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BEFORE THE ARIZONA CORPORATION COMMISSION

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Arizona Corporation Commission
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IN THE MATTER OF THE GENERIC DOCKET FOR THE 90 DAY PRE-APPLICATION PLANS FOR POWER PLANTS FILED PURSUANT TO A.R.S. § 40-360.02(B)

DOCKET NO. E-00000M-08-0170

NOTICE OF FILING PLAN PURSUANT TO A.R.S. § 40-360.02(B)

Sonoran Solar Energy, LLC. ("Sonoran") provides notice of filing its 90 Day Plan pursuant to A.R.S. § 40-360.02(B) attached hereto.

RESPECTFULLY SUBMITTED this 25th day of November, 2009.

JENNINGS, STROUSS & SALMON, P.L.C.

By:
for: Kenneth C. Sundlof, Jr.
201 East Washington Street - 11th Floor
Phoenix, AZ 85004-2384
Attorney Sonoran Solar Energy, LLC

ORIGINAL and 13 copies of the foregoing filed this 25th day of November, 2009, with:

Arizona Corporation Commission
Docket Control
1200 W. Washington Street
Phoenix, AZ 85007

By Michele Mosser

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November 25th, 2009

ARIZONA CORPORATION COMMISSION
Utilities Division
1200 W. Washington Street
Phoenix, AZ 85007

Re: 90 Day Notice Pursuant to A.R.S. § 40-360.02(B) re a proposed Solar-Thermal Electrical Generating Plant and Related Transmission

Dear Madam/Sir:

Pursuant to the provisions of A.R.S. § 40-360.02(B), Sonoran Solar Energy, LLC. ("Sonoran") provides its 90-day notice and states as follows:

1. The size and location of each plant proposed to be constructed.

Sonoran Solar Energy, LLC ("Sonoran") is a wholly owned subsidiary of NextEra Energy Resources, LLC. NextEra Energy Resources, LLC (formerly known as FPL Energy, LLC), is the competitive energy subsidiary of FPL Group Inc., and is based in Juno Beach, Florida.

Sonoran has applied to the Bureau of Land Management ("BLM") for a Right of Way ("ROW") on public lands to construct a 375-MW solar thermal plant comprised of two steam turbine generator units (i.e., a 125 MW unit and a 250 MW unit) to be known as the Sonoran Solar Energy project ("Project"). Each unit would utilize concentrated solar thermal ("CST") technology and have all ancillary linear facilities necessary to operate the plant and connect it to the transmission grid. Necessary linear facilities for the project would include a three mile 500-kilovolt ("kV") transmission line, water supply facilities, water pipelines, well field access roads, a natural gas pipeline, plant access roads and a substation. This project also contemplates the use of a natural gas co-firing system, with the possibility to add a thermal energy storage system, in order to maximize the project's dispatchability for the local customer.

The Project will be located in the Little Rainbow Valley, east of State Route ("SR") 85, and south of the Buckeye Hills and the town of Buckeye in Maricopa County, Arizona. Sonoran has applied for a right of way ("ROW") on approximately 14,000-acres of land managed by the BLM. It is important to note that although the ROW application area contains 14,000 acres, when ultimately constructed, the plant would occupy approximately

4,000 acres. A map of the proposed facilities is attached as Enclosure 1. The requested ROW consists of the following sections:

Township/Range	Section	Portion
T2S/R3W	9-16, 19-26	Section
T2S/R2W	29, 32	Section
T2S/R3W	27-30, 34-36	Partial Section
T2S/R2W	30-31	Partial Section
T3S/R2W	5-6	Partial Section
T2S/R2W	28	Partial Section
T2S/R2W	33	Partial Section

2. The purpose to be served by each proposed plant.

Sonoran is proposing to construct, operate, and maintain a utility-scale solar thermal generating facility capable of providing commercial quantities of clean, renewable, solar electricity to the state of Arizona. The Project is designed to assist the state in meeting the objectives mandated by the Arizona Corporation Commission's ("ACC") Renewable Energy Standard and Tariff Rules (Arizona Administrative Code R14-2-1801-1815), and other renewable energy mandates, which call on the state's electric utilities to produce 15% of their electricity from renewable sources by 2025. The Project is also intended to reduce the electricity sector's greenhouse gas emissions, contribute to Arizona's future electric power needs, and promote fuel diversity to protect consumers and electric utilities from fuel unavailability and price fluctuations. Sonoran intends that the electrical output of the units will be used by Arizona utilities for Arizona customers but will keep open the possibility for use by other utilities.

3. The estimated date by which each plant will be in operation.

Sonoran expects to receive all required permits by December 2010. Construction of the generating facility is scheduled to begin soon thereafter, in the first quarter of 2011. Unit One (125 MW) is expected to commence commercial operations in the summer of 2013 and Unit Two (250 MW) is expected to commence commercial operations in the summer of 2014.

4. The average and maximum power output measured in megawatts of each plant to be installed.

Sonoran is proposing to construct a 375-MW solar thermal plant comprising two smaller units: one 125-MW unit and a second 250-MW unit (for a total of 375 MW). The larger 250-MW solar thermal unit is expected to generate approximately 600,000 megawatt hours ("MWh") of solar generation per year; the smaller 125-MW unit would produce approximately half the electricity of the larger unit, or approximately 300,000 MWh of annual

solar generation. The addition of optional thermal storage (which would contemplate a larger solar field) would increase the MWh output by up to 50%, depending on the amount of storage that is designed and built. Similarly, the addition of optional natural gas co-firing would allow for increased annual generation. The number of additional MWh would ultimately depend on the frequency of use.

5. The expected capacity factor for each proposed plant.

Each unit's capacity factor will depend on the level of co-firing / utilization of thermal energy storage. The solar-only capacity factor is expected to be between 25 and 27%. The overall project capacity factor may be as high as 41% depending on the final configuration.

6. The type of fuel to be used for each proposed plant.

The plants will use parabolic trough solar thermal technology to produce electrical power using steam turbine generators ("STG") fed from solar steam generators ("SSG"). The SSG receives heated heat transfer fluid ("HTF") from solar thermal equipment comprised of arrays of parabolic mirrors that collect energy from the sun. Each unit will utilize natural gas fueled co-fired boilers or direct fired HTF heaters to provide additional electrical generation, auxiliary boilers to reduce startup time, and HTF freeze protection heaters. Freeze protection shall maintain the HTF at a minimum of 100 degrees Fahrenheit ("°F"). All supplementary heat sources will be fueled by natural gas. Thermal energy storage ("TES") utilizing tanks of molten salt may be used at each plant to increase daily hours of operation, shift energy production into peak periods, and continue production during periods of extended cloud cover. Small diesel-fueled internal combustion engines will be used for emergency power and for servicing the fire-fighting system.

7. The plans for any new facilities shall include a power flow and stability analysis report showing the effect on the current Arizona electric transmission system. Transmission owners shall provide the technical reports, analysis or basis for projects that are included for serving customer load growth in their service territories.

The power from both units will be transformed through the new Project substation located near the power blocks and will be connected to the Arizona electric transmission system at the Jojoba 500 kV substation via a 3-mile radial 500 kV line.

Sonoran submitted a completed generator interconnection application for up to 500 MW to the Palo Verde Eastern Transmission Operating Agent ("PVETS") and the Salt River Project ("SRP"), the operating agent of the Jojoba 500 kV substation, for the Project in February 2008. The System Impact Study Plan for this Project was drafted, circulated for

comment, revised, re-circulated, and finally approved by the Western Arizona Transmission Studies Task Force ("WATS") and the Arizona Nuclear Power Project ("ANPP") Engineering and Operation ("E&O") Committee. WATS approved the initial generator interconnection study report for this project in August 2008 and the approved study report is included as part of this filing. In early 2009, Sonoran then requested a change to the generator configuration (specifically that one of the two proposed 250 MW units be configured as two 125 MW units), for which WATS requested a supplemental study. The supplemental study was approved by WATS in October 2009 and is also included as part of this filing.

Sonoran has therefore completed a Generator Interconnection Study, which has been fully approved by WATS for this Project's proposed interconnection to the Jojoba 500 kV substation. This study was prepared in accordance with the System Impact Study Plan approved by WATS and the E&O Committee. These studies were performed by PDS Consulting; a Tempe, AZ based consulting firm specializing in generator interconnection studies. The results of the power flow and transient stability analysis showed that the addition of the proposed Project does not cause significant impacts to the existing transmission system.

The Palo Verde Updated Final Safety Analysis ("UFSAR") was also performed to determine the simultaneous Palo Verde Transmission System ("PVTS") safety operating limits following the addition of the proposed Project. The results of the UFSAR analysis showed that the stability of the Palo Verde nuclear plant will not be impacted by the addition of this proposed Project. Finally, the results of a short circuit analysis show available margins at the vicinity breakers and indicate that the interconnection of the proposed Sonoran Solar Energy Project will not cause any of the breakers to exceed their interruption capabilities. Other details of the analysis performed are included in the attached studies.

Very truly yours,

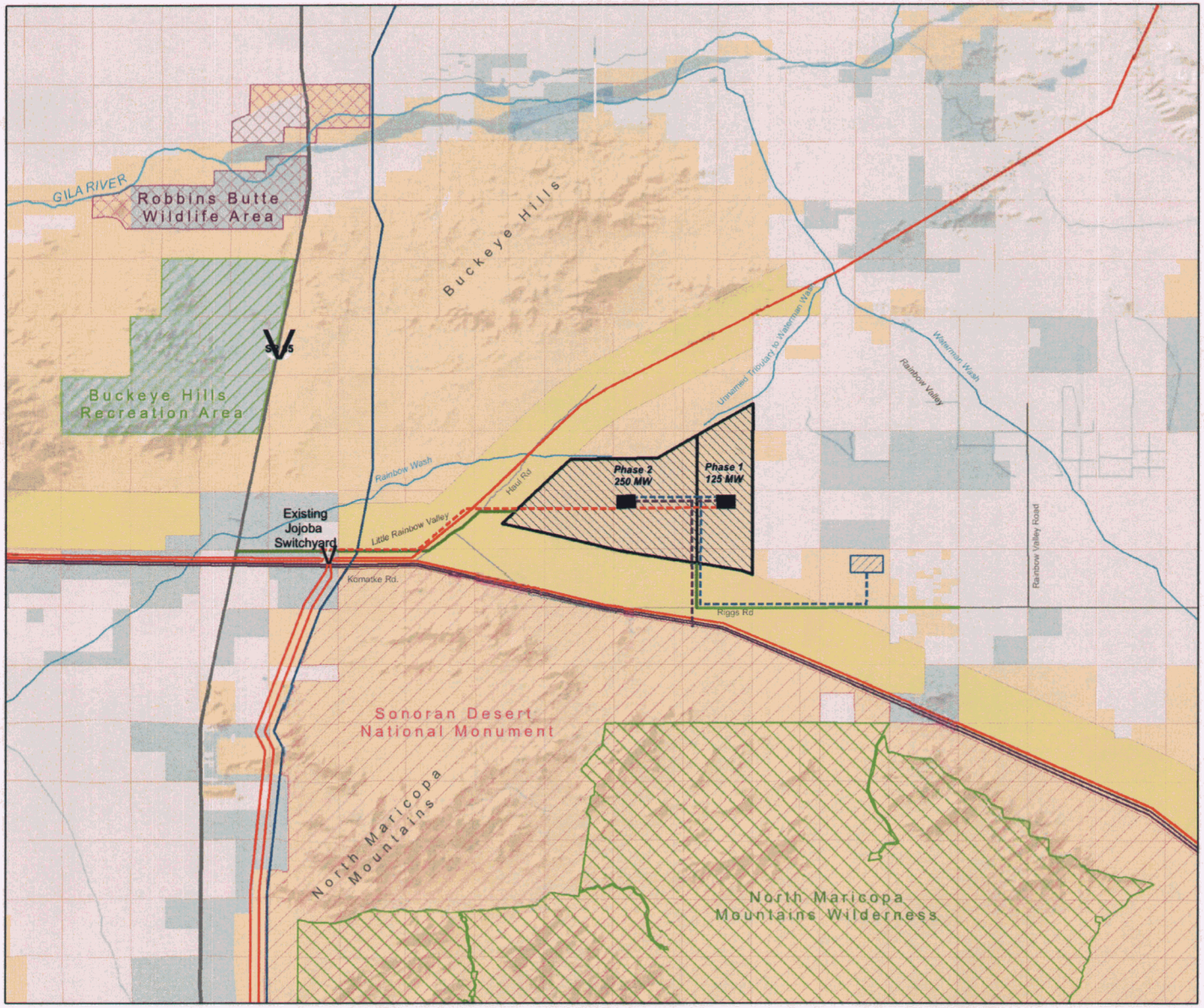
JENNINGS, STROUSS & SALMON, P.L.C.

By

Kenneth C. Sundlof, Jr.

Enclosures: (1) Proposed Sonoran Solar Energy Project Facilities
(2) Generator Interconnection Study (Original)
(3) Generator Interconnection Study (Supplemental)

EXHIBIT "1"



Sonoran Solar Energy Project
Project Description
Figure 1

Legend

Project Components

- 375 MW Solar Project Area
- Power Block
- Primary Access Road
- Secondary Access Road
- Well Area
- Water Pipeline
- 230kV or 500kV Transmission Line
- Gas Pipeline

Project Features

- Designated BLM Utility Corridor

Land Ownership

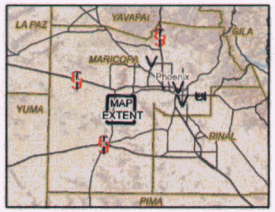
- BLM
- State
- Private/Other

Special Designation

- Wilderness Area
- National Monument
- Recreation Area
- State Wildlife Area

General Reference Features

- 500kV Transmission Line
- 230kV Transmission Line
- Pipeline
- Switchyard
- Highway
- Local Road
- River
- Wash
- Section Boundary



Source: Streetmap, 2008; Platts, 2008; EPG, 2009; Arizona Bureau of Land Management, 2006

0 1 2 3 4 Miles

November 12, 2009

epg

EXHIBIT "2"

Buckeye Concentrated Solar Project
Generator Interconnection Study

Final Report
August 29, 2008

Prepared for:

FPL Energy

Prepared by:

PDS Consulting, PLC

EXECUTIVE SUMMARY

FPL Energy, LLC (Customer) has submitted a completed generator interconnection application to the Palo Verde Eastern Transmission System Operating Agent (PVETS), the Salt River Project (SRP) for the Buckeye Concentrating Solar Project (Buckeye CSP). The Buckeye CSP would consist of two 270 MW steam turbines fueled via a solar collector system. The total maximum net plant output will be 500 MW. The Buckeye CSP will be located in Maricopa County, Arizona and its output will be connected to the Jojoba 500kV switchyard via a 3-mile radial 500 kV line. The planned commercial operation date for the Project is December 2012.

The Customer has requested Energy Resource Interconnection[1] Services for the Buckeye CSP. The Customer, in consultation with SRP has elected a third party contractor, PDS Consulting, PLC (PDS), to perform the Generator Interconnection Study (GIS) for the Project. The GIS was performed using approved Western Electricity Coordination Council (WECC) 2012 heavy summer base case to determine the impact of the Buckeye CSP on the interconnected transmission system. Two operating scenarios were studied: the maximum Palo Verde hub generation scenario (PV Gen Max Case) and the maximum Palo Verde East Path flow (PV East Max Case) scenario. Studies performed included power flow, post-transient, transient stability and short circuit analyses. The performance of the transmission system was measured using the WECC Reliability Criteria and North American Electric Reliability Council (NERC) Planning Standards.

The power flow study results showed that the addition of the Buckeye CSP caused an overload on the JOJOBA – KYRENE 500 kV line (102%) under normal operating condition. Also, the addition of the project caused the JOJOBA-KYRENE 500 kV line and the WHITETANK – RUDD 230 kV line to overload following the respective outages of the PALO VERDE- RUDD 500 kV line and the WHITETANK (APS) – RUDD 230 kV line. The overload on the JOJOBA- KYRENE 500 kV line occurred under the PV East Max Case in which the proposed HASSAYAMPA – PINAL WEST 500 kV line is not looped through the JOJOBA 500 kV Substation. By looping the proposed line through the JOJOBA 500 kV substation, the observed overload is mitigated. The observed contingency overload on the WHITETANK – RUDD 230 kV line (104%) may be attributable to the reduction of the Phoenix area generation below "must run" levels to take more external generation. In this case, the external generation is the Buckeye CSP output. However, the overload would occur regardless of which external generation displaced the Phoenix area generation. Thus, dispatching the Phoenix area generation will mitigate the contingency overload on the WHITETANK-RUDD 230 kV line. Alternatively, the output of the Buckeye CSP could be curtailed following the loss of the WHITETANK (APS) – RUDD 230 kV line to mitigate the WHITETANK- RUDD 230 kV line overload. Further, the study results showed that the addition of the project will

[1] For an "Energy Resource Interconnection", the generating facility's output is assumed to utilize the existing firm or non-firm capacity of the transmission system on an "as available" basis.

cause pre-existing contingency overloads[2] on several interconnected transmission system facilities to exacerbate. To mitigate the observed overloads detailed in this report, the Buckeye CSP would have to be included in the existing or new operational procedures that will be designed for mitigating the observed overloads.

Post-transient study results showed that the addition of the Buckeye CSP did not have any impact to the existing transmission system post-transient voltage deviation limits. The transient stability analysis also showed that the addition of the Buckeye CSP did not impact the stability of the existing transmission system.

The results of the short circuit analysis showed that the expected fault duty at the point of interconnection to the Jojoba 500kV switchyard is approximately 31,350A (three-phase) and 26,626A (single-phase-to ground). The incremental fault duty due to the Buckeye CSP was found to be 1,622A (three-phase) and 2,646A (single-phase-to-ground). The available margins at the vicinity breakers were not available at the time of this report; however, it is expected that due to the magnitude of the incremental fault duty and the relatively new age of the breakers with higher interrupting capability in this region that the interconnection of the Buckeye CSP will not require mitigation of any breakers.

The Palo Verde Updated Final Safety Analysis (UFSAR) was performed to determine the simultaneous Palo Verde Transmission System (PVTS) safety operating limits following the addition of the Buckeye CSP. The Palo Verde UFSAR analysis showed that the entire output (about 11, 947 MW) of the Palo Verde Nuclear Plant (Including 7% output margin) and PVTS Interconnections (including Buckeye CSP) can be dispatched without exceeding any of the Palo Verde transmission system facilities thermal ratings under normal or contingency conditions. The study also showed that the stability of the Palo Verde Nuclear plant is not impacted following the addition of the Buckeye CSP.

[2] SRP has informed the WATS Study Task Force Group that these 230 kV transmission overloads were not a major concern for the following reasons: (1) the base cases used were equivalent cases which were not intended for the local 230 kV transmission system study because they were not adequately represented for the detailed underlying transmission systems, (2) some future upgrade plans might not be incorporated in the SRP internal system, and (3) optimization of generation dispatch could alleviate the overload problems. SRP will reevaluate the realistic operating conditions in the appropriate time and will develop future plans if need be to mitigate these overloads.

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Appendix F: Summary of Short Circuit Analysis 45

ATTACHMENTS

Attachment A: Transient Stability Plots (PV Max Generation Case)
Attachment B: Transient Stability Plots (PV East Max Case)
Attachment C: Transient Stability Plots (Palo Verde UFSAR)
Attachment D: Power flow Analysis Contingency List

INTRODUCTION

FPL Energy, LLC (Customer) has submitted a completed generator interconnection application to the Palo Verde Eastern Transmission System Operating Agent (PVETS), the Salt River Project (SRP) for the Buckeye Concentrating Solar Project (Buckeye CSP). The Buckeye CSP would consist of two 270 MW steam turbines fueled via a solar collector system. The total maximum net plant output will be 500 MW. The Buckeye CSP will be located in Maricopa County, Arizona and its output will be connected to the Jojoba 500kV switchyard via a 3-mile radial 500 kV line. The planned commercial operation date for the Project is December 2012.

The Customer has requested Energy Resource Interconnection Services for the Buckeye CSP. The Customer, in consultation with SRP has elected a third party contractor, PDS Consulting, PLC (PDS), to perform the Generator Interconnection Study (GIS) for the Project. The GIS included power flow, post-transient, transient stability, short circuit and Sub Synchronous Resonance (SSR) analysis. The SSR analysis will be performed in a separate study. The GIS was performed using approved Western Electricity Coordination Council (WECC) 2012 heavy summer base case to determine the impact of the Buckeye CSP on the interconnected transmission system.

The scope of the analysis is to identify the transmission system impacts caused solely by the addition of the Buckeye CSP, and to identify the system reinforcements, if any, necessary to mitigate the adverse impact of the project under different system operating conditions.

PROJECT AND INTERCONNECTION INFORMATION

Table 1 provides the general project and interconnection information about the Buckeye CSP.

Project Location	Maricopa County, Arizona
Number and Type of Generators	2 x 270MW Steam Turbines
Maximum Generator Output	540MW
Generator Auxiliary Load	40MW
Maximum Net Output	500 MW
Power Factor	0.85 leading/lagging
Step-up Transformer	Two 240/300MVA, 18/500 kV 3-phase transformers, Z=12% (180MVA Base)
Interconnection Configuration	3-mile, 500kV tie line from the Buckeye CSP switchyard to the existing Jojoba 500kV switchyard.
Interconnection Voltage	500 kV

Table 1: The Buckeye Concentrated Solar Project General Information

Figure 1 depicts the Buckeye CSP interconnection point and the existing transmission system at the interconnection vicinity.

Figure 1: Buckeye CSP interconnection point and vicinity transmission system

A one line diagram of the project at the proposed interconnection point is shown in Figure 2.

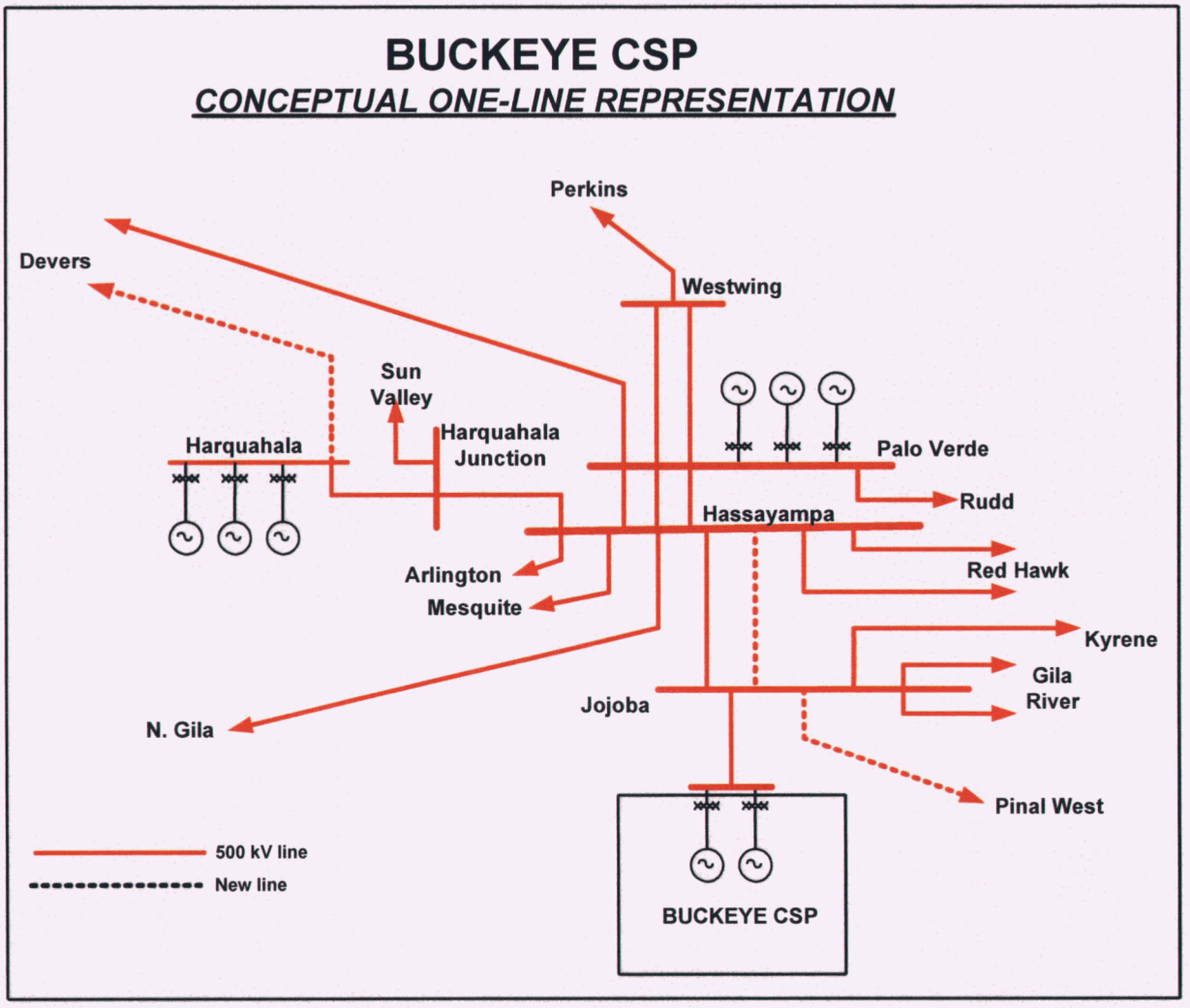


Figure 2: One-Line Diagram of the Buckeye CSP at the Interconnection point

STUDY BASE CASE DESCRIPTION AND ASSUMPTIONS

The GIS was conducted using two heavy summer base cases: Western Electricity Coordination Council (WECC) approved 2012 heavy summer base case (12hs2a1) and Southwest Area Transmission (SWAT) group approved 2011 heavy summer base case as the starting base cases. The 2012 heavy summer base case was updated to reflect 2013 heavy summer operating conditions. Proposed generation projects in SRP and APS control areas that have interconnection queue date ahead of the Buckeye CSP and also have commercial operation date earlier than autumn 2012 were modeled. Also approved transmission projects that have online date prior to autumn of 2012 were modeled. Approved transmission projects modeled include:

- Harquahala Junction-Sun Valley-Raceway-Pinnacle Peak 500 kV lines and the associated 230 kV lines
- **Hassayampa – Pinal West 500 kV (including the Jojoba loop-in)**
- **Pinal West – Pinal Central – Abel – Browning 500kV**
- **Harquahala Junction – Devers 500 kV (DPV2)**

Pre-project Base Cases

Following the addition of the proposed queued generation projects and approved transmission projects, a maximum Palo Verde hub generation case (PV Gen Max Case) was developed from the 2012 heavy summer starting base case. The *PV Gen Max Case* modeled all the commercially operating generating units at Palo Verde-Hassayampa hub at their maximum outputs. The units were also modeled to buck a total of 800 MVar of reactive power. A second pre-project base case, *PV East Max Case* was developed from the 2011 heavy summer base case which was originally approved by SWAT and was used for the Palo Verde East Path (which comprises of Palo Verde-Rudd, Palo Verde-Westwing #1 & #2 and Jojoba-Kyrene 500 kV lines) studies. The *PV East Max Case* modeled the Palo Verde East flow at its current rating of 7510 MW.

These two pre-project base cases were initially tested to ensure that all transmission facilities in Arizona are within their normal operating limits. While it is impossible to study all transmission system flows and generation levels during all seasons, these two pre-project base cases represent extreme generation and transmission flows that will potentially expose any transmission constraints at the interconnection point. Power flow maps with all transmission lines in service for the two pre-project base cases can be found at Appendix A, Sections 1 and 6.

Post-project base Cases

Post-project base cases were developed from the pre-project cases. The post-project base cases modeled the proposed Buckeye CSP as depicted in Figure 2. Two scheduling scenarios were studied. These scheduling scenarios are depicted in Table 2.

The 500 MW output of the proposed project were scheduled to displace Phoenix area and/or merchant generators in the Palo Verde hub as requested by the customer.

Scheduling Scenarios	Buckeye CSP Net Output (MW)	Power Scheduled to Palo Verde (MW)	Power Scheduled to Phoenix (MW)	Displaced Generation
Scenario A	500	0	500	Phoenix Area Peaking Units
Scenario B	500	250	250	Phoenix Area Peaking Units and Palo Verde Hub Generation

Table 2: Generation Scheduling Scenarios

In all three (3) post-project base cases were developed. These base cases and their descriptions are provided in Table 3.

Post-Project Base Cases	Base Case Description
PV Gen Max Case A	Developed from pre-project base case PV Gen Max Case and models scheduling scenario A
PV Gen Max Case B	Developed from pre-project base case PV Gen Max Case and models scheduling scenario B
PV East Max Case A	Developed from pre-project base case PV East Max Case and models scheduling scenario A. The PV East flow was adjusted to be within its7510 MW rating

Table 3: Post-project Base Cases

Palo Verde Updated Final Safety Analysis Report (UFSAR) Cases

The Palo Verde Updated Final Safety Analysis was performed to determine the simultaneous PVTS safety operating limits following the addition of the Buckeye CSP. This includes operating the Palo Verde Nuclear Units at 7% above the maximum generation output. The *PV Gen Max Case A* was used to determine the operating limits (if any) following the interconnection of the Buckeye CSP. The objective of this analysis is to ensure the stability of the Palo Verde Nuclear plant.

STUDY METHODOLOGY AND EVALUATION CRITERIA

Power flow, transient stability, post-transient and short circuit analyses were performed on both the pre-project and the post-project cases to determine the impact of the Buckeye CSP on the interconnected transmission system. Specific studies conducted and their evaluation criteria are outlined below:

Power Flow Analysis/Post-transient Analysis

Power flow and post-transient analysis were performed on both the pre-project and post-project base cases for the 2013 heavy summer operating condition. The pre- and post-project base cases were used to simulate the impact of the Buckeye CSP during normal operating conditions (N-0), as well as, single (N-1) and selected multiple contingencies. These outages (see Attachment D for list) included:

- All single (230-500 kV) transmission circuit outages within the vicinity of the project
- All single transformer outages within the vicinity of the project.
- Selected outages of double circuit tower lines (230-500 kV) within the vicinity of the project.

The post-transient analysis study methodology used is provided below:

- All loads are modeled as constant MVA during the post-transient time frame.
- All manually operated voltage control devices (including Tap-Changing-Under - Load (TCUL) transformers and Static Var Devices (SVD's)) are fixed at their pre-contingency levels.
- Phase shifting transformers are not allowed to vary from their pre-contingency levels.
- Remedial actions schemes such as generator dropping, load shedding and blocking of automatic generation control (AGC) are not considered for single contingencies.
- Generator MVAR limits are modeled as a single value for each generator and manual operator intervention is not allowed to increase the generator MVAR flow.

The WECC/NERC planning standards were used to assess the adequacy of the study results. The power flow and post-transient analysis related evaluation criteria that were used are summarized below:

- Pre-contingency bus voltage must be between 0.95 per unit and 1.05 per unit (SRP maintains a minimum of 1.0 p.u at 230 kV and above buses).
- Maximum voltage deviation allowed at all buses under contingency conditions must be 5% and 10% for N-1 and N-2 contingencies respectively.
- Pre- disturbance loading to remain within the continuous ratings of all equipment and line conductors.

- Post-disturbance loading to remain within emergency ratings of all equipment and line conductors.

Transient Stability Analysis

Transient stability studies were conducted on both the pre-project and post-project base cases for the 2013 heavy summer operating condition. Transient stability runs were simulated for 10 seconds excluding a 1 second pre-outage run to ensure the system is stable and positively damped.

Selected critical contingencies were simulated. Provided below are some of the outages simulated:

- Palo Verde-Devers 500 kV Line
- Harquahala Junction-Devers 500 kV Line
- Harquahala Junction-TS5 500 kV line
- Hassayampa-North Gila 500 kV Line
- Moenkopi- Eldorado 500 kV Line
- Navajo-Crystal 500 kV Line
- **Hassayampa – Jojoba 500kV line**
- Hassyampa-Pinal West 500 kV line[3]
- **Jojoba – Pinal West 500 kV line[4]**
- **Jojoba – Kyrene 500 kV line**
- **Palo Verde – Rudd 500 kV line**
- Mead-Perkins 500 kV Line
- **Palo Verde – Westwing # 1 500 kV line**
- Palo Verde-Westwing 500 kV #1 & 2 Lines
- Palo Verde-Devers and Harquahala-Devers 500 kV Lines
- IPPDC Bi-Pole
- Palo Verde Generating units 1 and 2
- Hassayampa-Jojoba #1 & 2 500 kV lines
- Hassyampa-Jojoba & Hassayampa-Pinal West 500 kV lines
- Palo Verde-Westwing #1 & **Palo Verde – Rudd 500 kV Lines**
- **Jojoba – Kyrene & Hassayampa – Pinal West 500 kV lines**

The transient stability evaluation criteria used to evaluate the impact of the project are as follows:

- All machines in the interconnected system shall remain in synchronism as demonstrated by their relative rotor angles.
- System stability is evaluated based on the damping of the relative rotor angles and the damping of the voltage magnitude swings.

[3] **The Hassayampa – Pinal West 500 kV line is applicable to PV East Max Case only**
[4] The Jojoba-Kyrene 500 kV line outage is applicable to PV Gen Max Case only

- WECC transient voltage dip criteria: The transient voltage dip must not exceed 25% at load buses or 30% at non-load buses for N-1 contingency. For N-2 contingency, the transient voltage dip must not exceed 30% at any bus. The maximum duration of the voltage dip of 20% at load buses must not exceed 20 cycles for N-1 contingency or 40 cycles for N-2 contingency.
- WECC transient frequency criteria: The minimum transient frequency for N-1 contingency is 59.6 Hz; if below 59.6 Hz, the duration must not exceed 6 cycles at load bus. For N-2 contingencies, the minimum transient frequency is 59.0 Hz; if below 59.0 Hz, the duration should not exceed 6 cycles at load bus.

A summary of the transient stability analysis evaluation criteria is provided in Table 2 and depicted graphically in Figure 3.

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
A System normal	Not Applicable	Nothing in addition to NERC		
B One element out-of-service	≥ 0.33	Not to exceed 25% at load buses or 30% at non-load buses. Not to exceed 20% for more than 20 cycles at load buses.	Not below 59.6Hz for 6 cycles or more at a load bus.	Not to exceed 5% at any bus.
C Two or more elements out-of-service	0.033 – 0.33	Not to exceed 30% at any bus. Not to exceed 20% for more than 40 cycles at load buses.	Not below 59.0Hz for 6 cycles or more at a load bus.	Not to exceed 10% at any bus.
D Extreme multiple-element outages	< 0.033	Nothing in addition to NERC		

Table 2: Stability and Post-transient Analysis Evaluation Criteria

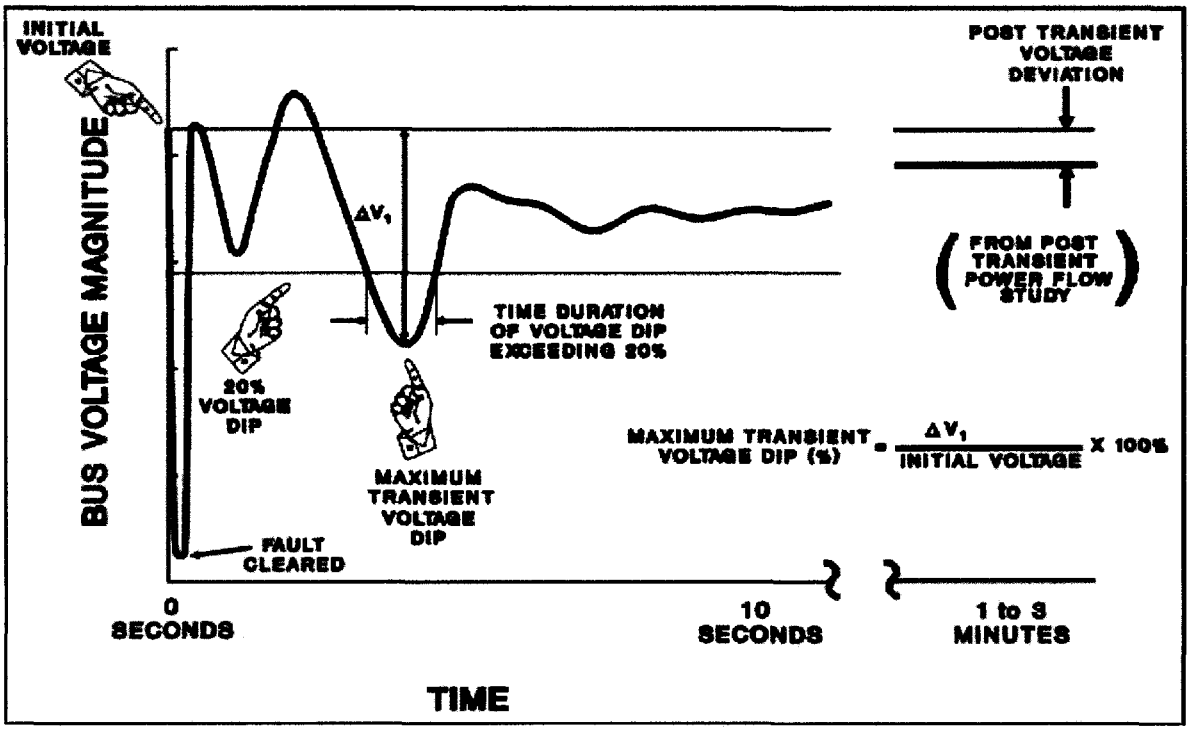


Figure 3: Graphical Representation of Stability Analysis Evaluation Criteria

Post-transient Reactive Power Margin Analysis

Post –transient reactive power margin analysis was performed on the PV East Path using the *PV East Max Case*. This included stressing the PV East Path 5% higher than its 7510 MW rating for N-1 contingencies and 2.5% higher for N-2 contingencies. To meet the planning standards the transmission system must have a positive reactive margin under these conditions. Additionally, reactive power margins were also calculated for the KYRENE, PINNACLE PEAK (APS), RUDD and WESTWING 230 kV buses. The contingency list used for this analysis is the same as the transient stability analysis contingency list.

Short Circuit Analysis

Short circuit studies were performed to evaluate the impact of the addition of the Buckeye CSP on selected PVETS participant's substation breaker duties. The studies were conducted in accordance with PVETS requirements.

Southwest utilities (e.g. SRP, TEP, APS, EPE, PNM, WAPA, IID, etc.) participate in the SWAT Short Circuit Work Group. Within the group, members agree to solution assumptions and options (i.e. phase shifter modeling, series capacitor flashing, pre-fault voltages, etc.) for performing fault duty studies and evaluating results. Members use

PTI and ASPEN programs and routinely convert databases for use between the two programs.

For the PVETS and this Interconnection Study, PDS used the current short circuit data base with updated system equivalent data and incorporated the Buckeye CSP for the assessment of the post-project scenario. For the pre-project case, PDS used the current data base for the 2013 time frame and included system upgrades as required.

Palo Verde Updated Final Safety Analysis Report (UFSAR)

The methodology and evaluation criteria for the UFSAR analysis include:

- Dispatch the Palo Verde Nuclear Units at 7% above its maximum operating limit of 4227 MW
- Dispatch at maximum all the commercially operating generating units (PVTS Interconnections) in the Palo Verde hub up to 6884 MW.
- Model the Palo Verde Nuclear Units and the PVTS Interconnections to buck up to 800 MVAR
- Dispatch the Buckeye CSP at 540 MW
- Determine the maximum total net generation that can safely be injected by Palo Verde Nuclear Units and the PVTS Interconnections without exceeding any of the PVTS thermal capability.
- Determine the Palo Verde plant stability limit and/or a transient voltage dip limit

STUDY RESULTS

Provided below is a summary of the performance of the interconnected transmission system following the power flow, post-transient and transient analyses of the pre- and post-project base cases. Detailed results are provided in the next section.

a) Normal (N-0) operating conditions

The pre-project base case (PV Gen Max Case) modeled a total generation of 10,781 MW from all of the Palo Verde Transmission System (PVTS) interconnectors including 4,227 MW of nuclear generation and up to 6,554 MW of thermal and steam generation. The post-project base cases (PV Gen Max Case A and PV Gen Max Case B) modeled additional net generation of 500 MW from the Buckeye CSP. The PV East Max pre-project base case modeled a total of 10820 MW of generation at PVTS.

The maximum pre-project flow under base case conditions was recorded on JOJOBA-KYRENE 500 kV line (99% of line's continuous rating). Following the injection of the Buckeye CSP output, the flow increased to 101.7% of the line's continuous rating. This normal overload is mitigated by looping the proposed HASSAYAMPA- PINAL WEST 500 kV line through JOJOBA 500 kV Substation. Table 4 below provides a summary of the major 500 kV line flows under base case conditions at the interconnection point.

b) Single element outage (N-1) conditions

The most critical single element outage occurs under the PV East Max base case condition. Under this condition, an outage of PALO VERDE RUDD 500 kV line loads the JOJOBA- KYRENE 500 kV line by 101% of the line's emergency rating. The pre-project loading following the same contingency is 99%. This normal overload is mitigated by looping the proposed HASSAYAMPA- PINAL WEST 500 kV line through JOJOBA 500 kV Substation.

No voltage deviation violation per WECC/NERC standard was observed under the N-1 conditions. Stable and adequately damped transient stability performance was observed following the N-1 outages simulated.

c) Credible N-2 outage conditions

The critical N-2 outage was found to be PALO VERDE-WESTWING #1 &2 500 kV lines. This outage causes the JOJOBA-KYRENE 500 kV line to load up to 109% of the line's emergency rating. The pre-project loading is 107%.

No voltage deviation violation per WECC/NERC standard was observed under the N-2 conditions. Stable and adequately damped transient stability performance was observed following the N-2 outages simulated.

Attribute	Pre-project Base Case	Post-project Base Case		Pre-project Base Case	Post-project Base Case
	PV Gen Max Case	PV Gen Max Case A	PV Gen Max Case B	PV East Max Case	PV East Max Case A
PVTS Generation (MW)	10,781	11,321	11,071	10,820	10,831
Nuclear Generation (MW)	4,227	4,227	4,227	4,227	4,227
Thermal/Steam (MW)	6,554	6,554	6,304	6,593	6,064
Buckeye CSP (MW)	0	540	540	0	540
N-0 Loadings (%)					
PV-Rudd 500 kV line	72.0	76.0	74.0	83.0	82.0
PV-WestWing #1 500 kV line	37.5	39.8	38.7	54.9	54.0
PV-Devers 500 kV line	47.0	47.6	47.5	20.9	20.7
Hassayampa-N. Gila 500 kV line	55.8	56.4	56.1	22.4	22.2
Jojoba-Kyrene 500 kV line	61.2	66.2	64.5	99.0	101.7
N-1Contingency Loadings(%)-Critical Outage: PALO VERDE-RUDD 500 kV LINE					
PV-Rudd 500 kV line	0.0	0.0	0.0	0.0	0.0
PV-WestWing #1 500 kV line	48.1	51.2	49.7	74.8	74.0
PV-Devers 500 kV line	38.7	39.2	39.1	20.1	
Hassayampa-N. Gila 500 kV line	42.7	43.4	43.1	18.9	19.0
Jojoba-Kyrene 500 kV line	68.1	73.6	71.6	98.9	100.8
N-2Contingency Loadings(%)-Critical Outage: PALO VERDE-WESTWING#1&2 500 kV LINES					
PV-Rudd 500 kV line	53.9	57.4	55.3	77.8	77.0
PV-WestWing #1 500 kV line	0.0	0.0	0.0	0.0	0.0
PV-Devers 500 kV line	43.0	43.8	43.6	32.8	32.2
Hassayampa-N. Gila 500 kV line	46.1	46.9	46.6	25.8	25.5
Jojoba-Kyrene 500 kV line	73.1	78.9	76.8	107.0	108.8

Table 4: System Conditions under Base Case and following Critical N-1 and N-2 outages

Power Flow /Post-Transient Analysis Results

a) *PV Gen Max* Operating Condition

Power flow solutions were achieved for all the contingencies simulated (See Attachment D for the power flow contingency list) under the *PV Gen Max* operating condition for both the pre- and post-project base cases. Summary of the power flow analysis results are provided in Appendix B, Tables B1 and B2. Power flow Maps with all transmission lines in service for the pre- and post-project base cases can be found at Appendix A. Also provided in Appendix A are the difference power flow maps between pre- and post-project base cases. Key findings from the power flow analysis during the *PV Gen Max* operating condition are:

- **No N-0 Transmission Facility Overload**

The study did not identify any transmission facility overload following the addition of the Buckeye CSP under the scheduling scenarios (See Table 2) modeled during the normal operating condition with all the generating facilities in Palo Verde hub operating at their maximum outputs.

- **One New N-1 Transmission facility Overload**

As depicted in Appendix B, Tables B1 and duplicated in Table 5 below, the addition of the Buckeye CSP and the subsequent schedule of the project's output to displace peaking units in Phoenix triggered a new 230 kV transmission facility to overload under contingency conditions. In particular, the outage the WHTNKAPS-RUDD 230 KV line overloads the WHITETNK-RUDD 230 KV line up to 4% under the scheduling scenarios A. The contingency loading on the WHITETNK-RUDD 230 KV line prior to the addition of the Buckeye CSP is 94%. The observed contingency overload on the WHITETNK – RUDD may be attributable to the reduction of the Phoenix area generation below "must run" levels to take more external generation. In this case, the external generation is the Buckeye CSP output. However, the overload would occur regardless of which external generation displaced the Phoenix area generation.

Contingency	Overloaded Facility	Applicable rating	Percent Loading	
			Pre-Project	Post-Project
Scheduling Scenario A				
WHTNKAPS- RUDD 230 KV LINE	WHITETNK – RUDD 230 KV LINE	2310 A	94	104

Table 5: *PV Gen Max* Operating Condition- New N-1 Overload

- **Several Existing N-1 Transmission Facility Overloads**

The addition of the Buckeye CSP caused existing contingency overload on four (4) transmission facilities to exacerbate following selected critical outages. Table 6 provides a summary of the critical outages and the associated transmission facility overloads.

Contingency	Overloaded Facility	Applicable rating	Percent Loading	
			Pre-Project	Post-Project
Scheduling Scenario A				
PINPK – PINPKSRP #1 230 KV LINE	PINPK – PINPKSRP #2 230 KV LINE	1700 A	102	105
PINPK – PINPKSRP #2 230 KV LINE	PINPK – PINPKSRP #1 230 KV LINE	1700 A	102	105
BROWNING #1 500/230 KV TRANSFORMER	BROWNING #2 500/230 KV TRANSFORMER	598 MVA	125	134
BROWNING #2 500/230 KV TRANSFORMER	BROWNING #1 500/230 KV TRANSFORMER	598 MVA	125	134

Table 6: *PV Gen Max* Operating Condition- Existing N-1 Overload

- **No Post-transient Voltage Deviation Violation**

Post-transient analysis was performed on selected critical outages (outage list is the same as the transient stability contingency list). The study did not identify any impact to the existing transmission system post-transient voltage deviation limits following the addition of the Buckeye CSP and subsequent dispatch of the project output Phoenix and/or Palo Verde hub. Appendix C, Tables C1 and C2 summarize the results of the post-transient analysis.

b) *PV East Max* Operating Condition

The pre-project *PV East Max Case* modeled the PV East flow at 7510 MW. Following the scheduling of the Buckeye CSP output to Phoenix in the post-project base case, the PV East flow exceeded the 7510 MW rating. The PV East flow was therefore reduced to pre-project levels by increasing the output of the generators in the Phoenix area and reducing the output of generators in the Palo Verde hub. Power flow analysis was performed on both the pre- and post-project base cases. All the contingencies simulated yielded power flow solutions. Summary of the power flow analysis results are provided in Appendix B, Table B3. Power flow maps with all transmission lines in service for the pre- and post-project base cases can be found at Appendix A. Also provided in Appendix A are the difference power flow maps between pre- and post-project base cases. Key findings from the power flow analysis during the *PV East Max* operating condition are:

- **One (1) New N-0 Transmission Facility Overload**

Following the interconnection of the Buckeye CSP to the JOJOBA 500 kV substation via a 3-mile radial line, the flow on the JOJOBA-KYRENE 500 KV line increased from 99% to 102% of the line's continuous rating of 2660 A. Obviously this overload is attributable to the interconnection of the Buckeye CSP. It must however be noted that the PV East Max Case did not include the proposed HASSAYAMPA-PINAL WEST 500 kV line loop in through JOJOBA 500 kV substation. By looping the HASSAYAMPA – PINAL WEST 500 kV line, the observed overload is mitigated.

- **One (1) New N-1 Transmission facility Overload**

As depicted in Appendix B, Tables B3 and duplicated in Table 7, the interconnection of the Buckeye CSP triggered a new 500 kV transmission facility to overload under contingency conditions. In particular, the outage the PALO VERDE-RUDD 500 KV line overloads the JOJOBA - KYRENE 500 KV line by 1%. The contingency loading on the JOJOBA-KYRENE 500 KV line prior to the interconnection of the Buckeye CSP is 99%.

Contingency	Overloaded Facility	Applicable rating	Percent Loading	
			Pre-Project	Post-Project
Scheduling Scenario A				
PALO VERDE-RUDD 500 KV LINE	JOJOBA – KYRENE 500 KV LINE	3175 A	99	101

Table 7: *PV East Max* Operating Condition - New N-1 Overload

- **No Post-transient Voltage Deviation Violation**

Post-transient analysis was performed on selected critical outages (outage list is the same as the transient stability contingency list). The study did not identify any impact to the existing transmission system post-transient voltage deviation limits following the addition of the Buckeye CSP and subsequent dispatch of the project output Phoenix and/or Palo Verde hub. Appendix C, Table C3 summarizes the results of the post-transient analysis.

Transient Stability Analysis Results

The transient stability analysis was performed on both *PV Gen Max* and *PV East Max* pre- and post-project base cases. A set of bus voltage, frequency and machine angle plots for each contingency simulated can be found at Attachments A and B. Key findings following the transient stability analysis are:

- Stable and adequately damped transient stability performances were achieved following all the outages simulated. Summary of the transient stability analysis are provided in Appendix D.

- No violation of WECC transient voltage dip and frequency criteria was found following all the outages simulated.

Post-Transient Reactive Power Margin Analysis Results

Reactive power margin analysis was performed for the PV East Max Case. For single contingencies, the flow on PV East Path was increased by 5% from 7510 MW to 7886 MW. For double contingencies the flow on PV East Path was increased by 2.5 %. Positive reactive margin was recorded for all the contingencies performed with and without the addition of the Buckeye CSP. Positive reactive margins were also recorded for the four 230 kV buses (RUDD, WESTWING, PINNACLE PEAK and KYRENE) monitored. A summary of the post-transient reactive margin analysis results following the interconnection of the Buckeye CSP is provided in Appendix E.

Short Circuit Analysis Results

To perform the short circuit study, the Buckeye generation addition was modeled in the SWAT 2008 short circuit case using the ASPEN One-Liner software.

The following data was used to prepare the short circuit case:

500 kV Line Impedances (Jojoba is the Point of Interconnection)

JOJOBA – BUCKEYE CSP Z1=0.00006 + j0.00024 p.u.
Z0=0.00016 + j0.00102 p.u.

Generator Step-up Transformers (two)

525/18.0kV (Y-Grounded/Delta)
Z1=0.0003 + j0.12 p.u. (180MVA Base)
Z0=0.0003 + j0.12 p.u. (180MVA Base)

Generators (two)

Machine Base = 293.5 MVA (18.0KV)
Subtransient reactance = Xd" = 0.20
Transient reactance = Xd' = 0.258

The following Table 8 summarizes the incremental impacts for the area:

BUS	BUS	PRE-PROJECT		POST-PROJECT		INCREMENTAL	
NAME	KV	3LG(A)	1LG(A)	3LG(A)	1LG(A)	3LG(A)2	1LG(A)2
BUCKEYECSP	525	0	0	29,526	24,415	29,526	24,415
JOJOBA (POI)	525	29,728	23,980	31,350	26,626	1,622	2,646
GILA_RIVER	525	24,852	23,271	25,690	24,234	838	964
HASSYAMP500	525	51,353	52,767	52,147	53,455	793	688
PALOVRDE_500	525	51,640	54,109	52,368	54,724	729	615
KYRENE_230	230	52,417	49,067	52,676	49,279	260	212
KYRENE_500	525	20,107	18,173	20,292	18,327	186	154
RUDD_230	230	52,917	45,996	53,096	46,090	180	95
WESTWING_500	525	34,575	27,789	34,729	27,857	154	68
PERKINPS	525	34,015	26,925	34,163	26,988	148	63
PINPK_SRP	230	48,258	46,525	48,358	46,588	101	62
RUDD_500	525	20,184	16,471	20,264	16,508	80	37
WESTWING_W2	230	28,172	28,655	28,214	28,683	41	29
PINAL_WEST	525	11,196	7,977	11,226	7,989	30	11
GILA_BEND230	230	8,495	8,133	8,521	8,154	26	21

A more detailed summary table for the short circuit analysis can be found in Appendix F.

The available margins at the vicinity breakers were not available at the time of this report; however, it is expected that due to the magnitude of the incremental fault duty and the relatively new age of the breakers with higher interrupting capability in this region that the interconnection of the Buckeye CSP will not require mitigation of any breakers.

Palo Verde UFSAR Analysis

The Palo Verde UFSAR analysis showed that the entire output (about 11, 947 MW) of the Palo Verde Nuclear Plant (Including 7% output margin) and PVTS Interconnections (including Buckeye CSP) can be dispatched without exceeding any of the Palo Verde transmission system facilities thermal ratings under normal or contingency conditions. The study also showed that the stability of the Palo Verde Nuclear plant would not be compromised following the addition of the Buckeye CSP. The results of the stability analysis are provided in Attachment C.

MITIGATION PLAN

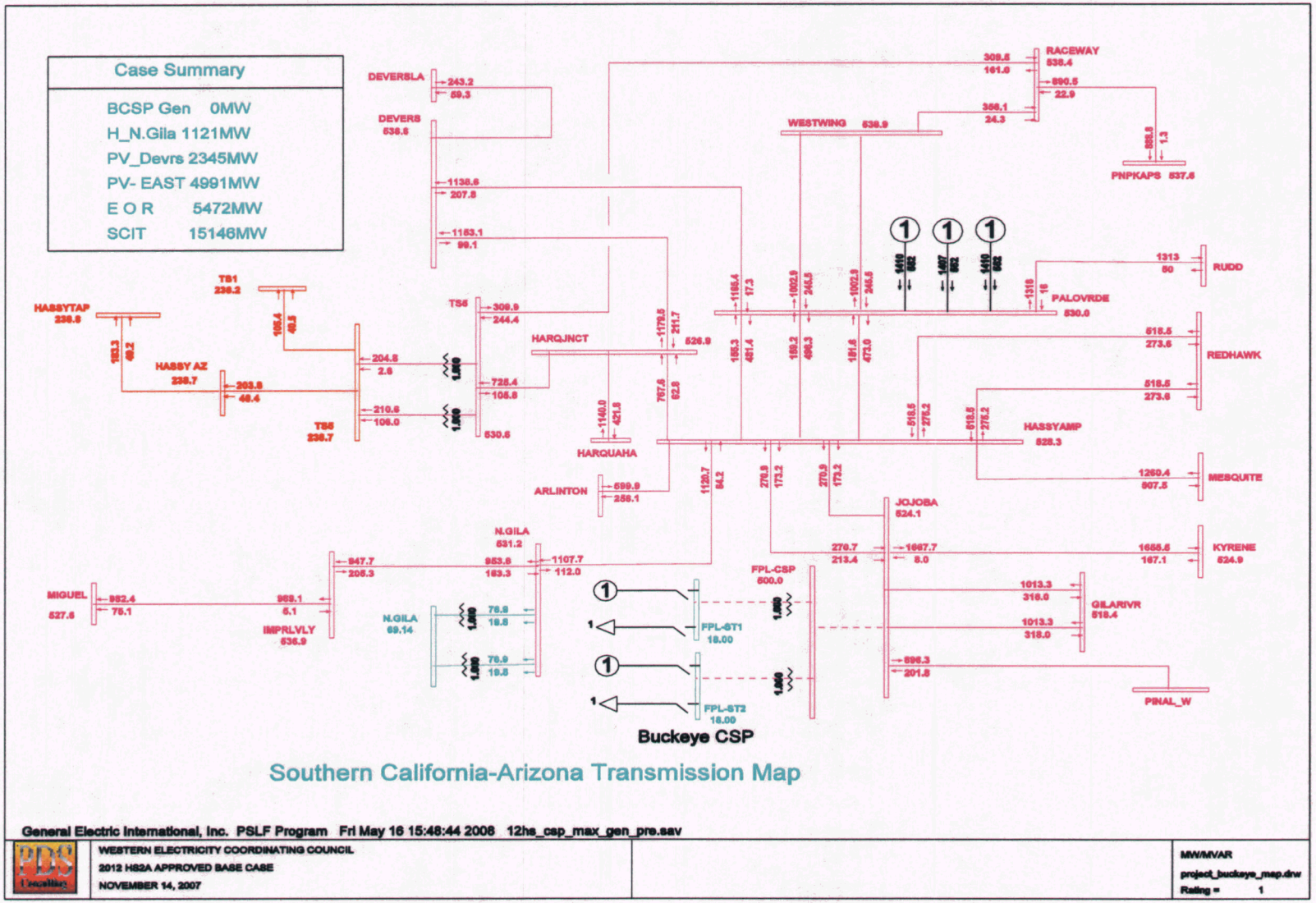
Provided below is the recommended corrective mitigation plan for the identified transmission facility overload solely due to the addition of the Buckeye CSP. For the existing overloads exacerbated with the addition of the Buckeye CSP, the project could be included in the existing mitigation plan or be made to participate in any new mitigation plan designed for such an overload. Further, SRP informed the WATS Study Task Force Group that the overloads were not a major concern for the following reasons: (1) the base cases used were equivalent cases which were not intended for the local 230 kV transmission system study because they were not adequately represented for the detailed underlying transmission systems, (2) some future upgrade plans might not be incorporated in the SRP internal system, and (3) optimization of generation dispatch could alleviate the overload problems. Additionally, SRP will reevaluate the realistic operating conditions in the appropriate time and will develop future plans if need be to mitigate these overloads.

Worst Outage	Overloaded Facility	Recommended Mitigation
N-0		
ALL LINES IN SERVICE	**JOJOBA – KYRENE 500 KV LINE**	**Loop proposed HASSYAMP –** PINAL WEST 500 kV line through JOJOBA 500 kV substation
N-1 Outage		
WHITNKAPS –RUDD 500 kV LINE	**WHITETNK – RUDD 230 KV LINE**	Dispatch Phoenix area generation to mitigate the observed overload
PALO VERDE-RUDD 500 KV LINE	JOJOBA-KYRENE 500 KV LINE	**Loop proposed HASSYAMP –** PINAL WEST 500 kV line through JOJOBA 500 kV substation
N-2 Outage		
PALO VERDE – WESTWING #1 &2 500 kV LINE	**JOJOBA – KYRENE 500 KV LINE**	**Loop proposed HASSYAMP –** PINAL WEST 500 kV line through JOJOBA 500 kV substation

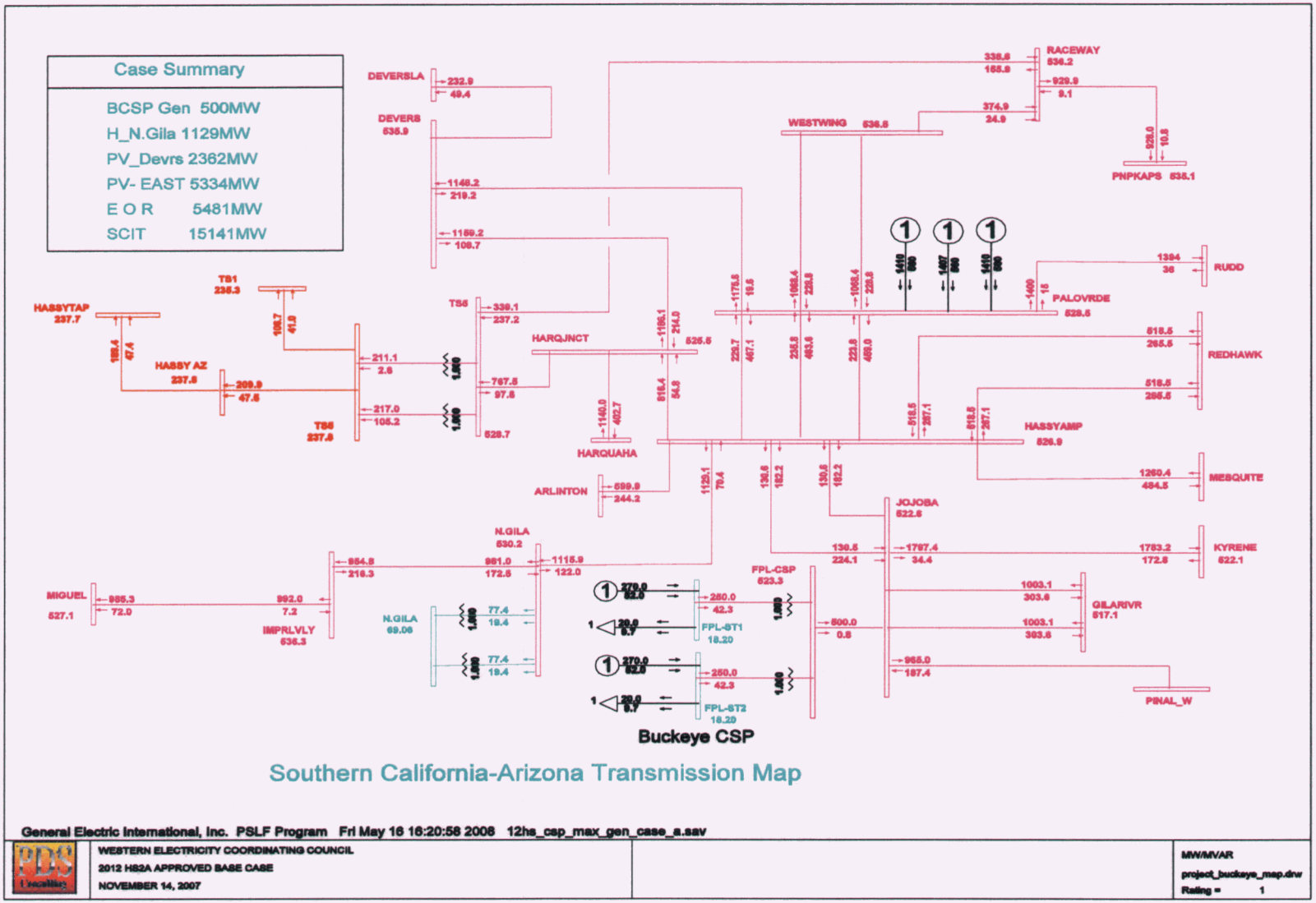
Appendix A

Power Flow Maps

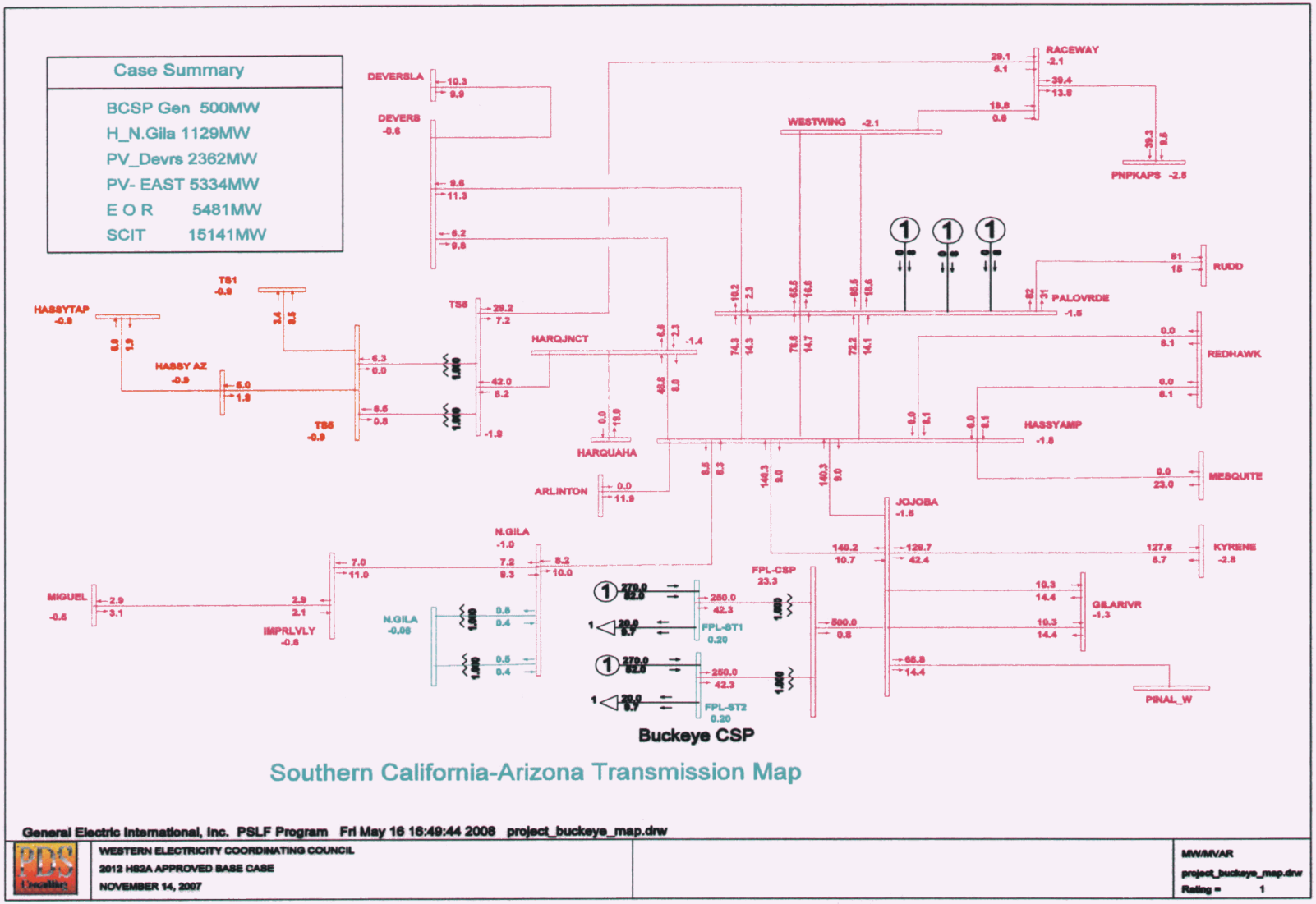
Section 1: 2012 Heavy Summer PV Gen Max Case-Power Flow Map (All lines in service)



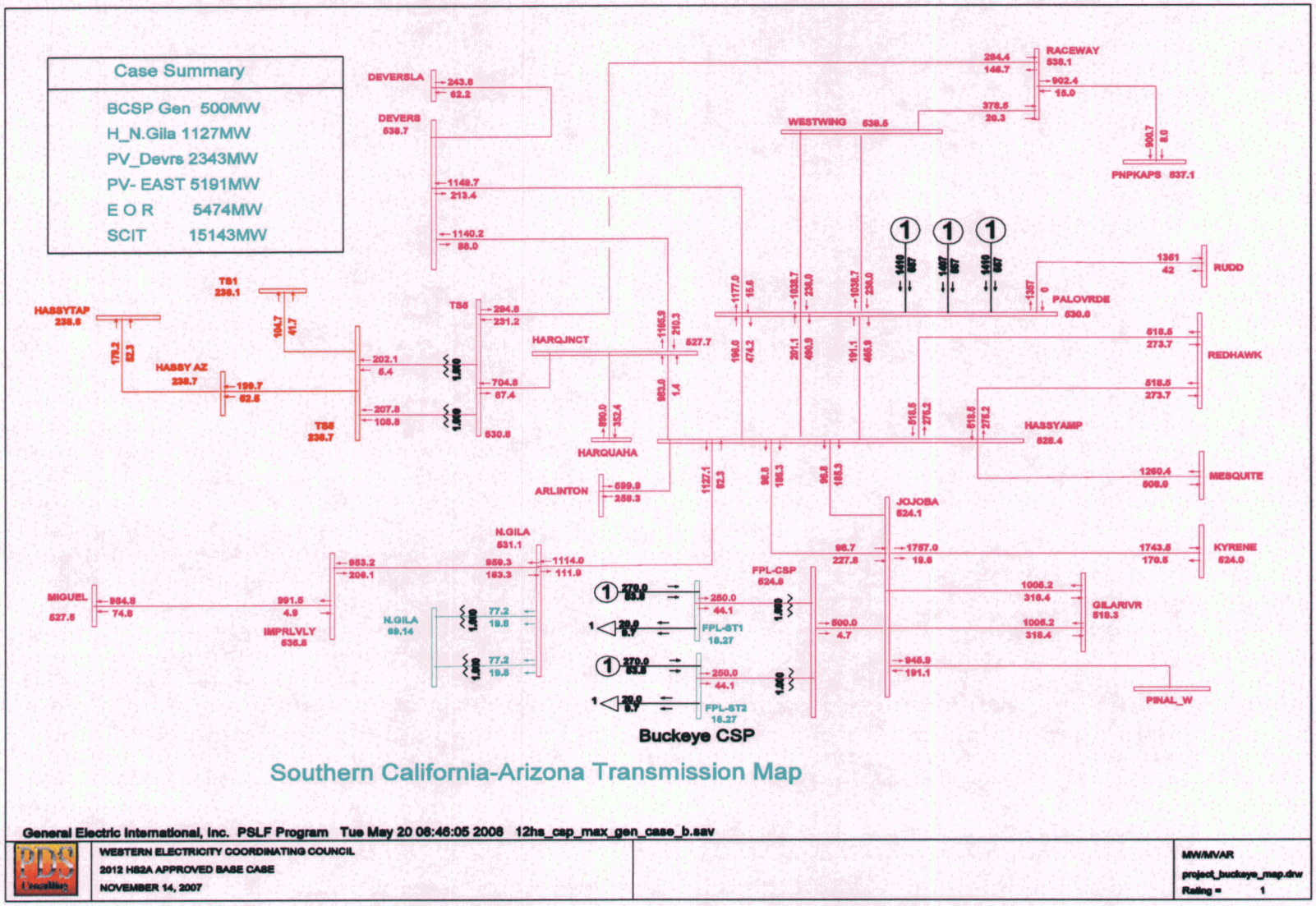
Section 2: 2012 Heavy Summer PV Gen Max Case A - Power Flow Map (All lines in service)



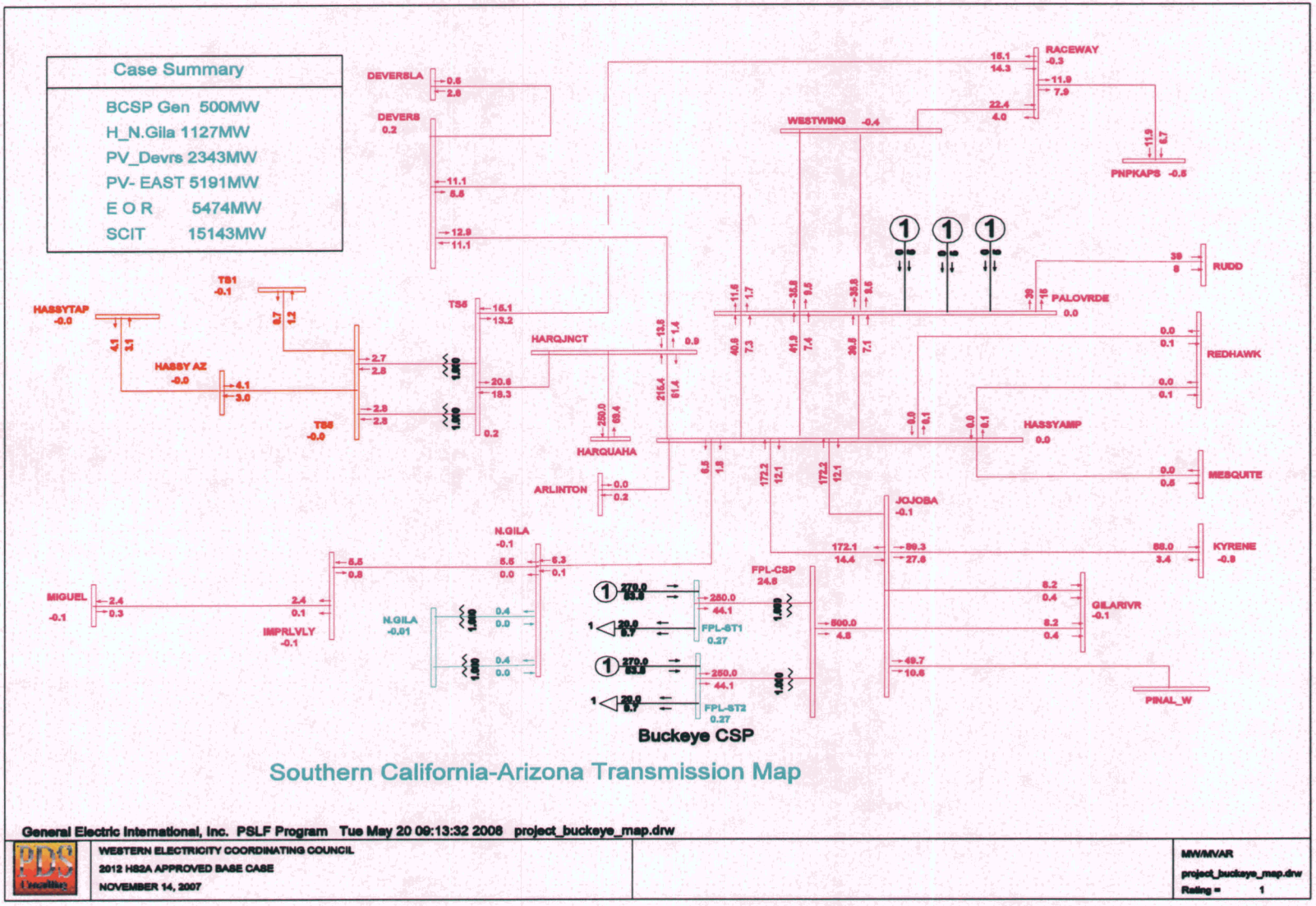
Section 3: Difference Power Flow Map ---PV Gen Max Case vs. PV Gen Max Case A (All lines in service)



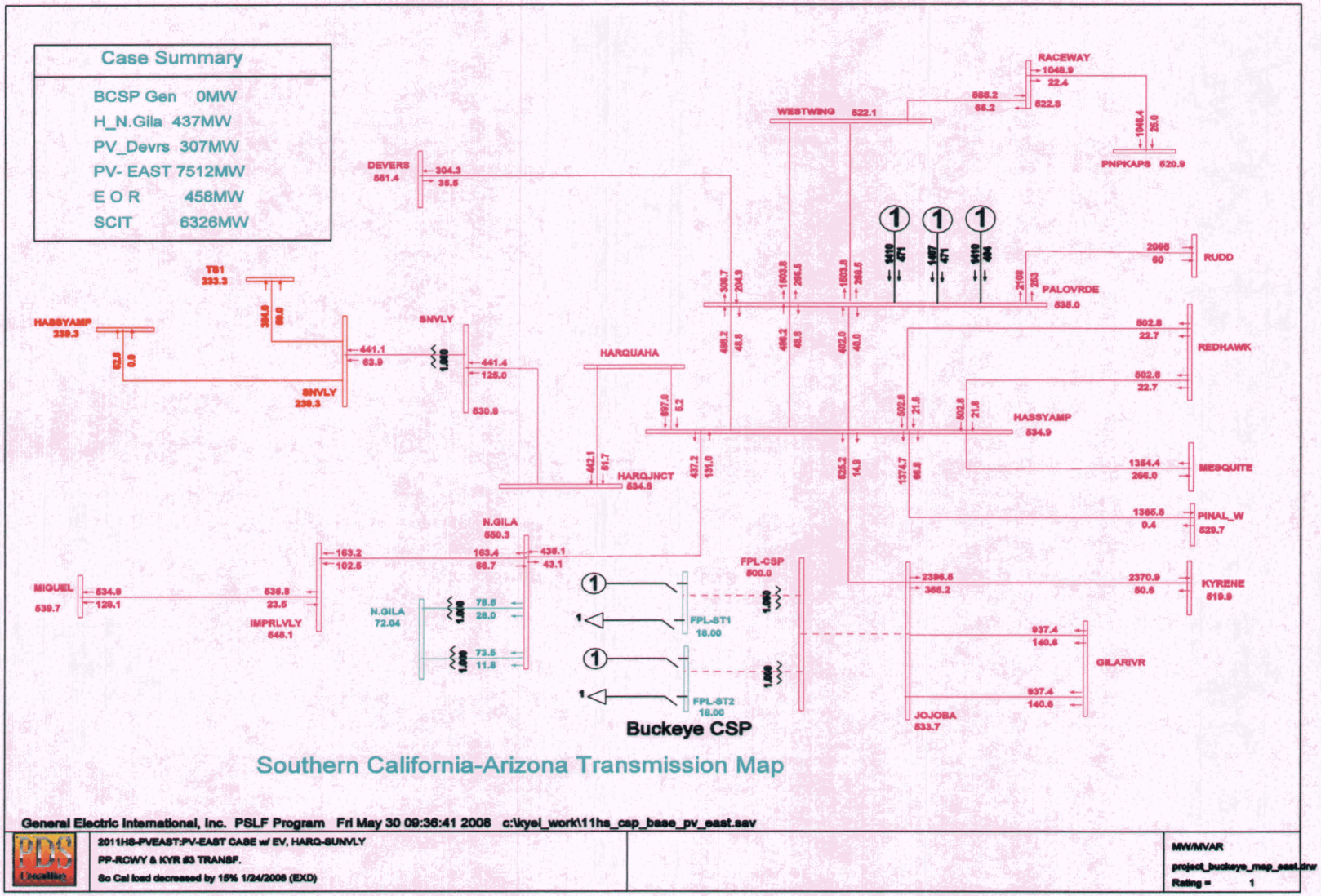
Section 4: 2012 Heavy Summer PV Gen Max Case B - Power Flow Map (All lines in service)



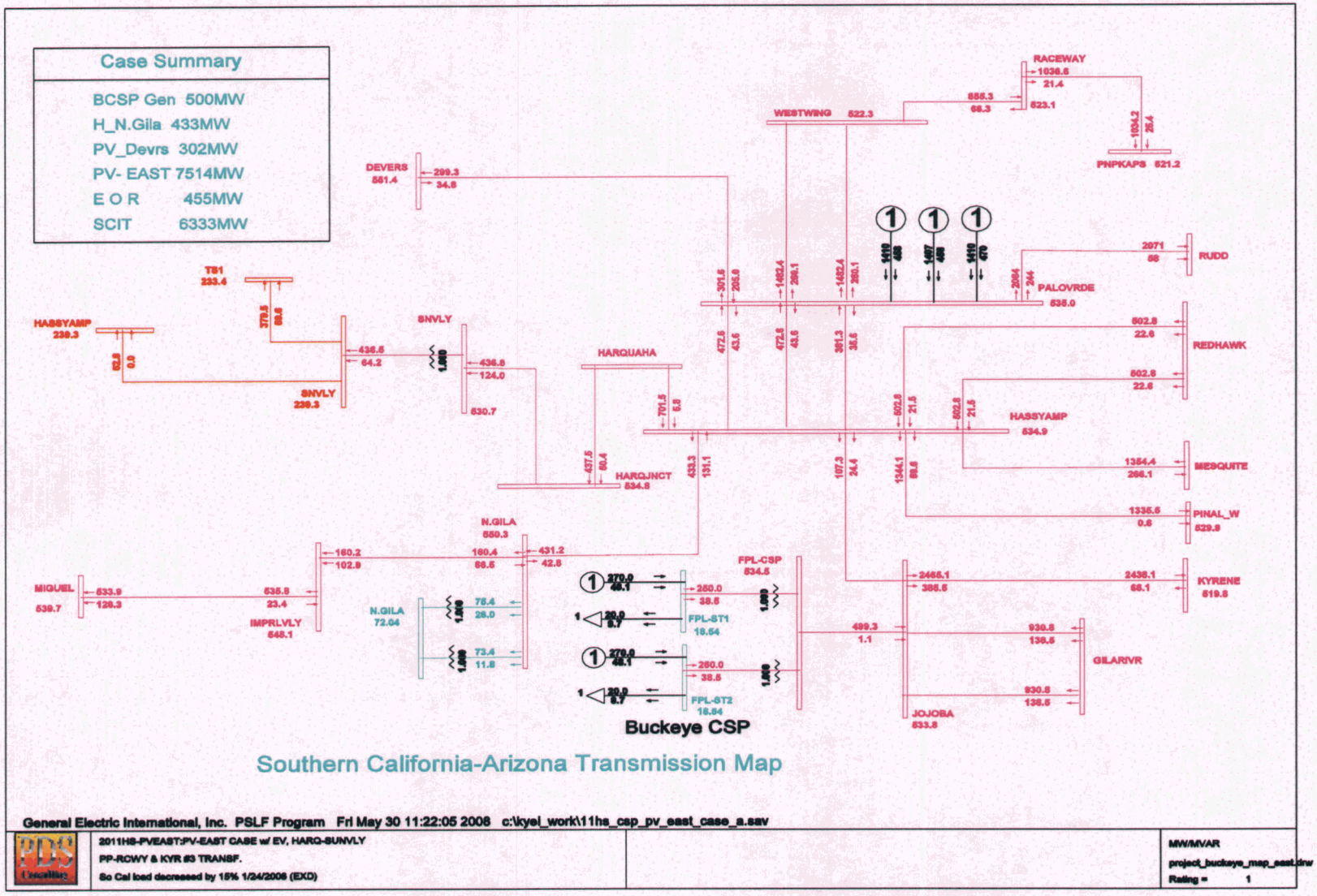
Section 5: Difference Power Flow Map ---PV Gen Max Case vs. PV Gen Max Case B (All lines in service)



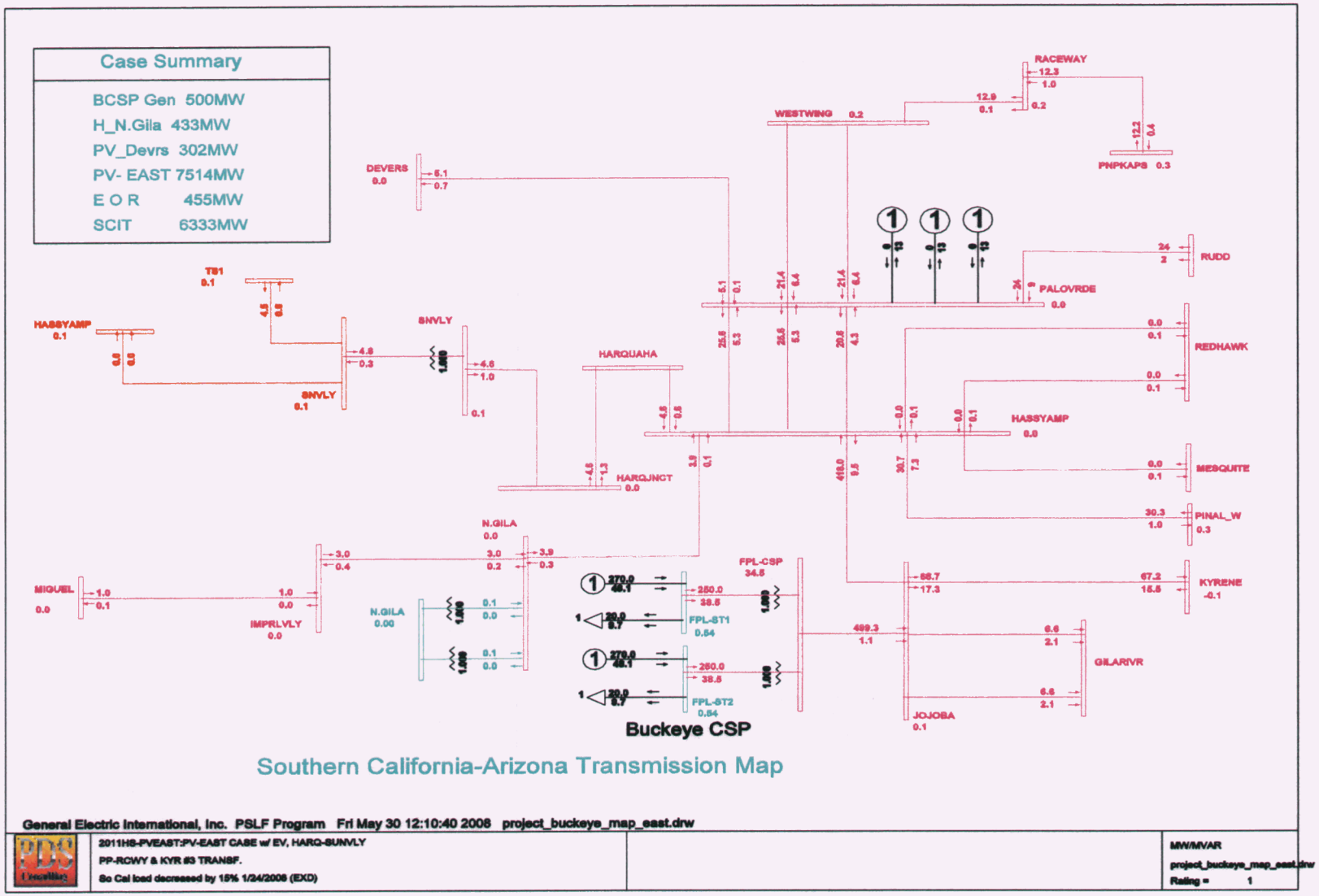
Section 6: 2011 Heavy Summer PV East Max Case- Power Flow Map (All lines in service)



Section 6: 2011 Heavy Summer PV East Max Case A - Power Flow Map (All lines in service)



Section 5: Difference Power Flow Map ---PV East Max Case vs. PV East Max Case A (All lines in service)



Appendix B

Summary of Power Flow Analysis Results

Table B1: Summary of Power Flow Study Results for PV Gen Max Case Vs PV Gen Max Case A

Outage Element	Overloaded Facility	Applicable Rating	PV Gen Max Case Loading (%)	PV Gen Max Case A Loading (%)	Comments
Category A—Normal Overloads					
ALL LINES IN SERVICE	NONE	N/A	N/A	N/A	None
Category B Contingencies					
WHTNKAPS- RUDD 230 KV LINE	WHITETNK – RUDD 230 KV LINE	2310 A	94	104	Overload triggered by the addition of the proposed project
LEUPP–COCONINO 230 KV LINE	VERDE – YAVAPAI 230 KV LINE	748 A	141	142	Pre-project overload. Overload persisted with addition of proposed project
LINCSTRT- WPHXAPSN 230 KV LINE	AGUAFRIA- GLENDALE 230 KV LINE	1428 A	108	103	
PINPK – PINPKSRP #1 230 KV LINE	PINPK – PINPKSRP #2 230 KV LINE	1700 A	102	105	Pre-project overload. Overload exacerbated with addition of proposed project
PINPK – PINPKSRP #2 230 KV LINE	PINPK – PINPKSRP #1 230 KV LINE	1700 A	102	105-	
FLAGSTAF-GLENCANY #1 345. KV LINE	FLAGSTAF-GLENCANY #2 345. KV LINE	1680 A	114	114	Pre-project overload. Overload persisted with addition of proposed project
FLAGSTAF-GLENCANY #2 345. KV LINE	FLAGSTAF-GLENCANY #1 345. KV LINE	1680 A	114	114	
ORME – RUDD 230 KV LINE	ANDERSON – KYRENE 230 KV LINE	2200 A	103	104	
CHOLLA - LEUPP 230 KV LINE	VERDE – YAVAPAI 230 KV LINE	530 A	141	142	
BROWNING #1 500/230 KV TRANSFORMER	BROWNING #2 500/230 KV TRANSFORMER	598 MVA	125	134	Pre-project overload exacerbated with addition of proposed project
BROWNING #2 500/230 KV TRANSFORMER	BROWNING #1 500/230 KV TRANSFORMER	598 MVA	125	134	

Table B1: Summary of Power Flow Study Results for PV Gen Max Case Vs PV Gen Max Case A (CONTINUED)

Outage Element	Overloaded Facility	Applicable Rating	PV Gen Max Case Loading (%)	PV Gen Max Case A Loading (%)	Comments
Category B Contingencies					
AGUAFRIA-ALEXANDR 230 KV LINE	DEERVALY-WESTWING 230 KV LINE	2000 A	103	105	Pre-project overload. Overload persisted with addition of proposed project
FLAGSTAF-PINPKBRB #2 345 KV LINE	FLAGSTAF-PINPKBRB #1 345 KV LINE	1650 A	113	114	
FLAGSTAF-PINPKBRB #1345 KV LINE	FLAGSTAF-PINPKBRB #2 345 KV LINE	1680 A	111	112	
GLENCANY #1 345/230 KV TRANSFORMER	GLENCANY #2 345/230 KV TRANSFORMER	300 MVA	142	143	Pre-project overload. Overload persisted with addition of proposed project
GLENCANY #2 345/230 KV TRANSFORMER	GLENCANY #1 345/230 KV TRANSFORMER	300 MVA	142	143	
CHOLLA 345/230 KV TRANSFORMER	VERDE- YAVAPAI 230 KV LINE	530 A	124	124-	

Table B2: Summary of Power Flow Study Results for PV Gen Max Case Vs PV Gen Max Case B

Outage Element	Overloaded Facility	Applicable Rating	PV Gen Max Case Loading (%)	PV Gen Max Case B Loading (%)	Comments
Category A—Normal Overloads					
ALL LINES IN SERVICE	NONE	N/A	N/A	N/A	None
Category B Contingencies					
LEUPP–COCONINO 230 KV LINE	VERDE – YAVAPAI 230 KV LINE	748 A	141	141	Pre-project overload exacerbated with addition of proposed project
LINCSTRT- WPHXAPSN 230 KV LINE	AGUAFRIA- GLENDALE 230 KV LINE	1428 A	108	106	
PINPK – PINPKSRP #1 230 KV LINE	PINPK – PINPKSRP #2 230 KV LINE	1700 A	102	103	Pre-project overload. Overload persisted following the addition of proposed project
PINPK – PINPKSRP #2 230 KV LINE	PINPK – PINPKSRP #1 230 KV LINE	1700 A	102	103-	
FLAGSTAF-GLENCANY #1 345. KV LINE	FLAGSTAF-GLENCANY #2 345. KV LINE	1680 A	114	114	
FLAGSTAF-GLENCANY #2 345. KV LINE	FLAGSTAF-GLENCANY #1 345. KV LINE	1680 A	114	114	
ORME – RUDD 230 KV LINE	ANDERSON – KYRENE 230 KV LINE	2200 A	103	103	
CHOLLA - LEUPP 230 KV LINE	VERDE – YAVAPAI 230 KV LINE	530 A	141	141	
BROWNING #1 500/230 KV TRANSFORMER	BROWNING #2 500/230 KV TRANSFORMER	598 MVA	125	130	Pre-project overload. exacerbated with addition of proposed project
BROWNING #2 500/230 KV TRANSFORMER	BROWNING #1 500/230 KV TRANSFORMER	598 MVA	125	130	

Table B2: Summary of Power Flow Study Results for PV Gen Max Case Vs PV Gen Max Case B (CONTINUED)

Outage Element	Overloaded Facility	Applicable Rating	PV Gen Max Case Loading (%)	PV Gen Max Case B Loading (%)	Comments
Category B Contingencies					
AGUAFRIA-ALEXANDR 230 KV LINE	DEERVALY-WESTWING 230 KV LINE	2000 A	103	104	Pre-project overload. Overload persisted following the addition of proposed project
FLAGSTAF-PINPKBRB #2 345 KV LINE	FLAGSTAF-PINPKBRB #1 345 KV LINE	1650 A	113	113	
FLAGSTAF-PINPKBRB #1345 KV LINE	FLAGSTAF-PINPKBRB #2 345 KV LINE	1680 A	111	111	
GLENCANY #1 345/230 KV TRANSFORMER	GLENCANY #2 345/230 KV TRANSFORMER	300 MVA	142	142	Pre-project overload. Overload persisted following the addition of proposed project
GLENCANY #2 345/230 KV TRANSFORMER	GLENCANY #1 345/230 KV TRANSFORMER	300 MVA	142	142	
CHOLLA 345/230 KV TRANSFORMER	VERDE- YAVAPAI 230 KV LINE	530 A	124	124-	

Table B3: Summary of Power Flow Study Results for PV East Max Case Vs PV East Max Case A

Outage Element	Overloaded Facility	Applicable Rating	PV East Max Case Loading (%)	PV East Max Case A Loading (%)	Comments
Category A—Normal Overloads					
ALL LINES IN SERVICE	TS1 230/69 KV TRANSFORMER	188 MVA	113	113	Pre-project overload. Overload persist with addition of proposed project
	JOJOBA – KYRENE 500 KV LINE	2660 A	99	102	Normal overload due to addition of proposed project
Category B Contingencies					
JOJOBA-KYRENE 500 KV LINE	ROGERS - THUNDRST 230 KV LINE	1155 A	106	105	Pre-project overload. Overload persisted following the addition of proposed project
KYRENE – SCHRADER 230 KV LINE	CORBELL – KYRENE 230 KV LINE	2180 A	106	105	
PALO VERDE-RUDD 500 KV LINE	JOJOBA – KYRENE 500 KV LINE	3175 A	99	101	Overload due to addition of Proposed project
Category C Contingencies					
PALO VERDE-WESTWING #1 &2 500 KV LINES	JOJOBA – KYRENE 500 KV LINE	3175 A	107	109	Pre-project overload. Overload exacerbated with addition of proposed project
	RUDD #1, 2 &3 500/230 KV TRANSFORMERS	734 MVA	103	102	Pre-project overload. Overload persisted following the addition of proposed project
	SNVLY 500/230 KV TRANSFORMER	598 MVA	104	104	
	RUDD-WHITETNK 230 KV LINE	2310 A	102	102	
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	JOJOBA – KYRENE 500 KV LINE	3175 A	112	113	
	PALOVRDE-WESTWING 500 KV LINE	3000 A	119	117	
	SNVLY 500/230 KV TRANSFORMER	598 MVA	127	126	

Table B3: Summary of Power Flow Study Results for PV East Max Case Vs PV East Max Case A (CONTINUED)

Outage Element	Overloaded Facility	Applicable Rating	PV East Max Case	PV East Max Case A	Comments
			Loading (%)	Loading (%)	
Category C Contingencies					
HASSYAMP-PINAL_W & JOJOBA-KYRENE 500 KV LINES	ROGERSWA – PINPK # 1& 2 230 KV LINES	1034 A	118	116	Pre-project overload. Overload persisted following the addition of proposed project
	FOURCORN 500/345 KV TRANSFORMER	840 MVA	104	103	
	GILARIVER 500/230 KV TRANSFORMER	560 MVA	108	110	
	RUDD #1, 2 &3 500/230 KV TRANSFORMERS	734 MVA	107	107	
	BRANDOW –PINPKSRP #1 &2 230 KV LINE	1100 A	103	103	
	DEERVALY-WESTWNGE 230 KV LINE	2100 A	102	101	
	ROGERS - THUNDRST 230 KV LINE	1155 A	132	130	

Appendix C

Summary of Post - Transient Analysis Results

Table C1: Summary of Post-Transient Study Results for PV Gen Max Case Vs PV Gen Max Case A

OUTAGE	PV GEN MAX CASE A BUS VOLTAGE DEVIATION	PV GEN MAX CASE A BUS VOLTAGE DEVIATION
CATEGORY B		
PALO VERDE-DEVERS 500 KV LINE	< 5%	<5%
HASSYAMP-N. GILA 500 KV LINE	< 5%	<5%
PALO VERDE - RUDD 500 KV LINE	< 5%	<5%
NAVAJO – CRYSTAL 500 KV LINE	< 5%	<5%
MOENKOPI – ELDORDO 500 KV LINE	< 5%	< 5%
PALO VERDE – WESTWING #1 500 KV LINE	< 5%	<5%
HASSYAMP – JOJOBA 500 KV LINE	< 5%	<5%
PERKINS – MEAD 500 KV LINE	<5%	<5%
JOJOBA – KYRENE 500 KV LINE	<5%	<5%
JOJOBA – PINAL_W 500 KV LINE	< 5%	<5%
HARQJNCT - DEVERS 500 KV LINE	< 5%	<5%
HARQJNCT –TS5 500 KV LINE	< 5%	<5%
N. GILA – IMPERIAL VALLEY 500 KV LINE	< 5%	<5%
CATEGORY C		
PALO VERDE G-2	<10%	<10%
PALO VERDE- DEVERS & HARQJNCT – DEVERS 500 KV LINES	<10%	<10%
PALO VERDE – WESTWING #1 &2 500 KV LINES	<10%	<10%
IPPDC BIPOLE	<10%	<10%
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	<10%	<10%
HASSYAMP - JOJOBA #1 & 2 500 KV LINES	<10%	<10%

Table C2: Summary of Post-Transient Study Results for PV Gen Max Case Vs PV Gen Max Case A

OUTAGE	PV GEN MAX CASE BUS VOLTAGE DEVIATION	PV GEN MAX CASE B BUS VOLTAGE DEVIATION
CATEGORY B		
PALO VERDE-DEVERS 500 KV LINE	< 5%	<5%
HASSYAMP-N. GILA 500 KV LINE	< 5%	<5%
PALO VERDE - RUDD 500 KV LINE	< 5%	<5%
NAVAJO – CRYSTAL 500 KV LINE	< 5%	<5%
MOENKOPI – ELDORDO 500 KV LINE	< 5%	< 5%
PALO VERDE – WESTWING #1 500 KV LINE	< 5%	<5%
HASSYAMP – JOJOBA 500 KV LINE	< 5%	<5%
PERKINS – MEAD 500 KV LINE	<5%	<5%
JOJOBA – KYRENE 500 KV LINE	<5%	<5%
JOJOBA – PINAL_W 500 KV LINE	< 5%	<5%
HARQJNCT - DEVERS 500 KV LINE	< 5%	<5%
HARQJNCT –TS5 500 KV LINE	< 5%	<5%
N. GILA – IMPERIAL VALLEY 500 KV LINE	< 5%	<5%
CATEGORY C		
PALO VERDE G-2	<10%	<10%
PALO VERDE- DEVERS & HARQJNCT – DEVERS 500 KV LINES	<10%	<10%
PALO VERDE – WESTWING #1 &2 500 KV LINES	<10%	<10%
IPPDC BIPOLE	<10%	<10%
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	<10%	<10%
HASSYAMP – JOJOBA #1 & 2 500 KV LINES	<10%	<10%

Table C3: Summary of Post-Transient Study Results for PV East Max Case Vs PV East Max Case A

OUTAGE	PV EAST MAX CASE BUS VOLTAGE DEVIATION	PV EAST MAX CASE A BUS VOLTAGE DEVIATION
CATEGORY B		
PALO VERDE-DEVERS 500 KV LINE	< 5%	<5%
HASSYAMP-N. GILA 500 KV LINE	< 5%	<5%
PALO VERDE - RUDD 500 KV LINE	< 5%	<5%
NAVAJO – CRYSTAL 500 KV LINE	< 5%	<5%
MOENKOPI – ELDORDO 500 KV LINE	< 5%	< 5%
PALO VERDE – WESTWING #1 500 KV LINE	< 5%	<5%
HASSYAMP – JOJOBA 500 KV LINE	< 5%	<5%
PERKINS – MEAD 500 KV LINE	< 5%	<5%
JOJOBA – KYRENE 500 KV LINE	< 5%	<5%
HASSYAMP – PINAL_W 500 KV LINE	< 5%	<5%
HARQJNCT - DEVERS 500 KV LINE	< 5%	<5%
HARQJNCT –SNVLY 500 KV LINE	< 5%	<5%
N. GILA – IMPERIAL VALLEY 500 KV LINE	< 5%	<5%
CATEGORY C		
PALO VERDE G-2	<10%	<10%
PALO VERDE – WESTWING #1 &2 500 KV LINES	<10%	<10%
IPPDC BIPOLE	<10%	<10%
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	<10%	<10%

Appendix D

Summary of Transient Analysis Results

Table D1: Summary of Transient Stability Study Results for PV Gen Max Case Vs PV Gen Max Case A

OUTAGE	PV GEN MAX CASE			PV GEN MAX CASE A		
	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING
CATEGORY B						
PALO VERDE-DEVERS 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP-N. GILA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE - RUDD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
NAVAJO – CRYSTAL 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
MOENKOPI – ELDORDO 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP – JOJOBA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PERKINS – MEAD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
JOJOBA – KYRENE 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
JOJOBA – PINAL_W 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HARQJNCT - DEVERS 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HARQJNCT –TS5 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
N. GILA – IMPERIAL VALLEY 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
CATEGORY C						
PALO VERDE G-2	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE- DEVERS & HARQJNCT – DEVERS 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 &2 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
IPPDC BIPOLE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP - JOJOBA #1 & 2 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE

Table D2: Summary of Transient Stability Study Results for PV Gen Max Case Vs PV Gen Max Case B

OUTAGE	PV GEN MAX CASE			PV GEN MAX CASE B		
	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING
CATEGORY B						
PALO VERDE-DEVERS 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP-N. GILA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE - RUDD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
NAVAJO – CRYSTAL 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
MOENKOPI – ELDORDO 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP – JOJOBA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PERKINS – MEAD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
JOJOBA – KYRENE 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
JOJOBA – PINAL_W 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HARQJNCT - DEVERS 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HARQJNCT –TS5 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
N. GILA – IMPERIAL VALLEY 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
CATEGORY C						
PALO VERDE G-2	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE- DEVERS & HARQJNCT – DEVERS 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 &2 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
IPPDC BIPOLE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP - JOJOBA #1 & 2 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE

Table D3: Summary of Transient Stability Study Results for PV East Max Case Vs PV East Max Case A

OUTAGE	PV EAST MAX CASE			PV EAST MAX CASE A		
	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING
CATEGORY B						
PALO VERDE-DEVERS 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP-N. GILA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE - RUDD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
NAVAJO – CRYSTAL 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
MOENKOPI – ELDORDO 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP – JOJOBA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PERKINS – MEAD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
JOJOBA – KYRENE 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP – PINAL_W 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HARQJNCT - DEVERS 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HARQJNCT –SNVLY 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
N. GILA – IMPERIAL VALLEY 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
CATEGORY C						
PALO VERDE G-2	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 &2 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
IPPDC BIPOLE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE

Appendix E

Summary of Post-Transient Reactive Power Margin Analysis Results

Table E1: Summary of Post-Transient Reactive Power Analysis Results for PV East Max Case A

OUTAGES	POST-TRANSIENT REACTIVE POWER MARGIN FOR PV EAST MAX CASE A				
	MONITORED BUSES				REACTIVE POWER MARGIN
	RUDD 230 KV	KYRENE 230 KV	WESTWNGE 230 KV	PNPKAPS 230 KV	
CATEGORY B					
PALO VERDE-DEVERS 500 KV LINE	1447 MVAR	1392 MVAR	1544 MVAR	1464 MVAR	POSITIVE
HASSYAMP-N. GILA 500 KV LINE	1502 MVAR	1429 MVAR	1587 MVAR	1508 MVAR	POSITIVE
PALO VERDE - RUDD 500 KV LINE	404 MVAR	498 MVAR	521 MVAR	475 MVAR	POSITIVE
NAVAJO – CRYSTAL 500 KV LINE	1553 MVAR	1484 MVAR	1647 MVAR	1560 MVAR	POSITIVE
MOENKOPI – ELDORDO 500 KV LINE	1560 MVAR	1474 MVAR	1637 MVAR	1549 MVAR	POSITIVE
PALO VERDE – WESTWING #1 500 KV LINE	1242 MVAR	1211 MVAR	1274 MVAR	1232 MVAR	POSITIVE
HASSYAMP – JOJOBA 500 KV LINE	1535 MVAR	1477 MVAR	1614 MVAR	1544 MVAR	POSITIVE
PERKINS – MEAD 500 KV LINE	1255 MVAR	1242 MVAR	1271 MVAR	1243 MVAR	POSITIVE
JOJOBA – KYRENE 500 KV LINE	37 MVAR	33 MVAR	43 MVAR	36 MVAR	POSITIVE
HASSYAMP – PINAL_W 500 KV LINE	1158 MVAR	1095 MVAR	1241 MVAR	1156 MVAR	POSITIVE
N. GILA – IMPERIAL VALLEY 500 KV LINE	1532 MVAR	1454 MVAR	1617 MVAR	1535 MVAR	POSITIVE
CATEGORY C					
PALO VERDE G-2	1378 MVAR	1378 MVAR	1456 MVAR	1344 MVAR	POSITIVE
PALO VERDE – WESTWING #1 &2 500 KV LINES	556 MVAR	582 MVAR	568 MVAR	560 MVAR	POSITIVE
IPPDC BIPOLE	1716 MVAR	1632 MVAR	1787 MVAR	1681 MVAR	POSITIVE
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	87 MVAR	114 MVAR	108 MVAR	101 MVAR	POSITIVE
HASSYAMP – PINAL_W & JOJOBA-KYRENE 500 KV LINES	115 MVAR	169 MVAR	134 MVAR	129 MVAR	POSITIVE
HASSYAMP-JOJOBA & HASSYAMP-PINAL_W 400 KV LINES	1143 MVAR	1210 MVAR	1215 MVAR	1180 MVAR	POSITIVE

Appendix F

Summary of Short Circuit Analysis Results

BUS	BUS	PRE-PROJECT		POST-PROJECT		INCREMENTAL	
NAME	KV	3LG(A)	1LG(A)	3LG(A)	1LG(A)	3LG(A)2	1LG(A)2
BUCKEYEFPL1	18	0	0	92,571	88,704	92,571	88,704
BUCKEYEFPL2	18	0	0	92,571	88,704	92,571	88,704
BUCKEYECSP	525	0	0	29,526	24,415	29,526	24,415
JOJOBA (POI)	525	29,728	23,980	31,350	26,626	1,622	2,646
GILA_RIVER	525	24,852	23,271	25,690	24,234	838	964
HASSYAMP500	525	51,353	52,767	52,147	53,455	793	688
MESQUITE500	525	49,465	48,757	50,197	49,340	733	583
PALOVRDE_500	525	51,640	54,109	52,368	54,724	729	615
REDHAWK500	525	49,373	49,443	50,100	50,034	726	591
PALOVERDE2	24	368,258	259,493	368,810	259,674	552	181
PALOVERDE1	24	366,703	258,977	367,245	259,156	542	179
PALOVERDE3	24	366,087	258,771	366,626	258,950	539	179
ARLINGTON500	525	35,648	29,372	36,013	29,567	365	195
KYRENE_230	230	52,417	49,067	52,676	49,279	260	212
KYRENENEW230	230	50,258	45,379	50,493	45,556	235	177
KYRENE_500	525	20,107	18,173	20,292	18,327	186	154
RUDD_230	230	52,917	45,996	53,096	46,090	180	95
WESTWING_500	525	34,575	27,789	34,729	27,857	154	68
PERKINPS	525	34,015	26,925	34,163	26,988	148	63
PERKINSSOUTH	525	33,348	26,451	33,489	26,511	140	60
WESTWING_W1	230	51,376	47,589	51,515	47,670	140	81
WESTWING_E1	230	51,083	47,306	51,221	47,386	138	80
VL138TX1	138	156,267	124,295	156,392	124,349	125	54
PINPK_SRP	230	48,258	46,525	48,358	46,588	101	62
PINPK_WAPA_S	230	48,357	47,361	48,457	47,425	101	64
PINPK_WAPA_N	230	48,313	47,256	48,414	47,320	101	64
PP230_WEST	230	48,096	47,191	48,196	47,255	99	64
PINPK_APS	230	47,724	46,896	47,822	46,959	98	63
HARQUAHAL500	525	20,196	16,768	20,293	16,815	97	48
VAIL CAP	345	79,378	99,210	79,470	99,259	93	48
SANTAN_230	230	38,738	40,355	38,830	40,423	92	68
ORME_230	230	35,482	24,861	35,570	24,891	88	31
BROWNING_500	525	15,626	13,100	15,713	13,149	87	50
CORBELL_230	230	33,456	27,562	33,540	27,605	84	44
AGUA_FRIA	230	42,330	34,174	42,412	34,210	82	36
ANDERSON_230	230	32,152	24,517	32,233	24,553	81	36
RUDD_500	525	20,184	16,471	20,264	16,508	80	37
BRANDOW	230	32,009	29,976	32,088	30,027	78	51
GIL_ST1_18	18	95,762	77,617	95,837	77,650	75	33
GIL_ST4_18	18	95,108	76,916	95,183	76,948	75	33

GIL_ST2_18	18	95,507	77,343	95,582	77,376	75	33
GIL_ST3_18	18	95,448	77,280	95,523	77,313	75	33
WHTTANKS_APS	230	37,155	26,156	37,228	26,181	74	25
WHTTANKS_SRP	230	35,014	27,508	35,086	27,538	73	31
KNOX	230	30,074	24,198	30,147	24,236	73	38
PAPAGOBT_230	230	29,449	25,655	29,516	25,693	67	38
LIBERTY_230	230	33,056	25,325	33,122	25,354	66	29
LIBERTY_TAP	230	32,433	24,668	32,498	24,696	64	28
WARD_230	230	28,631	25,935	28,693	25,974	63	38
BROWNING_230	230	23,460	23,573	23,519	23,618	59	45
EL_SOL	230	33,953	25,682	34,011	25,704	58	22
AGUAFRI_GT56	230	35,077	26,971	35,133	26,993	56	22
AGUAFRIA_GT4	230	34,889	26,953	34,944	26,975	56	22
DINOSAUR_TER	13.8	95,360	0	95,415	0	55	0
GILARIVR_230	230	12,024	11,864	12,076	11,917	51	53
GLENDALE	230	31,555	23,310	31,599	23,326	44	16
COUNTRY_CLUB	230	32,627	28,982	32,670	29,004	43	23
LINCOLN_ST	230	32,522	28,683	32,564	28,705	42	22
WESTWING_W2	230	28,172	28,655	28,214	28,683	41	29
WESTWING_E2	230	28,046	28,484	28,087	28,512	41	29
SCHRADER	230	23,963	17,096	24,003	17,112	41	15
SURPRISE	230	27,606	19,234	27,646	19,246	39	13
MEADOWBROOK	230	30,742	26,744	30,780	26,763	38	19
DEER_VALLEY	230	28,304	23,942	28,340	23,960	37	17
GIL_CT1_18	18	69,294	56,685	69,331	56,701	36	16
GIL_CT2_18	18	69,294	56,685	69,331	56,701	36	16
GIL_CT3_18	18	69,155	56,536	69,191	56,553	36	16
GIL_CT4_18	18	69,338	56,731	69,374	56,747	36	16
GIL_CT5_18	18	69,107	56,485	69,143	56,501	36	16
GIL_CT7_18	18	69,246	56,634	69,282	56,650	36	16
GIL_CT8_18	18	69,059	56,550	69,095	56,566	36	16
GIL_CT6_18	18	69,386	56,783	69,422	56,799	36	16
SANTAN_5S	18	144,477	9	144,513	9	36	0
ORME_RS_69	69	40,974	34,941	41,009	34,959	35	18
LONEPEAK	230	28,345	23,141	28,379	23,156	34	15
ANDRSNRS_69	69	38,356	32,642	38,390	32,661	33	18
THUNDERSTONE	230	24,596	25,596	24,629	25,620	33	24
REACH	230	27,660	22,521	27,692	22,535	32	14
SUNNYSLOPE	230	28,185	23,936	28,218	23,951	32	15
PAPAGOBT_69	69	36,522	32,095	36,554	32,113	32	18
RED_CT1_18	18	89,401	58,030	89,433	58,039	32	9
ALEXANDE_SRP	230	26,650	22,896	26,681	22,911	31	15
LIB_CAP	345	18,623	21,358	18,653	21,387	30	28

WEST_PHX_APS	230	29,828	28,636	29,858	28,655	30	19
ALEXANDE_APS	230	26,371	22,709	26,401	22,724	30	15
PINAL_WEST	525	11,196	7,977	11,226	7,989	30	11
BRANDOW	69	35,043	28,222	35,072	28,235	29	13
RED_ST1_18	18	99,921	72,830	99,950	72,840	29	10
RED_ST2_18	18	99,800	72,787	99,829	72,797	29	10
OC230_CENTER	230	25,246	23,012	25,275	23,029	29	17
OC230_SOUTH	230	25,227	22,996	25,256	23,013	29	17
OCOTILLO_230	230	25,256	23,016	25,285	23,033	29	17
RED_CT2_18	18	86,409	57,174	86,437	57,182	28	8
RED_CT4_18	18	86,332	57,151	86,361	57,160	28	8
RED_CT3_18	18	85,911	57,028	85,939	57,036	28	8
SANTAN	69	44,486	43,837	44,513	43,855	27	18
KYRENE_GT	69	43,969	44,295	43,995	44,314	26	19
SILVERKG_500	525	10,429	8,162	10,454	8,174	26	12
GILA_BEND230	230	8,495	8,133	8,521	8,154	26	21

