APPENDIX 3A

# System Impact Study

California ISO
Your Link to Power

California Independent
System Operator Corporation

March 21, 2007

Mr. Alex Sokoletsky
MMC Energy North America, LLC
26 Broadway, Suite 907
New York, NY 10004

**Subject:** MMC Chula Vista ISIS report

Dear Mr. Sokoletsky:

Attached is the Interconnection System Impact Study (ISIS) Report for the MMC Chula Vista Expansion Project (Project) which has been proposed as an increase in its existing generation capacity at the Chula Vista facility from 49.5 MW to 93 MW. The project is connected to the San Diego Gas & Electric Company's (SDG&E) OTAY substation via an existing 69 kV gen-tie line. The ISIS was performed by SDG&E under the direction of CAISO. The Project's proposed Commercial Operation Date is January 1, 2008.

The ISIS has determined that the project at its full output of 93 MW would cause several 69 kV transmission line overloads in the SDG&E's system. In addition, the project would also overstress some circuit breakers beyond the allowable 115% of their ratings at the OTAY substation.

The non-binding cost estimate of the Reliability and Delivery Network Upgrades to integrate this project into the CAISO Controlled Grid would be approximately **$11 million**, exclusive of ITCC[1]. The non-binding time to construct these facilities is 22-24 months from the signing of the LGIA (Interconnection Agreement), obtaining the necessary environmental and construction permits, and SDG&E receiving funds from MMC Chula Vista.

The ISIS has also addressed the Deliverability Assessment of this project and determined that the project is not deliverable to the CAISO Controlled Grid unless certain additional transmission line overloads are mitigated. Most of these line overloads are caused by projects higher in the CAISO queue. These deliverability-related overloads are not triggered by this project and therefore no cost responsibility has been assigned to this project. If the higher queued projects are withdrawn, or decide not to mitigate identified overloads, then the Deliverability Assessment will be redone with appropriate changes in assumptions and revised results will be published. The revised results may or may not identify any overloads attributable to this project.

Upon completion of the remaining Interconnection Studies, this project is approved to interconnect to the CAISO Controlled Grid after making the required system upgrades. The project, however, would not be eligible to sell Resource Adequacy Capacity unless the identified Deliverability-related Network Upgrades are mitigated either by higher queued projects or by this project itself.

[1] Income Tax Component of Contribution

The ISIS Results meeting will be coordinated and scheduled by the ISO Project Manager Judy Nickel (916) 608-7062 (JNickel@CAISO.Com) within 10 business days following receipt of the Interconnection System Impact Study (ISIS) Report.

Should you have any questions regarding the Study, please contact Nisar Shah at (916) 608-7376 (nshah@caiso.com) or myself at (916) 608-5880 (GDeShazo@caiso.com).

Sincerely,

Gary DeShazo
Director of Regional Transmission - North

DP/GD:dd

Attachment

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ISO Regional Transmission North & South

# Interconnection System Impact Study

Generation Interconnection

## MMC Chula Vista, L LC

## Chula Vista Expansion Project

California ISO
Your Link to Power

March 21, 2007

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## EXECUTIVE SUMMARY

MMC Chula Vista, LLC (MMC) filed an Interconnection Request (IR) with the California Independent System Operator (CAISO) to increase capacity of their existing Large Generating Facility from 49.5 MW to 93 MW. This expansion project (project) will also be located at the existing site in the city of Chula Vista, CA and connected to the SDG&E's OTAY substation via a 69 kV gen-tie. The planned Commercial Operating Date of the project is January 1, 2008. A Feasibility Study was completed in August 2006 indicating that some system upgrades are warranted to reliably interconnect this project into the CAISO Controlled Grid. The project has subsequently proceeded into the Interconnection System Impact Study (ISIS) phase of the FERC mandated Large Generation Interconnection Process (LGIP). Upon direction from the CAISO, SDG&E performed the ISIS for this project.

The ISIS is a detailed study intended to identify the impacts of this project on the CAISO Controlled Grid and on the SDG&E's electric system. This study has five main components:

- Thermal Analysis
- Voltage Analysis
- Short Circuit Analysis
- Transient Stability Analysis
- Deliverability Assessment

These analyses were conducted for a 2010 and a 2008 Future Year (FY) and a Commercial Operating Date year (COD) base cases respectively.

Thermal analysis indicates the following 69 kV transmission circuits will be overloaded beyond their emergency ratings as a result of this project:

TL6929 (Otay-Otay Unit 1)
TL649A (Otay-Otay Lake Tap)
TL642B (Sweetwater-Montgomery Tap)
TL644 (South Bay-Sweetwater)

Voltage analysis indicates the project has no adverse voltage impact on the CAISO Controlled Grid or on the SDG&E's electric system.

Short Circuit analysis indicates four 69 kV Circuit Breakers will be over-dutied at Otay substation as a result of this project.

Transient Stability analysis indicates the project has no adverse stability impact on the system.

Deliverability analysis indicates the project is not deliverable to the system unless certain transmission line upgrades are completed. CAISO, however, is in the process of revising the study results based on updated databases, and will be re-posting the results on CAISO website in the next few months.

The non-binding good faith cost estimate to construct or upgrade the identified facilities is about $**11** million as detailed in Table 1 below.

**Table 1**
**Non-Binding Good Faith Estimate of Costs to Construct**

| Item | Description | | Total w/ AFUDC |
|---|---|---|---|
| | **Interconnection Facilities (existing)** | | $0 |
| | **Reliability Network Upgrades** | | |
| 1 | Upgrade TL6929 (Otay-Otay Unit 1) | | included |
| 2 | Replace four circuit breakers at Otay Substation: OY30, OY623, OY649, OY6929 | | $1,469,000 |
| | | **Subtotal** | **$1,469,000** |
| | **Delivery Network Upgrades** | | |
| 3 | TL649A (Otay-Otay Lake Tap, 2.4 mi, upgrade the line to at least 80 MVA continuous capacity. | | $2,534,000 |
| 4 | TL642B (Sweetwater-Montgomery Tap, 2.4 mi), was initially identified as a transmission constraint based on its 157 MVA rating; however, it was determined that the line capability is actually 200 MVA, thus no upgrade is needed. | | $0 |
| 5 | TL644 (Southbay-Sweetwater, 3.9 mi), upgrade the line to at least 200 MVA continuous capacity. | | $6,969,000 |
| | | **Subtotal** | **$9,503,000** |
| | | | |
| | | **Total** | **$10,972,000** |

The non-binding good faith estimate for time-to-construct the above identified facilities is about **22-24** months. The time clock for this estimate begins after signing the LGIA (interconnection agreement), obtaining necessary construction and environmental permits, and SDG&E receiving the required funding from MMC.

In addition, SDG&E has determined that it is not feasible to complete the Delivery Network Upgrades by the desired Commercial Operating Date of January 1, 2008. SDG&E has recommended that an interim or long term Special Protection System (SPS) may be installed to mitigate thermal overloads of transmission facilities.

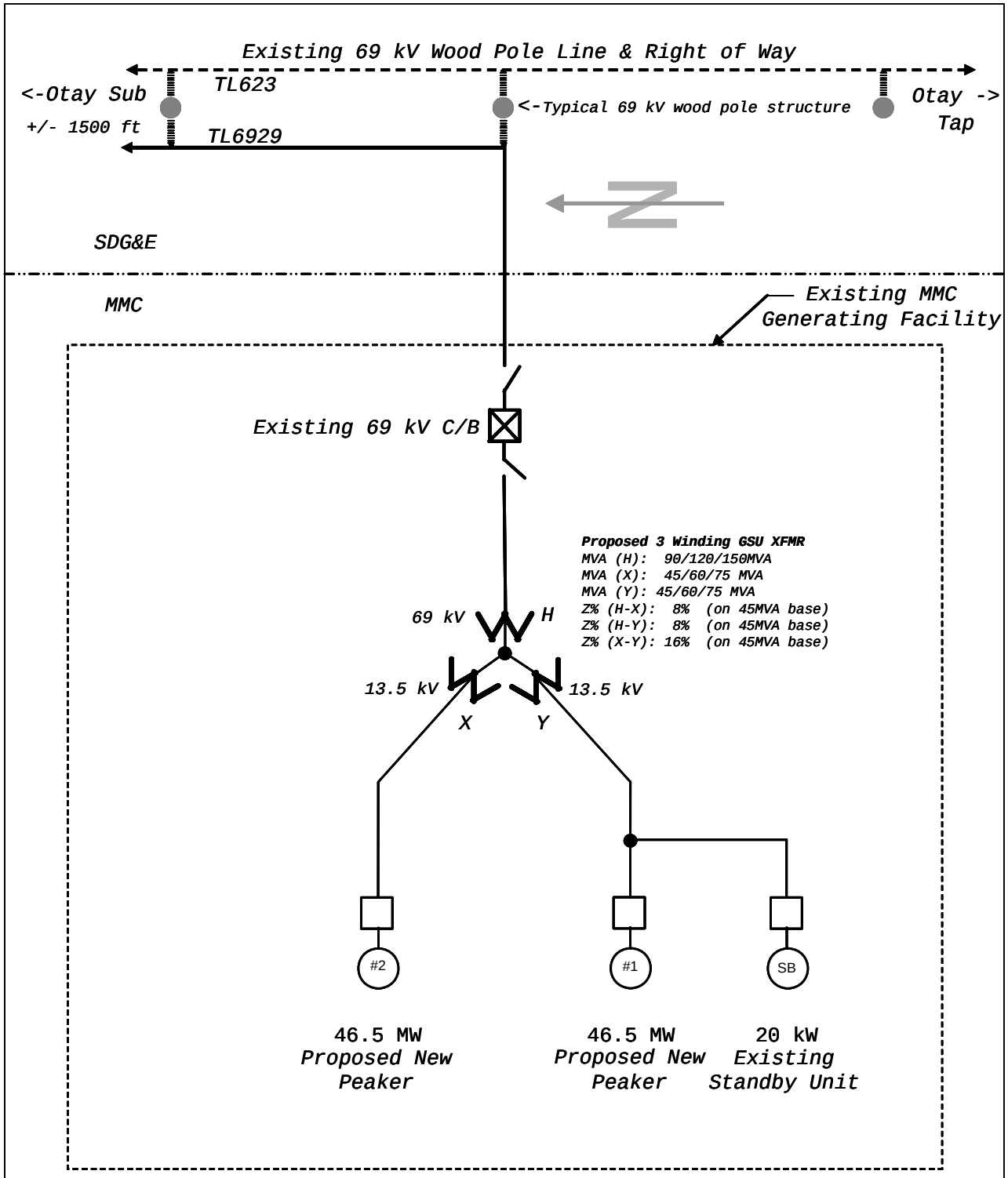
## PROJECT AND INTERCONNECTION INFORMATION

The MMC Chula Vista Expansion project (project) is an increase in generation capacity from the existing 49.5 MW to 93 MW at Chula Vista facility in the city of Chula Vista, CA county of San Diego. The existing older generating unit rated at 49.5 MW will be removed from service and two LM6000 turbine-generator sets will be installed in vacant positions. The net output to the grid from these two generators will be approximately 93 MW.

The point of interconnection for this increased generating capacity is the existing radial 69 kV gen-tie TL6929. TL6929 is approximately 1500 feet in length and solely provides interconnection service for the existing generating equipment on the MMC site. TL6929 is presently rated at 64 MVA due to certain terminal equipment limitations. The overhead conductor (1033 ACSR), however, is capable of carrying about 120 MVA. In order to accommodate the full output of this project, these terminal equipment limitations need to be remedied. The existing interconnection is at the 69 kV voltage level and will continue at that voltage level after the increase in generating capacity.

The project is proposed to be in-service by October 1, 2007 with Commercial Operating Date (COD) of January 1, 2008.

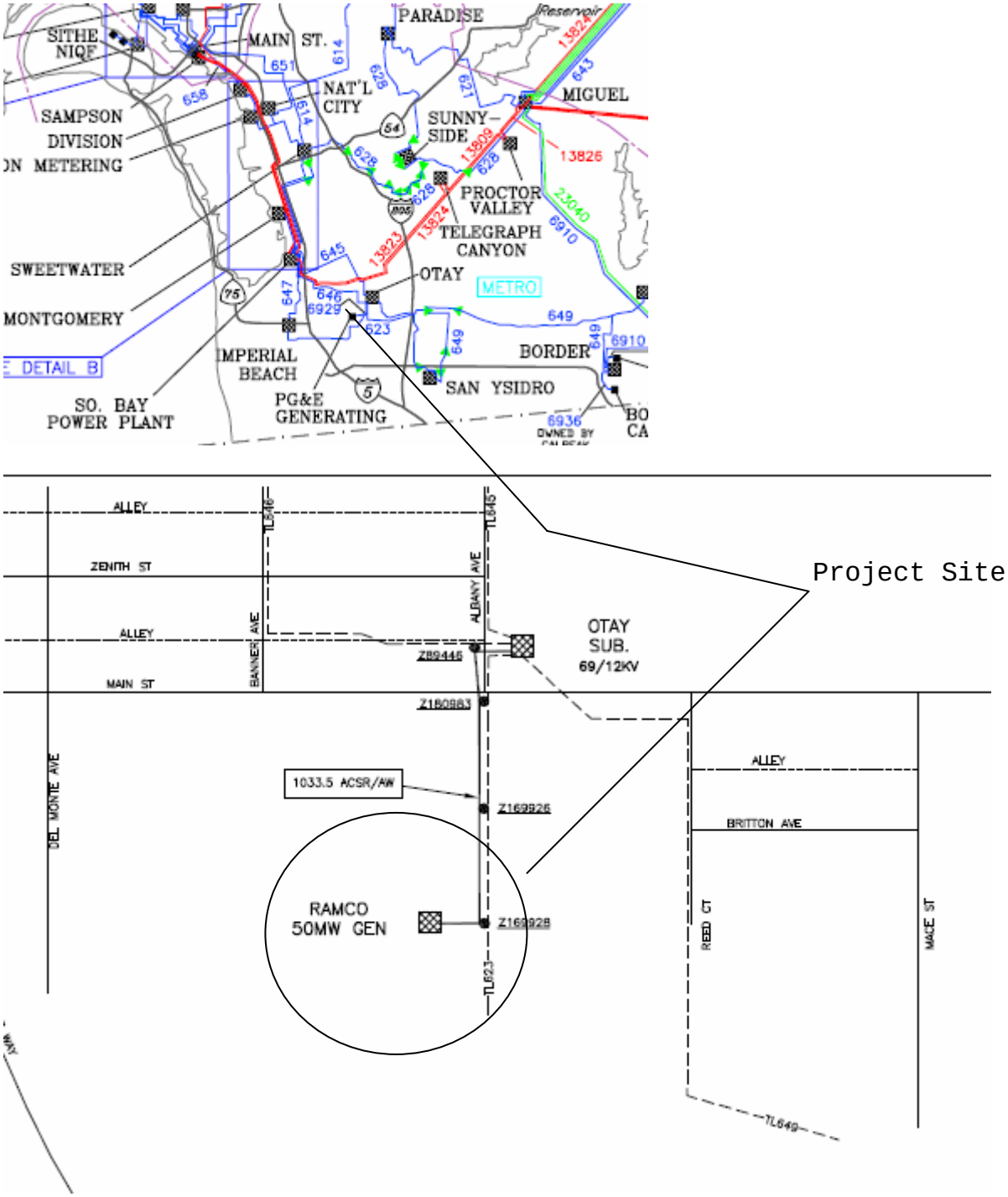
## CONCEPTUAL ONE-LINE DIAGRAM




*Rev 1: 6.6.21, delete two 2W GSU Xfmrs, add one 3W GSU Xfmr*

| | | |
|---|---|---|
| MMC Chula Vista Expansion Project | System Operating Diagram, Bus/Breaker<br>MMC 69 kV Switchyard<br>11 DEC 2006 | San Diego Gas & Electric Co.<br>Diagrammatic Drawing |

**PROJECT VICINITY MAP**
MMC Chula Vista Expansion Project
TL6929)



## LIST OF STUDY ASSUMPTIONS

1) The project is an increase in generating capacity from 49.5 MW to 93 MW at the existing MMC Chula Vista site,

2) The proposed In-Service date is October 1, 2007 and the proposed Commercial Operating Date is January 1, 2008,

3) The project's equipment will be natural gas fired GE LM6000 turbines as prime movers for Brush Electric generators. The total output capability of the two turbine-generator pairs is 93 MW. Auxiliary load has been assumed zero (0) so that full 93 MW are available to the grid. The existing 49.5 MW generator at the site will be removed from service.

4) The generators are rated at 60.5 MW, nominal terminal voltage of 13.8 kV, voltage regulation range of +/- 0.5%, and power factor regulation range of 0.85 lagging to 0.95 leading,

5) The generator output is fed through the existing 69 kV gen-tie, TL6929, to SDG&E's Otay 69/12 kV substation,

6) The step up transformer is a 3-winding transformer rated as:

Voltage: 69/13.8/13.8 kV

MVA (H): 90/120/150 MVA, (X): 45/60/75 MVA, (Y): 45/60/75 MVA,
Z% (H-X): 8% (on 45MVA base), (H-Y): 8% (45 MVA base),
(X-Y): 16% (45MVA base)

7) The FY study modeled higher queued generation projects, specifically:

| Queue | Project Name |
|---|---|
| 1A | Miguel Substation/Otay Mesa Generation |
| 4 | Palomar 230 kV/Palomar Energy (in-service) |
| 8 | Sycamore Canyon Substation |
| 13 | Escondido |
| 19 | Crestwood (in-service) |
| 25 | Crestwood |
| 26 | Crestwood |
| 27 | South Bay |
| 32 | Boulevard |
| 72 | Proposed Lee Lake |
| 78 | Imperial Valley Substation |

8) Power flow case scenarios are detailed in a load-resource spread sheet in Appendix A.

9) Additional projects modeled in the base cases include:

Otay Mesa Generating Project (FY only),
Otay Mesa Power Purchase Agreement project (FY only),
Miguel-Sycamore #2, (in-service)

Miguel-Mission #2, (in-service)
Silvergate Substation project (FY only),
Sunrise Power Link project (FY only), and

10) The load and resource assumptions for the years 2008 and 2010 include:

1-in-10 year forecast of 4849 MW for 2008 and 5038 MW for 2010.
Scenarios of low load: 50% of forecast peak.
Scenarios of maximum generation and minimum import:
Minimum import: 1450 MW

Sensitivity #1: Peak load, no Southbay generation, and high Miguel flow.

Sensitivity #2: Low load, high Southbay generation.

## SUMMARY OF POWER FLOW STUDY BASE CASES

The study was focused on the summer peak conditions to determine the maximum impact of this project on the CAISO Controlled Grid. A total of 24 power flow cases were evaluated including cases with low import, high dispatch; no South bay generation, high Miguel flow; and low Otay substation load, high Southbay generation. Both 2008 and 2010 summer peak seasons were evaluated. All projects ahead of this project in the CAISO queue were modeled for the 2010 cases (Future Year Analyis). For the 2008 cases, only those projects in the CAISO queue that were concurrent with this project's Commercial Operating Date were modeled.

A WECC full-loop representation was used for all cases of the study. This includes the Western United States, Western Canada and the system of Comisión Federal de Electricidad (CFE) of Baja California, Mexico. The SDG&E load and resources modeled in the power flow base cases are shown in Appendix A.

## STUDY CRITERIA and METHODOLOGY SUMMARY

The power system analysis for the proposed MMC Chula Vista Expansion project was conducted in accordance with the NERC, WECC, CAISO and SDG&E reliability and planning standards. The purpose was to identify if this project has any adverse reliability impacts on the CAISO Controlled Grid and SDG&E electric system. The study criteria primarily focuses on three levels of system operating conditions identified as Category A, B, and C. These categories are defined as follows:

**Category A:** This category of system operating conditions is also called normal operating conditions. It includes:

a) no forced outages
b) all facilities in service
c) all facilities operating under normal thermal limits
d) all voltages within applicable limits
e) dynamically stable system
f) no loss of firm load, and
g) no cascading

**Category B:** This category of system operating conditions allows loss of a single element from the system. Typical single elements are a single transmission line, a transformer, or a generator. As a result of a single element removed from service, commonly referred to as an "N-1" event, the system must continue to operate with:

a) all remaining facilities in-service
b) all remaining facilities operating within applicable thermal limits
c) all voltages within applicable limits,
d) dynamically stable system
e) no loss of firm load, and
f) no cascading

**Category C:** This category of system operating conditions allows loss of two or more elements from the system. Typical elements in this category include combinations of two transmission lines, transformers, or generators. Additionally, less frequent events such as bus faults causing loss of a bus section, bi-polar DC line loss, two circuits on a common tower line, or stuck breaker are also included. As a result of two or more elements removed from service, commonly referred to as an "N-2" event, the system must continue to operate with:

a) all remaining facilities in-service
b) all remaining facilities operating within applicable thermal limits (emergency ratings),
c) all voltages within applicable limits,
d) dynamically stable system
e) loss of only planned or controlled firm load, and
f) no cascading

**Transient Stability Criteria:** Studies will be performed to ensure system stability following a critical fault on the system. Cases will be run using the selected heavy summer WECC California cases (pre- and post-project). System performance for each level B disturbance (single element outage) will be compared to the following criteria:

1) Voltage on load buses may not dip more than 25% of the pre-fault voltage or dip more than 20% of the pre-fault voltage for more than 20 cycles. Voltages may not dip more than 30% at non-load buses.

2) Load bus frequencies may not dip below 59.6 Hz for more than 6 cycles.

System performance for each level C disturbance (N-2 or G-2) will be compared to the following criteria:

1) Voltage at any bus may not dip more than 30% of the pre-fault voltage or dip more than 20% of the pre-fault voltage for more than 40 cycles at load buses.

The system will be considered stable if all machines in the WECC interconnected system remain in synchronism and system oscillations are positively damped.

**Post-Transient/Voltage Stability Guidelines:** Post-transient/voltage stability studies will be performed solely to assess whether the proposed MMC project causes any degradation to the reactive power or voltage performance of the SDG&E portion of the CAISO controlled grid. This will be accomplished by:

1) determining compliance to the performance with respect to the NERC/WECC Planning Standards, I.D. WECC-S1, and S2. The method for testing compliance entails using the NERC/WECC method of increasing load or import by 105% or 102.5% (depending upon Category B or Category C),

2) the assessment can be performed using the Reactive Power Margin Requirement (V-Q Methodology developed by the Technical Studies Subcommittee of the WECC).

**Short Circuit Analysis Guidelines:** Based on SDG&E's planning criteria, an overstress of 115% of short circuit duty (nameplate rating) is permissible for existing non-generator substation breakers, 230 kV and below, and 100% of short circuit duty for existing generator breakers. Short circuit studies will be conducted with three-line-to-ground and single-line-to-ground faults to examine the impact of the MMC project on the system. The database for determining if any overstressed breakers exist due to the MMC project will include all higher-queued generation projects in SDG&E's service territory.

**Study Methodology:**

Power Flow/Thermal Analysis Guidelines: Power flow analysis (pre and post-project) entailed Category B and Category C contingency simulations on the entire SDG&E system.

These studies were performed adhering to the guidelines that no transmission element may be loaded above 100% of its continuous rating under base case conditions. For loss of the next system element(s), no transmission system element may be loaded above its emergency rating. System stresses shall be limited such that loss of the next system element(s) will not cause a violation on system voltage deviations. System bus voltages shall be within acceptable low voltage limits.

Generation: Generation within SDG&E is comprised of Qualifying Facilities (QFs) and Market Generation, much of which has been designated by the CAISO as Reliability Must-Run (RMR) capacity. In the power flow cases, internal generation will be dispatched based on the following assumptions:

1) Maximum generation/minimum power import,

2) Maximum 1-in-10 year load forecast: 4849 MW for 2008, 5038 MW for 2010

3) Low load conditions at about 50% of forecast peak load,

4) SDG&E used the latest Reliability Must-Run (RMR) units' designation from the LARS/RMR Study for 2007 as a guide in making generation unit commitment decisions,

5) Only older steam units anticipated to remain in-service in the SDG&E system in 2008 or 2010 will be assumed to be available for dispatch as needed. The existing South Bay steam generation, which is assumed to retire by 2010, will not be modeled. However, the proposed CAISO queue project for 650 MW at South Bay 230/138/69 kV switchyard will be modeled in FY analyses,

6) All GT Generation remaining in system shall be assumed available for dispatch,

7) A total Qualifying Facility (QF) output of 182 MW shall be modeled for peak load scenarios and a level of approximately 50% will be modeled for low load conditions. All QF generation explicitly represented in the power flow base cases will have their reactive power capabilities modeled according to contractual requirements,

8) San Onofre Nuclear Generating Station (SONGS) will be assumed to be on-line (both units) at maximum capability,

9) Peaker generating units in SDG&E's service area will be modeled and assumed available for dispatch, and

10) The MMC project in the post-project cases shall be fully dispatched at 93 MW. The existing 49.5 MW capacity will be dispatched in the pre-project scenarios.

Transient Stability Limits and Margin:

1) Three-phase fault damping will be modeled for the generators where the fault was applied, as follows:

| | |
|---|---|
| Palo Verde | -98 MW or 7.2% /unit |
| Navajo | -48 MW or 6.0% /unit |

2) Machine Representation: For the stability analysis, resources consistent with the time period studied will be dispatched to meet the load requirements in the base cases. Representation of turbine generators will be consistent with available data. The base case power system stabilizers that are normally in-service within the WECC system will be modeled for each operating period studied.

3) System Disturbances: System disturbances for stability studies will be initiated by a three-phase fault on the EHV bus adjacent to the major interconnection point and/or power plant of interest. Single-line-to-ground faults will be performed only if required.

4) Fault Clearing Time: Faults on the transmission lines being evaluated will be cleared in accordance with guidelines provided by the appropriate operating agents.

5) Series Capacitors: Series capacitor modeling during transient conditions is indicated by the attached switching sequences.

6) Unit Tripping: Unit tripping of other utility generation and pumping loads on under-frequency will be modeled in accordance with WECC guidelines or those provided by the appropriate operating agent.

7) Evidence of System Stability: The system will be considered stable if the following conditions are met:

a) Machine Synchronism: All machines in the WECC interconnected system must remain in synchronism as demonstrated by relative rotor angles (unless modeling problems are identified and concurrence is reached that a problem does not really exist), and

b) Simulation Time and System Damping: A stability simulation will be deemed to exhibit positive damping if a line defined by the peaks of the machine relative rotor angle swing curves tends to intersect a second line connecting the valleys of the curves with the passing of time. Corresponding lines on bus voltage swing curves will likewise tend to intersect. A stability simulation, which satisfies these conditions, will be defined as stable. Duration of a stability simulation run will be twenty seconds. The analysis will start with a one-second no disturbance period; the disturbance simulation will start after the typically “noisy” transient period of up to about two-tenths (0.2) of a second after the fault and associated system switching and remedial actions, and conclude at the end of the simulation. A case will be defined as marginally stable if it appears to have zero percent damping and voltage dips are within (or at) the WECC Reliability Criteria limits.

8) Voltage stability study methodology: The methodology considers the period of time after the power and voltage transient oscillations have damped out before operators intervention can take place. This time frame is approximately 1.5 to 3 minutes after the disturbance. Presently, determining compliance to voltage stability criteria can be accomplished by:

a) VAR margin study methodology: demonstrating satisfactory performance with respect to a deterministic, bus-by-bus or system-wide VAR margin criteria, or

b) Post transient voltage study methodology: demonstrating satisfactory performance based on VAR margin. If the power flow solves for the worst contingencies when load or imports are increased by 5% or 2.5% (depending on contingencies), the performance is considered satisfactory.

9) SDG&E implements the second voltage stability methodology by modeling the following in the contingency analysis:

a) Model 90/10 or 1-in-10 year coincident load forecast.

b) Summary of load and resources.

| Year/ # SONGS O/L | Base Load Cat B/C | Base Import Cat B/C | Load +5% Cat B | Load +2.5% Cat C | Import +5% Cat B | Import +2.5% Cat C |
|---|---|---|---|---|---|---|
| 2008 | 4849 | -2850 | 5091 | 4970 | 2992 | 2921 |

Note: OMGP generation and OMPPA transmission modeled in the case.

The post transient portion of this voltage assessment was based on a governor power flow simulation. Governor power flow simulations, in general terms, assume that all un-blocked operating generators will share generation deficiencies or surpluses in proportion to their respective maximum generating capabilities. It is assumed that this adjustment action continues until generators reach maximum or minimum output. A refinement in the simulation routine now first determines whether a generator has been declared as a base load unit (i.e. near or fully

dispatched). If the unit has been so designated the simulation routine excludes those units from being modeled as responding to incremental or decremental dispatch adjustments. Only such automatic adjusting actions as can be expected to occur in the zero to three minute time frame are simulated. Manual adjustments by operators are not modeled. If the power flow case/scenario solves the governor power flow simulation for a given disturbance, it is considered as having passed the first test for this voltage study. The solution parameters included not allowing adjustments in TCUL transformers, phase shifters, and SVD's. Area interchange was set to free flow.

Analysis was conducted such that, as regards the governor power flow test, cases with increased load or import will be used. For the explicit VAR margin analysis, cases with no increase in load or import will be simulated against critical single contingencies. If violations to the criteria are identified, new power flow cases will be developed modeling proposed mitigation.

For the post-transient period, if local voltage deviation is more than 5%, the Adelanto and Marketplace SVC will each provide 132 MVAR of reactive power support (nominal 500 kV). To simplify study procedure, 132 MVAR of shunt caps at each of the above buses will be simulated.

Voltage Stability Modeling Assumptions: The following methodologies will be applied to the post contingency outages:

1) All manually operated voltage control and phase shifting devices will be fixed with few exceptions,

2) All generators which control a high side remote bus will be set at the pre-disturbance voltage at the terminal bus, except for the following generators:

| | | |
|---|---|---|
| EHUNTR 1 24 | EHUNTR 2 24 | EHUNTR 3 22 |
| HUNTN G1 22 | HUNTN G2 22 | |

3) Northwest shunt capacitors modeled as synchronous condensers will be converted to fixed shunt capacitors using their pre-disturbance MVAR value except for Keeler and Maple Valley Static VAR Compensators.

In addition, the following assumptions are inherent to the methodology:

1) Transient stability simulation of the disturbance has found the system to be stable and within the voltage and frequency dip criteria,

2) Sufficient time after the disturbance has elapsed such that the system frequency is uniform and turbine outputs have reached steady-state values,

3) Unless specific information is available, LTCs and regulators have sufficient regulating range and time delay settings such that post-transient voltages at loads are restored to pre-disturbance levels,

4) Normal automatic generation control (AGC) will not significantly change generation within 1.5 to 3.0 minute time frame - either because of being too slow

or because of being intentionally suspended after the disturbance. In power flow simulation, this means area interchange control is not active,

5) All turbine-generators will be reviewed as to whether the base-load flag is set in power flow generator data. For units indicating “1”, the unit will be assumed operating in base-load mode and adjustments up/down to generator loading will not be simulated in voltage stability analysis. For units not identified as base-loaded, the governor power flow routine will increase or decrease generator load due to governor action. All generators operating with free governors will pick up their share of generation deficiency (or reduce excess) in proportion to their capacities (Pmax) and inversely proportional to droop setting until reaching max/min output,

6) Phase shifters are assumed to hold a fixed angle,

7) Transmission regulating transformers modeled in the pre-disturbance power flow to change taps in accordance with pre-set voltage schedules are fixed at their pre-disturbance level except where there is specific information to do otherwise,

8) Those remedial measures, which affect post transient steady state conditions, should be modeled. These remedial measures include high speed series capacitor switching, generation dropping and load (pump) dropping,

9) Shunt capacitors/reactors, modeled in pre-disturbance power flow to automatically switch “on” or “off” based on pre-set voltage schedules are fixed at pre-disturbance level except where there is specific information to do otherwise,

10) Bus voltage deviation shall not exceed 5% of its initial voltage unless agreed by the affected operating agent, and

11) No system element should be loaded more than 100% of its emergency rating.

The various power flow cases will be evaluated for select few worst case single contingencies, and monitoring of 5 SDG&E buses. Certain system parameters and/or representations were incorporated in the analysis and include the following:

Network representations for the 2008 planning years

90/10 or 1-in-10 year peak load forecasts
2008: 4849 MW

SDG&E cut plane flow
2008: 2300 MW and 2850 MW (2 SONGS)

New generation on-line:
2005: 46 MW peaker unit sited at Miramar CT bus
2006: 541 MW Palomar (PEN) combined cycle plant sited just south of Escondido.

Significant Transmission Modeling:
2008: The power flow cases for 2008 reflect the addition of the Miguel-Mission #2 and Miguel-Sycamore #2 230 kV lines as well as the

transmission modifications required for the Palomar (PEN) generation project.

Monitored Facilities: This study was focused on the local area near the Chula Vista facility. The following buses were monitored for VAR margin, critical voltage, and voltage margin:

Imperial Beach 69 kV, Otay 69 kV, San Ysidro 69 kV, Southbay 69 kV Sweetwater 69 kV

Reactive Margin Criteria: SDG&E uses 150 MVARS of VAR margin at buses following single contingencies (Category B), and 75 MVARS of VAR margin following double contingencies (Category C).

Contingency Simulations: The following contingencies will be simulated and evaluated:

Category A, no disturbance

Category B, single contingencies

- Hassayampa-North Gila 500 kV single line outage
- TL50001 IV-Miguel 500 kV W/SPS 6.1 no x-trip
- TL50001 I IV -Windfarm W/SPS 6.1 x-trip TL23050
- TL50001 Windfarm-Miguel 500 kV W/SPS 6.1 x-trip TL23050
- TL50001 IV-Windfarm W/SPS 6.1 x-trip TL23040
- TL50001 Windfarm-Miguel 500 kV W/SPS 6.1 x-trip TL23040
- TL6910 Miguel-Border 69 kV single line outage
- TL623 Imperial Beach-Otay-San Ysidro 69 kV N-1 outage
- Palomar G-1 (combined cycle total plant)

Category C, Two or more elements

- G-2 SONGS double unit outage
- Sweetwater 69 kV bus outage
- Southbay 69 kV n. bus outage

## SYSTEM IMPACT STUDY RESULTS

This study is comprised of the following set of analysis:

1. Thermal Analysis
2. Voltage Analysis
3. Short Circuit Analysis
4. Transient Stability Analysis
5. Deliverability Assessment

Each of these analysis and the corresponding results are presented in the following paragraphs:

**Thermal Analysis** provides expected ampere or MW loading data for all elements in the interconnected system under pre and post-contingency conditions. The time domain is of the steady state or long term, about 3 minutes past events, and prior to system adjustments either by automatic or manual operator interventions. Typically, only elements networked directly or nearby the project display significant change in loading.

A complete Grid Assessment contingency list (Appendix C) was simulated against twenty-four (24) power flow cases. Twelve cases were used for 2008 COD analysis and twelve for the 2010 future year analysis. These cases included all the necessary sensitivities such as high Southbay generation, low Otay load, no Southbay generation, high Miguel flow, three border units on, etc. Appendix A lists various load/resource assumptions for each of these base cases . A detailed transmission plot of the SDG&E 69 kV transmission network at and near the proposed MMC project is provided in Appendix D.

The results indicated the following transmission lines will be overloaded beyond their emergency ratings under a variety of contingency conditions.

TL6929 (Otay-Otay Unit 1)
TL649A (Otay-Otay Lake Tap)
TL644 (South Bay-Sweetwater)
TL642B (Sweetwater-Montgomery Tap)

These facilities are discussed below and listed in Tables 2, 3 and 4 on the next pages.

<u>Category A evaluation:</u>
The study indicated one Category A (all facilities in-service, no contingency) constraint that results from the proposed MMC upgrade project. The existing radial 69 kV gen-tie TL6929 will overload above its present 64 MVA continuous and emergency rating. The limitations presently are not due to the conductor size, but due to station terminal equipment and protection relay/current transformer settings. It is feasible to upgrade the line to near its full capability. As indicated in Table 2 below, the line will overload by 43% at full output of the project. This constraint exists for all system load levels. The preferred mitigation for relieving

this N-0 overload is to fund and install certain higher rated substation terminal equipment and revise existing relay and current transformer settings. Refer to Figures “a” and “b” in Appendix E. Additional detail depicting more elements of the southern SDG&E 69 kV transmission system is also provided in Appendix E**.** Power flow plots of pre- and post-project examples, with no Border generation on-line are also provided.

**Table 2**
**Category A: N-0 Thermal Loading Constraints**

| Overloaded Element | Contingency | FYA | Cat. A/B/C | case | % load | COD | Cat. A/B/C | case | % load |
|---|---|---|---|---|---|---|---|---|---|
| LINE OTAY 69kV-OTAY_93 69kV ck1 | Base system (n-0) | x | A | all post | 43 | x | A | all post | 43 |

*%Load column numbers are % loading above emergency ratings.*

<u>Category B evaluation:</u>
The single contingency simulations resulted in three Category B transmission constraints shown below in Table 3:

**Table 3**
**Category B: Thermal Loading Constraints**

| Overloaded Element | Contingency | FYA | Cat. A/B/C | case | % load | COD | Cat. A/B/C | case | % load |
|---|---|---|---|---|---|---|---|---|---|
| LINE OTAY 69kV-OTAYLKTP 69kV ck1 | line IMPRLBCH-OTAYTP-SYO 69 ck 1 | x | B | b | 7.2 | | | | |
| LINE SOUTHBAY 69kV-SWEETWTR 69kV ck1 | line MG-MONTGYTP-SW-SY 69 ck 1 | x | B | f, h | 10, 20 | x | B | d, f, g, h, s, t | 5.7, 16.6, 4.0, 23.5, 18.3, 37.8 |
| LINE SWEETWTR 69kV-MONTGYTP 69kV ck1 | line SOUTHBAY to SWEETWTR 69 ck 1 | x | B | h, l | 6.1, 13.2 | x | B | f, h, s, t | 4.6, 9.2, 6.3, 19.5 |

*%Load column numbers are % loading above emergency ratings.*

a) TL649A (Otay-Otay Lake Tap, 2.4 mi): This 69 kV transmission line overloads post contingency above its 50 MVA continuous/emergency rating for outage of TL623 (Imperial Beach-Otay-San Ysidro) 69 kV line. This line does not have an emergency rating. Without upgrading it, the project would be subject to pre-contingency curtailment by CAISO. The preferred mitigation is to upgrade this line by increasing the line rating to 80 MVA continuous capacity. Power flow plots of this transmission constraint are provided in Figures “c” and “d” in Appendix F.

b) TL644 (South Bay-Sweetwater, 3.9 mi): This 69 kV transmission line overloads post-contingency above its 143 MVA emergency rating for outage of TL642 (Southbay-Montgomery-Sweetwater) 69 kV line. Without upgrading this line the project would be subject to pre-contingency curtailment by CAISO. The existing line is composed largely of 2-636 ACSR/AW overhead conductors and 1750 MCM AL underground cable passing under the Sweetwater River channel. The line rating is limited by

the UG cable. The preferred mitigation is to upgrade this line by increasing the line rating to 200 MVA. Power flow plots of this transmission constraint are provided in Figures “e” and “f” in Appendix F.

c) TL642B (Sweetwater-Montgomery Tap, 2.4 mi): This 69 kV transmission line was initially identified as a transmission constraint based on its 157 MVA rating; however, it was determined that the line capability is actually 200 MVA, thus no upgrade is needed.

Category C Thermal Contingency Results: Analysis of simulated contingencies for Category C, loss of two or more elements, indicates the same three transmission lines in Table 3 are adversely affected. Table 4 below shows the details:

**Table 4**
**Category C: Thermal Loading Constraints**

| Overloaded Element | Contingency | FYA | Cat. A/B/C | case | % load | COD | Cat. A/B/C | case | % load |
|---|---|---|---|---|---|---|---|---|---|
| LINE OTAY 69kV-OTAYLKTP 69kV ck1 | Sweetwater 69kV Bus | | | | | x | C | b | 5.8 |
| LINE SOUTHBAY 69kV-SWEETWTR 69kV ck1 | Southbay 69kV S Bus | x | C | b, c, d, e, f, g, h, k, l | 20.6, 29.3, 30.1, 23.1, 44.9, 32.4, 54.1, 22.8, 44.6 | | | | |
| LINE SWEETWTR 69kV-MONTGYTP 69kV ck1 | Southbay 69kV N Bus | x | C | f, h, l | 0.1, 6.1, 11.7 | x | C | f, h, s, t | 4.7, 8.9, 5.5, 17.8 |

*%Load column numbers are % loading above emergency ratings.*

Upgrading these overloaded lines as proposed for Category B will take care of Category C contingencies as well.

**Sensitivity Thermal Analysis**: Upon CAISO comments on the Interconnection Feasibility Study, two sensitivity scenarios were included as part of this ISIS portion of the LGIP process. The scenarios include:

a) peak forecast load, no Southbay generation, three Border peakers on-line, and high Miguel flow (case labels ending “q” and “r”), and

b) low system load, low OTAY load, and high Southbay generation, three Border peakers on-line (case labels ending “s” and “t”).

The analyses were performed and no new constraints were identified in these sensitivity analyses.

**Voltage Analysis** provides voltage deviations at all monitored buses without and with the project. These deviations are also compared for all Category B and Category C contingencies. The results indicate numerous voltage violations, however, those violations are found in pre-project cases also. The project does not

result in any significant voltage impacts. The results are summarized in detail in Appendix H.

SDG&E follows a transmission voltage and VAR control operating procedure, TMC1005. This procedure provides the voltage performance criteria SDG&E and CAISO operate to for steady state and contingency conditions. Specific buses in the system have a narrow operating voltage range of set points which are adhered to if at all possible. All other buses are monitored according to the following general criteria:

| | Minimum Voltage (kV) | |
|---|---|---|
| Nominal Voltage (kV) | Pre-Contingency | Post-Contingency |
| 69 | 65.5 | 62.1 |
| 138 | 132.0 | 124.2 |
| 230 | 218.5 | 207.0 |
| 525 | 499.0 | 472.5 |

Review of the results from simulating 20 power flow cases against 5 Category B (single element) and 3 Category C (double element) contingencies are summarized below and tabularized in Appendix K:

**1) Governor power flow test:** The results indicate that all contingency simulations solved the governor power flow test.

**2) Contingency low voltage test:** All SDG&E buses were monitored for low voltages below 0.9 per unit, or 10% below the nominal voltage level, bus by bus, post-contingency at and near the project site. There were no buses exhibiting low voltage post-project that did not also exhibit low voltage for the same pre-project scenario and contingency.

**3) Delta voltage drop**: Acceptable delta voltage drop is less than 5% for Category B contingencies and less than 10% for Category C contingencies. The analysis included scenarios for Commercial Operating Date year and future year models. These models included scenarios of:

-peak load, peak load/high Miguel flow,
-low system/low Otay loads,
-maximum generation/minimum import
-0/1/2/3 Border peakers on line
-pre- and post-project

The most frequent non-conforming performance resulted from simulations of several 500 kV outages, certain bus outages, and a few select 69 kV and 138 kV line outages. However, there are **no** non-conforming delta voltage issues that relate to the MMC project.

**Short Circuit Analysis:** Short Circuit analysis determines fault current withstand capability of existing transmission circuit breakers in response to simulations of three-line-to-ground (3LG) and single-line-to-ground (SLG) faults.

Two separate short circuit base cases were created, one for 2008 COD study and the other for 2010 FY study. The 2010 case had all existing generators and those generators that were ahead of this project in the CAISO queue modeled per LGIP section 7.3 The 2008 case had all existing generators and only those new generators modeled that were scheduled to be in service prior to 2008 or concurrent with this project.

Pre-project and post-project fault currents were compared to existing breaker ratings at selected substations. Based on SDG&E's planning criteria, an overstress of up to 115% of circuit breaker rating is permissible for non-generator substation breakers, 230 kV and below, and up to100% for generator breakers.

From review of detailed fault duty results of 3LG and SLG fault simulations of all key SDG&E buses, several circuit breakers have been found in violation of the 115% breaker nameplate rating limit (Appendix I). In the Feasibility Study there were no violations attributable to MMC's proposed project. However, in the COD year model for existing and proposed generation units in the SDG&E system there are four circuit breakers indicating over stressed conditions from simulations. The affected circuit breakers are at Otay Substation:

**Table 5**
**Short Circuit summary**

| Overstressed Breakers as a result of the project | | | | | |
|---|---|---|---|---|---|
| Breaker | | 2008 Pre-project | 2008 Post-project | 2010 Pre-project | 2010 Post-project |
| OY30 | DUTY_Percent | 111.4 | 117.1 | 102 | 108.3 |
| | DUTY_Amps | 23389.7 | 24582.8 | 21430.2 | 22753.4 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| OY623 | DUTY_Percent | 111.4 | 117.1 | 102 | 108.3 |
| | DUTY_Amps | 23389.7 | 24582.8 | 21430.2 | 22753.4 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| OY649 | DUTY_Percent | 111.4 | 117.1 | 102 | 108.3 |
| | DUTY_Amps | 23389.7 | 24582.8 | 21430.2 | 22753.4 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| OY6929 | DUTY_Percent | 111.4 | 117.1 | 102 | 108.3 |
| | DUTY_Amps | 23389.7 | 24582.8 | 21430.2 | 22753.4 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |

Appendix I provides a complete listing of breaker ratings and simulation results. Difference in fault duty from comparing 2008 to 2010 results is attributable to generation modeling assumptions. In the FY model of year 2010 and drawing on the CAISO Controlled Grid Generation Queue, modeling of the queue 27 project indicates a displacing effect with respect to fault duty impact to the Otay 69 kV bus.

**Transient Stability Analysis** provides dynamic performance of the system under a variety of contingencies. This study was performed using Commercial Operating Date year power system models found in the following cases:

case_g: Pre-project/peak load 4849 MW/max gen/min import,

case_h: Post-project/peak load 4849 MW/max gen/min import,

case_s: Pre-project/low load 2425 MW/low Otay load of 13 MW/50% import/50% generation, and

case_t: Post-project/low load 2425 MW/low Otay load of 13 MW/50% import/50% generation.

These cases were considered representative cases to cover the most significant scenarios.

Selected major disturbances known to have significant impact on transient stability performance at the regional level were applied. Examples would be a three-phase fault at the Hassayampa 500 kV bus followed by tripping of the Hassayampa-North Gila 500 kV line, or other similar bus fault/line trip simulations. A three-phase 6 cycle fault on the project bus with the proposed generating units not being tripped. Selected generator double contingencies consistent with the WECC Reliability Criteria. The entire list is provided in Appendix C.

The study simulated selected Category A/B/C outages to determine whether the MMC project fails to perform within limits, or causes other existing system facilities to indicate unsatisfactory performance. Certain metrics are evaluated using the “WECC Disturbance Performance Table of Allowable Effects on Other Systems” (Appendix B). The analysis was performed using computer programs and script files which compare elemental model data results against prescribed criteria. The analysis is termed Worst Conditions Analysis (WCA). The WCA analysis compares the data for all buses/generators reporting data into the data output file against criteria for voltage at load buses, voltage at all buses, and frequency response at all buses. Those criteria include:

| Contingency Category | Transient Voltage Dip | Min Transient Frequency | Voltage Deviation |
|---|---|---|---|
| A | None | None | None |
| B | 25% @ load bus<br>30% @ non-load bus<br><= 20% for >20 cycles | >59.6 Hz<br>for 6 cycles<br>@ load bus | <= 5% @<br>any bus |
| C | 30% @ any bus<br><= 20% for >40 cycles | >59.0 Hz<br>for 6 cycles<br>@ load bus | <= 10% @<br>any bus |

A summary of the WCA analysis is provided in Appendix J. The results indicate that there are criteria violations resulting from several of the thirteen forced outage simulations performed. There are no indicated criteria violations for SDG&E

facilities from the 500 kV line outage or from the two generator outage simulations. The violations occur for peaker generators connected at Border and for the existing MMC unit connected to Otay. The violations are for frequency dips greater than the prescribed limits and occur for pre- and post-project for the Border units and only for pre-project for the existing MMC unit.

Investigations were made of the network and other model data. The only discrepant data was for several peaker step-up transformers base rating value. The data was corrected for the six step-up transformers and one simulation was re-run for the Miguel-Border forced outage. There was slight improvement to the performances. However, these data issues and unsatisfactory performance in some cases are not attributed to the MMC project.

Stability plots were generated for all these simulations. The various units, including the proposed project can be considered stable if all machines in the WECC interconnected system remain in synchronism and system oscillations are positively damped. Plots are provided for responses from units in the Arizona, Comisión de Electricidad (CFE, Mexico), Imperial Irrigation District (IID), Southern California Edison (SCE), and SDG&E control areas. As a benchmark reference, the system swing machine, modeled at the Pittsburg bus in the PG&E control area, is plotted as well. No-disturbance 10 second run-time plots are provided. The purpose of these plots is to demonstrate that no underlying system anomaly is present in power flow models with respect to dynamics data in use. Real-time plots for such no-disturbance periods would not plot as flat lines. The response parameters plotted are angle, frequency, and voltage responses. The data used for producing the plots is the same data used for the WCA analysis. Plots of performance pre- and post-project are provided in Appendix J. Results indicate that for pre- and post-project contingency simulations, the proposed MMC project does not create any adverse impact on the surrounding SDG&E/CAISO/WECC grid. All plots demonstrate well damped oscillations for all contingencies, all parameters plotted (i.e. angle, frequency, voltage).

## DELIVERABILITY ASSESSMENT

Deliverability assessment is conducted to determine how much capacity of a generation project is deliverable to the Grid without any system upgrades, and if not fully deliverable, what system upgrades are needed to make the generation project 100% deliverable.

CAISO performed deliverability analysis for a cluster of projects including MMC Chula Vista expansion project (project) and determined the following:

1. The project is not deliverable as proposed. The deliverability of this project to the CAISO Grid is zero megawatts.

2. The project can be made 100% deliverable if the following transmission line overloads are mitigated:
    - OTAY 69 kV to OTAY_109 69 kV ckt 1
    - NATNLCTY 69 kV to SWTWTRTP 69 kV ckt 1
    - MAIN ST 69 Kv to NATNLCTY 69 kV ckt 1
    - MONTGYTP 69 kV to SWTWTRTP 69 kV ckt 1
    - SWEETWTR 69 kV to SWTWTRTP 69 kV ckt 1

Most of these overloads are caused by projects higher than this project in the CAISO queue. If those higher-queued projects do not mitigate overloads, then the study will need to be revised without those projects to determine the impact of this project alone.

For more on the CAISO Deliverability study results, refer to the CAISO website link below:
http://www.caiso.com/181c/181c902120c80.html

The CAISO is currently updating the deliverability study databases and will be revising the study results in the next few months. The new results, after review from the Stakeholders, will be posted on the CAISO website.

## SUBSTATION EVALUATION

Otay Substation is SDG&E's 69/12 kV distribution load serving station. The sub has five 69 kV line positions and two transformer positions. There are no spare breaker/transformer positions available within the existing station. Otay is connected by two of the 69 kV lines directly to the South Bay 69 kV switchyard (TL645/46), by one 69 kV line (TL623) to the Imperial Beach Substation, and by one 69 kV line (TL649) to San Ysidro and Border subs, and finally by TL6929 which interconnects the existing MMC generation facility to the SDG&E/CAISO controlled grid at Otay sub.

During 2010 peak load periods SDG&E forecasts that this sub may serve 39.3 MW of customer load. This is a non-coincident number and has been factored down by a scaling factor to coincide with the system forecast for 2010 of 5038 MW. At the 5038 MW system load, the Otay load is modeled at 37.3 MW. The corresponding low-load scenarios model Otay load at about 18.4 MW. For pre-project scenarios, during peak load periods and at maximum output of 49.5 MW, the output of the MMC generation facility is largely delivered to the Otay load with about 12 MW flowing beyond Otay bus into the surrounding transmission network. At low load about 31 MW penetrates transmission beyond Otay.

Conversely, for the post-project scenarios, during peak load periods and at the proposed maximum output of 93 MW, the output does serve Otay load but with about 72 MW flowing beyond Otay bus into the surrounding transmission network. At low load, about 91 MW penetrates transmission beyond Otay. For either load level scenario the existing gen-tie will overload beyond its existing 64 MVA rating.

Regarding impacts to the Otay substation itself, the existing protection equipment settings will need to be revised and certain bus jumpers upgraded. Of additional concern is impact to the Otay 69 kV main bus. The standard power flow model is of a nodal topology. All interconnected facilities directly connected to a bus do so at one discrete point. This is illustrated from a plot of Otay bus as represented in the power flow model for this study in Figure "w" on the next page.

In the real-time network of a transmission or a distribution substation, the nodal model represented in a power flow is actually composed of:

1) a bus or buses, often sectionalized by a tie circuit breaker,

2) points along the bus at which jumpers connect to disconnect switches and circuit breakers, and ultimately to transmission lines as shown in Figure "x" below.

**Figure w**
**Otay 69 kV bus**

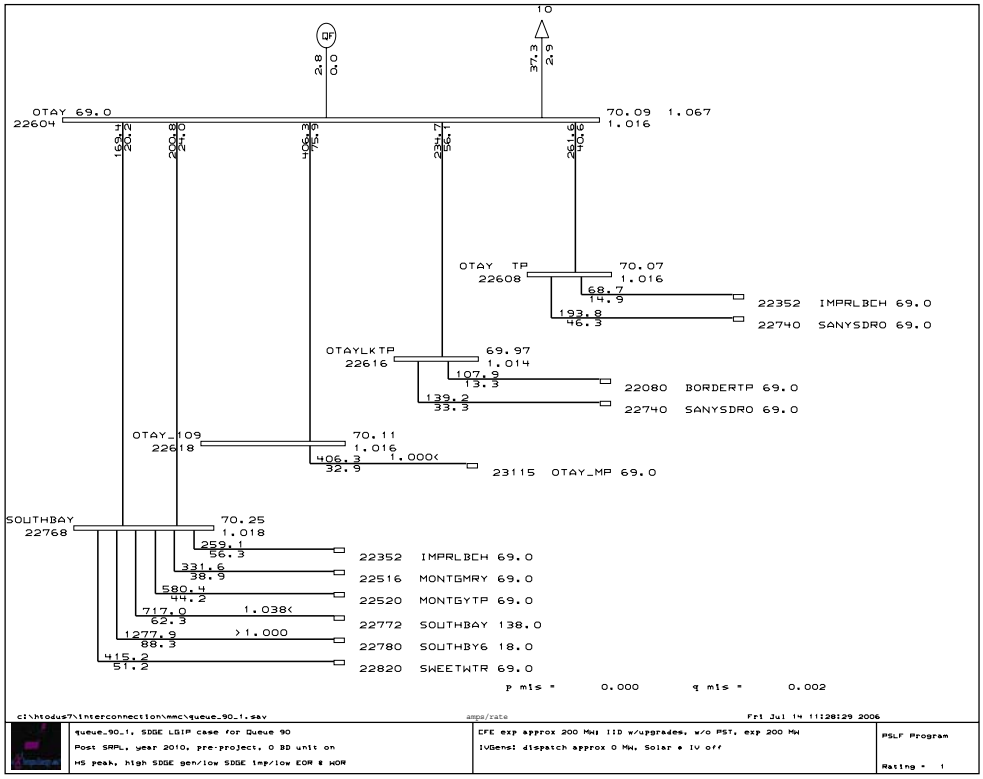
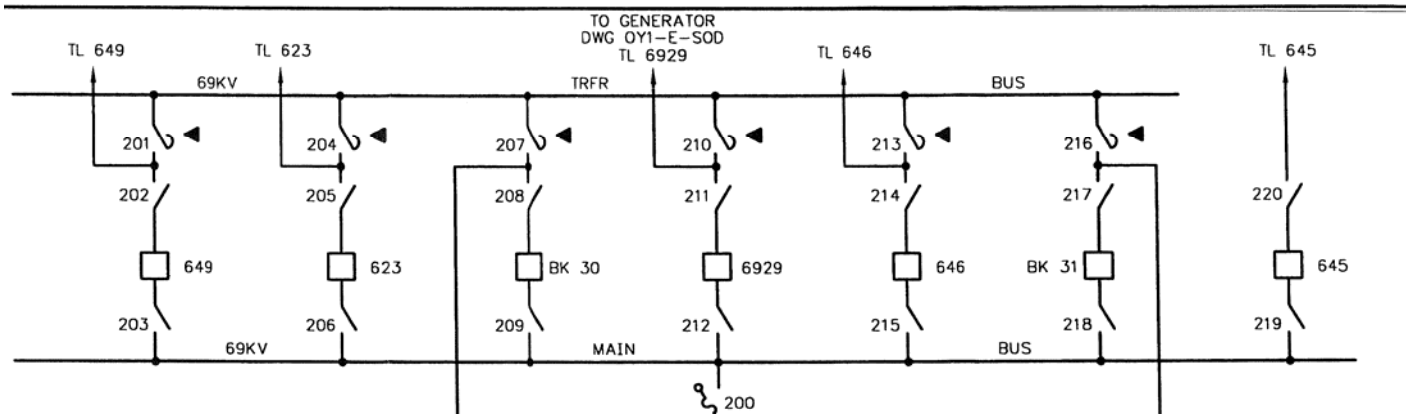



**Figure x**
**Otay 69 kV System Operating Diagram**




Of concern is whether the Otay 69 kV main bus, rated at 1980 amps, would be subject to higher than rated current flow as a result of the proposed MMC project. To answer the question with a high level of certainty, a detailed power flow model will be constructed which includes the discrete interconnecting elements and their respective ratings, and between each circuit breaker bay position a sensing element will be included. This can be addressed during the Interconnection Facility Study.

## IDENTIFICATION OF ANY OVERSTRESSED EQUIPMENT

Overstressed equipment, within the scope of this study, can be assessed for such items as transformers, line conductors, and substation terminal equipment (bus, jumpers, disconnect switches, circuit breakers, relays, current transformers).

From reviewing the various thermal facility loading data and voltage limit results for the proposed MMC project, certain equipment design or operating limits will be exceeded. This is caused either from operation of the proposed project or as an impact from other nearby facilities.

The existing gen-tie transmission line, TL6929, rated at 64 MVA, is limited not by the conductor capability but by the substation terminal equipment. The limitations stem from settings for protection equipment such as relays and current transformers. In addition, jumpers (short conductor material) in series with the breaker and line disconnect switches and the breaker, between the Otay 69 kV bus and the line drop conductors, would further limit the rating to less than the full capability of the overhead 1033 ACSR conductors. See the details below:

| Rating Amps | Equipment | Conductor | Bus |
|---|---|---|---|
| **540** | SEL-501 | | Otay |
| **660** | Line CT1200 | | Otay |
| **1090** | Jmp Line Disc to CB | 750 CU | Otay |
| **1090** | Jmp Bus Disc to CB | 750 CU | Otay |

In addition to the above potential for overstress to certain terminal equipment, the short circuit duty analysis indicates there are four 69 kV circuit breakers at the Otay substation that would be stressed beyond their short circuit duty ratings.

## SYSTEM PROTECTION STUDY

Results from preliminary review of the proposed MMC project, with respect to protection issues, indicate the following:

1) The existing gen-tie, TL6929, is rated at 64 MVA. The rating of this overhead transmission line is limited by a 600 amp over-current relay, current transformer settings, and jumpers at Otay Substation. From the Feasibility study it was determined that replacing certain terminal equipment and changing settings could increase the rating high enough to accommodate the proposed 93 MW project.

2) It appears to SDG&E that if the MMC project goes forward, and with or without MMC choosing to fund certain or all of the above identified constraints, there will need to be some Special Protection System (SPS) or integration of this project into existing SPS(s). This is due to infeasibility of the identified transmission constraints (Delivery Network Upgrades) to be constructed and placed in-service prior to the identified MMC start-up date. Research is on-going as to what extent an existing SPS will have to be modified. It is also possible that a new SPS will

have to be created to ensure grid reliability. The following transmission constraints have been identified as impacts resulting from the operation of the proposed MMC project:

a) TL649A (Otay-Otay Lake Tap, 2.4 mi.): Loading on this 69 kV transmission line can exceed the existing rating by as much as 50%. Offending outage(s) include TL623 (Imperial Beach-Otay-San Ysidro) and the Sweetwater 69 kV bus outage,

b) TL644 (Southbay-Sweetwater, 3.9 mi): Loading on this 69 kV transmission line can exceed the existing rating of 97 MVA by as much as 77% above the continuous rating. Offending outage(s) include TL642 (Montgomery-Sweetwater-Southbay) and the Southbay 69 kV north bus outage, and

c) TL642B (Sweetwater-Montgomery Tap, 2.4 mi) Loading on this 69 kV transmission line can exceed the existing rating of 157 MVA by as much as 11% above the continuous rating. Offending outage(s) include: TL6910 (Miguel-Border), TL644 (Sweetwater-Southbay) and the Southbay 69 kV north bus outage. This 69 kV transmission line was initially identified as a transmission constraint based on its 157 MVA rating; however, it was determined that the line capability is actually 200 MVA, thus no upgrade is needed.

To the extent that there are long lead time SPS related items, the Engineering and Procurement (E&P) document, mentioned elsewhere, should also address that SPS design/engineering/procurement/construction cost responsibility.

## MITIGATION MEASURES and the RECOMMENDED MITIGATION PLAN

SDG&E recommends to CAISO and MMC Chula Vista, LLC that the following mitigation measures be implemented to address the identified Delivery Network transmission constraints:

a) TL649A (Otay-Otay Lake Tap, 2.4 mi): This 69 kV transmission line can overload post contingency above its 50 MVA continuous/ emergency rating. Category B and C contingencies with the MMC proposed project in-service and fully dispatched can cause transmission constraints. Since the line does not have an emergency rating, without upgrading this line the project would be subject to pre-contingency congestion management protocols by CAISO. The preferred mitigation is to upgrade this line by increasing the line rating to 80 MVA continuous capacity. The non-binding/good faith cost estimate to construct this upgrade is approximately **$2,534,000**,

b) TL644 (South Bay-Sweetwater, 3.9 mi): This 69 kV transmission line can overload post-contingency above its 143 MVA continuous/ emergency rating. Category B and C contingencies with the MMC proposed project in-service and fully dispatched can cause transmission constraints. Without upgrading this line the project would be subject to CAISO congestion management protocols by CAISO. The preferred mitigation is to upgrade this line by increasing the line rating to 200 MVA. The non-binding/good faith cost estimate to construct this upgrade is approximately **$6,969,000**, and

c) TL642B (Sweetwater-Montgomery Tap, 2.4 mi), was initially identified as a transmission constraint based on its 157 MVA rating; however, it was determined that the line rating capability is actually 200 MVA, thus no upgrade is needed.

**Mitigation Alternatives**: The following alternatives are available to the Interconnection customer:

a) Accept pre-contingency generation curtailment, the amount of which, and the time of day, is determined by CAISO,

b) Propose to CAISO a new Special Protection System (SPS) or modification of an existing SPS,

c) Operate the plant at reduced capacity. The IC is entitled to reduce the plant output by 15% prior to getting into the facilities study.

<u>Information that may be useful:</u>

SDG&E provides recent 5 year outage frequency and duration history *for certain 69 kV facilities identified as causing transmission constraint in the MMC Interconnection System Impact Study. This data is for* information only and makes no representation as to how or what future outage history may be.

| MMC Project: Local Outage Information Summary | | | | | | |
|---|---|---|---|---|---|---|
| | | 2002 | 2003 | 2004 | 2005 | 2006 |
| TL623 | Hours | 0.017 | 0.83 | n/a | 2.75 | n/a |
| | Frequency | 2 | 1 | n/a | 2 | n/a |
| | duration (total hours/no. incidents) | 0.0085 | 0.83 | n/a | 1.38 | n/a |
| | | | | | | |
| TL642 | Hours | 0.05 | 2.52 | 1.62 | 3.7 | 1.48 |
| | Frequency | 1 | 1 | 1 | 4 | 2 |
| | duration (total hours/no. incidents) | 0.050 | 2.52 | 1.62 | 0.93 | 0.74 |
| | | | | | | |
| TL644 | Hours | n/a | 11.03 | 7.50 | 2.58 | n/a |
| | Frequency | n/a | 2 | 2 | 2 | n/a |
| | duration (total hours/no. incidents) | n/a | 5.50 | 3.75 | 1.29 | n/a |
| | | | | | | |
| TL6910 | Hours | 24.07 | n/a | n/a | 9.82 | n/a |
| | Frequency | 11 | n/a | n/a | 5 | n/a |
| | duration (total hours/no. incidents) | 2.19 | n/a | n/a | 1.96 | n/a |
| | | | | | | |
| **There were no outages on Sweetwater, Southbay North or South buses in 2002-2006 time period** | | | | | | |

## NON-BINDING GOOD FAITH COST ESTIMATE OF COST RESPONSIBILITY

Table 6 below summarizes the transmission reinforcements and their estimated cost as a result of the proposed MMC expansion project. The Interconnection Facilities costs are zero ($0) because the facilities already exist. The Reliability Network Upgrade cost estimate is approximately **$1,469,000**. The Delivery Network Upgrade cost estimate is **$9,503,000**. The total estimated cost for the Reliability and Delivery Network additions and upgrades is **$10,972,000**.

MMC is not obligated to pay for Delivery Network Upgrades. However, in that case, MMC will be subject to dispatch constraints imposed by CAISO to maintain Grid reliability.

**Table 6**
**Non-Binding Good Faith Cost Estimate**

| Item | Description | | Total w/ AFUDC |
|---|---|---|---|
| | **Interconnection Facilities (existing)** | | $0 |
| | **Reliability Network Upgrades** | | |
| 1 | Upgrade TL6929 (Otay-Otay Unit 1) | | included |
| 2 | Replace four circuit breakers at Otay Substation: OY30, OY623, OY649, OY6929 | | $1,469,000 |
| | | **Subtotal** | **$1,469,000** |
| | **Delivery Network Upgrades** | | |
| 3 | TL649A (Otay-Otay Lake Tap, 2.4 mi, upgrade the line to at least 80 MVA continuous capacity. | | $2,534,000 |
| 4 | TL642B (Sweetwater-Montgomery Tap, 2.4 mi), was initially identified as a transmission constraint based on its 157 MVA rating; however, it was determined that the line capability is actually 200 MVA, thus no upgrade is needed. | | $0 |
| 5 | TL644 (Southbay-Sweetwater, 3.9 mi), upgrade the line to at least 200 MVA continuous capacity. | | $6,969,000 |
| | | **Subtotal** | **$9,503,000** |
| | | **Total** | **$10,972,000** |

All the above cost estimates are preliminary, non-binding and good faith. These costs are in “as year spent dollars.” Taxes, landscaping, under grounding, walls, gates, driveways, CAISO metering, and environmental and licensing costs are not included. Network Upgrade Costs exclude acquisition of new transmission Right-Of-Way (ROW) and substation land. All Interconnection Facility costs for ROWs are assumed to be the responsibility of MMC Chula Vista, LLC.

## NON-BINDING GOOD FAITH ESTIMATE OF TIME TO CONSTRUCT

The non-binding good faith estimate of time to construct the required Interconnection Facilities, Reliability Network Upgrades, and Delivery Network Upgrades is 22-24 months from the signing of the Large Generator Interconnection Agreement (LGIA), obtaining the necessary environmental and construction permits, and MMC committing to fund these Network Upgrades.

Also, please note that SDG&E has determined that it is not feasible to complete the Delivery Network Upgrades by the desired Commercial Operating Date of January 1, 2008.

**PROJECT CHANGES THAT MAY REQUIRE A RE-STUDY**

A re-study may be required if the assumptions used in performing this study have changed significantly. Some examples of changes that may prompt a re-study are the following:

1) A higher queued project in the vicinity of the Chula Vista Expansion project is withdrawn from the queue,

2) This project or any other project higher in the CAISO queue in the vicinity of this project, has changed its point of interconnection, or

3) Any other changes in the CAISO Controlled Grid that may have a material impact on the results of this study.

## DISCLAIMER INFORMATION

Since the project is interconnecting into the SDG&E's electric system, SDG&E is providing the following disclaimer notice to the Interconnection Customer.

Local Furnishing Bonds: SDG&E has financed substantial portions of its transmission and distribution systems with proceeds from $687,000,000 of outstanding Local Furnishing Bonds (LFB) issued by the City of San Diego and the City of Chula Vista. Interest on these bonds is tax-exempt. Pursuant to applicable IRS private letter rulings, if the proposed project would cause impairment of the tax-exempt interest on these bonds, the Interconnection Customer would pay any resulting costs to SDG&E in mitigating the impairment to the continued tax-exempt status of interest on the LFB's (an Impairment).

The MMC Chula Vista Expansion Project does not appear to cause an Impairment at this time. However, the entirety of the matter is still under review by bond counsel and this conclusion may need to be revisited if material facts change which are relevant to the determination if an Impairment may arise.

SDG&E completed its assessment for the 2010 year time period to determine whether electric energy from the MMC project, in combination with other local generation may cause an actual or deemed cumulative annual net outbound flow of electric energy from SDG&E's wholly-owned electric facilities in San Diego, Orange, and Imperial Counties, in violation of the Encumbrances set forth in SDG&E's Appendix B to the Transmission Control Agreement with CAISO. Based on prior analyses modeling the net energy flow into the SDG&E service territory, electric generating plants used only for high peak load conditions will be dispatched relatively minimal hours per year. Per this assumption, the flows over these points of interconnection are expected to remain inbound on a net annual basis with the addition of the MMC project.

Also, if in the future the dispatch of electric energy by owners of existing and new generation located in San Diego that is not sold to SDG&E for service to its local furnishing customers, SDG&E may be required to effect a tax call on the LFBs in the absence of remedial measures that prevent annual net outbound flows from SDG&E's local transmission and distribution system, as contemplated by SDG&E's Appendix B to the Transmission Control Agreement ("TCA") with the CAISO. Under the CAISO Tariff and TCA, however, the CAISO is obligated to affect such remedial measures to avoid an Impairment that would otherwise trigger a tax call. Such remedial measures, for example, would be undertaken by CAISO through rejection of schedules or bid protocols sufficient to avoid net annual outbound flows resulting from the MMC project and other generation within the San Diego basin not utilized to service local furnishing customers, subject to the annual net importer limitation.

It is not expected that the MMC project will change line flows on LFB-funded transmission facilities, nor is it expected that any facilities will be constructed sooner, larger, more costly, or of a different design than SDG&E would undertake solely to service its local furnishing customers.

Transmission Line, Right-Of-Way, and Land Evaluation Requirements: Exacting transmission line, right-of-way, and land assessments are deferred until the Interconnection Facility Study is initiated.

Environmental Evaluation/Permitting Information: The length of time required for environmental and permitting processes for new transmission or transmission upgrades is uncertain. It depends on many factors, including whether exemption(s) can be obtained from the California Public Utilities Commission's (CPUC's) G.O. 131-D Certificate of Public Convenience and Necessity (CPCN) process, or the CPUC's Permit To Construct (PTC) process. The outcome of these processes could increase cost, as well as delay the in-service date. Absent an exemption, the process of obtaining CPUC approval could take one to two years, possibly longer.

SDG&E believes that the ability to obtain exemptions from the CPCN and PTC processes (in which case an advice letter filing with the CPUC should be sufficient for obtaining the CPUC's approval to proceed with construction) will be enhanced if MMC includes in its application to the appropriate permitting agency (i.e. CEC) the full scope of transmission and substation additions and upgrades that will be part of the project.

## APPENDICES

A Load, Resource, and Dispatch Table

B NERC/WECC: Planning Standard Table I
WECC Performance-Disturbance Table/Figure W-1

C Contingency List

D Plot of SDG&E Southern 69 kV Transmission Network

E Cat A Thermal Contingency Results & Power Flow Plots

F Cat B Thermal Contingency Results & Power Flow Plots

G Cat C Thermal Contingency Results & Power Flow Plots

H Detailed Listing of Voltage Limits Violations

I Circuit Breaker Short Circuit Duty Study Results

J Plots of Transient Stability Simulations

K Post Transient/Voltage Stability Results

# Appendix A

## Load, Resource, and Dispatch Table

**Queue 90 Interconnection System Impact Study**
**Load/Resource/Dispatch Table, FYA Analysis**

| All L&R per CAB I queue withdraw | | | <- - - - M a x G e n / M i n I m p - - - - -> | | | | | | | | Hi ML flow | | Low Otay load=13.2 MW | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <- - - - - - - - - - - Peak Load - - - - - - - - - - -> | | | | | | | | No South Bay gen | | High Southbay gen | |
| | | | 0BUOL | | 1BUOL | | 2BUOL | | 3BUOL | | 3BUOL | | 3BUOL | |
| | Year modeled: 2010 | | pre | post | pre | post | pre | post | pre | post | pre | post | pre | post |
| Queue # | | Case=> | q_90_fya_1 | q_90_fya_2 | q_90_fya_3 | q_90_fya_4 | q_90_fya_5 | q_90_fya_6 | q_90_fya_7 | q_90_fya_8 | q_90_fya_17 | q_90_fya_18 | q_90_fya_19 | q_90_fya_20 |
| | **Base Load (incl losses)** | | 5038 | 5038 | 5038 | 5038 | 5038 | 5038 | 5038 | 5038 | 5038 | 5038 | 2500 | 2500 |
| | **Interchange** | | -1450 | -1450 | -1450 | -1450 | -1450 | -1450 | -1450 | -1450 | -1850 | -1850 | -1450 | -1450 |
| | **Actual Cut-plane flow** | | **2315** | **2314** | **2299** | **2311** | **2295** | **2291** | **2282** | **2286** | **3260** | **3260** | **1417** | **1515** |
| | **Generation Required** | | 3588 | 3588 | 3588 | 3588 | 3588 | 3588 | 3588 | 3588 | 3188 | 3188 | 1050 | 1050 |
| | **Generation Dispatched** | | 3588 | 3588 | 3588 | 3588 | 3588 | 3588 | 3588 | 3588 | 3188 | 3188 | 1050 | 1050 |
| | **Dispatch** | **Pmax** | | | | | | | | | | | | |
| | **Must Take** | | | | | | | | | | | | | |
| | QF's | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 91 | 91 |
| 19 | Kumeyaay Wind | 50 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 0 | 0 |
| 25 | CRSTWD_A | 117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | CRSTWD_B | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | BOULVARD | 201 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 78 | IV_SUB | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 300 | 300 | 0 | 0 |
| | **Sub Total** | **886** | | | | | | | | | | | | |
| | **Combined Cycle** | | | | | | | | | | | | | |
| ~~5~~ | ~~ENCINA6~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| ~~5~~ | ~~ENCINA7~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| ~~5~~ | ~~ENCINA8~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| 8 | SYCAMORE1 | 160 | 155 | 150 | 150 | 150 | 149 | 145 | 141 | 140 | 130 | 130 | 0 | 0 |
| 8 | SYCAMORE2 | 160 | 155 | 150 | 150 | 150 | 149 | 145 | 141 | 135 | 130 | 130 | 0 | 0 |
| 8 | SYCAMORE3 | 160 | 155 | 150 | 150 | 150 | 149 | 145 | 141 | 135 | 0 | 0 | 0 | 0 |
| 8 | SYCAMORE4 | 270 | 260 | 240 | 232 | 195 | 240 | 230 | 238 | 200 | 140 | 140 | 0 | 0 |
| | INTBST | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 65 | 65 | 0 | 0 |
| | INTBCT | 150 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 140 | 140 | 0 | 0 |
| | IV GEN1 | 241 | 167 | 167 | 160 | 165 | 159 | 155 | 151 | 155 | 205 | 205 | 0 | 0 |
| | IV GEN2 | 179 | 124 | 124 | 120 | 124 | 118 | 118 | 113 | 116 | 155 | 155 | 0 | 0 |
| | IV GEN3 | 180 | 124 | 124 | 120 | 123 | 118 | 118 | 113 | 116 | 155 | 155 | 0 | 0 |
| 1A | OTAYMGT1 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 160 | 160 | 115 | 88 |
| 1A | OTAYMGT2 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 160 | 160 | 0 | 0 |
| 1A | OTAYMST1 | 221 | 210 | 202 | 210 | 210 | 150 | 151 | 150 | 150 | 91 | 48 | 60 | 44 |
| 4 | PEN_CT1 | 155 | 150 | 150 | 150 | 150 | 150 | 150 | 151 | 152 | 141 | 141 | 0 | 0 |
| 4 | PEN_CT2 | 155 | 150 | 150 | 150 | 150 | 150 | 150 | 151 | 152 | 141 | 141 | 0 | 0 |
| 4 | PEN_ST1 | 230 | 205 | 205 | 205 | 205 | 209 | 205 | 209 | 205 | 199 | 199 | 0 | 0 |
| 27 | SOUTHBY6 | 165 | 155 | 155 | 155 | 155 | 160 | 160 | 160 | 160 | 0 | 0 | 150 | 150 |
| 27 | SOUTHBY7 | 165 | 155 | 155 | 155 | 155 | 160 | 160 | 160 | 160 | 0 | 0 | 150 | 150 |
| 27 | SOUTHBY8 | 320 | 301 | 301 | 313 | 295 | 313 | 299 | 313 | 313 | 0 | 0 | 300 | 300 |
| | **Sub Total** | **3326** | | | | | | | | | | | | |
| | **Pump Storage** | | | | | | | | | | | | | |
| 13 | LkHodG1 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 0 | 0 |
| 13 | LkHodG2 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 0 | 0 |
| 72 | Lee Lake | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 460 | 460 | 0 | 0 |
| | **Sub Total** | **540** | | | | | | | | | | | | |
| | **Steam/GT/Peaker** | | | | | | | | | | | | | |
| | ENCINA5 | 329 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ENCINA4 | 299 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ENCINA3 | 109 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ENCINA2 | 103 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ENCINA1 | 106 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | CALPK_BD | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 42 | 42 | 42 | 42 | 42 |
| | CALPK_ES | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | CALPK_EC | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | LRKSPBD1 | 46 | 0 | 0 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| | LRKSPBD2 | 46 | 0 | 0 | 0 | 0 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| | MEF | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MMC_ES | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | OTAY1 | 49.5 | 49.5 | 0 | 49.5 | 0 | 49.5 | 0 | 49.5 | 0 | 49.5 | 0 | 49.5 | 0 |
| 90 | OTAY2 | 46.5 | 0 | 46.5 | 0 | 46.5 | 0 | 46.5 | 0 | 46.5 | 0 | 46.5 | 0 | 46.5 |
| 90 | OTAY3 | 46.5 | 0 | 46.5 | 0 | 46.5 | 0 | 46.5 | 0 | 46.5 | 0 | 46.5 | 0 | 46.5 |
| | MIRAMRGT | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MIRAMRGT | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3AB | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3AB | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3CD | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3CD | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ELCAJNGT | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ENCINAGT | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARNGT1 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2AB | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2AB | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2CD | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2CD | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ~~SOUTHBGT~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| | **SubTotal** | **1575** | | | | | | | | | | | | |
| | **Generation Total** | **6327** | | | | | | | | | | | | |

Notes _#_BUOL Number of Border Units On-Line

Reviewed WRT CAISO queue, 6.10.25

MMC Chula Vista Expansion Project

## Queue 90 Interconnection System Impact Study Load/Resource/Dispatch Table, COD Analysis

| All L&R per CAB I queue withdraw | | | <- - - - M a x G e n / M i n I m p - - - - -> | | | | | | | | Peak Load, Hi ML flow 3 BD pkrs on | | Low Otay load = 13.2 MW High Southbay gen | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <- - - - - - - - - - Peak Load - - - - - - - - - - -> | | | | | | | | | | | |
| | | | 0BUOL | | 1BUOL | | 2BUOL | | 3BUOL | | 3BUOL | | 3BUOL | |
| | Year modeled: 2007/08 | | pre | post | pre | post | pre | post | pre | post | pre | post | pre | post |
| Queue # | | Case=> | q_90_cod_a | q_90_cod_b | q_90_cod_c | q_90_cod_d | q_90_cod_e | q_90_cod_f | q_90_cod_g | q_90_cod_h | q_90_cod_q | q_90_cod_r | q_90_cod_s | q_90_cod_t |
| | **Base Load (incl losses)** | | 4849 | 4849 | 4849 | 4849 | 4849 | 4849 | 4849 | 4849 | 4849 | 4849 | 2425 | 2425 |
| | **Interchange** | | -1450 | -1450 | -1450 | -1450 | -1450 | -1450 | -1450 | -1450 | -1880 | -1880 | -1450 | -1450 |
| | **Actual Cut-plane flow** | | 1640 | 1641 | 1641 | 1642 | 1642 | 1642 | 1643 | 1642 | 2848 | 2846 | 1439 | 1439 |
| | **Generation Required** | | 3399 | 3399 | 3399 | 3399 | 3399 | 3399 | 3399 | 3399 | 2969 | 2969 | 975 | 975 |
| | **Generation Dispatched** | | 3399 | 3399 | 3399 | 3399 | 3399 | 3399 | 3399 | 3399 | 2969 | 2969 | 975 | 975 |
| | **Dispatch** | **Pmax** | | | | | | | | | | | | |
| | **Must Take** | | | | | | | | | | | | | |
| | QF's | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 91 | 91 |
| 19 | Kumeyaay Wind | 50 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 0 | 0 |
| 25 | CRSTWD_A | 117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | CRSTWD_B | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | BOULVARD | 201 | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| 103 | TL6910 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 0 | 0 | 27 | 27 |
| 106A | TL50001 (Wind) | 160 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 74 | 74 | 0 | 0 |
| 112 | TL50001 (Solar) | 300 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 170 | 170 | 0 | 0 |
| | **Sub Total** | **586** | | | | | | | | | | | | |
| | **Combined Cycle** | | | | | | | | | | | | | |
| | INTBST | 75 | 63 | 63 | 63 | 63 | 63 | 63 | 65 | 63 | 63 | 63 | 0 | 0 |
| | INTBCT | 150 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 0 | 0 |
| | IV GEN1 | 241 | 227 | 227 | 225 | 225 | 225 | 225 | 225 | 225 | 220 | 220 | 0 | 0 |
| | IV GEN2 | 179 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 0 | 0 |
| | IV GEN3 | 180 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 0 | 0 |
| ~~1A~~ | ~~OTAYMGT1~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| ~~1A~~ | ~~OTAYMGT2~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| ~~1A~~ | ~~OTAYMST1~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| 4 | PEN_CT1 | 155 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 0 | 0 |
| 4 | PEN_CT2 | 155 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 0 | 0 |
| 4 | PEN_ST1 | 230 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 210 | 210 | 0 | 0 |
| | **Sub Total** | **1365** | | | | | | | | | | | | |
| | **Pump Storage** | | | | | | | | | | | | | |
| 13 | LkHodG1 | 20 | 20 | 20 | 20 | 0 | 0 | 0 | 0 | 0 | 20 | 20 | 0 | 0 |
| 13 | LkHodG2 | 20 | 20 | 20 | 20 | 0 | 0 | 0 | 0 | 0 | 20 | 20 | 0 | 0 |
| | **Sub Total** | **40** | | | | | | | | | | | | |
| | **Steam/GT/Peaker** | | | | | | | | | | | | | |
| | SOUTHBAY1 | 145 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 0 | 0 | 141 | 141 |
| | SOUTHBAY2 | 149 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 0 | 0 | 145 | 145 |
| | SOUTHBAY3 | 174 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 0 | 0 | 172 | 172 |
| | ENCINA5 | 329 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 325 | 325 | 0 | 0 |
| | ENCINA4 | 299 | 278 | 277 | 278 | 278 | 278 | 276 | 278 | 278 | 228 | 227 | 0 | 0 |
| | ENCINA3 | 109 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 106 | 106 | 0 | 0 |
| | ENCINA2 | 103 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 102 | 102 | 0 | 0 |
| | ENCINA1 | 106 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 0 | 0 |
| | SOUTHBAY4 | 221 | 201 | 201 | 199 | 196 | 193 | 194 | 191 | 150 | 0 | 0 | 215 | 172 |
| | MEF | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 0 | 0 |
| | CALPK_BD | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 42 | 42 | 42 | 42 | 42 |
| | CALPK_ES | 42 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 42 | 0 | 0 |
| | CALPK_EC | 42 | 42 | 42 | 42 | 42 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | LRKSPBD1 | 46 | 0 | 0 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| | LRKSPBD2 | 46 | 0 | 0 | 0 | 0 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| | MMC_ES | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 |
| | OTAY1 | 49.5 | 49.5 | 0 | 49.5 | 0 | 49.5 | 0 | 49.5 | 0 | 49.5 | 0 | 49.5 | 0 |
| 90 | OTAY2 | 46.5 | 0 | 46.7 | 0 | 46.7 | 0 | 46.7 | 0 | 46.7 | 0 | 46.7 | 0 | 46.7 |
| 90 | OTAY3 | 46.5 | 0 | 46.7 | 0 | 46.7 | 0 | 46.7 | 0 | 46.7 | 0 | 46.7 | 0 | 46.7 |
| 121 | Miramar GT #2 | 49 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 0 | 0 |
| ~~122~~ | ~~Margarita~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| ~~123~~ | ~~Pala~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| | MIRAMRGT | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MIRAMRGT | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3AB | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3AB | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3CD | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3CD | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ELCAJNGT | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ENCINAGT | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARNGT1 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2AB | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2AB | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2CD | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2CD | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | SOUTHBGT | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **SubTotal** | **2325** | | | | | | | | | | | | |
| | **Generation Total** | **4316** | | | | | | | | | | | | |

Notes _#_BUOL Number of Border Units On-Line

FYA queues: Reviewed WRT CAISO queue, 6.10.26

COD analysis possibilities?

MMC Chula Vista Expansion Project

**Post Transient/Voltage Stability; Queue 90 ISIS Load/Resource/Dispatch Table, COD Analysis**

| L&R per CAB I queue withdrawn | | | < - - - - - -- - - - - - - - - - - - - - - - - - - - - - - 90/10 Peak Load Forecast - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -> | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | < - - - - - -- - - - - - - - - - - - - - - - - - - - - - - Three Border Units On-Line - - - - - - -- - - - - - - - - - - - - - - - - - - - - - - - -> | | | | | | | | | | | | | | | | | | | |
| | | | Base Load & Import | | | | Load +5% | | | | Load +2-1/2% | | | | Import +5% | | | | Import +2-1/2% | | | |
| | Year modeled: 2007/08 | | pre | | post | | pre | | post | | pre | | post | | pre | | post | | pre | | post | |
| Queue # | Source Case=> | | q_90_cod_g | | q_90_cod_h | | q_90_cod_g | | q_90_cod_h | | q_90_cod_g | | q_90_cod_h | | q_90_cod_g | | q_90_cod_h | | q_90_cod_g | | q_90_cod_h | |
| | | | case_a | case_a1 | case_b | case_b1 | case_c | case_c1 | case_d | case_d1 | case_e | case_e1 | case_f | case_f1 | case_g | case_g1 | case_h | case_h1 | case_i | case_i1 | case_j | case_j1 |
| | **Base Load (incl losses)** | | 4849 | 4849 | 4849 | 4861 | 5091 | 5091 | 5091 | 5103 | 4970 | 4983 | 4970 | 4984 | 4850 | 4865 | 4850 | 4866 | 4849 | 4862 | 4849 | 4863 |
| | **Interchange** | | -1450 | -2142 | -1450 | -2115 | -1450 | -2006 | -1450 | -2006 | -1450 | -2005 | -1450 | -2006 | -1566 | -2286 | -1565 | -2286 | -1507 | -2213 | -1507 | -2212 |
| | **Actual Cut-plane flow** | | 2297 | 2850 | 2295 | 2850 | 2297 | 2850 | 2297 | 2850 | 2297 | 2850 | 2298 | 2850 | 2412 | 2993 | 2412 | 2993 | 2253 | 2920 | 2354 | 2921 |
| | **Generation Required** | | 3399 | 2707 | 3399 | 2746 | 3641 | 3085 | 3641 | 3097 | 3520 | 2978 | 3520 | 2978 | 3284 | 2579 | 3285 | 2580 | 3342 | 2649 | 3342 | 2651 |
| | **Generation Dispatched** | | 3399 | 2707 | 3399 | 2746 | 3641 | 3085 | 3641 | 3097 | 3520 | 2978 | 3520 | 2978 | 3284 | 2579 | 3285 | 2580 | 3342 | 2649 | 3342 | 2651 |
| | **Dispatch** | **Pmax** | | | | | | | | | | | | | | | | | | | | |
| | **Must Take** | | | | | | | | | | | | | | | | | | | | | |
| | QF's | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 | 182 |
| 19 | Kumeyaay Wind | 50 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| 25 | CRSTWD_A | 117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | CRSTWD_B | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | ~~BOULVARD~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | 0 | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| 103 | TL6910 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 106A | TL50001 (Wind) | 160 | 32 | 0 | 32 | 0 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 0 | 32 | 0 | 32 | 0 | 32 | 0 |
| 112 | TL50001 (Solar) | 300 | 75 | 0 | 75 | 0 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 0 | 75 | 0 | 75 | 0 | 75 | 0 |
| | **Sub Total** | **872** | | | | | | | | | | | | | | | | | | | | |
| | **Combined Cycle** | | | | | | | | | | | | | | | | | | | | | |
| | INTBST | 75 | 65 | 65 | 63 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 |
| | INTBCT | 150 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 |
| | IV GEN1 | 241 | 225 | 210 | 225 | 227 | 225 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 227 | 210 | 227 | 210 | 227 | 210 | 227 | 210 |
| | IV GEN2 | 179 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 165 | 170 | 165 | 170 | 165 | 170 | 165 |
| | IV GEN3 | 180 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 165 | 170 | 165 | 170 | 165 | 170 | 165 |
| ~~1A~~ | ~~OTAYMGT1~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | 0 | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| ~~1A~~ | ~~OTAYMGT2~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | 0 | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| ~~1A~~ | ~~OTAYMST1~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | 0 | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| 4 | PEN_CT1 | 155 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| 4 | PEN_CT2 | 155 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| 4 | PEN_ST1 | 230 | 205 | 200 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 200 | 205 | 200 | 205 | 200 | 205 | 200 |
| | **Sub Total** | **1365** | | | | | | | | | | | | | | | | | | | | |
| | **Pump Storage** | | | | | | | | | | | | | | | | | | | | | |
| 13 | LkHodG1 | 20 | 0 | 0 | 0 | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | LkHodG2 | 20 | 0 | 0 | 0 | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Sub Total** | **40** | | | | | | | | | | | | | | | | | | | | |
| | **Steam/GT/Peaker** | | | | | | | | | | | | | | | | | | | | | |
| | SOUTHBAY1 | 145 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| | SOUTHBAY2 | 149 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| | SOUTHBAY3 | 174 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 |
| | ENCINA5 | 329 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 310 | 300 | 310 | 300 | 310 | 300 | 310 |
| | ENCINA4 | 299 | 278 | 259 | 278 | 233 | 264 | 248 | 222 | 217 | 144 | 141 | 101 | 98 | 161 | 131 | 119 | 89 | 222 | 201 | 176 | 160 |
| | ENCINA3 | 109 | 104 | 0 | 104 | 0 | 104 | 0 | 104 | 0 | 104 | 0 | 104 | 0 | 104 | 0 | 104 | 0 | 105 | 0 | 104 | 0 |
| | ENCINA2 | 103 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 0 |
| | ENCINA1 | 106 | 104 | 0 | 104 | 0 | 104 | 0 | 104 | 0 | 104 | 0 | 104 | 0 | 104 | 0 | 104 | 0 | 100 | 0 | 104 | 0 |
| | SOUTHBAY4 | 221 | 191 | 0 | 150 | 0 | 210 | 0 | 191 | 0 | 191 | 0 | 191 | 0 | 191 | 0 | 191 | 0 | 191 | 0 | 191 | 0 |
| | MEF | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| | CALPK_BD | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 |
| | CALPK_ES | 42 | 0 | 0 | 0 | 0 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | CALPK_EC | 42 | 0 | 0 | 0 | 0 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | LRKSPBD1 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| | LRKSPBD2 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| | MMC_ES | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | OTAY1 | 49.5 | 49.5 | 49.5 | 0 | 0 | 49.5 | 49.5 | 0 | 0 | 49.5 | 49.5 | 0 | 0 | 49.5 | 49.5 | 0 | 0 | 49.5 | 49.5 | 0 | 0 |
| 90 | OTAY2 | 46.5 | 0 | 0 | 46.7 | 46.7 | 0 | 0 | 46.7 | 46.7 | 0 | 0 | 46.7 | 46.7 | 0 | 0 | 46.7 | 46.7 | 0 | 0 | 46.7 | 46.7 |
| 90 | OTAY3 | 46.5 | 0 | 0 | 46.7 | 46.7 | 0 | 0 | 46.7 | 46.7 | 0 | 0 | 46.7 | 46.7 | 0 | 0 | 46.7 | 46.7 | 0 | 0 | 46.7 | 46.7 |
| 121 | Miramar GT #2 | 49 | 47 | 0 | 47 | 0 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 0 | 47 | 0 | 47 | 0 | 47 | 0 |
| ~~122~~ | ~~Margarita~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | 0 | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| ~~123~~ | ~~Pala~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | 0 | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ | ~~0~~ |
| | MIRAMRGT | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MIRAMRGT | 16 | 0 | 0 | 0 | 0 | 0 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3AB | 15 | 0 | 0 | 0 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3AB | 14 | 0 | 0 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3CD | 14 | 0 | 0 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN3CD | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ELCAJNGT | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ENCINAGT | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARNGT1 | 15 | 0 | 0 | 0 | 0 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2AB | 14 | 0 | 0 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2AB | 14 | 0 | 0 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2CD | 14 | 0 | 0 | 0 | 0 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | KEARN2CD | 13 | 0 | 0 | 0 | 0 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | SOUTHBGT | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **SubTotal** | **2325** | | | | | | | | | | | | | | | | | | | | |
| | **Generation Total** | **4602** | | | | | | | | | | | | | | | | | | | | |

Notes _#_BUOL Number of Border Units On-Line

FYA queues: Reviewed WRT CAISO queue, 6.10.26

COD analysis possibilities?

MMC Chula Vista Expansion Project

# Appendix B

## NERC/WECC: Planning Standard Table I

## WECC Performance-Disturbance Table/Figure W-1

## Table I. Transmission Systems Standards — Normal and Contingency Conditions

| Category | Contingencies | | System Limits or Impacts | | | | |
|---|---|---|---|---|---|---|---|
| | Initiating Event(s) and Contingency Element(s) | Elements Out of Service | Thermal Limits | Voltage Limits | System Stable | Loss of Demand or Curtailed Firm Transfers | Cascading[c] Outages |
| A - No Contingencies | All Facilities in Service | None | Applicable Rating[a] (A/R) | Applicable Rating[a] (A/R) | Yes | No | No |
| B – Event resulting in the loss of a single element. | Single Line Ground (SLG) or 3-Phase (3Ø) Fault, with Normal Clearing:<br>1. Generator<br>2. Transmission Circuit<br>3. Transformer<br>Loss of an Element without a Fault. | <br>Single<br>Single<br>Single<br>Single | <br>A/R<br>A/R<br>A/R<br>A/R | <br>A/R<br>A/R<br>A/R<br>A/R | <br>Yes<br>Yes<br>Yes<br>Yes | <br>No[b]<br>No[b]<br>No[b]<br>No[b] | <br>No<br>No<br>No<br>No |
| | Single Pole Block, Normal Clearing[f]:<br>4. Single Pole (dc) Line | Single | A/R | A/R | Yes | No[b] | No |
| C – Event(s) resulting in the loss of two or more (multiple) elements. | SLG Fault, with Normal Clearing[f]:<br>1. Bus Section<br>2. Breaker (failure or internal fault) | <br>Multiple<br>Multiple | <br>A/R<br>A/R | <br>A/R<br>A/R | <br>Yes<br>Yes | <br>Planned/Controlled[d]<br>Planned/Controlled[d] | <br>No<br>No |
| | SLG or 3Ø Fault, with Normal Clearing[f], Manual System Adjustments, followed by another SLG or 3Ø Fault, with Normal Clearing[f]:<br>3. Category B (B1, B2, B3, or B4) contingency, manual system adjustments, followed by another Category B (B1, B2, B3, or B4) contingency | Multiple | A/R | A/R | Yes | Planned/Controlled[d] | No |
| | Bipolar Block, with Normal Clearing[f]:<br>4. Bipolar (dc) Line<br>Fault (non 3Ø), with Normal Clearing[f]:<br>5. Any two circuits of a multiple Circuit towerline[g] | Multiple<br><br>Multiple | A/R<br><br>A/R | A/R<br><br>A/R | Yes<br><br>Yes | Planned/Controlled[d]<br><br>Planned/Controlled[d] | No<br><br>No |
| | SLG Fault, with Delayed Clearing[f] (stuck breaker or protection system failure):<br>6. Generator 8. Transformer<br>7. Transmission Circuit 9. Bus Section | Multiple<br>Multiple | A/R<br>A/R | A/R<br>A/R | Yes<br>Yes | Planned/Controlled[d]<br>Planned/Controlled[d] | No<br>No |

| | | |
|---|---|---|
| D [e] – Extreme event resulting in two or more (multiple) elements removed or cascading out of service | 3Ø Fault, with Delayed Clearing [f] (stuck breaker or protection system failure):<br>1. Generator 3. Transformer<br>2. Transmission Circuit 4. Bus Section<br>3Ø Fault, with Normal Clearing [f]:<br>5. Breaker (failure or internal fault)<br>Other:<br>6. Loss of towerline with three or more circuits<br>7. All transmission lines on a common right-of-way<br>8. Loss of a substation (one voltage level plus transformers)<br>9. Loss of a switching station (one voltage level plus transformers)<br>10. Loss of all generating units at a station<br>11. Loss of a large load or major load center<br>12. Failure of a fully redundant special protection system (or remedial action scheme) to operate when required<br>13. Operation, partial operation, or misoperation of a fully redundant special protection system (or remedial action scheme) in response to an event or abnormal system condition for which it was not intended to operate<br>14. Impact of severe power swings or oscillations from disturbances in another Regional Council. | Evaluate for risks and consequences.<br>• May involve substantial loss of customer demand and generation in a widespread area or areas.<br>• Portions or all of the interconnected systems may or may not achieve a new, stable operating point.<br>• Evaluation of these events may require joint studies with neighboring systems. |

**Footnotes to Table I.**

a) Applicable rating (A/R) refers to the applicable normal and emergency facility thermal rating or system voltage limit as determined and consistently applied by the system or facility owner. Applicable ratings may include emergency ratings applicable for short durations as required to permit operating steps necessary to maintain system control. All ratings must be established consistent with applicable NERC Planning Standards addressing facility ratings.

b) Planned or controlled interruption 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 security of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted firm (non-recallable reserved) electric power transfers.

c) Cascading is the uncontrolled successive loss of system elements triggered by an incident at any location. Cascading results in widespread service interruption which cannot be restrained from sequentially spreading beyond an area predetermined by appropriate studies.

d) Depending on system design and expected system impacts, the controlled interruption of electric supply to customers (load shedding), the planned removal from service of certain generators, and/or the curtailment of contracted firm (non-recallable reserved) electric power transfers may be necessary to maintain the overall security of the interconnected transmission systems.

e) A number of extreme contingencies that are listed under Category D and judged to be critical by the transmission planning entity(ies) will be selected for evaluation. It is not expected that all possible facility outages under each listed contingency of Category D will be evaluated.

f) Normal clearing is when the protection system operates as designed and the fault is cleared in the time normally expected with proper functioning of the installed protection systems. Delayed clearing of a fault is due to failure of any protection system component such as a relay, circuit breaker, or current transformer (CT), and not because of an intentional design delay.

g) System assessments may exclude these events where multiple circuit towers are used over short distances (e.g., station entrance, river crossings) in accordance with Regional exemption criteria

**WECC DISTURBANCE-PERFORMANCE TABLE
OF ALLOWABLE EFFECTS ON OTHER SYSTEMS**

| NERC and WECC Categories | Outage Frequency Associated with the Performance Category (outage/year) | Transient Voltage Dip Standard | Minimum Transient Frequency Standard | Post Transient Voltage Deviation Standard (See Note 2) |
|---|---|---|---|---|
| A | Not Applicable | Nothing in addition to NERC | | |
| B | ≥ 0.33 | Not to exceed **25%** at load buses or **30%** at non-load buses.<br><br>Not to exceed **20% for more than 20 cycles** at load buses. | Not below **59.6** Hz for 6 cycles or more at a load bus. | Not to exceed **5%** at any bus. |
| C | 0.033 – 0.33 | Not to exceed **30%** at any bus.<br><br>Not to exceed **20% for more than 40 cycles** at load buses. | Not below **59.0** Hz for 6 cycles or more at a load bus. | Not to exceed **10%** at any bus. |
| D | < 0.033 | Nothing in addition to NERC | | |

***Notes:***

1. *The WECC Disturbance-Performance Table applies equally to either a system with all elements in service, or a system with one element removed and the system adjusted.*

2. *As an example in applying the WECC Disturbance-Performance Table, a Category B disturbance in one system shall not cause a transient voltage dip in another system that is greater than 20% for more than 20 cycles at load buses, or exceed 25% at load buses or 30% at non-load buses at any time other than during the fault.*

3. *Additional voltage requirements associated with voltage stability are specified in Standard I-D. If it can be demonstrated that post transient voltage deviations that are less than the values in the table will result in voltage instability, the system in which the disturbance originated and the affected system(s) should cooperate in mutually resolving the problem.*

*Table W-1*

4. *Refer to Figure W-1 for voltage performance parameters.*

5. *Load buses include generating unit auxiliary loads.*

6. *To reach the frequency categories shown in the WECC Disturbance-Performance Table for Category C disturbances, it is presumed that some planned and controlled islanding has occurred. Underfrequency load shedding is expected to arrest this frequency decline and assure continued operation within the resulting islands.*

7. *For simulation test cases, the interconnected transmission system steady state loading conditions prior to a disturbance should be appropriate to the case. Disturbances should be simulated at locations on the system that result in maximum stress on other systems. Relay action, fault clearing time, and reclosing practice should be represented in simulations according to the planning and operation of the actual or planned systems. When simulating post transient conditions, actions are limited to automatic devices and no manual action is to be assumed.*

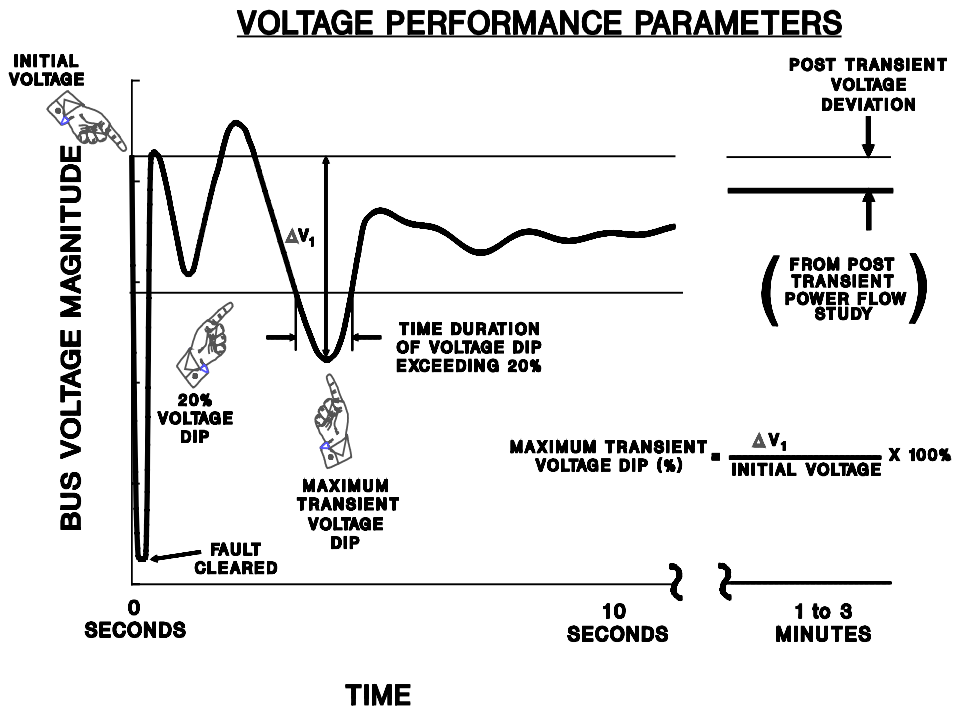



*Figure W-1*

# Appendix C

## Contingency List

# Thermal Contingency List

## 2008 Year/COD Model

```
##########################################################
#
# Contingency list for MMC ISIS study, 6.12.4, hdt
# from: SDG&E 2005 Grid Planning contingency file
#       2008hs
#
##########################################################
#
# SPS 6.1       TL50001 IV Gen SPS
#
##########################################################
50001_1A  "line IV-WNDFARMS 500 kV SPS6.1A"  "N-1" "B"
         1  "IMPRLVLY 500.00"  "WNDFARMS 500.00"  "1 "  1 0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
         3  "IV GEN3   18.00"    "3 "  0
         0
##########################################################
50001_1B "line WNDFARMS-ML 500 kV SPS6.1A "  "N-1" "B"
         1  "WNDFARMS 500.00"  "MIGUEL   500.00"  "1 "  1 0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
         3  "IV GEN3   18.00"    "3 "  0
         3  "WND160MW 230.00"    "1 "  0
         3  "WND300MW 230.00"    "1 "  0
         0
##########################################################
#
# SPS 6.2       CFE SPS
#
##########################################################
50001_2A "line IV-WNDFARMS 500 kV SPS6.2A "  "N-1" "B"
         1  "IMPRLVLY 500.00"  "WNDFARMS 500.00"  "1 "  1 0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
         3  "IV GEN3   18.00"    "3 "  0
         1  "IMPRLVLY 230.00"  "ROA-230  230.00"  "1 "  1 0
         0
##########################################################
50001_2B "line WNDFARMS-ML 500 kV SPS6.2B "  "N-1" "B"
         1  "WNDFARMS 500.00"  "MIGUEL   500.00"  "1 "  1 0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
         3  "IV GEN3   18.00"    "3 "  0
         3  "WND160MW 230.00"    "1 "  0
         3  "WND300MW 230.00"    "1 "  0
         1  "IMPRLVLY 230.00"  "ROA-230  230.00"  "1 "  1 0
         0
##########################################################
#
# SPS 6.3 for TL23021/22 in TMC 1505 for
# the Miguel-Mission congestion,
# 6.3   Miguel to South Bay 138 kV path N-2 SPS
#
##########################################################
23021/22a "line ML-MS&ML-SX 230kV SPS6.3"  "N-1" "B"
         1  "MIGUEL   230"  "MISSION  230"  "2 "   1  0
         1  "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3  "INTBST    18.00"    "2 "  0
```

```
#        3  "INTBCT    16.00"    "1 "  0
#        3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
23021/22b "line ML-MS&ML-SX 230kV SPS6.3"  "N-1" "B"
         1  "MIGUEL   230"  "MISSION  230"  "2 "   1  0
         1  "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
#        3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
23021/22c "line ML-MS&ML-SX 230kV SPS6.3"  "N-1" "B"
         1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
         1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
23021/22d "line ML-MS&ML-SX 230kV SPS6.3"  "N-1" "B"
         1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
         1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
23021/22e "line ML-MS&ML-SX 230kV SPS6.3"  "N-1" "B"
         1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
         1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
         3  "IV GEN3   18.00"    "3 "  0
         0
#############################################################
#
# SPS 6.4 for TL23022/23 in TMC 1505 for
# the Miguel-Mission congestion,
# 6.4   Miguel to South Bay 138 kV path & N-2 SPS
#
#############################################################
23022/23a "line ML-MS 1/2 230 kV SPS6.4 "  "N-1" "B"
         1  "MIGUEL   230"  "MISSION  230"  "2 "   1  0
         1  "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3  "INTBST    18.00"    "2 "  0
#        3  "INTBCT    16.00"    "1 "  0
#        3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
23022/23b "line ML-MS 1/2 230 kV SPS6.4 "  "N-1" "B"
         1  "MIGUEL   230"  "MISSION  230"  "2 "   1  0
         1  "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
#        3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
23022/23c "line ML-MS 1/2 230 kV SPS6.4 "  "N-1" "B"
```

```
         1  "MIGUEL   230"  "MISSION  230"  "2 "   1  0
         1  "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
23022/23d "line ML-MS 1/2 230 kV SPS6.4 "  "N-1" "B"
         1  "MIGUEL   230"  "MISSION  230"  "2 "   1  0
         1  "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
23022/23e "line ML-MS 1/2 230 kV SPS6.4 "  "N-1" "B"
         1  "MIGUEL   230"  "MISSION  230"  "2 "   1  0
         1  "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
         3  "IV GEN3   18.00"    "3 "  0
         0
##########################################################
#
# SPS 6.5 TL230S PROTECTION
#
##########################################################
TL_230SA "IVPS-EL CENTRO 230kV SPS6.4"  "N-1" "B"
         3  "INTBST    18.00"    "2 "  0
#        3  "INTBCT    16.00"    "1 "  0
#        3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
TL_230SB "IVPS-EL CENTRO 230kV SPS6.4"  "N-1" "B"
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
#        3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
TL_230SC "IVPS-EL CENTRO 230kV SPS6.4"  "N-1" "B"
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
TL_230SD "IVPS-EL CENTRO 230kV SPS6.4"  "N-1" "B"
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
TL_230SE "IVPS-EL CENTRO 230kV SPS6.4"  "N-1" "B"
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
         3  "IV GEN3   18.00"    "3 "  0
         0
TL_230SG "IVPS-EL CENTRO 230kV SPS6.4"  "N-1" "B"
```

```
         1  "IMPRLVLY 230"  "ELCENTRO 230"  "1 "   1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
         3  "IV GEN3   18.00"    "3 "  0
         0
##########################################################
#
# SPS 6.6       MIGUEL BK80/BK81
#
##########################################################
ML81SPSA "tran MIGUEL   230 to MIGUEL    500 ck 2"  "T-1" "B"
         2 "MIGUEL   230"  "MIGUEL   500"  "2 "  0
         3  "INTBST    18.00"    "2 "  0
#        3  "INTBCT    16.00"    "1 "  0
#        3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
ML81SPSB "tran MIGUEL   230 to MIGUEL    500 ck 2"  "T-1" "B"
         2 "MIGUEL   230"  "MIGUEL   500"  "2 "  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
#        3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
ML81SPSC "tran MIGUEL   230 to MIGUEL    500 ck 2"  "T-1" "B"
         2 "MIGUEL   230"  "MIGUEL   500"  "2 "  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
#        3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
ML81SPSD "tran MIGUEL   230 to MIGUEL    500 ck 2"  "T-1" "B"
         2 "MIGUEL   230"  "MIGUEL   500"  "2 "  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
ML81SPSE "tran MIGUEL   230 to MIGUEL    500 ck 2"  "T-1" "B"
         2 "MIGUEL   230"  "MIGUEL   500"  "2 "  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
ML81SPSF "tran MIGUEL   230 to MIGUEL    500 ck 2"  "T-1" "B"
         2 "MIGUEL   230"  "MIGUEL   500"  "2 "  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
         3  "IV GEN3   18.00"    "3 "  0
         0
##########################################################
#
# SPS 6.7        Miguel Stuck Breaker N-2 SPS
#
##########################################################
ML71/23021A "ML BK71 & Miguel - Mission #1 230 kV"  "N-2" "C"
         2 "MIGUEL    69"  "MIGUEL   230"  "2 "  0
```

```
         1 "MIGUEL   230"  "MISSION  230"  "1 "  1  0
         3  "INTBST    18.00"    "2 "  0
#        3  "INTBCT    16.00"    "1 "  0
#        3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
ML71/23021B "ML BK71 & Miguel - Mission #1 230 kV"  "N-2" "C"
         2 "MIGUEL    69"  "MIGUEL   230"  "2 "  0
         1 "MIGUEL   230"  "MISSION  230"  "1 "  1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
#        3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
ML71/23021C "ML BK71 & Miguel - Mission #1 230 kV"  "N-2" "C"
         2 "MIGUEL    69"  "MIGUEL   230"  "2 "  0
         1 "MIGUEL   230"  "MISSION  230"  "1 "  1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
#        3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
ML71/23021D "ML BK71 & Miguel - Mission #1 230 kV"  "N-2" "C"
         2 "MIGUEL    69"  "MIGUEL   230"  "2 "  0
         1 "MIGUEL   230"  "MISSION  230"  "1 "  1  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
#        3  "IV GEN3   18.00"    "3 "  0
         0
ML71/23021E "ML BK71 & Miguel - Mission #1 230 kV"  "N-2" "C"
         2 "MIGUEL    69"  "MIGUEL   230"  "2 "  0
         1 "MIGUEL   230"  "SYCAMORE 230"  "1 "  1  0
         3  "LRP-U1    16.00"    "1 "  0
         3  "INTBST    18.00"    "2 "  0
         3  "INTBCT    16.00"    "1 "  0
         3  "IV GEN1   21.00"    "1 "  0
         3  "IV GEN2   18.00"    "2 "  0
         3  "IV GEN3   18.00"    "3 "  0
         0
##############################################################
#
# SPS 6.8       230 kV TL 23040, Miguel - Tijuana SPS
# IV-ML open at either end & 23040 loads above 800 MVA
#
##############################################################
50001/23040A  "line IV-ML 500kV SPS 6.8A       "  "N-1" "B"
         1  "IMPRLVLY 500.00"  "WNDFARMS 500.00"  "1 "  1 0
         1  "IMPRLVLY 230.00"  "ROA-230  230.00"  "1 "  1 0
         0
##############################################################
50001/23040B  "line IV-ML 500kV SPS 6.8B       "  "N-1" "B"
         1  "WNDFARMS 500.00"  "MIGUEL   500.00"  "1 "  1 0
         1  "IMPRLVLY 230.00"  "ROA-230  230.00"  "1 "  1 0
         0
##############################################################
50001/23050C  "line IV-ML 500kV SPS 6.8C       "  "N-1" "B"
         1  "IMPRLVLY 500.00"  "WNDFARMS 500.00"  "1 "  1 0
         1  "TJI-230  230.00"  "MIGUEL   230.00"  "1 "  1 0
         0
##############################################################
50001/23050D  "line IV-ML 500kV SPS 6.8D       "  "N-1" "B"
         1  "WNDFARMS 500.00"  "MIGUEL   500.00"  "1 "  1 0
```

```
         1  "TJI-230  230.00"  "MIGUEL   230.00"  "1 "  1 0
         0
##########################################################
#
# SPS 7.0 - SPECIAL PROTECTION SYSTEMS FOR BORDER GENERATOR UNITS
# Outage of TL6910 O/L TL649
#
##########################################################
TL6910A "line MIGUEL   to BORDER    69 ck 1"  "N-1" "B"
         1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
         3 "CALPK BD  13.80"  "1 "   0
#        3 "LRKSPBD1  13.80"  "1 "   0
#        3 "LRKSPBD2  13.80"  "2 "   0
         0
TL6910B "line MIGUEL   to BORDER    69 ck 1"  "N-1" "B"
         1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
         3 "CALPK BD  13.80"  "1 "   0
         3 "LRKSPBD1  13.80"  "1 "   0
#        3 "LRKSPBD2  13.80"  "2 "   0
         0
TL6910C "line MIGUEL   to BORDER    69 ck 1"  "N-1" "B"
         1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
         3 "CALPK BD  13.80"  "1 "   0
         3 "LRKSPBD1  13.80"  "1 "   0
         3 "LRKSPBD2  13.80"  "2 "   0
         0
##########################################################
#
# SPS 9.1 230/69 kV Banks SA 70 and SA 71
# drop SA load for xfmr loading > 336 MVA
#
##########################################################
SA70A  "tran SANLUSRY  69 to SANLUSRY  230 ck 1"  "T-1" "B"
         2 "SANLUSRY  69"  "SANLUSRY 230"  "1 "  0
         4 "SANLUSRY  69"  "10"   0
         0
##########################################################
#
#               or
#
##########################################################
SA71A  "tran SANLUSRY  69 to SANLUSRY  230 ck 2"  "T-1" "B"
         2 "SANLUSRY  69"  "SANLUSRY 230"  "2 "  0
         4 "SANLUSRY  69"  "10"   0
         0
##########################################################
#
# SPS 9.2 138/69 kV Bk 51 at San Luis Rey
# drop SA load for xfmr loading > 200 MVA
#
##########################################################
SA7071RAS "SA5W TRIPS SA LOAD"  "BRKR" "C"
         2 "SANLUSRY  69"  "SANLUSRY 230"  "1 "  0
         2 "SANLUSRY  69"  "SANLUSRY 230"  "2 "  0
         4 "SANLUSRY  69"  "10"   0
         0
##########################################################
#
# SPS 9.4 69kV TL633 at RCL
# protect 69kV TL633 from overloads following either a Poway
# 69 kV South Bus outage or a common structure outage of
# 69 kV TL 6915 and TL 6924 at high system loads.
#
##########################################################
6915/24A "line POMERADO-SYCAMORE  69 ck 1/2 "  "N-2" "C"
         1 "POMERADO  69"  "SYCAMORE  69"  "1 "   1  0
         1 "POMERADO  69"  "SYCAMORE  69"  "2 "   1  0
```

```
         4 "R.CARMEL  69"  "10"   0
         0
##########################################################
#
#                       OR
#
##########################################################
Bus_PO69A "Poway 69kV Bus"  "BUS" "C"
         1 "POWAY     69"  "WARCYNTP  69"  "1 "   1  0
         1 "POWAY     69"  "POMERADO  69"  "1 "   1  0
         4 "R.CARMEL  69"  "10"   0
         7
         0
##########################################################
#
# SPS 9.5 69kV TL 684 at SM
# directional overcurrent relay is installed at SM, which will:
# 6.11.1-Trip SM load after 10 seconds if loading on 69 kV
# TL 684 into SM exceeds its emergency rating of 129 MVA.
# 6.11.2-Such loading is likely to occur at high system
# loads and heavy South of SONGS flow, following loss of
# both banks 70 and 71 at SA.
#
##########################################################
TL684RAS "SA5W TRIPS SM LOAD"  "BRKR" "C"
         2 "SANLUSRY  69"  "SANLUSRY 230"  "1 "  0
         2 "SANLUSRY  69"  "SANLUSRY 230"  "2 "  0
         4 "SANMRCOS  69"  "10"   0
         0
##########################################################
#
#       sps 9.6 DISABLED PER TMC1505, 6.12.4, hdt
#
##########################################################
#
# SPS 9.7 69kV TL695A at TA
# Prevent overloads on sections of TL 690/TL 692/TL695 following
# the common structure outage of TL23007 and TL 23052 (SONGS-TALEGA 1/2).
# Also designed to prevent o/l on Talega 138/69 kV Bk 50 and 69 kV TL 695
# following fault on San Luis Rey Bank 71. A stuck breaker condition
# (5W) will cause simultaneous loss of bank 70/71 at San Luis Rey.
# Such loading is likely to occur at high system loads and heavy SOS flow.
# A directional o/c relay is installed at Talega on TL 695 that will:
# trip TL 695 at Talega if loading on TL 695 into TA exceeds 7 MVA for
# 5 seconds, OR if loading on 69 kV TL 695 out of TA exceeds
# 30 MVA for 5 seconds.
#
##########################################################
23052/23007 "TA-SO 1 + 2 230KV"  "N-2" "C"
         1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
         1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
         4 "CRSTNTS   69"  "10"   0
         2 "TALEGA   138"  "TALEGA    69"  "1 "   1  0
         7
         0
##########################################################
#
#                       OR
#
##########################################################
TL695RAS "SA5W TRIP TL695"  "BRKR" "C"
         2 "SANLUSRY  69"  "SANLUSRY 230"  "1 "  0
         2 "SANLUSRY  69"  "SANLUSRY 230"  "2 "  0
         2 "TALEGA   138"  "TALEGA    69"  "1 "  0
         0
##########################################################
#
```

```
#       SPS 9.8 & 9.9 NOT MODELED AS TL632 MODELED AS ORIGINAL
#
##############################################################
#
# SPS 9.10, TL13812 PROTECTION
#
##############################################################
13836/13833A "TA-TB + TA-PI 138KV"  "N-2" "C"
         1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
         1 "TALEGA   138"  "PICO     138"  "1 "   1  0
         1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
         0
##############################################################
#
#                       OR
#
##############################################################
13833/13816B "PI-CP + TA-TB 138KV"  "N-2" "C"
         1 "PICO     138"  "CAPSTRNO 138"  "1 "   1  0
         1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
         1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
         0
##############################################################
#
# SPS 9.11 TL13813
#
##############################################################
TL13813A "line SOUTHBAY to MAINST50 138 ck 1"  "N-1" "B"
         1 "SOUTHBAY 138"  "MAINST51 138"  "1 "   1  0
         1 "PRCTRVLY 138"  "MIGUEL   138"  "1 "   1  0
         0
TL13813B "line SOUTHBAY to MAINST50 138 ck 1"  "N-1" "B"
         1 "OLD TOWN  69"  "KETTNER   69"  "1 "   1  0
         1 "PRCTRVLY 138"  "MIGUEL   138"  "1 "   1  0
         0
##############################################################
#
# SDG&E 500 kV Transmission Line Outages (Category B: N-1)
#
##############################################################
50002  "line N.GILA   to IMPRLVLY 500 ck 1 "  "N-1" "B"
         1 "N.GILA   500"  "IMPRLVLY 500"  "1 "   1  0
         0
50003  "line HASSYAMP to N.GILA 500 ck 1 "  "N-1" "B"
         1 "HASSYAMP 500"  "N.GILA   500"  "1 "   1  0
         0
##############################################################
# SDG&E 230 kV Transmission Line Outages (Category B: N-1)
##############################################################
TL23001  "line SANLUSRY to MISSION  230 ck 1"  "N-1" "B"
         1 "SANLUSRY 230"  "MISSION  230"  "1 "   1  0
         0
TL23002  "line SANLUSRY to S.ONOFRE 230 ck 1"  "N-1" "B"
         1 "SANLUSRY 230"  "S.ONOFRE 230"  "2 "   1  0
         0
TL23003  "line SANLUSRY to ENCINA   230 ck 1"  "N-1" "B"
         1 "SANLUSRY 230"  "ENCINA   230"  "1 "   1  0
         0
TL23004  "line SANLUSRY to MISSION  230 ck 2"  "N-1" "B"
         1 "SANLUSRY 230"  "MISSION  230"  "2 "   1  0
         0
TL23006  "line SANLUSRY to S.ONOFRE 230 ck 2"  "N-1" "B"
         1 "SANLUSRY 230"  "S.ONOFRE 230"  "3 "   1  0
         0
TL23007  "line TALEGA   to S.ONOFRE 230 ck 2"  "N-1" "B"
         1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
         0
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TL23010  "line SANLUSRY to S.ONOFRE 230 ck 3"  "N-1" "B"
         1 "SANLUSRY 230"  "S.ONOFRE 230"  "1 "   1  0
         0
TL23011  "line ENCINA-ESCNDIDO-SANLUSRY 230" "N-1" "B"
         1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
         1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
         1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
         7
         0
TL23012  "line PENSQTOS to ENCINA   230 ck 1"  "N-1" "B"
         1 "PENSQTOS 230"  "ENCINA   230"  "1 "   1  0
         0
TL23013  "line PENSQTOS to OLD TOWN 230 ck 1"  "N-1" "B"
         1 "PENSQTOS 230"  "OLD TOWN 230"  "1 "   1  0
         0
TL23014  "line EPP      to ESCNDIDO 230 ck 1"  "N-1" "B"
         1 "PEN      230"  "ESCNDIDO 230"  "1 "   1  0
         0
TL23021  "line MIGUEL   to SYCAMORE 230 ck 1"  "N-1" "B"
         1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
         0
TL23022  "line MIGUEL   to MISSION  230 ck 1"  "N-1" "B"
         1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         0
TL23023  "line MIGUEL   to MISSION  230 ck 2"  "N-1" "B"
         1 "MIGUEL   230"  "MISSION  230"  "2"    1  0
         0
TL23027  "line OLD TOWN to MISSION  230 ck 1"  "N-1" "B"
         1 "OLD TOWN 230"  "MISSION  230"  "1 "   1  0
         0
TL23028  "line OLD TOWN TP to MISSION  230 ck 2"  "N-1" "B"
         1 "OLD TOWN 230"  "MISSION  230"  "2 "   1  0
         0
TL23030  "line ESCNDIDO to TALEGA   230 ck 1"  "N-1" "B"
         1 "ESCNDIDO 230"  "TALEGA   230"  "1 "   1  0
         0
TL23040  "line OTAYMESA   to TJI-230  230 ck 1"  "N-1" "B"
         1 "MIGUEL   230"  "TJI-230  230"  "1 "   1  0
         0
TL23041  "line OTAYMESA   to SYCAMORE 230 ck 1"  "N-1" "B"
         1 "MIGUEL   230"  "SYCAMORE 230"  "2 "   1  0
         0
TL23045  "line INTB     to IMPRLVLY 230 ck 1"  "N-1" "B"
         1 "INTB     230"  "IMPRLVLY 230"  "1 "   1  0
         0
TL23046  "line INTB     to IMPRLVLY 230 ck 2"  "N-1" "B"
         1 "INTB     230"  "IMPRLVLY 230"  "2 "   1  0
         0
TL23047  "line IV-GEN   to IMPRLVLY 230 ck 1"  "N-1" "B"
         1 "IV-GEN   230"  "IMPRLVLY 230"  "1 "   1  0
         0
TL23048  "line IV-GEN   to IMPRLVLY 230 ck 2"  "N-1" "B"
         1 "IV-GEN   230"  "IMPRLVLY 230"  "2 "   1  0
         0
TL23050  "line IMPRLVLY to ROA-230  230 ck 1"  "N-1" "B"
         1 "IMPRLVLY 230"  "ROA-230  230"  "1 "   1  0
         0
TL23051  "line SYCAMORE to EPP      230 ck 1"  "N-1" "B"
         1 "PEN      230"  "SYCAMORE 230"  "1 "   1  0
         0
TL23052  "line TALEGA   to S.ONOFRE 230 ck 1"  "N-1" "B"
         1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
         0
TL_230S  "line IMPRLVLY  to ELCENTRO 230 ck 1"  "N-1" "B"
         1 "IMPRLVLY 230"  "ELCENTRO 230"  "1 "   1  0
         0
##########################################################
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#
# SDG&E 138 kV Transmission Line Outages (Category B: N-1)
#
##########################################################
TL13801  "line ENCINA   to CANNON   138 ck 1"  "N-1" "B"
         1 "ENCINA   138"  "CANNON   138"  "1 "   1  0
         0
TL13802  "line CANNON-SANLUSRY-SHADOWR 138"  "N-1" "B"
         1 "CALAVRTP 138"  "CANNON   138"  "1 "   1  0
         1 "CALAVRTP 138"  "SANLUSRY 138"  "1 "   1  0
         1 "CALAVRTP 138"  "SHADOWR  138"  "1 "   1  0
         7
         0
TL13804  "line BATIQTOS-PENSQTOS-ENCINA 138"  "N-1" "B"
         1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
         1 "BATIQTP  138"  "PENSQTOS 138"  "1 "   1  0
         1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
         7
         0
TL13805 "line PALOMAR  to BATIQTOS 138 ck 1"  "N-1" "B"
         1 "PALOMAR  138"  "BATIQTOS 138"  "1 "   1  0
         0
TL13806  "line ENCINA   to PALOMAR  138 ck 1"  "N-1" "B"
         1 "ENCINA   138"  "PALOMAR  138"  "1 "   1  0
         0
TL13807  "line ENCINA   to NORTHCTY 138 ck 1"  "N-1" "B"
         1 "ENCINA   138"  "NORTHCTY 138"  "1 "   1  0
         0
TL13808  "line NORTHCTY to PENSQTOS 138 ck 1"  "N-1" "B"
         1 "NORTHCTY 138"  "PENSQTOS 138"  "1 "   1  0
         0
TL13809  "line PRCTRVLY to TELECYN  138 ck 1 "  "N-1" "B"
         1 "PRCTRVLY 138"  "TELECYN  138"  "1 "   1  0
         0
TL13810  "line DOUBLET-FRIARS-PENSQTOS 138"  "N-1" "B"
         1 "DOUBLET  138"  "DOUBLTTP 138"  "1 "   1  0
         1 "DOUBLTTP 138"  "FRIARS   138"  "1 "   1  0
         1 "DOUBLTTP 138"  "PENSQTOS 138"  "1 "   1  0
         7
         0
TL13811  "line SHADOWR  to ESCNDO50 138 ck 1"  "N-1" "B"
         1 "SHADOWR  138"  "ESCNDO50 138"  "1 "   1  0
         0
TL13812  "line TALEGA   to SANMATEO 138 ck 1"  "N-1" "B"
         1 "TALEGA   138"  "SANMATEO 138"  "1 "   1  0
         0
TL13813  "line SOUTHBAY to MAINST51 138 ck 1"  "N-1" "B"
         1 "SOUTHBAY 138"  "MAINST51 138"  "1 "   1  0
         0
TL13814  "line SOUTHBAY to MAINST50 138 ck 1"  "N-1" "B"
         1 "SOUTHBAY 138"  "MAINST50 138"  "1 "   1  0
         0
TL13815A "line MISSION  to GRNT HLL 138 ck 1 "  "N-1" "B"
         1 "MISSION  138"  "GRNT HLL 138"  "1 "   1  0
         0
TL13815B "line GRNT HLL to SOUTHBAY 138 ck 1 "  "N-1" "B"
         1 "GRNT HLL 138"  "SOUTHBAY 138"  "1 "   1  0
         0
TL13816  "line CAPSTRNO to PICO     138 ck 1"  "N-1" "B"
         1 "CAPSTRNO 138"  "PICO     138"  "1 "   1  0
         0
TL13819 "line SANTEE   to LOSCOCHS 138 ck 1 "  "N-1" "B"
         1 "LOSCOCHS 138"  "SANTEE   138"  "1 "   1  0
         0
TL13820  "line SYCAMORE-CHCARITA 138"  "N-1" "B"
         1 "SYCAMORE 138"  "CHCARITA 138"  "1 "   1  0
         0
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TL13821  "line CARLTNHS-SANTEE 138"  "N-1" "B"
         1 "CARLTNHS 138"  "CARLTHTP 138"  "1 "   1  0
         1 "SYCAMORE 138"  "CARLTHTP 138"  "1 "   1  0
         1 "CARLTHTP 138"  "SANTEE   138"  "1 "   1  0
         7
         0
TL13822  "line MISSION  to CARLTNHS 138 ck 1"  "N-1" "B"
         1 "MISSION  138"  "CARLTNHS 138"  "1 "   1  0
         0
TL13823  "line TELECYN  to SOUTHBAY 138 ck 1"  "N-1" "B"
         1 "TELECYN  138"  "SOUTHBAY 138"  "1 "   1  0
         0
TL13824  "line LOSCOCHS to SOUTHBAY 138 ck 1"  "N-1" "B"
         1 "LOSCOCHS 138"  "SOUTHBAY 138"  "1 "   1  0
         0
TL13825  "line BQ-CH-SH             138 CK 1"  "N-1" "B"
         1 "BATIQTOS 138"  "SHADOWR  138"  "1 "   1  0
         1 "BATIQTOS 138"  "MDWLRKTP 138"  "1 "   1  0
         1 "CHCARITA 138"  "MDWLRKTP 138"  "1 "   1  0
         1 "CHCARITA 138"  "SHADOWR  138"  "1 "   1  0
         7
         0
TL13826  "line PRCTRVLY to MIGUEL   138 ck 1"  "N-1" "B"
         1 "PRCTRVLY 138"  "MIGUEL   138"  "1 "   1  0
         0
TL13827  "line FRIARS   to MISSION  138 ck 1"  "N-1" "B"
         1 "FRIARS   138"  "MISSION  138"  "1 "   1  0
         0
TL13830  "line MARGARTA to TRABUCO  138 ck 1"  "N-1" "B"
         1 "MARGARTA 138"  "TRABUCO  138"  "1 "   1  0
         0
TL13831  "line TALEGA   to MARGARTA 138 ck 1"  "N-1" "B"
         1 "TALEGA   138"  "MARGARTA 138"  "1 "   1  0
         0
TL13833  "line TALEGA   to TRABUCO  138 ck 1"  "N-1" "B"
         1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
         0
TL13834  "line CAPSTRNO to TRABUCO  138 ck 1"  "N-1" "B"
         1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
         0
TL13835  "line SANMATEO to LAGNA NL 138 ck 1"  "N-1" "B"
         1 "SANMATEO 138"  "LAGNA NL 138"  "1 "   1  0
         0
TL13836  "line TALEGA   to PICO     138 ck 1 "  "N-1" "B"
         1 "TALEGA   138"  "PICO     138"  "1 "   1  0
         0
TL13837  "line CAPSTRNO to LAGNA NL 138 ck 1"  "N-1" "B"
         1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
         0
##############################################################
#
# SDG&E 69 kV Transmission Line Outages (Category B: N-1)
#
##############################################################
TL00600  "line CLAIRMNT to CLARMTTP  69 ck 1"  "N-1" "B"
         1 "CLAIRMNT  69"  "CLARMTTP  69"  "1 "   1  0
         1 "KEARNY    69"  "CLARMTTP  69"  "1 "   1  0
         1 "ROSE CYN  69"  "CLARMTTP  69"  "1 "   1  0
         7
         0
TL00601  "line B        to URBAN     69 ck 1"  "N-1" "B"
         1 "B         69"  "URBAN     69"  "1 "   1  0
         0
TL00602  "line B        to MAIN ST   69 ck 1"  "N-1" "B"
         1 "B         69"  "MAIN ST   69"  "1 "   1  0
         0
TL00603  "line NC-NSM-SW             69 ck 1"  "N-1" "B"
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         1 "NATNLCTY  69"  "SWTWTRTP  69"  "1 "   1  0
         1 "NAVSTMTR  69"  "SWTWTRTP  69"  "1 "   1  0
         1 "SWEETWTR  69"  "SWTWTRTP  69"  "1 "   1  0
         7
         0
TL00604  "line OLD TOWN to KETTNER   69 ck 1"  "N-1" "B"
         1 "OLD TOWN  69"  "KETTNER   69"  "1 "   1  0
         0
TL00605  "line MAIN ST  to URBAN     69 ck 1"  "N-1" "B"
         1 "MAIN ST   69"  "URBAN     69"  "1 "   1  0
         0
TL00606  "line DIVISION to NAVSTMTR  69 ck 1"  "N-1" "B"
         1 "DIVISION  69"  "NAVSTMTR  69"  "1 "   1  0
         0
TL00607  "line WABASH   to STREAMVW  69 ck 1"  "N-1" "B"
         1 "WABASH    69"  "STREAMVW  69"  "1 "   1  0
         0
TL00608  "line STREAMVW to CHOLLAS   69 ck 1"  "N-1" "B"
         1 "STREAMVW  69"  "CHOLLAS   69"  "1 "   1  0
         0
TL00609  "line KETTNER  to B         69 ck 1"  "N-1" "B"
         1 "KETTNER   69"  "B         69"  "1 "   1  0
         0
TL00610  "line R.SNTAFE to R.SNTATP  69 ck 1"  "N-1" "B"
         1 "R.SNTAFE  69"  "R.SNTATP  69"  "1 "   1  0
         1 "R.SNTATP  69"  "DEL MAR   69"  "1 "   1  0
         1 "R.SNTATP  69"  "PENSQTOS  69"  "1 "   1  0
         7
         0
TL00611  "line OLD TOWN to POINTLMA  69 ck 2"  "N-1" "B"
         1 "OLD TOWN  69"  "POINTLMA  69"  "1 "   1  0
         0
TL00612  "line OLD TOWN to POINTLMA  69 ck 1"  "N-1" "B"
         1 "OLD TOWN  69"  "POINTLMA  69"  "2 "   1  0
         0
TL00613  "line PACFCBCH to OLD TOWN  69 ck 1"  "N-1" "B"
         1 "PACFCBCH  69"  "OLD TOWN  69"  "1 "   1  0
         0
TL00614  "line CHOLLAS  to SWEETWTR  69 ck 1 "  "N-1" "B"
         1 "CHOLLAS   69"  "SWEETWTR  69"  "1 "   1  0
         0
TL00615  "line CABRILLO to POINTLMA  69 ck 1"  "N-1" "B"
         1 "CABRILLO  69"  "POINTLMA  69"  "1 "  1 0
         0
TL00616  "line BERNARDO to BERNDOTP  69 ck 1"  "N-1" "B"
         1 "BERNARDO  69"  "BERNDOTP  69"  "1 "   1  0
         1 "BERNDOTP  69"  "R.SNTAFE  69"  "1 "   1  0
         1 "Lkhodges  69"  "BERNDOTP  69"  "1 "   1  0
         7
         0
TL00617  "line ROSCYNTP to PACFCBCH  69 ck 1"  "N-1" "B"
         1 "ROSCYNTP  69"  "PACFCBCH  69"  "1 "   1  0
         1 "ROSCYNTP  69"  "ROSE CYN  69"  "1 "   1  0
         1 "ROSCYNTP  69"  "LA JOLLA  69"  "1 "   1  0
         7
         0
TL00618  "line MISSION  to MURRAY    69 ck 1"  "N-1" "B"
         1 "MISSION   69"  "MURRAY    69"  "1 "   1  0
         0
TL00619  "line MISSION  to MURRAY    69 ck 2"  "N-1" "B"
         1 "MISSION   69"  "MURRAY    69"  "2 "   1  0
         0
TL00620  "line MURRAY   to GARFIELD  69 ck 1"  "N-1" "B"
         1 "MURRAY    69"  "GARFIELD  69"  "1 "   1  0
         0
TL00621  "line PARADISE to MIGUEL    69 ck 1"  "N-1" "B"
         1 "PARADISE  69"  "MIGUEL    69"  "1 "   1  0
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         0
TL00622  "line CHOLLAS  to SPRNGVLY  69 ck 1 "  "N-1" "B"
         1 "CHOLLAS   69"  "SPRNGVLY  69"  "1 "   1  0
         0
TL00623  "line IMPRLBCH to OTAY  TP  69 ck 1"  "N-1" "B"
         1 "IMPRLBCH  69"  "OTAY  TP  69"  "1 "   1  0
         1 "SANYSDRO  69"  "OTAY  TP  69"  "1 "   1  0
         1 "OTAY      69"  "OTAY  TP  69"  "1 "   1  0
         7
         0
TL00624  "line EL CAJON to JAMACHA   69 ck 1"  "N-1" "B"
         1 "EL CAJON  69"  "JAMACHA   69"  "1 "   1  0
         0
TL00625  "line BARRETT  to BARRETTP  69 ck 1"  "N-1" "B"
         1 "BARRETT   69"  "BARRETTP  69"  "1 "   1  0
         1 "DESCANSO  69"  "BARRETTP  69"  "1 "   1  0
         1 "LOVELAND  69"  "BARRETTP  69"  "1 "   1  0
         7
         0
TL00626  "line BLDCRKTP to DESCANSO  69 ck 1"  "N-1" "B"
         1 "BLDCRKTP  69"  "DESCANSO  69"  "1 "   1  0
         1 "BLDCRKTP  69"  "SANTYSBL  69"  "1 "   1  0
         7
         0
TL00627  "line MIGUEL   to JAMACHA   69 ck 1"  "N-1" "B"
         1 "MIGUEL    69"  "JAMACHA   69"  "1 "   1  0
         0
TL00628  "line MIGUELTP to MIGUEL    69 ck 1"  "N-1" "B"
         4 "SUNYSIDE  69"  "10"   0
         1 "MIGUELTP  69"  "MIGUEL    69"  "1 "   1  0
         1 "SWEETWTR  69"  "MIGUELTP  69"  "1 "   1  0
         1 "SUNYSDTP  69"  "MIGUELTP  69"  "1 "   1  0
         1 "SUNYSIDE  69"  "SUNYSDTP  69"  "1 "   1  0
         1 "PARADISE  69"  "SUNYSDTP  69"  "1 "   1  0
         7
         0
TL00629  "line BOLVRDTP to CAMERON   69 ck 1"  "N-1" "B"
         1 "DESCANSO  69"  "GLNCLFTP  69"  "1 "   1  0
         1 "GLENCLIF  69"  "GLNCLFTP  69"  "1 "   1  0
         1 "BOLVRDTP  69"  "GLNCLFTP  69"  "1 "   1  0
         1 "BOLVRDTP  69"  "CAMERON   69"  "1 "   1  0
         0
TL00630  "line EL CAJON to GRANITE   69 ck 1"  "N-1" "B"
         1 "EL CAJON  69"  "GRANITE   69"  "1 "   1  0
         0
TL00631  "line EL CAJON to LOSCOCHS  69 ck 1"  "N-1" "B"
         1 "EL CAJON  69"  "LOSCOCHS  69"  "1 "   1  0
         0
TL00632  "line GRANITE to GRANITTP   69 ck 1"  "N-1" "B"
         1 "GRANITTP  69"  "MIGUEL   69"  "1 "   1  0
         1 "GRANITTP  69"  "GRANITE  69"  "1 "   1  0
         1 "GRANITTP  69"  "LOSCOCHS 69"  "1 "   1  0
         7
         0
TL633    "line BERNARDO TO R.CARMEL  69 ck 1"  "N-1" "B"
         1 "BERNARDO  69"  "R.CARMEL 69"  "1 "   1  0
         7
         0
TL00634  "line ESCO     to WARCYNTP  69 ck 1"  "N-1" "B"
         4 "WARENCYN  69"  "10"   0
         1 "ESCO      69"  "WARCYNTP  69"  "1 "   1  0
         1 "WARENCYN  69"  "WARCYNTP  69"  "1 "   1  0
         1 "POWAY     69"  "WARCYNTP  69"  "1 "   1  0
         7
         0
TL00635  "line CREELMAN to LOSCOCHS  69 ck 1"  "N-1" "B"
         1 "CREELMAN  69"  "LOSCOCHS  69"  "1 "   1  0
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         0
TL00636  "line LOSCOCHS   to ELLIOTT  69 ck 1 "  "N-1" "B"
         1 "LOSCOCHS  69"  "ELLIOTT   69"  "1 "   1  0
         0
TL00637  "line SANTYSBL to CREELMAN  69 ck 1"  "N-1" "B"
         1 "SANTYSBL  69"  "CREELMAN  69"  "1 "   1  0
         0
TL00639  "line SYCAMORE to ELLIOTT   69 ck 1"  "N-1" "B"
         1 "SYCAMORE  69"  "ELLIOTT   69"  "1 "   1  0
         0
TL00640  "line PARADISE to CHOLLAS   69 ck 1 "  "N-1" "B"
         1 "PARADISE  69"  "CHOLLAS   69"  "1 "   1  0
         0
TL00641  "line SOUTHBAY to MONTGMRY  69 ck 1"  "N-1" "B"
         1 "SOUTHBAY  69"  "MONTGMRY  69"  "1 "   1  0
         0
TL00642  "line MONTGMRY to MONTGYTP  69 ck 1"  "N-1" "B"
         1 "MONTGMRY  69"  "MONTGYTP  69"  "1 "   1  0
         1 "SWEETWTR  69"  "MONTGYTP  69"  "1 "   1  0
         1 "SOUTHBAY  69"  "MONTGYTP  69"  "1 "   1  0
         7
         0
TL00643  "line MIGUEL   to JAMACHA   69 ck 2"  "N-1" "B"
         1 "MIGUEL    69"  "JAMACHA   69"  "2 "   1  0
         0
TL00644  "line SOUTHBAY to SWEETWTR  69 ck 1"  "N-1" "B"
         1 "SOUTHBAY  69"  "SWEETWTR  69"  "1 "   1  0
         0
TL00645  "line SOUTHBAY to OTAY      69 ck 1"  "N-1" "B"
         1 "SOUTHBAY  69"  "OTAY      69"  "1 "   1  0
         0
TL00646  "line SOUTHBAY to OTAY      69 ck 2"  "N-1" "B"
         1 "SOUTHBAY  69"  "OTAY      69"  "2 "   1  0
         0
TL00647  "line SOUTHBAY to IMPRLBCH  69 ck 1"  "N-1" "B"
         1 "SOUTHBAY  69"  "IMPRLBCH  69"  "1 "   1  0
         0
TL00648  "line POWAY    to R.CARMEL  69 ck 1"  "N-1" "B"
         1 "POWAY     69"  "R.CARMEL  69"  "1 "   1  0
         0
TL00649  "line LONESTAR to BORDERTP  69 ck 1"  "N-1" "B"
         4 "OTAYLAKE  69"  "10"   0
         1 "BORDER    69"  "BORDERTP  69"  "1 "   1  0
         1 "OTAYLAKE  69"  "BORDERTP  69"  "1 "   1  0
         1 "OTAYLKTP  69"  "BORDERTP  69"  "1 "   1  0
         1 "OTAY      69"  "OTAYLKTP  69"  "1 "   1  0
         1 "SANYSDRO  69"  "OTAYLKTP  69"  "1 "   1  0
         7
         0
TL00650  "line B        to B     TP  69 ck 1"  "N-1" "B"
         1 "B         69"  "B     TP  69"  "1 "   1  0
         1 "NOISLMTR  69"  "B     TP  69"  "1 "   1  0
         1 "CORONADO  69"  "B     TP  69"  "1 "   1  0
         7
         0
TL00651  "line NATNLCTY  to WABASH    69 ck 1"  "N-1" "B"
         1 "NATNLCTY   69"  "WABASH    69"  "1 "   1  0
         0
TL00652  "line WABASH   to MAIN ST   69 ck 1"  "N-1" "B"
         1 "WABASH    69"  "MAIN ST   69"  "1 "   1  0
         0
TL00653  "line MISSION  to F         69 ck 1"  "N-1" "B"
         1 "MISSION   69"  "F         69"  "1 "   1  0
         0
TL00654  "line MISSION  to F         69 ck 2"  "N-1" "B"
         1 "MISSION   69"  "F         69"  "2 "   1  0
         0
```

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TL00655  "line SAMPSON  to CORONADO  69 ck 1"  "N-1" "B"
         1 "SAMPSON   69"  "CORONADO  69"  "1 "   1  0
         0
TL00656  "line SAMPSON  to MAIN ST   69 ck 1"  "N-1" "B"
         1 "SAMPSON   69"  "MAIN ST   69"  "1 "   1  0
         0
TL00657  "line SAMPSON  to MAIN ST   69 ck 2"  "N-1" "B"
         1 "SAMPSON   69"  "MAIN ST   69"  "2 "   1  0
         0
TL00658  "line SAMPSON  to DIVISION  69 ck 1"  "N-1" "B"
         1 "SAMPSON   69"  "DIVISION  69"  "1 "   1  0
         0
TL00659  "line CABRILLO to POINTLMA  69 ck 2"  "N-1" "B"
         1 "CABRILLO  69"  "POINTLMA  69"  "2 "   1  0
         0
TL00660  "line ENCNITAS to DEL MAR   69 ck 1"  "N-1" "B"
         1 "ENCNITAS  69"  "DEL MAR   69"  "1 "   1  0
         0
TL00661  "line ROSE CYN to PENSQTOS  69 ck 1"  "N-1" "B"
         1 "ROSE CYN  69"  "PENSQTOS  69"  "1 "   1  0
         0
TL00662  "line PENSQTOS to TOREYPNS  69 ck 1"  "N-1" "B"
         1 "PENSQTOS  69"  "TOREYPNS  69"  "1 "   1  0
         0
TL00663  "line KEARNY   to MISSION   69 ck 1"  "N-1" "B"
         1 "KEARNY    69"  "MISSION   69"  "1 "   1  0
         0
TL00664  "line EASTGATE to MIRAMRTP  69 ck 1"  "N-1" "B"
         1 "EASTGATE  69"  "MIRAMRTP  69"  "1 "   1  0
         1 "PENSQTOS  69"  "MIRAMRTP  69"  "1 "   1  0
         1 "MIRAMAR1  69"  "MIRAMRTP  69"  "1 "   1  0
         7
         0
TL00665  "line PENSQTOS to GENESEE   69 ck 1"  "N-1" "B"
         1 "PENSQTOS  69"  "GENESEE   69"  "1 "   1  0
         0
TL00666  "line DEL MAR  to DELMARTP  69 ck 1"  "N-1" "B"
         4 "DUNHILL   69"  "10"   0
         1 "DEL MAR   69"  "DELMARTP  69"  "1 "   1  0
         1 "PENSQTOS  69"  "DELMARTP  69"  "1 "   1  0
         1 "DOUBLTTP  69"  "DELMARTP  69"  "1 "   1  0
         1 "DUNHILTP  69"  "DOUBLTTP  69"  "1 "   1  0
         1 "DUNHILTP  69"  "DUNHILL   69"  "1 "   1  0
         1 "TOREYPNS  69"  "DUNHILTP  69"  "1 "   1  0
         1 "DOUBLTTP  69"  "DOUBLET   69"  "1 "   1  0
         7
         0
TL00667  "line DEL MAR  to PENSQTOS  69 ck 1"  "N-1" "B"
         1 "DEL MAR   69"  "PENSQTOS  69"  "1 "   1  0
         0
TL00668  "line FENTONTP to FENTON    69 ck 1"  "N-1" "B"
         4 "FENTON    69"  "10"   0
         1 "FENTONTP  69"  "FENTON    69"  "1 "   1  0
         1 "MIRAMAR1  69"  "FENTONTP  69"  "1 "   1  0
         1 "MIRAMAR   69"  "FENTONTP  69"  "1 "   1  0
         7
         0
TL00669  "line MIRAMAR  to SCRIPPS   69 ck 1"  "N-1" "B"
         1 "MIRAMAR   69"  "SCRIPPS   69"  "1 "   1  0
         0
TL00670  "line MISSION to CLAIRMNT   69 ck 1"  "N-1" "B"
         1 "MISSION   69"  "CLAIRMNT  69"  "1 "   1  0
         0
TL00671  "line MISSION  to ELLIOTT   69 ck 1"  "N-1" "B"
         1 "MISSION   69"  "ELLIOTT   69"  "1 "   1  0
         0
TL00672A "line KYOCRATP to KYOCERA   69 ck1"  "N-1" "B"
```

```
         8 "KYOCRATP  69"
         8 "KYOCERA   69"
         4 "KYOCERA   69"  "10"   0
         1 "KYOCRATP  69"  "GENDYNTP  69"  "1 "   1  0
         1 "KYOCRATP  69"  "KYOCERA   69"  "1 "   1  0
         1 "MESAHGTS  69"  "KYOCRATP  69"  "1 "   1  0
         1 "KEARNY    69"  "GENDYNTP  69"  "1 "   1  0
         1 "GEN DYNM  69"  "GENDYNTP  69"  "1 "   1  0
         7
         0
TL00673  "line LA JOLLA to ROSE CYN  69 ck 1"  "N-1" "B"
         1 "LA JOLLA  69"  "ROSE CYN  69"  "1 "   1  0
         0
TL00674  "line ENCNITAS to PENSQTOS  69 ck 1"  "N-1" "B"
         1 "ENCNITAS  69"  "PENSQTOS  69"  "1 "   1  0
         0
TL00675  "line PENSQTOS to MESA RIM  69 ck 1"  "N-1" "B"
         1 "PENSQTOS  69"  "MESA RIM  69"  "1 "   1  0
         0
TL00676  "line MESAHGTS to MISSION   69 ck 1"  "N-1" "B"
         1 "MESAHGTS  69"  "MISSION   69"  "1 "   1  0
         0
TL00677  "line MESA RIM to MIRAMAR   69 ck 1"  "N-1" "B"
         1 "MESA RIM  69"  "MIRAMAR   69"  "1 "   1  0
         0
TL00678  "line LOSCOCHS to ALPINE    69 ck 1"  "N-1" "B"
         1 "LOSCOCHS  69"  "ALPINE    69"  "1 "   1  0
         0
TL00679  "line ESCNDIDO to FELICITA  69 ck 1"  "N-1" "B"
         1 "ESCNDIDO  69"  "FELICITA  69"  "1 "   1  0
         0
TL00680  "line MELROSE  to MELRSETP  69 ck 1"  "N-1" "B"
         1 "MELROSE   69"  "MELRSETP  69"  "1 "   1  0
         1 "MELRSETP  69"  "SANLUSRY  69"  "1 "   1  0
         1 "MELRSETP  69"  "SANMRCOS  69"  "1 "   1  0
         7
         0
TL00681  "line ASH      to ASH   TP  69 ck 1"  "N-1" "B"
         1 "ASH       69"  "ASH   TP  69"  "1 "   1  0
         1 "FELICITA  69"  "ASH   TP  69"  "1 "   1  0
         1 "VALCNTR   69"  "ASH   TP  69"  "1 "   1  0
         7
         0
TL00682  "line WARNERS  to RINCON    69 ck 1"  "N-1" "B"
         1 "WARNERS   69"  "RINCON    69"  "1 "   1  0
         0
TL00683  "line RINCON   to LILAC     69 ck 1 "  "N-1" "B"
         1 "RINCON    69"  "LILAC     69"  "1 "   1  0
         0
TL00684  "line ESCNDIDO to SANMRCOS  69 ck 1"  "N-1" "B"
         1 "ESCNDIDO  69"  "SANMRCOS  69"  "1 "   1  0
         0
TL00685  "line WARNERS  to SANTYSBL  69 ck 1"  "N-1" "B"
         1 "WARNERS   69"  "SANTYSBL  69"  "1 "   1  0
         0
TL00686  "line NARROWS to WARNERS    69 ck 1"  "N-1" "B"
         1 "NARROWS   69"  "WARNERS   69"  "1 "   1  0
         0
TL00687  "line BORREGO  to NARROWS   69 ck 1"  "N-1" "B"
         4 "BORREGO   12.5"  "10"   0
         1 "BORREGO   69"  "NARROWS   69"  "1 "   1  0
         0
TL00688  "line ESCNDIDO to LILAC     69 ck 1"  "N-1" "B"
         1 "ESCNDIDO  69"  "LILAC     69"  "1 "   1  0
         0
TL00689  "line BERNARDO to FELCTATP  69 ck 1"  "N-1" "B"
         1 "BERNARDO  69"  "FELCTATP  69"  "1 "   1  0
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         1 "ESCNDIDO  69"  "FELCTATP  69"  "1 "   1  0
         1 "FELCTATP  69"  "FELICITA  69"  "1 "   1  0
         7
         0
TL00690  "line OCNSDETP to OCEANSDE  69 ck 1"  "N-1" "B"
         4 "STUART    69"  "10"   0
         1 "OCNSDETP  69"  "SANLUSRY  69"  "1 "   1  0
         1 "OCNSDETP  69"  "OCEANSDE  69"  "1 "   1  0
         1 "OCNSDETP  69"  "STUARTTP  69"  "1 "   1  0
         1 "STUART    69"  "STUARTTP  69"  "1 "   1  0
         1 "STUARTTP  69"  "LASPULGS  69"  "1 "   1  0
         7
         0
TL00691  "line AVCADOTP to AVOCADO   69 ck 1"  "N-1" "B"
         1 "AVCADOTP  69"  "AVOCADO   69"  "1 "   1  0
         1 "PENDLETN  69"  "AVCADOTP  69"  "1 "   1  0
         1 "MONSRATE  69"  "AVCADOTP  69"  "1 "   1  0
         7
         0
TL00692  "line HORNO    to HORNO TP  69 ck 1"  "N-1" "B"
         1 "HORNO     69"  "HORNO TP  69"  "1 "   1  0
         1 "HORNO TP  69"  "JAP MESA  69"  "1 "   1  0
         1 "LASPULGS  69"  "HORNO TP  69"  "1 "   1  0
         7
         0
TL00693  "line MELROSE  to SANLUSRY  69 ck 1"  "N-1" "B"
         1 "MELROSE   69"  "SANLUSRY  69"  "1 "   1  0
         0
TL00694  "line MONSRATE to MORHILTP  69 ck 1"  "N-1" "B"
         4 "MOROHILL  69"  "10"   0
         1 "MONSRATE  69"  "MORHILTP  69"  "1 "   1  0
         1 "MORHILTP  69"  "MOROHILL  69"  "1 "   1  0
         1 "MORHILTP  69"  "SANLUSRY  69"  "1 "   1  0
         7
         0
TL00695  "line CRSTNTS  to TALEGATP  69 ck 1"  "N-1" "B"
         4 "CRSTNTS   69"  "10"   0
         2 "TALEGA   138"  "TALEGA    69"  "1 "   1  0
         0
TL00696  "line ESCNDIDO to ASH       69 ck 1"  "N-1" "B"
         1 "ESCNDIDO  69"  "ASH       69"  "1 "   1  0
         0
TL00697  "line SANLUSRY to OCEANSDE  69 ck 1"  "N-1" "B"
         1 "SANLUSRY  69"  "OCEANSDE  69"  "1 "   1  0
         0
TL00698  "line AVOCADO  to MNSRATTP  69 ck 1"  "N-1" "B"
         1 "AVOCADO   69"  "MNSRATTP  69"  "1 "   1  0
         1 "MONSRATE  69"  "MNSRATTP  69"  "1 "   1  0
         1 "PALA      69"  "MNSRATTP  69"  "1 "   1  0
         7
         0
TL00699  "line B        to MAIN ST   69 ck 2"  "N-1" "B"
         1 "B         69"  "MAIN ST   69"  "2 "   1  0
         0
TL06902 "line NOISLMTR to CORONADO  69 ck 1"  "N-1" "B"
         1 "NOISLMTR  69"  "CORONADO  69"  "1 "   1  0
         0
TL06904  "line LOVELAND to ALPINE    69 ck 1"  "N-1" "B"
         1 "LOVELAND  69"  "ALPINE    69"  "1 "   1  0
         0
TL06905  "line GENESEE  to PENSQTOS  69 ck 2 "  "N-1" "B"
         1 "GENESEE   69"  "PENSQTOS  69"  "2 "   1  0
         0
TL06906  "line MIRAMAR  to PENSQTOS  69 ck 1"  "N-1" "B"
         1 "MIRAMAR   69"  "PENSQTOS  69"  "1 "   1  0
         0
TL06907  "line GENESEE  to UCM       69 ck 1"  "N-1" "B"
```

```
         1 "GENESEE   69"  "UCM       69"  "1 "   1  0
         0
TL06908  "line ESCNDIDO to ESCO      69 ck 1"  "N-1" "B"
         1 "ESCNDIDO  69"  "ESCO      69"  "1 "   1  0
         0
TL06910  "line MIGUEL   to BORDER    69 ck 1"  "N-1" "B"
         1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
         0
TL06911  "line JAMACHA  to SPRNGVLY  69 ck 1"  "N-1" "B"
         1 "JAMACHA   69"  "SPRNGVLY  69"  "1 "   1  0
         0
TL06912  "line PENDLETN to SANLUSRY  69 ck 1"  "N-1" "B"
         1 "PENDLETN  69"  "SANLUSRY  69"  "1 "   1  0
         0
TL06913  "line POWAY    to POMERADO  69 ck 1"  "N-1" "B"
         1 "POWAY     69"  "POMERADO  69"  "1 "   1  0
         0
TL06914  "line LOVELAND to LOSCOCHS  69 ck 1"  "N-1" "B"
         1 "LOVELAND  69"  "LOSCOCHS  69"  "1 "   1  0
         0
TL06915  "line POMERADO to SYCAMORE  69 ck 1"  "N-1" "B"
         1 "POMERADO  69"  "SYCAMORE  69"  "1 "   1  0
         0
TL06916  "line SYCAMORE to SCRIPPS   69 ck 1"  "N-1" "B"
         1 "SYCAMORE  69"  "SCRIPPS   69"  "1 "   1  0
         0
TL06917  "line CREELMAN to SYCAMORE  69 ck 1"  "N-1" "B"
         1 "CREELMAN  69"  "SYCAMORE  69"  "1 "   1  0
         0
TL06918  "line ESCO     to GOALLINE  69 ck 1"  "N-1" "B"
         1 "ESCO      69"  "GOALLINE  69"  "1 "   1  0
         0
TL06920  "line ARTESN   to SYCAMORE  69 ck 1 "  "N-1" "B"
         1 "ARTESN    69"  "SYCAMORE  69"  "1 "   1  0
         0
TL06923  "line BARRETT  to CAMERON   69 ck 1"  "N-1" "B"
         1 "BARRETT   69"  "CAMERON   69"  "1 "   1  0
         0
TL06924  "line POMERADO to SYCAMORE  69 ck 2"  "N-1" "B"
         1 "POMERADO  69"  "SYCAMORE  69"  "2 "   1  0
         0
TL06925 "line GARFIELD to EL CAJON  69 ck 1"  "N-1" "B"
         1 "GARFIELD  69"  "EL CAJON  69"  "1 "   1  0
         0
TL06926  "line RINCON   to VALCNTR   69 ck 1"  "N-1" "B"
         1 "RINCON    69"  "VALCNTR   69"  "1 "   1  0
         0
TL06927  "line EASTGATE to ROSE CYN  69 ck 1"  "N-1" "B"
         1 "EASTGATE  69"  "ROSE CYN  69"  "1 "   1  0
         0
TL06930  "line OMWD     to ESCNDIDO  69 ck 1"  "N-1" "B"
         1 "OMWD      69"  "ESCNDIDO  69"  "1 "   1  0
         0
TL06931  "line BOULEVRD to CRESTWD   69 ck 1"  "N-1" "B"
         8 "BOULEVRD 69"
         4 "BOULEVRD  69"  "10"   0
         1 "BOULEVRD  69"  "CRESTWD   69"  "1 "   1  0
         0
TL06932 "line LILAC    to PALA      69 ck 1"  "N-1" "B"
         1 "LILAC     69"  "PALA      69"  "1 "   1  0
         0
TL06939 "line BERNARDO to ARTESN    69 ck 1 "  "N-1" "B"
         1 "BERNARDO  69"  "ARTESN    69"  "1 "   1  0
         0
##############################################################
#
# No longer in line-up for 2008
```

```
# TL06942  "line MIRAMAR  to SYCAMORE  69 ck 1"  "N-1" "B"
#        1 "MIRAMAR   69"  "SYCAMORE  69"  "1 "   1  0
#        0
##########################################################
TL06943  "line TOREYPNS  to UCM      69 ck 1"  "N-1" "B"
         1 "TOREYPNS   69"  "UCM      69"  "1 "   1  0
         0
##########################################################
#
# TL06946 and other periphery lines proposed for queue wind
# projects not accounted for in this list
#
##########################################################
# SDG&E Bulk Power Transformer Single Outage (80s)
# Note: Sorted by size, then alphabetically
##########################################################
IV80  "tran IMPRLVLY 230 to IMPRLVLY  500 ck 1"  "T-1" "B"
         2 "IMPRLVLY 230"  "IMPRLVLY 500"  "1 "  0
         0
IV81  "tran IMPRLVLY 230 to IMPRLVLY  500 ck 2"  "T-1" "B"
         2 "IMPRLVLY 230"  "IMPRLVLY 500"  "2 "  0
         0
ML80  "tran MIGUEL   230 to MIGUELMP  500 ck 1"  "T-1" "B"
         2 "MIGUEL   230"  "MIGUELMP 500"  "1 "  0
         2 "MIGUEL    12"  "MIGUELMP 500"  "1 "  0
         2 "MIGUEL   500"  "MIGUELMP 500"  "1 "  0
         0
ML81  "tran MIGUEL   230 to MIGUEL    500 ck 2"  "T-1" "B"
         2 "MIGUEL   230"  "MIGUEL   500"  "2 "  0
         0
NG500/69  "tran N.GILA  500 to N.GILA  69 ck 1"  "T-1" "B"
         2 "N.GILA   500"  "N.GILA    69"  "1 "  0
         0
ES70  "tran ESCNDIDO  69 to ESCNDIDO  230 ck 1"  "T-1" "B"
         2 "ESCNDIDO  69"  "ESCNDIDO 230"  "1 "  0
         0
ES71  "tran ESCNDIDO  69 to ESCNDIDO  230 ck 2"  "T-1" "B"
         2 "ESCNDIDO  69"  "ESCNDIDO 230"  "2 "  0
         0
ES72  "tran ESCNDIDO  69 to ESCNDIDO  230 ck 3"  "T-1" "B"
         2 "ESCNDIDO  69"  "ESCNDIDO 230"  "3 "  0
         0
ML70  "tran MIGUEL    69 to MIGUEL    230 ck 1"  "T-1" "B"
         2 "MIGUEL    69"  "MIGUEL   230"  "1 "  0
         0
ML71  "tran MIGUEL    69 to MIGUEL    230 ck 2"  "T-1" "B"
         2 "MIGUEL    69"  "MIGUEL   230"  "2 "  0
         0
MS70  "tran MISSION  230 to MISSION    69 ck 1"  "T-1" "B"
         2 "MISSION  230"  "MISSION   69"  "1 "  0
         0
OT70  "tran OLD TOWN  69 to OLD TOWN  230 ck 1"  "T-1" "B"
         2 "OLD TOWN  69"  "OLD TOWN 230"  "1 "  0
         0
OT71  "tran OLD TOWN  69 to OLD TOWN  230 ck 2"  "T-1" "B"
         2 "OLD TOWN  69"  "OLD TOWN 230"  "2 "  0
         0
PQ60  "tran PENSQTOS 230 to PENSQTOS  138 ck 1"  "T-1" "B"
         2 "PENSQTOS 230"  "PENSQTOS 138"  "1 "  0
         0
PQ70  "tran PENSQTOS 230 to PENSQTOS   69 ck 1"  "T-1" "B"
         2 "PENSQTOS 230"  "PENSQTOS  69"  "1 "  0
         0
PQ71  "tran PENSQTOS 230 to PENSQTOS   69 ck 2"  "T-1" "B"
         2 "PENSQTOS 230"  "PENSQTOS  69"  "2 "  0
         0
SA70  "tran SANLUSRY  69 to SANLUSRY  230 ck 1"  "T-1" "B"
```

```
         2 "SANLUSRY  69"  "SANLUSRY 230"  "1 "  0
         0
SA71  "tran SANLUSRY  69 to SANLUSRY  230 ck 2"  "T-1" "B"
         2 "SANLUSRY  69"  "SANLUSRY 230"  "2 "  0
         0
SX60  "tran SYCAMORE 230 to SYCAMORE  138 ck 1"  "T-1" "B"
         2 "SYCAMORE 230"  "SYCAMORE 138"  "1 "  0
         0
SX70  "tran SYCAMORE 230 to SYCAMORE   69 ck 1"  "T-1" "B"
         2 "SYCAMORE 230"  "SYCAMORE  69"  "1 "  0
         0
SX71  "tran SYCAMORE 230 to SYCAMORE   69 ck 2"  "T-1" "B"
         2 "SYCAMORE 230"  "SYCAMORE  69"  "2 "  0
         0
ML60  "tran MIGUEL   230 to MIGUEL    138 ck 1"  "T-1" "B"
         2 "MIGUEL   230"  "MIGUEL   138"  "1 "  0
         0
MS60  "tran MISSION  230 to MISSION   138 ck 1"  "T-1" "B"
         2 "MISSION  230"  "MISSION  138"  "1 "  0
         0
MS61  "tran MISSION  230 to MISSION   138 ck 2"  "T-1" "B"
         2 "MISSION  230"  "MISSION  138"  "2 "  0
         0
TA60  "tran TALEGA   230 to TALEGA    138 ck 1"  "T-1" "B"
         2 "TALEGA   230"  "TALEGA   138"  "1 "  0
         0
TA62  "tran TALEGA   230 to TALEGA    138 ck 2"  "T-1" "B"
         2 "TALEGA   230"  "TALEGA   138"  "2 "  0
         0
TA61  "tran TALEGA   230 to TALEGA    138 ck 3"  "T-1" "B"
         2 "TALEGA   230"  "TALEGA   138"  "3 "  0
         0
TA63  "tran TALEGA   230 to TALEGA    138 ck 4"  "T-1" "B"
         2 "TALEGA   230"  "TALEGA   138"  "4 "  0
         0
ES50  "tran ESCNDO50 138 to ESCNDIDO   69 ck 2"  "T-1" "B"
         2 "ESCNDO50 138"  "ESCNDIDO  69"  "2 "  0
         0
LC50  "tran LOSCOCHS 138 to LOSCOCHS   69 ck 1"  "T-1" "B"
         2 "LOSCOCHS 138"  "LOSCOCHS  69"  "1 "  0
         0
LC51  "tran LOSCOCHS  69 to LOSCOCHS  138 ck 2"  "T-1" "B"
         2 "LOSCOCHS  69"  "LOSCOCHS 138"  "2 "  0
         0
MS50  "tran MISSION  138 to MISSION    69 ck 1"  "T-1" "B"
         2 "MISSION  138"  "MISSION   69"  "1 "  0
         0
MS51  "tran MISSION  138 to MISSION    69 ck 2"  "T-1" "B"
         2 "MISSION  138"  "MISSION   69"  "2 "  0
         0
MS52     "tran MISSION  138 to MISSION    69 ck 3"  "T-1" "B"
         2 "MISSION  138"  "MISSION   69"  "3 "  0
         0
PQ50     "tran PENSQTOS 138 to PENSQTOS   69 ck 1"  "T-1" "B"
         2 "PENSQTOS 138"  "PENSQTOS  69"  "1 "  0
         0
PQ51     "tran PENSQTOS  69 to PENSQTOS  138 ck 2"  "T-1" "B"
         2 "PENSQTOS  69"  "PENSQTOS 138"  "2 "  0
         0
PQ52     "tran PENSQTOS  69 to PENSQTOS  138 ck 3"  "T-1" "B"
         2 "PENSQTOS  69"  "PENSQTOS 138"  "3 "  0
         0
SA51     "tran SANLUSRY 138 to SANLUSRY   69 ck 3"  "T-1" "B"
         2 "SANLUSRY 138"  "SANLUSRY  69"  "1 "  0
         0
SY50     "tran SOUTHBAY  69 to SOUTHBAY  138 ck 1"  "T-1" "B"
         2 "SOUTHBAY  69"  "SOUTHBAY 138"  "1 "  0
```

```
         0
TA50     "tran TALEGA    69 to TALEGA    138 ck 1"  "T-1" "B"
         2 "TALEGA    69"  "TALEGA   138"  "1 "  0
         0
##########################################################
#
# SDG&E Selected Generator Outage (Category B: G-1)
#
##########################################################
EA1      "gen ENCINA 1  14.40"  "G-1" "B"
         3 "ENCINA 1  14.40"  "1 "   0
         0
EA2      "gen ENCINA 2  14.40"  "G-1" "B"
         3 "ENCINA 2  14.40"  "2 "   0
         0
EA3      "gen ENCINA 3  14.40"  "G-1" "B"
         3 "ENCINA 3  14.40"  "3 "   0
         0
EA4      "gen ENCINA 4  22.00"  "G-1" "B"
         3 "ENCINA 4     22"  "4 "   0
         0
EA5      "gen ENCINA 5  24.00"  "G-1" "B"
         3 "ENCINA 5     24"  "5 "   0
         0
NIM-GT   "gen NOISLMTR  69.00"  "G-1" "B"
         3 "NOISLMTR     69"  "QF"  0
         0
CALPK-BD "gen CALPK_BD  13.80"  "G-1" "B"
         3 "CALPK_BD  13.80"  "1 "   0
         0
CALPK-EC "gen CALPK EC  13.80"  "G-1" "B"
         3 "CALPK_EC  13.80"  "1 "   0
         0
CALPK-ES "gen CALPK ES  13.80"  "G-1" "B"
         3 "CALPK_ES  13.80"  "1 "   0
         0
PEN1/2/3 "gen PEN 1/2/3 18.00"
         3 "PEN CT1    18.00"  "1 "  0
         3 "PEN_CT2    18.00"  "2 "  0
         3 "PEN_ST     18.00"  "3 "  0
         0
#OMGP/2/3 "gen OMGP 1/2/3"
#        3 "OTAYMGT1  18.00"  "1 "  0
#        3 "OTAYMGT2  18.00"  "1 "  0
#        3 "OTAYMST1  16.00"  "1 "  0
#        0
GOALLINE gen GOALLINE    69.00"
         3 "GOALLINE  69.00"  "QF"  0
         0
LRKSPBD1 "gen LRKSP BD  13.80"  "G-1" "B"
         3 "LRKSPBD1  13.80"  "1 "   0
         0
LRKSPBD2 "gen LRKSP_BD  13.80"  "G-1" "B"
         3 "LRKSPBD2  13.80"  "2 "   0
         0
MMC_ES   "gen MMC ES    13.80"  "G-1" "B"
         3 "MMC_ES    13.80"  "1 "   0
         0
#MMC_OY   "gen OTAY_49   13.80"  "G-1" "B"
#        3 "OTAY_49    13.80"  "1 "   0
#        0
MEF      "gen RAMCO_MR  13.80"  "G-1" "B"
         3 "MEF        13.80"  "1 "   0
         0
SY1      "gen SOUTHBY1  15.00"  "G-1" "B"
         3 "SOUTHBY1  15.00"    "1 "  0
         0
```

```
SY2      "gen SOUTHBY2  15.00"  "G-1" "B"
         3 "SOUTHBY2  15.00"    "2 "  0
         0
SY3      "gen SOUTHBY3  20.00"  "G-1" "B"
         3 "SOUTHBY3  20.00"    "3 "  0
         0
SY4      "gen SOUTHBY4  20.00"  "G-1" "B"
         3 "SOUTHBY4  20.00"    "4 "  0
         0
POINTLMA "gen POINTLMA  69.00"  "G-1" "B"
         3 "POINTLMA  69.00"    "QF"  0
         0
DIVISION "gen DIVISION  69.00"  "G-1" "B"
         3 "DIVISION  69.00"    "QF"  0
         0
BM27MW   "gen BM27MW    13.80"  "G-1" "B"
         3 "BM27MW    13.80"    "1 "  0
         0
INT_GEN  "gen INT GEN   13.80"  "G-1" "B"
         3 "INTBCT    16.00"    "1 "  0
         3 "INTBST    18.00"    "2 "  0
         0
INT_GEN  "gen INT GEN   13.80"  "G-1" "B"
         3 "IV GEN1   21.00"    "1 "  0
         3 "IV GEN2   18.00"    "2 "  0
         3 "IV GEN3   18.00"    "3 "  0
         0
MRGT49MW "gen MRGT49MW  13.80"  "G-1" "B"
         3 "MRGT49MW  13.80"    "1 "  0
         0
OTAY_46A "gen OTAY 46A  13.80"  "G-1" "B"
         3 "OTAY_46A  13.80"    "1 "  0
         0
OTAY_46B "gen OTAY 46B  13.80"  "G-1" "B"
         3 "OTAY_46B  13.80"    "1 "  0
         0
##############################################################
#
# SDG&E Bus Section Outages (Category C: Bus Section)
# Note: Alphabetical Order
#
##############################################################
Bus_AV69 "Avocado 69kV Bus"  "BUS" "C"
         1 "AVCADOTP  69"  "AVOCADO   69"  "1 "   1  0
         1 "AVOCADO   69"  "MNSRATTP  69"  "1 "   1  0
         4 "AVOCADO   69"  "10"   0
         0
Bus_B69N "Station B 69kV N Bus"  "BUS" "C"
         1 "B         69"  "B     TP  69"  "1 "   1  0
         1 "B         69"  "MAIN ST   69"  "2 "   1  0
         1 "KETTNER   69"  "B         69"  "1 "   1  0
         0
Bus_B69S "Station B 69kV S Bus"  "BUS" "C"
         1 "B         69"  "MAIN ST   69"  "1 "   1  0
         1 "B         69"  "URBAN     69"  "1 "   1  0
         0
Bus_BAR69 "Barrett 69kV Bus"  "BUS" "C"
         1 "BARRETT   69"  "CAMERON   69"  "1 "   1  0
         1 "BARRETT   69"  "BARRETTP  69"  "1 "   1  0
         4 "BARRETT   69"  "10"   0
         7
         0
Bus_BE69E "Bernardo 69kV E Bus"  "BUS" "C"
         1 "BERNARDO  69"  "BERNDOTP  69"  "1 "   1  0
         1 "BERNARDO  69"  "R.CARMEL  69"  "1 "   1  0
         7
         0
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Bus_BQ138E "Batiquitos 138kV E Bus"  "BUS" "C"
         1 "BATIQTOS 138"  "MDWLRKTP 138"  "1 "   1  0
         1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
         7
         0
Bus_CM69 "Clairemont 69kV Bus"  "BUS" "C"
         1 "CLAIRMNT  69"  "MISSION   69"  "1 "   1  0
         1 "CLAIRMNT  69"  "CLARMTTP  69"  "1 "   1  0
         4 "CLAIRMNT  69"  "10"   0
         7
         0
Bus_CN69 "Cameron 69kV Bus"  "BUS" "C"
         1 "BARRETT   69"  "CAMERON   69"  "1 "   1  0
         1 "BOLVRDTP  69"  "CAMERON   69"  "1 "   1  0
         4 "CAMERON   69"  "10"   0
         7
         0
Bus_CP138S "Capistrano 138kV S Bus"  "BUS" "C"
         1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
         1 "CAPSTRNO 138"  "PICO     138"  "1 "   1  0
         0
Bus_CR69W "Coronado 69kV W Bus"  "BUS" "C"
         1 "NOISLMTR  69"  "CORONADO  69"  "1 "   1  0
         1 "CORONADO  69"  "B     TP  69"  "1 "   1  0
         7
         0
Bus_CRE69E "Creelman 69kV E Bus"  "BUS" "C"
         1 "CREELMAN  69"  "LOSCOCHS  69"  "1 "   1  0
         1 "SANTYSBL  69"  "CREELMAN  69"  "1 "   1  0
         0
Bus_CS69 "Chollas 69kV Bus"   "BUS" "C"
         1 "CHOLLAS   69"  "SWEETWTR  69"  "1 "   1  0
         1 "CHOLLAS   69"  "SPRNGVLY  69"  "1 "   1  0
         1 "PARADISE  69"  "CHOLLAS   69"  "1 "   1  0
         1 "STREAMVW  69"  "CHOLLAS   69"  "1 "   1  0
         4 "CHOLLAS   69"  "10"   0
         0
Bus_DE69 "Descanso 69kV Bus"  "BUS" "C"
         1 "DESCANSO  69"  "BARRETTP  69"  "1 "   1  0
         1 "BLDCRKTP  69"  "DESCANSO  69"  "1 "   1  0
         1 "DESCANSO  69"  "GLNCLFTP  69"  "1 "   1  0
         4 "DESCANSO  69"  "10"   0
         7
         0
Bus_DM69E "Del Mar 69kV E Bus"  "BUS" "C"
         1 "DEL MAR   69"  "PENSQTOS  69"  "1 "   1  0
         1 "R.SNTATP  69"  "DEL MAR   69"  "1 "   1  0
         7
         0
Bus_DM69W "Del Mar W 69kV Bus"  "BUS" "C"
         1 "ENCNITAS  69"  "DEL MAR   69"  "1 "   1  0
         1 "DEL MAR   69"  "DELMARTP  69"  "1 "   1  0
         7
         0
Bus_EC69N "El Cajon 69kV N Bus"  "BUS" "C"
         1 "EL CAJON  69"  "LOSCOCHS  69"  "1 "   1  0
         1 "GARFIELD  69"  "EL CAJON  69"  "1 "   1  0
         1 "CALPK EC  69"  "EL CAJON  69"  "1 "   1  0
         8 "CALPK_EC 13.8"
         0
Bus_EC69S "El Cajon 69kV S Bus"  "BUS" "C"
         1 "EL CAJON  69"  "GRANITE   69"  "1 "   1  0
         1 "EL CAJON  69"  "JAMACHA   69"  "1 "   1  0
         0
Bus_EL69S "Elliot 69kV S Bus"  "BUS" "C"
         1 "MISSION   69"  "ELLIOTT   69"  "1 "   1  0
         1 "SYCAMORE  69"  "ELLIOTT   69"  "1 "   1  0
```

```
         0
#Bus ES69NE "Escondido 69kV NE Bus"  "BUS" "C"
#Bus_ES69NE outage is covered in N-1 category
        #1 "ESCNDIDO  69"  "FELCTATP  69"  "1 "   1  0
        #0
Bus_ES69NW "Escondido 69kV NW Bus"  "BUS" "C"
         1 "ESCNDIDO  69"  "SANMRCOS  69"  "1 "   1  0
         1 "MMC ES    69"  "ESCNDIDO  69"  "1 "   1  0
         8 "MMC ES   13.8"
         8 "MMC_ES    69"
         0
Bus_ES69SE "Escondido 69kV SE Bus"  "BUS" "C"
         1 "CALPK ES  69"  "ESCNDIDO  69"  "1 "   1  0
         1 "ESCNDIDO  69"  "ASH       69"  "1 "   1  0
         1 "ESCNDIDO  69"  "ESCO      69"  "1 "   1  0
         8 "CALPK_ES 13.8"
         0
Bus_ES69SW "Escondido 69kV SW Bus"  "BUS" "C"
         1 "ESCNDIDO  69"  "FELICITA  69"  "1 "   1  0
         1 "ESCNDIDO  69"  "LILAC     69"  "1 "   1  0
         0
Bus_F69 "Station F 69kV Bus"  "BUS" "C"
         1 "MISSION   69"  "F         69"  "1 "   1  0
         1 "MISSION   69"  "F         69"  "2 "   1  0
         4 "F         69"  "10"   0
         0
Bus_FE69S "Felicita 69kV S Bus"  "BUS" "C"
         1 "ESCNDIDO  69"  "FELICITA  69"  "1 "   1  0
         1 "FELICITA  69"  "ASH   TP  69"  "1 "   1  0
         7
         0
Bus_FR138 "Friars 138kV Bus"  "BUS" "C"
         1 "DOUBLTTP 138"  "FRIARS   138"  "1 "   1  0
         1 "FRIARS   138"  "MISSION  138"  "1 "   1  0
         4 "FRIARS   138"  "10"   0
         7
         0
Bus_GE69S "Genesee 69kV S Bus"  "BUS" "C"
         1 "GENESEE   69"  "UCM       69"  "1 "   1  0
         1 "PENSQTOS  69"  "GENESEE   69"  "1 "   1  0
         0
Bus_JM69N "Jamacha 69kV N Bus"  "BUS" "C"
         1 "JAMACHA   69"  "SPRNGVLY  69"  "1 "   1  0
         1 "MIGUEL    69"  "JAMACHA   69"  "2 "   1  0
         0
Bus_JM69S "Jamacha 69kV S Bus"  "BUS" "C"
         1 "EL CAJON  69"  "JAMACHA   69"  "1 "   1  0
         1 "MIGUEL    69"  "JAMACHA   69"  "1 "   1  0
         0
Bus_KY69E "Kearny 69kV E Bus"  "BUS" "C"
         1 "KEARNY    69"  "MISSION   69"  "1 "   1  0
         2 "KEARNY    69"  "KEAMDGT2  69"  "1 "   0
         2 "KEAMDGT2  69"  "KEARN2AB  12.50"  "1 "   0
         2 "KEAMDGT2  69"  "KEARN2CD  12.50"  "1 "   0
         0
Bus_KY69W "Kearny 69kV W Bus"  "BUS" "C"
         1 "KEARNY    69"  "CLARMTTP  69"  "1 "   1  0
         1 "KEARNY    69"  "GENDYNTP  69"  "1 "   1  0
         2 "KEARNY    69"  "KEAMDGT3  69"  "1 "   0
         2 "KEAMDGT3  69"  "KEARN3AB  12.50"  "1 "   0
         2 "KEAMDGT3  69"  "KEARN3CD  12.50"  "1 "   0
         0
Bus_LC69E "Los Coches 69kV E Bus"  "BUS" "C"
         1 "LOSCOCHS  69"  "GRANITTP  69"  "1 "   1  0
         1 "LOSCOCHS  69"  "ALPINE    69"  "1 "   1  0
         2 "LOSCOCHS 138"  "LOSCOCHS  69"  "2 "   0
         7
```

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         0
Bus_LC69W "Los Coches 69kV W Bus"  "BUS" "C"
         1 "CREELMAN  69"  "LOSCOCHS  69"  "1 "   1  0
         1 "EL CAJON  69"  "LOSCOCHS  69"  "1 "   1  0
         1 "LOSCOCHS  69"  "GRANITTP  69"  "1 "   1  0
         1 "LOSCOCHS  69"  "ELLIOTT   69"  "1 "   1  0
         2 "LOSCOCHS  69"  "LOSCOCHS 138"  "1 "   0
         7
         0
Bus_LI69S "Lilac 69kV S Bus"  "BUS" "C"
         1 "ESCNDIDO  69"  "LILAC     69"  "1 "   1  0
         1 "RINCON    69"  "LILAC     69"  "1 "   1  0
         0
Bus_LL69 "Loveland 69kV Bus"  "BUS" "C"
         1 "LOVELAND  69"  "ALPINE    69"  "1 "   1  0
         1 "LOVELAND  69"  "BARRETTP  69"  "1 "   1  0
         4 "LOVELAND  69"  "10"   0
         7
         0
Bus_LP69 "Las Pulgas 69kV Bus"  "BUS" "C"
         1 "LASPULGS  69"  "HORNO TP  69"  "1 "   1  0
         1 "STUARTTP  69"  "LASPULGS  69"  "1 "   1  0
         4 "LASPULGS  69"  "10"   0
         0
Bus_MG69 "Montgomery 69kV Bus"  "BUS" "C"
         1 "SOUTHBAY  69"  "MONTGMRY  69"  "1 "   1  0
         1 "MONTGMRY  69"  "MONTGYTP  69"  "1 "   1  0
         4 "MONTGMRY  69"  "10"   0
         7
         0
Bus_ML69N "Miguel 69kV N Bus"  "BUS" "C"
         1 "MIGUEL    69"  "GRANITTP  69"  "1 "   1  0
         1 "MIGUEL    69"  "JAMACHA   69"  "2 "   1  0
         7
         0
Bus_ML69S "Miguel 69kV S Bus"  "BUS" "C"
         1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
         1 "MIGUEL    69"  "JAMACHA   69"  "1 "   1  0
         1 "MIGUELTP  69"  "MIGUEL    69"  "1 "   1  0
         1 "PARADISE  69"  "MIGUEL    69"  "1 "   1  0
         7
         0
Bus_MN69 "Monserate 69kV S Bus"  "BUS" "C"
         1 "MONSRATE  69"  "MNSRATTP  69"  "1 "   1  0
         1 "MONSRATE  69"  "MORHILTP  69"  "1 "   1  0
         7
         0
Bus_MR69E "Miramar 69kV E Bus"  "BUS" "C"
         1 "MIRAMAR   69"  "PENSQTOS  69"  "1 "   1  0
         1 "MIRAMAR   69"  "SCRIPPS   69"  "1 "   1  0
         0
Bus_MR69W "Miramar 69kV W Bus"  "BUS" "C"
         1 "MIRAMAR   69"  "FENTONTP  69"  "1 "   1  0
         1 "MESA RIM  69"  "MIRAMAR   69"  "1 "   1  0
         7
         0
Bus_MRGT69 "Miramar1 (GT) 69kV Bus"  "BUS" "C"
         1 "MIRAMAR1  69"  "MIRAMRTP  69"  "1 "   1  0
         1 "MIRAMAR1  69"  "FENTONTP  69"  "1 "   1  0
         8 "MIRAMRGT  12.50"
         7
         0
Bus_MI69E "Main St 69kV E Bus"  "BUS" "C"
         1 "B         69"  "MAIN ST   69"  "2 "   1  0
         1 "SAMPSON   69"  "MAIN ST   69"  "1 "   1  0
         1 "WABASH    69"  "MAIN ST   69"  "1 "   1  0
         0
```

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Bus_MI69W "Main St 69kV W Bus"  "BUS" "C"
         1 "MAIN ST   69"  "URBAN     69"  "1 "   1  0
         1 "B         69"  "MAIN ST   69"  "1 "   1  0
         1 "SAMPSON   69"  "MAIN ST   69"  "2 "   1  0
         0
Bus_MS69N "Mission 69kV N Bus"  "BUS" "C"
         1 "KEARNY    69"  "MISSION   69"  "1 "   1  0
         1 "MISSION   69"  "CLAIRMNT  69"  "1 "   1  0
         1 "MISSION   69"  "F         69"  "1 "   1  0
         1 "MISSION   69"  "MURRAY    69"  "1 "   1  0
         0
Bus_MS69S "Mission 69kV S Bus"  "BUS" "C"
         1 "MESAHGTS  69"  "MISSION   69"  "1 "   1  0
         1 "MISSION   69"  "ELLIOTT   69"  "1 "   1  0
         1 "MISSION   69"  "F         69"  "2 "   1  0
         1 "MISSION   69"  "MURRAY    69"  "2 "   1  0
         2 "MISSION  138"  "MISSION   69"  "2 "   0
         0
Bus_MY69N "Murray 69kV N Bus"  "BUS" "C"
         1 "MISSION   69"  "MURRAY    69"  "1 "   1  0
         1 "MISSION   69"  "MURRAY    69"  "2 "   1  0
         0
Bus_NC69 "National City 69kV Bus"  "BUS" "C"
         1 "NATNLCTY  69"  "SWTWTRTP  69"  "1 "   1  0
         1 "NATNLCTY  69"  "WABASH    69"  "1 "   1  0
         4 "NATNLCTY  69"  "10"   0
         7
         0
Bus_NW69 "Narrows 69kV Bus"  "BUS" "C"
         8 "NARROWS   69"
         8 "BORREGO   69"
         0
Bus_OS69 "Oceanside 69kV Bus"  "BUS" "C"
         1 "OCEANSDE  69"  "SANLUSRY  69"  "1 "   1  0
         1 "OCEANSDE  69"  "OCNSDETP  69"  "1 "   1  0
         4 "OCEANSDE  69"  "10"   0
         7
         0
Bus_OY69 "Otay 69kV Bus"   "BUS" "C"
         1 "OTAY      69"  "OTAYLKTP  69"  "1 "   1  0
         1 "OTAY      69"  "OTAY  TP  69"  "1 "   1  0
         1 "SOUTHBAY  69"  "OTAY      69"  "1 "   1  0
         1 "SOUTHBAY  69"  "OTAY      69"  "2 "   1  0
         1 "OTAY 93   69"  "OTAY      69"  "1 "   1  0
         8 "OTAY_49 13.80"
         8 "OTAY      69"
         7
         0
#Bus_OY69 "Otay 69kV Bus"   "BUS" "C"
#        1 "OTAY      69"  "OTAYLKTP  69"  "1 "   1  0
#        1 "OTAY      69"  "OTAY  TP  69"  "1 "   1  0
#        1 "SOUTHBAY  69"  "OTAY      69"  "1 "   1  0
#        1 "SOUTHBAY  69"  "OTAY      69"  "2 "   1  0
#        1 "OTAY 93   69"  "OTAY      69"  "1 "   1  0
#        8 "OTAY 46A 13.80"
#        8 "OTAY_46B 13.80"
#        8 "OTAY      69"
#        7
#        0
Bus_PD69 "Paradise 69kV Bus"  "BUS" "C"
         1 "PARADISE  69"  "CHOLLAS   69"  "1 "   1  0
         1 "PARADISE  69"  "SUNYSDTP  69"  "1 "   1  0
         7
         0
Bus_PL69E "Point Loma 69kV E Bus"  "BUS" "C"
         1 "OLD TOWN  69"  "POINTLMA  69"  "2 "   1  0
         1 "CABRILLO  69"  "POINTLMA  69"  "1 "   1  0
```

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         0
Bus_PL69W "Point Loma 69kV W Bus"  "BUS" "C"
         1 "OLD TOWN  69"  "POINTLMA  69"  "1 "   1  0
         1 "CABRILLO  69"  "POINTLMA  69"  "2 "   1  0
         0
Bus_PO69 "Poway 69kV Bus"  "BUS" "C"
         1 "POWAY     69"  "WARCYNTP  69"  "1 "   1  0
         1 "POWAY     69"  "POMERADO  69"  "1 "   1  0
         7
         0
Bus_POM69E "Pomerado 69kV E Bus"  "BUS" "C"
         1 "POWAY     69"  "POMERADO  69"  "1 "   1  0
         1 "POMERADO  69"  "SYCAMORE  69"  "1 "   1  0
         0
Bus_PQ69NE "Penasquitos 69kV NE Bus"  "BUS" "C"
         1 "PENSQTOS  69"  "MIRAMRTP  69"  "1 "   1  0
         1 "PENSQTOS  69"  "GENESEE   69"  "2 "   1  0
         7
         0
Bus_PQ69NW "Penasquitos 69kV NW Bus"  "BUS" "C"
         1 "R.SNTATP  69"  "PENSQTOS  69"  "1 "   1  0
         1 "MIRAMAR   69"  "PENSQTOS  69"  "1 "   1  0
         7
         0
Bus_PQ69SE "Penasquitos 69kV SE Bus"  "BUS" "C"
         1 "PENSQTOS  69"  "ROSE CYN  69"  "1 "   1  0
         1 "PENSQTOS  69"  "MESA RIM  69"  "1 "   1  0
         1 "PENSQTOS  69"  "TOREYPNS  69"  "1 "   1  0
         0
Bus_PQ69SW "Penasquitos 69kV SW Bus"  "BUS" "C"
         1 "PENSQTOS  69"  "DELMARTP  69"  "1 "   1  0
         1 "DEL MAR   69"  "PENSQTOS  69"  "1 "   1  0
         7
         0
Bus_PV138 "Proctor Valley 138kV Bus"  "BUS" "C"
         1 "PRCTRVLY 138"  "MIGUEL   138"  "1 "   1  0
         1 "PRCTRVLY 138"  "TELECYN  138"  "1 "   1  0
         4 "PRCTRVLY 138"  "10"   0
         0
Bus_RIN69N "Rincon 69kV N Bus"  "BUS" "C"
         1 "RINCON    69"  "LILAC     69"  "1 "   1  0
         1 "WARNERS   69"  "RINCON    69"  "1 "   1  0
         0
Bus_RN69W "Rose Canyon 69kV W Bus"  "BUS" "C"
         1 "EASTGATE  69"  "ROSE CYN  69"  "1 "   1  0
         1 "LA JOLLA  69"  "ROSE CYN  69"  "1 "   1  0
         0
Bus_SA69N "San Luis Rey 69kV N Bus"  "BUS" "C"
         1 "MELROSE   69"  "SANLUSRY  69"  "1 "   1  0
         1 "OCNSDETP  69"  "SANLUSRY  69"  "1 "   1  0
         1 "PENDLETN  69"  "SANLUSRY  69"  "1 "   1  0
         7
         0
Bus_SA69S "San Luis Rey 69kV S Bus"  "BUS" "C"
         1 "SANLUSRY  69"  "OCEANSDE  69"  "1 "   1  0
         1 "MELRSETP  69"  "SANLUSRY  69"  "1 "   1  0
         1 "MORHILTP  69"  "SANLUSRY  69"  "1 "   1  0
         7
         0
Bus_SHBT "Shadow Ridge 138kV BusTIE"  "BUS" "C"
         1 "SHADOWR  138"  "ESCNDO50 138"  "1 "   1  0
         1 "CALAVRTP 138"  "SHADOWR  138"  "1 "   1  0
         4 "SHADOWR  138"  "10"   0
         8 "SHADOWR  138"
         0
Bus_SW69 "Sweetwater 69kV Bus      "  "BUS" "C"
         1 "SWEETWTR  69"  "CHOLLAS   69"  "1 "   1  0
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         1 "SWEETWTR  69"  "MIGUELTP  69"  "1 "   1  0
         1 "SWEETWTR  69"  "MONTGYTP  69"  "1 "   1  0
         1 "SOUTHBAY  69"  "SWEETWTR  69"  "1 "   1  0
         1 "SWTWTRTP  69"  "SWEETWTR  69"  "1 "   1  0
         8 "SWEETWTR  69"
         4 "SWEETWTR  69"  "10"   0
         7
         0
Bus_SY69N "Southbay 69kV N Bus"  "BUS" "C"
         1 "SOUTHBAY  69"  "SWEETWTR  69"  "1 "   1  0
         1 "SOUTHBAY  69"  "OTAY      69"  "1 "   1  0
         1 "SOUTHBAY  69"  "IMPRLBCH  69"  "1 "   1  0
         0
Bus_SY69S "Southbay 69kV S Bus"  "BUS" "C"
         1 "SOUTHBAY  69"  "MONTGMRY  69"  "1 "   1  0
         1 "SOUTHBAY  69"  "OTAY      69"  "2 "   1  0
         1 "SOUTHBAY  69"  "MONTGYTP  69"  "1 "   1  0
         7
         0
Bus_SX69S "Sycamore 69kV S Bus"  "BUS" "C"
         1 "ARTESN    69"  "SYCAMORE  69"  "1 "   1  0
         1 "SYCAMORE  69"  "ELLIOTT   69"  "1 "   1  0
         1 "POMERADO  69"  "SYCAMORE  69"  "1 "   1  0
         0
Bus_ST69 "Santa Ysabel 69kV Bus"  "BUS" "C"
         1 "WARNERS   69"  "SANTYSBL  69"  "1 "   1  0
         1 "BLDCRKTP  69"  "SANTYSBL  69"  "1 "   1  0
         1 "SANTYSBL  69"  "CREELMAN  69"  "1 "   1  0
         4 "SANTYSBL  69"  "10"   0
         7
         0
Bus_TB138S "Trabuco 138kV S Bus"  "BUS" "C"
         1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
         1 "MARGARTA 138"  "TRABUCO  138"  "1 "   1  0
         0
Bus_VC69 "Valycntr 69kV Bus"  "BUS" "C"
         1 "VALCNTR   69"  "ASH   TP  69"  "1 "   1  0
         1 "RINCON    69"  "VALCNTR   69"  "1 "   1  0
         4 "VALCNTR   69"  "10"   0
         7
         0
Bus_WA69 "Wabash 69kV Bus"  "BUS" "C"
         1 "WABASH    69"  "MAIN ST   69"  "1 "   1  0
         1 "WABASH    69"  "NATNLCTY  69"  "1 "   1  0
         1 "WABASH    69"  "STREAMVW  69"  "1 "   1  0
         4 "WABASH    69"  "10"   0
         0
Bus_WR69 "Warners 69kV Bus"  "BUS" "C"
         8 "NARROWS   69"
         8 "BORREGO   69"
         1 "NARROWS   69"  "WARNERS   69"  "1 "   1  0
         1 "WARNERS   69"  "RINCON    69"  "1 "   1  0
         1 "WARNERS   69"  "SANTYSBL  69"  "1 "   1  0
         4 "WARNERS   69"  "10"   0
         0
##############################################################
#
# SDG&E Stuck Breaker Outages (Category C: Stuck Breaker)
# Note: Alphabetical Order
#
##############################################################
Bkr_EA2T "ENCINA 2T Breaker"  "BRKR" "C"
         1 "PENSQTOS 230"   "ENCINA   230"  "1 "  1  0
         3 "ENCINA 5  24"   "5 "   0
         0
Bkr_EA2W "ENCINA 2W Breaker"  "BRKR" "C"
         1 "ENCINA   230"  "SANLUSRY 230"  "1 "   1  0
```

```
         3 "ENCINA 5  24"  "5 "    0
         0
##########################################################
#
# SDG&E Common Structure Outages (Category C: N-2)
#
##########################################################
23003/13807 "line SA-EA & EA-NCW 230-138" "N-2" "C"
         1 "SANLUSRY 230"  "ENCINA   230"  "1 "   1  0
         1 "ENCINA   138"  "NORTHCTY 138"  "1 "   1  0
         0
23052/23007 "TA-SO 1 + 2          230KV"  "N-2" "C"
         1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
         1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
         0
23051/23011 "SX-PEN + PEN-EA-SA   230KV"  "N-2" "C"
         1 "SYCAMORE 230"  "PEN      230"  "1 "   1  0
         1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
         1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
         1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
         7
         0
230XX/23014 "PEN-ES 1/2           230KV"  "N-2" "C"
         1 "PEN      230"  "ESCNDIDO 230"  "1 "   1  0
         1 "PEN      230"  "ESCNDIDO 230"  "2 "   1  0           7
         0
23051A/6920A "SX-PEN 230KV + BE-AR 69KV"  "N-2" "C"
         1 "SYCAMORE 230"  "PEN      230"  "1 "   1  0
         1 "BERNARDO  69"  "ARTESN    69"  "1 "   1  0
         0
23051B/6920A "PEN-ES 230KV + BE-AR 69KV"  "N-2" "C"
         1 "PEN      230"  "ESCNDIDO 230"  "1 "   1  0
         1 "BERNARDO  69"  "ARTESN    69"  "1 "   1  0
         0
23051A/6920B "SX-PEN 230KV + AR-SX 69KV"  "N-2" "C"
         1 "SYCAMORE 230"  "PEN      230"  "1 "   1  0
         1 "ARTESN    69"  "SYCAMORE  69"  "1 "   1  0
         0
23051B/6920B "PEN-ES 230KV + AR-SX 69KV"  "N-2" "C"
         1 "PEN      230"  "ESCNDIDO 230"  "1 "   1  0
         1 "ARTESN    69"  "SYCAMORE  69"  "1 "   1  0
         0
23027/23028 "OT-MS 1/2            230KV"  "N-2" "C"
         1 "OLD TOWN 230"  "MISSION  230"  "1 "   1  0
         1 "OLD TOWN 230"  "MISSION  230"  "2 "   1  0
         0
23022/23021 "ML-SX + ML-MS        230KV"  "N-2" "C"
         1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
         1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         0
##########################################################
#
# SPS 7.0-SPECIAL PROTECTION SYSTEMS FOR BORDER  GENERATOR UNITS
# Outage of TL23021/22 can O/L TL640
# Trip Bporder Genration sequentially
#
##########################################################
23022/21a "line ML-SX + ML-MS 230KV"  "N-2" "C"
         1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
         1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3 "CALPK BD  13.80"  "1 "   0
#        3 "LRKSPBD1  13.80"  "1 "   0
#        3 "LRKSPBD2  13.80"  "2 "   0
         0
23022/21b "line ML-SX + ML-MS 230KV"  "N-2" "C"
         1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
         1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
```

```
         3 "CALPK BD  13.80"  "1 "   0
         3 "LRKSPBD1  13.80"  "1 "   0
#        3 "LRKSPBD2  13.80"  "2 "   0
         0
23022/21c "line ML-SX + ML-MS 230KV"  "N-2" "C"
         1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
         1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         3 "CALPK BD  13.80"  "1 "   0
         3 "LRKSPBD1  13.80"  "1 "   0
         3 "LRKSPBD2  13.80"  "2 "   0
         0
23022/23023 "ML-MS1+ ML-MS2 230KV"  "N-2" "C"
         1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
         1 "MIGUEL   230"  "MISSION  230"  "2 "   1  0
         0
23023/230XX "ML-MS2+ ML-SX1 230KV"  "N-2" "C"
         1 "MIGUEL   230"  "MISSION  230"  "2 "   1  0
         1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
         0
23021/41  "ML-SX 1/2        230KV"  "N-2" "C"
         1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
         1 "MIGUEL   230"  "SYCAMORE 230"  "2 "   1  0
         0
23012/13808 "PQ-EA 230KV + NCW-PQ 138KV"  "N-2" "C"
         1 "PENSQTOS 230"  "ENCINA   230"  "1 "   1  0
         1 "NORTHCTY 138"  "PENSQTOS 138"  "1 "   1  0
         0
23012/13807 "PQ-EA 230KV + EA-NCW 138KV"  "N-2" "C"
         1 "PENSQTOS 230"  "ENCINA   230"  "1 "   1  0
         1 "ENCINA   138"  "NORTHCTY 138"  "1 "   1  0
         0
23011/23003 "SA-EA 230KV + SA-ES-EA 230KV"  "N-2" "C"
         1 "SANLUSRY 230"  "ENCINA   230"  "1 "   1  0
         1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
         1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
         1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
         7
         0
23011/14 "SA-EA-PEN TO PAL-ES  230-138 kV"  "N-2" "C "
         1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
         1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
         1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
         1 "PEN      230"  "ESCNDIDO 230"  "1 "   1  0
         0
23011/13805 "ES-EA-SA + PAL-BQ 230/138KV"  "N-2" "C"
         1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
         1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
         1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
         1 "PALOMAR  138"  "BATIQTOS 138"  "1 "   1  0
         0
23011/13806 "ES-EA-SA + EA-PAL 230/138KV"  "N-2" "C"
         1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
         1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
         1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
         1 "ENCINA   138"  "PALOMAR  138"  "1 "   1  0
         0
23011/13825 "ES-EA-SA 230KV + BQ-CC-ES-NCM 138KV"  "N-2" "C"
         1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
         1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
         1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
         1 "BATIQTOS 138"  "SHADOWR  138"  "1 "   1  0
         1 "BATIQTOS 138"  "MDWLRKTP 138"  "1 "   1  0
         1 "CHCARITA 138"  "MDWLRKTP 138"  "1 "   1  0
         1 "CHCARITA 138"  "SHADOWR  138"  "1 "   1  0
         7
         0
23010/23002 "SA-SO 2 + SO-SA 3 230KV"  "N-2" "C"
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```
         1 "SANLUSRY 230"  "S.ONOFRE 230"  "1 "   1  0
         1 "SANLUSRY 230"  "S.ONOFRE 230"  "3 "   1  0
         0
23004/23001 "SA-MS 1 + SA-MS 2          230KV"  "N-2" "C"
         1 "SANLUSRY 230"  "MISSION  230"  "1 "   1  0
         1 "SANLUSRY 230"  "MISSION  230"  "2 "   1  0
         0
13813/14  "line SY-MI51 & SY-MI50    138 ck 1"  "N-2" "C"
         1 "SOUTHBAY 138"  "MAINST51 138"  "1 "   1  0
         1 "SOUTHBAY 138"  "MAINST50 138"  "1 "   1  0
         0
13813/15  "line SY-MI50 & SY-GRNT    138 ck 1"  "N-2" "C"
         1 "SOUTHBAY 138"  "MAINST51 138"  "1 "   1  0
         1 "GRNT HLL 138"  "SOUTHBAY 138"  "1 "   1  0
         0
13814/15  "line SY-MI50 & SY-GRNT    138 ck 1"  "N-2" "C"
         1 "SOUTHBAY 138"  "MAINST50 138"  "1 "   1  0
         1 "GRNT HLL 138"  "SOUTHBAY 138"  "1 "   1  0
         0
13837/13835 "CP-LNL + SMO-LNL 138KV"  "N-2" "C"
         1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
         1 "SANMATEO 138"  "LAGNA NL 138"  "1 "   1  0
         4 "LAGNA NL 138"  "10"   0
         0
13837/13834 "CP-LNL + CP-TB 138KV"  "N-2" "C"
         1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
         1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
         0
13836/13833 "TA-TB + TA-PI 138KV"  "N-2" "C"
         1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
         1 "TALEGA   138"  "PICO     138"  "1 "   1  0
         0
13835/13833 "TA-TB + LNL-SMO 138KV"  "N-2" "C"
         1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
         1 "LAGNA NL 138"  "SANMATEO 138"  "1 "   1  0
         0
13835/695 "LNL-SMO 138KV + CI-JA-TA 69KV"  "N-2" "C"
         1 "LAGNA NL 138"  "SANMATEO 138"  "1 "   1  0
         1 "CRSTNTS   69"  "TALEGATP  69"  "1 "   1  0
         1 "JAP MESA  69"  "TALEGATP  69"  "1 "   1  0
         1 "TALEGA    69"  "TALEGATP  69"  "1 "   1  0
         4 "CRSTNTS   69"  "10"   0
         7
         0
13834/13833 "TB-CP + TA-TB 138KV"  "N-2" "C"
         1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
         1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
         0
13833/13816 "PI-CP + TA-TB 138KV"  "N-2" "C"
         1 "PICO     138"  "CAPSTRNO 138"  "1 "   1  0
         1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
         0
13827/670 "FR-MS 138KV + MS-CM 69KV"   "N-2" "C"
         1 "FRIARS   138"  "MISSION  138"  "1 "   1  0
         1 "CLAIRMNT  69"  "MISSION   69"  "1 "   1  0
         0
13825/13802 "BQ-CC-NCM-ES + CAN-SH-SA 138KV"  "N-2" "C"
         1 "BATIQTOS 138"  "SHADOWR  138"  "1 "   1  0
         1 "BATIQTOS 138"  "MDWLRKTP 138"  "1 "   1  0
         1 "CHCARITA 138"  "MDWLRKTP 138"  "1 "   1  0
         1 "CHCARITA 138"  "SHADOWR  138"  "1 "   1  0
         1 "CALAVRTP 138"  "CANNON   138"  "1 "   1  0
         1 "CALAVRTP 138"  "SANLUSRY 138"  "1 "   1  0
         1 "CALAVRTP 138"  "SHADOWR  138"  "1 "   1  0
         7
         0
13821B/638 "CH-SX-SN 138KV + SAN VCNT-EL 69KV"  "N-2" "C"
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         1 "CARLTNHS 138"  "CARLTHTP 138"  "1 "   1  0
         1 "SYCAMORE 138"  "CARLTHTP 138"  "1 "   1  0
         1 "CARLTHTP 138"  "SANTEE   138"  "1 "   1  0
         7
         0
13824/13823 "LC-SY + SY-TC 138KV"  "N-2" "C"
         1 "LOSCOCHS 138"  "SOUTHBAY 138"  "1 "   1  0
         1 "TELECYN  138"  "SOUTHBAY 138"  "1 "   1  0
         0
13824/632  "LC-SY+ML-LC 138/69KV"  "N-2" "C"
         1 "LOSCOCHS 138"  "SOUTHBAY 138"  "1 "   1  0
         1 "MIGUEL    69"  "GRANITTP  69"  "1 "   1  0
         1 "LOSCOCHS  69"  "GRANITTP  69"  "1 "   1  0
         1 "GRANITE   69"  "GRANITTP  69"  "1 "   1  0
         7
         0
13824/13809 "PV-TC + LC-SY 138KV"  "N-2" "C"
         1 "PRCTRVLY 138"  "TELECYN  138"  "1 "   1  0
         1 "LOSCOCHS 138"  "SOUTHBAY 138"  "1 "   1  0
         0
13810B/670 "DB-FR-MIR 138KV + CM-MS-FV 69KV"   "N-2" "C"
         1 "DOUBLET  138"  "DOUBLTTP 138"  "1 "   1  0
         1 "DOUBLTTP 138"  "PENSQTOS 138"  "1 "   1  0
         1 "DOUBLTTP 138"  "FRIARS   138"  "1 "   1  0
         1 "CLAIRMNT  69"  "MISSION   69"  "1 "   1  0
         7
         0
13808/13804 "PQ-NCW + EA-BQ-PQ 138KV"  "N-2" "C"
         1 "NORTHCTY 138"  "PENSQTOS 138"  "1 "   1  0
         1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
         1 "BATIQTP  138"  "PENSQTOS 138"  "1 "   1  0
         1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
         7
         0
13804/13801 "EA-BQ-PQ + EA-CAN 138KV"   "N-2" "C"
         1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
         1 "BATIQTP  138"  "PENSQTOS 138"  "1 "   1  0
         1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
         1 "ENCINA   138"  "CANNON   138"  "1 "   1  0
         7
         0
13804/6906 "EA-BQ-PQ 138KV + MR-PQ 69KV"   "N-2" "C"
         1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
         1 "BATIQTP  138"  "PENSQTOS 138"  "1 "   1  0
         1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
         1 "MIRAMAR   69"  "PENSQTOS  69"  "1 "   1  0
         7
         0
13802/13801 "CAN-SA-SH + EA-CAN 138KV"   "N-2" "C"
         1 "CALAVRTP 138"  "CANNON   138"  "1 "   1  0
         1 "CALAVRTP 138"  "SANLUSRY 138"  "1 "   1  0
         1 "CALAVRTP 138"  "SHADOWR  138"  "1 "   1  0
         1 "ENCINA   138"  "CANNON   138"  "1 "   1  0
         4 "CANNON   138"  "10"   0
         0
13819/636   "LC-SN + LC-EL 138/69 KV "   "N-2" "C"
         1 "LOSCOCHS 138"  "SANTEE   138"  "1 "   1  0
         1 "LOSCOCHS  69"  "ELLIOTT   69"  "1 "   1  0
         0
13821/636   "CH-SX-SN+LC-EL 138/69 KV"   "N-2" "C"
         1 "CARLTNHS 138"  "CARLTHTP 138"  "1 "   1  0
         1 "SYCAMORE 138"  "CARLTHTP 138"  "1 "   1  0
         1 "CARLTHTP 138"  "SANTEE   138"  "1 "   1  0
         1 "LOSCOCHS  69"  "ELLIOTT   69"  "1 "   1  0
         7
         0
6924/6915 "POM-SX 1 + 2 69KV"   "N-2" "C"
```

```
         1 "POMERADO  69"  "SYCAMORE  69"  "2 "   1  0
         1 "POMERADO  69"  "SYCAMORE  69"  "1 "   1  0
         0
6906/675 "MR-PQ 69KV + PQ-MRM 69KV"   "N-2" "C"
         1 "MIRAMAR   69"  "PENSQTOS  69"  "1 "   1  0
         1 "PENSQTOS  69"  "MESA RIM  69"  "1 "   1  0
         0
643/627 "ML-JM 1 + 2 69KV"   "N-2" "C"
         1 "MIGUEL    69"  "JAMACHA   69"  "1 "   1  0
         1 "MIGUEL    69"  "JAMACHA   69"  "2 "   1  0
         0
##############################################################
#
# SET THE FOLLOWING LINE TO -1 TO STOP RUNNING CONTINGENCIES
# IN NEIGHBORING AREAS # OR INSERT # BEFORE -1 TO RUN
# SELECTED CONTINGENCIES IN NEIGHBORING AREAS
#
##############################################################
-1

first element type:

    0 = end of contingency
   -1 = end of all contingencies
    1 = Change line (secdd) status
    2 = Change tran status (tran)
    3 = Change gen status (if status     1, change generation = P)
    4 = Change load status(if status     1, change load = P, const pf)
    5 = Change shunt status
    6 = Change SVD status
    7 = reorder
    8 = isolate a bus
   11 = change dc converter status
   20 = run an epcl for a complex outage
##############################################################
#
# SPS 6.13      69kV TL695A at TA
# Prevent overloads on sections of TL 690/TL 692/TL695 following
# the common structure outage of TL23007 and TL 23052 (SONGS-TALEGA 1/2).
# Also designed to prevent o/l on Talega 138/69 kV Bk 50 and 69 kV TL 695
# following fault on San Luis Rey Bank 71. A stuck breaker condition
# (5W) will cause simultaneous loss of bank 70/71 at San Luis Rey.
# Such loading is likely to occur at high system loads and heavy SOS flow.
# A directional o/c relay is installed at Talega on TL 695 that will:
# trip TL 695 at Talega if loading on TL 695 into TA exceeds 7 MVA for
# 5 seconds, OR if loading on 69 kV TL 695 out of TA exceeds
# 30 MVA for 5 seconds.
#
##############################################################
23052/23007 "TA-SO 1 + 2 230KV"  "N-2" "C"
         1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
         1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
         4 "CRSTNTS   69"  "10"   0
         2 "TALEGA   138"  "TALEGA    69"  "1 "   1  0
         0
##############################################################
#
#                       OR
#
##############################################################
TL695RAS "SA5W TRIP TL695"  "BRKR" "C"
         2 "SANLUSRY  69"  "SANLUSRY 230"  "1 "  0
         2 "SANLUSRY  69"  "SANLUSRY 230"  "2 "  0
         2 "TALEGA   138"  "TALEGA    69"  "1 "  0
         0
##############################################################
#
```

```
# SPS 7.0-SPECIAL PROTECTION SYSTEMS FOR BORDER  GENERATOR UNITS
# Outage of TL644 O/L TL642
# No longer in-service
#
##########################################################
TL00644a "line SOUTHBAY to SWEETWTR  69 ck 1"  "N-1" "B"
         1 "SOUTHBAY  69"  "SWEETWTR  69"  "1 "   1  0
         3 "CALPK BD  13.80"  "1 "   0
#        3 "LRKSPBD1  13.80"  "1 "   0
#        3 "LRKSPBD2  13.80"  "1 "   0
         0
TL00644b "line SOUTHBAY to SWEETWTR  69 ck 1"  "N-1" "B"
         1 "SOUTHBAY  69"  "SWEETWTR  69"  "1 "   1  0
         3 "CALPK_BD  13.80"  "1 "   0
         3 "LRKSPBD1  13.80"  "1 "   0
#        3 "LRKSPBD2  13.80"  "1 "   0
         0
TL00644c "line SOUTHBAY to SWEETWTR  69 ck 1"  "N-1" "B"
         1 "SOUTHBAY  69"  "SWEETWTR  69"  "1 "   1  0
         3 "CALPK BD  13.80"  "1 "   0
         3 "LRKSPBD1  13.80"  "1 "   0
         3 "LRKSPBD2  13.80"  "1 "   0
         0
##########################################################
#
# SPS 6.12      69 kV TL 688 at LI
# directional o/c relay is installed at LI, which will
# trip LI load after 15 seconds if loading on 69 kV
# TL 688 into LI exceeds its 15-min ER of 74 MVA.
#
##########################################################
TL688RAS "SA5W TRIPS LI LOAD"  "BRKR" "C"
         2 "SANLUSRY  69"  "SANLUSRY 230"  "1 "  0
         2 "SANLUSRY  69"  "SANLUSRY 230"  "2 "  0
         4 "LILAC     69"  "10"   0
         0
##########################################################
```

# Transient Stability Contingency List

## 2008 Year/COD Model

# Category B

## Loss of a Single Component

tran_stab_list.txt

haa_ng_slo

```
* haa_ng_slo_post.swt
q 90 cod b.dyd
TIT 05  HAA-NG SLO
 MMC ISIS, post-project
 Fault bus at Hassayampa
 Trip Hassayampa - N. Gila 500 kV Line

RUN 20
*   Loss of Hassayampa - N. Gila Line
*   No series cap bypass
*
*   Fault bus at Hassayampa
*
FB   0.0 "HASSYAMP" 500.
*
*  Apply fault damping to each Palo Verde Unit
*
GFD   0.0 "PALOVRD1" 24. "1 "  0.072485
GFD   0.0 "PALOVRD2" 24. "1 "  0.072485
GFD   0.0 "PALOVRD3" 24. "1 "  0.072485
*
*   Clear fault at Hassayampa
CFB  4.0 "HASSYAMP" 500.
*
*   Trip Palo Verde - N. Gila 500 kV Line
*
DL   4.0 "HASSYAMP" 500. "N.GILA   " 500. "1 "
*
*  Remove fault damping to each Palo Verde Unit
*
GFD   4.0 "PALOVRD1" 24. "1 "  0.0
GFD   4.0 "PALOVRD2" 24. "1 "  0.0
GFD   4.0 "PALOVRD3" 24. "1 "  0.0
*
```

```
iv ml tji
* iv_ml_tji_slo_post.swt
q 90 cod b.dyd
TIT 05  IV-WNDFARMS SLO w/SPS
 MMC ISIS, post-project
 Fault bus at Imperial Valley
 IV-WNDFARMS 500kV SLO w/XTrip SPS TJI-MIGUEL

RUN 20
*
*   Imperial Valley - Miguel 500kV Line Out
*   With Cross Trip RAS, trip TJI-OTAYMESA
*   3-phase 4 cycle fault at Imperial Valley
*   No SC bypass
*
*   Fault bus at Inmperial Valley
FB  0.0  "IMPRLVLY" 500.
*
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY" 500.
*
*   Trip Imperial Valley - Miguel line
*
DL  4.0  "IMPRLVLY" 500. "WNDFARMS" 500. "1 "
*
*   Trip TDM and InterGen
*
TG   8.0 "INTBST  "  18. "**"
TG   8.0 "INTBCT  "  16. "**"
TG   8.0 "IV GEN1 "  21. "**"
TG   8.0 "IV GEN2 "  18. "**"
TG   8.0 "IV GEN3 "  18. "**"
*
*   Trip 23040
*
DL  120.0  "MIGUEL  " 230. "TJI-230 " 230. "1 "
*
*
```

```
oy ib sdro
* oy_ib_sdro_post.swt
q 90 cod B.dyd
TIT 05  TL623
 MMC ISIS, post-project
 Fault bus at OTAY 69
 Trip Otay-Imp Beach-San Ysidro 69 kV line

RUN 20
*
*   Otay-Imp Beach-San Ysidro 69 kV line out
*
*   3-phase 6 cycle fault at OTAY 69
*
*   Fault bus at OTAY
FB  0.0  "OTAY    "  69.
*
*   Clear faulted bus at otay 69
*
CFB 6.0  "OTAY    "  69.
*
*   Trip Otay-Imp Beach-San Ysidro 69 kV line
*
DL  6.0  "OTAY    "  69. "OTAY  TP"  69. "1 "
DL  6.0  "IMPRLBCH"  69. "OTAY  TP"  69. "1 "
DL  6.0  "SANYSDRO"  69. "OTAY  TP"  69. "1 "
*
*
*
```

```
pen ccuo
* pen_ccuo_post.swt
q 90 cod b.dyd
TIT 05  PALOMAR CC PLANT OUTAGE
 MMC ISIS, post-project
 Fault bus at PEN
 Trip PEN 1/2/3 UNITS

RUN 20
*
*   PALOMAR CC PLANT OUTAGE
*
*   3-phase 4 cycle fault at PEN
*
*   Fault bus at PEN
FB  0.0  "PEN     " 230.
*
*   Clear faulted bus at PEN
*
CFB 4.0  "PEN     " 230.
*
*   Trip all three PEN units
*
TG   4.0 "PEN ST  "  18. "**"
TG   4.0 "PEN CT2 "  18. "**"
TG   4.0 "PEN_CT1 "  18. "**"
*
*
```

```
ml bd
* ml_bd_post.swt
q 90 cod b.dyd
TIT 05  TL6910
 MMC ISIS, post-project
 Fault bus at BORDER 69
 Trip MIGUEL-BORDER 69 kV line

RUN 20
*
*   MIGUEL TO BORDER 69 kV line out
*
*   3-phase 6 cycle fault at BORDER 69
*
*
*   Fault bus at BORDER
FB  0.0  "BORDER  "  69.
*
*   Clear faulted bus at otay 69
*
CFB 6.0  "BORDER  "  69.
*
*   Trip Otay-Imp Beach-San Ysidro 69 kV line
*
DL  6.0  "MIGUEL  "  69. "BORDER  "  69. "1 "
*
*
```

```
oy bus
* oy_bus_post.swt
q 90 cod b.dyd
TIT 05  OTAY 93 BUS FAULT
 MMC ISIS, post-project
 Fault bus at OTAY_93

RUN 20
*
*   FAULT OTAY_93 69 kV BUS
*
*   3-phase 6 cycle fault at OTAY_93
*
*   Fault bus at OTAY
FB  0.0  "OTAY_93 "  69.
*
*   Clear faulted bus at project OTAY_93
*
CFB 6.0  "OTAY_93 "  69.
*
*
```

# Category C

## Loss of Two or More Components

tran_stab_list.txt

```
songs g2
* songs_g2_post.swt
q 90 cod b.dyd
TIT 05  SONGS DUO
 MMC ISIS, post-project
 Trip SONGS #2 & #3 units

RUN 20
*  Loss of 2 SONGS generators
*
*  Trip SONGS units #2 and #3
*
TG   0.0 "S.ONOFR2 "  22. "**"
TG   0.0 "S.ONOFR3 "  22. "**"
*
*
```

tran_stab_list.txt

```
sw bus
* sw_bus_post.swt
q 90 cod b.dyd
TIT 05  SW Bus outage
 MMC ISIS, post-project
 Fault bus at Sweetwater 69
 Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
 SW-SWTP 69 kV lines

RUN  2
*
*    SW-CS, SW-MLTP,SW-MGTP,SW-SY, SW-SWTP 69 kV lines
*
*   3-phase 6 cycle fault at SWEETWATER 69
*
*   Fault bus at SWEETWATER
FB  0.0  "SWEETWTR"  69.
*
*   Clear faulted bus at Sweetwater 69
*
CFB 6.0  "SWEETWTR"  69.
*
*   Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY, SW-SWTP 69 kV lines
*
DL  6.0  "SWEETWTR"  69. "CHOLLAS "  69. "1 "
DL  6.0  "SWEETWTR"  69. "MIGUELTP"  69. "1 "
DL  6.0  "SWEETWTR"  69. "MONTGYTP"  69. "1 "
DL  6.0  "SOUTHBAY"  69. "SWEETWTR"  69. "1 "
DL  6.0  "SWTWTRTP"  69. "SWEETWTR"  69. "1 "
MBL  6.0  "SWEETWTR"  69. "10"  "D"
*
*
```

tran_stab_list.txt

```
sy nbus
* sy_n_bus_post.swt
q 90 cod b.dyd
TIT 05  TL
 MMC ISIS, post-project
 Fault bus at Southbay 69
 Trip SY-SW/SY-OY/SY-IB 69 kV lines

RUN  20
*
*   SY-SW/SY-OY/SY-IB 69 kV lines out
*
*   3-phase 6 cycle fault at SOUTHBAY 69
*
*   Fault bus at SOUTHBAY 69
FB  0.0  "SOUTHBAY"  69.
*
*   Clear faulted bus at SOUTHBAY 69
*
CFB 6.0  "SOUTHBAY"  69.
*
*    69 kV line out
*
DL  6.0  "SOUTHBAY"  69. "SWEETWTR"  69. "1 "
DL  6.0  "SOUTHBAY"  69. "OTAY    "  69. "1 "
DL  6.0  "SOUTHBAY"  69. "IMPRLBCH"  69. "1 "
*
*
```

