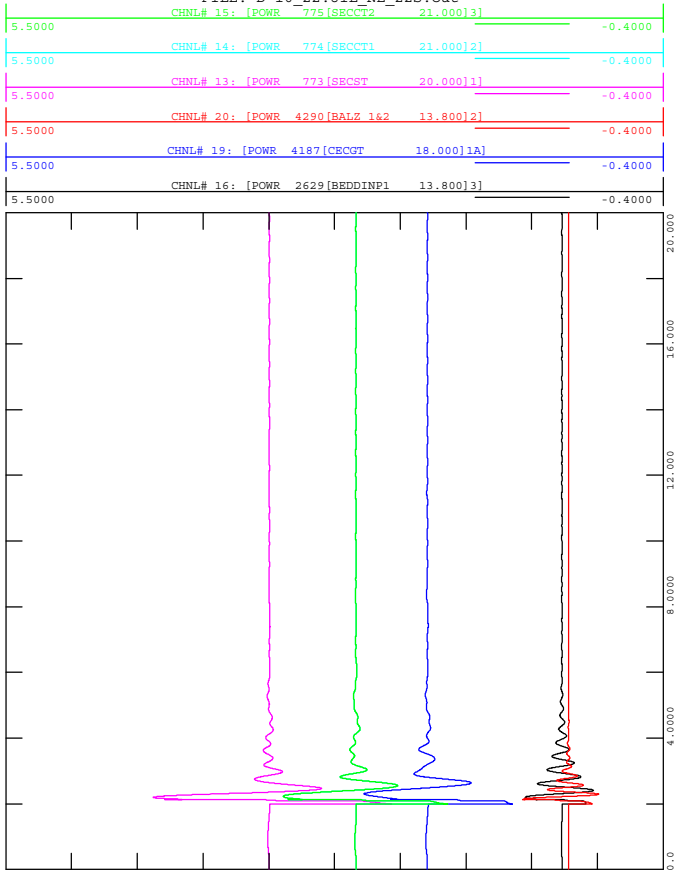
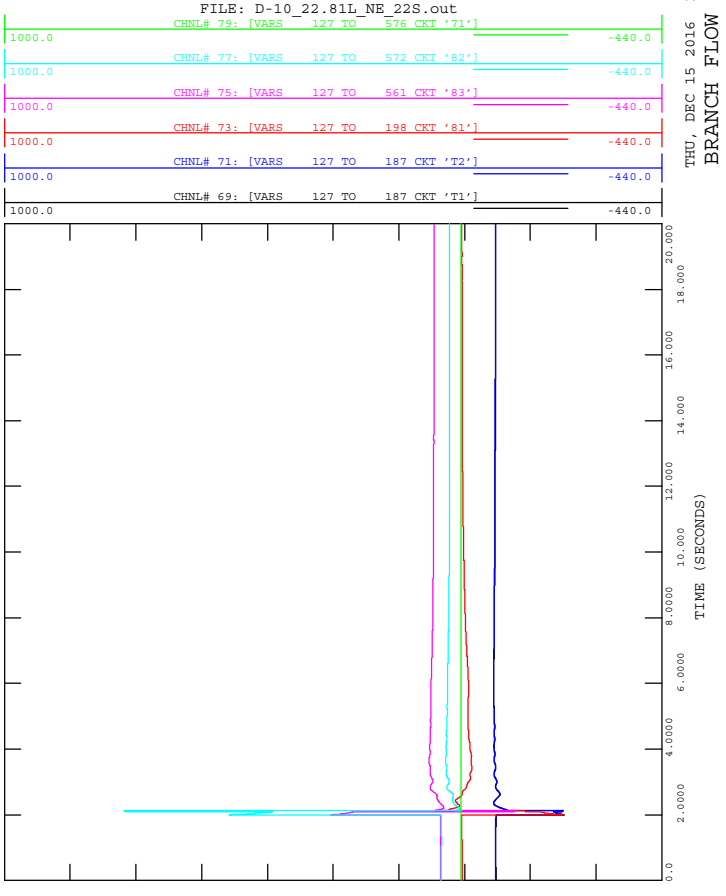
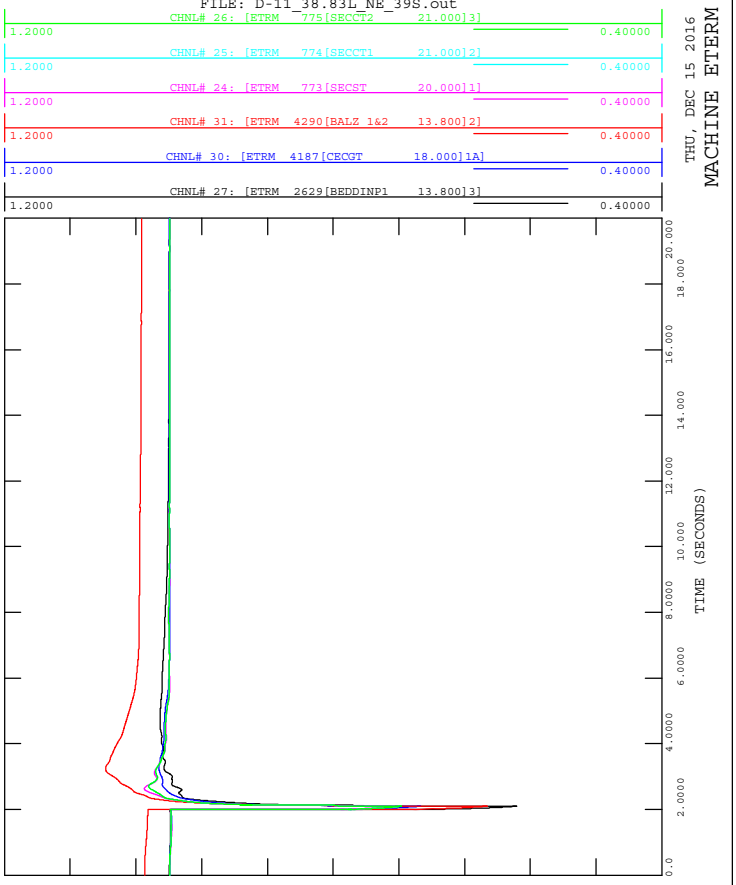


FIGURE D-10E
2018SP, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-22
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-10_22.81L_NE_22S.out



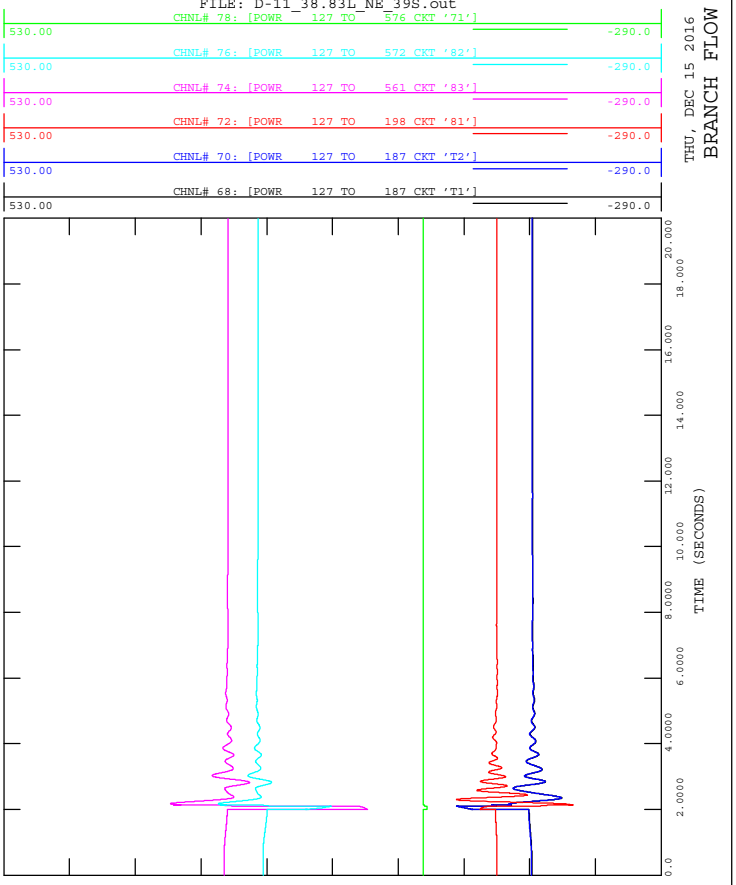
THU, DEC 15 2016 13:34
BRANCH FLOW (Q)

FIGURE D-11B
2018SP, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-11_38.83L_NE_39S.out



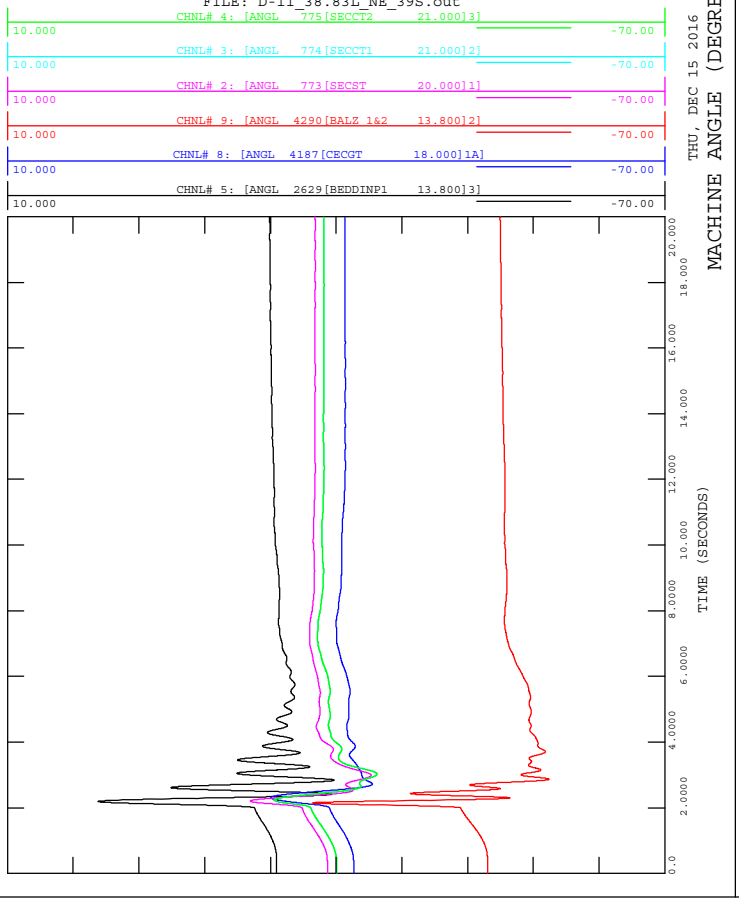
THU, DEC 15 2016 13:34
MACHINE ETERM (V)

FIGURE D-11D
2018SP, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-11_38.83L_NE_39S.out



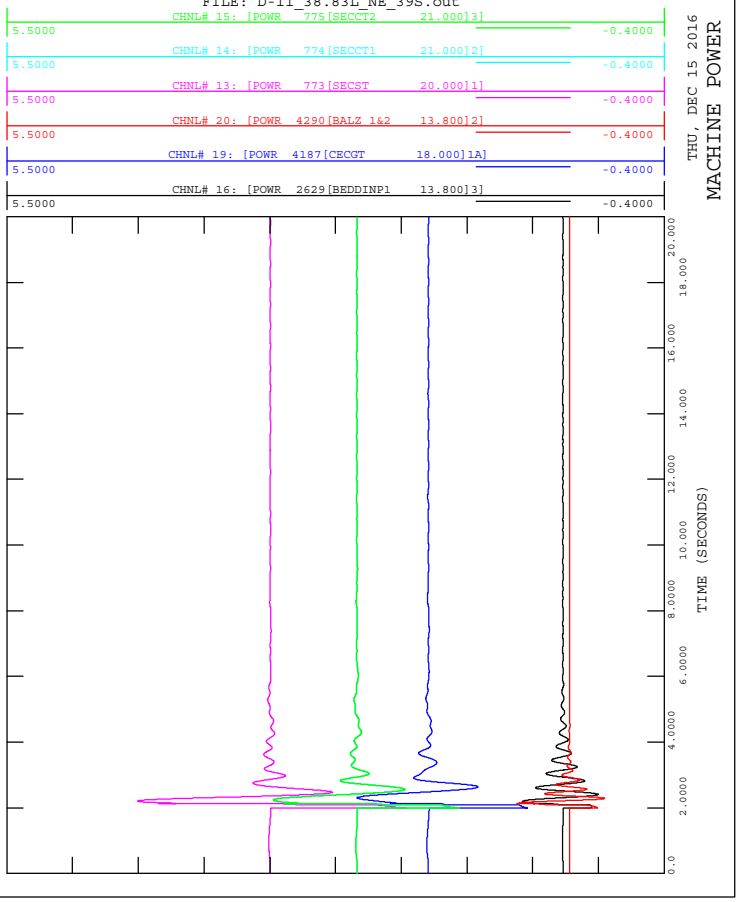
THU, DEC 15 2016 13:34
BRANCH FLOW (P)

FIGURE D-11A
2018SP, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-11_38.83L_NE_39S.out



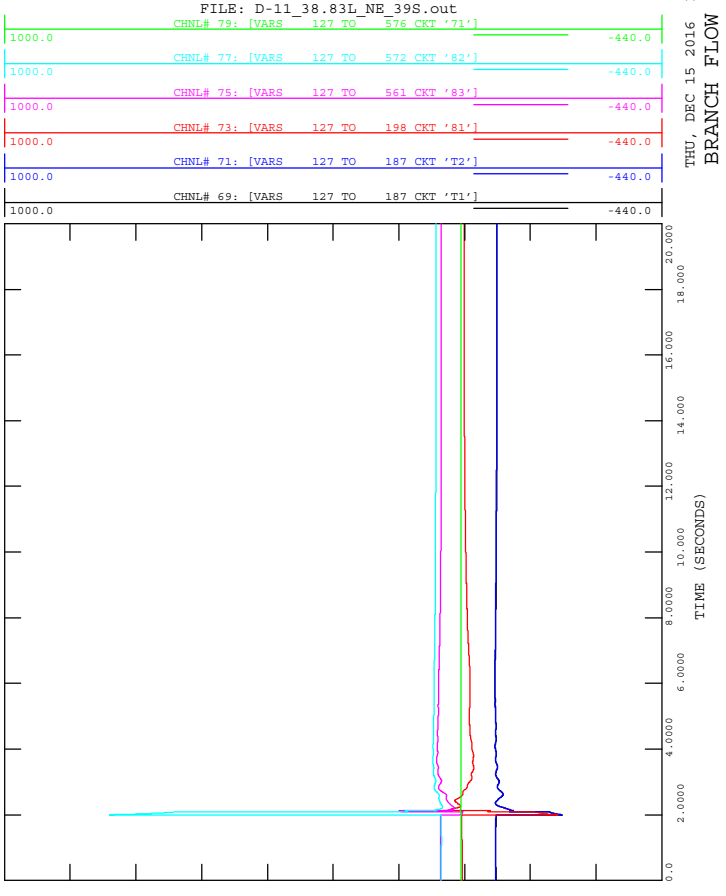
THU, DEC 15 2016 13:34
MACHINE ANGLE (DEGREES)

FIGURE D-11C
2018SP, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-11_38.83L_NE_39S.out



THU, DEC 15 2016 13:34
MACHINE POWER (MW)

FIGURE D-11E
2018SP, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-11_38.83L_NE_39S.out



THU, DEC 15 2016 13:34
BRANCH FLOW (Q)

FIGURE D-12B
2018SP, POST-PROJECT
3 PHASE FAULT ON 70.80L AT SS-70
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-12_70.80L_NE_70S.out

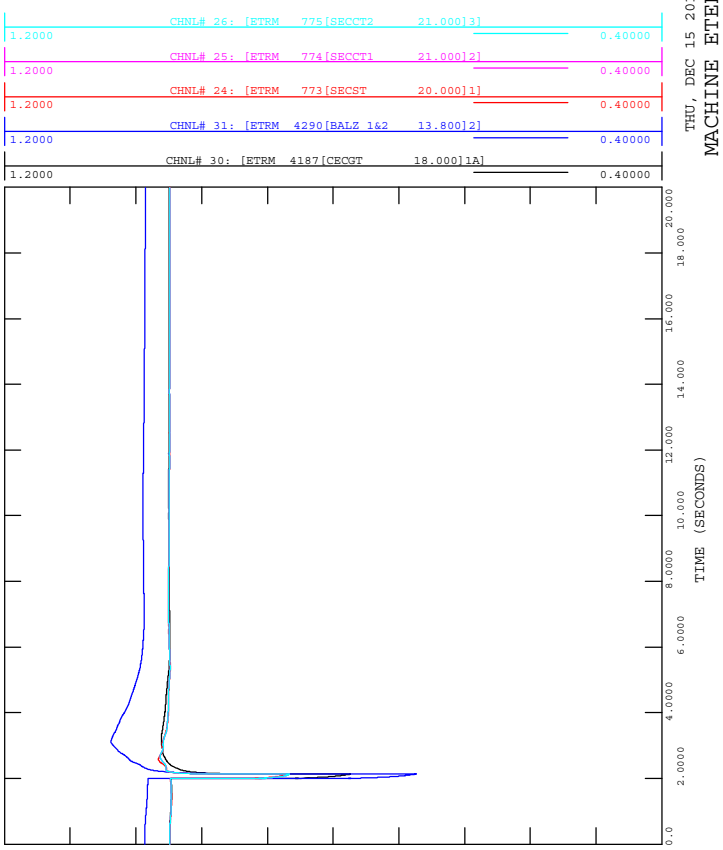


FIGURE D-12D
2018SP, POST-PROJECT
3 PHASE FAULT ON 70.80L AT SS-70
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-12_70.80L_NE_70S.out

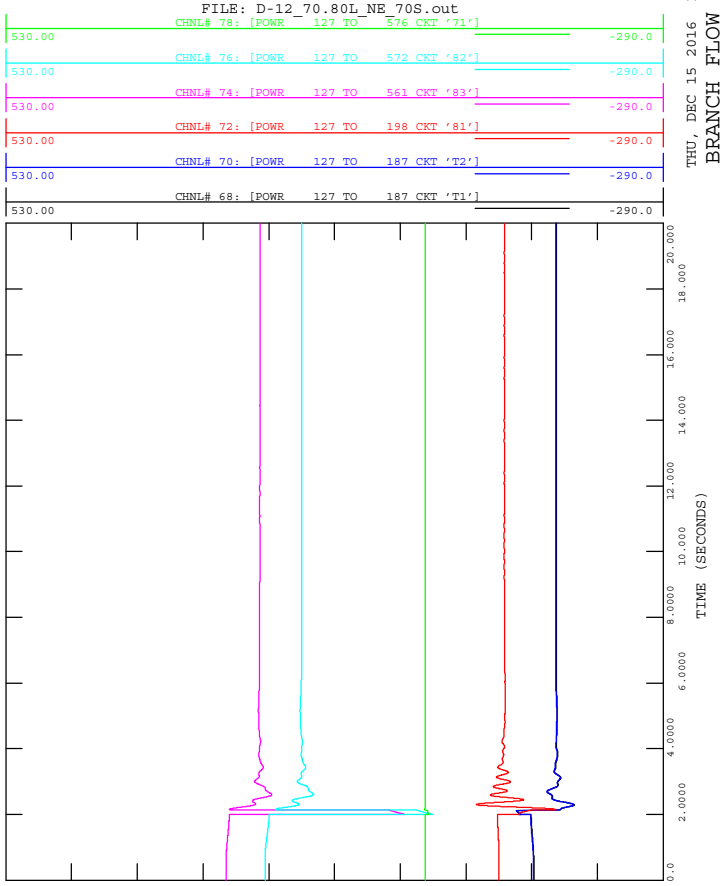


FIGURE D-12A
2018SP, POST-PROJECT
3 PHASE FAULT ON 70.80L AT SS-70
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-12_70.80L_NE_70S.out

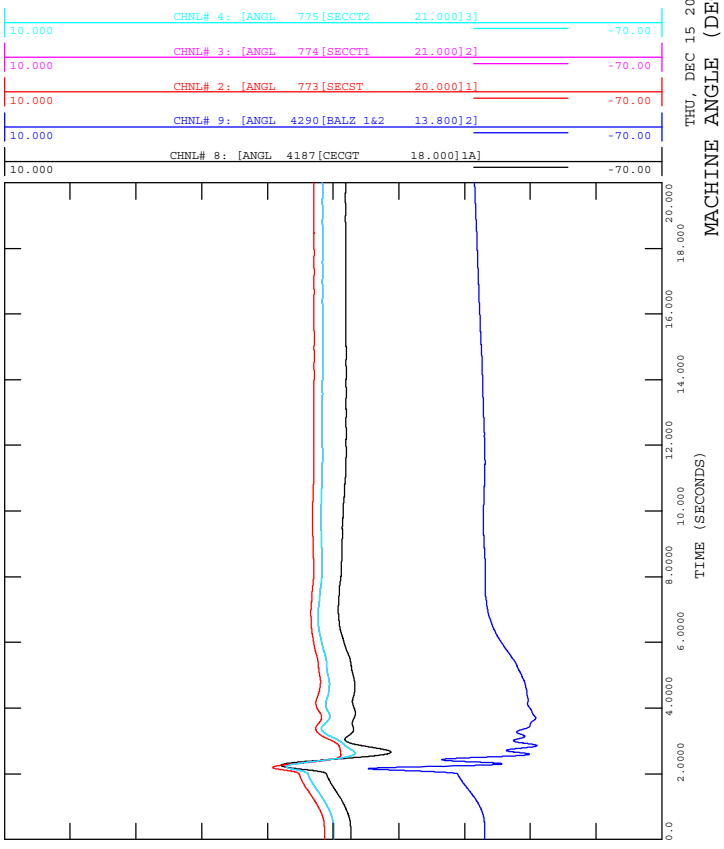
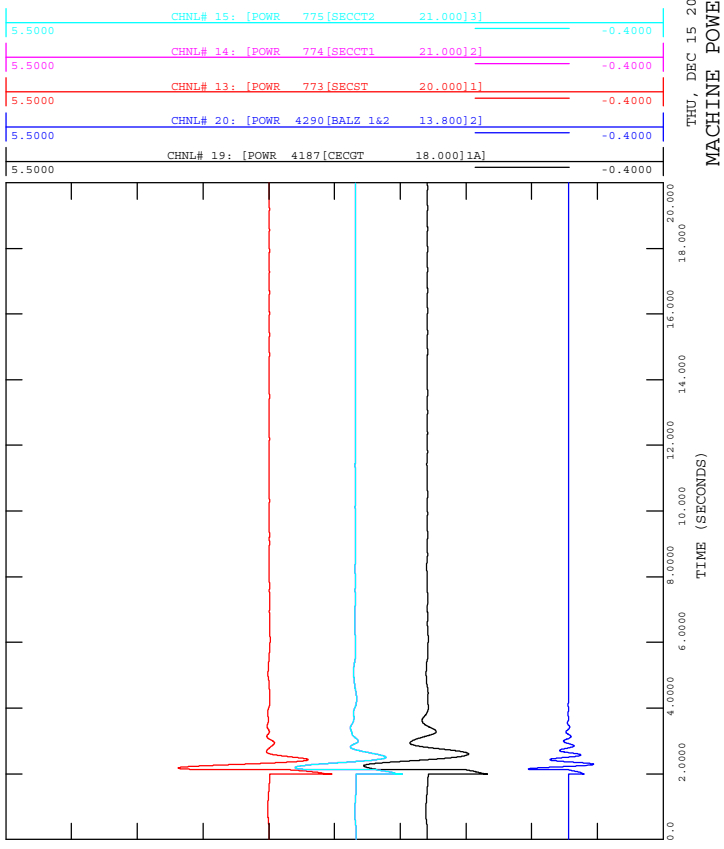


FIGURE D-12C
2018SP, POST-PROJECT
3 PHASE FAULT ON 70.80L AT SS-70
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-12_70.80L_NE_70S.out



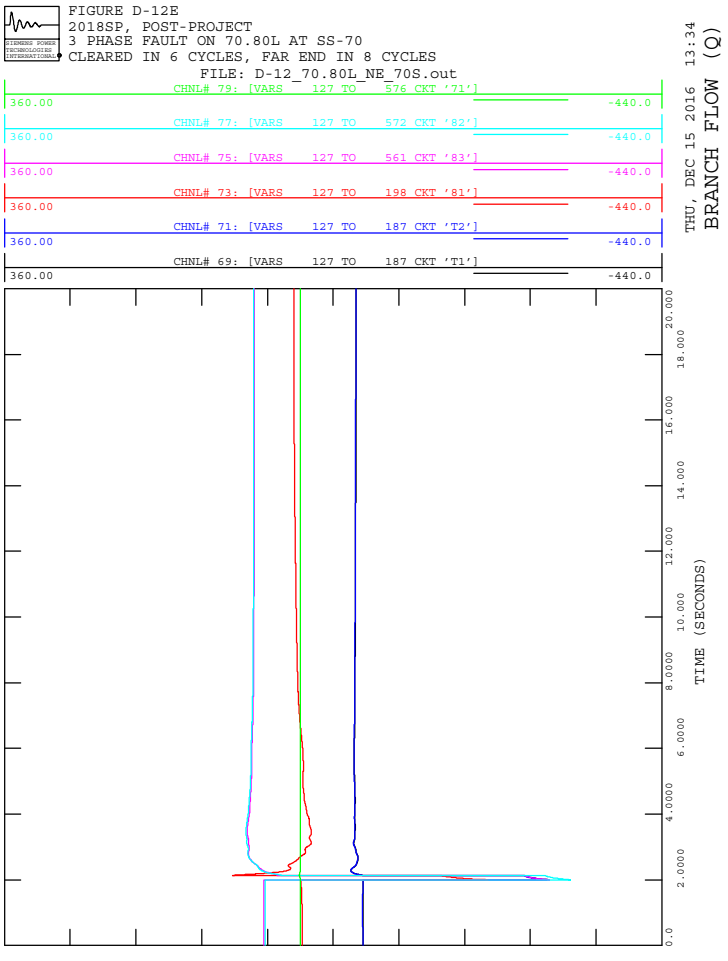
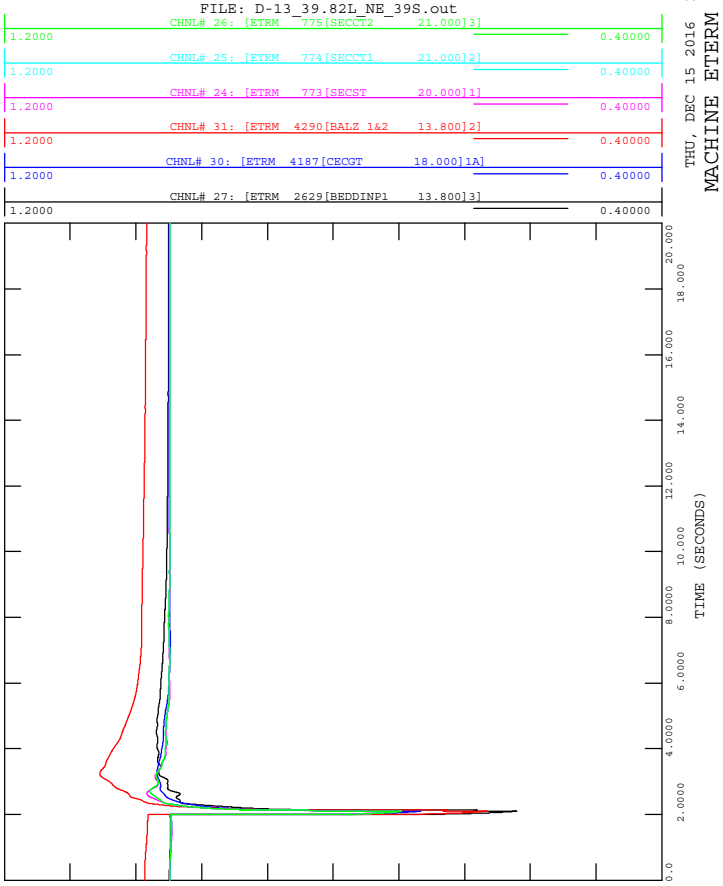


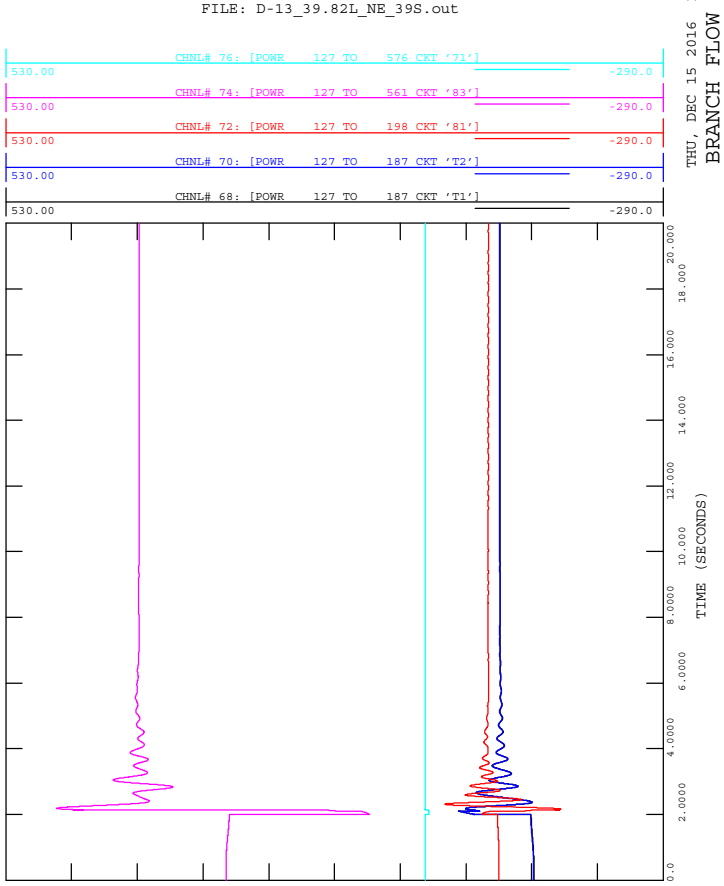
FIGURE D-12E
2018SP, POST-PROJECT
3 PHASE FAULT ON 70.80L AT SS-70
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-12_70.80L_NE_70S.out
CHNL# 79: [VARS 127 TO 576 CKT '71']
CHNL# 77: [VARS 127 TO 572 CKT '82']
CHNL# 75: [VARS 127 TO 561 CKT '83']
CHNL# 73: [VARS 127 TO 198 CKT '81']
CHNL# 71: [VARS 127 TO 187 CKT 'T2']
CHNL# 69: [VARS 127 TO 187 CKT 'T1']
360.00
-440.0
THU, DEC 15 2016 13:34
BRANCH FLOW (Q)
TIME (SECONDS)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000

FIGURE D-13B
2018SP, POST-PROJECT
3 PHASE FAULT ON 39.82L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-13_39.82L_NE_39S.out



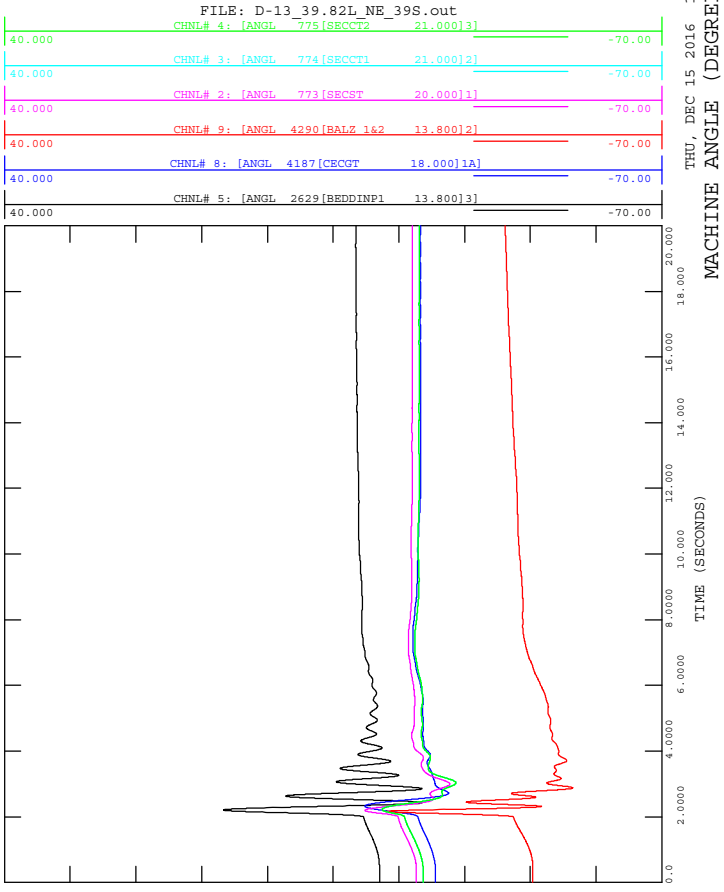
THU, DEC 15 2016 13:34
MACHINE ETERM (V)

FIGURE D-13D
2018SP, POST-PROJECT
3 PHASE FAULT ON 39.82L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-13_39.82L_NE_39S.out



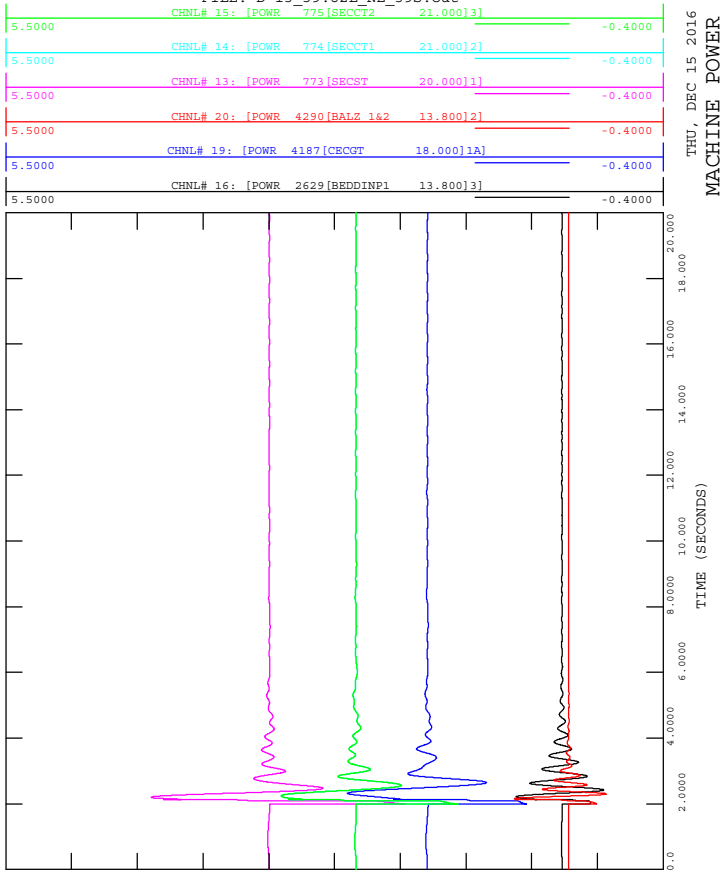
THU, DEC 15 2016 13:34
BRANCH FLOW (P)

FIGURE D-13A
2018SP, POST-PROJECT
3 PHASE FAULT ON 39.82L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-13_39.82L_NE_39S.out



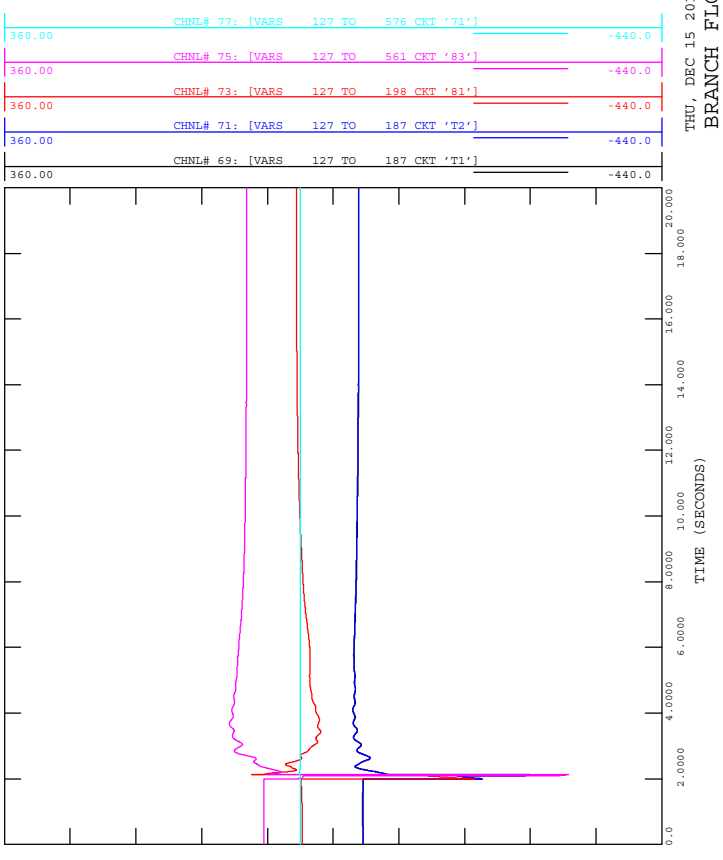
THU, DEC 15 2016 13:34
MACHINE ANGLE (DEGREES)

FIGURE D-13C
2018SP, POST-PROJECT
3 PHASE FAULT ON 39.82L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-13_39.82L_NE_39S.out



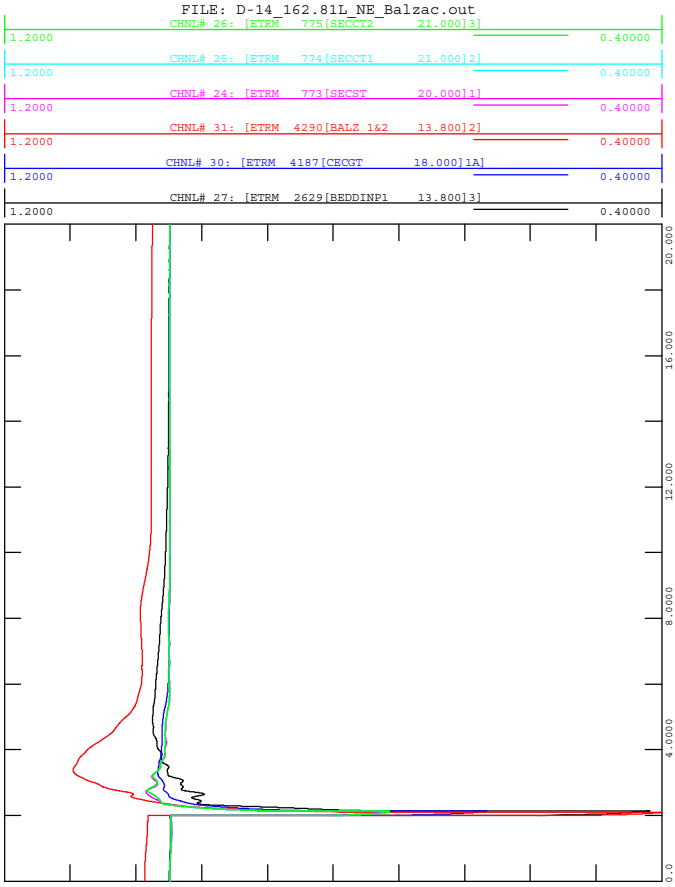
THU, DEC 15 2016 13:34
MACHINE POWER (MW)

FIGURE D-13E
2018SP, POST-PROJECT
3 PHASE FAULT ON 39.82L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-13_39.82L_NE_39S.out



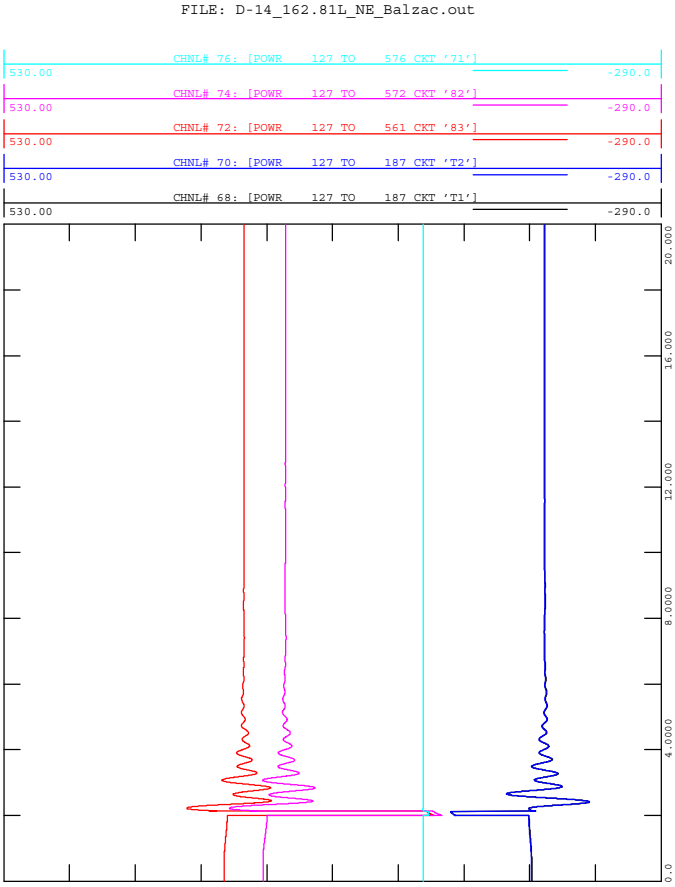
THU, DEC 15 2016 13:34
BRANCH FLOW (Q)

FIGURE D-14B
2018SP, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BALZAC
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-14_162.81L_NE_Balzac.out



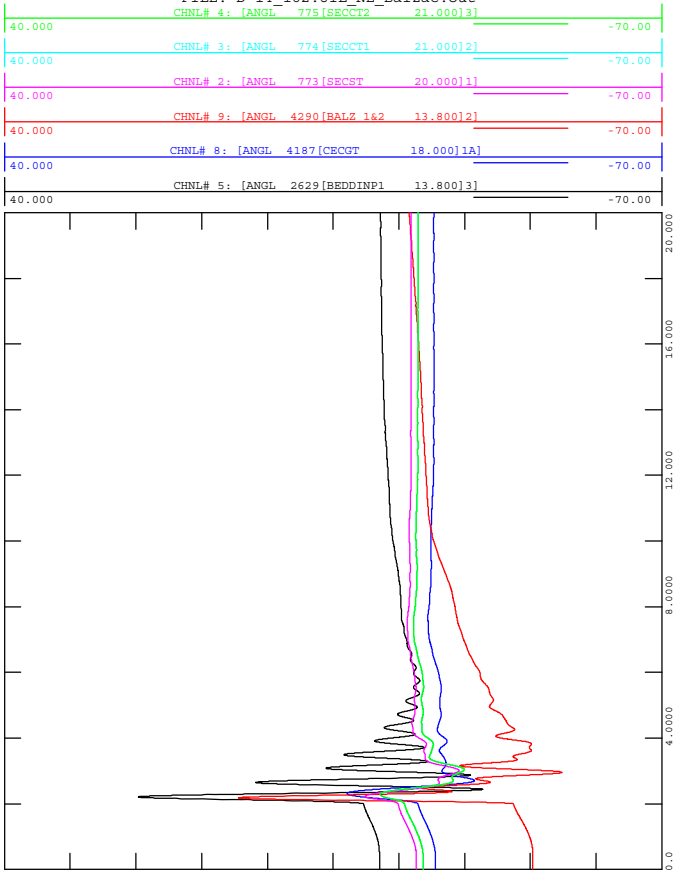
THU, DEC 15 2016 13:34
MACHINE ETERM (V)

FIGURE D-14D
2018SP, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BALZAC
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-14_162.81L_NE_Balzac.out



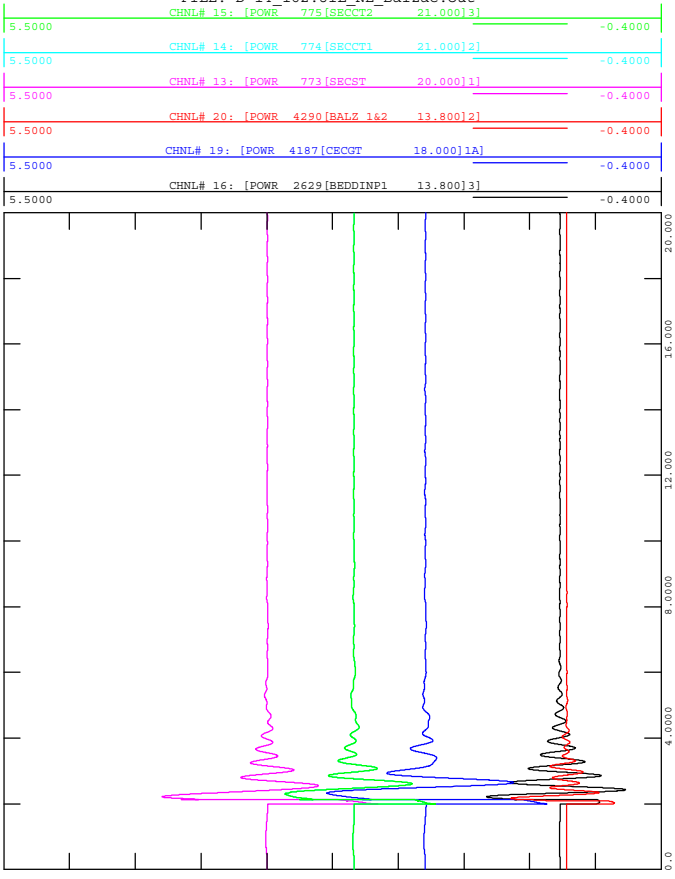
THU, DEC 15 2016 13:34
BRANCH FLOW (P)

FIGURE D-14A
2018SP, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BALZAC
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-14_162.81L_NE_Balzac.out



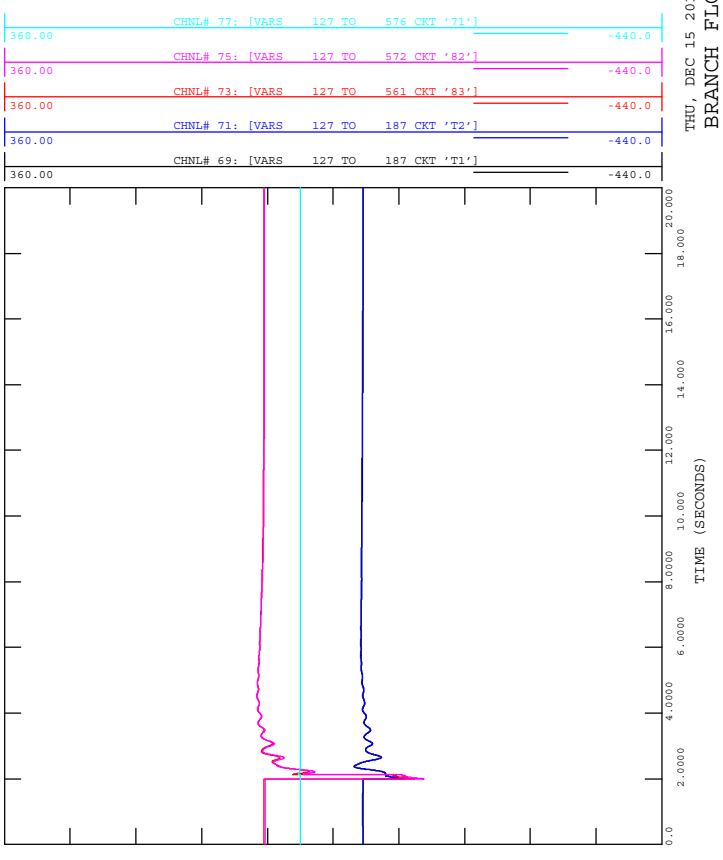
THU, DEC 15 2016 13:34
MACHINE ANGLE (DEGREES)