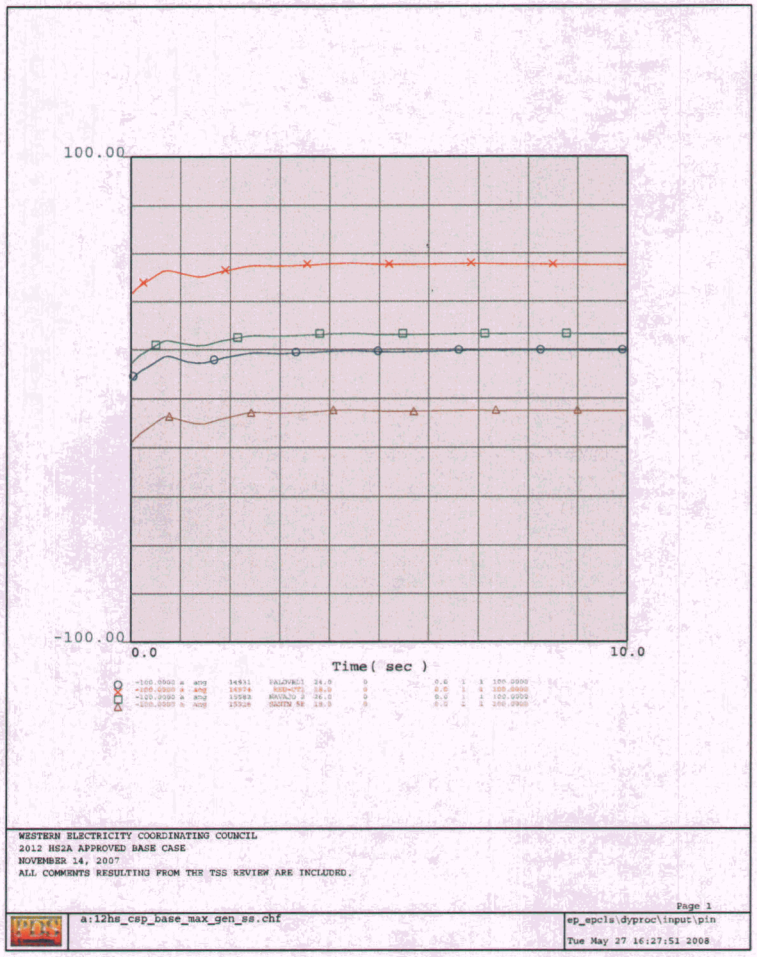
BUCKEYE CSP

Generator Interconnection Study

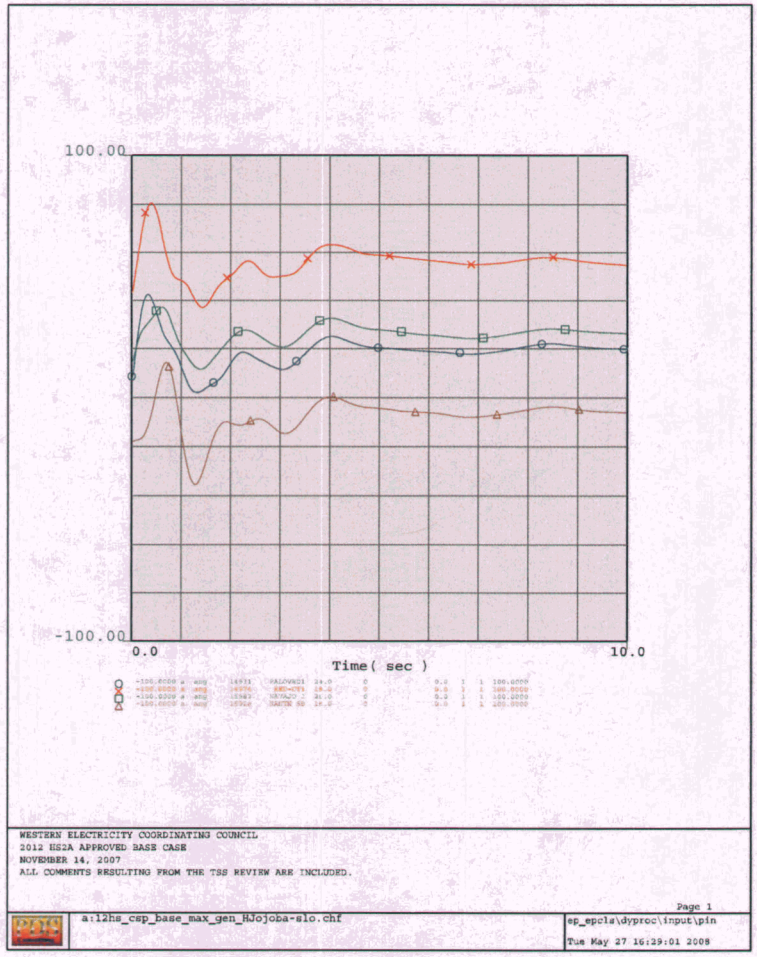
Attachment A

Transient Stability Plots
(PV Max Generation Case)

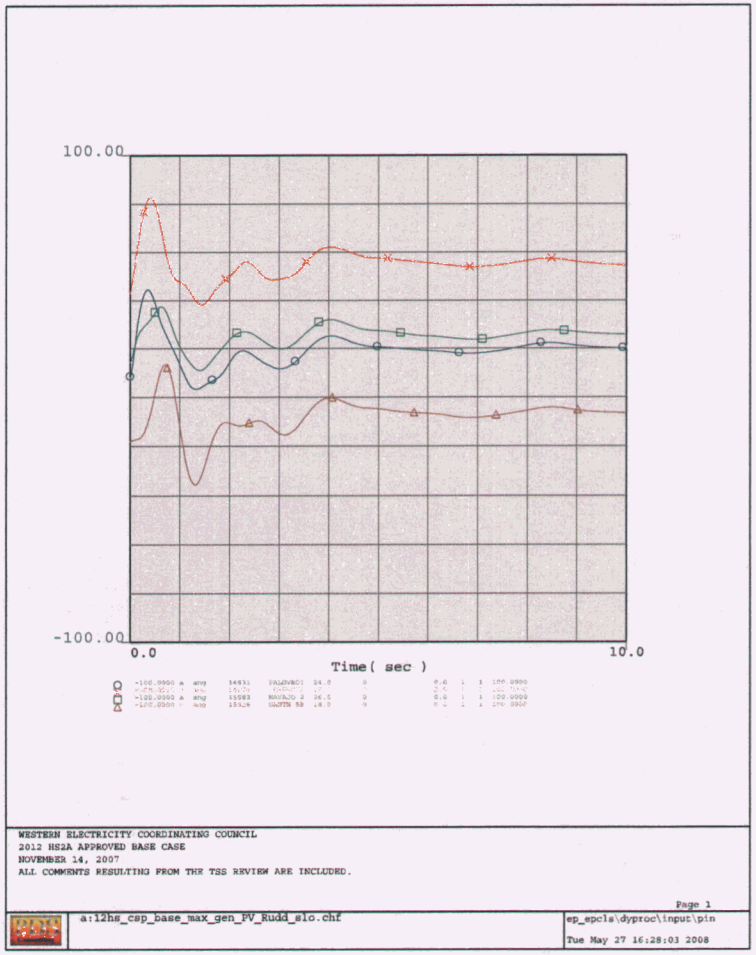
Pre-Project, PV Gen Max Case
No Outage
Transient Generator Angular Plots



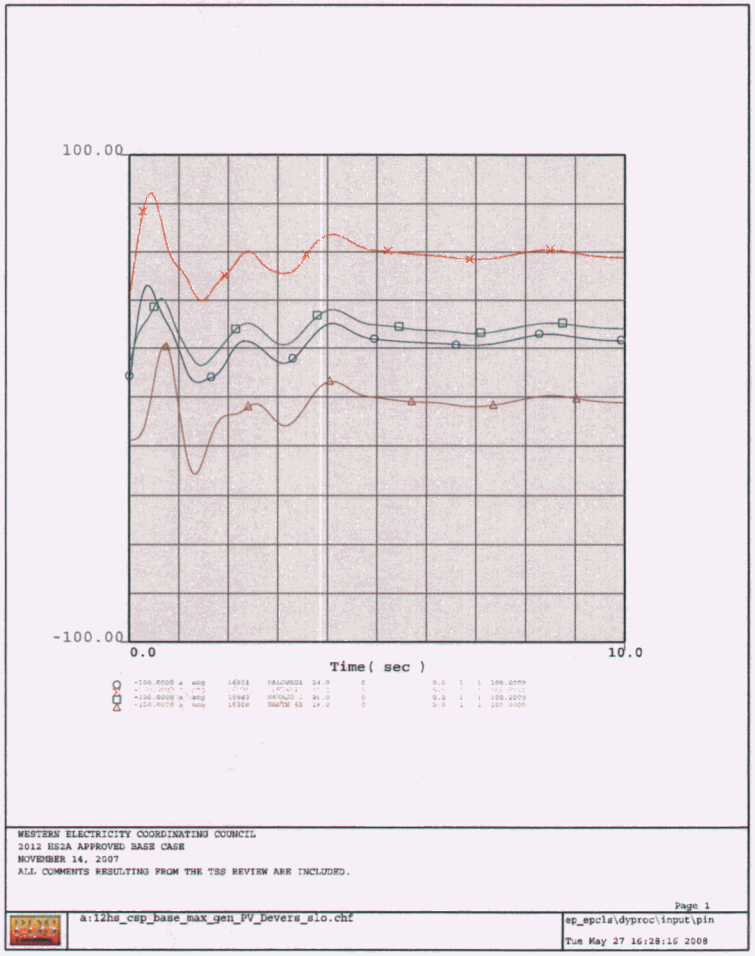
Pre-Project, PV Gen Max Case
Hassayampa-Jojoba 500 kV line outage
Transient Generator Angular Plots



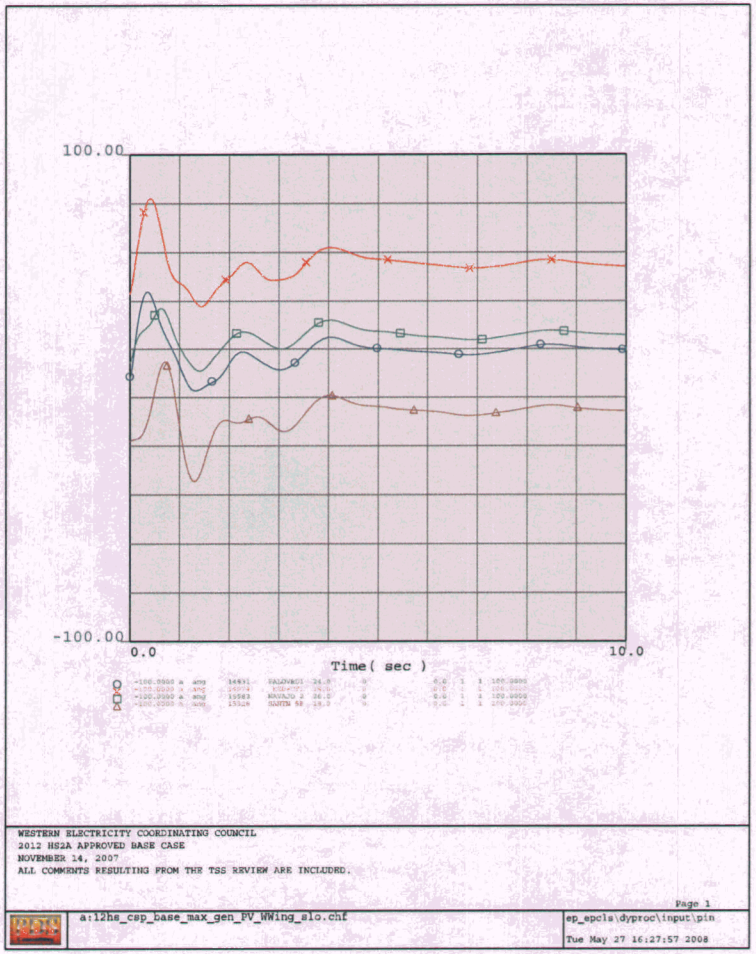
Pre-Project, PV Gen Max Case
Palo Verde-Rudd 500 kV line outage
Transient Generator Angular Plots



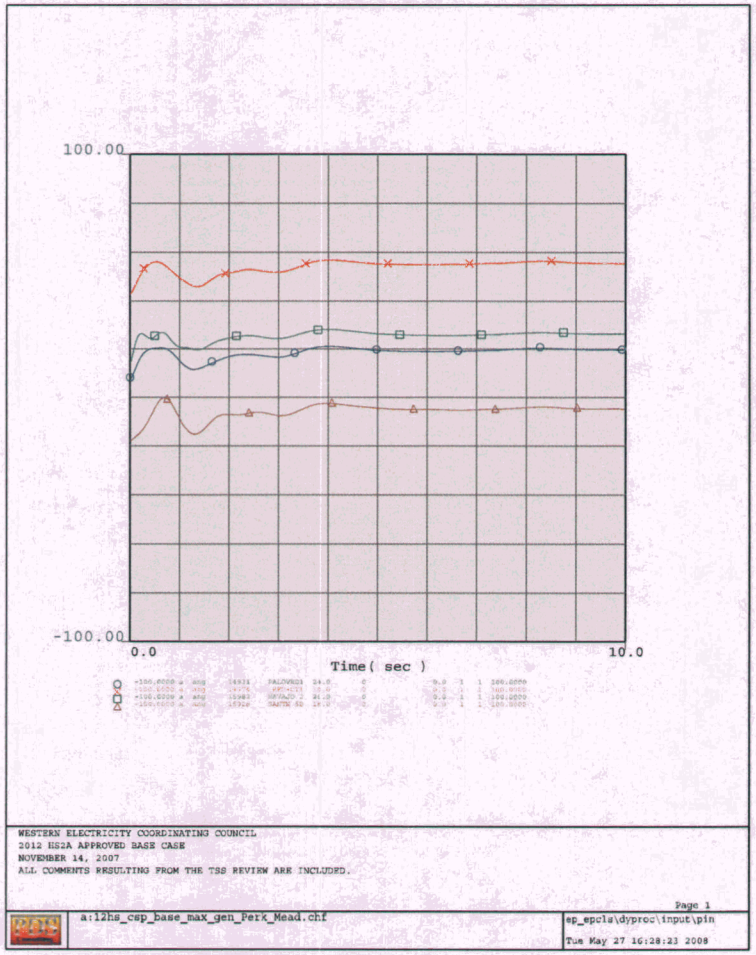
Pre-Project, PV Gen Max Case
Palo Verde-Devers 500 kV line outage
Transient Generator Angular Plots



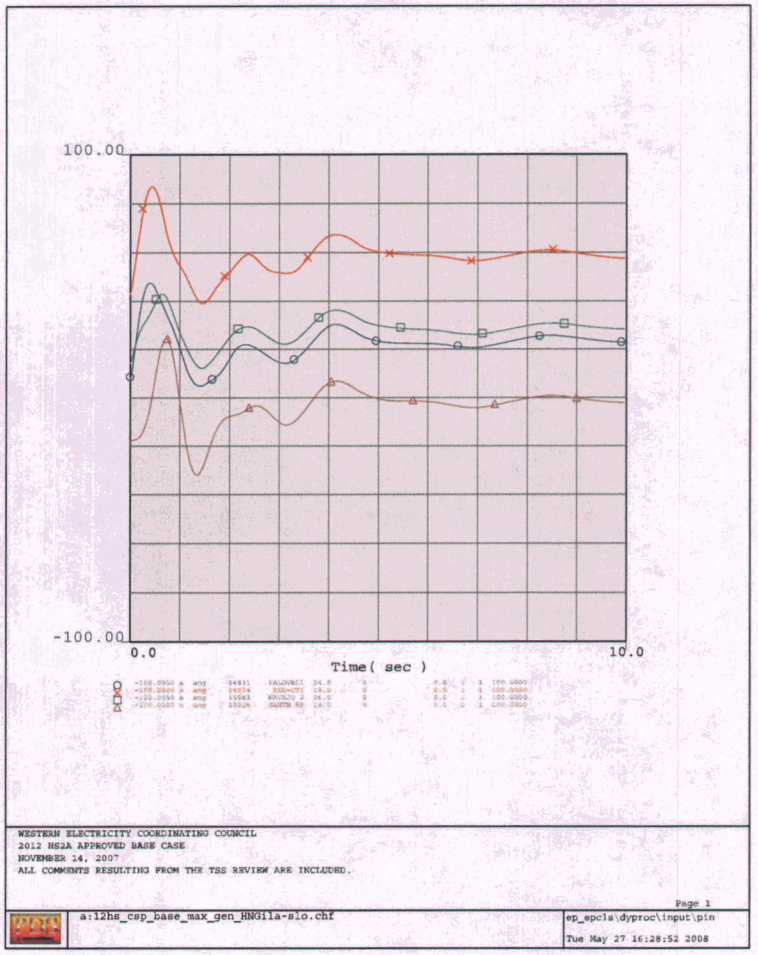
Pre-Project, PV Gen Max Case
Palo Verde-Westwing 500 kV line outage
Transient Generator Angular Plots



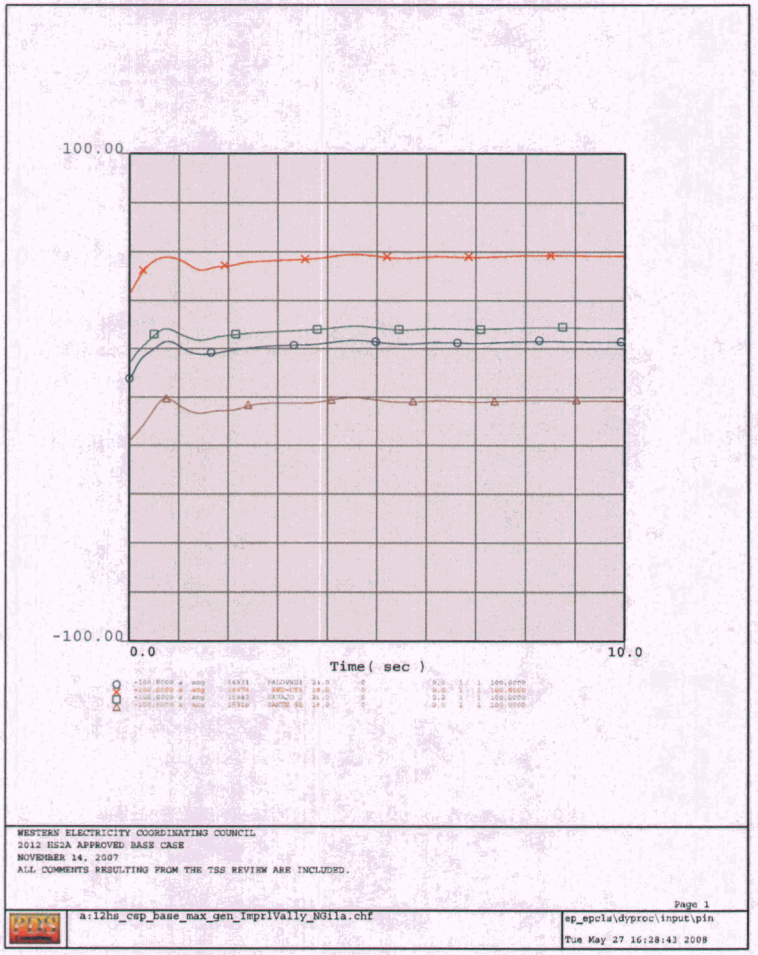
Pre-Project, PV Gen Max Case
Perkins-Mead 500 kV line outage
Transient Generator Angular Plots



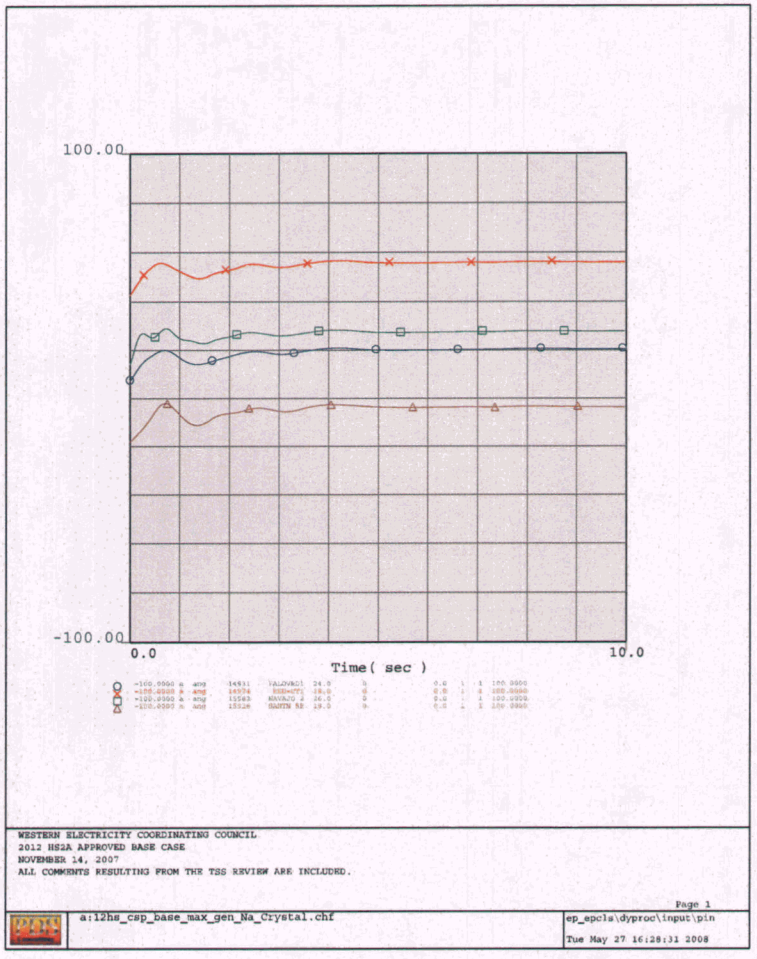
Pre-Project, PV Gen Max Case
Hassayampa -N. Gila 500 kV line outage
Transient Generator Angular Plots



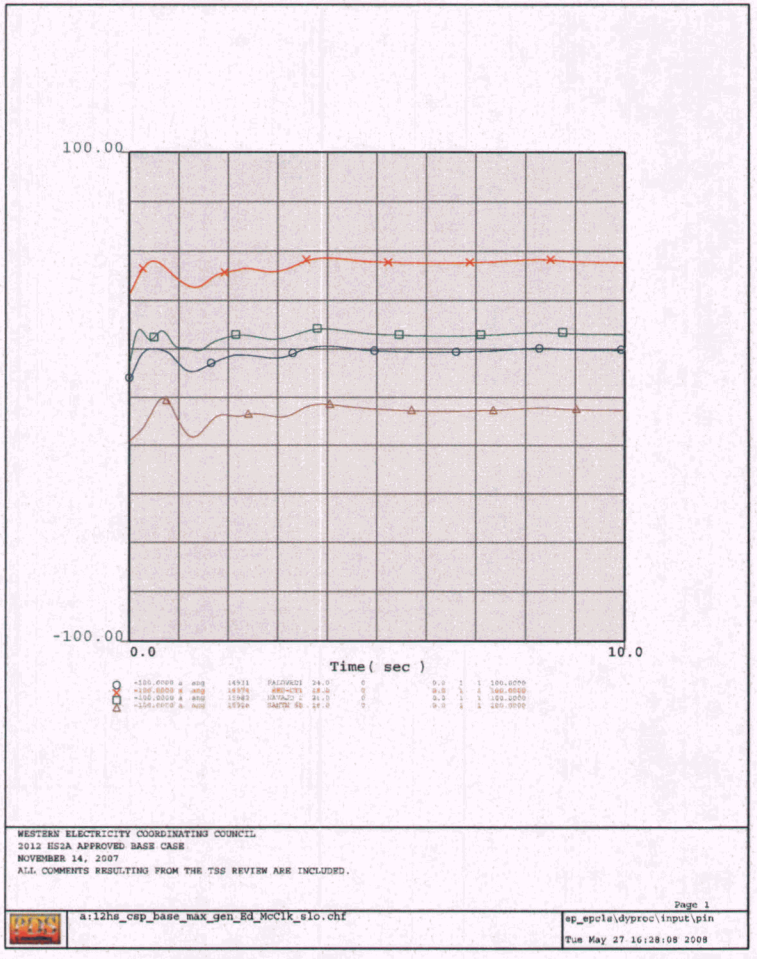
Pre-Project, PV Gen Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Generator Angular Plots



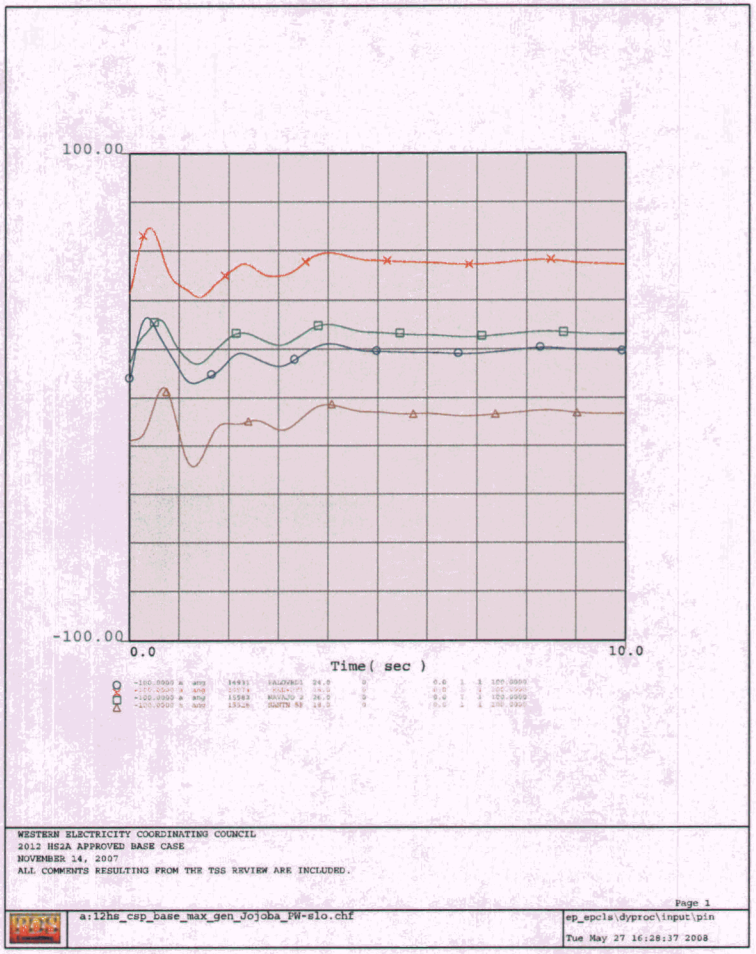
Pre-Project, PV Gen Max Case
Navajo-Crystal 500 kV line
Transient Generator Angular Plots



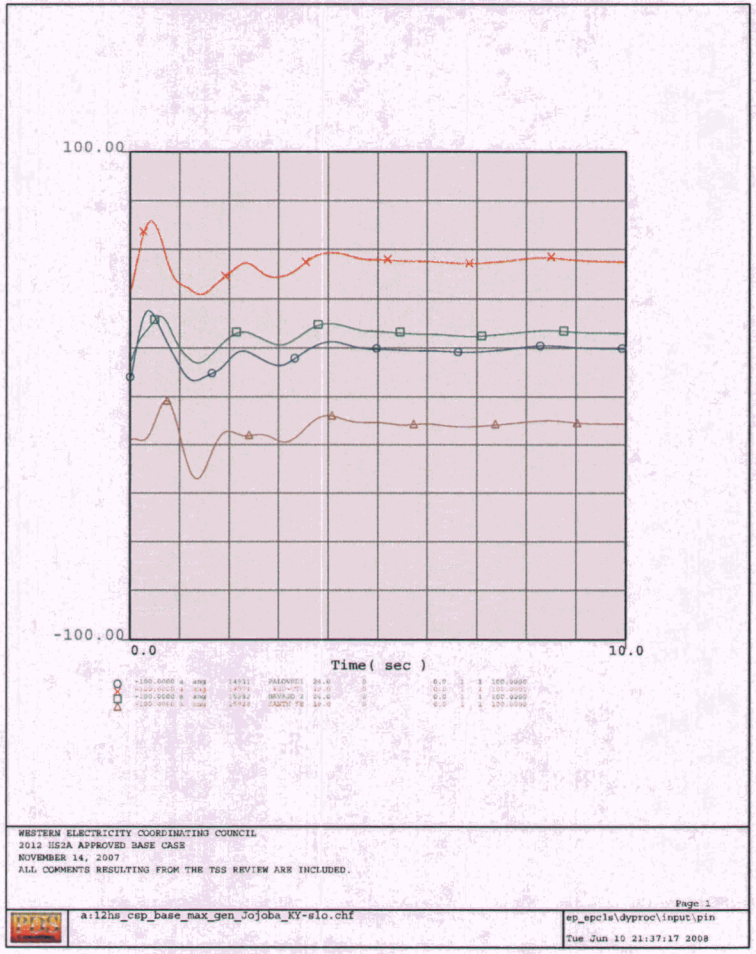
Pre-Project, PV Gen Max Case
El Dorado-McCullough 500 kV line outage
Transient Generator Angular Plots



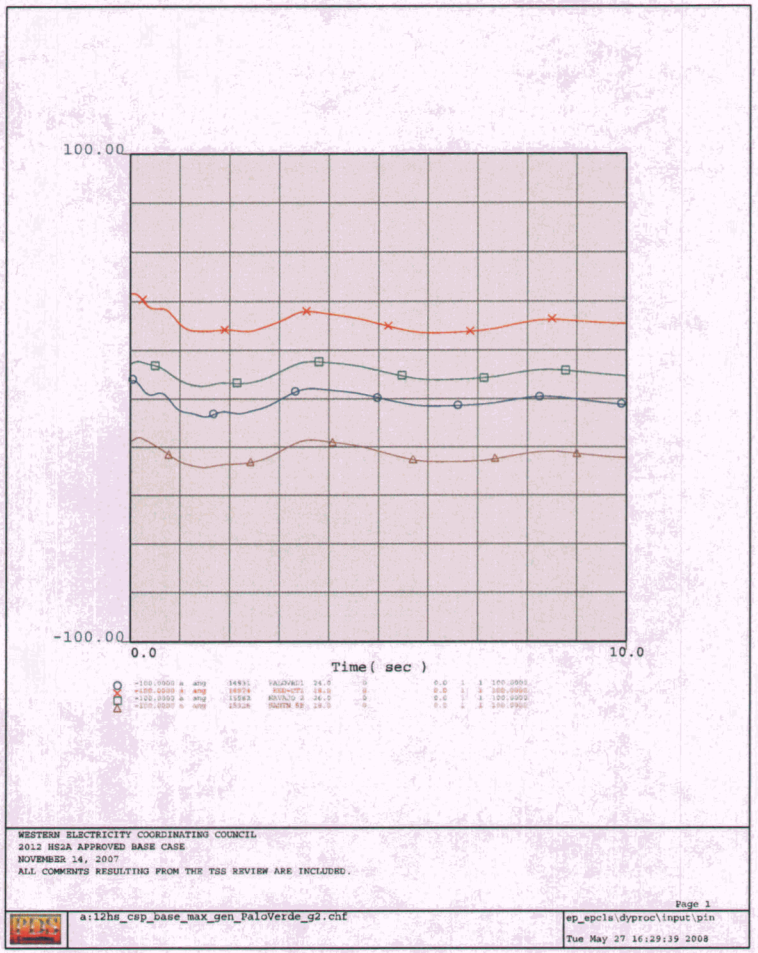
Pre-Project, PV Gen Max Case
Jojoba-Pinal West 500 kV line outage
Transient Generator Angular Plots



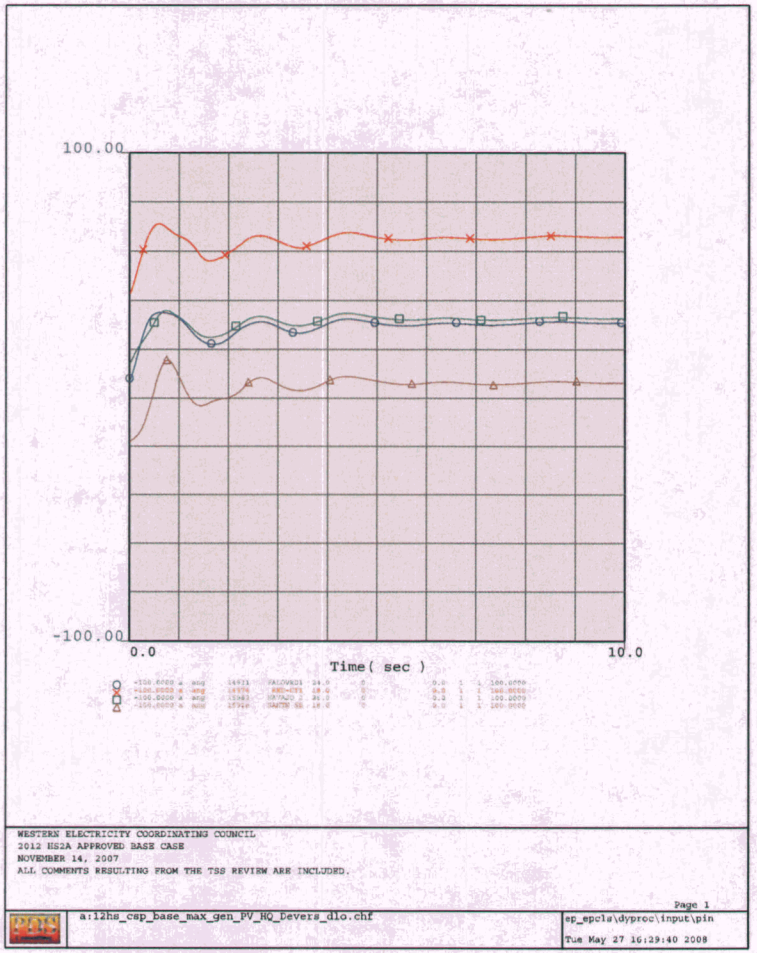
Pre-Project, PV Gen Max Case
Jojoba-Kyrene 500 kV line outage
Transient Generator Angular Plots



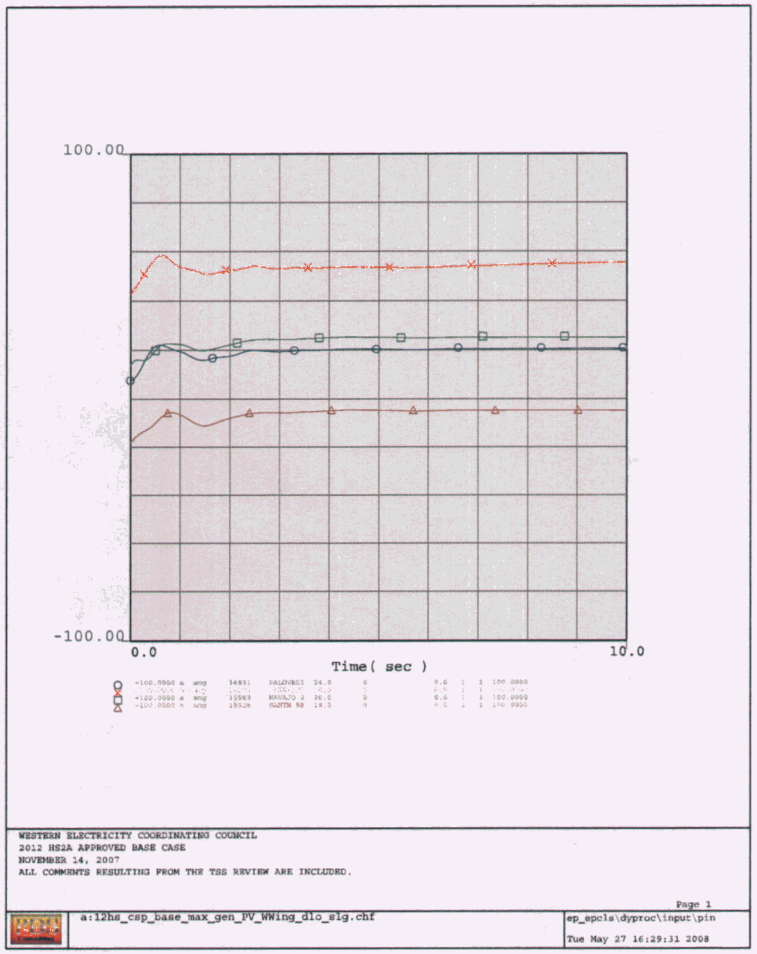
Pre-Project, PV Gen Max Case
Palo Verde G-2 outage
Transient Generator Angular Plots



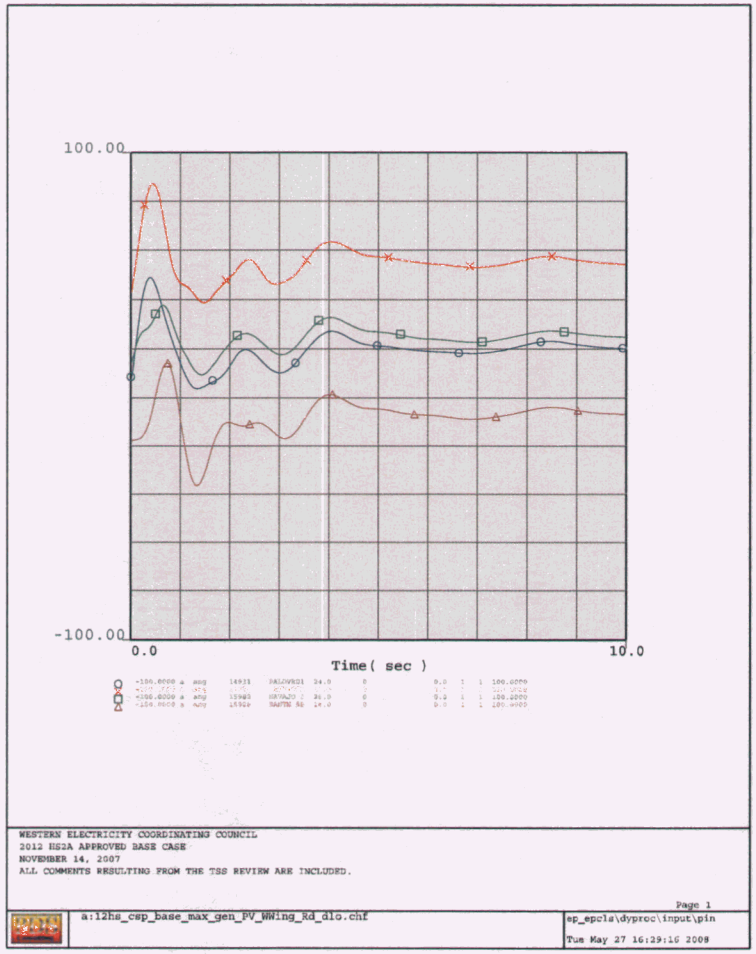
Pre-Project, PV Gen Max Case
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Generator Angular Plots



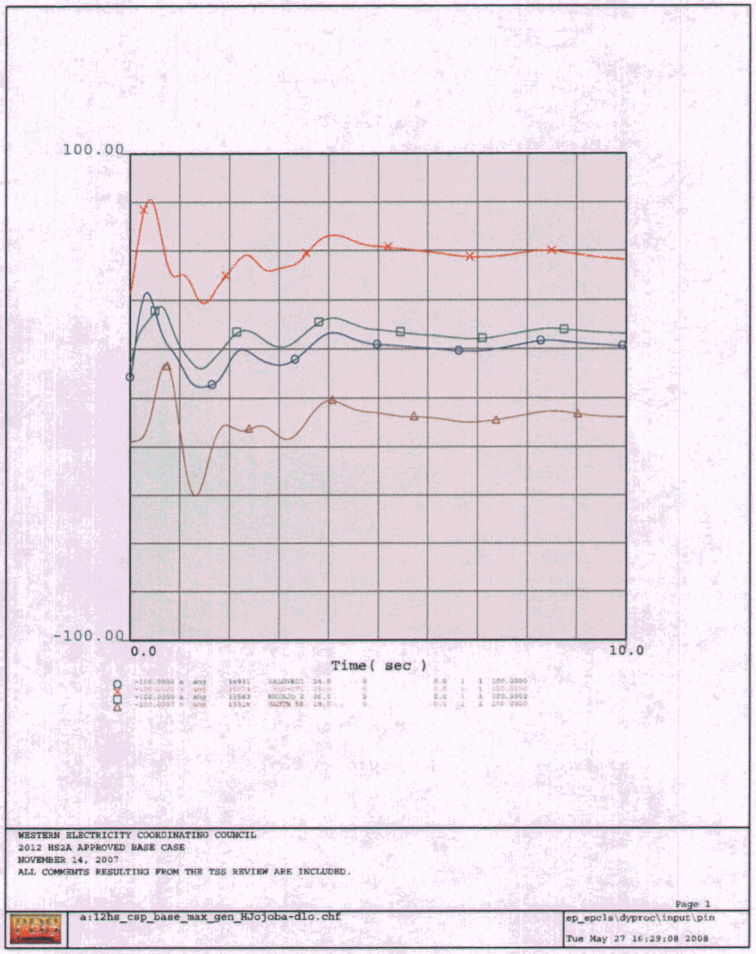
Pre-Project, PV Gen Max Case
PV-Westwing #1 & 2 500 kV lines outage
Transient Generator Angular Plots



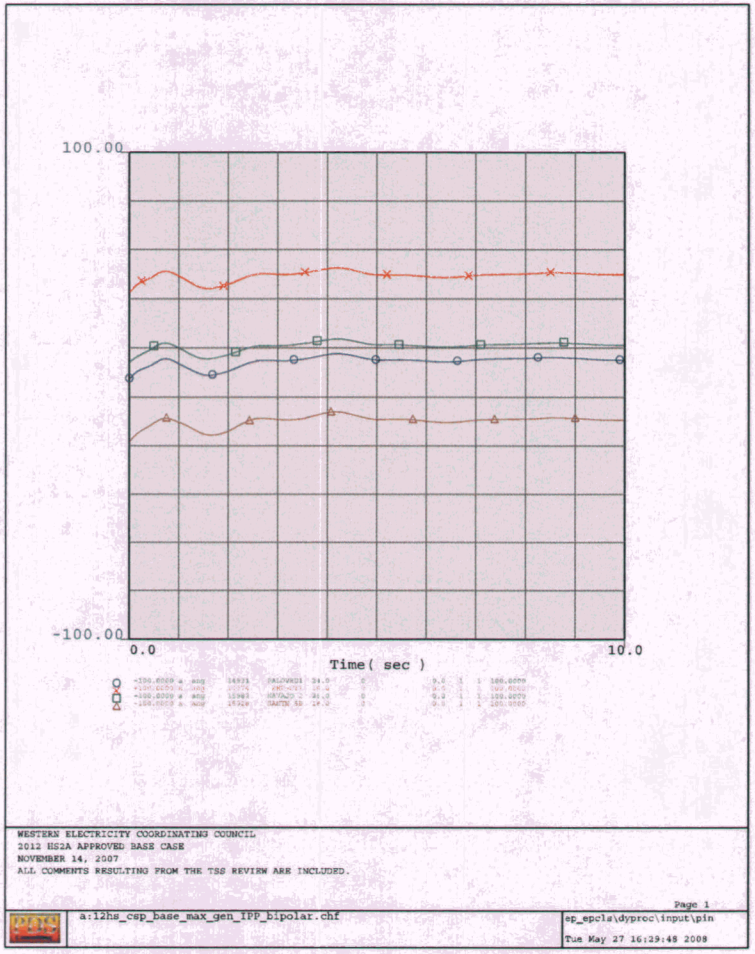
Pre-Project, PV Gen Max Case
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Generator Angular Plots



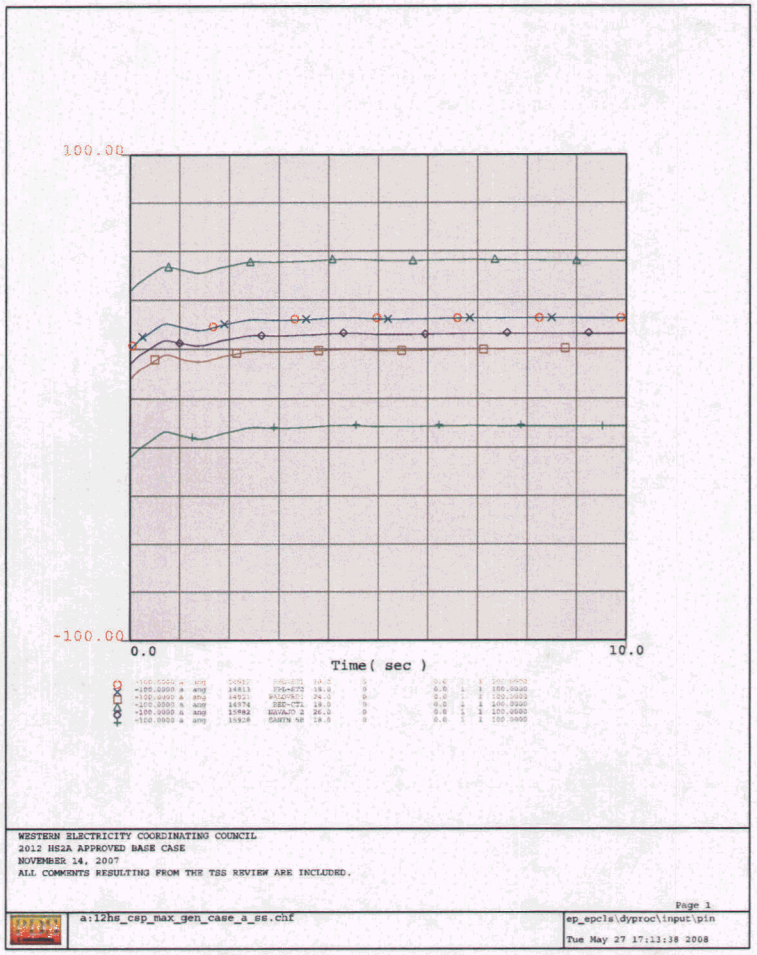
Pre-Project, PV Gen Max Case
Hassayampa-Jojoba #1 & 2 500 kV lines outage
Transient Generator Angular Plots



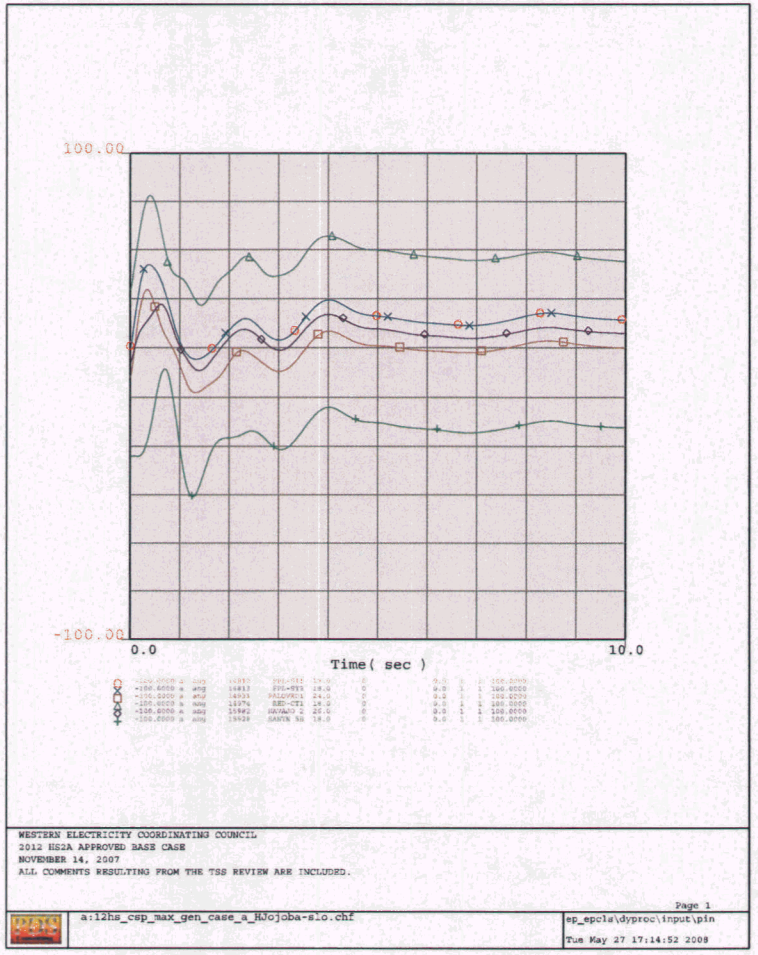
Pre-Project, PV Gen Max Case
IPP Bipole outage
Transient Generator Angular Plots



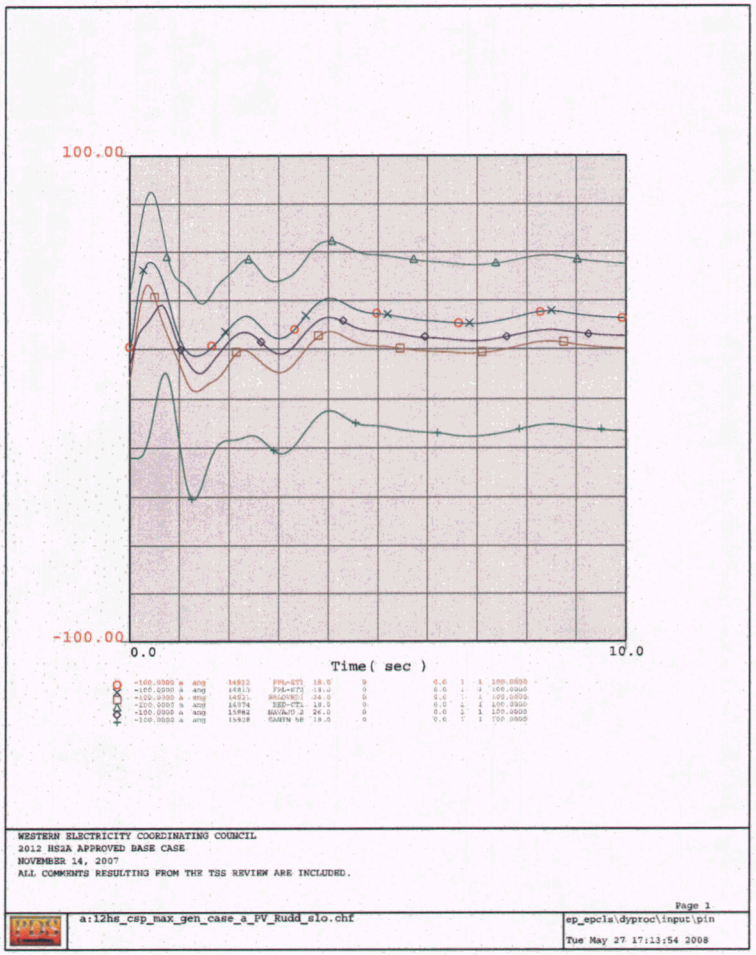
Post-Project, PV Gen Max Case A
No Outage
Transient Generator Angular Plots



Post-Project, PV Gen Max Case A
Hassayampa-Jojoba 500 kV line outage
Transient Generator Angular Plots



Post-Project, PV Gen Max Case A
Palo Verde-Rudd 500 kV line outage
Transient Generator Angular Plots



WESTERN ELECTRICITY COORDINATING COUNCIL
2012 HS2A APPROVED BASE CASE
NOVEMBER 14, 2007
ALL COMMENTS RESULTING FROM THE TSS REVIEW ARE INCLUDED.

Page 1

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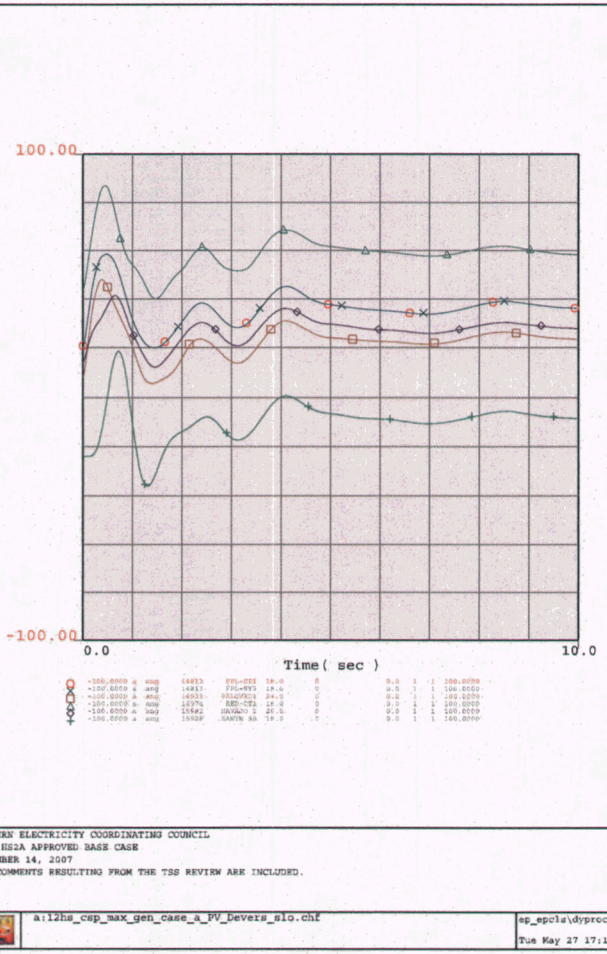
Post-Project, PV Gen Max Case A
Palo Verde-Devers 500 kV line outage
Transient Generator Angular Plots



WESTERN ELECTRICITY COORDINATING COUNCIL
2012 HS2A APPROVED BASE CASE
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Page 1

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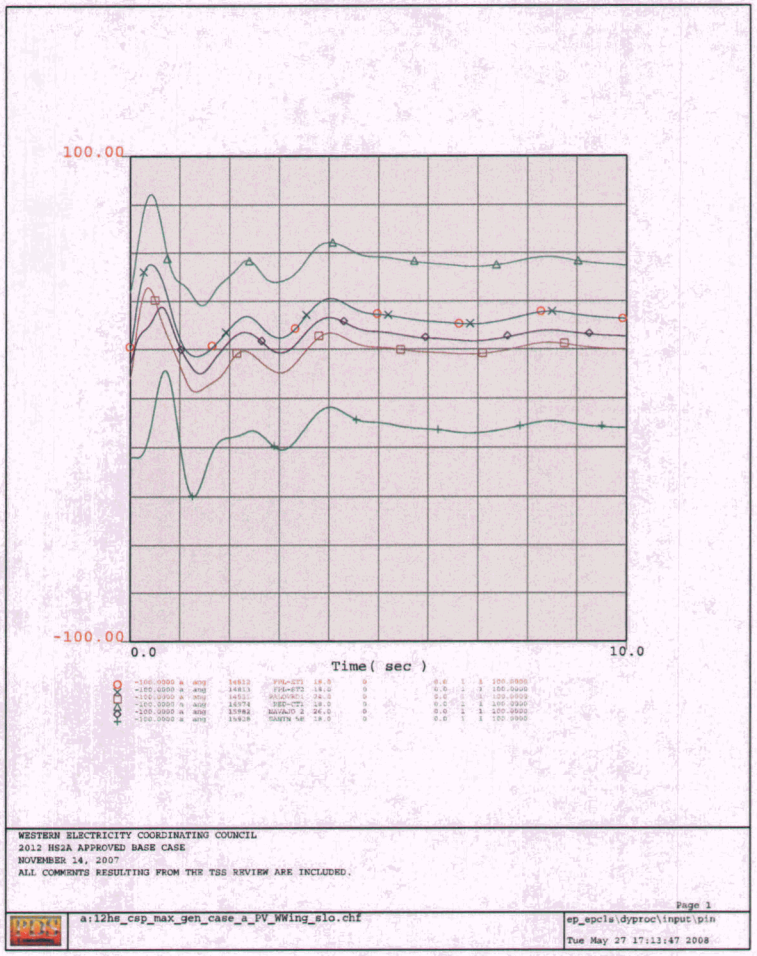
Post-Project, PV Gen Max Case A
Palo Verde-Westwing 500 kV line outage
Transient Generator Angular Plots



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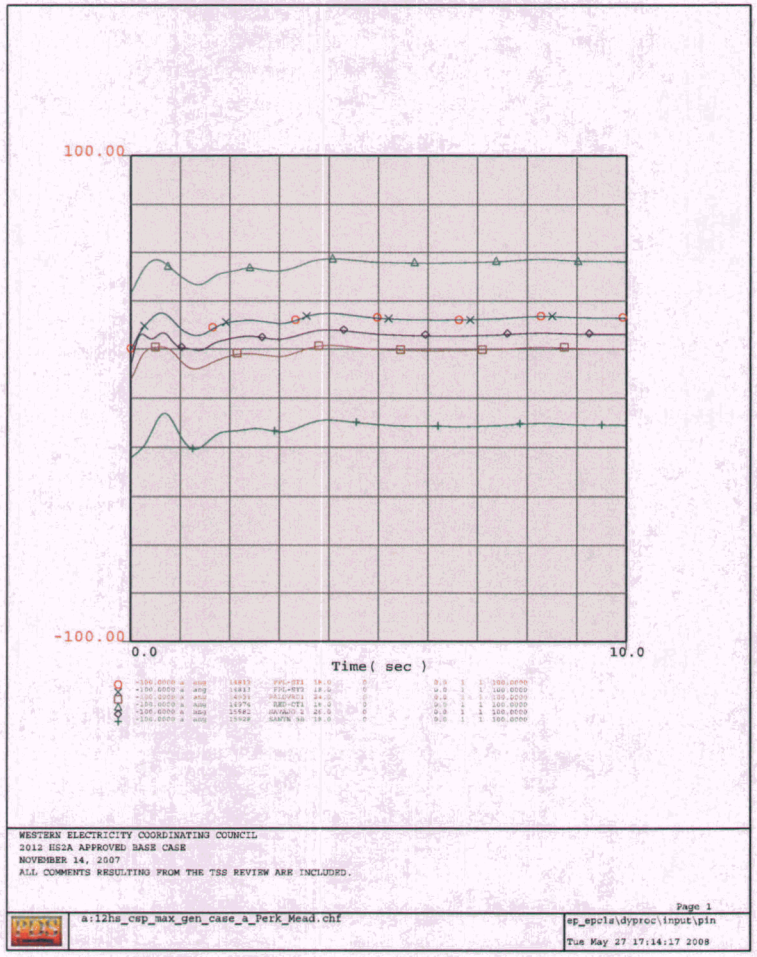
Perkins-Mead 500 kV line outage
Transient Generator Angular Plots



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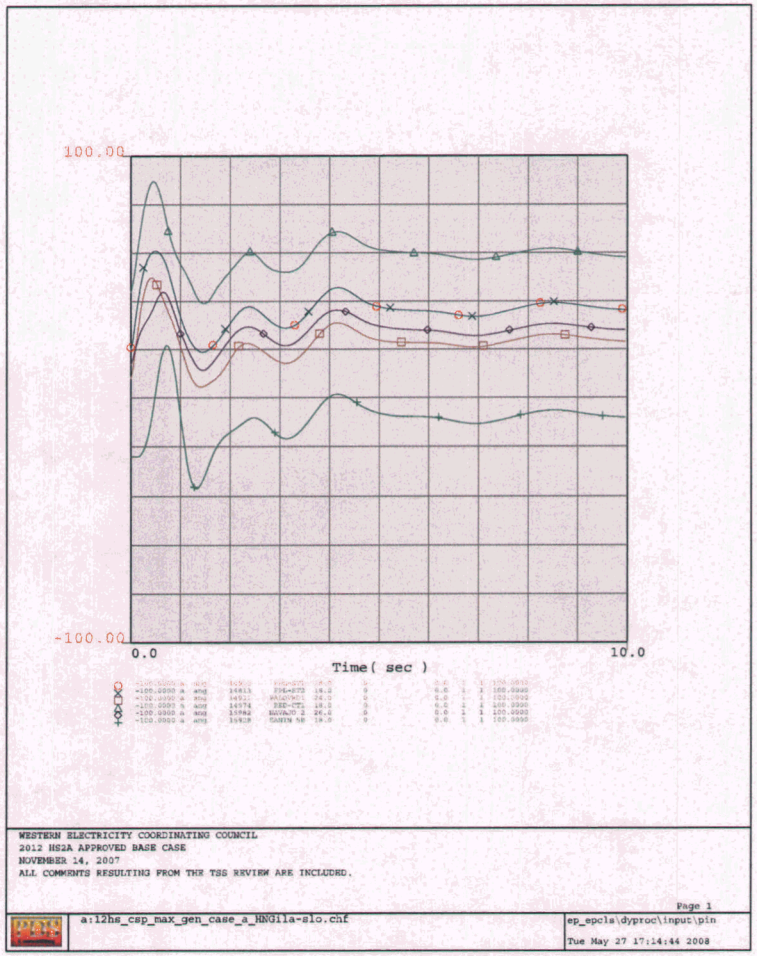
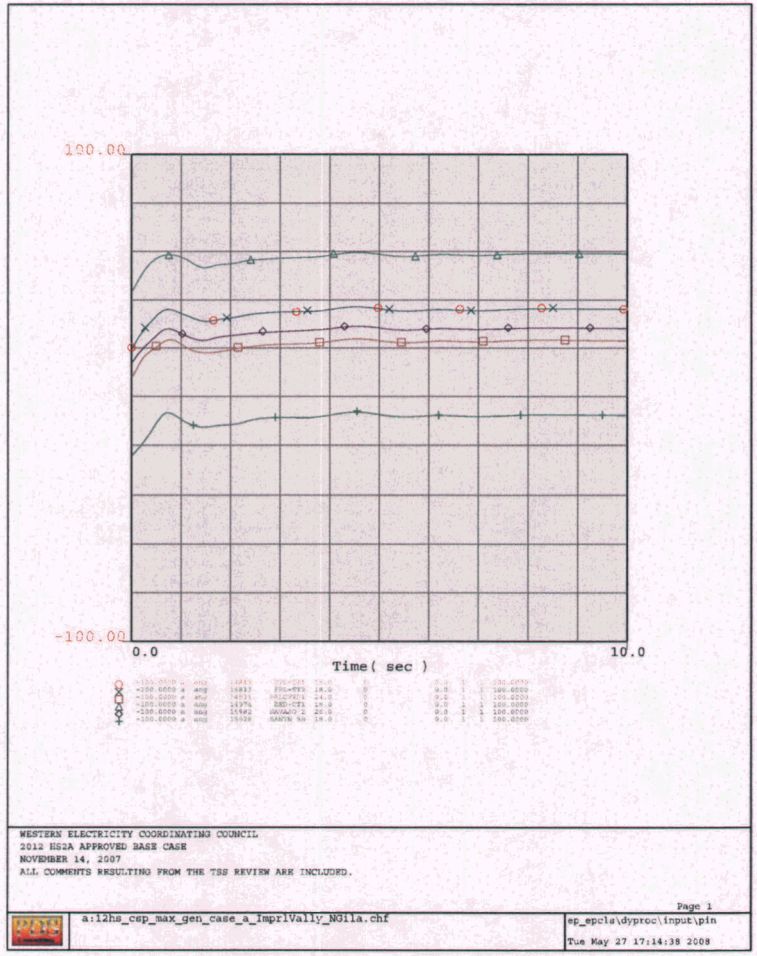
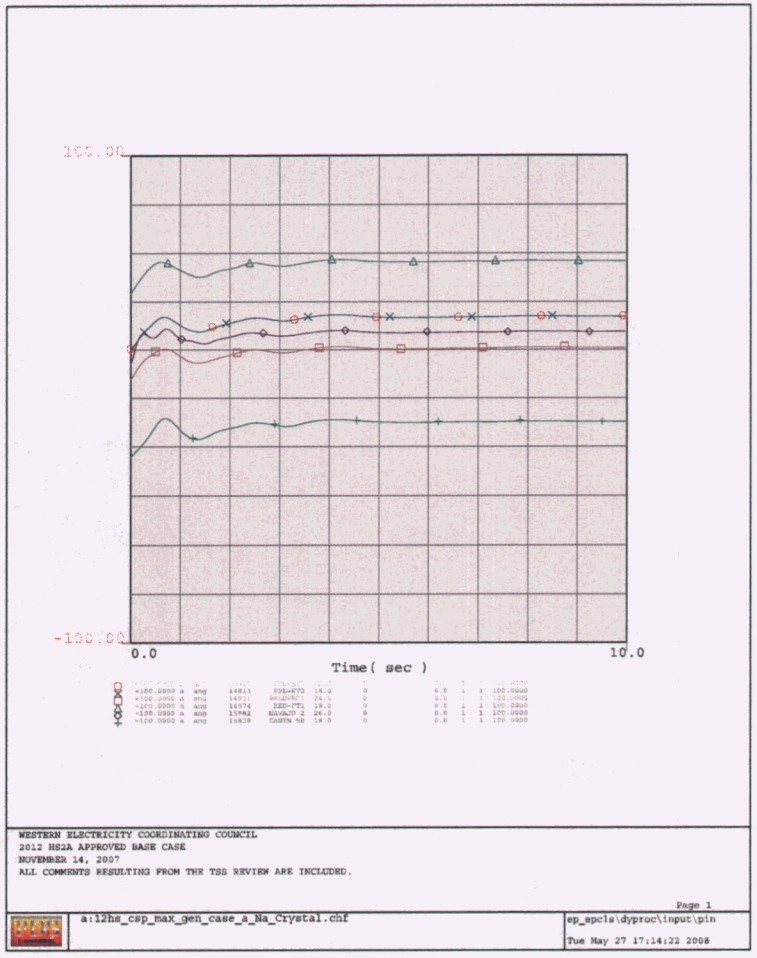
Hassayampa -N. Gila 500 kV line outage
Transient Generator Angular Plots



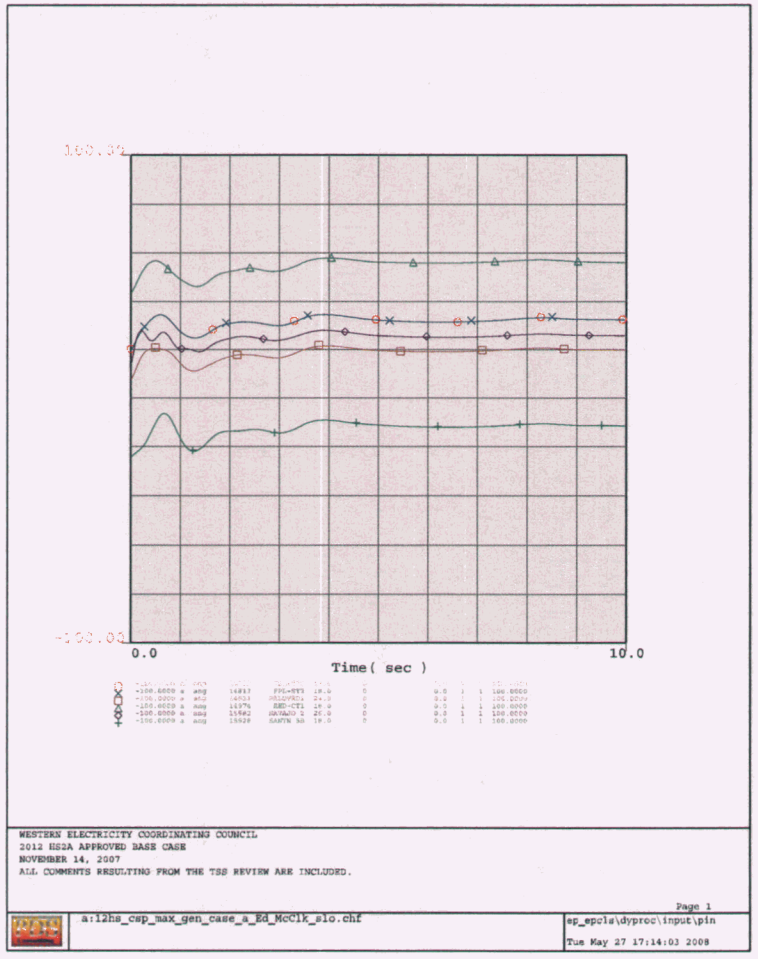
Post-Project, PV Gen Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Generator Angular Plots



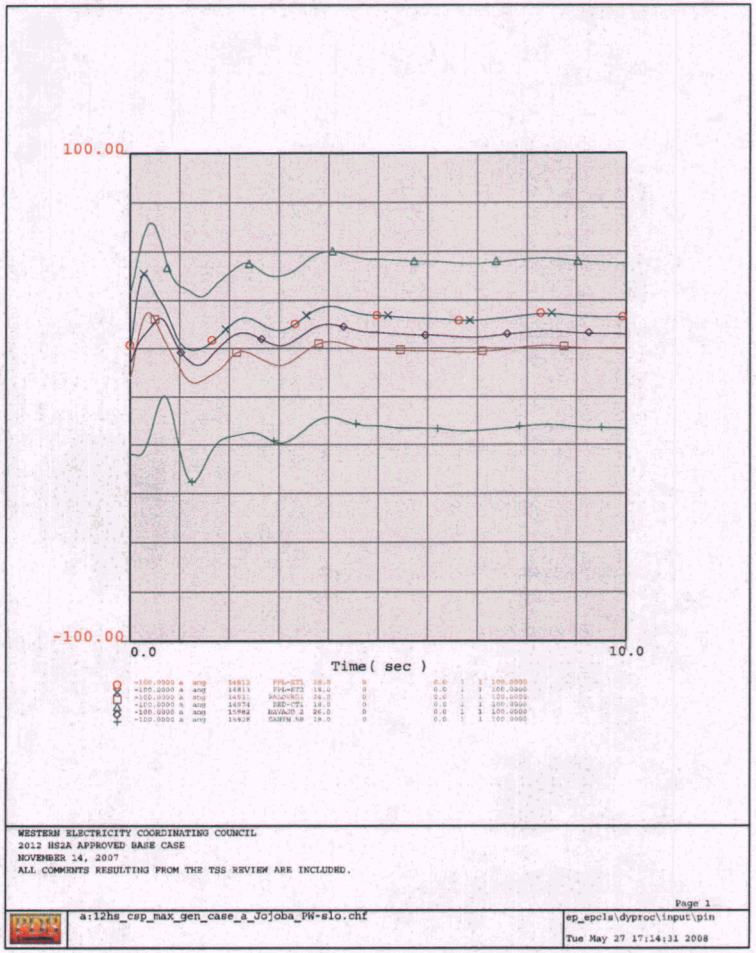
Post-Project, PV Gen Max Case A
Navajo-Crystal 500 kV line
Transient Generator Angular Plots



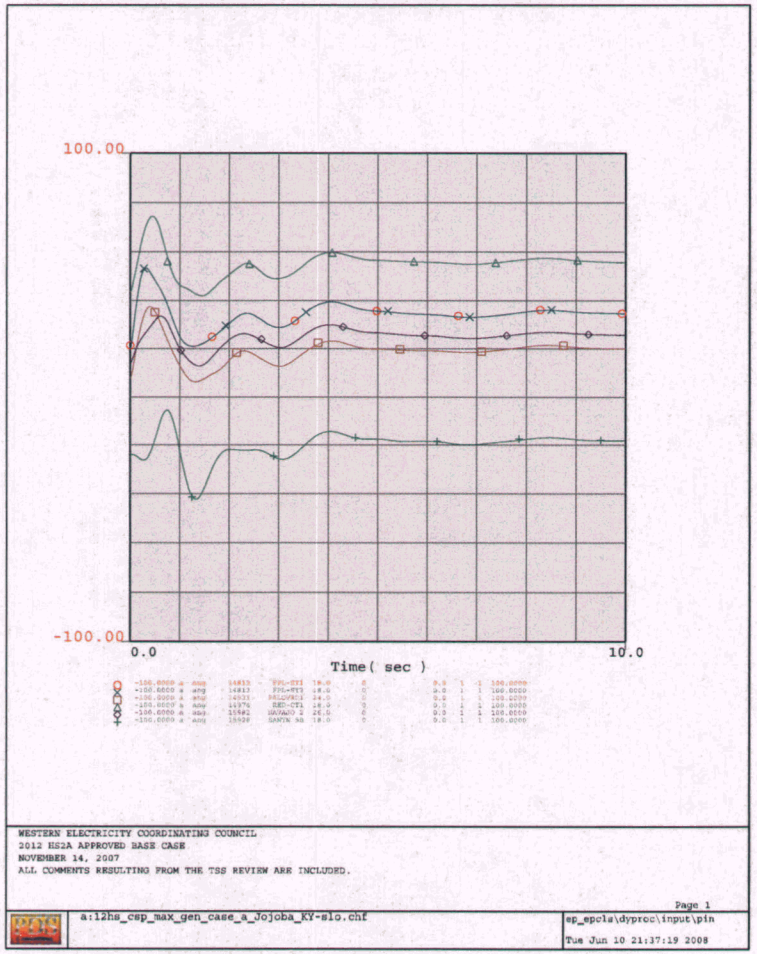
Post-Project, PV Gen Max Case
El Dorado-McCullough 500 kV line outage
Transient Generator Angular Plots



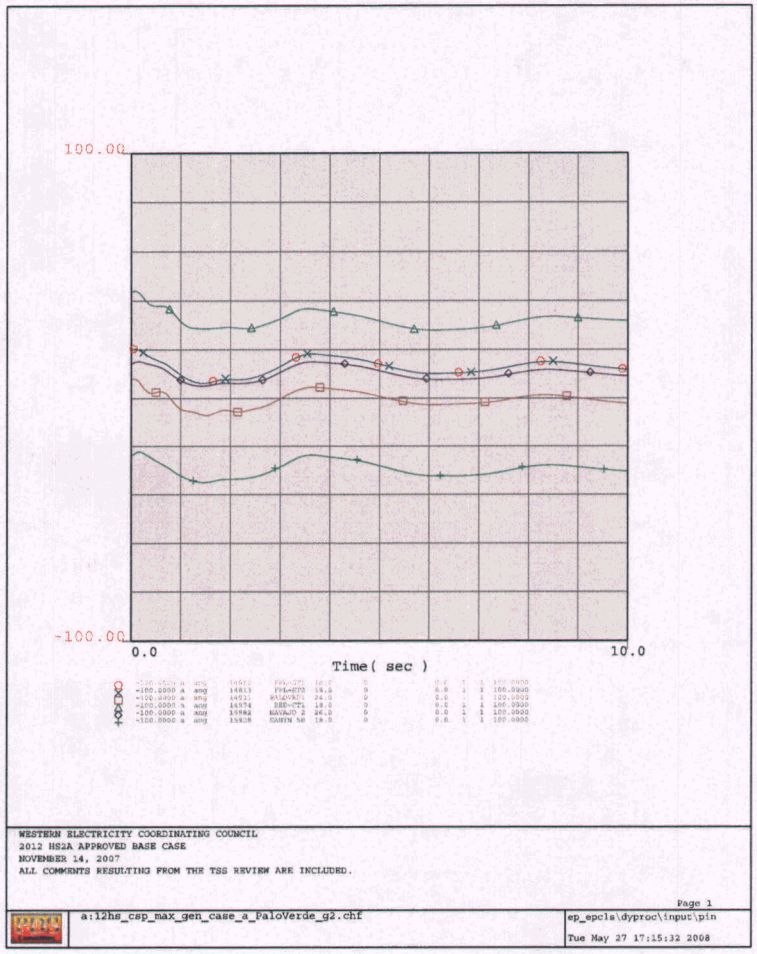
Post-Project, PV Gen Max Case A
Jojoba-Pinal West 500 kV line outage
Transient Generator Angular Plots



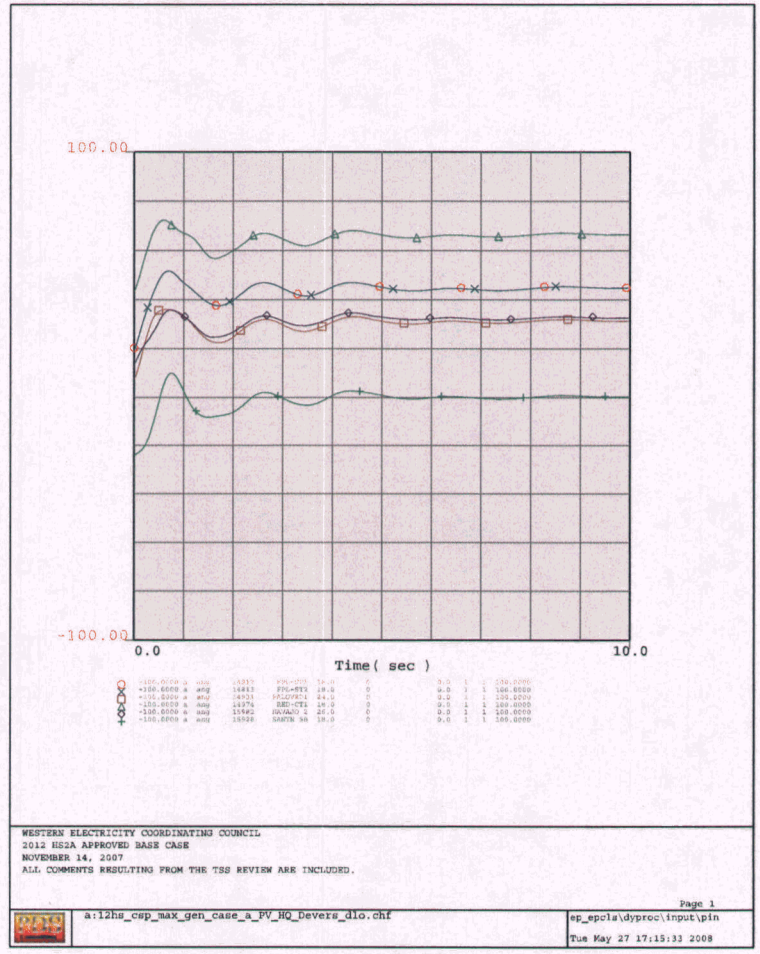
Post-Project, PV Gen Max Case A
Jojoba-Pinal West 500 kV line outage
Transient Generator Angular Plots



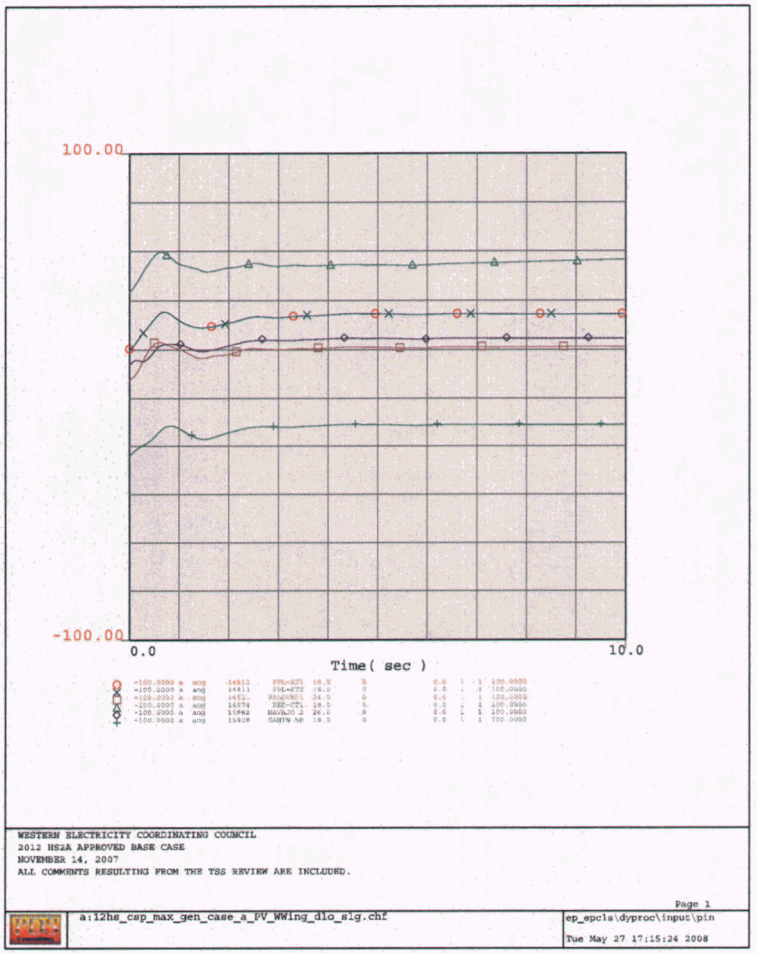
Post-Project, PV Gen Max Case A
Palo Verde G-2 outage
Transient Generator Angular Plots



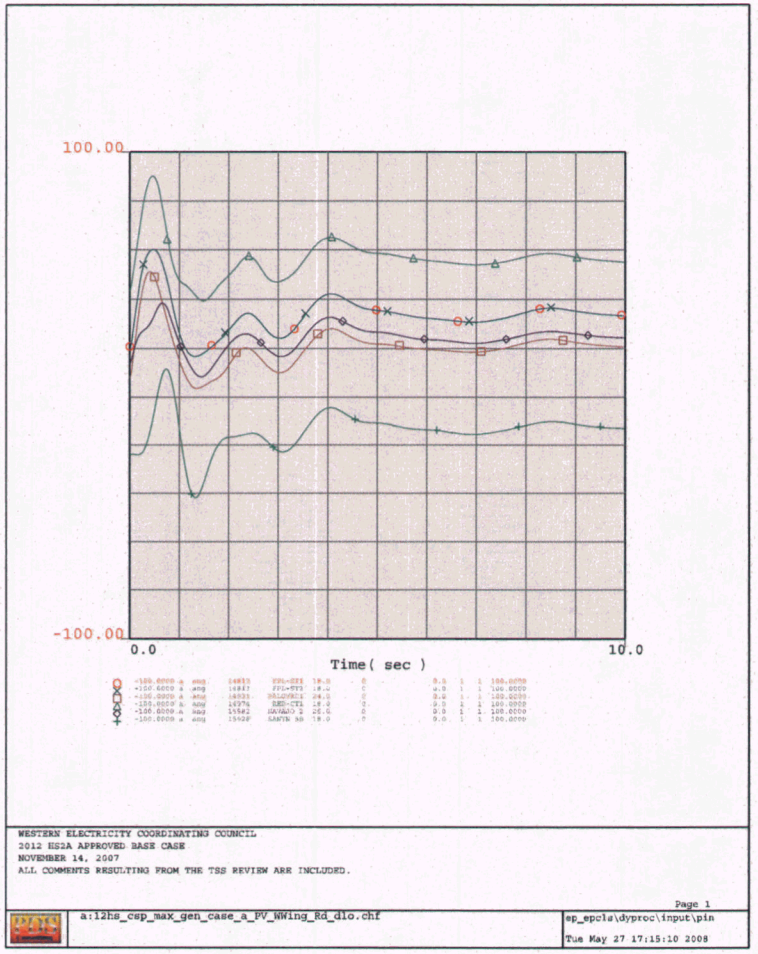
Post-Project, PV Gen Max Case A
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Generator Angular Plots



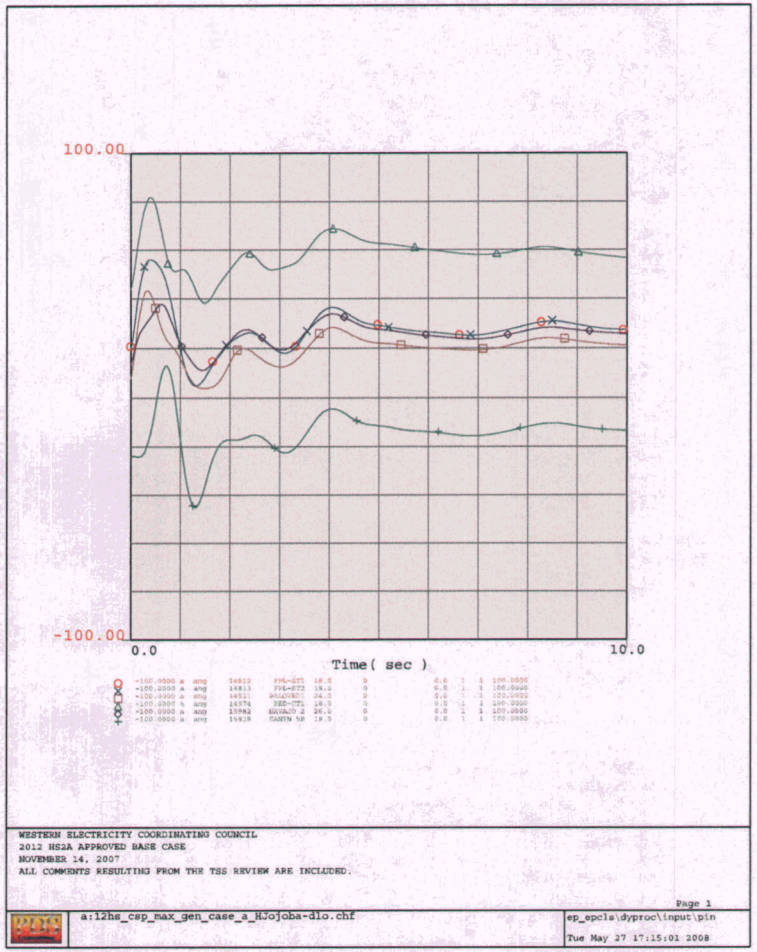
Post-Project, PV Gen Max Case A
PV-Westwing #1 & 2 500 kV lines outage
Transient Generator Angular Plots



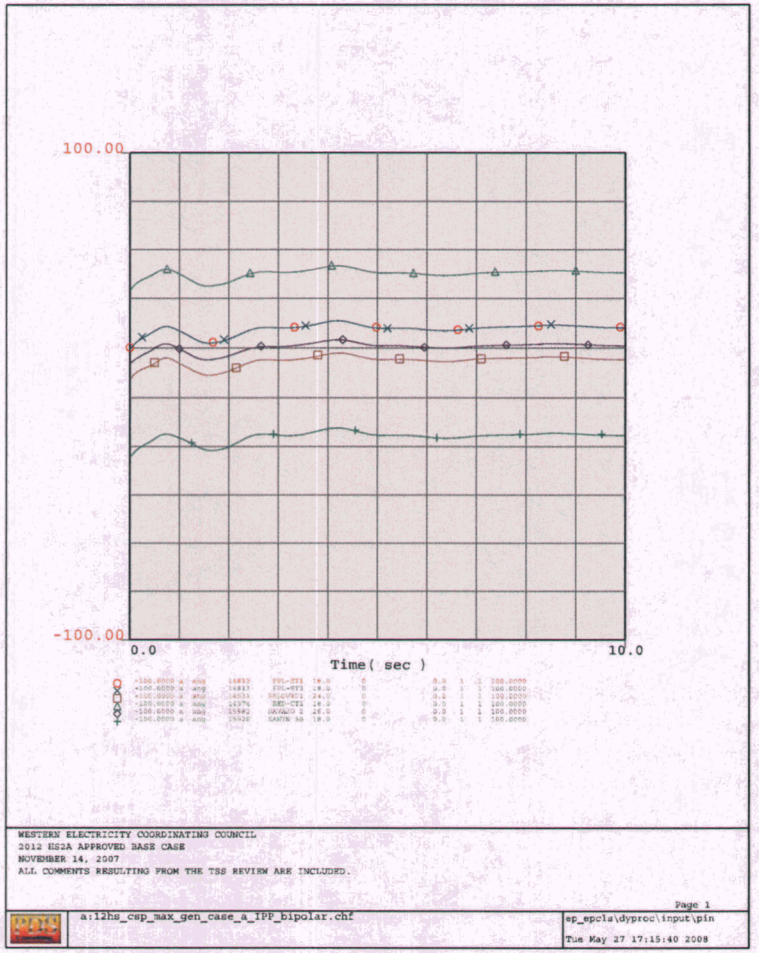
Post-Project, PV Gen Max Case A
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Generator Angular Plots



Post-Project, PV Gen Max Case A
Hassayampa-Jojoba #1 & 2 500 kV lines outage
Transient Generator Angular Plots

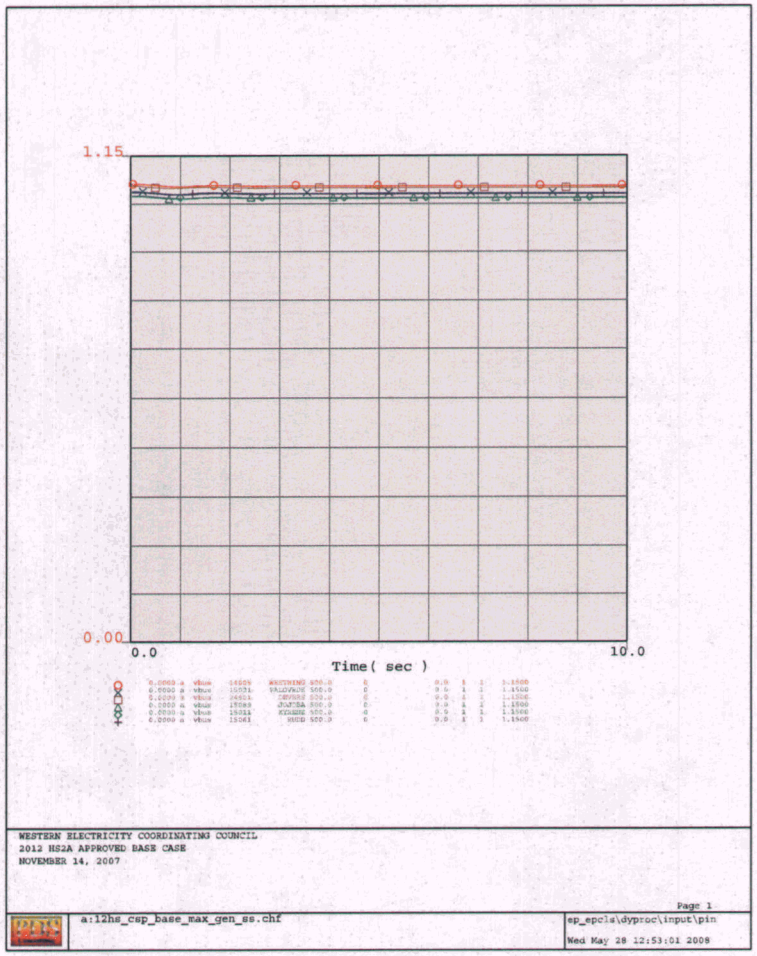


Post-Project, PV Gen Max Case A
IPP Bipole outage
Transient Generator Angular Plots

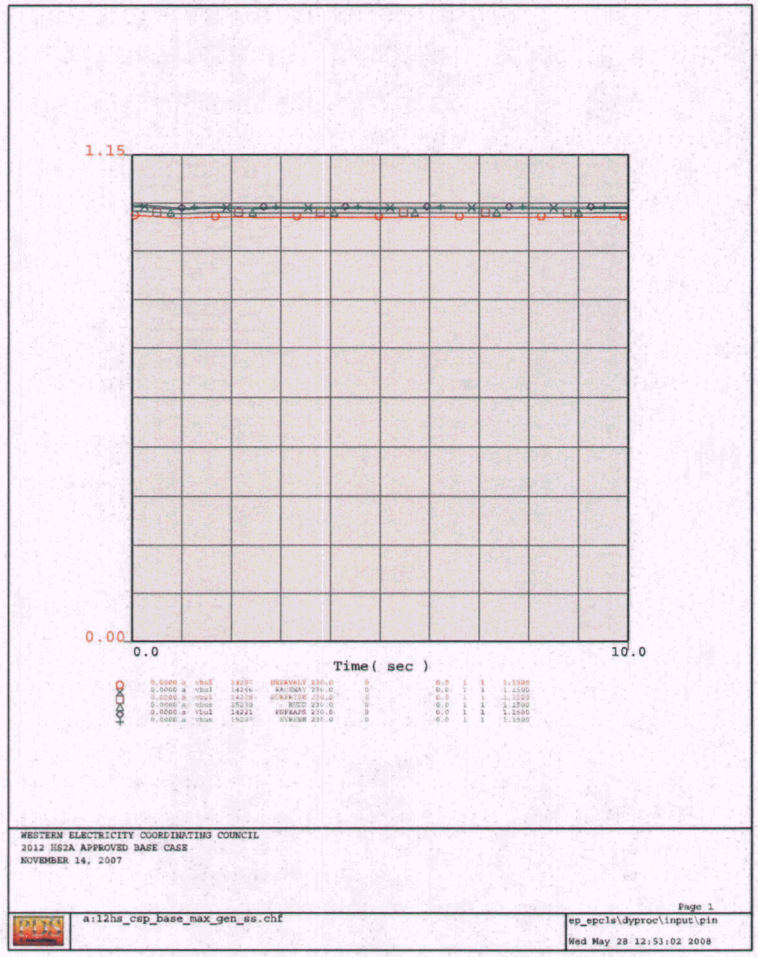


Transient Bus Voltage Plots

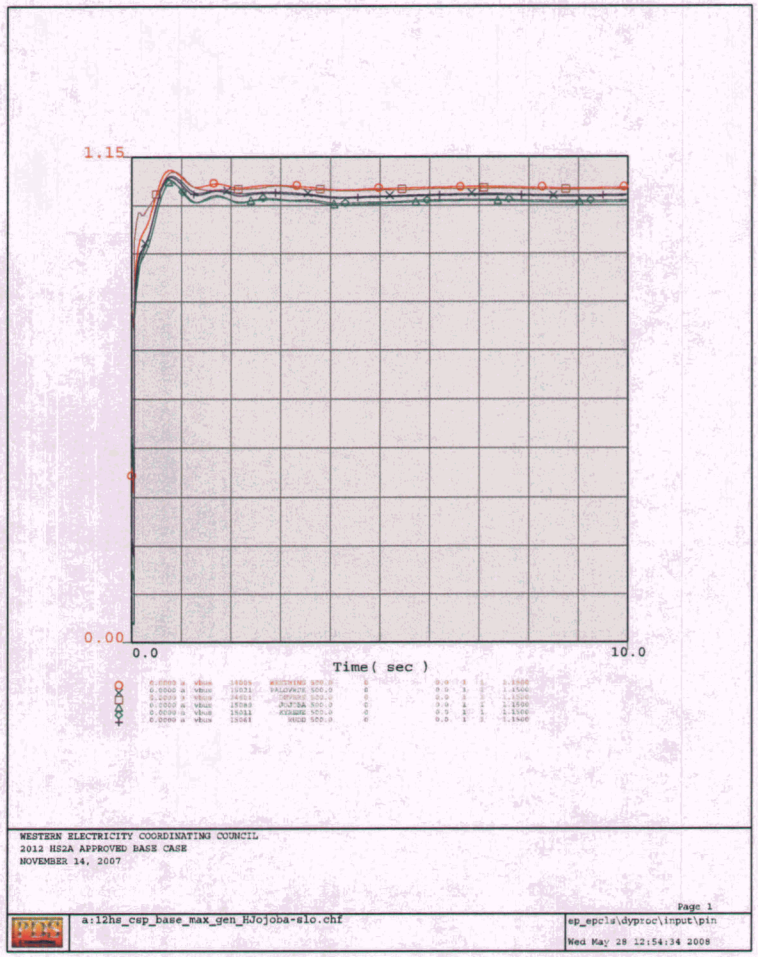
Pre-Project, PV Gen Max Case
No Outage
Transient Bus Voltage Plots



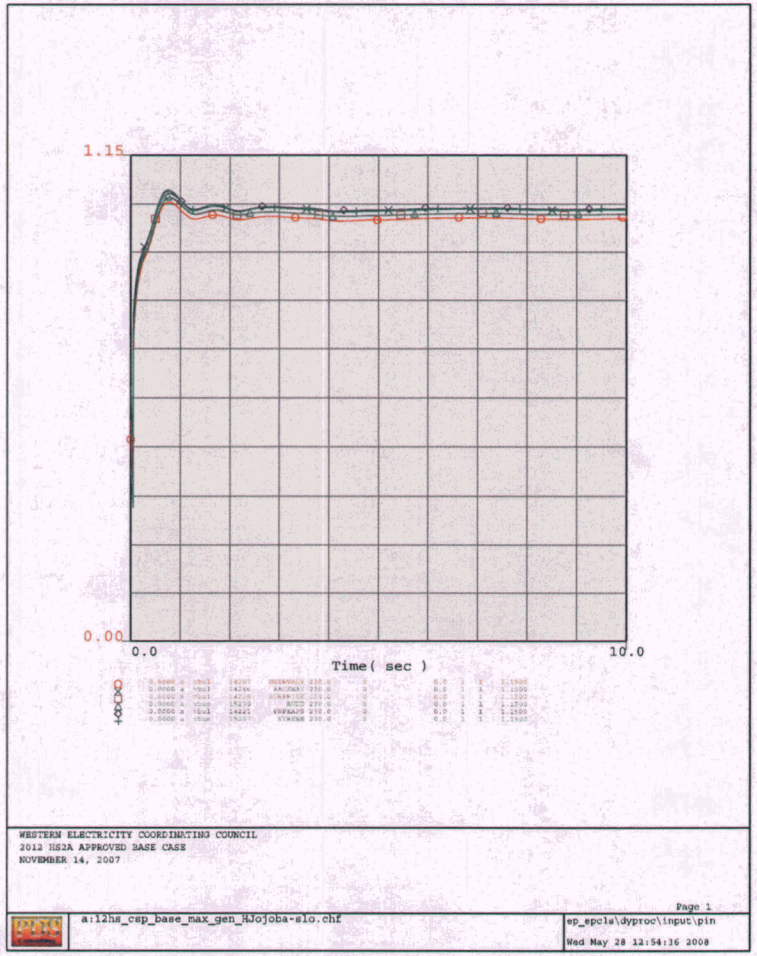
Pre-Project, PV Gen Max Case
No Outage
Transient Bus Voltage Plots



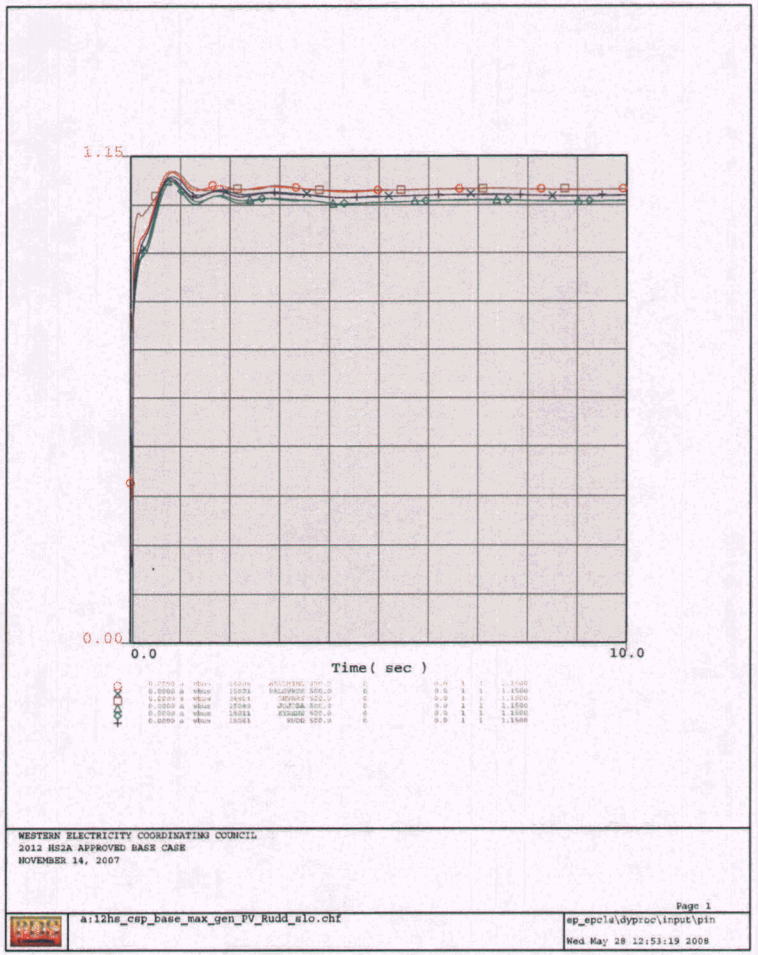
Pre-Project, PV Gen Max Case
Hassayampa-Jojoba 500 kV line outage
Transient Bus Voltage Plots



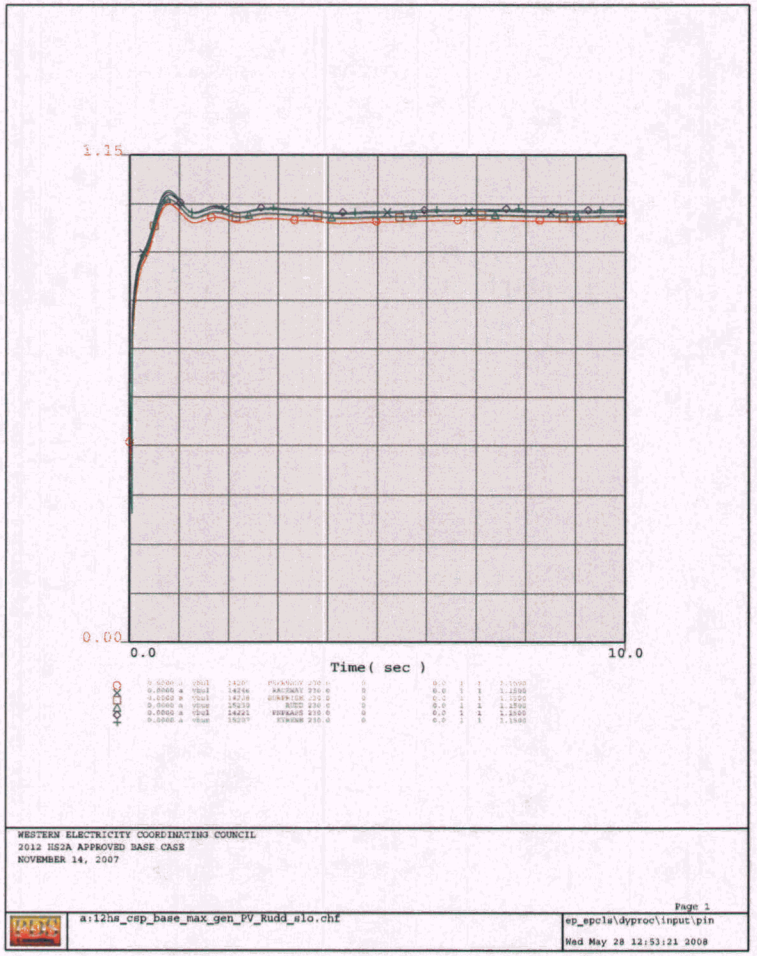
Pre-Project, PV Gen Max Case
Hassayampa-Jojoba 500 kV line outage
Transient Bus Voltage Plots



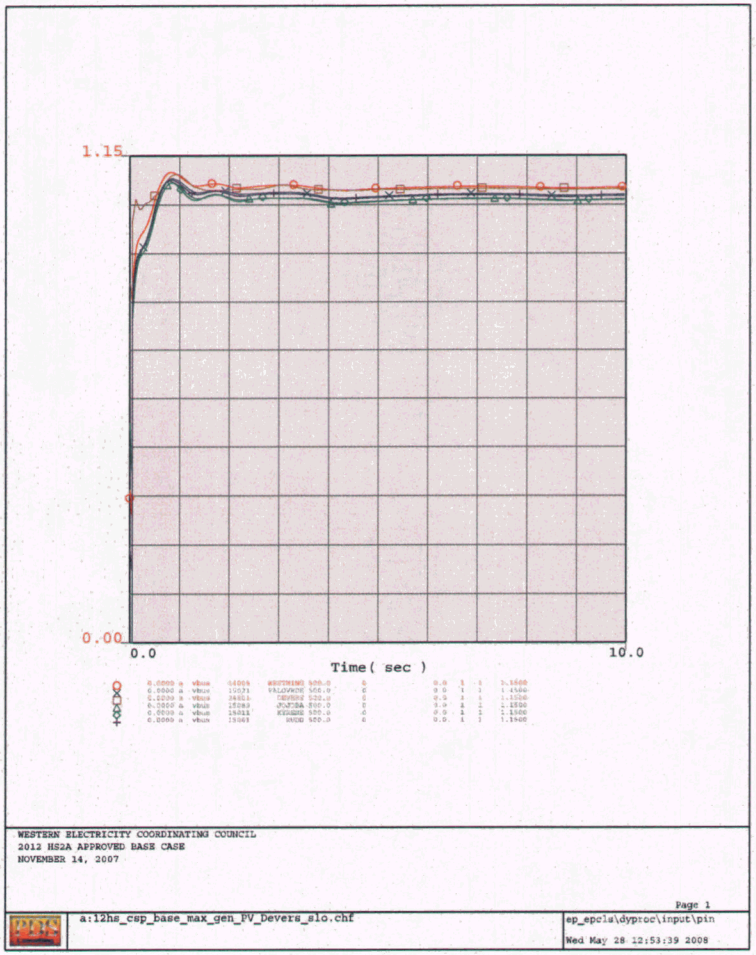
Pre-Project, PV Gen Max Case
Palo Verde-Rudd 500 kV line outage
Transient Bus Voltage Plots



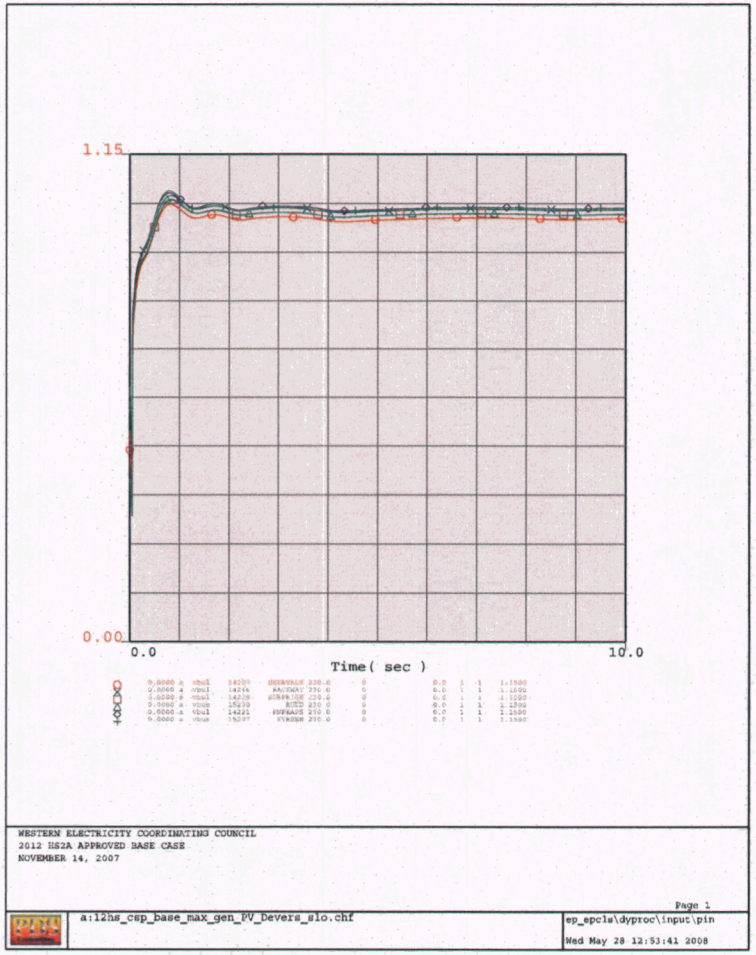
Pre-Project, PV Gen Max Case
Palo Verde-Rudd 500 kV line outage
Transient Bus Voltage Plots



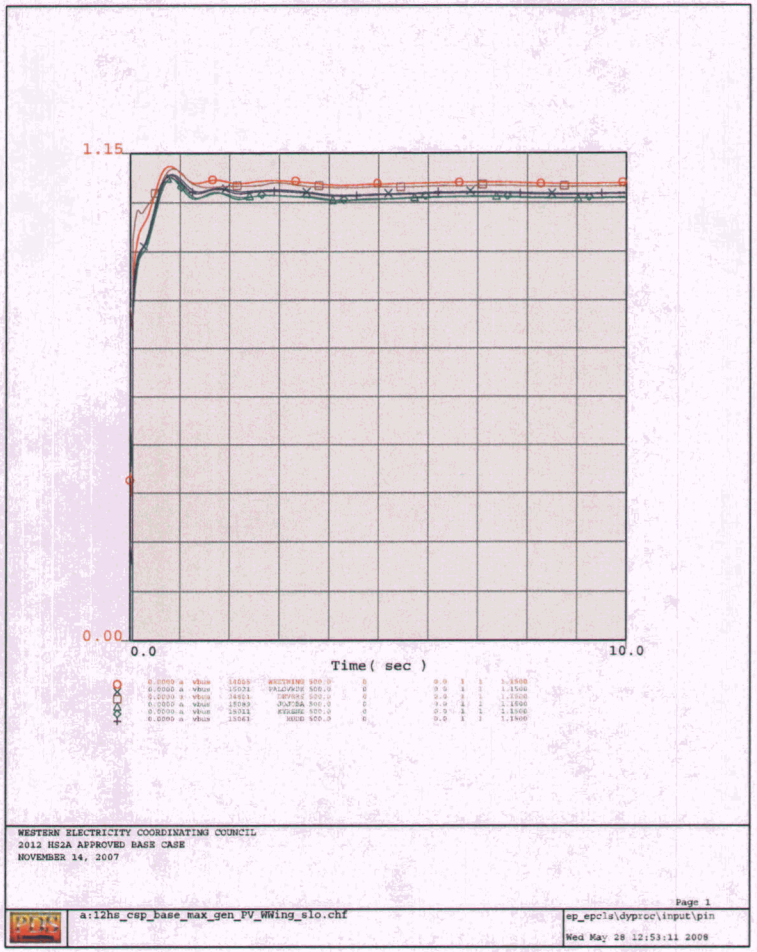
Pre-Project, PV Gen Max Case
Palo Verde-Devers 500 kV line outage
Transient Bus Voltage Plots



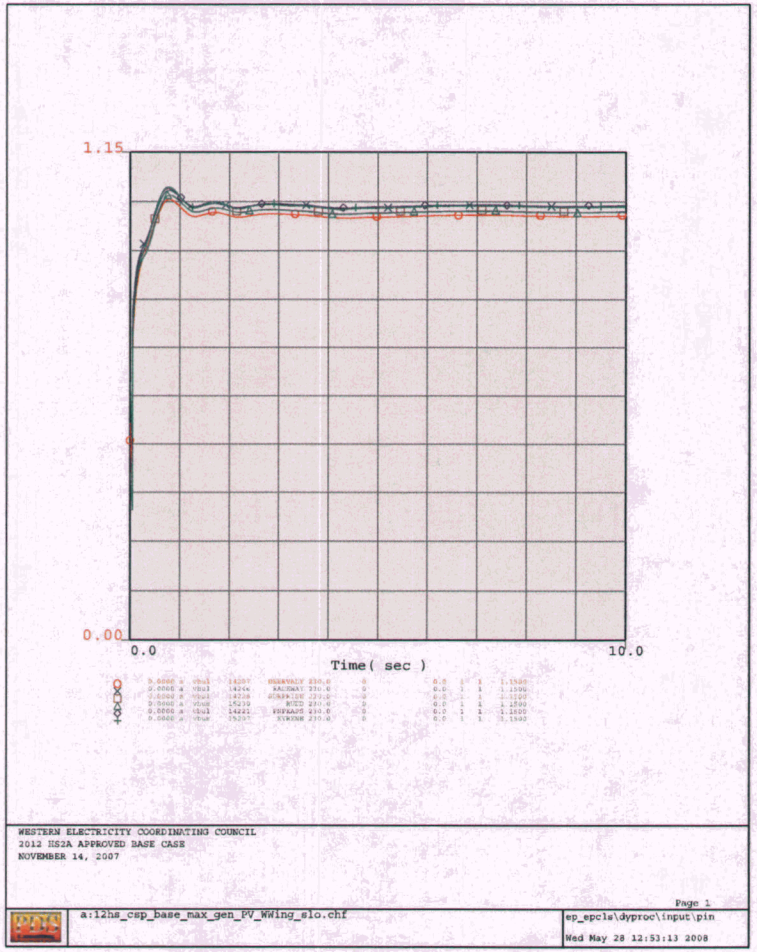
Pre-Project, PV Gen Max Case
Palo Verde-Devers 500 kV line outage
Transient Bus Voltage Plots



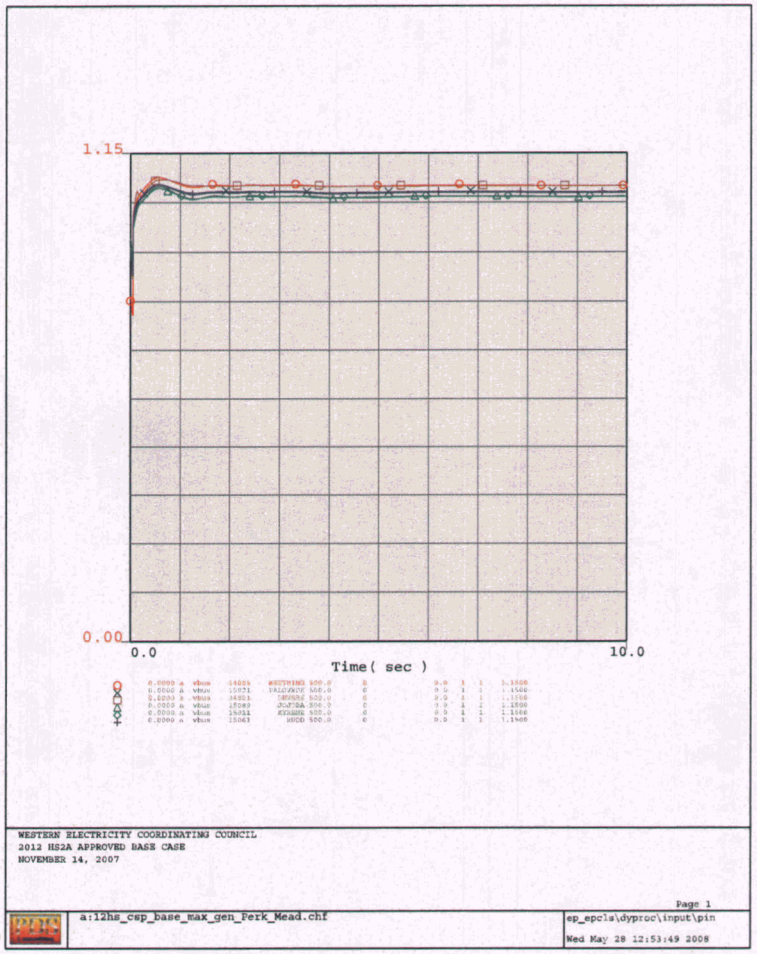
Pre-Project, PV Gen Max Case
Palo Verde-Westwing 500 kV line outage
Transient Bus Voltage Plots



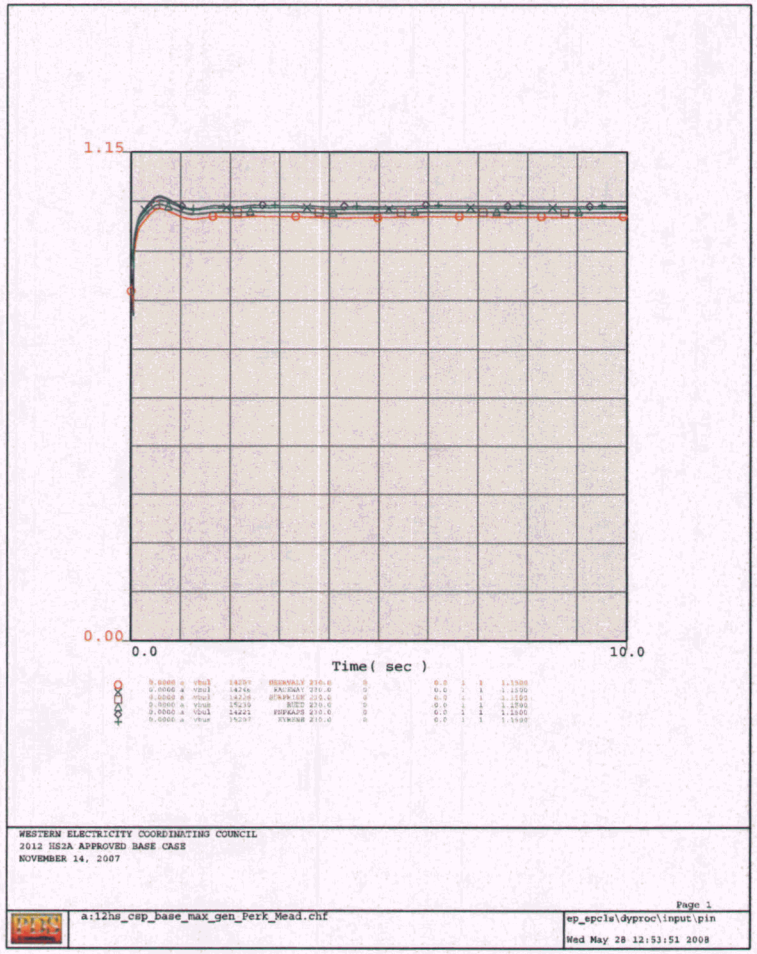
Pre-Project, PV Gen Max Case
Palo Verde-Westwing 500 kV line outage
Transient Bus Voltage Plots