# Post Transient/Voltage Stability Contingency List

## 2008 Year/COD Model

```
##############################################################################
#       Cat A/B/C contingecy file for MMC ISIS, 7.1.9, hdt
##############################################################################
#
# Contingency Simulations
# The following 13 contingencies (1 no-distrubance, 9 Cat B, and 3 Cat C) will
be simulated and evaluated:
#
##############################################################################
#
# Cat A, No Disturbance
#
##############################################################################
0,,,,,,,,,,No Disturbance,0
-1
##############################################################################
#
# Cat B, SINLGE CONTINGENCIES
#
##############################################################################
#  HAA-NG 500 kV SLO
##############################################################################
1,   15090,"HASSYAMP 500.00",   22536,"N.GILA   500.00","1 ",,1,0,,HAA -
N.GILA  500.00 kV SLO,1
3,   26119,"ADELSVC  500.00",,,,"1 ",0,0,,,HAA - N.GILA  500.00 kV SLO,1
3,   26120,"MKTPSVC  500.00",,,,"1 ",0,0,,,HAA - N.GILA  500.00 kV SLO,1
-1
##############################################################################
# TL50001 IV-ML W/ SPS 6.1 NO X-TRIP
##############################################################################
1,   22360,"IMPRLVLY 500.00",   22888,"WNDFARMS 500.00","1 ",,1,0,,IV-ML
500kV/Gen Trip/SPS 6.1/NO X-TRIP,2
3,   26119,"ADELSVC  500.00",,,,"1 ",0,0,,,IV-ML 500kV/Gen Trip/SPS 6.1/NO X-
TRIP,2
3,   26120,"MKTPSVC  500.00",,,,"1 ",0,0,,,IV-ML 500kV/Gen Trip/SPS 6.1/NO X-
TRIP,2
3,   22996,"INTBST   18.000",,,,"2 ",0,0,,,IV-ML 500kV/Gen Trip/SPS 6.1/NO X-
TRIP,2
3,   22997,"INTBCT   16.000",,,,"1 ",0,0,,,IV-ML 500kV/Gen Trip/SPS 6.1/NO X-
TRIP,2
3,   22981,"IV GEN1  21.000",,,,"1 ",0,0,,,IV-ML 500kV/Gen Trip/SPS 6.1/NO X-
TRIP,2
3,   22982,"IV GEN2  18.000",,,,"2 ",0,0,,,IV-ML 500kV/Gen Trip/SPS 6.1/NO X-
TRIP,2
3,   22983,"IV GEN3  18.000",,,,"3 ",0,0,,,IV-ML 500kV/Gen Trip/SPS 6.1/NO X-
TRIP,2
-1
```

```
################################################################################
################
# TL50001 IV-WND W/ SPS 6.1 X-TRIP 23050
################################################################################
################
1,   22360,"IMPRLVLY 500.00",   22888,"WNDFARMS 500.00","1 ",,1,0,,IV-WND
500kV/Gen Trip/SPS 6.1/X-TRIP 23050,2A
1,   22356,"IMPRLVLY 230.00",   20118,"ROA-230  230.00","1 ",,1,0,,IV-WND
500kV/Gen Trip/SPS 6.1/X-TRIP 23050,2A
3,   22996,"INTBST   18.000",,,,"2 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2A
3,   22997,"INTBCT   16.000",,,,"1 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2A
3,   22981,"IV GEN1  21.000",,,,"1 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2A
3,   22982,"IV GEN2  18.000",,,,"2 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2A
3,   22983,"IV GEN3  18.000",,,,"3 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2A
3,   26119,"ADELSVC  500.00",,,,"1 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2A
3,   26120,"MKTPSVC  500.00",,,,"1 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2A
-1
################################################################################
################
# TL50001 WND-ML W/ SPS 6.1 X-TRIP 23050
################################################################################
################
1,   22360,"WNDFARMS 500.00",   22888,"MIGUEL   500.00","1 ",,1,0,,WND-ML
500kV/Gen Trip/SPS 6.1/X-TRIP 23050,2B
1,   22356,"IMPRLVLY 230.00",   20118,"ROA-230  230.00","1 ",,1,0,,WND-ML
500kV/Gen Trip/SPS 6.1/X-TRIP 23050,2B
3,   22996,"INTBST   18.000",,,,"2 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2B
3,   22997,"INTBCT   16.000",,,,"1 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2B
3,   22981,"IV GEN1  21.000",,,,"1 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2B
3,   22982,"IV GEN2  18.000",,,,"2 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2B
3,   22983,"IV GEN3  18.000",,,,"3 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2B
3,   26119,"ADELSVC  500.00",,,,"1 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2B
3,   26120,"MKTPSVC  500.00",,,,"1 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23050,2B
-1
```

post_tran_list.txt

```
################################################################################
################
# TL50001 IV-WND W/ SPS 6.1 X-TRIP 23040
################################################################################
################
1,   22360,"IMPRLVLY 500.00",   22888,"WNDFARMS 500.00","1 ",,1,0,,IV-WND
500kV/Gen Trip/SPS 6.1/X-TRIP 23040,2C
1,   22464,"MIGUEL   230.00",   20149,"TJI-230  230.00","1 ",,1,0,,IV-WND
500kV/Gen Trip/SPS 6.1/X-TRIP 23040,2C
3,   22996,"INTBST   18.000",,,,"2 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2C
3,   22997,"INTBCT   16.000",,,,"1 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2C
3,   22981,"IV GEN1  21.000",,,,"1 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2C
3,   22982,"IV GEN2  18.000",,,,"2 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2C
3,   22983,"IV GEN3  18.000",,,,"3 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2C
3,   26119,"ADELSVC  500.00",,,,"1 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2C
3,   26120,"MKTPSVC  500.00",,,,"1 ",0,0,,,IV-WND 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2C
-1
################################################################################
################
# TL50001 WND-ML W/ SPS 6.1 X-TRIP 23040
################################################################################
################
1,   22360,"WNDFARMS 500.00",   22888,"MIGUEL   500.00","1 ",,1,0,,WND-ML
500kV/Gen Trip/SPS 6.1/X-TRIP 23040,2D
1,   22464,"MIGUEL   230.00",   20149,"TJI-230  230.00","1 ",,1,0,,WND-ML
500kV/Gen Trip/SPS 6.1/X-TRIP 23040,2D
3,   22996,"INTBST   18.000",,,,"2 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2D
3,   22997,"INTBCT   16.000",,,,"1 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2D
3,   22981,"IV GEN1  21.000",,,,"1 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2D
3,   22982,"IV GEN2  18.000",,,,"2 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2D
3,   22983,"IV GEN3  18.000",,,,"3 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2D
3,   26119,"ADELSVC  500.00",,,,"1 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2D
3,   26120,"MKTPSVC  500.00",,,,"1 ",0,0,,,WND-ML 500kV/Gen Trip/SPS 6.1/X-
TRIP 23040,2D
-1
################################################################################
################
# TL6910 ML-BD 69 kV SLO
################################################################################
################
1,   22456,"MIGUEL    69.00",   22076,"BORDER    69.00","1 ",,1,0,,MIGUEL-
BORDER 69kV SLO,3
-1
```

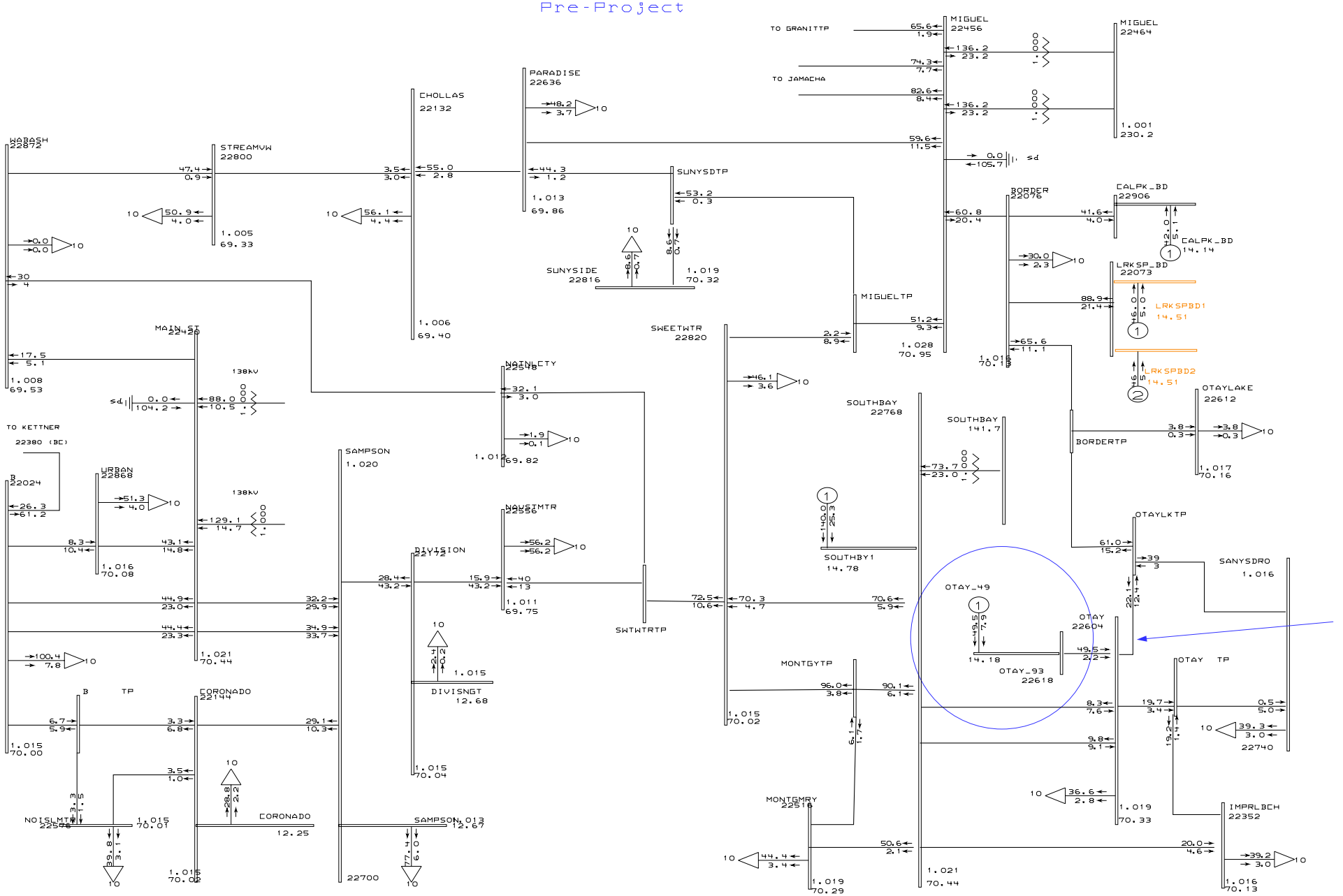
```
##############################################################################
################
# TL623 IB-OY-SYO 69 kV SLO
##############################################################################
################
1,   22352,"IMPRLBCH  69.00",   22608,"OTAY  TP  69.00","1 ",,1,0,,TL623 IB-
OY-SYO 69 kV SLO                ,4
1,   22604,"OTAY      69.00",   22608,"OTAY  TP  69.00","1 ",,1,0,,TL623 IB-
OY-SYO 69 kV SLO                ,4
1,   22740,"SANYSDRO  69.00",   22608,"OTAY  TP  69.00","1 ",,1,0,,TL623 IB-
OY-SYO 69 kV SLO                ,4
-1
##############################################################################
################
# PEN G-1 (CC TOTAL PLANT)
##############################################################################
################
3,   22262,"PEN CT1   18.00",,,,"1 ",0,0,,PEN G-1 (CC TOTAL PLANT)       ,5
3,   22263,"PEN CT2   18.00",,,,"2 ",0,0,,PEN G-1 (CC TOTAL PLANT)       ,5
3,   22265,"PEN_ST    18.00",,,,"3 ",0,0,,PEN G-1 (CC TOTAL PLANT)       ,5
3,   26119,"ADELSVC  500.00",,,,"1 ",0,0,,PEN G-1 (CC TOTAL PLANT)       ,5
3,   26120,"MKTPSVC  500.00",,,,"1 ",0,0,,PEN G-1 (CC TOTAL PLANT)       ,5
-1
```

```
##############################################################################
#
# Cat C, Two or more elements
#
##############################################################################
# G-2 SONGS DUO
##############################################################################
3,   24129,"S.ONOFR2  22.00",,,,"2 ",0,0,,SONGS DUO ,6
3,   24130,"S.ONOFR3  22.00",,,,"3 ",0,0,,SONGS DUO ,6
3,   26119,"ADELSVC  500.00",,,,"1 ",0,0,,SONGS DUO ,6
3,   26120,"MKTPSVC  500.00",,,,"1 ",0,0,,SONGS DUO ,6
-1
##############################################################################
# SWEETWATER 69 kV BUS OUTAGE
##############################################################################
1,   22132,"CHOLLAS   69.00",   22820,"SWEETWTR  69.00","1 ",,1,0,,SWEETWATER
69 kV BUS OUTAGE ,7
1,   22820,"SWEETWTR  69.00",   22476,"MIGUELTP  69.00","1 ",,1,0,,SWEETWATER
69 kV BUS OUTAGE ,7
1,   22820,"SWEETWTR  69.00",   22520,"MONTGYTP  69.00","1 ",,1,0,,SWEETWATER
69 kV BUS OUTAGE ,7
1,   22768,"SOUTHBAY  69.00",   22820,"SWEETWTR  69.00","1 ",,1,0,,SWEETWATER
69 kV BUS OUTAGE ,7
1,   22820,"SWEETWTR  69.00",   22824,"SWTWTRTP  69.00","1 ",,1,0,,SWEETWATER
69 kV BUS OUTAGE ,7
#4,,SWEETWTR"  69.00,,,,"10",0,0,,SWEETWATER 69 kV BUS OUTAGE ,7
-1
##############################################################################
# SOUTHBAY 69 kV N. BUS OUTAGE
##############################################################################
1,   22768,"SOUTHBAY  69.00",   22820,"SWEETWTR  69.00","1 ",,1,0,,SOUTHBAY 69
kV N. BUS OUTAGE ,8
1,   22768,"SOUTHBAY  69.00",   22604,"OTAY      69.00","1 ",,1,0,,SOUTHBAY 69
kV N. BUS OUTAGE ,8
1,   22768,"SOUTHBAY  69.00",   22352,"IMPRLBCH  69.00","1 ",,1,0,,SOUTHBAY 69
kV N. BUS OUTAGE ,8
-1
conend
```

# Appendix D

## Plot of SDG&E Southern 69 kV Transmission Network

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

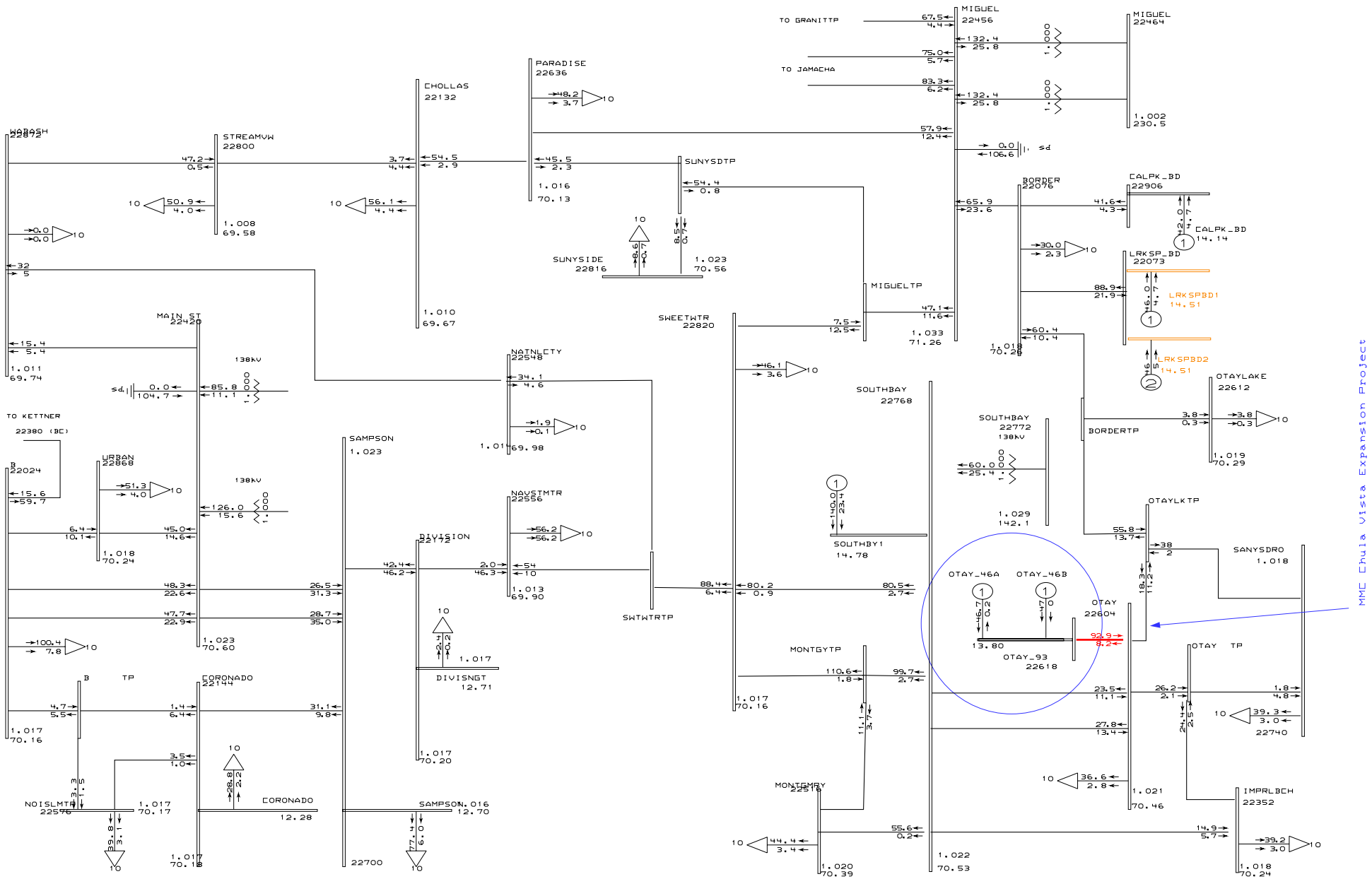



General Electric International, Inc. PSLF Program Tue Jan 23 14:38:34 2007 q_90_cod_g.sav

| | | |
|---|---|---|
| q_90_cod_g, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MW/MVAR |
| Pre SRPL, pre-project, 3 BD unit on | IVGens: dispatch approx 765 MW | metro_pre.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

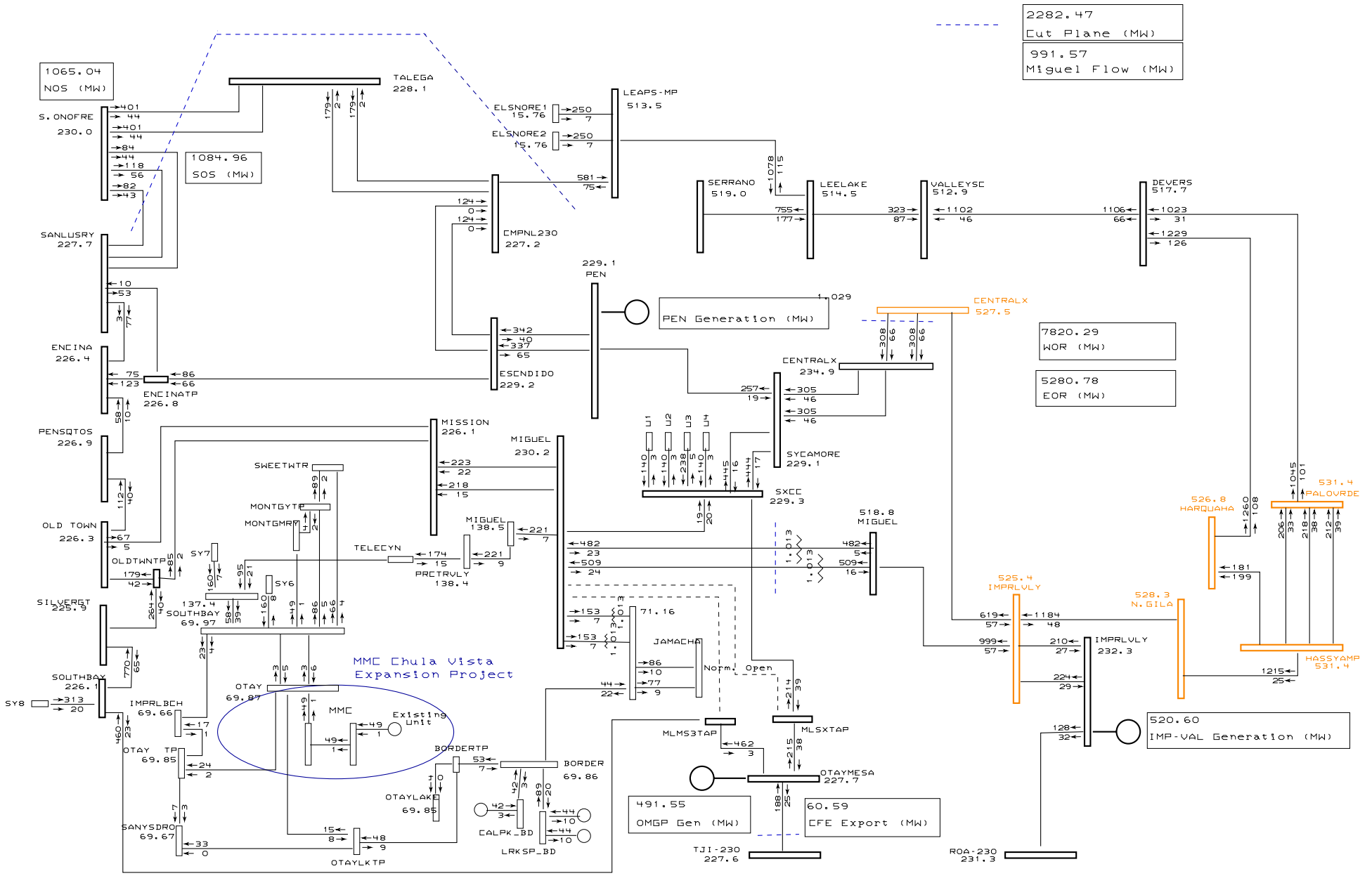
## Post-Project




General Electric International, Inc. PSLF Program Tue Jan 23 14:50:05 2007 case_h.sav

| | | |
|---|---|---|
| case_h, for qv: fr q_90_cod_g, SDGE LGIP case for Q90, yr 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MW/MVAR |
| Import +5%, Pre SRPL, post-project, 3 BD unit on | IVGens: dispatch approx 765 MW | metro_post.drw |
| HS peak, high SDGE gen/low SDGE cut plane/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

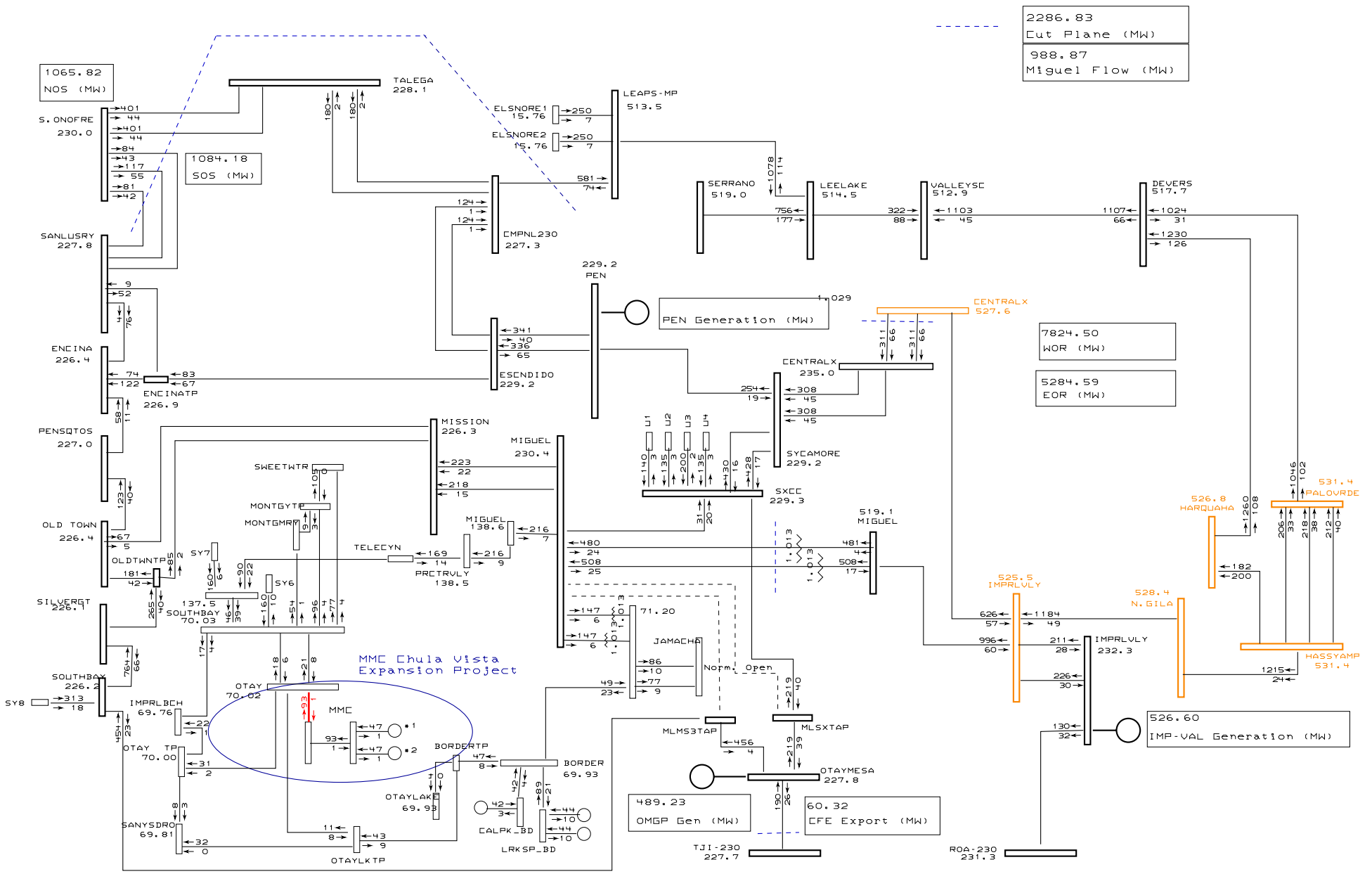



General Electric International, Inc. PSLF Program Tue Jan 23 14:25:55 2007 q_90_fya_7.sav

| | | | |
|---|---|---|---|
| | queue_90_7, SDGE LGIP case for Queue 90 | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW | MW/MVAR |
| | Post SRPL, year 2010, pre-project, 3 BD unit on | IVGens: dispatch approx 0 MW, Solar & IV off | mmc_area.drw |
| | HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

## Post-Project




General Electric International, Inc. PSLF Program Tue Jan 23 14:25:06 2007 q_90_fya_8.sav

queue_90_8, SDGE LGIP case for Queue 90

Post SRPL, year 2010, post-project, 3 BD unit on

HS peak, high SDGE gen/low SDGE imp/low EOR & WOR

CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW

IVGens: dispatch approx 0 MW, Solar & IV off

MW/MVAR

mmc_area_post.drw

Rating = 1

# Appendix E

## Cat A Thermal Contingency Results & Power Flow Plots

# Cat A Thermal Contingency Results

Interconnection System Impact Study
Queue 90, 93 MW Project
2008 Queued Time Frame, Commercial Operating Date Analysis
Thermal Transmission Constraints

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MVA1Trigger | >MVA1 | | | | | | | | | | | | | | | | |
| 0.9MVA1Trigger | (All) | | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | |
| Area | (All) | | | | | | | | | | | | | | Peak | Load | Low Otay Ld |
| Zone | (All) | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | | | Hi ML Flow | | 13.2 MW |
| LINE, TRAN, or ERROR | (All) | | | | < - - - - - - - - - Peak Load - - - - - - - - - - - > | | | | | | | | | | No SY Gen | | Hi SY Gen |
| Base or Cont | (All) | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| MVA1 pu Loading | | | | | | | C | a | s | e | N | a | m | e | | | |
| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | **cod_a** | **cod_b** | **cod_c** | **cod_d** | **cod_e** | **cod_f** | **cod_g** | **cod_h** | **cod_q** | **cod_r** | **cod_s** | **cod_t** | |
| **Category A** | | | | | | | | | | | | | | | | | |
| LINE OTAY 69kV-OTAY_93 69kV ck1 | Base system (n-0) | 64 | 64 | 1.00 | | 1.423 | | 1.425 | | 1.429 | | 1.428 | | 1.449 | | 1.421 | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2010 Queued Time Frame, Future Year Analysis
Thermal Transmission Constraints

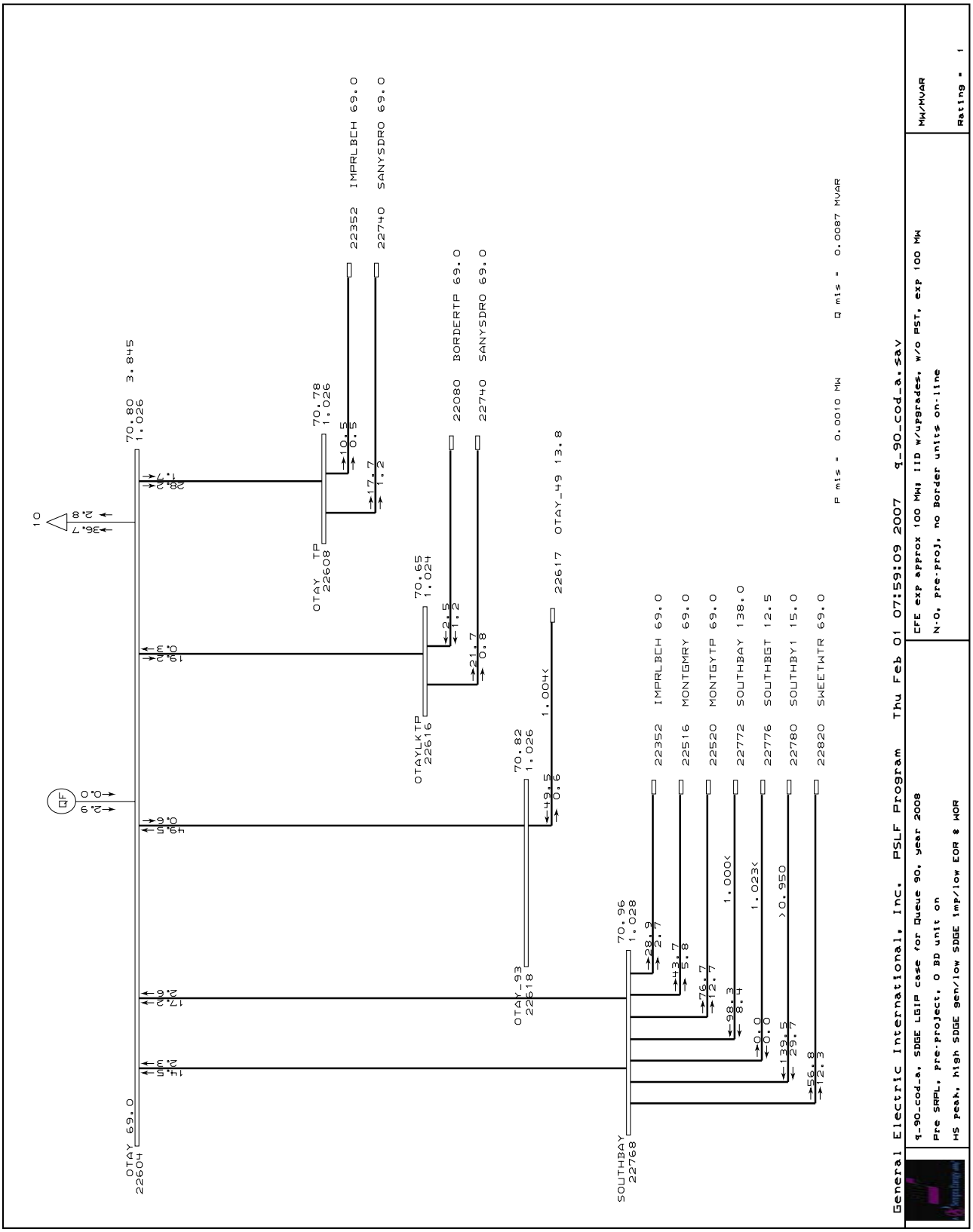
| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Contingency Type | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Peak | Load | Low Otay Ld | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | Hi ML Flow | | 13.2 MW | |
| | | | | | | | | | | | | | No SY Gen | | Hi SY Gen | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| MVA1 pu Loading | | | | | | | C | a | s | e | N | a | m | e | | |
| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | **fya_a** | **fya_b** | **fya_c** | **fya_d** | **fya_e** | **fya_f** | **fya_g** | **fya_h** | **fya_i** | **fya_j** | **fya_k** | **fya_l** |
| **Category A** | | | | | | | | | | | | | | | | |
| LINE BORREGO 69kV-NARROWS 69kV ck1 | Base system (n-0) | 12.5 | 14.5 | 1.16 | 1.023 | 1.025 | 1.028 | 1.023 | 1.028 | 1.026 | 1.027 | 1.026 | 1.011 | 1.02 | | |
| LINE OTAY 69kV-OTAY_93 69kV ck1 | Base system (n-0) | 64 | 64 | 1.00 | | 1.43 | | 1.43 | | 1.431 | | 1.431 | | 1.433 | | 1.428 |
| LINE SYCAMORE 69kV-SCRIPPS 69kV ck1 | Base system (n-0) | 102 | 130 | 1.27 | 1.017 | 1.014 | 1.007 | 1.015 | 1.019 | 1.015 | 1.015 | 1.009 | 1.012 | 1.017 | | |

# Cat A Thermal No Contingency Power Flow Plots

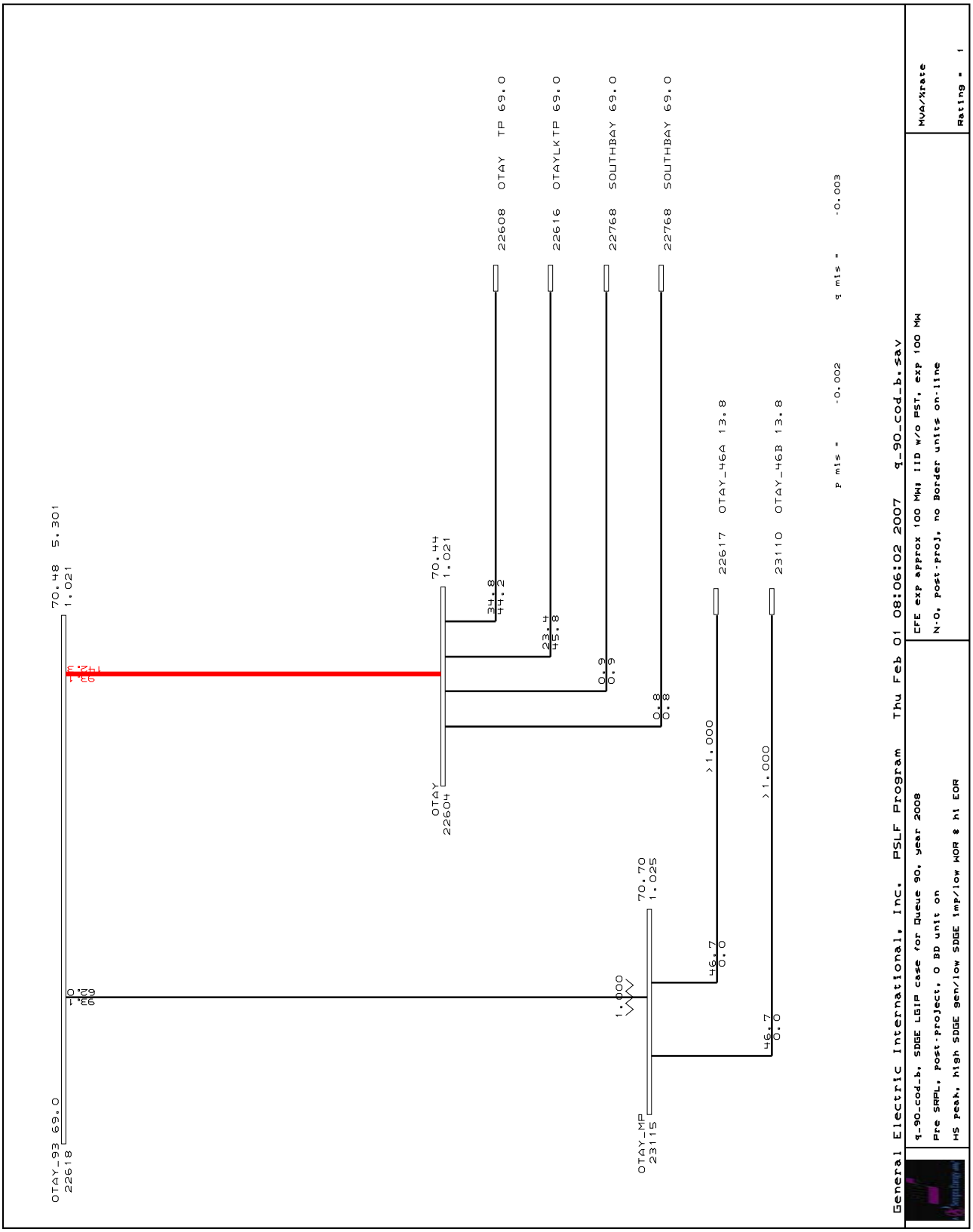
Plot of Project Local Area

Figure a: Pre-project, existing MMC unit on.


General Electric International, Inc. PSLF Program Thu Feb 01 07:59:09 2007 q_90_cod_a.sav
q_90_cod_a. SDGE LGIP case for Queue 90, year 2008
Pre SRPL, pre-project, 0 BD unit on
HS peak, high SDGE gen/low SDGE imp/low EOR & HOR
EFE exp approx 100 MW IID w/upgrades, w/o PST, exp 100 MW
N-0, pre-proj, no Border units on-line
MW/MVAR
Rating = 1
P mis = 0.0010 MW Q mis = 0.0087 MVAR
OTAY 69.0 22604
SOUTHBAY 22768
OTAY_93 22618
OTAYLKTP 22616
OTAY TP 22608
70.80 1.026 3.845
70.96 1.028
70.82 1.026
70.65 1.024
70.78 1.026
OTAY_49 13.8 22617
IMPRLBCH 69.0 22352
SANYSDRO 69.0 22740
BORDERTP 69.0 22080
MONTGMRY 69.0 22516
MONTGYTP 69.0 22520
SOUTHBAY 138.0 22772
SOUTHBGT 12.5 22776
SOUTHBY1 15.0 22780
SWEETWTR 69.0 22820
QF
10

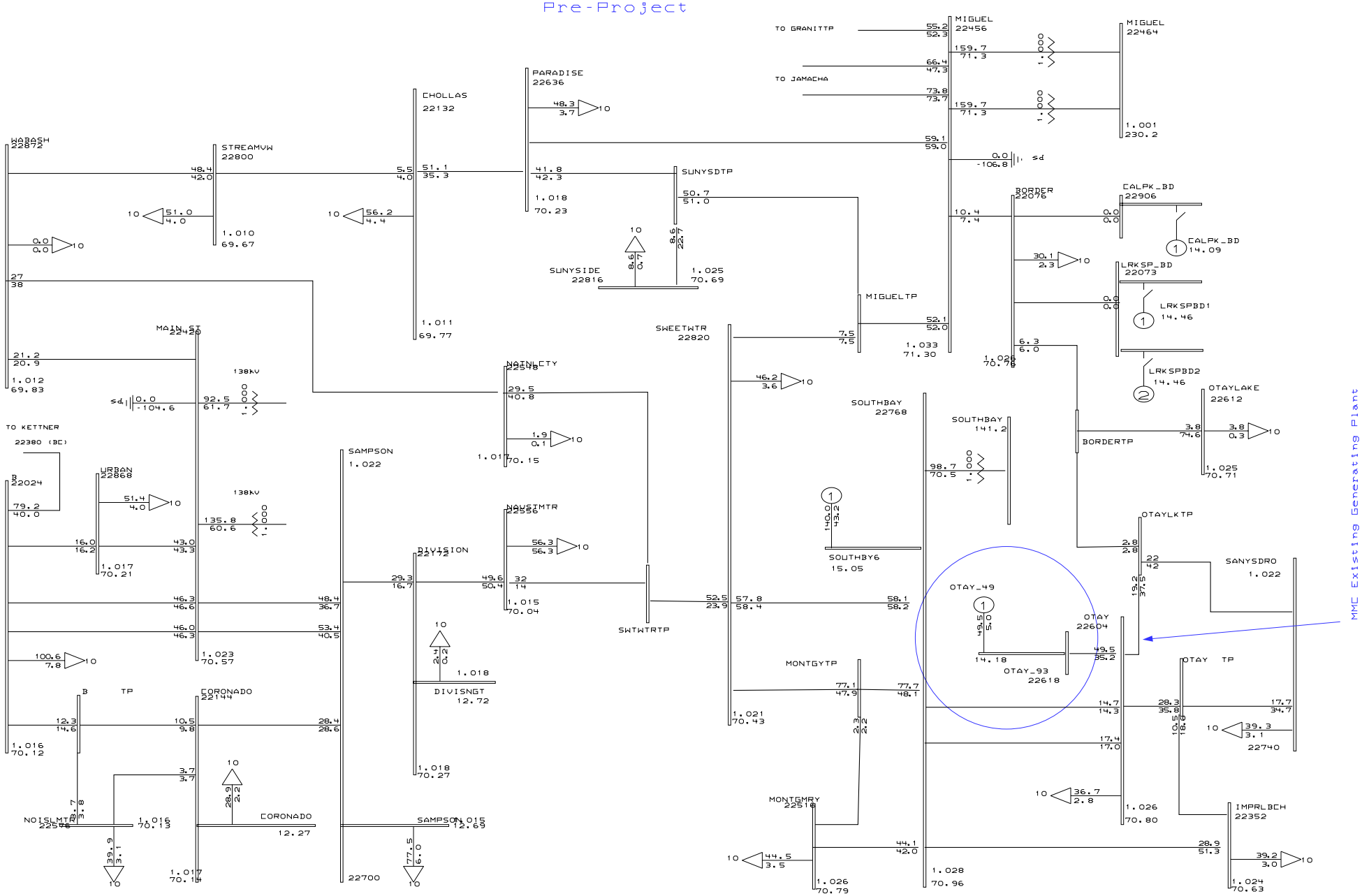
Plot of Project Local Area

Figure b: Post-project, proposed two MMC units on, O/L on TL6929.


OTAY_93 69.0
22618
70.48 5.301
1.021
92.1
142.3
92.1
1.000
OTAY_MP
23115
70.70
1.025
46.7
0.0
46.7
0.0
>1.000
>1.000
22617 OTAY_46A 13.8
23110 OTAY_46B 13.8
OTAY
22604
70.44
1.021
34.8
44.2
23.4
45.8
0.9
0.9
0.8
0.8
22608 OTAY TP 69.0
22616 OTAYLKTP 69.0
22768 SOUTHBAY 69.0
22768 SOUTHBAY 69.0
p mis = -0.002 q mis = -0.003
General Electric International, Inc. PSLF Program Thu Feb 01 08:06:02 2007 q_90_cod_b.sav
q_90_cod_b, SDGE LGIP case for Queue 90, year 2008
Pre SRPL, post-project, 0 BD unit on
HS peak, high SDGE gen/low SDGE imp/low WOR & h1 EOR
EFE exp approx 100 MW IID w/o PST, exp 100 MW
N-0, post-proj, no Border units on-line
MVA/%rate
Rating = 1

# Plots of SDG&E Southern 69 kV System

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

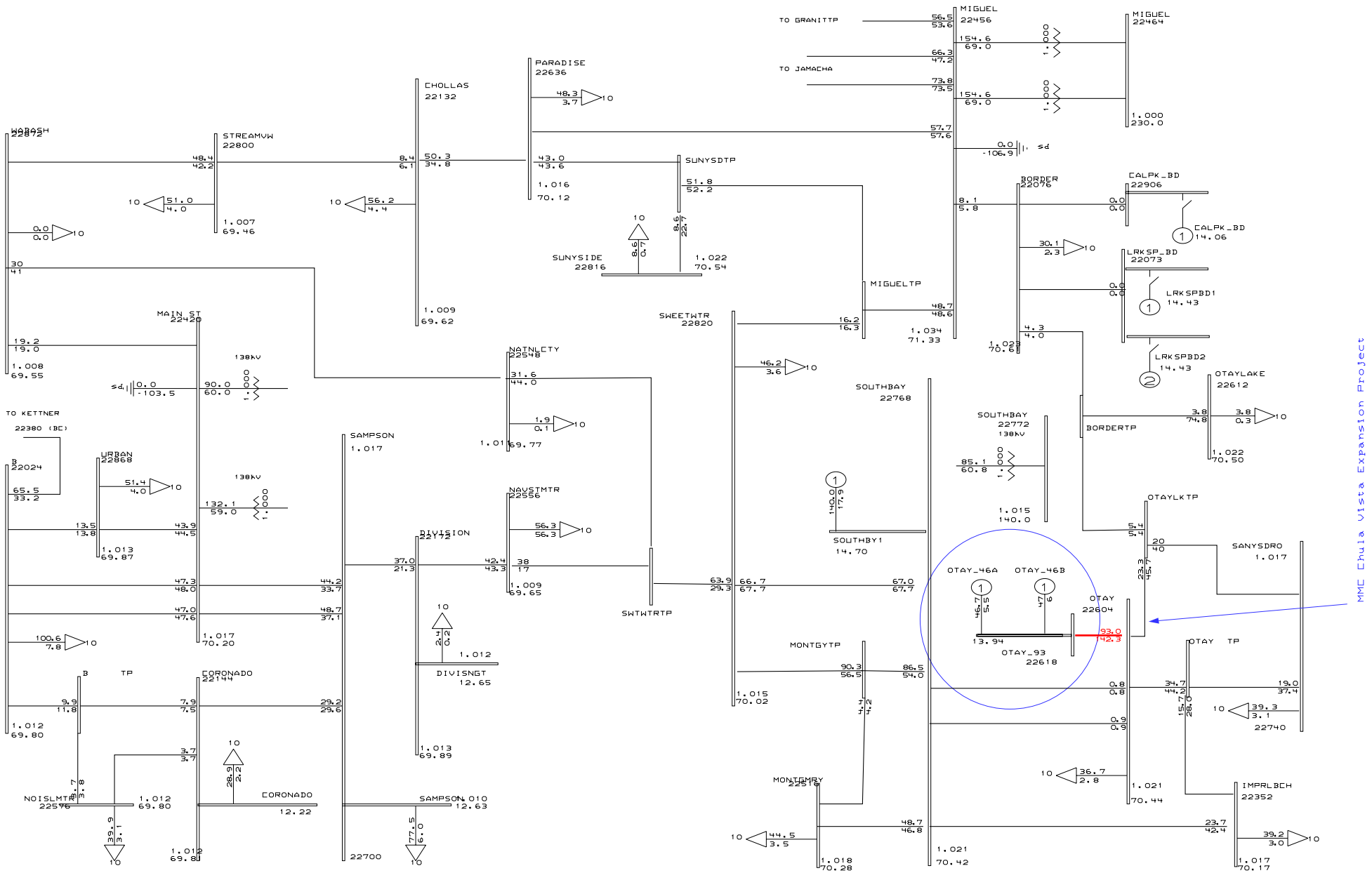



General Electric International, Inc. PSLF Program Wed Jan 24 10:47:31 2007 q_90_cod_a.sav

| | | |
|---|---|---|
| q_90_cod_a, SDGE LGIP case for Queue 90, year 2008<br>Pre SRPL, pre-project, O BD unit on<br>HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | CFE exp approx 100 MW; IID w/upgrades, w/o PST, exp 100 MW<br>N-0 | MVA/%rate<br>metro_pre.drw<br>Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

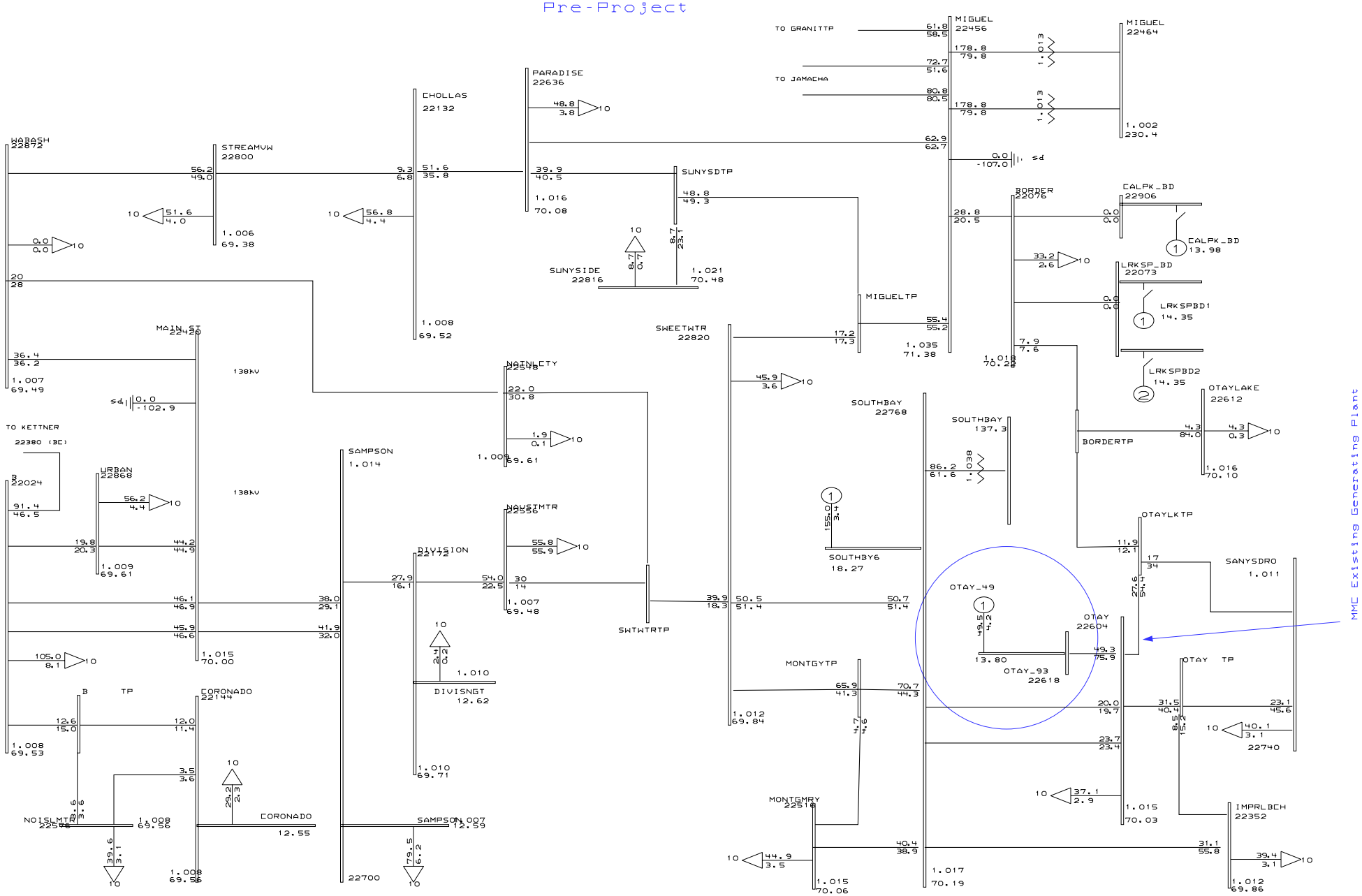
## Post-Project




General Electric International, Inc. PSLF Program Wed Jan 24 10:48:34 2007 q_90_cod_b.sav

| | | |
|---|---|---|
| q_90_cod_b, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, post-project, 0 BD unit on | N-0 | metro_post.drw |
| HS peak, high SDGE gen/low SDGE imp/low WOR & hi EOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

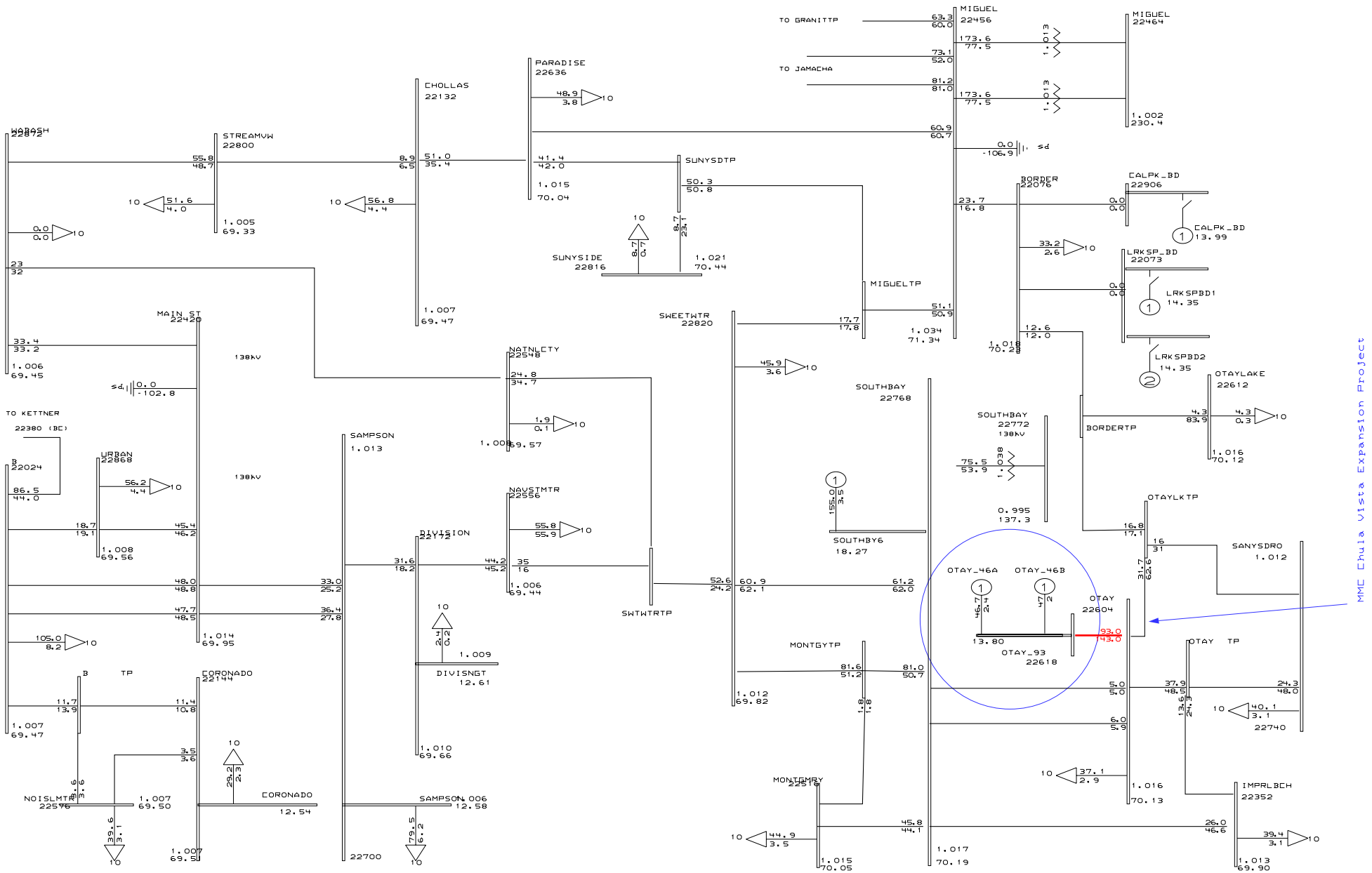



General Electric International, Inc. PSLF Program Wed Jan 24 10:45:59 2007 q_90_fya_1.sav

| | | |
|---|---|---|
| queue_90_1, SDGE LGIP case for Queue 90 | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW | MVA/%rate |
| Post SRPL, year 2010, pre-project, 0 BD unit on | N-0 | metro_pre.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

## Post-Project




General Electric International, Inc. PSLF Program Wed Jan 24 10:45:15 2007 q_90_fya_2.sav

| | | |
|---|---|---|
| queue_90_2, SDGE LGIP case for Queue 90<br>Post SRPL, year 2010, post project, O BD on<br>HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW<br>N-0 | MVA/%rate<br>metro_post.drw<br>Rating = 1 |

# Appendix F

## Cat B Thermal Contingency Results & Power Flow Plots

# Cat B Thermal Contingency Results

Interconnection System Impact Study
Queue 90, 93 MW Project
2008 Queued Time Frame, Commercial Operating Date Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | | | | | | | | | | | Peak | Load | Low Otay Ld | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | | | Hi ML Flow | | 13.2 MW | |
| | | | | | < - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | | | No SY Gen | | Hi SY Gen | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | | | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | | |
| MVA1 pu Loading | | | | | | | C | a | s | e | N | a | m | e | | | | |
| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | **cod_a** | **cod_b** | **cod_c** | **cod_d** | **cod_e** | **cod_f** | **cod_g** | **cod_h** | **cod_q** | **cod_r** | **cod_s** | **cod_t** | | |
| **Category B** | | | | | | | | | | | | | | | | | | |
| LINE BORDER 69kV-BORDERTP 69kV ck1 | line MIGUEL to BORDER 69 ck 1 | 103 | 103 | 1.00 | | | | | | | 1.241 | 1.241 | | | 1.381 | 1.381 | | |
| LINE BORREGO 69kV-NARROWS 69kV ck1 | line IV-ML 500kV SPS 6.8D | 12.5 | 14.5 | 1.16 | | | | | | | | | 1.058 | 1.036 | | | | |
| | line SANTYSBL to CREELMAN 69 ck 1 | 12.5 | 14.5 | 1.16 | 1.03 | 1.016 | 1.029 | 1.016 | 1.03 | 1.017 | 1.028 | 1.028 | 1.019 | 1.013 | | | | |
| | line WARNERS to SANTYSBL 69 ck 1 | 12.5 | 14.5 | 1.16 | 1.04 | 1.04 | 1.041 | 1.044 | 1.044 | 1.044 | 1.042 | 1.042 | 1.031 | 1.027 | | | | |
| LINE CALAVRTP 138kV-SHADOWR 138kV ck1 | line IV-ML 500kV SPS 6.8D | 112 | 112 | 1.00 | | | | | | | | | 1.048 | 1.026 | | | | |
| LINE CREELMAN 69kV-SYCAMORE 69kV ck1 | line CARLTNHS-SANTEE 138 | 71 | 71 | 1.00 | | | | | | | | | 1.094 | 1.075 | | | | |
| | line CREELMAN to LOSCOCHS 69 ck 1 | 71 | 71 | 1.00 | 1.03 | 1.024 | 1.031 | 1.022 | 1.03 | 1.026 | 1.032 | 1.032 | 1.037 | 1.033 | | | | |
| | line SOUTHBAY to MAINST50 138 ck 1 | 71 | 71 | 1.00 | | | | | | | | | 1.052 | 1.031 | | | | |
| LINE DIVISION 69kV-NAVSTMTR 69kV ck1 | line IV-ML 500kV SPS 6.8D | 97 | 100 | 1.03 | | | | | | | | | 1.016 | | | | | |
| | line MIGUEL to BORDER 69 ck 1 | 97 | 100 | 1.03 | | | | | | | | | 1.118 | | | | | |
| | tran MIGUEL 69 to MIGUEL 230 ck 1 | 97 | 100 | 1.03 | | | | | | | | | 1.07 | | | | | |
| | tran MIGUEL 69 to MIGUEL 230 ck 2 | 97 | 100 | 1.03 | | | | | | | | | 1.07 | | | | | |
| | tran SOUTHBAY 69 to SOUTHBAY 138 ck 1 | 97 | 100 | 1.03 | | | | | | | | | 1.195 | | | | | |
| LINE EASTGATE 69kV-ROSE CYN 69kV ck1 | line FENTONTP to FENTON 69 ck 1 | 50 | 50 | 1.00 | | | | | | | | | 1.09 | 1.064 | | | | |
| | line IV-ML 500kV SPS 6.8B | 50 | 50 | 1.00 | | | | | | | | | 1.054 | 1.031 | | | | |
| | line IV-ML 500kV SPS 6.8C | 50 | 50 | 1.00 | | | | | | | | | 1.043 | 1.015 | | | | |
| | line IV-ML 500kV SPS 6.8D | 50 | 50 | 1.00 | | | | | | | | | 1.178 | 1.123 | | | | |
| | line PACFCBCH to OLD TOWN 69 ck 1 | 50 | 50 | 1.00 | | | | | | | | | 1.035 | 1.021 | | | | |
| | line ROSE CYN to PENSQTOS 69 ck 1 | 50 | 50 | 1.00 | | | | | | | | | 1.242 | 1.213 | | | | |
| | line WNDFARMS-ML 500 kV SPS6.2B | 50 | 50 | 1.00 | | | | | | | | | 1.036 | 1.012 | | | | |
| LINE ELCENTRO 230kV-IMPRLVLY 230kV ck1 | line IV-ML 500kV SPS 6.8A | 215 | 259 | 1.20 | 1.35 | 1.35 | 1.348 | 1.35 | 1.348 | 1.35 | 1.35 | 1.348 | 1.575 | 1.567 | | | | |
| | line IV-ML 500kV SPS 6.8B | 215 | 259 | 1.20 | 1.40 | 1.405 | 1.403 | 1.405 | 1.403 | 1.405 | 1.404 | 1.403 | 1.71 | 1.701 | | | | |
| | line IV-ML 500kV SPS 6.8C | 215 | 259 | 1.20 | 1.43 | 1.43 | 1.428 | 1.429 | 1.428 | 1.429 | 1.429 | 1.428 | 1.319 | 1.314 | | | | |
| | line IV-ML 500kV SPS 6.8D | 215 | 259 | 1.20 | 1.48 | 1.485 | 1.483 | 1.485 | 1.484 | 1.485 | 1.485 | 1.484 | 1.447 | 1.44 | | | | |
| | line IV-WNDFARMS 500 kV SPS6.2A | 215 | 259 | 1.20 | | | | | | | | | 1.061 | 1.053 | | | | |
| | line WNDFARMS-ML 500 kV SPS6.2B | 215 | 259 | 1.20 | | | | | | | | | 1.077 | 1.066 | | | | |
| LINE ESCNDIDO 69kV-FELCTATP 69kV ck1 | line ESCNDIDO to FELICITA 69 ck 1 | 102 | 113 | 1.11 | | | | | | | | | 1.011 | | | | | |
| LINE GRANITE 69kV-GRANITTP 69kV ck1 | line EL CAJON to JAMACHA 69 ck 1 | 97 | 119 | 1.23 | | | | | | 1.012 | 1.039 | 1.046 | | | | | | |
| LINE GRNT HLL 138kV-SOUTHBAY 138kV ck1 | line SOUTHBAY to MAINST50 138 ck 1 | 310 | 434 | 1.40 | | | | | | | | | 1.123 | 1.056 | | | | |
| LINE KEARNY 69kV-MISSION 69kV ck1 | line MESAHGTS to MISSION 69 ck 1 | 97 | 129 | 1.33 | 1.08 | 1.086 | 1.083 | 1.095 | 1.091 | 1.085 | 1.079 | 1.078 | 1.027 | 1.025 | | | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2008 Queued Time Frame, Commercial Operating Date Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | cod_a | cod_b | cod_c | cod_d | cod_e | cod_f | cod_g | cod_h | cod_q | cod_r | cod_s | cod_t |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | | | | | | | | | Peak | Load | Low Otay Ld | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Hi ML Flow | | 13.2 MW | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | No SY Gen | | Hi SY Gen | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| LINE KETTNER 69kV-B 69kV ck1 | line IV-ML 500kV SPS 6.8B | 195 | 215 | 1.10 | | | | | | | | | 1.015 | | | |
| | line IV-ML 500kV SPS 6.8C | 195 | 215 | 1.10 | | | | | | | | | 1.007 | | | |
| | line IV-ML 500kV SPS 6.8D | 195 | 215 | 1.10 | | | | | | | | | 1.071 | 1.002 | | |
| | line PRCTRVLY to MIGUEL 138 ck 1 | 195 | 215 | 1.10 | | | | | | | | | 1.081 | 1.011 | | |
| | line PRCTRVLY to TELECYN 138 ck 1 | 195 | 215 | 1.10 | | | | | | | | | 1.043 | | | |
| | line SOUTHBAY to MAINST50 138 ck 1 | 195 | 215 | 1.10 | | | | | | | | | 1.149 | 1.078 | | |
| | tran MIGUEL 230 to MIGUEL 138 ck 1 | 195 | 215 | 1.10 | | | | | | | | | 1.081 | 1.011 | | |
| LINE MAINST51 138kV-SOUTHBAY 138kV ck1 | line GRNT HLL to SOUTHBAY 138 ck 1 | 150 | 150 | 1.00 | 1.02 | 1.003 | 1.01 | | | | | | | | | |
| | line OLD TOWN to KETTNER 69 ck 1 | 150 | 150 | 1.00 | 1.08 | 1.047 | 1.054 | 1.014 | 1.022 | | 1.003 | | 1.065 | | | |
| | line SOUTHBAY to MAINST50 138 ck 1 | 150 | 150 | 1.00 | 1.12 | 1.098 | 1.109 | 1.076 | 1.091 | 1.065 | 1.078 | 1.027 | | | | |
| | tran OLD TOWN 69 to OLD TOWN 230 ck 1 | 150 | 150 | 1.00 | 1.01 | | | | | | | | | | | |
| | tran OLD TOWN 69 to OLD TOWN 230 ck 2 | 150 | 150 | 1.00 | 1.01 | | | | | | | | | | | |
| | tran SOUTHBAY 69 to SOUTHBAY 138 ck 1 | 150 | 150 | 1.00 | 1.07 | 1.024 | 1.043 | | 1.011 | | | | | | | |
| LINE MELRSETP 69kV-SANLUSRY 69kV ck1 | line MELROSE to SANLUSRY 69 ck 1 | 97 | 102 | 1.05 | 1.02 | 1.051 | 1.054 | 1.077 | 1.079 | 1.077 | 1.077 | 1.076 | 1.032 | 1.058 | | |
| LINE MESAHGTS 69kV-MISSION 69kV ck1 | line KEARNY to MISSION 69 ck 1 | 97 | 136 | 1.40 | 1.15 | 1.156 | 1.155 | 1.165 | 1.162 | 1.155 | 1.15 | 1.149 | 1.096 | 1.095 | | |
| LINE MIGUEL 230kV-TJI-230 230kV ck1 | line WNDFARMS-ML 500 kV SPS6.1A | 796 | 830 | 1.04 | | | | | | | | | 1.029 | 1.023 | | |
| LINE MIGUEL 69kV-BORDER 69kV ck1 | line LONESTAR to BORDERTP 69 ck 1 | 136 | 143 | 1.05 | | | | | | | | | | | 1.046 | 1.046 |
| LINE MIGUEL 69kV-JAMACHA 69kV ck1 | line MIGUEL to JAMACHA 69 ck 2 | 97 | 136 | 1.40 | 1.01 | 1.011 | 1.042 | 1.036 | 1.064 | 1.118 | 1.144 | 1.149 | 1.146 | 1.147 | | |
| LINE MIGUELTP 69kV-MIGUEL 69kV ck1 | line DIVISION to NAVSTMTR 69 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.001 | | | |
| | line KETTNER to B 69 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.033 | | | |
| | line LONESTAR to BORDERTP 69 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.082 | 1.011 | | |
| | line MIGUEL to BORDER 69 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.017 | | | |
| | line OLD TOWN to KETTNER 69 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.095 | 1.033 | | |
| | line PARADISE to MIGUEL 69 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.257 | 1.19 | | |
| | line PRCTRVLY to MIGUEL 138 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.109 | 1.05 | | |
| | line PRCTRVLY to TELECYN 138 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.078 | 1.019 | | |
| | line SOUTHBAY to MAINST50 138 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.487 | 1.409 | | |
| | line TELECYN to SOUTHBAY 138 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.034 | | | |
| | tran MIGUEL 230 to MIGUEL 138 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.109 | 1.05 | | |
| | tran SOUTHBAY 69 to SOUTHBAY 138 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.005 | | | |
| LINE MISSION 138kV-GRNT HLL 138kV ck1 | line SOUTHBAY to MAINST50 138 ck 1 | 310 | 434 | 1.40 | | | | | | | | | 1.192 | 1.125 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2008 Queued Time Frame, Commercial Operating Date Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Peak Hi ML Flow No SY Gen | Load | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - - > | | | | | | | | | | | | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | cod_a | cod_b | cod_c | cod_d | cod_e | cod_f | cod_g | cod_h | cod_q | cod_r | cod_s | cod_t |
| LINE OLD TOWN 69kV-KETTNER 69kV ck1 | line IV-ML 500kV SPS 6.8A | 215 | 239 | 1.11 | | | | | | | | | 1.062 | 1.004 | | |
| | line IV-ML 500kV SPS 6.8B | 215 | 239 | 1.11 | | | | | | | | | 1.096 | 1.039 | | |
| | line IV-ML 500kV SPS 6.8C | 215 | 239 | 1.11 | | | | | | | | | 1.088 | 1.029 | | |
| | line IV-ML 500kV SPS 6.8D | 215 | 239 | 1.11 | | | | | | | | | 1.161 | 1.093 | | |
| | line IV-WNDFARMS 500 kV SPS6.2A | 215 | 239 | 1.11 | | | | | | | | | 1.05 | | | |
| | line MIGUEL to BORDER 69 ck 1 | 215 | 239 | 1.11 | | | | | | | | | 1.019 | | | |
| | line PRCTRVLY to MIGUEL 138 ck 1 | 215 | 239 | 1.11 | | | | | | | | | 1.164 | 1.102 | | |
| | line PRCTRVLY to TELECYN 138 ck 1 | 215 | 239 | 1.11 | | | | | | | | | 1.128 | 1.065 | | |
| | line SOUTHBAY to MAINST50 138 ck 1 | 215 | 239 | 1.11 | | | | | | | | | 1.232 | 1.167 | | |
| | line SOUTHBAY to MAINST51 138 ck 1 | 215 | 239 | 1.11 | | | | | | | | | 1.028 | | | |
| | line TELECYN to SOUTHBAY 138 ck 1 | 215 | 239 | 1.11 | | | | | | | | | 1.06 | | | |
| | line WNDFARMS-ML 500 kV SPS6.1A | 215 | 239 | 1.11 | | | | | | | | | 1.021 | | | |
| | line WNDFARMS-ML 500 kV SPS6.2B | 215 | 239 | 1.11 | | | | | | | | | 1.081 | 1.023 | | |
| | tran MIGUEL 69 to MIGUEL 230 ck 1 | 215 | 239 | 1.11 | | | | | | | | | 1.009 | | | |
| | tran MIGUEL 69 to MIGUEL 230 ck 2 | 215 | 239 | 1.11 | | | | | | | | | 1.009 | | | |
| | tran MIGUEL 230 to MIGUEL 138 ck 1 | 215 | 239 | 1.11 | | | | | | | | | 1.164 | 1.102 | | |
| LINE OTAY 69kV-OTAY_93 69kV ck1 | line DIVISION to NAVSTMTR 69 ck 1 | 64 | 64 | 1.00 | | | | | | | | | | 1.484 | | |
| | line IV-ML 500kV SPS 6.8B | 64 | 64 | 1.00 | | | | | | | | | | 1.487 | | |
| | line IV-ML 500kV SPS 6.8D | 64 | 64 | 1.00 | | | | | | | | | | 1.632 | | |
| | line PRCTRVLY to MIGUEL 138 ck 1 | 64 | 64 | 1.00 | | | | | | | | | | 1.494 | | |
| | line PRCTRVLY to TELECYN 138 ck 1 | 64 | 64 | 1.00 | | | | | | | | | | 1.483 | | |
| | line SOUTHBAY to MAINST50 138 ck 1 | 64 | 64 | 1.00 | | | | | | | | | | 1.524 | | |
| | line TELECYN to SOUTHBAY 138 ck 1 | 64 | 64 | 1.00 | | | | | | | | | | 1.484 | | |
| | line WNDFARMS-ML 500 kV SPS6.1A | 64 | 64 | 1.00 | | | | | | | | | | 1.504 | | |
| | line WNDFARMS-ML 500 kV SPS6.2B | 64 | 64 | 1.00 | | | | | | | | | | 1.486 | | |
| | tran MIGUEL 230 to MIGUEL 138 ck 1 | 64 | 64 | 1.00 | | | | | | | | | | 1.494 | | |
| LINE OTAY 69kV-OTAYLKTP 69kV ck1 | line MIGUEL to BORDER 69 ck 1 | 50 | 50 | 1.00 | | | | | | | 1.385 | 1.38 | 1.017 | 1.006 | 1.797 | 1.792 |
| LINE OTAYLKTP 69kV-BORDERTP 69kV ck1 | line MIGUEL to BORDER 69 ck 1 | 97 | 136 | 1.40 | | | | | | | 1.28 | 1.28 | 1.02 | 1.013 | 1.447 | 1.447 |
| LINE PARADISE 69kV-MIGUEL 69kV ck1 | line MIGUELTP to MIGUEL 69 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.089 | 1.057 | | |
| | line SOUTHBAY to MAINST50 138 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.143 | 1.102 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2008 Queued Time Frame, Commercial Operating Date Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | cod_a | cod_b | cod_c | cod_d | cod_e | cod_f | cod_g | cod_h | cod_q | cod_r | cod_s | cod_t |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | | | | | | | | | Peak Hi ML Flow No SY Gen | Load Hi SY Gen | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | | < - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | | | | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| LINE PENSQTOS 230kV-ENCINA 230kV ck1 | line IV-ML 500kV SPS 6.8A | 691 | 912 | 1.32 | | | | | | | | | 1.127 | 1.112 | | |
| | line IV-ML 500kV SPS 6.8B | 691 | 912 | 1.32 | | | | | | | | | 1.223 | 1.207 | | |
| | line IV-ML 500kV SPS 6.8C | 691 | 912 | 1.32 | | | | | | | | | 1.2 | 1.181 | | |
| | line IV-ML 500kV SPS 6.8D | 691 | 912 | 1.32 | 1.01 | | | | | | | | 1.362 | 1.328 | | |
| | line IV-WNDFARMS 500 kV SPS6.2A | 691 | 912 | 1.32 | | | | | | | | | 1.086 | 1.071 | | |
| | line WNDFARMS-ML 500 kV SPS6.2B | 691 | 912 | 1.32 | | | | | | | | | 1.172 | 1.156 | | |
| LINE PENSQTOS 69kV-DELMARTP 69kV ck1 | line PENSQTOS to TOREYPNS 69 ck 1 | 97 | 129 | 1.33 | 1.10 | 1.109 | 1.111 | 1.131 | 1.132 | 1.131 | 1.129 | 1.13 | 1.079 | 1.08 | | |
| LINE POMERADO 69kV-SYCAMORE 69kV ck1 | line POMERADO to SYCAMORE 69 ck 2 | 97 | 136 | 1.40 | 1.11 | 1.148 | 1.146 | 1.196 | 1.195 | 1.194 | 1.19 | 1.191 | | 1.002 | | |
| LINE POMERADO 69kV-SYCAMORE 69kV ck2 | line POMERADO to SYCAMORE 69 ck 1 | 97 | 136 | 1.40 | 1.11 | 1.149 | 1.148 | 1.197 | 1.197 | 1.195 | 1.192 | 1.192 | | 1.003 | | |
| LINE SANLUSRY 230kV-MISSION 230kV ck1 | line IV-ML 500kV SPS 6.8D | 456 | 557 | 1.22 | | | | | | | | | 1.061 | 1.034 | | |
| LINE SANLUSRY 230kV-MISSION 230kV ck2 | line IV-ML 500kV SPS 6.8D | 456 | 557 | 1.22 | | | | | | | | | 1.061 | 1.034 | | |
| LINE SANLUSRY 230kV-S.ONOFRE 230kV ck3 | line IV-ML 500kV SPS 6.8B | 796 | 1051 | 1.32 | | | | | | | | | 1.067 | 1.064 | | |
| | line IV-ML 500kV SPS 6.8C | 796 | 1051 | 1.32 | | | | | | | | | 1.042 | 1.038 | | |
| | line IV-ML 500kV SPS 6.8D | 796 | 1051 | 1.32 | | | | | | | | | 1.2 | 1.182 | | |
| | line WNDFARMS-ML 500 kV SPS6.2B | 796 | 1051 | 1.32 | | | | | | | | | 1.012 | 1.009 | | |
| LINE SANYSDRO 69kV-OTAYLKTP 69kV ck1 | line MIGUEL to BORDER 69 ck 1 | 50 | 50 | 1.00 | | | | | | | 1.122 | 1.127 | | | 1.017 | 1.023 |
| LINE SOUTHBAY 69kV-SWEETWTR 69kV ck1 | line MIGUEL to BORDER 69 ck 1 | 97 | 136 | 1.40 | | | | | | | | | | | 1.019 | 1.126 |
| | line MONTGMRY to MONTGYTP 69 ck 1 | 97 | 136 | 1.40 | 1.16 | 1.358 | 1.261 | 1.457 | 1.337 | 1.566 | 1.44 | 1.635 | | | 1.583 | 1.778 |
| LINE SWEETWTR 69kV-MIGUELTP 69kV ck1 | line SOUTHBAY to MAINST50 138 ck 1 | 97 | 100 | 1.03 | | | | | | | | | 1.076 | | | |
| LINE SWEETWTR 69kV-MONTGYTP 69kV ck1 | line MIGUEL to BORDER 69 ck 1 | 157 | 157 | 1.00 | | | | | | | | | | | | 1.011 |
| | line SOUTHBAY to SWEETWTR 69 ck 1 | 157 | 157 | 1.00 | | | | | | 1.046 | | 1.092 | | | 1.063 | 1.195 |
| LINE WARNERS 69kV-RINCON 69kV ck1 | line IV-ML 500kV SPS 6.8D | 32 | 32 | 1.00 | | | | | | | | | 1.007 | | | |
| TRAN ENCINA 5 24kV-ENCINA 230kV ck1 | line IV-ML 500kV SPS 6.8B | 355 | 355 | 1.00 | | | | | | | | | | 1.012 | | |
| | line IV-ML 500kV SPS 6.8C | 355 | 355 | 1.00 | | | | | | | | | | 1.003 | | |
| | line IV-ML 500kV SPS 6.8D | 355 | 355 | 1.00 | | | | | | | | | 1.031 | 1.031 | | |
| | line WNDFARMS-ML 500 kV SPS6.2B | 355 | 355 | 1.00 | | | | | | | | | | 1.004 | | |
| TRAN MIGUEL 230kV-MIGUEL 500kV ck2 | tran MIGUEL 230 to MIGUELMP 500 ck 1 | 1120 | 1344 | 1.20 | 1.06 | 1.059 | 1.059 | 1.057 | 1.058 | 1.056 | 1.058 | 1.057 | 1.276 | 1.281 | | |
| TRAN MIGUEL 230kV-MIGUELMP 500kV ck1 | tran MIGUEL 230 to MIGUEL 500 ck 2 | 1120 | 1329 | 1.19 | 1.07 | 1.07 | 1.07 | 1.068 | 1.069 | 1.068 | 1.069 | 1.068 | 1.29 | 1.295 | | |
| TRAN MIGUEL 500kV-MIGUELMP 500kV ck1 | tran MIGUEL 230 to MIGUEL 500 ck 2 | 1120 | 1329 | 1.19 | 1.07 | 1.068 | 1.067 | 1.066 | 1.066 | 1.065 | 1.067 | 1.066 | 1.285 | 1.291 | | |
| TRAN MIGUEL 69kV-MIGUEL 230kV ck1 | line SOUTHBAY to MAINST50 138 ck 1 | 224 | 305 | 1.36 | | | | | | | | | 1.085 | 1.048 | | |
| | tran MIGUEL 69 to MIGUEL 230 ck 2 | 224 | 305 | 1.36 | | | | | | | | | 1.087 | 1.06 | | |
| TRAN MIGUEL 69kV-MIGUEL 230kV ck2 | line SOUTHBAY to MAINST50 138 ck 1 | 224 | 305 | 1.36 | | | | | | | | | 1.085 | 1.048 | | |
| | tran MIGUEL 69 to MIGUEL 230 ck 1 | 224 | 305 | 1.36 | | | | | | | | | 1.087 | 1.06 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2008 Queued Time Frame, Commercial Operating Date Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | cod_a | cod_b | cod_c | cod_d | cod_e | cod_f | cod_g | cod_h | cod_q | cod_r | cod_s | cod_t |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | | | | | | | | | Peak | Load | Low Otay Ld | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Hi ML Flow | | 13.2 MW | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | No SY Gen | | Hi SY Gen | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| TRAN MISSION 138kV-MISSION 69kV ck2 | tran MISSION 138 to MISSION 69 ck 3 | 100 | 134 | 1.34 | | | | | | | 1.002 | | | | | |
| TRAN MISSION 230kV-MISSION 69kV ck1 | line SOUTHBAY to MAINST50 138 ck 1 | 224 | 305 | 1.36 | | | | | | | | | 1.028 | 1.013 | | |
| | tran MISSION 138 to MISSION 69 ck 1 | 224 | 305 | 1.36 | | | | | | | | | 1.014 | 1.003 | | |
| | tran MISSION 138 to MISSION 69 ck 3 | 224 | 305 | 1.36 | | | | | | | | | 1.017 | 1.006 | | |
| | tran MISSION 230 to MISSION 138 ck 1 | 224 | 305 | 1.36 | | | | | | | | | 1.013 | 1.002 | | |
| | tran MISSION 230 to MISSION 138 ck 2 | 224 | 305 | 1.36 | | | | | | | | | 1.013 | 1.002 | | |
| TRAN OLD TOWN 69kV-OLD TOWN 230kV ck1 | tran OLD TOWN 69 to OLD TOWN 230 ck 2 | 224 | 263 | 1.17 | | | | | | | | | 1.172 | 1.14 | | |
| TRAN OLD TOWN 69kV-OLD TOWN 230kV ck2 | tran OLD TOWN 69 to OLD TOWN 230 ck 1 | 224 | 239 | 1.07 | | | | | | | | | 1.172 | 1.14 | | |
| TRAN PEN_ST 18kV-PEN 230kV ck1 | line IV-ML 500kV SPS 6.8D | 235 | 235 | 1.00 | | | | | | | | | 1.025 | | | |
| TRAN SANLUSRY 69kV-SANLUSRY 230kV ck1 | tran SANLUSRY 69 to SANLUSRY 230 ck 2 | 224 | 269 | 1.20 | | | | | | | | | 1.034 | 1.043 | | |
| TRAN SANLUSRY 69kV-SANLUSRY 230kV ck2 | tran SANLUSRY 69 to SANLUSRY 230 ck 1 | 224 | 269 | 1.20 | | | | | | | | | 1.034 | 1.043 | | |
| TRAN SOUTHBAY 69kV-SOUTHBAY 138kV ck1 | gen SOUTHBY1 15.00 | 140 | 143 | 1.02 | 1.02 | | | | | | | | | | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2010 Queued Time Frame, Future Year Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Contingency Type | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | | | | | | | | | | Peak | Load | Low Otay Ld | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | | Hi ML Flow | | 13.2 MW | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | | No SY Gen | | Hi SY Gen | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | | Pre | Post | Pre | Post |
| MVA1 pu Loading | | | | | | | C | a | s | e | N | a | | m | e | | |
| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | **fya_a** | **fya_b** | **fya_c** | **fya_d** | **fya_e** | **fya_f** | **fya_g** | **fya_h** | | **fya_i** | **fya_j** | **fya_k** | **fya_l** |
| **Category B** | | | | | | | | | | | | | | | | | |
| LINE BORDER 69kV-BORDERTP 69kV ck1 | line MIGUEL to BORDER 69 ck 1 *assoc SPS | 103 | 103 | 1.00 | | | | | | | | | | | | 1.121 | 1.121 |
| LINE BORREGO 69kV-NARROWS 69kV ck1 | line SANTYSBL to CREELMAN 69 ck 1 | 12.5 | 14.5 | 1.16 | 1.053 | 1.054 | 1.059 | 1.052 | 1.058 | 1.056 | 1.057 | 1.055 | | | 1.049 | | |
| | line WARNERS to NARROWS 69 ck 1 | 12.5 | 14.5 | 1.16 | | 1.108 | | | | | | | | | | | |
| | line WARNERS to SANTYSBL 69 ck 1 | 12.5 | 14.5 | 1.16 | 1.09 | 1.091 | 1.094 | 1.095 | 1.097 | 1.096 | 1.097 | 1.095 | | 1.086 | 1.096 | | |
| LINE CREELMAN 69kV-SYCAMORE 69kV ck1 | line CARLTNHS-SANTEE-SX 138 | 71 | 71 | 1.00 | 1.084 | 1.071 | 1.066 | 1.059 | 1.055 | 1.042 | 1.041 | 1.025 | | 1.138 | 1.134 | | |
| | line CREELMAN to LOSCOCHS 69 ck 1 | 71 | 71 | 1.00 | 1.155 | 1.152 | 1.152 | 1.149 | 1.15 | 1.146 | 1.147 | 1.142 | | 1.154 | 1.159 | | |
| | line IV-ML 500kV SPS 6.8 | 71 | 71 | 1.00 | 1.047 | 1.037 | 1.03 | 1.028 | 1.023 | 1.012 | 1.011 | | | 1.128 | 1.126 | | |
| | line LOSCOCHS to SOUTHBAY 138 ck 1 | 71 | 71 | 1.00 | | | | | | | | | | 1.009 | 1.009 | | |
| | line PENSQTOS to SYCAMORE 230 | 71 | 71 | 1.00 | | | | | | | | | | 1.01 | 1.008 | | |
| | line PRCTRVLY to MIGUEL 138 ck 1 | 71 | 71 | 1.00 | | | | | | | | | | 1.028 | 1.026 | | |
| | line PRCTRVLY to TELECYN 138 ck 1 | 71 | 71 | 1.00 | | | | | | | | | | 1.015 | 1.013 | | |
| | line SANTEE to LOSCOCHS 138 ck 1 | 71 | 71 | 1.00 | | | | | | | | | | 1.053 | 1.049 | | |
| | line SYCAMORE to SCRIPPS 69 ck 1 | 71 | 71 | 1.00 | | | | | | | | | | 1.03 | 1.028 | | |
| | tran LOSCOCHS 69 to LOSCOCHS 138 ck 2 | 71 | 71 | 1.00 | 1.005 | | | | | | | | | 1.039 | 1.037 | | |
| | tran LOSCOCHS 138 to LOSCOCHS 69 ck 1 | 71 | 71 | 1.00 | 1.007 | | | | | | | | | 1.041 | 1.039 | | |
| | tran MIGUEL 230 to MIGUEL 138 ck 1 | 71 | 71 | 1.00 | | | | | | | | | | 1.028 | 1.026 | | |
| | tran SYCAMORE 230 to SYCAMORE 138 ck 1 | 71 | 71 | 1.00 | 1.015 | 1.003 | | | | | | | | 1.053 | 1.051 | | |
| | line IV-ML 500kV IV Generator SPS6.1 | 71 | 71 | 1.00 | 1.024 | 1.013 | 1.007 | 1.005 | | | | | | 1.093 | 1.091 | | |
| | line IV-ML 500kV IV Generator SPS6.2 | 71 | 71 | 1.00 | 1.034 | 1.023 | 1.017 | 1.015 | 1.01 | | | | | 1.113 | 1.111 | | |
| LINE DIVISION 69kV-NAVSTMTR 69kV ck1 | Border Gen SPS- TL6910 c | 97 | 100 | 1.03 | | | | | | | | | | 1.078 | | | |
| | line IV-ML 500kV SPS 6.8 | 97 | 100 | 1.03 | | | | | | | | | | 1.095 | | | |
| | tran SOUTHBAY 69 to SOUTHBAY 138 ck 1 | 97 | 100 | 1.03 | | | | | | | | | | 1.12 | | | |
| | line IV-ML 500kV IV Generator SPS6.1 | 97 | 100 | 1.03 | | | | | | | | | | 1.124 | | | |
| | line IV-ML 500kV IV Generator SPS6.2 | 97 | 100 | 1.03 | | | | | | | | | | 1.092 | | | |
| LINE GRANITE 69kV-GRANITTP 69kV ck1 | line EL CAJON to JAMACHA 69 ck 1 | 97.5 | 137 | 1.40 | | 1.014 | 1.019 | 1.02 | 1.035 | 1.044 | 1.049 | 1.057 | | 1.001 | 1.018 | | |
| LINE KEARNY 69kV-MISSION 69kV ck1 | line MESAHGTS to MISSION 69 ck 1 | 97 | 129 | 1.33 | 1.199 | 1.2 | 1.196 | 1.213 | 1.213 | 1.214 | 1.216 | 1.216 | | 1.181 | 1.192 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2010 Queued Time Frame, Future Year Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Contingency Type | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | fya_a | fya_b | fya_c | fya_d | fya_e | fya_f | fya_g | fya_h | fya_i | fya_j | fya_k | fya_l |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Peak Hi ML No SY Gen | Load Flow | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | | | | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| LINE MELRSETP 69kV-SANLUSRY 69kV ck1 | line ESCNDIDO to SANMRCOS 69 ck 1 | 97 | 102 | 1.05 | | | 1.003 | 1.003 | 1.004 | 1.003 | 1.004 | 1.003 | | 1.004 | | |
| | line MELROSE to SANLUSRY 69 ck 1 | 97 | 102 | 1.05 | 1.088 | 1.09 | 1.09 | 1.091 | 1.091 | 1.091 | 1.092 | 1.092 | 1.11 | 1.119 | | |
| LINE MESAHGTS 69kV-MISSION 69kV ck1 | line KEARNY to MISSION 69 ck 1 | 97 | 136 | 1.40 | 1.27 | 1.272 | 1.268 | 1.284 | 1.285 | 1.285 | 1.287 | 1.287 | 1.252 | 1.263 | | |
| LINE MIGUEL 69kV-JAMACHA 69kV ck1 | line CHOLLAS to SPRNGVLY 69 ck 1 | 97 | 136 | 1.40 | | | | | | 1.004 | 1.013 | 1.024 | | 1.002 | | |
| | line GRANITE to GRANITTP 69 ck 1 | 97 | 136 | 1.40 | | | | | 1.004 | 1.008 | 1.024 | 1.027 | 1.042 | 1.052 | | |
| | line MIGUEL to JAMACHA 69 ck 2 | 97 | 136 | 1.40 | 1.107 | 1.114 | 1.136 | 1.135 | 1.162 | 1.165 | 1.186 | 1.188 | 1.216 | 1.227 | | |
| | line ML-MS 1&2 230kV SPS6.4 a | 97 | 136 | 1.40 | | | | | | | | | 1.001 | 1.01 | | |
| | line ML-MS 1&2 230kV SPS6.4 b | 97 | 136 | 1.40 | | | | | | | | | | 1.006 | | |
| LINE MIGUELTP 69kV-MIGUEL 69kV ck1 | line ML-MS 1&2 230kV SPS6.4 a | 97 | 136 | 1.40 | | | | | | | | | 1.018 | | | |
| | line ML-MS 1&2 230kV SPS6.4 b | 97 | 136 | 1.40 | | | | | | | | | 1.013 | | | |
| | line ML-MS 1&2 230kV SPS6.4 c | 97 | 136 | 1.40 | | | | | | | | | 1.002 | | | |
| | line PARADISE to MIGUEL 69 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.206 | 1.158 | | |
| | line BRDR-BRDRTP-OYTP-OY-SYO 69 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.023 | | | |
| LINE OTAY 69kV-OTAY_93 69kV ck1 | line IMPRLVLY to CENTRALX 230 | 64 | 64 | 1.00 | | | | | | | | | | 1.47 | | |
| | line IV-ML 500kV SPS 6.8 | 64 | 64 | 1.00 | | | | | | | | | | 1.469 | | |
| | tran SOUTHBAY 69 to SOUTHBAY 138 ck 1 | 64 | 64 | 1.00 | | | | | | | | | | 1.477 | | |
| LINE OTAY 69kV-OTAYLKTP 69kV ck1 | line IMPRLBCH-OTAYTP-SYO 69 ck 1 | 50 | 50 | 1.00 | | 1.072 | | | | | | | | | | |
| | line MIGUEL to BORDER 69 ck 1 *assoc SPS | 50 | 50 | 1.00 | | | | | | | 1.032 | 1.03 | 1.034 | 1.026 | 1.467 | 1.462 |
| LINE OTAYLKTP 69kV-BORDERTP 69kV ck1 | line MIGUEL to BORDER 69 ck 1 *assoc SPS | 97 | 136 | 1.40 | | | | | | | | | | | 1.169 | 1.169 |
| LINE PARADISE 69kV-MIGUEL 69kV ck1 | line MIGUELTP to MIGUEL 69 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.08 | 1.062 | | |
| LINE PENSQTOS 69kV-DELMARTP 69kV ck1 | line PENSQTOS to TOREYPNS 69 ck 1 | 97 | 129 | 1.33 | 1.132 | 1.133 | 1.13 | 1.136 | 1.138 | 1.137 | 1.138 | 1.137 | 1.115 | 1.124 | | |
| LINE PENSQTOS 69kV-MESA RIM 69kV ck1 | line SYCAMORE to SCRIPPS 69 ck 1 | 97 | 136 | 1.40 | 1.057 | 1.059 | 1.053 | 1.06 | 1.063 | 1.061 | 1.062 | 1.06 | 1.048 | 1.056 | | |
| LINE POMERADO 69kV-SYCAMORE 69kV ck1 | line POMERADO to SYCAMORE 69 ck 2 *assoc SPS | 97 | 136 | 1.40 | 1.352 | 1.35 | 1.354 | 1.356 | 1.356 | 1.355 | 1.356 | 1.354 | 1.306 | 1.319 | | |
| LINE POMERADO 69kV-SYCAMORE 69kV ck2 | line POMERADO to SYCAMORE 69 ck 1 *assoc SPS | 97 | 136 | 1.40 | 1.353 | 1.352 | 1.355 | 1.357 | 1.358 | 1.356 | 1.357 | 1.355 | 1.308 | 1.32 | | |
| LINE POWAY 69kV-POMERADO 69kV ck1 | line ARTESN to SYCAMORE 69 ck 1 | 97 | 136 | 1.40 | 1.081 | 1.078 | 1.082 | 1.086 | 1.085 | 1.083 | 1.084 | 1.082 | 1.027 | 1.038 | | |
| | line ESCNDIDO to ESCO 69 ck 1 | 97 | 136 | 1.40 | 1.007 | 1.006 | 1.008 | 1.011 | 1.011 | 1.01 | 1.011 | 1.009 | | | | |
| | line SYCAMORE to PEN 230 ck 1 | 97 | 136 | 1.40 | 1.032 | 1.028 | 1.031 | 1.031 | 1.031 | 1.029 | 1.029 | 1.025 | | | | |
| | line SYCAMORE to SCRIPPS 69 ck 1 | 97 | 136 | 1.40 | 1.025 | 1.023 | 1.024 | 1.029 | 1.028 | 1.027 | 1.027 | 1.025 | | | | |
| LINE PRCTRVLY 138kV-MIGUEL 138kV ck1 | line ML-MS 1&2 230kV SPS6.4 a | 392 | 468 | 1.19 | | | | | | | | | 1.025 | 1.019 | | |
| | line ML-MS 1&2 230kV SPS6.4 b | 392 | 468 | 1.19 | | | | | | | | | 1.018 | 1.013 | | |
| | line ML-MS 1&2 230kV SPS6.4 c | 392 | 468 | 1.19 | | | | | | | | | 1.004 | | | |
| LINE SHADOWR 138kV-ESCNDO50 138kV ck1 | line CANNON-SANLUSRY-SHADOWR 138 *assoc. SPS | 63 | 73 | 1.16 | 1.213 | 1.213 | 1.187 | 1.187 | 1.188 | 1.187 | 1.188 | 1.187 | 1.178 | 1.188 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2010 Queued Time Frame, Future Year Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Contingency Type | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | fya_a | fya_b | fya_c | fya_d | fya_e | fya_f | fya_g | fya_h | fya_i | fya_j | fya_k | fya_l |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Peak Load Hi ML Flow No SY Gen | | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | | | | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| LINE SILVERGT 230kV-OLD TOWN 230kV ck1 | line OLD TOWN to MISSION 230 ck 2 | 456 | 588 | 1.29 | 1.163 | 1.164 | 1.185 | 1.166 | 1.14 | 1.124 | 1.146 | 1.153 | | | | |
| | line SILVERGT-OLDTWNTP-MISSION 230 | 456 | 588 | 1.29 | 1.163 | 1.164 | 1.185 | 1.166 | 1.14 | 1.124 | 1.146 | 1.153 | | | | |
| LINE SILVERGT 230kV-OLDTWNTP 230kV ck1 | line SILVERGT to OLD TOWN 230 | 456 | 588 | 1.29 | 1.166 | 1.166 | 1.187 | 1.168 | 1.142 | 1.125 | 1.148 | 1.154 | | | | |
| LINE SILVERGT 230kV-SOUTHBAY 230kV ck1 | line MIGUEL to SXCC 230 ck 1 | 912 | 1176 | 1.29 | 1.083 | 1.075 | 1.096 | 1.076 | 1.043 | 1.022 | 1.042 | 1.039 | | | | |
| | line OTAYMESA to SXCC 230 | 912 | 1176 | 1.29 | 1.084 | 1.076 | 1.096 | 1.076 | 1.043 | 1.022 | 1.042 | 1.039 | | | | |
| LINE SOUTHBAY 69kV-SWEETWTR 69kV ck1 | line MG-MONTGYTP-SW-SY 69 ck 1 | 97 | 136 | 1.40 | 1.024 | 1.251 | 1.134 | 1.358 | 1.275 | 1.502 | 1.372 | 1.598 | | | 1.467 | 1.695 |
| | line MIGUEL to BORDER 69 ck 1 *assoc SPS | 97 | 136 | 1.40 | | | | | | | | | | | | 1.027 |
| LINE SWEETWTR 69kV-MONTGYTP 69kV ck1 | line SY-SWEETWTR69 ck 1 *assoc SPS | 157 | 157 | 1.00 | | | | | | | | 1.061 | | | | 1.132 |
| LINE SYCAMORE 138kV-CARLTHTP 138kV ck1 | line IV-ML 500kV SPS 6.8 | 247 | 247 | 1.00 | | | | | | | | | 1.103 | 1.096 | | |
| | line IV-ML 500kV IV Generator SPS6.1 | 247 | 247 | 1.00 | | | | | | | | | 1.02 | 1.012 | | |
| | line IV-ML 500kV IV Generator SPS6.2 | 247 | 247 | 1.00 | | | | | | | | | 1.066 | 1.059 | | |
| LINE SYCAMORE 230kV-PENSQTOS 230kV ck1 | line SILVERGT to SOUTHBAY 230 | 797 | 1153 | 1.45 | 1.089 | 1.073 | 1.078 | 1.058 | 1.06 | 1.044 | 1.047 | 1.028 | | | | |
| LINE SYCAMORE 230kV-SXCC 230kV ck1 | line SYCAMORE to SXCC 230 ck 1 | 797 | 968 | 1.22 | 1.108 | 1.08 | 1.079 | 1.049 | 1.066 | 1.047 | 1.045 | 1.009 | | | | |
| LINE SYCAMORE 230kV-SXCC 230kV ck2 | line SYCAMORE to SXCC 230 ck 1 *assoc SPS | 796 | 912 | 1.15 | 1.109 | 1.081 | 1.08 | 1.05 | 1.067 | 1.048 | 1.047 | 1.01 | | | | |
| LINE SYCAMORE 69kV-ELLIOTT 69kV ck1 | line IV-ML 500kV SPS 6.8 | 68 | 68 | 1.00 | | | | | | | | | 1.01 | 1.001 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2010 Queued Time Frame, Future Year Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Contingency Type | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | fya_a | fya_b | fya_c | fya_d | fya_e | fya_f | fya_g | fya_h | fya_i | fya_j | fya_k | fya_l |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | | | | | | | | | Peak | Load | Low Otay Ld | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Hi ML Flow | | 13.2 MW | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | No SY Gen | | Hi SY Gen | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| LINE SYCAMORE 69kV-SCRIPPS 69kV ck1 | line ARTESN to SYCAMORE 69 ck 1 | 102 | 130 | 1.27 | 1.07 | 1.067 | 1.06 | 1.068 | 1.072 | 1.068 | 1.069 | 1.062 | 1.062 | 1.068 | | |
| | line CREELMAN to SYCAMORE 69 ck 1 | 102 | 130 | 1.27 | 1.094 | 1.091 | 1.084 | 1.089 | 1.093 | 1.089 | 1.089 | 1.082 | 1.092 | 1.097 | | |
| | line EASTGATE to MIRAMRTP 69 ck 1 | 102 | 130 | 1.27 | 1.066 | 1.064 | 1.055 | 1.066 | 1.069 | 1.067 | 1.067 | 1.062 | 1.056 | 1.063 | | |
| | line FNTNTP-FNTON-MR-MR 69 ck 1 | 102 | 130 | 1.27 | 1.081 | 1.078 | 1.071 | 1.08 | 1.083 | 1.08 | 1.081 | 1.075 | 1.072 | 1.079 | | |
| | line IV-ML 500kV SPS 6.8 | 102 | 130 | 1.27 | 1.079 | 1.075 | 1.068 | 1.075 | 1.079 | 1.075 | 1.075 | 1.068 | 1.096 | 1.101 | | |
| | line MIRAMAR to PENSQTOS 69 ck 1 | 102 | 130 | 1.27 | 1.128 | 1.126 | 1.118 | 1.126 | 1.13 | 1.127 | 1.127 | 1.121 | 1.121 | 1.128 | | |
| | line ML-MS 1&2 230kV SPS6.4 a | 102 | 130 | 1.27 | 1.068 | 1.066 | 1.059 | 1.067 | 1.071 | 1.068 | 1.068 | 1.062 | 1.078 | 1.084 | | |
| | line ML-MS 1&2 230kV SPS6.4 b | 102 | 130 | 1.27 | 1.068 | 1.066 | 1.059 | 1.067 | 1.071 | 1.068 | 1.068 | 1.062 | 1.075 | 1.081 | | |
| | line ML-MS 1&2 230kV SPS6.4 c | 102 | 130 | 1.27 | 1.068 | 1.066 | 1.059 | 1.067 | 1.071 | 1.068 | 1.068 | 1.062 | 1.069 | 1.075 | | |
| | line ML-MS 1&2 230kV SPS6.4 d | 102 | 130 | 1.27 | 1.061 | 1.058 | 1.052 | 1.06 | 1.064 | 1.061 | 1.061 | 1.055 | 1.06 | 1.066 | | |
| | line ML-MS 1&2 230kV SPS6.4 e | 102 | 130 | 1.27 | 1.056 | 1.053 | 1.047 | 1.054 | 1.059 | 1.056 | 1.057 | 1.05 | 1.054 | 1.059 | | |
| | line ML-MS 1&2 230kV SPS6.4 f | 102 | 130 | 1.27 | 1.051 | 1.048 | 1.042 | 1.049 | 1.054 | 1.051 | 1.052 | 1.045 | 1.047 | 1.053 | | |
| | line OTAYMESA to SOUTHBAY 230 | 102 | 130 | 1.27 | 1.098 | 1.094 | 1.088 | 1.094 | 1.094 | 1.09 | 1.09 | 1.083 | 1.111 | 1.115 | | |
| | line PACFCBCH to OLD TOWN 69 ck 1 | 102 | 130 | 1.27 | 1.063 | 1.061 | 1.053 | 1.062 | 1.066 | 1.063 | 1.063 | 1.057 | 1.053 | 1.06 | | |
| | line PENSQTOS to MESA RIM 69 ck 1 | 102 | 130 | 1.27 | 1.221 | 1.219 | 1.21 | 1.22 | 1.224 | 1.221 | 1.221 | 1.215 | 1.213 | 1.22 | | |
| | line PENSQTOS to SYCAMORE 230 | 102 | 130 | 1.27 | 1.277 | 1.27 | 1.264 | 1.267 | 1.273 | 1.267 | 1.266 | 1.255 | 1.275 | 1.281 | | |
| | line POWAY to POMERADO 69 ck 1 | 102 | 130 | 1.27 | 1.124 | 1.121 | 1.114 | 1.122 | 1.126 | 1.122 | 1.122 | 1.116 | 1.112 | 1.119 | | |
| | line POWAY to R.CARMEL 69 ck 1 | 102 | 130 | 1.27 | 1.062 | 1.059 | 1.051 | 1.059 | 1.063 | 1.06 | 1.06 | 1.054 | 1.055 | 1.061 | | |
| | line SILVERGT to SOUTHBAY 230 | 102 | 130 | 1.27 | 1.153 | 1.148 | 1.145 | 1.148 | 1.151 | 1.144 | 1.146 | 1.138 | 1.112 | 1.116 | | |
| | line SYCAMORE to ELLIOTT 69 ck 1 | 102 | 130 | 1.27 | 1.074 | 1.071 | 1.063 | 1.066 | 1.072 | 1.068 | 1.068 | 1.06 | 1.073 | 1.077 | | |
| | line SYCAMORE to PEN 230 ck 1 | 102 | 130 | 1.27 | 1.049 | 1.046 | 1.038 | 1.046 | 1.05 | 1.046 | 1.046 | 1.039 | | | | |
| | tran PENSQTOS 69 to PENSQTOS 138 ck 2 | 102 | 130 | 1.27 | 1.062 | 1.059 | 1.05 | 1.06 | 1.064 | 1.06 | 1.06 | 1.054 | 1.055 | 1.061 | | |
| | tran PENSQTOS 69 to PENSQTOS 138 ck 3 | 102 | 130 | 1.27 | 1.062 | 1.059 | 1.05 | 1.06 | 1.064 | 1.06 | 1.06 | 1.054 | 1.055 | 1.061 | | |
| | tran PENSQTOS 138 to PENSQTOS 69 ck 1 | 102 | 130 | 1.27 | 1.063 | 1.06 | 1.051 | 1.06 | 1.064 | 1.061 | 1.061 | 1.055 | 1.056 | 1.062 | | |
| | tran PENSQTOS 230 to PENSQTOS 138 ck 1 | 102 | 130 | 1.27 | 1.094 | 1.091 | 1.085 | 1.092 | 1.096 | 1.092 | 1.093 | 1.086 | 1.088 | 1.094 | | |
| | tran PENSQTOS 230 to PENSQTOS 69 ck 1 | 102 | 130 | 1.27 | 1.168 | 1.165 | 1.156 | 1.165 | 1.17 | 1.166 | 1.166 | 1.159 | 1.16 | 1.167 | | |
| | tran PENSQTOS 230 to PENSQTOS 69 ck 2 | 102 | 130 | 1.27 | 1.172 | 1.169 | 1.16 | 1.169 | 1.174 | 1.17 | 1.17 | 1.163 | 1.164 | 1.171 | | |
| | tran SYCAMORE 230 to SYCAMORE 138 ck 1 | 102 | 130 | 1.27 | 1.078 | 1.075 | 1.067 | 1.074 | 1.078 | 1.074 | 1.074 | 1.067 | 1.075 | 1.081 | | |
| | line IV-ML 500kV IV Generator SPS6.1 | 102 | 130 | 1.27 | | | | | | | | | 1.045 | 1.05 | | |
| | line IV-ML 500kV IV Generator SPS6.2 | 102 | 130 | 1.27 | 1.055 | 1.051 | 1.045 | 1.051 | 1.056 | 1.052 | 1.052 | 1.045 | 1.065 | 1.07 | | |
| | line SYCAMORE-CHCARITA 138 | 102 | 130 | 1.27 | 1.052 | 1.049 | 1.042 | 1.05 | 1.054 | 1.051 | 1.051 | 1.044 | 1.045 | 1.051 | | |
| LINE TALEGA 230kV-S.ONOFRE 230kV ck1 | line TALEGA to S.ONOFRE 230 ck 2 *assoc SPS | 456 | 577 | 1.27 | 1.564 | 1.566 | 1.566 | 1.568 | 1.567 | 1.566 | 1.567 | 1.568 | 1.652 | 1.658 | 1.231 | 1.231 |
| LINE TALEGA 230kV-S.ONOFRE 230kV ck2 | line TALEGA to S.ONOFRE 230 ck 1 *assoc SPS | 456 | 577 | 1.27 | 1.564 | 1.566 | 1.566 | 1.568 | 1.567 | 1.566 | 1.567 | 1.568 | 1.652 | 1.658 | 1.231 | 1.231 |
| TRAN BORREGO 69kV-BORREGO 12.5kV ck1 | line WARNERS to NARROWS 69 ck 1 | 12.5 | 12.5 | 1.00 | | 1.062 | | | | | | | | | | |
| TRAN ESCNDO50 138kV-ESCNDIDO 69kV ck2 | line CANNON-SANLUSRY-SHADOWR 138 *assoc. SPS | 63 | 73 | 1.16 | 1.202 | 1.202 | 1.1 | 1.099 | 1.1 | 1.099 | 1.1 | 1.099 | 1.091 | 1.1 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2010 Queued Time Frame, Future Year Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Contingency Type | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Peak Load | | Low Otay Ld | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | Hi ML Flow | | 13.2 MW | |
| | | | | | | | | | | | | | No SY Gen | | Hi SY Gen | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | fya_a | fya_b | fya_c | fya_d | fya_e | fya_f | fya_g | fya_h | fya_i | fya_j | fya_k | fya_l |
| TRAN LOSCOCHS 69kV-LOSCOCHS 138kV ck2 | tran LOSCOCHS 138 to LOSCOCHS 69 ck 1 | 140 | 155 | 1.11 | 1.023 | 1.018 | 1.027 | 1.001 | 1.004 | | | | 1.021 | 1.023 | | |
| TRAN MIGUEL 230kV-MIGUEL 138kV ck1 | line ML-MS 1&2 230kV SPS6.4 a | 392 | 468 | 1.19 | | | | | | | | | 1.023 | 1.018 | | |
| | line ML-MS 1&2 230kV SPS6.4 b | 392 | 468 | 1.19 | | | | | | | | | 1.017 | 1.011 | | |
| | line ML-MS 1&2 230kV SPS6.4 c | 392 | 468 | 1.19 | | | | | | | | | 1.002 | | | |
| TRAN MIGUEL 230kV-MIGUEL 500kV ck2 | ML BK80/81 SPS6.6 a | 1120 | 1344 | 1.20 | | | | | | | | | 1.013 | 1.01 | | |
| | ML BK80/81 SPS6.6 b | 1120 | 1344 | 1.20 | | | | | | | | | 1.003 | 1.001 | | |
| | tran MIGUEL 230 to MIGUELMP 500 ck 1 *assoc SPS | 1120 | 1344 | 1.20 | | | | | | | | | 1.026 | 1.023 | | |
| TRAN MIGUEL 230kV-MIGUELMP 500kV ck1 | tran MIGUEL 230 to MIGUEL 500 ck 2 *assoc SPS | 1120 | 1329 | 1.19 | | | | | | | | | 1.04 | 1.038 | | |
| TRAN MIGUEL 500kV-MIGUELMP 500kV ck1 | tran MIGUEL 230 to MIGUEL 500 ck 2 *assoc SPS | 1120 | 1329 | 1.19 | | | | | | | | | 1.037 | 1.035 | | |
| TRAN MIGUEL 69kV-MIGUEL 230kV ck1 | tran MIGUEL 69 to MIGUEL 230 ck 2 *assoc SPS | 224 | 305 | 1.36 | 1.102 | 1.07 | 1.046 | 1.019 | | | | | 1.139 | 1.118 | | |
| TRAN MIGUEL 69kV-MIGUEL 230kV ck2 | tran MIGUEL 69 to MIGUEL 230 ck 1 | 224 | 305 | 1.36 | 1.102 | 1.07 | 1.046 | 1.019 | | | | | 1.139 | 1.118 | | |
| TRAN MISSION 138kV-MISSION 69kV ck2 | tran MISSION 138 to MISSION 69 ck 1 | 100 | 134 | 1.34 | | | 1.011 | | 1.007 | 1.005 | 1.005 | 1.003 | | | | |
| | tran MISSION 138 to MISSION 69 ck 3 | 100 | 134 | 1.34 | | | 1.015 | 1.002 | 1.011 | 1.009 | 1.009 | 1.006 | | | | |
| TRAN SYCAMORE 230kV-SYCAMORE 69kV ck1 | line PENSQTOS to SYCAMORE 230 | 224 | 285 | 1.27 | 1.054 | 1.047 | 1.046 | 1.038 | 1.042 | 1.036 | 1.035 | 1.025 | 1.046 | 1.049 | | |
| | tran SYCAMORE 230 to SYCAMORE 69 ck 2 | 224 | 285 | 1.27 | 1.272 | 1.266 | 1.264 | 1.256 | 1.259 | 1.253 | 1.253 | 1.243 | 1.259 | 1.264 | | |
| TRAN SYCAMORE 230kV-SYCAMORE 69kV ck2 | line PENSQTOS to SYCAMORE 230 | 224 | 269 | 1.20 | 1.03 | 1.023 | 1.022 | 1.014 | 1.018 | 1.012 | 1.011 | 1.001 | 1.022 | 1.025 | | |
| | tran SYCAMORE 230 to SYCAMORE 69 ck 1 | 224 | 269 | 1.20 | 1.255 | 1.249 | 1.246 | 1.239 | 1.242 | 1.236 | 1.236 | 1.226 | 1.242 | 1.246 | | |
| TRAN SYCAMORE 230kV-SYCAMORE 138kV ck1 | line PENSQTOS to SYCAMORE 230 | 392 | 477 | 1.22 | 1.037 | 1.021 | 1.017 | 1.004 | 1.007 | | | | 1.056 | 1.055 | | |
| LINE MLSXTAP 230kV-SXCC 230kV ck1 | line SILVERGT to SOUTHBAY 230 | 797 | 968 | 1.22 | 1.026 | 1.02 | 1.04 | 1.024 | | | | | | | | |
| LINE IMPRLVLY 500kV-MIGUEL 500kV ck1 | line IMPRLVLY to CENTRALX 230 | 2252 | 2598 | 1.15 | | | | | | | | | 1.027 | 1.026 | | |
| TRAN IMPRLVLY 230kV-IMPRLVLY 500kV ck2 | line HASSYAMP to N.GILA 500 ck 1 | 600 | 732 | 1.22 | | | | | | | | | 1.016 | 1.015 | | |
| | line N.GILA to IMPRLVLY 500 ck 1 | 600 | 732 | 1.22 | | | | | | | | | 1.108 | 1.107 | | |
| | line OMGP-TJI-230 230kV | 600 | 732 | 1.22 | | | | | | | | | 1.057 | 1.056 | | |
| | line OTAYMESA to TJI 230 | 600 | 732 | 1.22 | | | | | | | | | 1.057 | 1.056 | | |
| | tran IMPRLVLY 230 to IMPRLVLY 500 ck 1 | 600 | 732 | 1.22 | | | | | | | | | 1.378 | 1.376 | | |

# Cat B Thermal Contingency Power Flow Plots

# Cat B Contingency Plots of Project Local Area

Figures “c” through “v”

Pre- and Post-Project

Figure c; Pre-project, FY_1, TL649A O/L by outage of TL623:

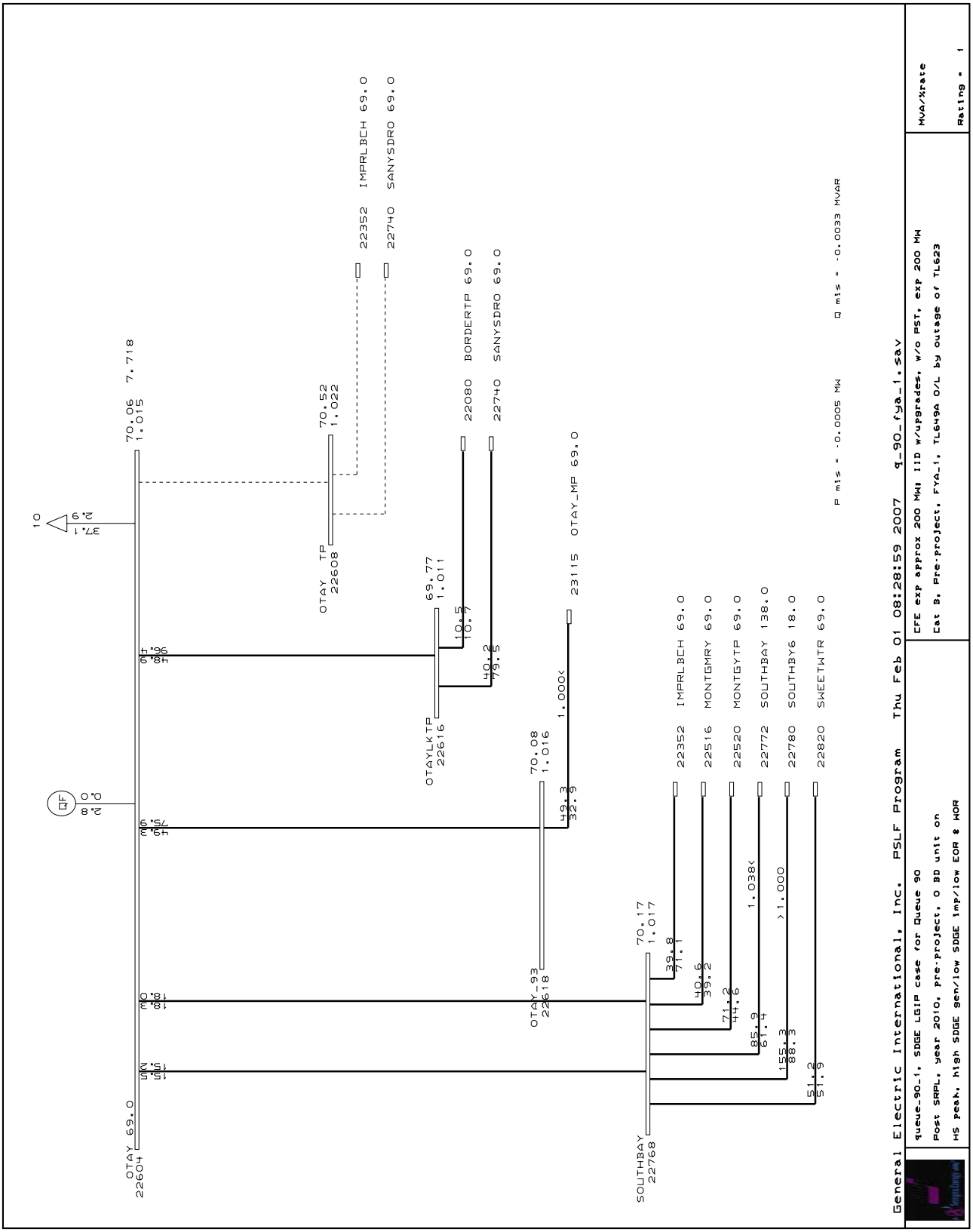


Figure d; Post-project, FY_2, TL649A O/L by outage of TL623:

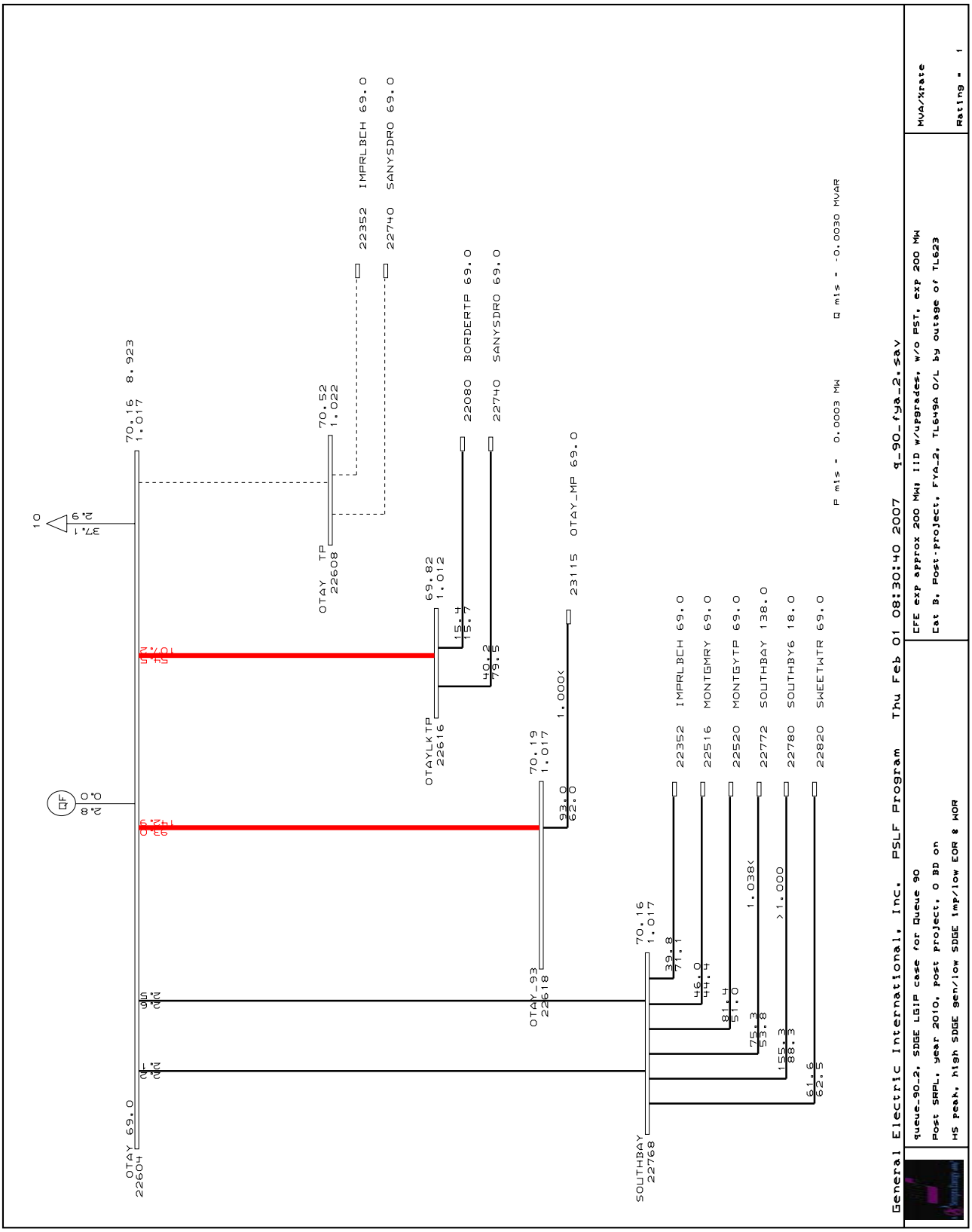


Figure e; Pre-project, cod_c, TL644 O/L by outage of TL642:

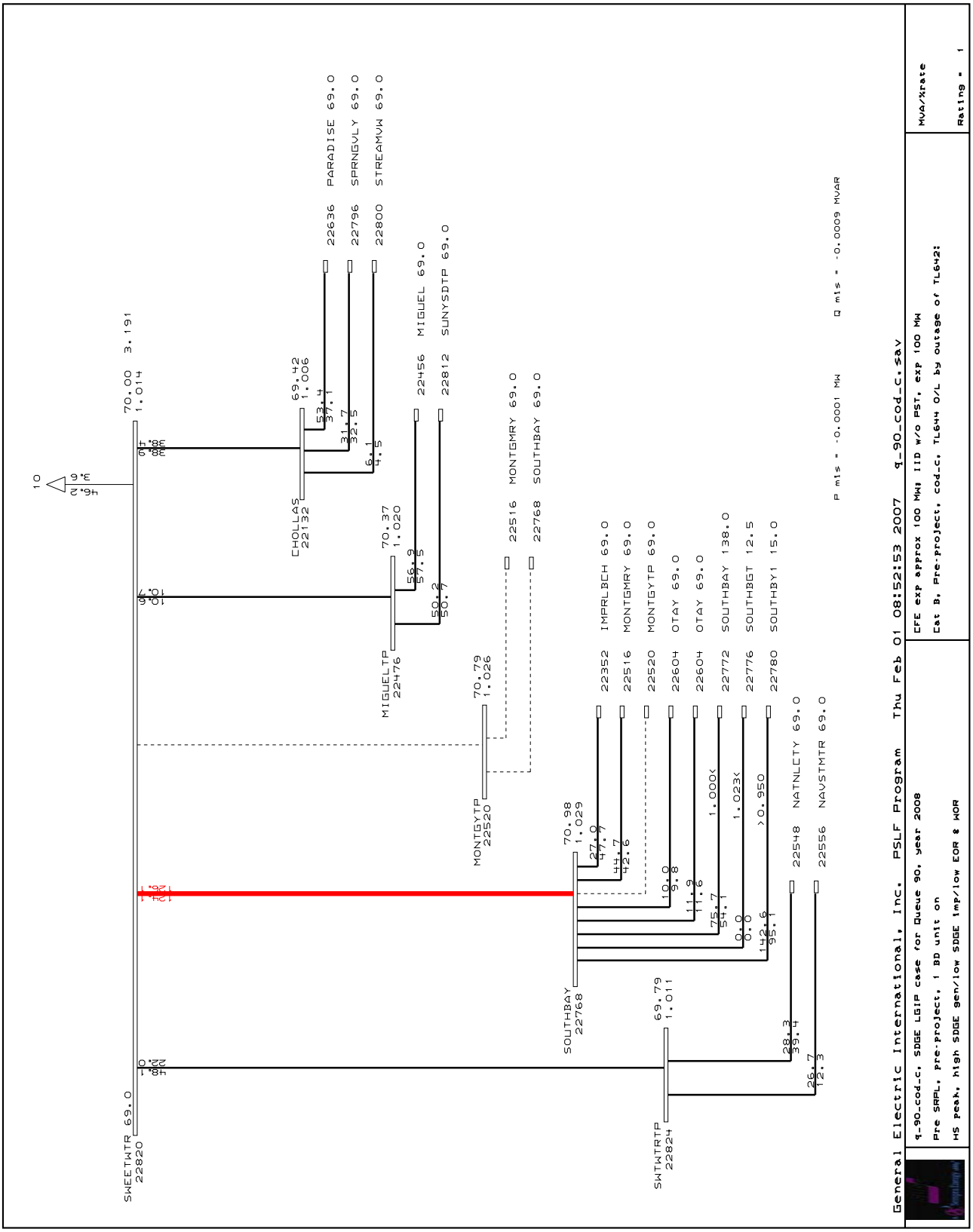


Figure f; Post-project, cod_d, TL644 O/L by outage of TL642:

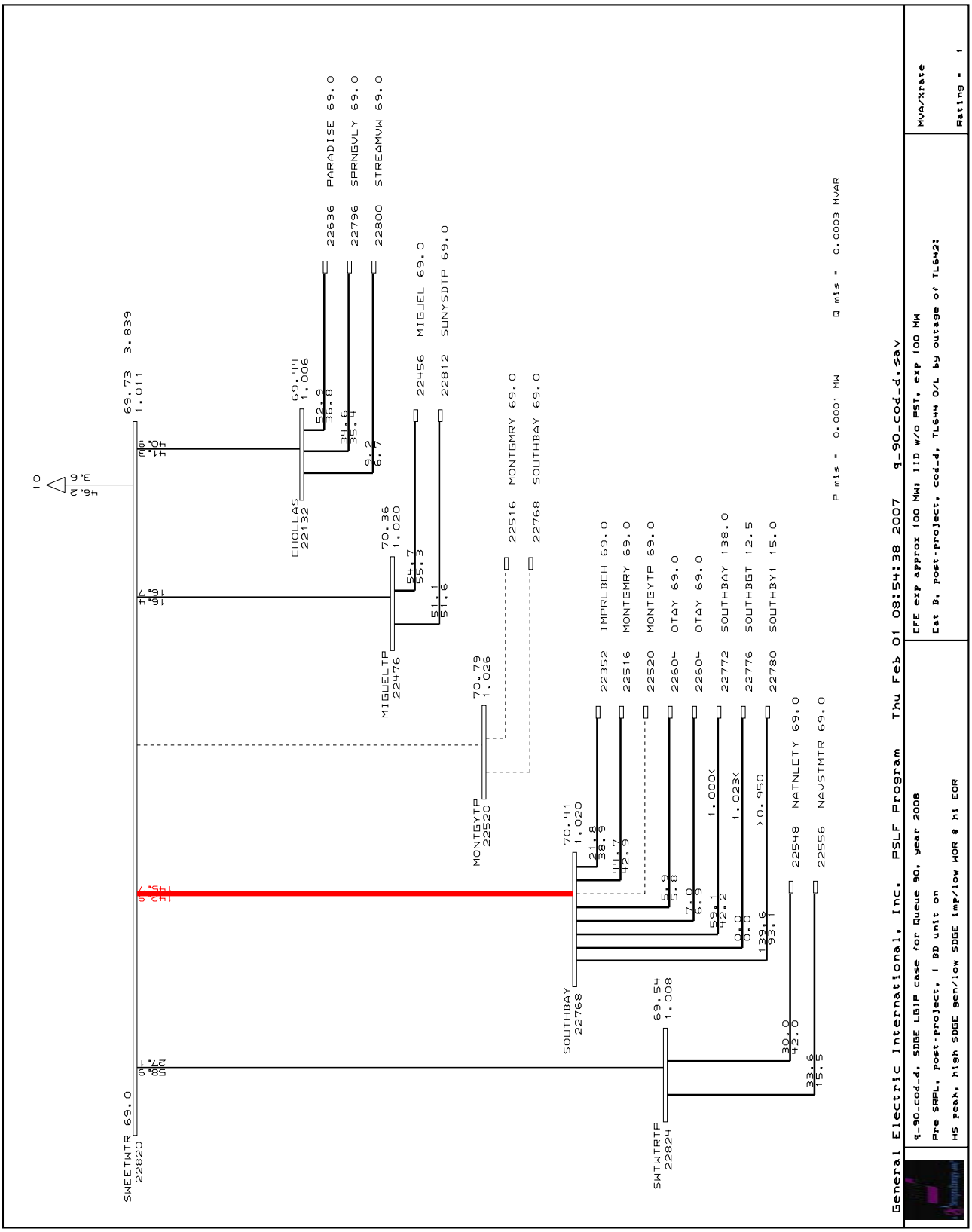


Figure g; Pre-project, cod_s, TL644 O/L by outage of TL642:

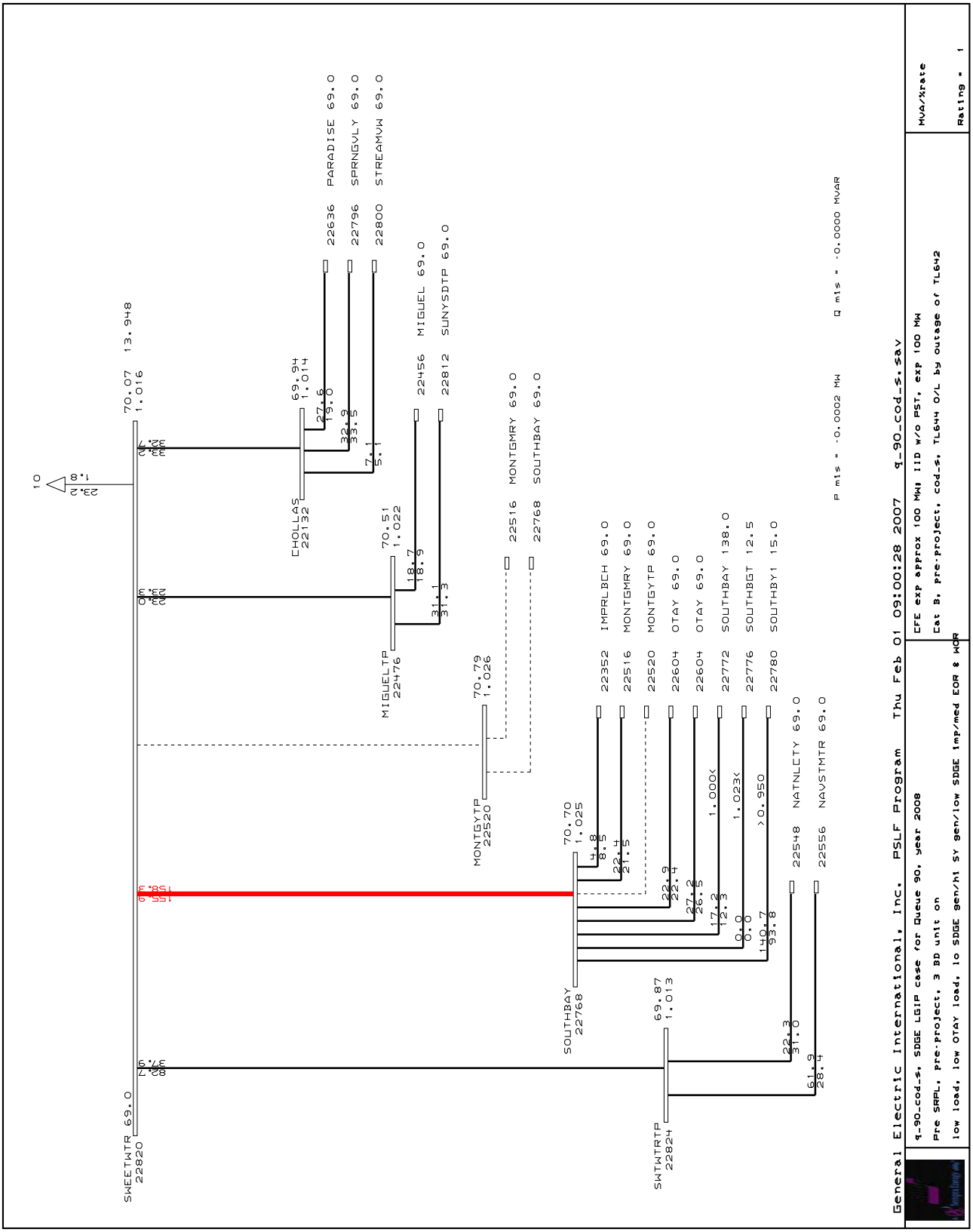


Figure h; Post-project, cod_t, TL644 O/L by outage of TL642:

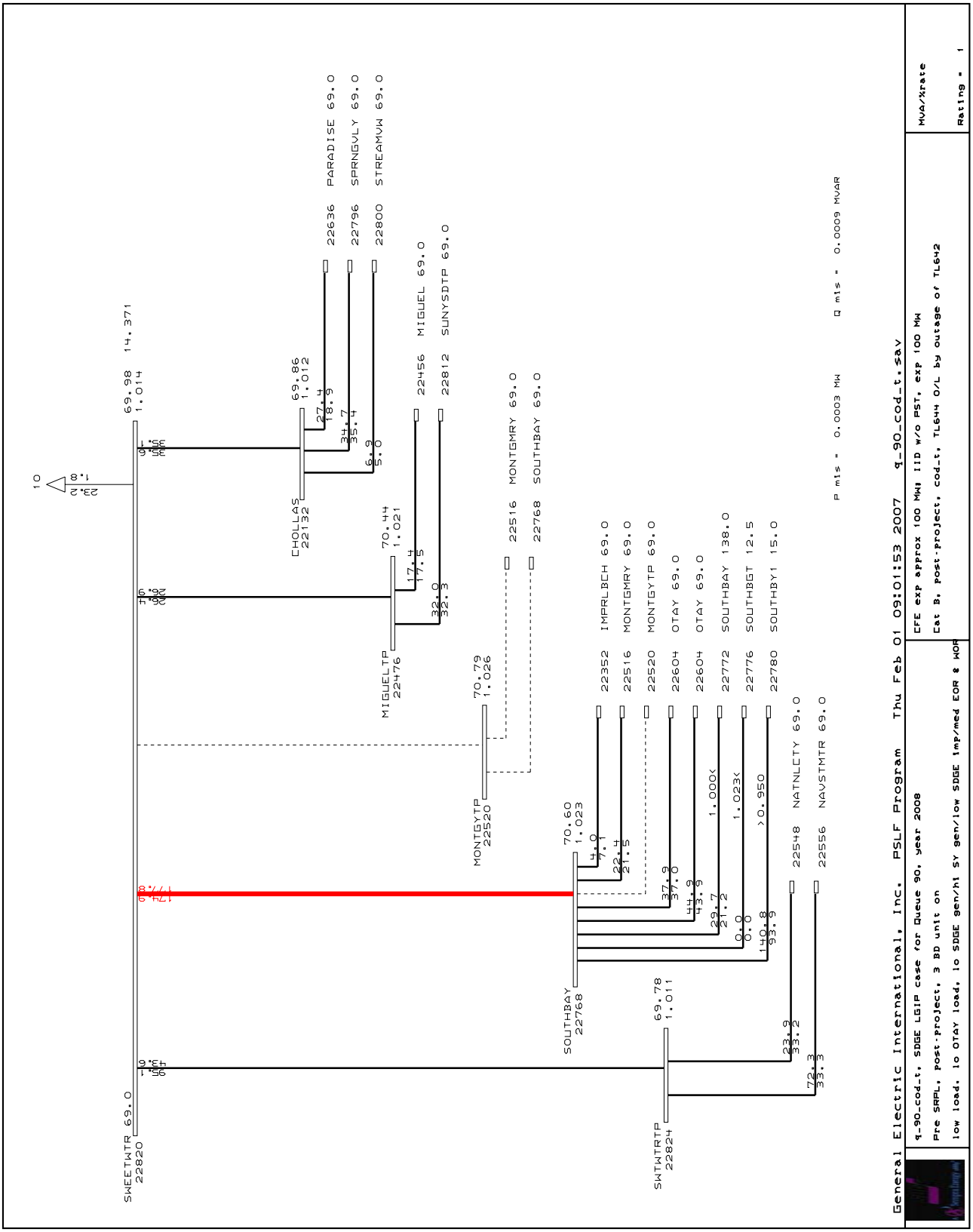


Figure i; Pre-project, FY_5, TL644 O/L by outage of TL642:

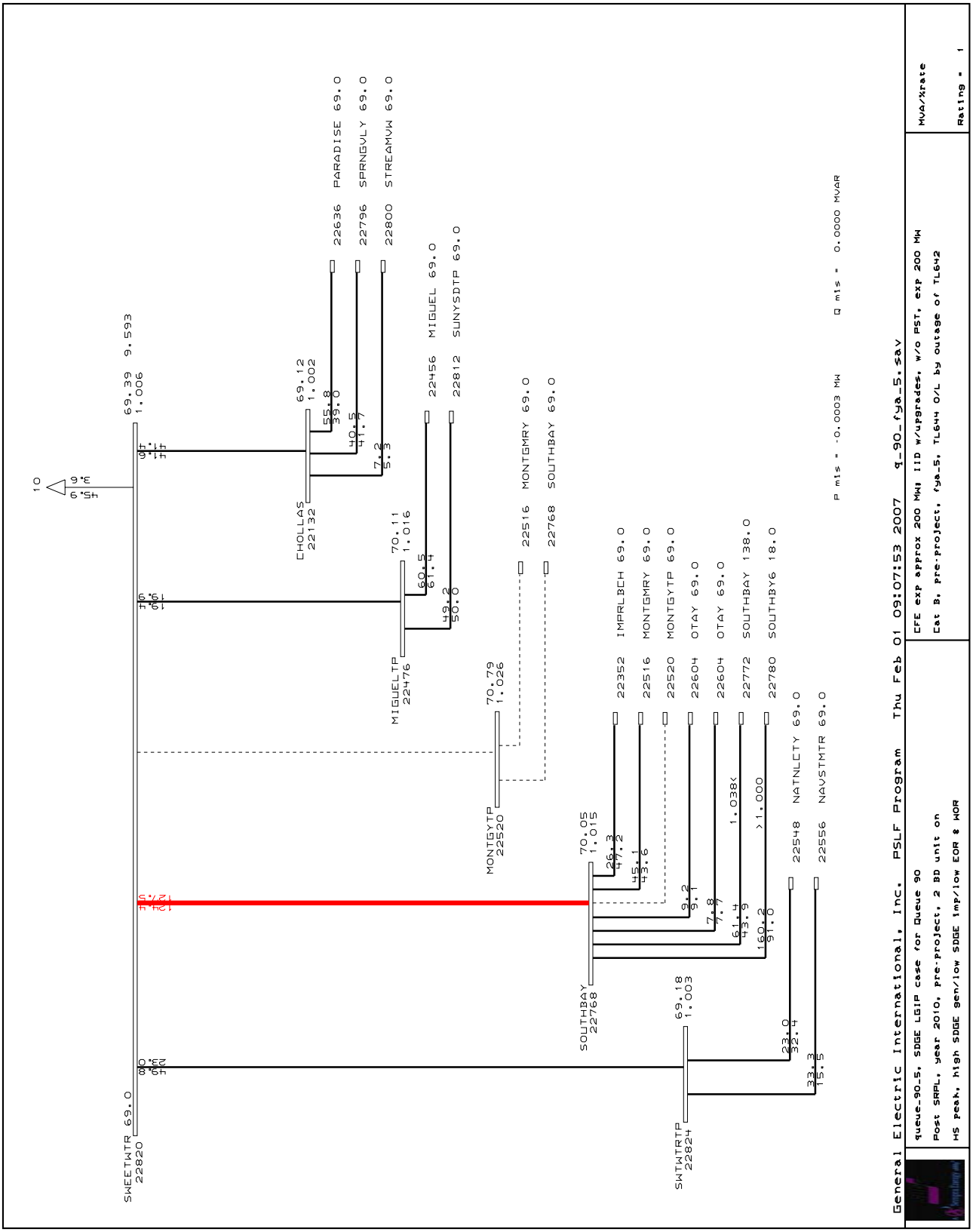


Figure j; Post-project, FY_6, TL644 O/L by outage of TL642:

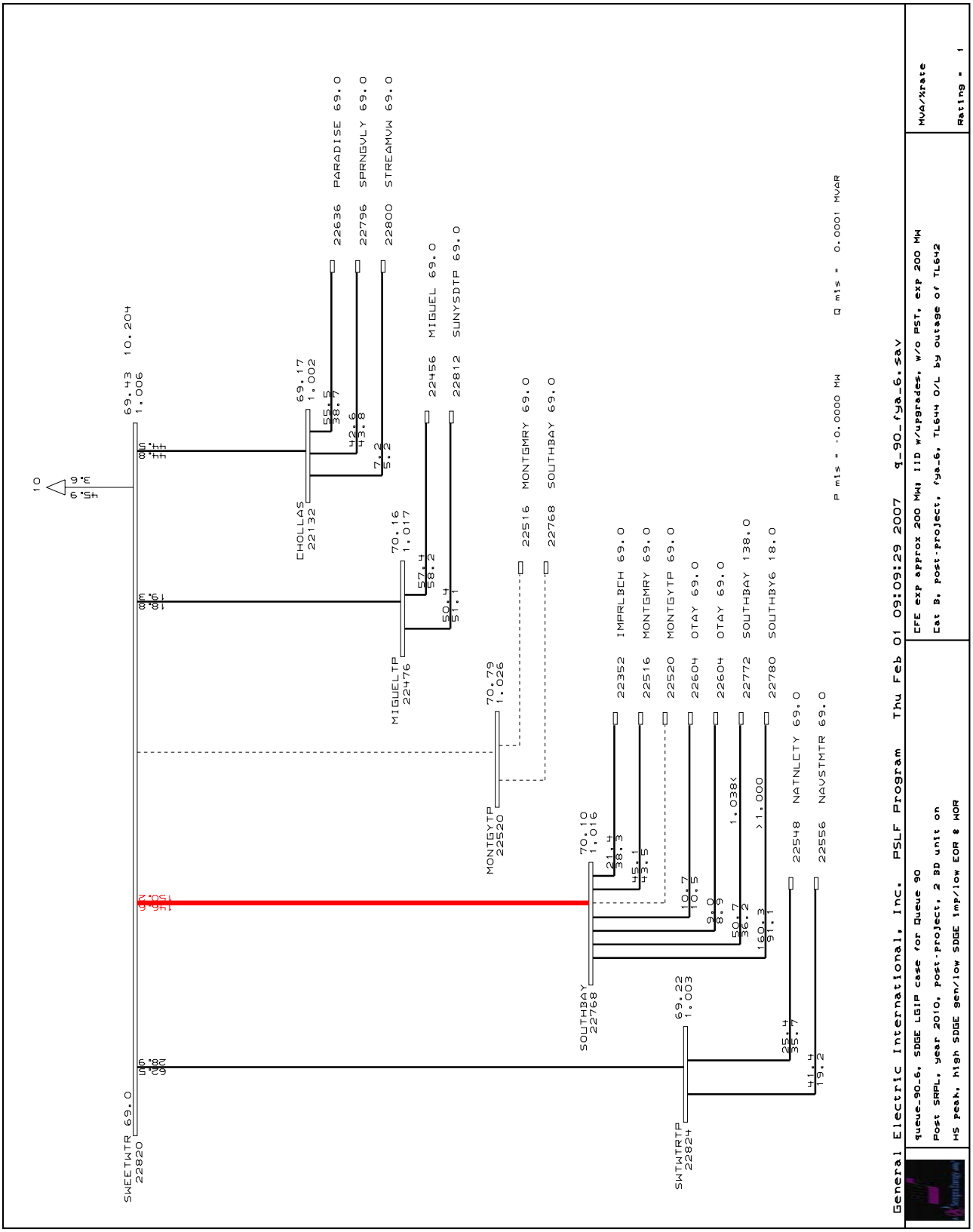


Figure k; Pre-project, FY_7, TL644 O/L by outage of TL642:

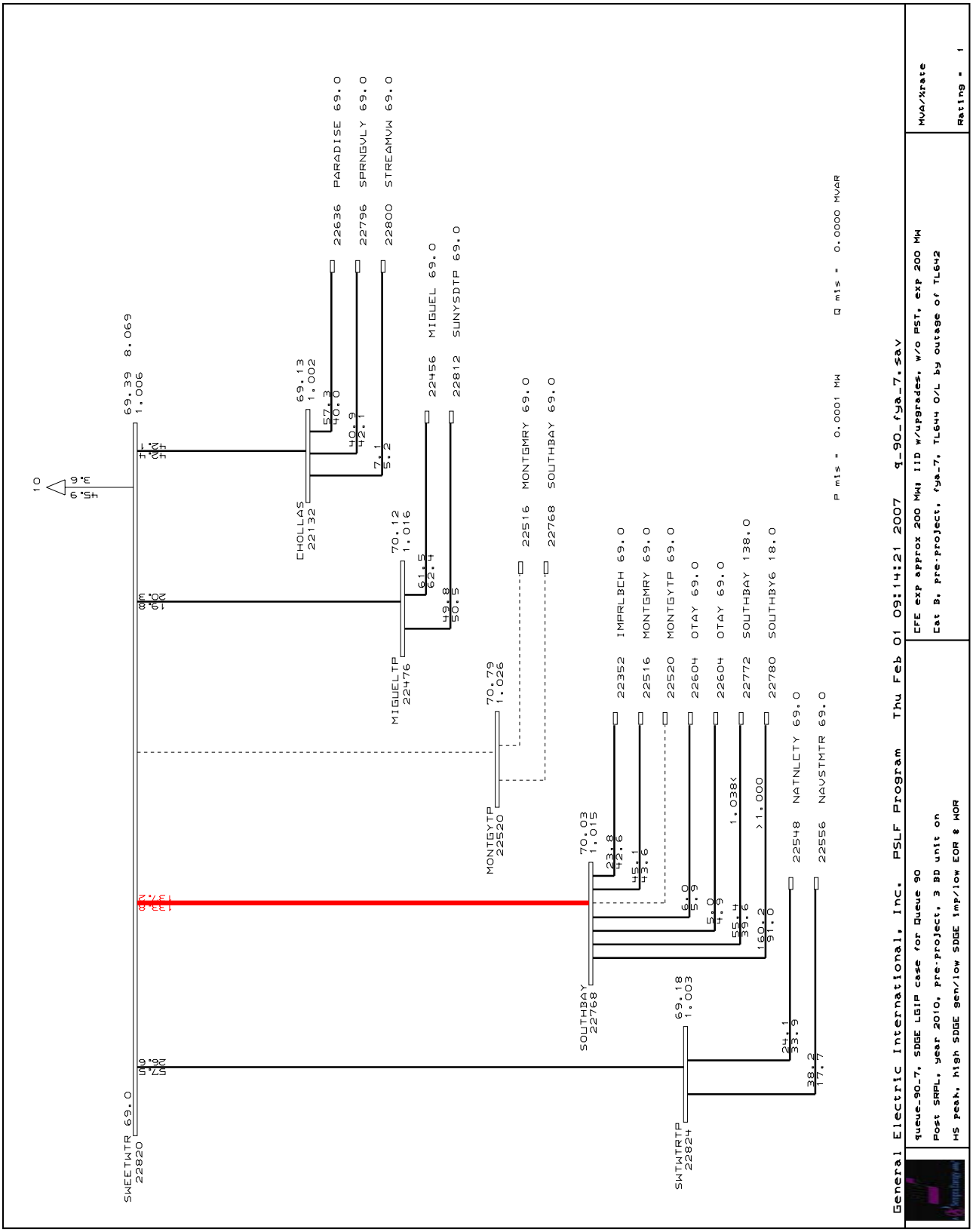


Figure l; Post-project, FY_8, TL644 O/L by outage of TL642:

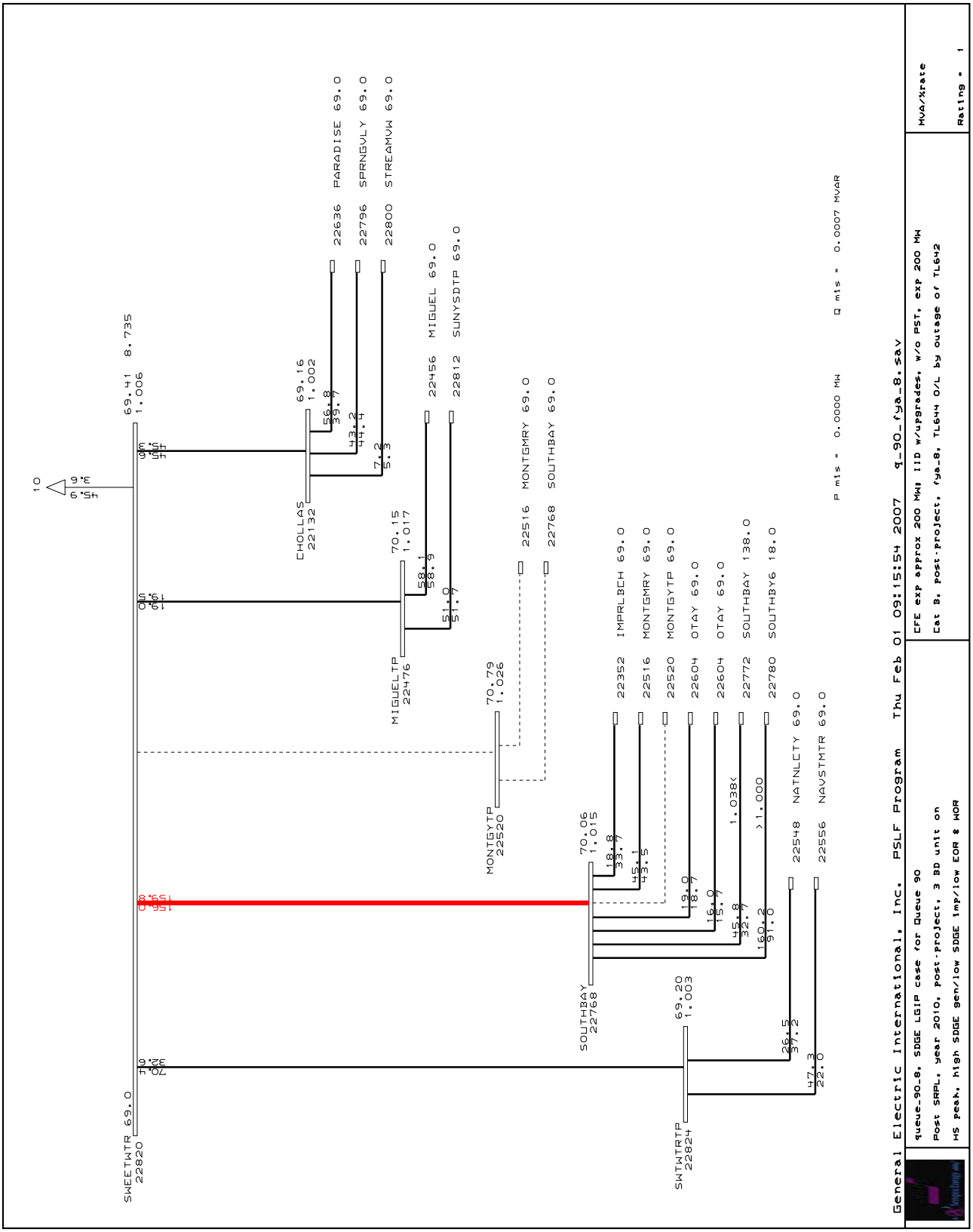


Figure m; Pre-project, cod_e, TL642B O/L by outage of TL644:

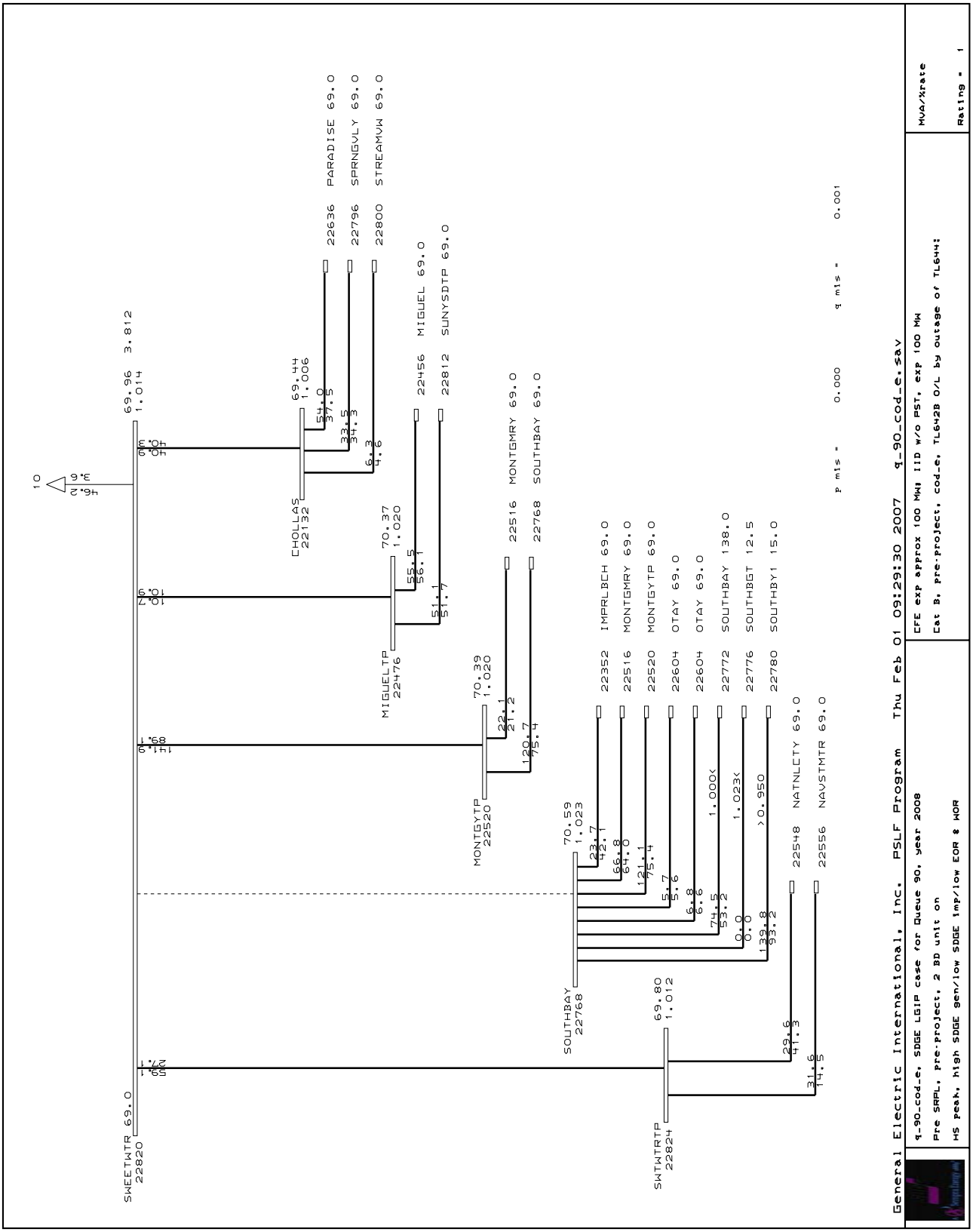


Figure n; Post-project, cod_f, TL642B O/L by outage of TL644:

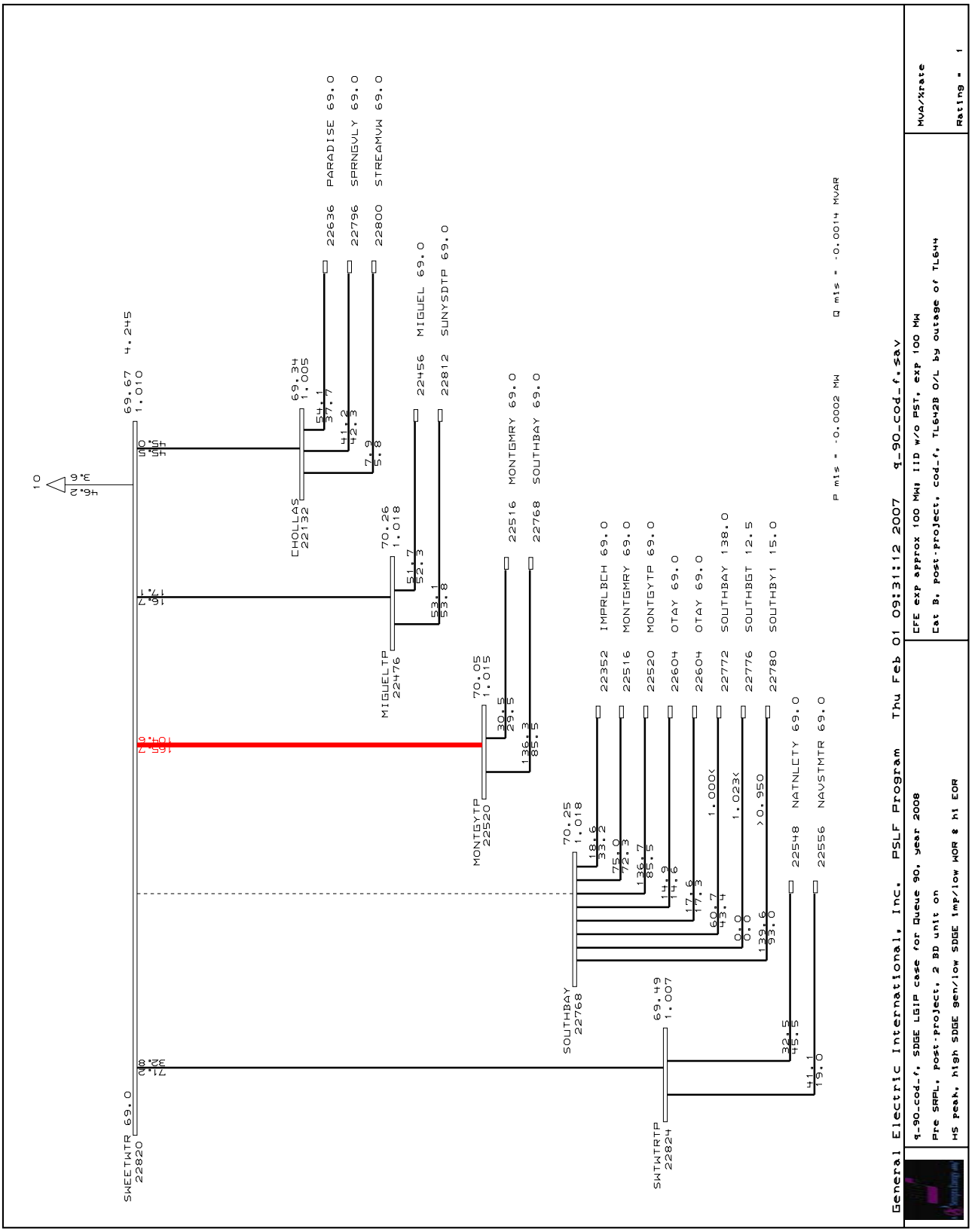


Figure o; Pre-project, cod_g, TL642B O/L by outage of TL644:

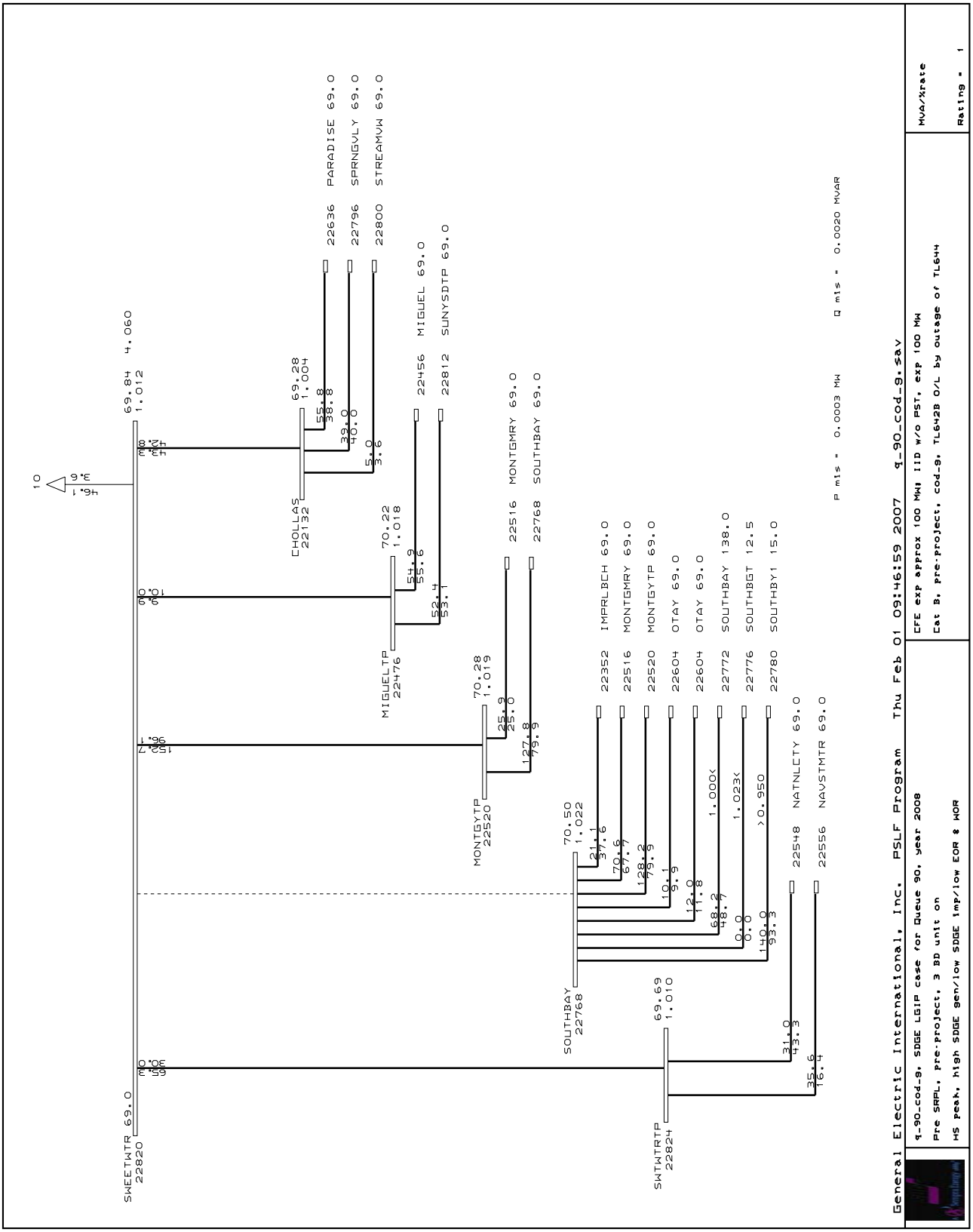


Figure p; Post-project, cod_h, TL642B O/L by outage of TL644:

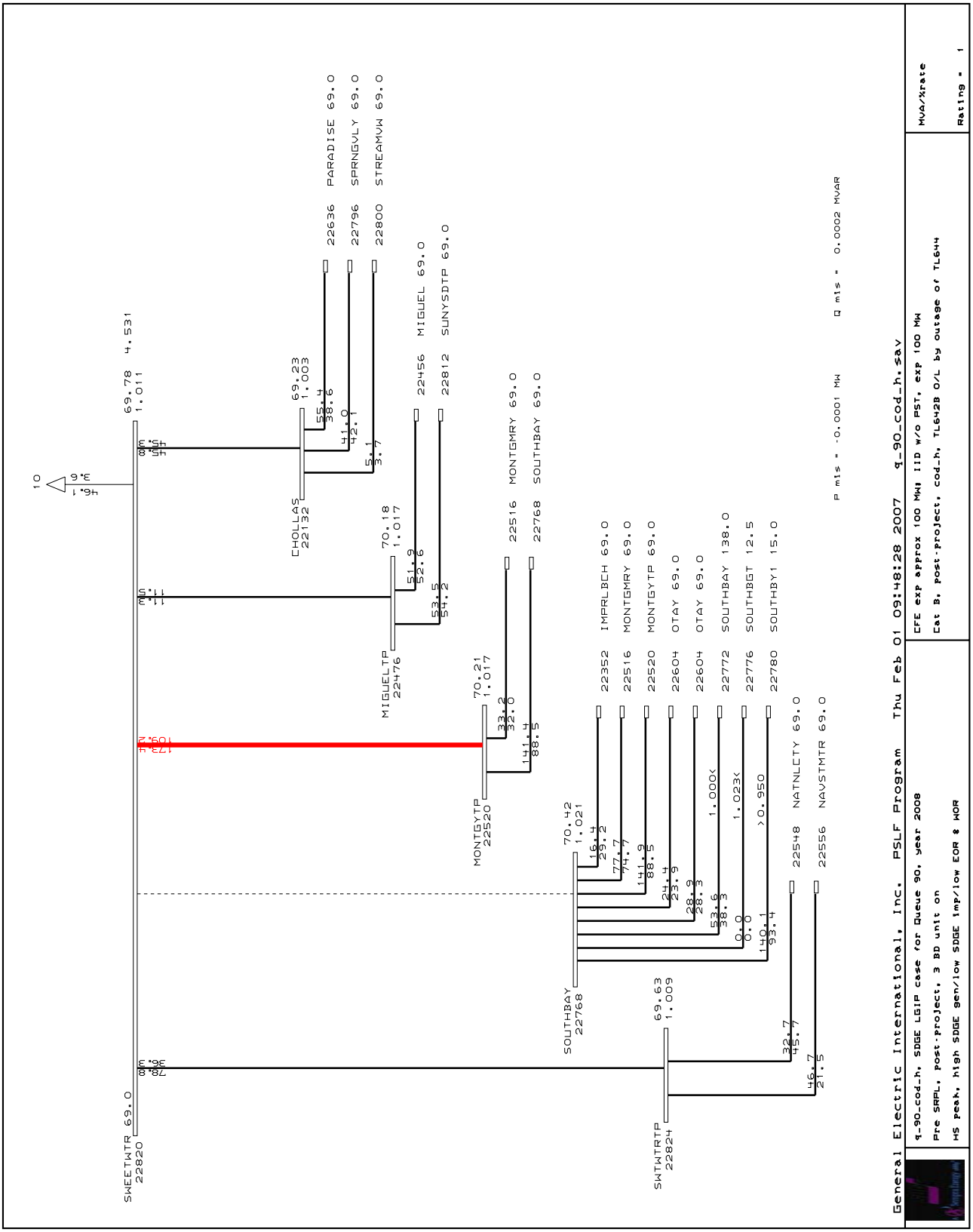


Figure q; Pre-project, cod_s, TL642B O/L by outage of TL644:

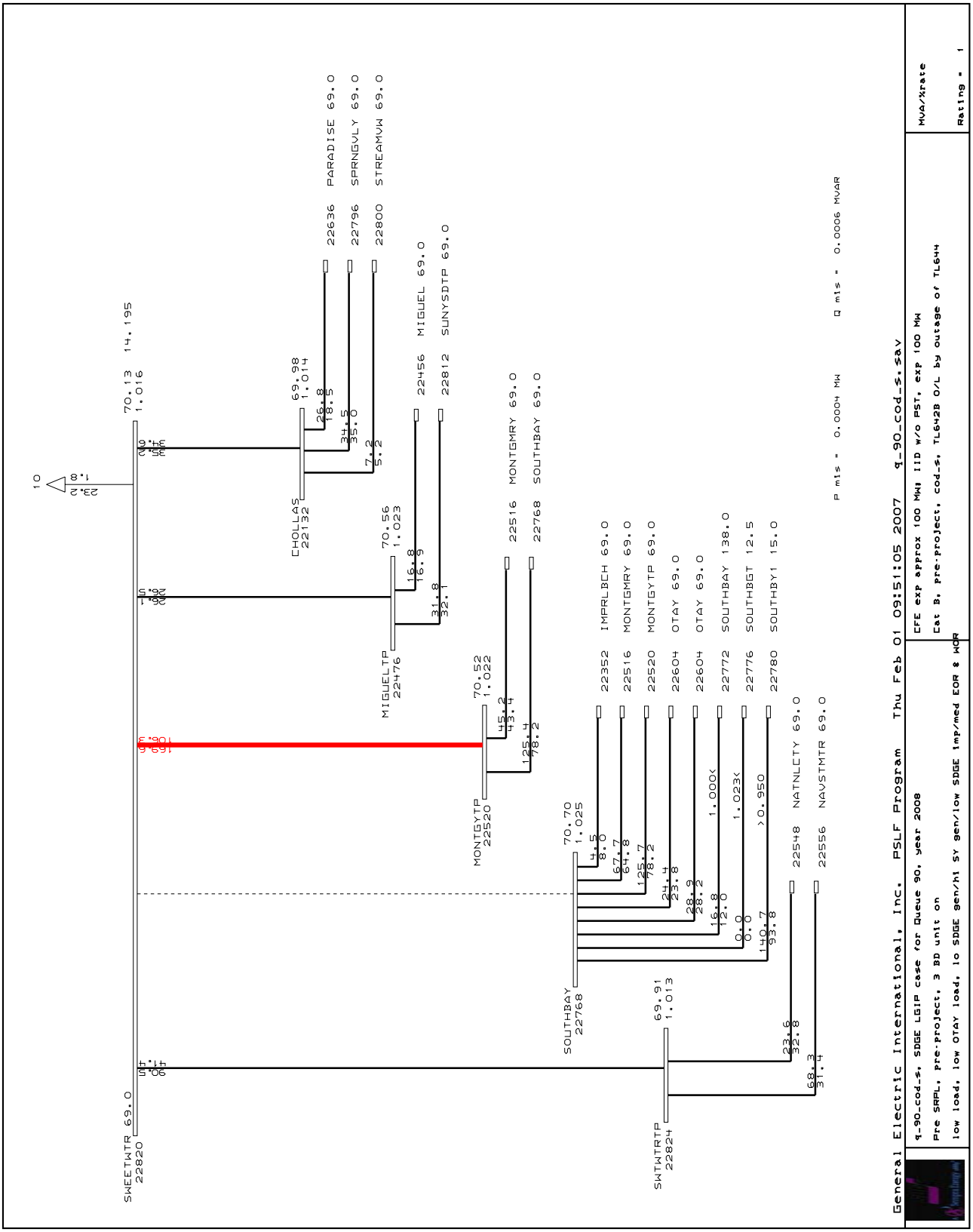


Figure r; Post-project, cod_t, TL642B O/L by outage of TL644:

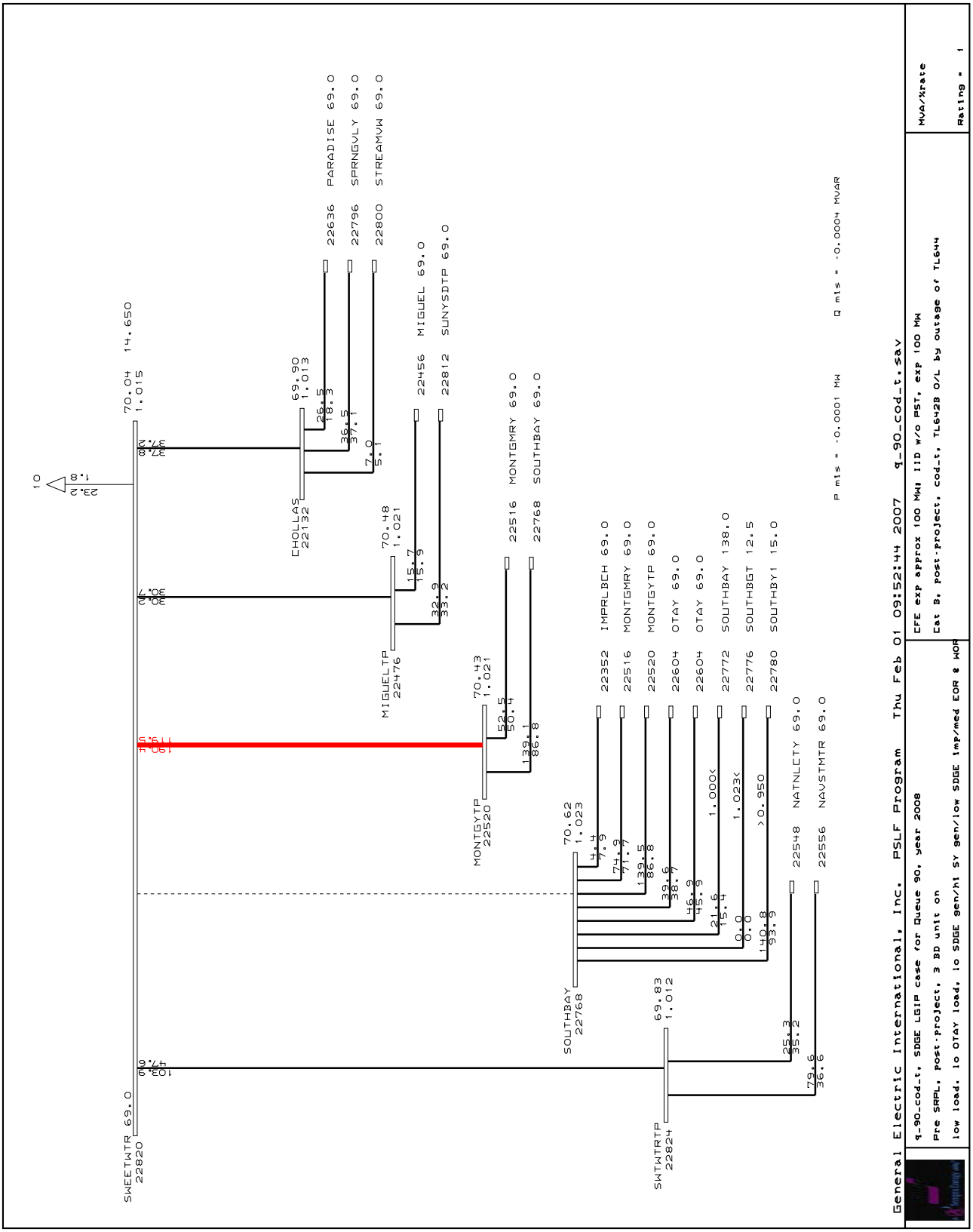


Figure s; Pre-project, FY_7, TL642B O/L by outage of TL644:

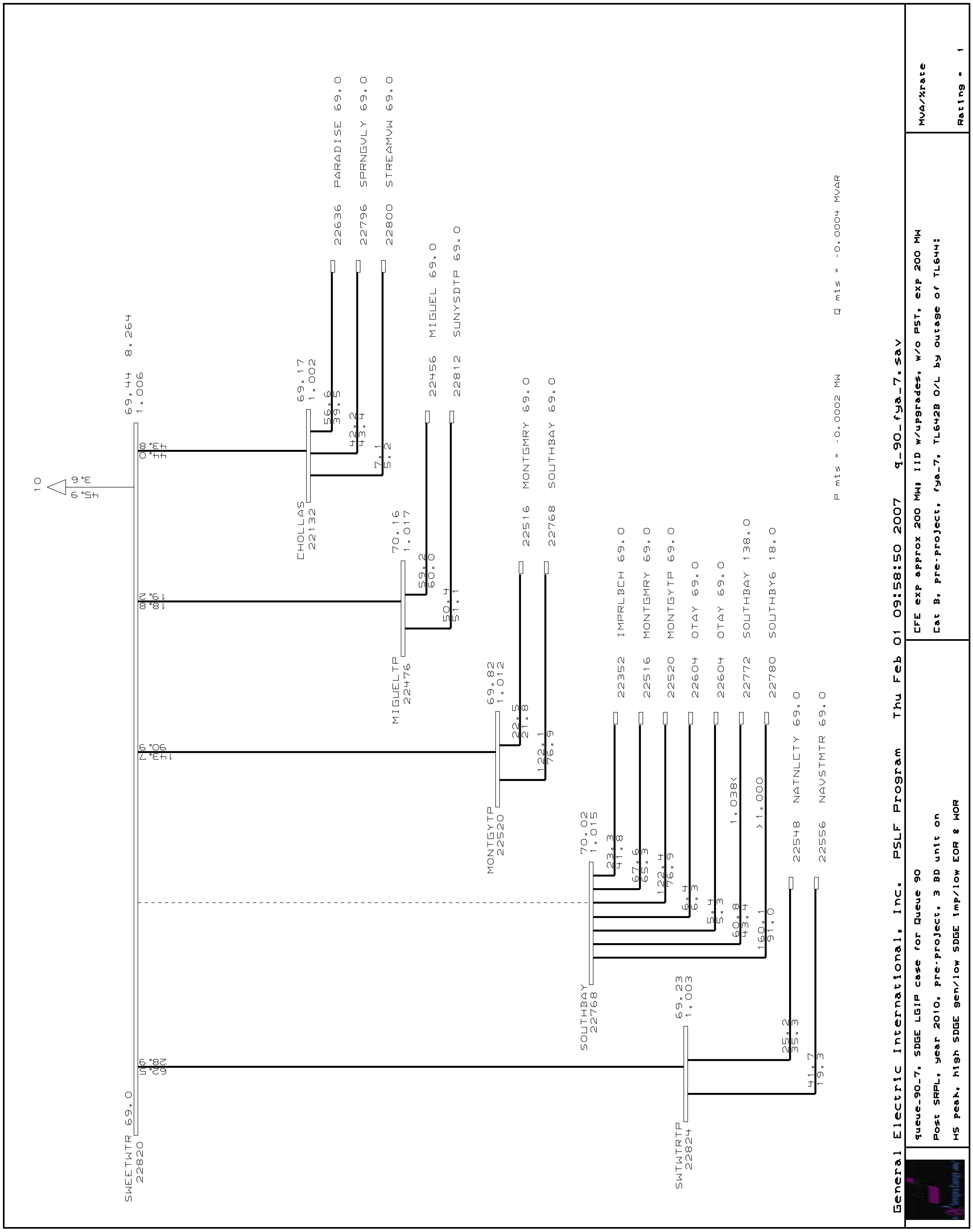


Figure t; Post-project, FY_8, TL642B O/L by outage of TL644:

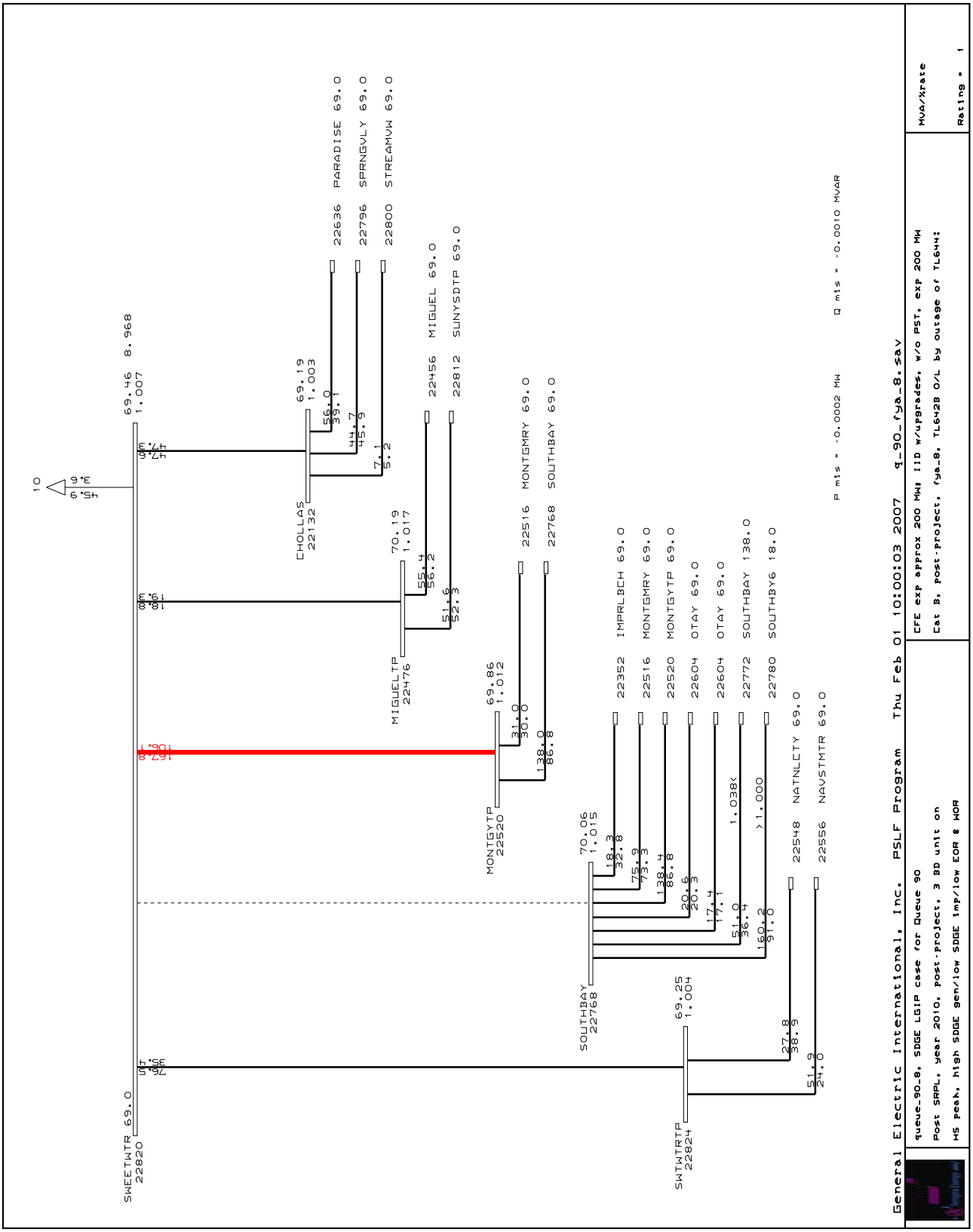


Figure u; Pre-project, FY_19, TL642B O/L by outage of TL644:

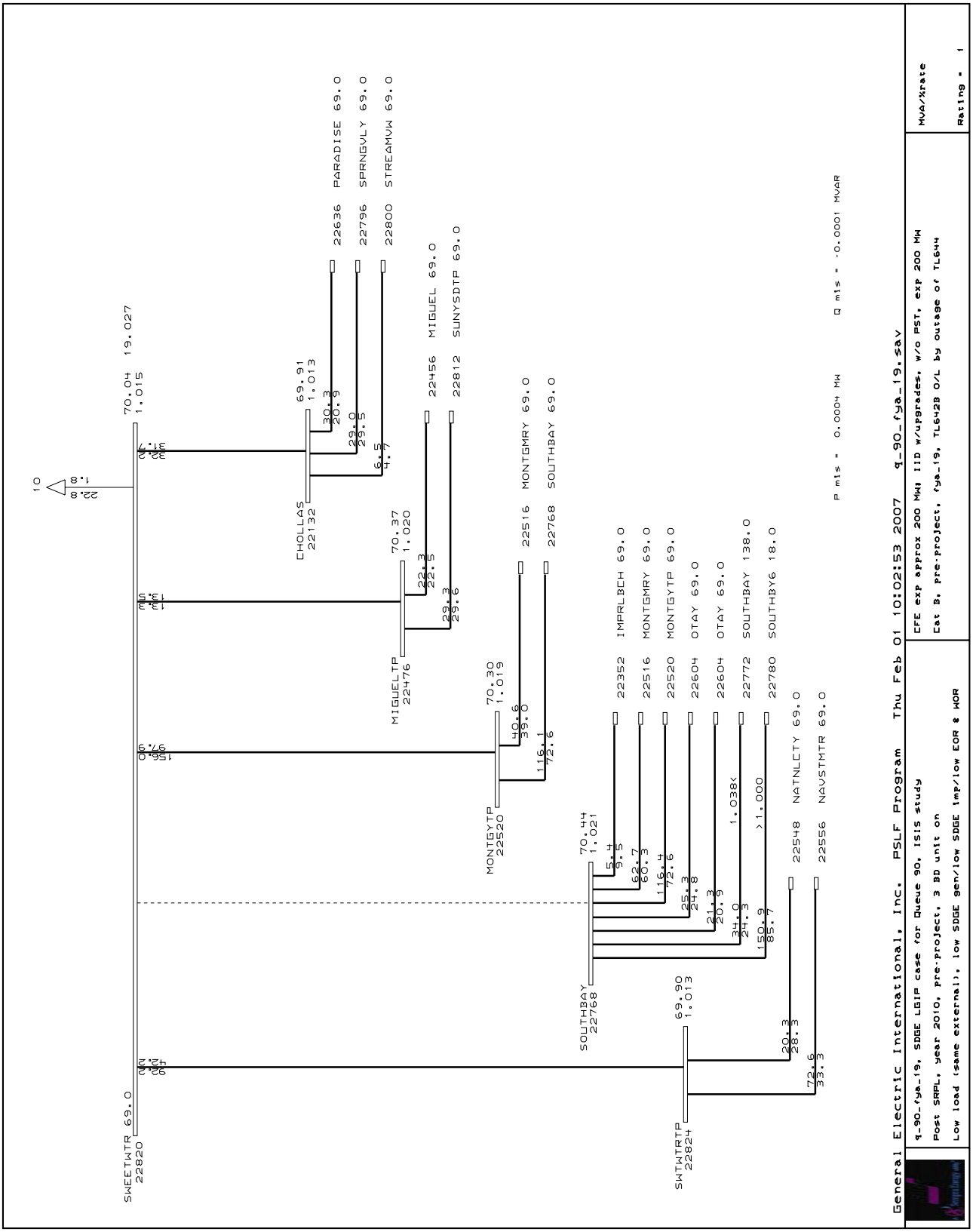
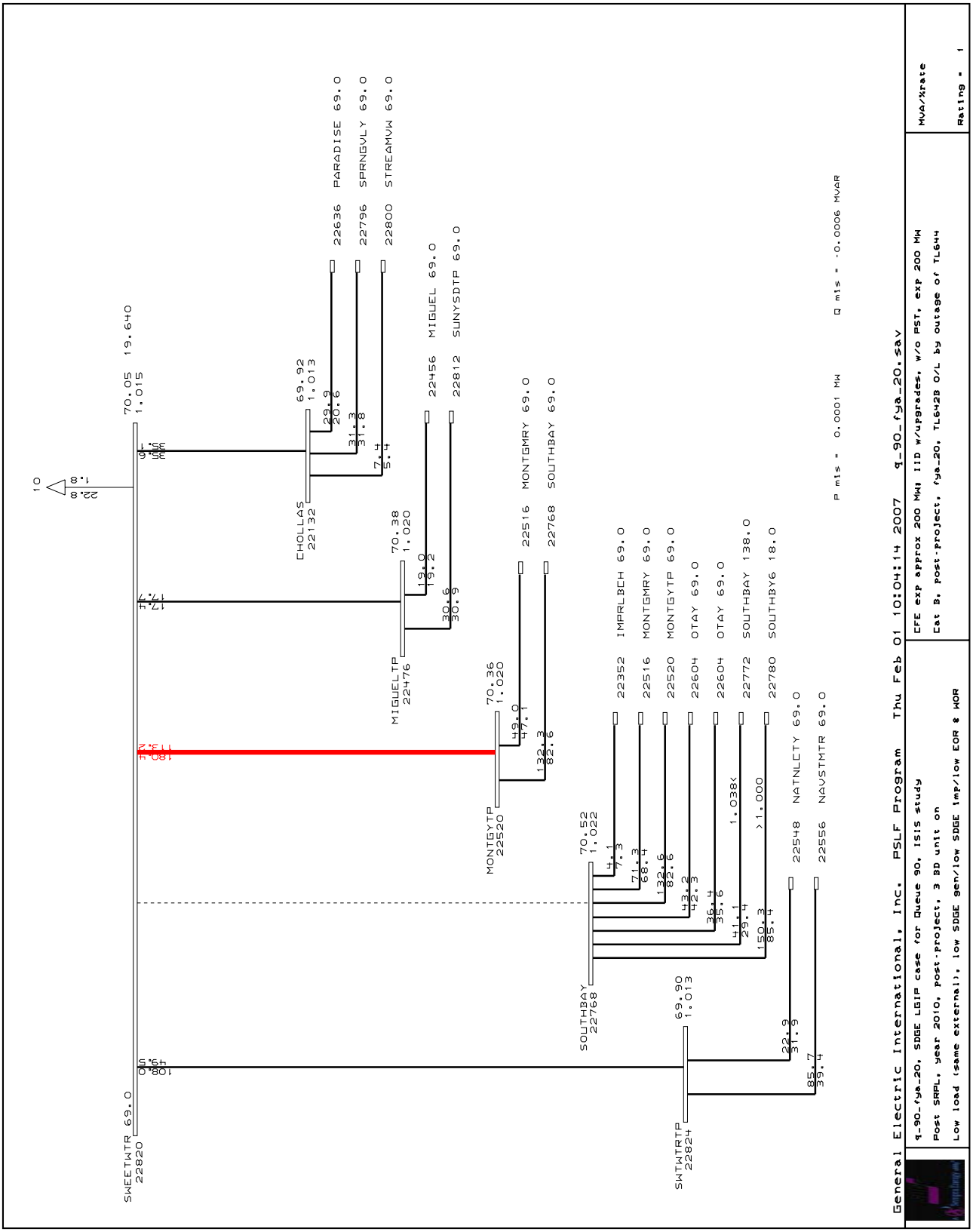
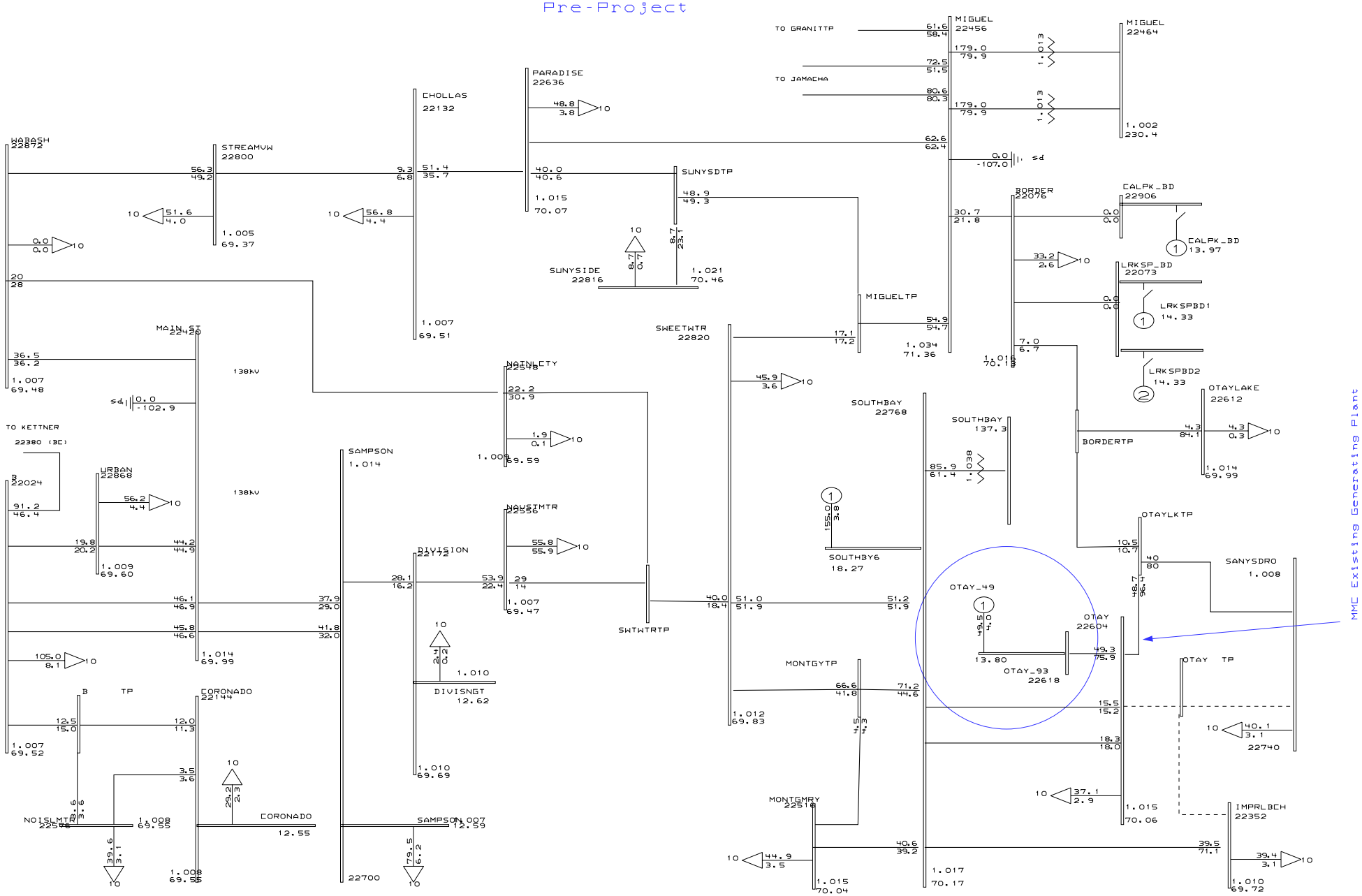


Figure v; Post-project, FY_20, TL642B O/L by outage of TL644:



# Cat B Contingency Plots of SDG&E Southern 69 kV System

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

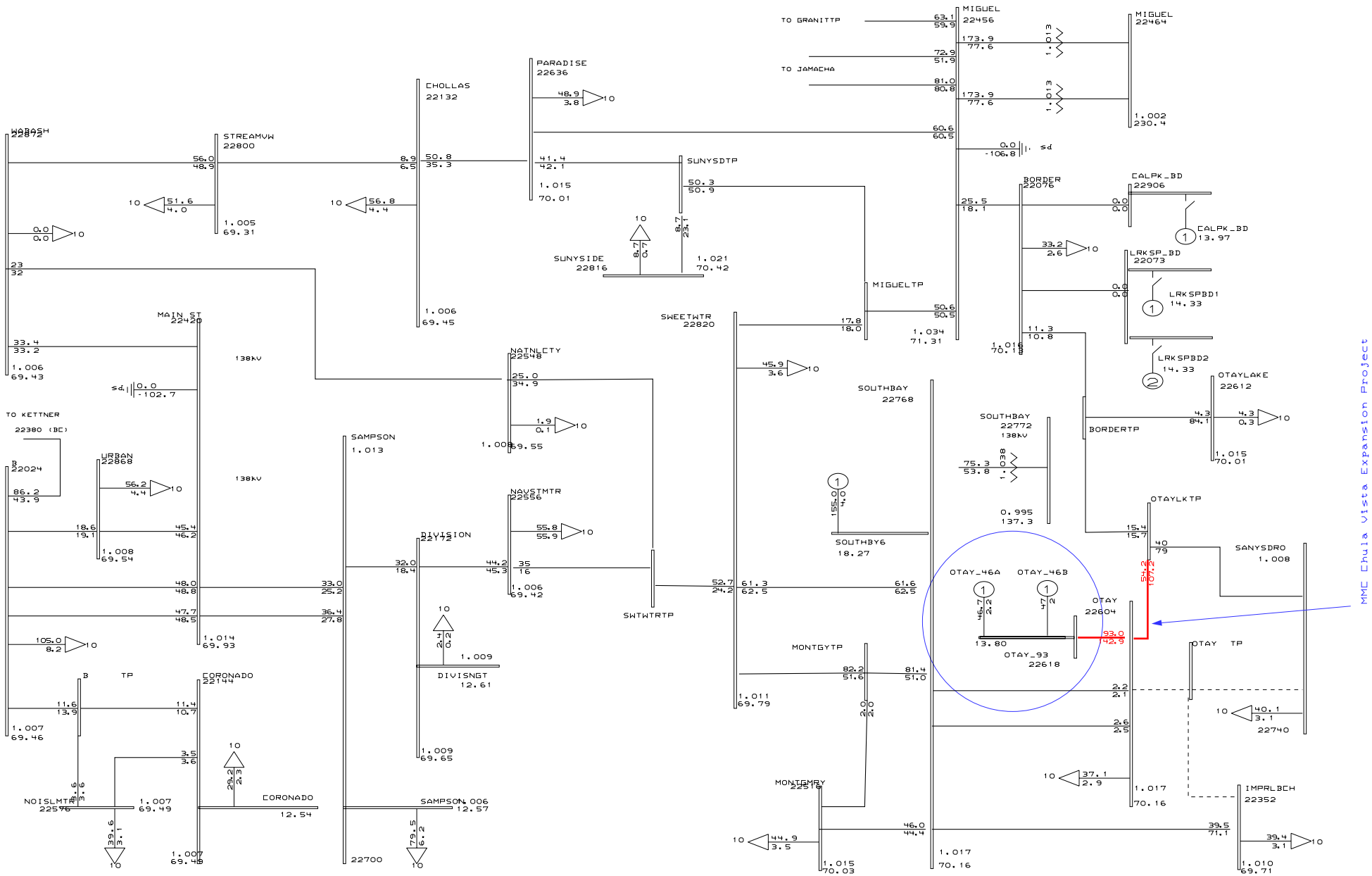



General Electric International, Inc. PSLF Program Wed Jan 24 10:53:23 2007 q_90_fya_1.sav

| | | |
|---|---|---|
| queue_90_1, SDGE LGIP case for Queue 90<br>Post SRPL, year 2010, pre-project, O BD unit on<br>HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW<br>Outage: TL623-Imperial Beach-Otay-San Ysidro | MVA/%rate<br>metro_pre.drw<br>Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

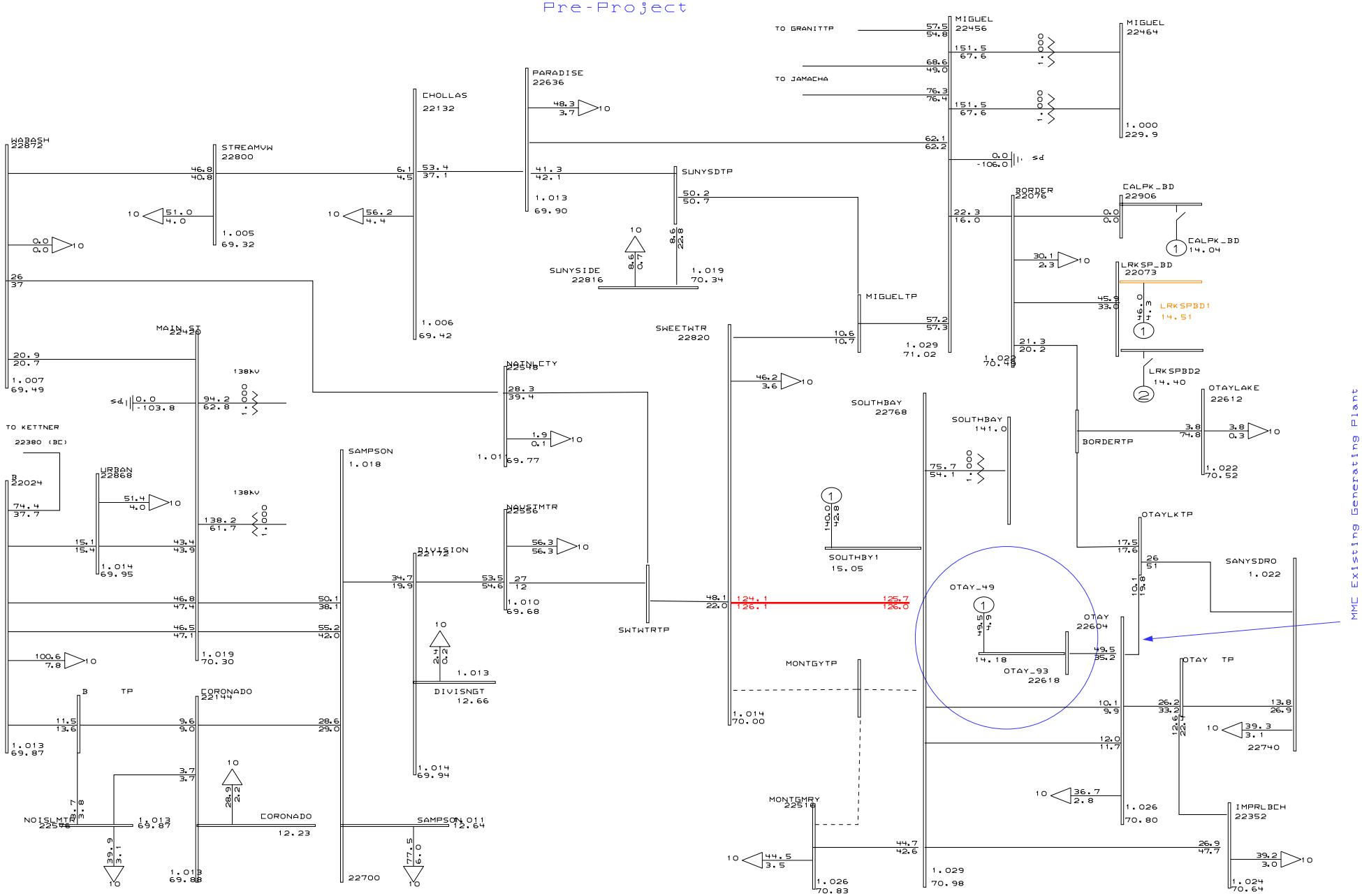
## Post-Project




General Electric International, Inc. PSLF Program Wed Jan 24 10:55:39 2007 q_90_fya_2.sav

| | | |
|---|---|---|
| queue_90_2, SDGE LGIP case for Queue 90 | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW | MVA/%rate |
| Post SRPL, year 2010, post project, 0 BD on | Outage: TL623-Imperial Beach-Otay-San Ysidro | metro_post.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

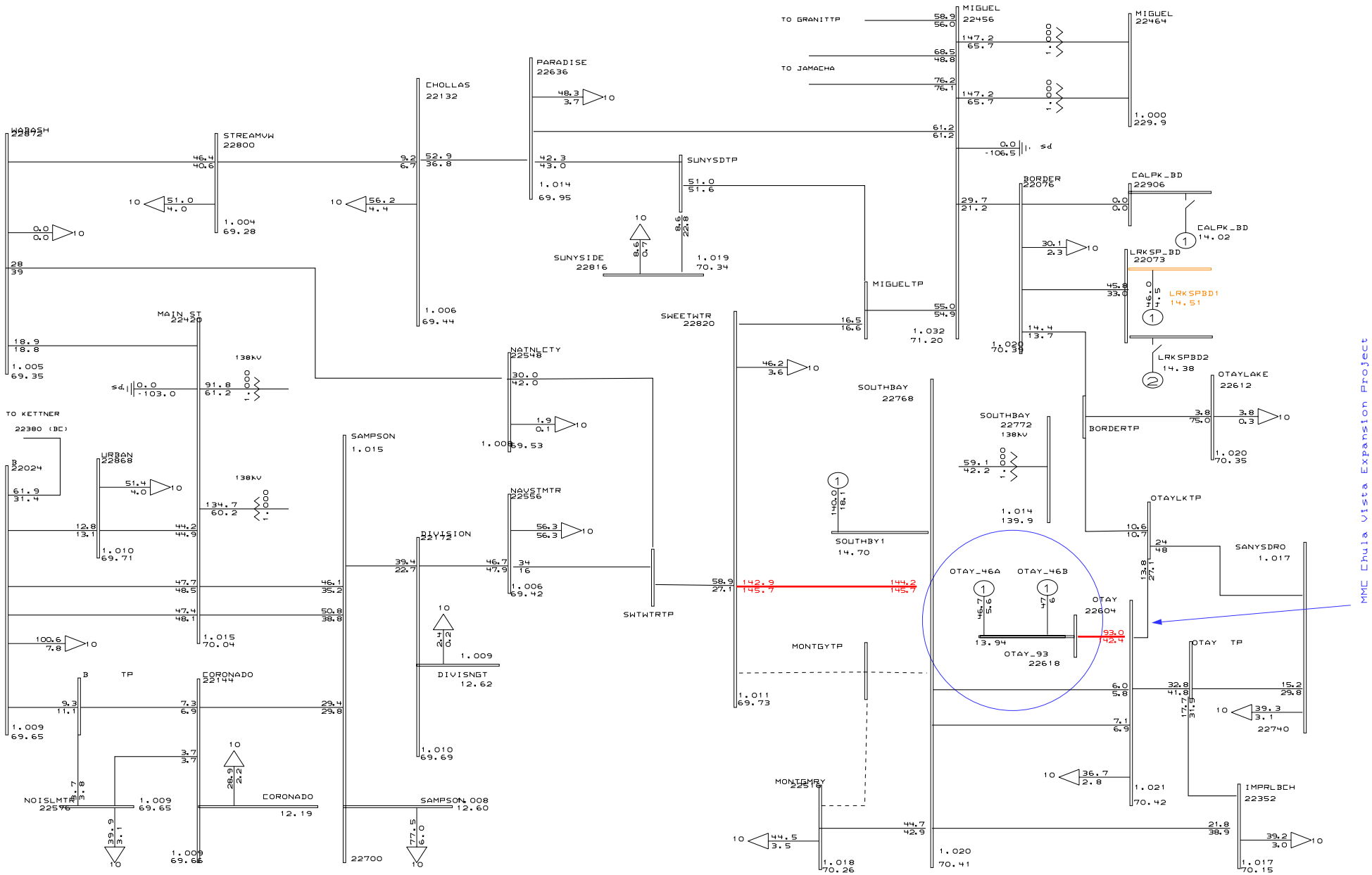



General Electric International, Inc. PSLF Program Wed Jan 24 11:47:35 2007 q_90_cod_c.sav

| | | |
|---|---|---|
| q_90_cod_c, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, pre-project, 1 BD unit on | Outage: TL642-Montgomery-Sweetwater-Southbay | metro_pre.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

## Post-Project

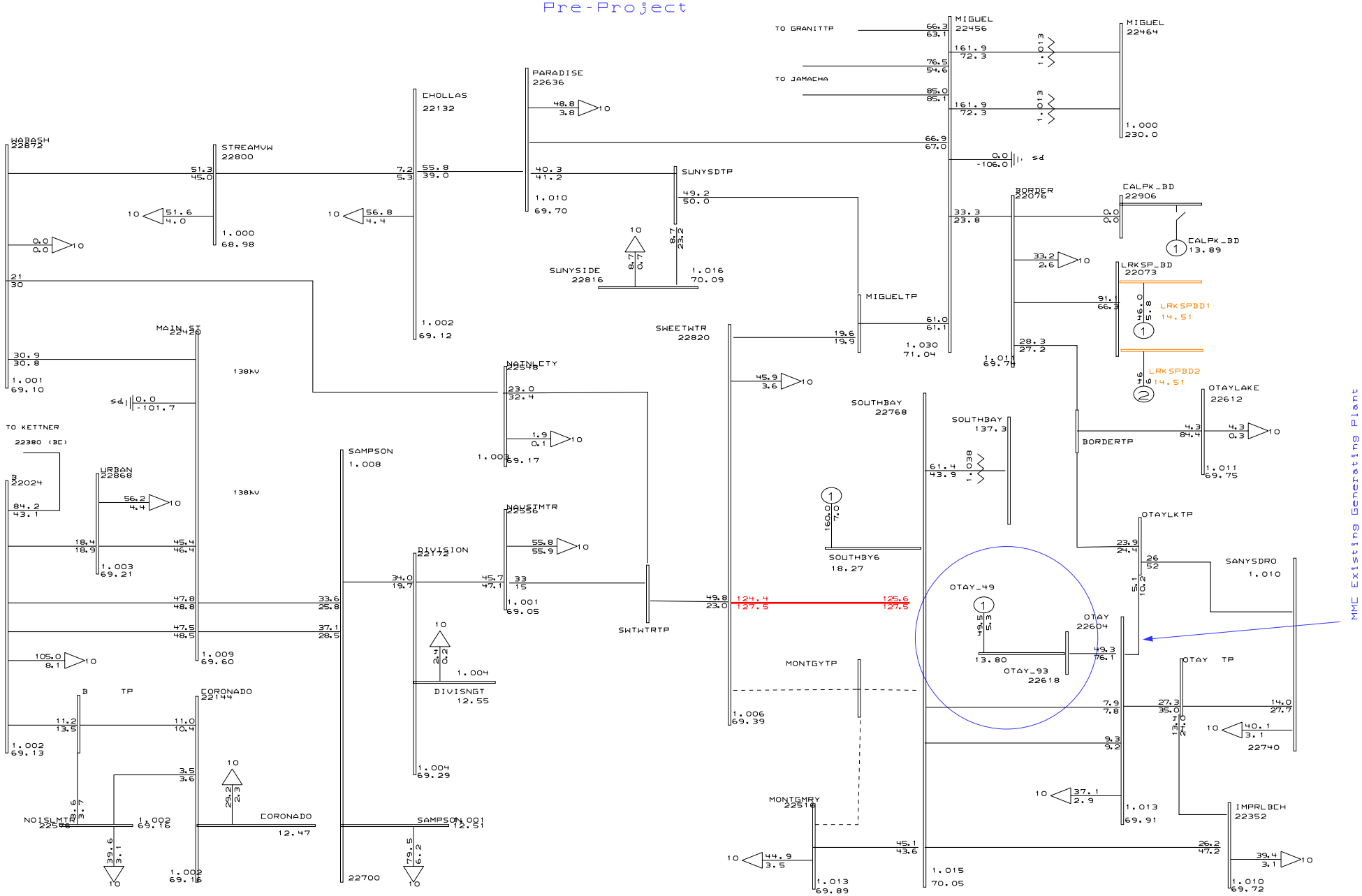



General Electric International, Inc. PSLF Program Wed Jan 24 11:50:05 2007 q_90_cod_d.sav

| | | |
|---|---|---|
| q_90_cod_d, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, post-project, 1 BD unit on | Outage: TL642-Montgomery-Sweetwater-Southbay | metro_post.drw |
| HS peak, high SDGE gen/low SDGE imp/low WOR & hi EOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

## Pre-Project




General Electric International, Inc. PSLF Program Wed Jan 24 11:10:00 2007 q_90_fya_5.sav

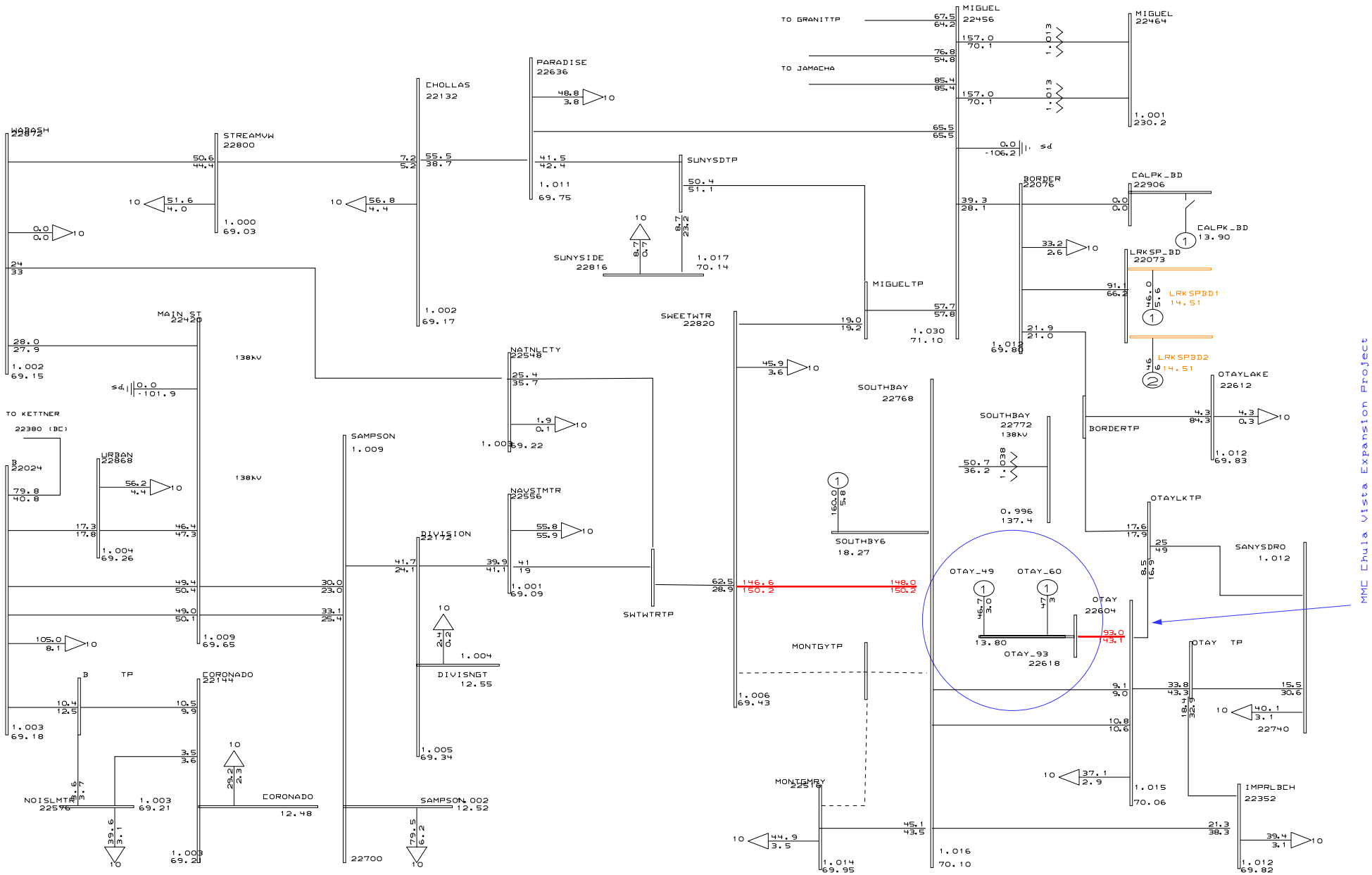
queue_90_5, SDGE LGIP case for Queue 90
Post SRPL, year 2010, pre-project, 2 BD unit on
HS peak, high SDGE gen/low SDGE imp/low EOR & WOR

CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW
Outage: TL642-Montgomery-Sweetwater-Southbay

MVA/%rate
metro_pre.drw
Rating = 1

# Queue 90: MMC Chula Vista Expansion Project

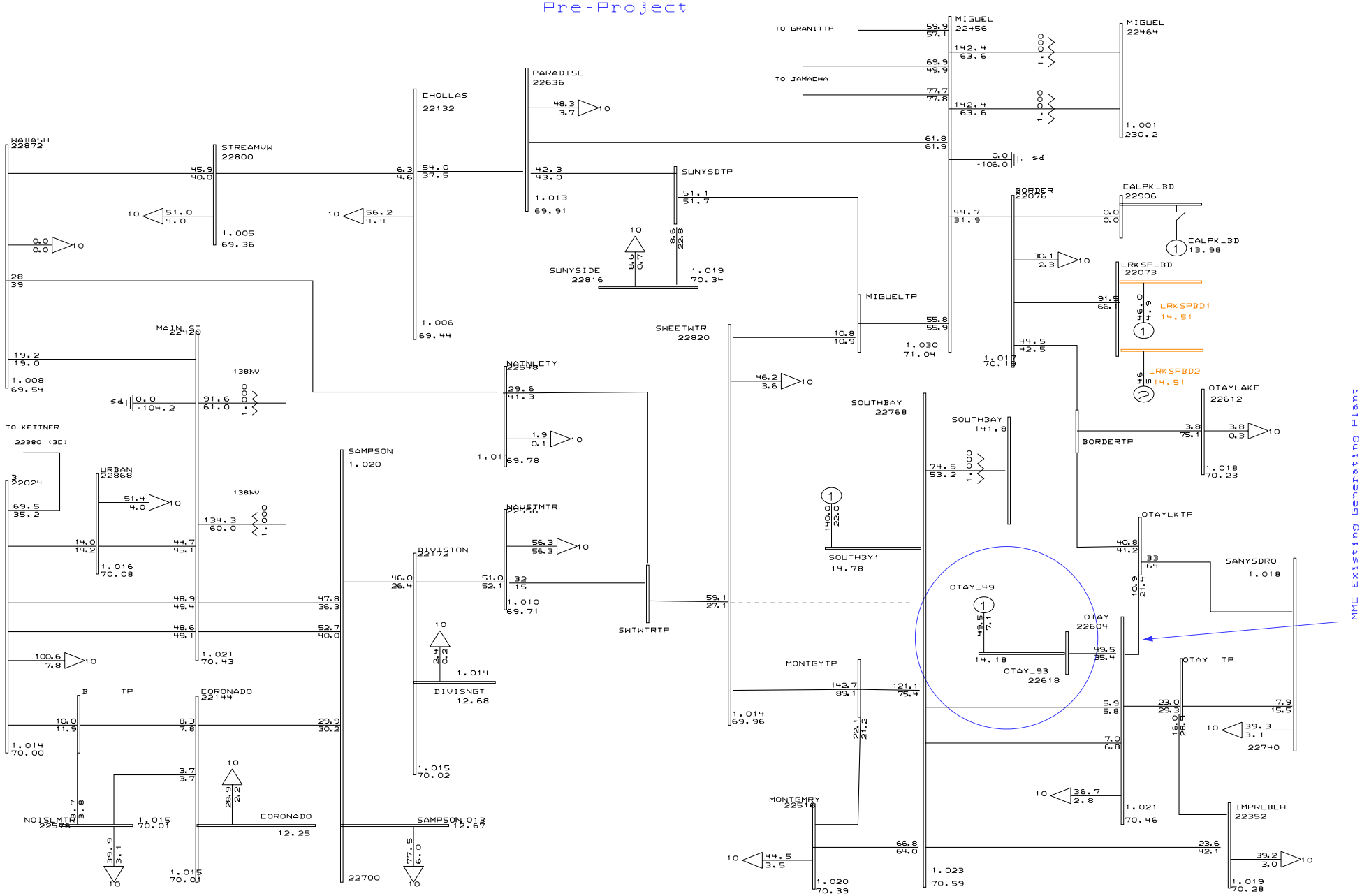
## Post-Project




General Electric International, Inc. PSLF Program Wed Jan 24 11:16:19 2007 q_90_fya_6.sav

| | | |
|---|---|---|
| queue_90_6, SDGE LGIP case for Queue 90 | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW | MVA/%rate |
| Post SRPL, year 2010, post-project, 2 BD unit on | Outage: TL642-Montgomery-Sweetwater-Southbay | metro_post.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

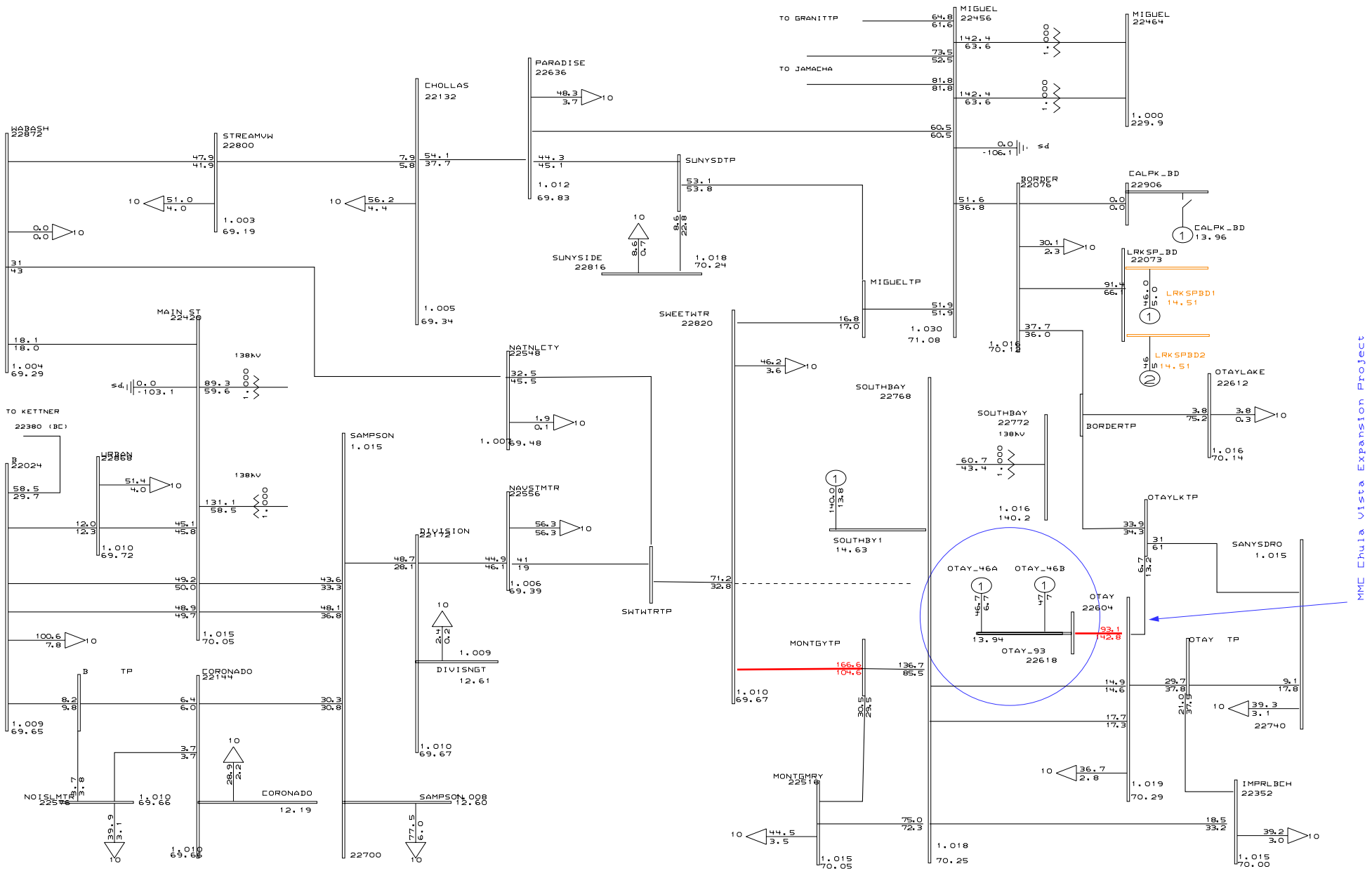



General Electric International, Inc. PSLF Program Wed Jan 24 13:20:14 2007 q_90_cod_e.sav

| | | |
|---|---|---|
| q_90_cod_e, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, pre-project, 2 BD unit on | Outage: TL644-Sweetwater-Southbay | metro_pre.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