FIGURE D-14C
2018SP, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BALZAC
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-14_162.81L_NE_Balzac.out



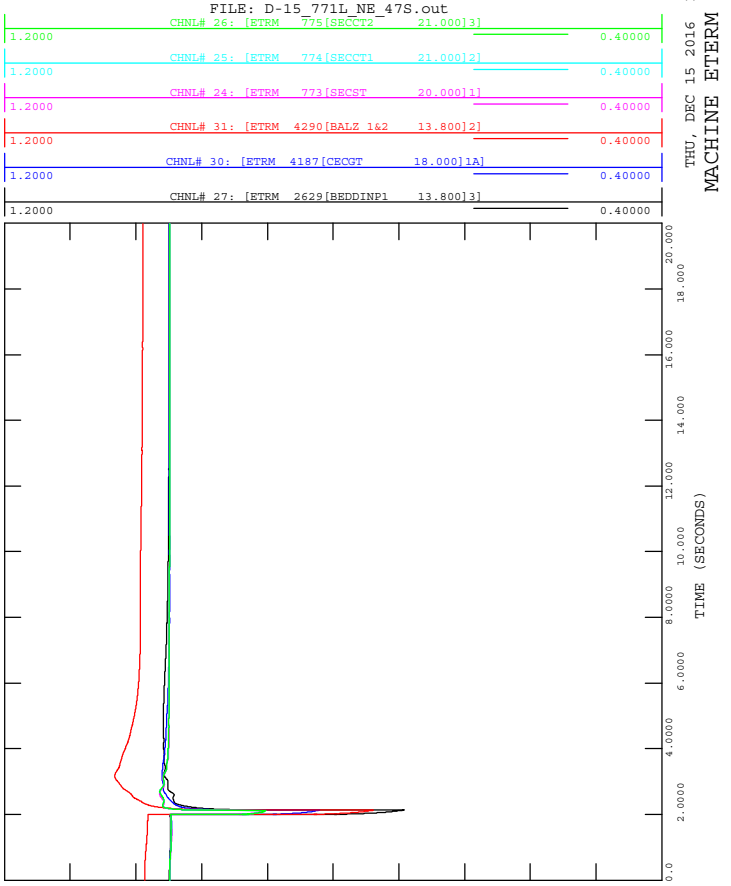
THU, DEC 15 2016 13:34
MACHINE POWER (MW)

FIGURE D-14E
2018SP, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BALZAC
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-14_162.81L_NE_Balzac.out



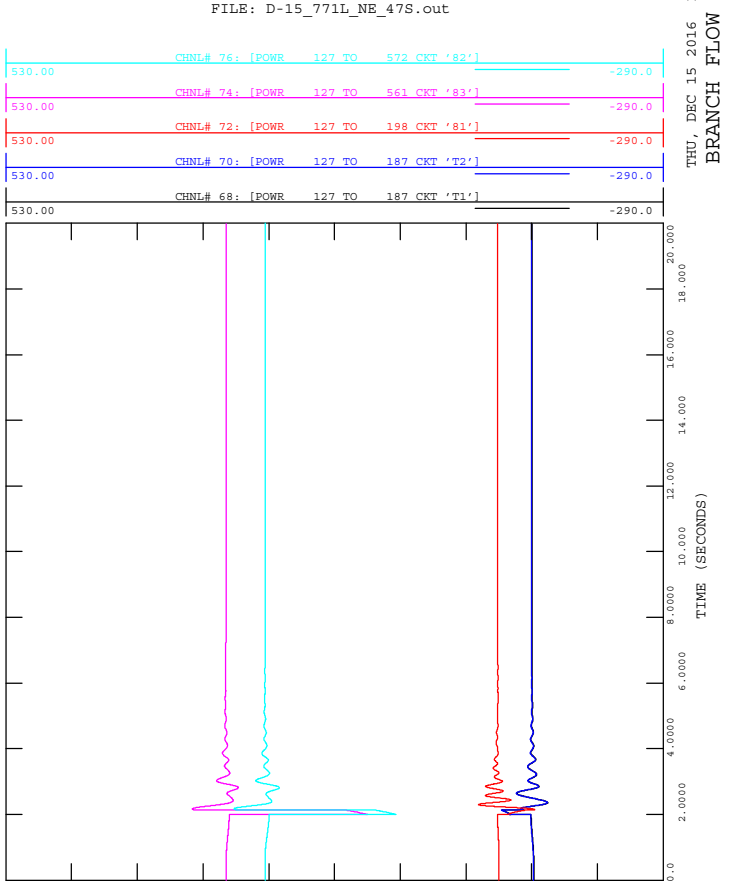
THU, DEC 15 2016 13:34
BRANCH FLOW (Q)

FIGURE D-15B
2018SP, POST-PROJECT
3 PHASE FAULT ON 771L AT SS-47
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-15_771L_NE_47S.out



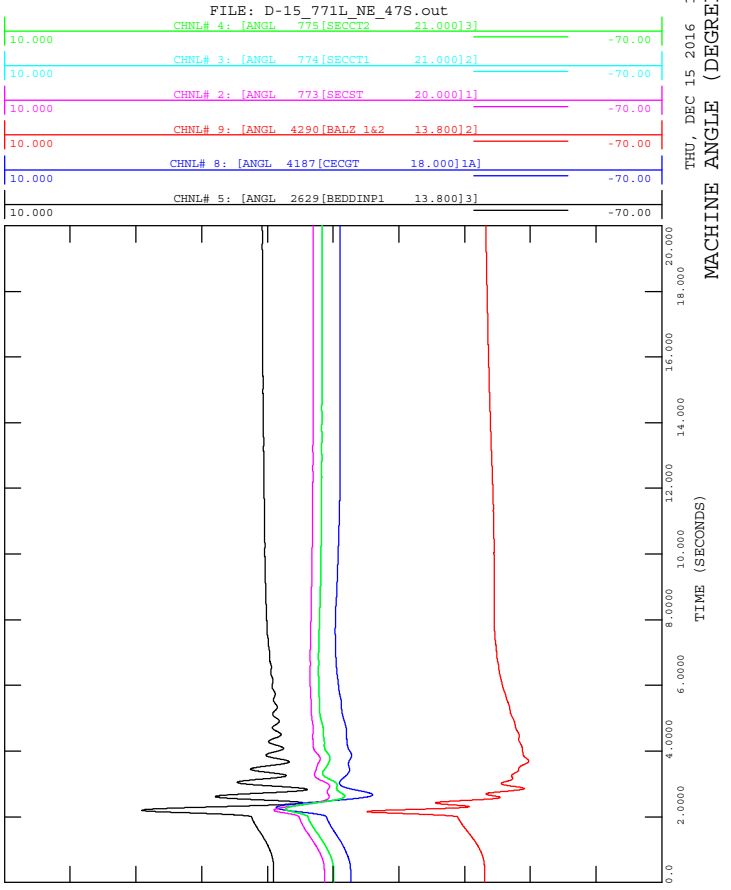
THU, DEC 15 2016 13:34
MACHINE ETERM (V)

FIGURE D-15D
2018SP, POST-PROJECT
3 PHASE FAULT ON 771L AT SS-47
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-15_771L_NE_47S.out



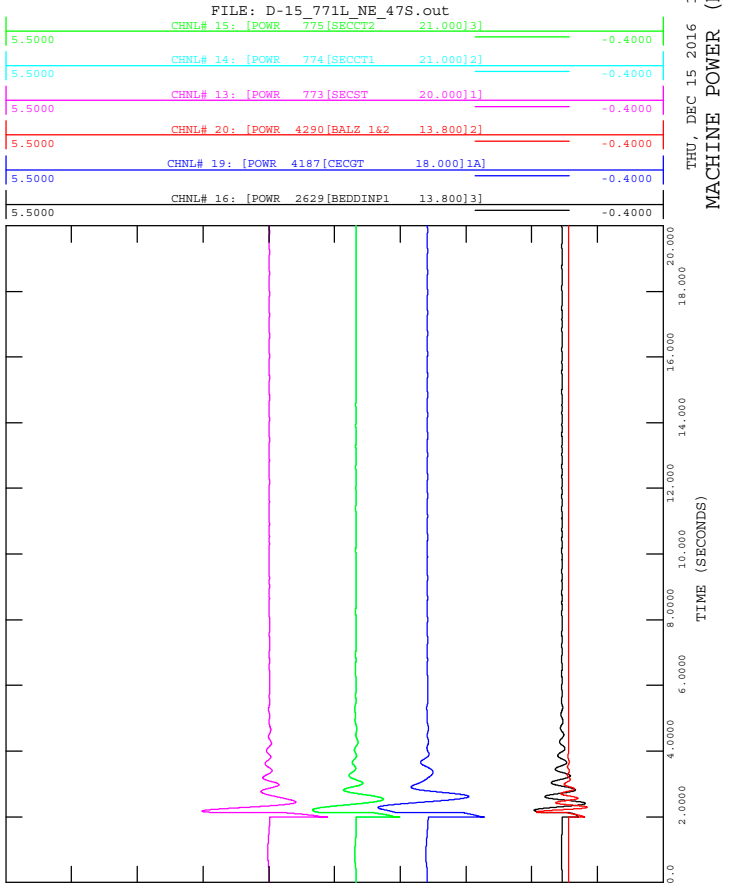
THU, DEC 15 2016 13:34
BRANCH FLOW (P)

FIGURE D-15A
2018SP, POST-PROJECT
3 PHASE FAULT ON 771L AT SS-47
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-15_771L_NE_47S.out



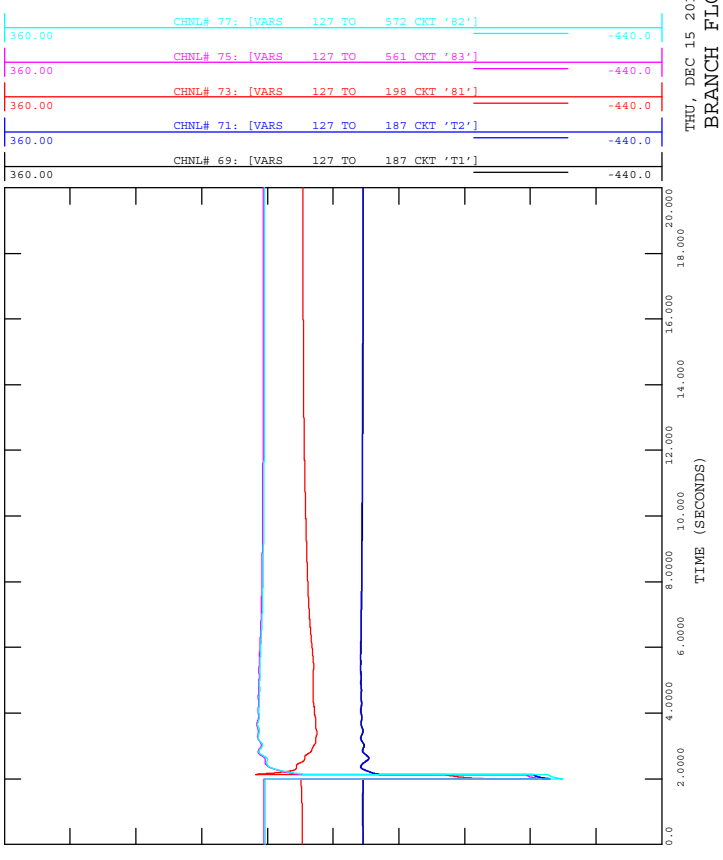
THU, DEC 15 2016 13:34
MACHINE ANGLE (DEGREES)

FIGURE D-15C
2018SP, POST-PROJECT
3 PHASE FAULT ON 771L AT SS-47
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-15_771L_NE_47S.out



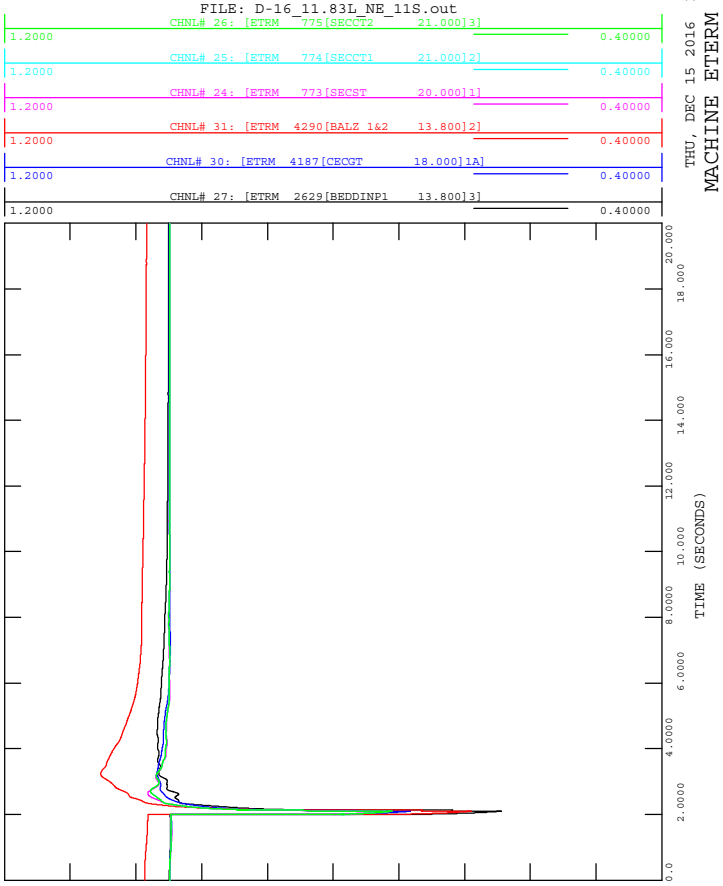
THU, DEC 15 2016 13:34
MACHINE POWER (MW)

FIGURE D-15E
2018SP, POST-PROJECT
3 PHASE FAULT ON 771L AT SS-47
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-15_771L_NE_47S.out



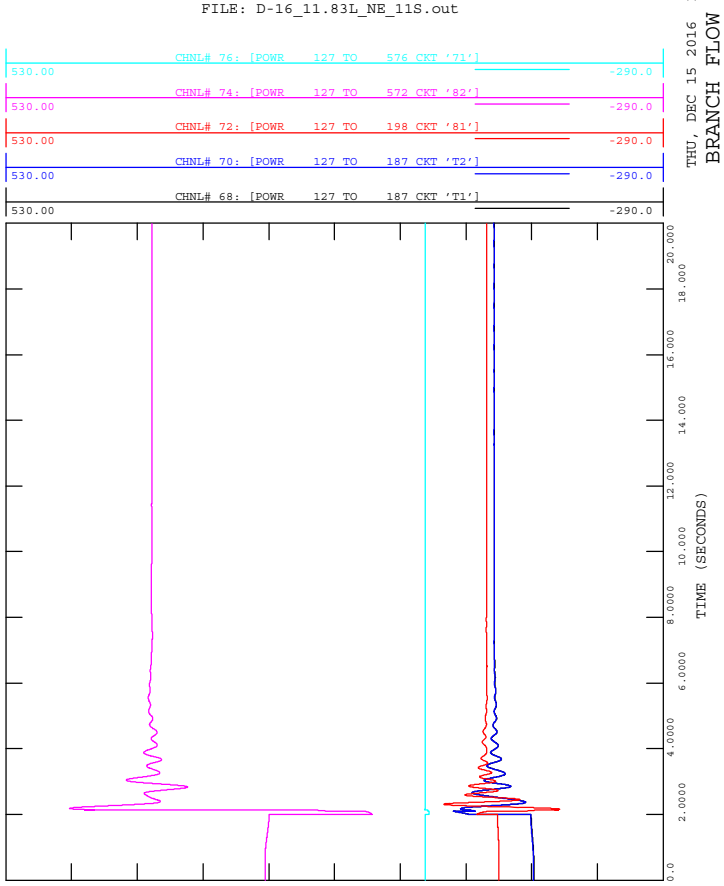
THU, DEC 15 2016 13:34
BRANCH FLOW (Q)

FIGURE D-16B
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.83L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-16_11.83L_NE_11S.out



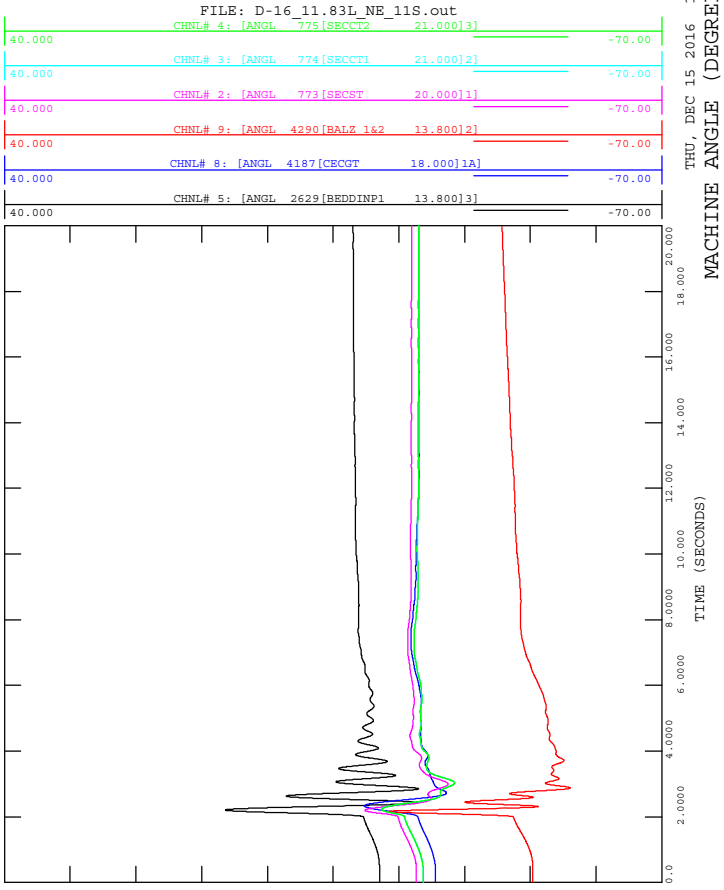
THU, DEC 15 2016 13:34
MACHINE ETERM (V)

FIGURE D-16D
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.83L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-16_11.83L_NE_11S.out



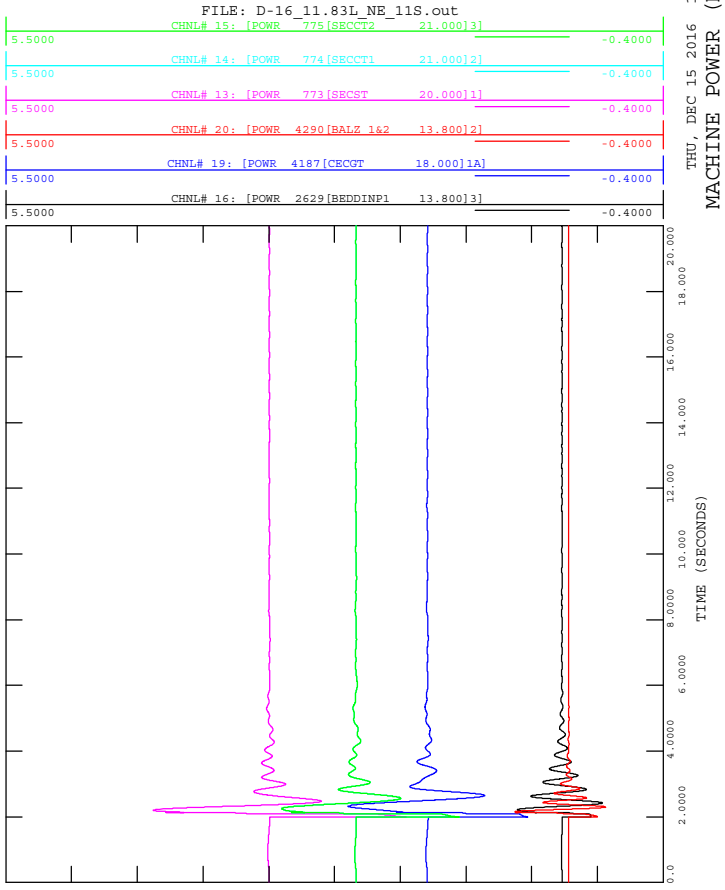
THU, DEC 15 2016 13:34
BRANCH FLOW (P)

FIGURE D-16A
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.83L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-16_11.83L_NE_11S.out



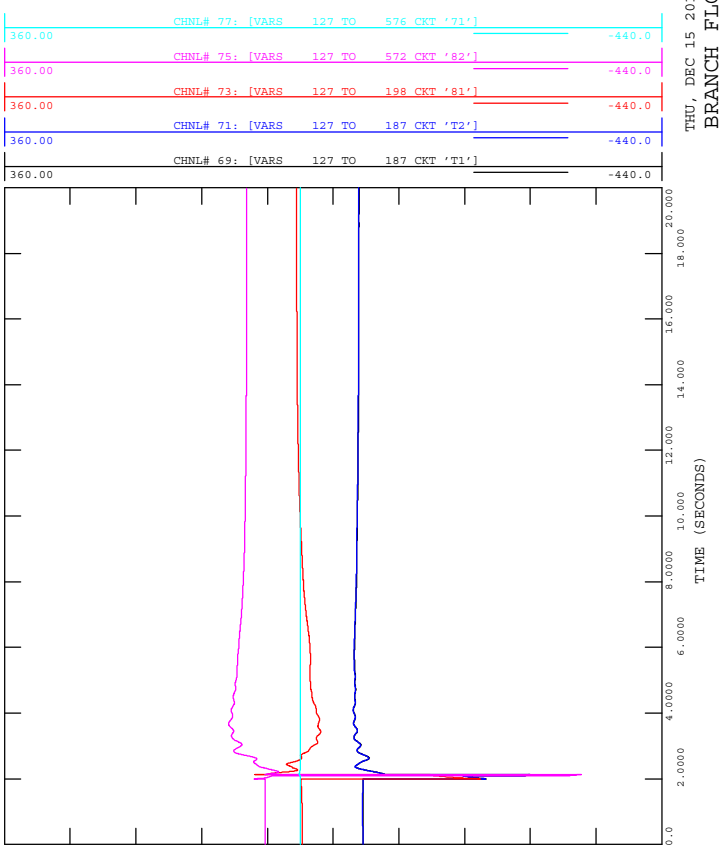
THU, DEC 15 2016 13:34
MACHINE ANGLE (DEGREES)

FIGURE D-16C
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.83L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-16_11.83L_NE_11S.out



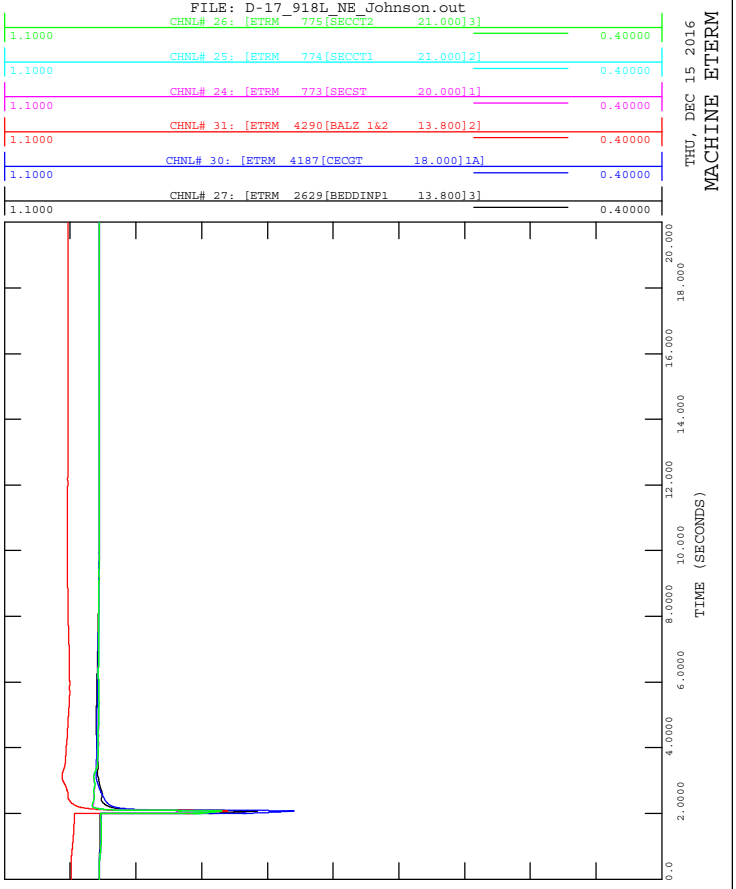
THU, DEC 15 2016 13:34
MACHINE POWER (MW)

FIGURE D-16E
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.83L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-16_11.83L_NE_11S.out



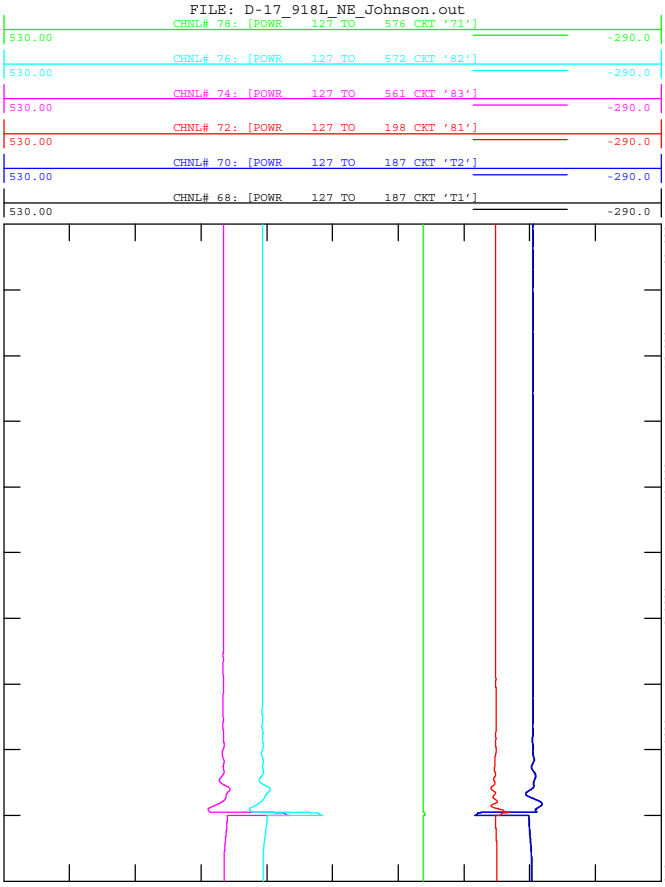
THU, DEC 15 2016 13:34
BRANCH FLOW (Q)

FIGURE D-17B
2018SP, POST-PROJECT
3 PHASE FAULT ON 918L AT JOHNSON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-17_918L_NE_Johnson.out



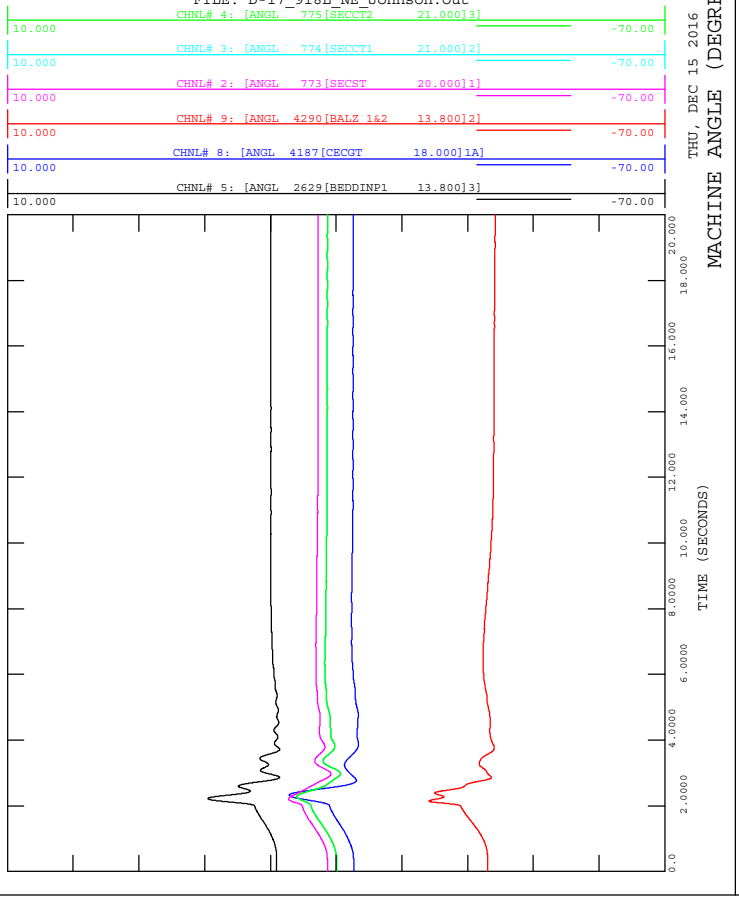
THU, DEC 15 2016 13:34
MACHINE ETERM (V)

FIGURE D-17D
2018SP, POST-PROJECT
3 PHASE FAULT ON 918L AT JOHNSON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-17_918L_NE_Johnson.out



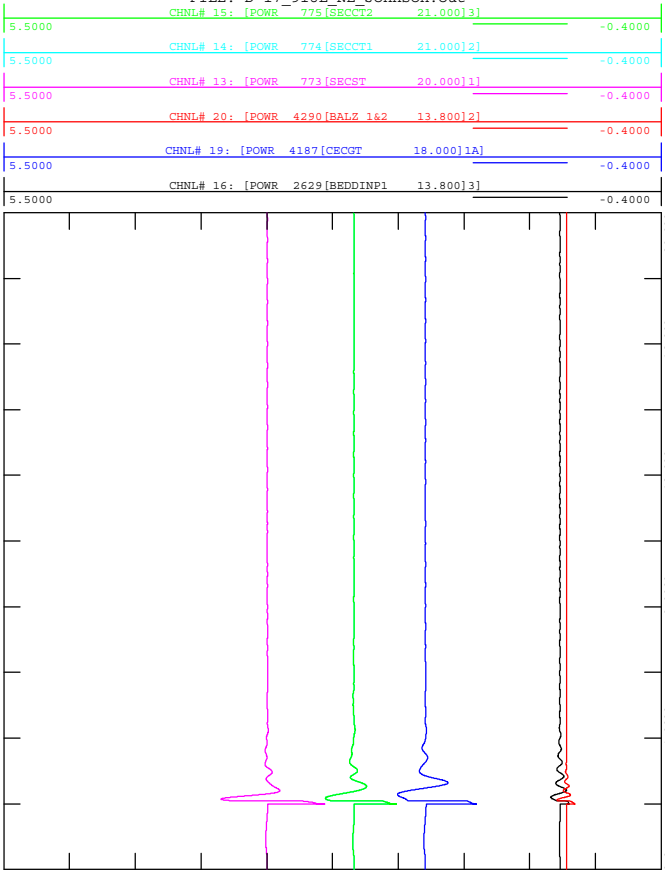
THU, DEC 15 2016 13:34
BRANCH FLOW (P)

FIGURE D-17A
2018SP, POST-PROJECT
3 PHASE FAULT ON 918L AT JOHNSON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-17_918L_NE_Johnson.out



THU, DEC 15 2016 13:34
MACHINE ANGLE (DEGREES)

FIGURE D-17C
2018SP, POST-PROJECT
3 PHASE FAULT ON 918L AT JOHNSON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-17_918L_NE_Johnson.out



THU, DEC 15 2016 13:34
MACHINE POWER (MW)

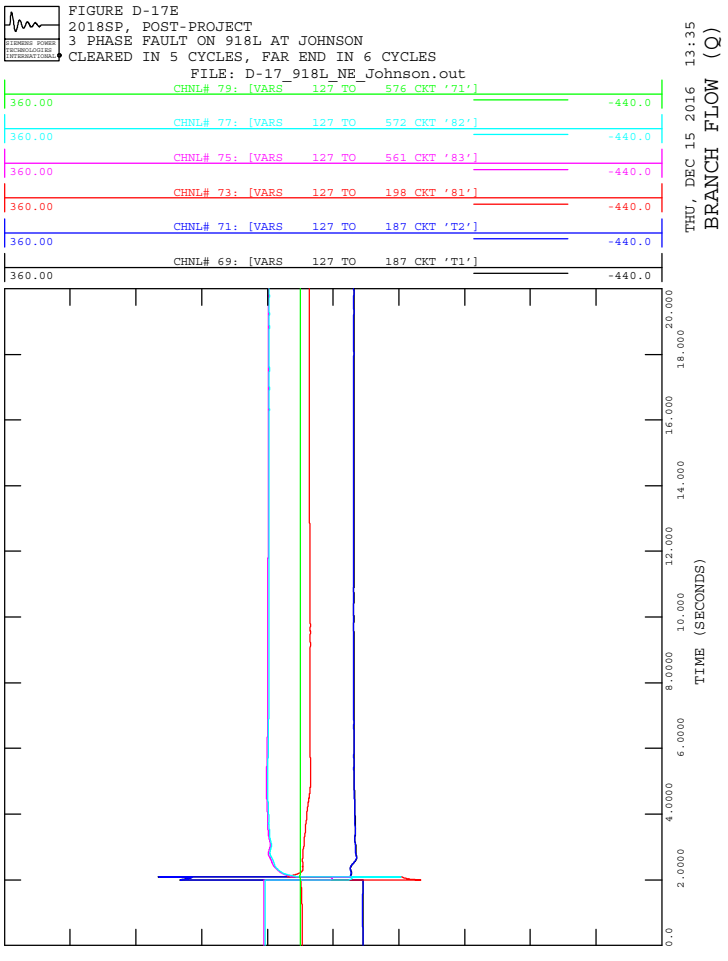
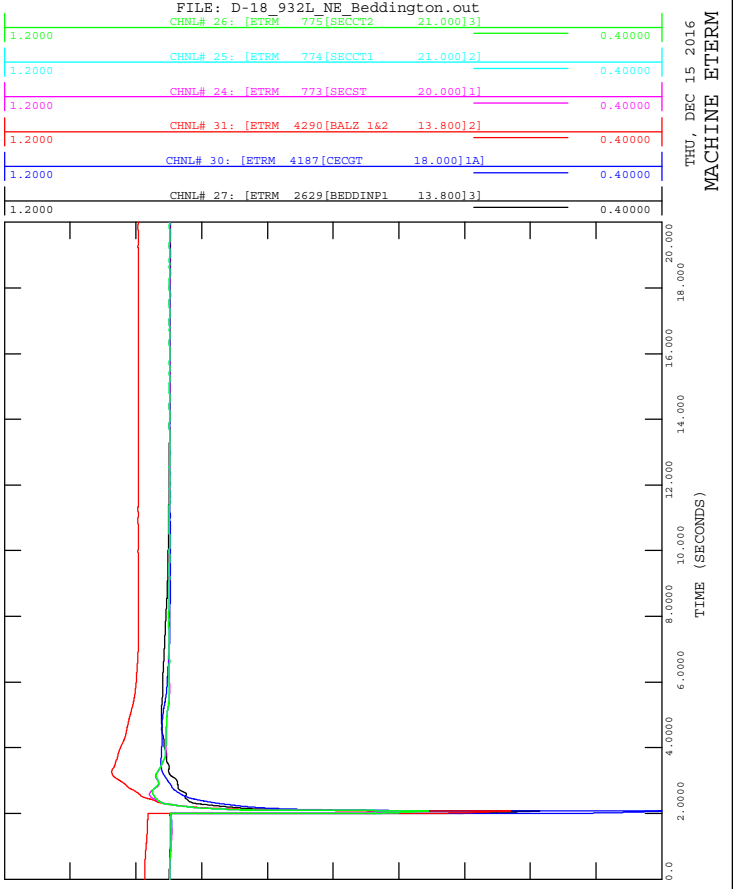


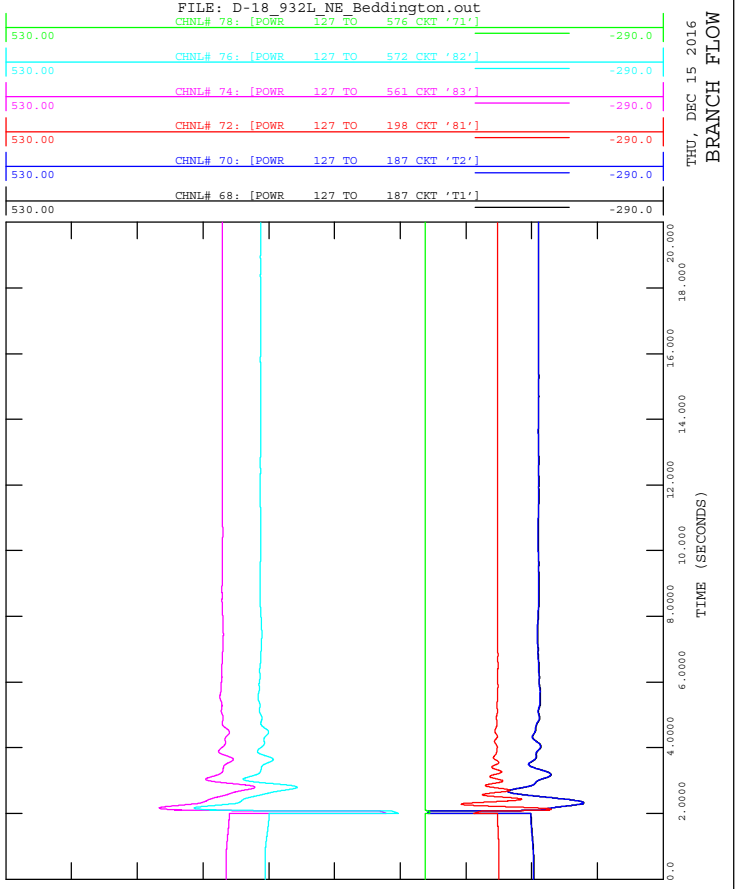
FIGURE D-17E
2018SP, POST-PROJECT
3 PHASE FAULT ON 918L AT JOHNSON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-17_918L_NE_Johnson.out
CHNL# 79: [VARS 127 TO 576 CKT '71']
CHNL# 77: [VARS 127 TO 572 CKT '82']
CHNL# 75: [VARS 127 TO 561 CKT '83']
CHNL# 73: [VARS 127 TO 198 CKT '81']
CHNL# 71: [VARS 127 TO 187 CKT 'T2']
CHNL# 69: [VARS 127 TO 187 CKT 'T1']
360.00
-440.0
THU, DEC 15 2016 13:35
BRANCH FLOW (Q)
TIME (SECONDS)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000

FIGURE D-18B
2018SP, POST-PROJECT
3 PHASE FAULT ON 932L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-18_932L_NE_Beddington.out



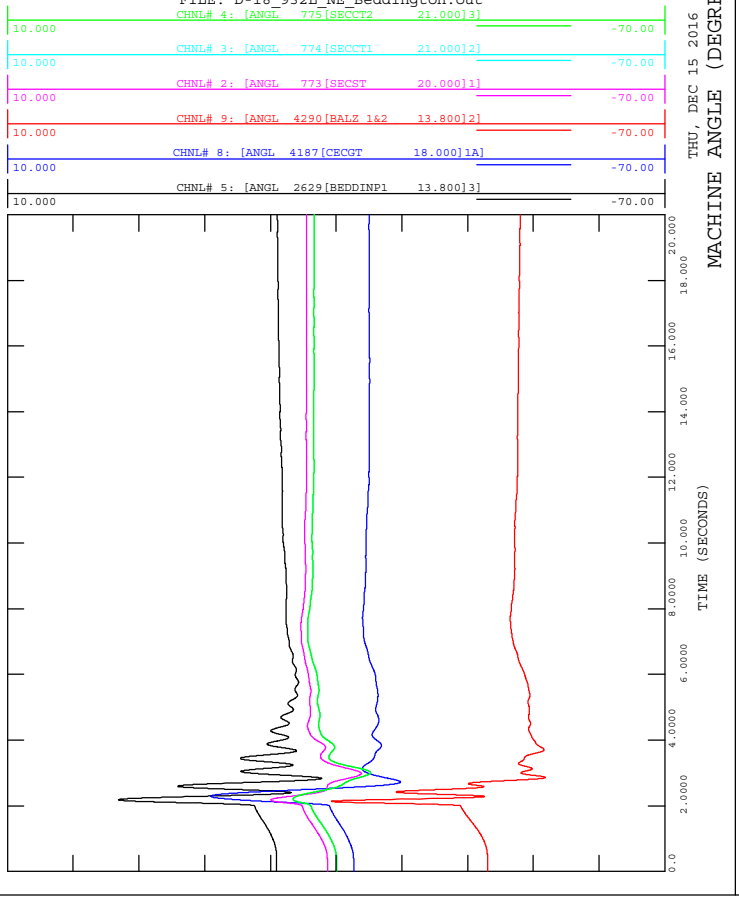
THU, DEC 15 2016 13:35
MACHINE ETERM (V)

FIGURE D-18D
2018SP, POST-PROJECT
3 PHASE FAULT ON 932L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-18_932L_NE_Beddington.out



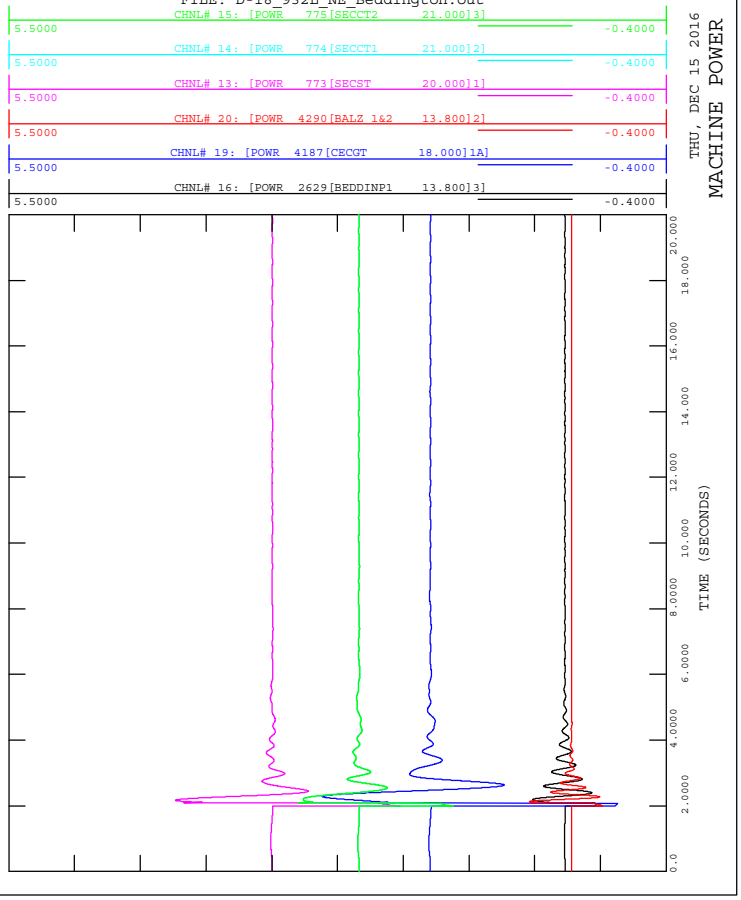
THU, DEC 15 2016 13:35
BRANCH FLOW (P)

FIGURE D-18A
2018SP, POST-PROJECT
3 PHASE FAULT ON 932L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-18_932L_NE_Beddington.out



THU, DEC 15 2016 13:35
MACHINE ANGLE (DEGREES)

FIGURE D-18C
2018SP, POST-PROJECT
3 PHASE FAULT ON 932L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-18_932L_NE_Beddington.out



THU, DEC 15 2016 13:35
MACHINE POWER (MW)

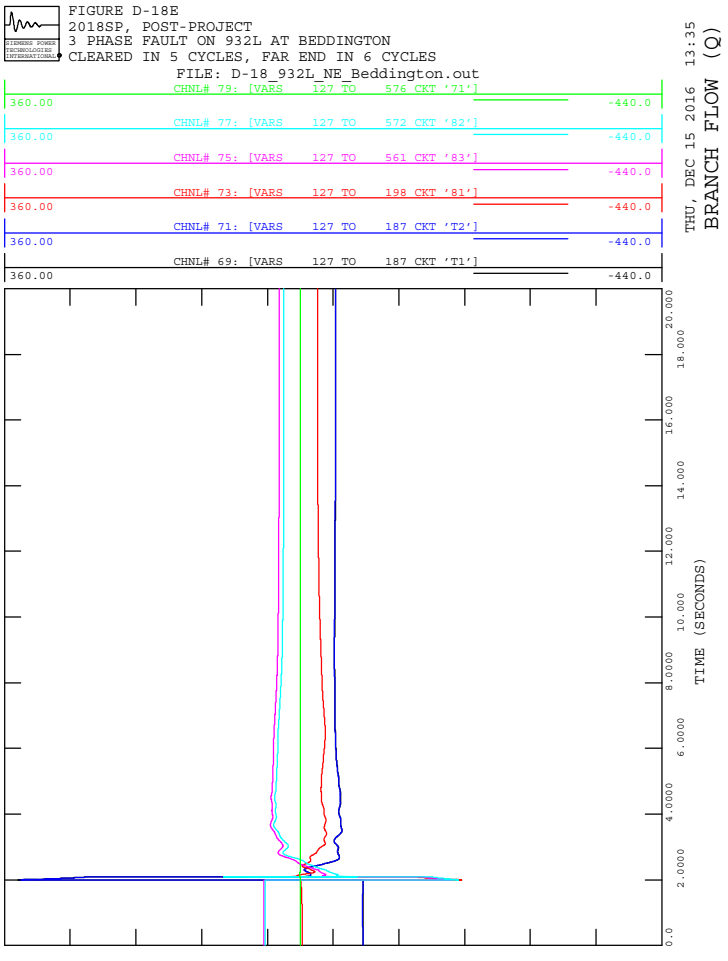


FIGURE D-18E
2018SP, POST-PROJECT
3 PHASE FAULT ON 932L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-18_932L_NE_Beddington.out
CHNL# 79: [VARS 127 TO 576 CKT '71']
360.00
-440.0
CHNL# 77: [VARS 127 TO 572 CKT '82']
360.00
-440.0
CHNL# 75: [VARS 127 TO 561 CKT '83']
360.00
-440.0
CHNL# 73: [VARS 127 TO 198 CKT '81']
360.00
-440.0
CHNL# 71: [VARS 127 TO 187 CKT 'T2']
360.00
-440.0
CHNL# 69: [VARS 127 TO 187 CKT 'T1']
360.00
-440.0
THU, DEC 15 2016 13:35
BRANCH FLOW (Q)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)

FIGURE D-19B
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-19_11.82L_NE_11S.out