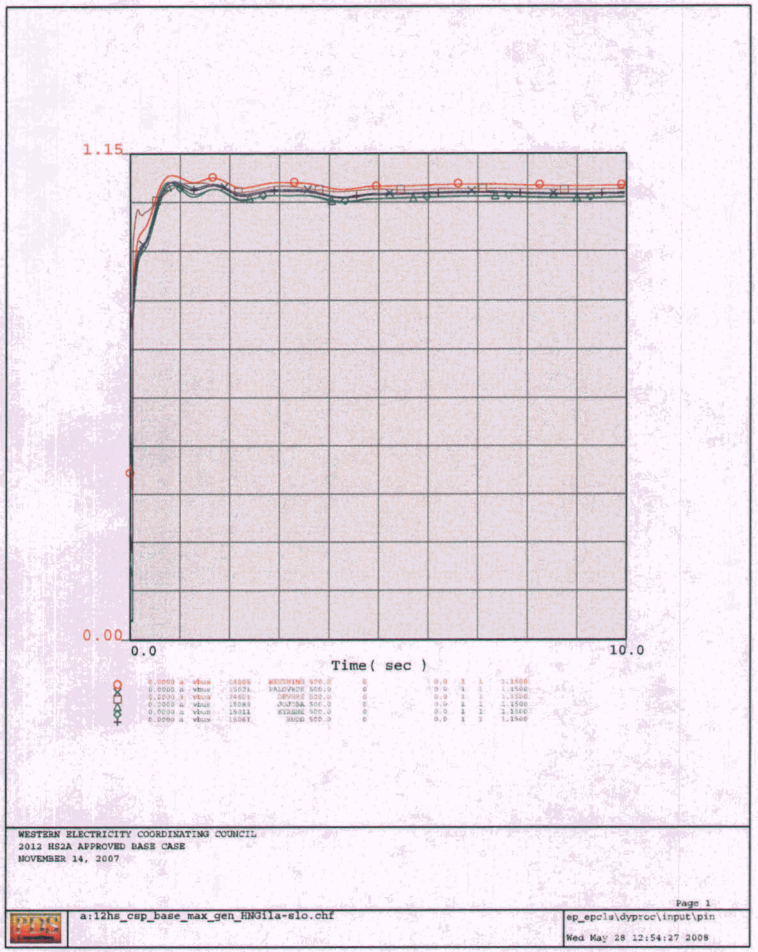
Pre-Project, PV Gen Max Case
Perkins-Mead 500 kV line outage
Transient Bus Voltage Plots



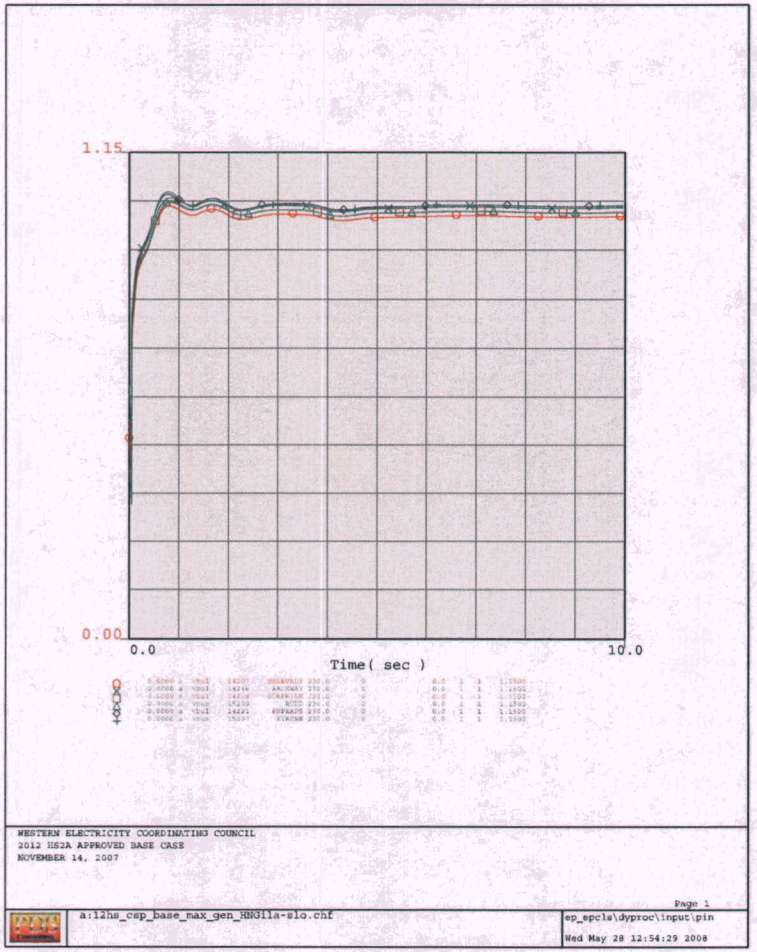
Pre-Project, PV Gen Max Case
Perkins-Mead 500 kV line outage
Transient Bus Voltage Plots



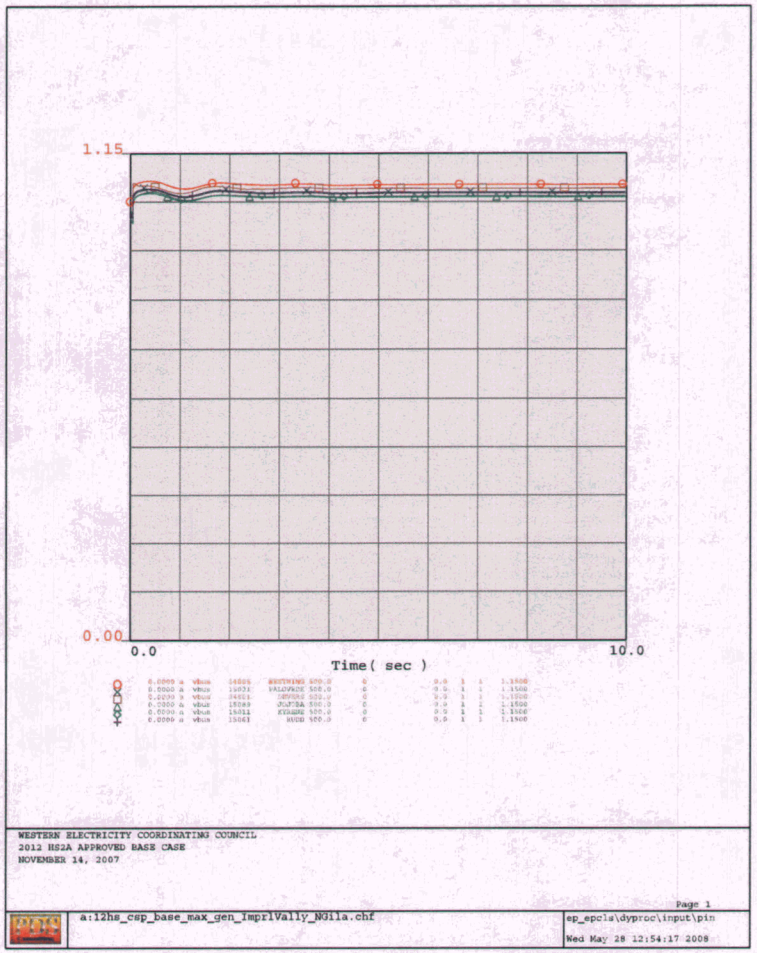
Pre-Project, PV Gen Max Case
Hassayampa -N. Gila 500 kV line outage
Transient Bus Voltage Plots



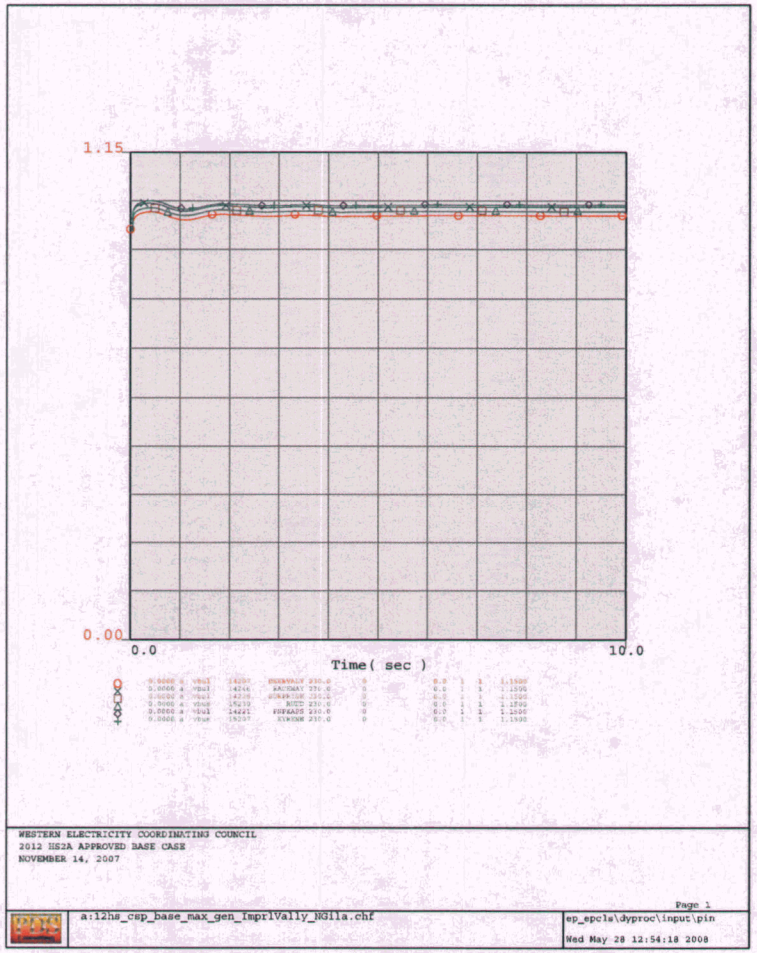
Pre-Project, PV Gen Max Case
Hassayampa -N. Gila 500 kV line outage
Transient Bus Voltage Plots



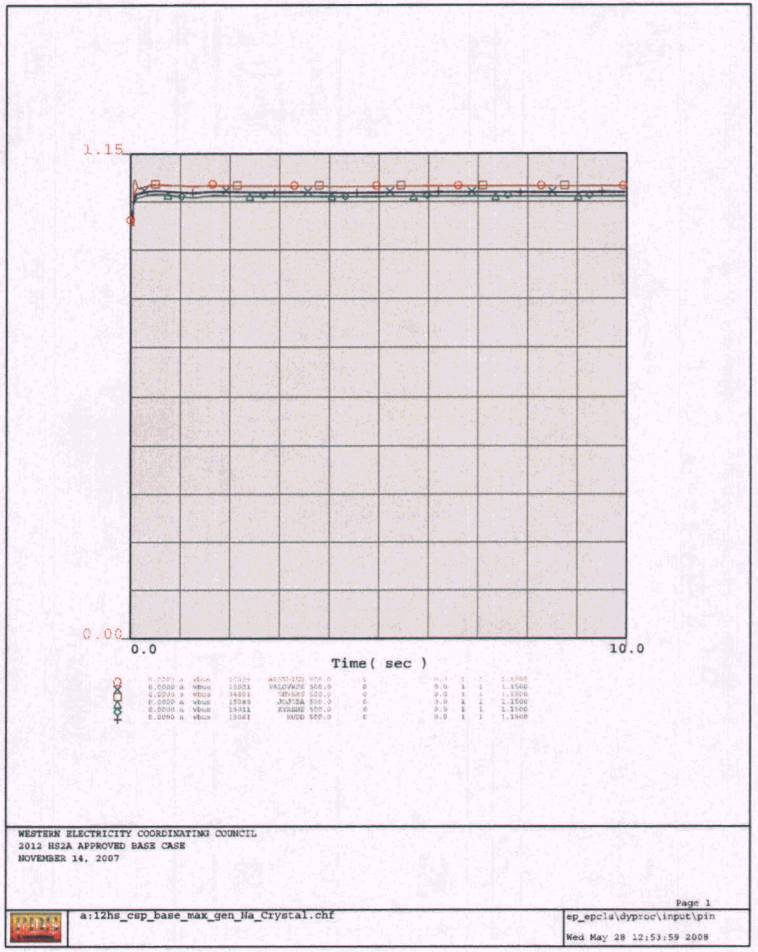
Pre-Project, PV Gen Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Bus Voltage Plots



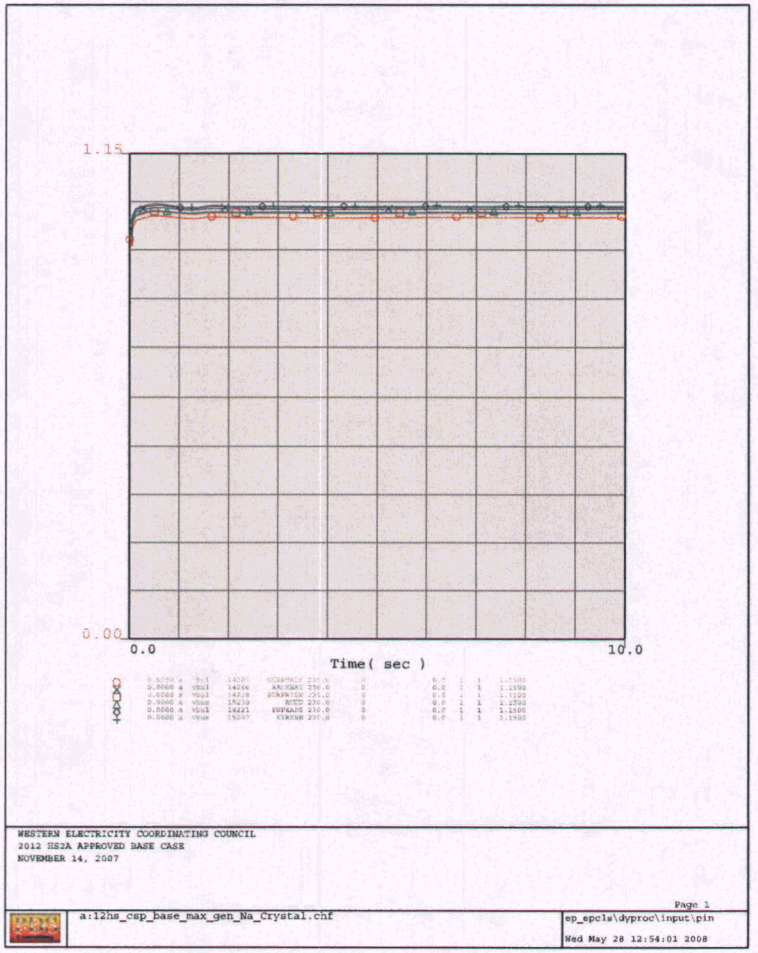
Pre-Project, PV Gen Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Bus Voltage Plots



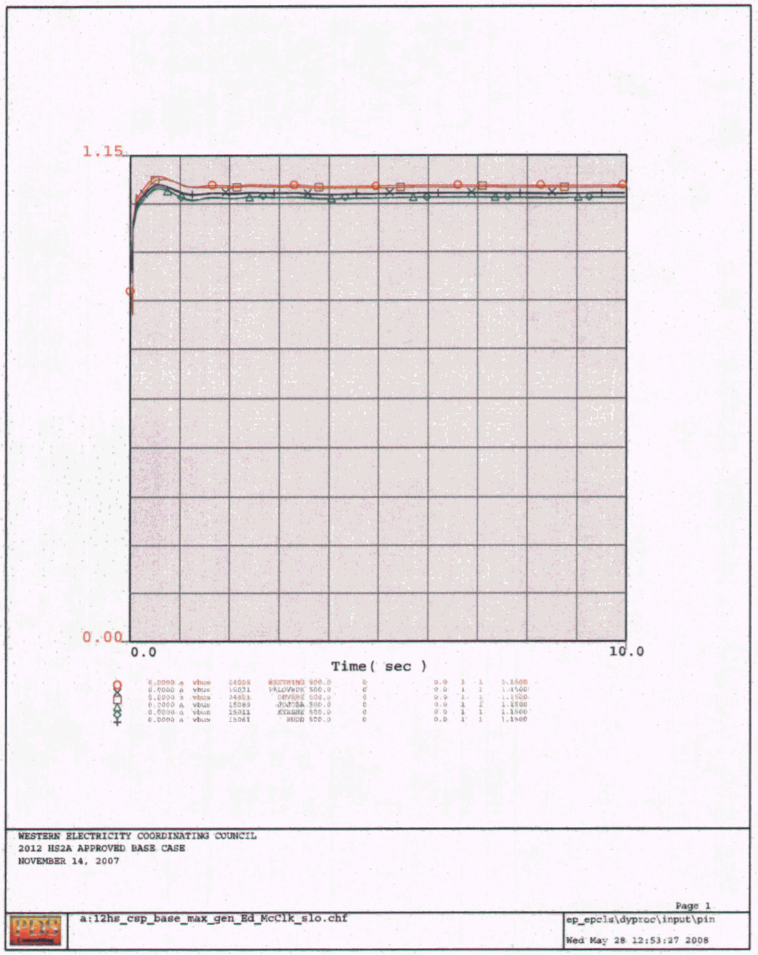
Pre-Project, PV Gen Max Case
Navajo-Crystal 500 kV line
Transient Bus Voltage Plots



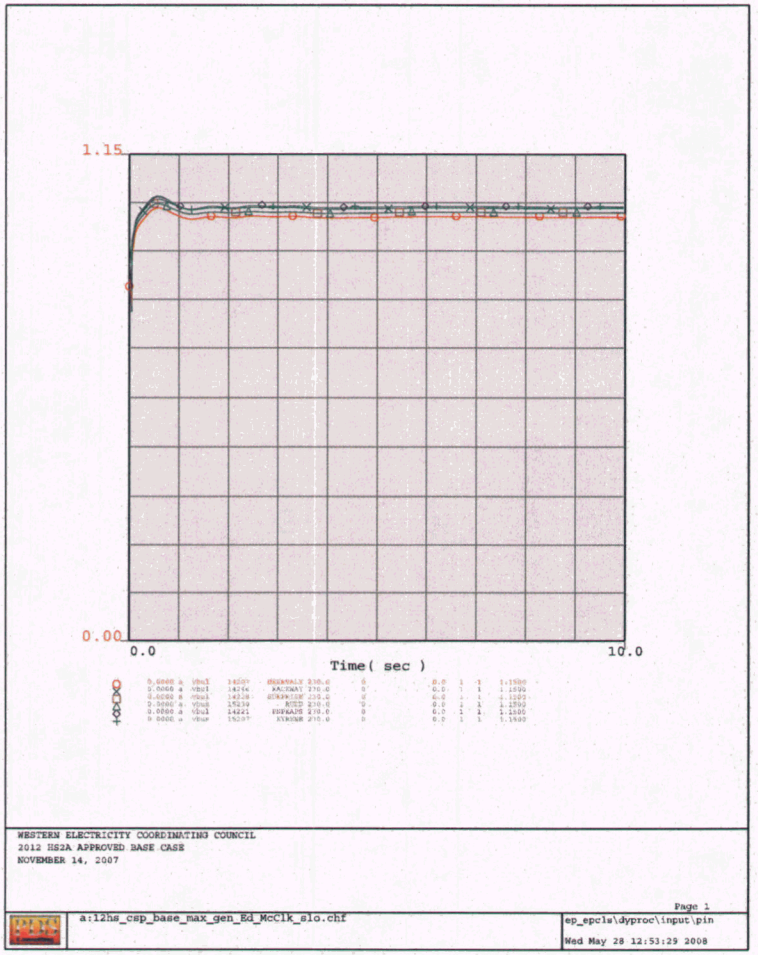
Pre-Project, PV Gen Max Case
Navajo-Crystal 500 kV line
Transient Bus Voltage Plots



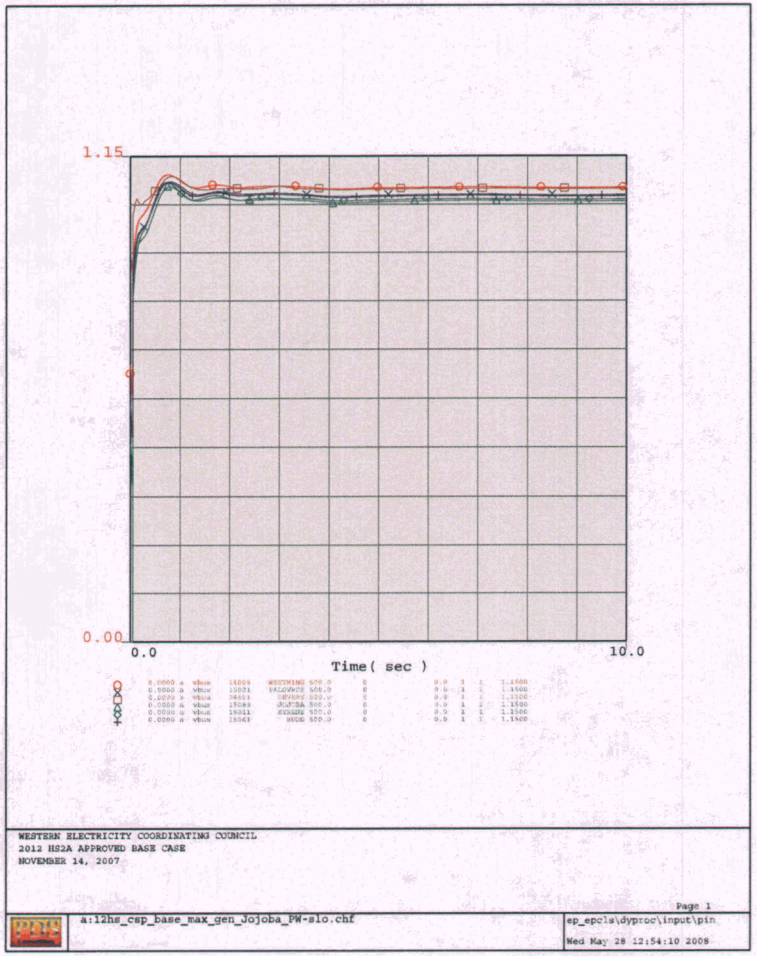
Pre-Project, PV Gen Max Case
El Dorado-McCullough 500 kV line outage
Transient Bus Voltage Plots



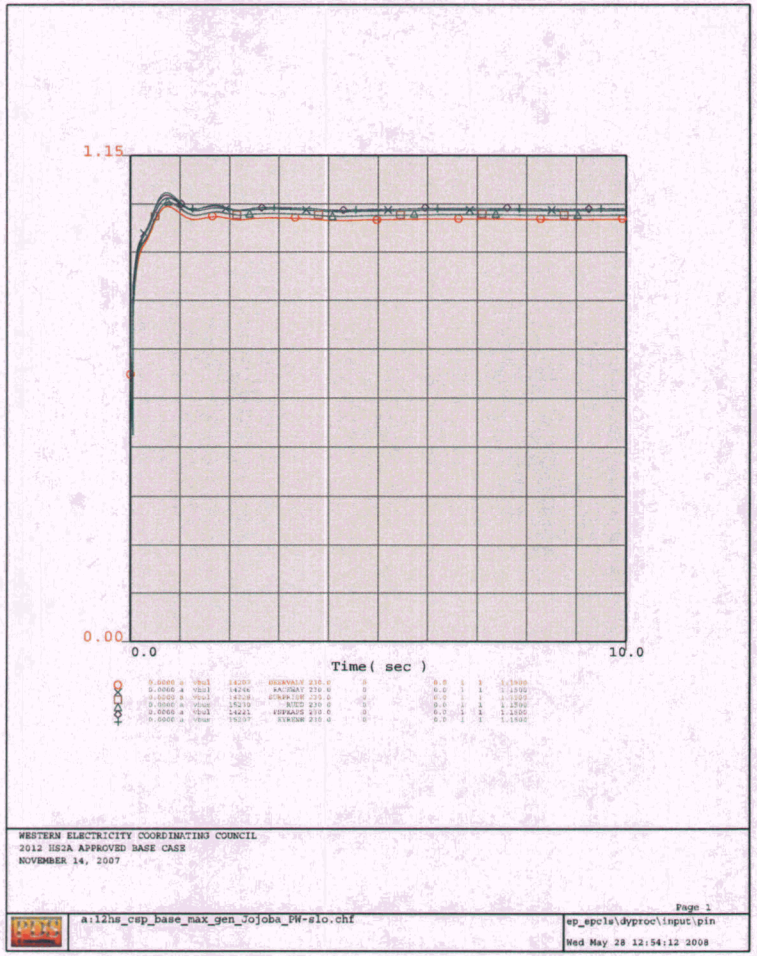
Pre-Project, PV Gen Max Case
El Dorado-McCullough 500 kV line outage
Transient Bus Voltage Plots



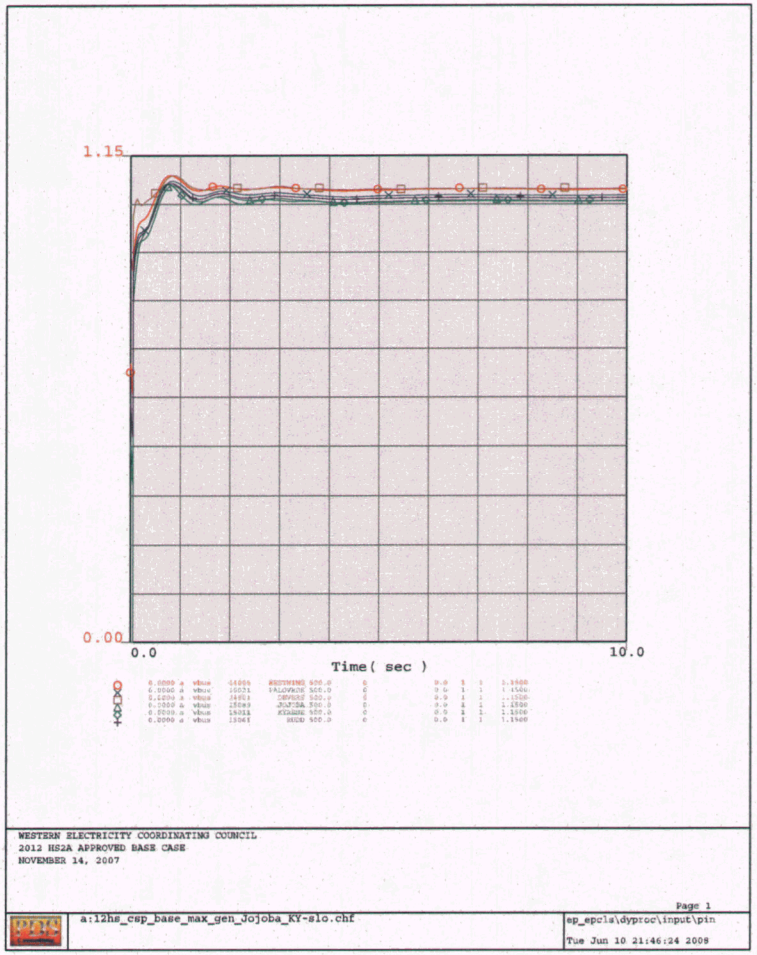
Pre-Project, PV Gen Max Case
Jojoba-Pinal West 500 kV line outage
Transient Bus Voltage Plots



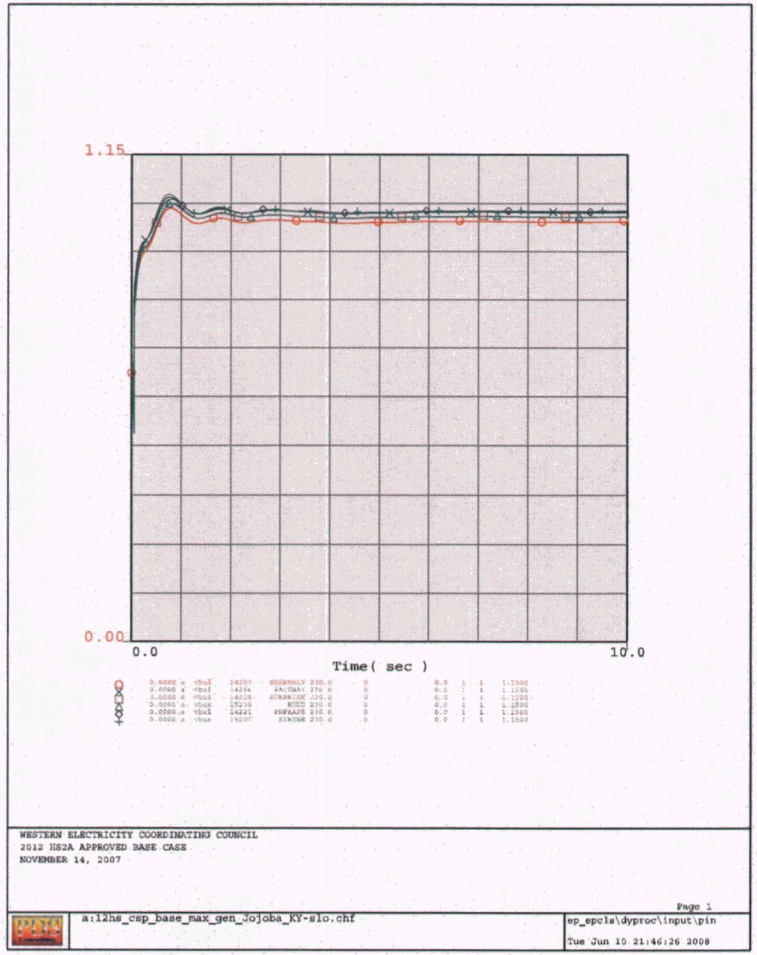
Pre-Project, PV Gen Max Case
Jojoba-Pinal West 500 kV line outage
Transient Bus Voltage Plots



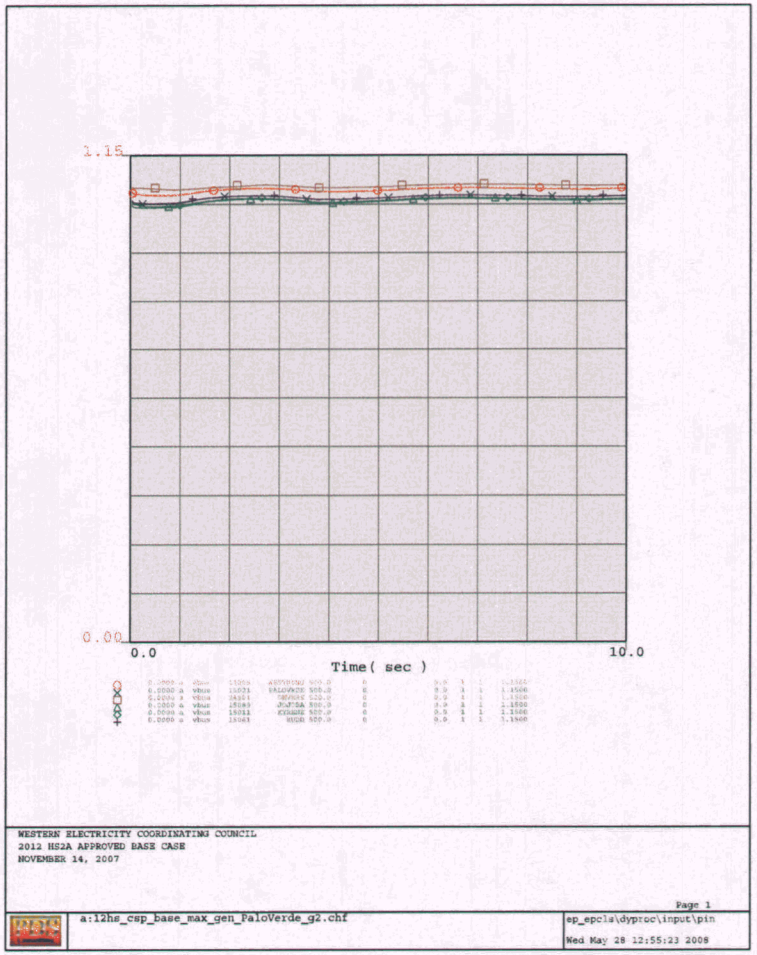
Pre-Project, PV Gen Max Case
Jojoba-Kyrene 500 kV line outage
Transient Bus Voltage Plots



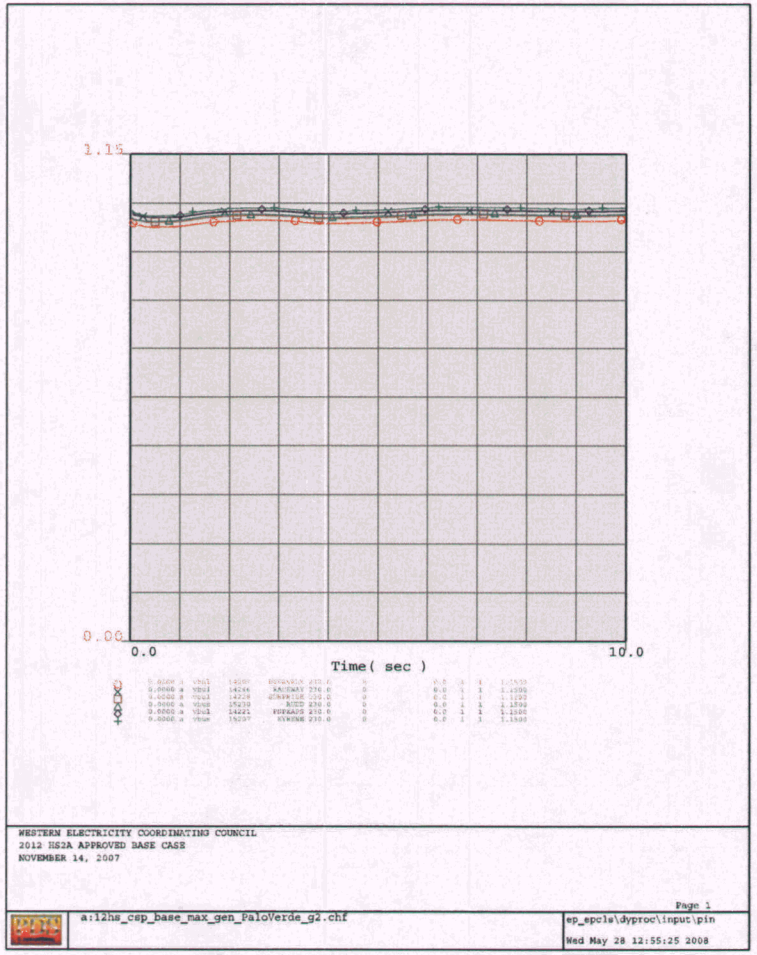
Pre-Project, PV Gen Max Case
Jojoba-Kyrene 500 kV line outage
Transient Bus Voltage Plots



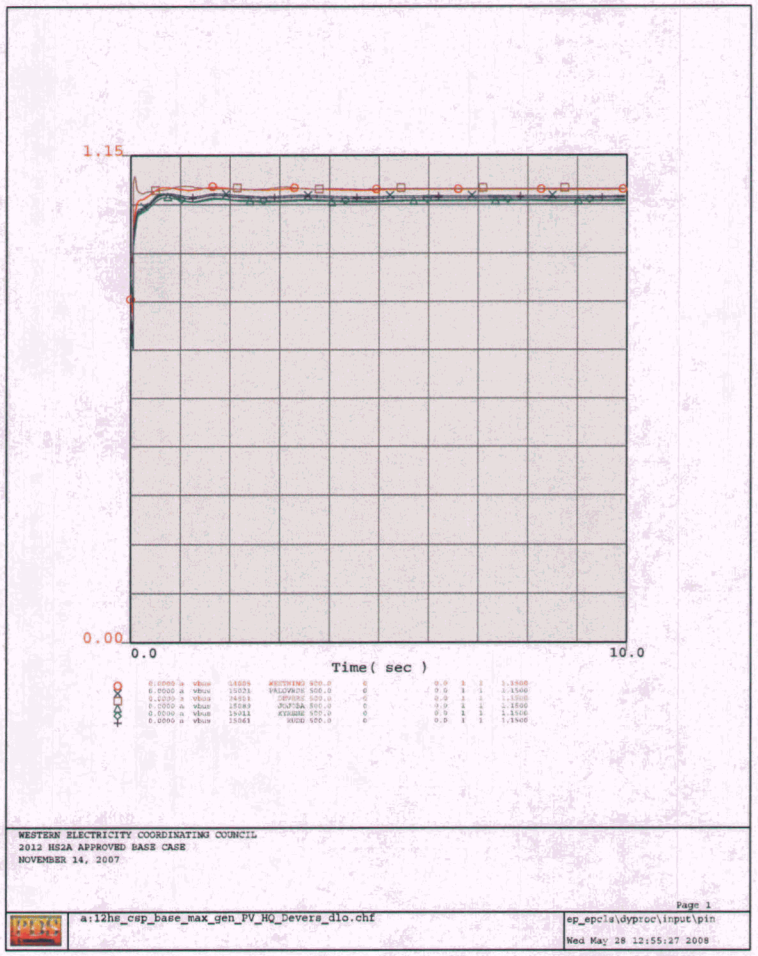
Pre-Project, PV Gen Max Case
Palo Verde G-2 outage
Transient Bus Voltage Plots



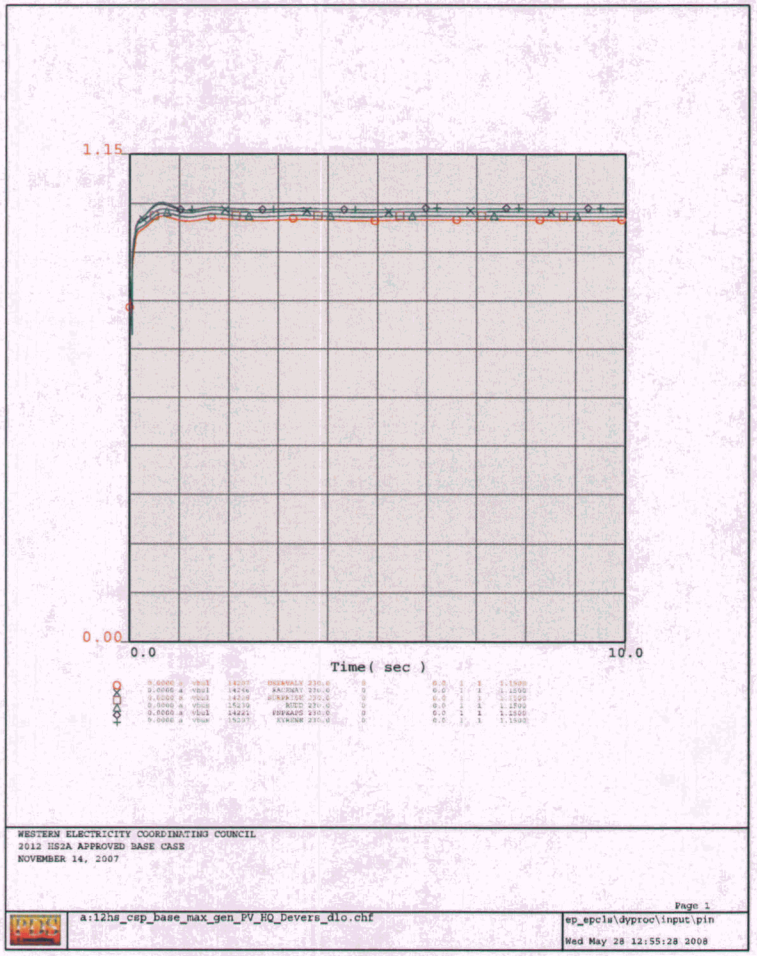
Pre-Project, PV Gen Max Case
Palo Verde G-2 outage
Transient Bus Voltage Plots



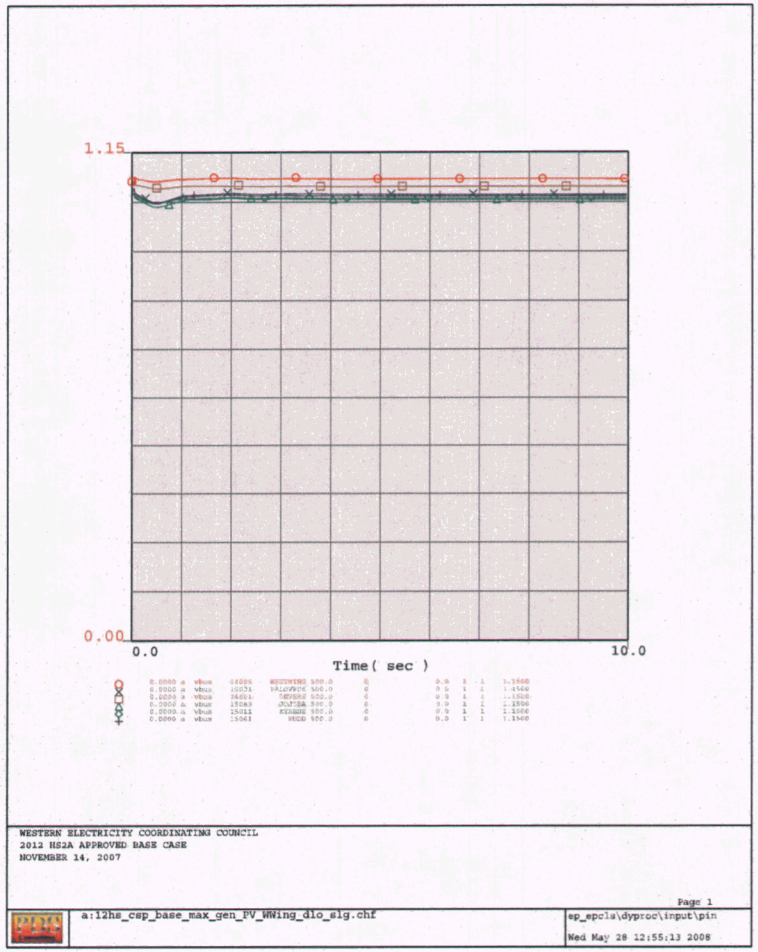
Pre-Project, PV Gen Max Case
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Bus Voltage Plots



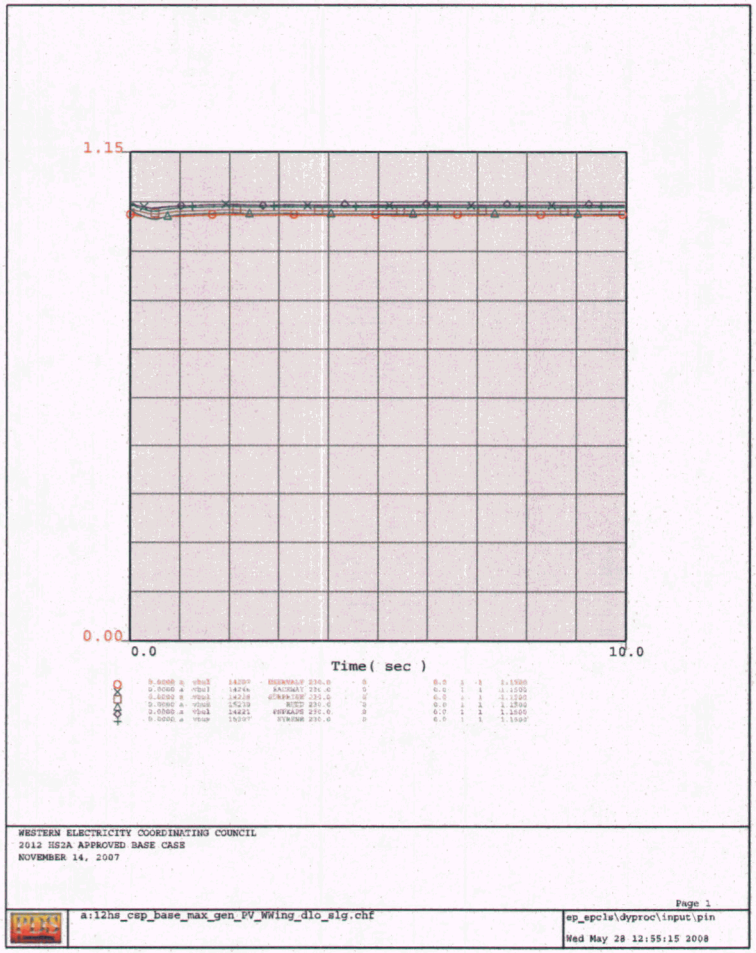
Pre-Project, PV Gen Max Case
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Bus Voltage Plots



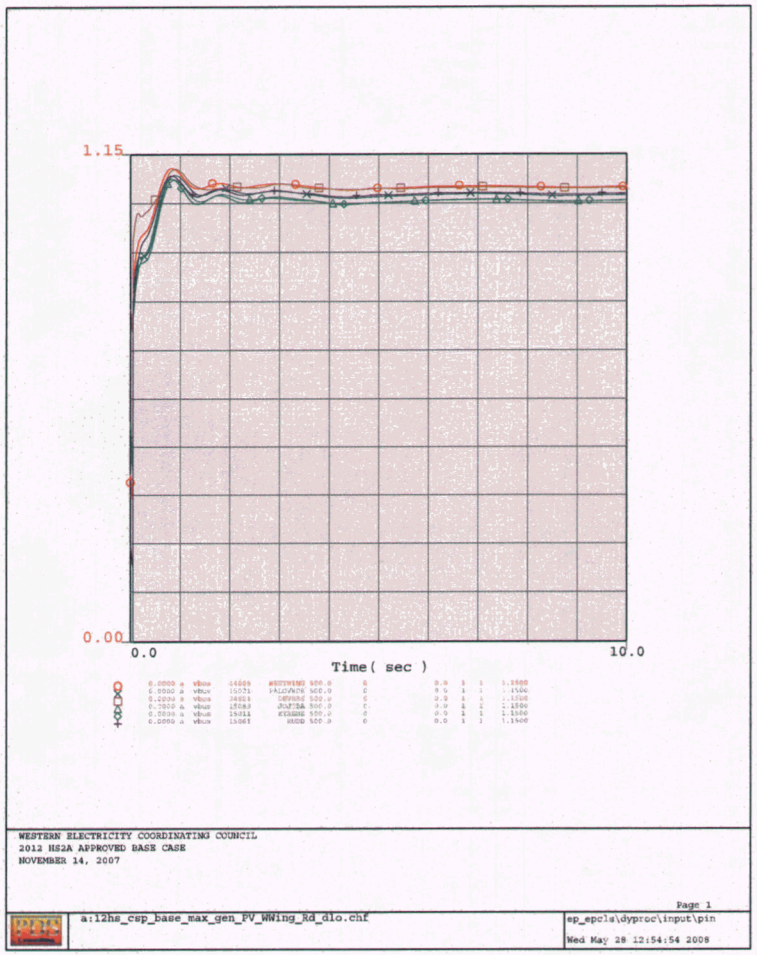
Pre-Project, PV Gen Max Case
PV-Westwing #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



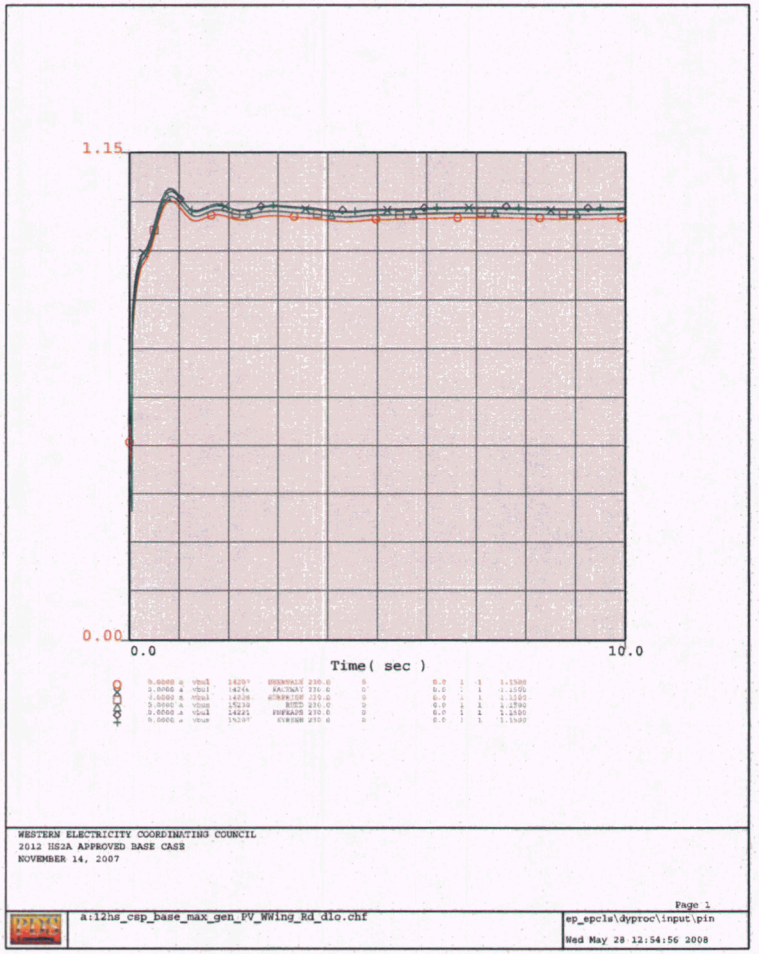
Pre-Project, PV Gen Max Case
PV-Westwing #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



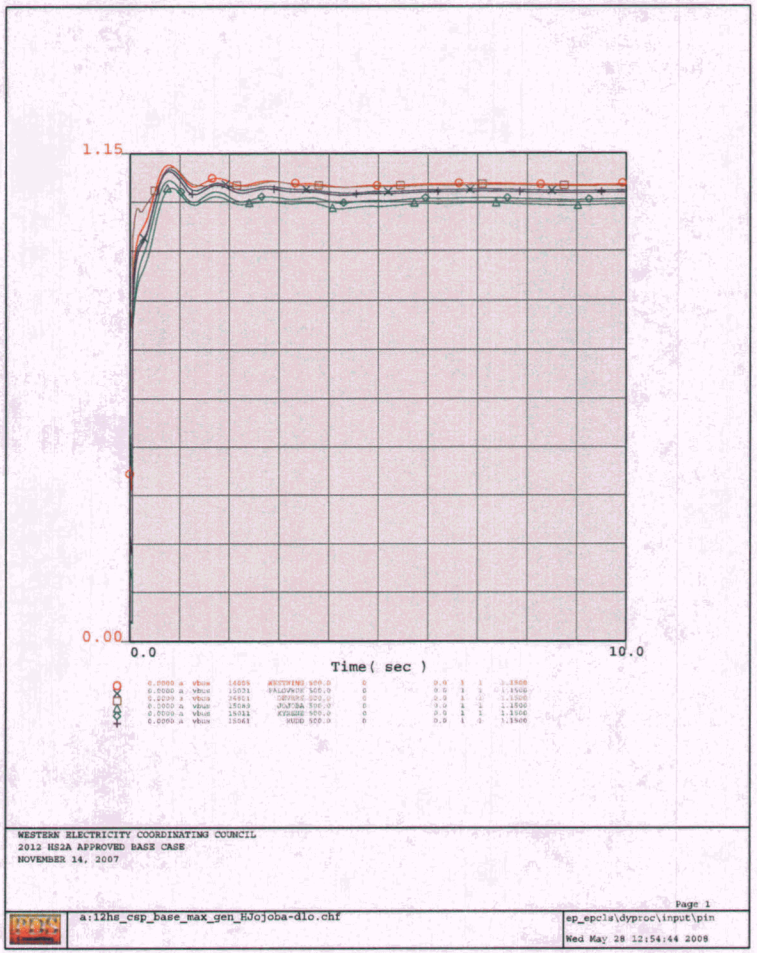
Pre-Project, PV Gen Max Case
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Bus Voltage Plots



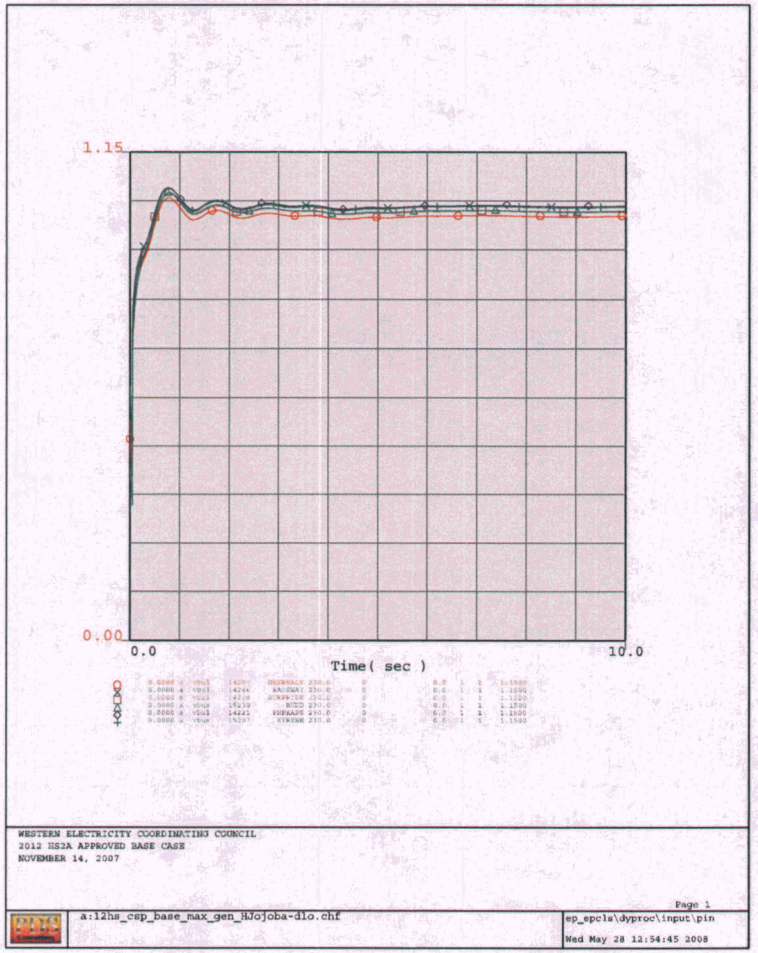
Pre-Project, PV Gen Max Case
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Bus Voltage Plots



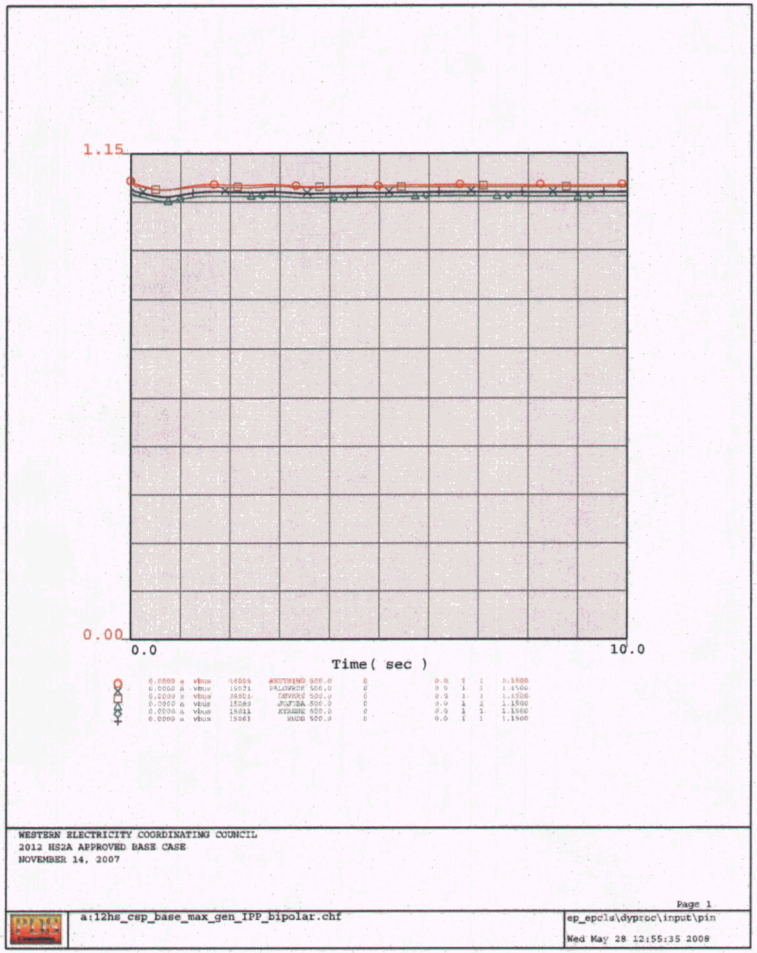
Pre-Project, PV Gen Max Case
Hassayampa-Jojoba #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



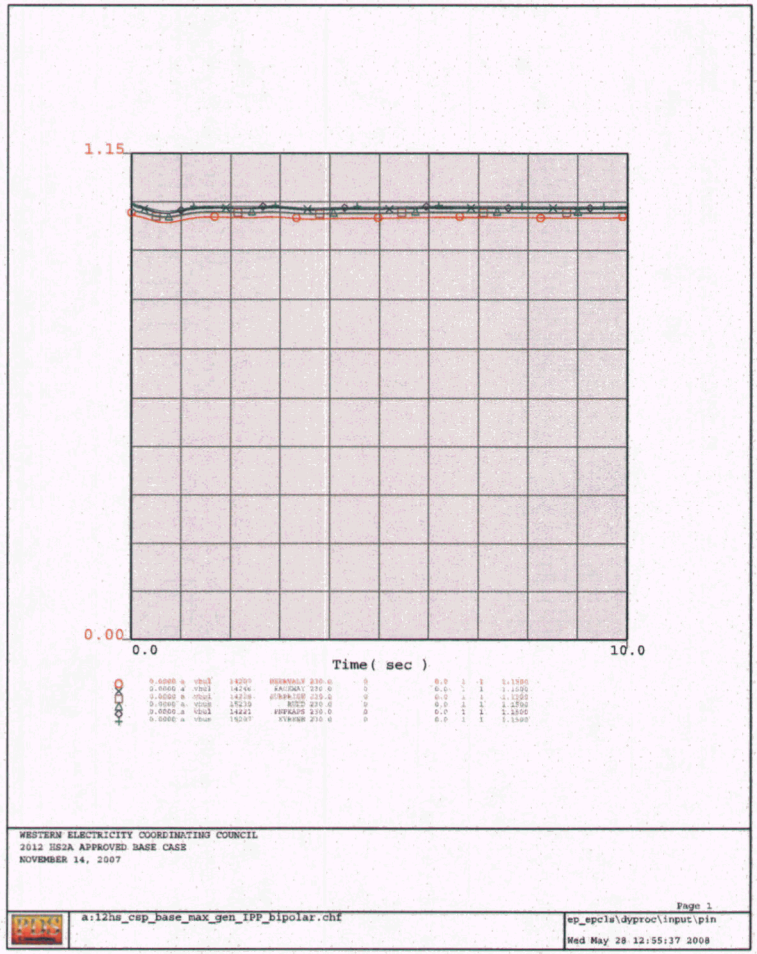
Pre-Project, PV Gen Max Case
Hassayampa-Jojoba #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



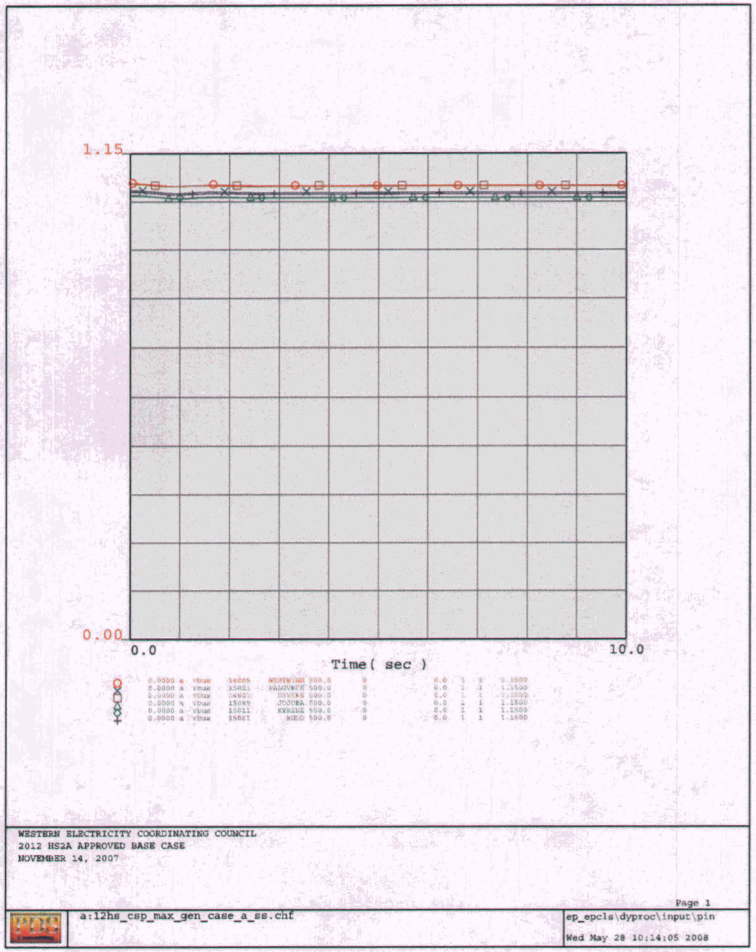
Pre-Project, PV Gen Max Case
IPP Bipole outage
Transient Bus Voltage Plots



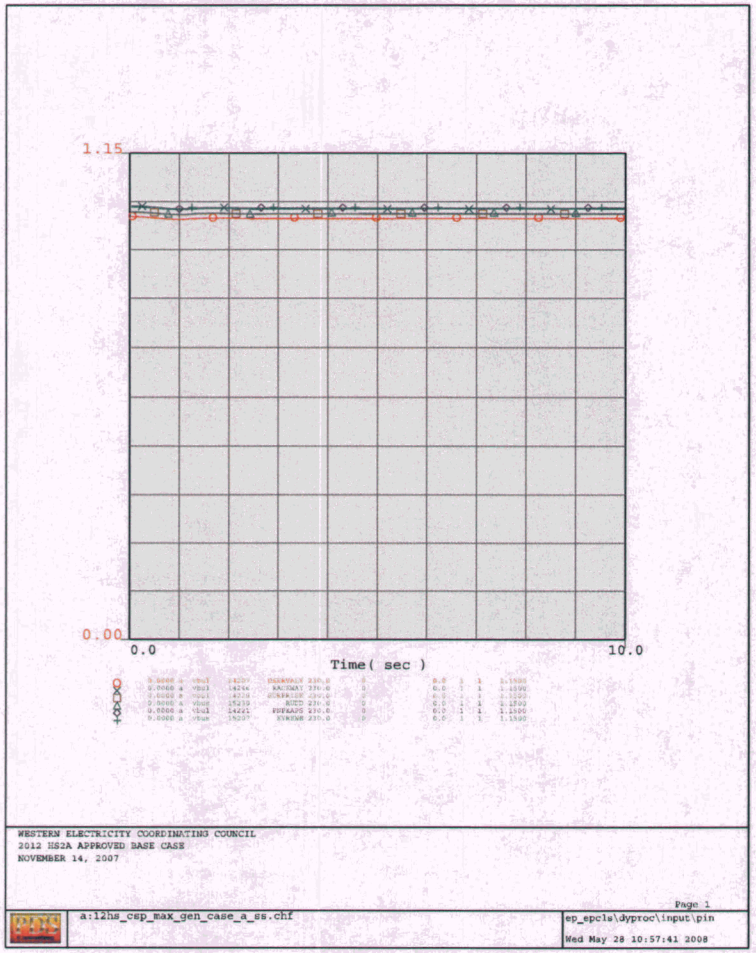
Pre-Project, PV Gen Max Case
IPP Bipole outage
Transient Bus Voltage Plots



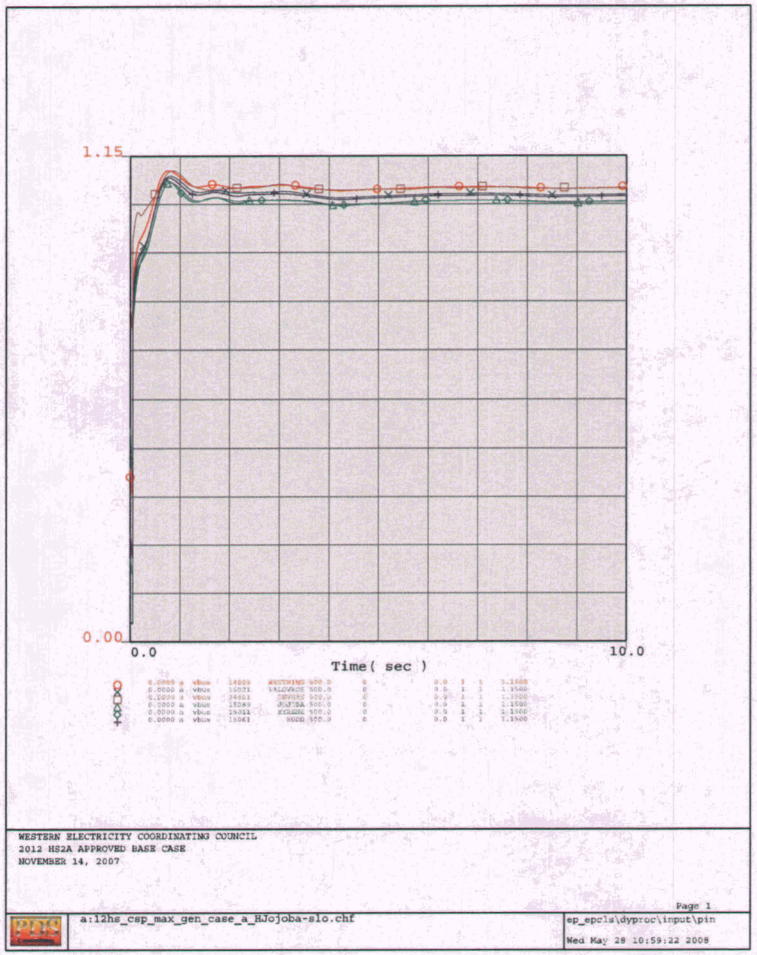
Post-Project, PV Gen Max Case A
No Outage
Transient Bus Voltage Plots



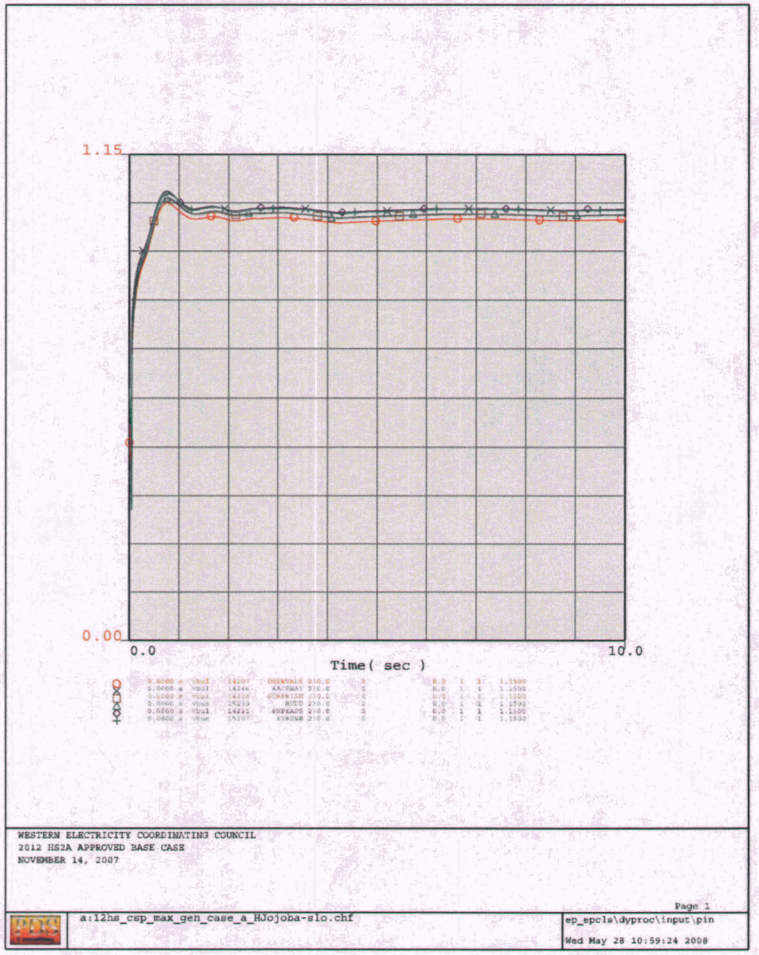
Post-Project, PV Gen Max Case A
No Outage
Transient Bus Voltage Plots



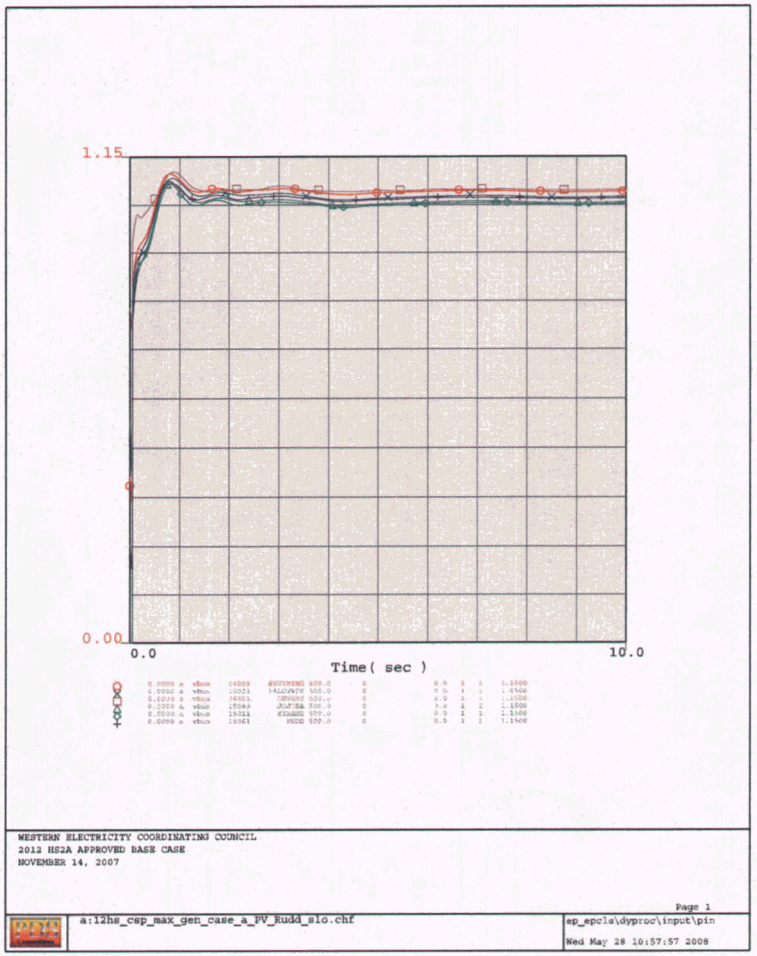
Post-Project, PV Gen Max Case A
Hassayampa-Jojoba 500 kV line outage
Transient Bus Voltage Plots



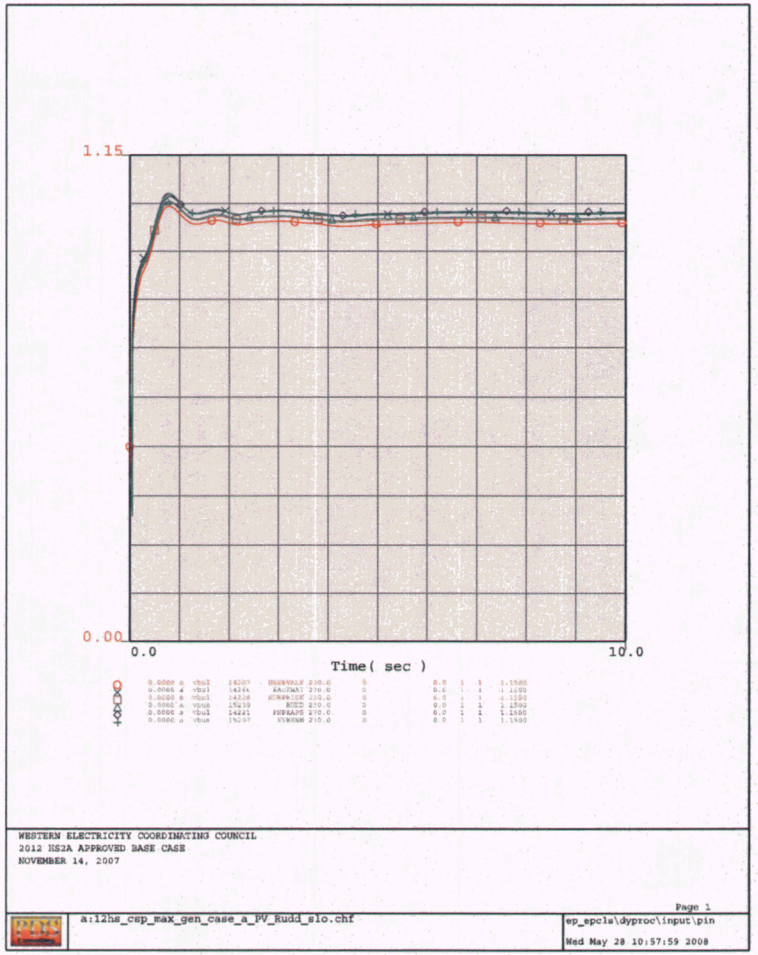
Post-Project, PV Gen Max Case A
Hassayampa-Jojoba 500 kV line outage
Transient Bus Voltage Plots



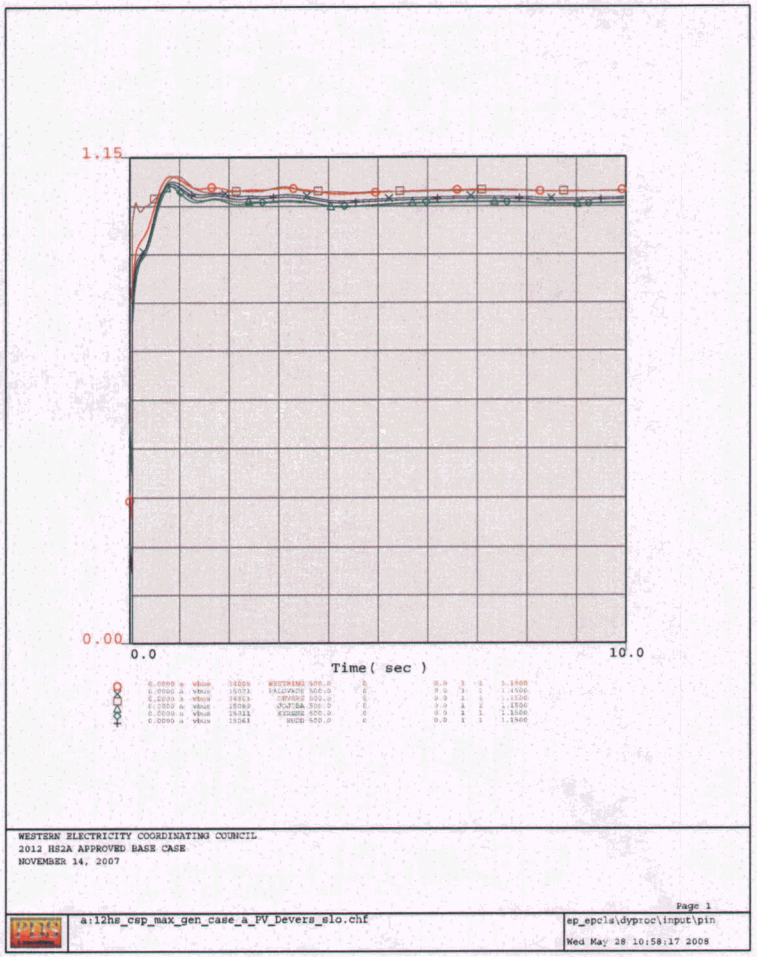
Post-Project, PV Gen Max Case A
Palo Verde-Rudd 500 kV line outage
Transient Bus Voltage Plots



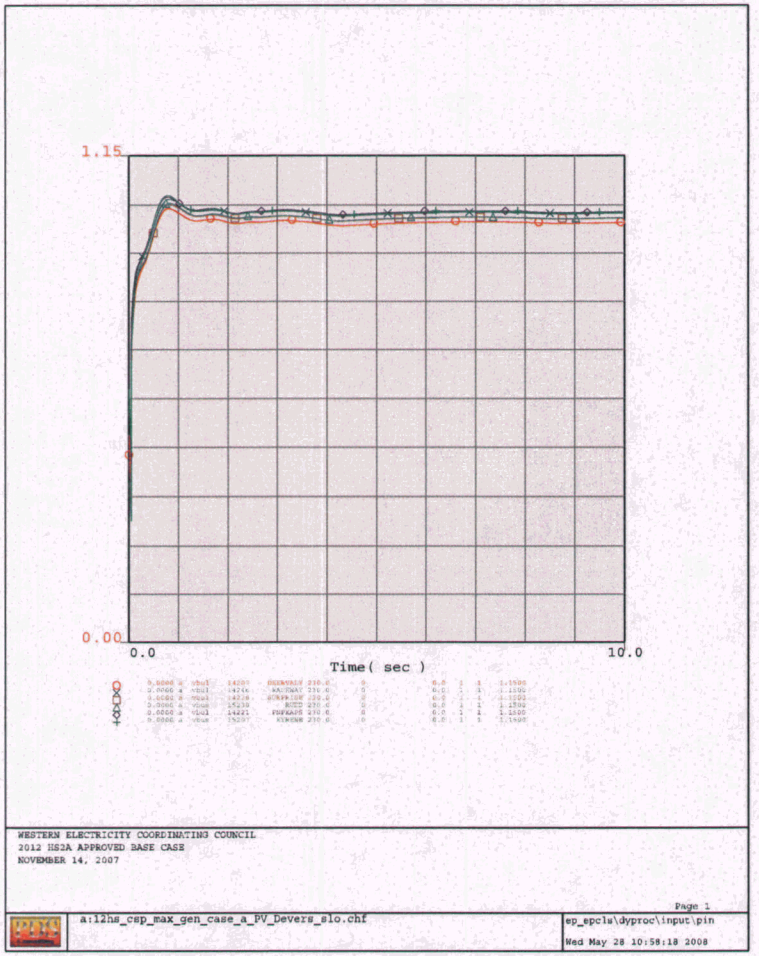
Post-Project, PV Gen Max Case A
Palo Verde-Rudd 500 kV line outage
Transient Bus Voltage Plots



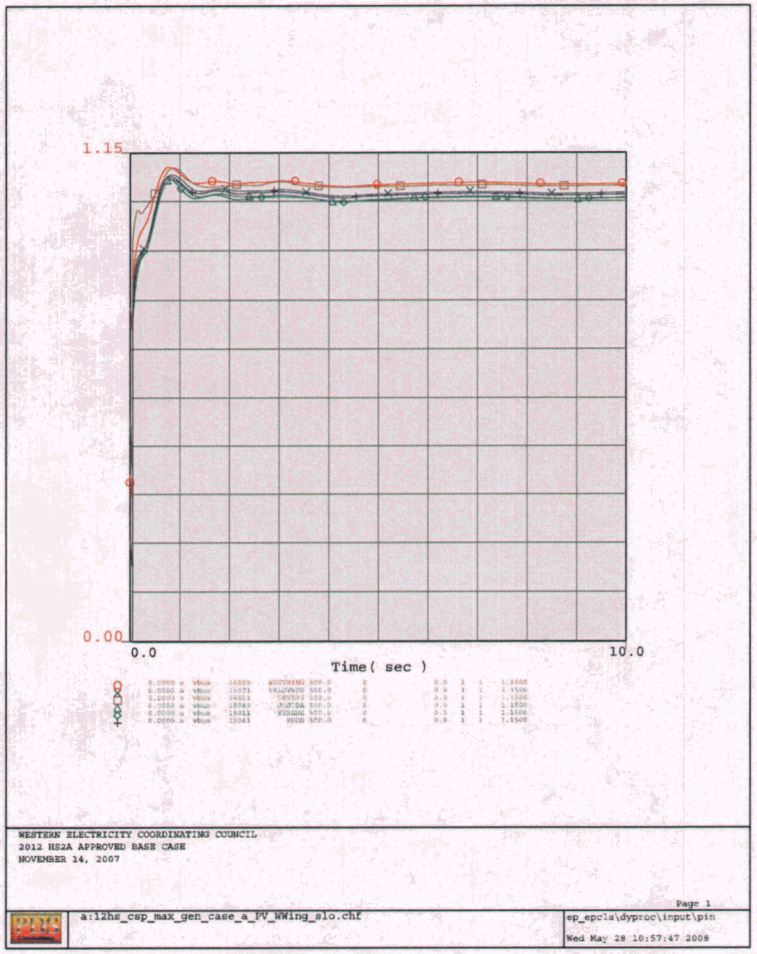
Post-Project, PV Gen Max Case A
Palo Verde-Devers 500 kV line outage
Transient Bus Voltage Plots



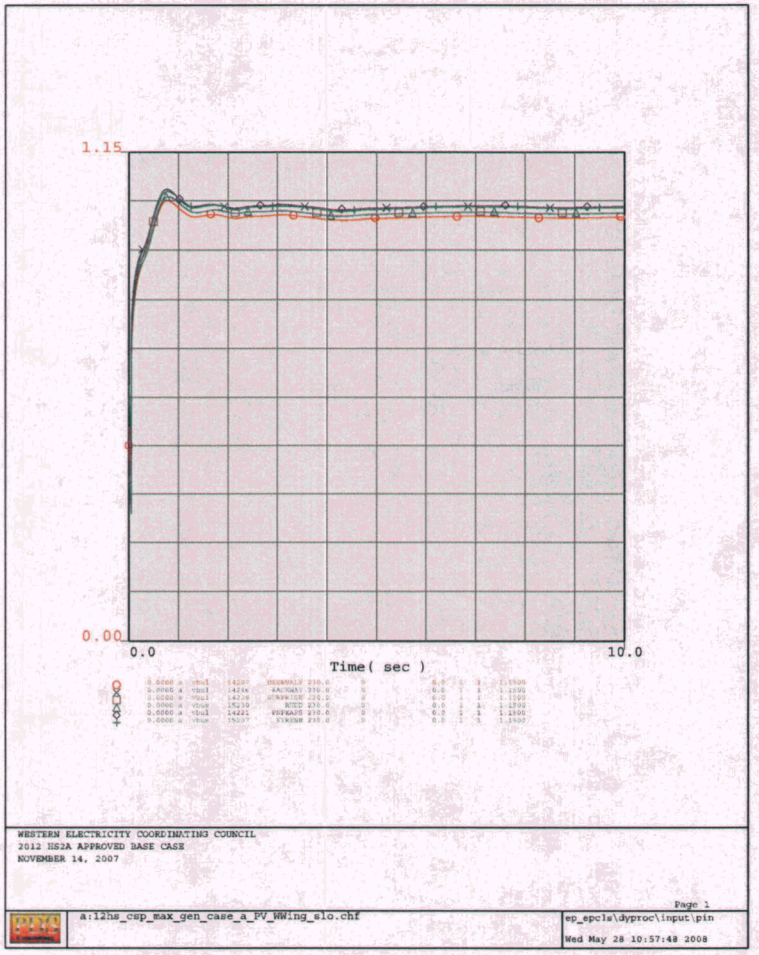
Post-Project, PV Gen Max Case A
Palo Verde-Devers 500 kV line outage
Transient Bus Voltage Plots



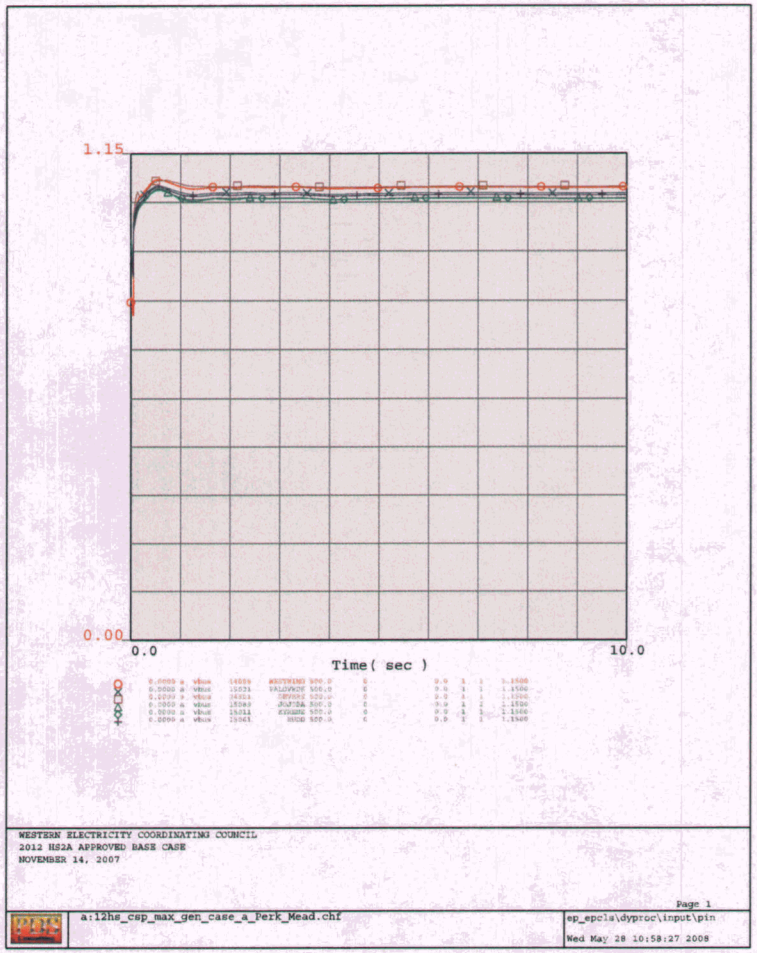
Post-Project, PV Gen Max Case A
Palo Verde-Westwing 500 kV line outage
Transient Bus Voltage Plots



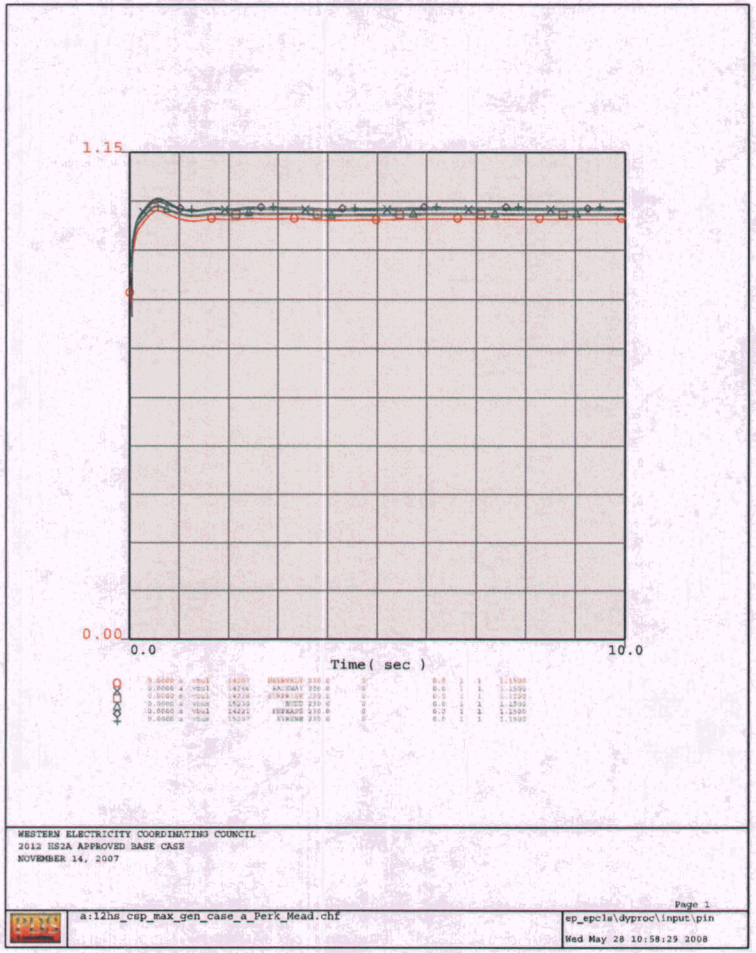
Post-Project, PV Gen Max Case A
Palo Verde-Westwing 500 kV line outage
Transient Bus Voltage Plots



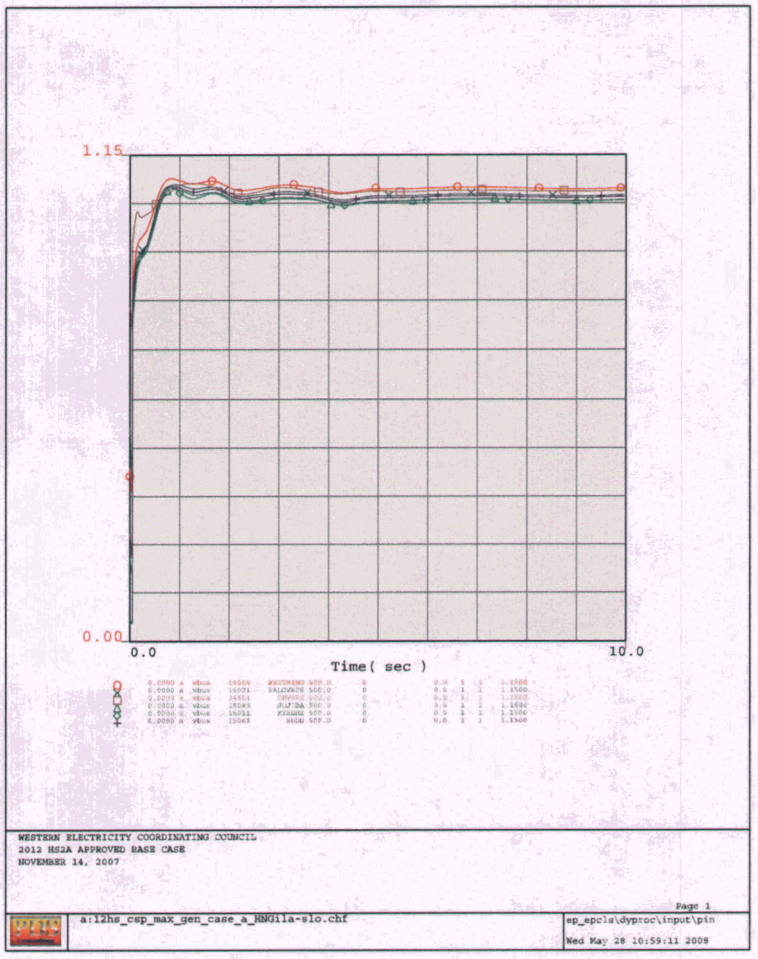
Post-Project, PV Gen Max Case A
Perkins-Mead 500 kV line outage
Transient Bus Voltage Plots



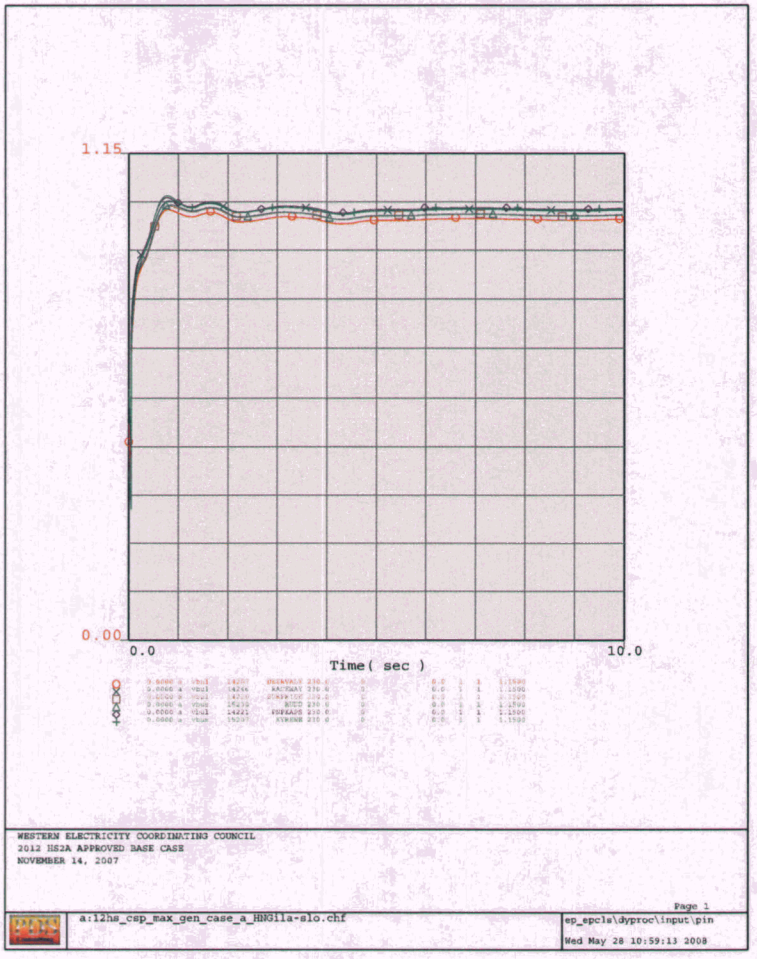
Post-Project, PV Gen Max Case A
Perkins-Mead 500 kV line outage
Transient Bus Voltage Plots



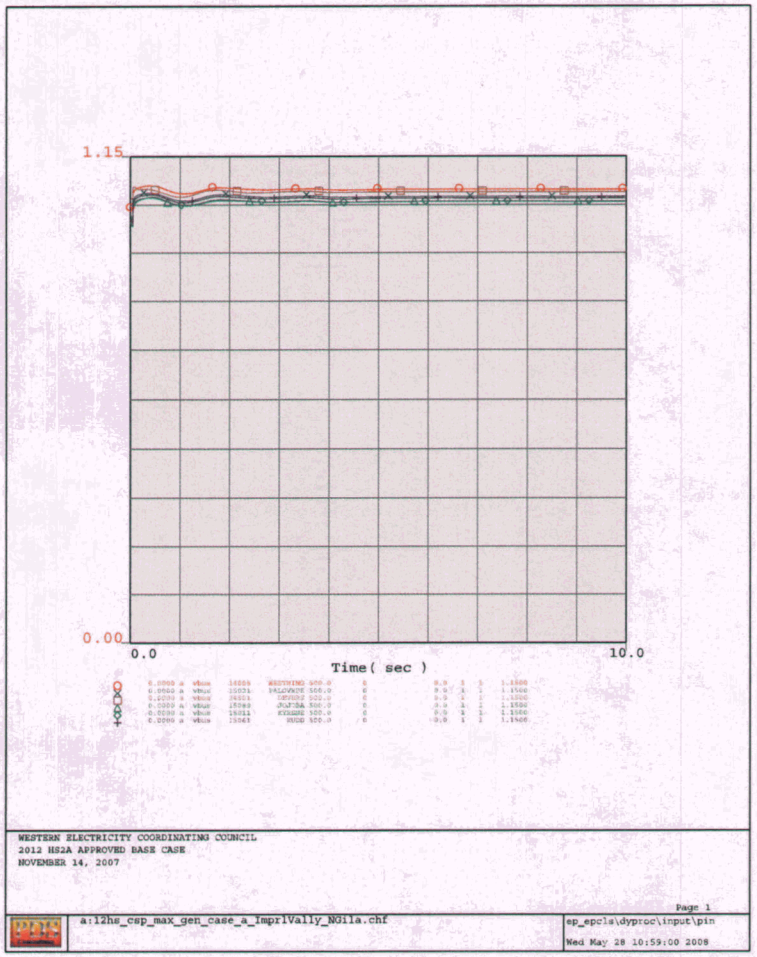
Post-Project, PV Gen Max Case A
Hassayampa -N. Gila 500 kV line outage
Transient Bus Voltage Plots



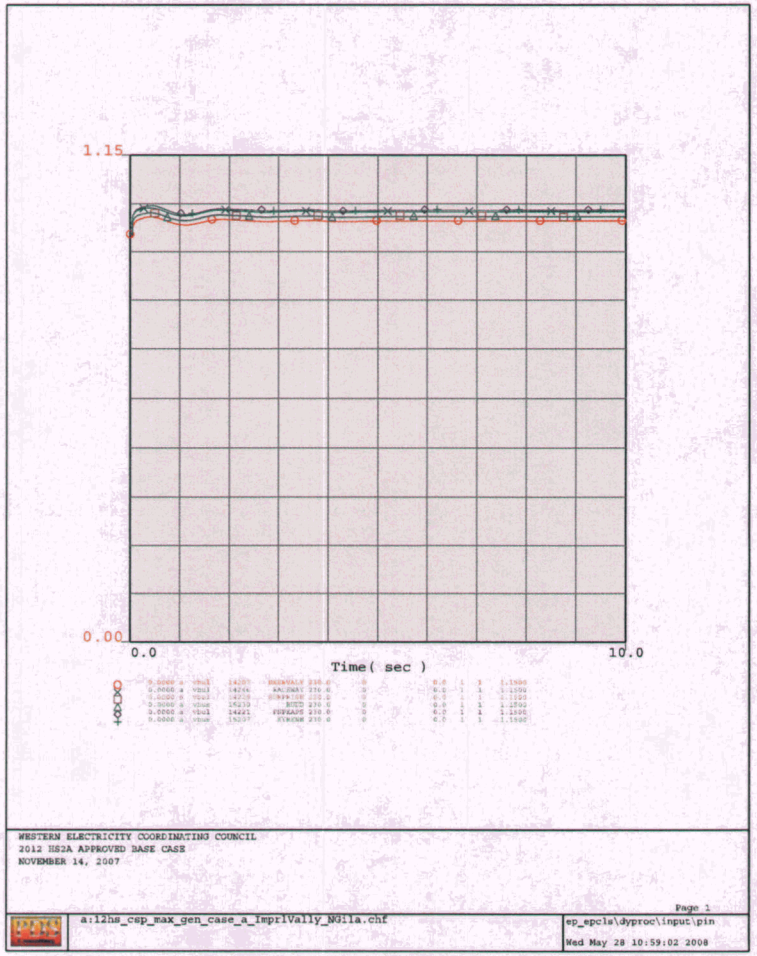
Post-Project, PV Gen Max Case A
Hassayampa -N. Gila 500 kV line outage
Transient Bus Voltage Plots



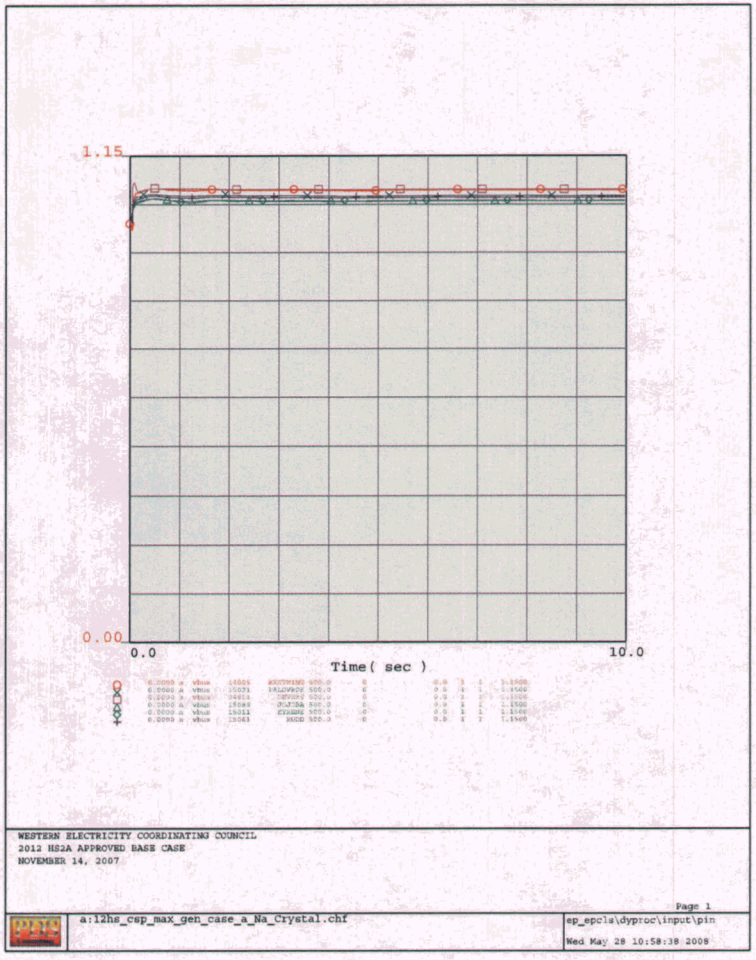
Post-Project, PV Gen Max Case A
N. Gila-Imperial Valley 500 kV line outage
Transient Bus Voltage Plots



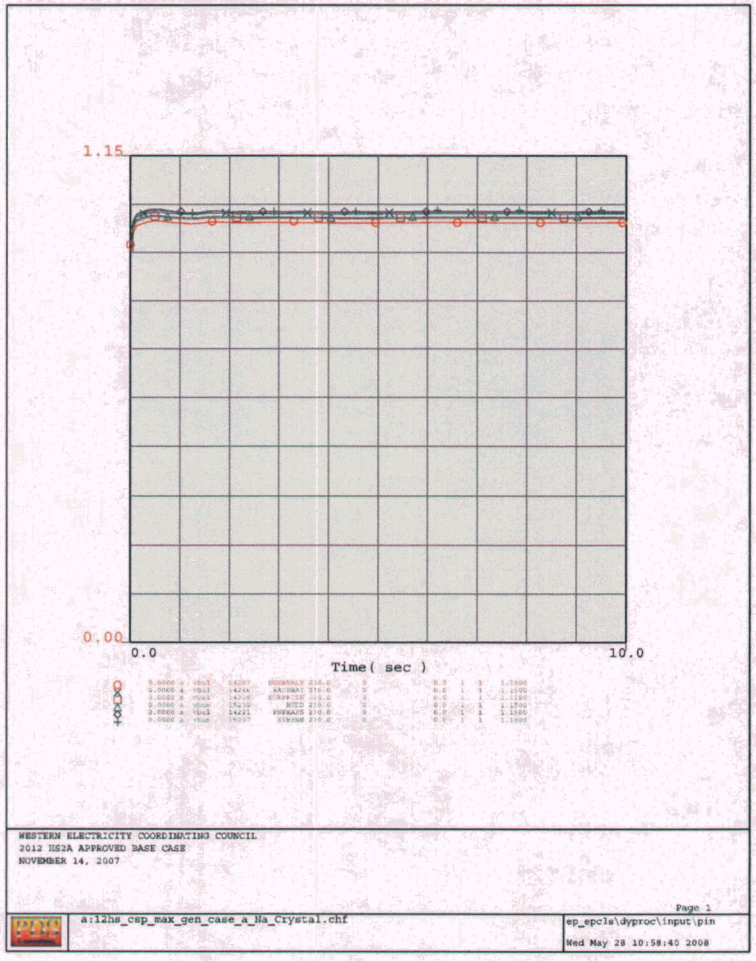
Post-Project, PV Gen Max Case A
N. Gila-Imperial Valley 500 kV line outage
Transient Bus Voltage Plots



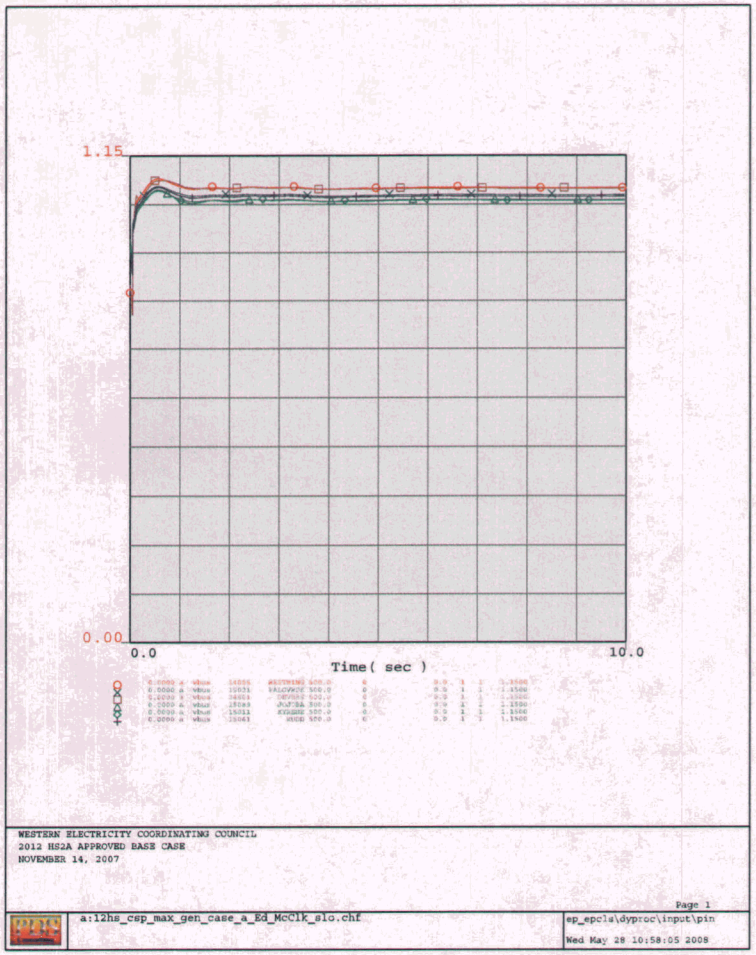
Post-Project, PV Gen Max Case A
Navajo-Crystal 500 kV line
Transient Bus Voltage Plots



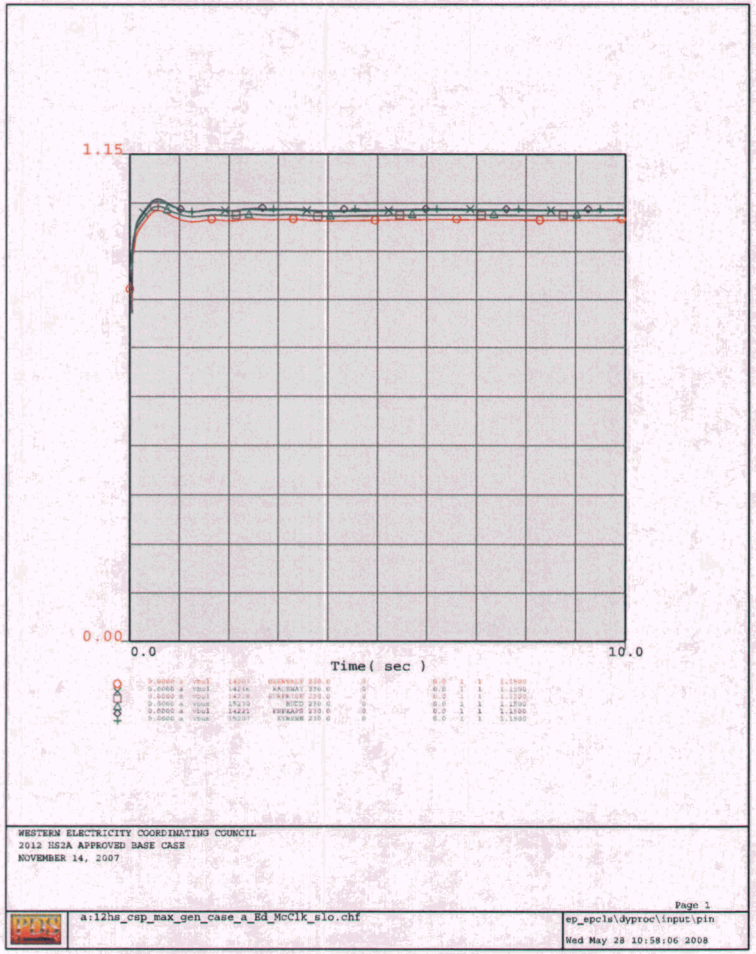
Post-Project, PV Gen Max Case A
Navajo-Crystal 500 kV line
Transient Bus Voltage Plots



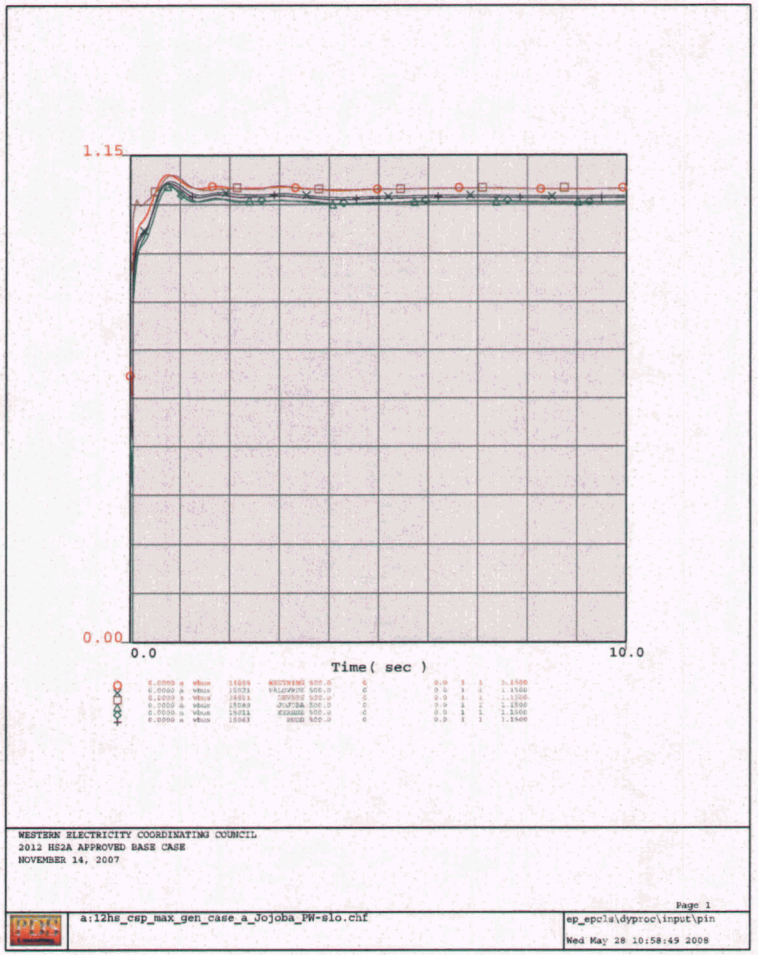
Post-Project, PV Gen Max Case A
El Dorado-McCullough 500 kV line outage
Transient Bus Voltage Plots



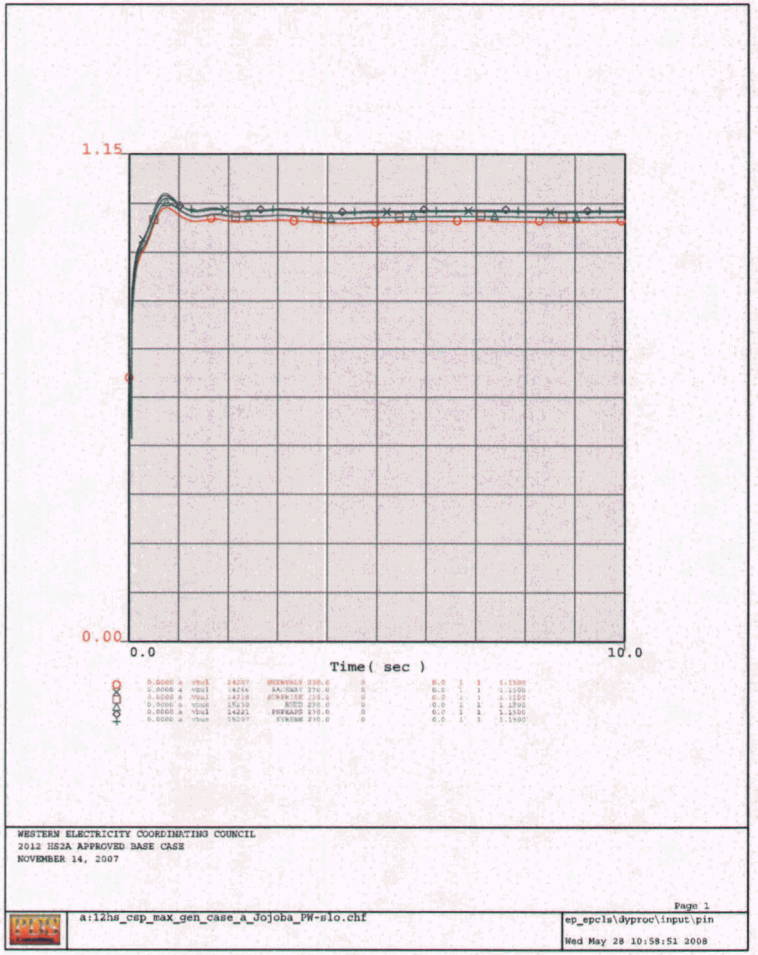
Post-Project, PV Gen Max Case A
El Dorado-McCullough 500 kV line outage
Transient Bus Voltage Plots