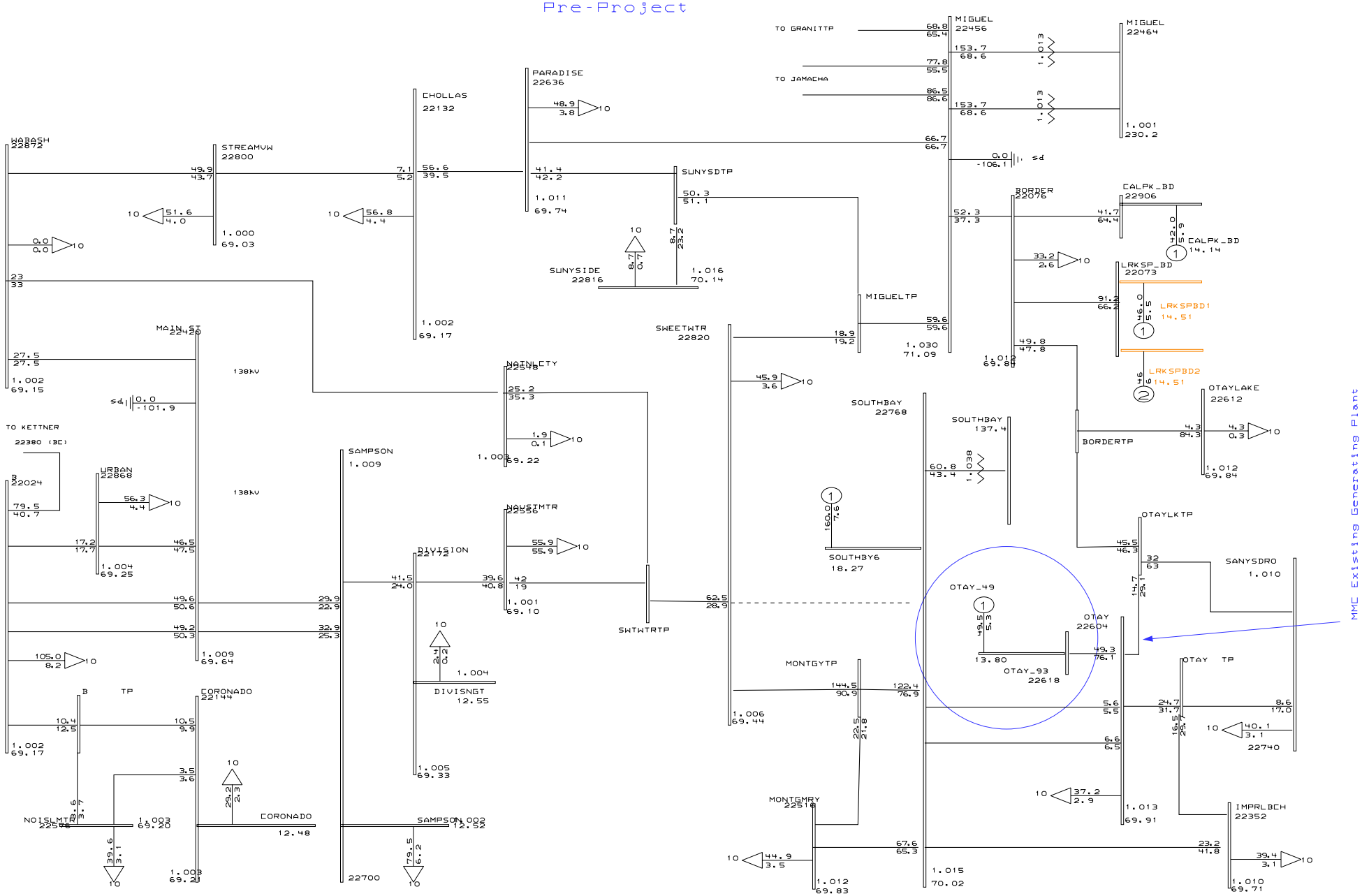
## Post-Project




General Electric International, Inc. PSLF Program Wed Jan 24 13:21:55 2007 q_90_cod_f.sav

| | | |
|---|---|---|
| q_90_cod_f, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, post-project, 2 BD unit on | Outage: TL644-Sweetwater-Southbay | metro_post.drw |
| HS peak, high SDGE gen/low SDGE imp/low WOR & hi EOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

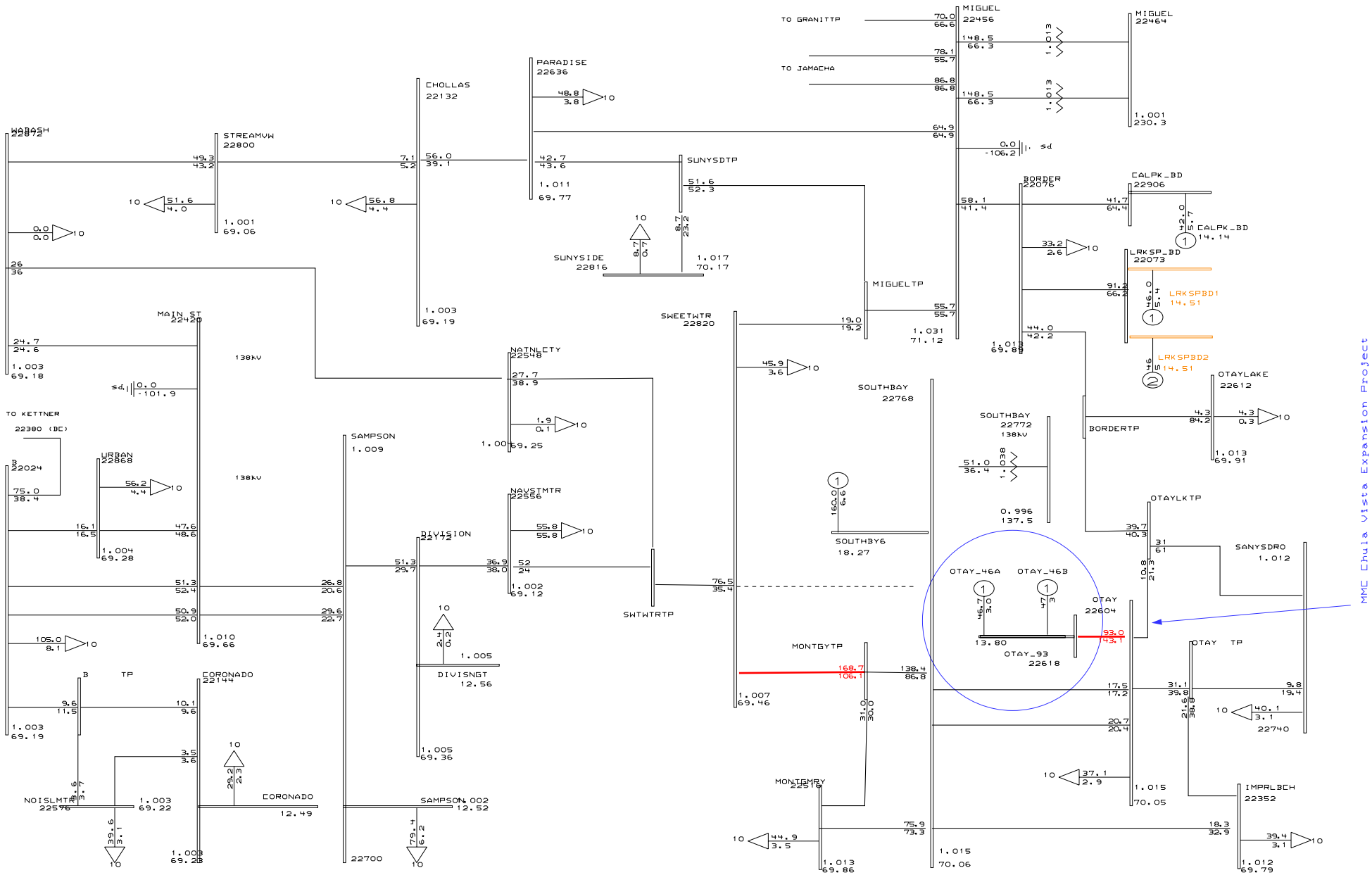



General Electric International, Inc. PSLF Program Wed Jan 24 12:57:39 2007 q_90_fya_7.sav

| | | |
|---|---|---|
| queue_90_7, SDGE LGIP case for Queue 90 | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW | MVA/%rate |
| Post SRPL, year 2010, pre-project, 3 BD unit on | Outage: TL644-Sweetwater-Southbay | metro_pre.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

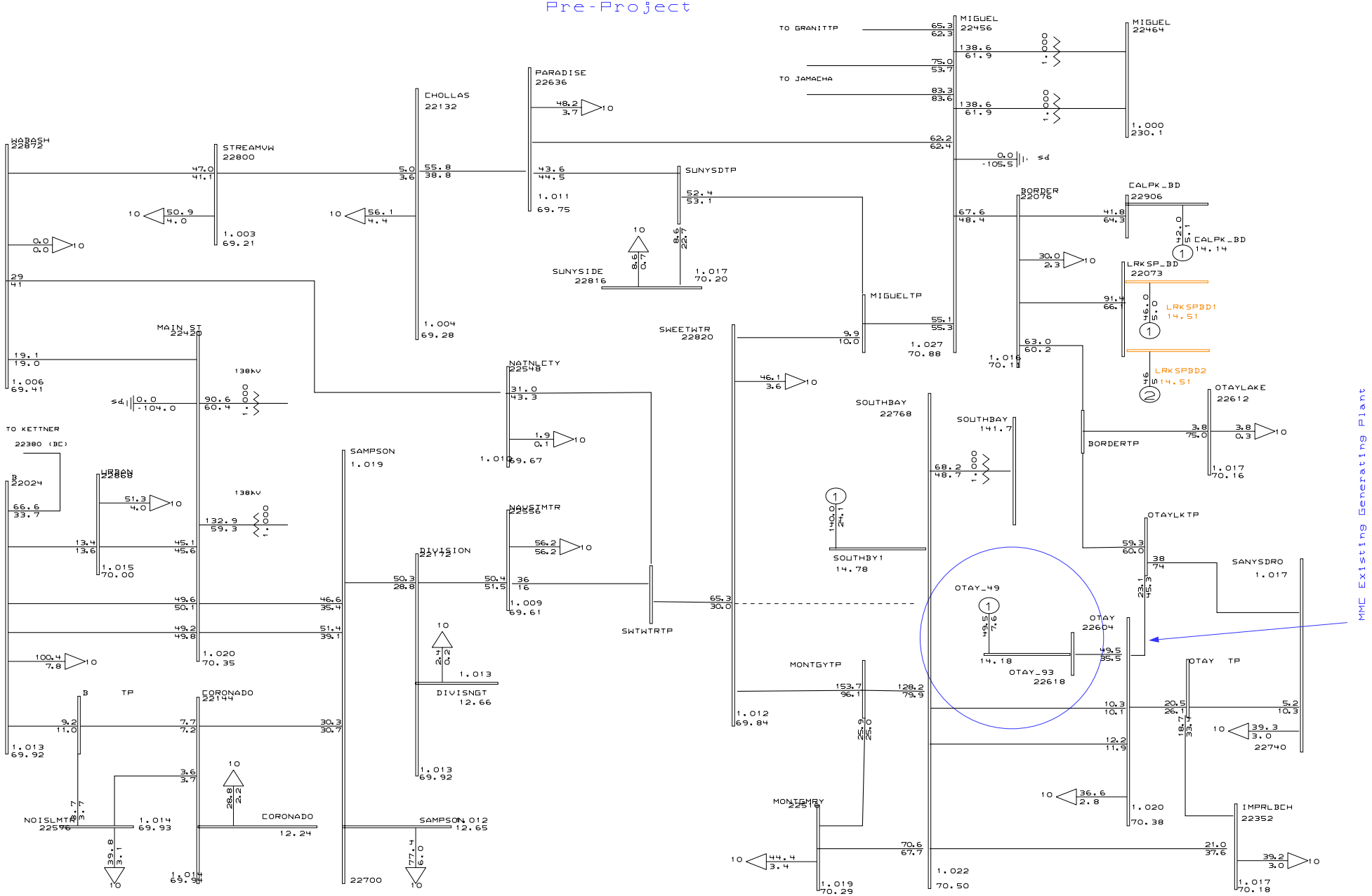
## Post-Project




General Electric International, Inc. PSLF Program Wed Jan 24 12:59:46 2007 q_90_fya_8.sav

| | | |
|---|---|---|
| queue_90_8, SDGE LGIP case for Queue 90 | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW | MVA/%rate |
| Post SRPL, year 2010, post-project, 3 BD unit on | Outage: TL644-Sweetwater-Southbay | metro_post.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

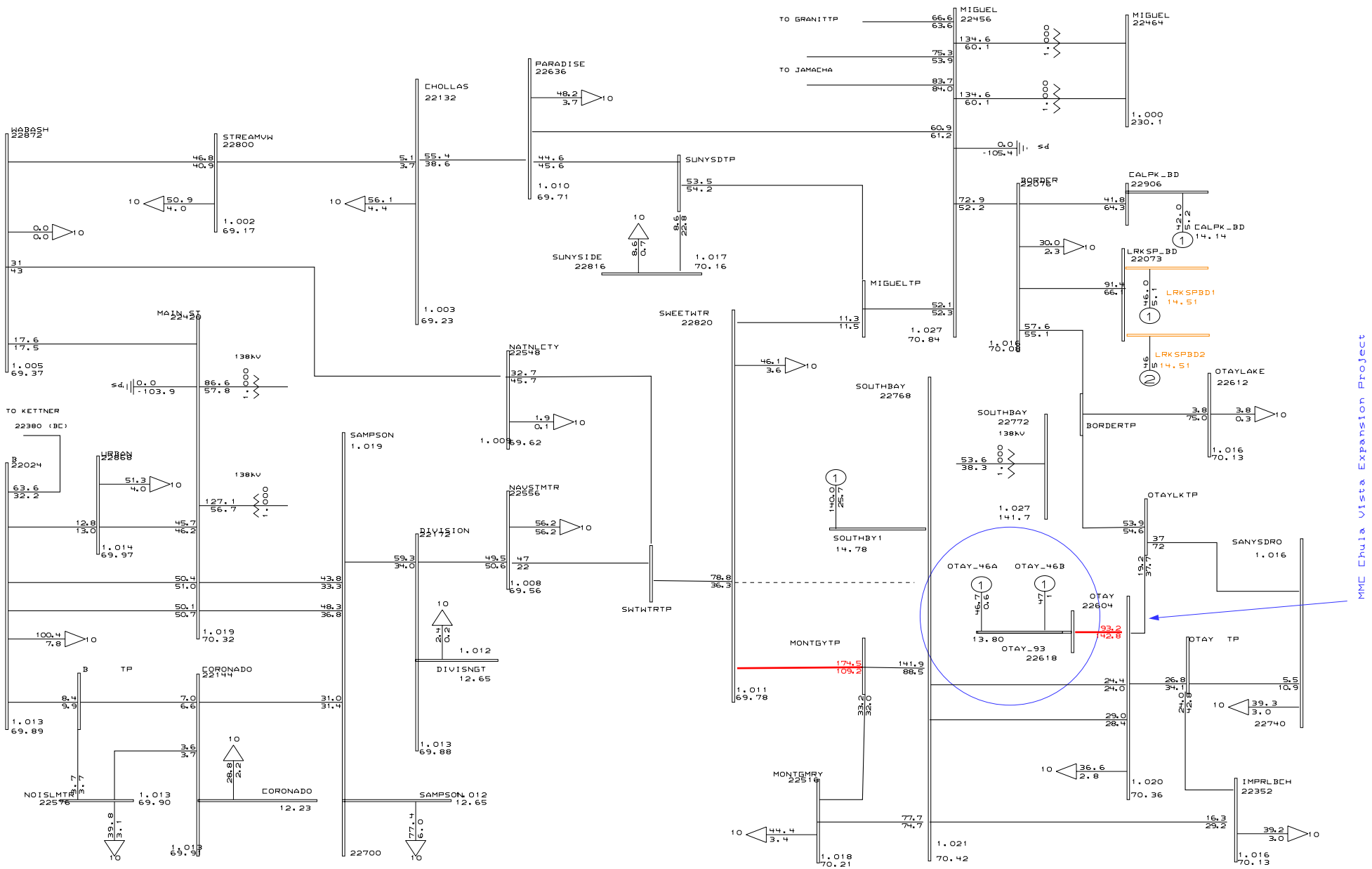



General Electric International, Inc. PSLF Program Wed Jan 24 13:24:04 2007 q_90_cod_g.sav

| | | | |
|---|---|---|---|
| | q_90_cod_g, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| | Pre SRPL, pre-project, 3 BD unit on | Outage: TL644-Sweetwater-Southbay | metro_pre.drw |
| | HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

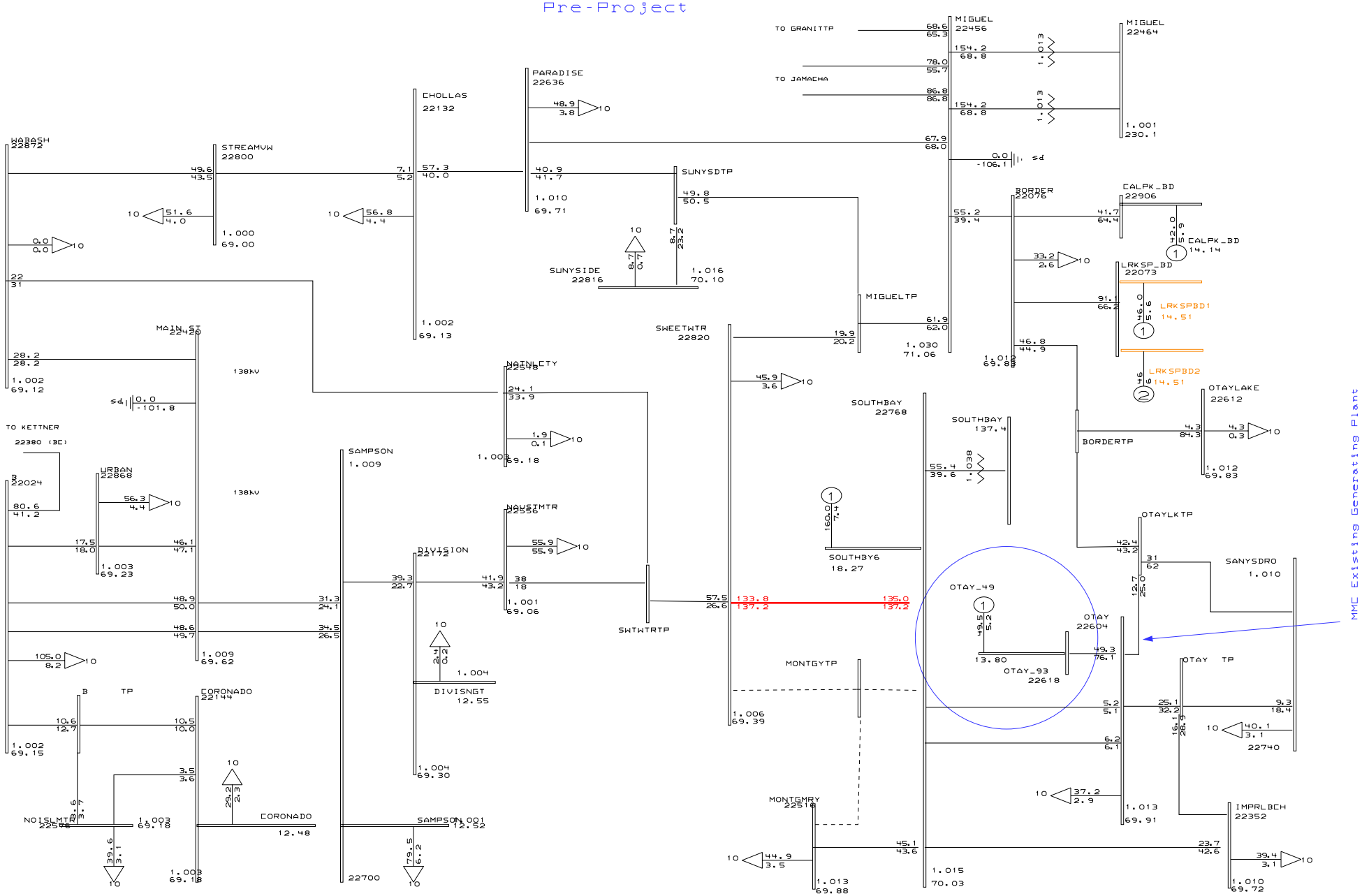
## Post-Project




General Electric International, Inc. PSLF Program Wed Jan 24 13:25:50 2007 q_90_cod_h.sav

| | | |
|---|---|---|
| q_90_cod_h, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, post-project, 3 BD unit on | Outage: TL644-Sweetwater-Southbay | metro_post.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

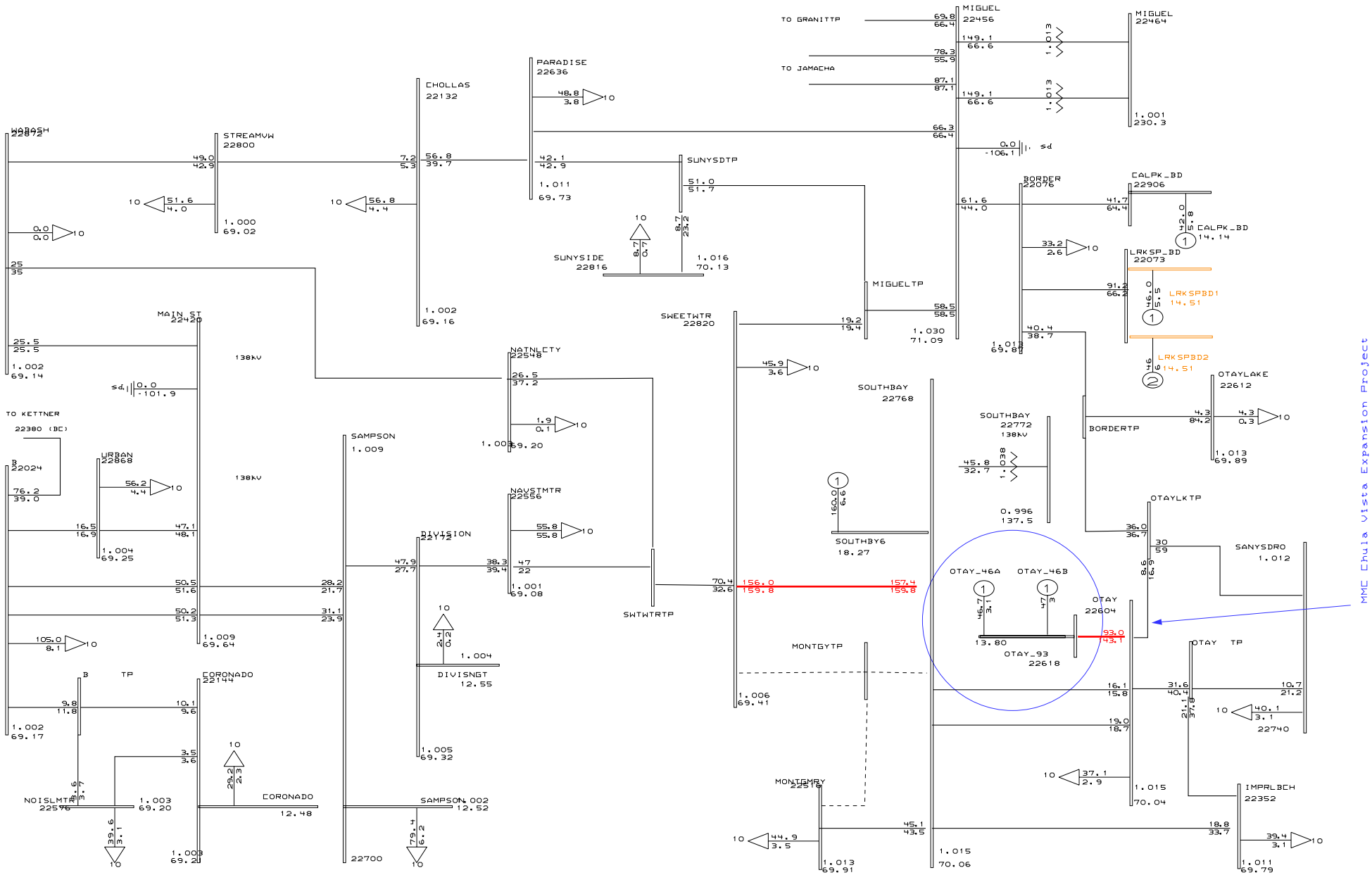



General Electric International, Inc. PSLF Program Wed Jan 24 11:42:45 2007 q_90_fya_7.sav

| | | |
|---|---|---|
| queue_90_7, SDGE LGIP case for Queue 90 | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW | MVA/%rate |
| Post SRPL, year 2010, pre-project, 3 BD unit on | Outage: TL642-Montgomery-Sweetwater-Southbay | metro_pre.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

## Post-Project

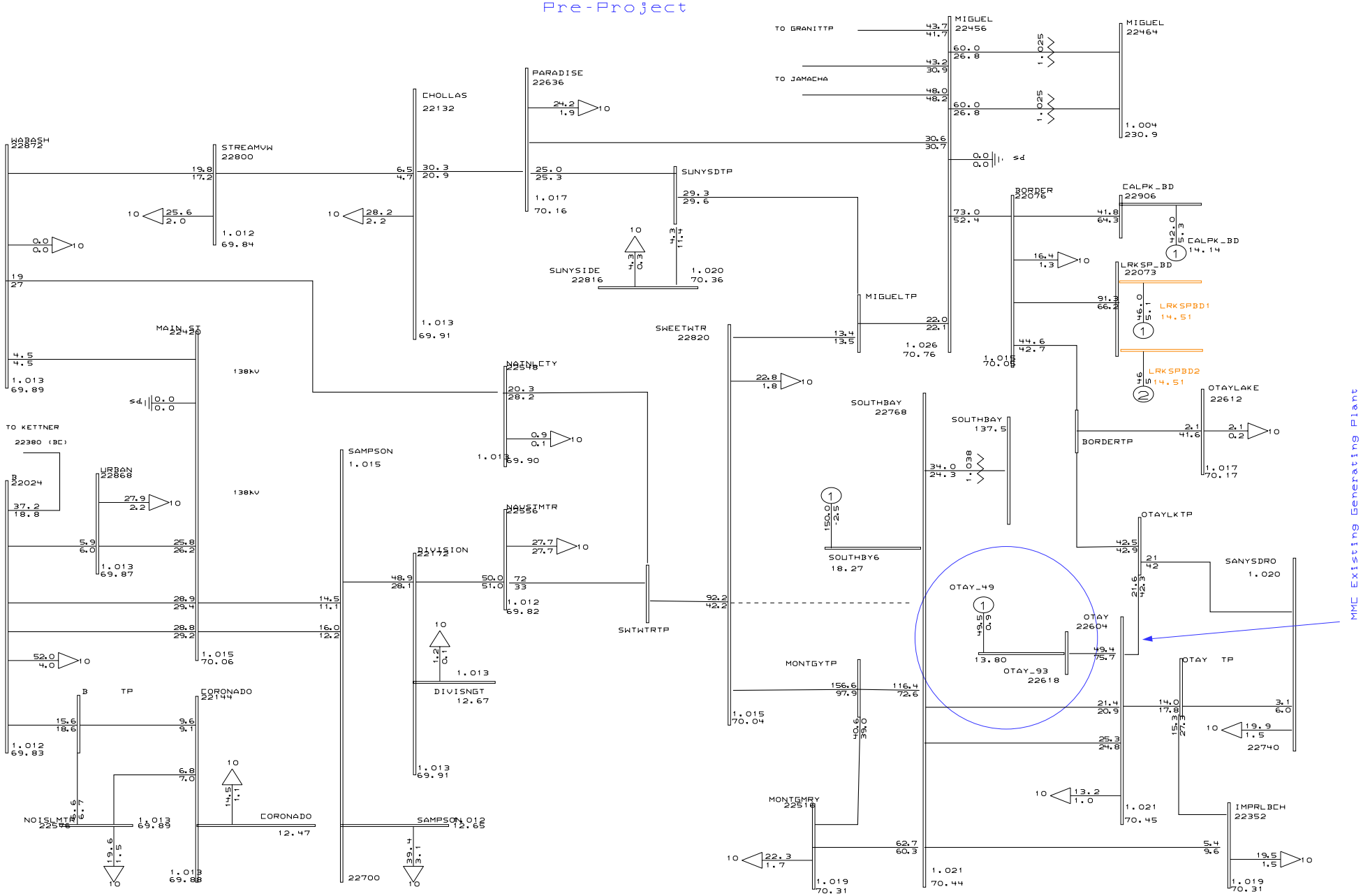



General Electric International, Inc. PSLF Program Wed Jan 24 11:44:28 2007 q_90_fya_8.sav

| | | |
|---|---|---|
| queue_90_8, SDGE LGIP case for Queue 90<br>Post SRPL, year 2010, post-project, 3 BD unit on<br>HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW<br>Outage: TL642-Montgomery-Sweetwater-Southbay | MVA/%rate<br>metro_post.drw<br>Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

## Pre-Project

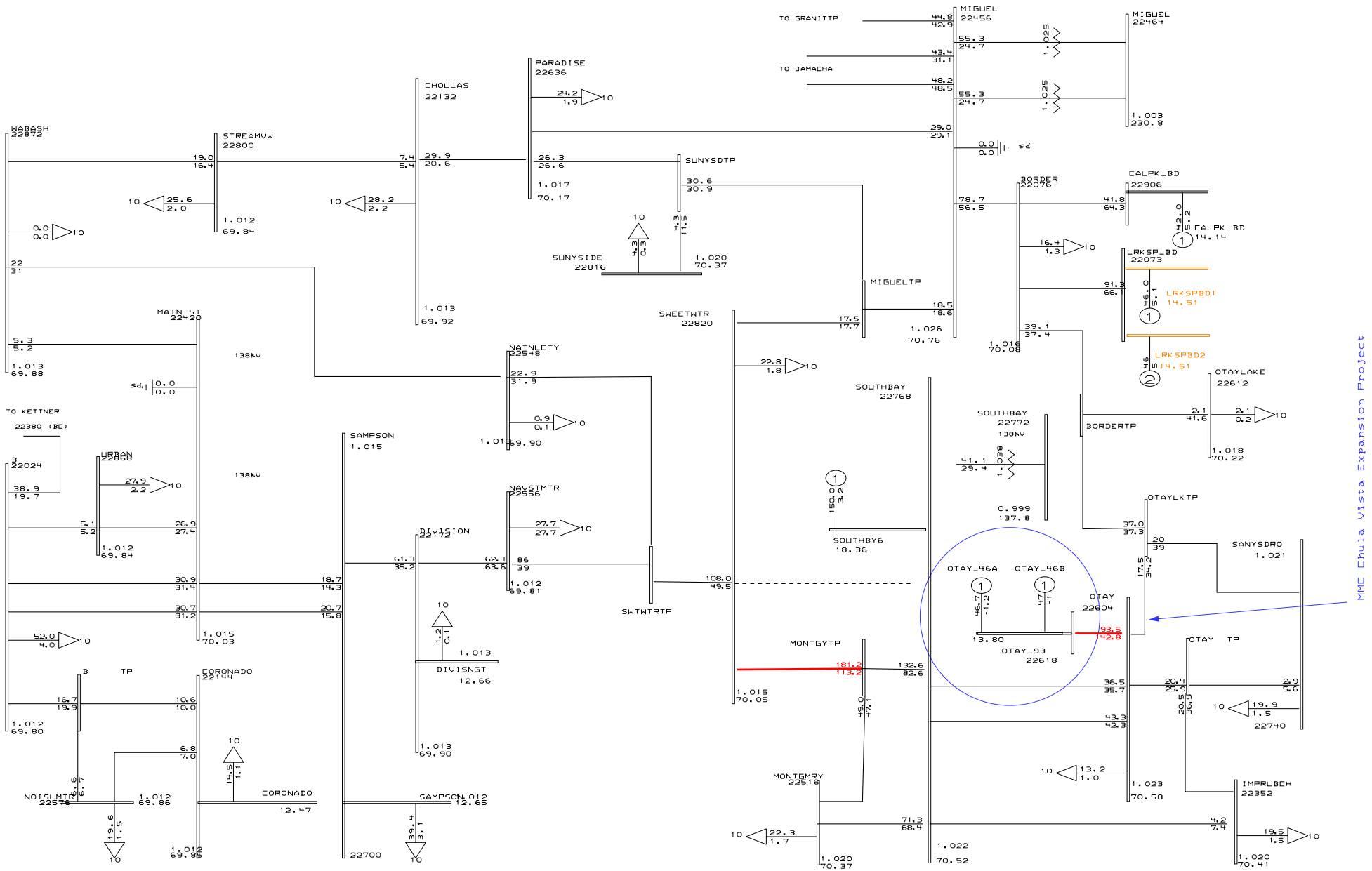



General Electric International, Inc. PSLF Program Wed Jan 24 13:14:59 2007 q_90_fya_19.sav

| | | |
|---|---|---|
| q_90_fya_19, SDGE LGIP case for Queue 90, ISIS study<br>Post SRPL, year 2010, pre-project, 3 BD unit on<br>Low load (same external), low SDGE gen/low SDGE imp/low EOR & WOR | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW<br>Outage: TL644-Sweetwater-Southbay | MVA/%rate<br>metro_pre.drw<br>Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

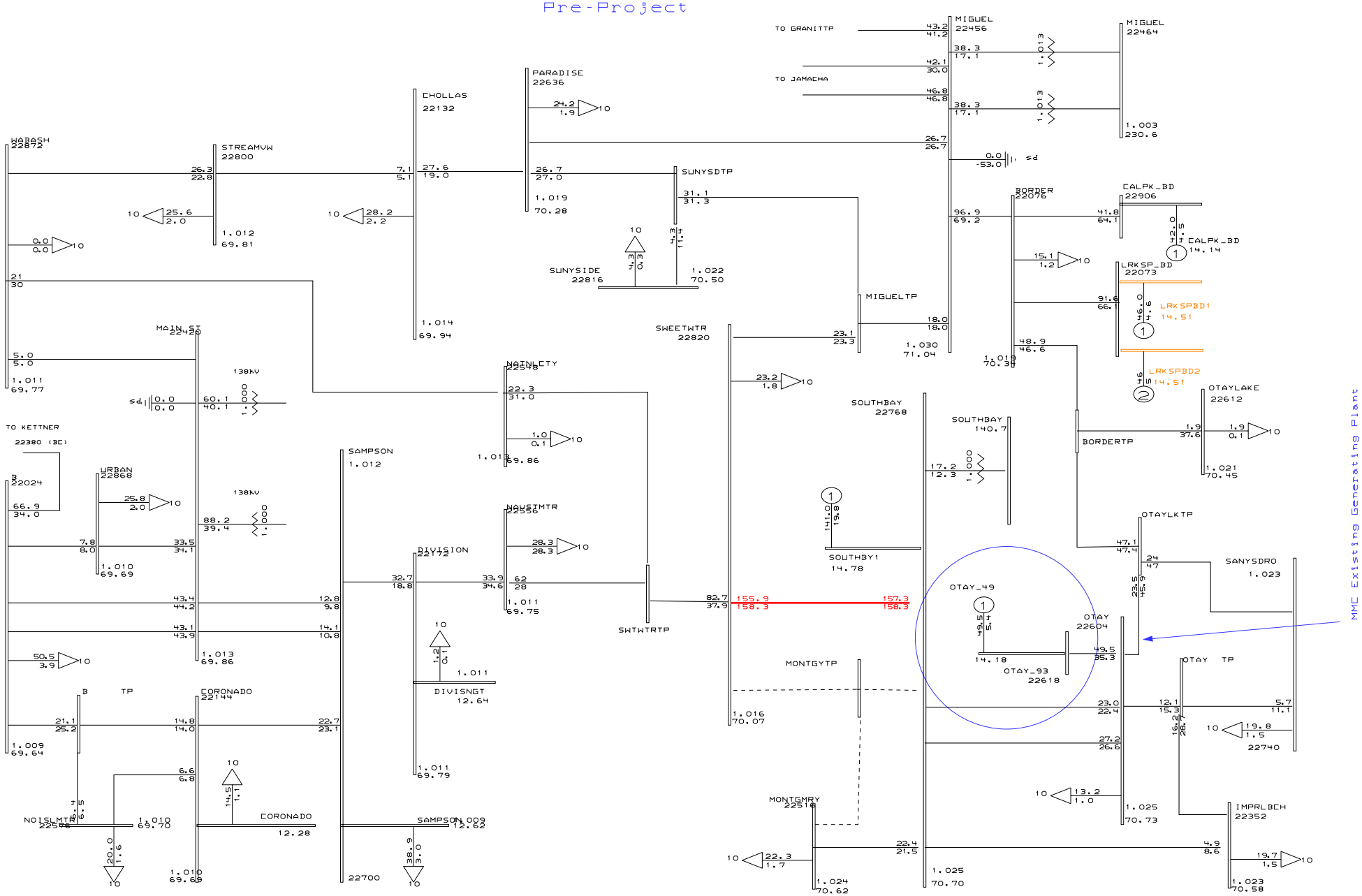
## Post-Project




General Electric International, Inc. PSLF Program Wed Jan 24 13:16:51 2007 q_90_fya_20.sav

| | | |
|---|---|---|
| q_90_fya_20, SDGE LGIP case for Queue 90, ISIS study<br>Post SRPL, year 2010, post-project, 3 BD unit on<br>Low load (same external), low SDGE gen/low SDGE imp/low EOR & WOR | CFE exp approx 200 MW; IID w/upgrades, w/o PST, exp 200 MW<br>Outage: TL644-Sweetwater-Southbay | MVA/%rate<br>metro_post.drw<br>Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

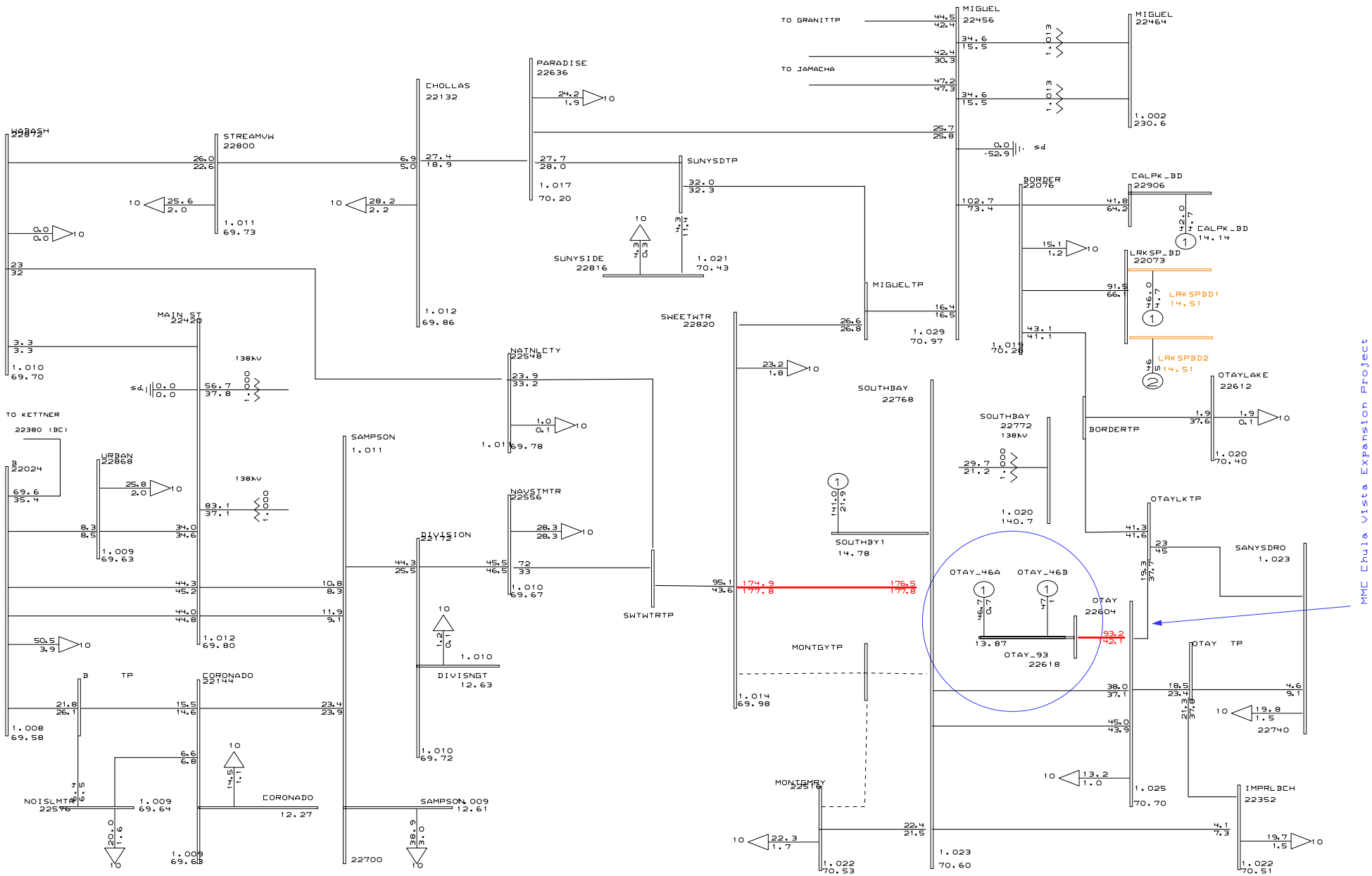



General Electric International, Inc. PSLF Program Wed Jan 24 11:53:11 2007 q_90_cod_s.sav

| | | |
|---|---|---|
| q_90_cod_s, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, pre-project, 3 BD unit on | Outage: TL642-Montgomery-Sweetwater-Southbay | metro_pre.drw |
| low load, low OTAY load, lo SDGE gen/hi SY gen/low SDGE imp/med EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

## Post-Project



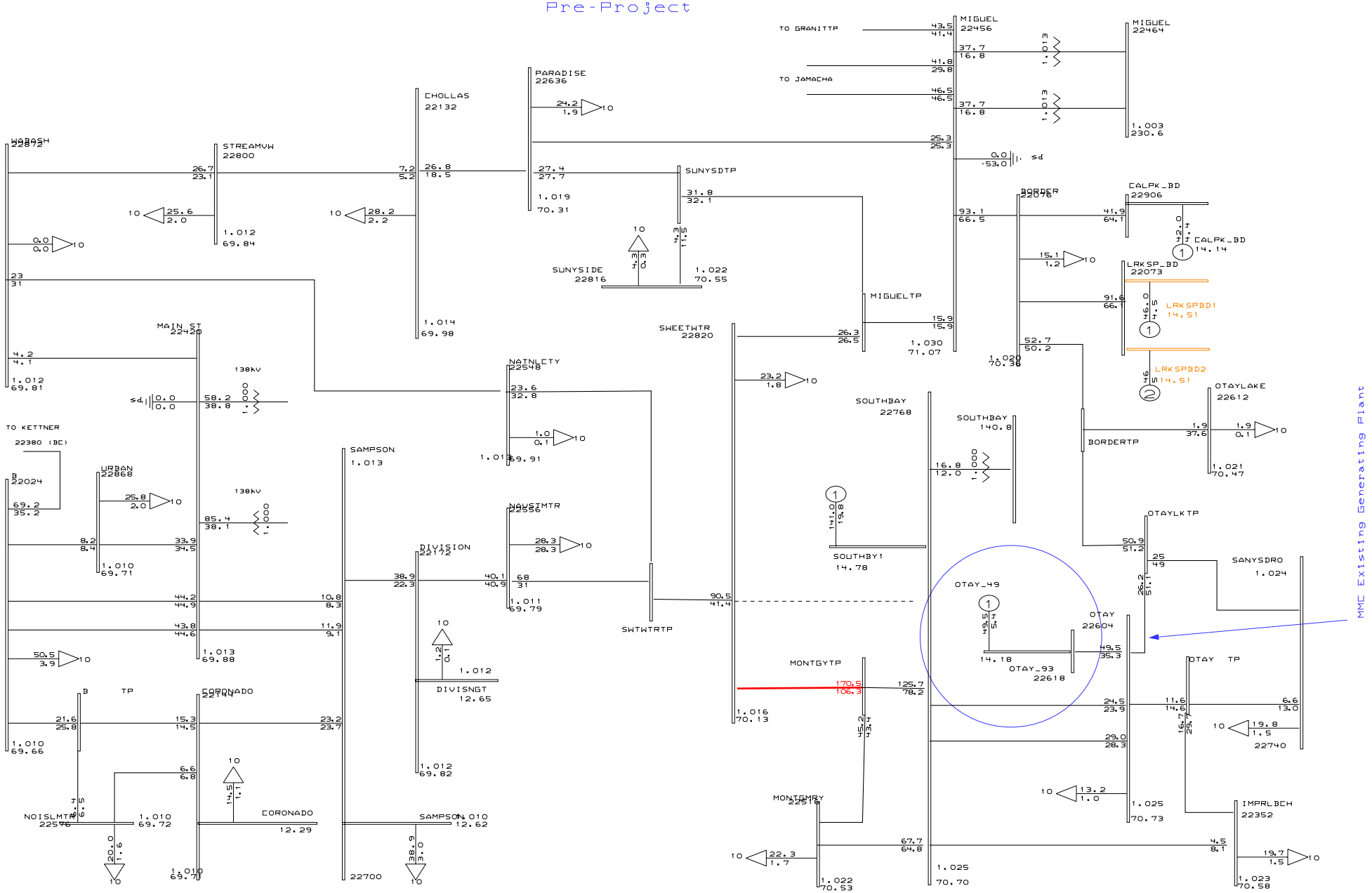

General Electric International, Inc. PSLF Program Wed Jan 24 11:55:36 2007 q_90_cod_t.sav

q_90_cod_t, SDGE LGIP case for Queue 90, year 2008
Pre SRPL, post-project, 3 BD unit on
low load, lo OTAY load, lo SDGE gen/hi SY gen/low SDGE imp/med EOR & WOR

CFE exp approx 100 MW; IID w/o PST, exp 100 MW
Outage: TL642-Montgomery-Sweetwater-Southbay

MVA/%rate
metro_post.drw
Rating = 1

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

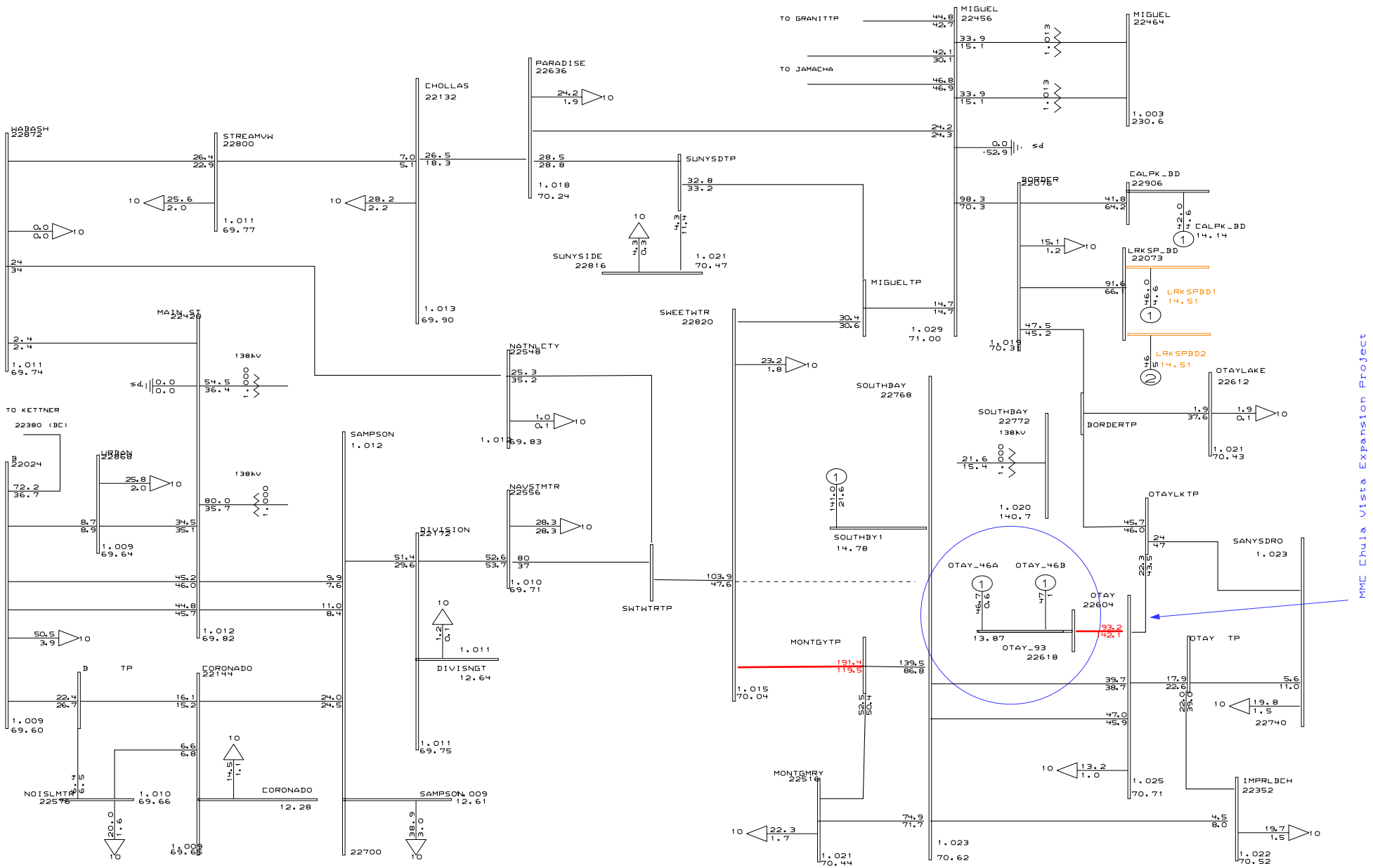



General Electric International, Inc. PSLF Program Wed Jan 24 13:27:52 2007 q_90_cod_s.sav

| | | |
|---|---|---|
| q_90_cod_s, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, pre-project, 3 BD unit on | Outage: TL644-Sweetwater-Southbay | metro_pre.drw |
| low load, low OTAY load, lo SDGE gen/hi SY gen/low SDGE imp/med EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

## Post-Project




General Electric International, Inc. PSLF Program Wed Jan 24 13:29:33 2007 q_90_cod_t.sav

| | | |
|---|---|---|
| q_90_cod_t, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, post-project, 3 BD unit on | Outage: TL644-Sweetwater-Southbay | metro_post.drw |
| low load, lo OTAY load, lo SDGE gen/hi SY gen/low SDGE imp/med EOR & WOR | | Rating = 1 |

# Appendix G

## Cat C Thermal Contingency Results & Power Flow Plots

Interconnection System Impact Study
Queue 90, 93 MW Project
2008 Queued Time Frame, Commercial Operating Date Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Peak Hi ML Flow No SY Gen | Load | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | | < - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | | | | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| MVA1 pu Loading | | | | | | | C | a | s | e | N | a | m | e | | |
| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | cod_a | cod_b | cod_c | cod_d | cod_e | cod_f | cod_g | cod_h | cod_q | cod_r | cod_s | cod_t |
| **Category C** | | | | | | | | | | | | | | | | |
| LINE B 69kV-MAIN ST 69kV ck2 | Main St 69kV W Bus | 97 | 111 | 1.14 | 1.02 | 1.045 | 1.059 | 1.081 | 1.087 | 1.1 | 1.101 | 1.119 | | | | |
| LINE BERNARDO 69kV-R.CARMEL 69kV ck1 | POM-SX 1 + 2 69KV | 68 | 76 | 1.12 | 1.28 | 1.295 | 1.296 | 1.286 | 1.286 | 1.285 | 1.282 | 1.283 | 1.203 | 1.219 | | |
| | Poway 69kV Bus | 68 | 76 | 1.12 | 1.53 | 1.528 | 1.532 | 1.539 | 1.541 | 1.539 | 1.538 | 1.538 | 1.522 | 1.515 | | |
| LINE BORDER 69kV-BORDERTP 69kV ck1 | Miguel 69kV S Bus | 103 | 103 | 1.00 | | | | | | | 1.242 | 1.242 | 1.003 | | 1.382 | 1.381 |
| LINE BORREGO 69kV-NARROWS 69kV ck1 | Creelman 69kV E Bus | 12.5 | 14.5 | 1.16 | 1.03 | 1.017 | 1.031 | 1.017 | 1.031 | 1.018 | 1.03 | 1.03 | 1.021 | 1.015 | | |
| | Santa Ysabel 69kV Bus | 12.5 | 14.5 | 1.16 | 1.04 | 1.04 | 1.041 | 1.043 | 1.044 | 1.043 | 1.042 | 1.042 | 1.031 | 1.027 | | |
| LINE CAPSTRNO 138kV-PICO 138kV ck1 | TA-TB + LNL-SMO 138KV | 157 | 157 | 1.00 | 1.10 | 1.104 | 1.104 | 1.104 | 1.104 | 1.104 | 1.102 | 1.102 | 1.096 | 1.096 | | |
| LINE CHOLLAS 69kV-SPRNGVLY 69kV ck1 | ML-JM 1 + 2 69KV | 97 | 136 | 1.40 | 1.06 | 1.079 | 1.093 | 1.107 | 1.115 | 1.225 | 1.232 | 1.258 | 1.006 | 1.037 | | |
| LINE CREELMAN 69kV-SYCAMORE 69kV ck1 | CH-SX-SN 138KV + SAN VCNT-EL 69KV | 71 | 71 | 1.00 | | | | | | | | | 1.094 | 1.075 | | |
| | CH-SX-SN+LC-EL 138/69 KV | 71 | 71 | 1.00 | | | | | | | | | 1.16 | 1.139 | | |
| | Elliot 69kV S Bus | 71 | 71 | 1.00 | | | | | | | | | 1.012 | | | |
| | LC-SN + LC-EL 138/69 KV | 71 | 71 | 1.00 | | | | | | | | | 1.055 | 1.035 | | |
| | Los Coches 69kV W Bus | 71 | 71 | 1.00 | 1.06 | 1.032 | 1.065 | 1.03 | 1.065 | 1.029 | 1.062 | 1.063 | 1.051 | 1.047 | | |
| | Murray 69kV N Bus | 71 | 71 | 1.00 | | | | | | | | | 1.02 | 1.002 | | |
| LINE DEL MAR 69kV-DELMARTP 69kV ck1 | Del Mar 69kV E Bus | 50 | 54 | 1.08 | 1.08 | 1.079 | 1.081 | 1.08 | 1.08 | 1.08 | 1.078 | 1.078 | 1.075 | 1.071 | | |
| LINE DEL MAR 69kV-PENSQTOS 69kV ck1 | Penasquitos 69kV NW Bus | 50 | 50 | 1.00 | | | | 1.085 | 1.088 | 1.085 | 1.085 | 1.085 | | | | |
| | PEN-ES 1/2 230KV | 50 | 50 | 1.00 | | | | 1.019 | 1.022 | 1.02 | 1.02 | 1.02 | | | | |
| LINE DIVISION 69kV-NAVSTMTR 69kV ck1 | line SY-MI51 & SY-MI50 138 ck 1 | 97 | 100 | 1.03 | | | | | | | | | | | 1.011 | 1.098 |
| | Miguel 69kV S Bus | 97 | 100 | 1.03 | | | | | | | | | 1.374 | 1.167 | | |
| | ML BK71 & Miguel - Mission #1 230 kV | 97 | 100 | 1.03 | | | | | | | | | 1.081 | | | |
| | Murray 69kV N Bus | 97 | 100 | 1.03 | | | | | | | | | 1.015 | | | |
| LINE EASTGATE 69kV-ROSE CYN 69kV ck1 | Miramar 69kV W Bus | 50 | 50 | 1.00 | | | | | | | | | 1.075 | 1.049 | | |
| | Penasquitos 69kV SE Bus | 50 | 50 | 1.00 | | | | | | | | | 1.21 | 1.181 | | |
| LINE EL CAJON 69kV-LOSCOCHS 69kV ck1 | Murray 69kV N Bus | 55 | 59 | 1.07 | 1.03 | | | | | 1.15 | 1.142 | 1.115 | 1.281 | 1.242 | | |
| LINE ESCNDIDO 69kV-ASH 69kV ck1 | Escondido 69kV SW Bus | 120 | 120 | 1.00 | 1.02 | 1.005 | 1.01 | 1.005 | 1.01 | 1.006 | 1.01 | 1.01 | 1.065 | 1.044 | | |
| LINE ESCNDIDO 69kV-FELCTATP 69kV ck1 | Escondido 69kV SE Bus | 102 | 113 | 1.11 | | | | | | | | | 1.047 | 1.035 | | |
| | Escondido 69kV SW Bus | 102 | 113 | 1.11 | 1.00 | | | | | | | | 1.101 | 1.067 | | |
| | Felicita 69kV S Bus | 102 | 113 | 1.11 | | | | | | | | | 1.051 | 1.013 | | |
| LINE ESCNDIDO 69kV-FELICITA 69kV ck1 | Escondido 69kV SE Bus | 97 | 102 | 1.05 | | | | | | | | | 1.005 | | | |
| LINE ESCNDIDO 69kV-SANMRCOS 69kV ck1 | SA5W TRIP TL695 | 97 | 129 | 1.33 | 1.62 | 1.599 | 1.602 | 1.586 | 1.585 | 1.586 | 1.586 | 1.586 | 1.727 | 1.698 | | |
| | SA5W TRIPS SA LOAD | 97 | 129 | 1.33 | 1.21 | 1.181 | 1.183 | 1.166 | 1.164 | 1.165 | 1.166 | 1.166 | 1.299 | 1.27 | | |
| LINE GARFIELD 69kV-EL CAJON 69kV ck1 | Murray 69kV N Bus | 97 | 102 | 1.05 | 1.24 | 1.227 | 1.246 | 1.223 | 1.244 | 1.234 | 1.256 | 1.256 | 1.257 | 1.248 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2008 Queued Time Frame, Commercial Operating Date Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | cod_a | cod_b | cod_c | cod_d | cod_e | cod_f | cod_g | cod_h | cod_q | cod_r | cod_s | cod_t |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | | | | | | | | | Peak Hi ML Flow No SY Gen | Load Hi SY Gen | Low Otay Ld 13.2 MW | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | | | | |
| | | | | | < - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | | | | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| LINE GRANITE 69kV-GRANITTP 69kV ck1 | El Cajon 69kV N Bus | 97 | 119 | 1.23 | 1.04 | 1.014 | 1.021 | | 1.003 | | | | 1.058 | 1.037 | | |
| | Jamacha 69kV S Bus | 97 | 119 | 1.23 | | | | | | 1.018 | 1.045 | 1.052 | | | | |
| | Miguel 69kV S Bus | 97 | 119 | 1.23 | | | | | | | | | 1.007 | | | |
| | ML-JM 1 + 2 69KV | 97 | 119 | 1.23 | | | | | | 1.07 | 1.091 | 1.09 | 1.064 | 1.06 | | |
| | Murray 69kV N Bus | 97 | 119 | 1.23 | 1.10 | 1.076 | 1.096 | 1.066 | 1.088 | 1.181 | 1.204 | 1.198 | 1.243 | 1.226 | | |
| LINE GRNT HLL 138kV-SOUTHBAY 138kV ck1 | LC-SY + SY-TC 138KV | 310 | 434 | 1.40 | | | | | | | | | | | 1.008 | |
| LINE JAP MESA 69kV-TALEGATP 69kV ck1 | SA5W TRIPS SM LOAD | 24 | 24 | 1.00 | | | | | | | | | 1.037 | 1.04 | | |
| | TA-SO 1 + 2 230KV | 24 | 24 | 1.00 | | | | | | | | | 1.001 | 1.004 | | |
| LINE KEARNY 69kV-MISSION 69kV ck1 | Mission 69kV S Bus | 97 | 129 | 1.33 | 1.09 | 1.101 | 1.098 | 1.111 | 1.108 | 1.102 | 1.097 | 1.095 | 1.044 | 1.042 | | |
| LINE KETTNER 69kV-B 69kV ck1 | line SY-MI51 & SY-MI50 138 ck 1 | 195 | 215 | 1.10 | | | | | | | | | 1.128 | 1.057 | | |
| | Proctor Valley 138kV Bus | 195 | 215 | 1.10 | | | | | | | | | 1.041 | | | |
| | PV-TC + LC-SY 138KV | 195 | 215 | 1.10 | | | | | | | | | 1.044 | | | |
| LINE LOSCOCHS 138kV-SOUTHBAY 138kV ck1 | CH-SX-SN+LC-EL 138/69 KV | 191 | 200 | 1.05 | | | | | | 1.025 | 1.008 | | | | | |
| LINE MAINST50 138kV-SOUTHBAY 138kV ck1 | line SY-MI50 & SY-GRNT 138 ck 1 | 150 | 150 | 1.00 | 1.01 | | | | | | | | | | | |
| LINE MAINST51 138kV-SOUTHBAY 138kV ck1 | line SY-MI50 & SY-GRNT 138 ck 1 | 150 | 150 | 1.00 | 1.29 | 1.272 | 1.281 | 1.256 | 1.268 | 1.248 | 1.259 | 1.201 | | | | |
| | Miguel 69kV S Bus | 150 | 150 | 1.00 | 1.01 | | | | | | | | | | | |
| | Sweetwater 69kV Bus | 150 | 150 | 1.00 | 1.06 | 1.074 | 1.07 | 1.078 | 1.072 | 1.087 | 1.08 | 1.073 | | | | |
| LINE MELROSE 69kV-SANLUSRY 69kV ck1 | San Luis Rey 69kV S Bus | 97 | 102 | 1.05 | | | | 1.018 | 1.019 | 1.018 | 1.017 | 1.017 | | | | |
| LINE MELRSETP 69kV-SANLUSRY 69kV ck1 | PEN-ES 1/2 230KV | 97 | 102 | 1.05 | | | | 1.007 | 1.01 | 1.008 | 1.009 | 1.008 | | | | |
| | San Luis Rey 69kV N Bus | 97 | 102 | 1.05 | 1.05 | 1.088 | 1.091 | 1.115 | 1.117 | 1.116 | 1.115 | 1.115 | 1.068 | 1.095 | | |
| LINE MESAHGTS 69kV-MISSION 69kV ck1 | Kearny 69kV E Bus | 97 | 136 | 1.40 | 1.15 | 1.156 | 1.155 | 1.165 | 1.162 | 1.155 | 1.15 | 1.149 | 1.096 | 1.095 | | |
| | Mission 69kV N Bus | 97 | 136 | 1.40 | 1.34 | 1.347 | 1.343 | 1.359 | 1.353 | 1.348 | 1.34 | 1.338 | 1.277 | 1.274 | | |
| LINE MIGUEL 69kV-BORDER 69kV ck1 | Sweetwater 69kV Bus | 136 | 143 | 1.05 | | | | | | | | | | | 1.003 | 1.084 |
| LINE MIGUEL 69kV-JAMACHA 69kV ck1 | Chollas 69kV Bus | 97 | 136 | 1.40 | | | | | | | 1.002 | 1.013 | | | | |
| | Jamacha 69kV N Bus | 97 | 136 | 1.40 | 1.02 | 1.024 | 1.054 | 1.058 | 1.082 | 1.179 | 1.201 | 1.218 | 1.081 | 1.1 | | |
| | LC-SY+ML-LC 138/69KV | 97 | 136 | 1.40 | | | | | | 1.007 | 1.031 | 1.035 | | | | |
| | Miguel 69kV N Bus | 97 | 136 | 1.40 | 1.16 | 1.16 | 1.197 | 1.192 | 1.225 | 1.29 | 1.32 | 1.328 | 1.31 | 1.312 | | |
| | Murray 69kV N Bus | 97 | 136 | 1.40 | | | | | | 1.02 | 1.043 | 1.044 | 1.083 | 1.076 | | |
| LINE MIGUEL 69kV-JAMACHA 69kV ck2 | Miguel 69kV S Bus | 136 | 143 | 1.05 | | | | | | | | | 1.156 | 1.121 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2008 Queued Time Frame, Commercial Operating Date Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | cod_a | cod_b | cod_c | cod_d | cod_e | cod_f | cod_g | cod_h | cod_q | cod_r | cod_s | cod_t |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | Peak Hi ML Flow No SY Gen | Load Hi SY Gen | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| LINE MIGUELTP 69kV-MIGUEL 69kV ck1 | Jamacha 69kV N Bus | 97 | 136 | 1.40 | | | | | | | | | 1.02 | | | |
| | LC-SY + SY-TC 138KV | 97 | 136 | 1.40 | | | | | | | | | 1.034 | | | |
| | line SY-MI51 & SY-MI50 138 ck 1 | 97 | 136 | 1.40 | | | | | | | | | 1.039 | | | |
| | Miguel 69kV N Bus | 97 | 136 | 1.40 | | | | | | | | | 1.088 | 1.034 | | |
| | ML-JM 1 + 2 69KV | 97 | 136 | 1.40 | | | | | | | | | 1.253 | 1.197 | | |
| | Proctor Valley 138kV Bus | 97 | 136 | 1.40 | | | | | | | | | 1.08 | 1.021 | | |
| | PV-TC + LC-SY 138KV | 97 | 136 | 1.40 | | | | | | | | | 1.087 | 1.023 | | |
| | Station B 69kV N Bus | 97 | 136 | 1.40 | | | | | | | | | 1.035 | | | |
| LINE MONSRATE 69kV-MNSRATTP 69kV ck1 | Lilac 69kV S Bus | 77 | 77 | 1.00 | 1.01 | 1.006 | 1.007 | 1.007 | 1.007 | 1.007 | 1.005 | 1.005 | | | | |
| LINE OCNSDETP 69kV-STUARTTP 69kV ck1 | TA-SO 1 + 2 230KV | 32 | 32 | 1.00 | 1.07 | 1.071 | 1.072 | 1.075 | 1.075 | 1.075 | 1.072 | 1.072 | 1.079 | 1.08 | | |
| | TA-SO 1 + 2 230KV | 32 | 32 | 1.00 | | | | 1.002 | 1.002 | 1.003 | | | 1.007 | 1.009 | | |
| LINE OLD TOWN 69kV-KETTNER 69kV ck1 | LC-SY + SY-TC 138KV | 215 | 239 | 1.11 | | | | | | | | | 1.05 | | | |
| | line SY-MI50 & SY-GRNT 138 ck 1 | 215 | 239 | 1.11 | | | | | | | | | 1.065 | | | |
| | line SY-MI51 & SY-MI50 138 ck 1 | 215 | 239 | 1.11 | | | | | | | | | 1.217 | 1.151 | | |
| | Miguel 69kV S Bus | 215 | 239 | 1.11 | | | | | | | | | 1.063 | | | |
| | ML BK71 & Miguel - Mission #1 230 kV | 215 | 239 | 1.11 | | | | | | | | | 1.028 | | | |
| | Proctor Valley 138kV Bus | 215 | 239 | 1.11 | | | | | | | | | 1.126 | 1.063 | | |
| | PV-TC + LC-SY 138KV | 215 | 239 | 1.11 | | | | | | | | | 1.131 | 1.065 | | |
| LINE OTAY 69kV-OTAY_93 69kV ck1 | LC-SY + SY-TC 138KV | 64 | 64 | 1.00 | | | | | | | | | | 1.491 | | |
| | Miguel 69kV S Bus | 64 | 64 | 1.00 | | | | | | | | | | 1.526 | | |
| | Proctor Valley 138kV Bus | 64 | 64 | 1.00 | | | | | | | | | | 1.481 | | |
| | PV-TC + LC-SY 138KV | 64 | 64 | 1.00 | | | | | | | | | | 1.488 | | |
| LINE OTAY 69kV-OTAYLKTP 69kV ck1 | Miguel 69kV S Bus | 50 | 50 | 1.00 | | | | | | | 1.38 | 1.376 | 1.009 | | 1.796 | 1.791 |
| | Sweetwater 69kV Bus | 50 | 50 | 1.00 | | 1.058 | | | | | | | | | | |
| LINE OTAYLKTP 69kV-BORDERTP 69kV ck1 | Miguel 69kV S Bus | 97 | 136 | 1.40 | | | | | | | 1.281 | 1.281 | 1.026 | 1.016 | 1.448 | 1.448 |
| LINE PARADISE 69kV-MIGUEL 69kV ck1 | ML-JM 1 + 2 69KV | 97 | 136 | 1.40 | | | | | | | | | 1.124 | 1.096 | | |
| LINE PENSQTOS 69kV-DELMARTP 69kV ck1 | Del Mar 69kV E Bus | 97 | 129 | 1.33 | 1.11 | 1.109 | 1.111 | 1.11 | 1.11 | 1.11 | 1.108 | 1.108 | 1.105 | 1.101 | | |
| | Penasquitos 69kV SE Bus | 97 | 129 | 1.33 | 1.11 | 1.115 | 1.117 | 1.137 | 1.137 | 1.137 | 1.135 | 1.135 | 1.086 | 1.088 | | |
| LINE PENSQTOS 69kV-MIRAMRTP 69kV ck1 | MR-PQ 69KV + PQ-MRM 69KV | 97 | 102 | 1.05 | | | | | | | | | 1.038 | 1.029 | | |
| LINE POMERADO 69kV-SYCAMORE 69kV ck2 | Sycamore 69kV S Bus | 97 | 136 | 1.40 | 1.29 | 1.338 | 1.339 | 1.399 | 1.399 | 1.397 | 1.395 | 1.395 | 1.128 | 1.18 | | |
| LINE POWAY 69kV-POMERADO 69kV ck1 | PEN-ES 1/2 230KV | 97 | 136 | 1.40 | 1.19 | 1.27 | 1.271 | 1.345 | 1.347 | 1.344 | 1.342 | 1.342 | | 1.028 | | |
| LINE R.SNTAFE 69kV-R.SNTATP 69kV ck1 | PEN-ES 1/2 230KV | 64 | 64 | 1.00 | 1.01 | 1.102 | 1.106 | 1.3 | 1.308 | 1.301 | 1.304 | 1.304 | | | | |
| LINE SAMPSON 69kV-MAIN ST 69kV ck1 | Main St 69kV W Bus | 129 | 129 | 1.00 | | | | | | | | | 1.045 | | | |
| LINE SAMPSON 69kV-MAIN ST 69kV ck2 | Main St 69kV E Bus | 129 | 129 | 1.00 | | | | | | | | | 1.051 | | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2008 Queued Time Frame, Commercial Operating Date Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | cod_a | cod_b | cod_c | cod_d | cod_e | cod_f | cod_g | cod_h | cod_q | cod_r | cod_s | cod_t |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | <- - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | | | | | | | | | Peak Hi ML Flow No SY Gen | Load Hi SY Gen | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | | <- - - - - - - - - Peak Load - - - - - - - - - - -> | | | | | | | | | | | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| LINE SANYSDRO 69kV-OTAYLKTP 69kV ck1 | Miguel 69kV S Bus | 50 | 50 | 1.00 | | | | | | | 1.126 | 1.131 | | | 1.019 | 1.024 |
| | Otay 69kV Bus | 50 | 50 | 1.00 | | | | | | | 1.148 | 1.159 | 1.264 | 1.27 | | |
| LINE SOUTHBAY 69kV-IMPRLBCH 69kV ck1 | Otay 69kV Bus | 55 | 55 | 1.00 | 1.12 | 1.119 | | | | | | | | | | |
| LINE SOUTHBAY 69kV-SWEETWTR 69kV ck1 | line SY-MI50 & SY-GRNT 138 ck 1 | 97 | 136 | 1.40 | | | | | | | | | | | | 1.036 |
| | line SY-MI51 & SY-MI50 138 ck 1 | 97 | 136 | 1.40 | | | | | | 1.04 | | 1.067 | | | | 1.008 |
| | Miguel 69kV S Bus | 97 | 136 | 1.40 | | | | | | 1.002 | | 1.089 | | | 1.019 | 1.119 |
| | Southbay 69kV S Bus | 97 | 136 | 1.40 | 1.50 | 1.698 | 1.602 | 1.793 | 1.676 | 1.897 | 1.775 | 1.96 | | | 1.739 | 1.925 |
| LINE STUART 69kV-STUARTTP 69kV ck1 | Escondido 69kV SE Bus | 4 | 4 | 1.00 | | 1.148 | | | | | | | | | | |
| LINE STUARTTP 69kV-LASPULGS 69kV ck1 | TA-SO 1 + 2 230KV | 32 | 32 | 1.00 | 1.01 | 1.017 | 1.017 | 1.02 | 1.02 | 1.02 | 1.018 | 1.017 | 1.025 | 1.026 | | |
| LINE SWEETWTR 69kV-MONTGYTP 69kV ck1 | Miguel 69kV S Bus | 157 | 157 | 1.00 | | | | | | | | | | | | 1.005 |
| | Southbay 69kV N Bus | 157 | 157 | 1.00 | | | | | | 1.047 | | 1.089 | | | 1.055 | 1.178 |
| LINE SYCAMORE 69kV-SCRIPPS 69kV ck1 | MR-PQ 69KV + PQ-MRM 69KV | 102 | 130 | 1.27 | 1.03 | 1.026 | 1.027 | 1.024 | 1.023 | 1.022 | 1.02 | 1.02 | 1.027 | 1.026 | | |
| LINE TALEGA 138kV-MARGARTA 138kV ck1 | TA-TB + TA-PI 138KV | 273 | 292 | 1.07 | 1.04 | 1.039 | 1.039 | 1.039 | 1.039 | 1.039 | 1.037 | 1.037 | 1.031 | 1.031 | | |
| LINE TALEGA 138kV-PICO 138kV ck1 | TA-TB + LNL-SMO 138KV | 204 | 204 | 1.00 | 1.04 | 1.039 | 1.039 | 1.039 | 1.039 | 1.039 | 1.037 | 1.037 | 1.032 | 1.032 | | |
| LINE TALEGA 138kV-SANMATEO 138kV ck1 | PI-CP + TA-TB 138KV | 136 | 136 | 1.00 | 1.07 | 1.065 | 1.065 | 1.065 | 1.065 | 1.065 | 1.063 | 1.063 | 1.057 | 1.057 | | |
| | | | | | | | | | | | | | | | | |
| | SA5W TRIPS SM LOAD | 24 | 24 | 1.00 | | | | | | | | | 1.172 | 1.175 | | |
| TRAN MAIN ST 69kV-MAINST50 138kV ck1 | line SY-MI50 & SY-GRNT 138 ck 1 | 150 | 200 | 1.33 | 1.02 | | 1.01 | | 1.004 | | | | | | | |
| TRAN MIGUEL 69kV-MIGUEL 230kV ck1 | ML BK71 & Miguel - Mission #1 230 kV | 224 | 305 | 1.36 | 1.02 | | | | | | | | 1.116 | 1.089 | | |
| TRAN MISSION 230kV-MISSION 69kV ck1 | ML-SX 1/2 230KV | 224 | 305 | 1.36 | | | | | | | | | 1.002 | | | |
| TRAN SANLUSRY 138kV-SANLUSRY 69kV ck1 | PQ-NCW + EA-BQ-PQ 138KV | 140 | 160 | 1.14 | 1.21 | 1.211 | 1.211 | 1.221 | 1.23 | 1.224 | 1.21 | 1.21 | | | | |
| | SA5W TRIP TL695 | 140 | 160 | 1.14 | 1.72 | 1.741 | 1.743 | 1.761 | 1.767 | 1.762 | 1.76 | 1.76 | 1.613 | 1.631 | | |
| | SA5W TRIPS SA LOAD | 140 | 160 | 1.14 | 1.27 | 1.293 | 1.295 | 1.311 | 1.316 | 1.312 | 1.309 | 1.309 | 1.149 | 1.167 | | |
| | SA5W TRIPS SM LOAD | 140 | 160 | 1.14 | 1.47 | 1.487 | 1.489 | 1.505 | 1.51 | 1.506 | 1.503 | 1.503 | 1.345 | 1.363 | | |
| TRAN SOUTHBAY 69kV-SOUTHBAY 138kV ck1 | line SY-MI50 & SY-GRNT 138 ck 1 | 140 | 143 | 1.02 | 1.09 | | 1.033 | | | | | | | | | |
| | line SY-MI51 & SY-MI50 138 ck 1 | 140 | 143 | 1.02 | 1.19 | 1.066 | 1.12 | | 1.059 | | 1.01 | | | | | |
| | Sweetwater 69kV Bus | 140 | 143 | 1.02 | | | | | | | | | | | | 1.11 |
| TRAN TALEGA 69kV-TALEGA 138kV ck1 | SA5W TRIPS SA LOAD | 25 | 37 | 1.48 | | | | | | | | | 1.031 | 1.035 | | |
| | SA5W TRIPS SM LOAD | 25 | 37 | 1.48 | | | | | | | | | 1.166 | 1.169 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2010 Queued Time Frame, Future Year Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Contingency Type | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | fya_a | fya_b | fya_c | fya_d | fya_e | fya_f | fya_g | fya_h | fya_i | fya_j | fya_k | fya_l |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | <- - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | | | | |
| | | | | | <- - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | | | | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| | | | | | <-S e n s I t I v I t I e s-> | | | | | | | | Peak Hi ML No SY Gen | Load Flow | Low Otay Ld 13.2 MW Hi SY Gen | |
| **Category C** | | | | | | | | | | | | | | | | |
| LINE BERNARDO 69kV-R.CARMEL 69kV ck1 | POM-SX 1 + 2 69KV | 68 | 76 | 1.12 | 1.338 | 1.338 | 1.345 | 1.344 | 1.345 | 1.344 | 1.345 | 1.344 | 1.317 | 1.329 | | |
| | Poway 69kV Bus | 68 | 76 | 1.12 | 1.548 | 1.549 | 1.549 | 1.552 | 1.555 | 1.553 | 1.555 | 1.553 | 1.538 | 1.551 | | |
| LINE BORDER 69kV-BORDERTP 69kV ck1 | Miguel 69kV S Bus | 103 | 103 | 1.00 | | | | | | | | | | | 1.122 | 1.121 |
| LINE BORREGO 69kV-NARROWS 69kV ck1 | Creelman 69kV E Bus | 12.5 | 14.5 | 1.16 | 1.057 | 1.058 | 1.063 | 1.056 | 1.061 | 1.06 | 1.061 | 1.059 | 1.044 | 1.053 | | |
| | Santa Ysabel 69kV Bus | 12.5 | 14.5 | 1.16 | 1.089 | 1.09 | 1.094 | 1.095 | 1.097 | 1.095 | 1.096 | 1.095 | 1.085 | 1.096 | | |
| LINE CALAVRTP 138kV-SHADOWR 138kV ck1 | PEN-ES #1+ PEN-ES #2 230KV | 112 | 112 | 1.00 | | | 1.031 | 1.03 | 1.032 | 1.031 | 1.032 | 1.031 | | 1.001 | | |
| LINE CAPSTRNO 138kV-PICO 138kV ck1 | TA-TB + LNL-SMO 138KV | 157 | 157 | 1.00 | 1.172 | 1.172 | 1.172 | 1.172 | 1.173 | 1.172 | 1.173 | 1.172 | 1.164 | 1.173 | | |
| LINE CHOLLAS 69kV-SPRNGVLY 69kV ck1 | ML-JM 1 + 2 69KV | 97 | 136 | 1.40 | 1.221 | 1.256 | 1.25 | 1.271 | 1.277 | 1.305 | 1.3 | 1.329 | 1.169 | 1.207 | | |
| LINE CLAIRMNT 69kV-CLARMTTP 69kV ck1 | FR-MS 138KV + CM-MS 69KV | 50 | 50 | 1.00 | 1.015 | 1.018 | 1.015 | 1.016 | 1.02 | 1.019 | 1.02 | 1.019 | 1.007 | 1.015 | | |
| LINE CREELMAN 69kV-SYCAMORE 69kV ck1 | CH-SX-SN 138KV + SAN VCNT-EL 69KV | 71 | 71 | 1.00 | 1.084 | 1.071 | 1.066 | 1.059 | 1.055 | 1.042 | 1.041 | 1.025 | 1.138 | 1.134 | | |
| | CH-SX-SN+LC-EL 138/69 KV | 71 | 71 | 1.00 | 1.137 | 1.123 | 1.117 | 1.109 | 1.105 | 1.09 | 1.09 | 1.072 | 1.196 | 1.192 | | |
| | Creelman 69kV E Bus | 71 | 71 | 1.00 | 1.1 | 1.101 | 1.101 | 1.102 | 1.103 | 1.102 | 1.103 | 1.102 | 1.096 | 1.103 | | |
| | Elliot 69kV S Bus | 71 | 71 | 1.00 | 1.041 | 1.03 | 1.024 | 1.019 | 1.016 | 1.004 | 1.004 | | 1.077 | 1.076 | | |
| | LC-SN + LC-EL 138/69 KV | 71 | 71 | 1.00 | 1.042 | 1.028 | 1.022 | 1.016 | 1.011 | | | | 1.101 | 1.097 | | |
| | LC-SY + SY-TC 138KV | 71 | 71 | 1.00 | | | | | | | | | 1.024 | 1.024 | | |
| | LC-SY+ML-LC 138/69KV | 71 | 71 | 1.00 | 1.056 | 1.049 | 1.044 | 1.044 | 1.042 | 1.035 | 1.034 | 1.025 | 1.08 | 1.082 | | |
| | line POMERADO-SYCAMORE 69 ck 1/2 SPS | 71 | 71 | 1.00 | 1.01 | | | | | | | | 1.04 | 1.039 | | |
| | Los Coches 69kV E Bus | 71 | 71 | 1.00 | 1.018 | 1.01 | 1.006 | 1.004 | 1.001 | | | | 1.065 | 1.066 | | |
| | Los Coches 69kV W Bus | 71 | 71 | 1.00 | 1.182 | 1.181 | 1.181 | 1.181 | 1.181 | 1.179 | 1.18 | 1.176 | 1.188 | 1.195 | | |
| | Miguel 69kV N Bus | 71 | 71 | 1.00 | | | | | | | | | 1.021 | 1.021 | | |
| | Murray 69kV N Bus | 71 | 71 | 1.00 | 1.034 | 1.022 | 1.017 | 1.011 | 1.007 | | | | 1.065 | 1.062 | | |
| | POM-SX 1 + 2 69KV | 71 | 71 | 1.00 | 1.005 | | | | | | | | 1.036 | 1.035 | | |
| | Proctor Valley 138kV Bus | 71 | 71 | 1.00 | | | | | | | | | 1.013 | 1.011 | | |
| | PV-TC + LC-SY 138KV | 71 | 71 | 1.00 | 1.003 | | | | | | | | 1.032 | 1.032 | | |
| | Sycamore 69kV S Bus | 71 | 71 | 1.00 | 1.001 | | | | | | | | 1.038 | 1.036 | | |
| LINE DEL MAR 69kV-DELMARTP 69kV ck1 | Del Mar 69kV E Bus | 50 | 54 | 1.08 | 1.123 | 1.125 | 1.118 | 1.127 | 1.13 | 1.129 | 1.13 | 1.128 | 1.11 | 1.119 | | |
| LINE DIVISION 69kV-NAVSTMTR 69kV ck1 | MI50-SY + GH-SY 138KV | 97 | 100 | 1.03 | | | | | | | | | | | | 1.006 |
| | Miguel 69kV S Bus | 97 | 100 | 1.03 | | | | | | | | | 1.213 | 1.051 | | |
| | ML BK71 & Miguel - Sycamore #1 230 kV f | 97 | 100 | 1.03 | | | | | | | | | 1.011 | | | |
| LINE EL CAJON 69kV-JAMACHA 69kV ck1 | Murray 69kV N Bus | 136 | 143 | 1.05 | | | | | | | | 1.009 | | | | |
| LINE EL CAJON 69kV-LOSCOCHS 69kV ck1 | Murray 69kV N Bus | 55 | 59 | 1.07 | 1.227 | 1.197 | 1.195 | 1.161 | 1.153 | 1.125 | 1.118 | 1.088 | 1.182 | 1.164 | | |
| LINE ESCNDIDO 69kV-ASH 69kV ck1 | Escondido 69kV SW Bus | 120 | 120 | 1.00 | | | 1.001 | | 1.002 | | 1.001 | | 1.001 | 1.008 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2010 Queued Time Frame, Future Year Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Contingency Type | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| | | | | | <-S e n s I t I v I t I e s-> | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Peak Load Hi ML Flow No SY Gen | | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | | | | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | fya_a | fya_b | fya_c | fya_d | fya_e | fya_f | fya_g | fya_h | fya_i | fya_j | fya_k | fya_l |
| LINE GARFIELD 69kV-EL CAJON 69kV ck1 | Murray 69kV N Bus | 97 | 102 | 1.05 | 1.282 | 1.282 | 1.288 | 1.277 | 1.285 | 1.282 | 1.284 | 1.282 | 1.269 | 1.278 | | |
| LINE GRANITE 69kV-GRANITTP 69kV ck1 | El Cajon 69kV N Bus | 97.5 | 137 | 1.40 | 1.017 | 1.003 | 1.005 | | | | | | | | | |
| | Jamacha 69kV S Bus | 97.5 | 137 | 1.40 | 1.006 | 1.02 | 1.026 | 1.027 | 1.042 | 1.05 | 1.056 | 1.064 | 1.009 | 1.026 | | |
| | Miguel 69kV S Bus | 97.5 | 137 | 1.40 | 1.011 | 1.005 | 1.005 | | | | | | 1.023 | 1.022 | | |
| | ML-JM 1 + 2 69KV | 97.5 | 137 | 1.40 | 1.07 | 1.075 | 1.082 | 1.077 | 1.092 | 1.091 | 1.099 | 1.098 | 1.093 | 1.102 | | |
| | Murray 69kV N Bus | 97.5 | 137 | 1.40 | 1.222 | 1.215 | 1.222 | 1.205 | 1.212 | 1.204 | 1.206 | 1.197 | 1.211 | 1.213 | | |
| LINE KEARNY 69kV-MISSION 69kV ck1 | Mission 69kV S Bus | 97 | 129 | 1.33 | 1.21 | 1.21 | 1.207 | 1.224 | 1.223 | 1.223 | 1.226 | 1.226 | 1.191 | 1.201 | | |
| LINE MELROSE 69kV-SANLUSRY 69kV ck1 | San Luis Rey 69kV S Bus | 97 | 102 | 1.05 | 1.027 | 1.029 | 1.029 | 1.03 | 1.03 | 1.03 | 1.031 | 1.031 | 1.044 | 1.053 | | |
| LINE MELRSETP 69kV-SANLUSRY 69kV ck1 | Escondido 69kV NW Bus | 97 | 102 | 1.05 | | | 1.003 | 1.003 | 1.004 | 1.003 | 1.004 | 1.003 | | 1.004 | | |
| | San Luis Rey 69kV N Bus | 97 | 102 | 1.05 | 1.12 | 1.122 | 1.122 | 1.123 | 1.124 | 1.123 | 1.124 | 1.125 | 1.143 | 1.152 | | |
| LINE MESAHGTS 69kV-KYOCRATP 69kV ck1 | Mission 69kV N Bus | 97 | 129 | 1.33 | 1.081 | 1.079 | 1.075 | 1.099 | 1.095 | 1.096 | 1.098 | 1.099 | 1.061 | 1.071 | | |
| LINE MESAHGTS 69kV-MISSION 69kV ck1 | FR-MS 138KV + CM-MS 69KV | 97 | 136 | 1.40 | | | | | | 1.001 | 1.003 | 1.004 | | | | |
| | Kearny 69kV E Bus | 97 | 136 | 1.40 | 1.27 | 1.272 | 1.268 | 1.284 | 1.285 | 1.285 | 1.287 | 1.287 | 1.252 | 1.263 | | |
| | Mission 69kV N Bus | 97 | 136 | 1.40 | 1.538 | 1.538 | 1.534 | 1.556 | 1.555 | 1.555 | 1.558 | 1.558 | 1.515 | 1.528 | | |
| LINE MIGUEL 69kV-JAMACHA 69kV ck1 | Chollas 69kV Bus | 97 | 136 | 1.40 | | | | 1.004 | 1.02 | 1.031 | 1.04 | 1.051 | 1.016 | 1.034 | | |
| | Jamacha 69kV N Bus | 97 | 136 | 1.40 | 1.16 | 1.182 | 1.195 | 1.207 | 1.228 | 1.245 | 1.257 | 1.274 | 1.216 | 1.242 | | |
| | LC-SY+ML-LC 138/69KV | 97 | 136 | 1.40 | | | | | 1.009 | 1.014 | 1.031 | 1.035 | 1.038 | 1.051 | | |
| | Miguel 69kV N Bus | 97 | 136 | 1.40 | 1.277 | 1.288 | 1.312 | 1.314 | 1.345 | 1.351 | 1.374 | 1.379 | 1.399 | 1.415 | | |
| | Murray 69kV N Bus | 97 | 136 | 1.40 | 1.03 | 1.03 | 1.047 | 1.04 | 1.06 | 1.058 | 1.072 | 1.07 | 1.102 | 1.108 | | |
| LINE MIGUEL 69kV-JAMACHA 69kV ck2 | Miguel 69kV S Bus | 136 | 143 | 1.05 | 1.103 | 1.083 | 1.081 | 1.059 | 1.061 | 1.04 | 1.042 | 1.02 | 1.179 | 1.165 | | |
| LINE MIGUELTP 69kV-MIGUEL 69kV ck1 | Miguel 69kV N Bus | 97 | 136 | 1.40 | | | | | | | | | 1.059 | 1.023 | | |
| | ML-JM 1 + 2 69KV | 97 | 136 | 1.40 | | | | | | | | | 1.222 | 1.185 | | |
| LINE MONSRATE 69kV-MNSRATTP 69kV ck1 | Lilac 69kV S Bus | 77 | 77 | 1.00 | 1.019 | 1.019 | 1.024 | 1.025 | 1.026 | 1.025 | 1.026 | 1.024 | 1.017 | 1.026 | | |
| LINE MURRAY 69kV-GARFIELD 69kV ck1 | Murray 69kV N Bus | 97 | 103 | 1.06 | 1.016 | 1.016 | 1.021 | 1.012 | 1.018 | 1.016 | 1.018 | 1.016 | 1.006 | 1.013 | | |
| LINE OTAY 69kV-OTAY_93 69kV ck1 | MI50-SY + GH-SY 138KV | 64 | 64 | 1.00 | | | | | | | | | | 1.464 | | |
| | Miguel 69kV S Bus | 64 | 64 | 1.00 | | | | | | | | | | 1.486 | | |
| LINE OTAY 69kV-OTAYLKTP 69kV ck1 | Miguel 69kV S Bus | 50 | 50 | 1.00 | | | | | | | 1.026 | 1.025 | 1.026 | 1.018 | 1.467 | 1.462 |
| | Sweetwater 69kV Bus | 50 | 50 | 1.00 | 1.033 | 1.231 | | | | | | | | | | |
| LINE OTAYLKTP 69kV-BORDERTP 69kV ck1 | Miguel 69kV S Bus | 97 | 136 | 1.40 | | | | | | | | | | | 1.17 | 1.17 |
| LINE PALA 69kV-MNSRATTP 69kV ck1 | Lilac 69kV S Bus | 68 | 68 | 1.00 | 1.006 | 1.007 | 1.012 | 1.012 | 1.013 | 1.012 | 1.013 | 1.012 | 1.004 | 1.013 | | |
| LINE PARADISE 69kV-MIGUEL 69kV ck1 | ML-JM 1 + 2 69KV | 97 | 136 | 1.40 | | | | | | | 1.002 | | 1.147 | 1.134 | | |
| LINE PENSQTOS 69kV-DELMARTP 69kV ck1 | Del Mar 69kV E Bus | 97 | 129 | 1.33 | 1.149 | 1.151 | 1.144 | 1.153 | 1.156 | 1.155 | 1.156 | 1.154 | 1.136 | 1.145 | | |
| | Penasquitos 69kV SE Bus | 97 | 129 | 1.33 | 1.139 | 1.14 | 1.137 | 1.143 | 1.145 | 1.144 | 1.145 | 1.144 | 1.122 | 1.131 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2010 Queued Time Frame, Future Year Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Contingency Type | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | | Peak Load | | Low Otay Ld | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | | Hi ML Flow | | 13.2 MW | |
| | | | | | | | | | | | | | | No SY Gen | | Hi SY Gen | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | |
| | | | | | | | C | a | s | e | N | a | m | e | | | |
| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | fya_a | fya_b | fya_c | fya_d | fya_e | fya_f | fya_g | fya_h | fya_i | fya_j | fya_k | fya_l | |
| LINE PENSQTOS 69kV-MESA RIM 69kV ck1 | Miramar 69kV E Bus | 97 | 136 | 1.40 | 1.055 | 1.057 | 1.052 | 1.057 | 1.06 | 1.058 | 1.059 | 1.057 | 1.048 | 1.055 | | | |
| LINE PENSQTOS 69kV-MIRAMRTP 69kV ck1 | Miramar 69kV E Bus | 97 | 102 | 1.05 | 1.004 | 1.005 | 1.009 | | | | | | 1.029 | 1.031 | | | |
| | MR-PQ 69KV + PQ-MRM 69KV | 97 | 102 | 1.05 | 1.264 | 1.267 | 1.28 | 1.248 | 1.257 | 1.252 | 1.254 | 1.249 | 1.293 | 1.298 | | | |
| | Penasquitos 69kV SE Bus | 97 | 102 | 1.05 | 1.1 | 1.101 | 1.115 | 1.076 | 1.087 | 1.08 | 1.082 | 1.072 | 1.144 | 1.145 | | | |
| LINE POMERADO 69kV-SYCAMORE 69kV ck2 | PEN-ES #1+ PEN-ES #2 230KV | 97 | 136 | 1.40 | 1.002 | 1.001 | 1.003 | 1.003 | 1.005 | 1.004 | 1.004 | 1.002 | | | | | |
| | Sycamore 69kV S Bus | 97 | 136 | 1.40 | 1.607 | 1.605 | 1.608 | 1.608 | 1.61 | 1.607 | 1.608 | 1.604 | 1.555 | 1.569 | | | |
| LINE POWAY 69kV-POMERADO 69kV ck1 | Escondido 69kV SE Bus | 97 | 136 | 1.40 | 1.044 | 1.043 | 1.045 | 1.048 | 1.048 | 1.047 | 1.048 | 1.045 | 1.011 | 1.022 | | | |
| | PEN-ES #1+ PEN-ES #2 230KV | 97 | 136 | 1.40 | 1.427 | 1.425 | 1.428 | 1.429 | 1.431 | 1.429 | 1.43 | 1.427 | 1.345 | 1.356 | | | |
| | SX-PEN + PEN-EA-SA 230KV | 97 | 136 | 1.40 | 1.071 | 1.068 | 1.071 | 1.071 | 1.069 | 1.066 | 1.066 | 1.063 | | 1.006 | | | |
| | SX-PEN 230KV + AR-SX 69KV | 97 | 136 | 1.40 | 1.267 | 1.263 | 1.267 | 1.267 | 1.267 | 1.264 | 1.264 | 1.26 | 1.181 | 1.193 | | | |
| | SX-PEN 230KV + BE-AR 69KV | 97 | 136 | 1.40 | 1.159 | 1.155 | 1.158 | 1.159 | 1.159 | 1.155 | 1.156 | 1.152 | 1.074 | 1.085 | | | |
| | Sycamore 69kV S Bus | 97 | 136 | 1.40 | 1.04 | 1.038 | 1.041 | 1.041 | 1.042 | 1.04 | 1.04 | 1.037 | | 1.001 | | | |
| LINE SANMATEO 138kV-LAGNA NL 138kV ck1 | TA-TB + TA-PI 138KV | 136 | 136 | 1.00 | 1.019 | 1.02 | 1.02 | 1.019 | 1.02 | 1.019 | 1.02 | 1.019 | 1.012 | 1.021 | | | |
| LINE SANYSDRO 69kV-OTAYLKTP 69kV ck1 | Otay 69kV Bus | 50 | 50 | 1.00 | | | | | | | | | 1.197 | 1.201 | | | |
| LINE SHADOWR 138kV-ESCNDO50 138kV ck1 | CAN-SA-SH + EA-CAN 138KV | 63 | 73 | 1.16 | 1.213 | 1.213 | 1.186 | 1.186 | 1.188 | 1.187 | 1.188 | 1.186 | 1.177 | 1.187 | | | |
| LINE SILVERGT 230kV-OLD TOWN 230kV ck1 | OT-MS + SG-OT-MS 230KV | 456 | 588 | 1.29 | 1.099 | 1.101 | 1.122 | 1.103 | 1.081 | 1.067 | 1.087 | 1.094 | | | | | |
| LINE SILVERGT 230kV-SOUTHBAY 230kV ck1 | line MIGUEL to SXCC 230 ck 1 | 912 | 1176 | 1.29 | 1.084 | 1.076 | 1.097 | 1.077 | 1.044 | 1.023 | 1.043 | 1.041 | | | | | |
| | line SYCAMORE to SXCC 230 ck 1 | 912 | 1176 | 1.29 | 1.198 | 1.181 | 1.197 | 1.168 | 1.16 | 1.134 | 1.15 | 1.133 | | | | | |
| LINE SOUTHBAY 69kV-IMPRLBCH 69kV ck1 | Otay 69kV Bus | 55 | 55 | 1.00 | 1.306 | 1.308 | 1.057 | 1.054 | | | | | | | | | |
| LINE SOUTHBAY 69kV-SWEETWTR 69kV ck1 | Miguel 69kV S Bus | 97 | 136 | 1.40 | | | | | | | | 1.033 | | | | 1.042 | |
| | Southbay 69kV S Bus | 97 | 136 | 1.40 | 1.387 | 1.606 | 1.493 | 1.709 | 1.631 | 1.849 | 1.724 | 1.941 | | | 1.628 | 1.846 | |
| LINE SWEETWTR 69kV-MONTGYTP 69kV ck1 | Southbay 69kV N Bus | 157 | 157 | 1.00 | | | | | | 1.001 | | 1.061 | | | | 1.117 | |
| LINE SYCAMORE 230kV-PENSQTOS 230kV ck1 | MI50-SY + GH-SY 138KV | 797 | 1153 | 1.45 | 1.103 | 1.088 | 1.093 | 1.073 | 1.075 | 1.06 | 1.063 | 1.045 | | | | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2010 Queued Time Frame, Future Year Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Contingency Type | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| | | | | | <-S e n s I t I v I t I e s-> | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Peak Load Hi ML Flow No SY Gen | | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | | | | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | fya_a | fya_b | fya_c | fya_d | fya_e | fya_f | fya_g | fya_h | fya_i | fya_j | fya_k | fya_l |
| LINE SYCAMORE 69kV-SCRIPPS 69kV ck1 | EA-BQ-PQ 138KV + MR-PQ 69KV | 102 | 130 | 1.27 | 1.127 | 1.125 | 1.115 | 1.124 | 1.128 | 1.125 | 1.125 | 1.119 | 1.12 | 1.127 | | |
| | Elliot 69kV S Bus | 102 | 130 | 1.27 | 1.058 | 1.054 | 1.046 | 1.05 | 1.056 | 1.051 | 1.052 | 1.043 | 1.057 | 1.062 | | |
| | FR-MS 138KV + CM-MS 69KV | 102 | 130 | 1.27 | 1.053 | 1.051 | 1.045 | 1.055 | 1.059 | 1.056 | 1.056 | 1.05 | 1.045 | 1.051 | | |
| | line POMERADO-SYCAMORE 69 ck 1/2 SPS | 102 | 130 | 1.27 | 1.197 | 1.193 | 1.186 | 1.194 | 1.198 | 1.195 | 1.195 | 1.189 | 1.184 | 1.192 | | |
| | MI50-SY + GH-SY 138KV | 102 | 130 | 1.27 | 1.162 | 1.158 | 1.154 | 1.158 | 1.161 | 1.154 | 1.157 | 1.149 | 1.115 | 1.12 | | |
| | Miramar1 (GT) 69kV Bus | 102 | 130 | 1.27 | 1.093 | 1.091 | 1.083 | 1.092 | 1.096 | 1.093 | 1.093 | 1.088 | 1.085 | 1.091 | | |
| | Mission 69kV N Bus | 102 | 130 | 1.27 | 1.054 | 1.051 | 1.043 | 1.053 | 1.056 | 1.053 | 1.053 | 1.047 | 1.048 | 1.054 | | |
| | MR-PQ 69KV + PQ-MRM 69KV | 102 | 130 | 1.27 | 1.521 | 1.52 | 1.511 | 1.52 | 1.525 | 1.522 | 1.523 | 1.517 | 1.511 | 1.521 | | |
| | Penasquitos 69kV NE Bus | 102 | 130 | 1.27 | 1.096 | 1.093 | 1.085 | 1.092 | 1.097 | 1.093 | 1.093 | 1.086 | 1.092 | 1.097 | | |
| | Penasquitos 69kV NW Bus | 102 | 130 | 1.27 | 1.119 | 1.117 | 1.109 | 1.117 | 1.121 | 1.118 | 1.118 | 1.112 | 1.113 | 1.119 | | |
| | Penasquitos 69kV SE Bus | 102 | 130 | 1.27 | 1.212 | 1.21 | 1.201 | 1.211 | 1.215 | 1.212 | 1.212 | 1.206 | 1.203 | 1.21 | | |
| | Pomerado 69kV E Bus | 102 | 130 | 1.27 | 1.124 | 1.121 | 1.113 | 1.122 | 1.126 | 1.122 | 1.122 | 1.116 | 1.112 | 1.119 | | |
| | POM-SX 1 + 2 69KV | 102 | 130 | 1.27 | 1.193 | 1.19 | 1.183 | 1.19 | 1.195 | 1.191 | 1.191 | 1.185 | 1.181 | 1.188 | | |
| | Poway 69kV Bus | 102 | 130 | 1.27 | 1.118 | 1.115 | 1.107 | 1.116 | 1.119 | 1.116 | 1.116 | 1.11 | 1.106 | 1.113 | | |
| | Poway 69kV Bus SPS | 102 | 130 | 1.27 | 1.124 | 1.12 | 1.113 | 1.122 | 1.125 | 1.122 | 1.122 | 1.116 | 1.112 | 1.118 | | |
| | SX-PEN 230KV + AR-SX 69KV | 102 | 130 | 1.27 | 1.112 | 1.108 | 1.101 | 1.108 | 1.112 | 1.108 | 1.108 | 1.101 | 1.097 | 1.104 | | |
| | SX-PEN 230KV + BE-AR 69KV | 102 | 130 | 1.27 | 1.083 | 1.08 | 1.072 | 1.08 | 1.084 | 1.08 | 1.08 | 1.073 | 1.069 | 1.075 | | |
| | Sycamore 69kV S Bus | 102 | 130 | 1.27 | 1.155 | 1.152 | 1.144 | 1.148 | 1.154 | 1.149 | 1.149 | 1.14 | 1.151 | 1.156 | | |
| | SA-EA 230KV + SA-ES-EA 230KV | 102 | 130 | 1.27 | 1.054 | 1.051 | 1.044 | 1.053 | 1.058 | 1.054 | 1.054 | 1.047 | 1.064 | 1.069 | | |
| | ES-EA-SA 230KV + BQ-CC-ES-NCM 138KV | 102 | 130 | 1.27 | 1.054 | 1.051 | 1.044 | 1.052 | 1.057 | 1.053 | 1.053 | 1.046 | 1.046 | 1.051 | | |
| LINE TALEGA 138kV-PICO 138kV ck1 | TA-TB + LNL-SMO 138KV | 204 | 204 | 1.00 | 1.116 | 1.116 | 1.116 | 1.116 | 1.116 | 1.115 | 1.116 | 1.115 | 1.108 | 1.117 | | |
| LINE TALEGA 138kV-SANMATEO 138kV ck1 | PI-CP + TA-TB 138KV | 136 | 136 | 1.00 | 1.136 | 1.136 | 1.136 | 1.136 | 1.137 | 1.136 | 1.137 | 1.136 | 1.128 | 1.137 | | |
| | TA-TB + TA-PI 138KV | 136 | 136 | 1.00 | 1.279 | 1.279 | 1.279 | 1.279 | 1.28 | 1.278 | 1.279 | 1.278 | 1.27 | 1.28 | | |
| LINE TALEGA 230kV-S.ONOFRE 230kV ck1 | line ESCNDIDO to CMPNL230 230 ck 1 | 456 | 577 | 1.27 | 1.082 | 1.082 | 1.082 | 1.083 | 1.083 | 1.082 | 1.082 | 1.082 | 1.096 | 1.099 | | |
| | PEN-ES #1+ PEN-ES #2 230KV | 456 | 577 | 1.27 | 1.222 | 1.223 | 1.223 | 1.223 | 1.224 | 1.223 | 1.223 | 1.223 | 1.252 | 1.256 | | |
| | SA-SO 2 + SO-SA 3 230KV | 456 | 577 | 1.27 | | | | | | | | | 1.013 | 1.016 | | |
| | SX-PEN + PEN-EA-SA 230KV | 456 | 577 | 1.27 | | | | | | | | | | 1.004 | | |
| LINE TALEGA 230kV-S.ONOFRE 230kV ck2 | line ESCNDIDO to CMPNL230 230 ck 1 | 456 | 577 | 1.27 | 1.082 | 1.082 | 1.082 | 1.083 | 1.083 | 1.082 | 1.082 | 1.082 | 1.096 | 1.099 | | |
| | PEN-ES #1+ PEN-ES #2 230KV | 456 | 577 | 1.27 | 1.222 | 1.223 | 1.223 | 1.223 | 1.224 | 1.223 | 1.223 | 1.223 | 1.252 | 1.256 | | |
| | SA-SO 2 + SO-SA 3 230KV | 456 | 577 | 1.27 | | | | | | | | | 1.013 | 1.016 | | |
| | SX-PEN + PEN-EA-SA 230KV | 456 | 577 | 1.27 | | | | | | | | | | 1.004 | | |
| TRAN ESCNDO50 138kV-ESCNDIDO 69kV ck2 | CAN-SA-SH + EA-CAN 138KV | 63 | 73 | 1.16 | 1.203 | 1.202 | 1.1 | 1.099 | 1.099 | 1.099 | 1.1 | 1.099 | 1.091 | 1.1 | | |
| TRAN LOSCOCHS 69kV-LOSCOCHS 138kV ck2 | Los Coches 69kV W Bus | 140 | 155 | 1.11 | | | | | | | | | 1.207 | 1.213 | | |

Interconnection System Impact Study
Queue 90, 93 MW Project
2010 Queued Time Frame, Future Year Analysis
Thermal Transmission Constraints

| | |
|---|---|
| MVA1Trigger | >MVA1 |
| 0.9MVA1Trigger | (All) |
| Contingency Type | (All) |
| Area | (All) |
| Zone | (All) |
| LINE, TRAN, or ERROR | (All) |
| Base or Cont | (All) |

MVA1 pu Loading

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | <-S e n s I t I v I t I e s-> | | |
| | | | | | < - - - - - - Max Gen / Min Import - - - - - - > | | | | | | | | Peak Load | | Low Otay Ld | |
| | | | | | < - - - - - - - - - Peak Load - - - - - - - - - - > | | | | | | | | Hi ML Flow | | 13.2 MW | |
| | | | | | | | | | | | | | No SY Gen | | Hi SY Gen | |
| | | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| | | | | | | | C | a | s | e | N | a | m | e | | |
| Monitored Element | Contingency Description | MVA1 | MVA2 | MVA2/ MVA1 | **fya_a** | **fya_b** | **fya_c** | **fya_d** | **fya_e** | **fya_f** | **fya_g** | **fya_h** | **fya_i** | **fya_j** | **fya_k** | **fya_l** |
| TRAN MIGUEL 69kV-MIGUEL 230kV ck1 | ML BK71 & Miguel - Sycamore #1 230 kV a | 224 | 305 | 1.36 | 1.097 | 1.068 | 1.044 | 1.019 | | | | | 1.162 | 1.142 | | |
| | ML BK71 & Miguel - Sycamore #1 230 kV b | 224 | 305 | 1.36 | 1.097 | 1.068 | 1.044 | 1.019 | | | | | 1.158 | 1.137 | | |
| | ML BK71 & Miguel - Sycamore #1 230 kV c | 224 | 305 | 1.36 | 1.097 | 1.068 | 1.044 | 1.019 | | | | | 1.148 | 1.128 | | |
| | ML BK71 & Miguel - Sycamore #1 230 kV d | 224 | 305 | 1.36 | 1.086 | 1.057 | 1.034 | 1.008 | | | | | 1.136 | 1.115 | | |
| | ML BK71 & Miguel - Sycamore #1 230 kV e | 224 | 305 | 1.36 | 1.086 | 1.057 | 1.034 | 1.008 | | | | | 1.136 | 1.115 | | |
| | ML BK71 & Miguel - Sycamore #1 230 kV f | 224 | 305 | 1.36 | 1.07 | 1.041 | 1.018 | | | | | | 1.115 | 1.094 | | |
| TRAN SANLUSRY 69kV-SANLUSRY 230kV ck3 | SA5W TRIP TL695 SPS | 224 | 301 | 1.34 | 1.108 | 1.109 | 1.113 | 1.114 | 1.114 | 1.114 | 1.114 | 1.114 | 1.146 | 1.154 | | |
| | SA5W TRIPS SM LOAD SPS | 224 | 301 | 1.34 | | | | | | | | | 1.019 | 1.026 | | |
| TRAN SOUTHBAY 69kV-SOUTHBAY 138kV ck1 | Sweetwater 69kV Bus | 140 | 143 | 1.02 | | | | | | | | | | | | 1.143 |
| TRAN SYCAMORE 230kV-SYCAMORE 69kV ck1 | MI50-SY + GH-SY 138KV | 224 | 285 | 1.27 | 1.001 | | | | | | | | | | | |
| | PEN-ES #1+ PEN-ES #2 230KV | 224 | 285 | 1.27 | 1.061 | 1.056 | 1.054 | 1.048 | 1.051 | 1.047 | 1.047 | 1.039 | 1.043 | 1.047 | | |
| TRAN SYCAMORE 230kV-SYCAMORE 69kV ck2 | PEN-ES #1+ PEN-ES #2 230KV | 224 | 269 | 1.20 | 1.036 | 1.031 | 1.03 | 1.024 | 1.027 | 1.022 | 1.022 | 1.015 | 1.019 | 1.023 | | |
| LINE MLSXTAP 230kV-SXCC 230kV ck1 | MI50-SY + GH-SY 138KV | 797 | 968 | 1.22 | 1.027 | 1.021 | 1.041 | 1.025 | | | | | | | | |

# Cat C Thermal Contingency Power Flow Plots

# Cat C Contingency Plots of Project Local Area

Figures “ca” through “ch”

Pre- and Post-Project

Figure ca; Pre-project, cod_a, TL649A O/L by outage of Sweetwater 69 kV bus:

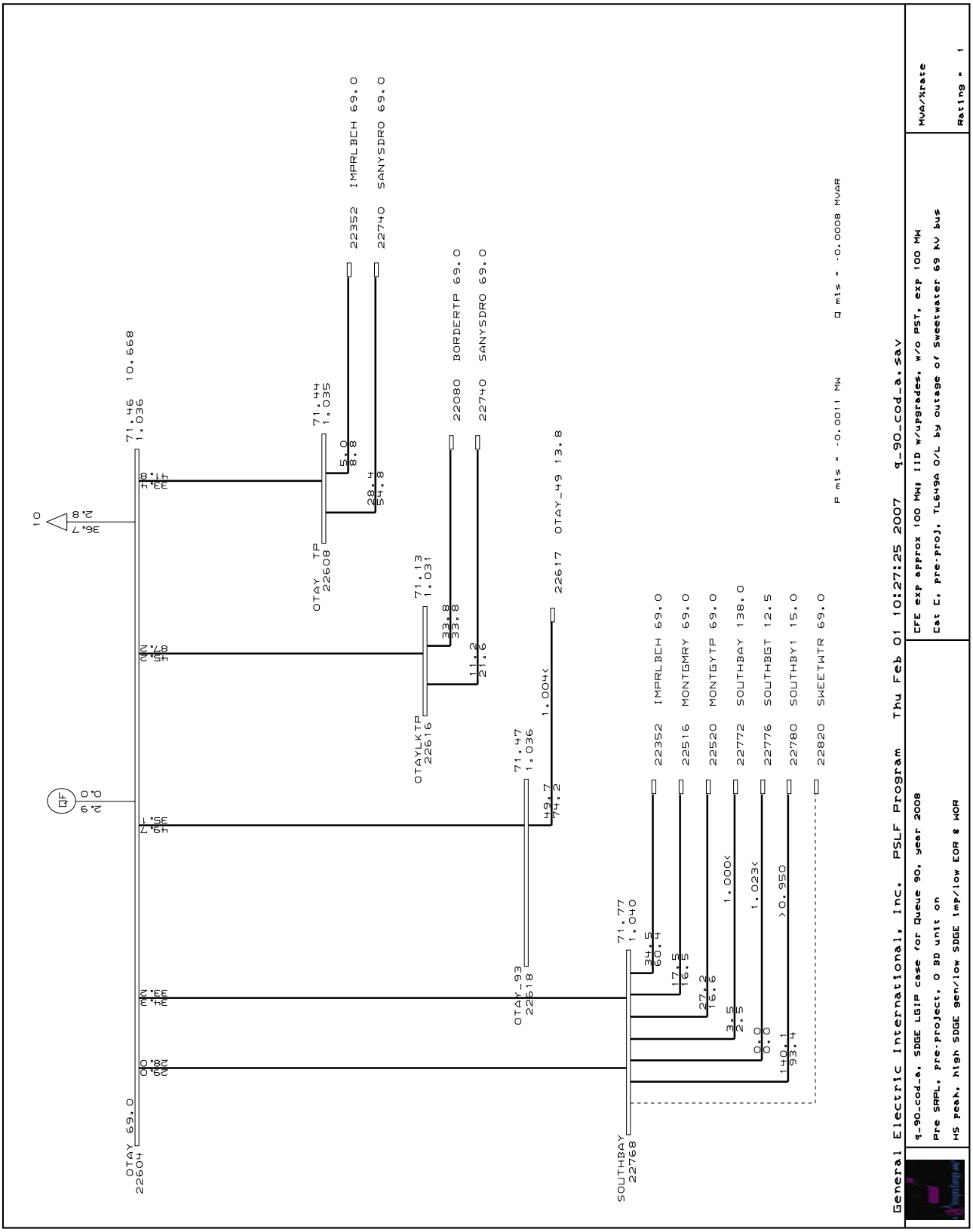


Figure cb; Post-project, cod_b, TL649A O/L by outage of Sweetwater 69 kV bus:

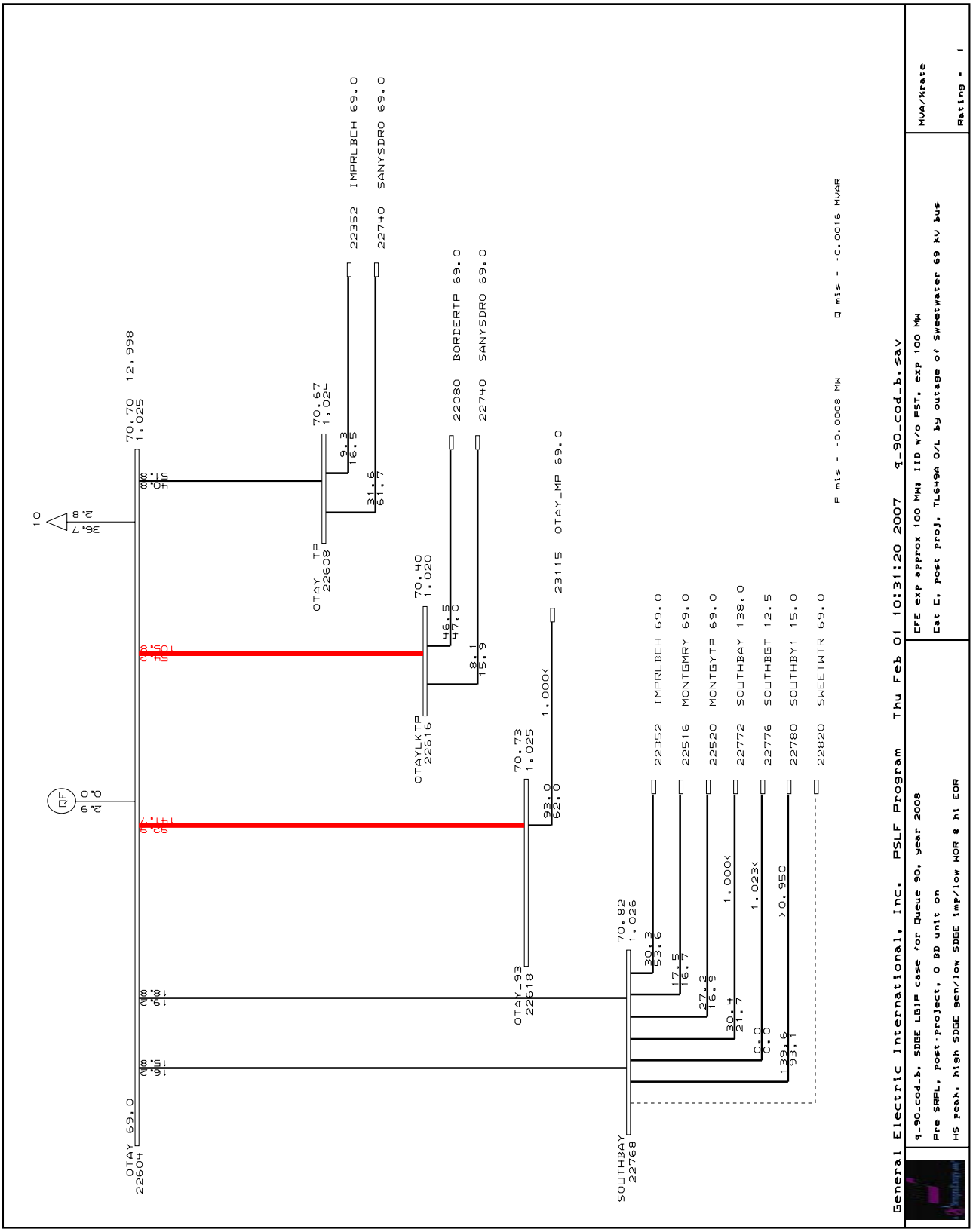


Figure cc; Pre-project, cod_e, TL642B O/L by outage of Southbay 69 kV north bus:

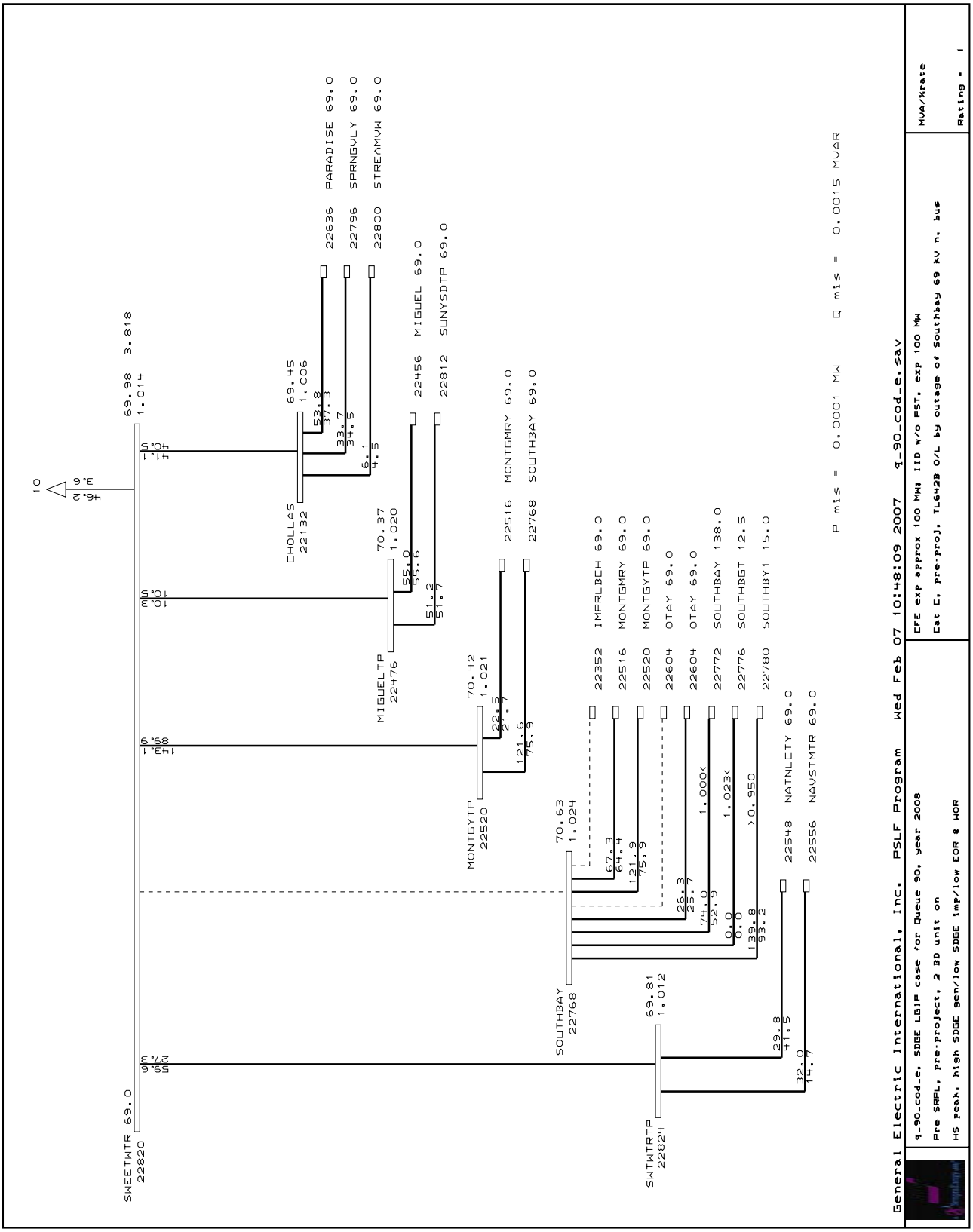


Figure ce; Pre-project, cod_g, TL642B O/L by outage of Southbay 69 kV north bus:

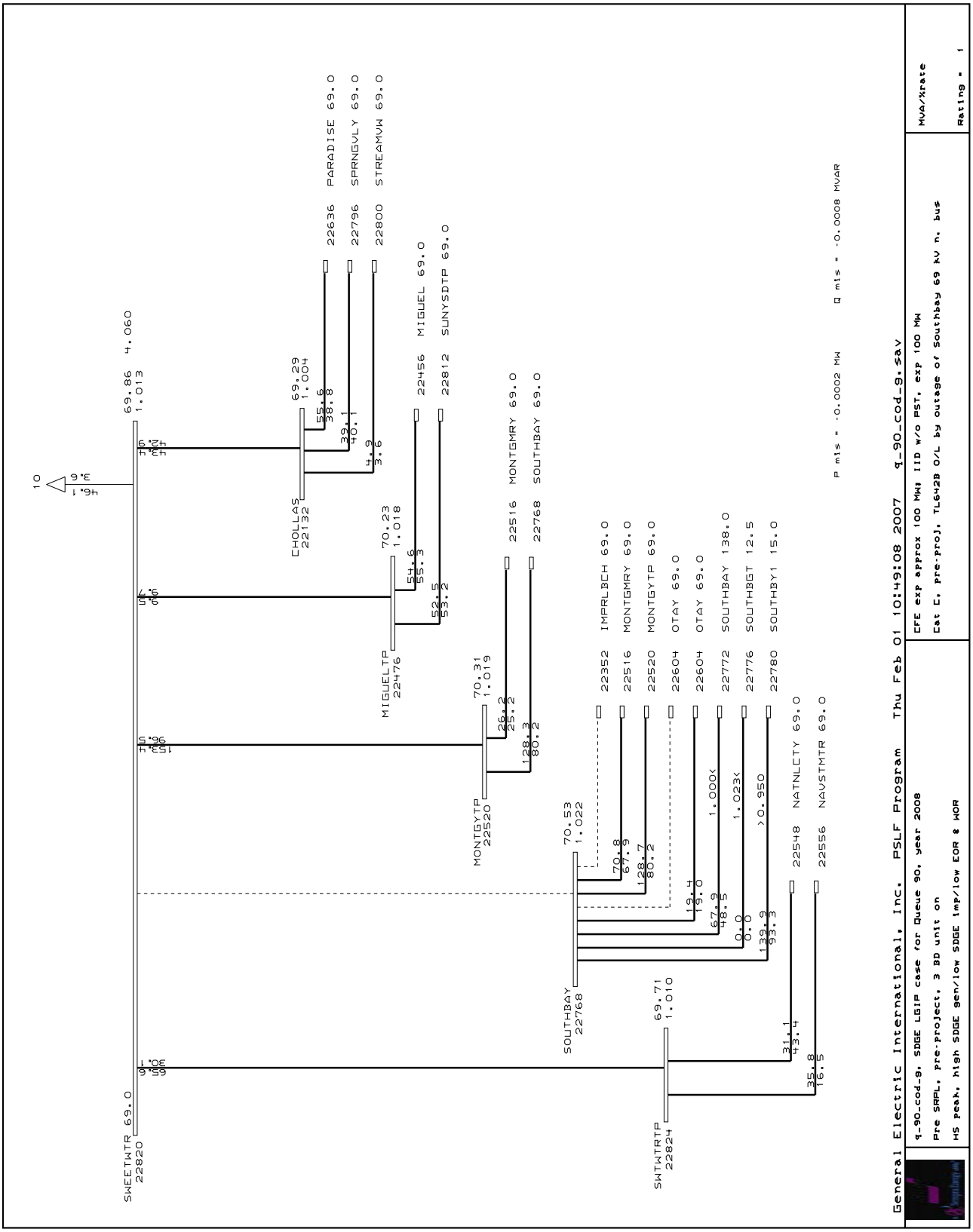


Figure cf; Post-project, cod_h, TL642B O/L by outage of Southbay 69 kV north bus:

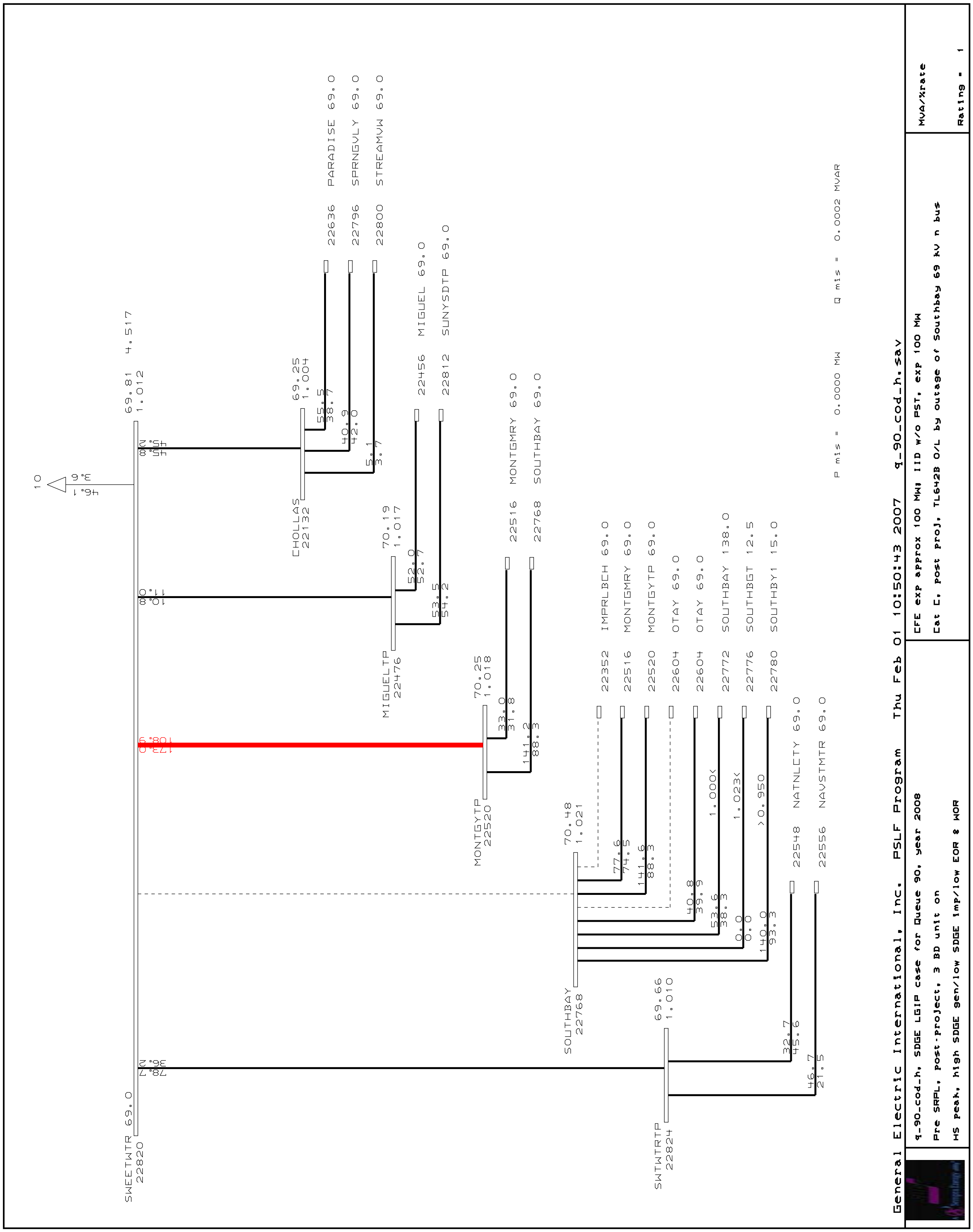


Figure cd; Post-project, cod_f, TL642B O/L by outage of Southbay 69 kV north bus:

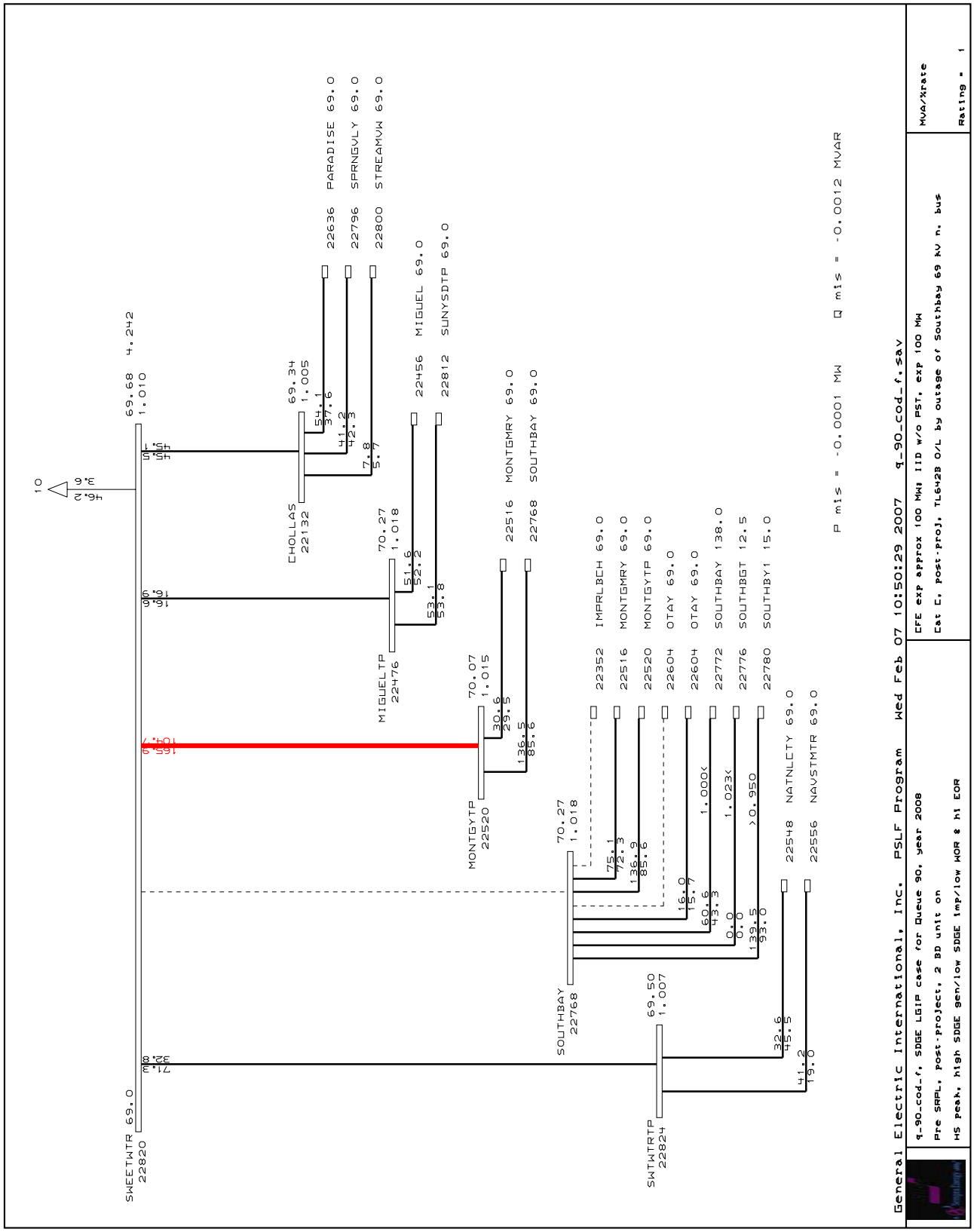


Figure cg; Pre-project, FY_1, TL644 O/L by outage of Southbay 69 kV south bus:

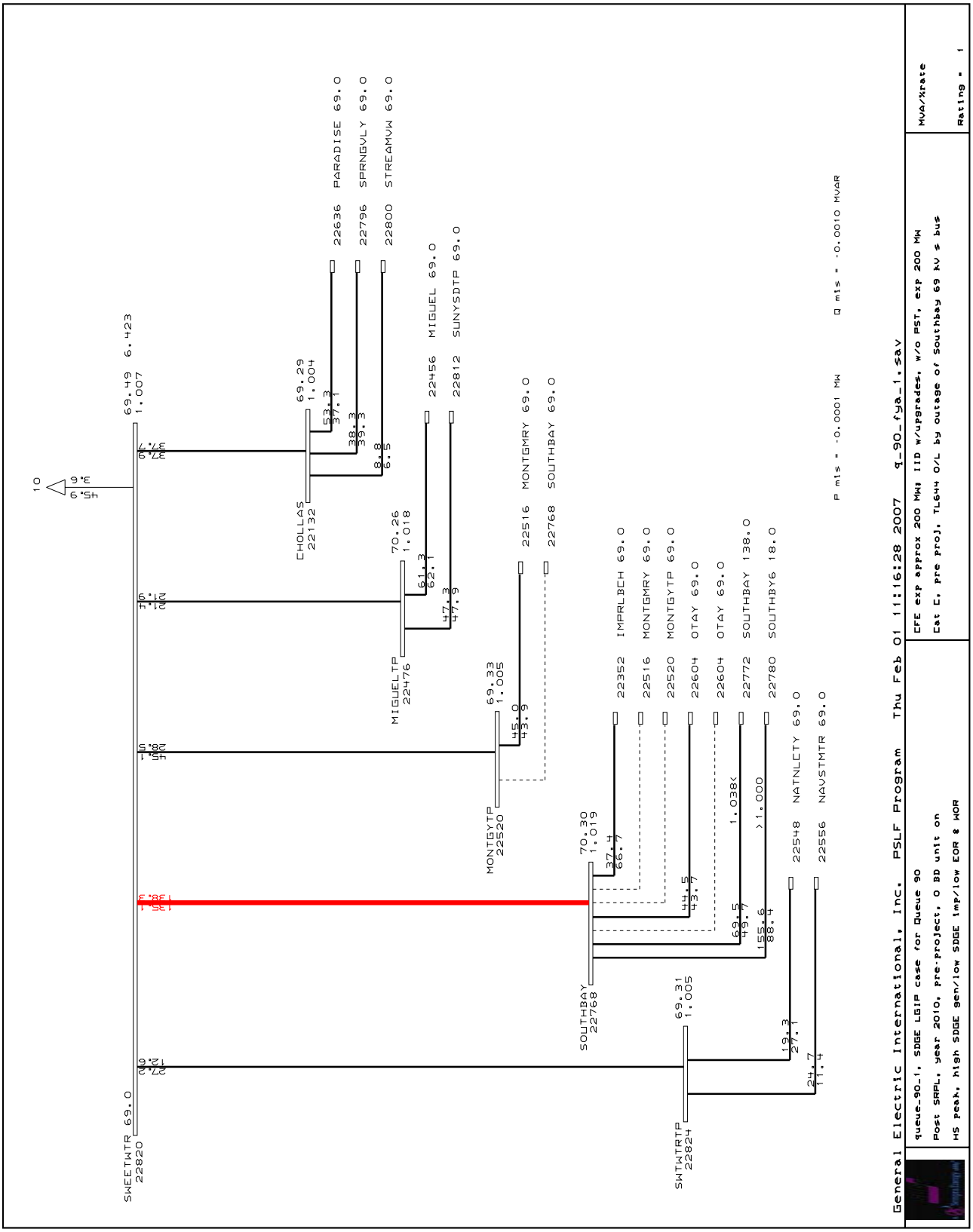
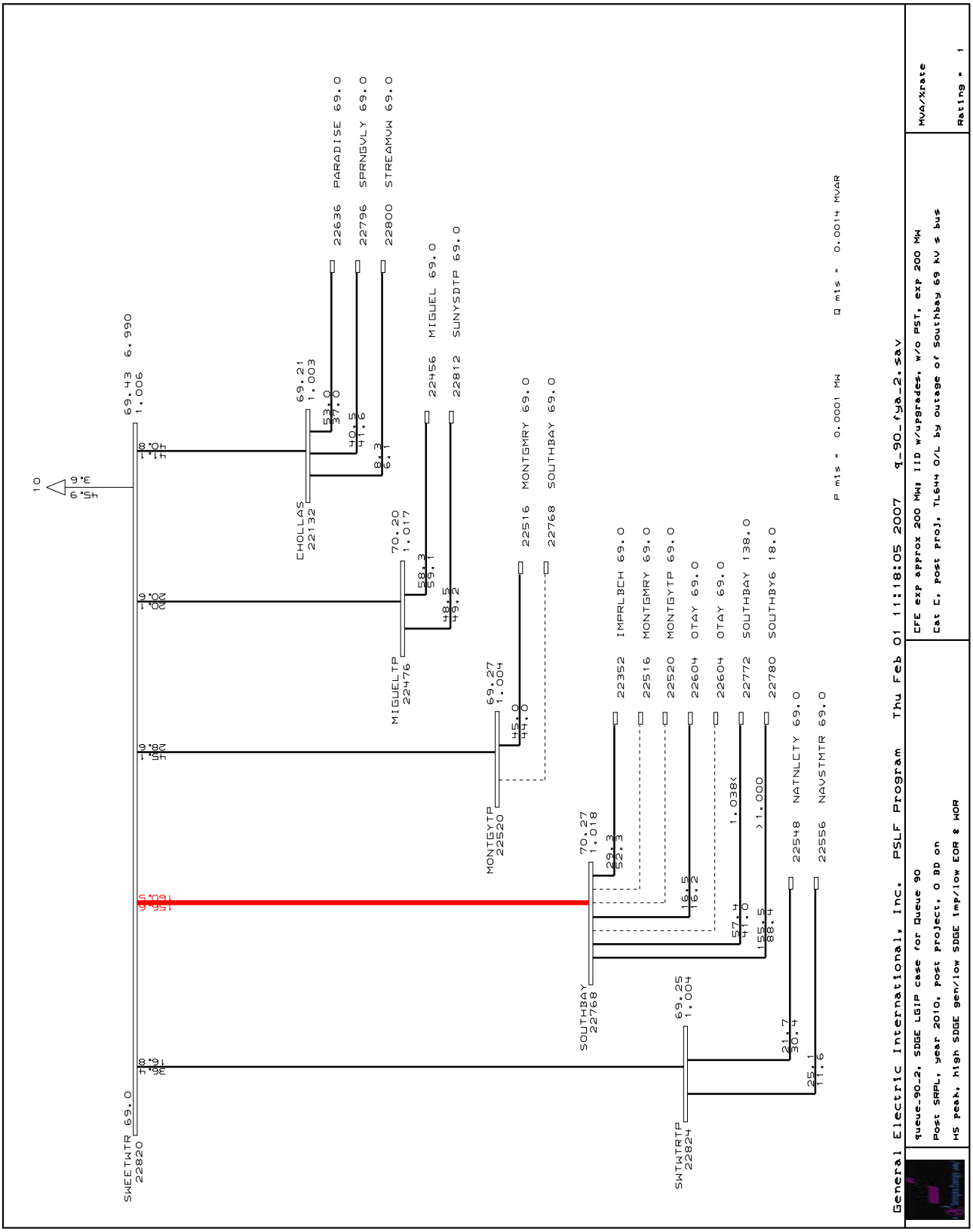
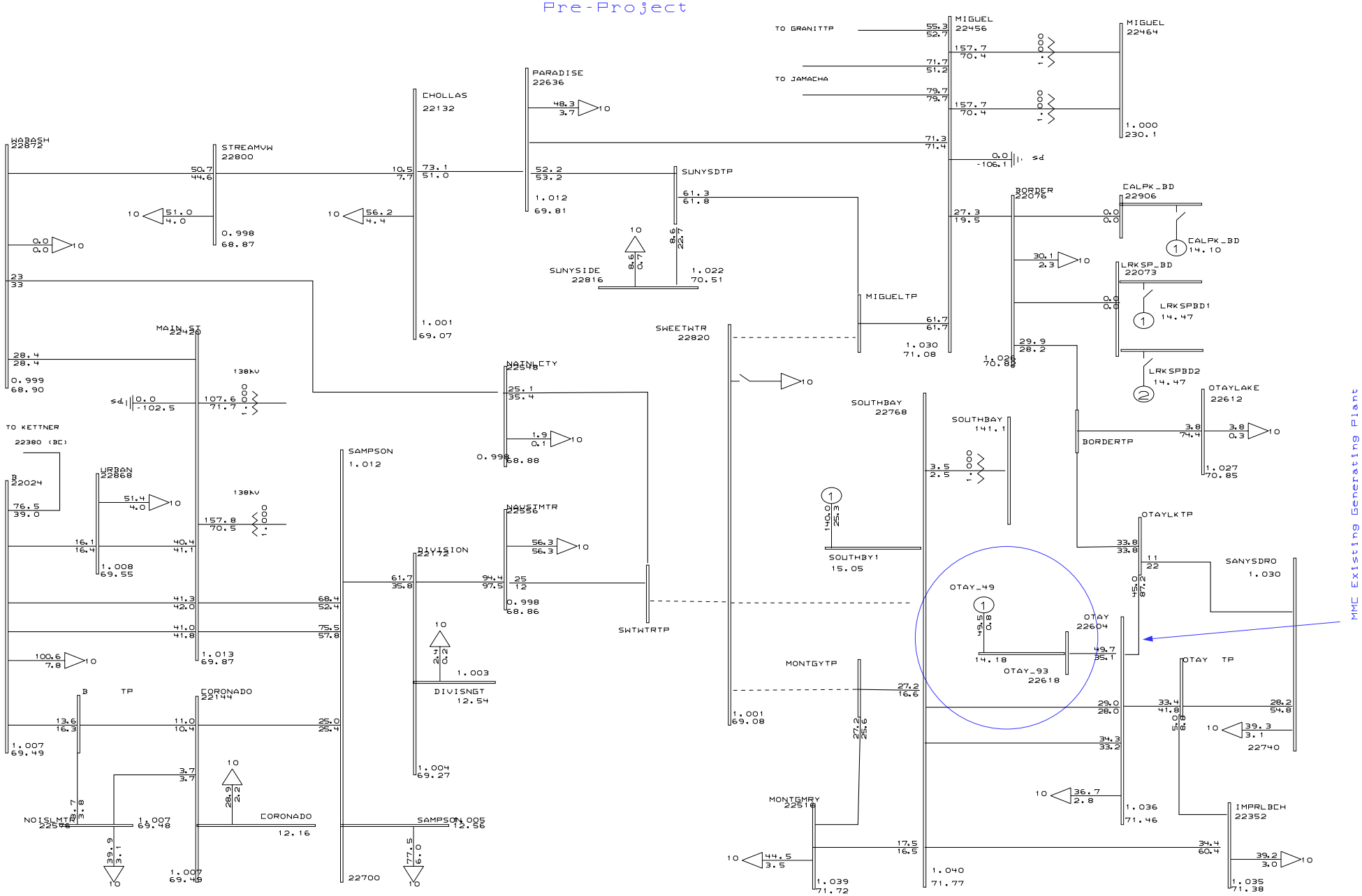


Figure ch; Post-project, FY_2, TL644 O/L by outage of Southbay 69 kV south bus:



# Cat C Contingency Plots of SDG&E Southern 69 kV System

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

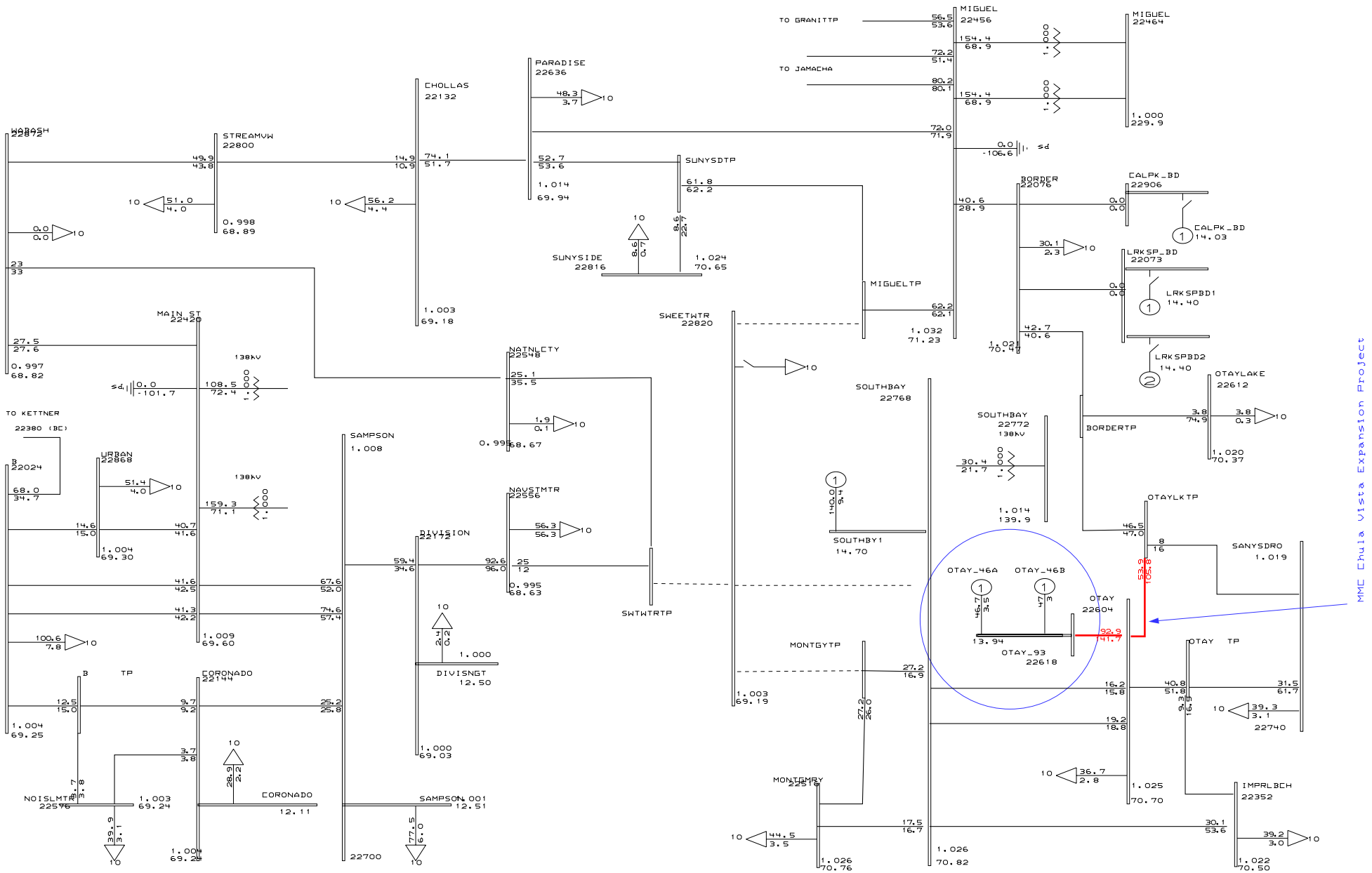



General Electric International, Inc. PSLF Program Wed Jan 24 10:58:35 2007 q_90_cod_a.sav

| | | |
|---|---|---|
| q_90_cod_a, SDGE LGIP case for Queue 90, year 2008<br>Pre SRPL, pre-project, O BD unit on<br>HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | CFE exp approx 100 MW; IID w/upgrades, w/o PST, exp 100 MW<br>Outage: Sweetwater 69 kB bus | MVA/%rate<br>metro_pre.drw<br>Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

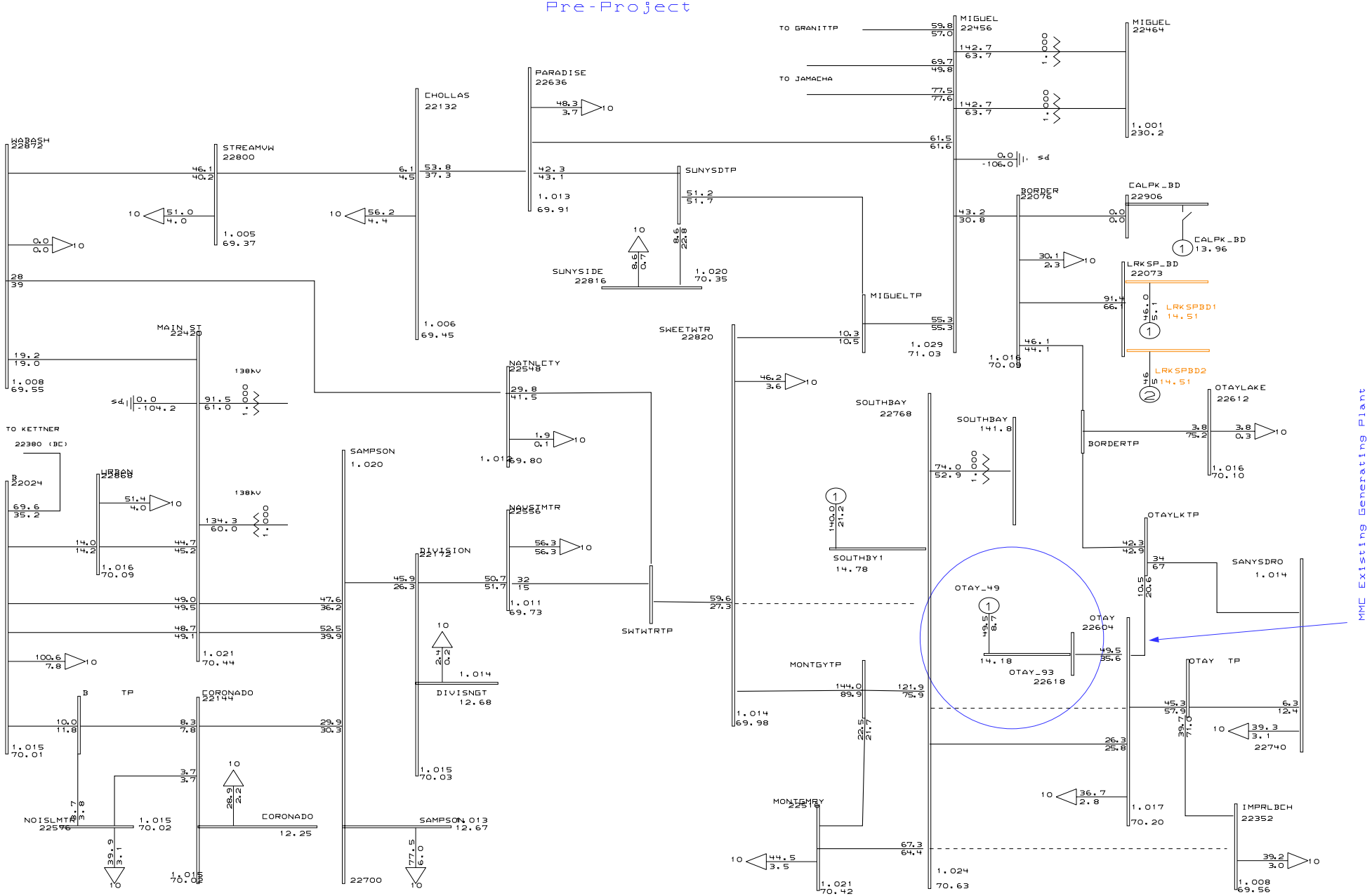
## Post-Project




General Electric International, Inc. PSLF Program Wed Jan 24 11:00:34 2007 q_90_cod_b.sav

| | | |
|---|---|---|
| q_90_cod_b, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, post-project, 0 BD unit on | Outage: Sweetwater 69 kV bus | metro_post.drw |
| HS peak, high SDGE gen/low SDGE imp/low WOR & hi EOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

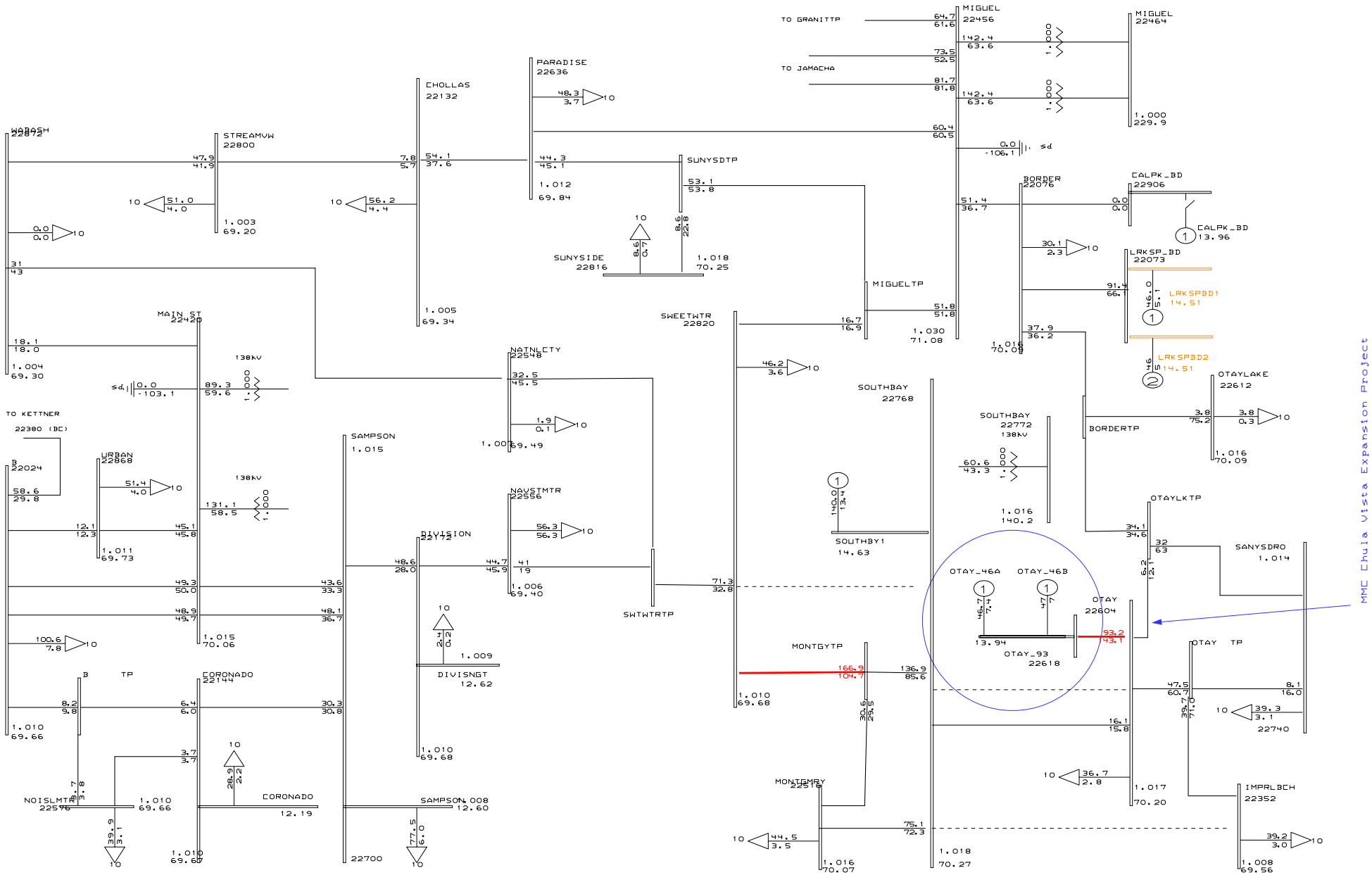



General Electric International, Inc. PSLF Program Thu Jan 25 08:11:19 2007 q_90_cod_e.sav

| | | |
|---|---|---|
| q_90_cod_e, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, pre-project, 2 BD unit on | Outage: Southbay 69 kV north bus | metro_pre.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

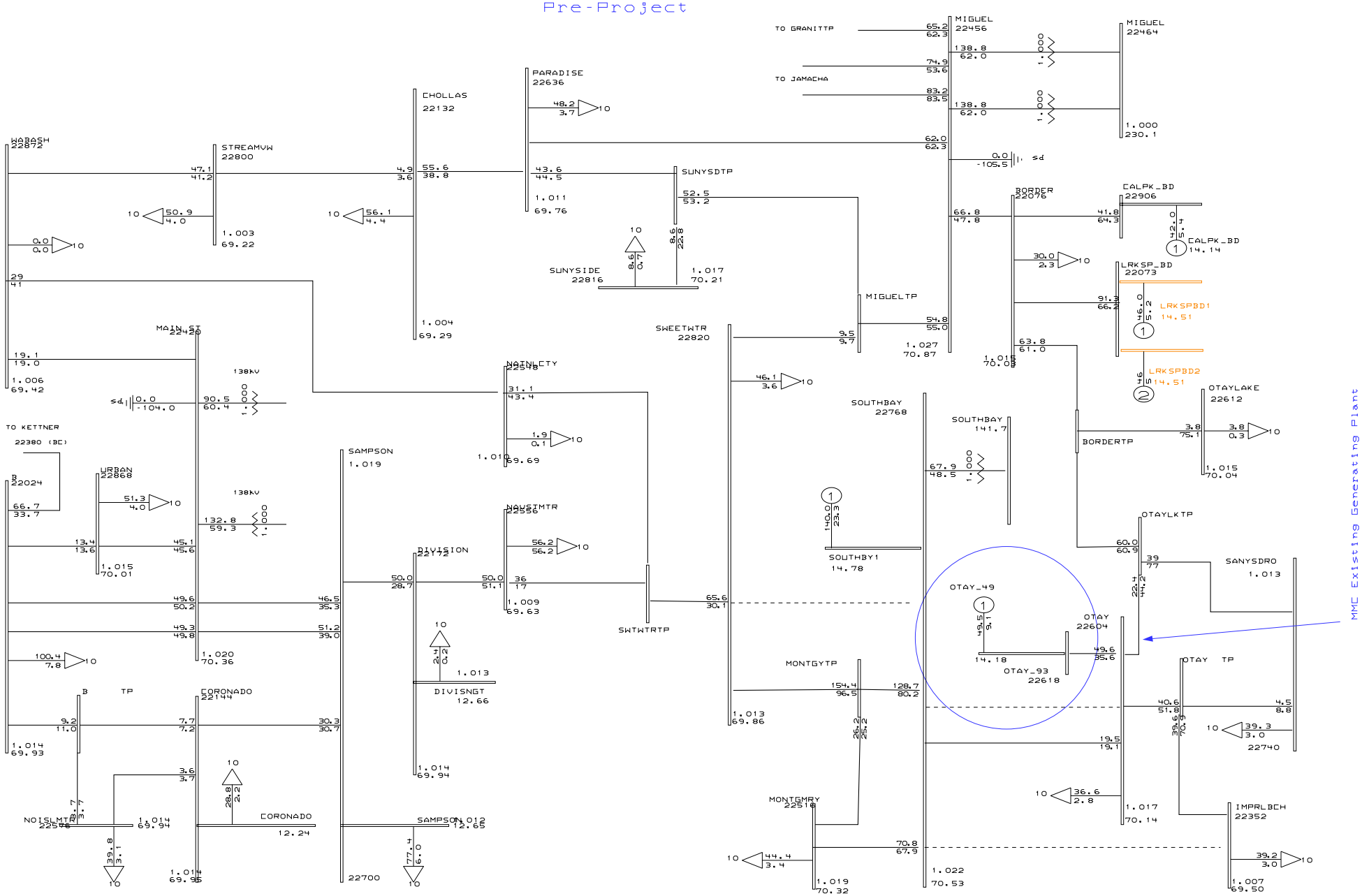
## Post-Project




General Electric International, Inc. PSLF Program Thu Jan 25 08:09:52 2007 q_90_cod_f.sav

| | | |
|---|---|---|
| q_90_cod_f, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, post-project, 2 BD unit on | Outage: Southbay 69 kV north bus | metro_post.drw |
| HS peak, high SDGE gen/low SDGE imp/low WOR & hi EOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project
## Pre-Project

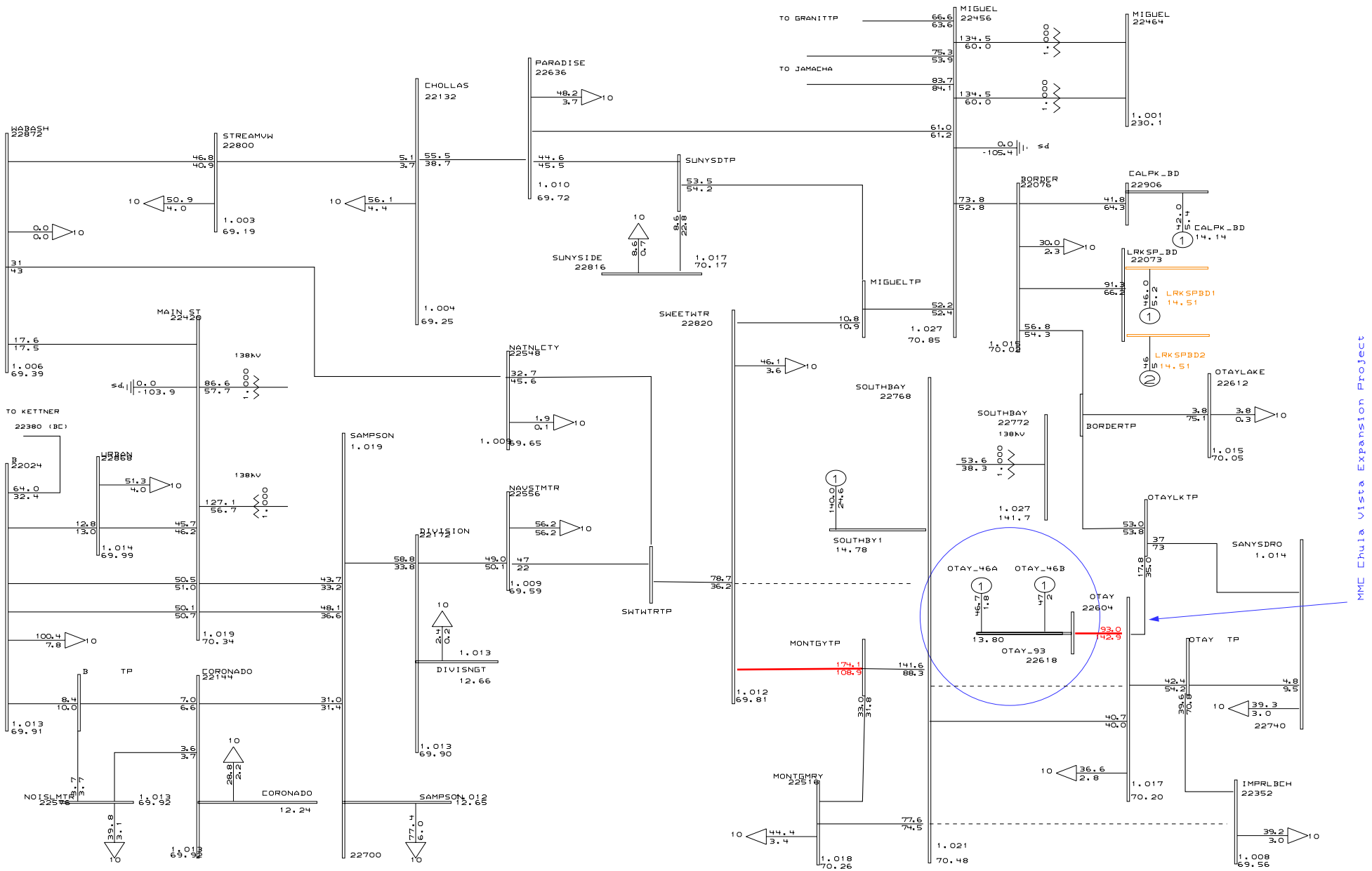



General Electric International, Inc. PSLF Program Thu Jan 25 08:12:36 2007 q_90_cod_g.sav

| | | | |
|---|---|---|---|
| | q_90_cod_g, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| | Pre SRPL, pre-project, 3 BD unit on | Outage: Southbay 69 kV north bus | metro_pre.drw |
| | HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Queue 90: MMC Chula Vista Expansion Project

## Post-Project




General Electric International, Inc. PSLF Program Thu Jan 25 08:14:04 2007 q_90_cod_h.sav

| | | |
|---|---|---|
| q_90_cod_h, SDGE LGIP case for Queue 90, year 2008 | CFE exp approx 100 MW; IID w/o PST, exp 100 MW | MVA/%rate |
| Pre SRPL, post-project, 3 BD unit on | Outage: Southbay 69 kV north bus | metro_post.drw |
| HS peak, high SDGE gen/low SDGE imp/low EOR & WOR | | Rating = 1 |

# Appendix H

## Detailed Listing of Voltage Limits Violations

## Delta Voltage Analysis

| | |
|---|---|
| Delta V Violations | Violations |
| Contingency Type | (All) |
| Contingency Categ | (All) |
| BUS or ERROR | (All) |
| Base or Cont | (All) |

| | | | | <---Commercial Operating Date Analysis Results---> | | | | | | | | | | | | <----------FutureYear Analysis Results----------> | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Sensitivities | | | | | | | | | | | | Sensitivities | | | |
| | | | | <- - - - -Max Gen / Min Import- - - - -> | | | | | | | | Peak Load Hi ML Flow No SY Gen | | Low Otay Ld 13.2 MW Hi SY Gen | | <- - - -Max Gen / Min Import- - - -> | | | | | | | | Peak Load Hi ML Flow No SY Gen | | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | < - - - - - -Peak Load- - - - - - - - - > | | | | | | | | | | | | <- - - - - -Peak Load- - - - - - - -> | | | | | | | | | | | |
| | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| Max of Delta V | | | | CaseName | | | | | | | | | | | | | | | | | | | | | | | |
| Area | BUS Name | Contingency Nan | kV | cod_a | cod_b | cod_c | cod_d | cod_e | cod_f | cod_g | cod_h | cod_q | cod_r | cod_s | cod_t | fya_a | fya_b | fya_c | fya_d | fya_e | fya_f | fya_g | fya_h | fya_i | fya_j | fya_k | fya_l |
| 22 | ALPINE | 50001/23050D | 69 | | | | | | | | | -0.07 | -0.05 | | | | | | | | | | | | | | |
| | | Bus_LC69W | 69 | | | | | | | | | | | | | | | | | | | | | 0.06 | 0.06 | | |
| | ARTESN | 50001/23050D | 69 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |
| | AVOCADO | TL695RAS | 69 | | | | | | | | | -0.05 | -0.05 | | | | | | | | | | | | | | |
| | B | 50001/23050D | 69 | | | | | | | | | -0.07 | | | | | | | | | | | | | | | |
| | B TP | 50001/23050D | 69 | | | | | | | | | -0.07 | | | | | | | | | | | | | | | |
| | BARRETT | 50001/23050D | 69 | | | | | | | | | -0.06 | -0.05 | | | | | | | | | | | | | | |
| | | Bus_LC69W | 69 | | | | | | | | | | | | | | | | | | | | | 0.05 | 0.05 | | |
| | | TL00625 | 69 | -0.05 | -0.07 | -0.05 | -0.07 | -0.06 | -0.07 | -0.05 | -0.05 | -0.05 | -0.06 | -0.06 | -0.06 | | | | | | | | | | | | |
| | BERNARDO | 50001/23050D | 69 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |
| | BORREGO | 50001/23050D | 69 | | | | | | | | | -0.07 | -0.06 | | | | | | | | | | | | | | |
| | | Bus_ST69 | 69 | | -0.06 | | -0.06 | | -0.06 | | | | | | | -0.06 | -0.06 | -0.06 | -0.07 | -0.06 | -0.06 | -0.06 | -0.06 | -0.07 | -0.07 | | |
| | | TL00685 | 69 | | -0.06 | | -0.06 | | -0.06 | | | | | | | -0.06 | -0.06 | -0.06 | -0.07 | -0.06 | -0.06 | -0.06 | -0.06 | -0.07 | -0.07 | | |
| | BOULEVRD | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | | Bus_LC69W | 69 | | | | | | | | | | | | | | | | | | | | | 0.05 | 0.05 | | |
| | | TL00625 | 69 | | -0.05 | | -0.06 | | -0.06 | | | | | -0.06 | -0.06 | | | | | | | | | | | | |
| | CABRILLO | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | CABRLNVY | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | CALPK_EC | 50001/23050D | 69 | | | | | | | | | -0.07 | -0.05 | | | | | | | | | | | | | | |
| | CAMERON | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | | Bus_LC69W | 69 | | | | | | | | | | | | | | | | | | | | | 0.05 | 0.05 | | |
| | | TL00625 | 69 | | -0.06 | | -0.07 | | -0.07 | | | | -0.05 | -0.06 | -0.06 | | | | | | | | | | | | |
| | CAMPOGEN | 50001/23050D | 69 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |
| | | Bus_LC69W | 34.5 | | | | | | | | | | | | | | | | | | | | | 0.05 | 0.05 | | |
| | | | 69 | | | | | | | | | | | | | | | | | | | | | 0.05 | 0.05 | | |
| | | TL00625 | 34.5 | | | | -0.05 | | -0.05 | | | | | -0.06 | -0.06 | | | | | | | | | | | | |
| | | | 69 | | -0.05 | | -0.06 | | -0.06 | | | | | -0.06 | -0.06 | | | | | | | | | | | | |
| | CANNON | 13804/13801 | 138 | | | | | | | | | | | | | | | | | | | | | | | -0.05 | -0.05 |
| | | TL13801 | 138 | | | | | | | | | | | | | | | | | | | | | | | -0.05 | -0.05 |
| | CAPSTRNO | 23052/23007 | 138 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | | | | | | | | | | | | | | |
| | CARLTNHS | 50001/23050D | 138 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | CENTRALX | 50001/23040a | 230 | | | | | | | | | | | | | | | | | | | | | -0.05 | -0.05 | | |
| | | | 500 | | | | | | | | | | | | | | | | | | | | | -0.05 | -0.05 | | |
| | | 50001_1a | 500 | | | | | | | | | | | | | | | | | | | | | -0.05 | | | |
| | | TLSUNRI | 500 | | | | | | | | | | | | | | | | | | | | | | | -0.06 | -0.06 |
| | CHOLLAS | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | CLAIRMNT | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | CORONADO | 50001/23050D | 69 | | | | | | | | | -0.07 | | | | | | | | | | | | | | | |

## Delta Voltage Analysis

| | |
|---|---|
| Delta V Violations | Violations |
| Contingency Type | (All) |
| Contingency Categ | (All) |
| BUS or ERROR | (All) |
| Base or Cont | (All) |

| | | | | <---Commercial Operating Date Analysis Results---> | | | | | | | | | | | | <----------FutureYear Analysis Results----------> | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Sensitivities | | | | | | | | | | | | Sensitivities | | | |
| | | | | <- - - - -Max Gen / Min Import- - - - -> | | | | | | | | Peak Load Hi ML Flow No SY Gen | | Low Otay Ld 13.2 MW Hi SY Gen | | <- - - -Max Gen / Min Import- - - -> | | | | | | | | Peak Load Hi ML Flow No SY Gen | | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | < - - - - - -Peak Load- - - - - - - - - > | | | | | | | | | | | | <- - - - - -Peak Load- - - - - - - -> | | | | | | | | | | | |
| | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| Max of Delta V | | | | CaseName | | | | | | | | | | | | | | | | | | | | | | | |
| Area | BUS Name | Contingency Nan | kV | cod_a | cod_b | cod_c | cod_d | cod_e | cod_f | cod_g | cod_h | cod_q | cod_r | cod_s | cod_t | fya_a | fya_b | fya_c | fya_d | fya_e | fya_f | fya_g | fya_h | fya_i | fya_j | fya_k | fya_l |
| 22 | CREELMAN | 50001/23050D | 69 | | | | | | | | | -0.06 | -0.05 | | | | | | | | | | | | | | |
| | | Bus_CRE69E | 69 | | | | | | | | | | | | | 0.05 | 0.05 | 0.06 | | 0.05 | 0.05 | 0.05 | 0.05 | | | | |
| | CRESTWD | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | | Bus_LC69W | 69 | | | | | | | | | | | | | | | | | | | | | 0.05 | 0.05 | | |
| | | TL00625 | 69 | | -0.05 | | -0.06 | | -0.06 | | | | | -0.06 | -0.06 | | | | | | | | | | | | |
| | CRSTNTS | 23052/23007 | 69 | -0.08 | -0.08 | -0.08 | -0.08 | -0.08 | -0.08 | -0.08 | -0.08 | -0.08 | -0.08 | | | | | | | | | | | | | | |
| | | TL695RAS | 69 | -0.09 | -0.09 | -0.09 | -0.09 | -0.09 | -0.09 | -0.09 | -0.09 | -0.09 | -0.09 | | | | | | | | | | | | | | |
| | CW117MW | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | | Bus_LC69W | 69 | | | | | | | | | | | | | | | | | | | | | 0.05 | 0.05 | | |
| | | TL00625 | 69 | | -0.05 | | -0.06 | | -0.06 | | | | | -0.06 | -0.06 | | | | | | | | | | | | |
| | CW117MWG | 50001/23050D | 34.5 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | | Bus_LC69W | 34.5 | | | | | | | | | | | | | | | | | | | | | 0.05 | 0.05 | | |
| | | TL00625 | 34.5 | | -0.05 | | -0.06 | | -0.06 | | | | | -0.06 | -0.06 | | | | | | | | | | | | |
| | CW36MWG | 50001/23050D | 34.5 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |
| | | TL00625 | 34.5 | | -0.05 | | -0.06 | | -0.06 | | | | | -0.05 | -0.05 | | | | | | | | | | | | |
| | CW36MWT | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | | Bus_LC69W | 69 | | | | | | | | | | | | | | | | | | | | | 0.05 | 0.05 | | |
| | | TL00625 | 69 | | -0.05 | | -0.06 | | -0.06 | | | | | -0.06 | -0.06 | | | | | | | | | | | | |
| | DEL MAR | 50001/23050D | 69 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |
| | DESCANSO | 50001/23050D | 69 | | | | | | | | | -0.06 | -0.05 | | | | | | | | | | | | | | |
| | DIVISION | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | DOUBLET | 50001/23050D | 69 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |
| | DUNHILL | 50001/23050D | 69 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |
| | EASTGATE | 50001/23050D | 69 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |
| | EL CAJON | 50001/23050D | 69 | | | | | | | | | -0.07 | -0.05 | | | | | | | | | | | | | | |
| | ELLIOTT | 50001/23050D | 69 | | | | | | | | | -0.06 | -0.05 | | | | | | | | | | | | | | |
| | | Bus_EL69S | 69 | -0.09 | -0.07 | -0.09 | -0.06 | -0.09 | -0.07 | -0.10 | -0.10 | -0.09 | -0.08 | | | -0.09 | -0.09 | -0.10 | -0.09 | -0.09 | -0.09 | -0.09 | -0.09 | -0.08 | -0.08 | | |
| | ENCNITAS | 50001/23050D | 69 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |
| | ESCNDO50 | 13802/13801 | 138 | | | | | | | | | | | | | | | -0.10 | -0.10 | -0.10 | -0.10 | -0.10 | -0.10 | -0.10 | -0.10 | -0.07 | -0.07 |
| | | Bus_SHBT | 138 | | | | | | | | | | | | | -0.09 | -0.09 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.06 | -0.06 |
| | | ES50 | 138 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | | | | | | | | | | | | | | |
| | | TL13802 | 138 | | | | | | | | | | | | | | | -0.10 | -0.10 | -0.10 | -0.10 | -0.10 | -0.10 | -0.10 | -0.10 | -0.07 | -0.07 |
| | | TL13811 | 138 | | | | | | | | | | | | | -0.08 | -0.08 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.07 | -0.06 | -0.06 |
| | F | 50001/23050D | 69 | | | | | | | | | -0.07 | -0.05 | | | | | | | | | | | | | | |
| | FRIARS | 50001/23050D | 138 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | GARFIELD | 50001/23050D | 69 | | | | | | | | | -0.07 | -0.05 | | | | | | | | | | | | | | |
| | GEN DYNM | 50001/23050D | 69 | | | | | | | | | -0.06 | -0.05 | | | | | | | | | | | | | | |
| | | | 138 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | | Bus_LC69W | 69 | | | | | | 0.05 | | | | | | | | | | | | | | | 0.06 | 0.06 | | |

## Delta Voltage Analysis

| | |
|---|---|
| Delta V Violations | Violations |
| Contingency Type | (All) |
| Contingency Categ | (All) |
| BUS or ERROR | (All) |
| Base or Cont | (All) |

| | | | | <---Commercial Operating Date Analysis Results---> | | | | | | | | | | | | <----------FutureYear Analysis Results----------> | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Sensitivities | | | | | | | | | | | | Sensitivities | | | |
| | | | | <- - - - -Max Gen / Min Import- - - - -> | | | | | | | | Peak Load Hi ML Flow No SY Gen | | Low Otay Ld 13.2 MW Hi SY Gen | | <- - - -Max Gen / Min Import- - - -> | | | | | | | | Peak Load Hi ML Flow No SY Gen | | Low Otay Ld 13.2 MW Hi SY Gen | |
| | | | | < - - - - - -Peak Load- - - - - - - - - > | | | | | | | | | | | | <- - - - - -Peak Load- - - - - - - -> | | | | | | | | | | | |
| | | | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | | 0 BD Gen | | 1 BD Gen | | 2 BD Gen | | 3 BD Gen | | 3 BD Gen | | 3 BD Gen | |
| | | | | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| Max of Delta V | | | | CaseName | | | | | | | | | | | | | | | | | | | | | | | |
| Area | BUS Name | Contingency Nan | kV | cod_a | cod_b | cod_c | cod_d | cod_e | cod_f | cod_g | cod_h | cod_q | cod_r | cod_s | cod_t | fya_a | fya_b | fya_c | fya_d | fya_e | fya_f | fya_g | fya_h | fya_i | fya_j | fya_k | fya_l |
| 22 | LOVELAND | 50001/23050D | 69 | | | | | | | | | -0.07 | -0.05 | | | | | | | | | | | | | | |
| | | Bus_LC69W | 69 | | | | | | | | | | | | | | | | | | | | | 0.06 | 0.06 | | |
| | MESA RIM | 50001/23050D | 69 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |
| | MESAHGTS | 50001/23050D | 69 | | | | | | | | | -0.06 | -0.05 | | | | | | | | | | | | | | |
| | MIGUEL | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | NAVSTMTR | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | NOISLMTR | 50001/23050D | 69 | | | | | | | | | -0.07 | | | | | | | | | | | | | | | |
| | NORTHCTY | 13808/13804 | 138 | | | | | | | | | | | | | 0.07 | 0.07 | | | | | | | | | 0.05 | 0.06 |
| | OCEANSDE | TL695RAS | 69 | -0.05 | -0.05 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | | | | | | | | | | | | | | |
| | OLD TOWN | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | | | 230 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | POWAY | 50001/23050D | 69 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | | 6924/6915 | 69 | -0.05 | -0.05 | -0.05 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | | -0.05 | | | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | | |
| | | Bus_PO69 | 69 | | -0.05 | -0.05 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | | -0.05 | | | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | -0.06 | | |
| | PRCTRVLY | 50001/23050D | 138 | | | | | | | | | -0.06 | | | | | | | | | | | | | | | |
| | | TL13813B | 138 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |
| | R.CARMEL | 50001/23050D | 69 | | | | | | | | | -0.05 | | | | | | | | | | | | | | | |

# Appendix I

## Circuit Breaker Short Circuit Duty Study Results

Queue 90 ISIS Short Circuit/Breaker Interrupting Duty Assessment

| | | Case | | | |
|---|---|---|---|---|---|
| BREAKER | Data | cod_pre | cod_post | fya_pre | fya_post |
| DI606 | DUTY_Percent | 96 | 95.9 | | |
| | DUTY_Amps | 42256.2 | 42178.4 | | |
| | BKR_Rating | 44000 | 44000 | | |
| DI658 | DUTY_Percent | 103.9 | 103.7 | 152 | 151.9 |
| | DUTY_Amps | 41561.4 | 41496.8 | 41029.1 | 41006.9 |
| | BKR_Rating | 40000 | 40000 | 27000 | 27000 |
| DI6901 | DUTY_Percent | 101 | 100.9 | 99.7 | 99.7 |
| | DUTY_Amps | 40404.9 | 40348.4 | 39894.5 | 39879.6 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| EC624 | DUTY_Percent | 104.1 | 103.7 | 101.7 | 101.4 |
| | DUTY_Amps | 21863.3 | 21783.2 | 21358.6 | 21283.5 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| EL636 | DUTY_Percent | 108.5 | 108.2 | 106.6 | 106.3 |
| | DUTY_Amps | 22774.7 | 22714.4 | 22386.7 | 22327 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| EL671 | DUTY_Percent | 108.5 | 108.2 | 106.6 | 106.3 |
| | DUTY_Amps | 22774.7 | 22714.4 | 22386.7 | 22327 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| ES30 | DUTY_Percent | 112.4 | 112.2 | 115.8 | 115.6 |
| | DUTY_Amps | 44942 | 44880.1 | 46303.4 | 46243.3 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES31 | DUTY_Percent | 112.4 | 112.2 | 115.8 | 115.6 |
| | DUTY_Amps | 44942 | 44880.1 | 46303.4 | 46243.3 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES32 | DUTY_Percent | 112.4 | 112.2 | 115.8 | 115.6 |
| | DUTY_Amps | 44942 | 44880.1 | 46303.4 | 46243.3 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES50 | DUTY_Percent | 109.9 | 109.8 | 113.3 | 113.1 |
| | DUTY_Amps | 43975.7 | 43915.2 | 45304.9 | 45246 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES616 | DUTY_Percent | 112.4 | 112.2 | 115.8 | 115.6 |
| | DUTY_Amps | 44942 | 44880.1 | 46303.4 | 46243.3 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES679 | DUTY_Percent | 112.4 | 112.2 | 115.8 | 115.6 |
| | DUTY_Amps | 44942 | 44880.1 | 46303.4 | 46243.3 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES684 | DUTY_Percent | 109.9 | 109.8 | 113.3 | 113.1 |
| | DUTY_Amps | 43975.7 | 43915.2 | 45304.9 | 45246 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES688 | DUTY_Percent | 109.9 | 109.8 | 113.3 | 113.1 |
| | DUTY_Amps | 43975.7 | 43915.2 | 45304.9 | 45246 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES689 | DUTY_Percent | 112.4 | 112.2 | 115.8 | 115.6 |
| | DUTY_Amps | 44942 | 44880.1 | 46303.4 | 46243.3 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES6908 | DUTY_Percent | 109.9 | 109.8 | 113.3 | 113.1 |
| | DUTY_Amps | 43975.7 | 43915.2 | 45304.9 | 45246 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |

Queue 90 ISIS Short Circuit/Breaker Interrupting Duty Assessment

| | | Case | | | |
|---|---|---|---|---|---|
| BREAKER | Data | cod_pre | cod_post | fya_pre | fya_post |
| ES696 | DUTY_Percent | 109.9 | 109.8 | 113.3 | 113.1 |
| | DUTY_Amps | 43975.7 | 43915.2 | 45304.9 | 45246 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES70 | DUTY_Percent | 112.4 | 112.2 | 115.8 | 115.6 |
| | DUTY_Amps | 44942 | 44880.1 | 46303.4 | 46243.3 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES71 | DUTY_Percent | 112.4 | 112.2 | 115.8 | 115.6 |
| | DUTY_Amps | 44942 | 44880.1 | 46303.4 | 46243.3 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| ES72 | DUTY_Percent | 109.9 | 109.8 | 113.3 | 113.1 |
| | DUTY_Amps | 43975.7 | 43915.2 | 45304.9 | 45246 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| IB623 | DUTY_Percent | | | 117.2 | 119.2 |
| | DUTY_Amps | | | 14645.1 | 14896.8 |
| | BKR_Rating | | | 12500 | 12500 |
| KY30 | DUTY_Percent | 97.9 | 97.7 | 96.6 | 96.4 |
| | DUTY_Amps | 28404.5 | 28336.2 | 28027.4 | 27960 |
| | BKR_Rating | 29000 | 29000 | 29000 | 29000 |
| KY31 | DUTY_Percent | 105.2 | 104.9 | 103.8 | 103.6 |
| | DUTY_Amps | 28404.5 | 28336.2 | 28027.4 | 27960 |
| | BKR_Rating | 27000 | 27000 | 27000 | 27000 |
| KY32 | DUTY_Percent | 105.2 | 104.9 | 103.8 | 103.6 |
| | DUTY_Amps | 28404.5 | 28336.2 | 28027.4 | 27960 |
| | BKR_Rating | 27000 | 27000 | 27000 | 27000 |
| KY663 | DUTY_Percent | 97.9 | 97.7 | 96.6 | 96.4 |
| | DUTY_Amps | 28404.5 | 28336.2 | 28027.4 | 27960 |
| | BKR_Rating | 29000 | 29000 | 29000 | 29000 |
| LCEAST31 | DUTY_Percent | 104.6 | 104.3 | 101.7 | 101.4 |
| | DUTY_Amps | 21971.2 | 21898.3 | 21352.3 | 21283.8 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| LCWEST32 | DUTY_Percent | 104.7 | 104.4 | 101.8 | 101.4 |
| | DUTY_Amps | 21991.7 | 21918.9 | 21372.5 | 21303.9 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| ME32 | DUTY_Percent | 98.8 | 98.6 | 97.9 | 97.8 |
| | DUTY_Amps | 12347.4 | 12330.3 | 12239.7 | 12222.6 |
| | BKR_Rating | 12500 | 12500 | 12500 | 12500 |
| ME33 | DUTY_Percent | 98.8 | 98.6 | 97.9 | 97.8 |
| | DUTY_Amps | 12347.4 | 12330.3 | 12239.7 | 12222.6 |
| | BKR_Rating | 12500 | 12500 | 12500 | 12500 |
| MG30 | DUTY_Percent | 96.7 | 98.4 | | |
| | DUTY_Amps | 28030 | 28534.9 | | |
| | BKR_Rating | 29000 | 29000 | | |
| MG31 | DUTY_Percent | 96.7 | 98.4 | | |
| | DUTY_Amps | 28030 | 28534.9 | | |
| | BKR_Rating | 29000 | 29000 | | |
| MG641 | DUTY_Percent | 105.9 | 106.9 | | 96.4 |
| | DUTY_Amps | 28604.3 | 28869.3 | | 26031.1 |
| | BKR_Rating | 27000 | 27000 | | 27000 |

Queue 90 ISIS Short Circuit/Breaker Interrupting Duty Assessment

| | | Case | | | |
|---|---|---|---|---|---|
| BREAKER | Data | cod_pre | cod_post | fya_pre | fya_post |
| MG642 | DUTY_Percent | 105.9 | 106.9 | | 96.4 |
| | DUTY_Amps | 28604.3 | 28869.3 | | 26031.1 |
| | BKR_Rating | 27000 | 27000 | | 27000 |
| MI602 | DUTY_Percent | | | 96.8 | 96.4 |
| | DUTY_Amps | | | 38703.5 | 38575 |
| | BKR_Rating | | | 40000 | 40000 |
| MS30 | DUTY_Percent | 113.5 | 113.2 | 111.8 | 111.5 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| MS31 | DUTY_Percent | 113.5 | 113.2 | 111.8 | 111.5 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| MS32 | DUTY_Percent | 113.5 | 113.2 | 111.8 | 111.5 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| MS33 | DUTY_Percent | 113.5 | 113.2 | 111.8 | 111.5 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| MS50 | DUTY_Percent | 110.7 | 110.5 | 109 | 108.8 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 41000 | 41000 | 41000 | 41000 |
| MS51 | DUTY_Percent | 110.7 | 110.5 | 109 | 108.8 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 41000 | 41000 | 41000 | 41000 |
| MS52 | DUTY_Percent | 110.7 | 110.5 | 109 | 108.8 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 41000 | 41000 | 41000 | 41000 |
| MS618 | DUTY_Percent | 108.1 | 107.8 | 106.4 | 106.2 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 42000 | 42000 | 42000 | 42000 |
| MS619 | DUTY_Percent | 113.5 | 113.2 | 111.8 | 111.5 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| MS653 | DUTY_Percent | 113.5 | 113.2 | 111.8 | 111.5 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| MS654 | DUTY_Percent | 113.5 | 113.2 | 111.8 | 111.5 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| MS663 | DUTY_Percent | 108.1 | 107.8 | 106.4 | 106.2 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 42000 | 42000 | 42000 | 42000 |
| MS670 | DUTY_Percent | 108.1 | 107.8 | 106.4 | 106.2 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 42000 | 42000 | 42000 | 42000 |
| MS671 | DUTY_Percent | 113.5 | 113.2 | 111.8 | 111.5 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |

Queue 90 ISIS Short Circuit/Breaker Interrupting Duty Assessment

| | | Case | | | |
|---|---|---|---|---|---|
| BREAKER | Data | cod_pre | cod_post | fya_pre | fya_post |
| MS676 | DUTY_Percent | 113.5 | 113.2 | 111.8 | 111.5 |
| | DUTY_Amps | 45386.1 | 45289 | 44704.3 | 44614.9 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| MS70 | DUTY_Percent | 113.5 | 113.2 | 111.8 | 111.5 |
| | DUTY_Amps | 45386.1 | 45289 | 44718.4 | 44614.9 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| OY30 | DUTY_Percent | 111.4 | 117.1 | 102 | 108.3 |
| | DUTY_Amps | 23389.7 | 24582.8 | 21430.2 | 22753.4 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| OY31 | DUTY_Percent | | 98.3 | | |
| | DUTY_Amps | | 24582.8 | | |
| | BKR_Rating | | 25000 | | |
| OY623 | DUTY_Percent | 111.4 | 117.1 | 102 | 108.3 |
| | DUTY_Amps | 23389.7 | 24582.8 | 21430.2 | 22753.4 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| OY646 | DUTY_Percent | | 98.3 | | |
| | DUTY_Amps | | 24582.8 | | |
| | BKR_Rating | | 25000 | | |
| OY649 | DUTY_Percent | 111.4 | 117.1 | 102 | 108.3 |
| | DUTY_Amps | 23389.7 | 24582.8 | 21430.2 | 22753.4 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| OY6929 | DUTY_Percent | 111.4 | 117.1 | 102 | 108.3 |
| | DUTY_Amps | 23389.7 | 24582.8 | 21430.2 | 22753.4 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| PQ13810 | DUTY_Percent | 129.5 | 129.3 | 135.1 | 134.9 |
| | DUTY_Amps | 27193.3 | 27147.3 | 28365.1 | 28319 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| PQ50 | DUTY_Percent | 129.5 | 129.3 | 135.1 | 134.9 |
| | DUTY_Amps | 42500.7 | 42421.6 | 44595.1 | 44507.9 |
| | BKR_Rating | 63000 | 63000 | 63000 | 63000 |
| PQ51 | DUTY_Percent | 111.8 | 111.6 | 117.4 | 117.1 |
| | DUTY_Amps | 42500.7 | 42421.6 | 44595.1 | 44507.9 |
| | BKR_Rating | 38000 | 38000 | 38000 | 38000 |
| PQ52 | DUTY_Percent | 111.8 | 111.6 | 117.4 | 117.1 |
| | DUTY_Amps | 42500.7 | 42421.6 | 44595.1 | 44507.9 |
| | BKR_Rating | 38000 | 38000 | 38000 | 38000 |
| PQ610 | DUTY_Percent | 101.5 | 101.3 | 108.2 | 108 |
| | DUTY_Amps | 42648 | 42563.5 | 45458.5 | 45369 |
| | BKR_Rating | 42000 | 42000 | 42000 | 42000 |
| PQ661 | DUTY_Percent | 101.2 | 101 | 106.2 | 106 |
| | DUTY_Amps | 42500.7 | 42421.6 | 44595.1 | 44507.9 |
| | BKR_Rating | 42000 | 42000 | 42000 | 42000 |
| PQ662 | DUTY_Percent | 101.2 | 101 | 106.2 | 106 |
| | DUTY_Amps | 42500.7 | 42421.6 | 44595.1 | 44507.9 |
| | BKR_Rating | 42000 | 42000 | 42000 | 42000 |
| PQ664 | DUTY_Percent | 112.3 | 112.1 | 119.7 | 119.4 |
| | DUTY_Amps | 42683.9 | 42599.4 | 45479.7 | 45390.1 |
| | BKR_Rating | 38000 | 38000 | 38000 | 38000 |

Queue 90 ISIS Short Circuit/Breaker Interrupting Duty Assessment

| | | Case | | | |
|---|---|---|---|---|---|
| BREAKER | Data | cod_pre | cod_post | fya_pre | fya_post |
| PQ665 | DUTY_Percent | 106.7 | 106.5 | 113.7 | 113.5 |
| | DUTY_Amps | 42683.9 | 42599.4 | 45479.7 | 45390.1 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| PQ666 | DUTY_Percent | 106.7 | 106.5 | 113.7 | 113.5 |
| | DUTY_Amps | 42683.9 | 42599.4 | 45479.7 | 45390.1 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| PQ667 | DUTY_Percent | 106.7 | 106.5 | 113.7 | 113.5 |
| | DUTY_Amps | 42683.9 | 42599.4 | 45479.7 | 45390.1 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| PQ674 | DUTY_Percent | 101.2 | 101 | 106.2 | 106 |
| | DUTY_Amps | 42500.7 | 42421.6 | 44595.1 | 44507.9 |
| | BKR_Rating | 42000 | 42000 | 42000 | 42000 |
| PQ675 | DUTY_Percent | 101.2 | 101 | 106.2 | 106 |
| | DUTY_Amps | 42500.7 | 42421.6 | 44595.1 | 44507.9 |
| | BKR_Rating | 42000 | 42000 | 42000 | 42000 |
| PQ6905 | DUTY_Percent | 101.2 | 101 | 106.2 | 106 |
| | DUTY_Amps | 42500.7 | 42421.6 | 44595.1 | 44507.9 |
| | BKR_Rating | 42000 | 42000 | 42000 | 42000 |
| PQ6906 | DUTY_Percent | 112.3 | 112.1 | 119.7 | 119.4 |
| | DUTY_Amps | 42683.9 | 42599.4 | 45479.7 | 45390.1 |
| | BKR_Rating | 38000 | 38000 | 38000 | 38000 |
| PQ70 | DUTY_Percent | 106.6 | 106.4 | 113.6 | 113.4 |
| | DUTY_Amps | 42648 | 42563.5 | 45458.5 | 45369 |
| | BKR_Rating | 40000 | 40000 | 40000 | 40000 |
| PQ71 | DUTY_Percent | 111.8 | 111.6 | 117.4 | 117.1 |
| | DUTY_Amps | 42500.7 | 42421.6 | 44595.1 | 44507.9 |
| | BKR_Rating | 38000 | 38000 | 38000 | 38000 |
| RN617 | DUTY_Percent | 111.1 | 110.8 | 109.9 | 109.7 |
| | DUTY_Amps | 23322.7 | 23261.3 | 23089.2 | 23028 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| RN661 | DUTY_Percent | 111.1 | 110.8 | 109.9 | 109.7 |
| | DUTY_Amps | 23322.7 | 23261.3 | 23089.2 | 23028 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| RN6927 | DUTY_Percent | 111.1 | 110.8 | 109.9 | 109.7 |
| | DUTY_Amps | 23322.7 | 23261.3 | 23089.2 | 23028 |
| | BKR_Rating | 21000 | 21000 | 21000 | 21000 |
| SA34 | DUTY_Percent | 125.6 | 125.4 | 125.5 | 125.3 |
| | DUTY_Amps | 33899.9 | 33854.6 | 33880.9 | 33835.2 |
| | BKR_Rating | 27000 | 27000 | 27000 | 27000 |
| SA35 | DUTY_Percent | 125.6 | 125.4 | 125.5 | 125.3 |
| | DUTY_Amps | 33899.9 | 33854.6 | 33880.9 | 33835.2 |
| | BKR_Rating | 27000 | 27000 | 27000 | 27000 |
| SA680 | DUTY_Percent | 125.6 | 125.4 | 125.5 | 125.3 |
| | DUTY_Amps | 33899.9 | 33854.6 | 33880.9 | 33835.2 |
| | BKR_Rating | 27000 | 27000 | 27000 | 27000 |
| SA6912 | DUTY_Percent | 125.6 | 125.4 | 125.5 | 125.3 |
| | DUTY_Amps | 33899.9 | 33854.6 | 33880.9 | 33835.2 |
| | BKR_Rating | 27000 | 27000 | 27000 | 27000 |

Queue 90 ISIS Short Circuit/Breaker Interrupting Duty Assessment

| | | Case | | | |
|---|---|---|---|---|---|
| BREAKER | Data | cod_pre | cod_post | fya_pre | fya_post |
| SA693 | DUTY_Percent | 125.6 | 125.4 | 125.5 | 125.3 |
| | DUTY_Amps | 33899.9 | 33854.6 | 33880.9 | 33835.2 |
| | BKR_Rating | 27000 | 27000 | 27000 | 27000 |
| SA694 | DUTY_Percent | 107.6 | 107.5 | 107.6 | 107.4 |
| | DUTY_Amps | 33899.9 | 33854.6 | 33880.9 | 33835.2 |
| | BKR_Rating | 31500 | 31500 | 31500 | 31500 |
| SA697 | DUTY_Percent | 125.6 | 125.4 | 125.5 | 125.3 |
| | DUTY_Amps | 33899.9 | 33854.6 | 33880.9 | 33835.2 |
| | BKR_Rating | 27000 | 27000 | 27000 | 27000 |
| SF616 | DUTY_Percent | 107 | 106.8 | 107.8 | 107.6 |
| | DUTY_Amps | 13910.1 | 13882.5 | 14018.4 | 13992.7 |
| | BKR_Rating | 13000 | 13000 | 13000 | 13000 |
| SO23002 | DUTY_Percent | | | 96.8 | 96.7 |
| | DUTY_Amps | | | 60956.1 | 60917.8 |
| | BKR_Rating | | | 63000 | 63000 |
| SO23006 | DUTY_Percent | | | 96.8 | 96.7 |
| | DUTY_Amps | | | 60956.1 | 60917.8 |
| | BKR_Rating | | | 63000 | 63000 |
| SO23007 | DUTY_Percent | 110.1 | 110 | 121.9 | 121.8 |
| | DUTY_Amps | 55060.2 | 55023 | 60956.1 | 60917.8 |
| | BKR_Rating | 50000 | 50000 | 50000 | 50000 |
| SO23010 | DUTY_Percent | | | 96.8 | 96.7 |
| | DUTY_Amps | | | 60956.1 | 60917.8 |
| | BKR_Rating | | | 63000 | 63000 |
| SO23052 | DUTY_Percent | | | 96.8 | 96.7 |
| | DUTY_Amps | | | 60956.1 | 60917.8 |
| | BKR_Rating | | | 63000 | 63000 |
| SY1 | DUTY_Percent | 152.8 | 156 | 95.4 | 98.1 |
| | DUTY_Amps | 44317.3 | 45232.7 | 27655.3 | 28462.3 |
| | BKR_Rating | 29000 | 29000 | 29000 | 29000 |
| SY50 | DUTY_Percent | 105.5 | 107.7 | | |
| | DUTY_Amps | 44317.3 | 45232.7 | | |
| | BKR_Rating | 42000 | 42000 | | |
| SY641 | DUTY_Percent | 105.5 | 107.7 | | |
| | DUTY_Amps | 44317.3 | 45232.7 | | |
| | BKR_Rating | 42000 | 42000 | | |
| SY642 | DUTY_Percent | 115.8 | 118.3 | | |
| | DUTY_Amps | 43998.1 | 44949.7 | | |
| | BKR_Rating | 38000 | 38000 | | |
| SY644 | DUTY_Percent | 105.5 | 107.7 | | |
| | DUTY_Amps | 44317.3 | 45232.7 | | |
| | BKR_Rating | 42000 | 42000 | | |
| SY645 | DUTY_Percent | 105.5 | 107.7 | | |
| | DUTY_Amps | 44317.3 | 45232.7 | | |
| | BKR_Rating | 42000 | 42000 | | |
| SY646 | DUTY_Percent | 105.5 | 107.7 | | |
| | DUTY_Amps | 44317.3 | 45232.7 | | |
| | BKR_Rating | 42000 | 42000 | | |

Queue 90 ISIS Short Circuit/Breaker Interrupting Duty Assessment

| | | Case | | | |
|---|---|---|---|---|---|
| BREAKER | Data | cod_pre | cod_post | fya_pre | fya_post |
| SY647 | DUTY_Percent | 104.8 | 107 | | |
| | DUTY_Amps | 43998.1 | 44949.7 | | |
| | BKR_Rating | 42000 | 42000 | | |
| SYGT1 | DUTY_Percent | 105.5 | 107.7 | | |
| | DUTY_Amps | 44317.3 | 45232.7 | | |
| | BKR_Rating | 42000 | 42000 | | |

# Appendix J

## Worst Conditions Analysis Summary

## And

## Plots of Transient Stability Simulations

# Worst Conditions Analysis Summary

Worst Condition Analysis Report
Scenario: Peak load, low import, hi generation, 3 Border units on-line
Case(s): Commercial Operating Date; q_90_cod_g/h/s/t/shg/thg.sav (pre- and post-project)

| Case Name | .chf Name | Parameter | Bus Name | Initial Volt/ Freq | Percent Dip | Time | Duration |
|---|---|---|---|---|---|---|---|
| q_90_cod_g | haa_ng_slo_pre.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | No dips violating criteria, worst dip 0.46 at 16507 SUNDTGE1 13.8 | | | | |
| | | V_all buses | No dips violating criteria, worst dip 15.13 at 15630 DINOSAUR 69.0 | | | | |
| q_90_cod_h | haa_ng_slo_post.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | No dips violating criteria, worst dip 0.46 at 16507 SUNDTGE1 13.8 | | | | |
| | | V_all buses | No dips violating criteria, worst dip 15.14 at 15630 DINOSAUR 69.0 | | | | |
| q_90_cod_g | iv_ml_tji_slo_pre.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | 20006 PJZ-U5 15.0 | 60.0000 | 0.695 | 3.2208 | 0.108 |
| | | | 20007 PJZ-U6 15.0 | 60.0000 | 0.684 | 3.2208 | 0.108 |
| | | | 20014 PJZ-U7 18.0 | 60.0000 | 0.685 | 3.2750 | 0.108 |
| | | | 20011 CCBC-U2 21.0 | 60.0000 | 0.684 | 3.2208 | 0.108 |
| | | | worst dip 0.69 at 20006 PJZ-U5 15.0 | | | | |
| | | V_all buses | No dips violating criteria, worst dip 4.39 at 20009 PJZ-U9 21.0 | | | | |
| q_90_cod_h | iv_ml_tji_slo_post.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | 20006 PJZ-U5 15.0 | 60.0000 | 0.694 | 3.2208 | 0.108 |
| | | | 20007 PJZ-U6 15.0 | 60.0000 | 0.683 | 3.2208 | 0.108 |
| | | | 20014 PJZ-U7 18.0 | 60.0000 | 0.684 | 3.2750 | 0.108 |
| | | | 20011 CCBC-U2 21.0 | 60.0000 | 0.683 | 3.2208 | 0.108 |
| | | | worst dip 0.69 at 20006 PJZ-U5 15.0 | | | | |
| | | V_all buses | No dips violating criteria, worst dip 4.37 at 20009 PJZ-U9 21.0 | | | | |
| q_90_cod_g | ml_bd_pre.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | 22074 LRKSPBD1 13.8 | 60.0000 | 2.062 | 1.3208 | 0.271 |
| | | | 22075 LRKSPBD2 13.8 | 60.0000 | 2.065 | 1.3208 | 0.271 |
| | | | 22149 CALPK_BD 13.8 | 60.0000 | 1.545 | 1.3208 | 0.217 |
| | | | worst dip 2.07 at 22075 LRKSPBD2 13.8 | | | | |
| | | V_all buses | No dips violating criteria, worst dip 23.48 at 22906 CALPK_BD 69.0 | | | | |
| q_90_cod_h | ml_bd_post.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | 22074 LRKSPBD1 13.8 | 60.0000 | 2.066 | 1.3208 | 0.271 |
| | | | 22075 LRKSPBD2 13.8 | 60.0000 | 2.070 | 1.3208 | 0.271 |
| | | | 22149 CALPK_BD 13.8 | 60.0000 | 1.543 | 1.3208 | 0.217 |
| | | | worst dip 2.07 at 22075 LRKSPBD2 13.8 | | | | |
| | | V_all buses | No dips violating criteria, worst dip 23.29 at 22906 CALPK_BD 69.0 | | | | |

| Case Name | .chf Name | Parameter | Bus Name | Initial Volt/ Freq | Percent Dip | Time | Duration |
|---|---|---|---|---|---|---|---|
| q_90_cod_g | oy_bus_pre.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_allbuses | 22074 LRKSPBD1 13.8 | 60.0000 | 1.024 | 1.3208 | 0.163 |
| | | | 22075 LRKSPBD2 13.8 | 60.0000 | 1.025 | 1.3208 | 0.163 |
| | | | 22149 CALPK_BD 13.8 | 60.0000 | 0.796 | 1.3208 | 0.108 |
| | | | 22617 OTAY_49 13.8 | 60.0000 | 0.970 | 1.2667 | 0.108 |
| | | | | | worst dip 1.02 at 22075 LRKSPBD2 13.8 | | |
| | | V_all buses | No dips violating criteria, worst dip 12.16 at 22617 OTAY_49 13.8 | | | | |
| q_90_cod_h | oy_bus_post.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | 22074 LRKSPBD1 13.8 | 60.0000 | 1.020 | 1.3208 | 0.163 |
| | | | 22075 LRKSPBD2 13.8 | 60.0000 | 1.021 | 1.3208 | 0.163 |
| | | | 22149 CALPK_BD 13.8 | 60.0000 | 0.795 | 1.3208 | 0.108 |
| | | | | | worst dip 1.02 at 22075 LRKSPBD2 13.8 | | |
| | | V_all buses | No dips violating criteria, worst dip 13.56 at 23110 OTAY_46B 13.8 | | | | |
| q_90_cod_g | oy_ib_sdro_pre.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | 22074 LRKSPBD1 13.8 | 60.0000 | 1.118 | 1.3208 | 0.163 |
| | | | 22075 LRKSPBD2 13.8 | 60.0000 | 1.120 | 1.3208 | 0.163 |
| | | | 22149 CALPK_BD 13.8 | 60.0000 | 0.862 | 1.3208 | 0.108 |
| | | | 22617 OTAY_49 13.8 | 60.0000 | 0.974 | 1.2667 | 0.108 |
| | | | | | worst dip 1.12 at 22075 LRKSPBD2 13.8 | | |
| | | V_all buses | No dips violating criteria, worst dip 12.27 at 22617 OTAY_49 13.8 | | | | |
| q_90_cod_h | oy_ib_sdro_post.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | 22074 LRKSPBD1 13.8 | 60.0000 | 1.113 | 1.3208 | 0.163 |
| | | | 22075 LRKSPBD2 13.8 | 60.0000 | 1.114 | 1.3208 | 0.163 |
| | | | 22149 CALPK_BD 13.8 | 60.0000 | 0.861 | 1.3208 | 0.108 |
| | | | | | worst dip 1.11 at 22075 LRKSPBD2 13.8 | | |
| | | V_all buses | No dips violating criteria, worst dip 13.82 at 23110 OTAY_46B 13.8 | | | | |
| q_90_cod_g | pen_ccuo_pre.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | No dips violating criteria, worst dip 0.12 at 14963 YUCCACT3 13.8 | | | | |
| | | V_all buses | No dips violating criteria, worst dip 7.83 at 22916 PFC-AVC 0.6 | | | | |
| q_90_cod_h | pen_ccuo_post.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | No dips violating criteria, worst dip 0.12 at 14963 YUCCACT3 13.8 | | | | |
| | | V_all buses | No dips violating criteria, worst dip 7.74 at 22916 PFC-AVC 0.6 | | | | |
| q_90_cod_g | songs_g2_pre.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | No dips violating criteria, worst dip 0.23 at 22487 MRGT49MW 13.8 | | | | |
| | | V_all buses | No dips violating criteria, worst dip 3.76 at 20236 MTM-115 115.0 | | | | |
| q_90_cod_h | songs_g2_post.chf | V_ldbus | No dips violating criteria. | | | | |
| | | F_all buses | No dips violating criteria, worst dip 0.23 at 22487 MRGT49MW 13.8 | | | | |
| | | V_all buses | No dips violating criteria, worst dip 3.74 at 20236 MTM-115 115.0 | | | | |

```
                                                                  Initial      Percent
Case                                                               Volt/       Dip      Time      Duration
Name        | .chf Name              Parameter   Bus Name           Freq
------------|-------------------------------------------------------------------------------------------------
q_90_cod_g  | sw_bus_pre.chf         V_ldbus     No dips violating criteria.
            |                        F_all buses 22074 LRKSPBD1  13.8    60.0000     0.958    1.3750     0.108
            |                                    22075 LRKSPBD2  13.8    60.0000     0.959    1.3750     0.108
            |                                    22149 CALPK_BD  13.8    60.0000     0.737    1.3208     0.108
            |                                                                 worst dip  0.96 at 22075 LRKSPBD2  13.8
            |                        V_all buses No dips violating criteria, worst dip 11.21 at 22780 SOUTHBY1  15.0
            |
q_90_cod_h  | sw_bus_post.chf        V_ldbus     No dips violating criteria.
            |                        F_all buses 22074 LRKSPBD1  13.8    60.0000     0.926    1.3750     0.108
            |                                    22075 LRKSPBD2  13.8    60.0000     0.929    1.3750     0.108
            |                                                                 worst dip  0.93 at 22075 LRKSPBD2  13.8
            |                        V_all buses No dips violating criteria, worst dip 11.62 at 22780 SOUTHBY1  15.0
------------|-------------------------------------------------------------------------------------------------
            |
q_90_cod_g  | sy_nbus_pre.chf        V_ldbus     No dips violating criteria.
            |                        F_all buses 22074 LRKSPBD1  13.8    60.0000     1.151    1.3208     0.163
            |                                    22075 LRKSPBD2  13.8    60.0000     1.152    1.3208     0.163
            |                                    22149 CALPK_BD  13.8    60.0000     0.868    1.3208     0.108
            |                                                                 worst dip  1.15 at 22075 LRKSPBD2  13.8
            |                        V_all buses No dips violating criteria, worst dip 13.92 at 22352 IMPRLBCH  69.0
            |
q_90_cod_h  | sy_nbus_post.chf       V_ldbus     No dips violating criteria.
            |                        F_all buses 22074 LRKSPBD1  13.8    60.0000     1.135    1.3208     0.163
            |                                    22075 LRKSPBD2  13.8    60.0000     1.136    1.3208     0.163
            |                                    22149 CALPK_BD  13.8    60.0000     0.871    1.3208     0.108
            |                                                                 worst dip  1.14 at 22075 LRKSPBD2  13.8
            |                        V_all buses No dips violating criteria, worst dip 14.73 at 22352 IMPRLBCH  69.0
------------|-------------------------------------------------------------------------------------------------
```

Worst Condition Analysis Report
Scenario: Sensitivities, low system load (2375 MW), low OTAY load (13 Mw), low import (-1225 MW), hi Southbay generation,
3 Border units on-line
Case(s): Commercial Operating Date; q_90_cod_shg/thg.sav (pre- and post-project)

```
                                                                  Initial     Percent
Case                                                               Volt/        Dip    Time      Duration
Name        | .chf Name               Parameter   Bus Name          Freq
------------|-------------------------------------------------------------------------------------------------
q_90_cod_shg| oy_bus_pre_shg.chf      V_ldbus     No dips violating criteria.
            |                         F_all buses 22074 LRKSPBD1  13.8    60.0000     0.999    1.3208     0.163
            |                                     22075 LRKSPBD2  13.8    60.0000     1.000    1.3208     0.163
            |                                     22149 CALPK_BD  13.8    60.0000     0.772    1.3208     0.108
            |                                     22617 OTAY_49   13.8    60.0000     0.973    1.2667     0.108
            |                                                                 worst dip  1.00 at 22075 LRKSPBD2  13.8
            |                         V_all buses No dips violating criteria, worst dip 12.02 at 22617 OTAY_49   13.8
            |
q_90_cod_thg| oy_bus_post_thg.chf     V_ldbus     No dips violating criteria.
            |                         F_all buses 22074 LRKSPBD1  13.8    60.0000     0.999    1.3208     0.163
            |                                     22075 LRKSPBD2  13.8    60.0000     1.000    1.3208     0.163
            |                                     22149 CALPK_BD  13.8    60.0000     0.775    1.3208     0.108
            |                                                                 worst dip  1.00 at 22075 LRKSPBD2  13.8
            |                         V_all buses No dips violating criteria, worst dip 13.14 at 23110 OTAY_46B  13.8
------------|-------------------------------------------------------------------------------------------------
q_90_cod_shg| oy_ib_sdro_pre_shg.chf  V_ldbus     No dips violating criteria.
            |                         F_all buses 22074 LRKSPBD1  13.8    60.0000     1.093    1.3208     0.163
            |                                     22075 LRKSPBD2  13.8    60.0000     1.094    1.3208     0.163
            |                                     22149 CALPK_BD  13.8    60.0000     0.838    1.3208     0.108
            |                                     22617 OTAY_49   13.8    60.0000     0.978    1.2667     0.108
            |                                                                 worst dip  1.09 at 22075 LRKSPBD2  13.8
            |                         V_all buses No dips violating criteria, worst dip 12.10 at 22617 OTAY_49   13.8
            |
q_90_cod_thg| oy_ib_sdro_post_thg.chf V_ldbus     No dips violating criteria.
            |                         F_all buses 22074 LRKSPBD1  13.8    60.0000     1.091    1.3208     0.163
            |                                     22075 LRKSPBD2  13.8    60.0000     1.092    1.3208     0.163
            |                                     22149 CALPK_BD  13.8    60.0000     0.842    1.3208     0.108
            |                                                                 worst dip  1.09 at 22075 LRKSPBD2  13.8
            |                         V_all buses No dips violating criteria, worst dip 13.35 at 23110 OTAY_46B  13.8
------------|-------------------------------------------------------------------------------------------------
q_90_cod_shg| sw_bus_pre_shg.chf      V_ldbus     No dips violating criteria.
            |                         F_all buses 22074 LRKSPBD1  13.8    60.0000     0.922    1.3750     0.108
            |                                     22075 LRKSPBD2  13.8    60.0000     0.923    1.3750     0.108
            |                                                                 worst dip  0.92 at 22075 LRKSPBD2  13.8
            |                         V_all buses No dips violating criteria, worst dip 11.38 at 22780 SOUTHBY1  15.0
            |
q_90_cod_thg| sw_bus_post_thg.chf     V_ldbus     No dips violating criteria.
            |                         F_all buses 22074 LRKSPBD1  13.8    60.0000     0.896    1.3750     0.108
            |                                     22075 LRKSPBD2  13.8    60.0000     0.899    1.3750     0.108
            |                                                                 worst dip  0.90 at 22075 LRKSPBD2  13.8
            |                         V_all buses No dips violating criteria, worst dip 11.80 at 22780 SOUTHBY1  15.0
------------|-------------------------------------------------------------------------------------------------
```

```
                                                                    Initial     Percent
Case                                                                 Volt/        Dip    Time      Duration
Name        | .chf Name               Parameter   Bus Name                 Freq
------------|-------------------------------------------------------------------------------------------------
q_90_cod_shg| sy_nbus_pre_shg.chf     V_ldbus     No dips violating criteria.
            |                         F_all buses 22074 LRKSPBD1  13.8    60.0000     1.123    1.3208     0.163
            |                                     22075 LRKSPBD2  13.8    60.0000     1.124    1.3208     0.163
            |                                     22149 CALPK_BD  13.8    60.0000     0.838    1.3208     0.108
            |                                                                 worst dip  1.12 at 22075 LRKSPBD2  13.8
            |                         V_all buses No dips violating criteria, worst dip 13.46 at 22780 SOUTHBY1  15.0
            |
q_90_cod_thg| sy_nbus_post_thg.chf    V_ldbus     No dips violating criteria.
            |                         F_all buses 22074 LRKSPBD1  13.8    60.0000     1.111    1.3208     0.163
            |                                     22075 LRKSPBD2  13.8    60.0000     1.112    1.3208     0.163
            |                                     22149 CALPK_BD  13.8    60.0000     0.844    1.3208     0.108
            |                                                                 worst dip  1.11 at 22075 LRKSPBD2  13.8
            |                         V_all buses No dips violating criteria, worst dip 14.00 at 22780 SOUTHBY1  15.0
------------|-------------------------------------------------------------------------------------------------

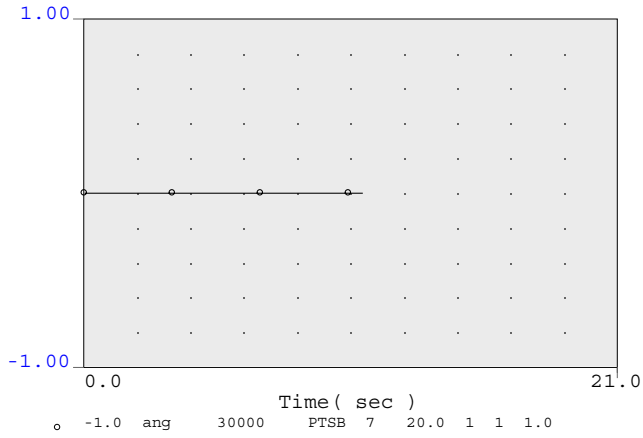
Legend:
cod    Commercial Operating Date (year)
nbus   north bus outage
pre    pre-MMC project
post   post MMc project
slo    single line outage
shg|
   |>  sensitivity simulations, pre-post MMC, low system load, low Otay load, high Southbay generation
thg|
```

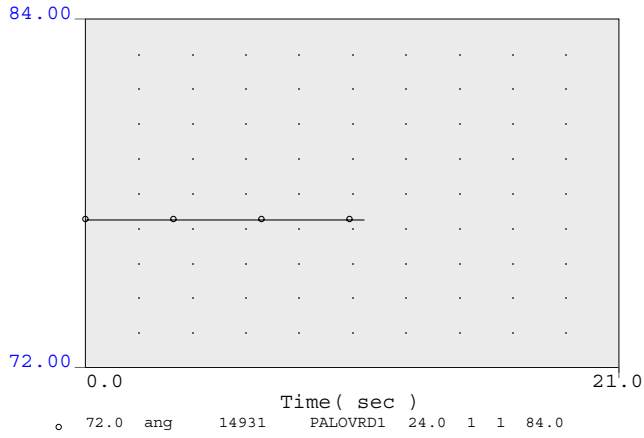
10 Second No-Disturbance Plots of:

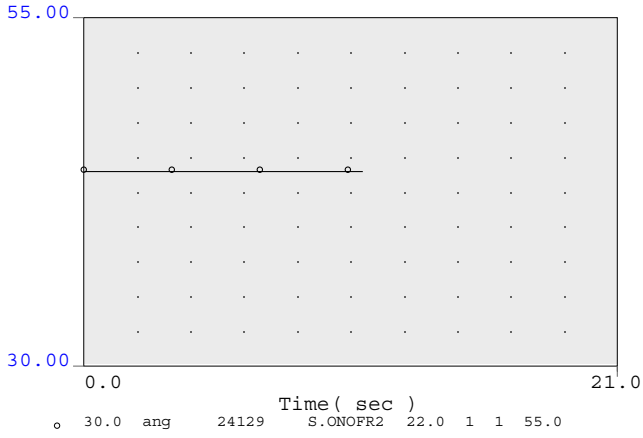
Cases q_90_cod_a/b
Pre- and Post-Project

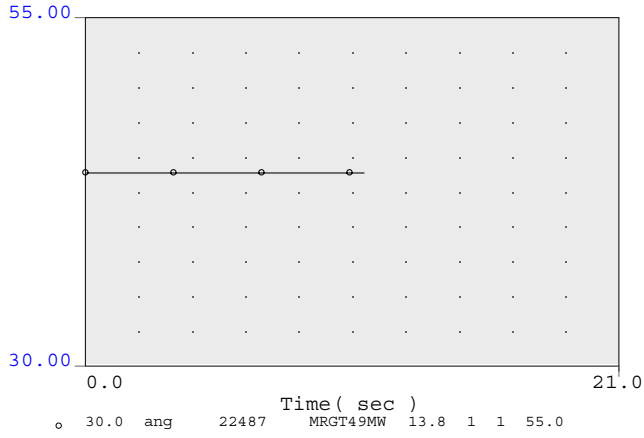
and

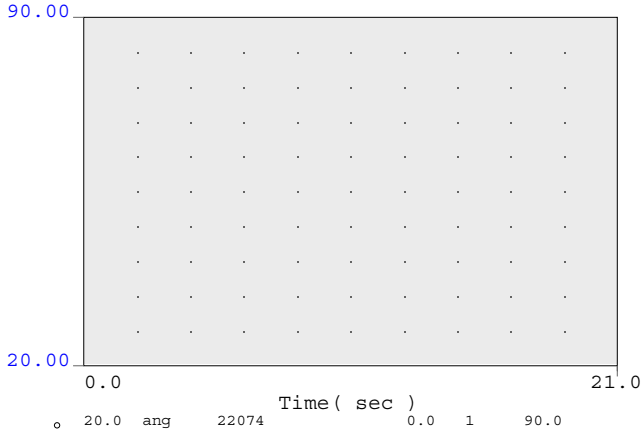
Cases q_90_cod_g/h
Pre- and Post-Project