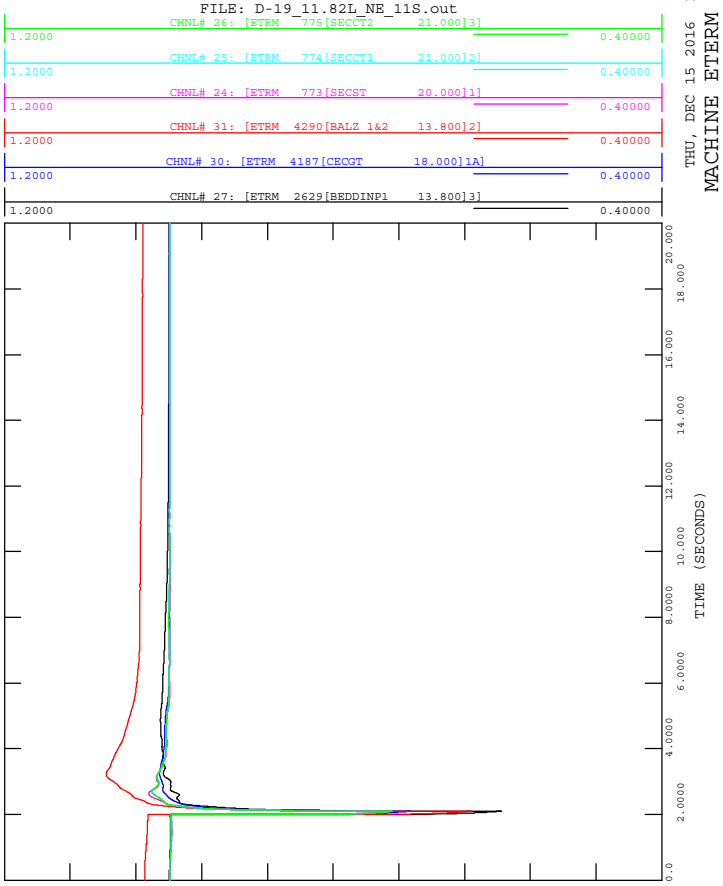


FIGURE D-19D
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-19_11.82L_NE_11S.out

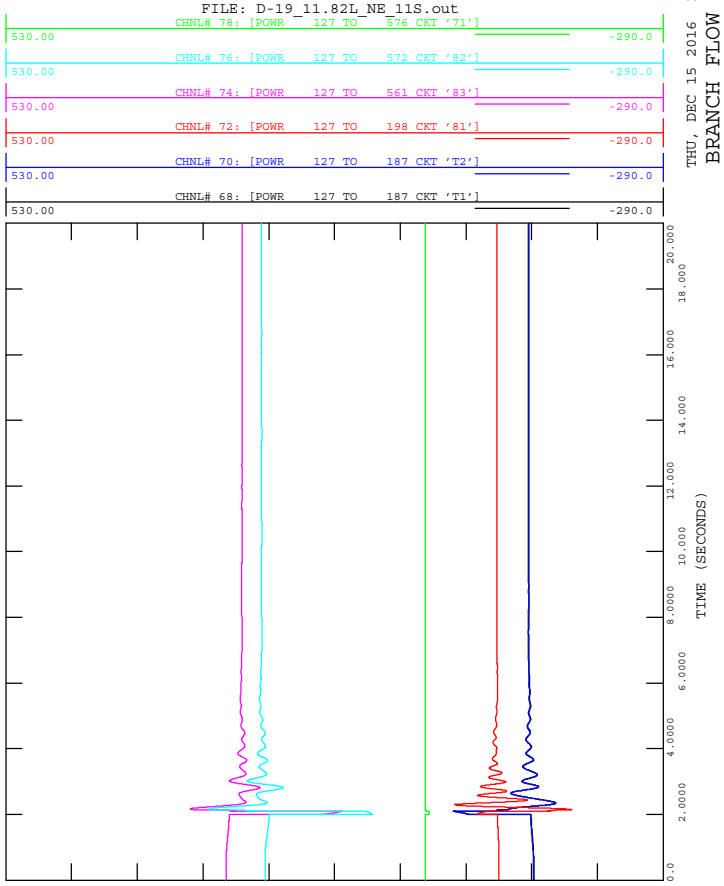


FIGURE D-19A
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-19_11.82L_NE_11S.out

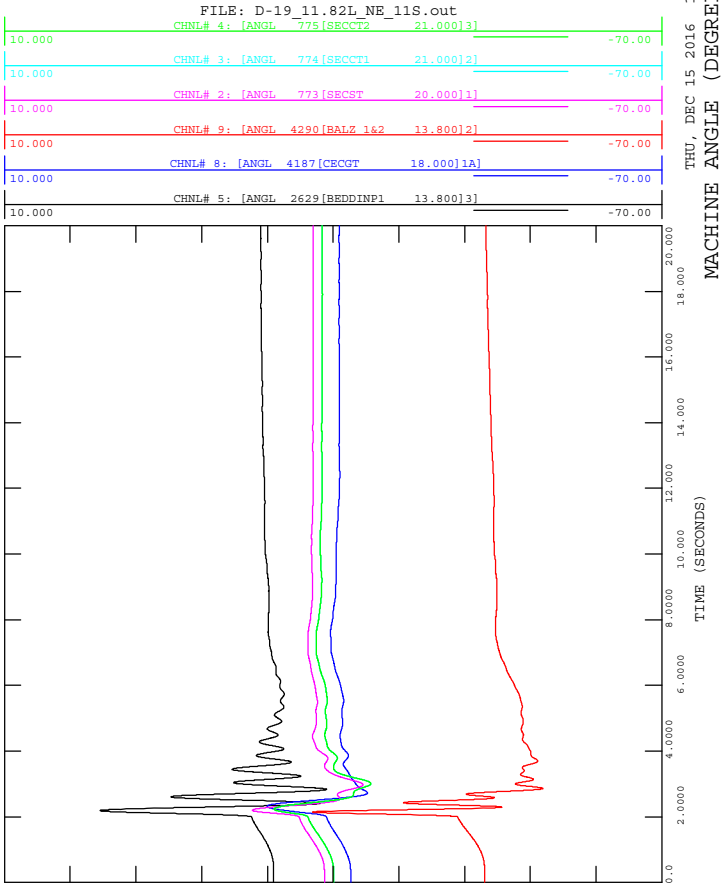
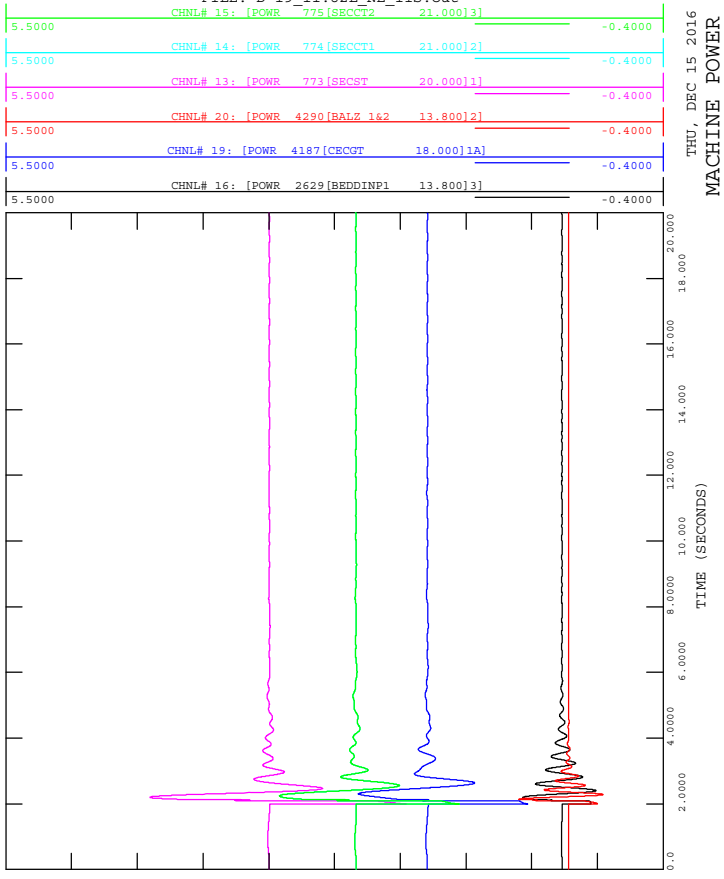


FIGURE D-19C
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-19_11.82L_NE_11S.out



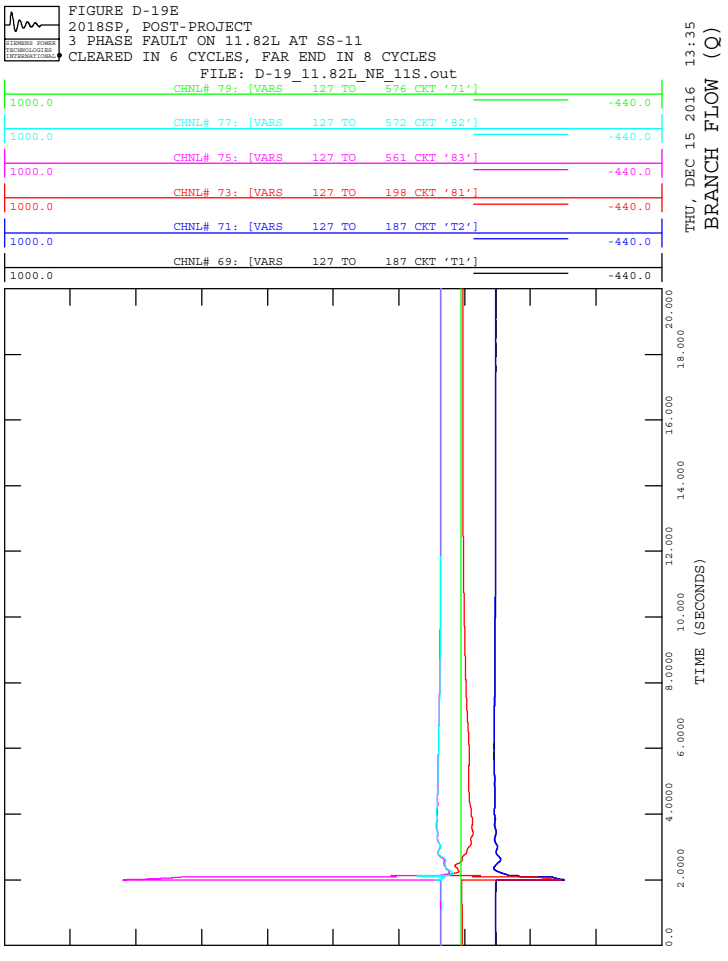
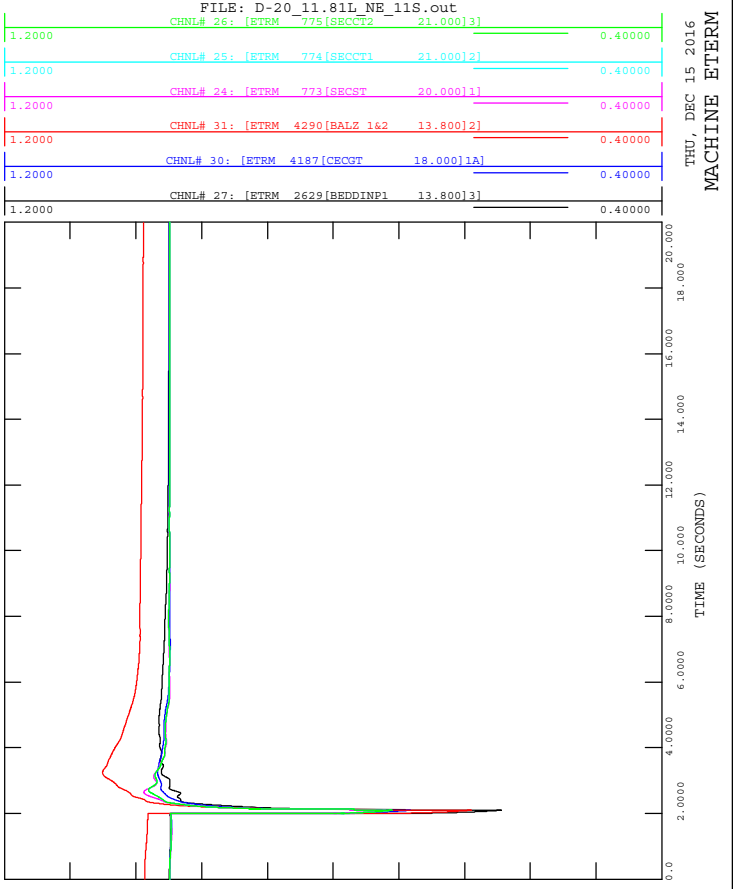


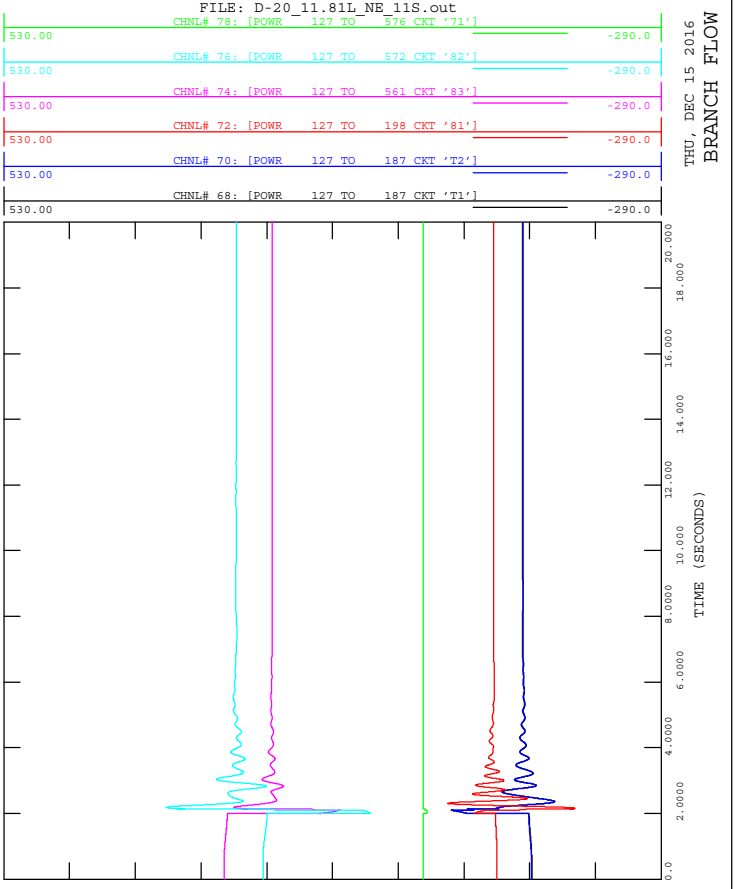
FIGURE D-19E
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-19_11.82L_NE_11S.out
CHNL# 79: [VARS 127 TO 576 CKT '71']
1000.0
-440.0
CHNL# 77: [VARS 127 TO 572 CKT '82']
1000.0
-440.0
CHNL# 75: [VARS 127 TO 561 CKT '83']
1000.0
-440.0
CHNL# 73: [VARS 127 TO 198 CKT '81']
1000.0
-440.0
CHNL# 71: [VARS 127 TO 187 CKT 'T2']
1000.0
-440.0
CHNL# 69: [VARS 127 TO 187 CKT 'T1']
1000.0
-440.0
THU, DEC 15 2016 13:35
BRANCH FLOW (Q)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)

FIGURE D-20B
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-20_11.81L_NE_11S.out



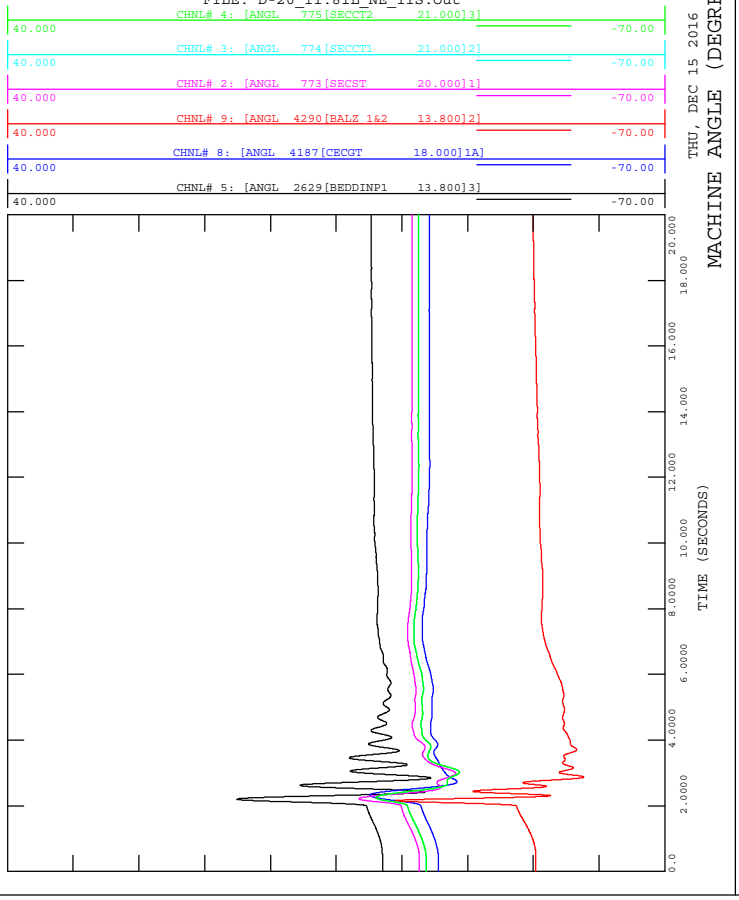
THU, DEC 15 2016 13:35
MACHINE ETERM (V)

FIGURE D-20D
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-20_11.81L_NE_11S.out



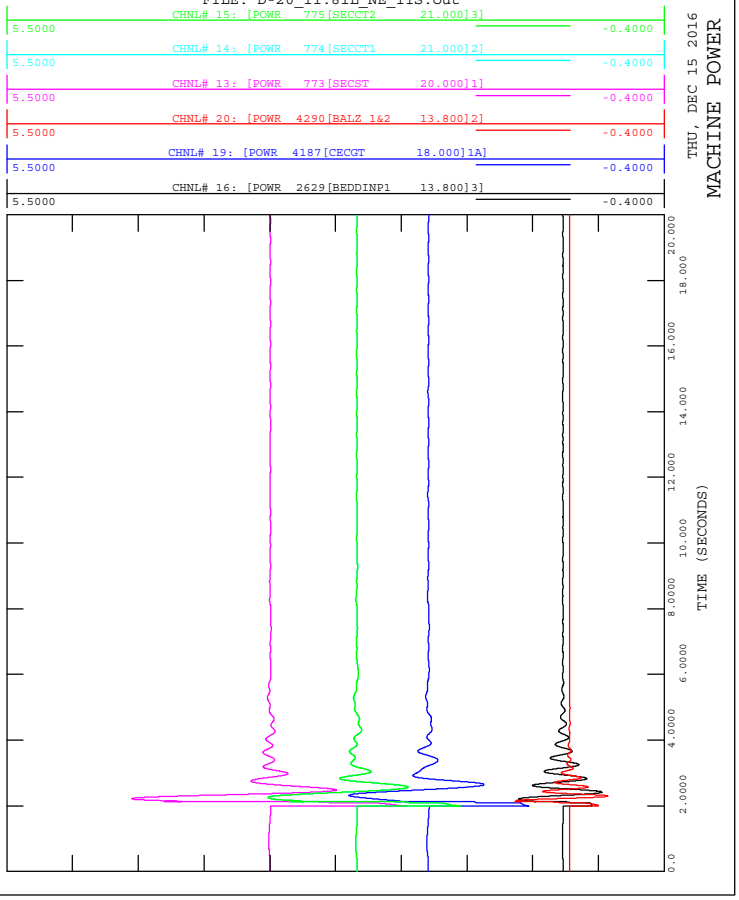
THU, DEC 15 2016 13:35
BRANCH FLOW (P)

FIGURE D-20A
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-20_11.81L_NE_11S.out



THU, DEC 15 2016 13:35
MACHINE ANGLE (DEGREES)

FIGURE D-20C
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-20_11.81L_NE_11S.out



THU, DEC 15 2016 13:35
MACHINE POWER (MW)

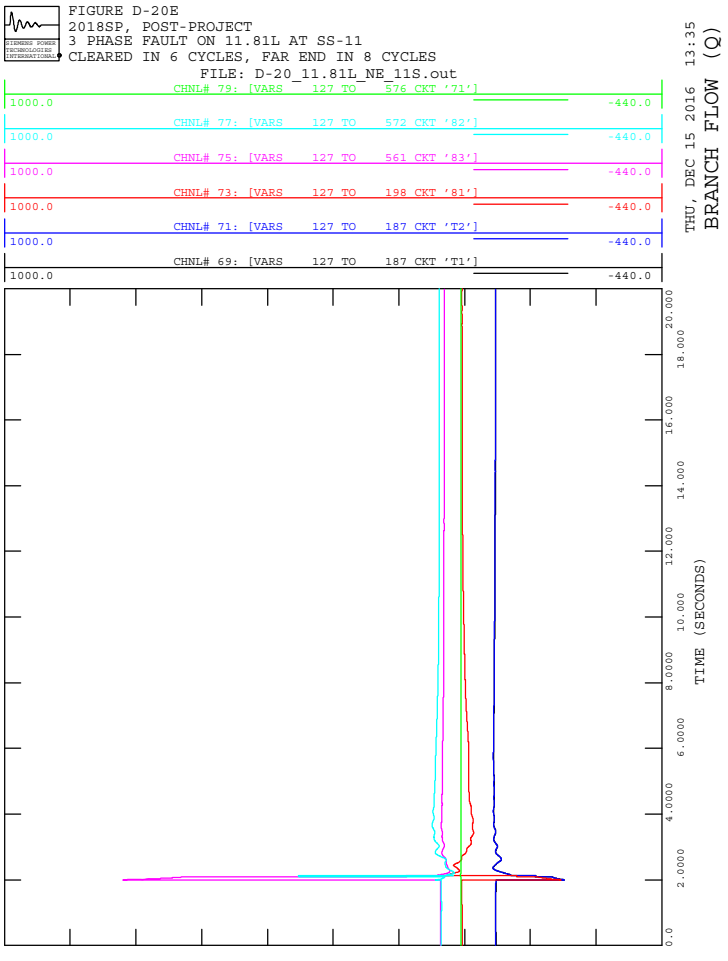
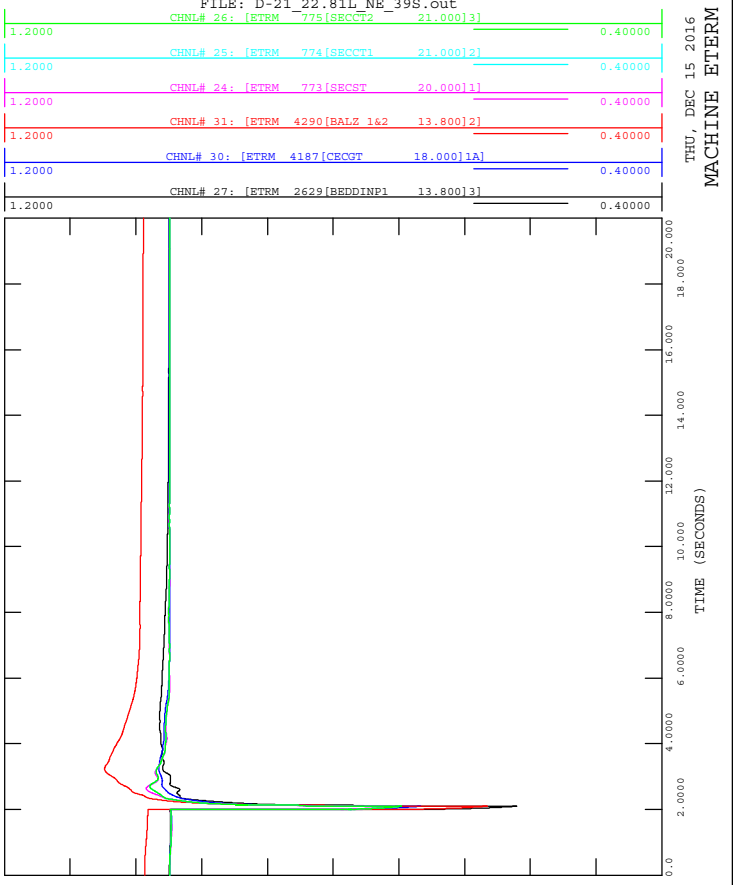


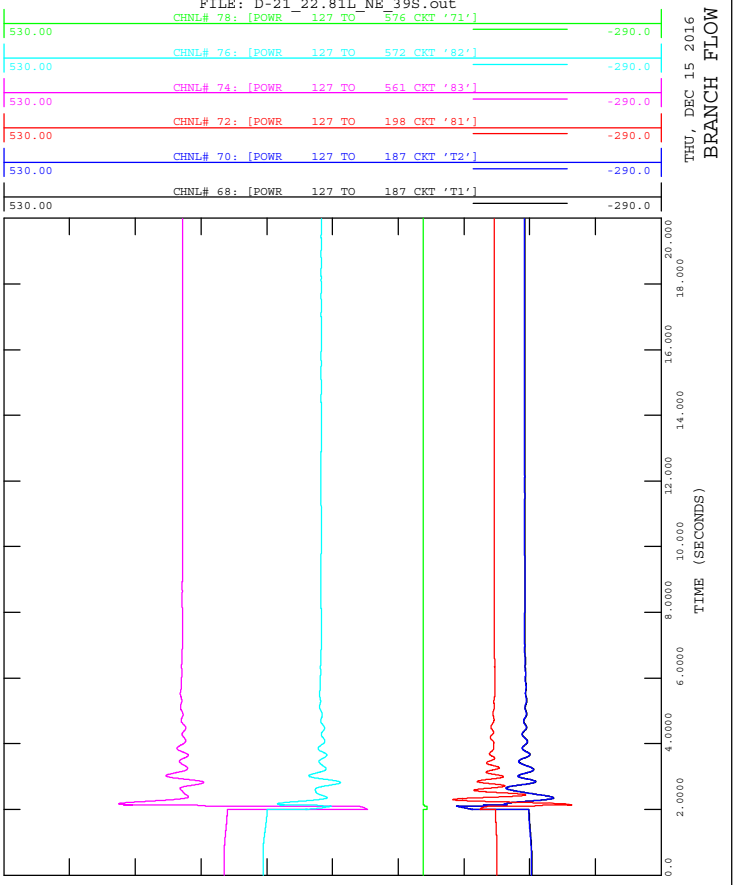
FIGURE D-20E
2018SP, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-20_11.81L_NE_11S.out
CHNL# 79: [VARS 127 TO 576 CKT '71']
1000.0
-440.0
CHNL# 77: [VARS 127 TO 572 CKT '82']
1000.0
-440.0
CHNL# 75: [VARS 127 TO 561 CKT '83']
1000.0
-440.0
CHNL# 73: [VARS 127 TO 198 CKT '81']
1000.0
-440.0
CHNL# 71: [VARS 127 TO 187 CKT 'T2']
1000.0
-440.0
CHNL# 69: [VARS 127 TO 187 CKT 'T1']
1000.0
-440.0
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)
THU, DEC 15 2016 13:35
BRANCH FLOW (Q)

FIGURE D-21B
2018SP, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-21_22.81L_NE_39S.out



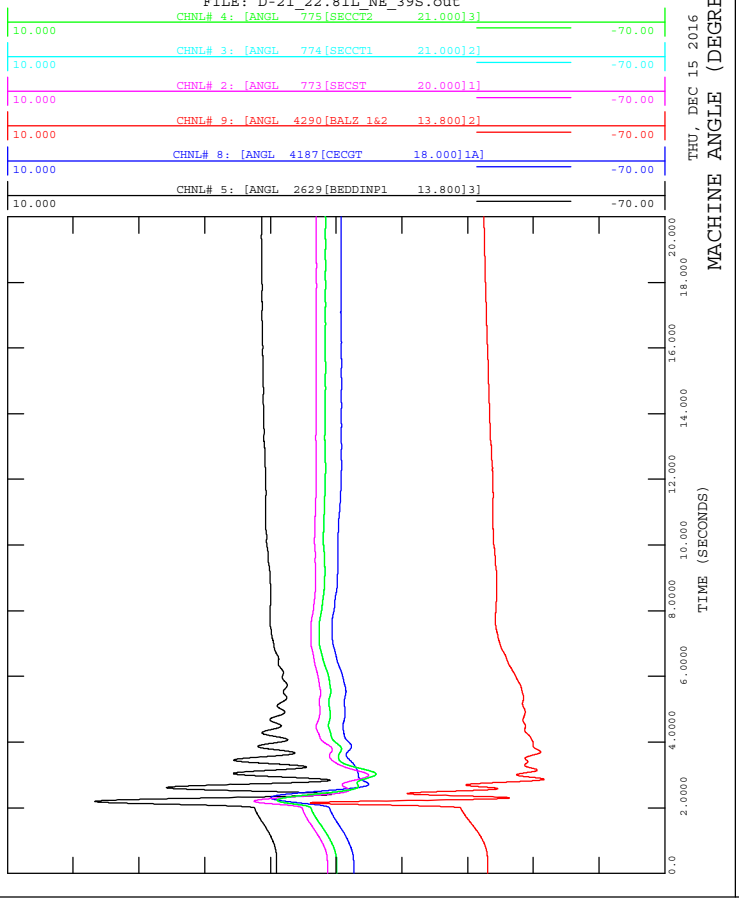
THU, DEC 15 2016 13:35
MACHINE ETERM (V)

FIGURE D-21D
2018SP, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-21_22.81L_NE_39S.out



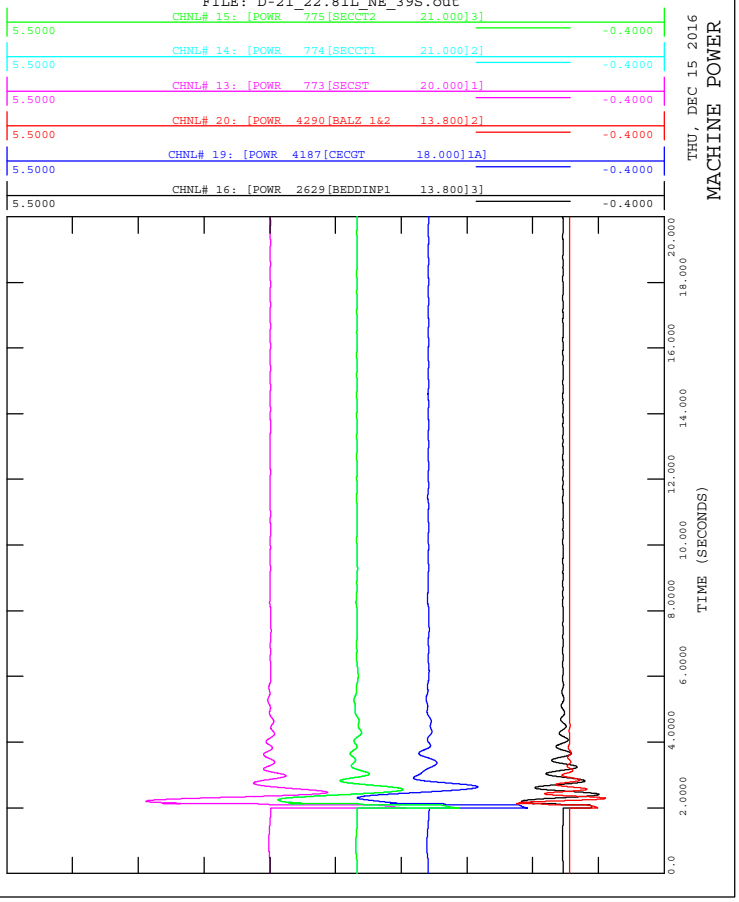
THU, DEC 15 2016 13:35
BRANCH FLOW (P)

FIGURE D-21A
2018SP, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-21_22.81L_NE_39S.out



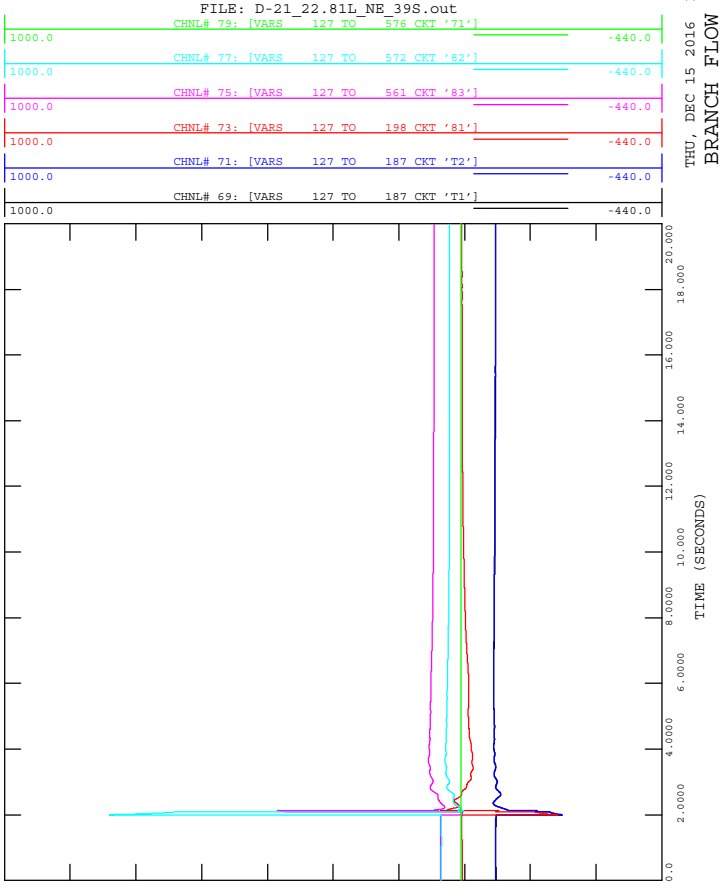
THU, DEC 15 2016 13:35
MACHINE ANGLE (DEGREES)

FIGURE D-21C
2018SP, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-21_22.81L_NE_39S.out



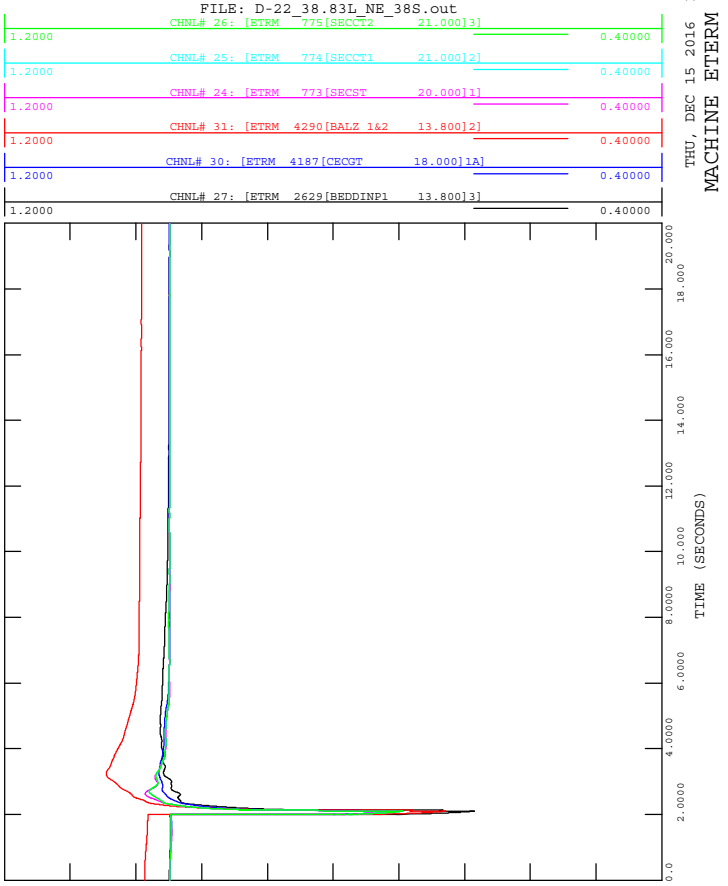
THU, DEC 15 2016 13:35
MACHINE POWER (MW)

FIGURE D-21E
2018SP, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-21_22.81L_NE_39S.out



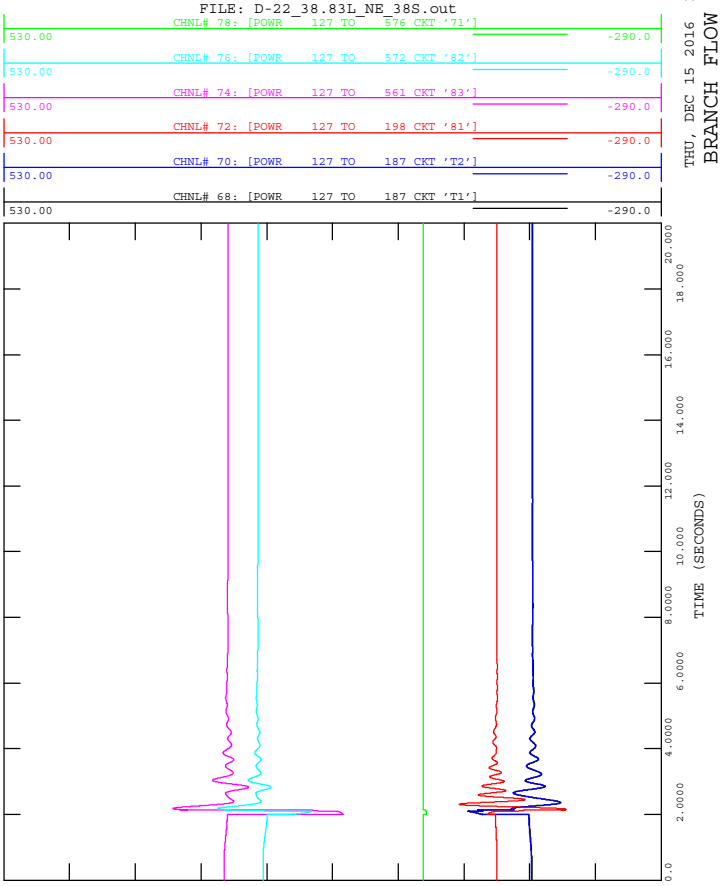
THU, DEC 15 2016 13:35
BRANCH FLOW (Q)

FIGURE D-22B
2018SP, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-38
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-22_38.83L_NE_38S.out



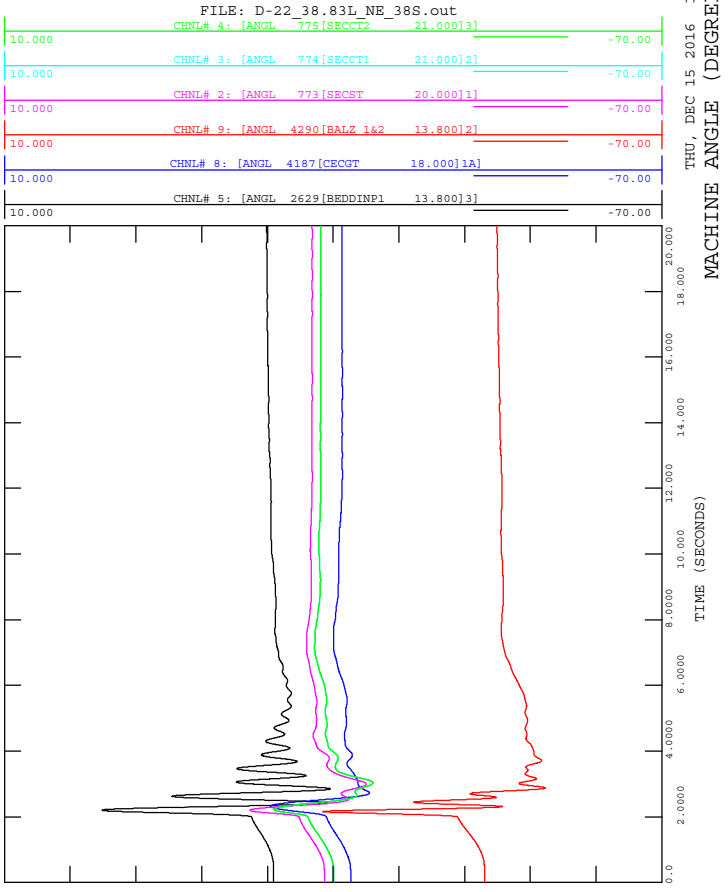
THU, DEC 15 2016 13:35
MACHINE ETERM (V)

FIGURE D-22D
2018SP, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-38
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-22_38.83L_NE_38S.out



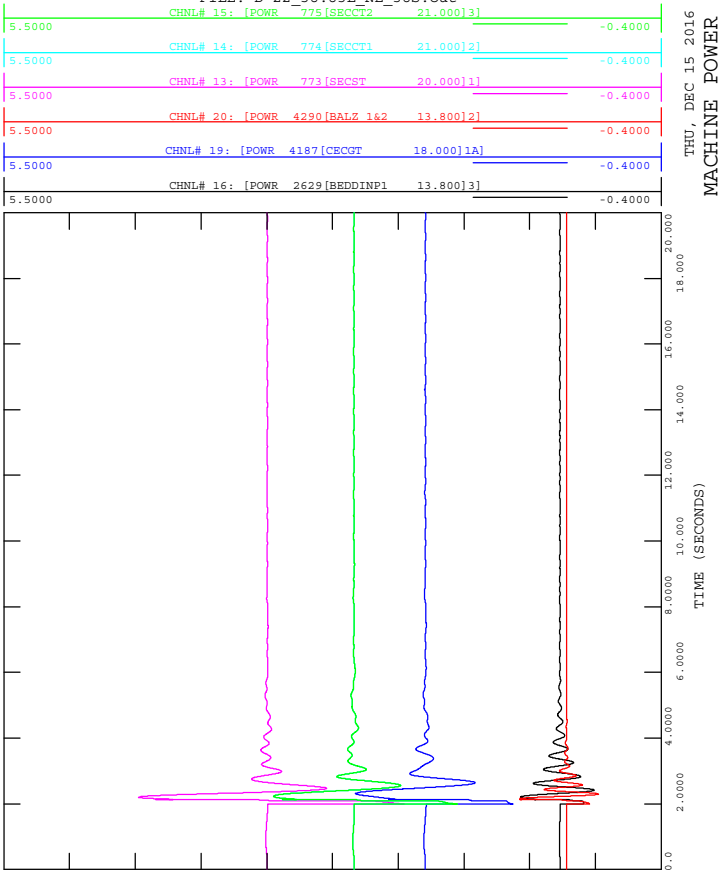
THU, DEC 15 2016 13:35
BRANCH FLOW (P)

FIGURE D-22A
2018SP, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-38
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-22_38.83L_NE_38S.out



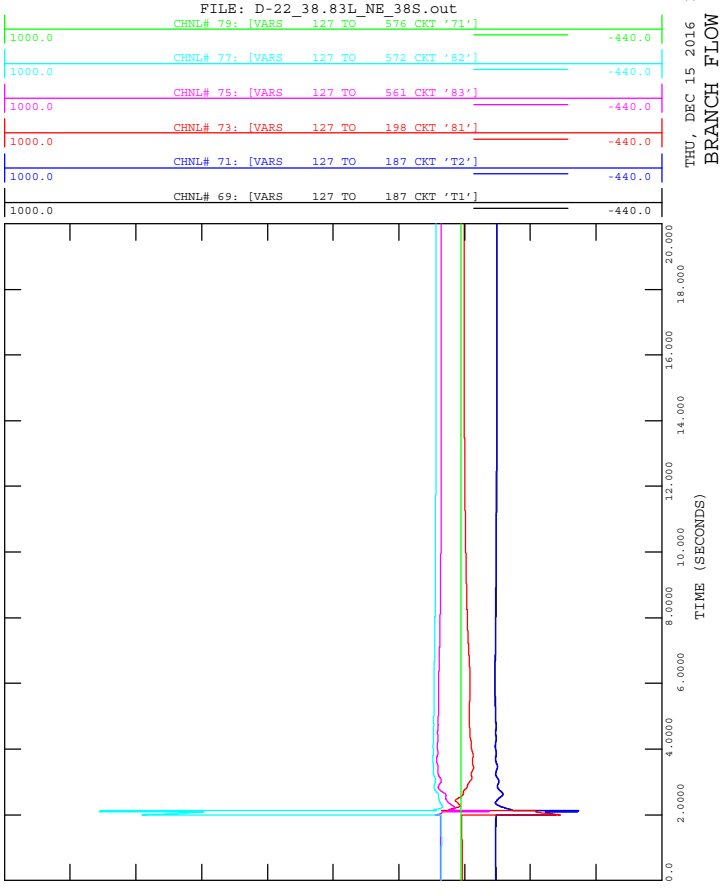
THU, DEC 15 2016 13:35
MACHINE ANGLE (DEGREES)

FIGURE D-22C
2018SP, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-38
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-22_38.83L_NE_38S.out



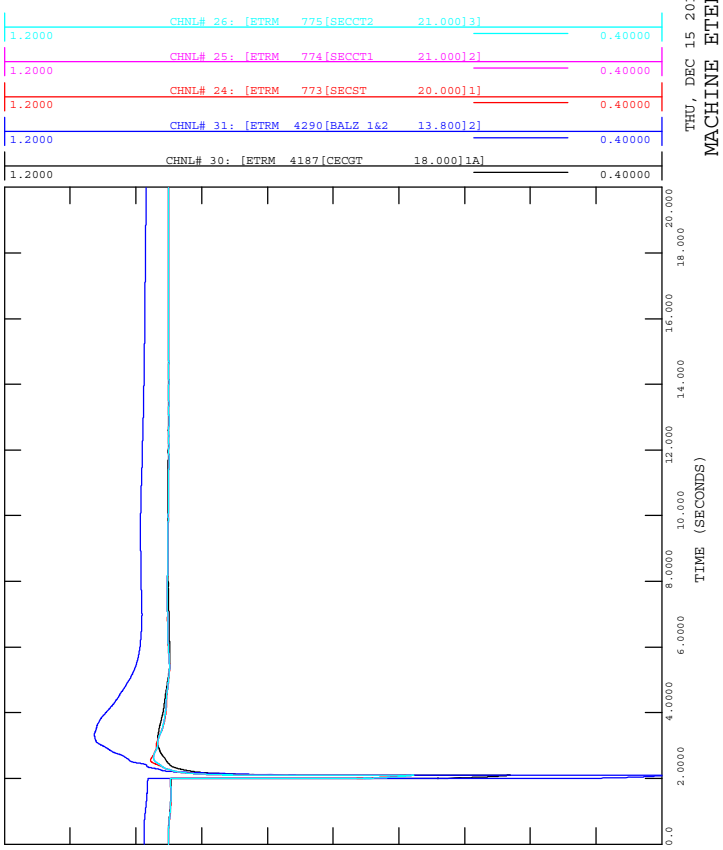
THU, DEC 15 2016 13:35
MACHINE POWER (MW)

FIGURE D-22E
2018SP, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-38
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-22_38.83L_NE_38S.out



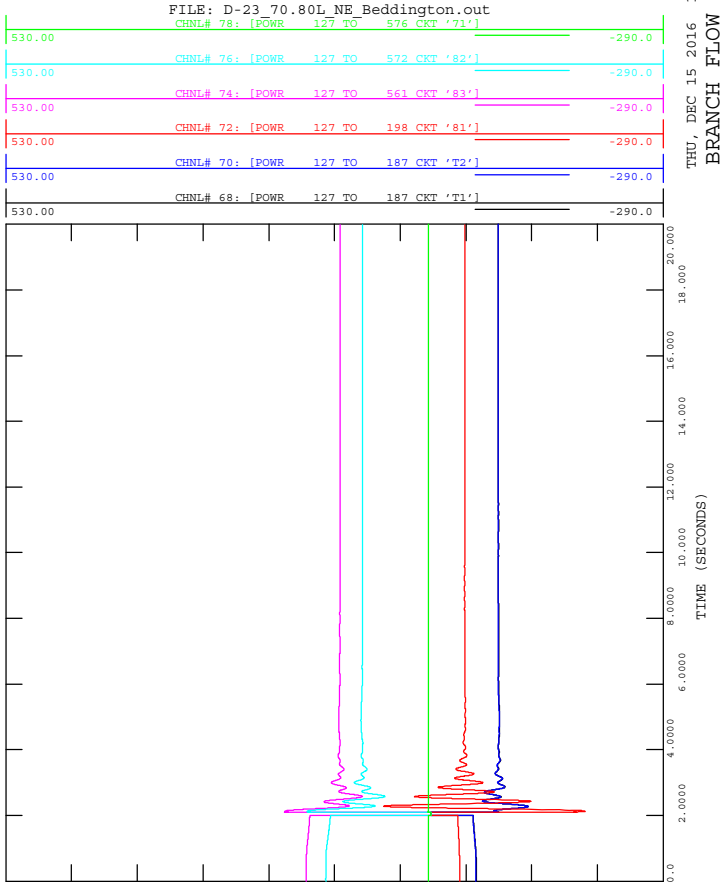
THU, DEC 15 2016 13:35
BRANCH FLOW (Q)