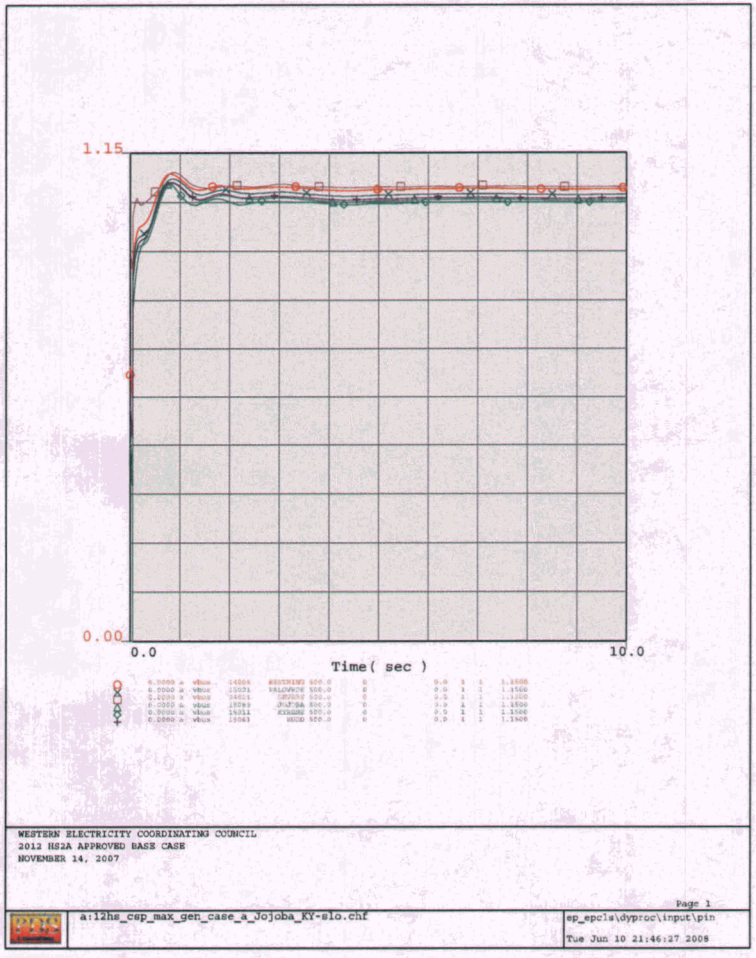
Post-Project, PV Gen Max Case A
Jojoba-Pinal West 500 kV line outage
Transient Bus Voltage Plots



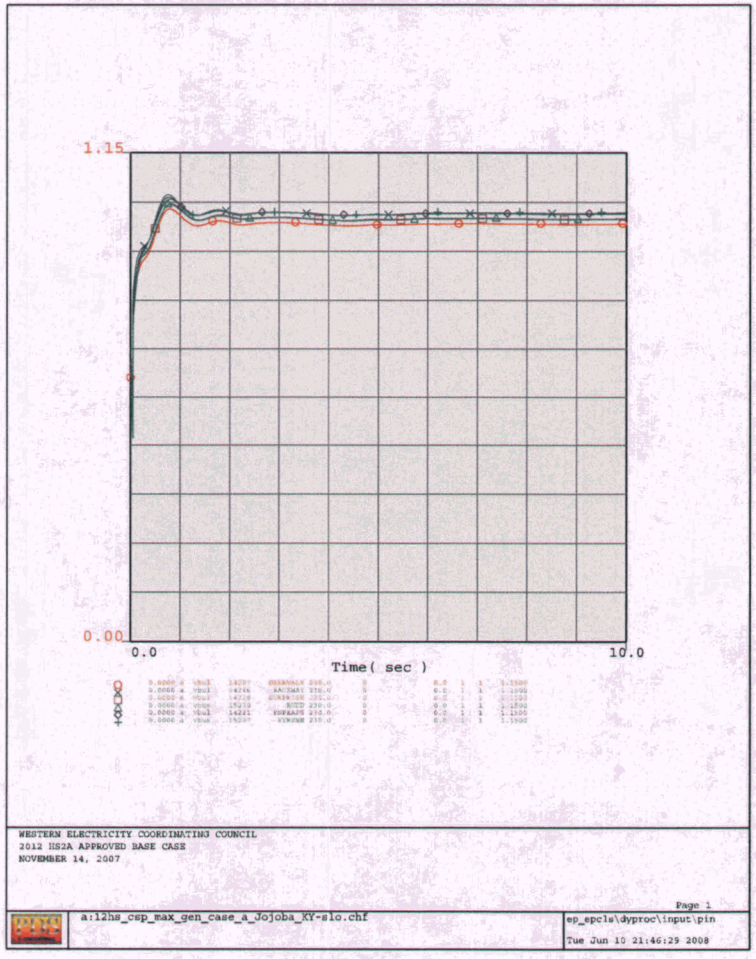
Post-Project, PV Gen Max Case A
Jojoba-Pinal West 500 kV line outage
Transient Bus Voltage Plots



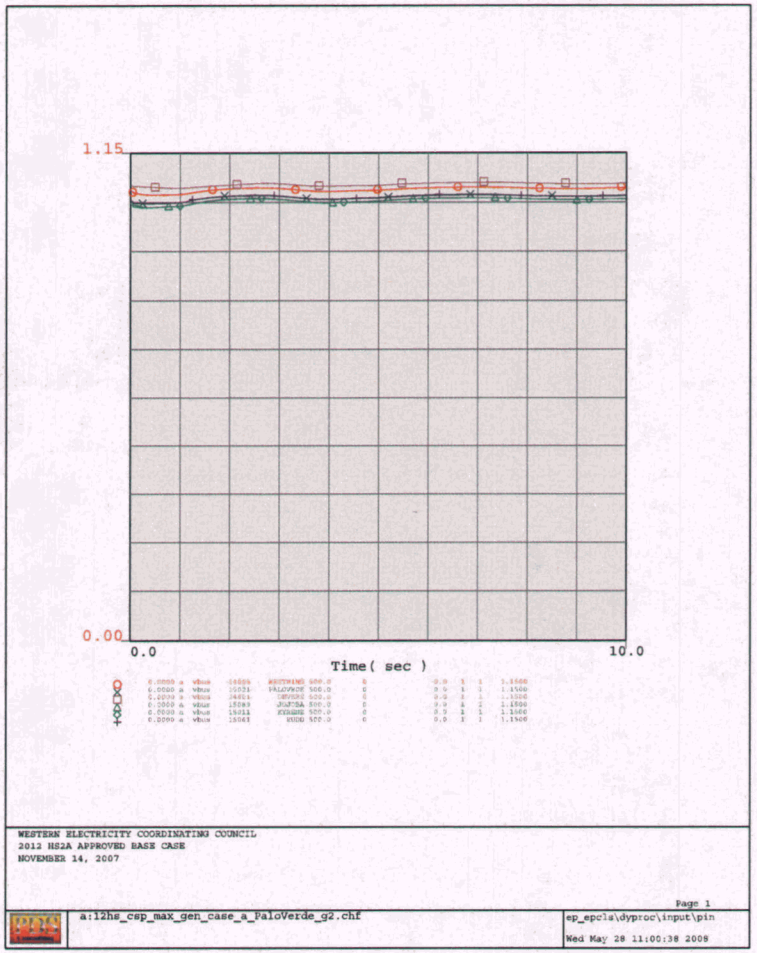
Post-Project, PV Gen Max Case A
Jojoba-Kyrene 500 kV line outage
Transient Bus Voltage Plots



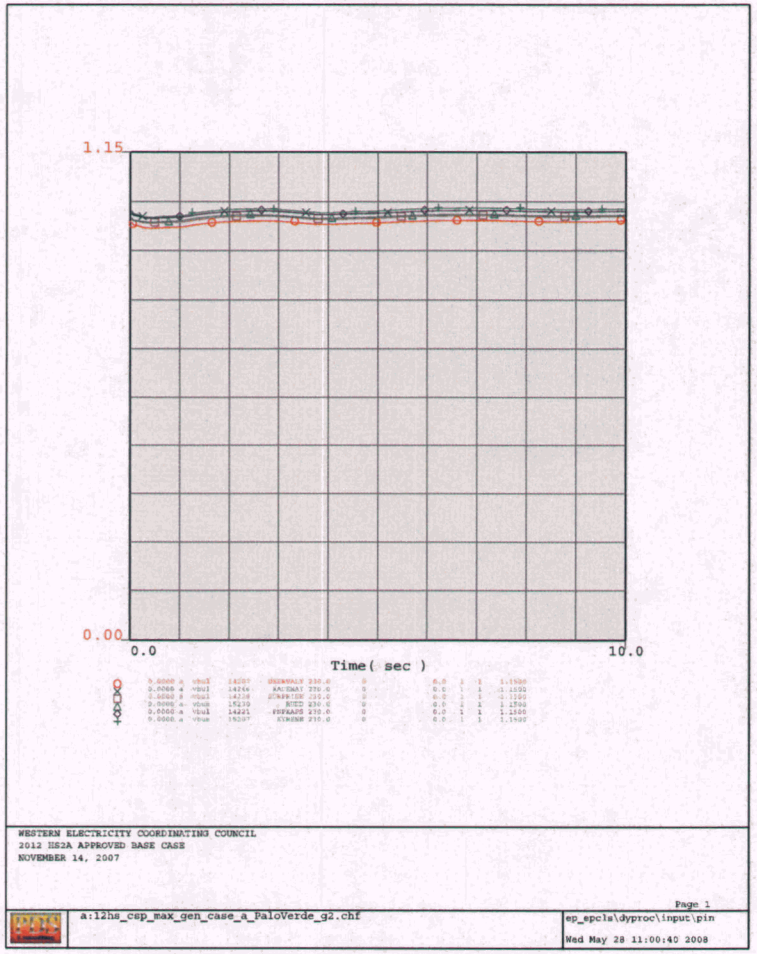
Post-Project, PV Gen Max Case A
Jojoba-Kyrene 500 kV line outage
Transient Bus Voltage Plots



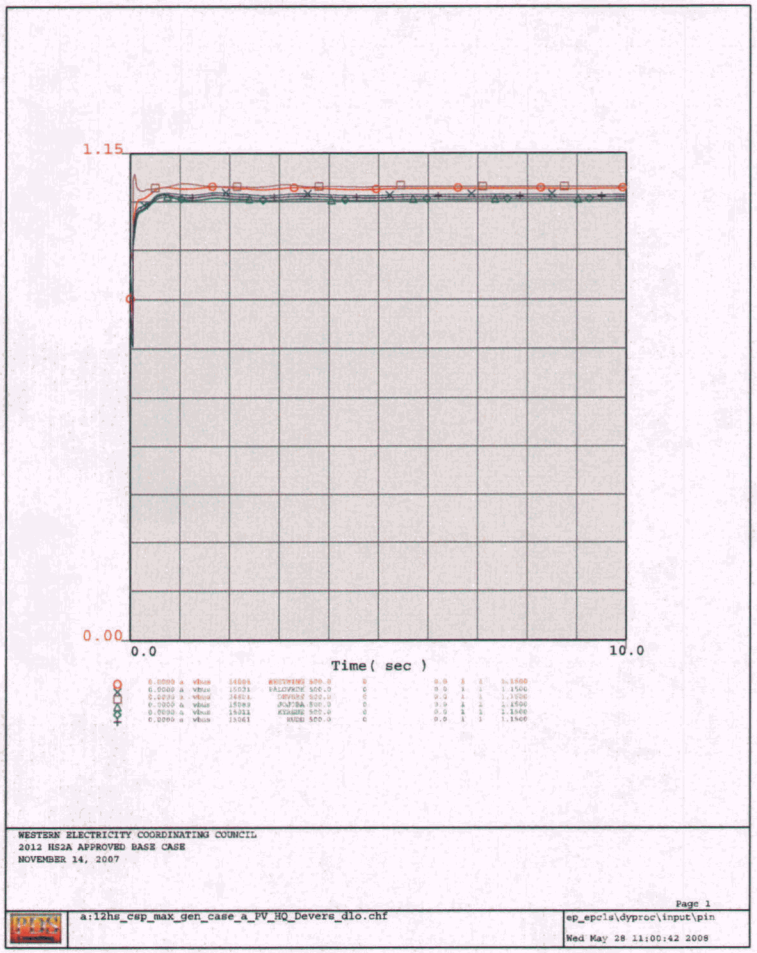
Post-Project, PV Gen Max Case A
Palo Verde G-2 outage
Transient Bus Voltage Plots



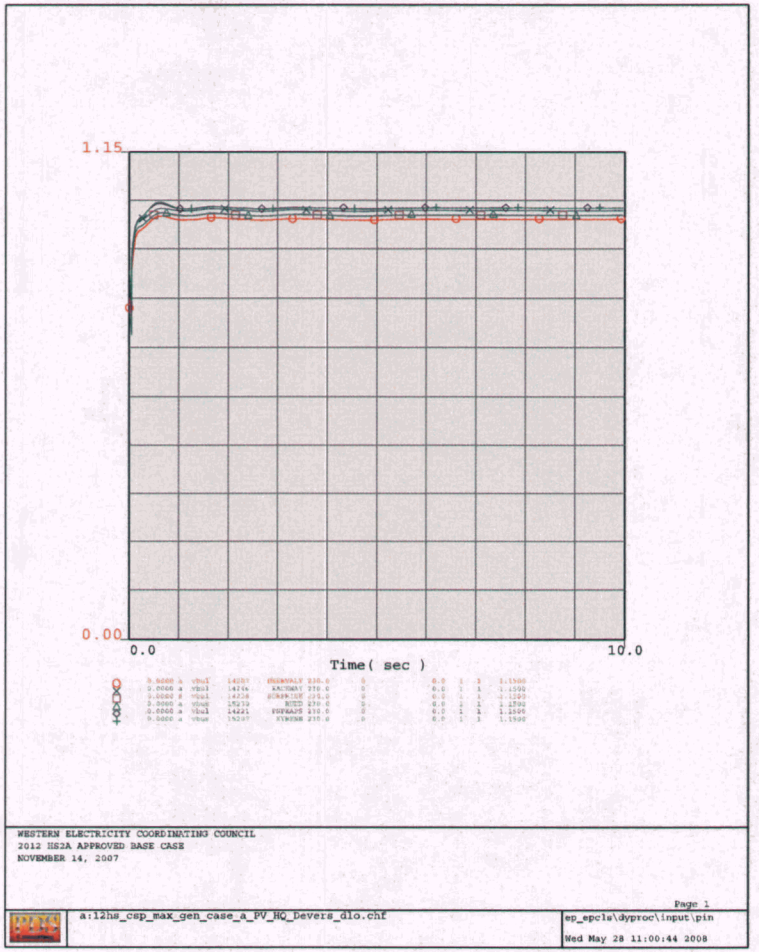
Post-Project, PV Gen Max Case A
Palo Verde G-2 outage
Transient Bus Voltage Plots



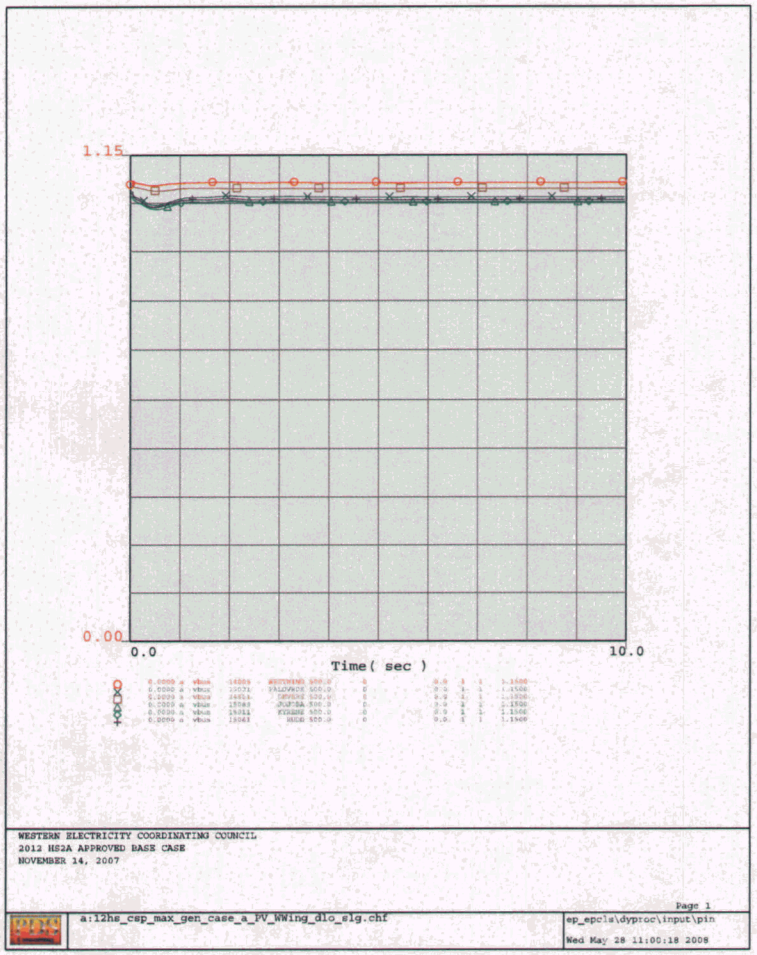
Post-Project, PV Gen Max Case A
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Bus Voltage Plots



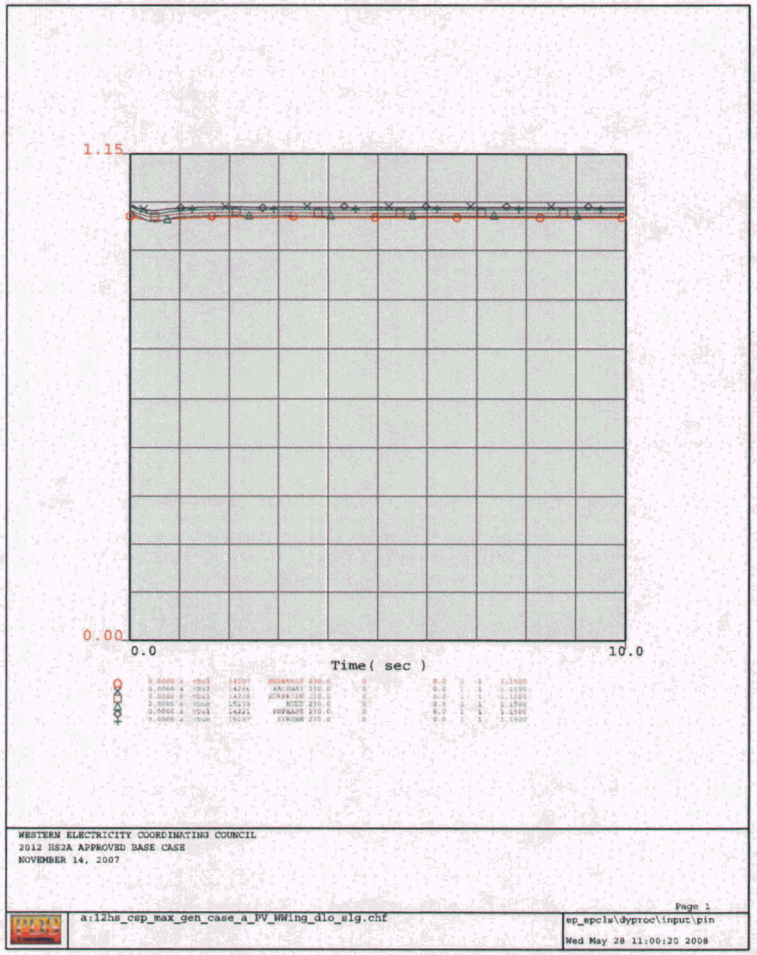
Post-Project, PV Gen Max Case A
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Bus Voltage Plots



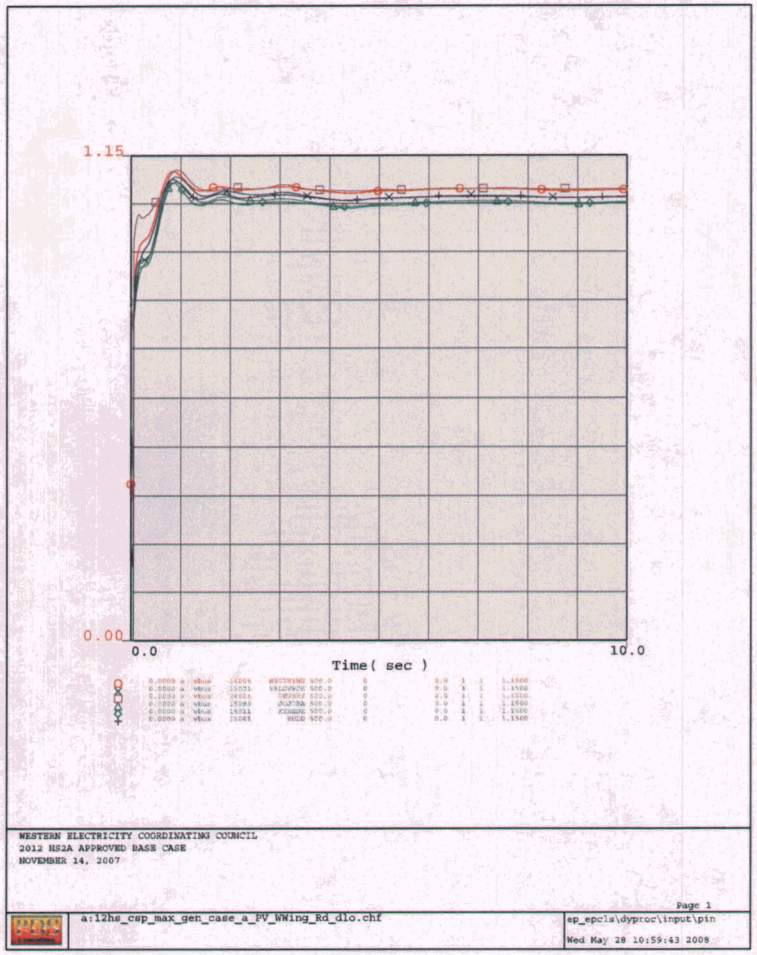
Post-Project, PV Gen Max Case A
PV-Westwing #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



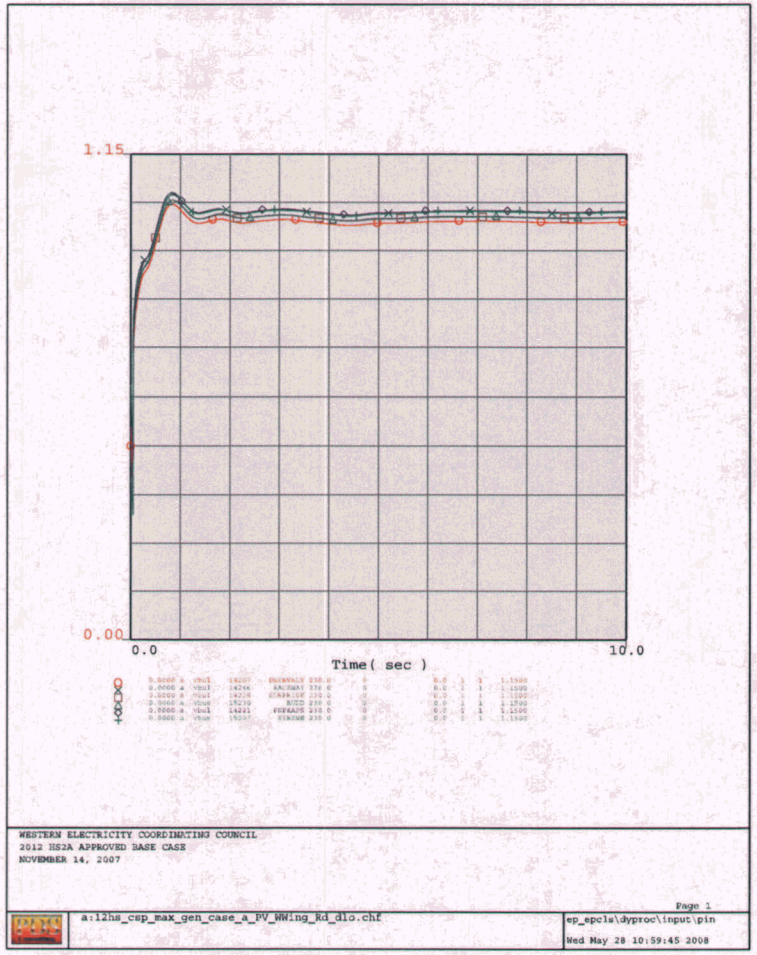
Post-Project, PV Gen Max Case A
PV-Westwing #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



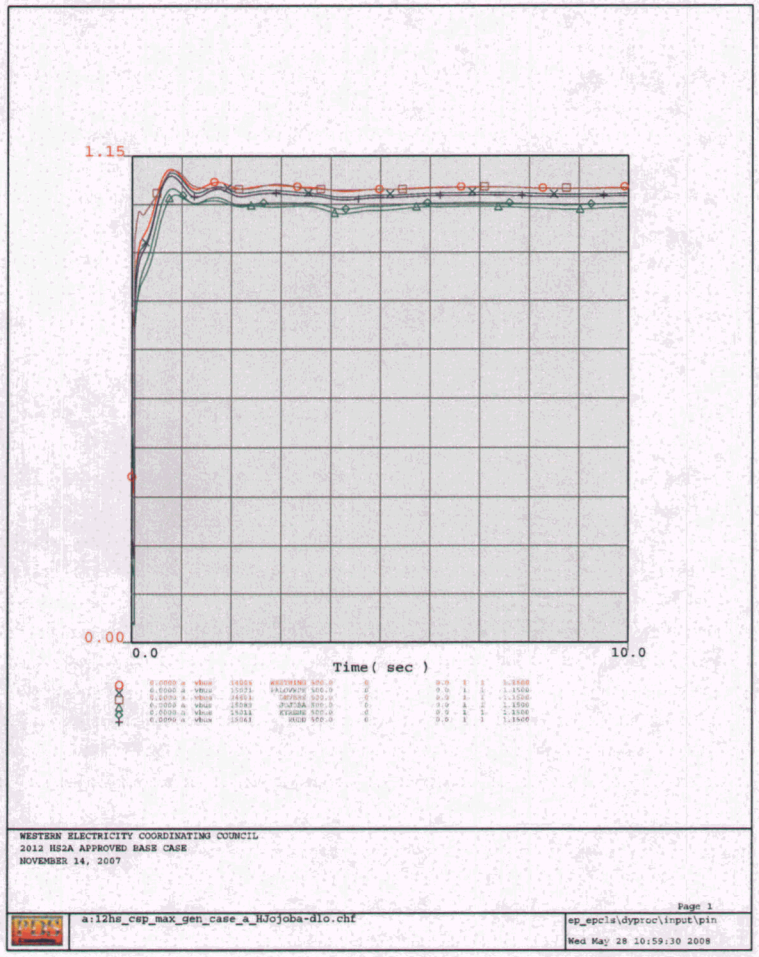
Post-Project, PV Gen Max Case A
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Bus Voltage Plots



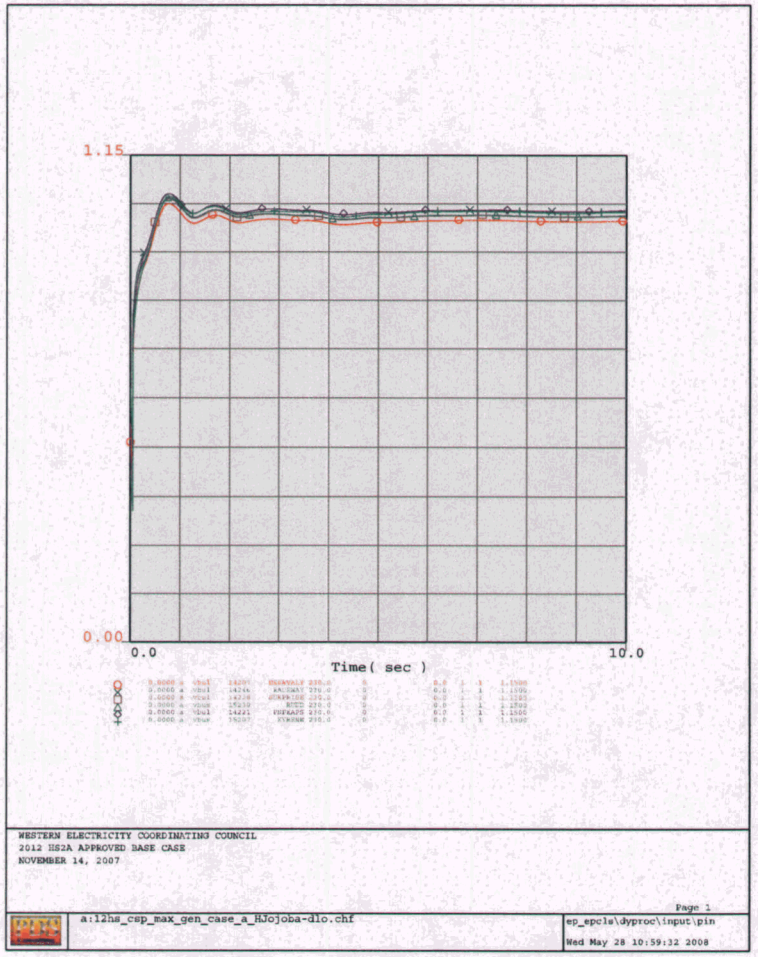
Post-Project, PV Gen Max Case A
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Bus Voltage Plots



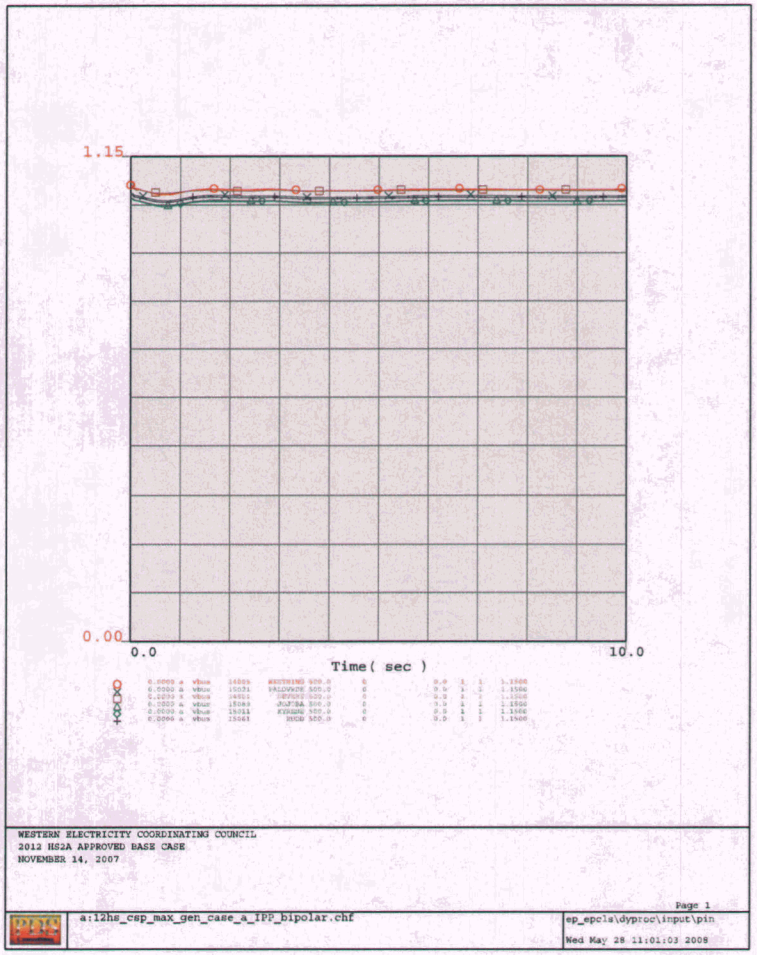
Post-Project, PV Gen Max Case A
Hassayampa-Jojoba #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



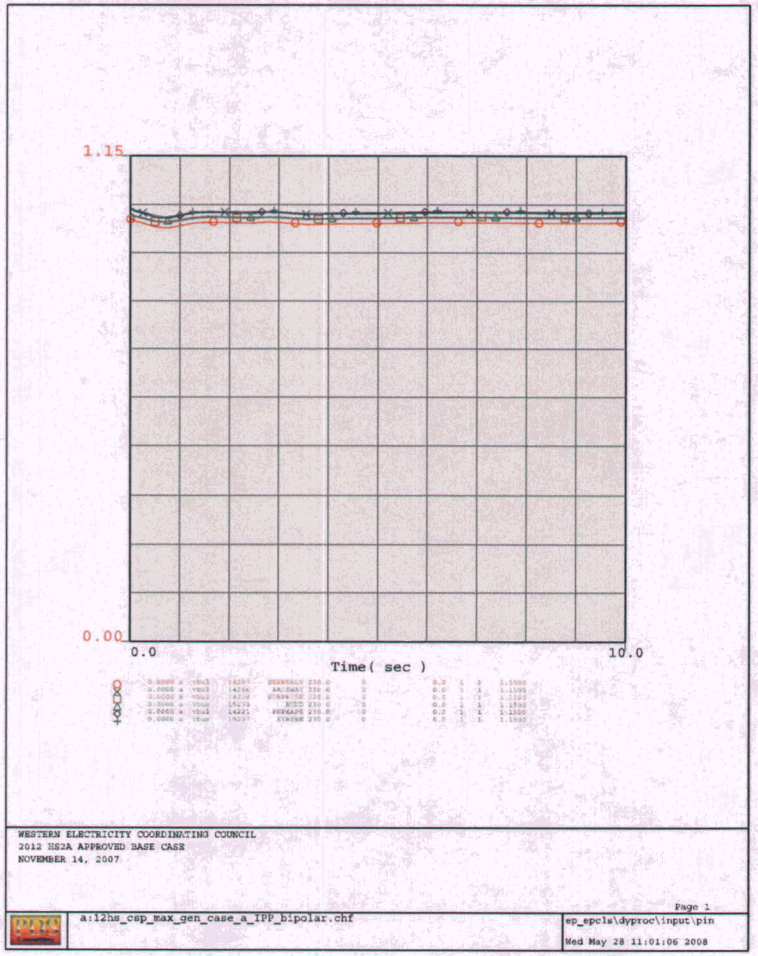
Post-Project, PV Gen Max Case A
Hassayampa-Jojoba #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



Post-Project, PV Gen Max Case A
IPP Bipole outage
Transient Bus Voltage Plots

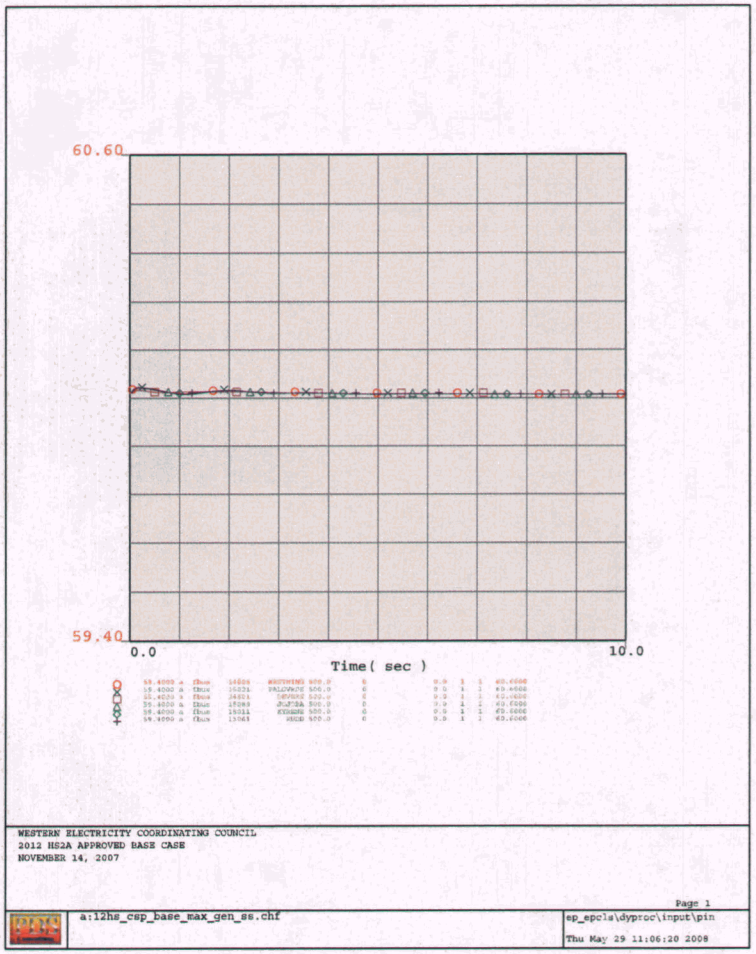


Post-Project, PV Gen Max Case A
IPP Bipole outage
Transient Bus Voltage Plots

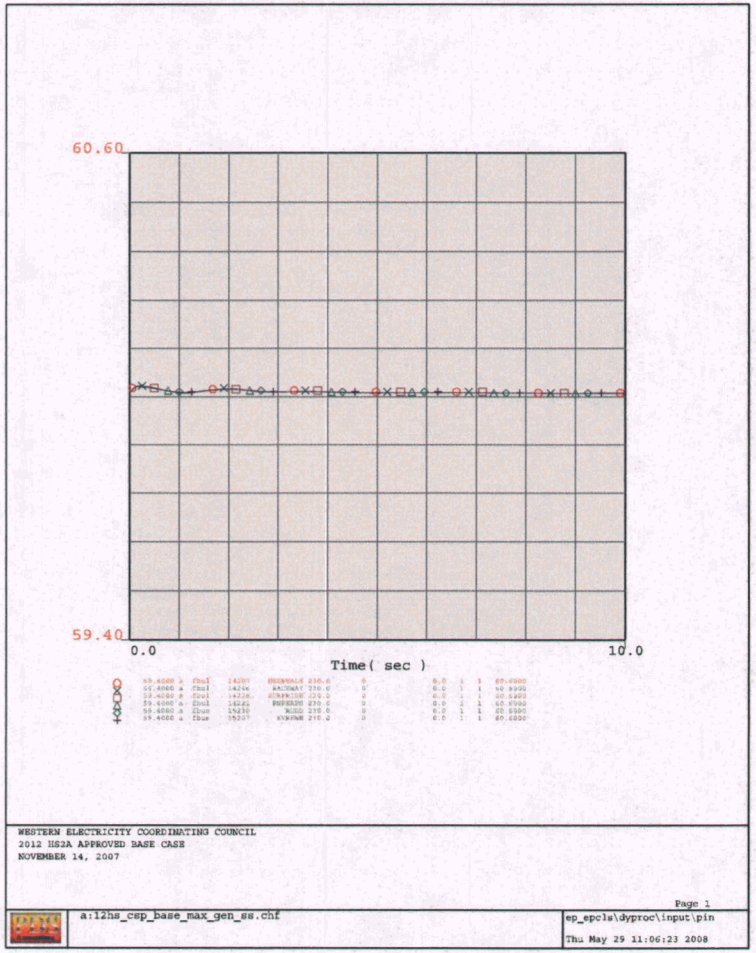


Transient Frequency Plots

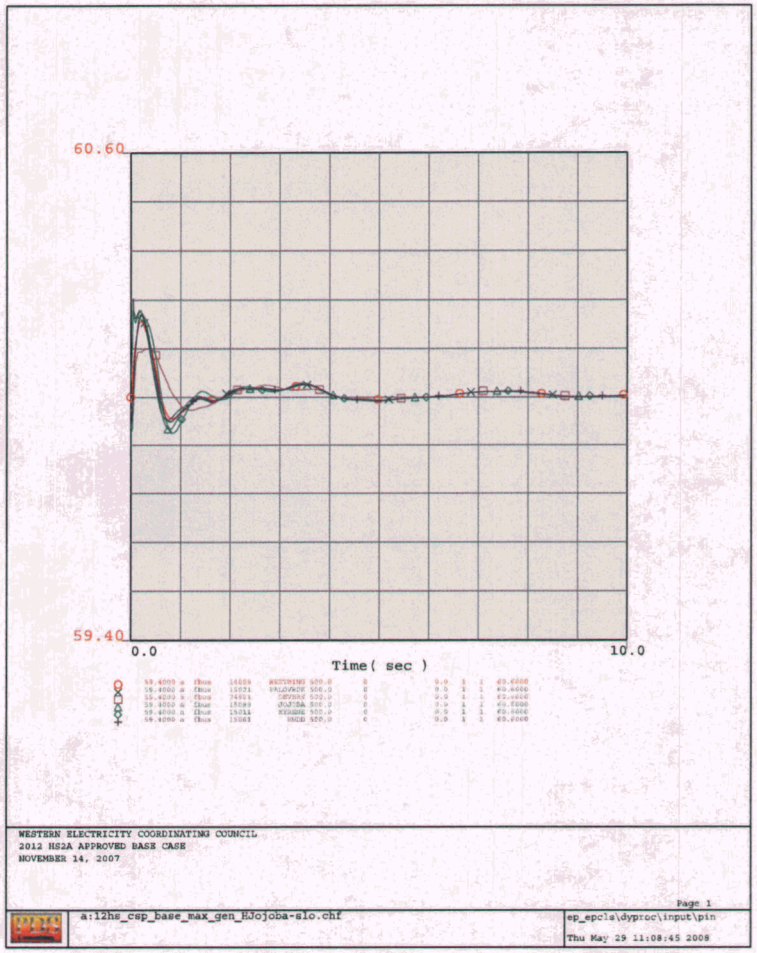
Pre-Project, PV Gen Max Case
No Outage
Transient Frequency Plots



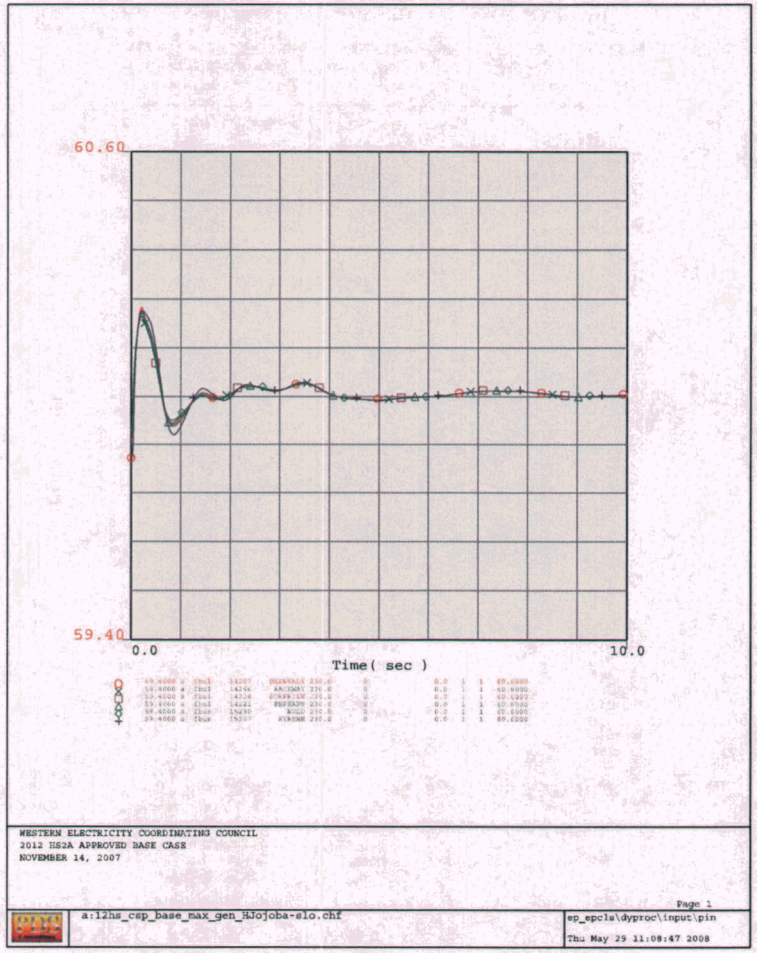
Pre-Project, PV Gen Max Case
No Outage
Transient Frequency Plots



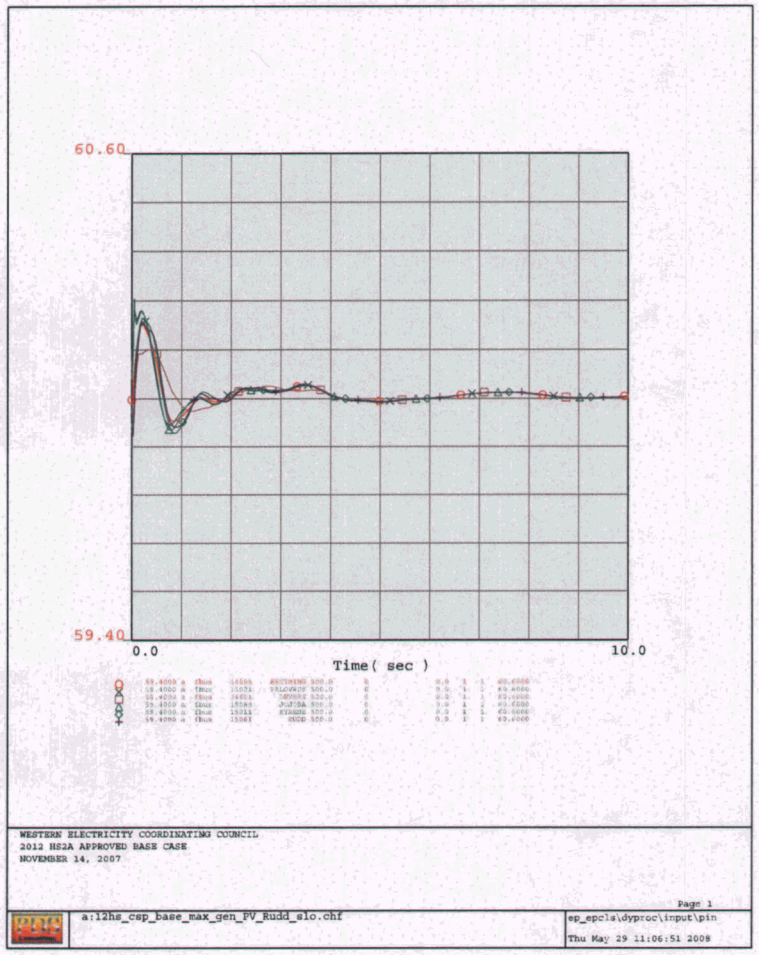
Pre-Project, PV Gen Max Case
Hassayampa-Jojoba 500 kV line outage
Transient Frequency Plots



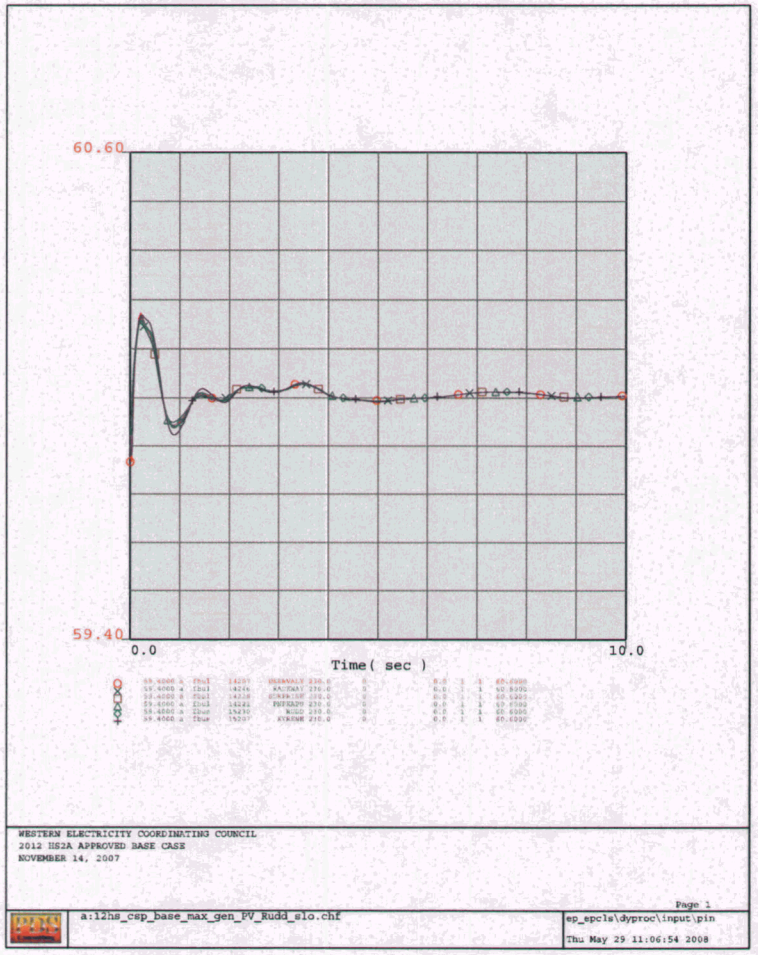
Pre-Project, PV Gen Max Case
Hassayampa-Jojoba 500 kV line outage
Transient Frequency Plots



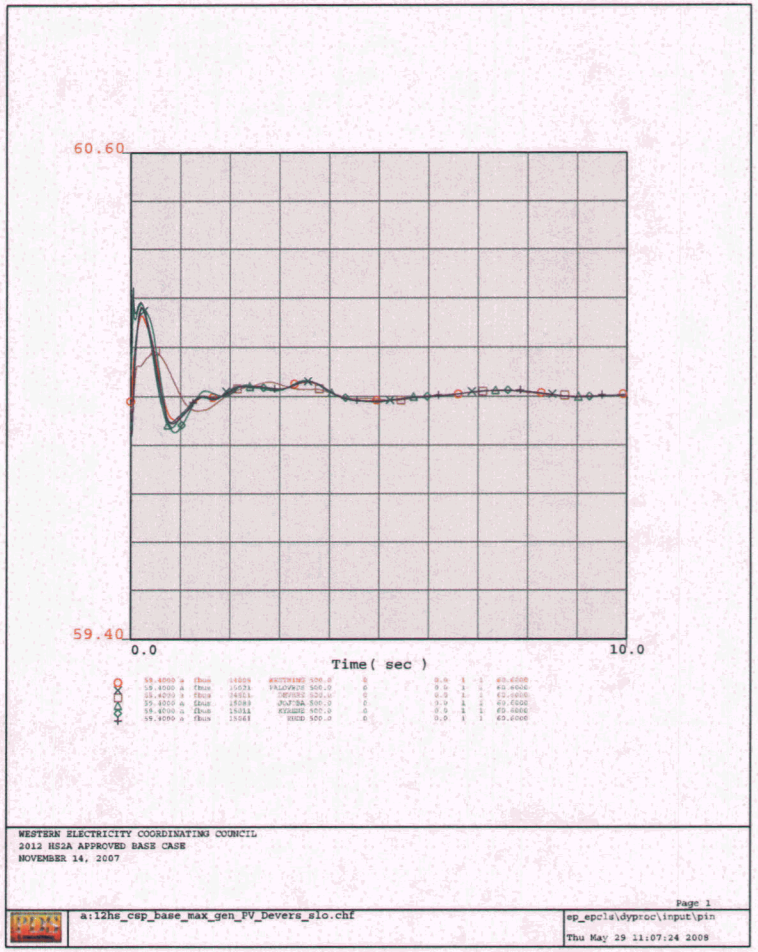
Pre-Project, PV Gen Max Case
Palo Verde-Rudd 500 kV line outage
Transient Frequency Plots



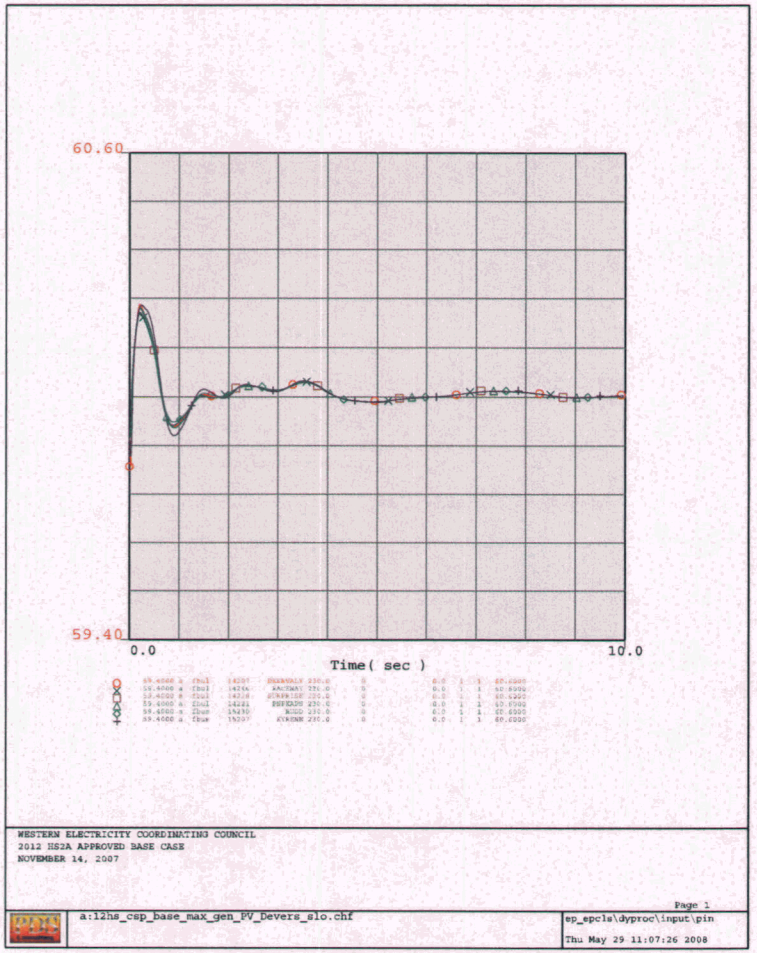
Pre-Project, PV Gen Max Case
Palo Verde-Rudd 500 kV line outage
Transient Frequency Plots



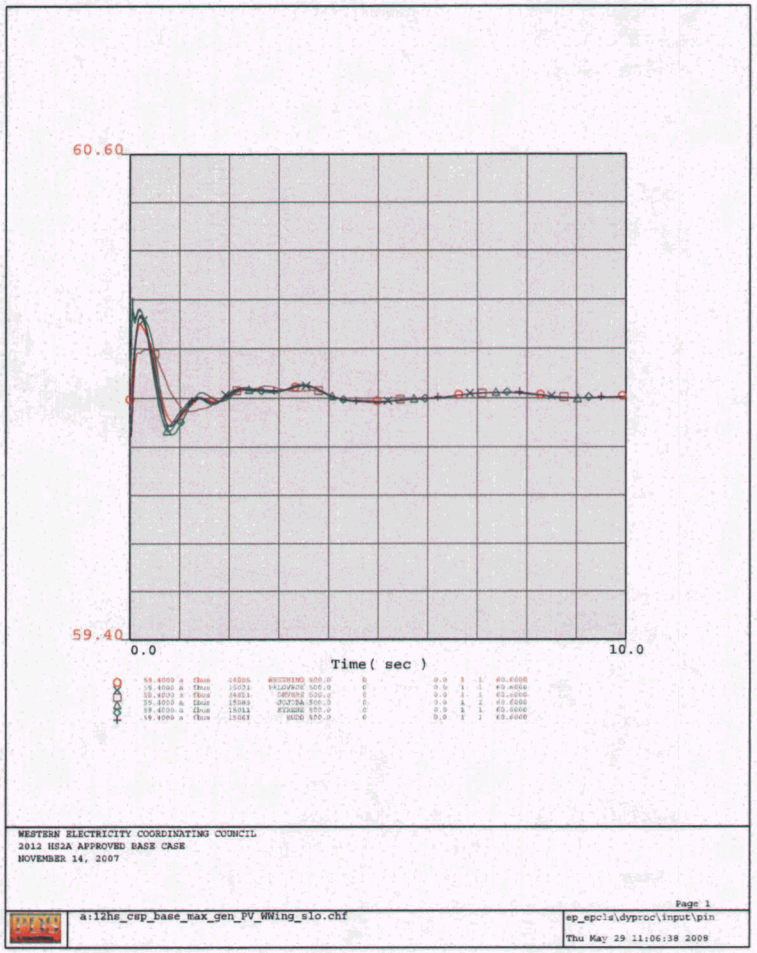
Pre-Project, PV Gen Max Case
Palo Verde-Devers 500 kV line outage
Transient Frequency Plots



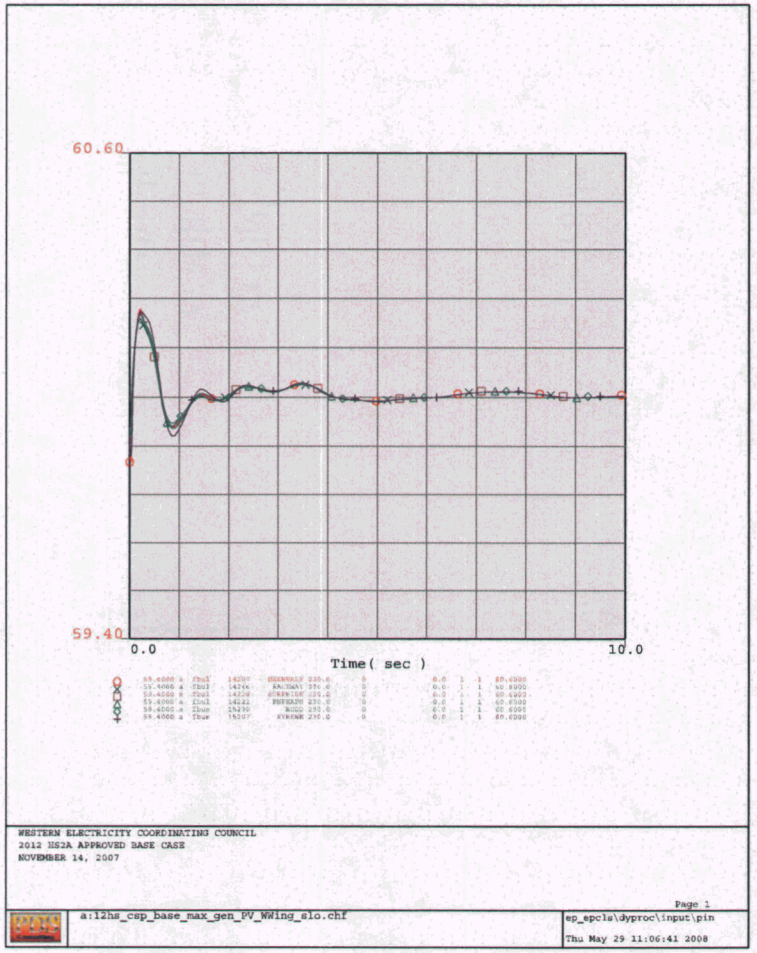
Pre-Project, PV Gen Max Case
Palo Verde-Devers 500 kV line outage
Transient Frequency Plots



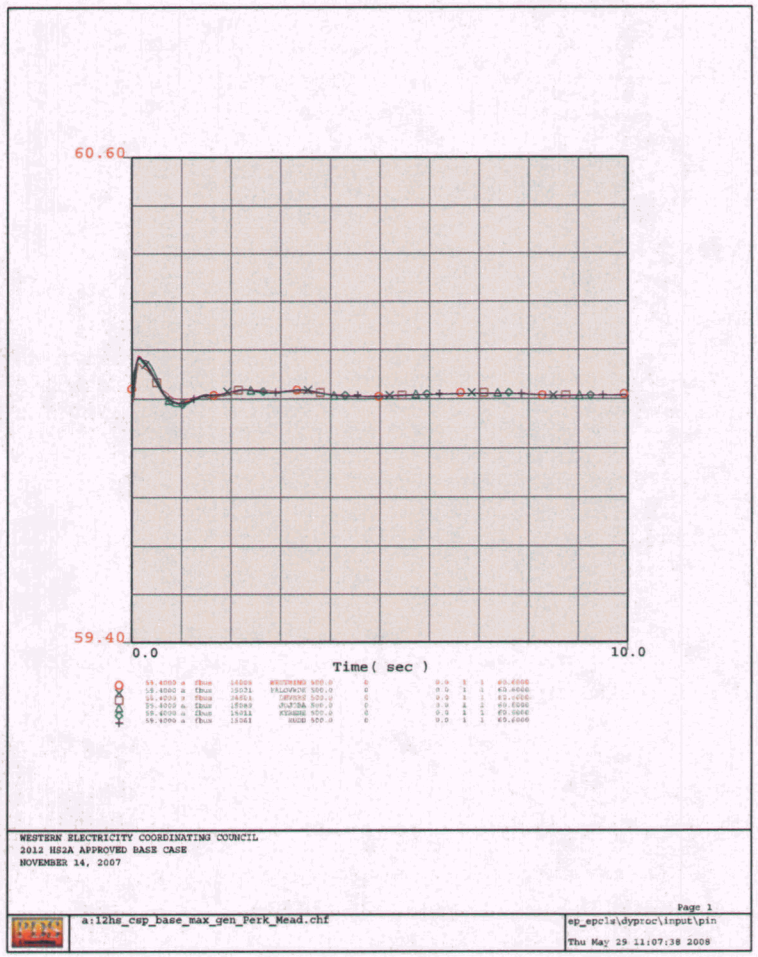
Pre-Project, PV Gen Max Case
Palo Verde-Westwing 500 kV line outage
Transient Frequency Plots



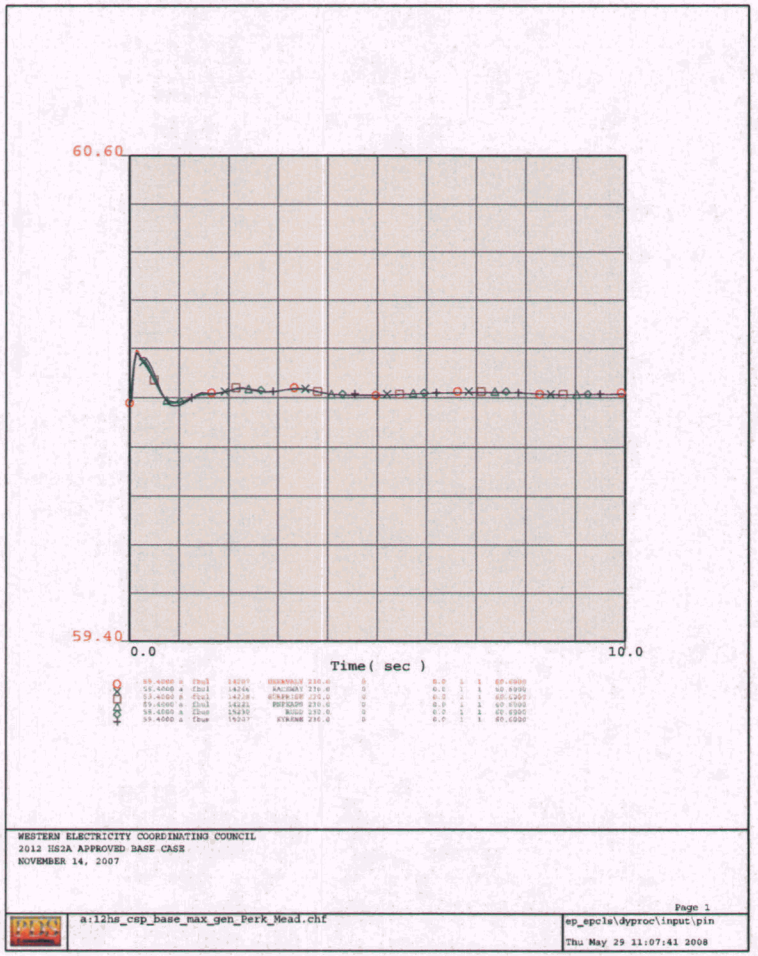
Pre-Project, PV Gen Max Case
Palo Verde-Westwing 500 kV line outage
Transient Frequency Plots



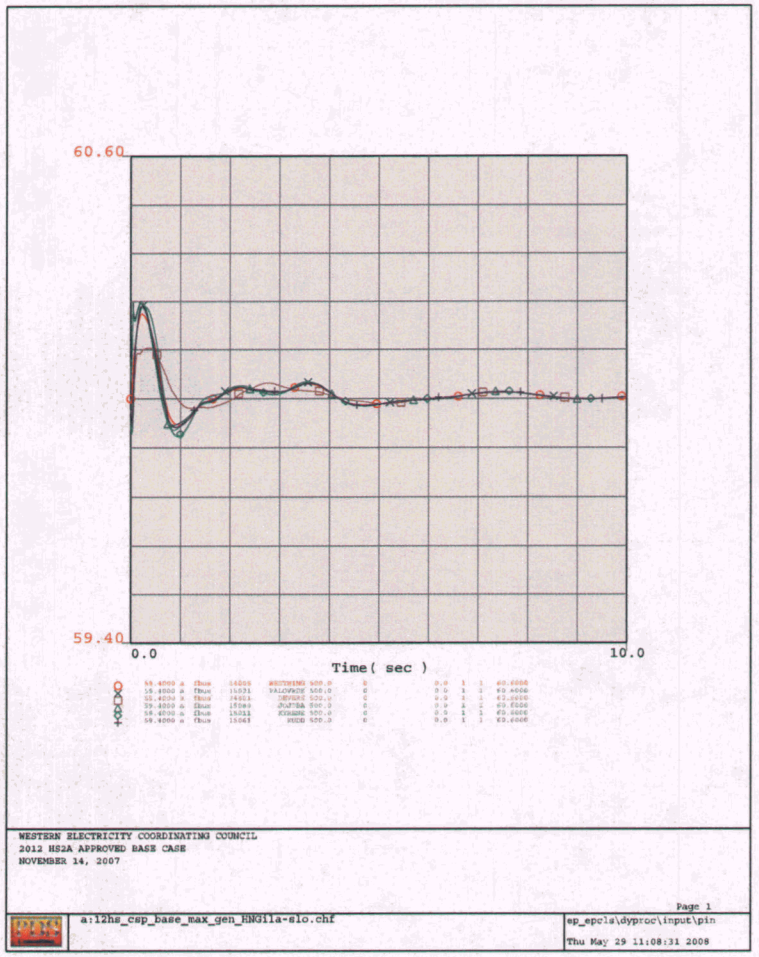
Pre-Project, PV Gen Max Case
Perkins-Mead 500 kV line outage
Transient Frequency Plots



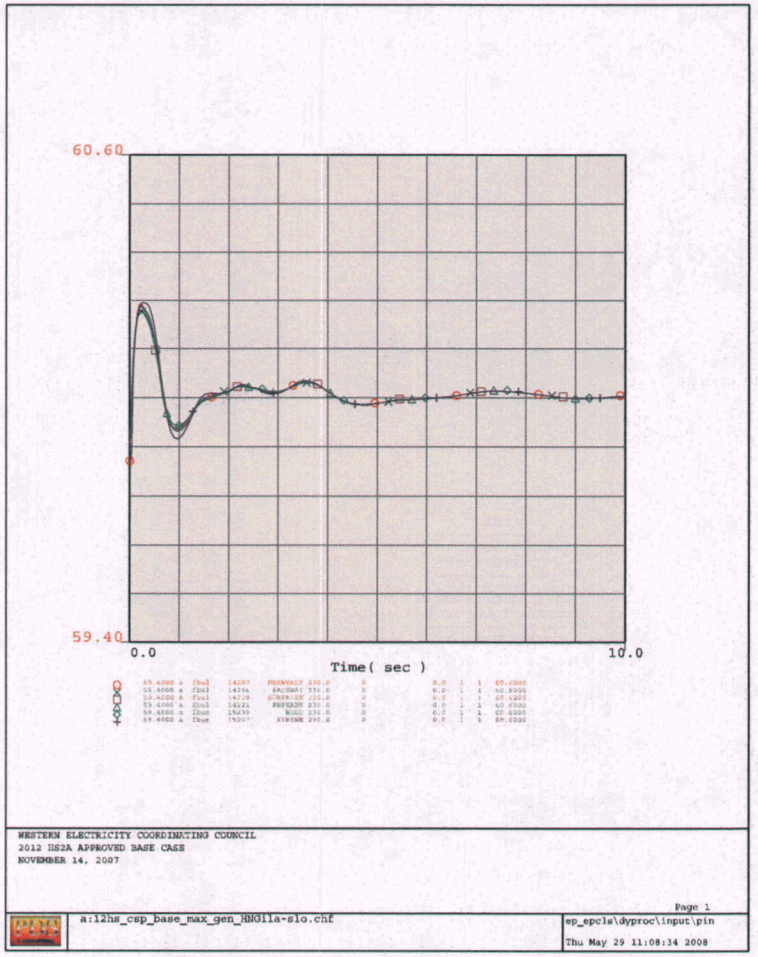
Pre-Project, PV Gen Max Case
Perkins-Mead 500 kV line outage
Transient Frequency Plots



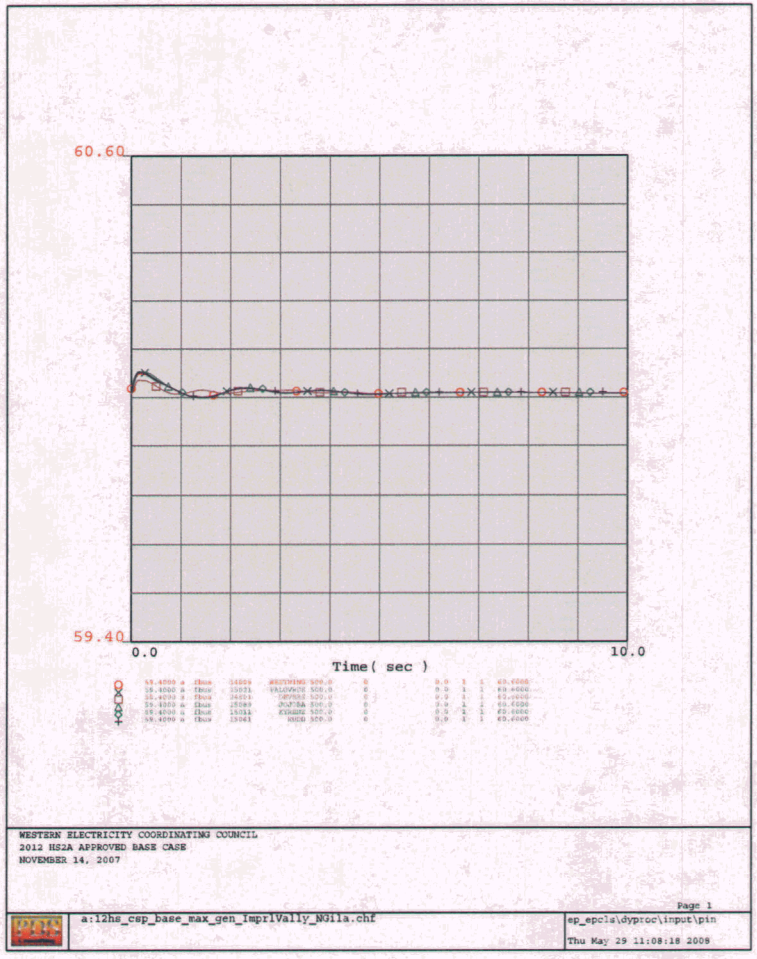
Pre-Project, PV Gen Max Case
Hassayampa -N. Gila 500 kV line outage
Transient Frequency Plots



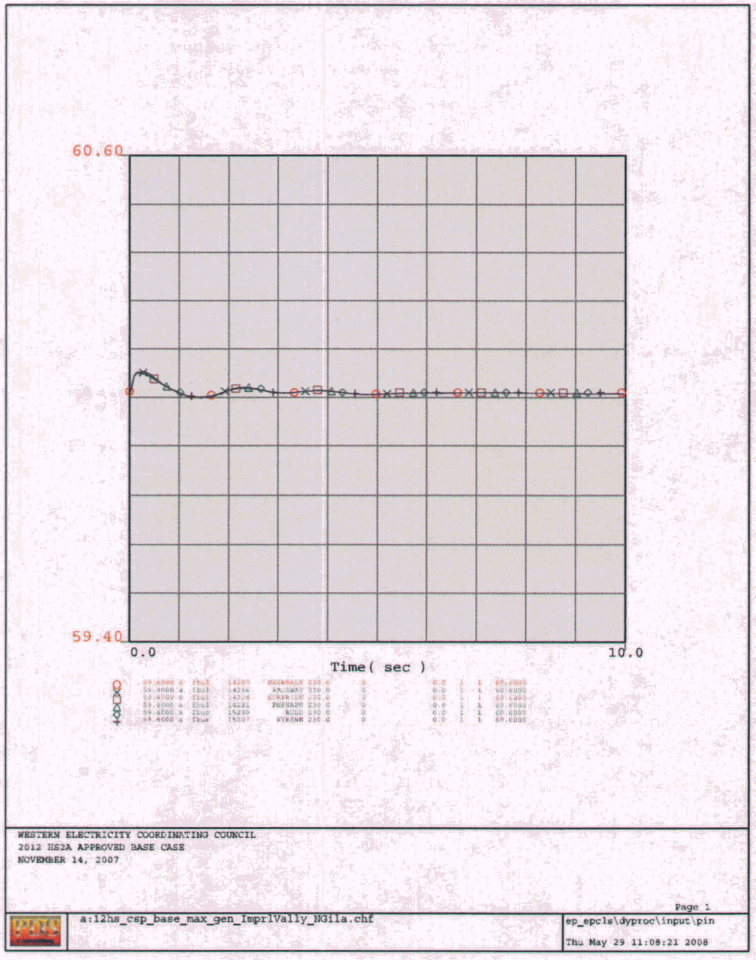
Pre-Project, PV Gen Max Case
Hassayampa -N. Gila 500 kV line outage
Transient Frequency Plots



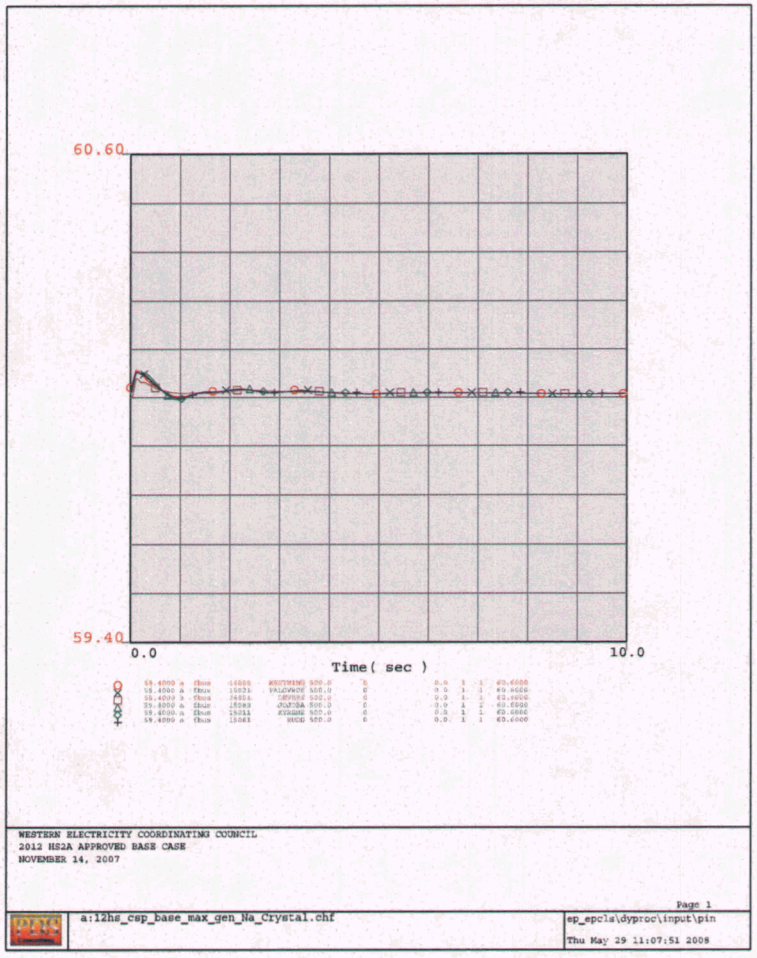
Pre-Project, PV Gen Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Frequency Plots



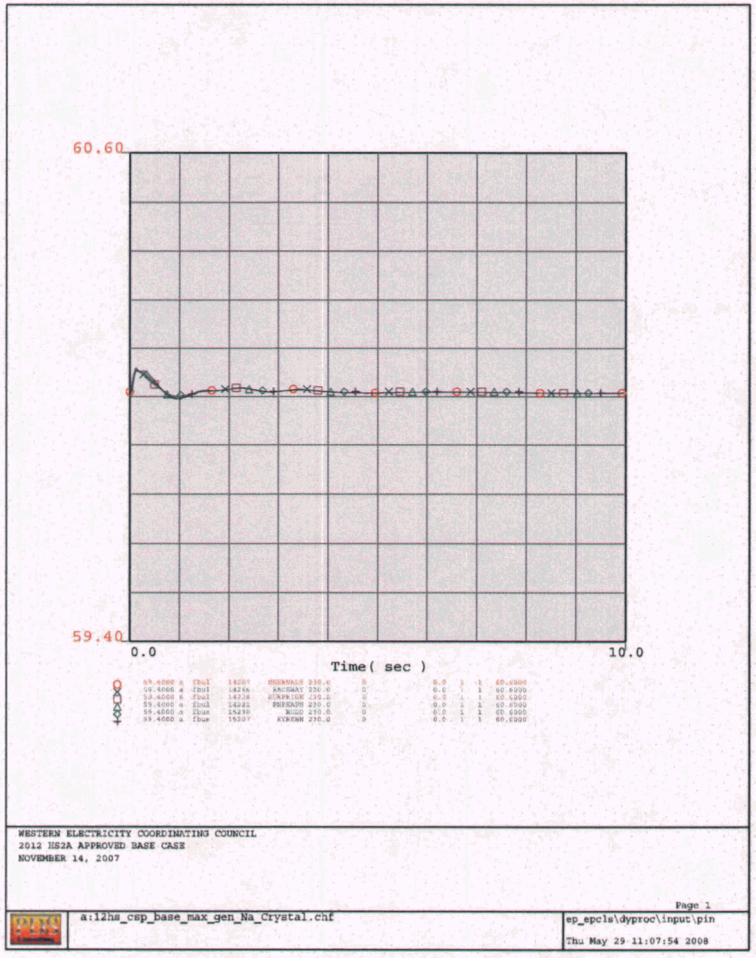
Pre-Project, PV Gen Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Frequency Plots



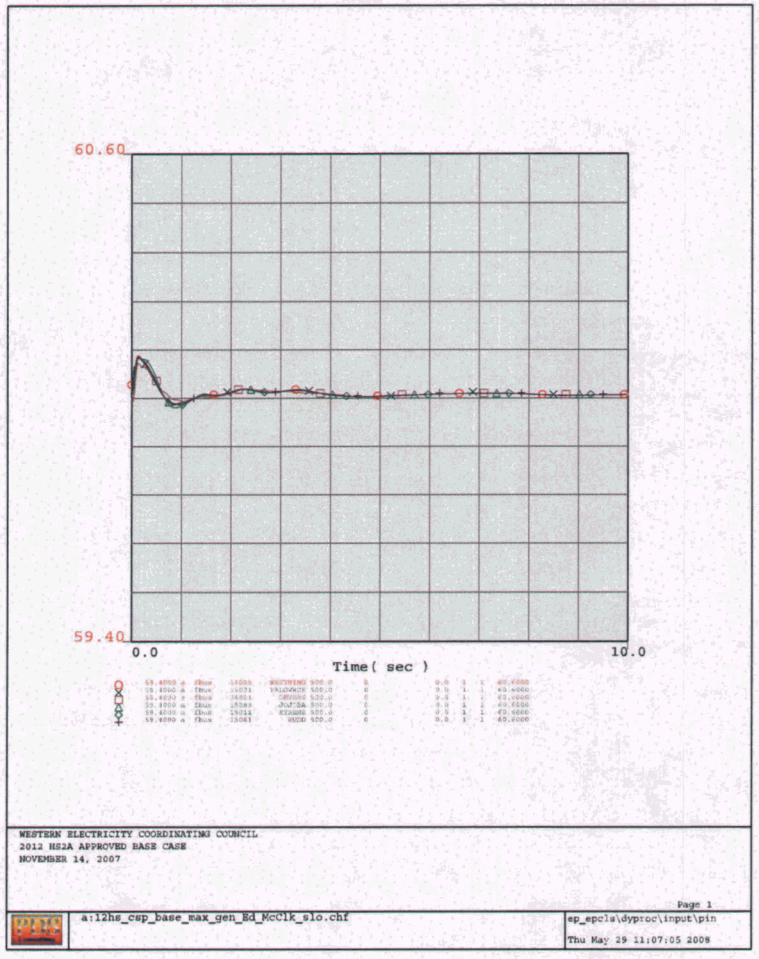
Pre-Project, PV Gen Max Case
Navajo-Crystal 500 kV line
Transient Frequency Plots



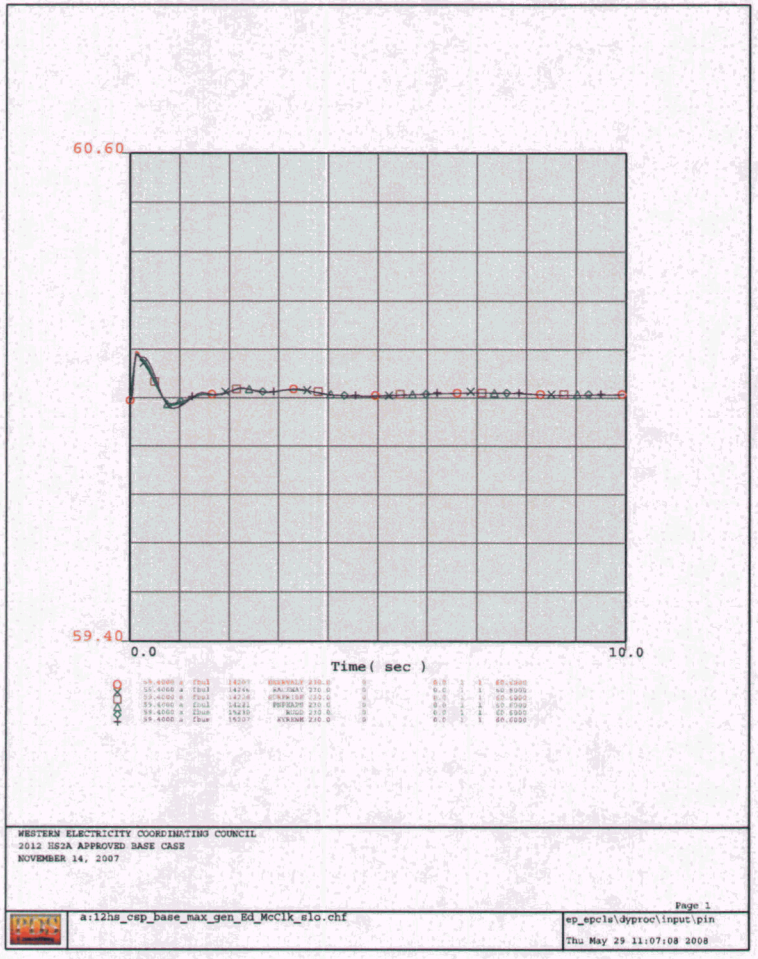
Pre-Project, PV Gen Max Case
Navajo-Crystal 500 kV line
Transient Frequency Plots



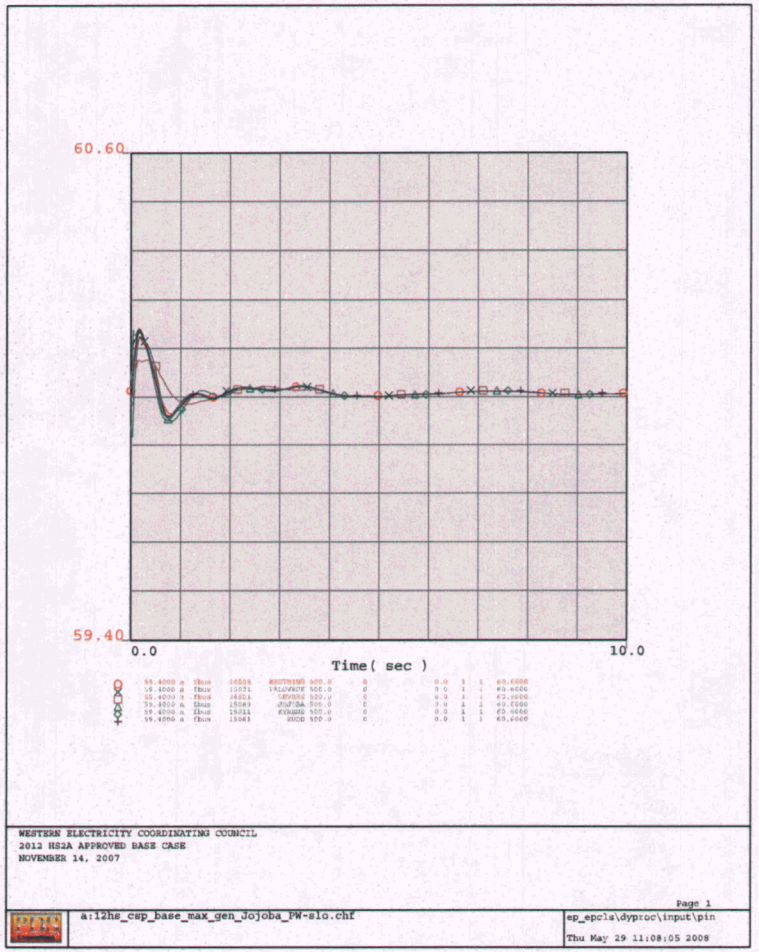
Pre-Project, PV Gen Max Case
El Dorado-McCullough 500 kV line outage
Transient Frequency Plots



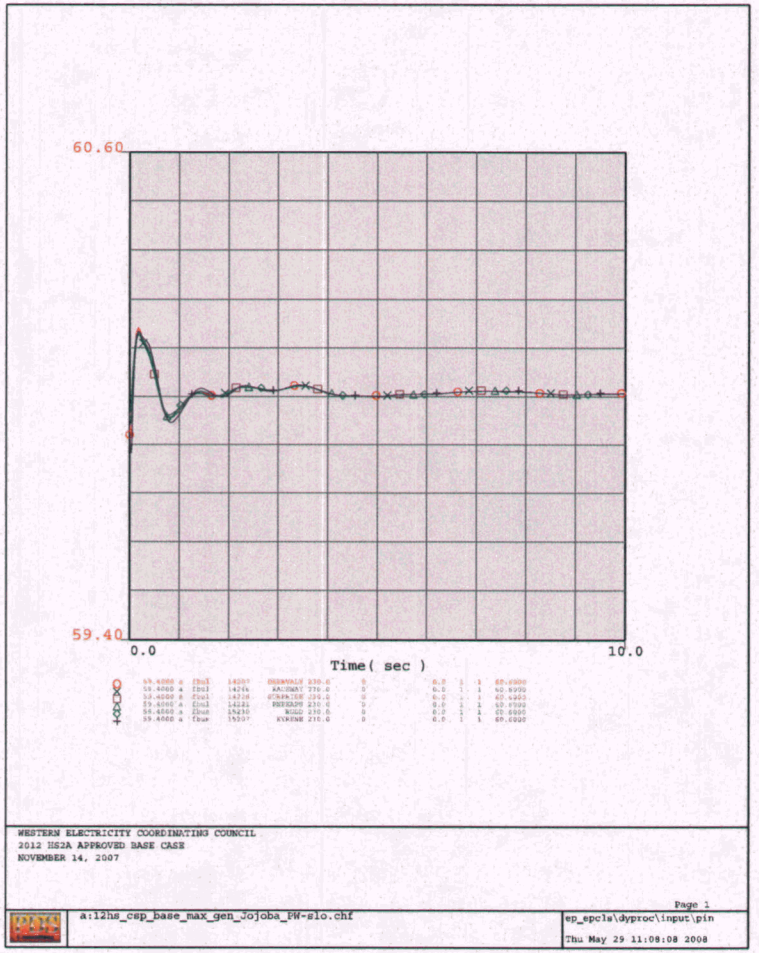
Pre-Project, PV Gen Max Case
El Dorado-McCullough 500 kV line outage
Transient Frequency Plots



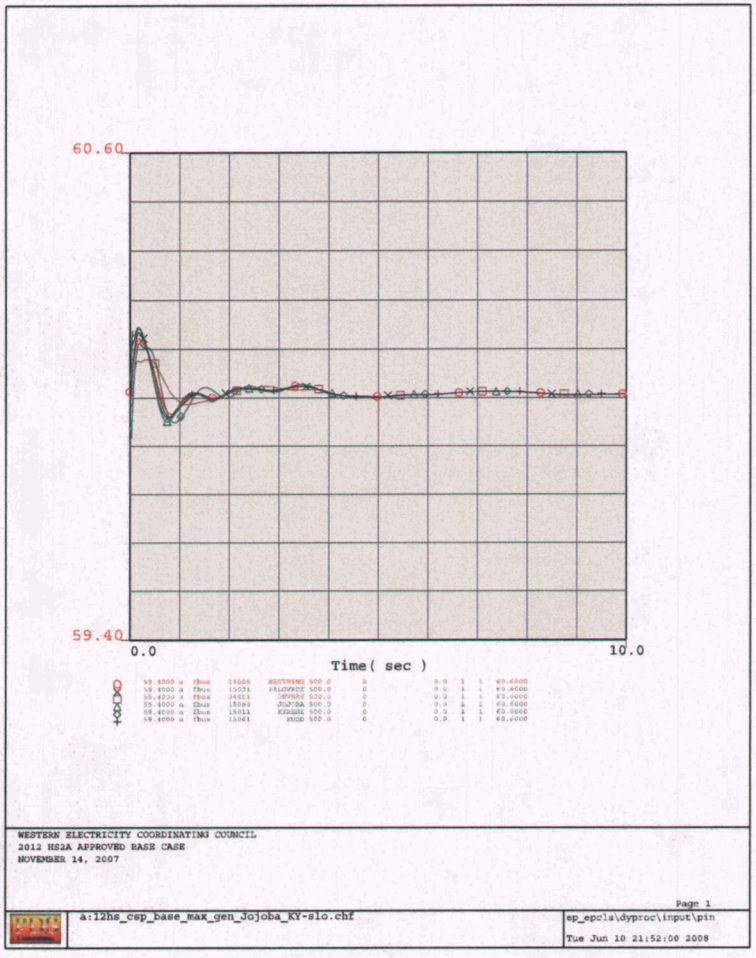
Pre-Project, PV Gen Max Case
Jojoba-Pinal West 500 kV line outage
Transient Frequency Plots



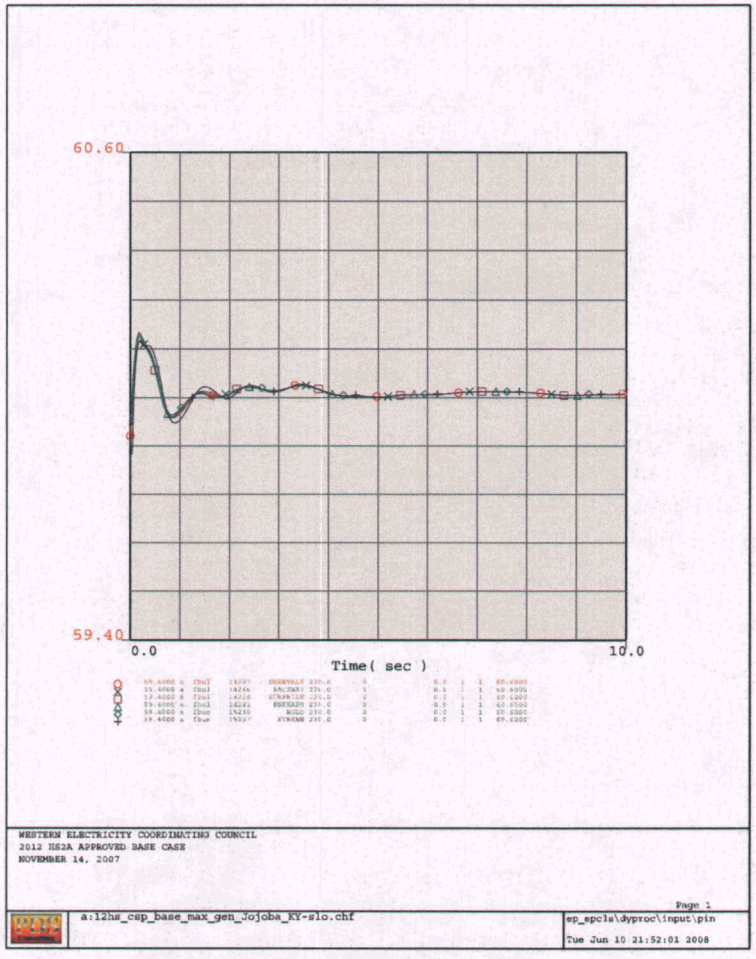
Pre-Project, PV Gen Max Case
Jojoba-Pinal West 500 kV line outage
Transient Frequency Plots



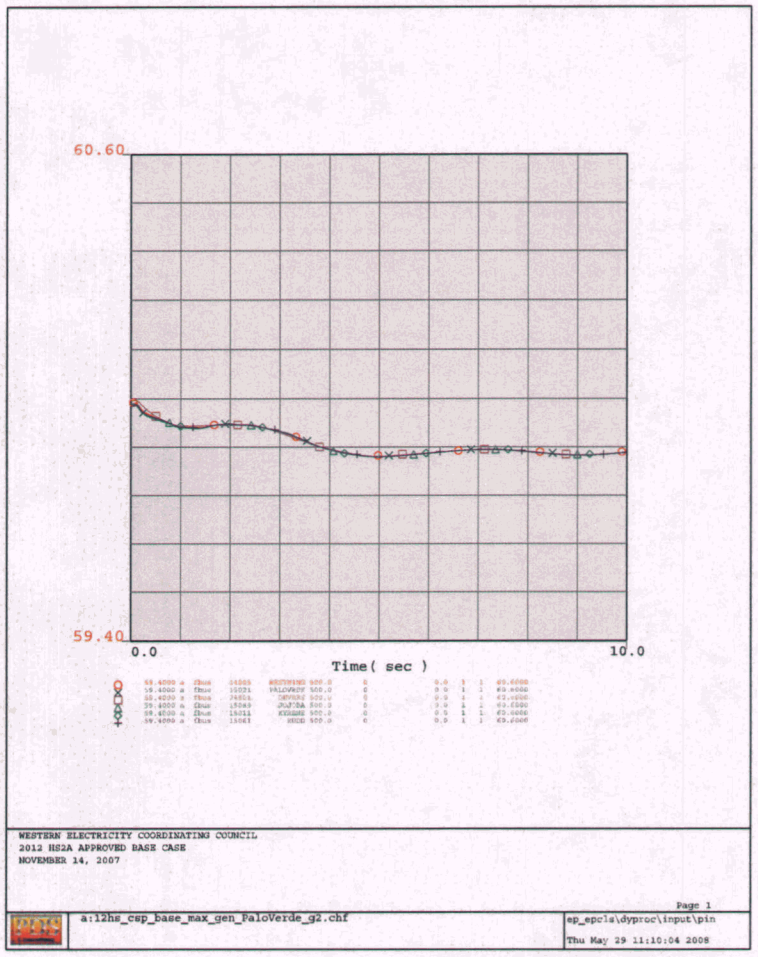
Pre-Project, PV Gen Max Case
Jojoba-Kyrene 500 kV line outage
Transient Frequency Plots



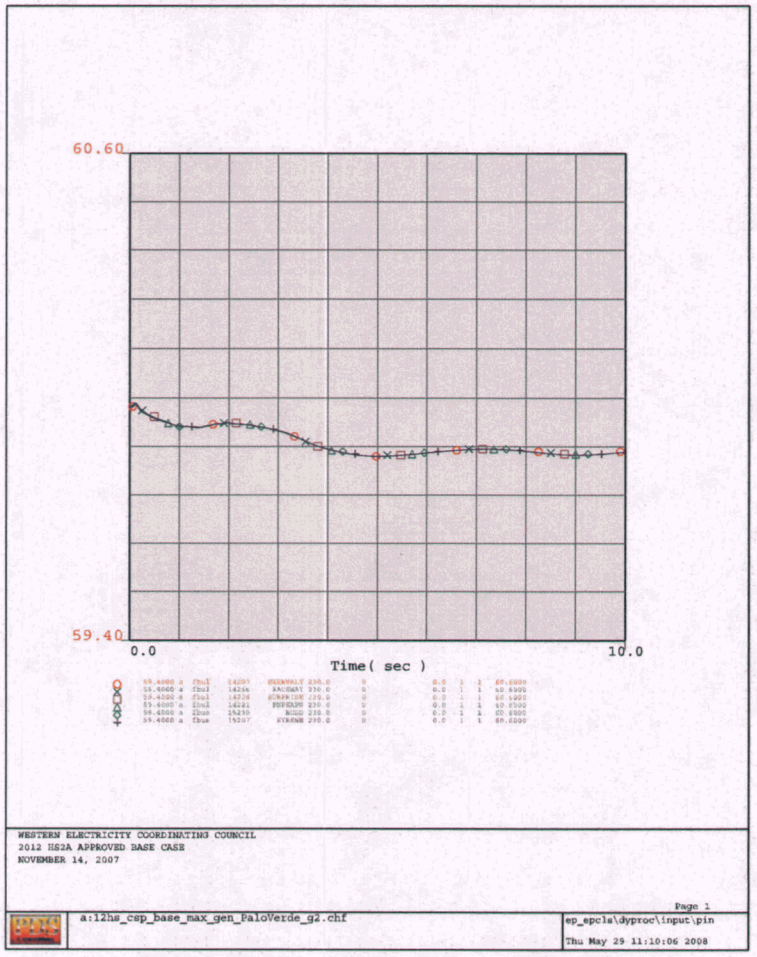
Pre-Project, PV Gen Max Case
Jojoba-Kyrene 500 kV line outage
Transient Frequency Plots



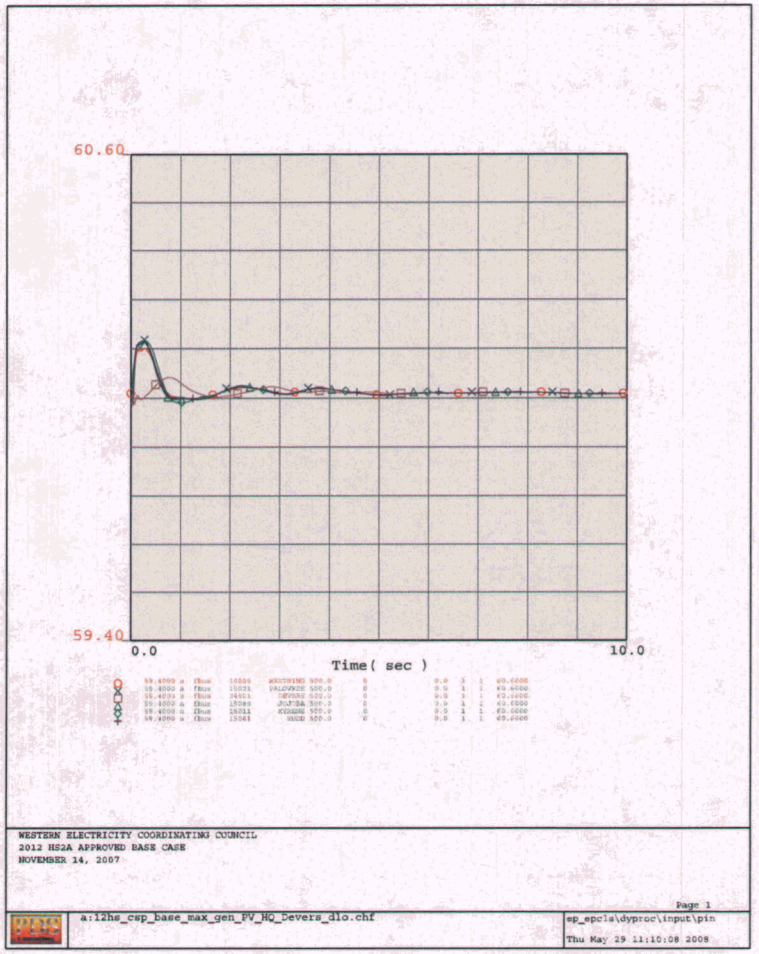
Pre-Project, PV Gen Max Case
Palo Verde G-2 outage
Transient Frequency Plots



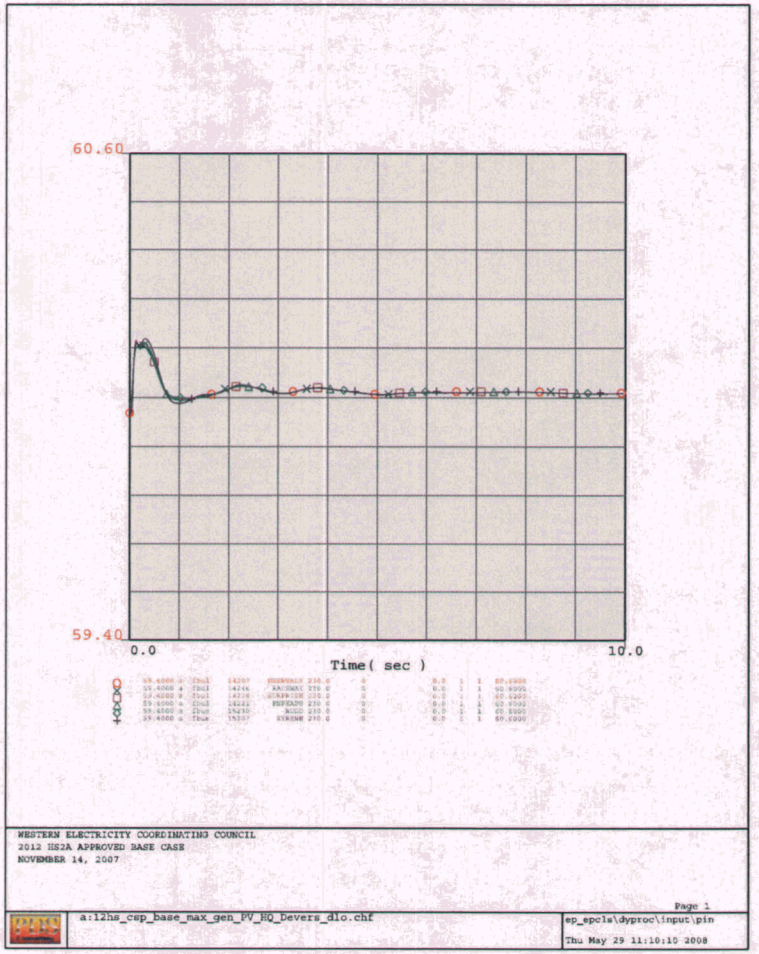
Pre-Project, PV Gen Max Case
Palo Verde G-2 outage
Transient Frequency Plots



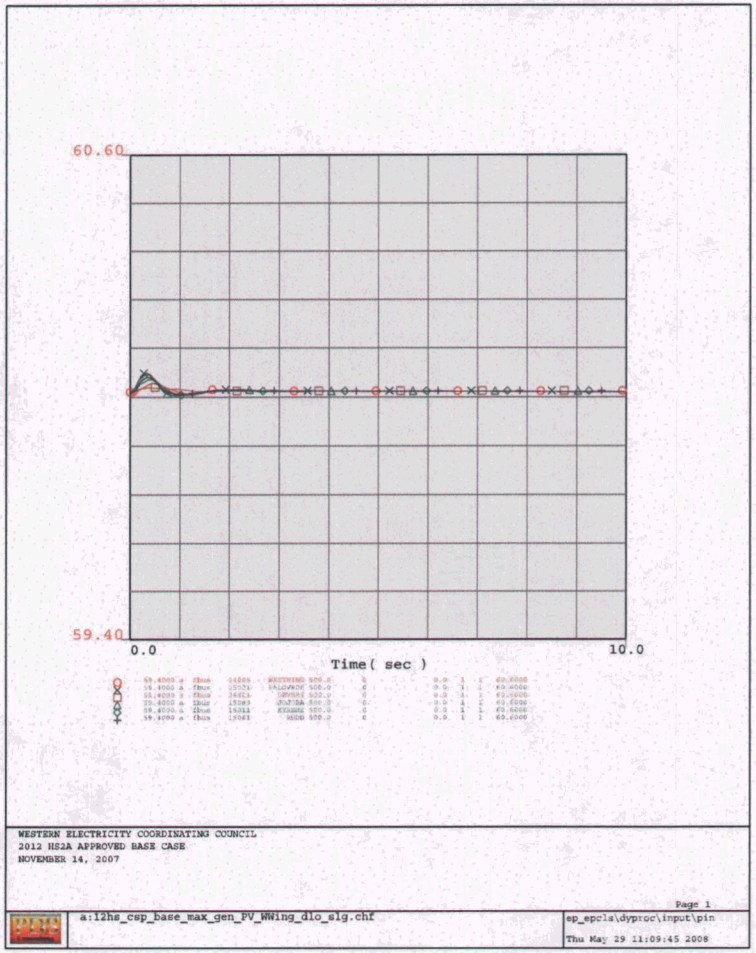
Pre-Project, PV Gen Max Case
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Frequency Plots



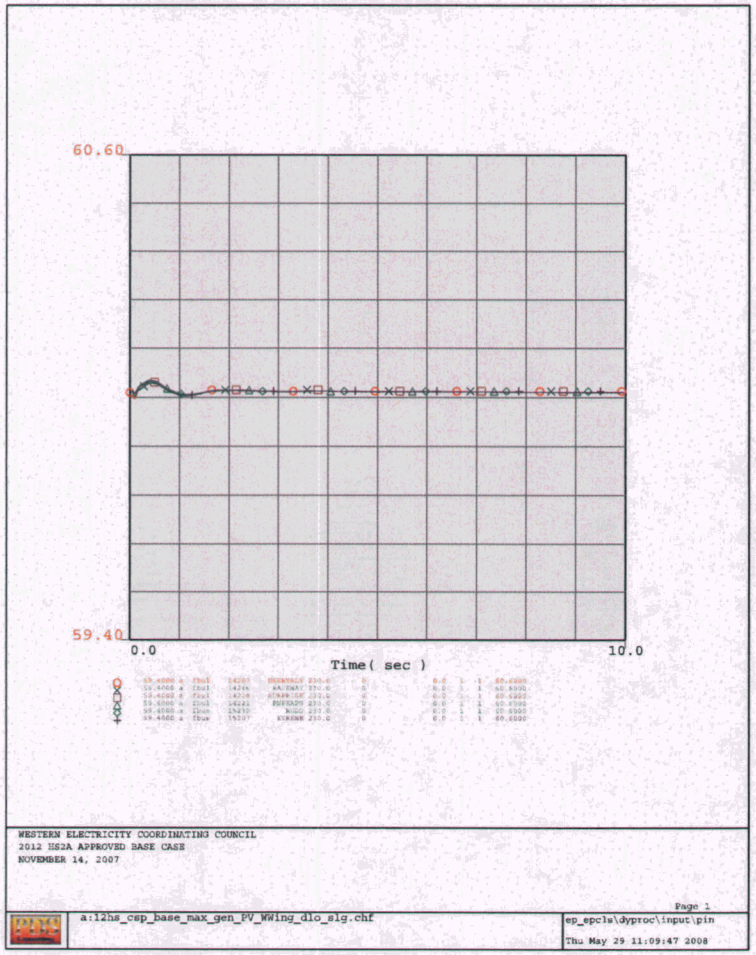
Pre-Project, PV Gen Max Case
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Frequency Plots



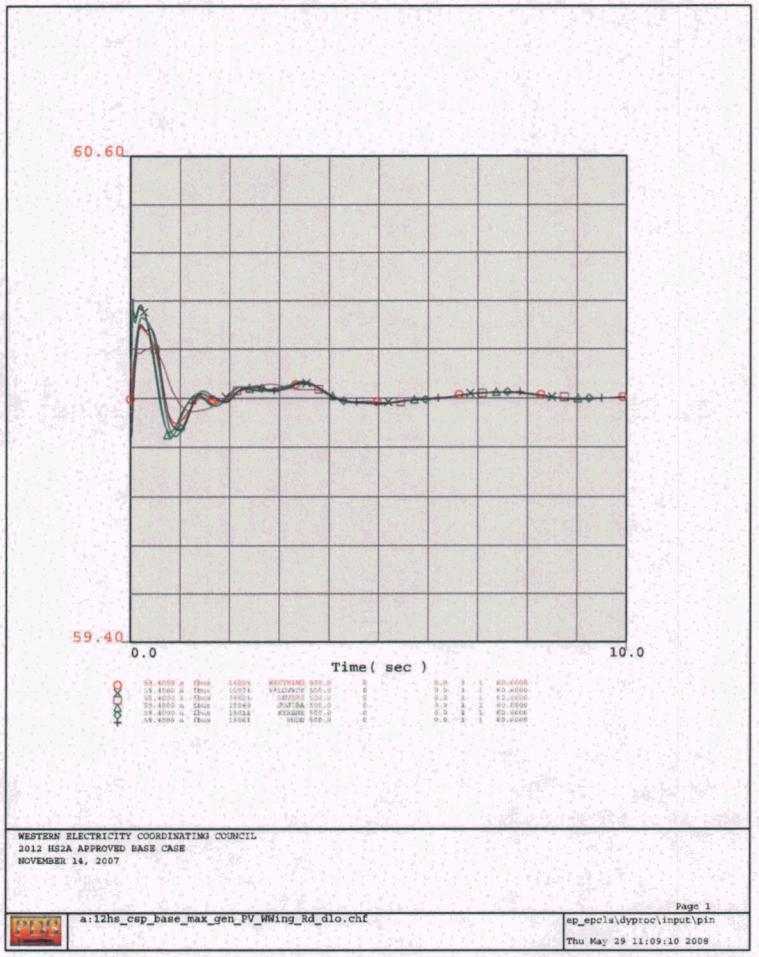
Pre-Project, PV Gen Max Case
PV-Westwing #1 & 2 500 kV lines outage
Transient Frequency Plots



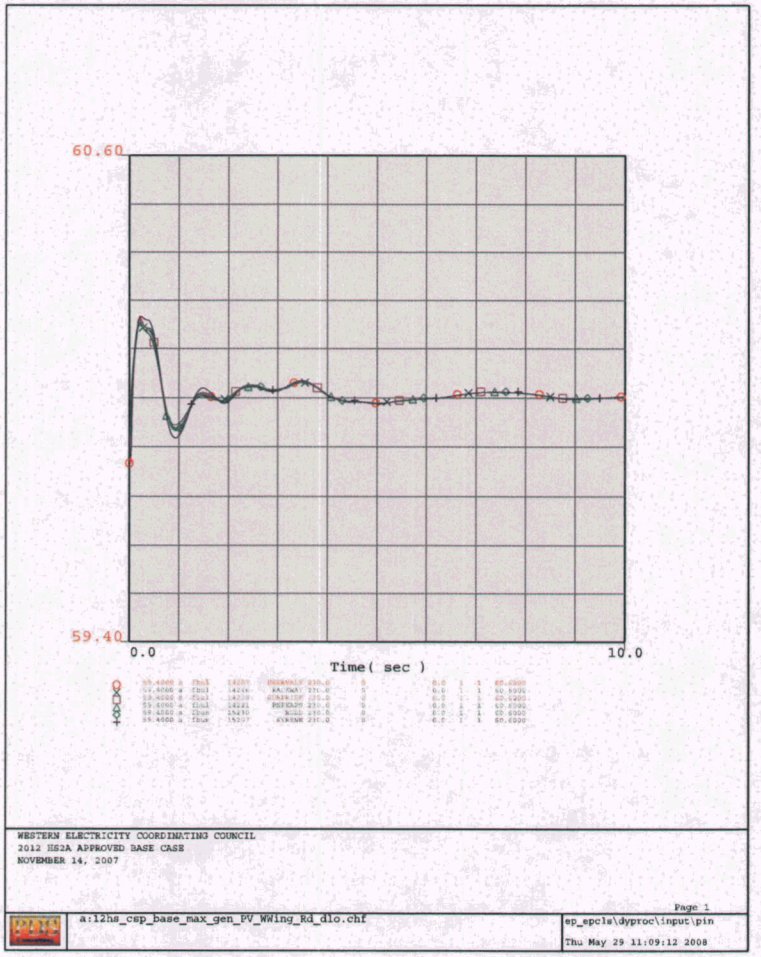
Pre-Project, PV Gen Max Case
PV-Westwing #1 & 2 500 kV lines outage
Transient Frequency Plots



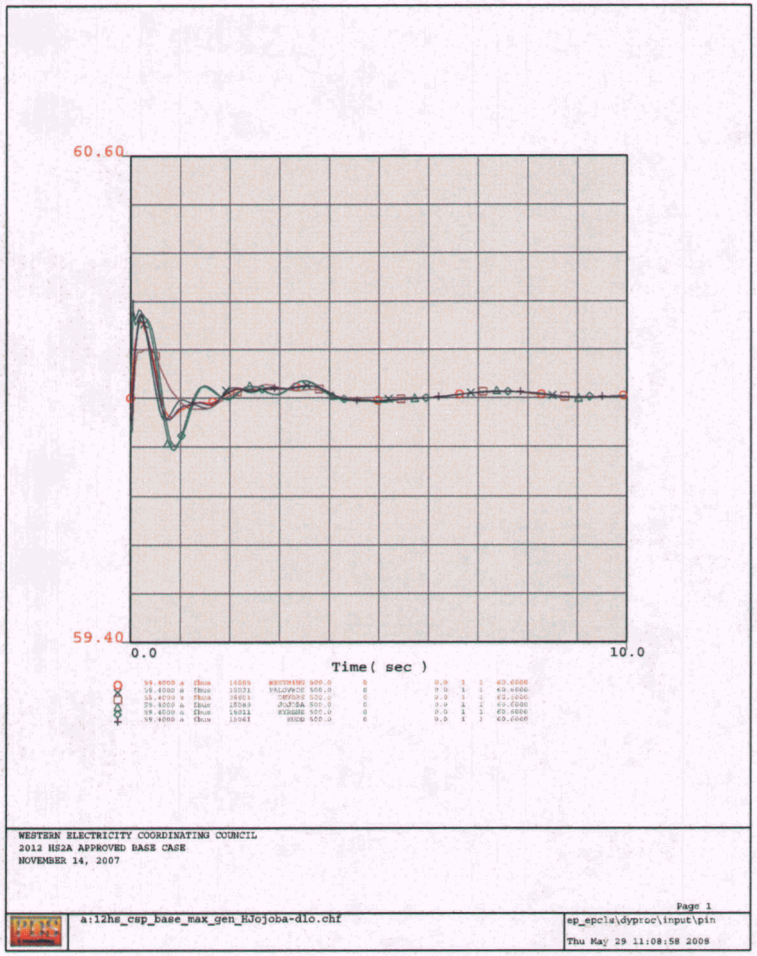
Pre-Project, PV Gen Max Case
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Frequency Plots