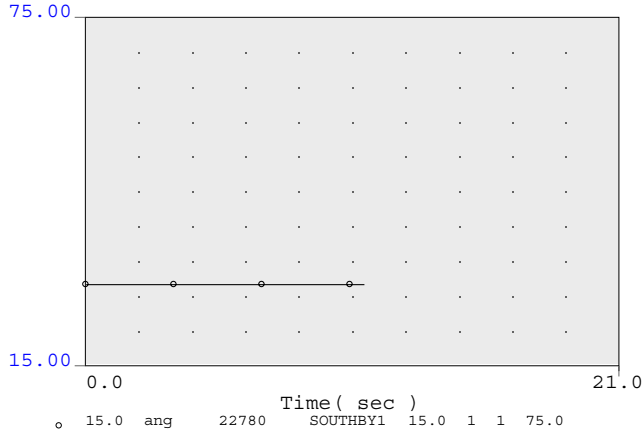


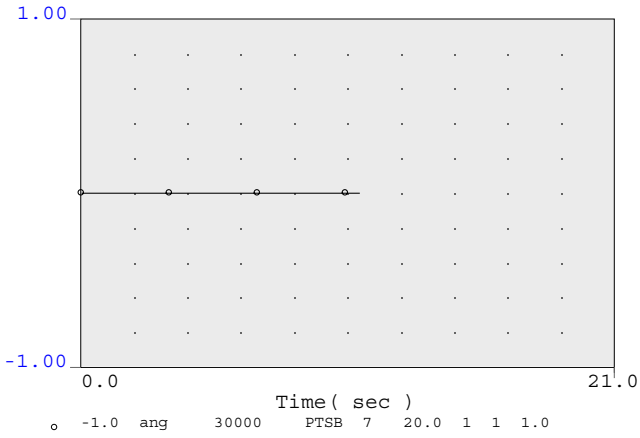



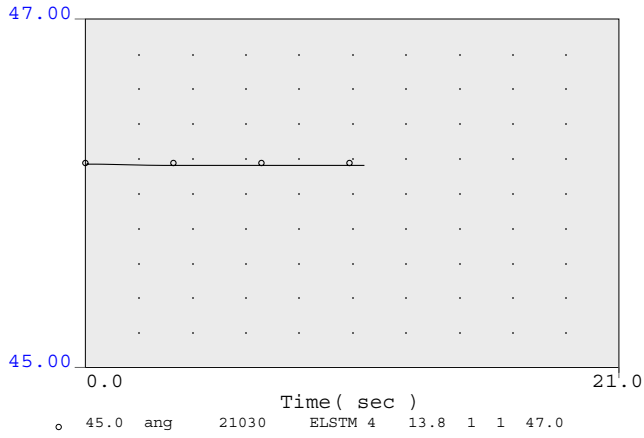



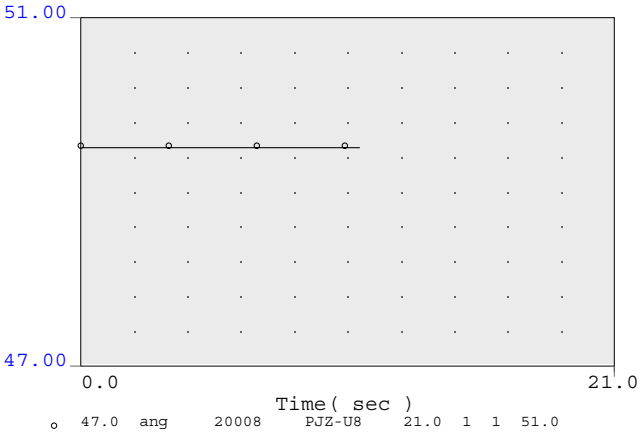



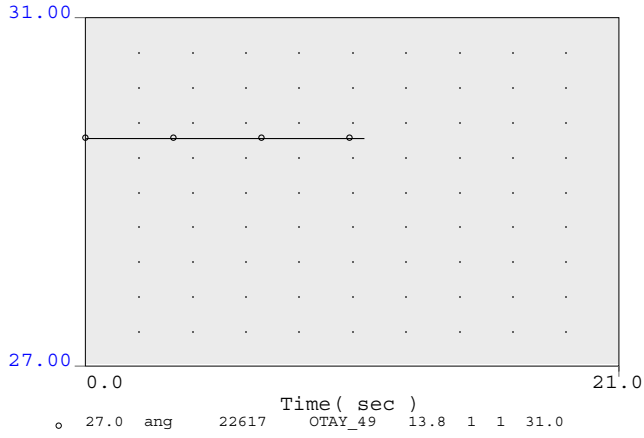



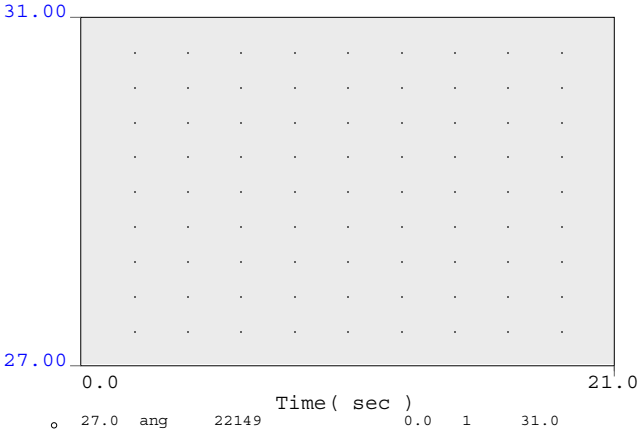

MMC ISIS
Peak Load, Pre-project
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)
External areas based on WECC case 09HS2SA
Internal area based on 2006_seed.sav (by Harold Todus)

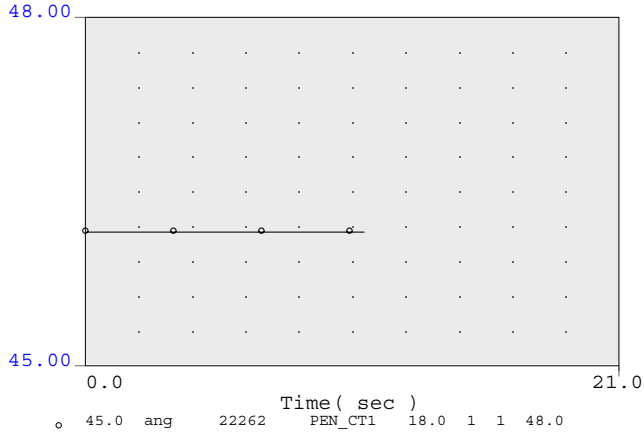



MMC ISIS
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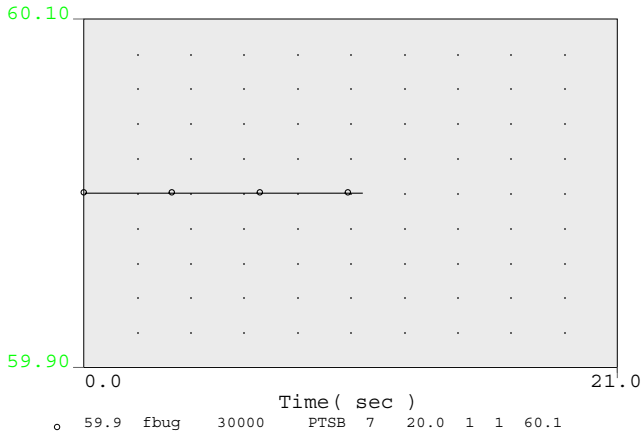


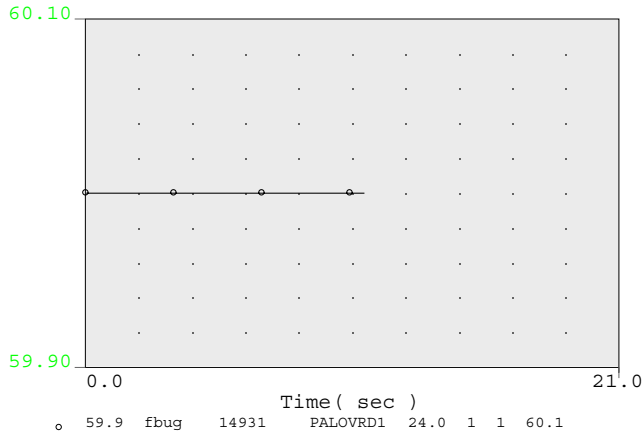


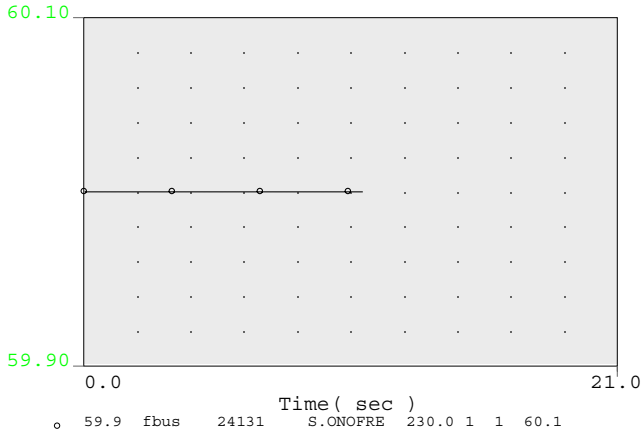


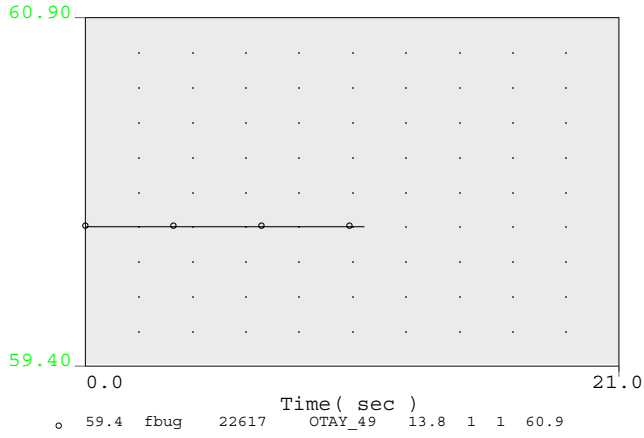


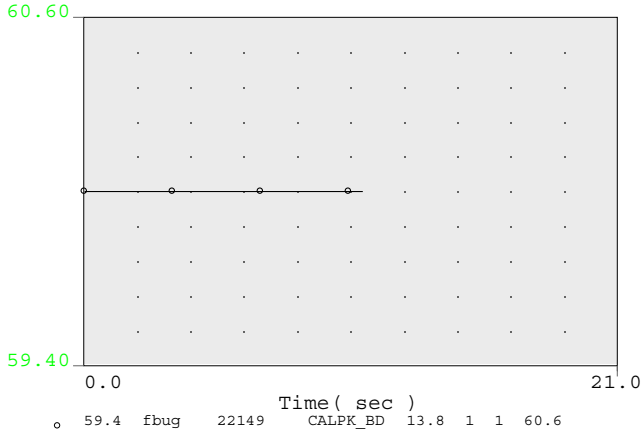


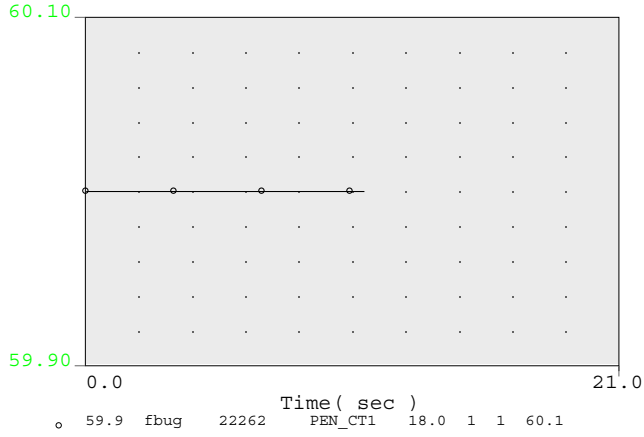


MMC ISIS
Peak Load, Pre-project
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)
External areas based on WECC case 09HS2SA
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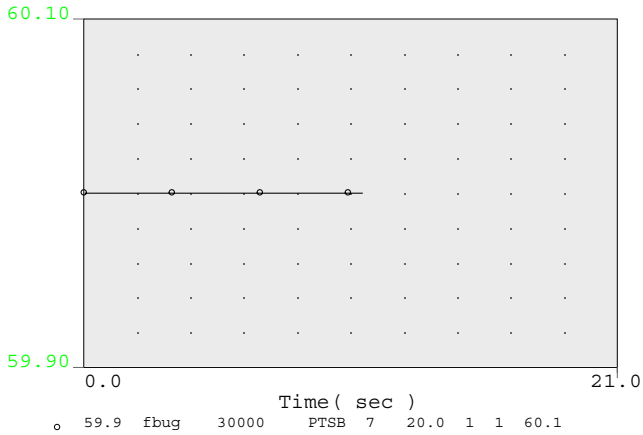


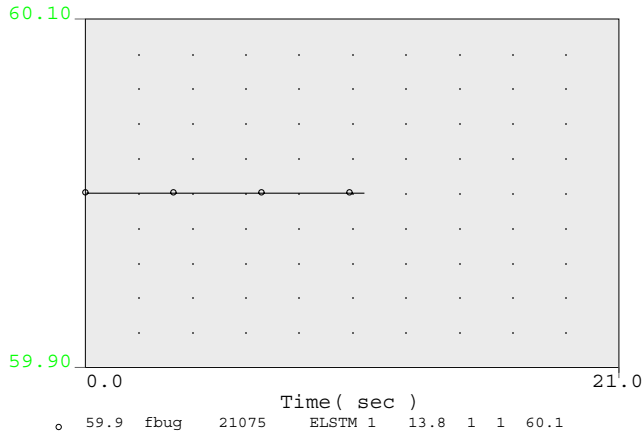


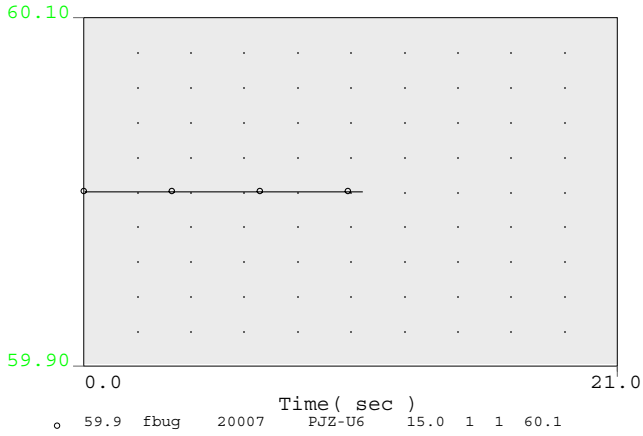


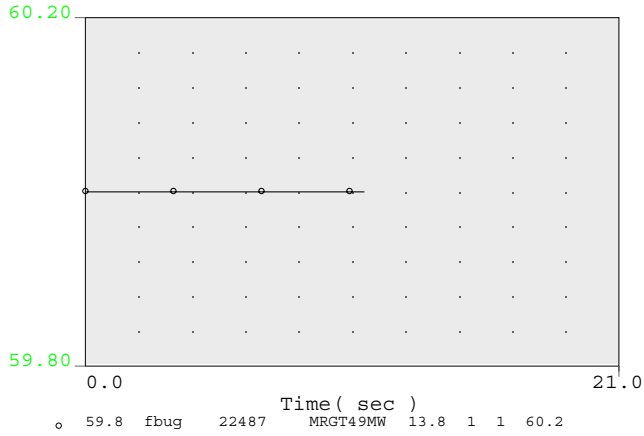


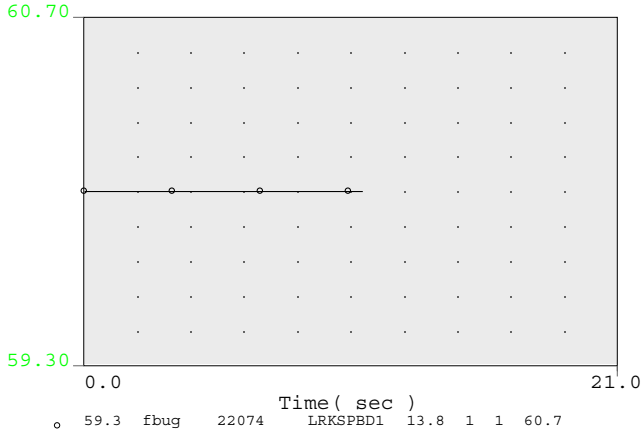


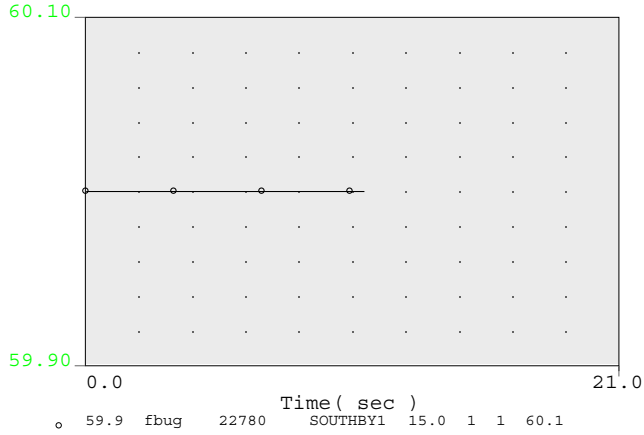


MMC ISIS
Peak Load, Pre-project
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)
External areas based on WECC case 09HS2SA
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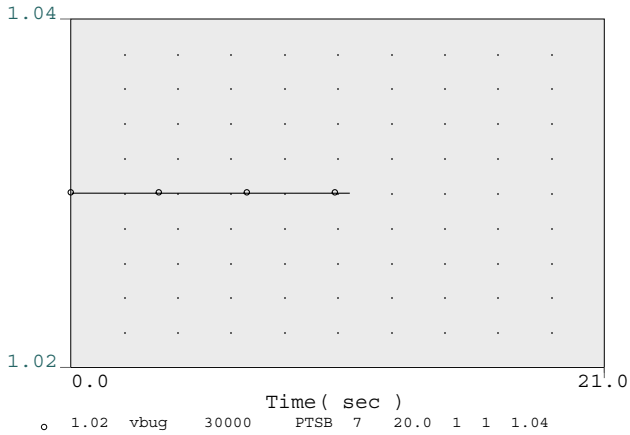


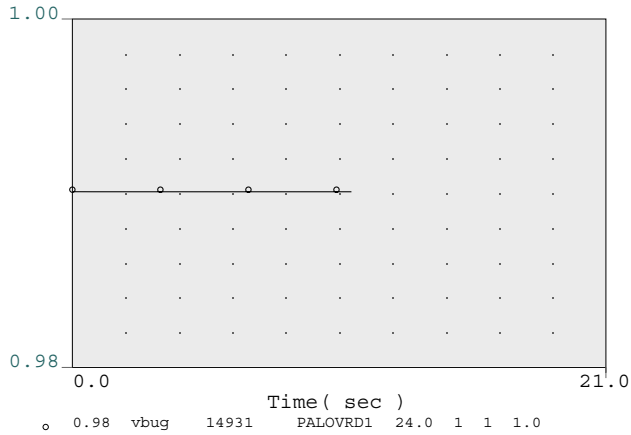


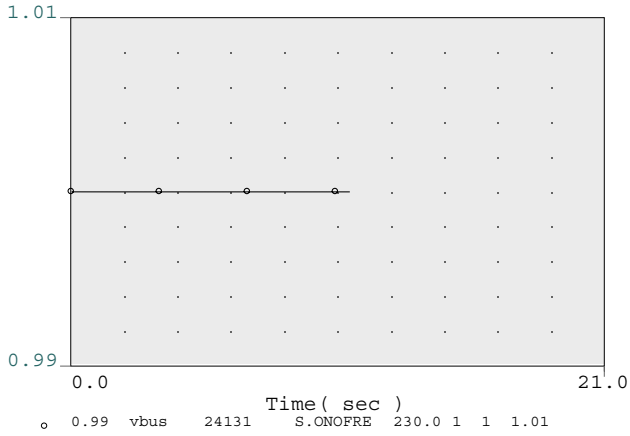


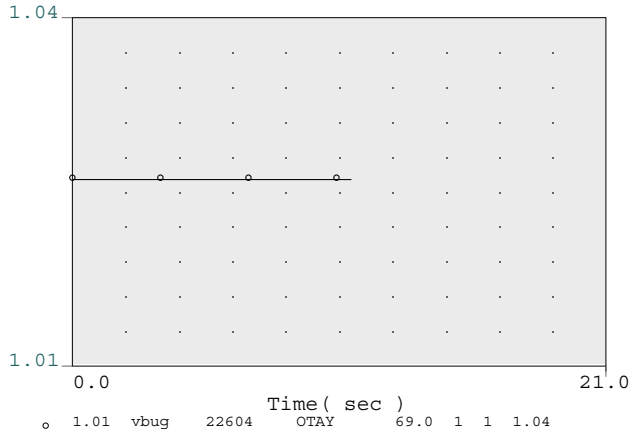


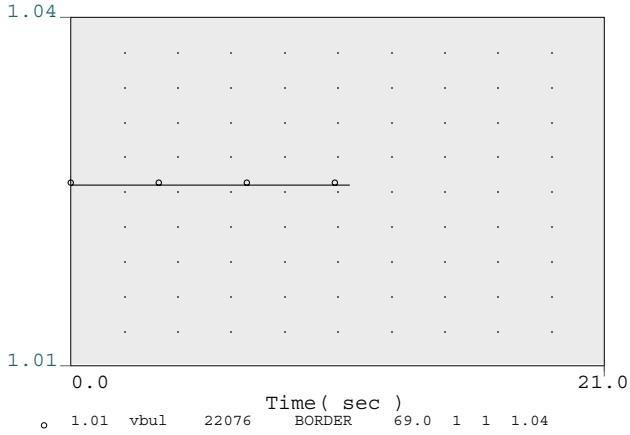


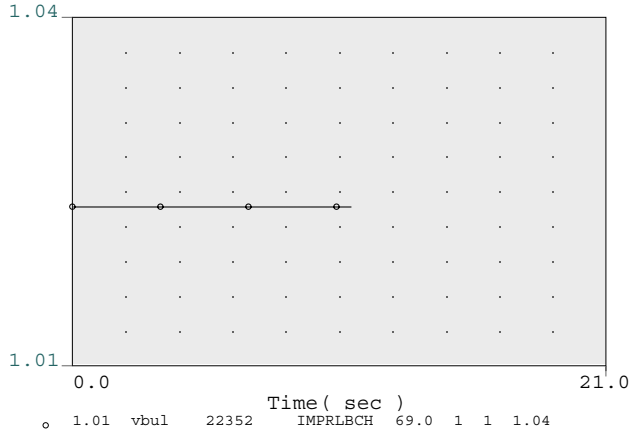


MMC ISIS
Peak Load, Pre-project
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)
External areas based on WECC case 09HS2SA
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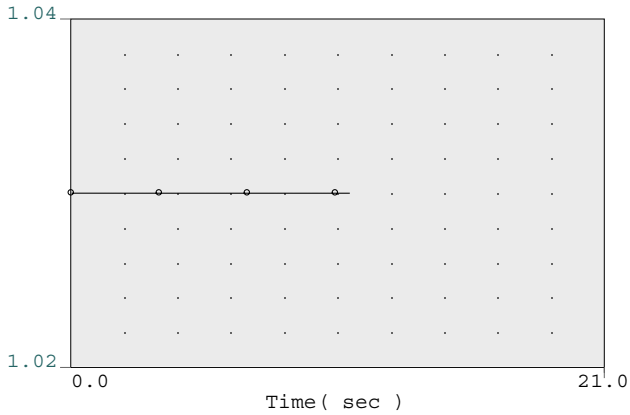


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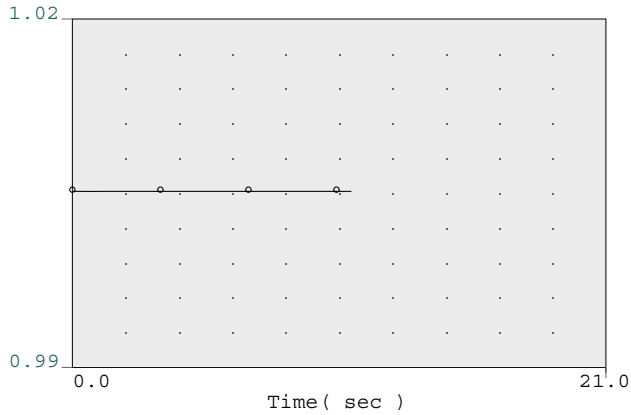


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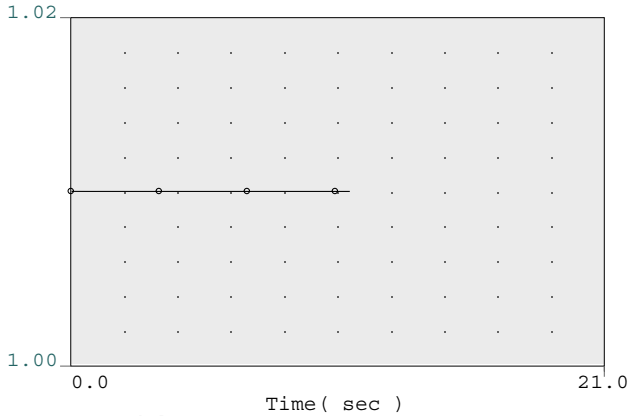


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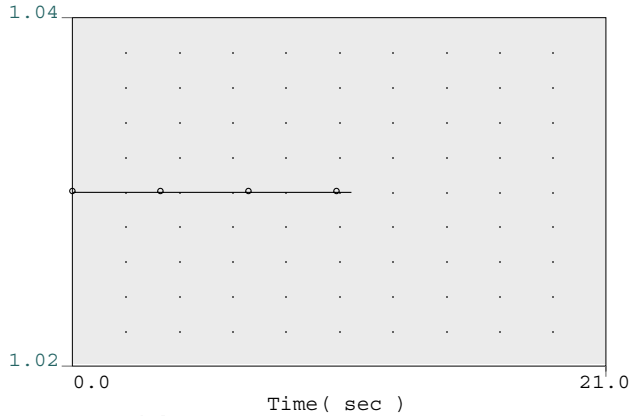


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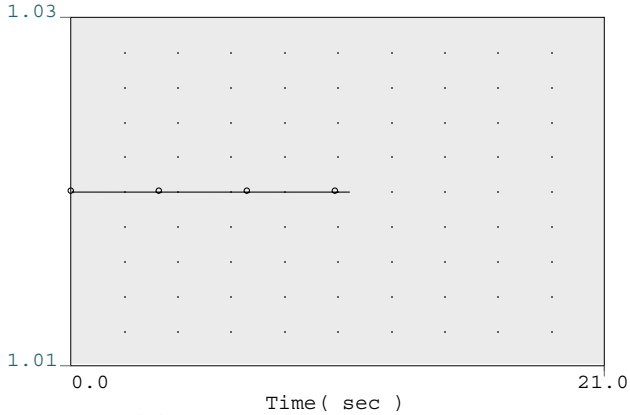


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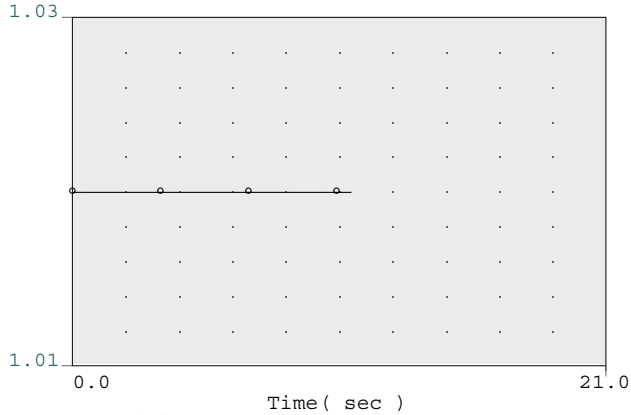
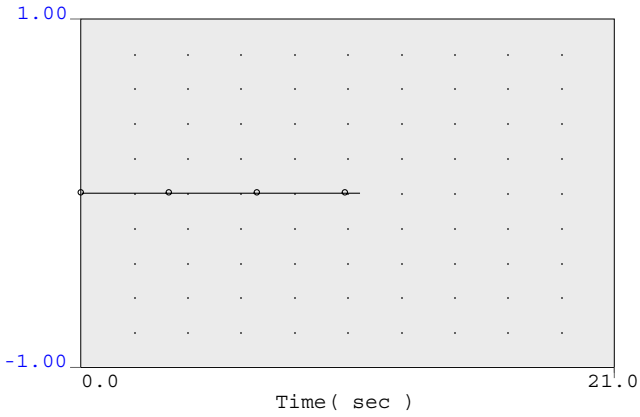



1.0108vbul 22820 SWEETWTR 69.0 1 1 1.0308

MMC ISIS
Peak Load, Pre-project
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)
External areas based on WECC case 09HS2SA
Internal area based on 2006_seed.sav (by Harold Todus)

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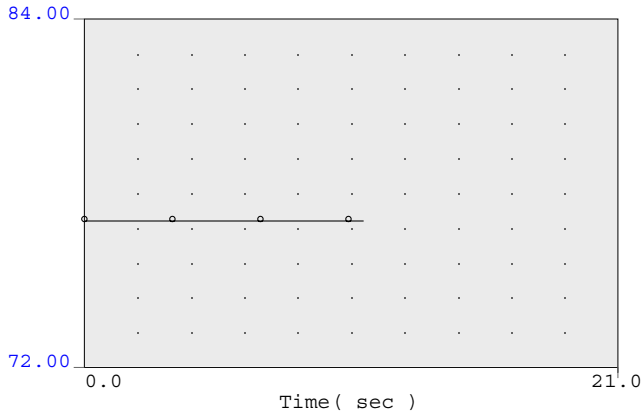
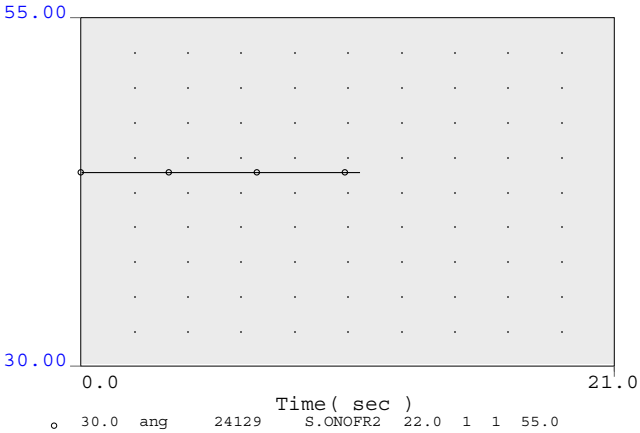
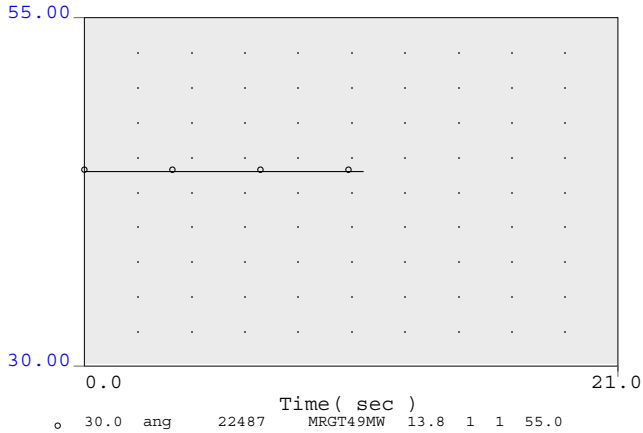



72.0 ang 14931 PALOVRD1 24.0 1 1 84.0




30.0 ang 24129 S.ONOFR2 22.0 1 1 55.0

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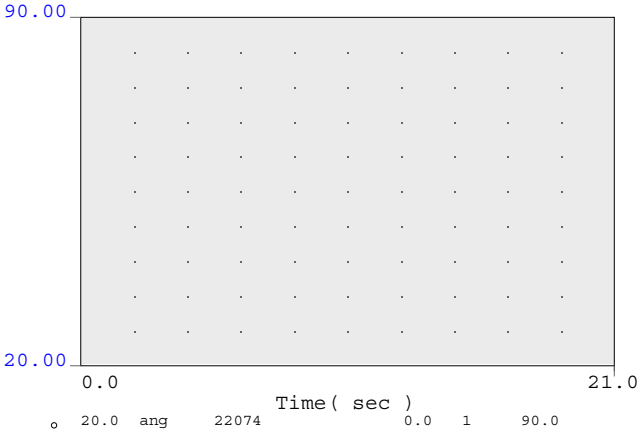
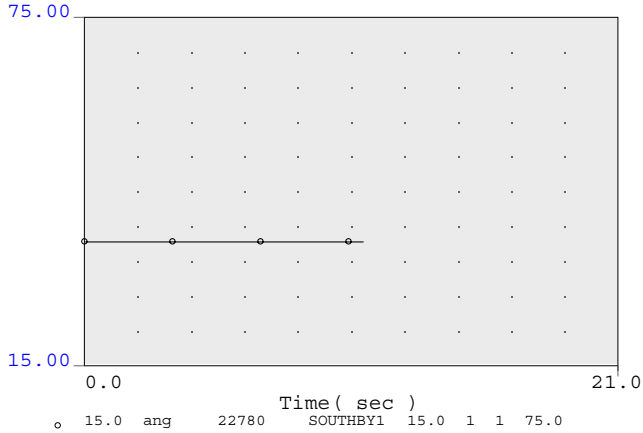



20.0 ang 22074 0.0 1 90.0




15.0 ang 22780 SOUTHBY1 15.0 1 1 75.0

q_90_cod_b, SDGE LGIP case for Queue 90, year 2008
Pre SRPL, post-project, 0 BD unit on
HS peak, high SDGE gen/low SDGE imp/low WOR & hi EOR
CFE exp approx 100 MW; IID w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)



areas based on WECC case 09HS2SA
no_distr_b.chf
area based on 2006_seed.sav (by Harold Todus)

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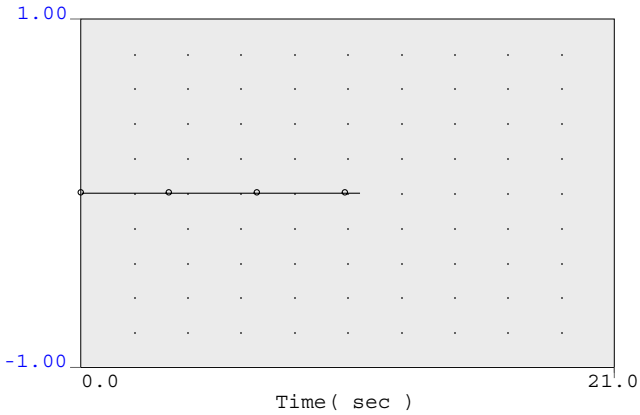
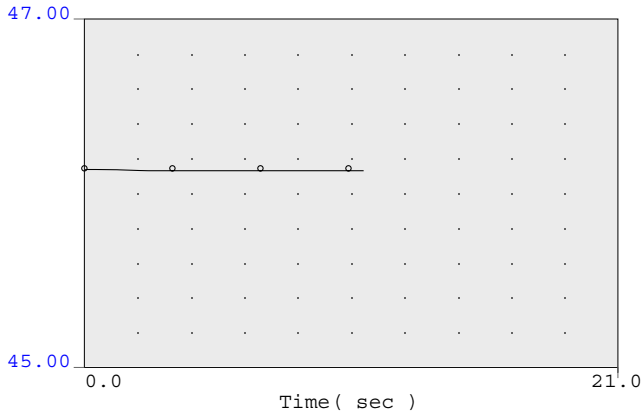
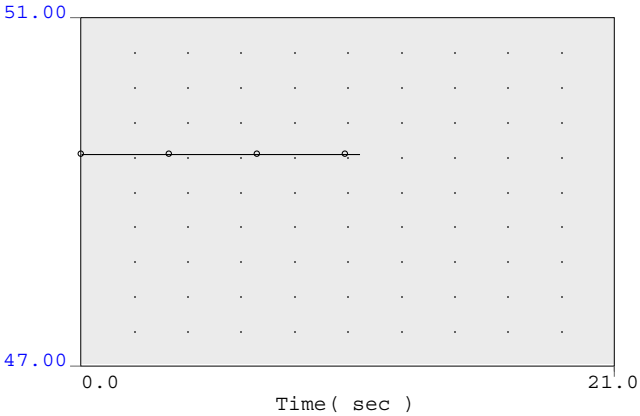


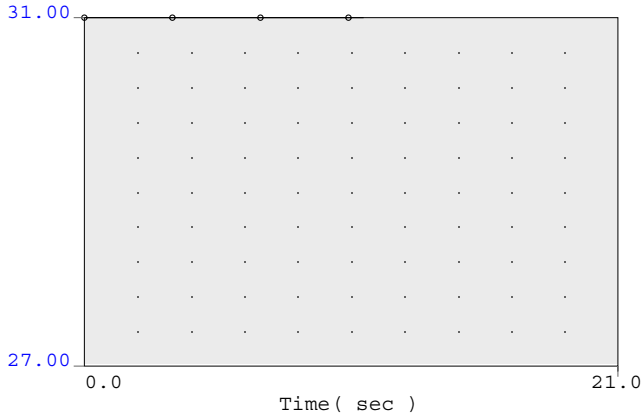

-1.0 ang 30000 PTSB 7 20.0 1 1 1.0



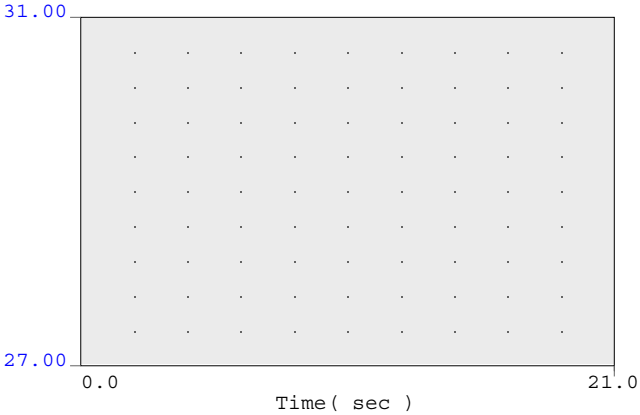

45.0 ang 21030 ELSTM 4 13.8 1 1 47.0



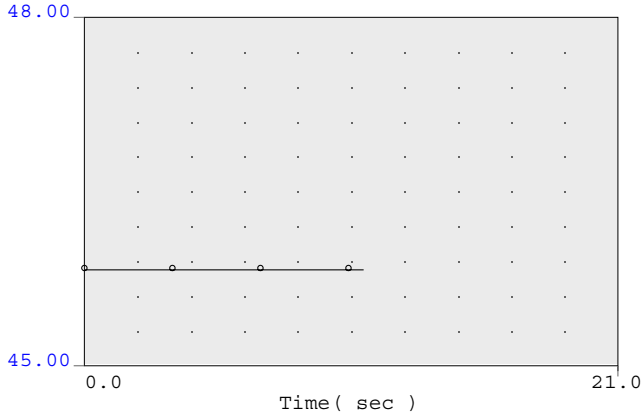

47.0 ang 20008 PJZ-U8 21.0 1 1 51.0




27.0 ang 22617 OTAY_46A 13.8 1 1 31.0

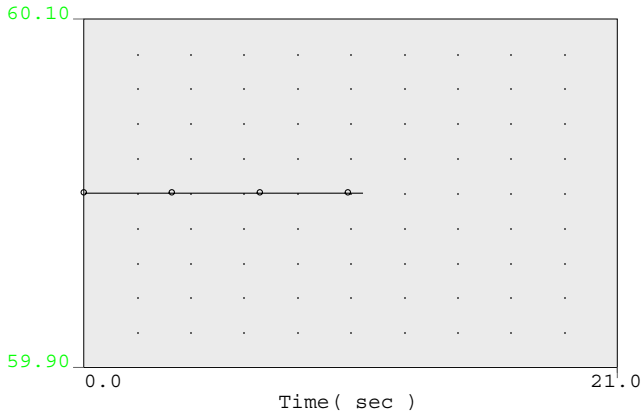



27.0 ang 22149 0.0 1 31.0

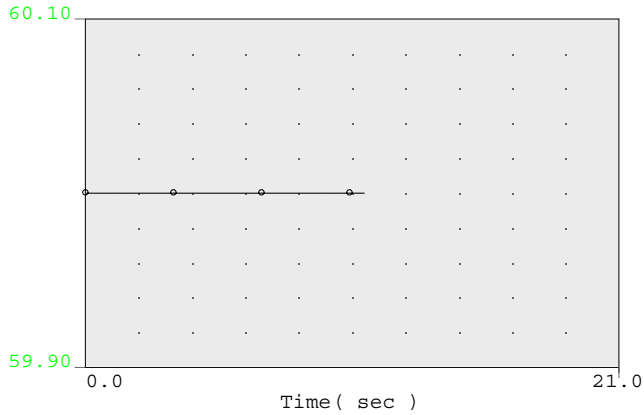



45.0 ang 22262 PEN_CT1 18.0 1 1 48.0

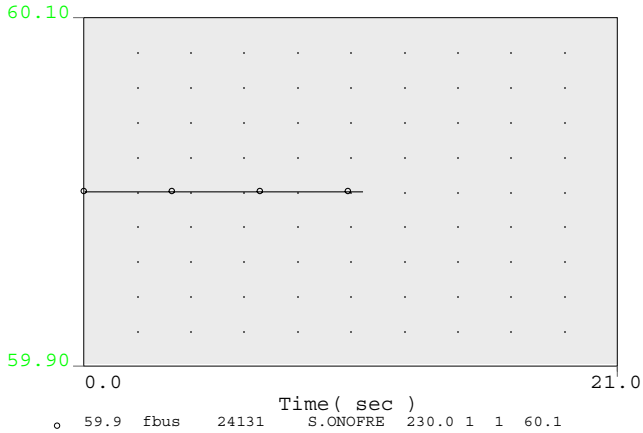
q_90_cod_b, SDGE LGIP case for Queue 90, year 2008
Pre SRPL, post-project, 0 BD unit on
HS peak, high SDGE gen/low SDGE imp/low WOR & hi EOR
CFE exp approx 100 MW; IID w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)



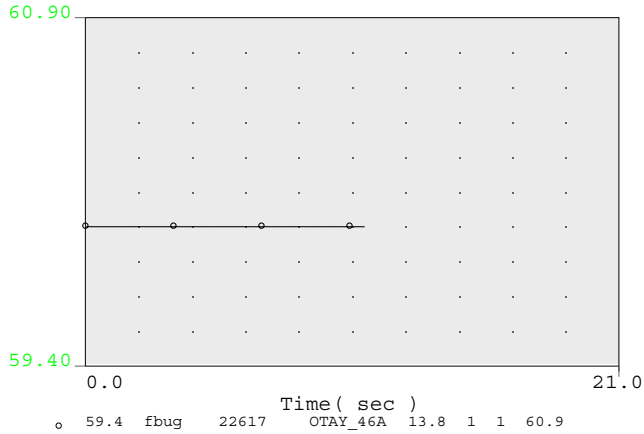

59.9 fbug 30000 PTSB 7 20.0 1 1 60.1



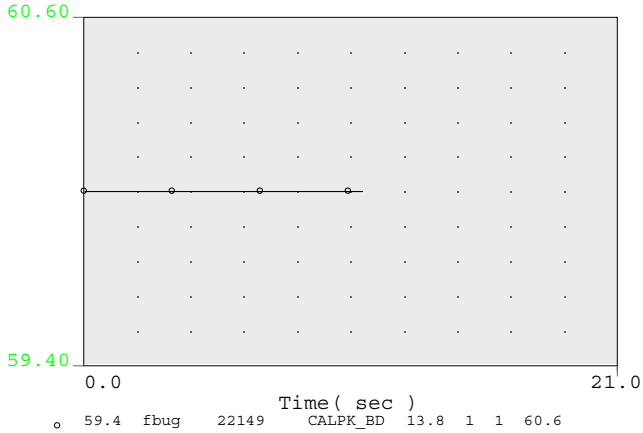

59.9 fbug 14931 PALOVRD1 24.0 1 1 60.1



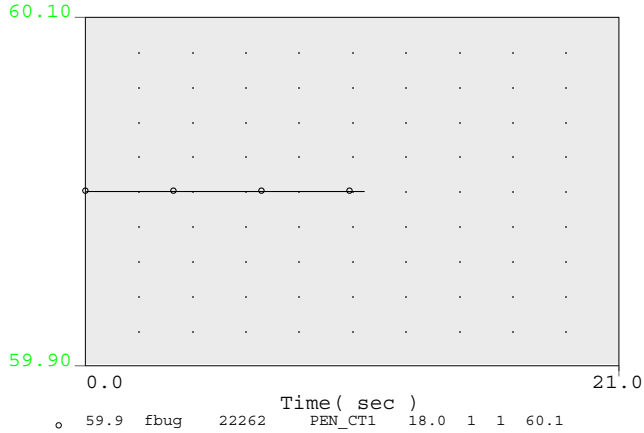

59.9 fbus 24131 S.ONOFRE 230.0 1 1 60.1




59.4 fbug 22617 OTAY_46A 13.8 1 1 60.9

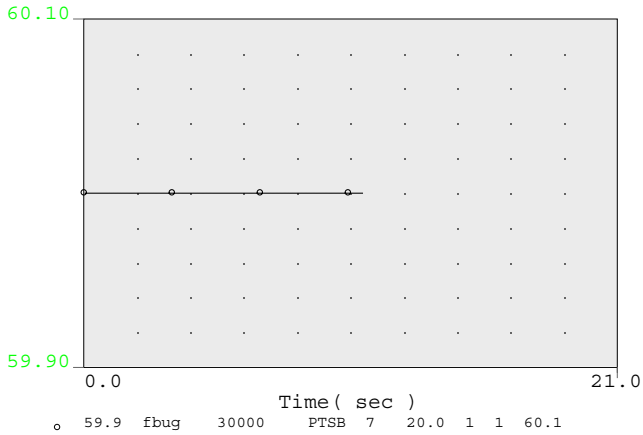


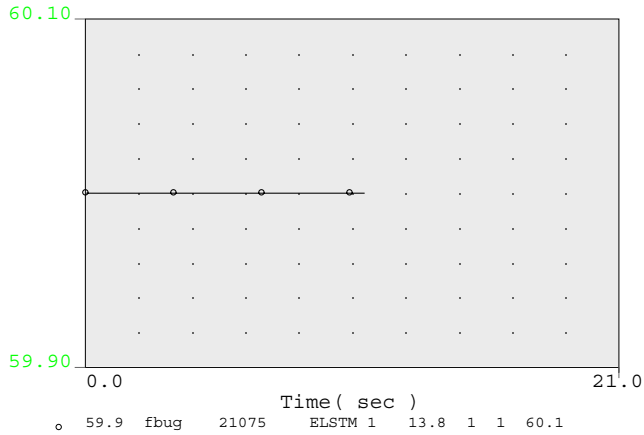

59.4 fbug 22149 CALPK_BD 13.8 1 1 60.6

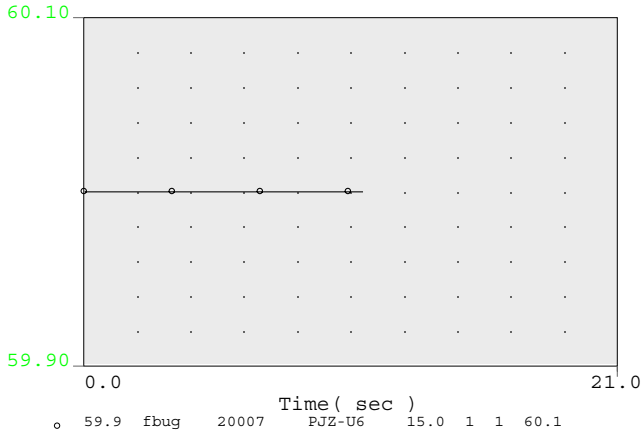


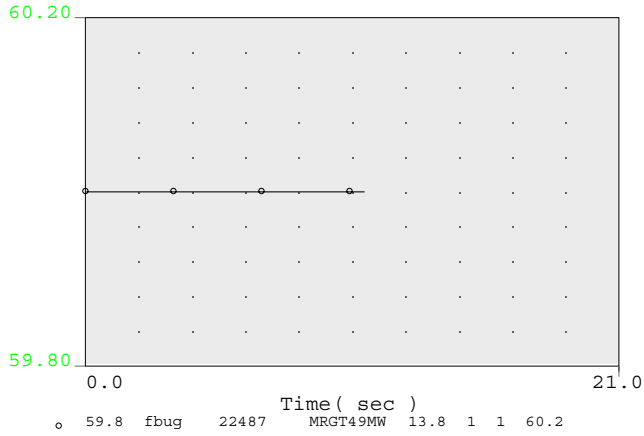

59.9 fbug 22262 PEN_CT1 18.0 1 1 60.1

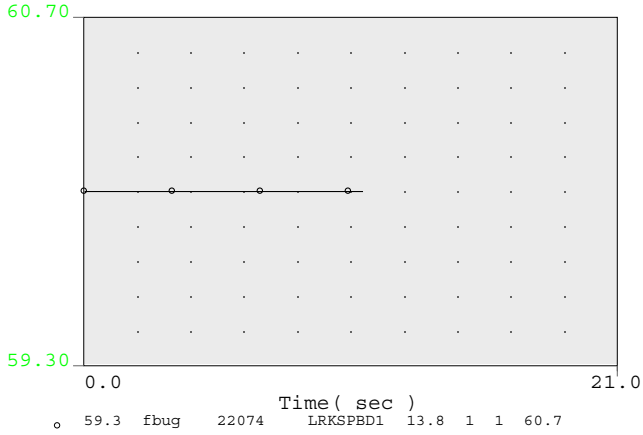
q_90_cod_b, SDGE LGIP case for Queue 90, year 2008
Pre SRPL, post-project, 0 BD unit on
HS peak, high SDGE gen/low SDGE imp/low WOR & hi EOR
CFE exp approx 100 MW; IID w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)

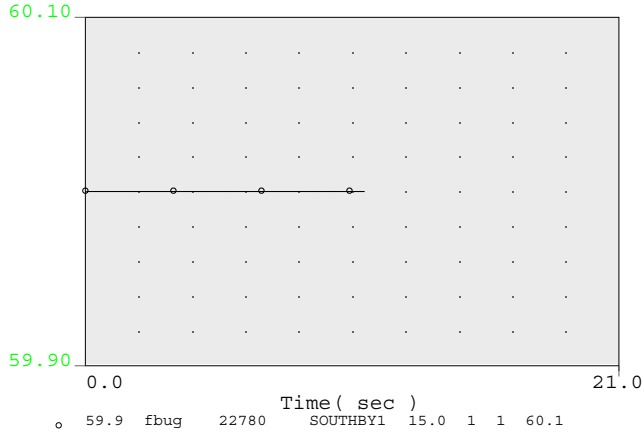


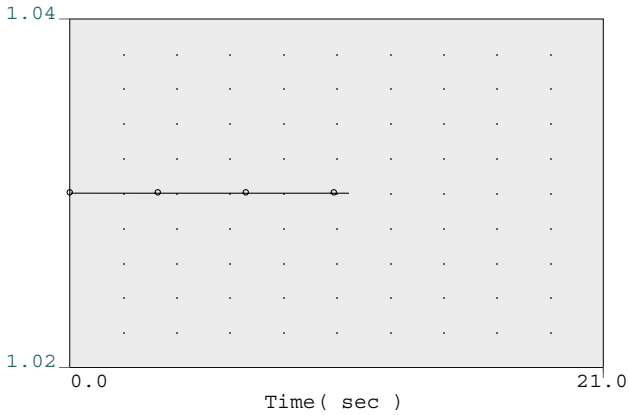




q_90_cod_b, SDGE LGIP case for Queue 90, year 2008
Pre SRPL, post-project, 0 BD unit on
HS peak, high SDGE gen/low SDGE imp/low WOR & hi EOR
CFE exp approx 100 MW; IID w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)

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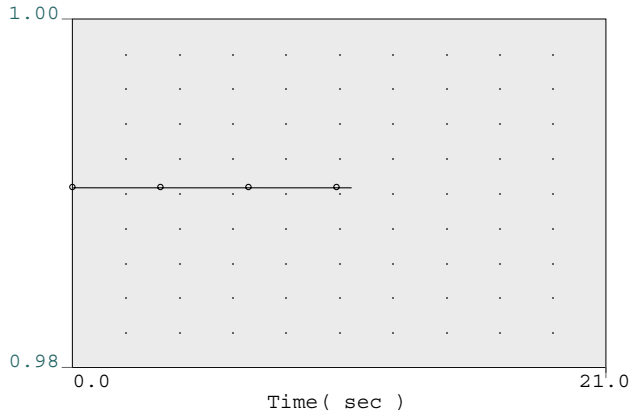


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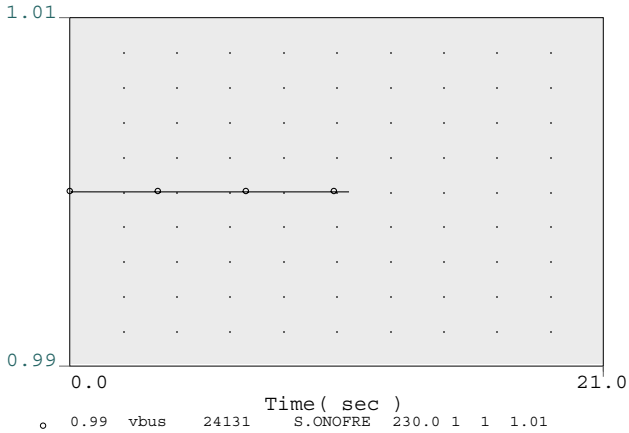


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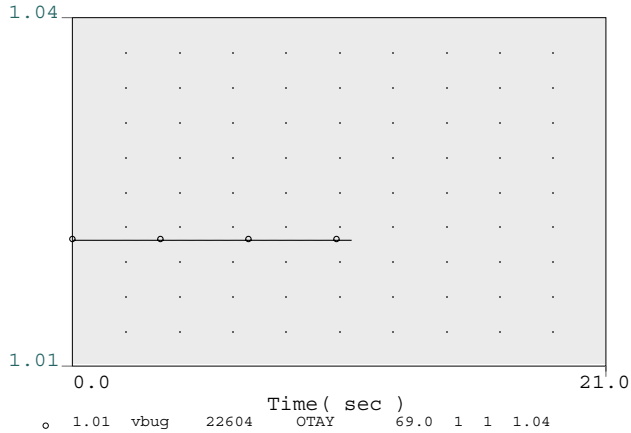


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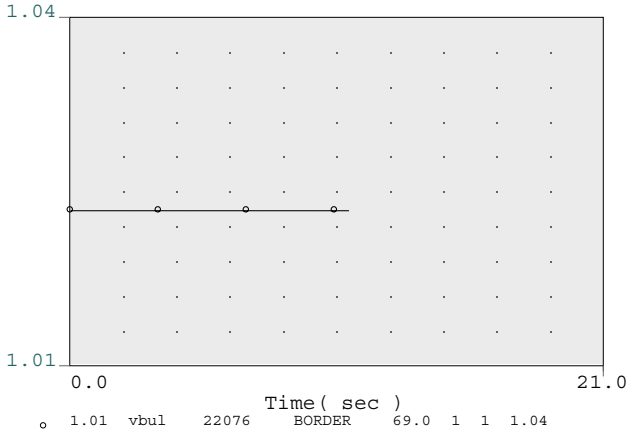


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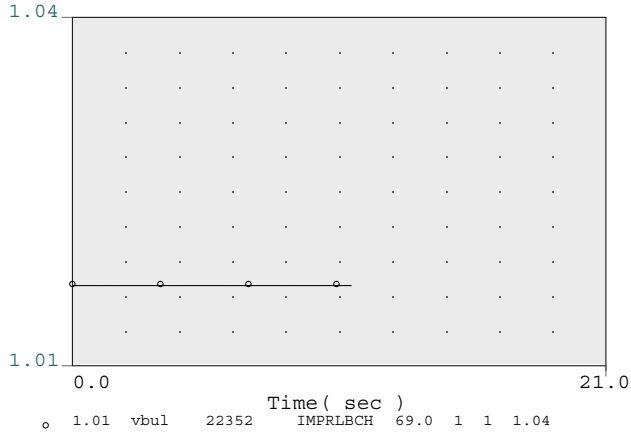


1.01 vbul 22352 IMPRLBCH 69.0 1 1 1.04

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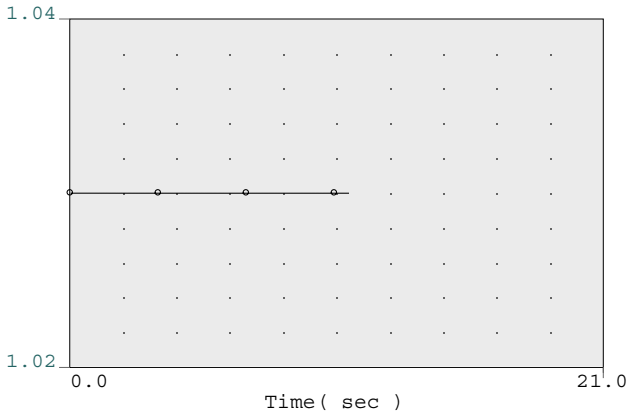


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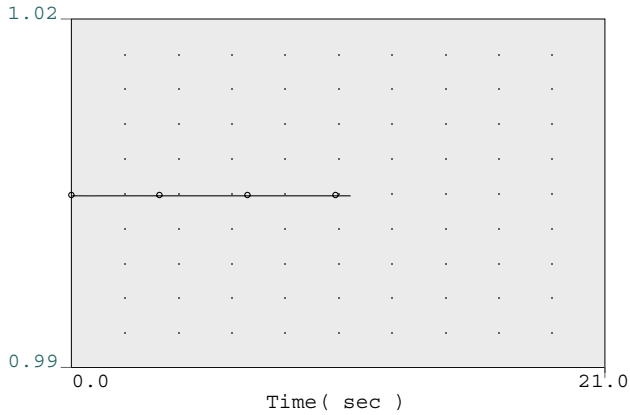


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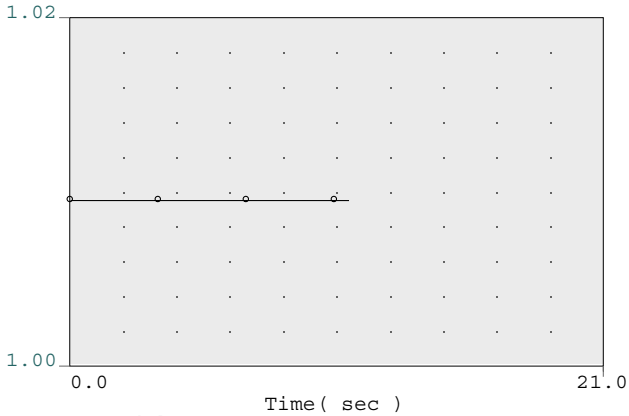


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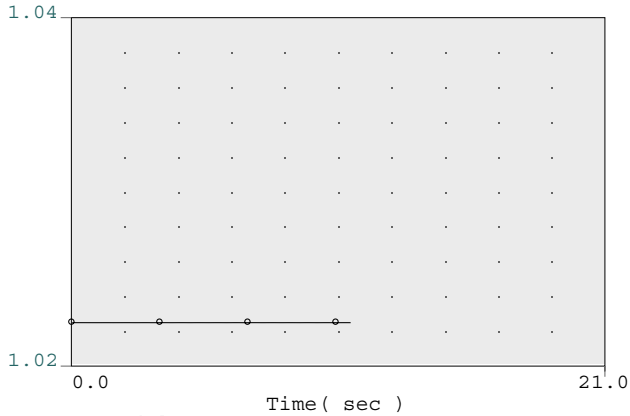


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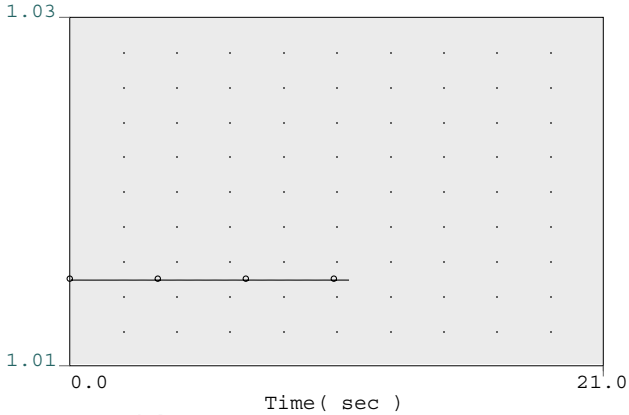


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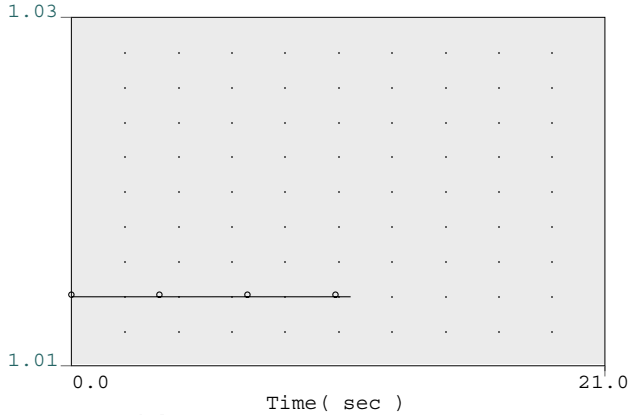


1.0108vbul 22820 SWEETWTR 69.0 1 1 1.0308

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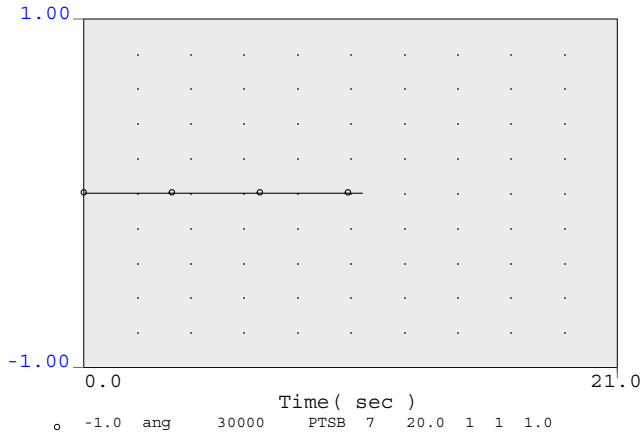


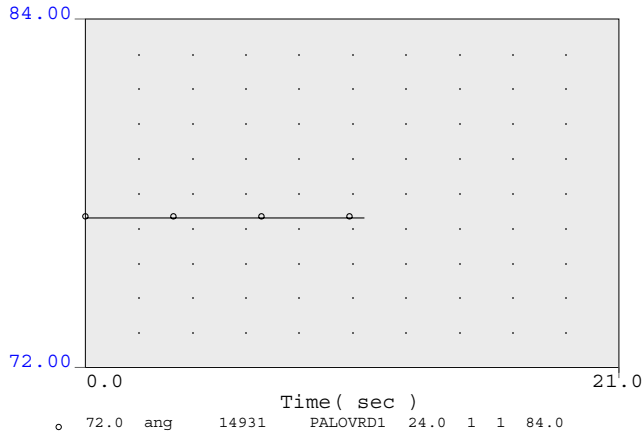


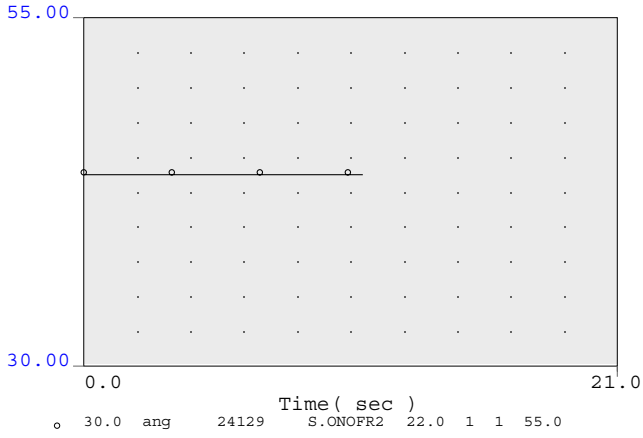


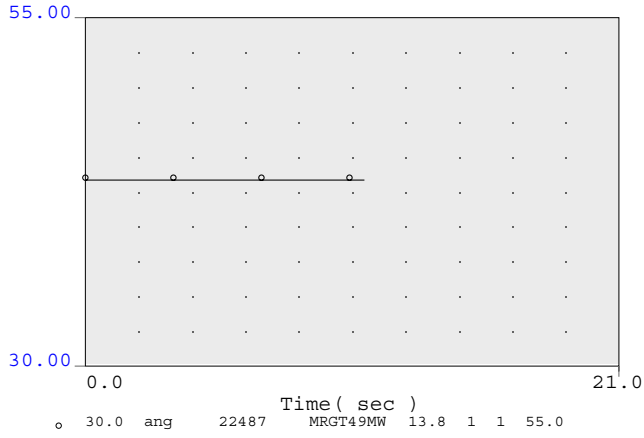


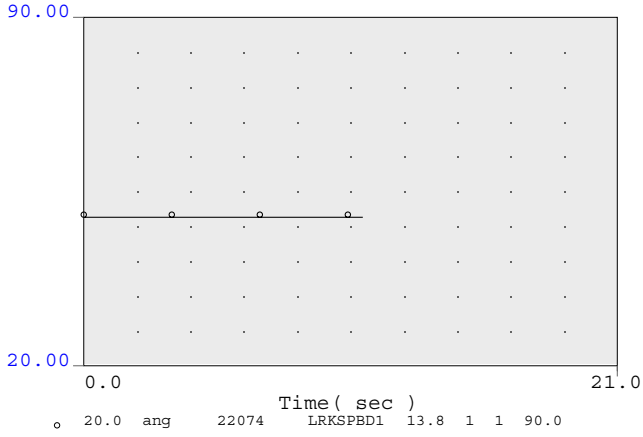


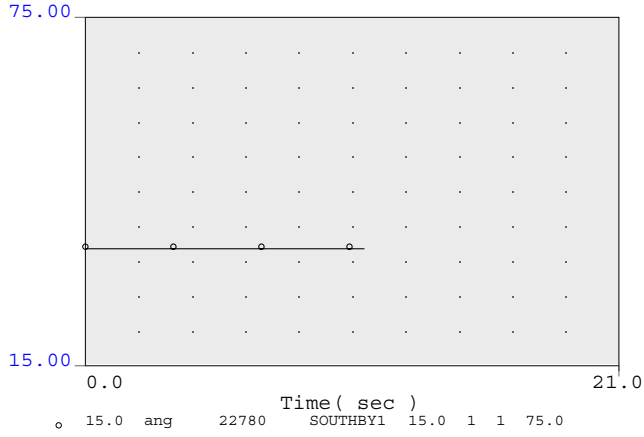


MMC ISIS
Peak Load, Pre-project
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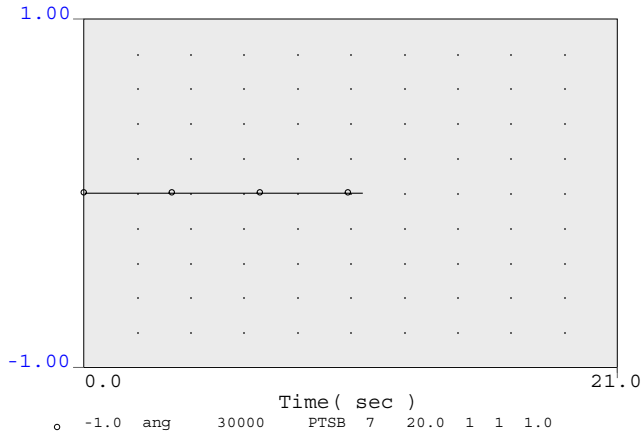


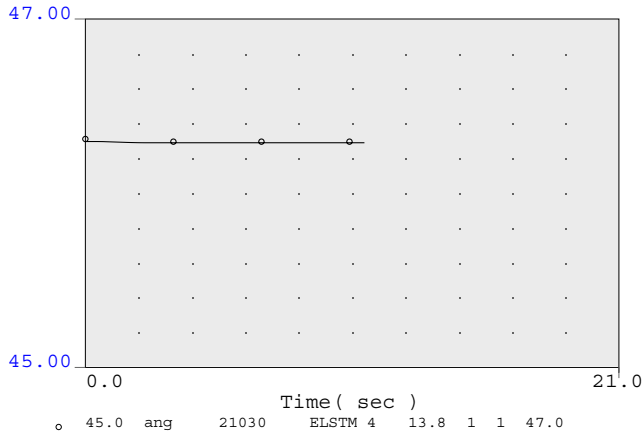


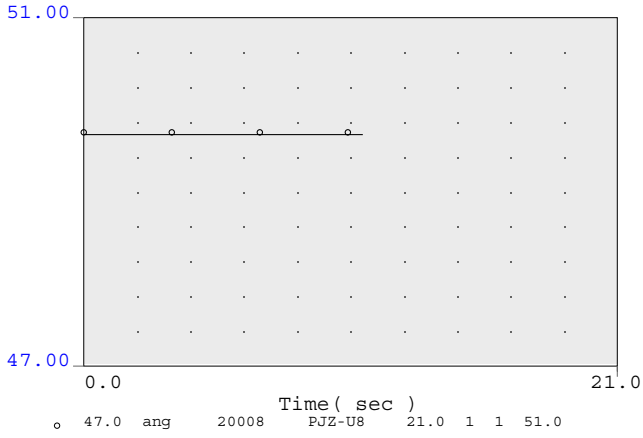


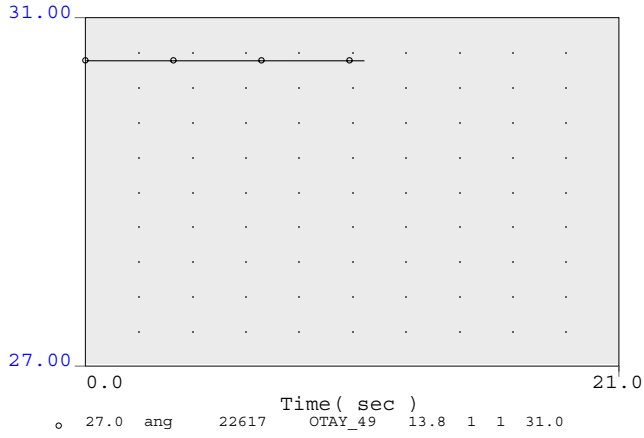


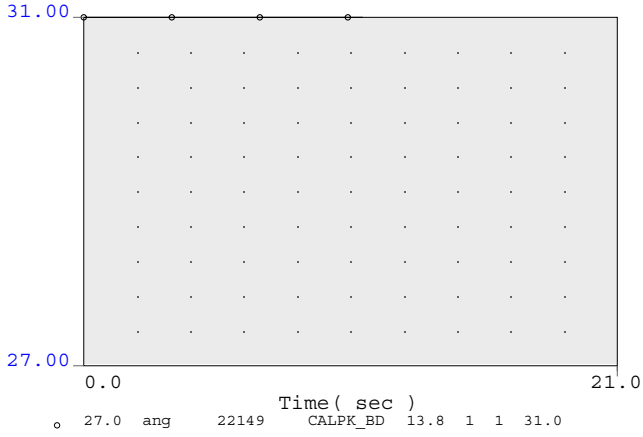


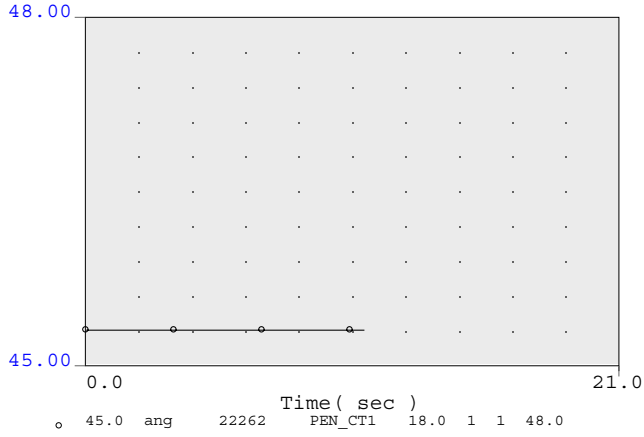


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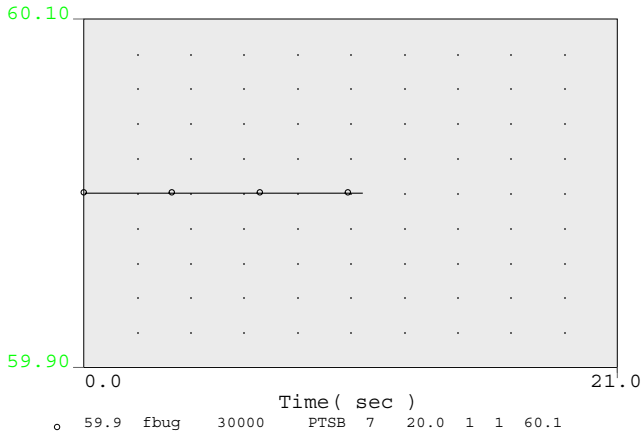


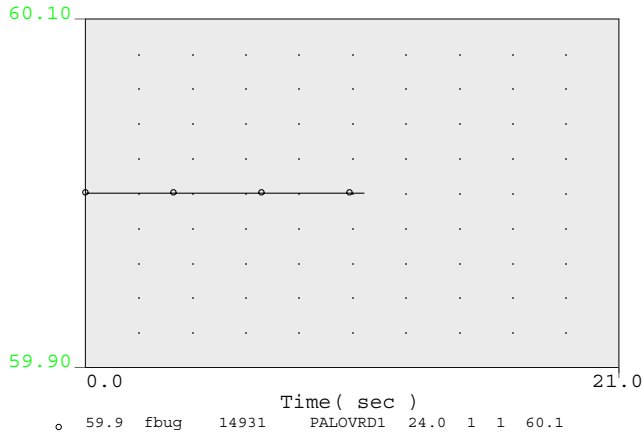


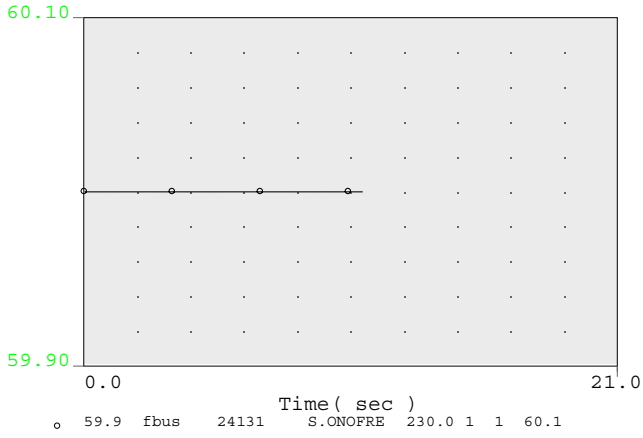


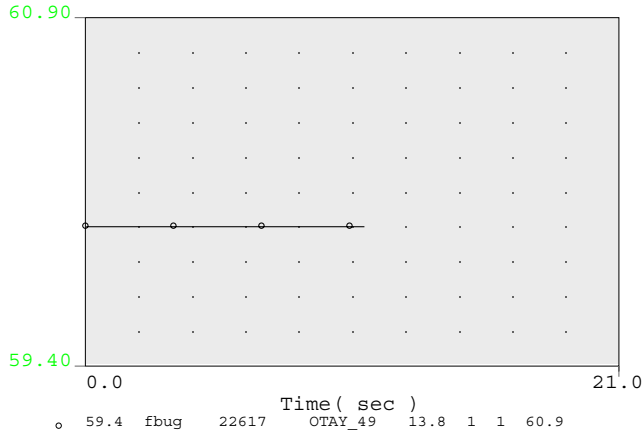


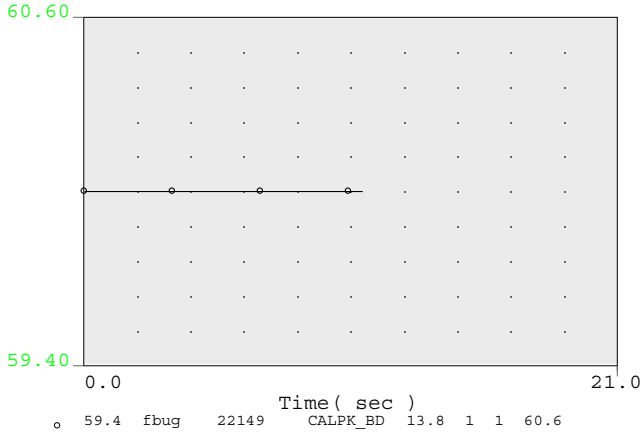


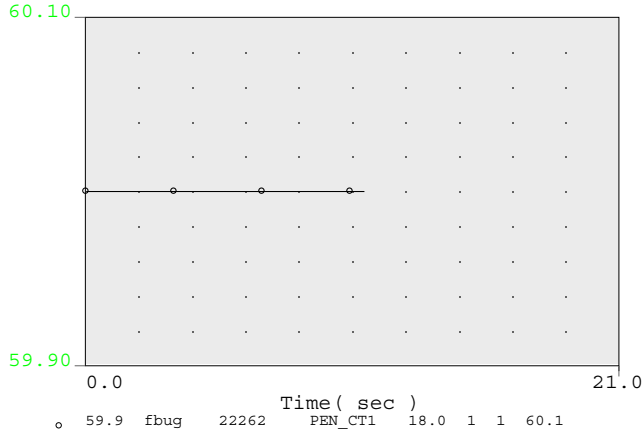


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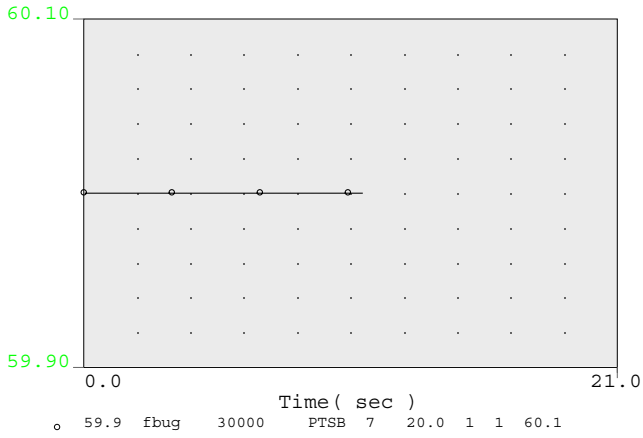


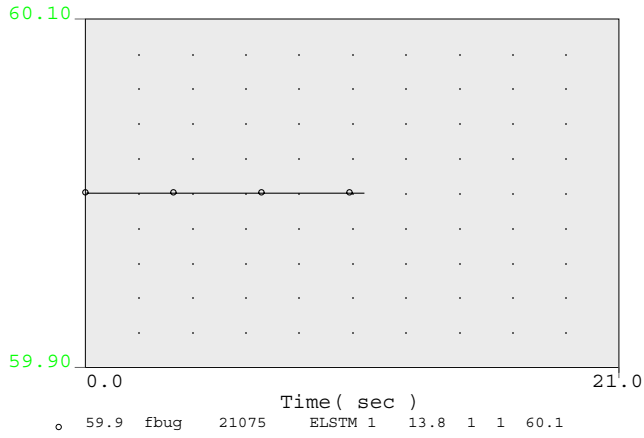


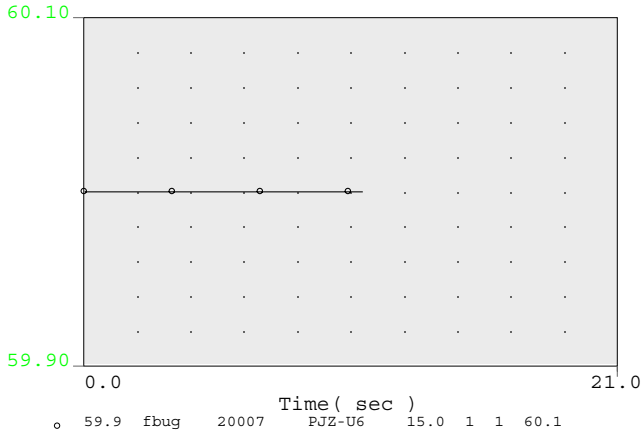


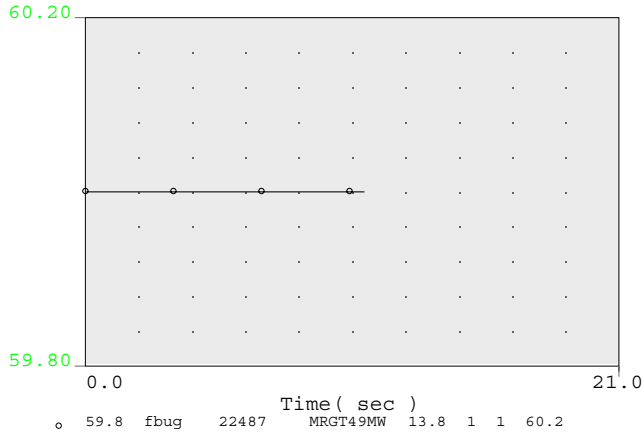


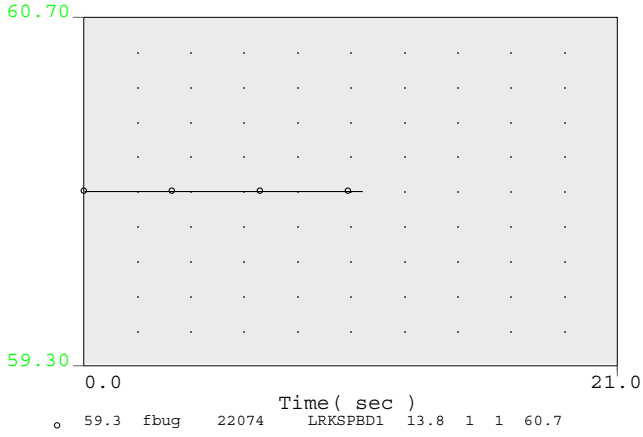


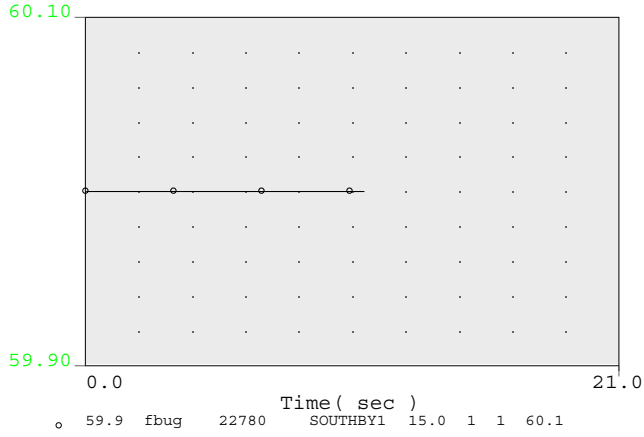


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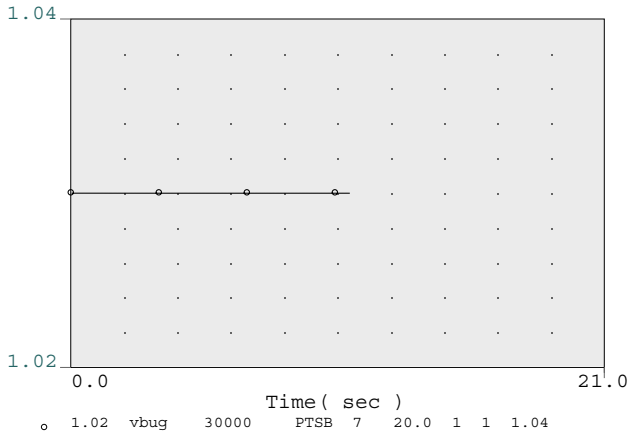


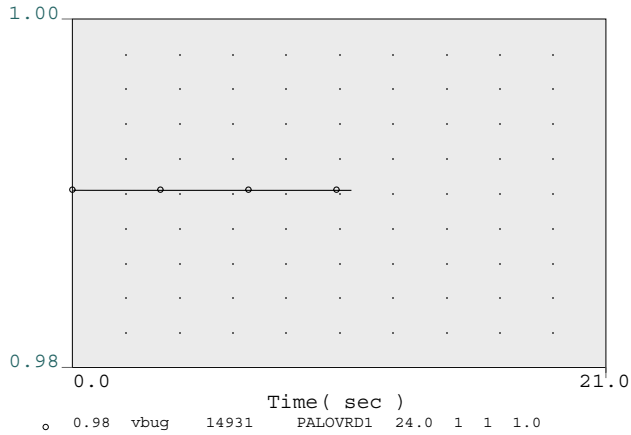


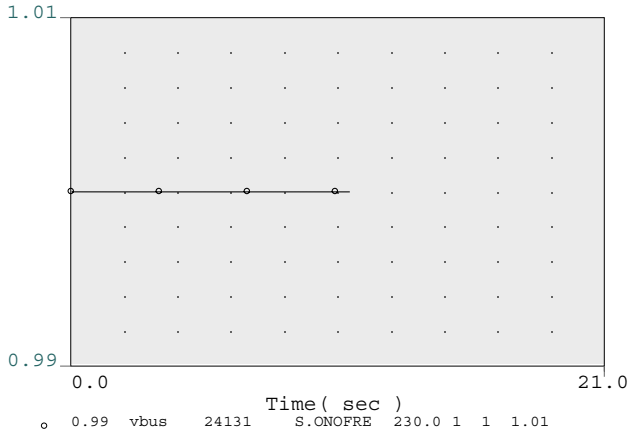


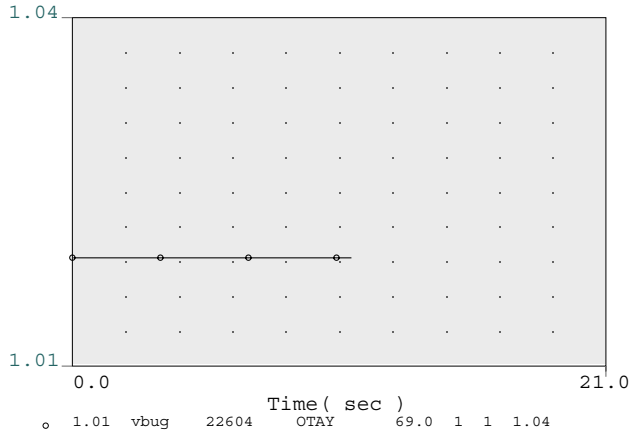


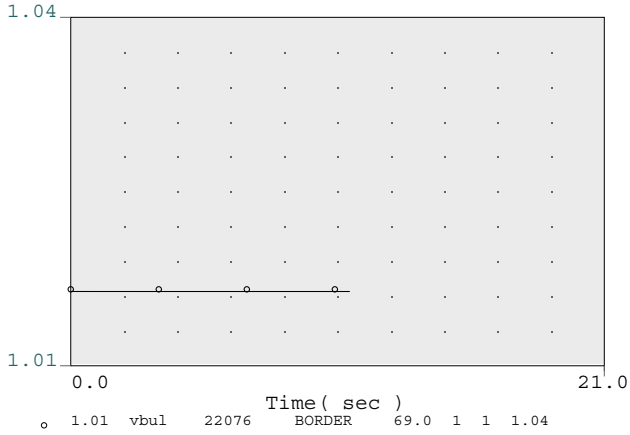


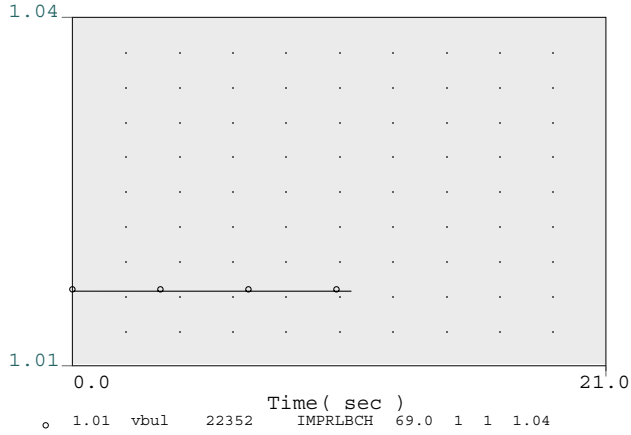


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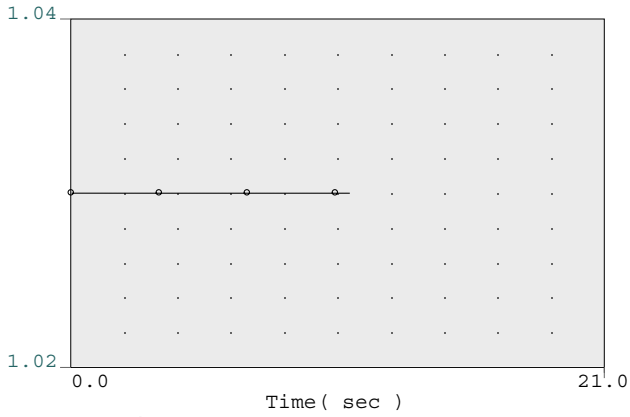
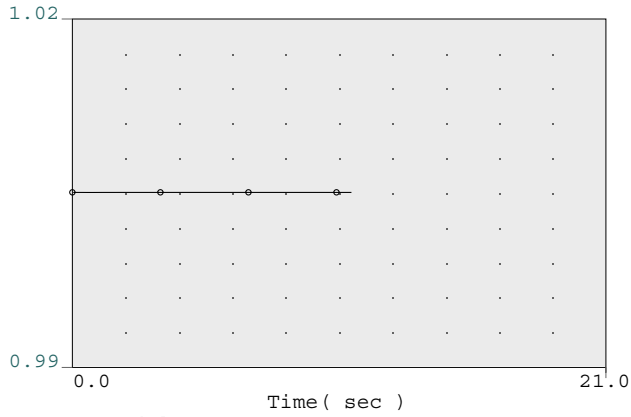



1.02 vbug 30000 PTSB 7 20.0 1 1 1.04

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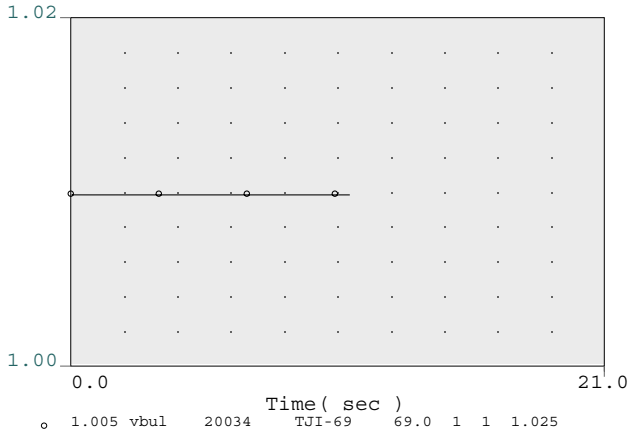


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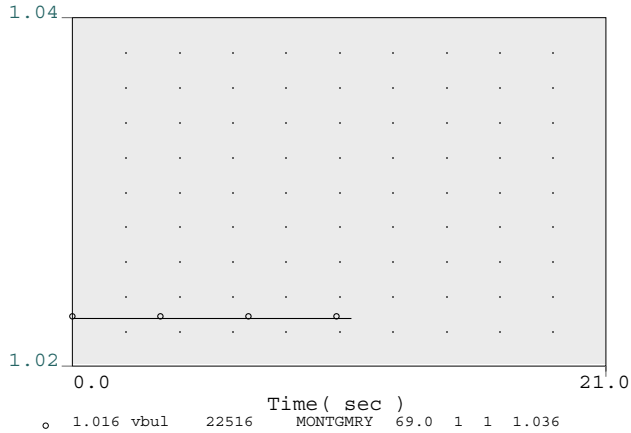


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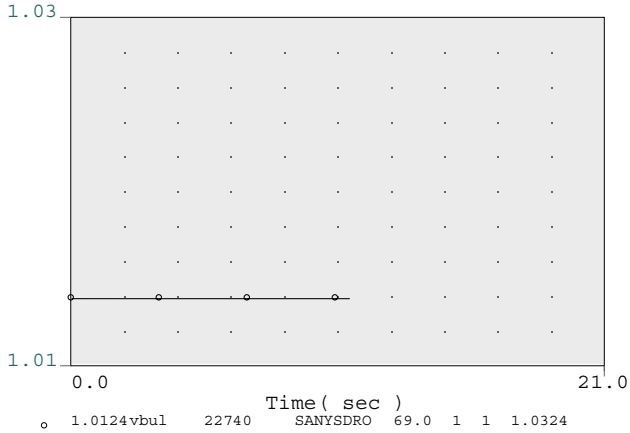


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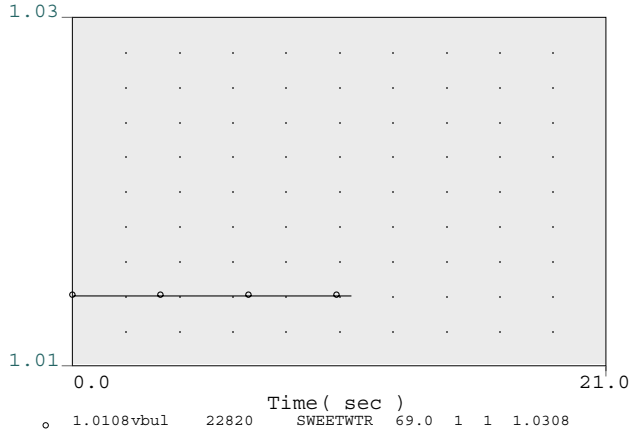


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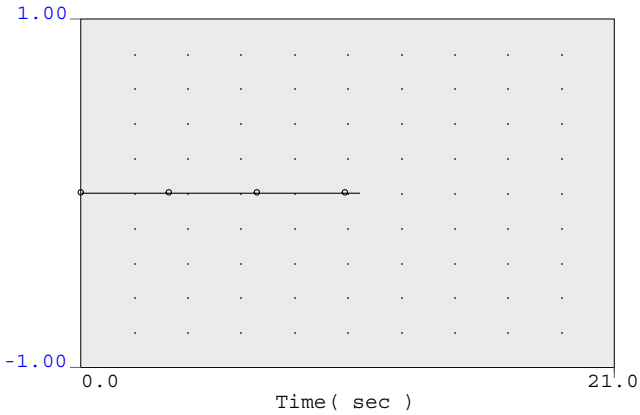


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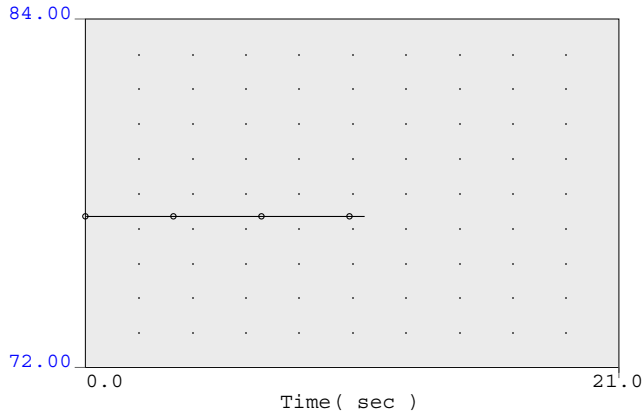


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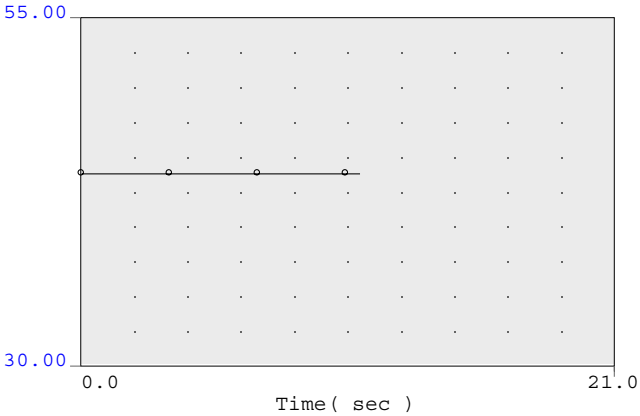


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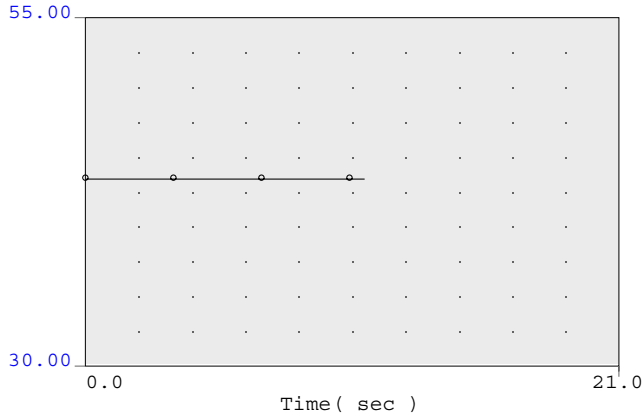


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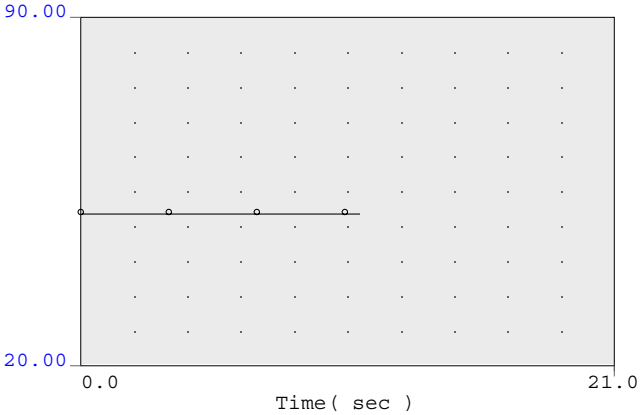


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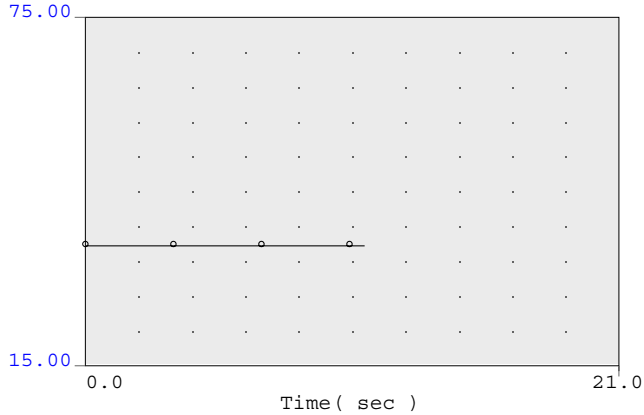


15.0 ang 22780 SOUTHBY1 15.0 1 1 75.0

q_90_cod_a, SDGE LGIP case for Queue 90, year 2008
Pre SRPL, pre-project, 0 BD unit on
HS peak, high SDGE gen/low SDGE imp/low EOR & WOR
CFE exp approx 100 MW; IID w/upgrades, w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)



areas based on WECC case 09HS2SA
no_distr_h.chf
area based on 2006_seed.sav (by Harold Todus)

c:\upslf16\mypslf

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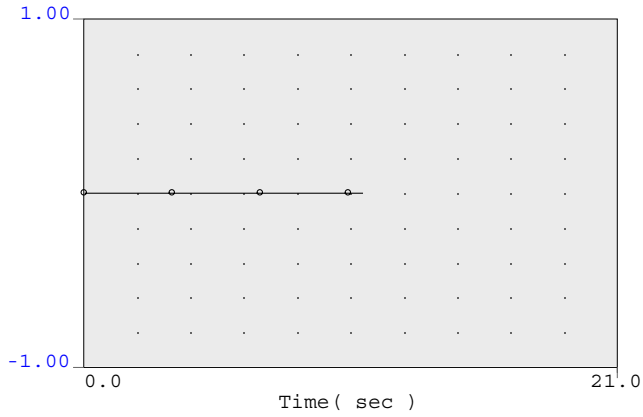


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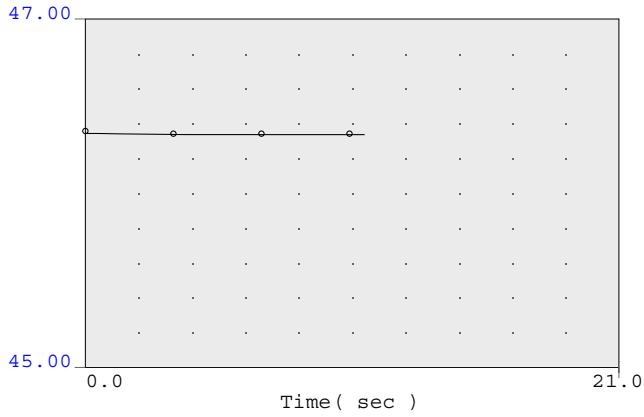


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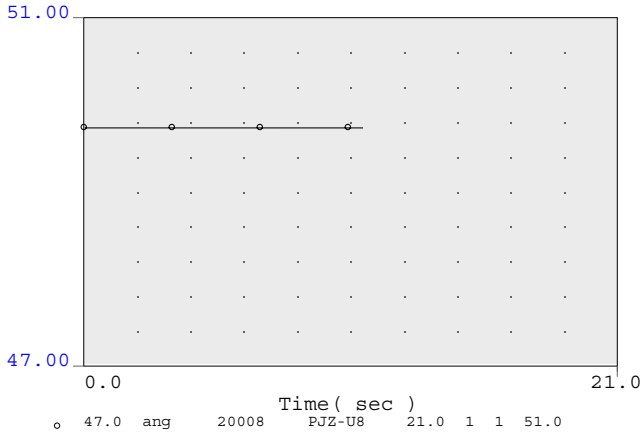


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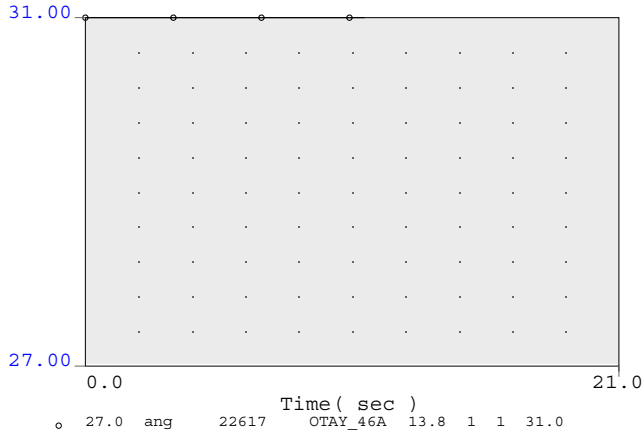


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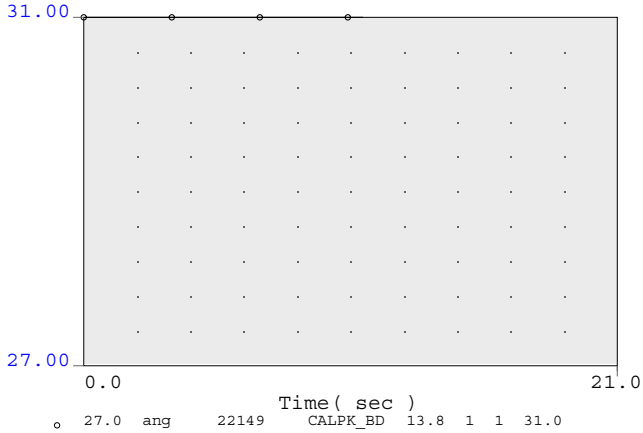


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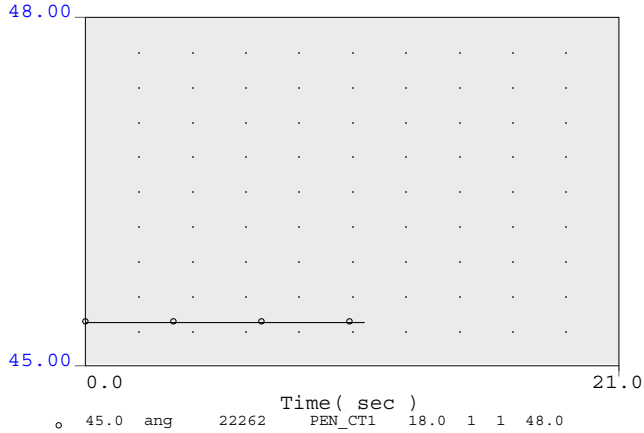


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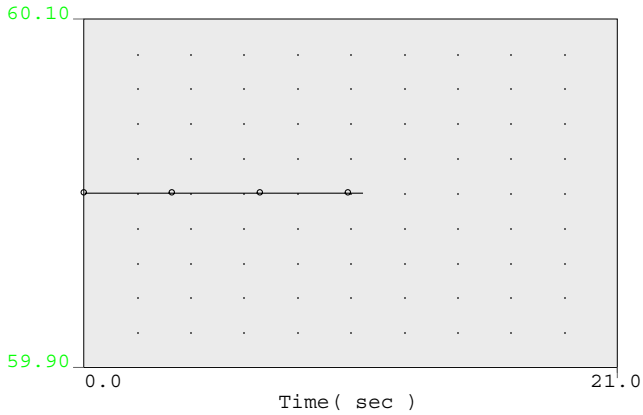
q_90_cod_a, SDGE LGIP case for Queue 90, year 2008
Pre SRPL, pre-project, 0 BD unit on
HS peak, high SDGE gen/low SDGE imp/low EOR & WOR
CFE exp approx 100 MW; IID w/upgrades, w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)

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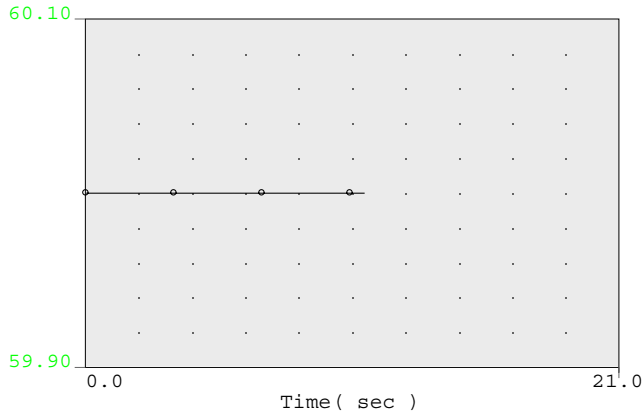


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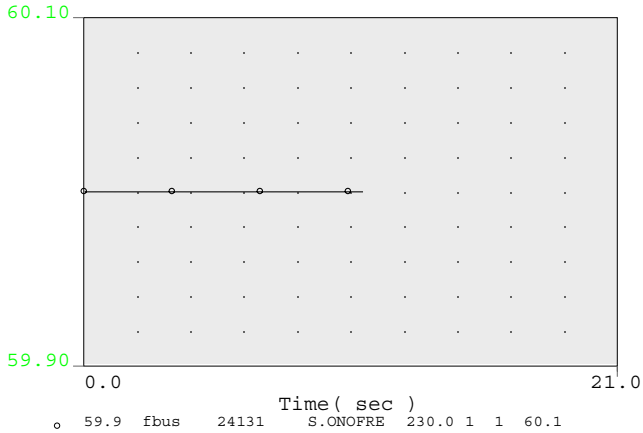


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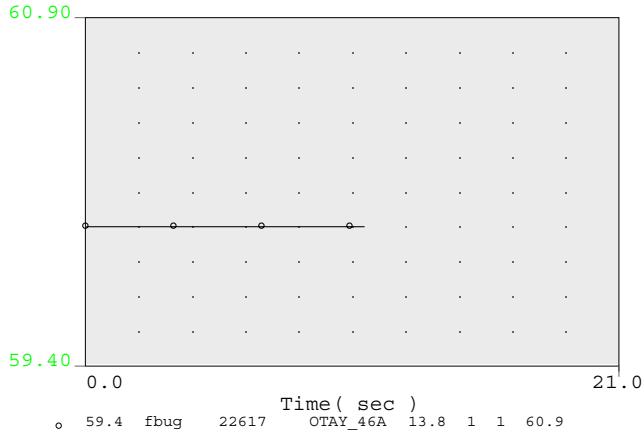


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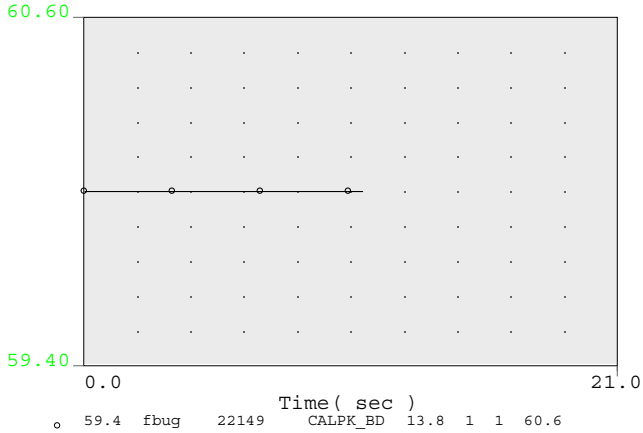


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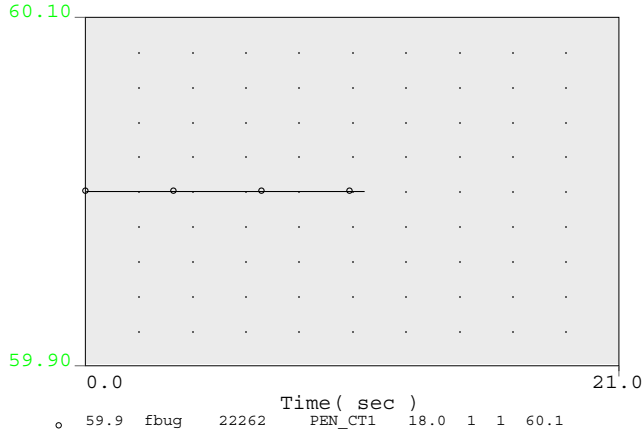
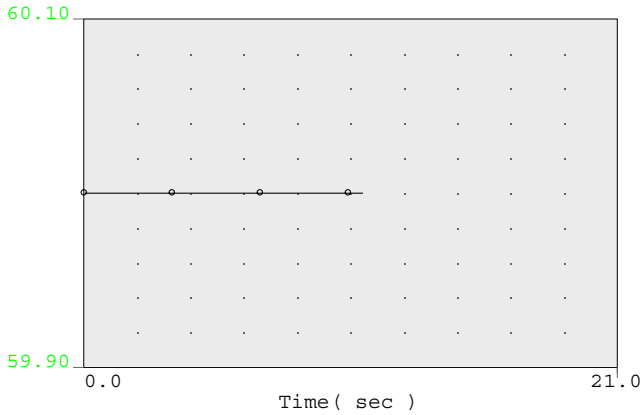



59.9 fbug 22262 PEN_CT1 18.0 1 1 60.1

q_90_cod_a, SDGE LGIP case for Queue 90, year 2008
Pre SRPL, pre-project, 0 BD unit on
HS peak, high SDGE gen/low SDGE imp/low EOR & WOR
CFE exp approx 100 MW; IID w/upgrades, w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)

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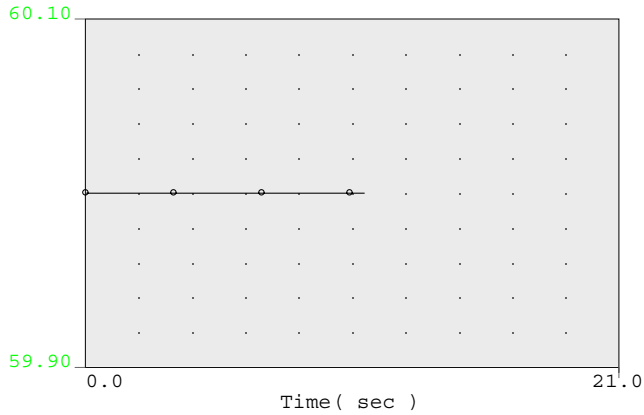


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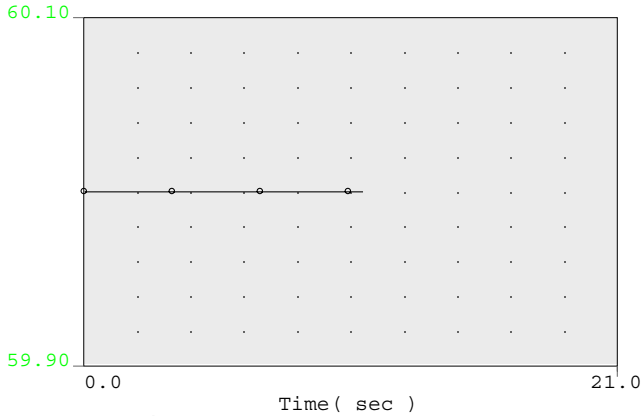


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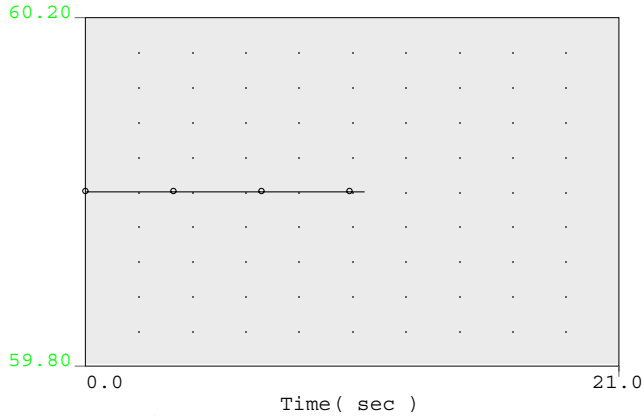


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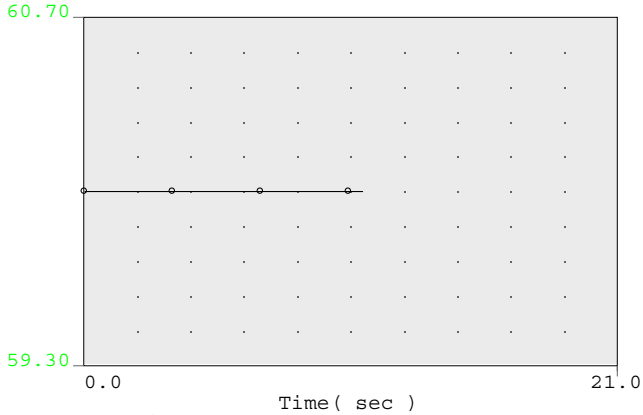


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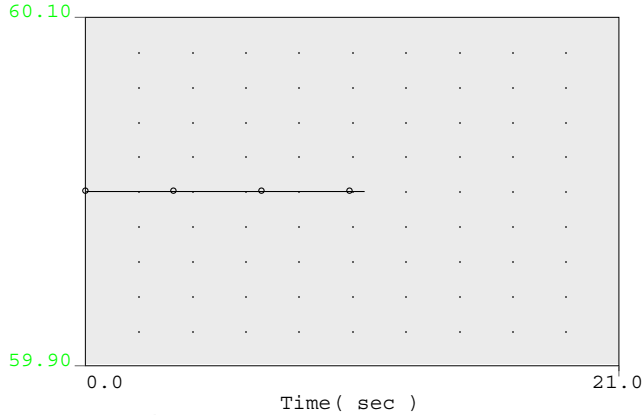
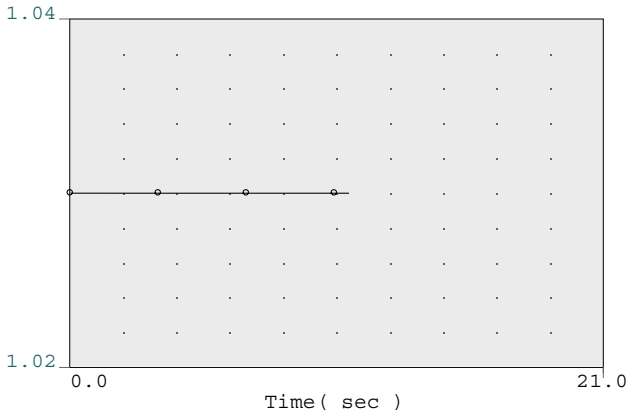
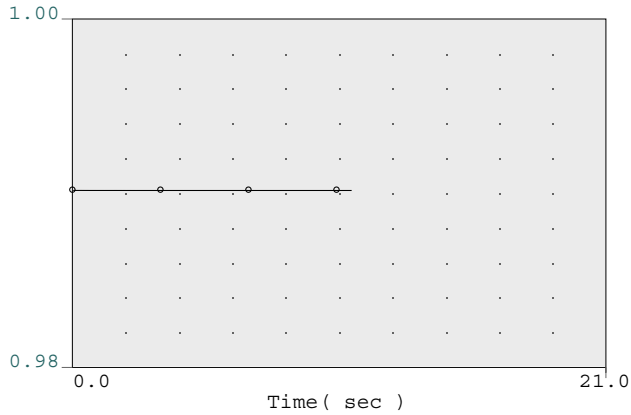
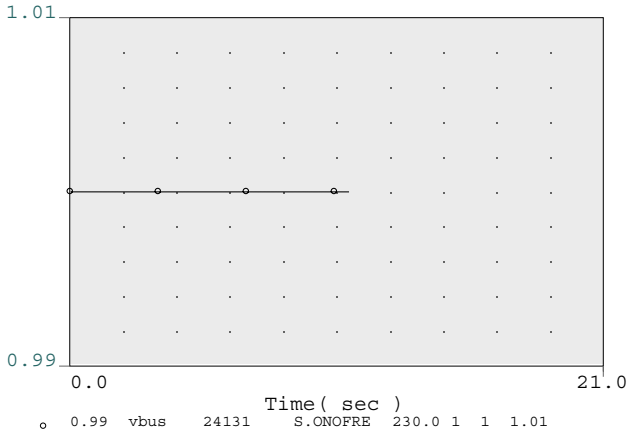


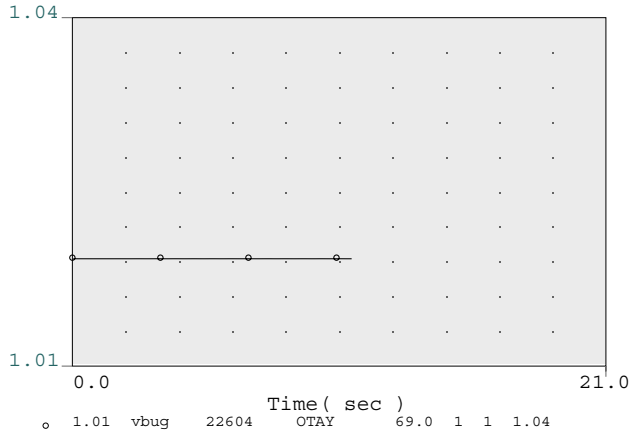

59.9 fbug 22780 SOUTHBY1 15.0 1 1 60.1

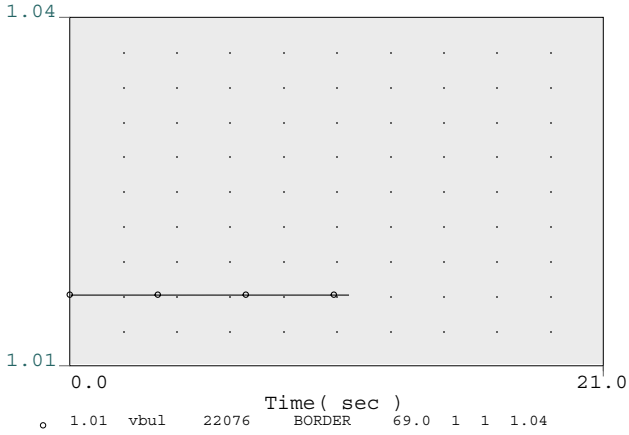
q_90_cod_a, SDGE LGIP case for Queue 90, year 2008
Pre SRPL, pre-project, 0 BD unit on
HS peak, high SDGE gen/low SDGE imp/low EOR & WOR
CFE exp approx 100 MW; IID w/upgrades, w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)

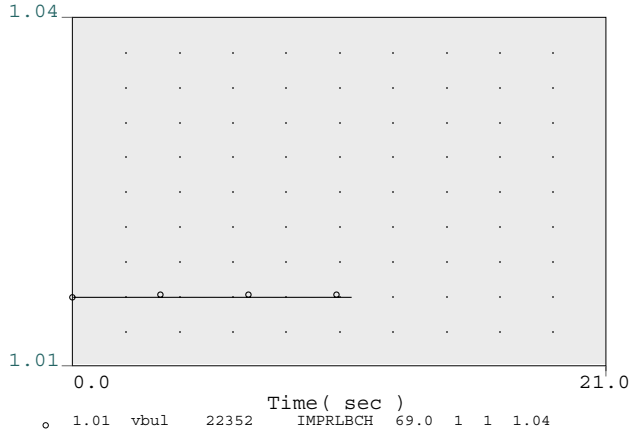



q_90_cod_a, SDGE LGIP case for Queue 90, year 2008
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HS peak, high SDGE gen/low SDGE imp/low EOR & WOR
CFE exp approx 100 MW; IID w/upgrades, w/o PST, exp 100 MW
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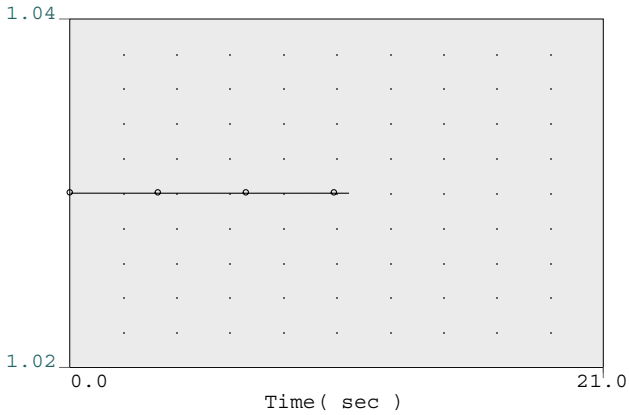
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)

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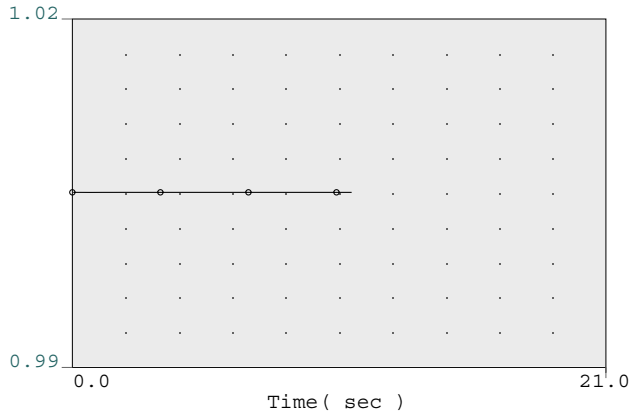


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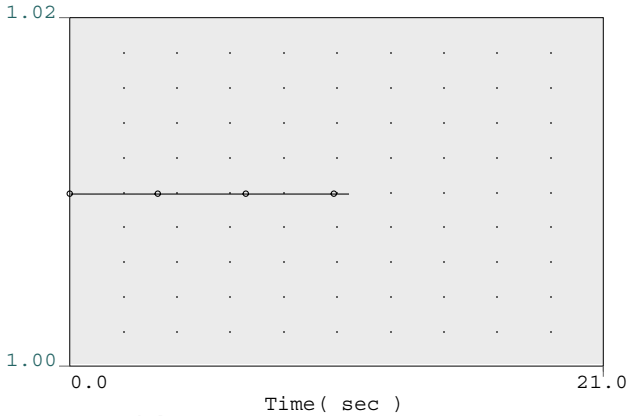


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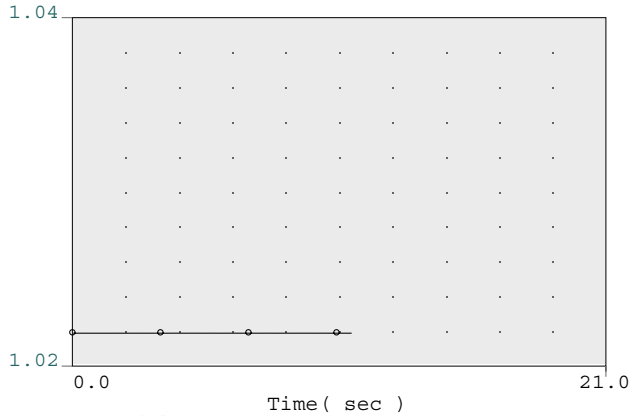


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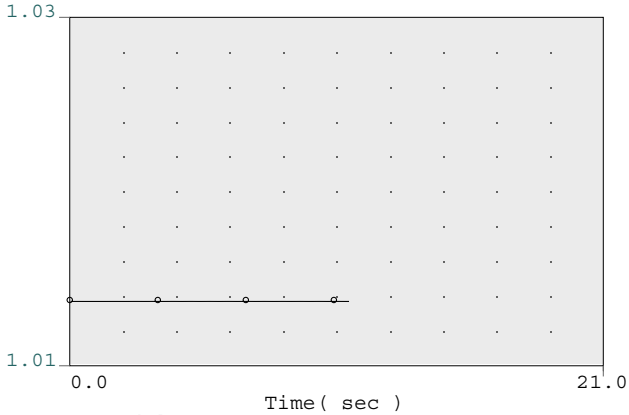


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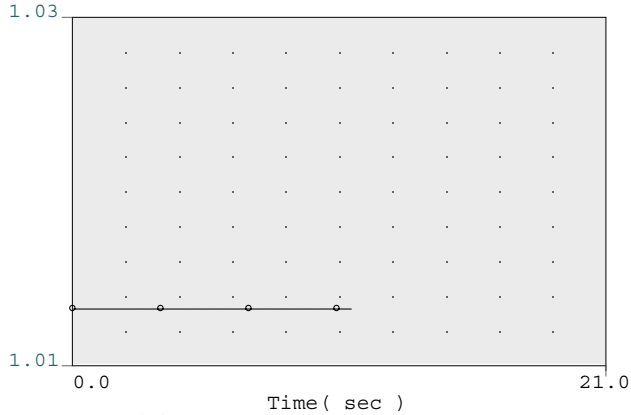


o 1.0108vbul 22820 SWEETWTR 69.0 1 1 1.0308

q_90_cod_a, SDGE LGIP case for Queue 90, year 2008
Pre SRPL, pre-project, 0 BD unit on
HS peak, high SDGE gen/low SDGE imp/low EOR & WOR
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IVGens: dispatch approx 765 MW
2006 Grid Assessment Case: 2008 "post" basecase (by Brian Murphy)

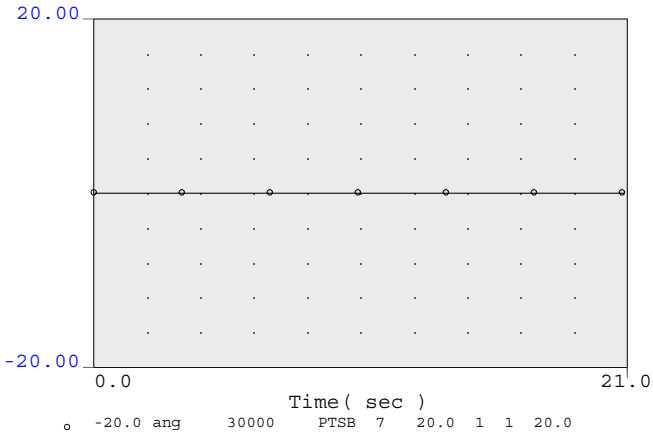
Category B

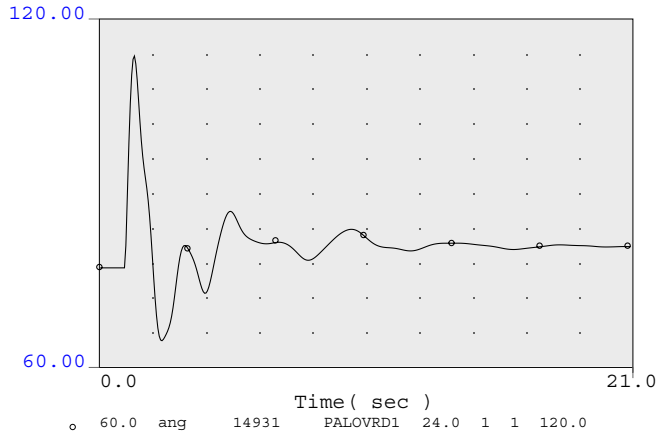
Plots of

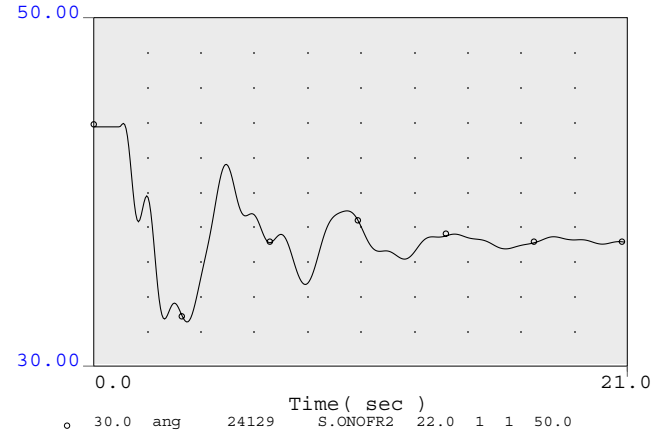
Transient Stability Outage Simulations

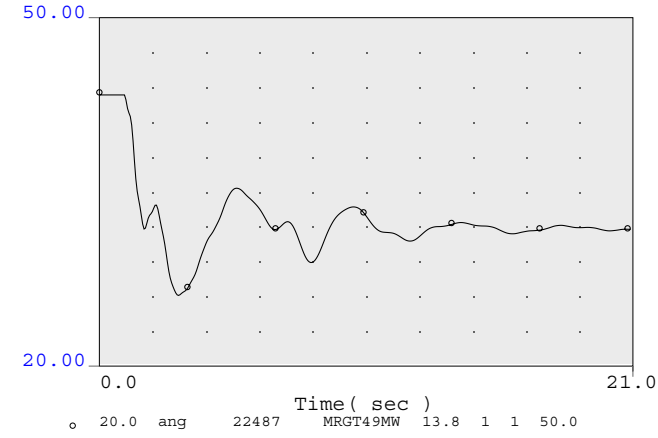
Hassayampa-North Gila 500 kV SLO

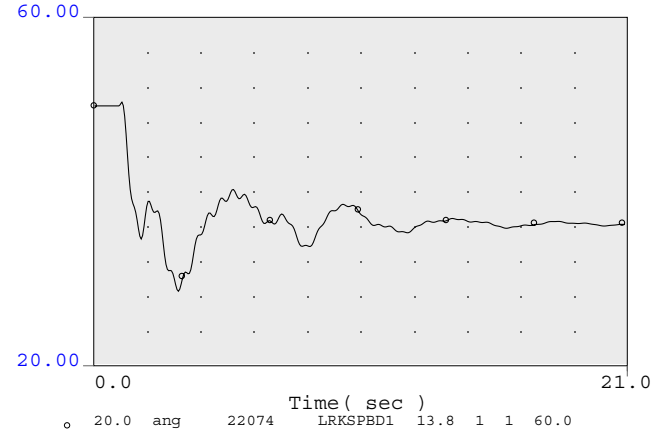
Pre and Post-Project

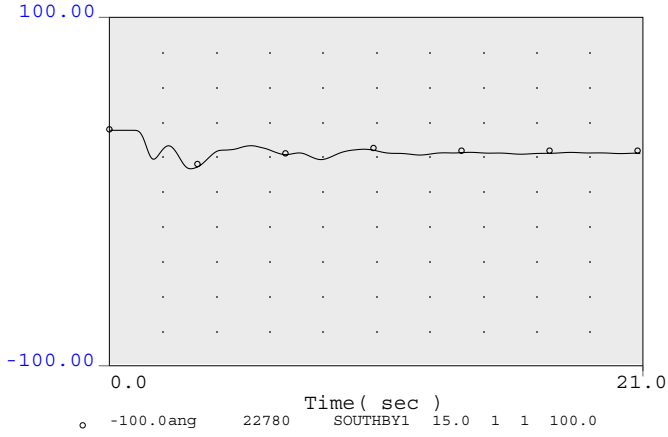



MMC ISIS, pre-project

Fault bus at Hassayampa

Trip Hassayampa - N. Gila 500 kV Line



haa_ng_slo_pre.chf

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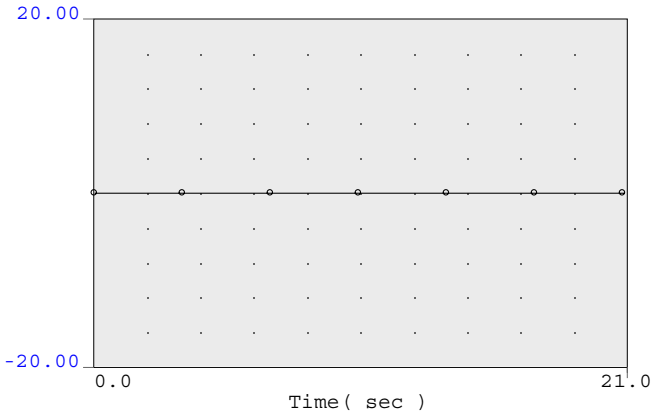


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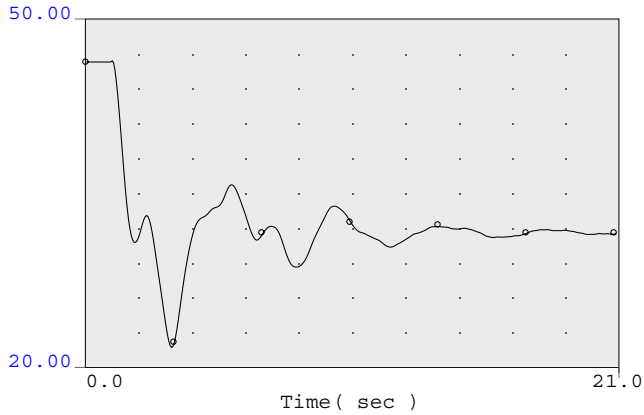


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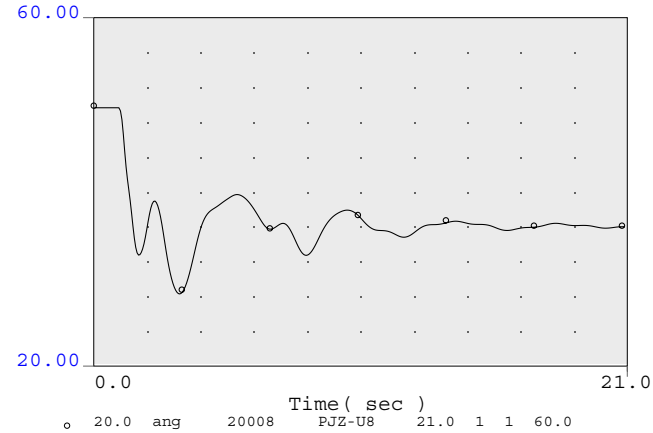


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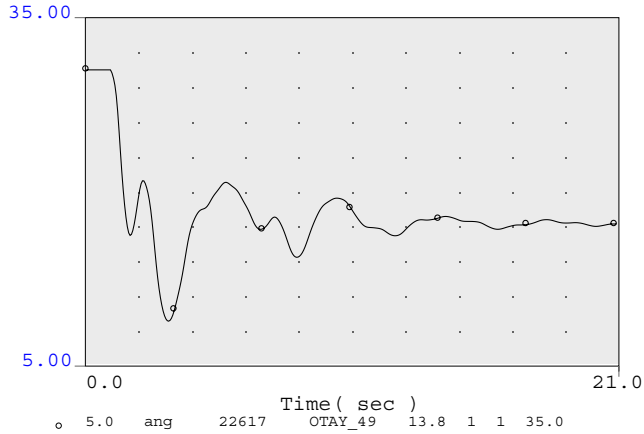


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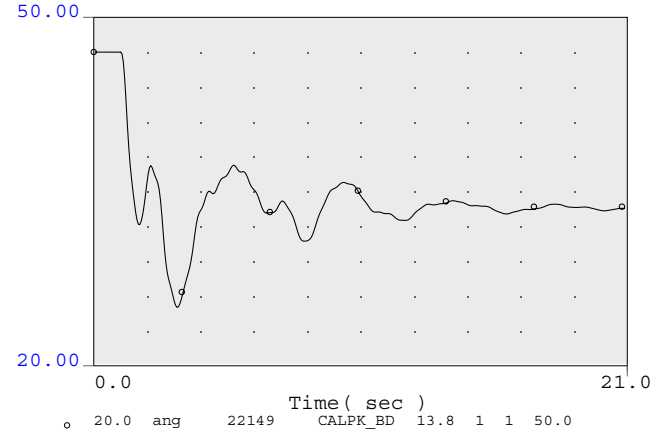


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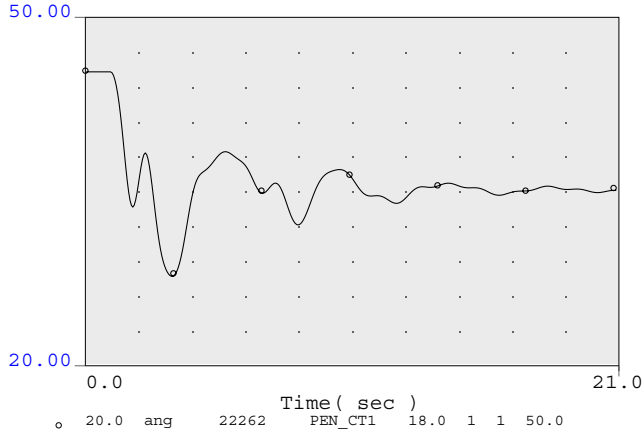


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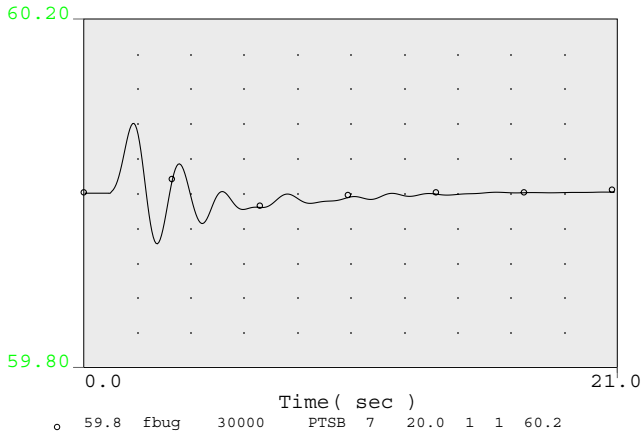
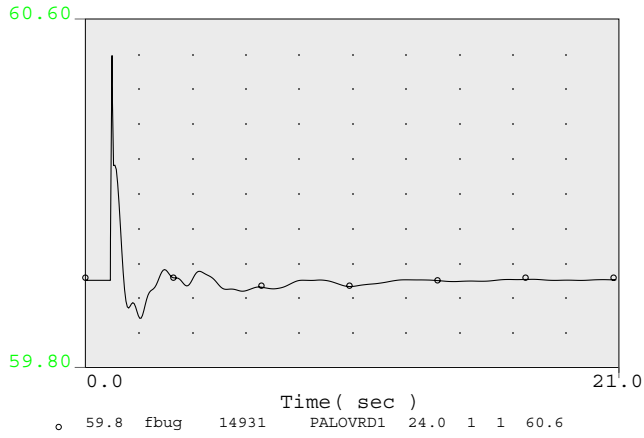
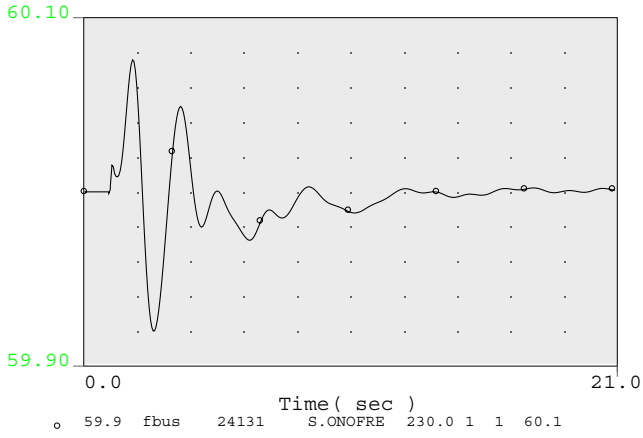
MMC ISIS, pre-project

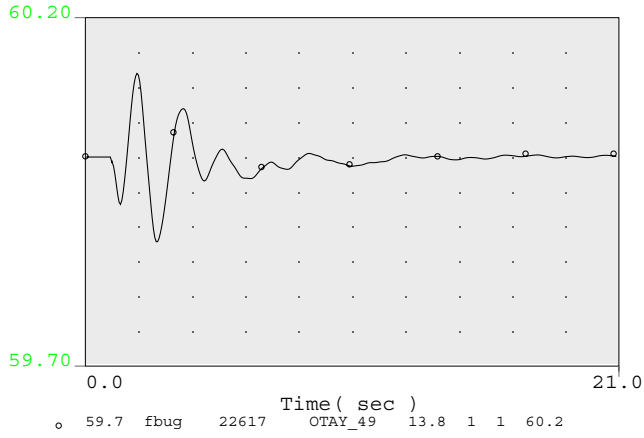
Fault bus at Hassayampa

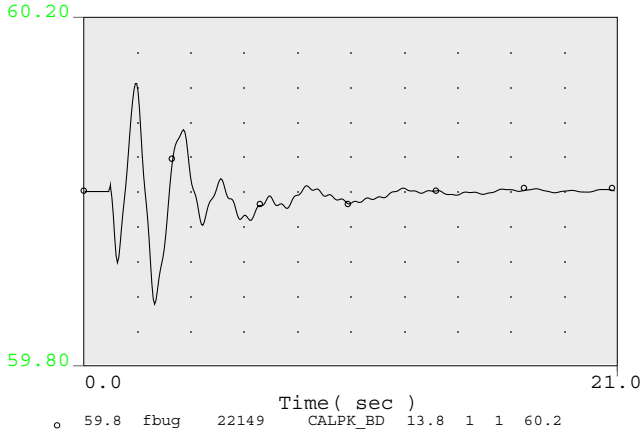
Trip Hassayampa - N. Gila 500 kV Line

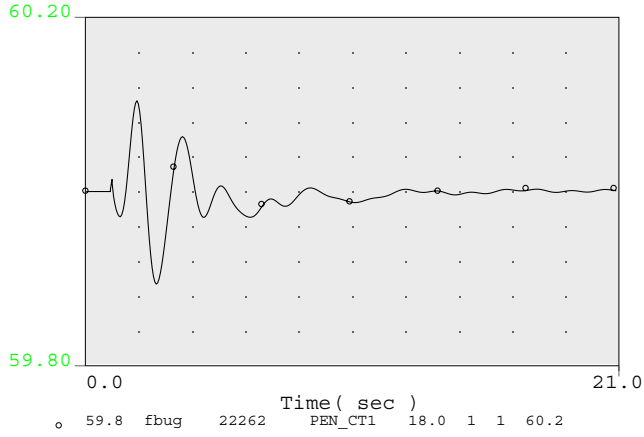


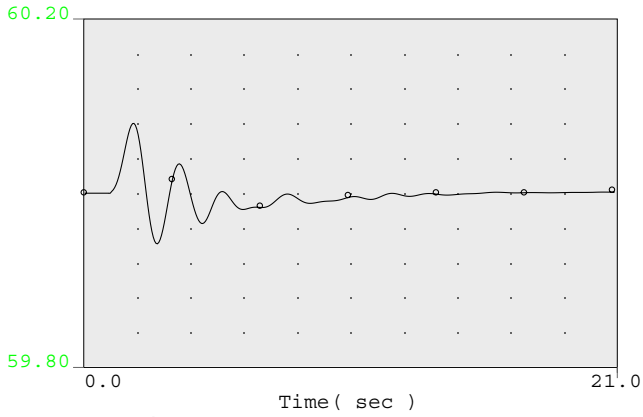



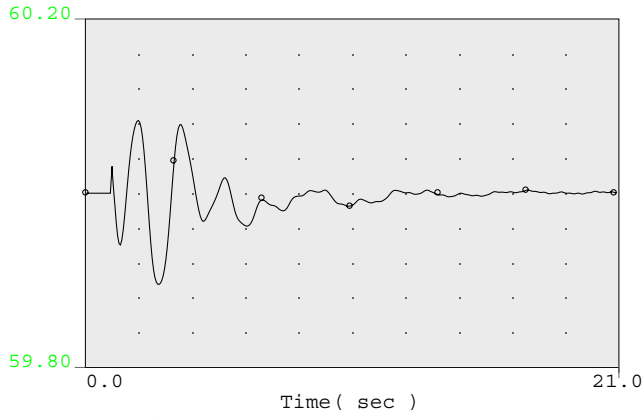




MMC ISIS, pre-project
Fault bus at Hassayampa
Trip Hassayampa - N. Gila 500 kV Line




59.8 fbug 30000 PTSB 7 20.0 1 1 60.2

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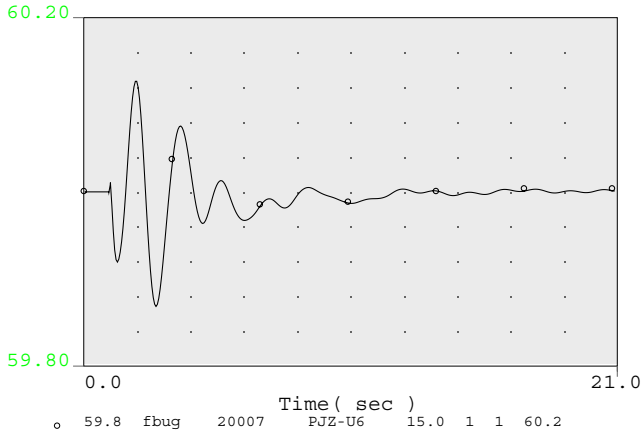


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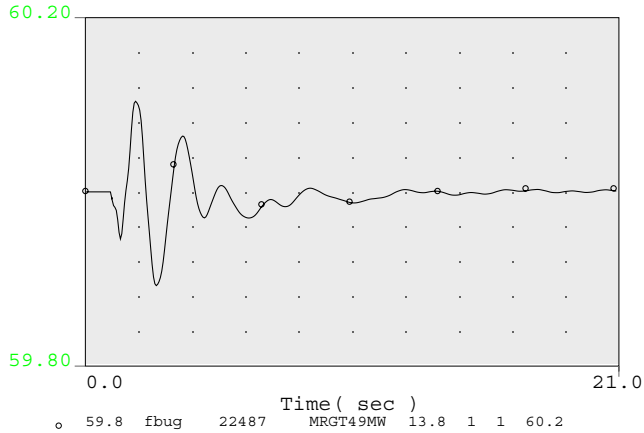


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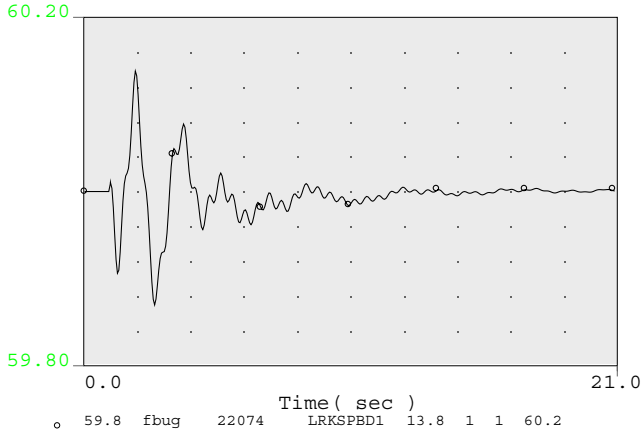


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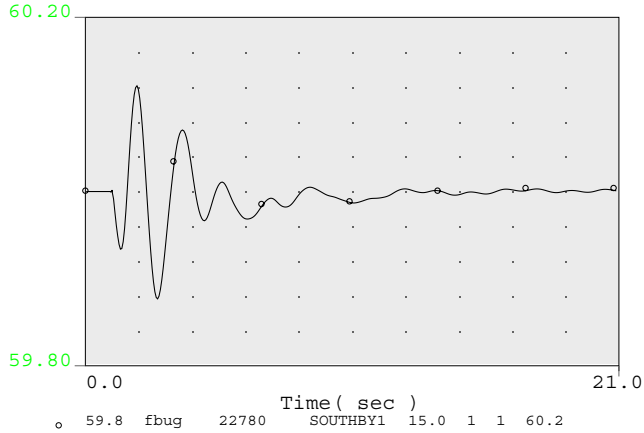
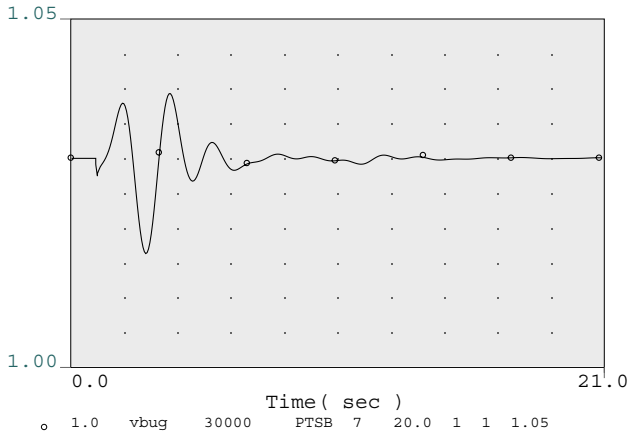
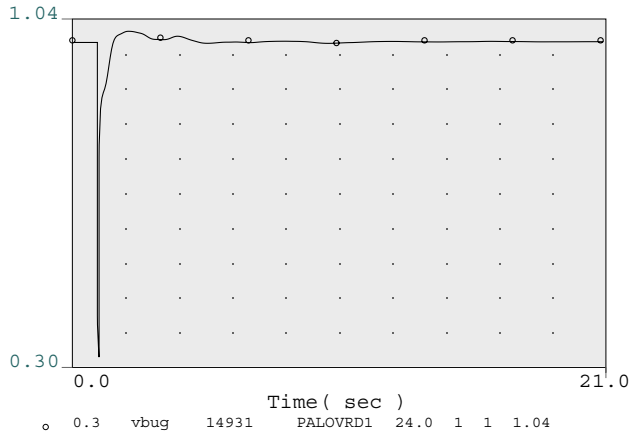
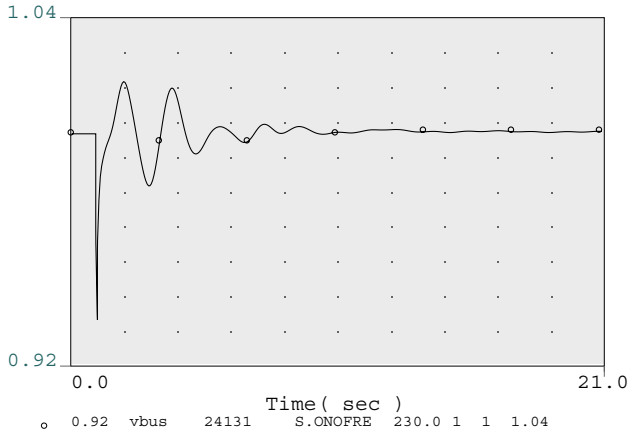


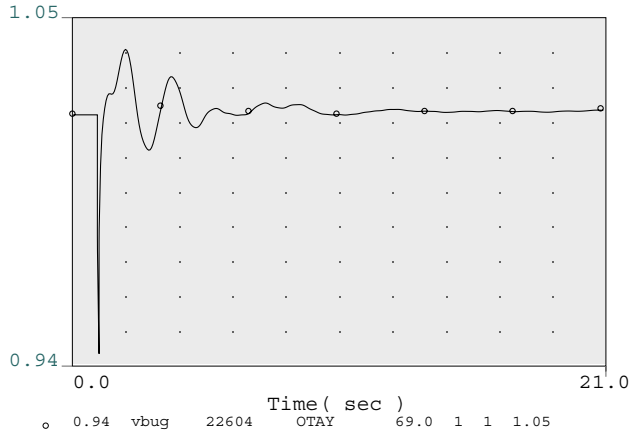

59.8 fbug 22780 SOUTHBY1 15.0 1 1 60.2

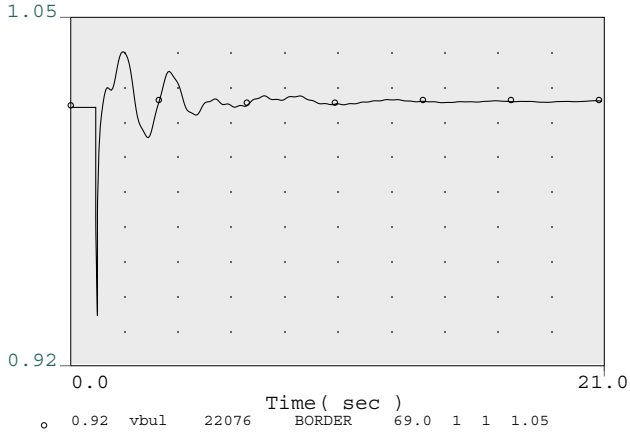
MMC ISIS, pre-project
Fault bus at Hassayampa
Trip Hassayampa - N. Gila 500 kV Line

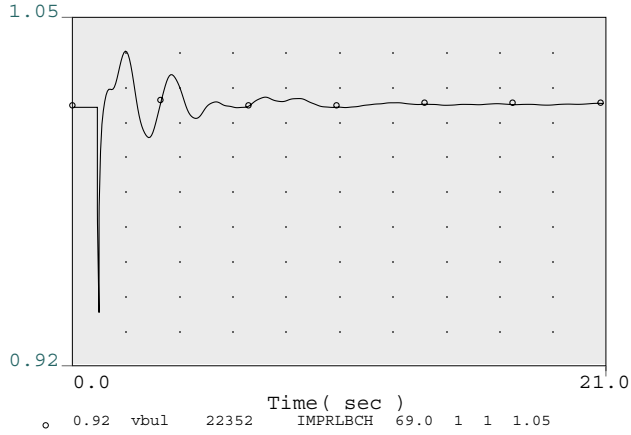


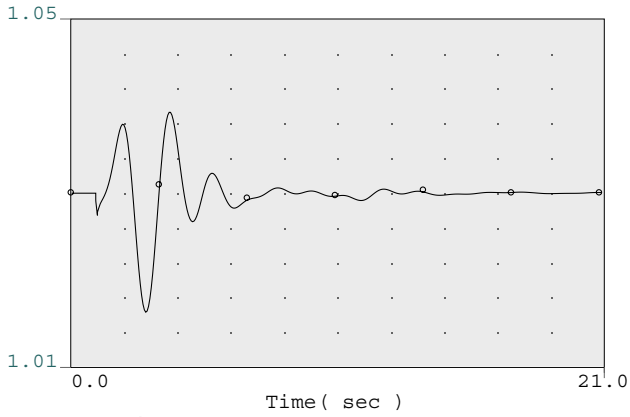




MMC ISIS, pre-project

Fault bus at Hassayampa

Trip Hassayampa - N. Gila 500 kV Line

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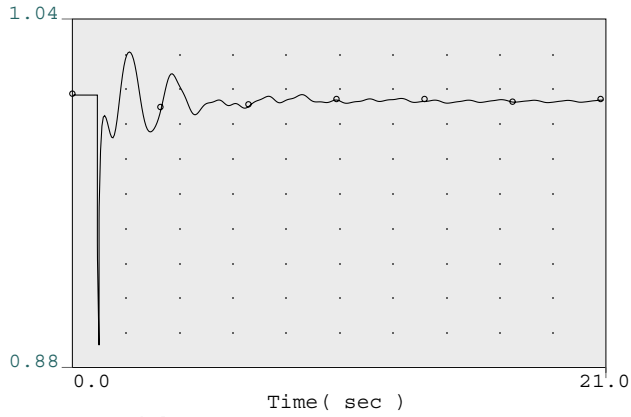


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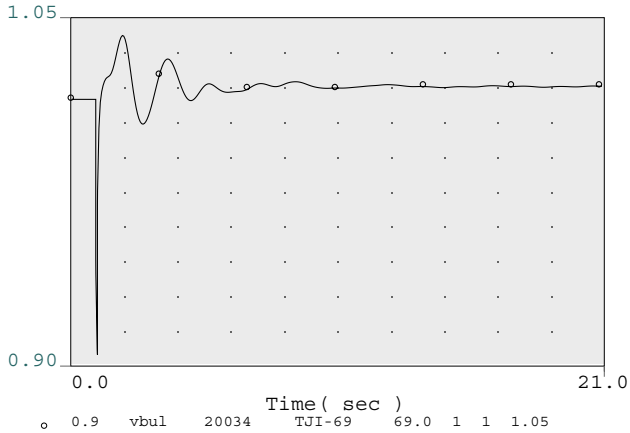


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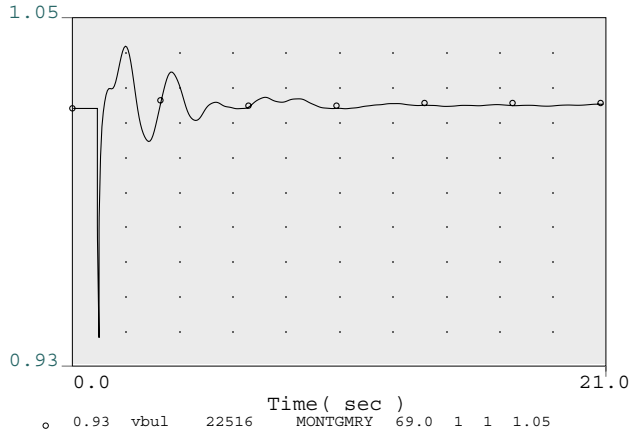


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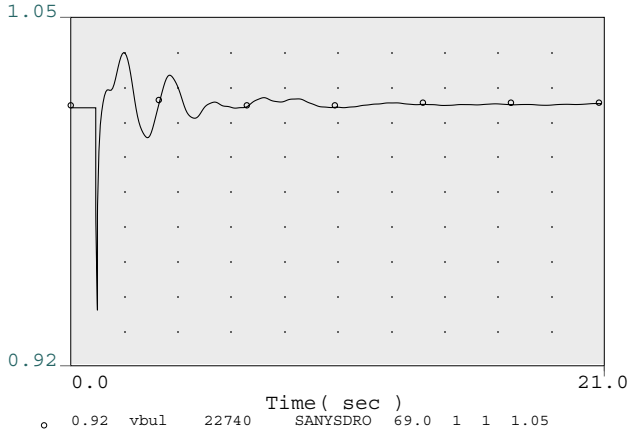


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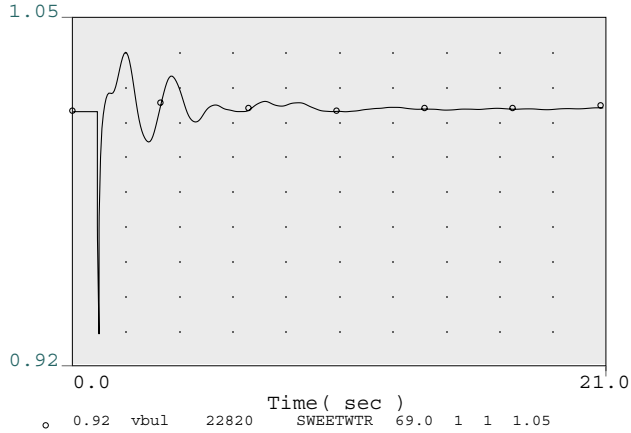


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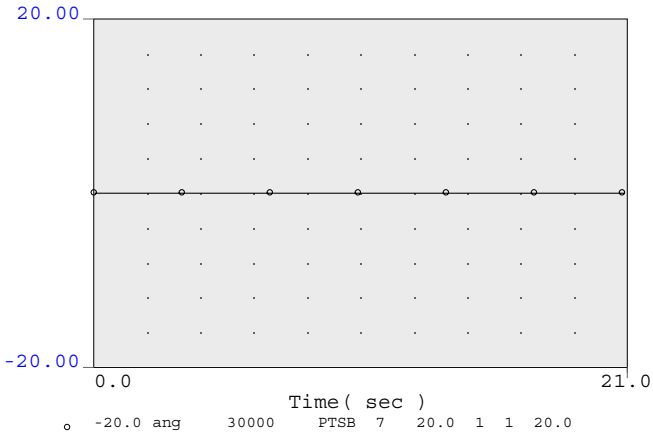
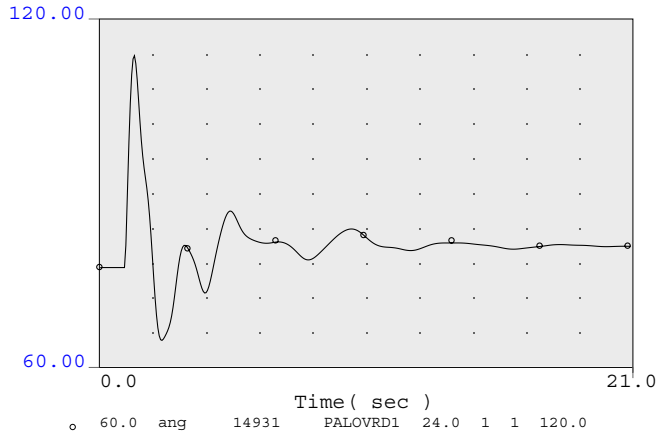
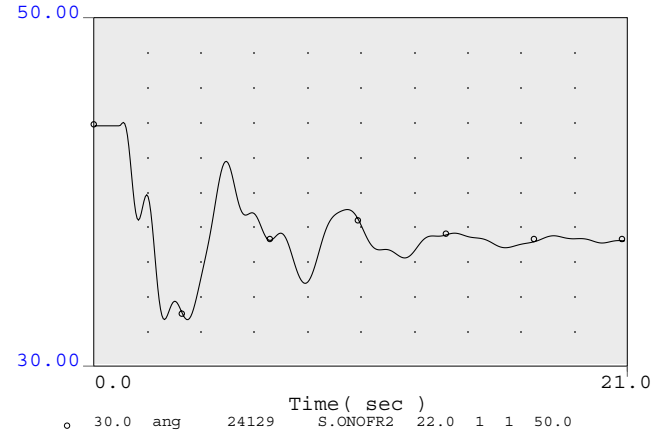
MMC ISIS, pre-project

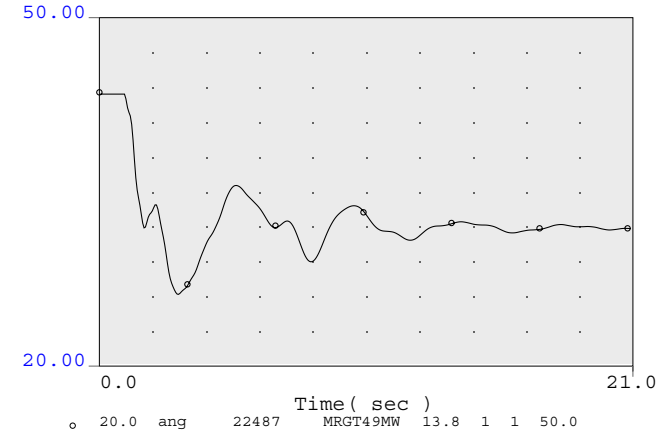
Fault bus at Hassayampa

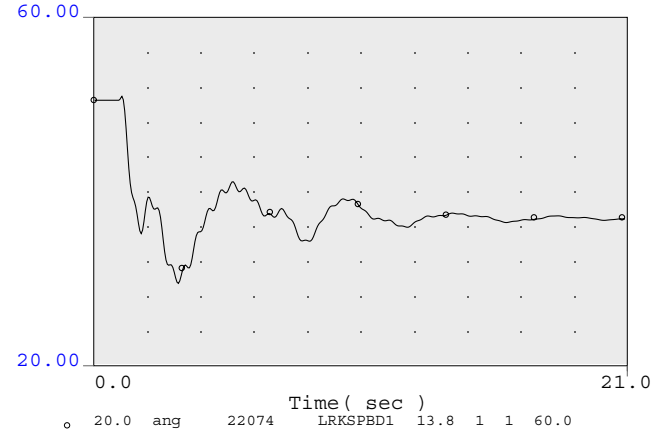
Trip Hassayampa - N. Gila 500 kV Line

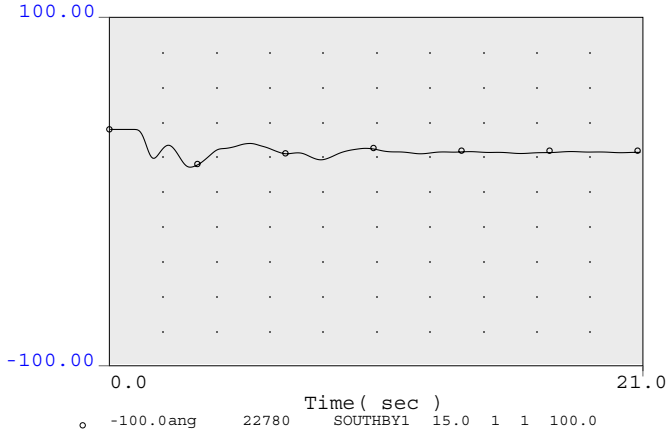



MMC ISIS, post-project
Fault bus at Hassayampa
Trip Hassayampa - N. Gila 500 kV Line



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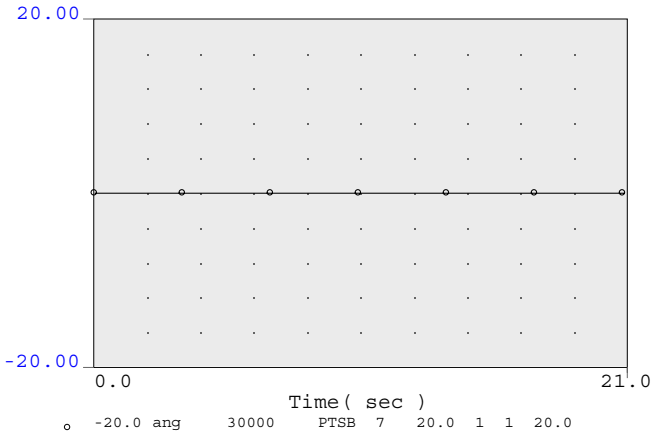
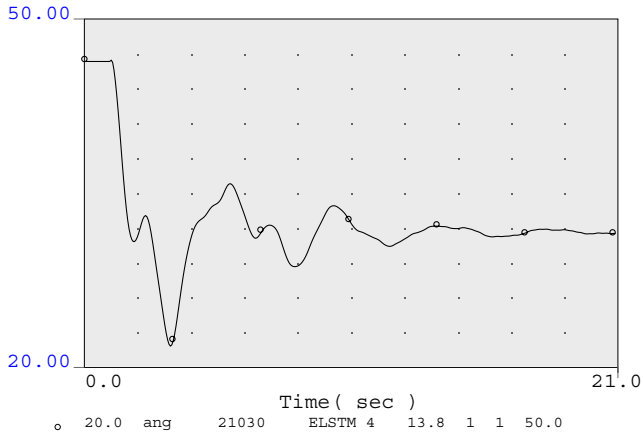
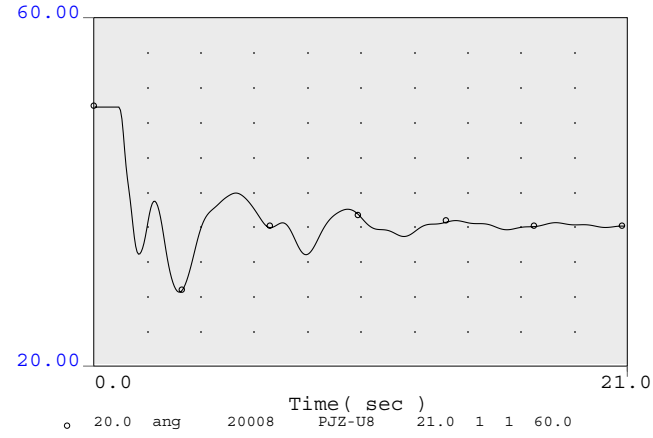
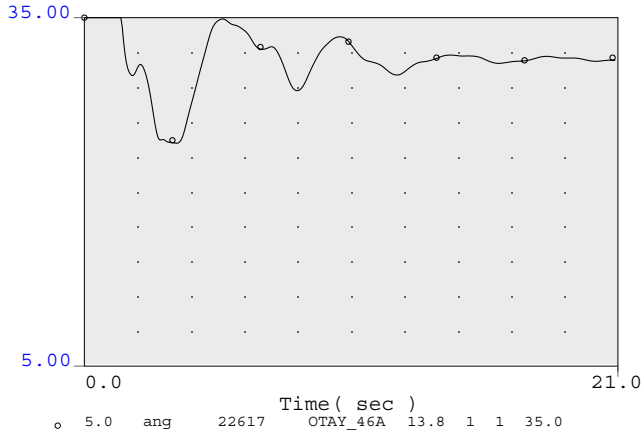
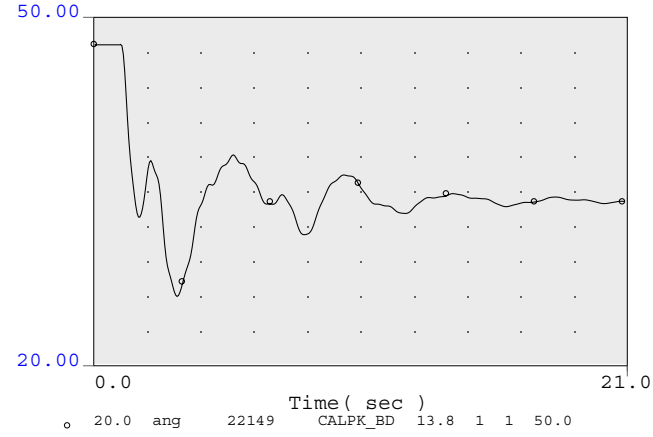
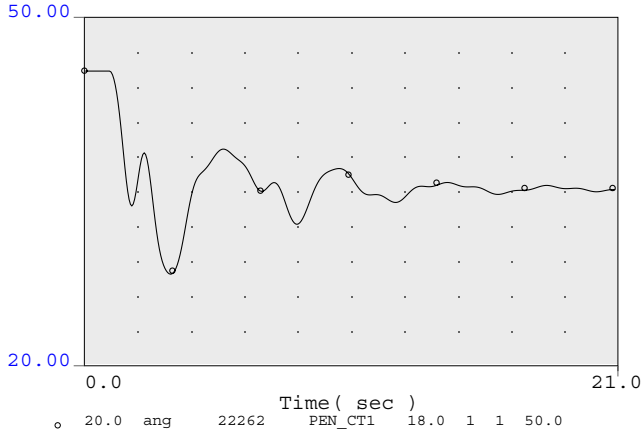


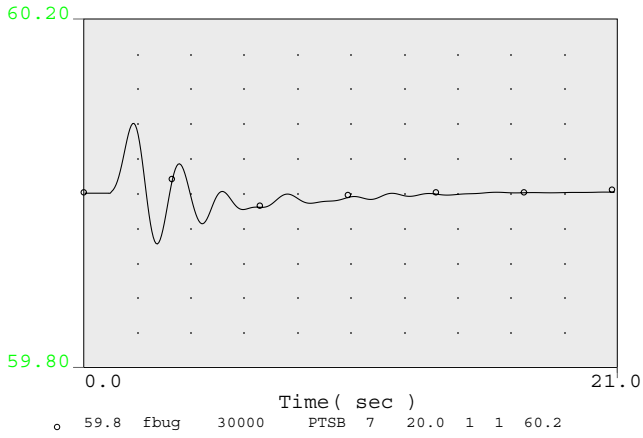



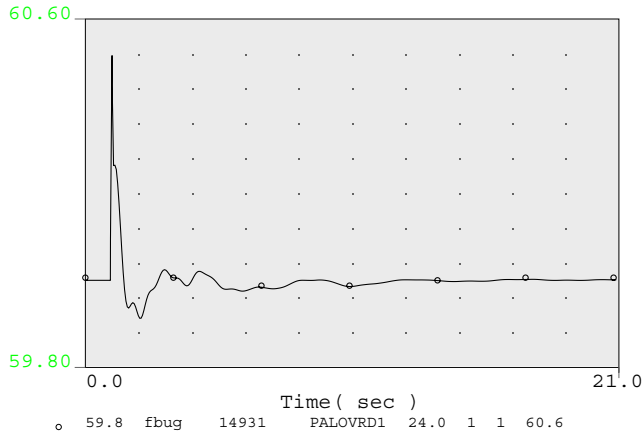



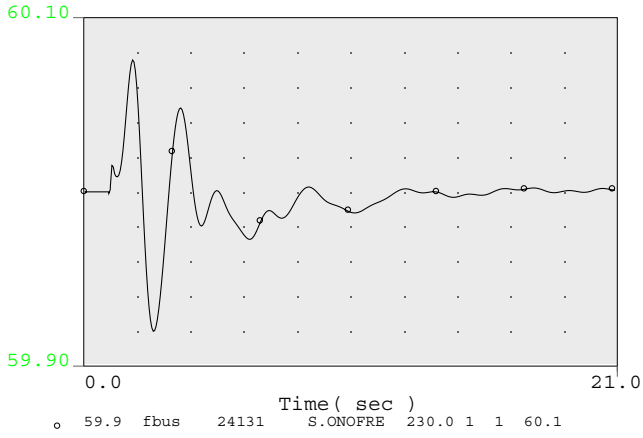



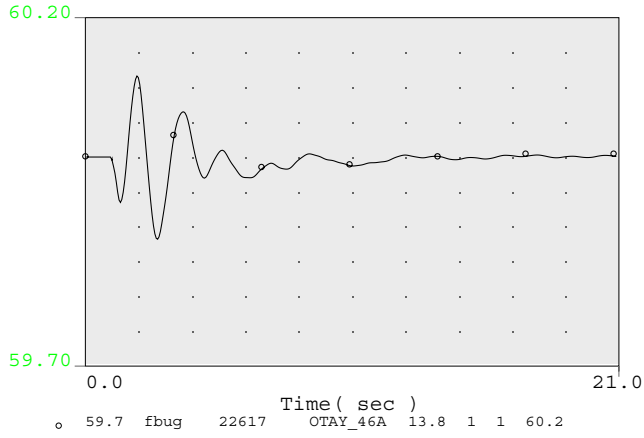



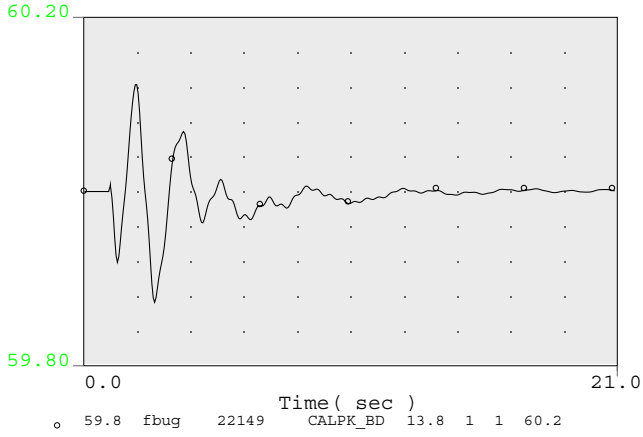

MMC ISIS, post-project
Fault bus at Hassayampa
Trip Hassayampa - N. Gila 500 kV Line

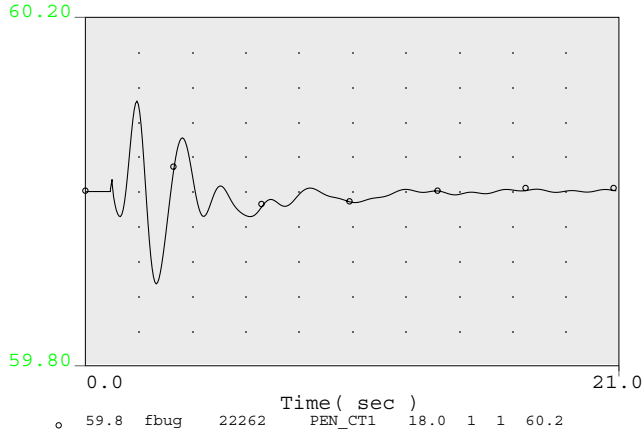


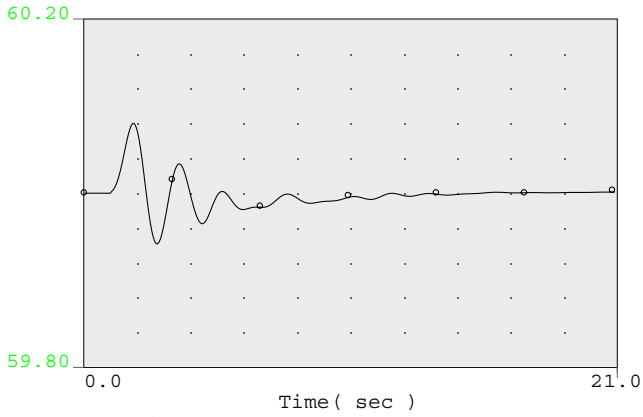




MMC ISIS, post-project
Fault bus at Hassayampa
Trip Hassayampa - N. Gila 500 kV Line

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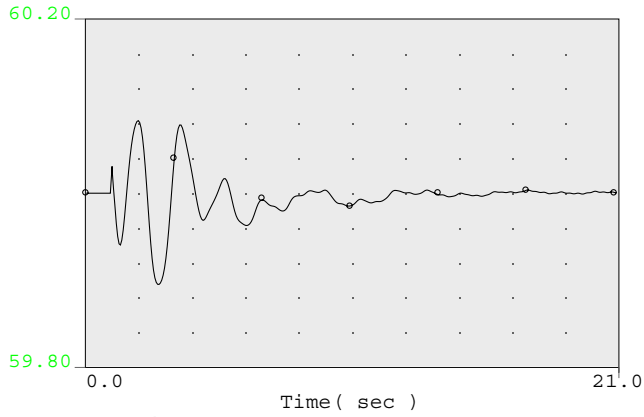


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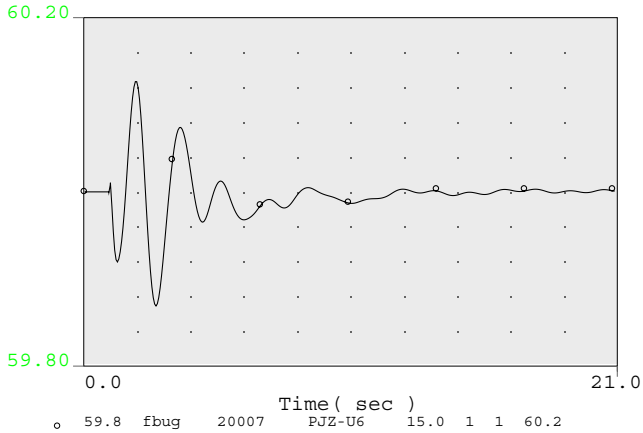


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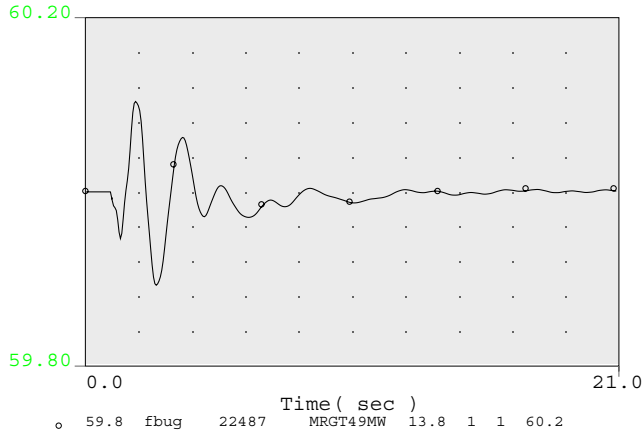


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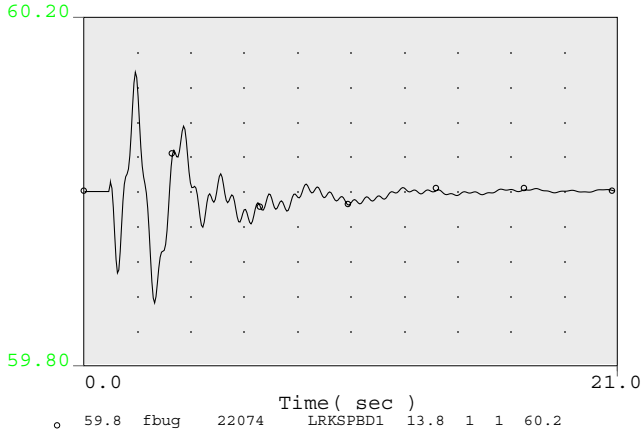


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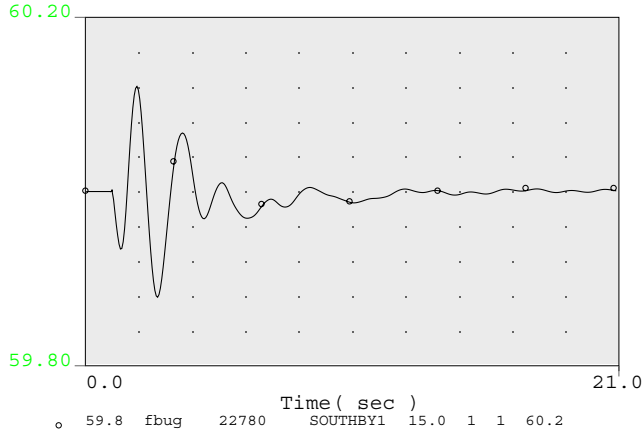
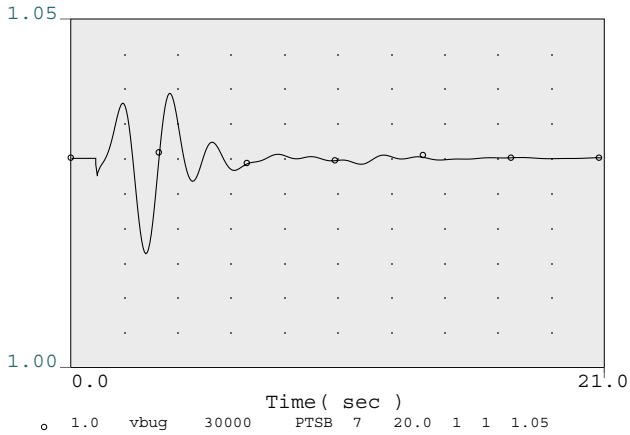
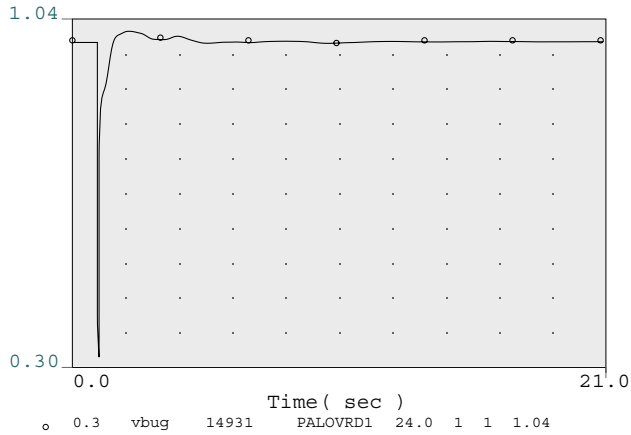
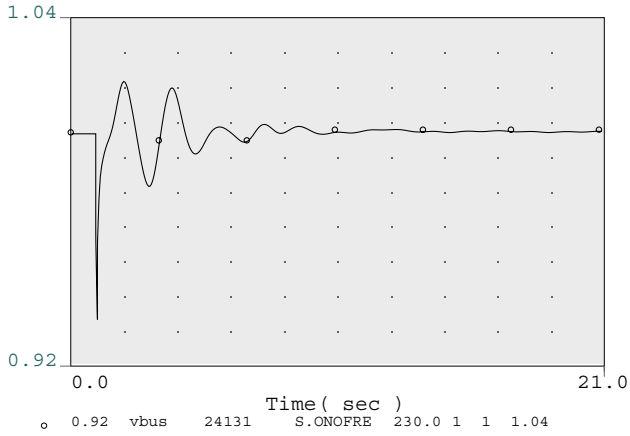


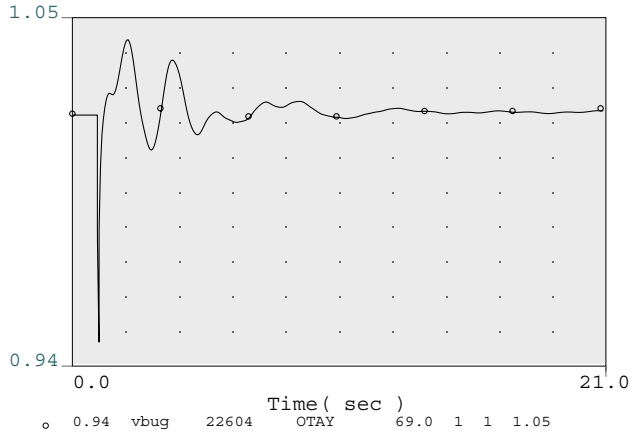

59.8 fbug 22780 SOUTHBY1 15.0 1 1 60.2

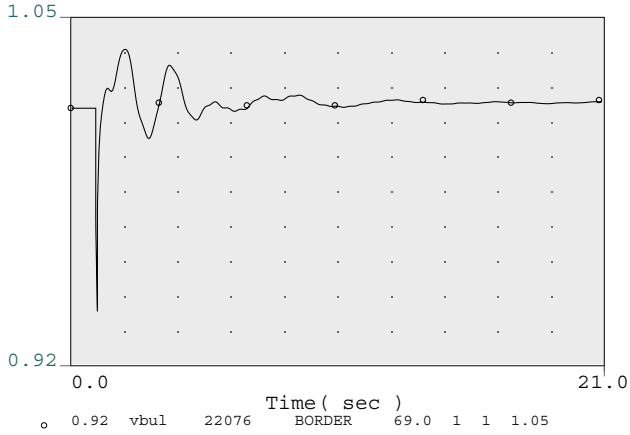
MMC ISIS, post-project
Fault bus at Hassayampa
Trip Hassayampa - N. Gila 500 kV Line

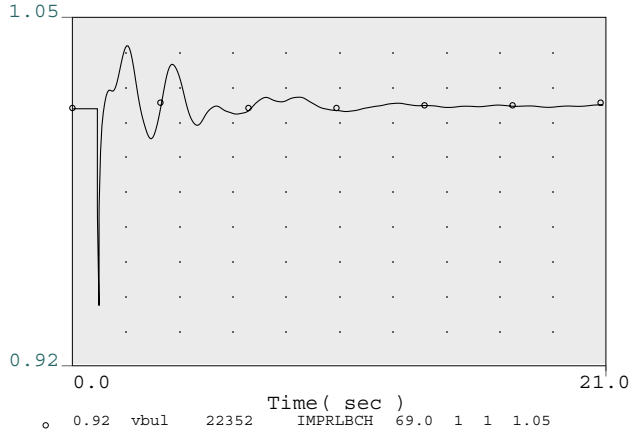


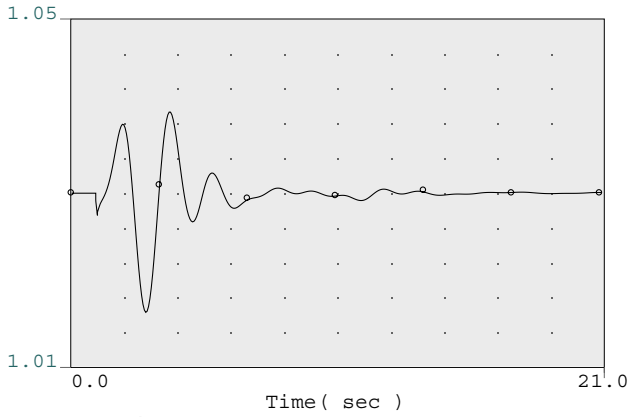




MMC ISIS, post-project

Fault bus at Hassayampa

Trip Hassayampa - N. Gila 500 kV Line

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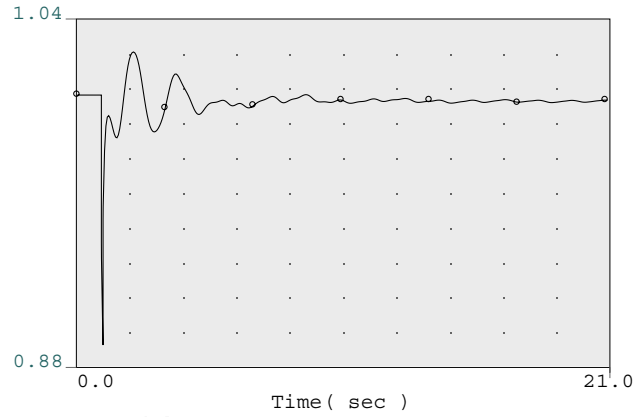


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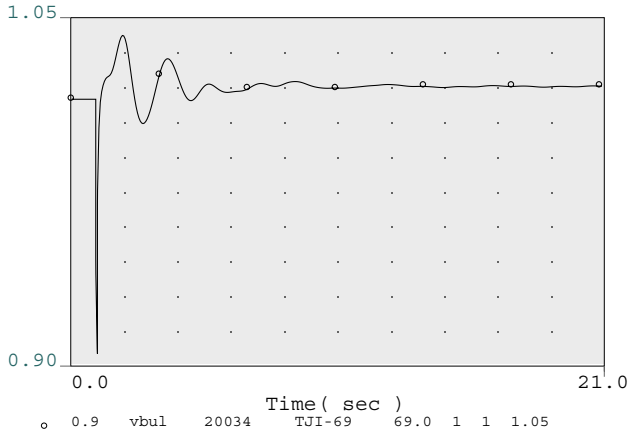


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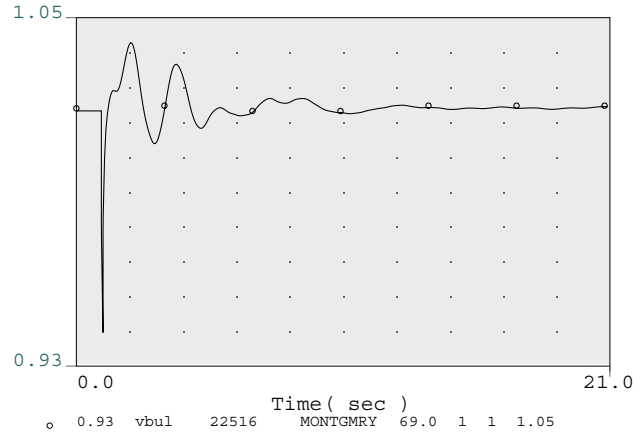


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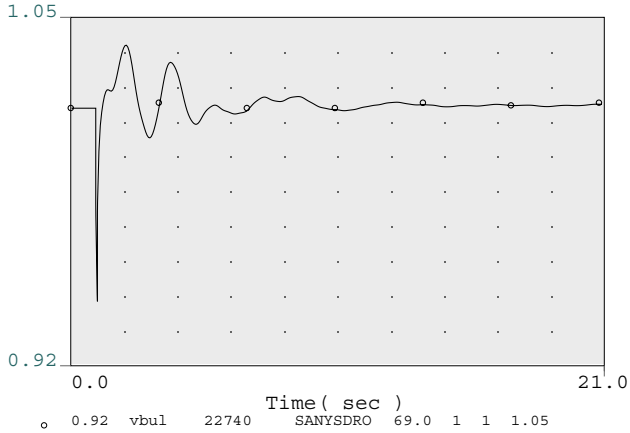


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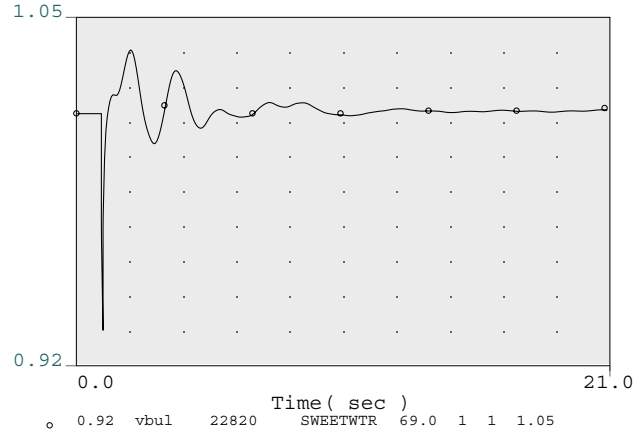


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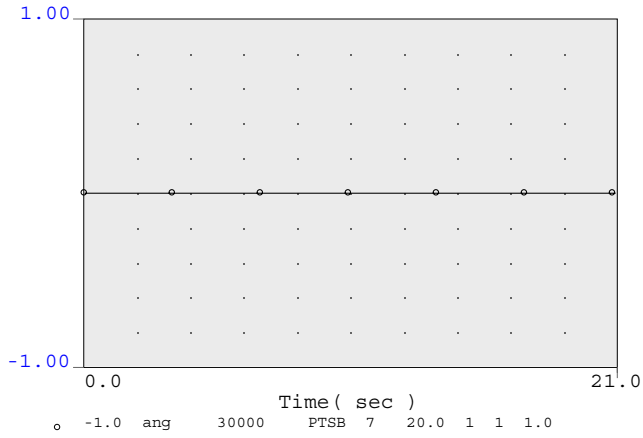
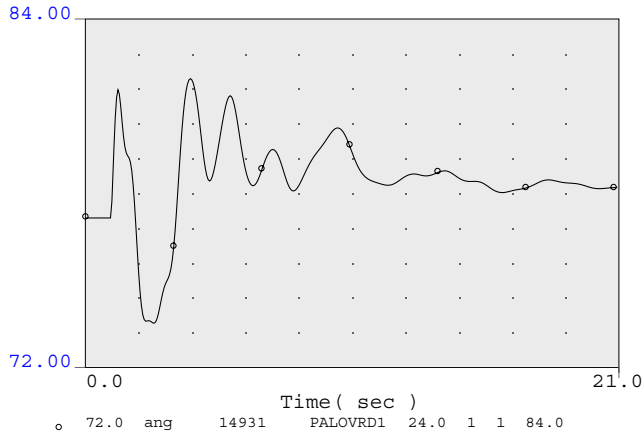
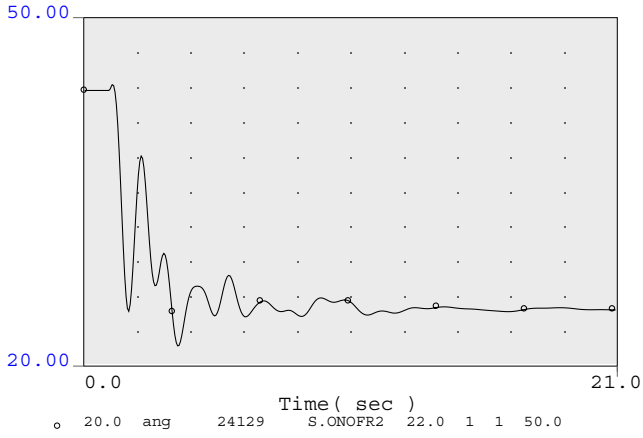
MMC ISIS, post-project
Fault bus at Hassayampa
Trip Hassayampa - N. Gila 500 kV Line

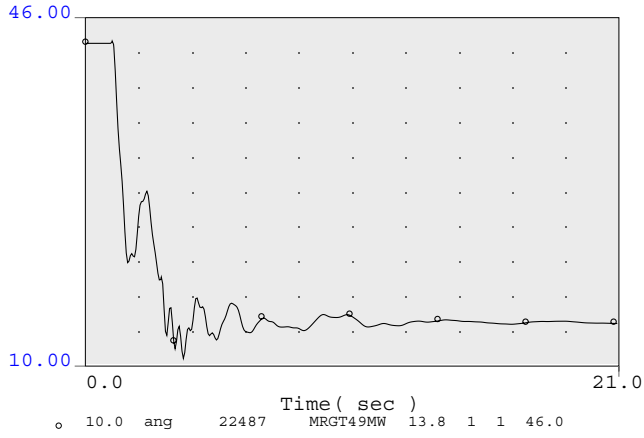
Imperial Valley-Miguel (Wind Farms) 500 kV SLO

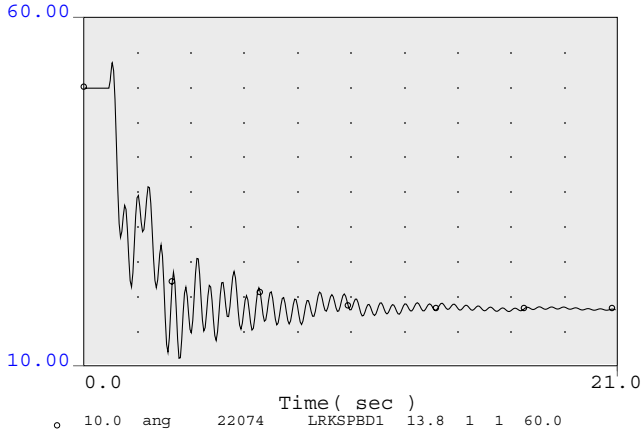
Pre- and Post-Project

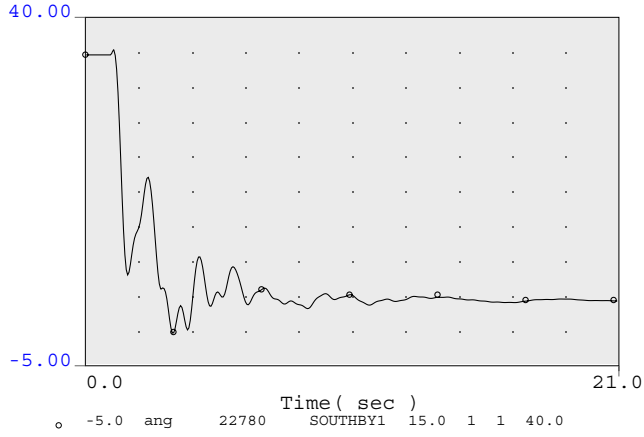


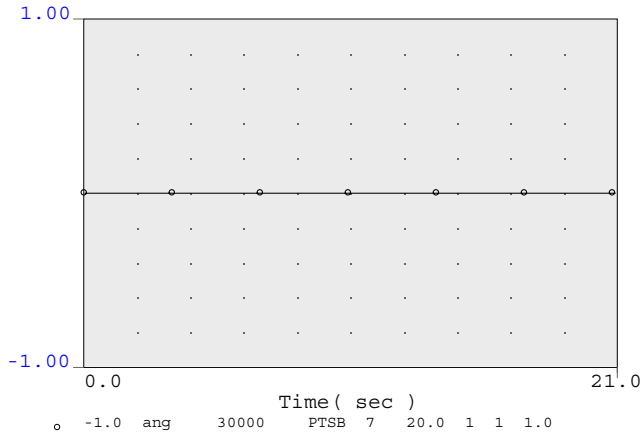



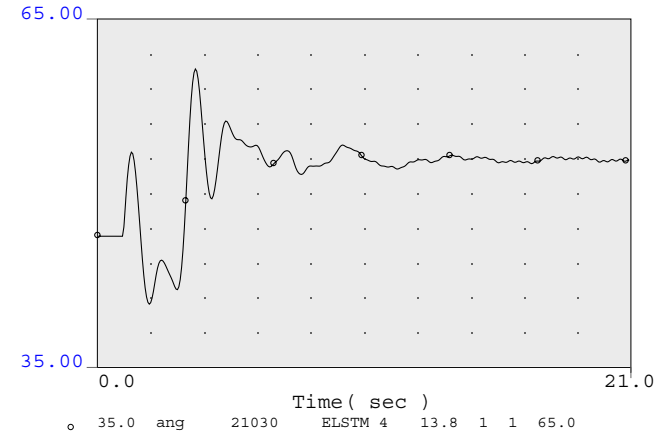



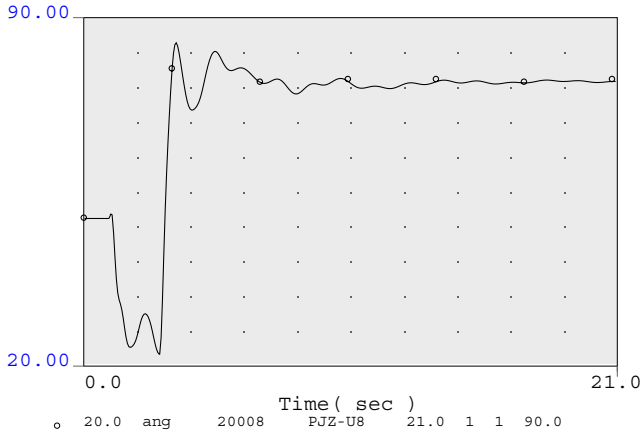



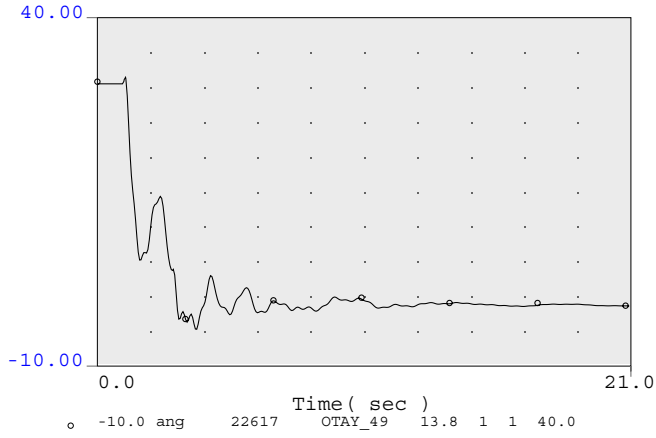



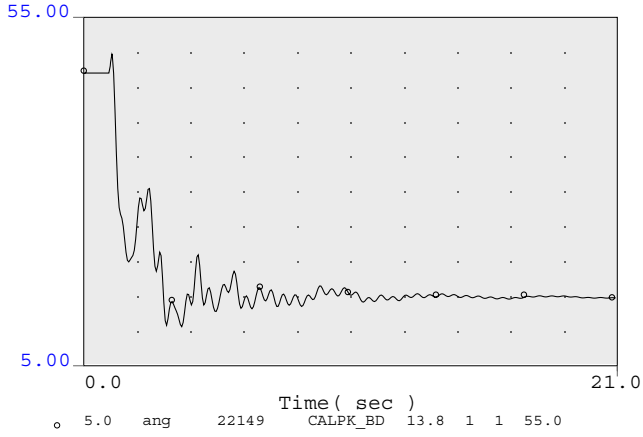

MMC ISIS, pre-project
Fault bus at Imperial Valley
IV-WNDFARMS 500kV SLO w/XTrip SPS TJI-MIGUEL
CFE exp approx 100 MW; IID w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW

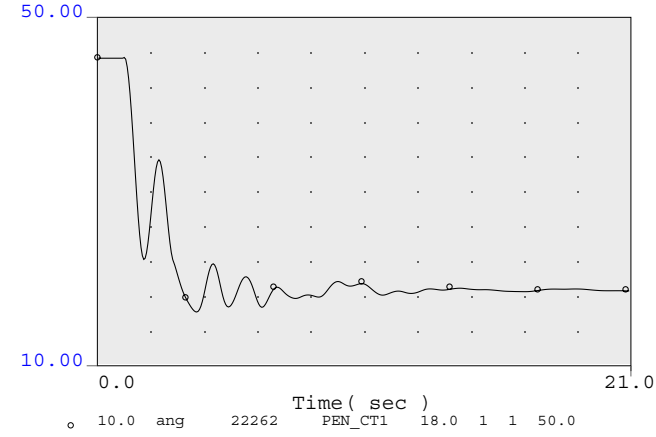
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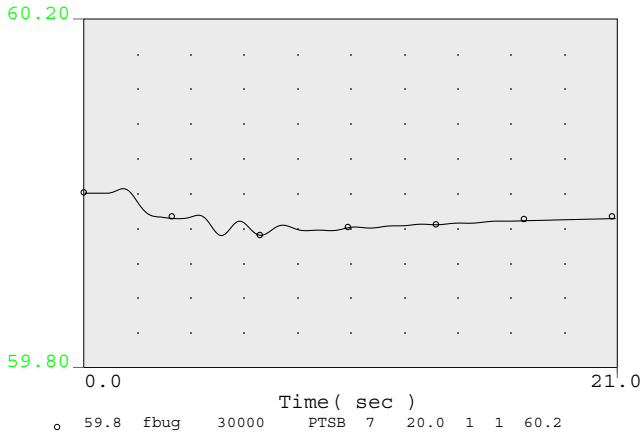


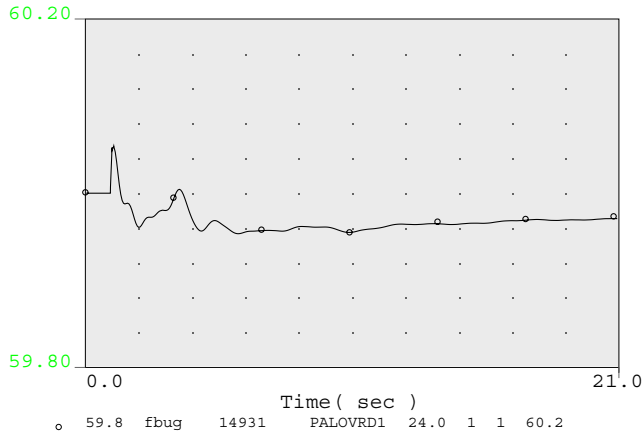


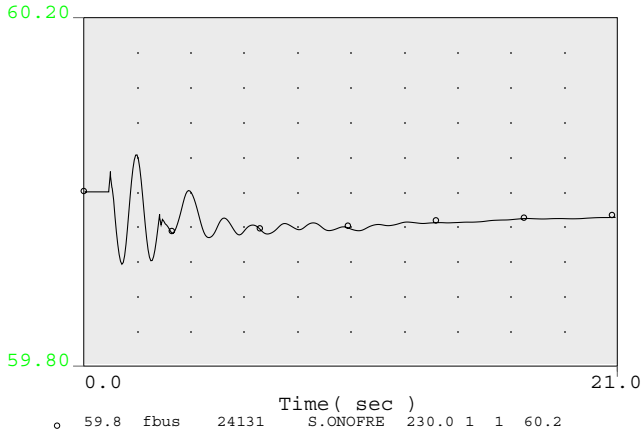


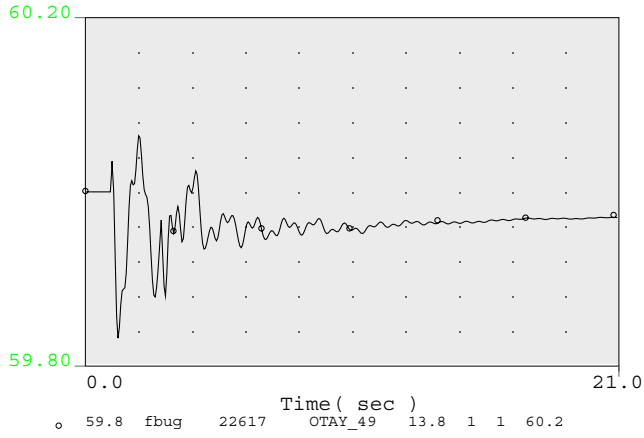


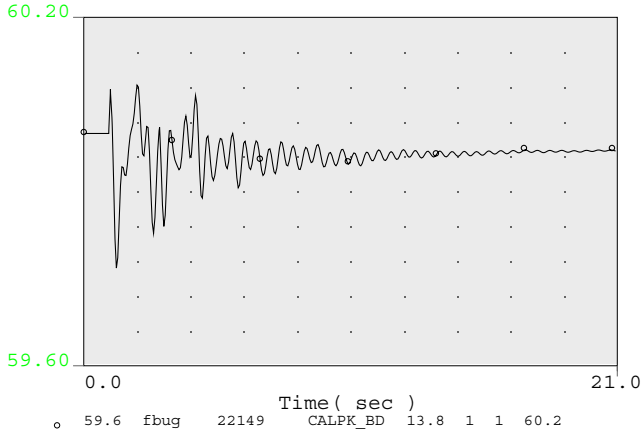


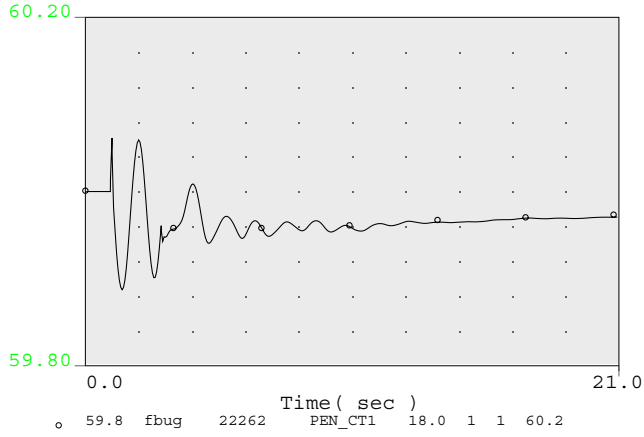


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Fault bus at Imperial Valley
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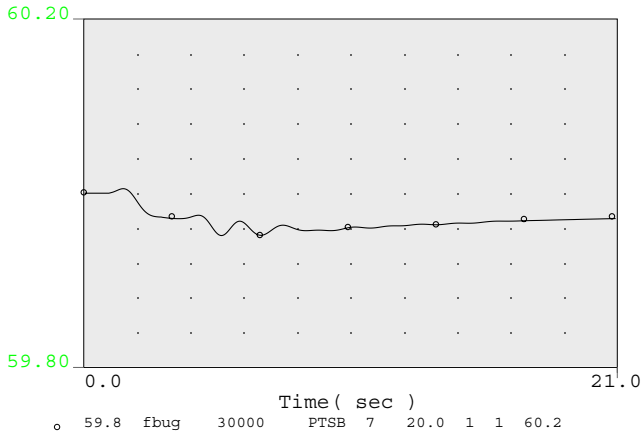


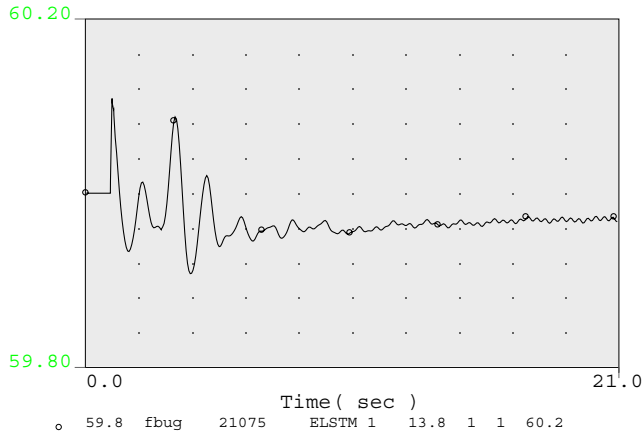


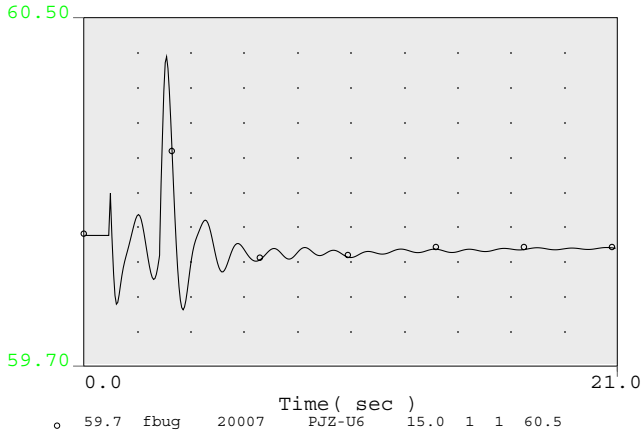


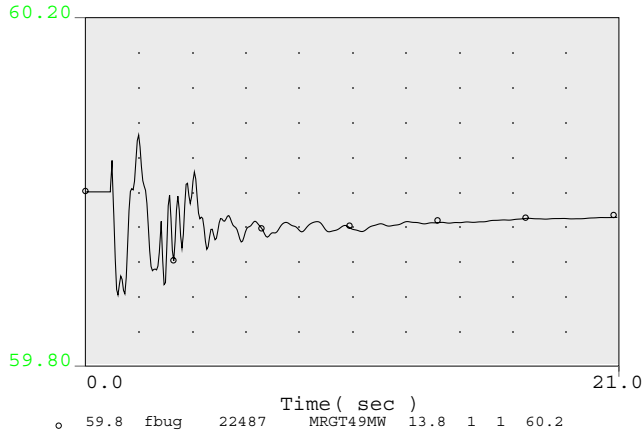


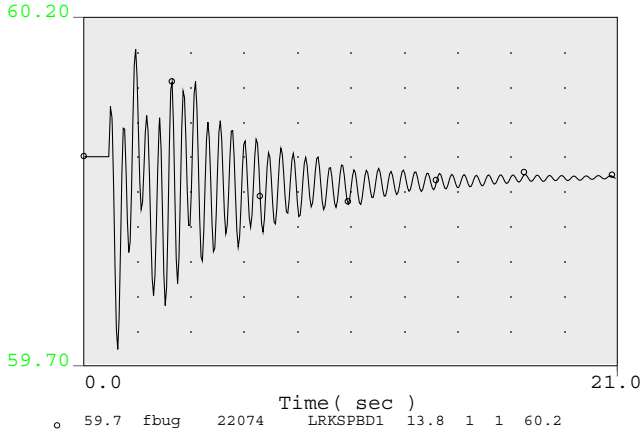


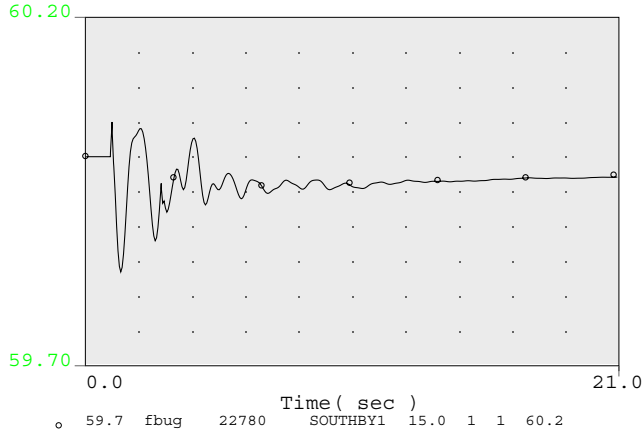


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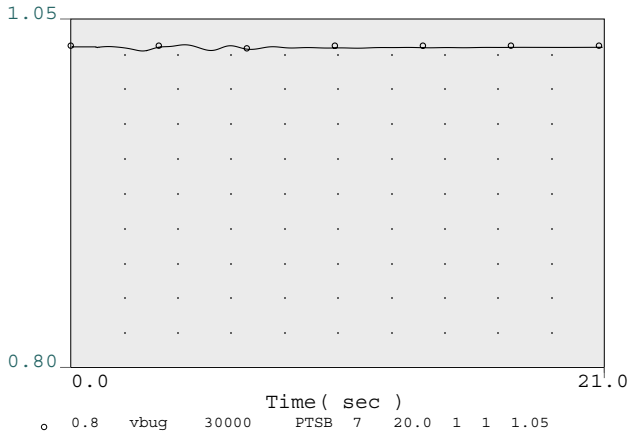


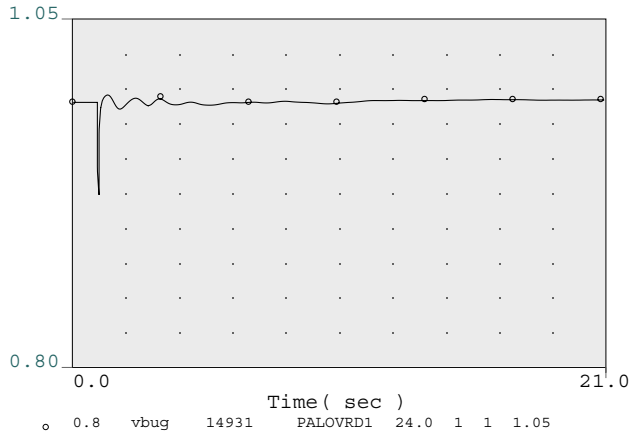


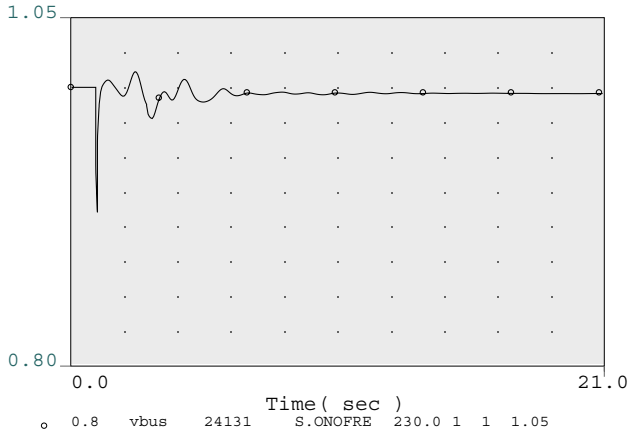


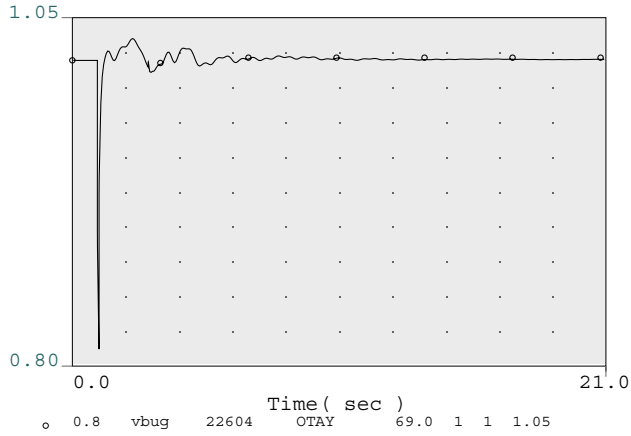


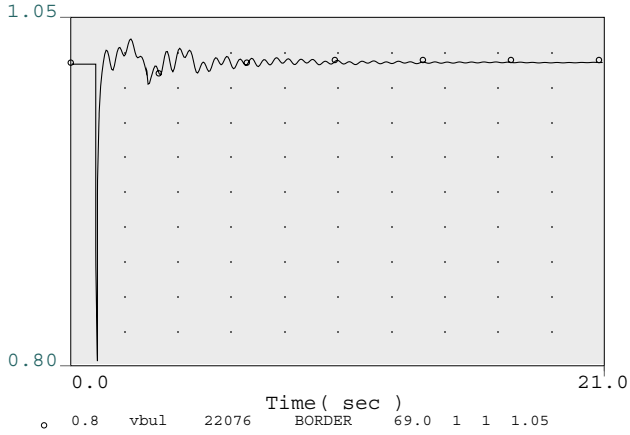


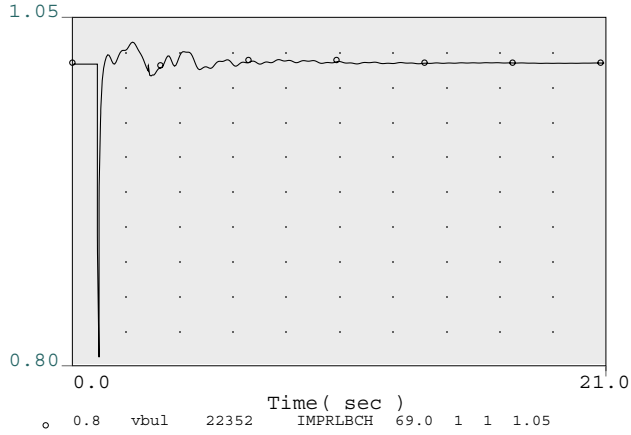


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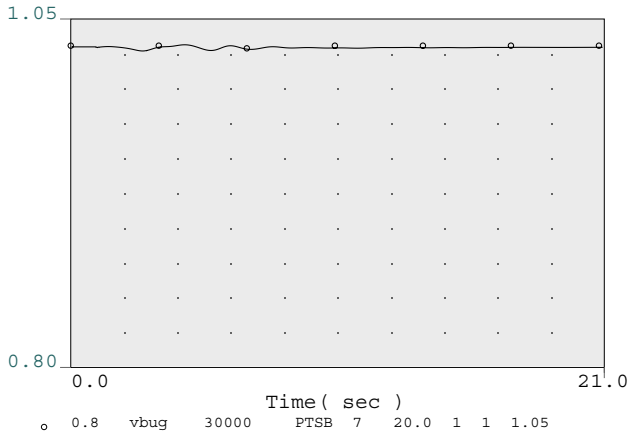


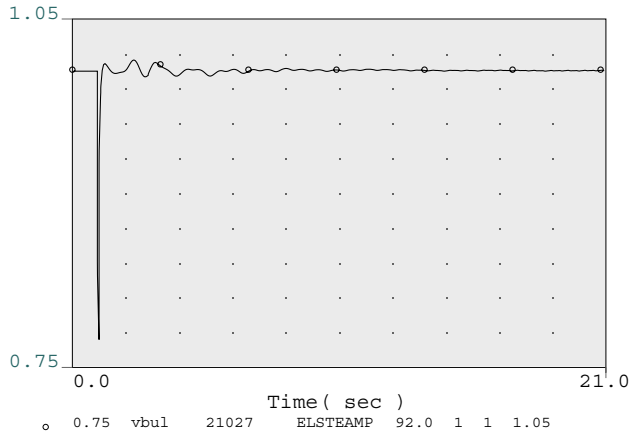


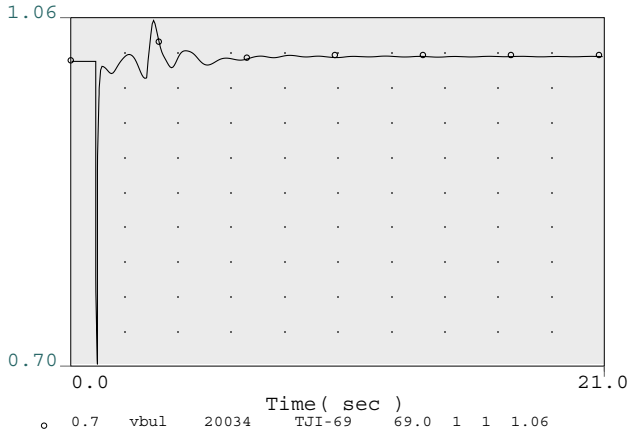


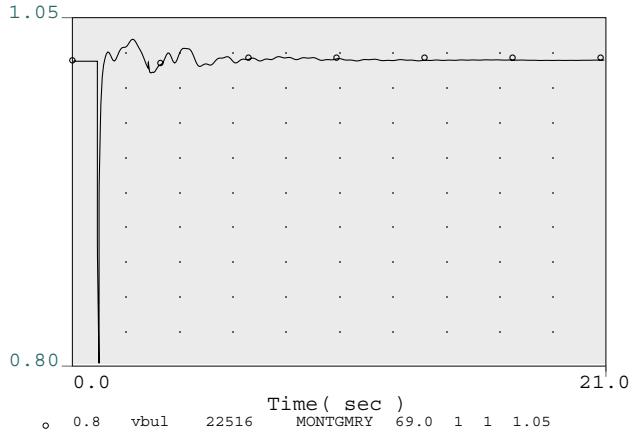


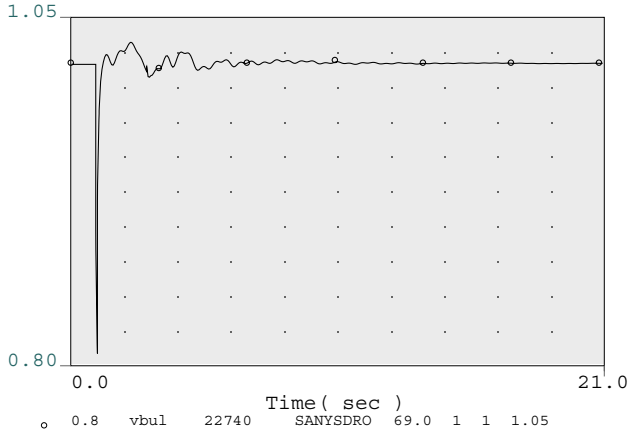


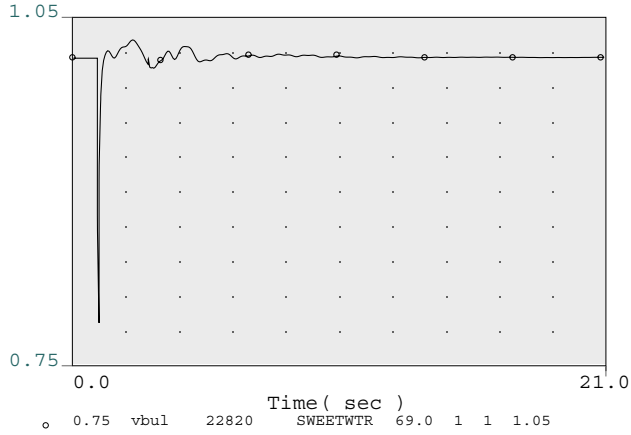


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Fault bus at Imperial Valley
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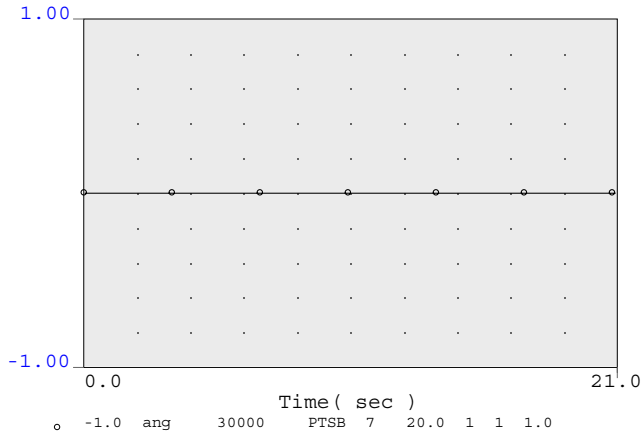