FIGURE D-23B
2018SL, POST-PROJECT
3 PHASE FAULT ON 70.80L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-23_70.80L_NE_Beddington.out



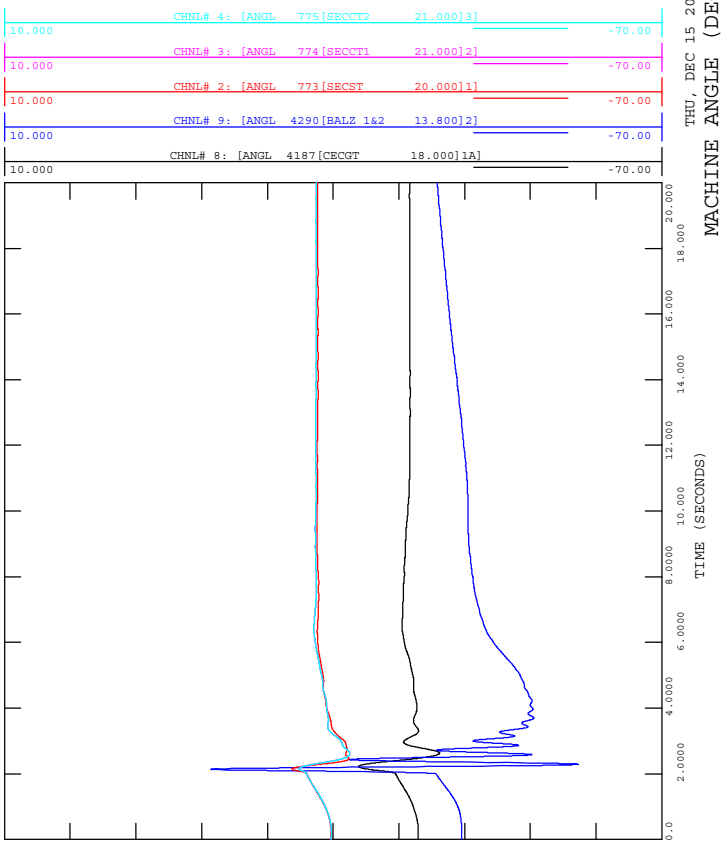
THU, DEC 15 2016 13:35
MACHINE ETERM (V)

FIGURE D-23D
2018SL, POST-PROJECT
3 PHASE FAULT ON 70.80L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-23_70.80L_NE_Beddington.out



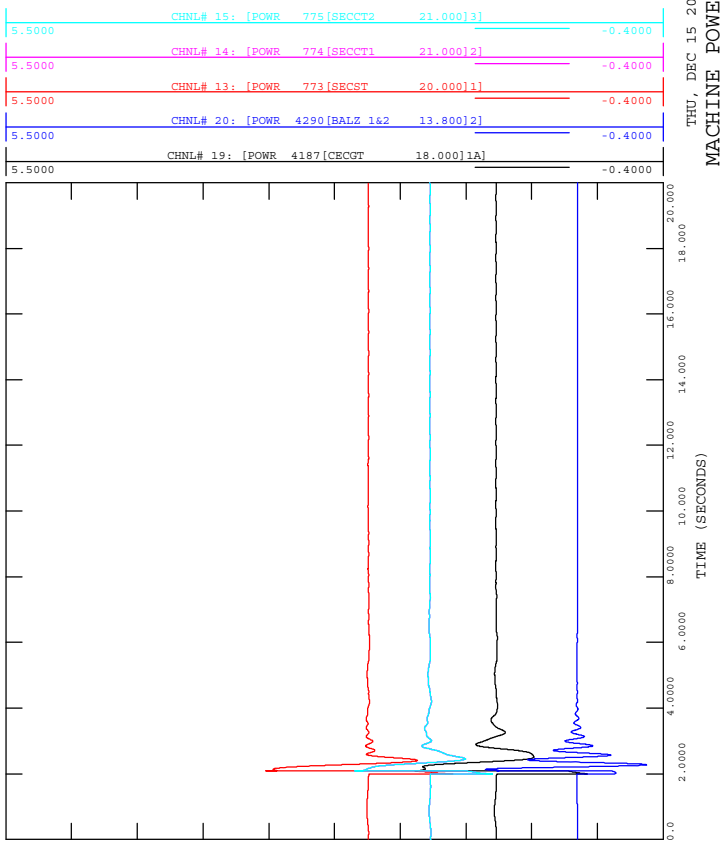
THU, DEC 15 2016 13:35
BRANCH FLOW (P)

FIGURE D-23A
2018SL, POST-PROJECT
3 PHASE FAULT ON 70.80L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-23_70.80L_NE_Beddington.out



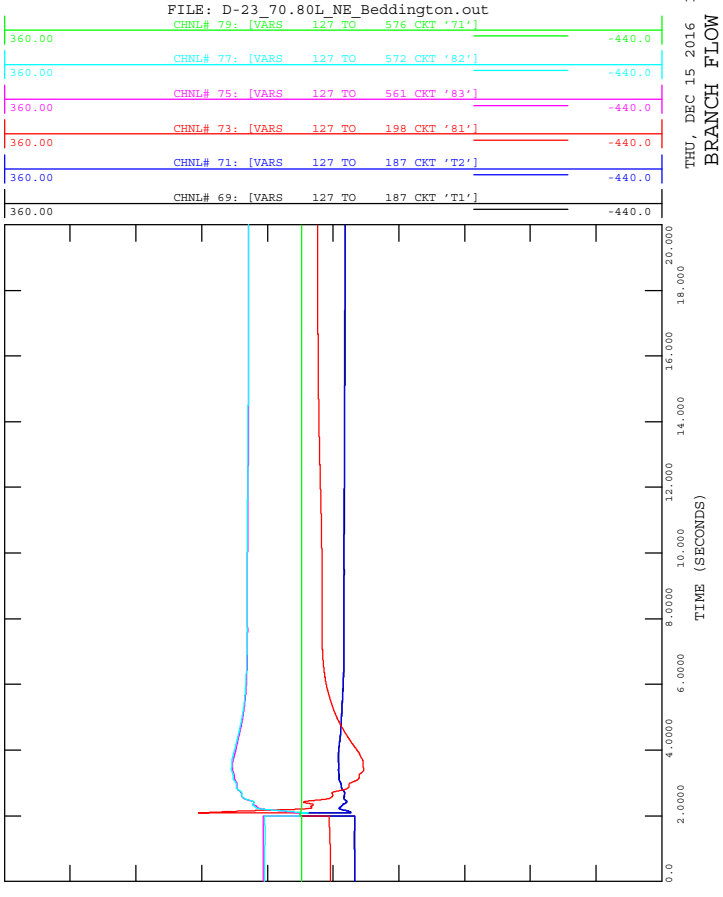
THU, DEC 15 2016 13:35
MACHINE ANGLE (DEGREES)

FIGURE D-23C
2018SL, POST-PROJECT
3 PHASE FAULT ON 70.80L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-23_70.80L_NE_Beddington.out



THU, DEC 15 2016 13:35
MACHINE POWER (MW)

FIGURE D-23E
2018SL, POST-PROJECT
3 PHASE FAULT ON 70.80L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-23_70.80L_NE_Beddington.out



THU, DEC 15 2016 13:35
BRANCH FLOW (Q)

FIGURE D-24B
2018SL, POST-PROJECT
3 PHASE FAULT ON 39.82L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-24_39.82L_NE_Beddington.out

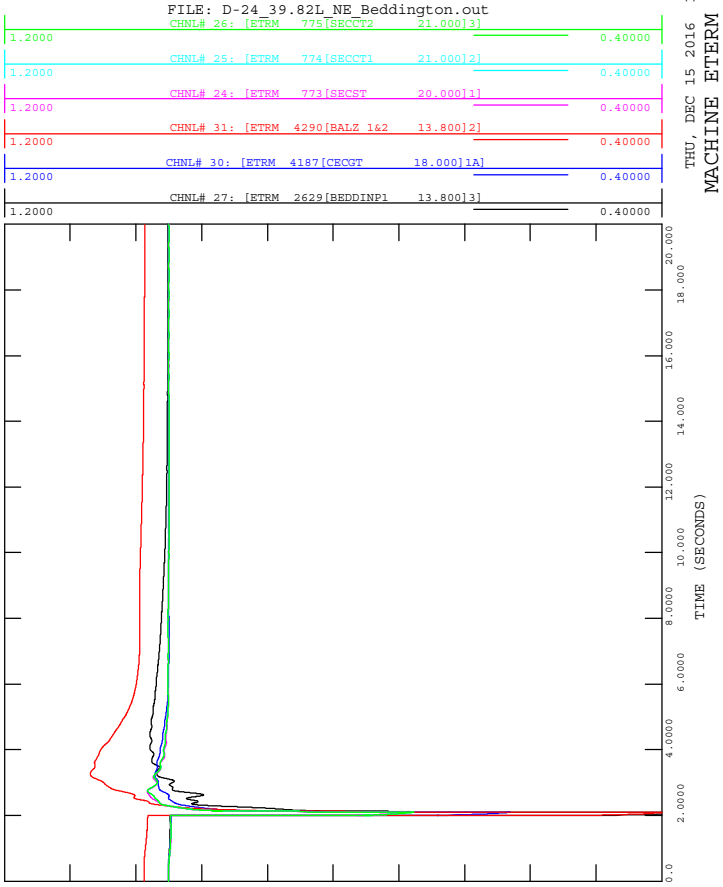


FIGURE D-24D
2018SL, POST-PROJECT
3 PHASE FAULT ON 39.82L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-24_39.82L_NE_Beddington.out

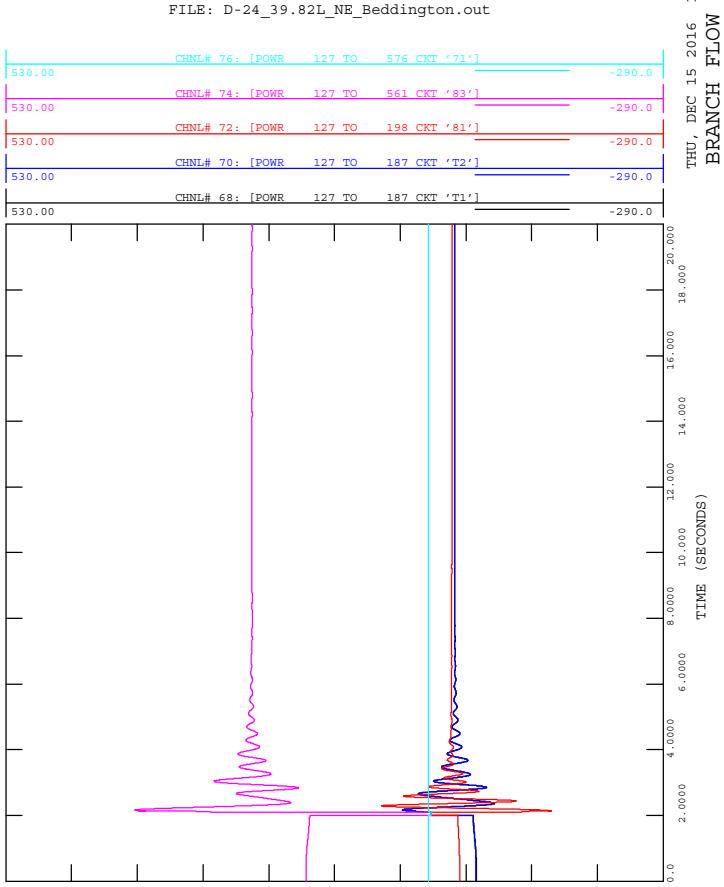


FIGURE D-24A
2018SL, POST-PROJECT
3 PHASE FAULT ON 39.82L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-24_39.82L_NE_Beddington.out

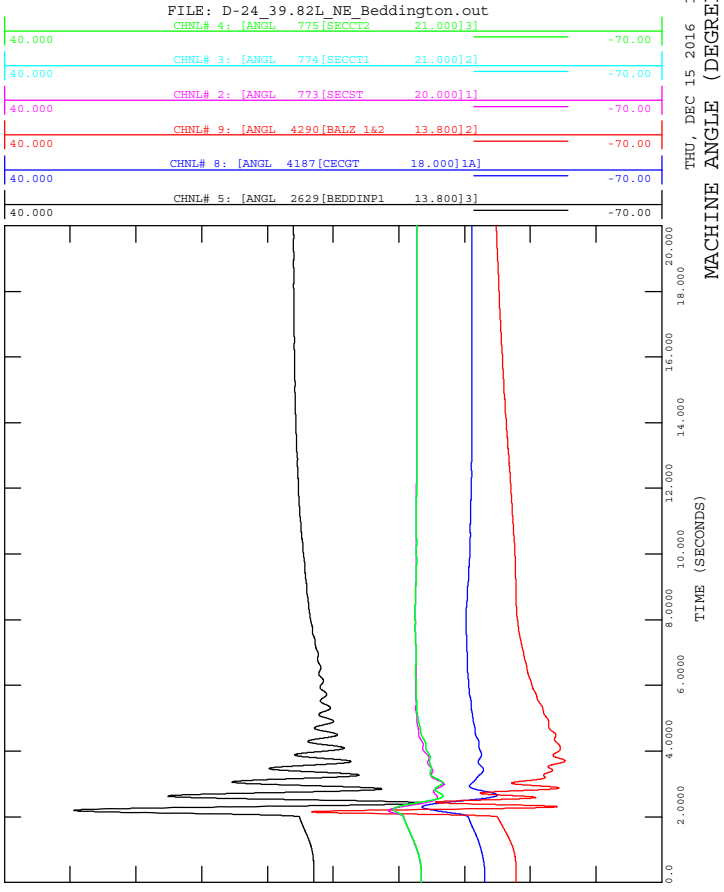


FIGURE D-24C
2018SL, POST-PROJECT
3 PHASE FAULT ON 39.82L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-24_39.82L_NE_Beddington.out

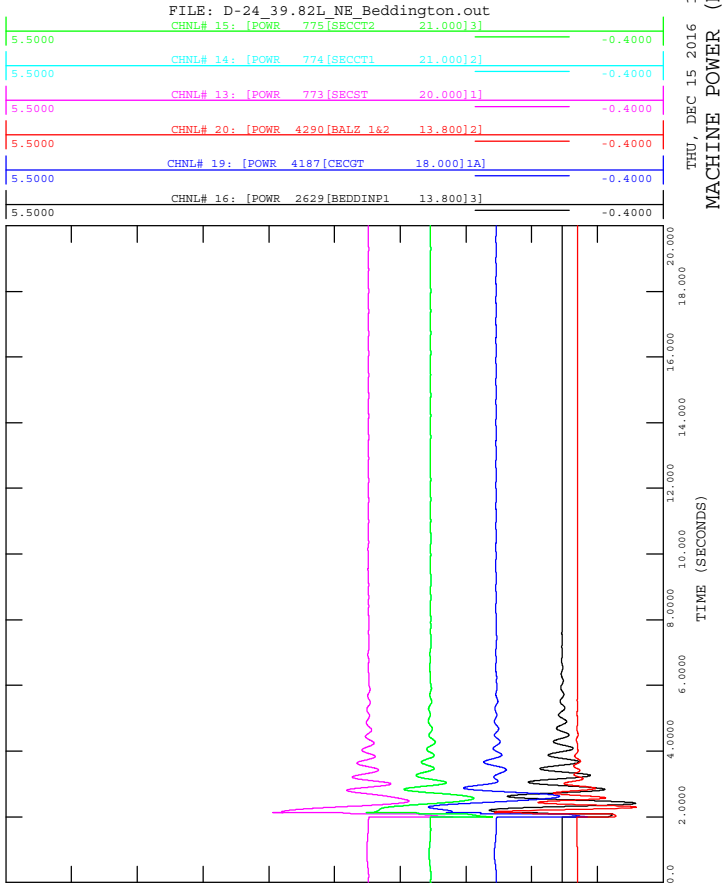
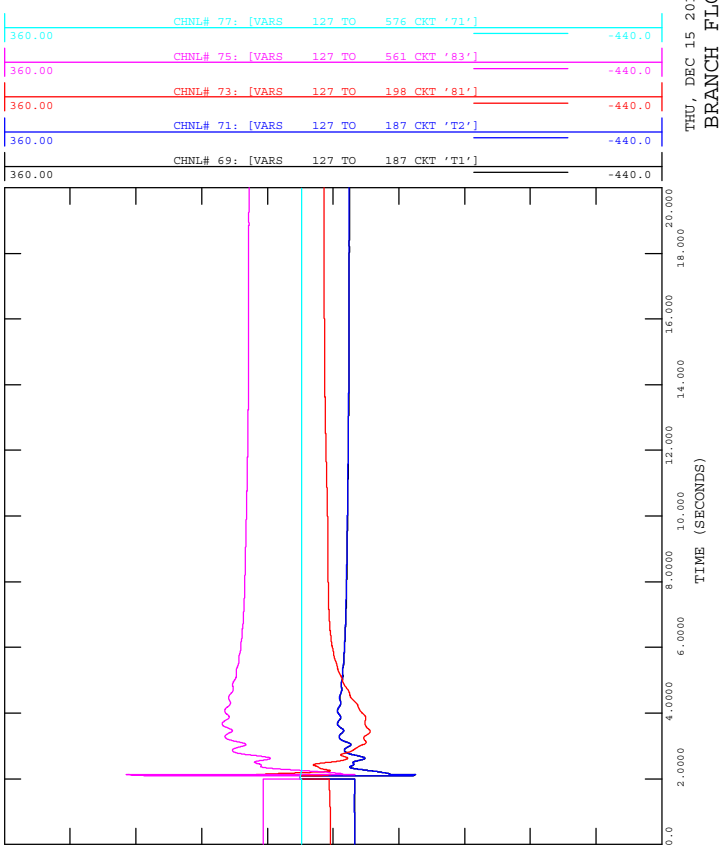
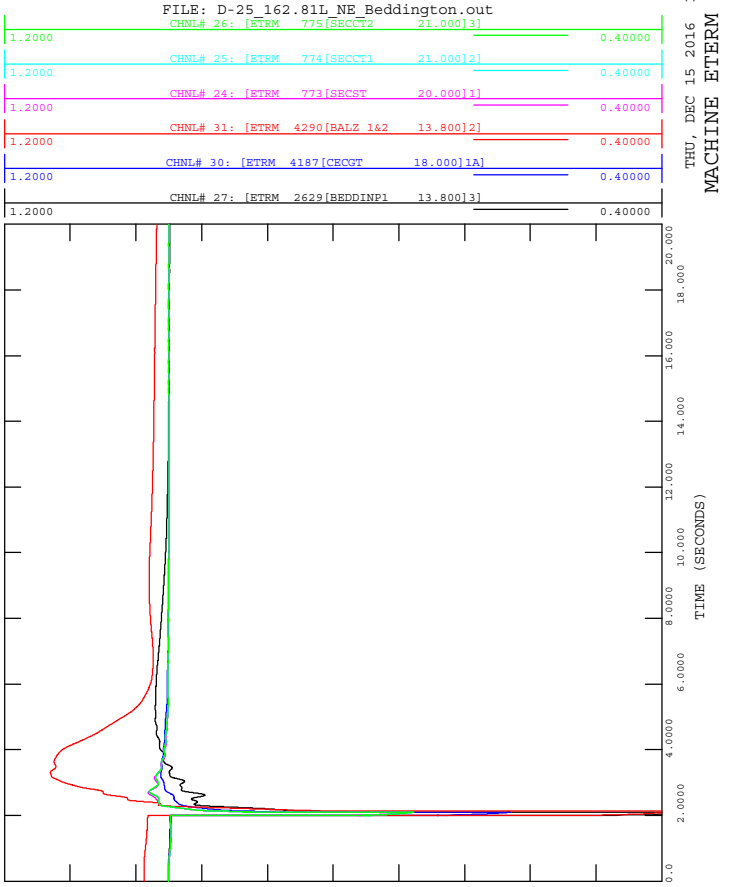


FIGURE D-24E
2018SL, POST-PROJECT
3 PHASE FAULT ON 39.82L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-24_39.82L_NE_Beddington.out



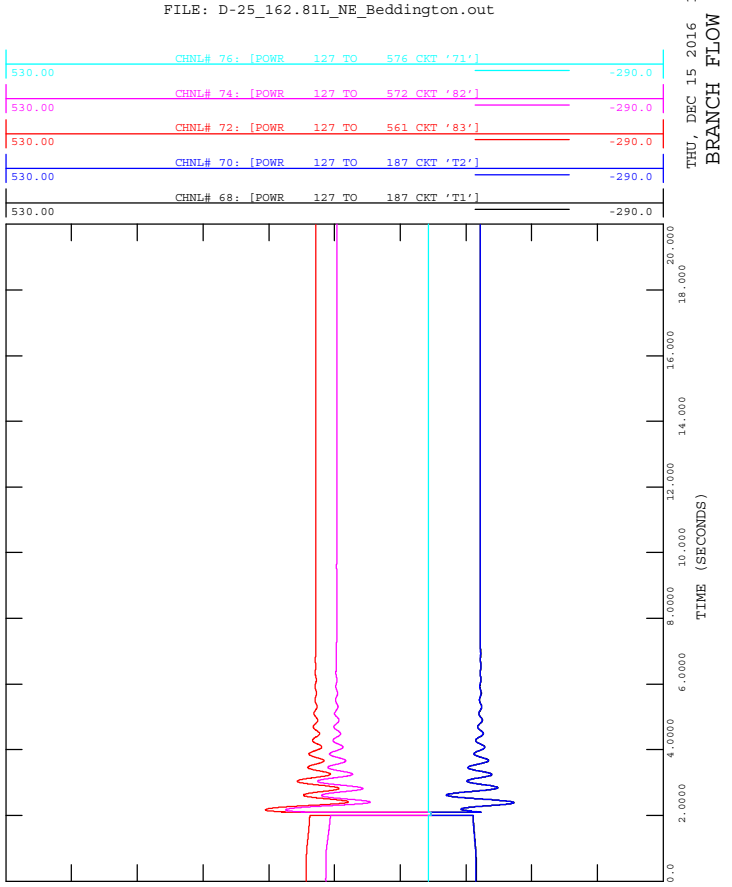
THU, DEC 15 2016 13:35
BRANCH FLOW (Q)

FIGURE D-25B
2018SL, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-25_162.81L_NE_Beddington.out



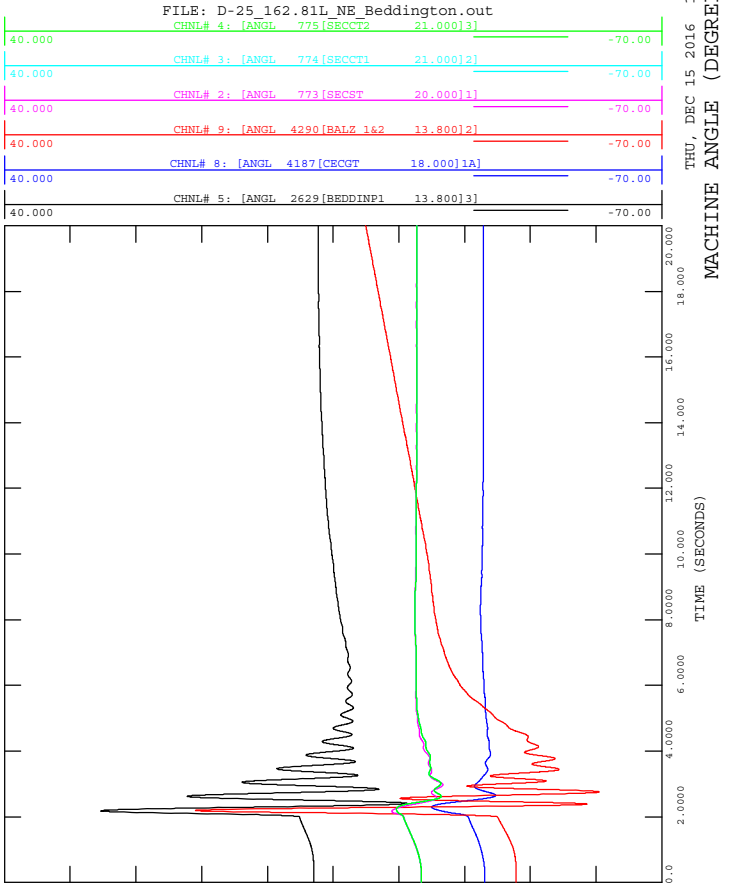
THU, DEC 15 2016 13:35
MACHINE ETERM (V)

FIGURE D-25D
2018SL, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-25_162.81L_NE_Beddington.out



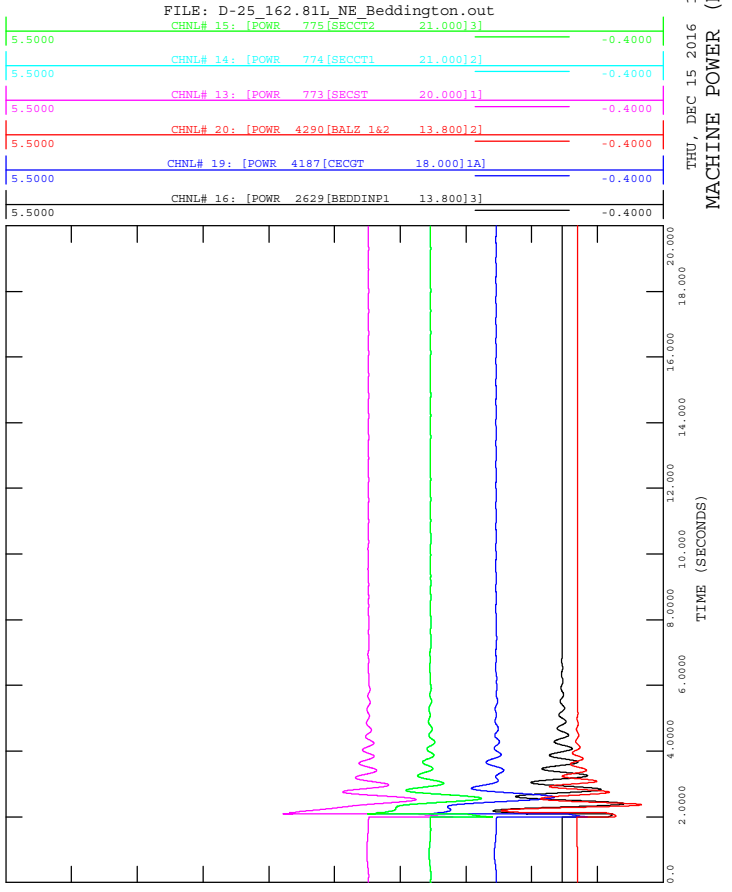
THU, DEC 15 2016 13:35
BRANCH FLOW (P)

FIGURE D-25A
2018SL, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-25_162.81L_NE_Beddington.out



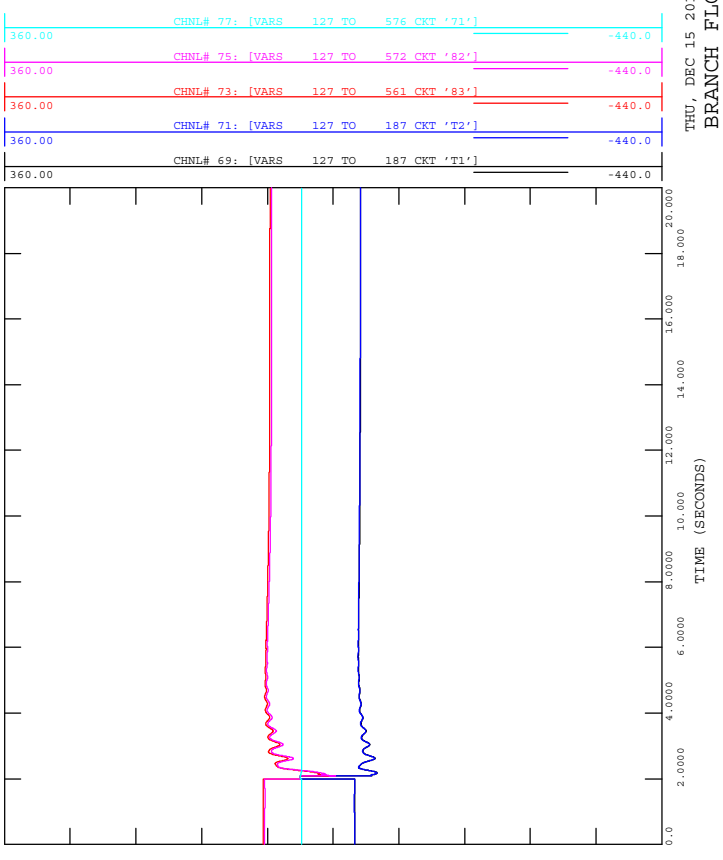
THU, DEC 15 2016 13:35
MACHINE ANGLE (DEGREES)

FIGURE D-25C
2018SL, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-25_162.81L_NE_Beddington.out



THU, DEC 15 2016 13:35
MACHINE POWER (MW)

FIGURE D-25E
2018SL, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-25_162.81L_NE_Beddington.out



THU, DEC 15 2016 13:35
BRANCH FLOW (Q)

FIGURE D-26B
2018SL, POST-PROJECT
3 PHASE FAULT ON 771L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-26_771L_NE_Beddington.out

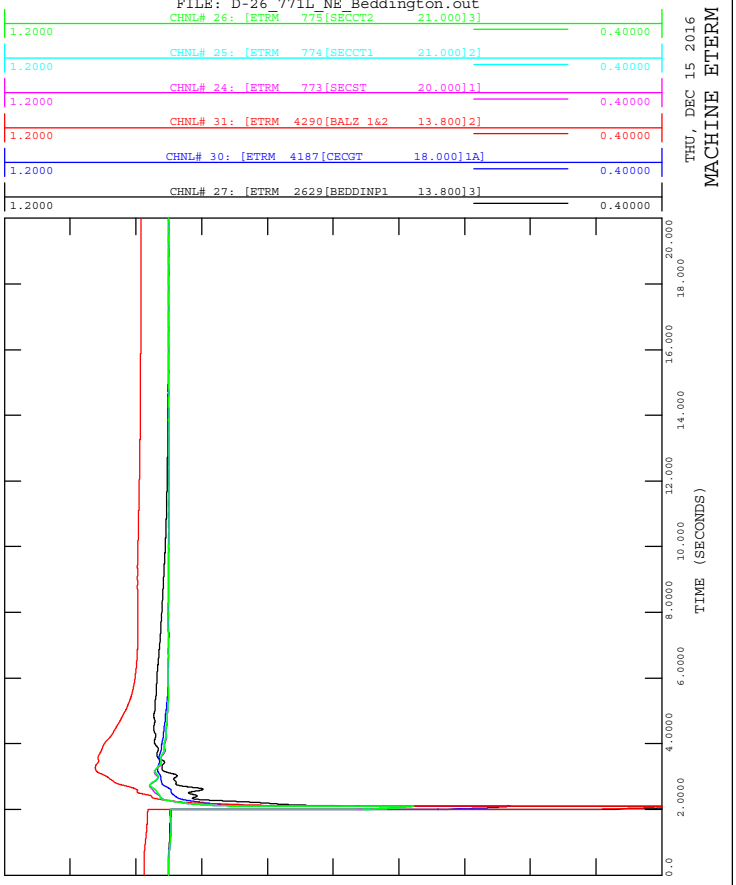


FIGURE D-26D
2018SL, POST-PROJECT
3 PHASE FAULT ON 771L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-26_771L_NE_Beddington.out

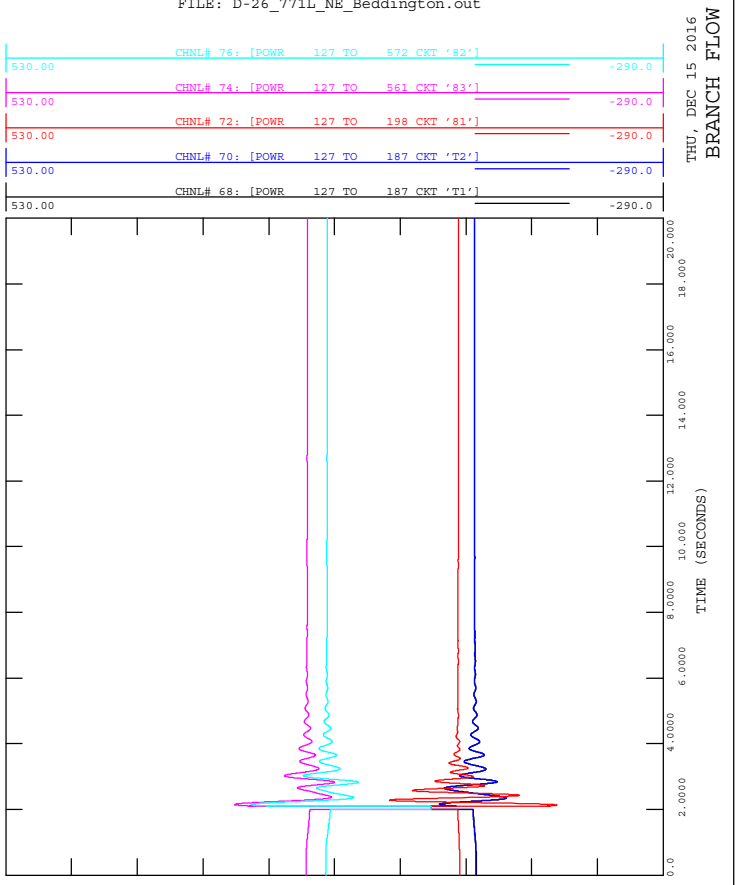


FIGURE D-26A
2018SL, POST-PROJECT
3 PHASE FAULT ON 771L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-26_771L_NE_Beddington.out

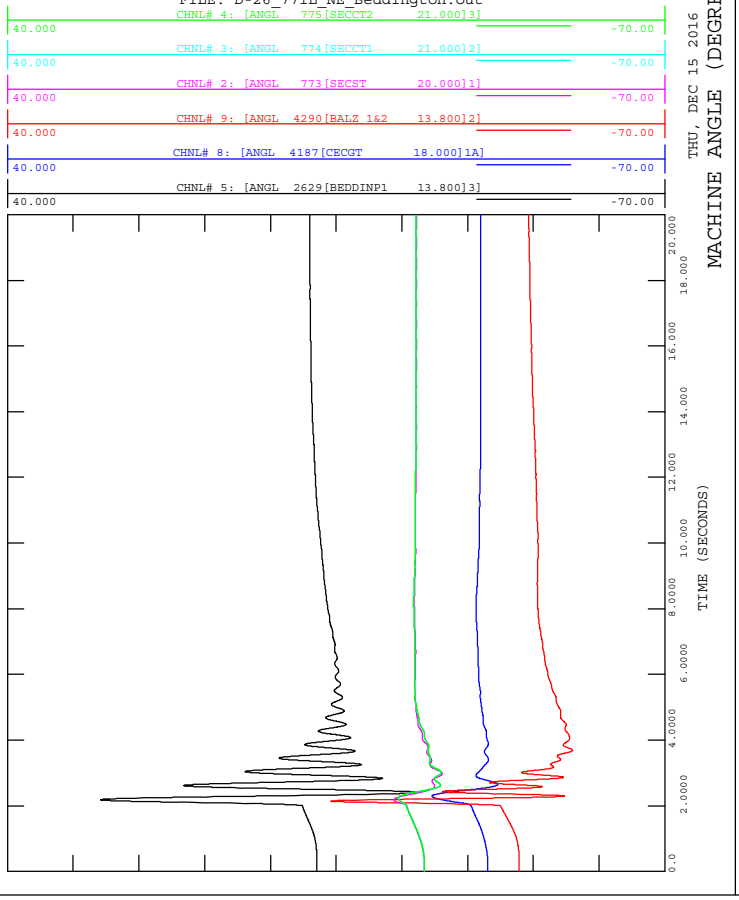


FIGURE D-26C
2018SL, POST-PROJECT
3 PHASE FAULT ON 771L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-26_771L_NE_Beddington.out

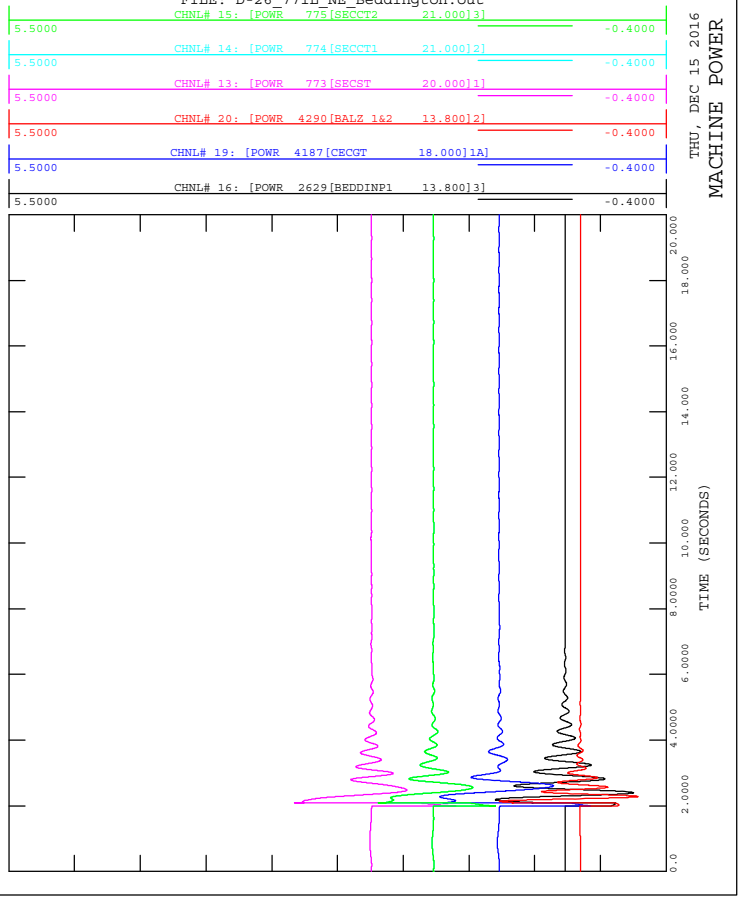
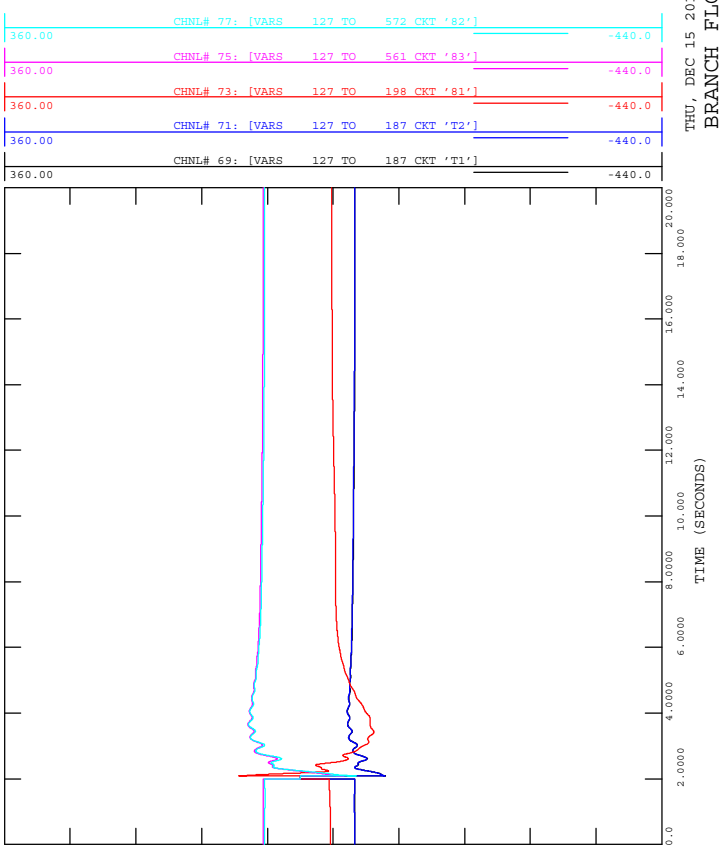


FIGURE D-26E
2018SL, POST-PROJECT
3 PHASE FAULT ON 771L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-26_771L_NE_Beddington.out



THU, DEC 15 2016 13:35
BRANCH FLOW (Q)

FIGURE D-27B
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.83L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-27_11.83L_NE_Beddington.out

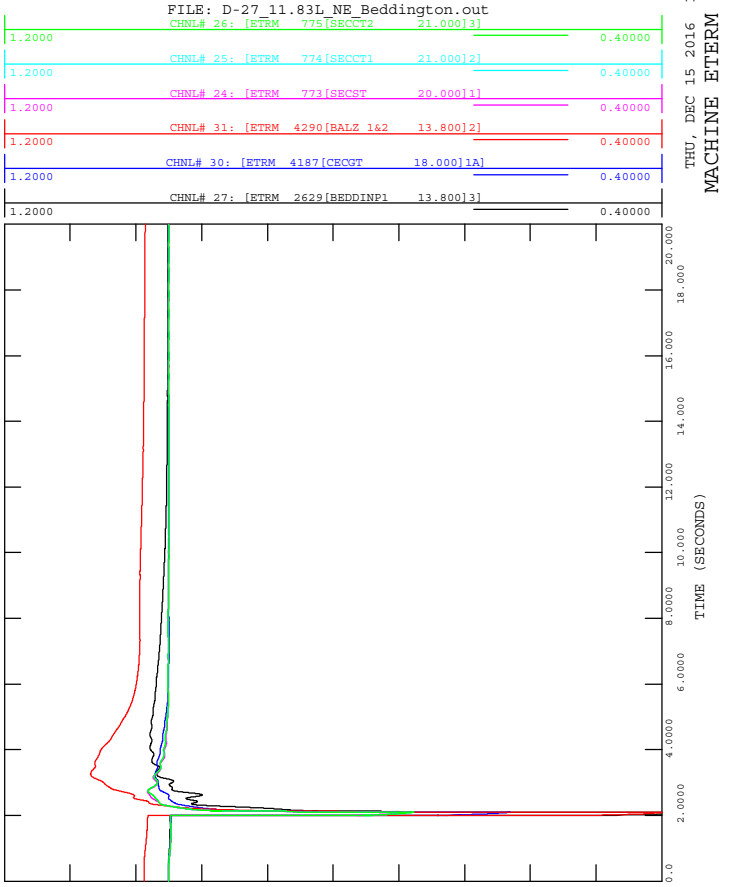


FIGURE D-27D
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.83L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-27_11.83L_NE_Beddington.out

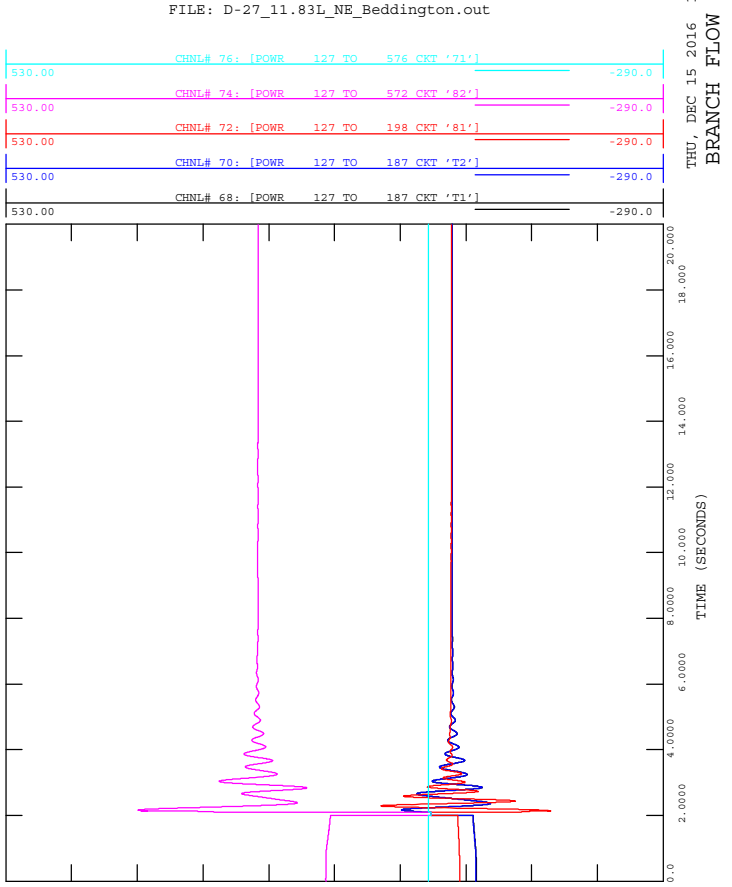


FIGURE D-27A
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.83L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-27_11.83L_NE_Beddington.out

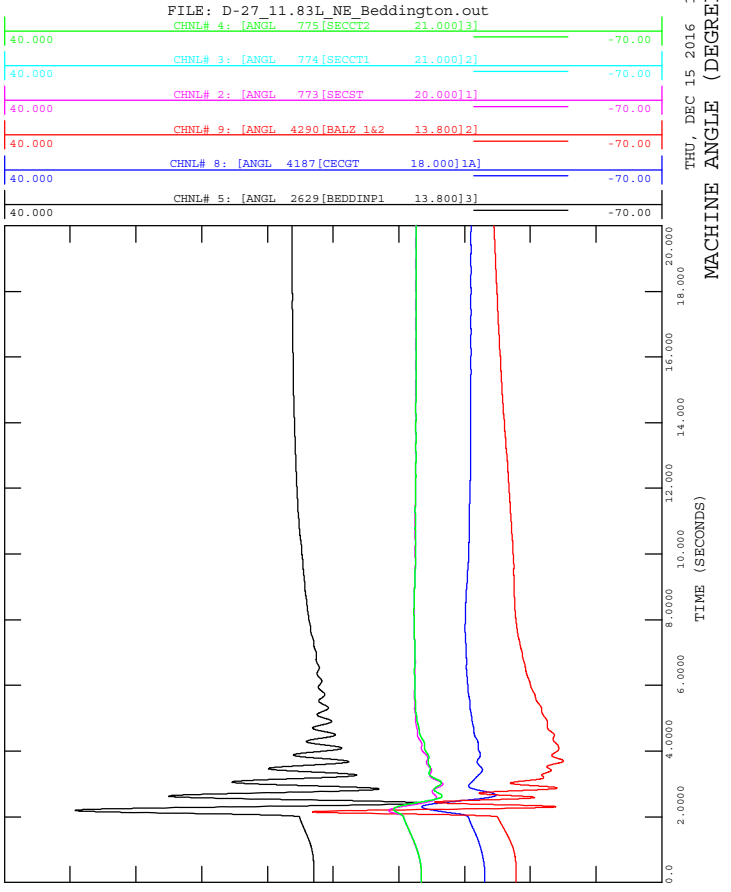


FIGURE D-27C
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.83L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-27_11.83L_NE_Beddington.out