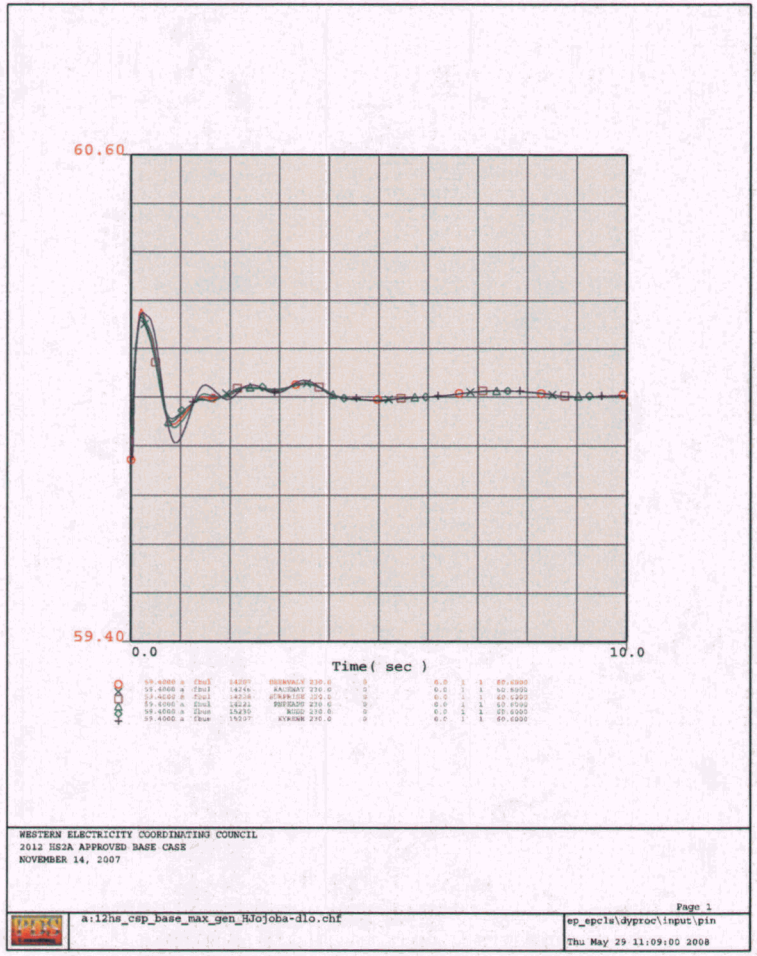
Pre-Project, PV Gen Max Case
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Frequency Plots



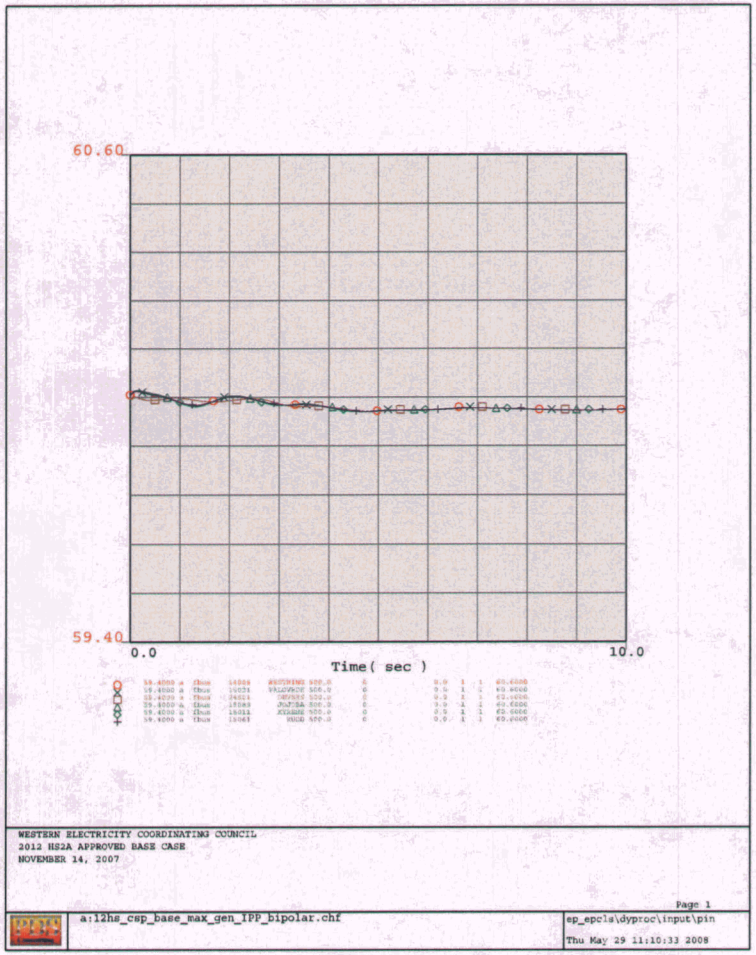
Pre-Project, PV Gen Max Case
Hassayampa-Jojoba #1 & 2 500 kV lines outage
Transient Frequency Plots



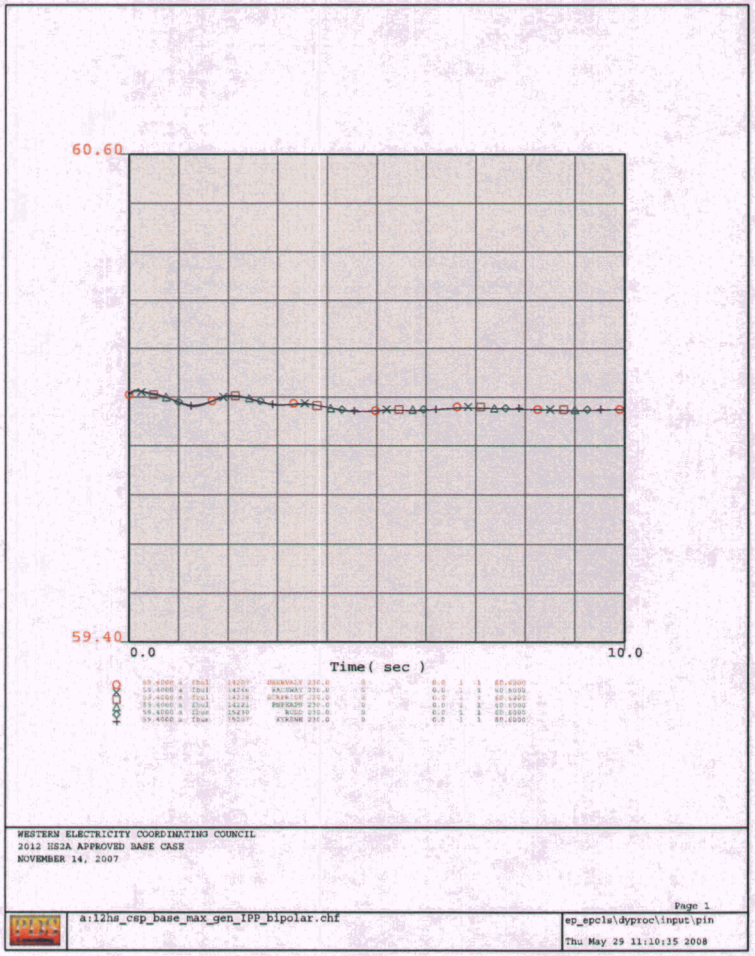
Pre-Project, PV Gen Max Case
Hassayampa-Jojoba #1 & 2 500 kV lines outage
Transient Frequency Plots



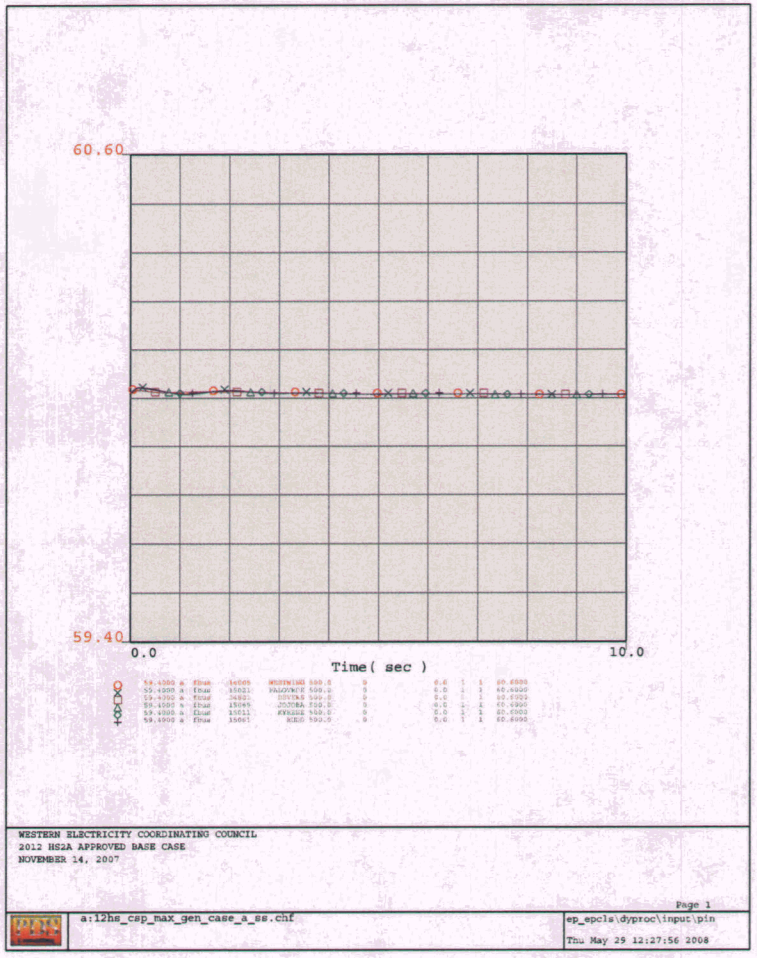
Pre-Project, PV Gen Max Case
IPP Bipole outage
Transient Frequency Plots



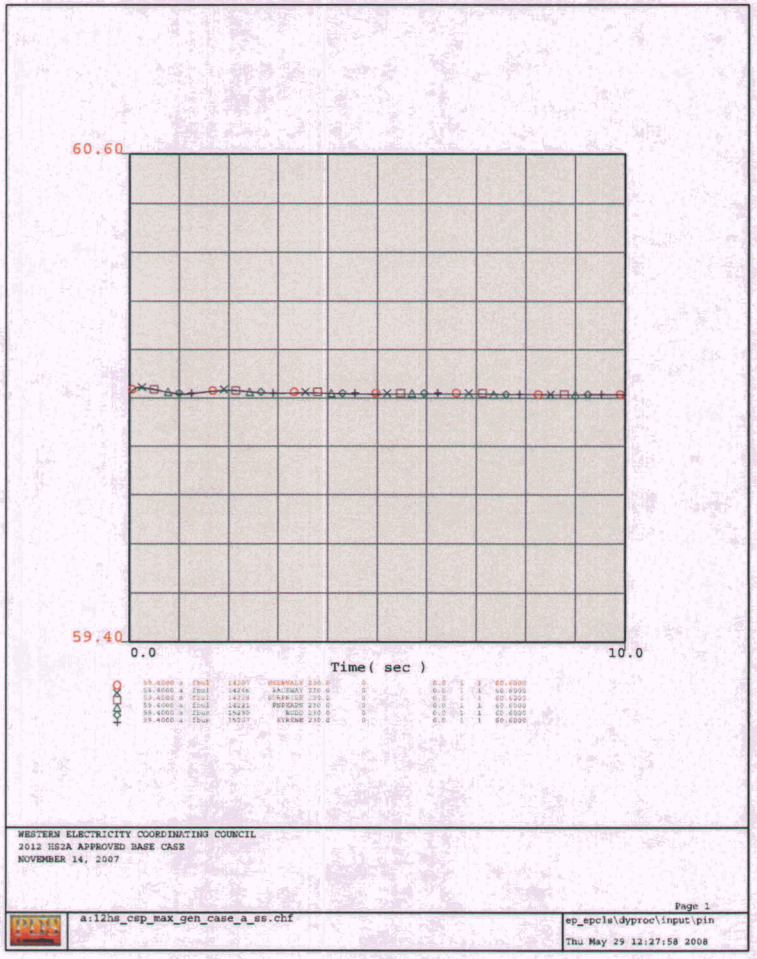
Pre-Project, PV Gen Max Case
IPP Bipole outage
Transient Frequency Plots



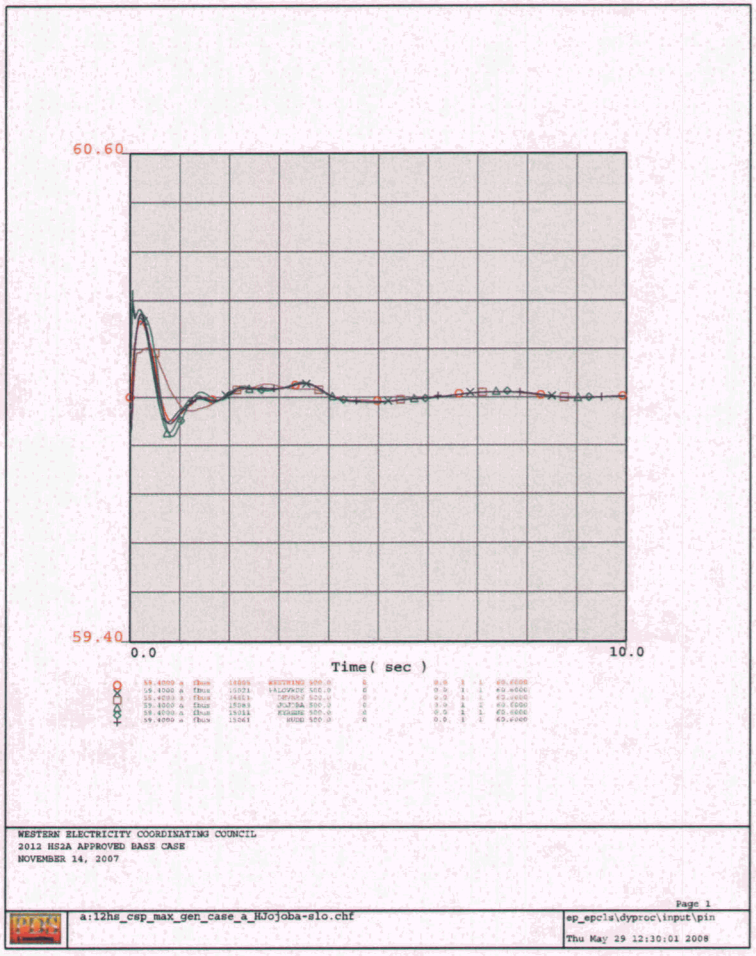
Post-Project, PV Gen Max Case A
No Outage
Transient Frequency Plots



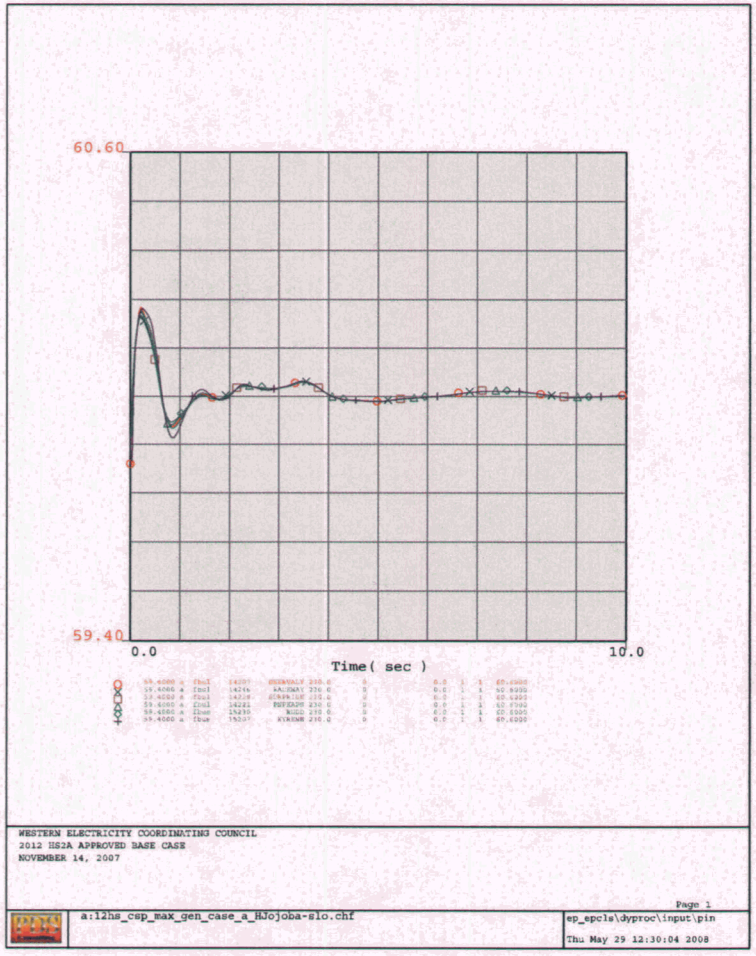
Post-Project, PV Gen Max Case A
No Outage
Transient Frequency Plots



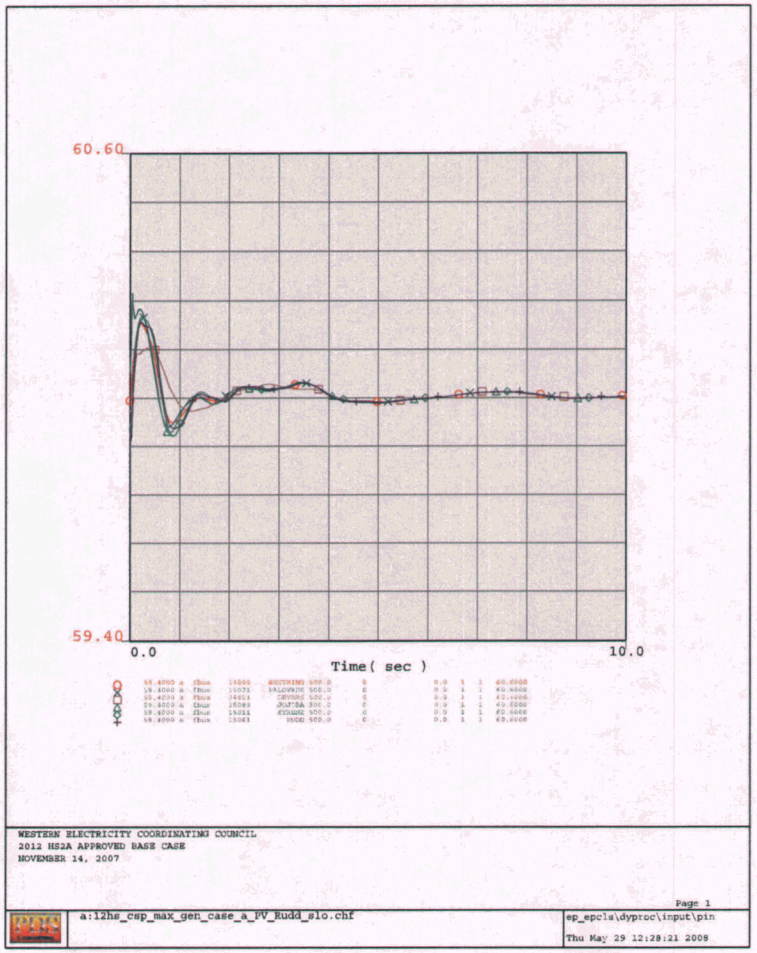
Post-Project, PV Gen Max Case A
Hassayampa-Jojoba 500 kV line outage
Transient Frequency Plots



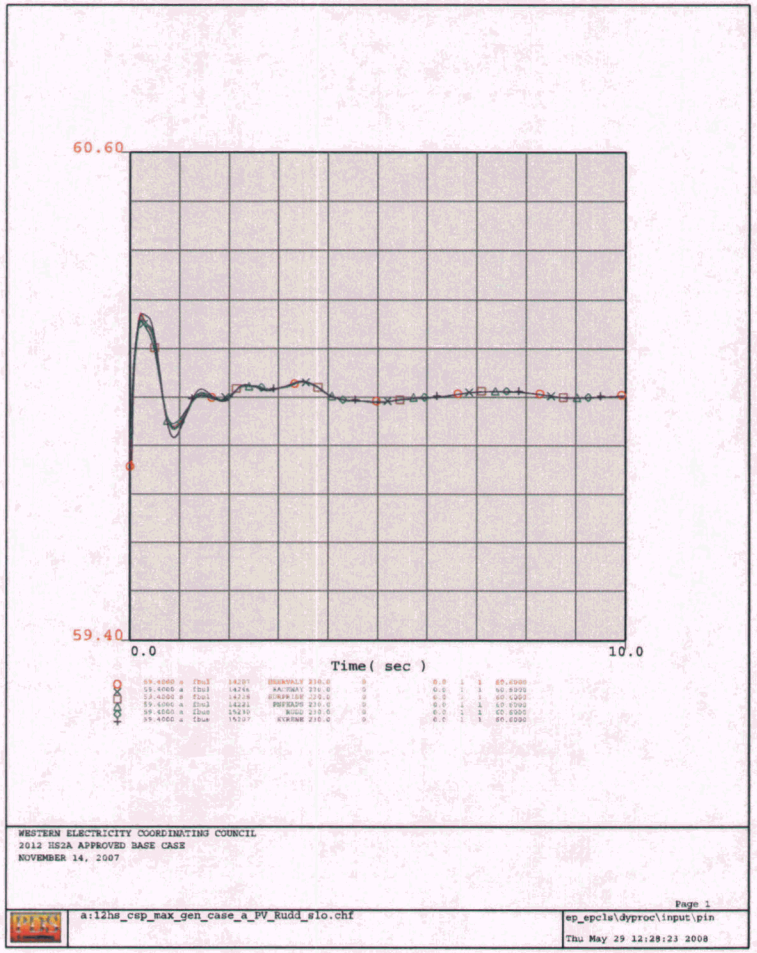
Post-Project, PV Gen Max Case A
Hassayampa-Jojoba 500 kV line outage
Transient Frequency Plots



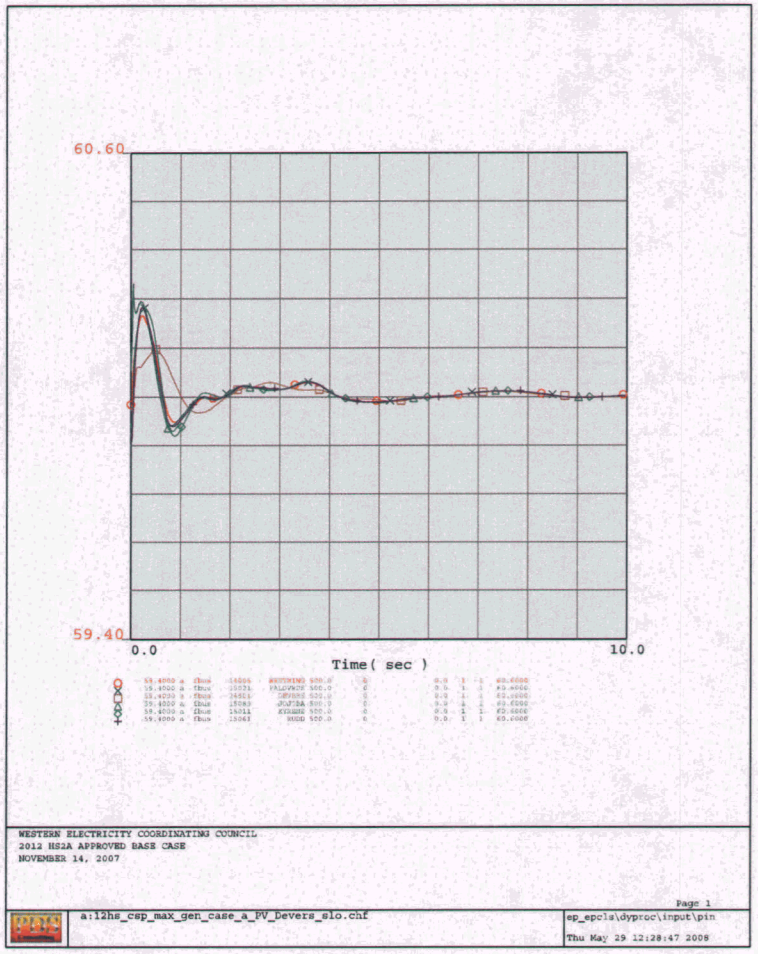
Post-Project, PV Gen Max Case A
Palo Verde-Rudd 500 kV line outage
Transient Frequency Plots



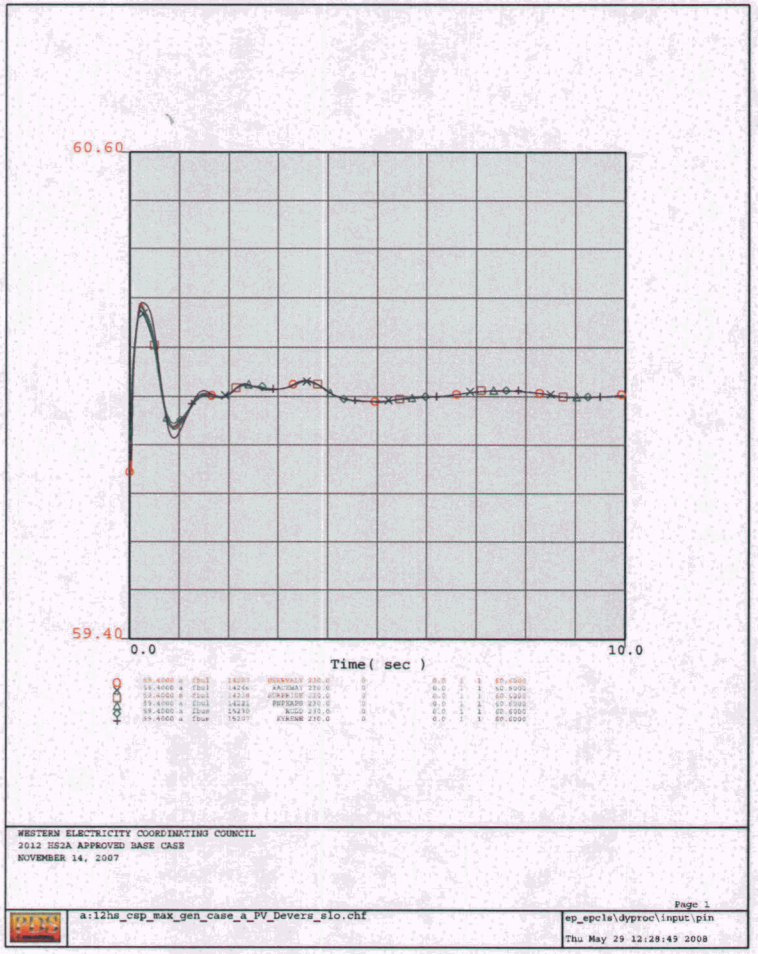
Post-Project, PV Gen Max Case A
Palo Verde-Rudd 500 kV line outage
Transient Frequency Plots



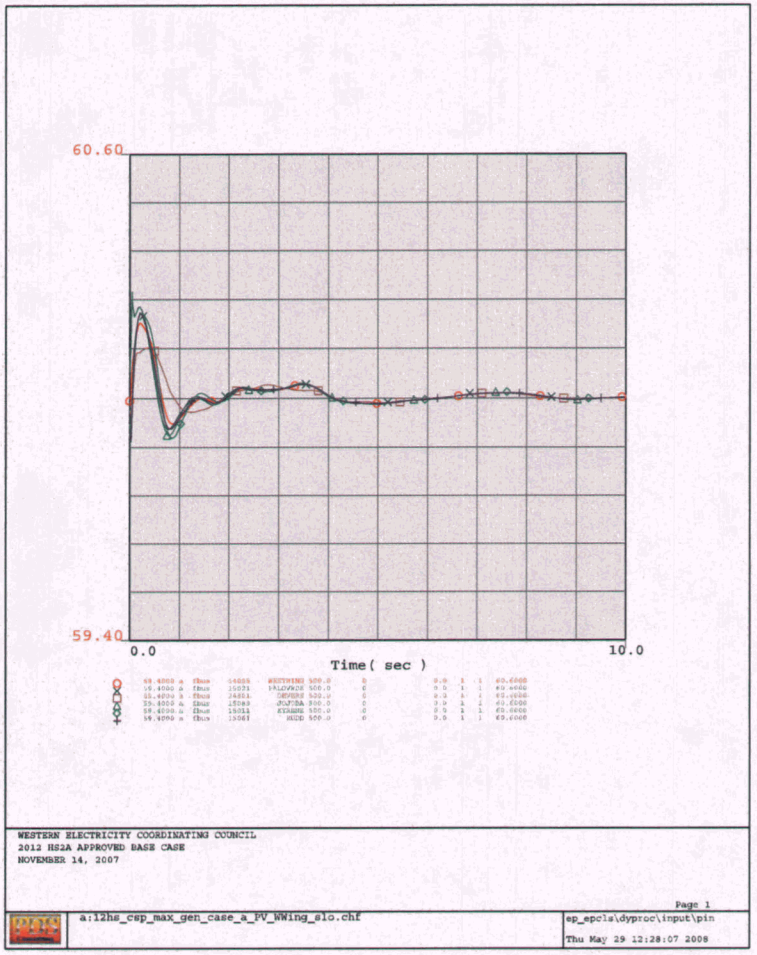
Post-Project, PV Gen Max Case A
Palo Verde-Devers 500 kV line outage
Transient Frequency Plots



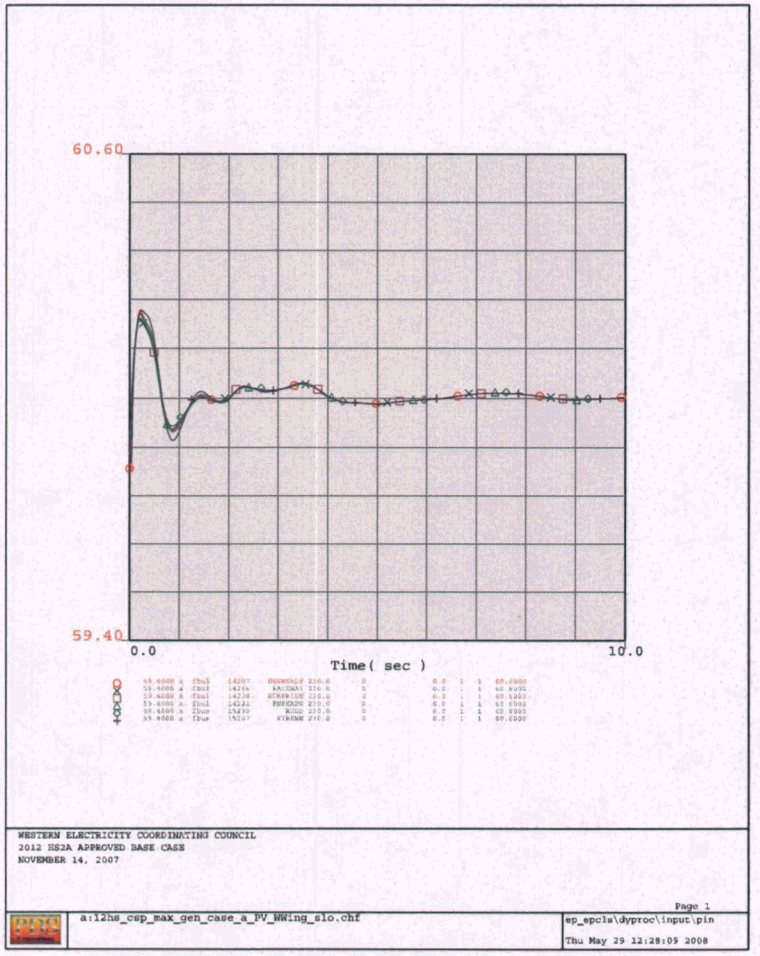
Post-Project, PV Gen Max Case A
Palo Verde-Devers 500 kV line outage
Transient Frequency Plots



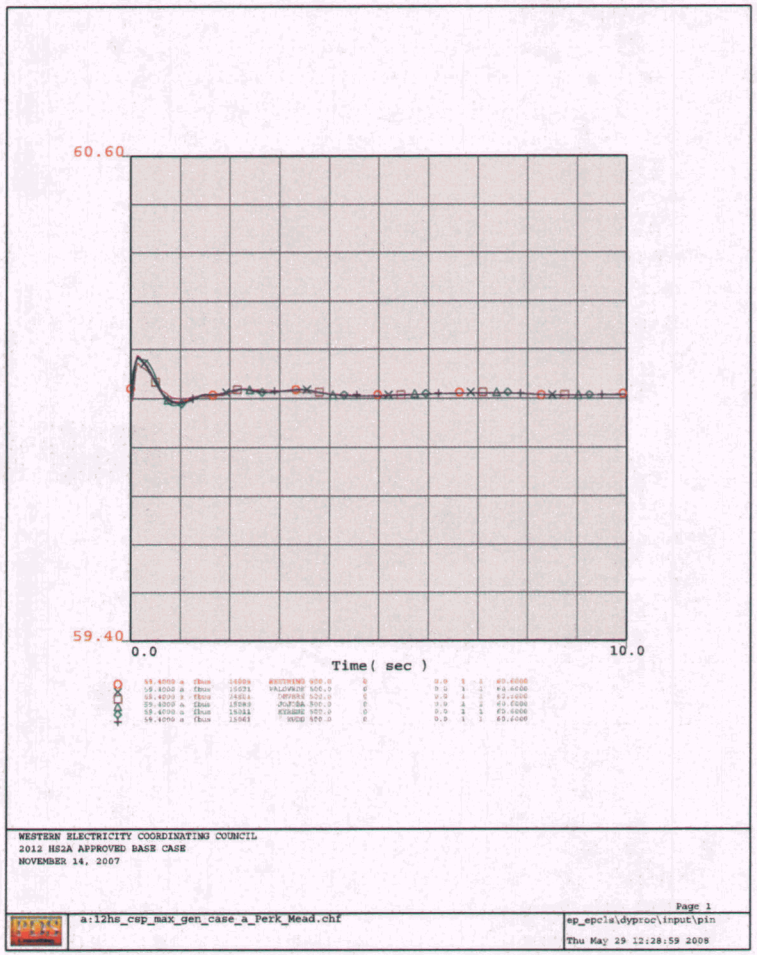
Post-Project, PV Gen Max Case A
Palo Verde-Westwing 500 kV line outage
Transient Frequency Plots



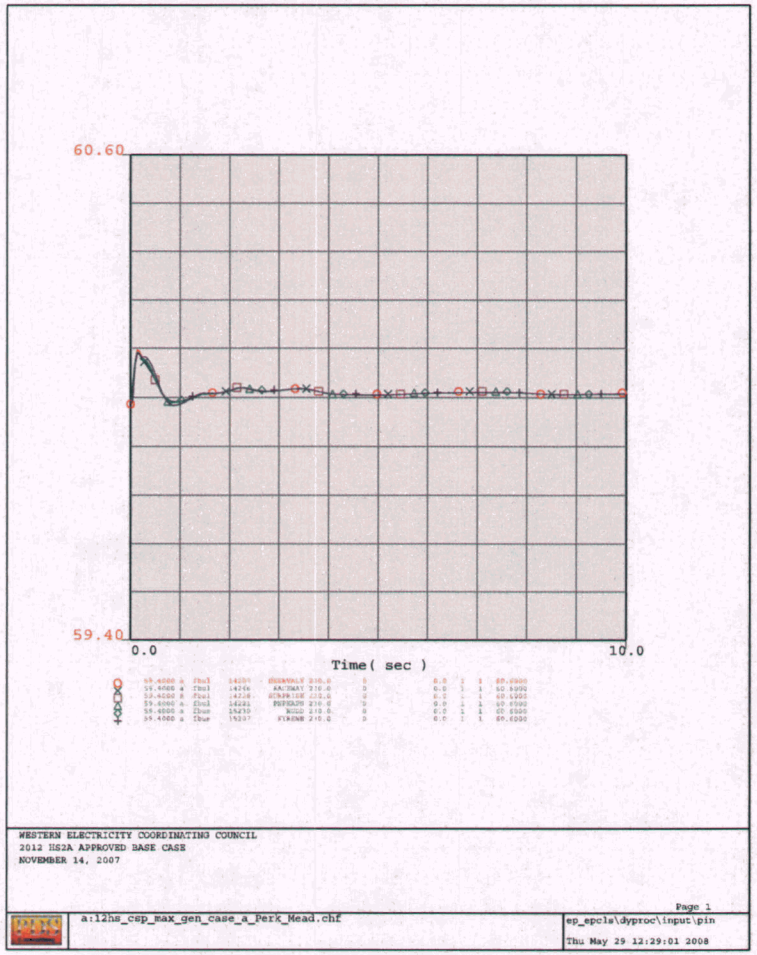
Post-Project, PV Gen Max Case A
Palo Verde-Westwing 500 kV line outage
Transient Frequency Plots



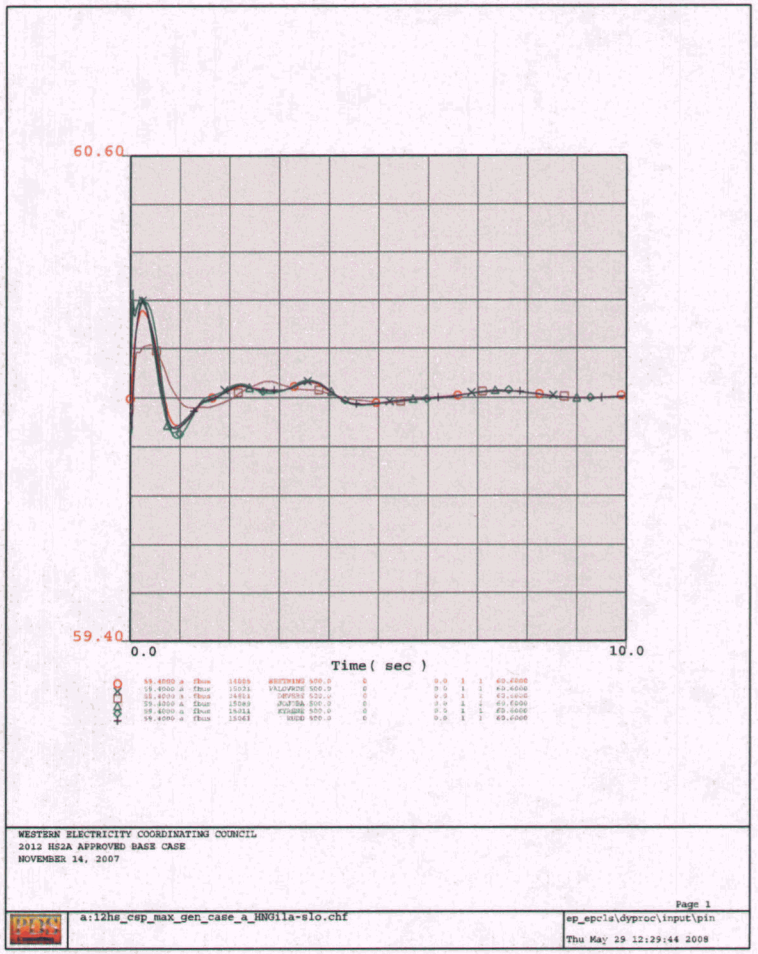
Post-Project, PV Gen Max Case A
Perkins-Mead 500 kV line outage
Transient Frequency Plots



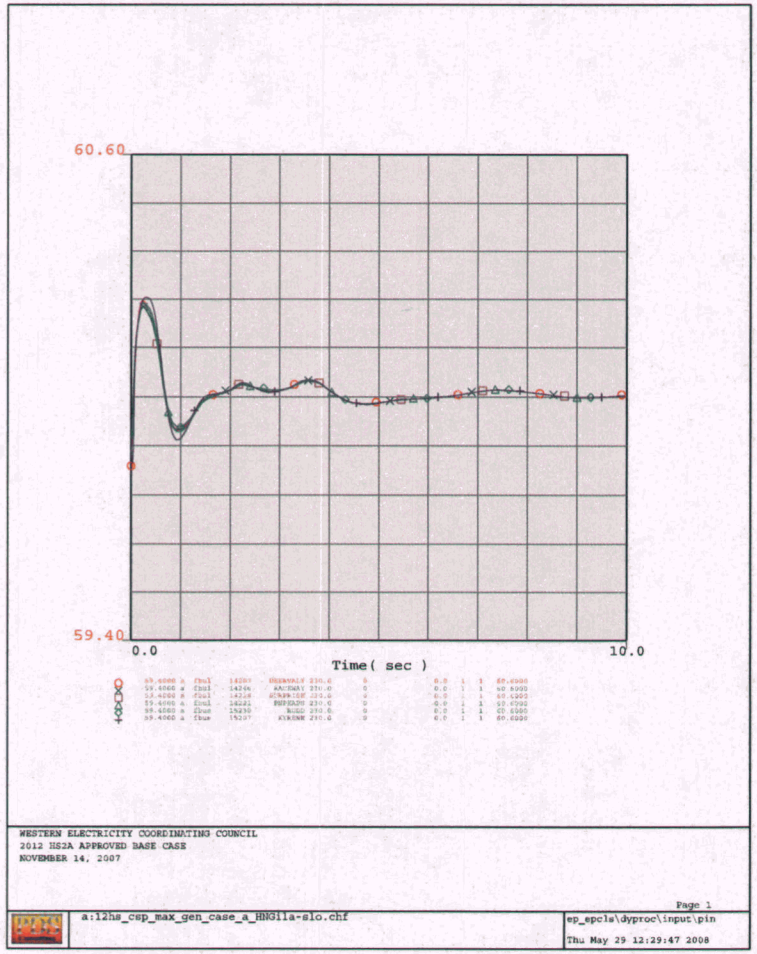
Post-Project, PV Gen Max Case A
Perkins-Mead 500 kV line outage
Transient Frequency Plots



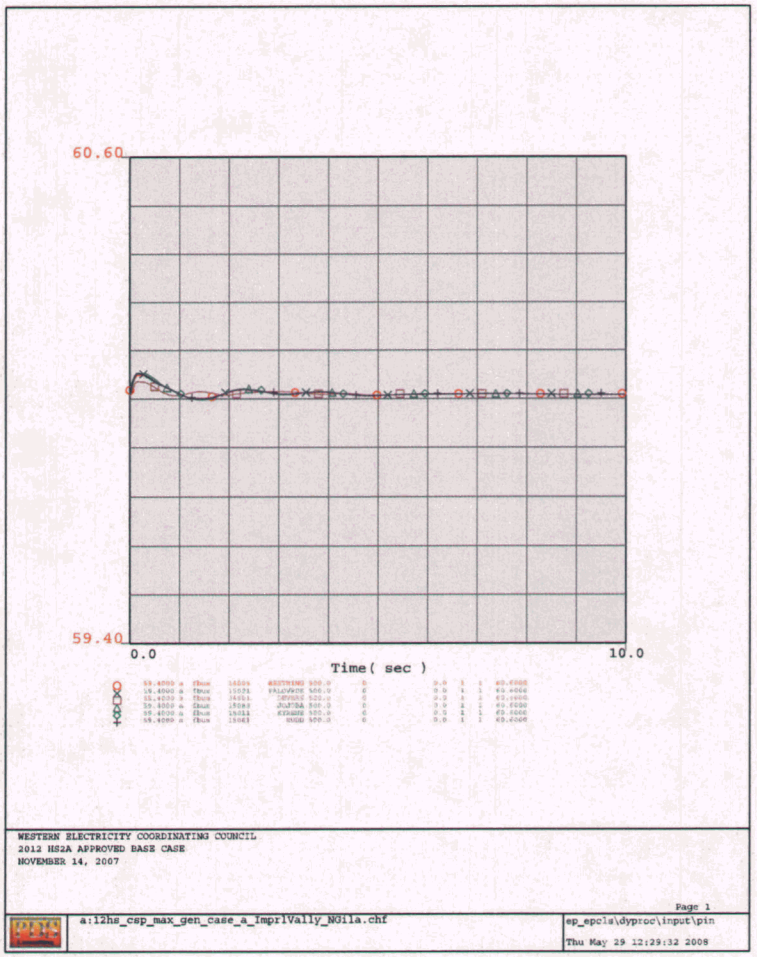
Post-Project, PV Gen Max Case A
Hassayampa -N. Gila 500 kV line outage
Transient Frequency Plots



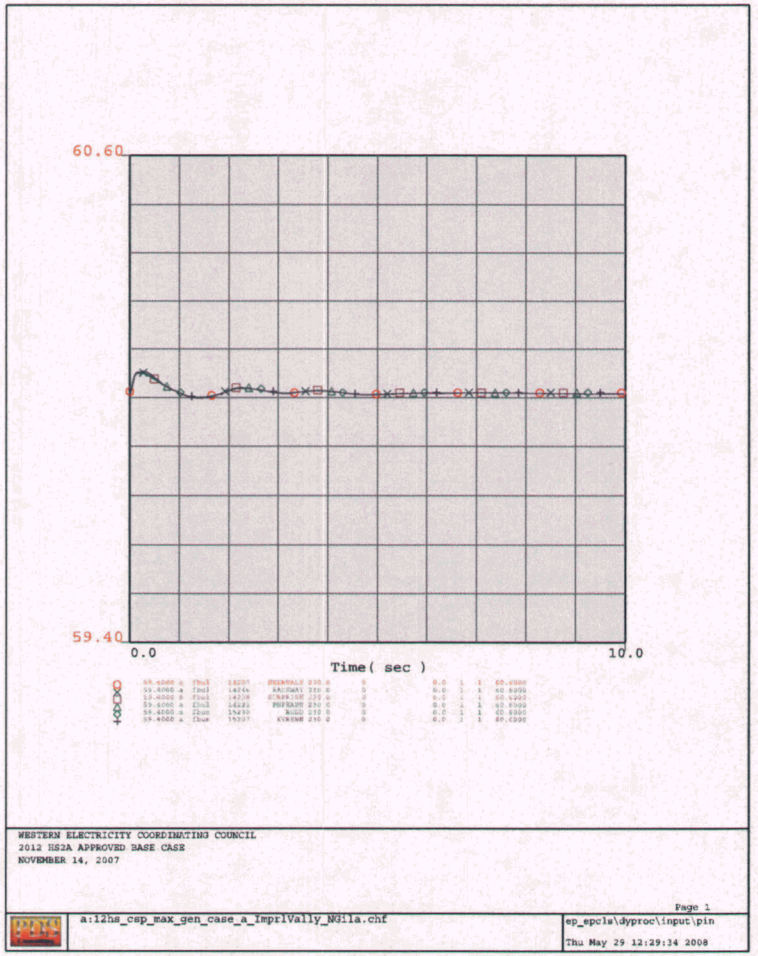
Post-Project, PV Gen Max Case A
Hassayampa -N. Gila 500 kV line outage
Transient Frequency Plots



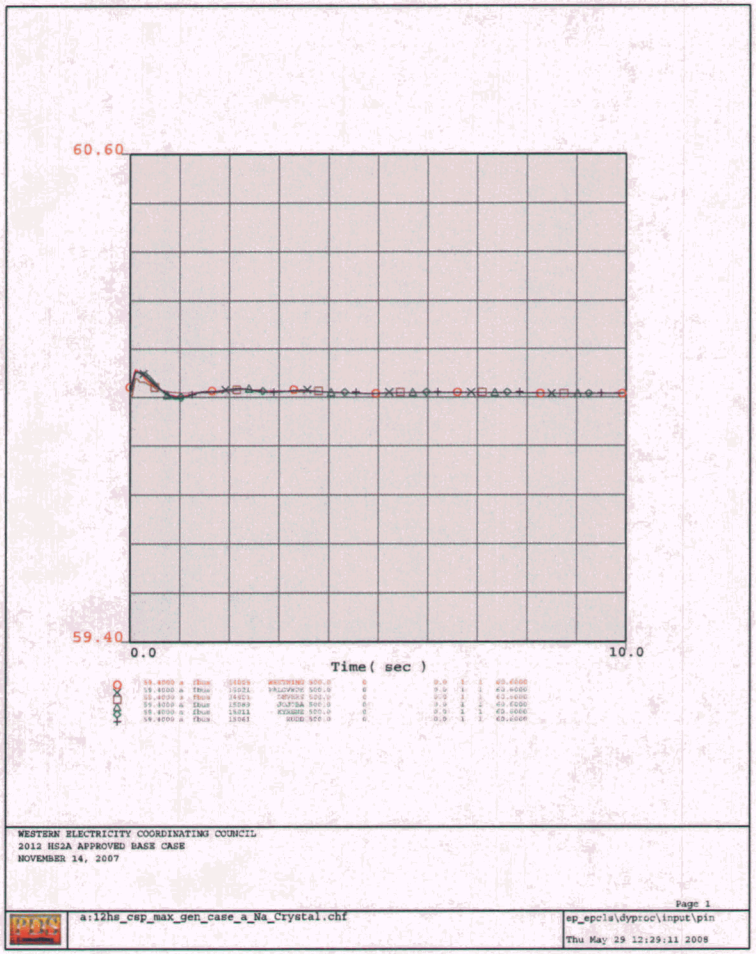
Post-Project, PV Gen Max Case A
N. Gila-Imperial Valley 500 kV line outage
Transient Frequency Plots



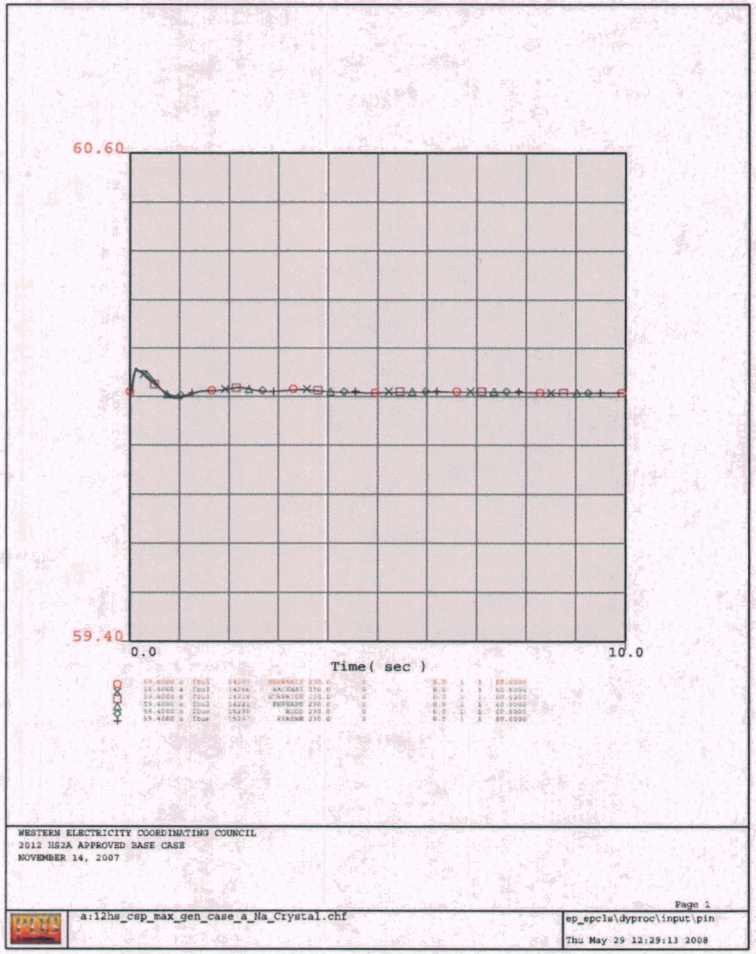
Post-Project, PV Gen Max Case A
N. Gila-Imperial Valley 500 kV line outage
Transient Frequency Plots



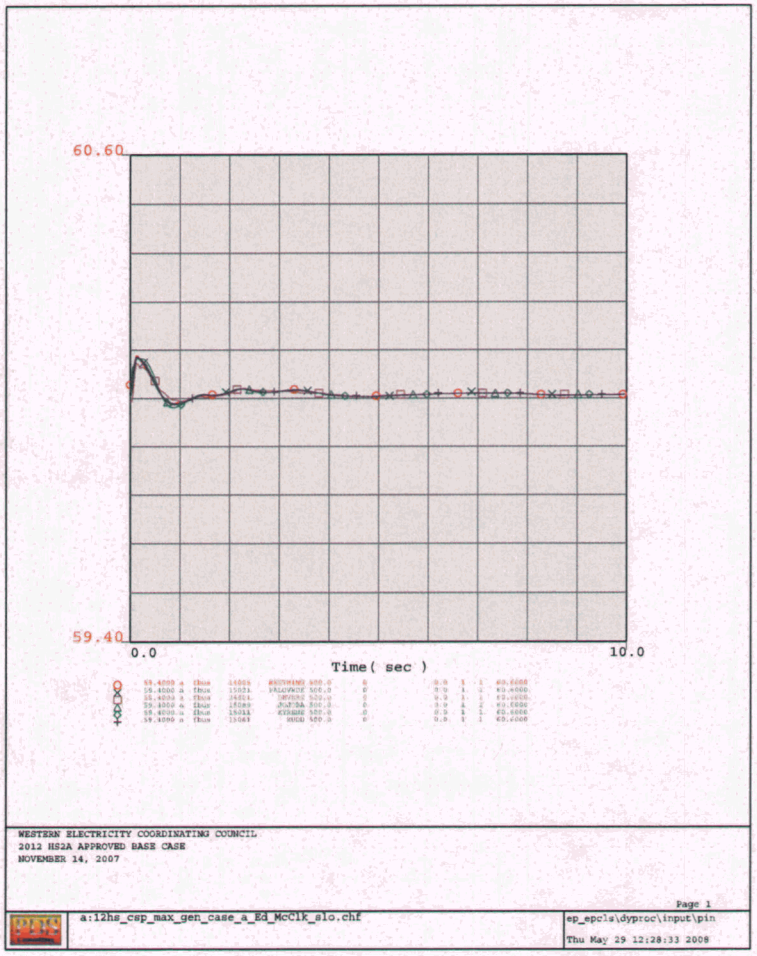
Post-Project, PV Gen Max Case A
Navajo-Crystal 500 kV line
Transient Frequency Plots



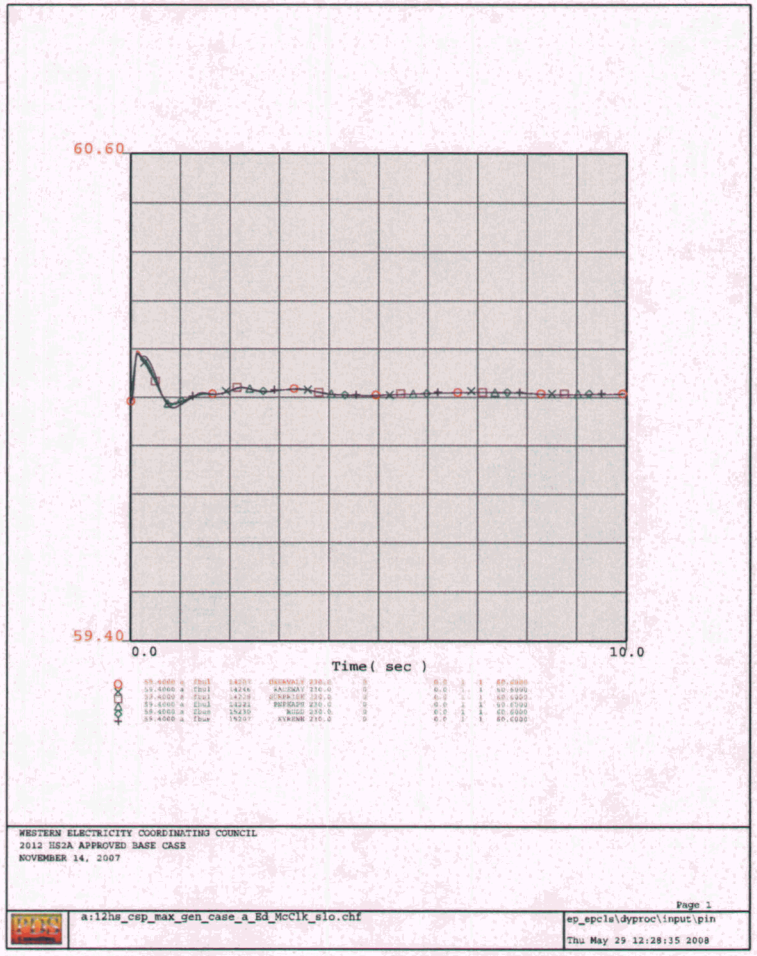
Post-Project, PV Gen Max Case A
Navajo-Crystal 500 kV line
Transient Frequency Plots



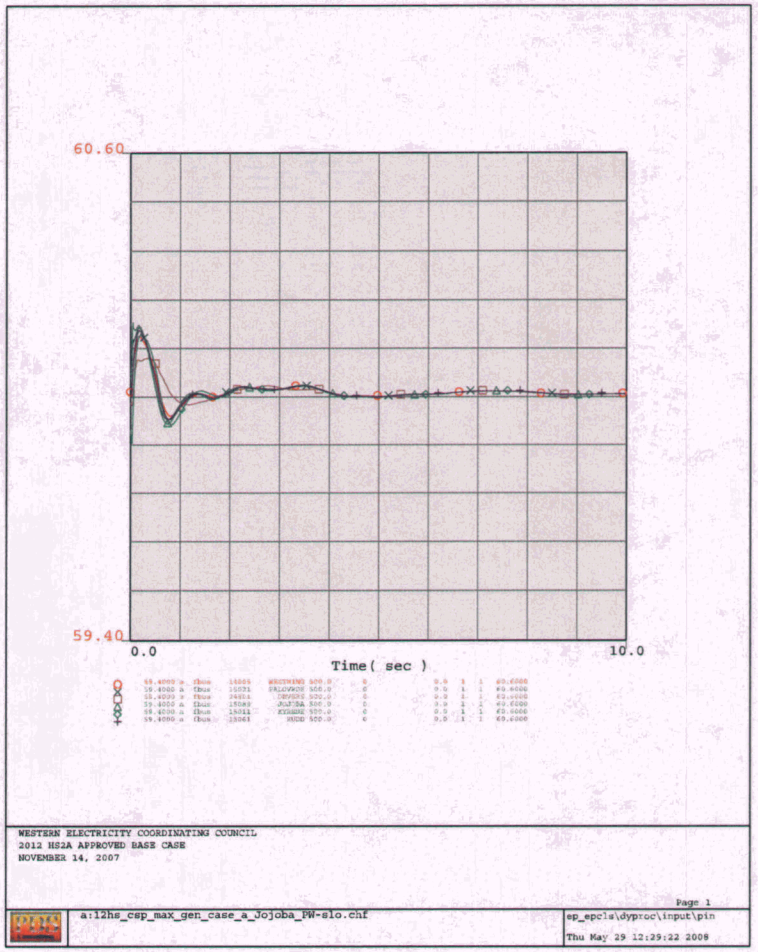
Post-Project, PV Gen Max Case A
El Dorado-McCullough 500 kV line outage
Transient Frequency Plots



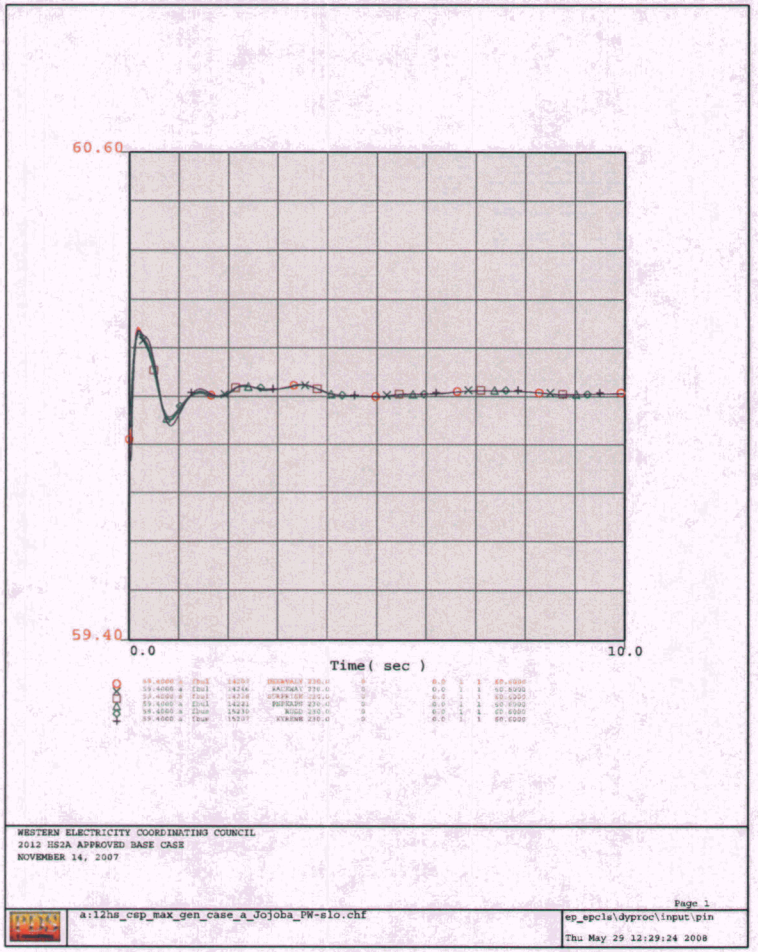
Post-Project, PV Gen Max Case A
El Dorado-McCullough 500 kV line outage
Transient Frequency Plots



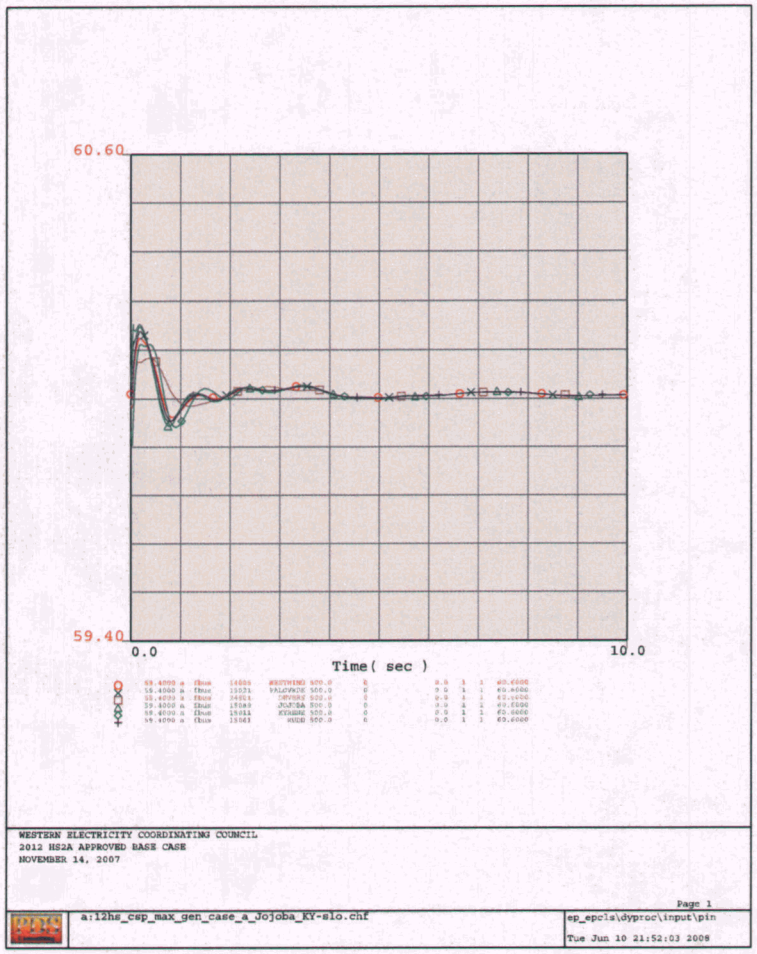
Post-Project, PV Gen Max Case A
Jojoba-Pinal West 500 kV line outage
Transient Frequency Plots



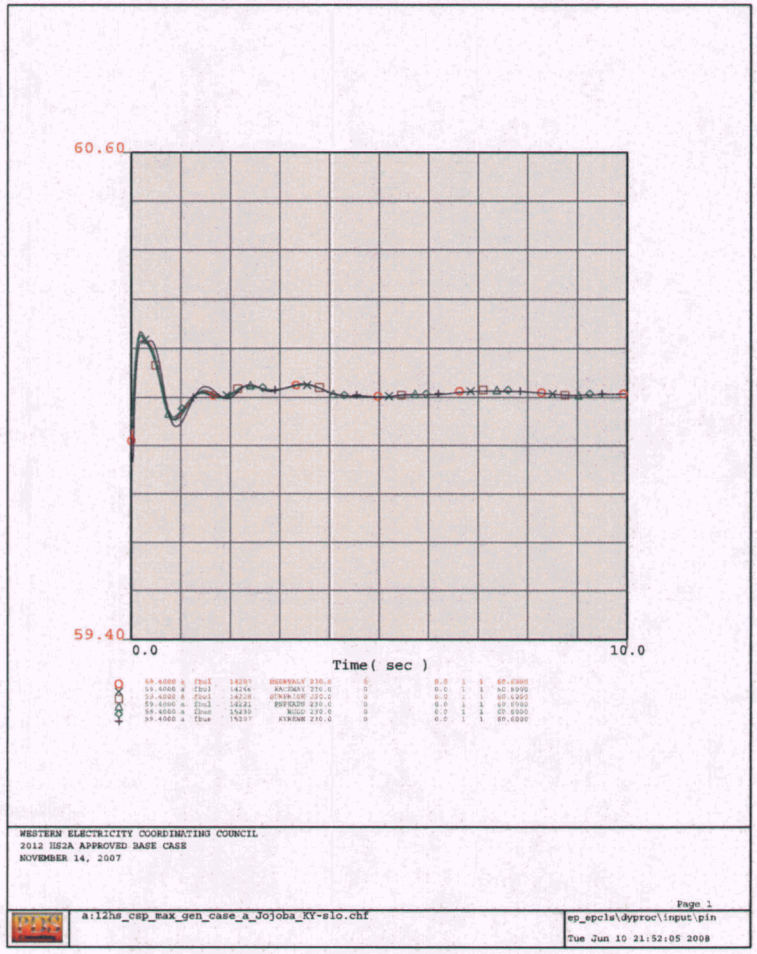
Post-Project, PV Gen Max Case A
Jojoba-Pinal West 500 kV line outage
Transient Frequency Plots



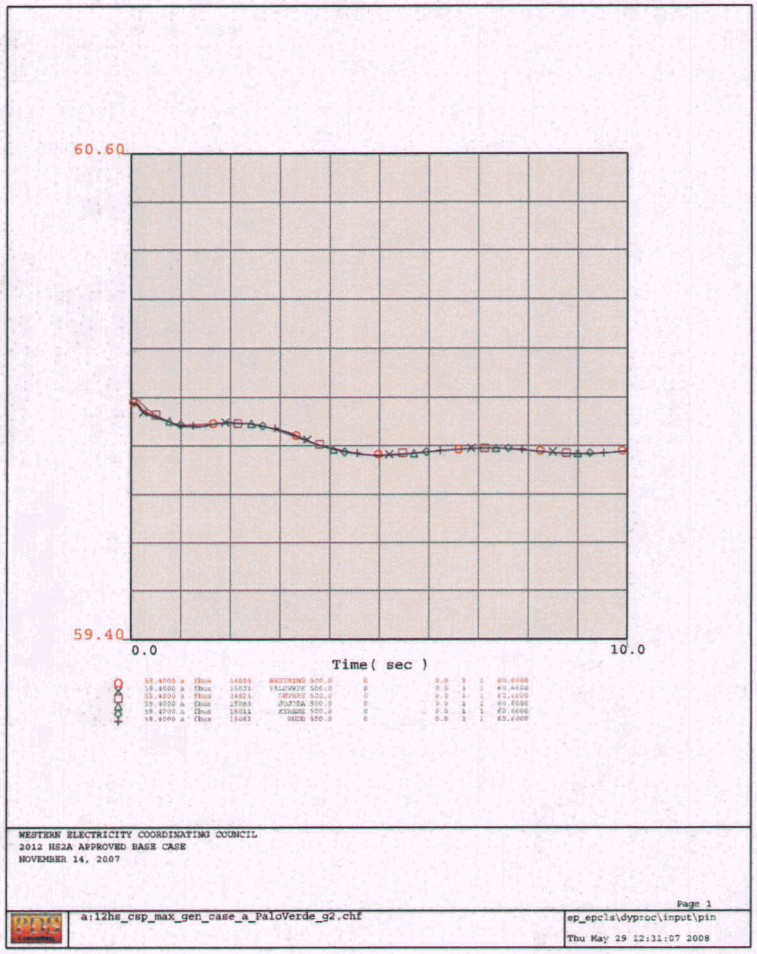
Post-Project, PV Gen Max Case A
Jojoba-Kyrene 500 kV line outage
Transient Frequency Plots



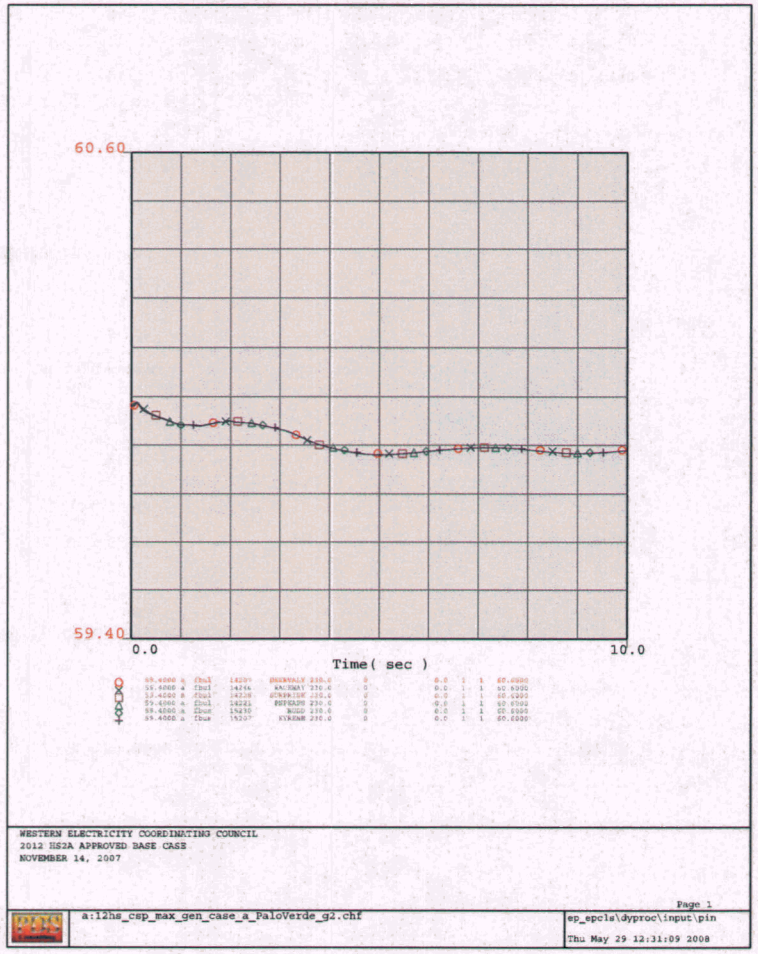
Post-Project, PV Gen Max Case A
Jojoba-Kyrene 500 kV line outage
Transient Frequency Plots



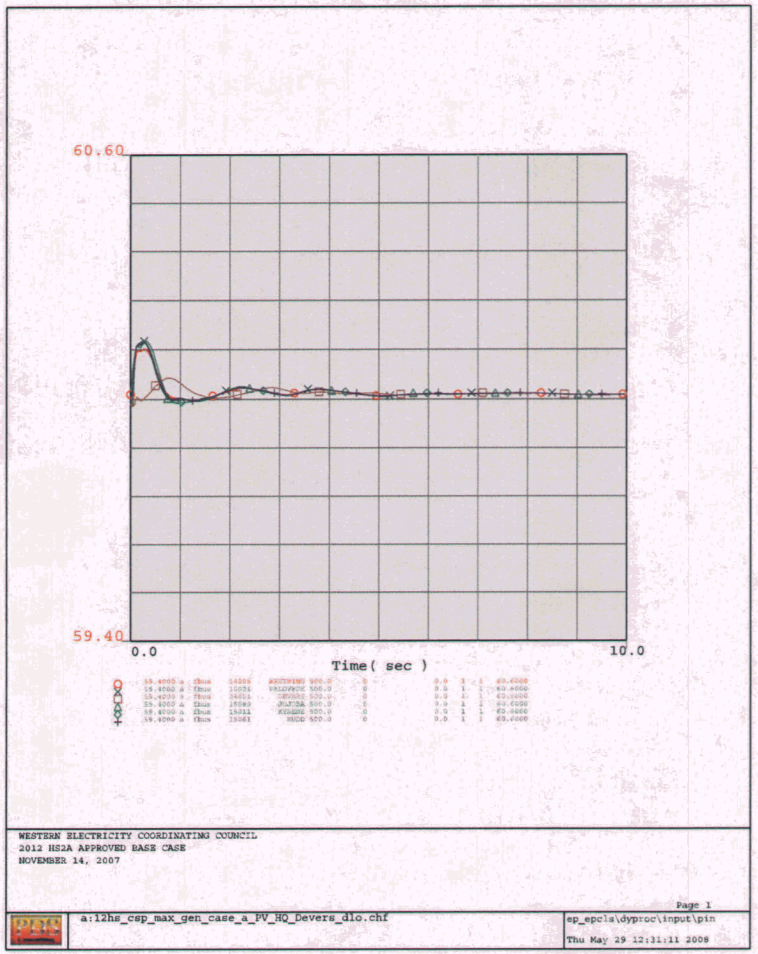
Post-Project, PV Gen Max Case A
Palo Verde G-2 outage
Transient Frequency Plots



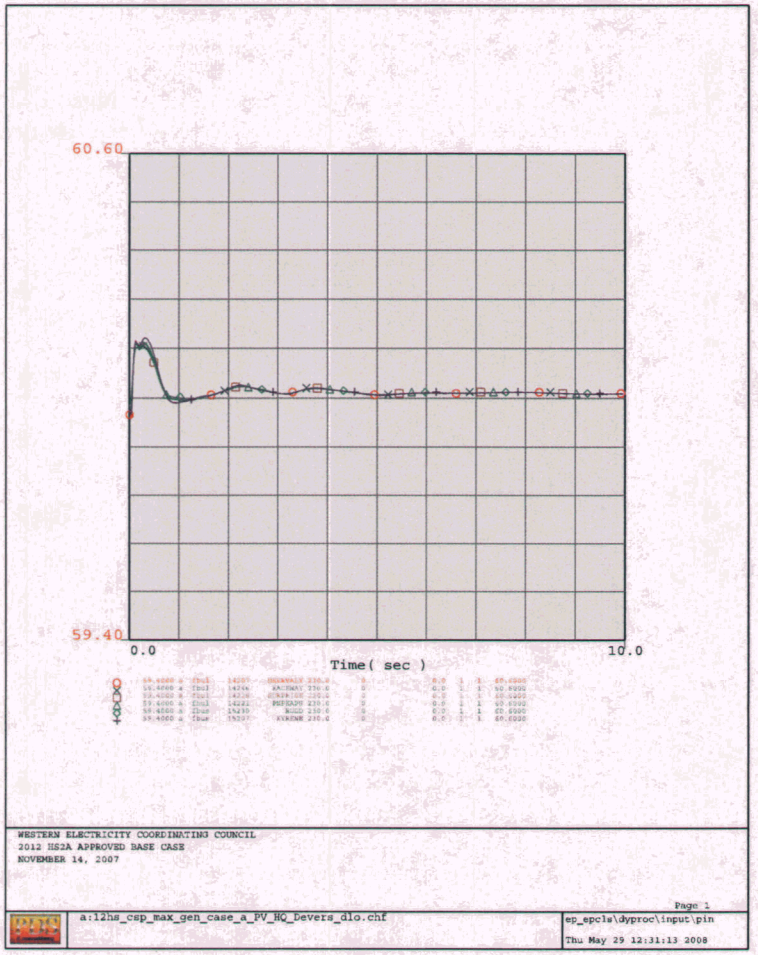
Post-Project, PV Gen Max Case A
Palo Verde G-2 outage
Transient Frequency Plots



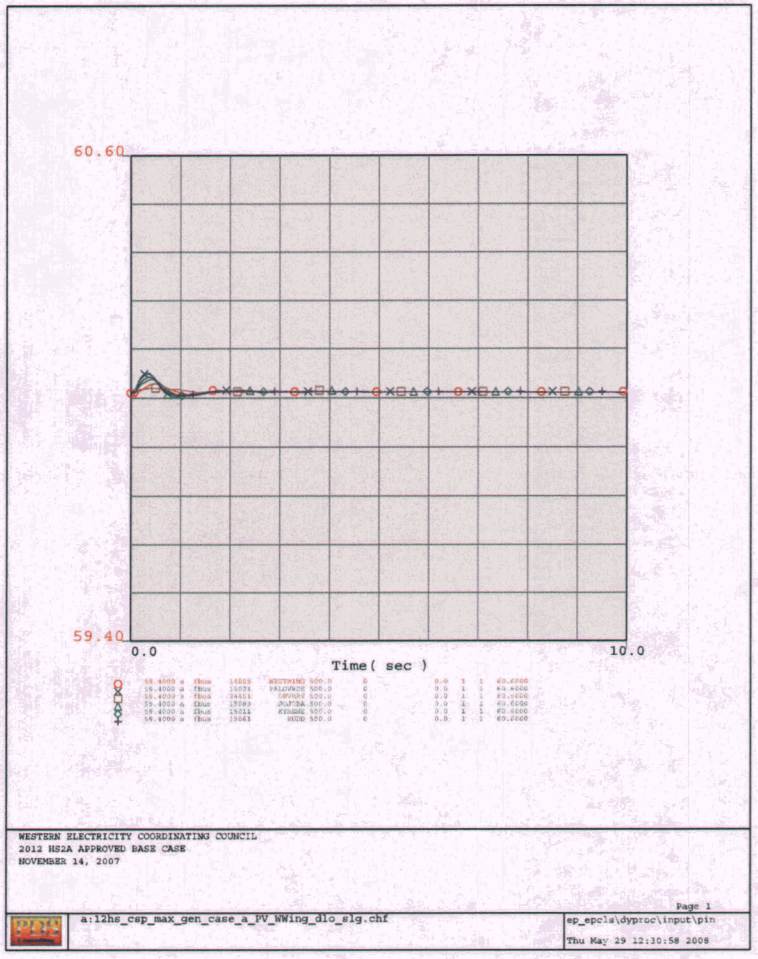
Post-Project, PV Gen Max Case A
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Frequency Plots



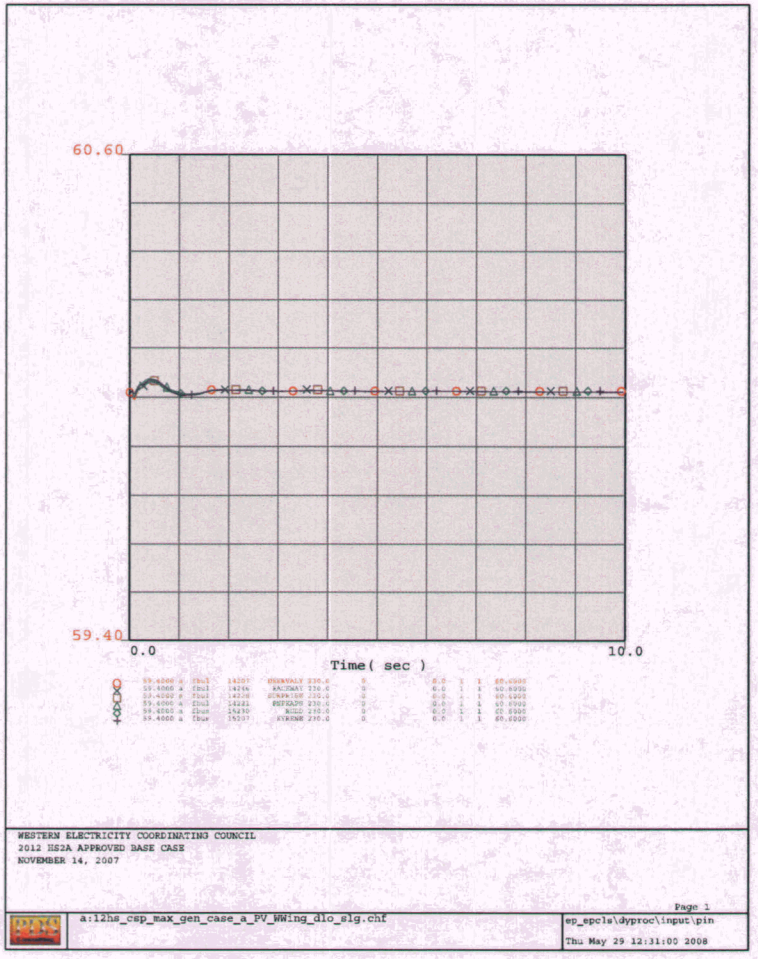
Post-Project, PV Gen Max Case A
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Frequency Plots



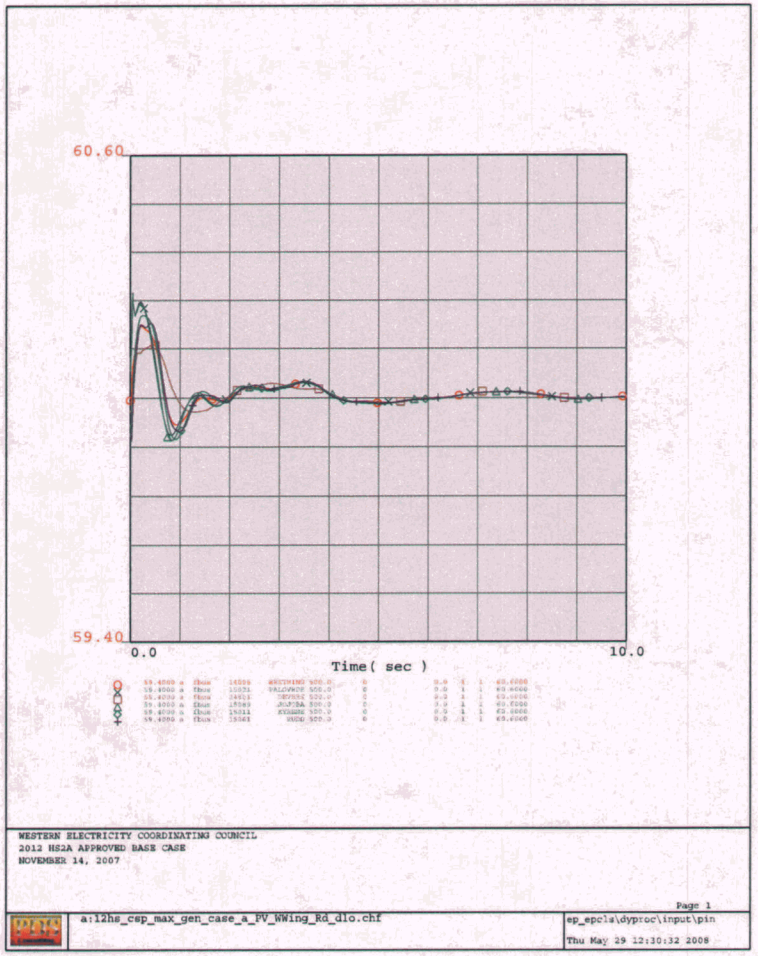
Post-Project, PV Gen Max Case A
PV-Westwing #1 & 2 500 kV lines outage
Transient Frequency Plots



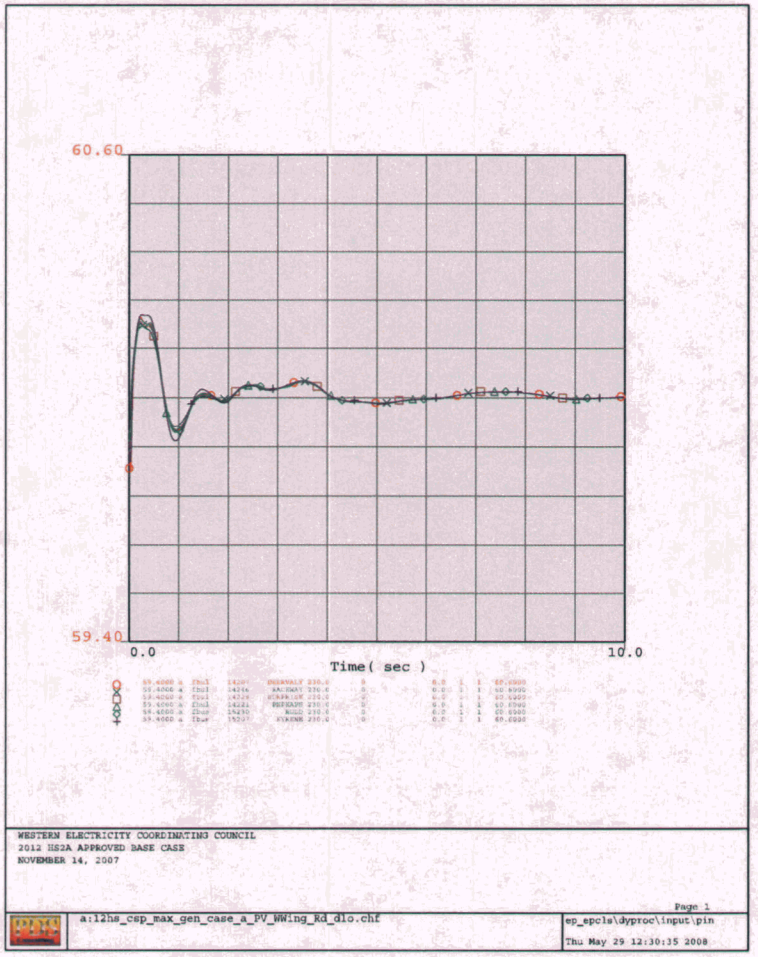
Post-Project, PV Gen Max Case A
PV-Westwing #1 & 2 500 kV lines outage
Transient Frequency Plots



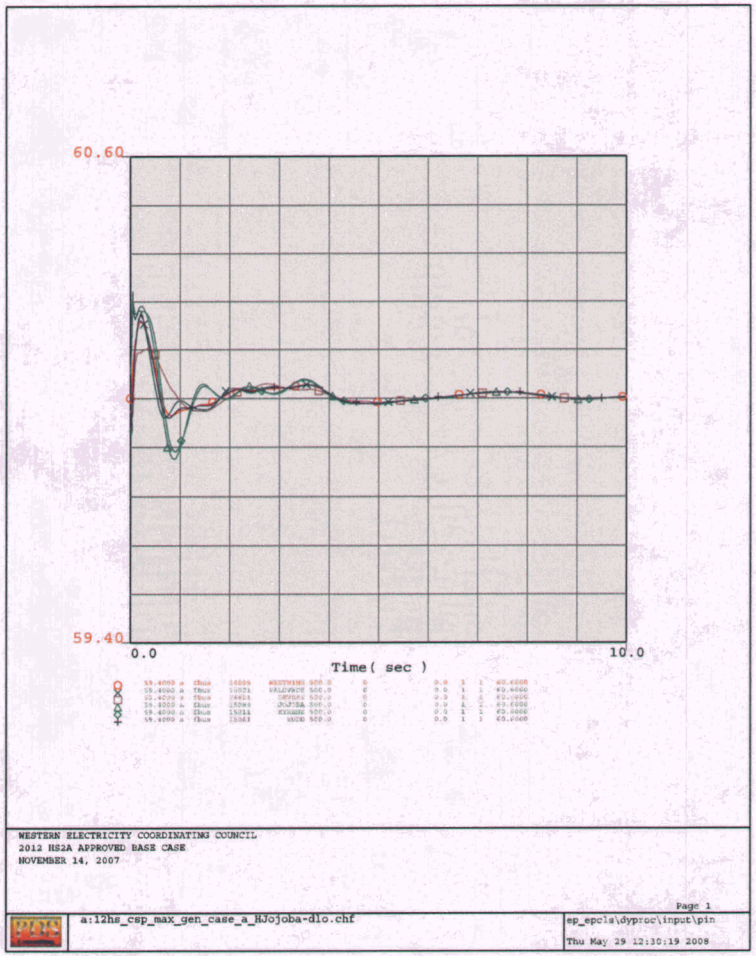
Post-Project, PV Gen Max Case A
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Frequency Plots



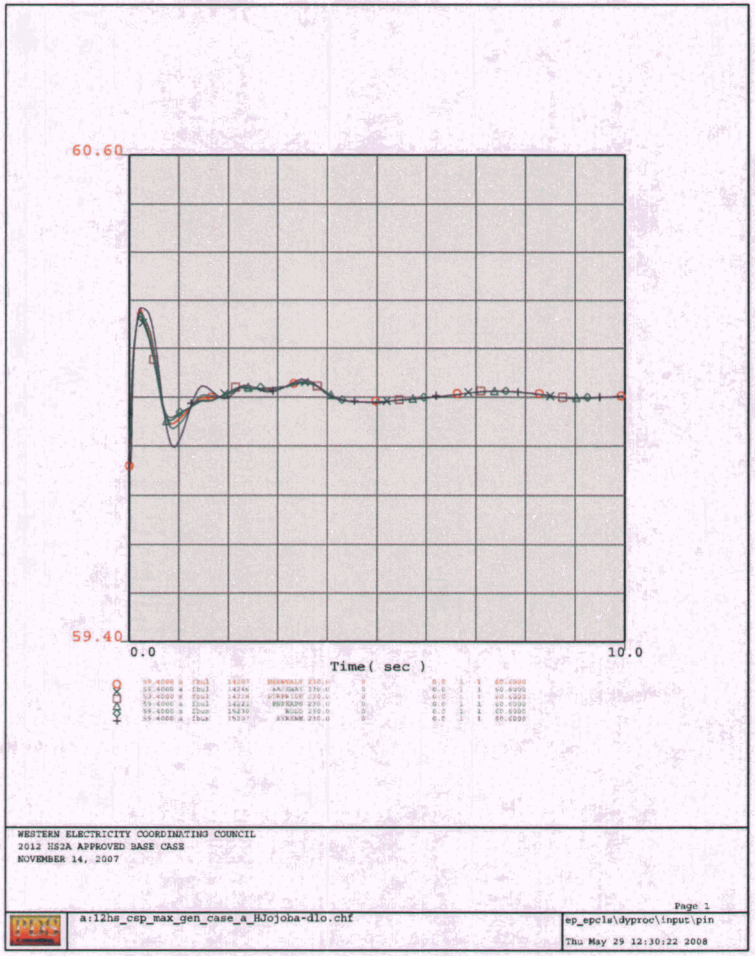
Post-Project, PV Gen Max Case A
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Frequency Plots



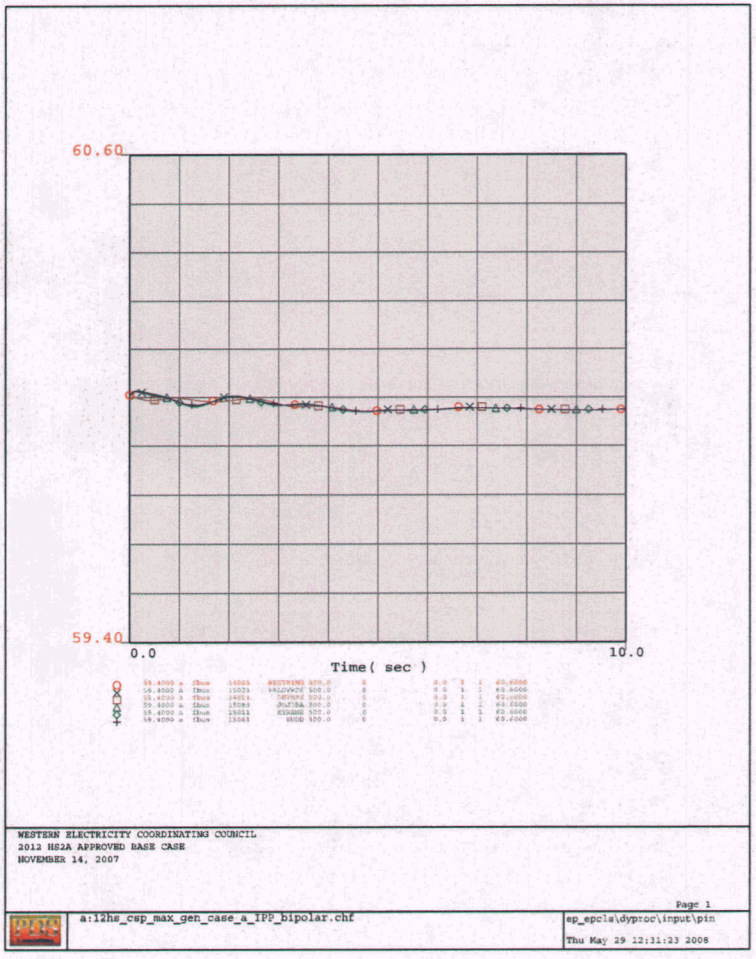
Post-Project, PV Gen Max Case A
Hassayampa-Jojoba #1 & 2 500 kV lines outage
Transient Frequency Plots



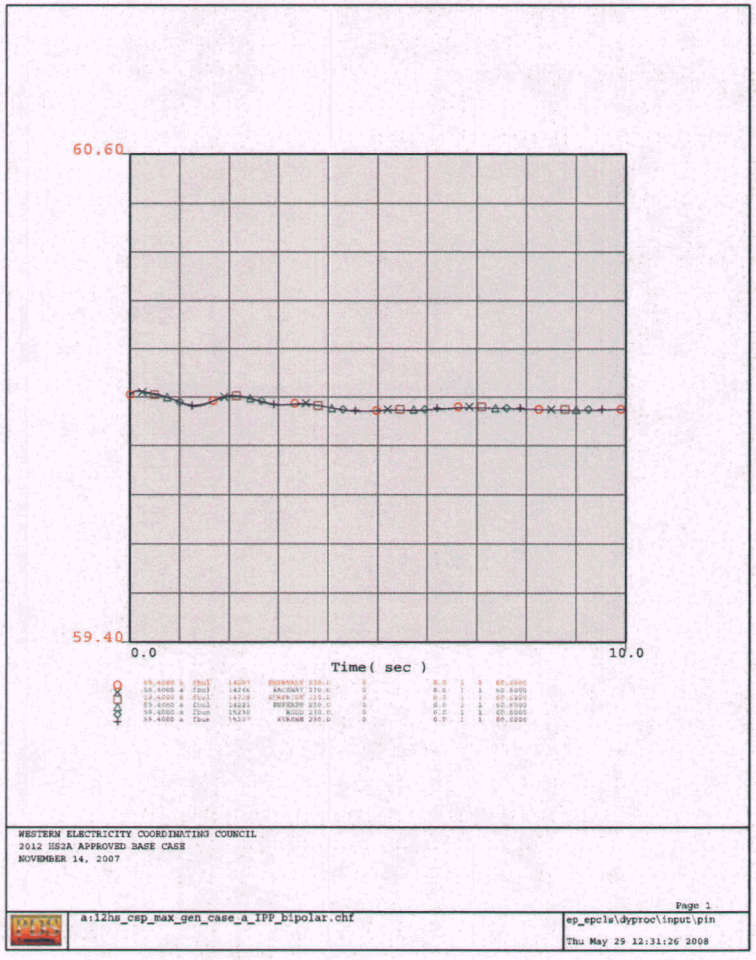
Post-Project, PV Gen Max Case A
Hassayampa-Jojoba #1 & 2 500 kV lines outage
Transient Frequency Plots



Post-Project, PV Gen Max Case A
IPP Bipole outage
Transient Frequency Plots



Post-Project, PV Gen Max Case A
IPP Bipole outage
Transient Frequency Plots



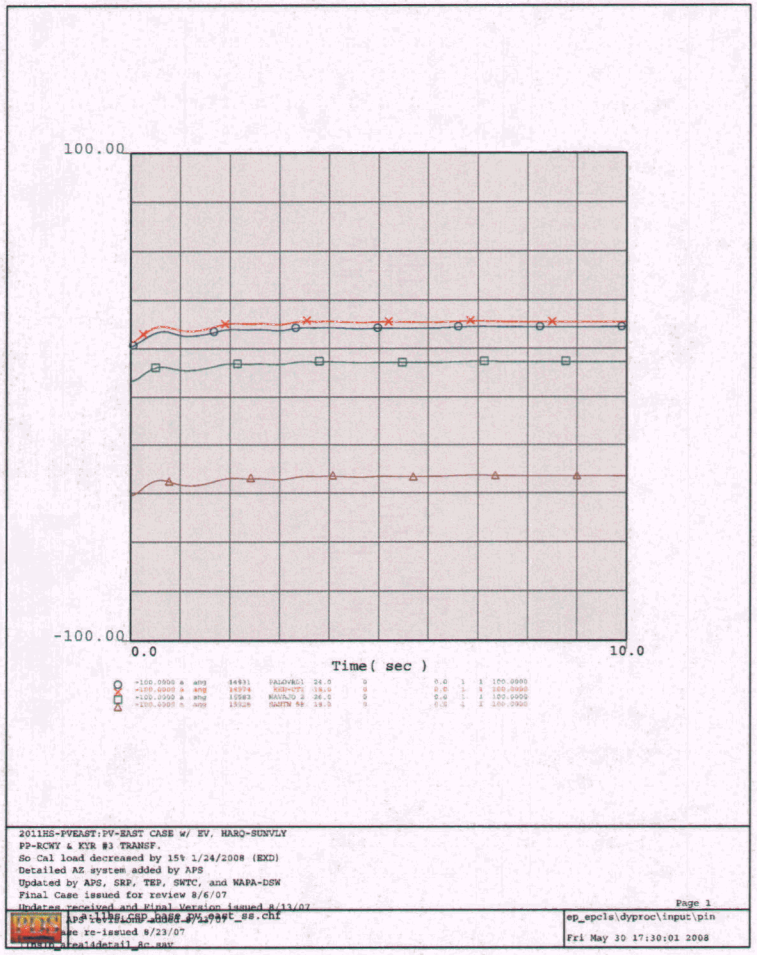
BUCKEYE CSP

Generator Interconnection Study

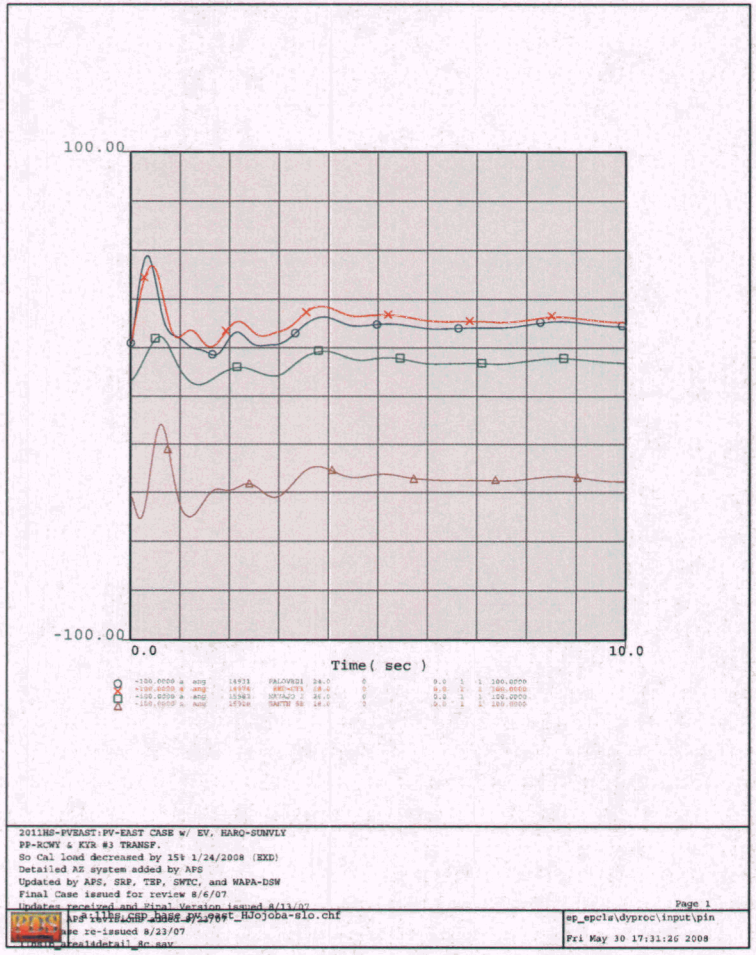
Attachment B

Transient Stability Plots
(PV East Max Case)

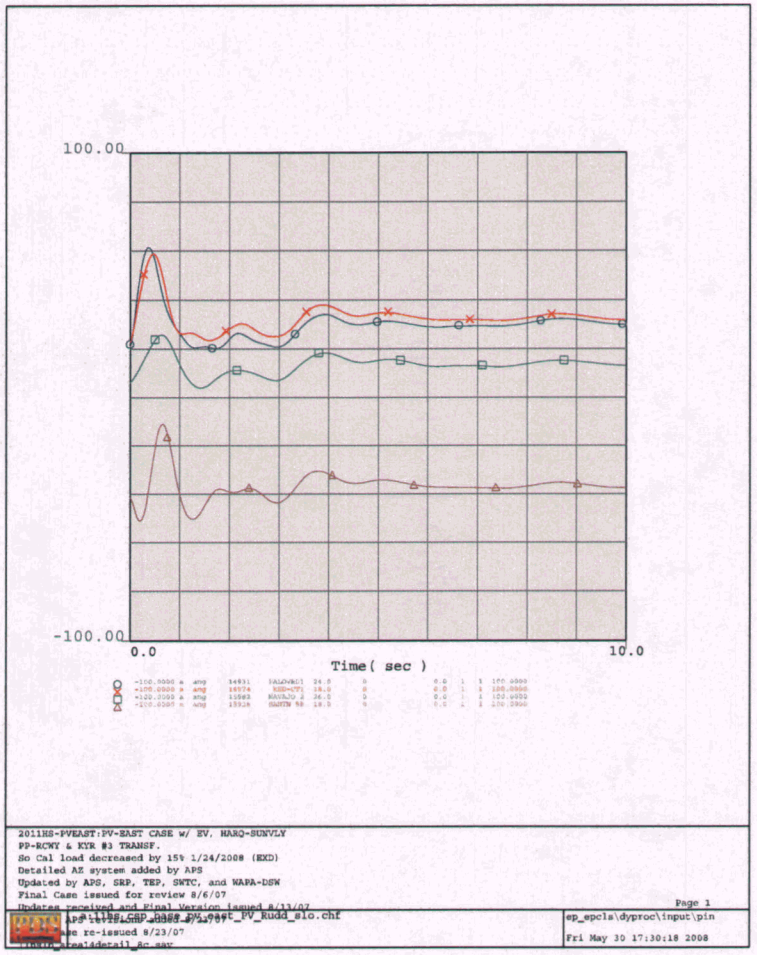
Pre-Project, PV East Max Case
No Outage
Transient Generator Angular Plots



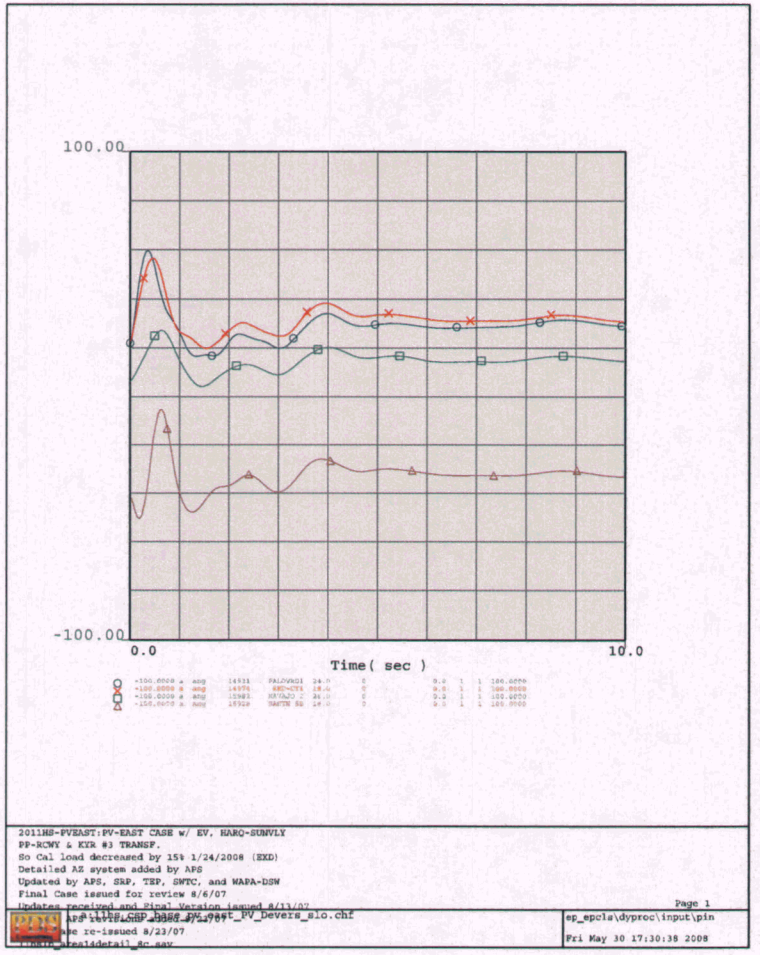
Pre-Project, PV East Max Case
Hassayampa-Jojoba 500 kV line outage
Transient Generator Angular Plots



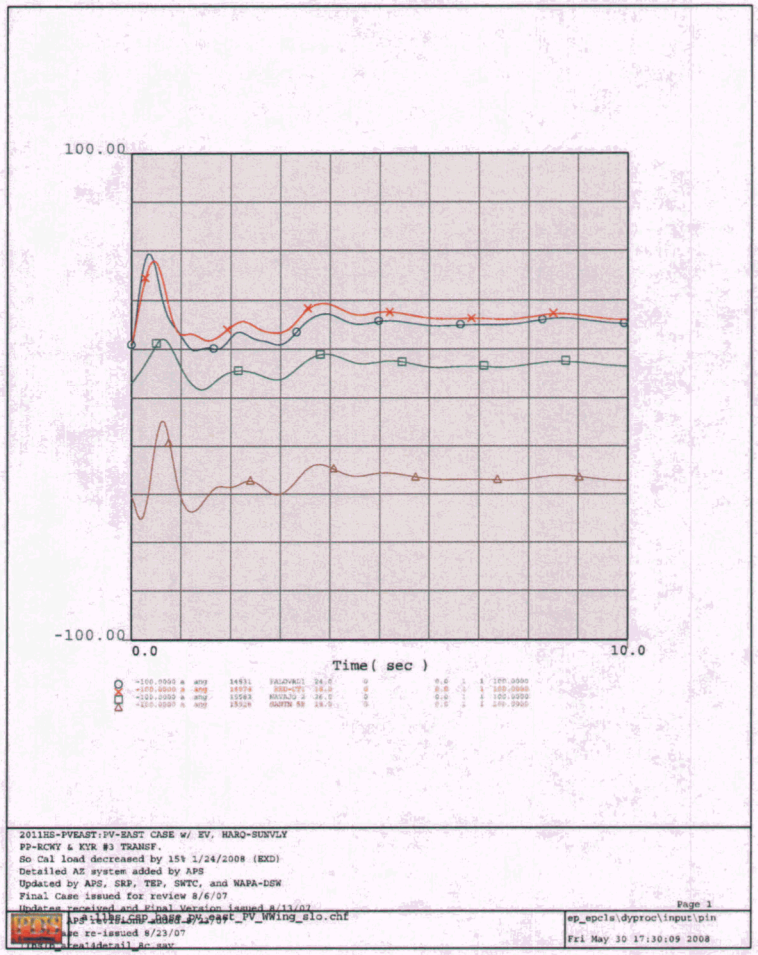
Pre-Project, PV East Max Case
Palo Verde-Rudd 500 kV line outage
Transient Generator Angular Plots



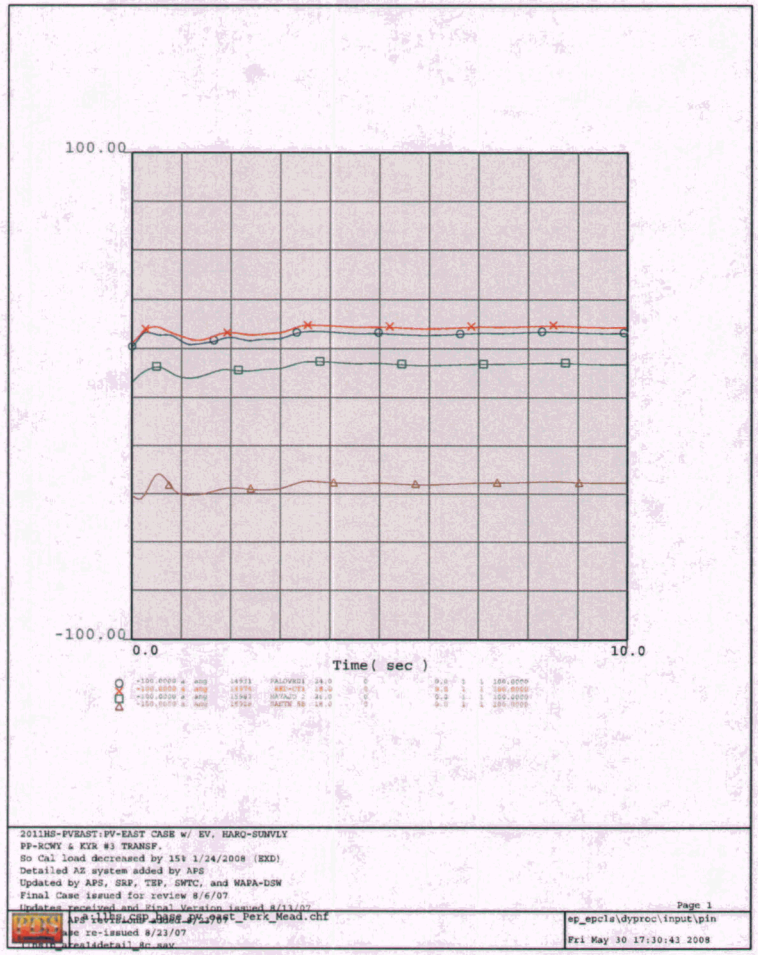
Pre-Project, PV East Max Case
Palo Verde-Devers 500 kV line outage
Transient Generator Angular Plots



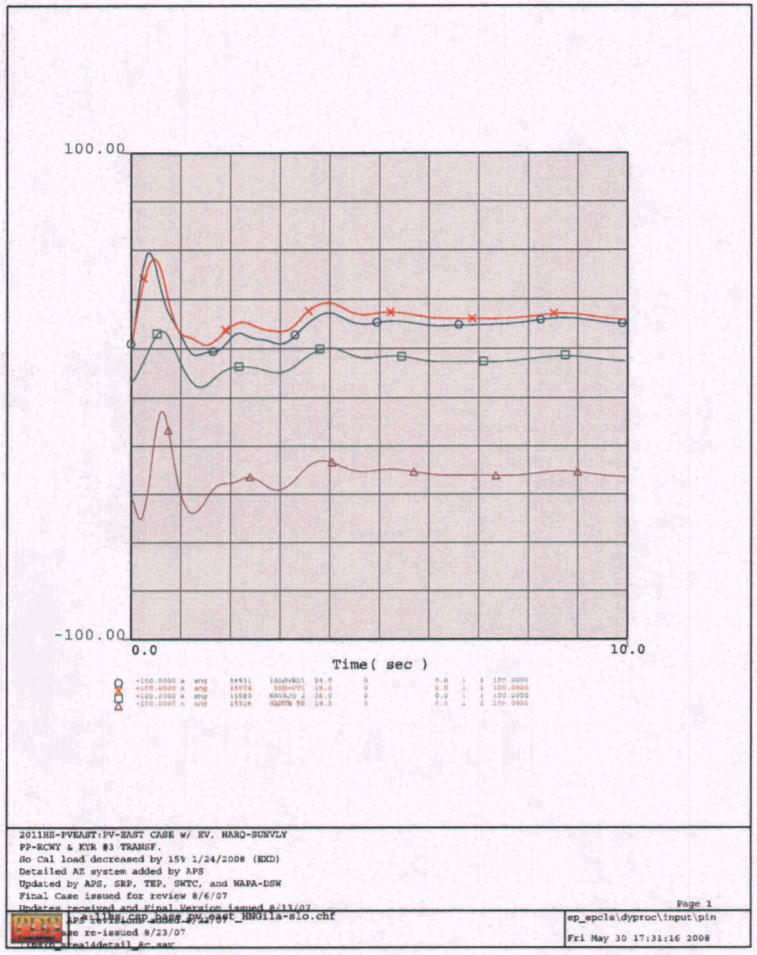
Pre-Project, PV East Max Case
Palo Verde-Westwing 500 kV line outage
Transient Generator Angular Plots



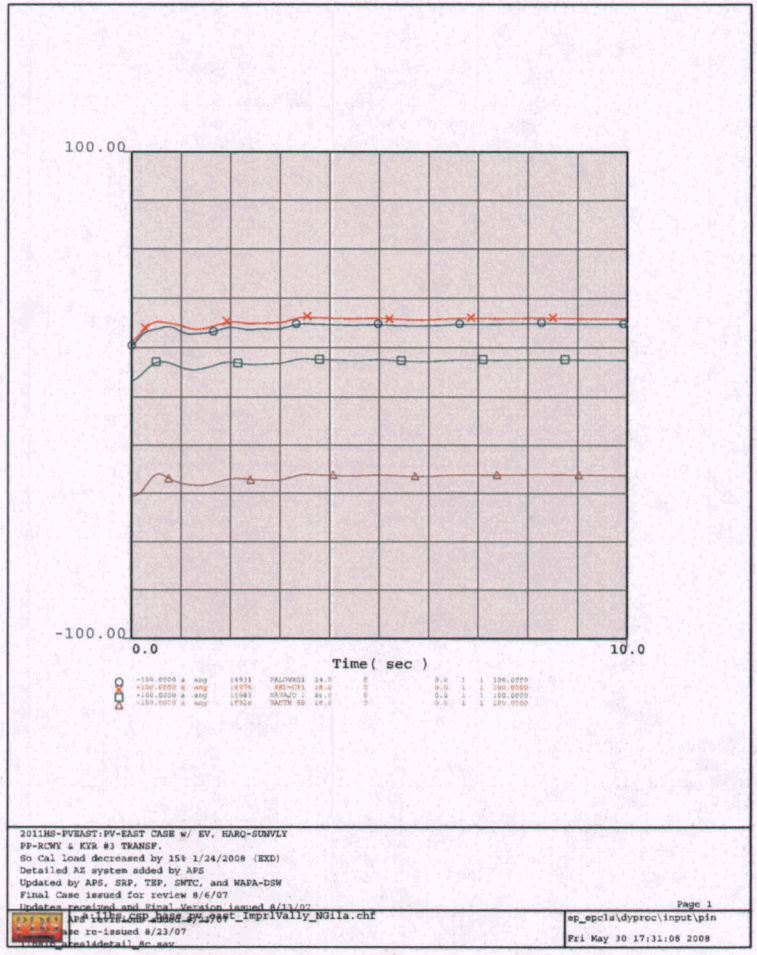
Pre-Project, PV East Max Case
Perkins-Mead 500 kV line outage
Transient Generator Angular Plots