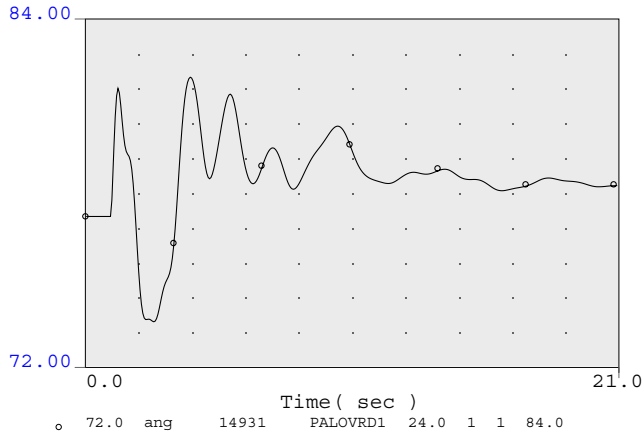


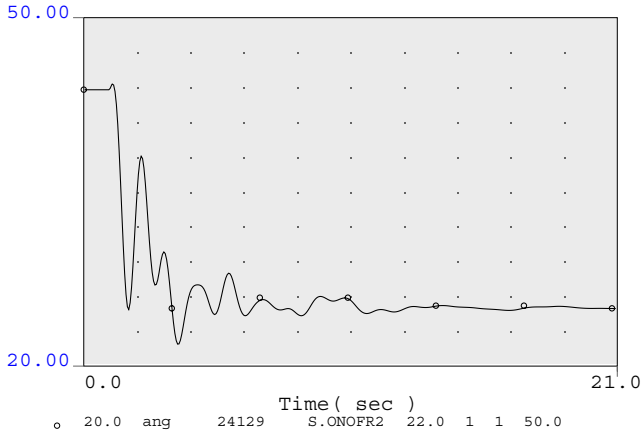


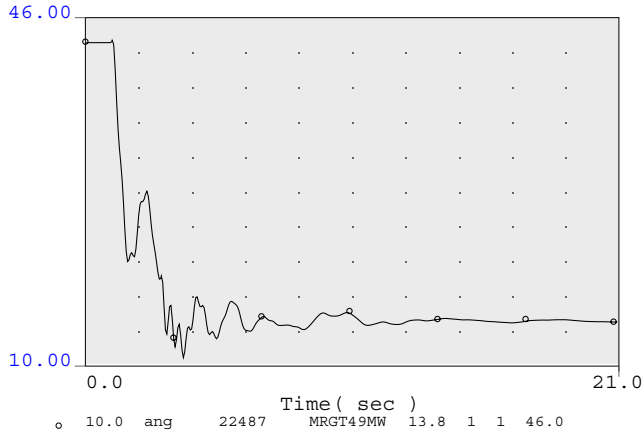


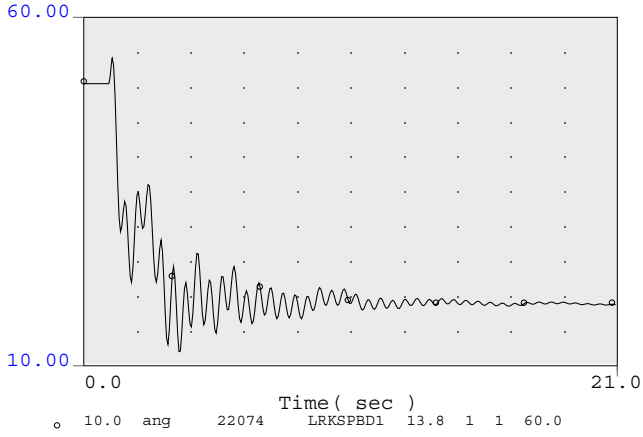


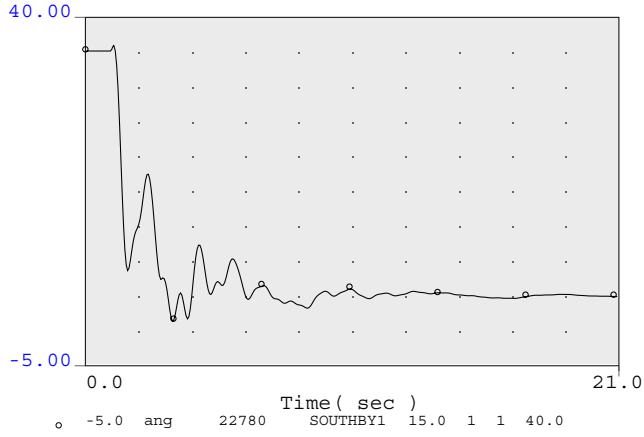


MMC ISIS, post-project
Fault bus at Inmperial Valley
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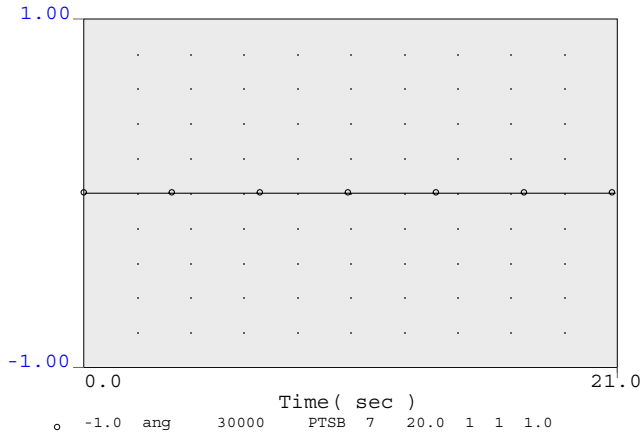


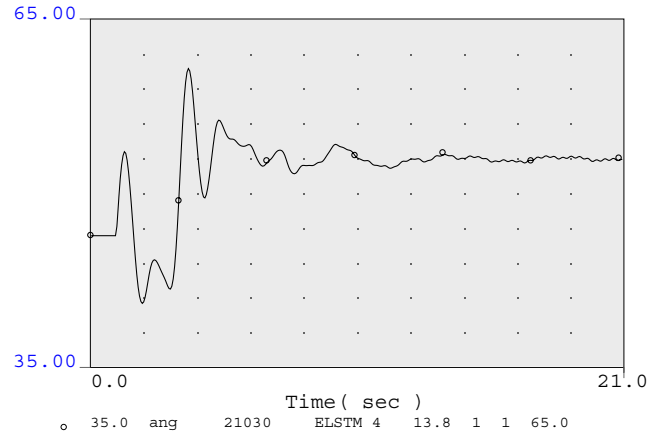


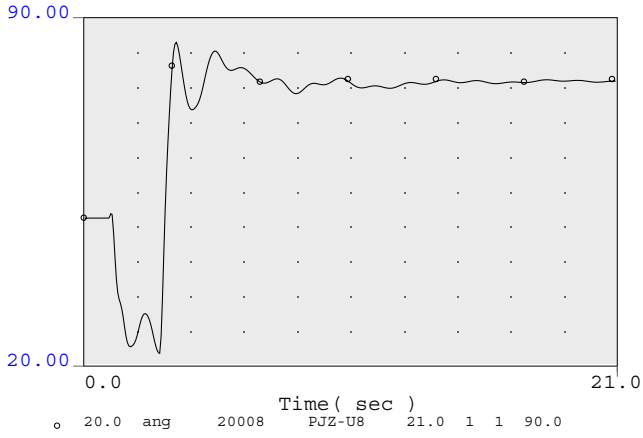


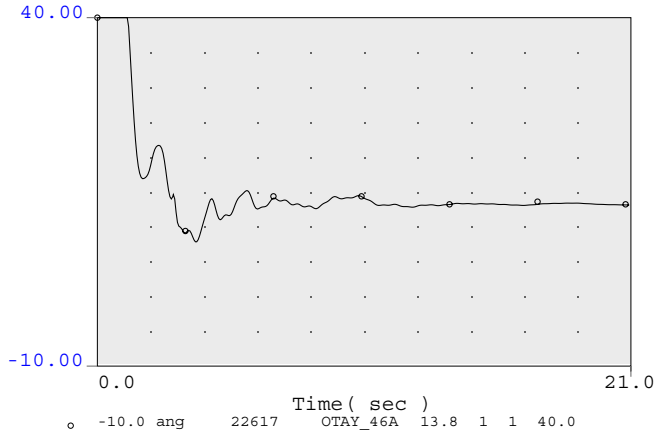


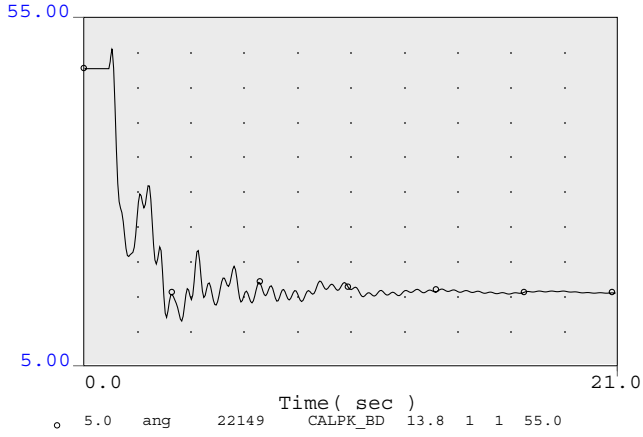


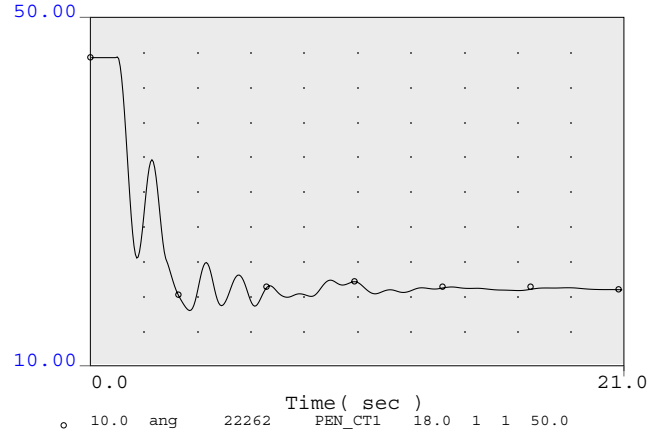


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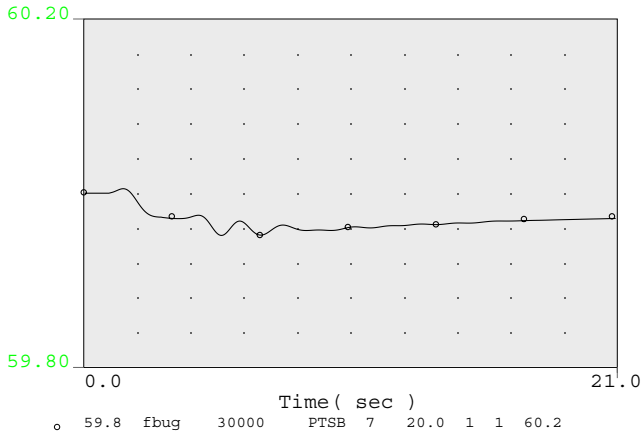
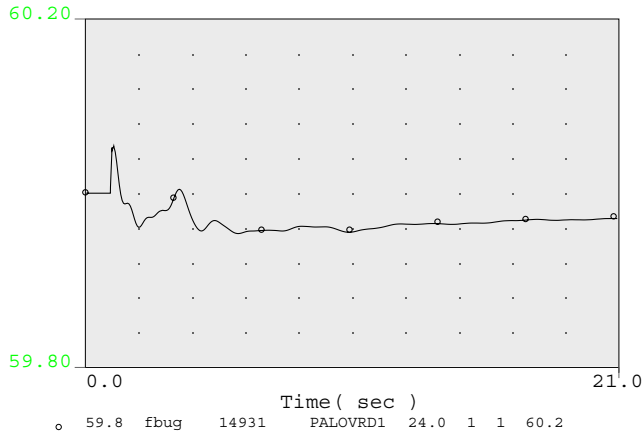
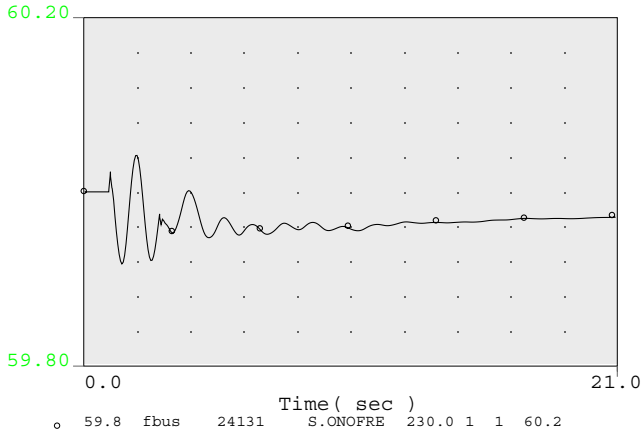
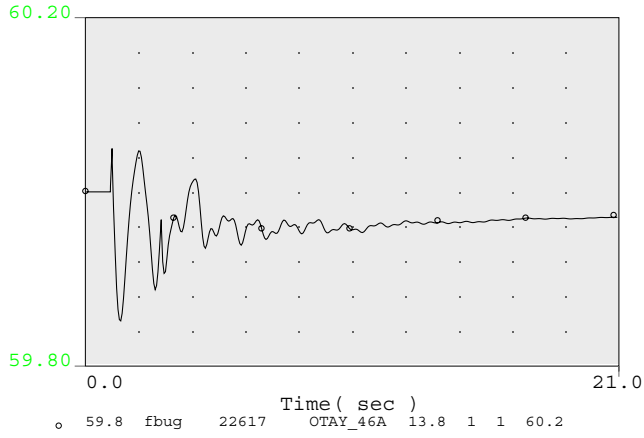
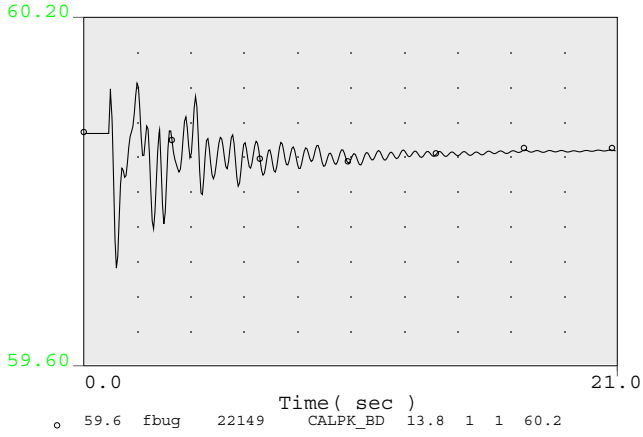
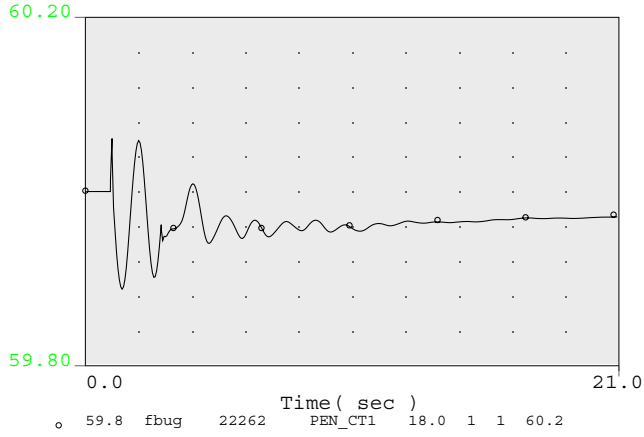


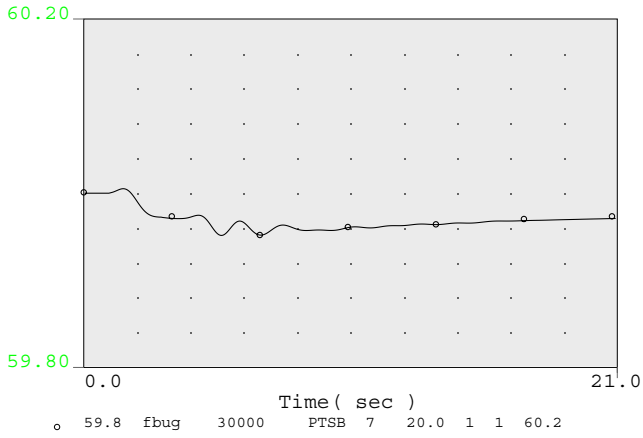



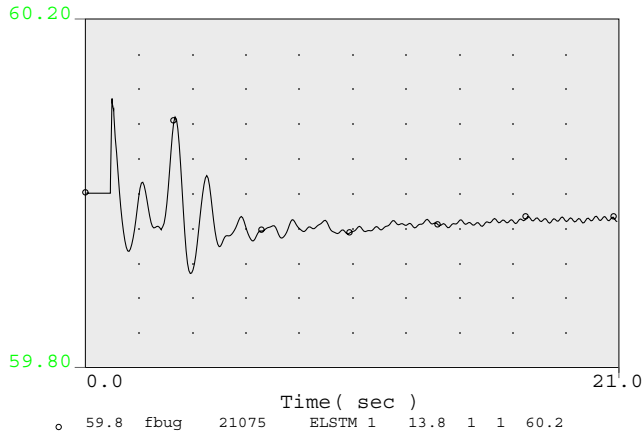



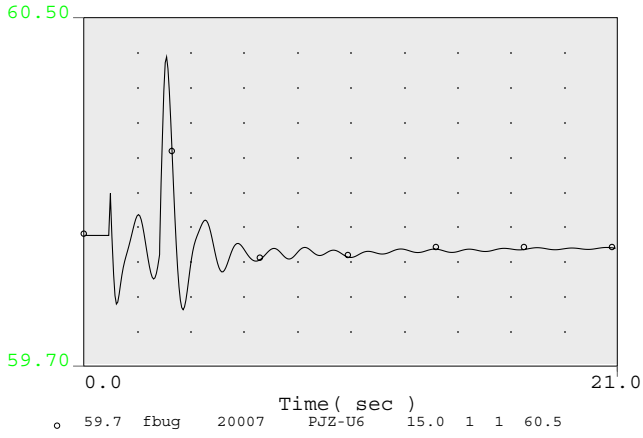



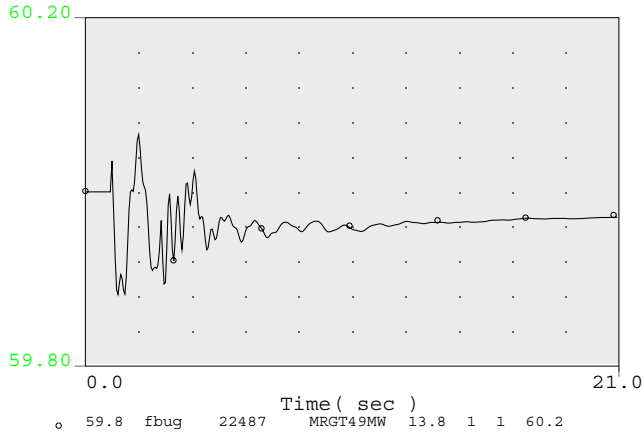



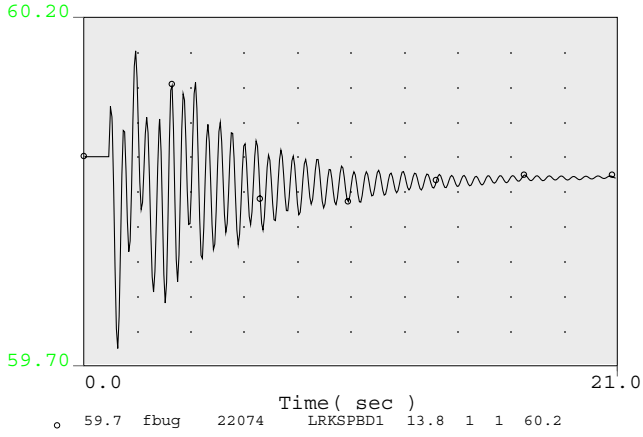

MMC ISIS, post-project
Fault bus at Inmperial Valley
IV-WNDFARMS 500kV SLO w/XTrip SPS TJI-MIGUEL
CFE exp approx 100 MW; IID w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW

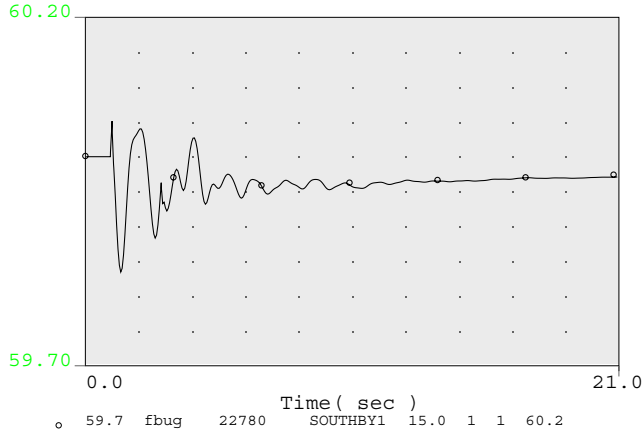


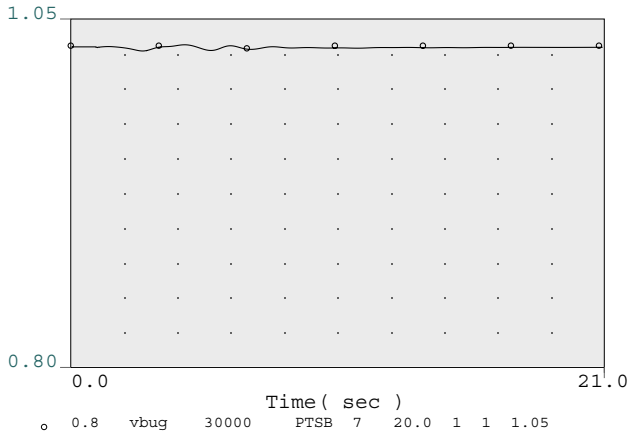



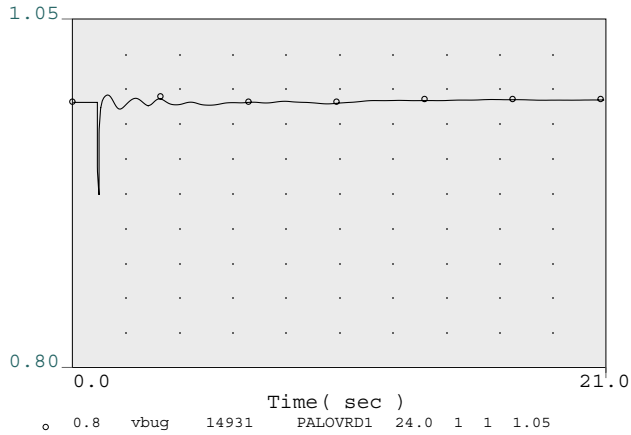



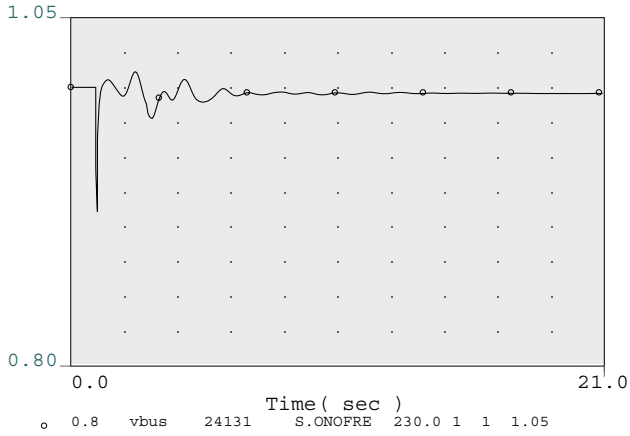



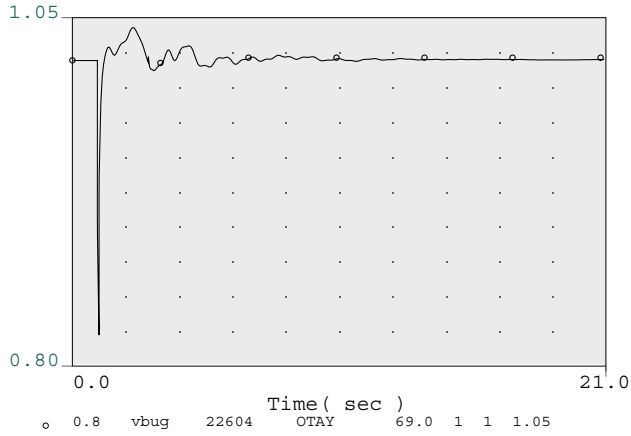



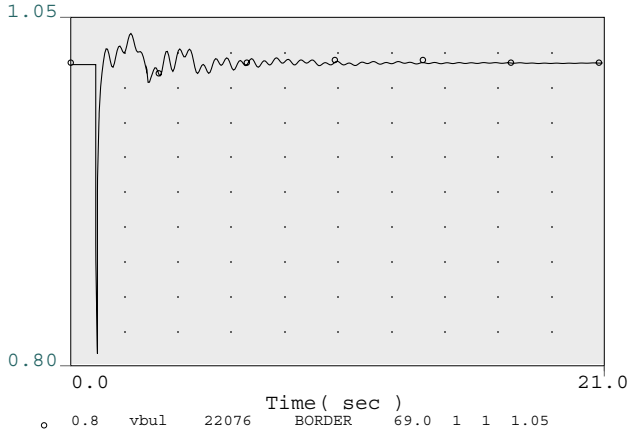

MMC ISIS, post-project
Fault bus at Inmperial Valley
IV-WNDFARMS 500kV SLO w/XTrip SPS TJI-MIGUEL
CFE exp approx 100 MW; IID w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW

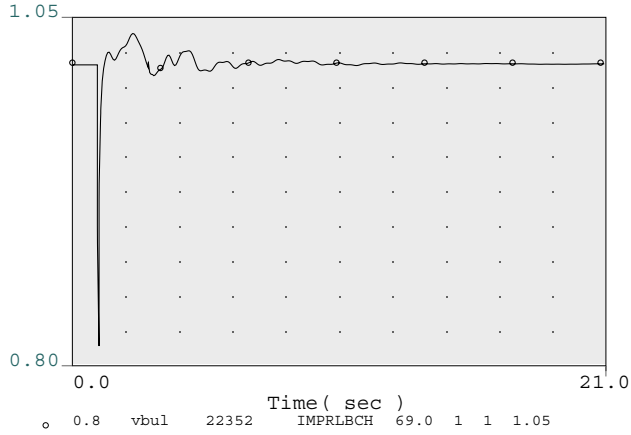


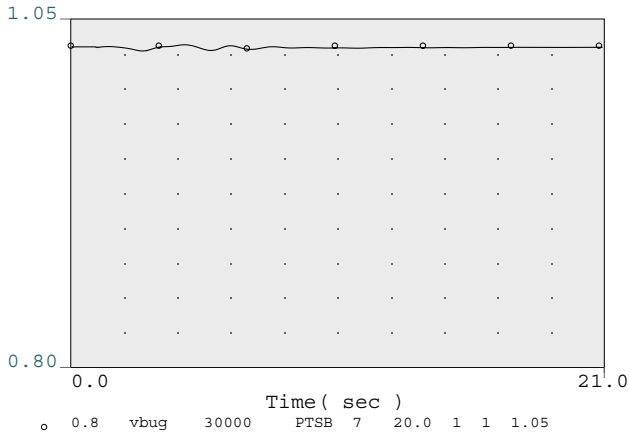



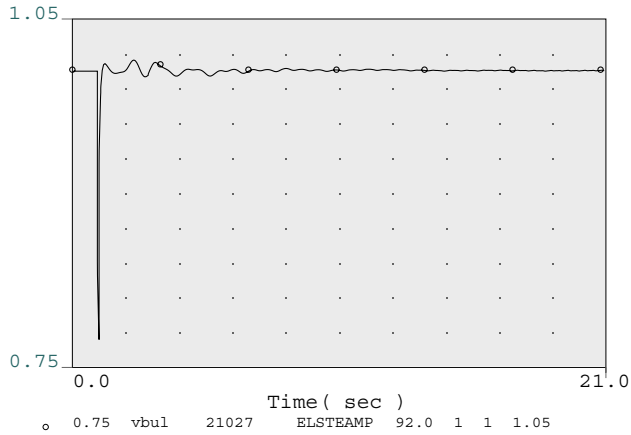



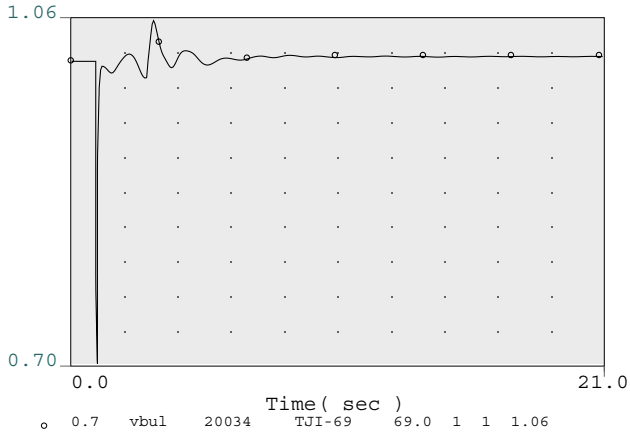



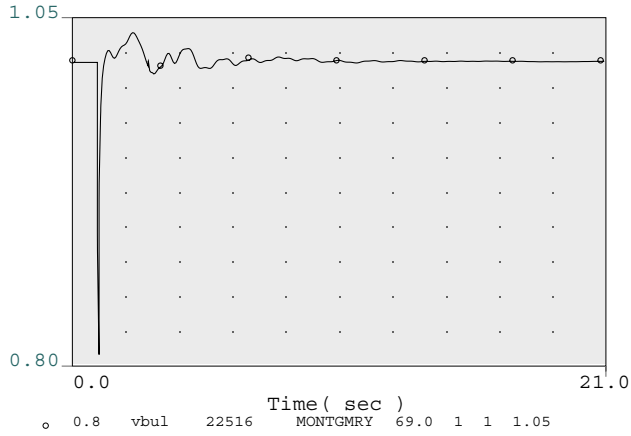



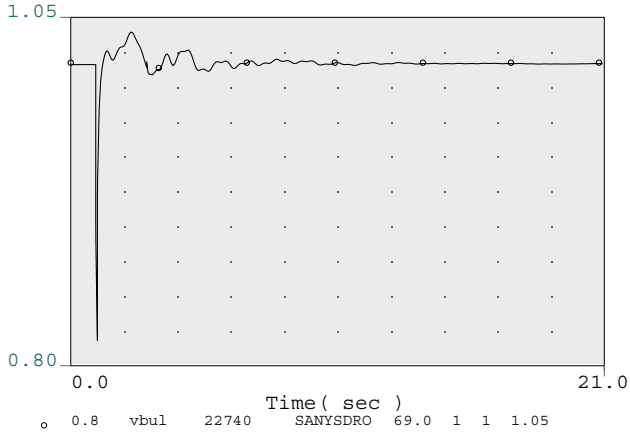

MMC ISIS, post-project
Fault bus at Inmperial Valley
IV-WNDFARMS 500kV SLO w/XTrip SPS TJI-MIGUEL
CFE exp approx 100 MW; IID w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW

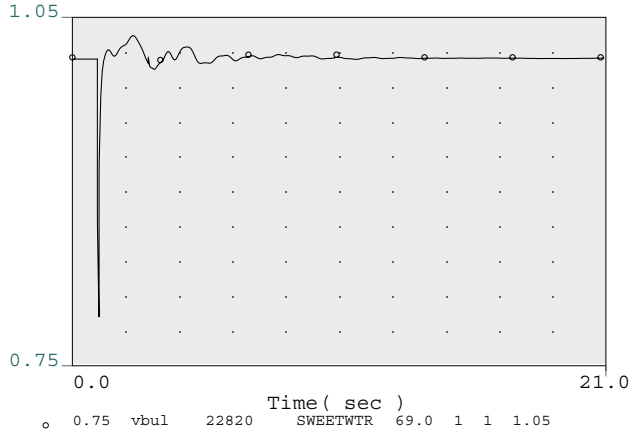


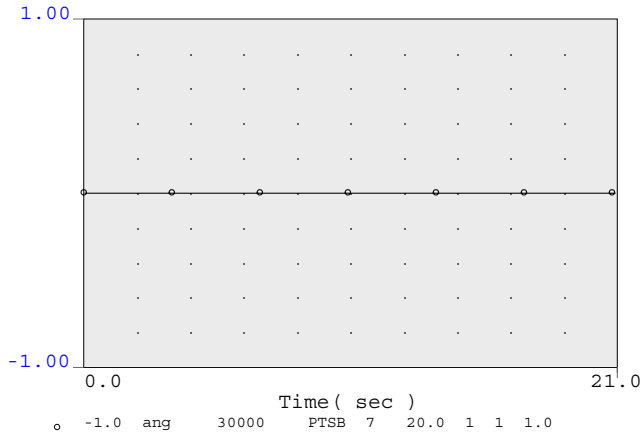



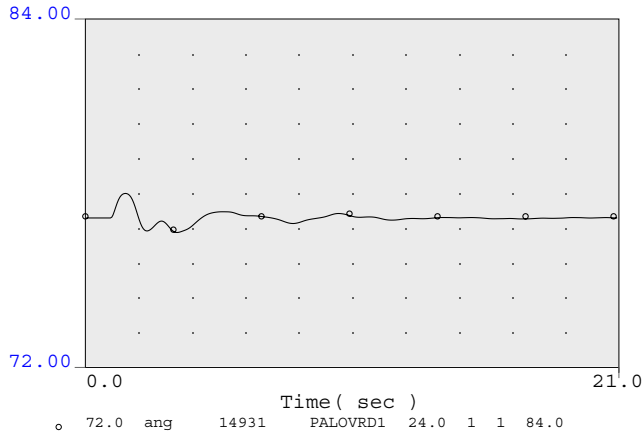



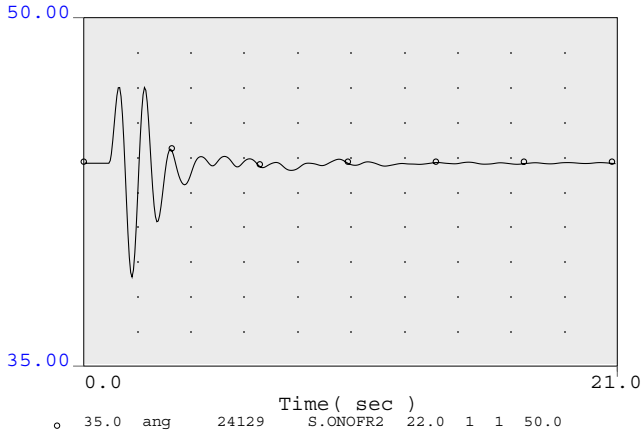

MMC ISIS, post-project
Fault bus at Inmperial Valley
IV-WNDFARMS 500kV SLO w/XTrip SPS TJI-MIGUEL
CFE exp approx 100 MW; IID w/o PST, exp 100 MW
IVGens: dispatch approx 765 MW

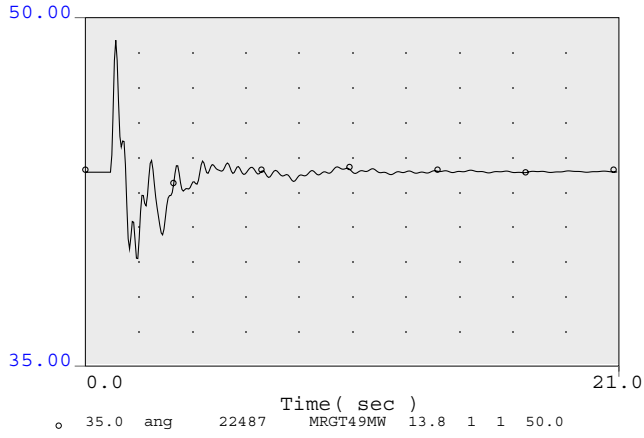
TL623 (Imperial Beach-Otay-San Ysidro) 69 kV SLO

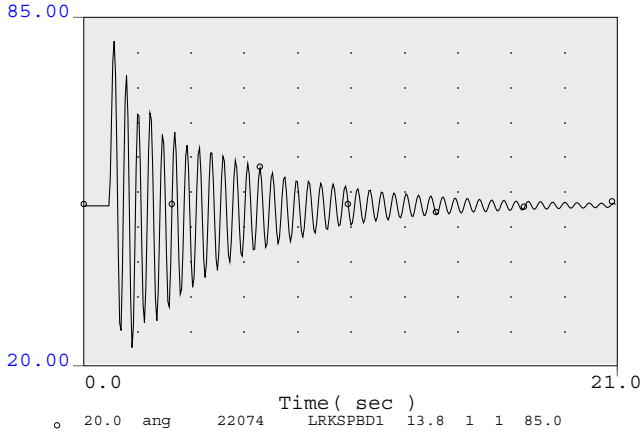
Pre- and Post-Project

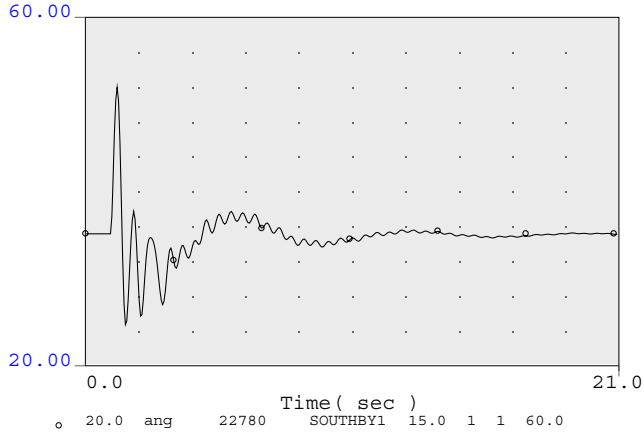



MMC ISIS, pre-project

Fault bus at OTAY 69

Trip Otay-Imp Beach-San Ysidro 69 kV line



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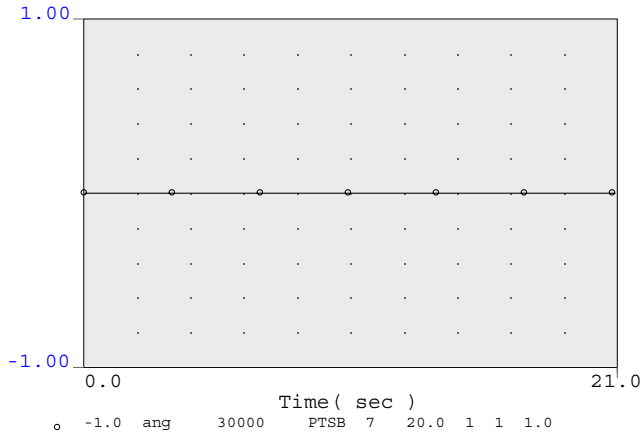
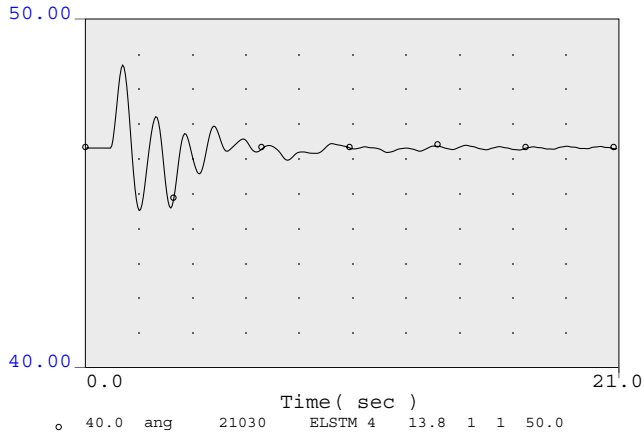
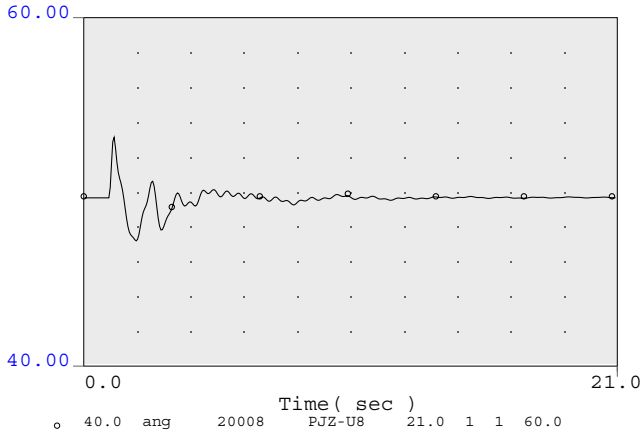
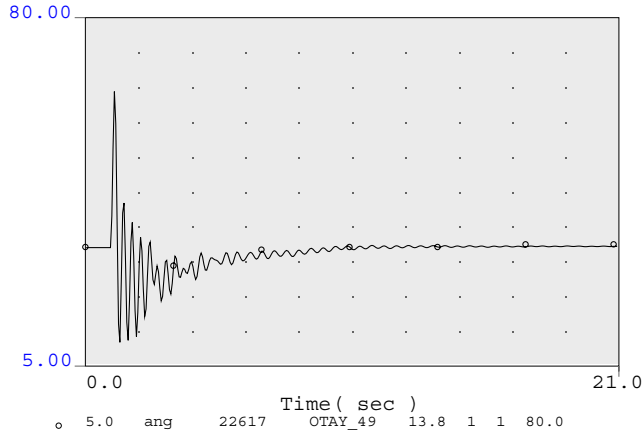
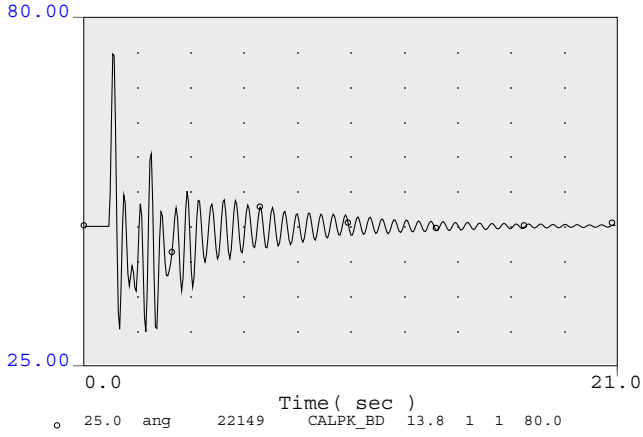
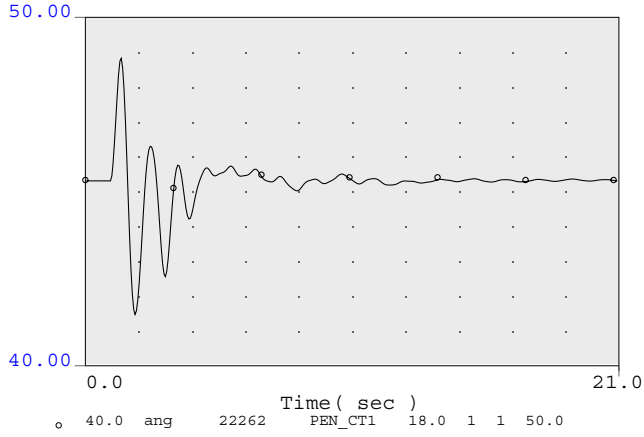


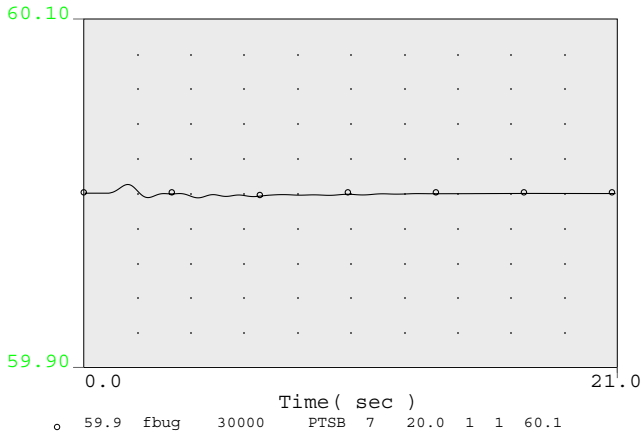



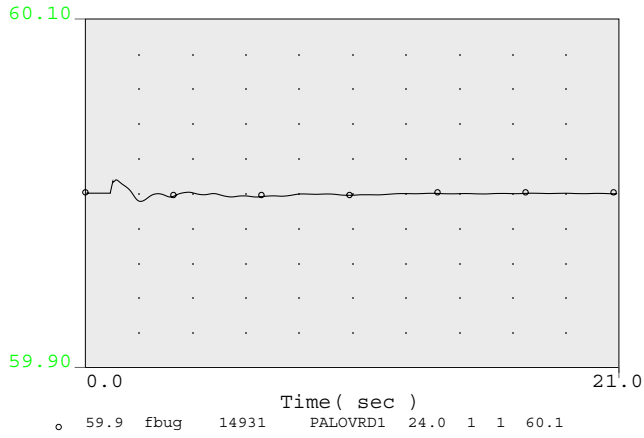



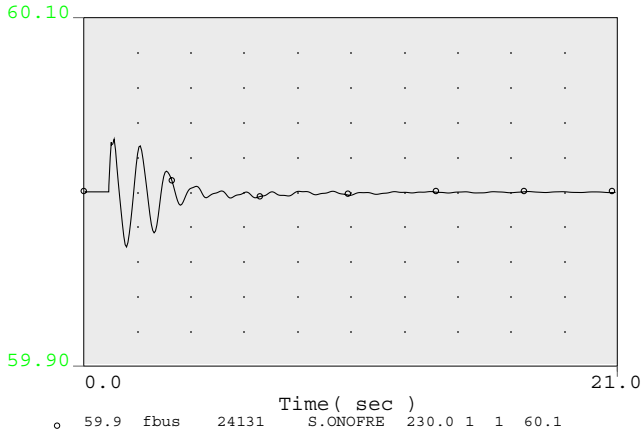

MMC ISIS, pre-project

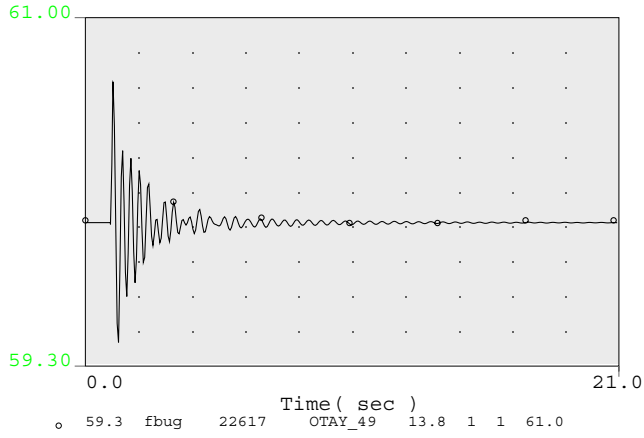
Fault bus at OTAY 69

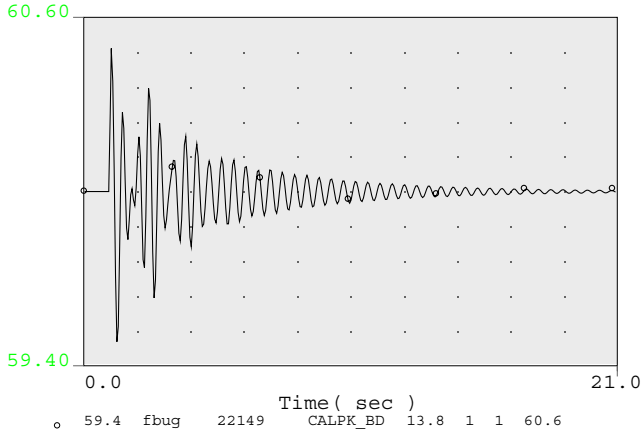
Trip Otay-Imp Beach-San Ysidro 69 kV line

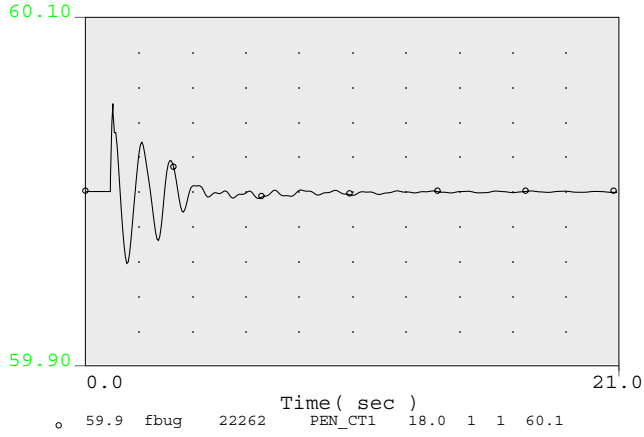


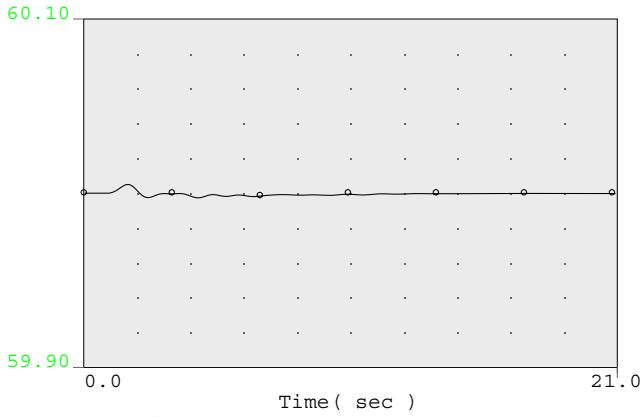



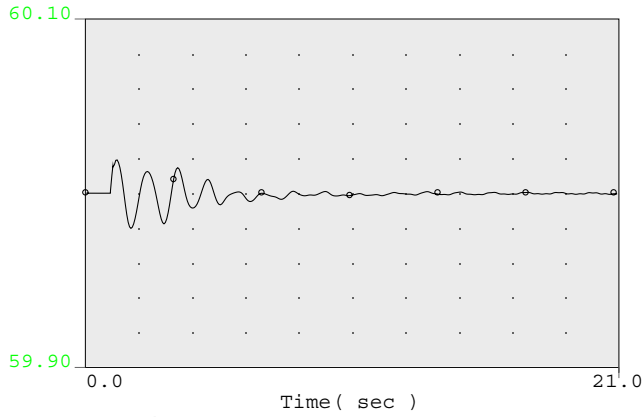

MMC ISIS, pre-project

Fault bus at OTAY 69

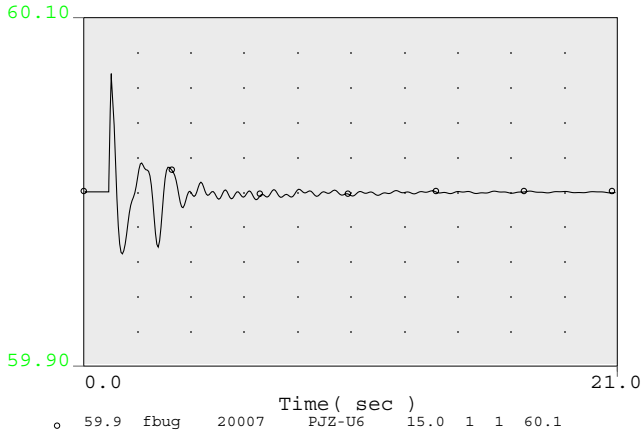
Trip Otay-Imp Beach-San Ysidro 69 kV line




59.9 fbug 30000 PTSB 7 20.0 1 1 60.1




59.9 fbug 21075 ELSTM 1 13.8 1 1 60.1

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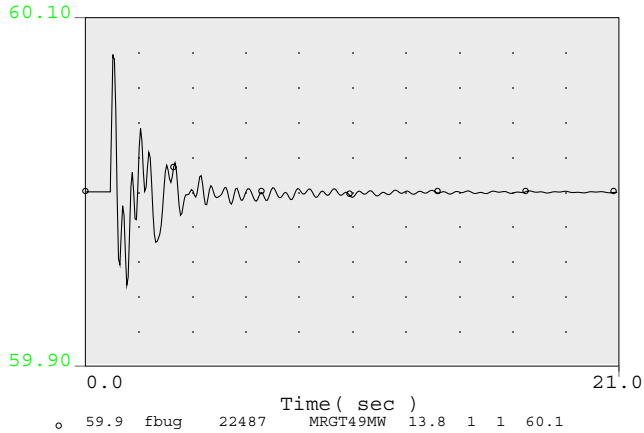


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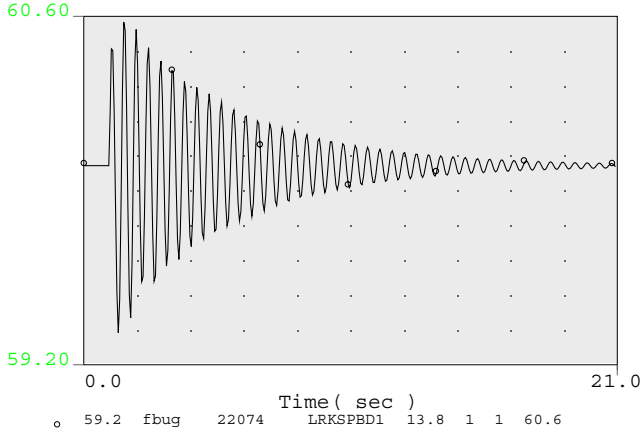
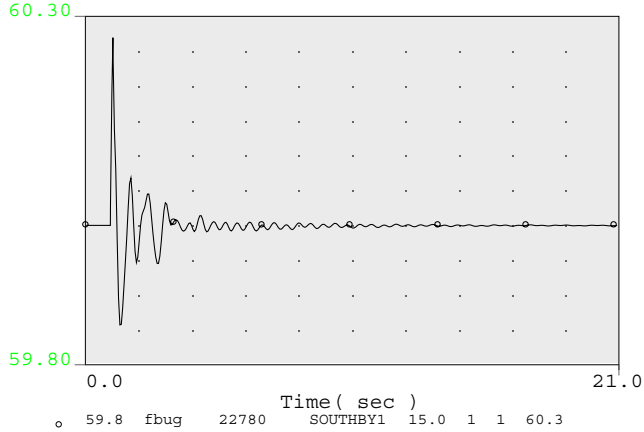



59.2 fbug 22074 LRKSPBD1 13.8 1 1 60.6

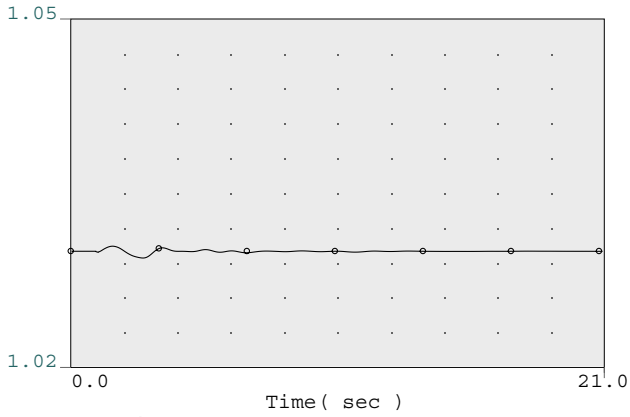



59.8 fbug 22780 SOUTHBY1 15.0 1 1 60.3

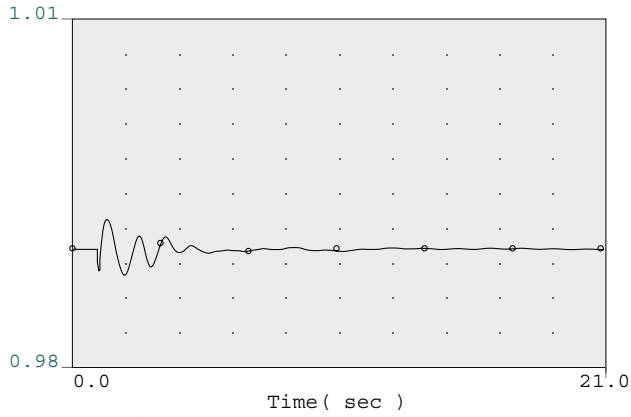
MMC ISIS, pre-project

Fault bus at OTAY 69

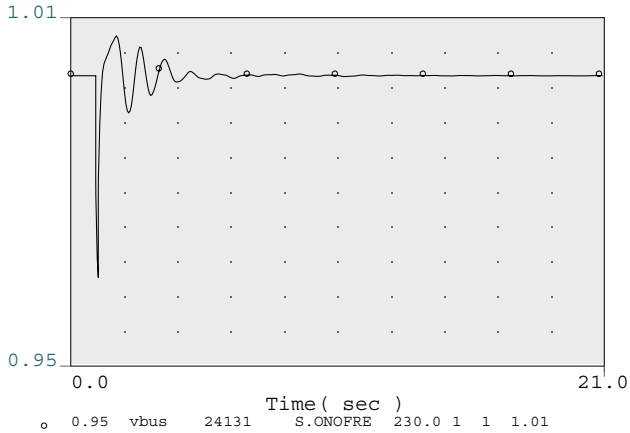
Trip Otay-Imp Beach-San Ysidro 69 kV line



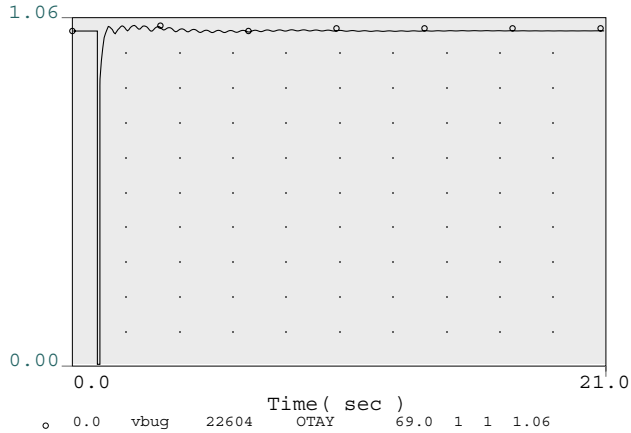

o 1.02 vbug 30000 PTSB 7 20.0 1 1 1.05



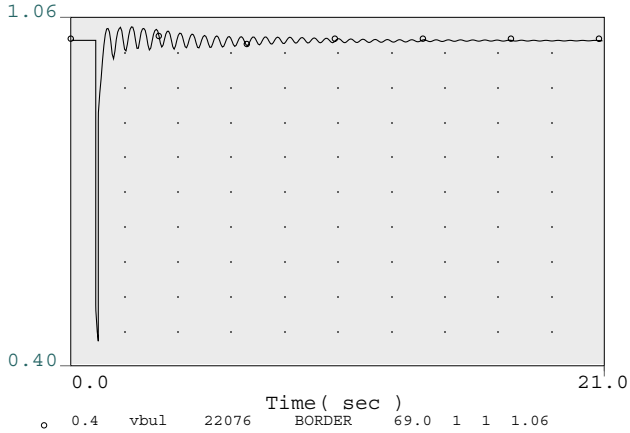

o 0.98 vbug 14931 PALOVRD1 24.0 1 1 1.01



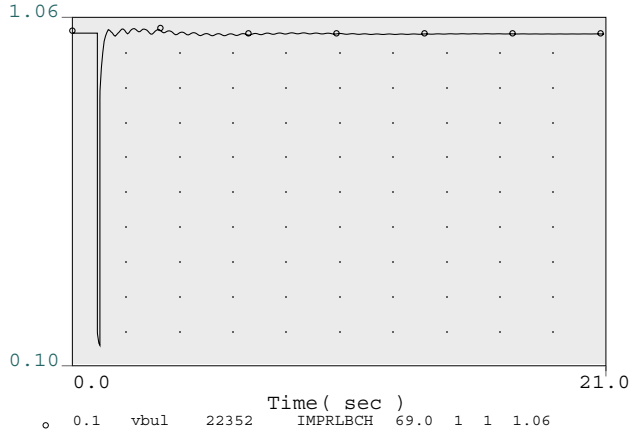

o 0.95 vbus 24131 S.ONOFRE 230.0 1 1 1.01




o 0.0 vbug 22604 OTAY 69.0 1 1 1.06




o 0.4 vbul 22076 BORDER 69.0 1 1 1.06

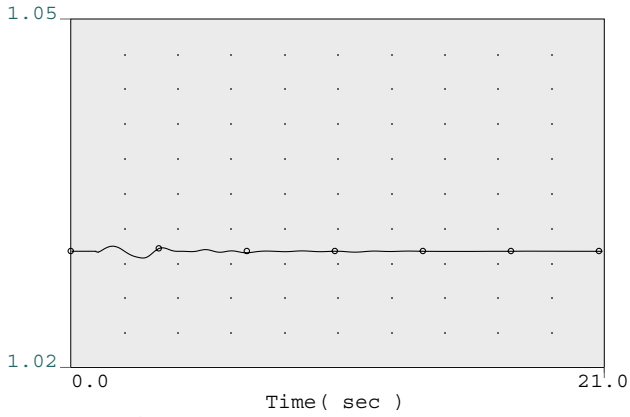



o 0.1 vbul 22352 IMPRLBCH 69.0 1 1 1.06

MMC ISIS, pre-project

Fault bus at OTAY 69

Trip Otay-Imp Beach-San Ysidro 69 kV line

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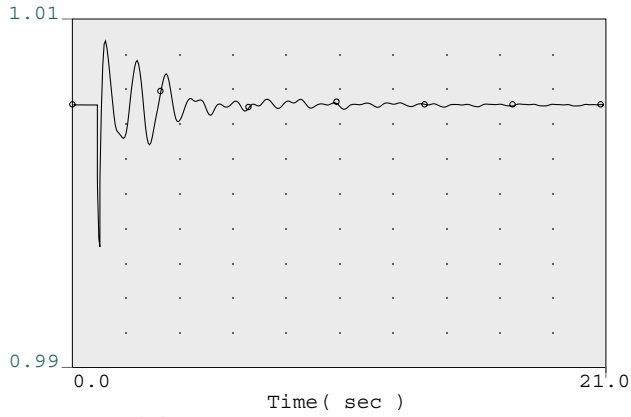
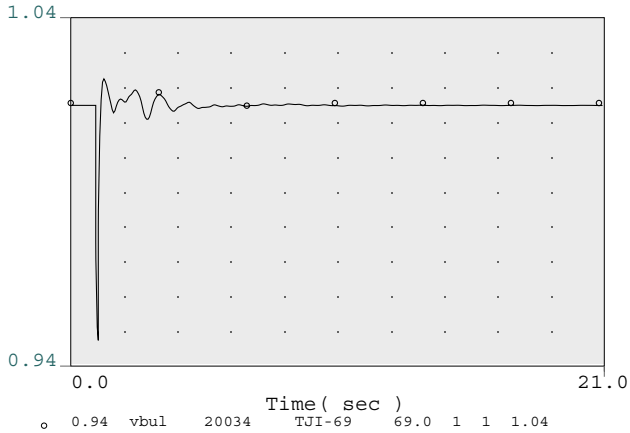
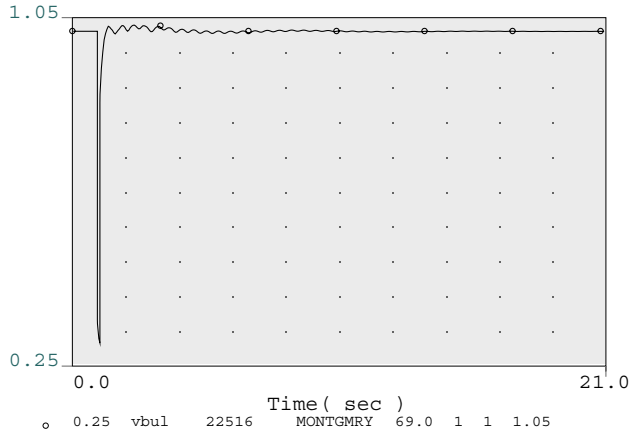


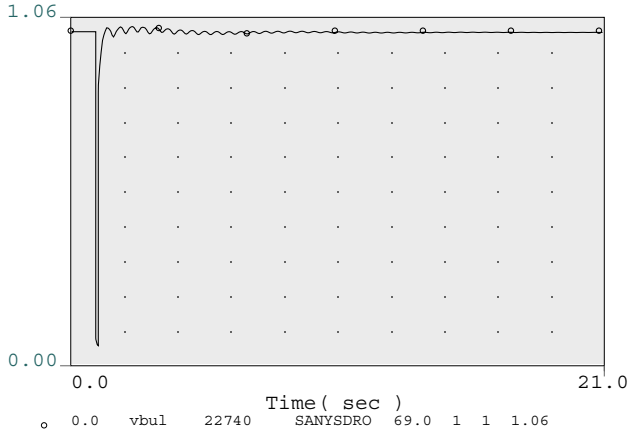

0.99 vbul 21027 ELSTEAMP 92.0 1 1 1.01




0.94 vbul 20034 TJI-69 69.0 1 1 1.04




0.25 vbul 22516 MONTGMRY 69.0 1 1 1.05

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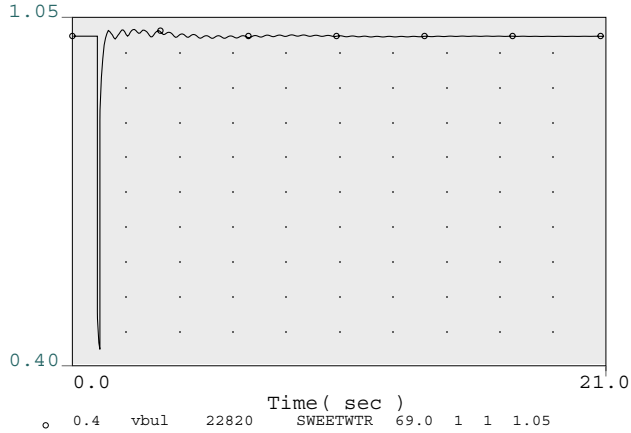


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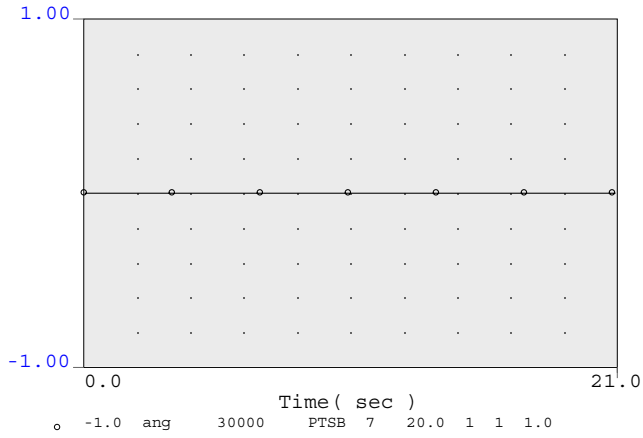
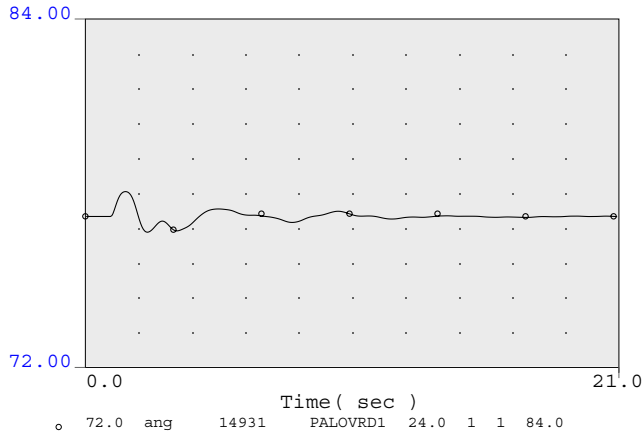
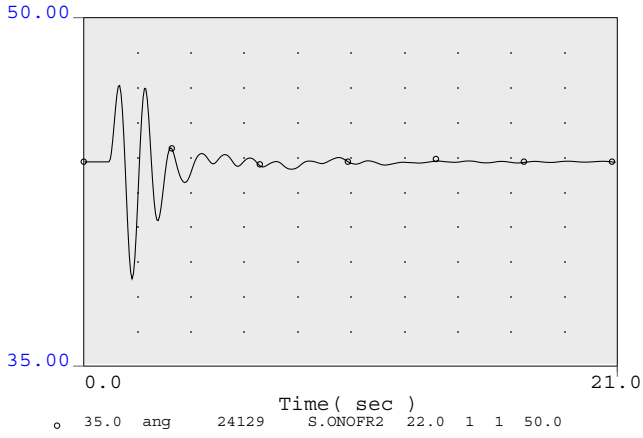
MMC ISIS, pre-project

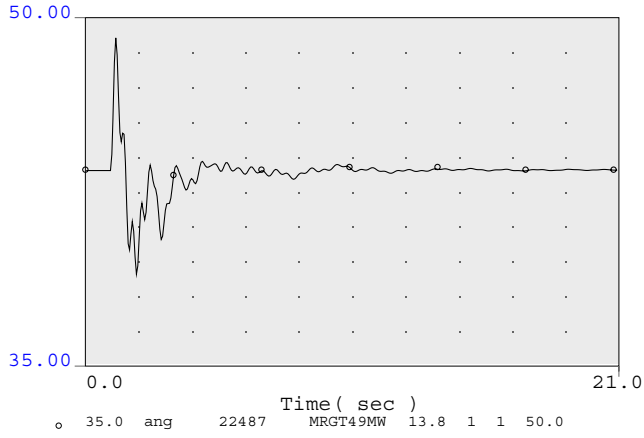
Fault bus at OTAY 69

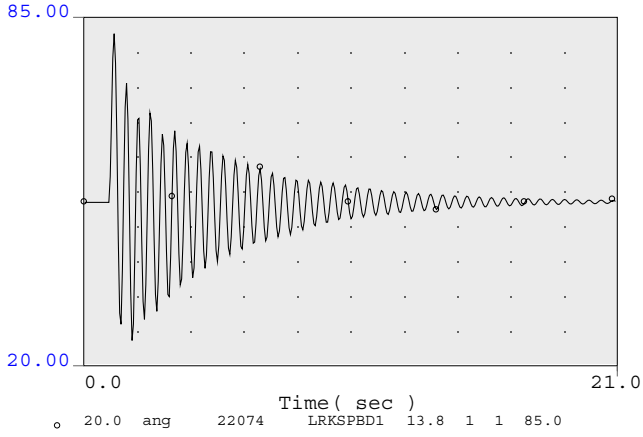
Trip Otay-Imp Beach-San Ysidro 69 kV line

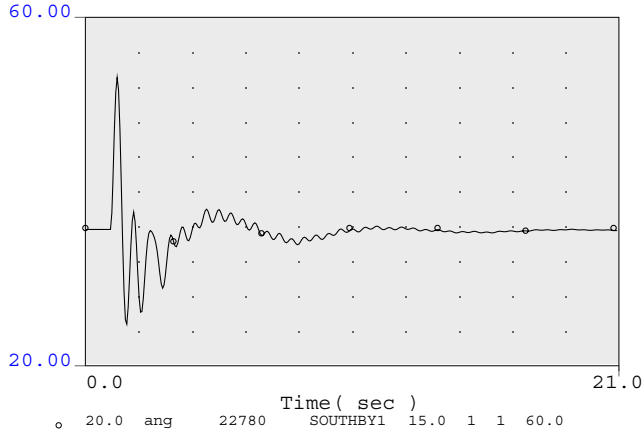


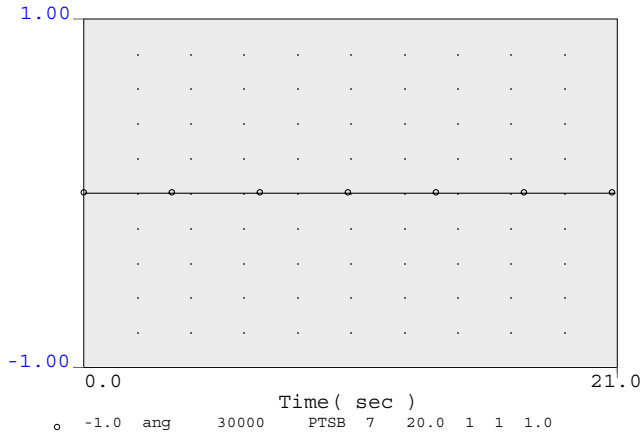



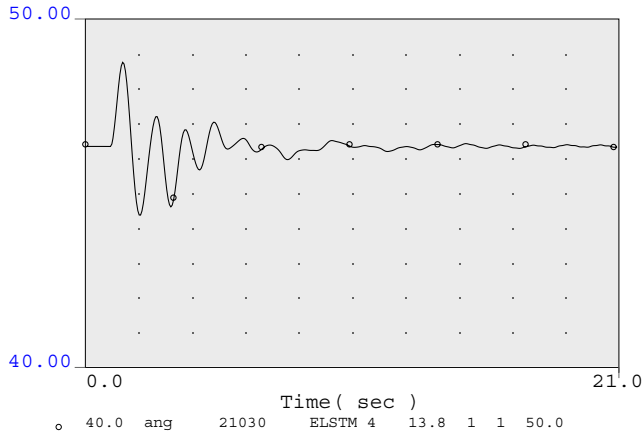



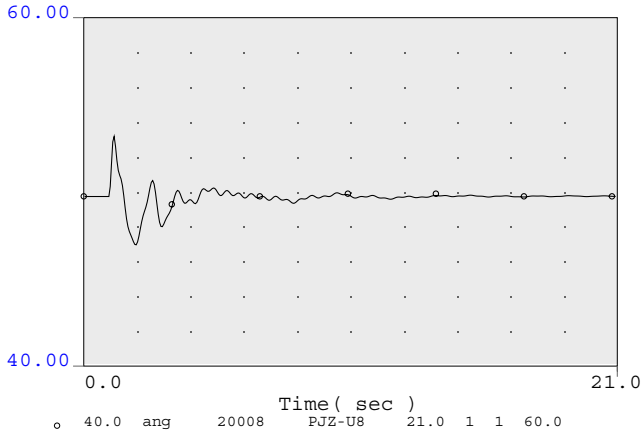

MMC ISIS, post-project

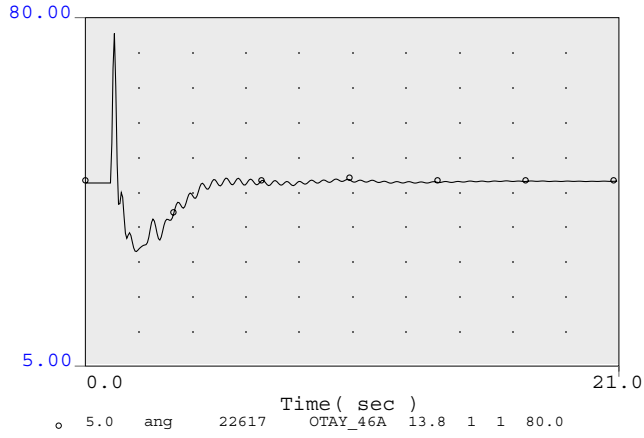
Fault bus at OTAY 69

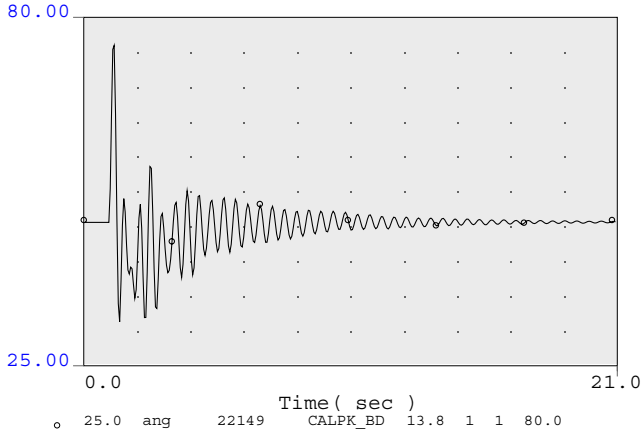
Trip Otay-Imp Beach-San Ysidro 69 kV line

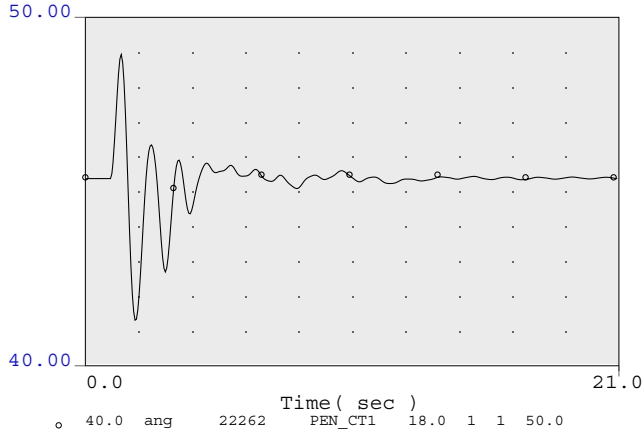


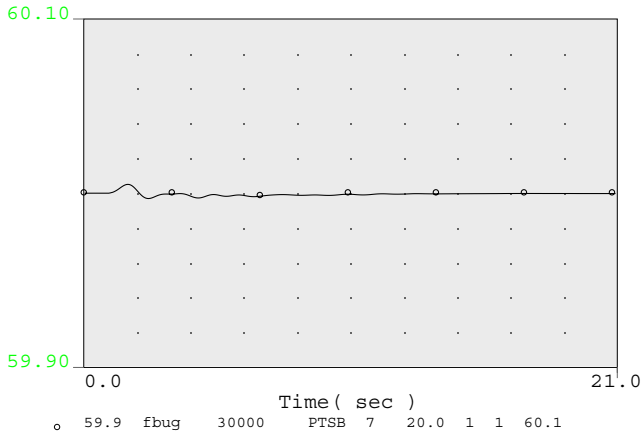



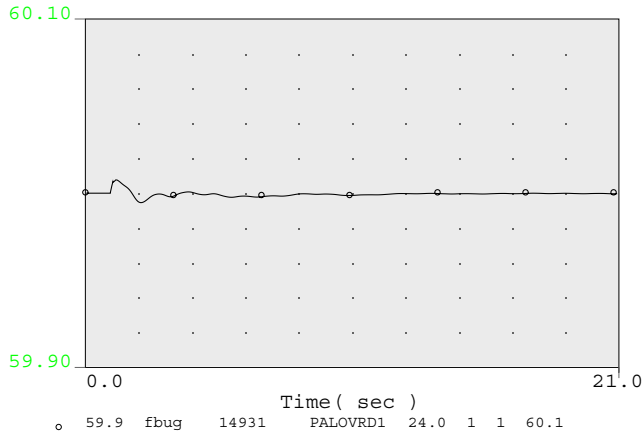



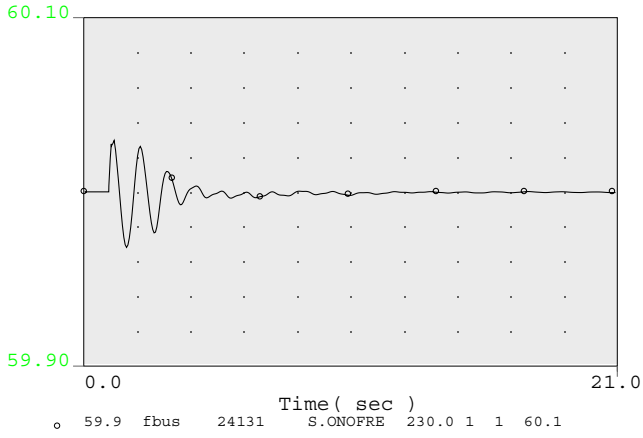

MMC ISIS, post-project

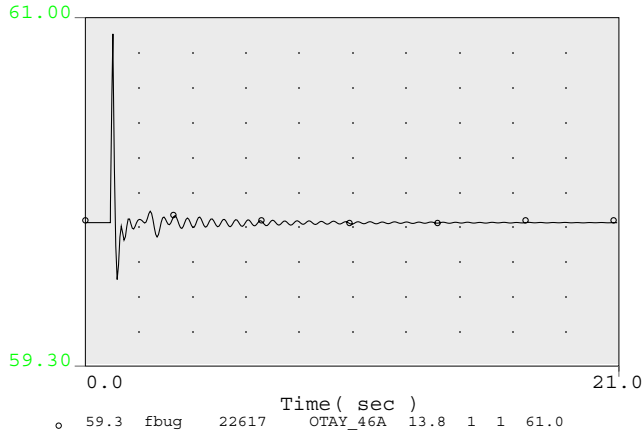
Fault bus at OTAY 69

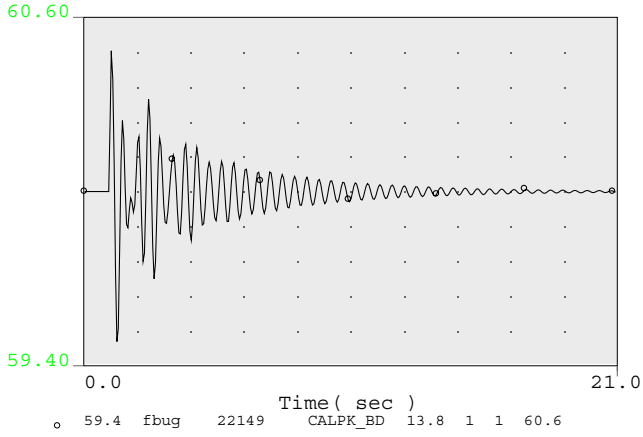
Trip Otay-Imp Beach-San Ysidro 69 kV line

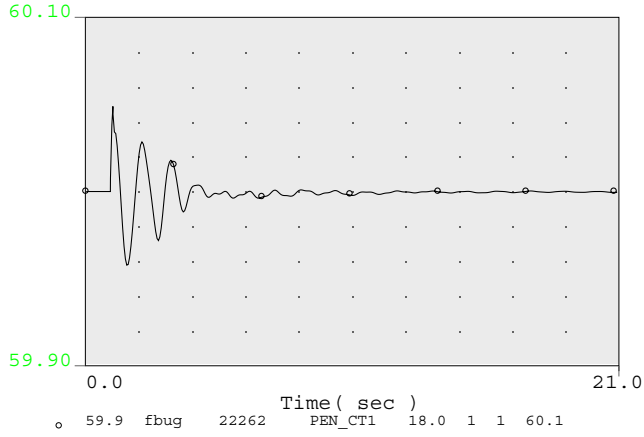


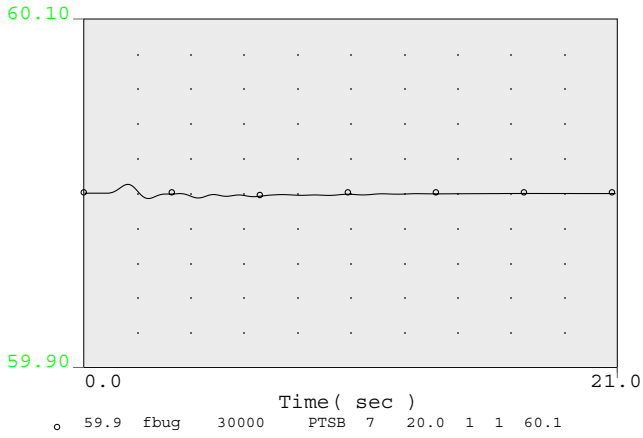



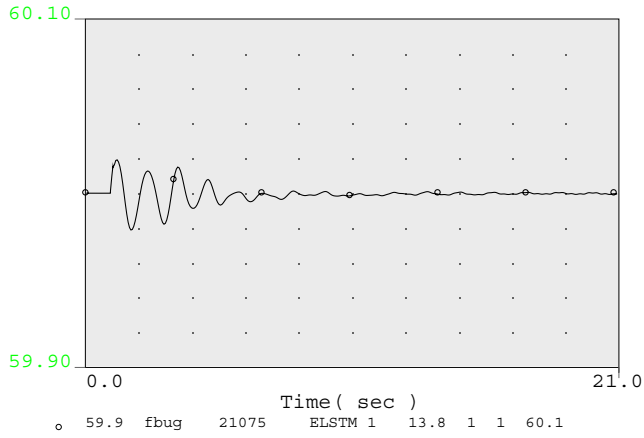



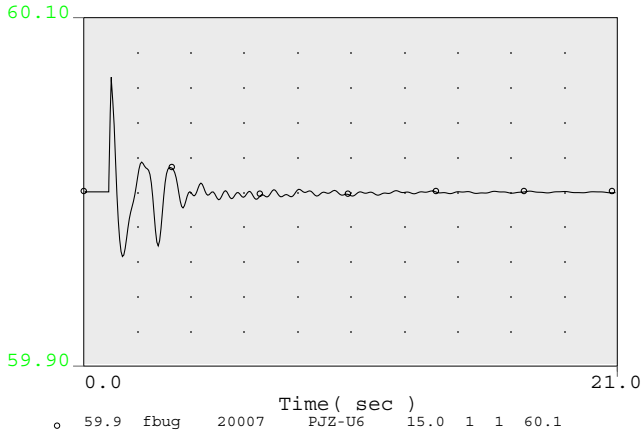

MMC ISIS, post-project

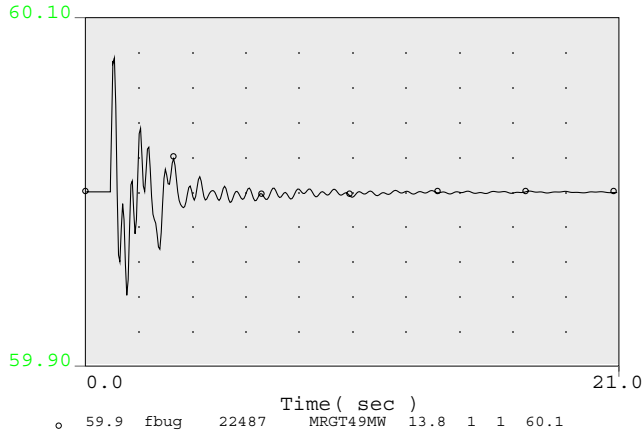
Fault bus at OTAY 69

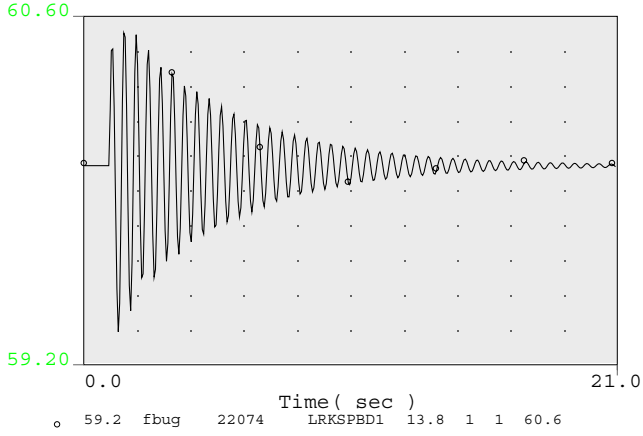
Trip Otay-Imp Beach-San Ysidro 69 kV line

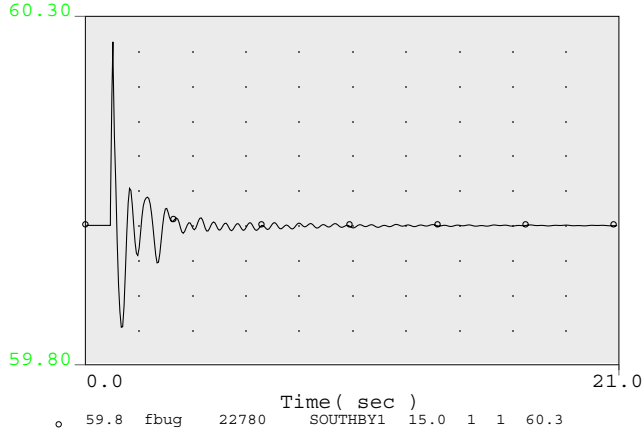


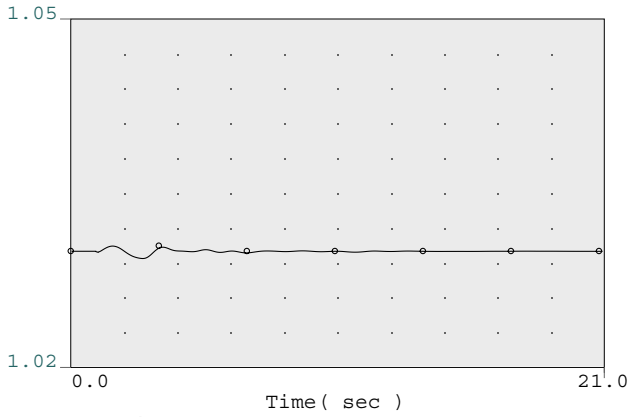




MMC ISIS, post-project

Fault bus at OTAY 69

Trip Otay-Imp Beach-San Ysidro 69 kV line

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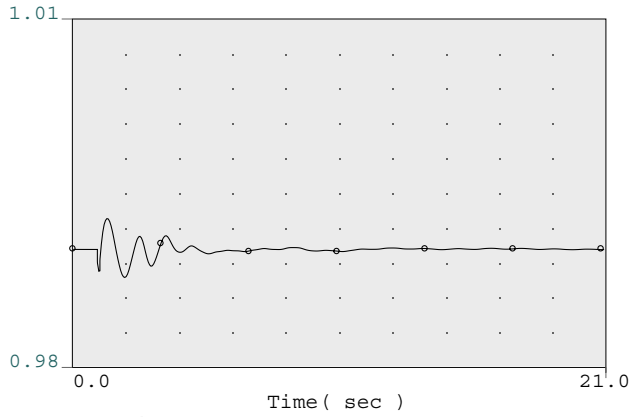


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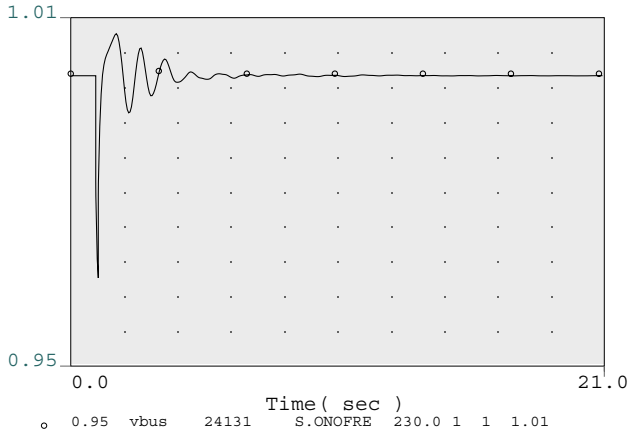


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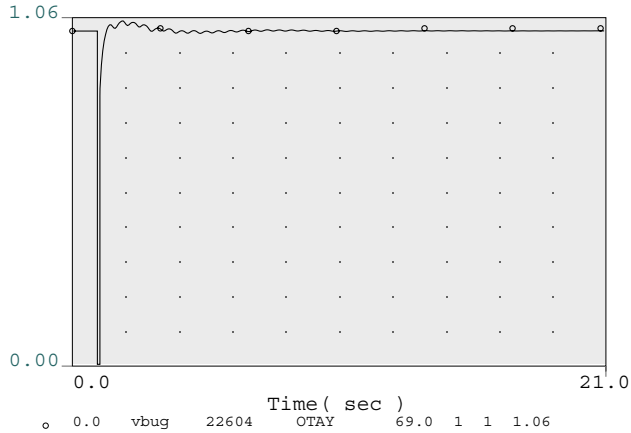


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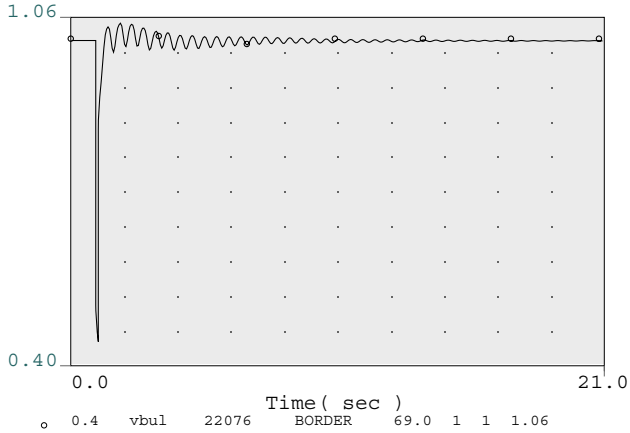


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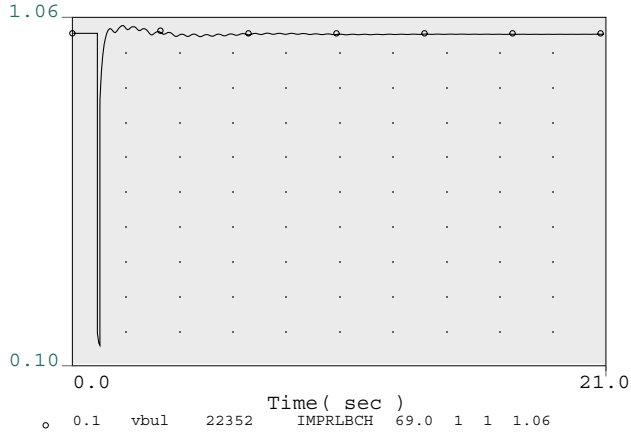
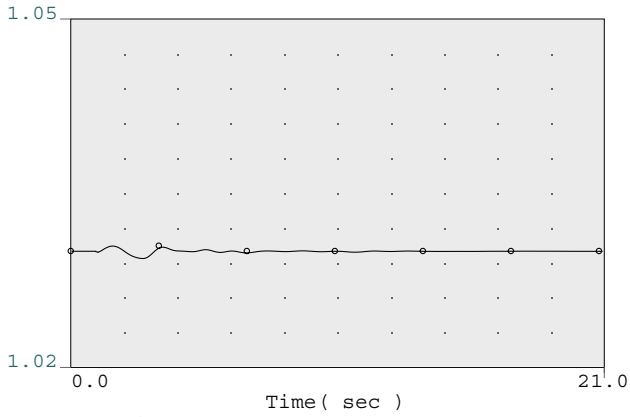



o 0.1 vbul 22352 IMPRLBCH 69.0 1 1 1.06

MMC ISIS, post-project

Fault bus at OTAY 69

Trip Otay-Imp Beach-San Ysidro 69 kV line

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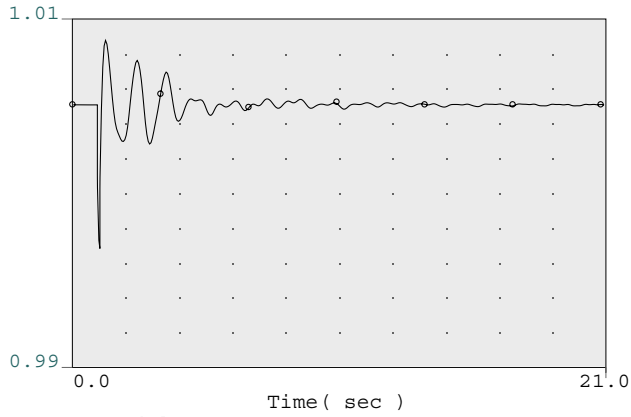


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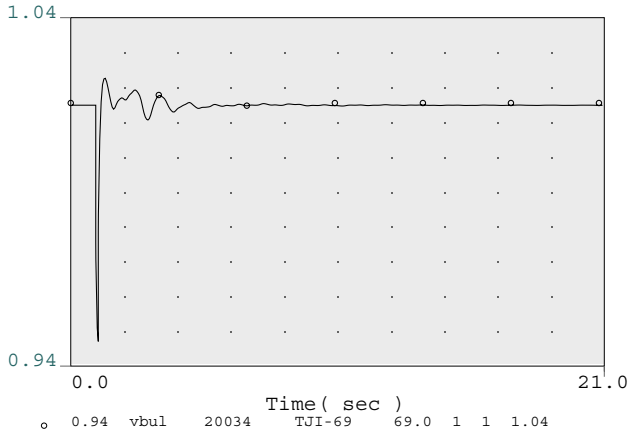


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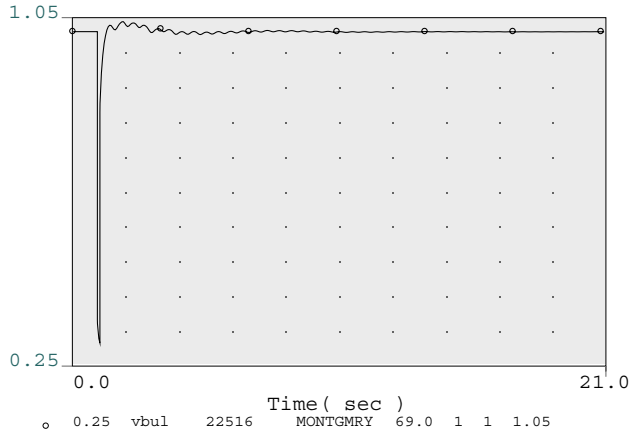


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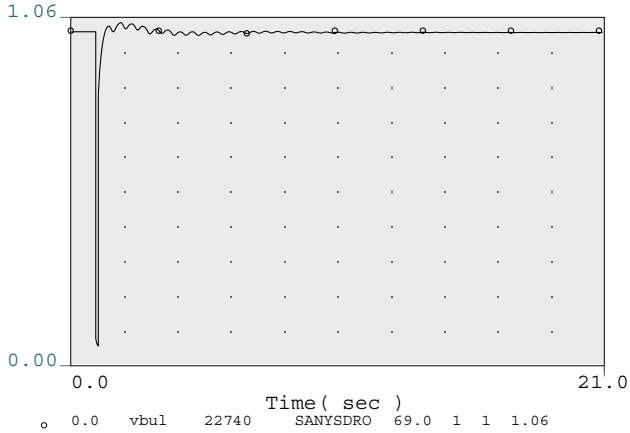


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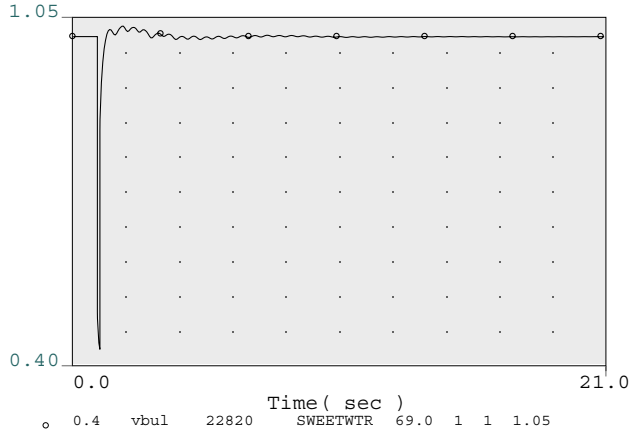



o 0.4 vbul 22820 SWEETWTR 69.0 1 1 1.05

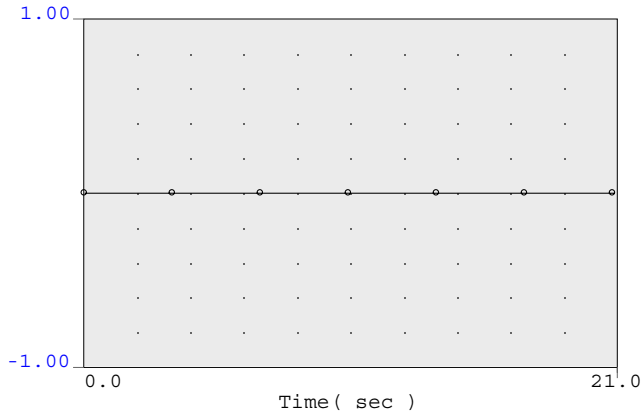
MMC ISIS, post-project

Fault bus at OTAY 69

Trip Otay-Imp Beach-San Ysidro 69 kV line

# Palomar Combined Cycle Plant Outage

## Pre- and Post-Project

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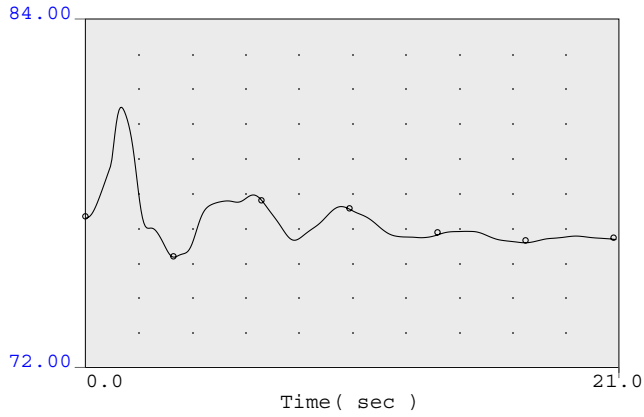
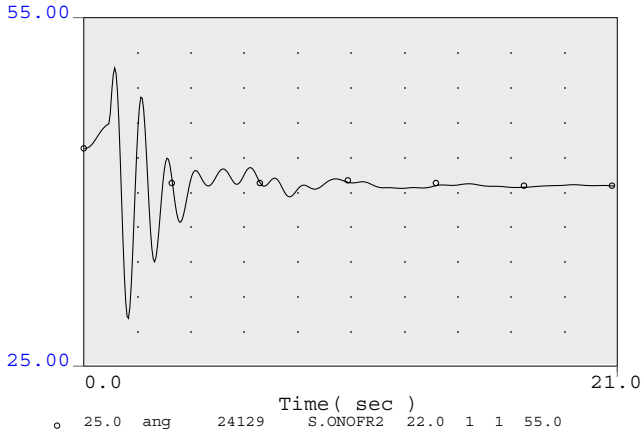



72.0 ang 14931 PALOVRD1 24.0 1 1 84.0

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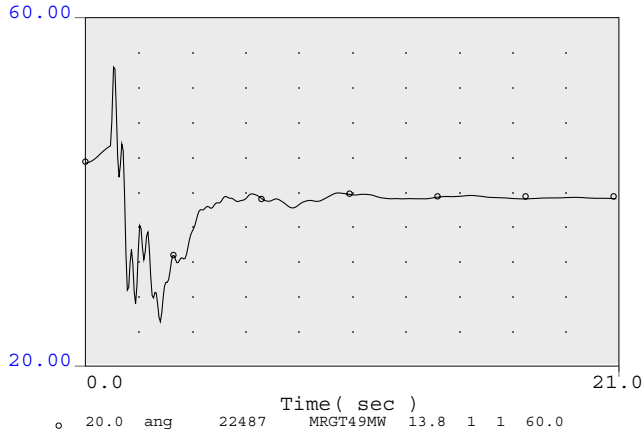


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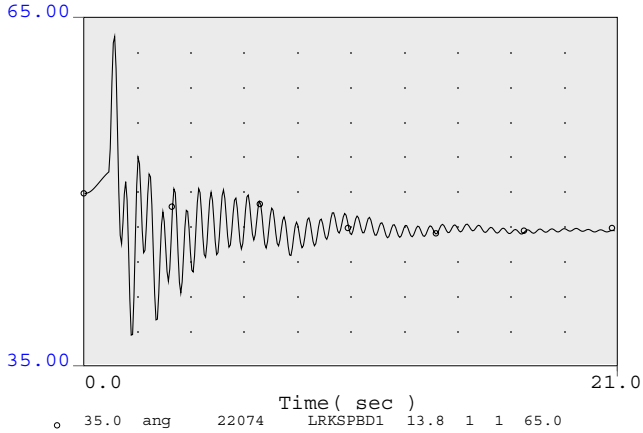


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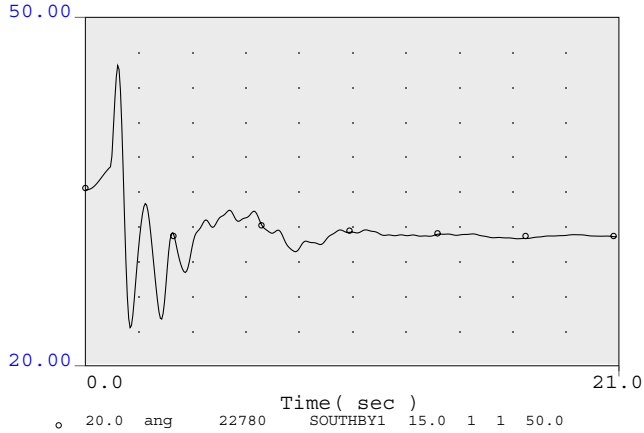


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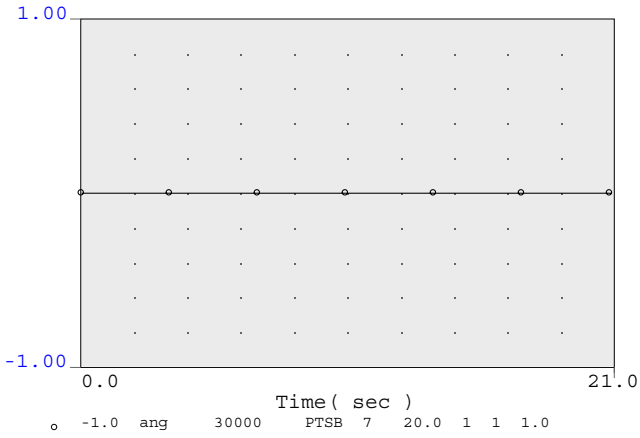
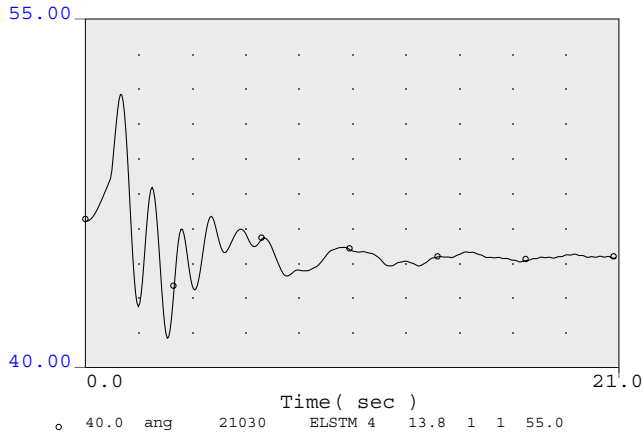
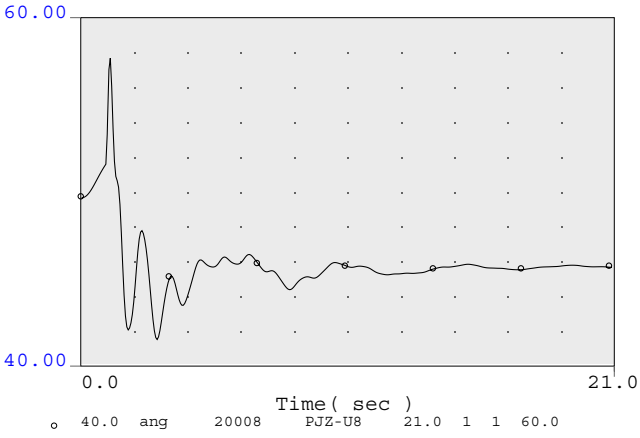
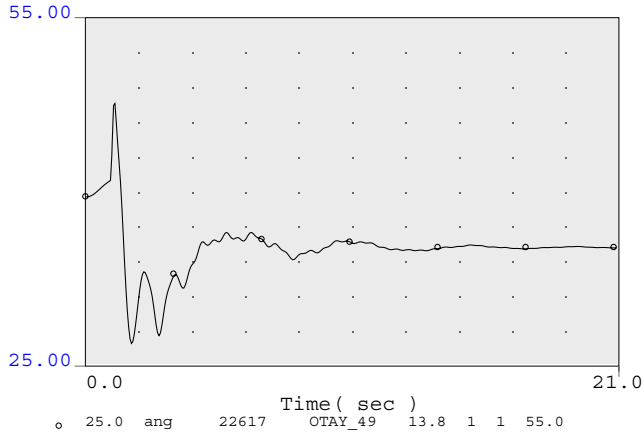
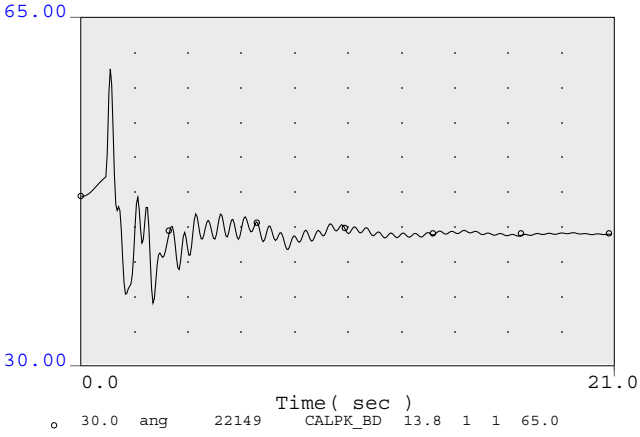
MMC ISIS, pre-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

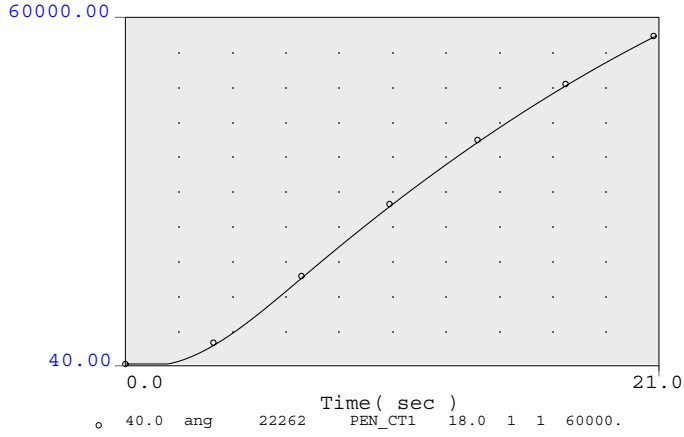


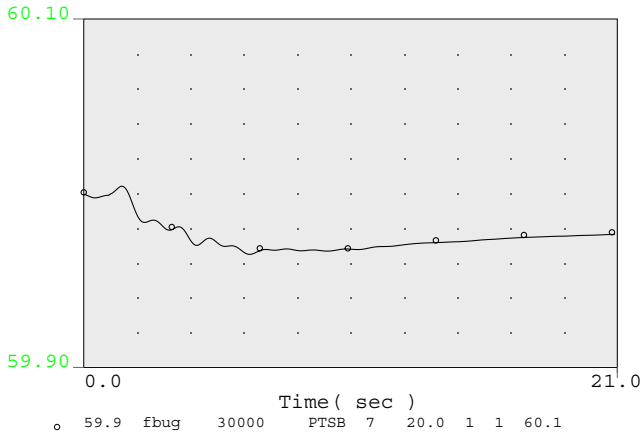



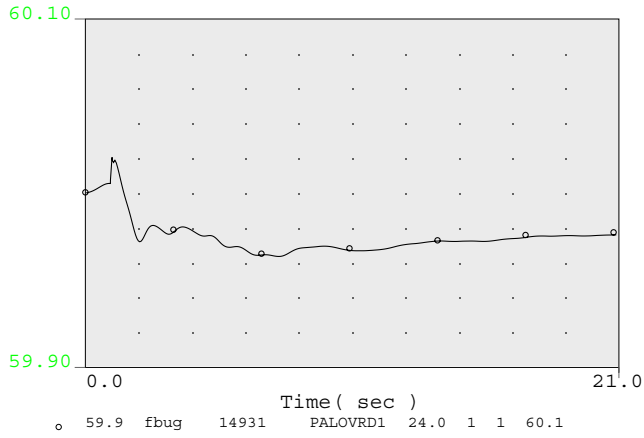



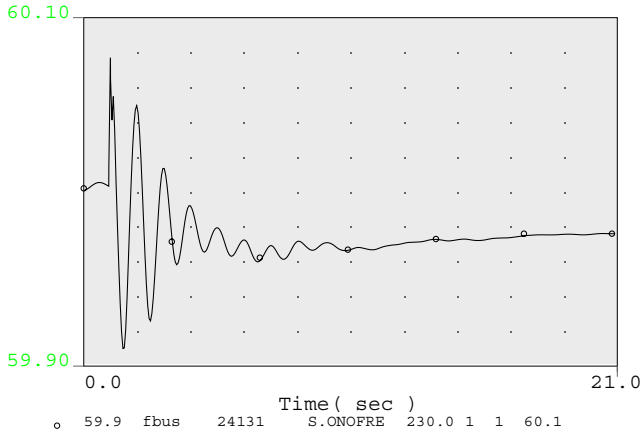



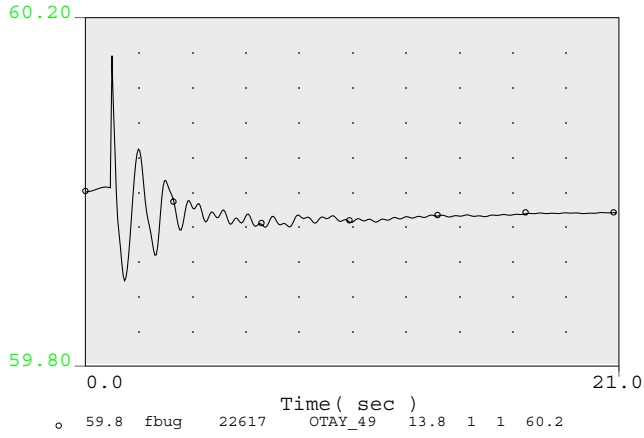



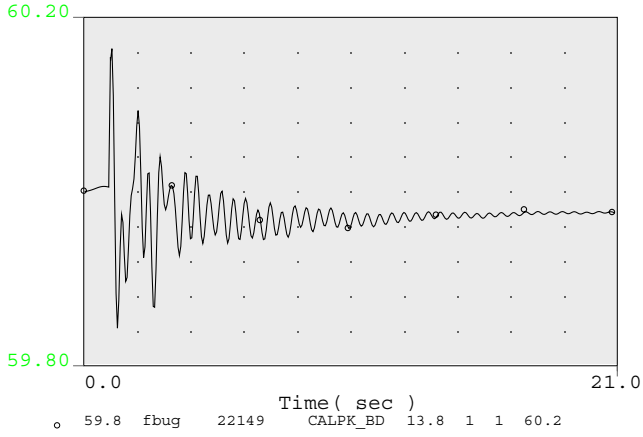

MMC ISIS, pre-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

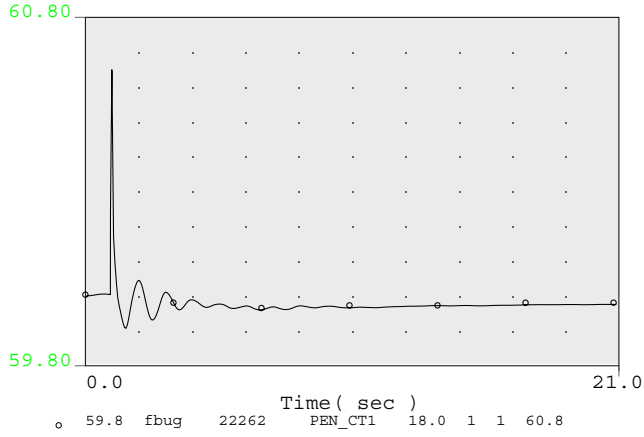


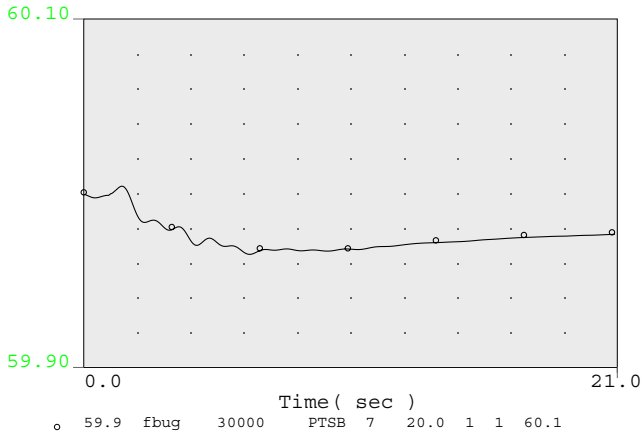



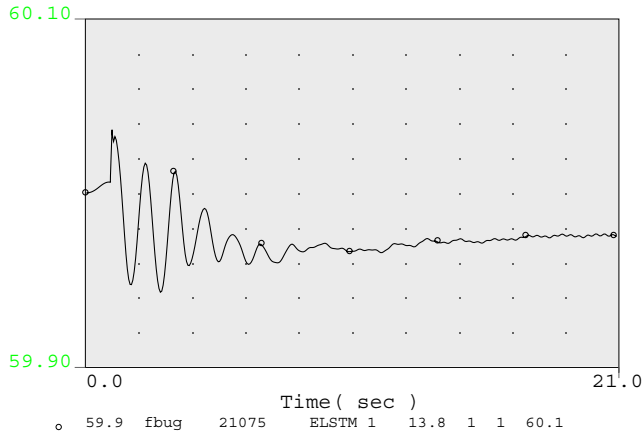



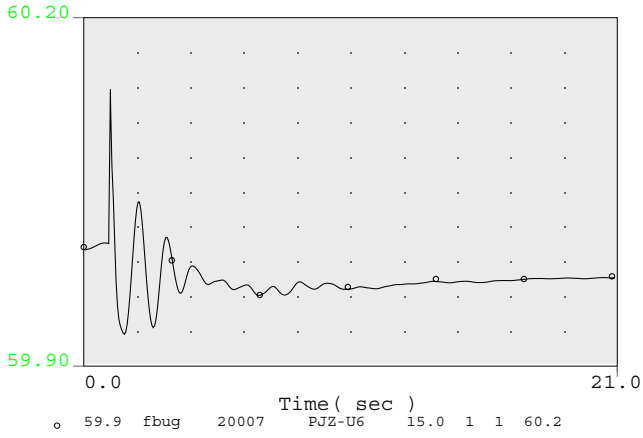



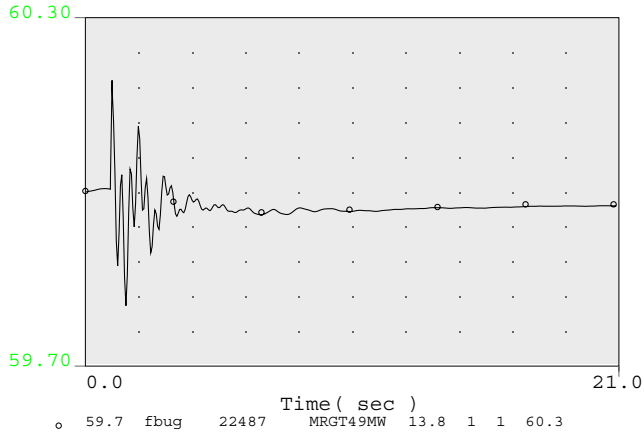



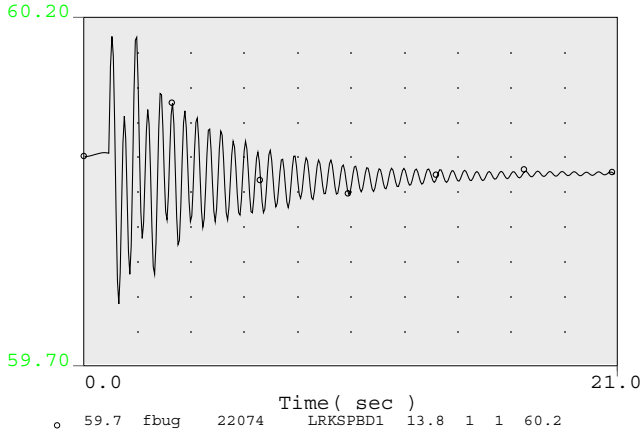

MMC ISIS, pre-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

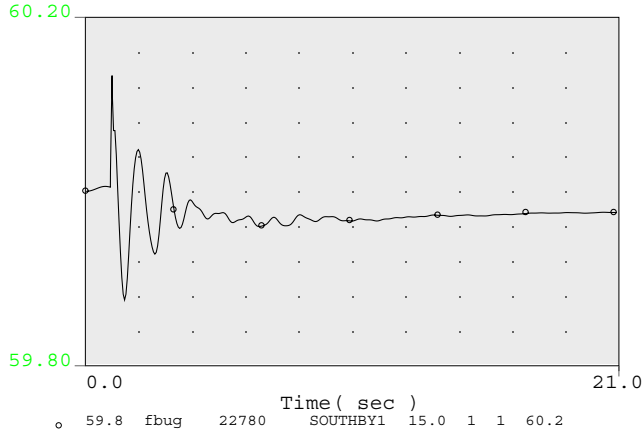


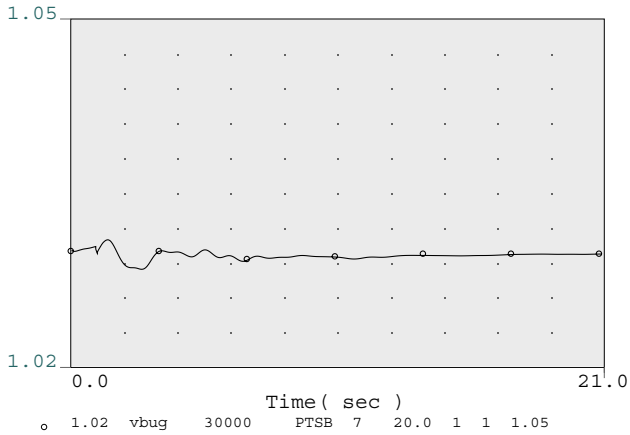



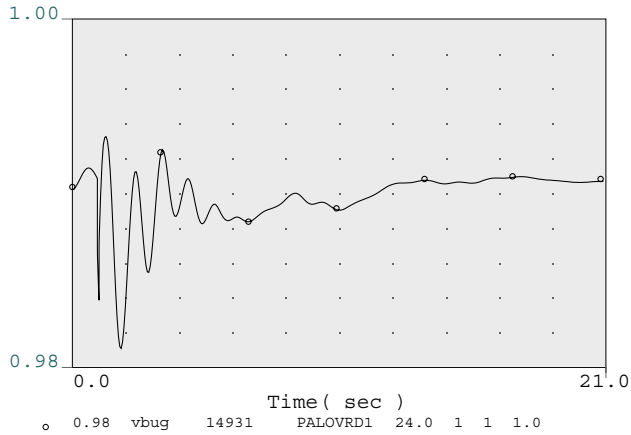



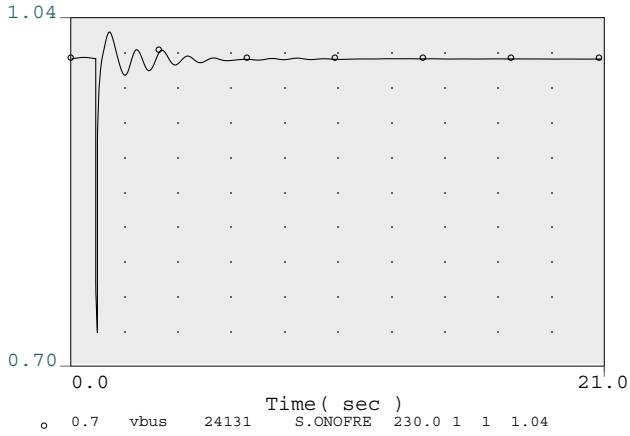



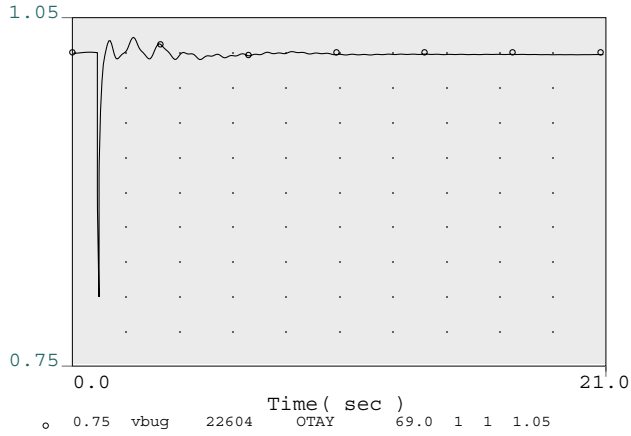



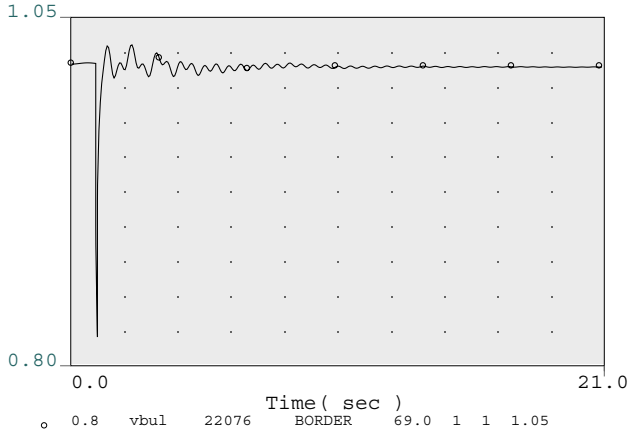

MMC ISIS, pre-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

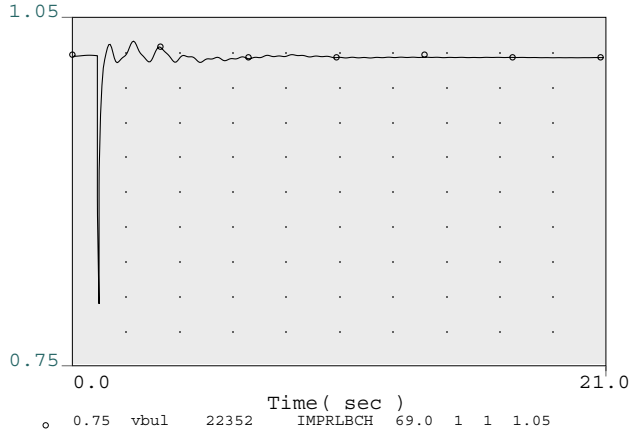


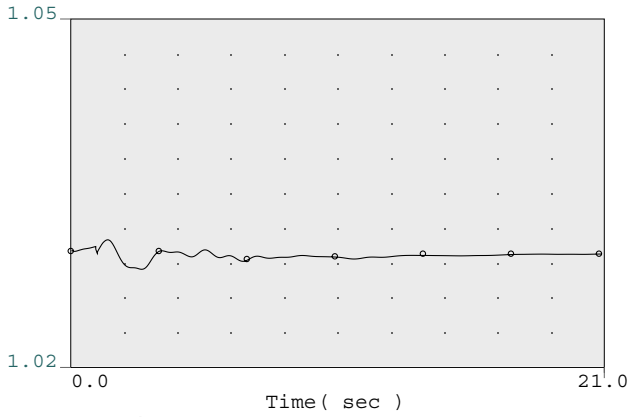




MMC ISIS, pre-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

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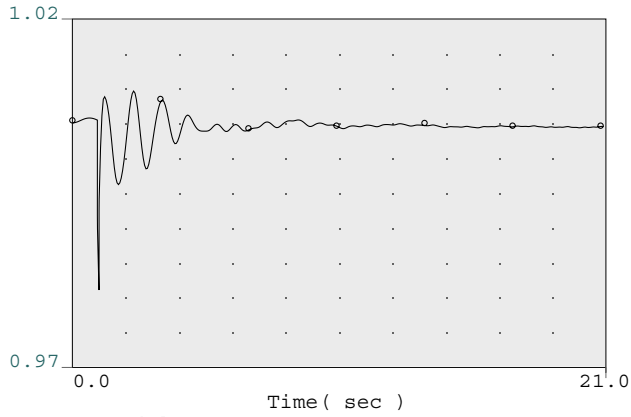
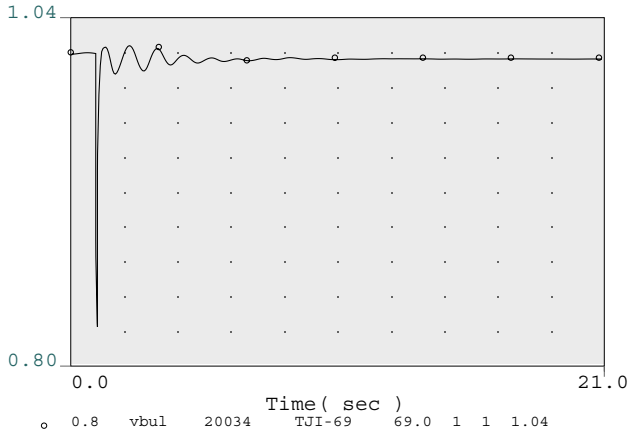



o 0.97 vbul 21027 ELSTEAMP 92.0 1 1 1.02

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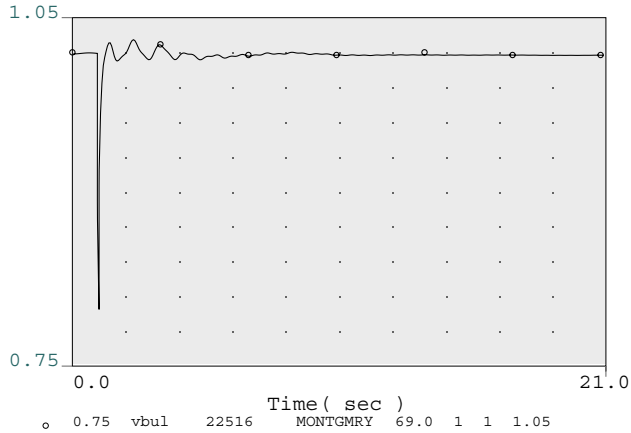


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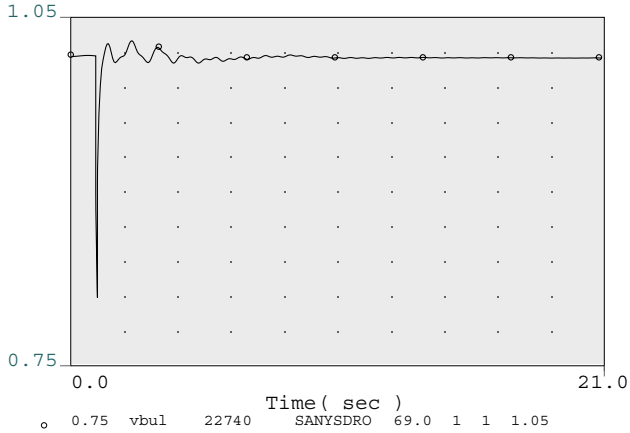


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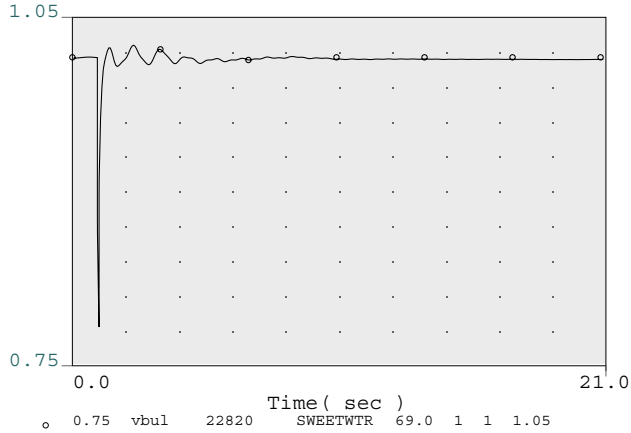


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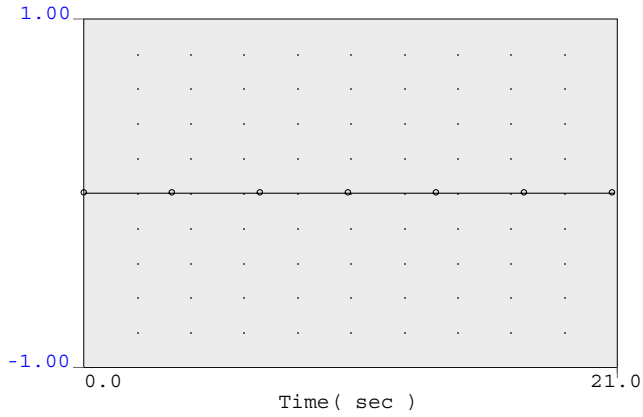
MMC ISIS, pre-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

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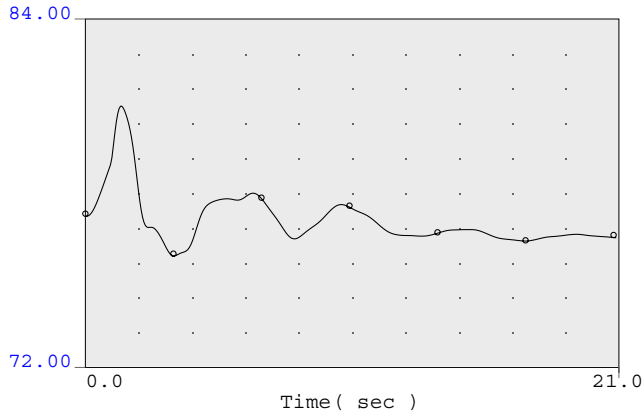


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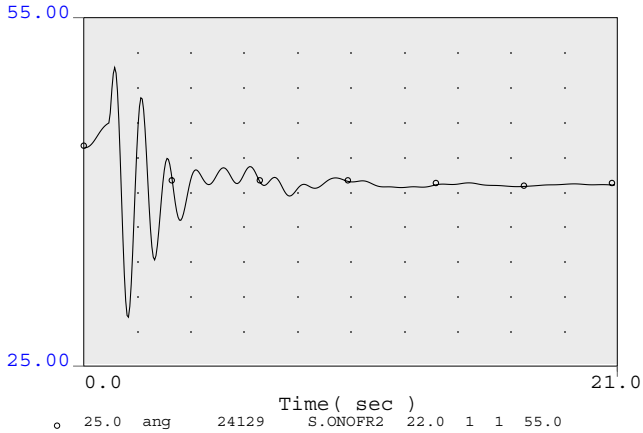


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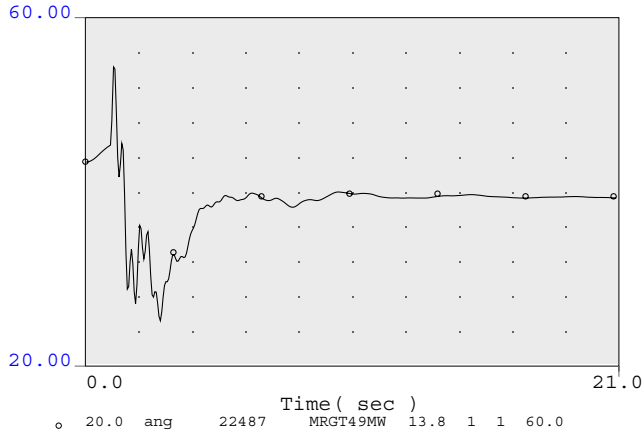
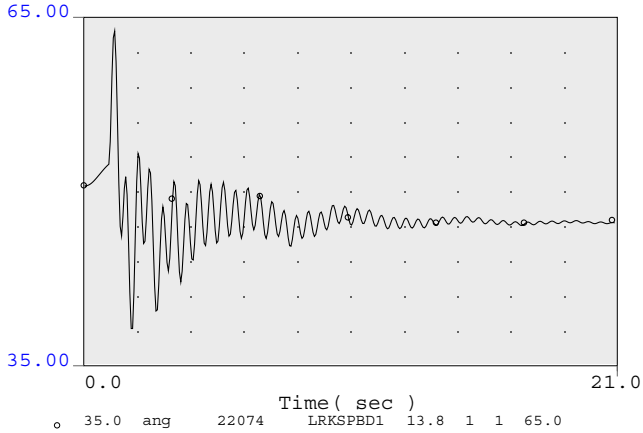



20.0 ang 22487 MRGT49MW 13.8 1 1 60.0

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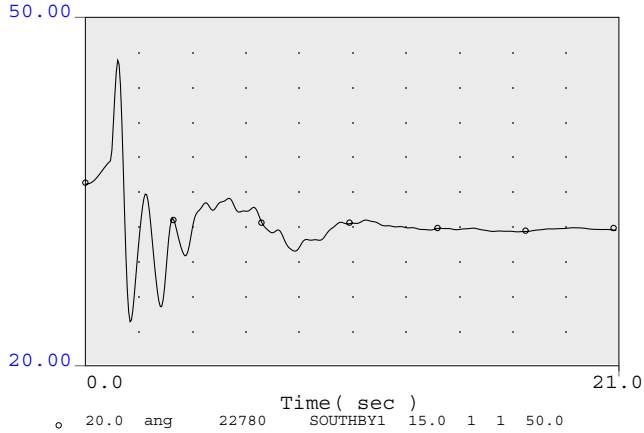


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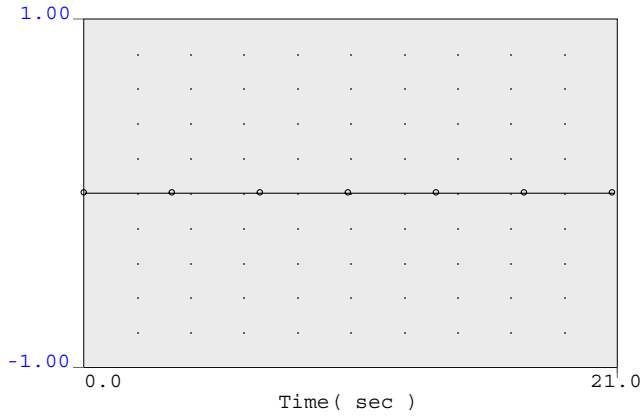
MMC ISIS, post-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

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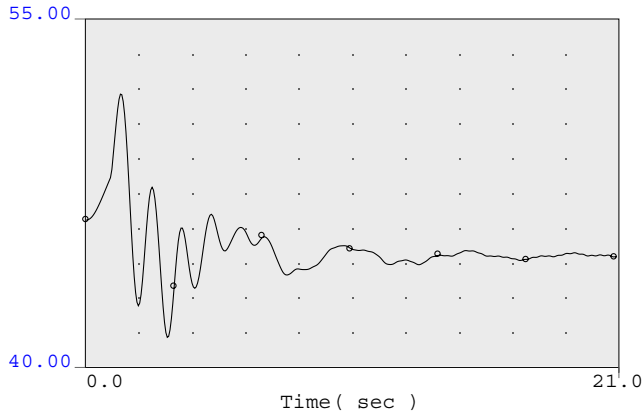


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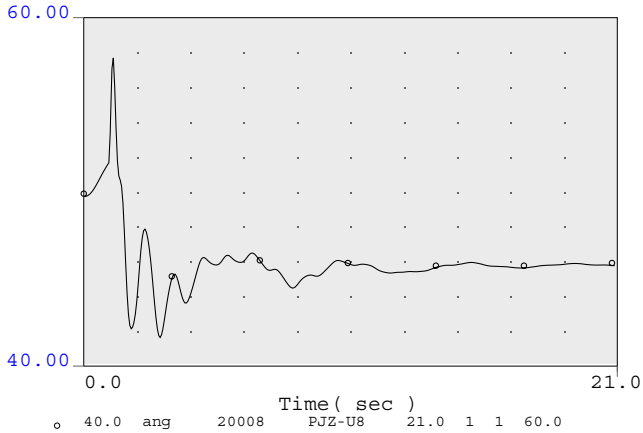


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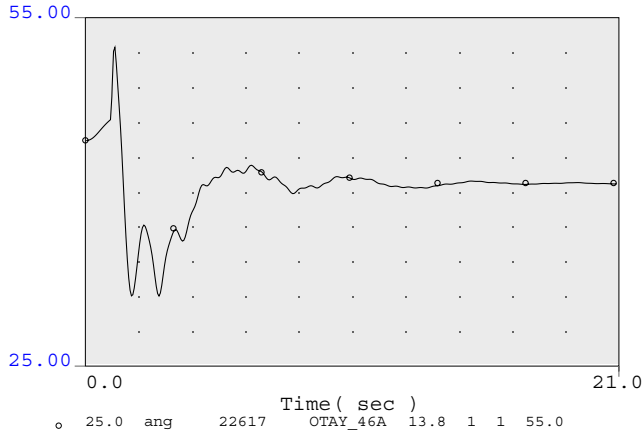


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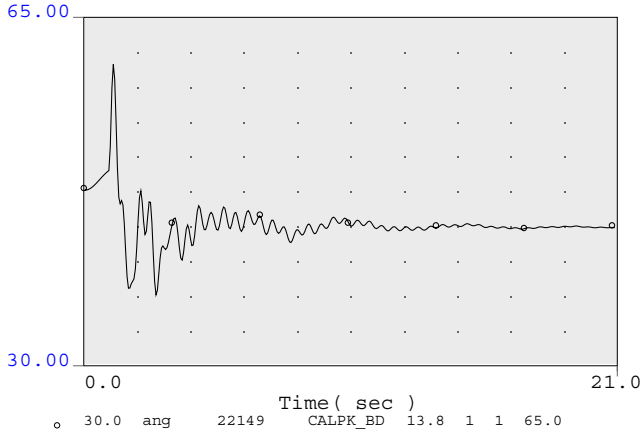


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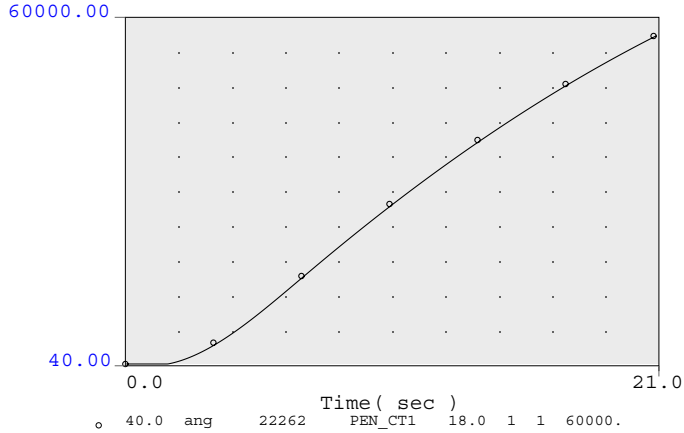


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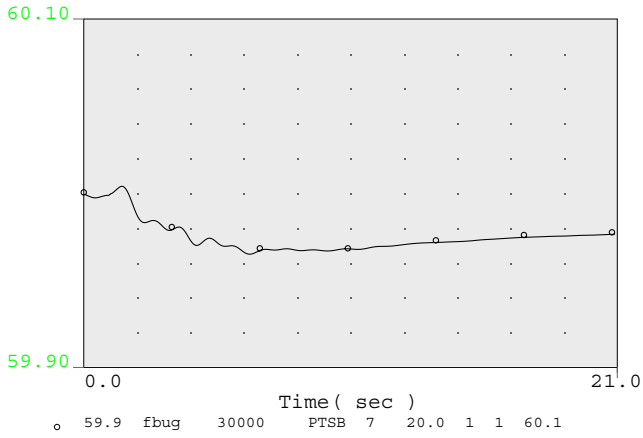
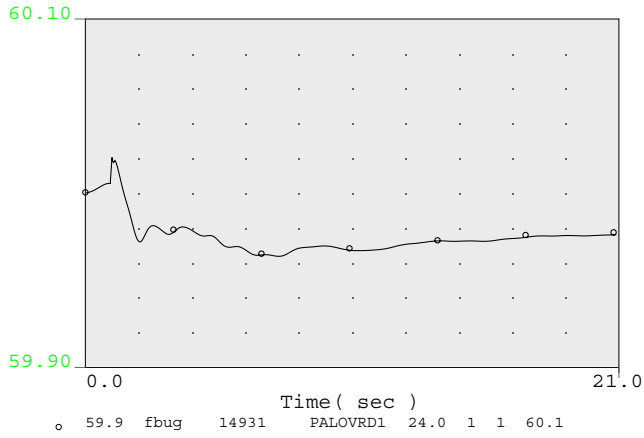
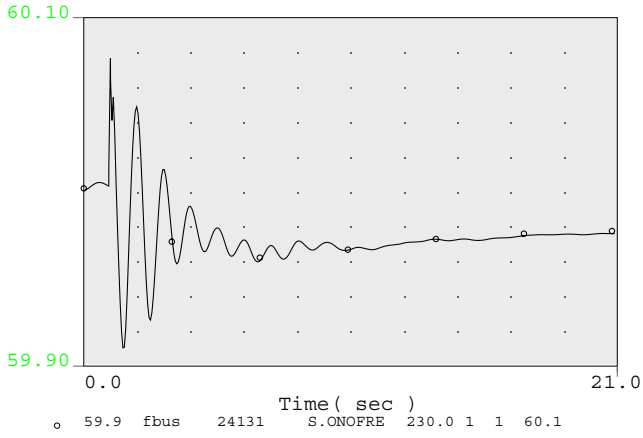
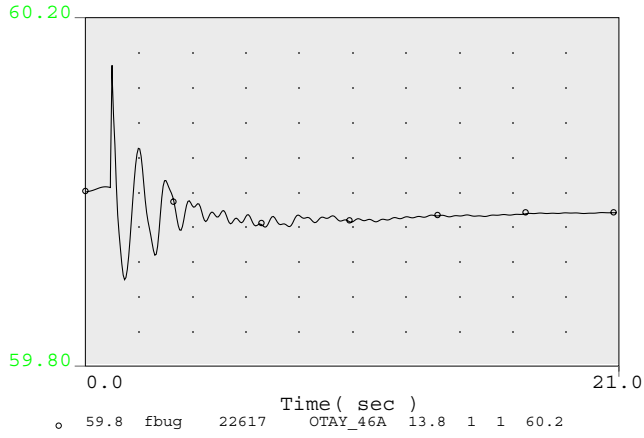
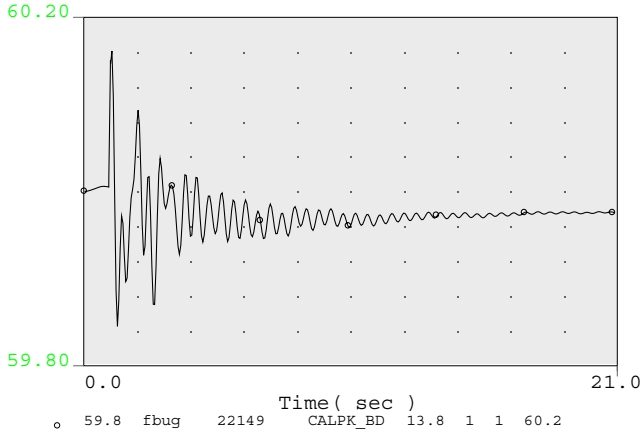
MMC ISIS, post-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

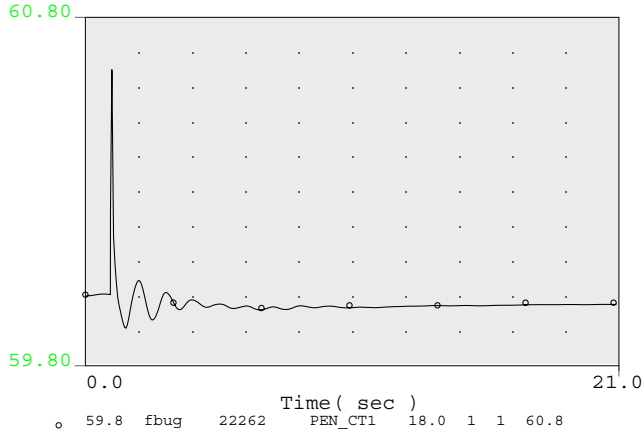


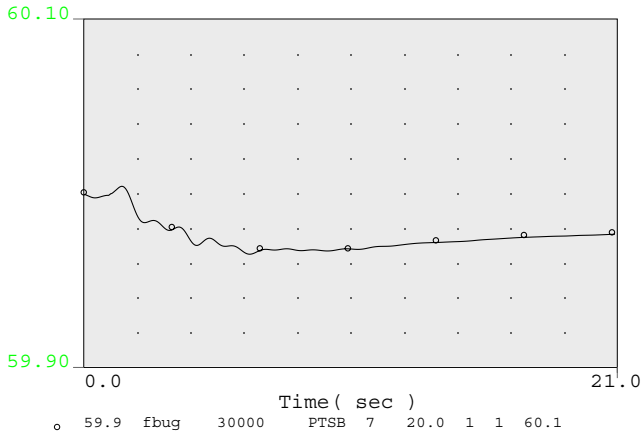



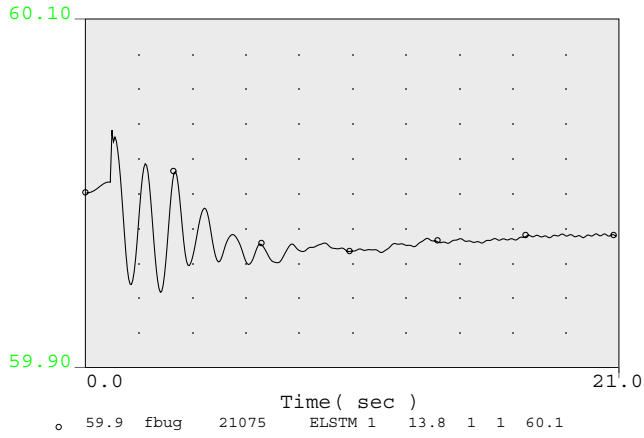



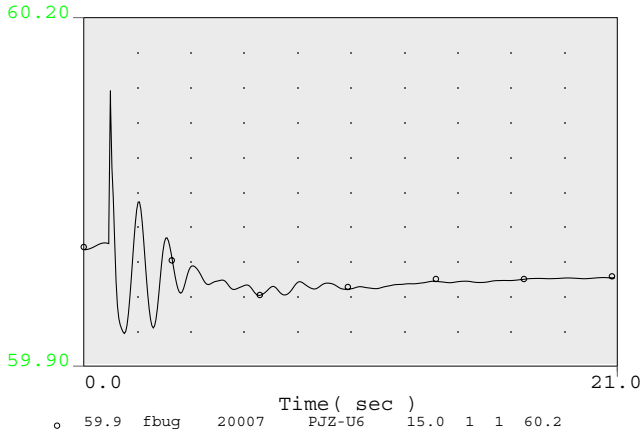



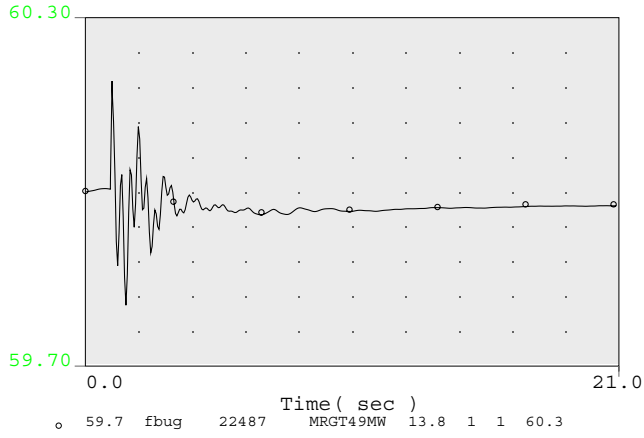



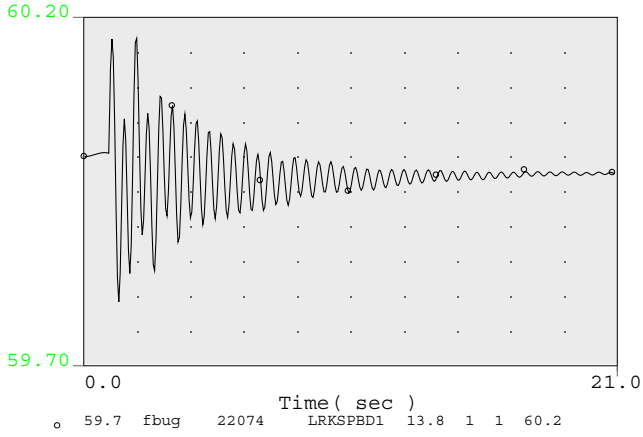

MMC ISIS, post-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

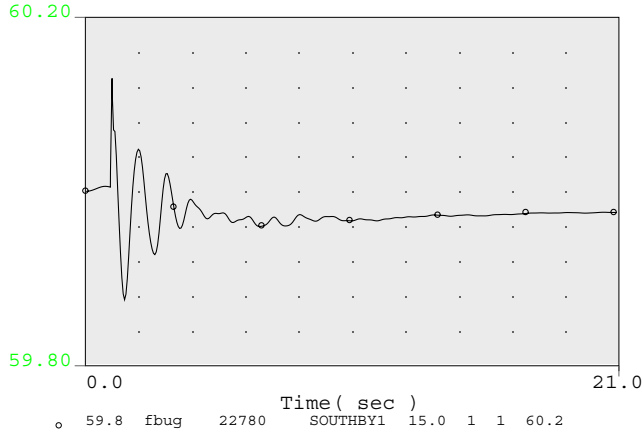


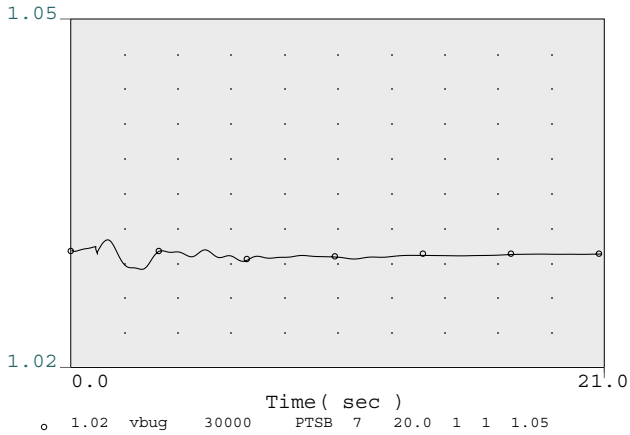



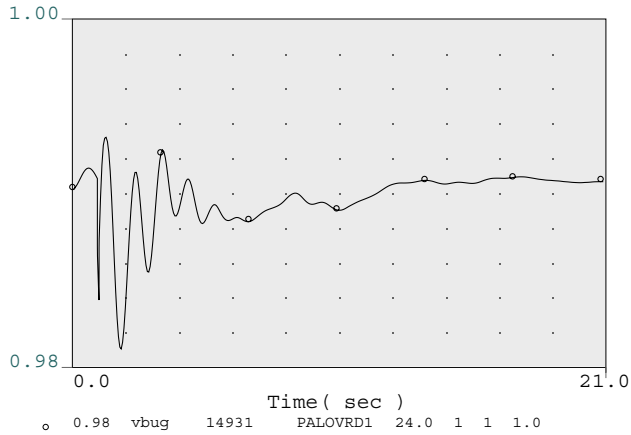



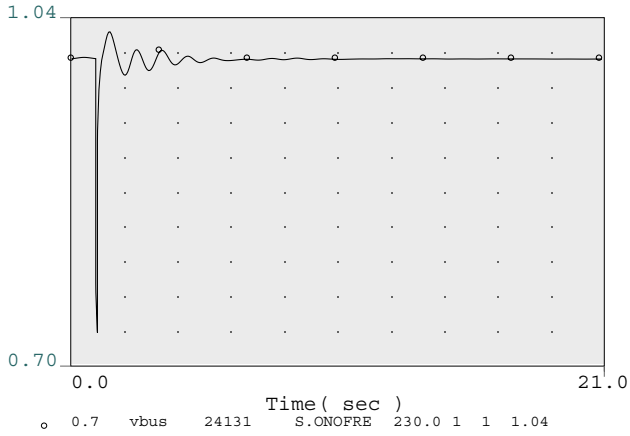



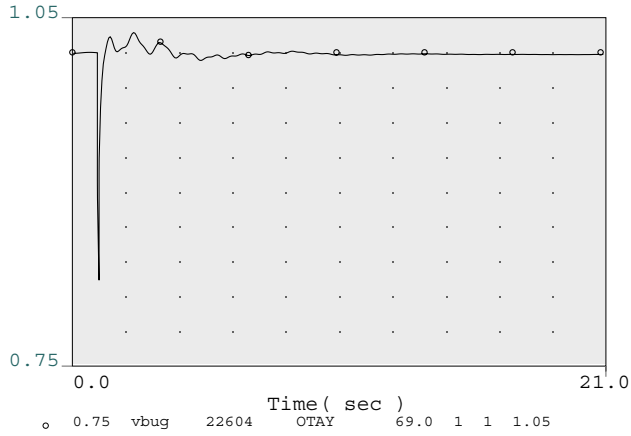



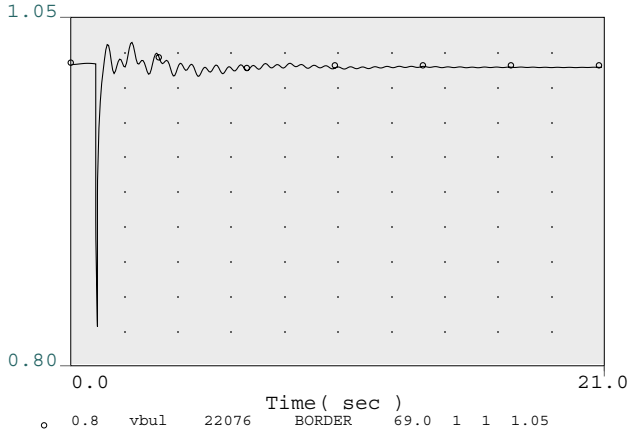

MMC ISIS, post-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

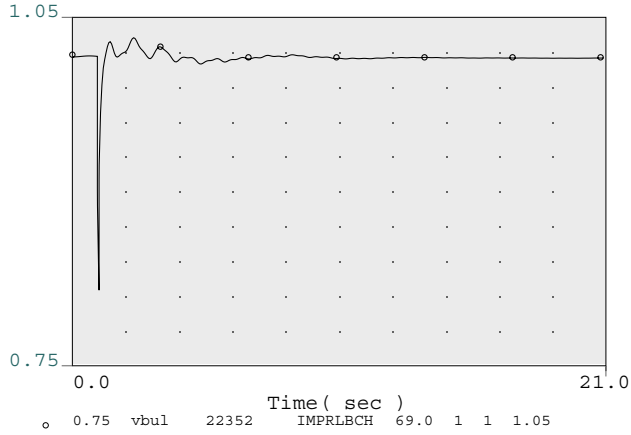


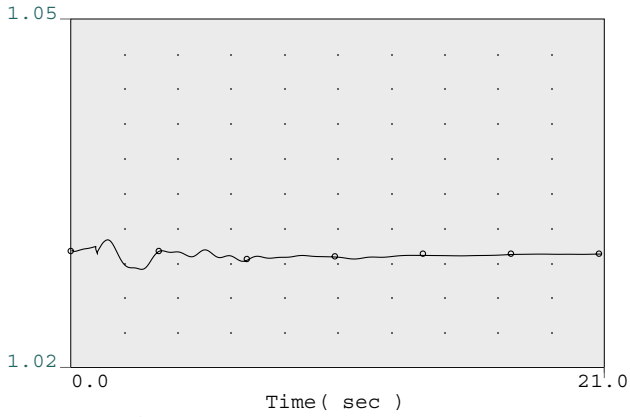




MMC ISIS, post-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

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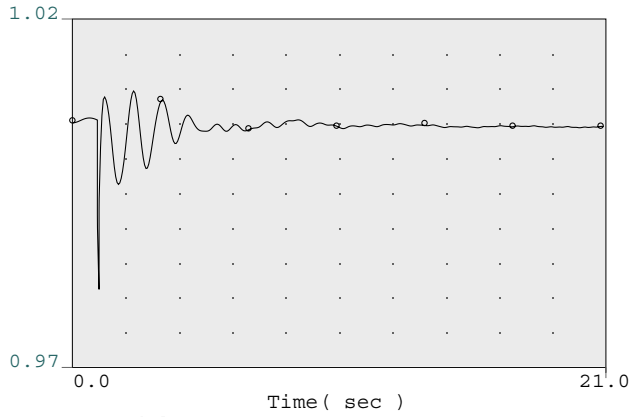


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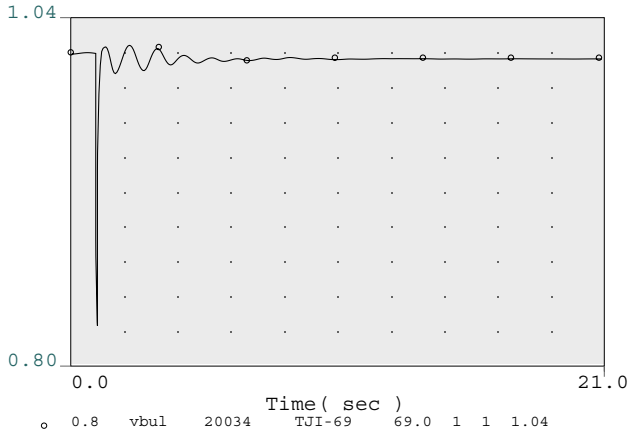


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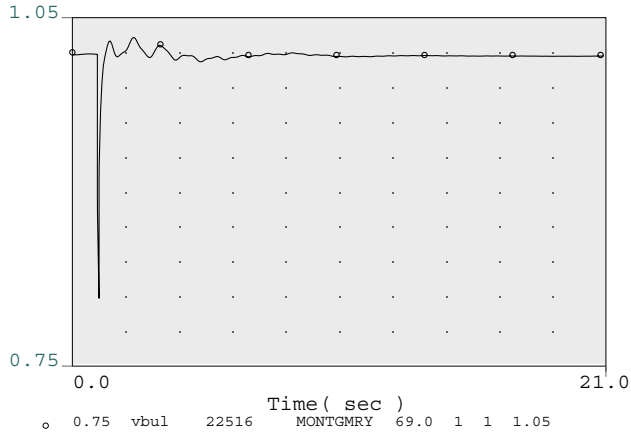


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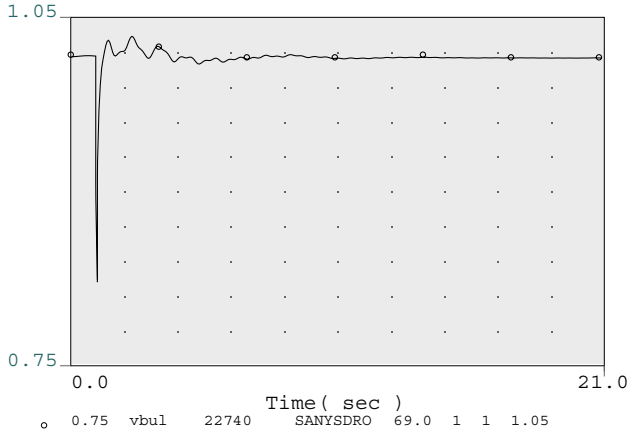


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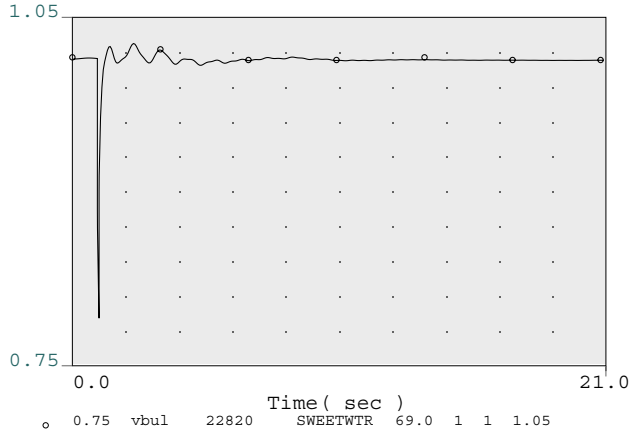


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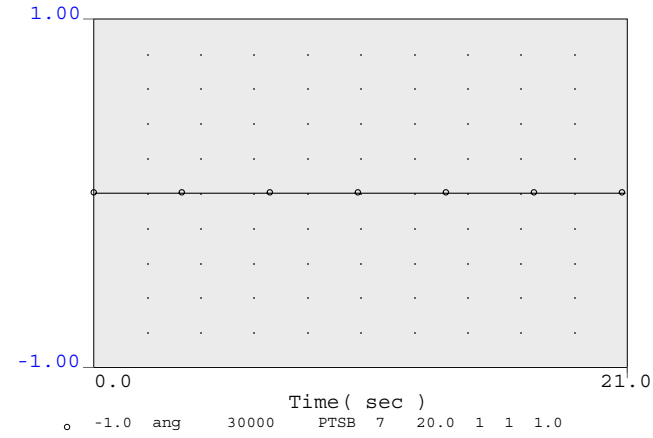
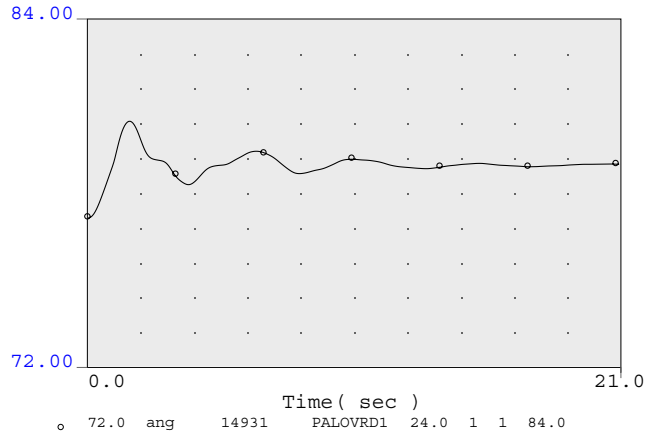
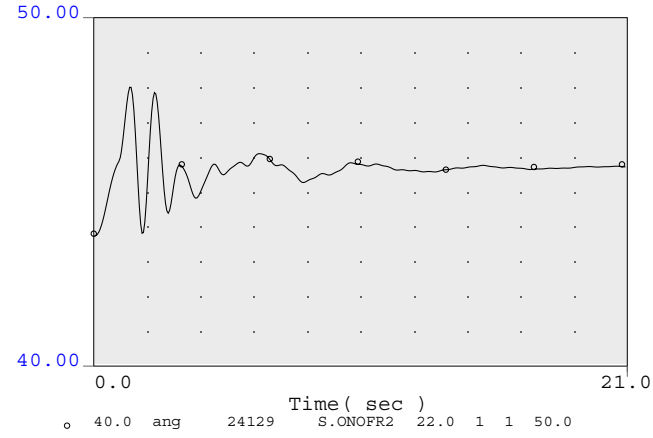
MMC ISIS, post-project
Fault bus at PEN
Trip PEN 1/2/3 UNITS

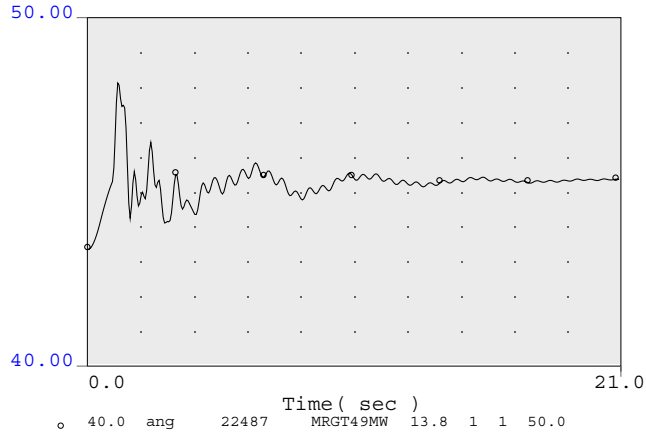
TL6910 (Miguel-Border) 69 kV SLO

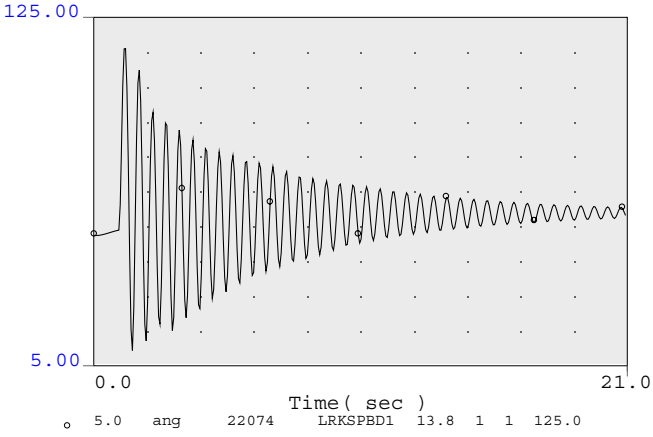
Pre- and Post-Project

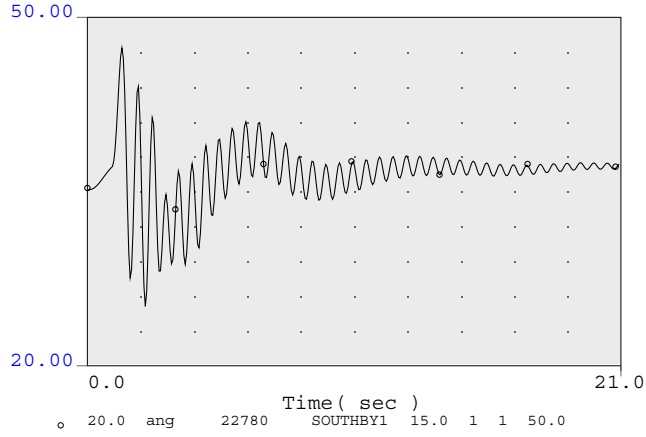


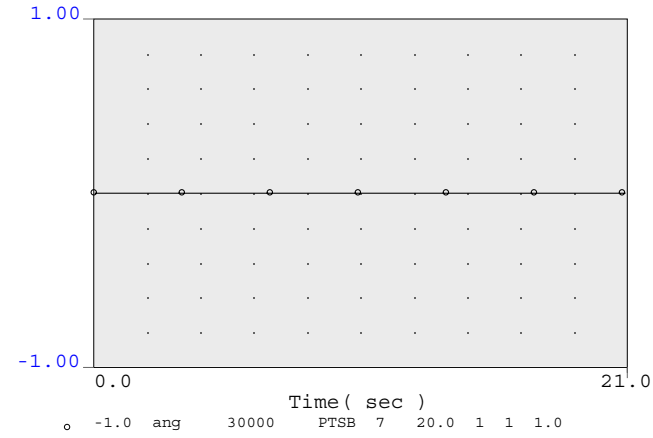



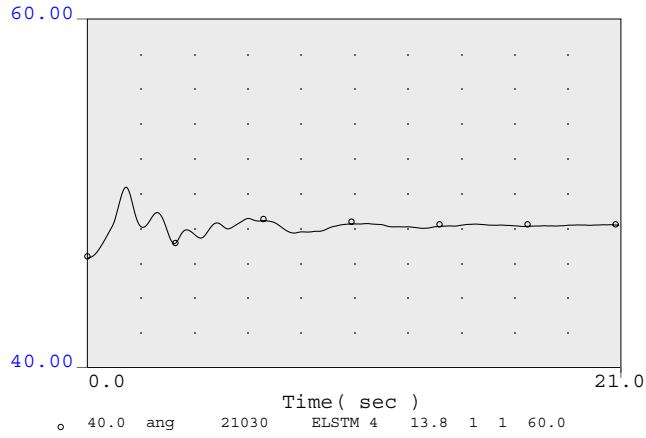



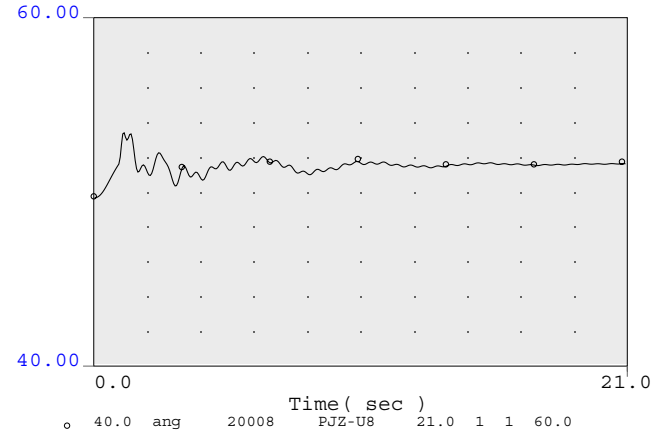



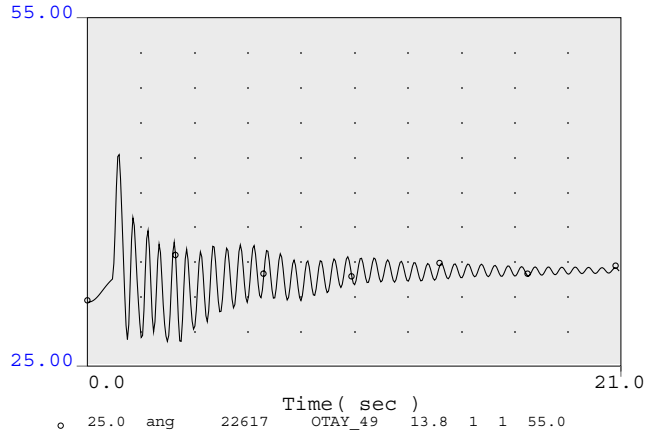



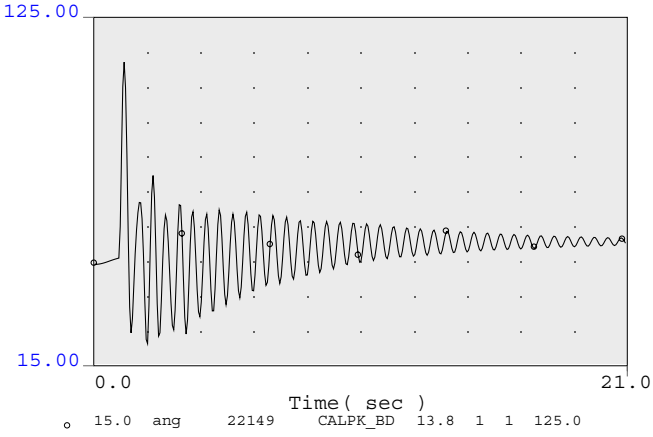

MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

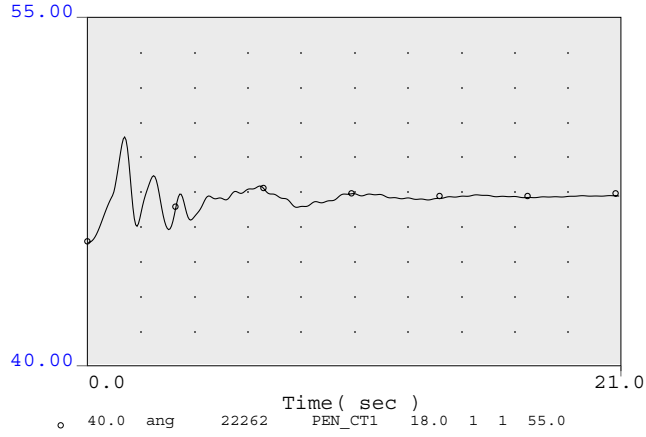


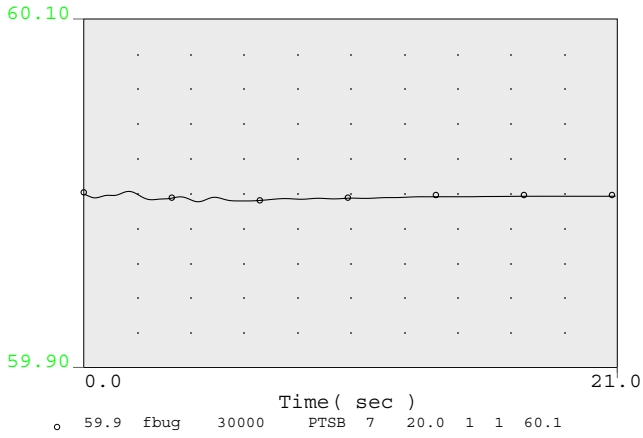



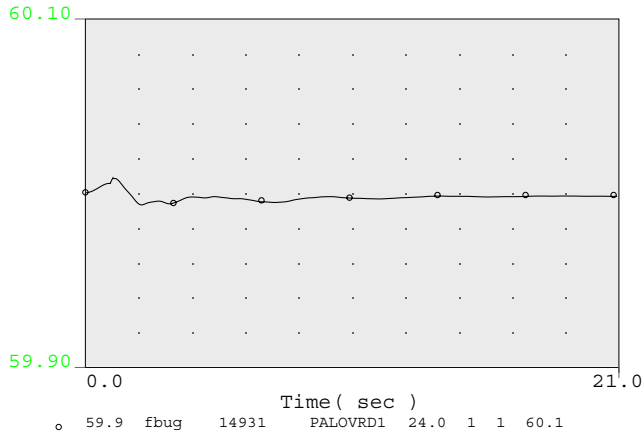



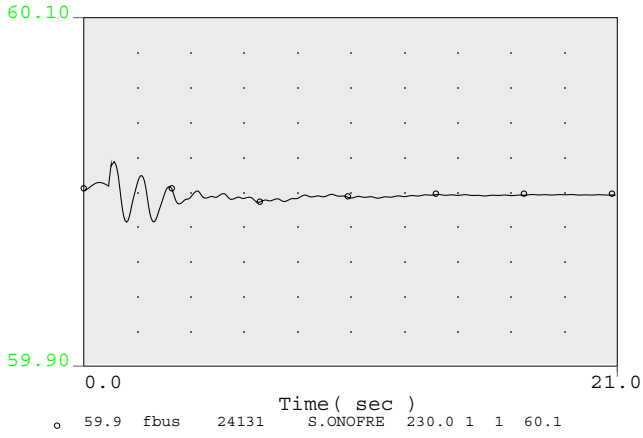



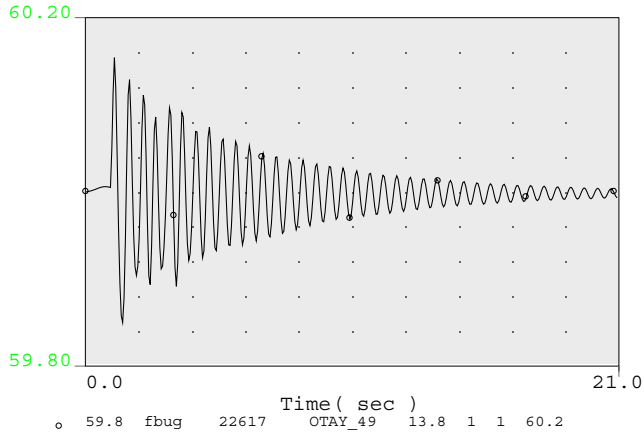



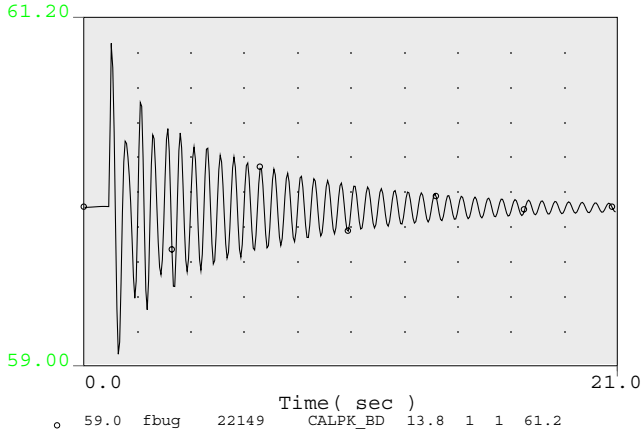

MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

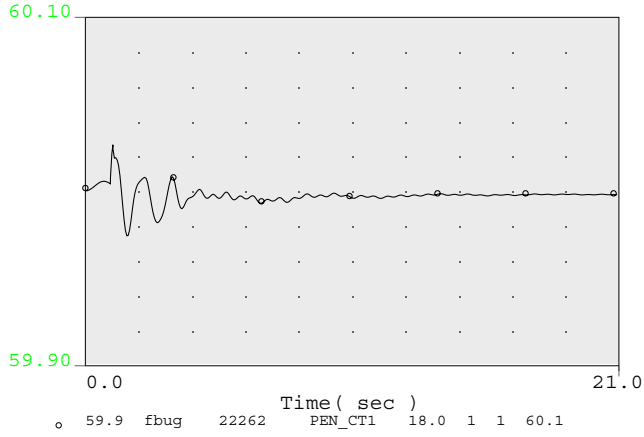


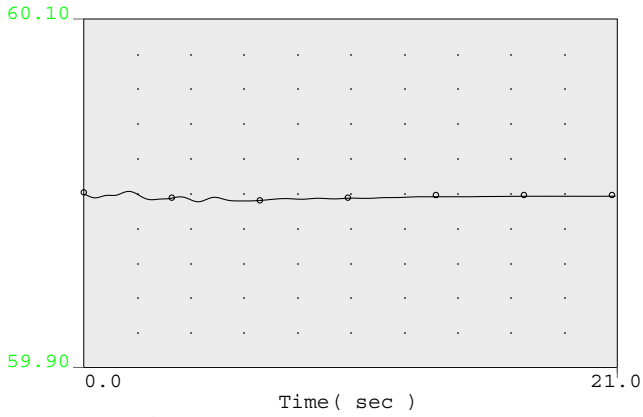



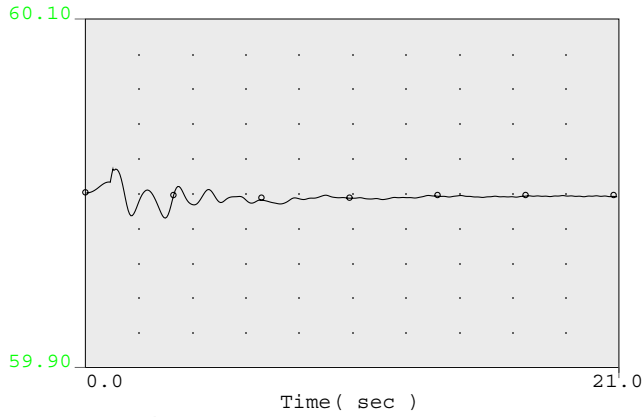



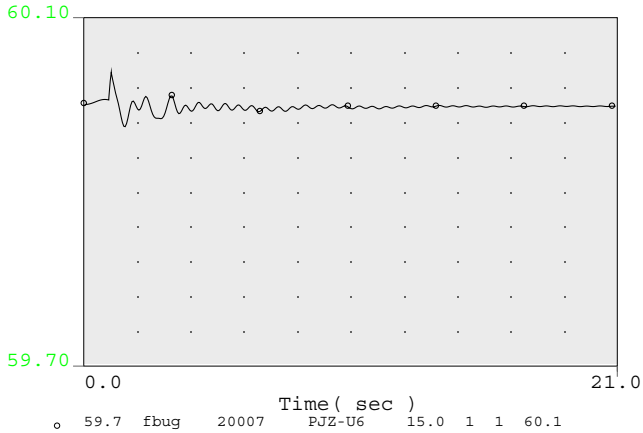

MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line



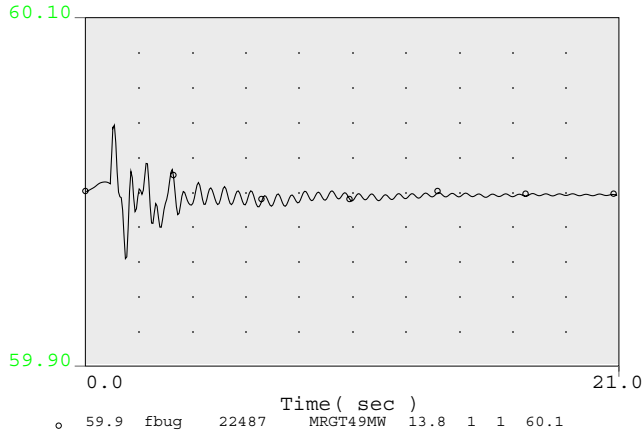

59.9 fbug 30000 PTSB 7 20.0 1 1 60.1



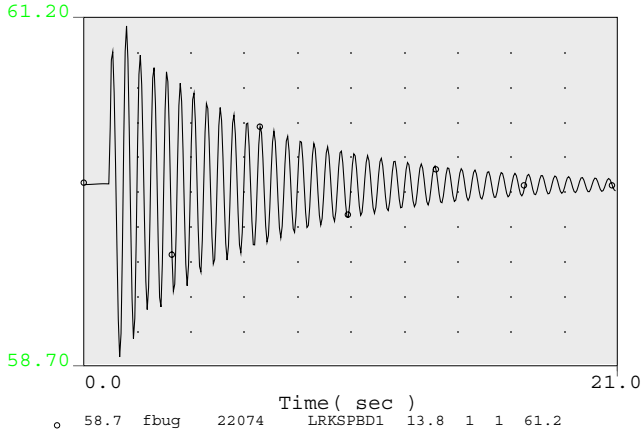

59.9 fbug 21075 ELSTM 1 13.8 1 1 60.1




59.7 fbug 20007 PJZ-U6 15.0 1 1 60.1




59.9 fbug 22487 MRGT49MW 13.8 1 1 60.1

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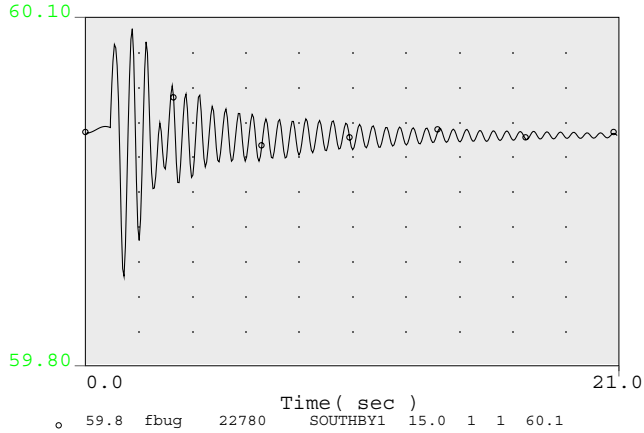
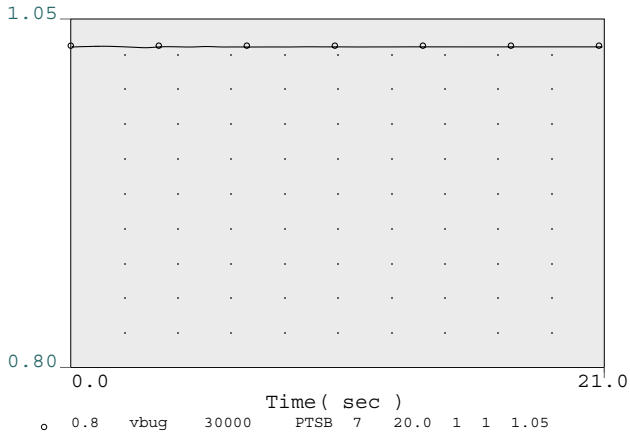
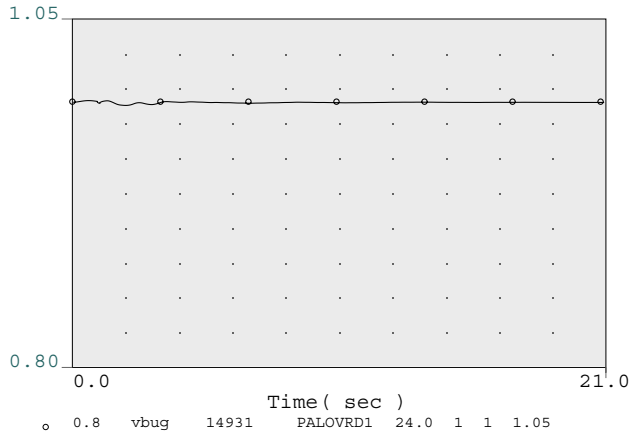
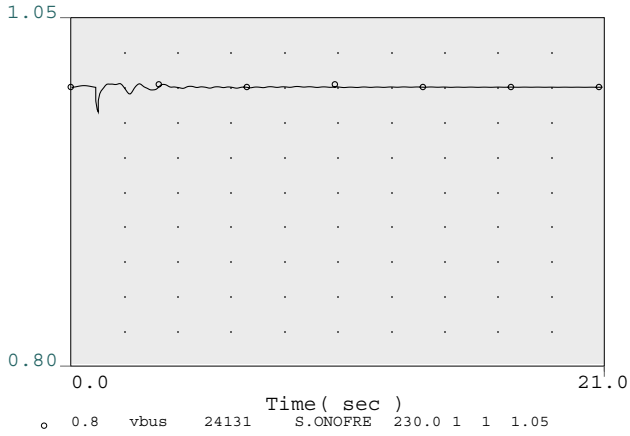


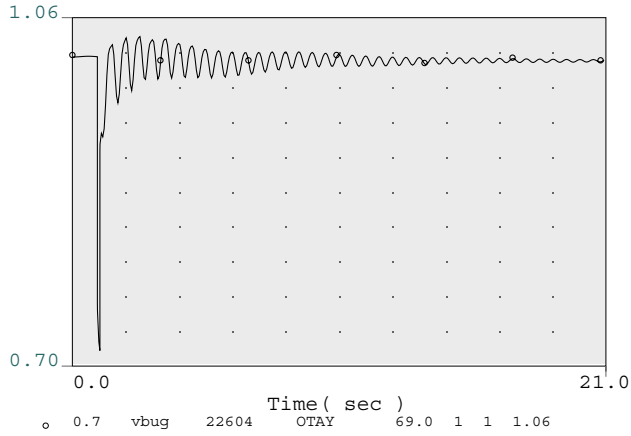

59.8 fbug 22780 SOUTHBY1 15.0 1 1 60.1

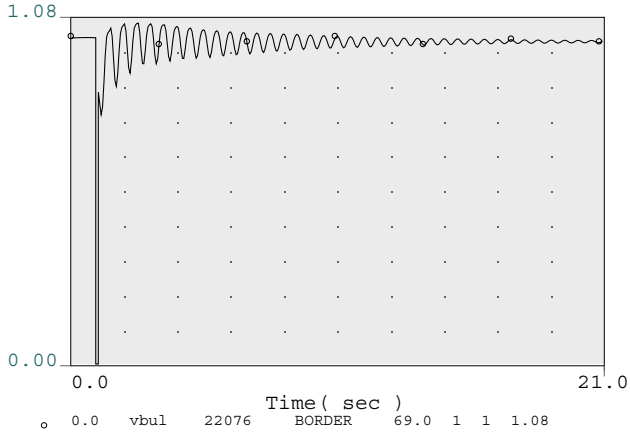
MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

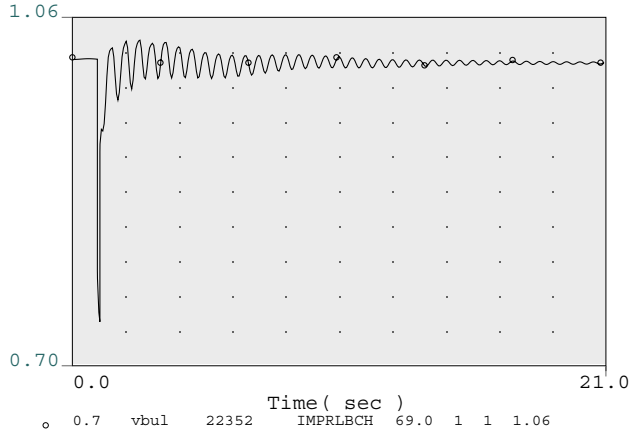


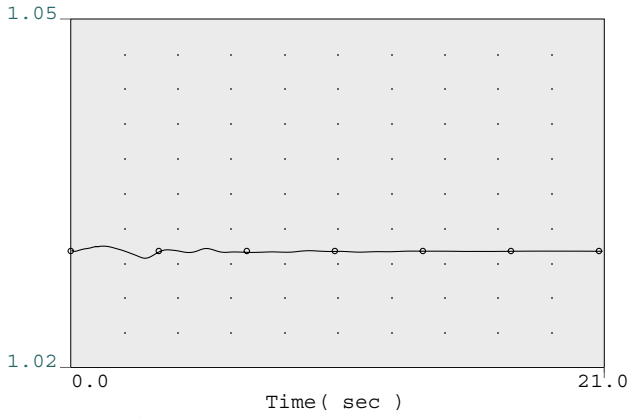



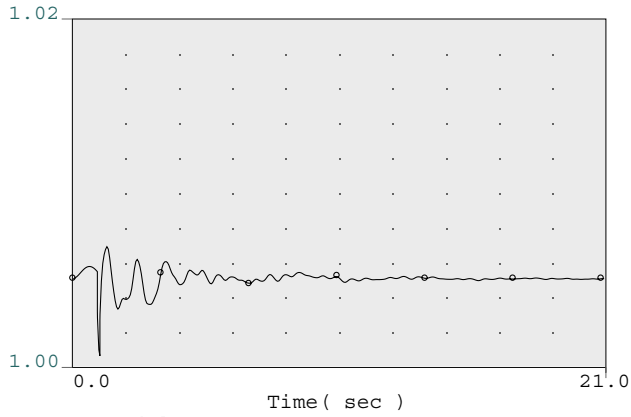



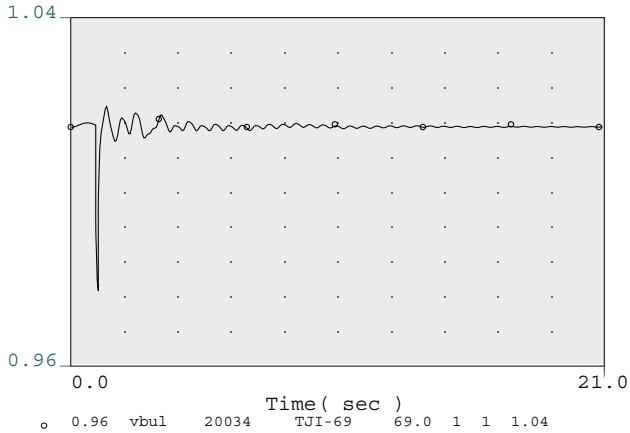

MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line



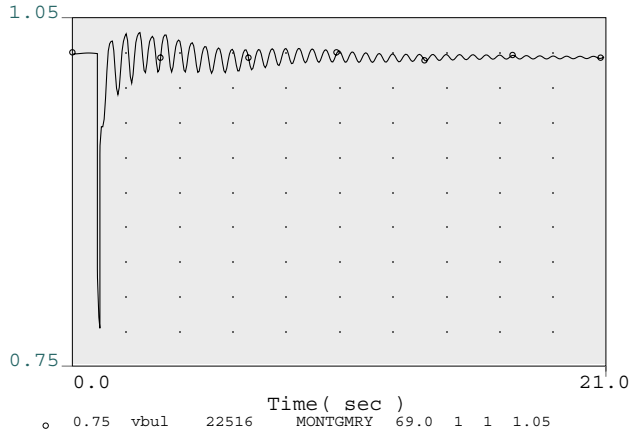

1.02 vbug 30000 PTSB 7 20.0 1 1 1.05




1.0 vbul 21027 ELSTEAMP 92.0 1 1 1.02




0.96 vbul 20034 TJI-69 69.0 1 1 1.04

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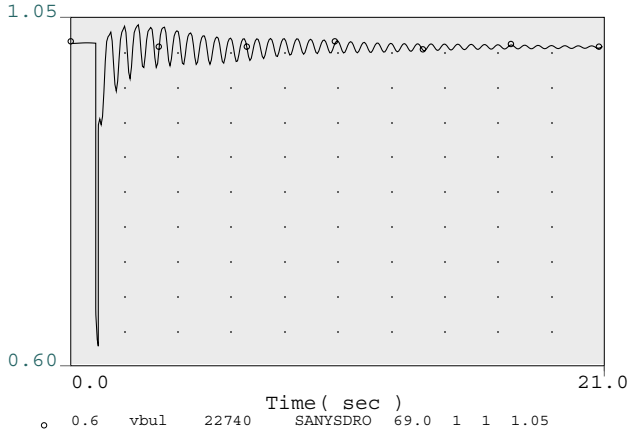


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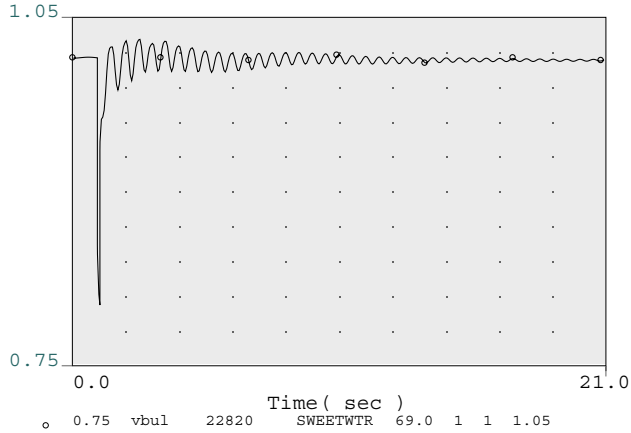
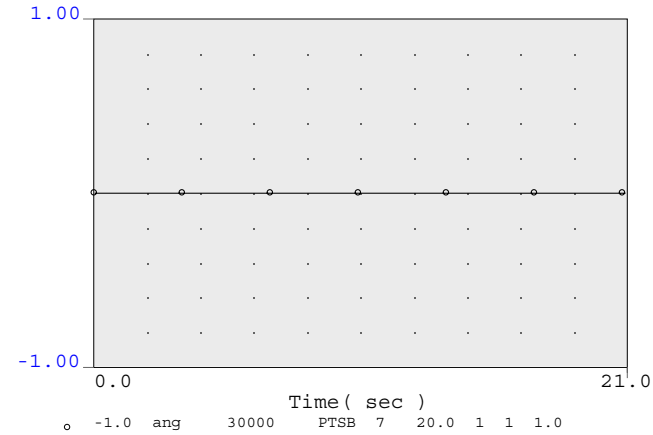
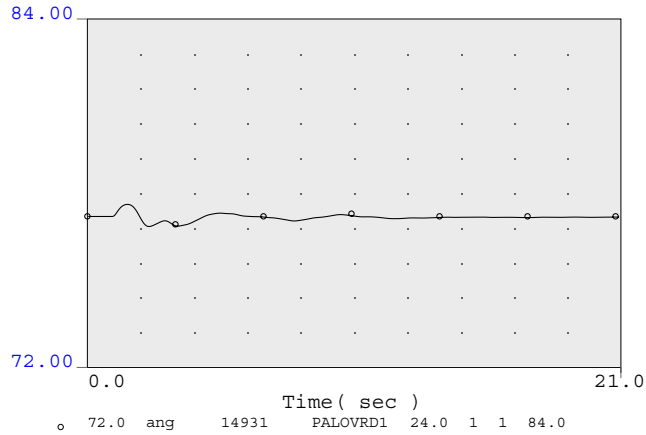
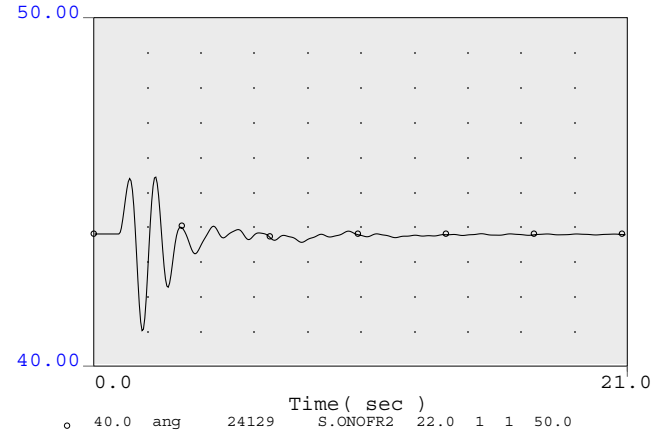


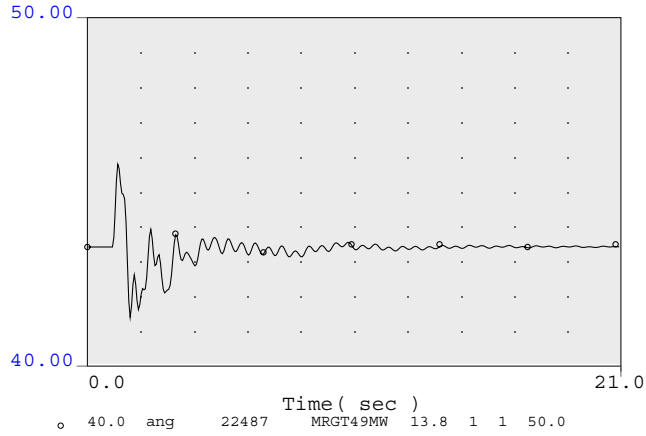

0.75 vbul 22820 SWEETWTR 69.0 1 1 1.05

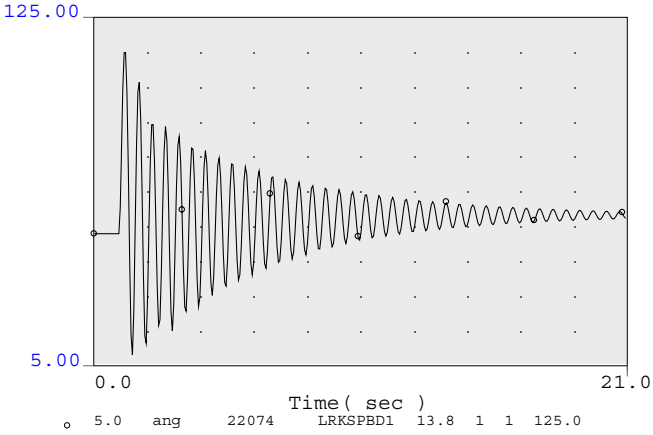
MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

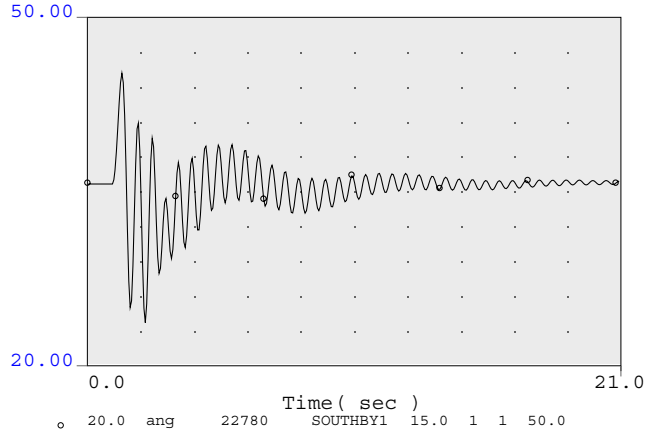


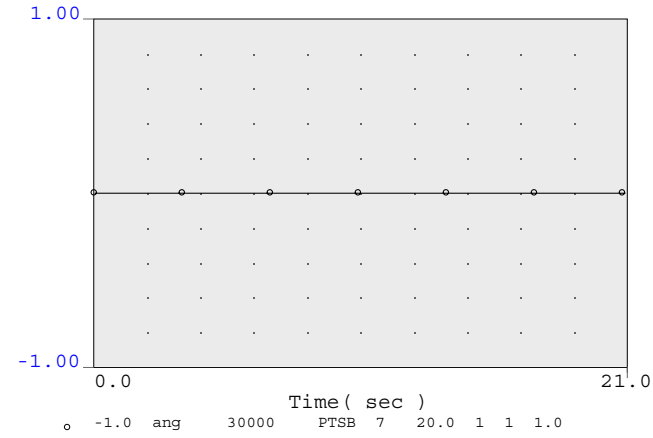



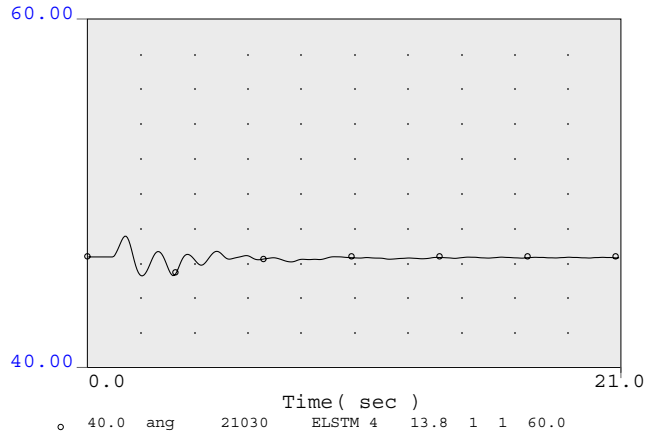



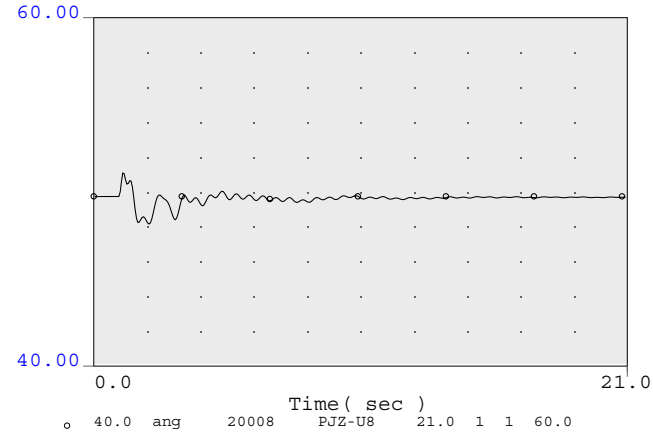



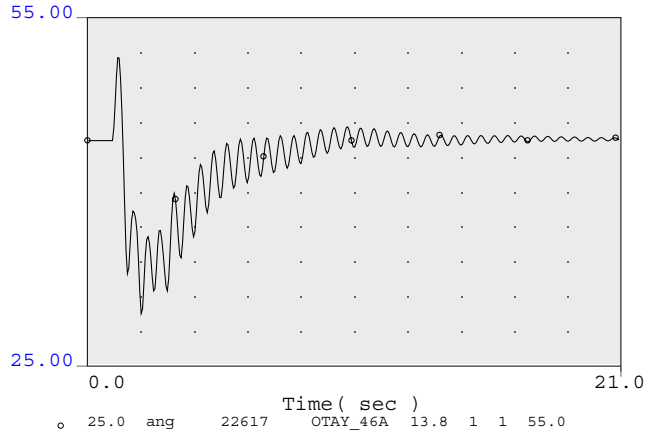



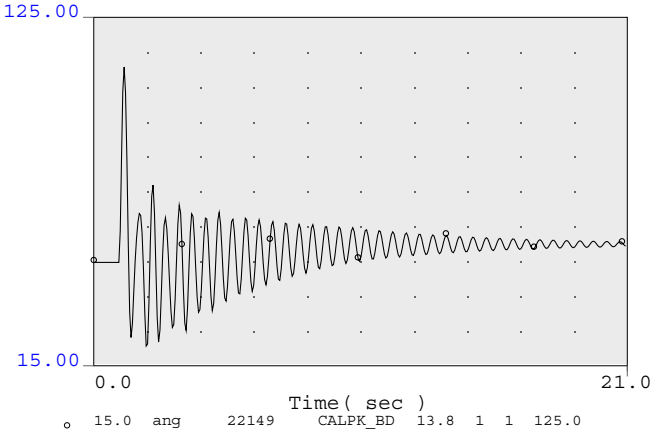

MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

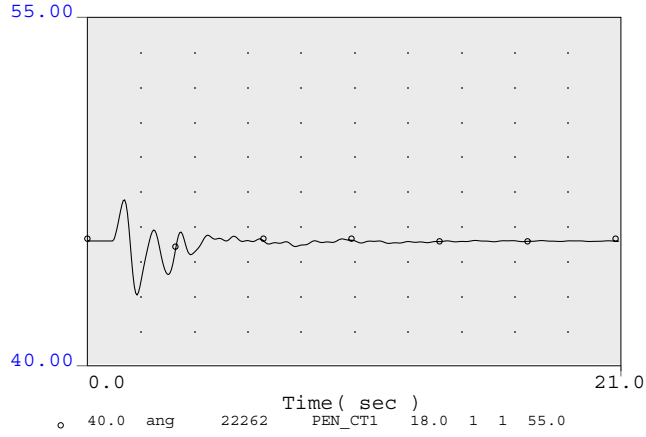


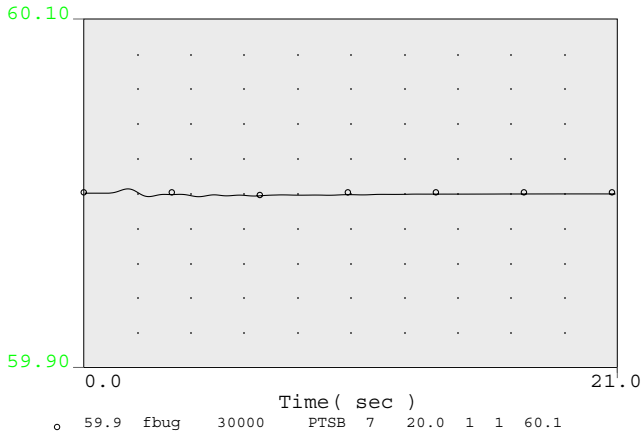



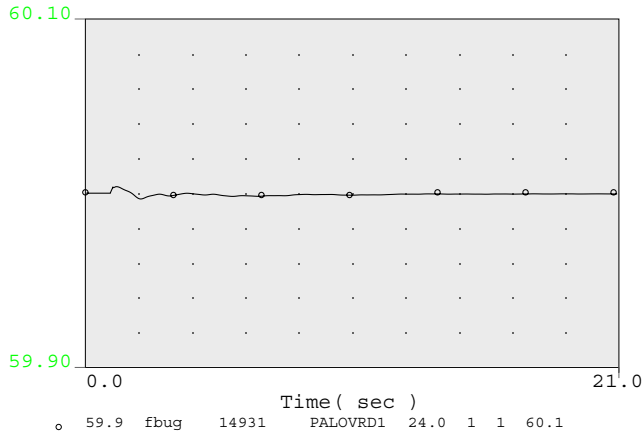



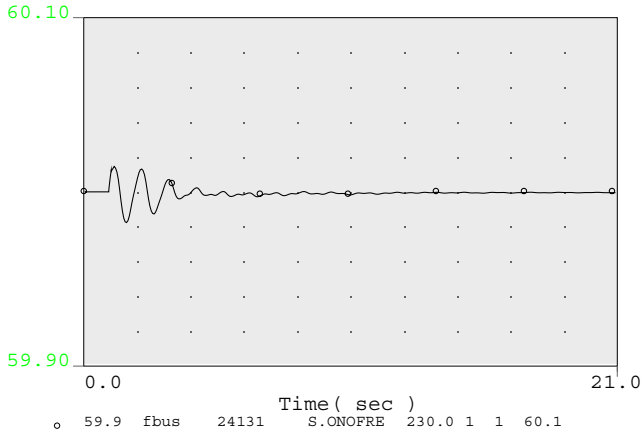



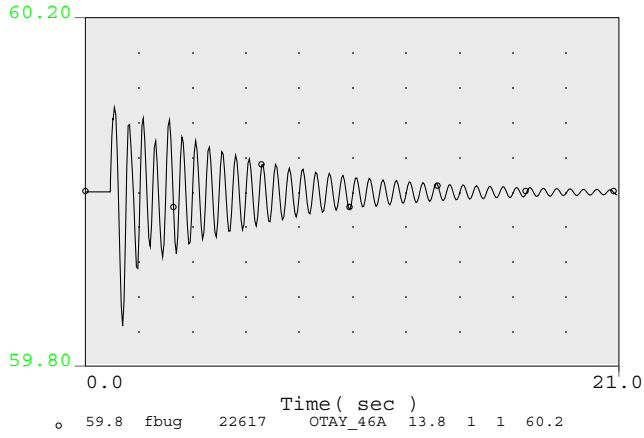



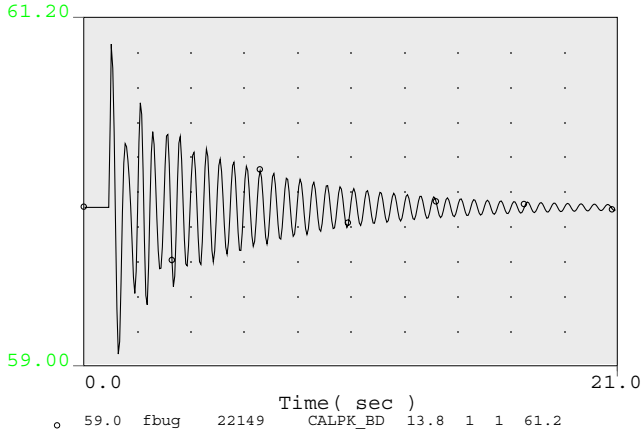

MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

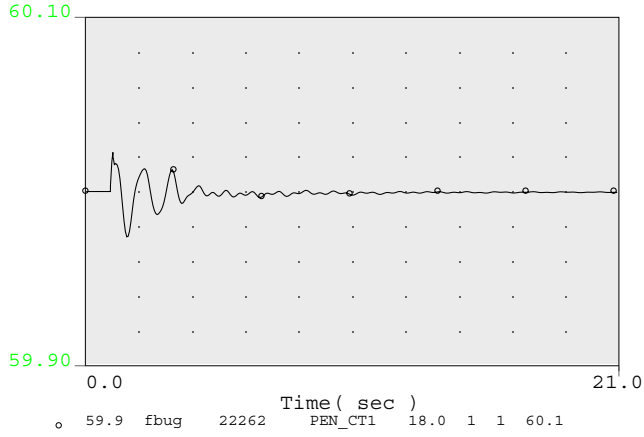


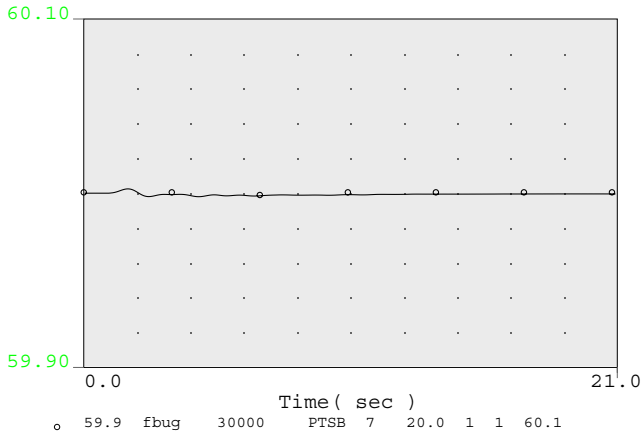



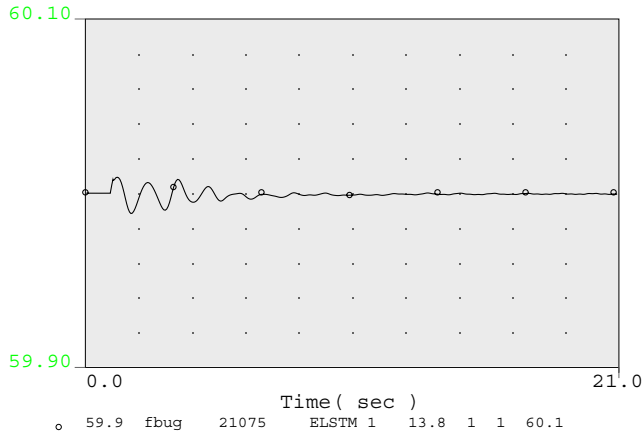



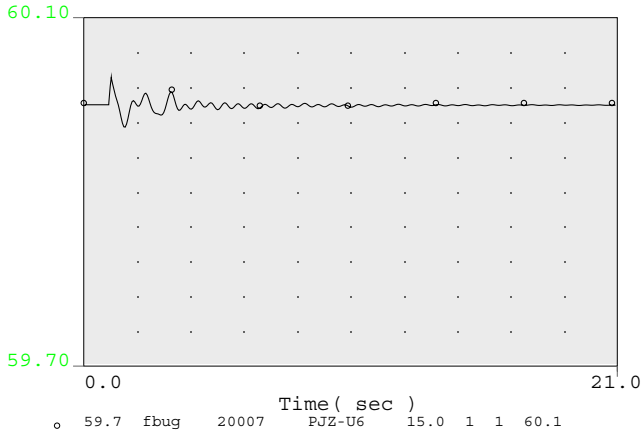



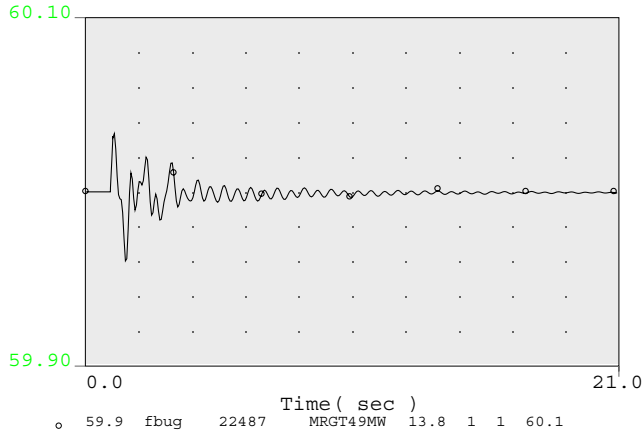



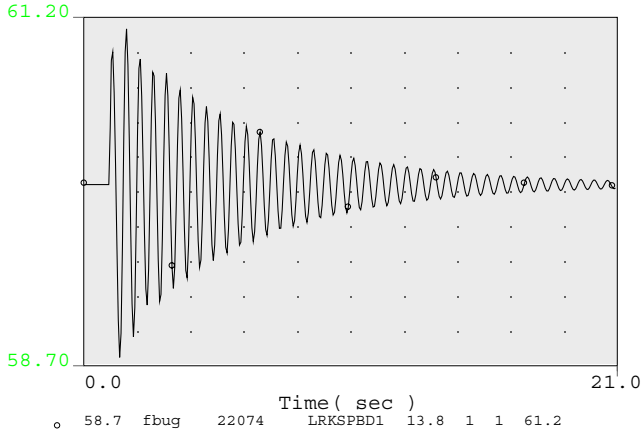

MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

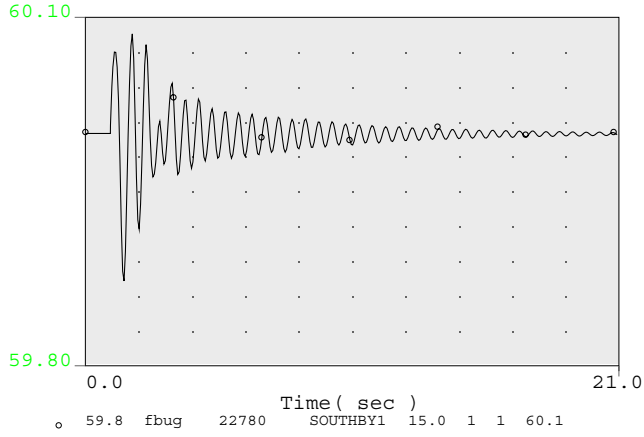


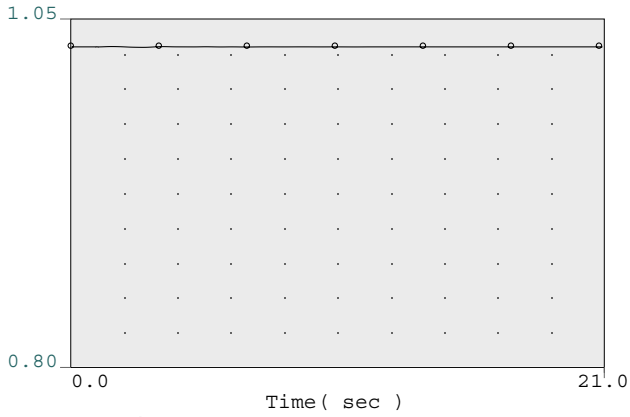




MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

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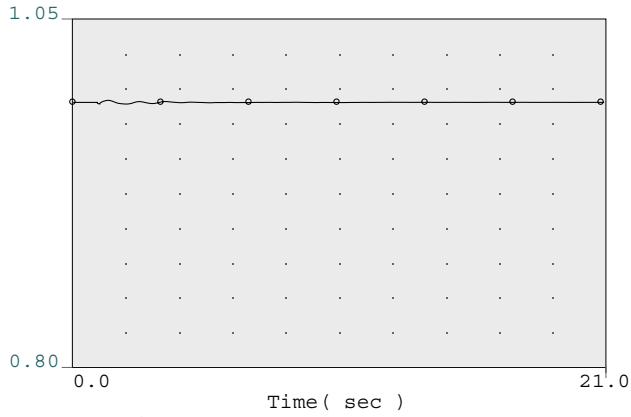


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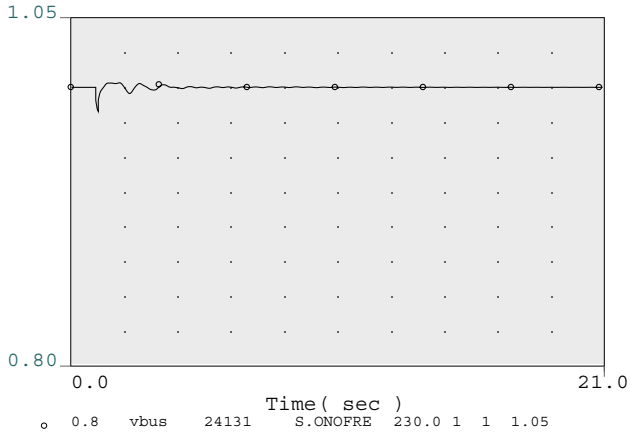


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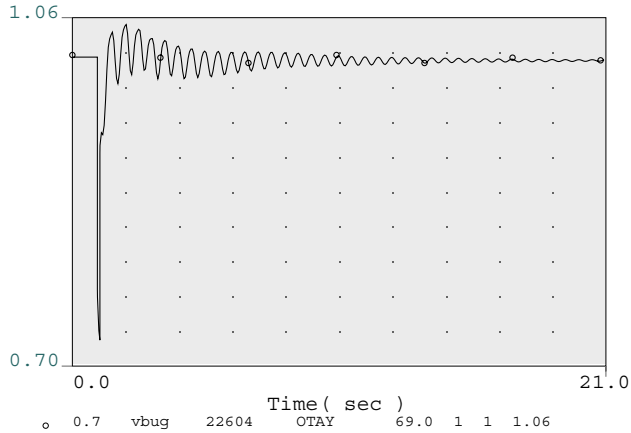


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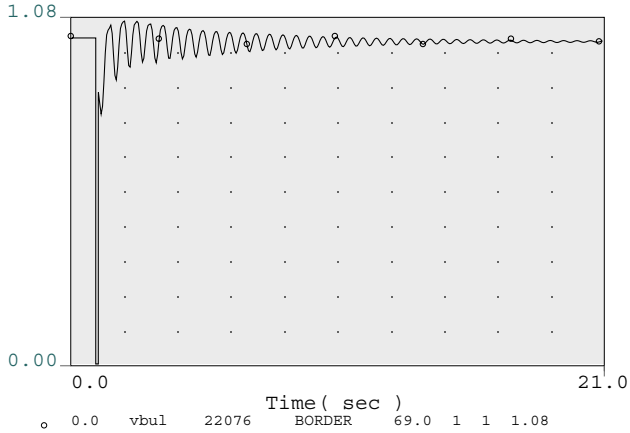


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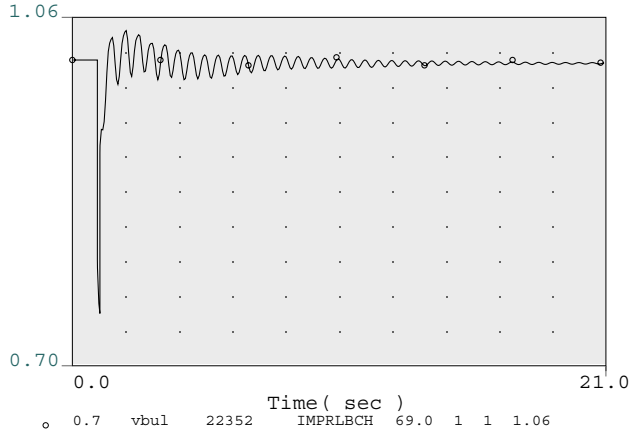