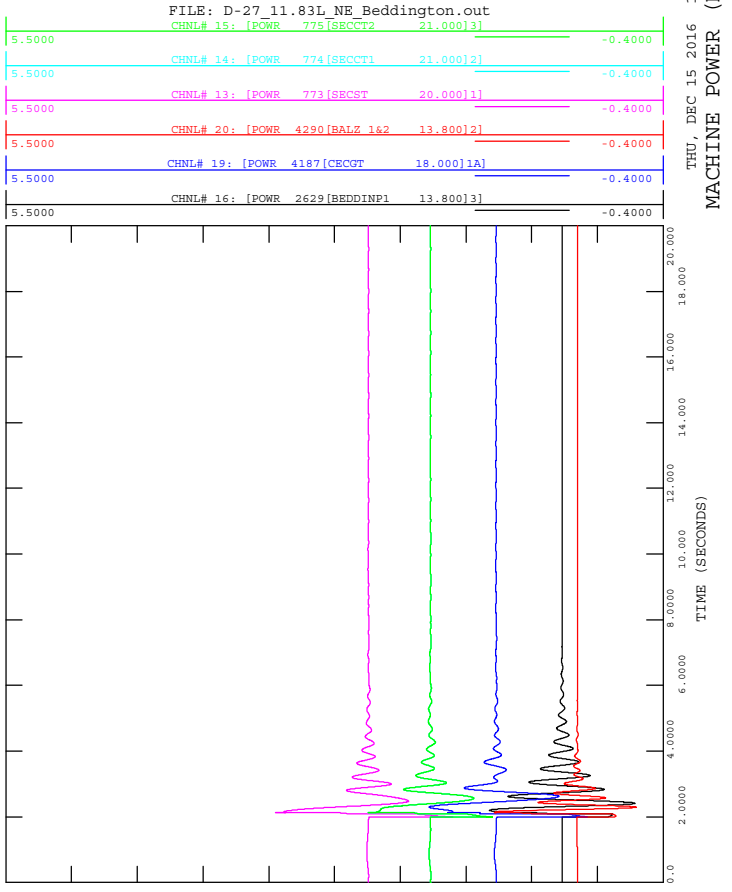
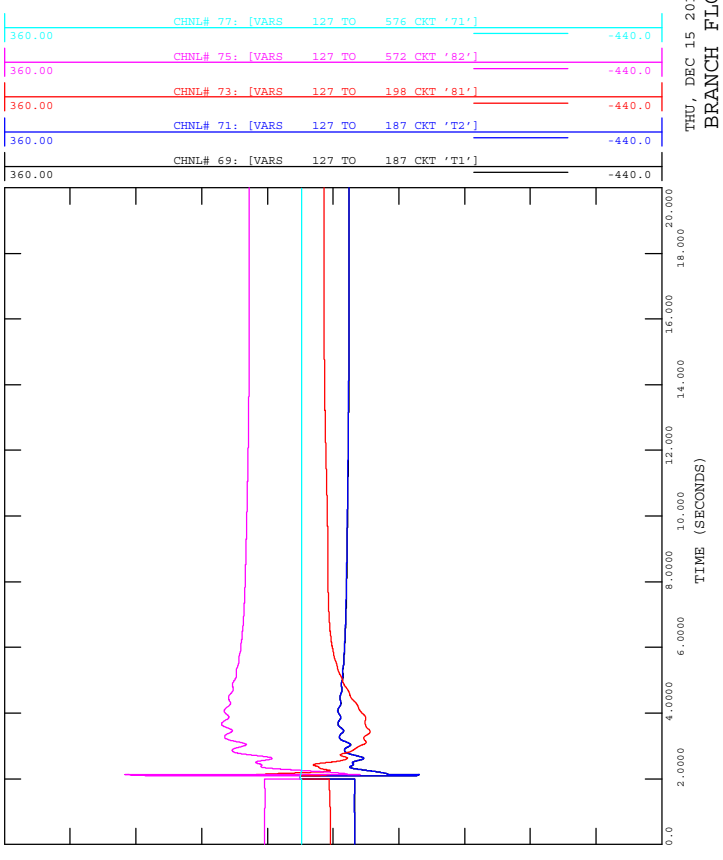
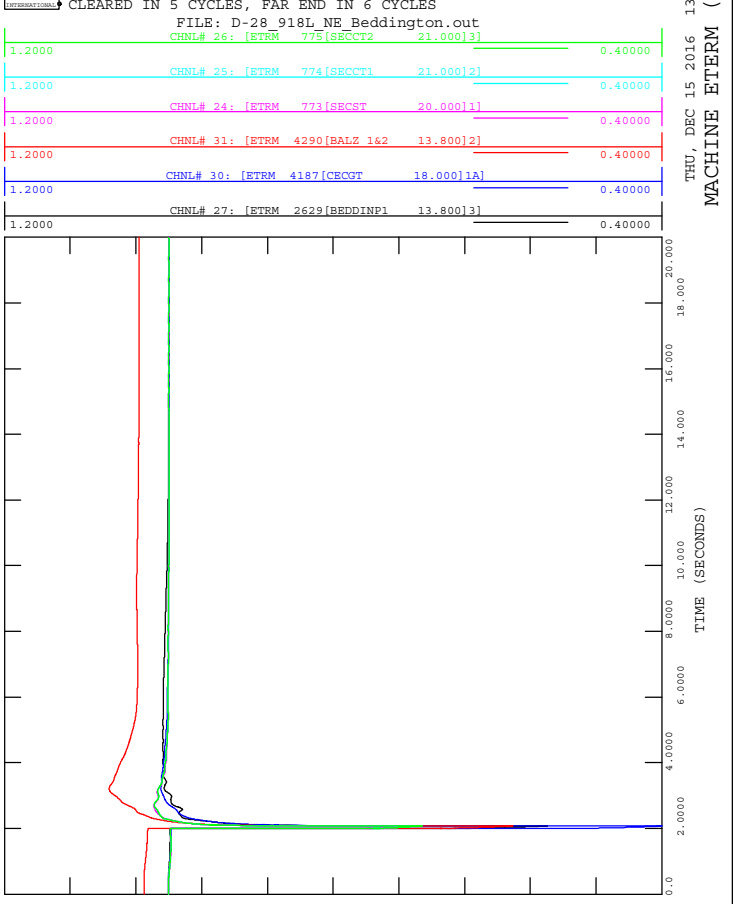


FIGURE D-27E
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.83L AT BEDDINGTON
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-27_11.83L_NE_Beddington.out



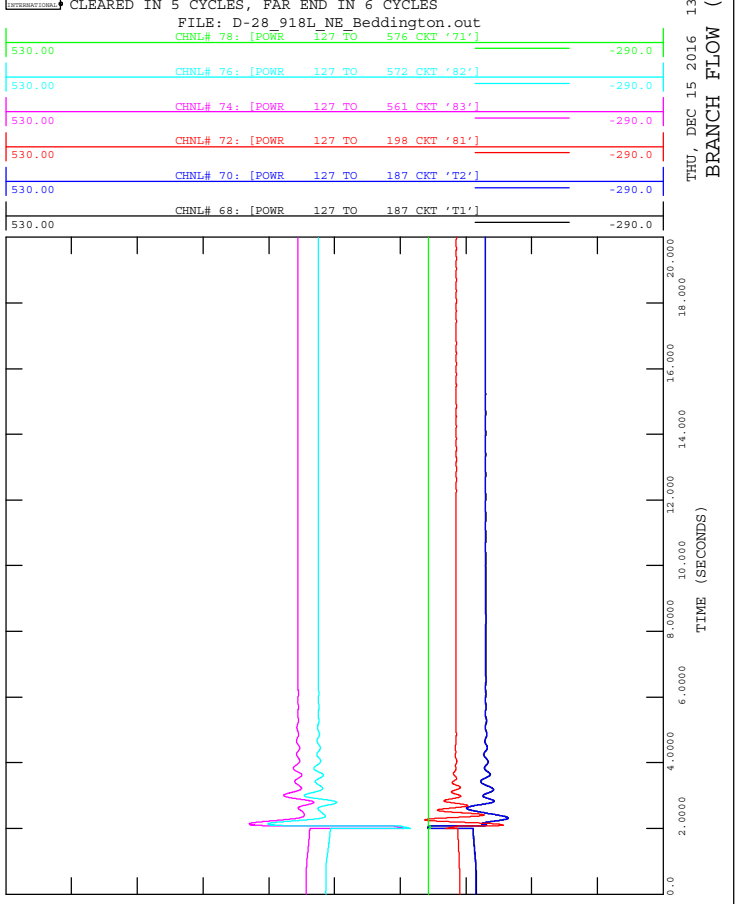
THU, DEC 15 2016 13:35
BRANCH FLOW (Q)

FIGURE D-28B
2018SL, POST-PROJECT
3 PHASE FAULT ON 918L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-28_918L_NE_Beddington.out



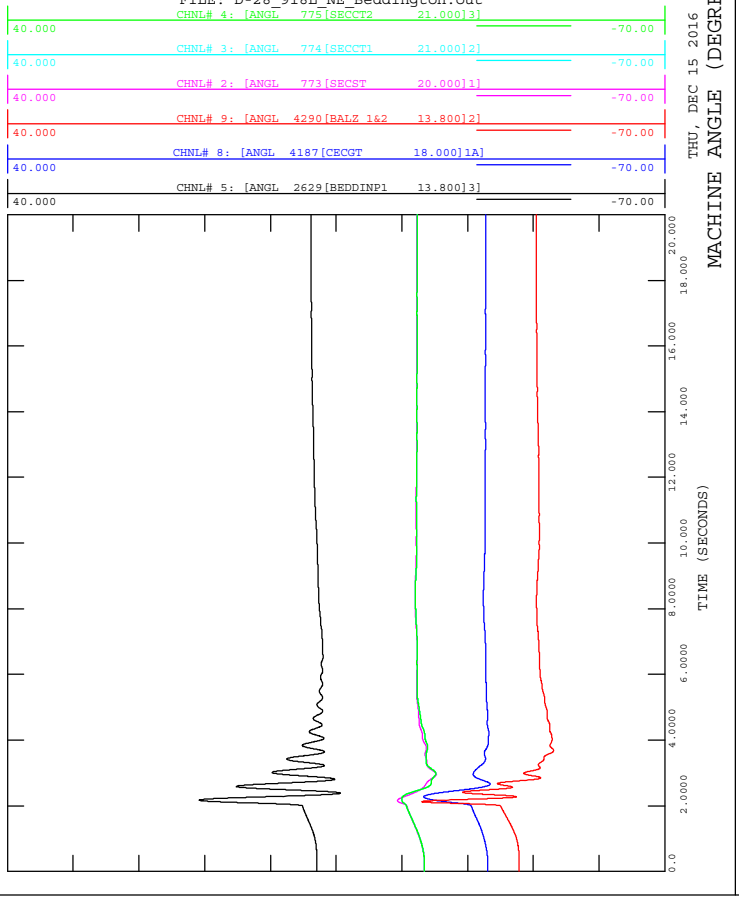
THU, DEC 15 2016 13:35
MACHINE ETERM (V)

FIGURE D-28D
2018SL, POST-PROJECT
3 PHASE FAULT ON 918L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-28_918L_NE_Beddington.out



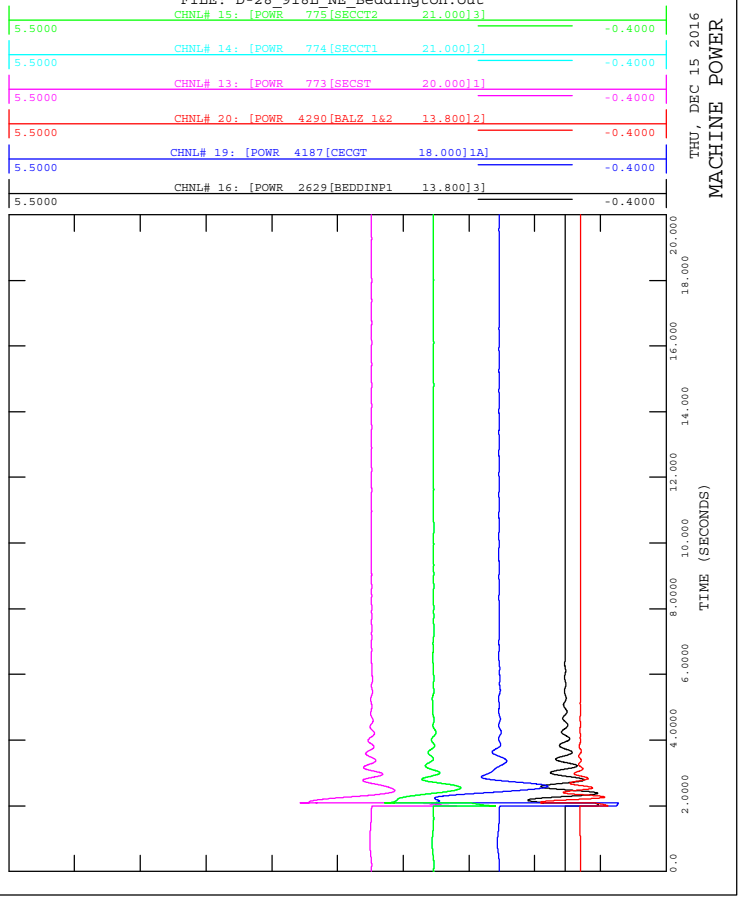
THU, DEC 15 2016 13:35
BRANCH FLOW (P)

FIGURE D-28A
2018SL, POST-PROJECT
3 PHASE FAULT ON 918L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-28_918L_NE_Beddington.out



THU, DEC 15 2016 13:35
MACHINE ANGLE (DEGREES)

FIGURE D-28C
2018SL, POST-PROJECT
3 PHASE FAULT ON 918L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-28_918L_NE_Beddington.out



THU, DEC 15 2016 13:35
MACHINE POWER (MW)

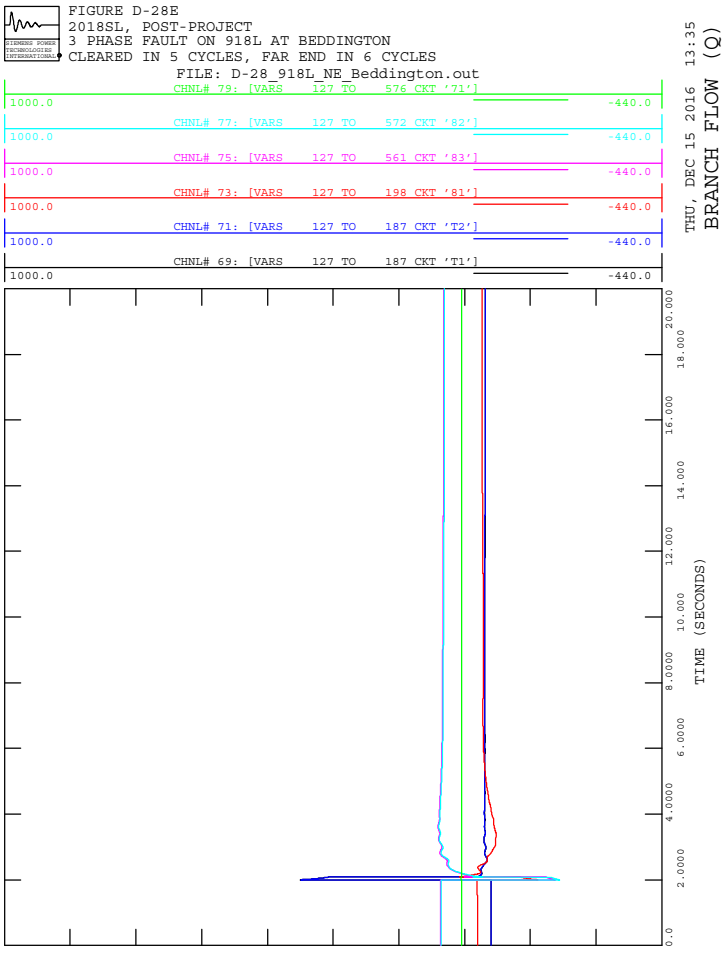


FIGURE D-28E
2018SL, POST-PROJECT
3 PHASE FAULT ON 918L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-28_918L_NE_Beddington.out
CHNL# 79: [VARS 127 TO 576 CKT '71']
1000.0
-440.0
CHNL# 77: [VARS 127 TO 572 CKT '82']
1000.0
-440.0
CHNL# 75: [VARS 127 TO 561 CKT '83']
1000.0
-440.0
CHNL# 73: [VARS 127 TO 198 CKT '81']
1000.0
-440.0
CHNL# 71: [VARS 127 TO 187 CKT 'T2']
1000.0
-440.0
CHNL# 69: [VARS 127 TO 187 CKT 'T1']
1000.0
-440.0
THU, DEC 15 2016 13:35
BRANCH FLOW (Q)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)

FIGURE D-29B
2018SL, POST-PROJECT
3 PHASE FAULT ON 932L AT JANET
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-29_932L_NE_Janet.out

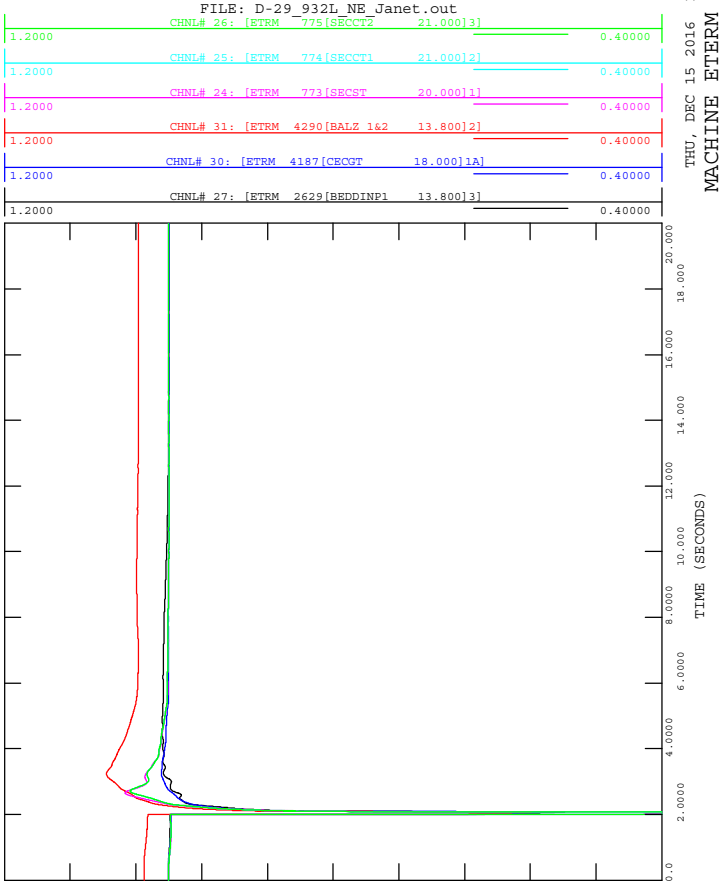


FIGURE D-29D
2018SL, POST-PROJECT
3 PHASE FAULT ON 932L AT JANET
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-29_932L_NE_Janet.out

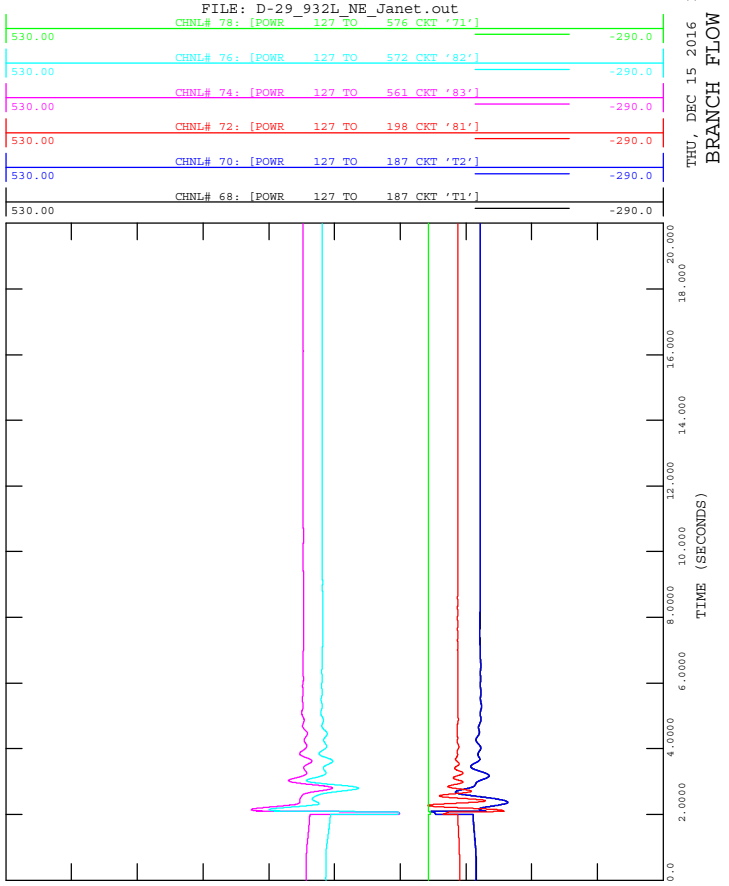


FIGURE D-29A
2018SL, POST-PROJECT
3 PHASE FAULT ON 932L AT JANET
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-29_932L_NE_Janet.out

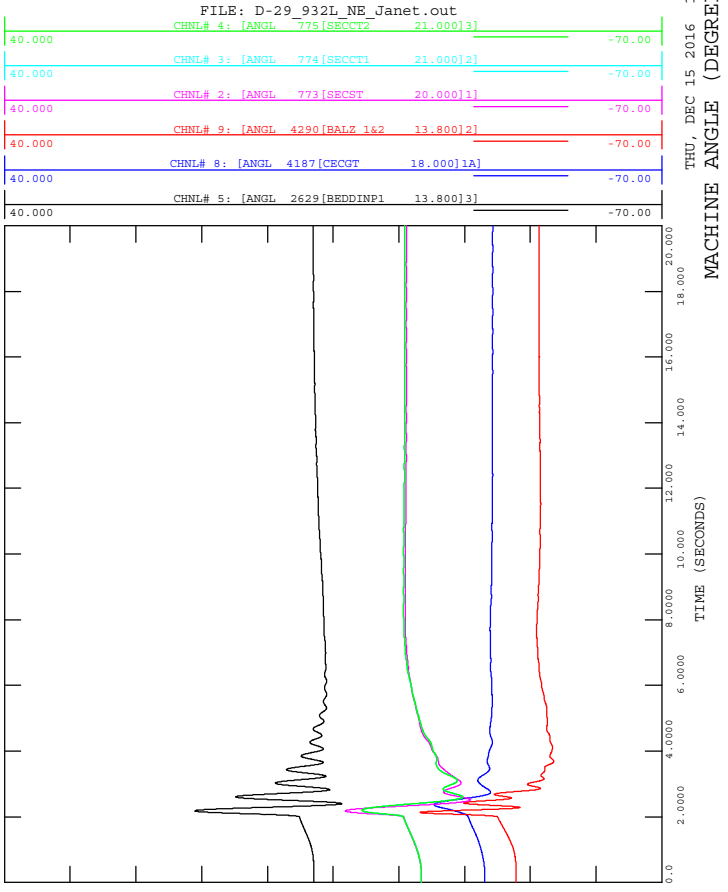


FIGURE D-29C
2018SL, POST-PROJECT
3 PHASE FAULT ON 932L AT JANET
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-29_932L_NE_Janet.out

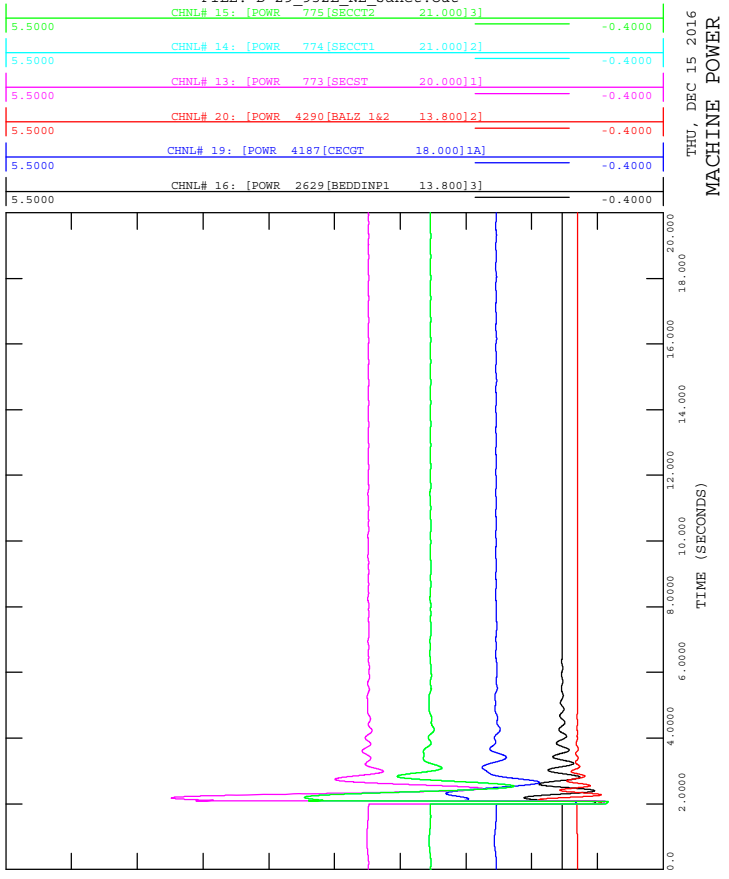
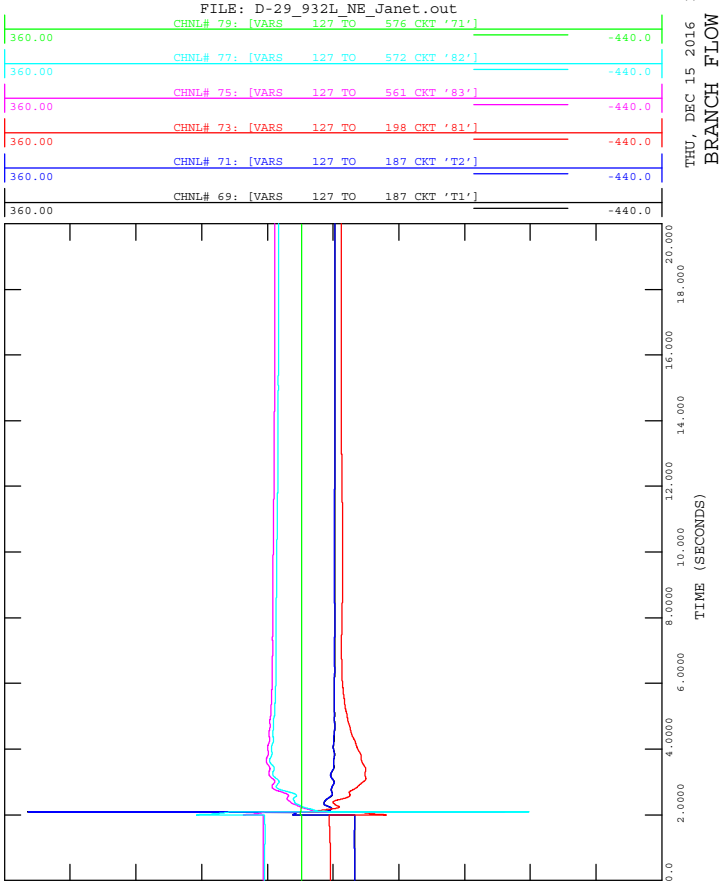
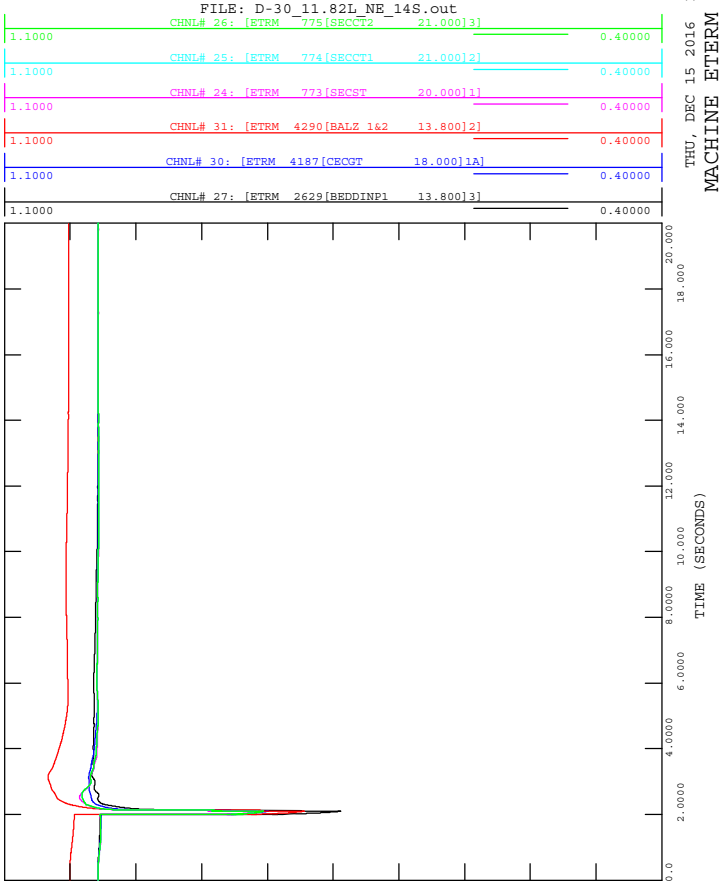


FIGURE D-29E
2018SL, POST-PROJECT
3 PHASE FAULT ON 932L AT JANET
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-29_932L_NE_Janet.out



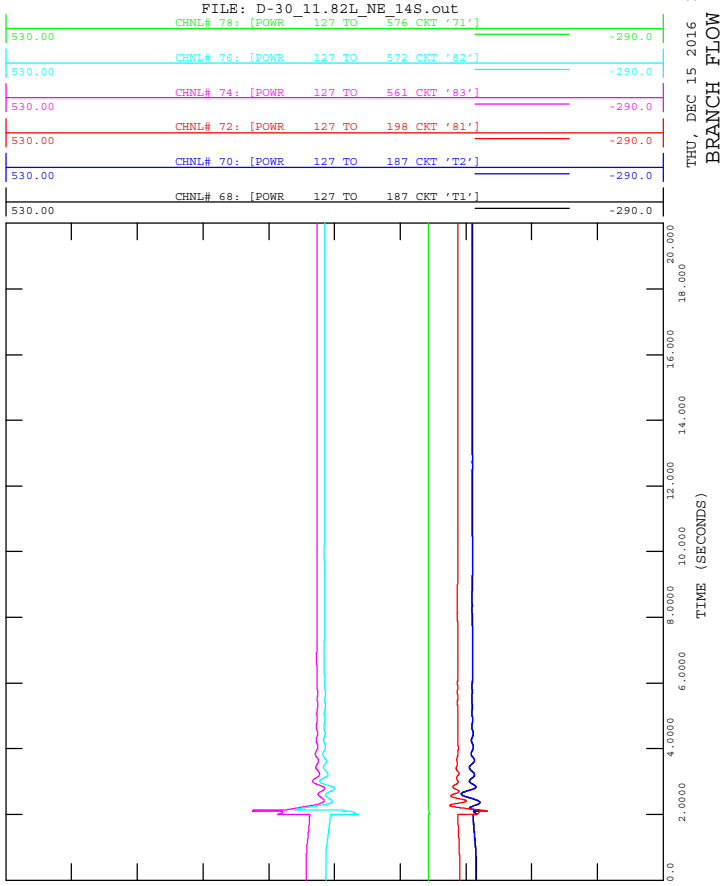
THU, DEC 15 2016 13:35
BRANCH FLOW (Q)

FIGURE D-30B
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-14
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-30_11.82L_NE_14S.out



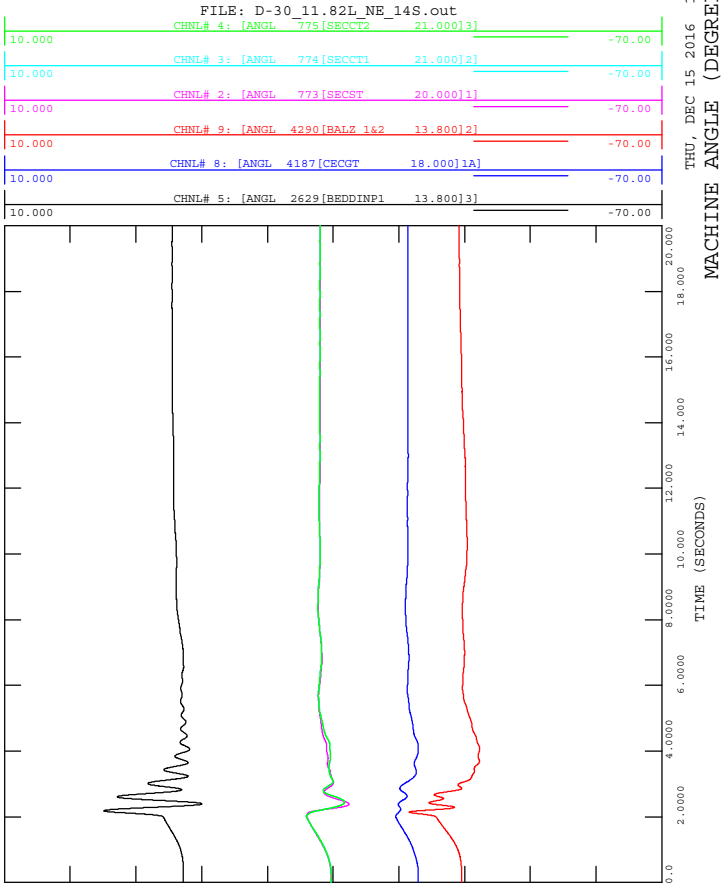
THU, DEC 15 2016 13:35
MACHINE ETERM (V)

FIGURE D-30D
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-14
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-30_11.82L_NE_14S.out



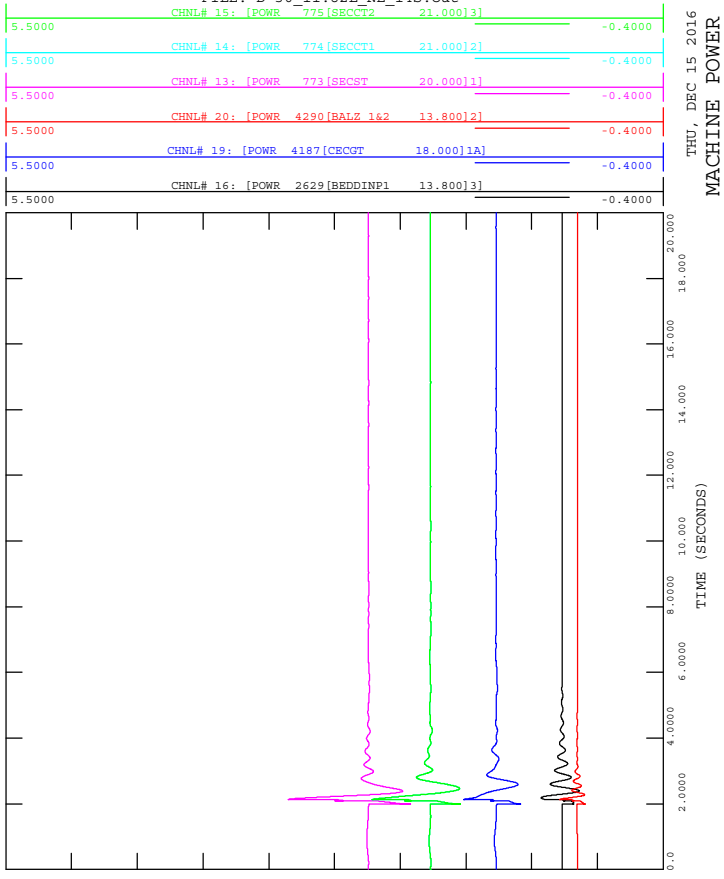
THU, DEC 15 2016 13:35
BRANCH FLOW (P)

FIGURE D-30A
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-14
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-30_11.82L_NE_14S.out



THU, DEC 15 2016 13:35
MACHINE ANGLE (DEGREES)

FIGURE D-30C
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-14
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-30_11.82L_NE_14S.out



THU, DEC 15 2016 13:35
MACHINE POWER (MW)

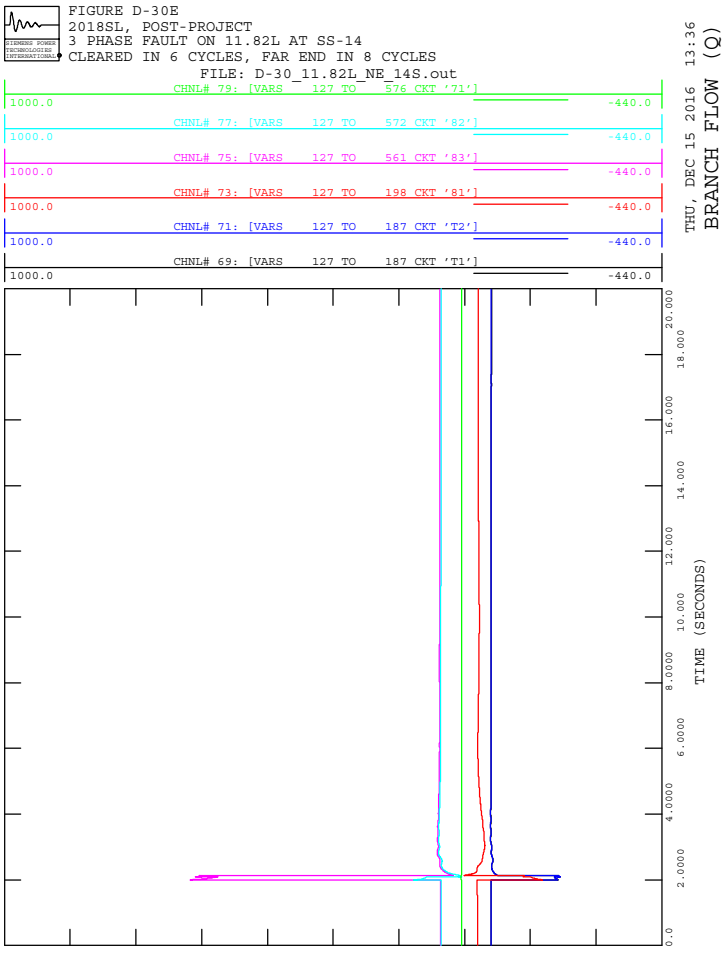
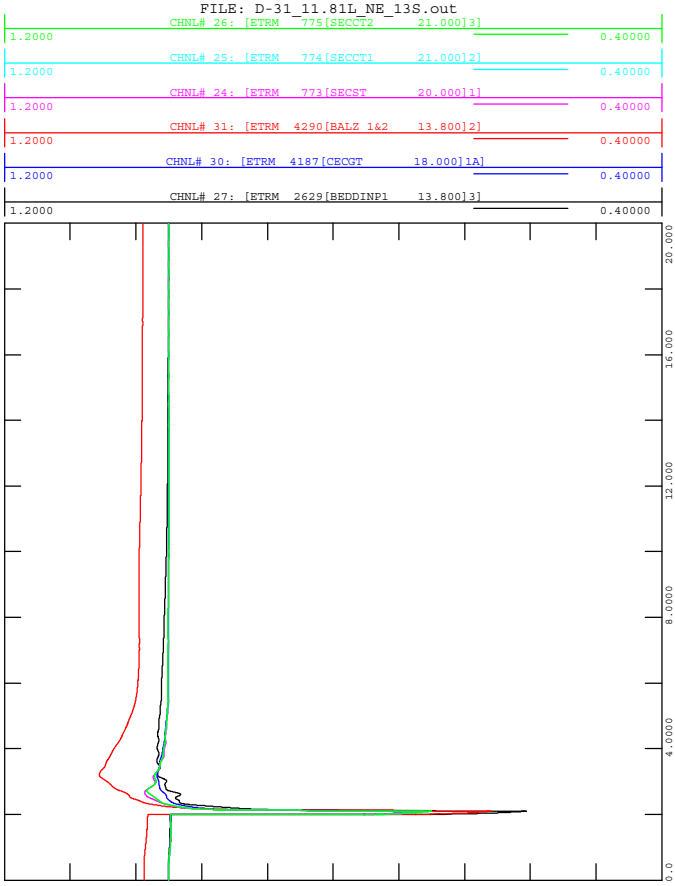


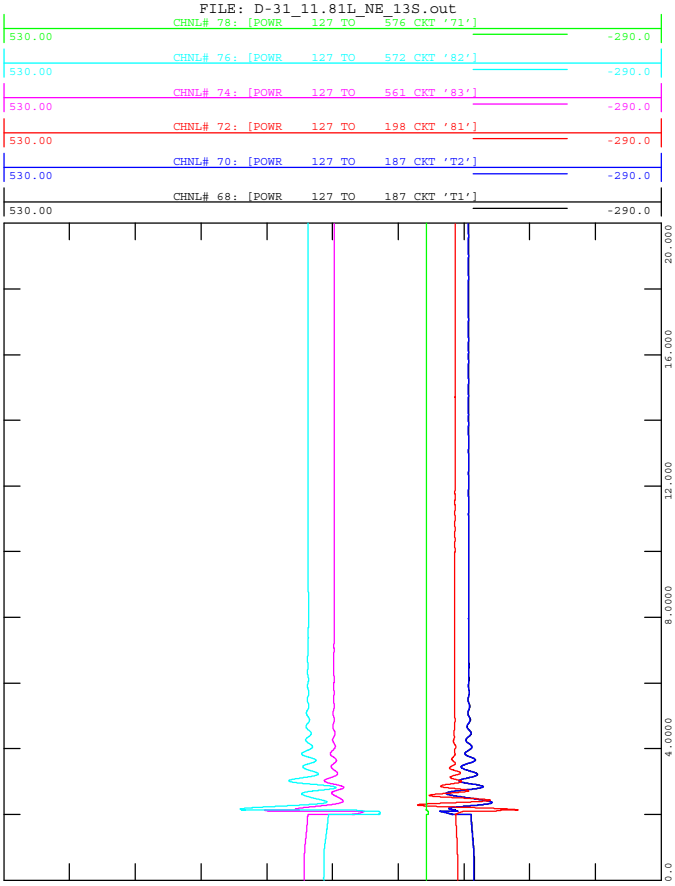
FIGURE D-30E
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-14
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-30_11.82L_NE_14S.out
CHNL# 79: [VARS 127 TO 576 CKT '71']
1000.0
-440.0
CHNL# 77: [VARS 127 TO 572 CKT '82']
1000.0
-440.0
CHNL# 75: [VARS 127 TO 561 CKT '83']
1000.0
-440.0
CHNL# 73: [VARS 127 TO 198 CKT '81']
1000.0
-440.0
CHNL# 71: [VARS 127 TO 187 CKT 'T2']
1000.0
-440.0
CHNL# 69: [VARS 127 TO 187 CKT 'T1']
1000.0
-440.0
THU, DEC 15 2016 13:36
BRANCH FLOW (Q)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)

FIGURE D-31B
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-13
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-31_11.81L_NE_13S.out



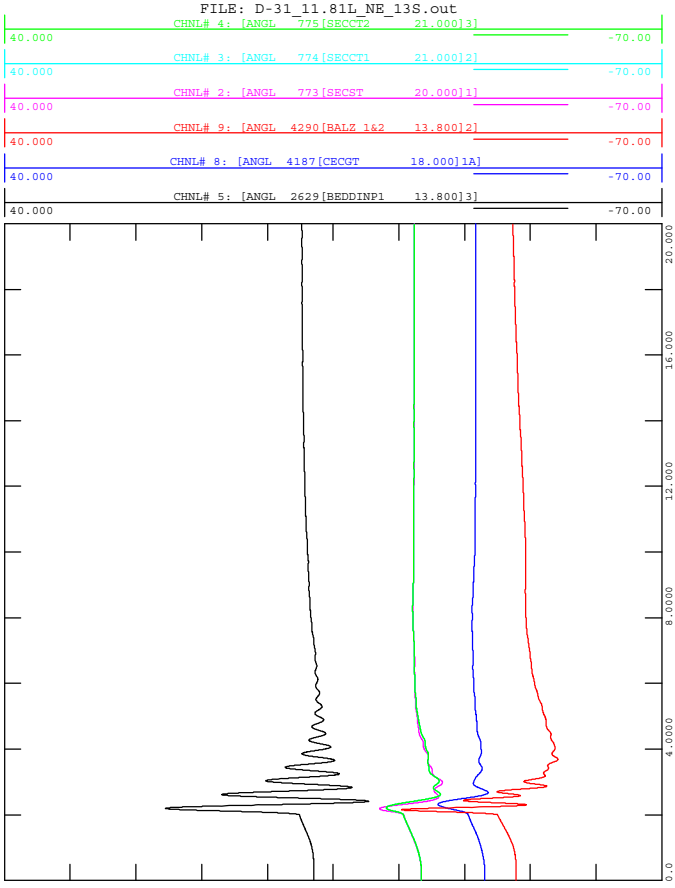
THU, DEC 15 2016 13:36
MACHINE ETERM (V)

FIGURE D-31D
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-13
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-31_11.81L_NE_13S.out



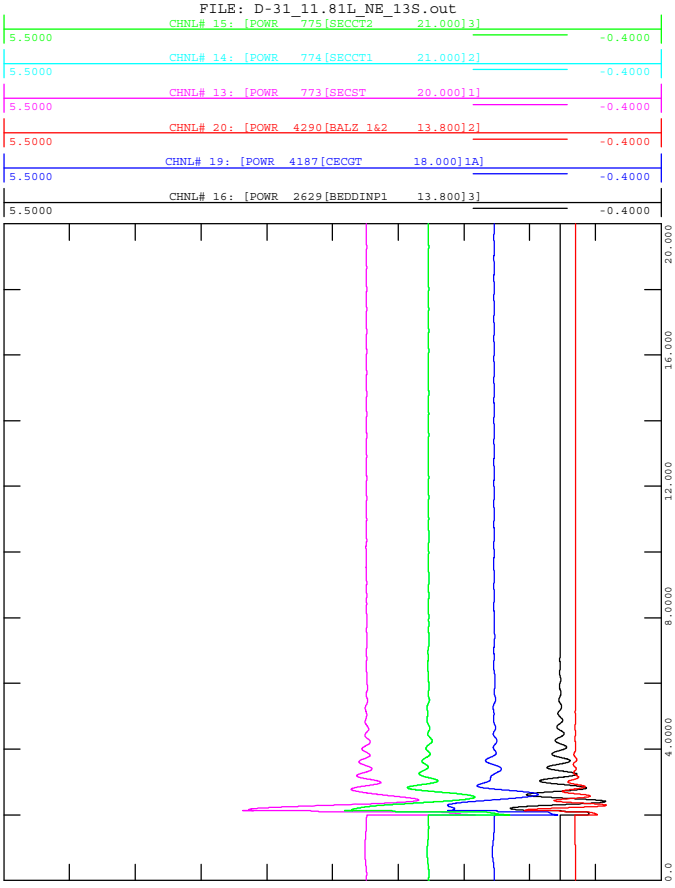
THU, DEC 15 2016 13:36
BRANCH FLOW (P)

FIGURE D-31A
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-13
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-31_11.81L_NE_13S.out