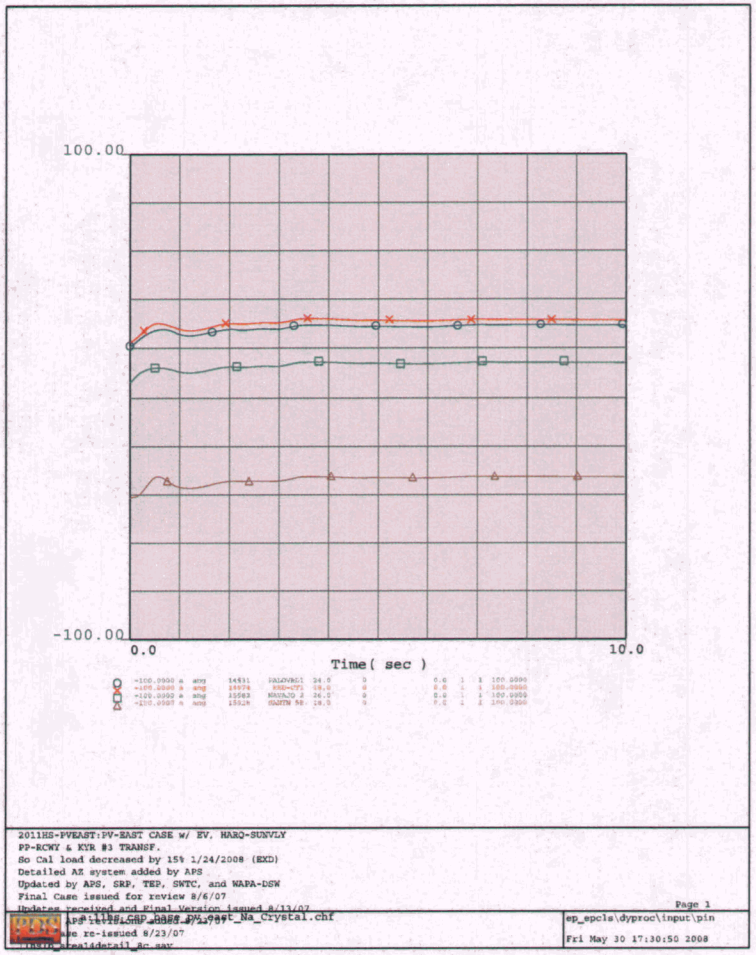
Pre-Project, PV East Max Case
Hassayampa -N. Gila 500 kV line outage
Transient Generator Angular Plots



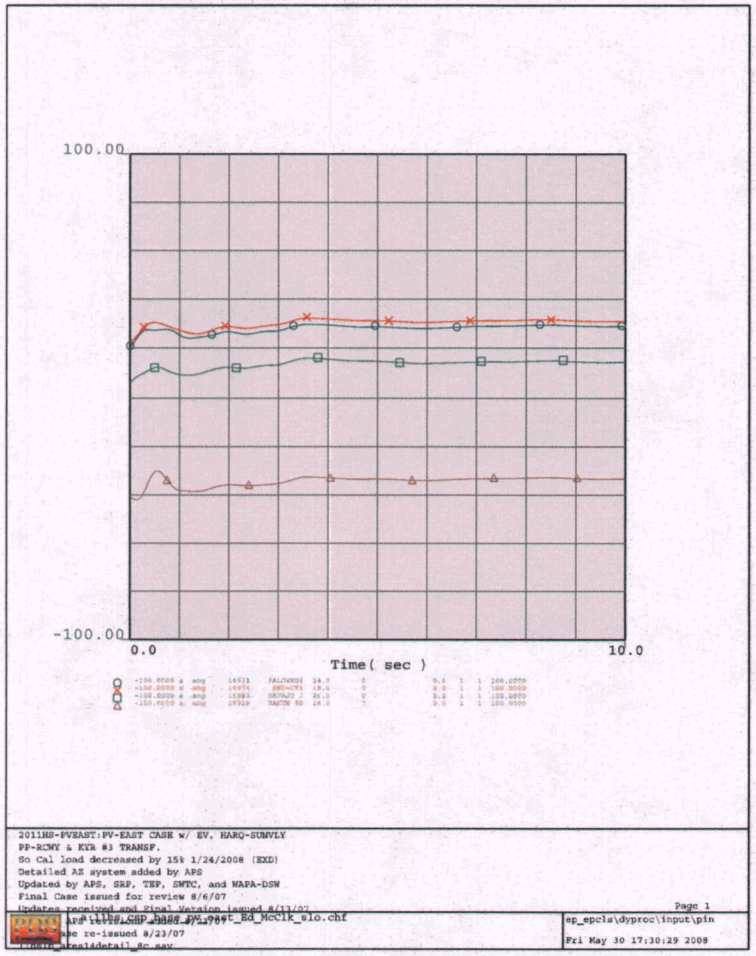
Pre-Project, PV East Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Generator Angular Plots



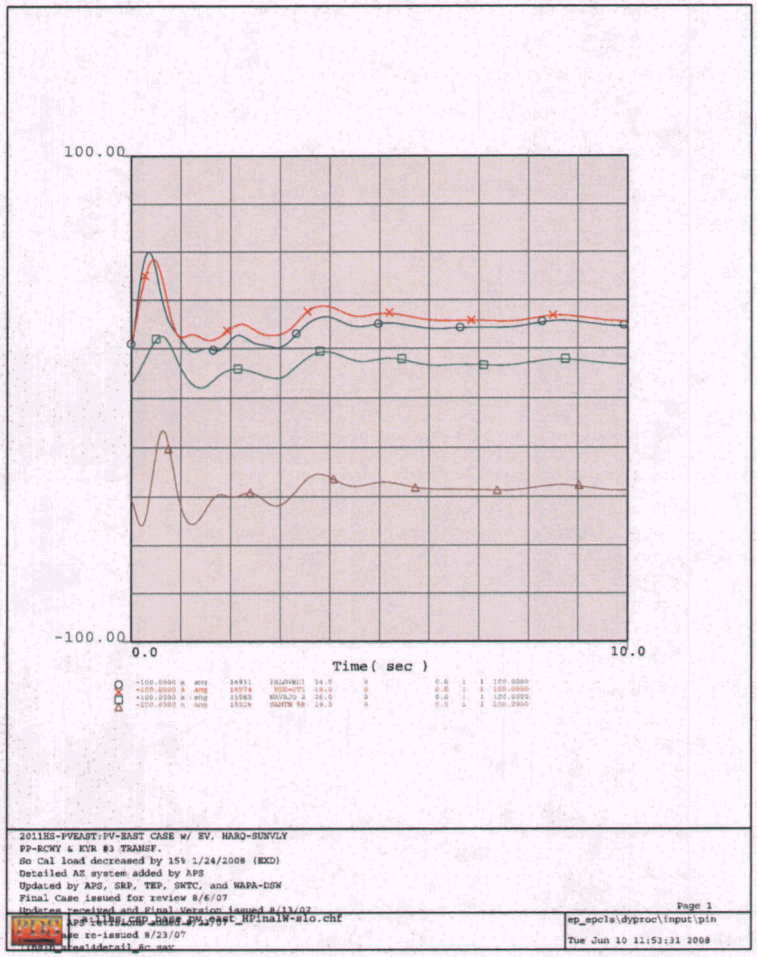
Pre-Project, PV East Max Case
Navajo-Crystal 500 kV line
Transient Generator Angular Plots



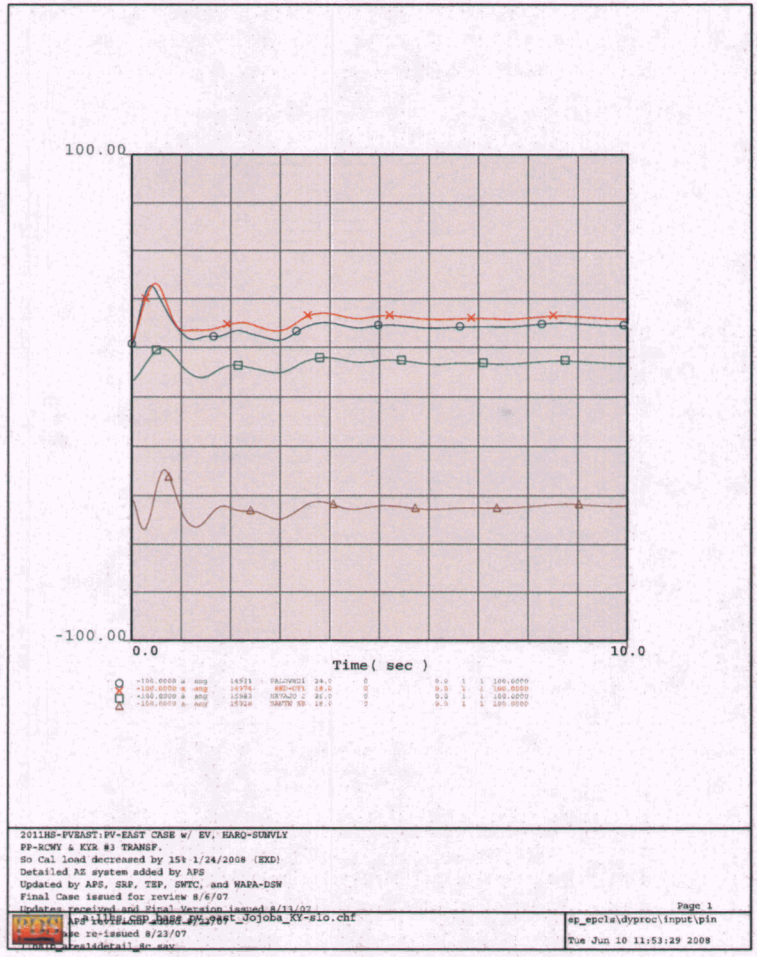
Pre-Project, PV East Max Case
El Dorado-McCullough 500 kV line outage
Transient Generator Angular Plots



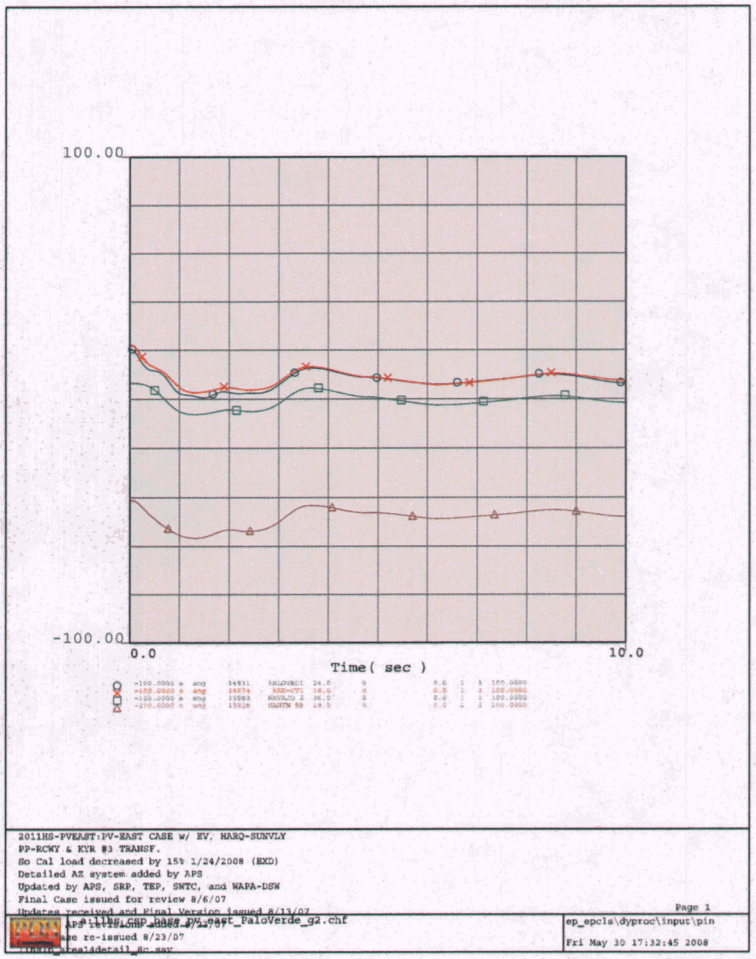
Pre-Project, PV East Max Case
Hassayampa-Pinal West 500 kV line outage
Transient Generator Angular Plots



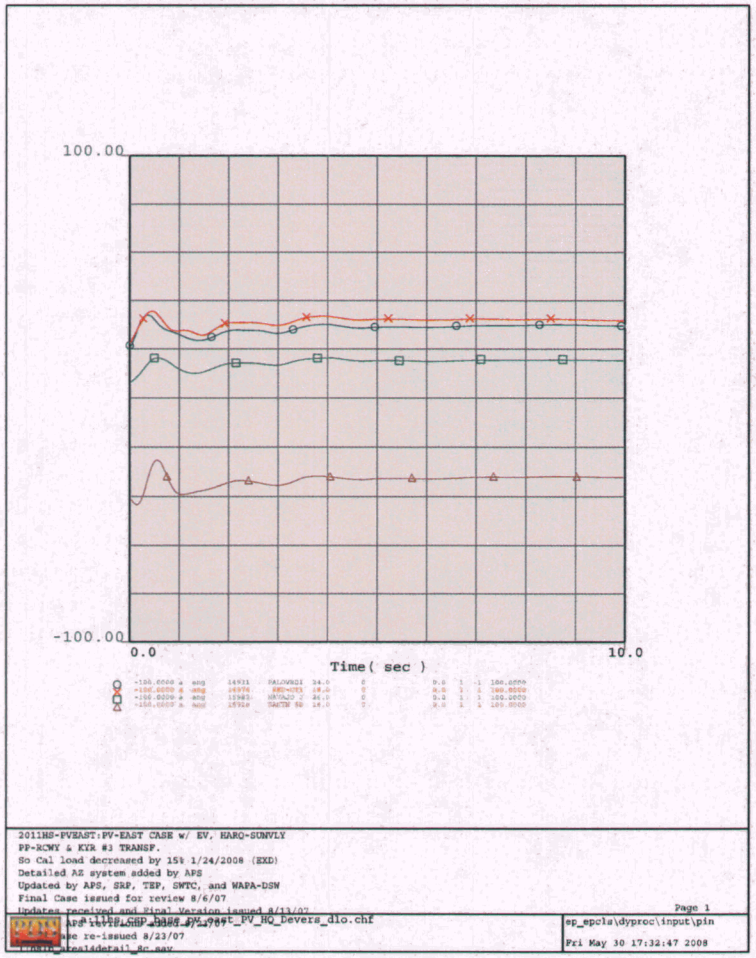
Pre-Project, PV East Max Case
Jojoba-Kyrene 500 kV line outage
Transient Generator Angular Plots



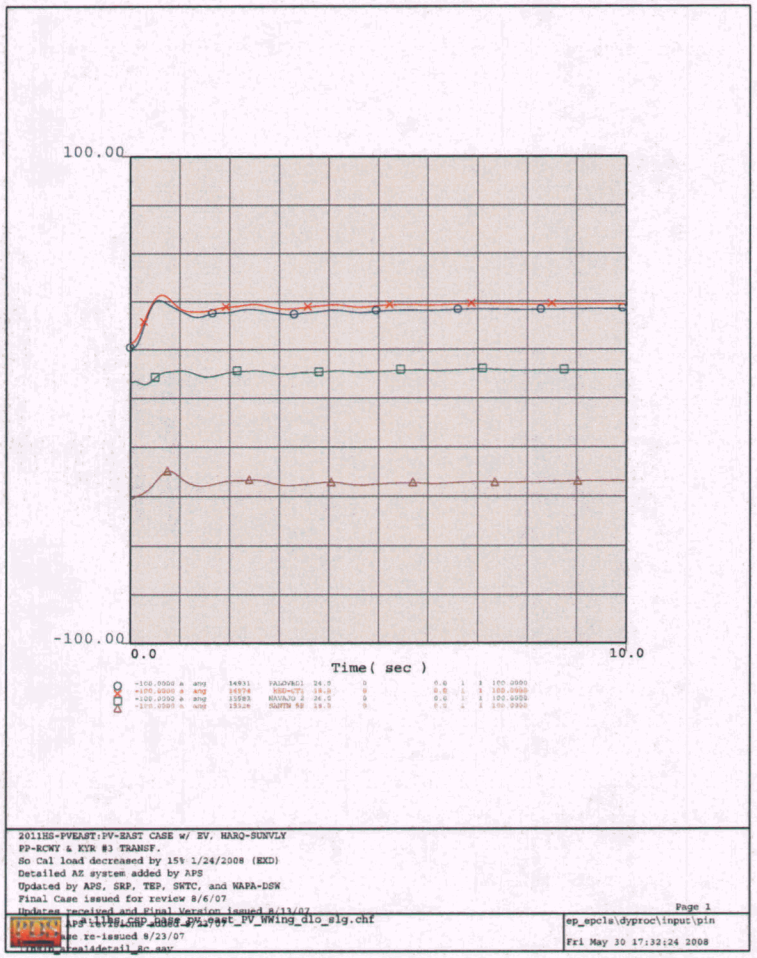
Pre-Project, PV East Max Case
Palo Verde G-2 outage
Transient Generator Angular Plots



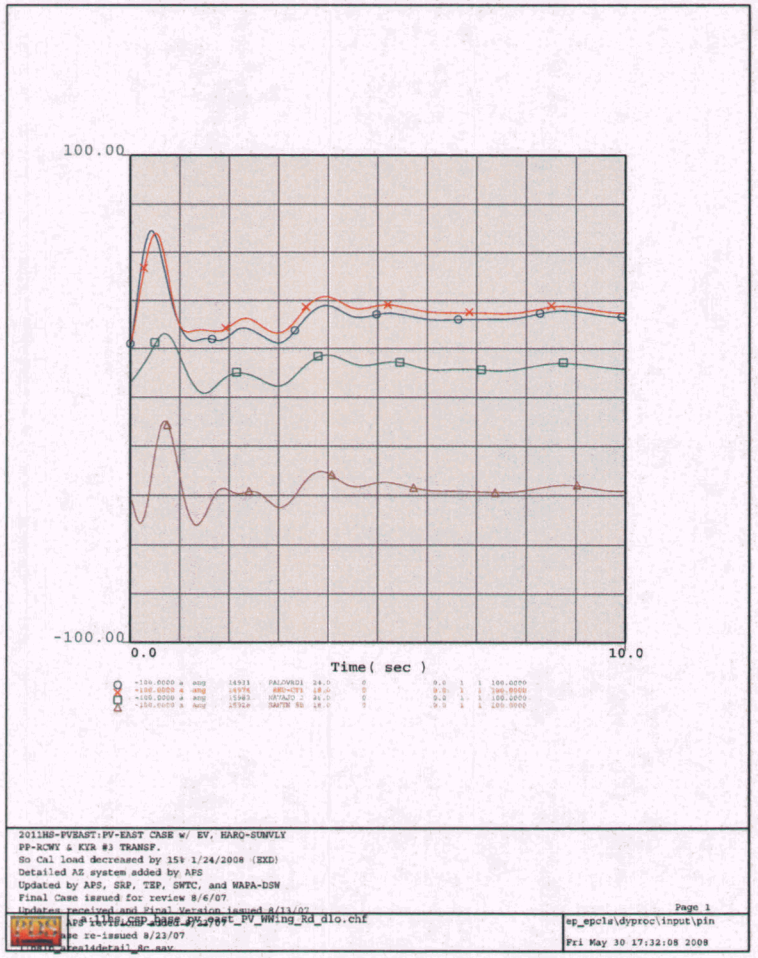
Pre-Project, PV East Max Case
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Generator Angular Plots



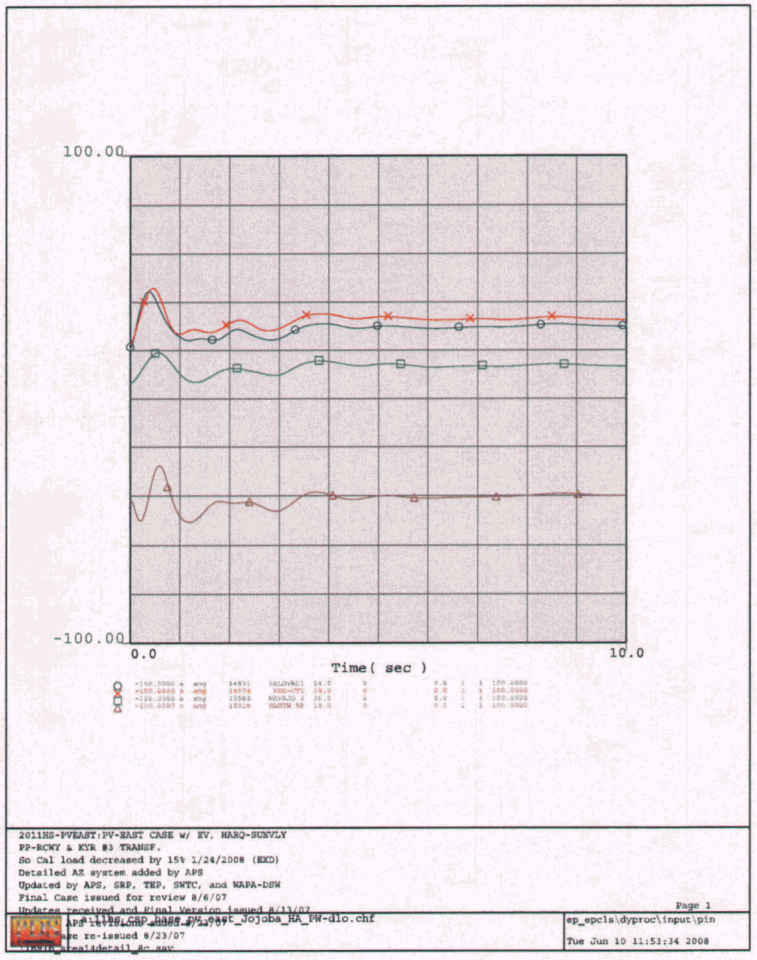
Pre-Project, PV East Max Case
PV-Westwing #1 & 2 500 kV lines outage
Transient Generator Angular Plots



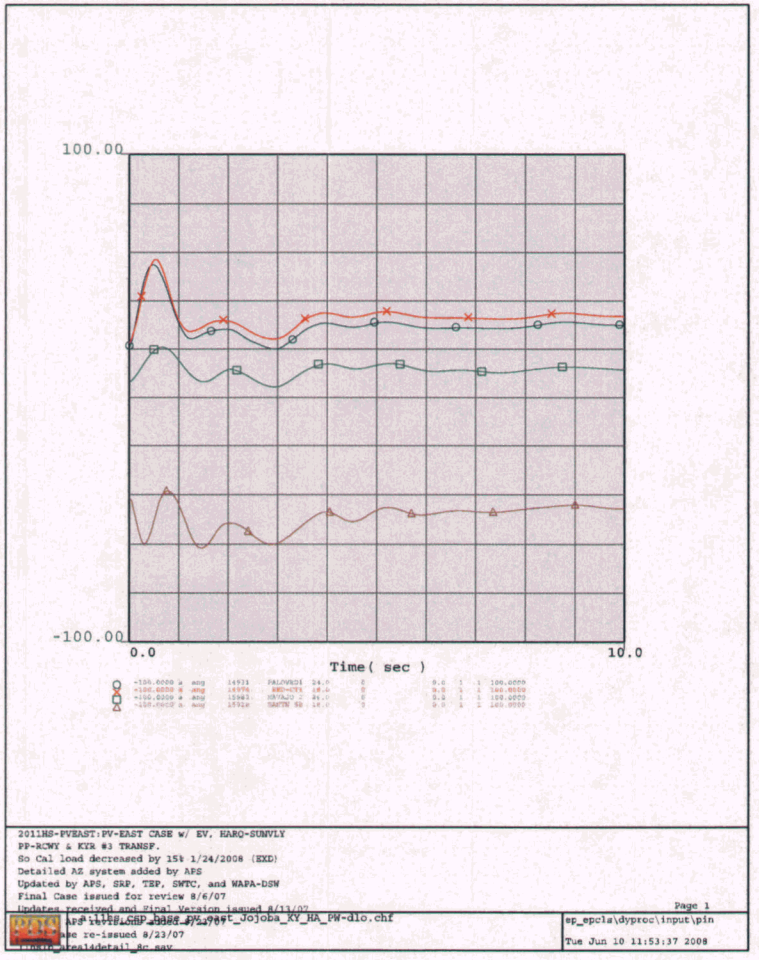
Pre-Project, PV East Max Case
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Generator Angular Plots



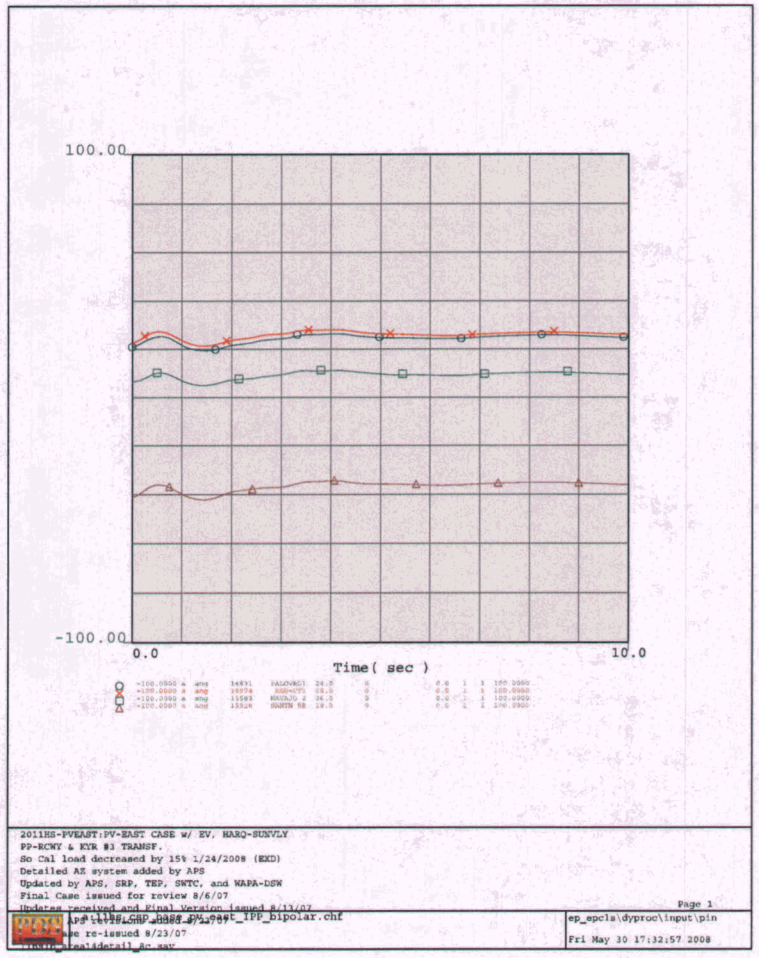
Pre-Project, PV East Max Case
HA-Jojoba, HA-Pinal West 500 kV lines outage
Transient Generator Angular Plots



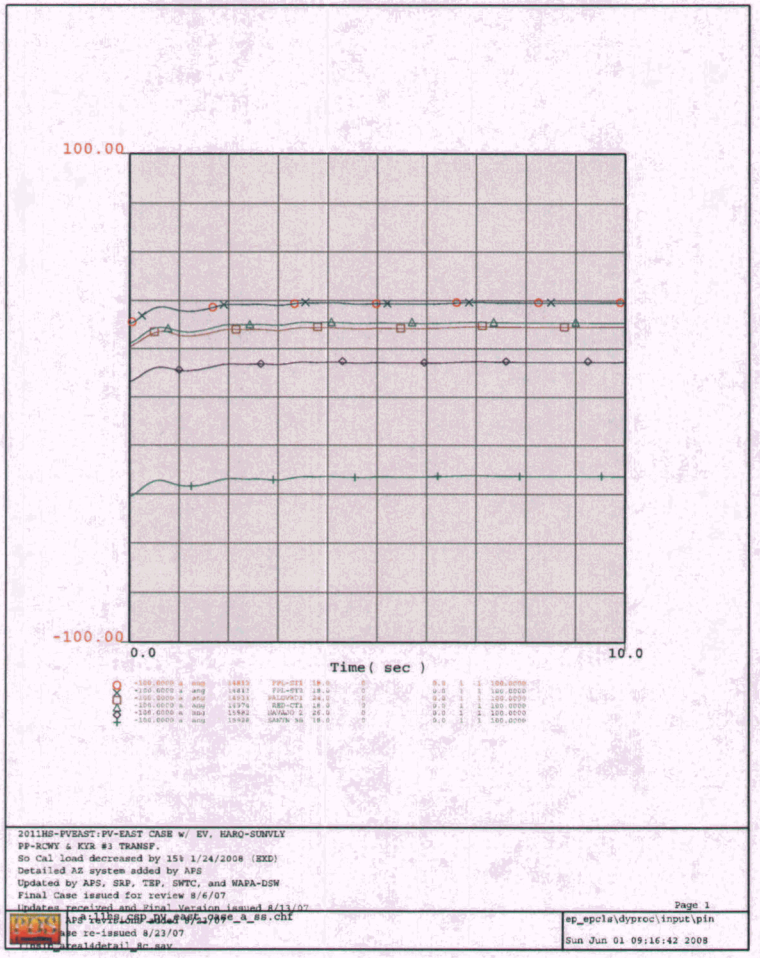
Pre-Project, PV East Max Case
Jojoba-Kyrene, HA-Pinal West 500 kV lines outage
Transient Generator Angular Plots



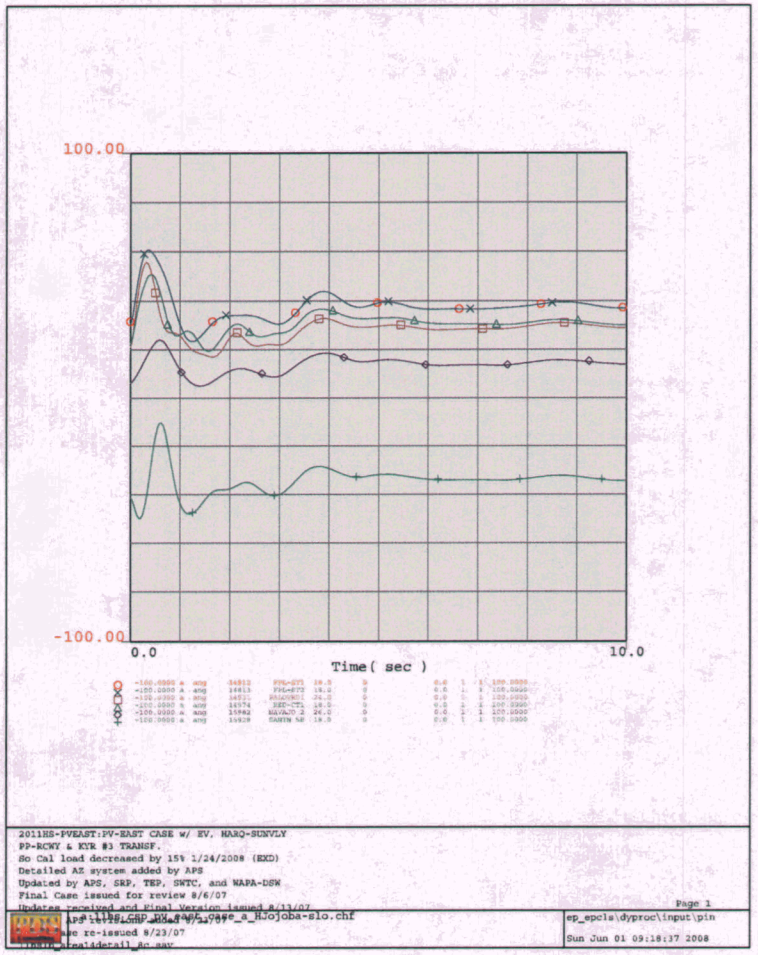
Pre-Project, PV East Max Case
IPP Bipole outage
Transient Generator Angular Plots



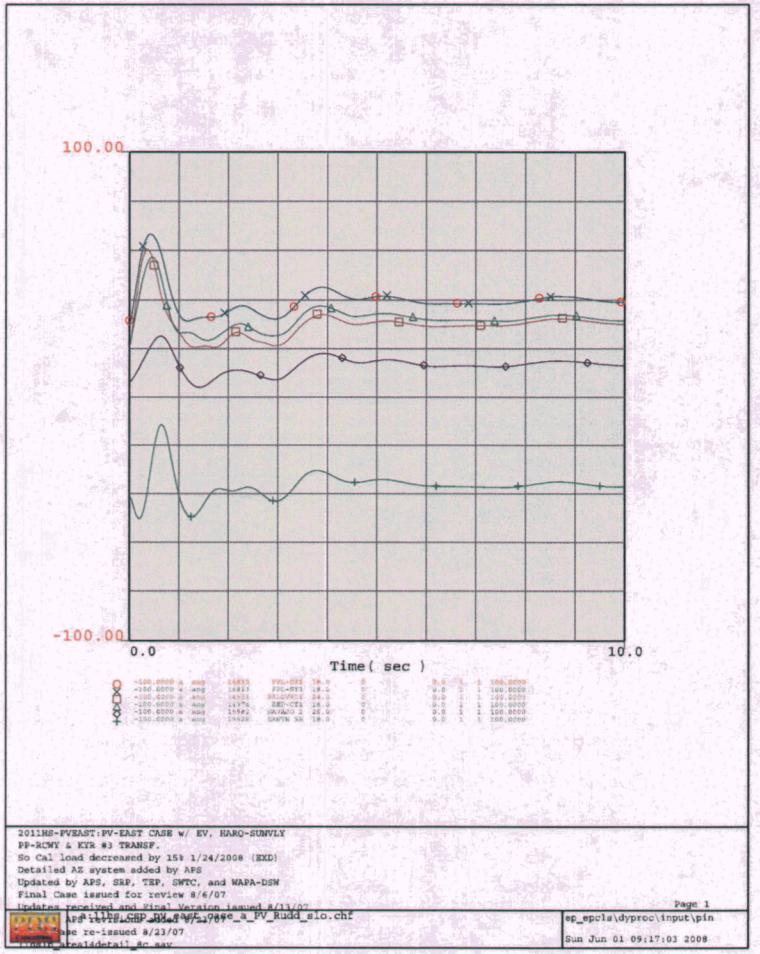
Post-Project, PV East Max Case A
No Outage
Transient Generator Angular Plots



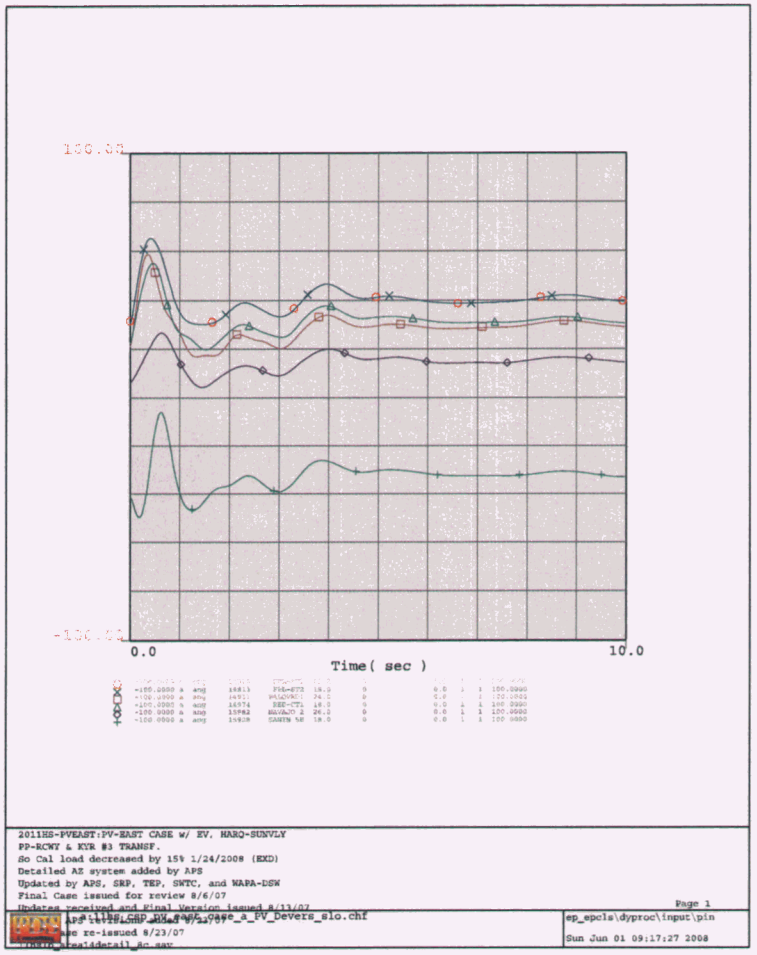
Post-Project, PV East Max Case A
Hassayampa-Jojoba 500 kV line outage
Transient Generator Angular Plots



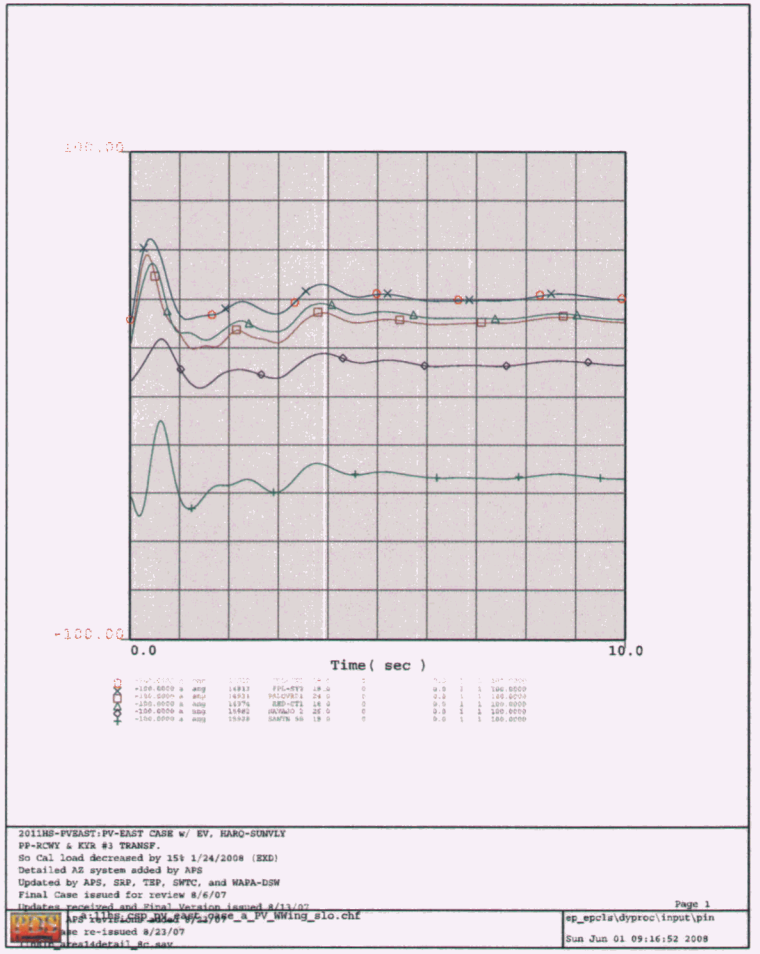
Post-Project, PV East Max Case A
Palo Verde-Rudd 500 kV line outage
Transient Generator Angular Plots



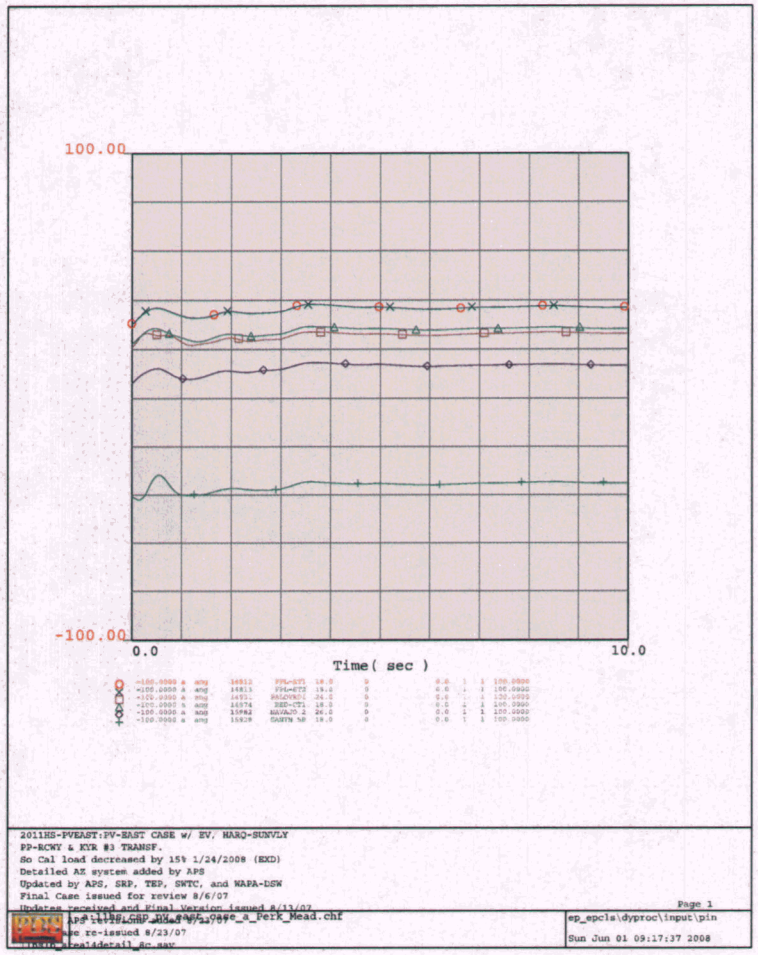
Post-Project, PV East Max Case A
Palo Verde-Devers 500 kV line outage
Transient Generator Angular Plots



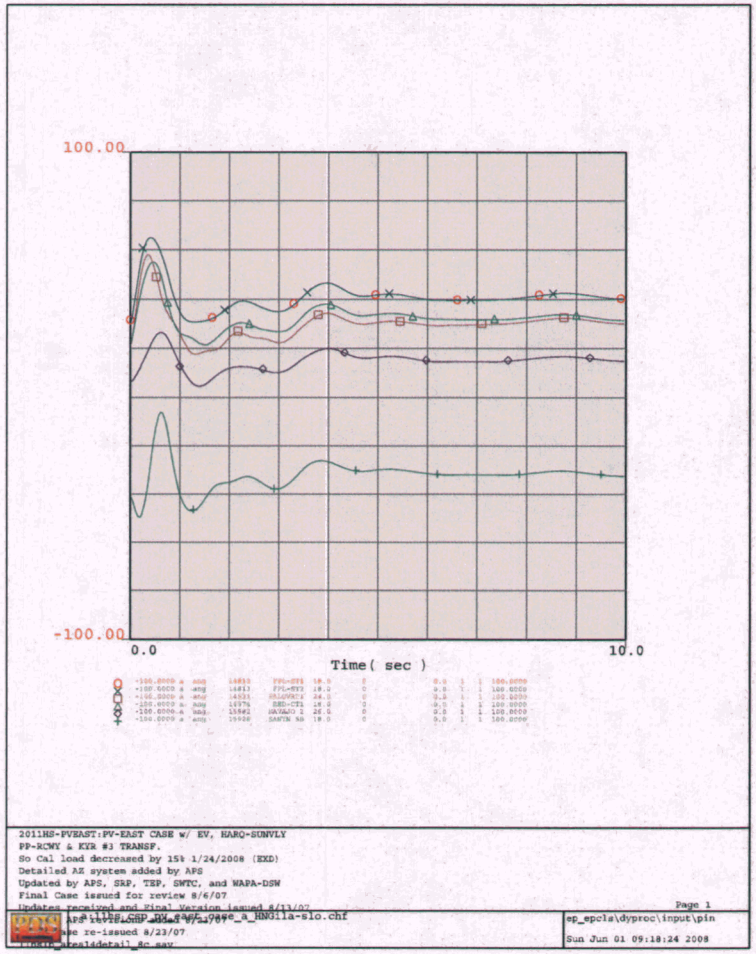
Post-Project, PV East Max Case A
Palo Verde-Westwing 500 kV line outage
Transient Generator Angular Plots



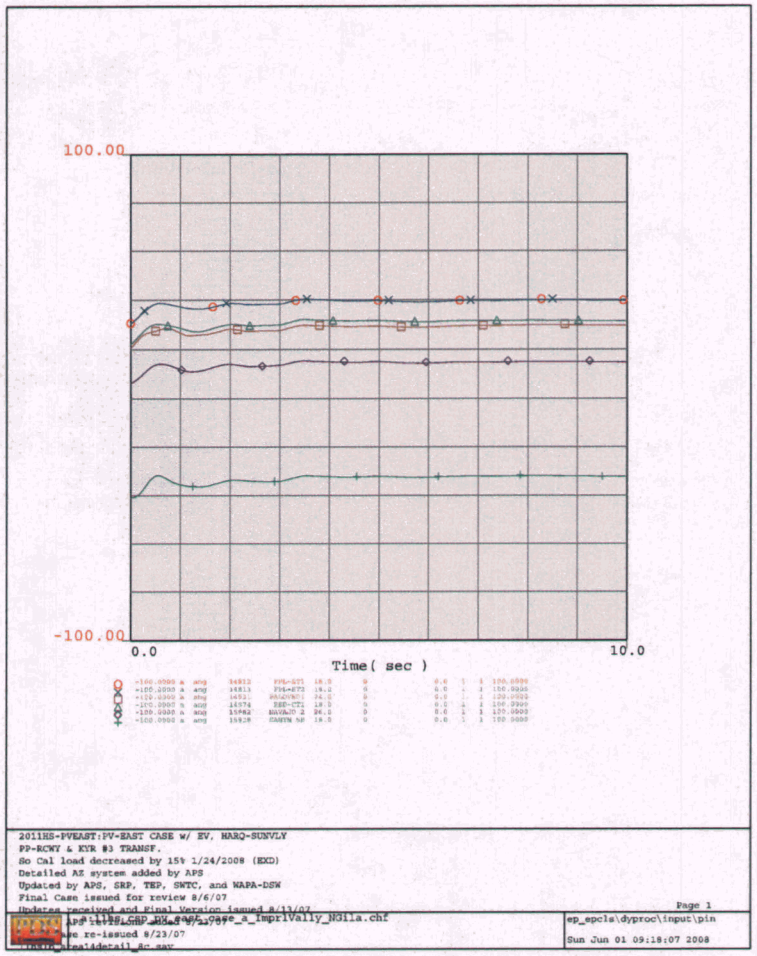
Post-Project, PV East Max Case A
Perkins-Mead 500 kV line outage
Transient Generator Angular Plots



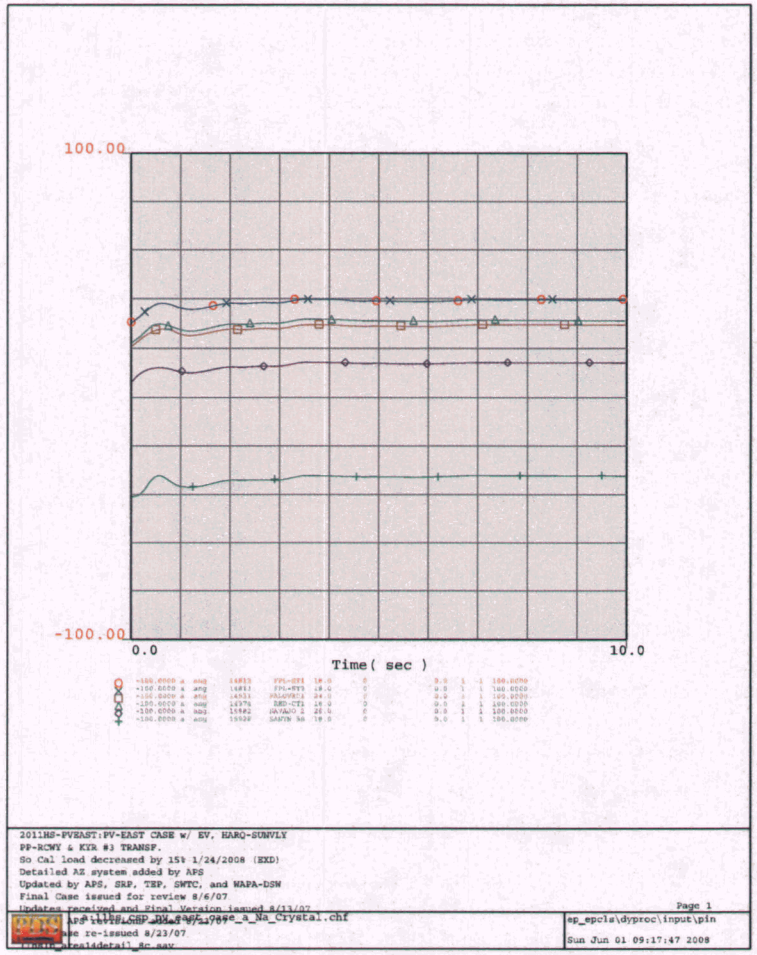
Post-Project, PV East Max Case A
Hassayampa -N. Gila 500 kV line outage
Transient Generator Angular Plots



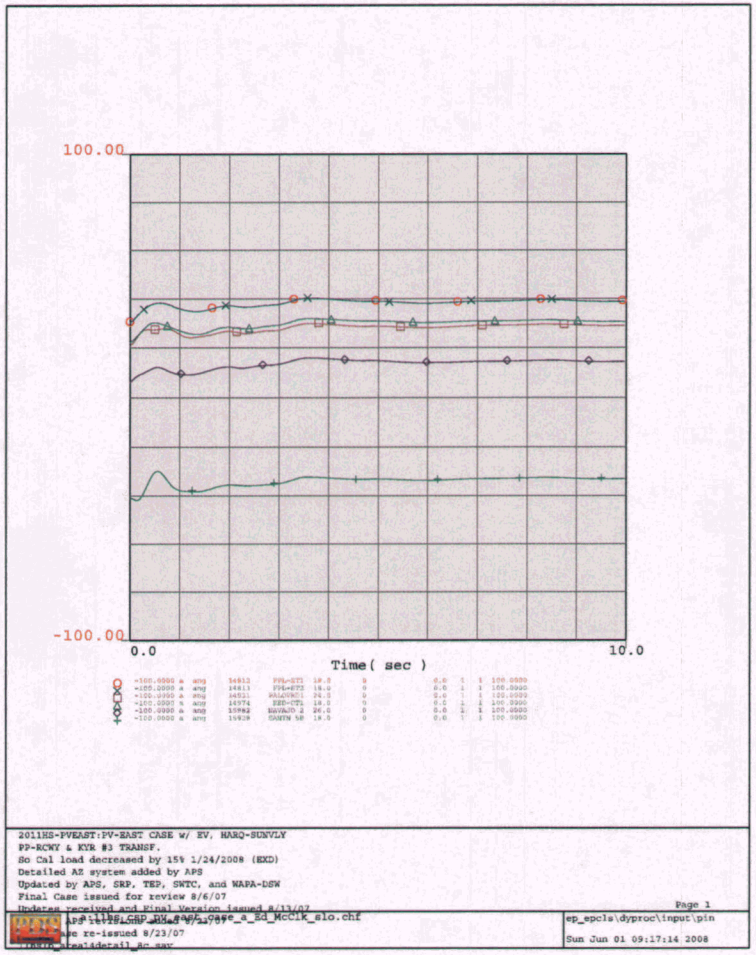
Post-Project, PV East Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Generator Angular Plots



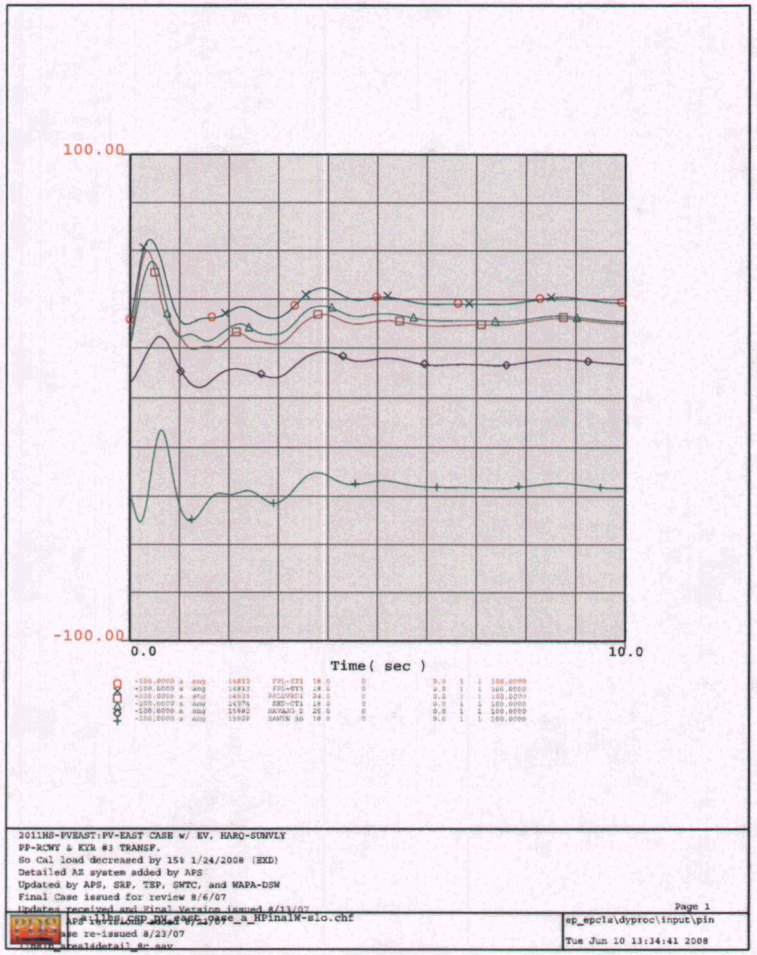
Post-Project, PV East Max Case A
Navajo-Crystal 500 kV line
Transient Generator Angular Plots



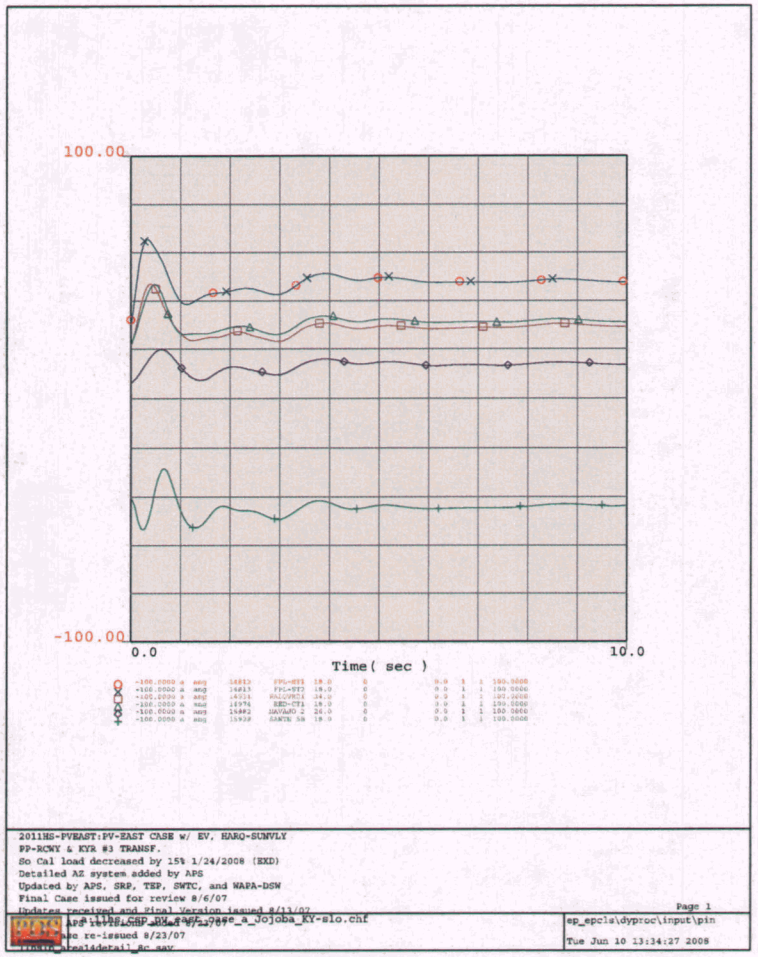
Post-Project, PV East Max Case
El Dorado-McCullough 500 kV line outage
Transient Generator Angular Plots



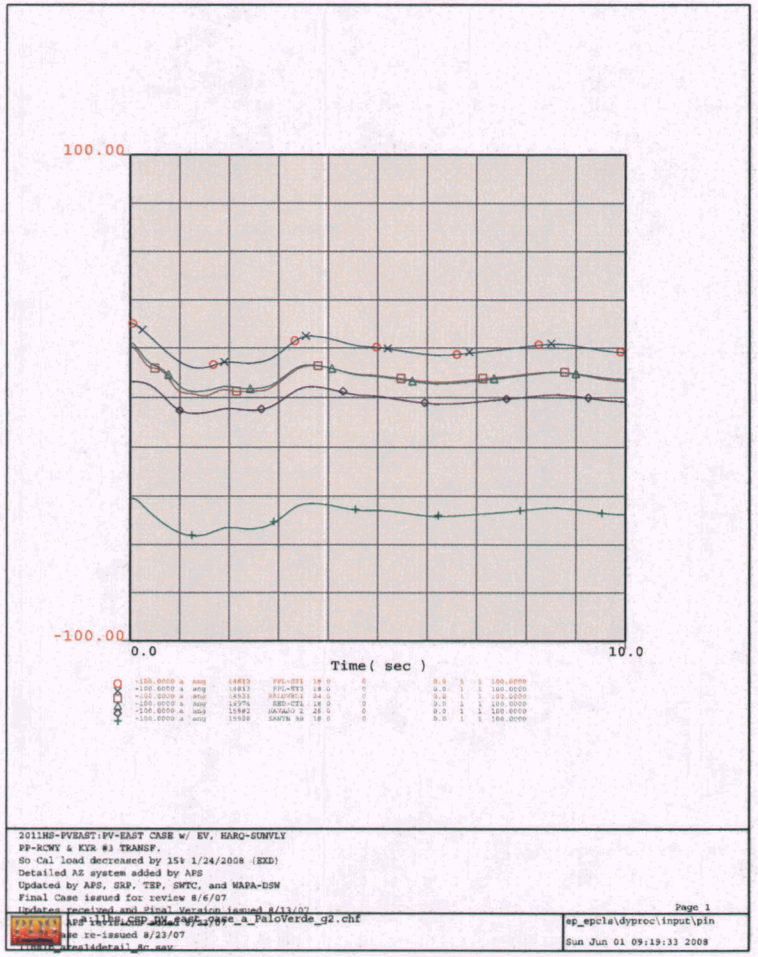
Post-Project, PV East Max Case A
Hassayampa-Pinal West 500 kV line outage
Transient Generator Angular Plots



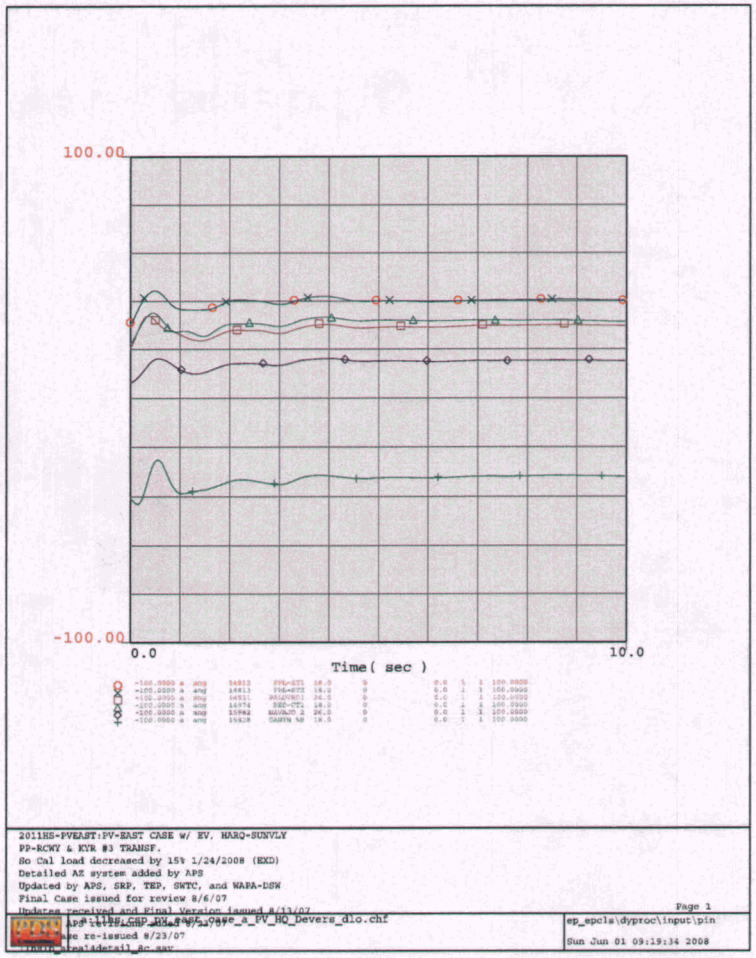
Post-Project, PV East Max Case A
Jojoba-Kyrene 500 kV line outage
Transient Generator Angular Plots



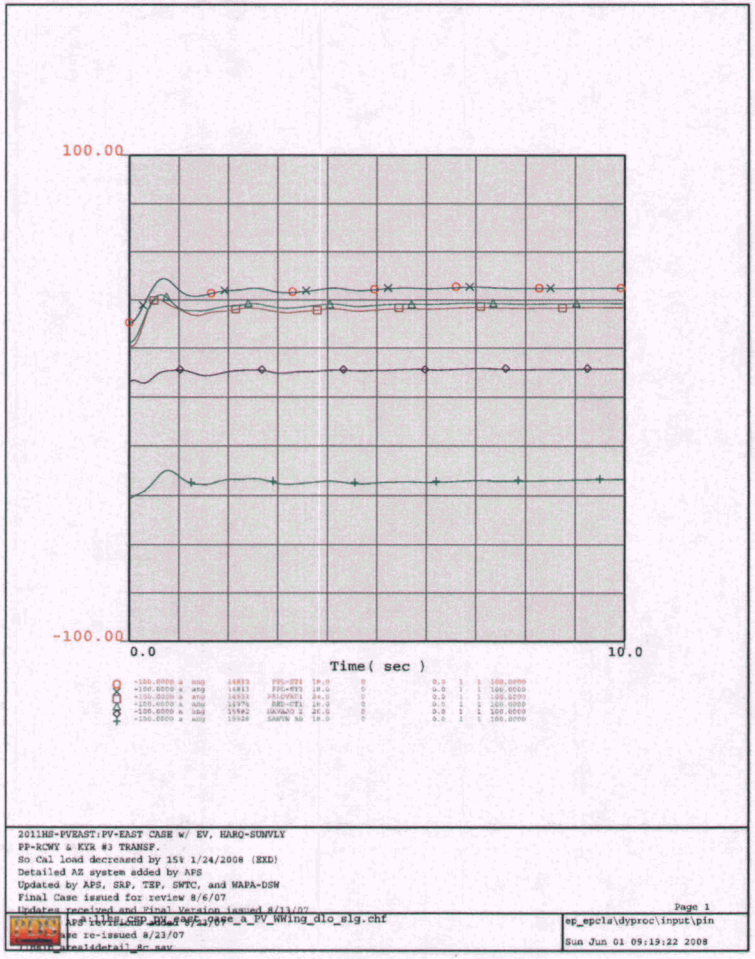
Post-Project, PV East Max Case A
Palo Verde G-2 outage
Transient Generator Angular Plots



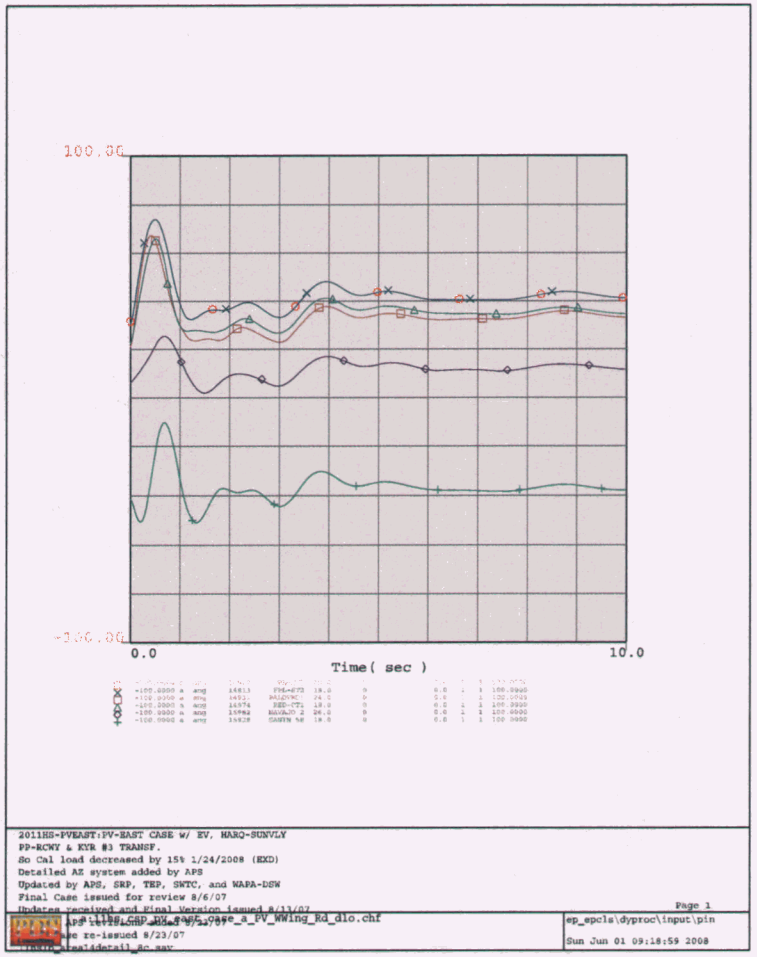
Post-Project, PV East Max Case A
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Generator Angular Plots



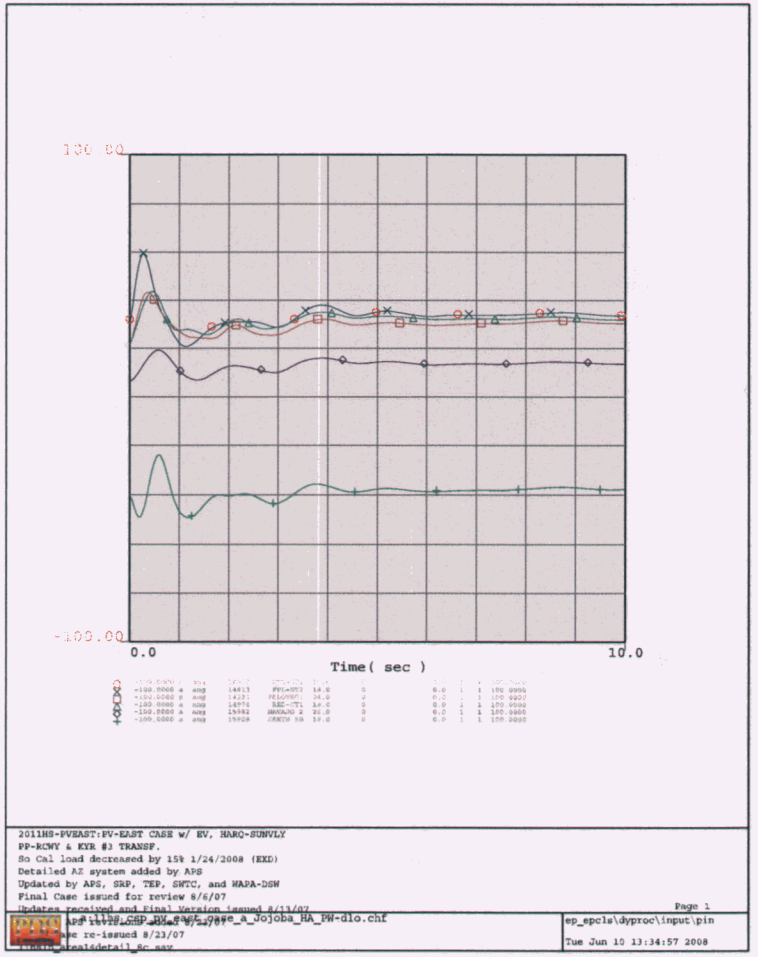
Post-Project, PV East Max Case A
PV-Westwing #1 & 2 500 kV lines outage
Transient Generator Angular Plots



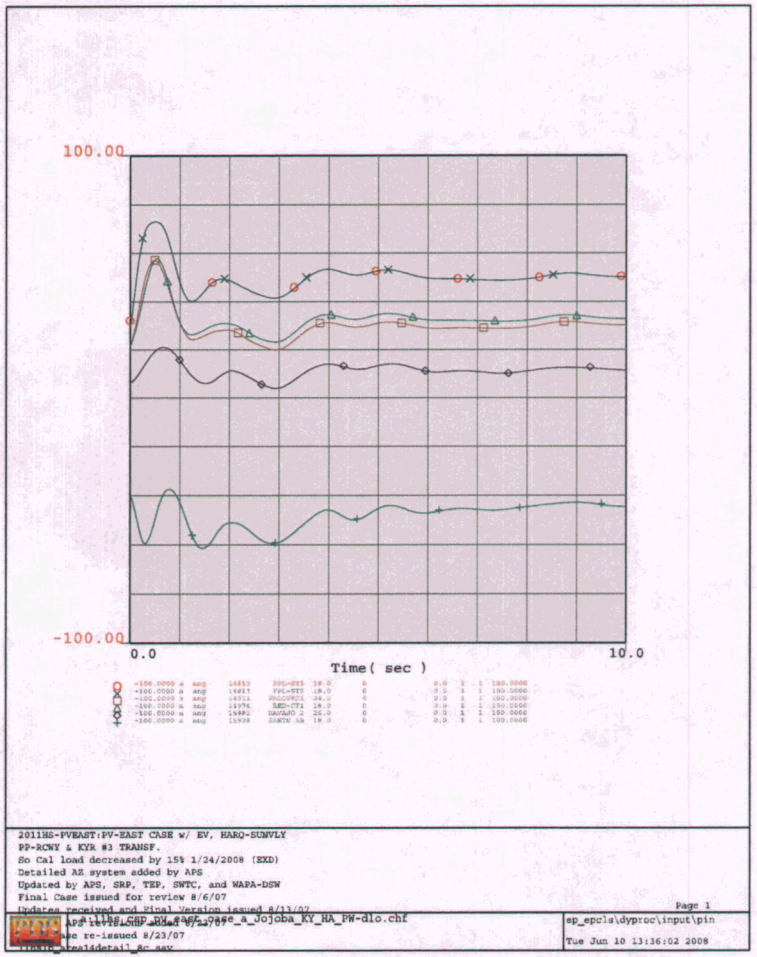
Post-Project, PV East Max Case A
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Generator Angular Plots



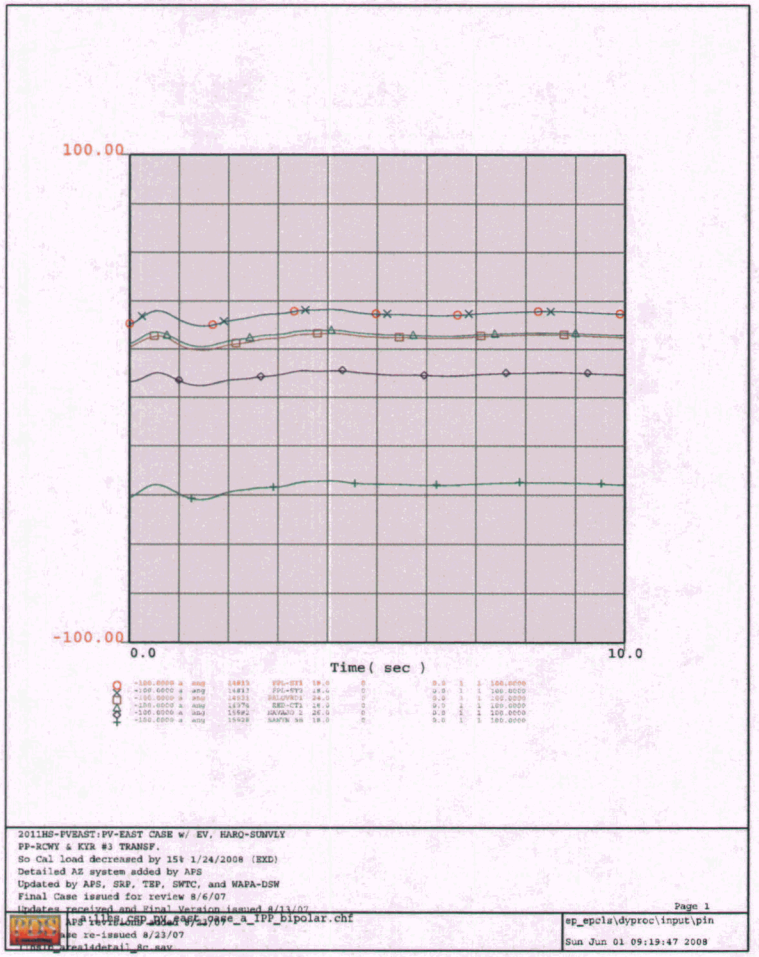
Post-Project, PV East Max Case A
HA-Pinal West, HA-Jojoba 500 kV lines outage
Transient Generator Angular Plots



Post-Project, PV East Max Case A
HA-Pinal West, Jojoba-Kyrene 500 kV lines outage
Transient Generator Angular Plots

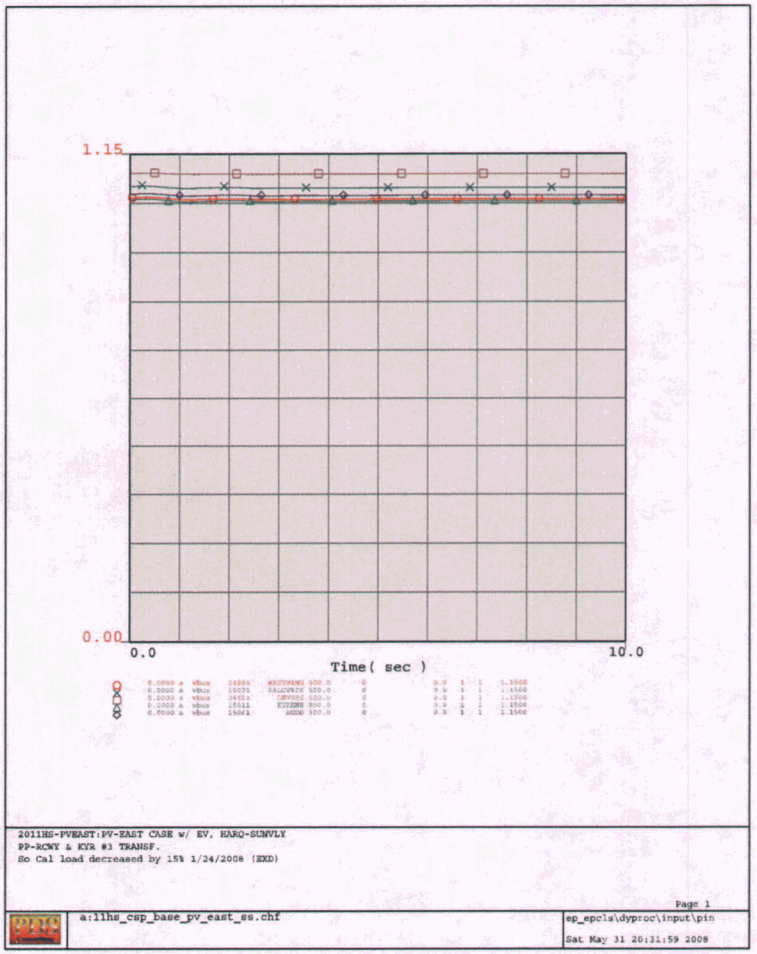


Post-Project, PV East Max Case A
IPP Bipole outage
Transient Generator Angular Plots

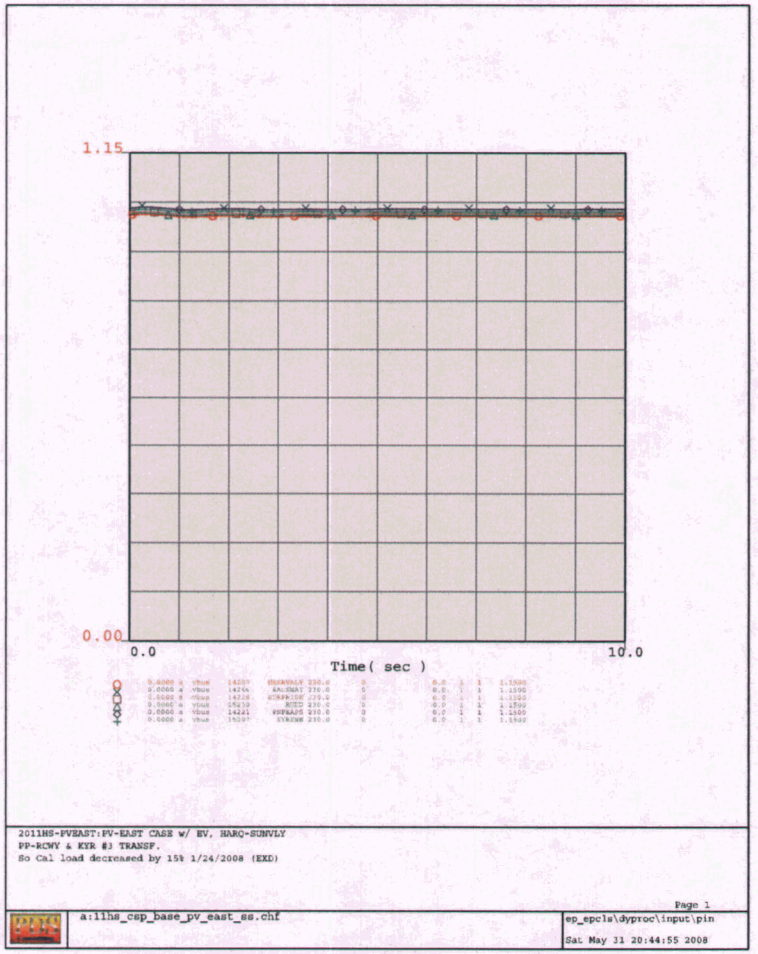


Transient Bus Voltage Plots

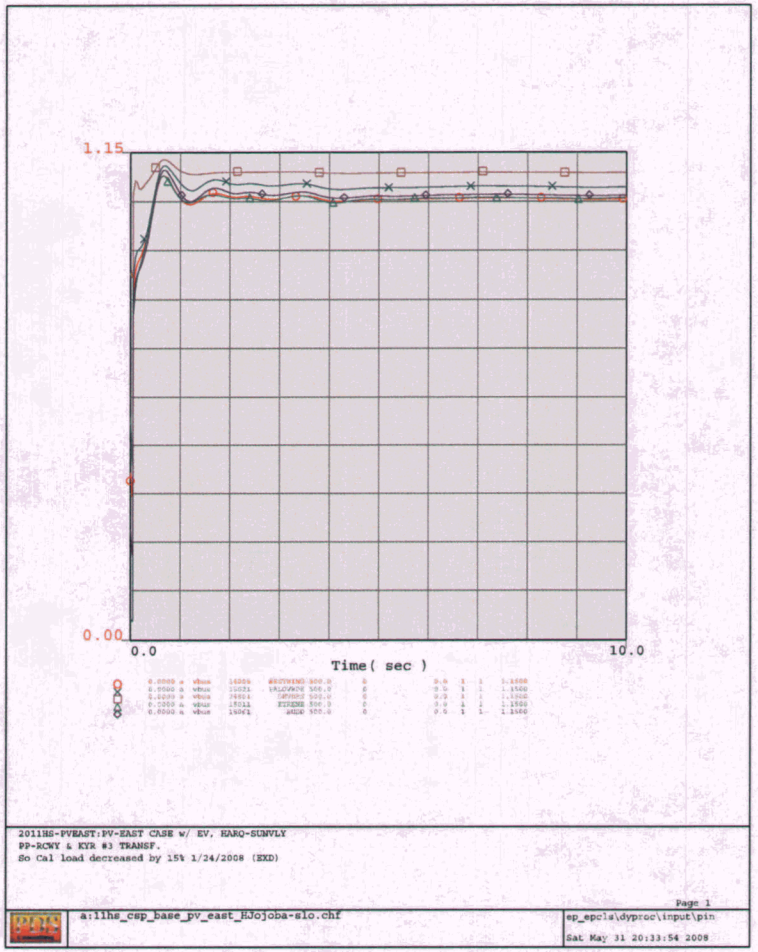
Pre-Project, PV East Max Case
No Outage
Transient Bus Voltage Plots



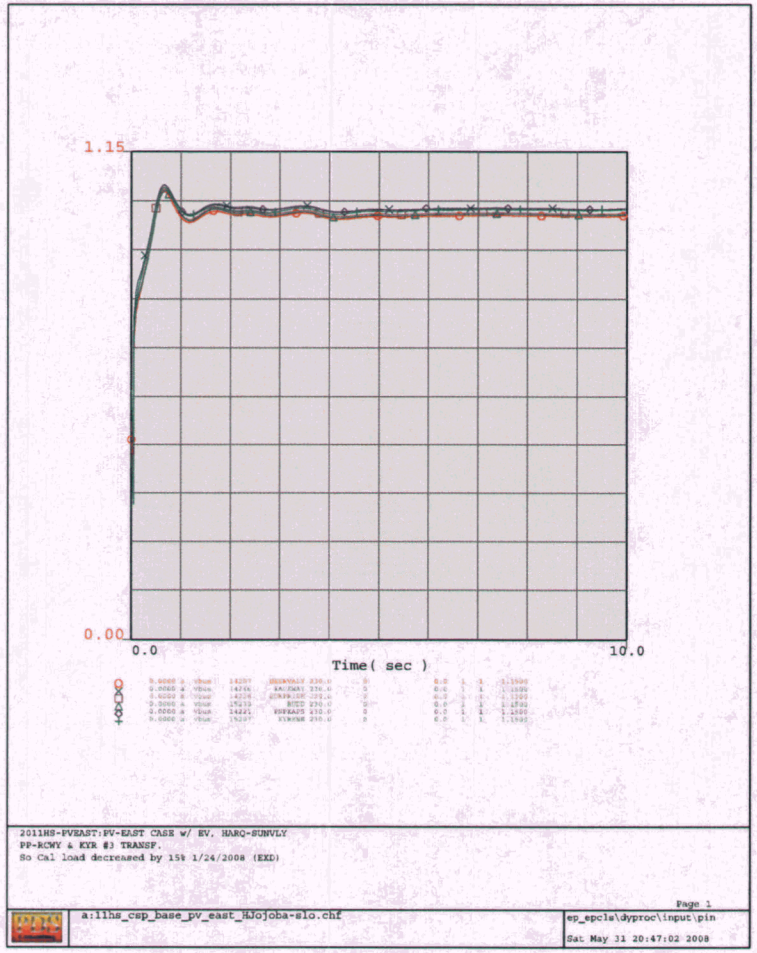
Pre-Project, PV East Max Case
No Outage
Transient Bus Voltage Plots



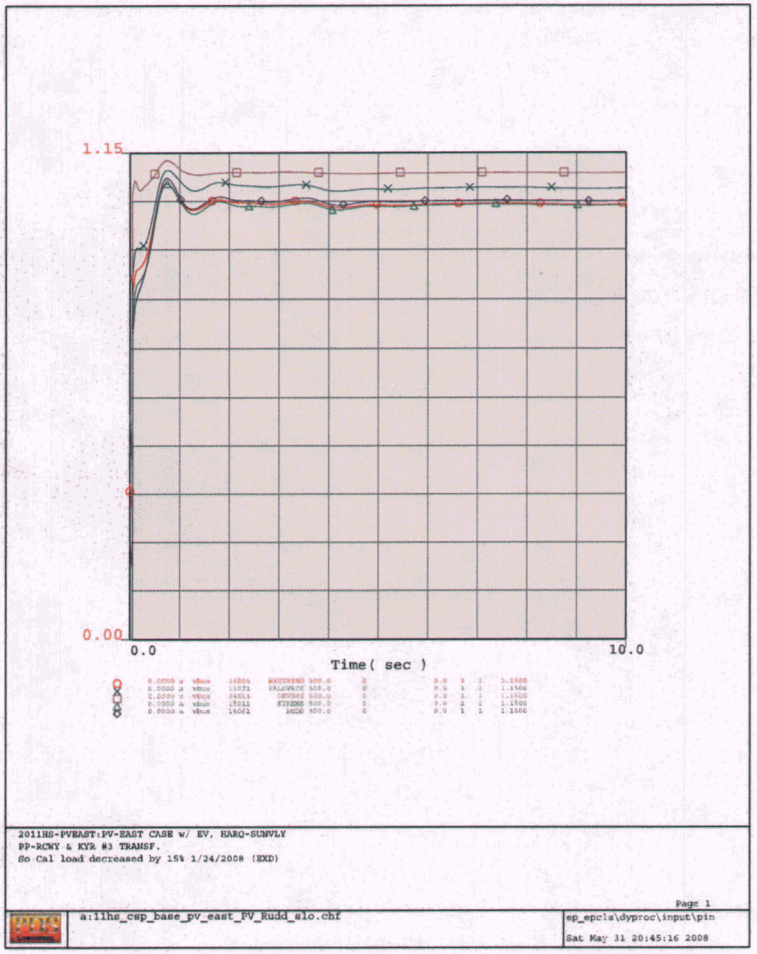
Pre-Project, PV East Max Case
Hassayampa-Jojoba 500 kV line outage
Transient Bus Voltage Plots



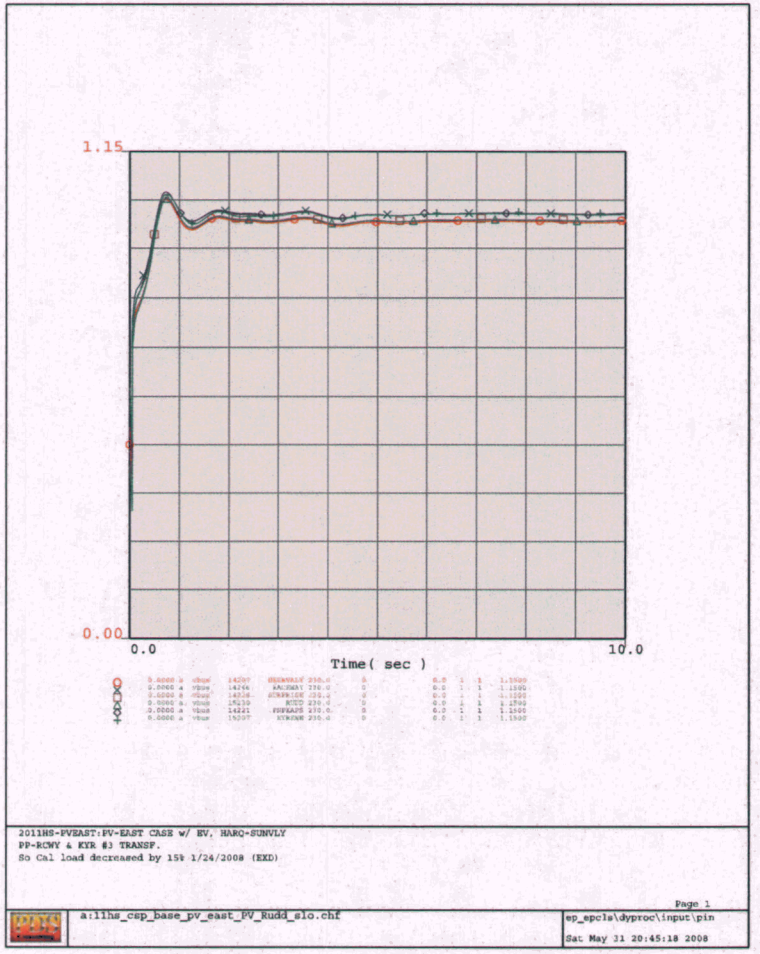
Pre-Project, PV East Max Case
Hassayampa-Jojoba 500 kV line outage
Transient Bus Voltage Plots



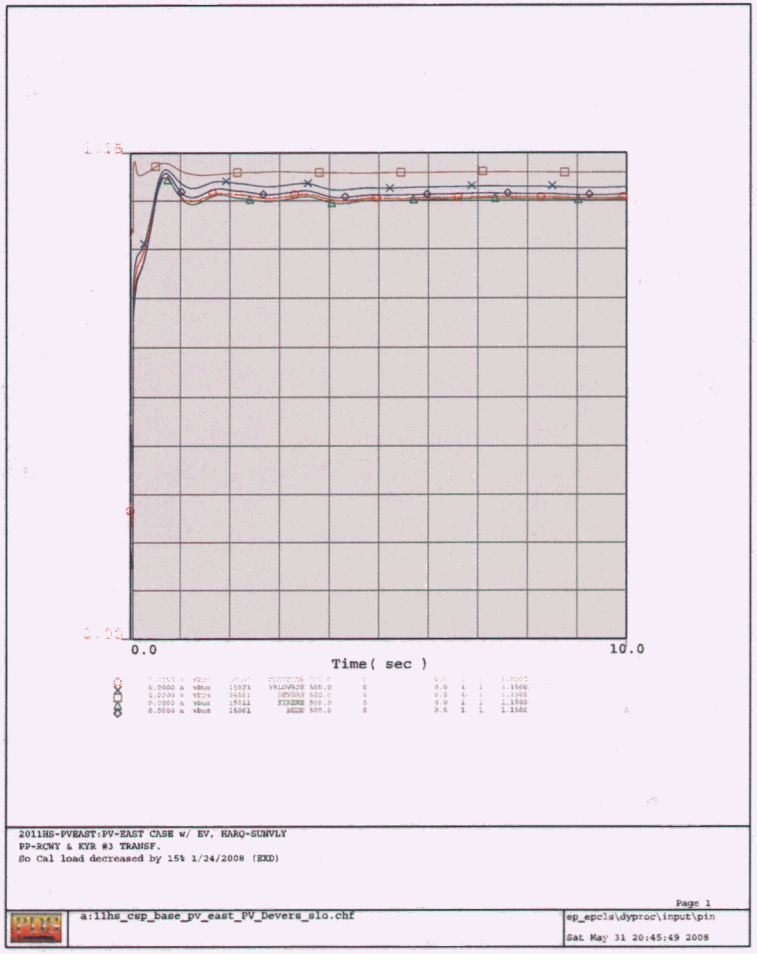
Pre-Project, PV East Max Case
Palo Verde-Rudd 500 kV line outage
Transient Bus Voltage Plots



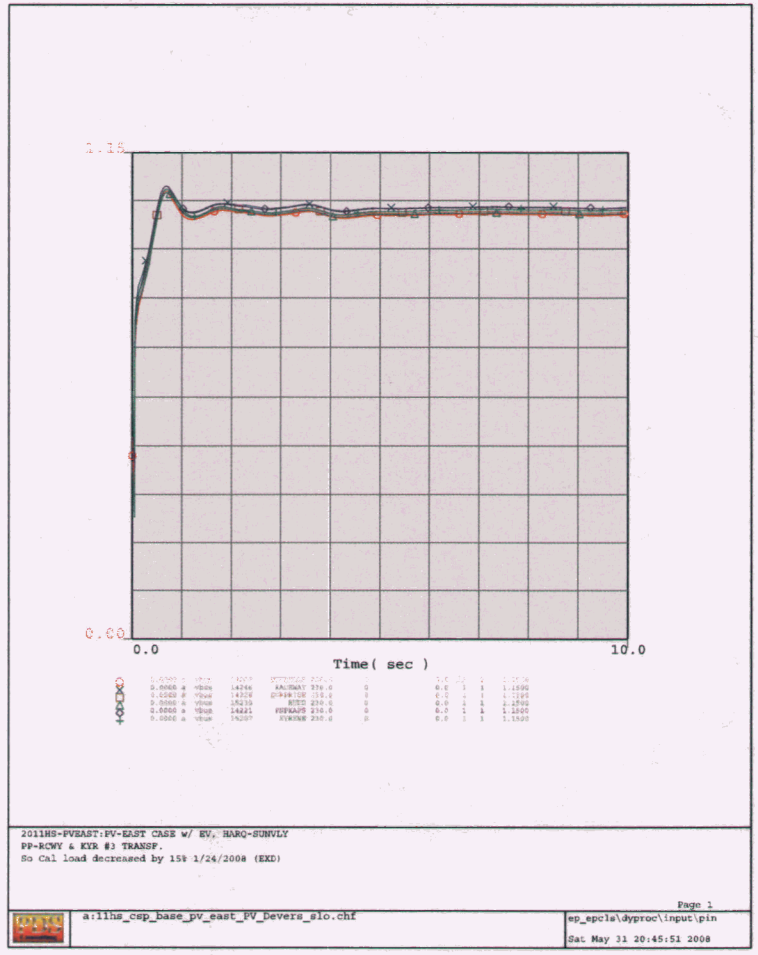
Pre-Project, PV East Max Case
Palo Verde-Rudd 500 kV line outage
Transient Bus Voltage Plots



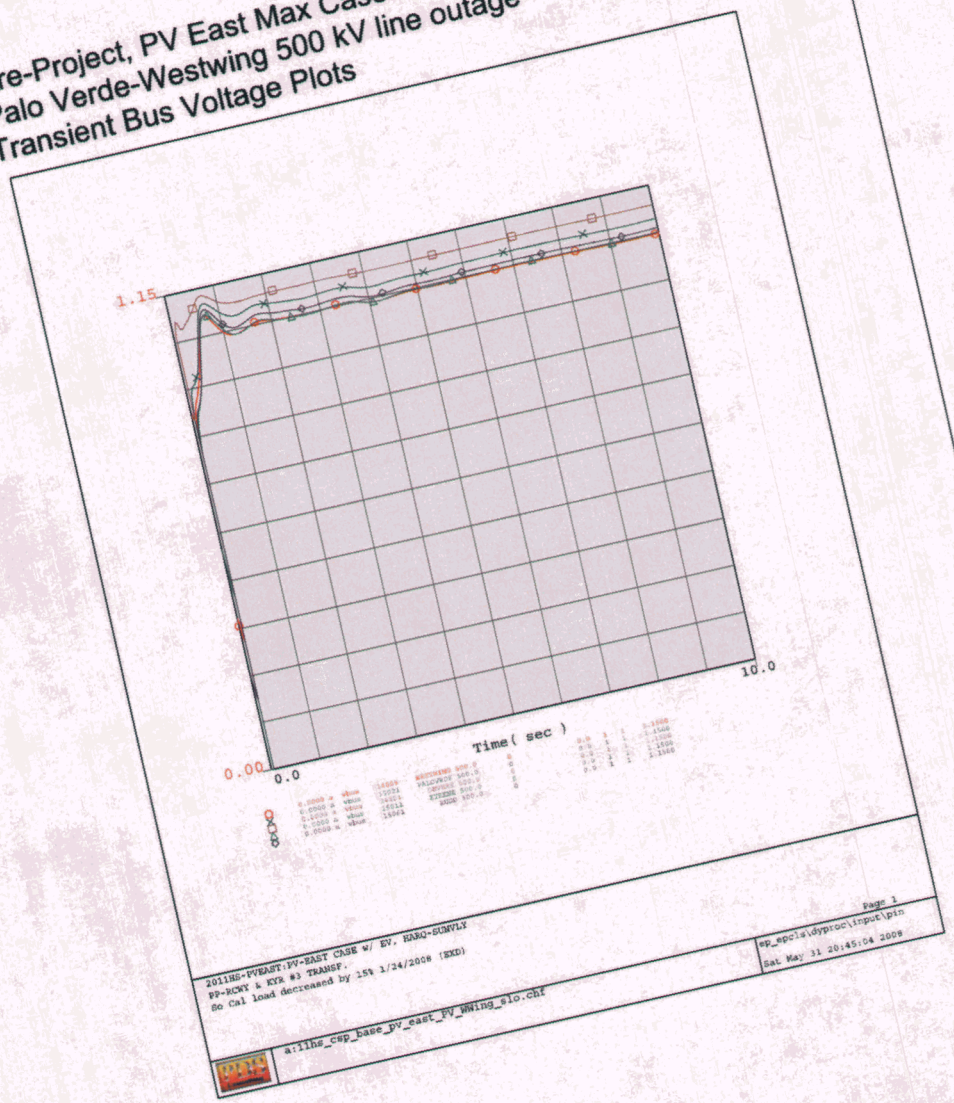
Pre-Project, PV East Max Case
Palo Verde-Devers 500 kV line outage
Transient Bus Voltage Plots



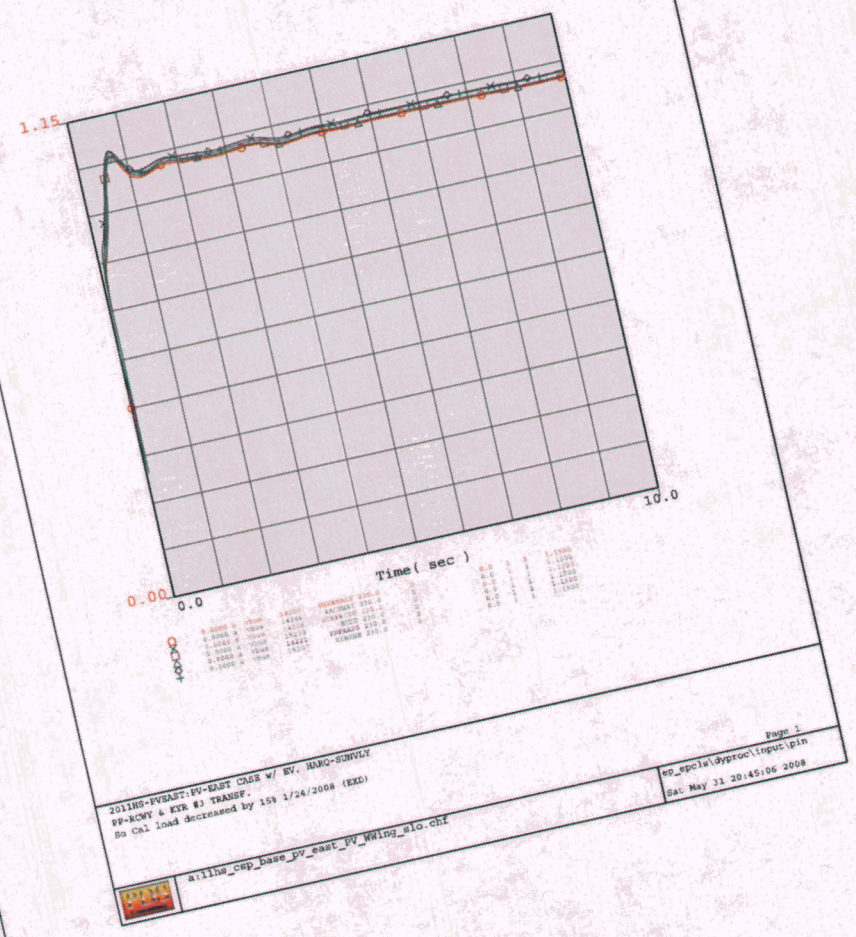
Pre-Project, PV East Max Case
Palo Verde-Devers 500 kV line outage
Transient Bus Voltage Plots



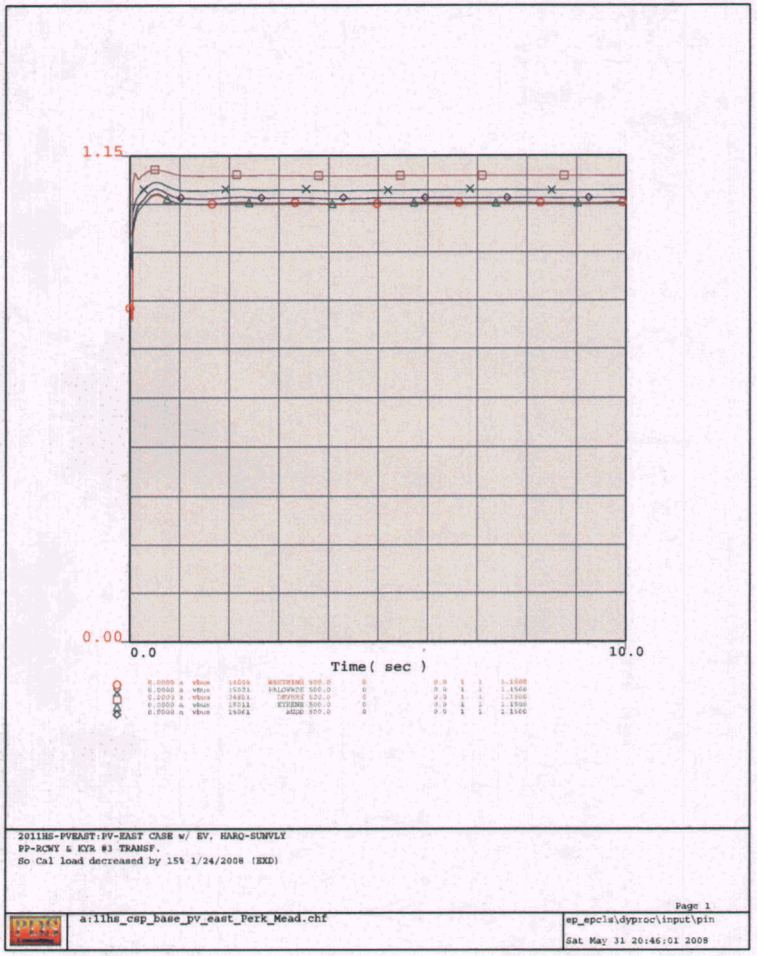
Pre-Project, PV East Max Case
Palo Verde-Westwing 500 kV line outage
Transient Bus Voltage Plots



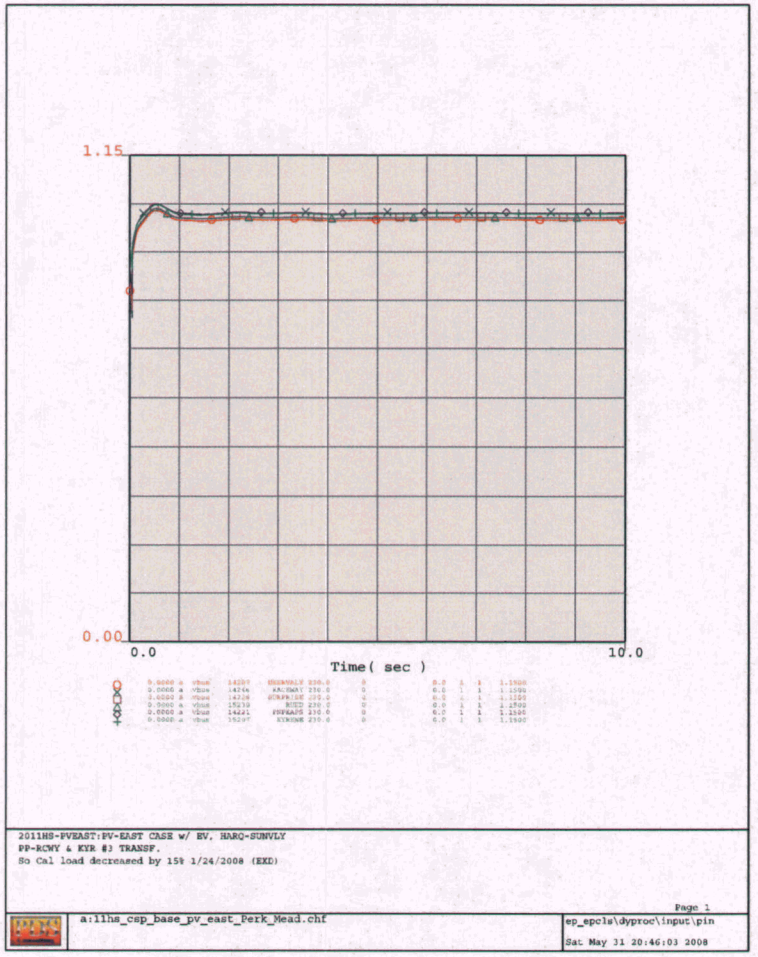
Pre-Project, PV East Max Case
Palo Verde-Westwing 500 kV line outage
Transient Bus Voltage Plots



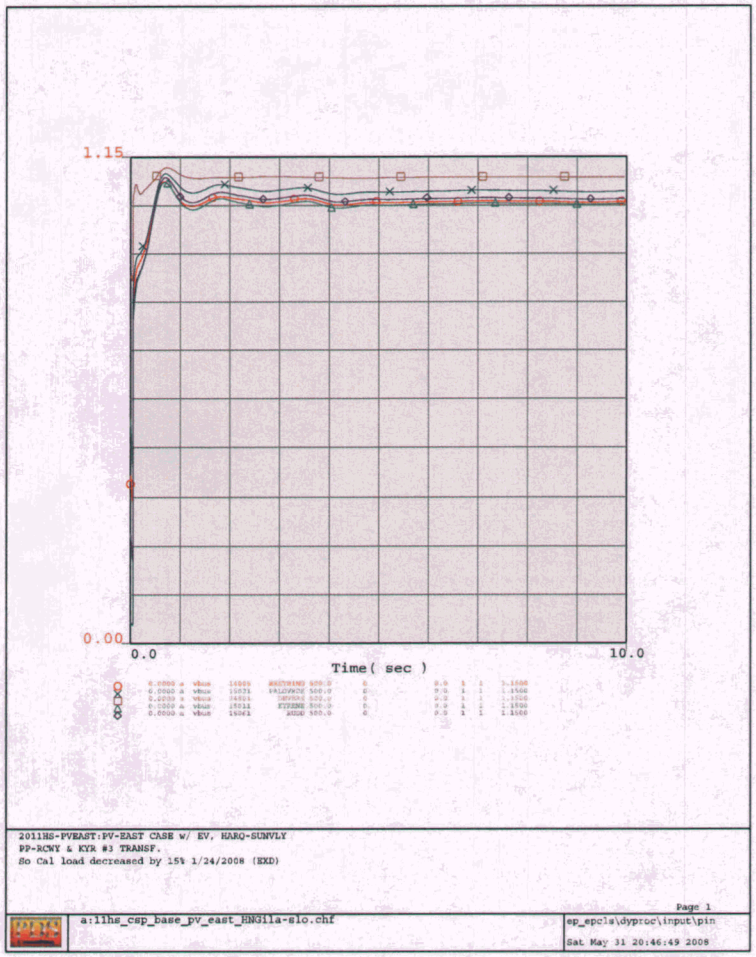
Pre-Project, PV East Max Case
Perkins-Mead 500 kV line outage
Transient Bus Voltage Plots



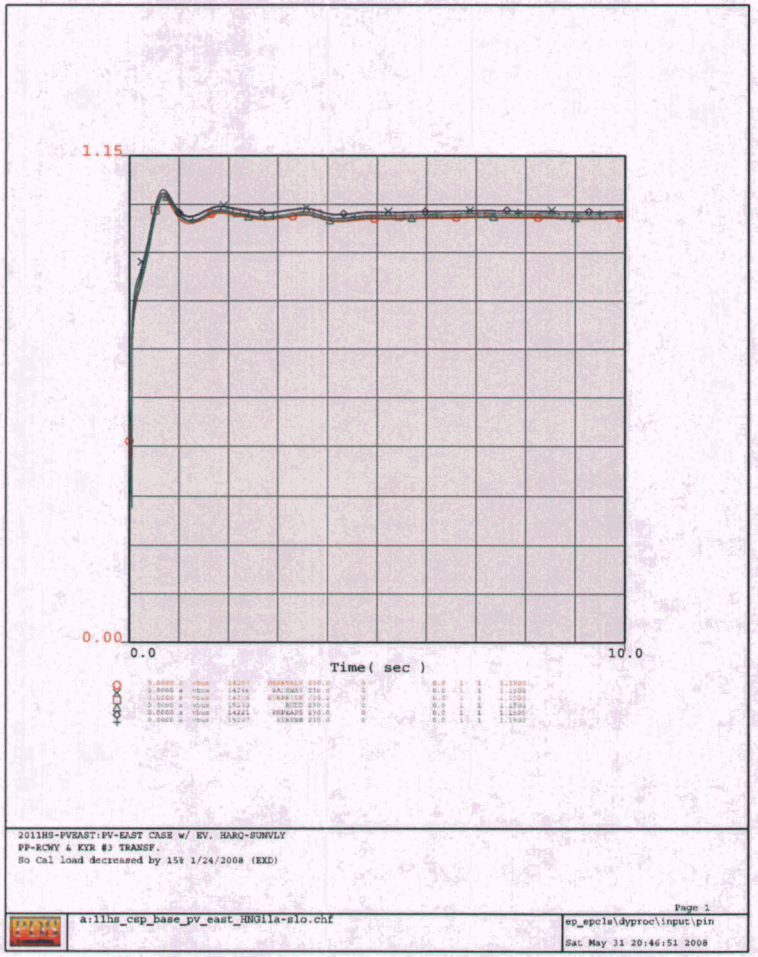
Pre-Project, PV East Max Case
Perkins-Mead 500 kV line outage
Transient Bus Voltage Plots



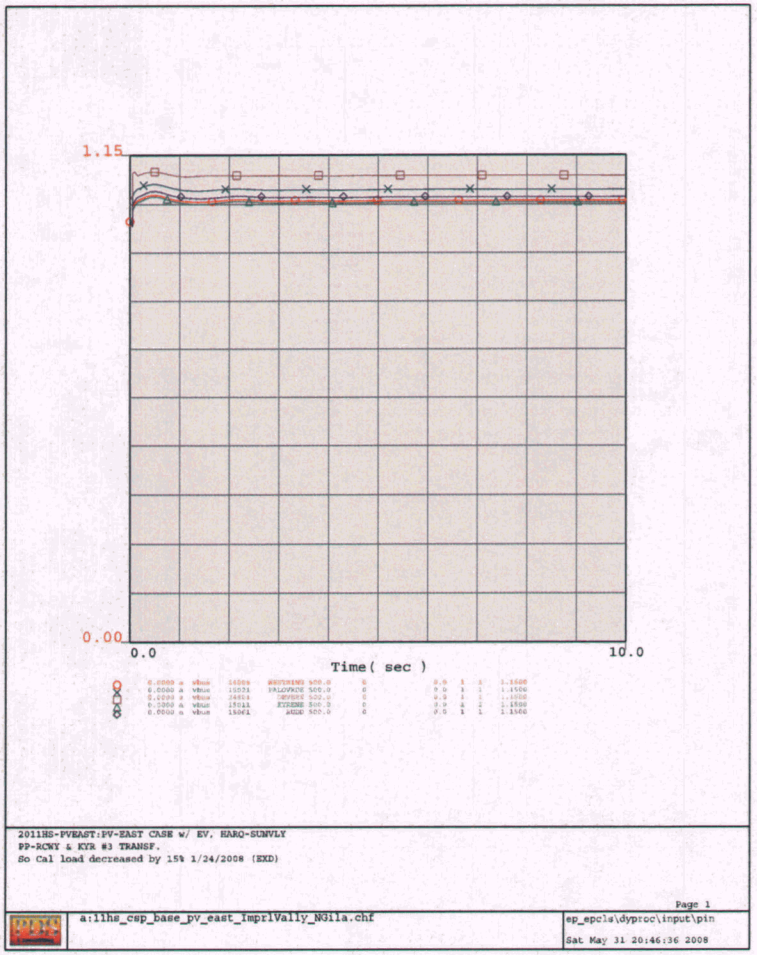
Pre-Project, PV East Max Case
Hassayampa -N. Gila 500 kV line outage
Transient Bus Voltage Plots



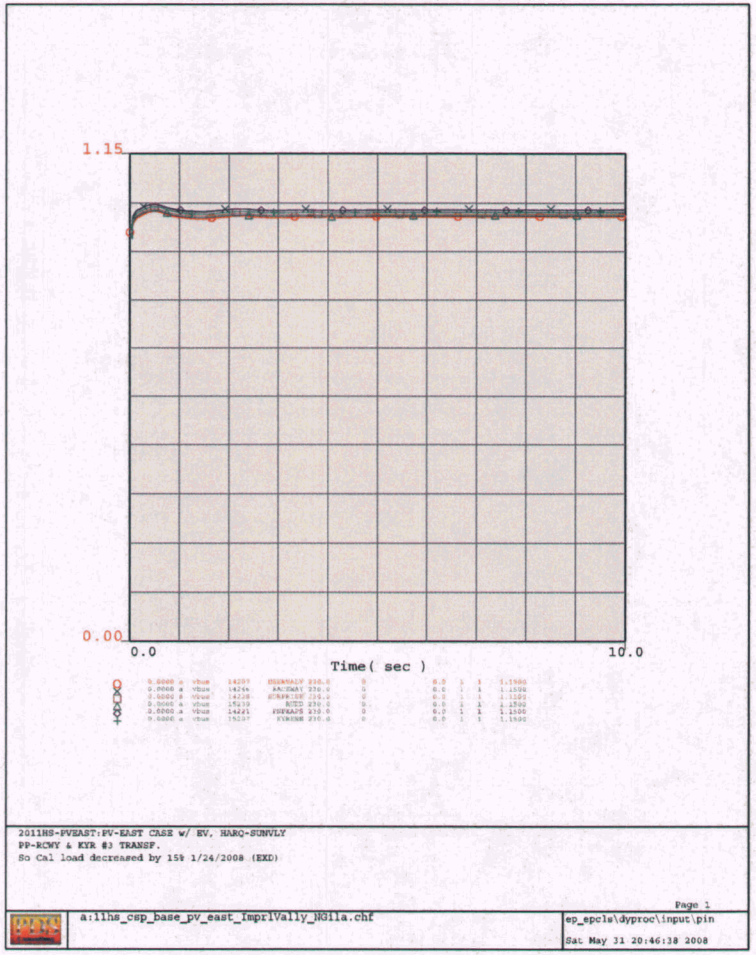
Pre-Project, PV East Max Case
Hassayampa -N. Gila 500 kV line outage
Transient Bus Voltage Plots



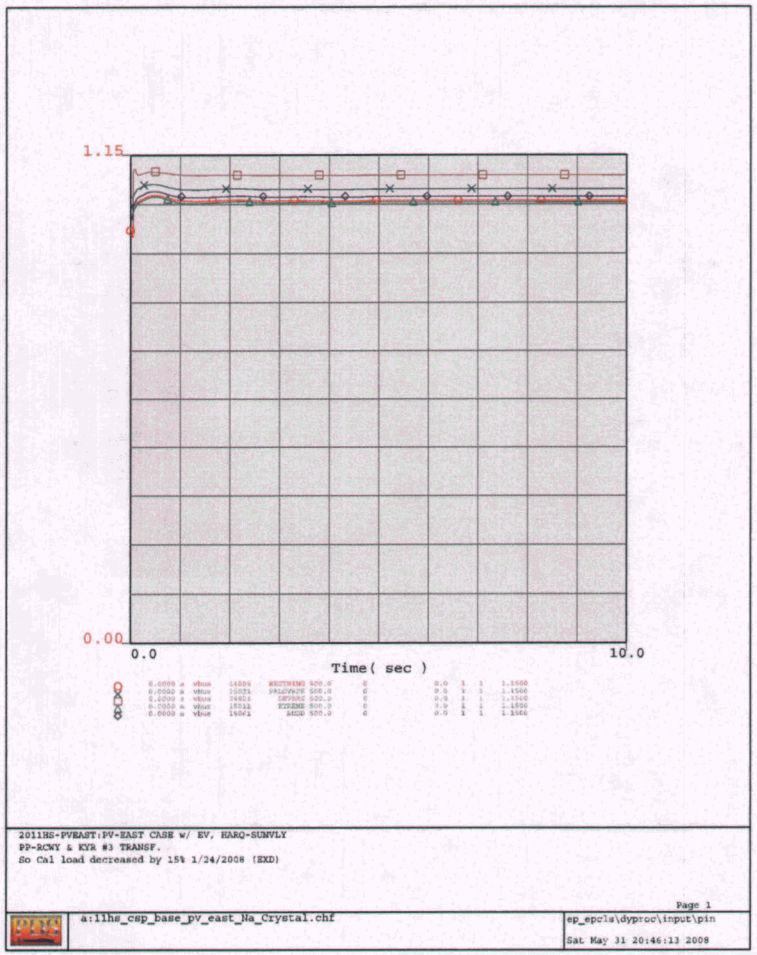
Pre-Project, PV East Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Bus Voltage Plots