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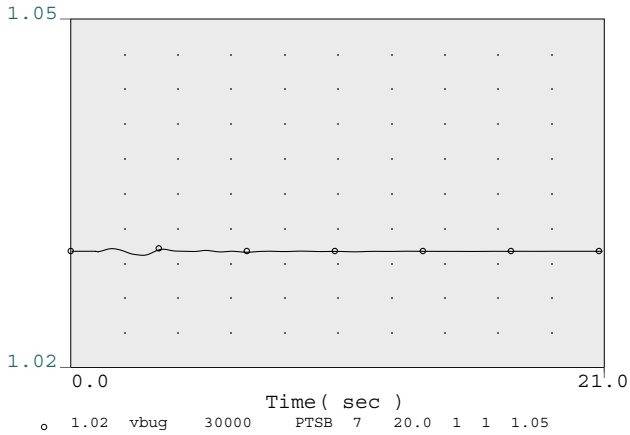
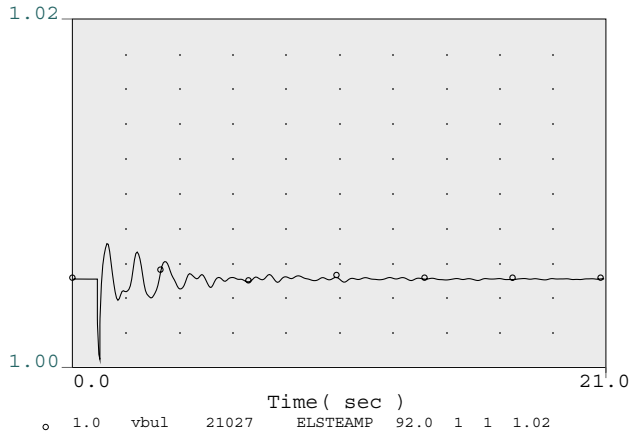
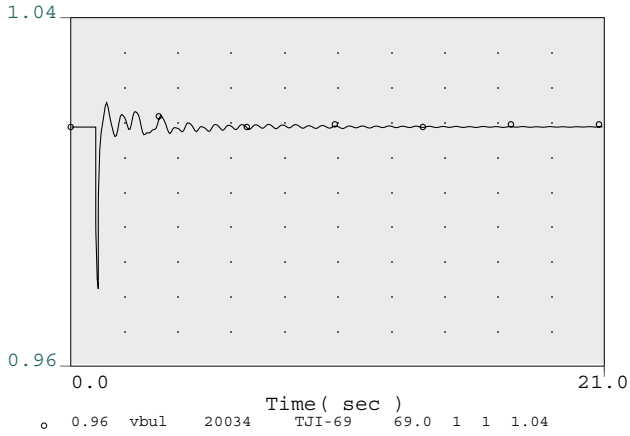
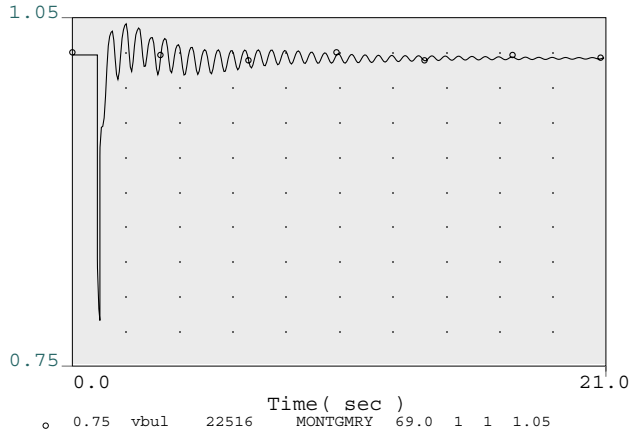
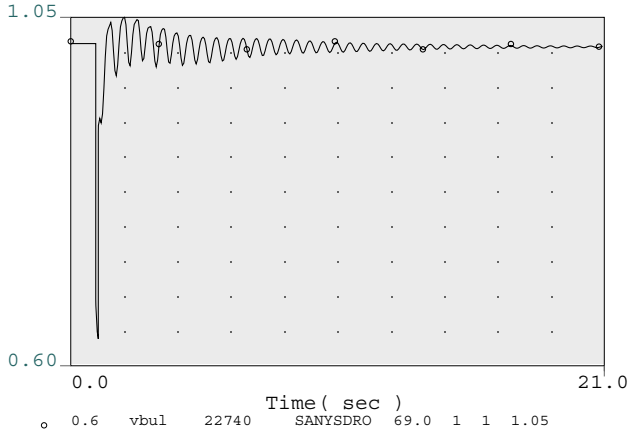
MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

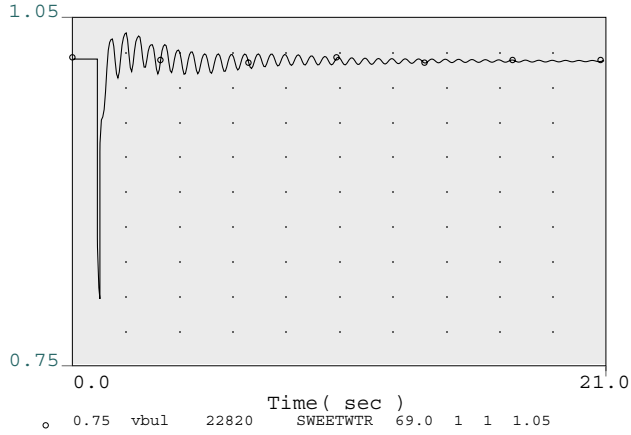


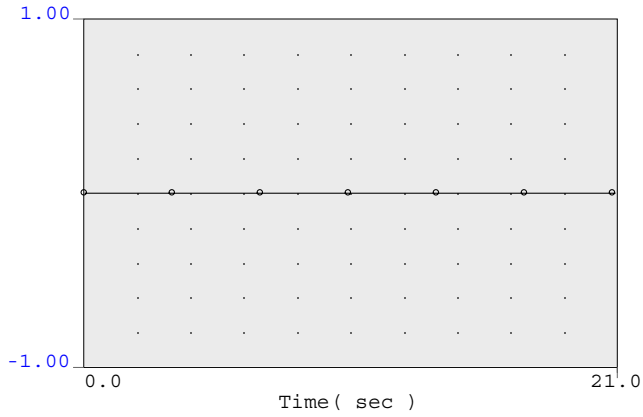




MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

Otay 69 kV Bus Fault

Fault bus for 6 cycles

Pre- and Post-Project

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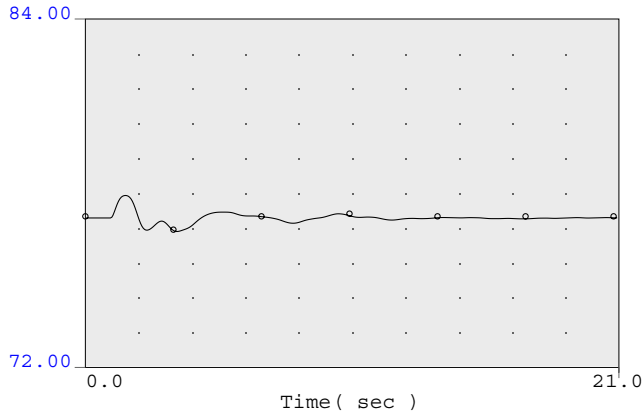


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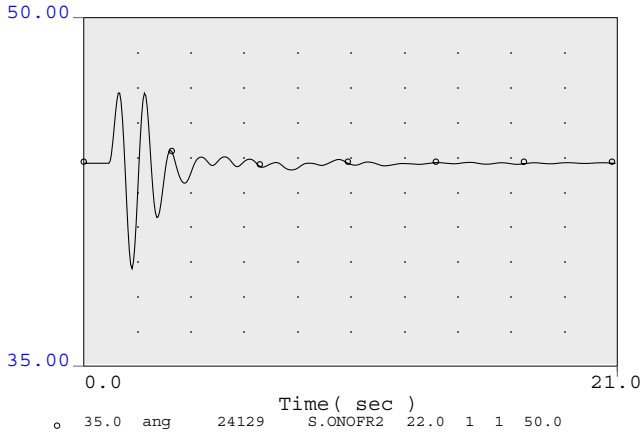


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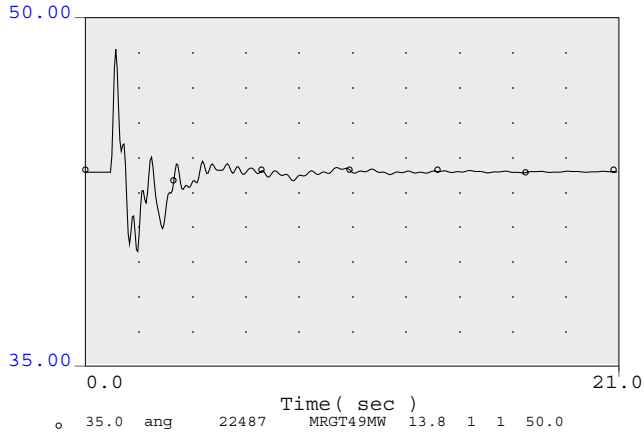


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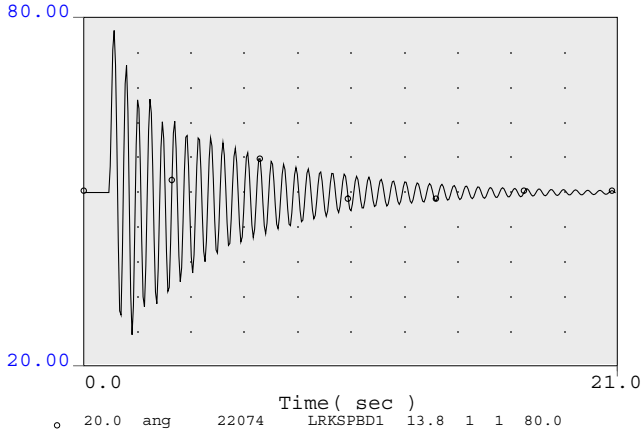


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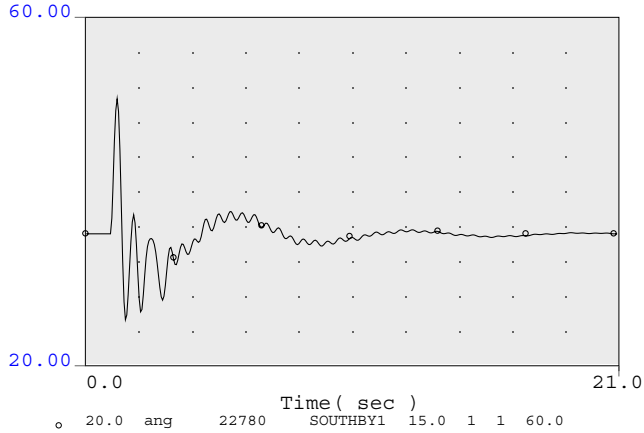


20.0 ang 22780 SOUTHBY1 15.0 1 1 60.0

MMC ISIS, pre-project

Fault bus at OTAY_93



oy_bus_pre.chf

c:\upslf16\mypslf

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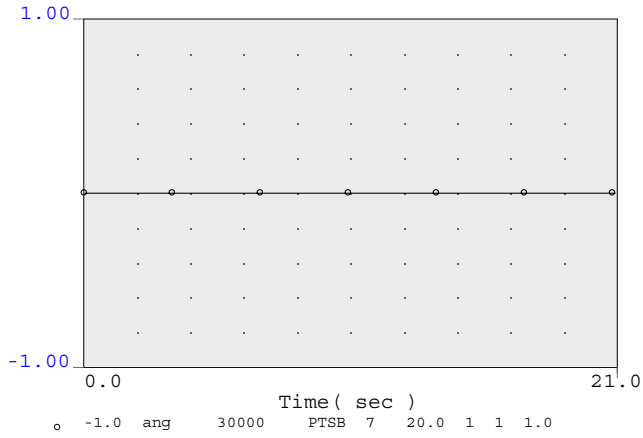
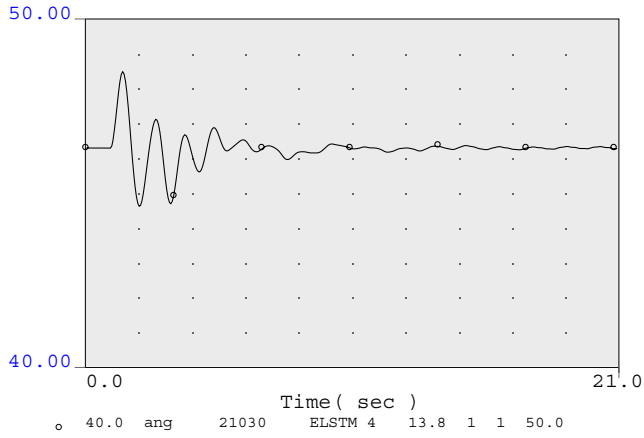
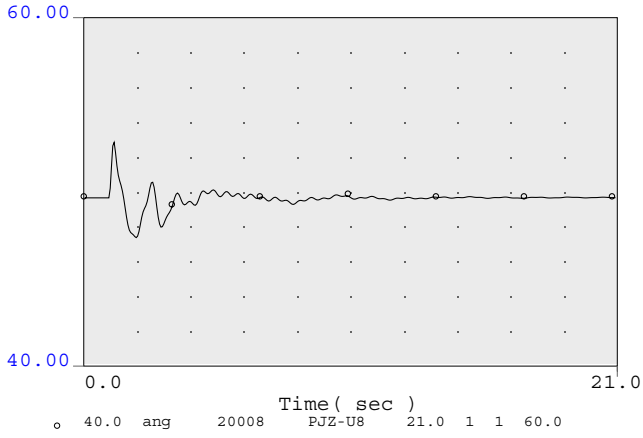
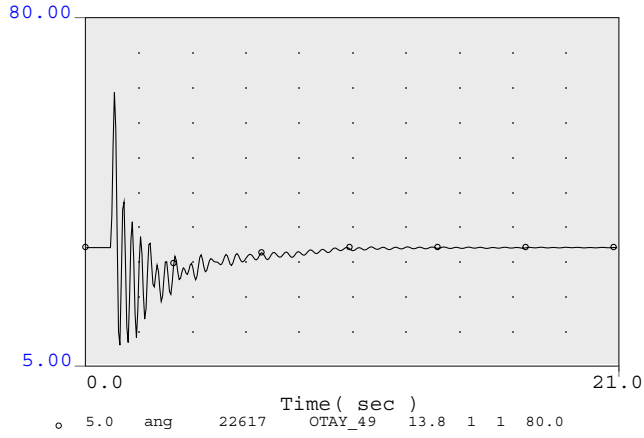
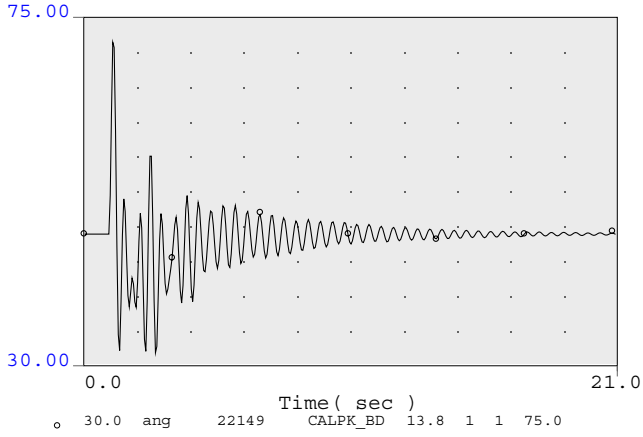
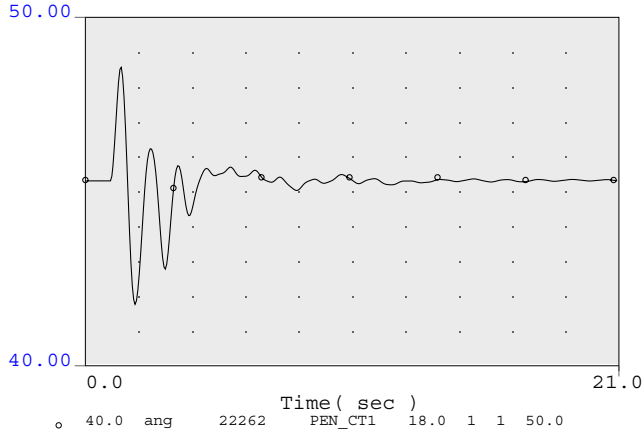


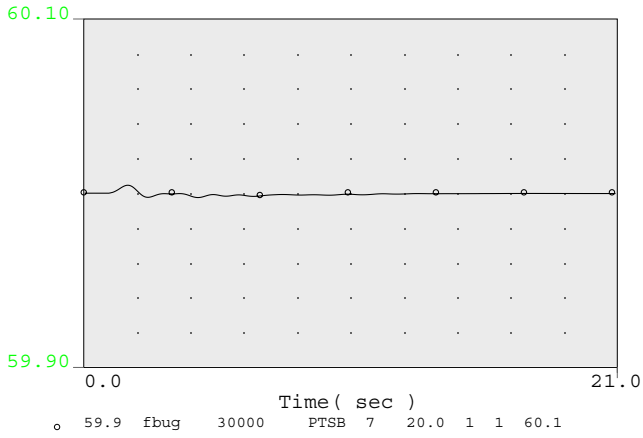



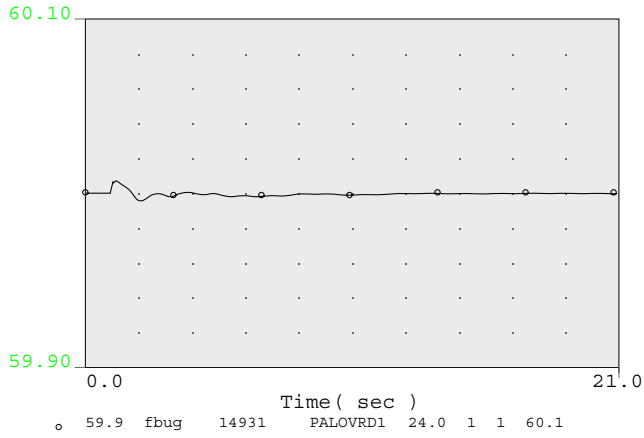



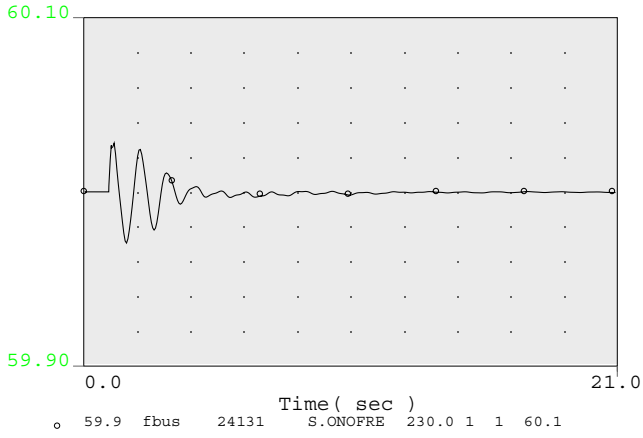



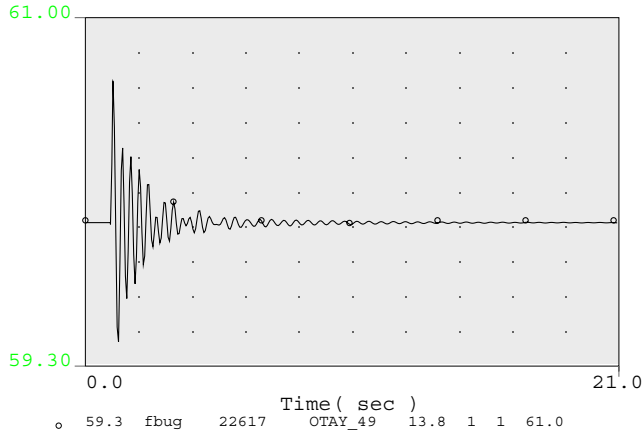



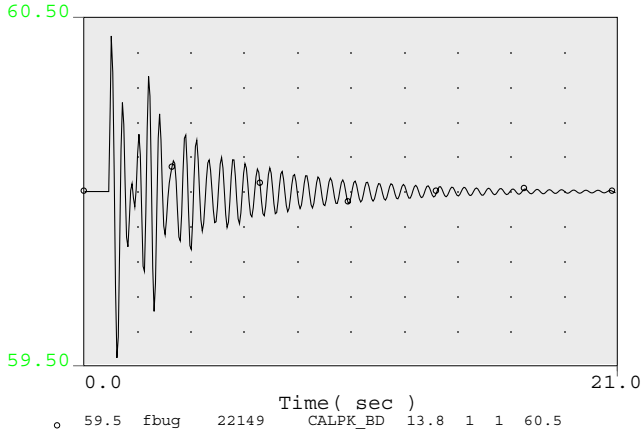

MMC ISIS, pre-project
Fault bus at OTAY_93

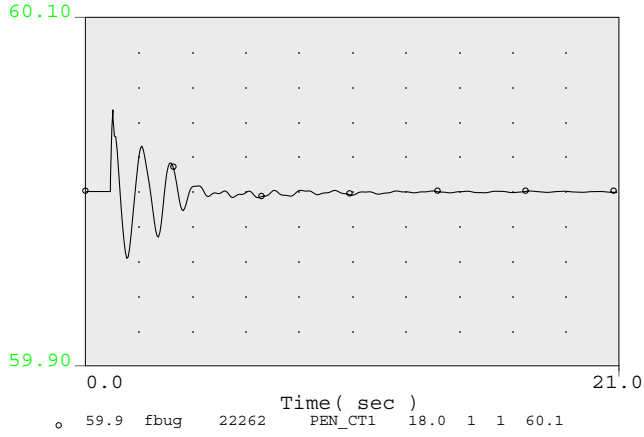


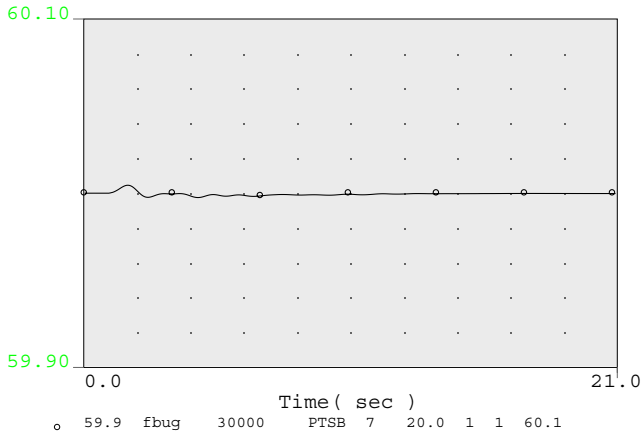



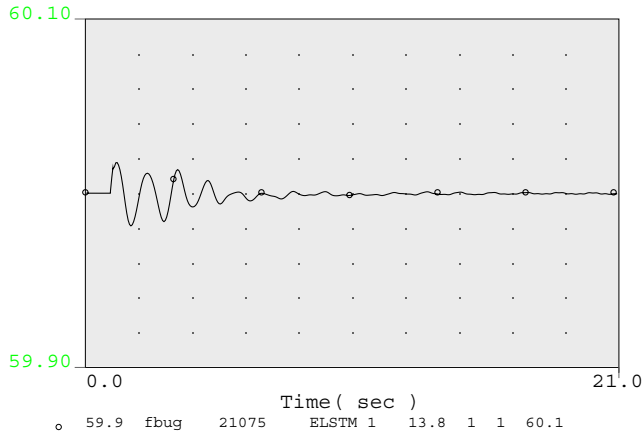



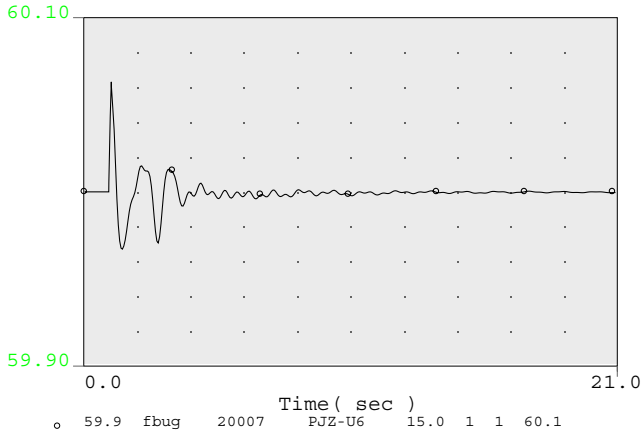



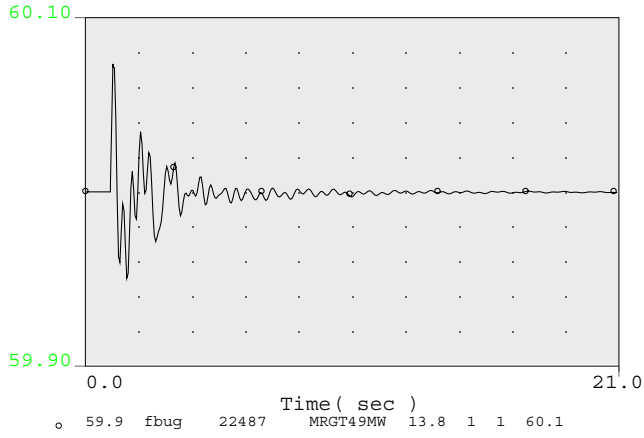



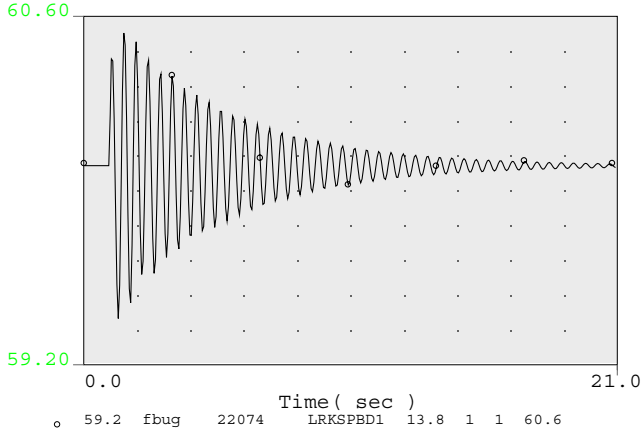

MMC ISIS, pre-project
Fault bus at OTAY_93

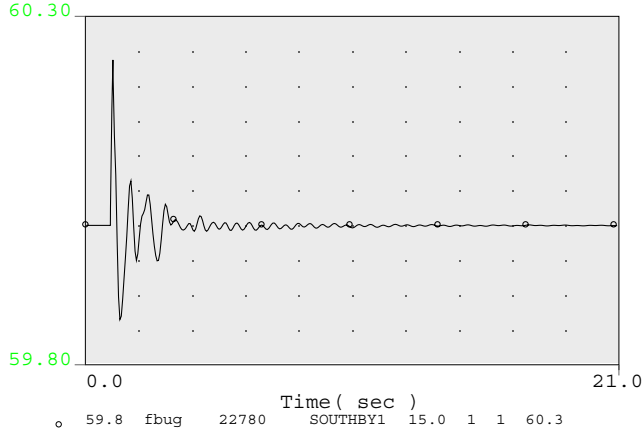


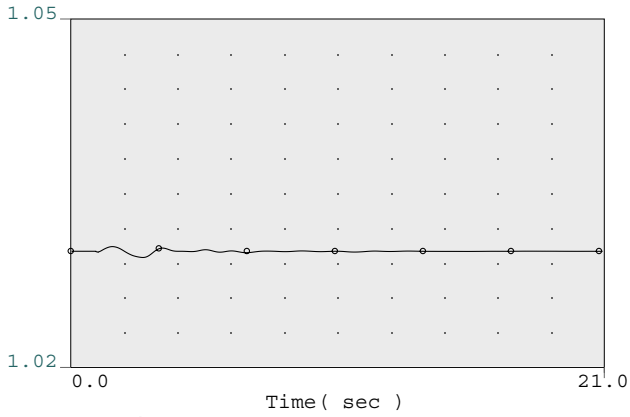




MMC ISIS, pre-project
Fault bus at OTAY_93

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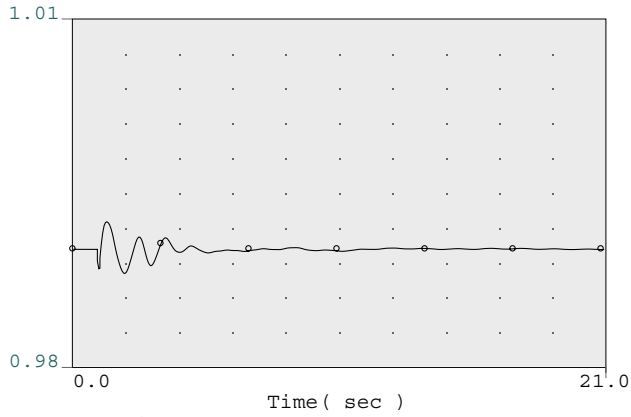


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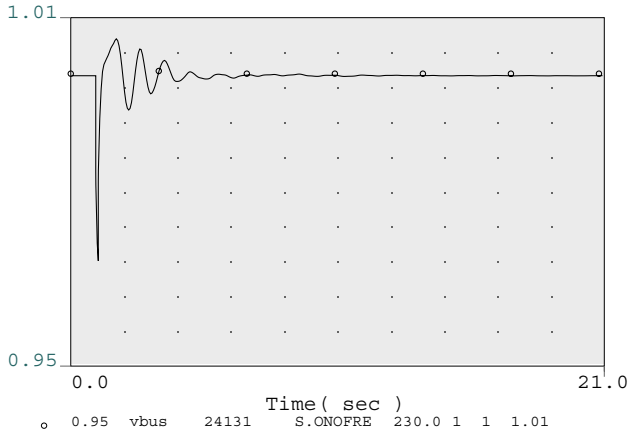


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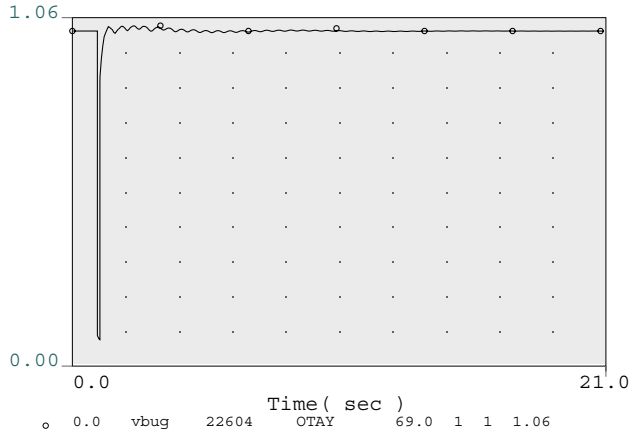


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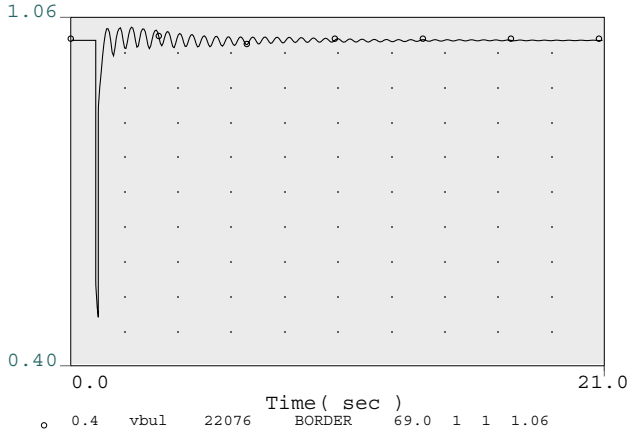


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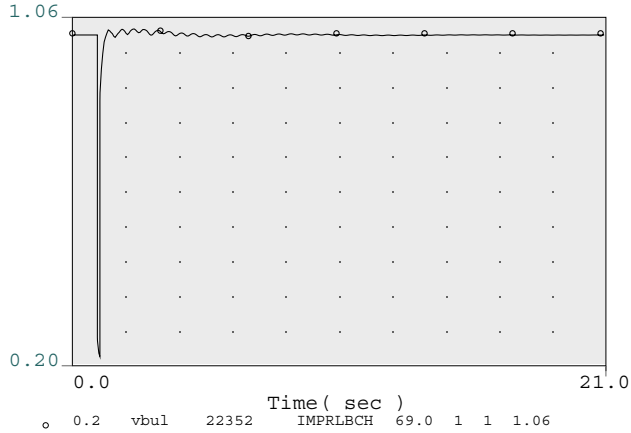


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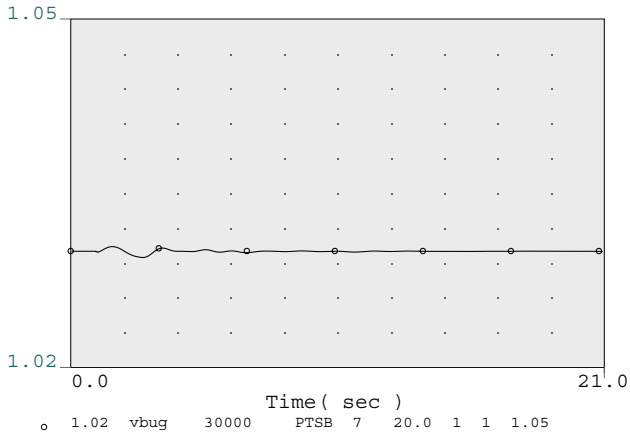
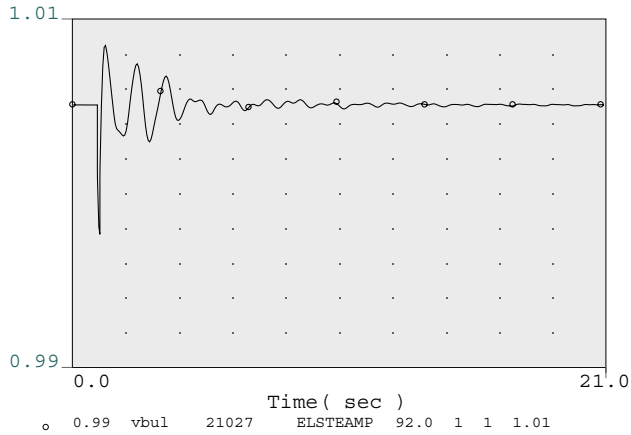
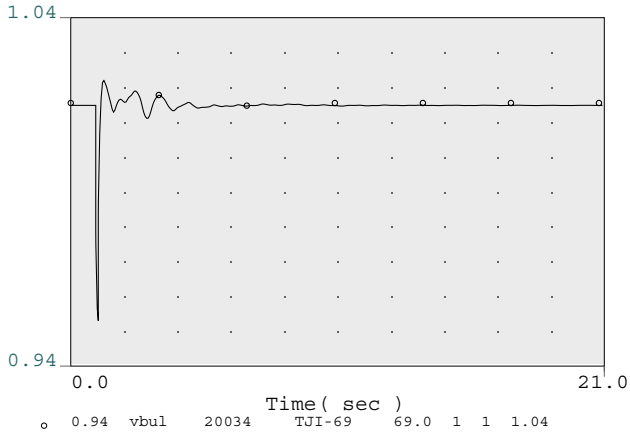
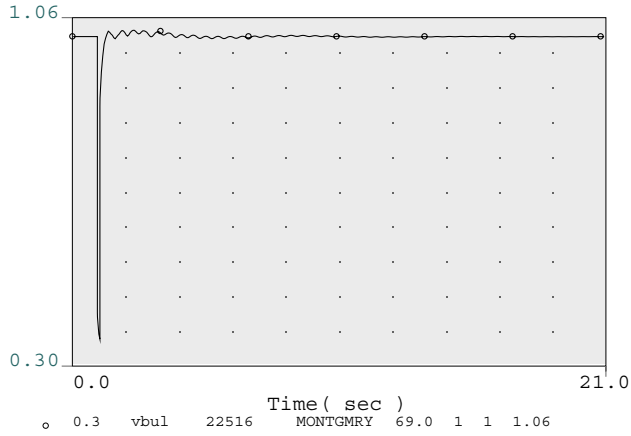
MMC ISIS, pre-project

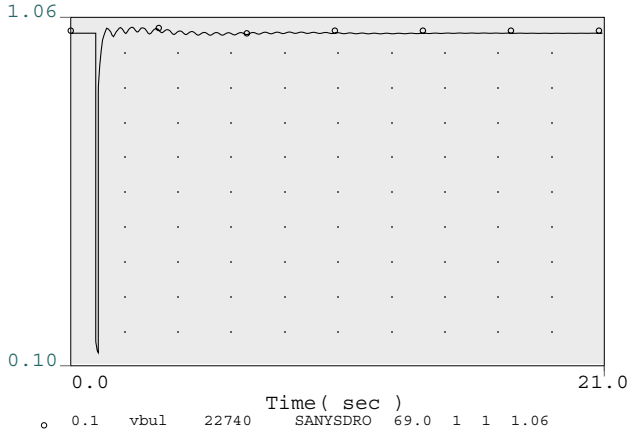
Fault bus at OTAY_93

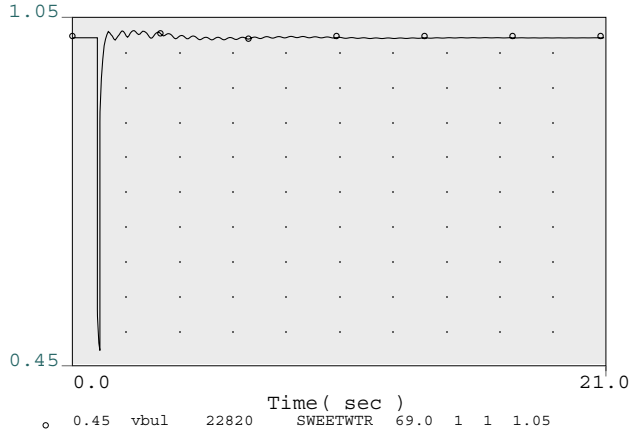


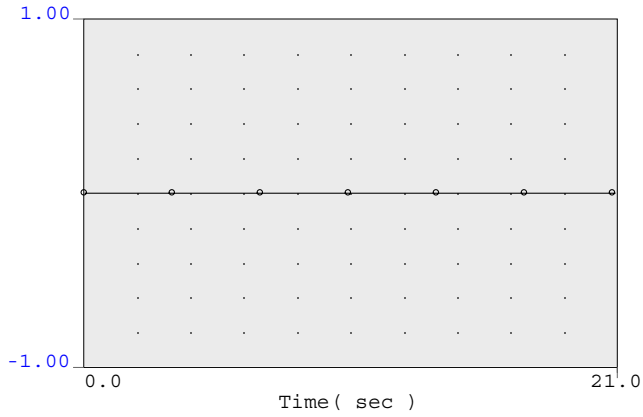



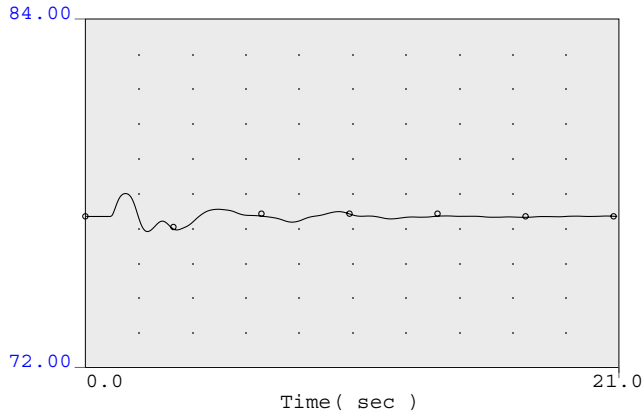




MMC ISIS, pre-project
Fault bus at OTAY_93




-1.0 ang 30000 PTSB 7 20.0 1 1 1.0

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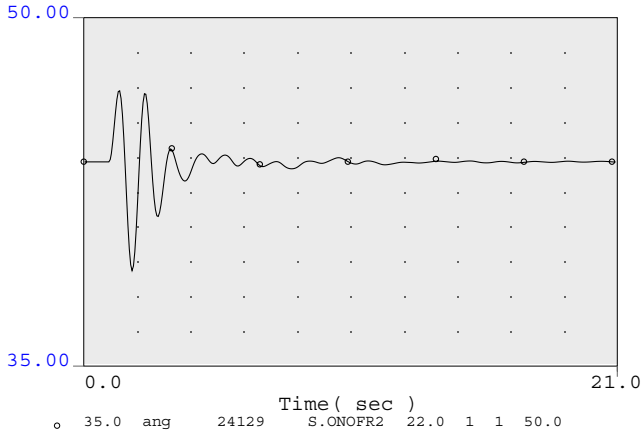


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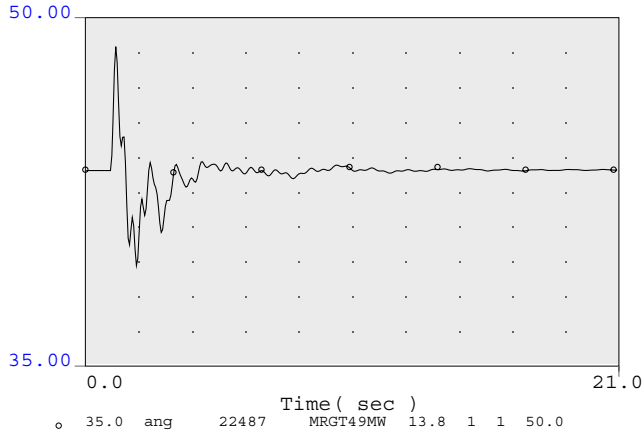


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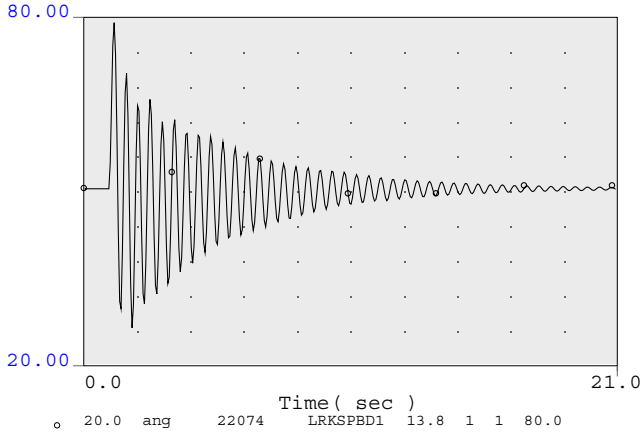


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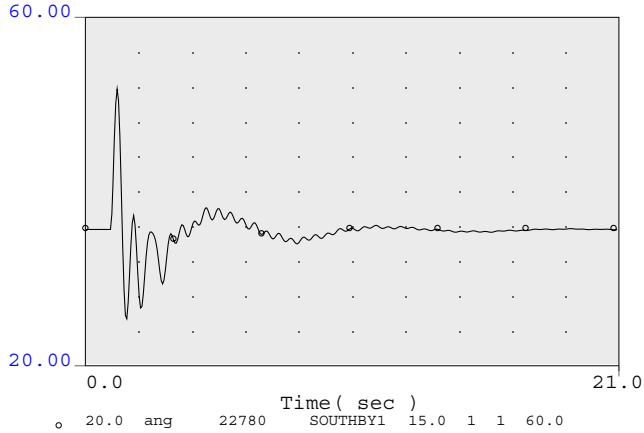


20.0 ang 22780 SOUTHBY1 15.0 1 1 60.0

MMC ISIS, post-project

Fault bus at OTAY_93



oy_bus_post.chf

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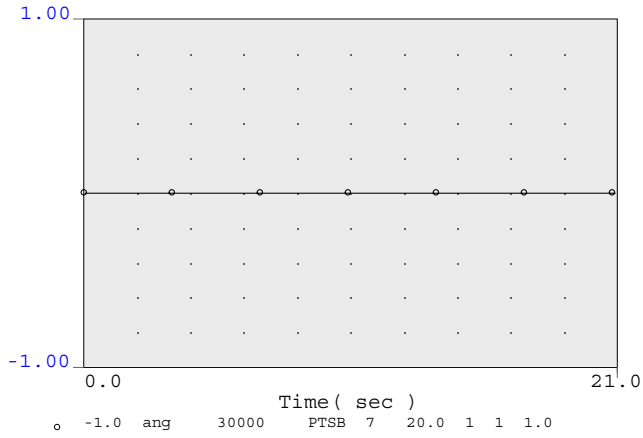
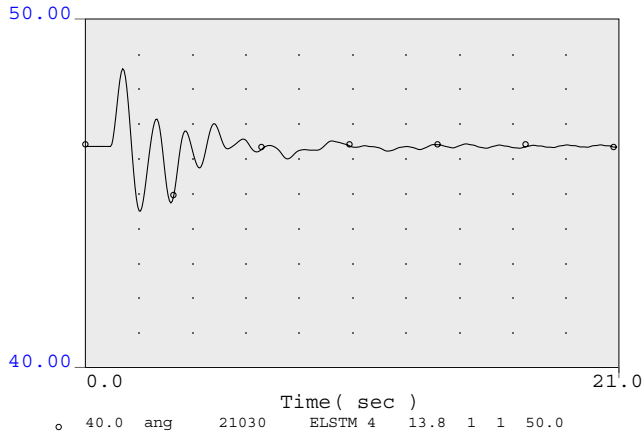
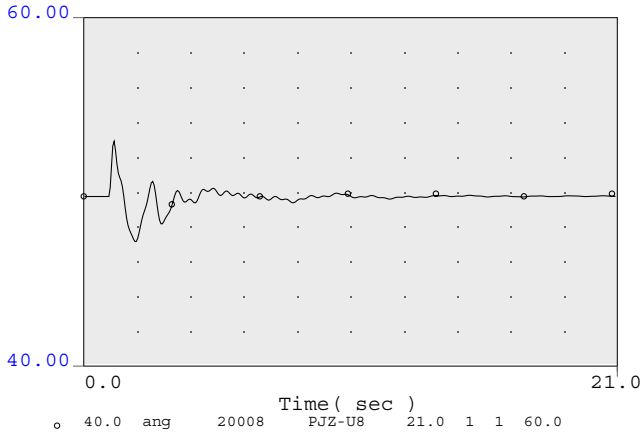
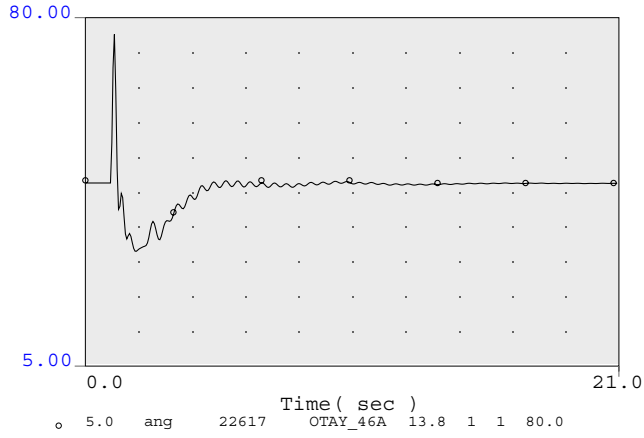
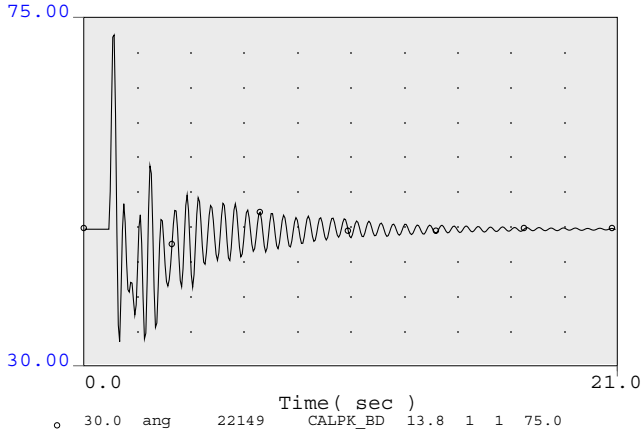
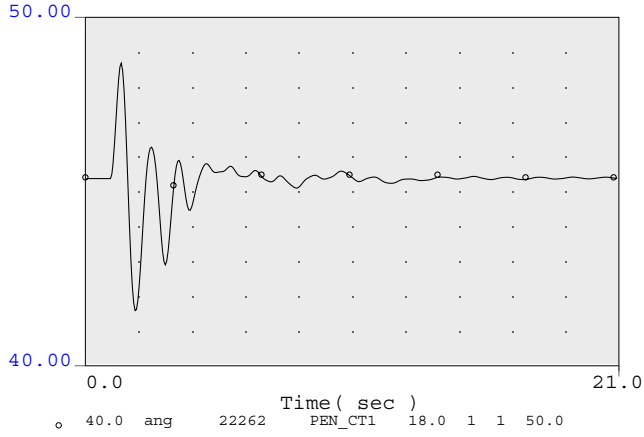


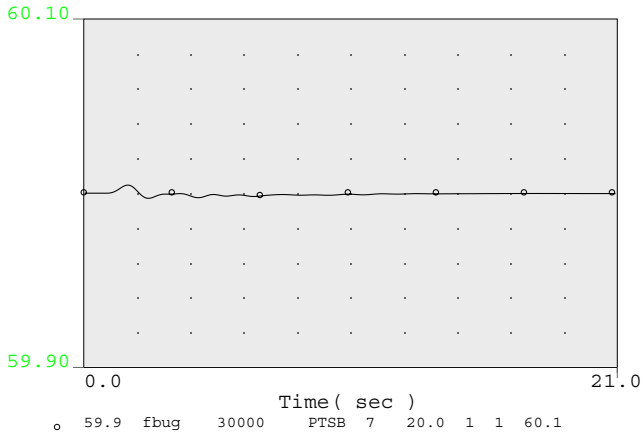



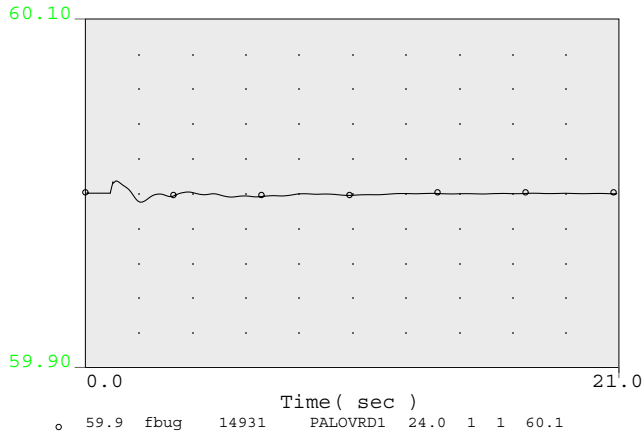



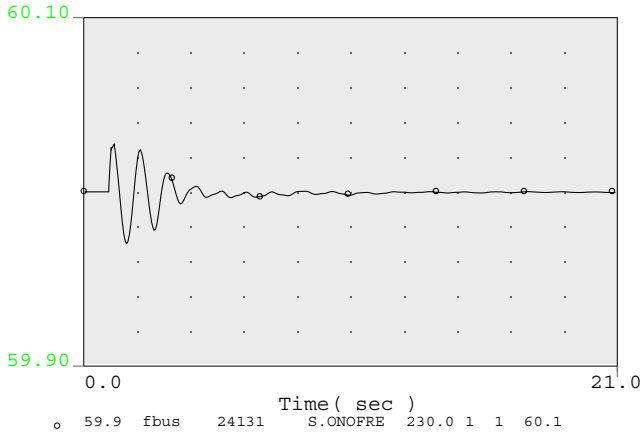



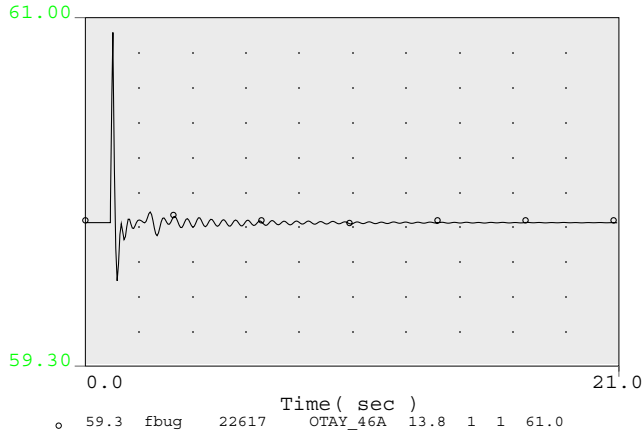



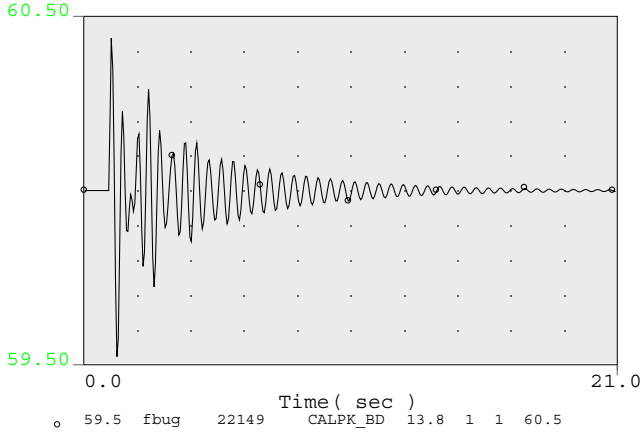

MMC ISIS, post-project
Fault bus at OTAY_93

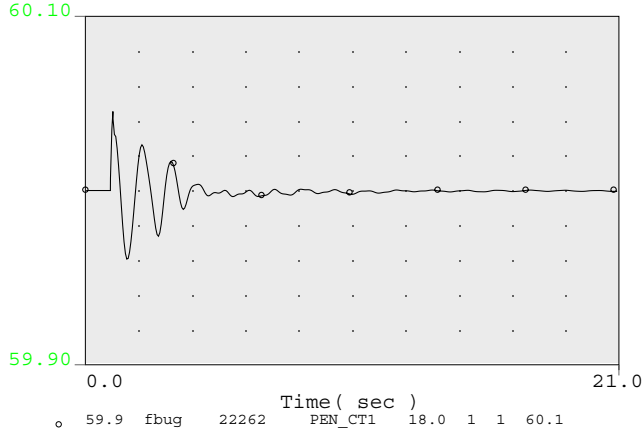


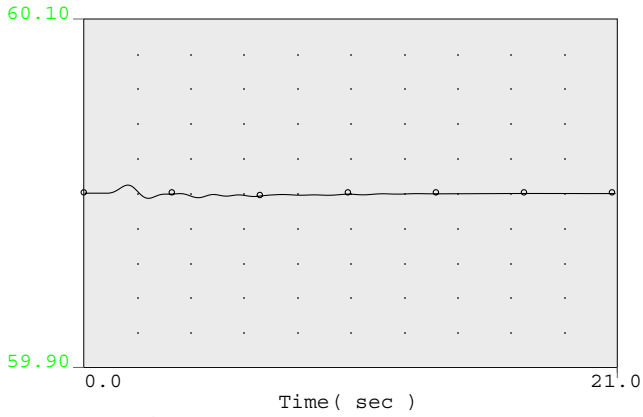



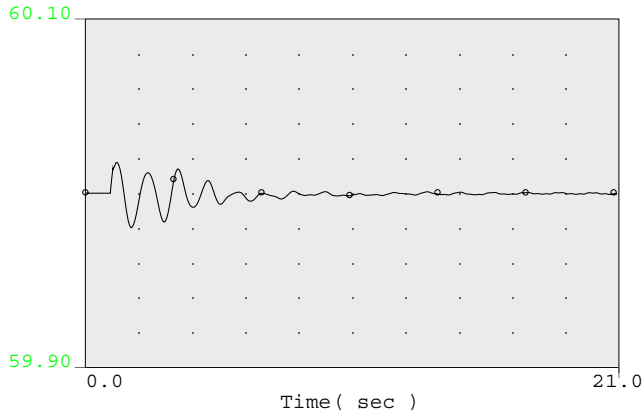



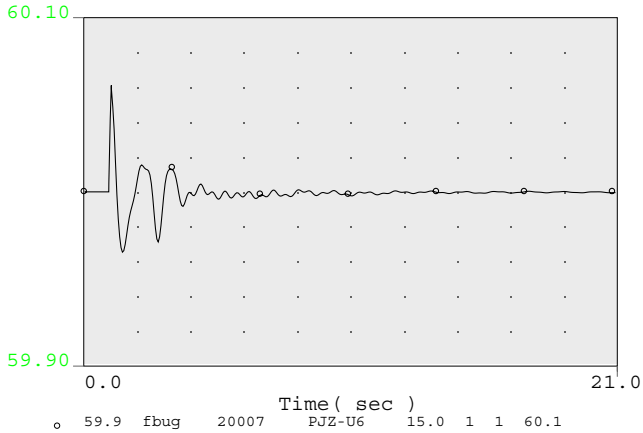

MMC ISIS, post-project
Fault bus at OTAY_93



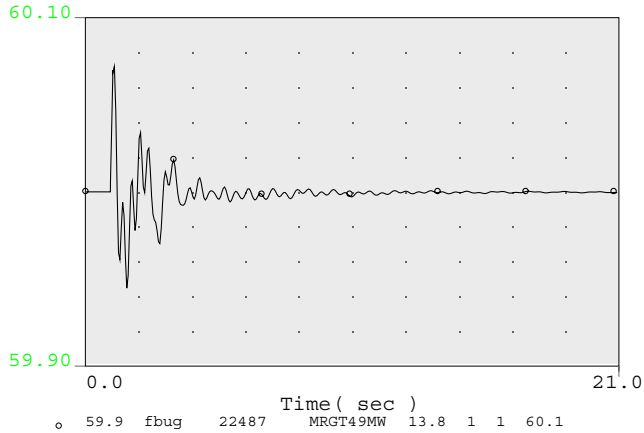

59.9 fbug 30000 PTSB 7 20.0 1 1 60.1



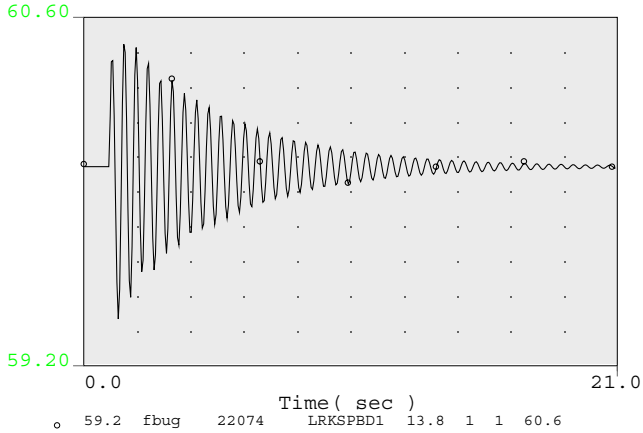

59.9 fbug 21075 ELSTM 1 13.8 1 1 60.1



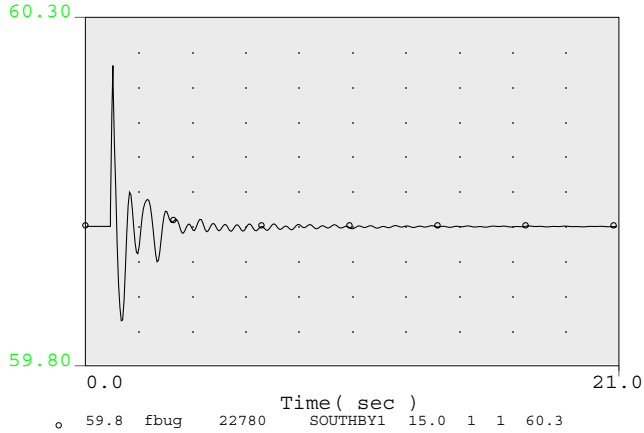

59.9 fbug 20007 PJZ-U6 15.0 1 1 60.1




59.9 fbug 22487 MRGT49MW 13.8 1 1 60.1



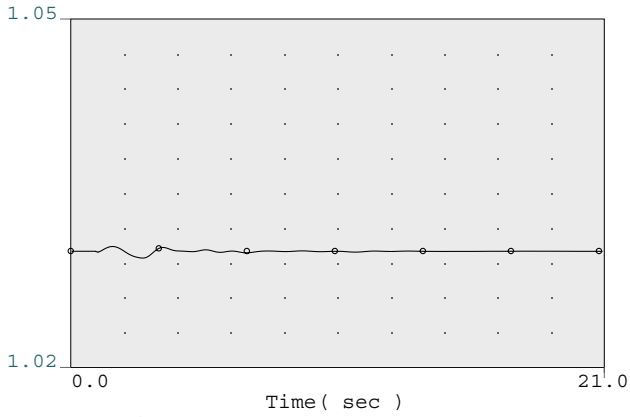

59.2 fbug 22074 LRKSPBD1 13.8 1 1 60.6



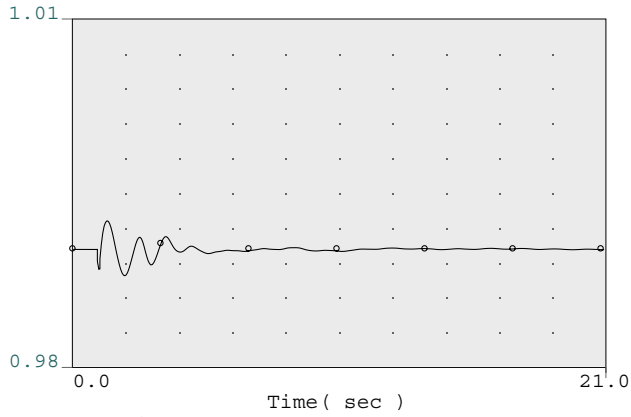

59.8 fbug 22780 SOUTHBY1 15.0 1 1 60.3

MMC ISIS, post-project

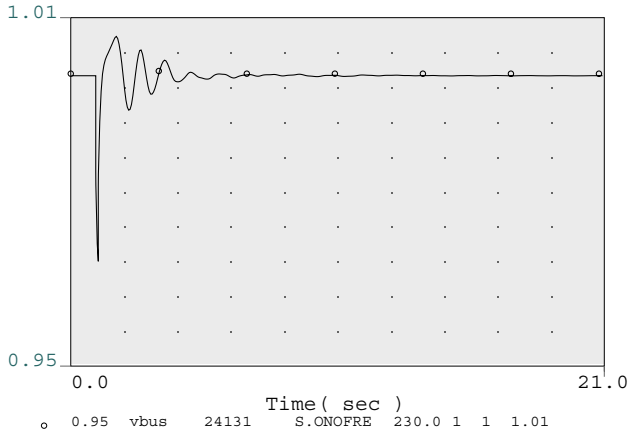
Fault bus at OTAY_93



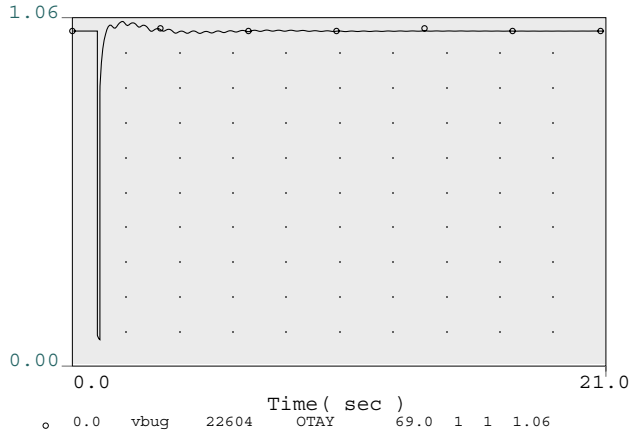

o 1.02 vbug 30000 PTSB 7 20.0 1 1 1.05



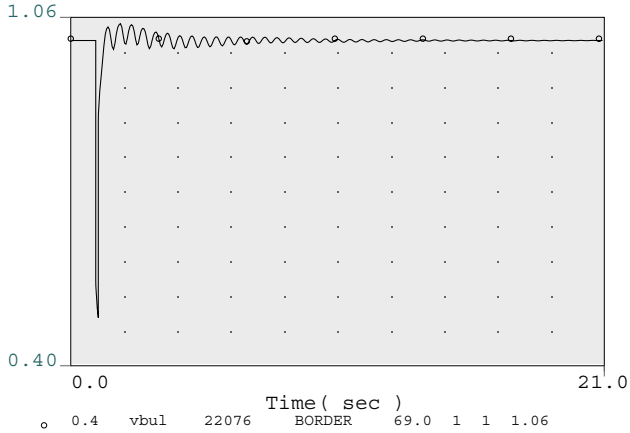

o 0.98 vbug 14931 PALOVRD1 24.0 1 1 1.01



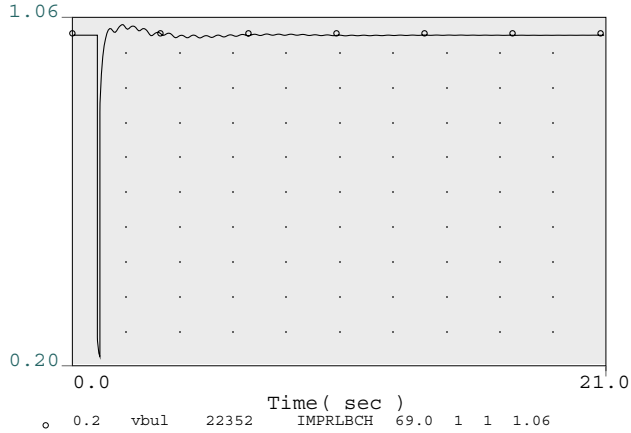

o 0.95 vbus 24131 S.ONOFRE 230.0 1 1 1.01




o 0.0 vbug 22604 OTAY 69.0 1 1 1.06



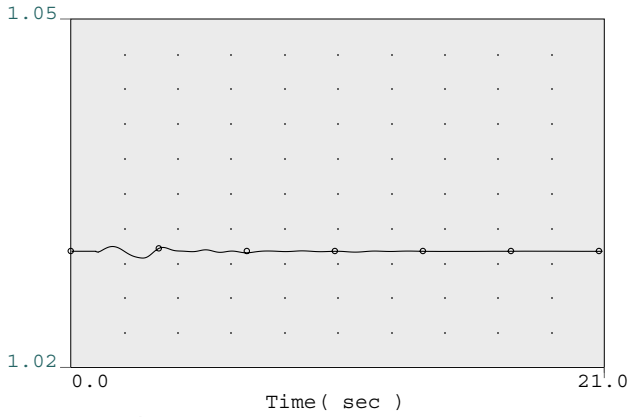

o 0.4 vbul 22076 BORDER 69.0 1 1 1.06




o 0.2 vbul 22352 IMPRLBCH 69.0 1 1 1.06

MMC ISIS, post-project

Fault bus at OTAY_93

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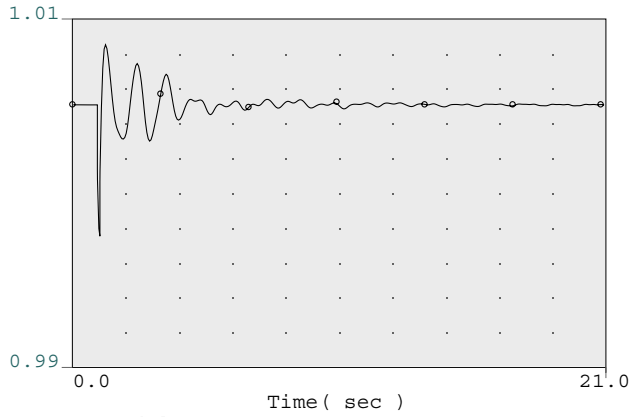


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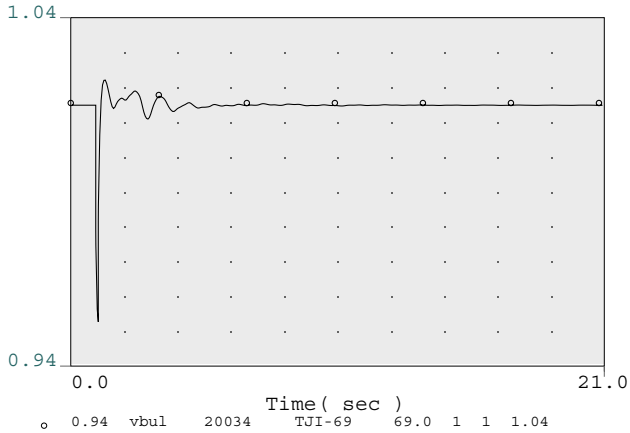


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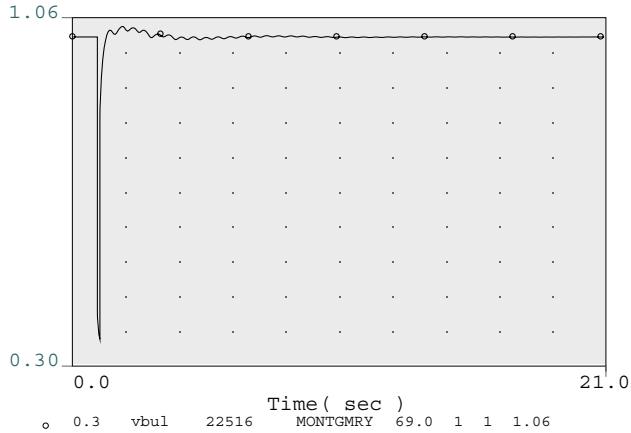
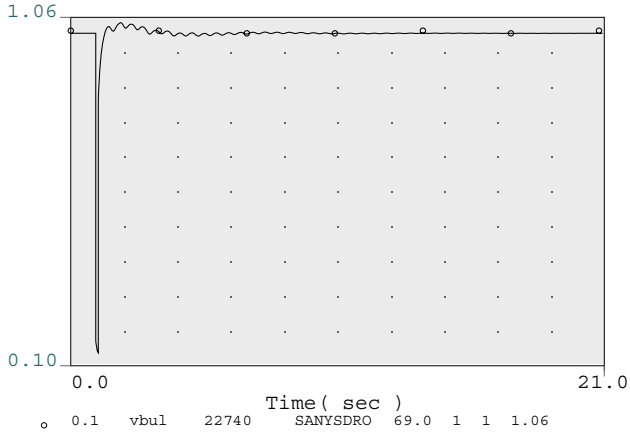



0.3 vbul 22516 MONTGMRY 69.0 1 1 1.06

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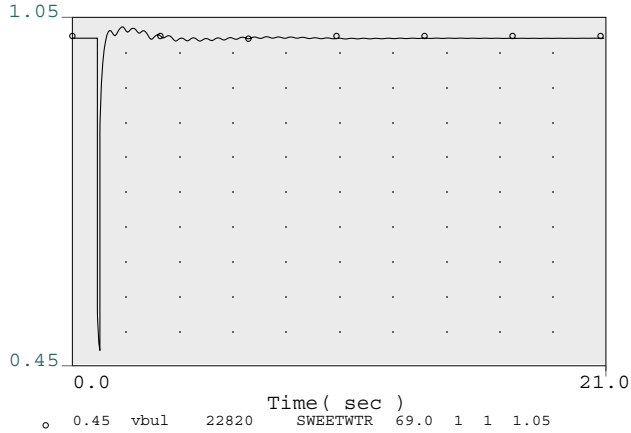


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MMC ISIS, post-project

Fault bus at OTAY_93

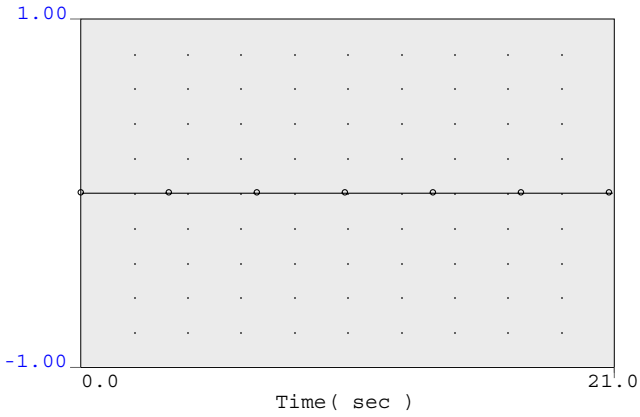
Category C

Plots of

Transient Stability Outage Simulations

SONGS Units 2 & 3 Double Unit Outage

Pre and Post-Project

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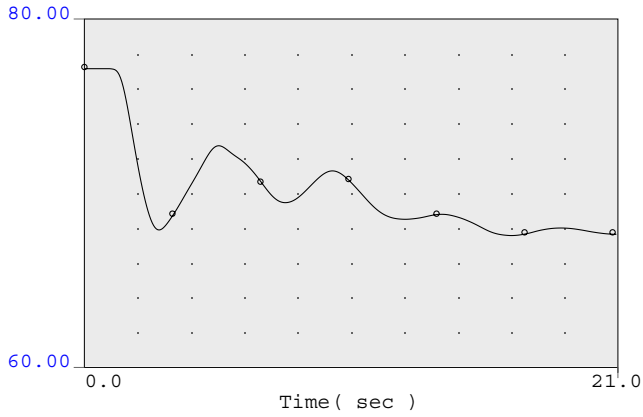


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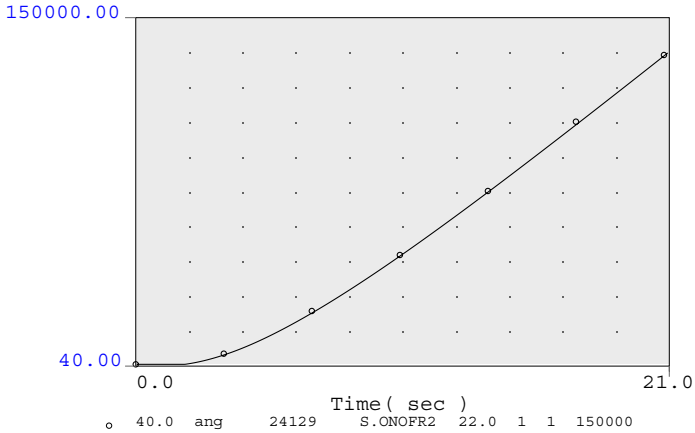


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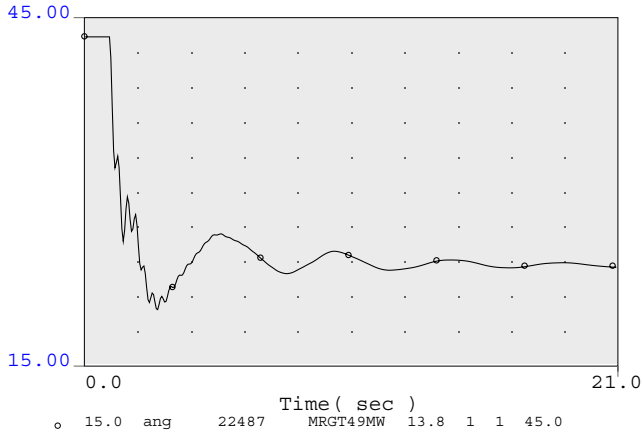


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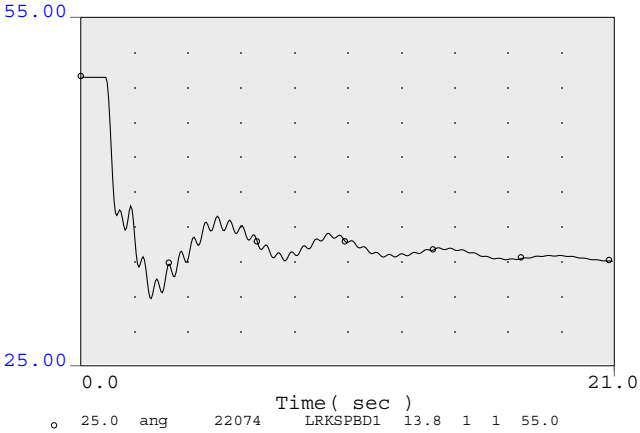


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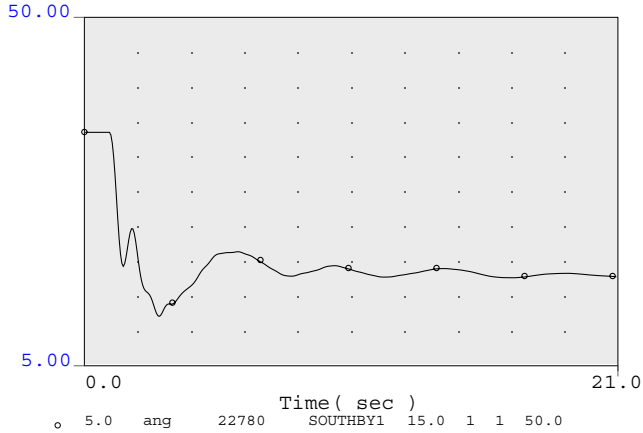


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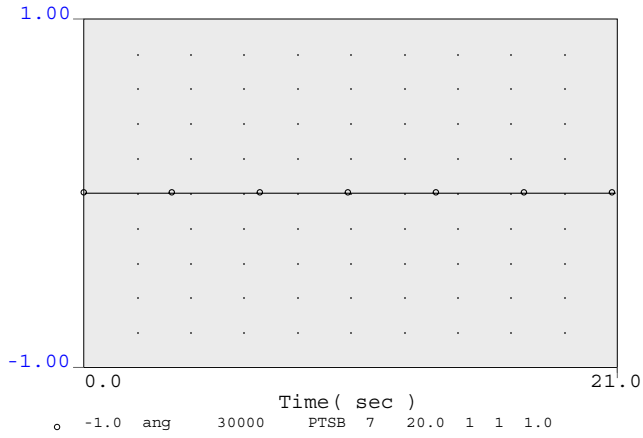
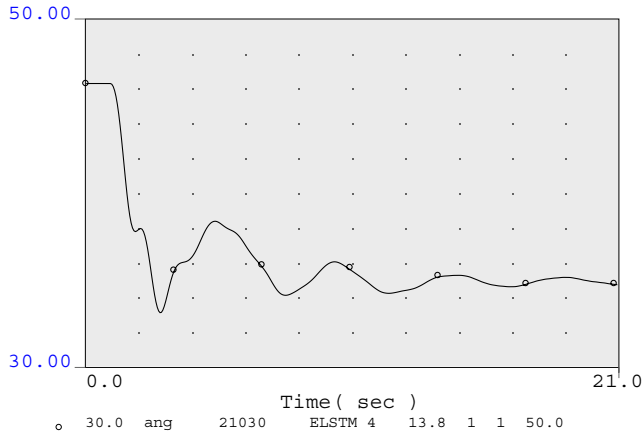
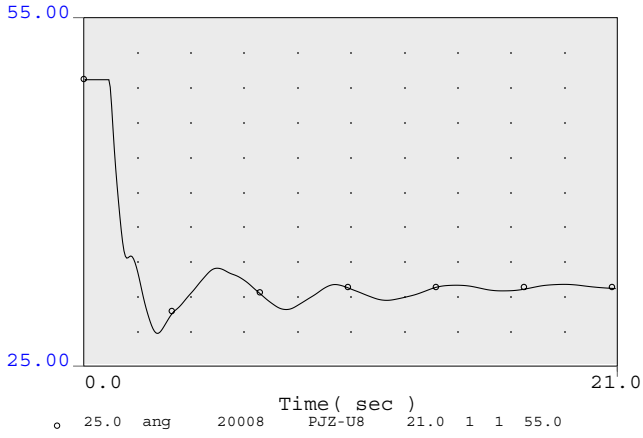
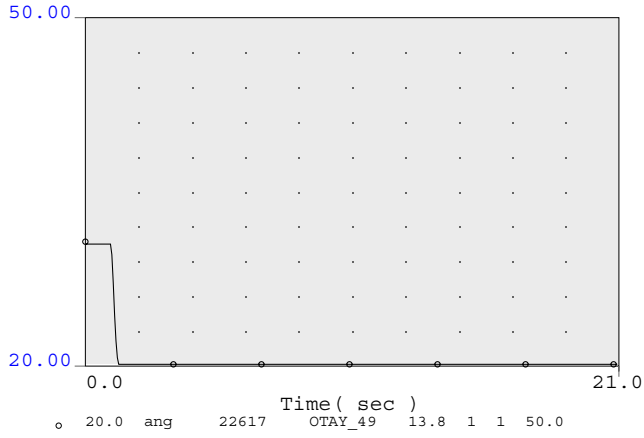
MMC ISIS, pre-project

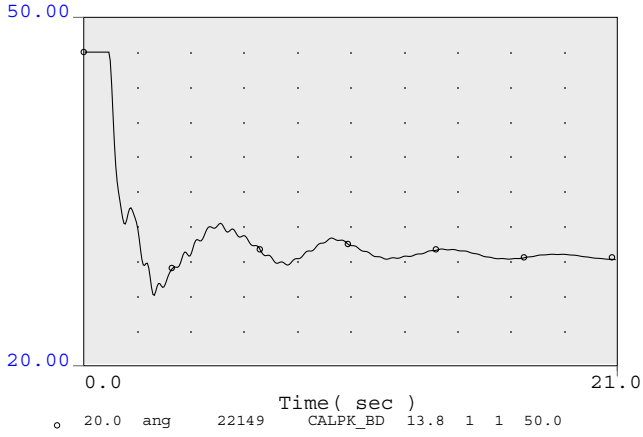
Trip SONGS #2 & #3 units

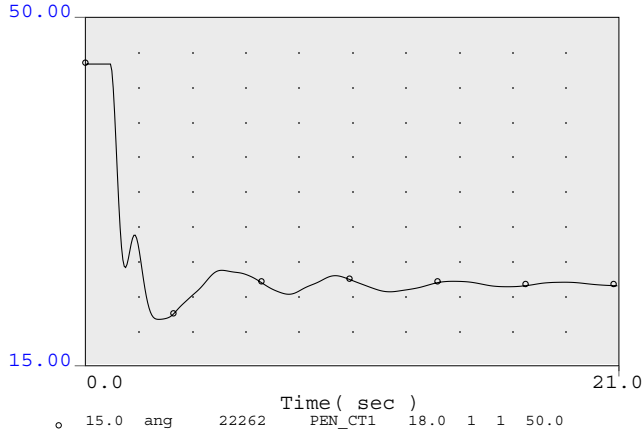


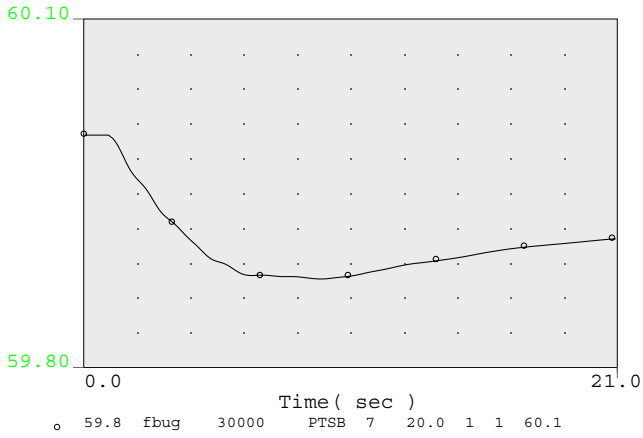



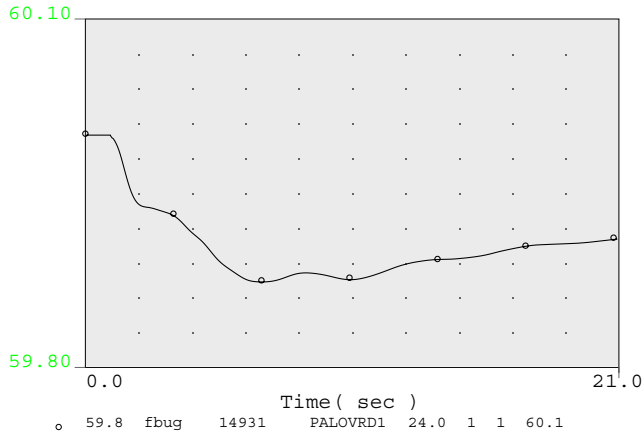



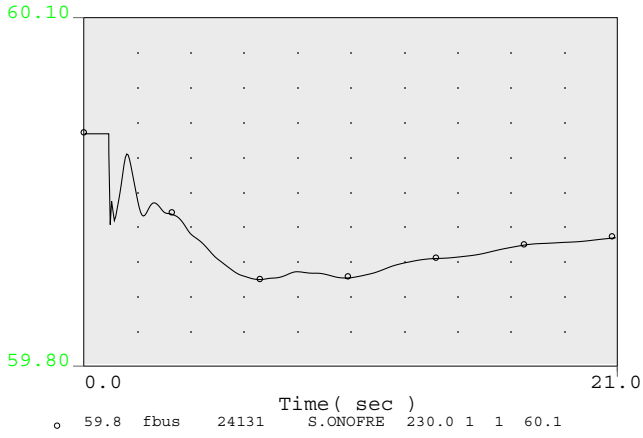



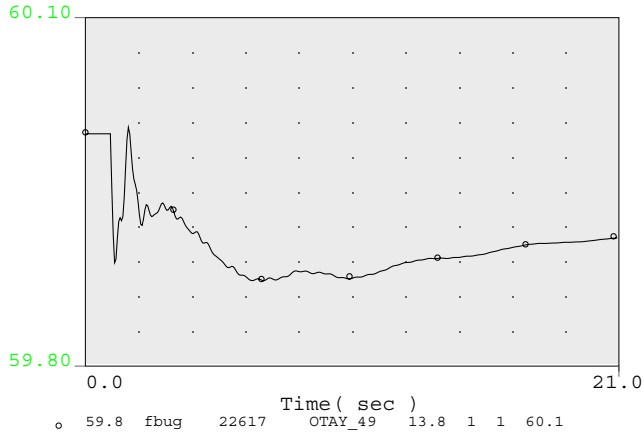

MMC ISIS, pre-project

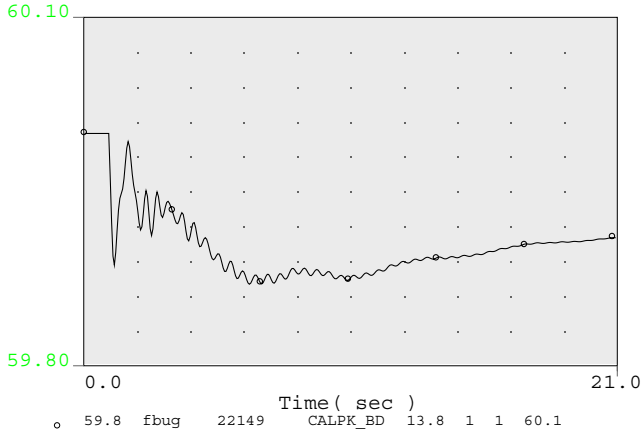
Trip SONGS #2 & #3 units

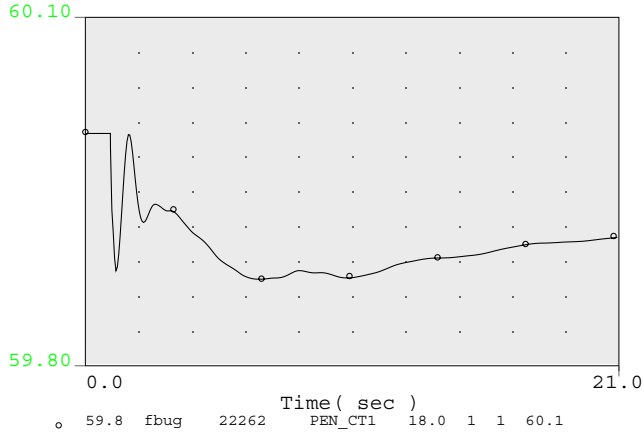


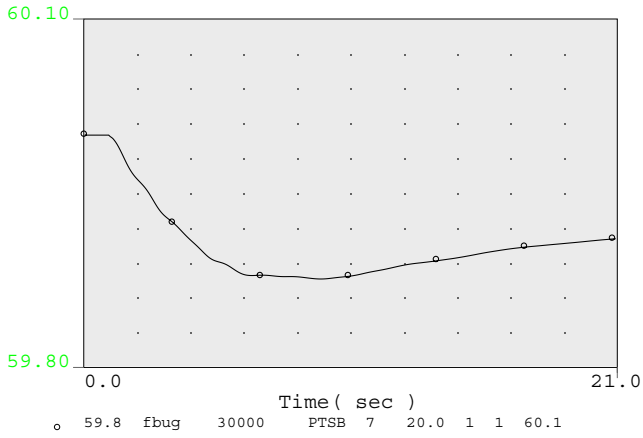



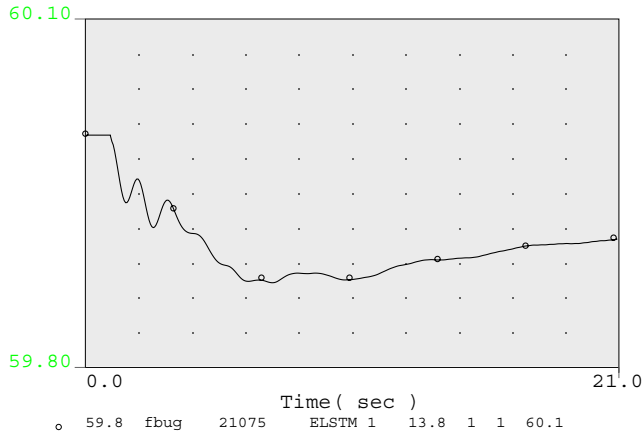



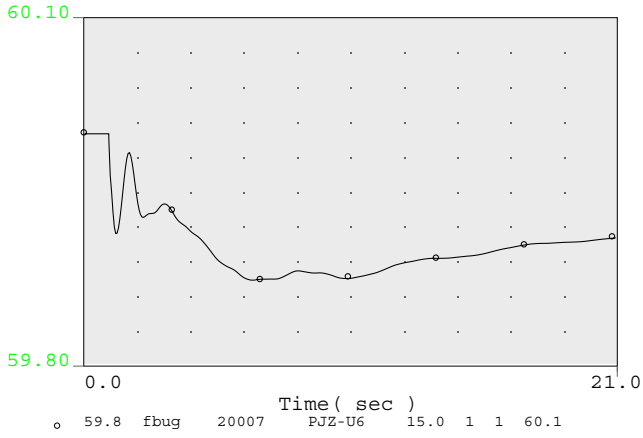



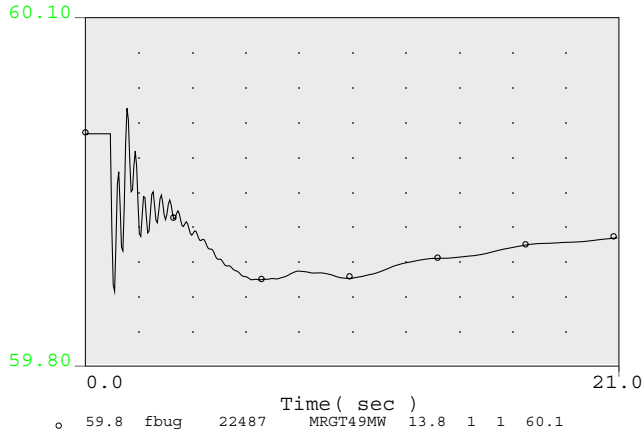



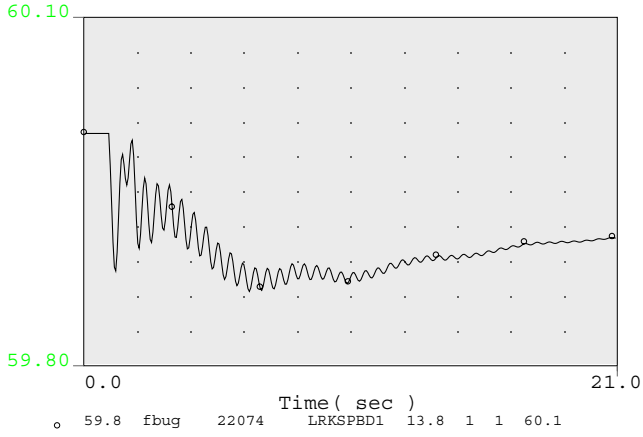

MMC ISIS, pre-project
Trip SONGS #2 & #3 units

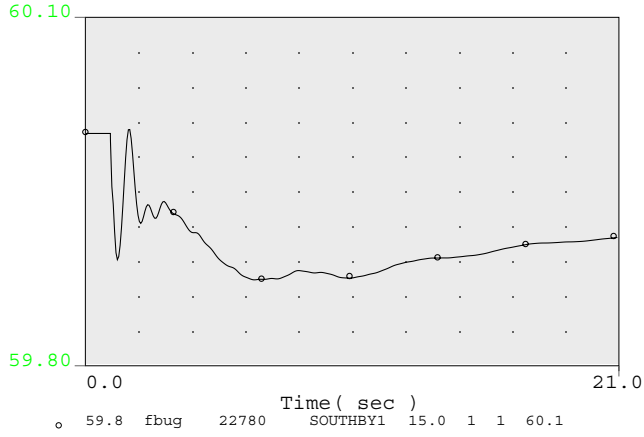


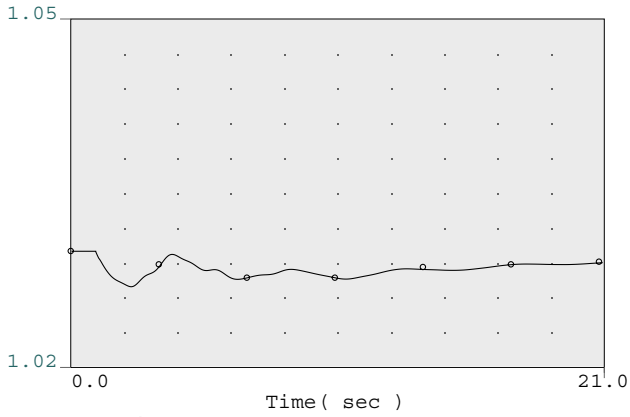




MMC ISIS, pre-project
Trip SONGS #2 & #3 units

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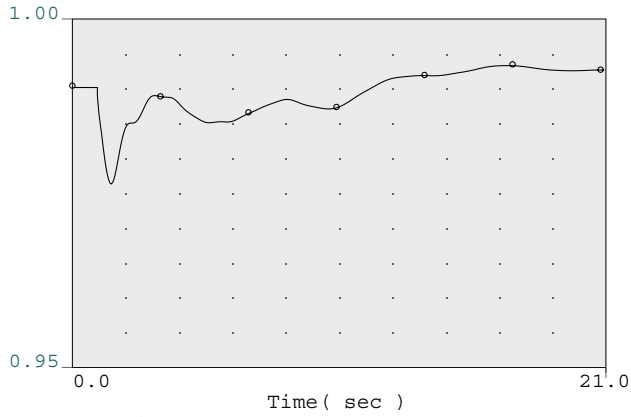


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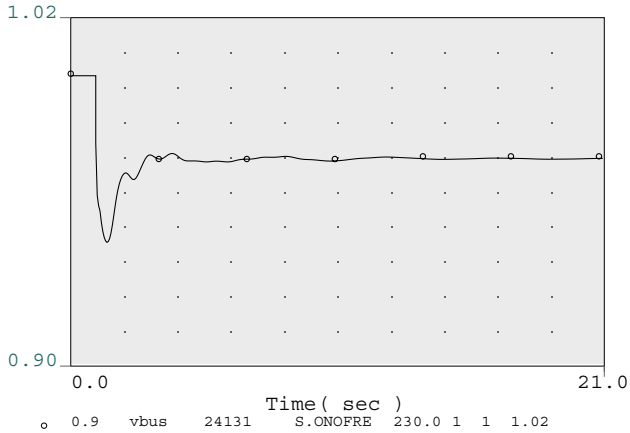


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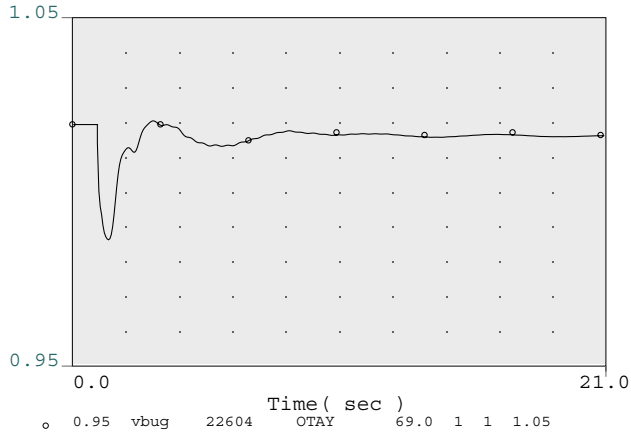
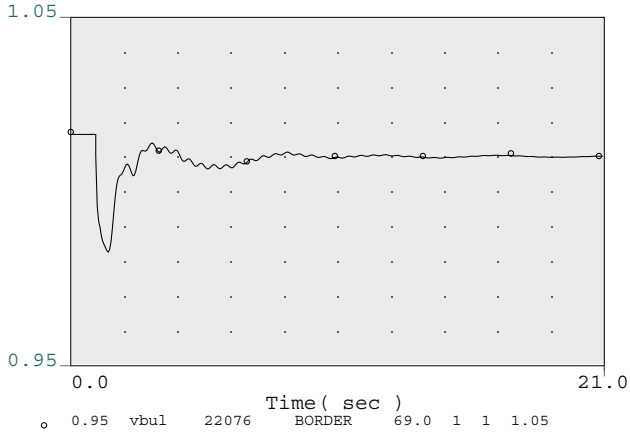



o 0.95 vbug 22604 OTAY 69.0 1 1 1.05

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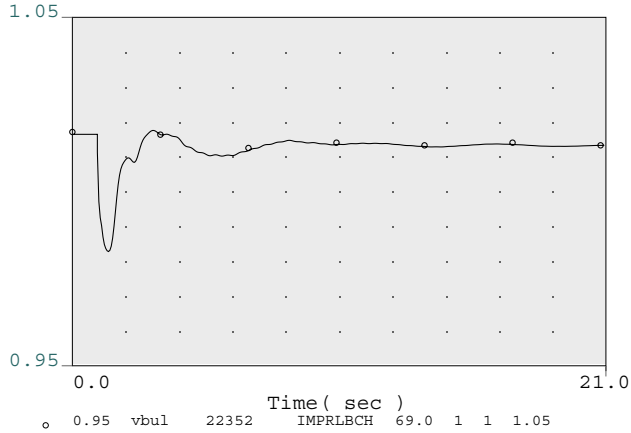


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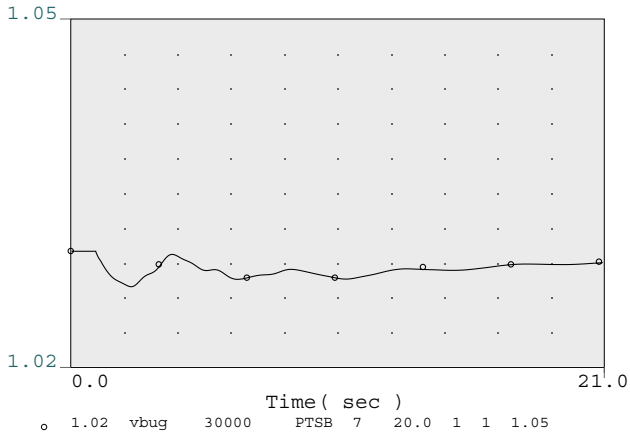
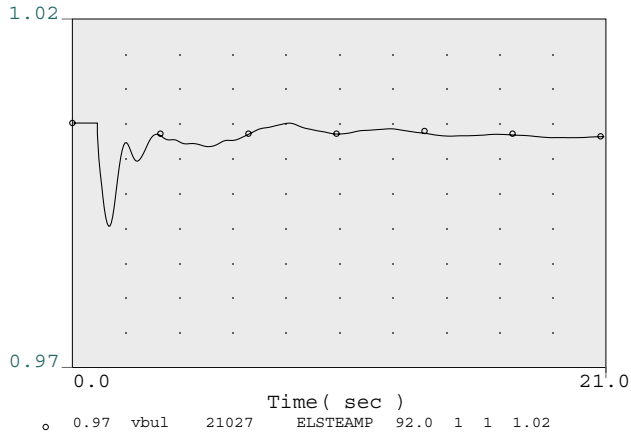
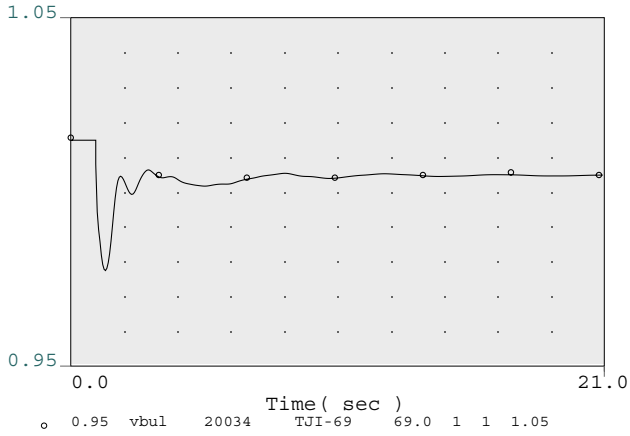
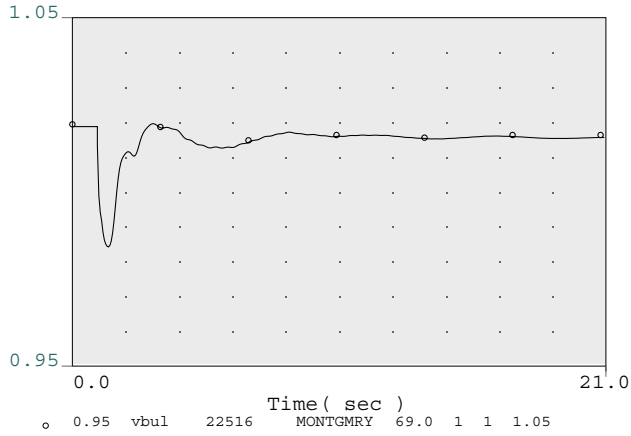
MMC ISIS, pre-project

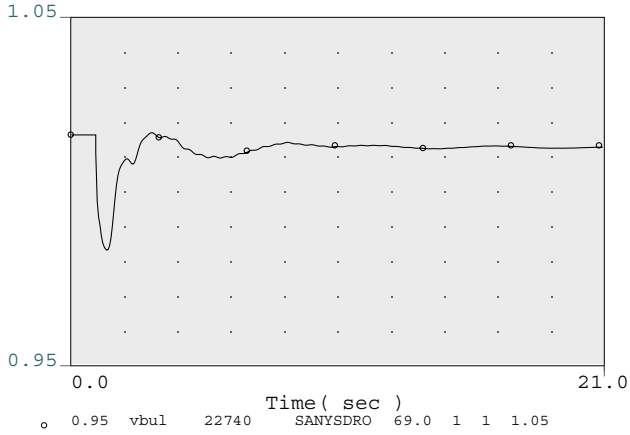
Trip SONGS #2 & #3 units

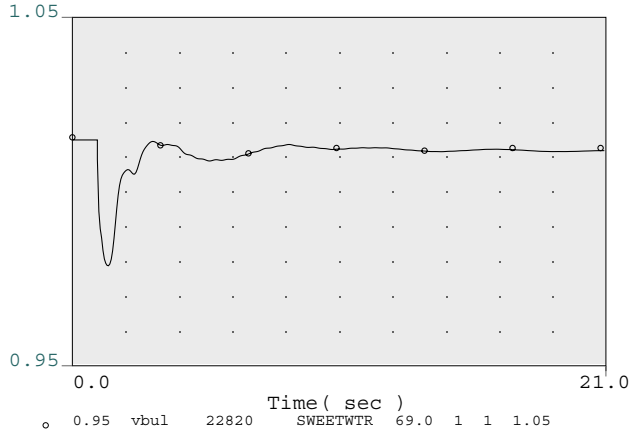


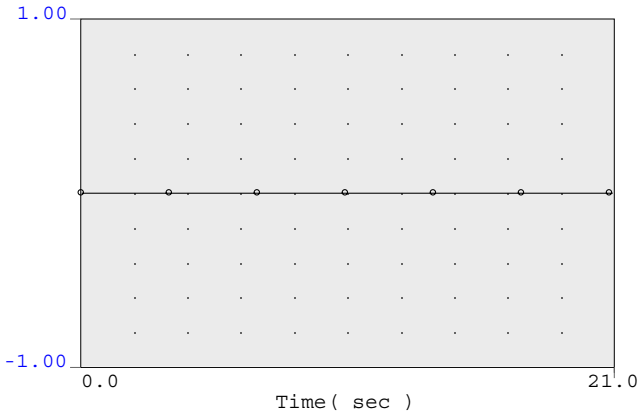




MMC ISIS, pre-project
Trip SONGS #2 & #3 units

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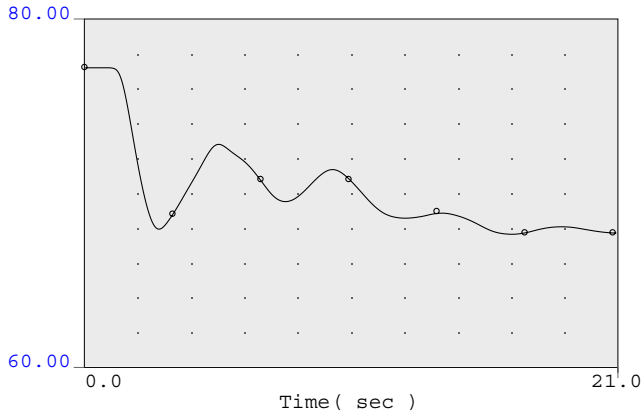
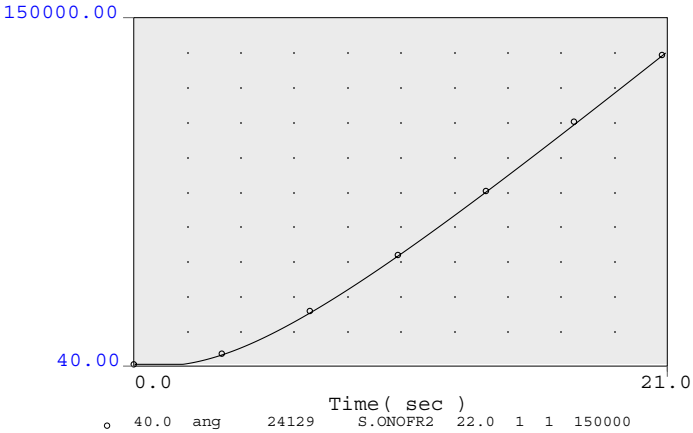
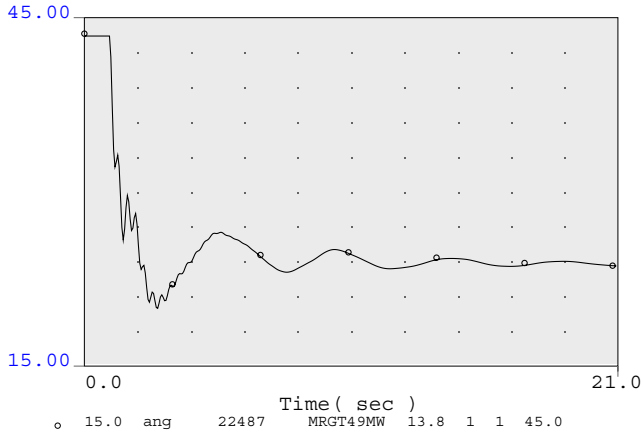


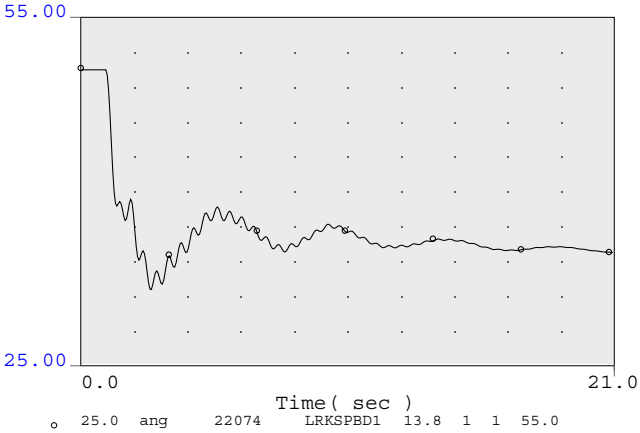

60.0 ang 14931 PALOVRD1 24.0 1 1 80.0



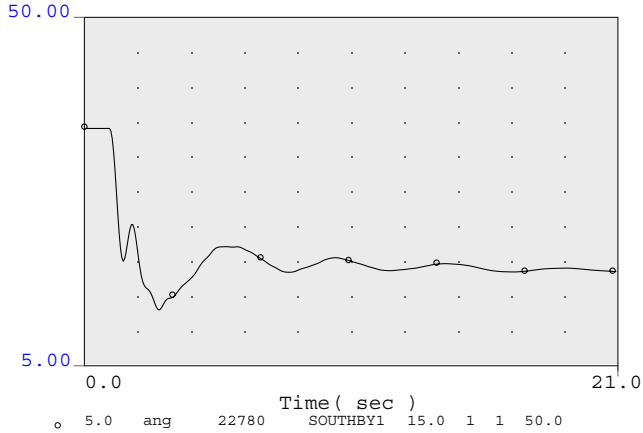

40.0 ang 24129 S.ONOFR2 22.0 1 1 150000




15.0 ang 22487 MRGT49MW 13.8 1 1 45.0



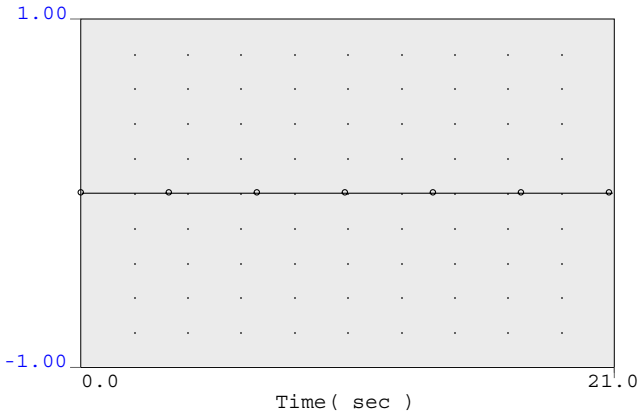

25.0 ang 22074 LRKSPBD1 13.8 1 1 55.0



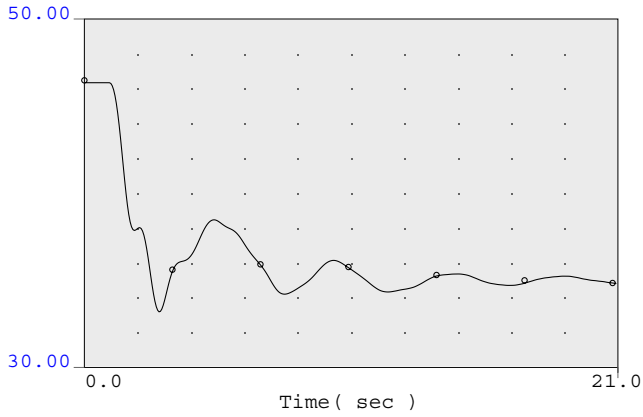

5.0 ang 22780 SOUTHBY1 15.0 1 1 50.0

MMC ISIS, post-project

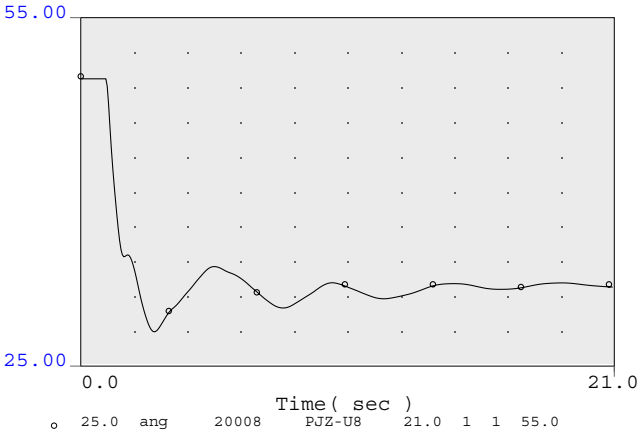
Trip SONGS #2 & #3 units



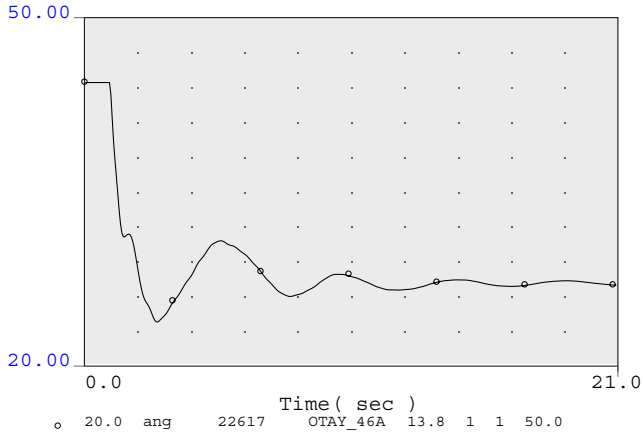

-1.0 ang 30000 PTSB 7 20.0 1 1 1.0




30.0 ang 21030 ELSTM 4 13.8 1 1 50.0




25.0 ang 20008 PJZ-U8 21.0 1 1 55.0

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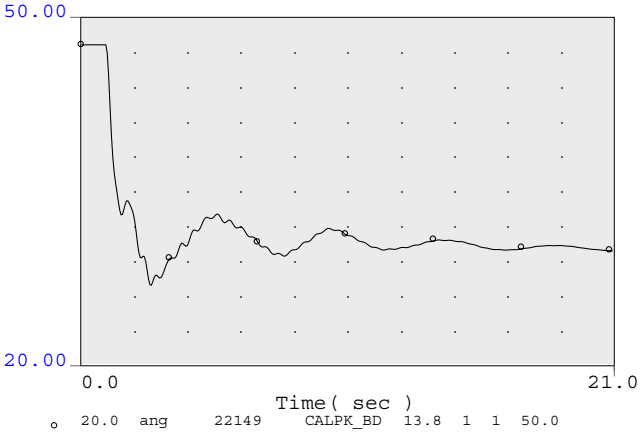
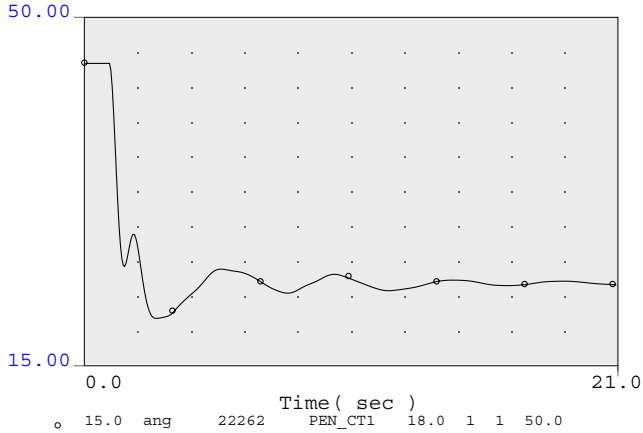
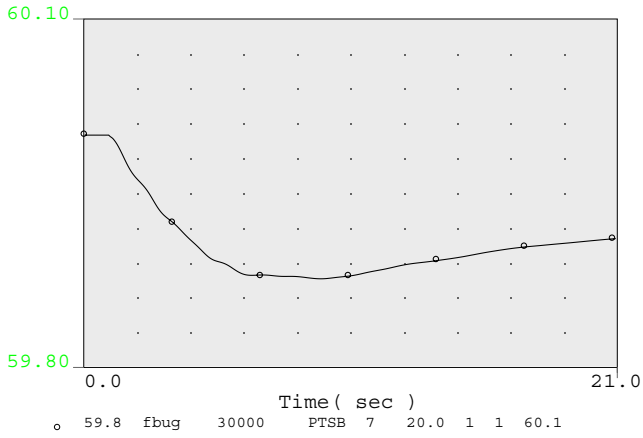


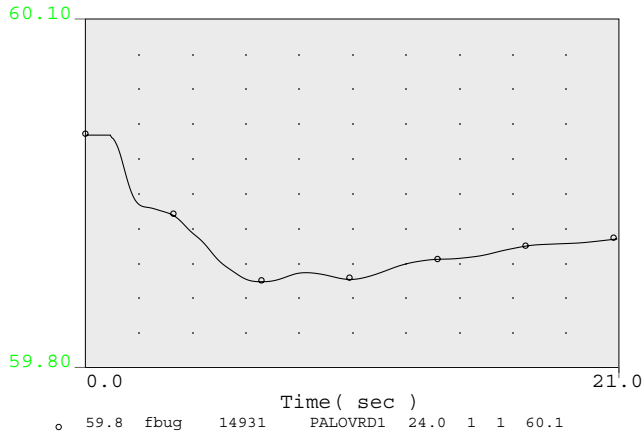

20.0 ang 22149 CALPK_BD 13.8 1 1 50.0

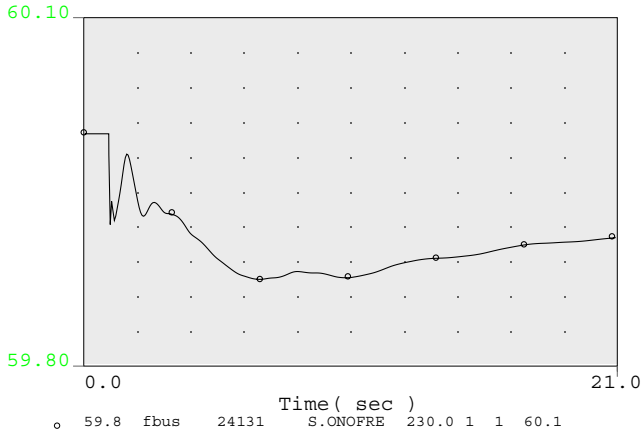


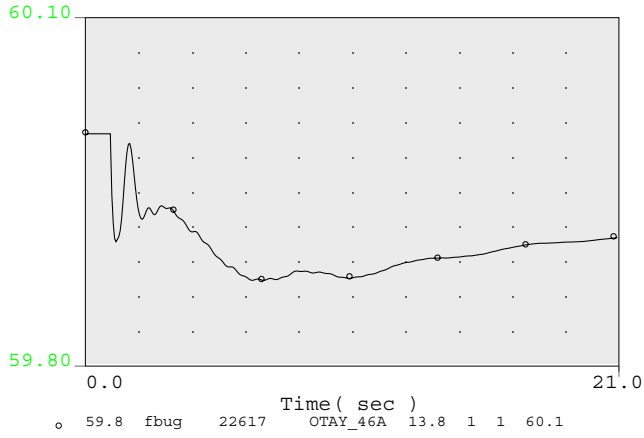

15.0 ang 22262 PEN_CT1 18.0 1 1 50.0

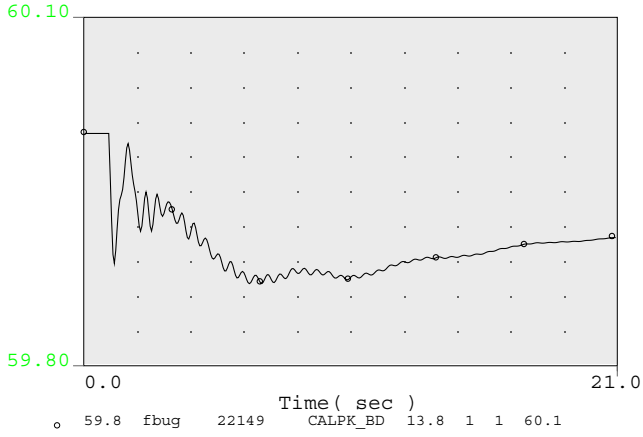
MMC ISIS, post-project
Trip SONGS #2 & #3 units

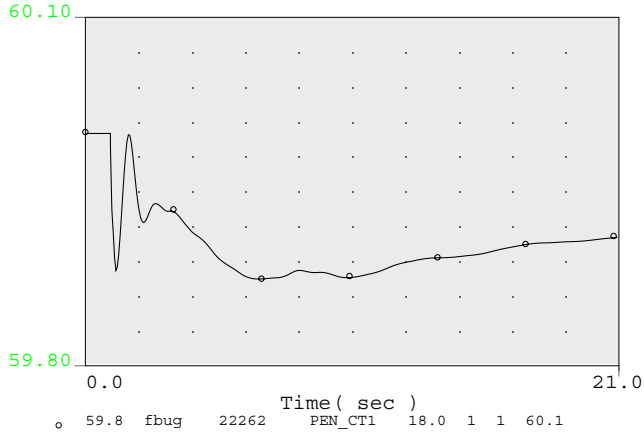


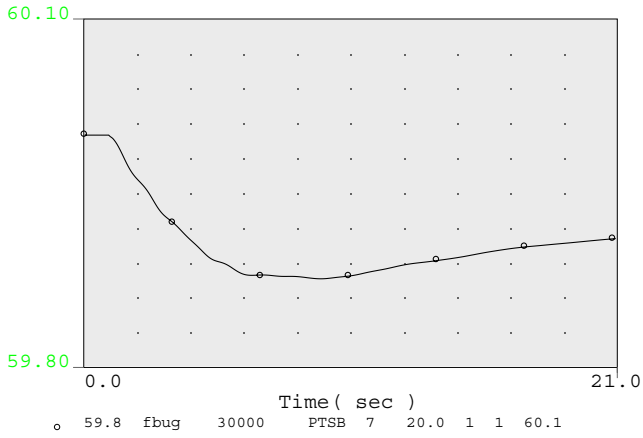



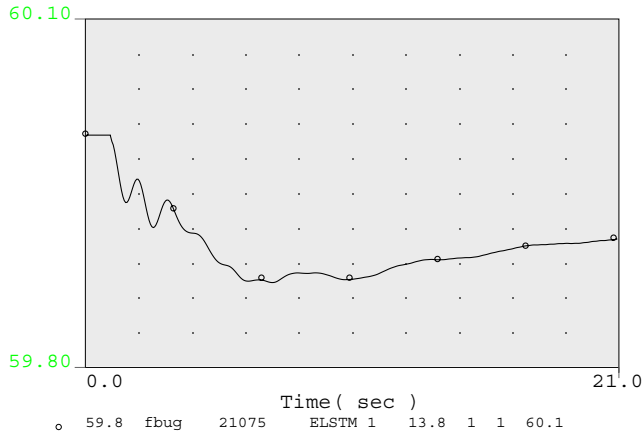



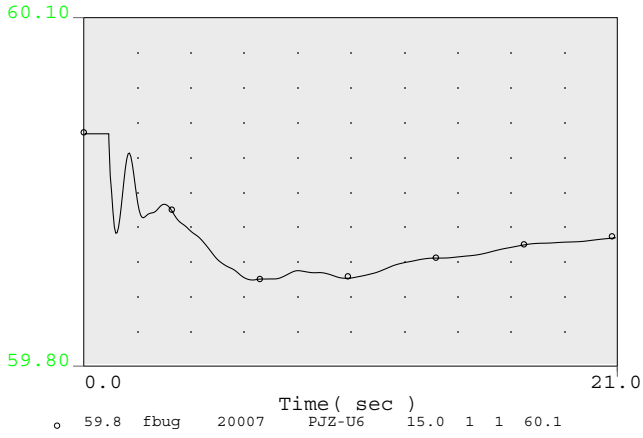



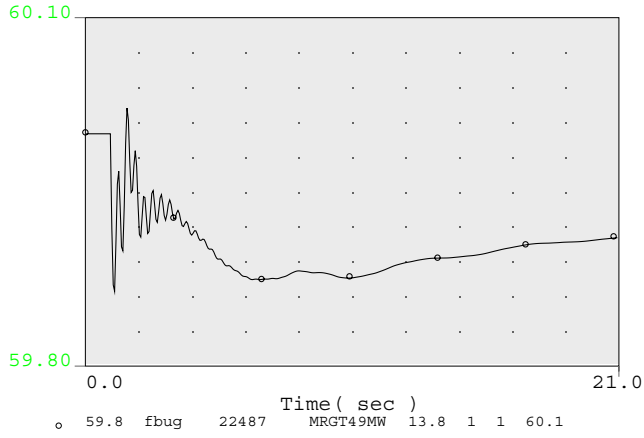



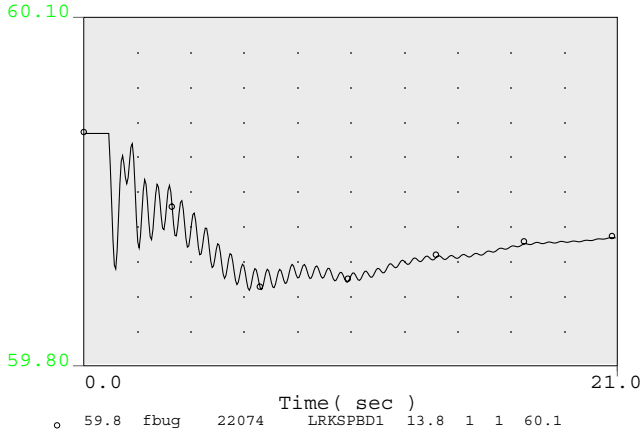

MMC ISIS, post-project
Trip SONGS #2 & #3 units

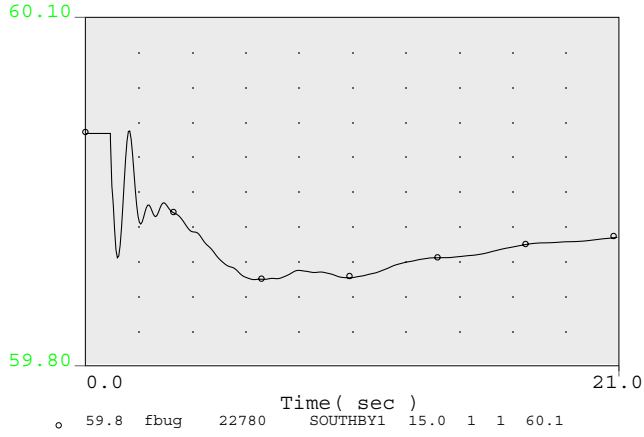


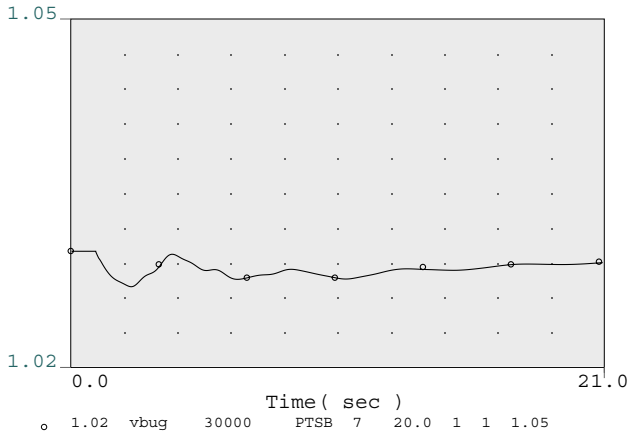



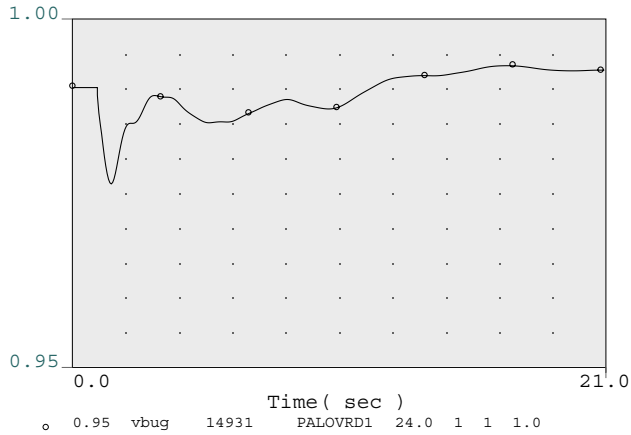



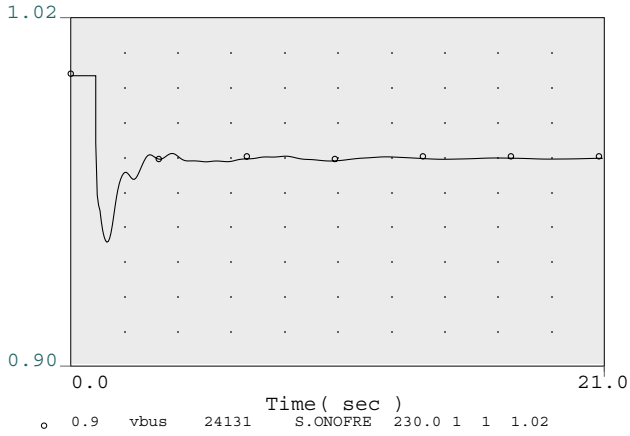



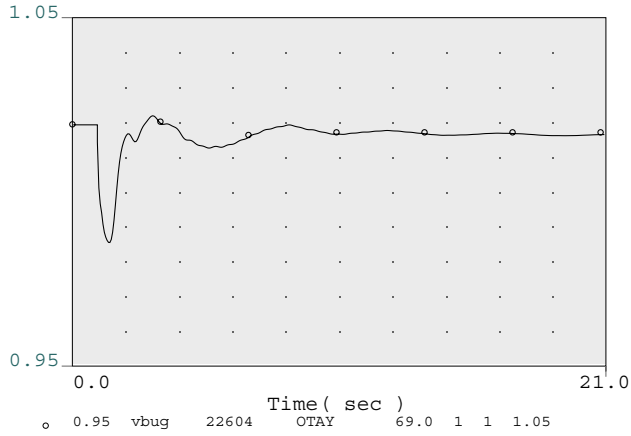



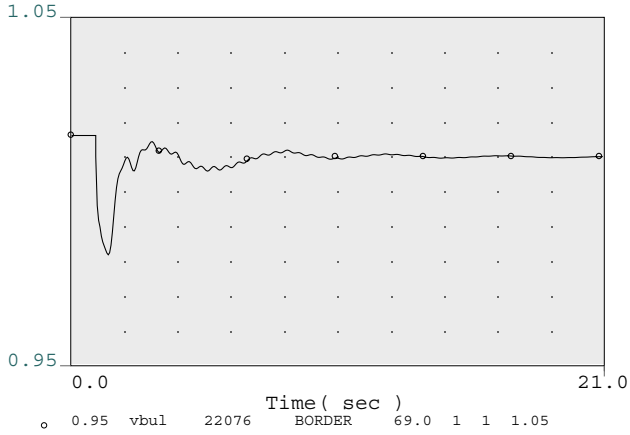

MMC ISIS, post-project
Trip SONGS #2 & #3 units

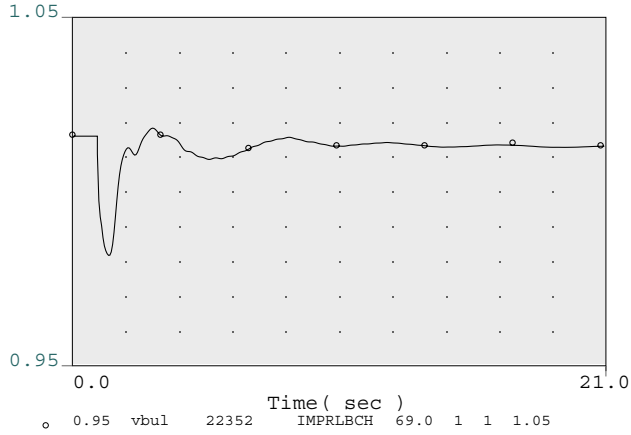


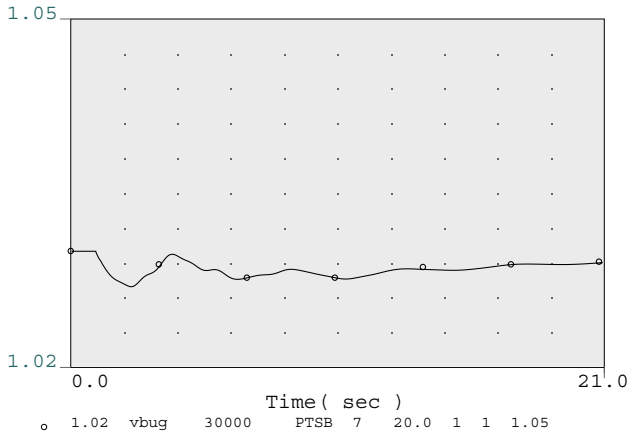



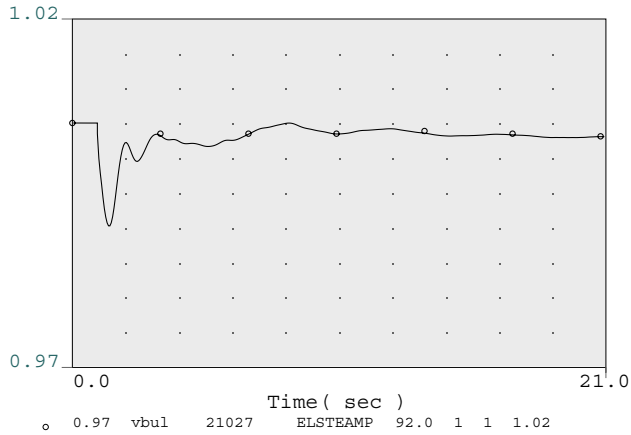



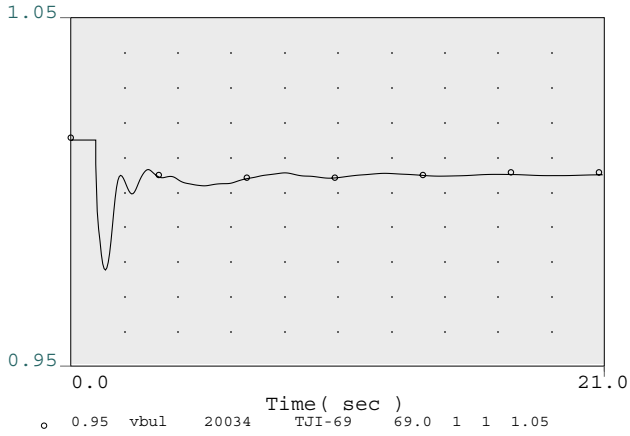



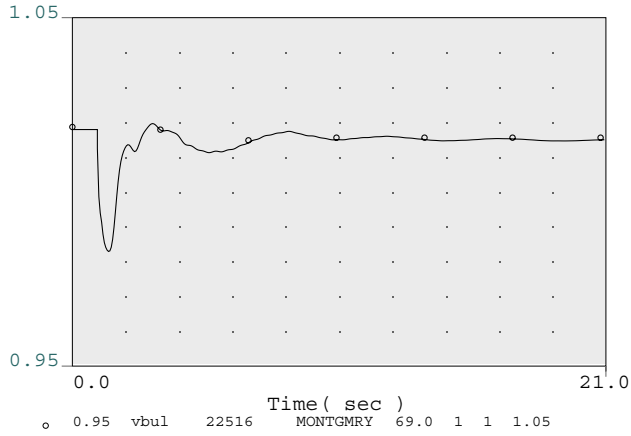

MMC ISIS, post-project

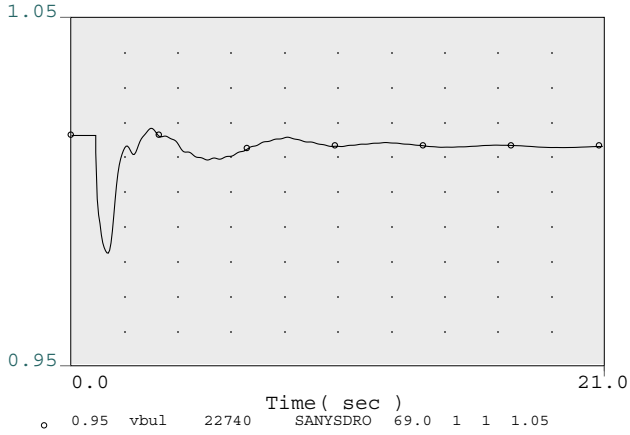
Trip SONGS #2 & #3 units

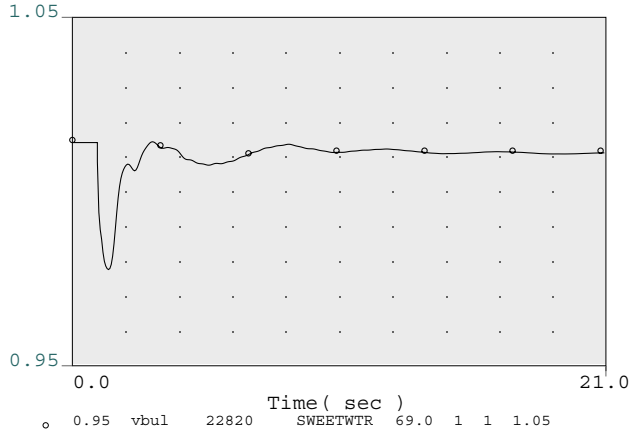


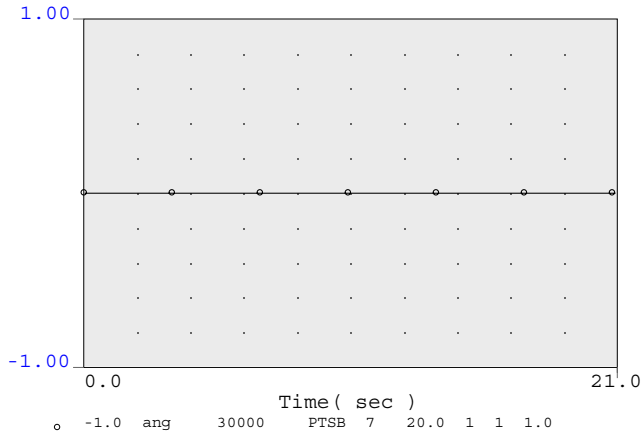

MMC ISIS, post-project
Trip SONGS #2 & #3 units

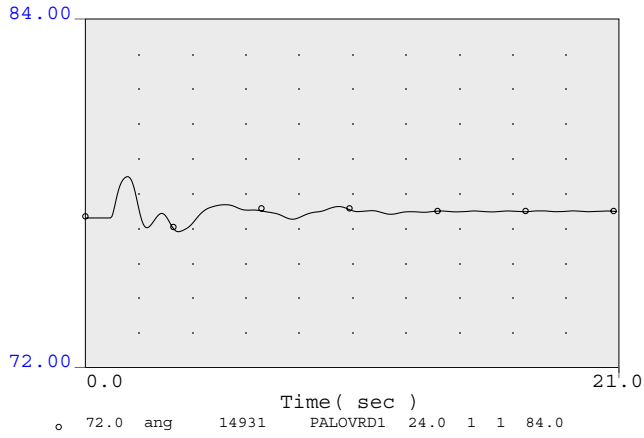
Sweetwater 69 kB Bus Outage

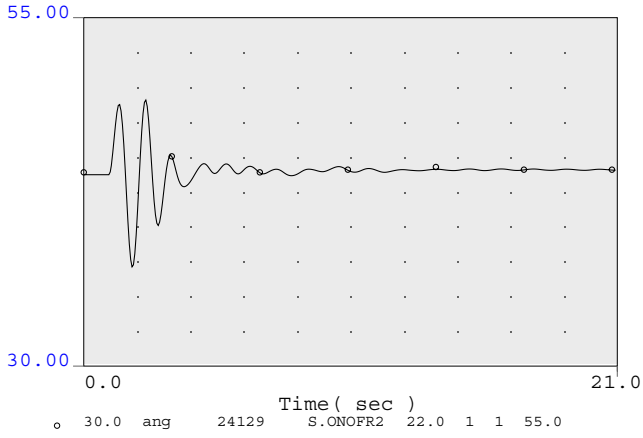
Loss of the following 69 kV facilities:

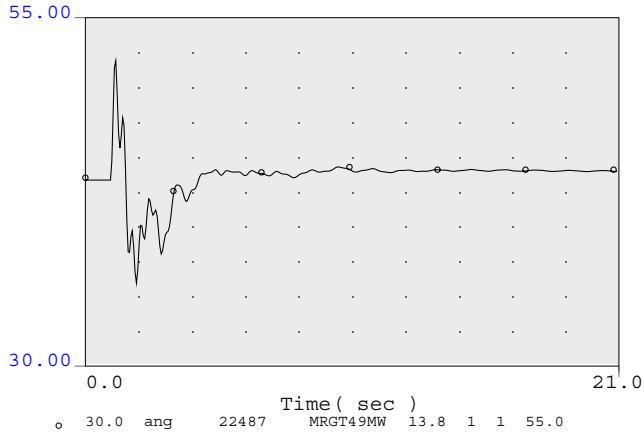
Sweetwater-Chollas,
Sweetwater-Miguel Tap,
Sweetwater-Montgomery Tap,
Southbay-Sweetwater,
Sweetwater-Sweetwater Tap, and
Load at Sweetwater

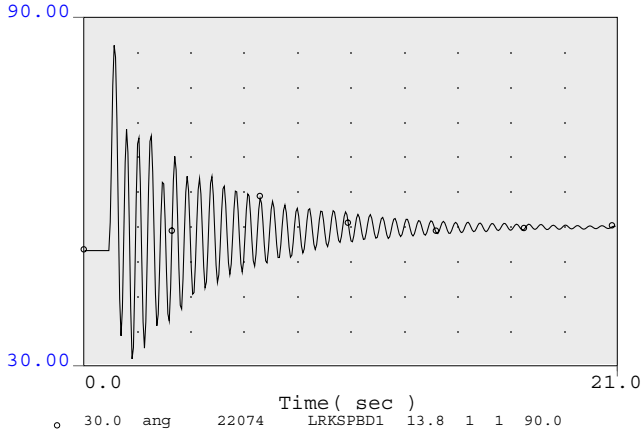
Pre- and Post-Project

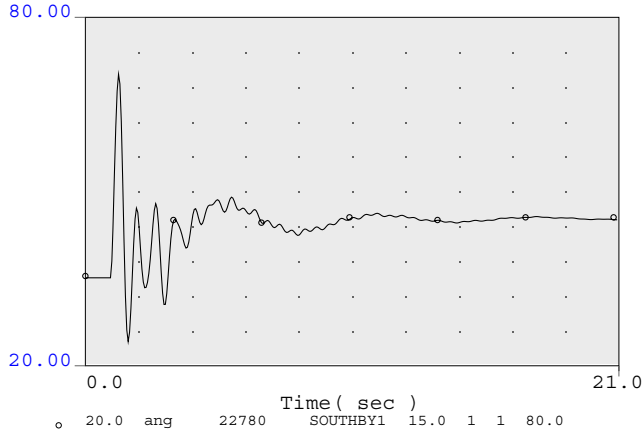


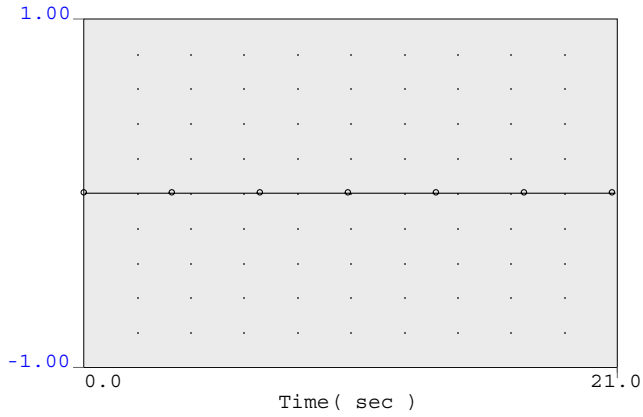



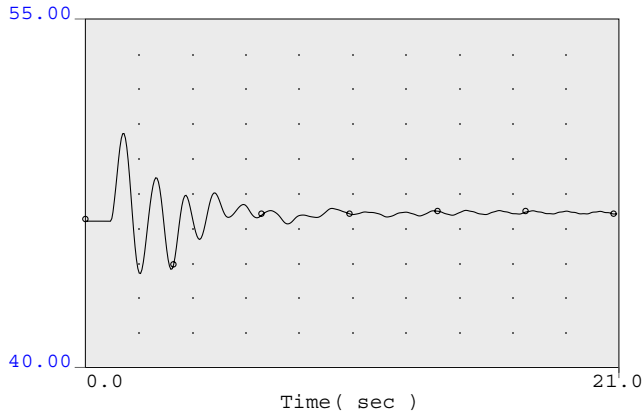



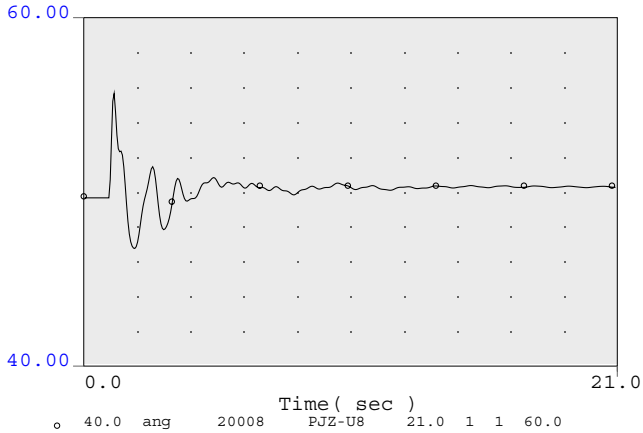

MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines




-1.0 ang 30000 PTSB 7 20.0 1 1 1.0




40.0 ang 21030 ELSTM 4 13.8 1 1 55.0

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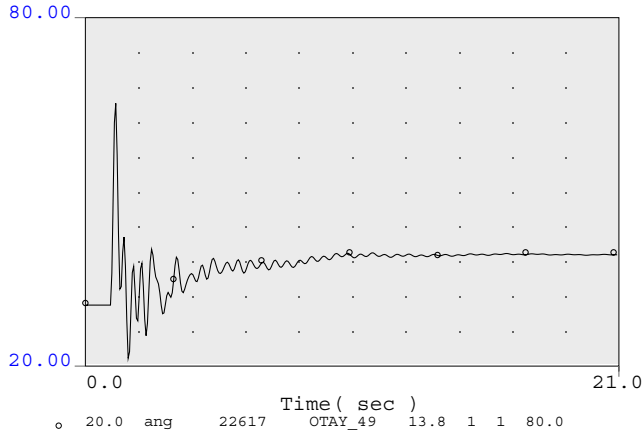
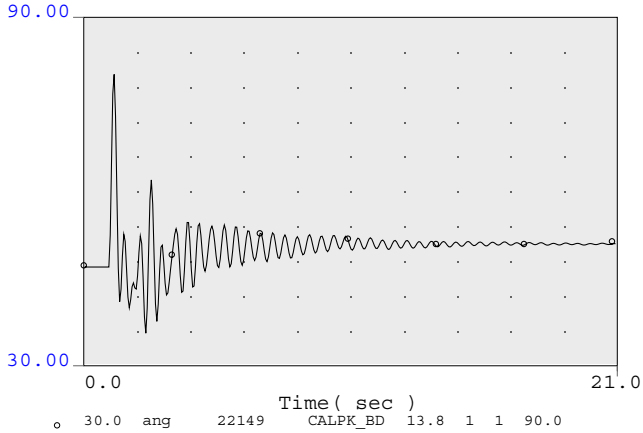
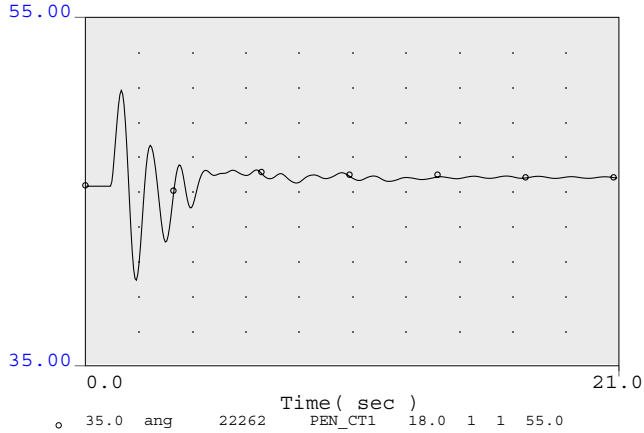



20.0 ang 22617 OTAY_49 13.8 1 1 80.0

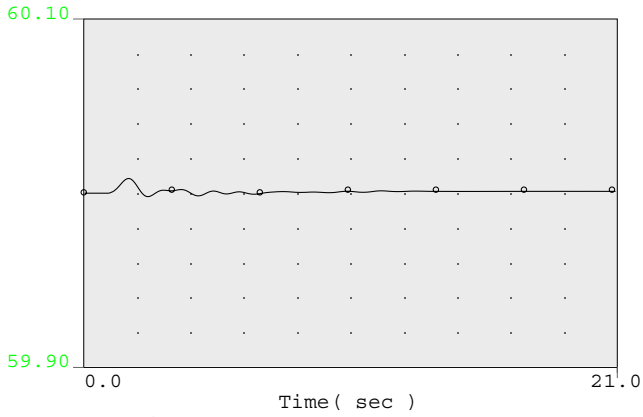



30.0 ang 22149 CALPK_BD 13.8 1 1 90.0

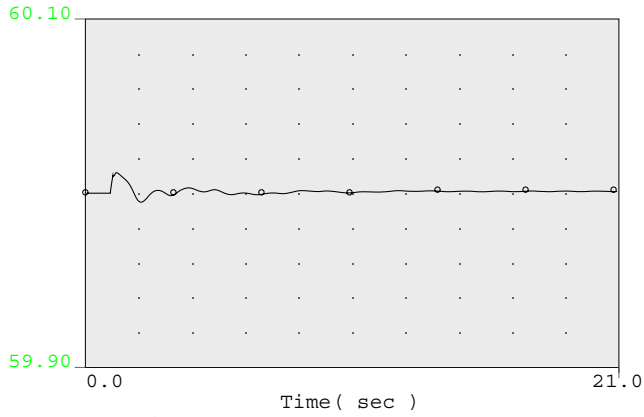



35.0 ang 22262 PEN_CT1 18.0 1 1 55.0

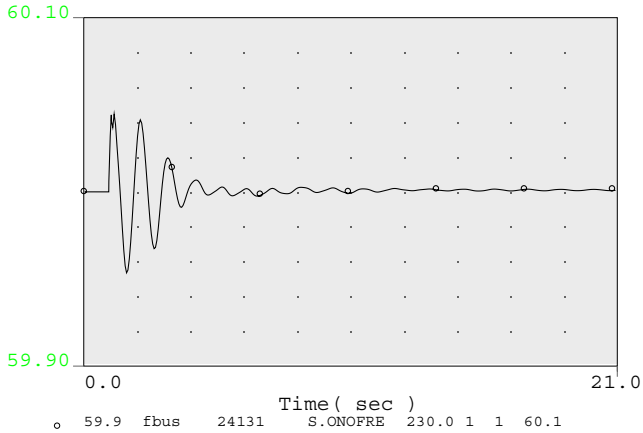
MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines



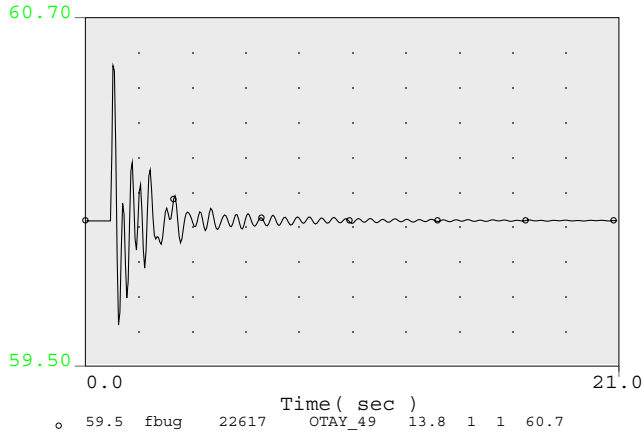

59.9 fbug 30000 PTSB 7 20.0 1 1 60.1



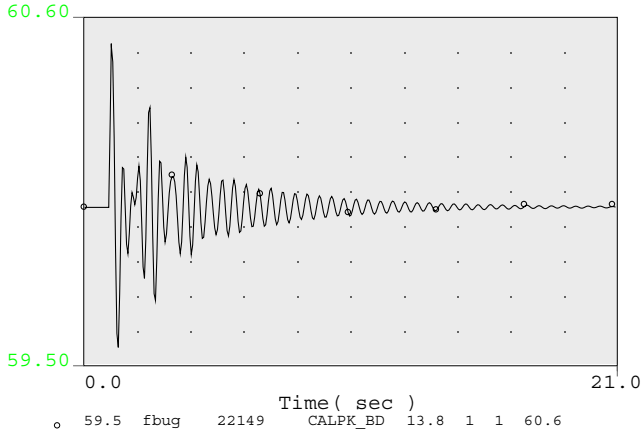

59.9 fbug 14931 PALOVRD1 24.0 1 1 60.1



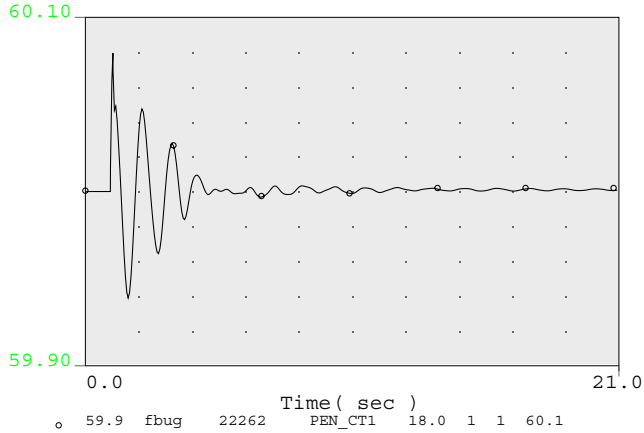

59.9 fbus 24131 S.ONOFRE 230.0 1 1 60.1




59.5 fbug 22617 OTAY_49 13.8 1 1 60.7

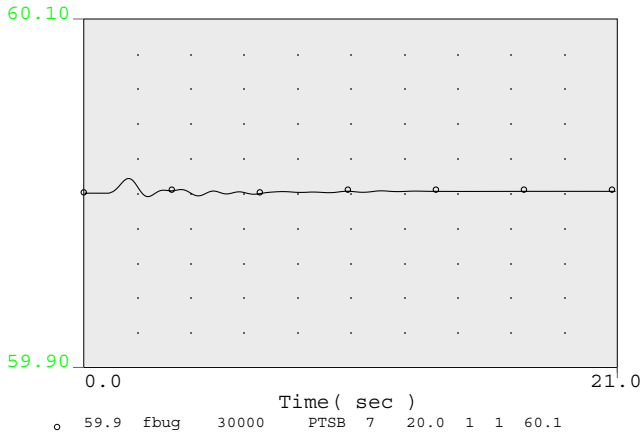


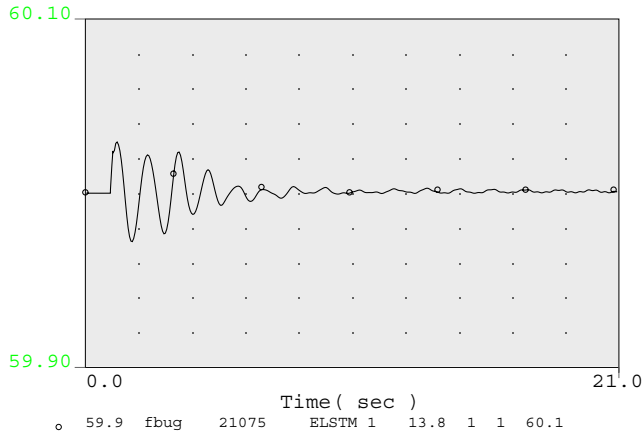

59.5 fbug 22149 CALPK_BD 13.8 1 1 60.6

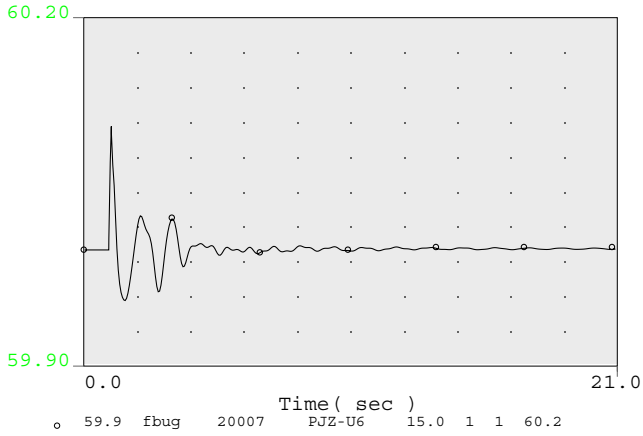


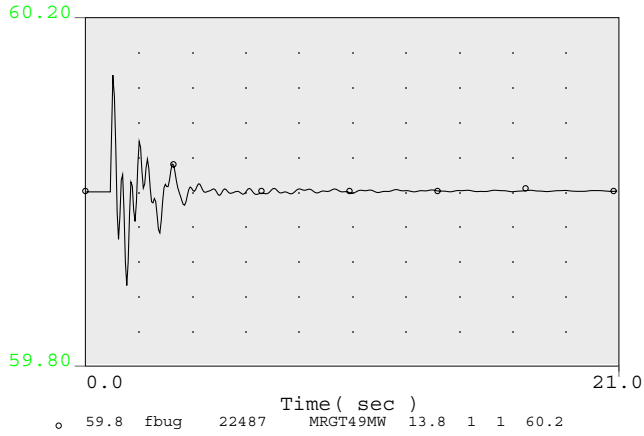

59.9 fbug 22262 PEN_CT1 18.0 1 1 60.1

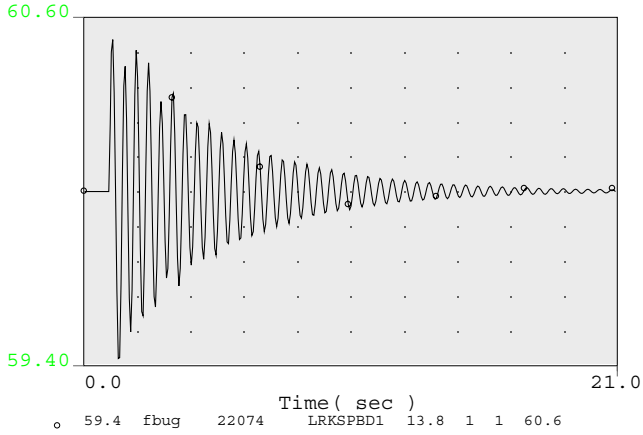
MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

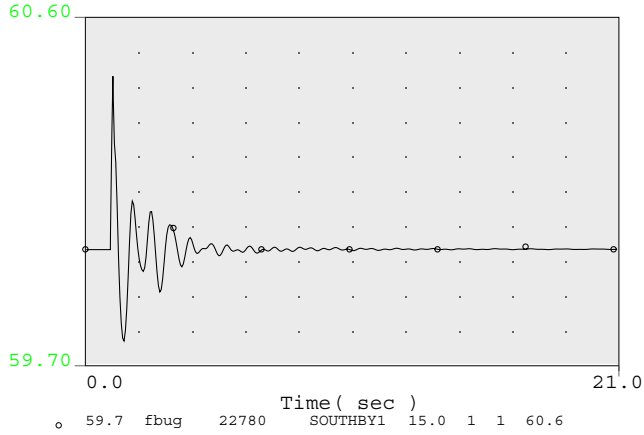


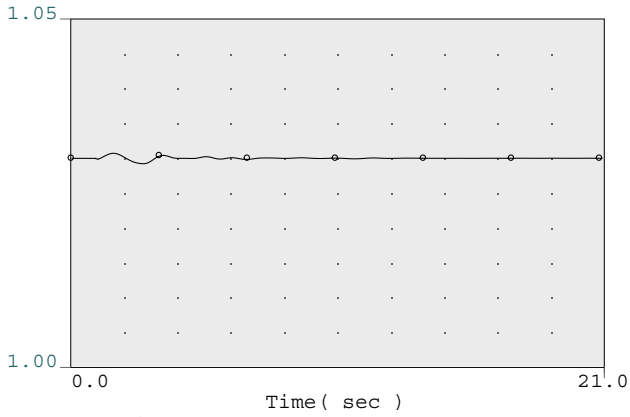



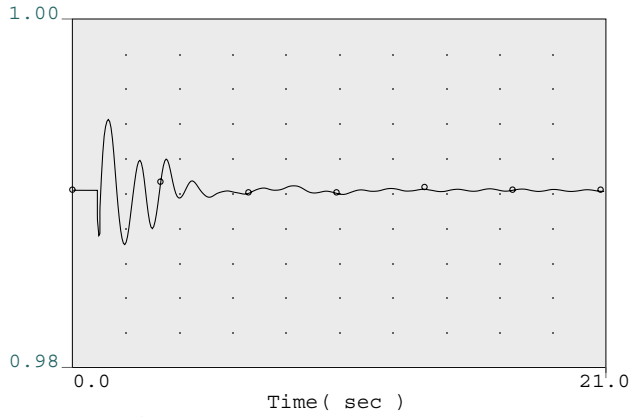



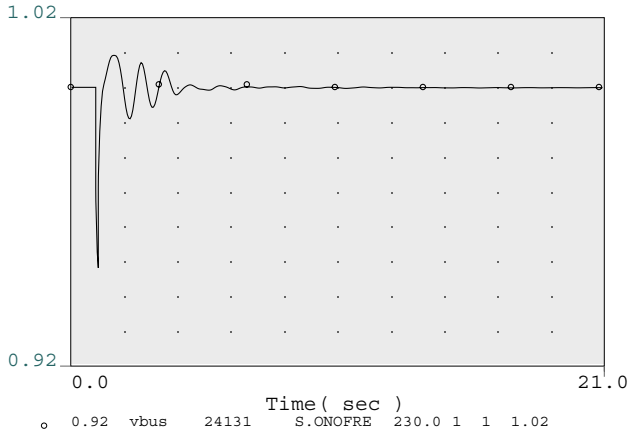

MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines



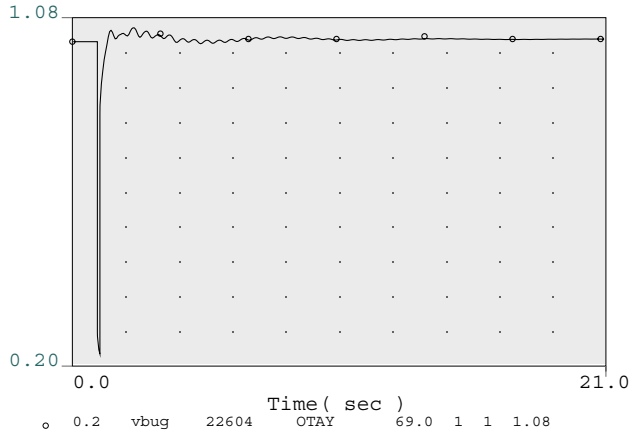

o 1.0 vbug 30000 PTSB 7 20.0 1 1 1.05



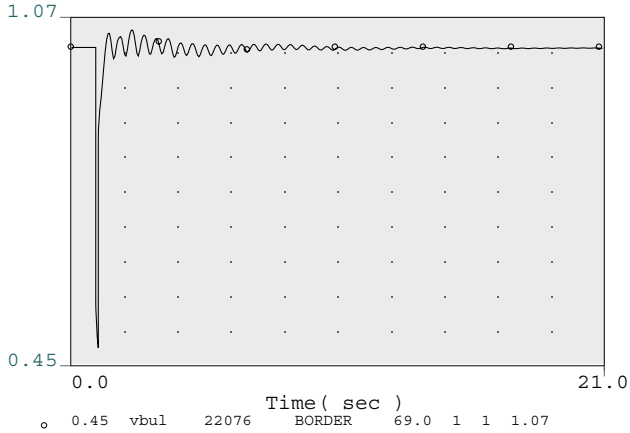

o 0.98 vbug 14931 PALOVRD1 24.0 1 1 1.0



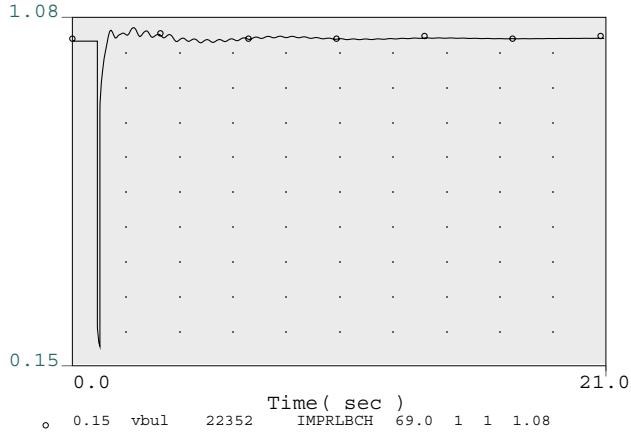

o 0.92 vbus 24131 S.ONOFRE 230.0 1 1 1.02




o 0.2 vbug 22604 OTAY 69.0 1 1 1.08

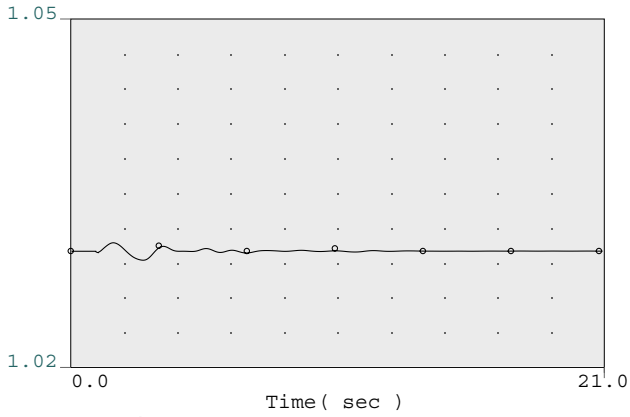



o 0.45 vbul 22076 BORDER 69.0 1 1 1.07

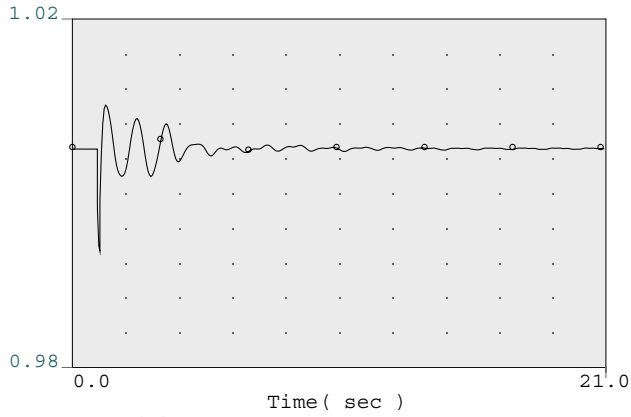



o 0.15 vbul 22352 IMPRLBCH 69.0 1 1 1.08

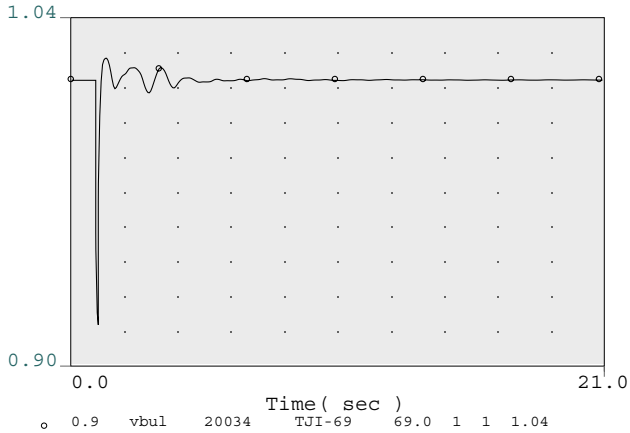
MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines



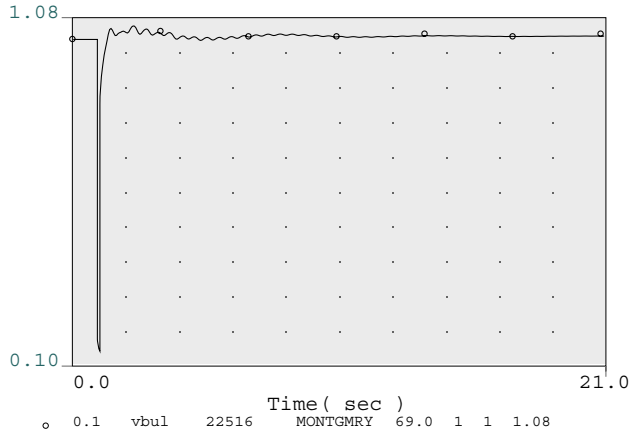

o 1.02 vbug 30000 PTSB 7 20.0 1 1 1.05



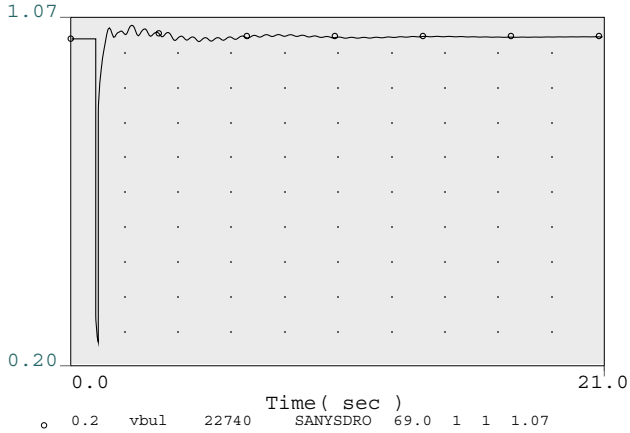

o 0.98 vbul 21027 ELSTEAMP 92.0 1 1 1.02



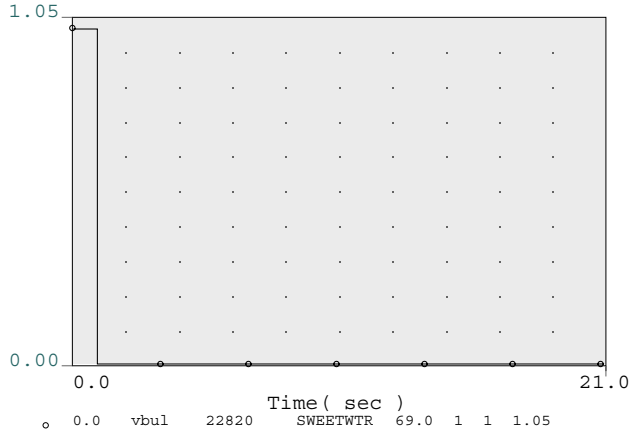

o 0.9 vbul 20034 TJI-69 69.0 1 1 1.04




o 0.1 vbul 22516 MONTGMRY 69.0 1 1 1.08

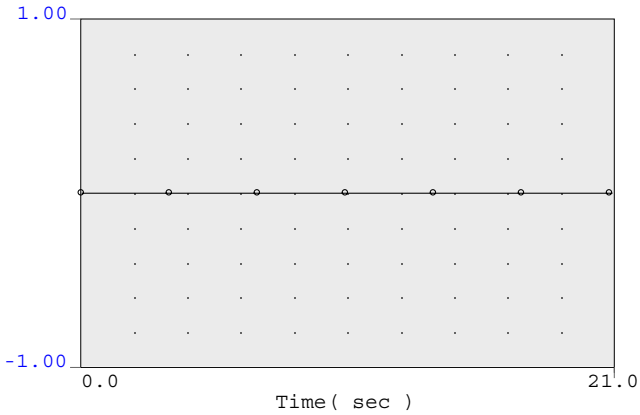



o 0.2 vbul 22740 SANYSDRO 69.0 1 1 1.07

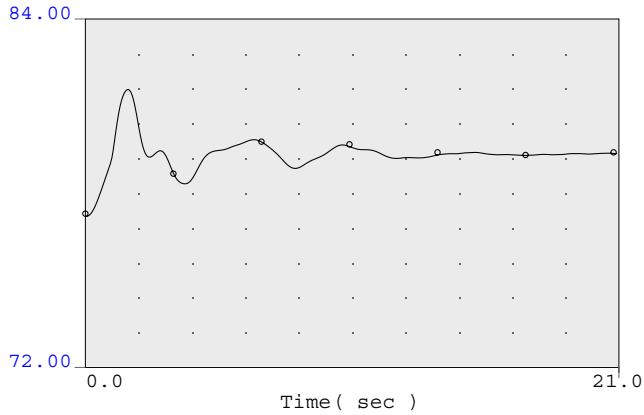



o 0.0 vbul 22820 SWEETWTR 69.0 1 1 1.05

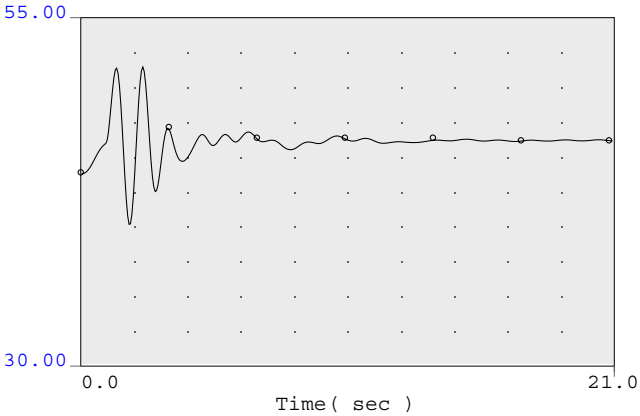
MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines



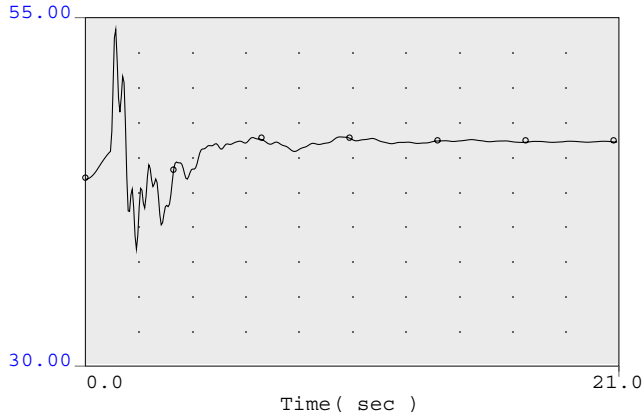

-1.0 ang 30000 PTSB 7 20.0 1 1 1.0



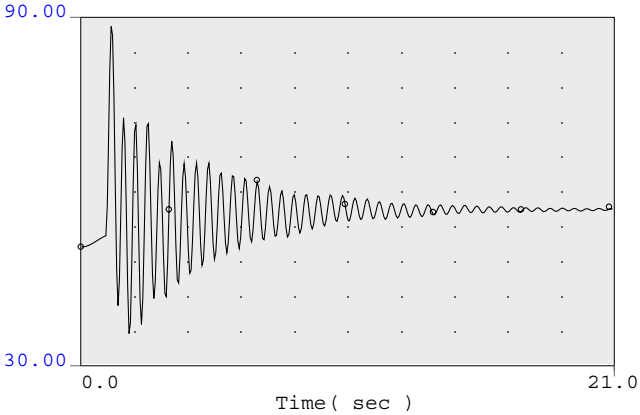

72.0 ang 14931 PALOVRD1 24.0 1 1 84.0




30.0 ang 24129 S.ONOFR2 22.0 1 1 55.0




30.0 ang 22487 MRGT49MW 13.8 1 1 55.0

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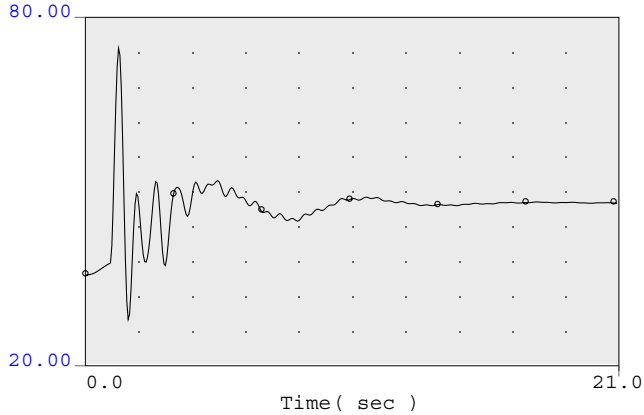
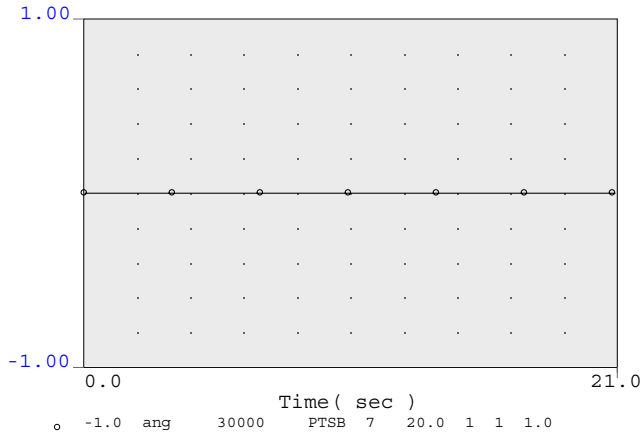
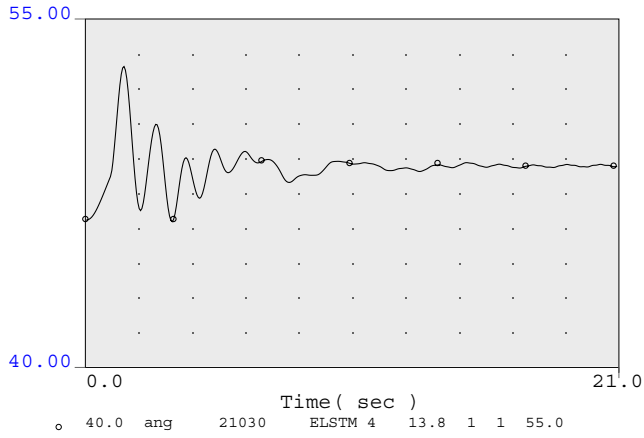
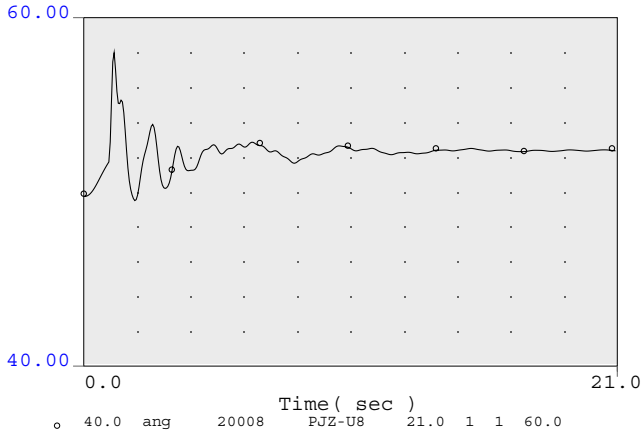


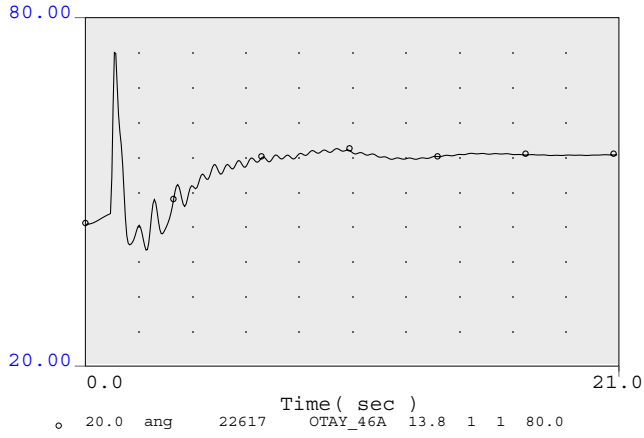

20.0 ang 22780 SOUTHBY1 15.0 1 1 80.0

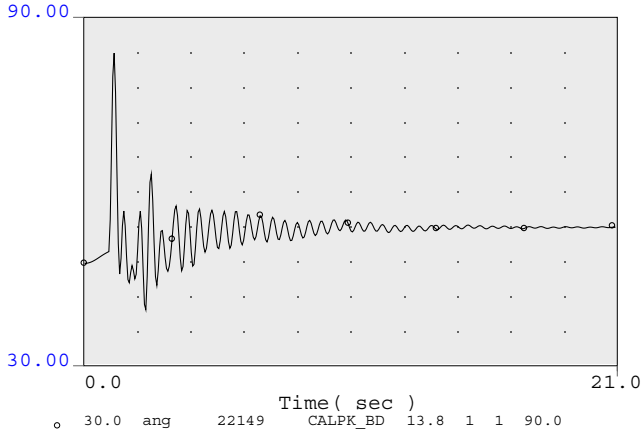
MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

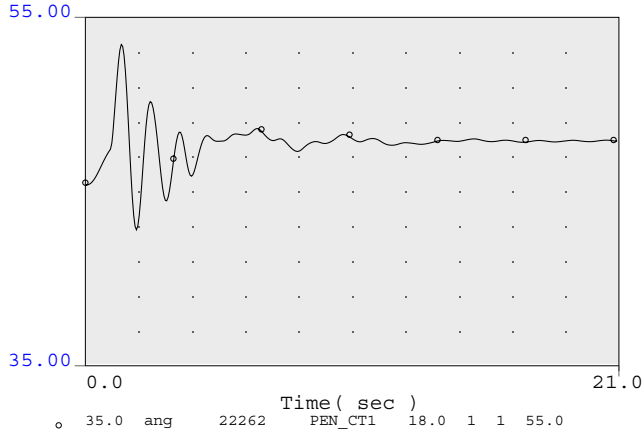


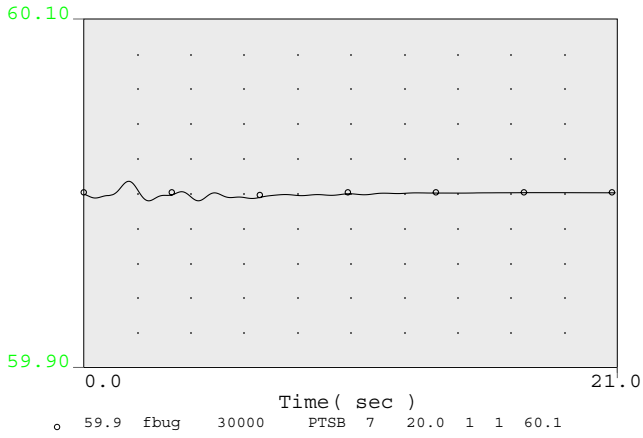



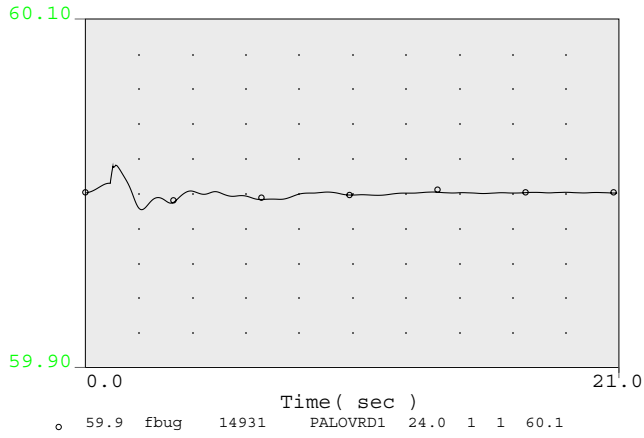



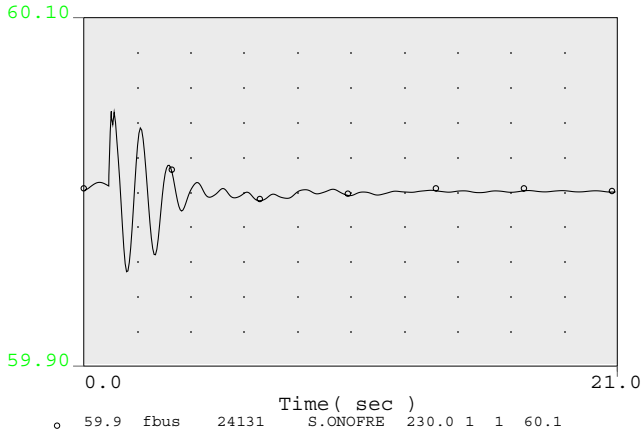



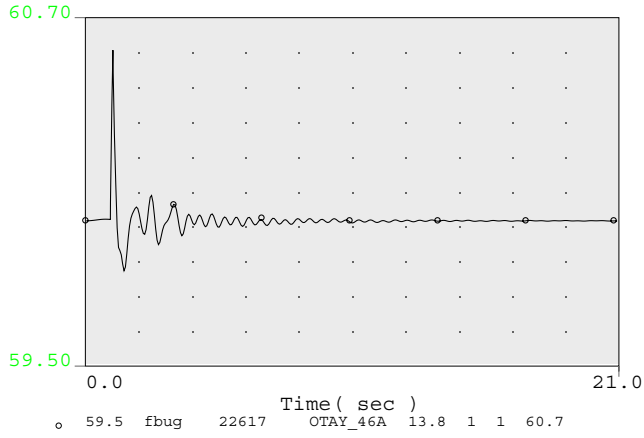



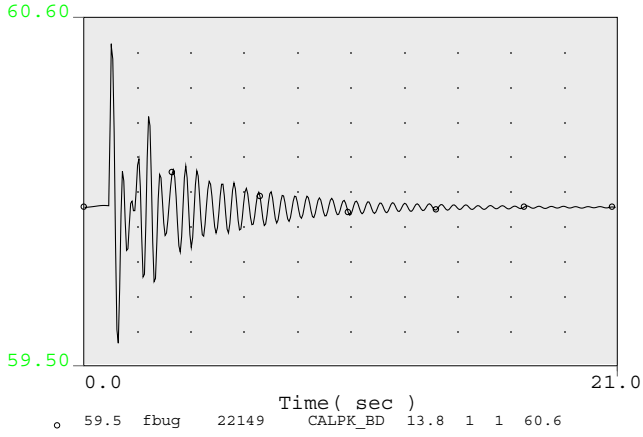

MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

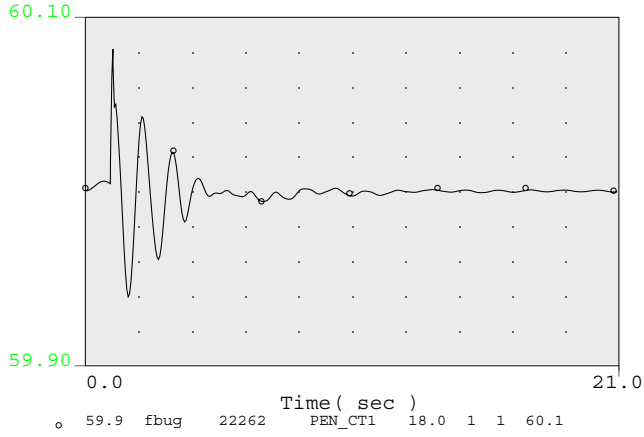


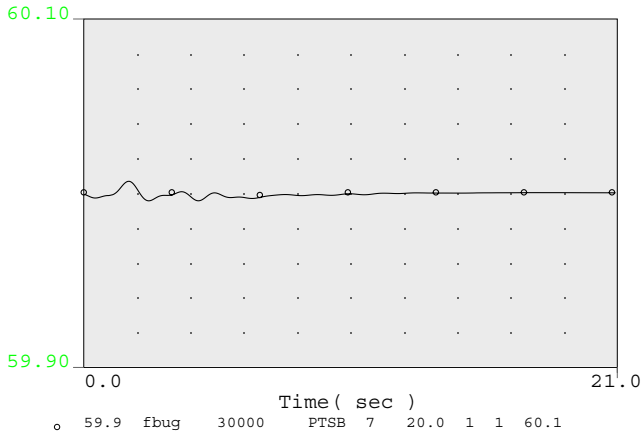



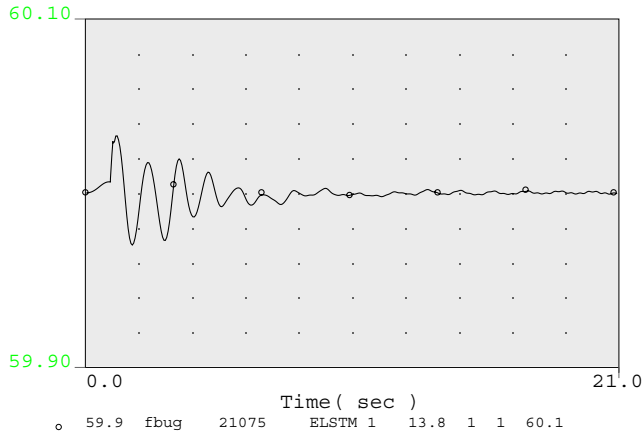



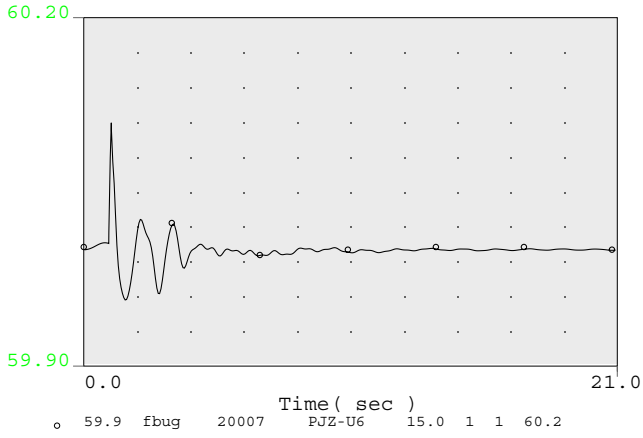



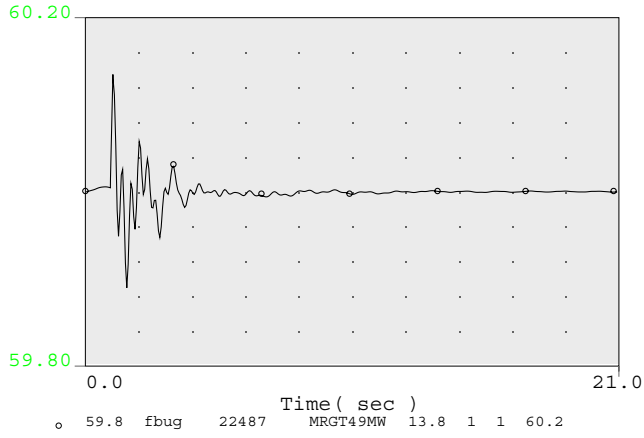



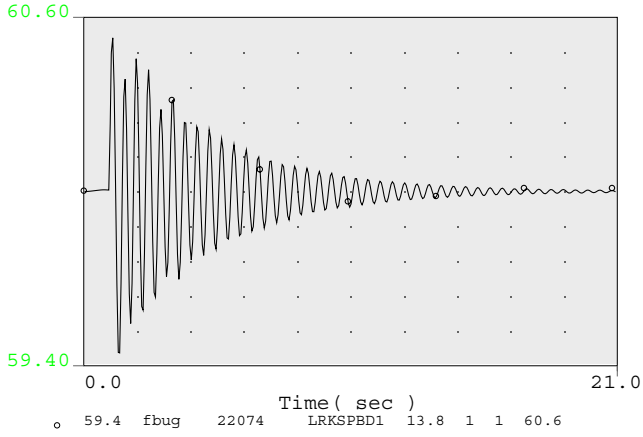

MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

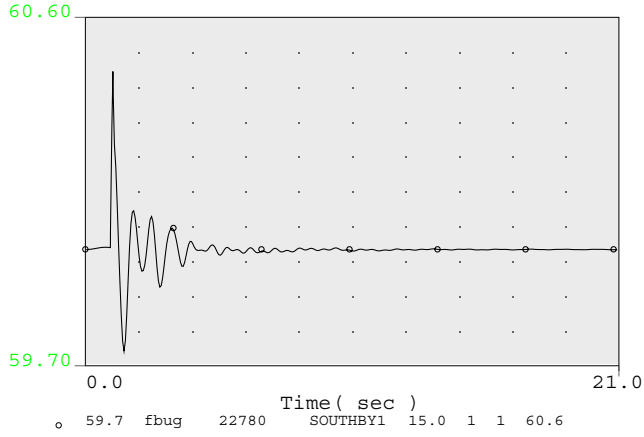


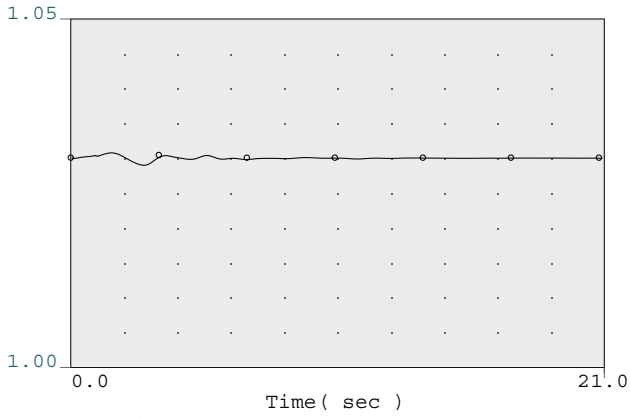



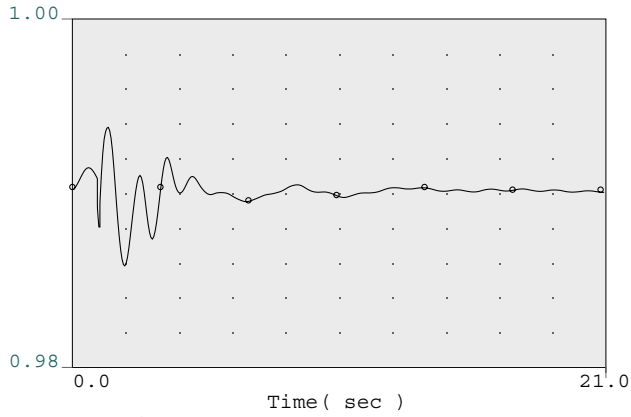



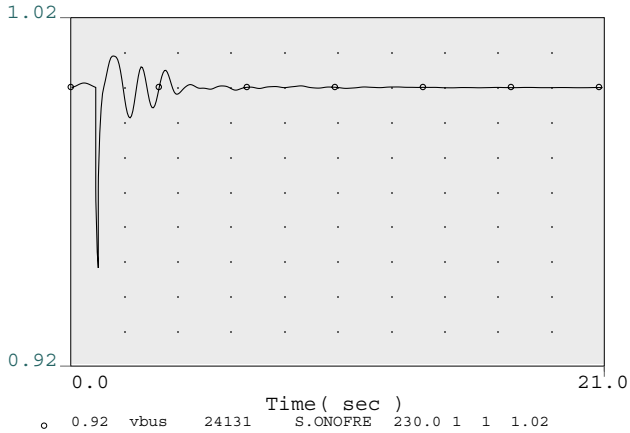

MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines



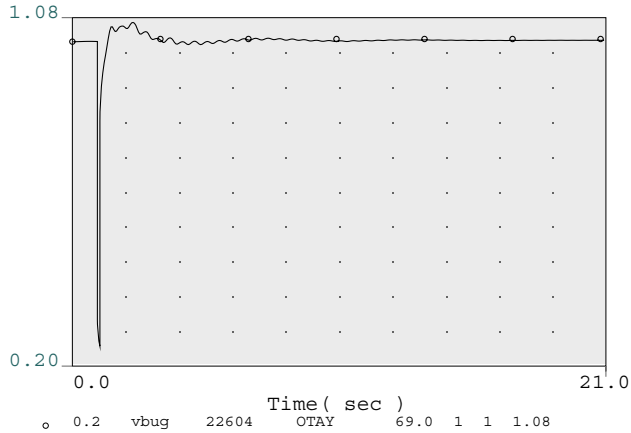

o 1.0 vbug 30000 PTSB 7 20.0 1 1 1.05



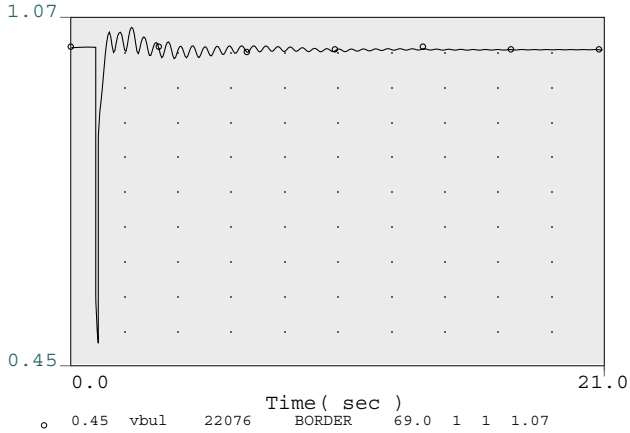

o 0.98 vbug 14931 PALOVRD1 24.0 1 1 1.0



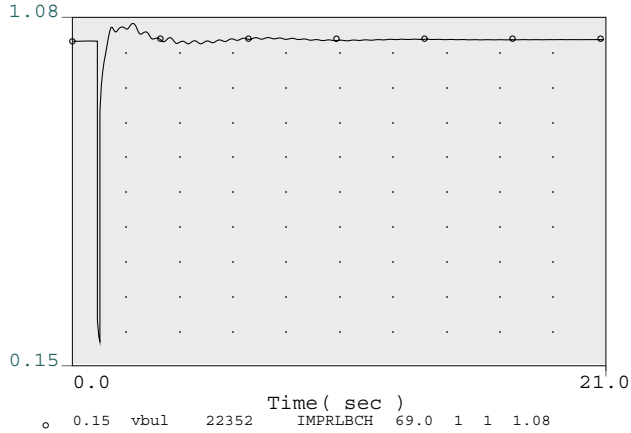

o 0.92 vbus 24131 S.ONOFRE 230.0 1 1 1.02




o 0.2 vbug 22604 OTAY 69.0 1 1 1.08

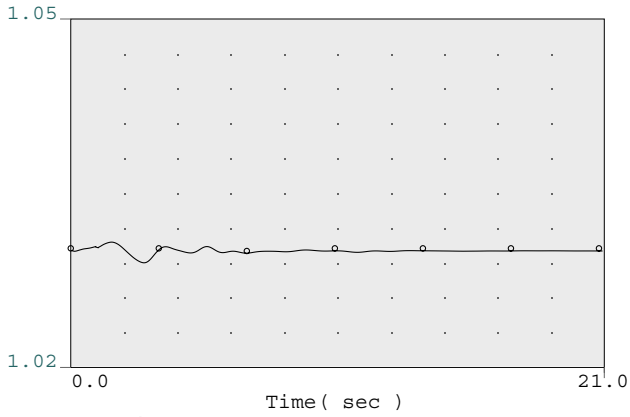



o 0.45 vbul 22076 BORDER 69.0 1 1 1.07

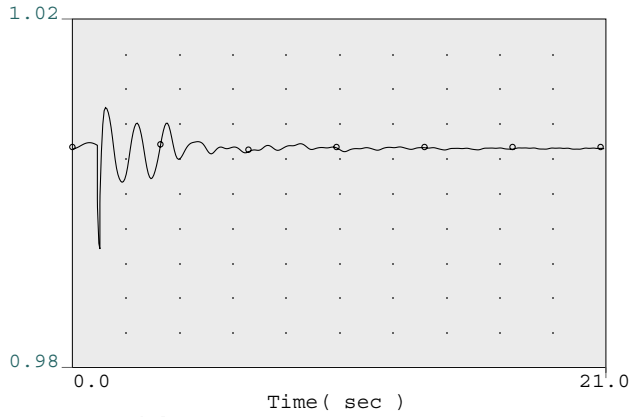



o 0.15 vbul 22352 IMPRLBCH 69.0 1 1 1.08

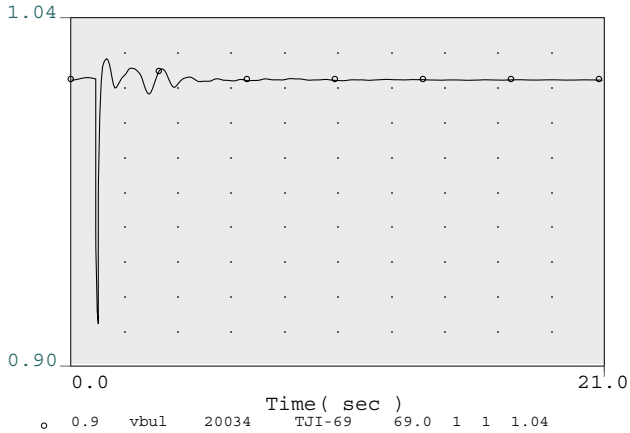
MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines



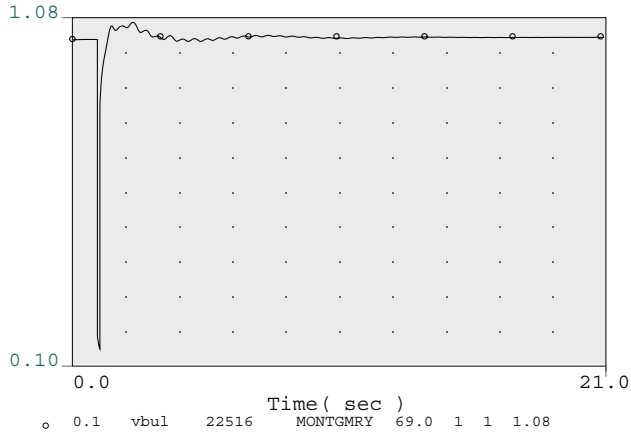

o 1.02 vbug 30000 PTSB 7 20.0 1 1 1.05



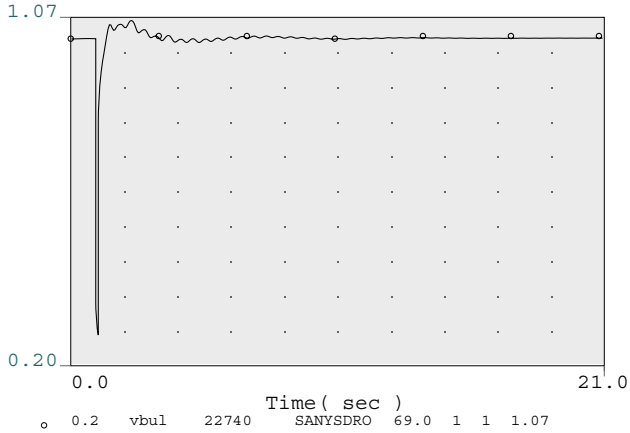

o 0.98 vbul 21027 ELSTEAMP 92.0 1 1 1.02



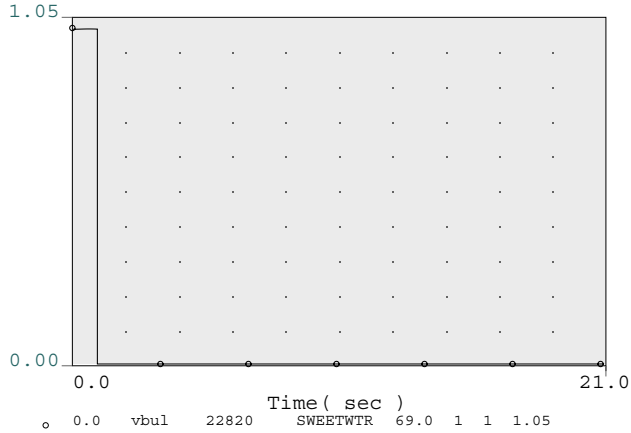

o 0.9 vbul 20034 TJI-69 69.0 1 1 1.04




o 0.1 vbul 22516 MONTGMRY 69.0 1 1 1.08




o 0.2 vbul 22740 SANYSDRO 69.0 1 1 1.07




o 0.0 vbul 22820 SWEETWTR 69.0 1 1 1.05

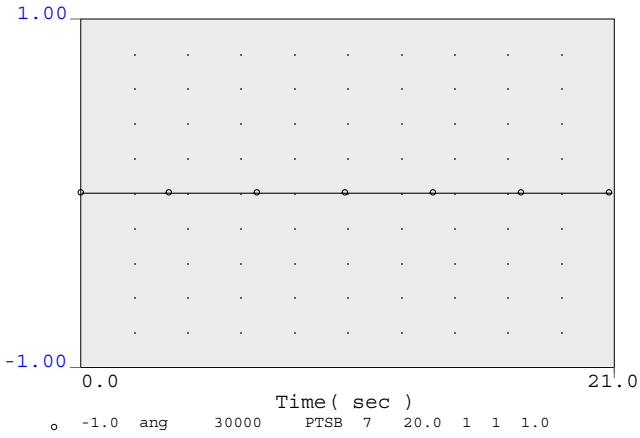
MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

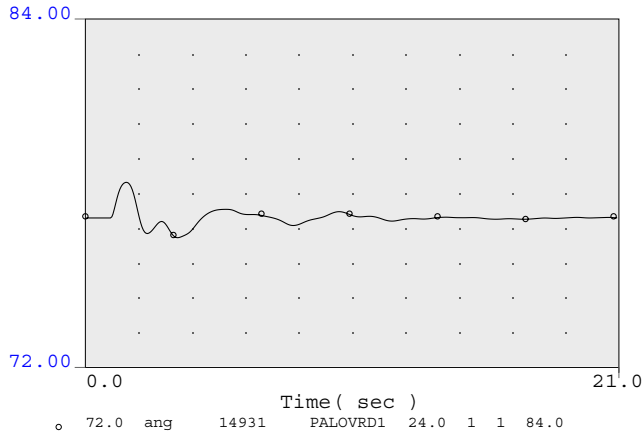
Southbay North Bus Outage

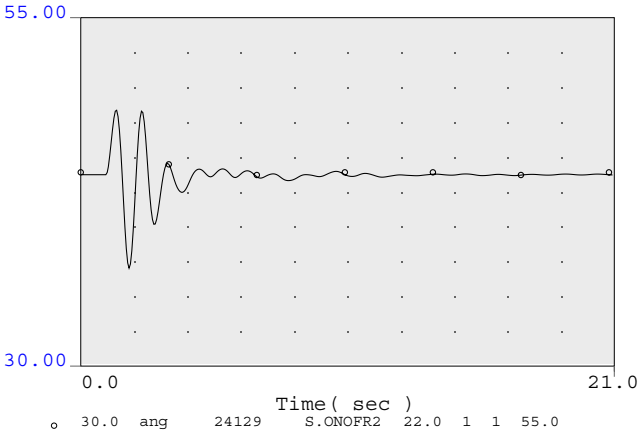
Pre- and Post-Project

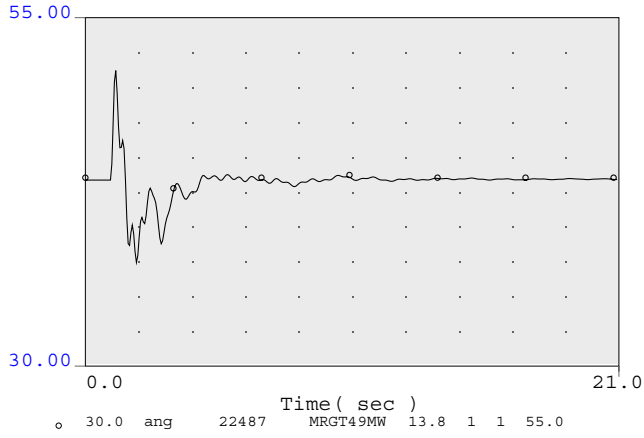
Loss of the following 69 kV facilities:

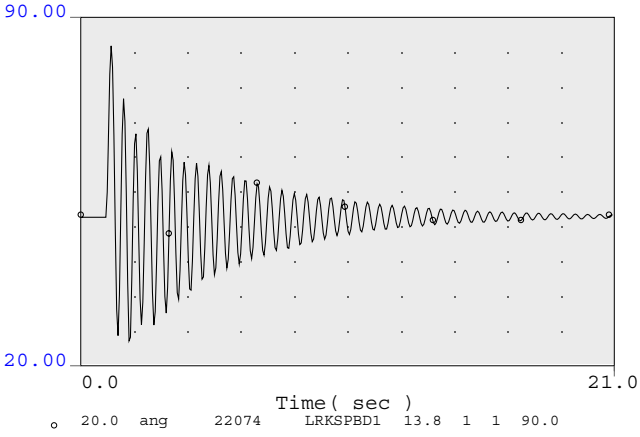
Sweetwater-Sweetwater,
Southbay-Otay, and
Southbay-Imperial Beach.