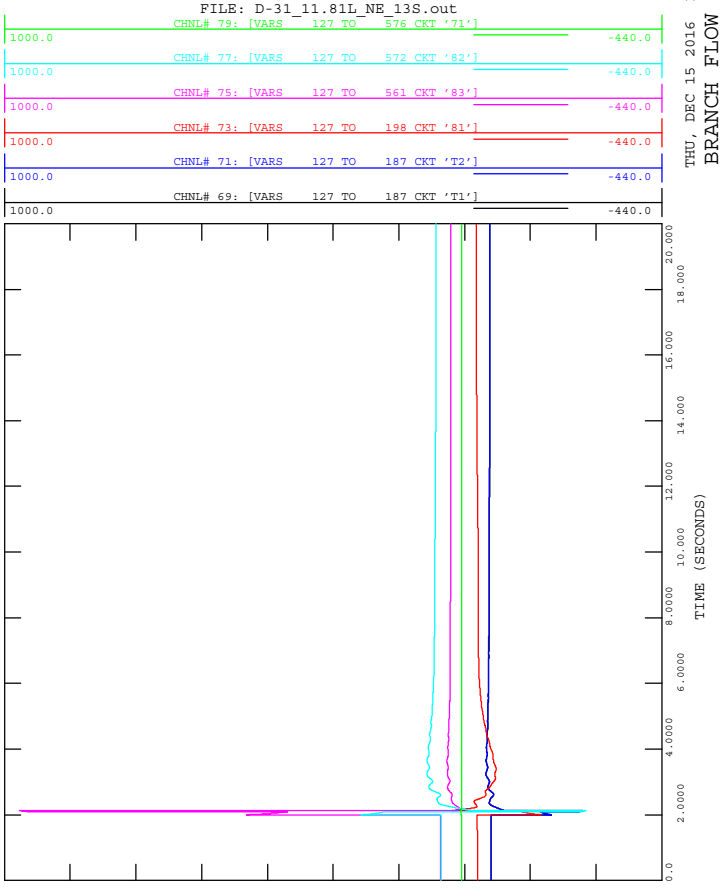
THU, DEC 15 2016 13:36
MACHINE ANGLE (DEGREES)

FIGURE D-31C
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-13
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-31_11.81L_NE_13S.out



THU, DEC 15 2016 13:36
MACHINE POWER (MW)

FIGURE D-31E
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-13
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-31_11.81L_NE_13S.out



THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-32B
2018SL, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-22
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-32_22.81L_NE_22S.out

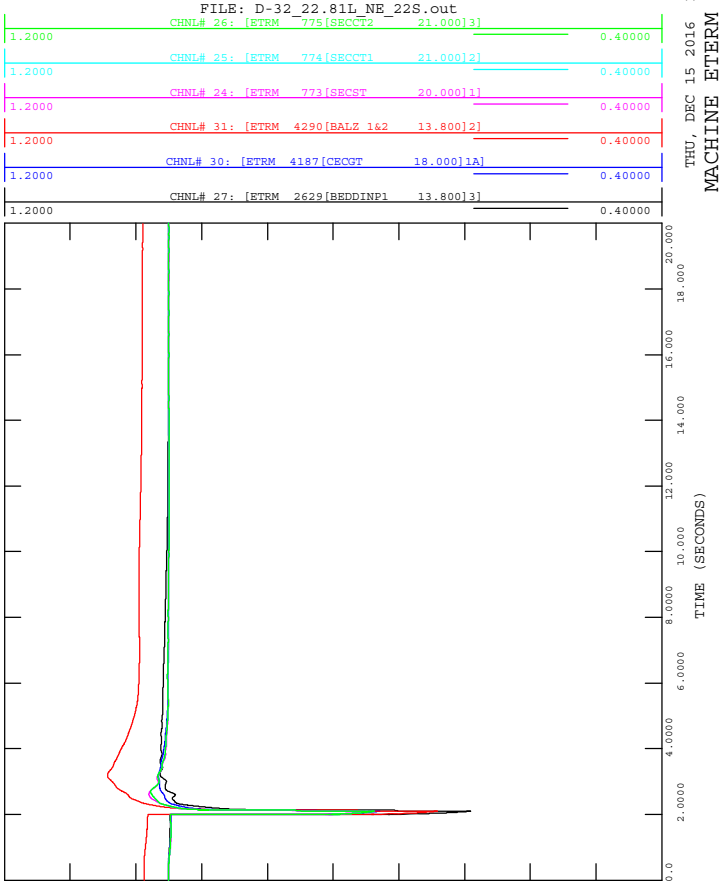


FIGURE D-32D
2018SL, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-22
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-32_22.81L_NE_22S.out

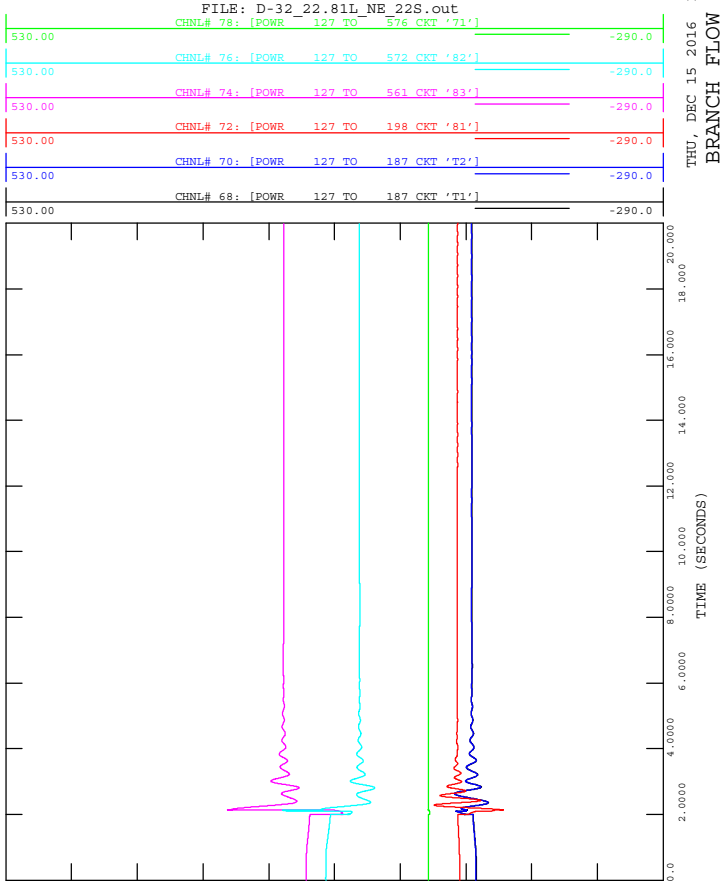


FIGURE D-32A
2018SL, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-22
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-32_22.81L_NE_22S.out

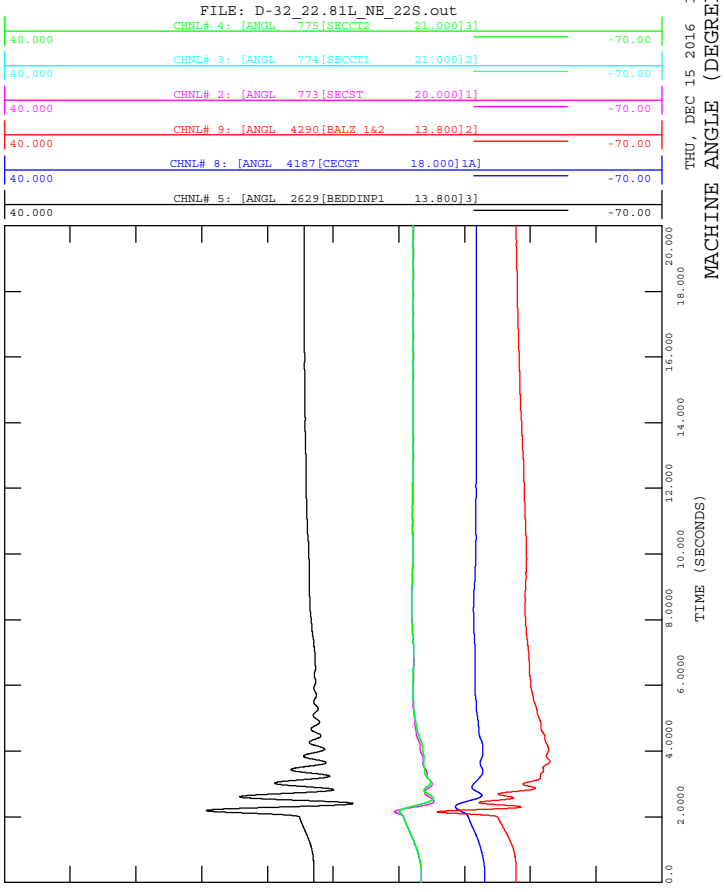


FIGURE D-32C
2018SL, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-22
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-32_22.81L_NE_22S.out

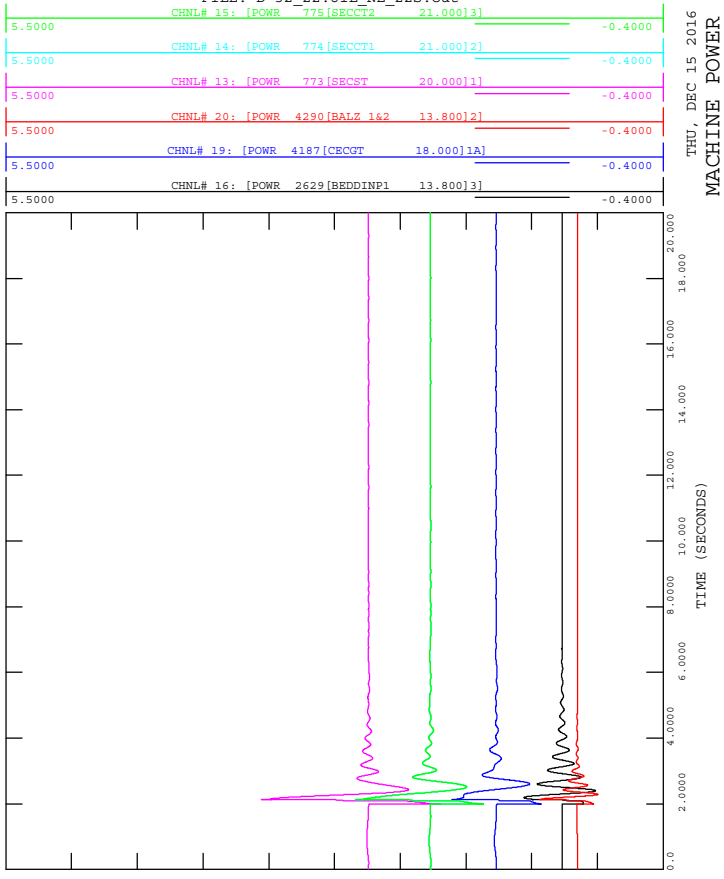
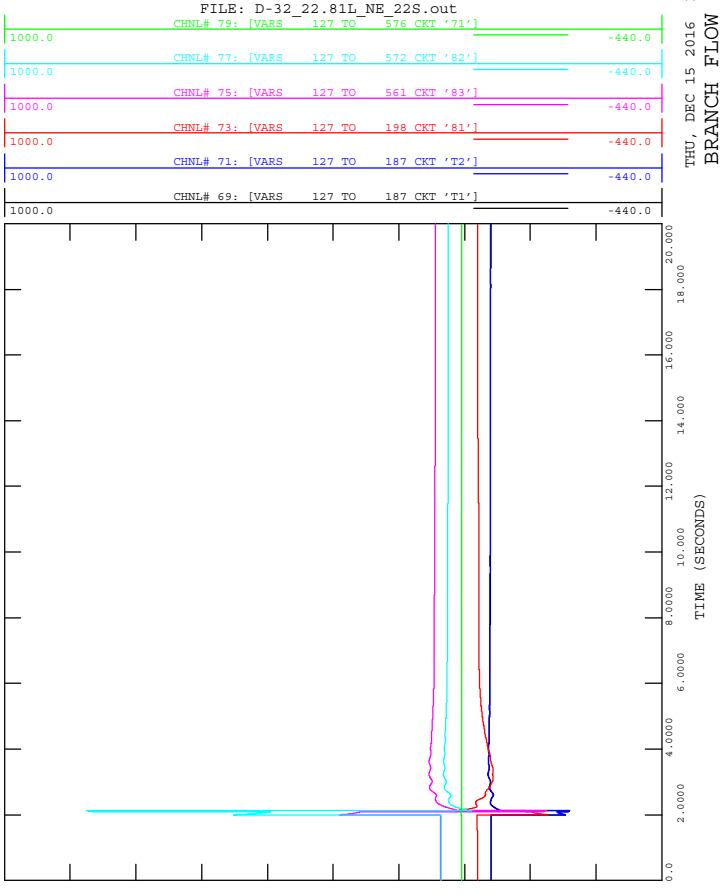
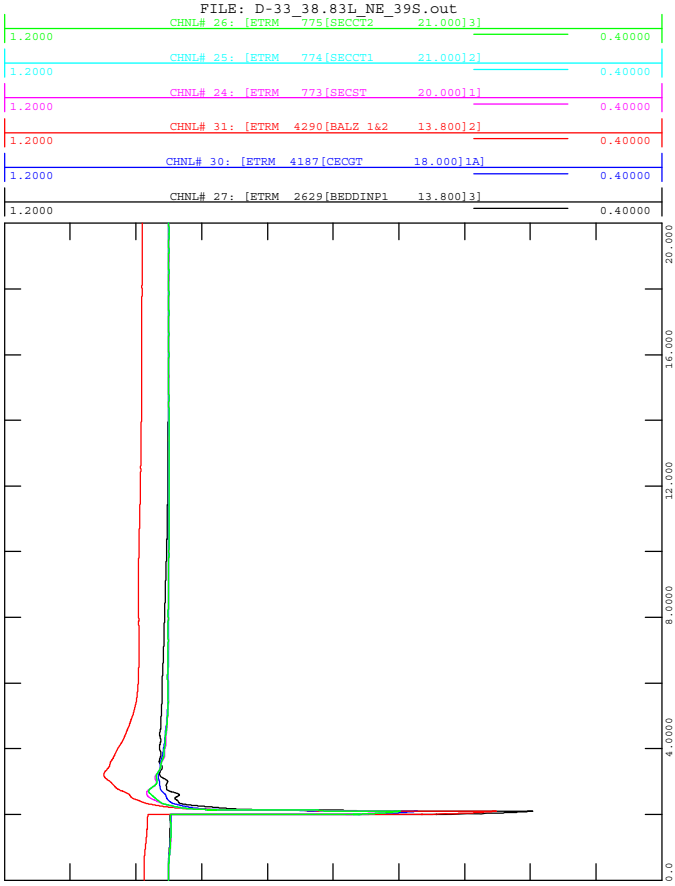


FIGURE D-32E
2018SL, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-22
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-32_22.81L_NE_22S.out



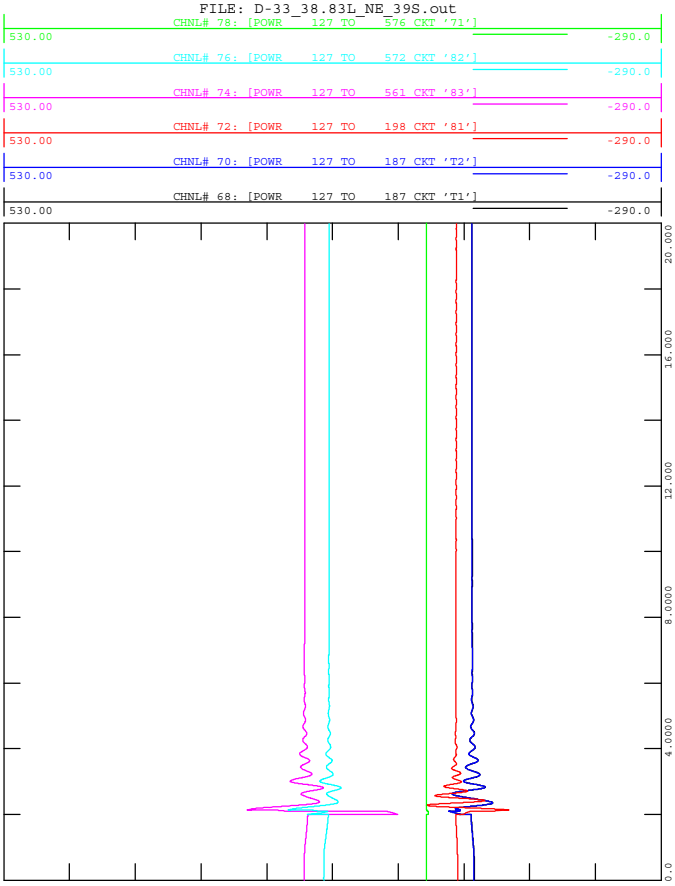
THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-33B
2018SL, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-33_38.83L_NE_39S.out



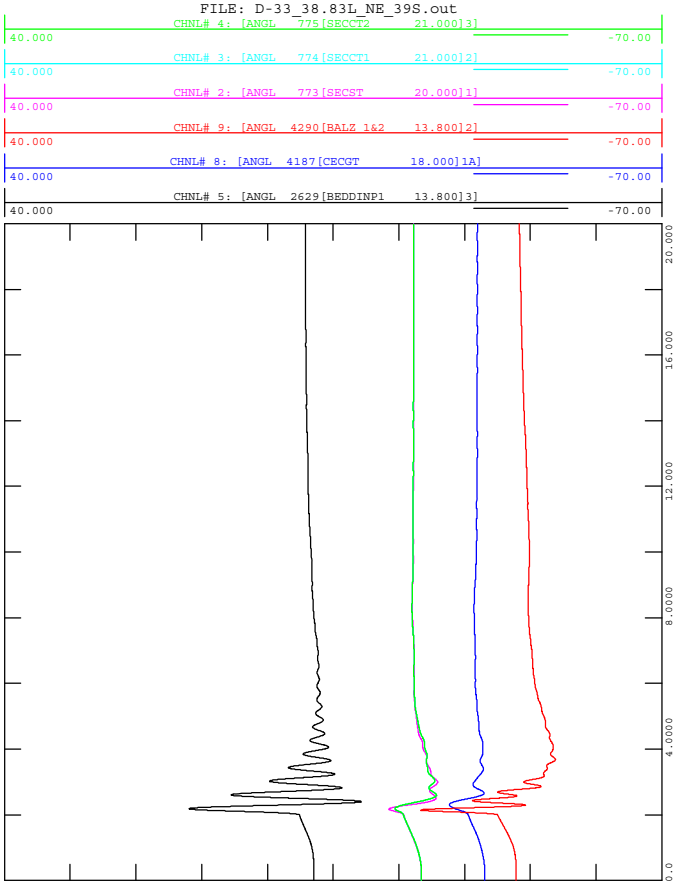
THU, DEC 15 2016 13:36
MACHINE ETERM (V)

FIGURE D-33D
2018SL, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-33_38.83L_NE_39S.out



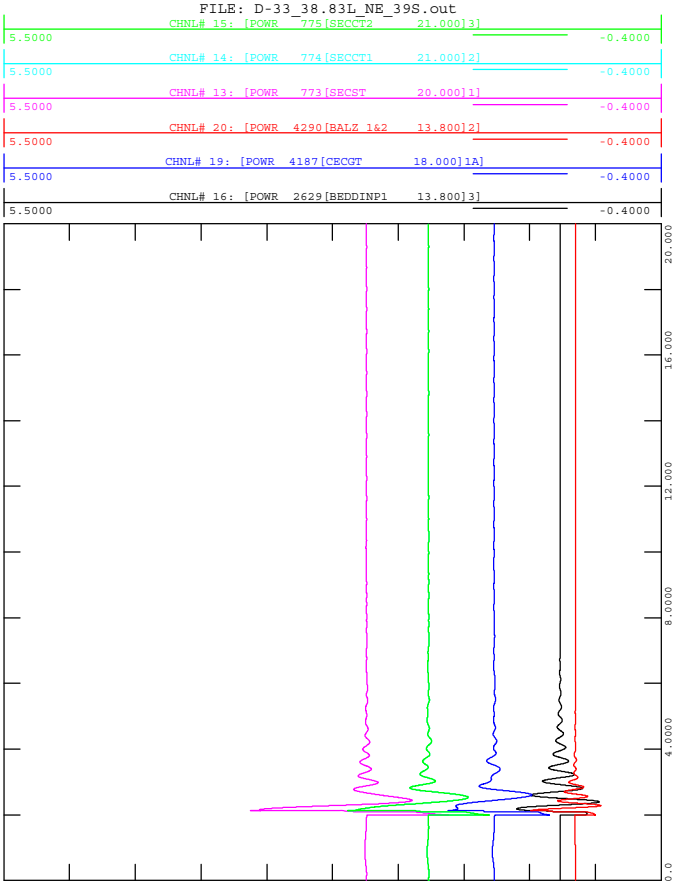
THU, DEC 15 2016 13:36
BRANCH FLOW (P)

FIGURE D-33A
2018SL, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-33_38.83L_NE_39S.out



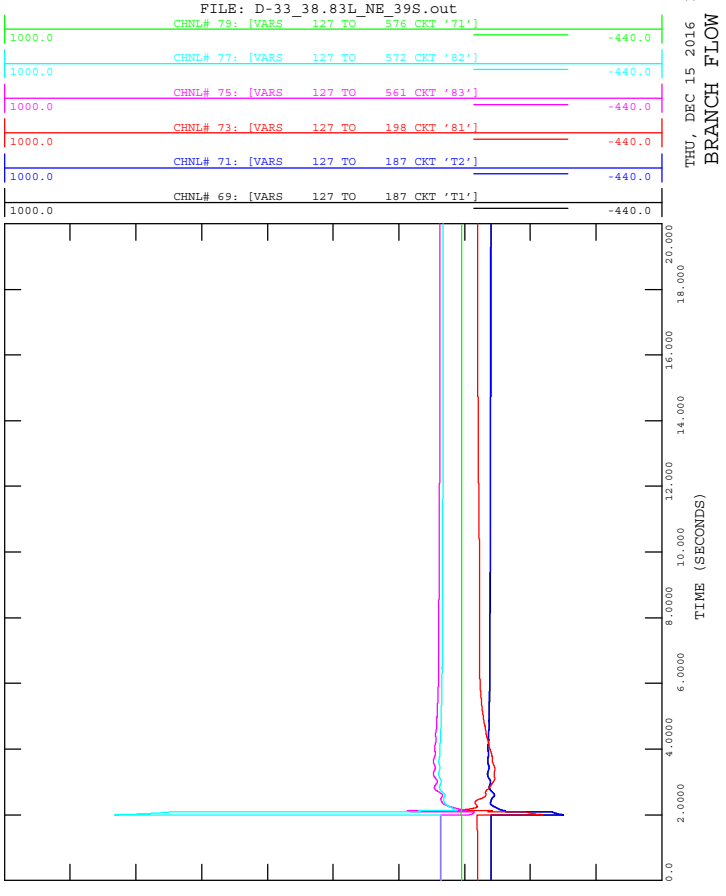
THU, DEC 15 2016 13:36
MACHINE ANGLE (DEGREES)

FIGURE D-33C
2018SL, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-33_38.83L_NE_39S.out



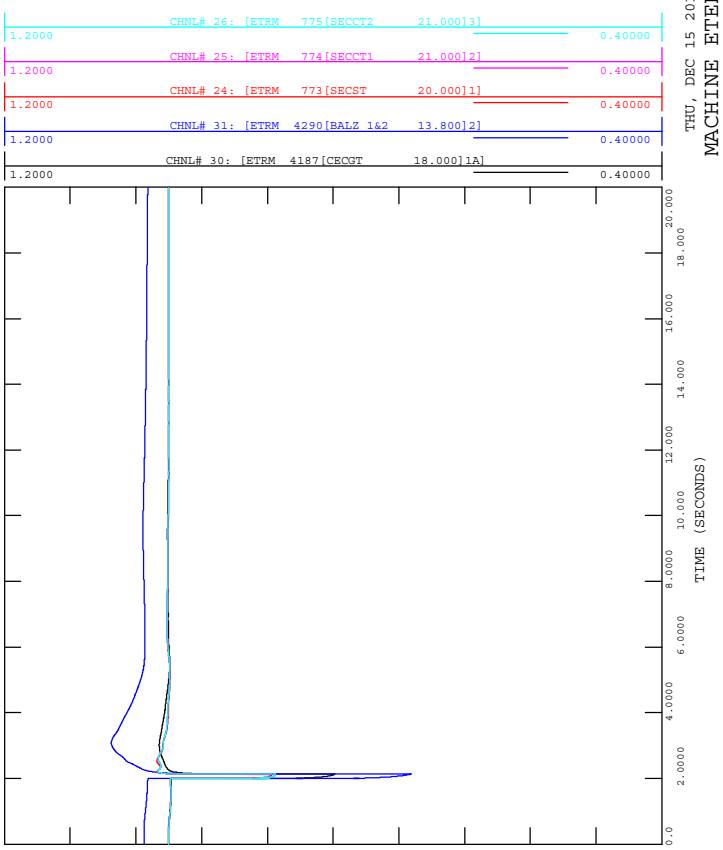
THU, DEC 15 2016 13:36
MACHINE POWER (MW)

FIGURE D-33E
2018SL, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-33_38.83L_NE_39S.out



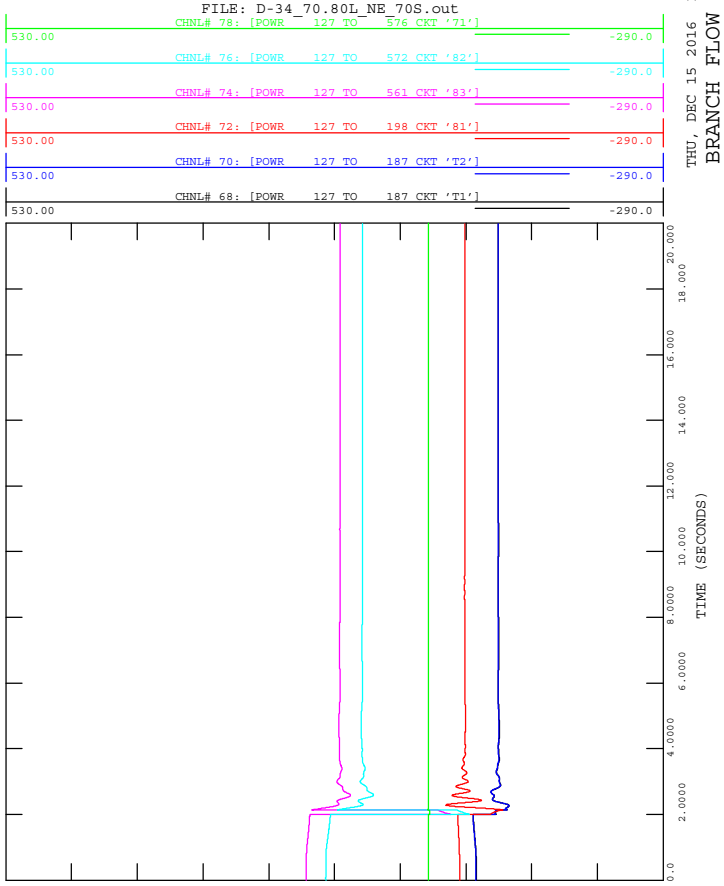
THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-34B
2018SL, POST-PROJECT
3 PHASE FAULT ON 70.80L AT SS-70
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-34_70.80L_NE_70S.out



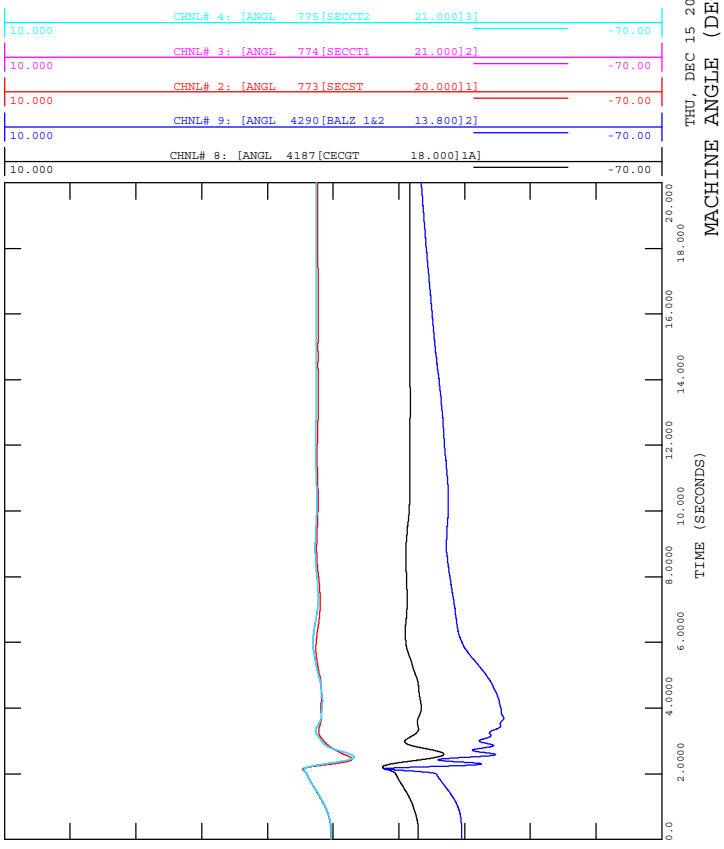
THU, DEC 15 2016 13:36
MACHINE ETERM (V)

FIGURE D-34D
2018SL, POST-PROJECT
3 PHASE FAULT ON 70.80L AT SS-70
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-34_70.80L_NE_70S.out



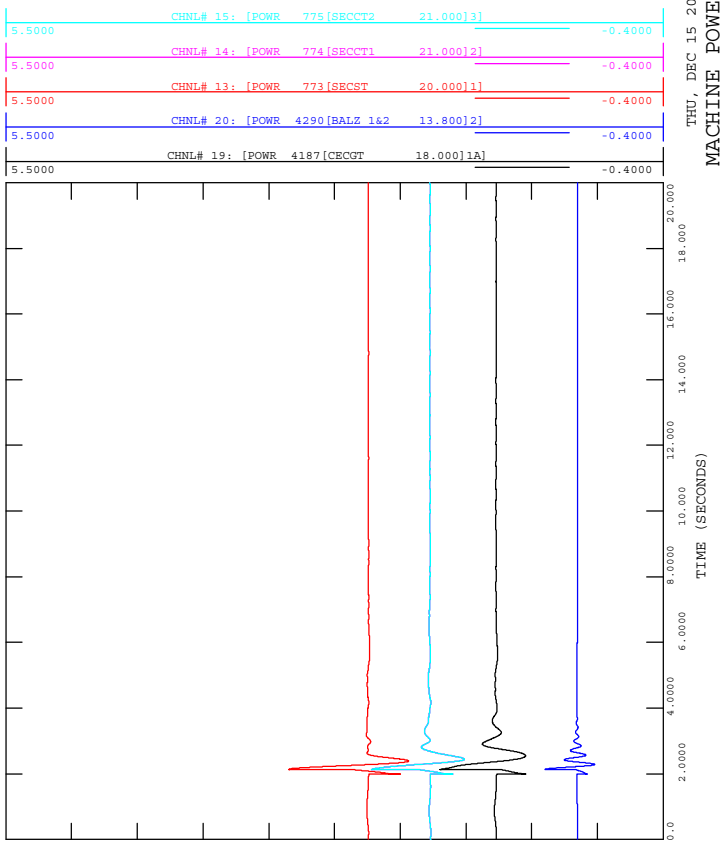
THU, DEC 15 2016 13:36
BRANCH FLOW (P)

FIGURE D-34A
2018SL, POST-PROJECT
3 PHASE FAULT ON 70.80L AT SS-70
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-34_70.80L_NE_70S.out



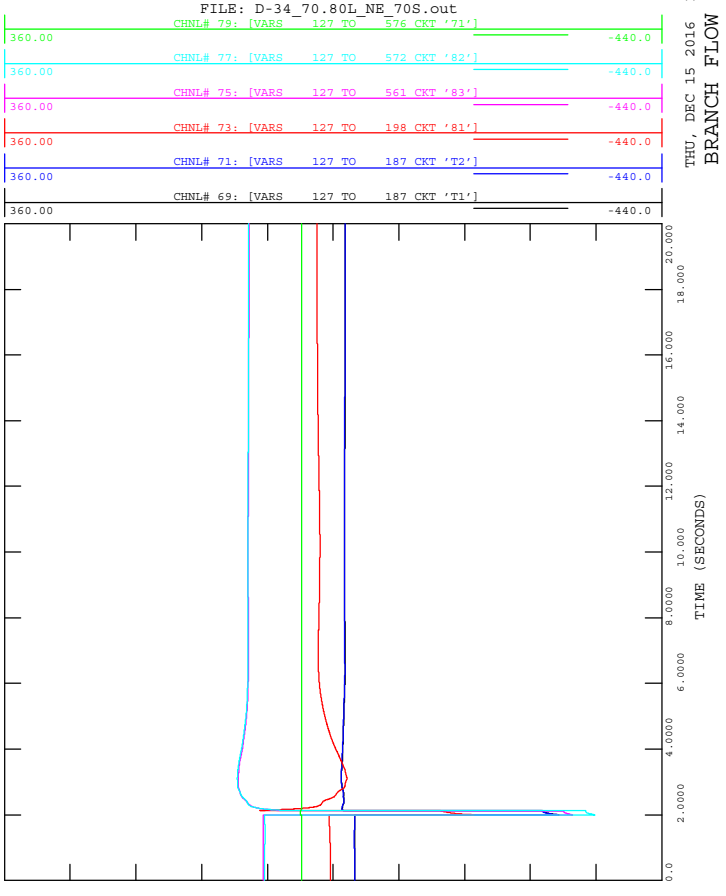
THU, DEC 15 2016 13:36
MACHINE ANGLE (DEGREES)

FIGURE D-34C
2018SL, POST-PROJECT
3 PHASE FAULT ON 70.80L AT SS-70
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-34_70.80L_NE_70S.out



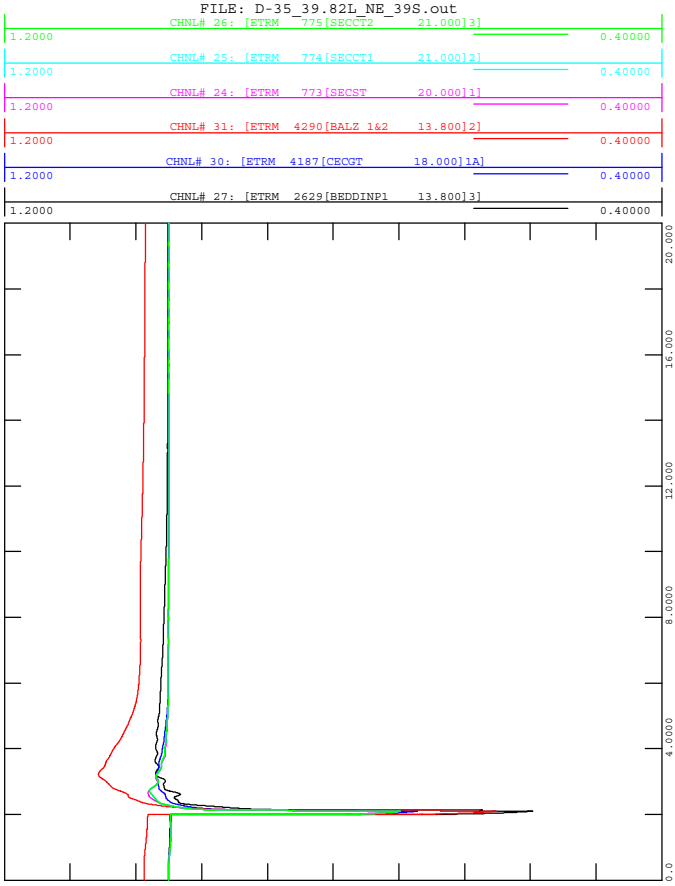
THU, DEC 15 2016 13:36
MACHINE POWER (MW)

FIGURE D-34E
2018SL, POST-PROJECT
3 PHASE FAULT ON 70.80L AT SS-70
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-34_70.80L_NE_70S.out



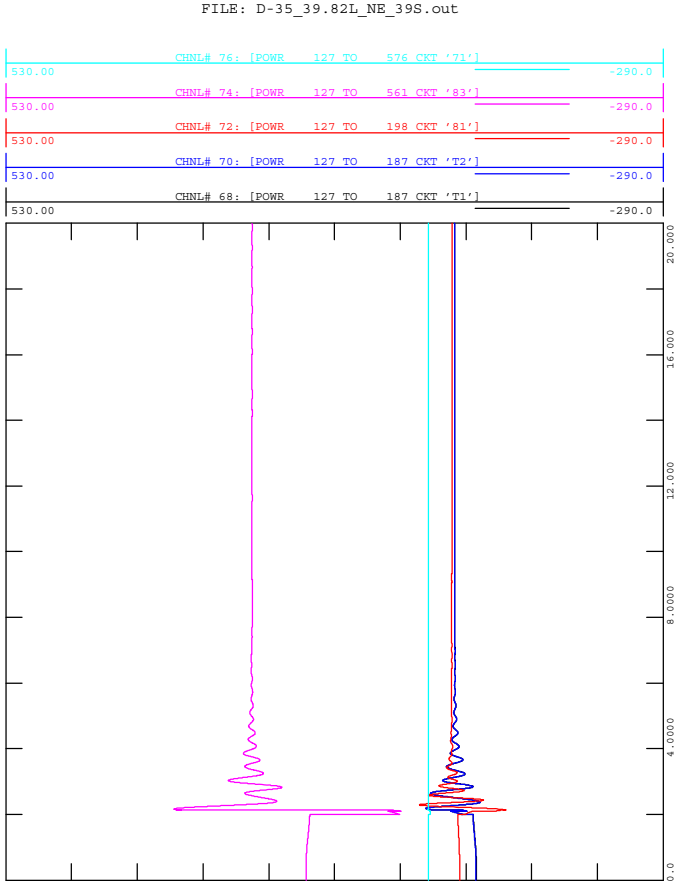
THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-35B
2018SL, POST-PROJECT
3 PHASE FAULT ON 39.82L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-35_39.82L_NE_39S.out



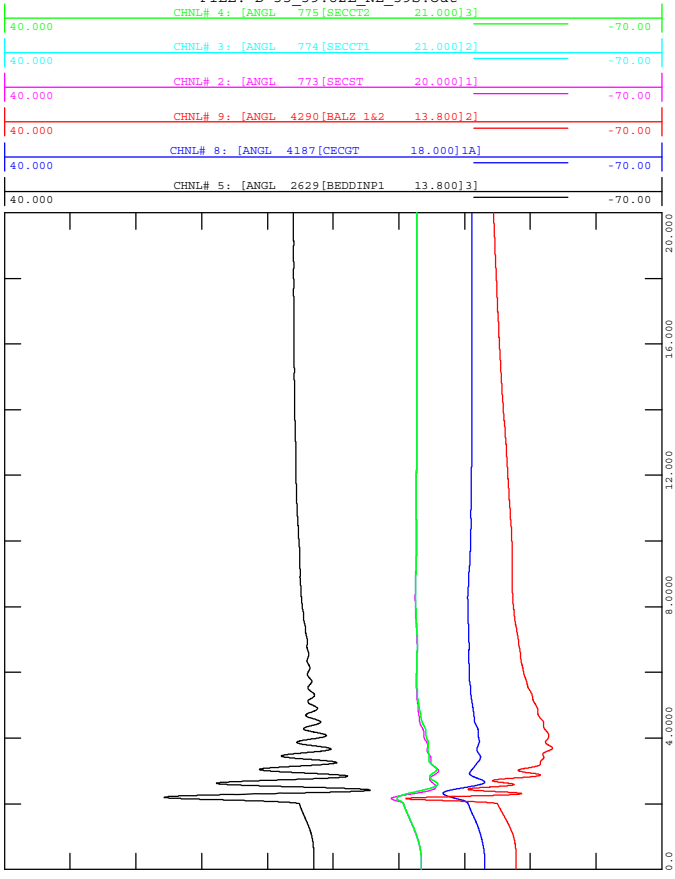
THU, DEC 15 2016 13:36
MACHINE ETERM (V)

FIGURE D-35D
2018SL, POST-PROJECT
3 PHASE FAULT ON 39.82L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-35_39.82L_NE_39S.out



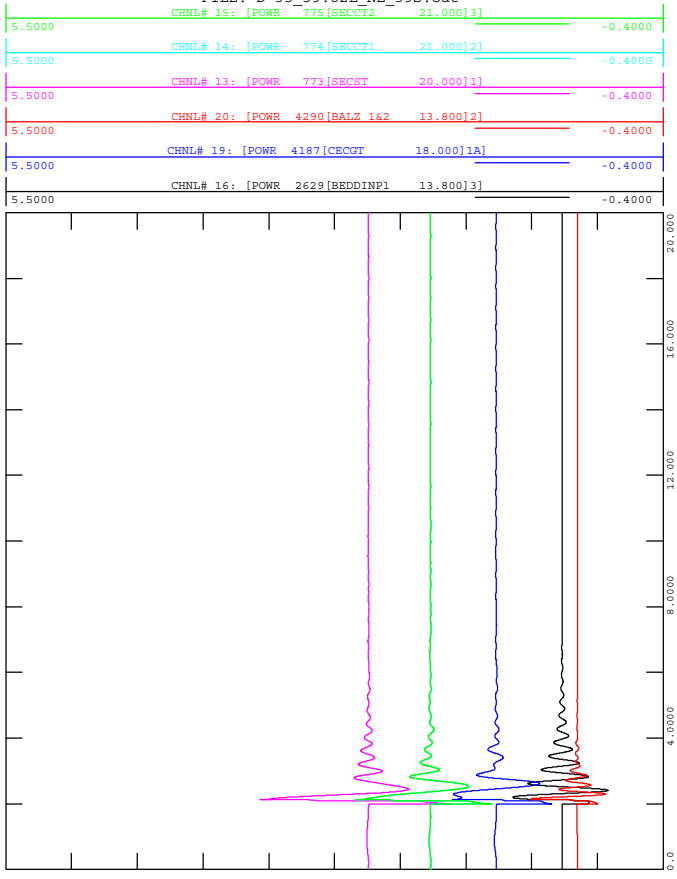
THU, DEC 15 2016 13:36
BRANCH FLOW (P)

FIGURE D-35A
2018SL, POST-PROJECT
3 PHASE FAULT ON 39.82L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-35_39.82L_NE_39S.out



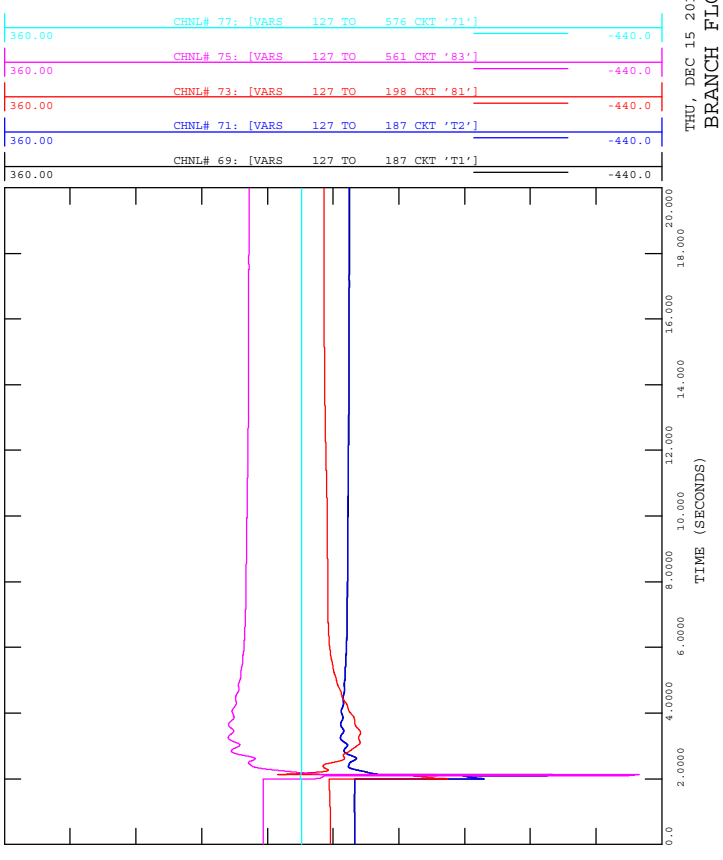
THU, DEC 15 2016 13:36
MACHINE ANGLE (DEGREES)

FIGURE D-35C
2018SL, POST-PROJECT
3 PHASE FAULT ON 39.82L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-35_39.82L_NE_39S.out



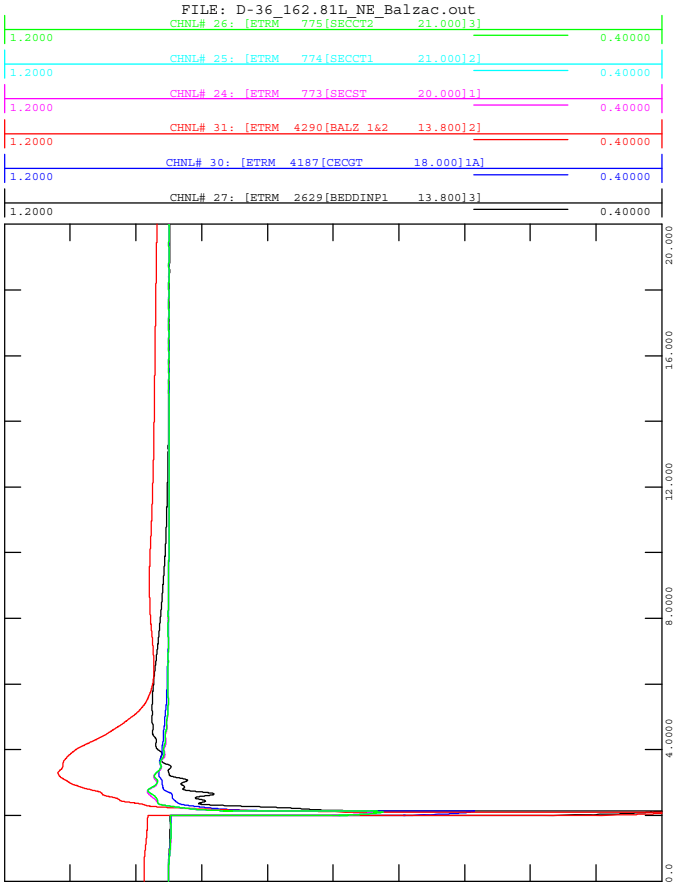
THU, DEC 15 2016 13:36
MACHINE POWER (MW)

FIGURE D-35E
2018SL, POST-PROJECT
3 PHASE FAULT ON 39.82L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-35_39.82L_NE_39S.out