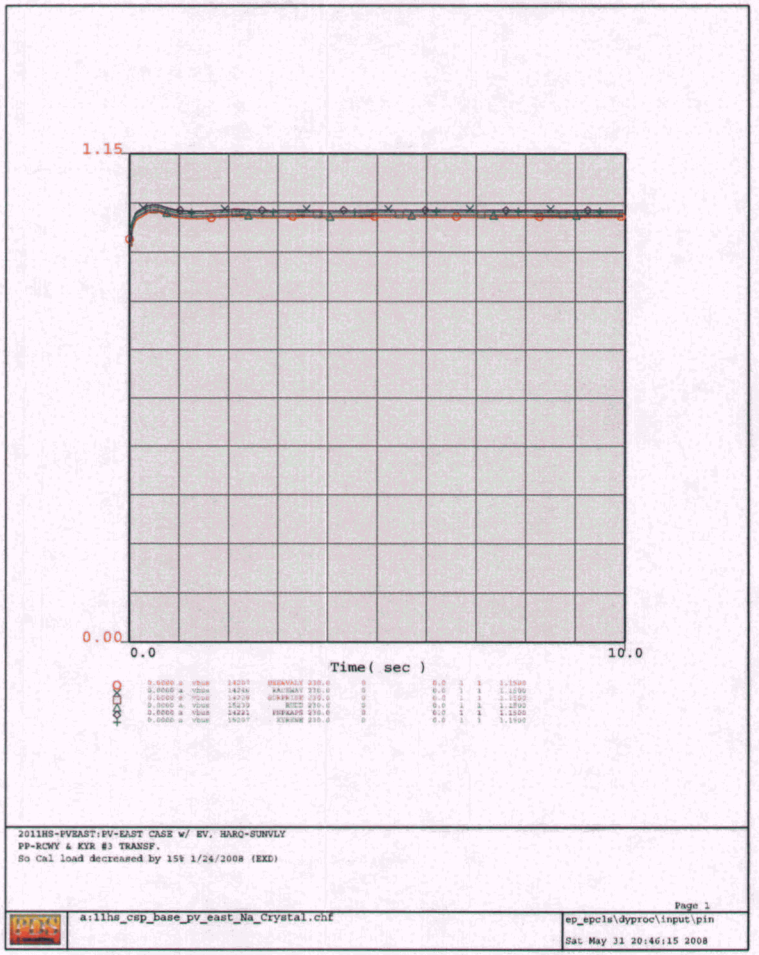
Pre-Project, PV East Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Bus Voltage Plots



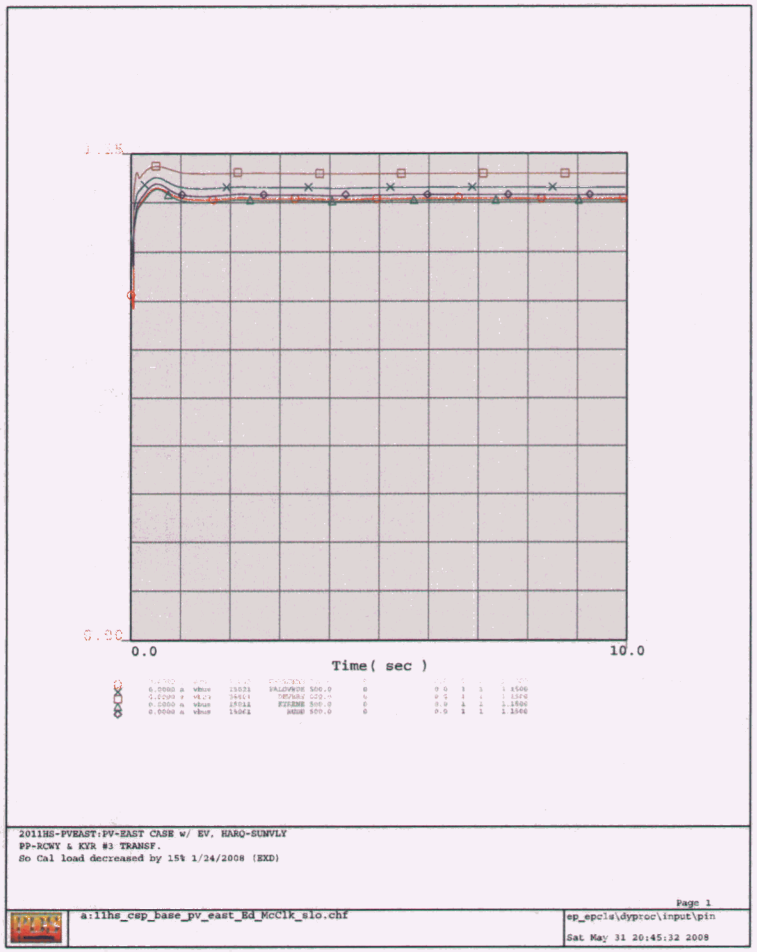
Pre-Project, PV East Max Case
Navajo-Crystal 500 kV line
Transient Bus Voltage Plots



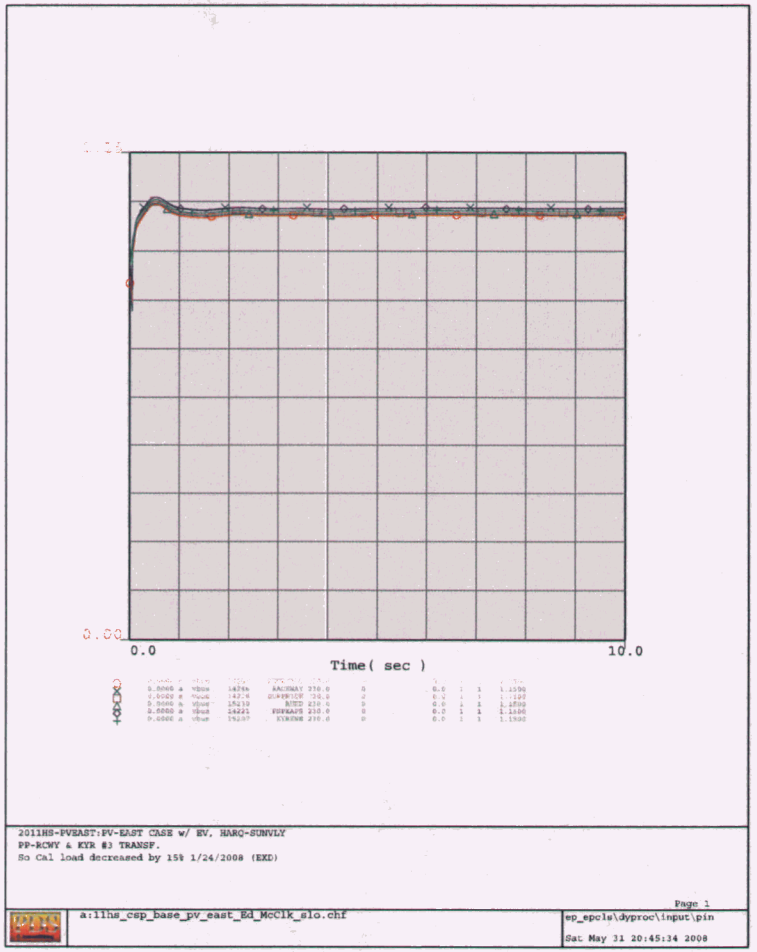
Pre-Project, PV East Max Case
Navajo-Crystal 500 kV line
Transient Bus Voltage Plots



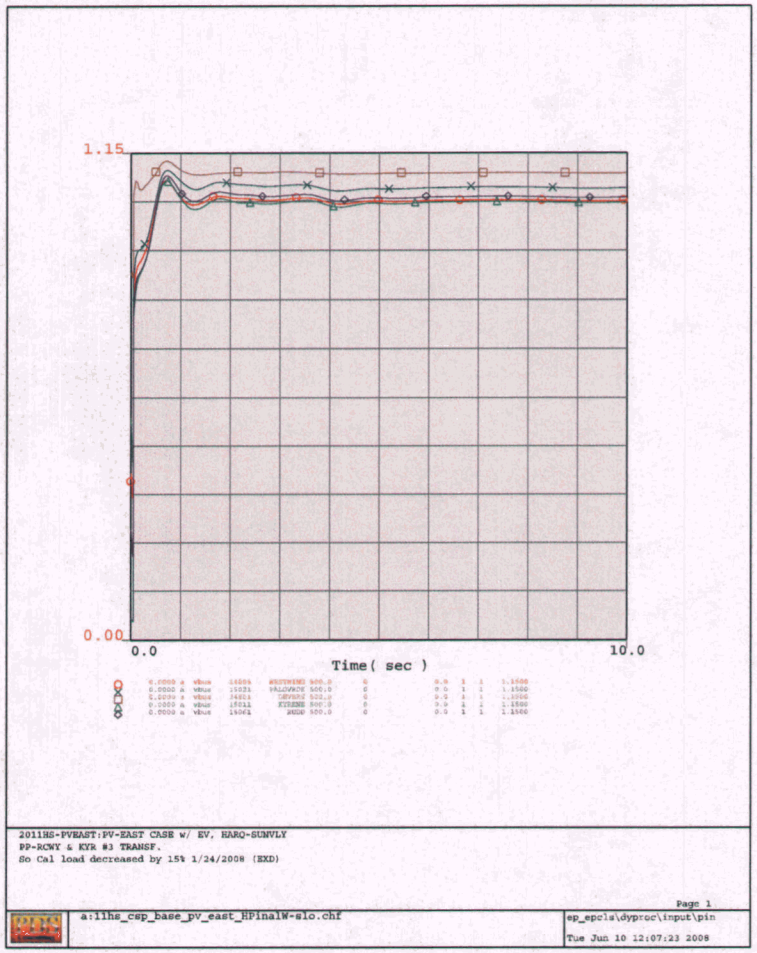
Pre-Project, PV East Max Case
El Dorado-McCullough 500 kV line outage
Transient Bus Voltage Plots



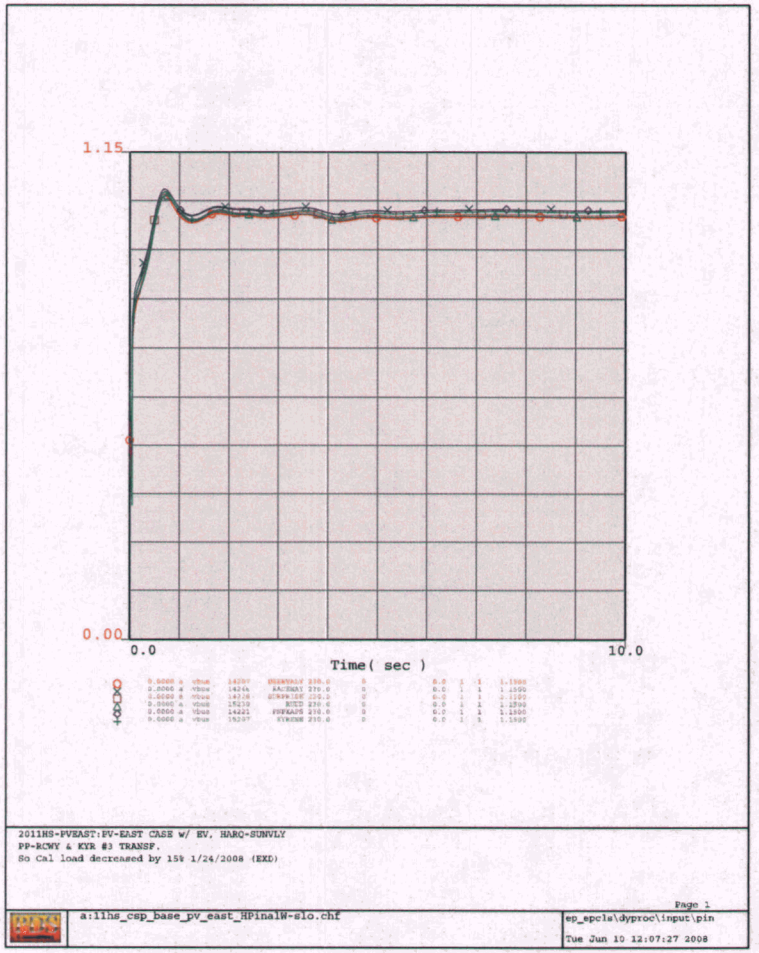
Pre-Project, PV East Max Case
El Dorado-McCullough 500 kV line outage
Transient Bus Voltage Plots



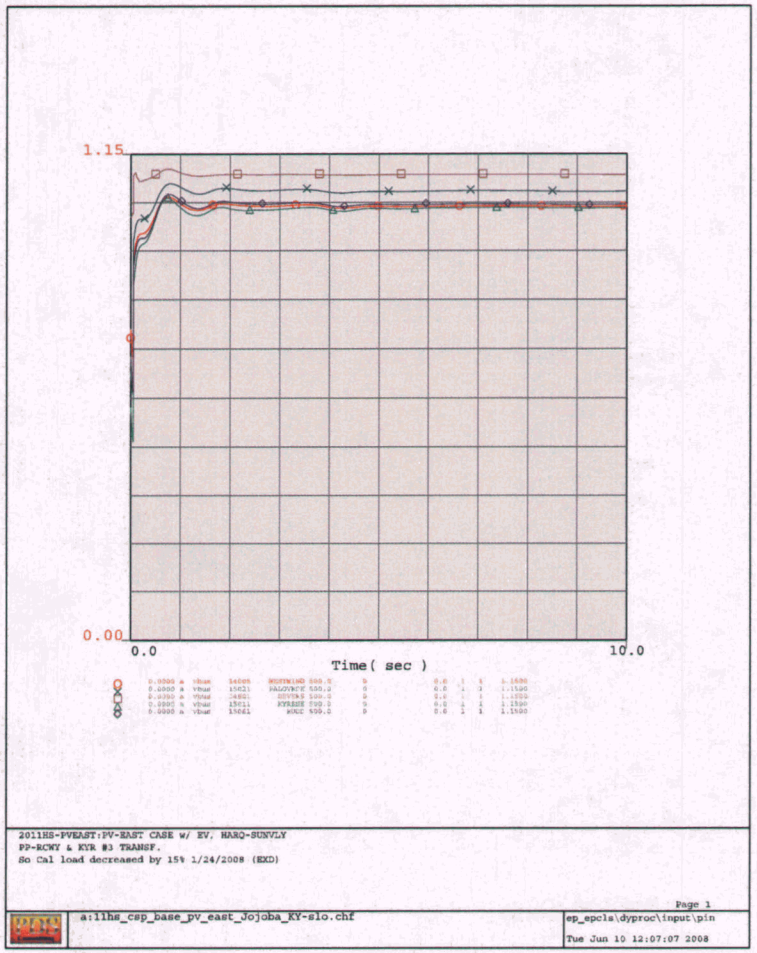
Pre-Project, PV East Max Case
Hassyampa-Pinal West 500 kV line outage
Transient Bus Voltage Plots



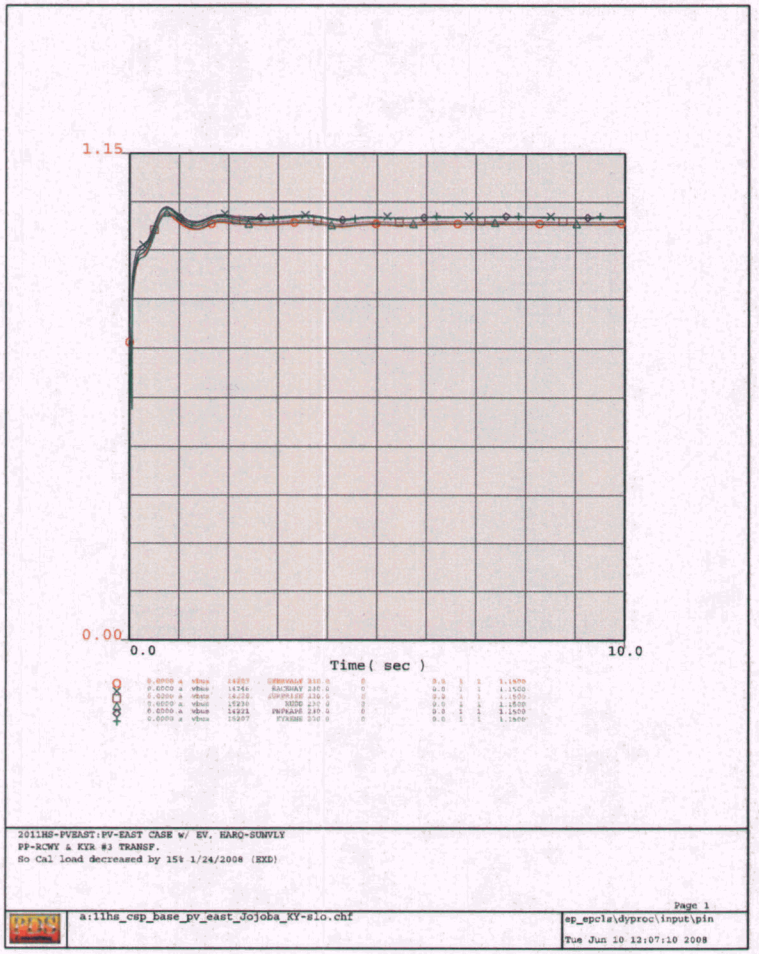
Pre-Project, PV East Max Case
Hassyampa-Pinal West 500 kV line outage
Transient Bus Voltage Plots



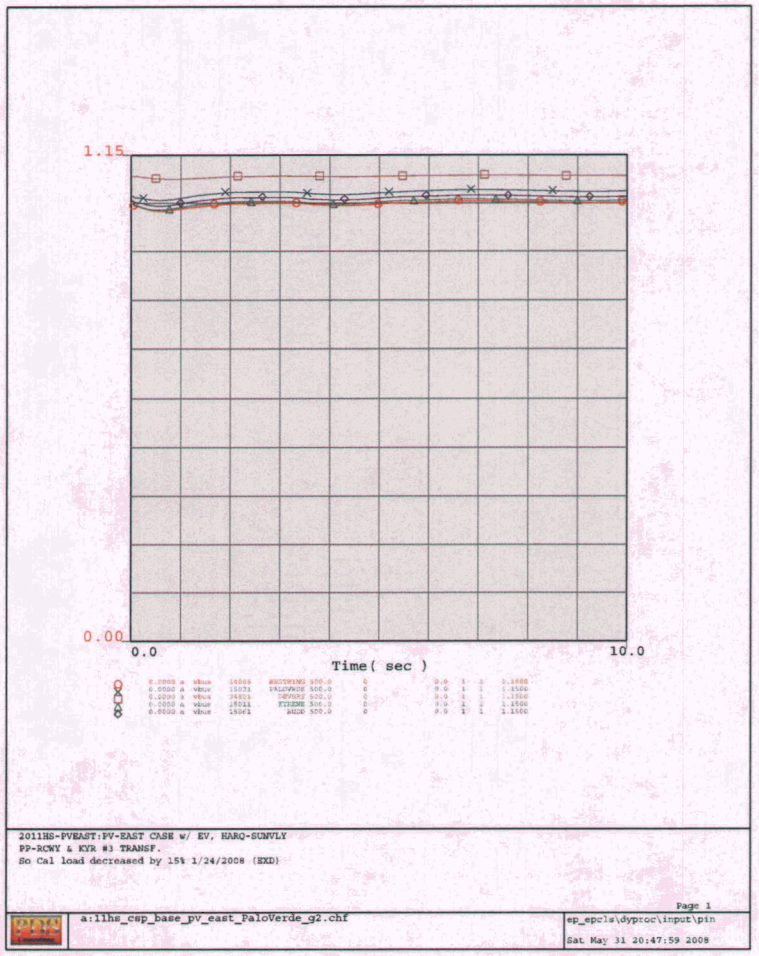
Pre-Project, PV East Max Case
Jojoba-Kyrene 500 kV line outage
Transient Bus Voltage Plots



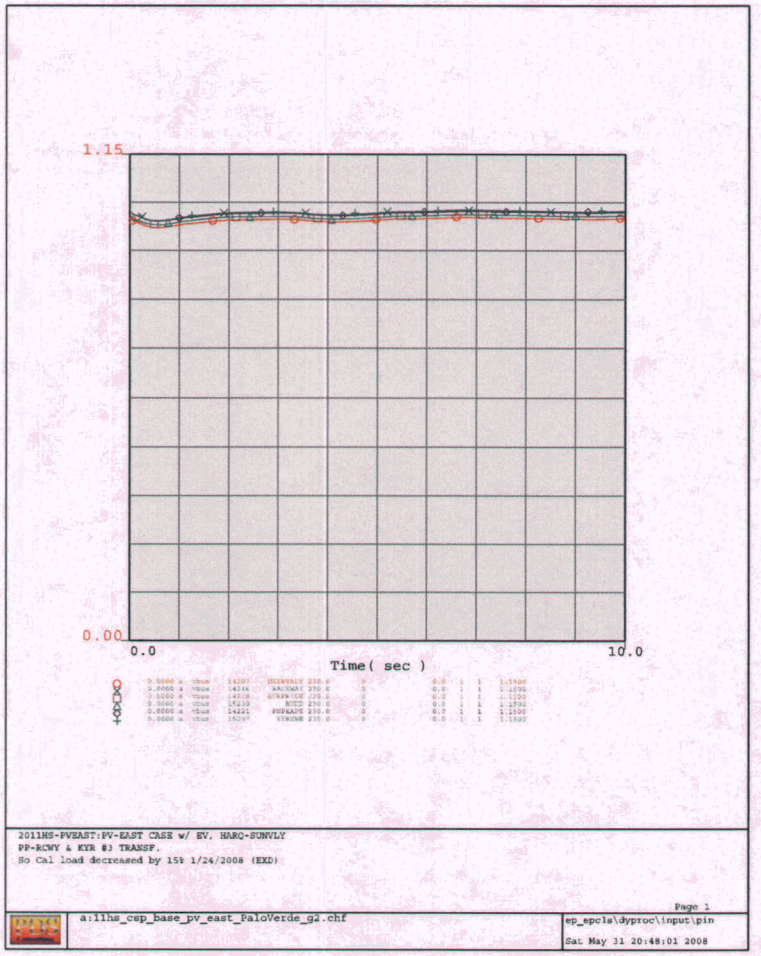
Pre-Project, PV East Max Case
Jojoba-Kyrene 500 kV line outage
Transient Bus Voltage Plots



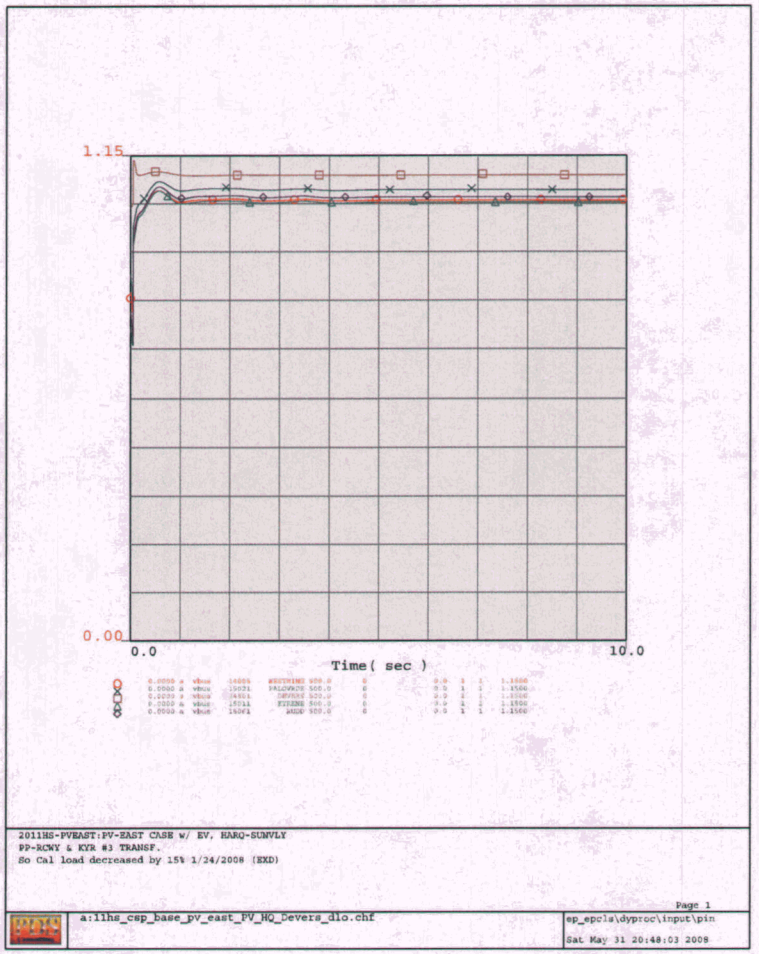
Pre-Project, PV East Max Case
Palo Verde G-2 outage
Transient Bus Voltage Plots



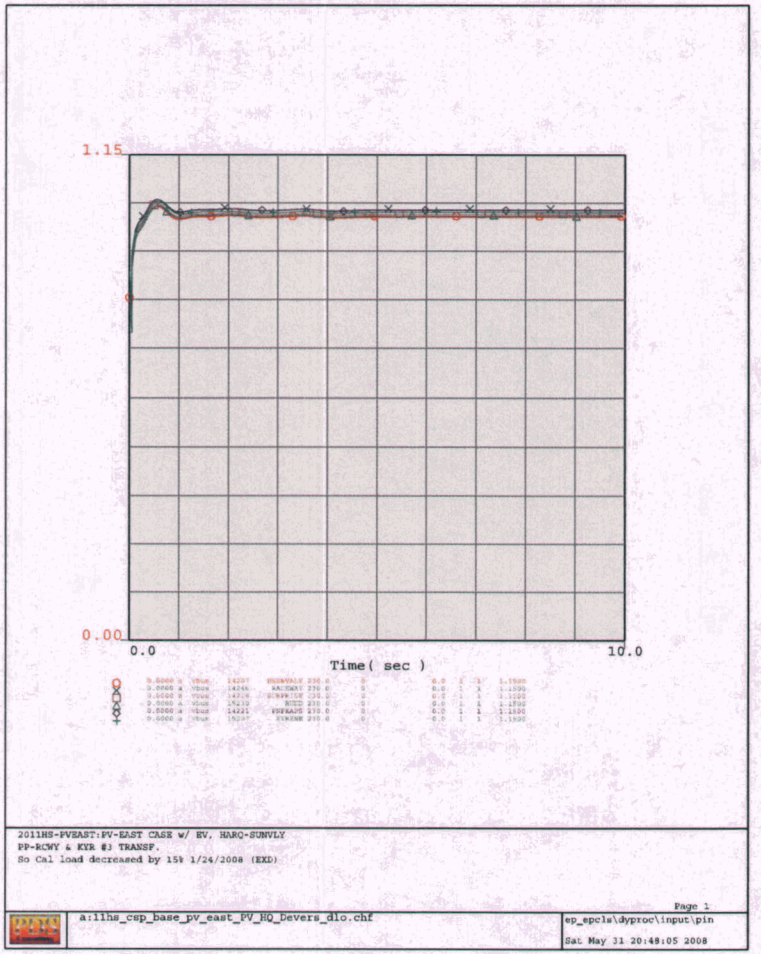
Pre-Project, PV East Max Case
Palo Verde G-2 outage
Transient Bus Voltage Plots



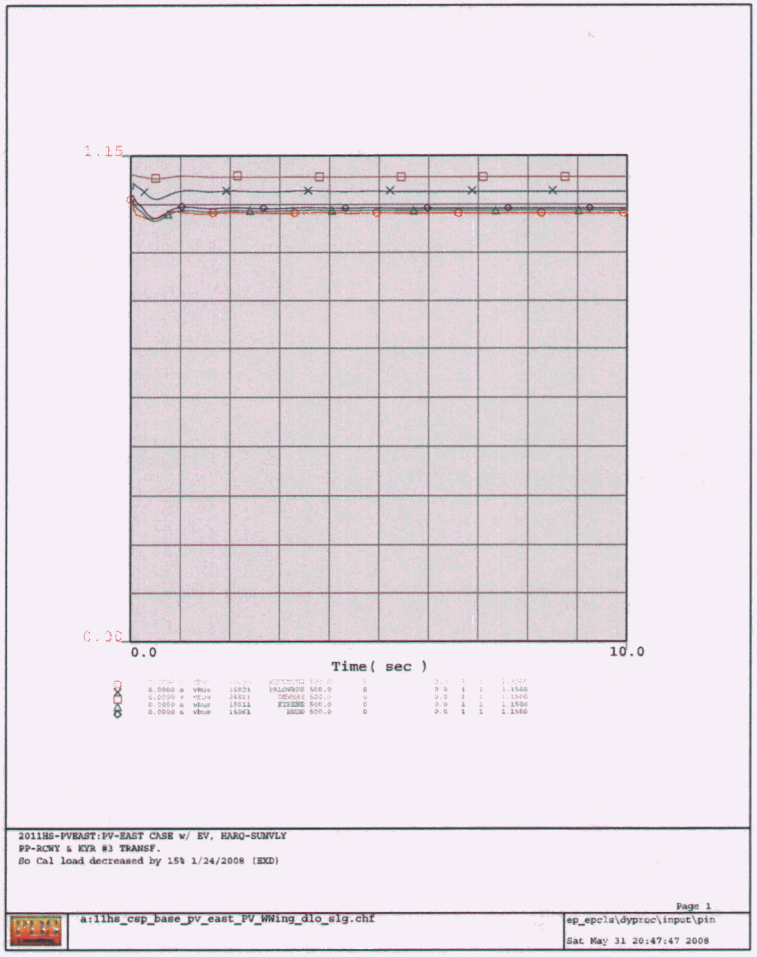
Pre-Project, PV East Max Case
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Bus Voltage Plots



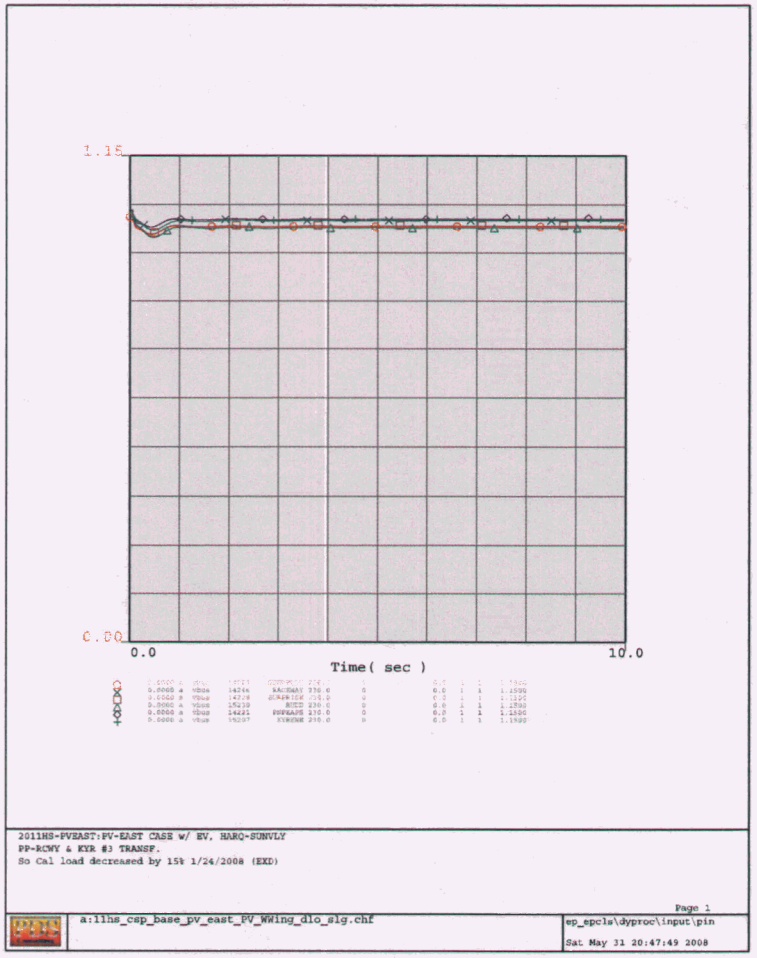
Pre-Project, PV East Max Case
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Bus Voltage Plots



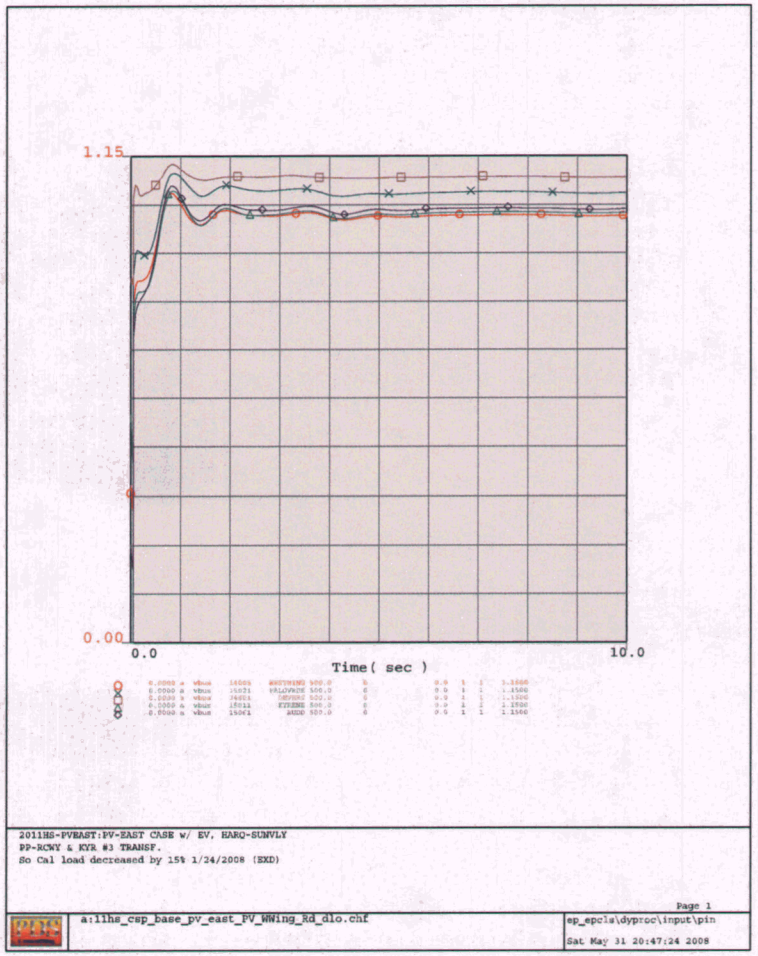
Pre-Project, PV East Max Case
PV-Westwing #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



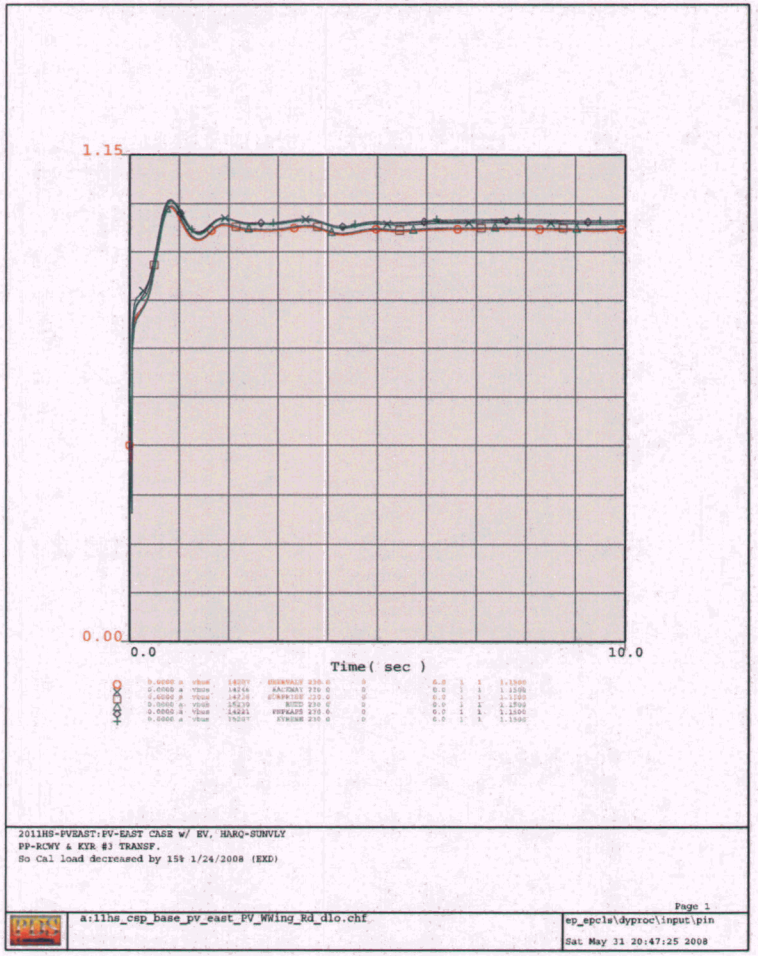
Pre-Project, PV East Max Case
PV-Westwing #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



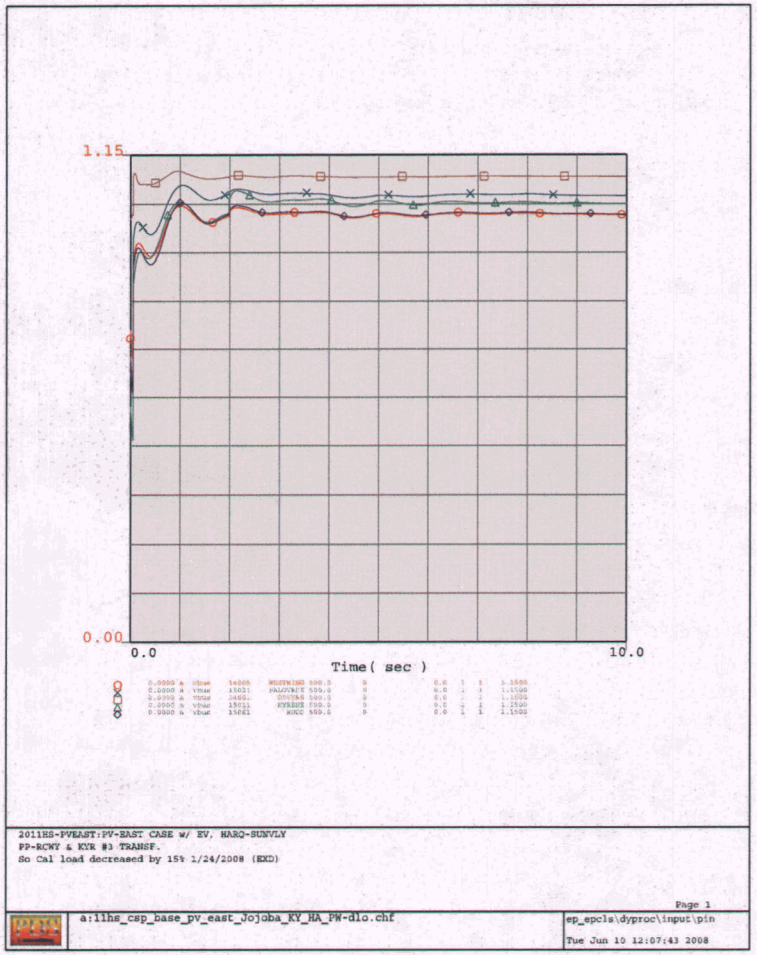
Pre-Project, PV East Max Case
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Bus Voltage Plots



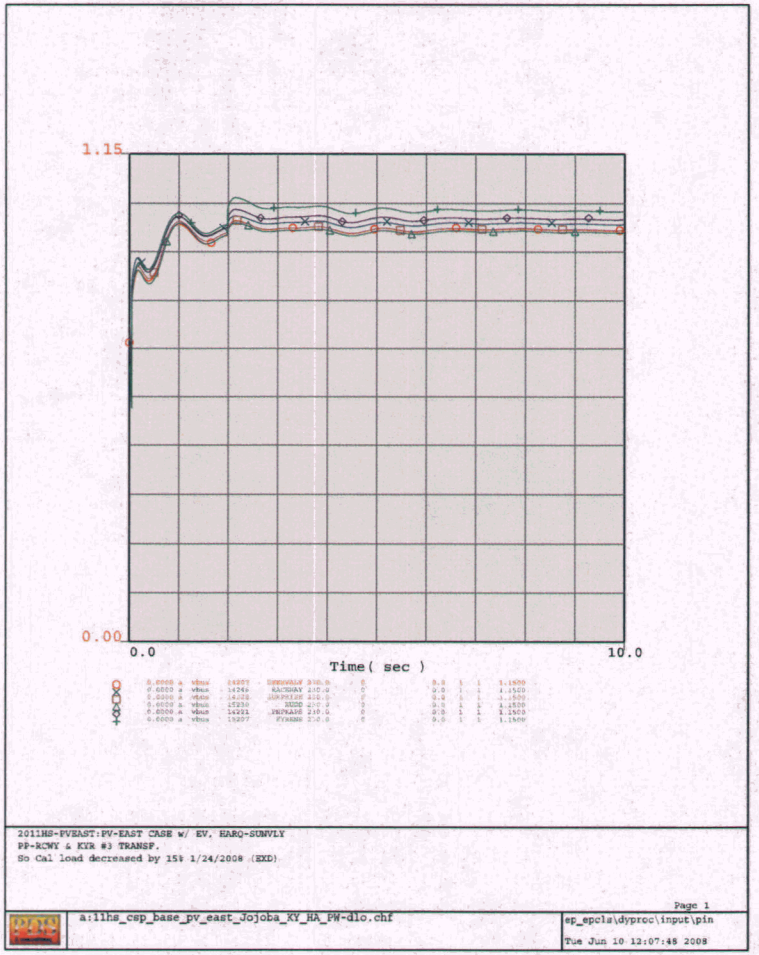
Pre-Project, PV East Max Case
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Bus Voltage Plots



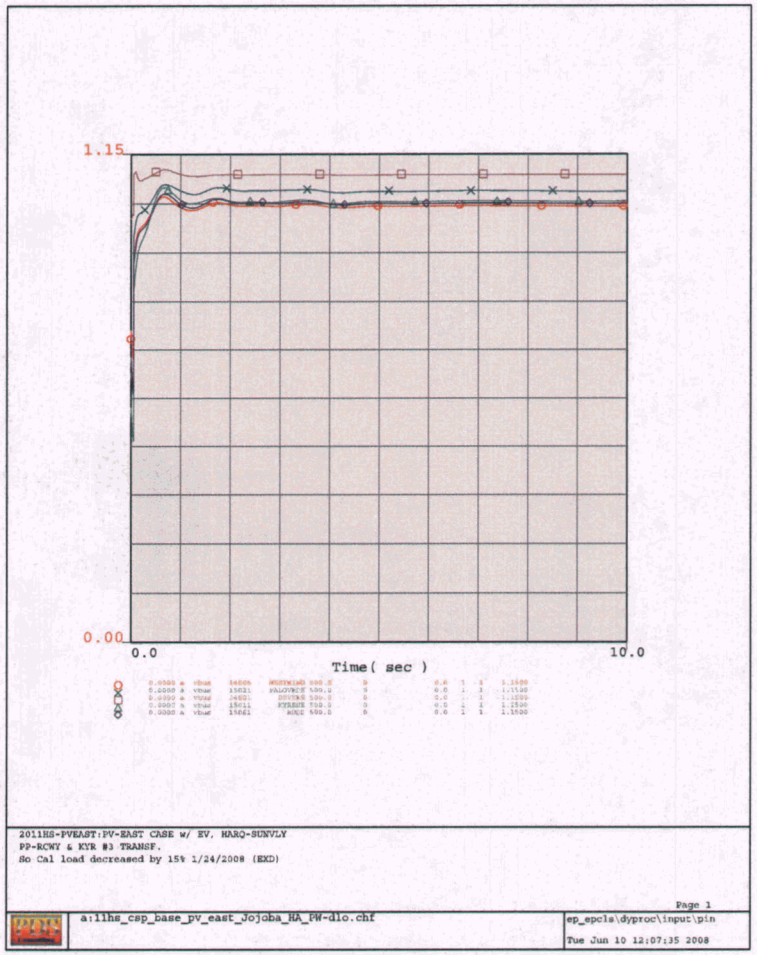
Pre-Project, PV East Max Case
HA-Pinal West, Jojoba-Kyrene 500 kV lines outage
Transient Bus Voltage Plots



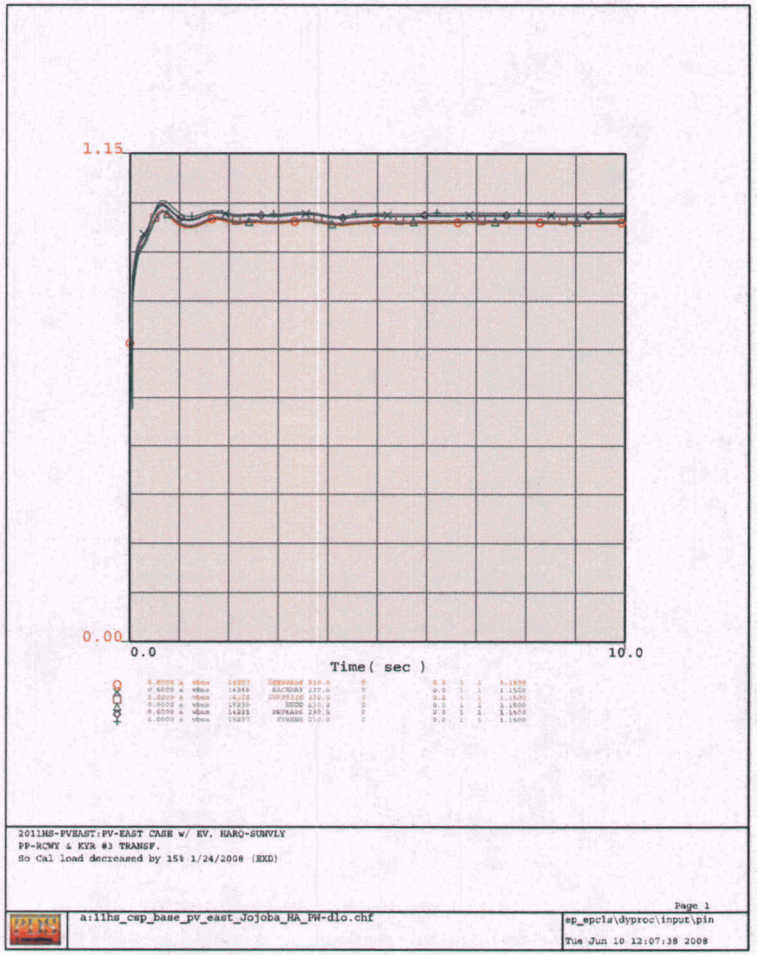
Pre-Project, PV East Max Case
HA-Pinal West, Jojoba-Kyrene 500 kV lines outage
Transient Bus Voltage Plots



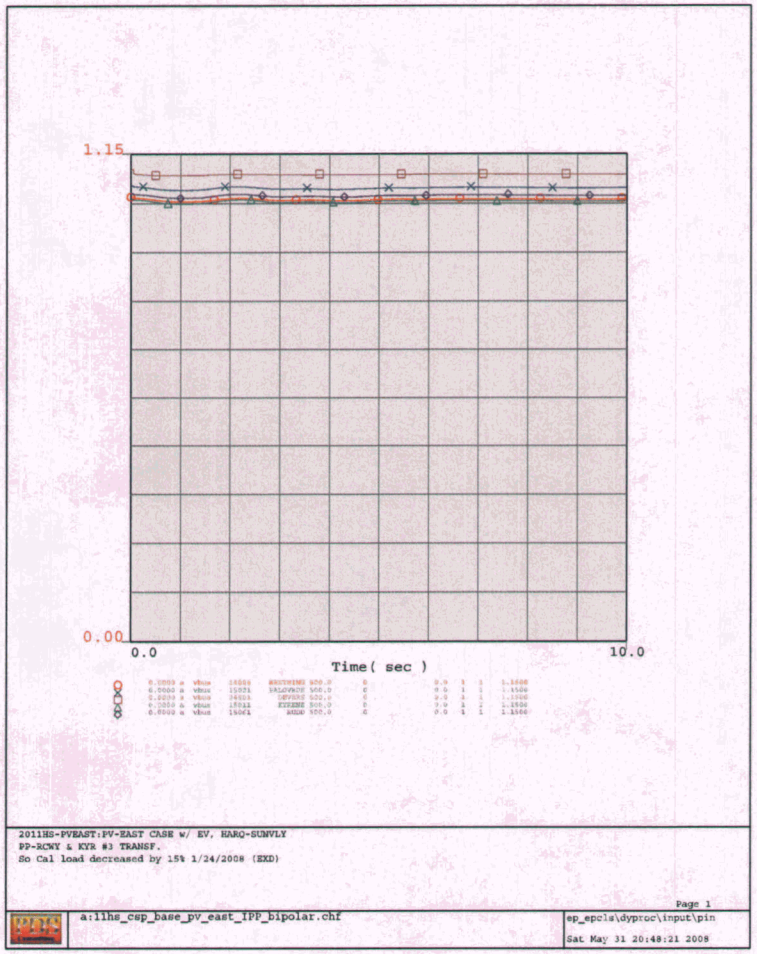
Pre-Project, PV East Max Case
HA-Pinal West, HA-Jojoba 500 kV lines outage
Transient Bus Voltage Plots



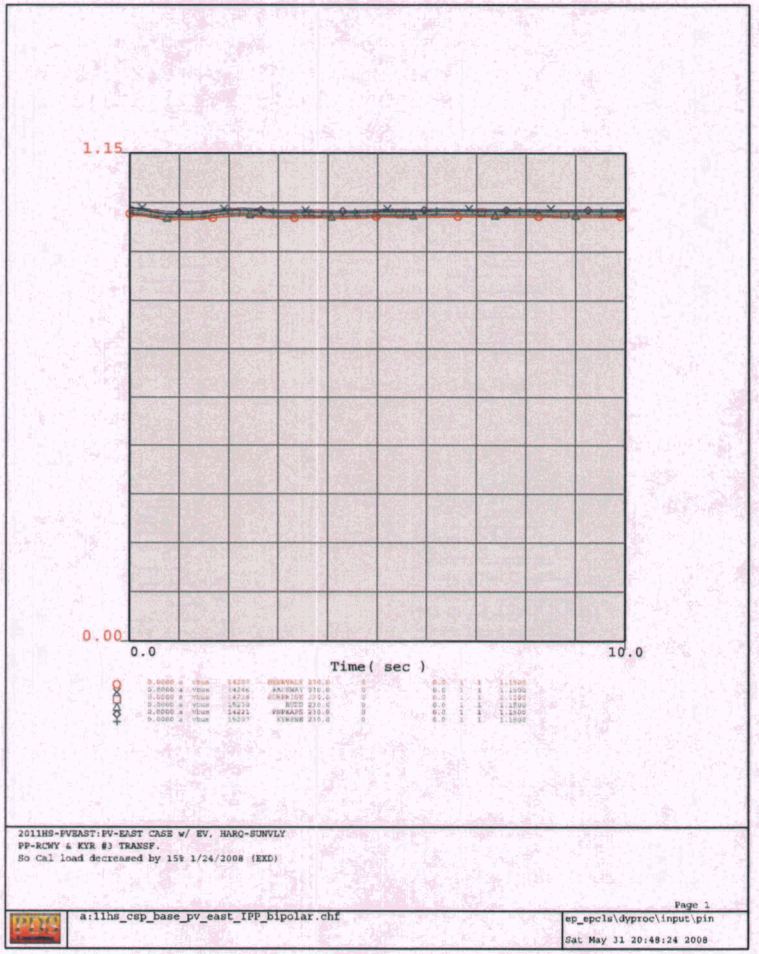
Pre-Project, PV East Max Case
HA-Pinal West, HA-Jojoba 500 kV lines outage
Transient Bus Voltage Plots



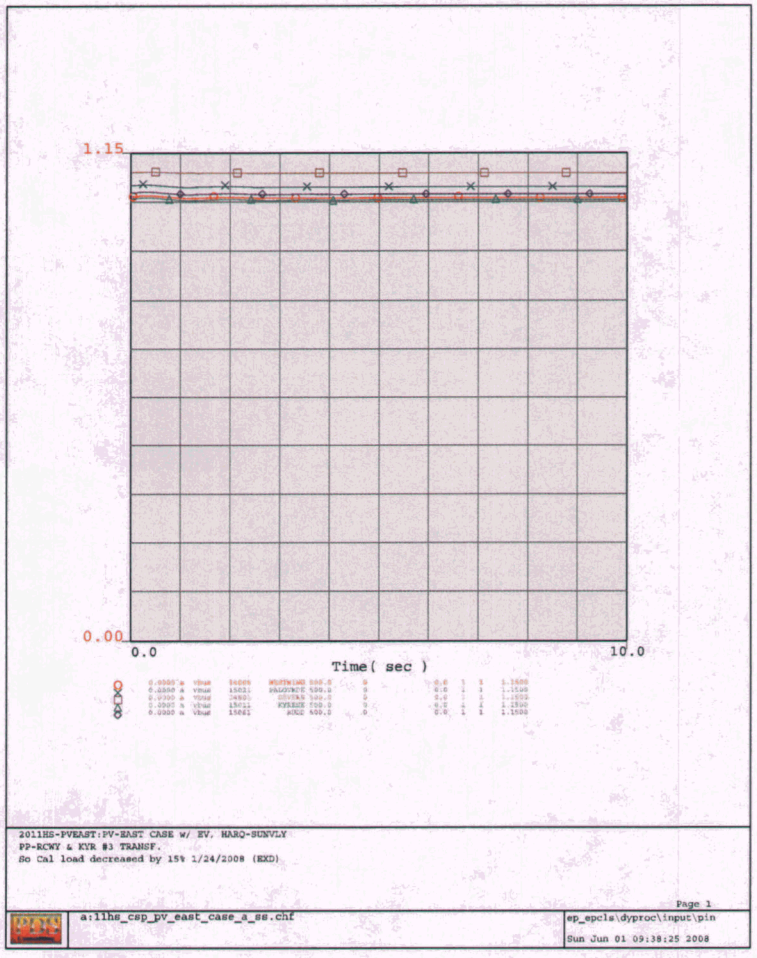
Pre-Project, PV East Max Case
IPP Bipole outage
Transient Bus Voltage Plots



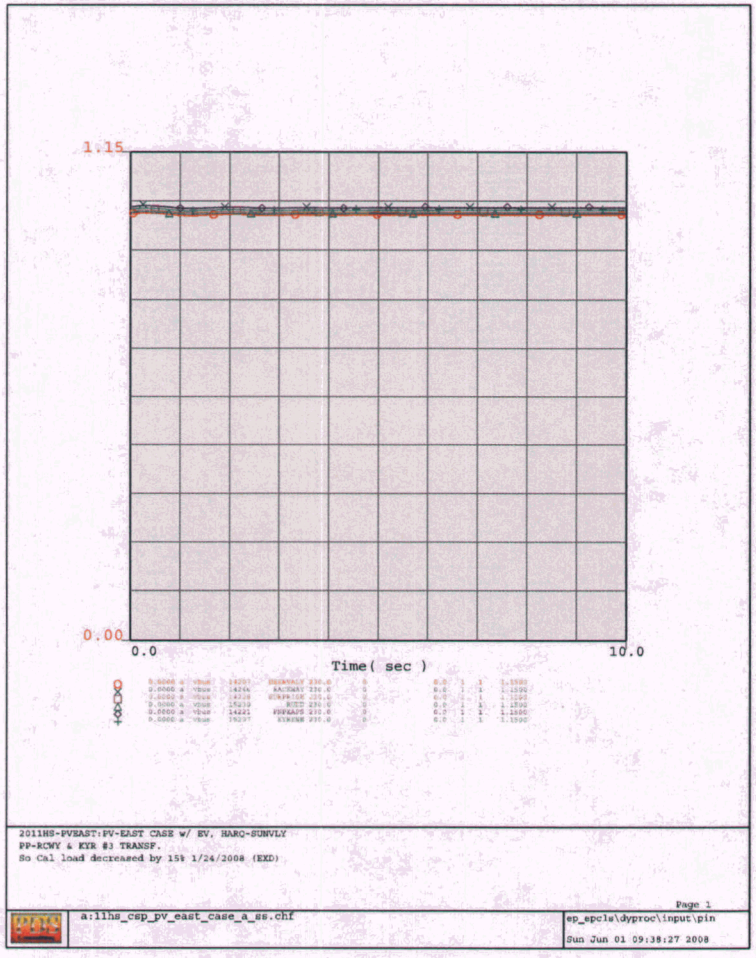
Pre-Project, PV East Max Case
IPP Bipole outage
Transient Bus Voltage Plots



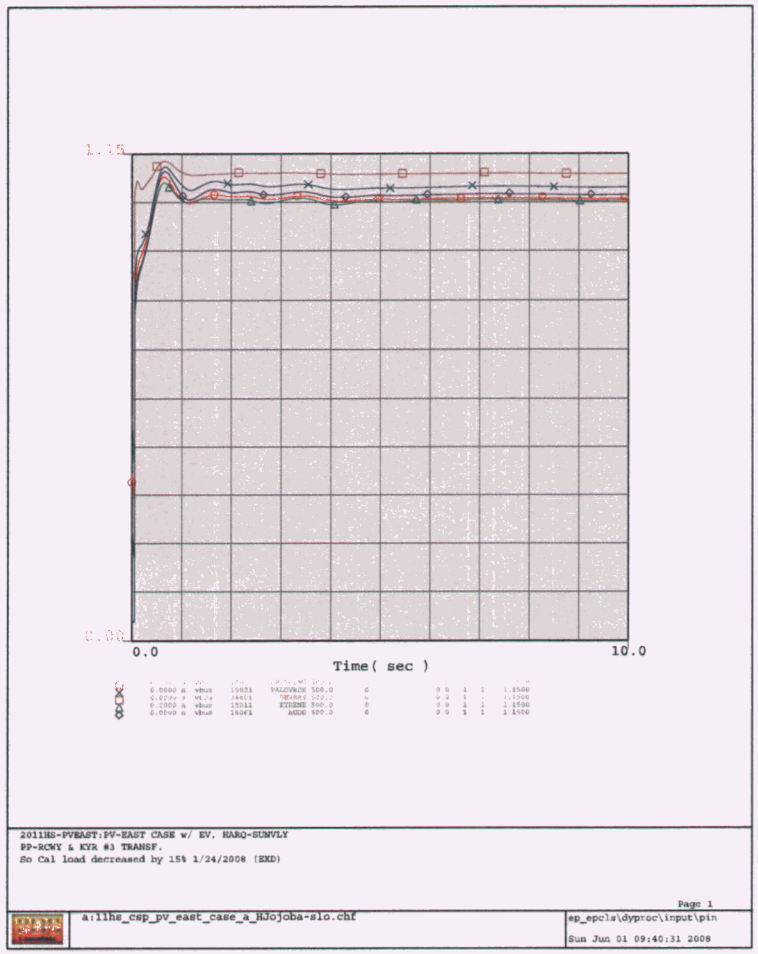
Post-Project, PV East Max Case A
No Outage
Transient Bus Voltage Plots



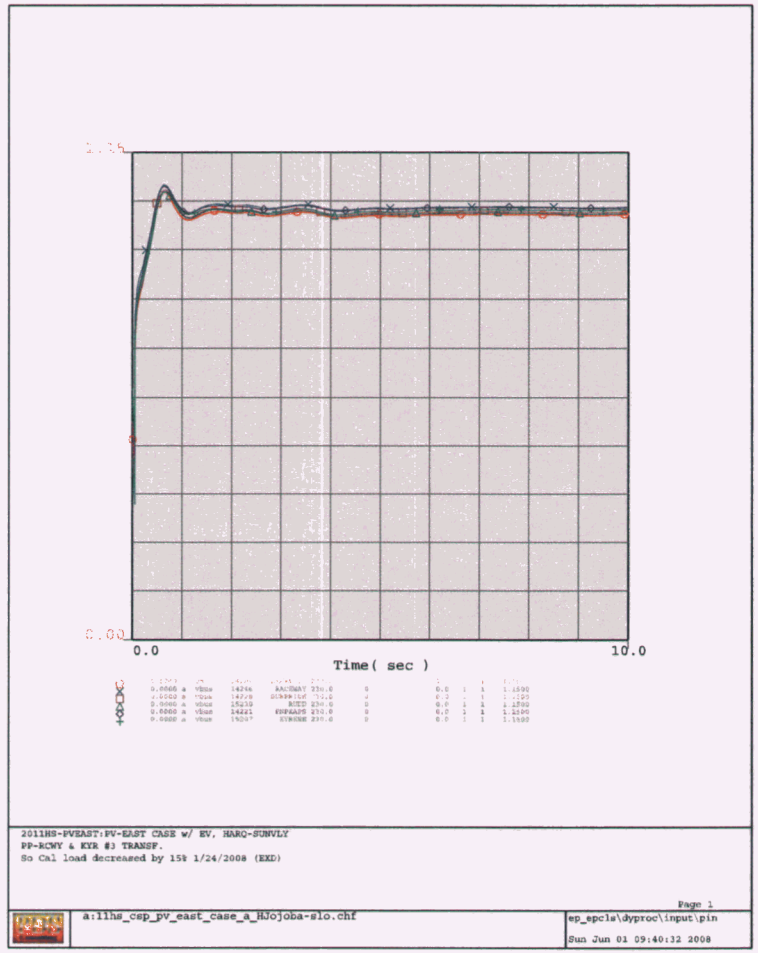
Post-Project, PV East Max Case A
No Outage
Transient Bus Voltage Plots



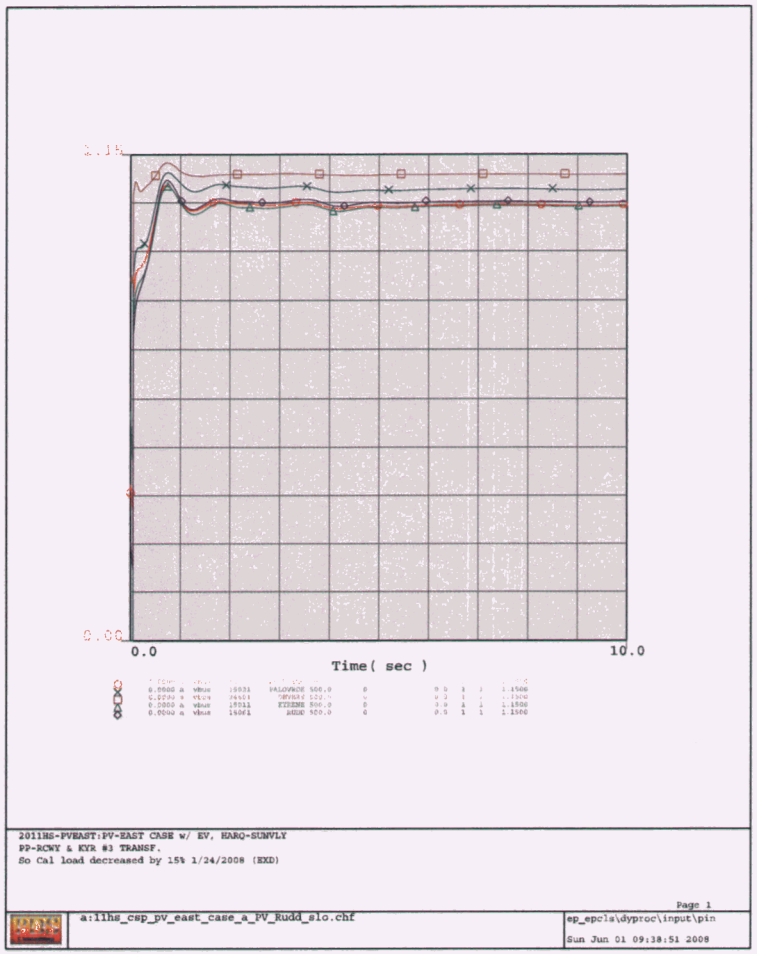
Post-Project, PV East Max Case A
Hassayampa-Jojoba 500 kV line outage
Transient Bus Voltage Plots



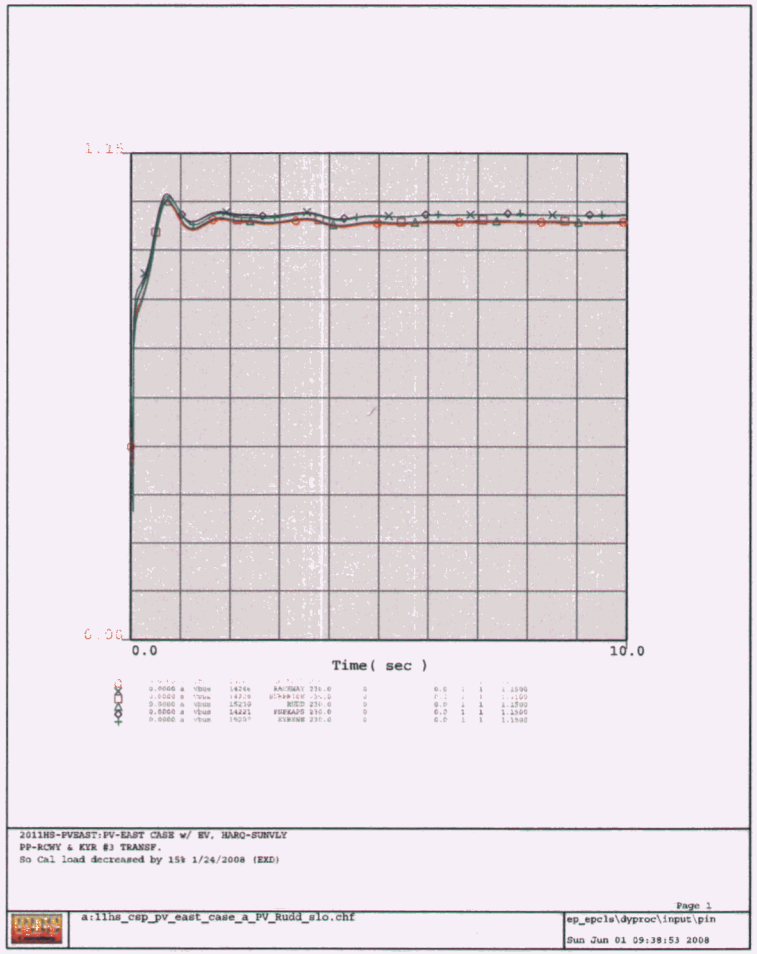
Post-Project, PV East Max Case A
Hassayampa-Jojoba 500 kV line outage
Transient Bus Voltage Plots



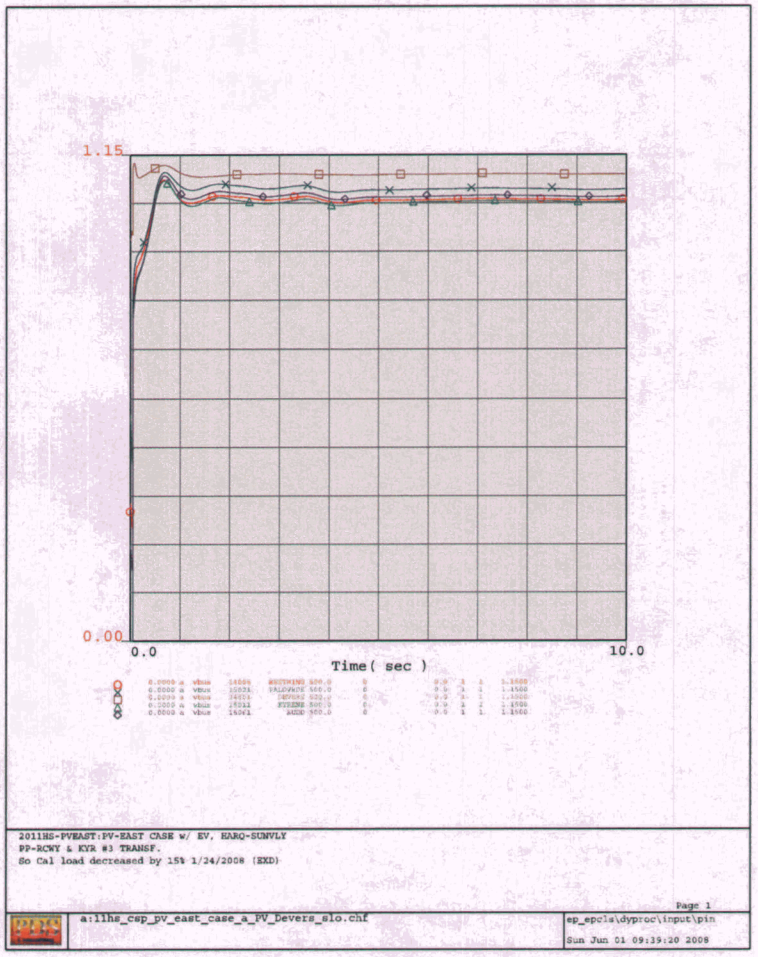
Post-Project, PV East Max Case A
Palo Verde-Rudd 500 kV line outage
Transient Bus Voltage Plots



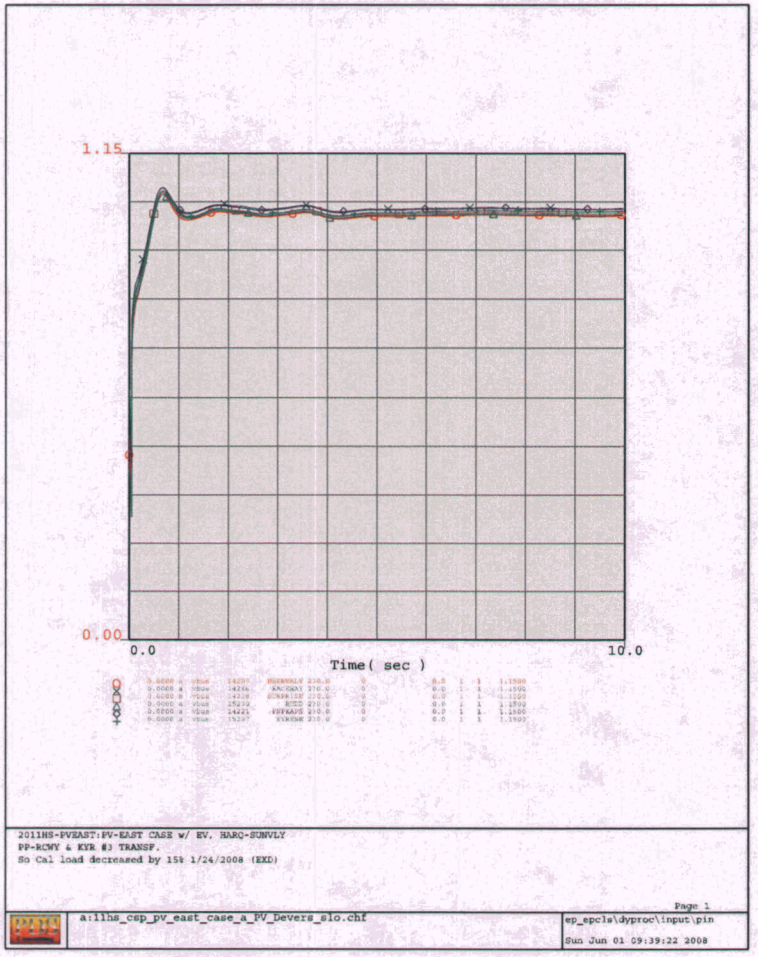
Post-Project, PV East Max Case A
Palo Verde-Rudd 500 kV line outage
Transient Bus Voltage Plots



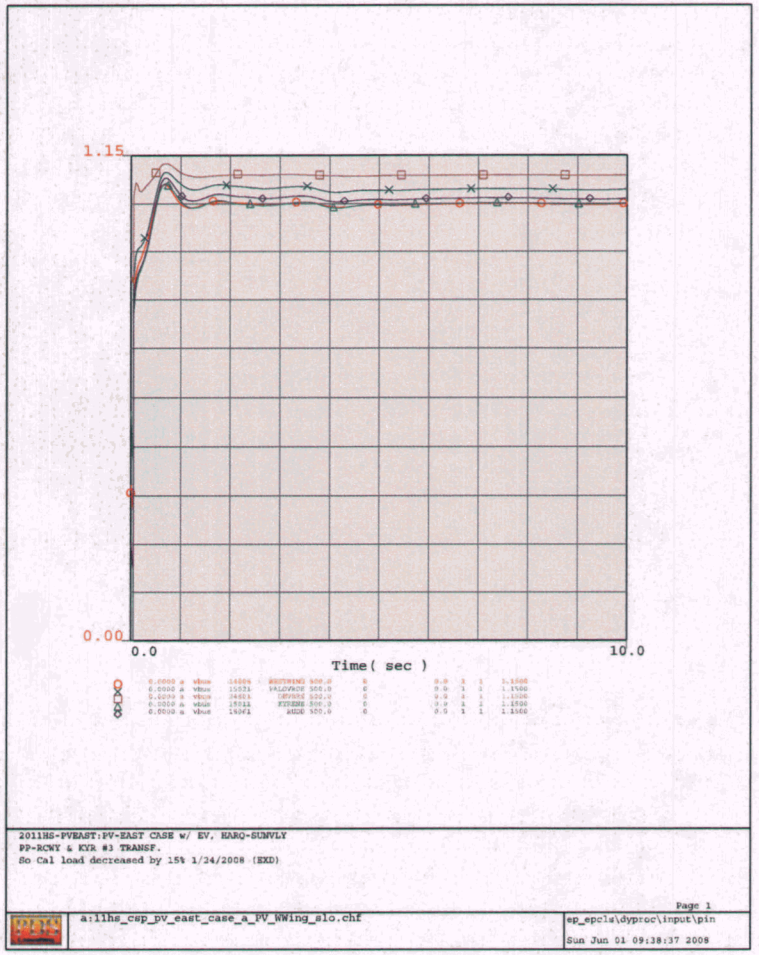
Post-Project, PV East Max Case A
Palo Verde-Devers 500 kV line outage
Transient Bus Voltage Plots



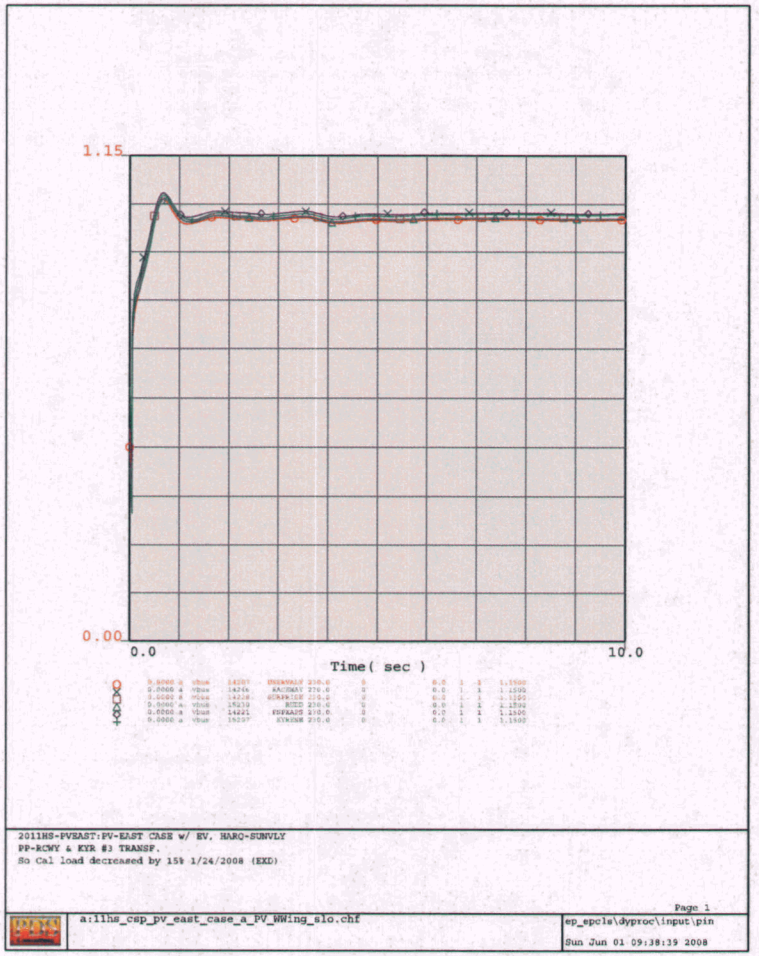
Post-Project, PV East Max Case A
Palo Verde-Devers 500 kV line outage
Transient Bus Voltage Plots



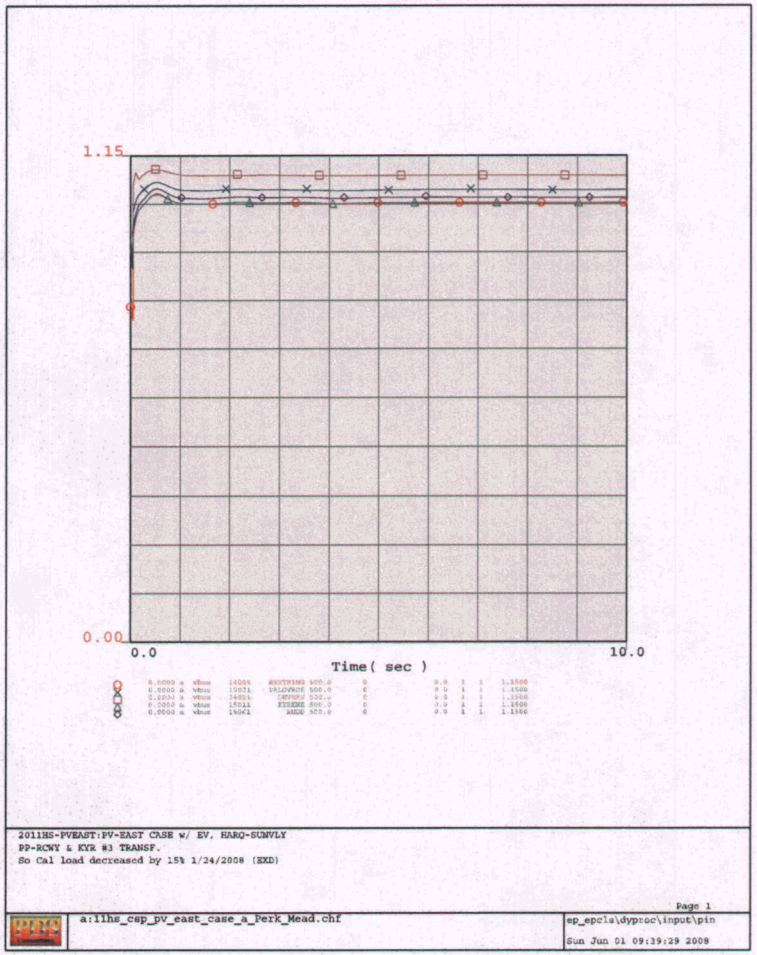
Post-Project, PV East Max Case A
Palo Verde-Westwing 500 kV line outage
Transient Bus Voltage Plots



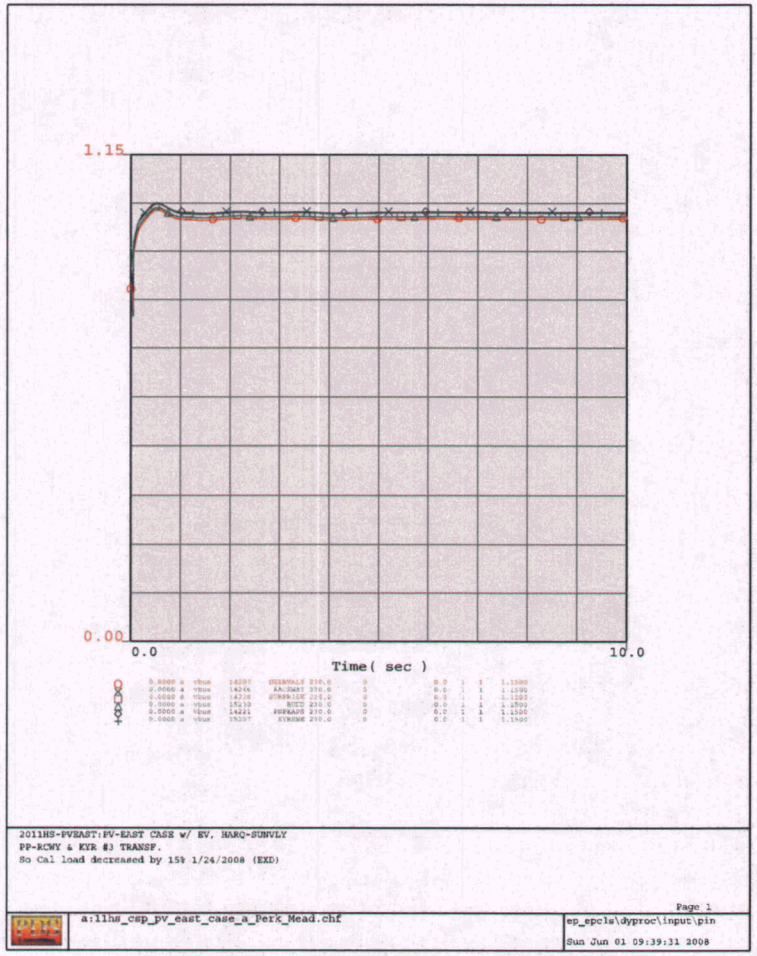
Post-Project, PV East Max Case A
Palo Verde-Westwing 500 kV line outage
Transient Bus Voltage Plots



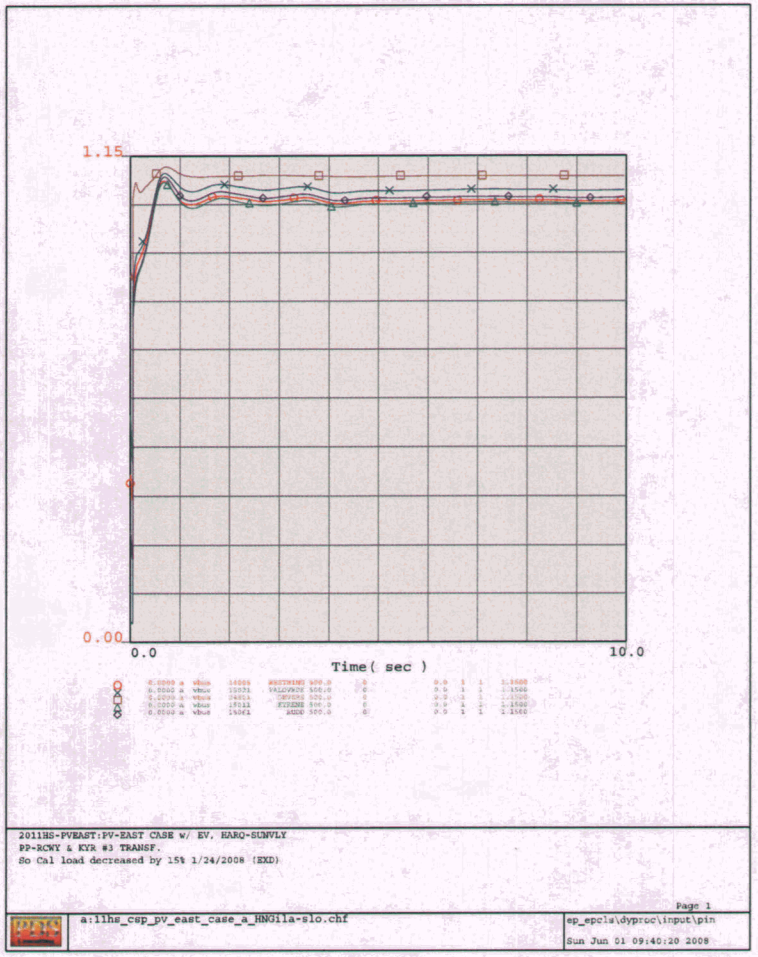
Post-Project, PV East Max Case A
Perkins-Mead 500 kV line outage
Transient Bus Voltage Plots



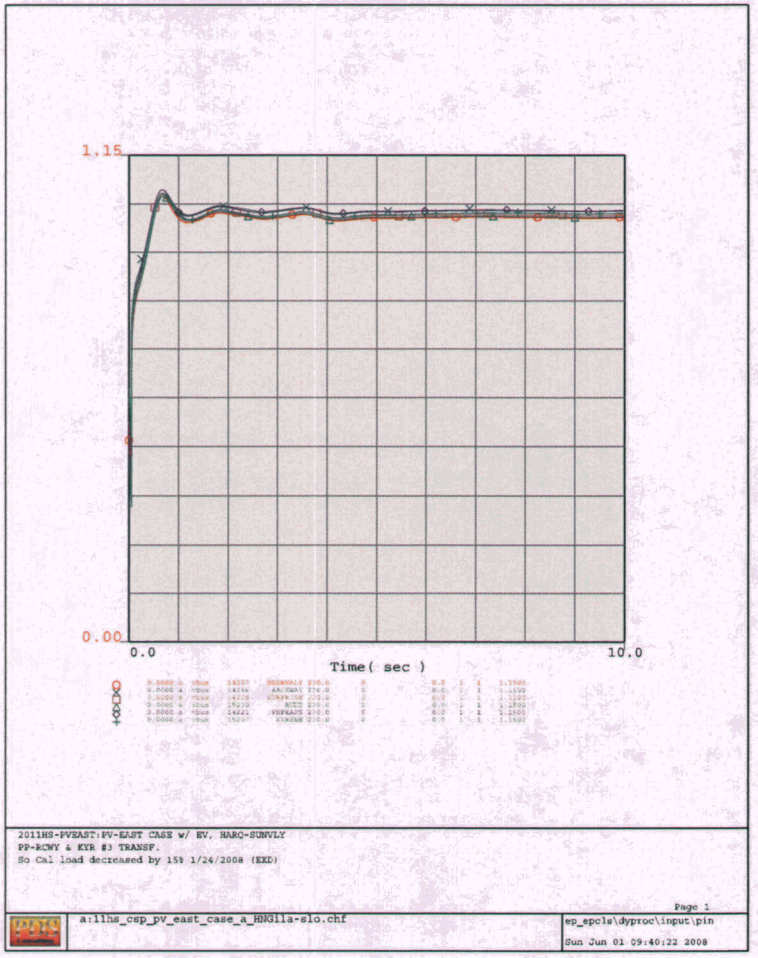
Post-Project, PV East Max Case A
Perkins-Mead 500 kV line outage
Transient Bus Voltage Plots



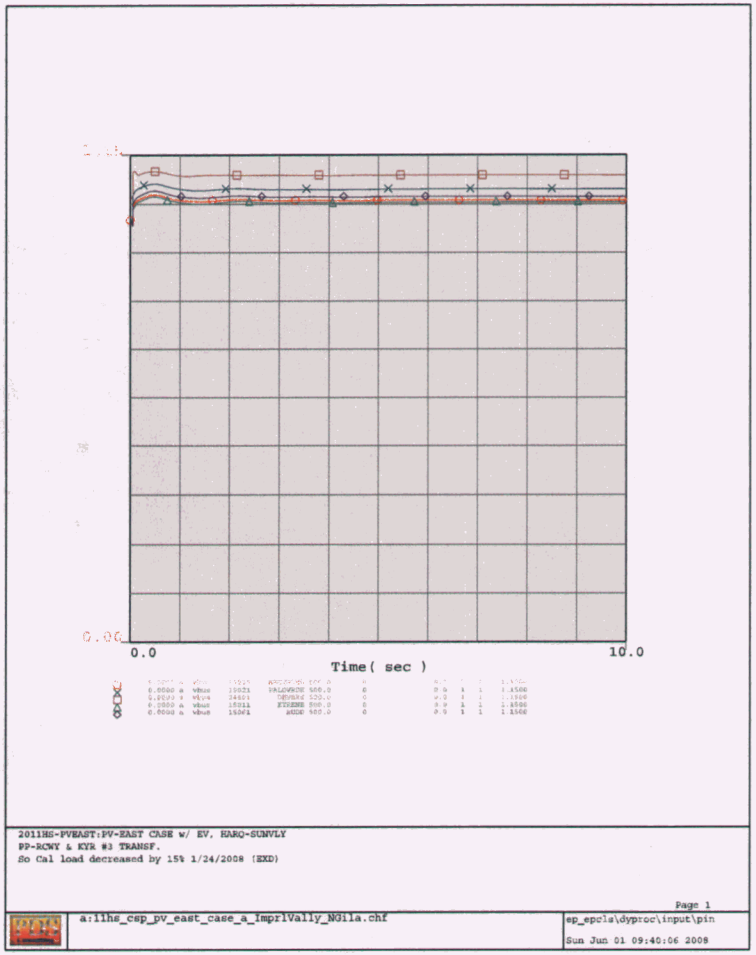
Post-Project, PV East Max Case A
Hassayampa -N. Gila 500 kV line outage
Transient Bus Voltage Plots



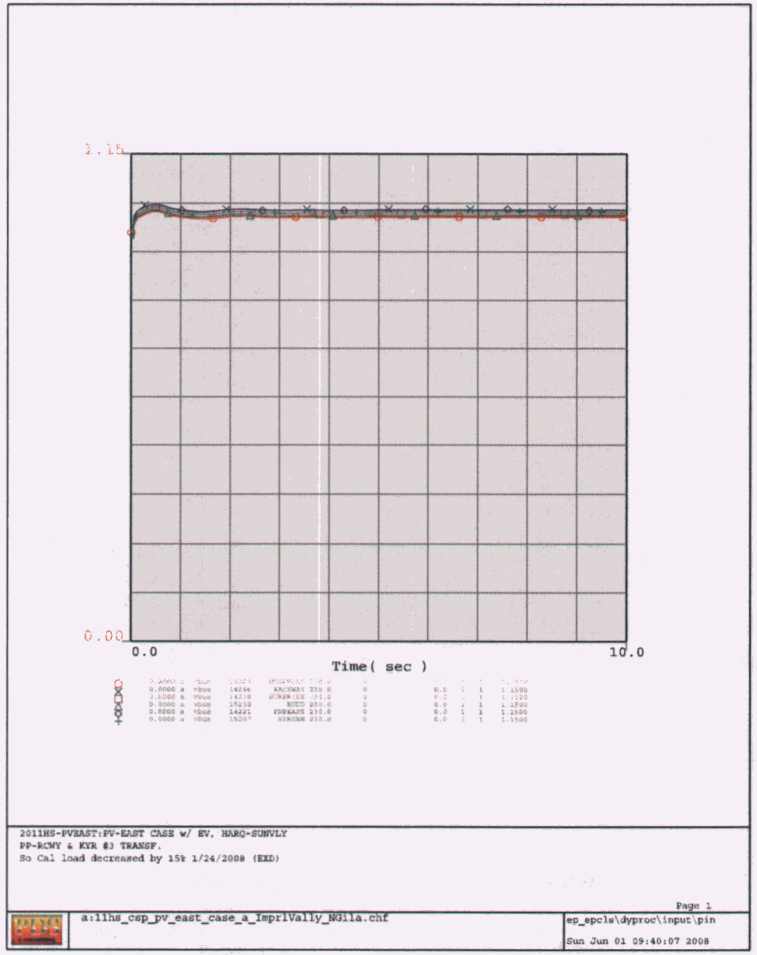
Post-Project, PV East Max Case A
Hassayampa -N. Gila 500 kV line outage
Transient Bus Voltage Plots



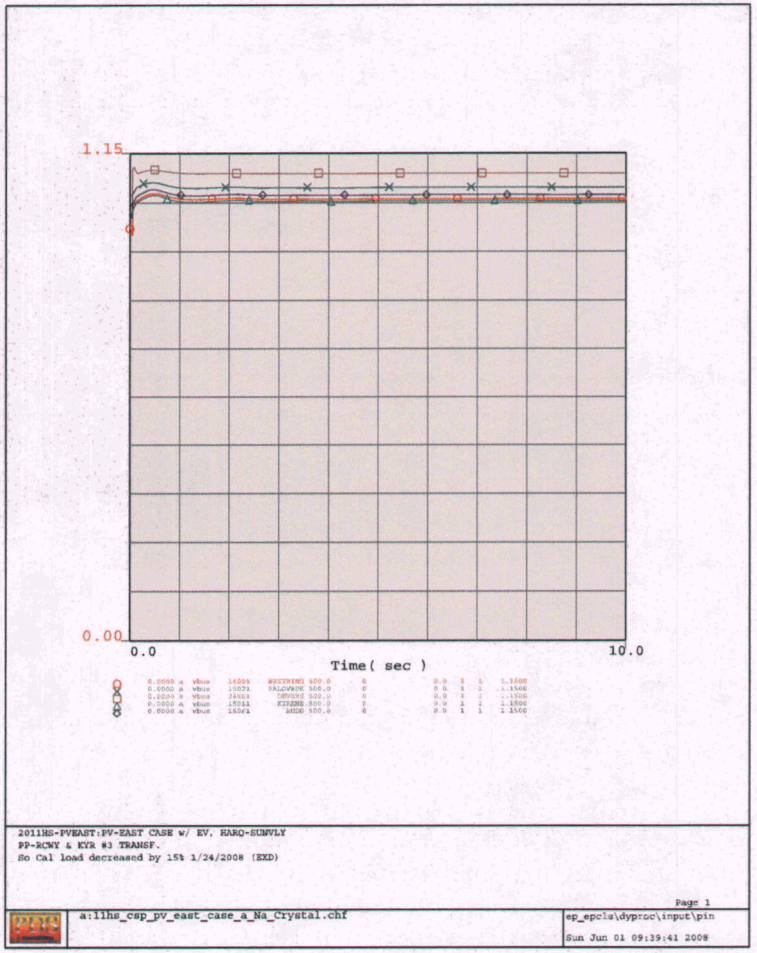
Post-Project, PV East Max Case A
N. Gila-Imperial Valley 500 kV line outage
Transient Bus Voltage Plots



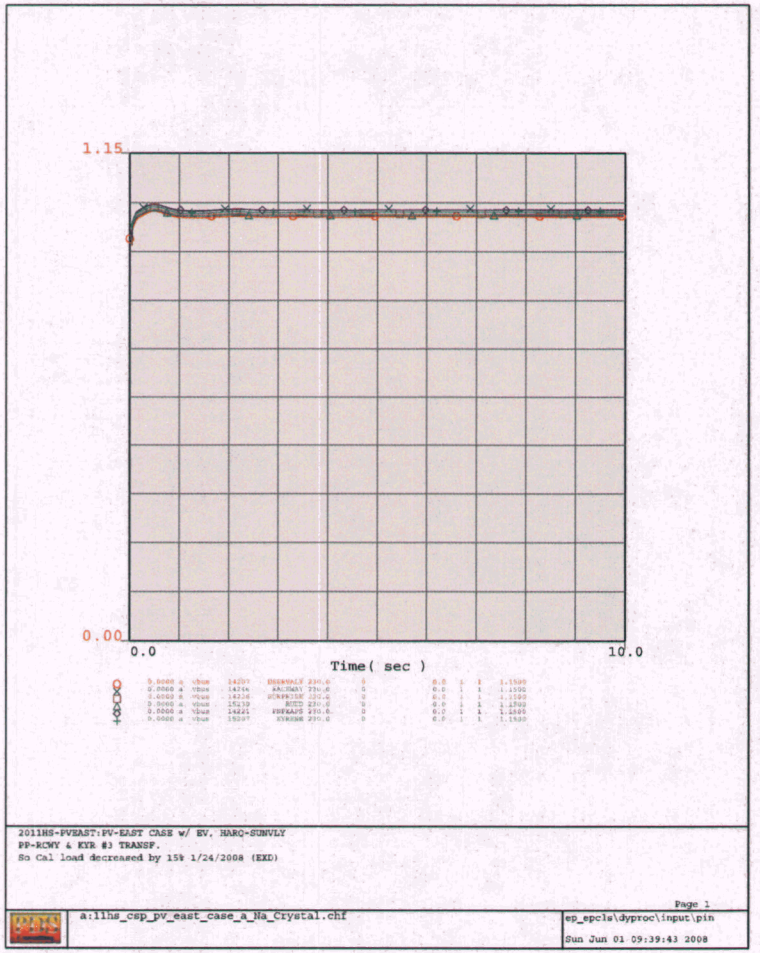
Post-Project, PV East Max Case A
N. Gila-Imperial Valley 500 kV line outage
Transient Bus Voltage Plots



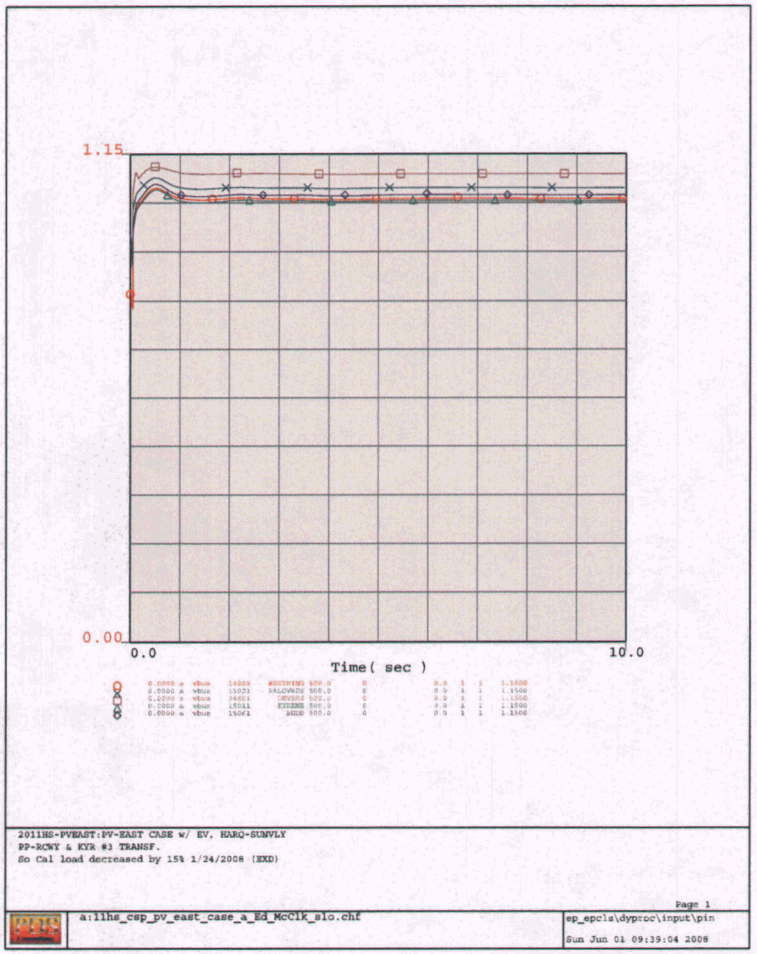
Post-Project, PV East Max Case A
Navajo-Crystal 500 kV line
Transient Bus Voltage Plots



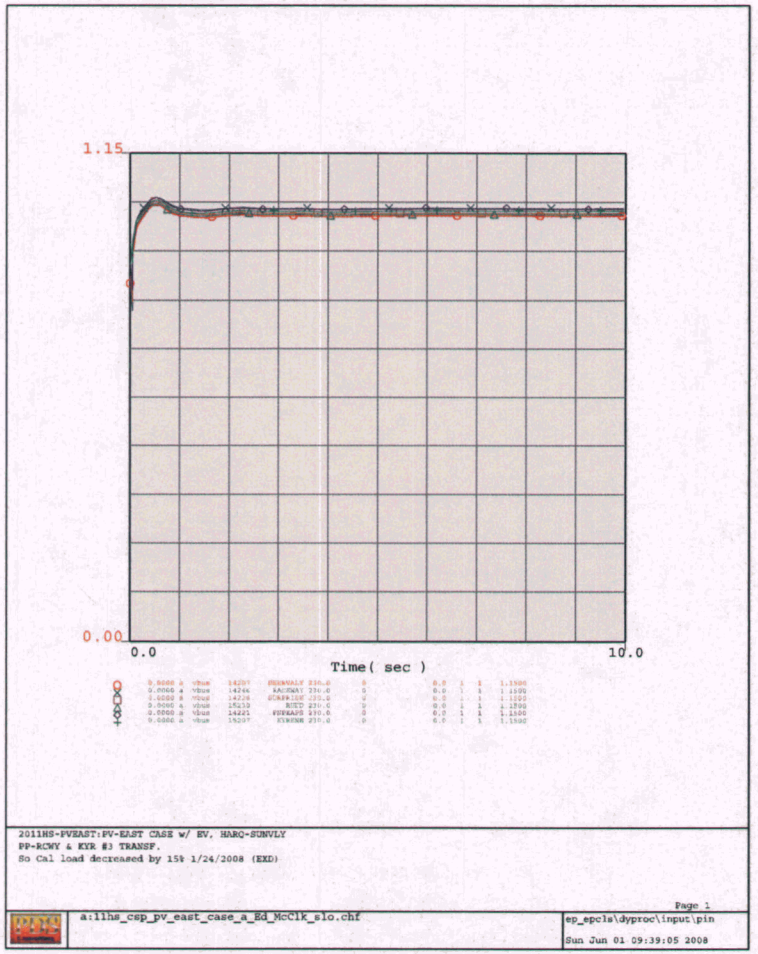
Post-Project, PV East Max Case A
Navajo-Crystal 500 kV line
Transient Bus Voltage Plots



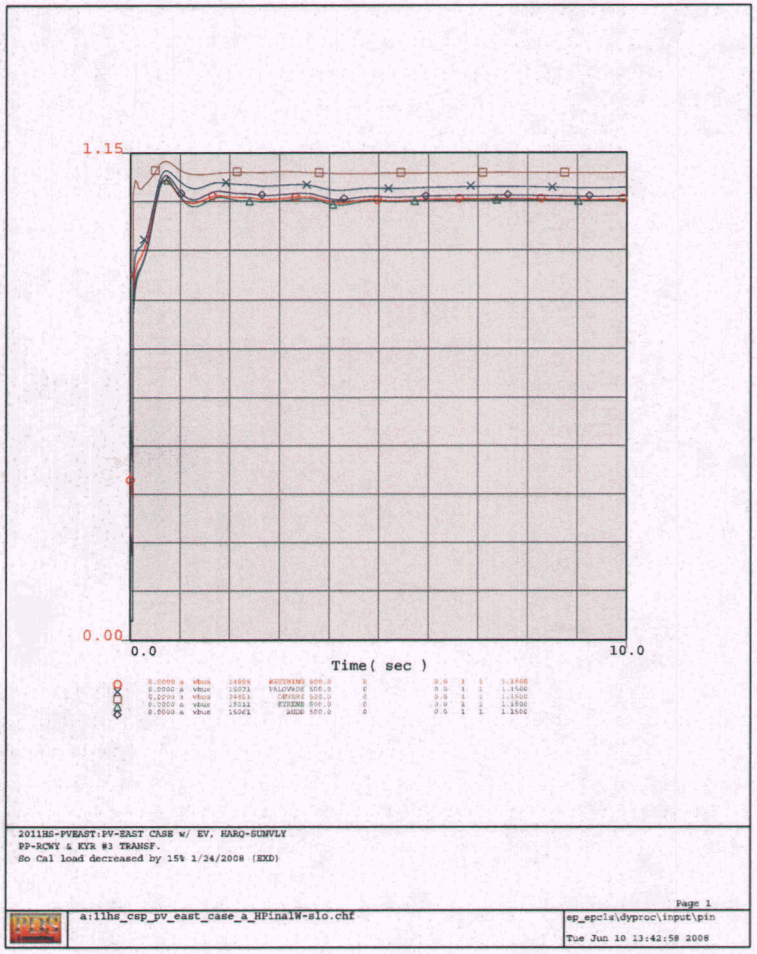
Post-Project, PV East Max Case A
El Dorado-McCullough 500 kV line outage
Transient Bus Voltage Plots



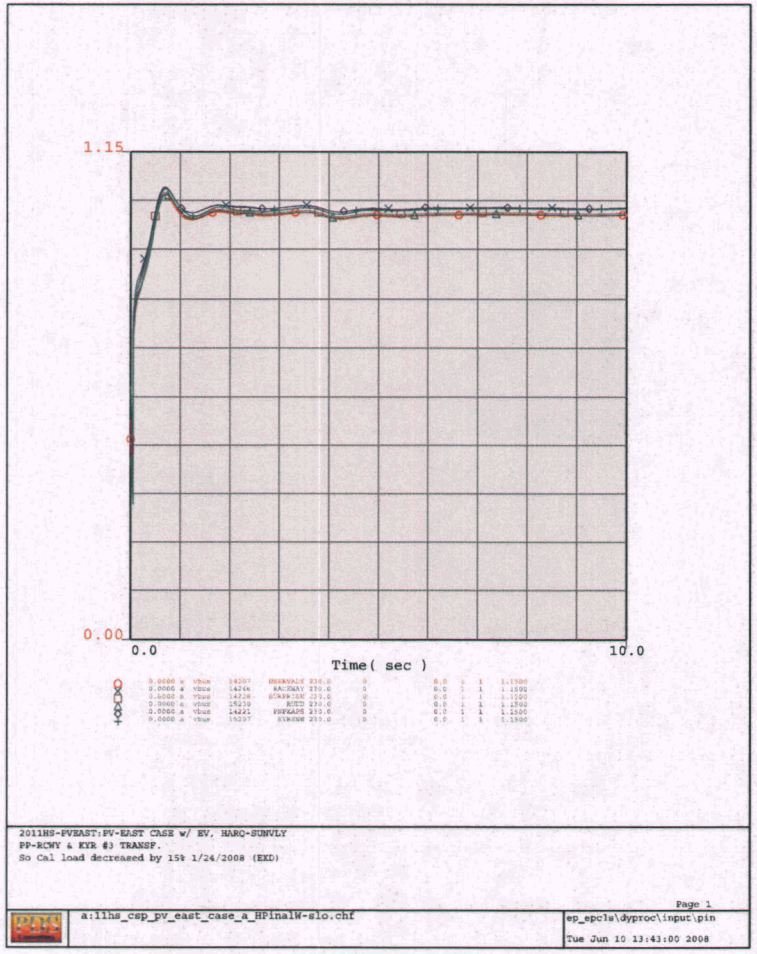
Post-Project, PV East Max Case A
El Dorado-McCullough 500 kV line outage
Transient Bus Voltage Plots



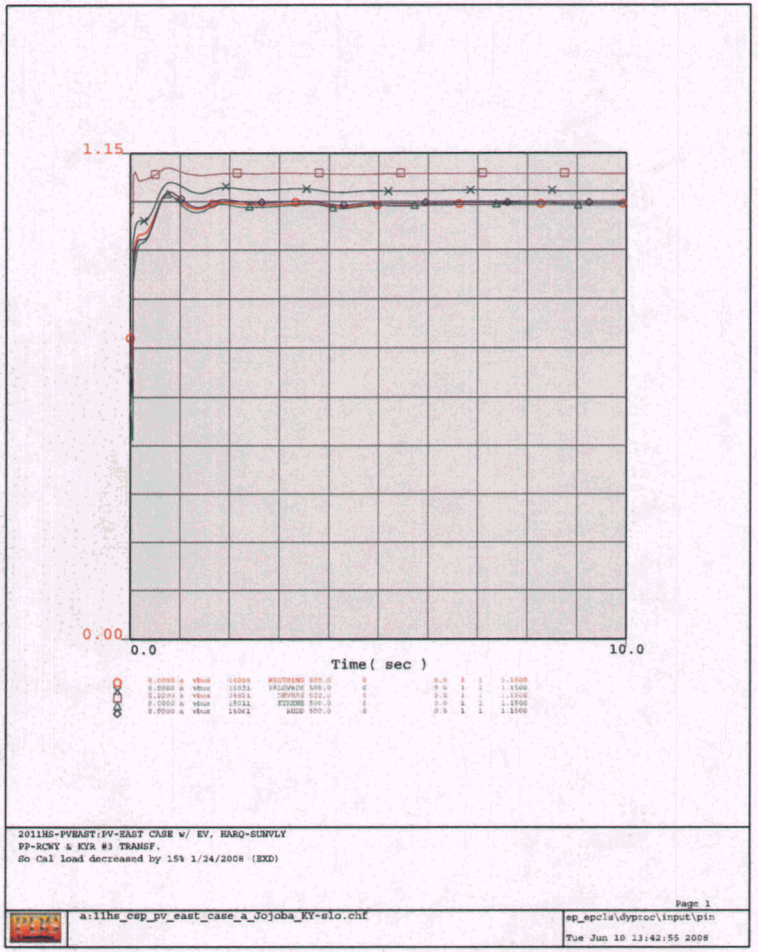
Post-Project, PV East Max Case A
Hassyampa-Pinal West 500 kV line outage
Transient Bus Voltage Plots



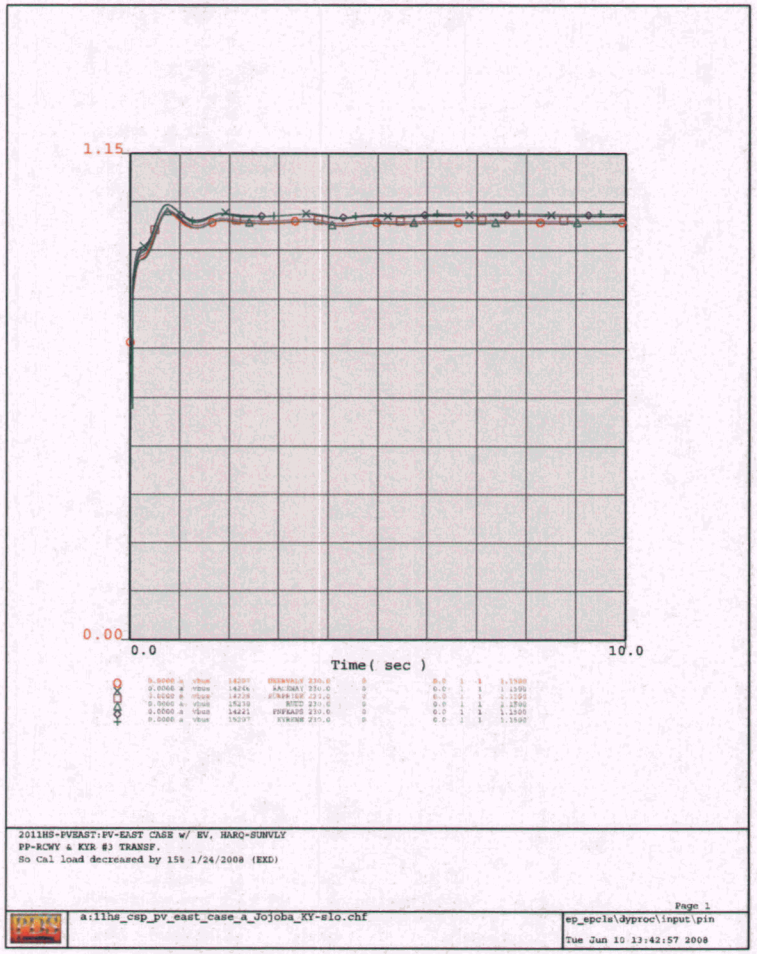
Post-Project, PV East Max Case A
Hassayampa-Pinal West 500 kV line outage
Transient Bus Voltage Plots



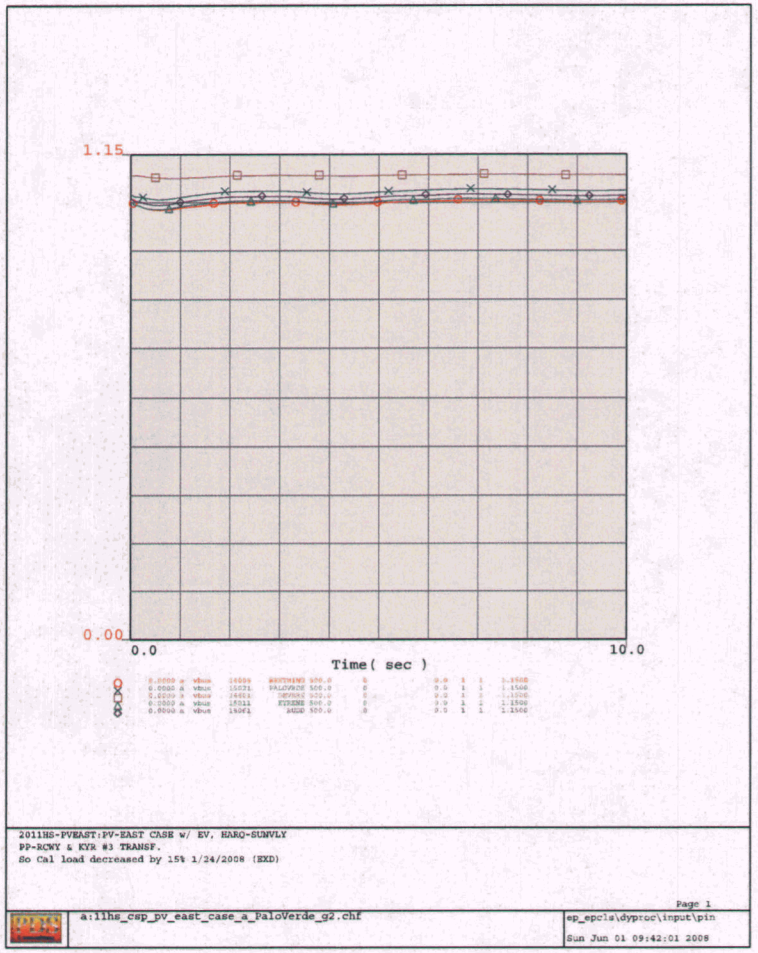
Post-Project, PV East Max Case A
Jojoba-Kyrene 500 kV line outage
Transient Bus Voltage Plots