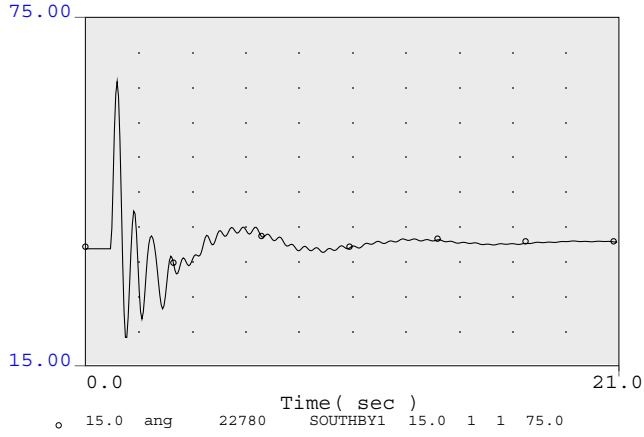


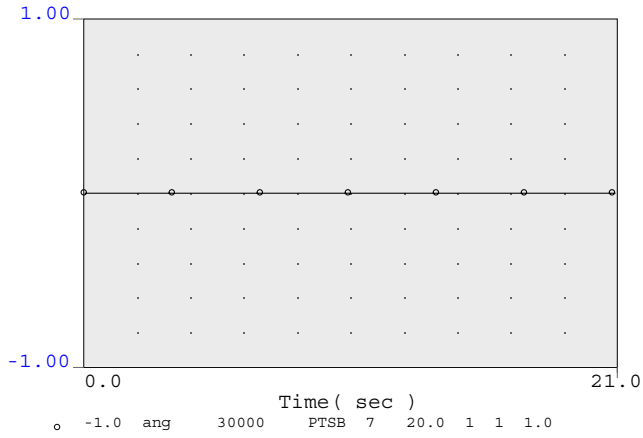



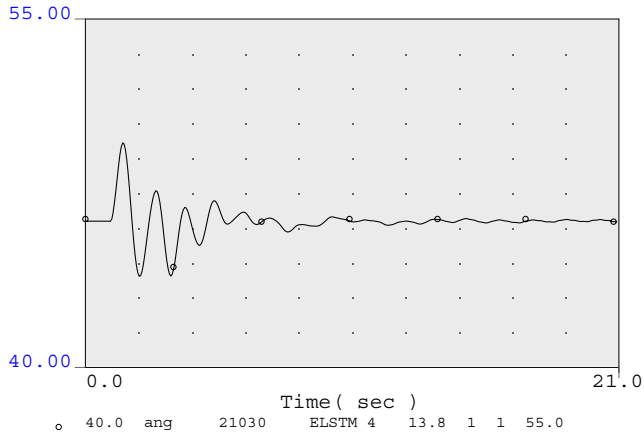



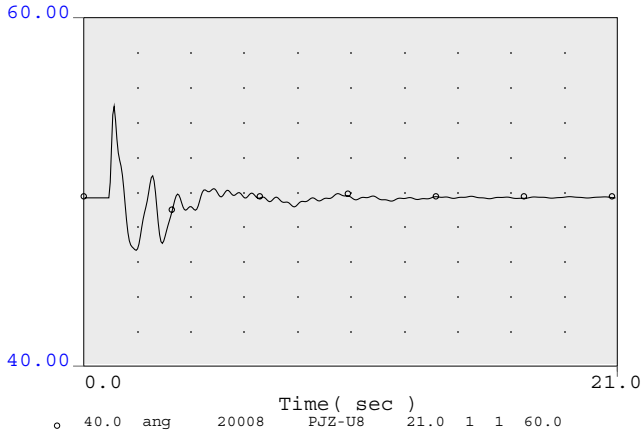



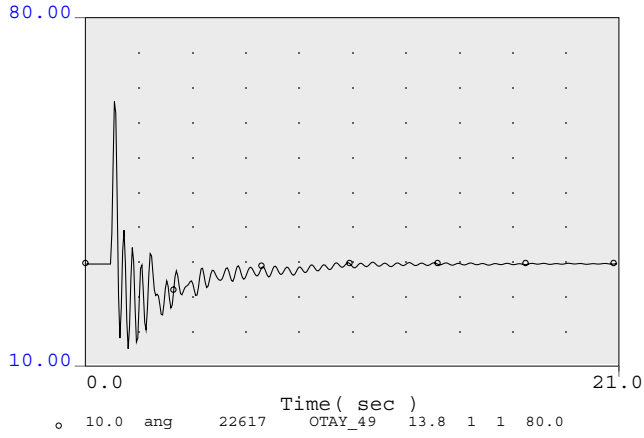



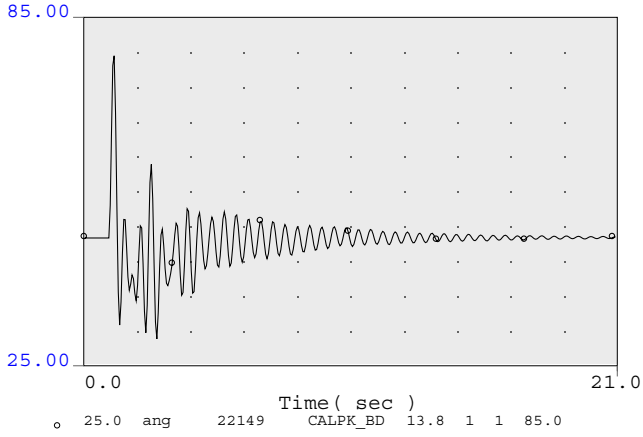

MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

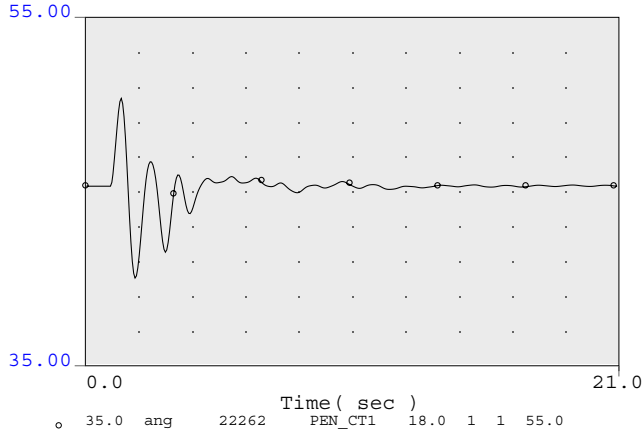


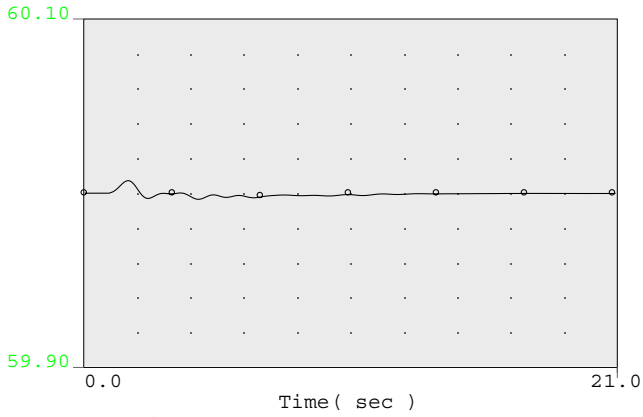



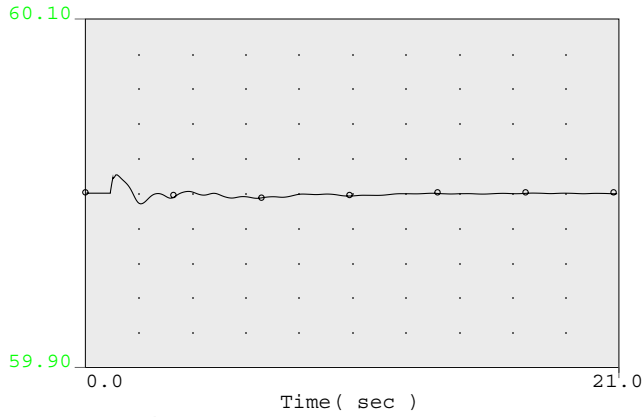



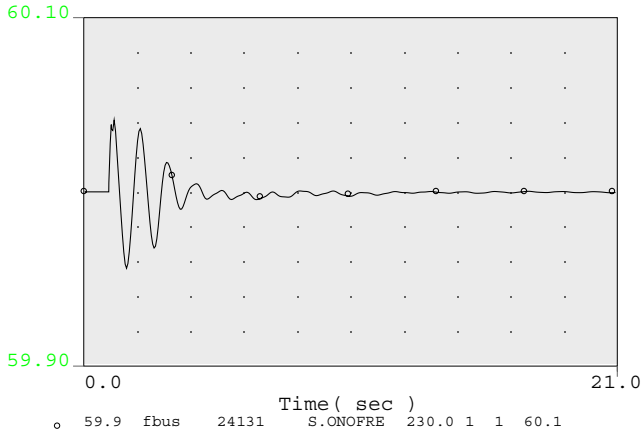

MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines



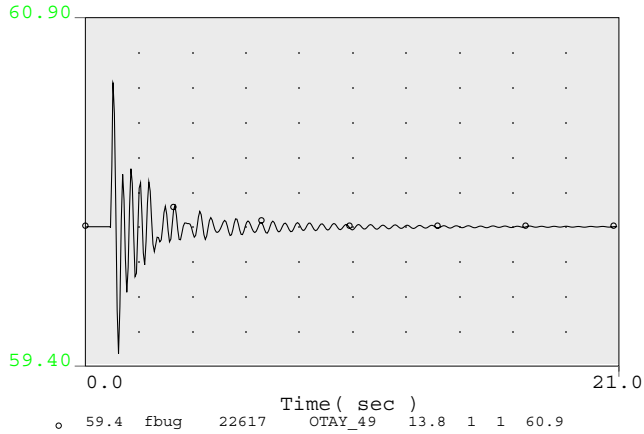

59.9 fbug 30000 PTSB 7 20.0 1 1 60.1



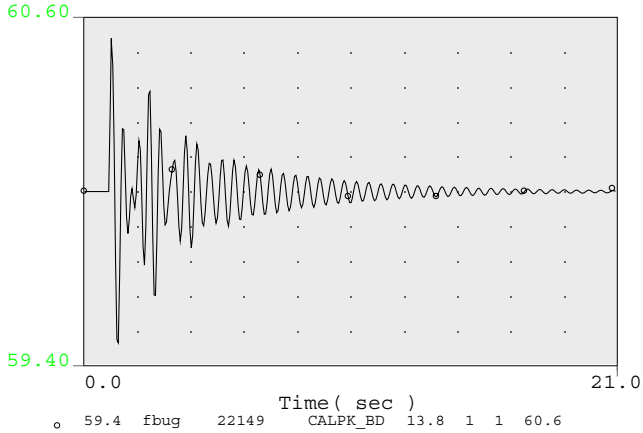

59.9 fbug 14931 PALOVRD1 24.0 1 1 60.1



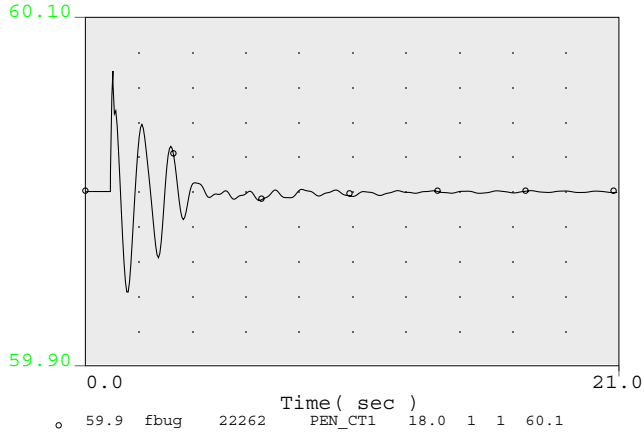

59.9 fbus 24131 S.ONOFRE 230.0 1 1 60.1




59.4 fbug 22617 OTAY_49 13.8 1 1 60.9

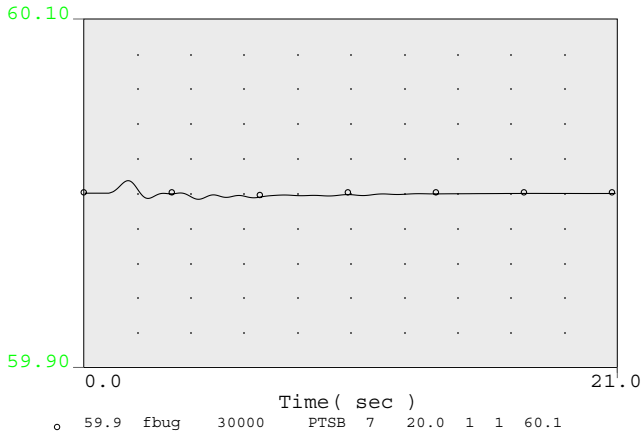


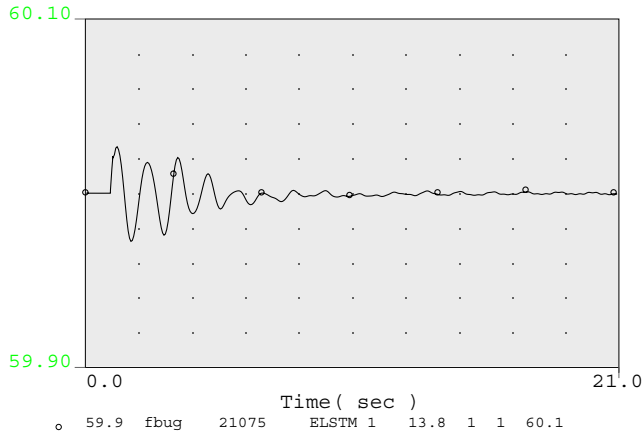

59.4 fbug 22149 CALPK_BD 13.8 1 1 60.6

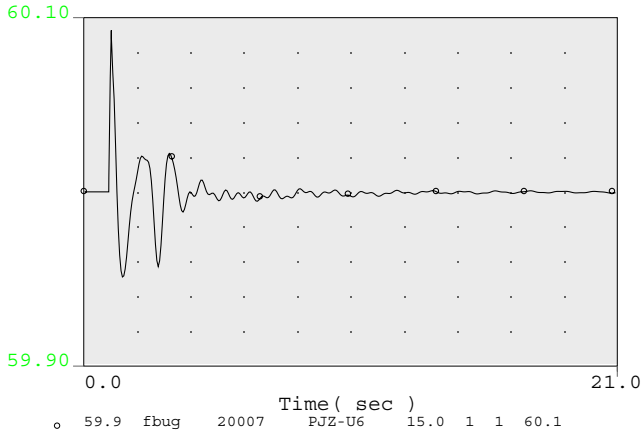


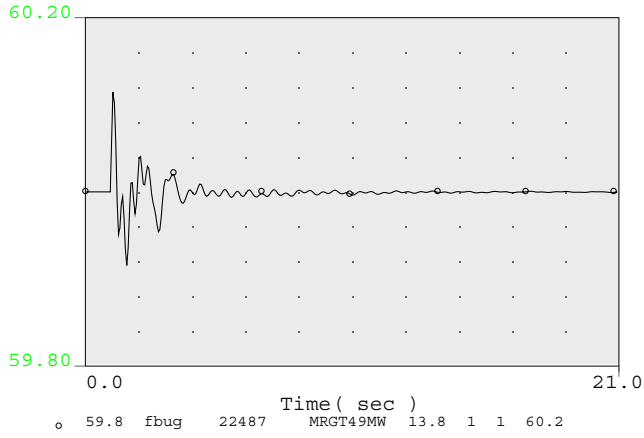

59.9 fbug 22262 PEN_CT1 18.0 1 1 60.1

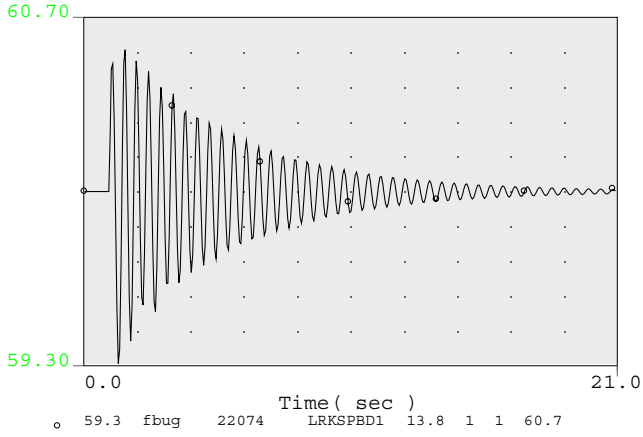
MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

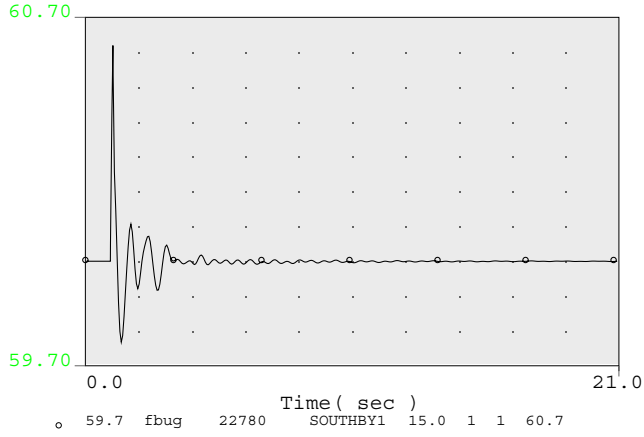


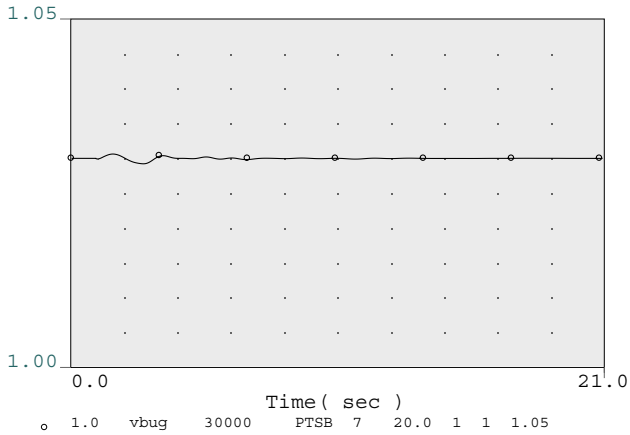



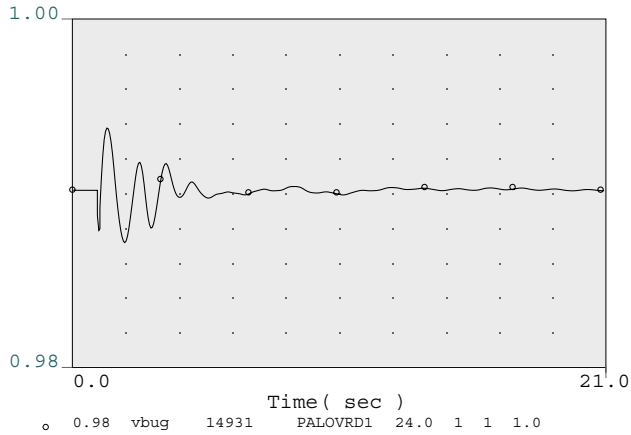



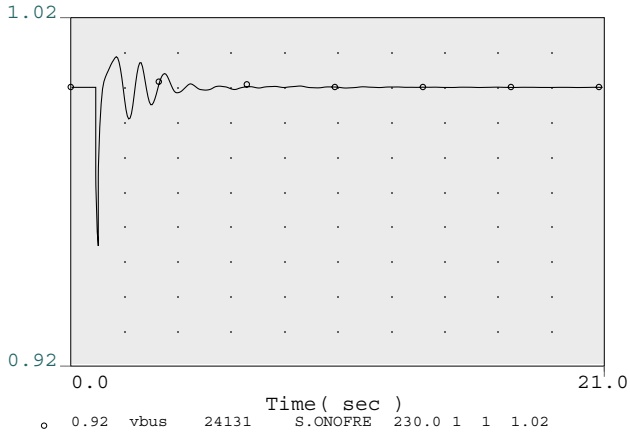



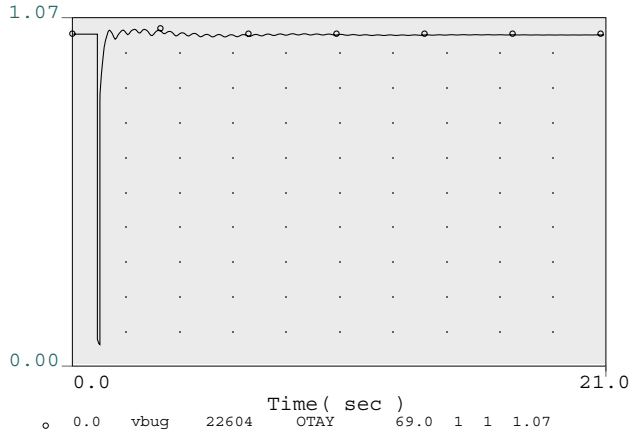



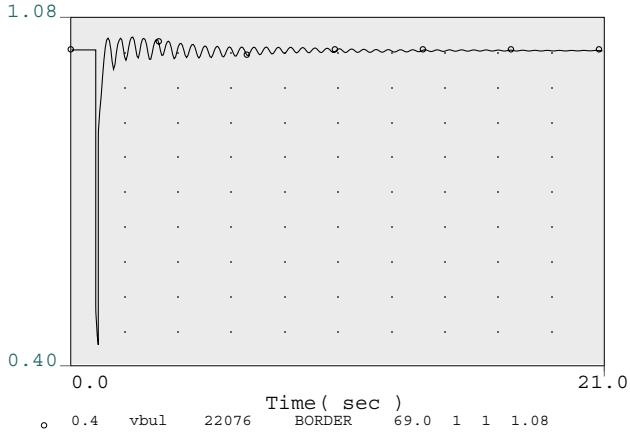

MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

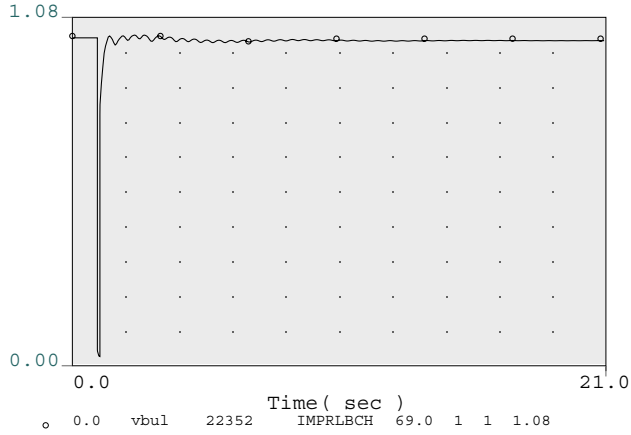


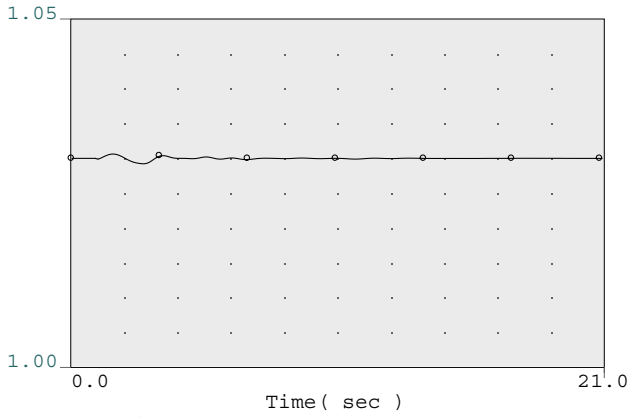



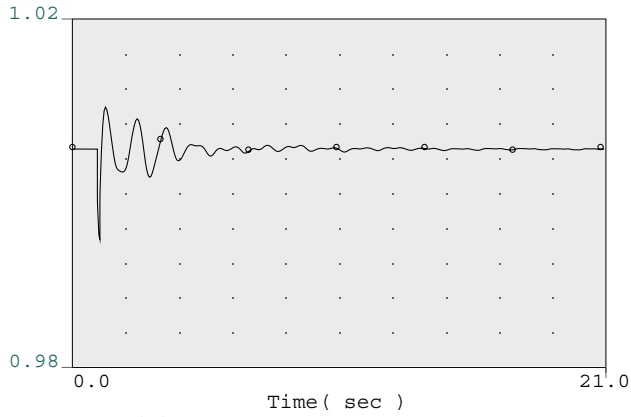



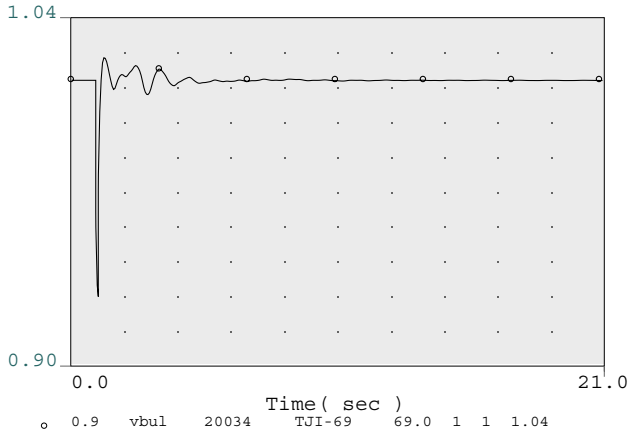

MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines



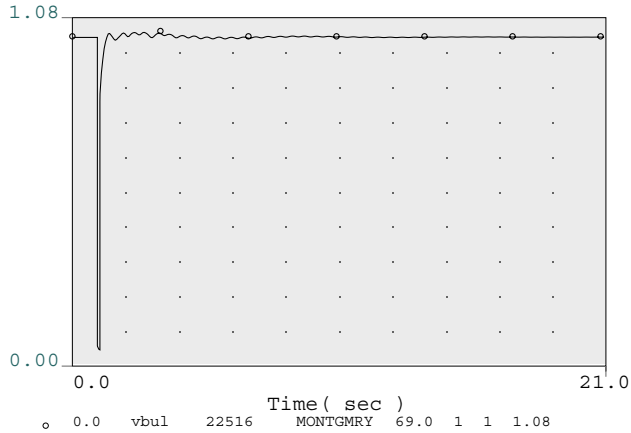

1.0 vbug 30000 PTSB 7 20.0 1 1 1.05



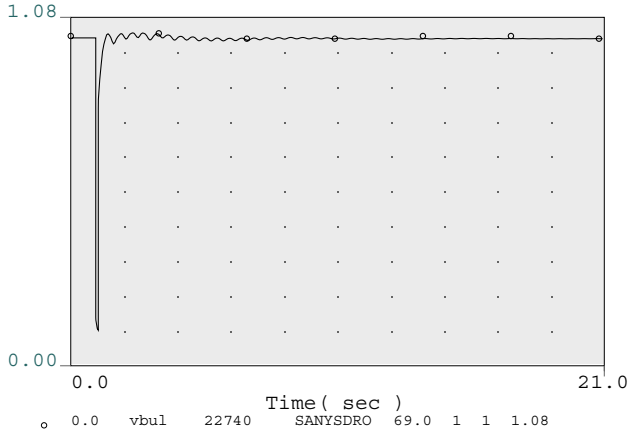

0.98 vbul 21027 ELSTEAMP 92.0 1 1 1.02



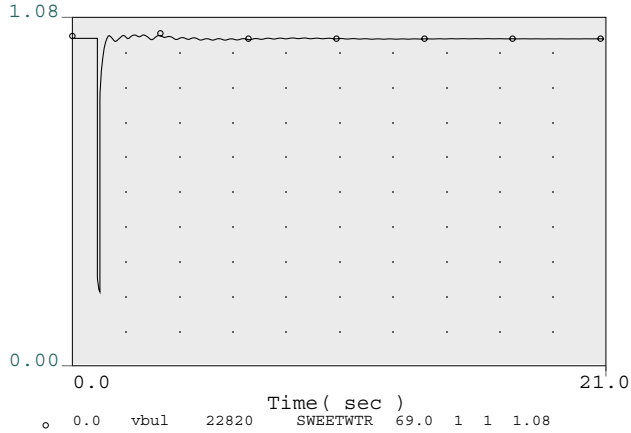

0.9 vbul 20034 TJI-69 69.0 1 1 1.04




0.0 vbul 22516 MONTGMRY 69.0 1 1 1.08

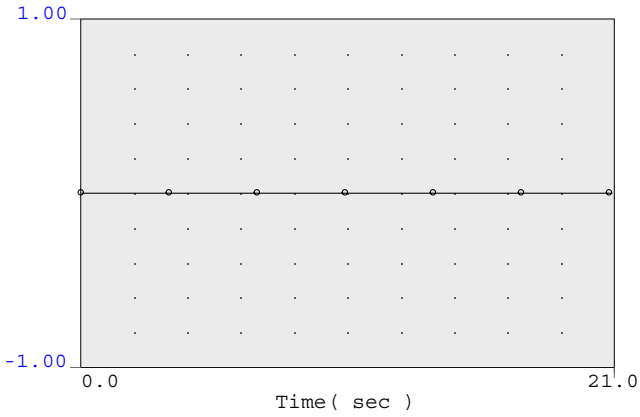



0.0 vbul 22740 SANYSDRO 69.0 1 1 1.08

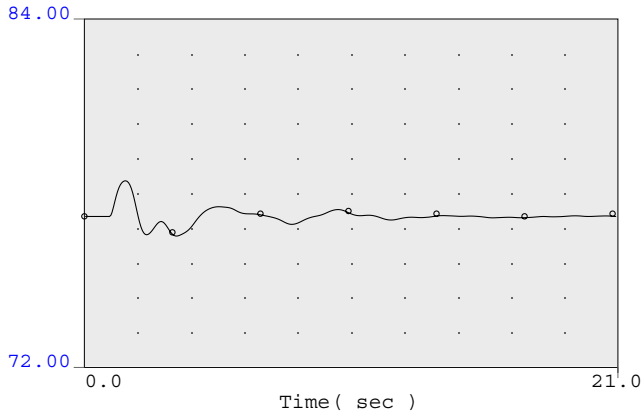



0.0 vbul 22820 SWEETWTR 69.0 1 1 1.08

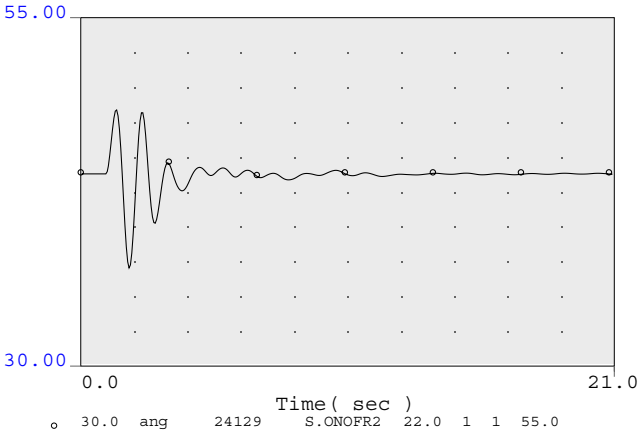
MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines



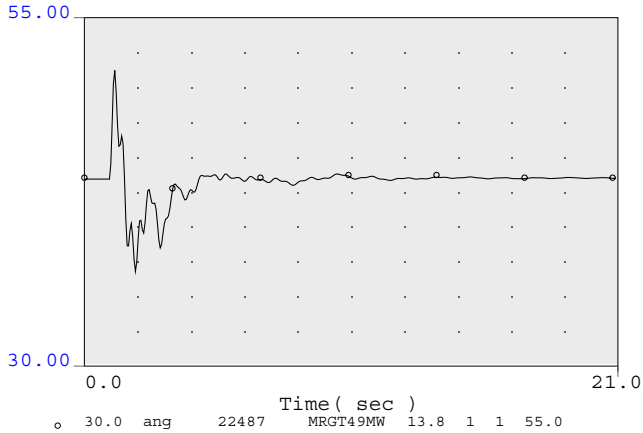

-1.0 ang 30000 PTSB 7 20.0 1 1 1.0



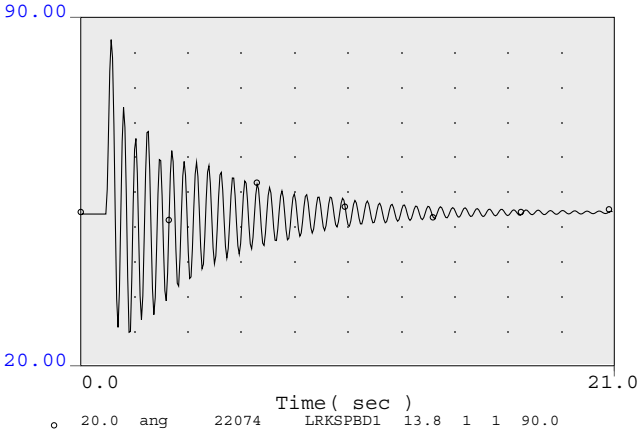

72.0 ang 14931 PALOVRD1 24.0 1 1 84.0



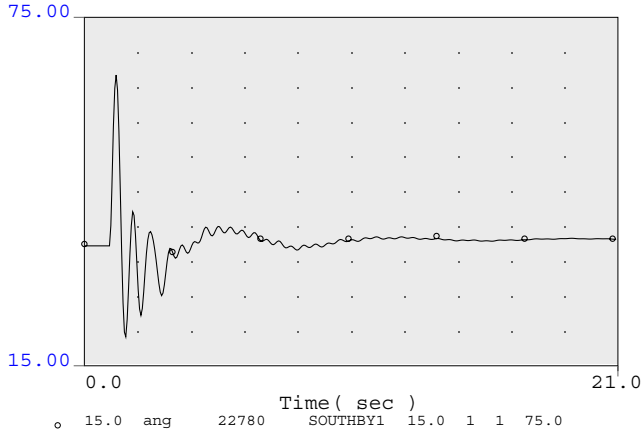

30.0 ang 24129 S.ONOFR2 22.0 1 1 55.0




30.0 ang 22487 MRGT49MW 13.8 1 1 55.0

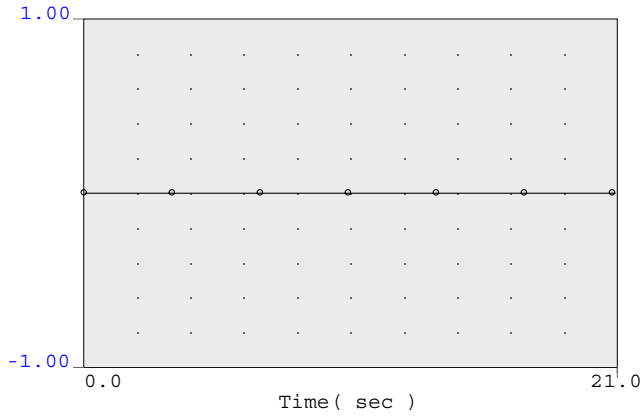



20.0 ang 22074 LRKSPBD1 13.8 1 1 90.0

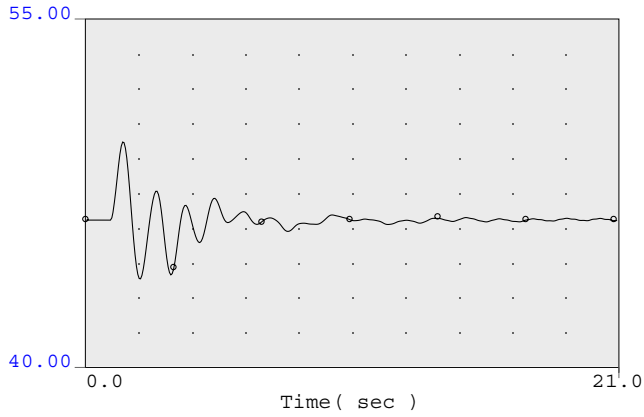



15.0 ang 22780 SOUTHBY1 15.0 1 1 75.0

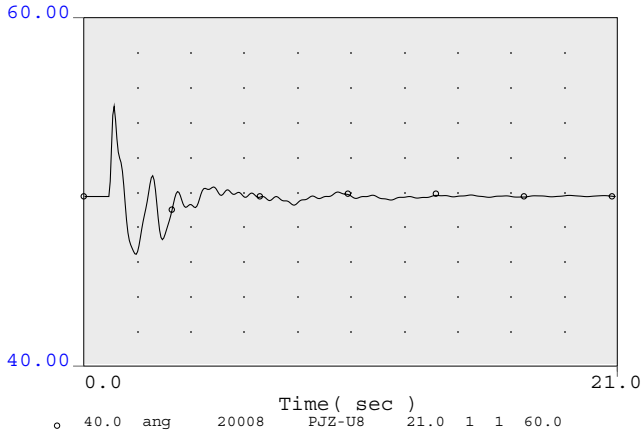
MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines



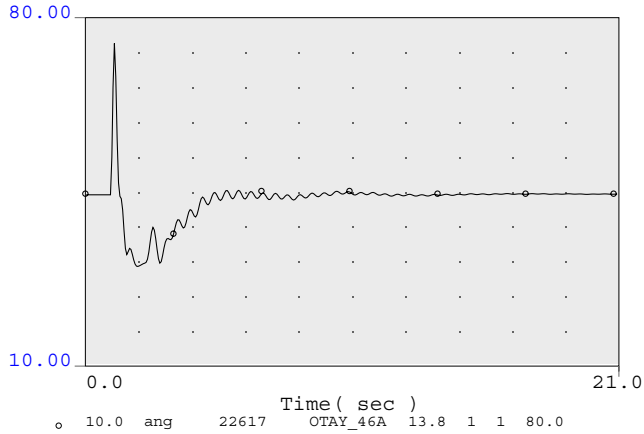

-1.0 ang 30000 PTSB 7 20.0 1 1 1.0



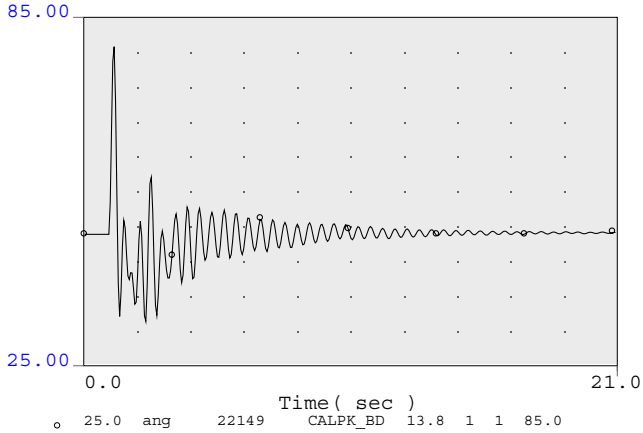

40.0 ang 21030 ELSTM 4 13.8 1 1 55.0



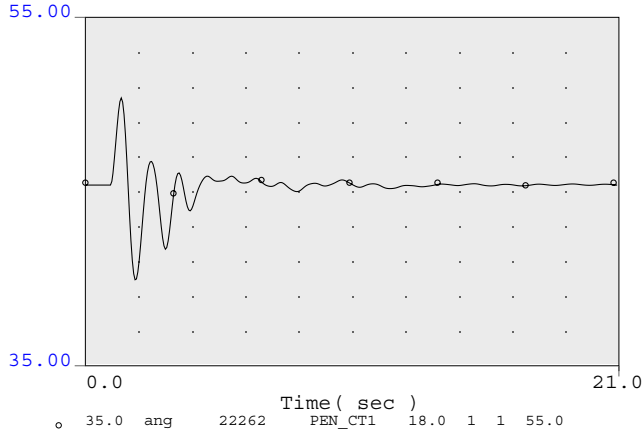

40.0 ang 20008 PJZ-U8 21.0 1 1 60.0




10.0 ang 22617 OTAY_46A 13.8 1 1 80.0

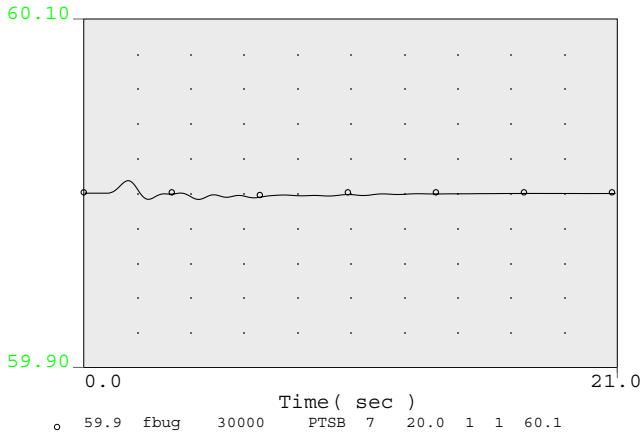


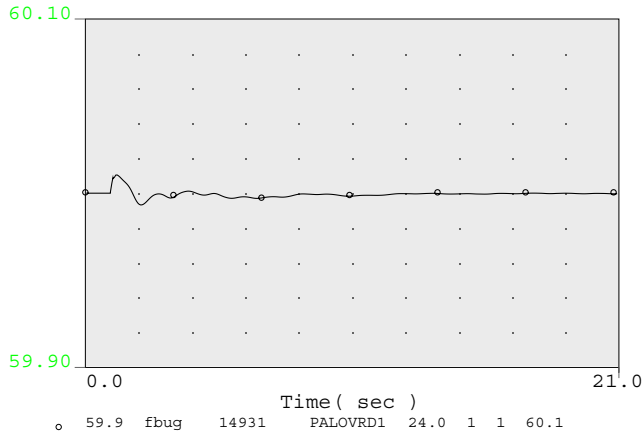

25.0 ang 22149 CALPK_BD 13.8 1 1 85.0

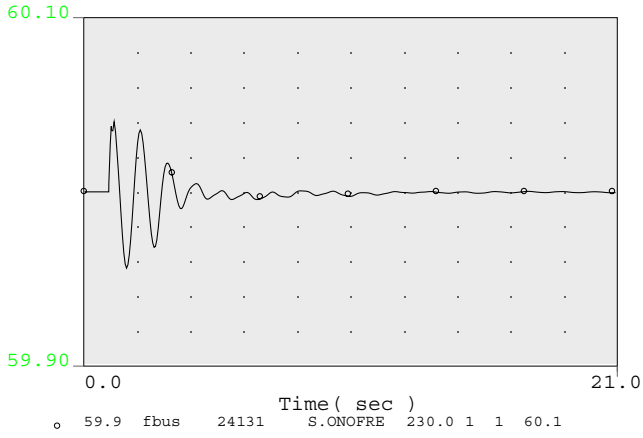


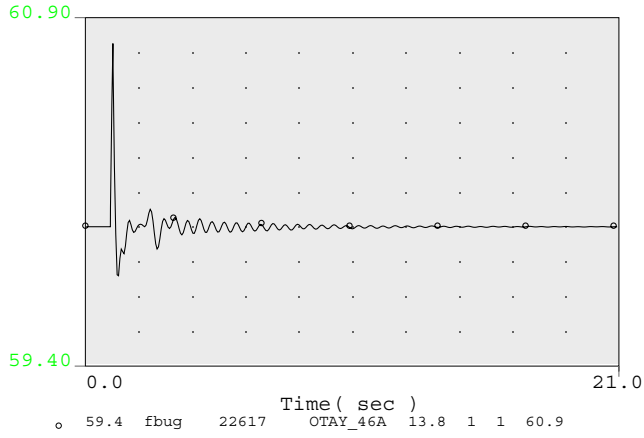

35.0 ang 22262 PEN_CT1 18.0 1 1 55.0

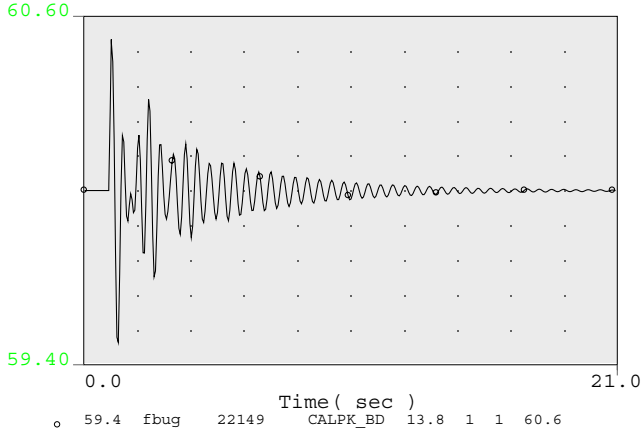
MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

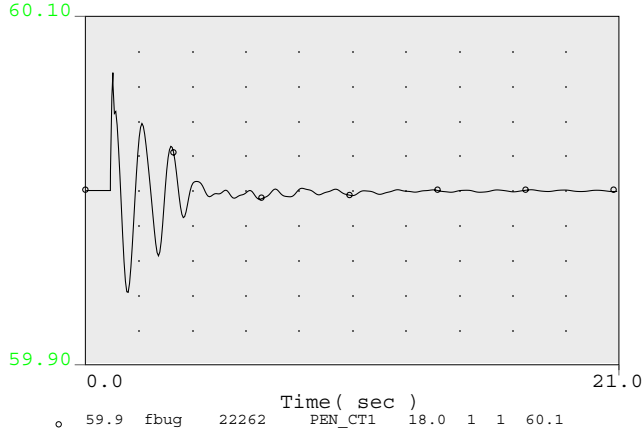


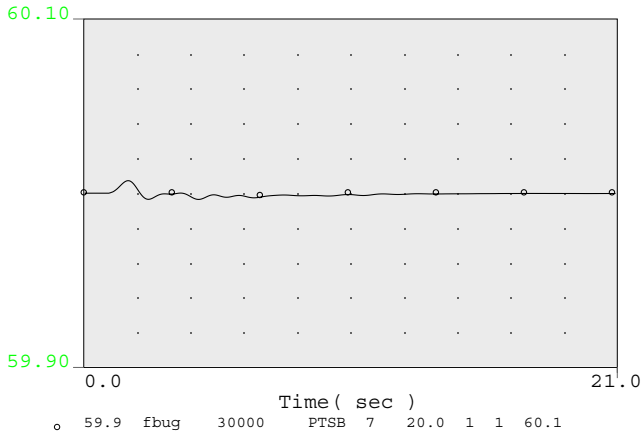



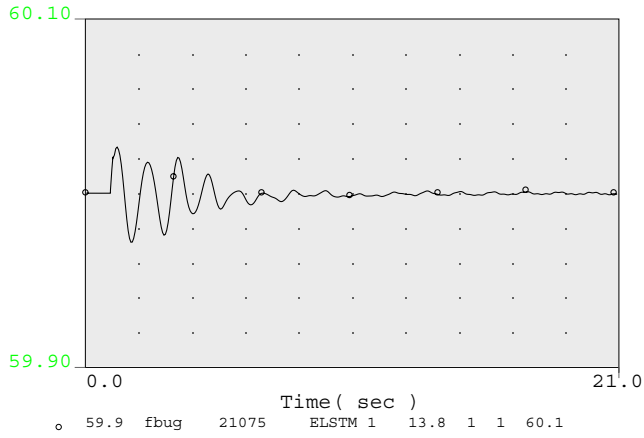



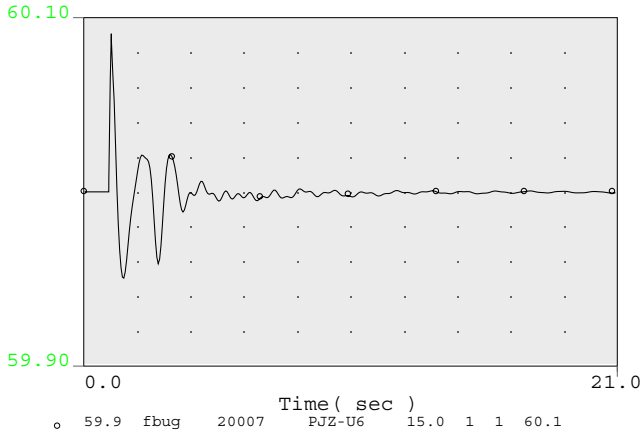



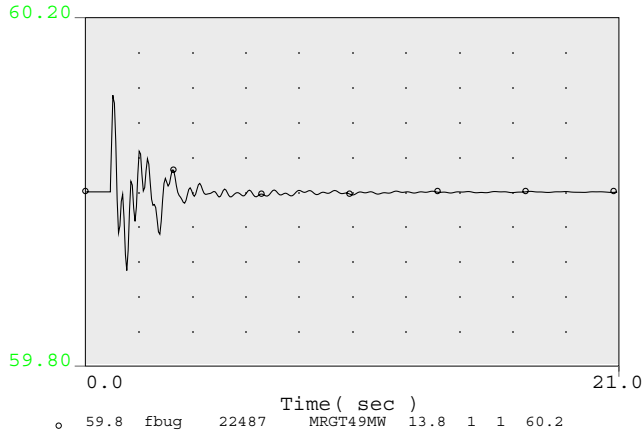



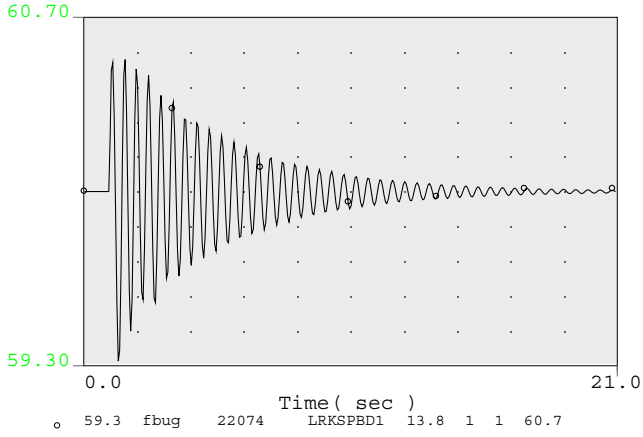

MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

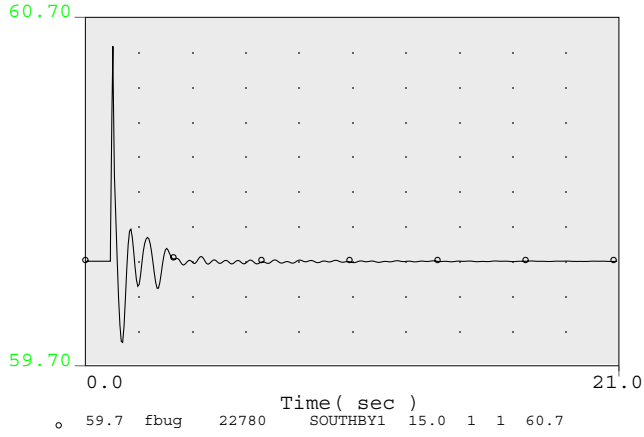


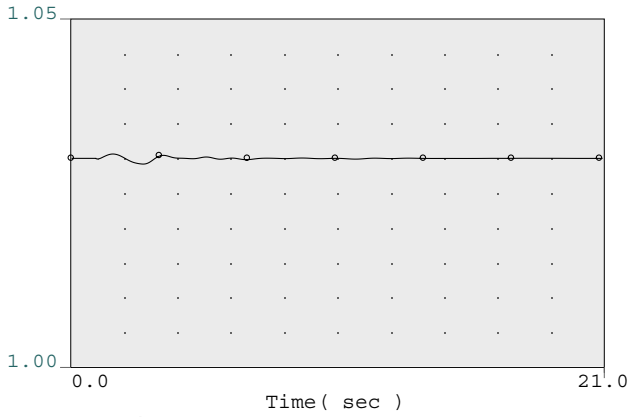




MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

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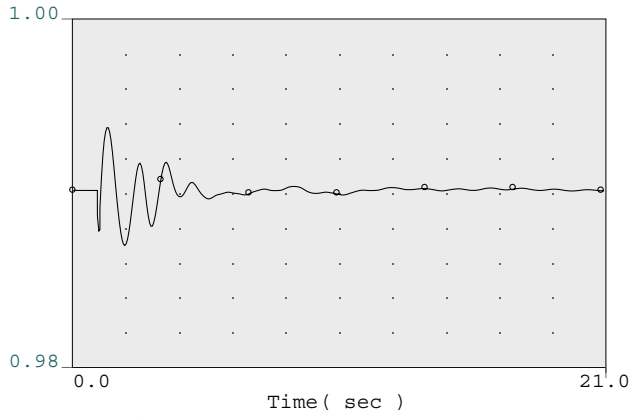


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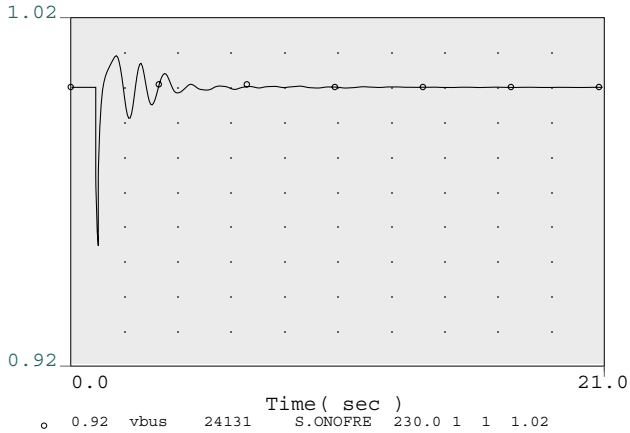


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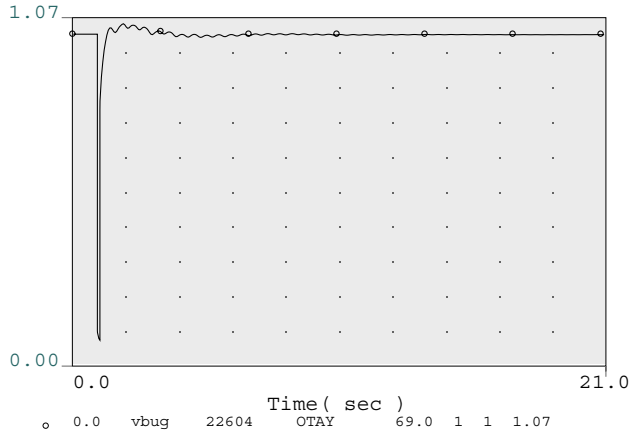


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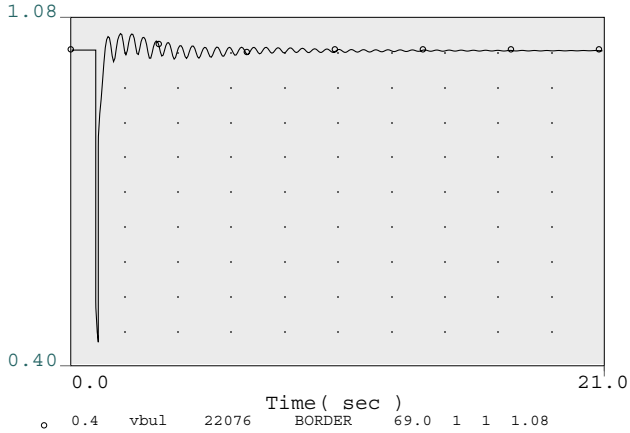
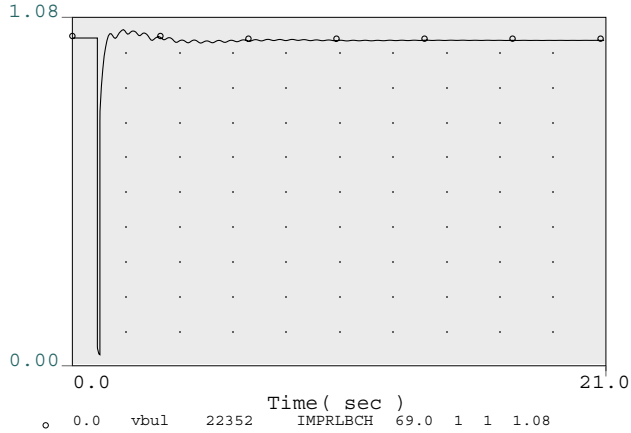
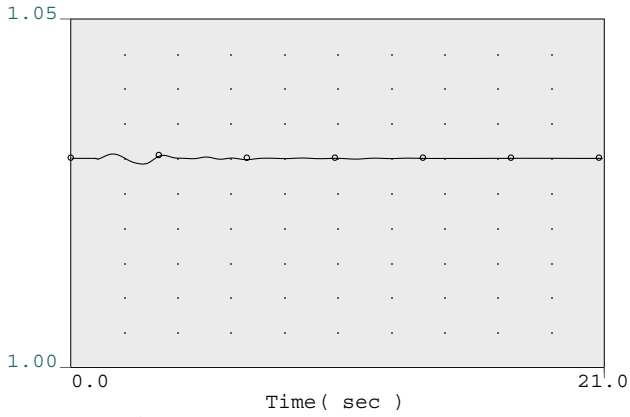



0.4 vbul 22076 BORDER 69.0 1 1 1.08




0.0 vbul 22352 IMPRLBCH 69.0 1 1 1.08

MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

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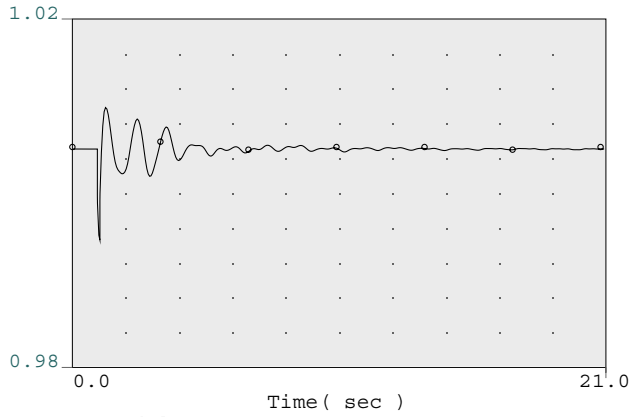
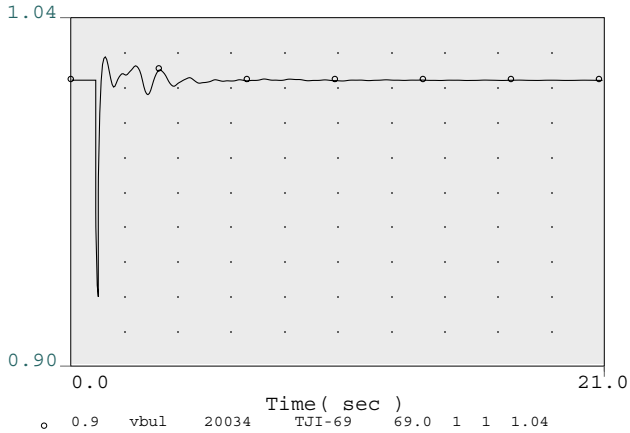



0.98 vbul 21027 ELSTEAMP 92.0 1 1 1.02

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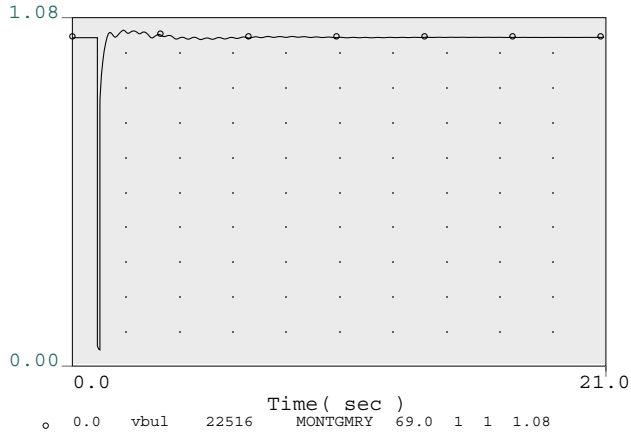
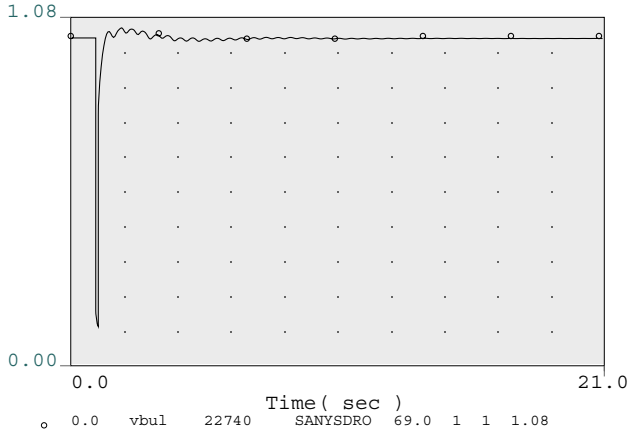



0.0 vbul 22516 MONTGMRY 69.0 1 1 1.08

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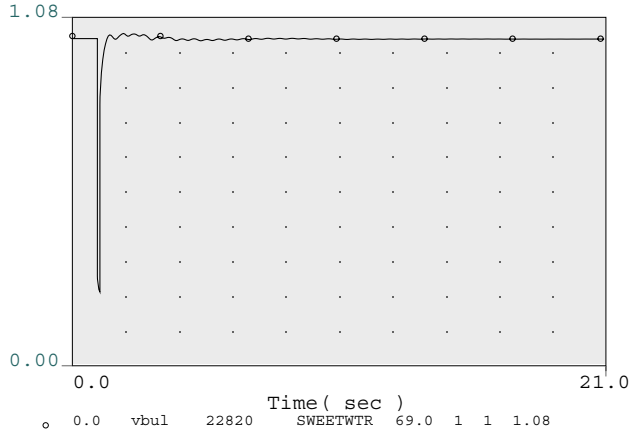



0.0 vbul 22820 SWEETWTR 69.0 1 1 1.08

MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

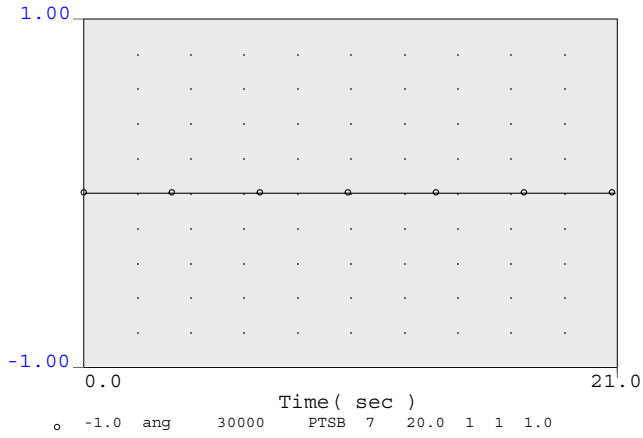
Plots of Transient Stability Simulations

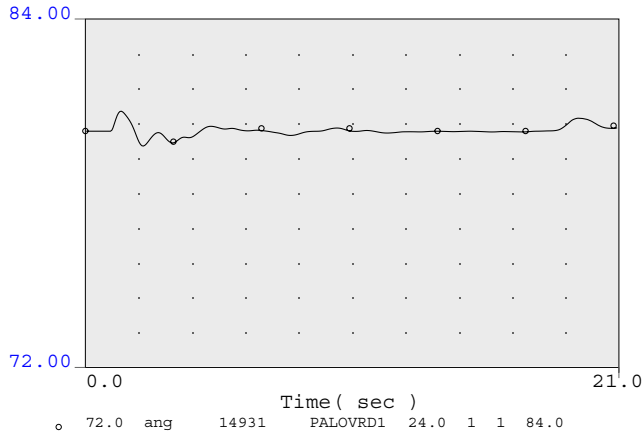
Sensitivity Cases

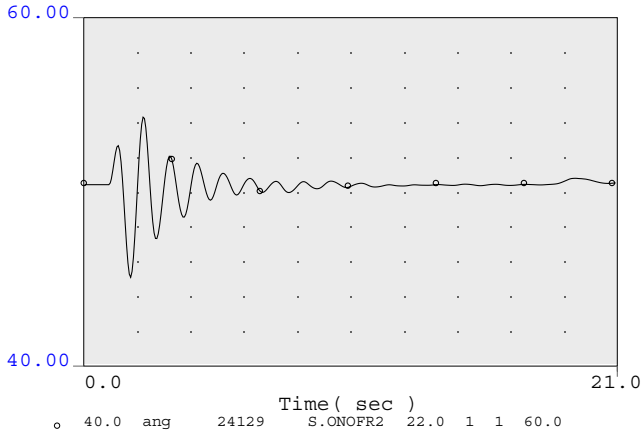
Low Otay Load, High Southbay Generation

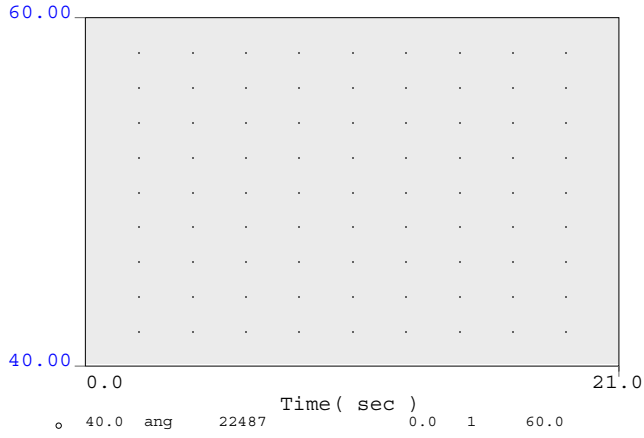
TL623 (Imperial Beach-Otay-San Ysidro) 69 kV SLO

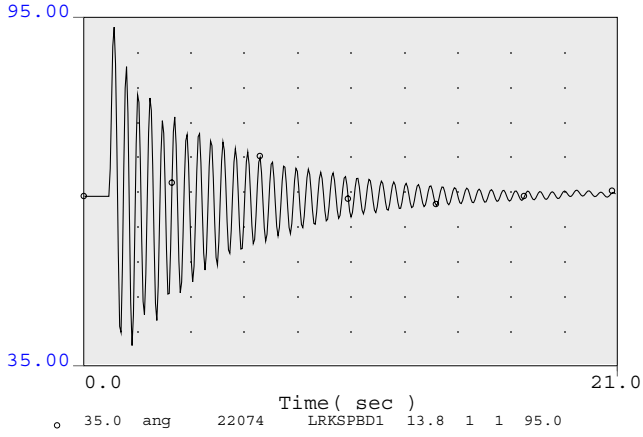
Pre- and Post-Project

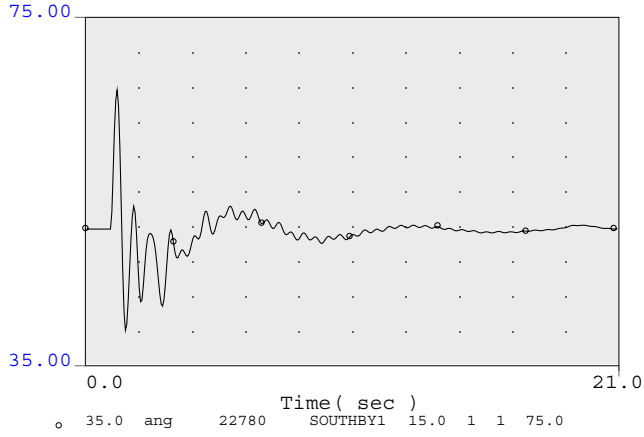


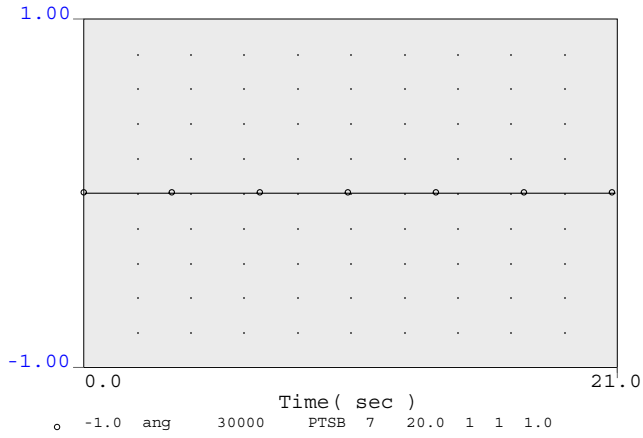



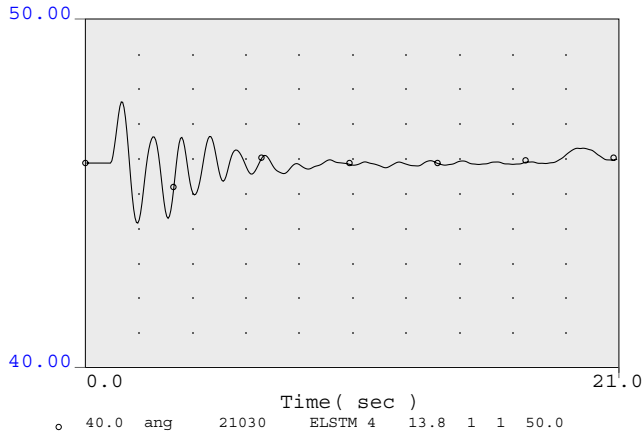



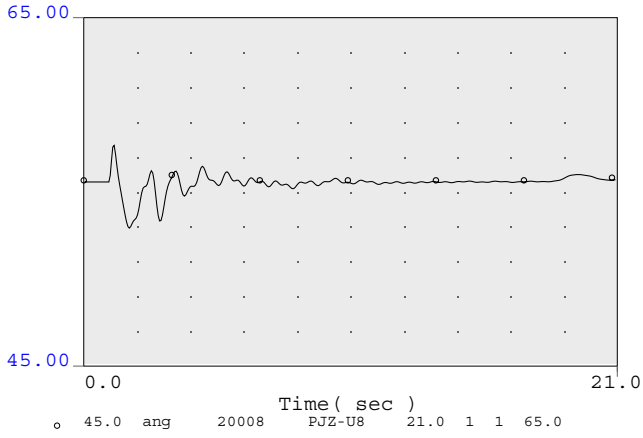

MMC ISIS, pre-project

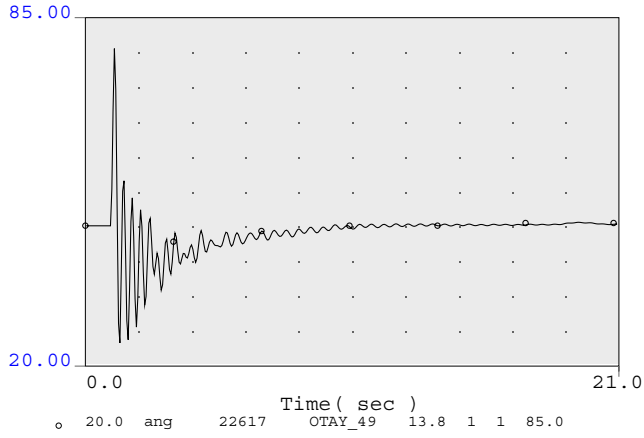
Fault bus at OTAY 69

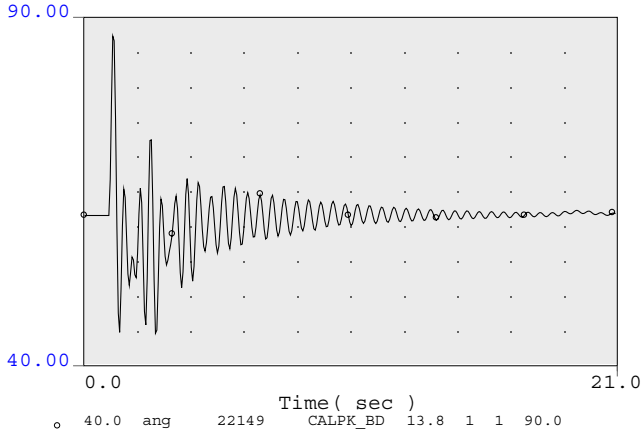
Trip Otay-Imp Beach-San Ysidro 69 kV line

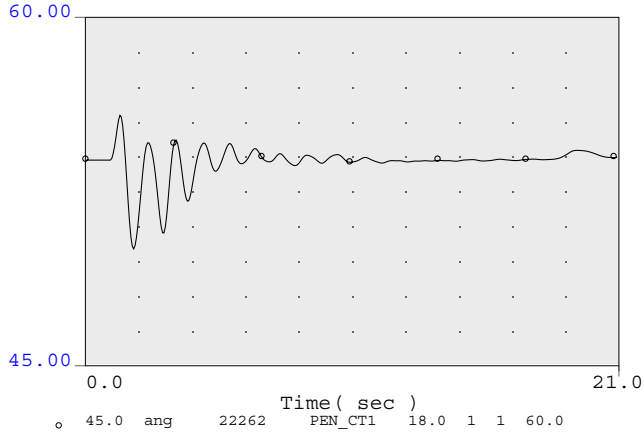


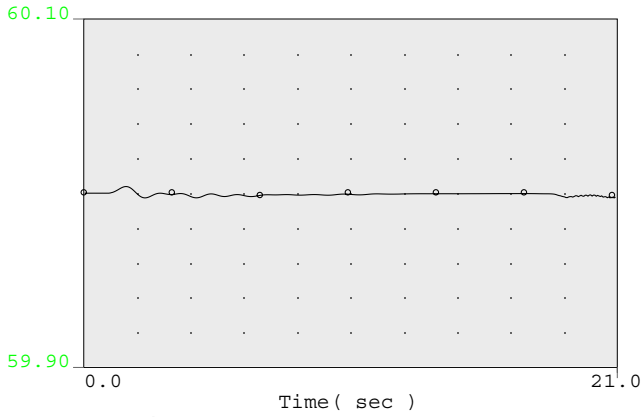



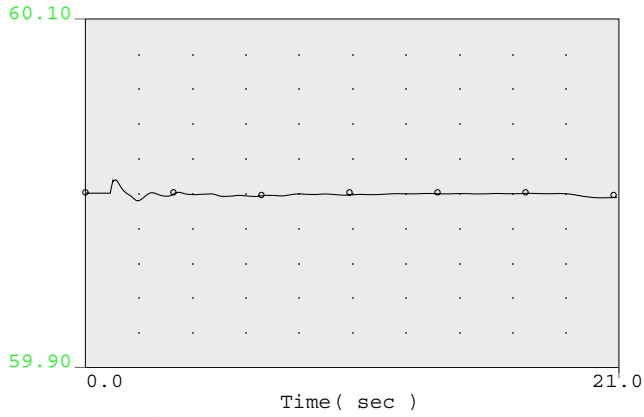

MMC ISIS, pre-project

Fault bus at OTAY 69

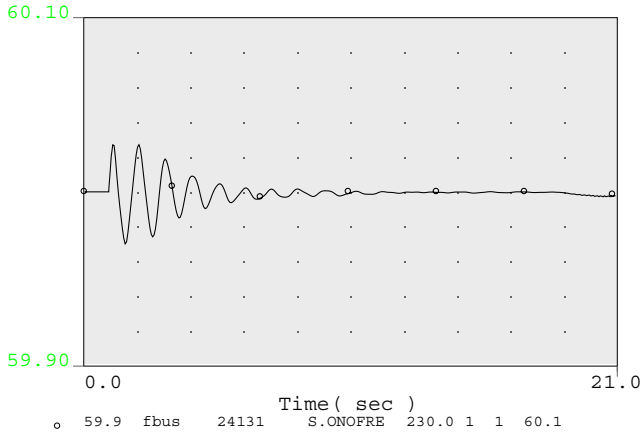
Trip Otay-Imp Beach-San Ysidro 69 kV line



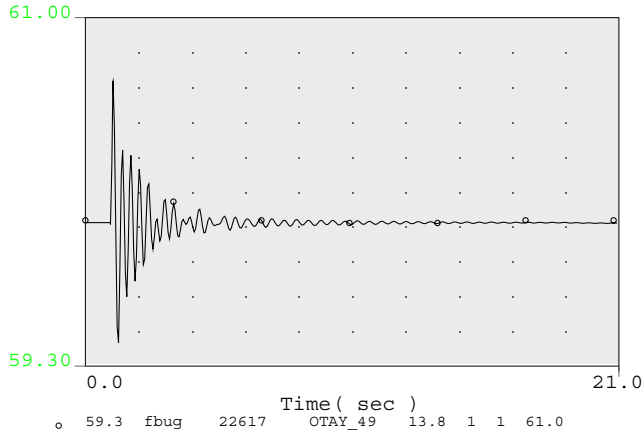

59.9 fbug 30000 PTSB 7 20.0 1 1 60.1



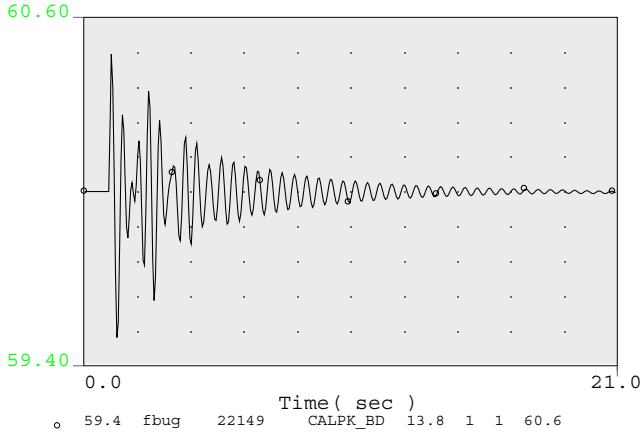

59.9 fbug 14931 PALOVRD1 24.0 1 1 60.1



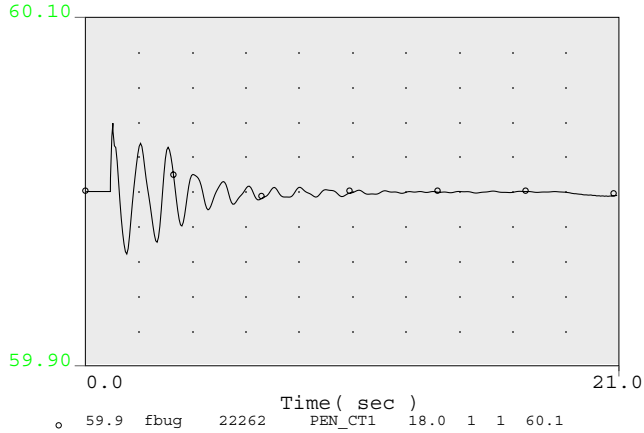

59.9 fbus 24131 S.ONOFRE 230.0 1 1 60.1




59.3 fbug 22617 OTAY_49 13.8 1 1 61.0




59.4 fbug 22149 CALPK_BD 13.8 1 1 60.6

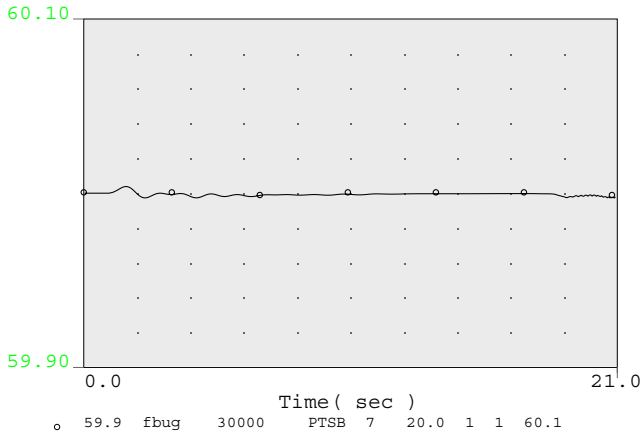


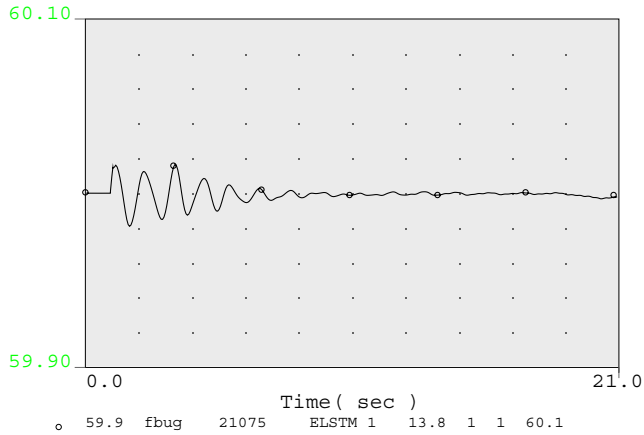

59.9 fbug 22262 PEN_CT1 18.0 1 1 60.1

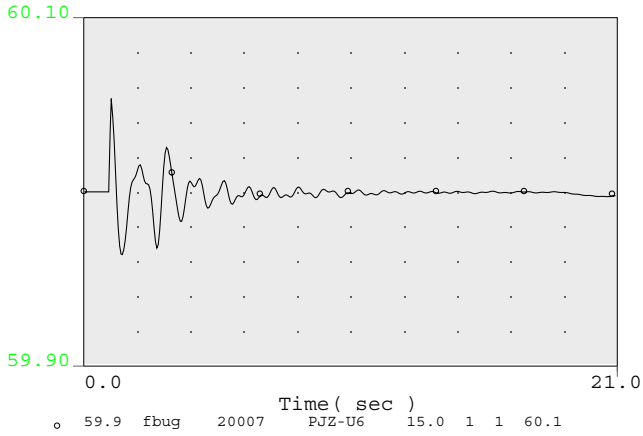
MMC ISIS, pre-project

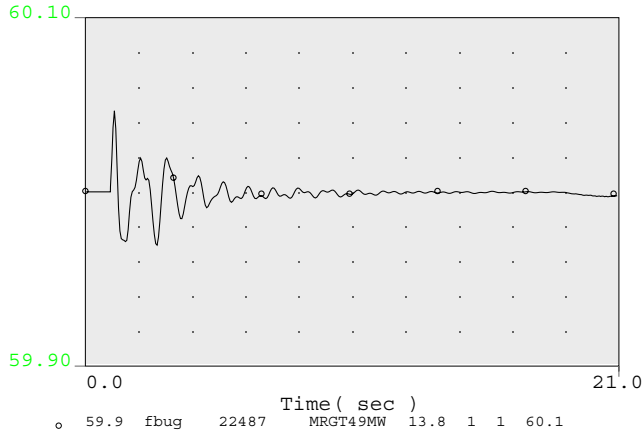
Fault bus at OTAY 69

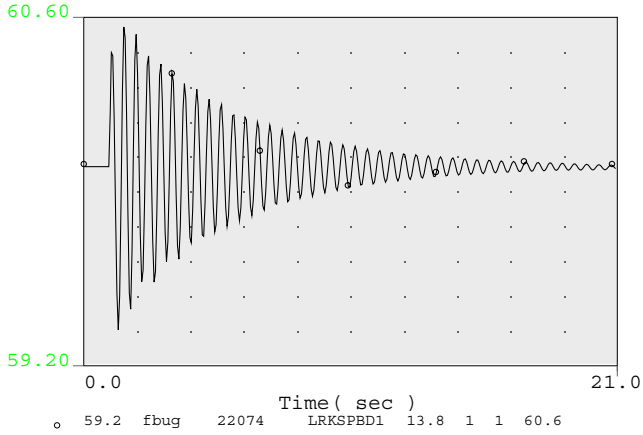
Trip Otay-Imp Beach-San Ysidro 69 kV line

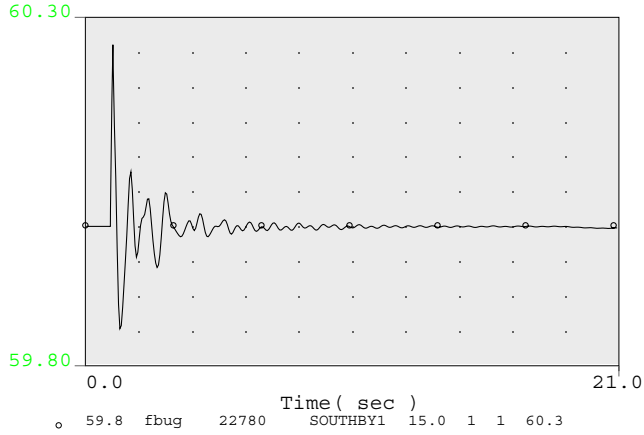


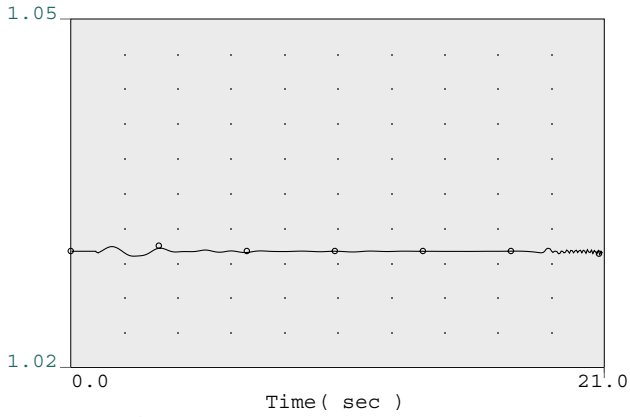



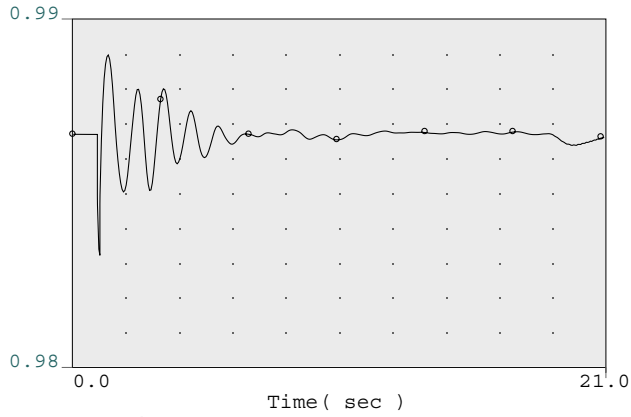

MMC ISIS, pre-project

Fault bus at OTAY 69

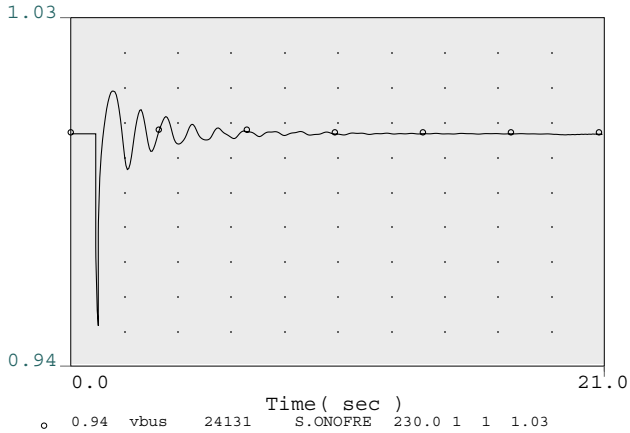
Trip Otay-Imp Beach-San Ysidro 69 kV line



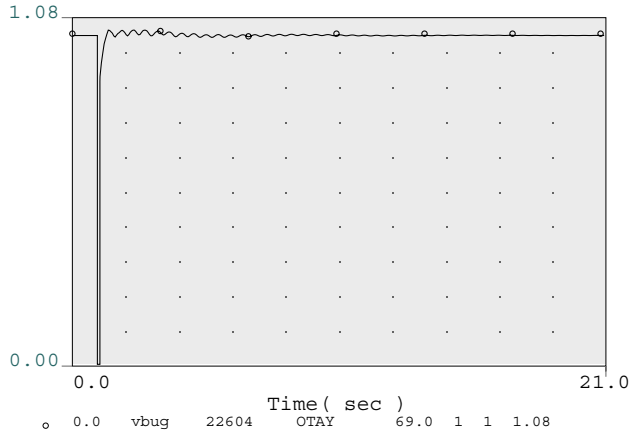

o 1.02 vbug 30000 PTSB 7 20.0 1 1 1.05



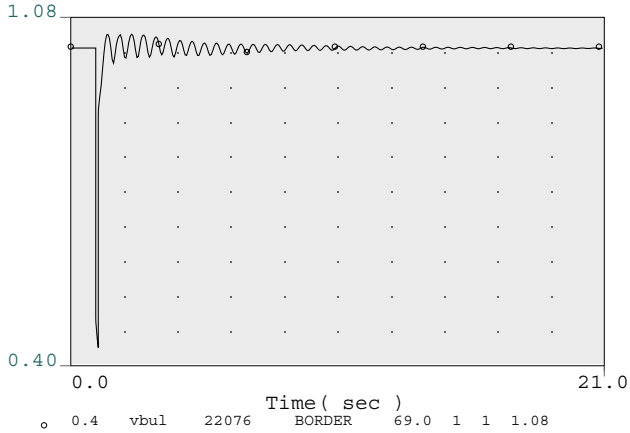

o 0.98 vbug 14931 PALOVRD1 24.0 1 1 0.99



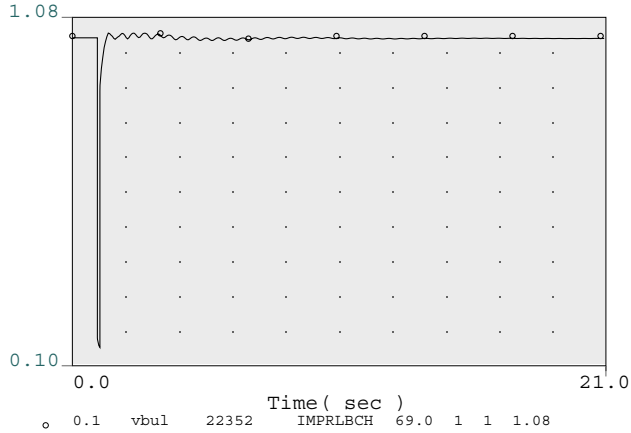

o 0.94 vbus 24131 S.ONOFRE 230.0 1 1 1.03




o 0.0 vbug 22604 OTAY 69.0 1 1 1.08




o 0.4 vbul 22076 BORDER 69.0 1 1 1.08

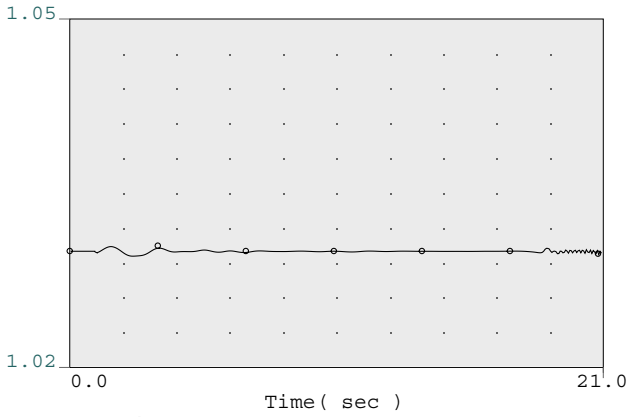



o 0.1 vbul 22352 IMPRLBCH 69.0 1 1 1.08

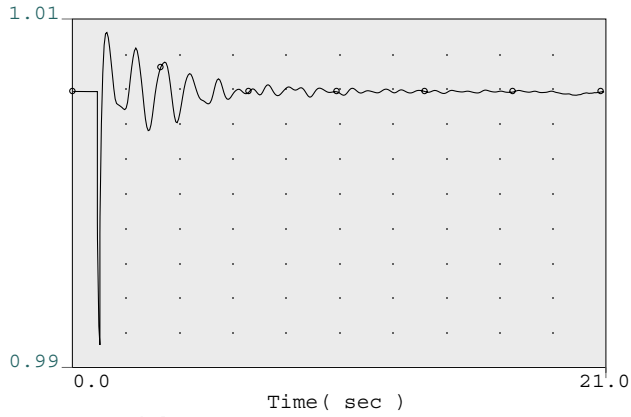
MMC ISIS, pre-project

Fault bus at OTAY 69

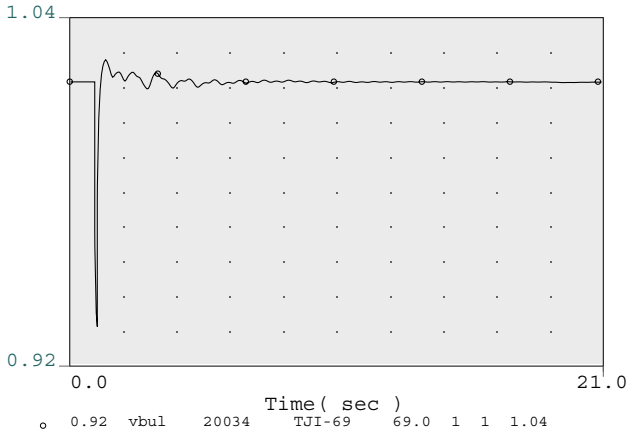
Trip Otay-Imp Beach-San Ysidro 69 kV line



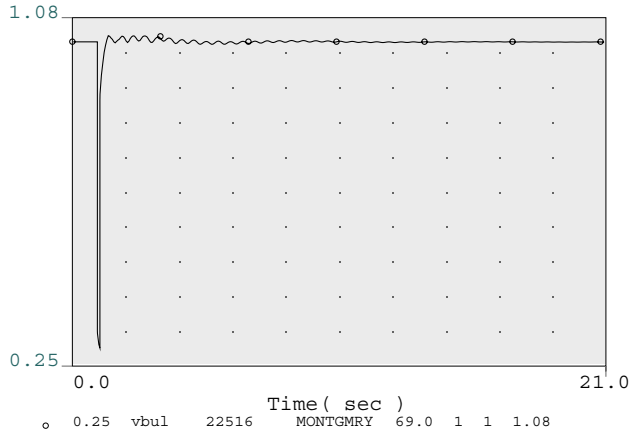

1.02 vbug 30000 PTSB 7 20.0 1 1 1.05



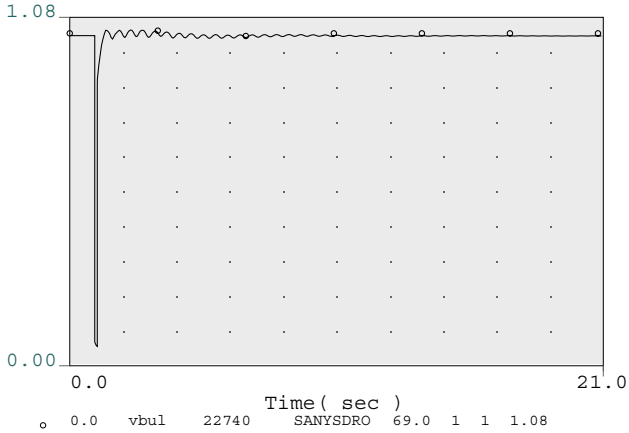

0.99 vbul 21027 ELSTEAMP 92.0 1 1 1.01




0.92 vbul 20034 TJI-69 69.0 1 1 1.04




0.25 vbul 22516 MONTGMRY 69.0 1 1 1.08

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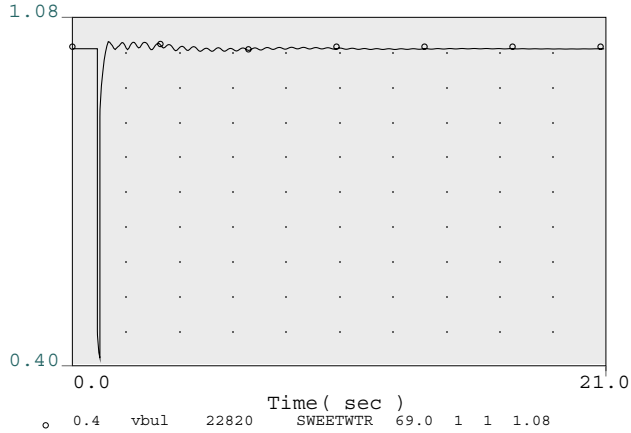
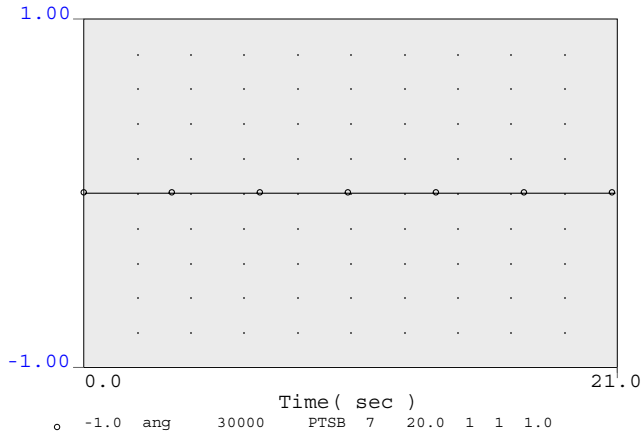
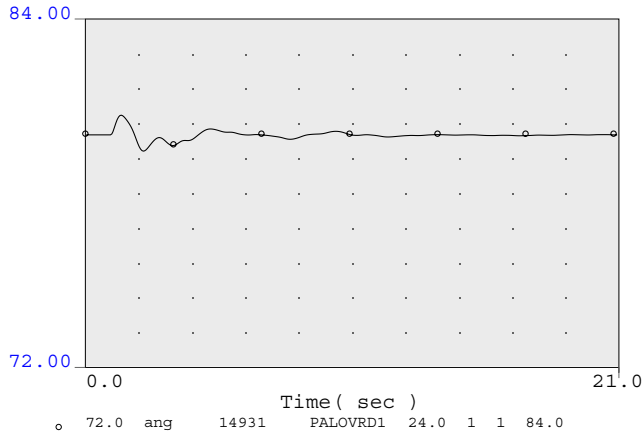
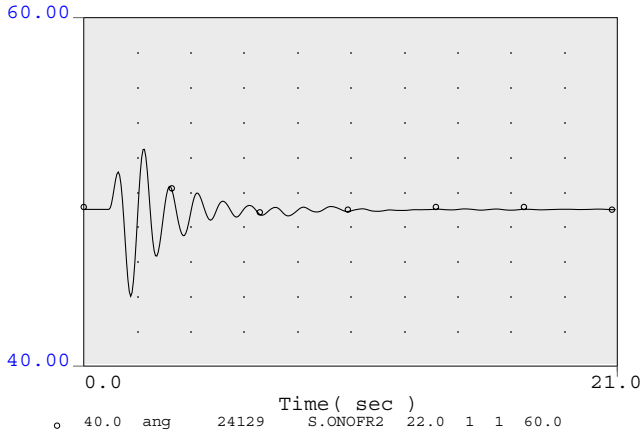


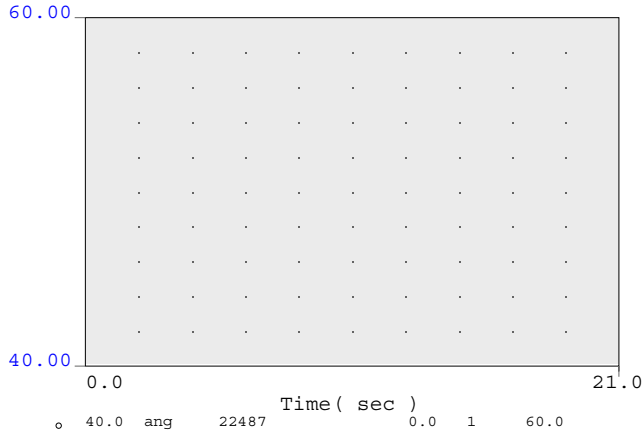

0.4 vbul 22820 SWEETWTR 69.0 1 1 1.08

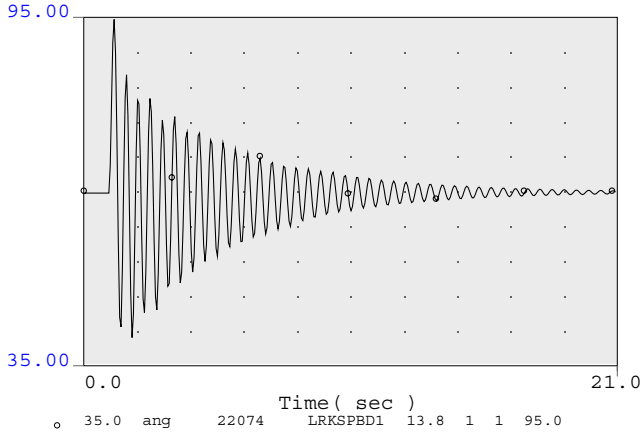
MMC ISIS, pre-project
Fault bus at OTAY 69
Trip Otay-Imp Beach-San Ysidro 69 kV line

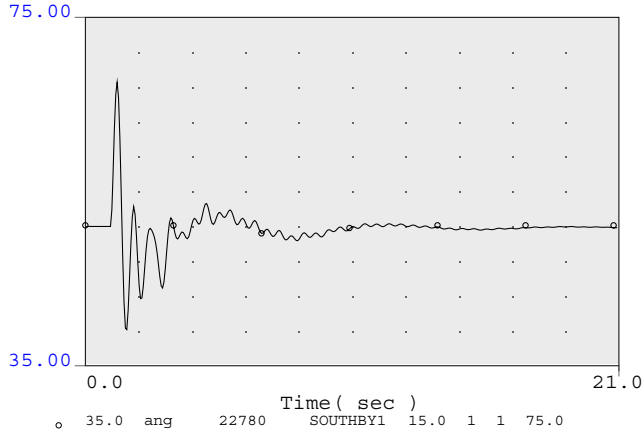


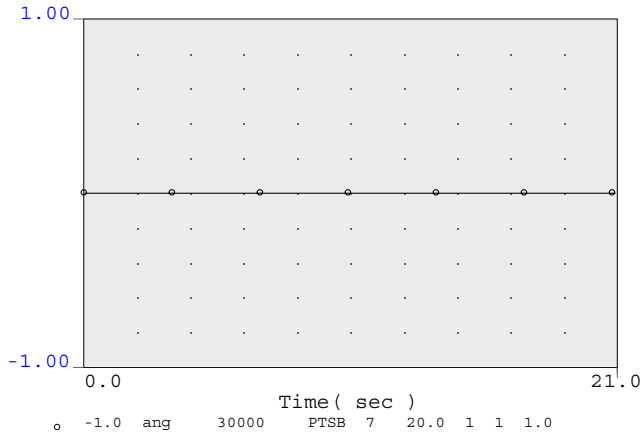



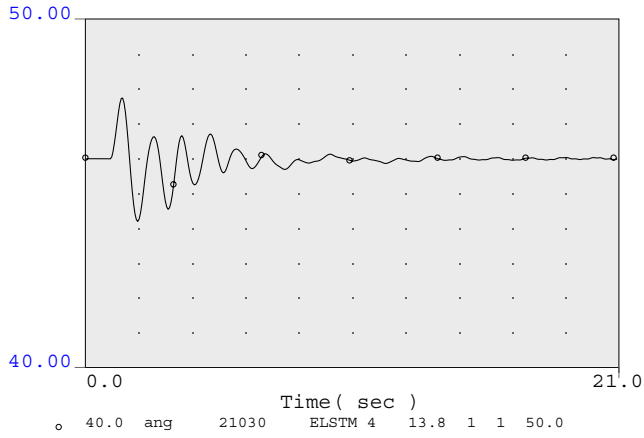



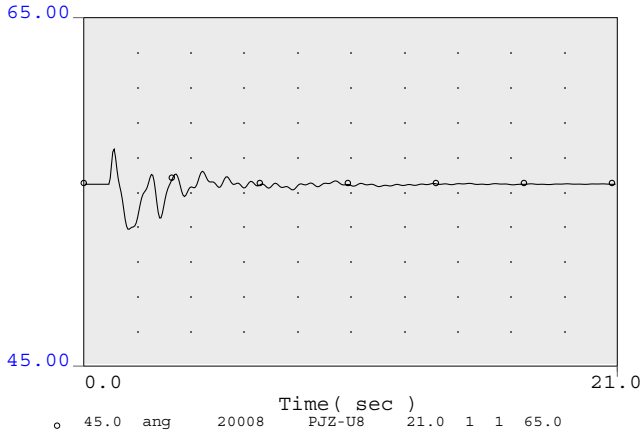

MMC ISIS, post-project

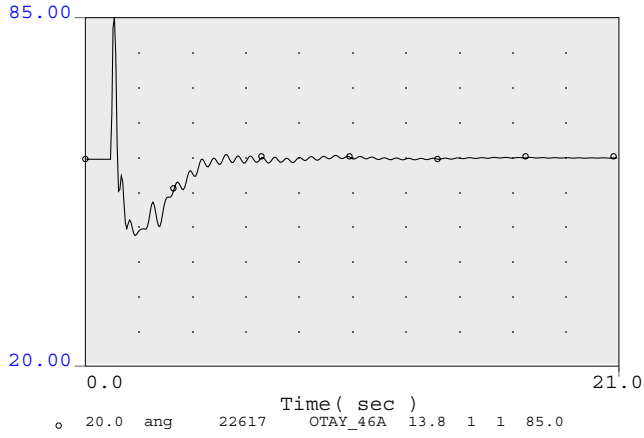
Fault bus at OTAY 69

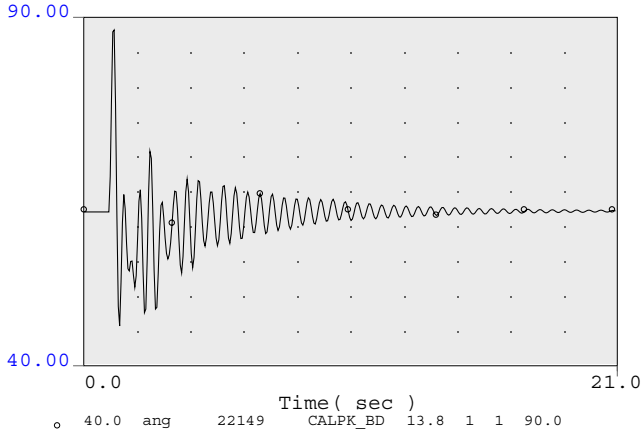
Trip Otay-Imp Beach-San Ysidro 69 kV line

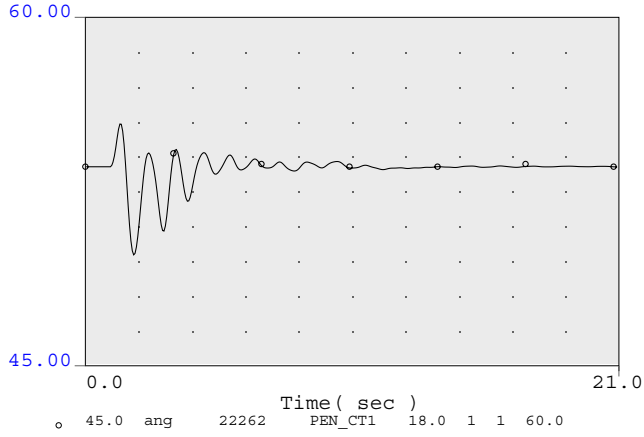


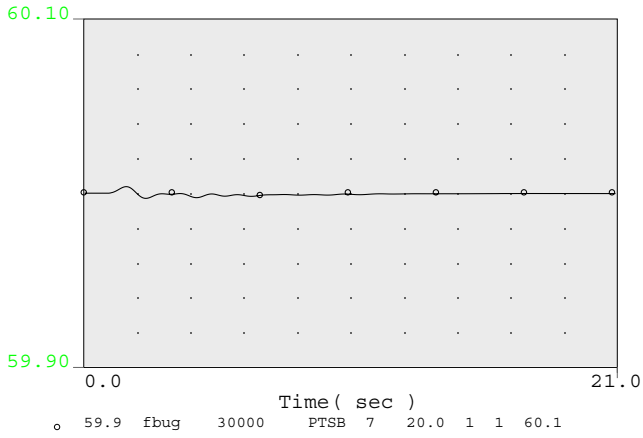



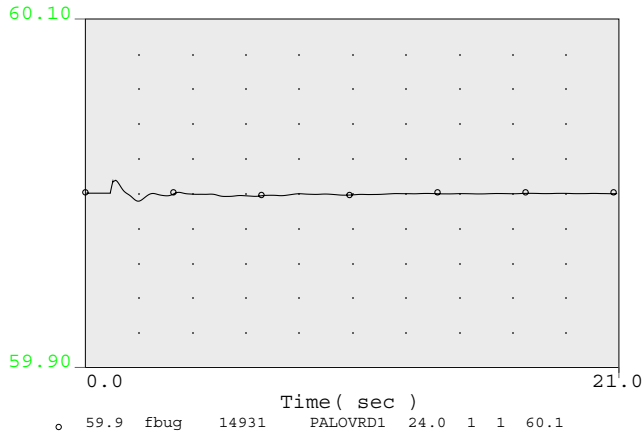



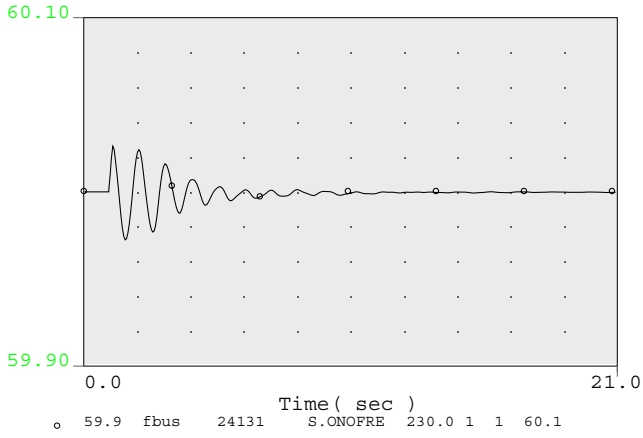

MMC ISIS, post-project

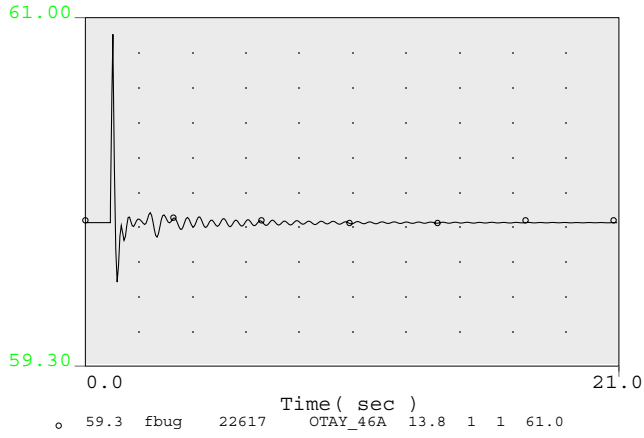
Fault bus at OTAY 69

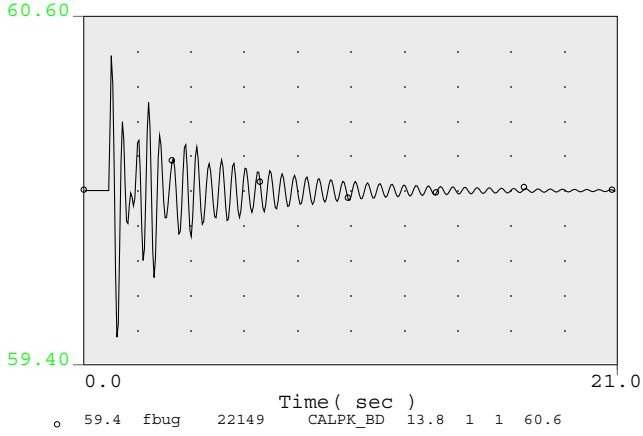
Trip Otay-Imp Beach-San Ysidro 69 kV line

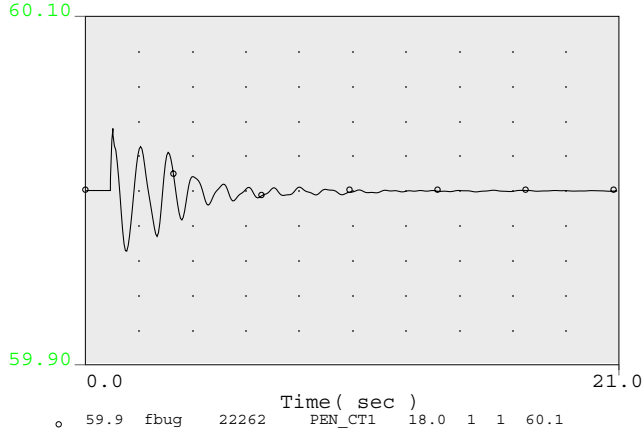


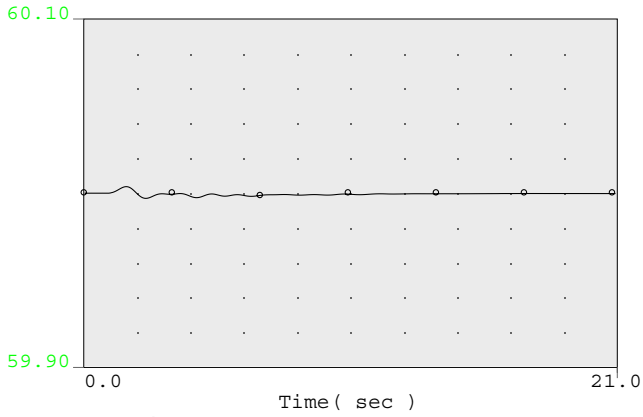



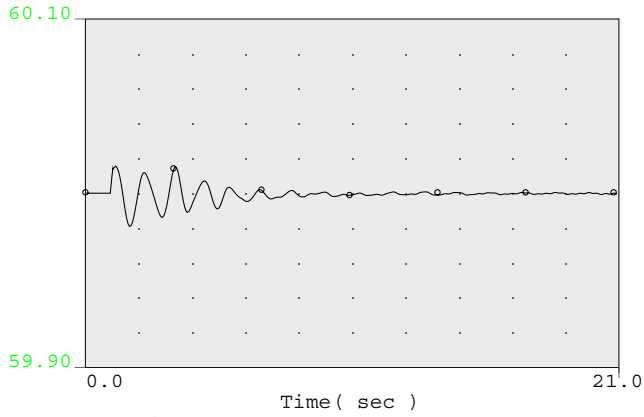

MMC ISIS, post-project

Fault bus at OTAY 69

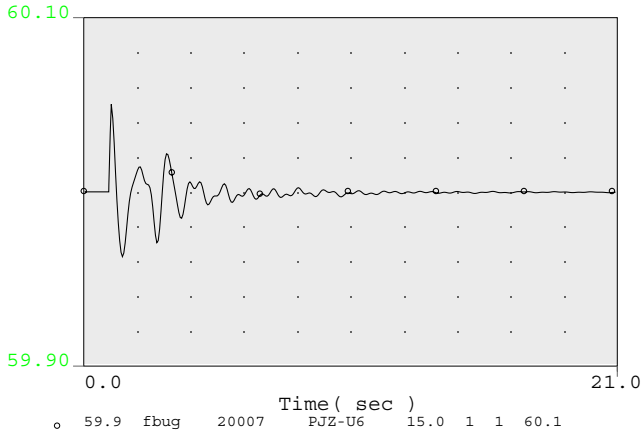
Trip Otay-Imp Beach-San Ysidro 69 kV line



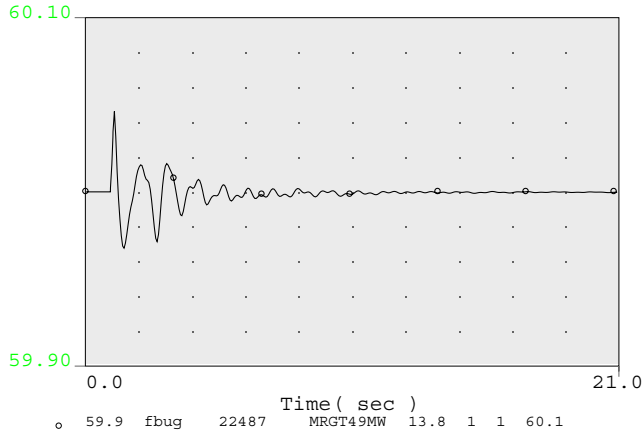

59.9 fbug 30000 PTSB 7 20.0 1 1 60.1



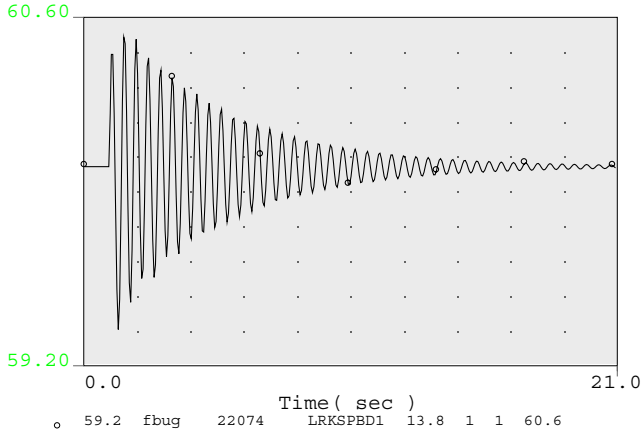

59.9 fbug 21075 ELSTM 1 13.8 1 1 60.1




59.9 fbug 20007 PJZ-U6 15.0 1 1 60.1




59.9 fbug 22487 MRGT49MW 13.8 1 1 60.1

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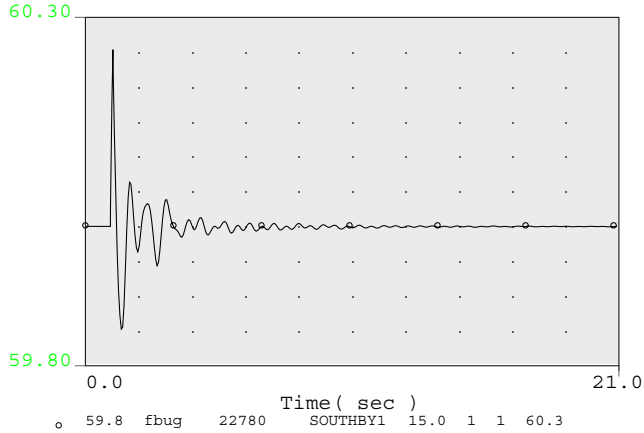
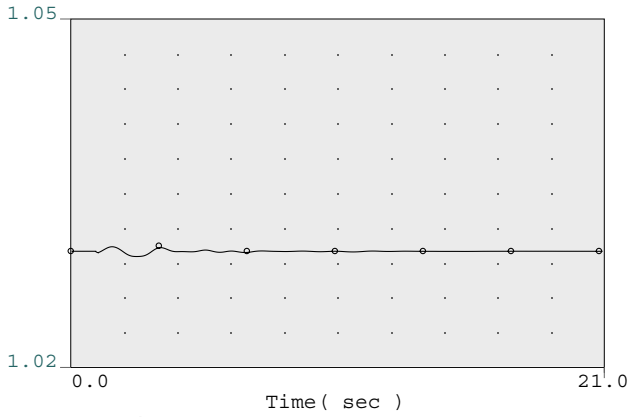
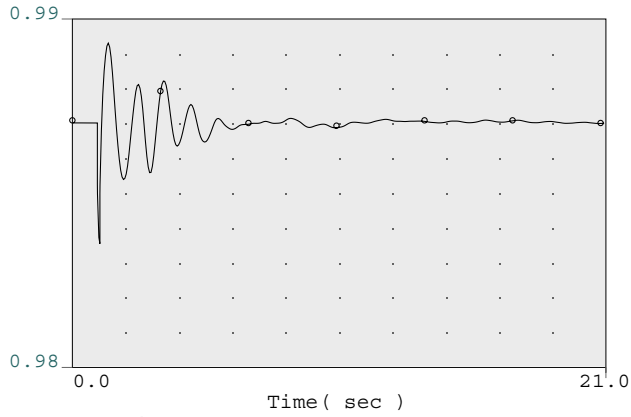



59.8 fbug 22780 SOUTHBY1 15.0 1 1 60.3

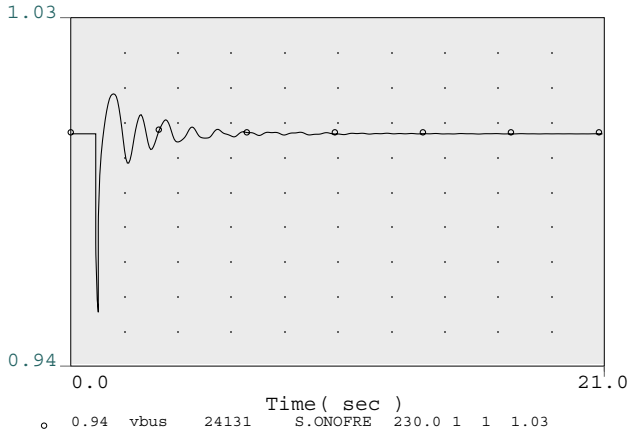
MMC ISIS, post-project
Fault bus at OTAY 69
Trip Otay-Imp Beach-San Ysidro 69 kV line



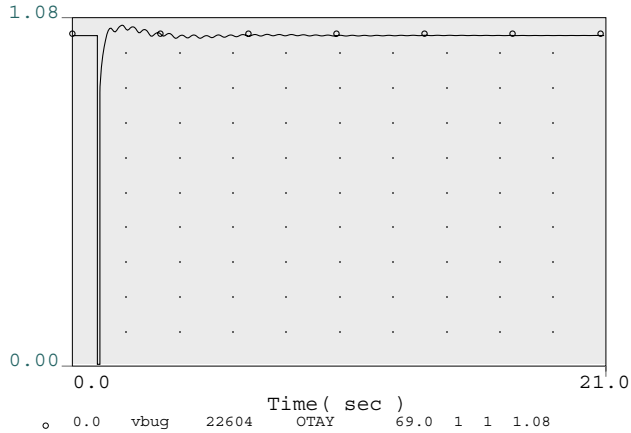

o 1.02 vbug 30000 PTSB 7 20.0 1 1 1.05



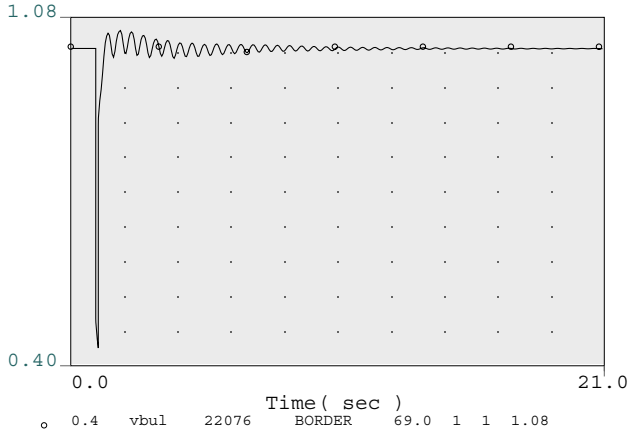

o 0.98 vbug 14931 PALOVRD1 24.0 1 1 0.99



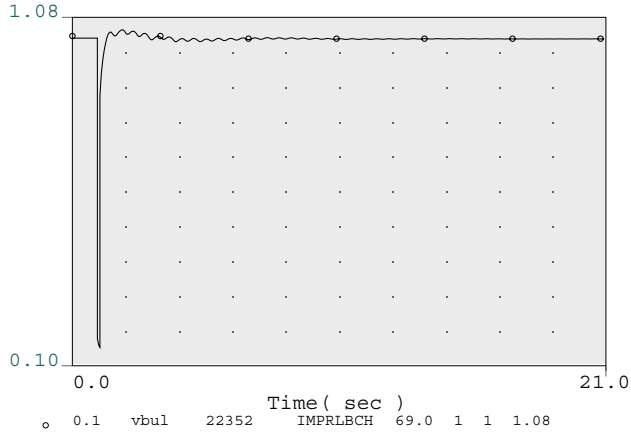

o 0.94 vbus 24131 S.ONOFRE 230.0 1 1 1.03




o 0.0 vbug 22604 OTAY 69.0 1 1 1.08




o 0.4 vbul 22076 BORDER 69.0 1 1 1.08

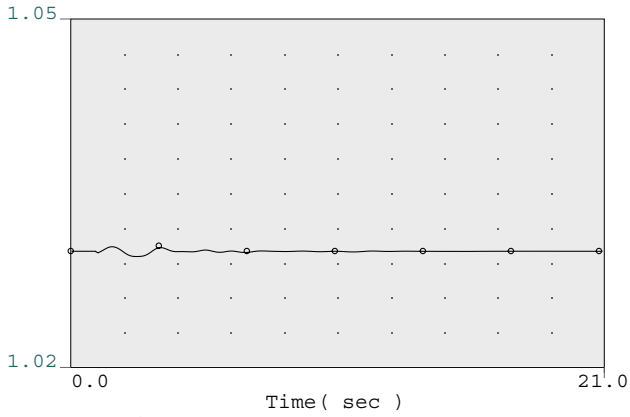



o 0.1 vbul 22352 IMPRLBCH 69.0 1 1 1.08

MMC ISIS, post-project

Fault bus at OTAY 69

Trip Otay-Imp Beach-San Ysidro 69 kV line

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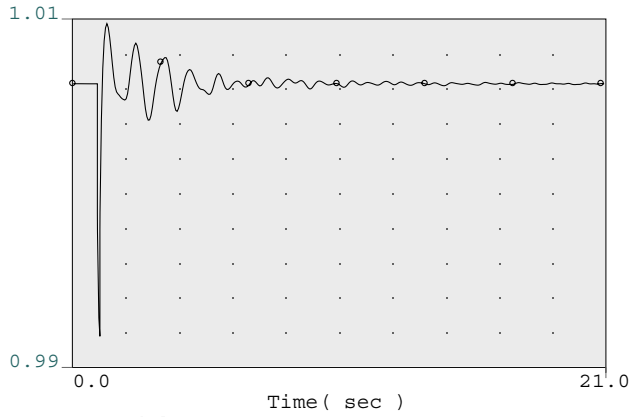
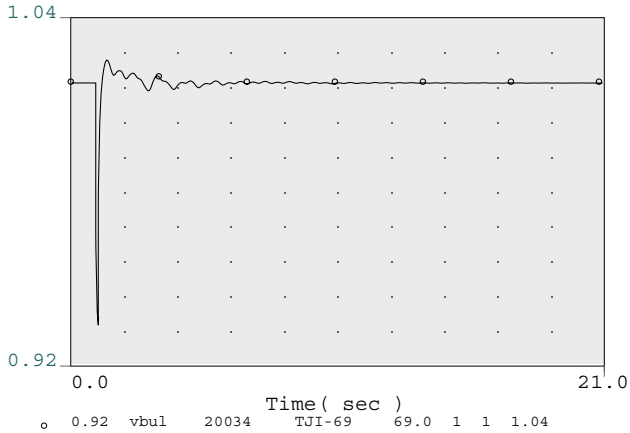



0.99 vbul 21027 ELSTEAMP 92.0 1 1 1.01

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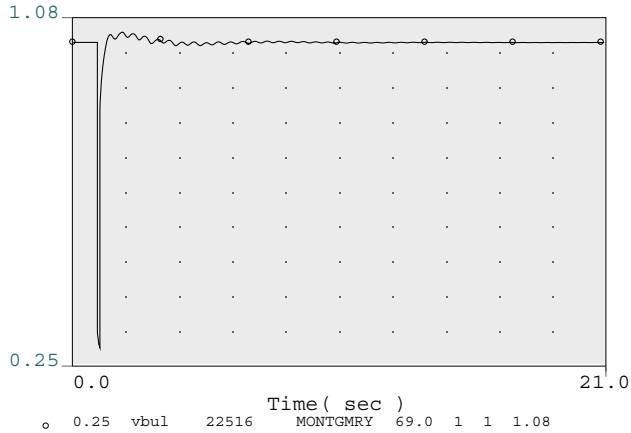


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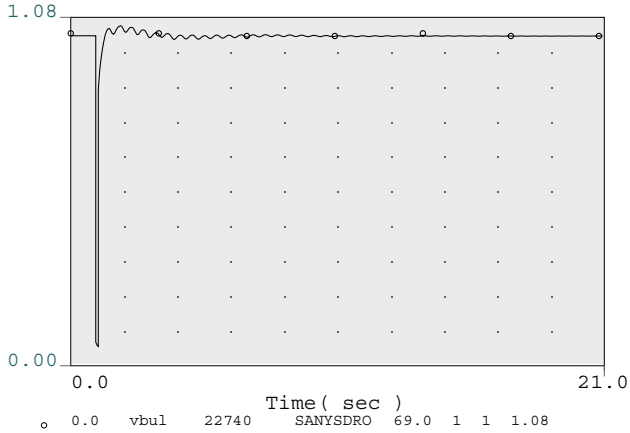


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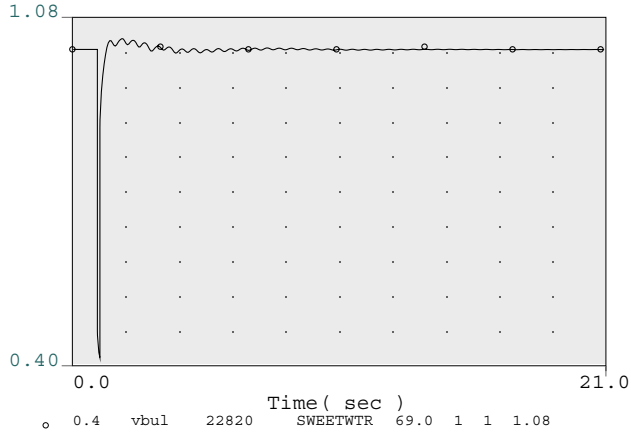



0.4 vbul 22820 SWEETWTR 69.0 1 1 1.08

MMC ISIS, post-project

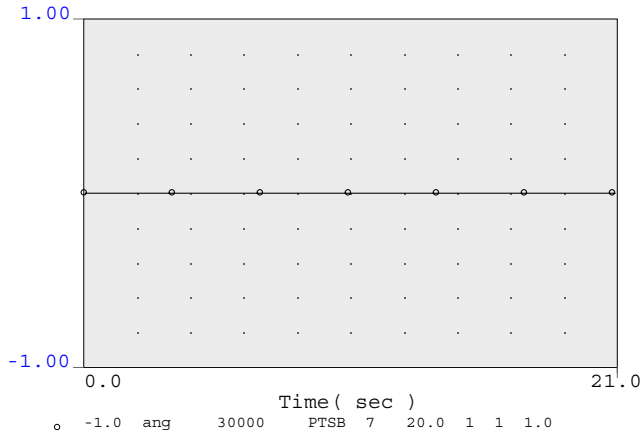
Fault bus at OTAY 69

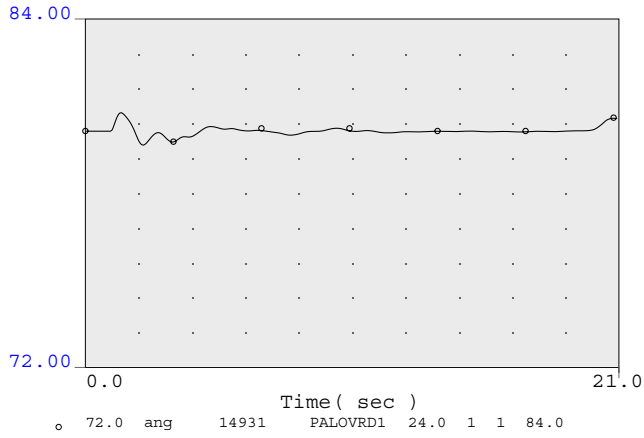
Trip Otay-Imp Beach-San Ysidro 69 kV line

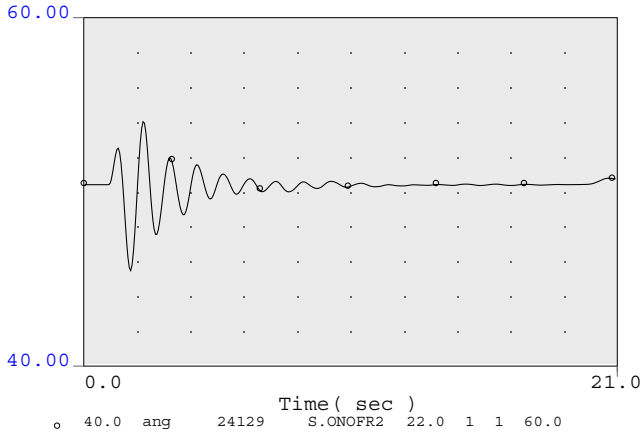
Otay 69 kV Bus Fault

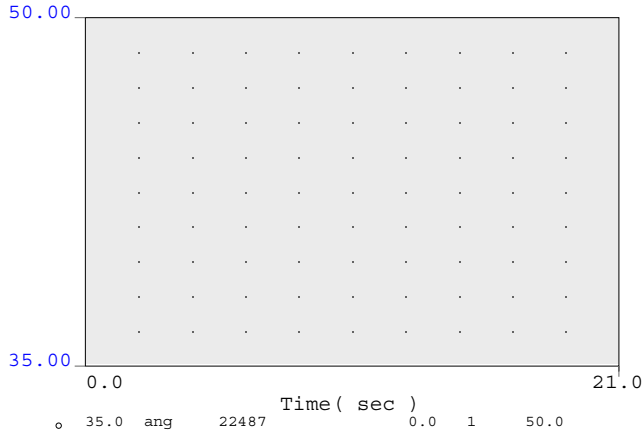
Fault bus for 6 cycles

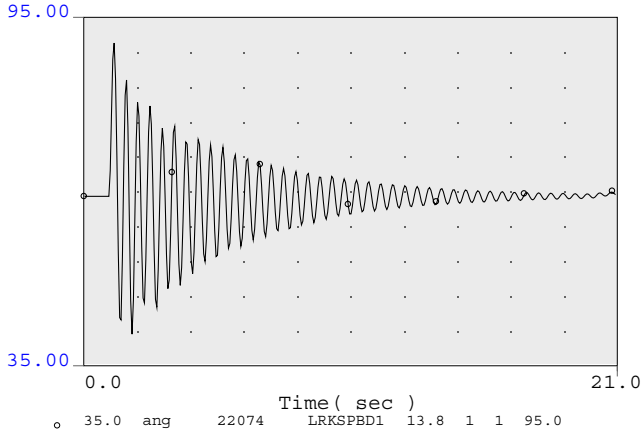
Pre- and Post-Project

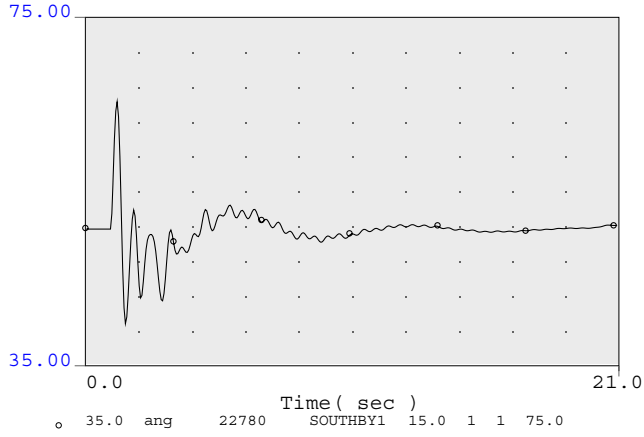



MMC ISIS, pre-project

Fault bus at OTAY_93



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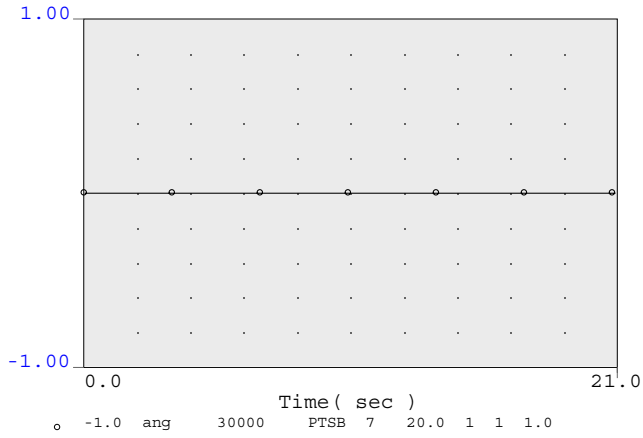
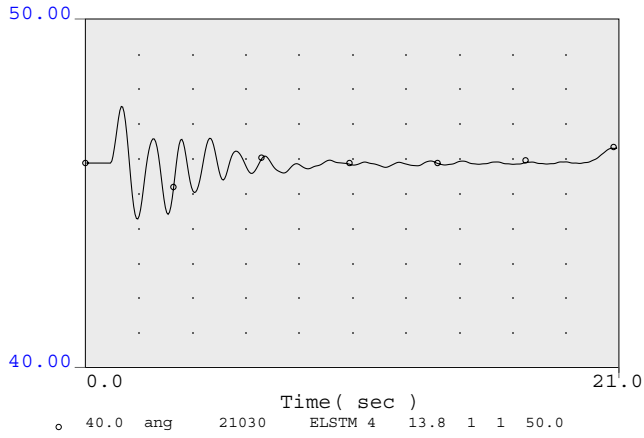
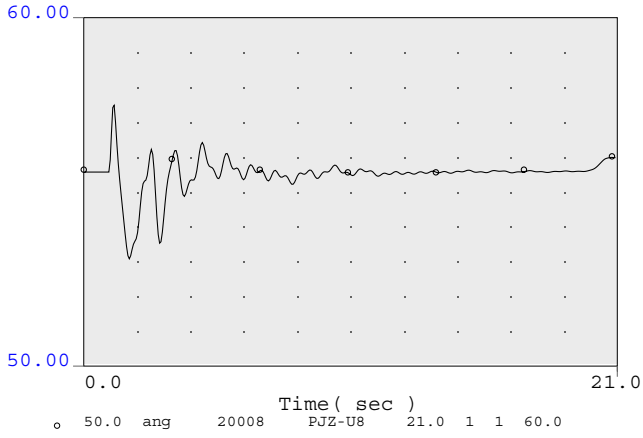
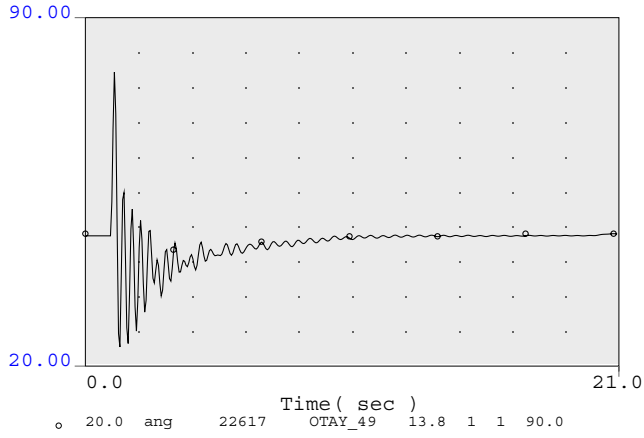
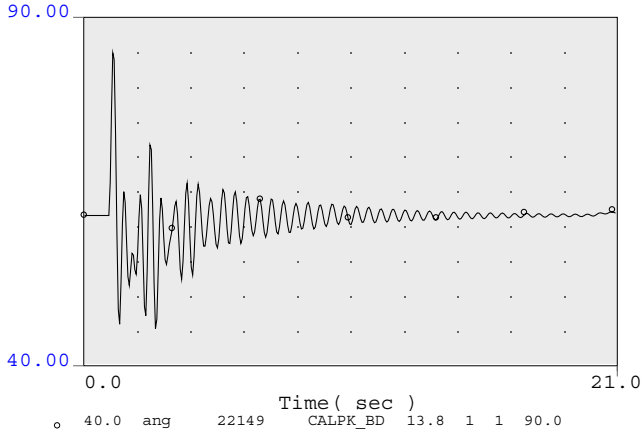
Fri Jan 19 13:41:22 2007

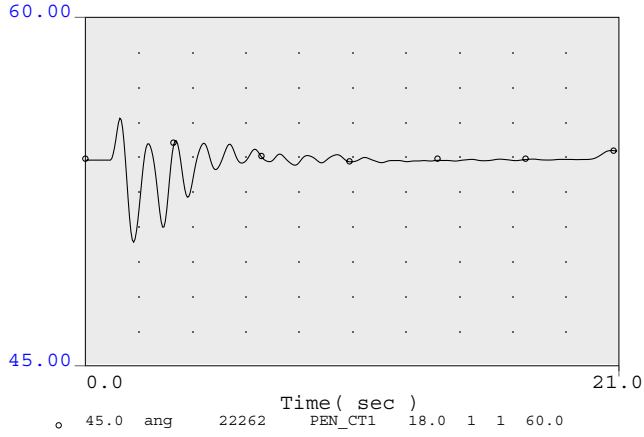


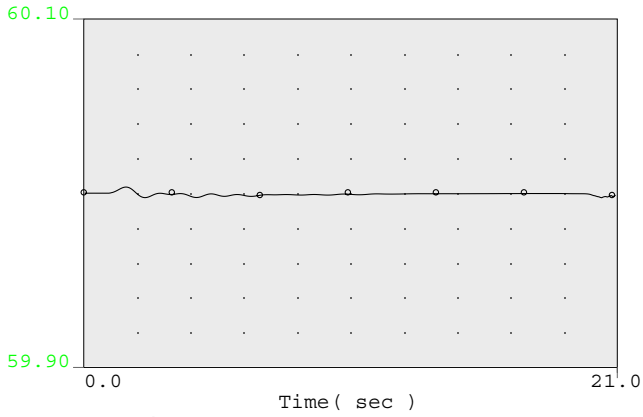



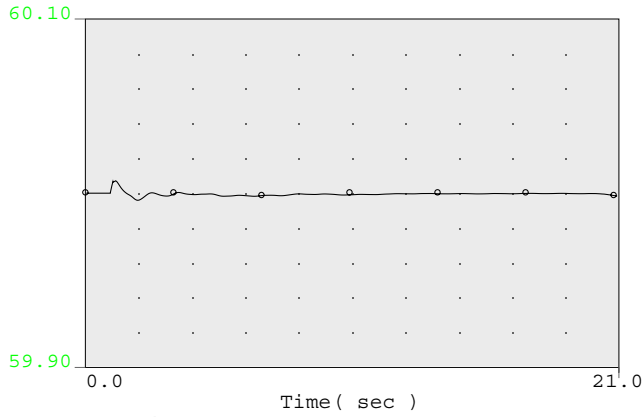



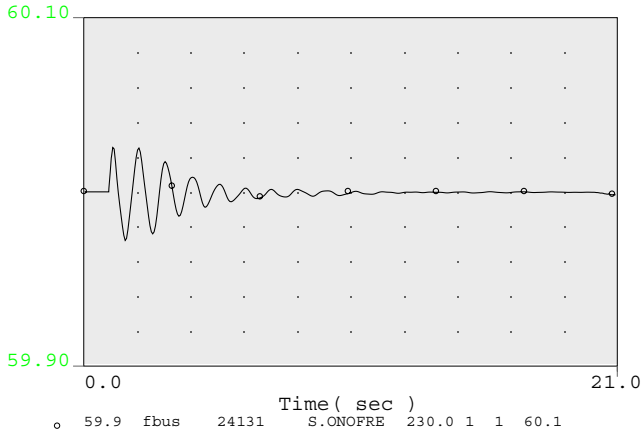

MMC ISIS, pre-project
Fault bus at OTAY_93



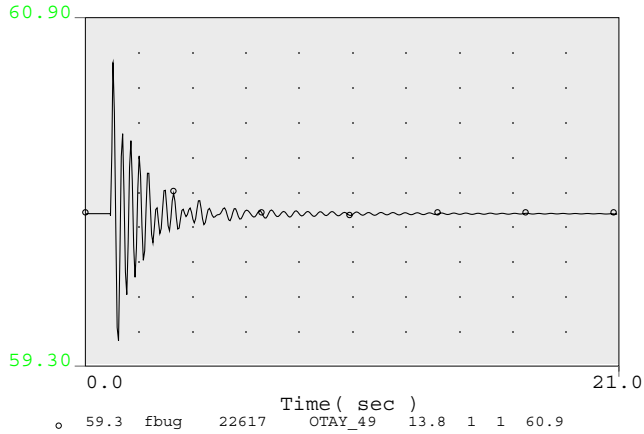

59.9 fbug 30000 PTSB 7 20.0 1 1 60.1




59.9 fbug 14931 PALOVRD1 24.0 1 1 60.1




59.9 fbus 24131 S.ONOFRE 230.0 1 1 60.1

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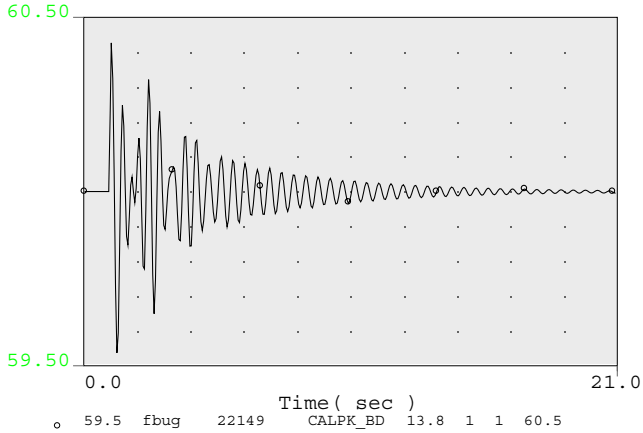


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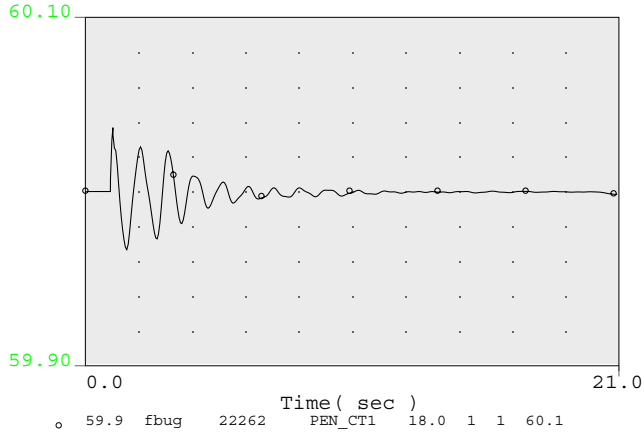
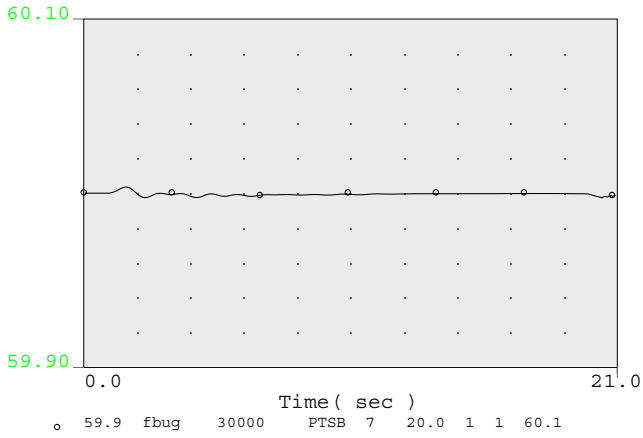
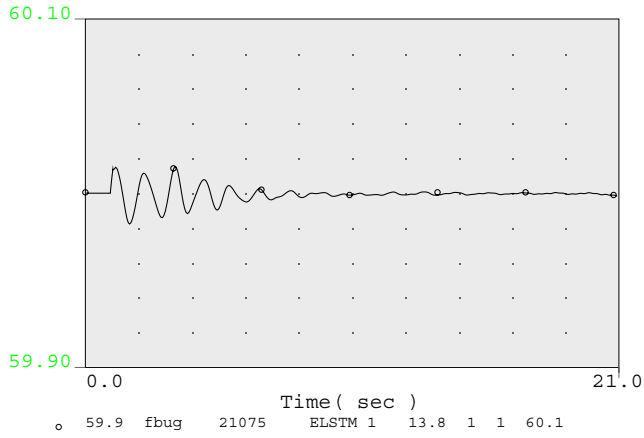


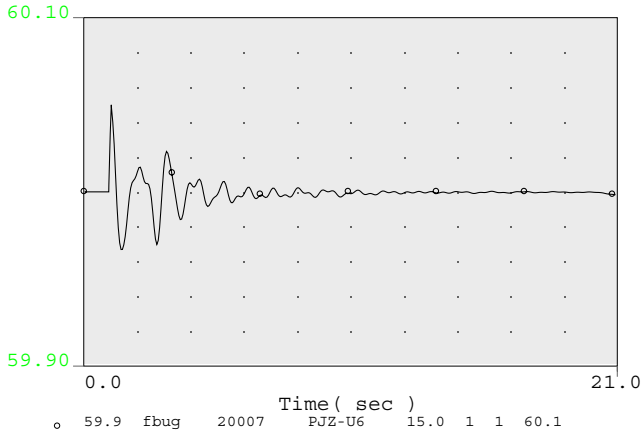

59.9 fbug 22262 PEN_CT1 18.0 1 1 60.1

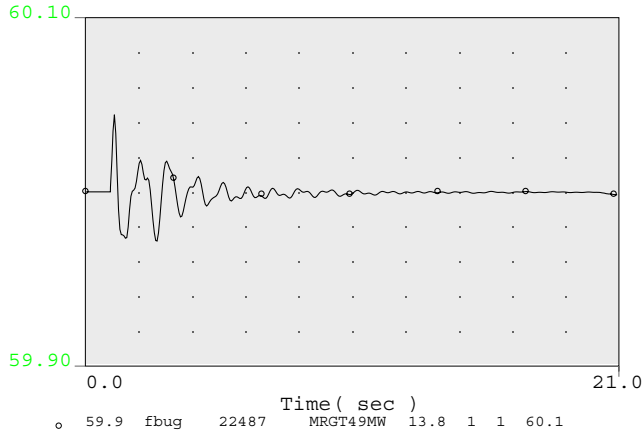
MMC ISIS, pre-project

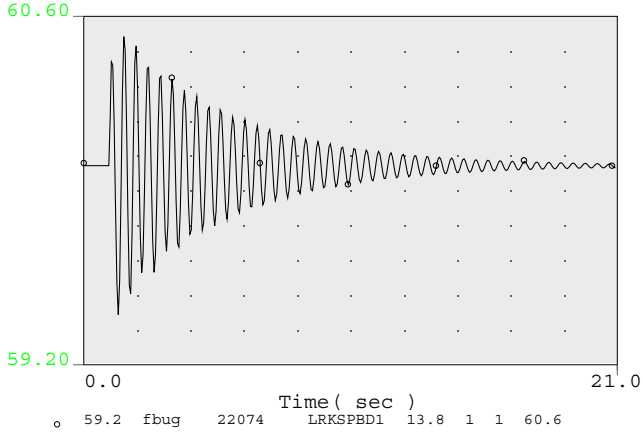
Fault bus at OTAY_93

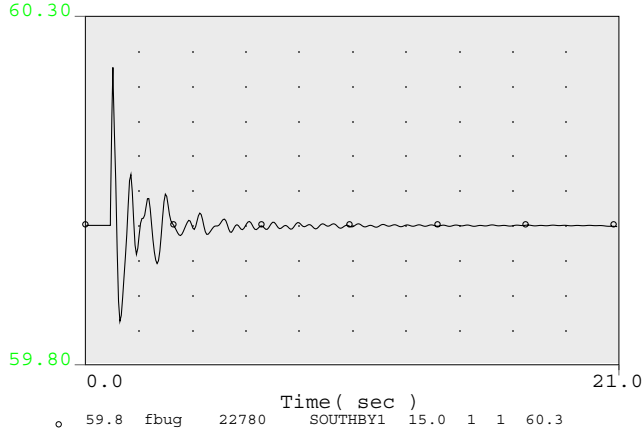


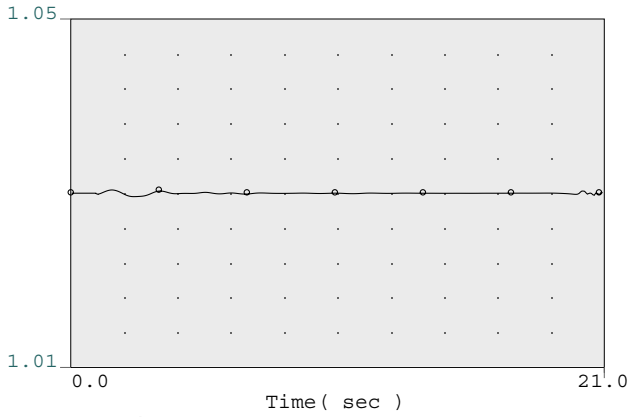




MMC ISIS, pre-project
Fault bus at OTAY_93

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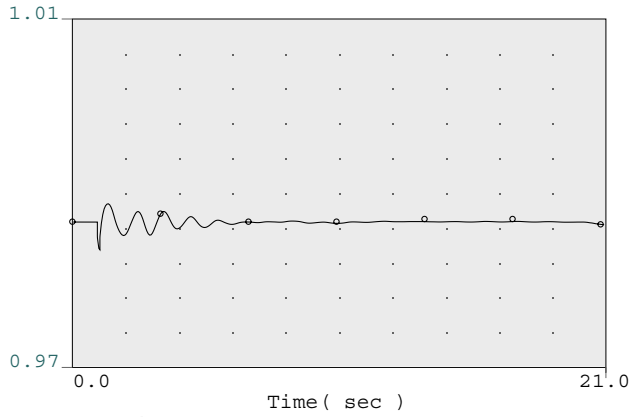


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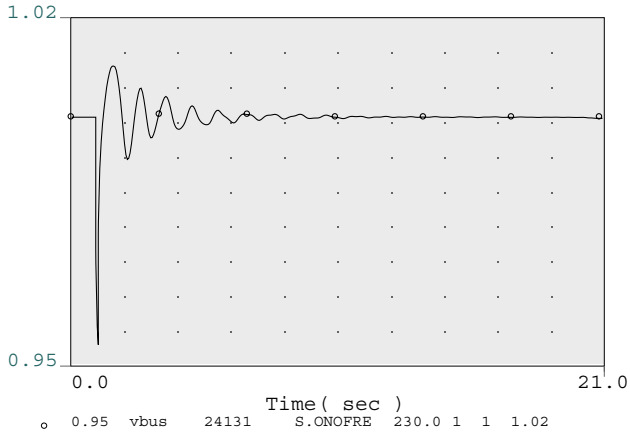


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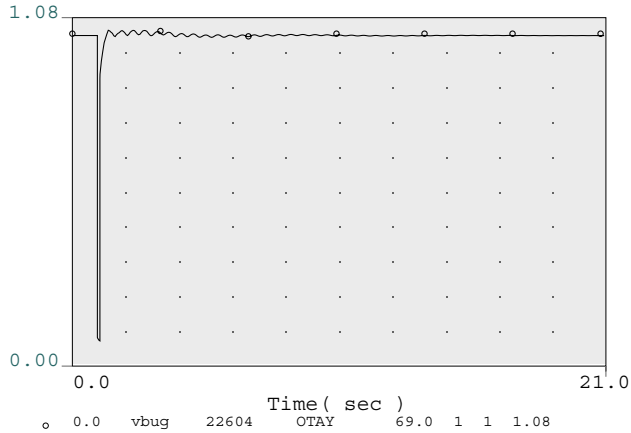


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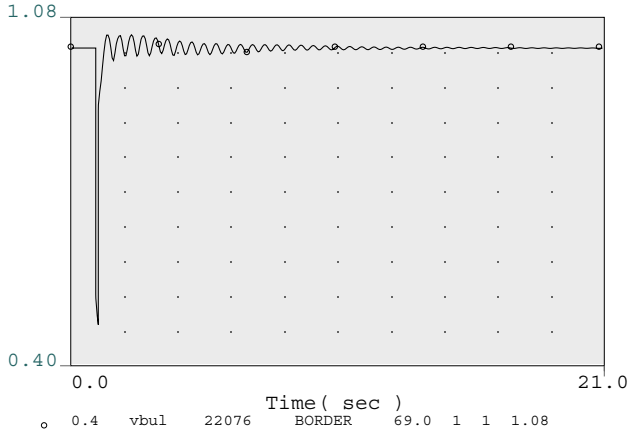


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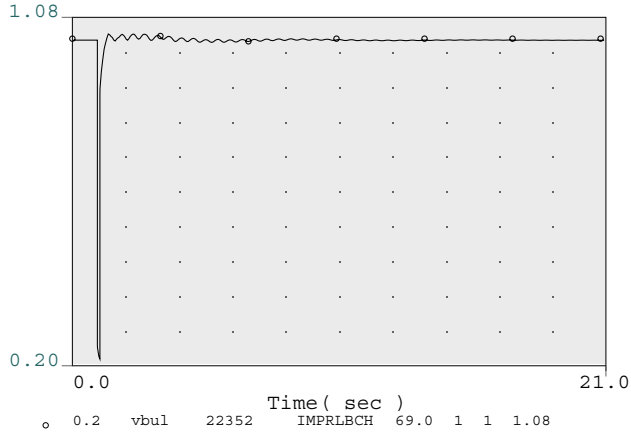
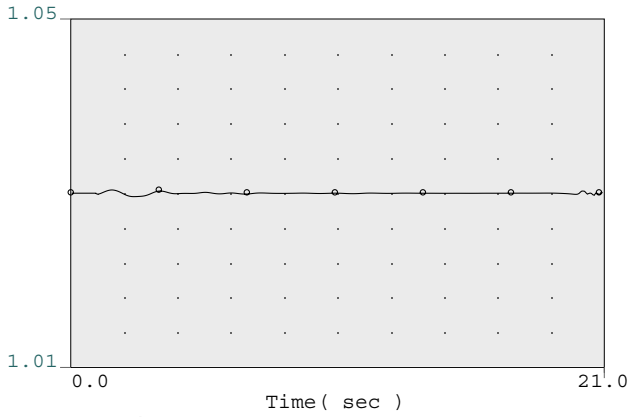



o 0.2 vbul 22352 IMPRLBCH 69.0 1 1 1.08

MMC ISIS, pre-project

Fault bus at OTAY_93

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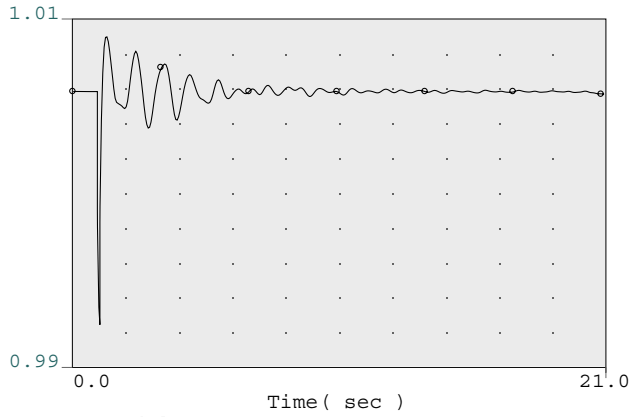


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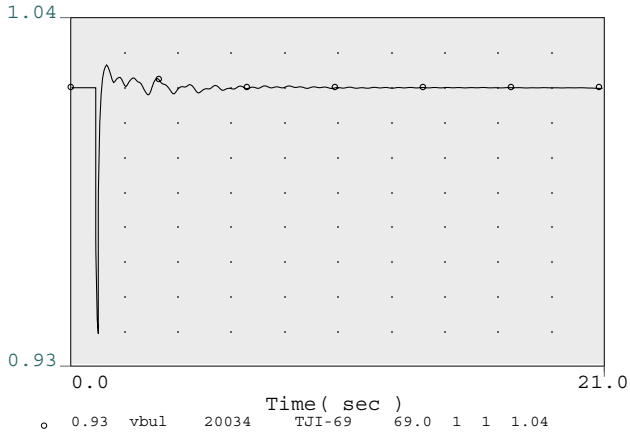


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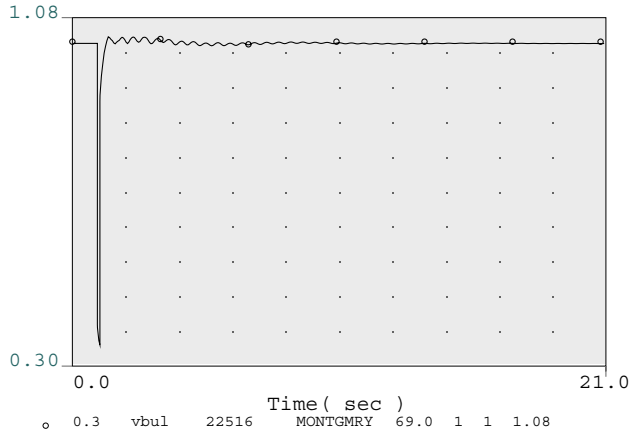


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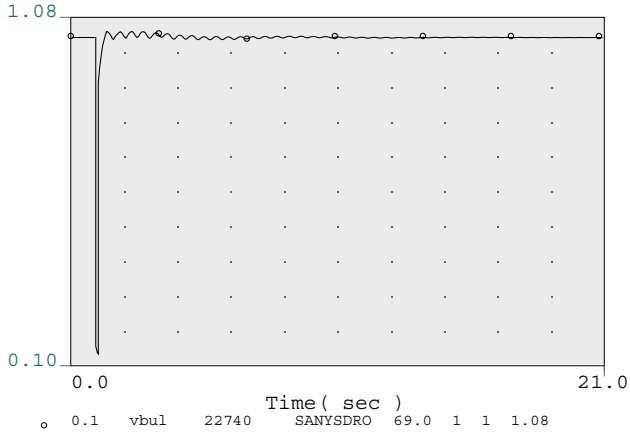


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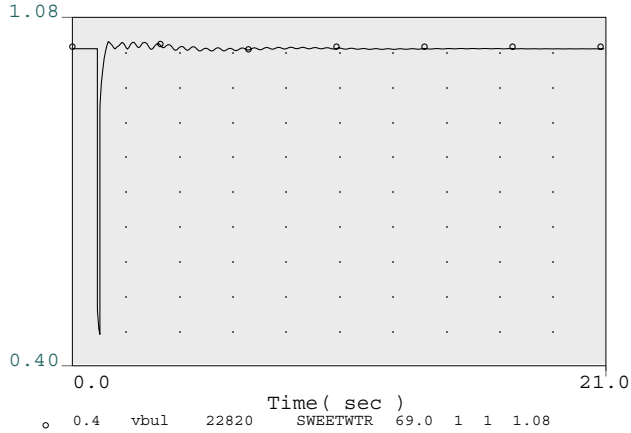


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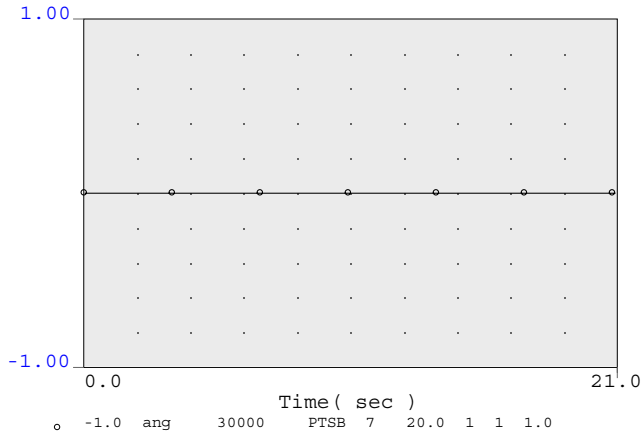
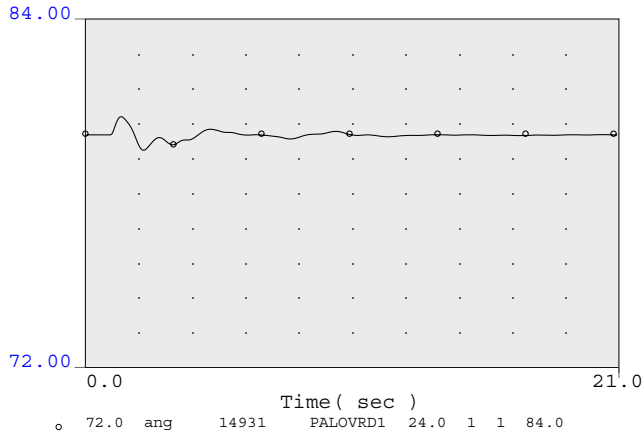
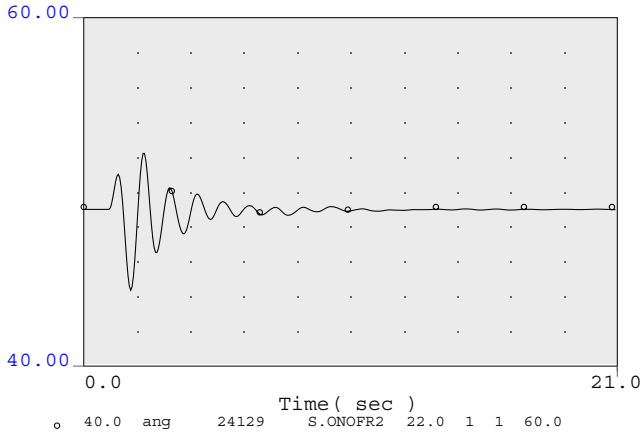
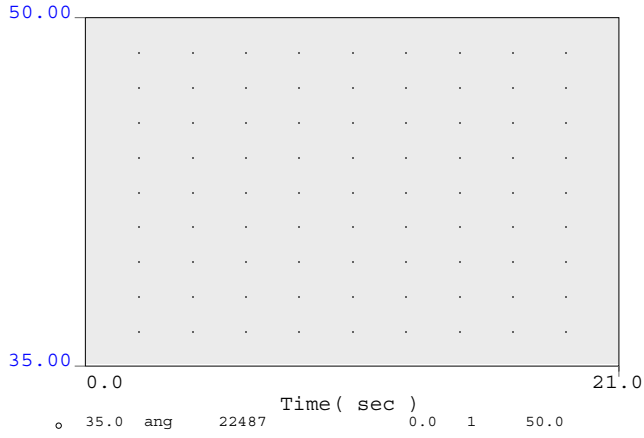
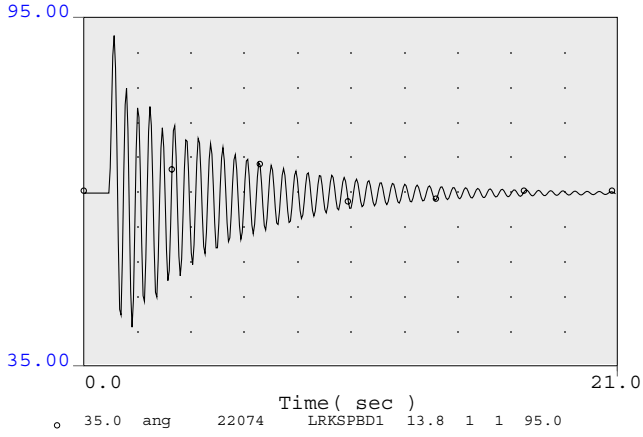
MMC ISIS, pre-project
Fault bus at OTAY_93

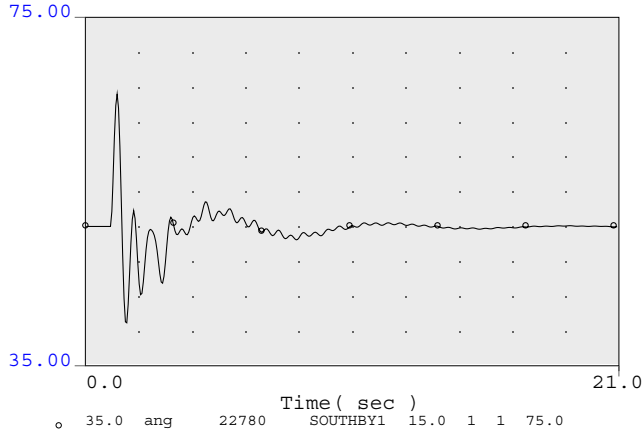



MMC ISIS, post-project

Fault bus at OTAY_93



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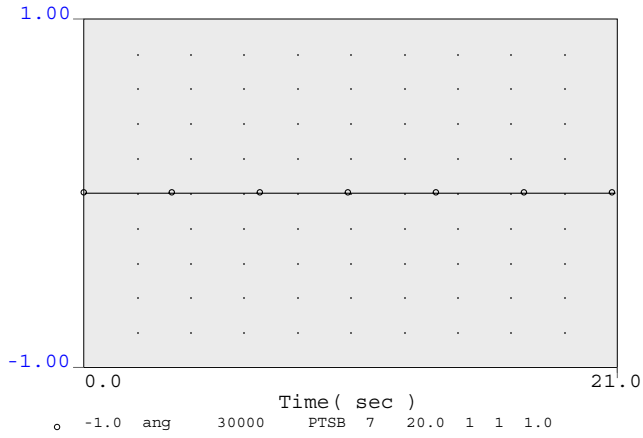
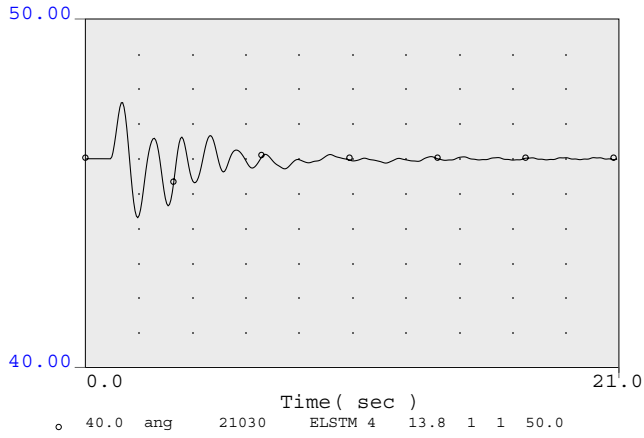
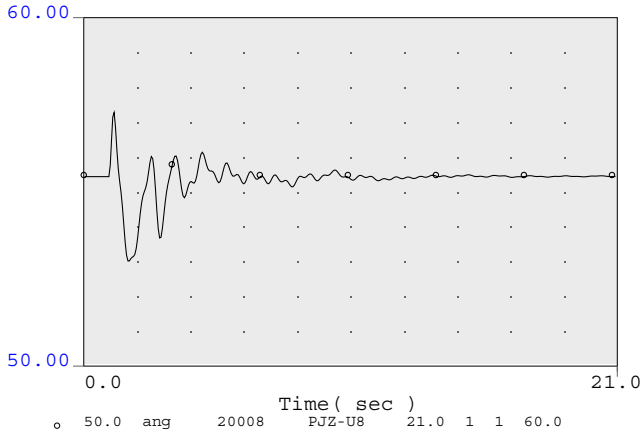
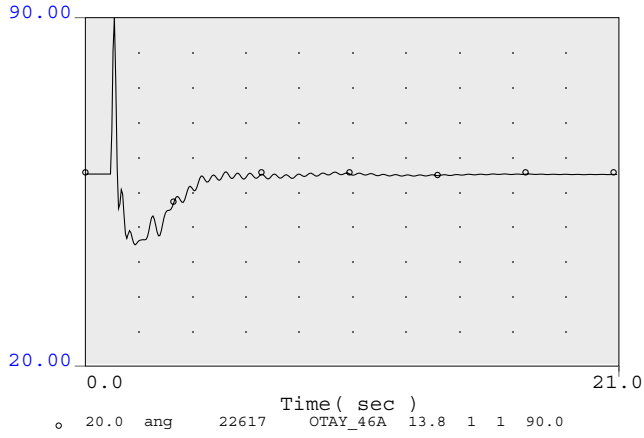
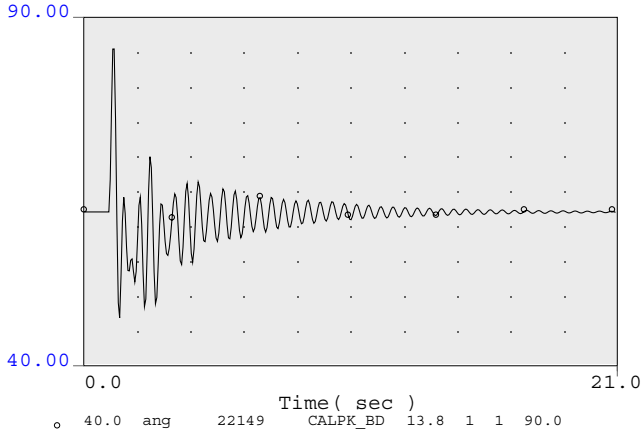
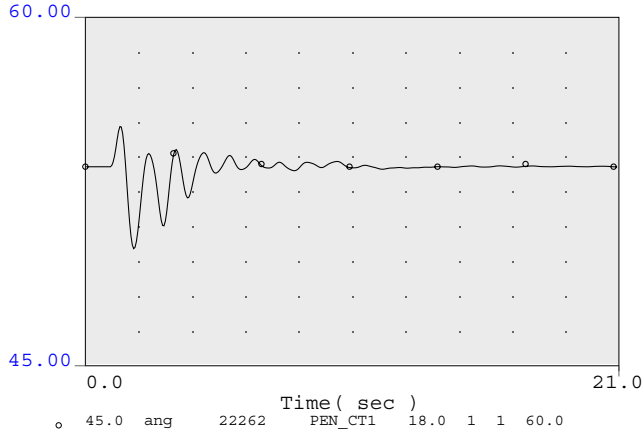


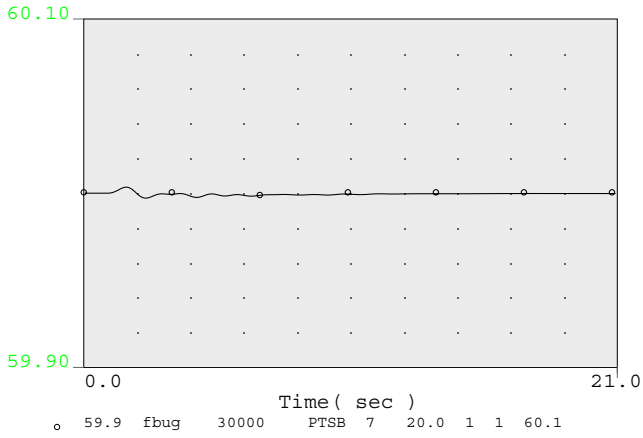



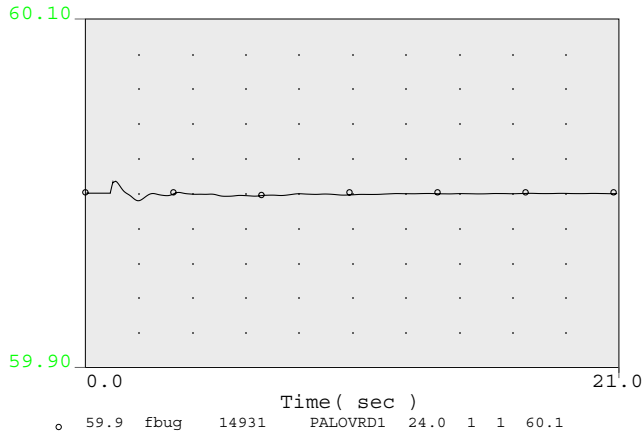



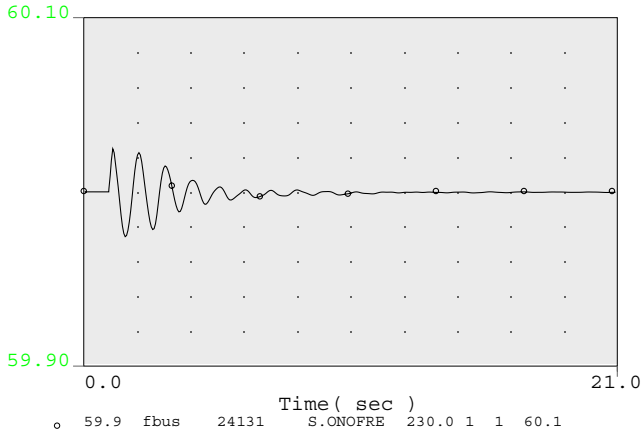



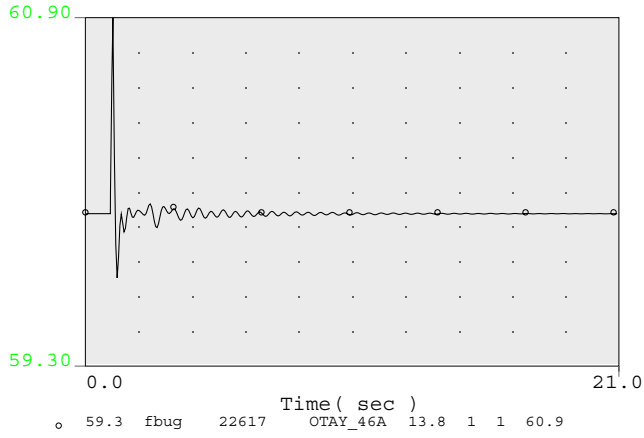



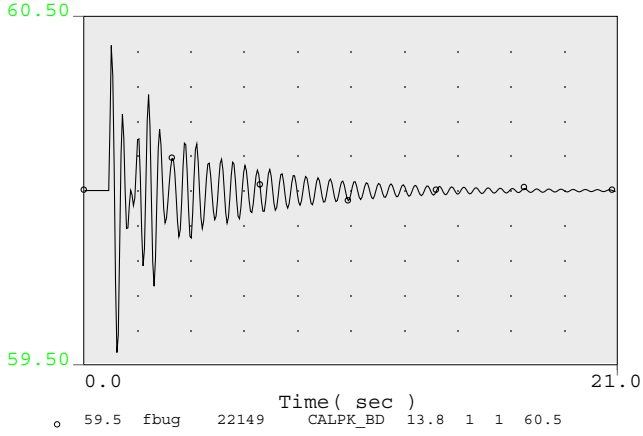

MMC ISIS, post-project
Fault bus at OTAY_93

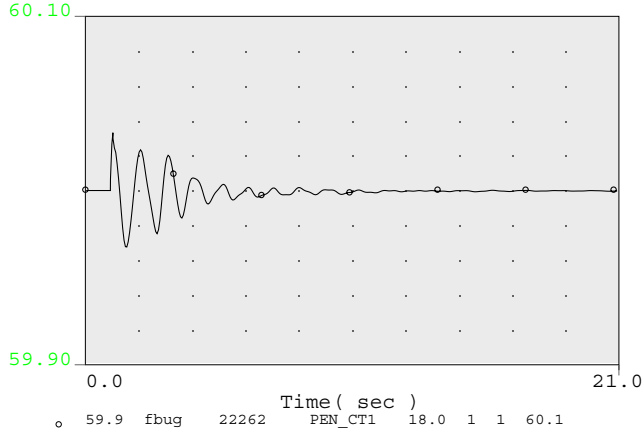


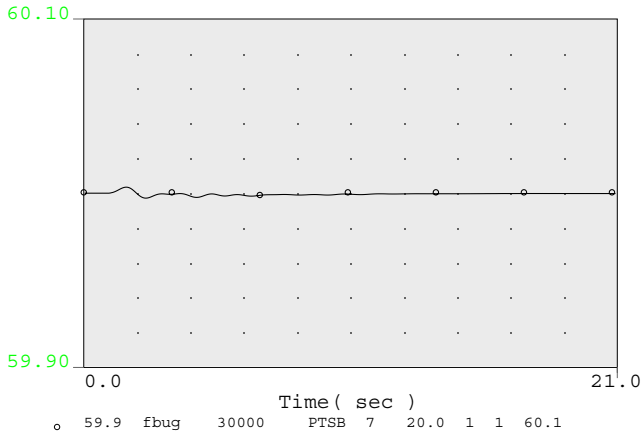



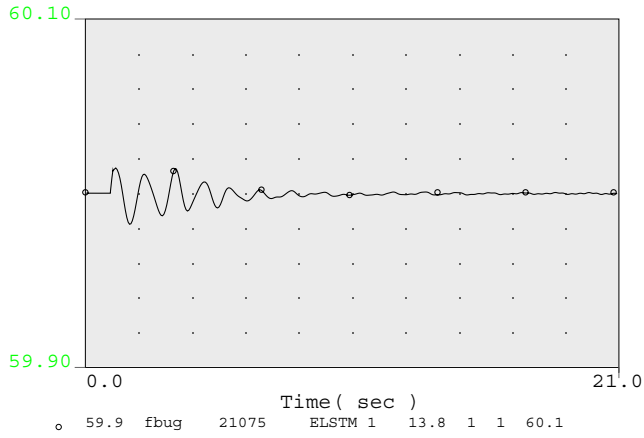



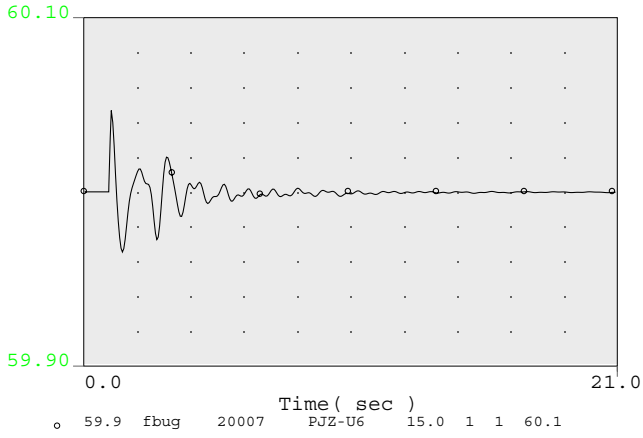



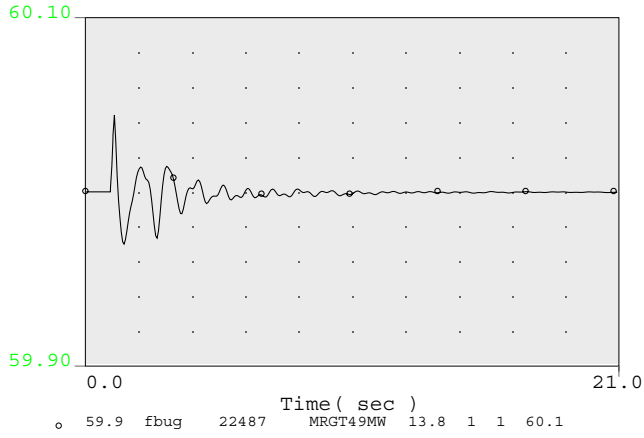



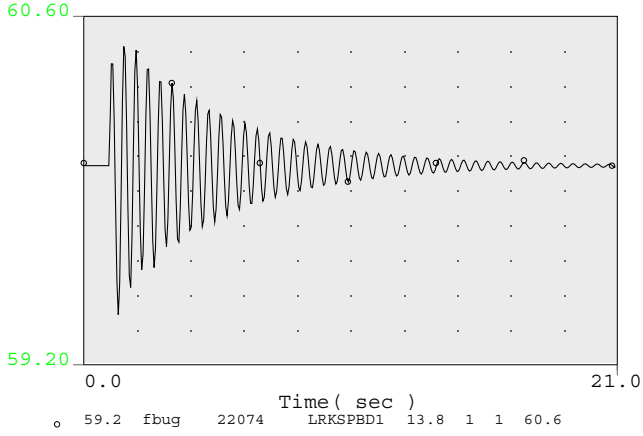

MMC ISIS, post-project
Fault bus at OTAY_93

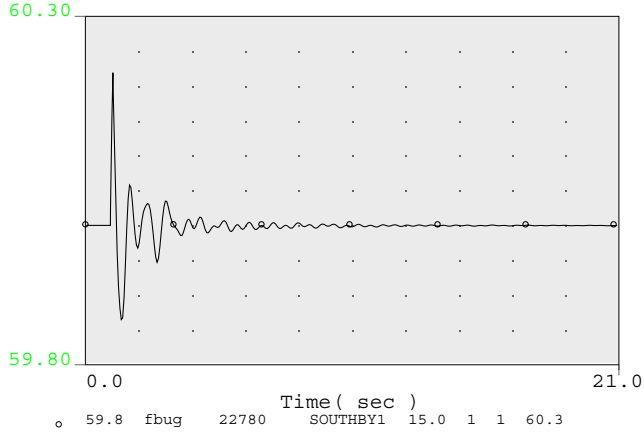


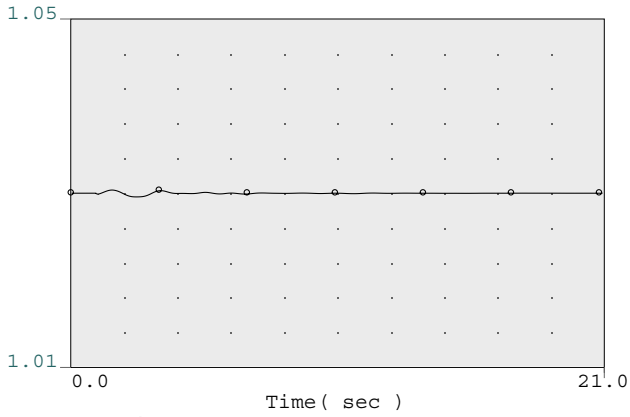




MMC ISIS, post-project
Fault bus at OTAY_93

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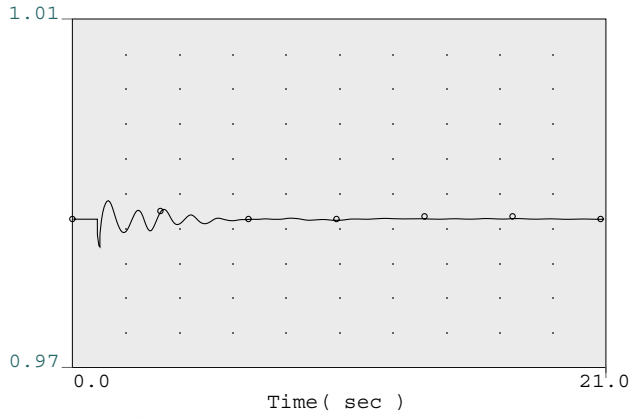


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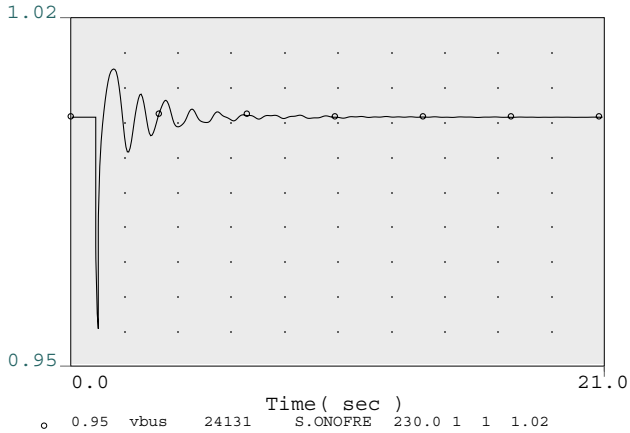


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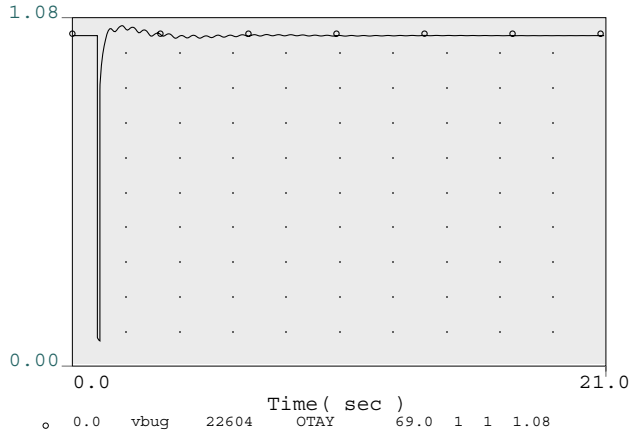


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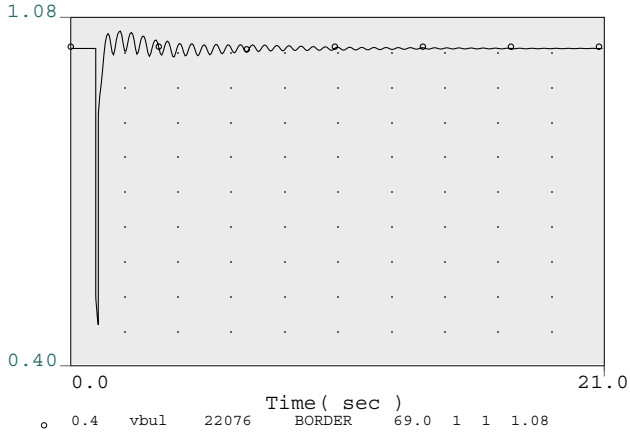


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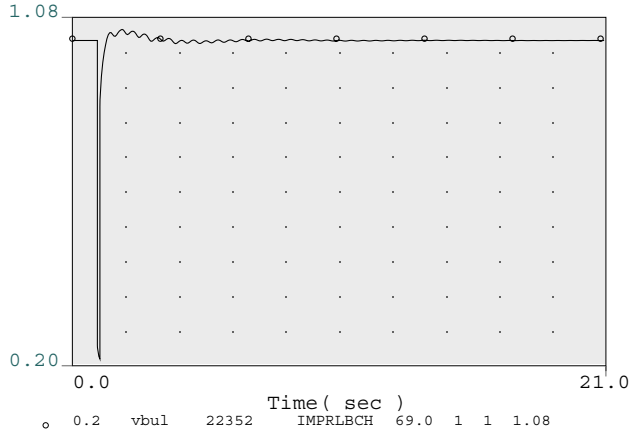
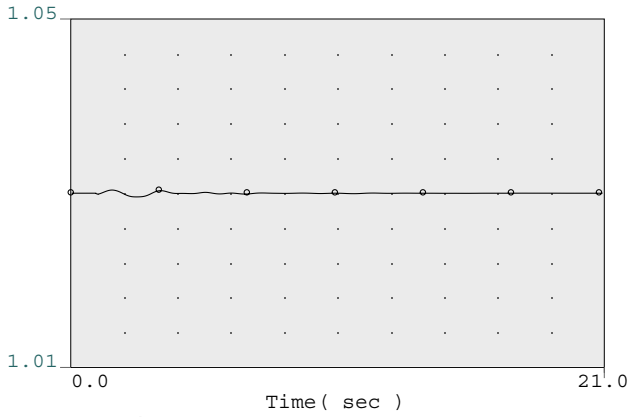



0.2 vbul 22352 IMPRLBCH 69.0 1 1 1.08

MMC ISIS, post-project

Fault bus at OTAY_93

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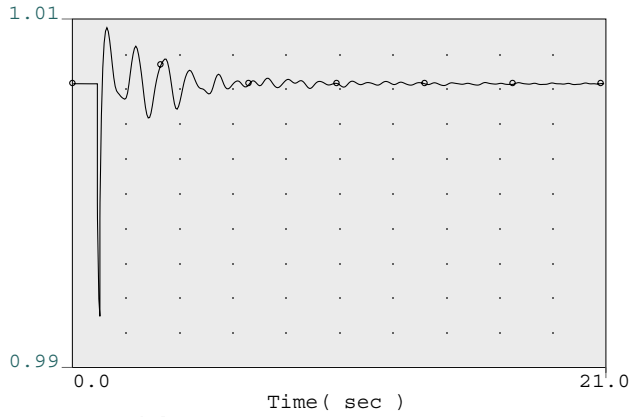


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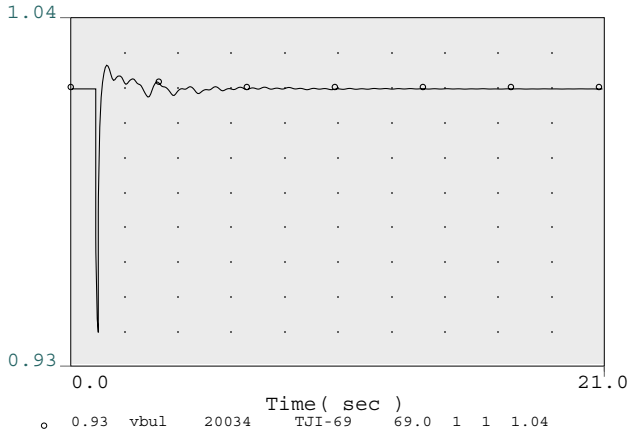


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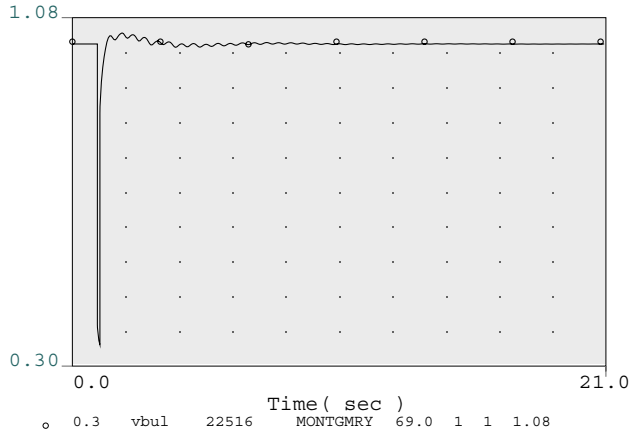


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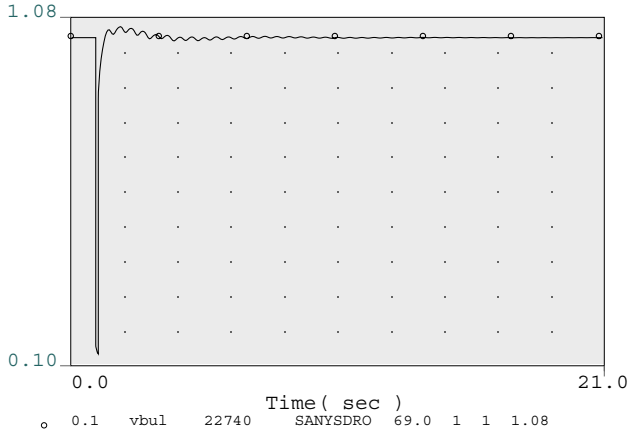


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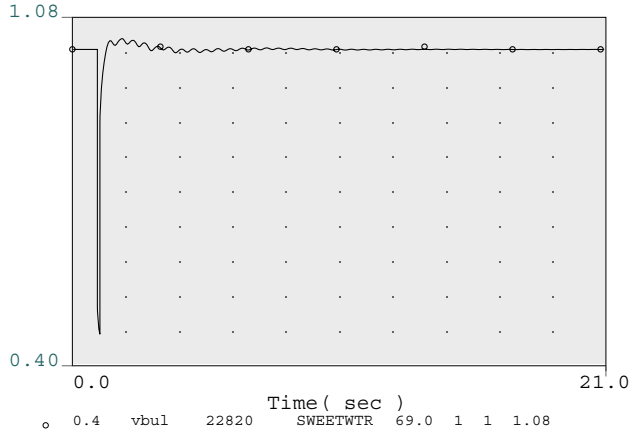



0.4 vbul 22820 SWEETWTR 69.0 1 1 1.08

MMC ISIS, post-project

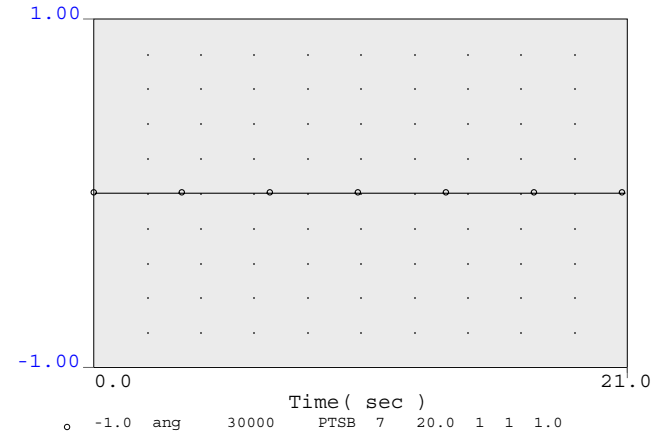
Fault bus at OTAY_93

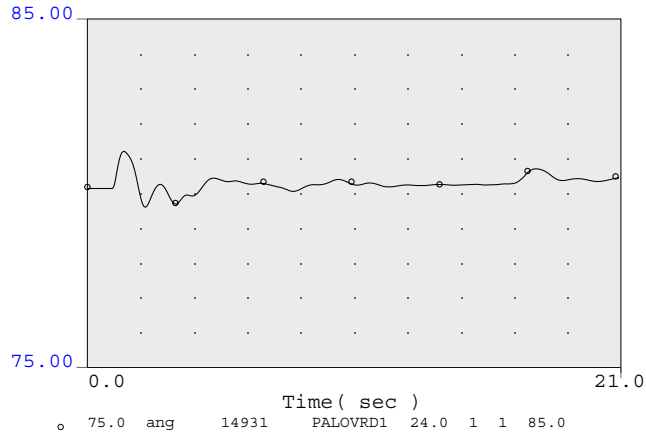
Sweetwater 69 kB Bus Outage

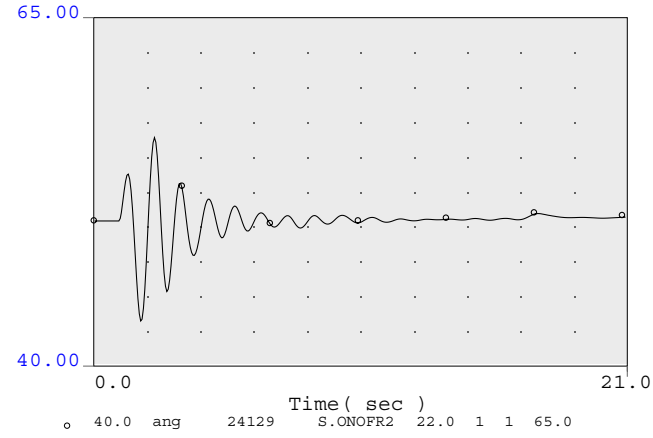
Loss of the following 69 kV facilities:

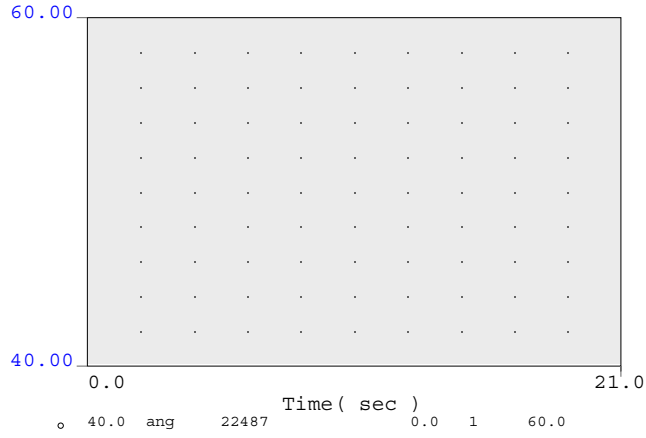
Sweetwater-Chollas,
Sweetwater-Miguel Tap,
Sweetwater-Montgomery Tap,
Southbay-Sweetwater,
Sweetwater-Sweetwater Tap, and
Load at Sweetwater

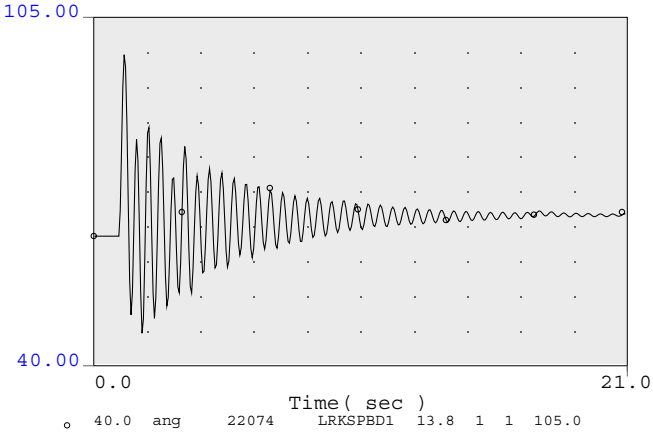
Pre- and Post-Project

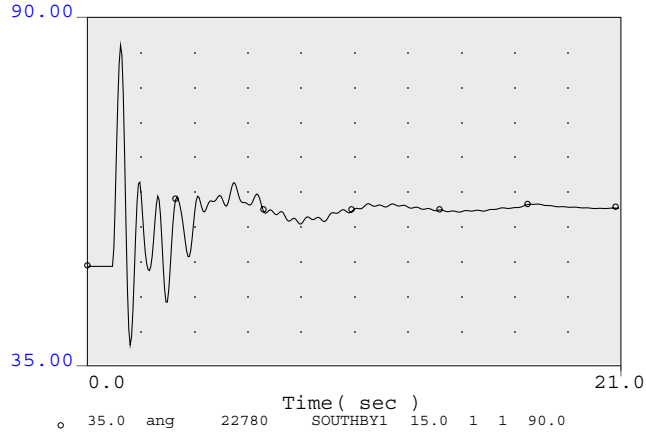


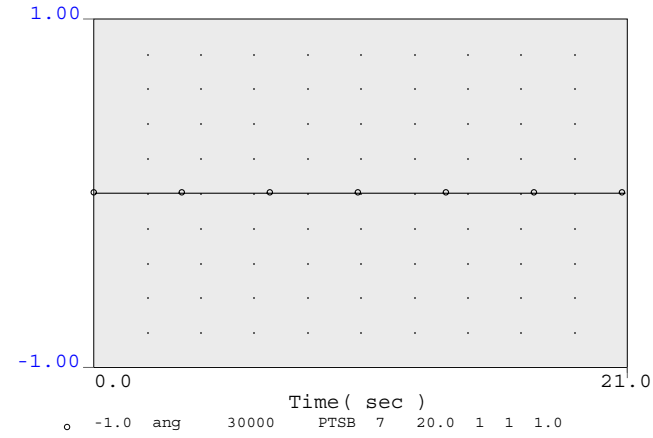



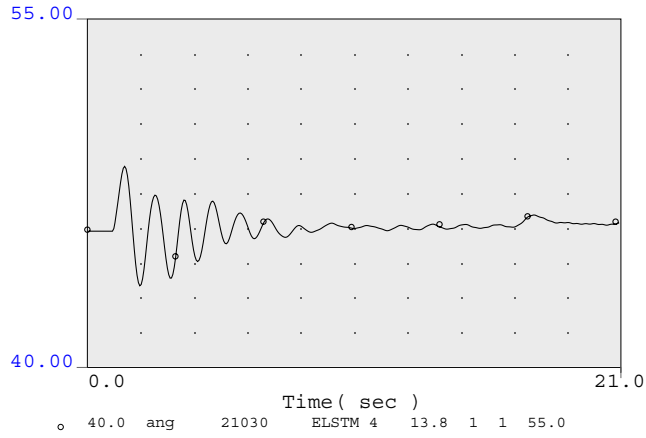



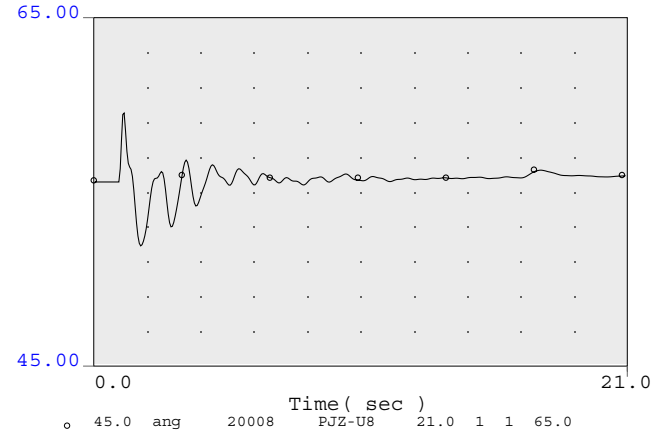



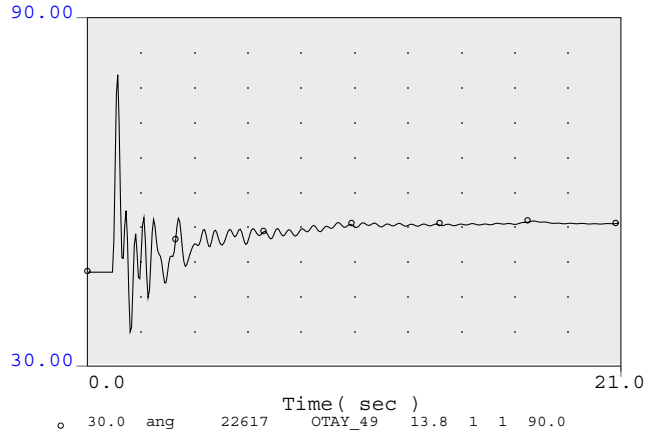



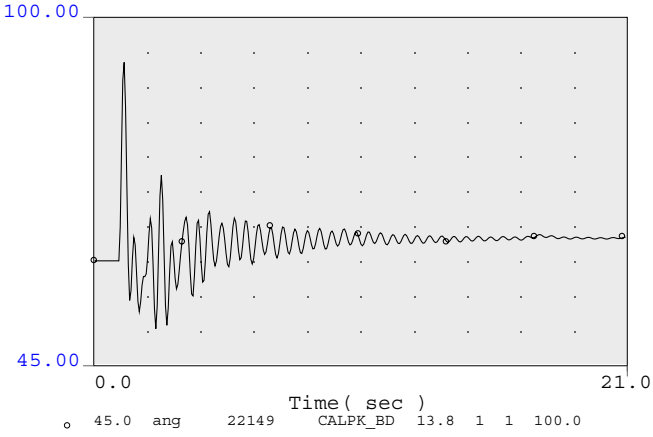

MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

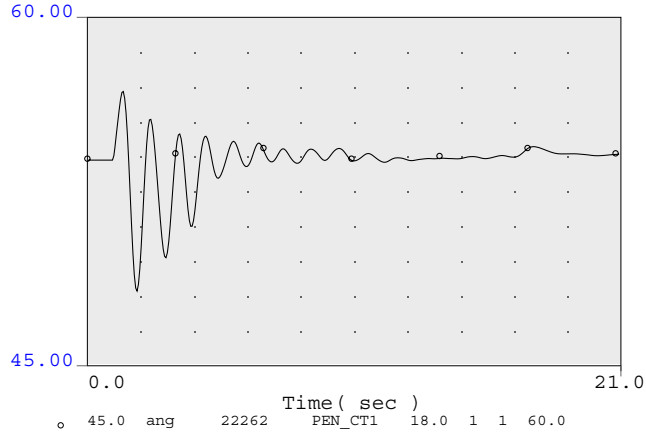


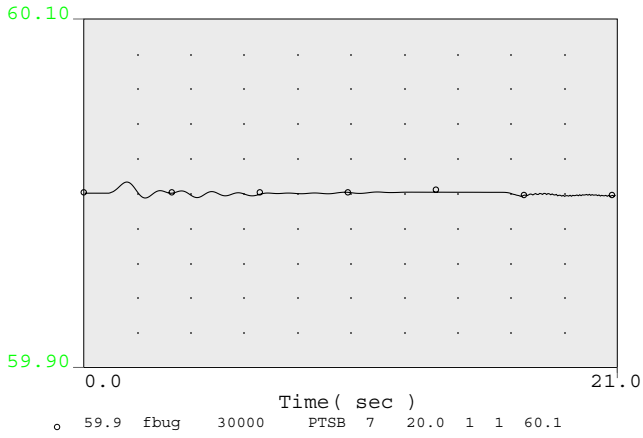



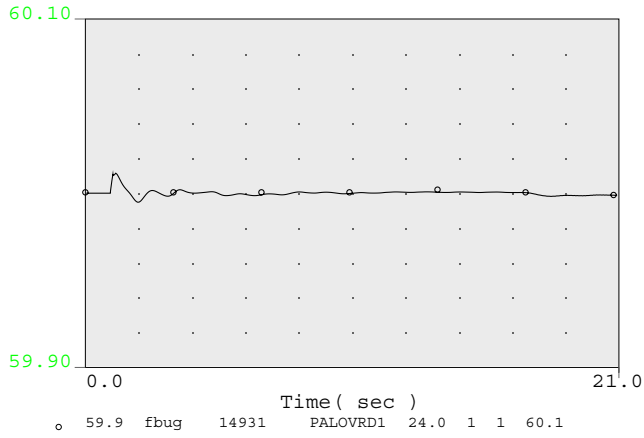



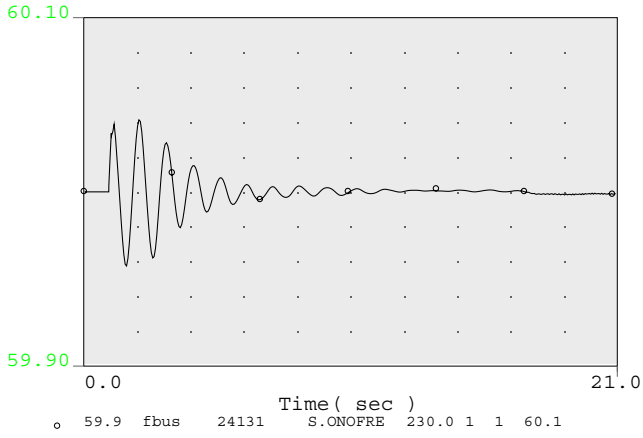



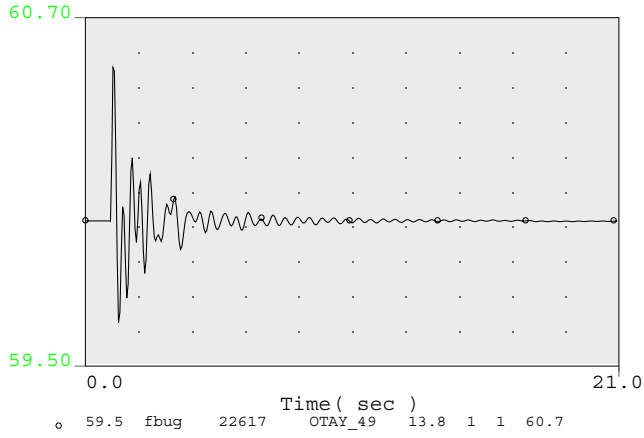



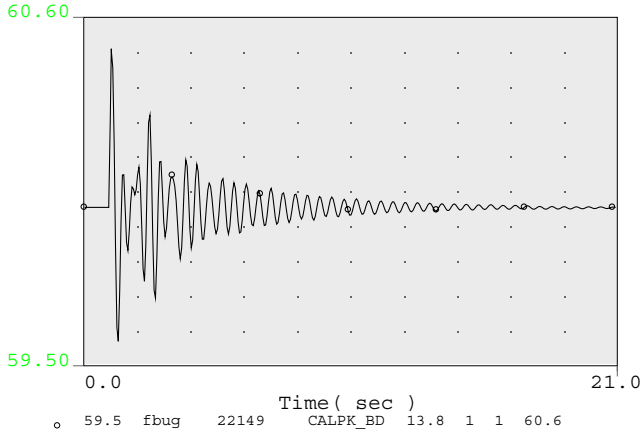

MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

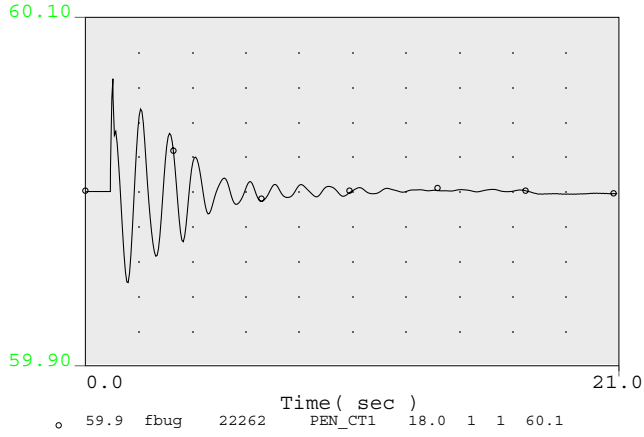


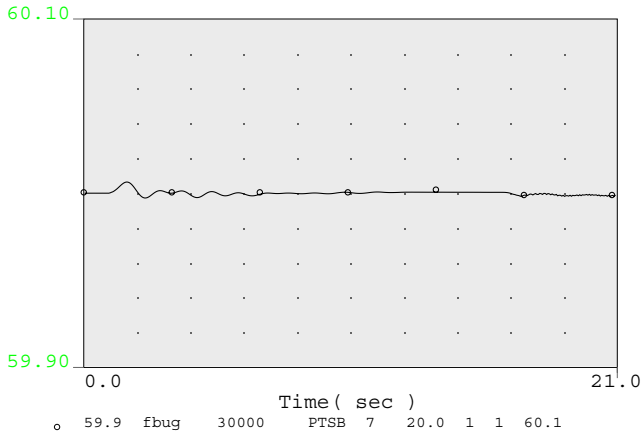



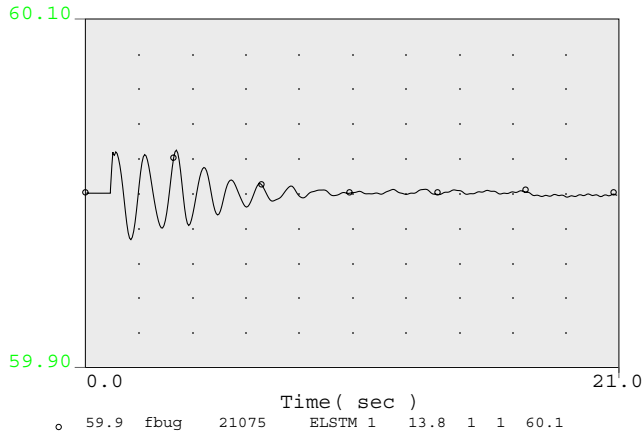



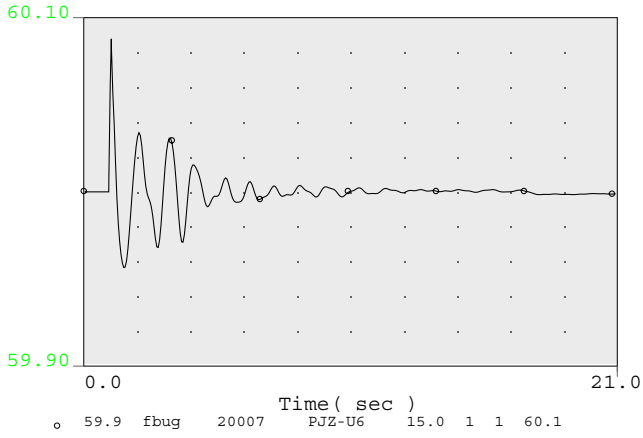



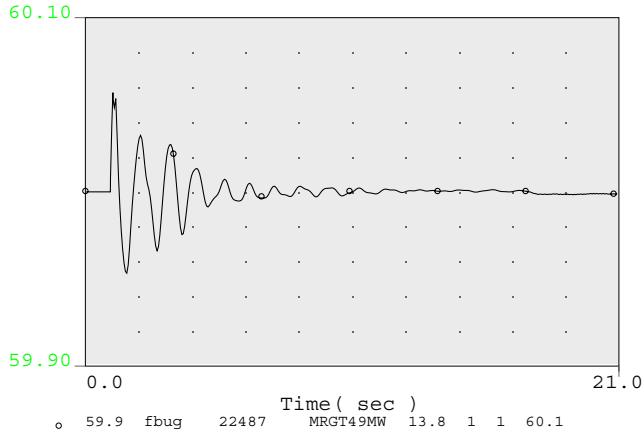



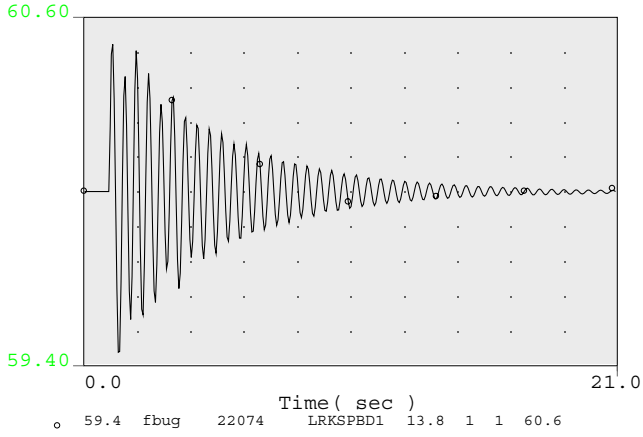

MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

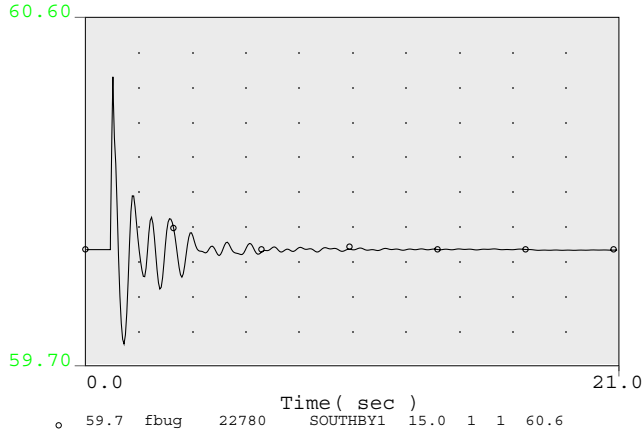


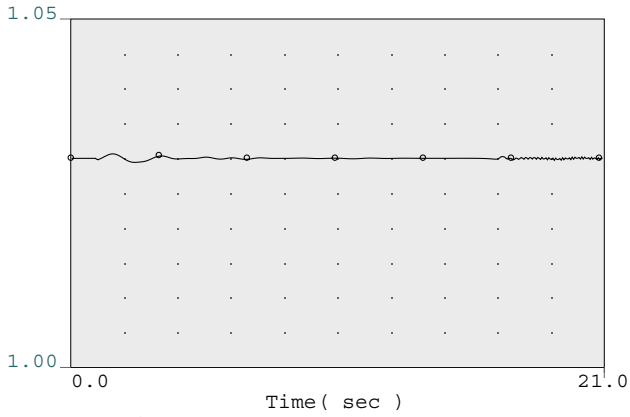



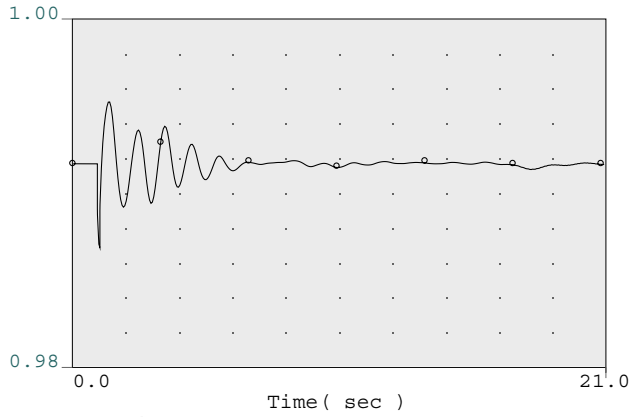




MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines




o 1.0 vbug 30000 PTSB 7 20.0 1 1 1.05

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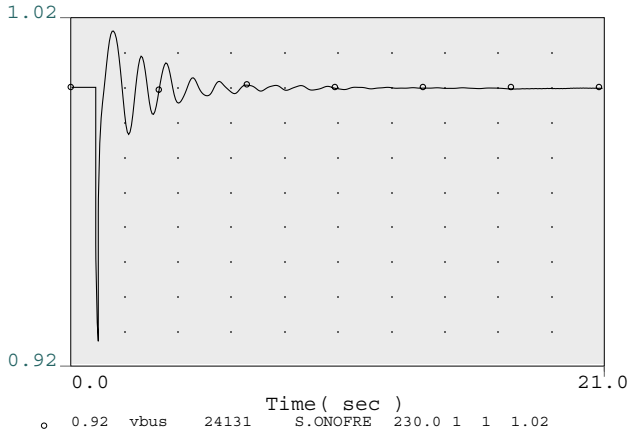


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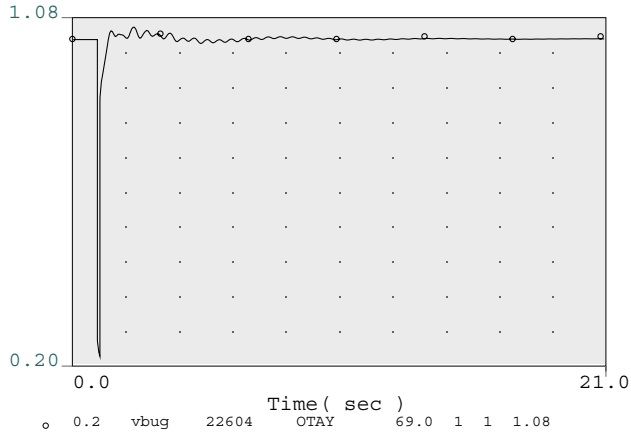
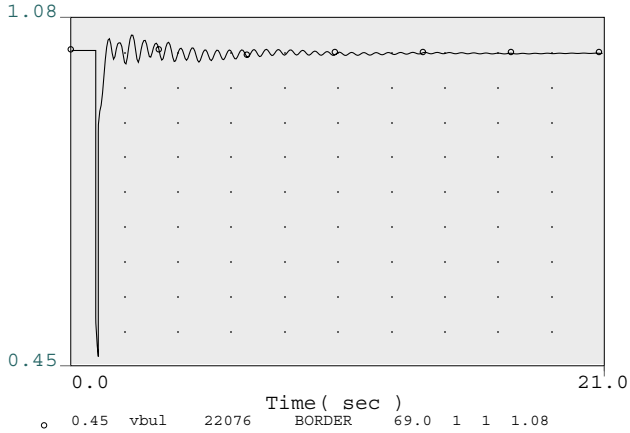
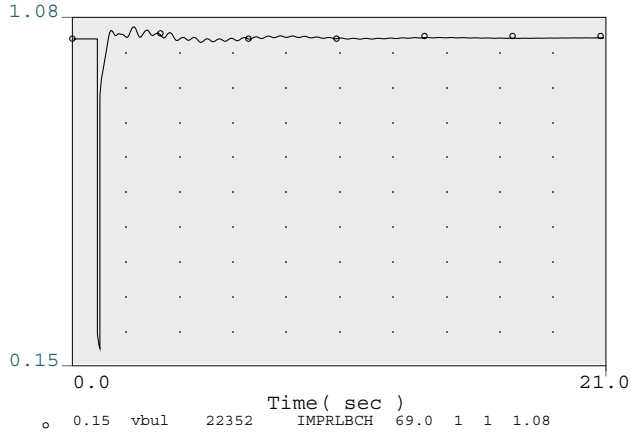



o 0.2 vbug 22604 OTAY 69.0 1 1 1.08

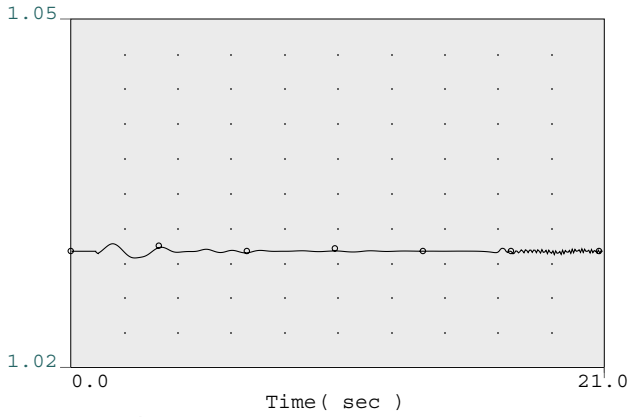



o 0.45 vbul 22076 BORDER 69.0 1 1 1.08

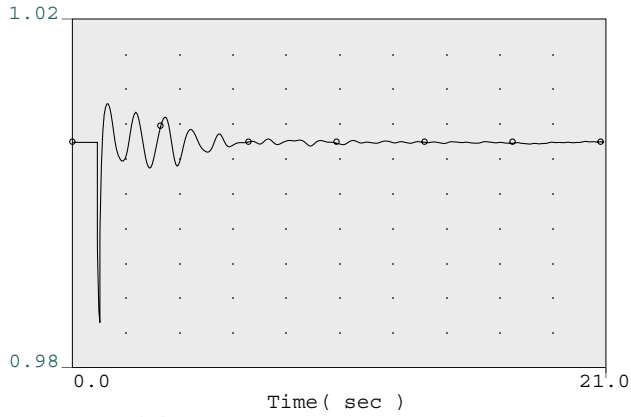



o 0.15 vbul 22352 IMPRLBCH 69.0 1 1 1.08

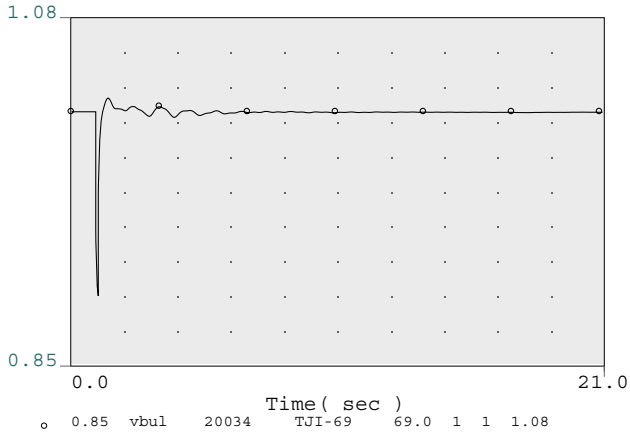
MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines




o 1.02 vbug 30000 PTSB 7 20.0 1 1 1.05




o 0.98 vbul 21027 ELSTEAMP 92.0 1 1 1.02

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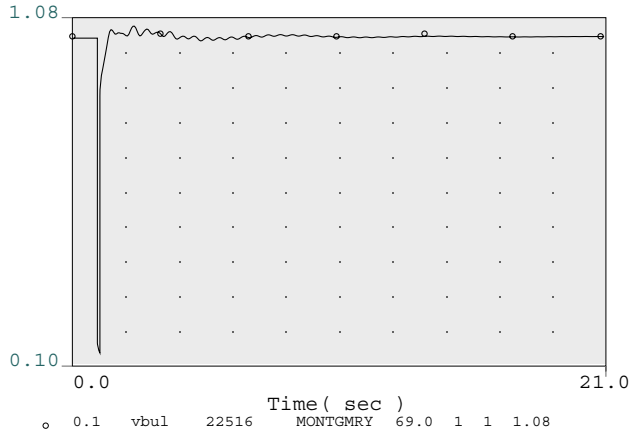


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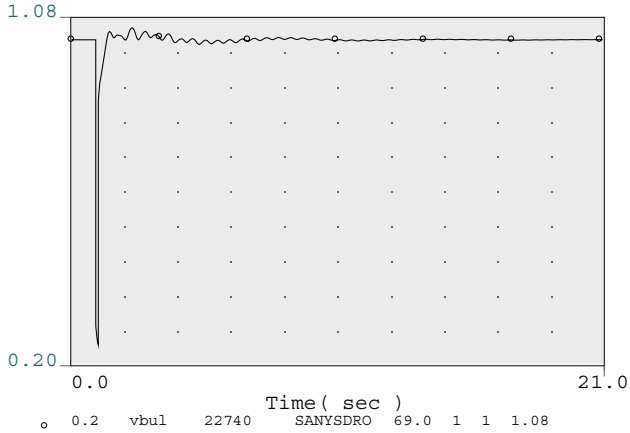


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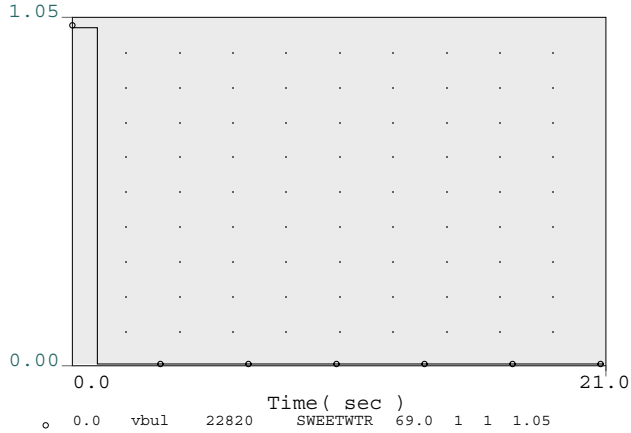
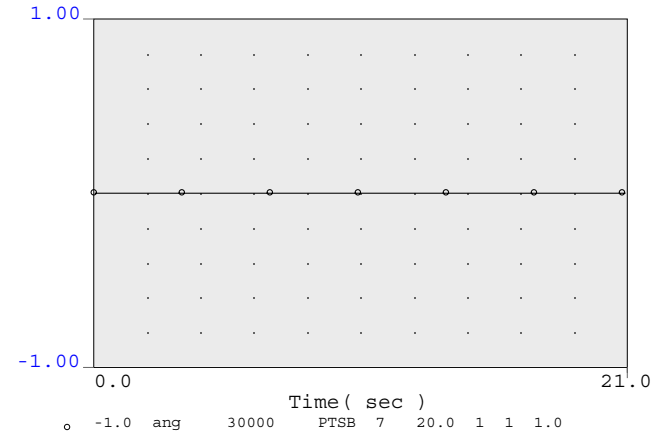
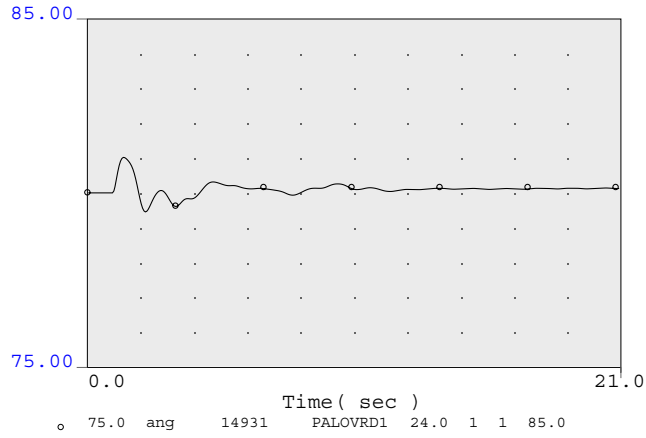
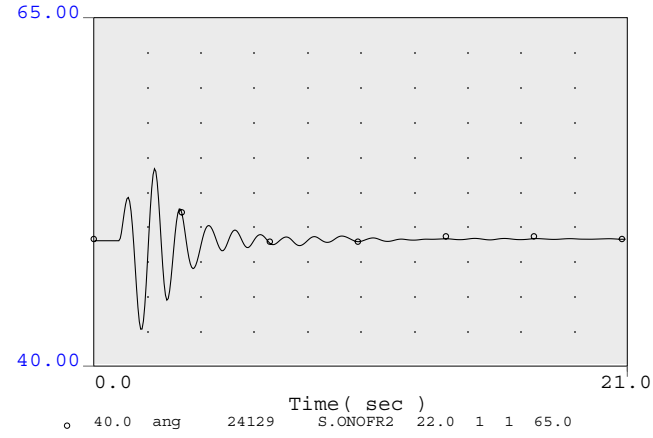


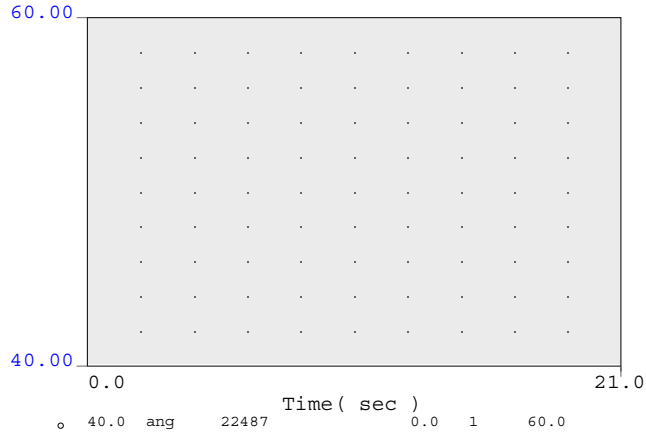

o 0.0 vbul 22820 SWEETWTR 69.0 1 1 1.05

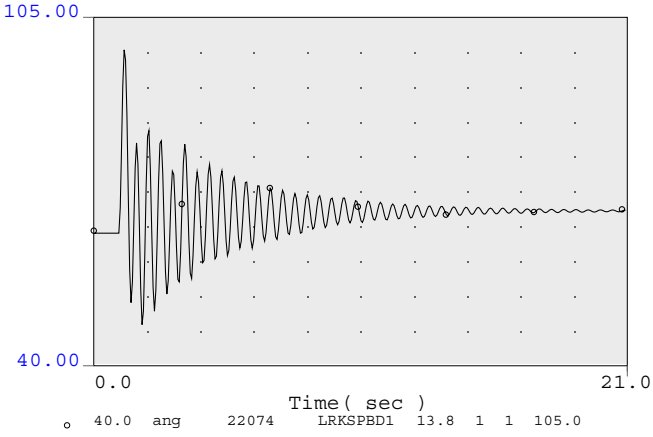
MMC ISIS, pre-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

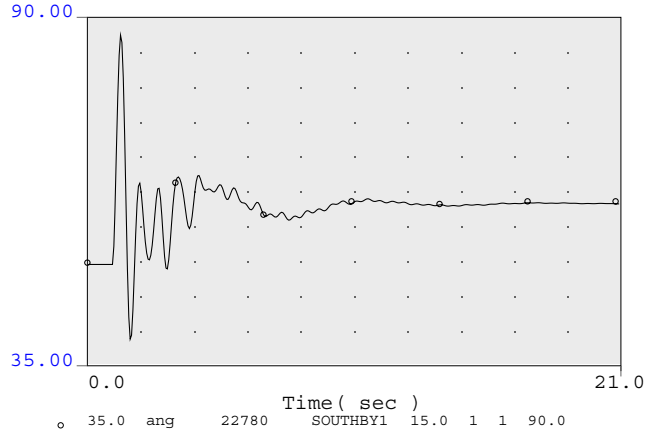


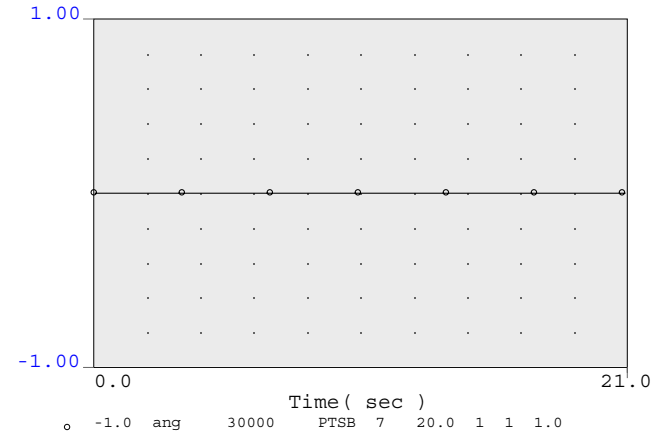



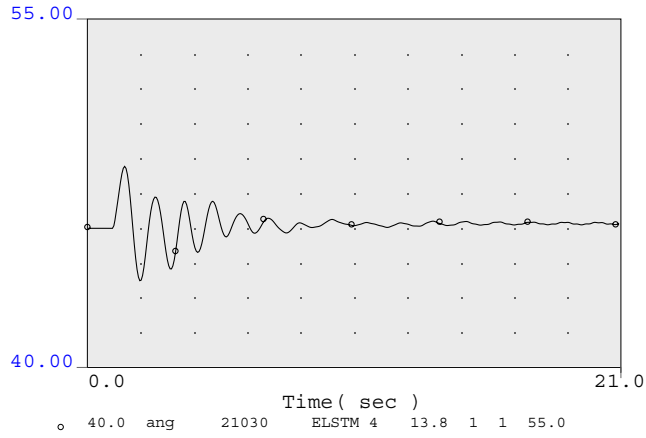



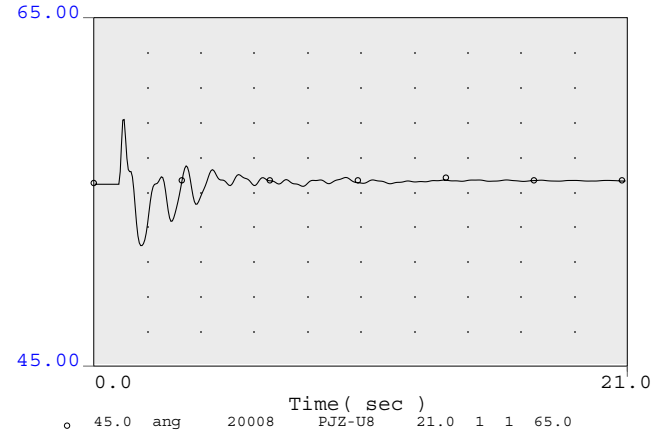



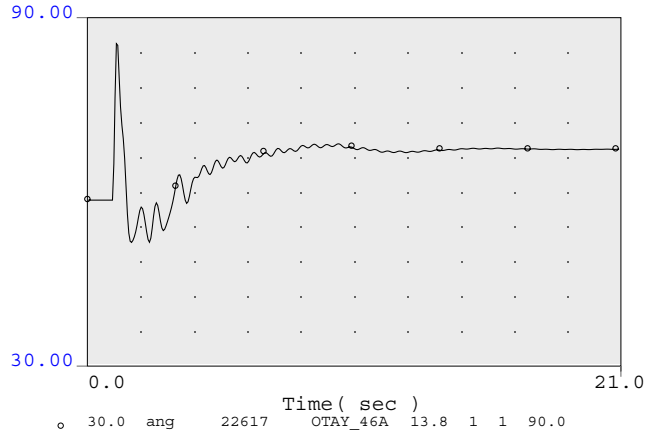



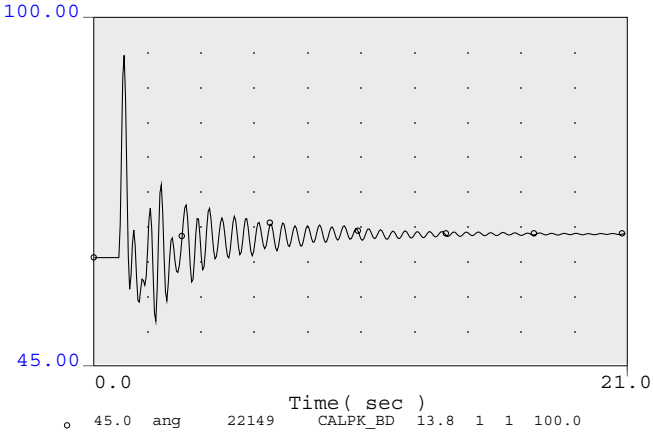

MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

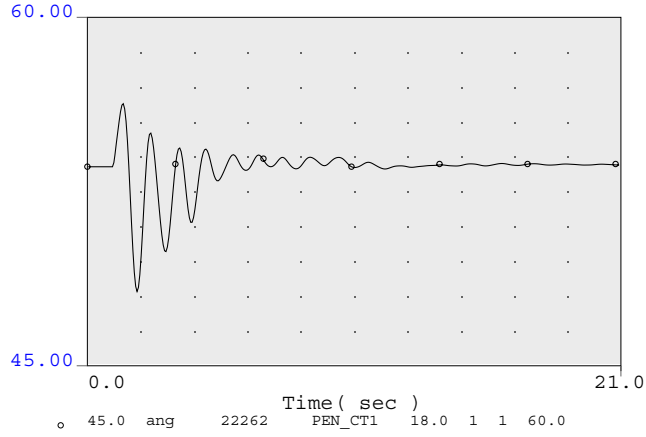


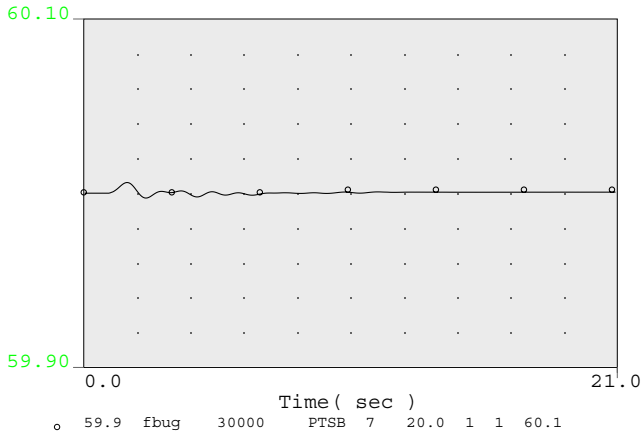



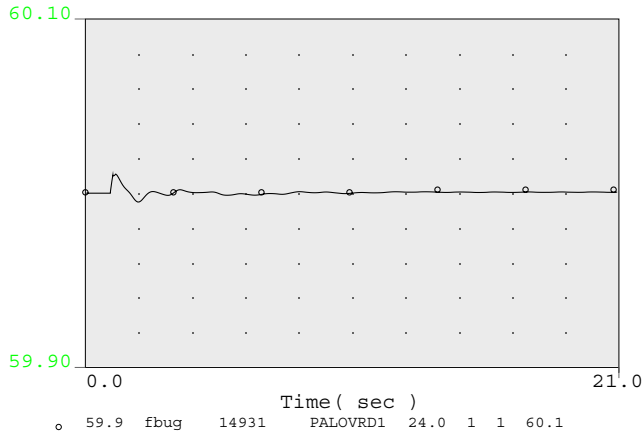



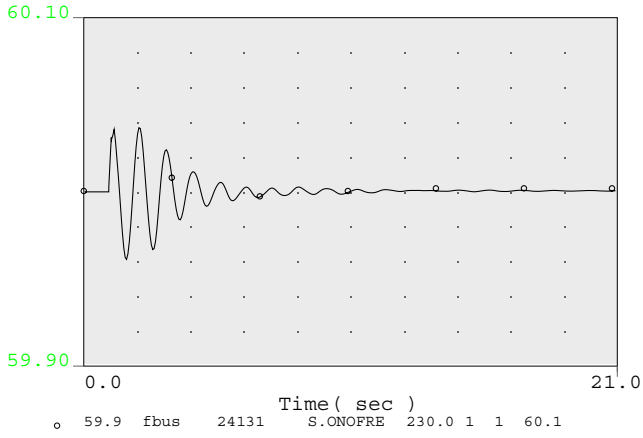



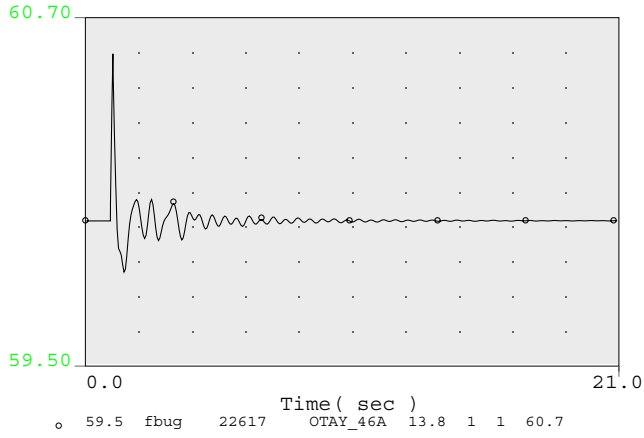



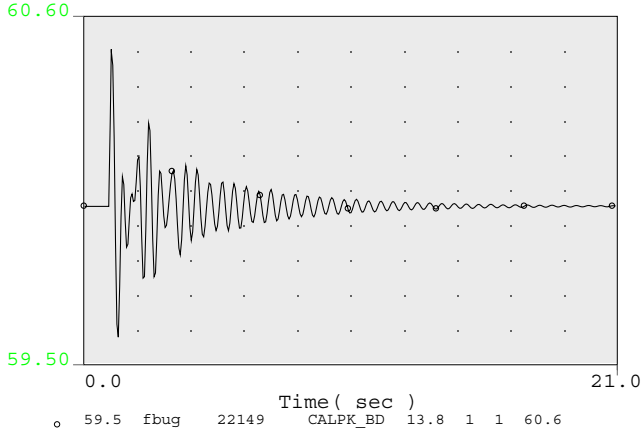

MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

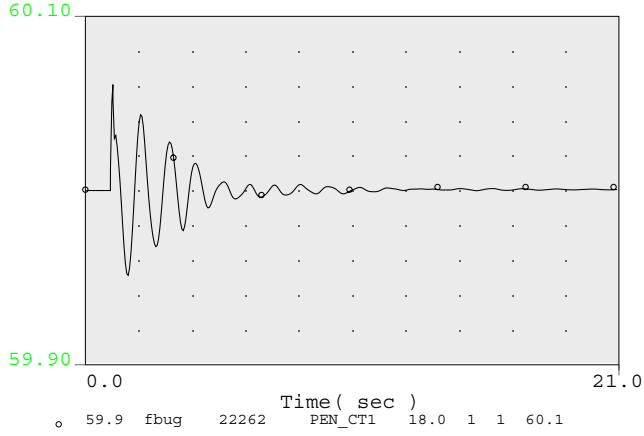


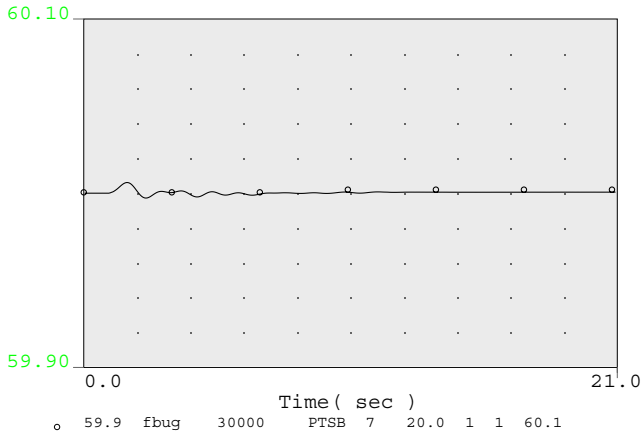



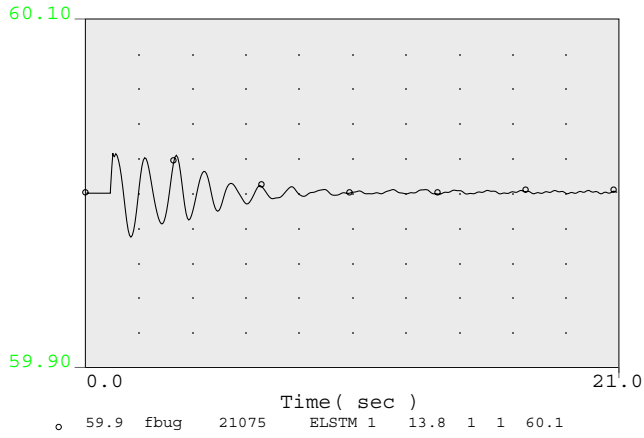



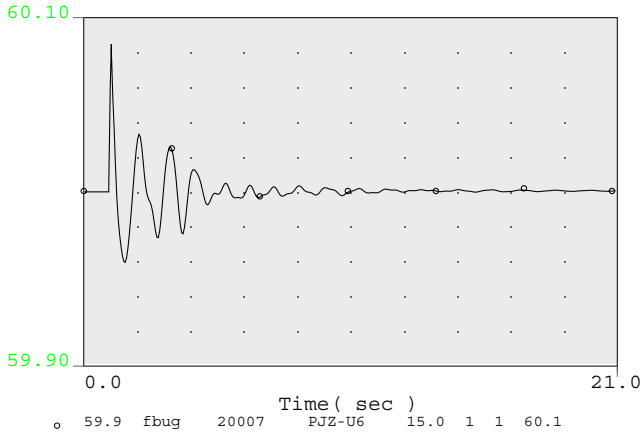



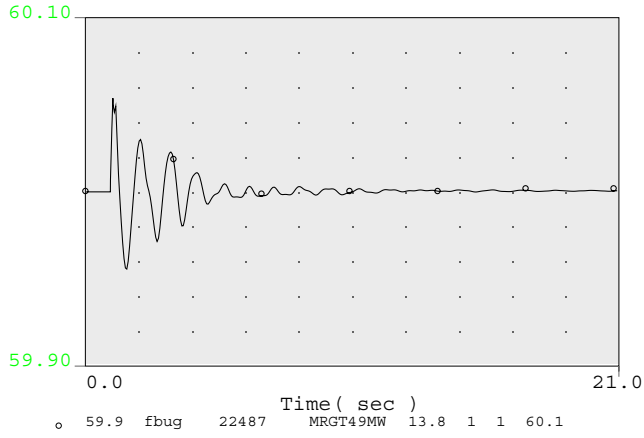



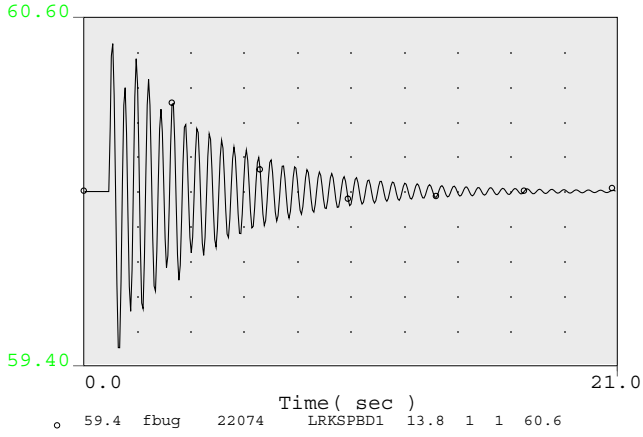

MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

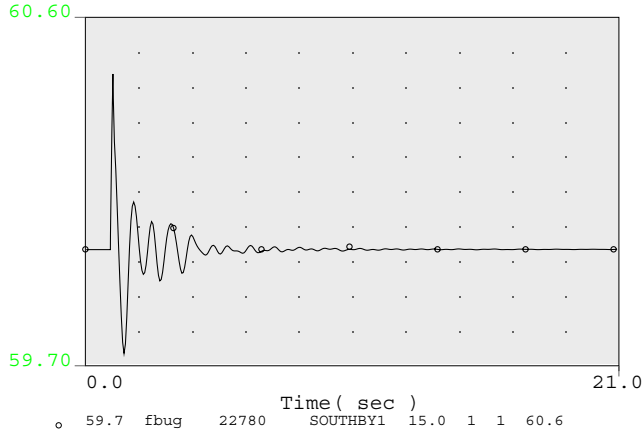


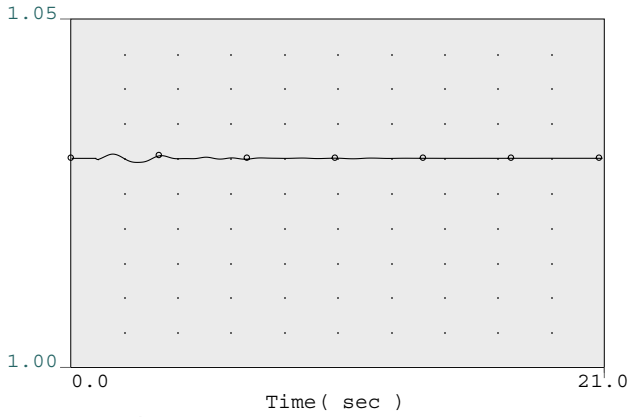



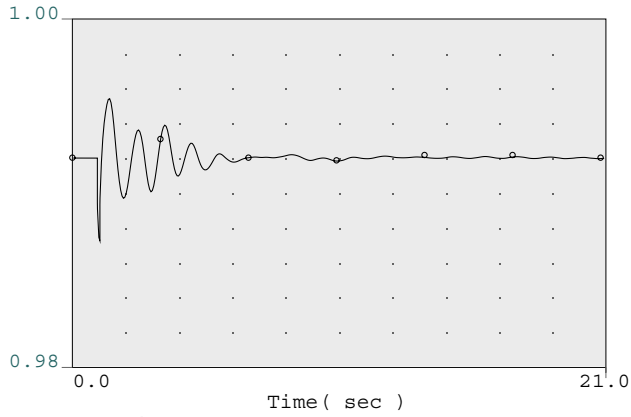



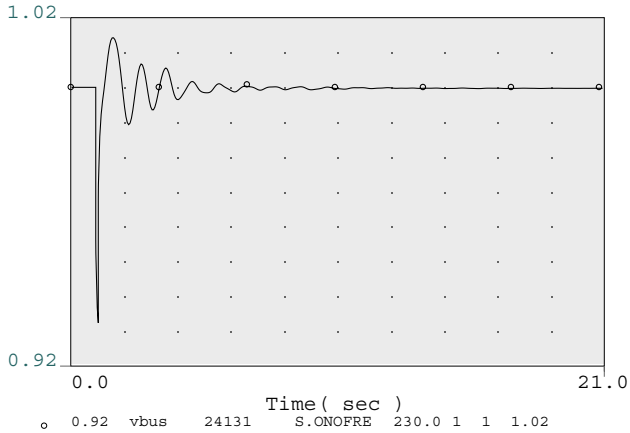

MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines



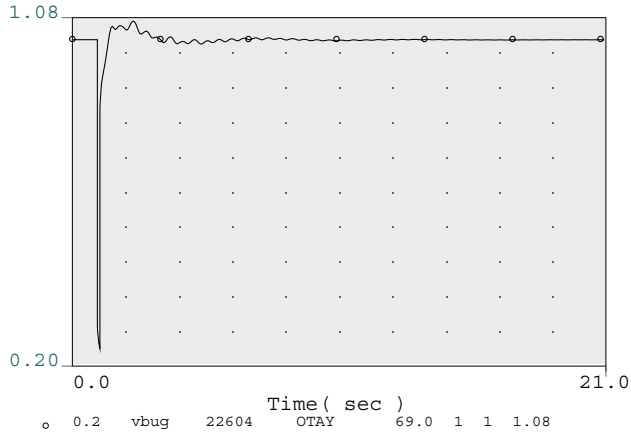

o 1.0 vbug 30000 PTSB 7 20.0 1 1 1.05



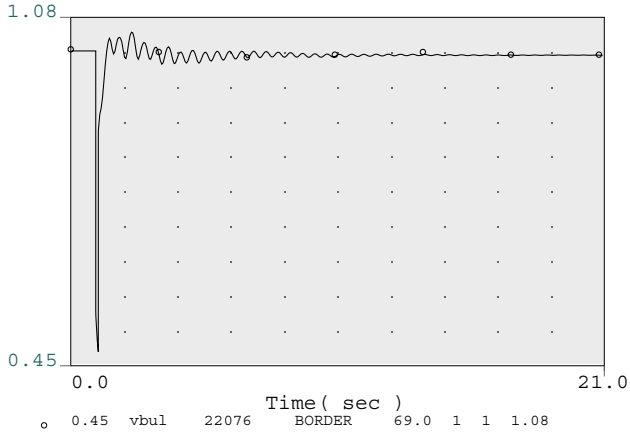

o 0.975 vbug 14931 PALOVRD1 24.0 1 1 0.995



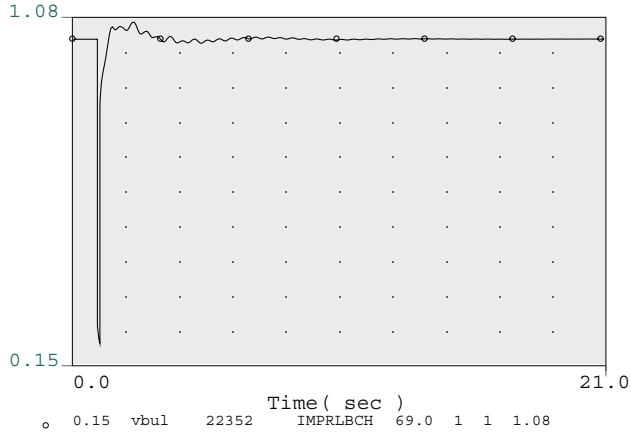

o 0.92 vbus 24131 S.ONOFRE 230.0 1 1 1.02




o 0.2 vbug 22604 OTAY 69.0 1 1 1.08

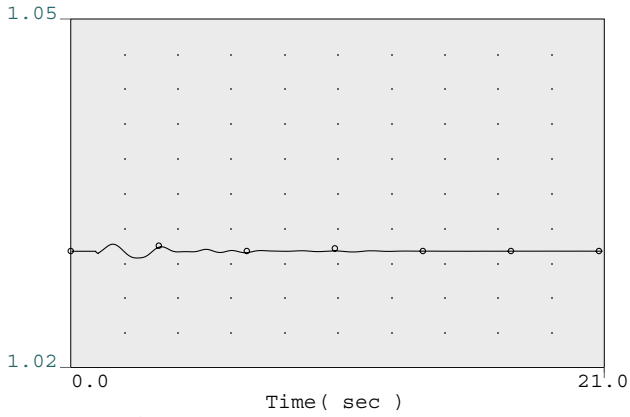



o 0.45 vbul 22076 BORDER 69.0 1 1 1.08

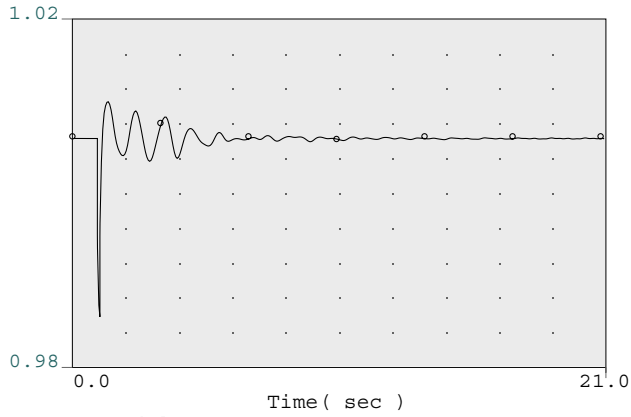



o 0.15 vbul 22352 IMPRLBCH 69.0 1 1 1.08

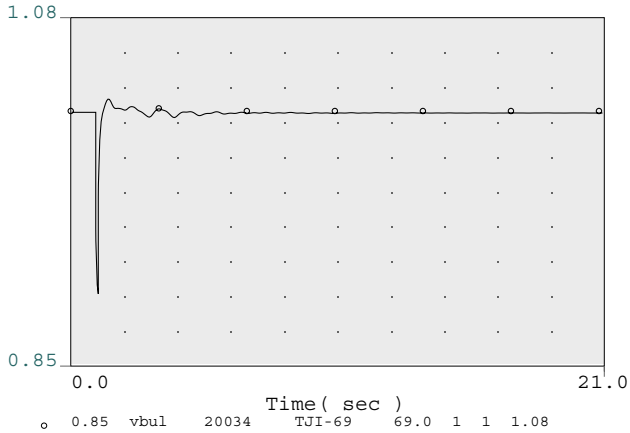
MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines



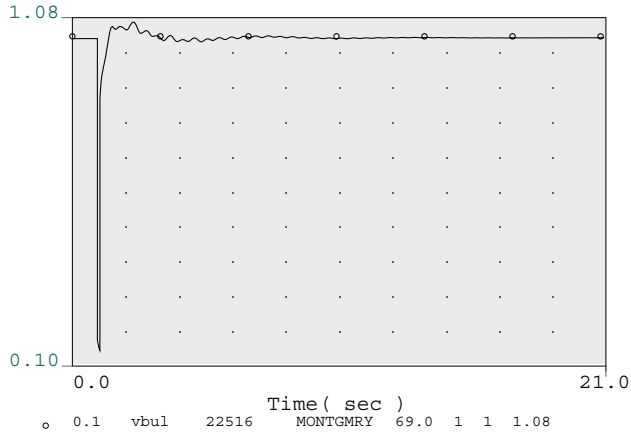

o 1.02 vbug 30000 PTSB 7 20.0 1 1 1.05



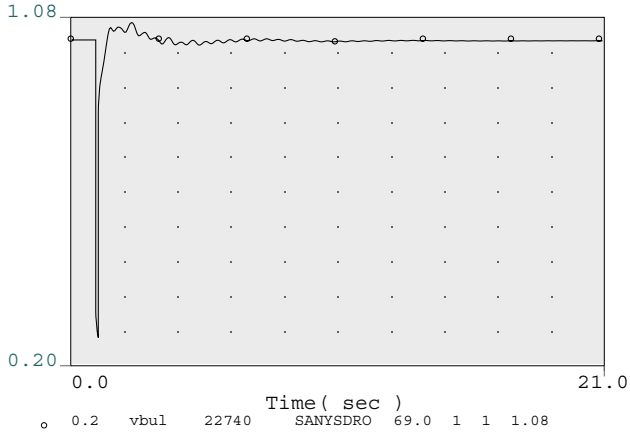

o 0.98 vbul 21027 ELSTEAMP 92.0 1 1 1.02



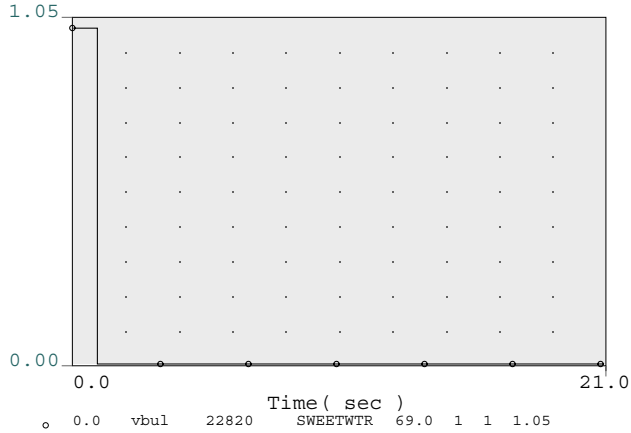

o 0.85 vbul 20034 TJI-69 69.0 1 1 1.08




o 0.1 vbul 22516 MONTGMRY 69.0 1 1 1.08




o 0.2 vbul 22740 SANYSDRO 69.0 1 1 1.08




o 0.0 vbul 22820 SWEETWTR 69.0 1 1 1.05

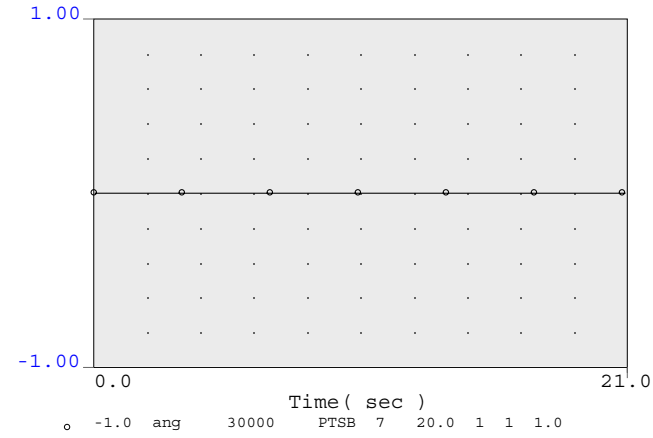
MMC ISIS, post-project
Fault bus at Sweetwater 69
Trip SW-CS, SW-MLTP,SW-MGTP,SW-SY
SW-SWTP 69 kV lines

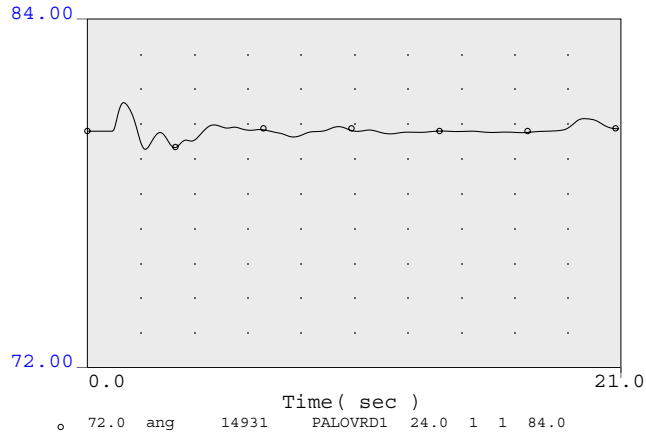
Southbay North Bus Outage

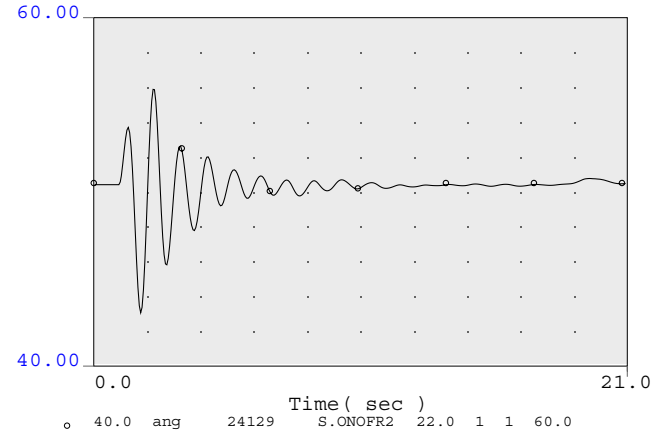
Pre- and Post-Project

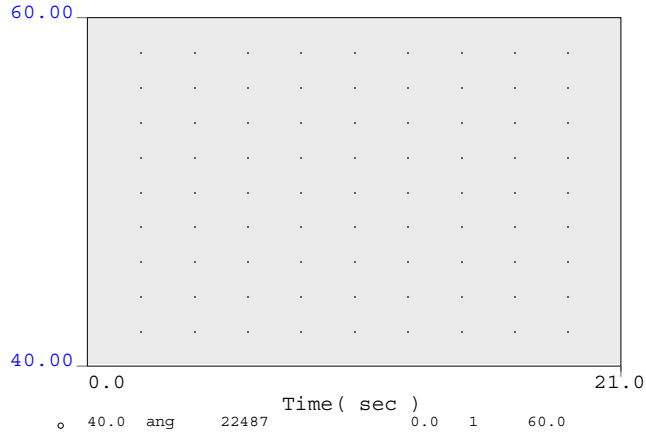
Loss of the following 69 kV facilities:

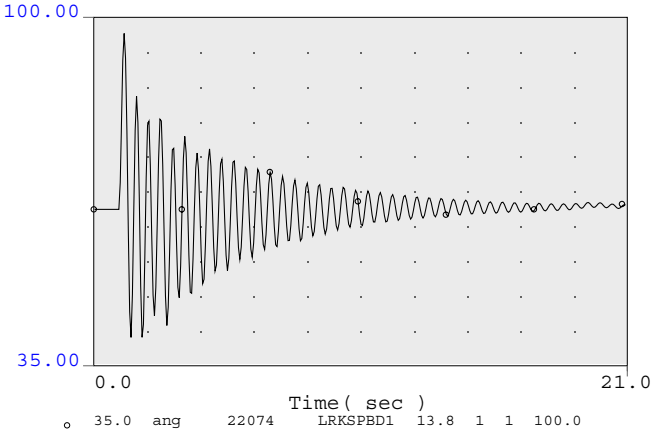
Sweetwater-Sweetwater,
Southbay-Otay, and
Southbay-Imperial Beach.