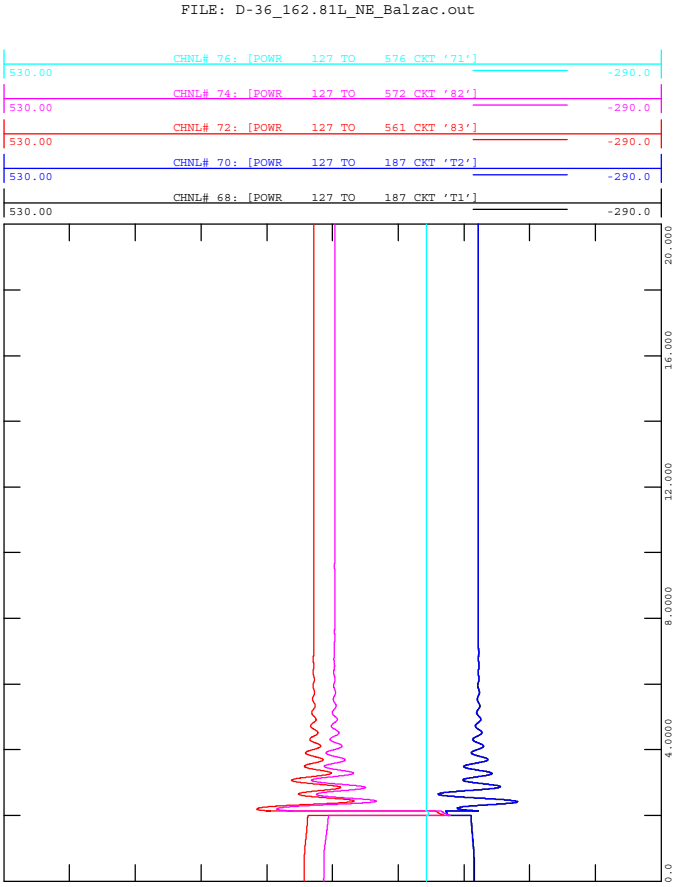
THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-36B
2018SL, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BALZAC
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-36_162.81L_NE_Balzac.out



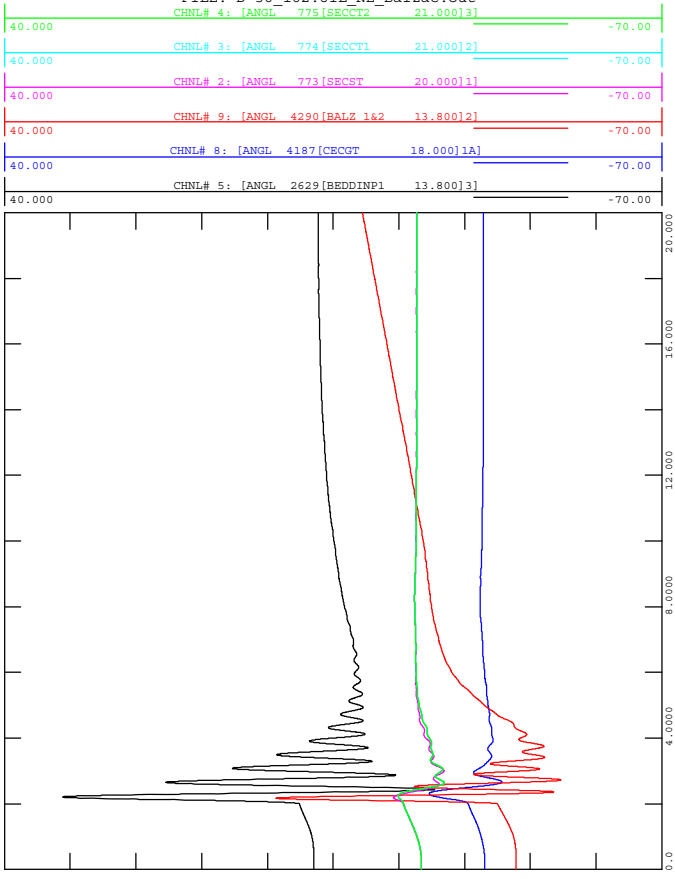
THU, DEC 15 2016 13:36
MACHINE ETERM (V)

FIGURE D-36D
2018SL, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BALZAC
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-36_162.81L_NE_Balzac.out



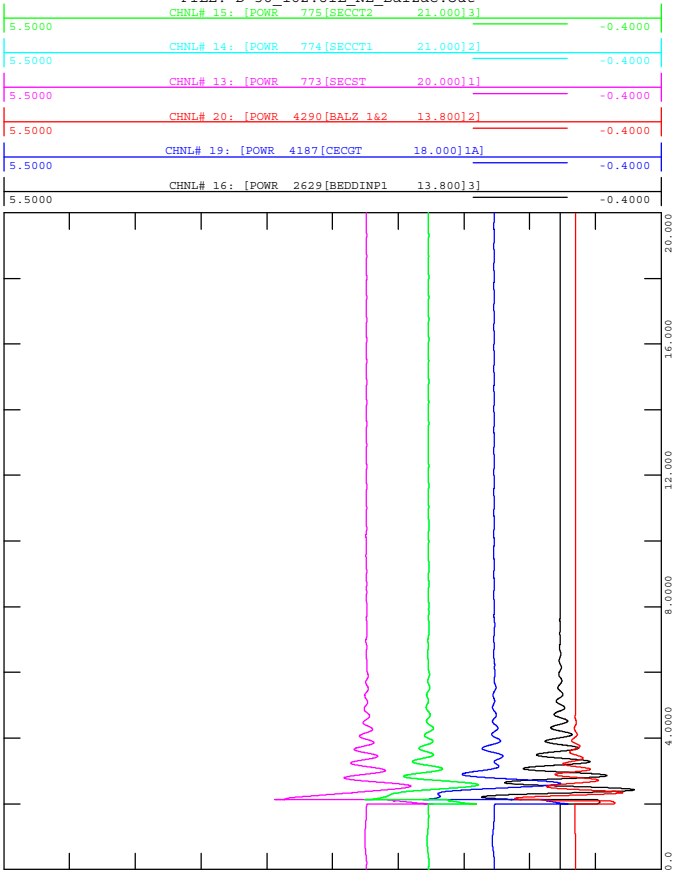
THU, DEC 15 2016 13:36
BRANCH FLOW (P)

FIGURE D-36A
2018SL, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BALZAC
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-36_162.81L_NE_Balzac.out



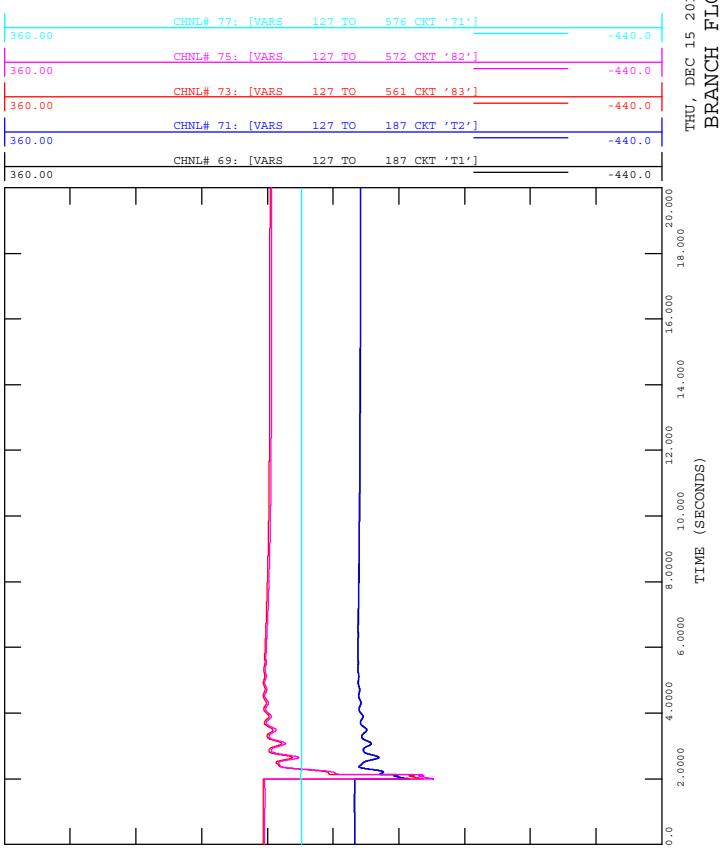
THU, DEC 15 2016 13:36
MACHINE ANGLE (DEGREES)

FIGURE D-36C
2018SL, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BALZAC
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-36_162.81L_NE_Balzac.out



THU, DEC 15 2016 13:36
MACHINE POWER (MW)

FIGURE D-36E
2018SL, POST-PROJECT
3 PHASE FAULT ON 162.81L AT BALZAC
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-36_162.81L_NE_Balzac.out



THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-37B
2018SL, POST-PROJECT
3 PHASE FAULT ON 771L AT SS-47
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-37_771L_NE_47S.out

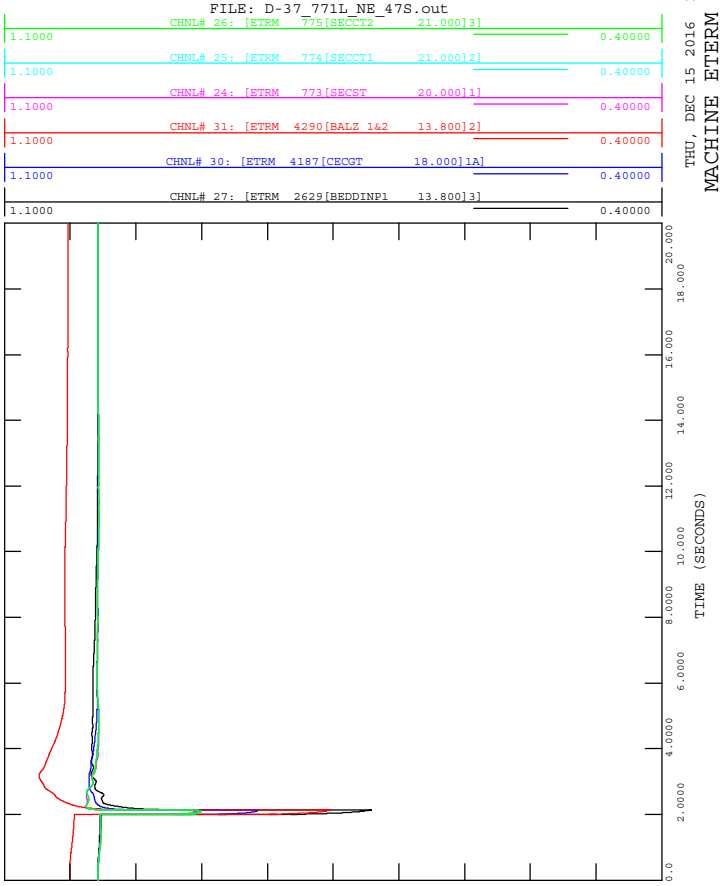


FIGURE D-37D
2018SL, POST-PROJECT
3 PHASE FAULT ON 771L AT SS-47
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-37_771L_NE_47S.out

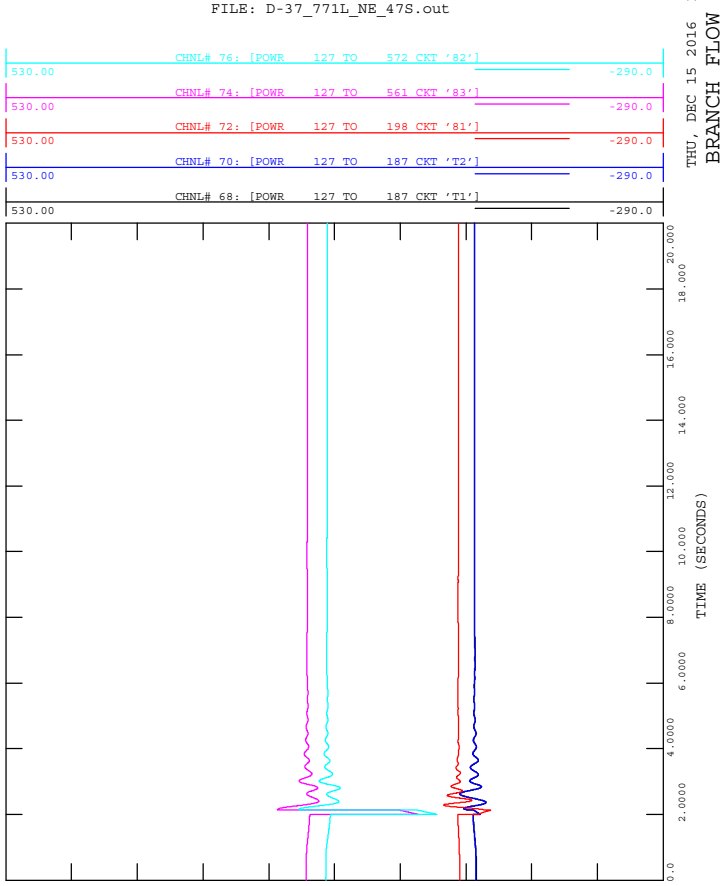


FIGURE D-37A
2018SL, POST-PROJECT
3 PHASE FAULT ON 771L AT SS-47
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-37_771L_NE_47S.out

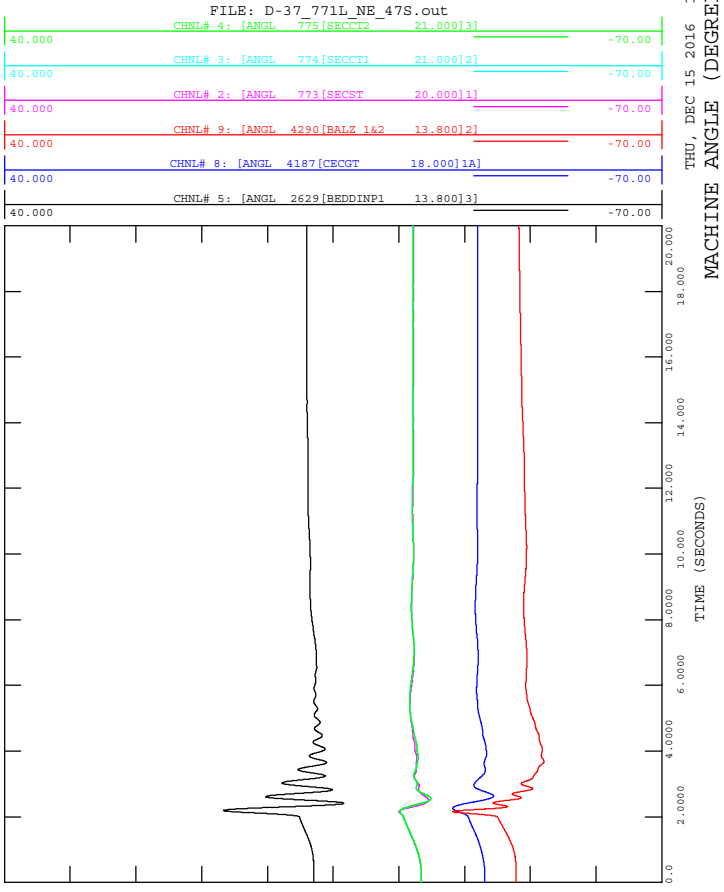


FIGURE D-37C
2018SL, POST-PROJECT
3 PHASE FAULT ON 771L AT SS-47
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-37_771L_NE_47S.out

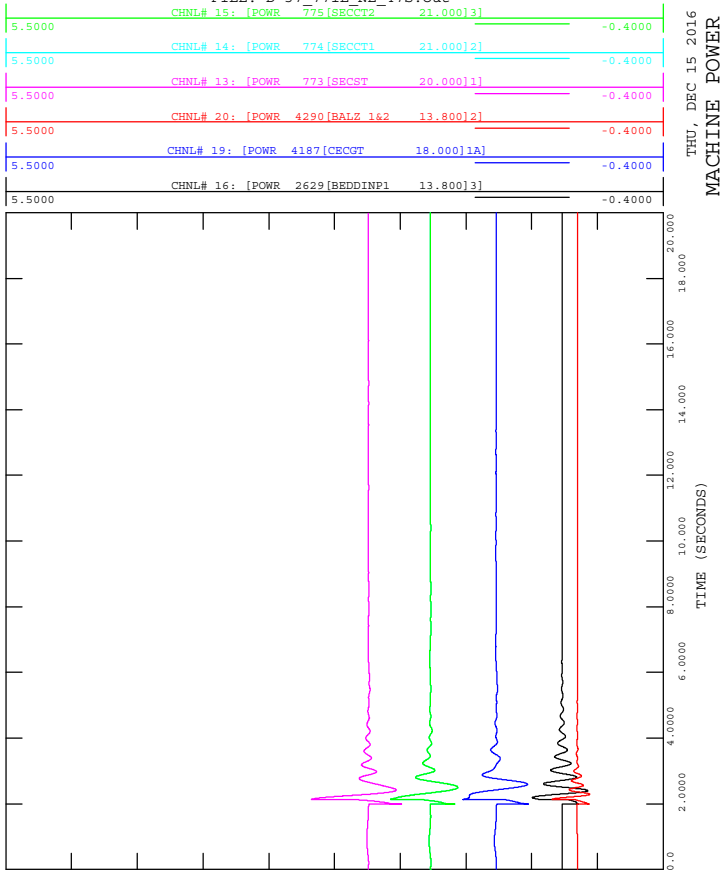
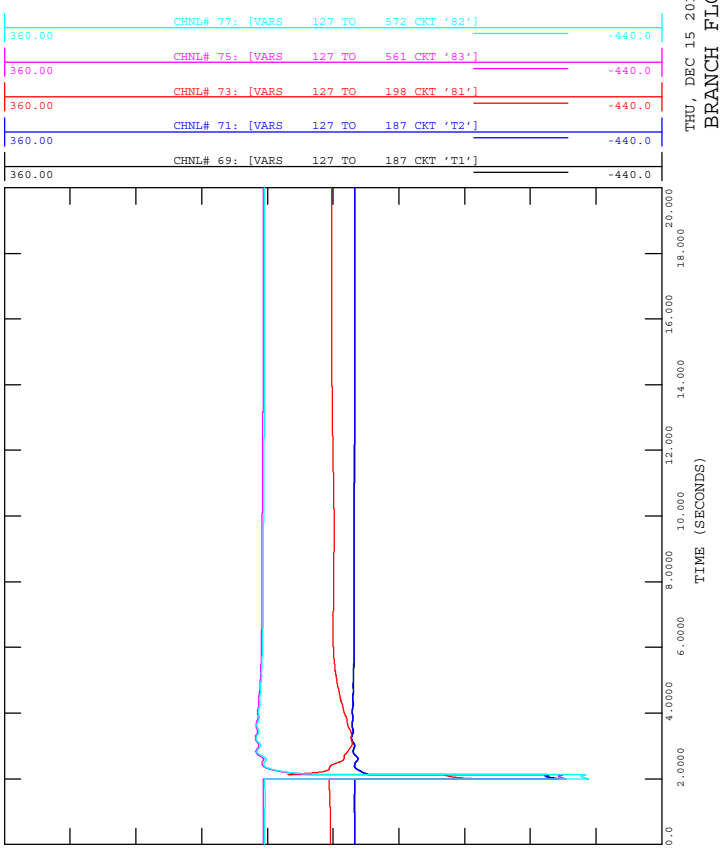
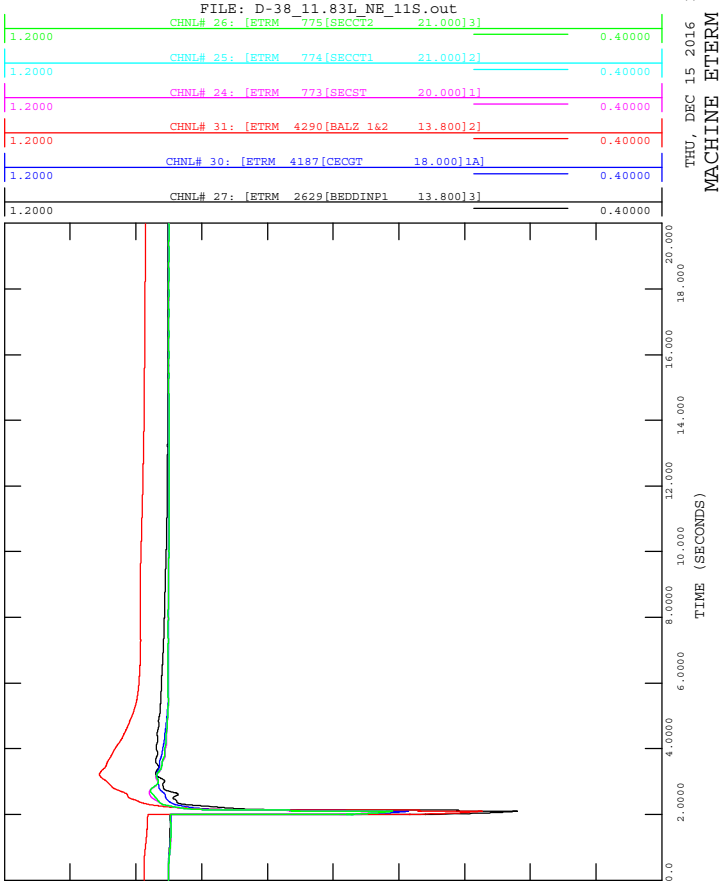


FIGURE D-37E
2018SL, POST-PROJECT
3 PHASE FAULT ON 771L AT SS-47
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-37_771L_NE_47S.out



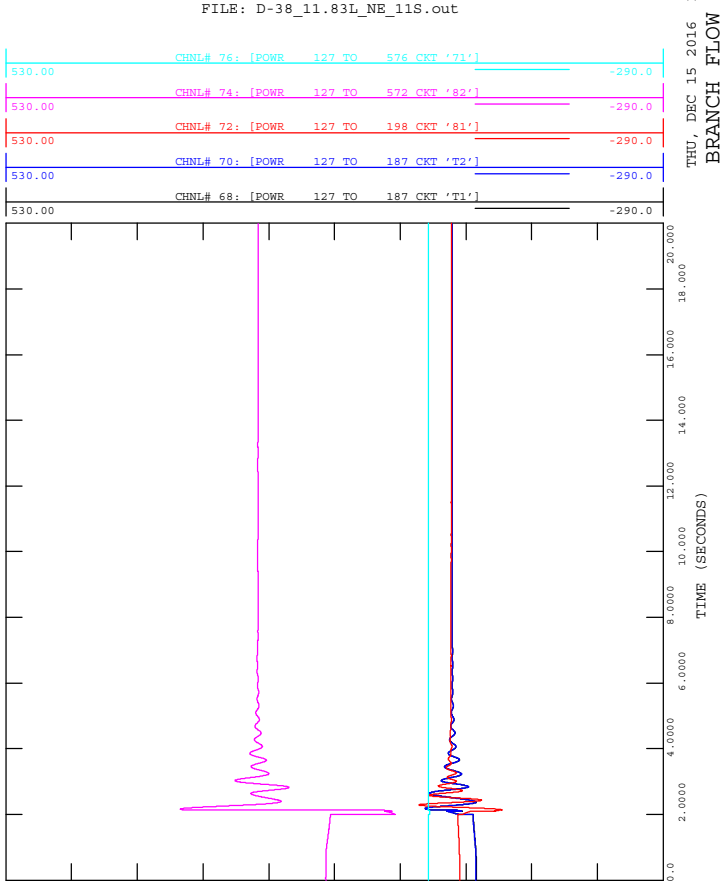
THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-38B
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.83L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-38_11.83L_NE_11S.out



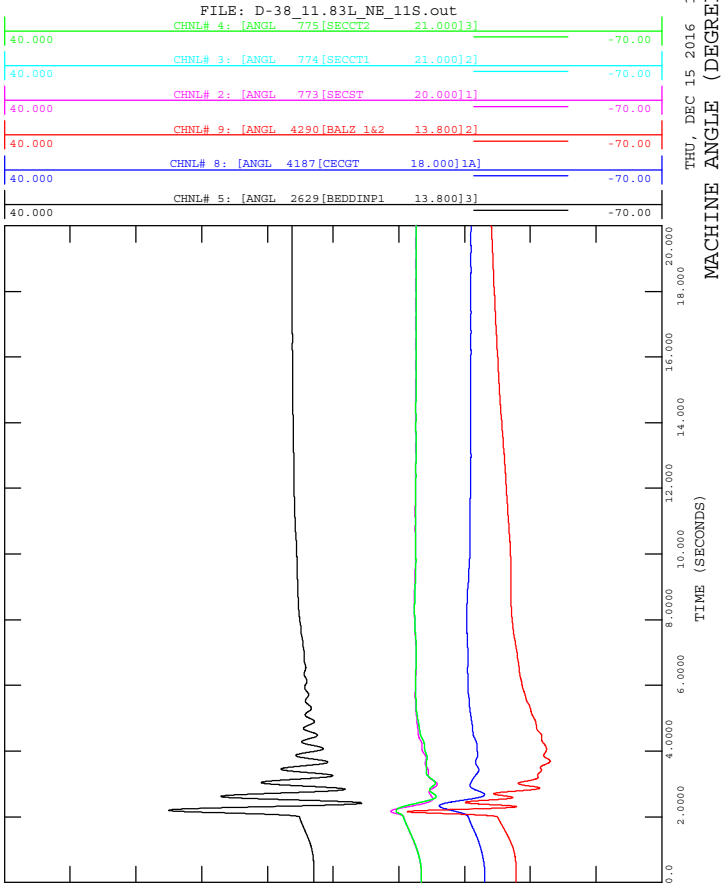
THU, DEC 15 2016 13:36
MACHINE ETERM (V)

FIGURE D-38D
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.83L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-38_11.83L_NE_11S.out



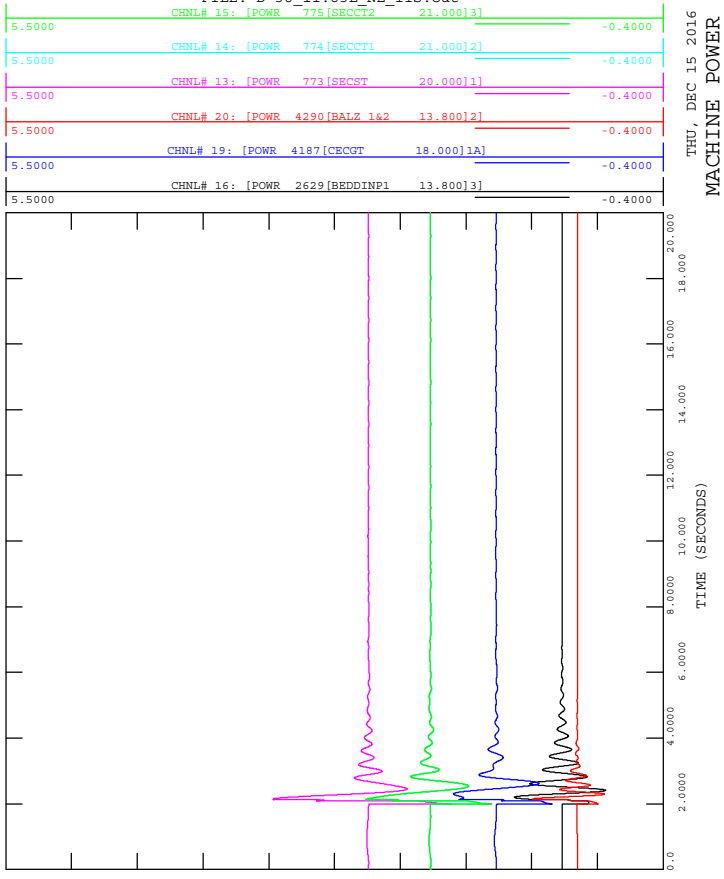
THU, DEC 15 2016 13:36
BRANCH FLOW (P)

FIGURE D-38A
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.83L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-38_11.83L_NE_11S.out



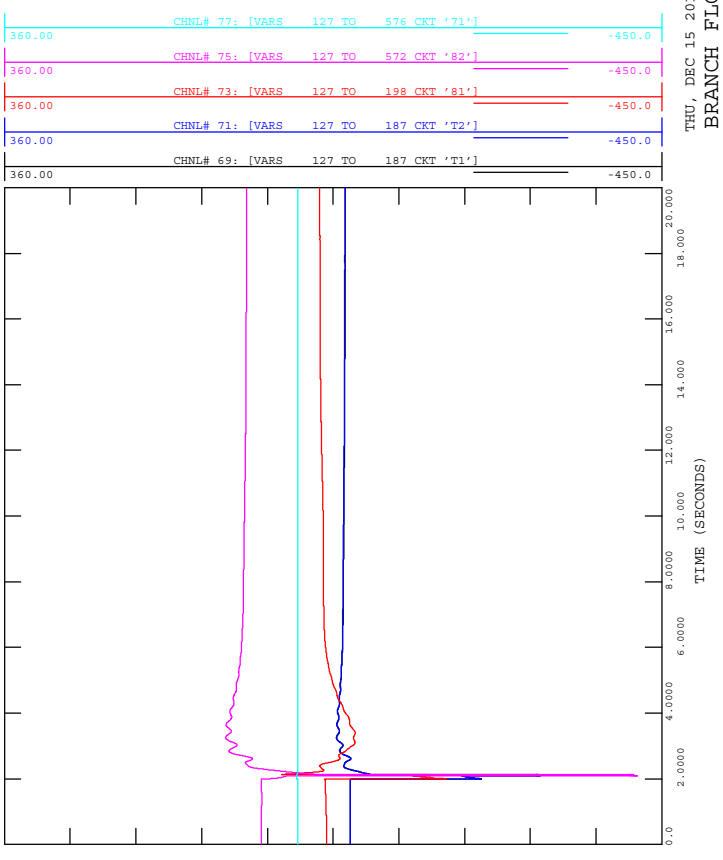
THU, DEC 15 2016 13:36
MACHINE ANGLE (DEGREES)

FIGURE D-38C
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.83L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-38_11.83L_NE_11S.out



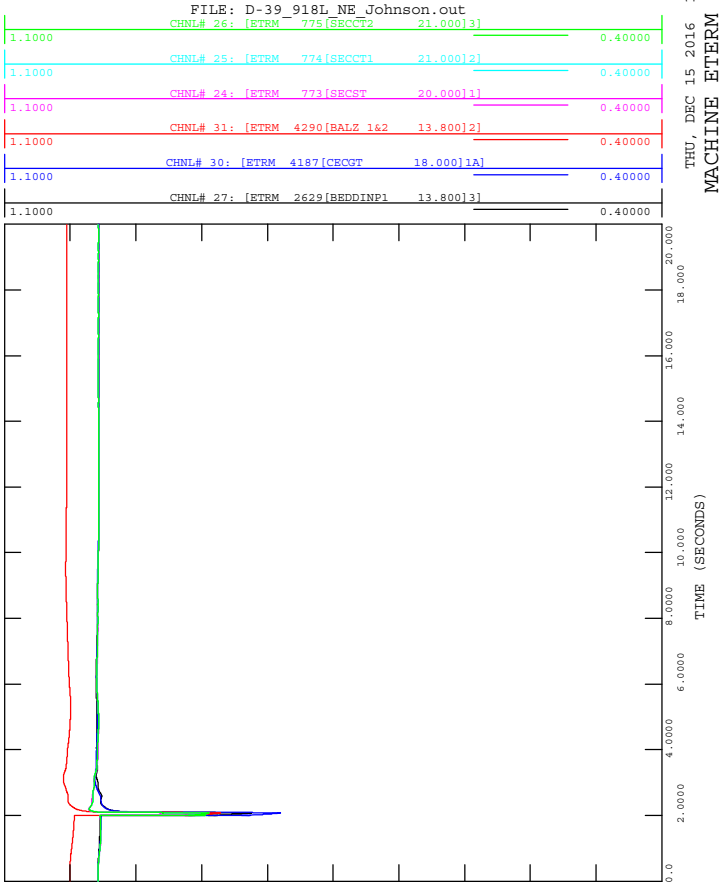
THU, DEC 15 2016 13:36
MACHINE POWER (MW)

FIGURE D-38E
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.83L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-38_11.83L_NE_11S.out



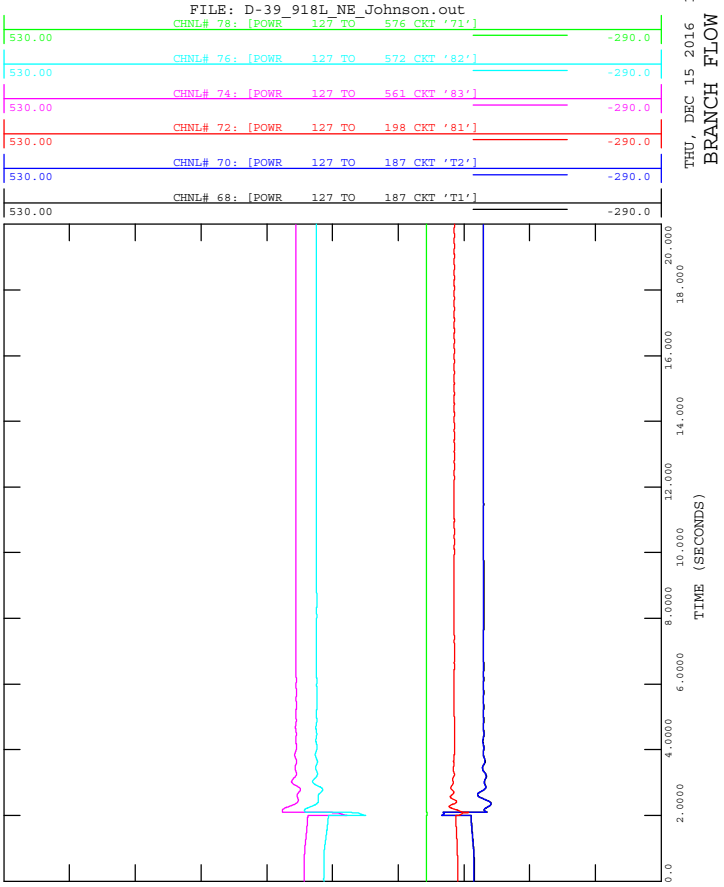
THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-39B
2018SL, POST-PROJECT
3 PHASE FAULT ON 918L AT JOHNSON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-39_918L_NE_Johnson.out



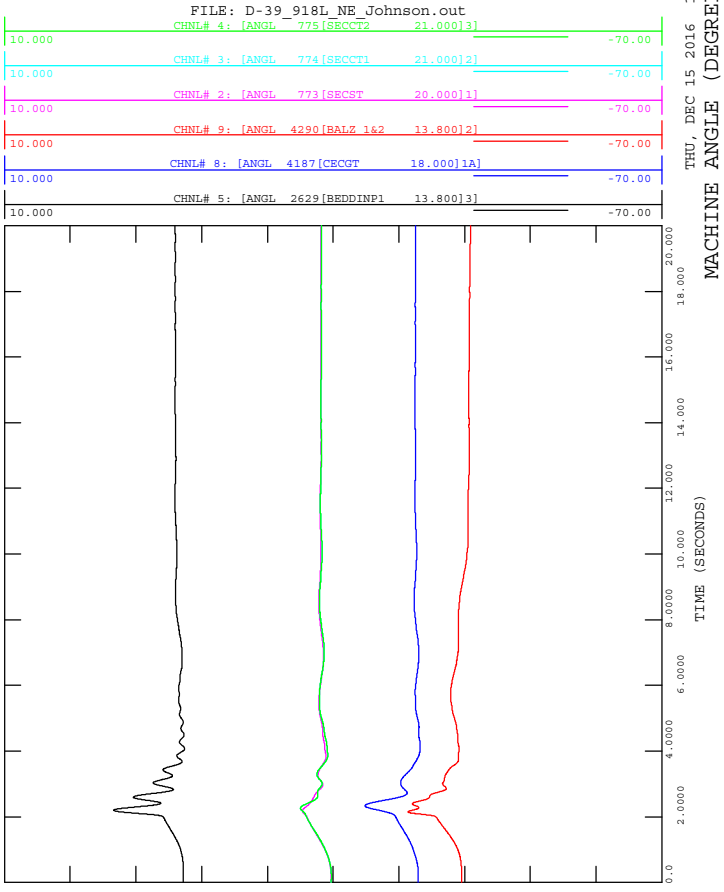
THU, DEC 15 2016 13:36
MACHINE ETERM (V)

FIGURE D-39D
2018SL, POST-PROJECT
3 PHASE FAULT ON 918L AT JOHNSON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-39_918L_NE_Johnson.out



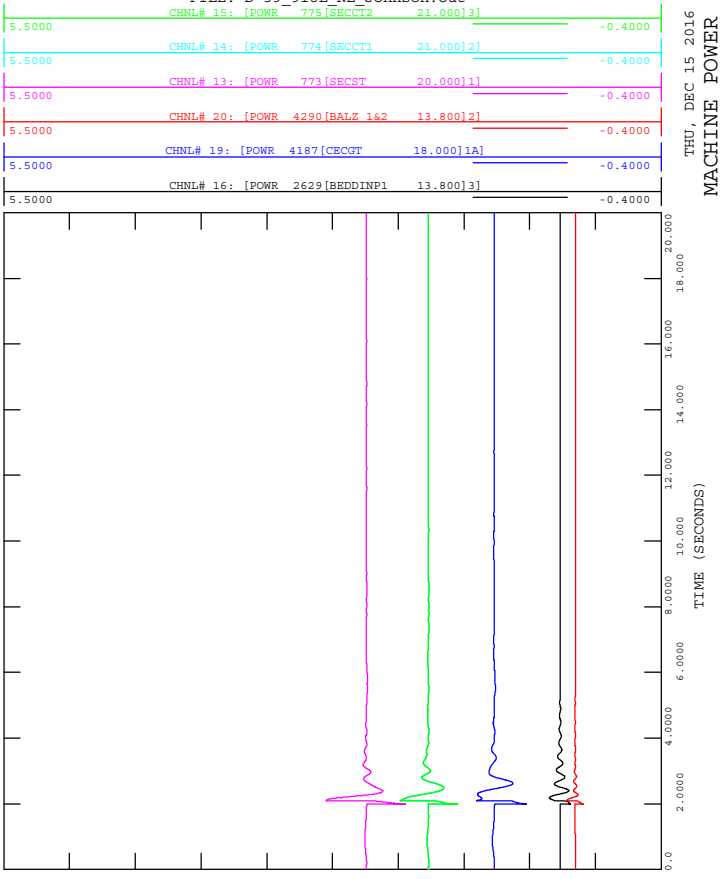
THU, DEC 15 2016 13:36
BRANCH FLOW (P)

FIGURE D-39A
2018SL, POST-PROJECT
3 PHASE FAULT ON 918L AT JOHNSON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-39_918L_NE_Johnson.out



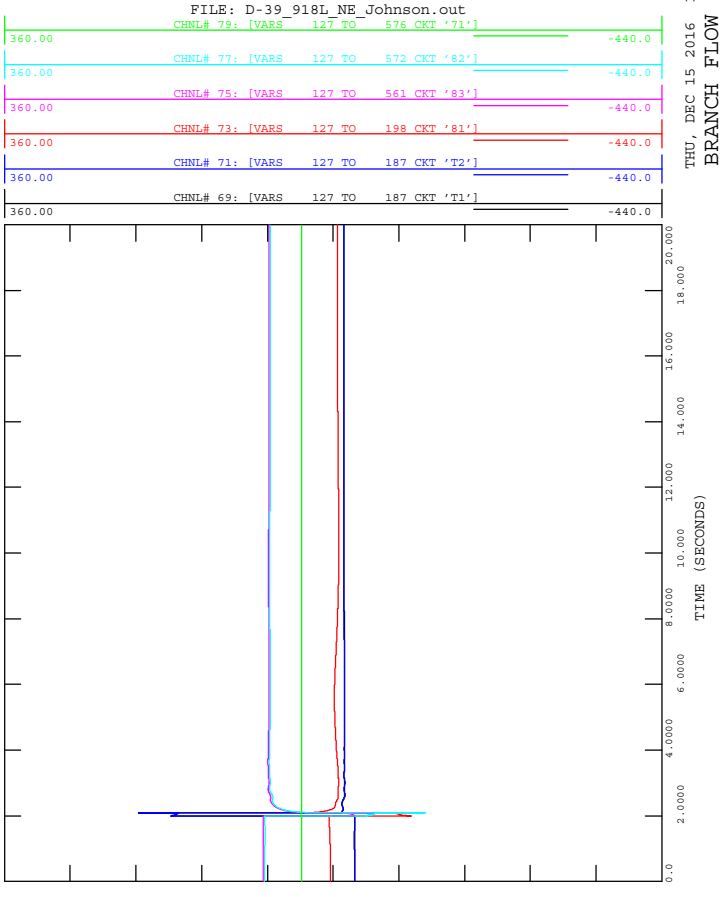
THU, DEC 15 2016 13:36
MACHINE ANGLE (DEGREES)

FIGURE D-39C
2018SL, POST-PROJECT
3 PHASE FAULT ON 918L AT JOHNSON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-39_918L_NE_Johnson.out



THU, DEC 15 2016 13:36
MACHINE POWER (MW)

FIGURE D-39E
2018SL, POST-PROJECT
3 PHASE FAULT ON 918L AT JOHNSON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-39_918L_NE_Johnson.out



THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-40B
2018SL, POST-PROJECT
3 PHASE FAULT ON 932L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-40_932L_NE_Beddington.out

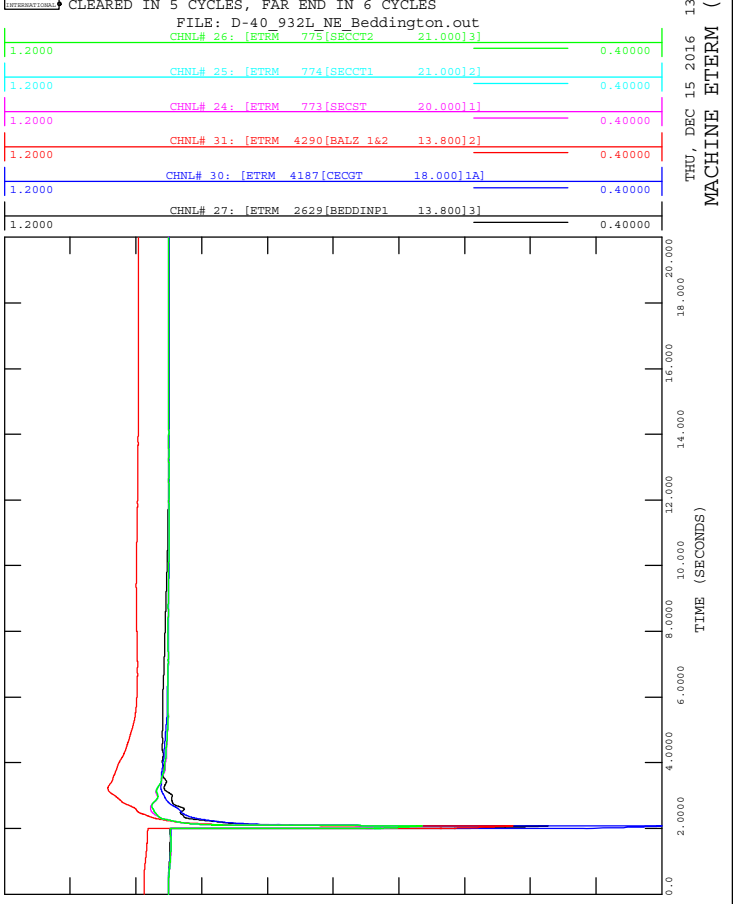


FIGURE D-40D
2018SL, POST-PROJECT
3 PHASE FAULT ON 932L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-40_932L_NE_Beddington.out

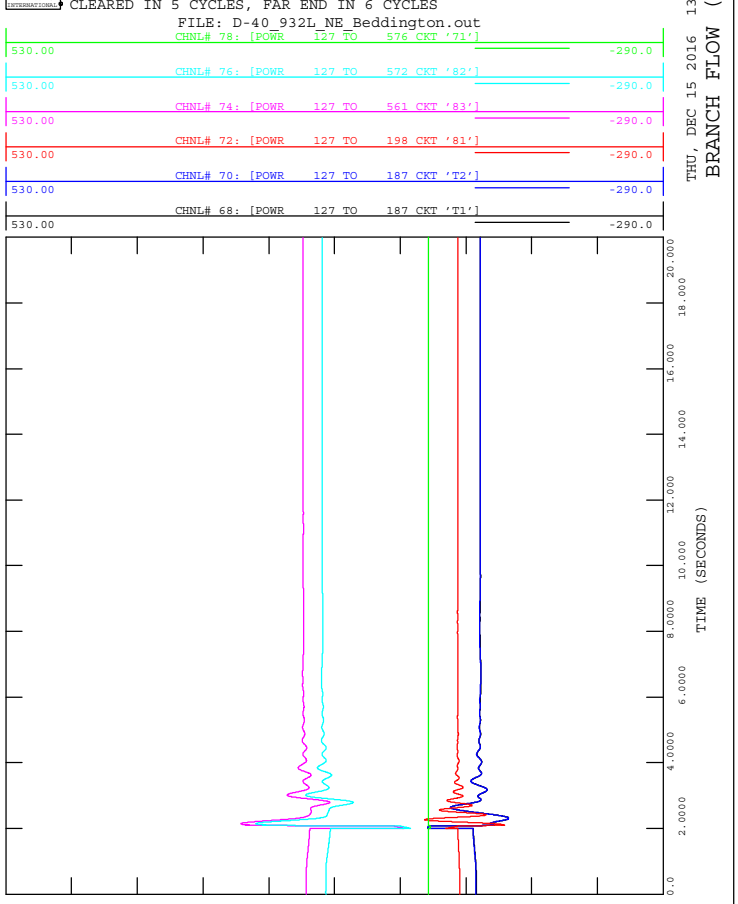


FIGURE D-40A
2018SL, POST-PROJECT
3 PHASE FAULT ON 932L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-40_932L_NE_Beddington.out

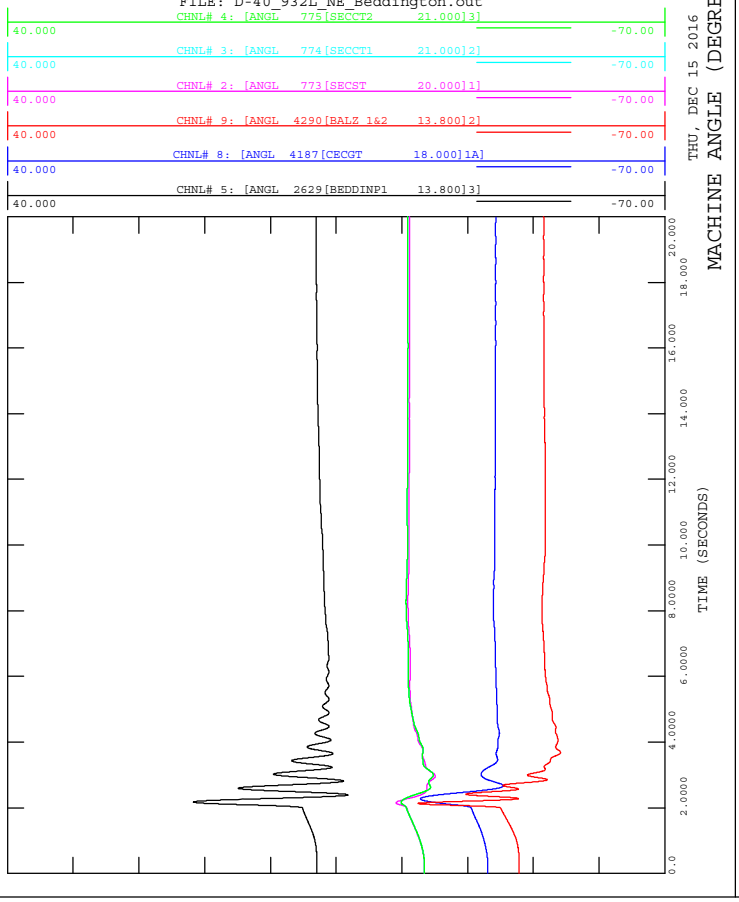
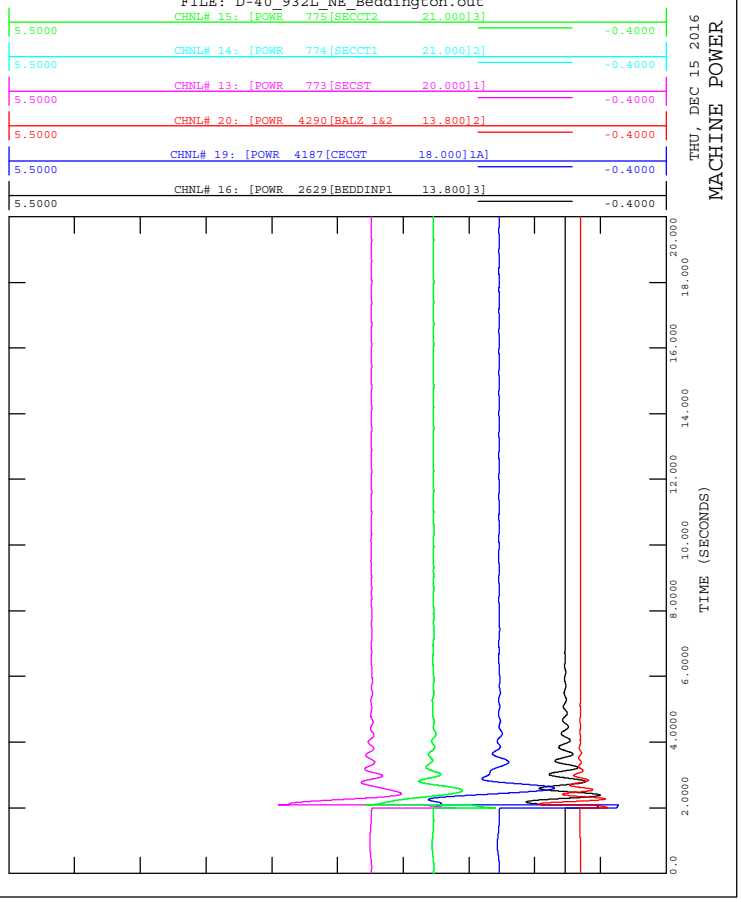