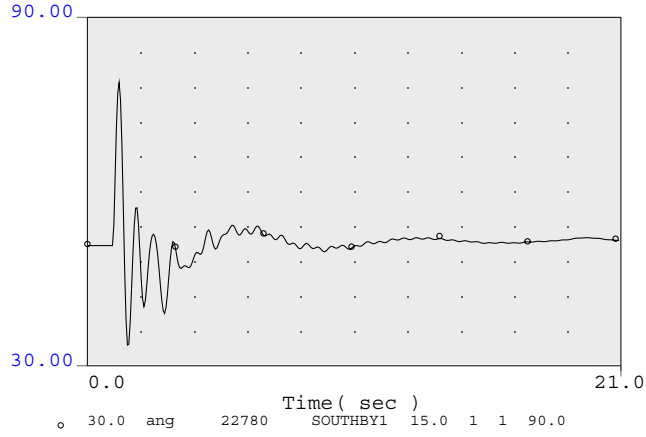


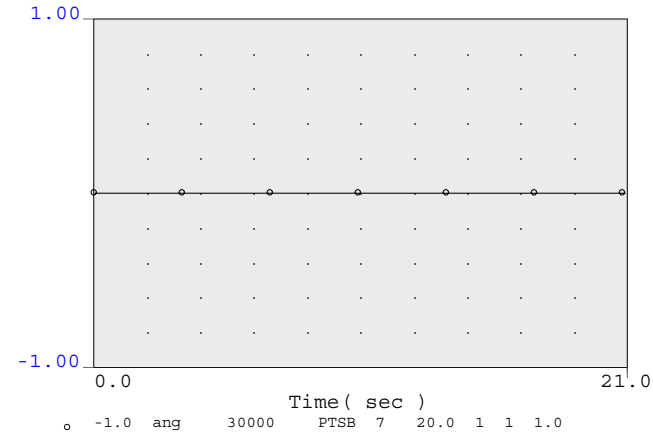



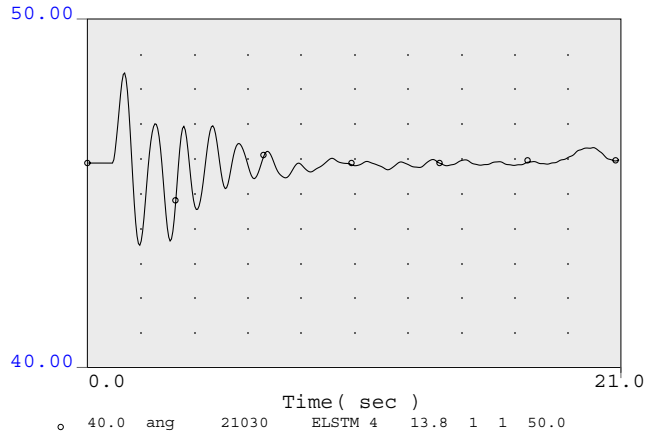



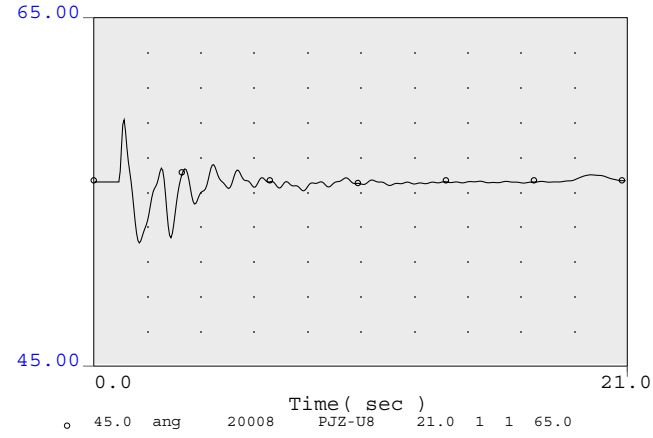



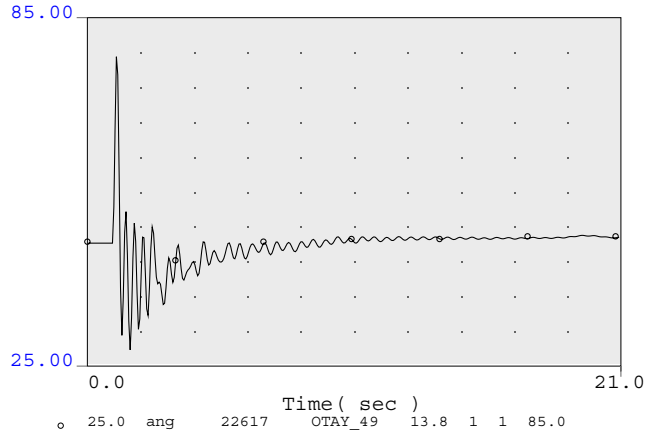



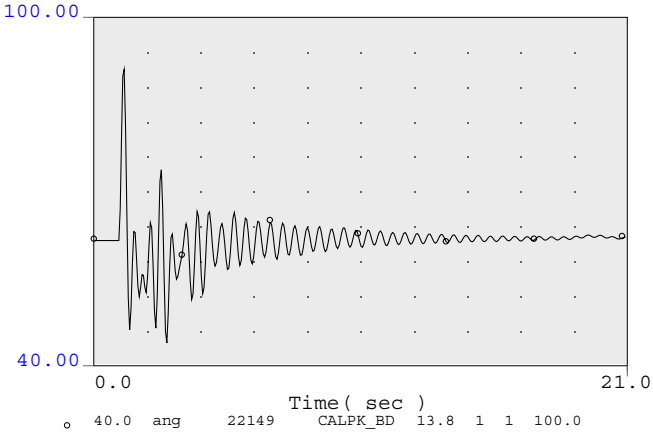

MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

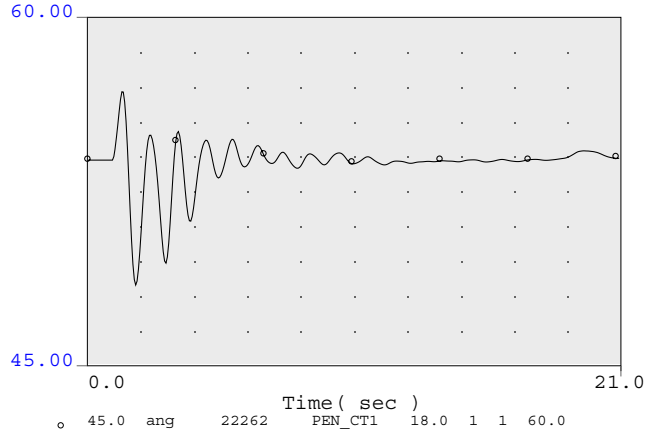


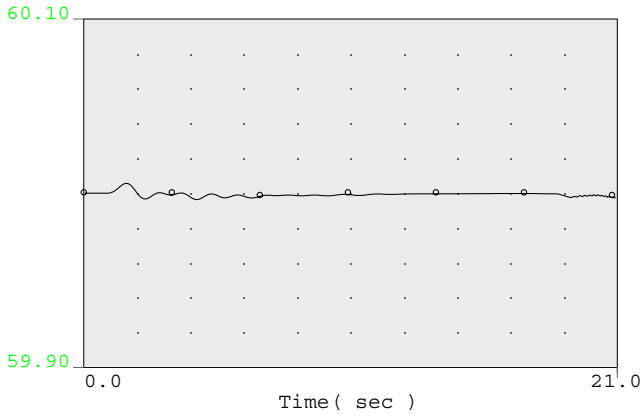



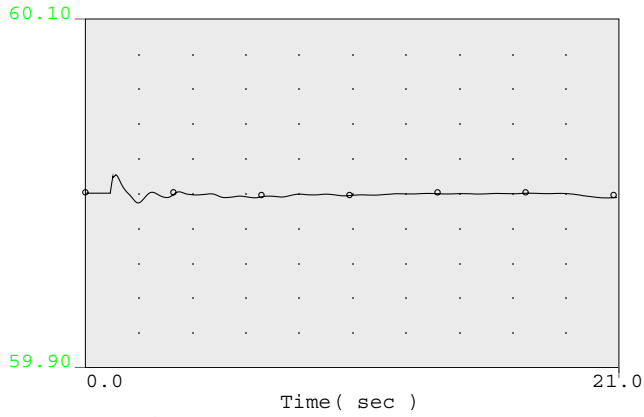



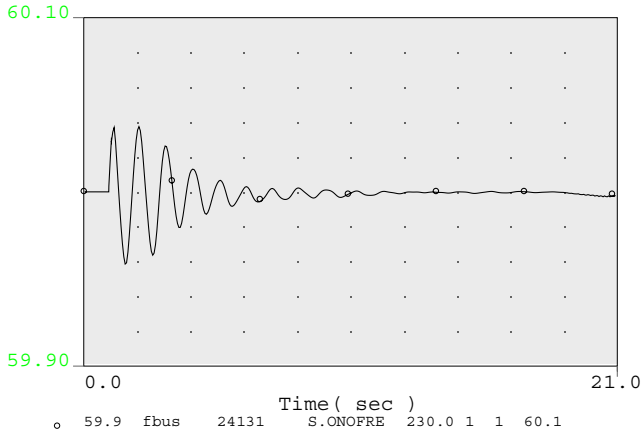

MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines



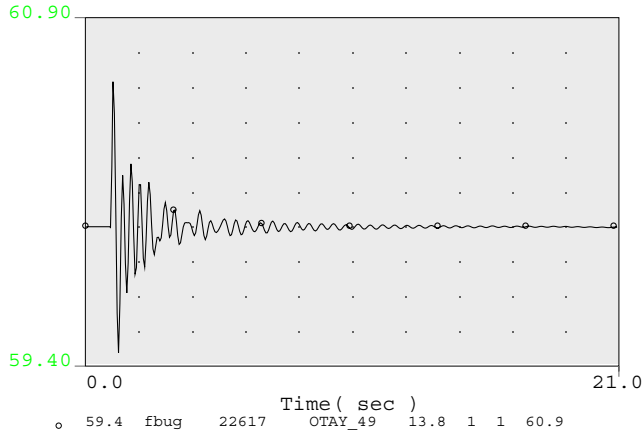

59.9 fbug 30000 PTSB 7 20.0 1 1 60.1



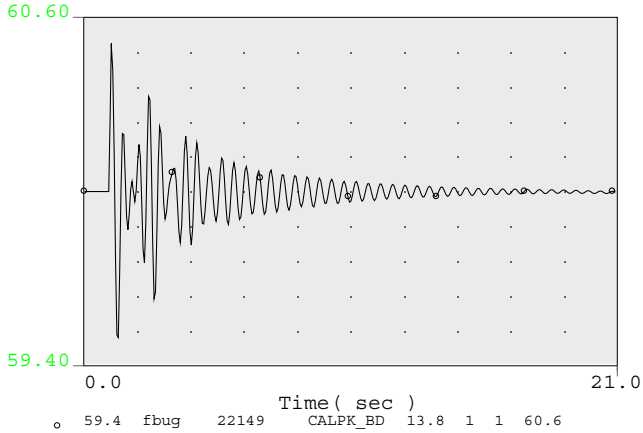

59.9 fbug 14931 PALOVRD1 24.0 1 1 60.1



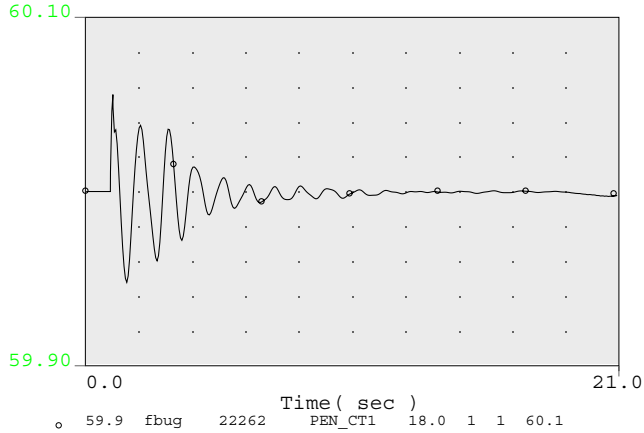

59.9 fbus 24131 S.ONOFRE 230.0 1 1 60.1




59.4 fbug 22617 OTAY_49 13.8 1 1 60.9

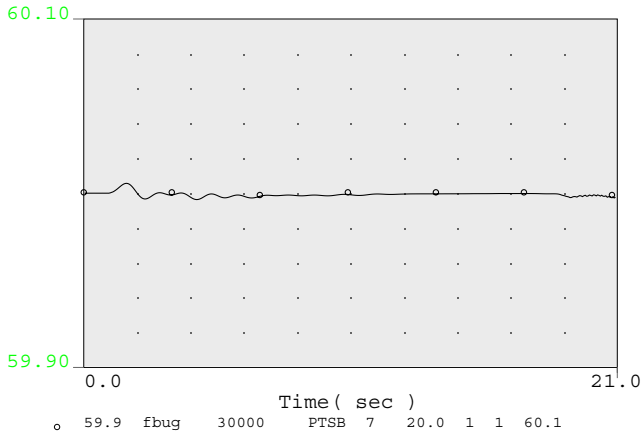


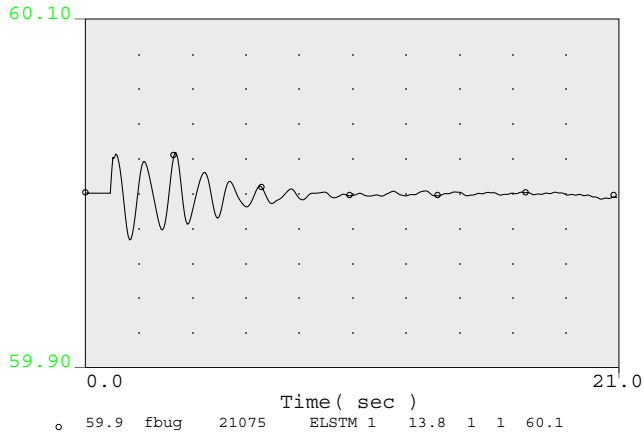

59.4 fbug 22149 CALPK_BD 13.8 1 1 60.6

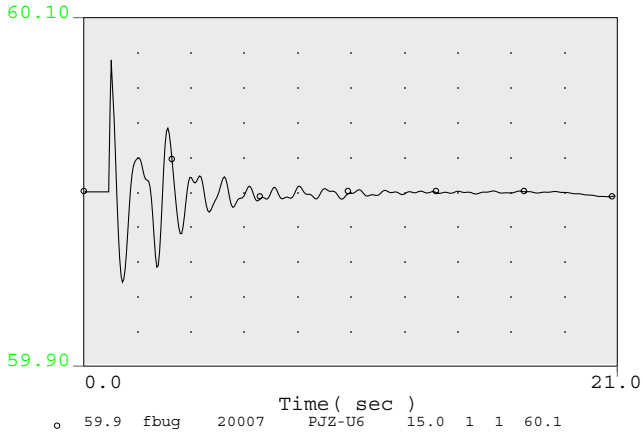


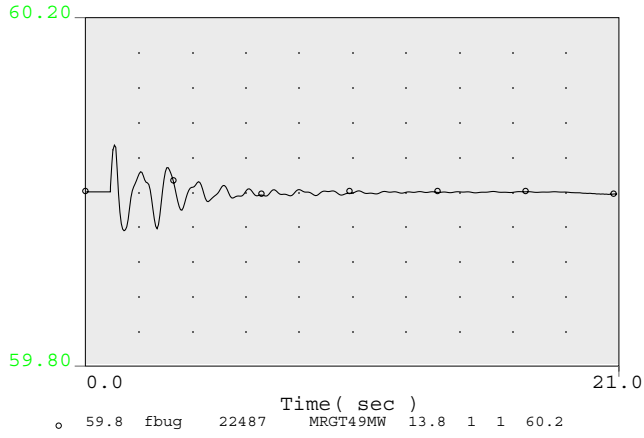

59.9 fbug 22262 PEN_CT1 18.0 1 1 60.1

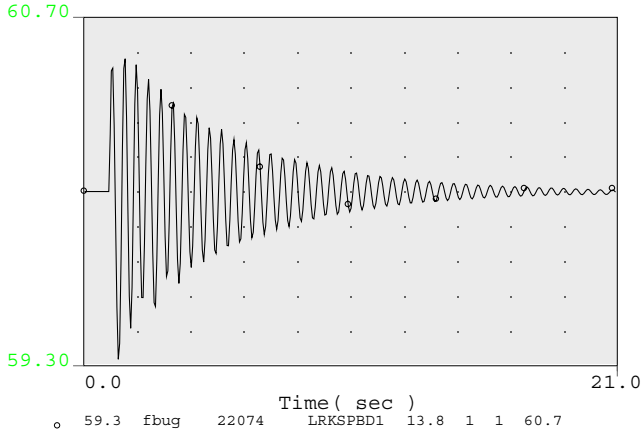
MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

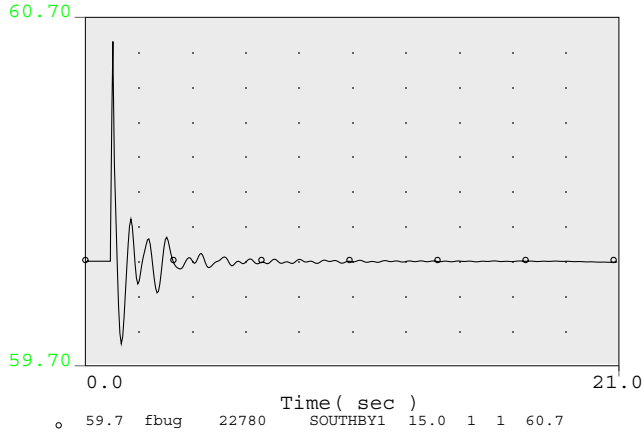


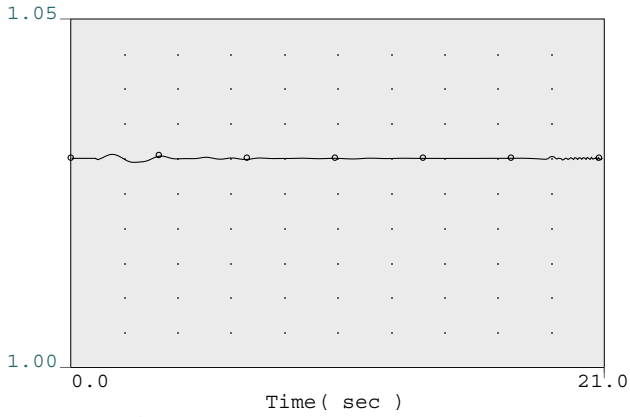



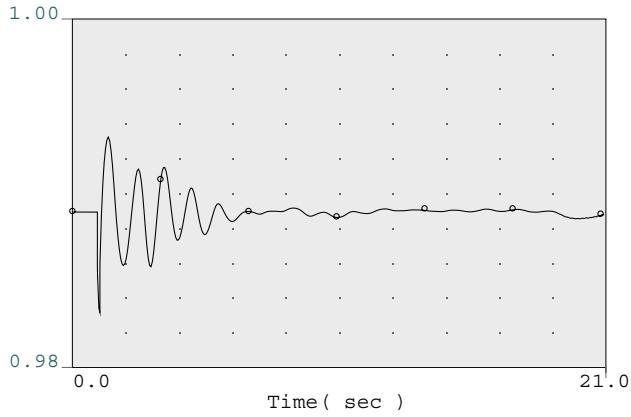



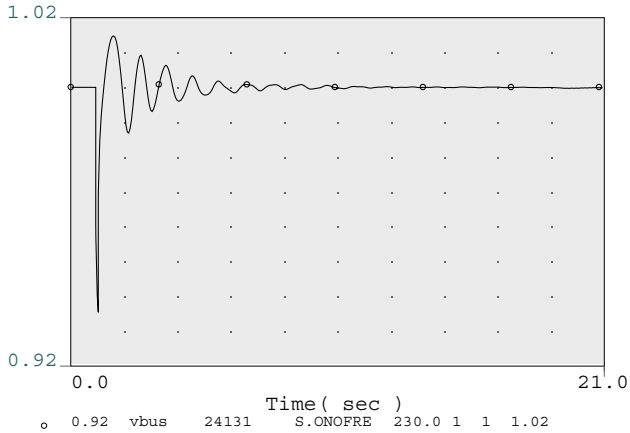

MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines



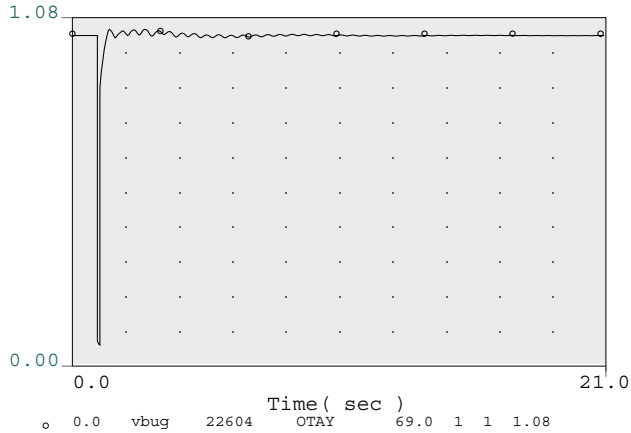

1.0 vbug 30000 PTSB 7 20.0 1 1 1.05



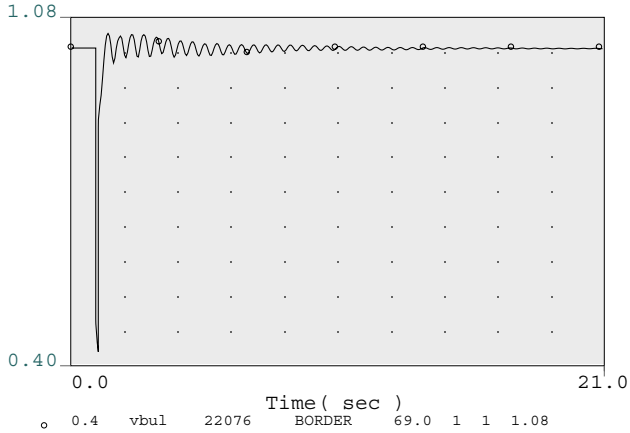

0.98 vbug 14931 PALOVRD1 24.0 1 1 0.995



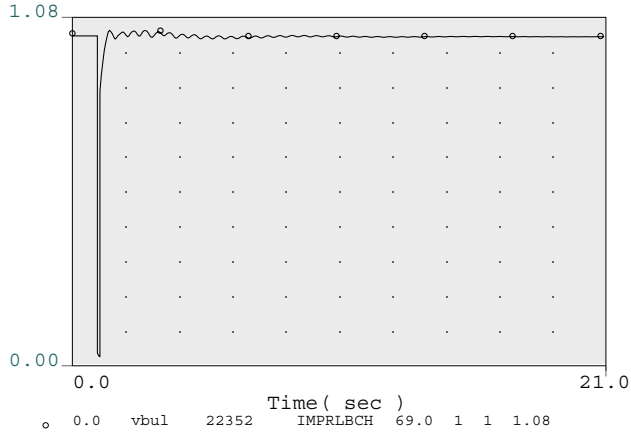

0.92 vbus 24131 S.ONOFRE 230.0 1 1 1.02




0.0 vbug 22604 OTAY 69.0 1 1 1.08

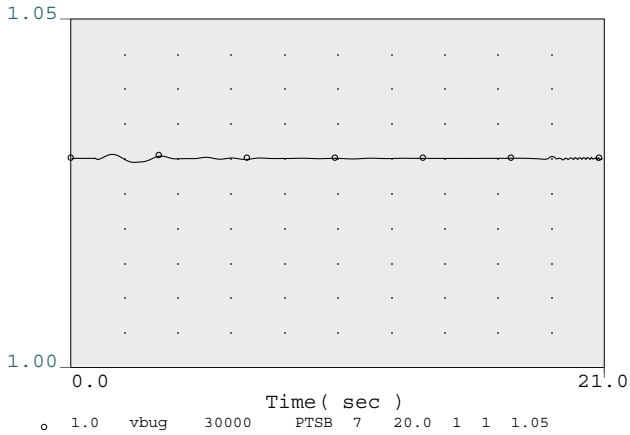


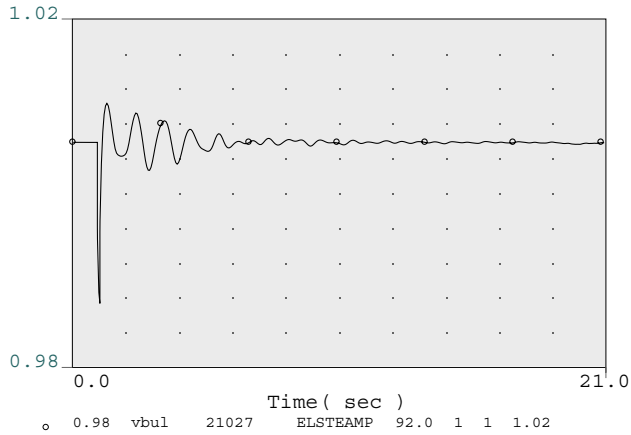

0.4 vbul 22076 BORDER 69.0 1 1 1.08

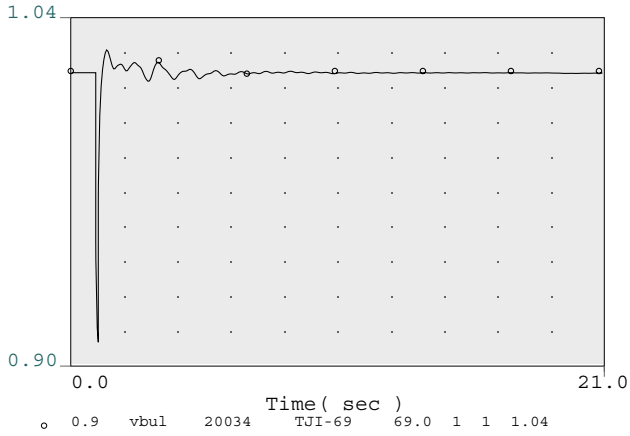


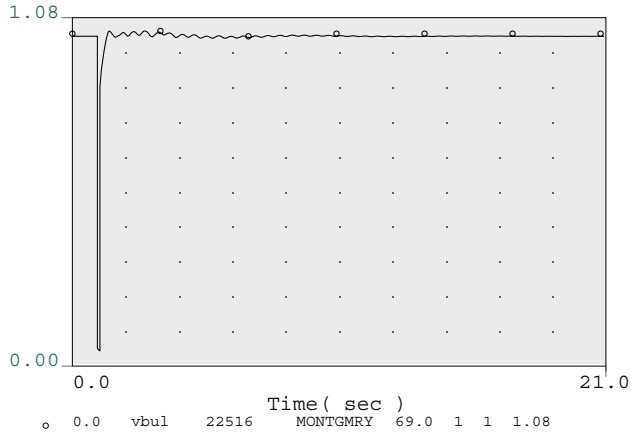

0.0 vbul 22352 IMPRLBCH 69.0 1 1 1.08

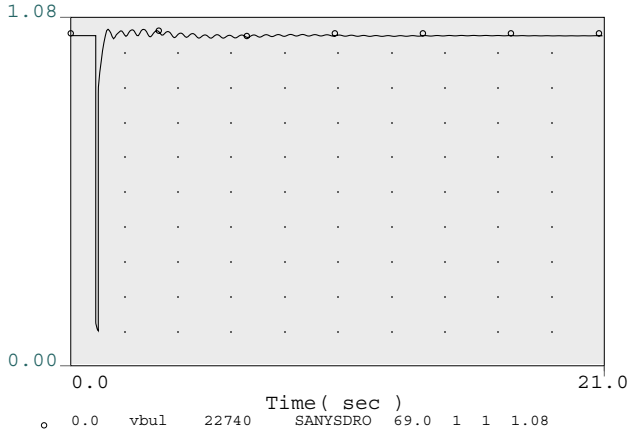
MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

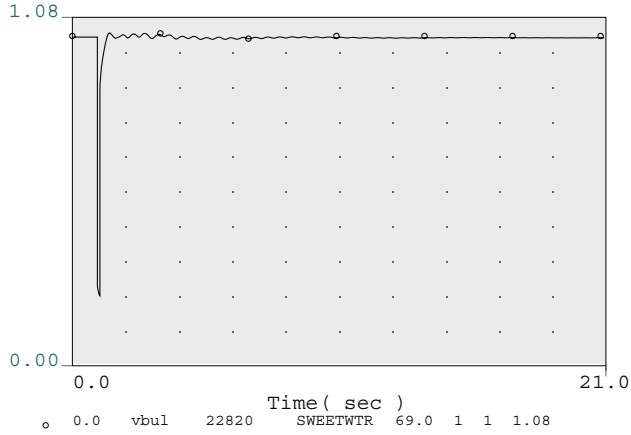


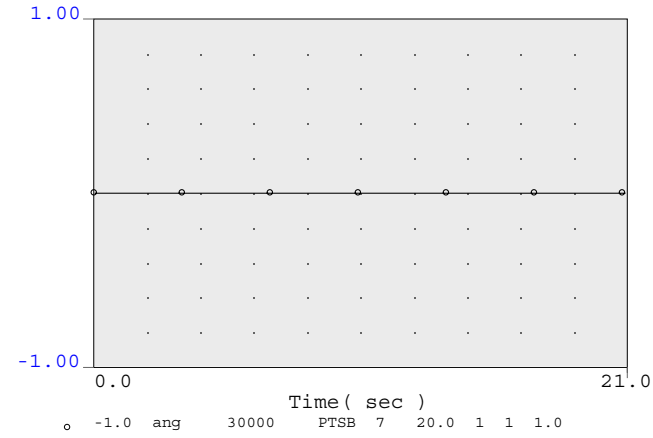



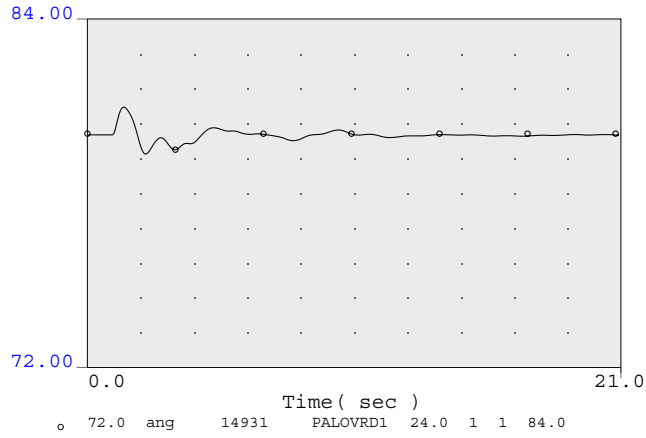



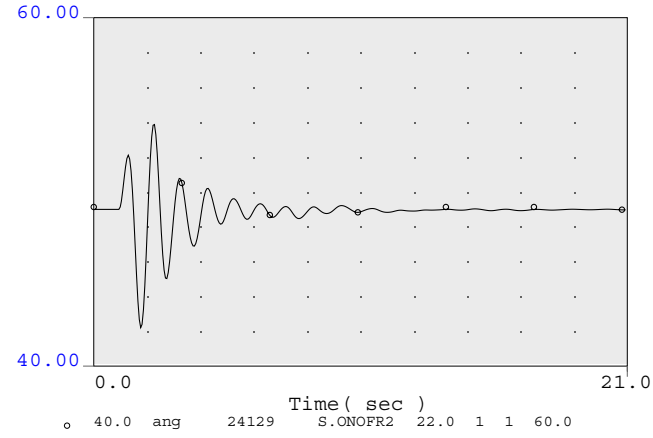



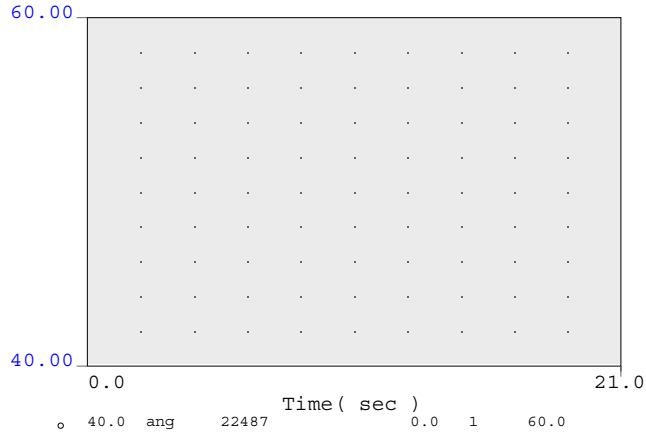



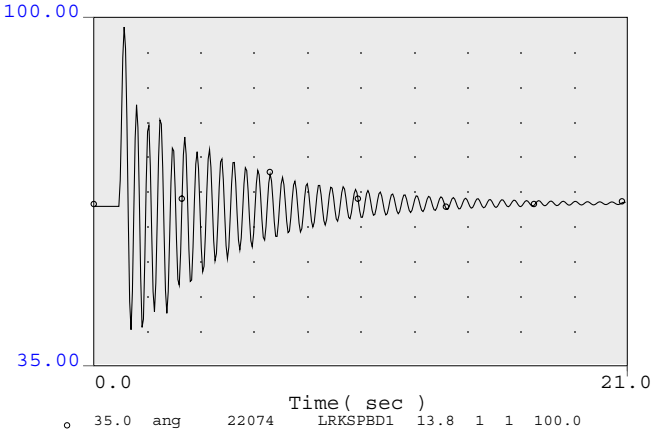

MMC ISIS, pre-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

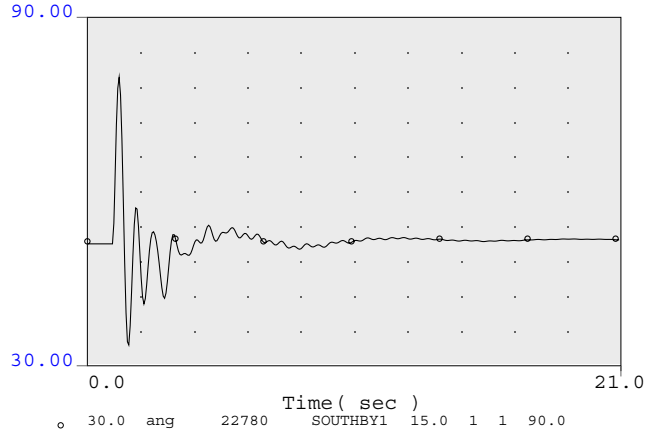


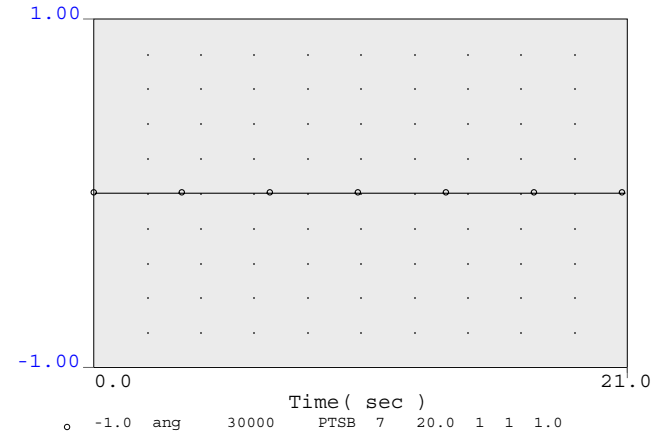



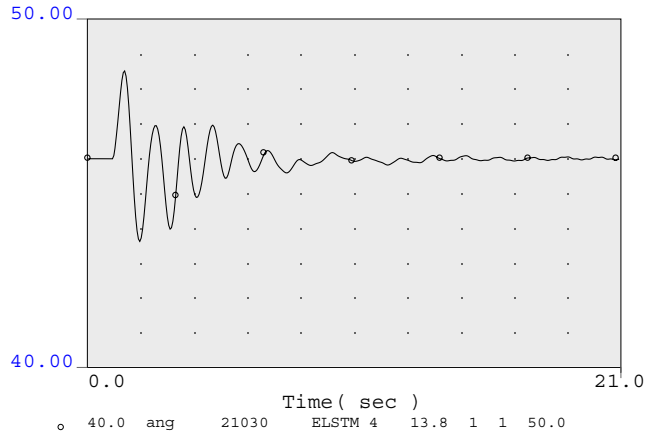



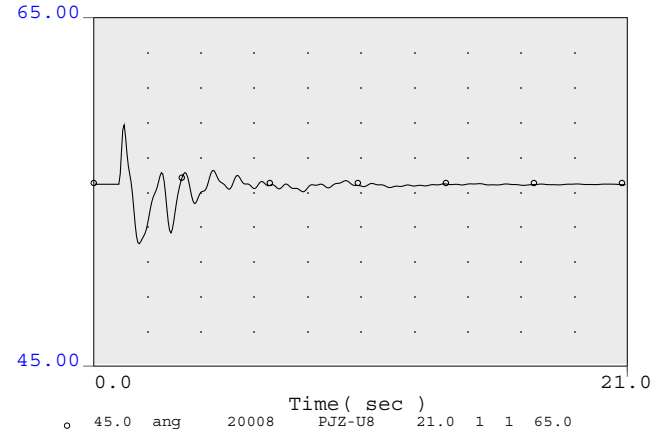



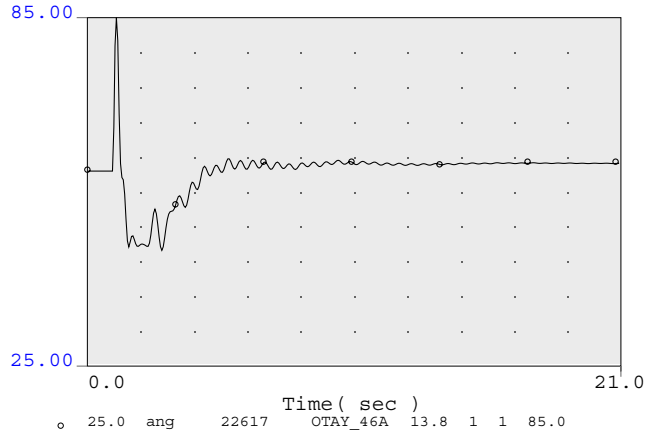



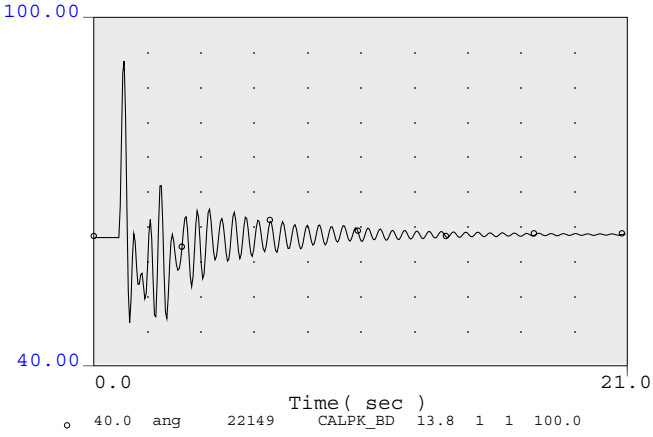

MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

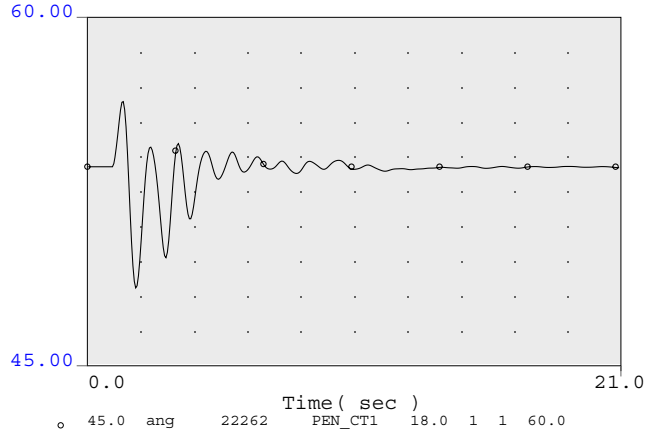


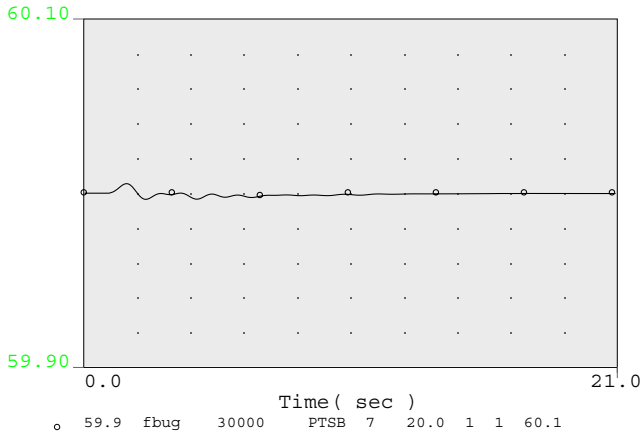



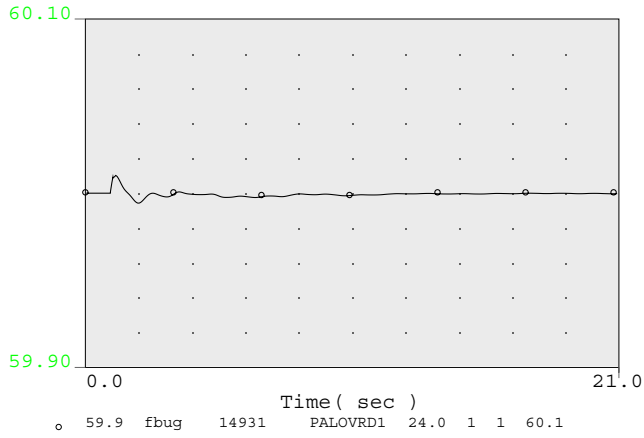



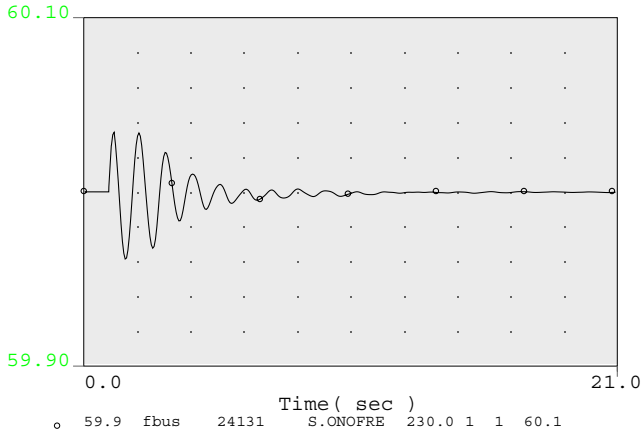



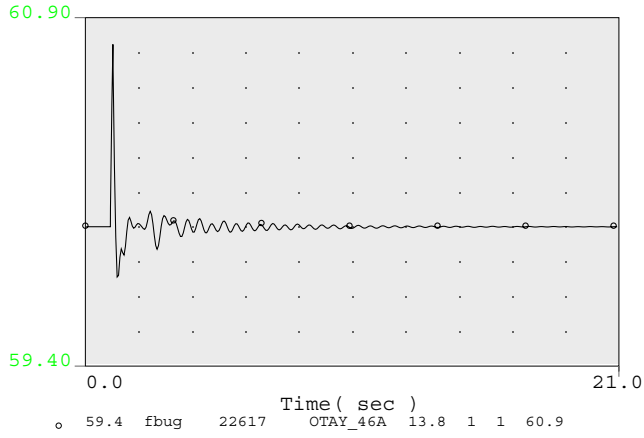



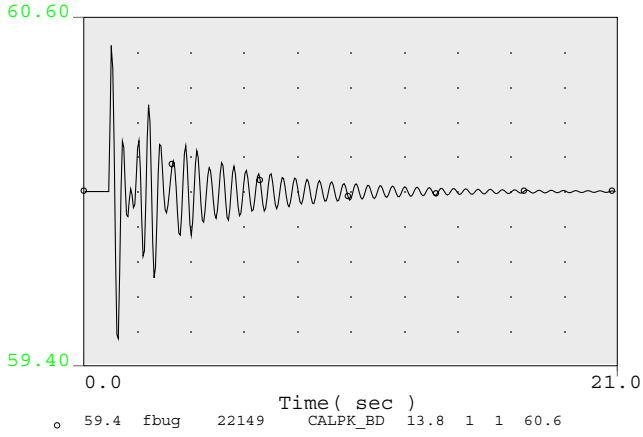

MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

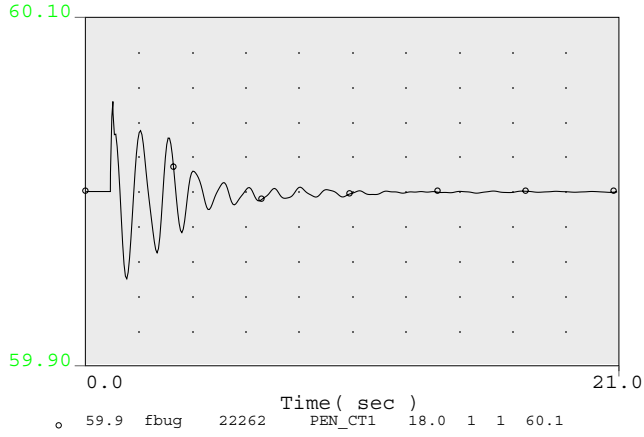


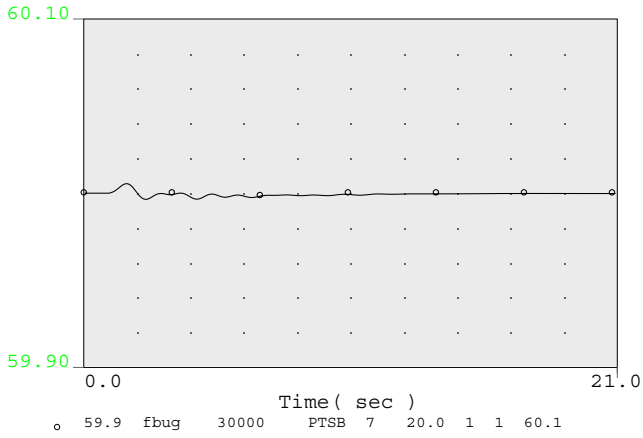



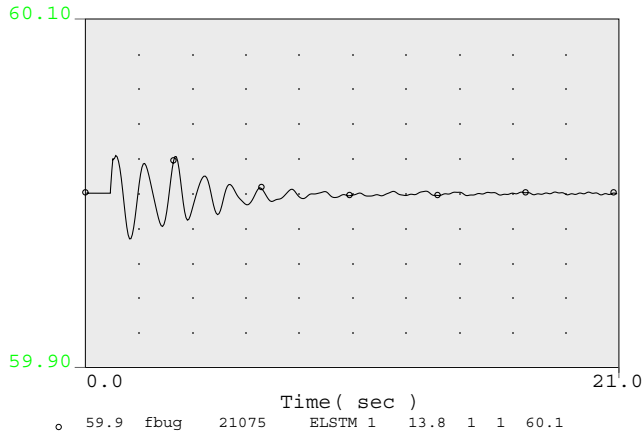



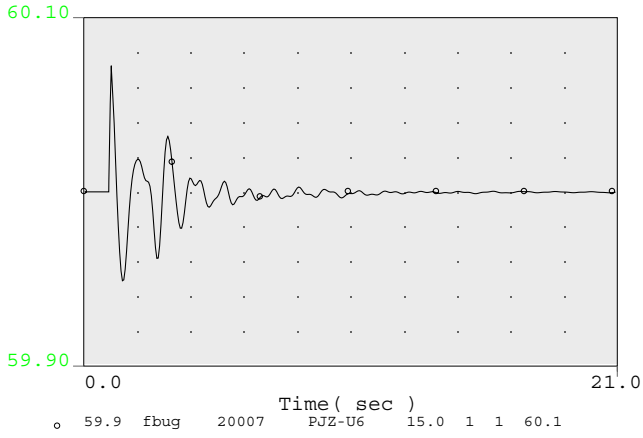



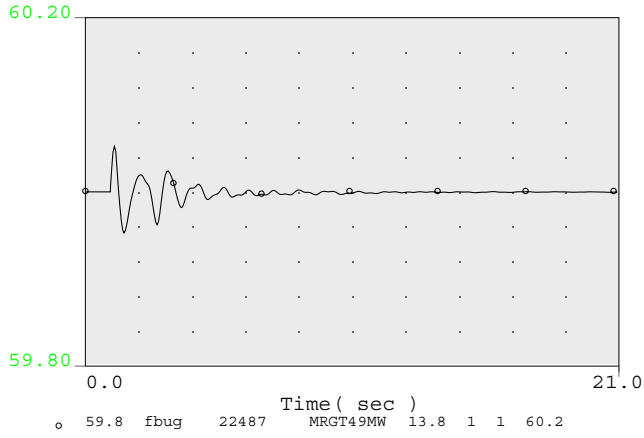



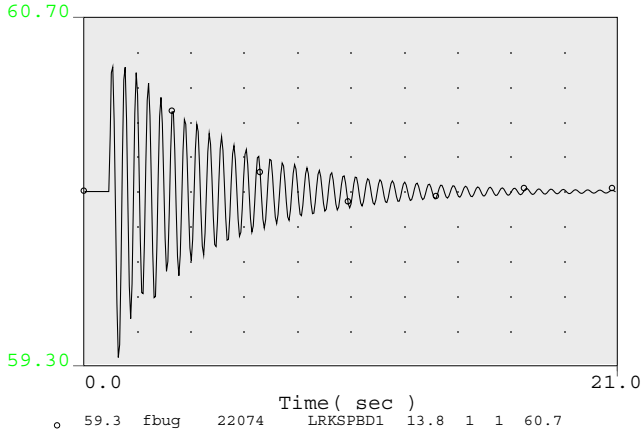

MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

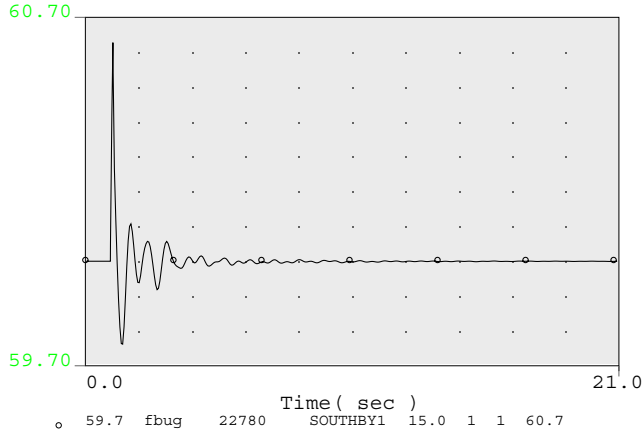


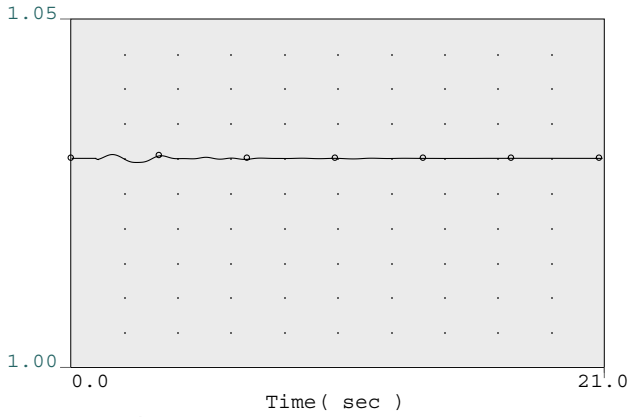



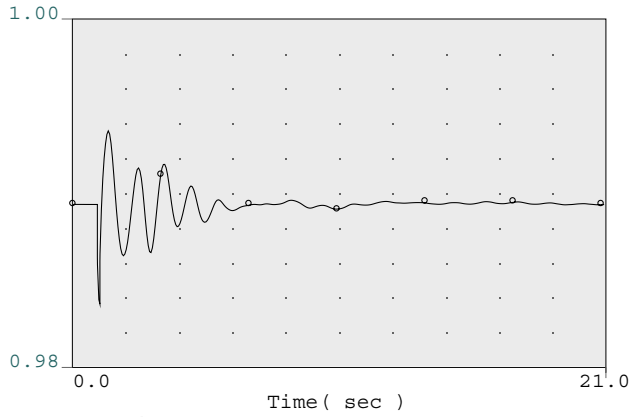



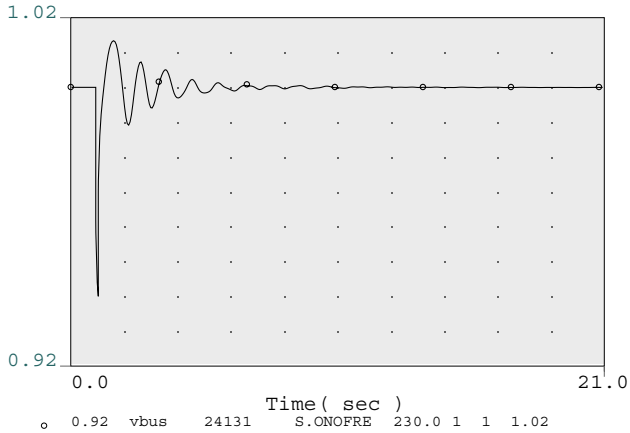

MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines



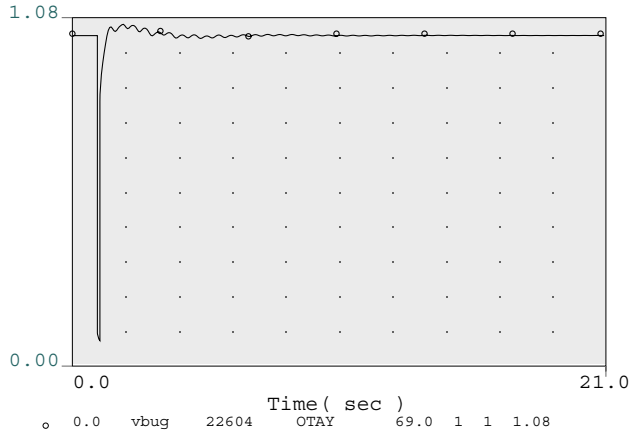

o 1.0 vbug 30000 PTSB 7 20.0 1 1 1.05



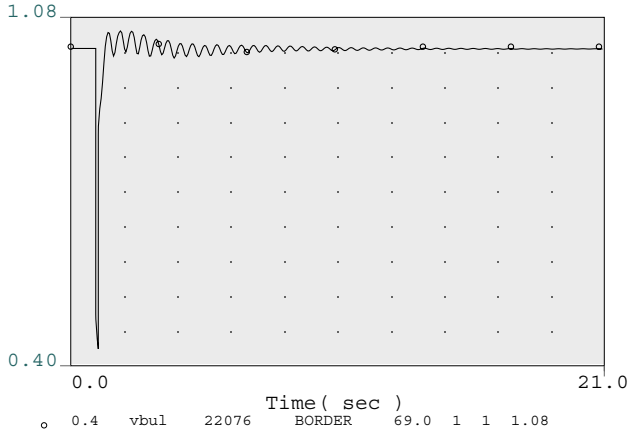

o 0.98 vbug 14931 PALOVRD1 24.0 1 1 0.995



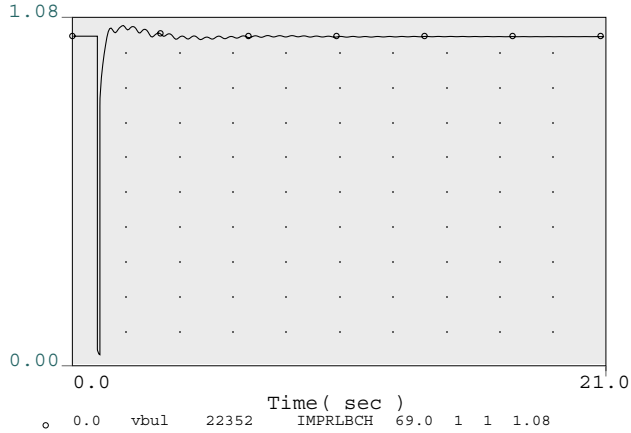

o 0.92 vbus 24131 S.ONOFRE 230.0 1 1 1.02




o 0.0 vbug 22604 OTAY 69.0 1 1 1.08

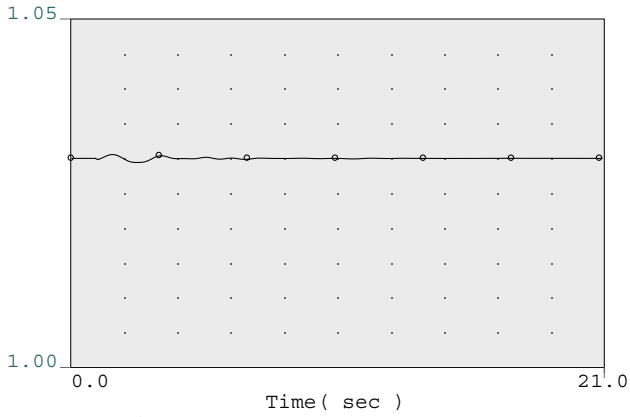



o 0.4 vbul 22076 BORDER 69.0 1 1 1.08




o 0.0 vbul 22352 IMPRLBCH 69.0 1 1 1.08

MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

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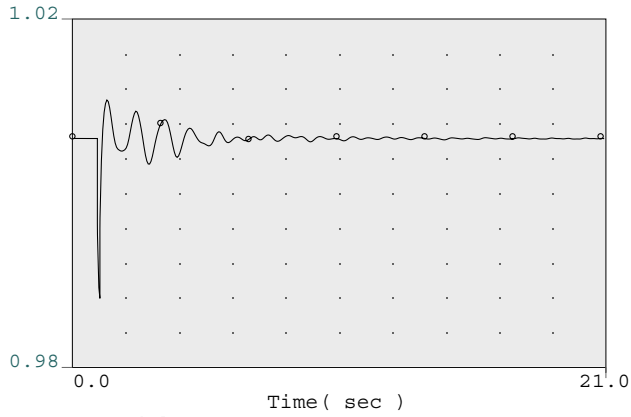
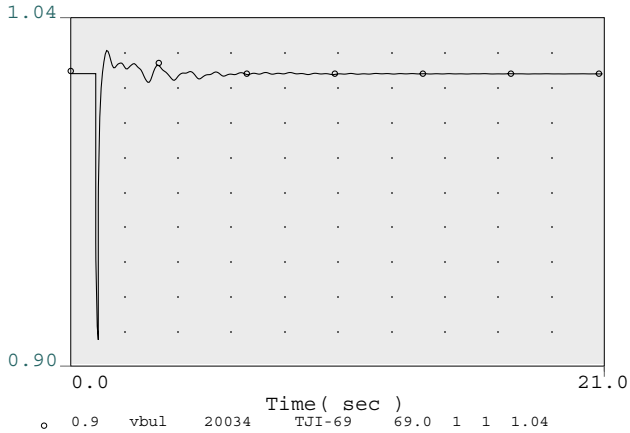
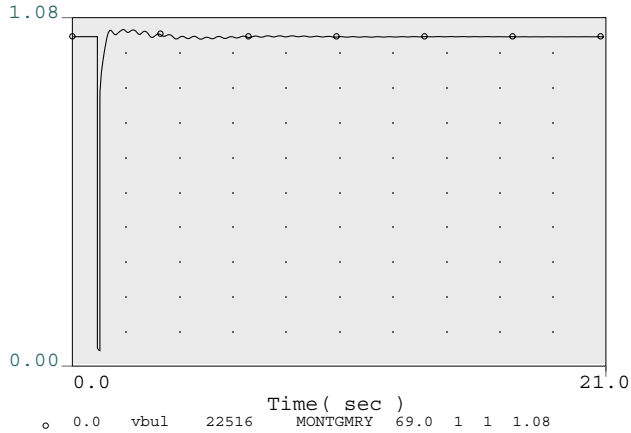


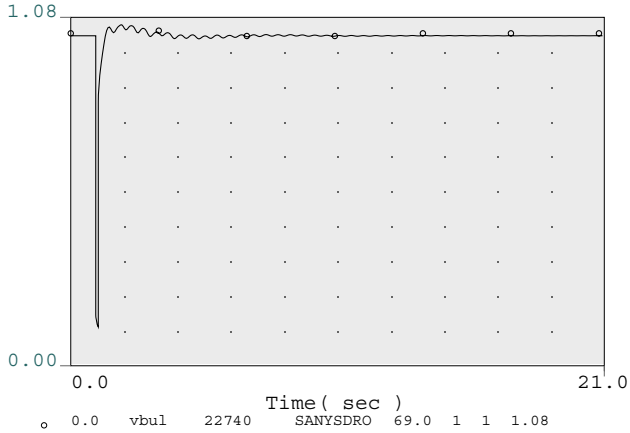

0.98 vbul 21027 ELSTEAMP 92.0 1 1 1.02




0.9 vbul 20034 TJI-69 69.0 1 1 1.04




0.0 vbul 22516 MONTGMRY 69.0 1 1 1.08

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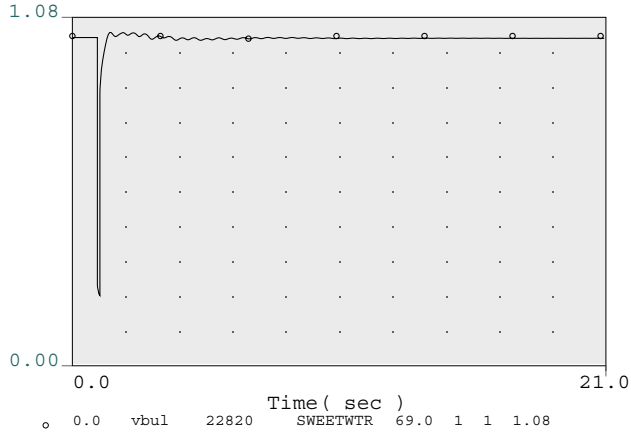



0.0 vbul 22820 SWEETWTR 69.0 1 1 1.08

MMC ISIS, post-project
Fault bus at Southbay 69
Trip SY-SW/SY-OY/SY-IB 69 kV lines

Plots of Transient Stability Simulations

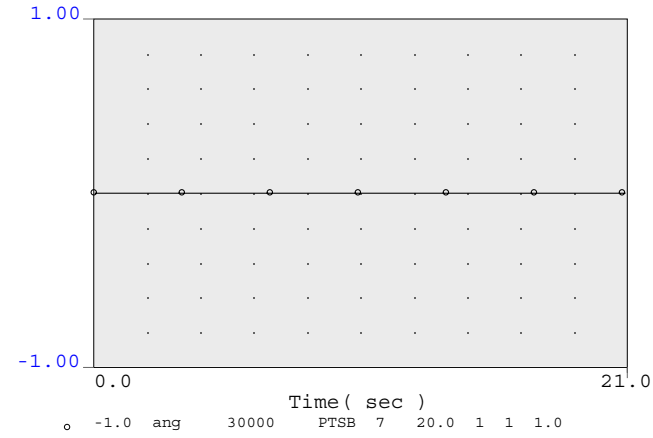
Sensitivity Cases

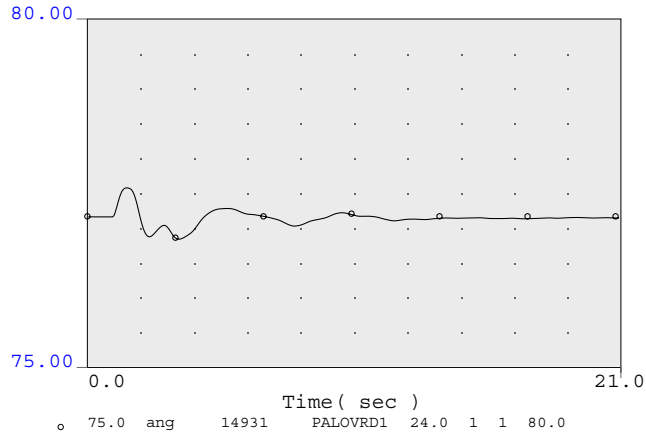
Re-run one case

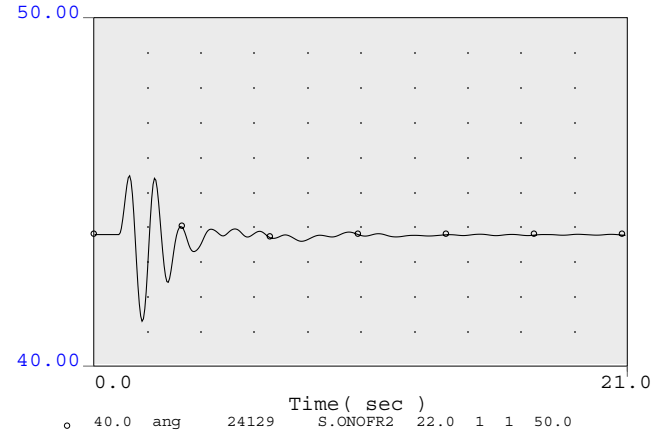
Test for incorrect peaker step-up transformer base

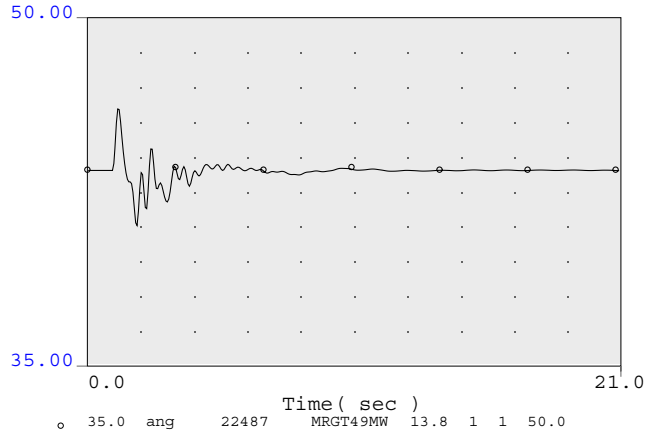
TL6910 (Miguel-Border) 69 kV SLO

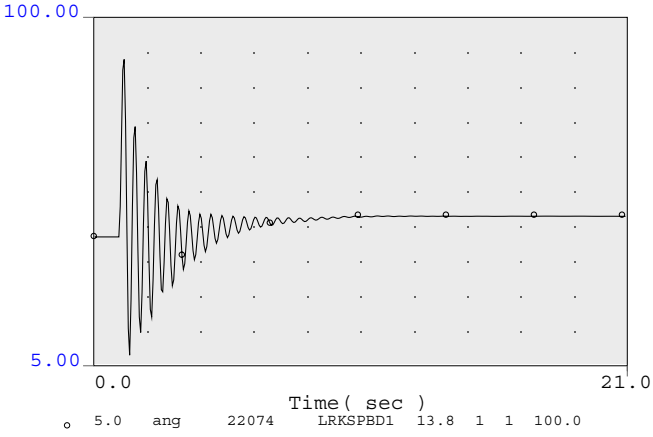
Pre- and Post-Project

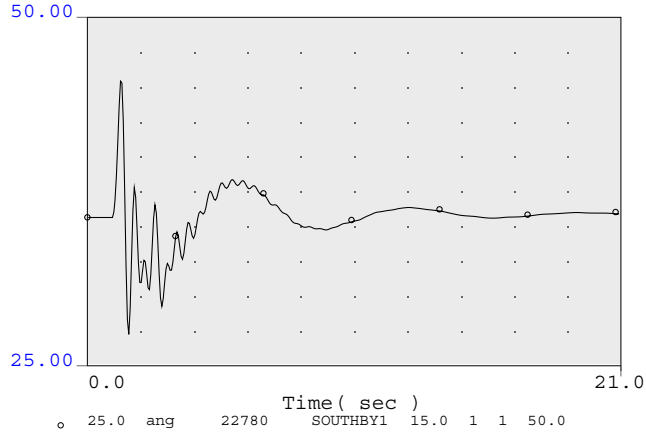


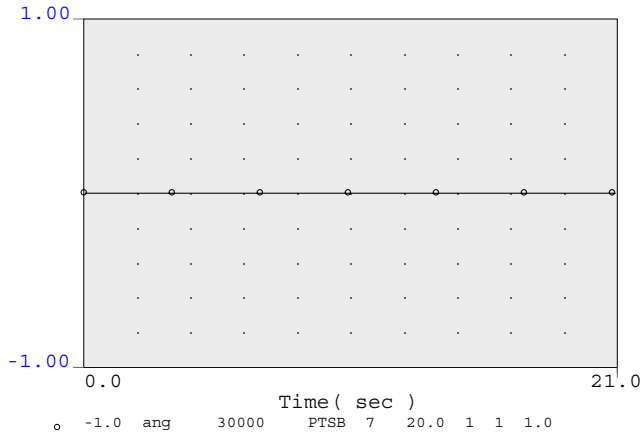



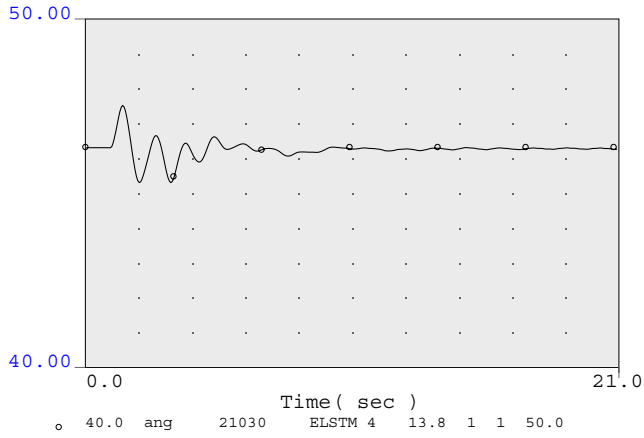



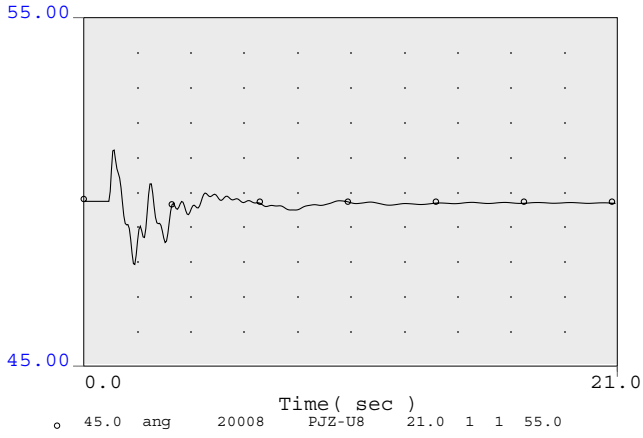



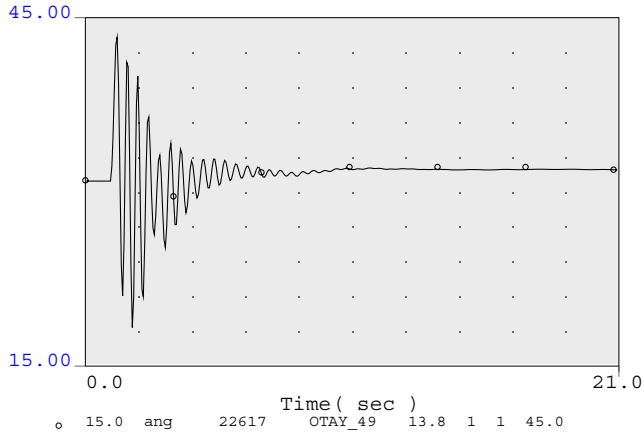



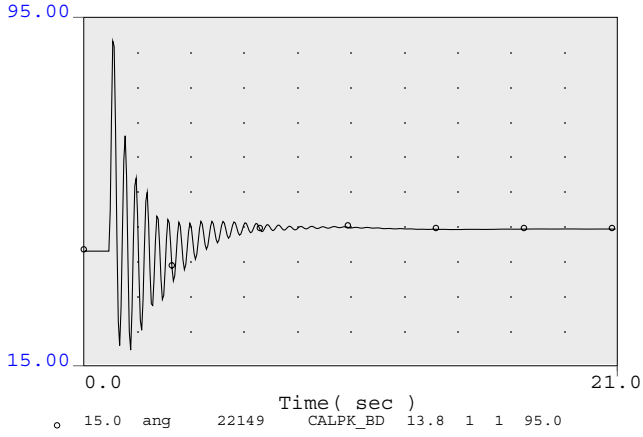

MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

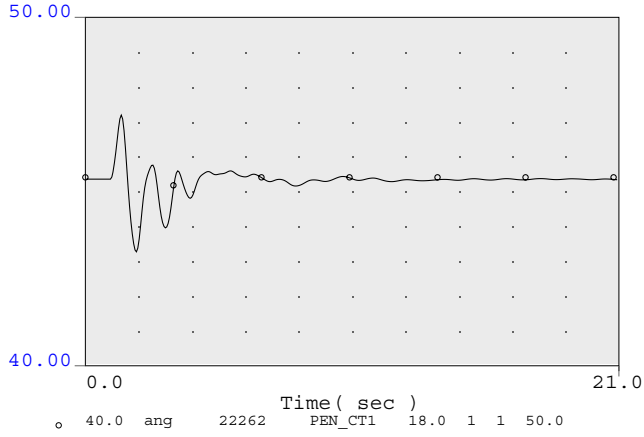


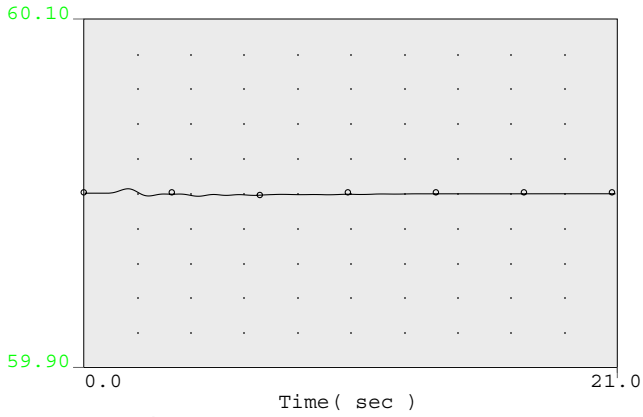



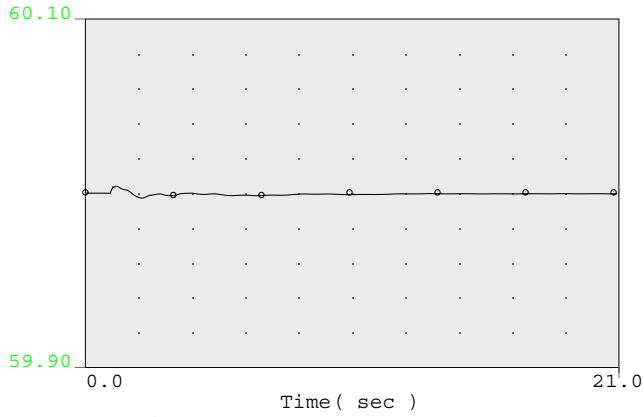



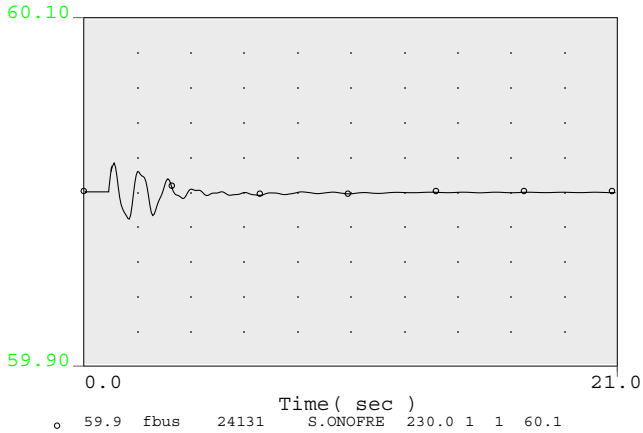

MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line



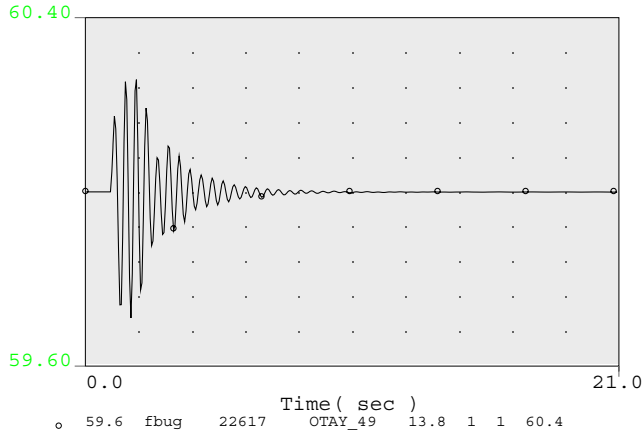

59.9 fbug 30000 PTSB 7 20.0 1 1 60.1



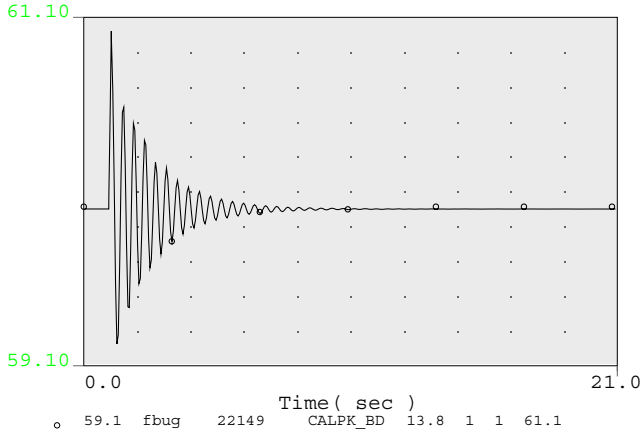

59.9 fbug 14931 PALOVRD1 24.0 1 1 60.1



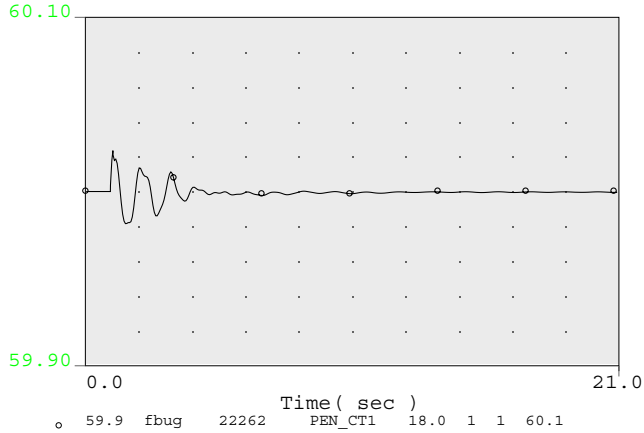

59.9 fbus 24131 S.ONOFRE 230.0 1 1 60.1




59.6 fbug 22617 OTAY_49 13.8 1 1 60.4

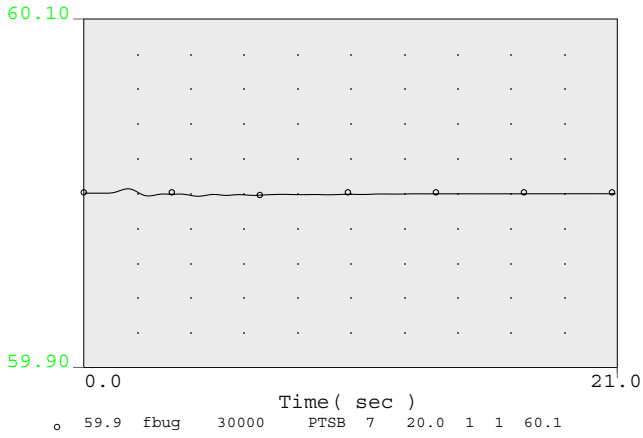


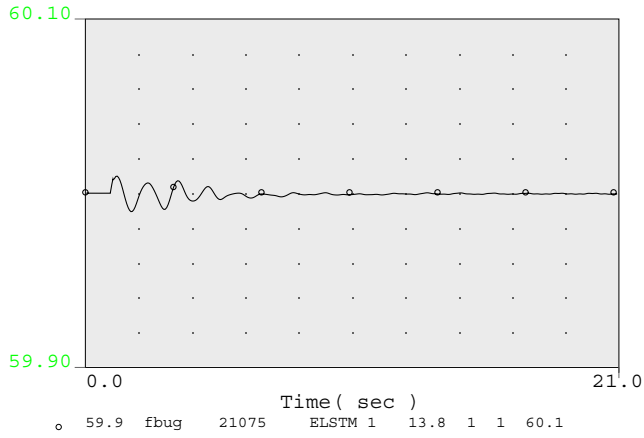

59.1 fbug 22149 CALPK_BD 13.8 1 1 61.1

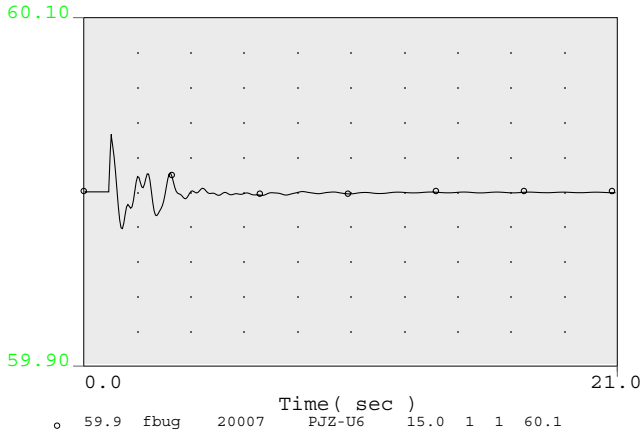


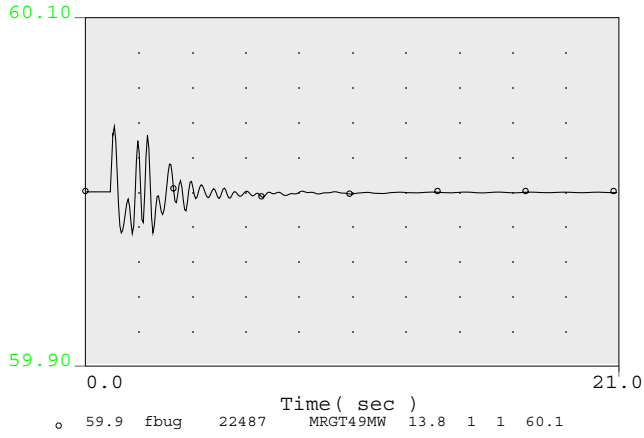

59.9 fbug 22262 PEN_CT1 18.0 1 1 60.1

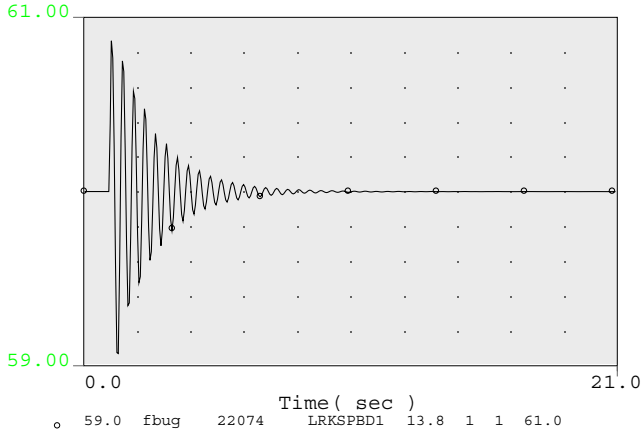
MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

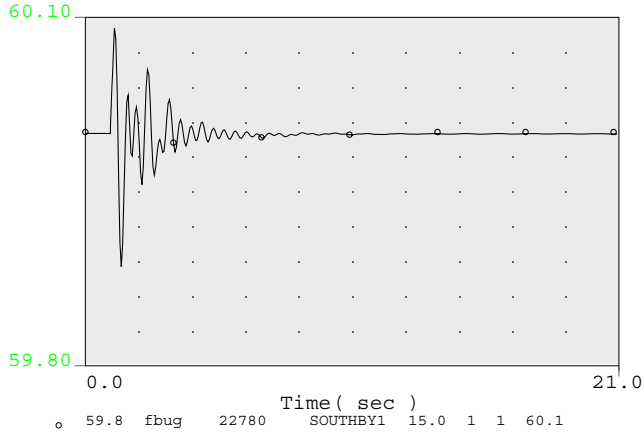


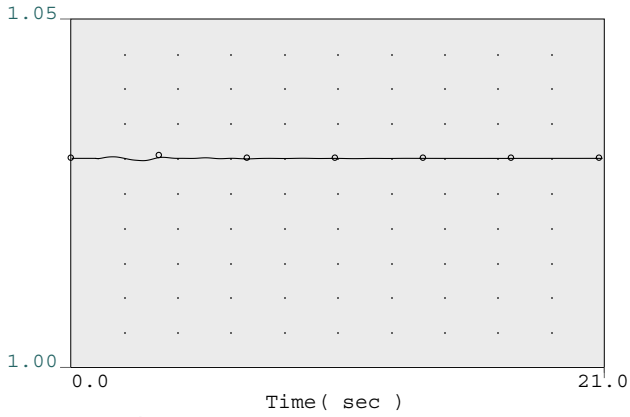




MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

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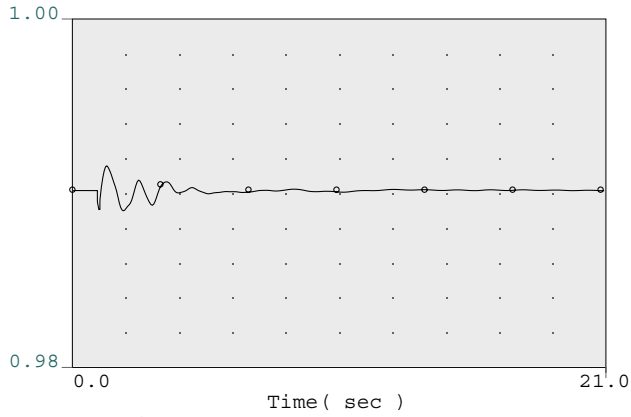


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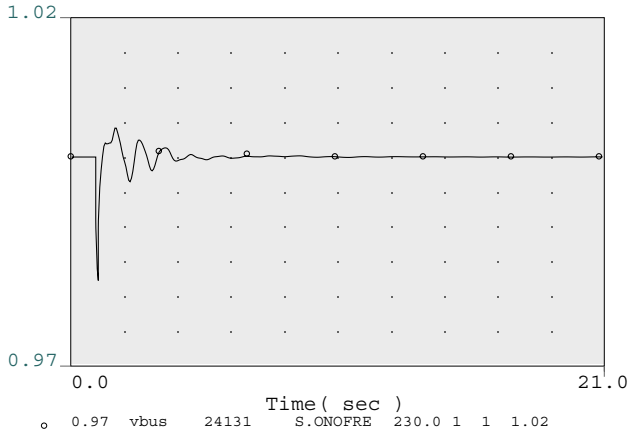


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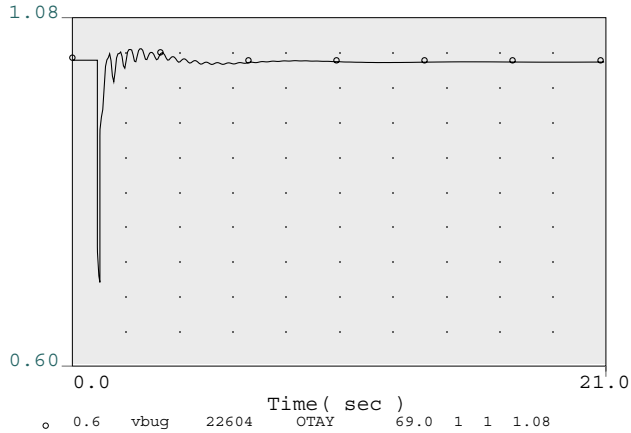
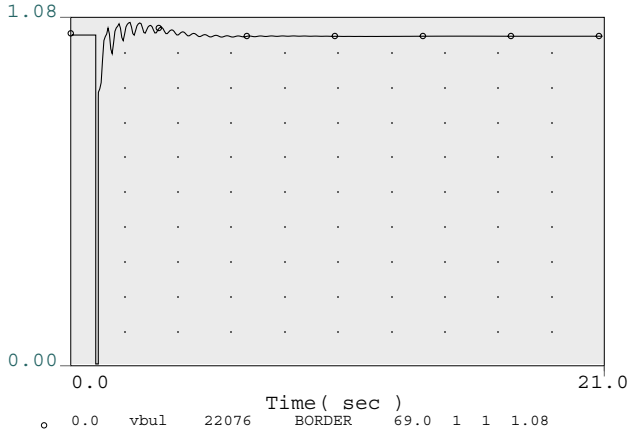
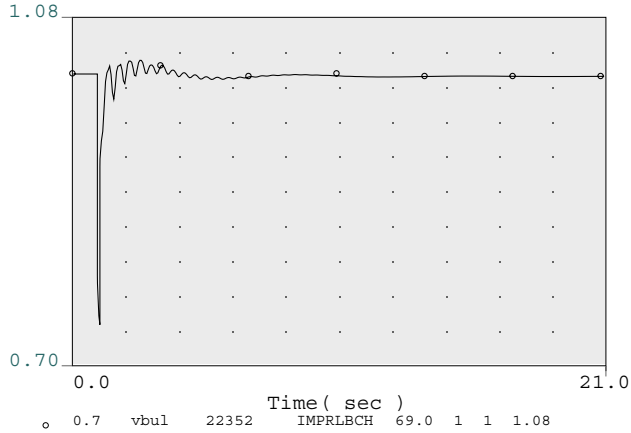



0.6 vbug 22604 OTAY 69.0 1 1 1.08

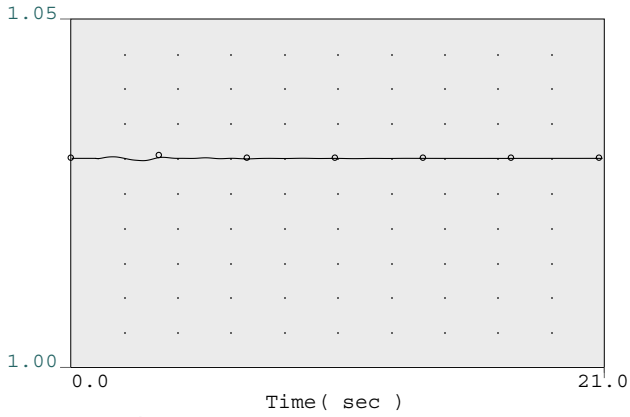



0.0 vbul 22076 BORDER 69.0 1 1 1.08




0.7 vbul 22352 IMPRLBCH 69.0 1 1 1.08

MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

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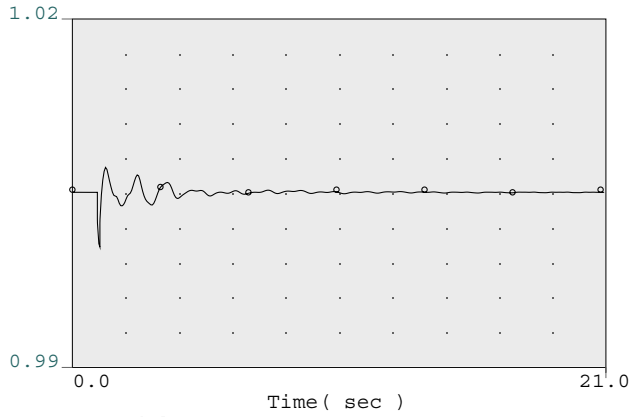
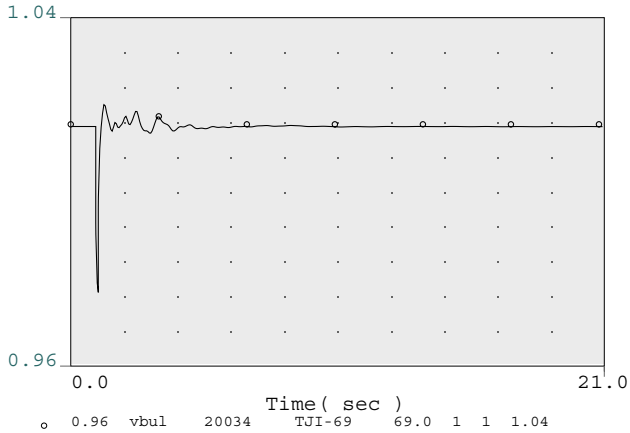



0.99 vbul 21027 ELSTEAMP 92.0 1 1 1.02

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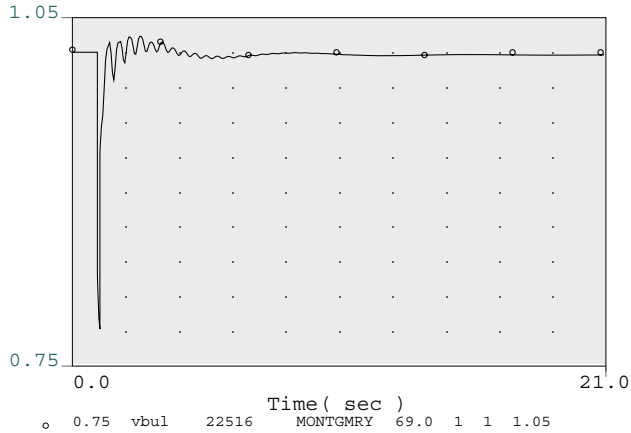


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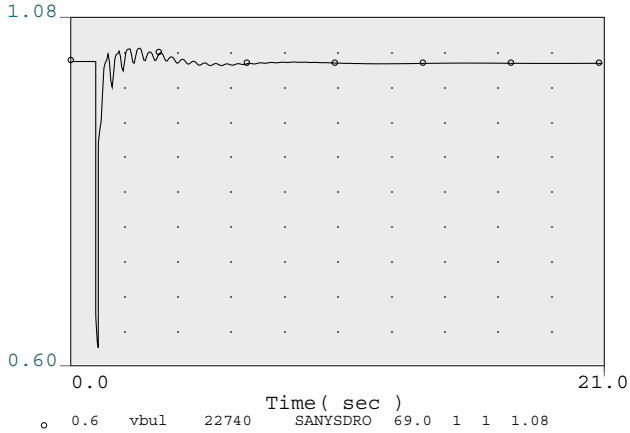
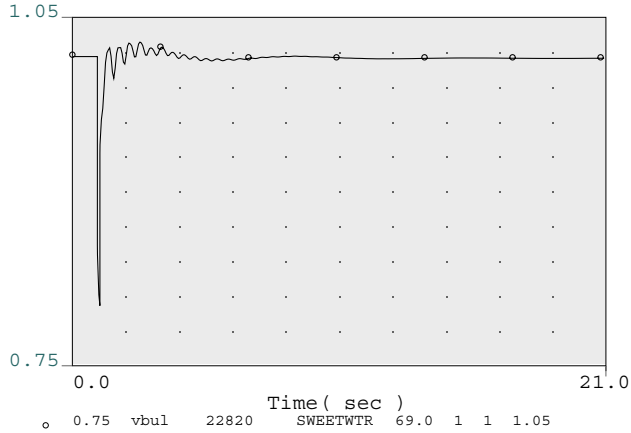
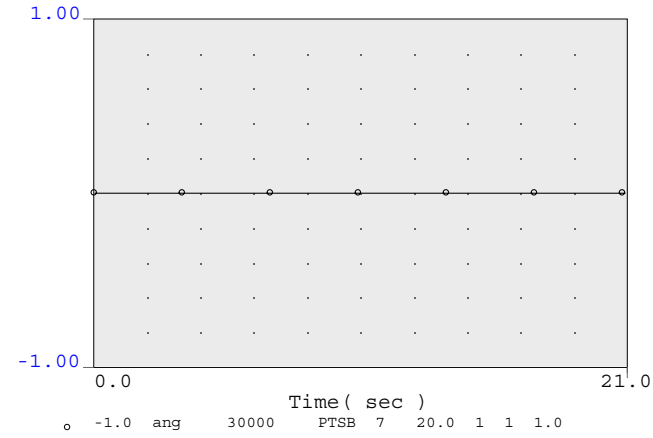


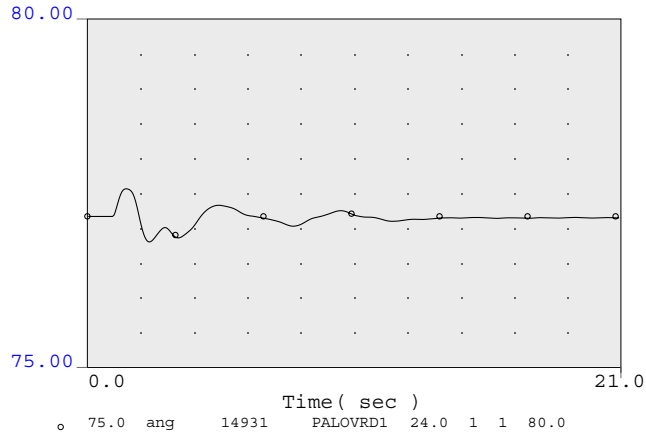

0.6 vbul 22740 SANYSDRO 69.0 1 1 1.08

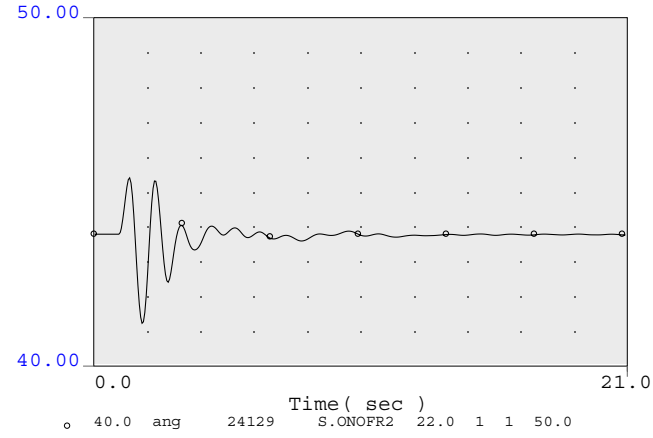


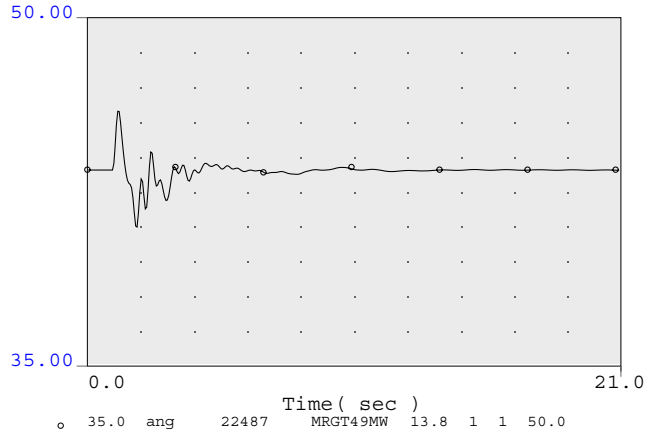

0.75 vbul 22820 SWEETWTR 69.0 1 1 1.05

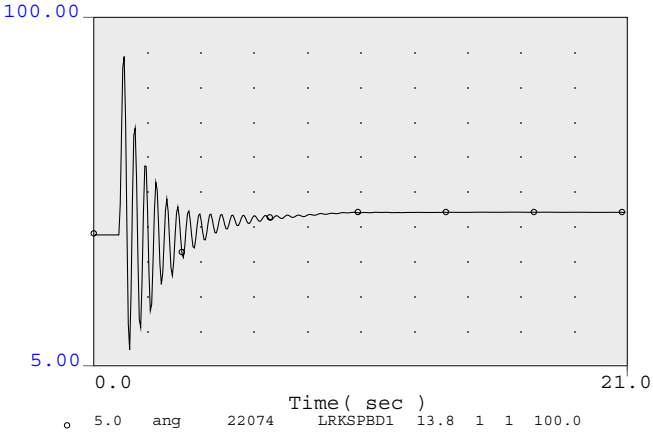
MMC ISIS, pre-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

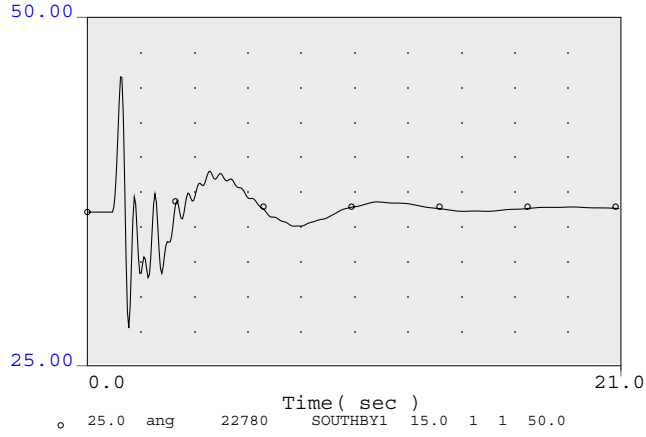


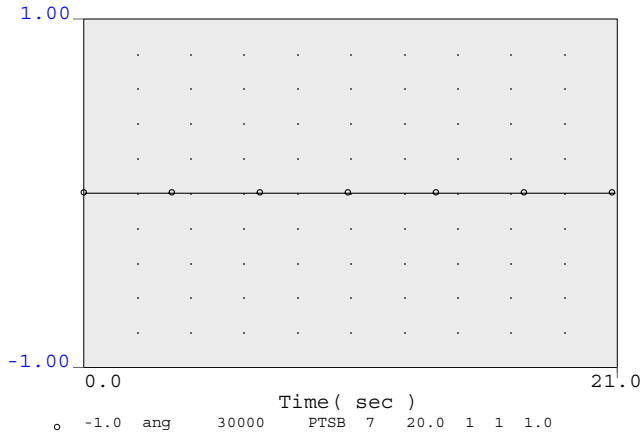



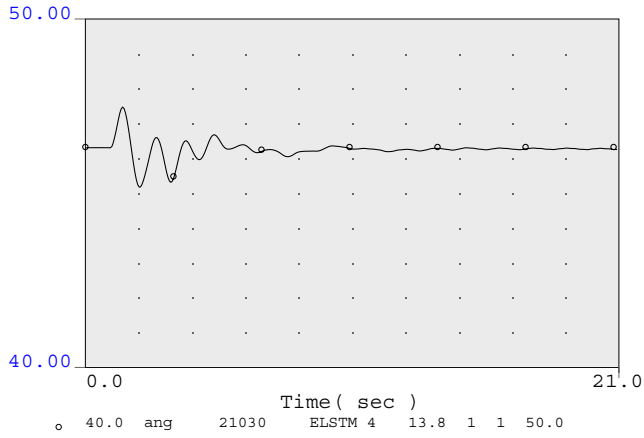



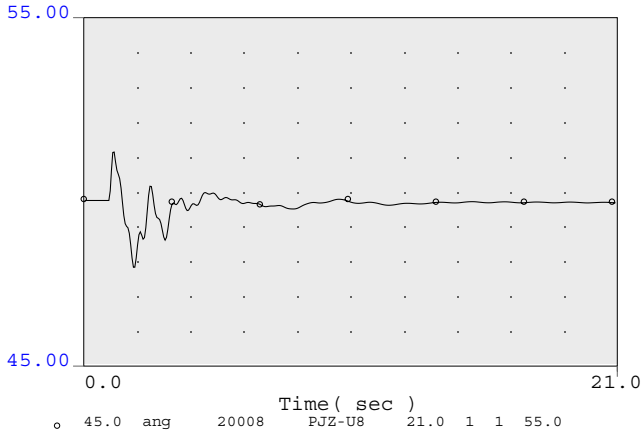



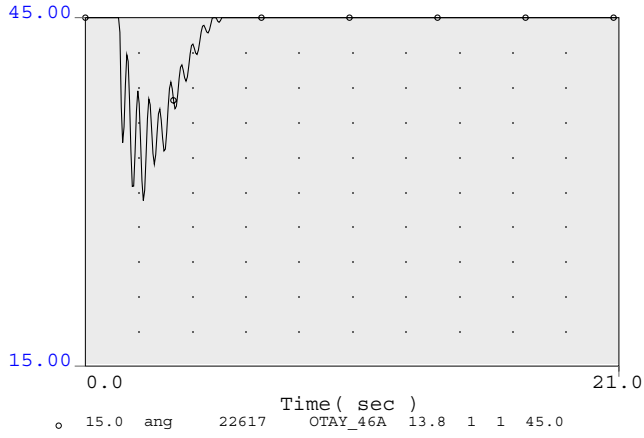



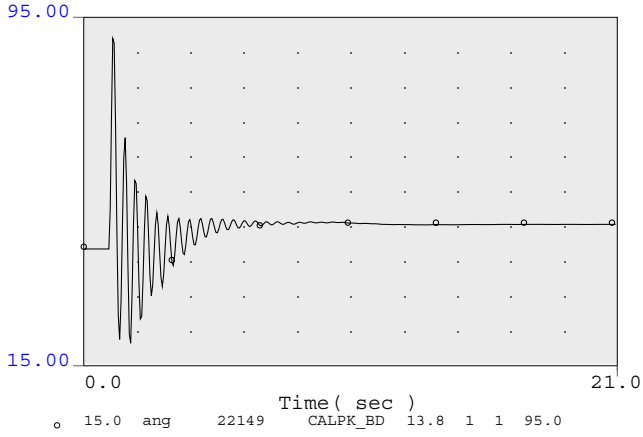

MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

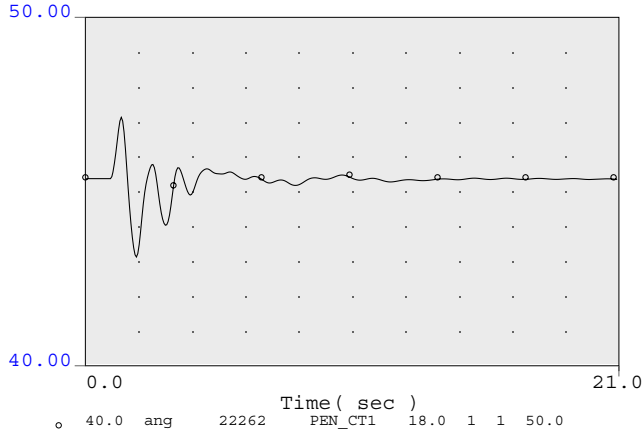


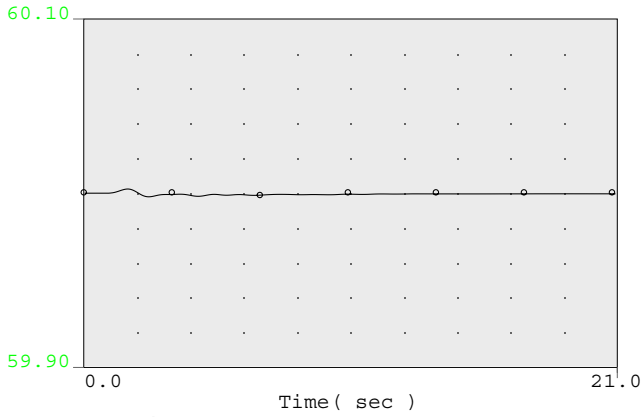



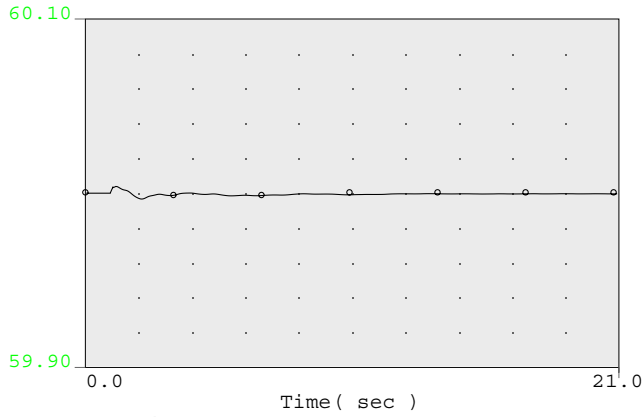



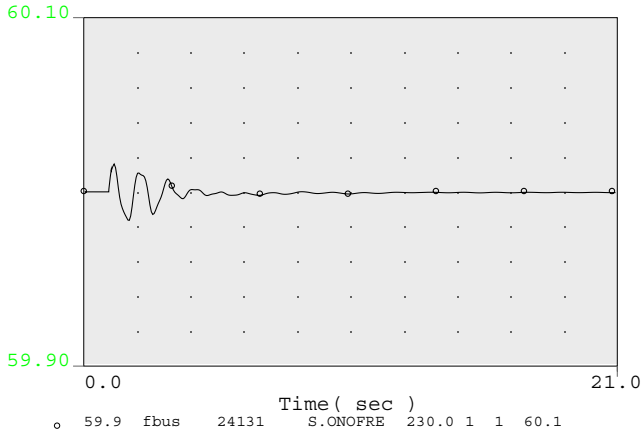

MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line



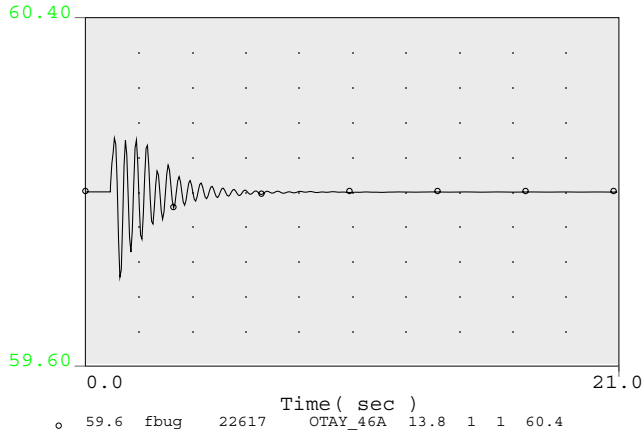

59.9 fbug 30000 PTSB 7 20.0 1 1 60.1




59.9 fbug 14931 PALOVRD1 24.0 1 1 60.1




59.9 fbus 24131 S.ONOFRE 230.0 1 1 60.1

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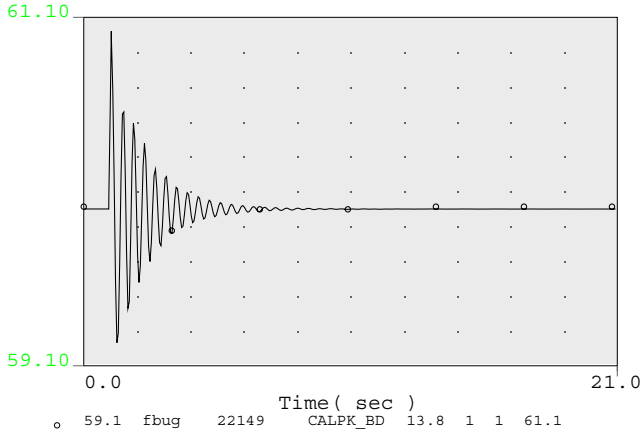


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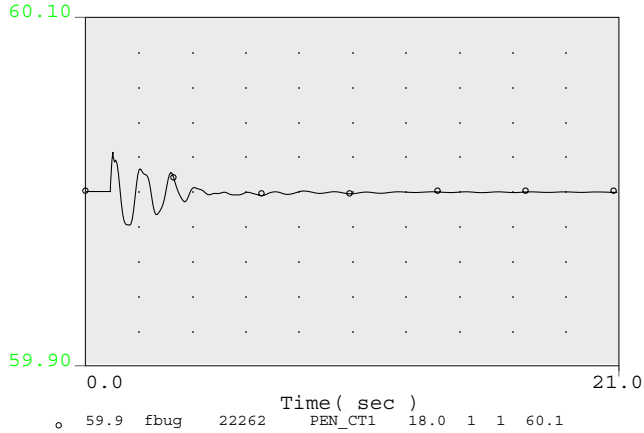
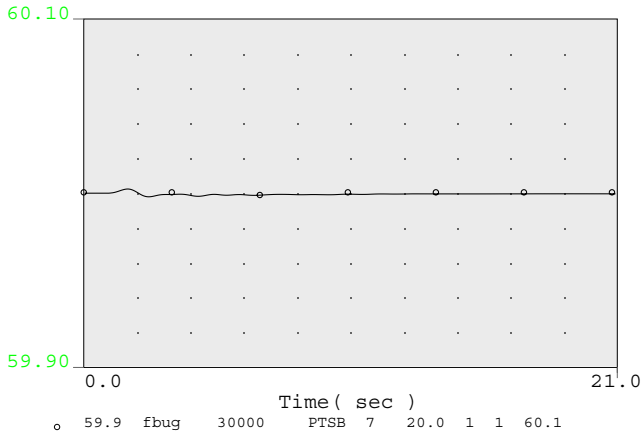
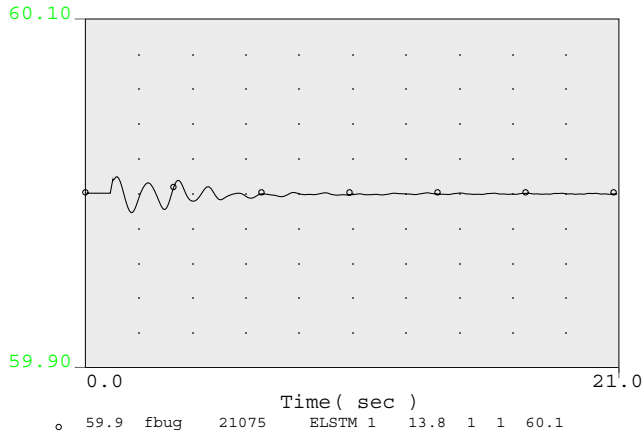
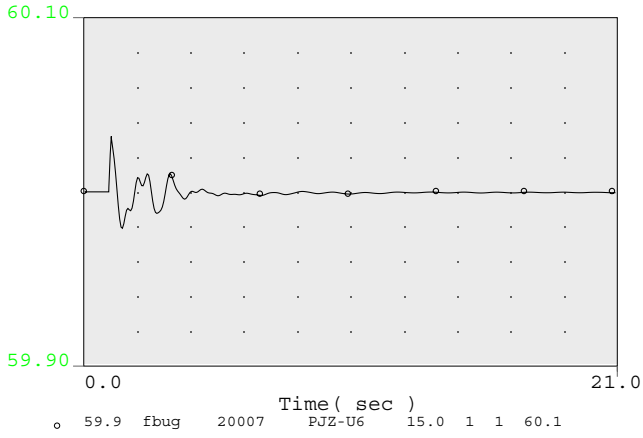


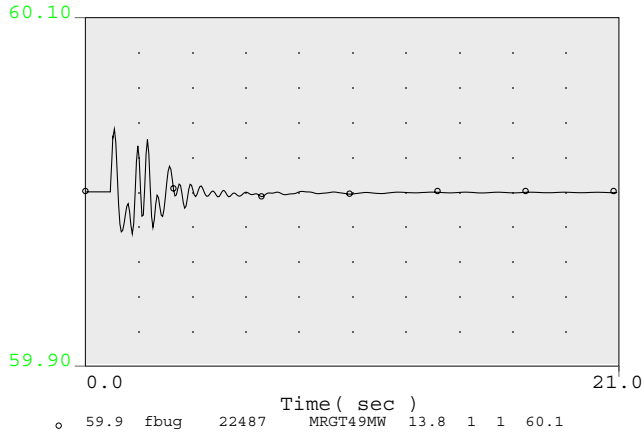

59.9 fbug 22262 PEN_CT1 18.0 1 1 60.1

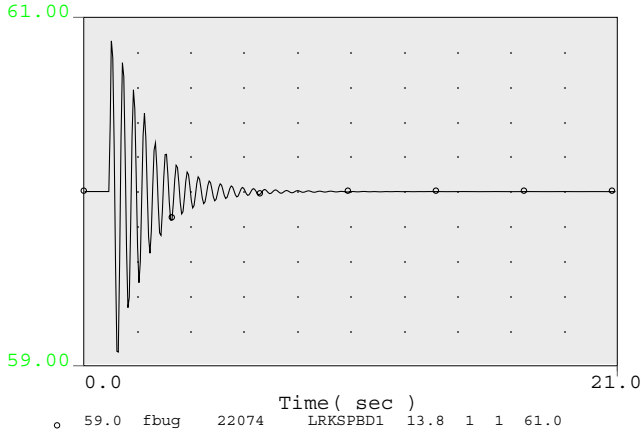
MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

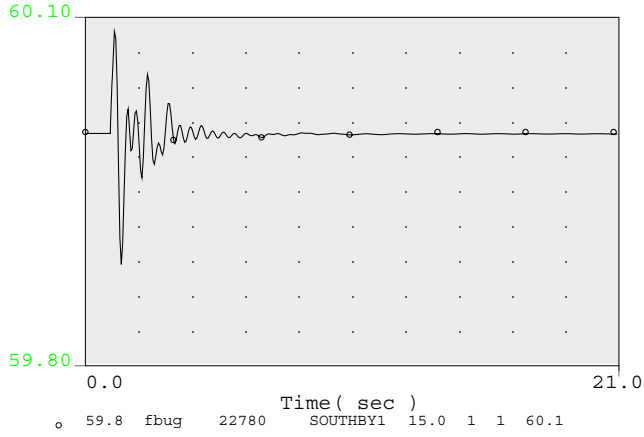


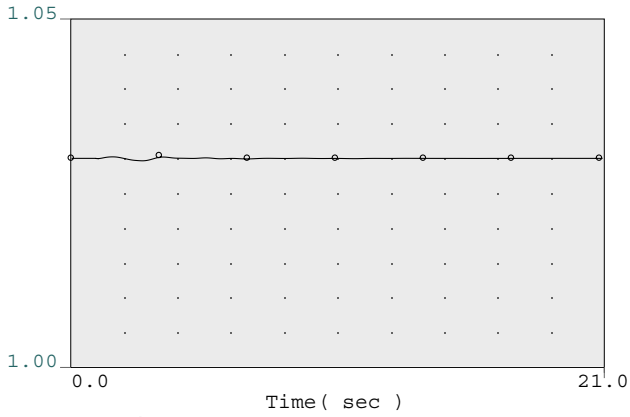



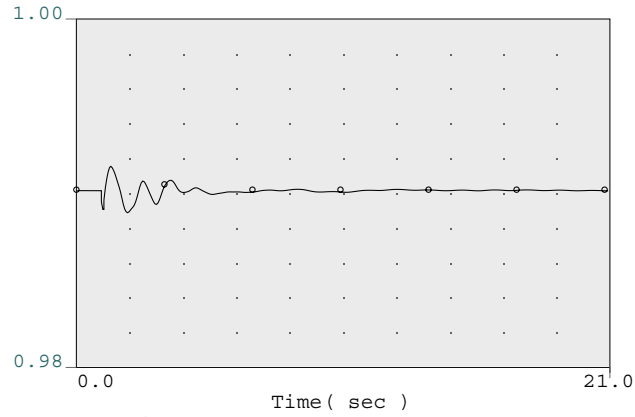



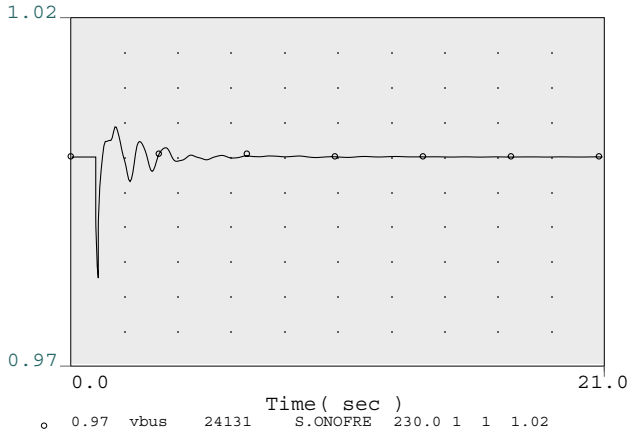

MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line



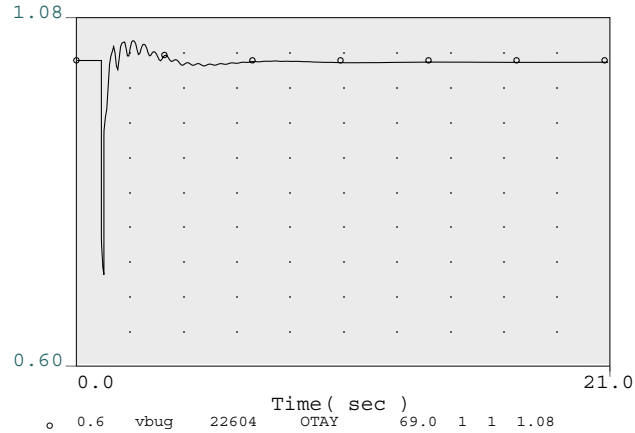

1.0 vbug 30000 PTSB 7 20.0 1 1 1.05



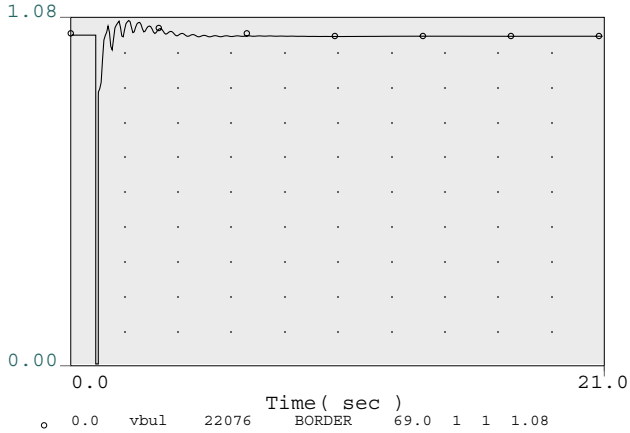

0.98 vbug 14931 PALOVRD1 24.0 1 1 1.0



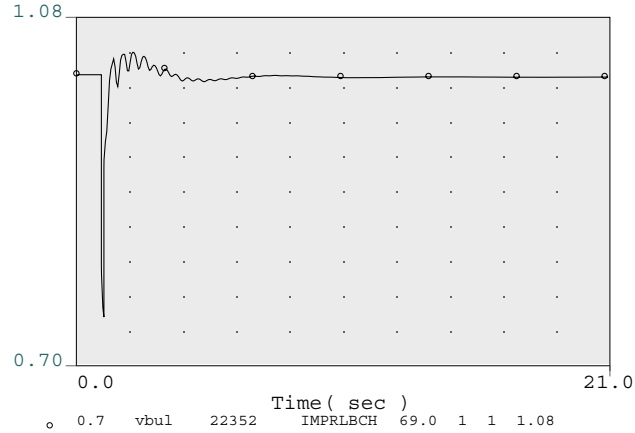

0.97 vbus 24131 S.ONOFRE 230.0 1 1 1.02




0.6 vbug 22604 OTAY 69.0 1 1 1.08

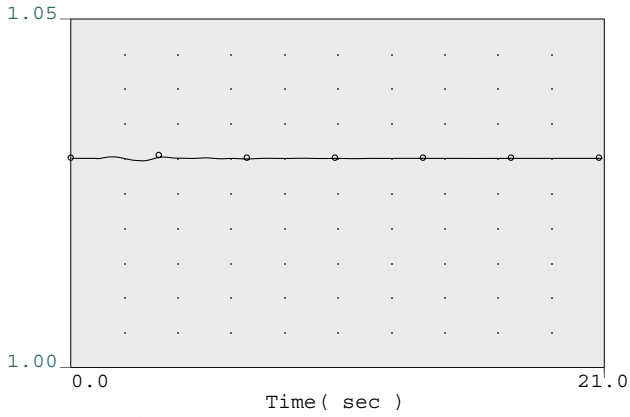


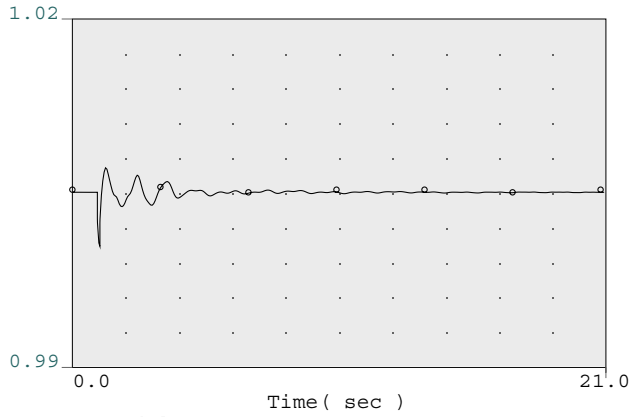

0.0 vbul 22076 BORDER 69.0 1 1 1.08

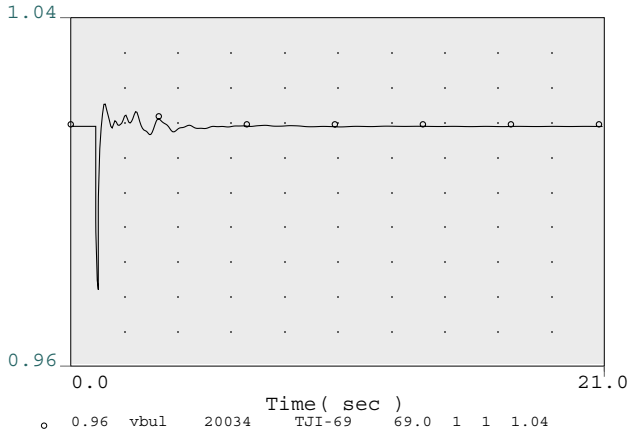


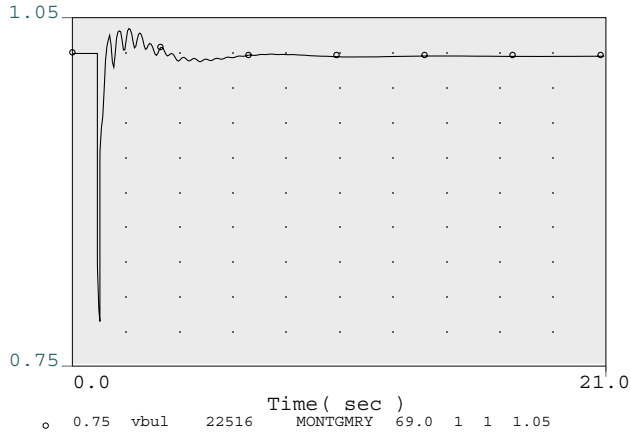

0.7 vbul 22352 IMPRLBCH 69.0 1 1 1.08

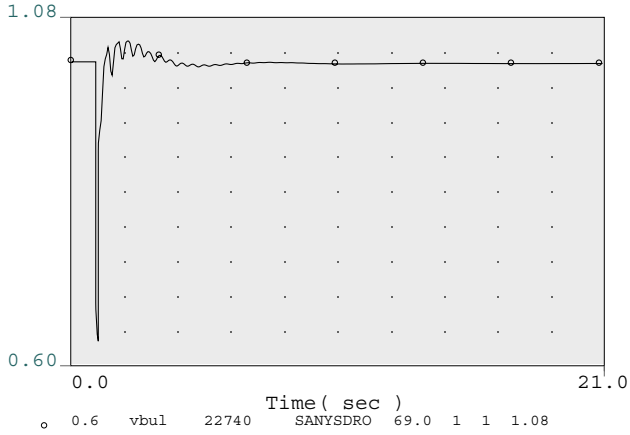
MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

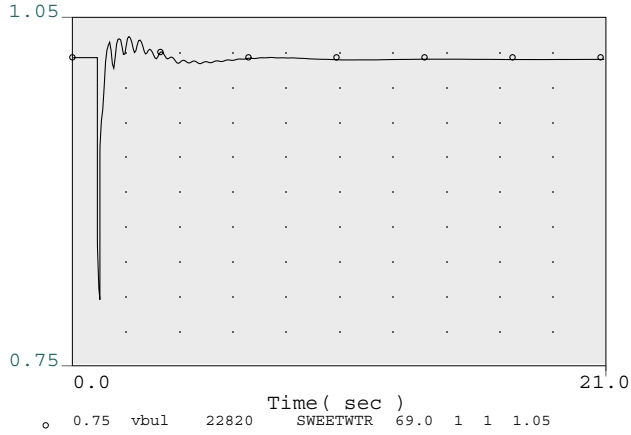



MMC ISIS, post-project
Fault bus at BORDER 69
Trip MIGUEL-BORDER 69 kV line

# Appendix K

## Post Transient/Voltage Stability Results

# VAR MARGIN POWER FLOW CASES/SCENARIOS

VAR Margin Power flow cases/scenarios:

| Power Flow Case | Original Case | Pre/Post Project? | Condition? | Value Load/Cut Plane Flow |
|---|---|---|---|---|
| case_a | q_8_g.sav | Pre | Base Load/Imp | 4849/-2297 |
| case_b | q_8_h.sav | Post | Base Load/Imp | 4849/-2295 |
| case_c | q_8_g.sav | Pre | Load +5% | 5091/-2297 |
| case_d | q_8_h.sav | Post | Load +5% | 5091/-2297 |
| case_e | q_8_g.sav | Pre | Load +2-1/2% | 4970/-2297 |
| case_f | q_8_h.sav | Post | Load +2-1/2% | 4970/-2298 |
| case_g | q_8_g.sav | Pre | Import +5% | 4849/-2412 |
| case_h | q_8_h.sav | Post | Import +5% | 4849/-2412 |
| case_i | q_8_g.sav | Pre | Import +2-1/2% | 4849/-2353 |
| case_j | q_8_h.sav | Post | Import +2-1/2% | 4849/-2354 |
| case_a1 | q_8_g.sav | Pre | Base Load/Imp | 4849/-2850 |
| case_b1 | q_8_h.sav | Post | Base Load/Imp | 4849/-2850 |
| case_c1 | q_8_g.sav | Pre | Load +5% | 5091/-2850 |
| case_d1 | q_8_h.sav | Post | Load +5% | 5091/-2850 |
| case_e1 | q_8_g.sav | Pre | Load +2-1/2% | 4970/-2850 |
| case_f1 | q_8_h.sav | Post | Load +2-1/2% | 4970/-2850 |
| case_g1 | q_8_g.sav | Pre | Import +5% | 4849/-2993 |
| case_h1 | q_8_h.sav | Post | Import +5% | 4849/-2993 |
| case_i1 | q_8_g.sav | Pre | Import +2-1/2% | 4849/-2921 |
| case_j1 | q_8_h.sav | Post | Import +2-1/2% | 4849/-2921 |

# Governor Power Flow Summary Results

Queue 90 ISIS Voltage Stability Study
Governor Power Flow Summary Results

| Contingency | Governor Power Flow, Solve w/Margin? (Y/N) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A - No contingencies** | **Case** | **a** | **b** | **c** | **d** | **e** | **f** | **g** | **h** | **i** | **j** |
| No Disturbance | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| **Cat B - Loss of a single component** | | | | | | | | | | | |
| HAA - N.GILA 500.00 kV SLO | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| IV-ML 500kV/Gen Trip/SPS 6.1/NO X-TRIP | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| MIGUEL-BORDER 69kV SLO | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| TL623 IB-OY-SYO 69 kV SLO | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| PEN G-1 (CC TOTAL PLANT) | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| **Cat C - Loss of two or more components** | | | | | | | | | | | |
| SONGS DUO | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| SOUTHBAY 69 kV N. BUS OUTAGE | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| SWEETWATER 69 kV BUS OUTAGE | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |

| **Cat A - No contingencies** | **Case** | **a1** | **b1** | **c1** | **d1** | **e1** | **f1** | **g1** | **h1** | **i1** | **j1** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No Disturbance | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| **Cat B - Loss of a single component** | | | | | | | | | | | |
| HAA - N.GILA 500.00 kV SLO | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| IV-ML 500kV/Gen Trip/SPS 6.1/NO X-TRIP | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| MIGUEL-BORDER 69kV SLO | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| TL623 IB-OY-SYO 69 kV SLO | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| PEN G-1 (CC TOTAL PLANT) | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| **Cat C - Loss of two or more components** | | | | | | | | | | | |
| SONGS DUO | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| SOUTHBAY 69 kV N. BUS OUTAGE | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| SWEETWATER 69 kV BUS OUTAGE | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |

# Var Margin, Voltage, Voltage Margin Results

Queue 90 ISIS Voltage Stability Summary
2008 Year COD Analysis

**Base Load 4849 MW and Base Cut Plane 2295 MW**

| Contingency | Monitor Bus | | Pre-Project case_a margin | voltage | v.margin | turn? | Post-Project case_b margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -315.4 | 0.77 | 0.249 | No Turn Around | -334.9 | 0.77 | 0.248 | No Turn Around |
| | OTAY | 69 | -388.9 | 0.79 | 0.232 | No Turn Around | -420.0 | 0.79 | 0.232 | No Turn Around |
| | SANYSDRO | 69 | -289.7 | 0.77 | 0.249 | No Turn Around | -308.9 | 0.77 | 0.248 | No Turn Around |
| | SOUTHBAY | 69 | -485.3 | 0.77 | 0.254 | No Turn Around | -513.4 | 0.77 | 0.253 | No Turn Around |
| | SWEETWTR | 69 | -417.6 | 0.85 | 0.169 | No Turn Around | -427.9 | 0.86 | 0.158 | No Turn Around |
| **Cat B** | | | | | | | | | | |
| HAA - N.GILA 500.00 kV SLO | IMPRLBCH | 69 | -225.5 | 0.88 | 0.143 | No Turn Around | -345.0 | 0.77 | 0.251 | No Turn Around |
| | OTAY | 69 | -418.1 | 0.77 | 0.255 | No Turn Around | -449.0 | 0.77 | 0.254 | No Turn Around |
| | SANYSDRO | 69 | -297.3 | 0.77 | 0.252 | No Turn Around | -316.3 | 0.77 | 0.251 | No Turn Around |
| | SOUTHBAY | 69 | -501.2 | 0.77 | 0.257 | No Turn Around | -529.5 | 0.77 | 0.256 | No Turn Around |
| | SWEETWTR | 69 | -539.0 | 0.77 | 0.253 | No Turn Around | -563.7 | 0.77 | 0.251 | No Turn Around |
| IV-ML 500kV/Gen Trip/SPS 6.1/NO X-TRIP | IMPRLBCH | 69 | -315.9 | 0.77 | 0.251 | No Turn Around | -336.0 | 0.77 | 0.250 | No Turn Around |
| | OTAY | 69 | -402.8 | 0.77 | 0.254 | No Turn Around | -434.0 | 0.77 | 0.253 | No Turn Around |
| | SANYSDRO | 69 | -290.7 | 0.77 | 0.251 | No Turn Around | -310.2 | 0.77 | 0.250 | No Turn Around |
| | SOUTHBAY | 69 | -478.5 | 0.77 | 0.255 | No Turn Around | -507.4 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | -509.6 | 0.77 | 0.251 | No Turn Around | -535.5 | 0.77 | 0.249 | No Turn Around |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -300.9 | 0.77 | 0.251 | No Turn Around | -322.5 | 0.77 | 0.250 | No Turn Around |
| | OTAY | 69 | -374.2 | 0.77 | 0.254 | No Turn Around | -406.3 | 0.77 | 0.253 | No Turn Around |
| | SANYSDRO | 69 | -279.9 | 0.77 | 0.251 | No Turn Around | -301.4 | 0.77 | 0.250 | No Turn Around |
| | SOUTHBAY | 69 | -433.6 | 0.77 | 0.256 | No Turn Around | -464.0 | 0.77 | 0.255 | No Turn Around |
| | SWEETWTR | 69 | -454.9 | 0.77 | 0.251 | No Turn Around | -482.9 | 0.77 | 0.250 | No Turn Around |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -316.5 | 0.77 | 0.251 | No Turn Around | -336.8 | 0.77 | 0.250 | No Turn Around |
| | OTAY | 69 | -403.7 | 0.77 | 0.254 | No Turn Around | -435.1 | 0.77 | 0.253 | No Turn Around |
| | SANYSDRO | 69 | -291.2 | 0.77 | 0.251 | No Turn Around | -310.8 | 0.77 | 0.250 | No Turn Around |
| | SOUTHBAY | 69 | -480.3 | 0.77 | 0.256 | No Turn Around | -509.3 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | -513.4 | 0.77 | 0.251 | No Turn Around | -539.2 | 0.77 | 0.250 | No Turn Around |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -300.9 | 0.77 | 0.251 | No Turn Around | -322.5 | 0.77 | 0.250 | No Turn Around |
| | OTAY | 69 | -374.2 | 0.77 | 0.254 | No Turn Around | -406.3 | 0.77 | 0.253 | No Turn Around |
| | SANYSDRO | 69 | -279.9 | 0.77 | 0.251 | No Turn Around | -301.4 | 0.77 | 0.250 | No Turn Around |
| | SOUTHBAY | 69 | -433.6 | 0.77 | 0.256 | No Turn Around | -464.0 | 0.77 | 0.255 | No Turn Around |
| | SWEETWTR | 69 | -454.9 | 0.77 | 0.251 | No Turn Around | -482.9 | 0.77 | 0.250 | No Turn Around |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -316.5 | 0.77 | 0.251 | No Turn Around | -336.8 | 0.77 | 0.250 | No Turn Around |
| | OTAY | 69 | -403.7 | 0.77 | 0.254 | No Turn Around | -435.1 | 0.77 | 0.253 | No Turn Around |
| | SANYSDRO | 69 | -291.2 | 0.77 | 0.251 | No Turn Around | -310.8 | 0.77 | 0.250 | No Turn Around |
| | SOUTHBAY | 69 | -480.3 | 0.77 | 0.256 | No Turn Around | -509.3 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | -513.4 | 0.77 | 0.251 | No Turn Around | -539.2 | 0.77 | 0.250 | No Turn Around |
| MIGUEL-BORDER 69kV SLO | IMPRLBCH | 69 | -301.1 | 0.77 | 0.245 | No Turn Around | -319.7 | 0.77 | 0.245 | No Turn Around |
| | OTAY | 69 | -367.5 | 0.77 | 0.248 | No Turn Around | -386.2 | 0.79 | 0.228 | No Turn Around |
| | SANYSDRO | 69 | -262.5 | 0.77 | 0.244 | No Turn Around | -280.9 | 0.77 | 0.244 | No Turn Around |
| | SOUTHBAY | 69 | -397.7 | 0.83 | 0.190 | No Turn Around | -481.8 | 0.77 | 0.249 | No Turn Around |
| | SWEETWTR | 69 | -402.4 | 0.85 | 0.166 | No Turn Around | -410.8 | 0.86 | 0.155 | No Turn Around |
| TL623 IB-OY-SYO 69 kV SLO | IMPRLBCH | 69 | -251.5 | 0.77 | 0.247 | No Turn Around | -264.2 | 0.77 | 0.246 | No Turn Around |
| | OTAY | 69 | -379.0 | 0.79 | 0.233 | No Turn Around | -410.1 | 0.79 | 0.232 | No Turn Around |
| | SANYSDRO | 69 | -223.3 | 0.77 | 0.247 | No Turn Around | -237.1 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -405.9 | 0.84 | 0.184 | No Turn Around | -510.7 | 0.77 | 0.252 | No Turn Around |
| | SWEETWTR | 69 | -416.3 | 0.85 | 0.168 | No Turn Around | -441.5 | 0.85 | 0.167 | No Turn Around |
| PEN G-1 (CC TOTAL PLANT) | IMPRLBCH | 69 | -303.5 | 0.77 | 0.246 | No Turn Around | -323.2 | 0.77 | 0.246 | No Turn Around |
| | OTAY | 69 | -388.6 | 0.77 | 0.249 | No Turn Around | -419.4 | 0.77 | 0.249 | No Turn Around |
| | SANYSDRO | 69 | -279.4 | 0.77 | 0.246 | No Turn Around | -299.2 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -463.8 | 0.77 | 0.251 | No Turn Around | -492.0 | 0.77 | 0.250 | No Turn Around |
| | SWEETWTR | 69 | -496.1 | 0.77 | 0.245 | No Turn Around | -520.9 | 0.77 | 0.244 | No Turn Around |

# Queue 90 ISIS Voltage Stability Summary
## 2008 Year COD Analysis

**Base Load 4849 MW and Base Cut Plane 2295 MW**

| Contingency | Monitor Bus | | Pre-Project case_a margin | voltage | v.margin | turn? | Post-Project case_b margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -315.4 | 0.77 | 0.249 | No Turn Around | -334.9 | 0.77 | 0.248 | No Turn Around |
| | OTAY | 69 | -388.9 | 0.79 | 0.232 | No Turn Around | -420.0 | 0.79 | 0.232 | No Turn Around |
| | SANYSDRO | 69 | -289.7 | 0.77 | 0.249 | No Turn Around | -308.9 | 0.77 | 0.248 | No Turn Around |
| | SOUTHBAY | 69 | -485.3 | 0.77 | 0.254 | No Turn Around | -513.4 | 0.77 | 0.253 | No Turn Around |
| | SWEETWTR | 69 | -417.6 | 0.85 | 0.169 | No Turn Around | -427.9 | 0.86 | 0.158 | No Turn Around |
| **Cat C** | | | | | | | | | | |
| SONGS DUO | IMPRLBCH | 69 | -280.1 | 0.77 | 0.239 | No Turn Around | -300.1 | 0.77 | 0.240 | No Turn Around |
| | OTAY | 69 | -354.8 | 0.77 | 0.242 | No Turn Around | -385.7 | 0.77 | 0.244 | No Turn Around |
| | SANYSDRO | 69 | -258.9 | 0.77 | 0.239 | No Turn Around | -278.9 | 0.77 | 0.240 | No Turn Around |
| | SOUTHBAY | 69 | -414.4 | 0.77 | 0.244 | No Turn Around | -398.6 | 0.82 | 0.194 | No Turn Around |
| | SWEETWTR | 69 | -418.4 | 0.79 | 0.216 | No Turn Around | -444.3 | 0.79 | 0.216 | No Turn Around |
| SOUTHBAY 69 kV N. BUS OUTAGE | IMPRLBCH | 69 | -170.4 | 0.77 | 0.240 | No Turn Around | -185.5 | 0.77 | 0.240 | No Turn Around |
| | OTAY | 69 | -331.0 | 0.77 | 0.249 | No Turn Around | -362.7 | 0.77 | 0.249 | No Turn Around |
| | SANYSDRO | 69 | -250.6 | 0.77 | 0.246 | No Turn Around | -271.9 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -406.1 | 0.82 | 0.205 | No Turn Around | -481.5 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | -402.7 | 0.85 | 0.166 | No Turn Around | -424.8 | 0.85 | 0.165 | No Turn Around |
| SWEETWATER 69 kV BUS OUTAGE | IMPRLBCH | 69 | -223.7 | 0.77 | 0.254 | No Turn Around | -242.6 | 0.77 | 0.251 | No Turn Around |
| | OTAY | 69 | -267.7 | 0.77 | 0.256 | No Turn Around | -284.3 | 0.79 | 0.233 | No Turn Around |
| | SANYSDRO | 69 | -224.0 | 0.77 | 0.252 | No Turn Around | -243.3 | 0.77 | 0.249 | No Turn Around |
| | SOUTHBAY | 69 | -282.4 | 0.77 | 0.259 | No Turn Around | -305.2 | 0.77 | 0.256 | No Turn Around |
| | SWEETWTR | 69 | QV bus does not exist | | | | QV bus does not exist | | | |

Queue 90 ISIS Voltage Stability Summary
2008 Year COD Analysis

**Load +5% 5091 MW and Cut Plane 2295 MW**

| Contingency | Monitor Bus | | Pre-Project case_c margin | voltage | v.margin | turn? | Post-Project case_d margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -310.3 | 0.77 | 0.244 | No Turn Around | -329.4 | 0.77 | 0.244 | No Turn Around |
| | OTAY | 69 | -394.0 | 0.78 | 0.237 | No Turn Around | -416.8 | 0.79 | 0.227 | No Turn Around |
| | SANYSDRO | 69 | -282.4 | 0.77 | 0.244 | No Turn Around | -301.3 | 0.77 | 0.244 | No Turn Around |
| | SOUTHBAY | 69 | -416.9 | 0.83 | 0.189 | No Turn Around | -458.5 | 0.82 | 0.198 | No Turn Around |
| | SWEETWTR | 69 | -443.7 | 0.83 | 0.183 | No Turn Around | -544.6 | 0.77 | 0.242 | No Turn Around |
| **Cat B** | | | | | | | | | | |
| HAA - N.GILA 500.00 kV SLO | IMPRLBCH | 69 | -317.6 | 0.77 | 0.247 | No Turn Around | -336.4 | 0.77 | 0.246 | No Turn Around |
| | OTAY | 69 | -414.5 | 0.77 | 0.250 | No Turn Around | -445.6 | 0.77 | 0.250 | No Turn Around |
| | SANYSDRO | 69 | -288.4 | 0.77 | 0.247 | No Turn Around | -307.4 | 0.77 | 0.247 | No Turn Around |
| | SOUTHBAY | 69 | -498.8 | 0.77 | 0.252 | No Turn Around | -527.3 | 0.77 | 0.251 | No Turn Around |
| | SWEETWTR | 69 | -537.2 | 0.77 | 0.246 | No Turn Around | -562.1 | 0.77 | 0.246 | No Turn Around |
| IV-ML 500kV/Gen Trip/SPS 6.1/NO X-TRIP | IMPRLBCH | 69 | -311.1 | 0.77 | 0.245 | No Turn Around | -330.4 | 0.77 | 0.245 | No Turn Around |
| | OTAY | 69 | -400.9 | 0.77 | 0.248 | No Turn Around | -432.3 | 0.77 | 0.249 | No Turn Around |
| | SANYSDRO | 69 | -283.2 | 0.77 | 0.245 | No Turn Around | -302.3 | 0.77 | 0.245 | No Turn Around |
| | SOUTHBAY | 69 | -478.2 | 0.77 | 0.250 | No Turn Around | -507.2 | 0.77 | 0.249 | No Turn Around |
| | SWEETWTR | 69 | -511.1 | 0.77 | 0.244 | No Turn Around | -537.1 | 0.77 | 0.244 | No Turn Around |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -300.9 | 0.77 | 0.245 | No Turn Around | -202.5 | 0.90 | 0.115 | No Turn Around |
| | OTAY | 69 | -376.5 | 0.77 | 0.248 | No Turn Around | -408.6 | 0.77 | 0.249 | No Turn Around |
| | SANYSDRO | 69 | -277.0 | 0.77 | 0.245 | No Turn Around | -296.8 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -438.9 | 0.77 | 0.250 | No Turn Around | -469.2 | 0.77 | 0.250 | No Turn Around |
| | SWEETWTR | 69 | -463.0 | 0.77 | 0.244 | No Turn Around | -490.8 | 0.77 | 0.244 | No Turn Around |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -311.9 | 0.77 | 0.246 | No Turn Around | -331.3 | 0.77 | 0.245 | No Turn Around |
| | OTAY | 69 | -402.1 | 0.77 | 0.249 | No Turn Around | -433.6 | 0.77 | 0.249 | No Turn Around |
| | SANYSDRO | 69 | -283.9 | 0.77 | 0.246 | No Turn Around | -303.1 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -479.9 | 0.77 | 0.250 | No Turn Around | -509.1 | 0.77 | 0.250 | No Turn Around |
| | SWEETWTR | 69 | -514.0 | 0.77 | 0.245 | No Turn Around | -539.9 | 0.77 | 0.244 | No Turn Around |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -300.9 | 0.77 | 0.245 | No Turn Around | -202.5 | 0.90 | 0.115 | No Turn Around |
| | OTAY | 69 | -376.5 | 0.77 | 0.248 | No Turn Around | -408.6 | 0.77 | 0.249 | No Turn Around |
| | SANYSDRO | 69 | -277.0 | 0.77 | 0.245 | No Turn Around | -296.8 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -438.9 | 0.77 | 0.250 | No Turn Around | -469.2 | 0.77 | 0.250 | No Turn Around |
| | SWEETWTR | 69 | -463.0 | 0.77 | 0.244 | No Turn Around | -490.8 | 0.77 | 0.244 | No Turn Around |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -311.9 | 0.77 | 0.246 | No Turn Around | -331.3 | 0.77 | 0.245 | No Turn Around |
| | OTAY | 69 | -402.1 | 0.77 | 0.249 | No Turn Around | -433.6 | 0.77 | 0.249 | No Turn Around |
| | SANYSDRO | 69 | -283.9 | 0.77 | 0.246 | No Turn Around | -303.1 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -479.9 | 0.77 | 0.250 | No Turn Around | -509.1 | 0.77 | 0.250 | No Turn Around |
| | SWEETWTR | 69 | -514.0 | 0.77 | 0.245 | No Turn Around | -539.9 | 0.77 | 0.244 | No Turn Around |
| MIGUEL-BORDER 69kV SLO | IMPRLBCH | 69 | -296.6 | 0.77 | 0.240 | No Turn Around | -314.8 | 0.77 | 0.240 | No Turn Around |
| | OTAY | 69 | -365.1 | 0.77 | 0.243 | No Turn Around | -393.9 | 0.77 | 0.244 | No Turn Around |
| | SANYSDRO | 69 | -255.5 | 0.77 | 0.240 | No Turn Around | -273.8 | 0.77 | 0.240 | No Turn Around |
| | SOUTHBAY | 69 | -406.2 | 0.82 | 0.195 | No Turn Around | -433.5 | 0.82 | 0.195 | No Turn Around |
| | SWEETWTR | 69 | -414.4 | 0.84 | 0.170 | No Turn Around | -422.8 | 0.85 | 0.160 | No Turn Around |
| TL623 IB-OY-SYO 69 kV SLO | IMPRLBCH | 69 | -243.9 | 0.77 | 0.242 | No Turn Around | -256.1 | 0.77 | 0.241 | No Turn Around |
| | OTAY | 69 | -384.0 | 0.78 | 0.238 | No Turn Around | -422.8 | 0.77 | 0.248 | No Turn Around |
| | SANYSDRO | 69 | -216.5 | 0.77 | 0.242 | No Turn Around | -230.4 | 0.77 | 0.242 | No Turn Around |
| | SOUTHBAY | 69 | -414.7 | 0.83 | 0.188 | No Turn Around | -430.3 | 0.84 | 0.178 | No Turn Around |
| | SWEETWTR | 69 | -442.3 | 0.83 | 0.182 | No Turn Around | -542.6 | 0.77 | 0.242 | No Turn Around |
| PEN G-1 (CC TOTAL PLANT) | IMPRLBCH | 69 | -301.5 | 0.77 | 0.241 | No Turn Around | -321.0 | 0.77 | 0.241 | No Turn Around |
| | OTAY | 69 | -387.6 | 0.77 | 0.244 | No Turn Around | -418.6 | 0.77 | 0.245 | No Turn Around |
| | SANYSDRO | 69 | -275.8 | 0.77 | 0.241 | No Turn Around | -295.1 | 0.77 | 0.242 | No Turn Around |
| | SOUTHBAY | 69 | -464.1 | 0.77 | 0.246 | No Turn Around | -492.6 | 0.77 | 0.246 | No Turn Around |
| | SWEETWTR | 69 | -497.5 | 0.77 | 0.239 | No Turn Around | -522.4 | 0.77 | 0.239 | No Turn Around |

# Queue 90 ISIS Voltage Stability Summary
## 2008 Year COD Analysis

**Load +2-1/2% 4970 MW and Cut Plane 2295 MW**

| Contingency | Monitor Bus | | Pre-Project case_e margin | voltage | v.margin | turn? | Post-Project case_f margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -314.8 | 0.77 | 0.246 | No Turn Around | -333.3 | 0.77 | 0.245 | No Turn Around |
| | OTAY | 69 | -400.7 | 0.78 | 0.239 | No Turn Around | -423.2 | 0.79 | 0.229 | No Turn Around |
| | SANYSDRO | 69 | -285.9 | 0.77 | 0.246 | No Turn Around | -304.7 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -425.3 | 0.83 | 0.190 | No Turn Around | -453.9 | 0.83 | 0.189 | No Turn Around |
| | SWEETWTR | 69 | -438.8 | 0.84 | 0.175 | No Turn Around | -448.4 | 0.85 | 0.164 | No Turn Around |
| **Cat C** | | | | | | | | | | |
| SONGS DUO | IMPRLBCH | 69 | -284.9 | 0.77 | 0.237 | No Turn Around | -304.4 | 0.77 | 0.237 | No Turn Around |
| | OTAY | 69 | -364.5 | 0.77 | 0.240 | No Turn Around | -395.1 | 0.77 | 0.241 | No Turn Around |
| | SANYSDRO | 69 | -262.7 | 0.77 | 0.237 | No Turn Around | -282.4 | 0.77 | 0.238 | No Turn Around |
| | SOUTHBAY | 69 | -430.1 | 0.77 | 0.241 | No Turn Around | -458.1 | 0.77 | 0.241 | No Turn Around |
| | SWEETWTR | 69 | -455.5 | 0.77 | 0.233 | No Turn Around | -480.4 | 0.77 | 0.233 | No Turn Around |
| SOUTHBAY 69 kV N. BUS OUTAGE | IMPRLBCH | 69 | -166.7 | 0.77 | 0.236 | No Turn Around | -181.7 | 0.77 | 0.237 | No Turn Around |
| | OTAY | 69 | -330.9 | 0.77 | 0.246 | No Turn Around | -362.7 | 0.77 | 0.247 | No Turn Around |
| | SANYSDRO | 69 | -245.8 | 0.77 | 0.243 | No Turn Around | -267.1 | 0.77 | 0.244 | No Turn Around |
| | SOUTHBAY | 69 | -421.3 | 0.81 | 0.211 | No Turn Around | -436.7 | 0.82 | 0.201 | No Turn Around |
| | SWEETWTR | 69 | -423.3 | 0.84 | 0.172 | No Turn Around | -534.2 | 0.77 | 0.242 | No Turn Around |
| SWEETWATER 69 kV BUS OUTAGE | IMPRLBCH | 69 | -219.1 | 0.77 | 0.252 | No Turn Around | -238.0 | 0.77 | 0.249 | No Turn Around |
| | OTAY | 69 | -265.4 | 0.77 | 0.254 | No Turn Around | -280.8 | 0.79 | 0.231 | No Turn Around |
| | SANYSDRO | 69 | -219.2 | 0.77 | 0.249 | No Turn Around | -238.5 | 0.77 | 0.247 | No Turn Around |
| | SOUTHBAY | 69 | -281.8 | 0.77 | 0.257 | No Turn Around | -304.7 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | QV bus does not exist | | | | QV bus does not exist | | | |

Queue 90 ISIS Voltage Stability Summary
2008 Year COD Analysis

**Base Load 4849 MW and Cut Plane +5% 2412 MW**

| Contingency | Monitor Bus | | Pre-Project case_g margin | voltage | v.margin | turn? | Post-Project case_h margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -228.2 | 0.87 | 0.149 | No Turn Around | -236.7 | 0.88 | 0.138 | No Turn Around |
| | OTAY | 69 | -246.0 | 0.91 | 0.112 | No Turn Around | -246.5 | 0.93 | 0.091 | No Turn Around |
| | SANYSDRO | 69 | -217.0 | 0.86 | 0.159 | No Turn Around | -227.4 | 0.87 | 0.148 | No Turn Around |
| | SOUTHBAY | 69 | -283.9 | 0.92 | 0.103 | No Turn Around | -250.4 | 0.95 | 0.072 | No Turn Around |
| | SWEETWTR | 69 | -245.4 | 0.94 | 0.078 | No Turn Around | -235.2 | 0.95 | 0.067 | No Turn Around |
| **Cat B** | | | | | | | | | | |
| HAA - N.GILA 500.00 kV SLO | IMPRLBCH | 69 | -324.6 | 0.77 | 0.252 | No Turn Around | -344.1 | 0.77 | 0.251 | No Turn Around |
| | OTAY | 69 | -416.9 | 0.77 | 0.255 | No Turn Around | -447.6 | 0.77 | 0.254 | No Turn Around |
| | SANYSDRO | 69 | -296.6 | 0.77 | 0.252 | No Turn Around | -315.6 | 0.77 | 0.251 | No Turn Around |
| | SOUTHBAY | 69 | -499.7 | 0.77 | 0.257 | No Turn Around | -527.8 | 0.77 | 0.255 | No Turn Around |
| | SWEETWTR | 69 | -537.3 | 0.77 | 0.252 | No Turn Around | -561.7 | 0.77 | 0.251 | No Turn Around |
| IV-ML 500kV/Gen Trip/SPS 6.1/NO X-TRIP | IMPRLBCH | 69 | -314.2 | 0.77 | 0.250 | No Turn Around | -334.1 | 0.77 | 0.249 | No Turn Around |
| | OTAY | 69 | -400.6 | 0.77 | 0.253 | No Turn Around | -431.5 | 0.77 | 0.253 | No Turn Around |
| | SANYSDRO | 69 | -289.3 | 0.77 | 0.250 | No Turn Around | -308.8 | 0.77 | 0.249 | No Turn Around |
| | SOUTHBAY | 69 | -474.5 | 0.77 | 0.255 | No Turn Around | -503.2 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | -503.7 | 0.77 | 0.250 | No Turn Around | -529.8 | 0.77 | 0.249 | No Turn Around |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -297.3 | 0.77 | 0.250 | No Turn Around | -318.7 | 0.77 | 0.249 | No Turn Around |
| | OTAY | 69 | -369.5 | 0.77 | 0.253 | No Turn Around | -401.2 | 0.77 | 0.252 | No Turn Around |
| | SANYSDRO | 69 | -276.7 | 0.77 | 0.250 | No Turn Around | -298.0 | 0.77 | 0.249 | No Turn Around |
| | SOUTHBAY | 69 | -426.4 | 0.77 | 0.255 | No Turn Around | -456.4 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | -446.9 | 0.77 | 0.250 | No Turn Around | -474.4 | 0.77 | 0.249 | No Turn Around |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -314.5 | 0.77 | 0.251 | No Turn Around | -334.6 | 0.77 | 0.250 | No Turn Around |
| | OTAY | 69 | -401.0 | 0.77 | 0.253 | No Turn Around | -432.2 | 0.77 | 0.253 | No Turn Around |
| | SANYSDRO | 69 | -289.6 | 0.77 | 0.250 | No Turn Around | -309.2 | 0.77 | 0.250 | No Turn Around |
| | SOUTHBAY | 69 | -477.0 | 0.77 | 0.255 | No Turn Around | -505.7 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | -509.6 | 0.77 | 0.250 | No Turn Around | -535.1 | 0.77 | 0.249 | No Turn Around |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -297.3 | 0.77 | 0.250 | No Turn Around | -318.7 | 0.77 | 0.249 | No Turn Around |
| | OTAY | 69 | -369.5 | 0.77 | 0.253 | No Turn Around | -401.2 | 0.77 | 0.252 | No Turn Around |
| | SANYSDRO | 69 | -276.7 | 0.77 | 0.250 | No Turn Around | -298.0 | 0.77 | 0.249 | No Turn Around |
| | SOUTHBAY | 69 | -426.4 | 0.77 | 0.255 | No Turn Around | -456.4 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | -446.9 | 0.77 | 0.250 | No Turn Around | -474.4 | 0.77 | 0.249 | No Turn Around |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -314.5 | 0.77 | 0.251 | No Turn Around | -334.6 | 0.77 | 0.250 | No Turn Around |
| | OTAY | 69 | -401.0 | 0.77 | 0.253 | No Turn Around | -432.2 | 0.77 | 0.253 | No Turn Around |
| | SANYSDRO | 69 | -289.6 | 0.77 | 0.250 | No Turn Around | -309.2 | 0.77 | 0.250 | No Turn Around |
| | SOUTHBAY | 69 | -477.0 | 0.77 | 0.255 | No Turn Around | -505.7 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | -509.6 | 0.77 | 0.250 | No Turn Around | -535.1 | 0.77 | 0.249 | No Turn Around |
| MIGUEL-BORDER 69kV SLO | IMPRLBCH | 69 | -245.6 | 0.84 | 0.175 | No Turn Around | -223.9 | 0.88 | 0.134 | No Turn Around |
| | OTAY | 69 | -239.6 | 0.90 | 0.118 | No Turn Around | -240.8 | 0.92 | 0.097 | No Turn Around |
| | SANYSDRO | 69 | -214.4 | 0.84 | 0.174 | No Turn Around | -233.1 | 0.84 | 0.174 | No Turn Around |
| | SOUTHBAY | 69 | -451.9 | 0.77 | 0.250 | No Turn Around | -253.0 | 0.94 | 0.079 | No Turn Around |
| | SWEETWTR | 69 | -256.6 | 0.93 | 0.086 | No Turn Around | -222.4 | 0.95 | 0.065 | No Turn Around |
| TL623 IB-OY-SYO 69 kV SLO | IMPRLBCH | 69 | -210.1 | 0.83 | 0.187 | No Turn Around | -214.7 | 0.84 | 0.176 | No Turn Around |
| | OTAY | 69 | -239.6 | 0.91 | 0.112 | No Turn Around | -241.3 | 0.93 | 0.092 | No Turn Around |
| | SANYSDRO | 69 | -199.5 | 0.81 | 0.207 | No Turn Around | -207.4 | 0.82 | 0.196 | No Turn Around |
| | SOUTHBAY | 69 | -282.3 | 0.92 | 0.103 | No Turn Around | -248.6 | 0.95 | 0.072 | No Turn Around |
| | SWEETWTR | 69 | -268.5 | 0.93 | 0.088 | No Turn Around | -233.0 | 0.95 | 0.067 | No Turn Around |
| PEN G-1 (CC TOTAL PLANT) | IMPRLBCH | 69 | -301.6 | 0.77 | 0.246 | No Turn Around | -321.1 | 0.77 | 0.245 | No Turn Around |
| | OTAY | 69 | -386.0 | 0.77 | 0.249 | No Turn Around | -416.6 | 0.77 | 0.249 | No Turn Around |
| | SANYSDRO | 69 | -277.7 | 0.77 | 0.246 | No Turn Around | -297.4 | 0.77 | 0.245 | No Turn Around |
| | SOUTHBAY | 69 | -460.6 | 0.77 | 0.250 | No Turn Around | -488.5 | 0.77 | 0.249 | No Turn Around |
| | SWEETWTR | 69 | -492.2 | 0.77 | 0.244 | No Turn Around | -516.6 | 0.77 | 0.243 | No Turn Around |

# Queue 90 ISIS Voltage Stability Summary
## 2008 Year COD Analysis

**Base Load 4849 MW and Cut Plane +2-1/2% 2354 MW**

| Contingency | Monitor Bus | | Pre-Project case_i margin | voltage | v.margin | turn? | Post-Project case_j margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -300.9 | 0.79 | 0.229 | No Turn Around | -320.7 | 0.79 | 0.228 | No Turn Around |
| | OTAY | 69 | -338.6 | 0.84 | 0.182 | No Turn Around | -348.5 | 0.86 | 0.161 | No Turn Around |
| | SANYSDRO | 69 | -289.1 | 0.77 | 0.249 | No Turn Around | -308.3 | 0.77 | 0.248 | No Turn Around |
| | SOUTHBAY | 69 | -351.2 | 0.88 | 0.144 | No Turn Around | -365.8 | 0.89 | 0.132 | No Turn Around |
| | SWEETWTR | 69 | -351.5 | 0.89 | 0.128 | No Turn Around | -359.7 | 0.90 | 0.117 | No Turn Around |
| **Cat C** | | | | | | | | | | |
| SONGS DUO | IMPRLBCH | 69 | -278.8 | 0.77 | 0.239 | No Turn Around | -298.7 | 0.77 | 0.239 | No Turn Around |
| | OTAY | 69 | -352.2 | 0.77 | 0.242 | No Turn Around | -382.9 | 0.77 | 0.243 | No Turn Around |
| | SANYSDRO | 69 | -257.9 | 0.77 | 0.239 | No Turn Around | -277.8 | 0.77 | 0.240 | No Turn Around |
| | SOUTHBAY | 69 | -411.1 | 0.77 | 0.243 | No Turn Around | -439.4 | 0.77 | 0.243 | No Turn Around |
| | SWEETWTR | 69 | -370.7 | 0.83 | 0.175 | No Turn Around | -458.2 | 0.77 | 0.235 | No Turn Around |
| SOUTHBAY 69 kV N. BUS OUTAGE | IMPRLBCH | 69 | -170.2 | 0.77 | 0.240 | No Turn Around | -185.2 | 0.77 | 0.240 | No Turn Around |
| | OTAY | 69 | -323.9 | 0.78 | 0.239 | No Turn Around | -333.9 | 0.81 | 0.209 | No Turn Around |
| | SANYSDRO | 69 | -250.2 | 0.77 | 0.246 | No Turn Around | -271.5 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -330.7 | 0.88 | 0.145 | No Turn Around | -358.2 | 0.88 | 0.144 | No Turn Around |
| | SWEETWTR | 69 | -354.4 | 0.88 | 0.136 | No Turn Around | -524.9 | 0.77 | 0.245 | No Turn Around |
| SWEETWATER 69 kV BUS OUTAGE | IMPRLBCH | 69 | -223.4 | 0.77 | 0.254 | No Turn Around | -242.3 | 0.77 | 0.251 | No Turn Around |
| | OTAY | 69 | -267.2 | 0.77 | 0.256 | No Turn Around | -283.8 | 0.79 | 0.233 | No Turn Around |
| | SANYSDRO | 69 | -223.7 | 0.77 | 0.252 | No Turn Around | -243.0 | 0.77 | 0.249 | No Turn Around |
| | SOUTHBAY | 69 | -282.0 | 0.77 | 0.259 | No Turn Around | -304.7 | 0.77 | 0.256 | No Turn Around |
| | SWEETWTR | 69 | QV bus does not exist | | | | QV bus does not exist | | | |

Queue 90 ISIS Voltage Stability Summary
2008 Year COD Analysis

**Base Load 4849 MW and Base Cut Plane 2295 MW**

| Contingency | Monitor Bus | | Pre-Project case_a1 margin | voltage | v.margin | turn? | Post-Project case_b1 margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -248.7 | 0.83 | 0.185 | No Turn Around | -312.7 | 0.77 | 0.246 | No Turn Around |
| | OTAY | 69 | -276.4 | 0.87 | 0.148 | No Turn Around | -406.1 | 0.77 | 0.251 | No Turn Around |
| | SANYSDRO | 69 | -245.0 | 0.81 | 0.206 | No Turn Around | -290.5 | 0.77 | 0.247 | No Turn Around |
| | SOUTHBAY | 69 | -284.5 | 0.90 | 0.119 | No Turn Around | -475.2 | 0.77 | 0.250 | No Turn Around |
| | SWEETWTR | 69 | -278.2 | 0.91 | 0.104 | No Turn Around | -504.3 | 0.77 | 0.244 | No Turn Around |
| **Cat B** | | | | | | | | | | |
| HAA - N.GILA 500.00 kV SLO | IMPRLBCH | 69 | -230.5 | 0.86 | 0.159 | No Turn Around | -323.8 | 0.77 | 0.250 | No Turn Around |
| | OTAY | 69 | -290.7 | 0.87 | 0.152 | No Turn Around | -420.5 | 0.77 | 0.254 | No Turn Around |
| | SANYSDRO | 69 | -229.3 | 0.84 | 0.179 | No Turn Around | -300.2 | 0.77 | 0.251 | No Turn Around |
| | SOUTHBAY | 69 | -302.5 | 0.90 | 0.123 | No Turn Around | -492.7 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | -297.2 | 0.91 | 0.109 | No Turn Around | -523.8 | 0.77 | 0.249 | No Turn Around |
| IV-ML 500kV/Gen Trip/SPS 6.1/NO X-TRIP | IMPRLBCH | 69 | -278.2 | 0.77 | 0.244 | No Turn Around | -297.0 | 0.77 | 0.245 | No Turn Around |
| | OTAY | 69 | -343.4 | 0.77 | 0.247 | No Turn Around | -371.6 | 0.77 | 0.249 | No Turn Around |
| | SANYSDRO | 69 | -260.8 | 0.77 | 0.244 | No Turn Around | -279.5 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -379.7 | 0.79 | 0.228 | No Turn Around | -417.4 | 0.77 | 0.248 | No Turn Around |
| | SWEETWTR | 69 | -403.2 | 0.77 | 0.243 | No Turn Around | -429.7 | 0.77 | 0.242 | No Turn Around |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -216.7 | 0.77 | 0.237 | No Turn Around | -242.8 | 0.77 | 0.239 | No Turn Around |
| | OTAY | 69 | -234.5 | 0.81 | 0.200 | No Turn Around | -272.3 | 0.80 | 0.214 | |
| | SANYSDRO | 69 | -209.1 | 0.77 | 0.237 | No Turn Around | -233.5 | 0.77 | 0.241 | No Turn Around |
| | SOUTHBAY | 69 | -240.3 | 0.84 | 0.171 | | -282.6 | 0.82 | 0.192 | |
| | SWEETWTR | 69 | -240.7 | 0.84 | 0.163 | | -280.1 | 0.82 | 0.184 | |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -277.5 | 0.77 | 0.242 | No Turn Around | -295.8 | 0.77 | 0.244 | No Turn Around |
| | OTAY | 69 | -350.8 | 0.77 | 0.246 | No Turn Around | -159.5 | 0.96 | 0.058 | No Turn Around |
| | SANYSDRO | 69 | -258.3 | 0.77 | 0.243 | No Turn Around | -276.6 | 0.77 | 0.245 | No Turn Around |
| | SOUTHBAY | 69 | -408.1 | 0.77 | 0.247 | No Turn Around | -180.9 | 0.96 | 0.057 | No Turn Around |
| | SWEETWTR | 69 | -427.9 | 0.77 | 0.241 | No Turn Around | -446.5 | 0.78 | 0.230 | No Turn Around |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -216.7 | 0.77 | 0.237 | No Turn Around | -242.8 | 0.77 | 0.239 | No Turn Around |
| | OTAY | 69 | -234.5 | 0.81 | 0.200 | No Turn Around | -272.3 | 0.80 | 0.214 | |
| | SANYSDRO | 69 | -209.1 | 0.77 | 0.237 | No Turn Around | -233.5 | 0.77 | 0.241 | No Turn Around |
| | SOUTHBAY | 69 | -240.3 | 0.84 | 0.171 | | -282.6 | 0.82 | 0.192 | |
| | SWEETWTR | 69 | -240.7 | 0.84 | 0.163 | | -280.1 | 0.82 | 0.184 | |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -277.5 | 0.77 | 0.242 | No Turn Around | -295.8 | 0.77 | 0.244 | No Turn Around |
| | OTAY | 69 | -350.8 | 0.77 | 0.246 | No Turn Around | -159.5 | 0.96 | 0.058 | No Turn Around |
| | SANYSDRO | 69 | -258.3 | 0.77 | 0.243 | No Turn Around | -276.6 | 0.77 | 0.245 | No Turn Around |
| | SOUTHBAY | 69 | -408.1 | 0.77 | 0.247 | No Turn Around | -180.9 | 0.96 | 0.057 | No Turn Around |
| | SWEETWTR | 69 | -427.9 | 0.77 | 0.241 | No Turn Around | -446.5 | 0.78 | 0.230 | No Turn Around |
| MIGUEL-BORDER 69kV SLO | IMPRLBCH | 69 | -235.7 | 0.83 | 0.181 | No Turn Around | -298.2 | 0.77 | 0.243 | No Turn Around |
| | OTAY | 69 | -254.8 | 0.87 | 0.144 | No Turn Around | -368.2 | 0.77 | 0.247 | No Turn Around |
| | SANYSDRO | 69 | -245.6 | 0.77 | 0.241 | No Turn Around | -263.7 | 0.77 | 0.243 | No Turn Around |
| | SOUTHBAY | 69 | -266.0 | 0.90 | 0.116 | No Turn Around | -445.4 | 0.77 | 0.247 | No Turn Around |
| | SWEETWTR | 69 | -264.8 | 0.91 | 0.102 | No Turn Around | -485.0 | 0.77 | 0.242 | No Turn Around |
| TL623 IB-OY-SYO 69 kV SLO | IMPRLBCH | 69 | -224.0 | 0.79 | 0.223 | No Turn Around | -248.0 | 0.77 | 0.243 | No Turn Around |
| | OTAY | 69 | -258.0 | 0.88 | 0.139 | No Turn Around | -396.8 | 0.77 | 0.251 | No Turn Around |
| | SANYSDRO | 69 | -212.9 | 0.77 | 0.244 | No Turn Around | -226.0 | 0.77 | 0.245 | No Turn Around |
| | SOUTHBAY | 69 | -298.3 | 0.89 | 0.129 | No Turn Around | -472.5 | 0.77 | 0.250 | No Turn Around |
| | SWEETWTR | 69 | -277.0 | 0.91 | 0.104 | No Turn Around | -502.4 | 0.77 | 0.244 | No Turn Around |
| PEN G-1 (CC TOTAL PLANT) | IMPRLBCH | 69 | -277.8 | 0.77 | 0.241 | No Turn Around | -296.8 | 0.77 | 0.242 | No Turn Around |
| | OTAY | 69 | -353.8 | 0.77 | 0.244 | No Turn Around | -383.7 | 0.77 | 0.247 | No Turn Around |
| | SANYSDRO | 69 | -257.7 | 0.77 | 0.241 | No Turn Around | -276.6 | 0.77 | 0.244 | No Turn Around |
| | SOUTHBAY | 69 | -415.1 | 0.77 | 0.245 | No Turn Around | -444.1 | 0.77 | 0.246 | No Turn Around |
| | SWEETWTR | 69 | -438.5 | 0.77 | 0.239 | No Turn Around | -465.7 | 0.77 | 0.239 | No Turn Around |

# Queue 90 ISIS Voltage Stability Summary
## 2008 Year COD Analysis

**Base Load 4849 MW and Base Cut Plane 2295 MW**

| Contingency | Monitor Bus | | Pre-Project case_a1 margin | voltage | v.margin | turn? | Post-Project case_b1 margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -248.7 | 0.83 | 0.185 | No Turn Around | -312.7 | 0.77 | 0.246 | No Turn Around |
| | OTAY | 69 | -276.4 | 0.87 | 0.148 | No Turn Around | -406.1 | 0.77 | 0.251 | No Turn Around |
| | SANYSDRO | 69 | -245.0 | 0.81 | 0.206 | No Turn Around | -290.5 | 0.77 | 0.247 | No Turn Around |
| | SOUTHBAY | 69 | -284.5 | 0.90 | 0.119 | No Turn Around | -475.2 | 0.77 | 0.250 | No Turn Around |
| | SWEETWTR | 69 | -278.2 | 0.91 | 0.104 | No Turn Around | -504.3 | 0.77 | 0.244 | No Turn Around |
| **Cat C** | | | | | | | | | | |
| SONGS DUO | IMPRLBCH | 69 | -98.1 | 0.93 | 0.069 | No Turn Around | -94.9 | 0.95 | 0.053 | No Turn Around |
| | OTAY | 69 | -203.5 | 0.87 | 0.132 | No Turn Around | -316.3 | 0.77 | 0.239 | No Turn Around |
| | SANYSDRO | 69 | -151.2 | 0.87 | 0.130 | No Turn Around | -182.5 | 0.86 | 0.145 | No Turn Around |
| | SOUTHBAY | 69 | -306.9 | 0.77 | 0.232 | No Turn Around | -82.0 | 0.98 | 0.026 | No Turn Around |
| | SWEETWTR | 69 | 92.8 | 1.02 | -0.026 | No Turn Around | -351.8 | 0.77 | 0.227 | No Turn Around |
| SOUTHBAY 69 kV N. BUS OUTAGE | IMPRLBCH | 69 | -162.8 | 0.77 | 0.236 | No Turn Around | -177.4 | 0.77 | 0.240 | No Turn Around |
| | OTAY | 69 | -245.6 | 0.85 | 0.166 | No Turn Around | -339.6 | 0.77 | 0.249 | No Turn Around |
| | SANYSDRO | 69 | -237.0 | 0.77 | 0.243 | No Turn Around | -257.8 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -268.3 | 0.90 | 0.121 | No Turn Around | -445.9 | 0.77 | 0.251 | No Turn Around |
| | SWEETWTR | 69 | -265.8 | 0.91 | 0.102 | No Turn Around | -486.4 | 0.77 | 0.242 | No Turn Around |
| SWEETWATER 69 kV BUS OUTAGE | IMPRLBCH | 69 | -208.3 | 0.77 | 0.250 | No Turn Around | -227.0 | 0.77 | 0.250 | No Turn Around |
| | OTAY | 69 | -248.8 | 0.77 | 0.253 | No Turn Around | -264.6 | 0.79 | 0.233 | No Turn Around |
| | SANYSDRO | 69 | -210.3 | 0.77 | 0.249 | No Turn Around | -229.4 | 0.77 | 0.249 | No Turn Around |
| | SOUTHBAY | 69 | -261.5 | 0.77 | 0.255 | No Turn Around | -283.9 | 0.77 | 0.254 | No Turn Around |
| | SWEETWTR | 69 | QV bus does not exist | | | | QV bus does not exist | | | |

# Queue 90 ISIS Voltage Stability Summary
## 2008 Year COD Analysis

**Load +5% 5091 MW and Cut Plane 2295 MW**

| Contingency | Monitor Bus | | Pre-Project case_c1 margin | voltage | v.margin | turn? | Post-Project case_d1 margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -290.0 | 0.77 | 0.241 | No Turn Around | -309.7 | 0.77 | 0.242 | No Turn Around |
| | OTAY | 69 | -372.9 | 0.77 | 0.245 | No Turn Around | -403.9 | 0.77 | 0.245 | No Turn Around |
| | SANYSDRO | 69 | -267.5 | 0.77 | 0.242 | No Turn Around | -287.3 | 0.77 | 0.242 | No Turn Around |
| | SOUTHBAY | 69 | -445.6 | 0.77 | 0.246 | No Turn Around | -473.9 | 0.77 | 0.246 | No Turn Around |
| | SWEETWTR | 69 | -478.5 | 0.77 | 0.240 | No Turn Around | -503.4 | 0.77 | 0.240 | No Turn Around |
| **Cat B** | | | | | | | | | | |
| HAA - N.GILA 500.00 kV SLO | IMPRLBCH | 69 | -301.7 | 0.77 | 0.246 | No Turn Around | -321.5 | 0.77 | 0.245 | No Turn Around |
| | OTAY | 69 | -388.5 | 0.77 | 0.249 | No Turn Around | -419.7 | 0.77 | 0.249 | No Turn Around |
| | SANYSDRO | 69 | -277.9 | 0.77 | 0.246 | No Turn Around | -297.7 | 0.77 | 0.246 | No Turn Around |
| | SOUTHBAY | 69 | -464.6 | 0.77 | 0.250 | No Turn Around | -493.2 | 0.77 | 0.250 | No Turn Around |
| | SWEETWTR | 69 | -499.9 | 0.77 | 0.245 | No Turn Around | -525.1 | 0.77 | 0.244 | No Turn Around |
| IV-ML 500kV/Gen Trip/SPS 6.1/NO X-TRIP | IMPRLBCH | 69 | -286.2 | 0.77 | 0.242 | No Turn Around | -306.9 | 0.77 | 0.242 | No Turn Around |
| | OTAY | 69 | -358.5 | 0.77 | 0.246 | No Turn Around | -390.3 | 0.77 | 0.246 | No Turn Around |
| | SANYSDRO | 69 | -265.3 | 0.77 | 0.243 | No Turn Around | -285.8 | 0.77 | 0.243 | No Turn Around |
| | SOUTHBAY | 69 | -414.9 | 0.77 | 0.247 | No Turn Around | -444.8 | 0.77 | 0.247 | No Turn Around |
| | SWEETWTR | 69 | -437.3 | 0.77 | 0.241 | No Turn Around | -464.6 | 0.77 | 0.241 | No Turn Around |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -250.3 | 0.77 | 0.239 | No Turn Around | -273.1 | 0.77 | 0.240 | No Turn Around |
| | OTAY | 69 | -301.3 | 0.77 | 0.242 | No Turn Around | -335.1 | 0.77 | 0.244 | No Turn Around |
| | SANYSDRO | 69 | -235.8 | 0.77 | 0.239 | No Turn Around | -258.7 | 0.77 | 0.241 | No Turn Around |
| | SOUTHBAY | 69 | -334.5 | 0.77 | 0.243 | No Turn Around | -368.5 | 0.77 | 0.244 | No Turn Around |
| | SWEETWTR | 69 | -341.5 | 0.77 | 0.236 | No Turn Around | -374.3 | 0.77 | 0.237 | No Turn Around |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -284.4 | 0.77 | 0.242 | No Turn Around | -305.1 | 0.77 | 0.242 | No Turn Around |
| | OTAY | 69 | -362.1 | 0.77 | 0.245 | No Turn Around | -393.9 | 0.77 | 0.246 | No Turn Around |
| | SANYSDRO | 69 | -263.5 | 0.77 | 0.242 | No Turn Around | -284.2 | 0.77 | 0.243 | No Turn Around |
| | SOUTHBAY | 69 | -427.4 | 0.77 | 0.246 | No Turn Around | -372.0 | 0.85 | 0.166 | No Turn Around |
| | SWEETWTR | 69 | -455.0 | 0.77 | 0.240 | No Turn Around | -481.6 | 0.77 | 0.240 | No Turn Around |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -250.3 | 0.77 | 0.239 | No Turn Around | -273.1 | 0.77 | 0.240 | No Turn Around |
| | OTAY | 69 | -301.3 | 0.77 | 0.242 | No Turn Around | -335.1 | 0.77 | 0.244 | No Turn Around |
| | SANYSDRO | 69 | -235.8 | 0.77 | 0.239 | No Turn Around | -258.7 | 0.77 | 0.241 | No Turn Around |
| | SOUTHBAY | 69 | -334.5 | 0.77 | 0.243 | No Turn Around | -368.5 | 0.77 | 0.244 | No Turn Around |
| | SWEETWTR | 69 | -341.5 | 0.77 | 0.236 | No Turn Around | -374.3 | 0.77 | 0.237 | No Turn Around |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -284.4 | 0.77 | 0.242 | No Turn Around | -305.1 | 0.77 | 0.242 | No Turn Around |
| | OTAY | 69 | -362.1 | 0.77 | 0.245 | No Turn Around | -393.9 | 0.77 | 0.246 | No Turn Around |
| | SANYSDRO | 69 | -263.5 | 0.77 | 0.242 | No Turn Around | -284.2 | 0.77 | 0.243 | No Turn Around |
| | SOUTHBAY | 69 | -427.4 | 0.77 | 0.246 | No Turn Around | -372.0 | 0.85 | 0.166 | No Turn Around |
| | SWEETWTR | 69 | -455.0 | 0.77 | 0.240 | No Turn Around | -481.6 | 0.77 | 0.240 | No Turn Around |
| MIGUEL-BORDER 69kV SLO | IMPRLBCH | 69 | -277.1 | 0.77 | 0.238 | No Turn Around | -295.8 | 0.77 | 0.238 | No Turn Around |
| | OTAY | 69 | -338.0 | 0.77 | 0.241 | No Turn Around | -366.8 | 0.77 | 0.242 | No Turn Around |
| | SANYSDRO | 69 | -242.1 | 0.77 | 0.238 | No Turn Around | -261.1 | 0.77 | 0.238 | No Turn Around |
| | SOUTHBAY | 69 | -417.0 | 0.77 | 0.243 | No Turn Around | -445.0 | 0.77 | 0.243 | No Turn Around |
| | SWEETWTR | 69 | -462.0 | 0.77 | 0.238 | No Turn Around | -485.3 | 0.77 | 0.238 | No Turn Around |
| TL623 IB-OY-SYO 69 kV SLO | IMPRLBCH | 69 | -231.2 | 0.77 | 0.239 | No Turn Around | -244.6 | 0.77 | 0.239 | No Turn Around |
| | OTAY | 69 | -363.7 | 0.77 | 0.245 | No Turn Around | -394.6 | 0.77 | 0.246 | No Turn Around |
| | SANYSDRO | 69 | -208.7 | 0.77 | 0.240 | No Turn Around | -223.0 | 0.77 | 0.240 | No Turn Around |
| | SOUTHBAY | 69 | -443.5 | 0.77 | 0.246 | No Turn Around | -471.2 | 0.77 | 0.245 | No Turn Around |
| | SWEETWTR | 69 | -477.0 | 0.77 | 0.240 | No Turn Around | -501.6 | 0.77 | 0.239 | No Turn Around |
| PEN G-1 (CC TOTAL PLANT) | IMPRLBCH | 69 | -275.2 | 0.77 | 0.237 | No Turn Around | -295.1 | 0.77 | 0.238 | No Turn Around |
| | OTAY | 69 | -352.0 | 0.77 | 0.241 | No Turn Around | -383.0 | 0.77 | 0.242 | No Turn Around |
| | SANYSDRO | 69 | -254.8 | 0.77 | 0.238 | No Turn Around | -274.9 | 0.77 | 0.239 | No Turn Around |
| | SOUTHBAY | 69 | -416.3 | 0.77 | 0.242 | No Turn Around | -444.8 | 0.77 | 0.242 | No Turn Around |
| | SWEETWTR | 69 | -441.9 | 0.77 | 0.235 | No Turn Around | -467.6 | 0.77 | 0.235 | No Turn Around |

# Queue 90 ISIS Voltage Stability Summary
## 2008 Year COD Analysis

**Load +2-1/2% 4970 MW and Cut Plane 2295 MW**

| Contingency | Monitor Bus | | Pre-Project case_e1 margin | voltage | v.margin | turn? | Post-Project case_f1 margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -294.7 | 0.77 | 0.243 | No Turn Around | -314.1 | 0.77 | 0.243 | No Turn Around |
| | OTAY | 69 | -379.4 | 0.77 | 0.246 | No Turn Around | -409.9 | 0.77 | 0.247 | No Turn Around |
| | SANYSDRO | 69 | -271.6 | 0.77 | 0.244 | No Turn Around | -291.2 | 0.77 | 0.244 | No Turn Around |
| | SOUTHBAY | 69 | -453.6 | 0.77 | 0.248 | No Turn Around | -481.3 | 0.77 | 0.247 | No Turn Around |
| | SWEETWTR | 69 | -487.9 | 0.77 | 0.242 | No Turn Around | -512.1 | 0.77 | 0.241 | No Turn Around |
| **Cat C** | | | | | | | | | | |
| SONGS DUO | IMPRLBCH | 69 | -87.8 | 0.94 | 0.058 | No Turn Around | -106.3 | 0.94 | 0.060 | No Turn Around |
| | OTAY | 69 | -299.2 | 0.77 | 0.232 | No Turn Around | -121.5 | 0.96 | 0.045 | No Turn Around |
| | SANYSDRO | 69 | -227.1 | 0.77 | 0.229 | No Turn Around | -116.9 | 0.93 | 0.072 | No Turn Around |
| | SOUTHBAY | 69 | -341.6 | 0.77 | 0.232 | No Turn Around | -330.4 | 0.82 | 0.184 | No Turn Around |
| | SWEETWTR | 69 | -331.4 | 0.80 | 0.194 | No Turn Around | -77.1 | 0.97 | 0.025 | No Turn Around |
| SOUTHBAY 69 kV N. BUS OUTAGE | IMPRLBCH | 69 | -161.2 | 0.77 | 0.234 | No Turn Around | -176.6 | 0.77 | 0.236 | No Turn Around |
| | OTAY | 69 | -309.9 | 0.77 | 0.244 | No Turn Around | -341.4 | 0.77 | 0.245 | No Turn Around |
| | SANYSDRO | 69 | -236.1 | 0.77 | 0.241 | No Turn Around | -257.7 | 0.77 | 0.242 | No Turn Around |
| | SOUTHBAY | 69 | -425.0 | 0.77 | 0.249 | No Turn Around | -451.1 | 0.77 | 0.248 | No Turn Around |
| | SWEETWTR | 69 | -473.3 | 0.77 | 0.240 | No Turn Around | -494.0 | 0.77 | 0.239 | No Turn Around |
| SWEETWATER 69 kV BUS OUTAGE | IMPRLBCH | 69 | -208.1 | 0.77 | 0.249 | No Turn Around | -227.1 | 0.77 | 0.247 | No Turn Around |
| | OTAY | 69 | -249.0 | 0.77 | 0.252 | No Turn Around | -265.1 | 0.79 | 0.230 | No Turn Around |
| | SANYSDRO | 69 | -209.9 | 0.77 | 0.248 | No Turn Around | -229.5 | 0.77 | 0.245 | No Turn Around |
| | SOUTHBAY | 69 | -262.2 | 0.77 | 0.254 | No Turn Around | -284.8 | 0.77 | 0.251 | No Turn Around |
| | SWEETWTR | 69 | QV bus does not exist | | | | QV bus does not exist | | | |

# Queue 90 ISIS Voltage Stability Summary
## 2008 Year COD Analysis

**Base Load 4849 MW and Cut Plane +5% 2412 MW**

| Contingency | Monitor Bus | | Pre-Project case_g1 margin | voltage | v.margin | turn? | Post-Project case_h1 margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -244.8 | 0.83 | 0.184 | No Turn Around | -256.7 | 0.84 | 0.174 | No Turn Around |
| | OTAY | 69 | -271.2 | 0.87 | 0.147 | No Turn Around | -291.4 | 0.88 | 0.137 | No Turn Around |
| | SANYSDRO | 69 | -241.6 | 0.81 | 0.204 | No Turn Around | -254.6 | 0.82 | 0.195 | No Turn Around |
| | SOUTHBAY | 69 | -278.0 | 0.90 | 0.118 | No Turn Around | -291.5 | 0.91 | 0.108 | No Turn Around |
| | SWEETWTR | 69 | -270.8 | 0.91 | 0.103 | No Turn Around | -314.5 | 0.90 | 0.112 | No Turn Around |
| **Cat B** | | | | | | | | | | |
| HAA - N.GILA 500.00 kV SLO | IMPRLBCH | 69 | -16.1 | 1.01 | 0.008 | No Turn Around | -15.7 | 1.01 | 0.007 | No Turn Around |
| | OTAY | 69 | -33.9 | 1.01 | 0.011 | No Turn Around | -39.2 | 1.01 | 0.010 | No Turn Around |
| | SANYSDRO | 69 | -111.9 | 0.95 | 0.068 | No Turn Around | -35.0 | 1.00 | 0.018 | No Turn Around |
| | SOUTHBAY | 69 | -8.5 | 1.02 | 0.002 | No Turn Around | -51.3 | 1.01 | 0.011 | No Turn Around |
| | SWEETWTR | 69 | -28.4 | 1.01 | 0.007 | No Turn Around | -26.3 | 1.01 | 0.006 | No Turn Around |
| IV-ML 500kV/Gen Trip/SPS 6.1/NO X-TRIP | IMPRLBCH | 69 | -268.1 | 0.77 | 0.242 | No Turn Around | -289.5 | 0.77 | 0.242 | No Turn Around |
| | OTAY | 69 | -328.4 | 0.77 | 0.246 | No Turn Around | -359.5 | 0.77 | 0.246 | No Turn Around |
| | SANYSDRO | 69 | -251.8 | 0.77 | 0.243 | No Turn Around | -273.1 | 0.77 | 0.243 | No Turn Around |
| | SOUTHBAY | 69 | -366.6 | 0.77 | 0.247 | No Turn Around | -388.5 | 0.79 | 0.226 | No Turn Around |
| | SWEETWTR | 69 | -377.6 | 0.77 | 0.241 | No Turn Around | -397.7 | 0.79 | 0.220 | No Turn Around |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -160.6 | 0.84 | 0.162 | No Turn Around | -190.6 | 0.83 | 0.174 | No Turn Around |
| | OTAY | 69 | -167.3 | 0.87 | 0.135 | No Turn Around | -203.4 | 0.87 | 0.138 | No Turn Around |
| | SANYSDRO | 69 | -162.2 | 0.83 | 0.173 | No Turn Around | -192.6 | 0.82 | 0.185 | No Turn Around |
| | SOUTHBAY | 69 | -171.8 | 0.89 | 0.115 | | -206.2 | 0.89 | 0.117 | |
| | SWEETWTR | 69 | -169.7 | 0.89 | 0.107 | | -201.6 | 0.89 | 0.108 | |
| IV-WND 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -269.7 | 0.77 | 0.240 | No Turn Around | -290.4 | 0.77 | 0.241 | No Turn Around |
| | OTAY | 69 | -340.1 | 0.77 | 0.244 | No Turn Around | -371.3 | 0.77 | 0.245 | No Turn Around |
| | SANYSDRO | 69 | -251.5 | 0.77 | 0.241 | No Turn Around | -272.2 | 0.77 | 0.242 | No Turn Around |
| | SOUTHBAY | 69 | -377.9 | 0.79 | 0.224 | No Turn Around | -419.9 | 0.77 | 0.244 | No Turn Around |
| | SWEETWTR | 69 | -402.8 | 0.77 | 0.238 | No Turn Around | -427.3 | 0.78 | 0.228 | No Turn Around |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23040 | IMPRLBCH | 69 | -160.6 | 0.84 | 0.162 | No Turn Around | -190.6 | 0.83 | 0.174 | No Turn Around |
| | OTAY | 69 | -167.3 | 0.87 | 0.135 | No Turn Around | -203.4 | 0.87 | 0.138 | No Turn Around |
| | SANYSDRO | 69 | -162.2 | 0.83 | 0.173 | No Turn Around | -192.6 | 0.82 | 0.185 | No Turn Around |
| | SOUTHBAY | 69 | -171.8 | 0.89 | 0.115 | | -206.2 | 0.89 | 0.117 | |
| | SWEETWTR | 69 | -169.7 | 0.89 | 0.107 | | -201.6 | 0.89 | 0.108 | |
| WND-ML 500kV/Gen Trip/SPS 6.1/X-TRIP 23050 | IMPRLBCH | 69 | -269.7 | 0.77 | 0.240 | No Turn Around | -290.4 | 0.77 | 0.241 | No Turn Around |
| | OTAY | 69 | -340.1 | 0.77 | 0.244 | No Turn Around | -371.3 | 0.77 | 0.245 | No Turn Around |
| | SANYSDRO | 69 | -251.5 | 0.77 | 0.241 | No Turn Around | -272.2 | 0.77 | 0.242 | No Turn Around |
| | SOUTHBAY | 69 | -377.9 | 0.79 | 0.224 | No Turn Around | -419.9 | 0.77 | 0.244 | No Turn Around |
| | SWEETWTR | 69 | -402.8 | 0.77 | 0.238 | No Turn Around | -427.3 | 0.78 | 0.228 | No Turn Around |
| MIGUEL-BORDER 69kV SLO | IMPRLBCH | 69 | -232.0 | 0.83 | 0.180 | No Turn Around | -243.0 | 0.84 | 0.170 | No Turn Around |
| | OTAY | 69 | -250.0 | 0.87 | 0.143 | No Turn Around | -280.1 | 0.87 | 0.144 | No Turn Around |
| | SANYSDRO | 69 | -225.9 | 0.80 | 0.210 | No Turn Around | -245.1 | 0.80 | 0.210 | No Turn Around |
| | SOUTHBAY | 69 | -259.8 | 0.90 | 0.115 | No Turn Around | -271.6 | 0.91 | 0.104 | No Turn Around |
| | SWEETWTR | 69 | -275.3 | 0.90 | 0.111 | No Turn Around | -281.6 | 0.91 | 0.100 | No Turn Around |
| TL623 IB-OY-SYO 69 kV SLO | IMPRLBCH | 69 | -232.4 | 0.77 | 0.242 | No Turn Around | -234.4 | 0.79 | 0.221 | No Turn Around |
| | OTAY | 69 | -264.9 | 0.87 | 0.148 | No Turn Around | -285.3 | 0.88 | 0.138 | No Turn Around |
| | SANYSDRO | 69 | -210.9 | 0.77 | 0.243 | No Turn Around | -225.1 | 0.77 | 0.243 | No Turn Around |
| | SOUTHBAY | 69 | -291.9 | 0.89 | 0.128 | No Turn Around | -320.6 | 0.89 | 0.127 | No Turn Around |
| | SWEETWTR | 69 | -269.7 | 0.91 | 0.103 | No Turn Around | -294.8 | 0.91 | 0.102 | No Turn Around |
| PEN G-1 (CC TOTAL PLANT) | IMPRLBCH | 69 | -272.9 | 0.77 | 0.239 | No Turn Around | -292.6 | 0.77 | 0.239 | No Turn Around |
| | OTAY | 69 | -346.2 | 0.77 | 0.242 | No Turn Around | -376.5 | 0.77 | 0.243 | No Turn Around |
| | SANYSDRO | 69 | -253.4 | 0.77 | 0.240 | No Turn Around | -273.2 | 0.77 | 0.240 | No Turn Around |
| | SOUTHBAY | 69 | -402.7 | 0.77 | 0.243 | No Turn Around | -430.4 | 0.77 | 0.243 | No Turn Around |
| | SWEETWTR | 69 | -422.8 | 0.77 | 0.236 | No Turn Around | -447.7 | 0.77 | 0.236 | No Turn Around |

# Queue 90 ISIS Voltage Stability Summary
## 2008 Year COD Analysis

**Base Load 4849 MW and Cut Plane +2-1/2% 2354 MW**

| Contingency | Monitor Bus | | Pre-Project case_i1 margin | voltage | v.margin | turn? | Post-Project case_j1 margin | voltage | v.margin | turn? |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cat A** | | | | | | | | | | |
| No Disturbance | IMPRLBCH | 69 | -52.8 | 0.99 | 0.026 | No Turn Around | -11.7 | 1.01 | 0.005 | No Turn Around |
| | OTAY | 69 | -83.5 | 0.99 | 0.029 | No Turn Around | -33.0 | 1.01 | 0.009 | No Turn Around |
| | SANYSDRO | 69 | -47.1 | 0.99 | 0.026 | No Turn Around | -31.7 | 1.00 | 0.016 | No Turn Around |
| | SOUTHBAY | 69 | -75.3 | 1.00 | 0.020 | No Turn Around | 4.1 | 1.02 | -0.001 | No Turn Around |
| | SWEETWTR | 69 | -89.7 | 0.99 | 0.025 | No Turn Around | 23.8 | 1.02 | -0.006 | No Turn Around |
| **Cat C** | | | | | | | | | | |
| SONGS DUO | IMPRLBCH | 69 | -30.5 | 0.98 | 0.019 | No Turn Around | -20.2 | 0.99 | 0.011 | No Turn Around |
| | OTAY | 69 | -28.9 | 0.99 | 0.013 | No Turn Around | -16.6 | 1.00 | 0.006 | No Turn Around |
| | SANYSDRO | 69 | -30.3 | 0.98 | 0.020 | No Turn Around | -22.3 | 0.99 | 0.013 | No Turn Around |
| | SOUTHBAY | 69 | -181.3 | 0.91 | 0.093 | No Turn Around | -330.4 | 0.77 | 0.234 | No Turn Around |
| | SWEETWTR | 69 | -12.2 | 0.99 | 0.004 | No Turn Around | -273.4 | 0.86 | 0.135 | No Turn Around |
| SOUTHBAY 69 kV N. BUS OUTAGE | IMPRLBCH | 69 | -17.1 | 0.99 | 0.017 | No Turn Around | -178.8 | 0.77 | 0.238 | No Turn Around |
| | OTAY | 69 | -15.3 | 1.01 | 0.006 | No Turn Around | -341.9 | 0.77 | 0.247 | No Turn Around |
| | SANYSDRO | 69 | -21.4 | 1.00 | 0.013 | No Turn Around | -259.8 | 0.77 | 0.244 | No Turn Around |
| | SOUTHBAY | 69 | -74.7 | 1.00 | 0.021 | No Turn Around | -448.2 | 0.77 | 0.250 | No Turn Around |
| | SWEETWTR | 69 | -10.5 | 1.01 | 0.003 | No Turn Around | -489.0 | 0.77 | 0.242 | No Turn Around |
| SWEETWATER 69 kV BUS OUTAGE | IMPRLBCH | 69 | -200.7 | 0.79 | 0.230 | No Turn Around | -205.5 | 0.82 | 0.198 | No Turn Around |
| | OTAY | 69 | -218.1 | 0.83 | 0.193 | No Turn Around | -225.2 | 0.86 | 0.160 | No Turn Around |
| | SANYSDRO | 69 | -202.2 | 0.79 | 0.229 | No Turn Around | -212.0 | 0.81 | 0.206 | No Turn Around |
| | SOUTHBAY | 69 | -223.5 | 0.84 | 0.185 | No Turn Around | -226.7 | 0.87 | 0.152 | No Turn Around |
| | SWEETWTR | 69 | QV bus does not exist | | | | QV bus does not exist | | | |