FIGURE D-40C
2018SL, POST-PROJECT
3 PHASE FAULT ON 932L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-40_932L_NE_Beddington.out



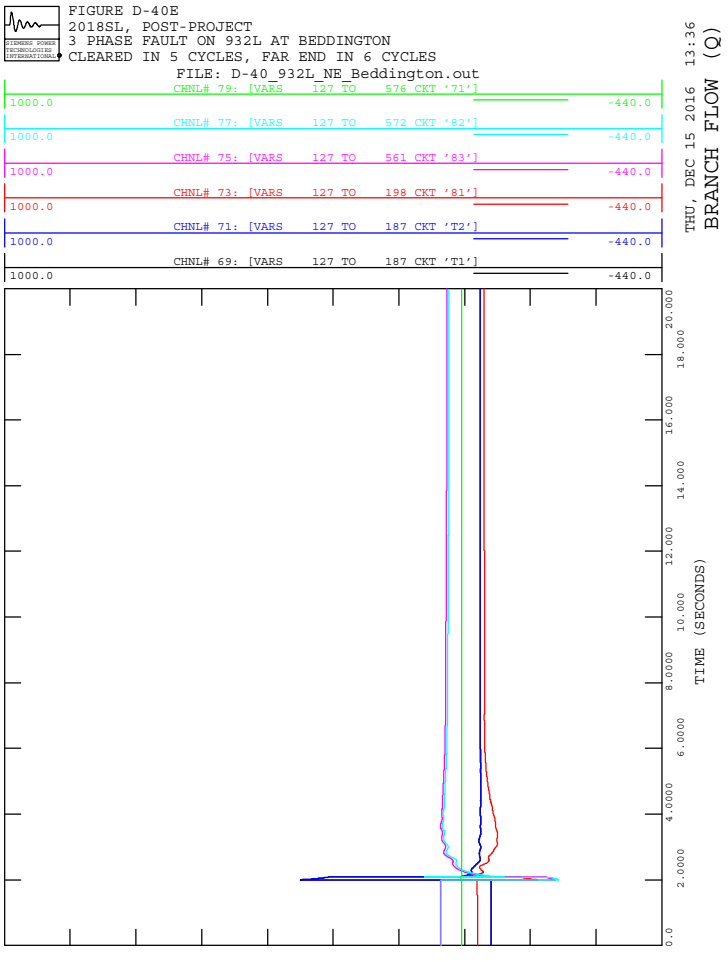
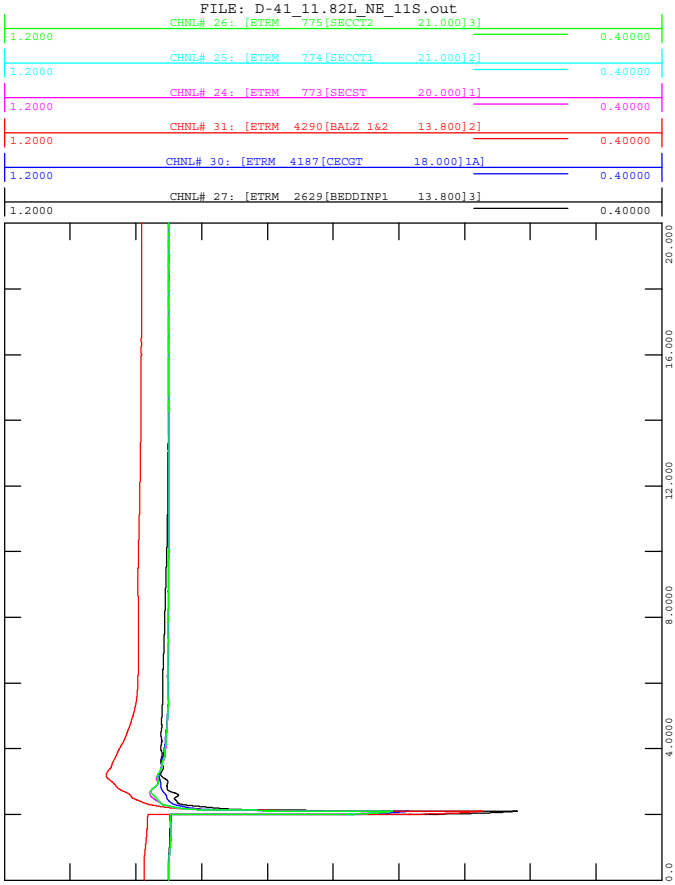


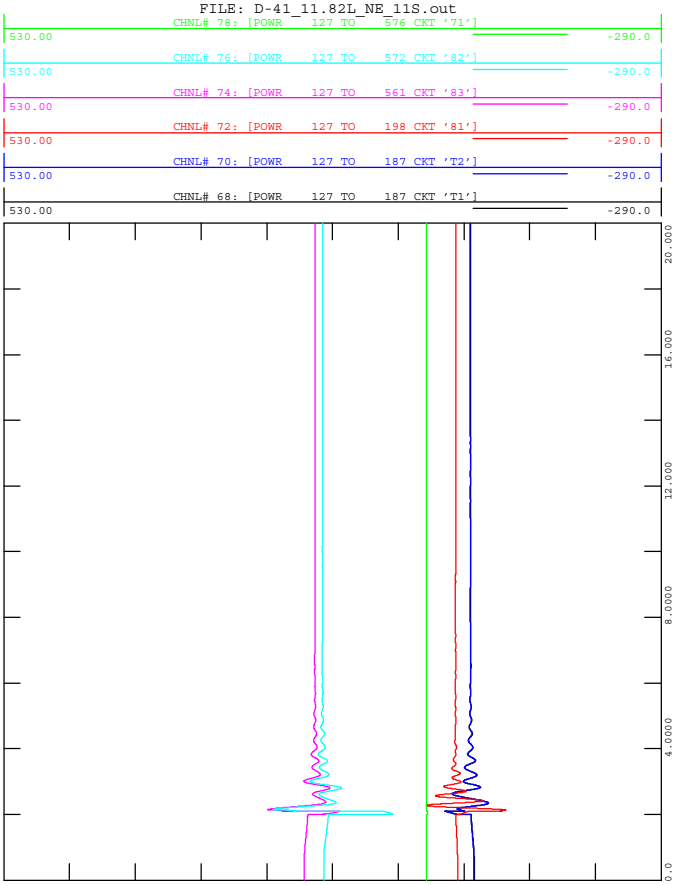
FIGURE D-40E
2018SL, POST-PROJECT
3 PHASE FAULT ON 932L AT BEDDINGTON
CLEARED IN 5 CYCLES, FAR END IN 6 CYCLES
FILE: D-40_932L_NE_Beddington.out
CHNL# 79: [VARS 127 TO 576 CKT '71']
1000.0
-440.0
CHNL# 77: [VARS 127 TO 572 CKT '82']
1000.0
-440.0
CHNL# 75: [VARS 127 TO 561 CKT '83']
1000.0
-440.0
CHNL# 73: [VARS 127 TO 198 CKT '81']
1000.0
-440.0
CHNL# 71: [VARS 127 TO 187 CKT 'T2']
1000.0
-440.0
CHNL# 69: [VARS 127 TO 187 CKT 'T1']
1000.0
-440.0
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)
THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-41B
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-41_11.82L_NE_11S.out



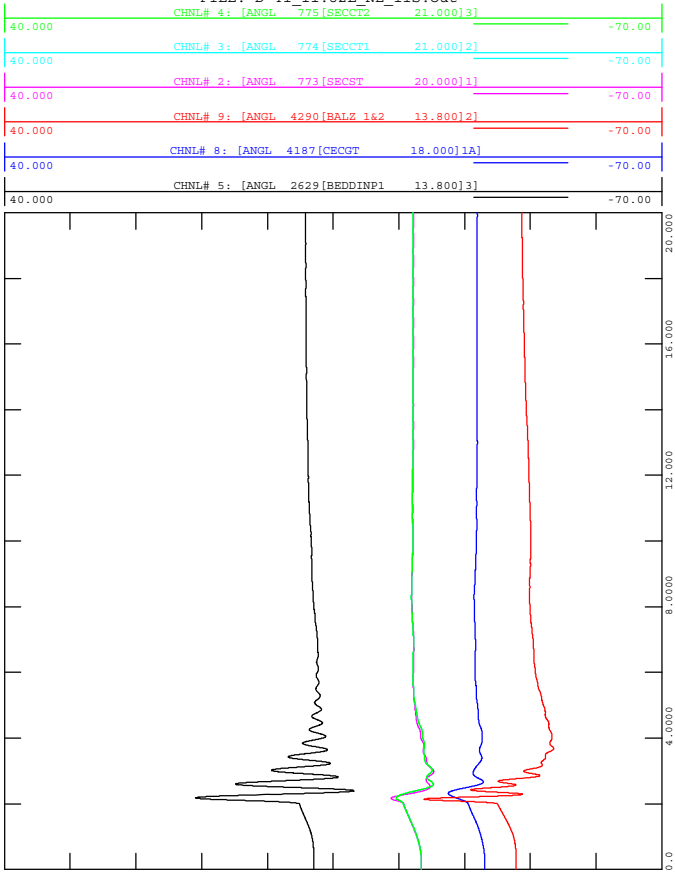
THU, DEC 15 2016 13:36
MACHINE ETERM (V)

FIGURE D-41D
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-41_11.82L_NE_11S.out



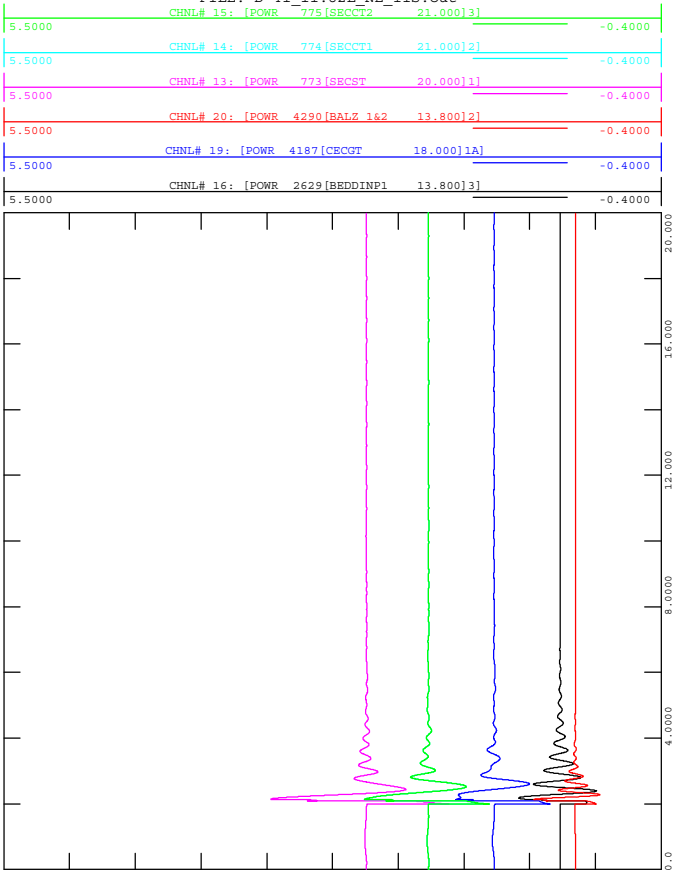
THU, DEC 15 2016 13:36
BRANCH FLOW (P)

FIGURE D-41A
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-41_11.82L_NE_11S.out



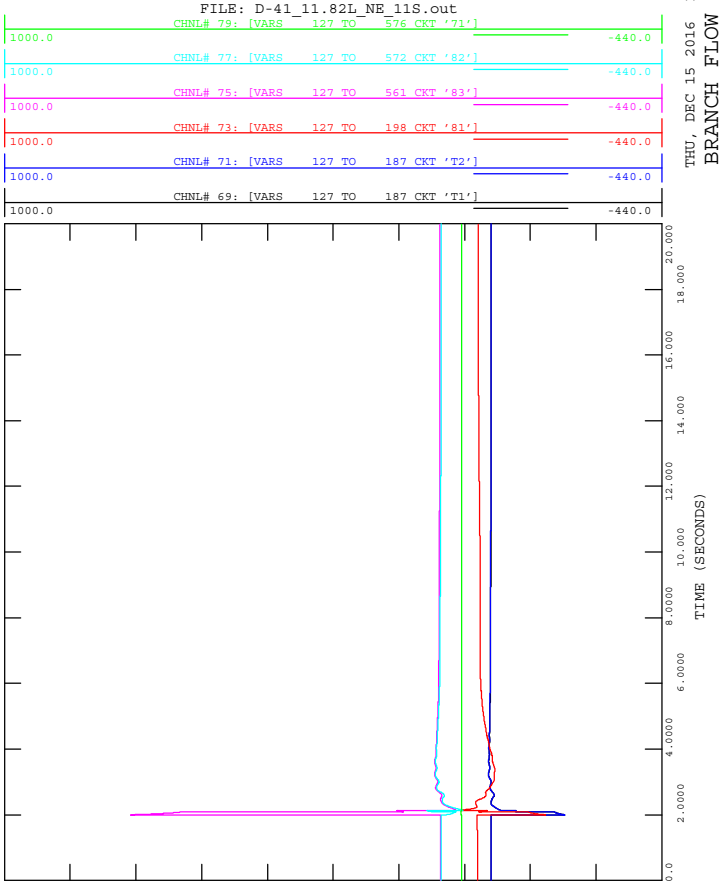
THU, DEC 15 2016 13:36
MACHINE ANGLE (DEGREES)

FIGURE D-41C
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-41_11.82L_NE_11S.out



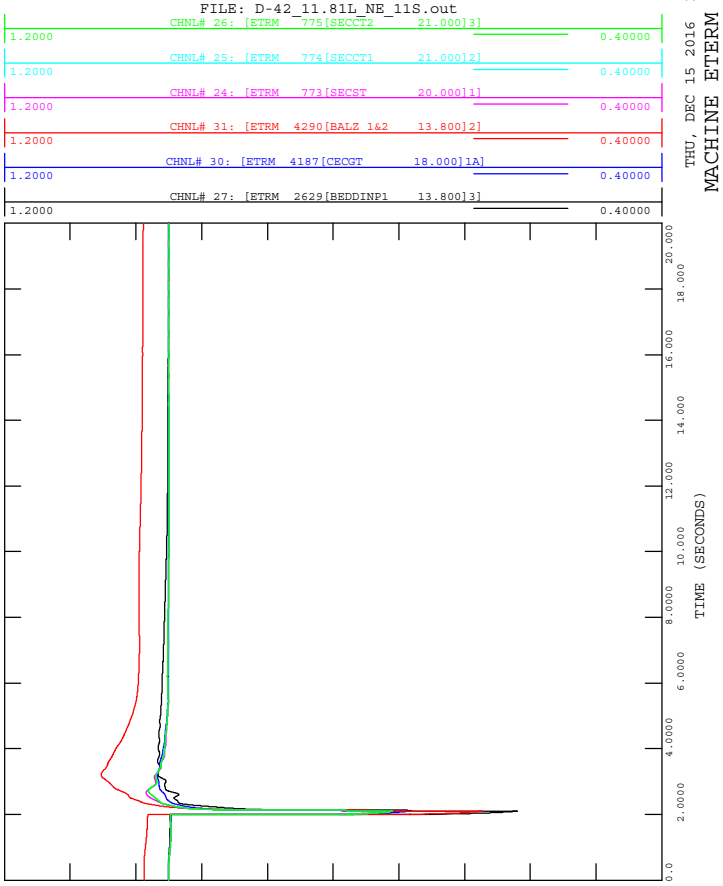
THU, DEC 15 2016 13:36
MACHINE POWER (MW)

FIGURE D-41E
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.82L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-41_11.82L_NE_11S.out



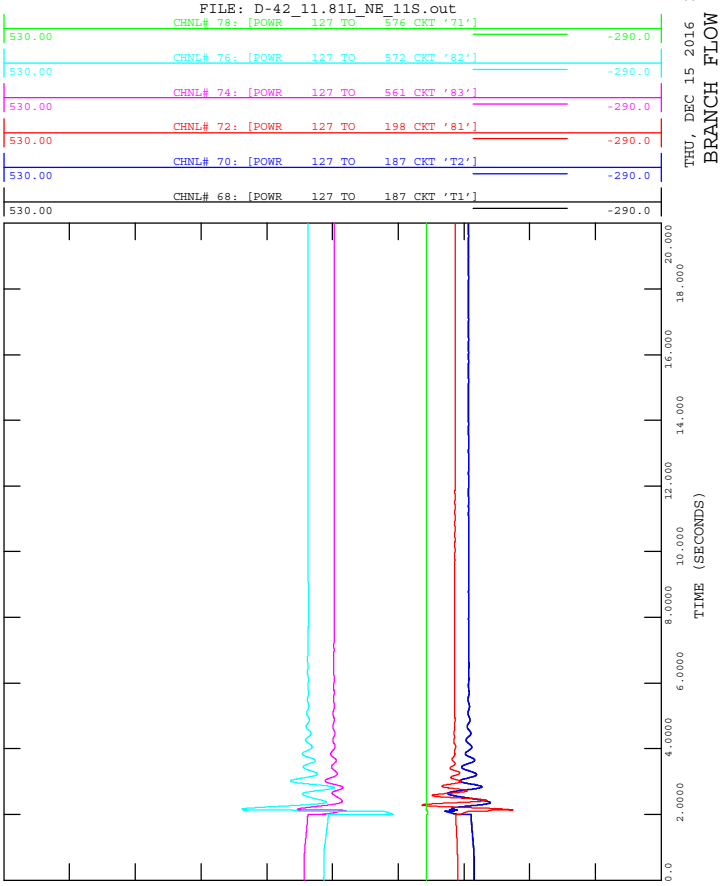
THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-42B
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-42_11.81L_NE_11S.out



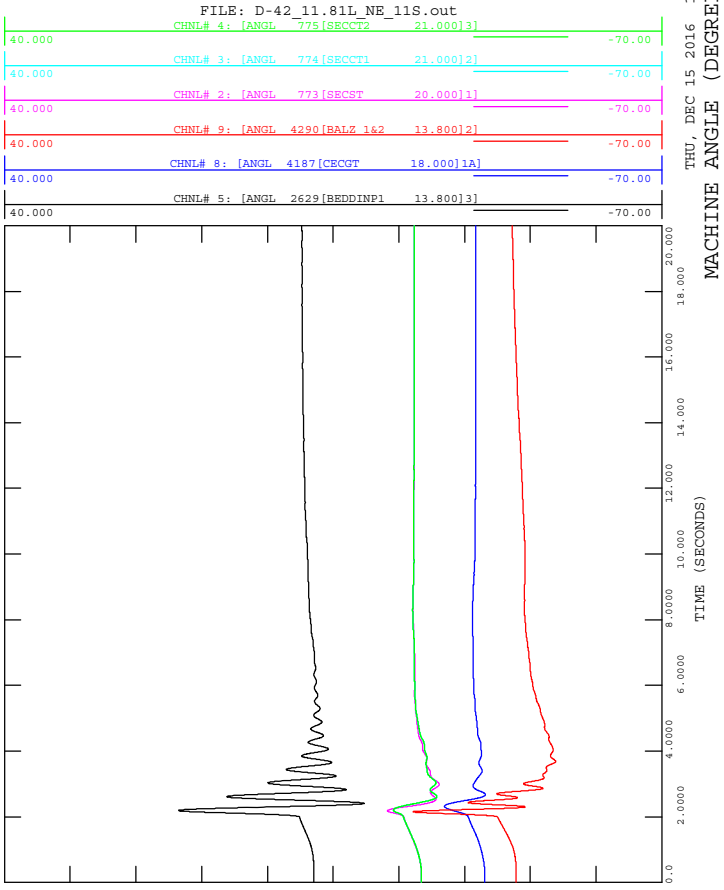
THU, DEC 15 2016 13:36
MACHINE ETERM (V)

FIGURE D-42D
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-42_11.81L_NE_11S.out



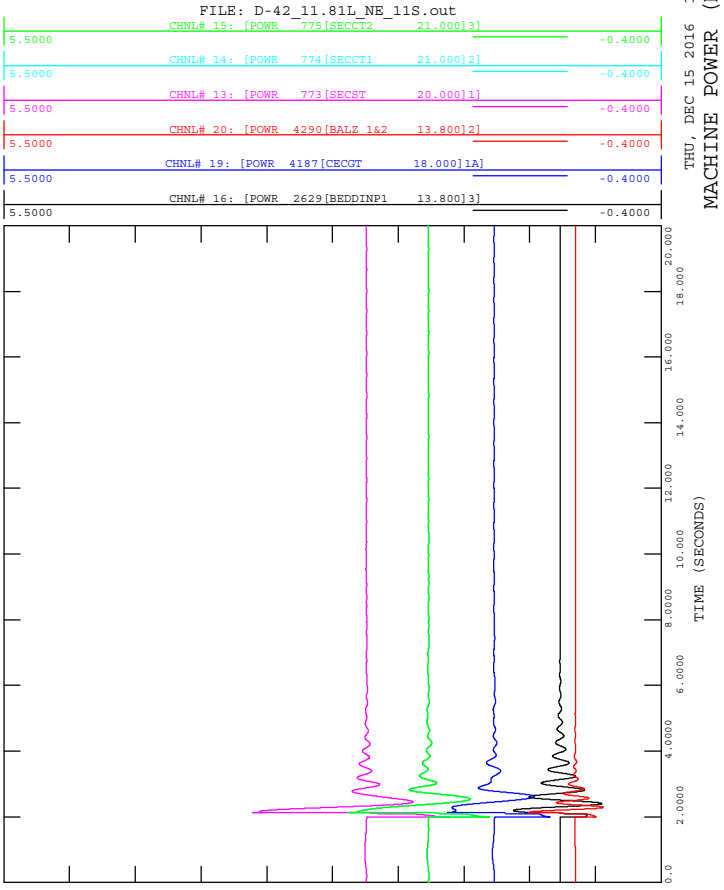
THU, DEC 15 2016 13:36
BRANCH FLOW (P)

FIGURE D-42A
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-42_11.81L_NE_11S.out



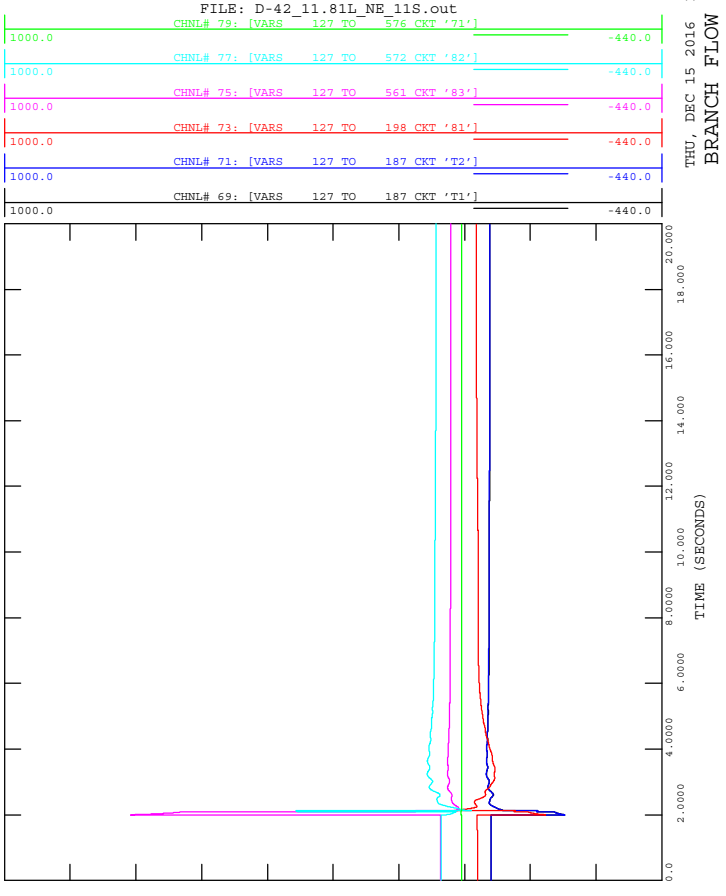
THU, DEC 15 2016 13:36
MACHINE ANGLE (DEGREES)

FIGURE D-42C
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-42_11.81L_NE_11S.out



THU, DEC 15 2016 13:36
MACHINE POWER (MW)

FIGURE D-42E
2018SL, POST-PROJECT
3 PHASE FAULT ON 11.81L AT SS-11
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-42_11.81L_NE_11S.out



THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-43B
2018SL, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-43_22.81L_NE_39S.out

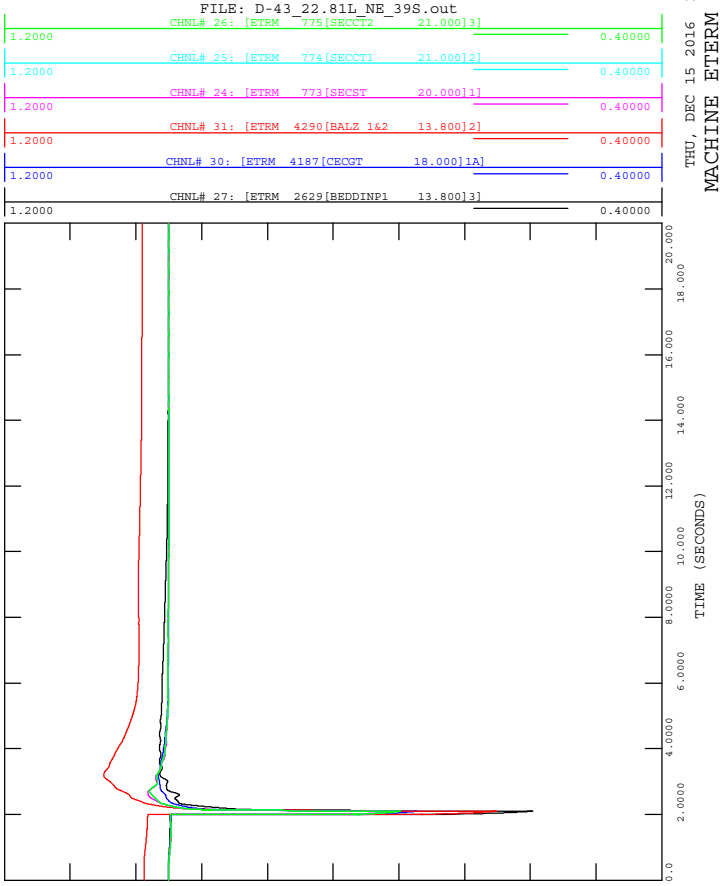


FIGURE D-43D
2018SL, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-43_22.81L_NE_39S.out

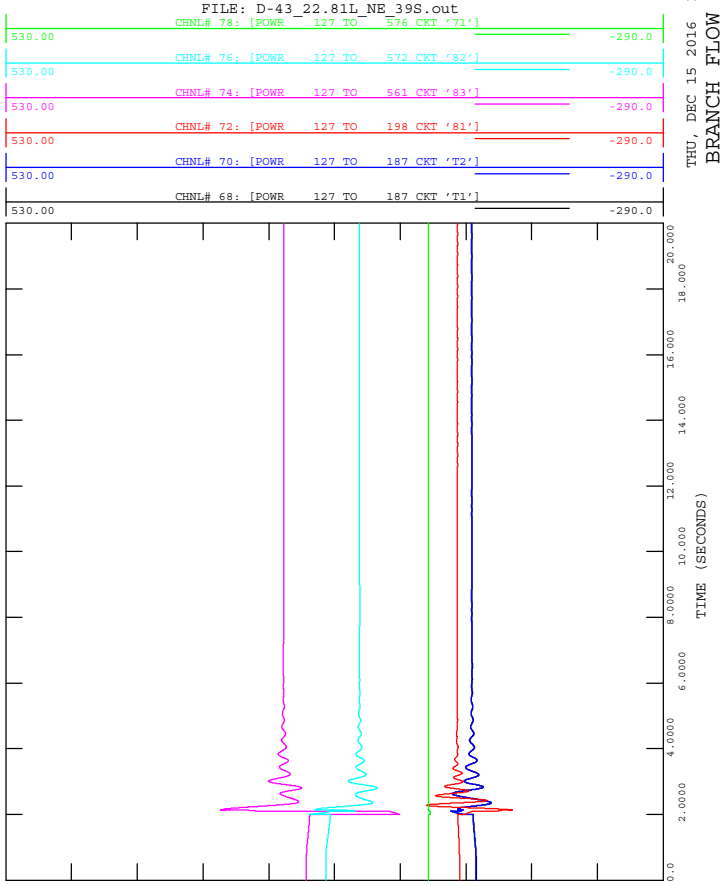


FIGURE D-43A
2018SL, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-43_22.81L_NE_39S.out

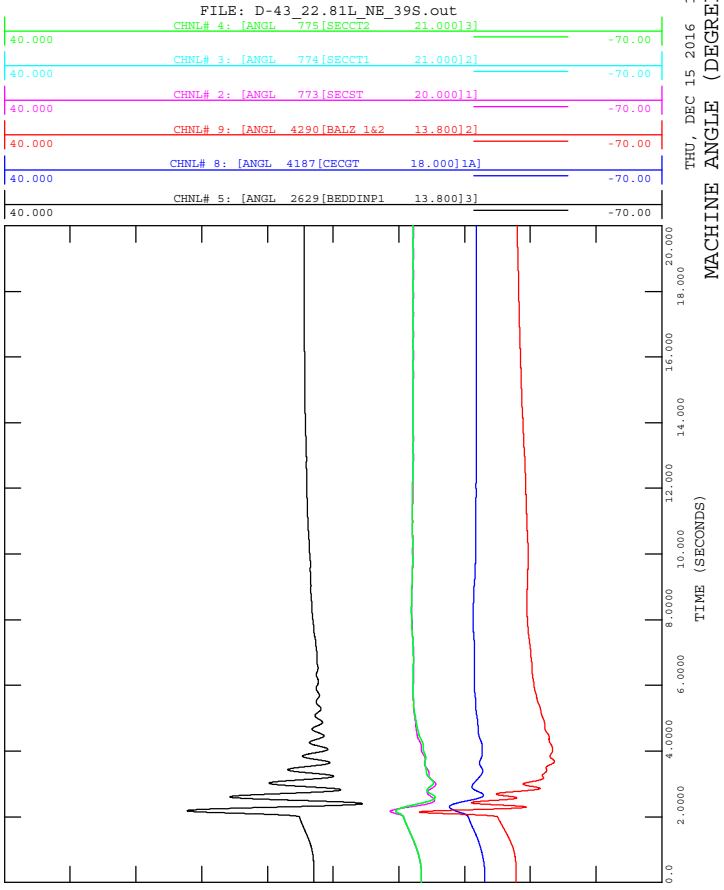


FIGURE D-43C
2018SL, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-43_22.81L_NE_39S.out

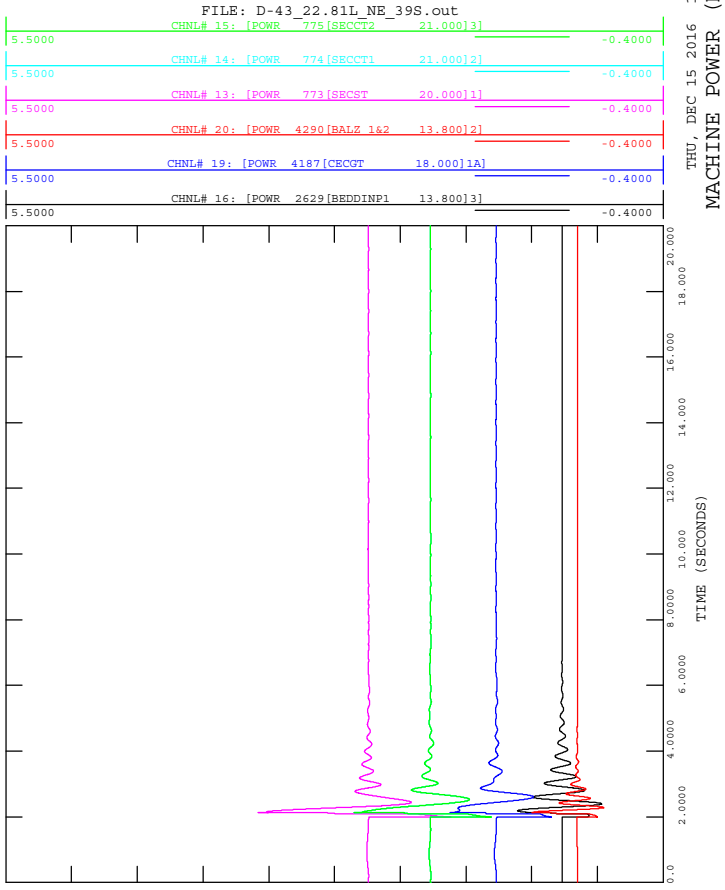
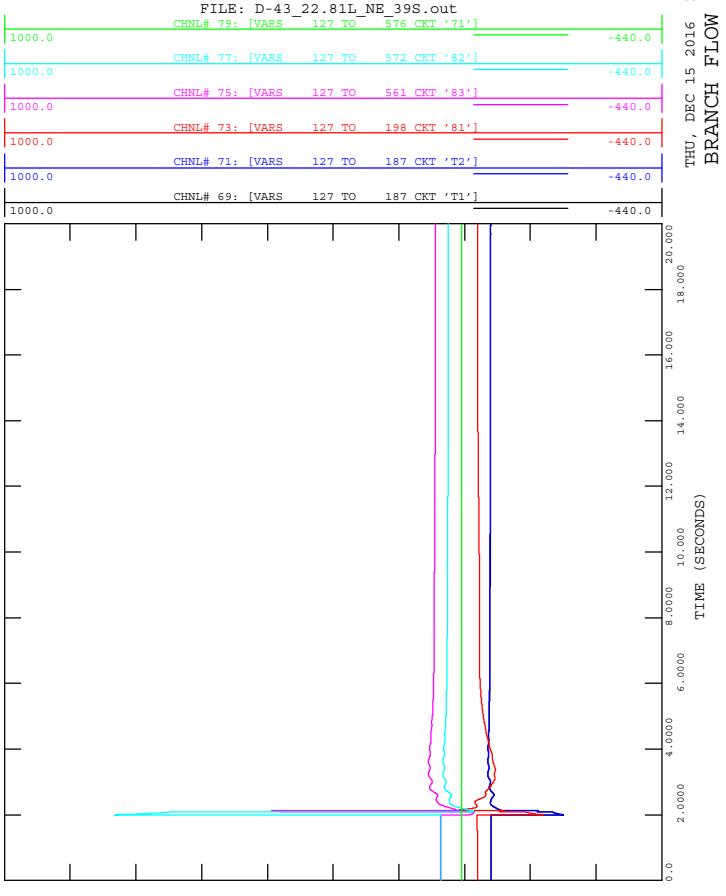
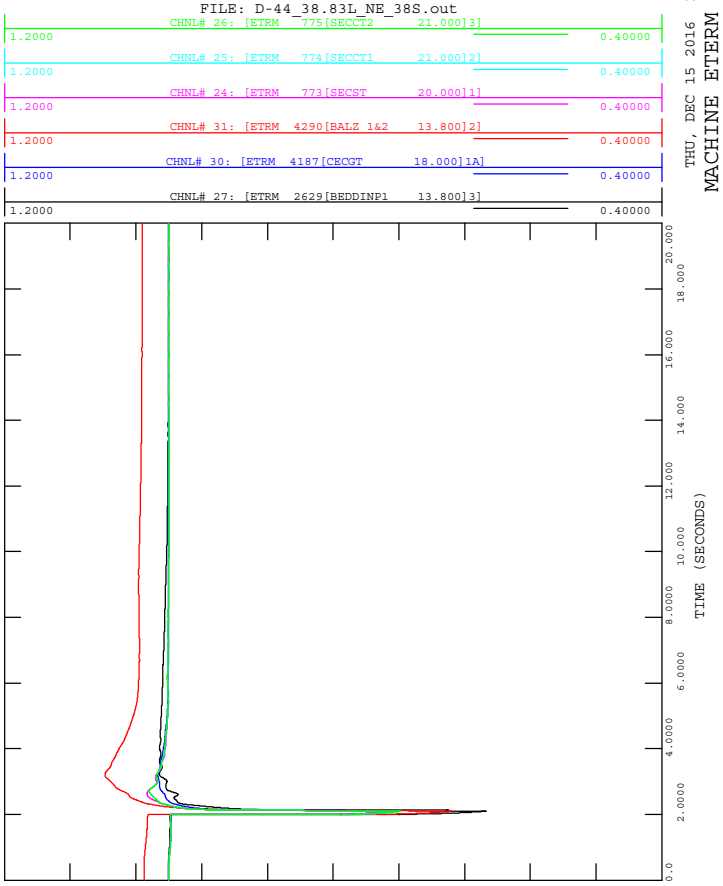


FIGURE D-43E
2018SL, POST-PROJECT
3 PHASE FAULT ON 22.81L AT SS-39
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-43_22.81L_NE_39S.out



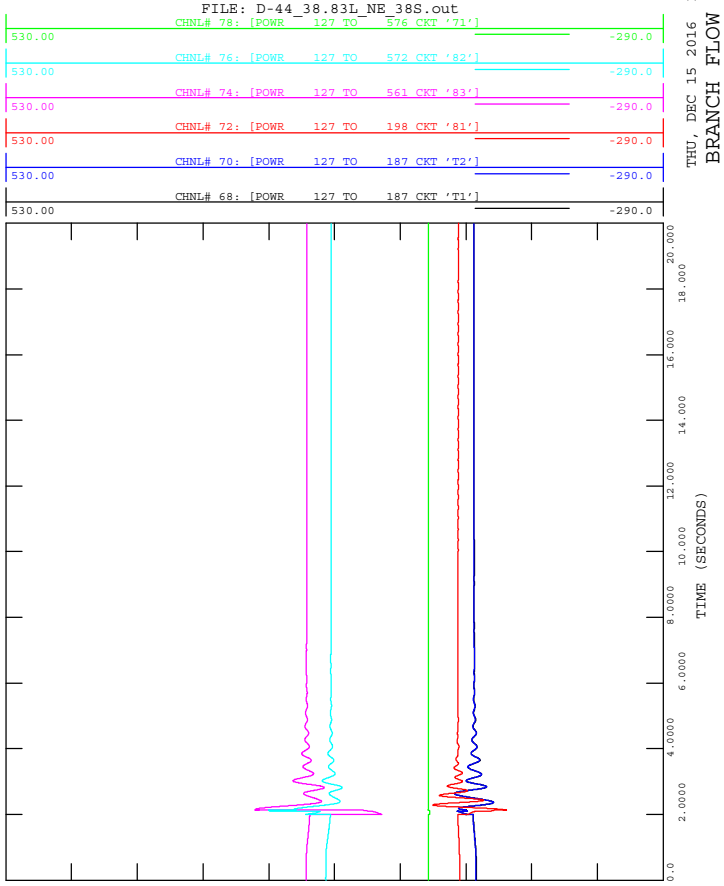
THU, DEC 15 2016 13:36
BRANCH FLOW (Q)

FIGURE D-44B
2018SL, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-38
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-44_38.83L_NE_38S.out



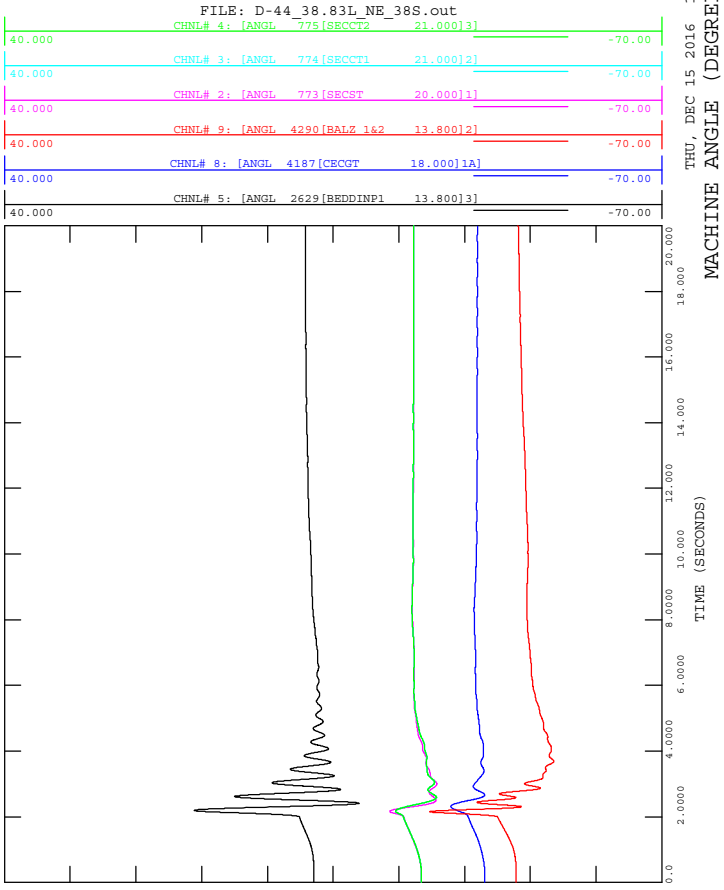
THU, DEC 15 2016 13:37
MACHINE ETERM (V)

FIGURE D-44D
2018SL, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-38
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-44_38.83L_NE_38S.out



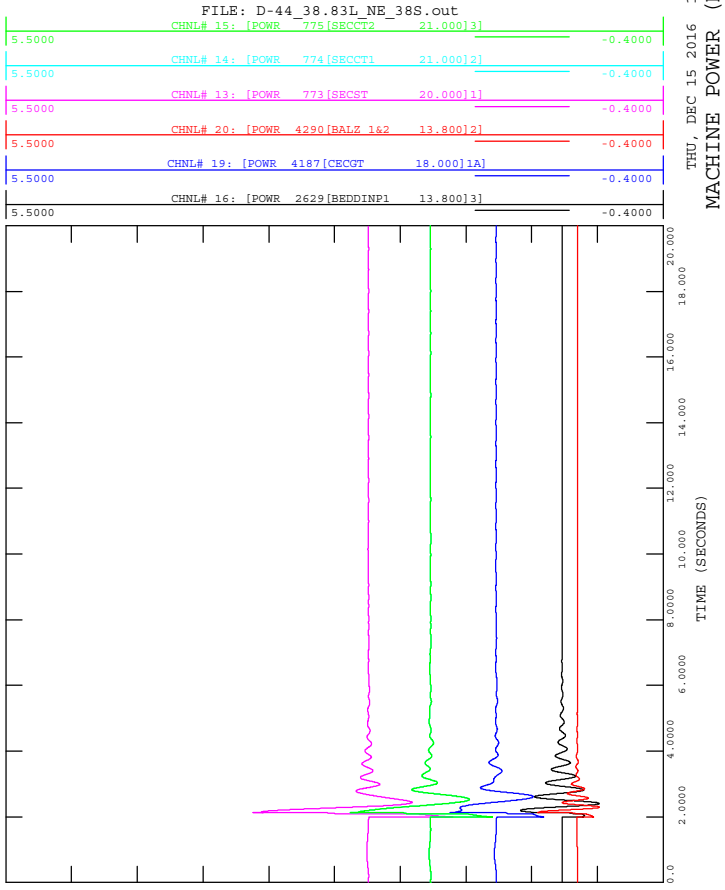
THU, DEC 15 2016 13:37
BRANCH FLOW (P)

FIGURE D-44A
2018SL, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-38
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-44_38.83L_NE_38S.out



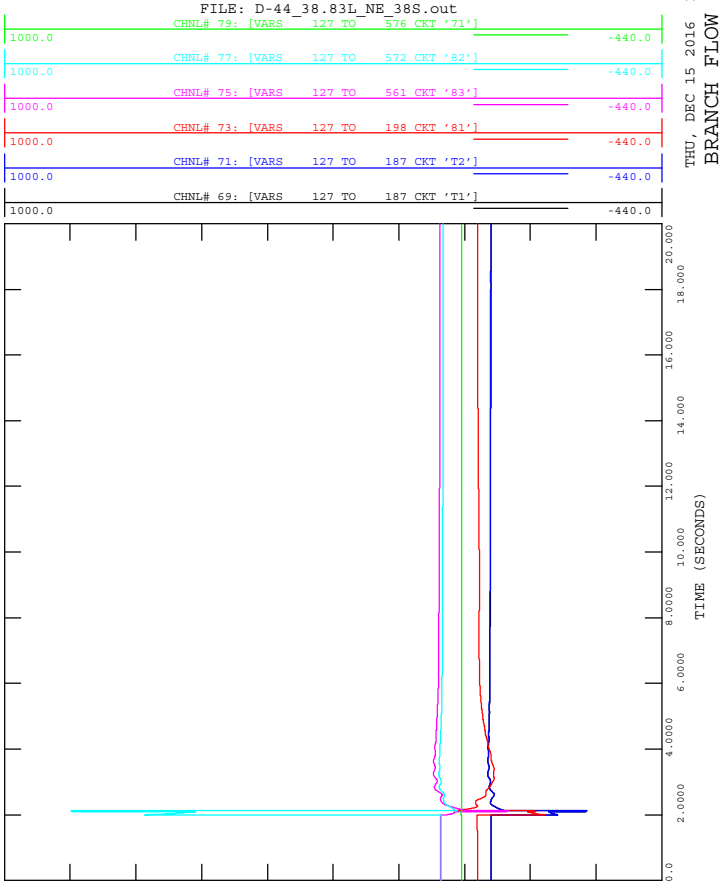
THU, DEC 15 2016 13:37
MACHINE ANGLE (DEGREES)

FIGURE D-44C
2018SL, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-38
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-44_38.83L_NE_38S.out



THU, DEC 15 2016 13:37
MACHINE POWER (MW)

FIGURE D-44E
2018SL, POST-PROJECT
3 PHASE FAULT ON 38.83L AT SS-38
CLEARED IN 6 CYCLES, FAR END IN 8 CYCLES
FILE: D-44_38.83L_NE_38S.out



THU, DEC 15 2016 13:37
BRANCH FLOW (Q)