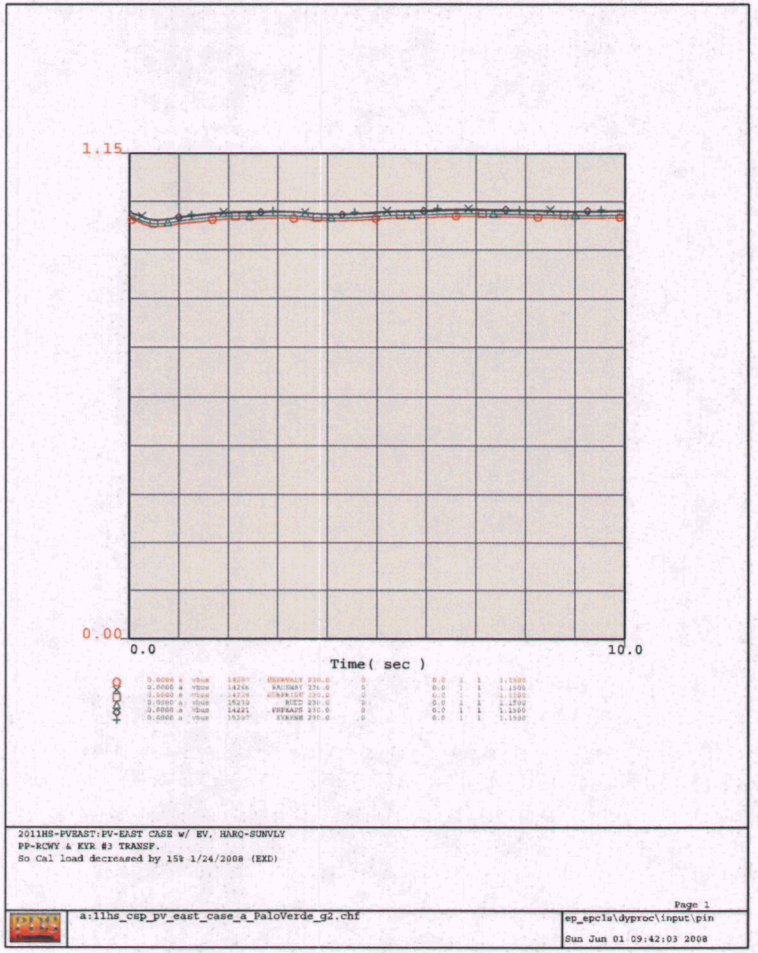
Post-Project, PV East Max Case A
Jojoba-Kyrene 500 kV line outage
Transient Bus Voltage Plots



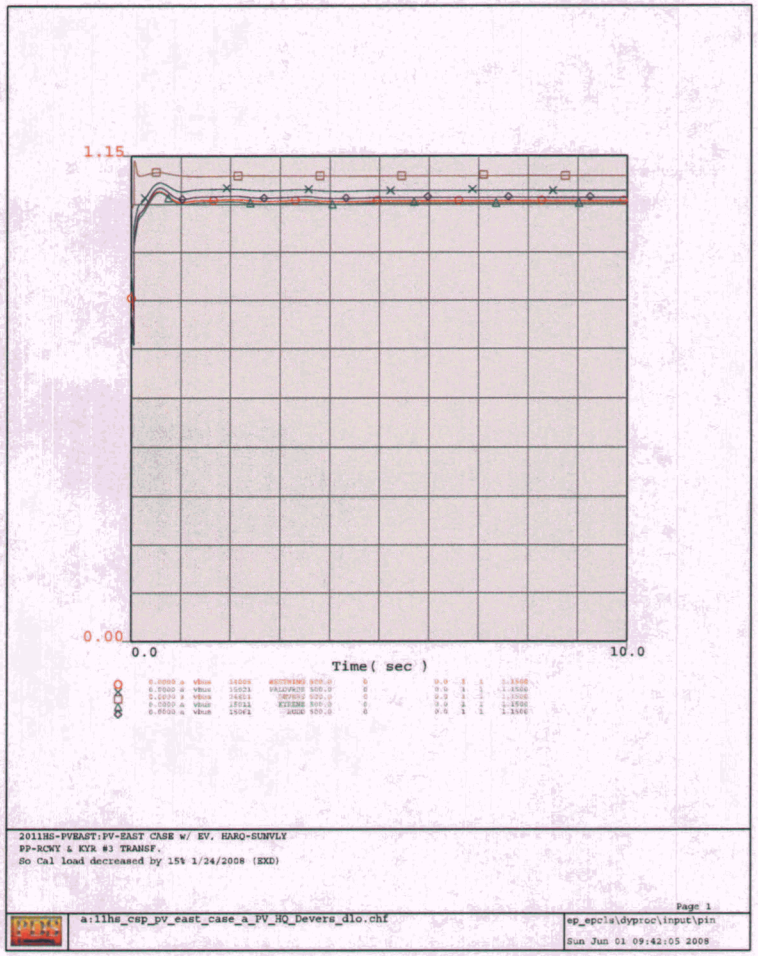
Post-Project, PV East Max Case A
Palo Verde G-2 outage
Transient Bus Voltage Plots



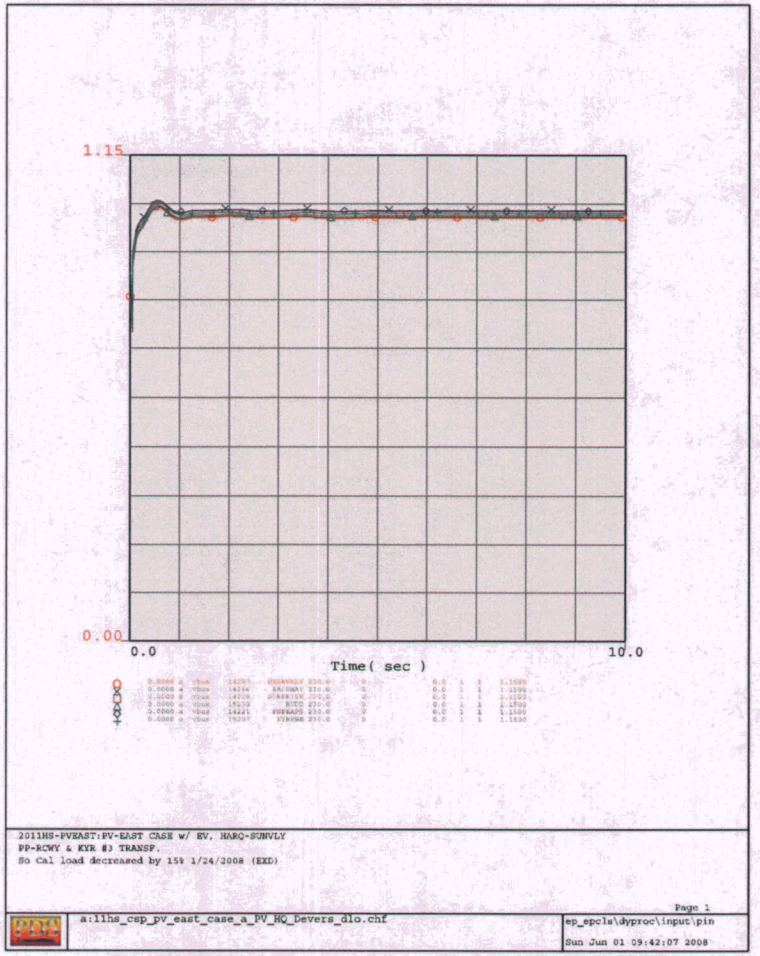
Post-Project, PV East Max Case A
Palo Verde G-2 outage
Transient Bus Voltage Plots



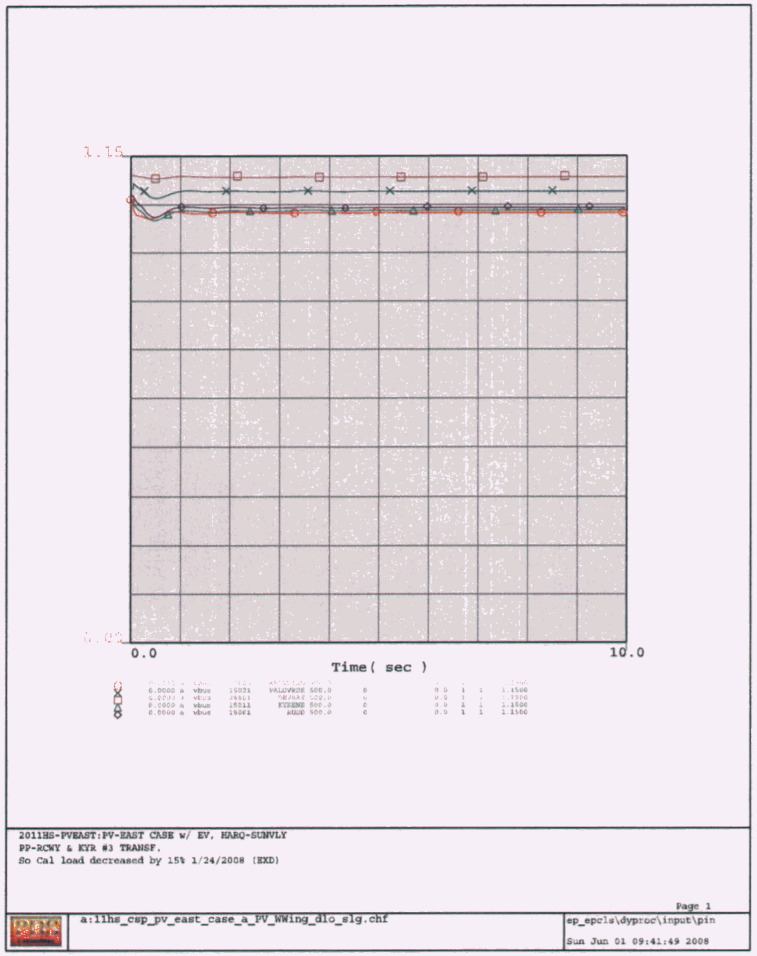
Post-Project, PV East Max Case A
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Bus Voltage Plots



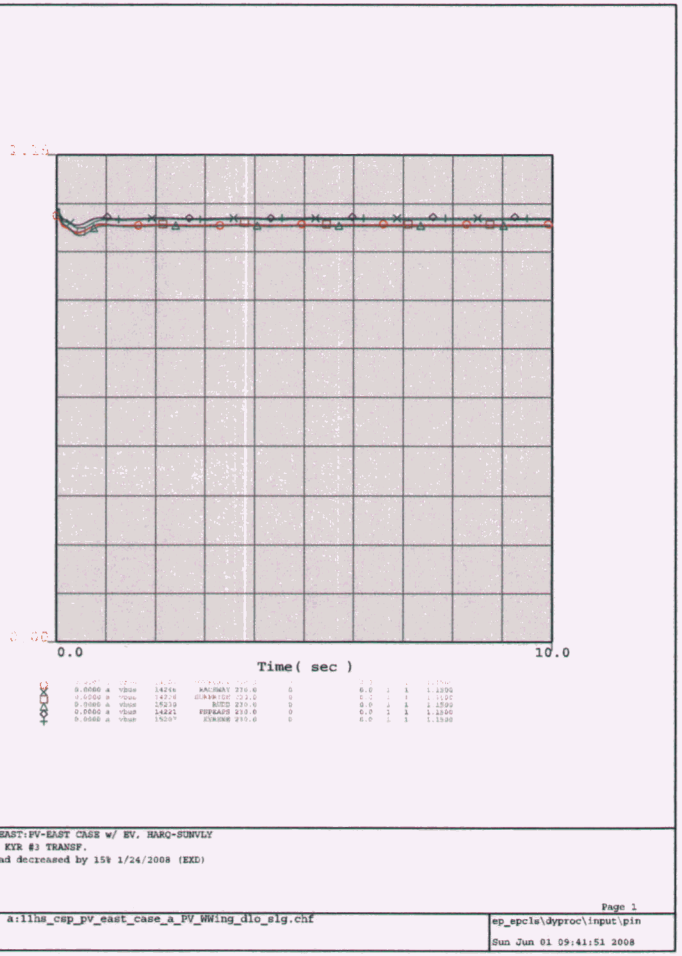
Post-Project, PV East Max Case A
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Bus Voltage Plots



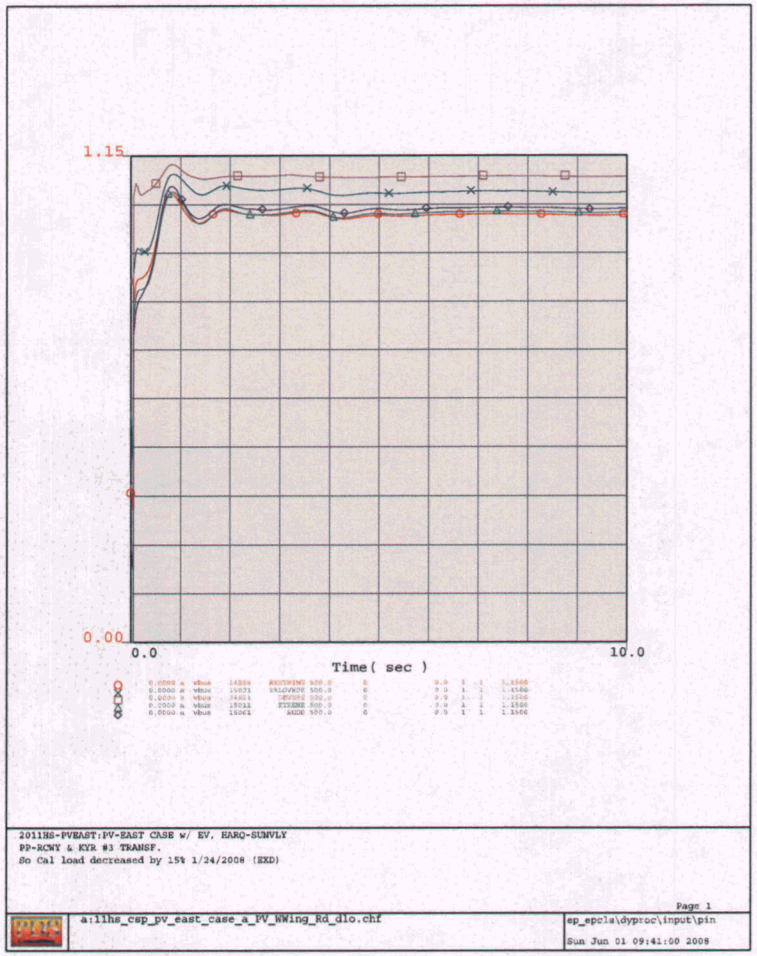
Post-Project, PV East Max Case A
PV-Westwing #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



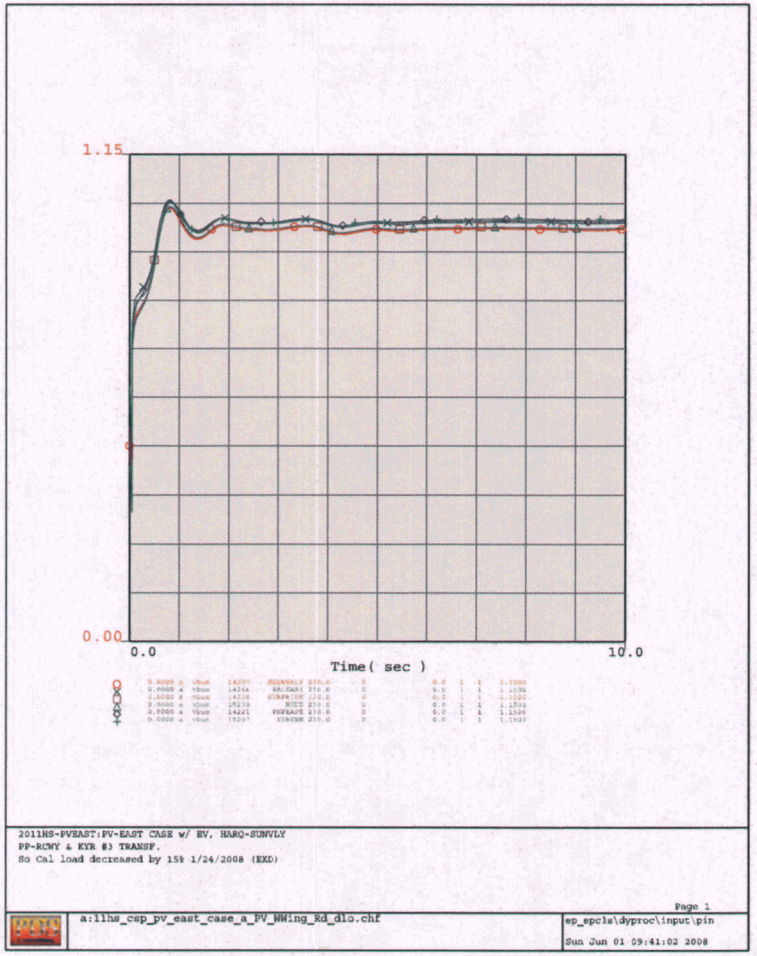
Post-Project, PV East Max Case A
PV-Westwing #1 & 2 500 kV lines outage
Transient Bus Voltage Plots



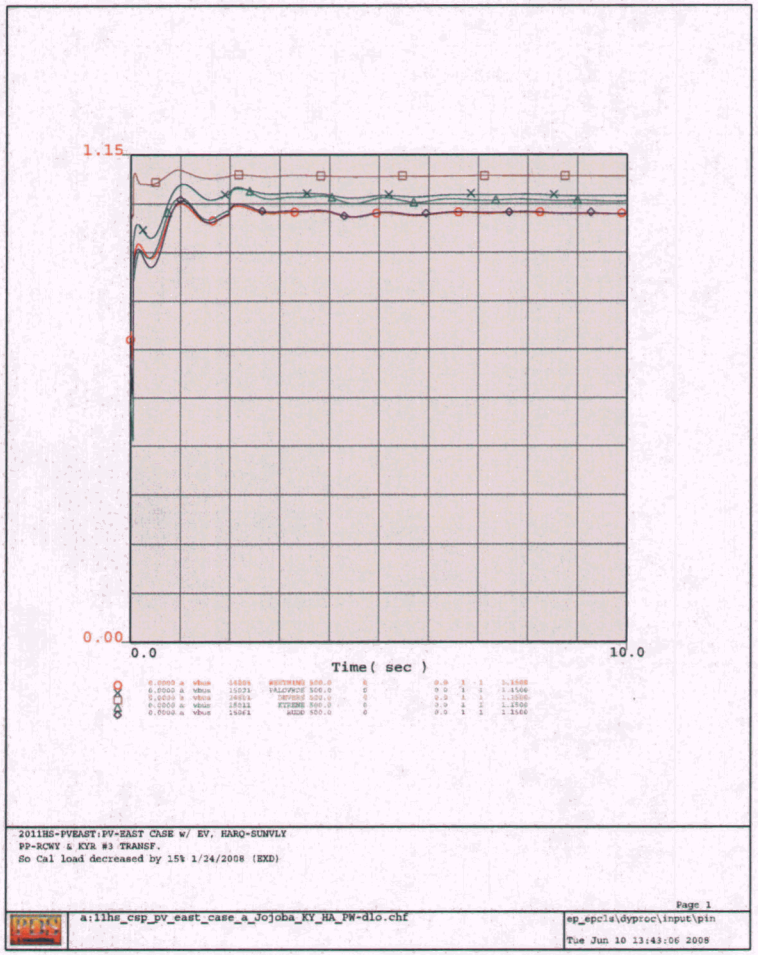
Post-Project, PV East Max Case A
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Bus Voltage Plots



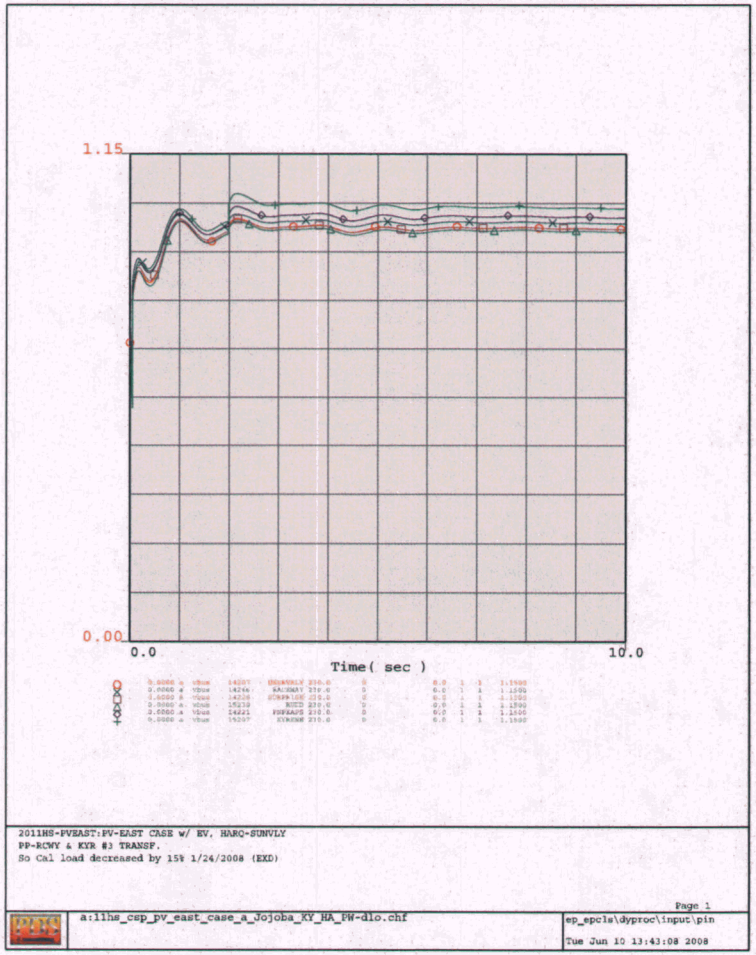
Post-Project, PV East Max Case A
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Bus Voltage Plots



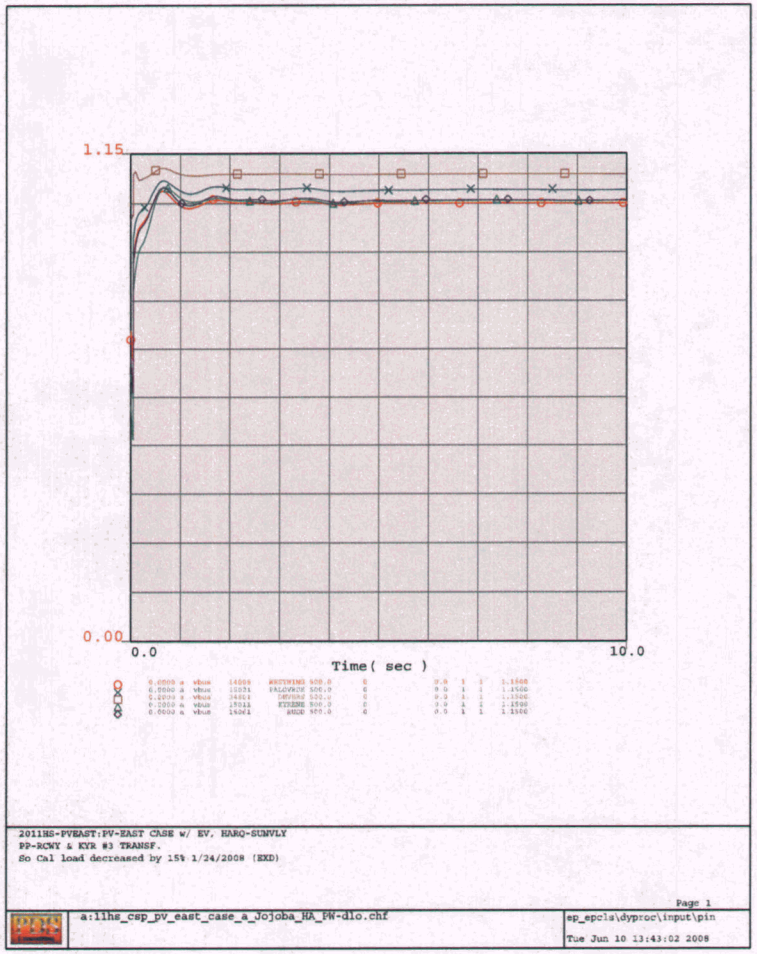
Post-Project, PV East Max Case A
HA-Pinal West, Jojoba-Kyrene 500 kV lines outage
Transient Bus Voltage Plots



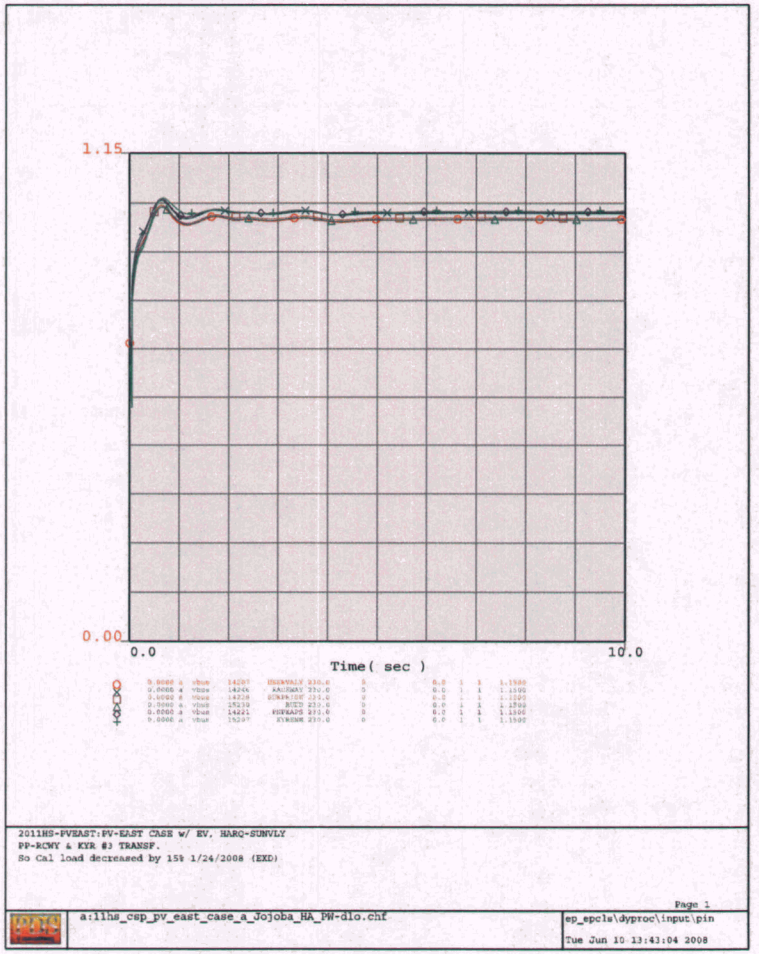
Post-Project, PV East Max Case A
HA-Pinal West, Jojoba-Kyrene 500 kV lines outage
Transient Bus Voltage Plots



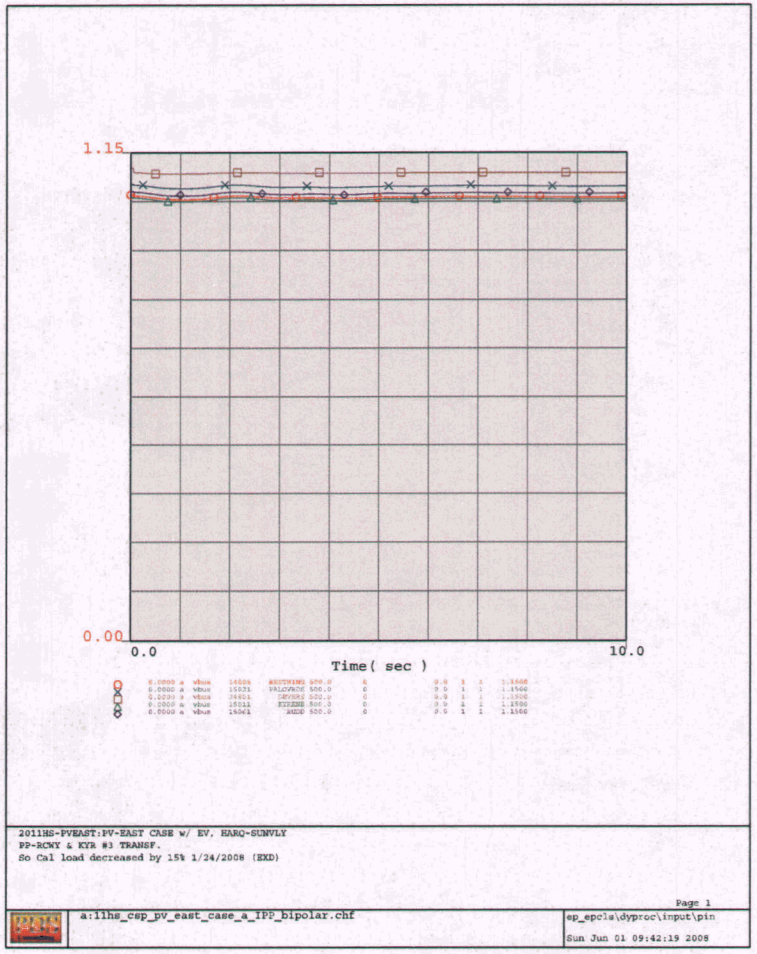
Post-Project, PV East Max Case A
HA-Pinal West, HA-Jojoba 500 kV lines outage
Transient Bus Voltage Plots



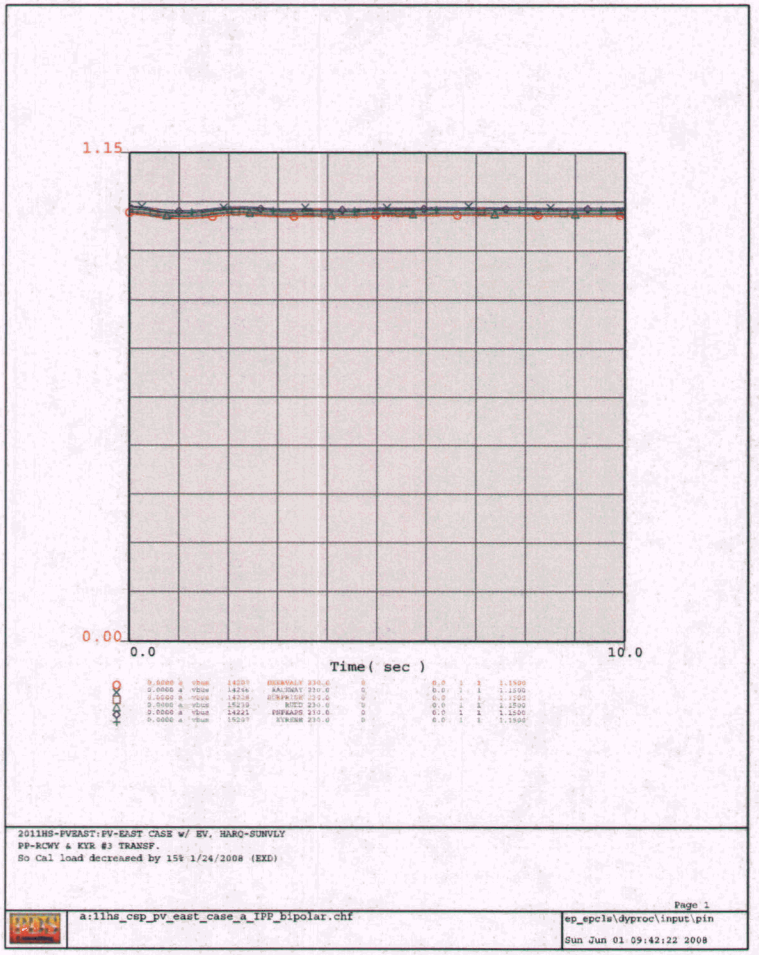
Post-Project, PV East Max Case A
HA-Pinal West, HA-Jojoba 500 kV lines outage
Transient Bus Voltage Plots



Post-Project, PV East Max Case A
IPP Bipole outage
Transient Bus Voltage Plots

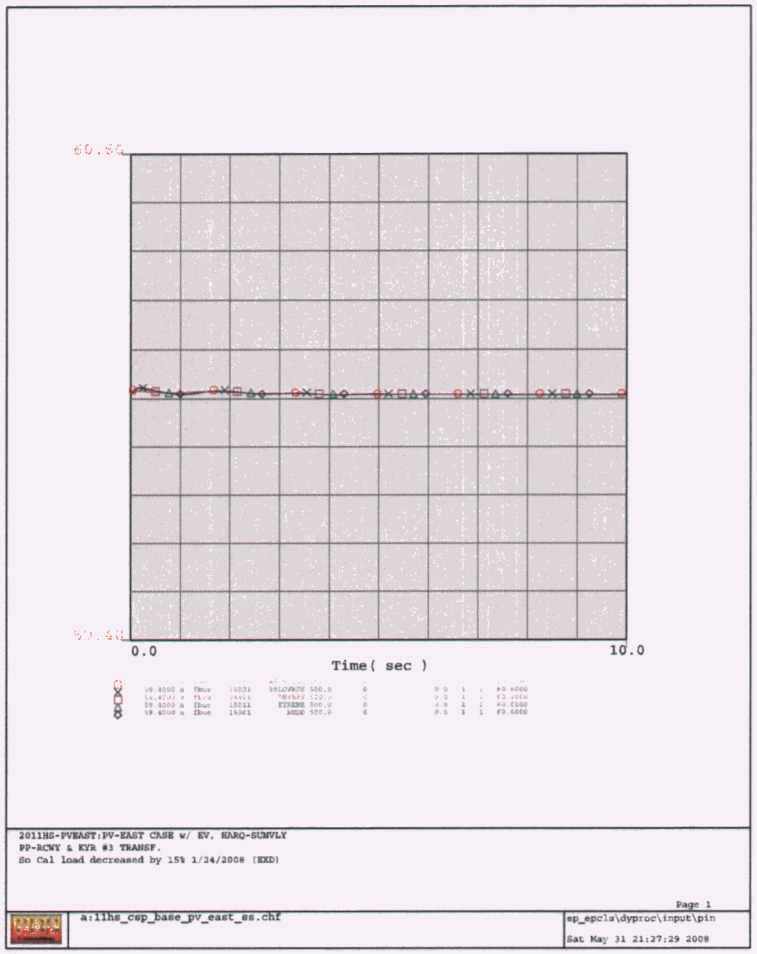


Post-Project, PV East Max Case A
IPP Bipole outage
Transient Bus Voltage Plots

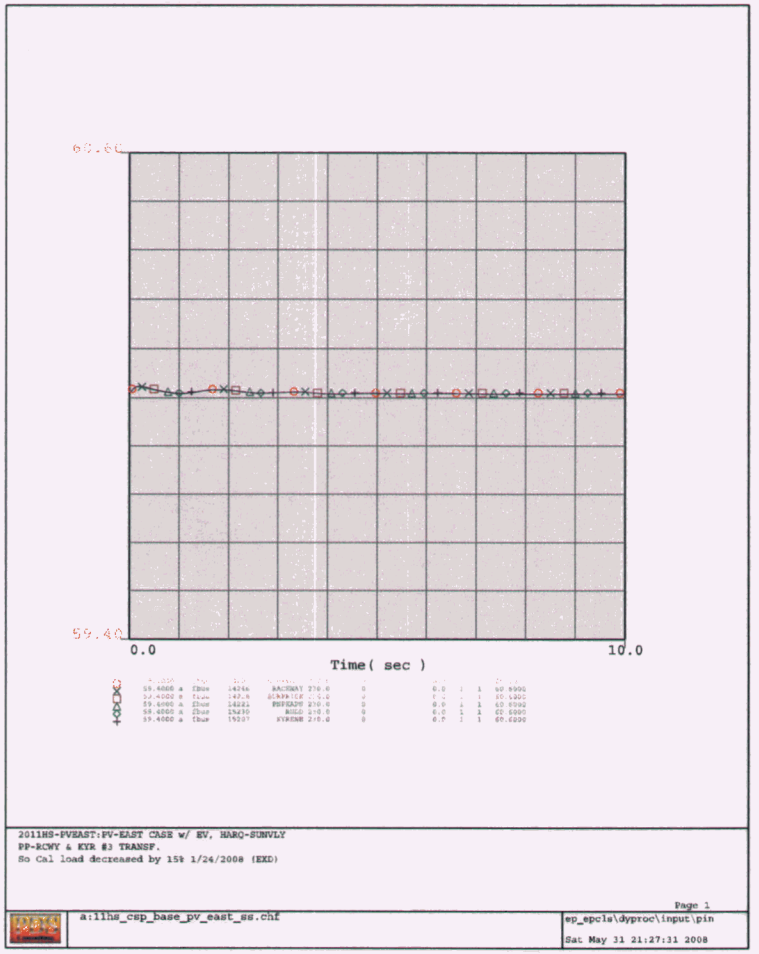


Transient Frequency Plots

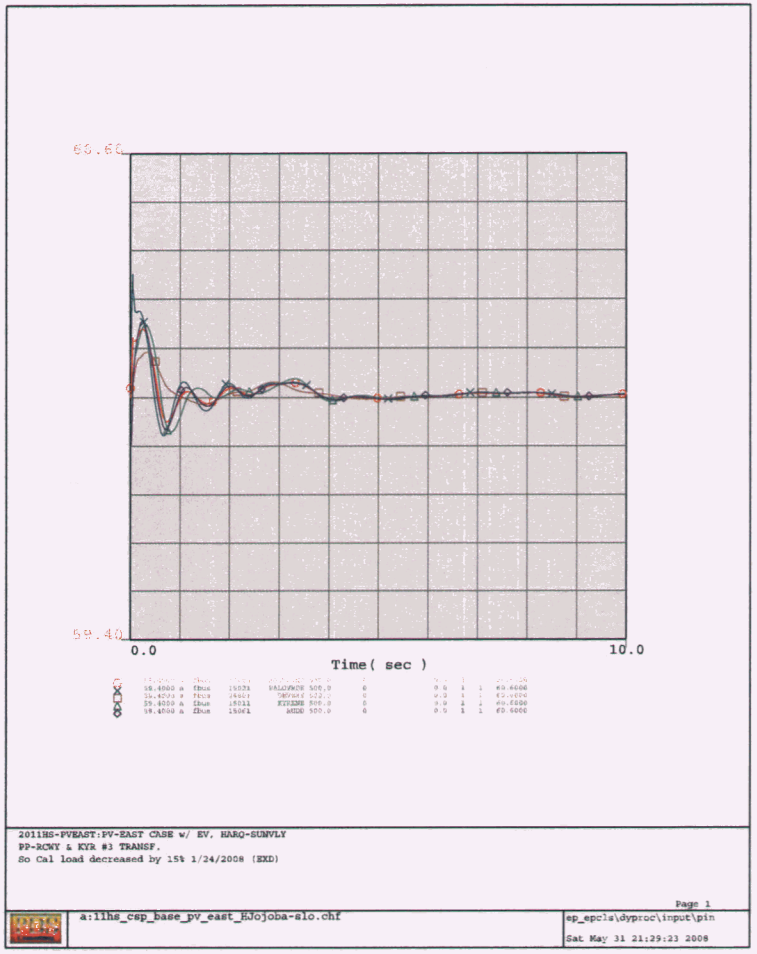
Pre-Project, PV East Max Case
No Outage
Transient Frequency Plots



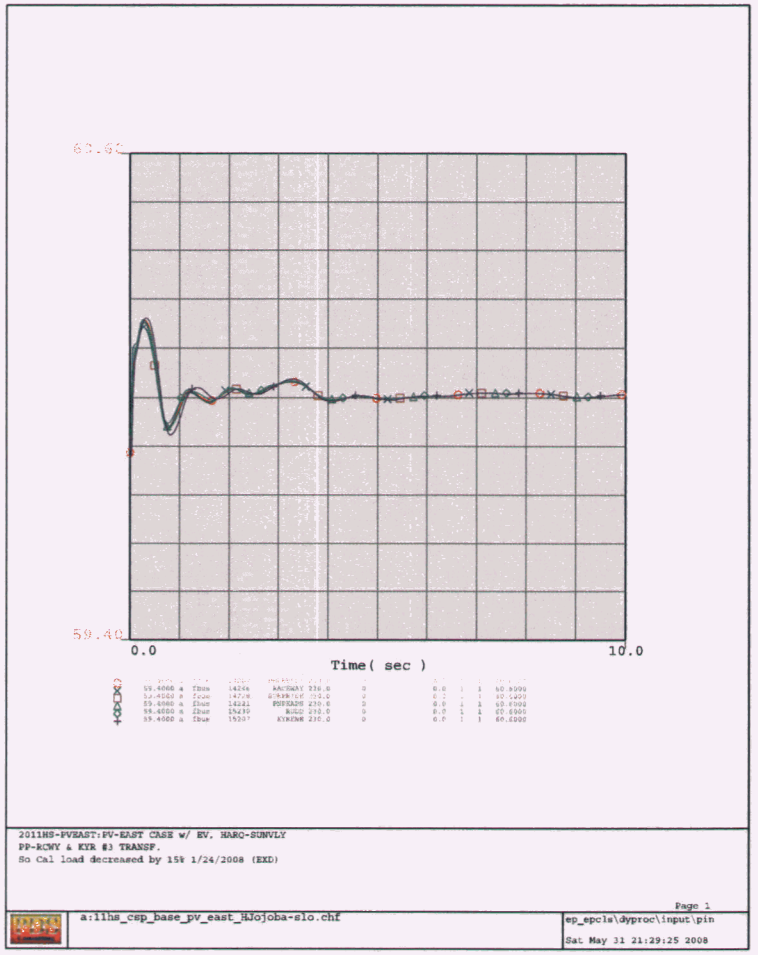
Pre-Project, PV East Max Case
No Outage
Transient Frequency Plots



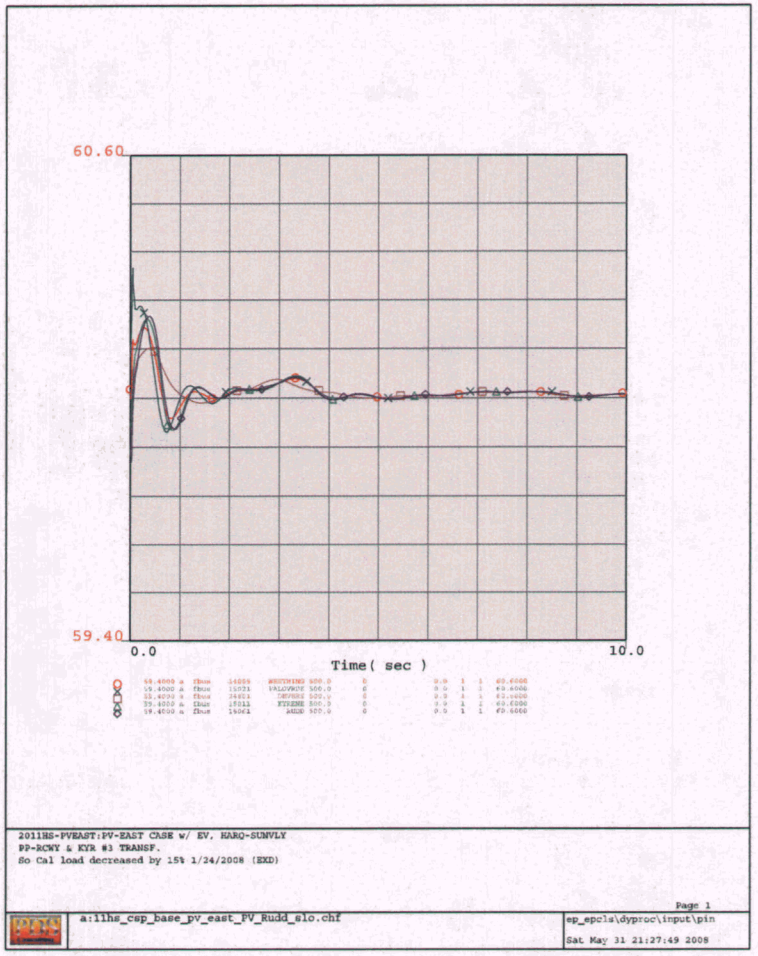
Pre-Project, PV East Max Case
Hassayampa-Jojoba 500 kV line outage
Transient Frequency Plots



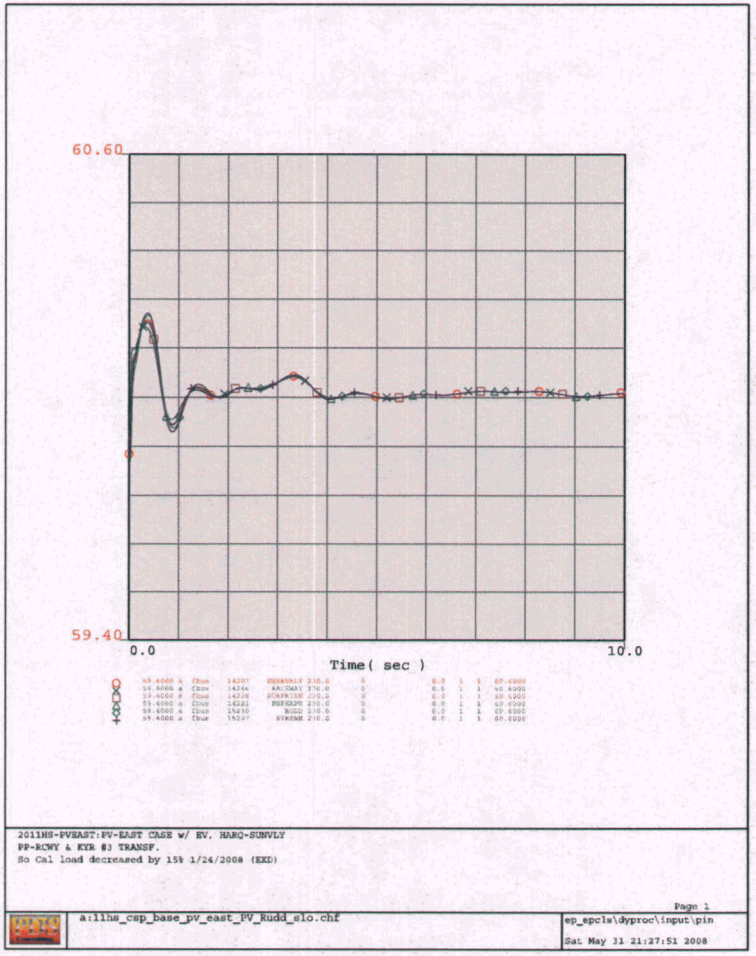
Pre-Project, PV East Max Case
Hassayampa-Jojoba 500 kV line outage
Transient Frequency Plots



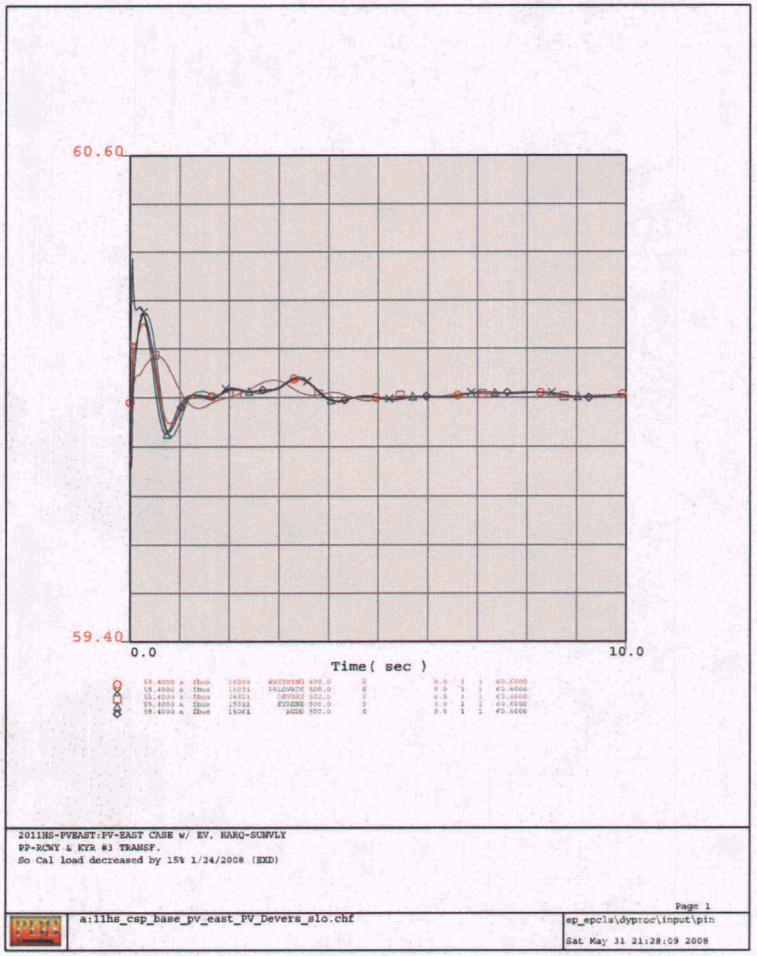
Pre-Project, PV East Max Case
Palo Verde-Rudd 500 kV line outage
Transient Frequency Plots



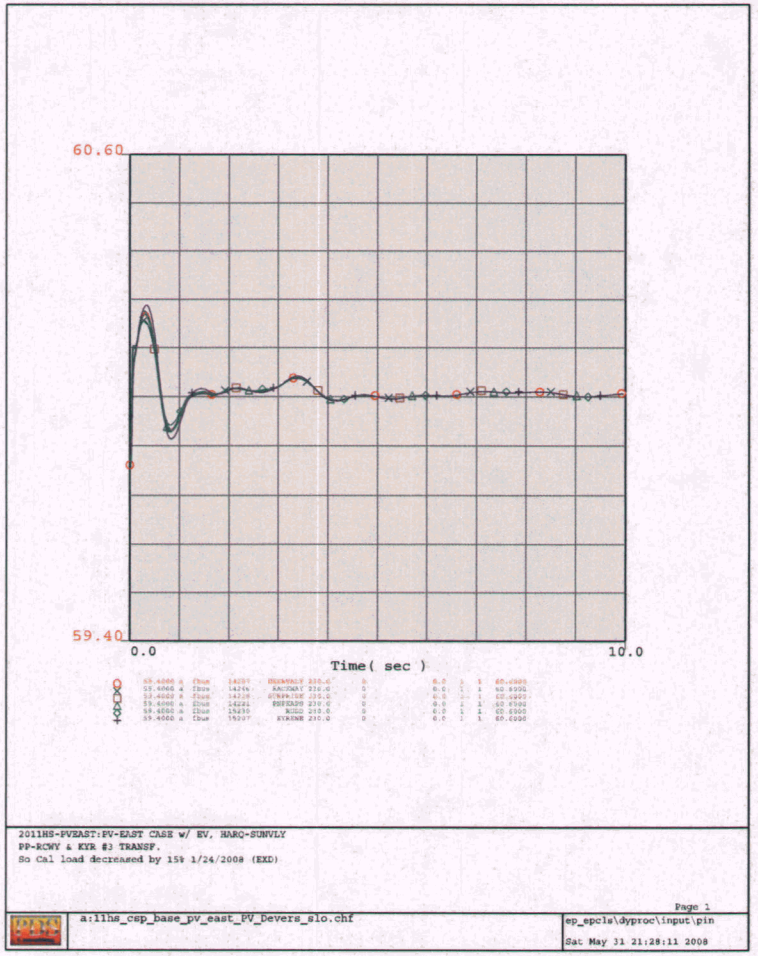
Pre-Project, PV East Max Case
Palo Verde-Rudd 500 kV line outage
Transient Frequency Plots



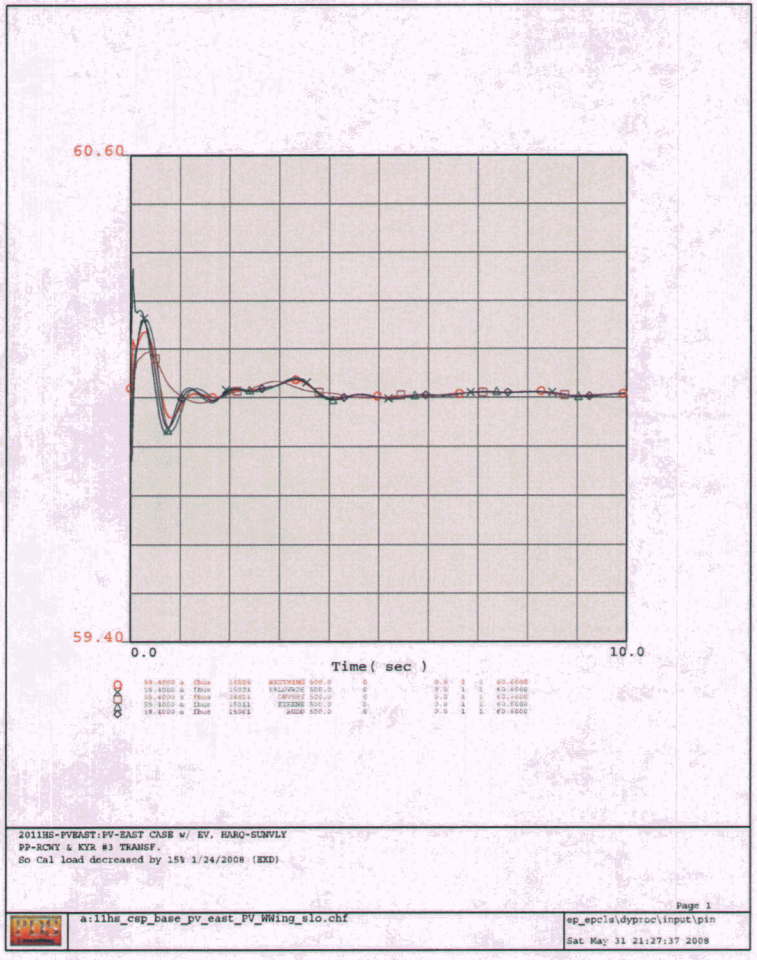
Pre-Project, PV East Max Case
Palo Verde-Devers 500 kV line outage
Transient Frequency Plots



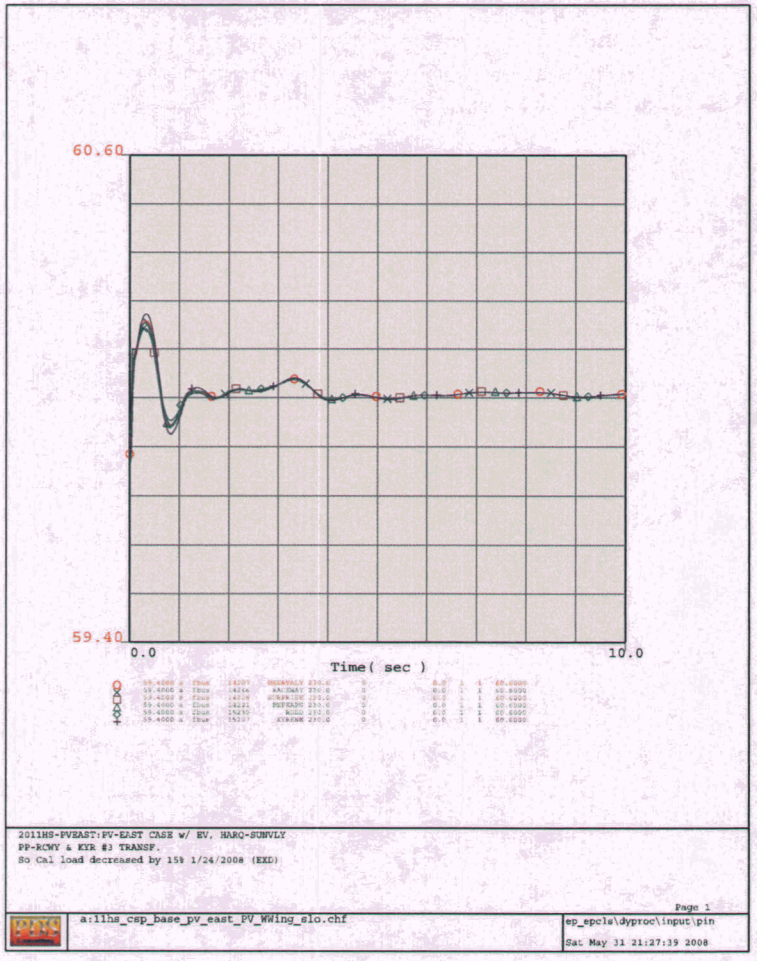
Pre-Project, PV East Max Case
Palo Verde-Devers 500 kV line outage
Transient Frequency Plots



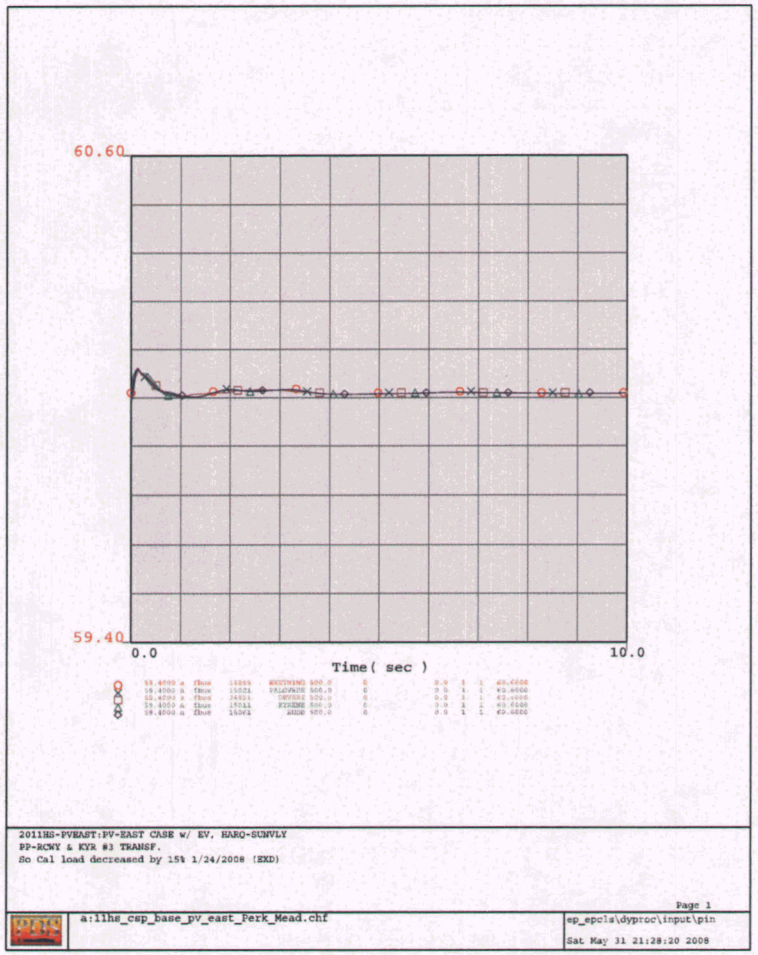
Pre-Project, PV East Max Case
Palo Verde-Westwing 500 kV line outage
Transient Frequency Plots



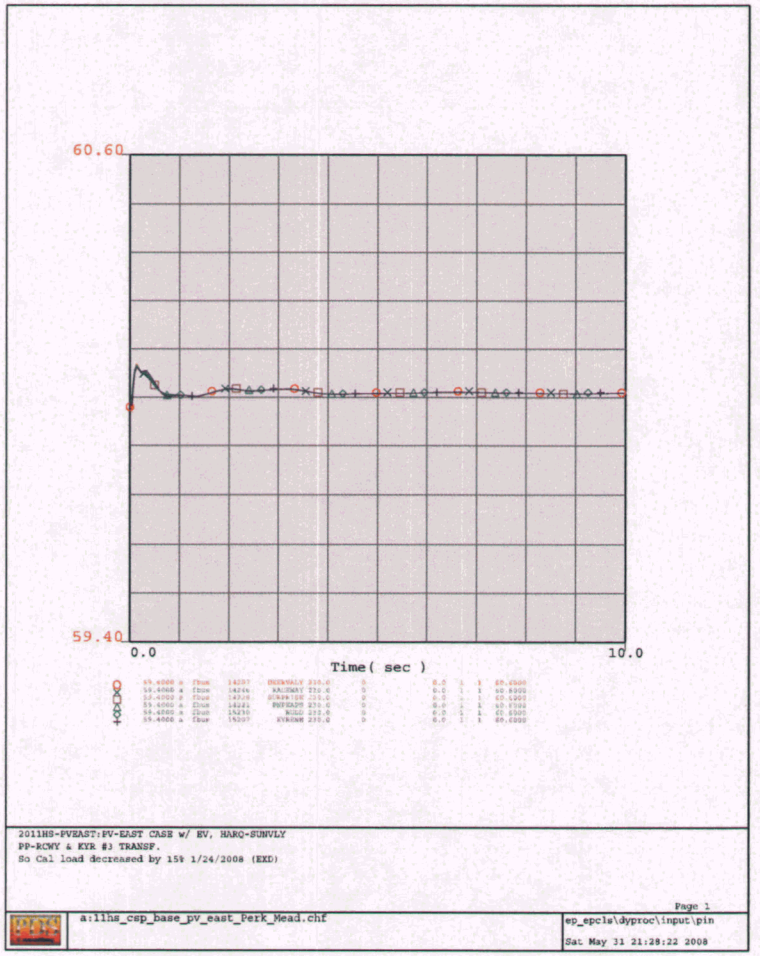
Pre-Project, PV East Max Case
Palo Verde-Westwing 500 kV line outage
Transient Frequency Plots



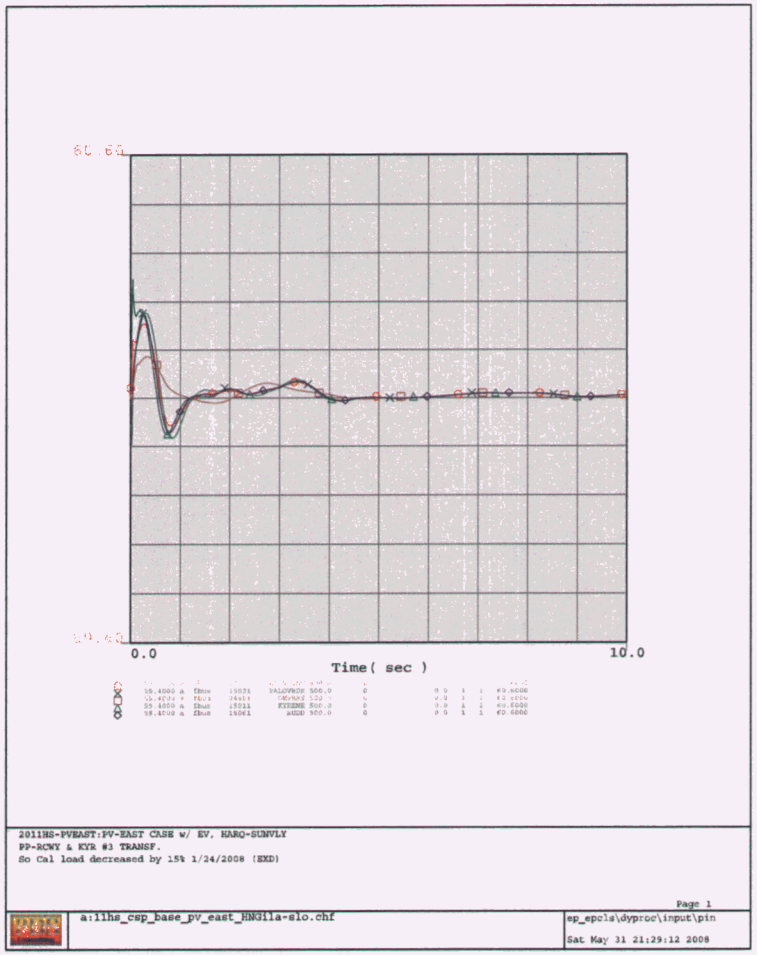
Pre-Project, PV East Max Case
Perkins-Mead 500 kV line outage
Transient Frequency Plots



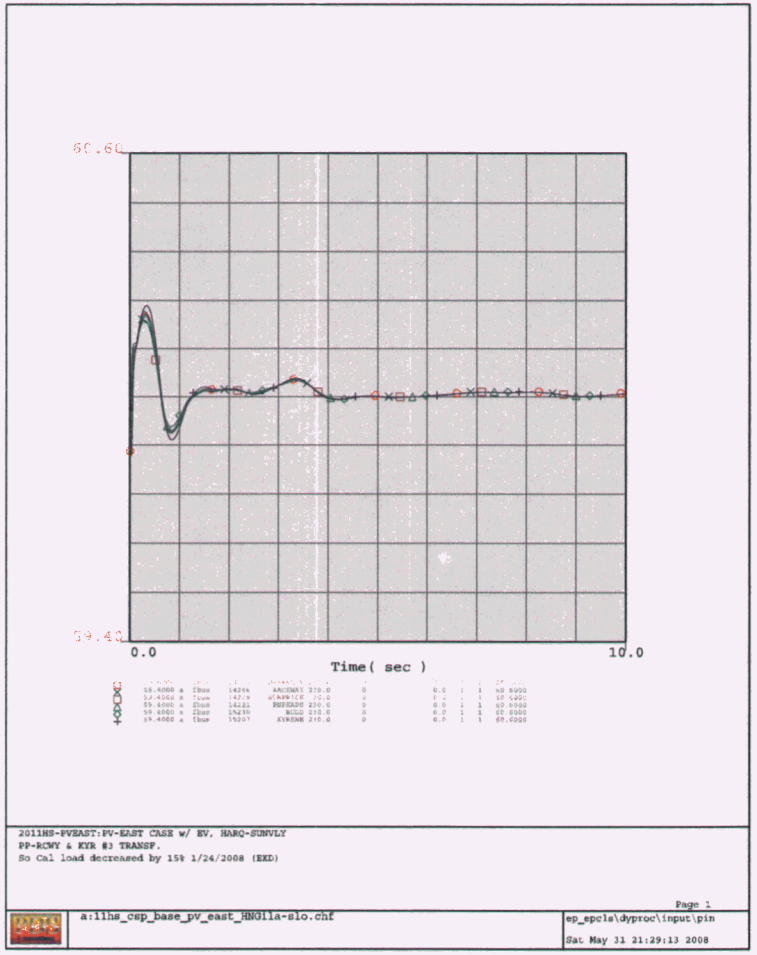
Pre-Project, PV East Max Case
Perkins-Mead 500 kV line outage
Transient Frequency Plots



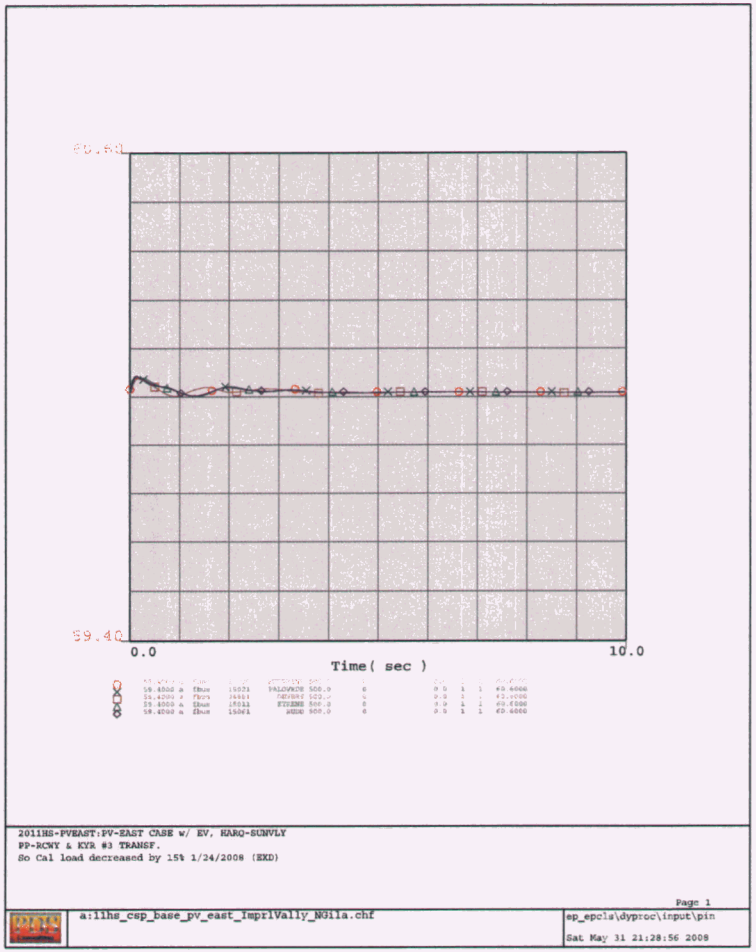
Pre-Project, PV East Max Case
Hassayampa -N. Gila 500 kV line outage
Transient Frequency Plots



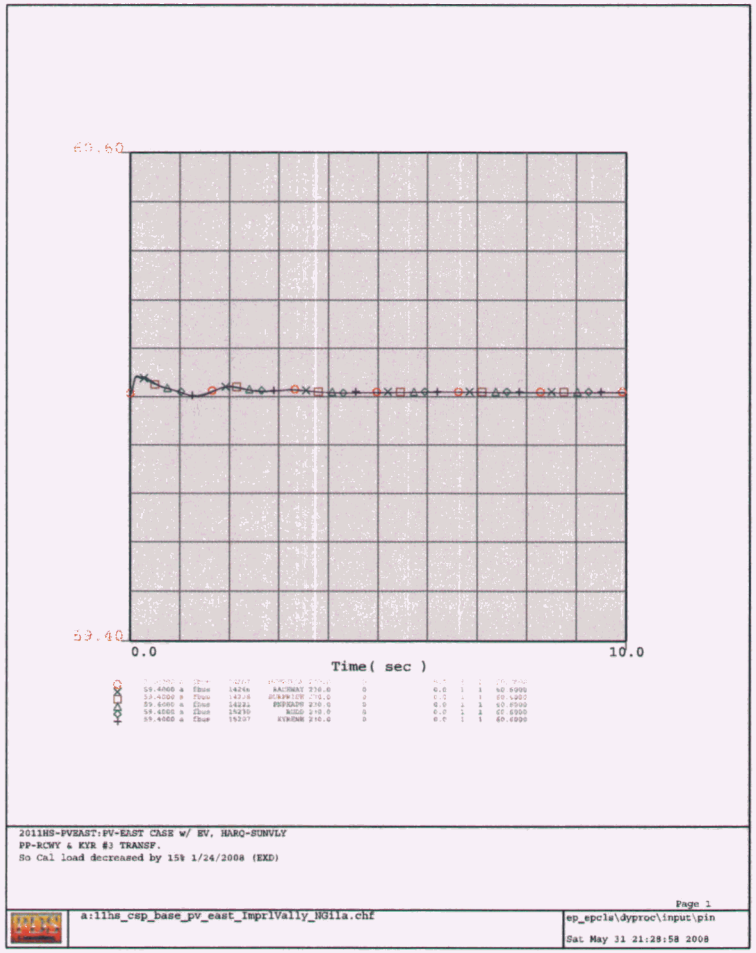
Pre-Project, PV East Max Case
Hassayampa -N. Gila 500 kV line outage
Transient Frequency Plots



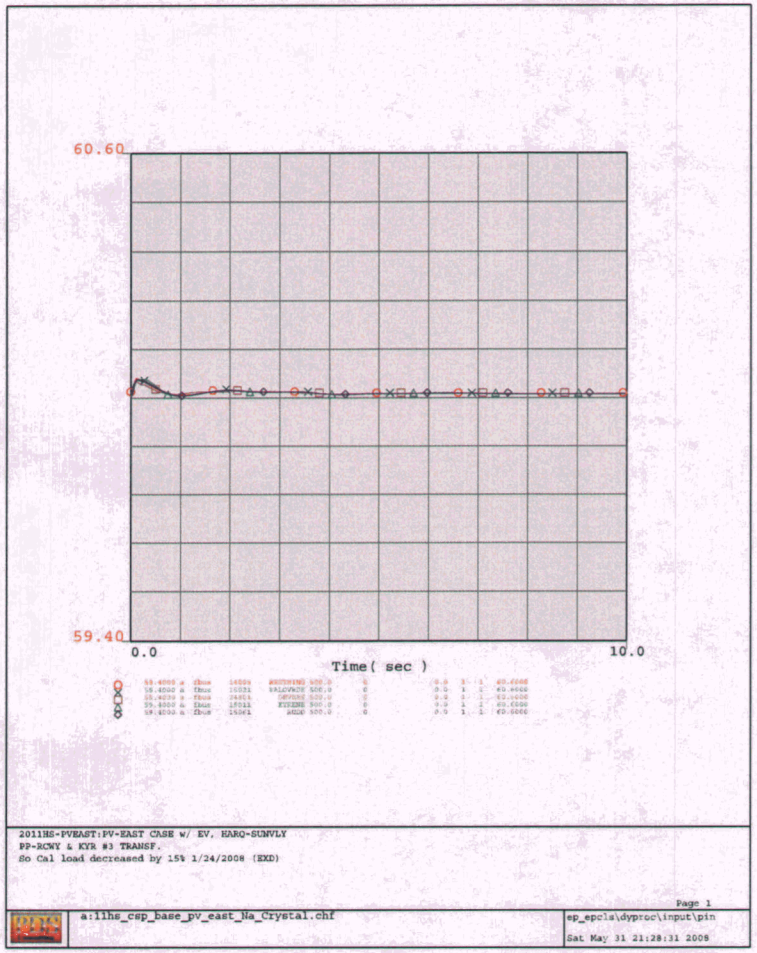
Pre-Project, PV East Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Frequency Plots



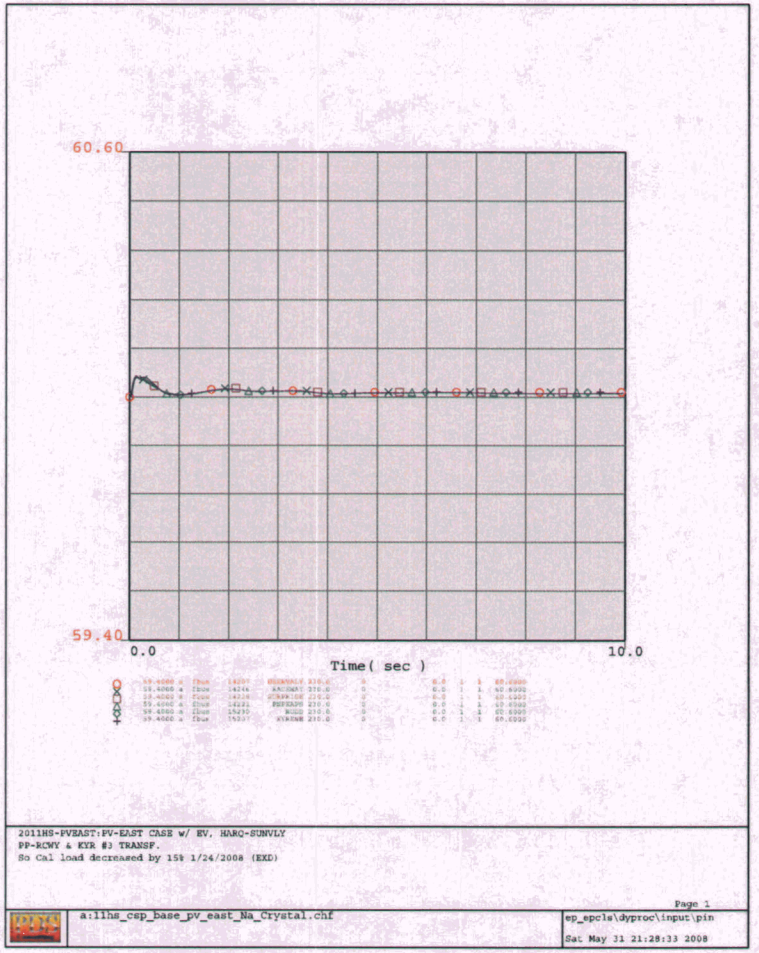
Pre-Project, PV East Max Case
N. Gila-Imperial Valley 500 kV line outage
Transient Frequency Plots



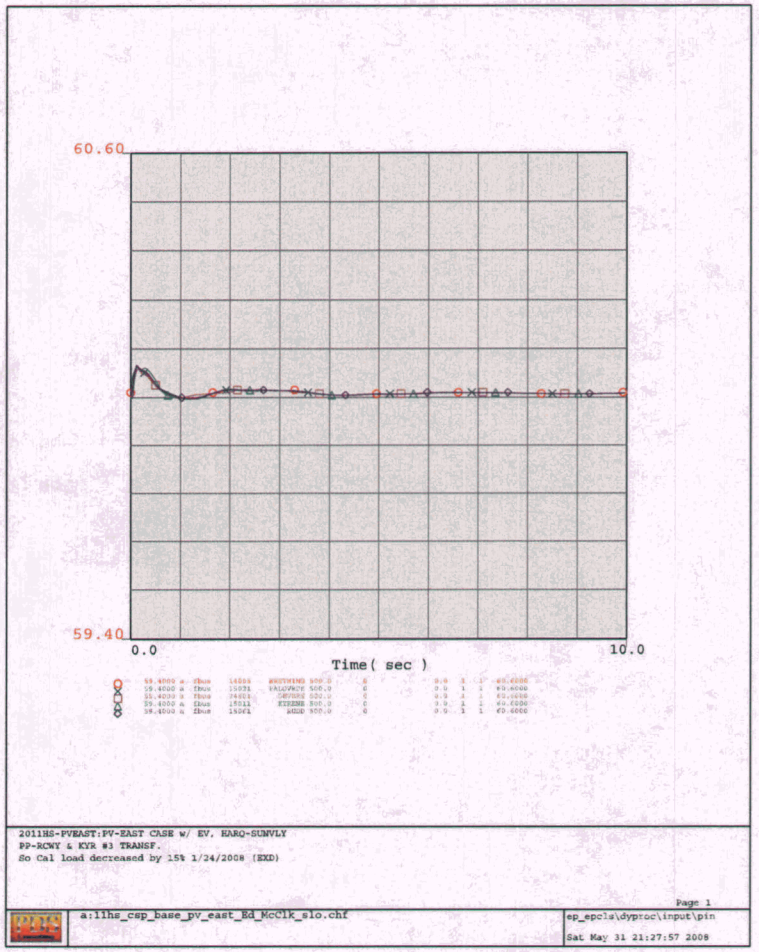
Pre-Project, PV East Max Case
Navajo-Crystal 500 kV line
Transient Frequency Plots



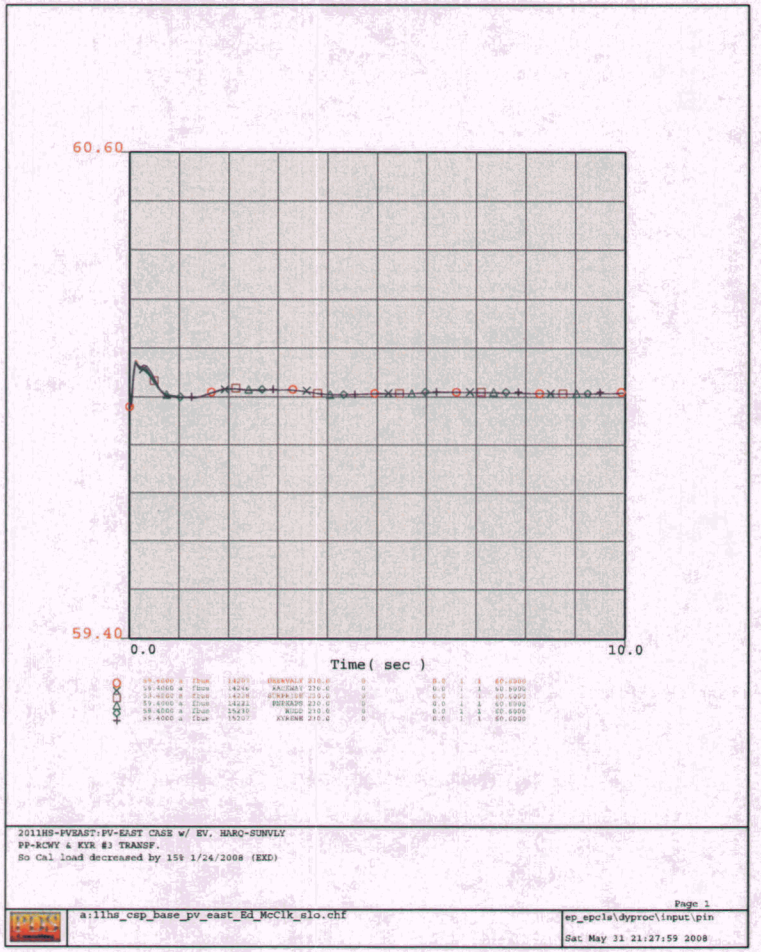
Pre-Project, PV East Max Case
Navajo-Crystal 500 kV line
Transient Frequency Plots



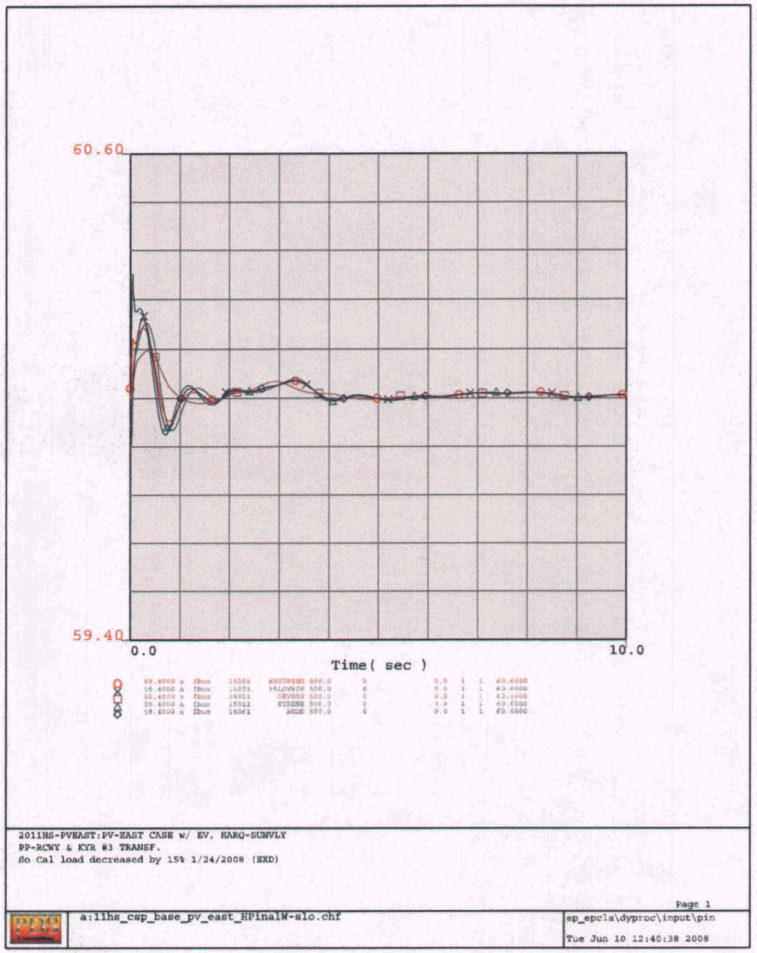
Pre-Project, PV East Max Case
El Dorado-McCullough 500 kV line outage
Transient Frequency Plots



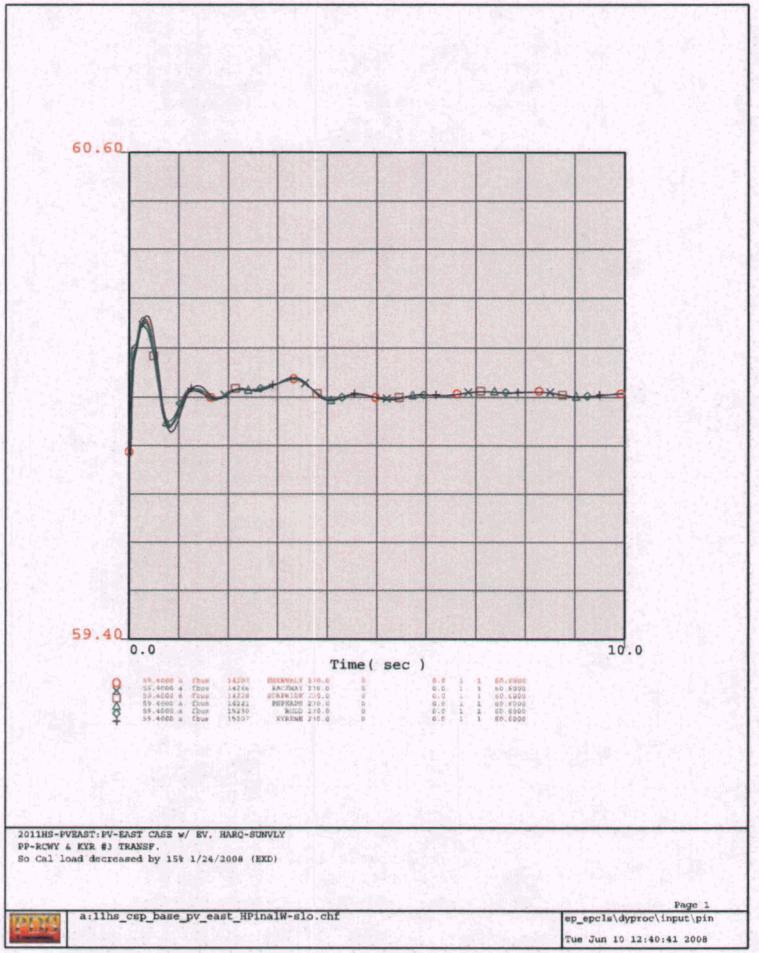
Pre-Project, PV East Max Case
El Dorado-McCullough 500 kV line outage
Transient Frequency Plots



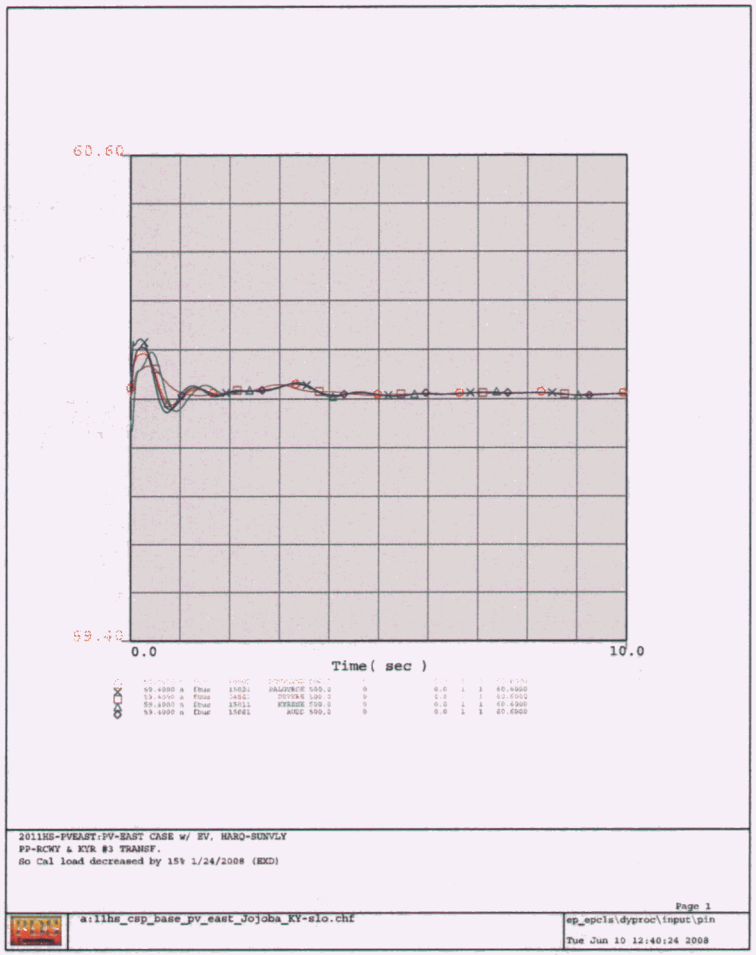
Pre-Project, PV East Max Case
Hassayampa-Pinal West 500 kV line outage
Transient Frequency Plots



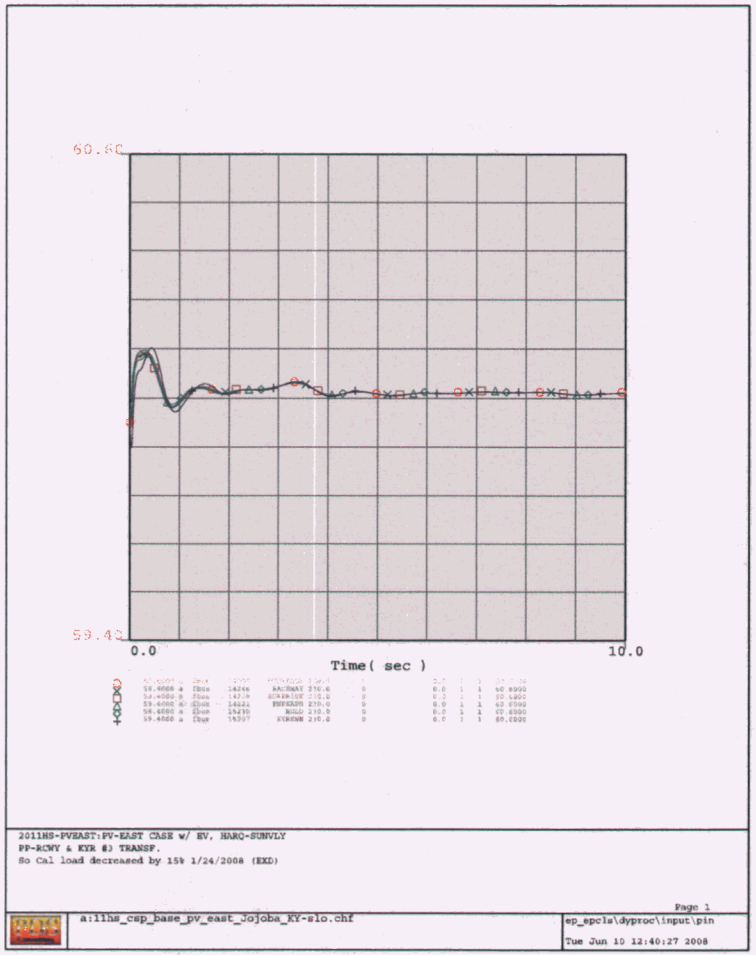
Pre-Project, PV East Max Case
Hassayampa-Pinal West 500 kV line outage
Transient Frequency Plots



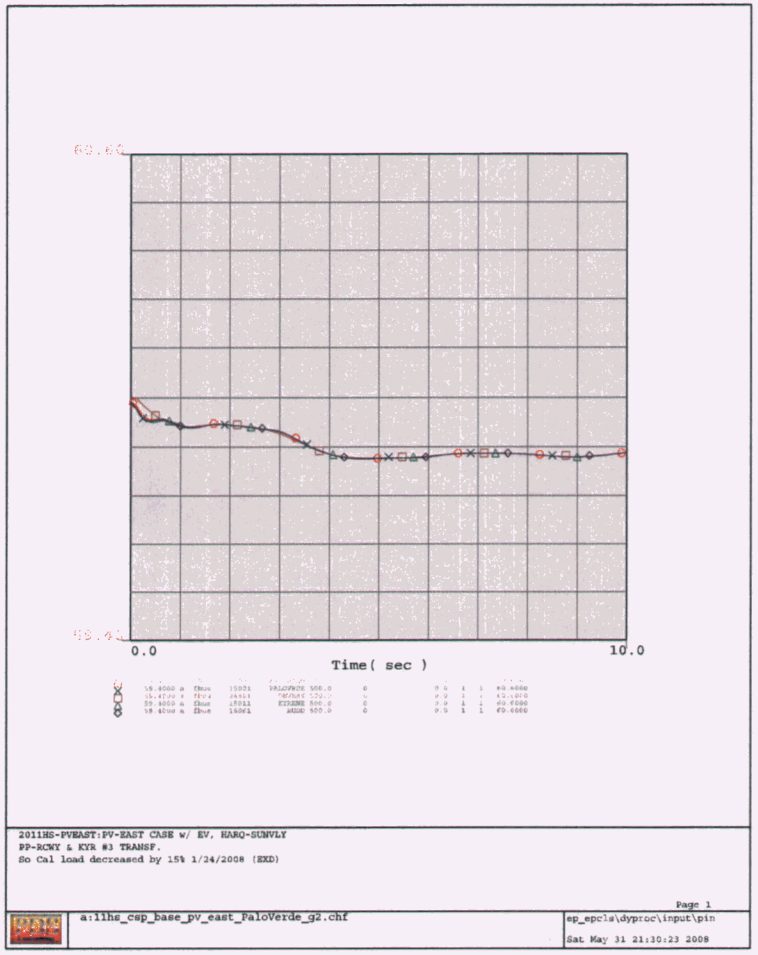
Pre-Project, PV East Max Case
Jojoba-Kyrene 500 kV line outage
Transient Frequency Plots



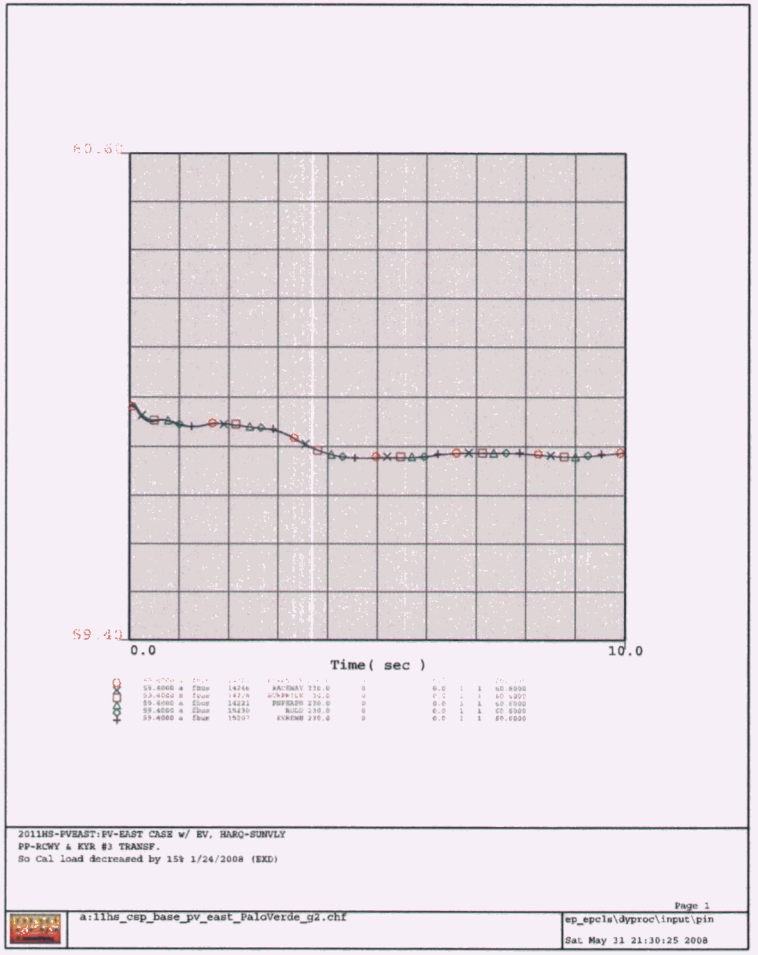
Pre-Project, PV East Max Case
Jojoba-Kyrene 500 kV line outage
Transient Frequency Plots



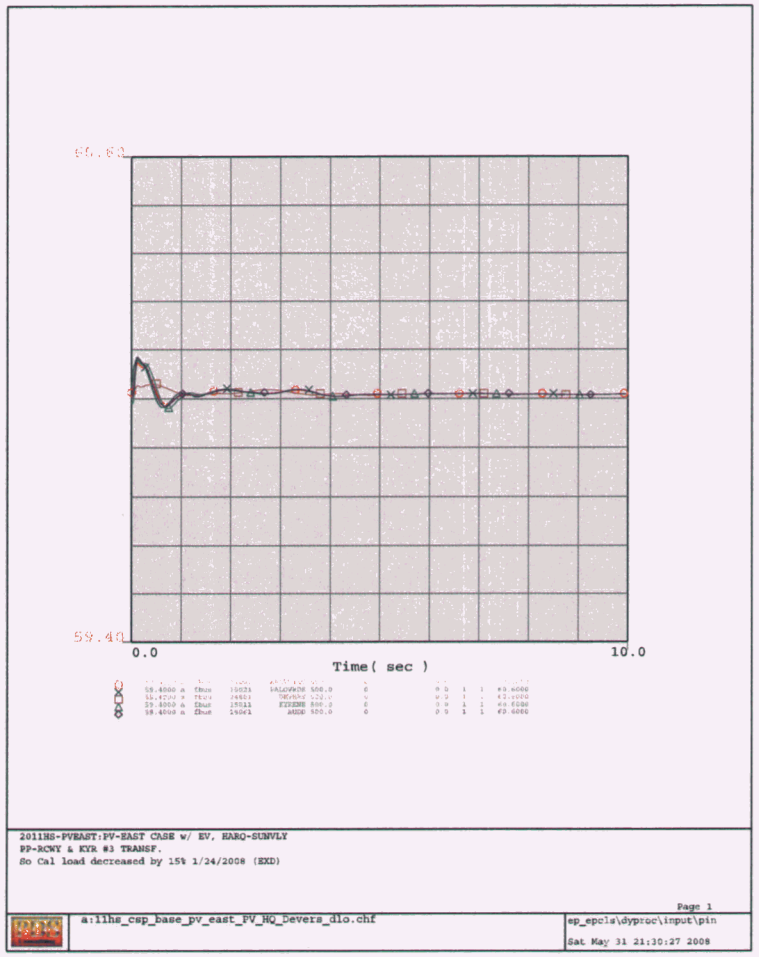
Pre-Project, PV East Max Case
Palo Verde G-2 outage
Transient Frequency Plots



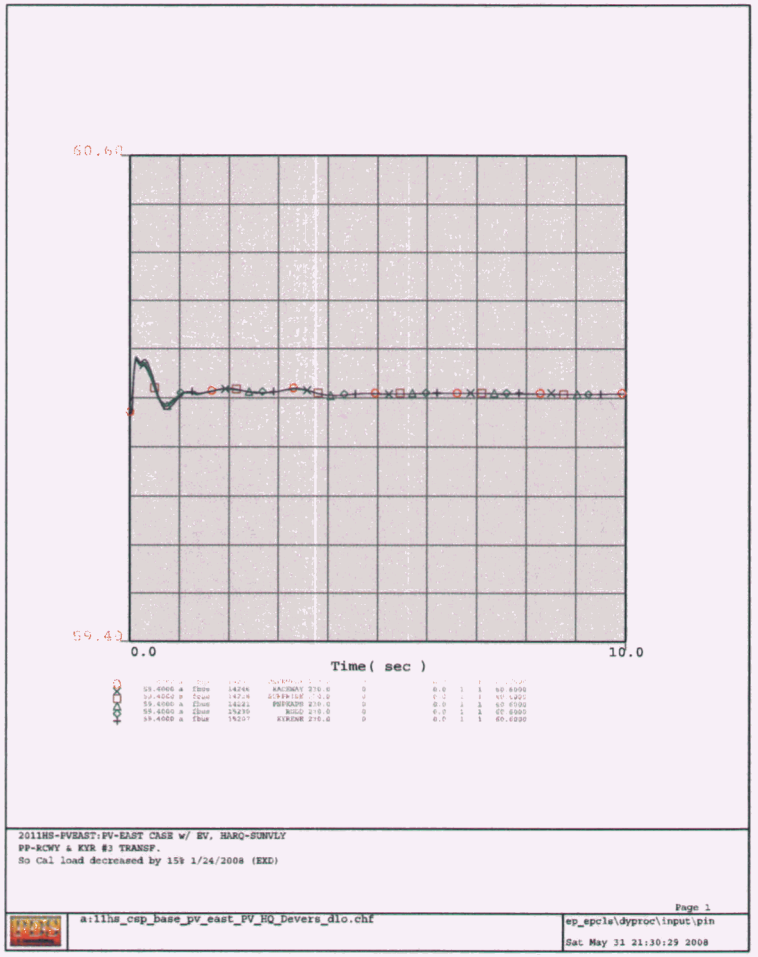
Pre-Project, PV East Max Case
Palo Verde G-2 outage
Transient Frequency Plots



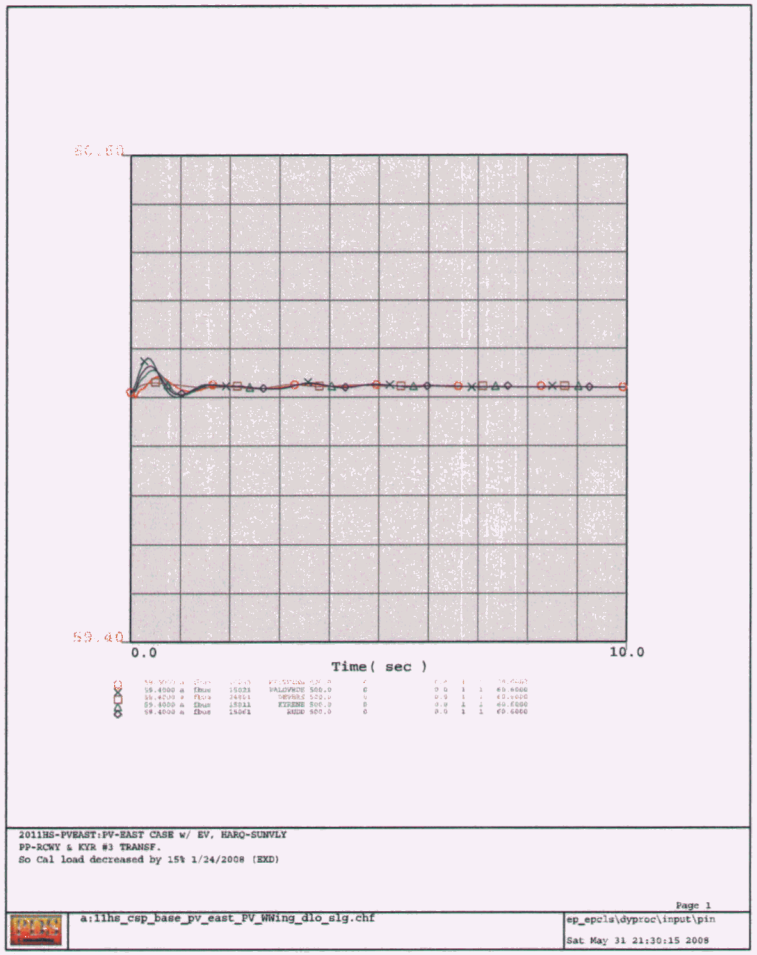
Pre-Project, PV East Max Case
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Frequency Plots



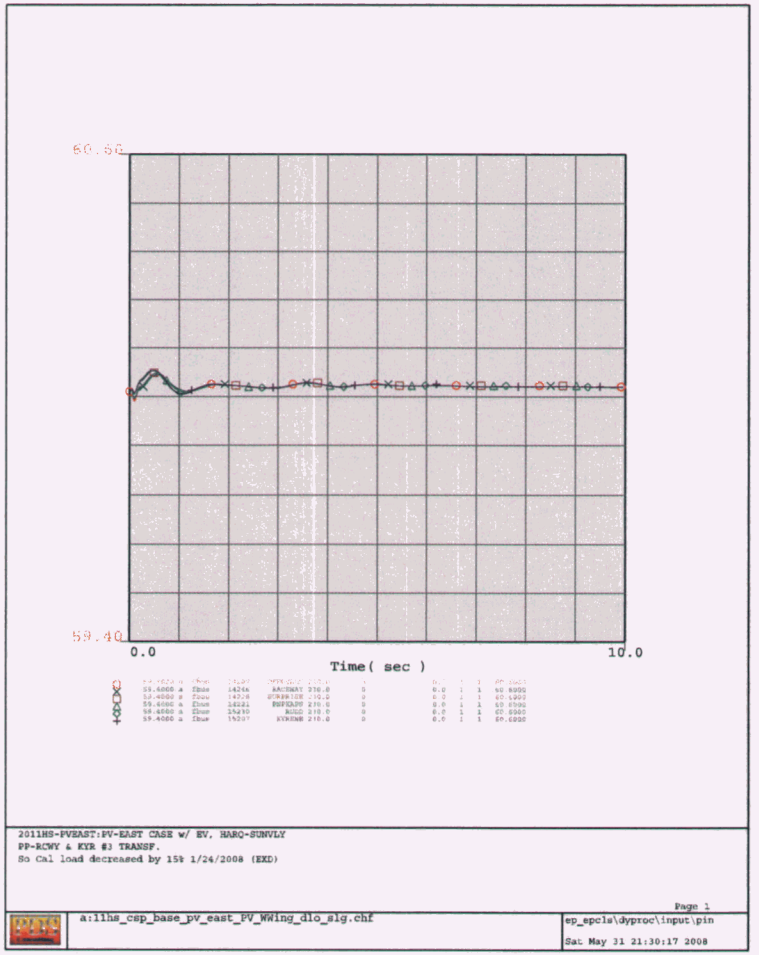
Pre-Project, PV East Max Case
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Frequency Plots



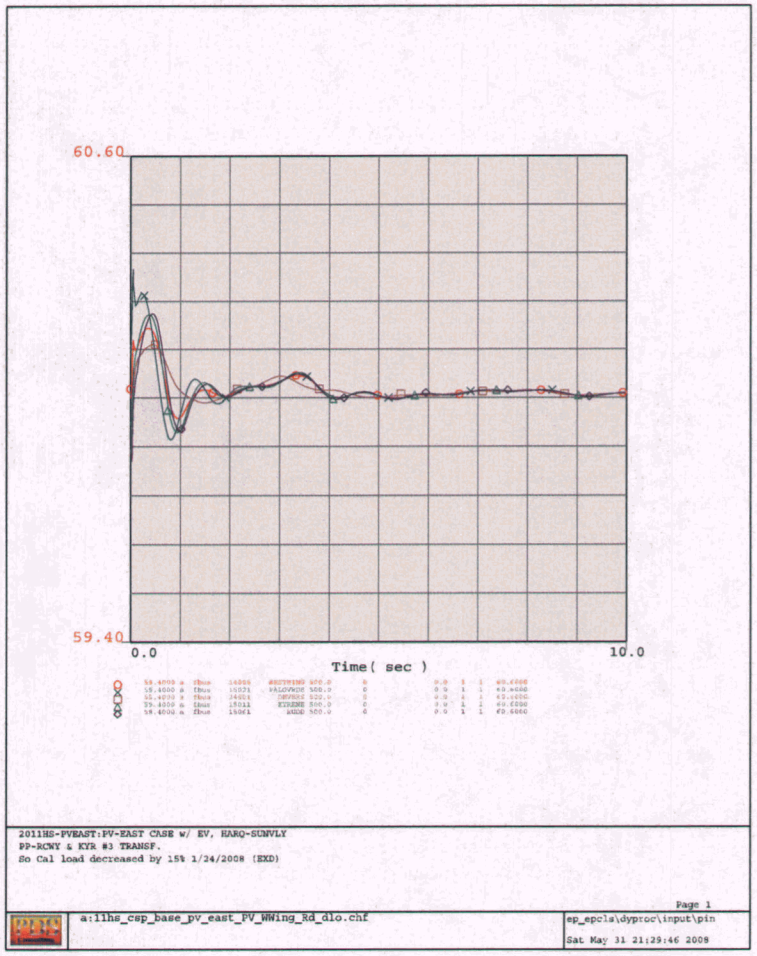
Pre-Project, PV East Max Case
PV-Westwing #1 & 2 500 kV lines outage
Transient Frequency Plots



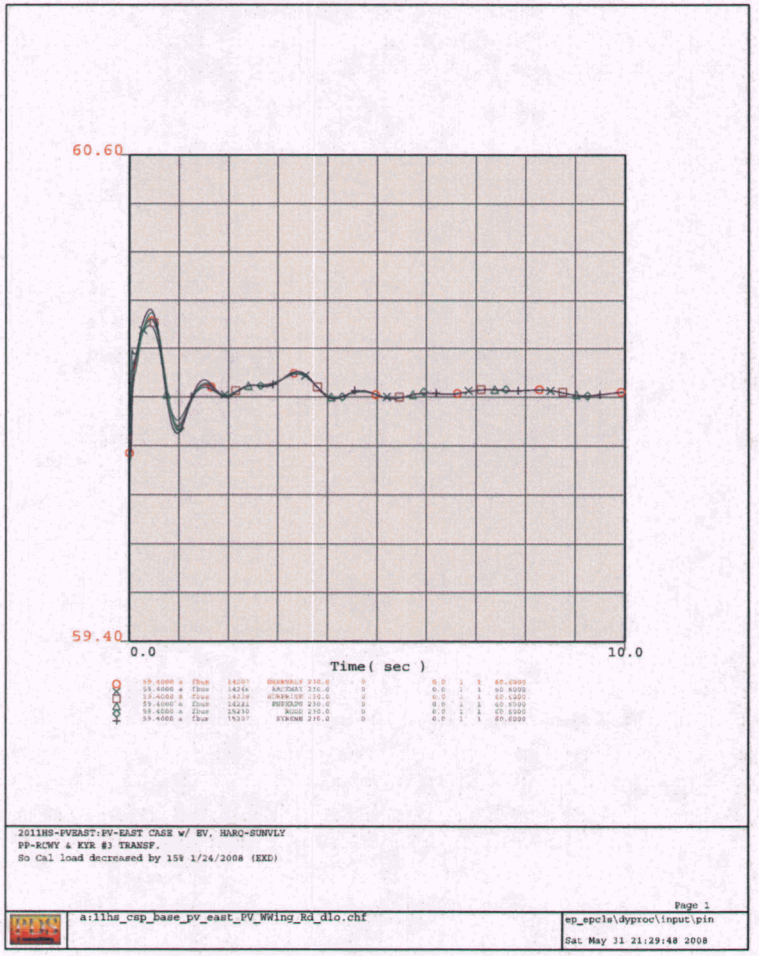
Pre-Project, PV East Max Case
PV-Westwing #1 & 2 500 kV lines outage
Transient Frequency Plots



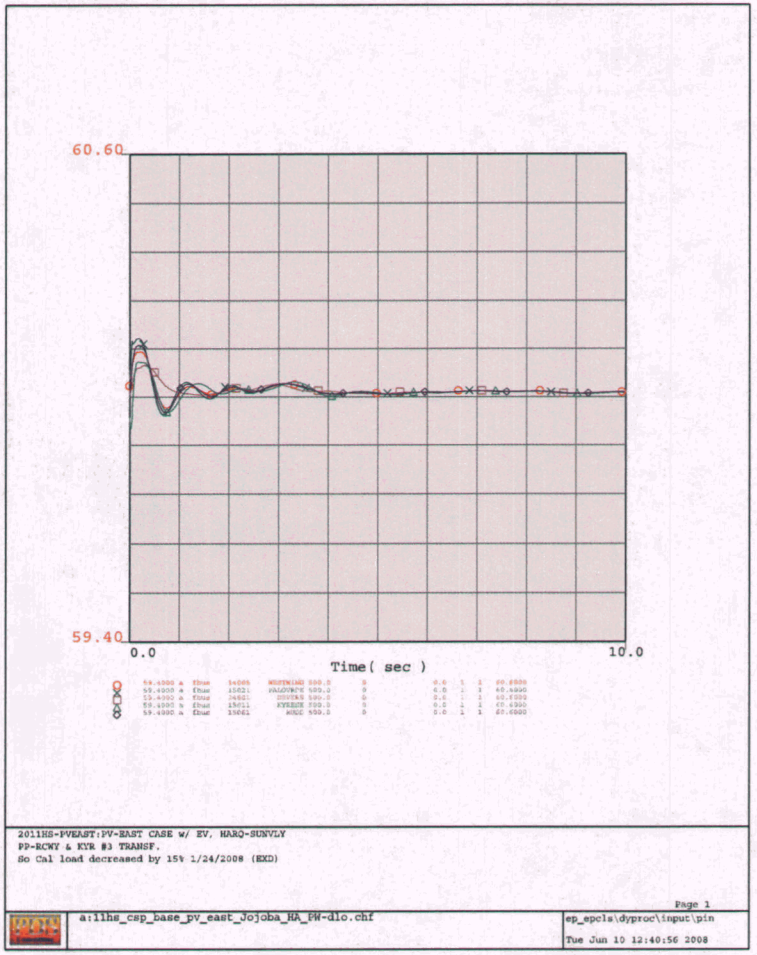
Pre-Project, PV East Max Case
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Frequency Plots



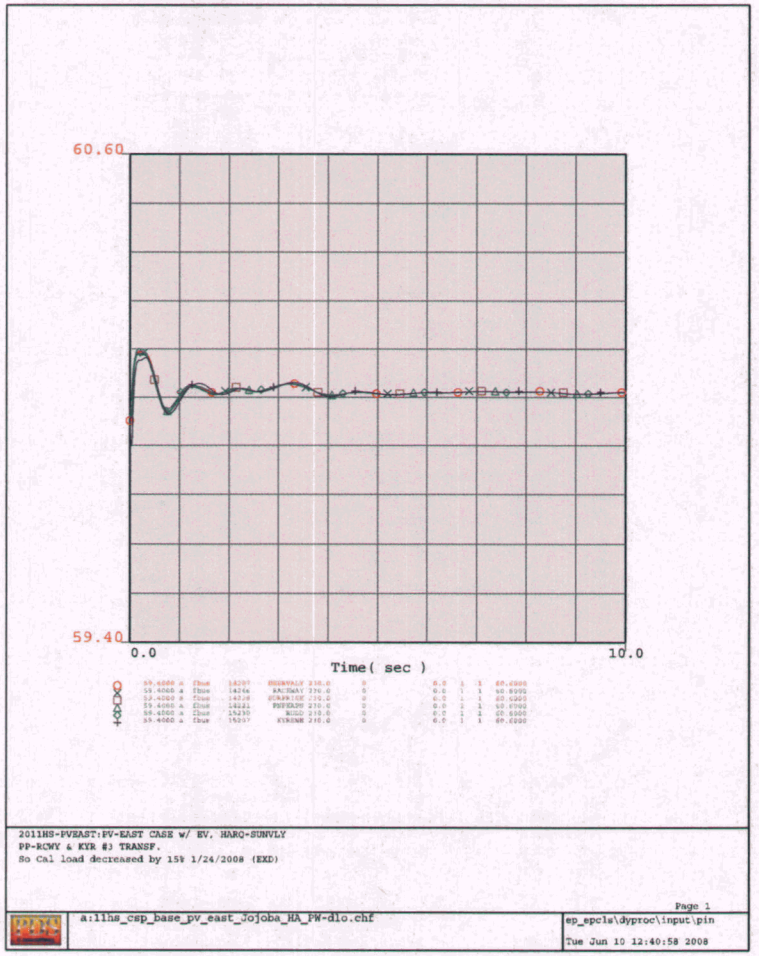
Pre-Project, PV East Max Case
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Frequency Plots



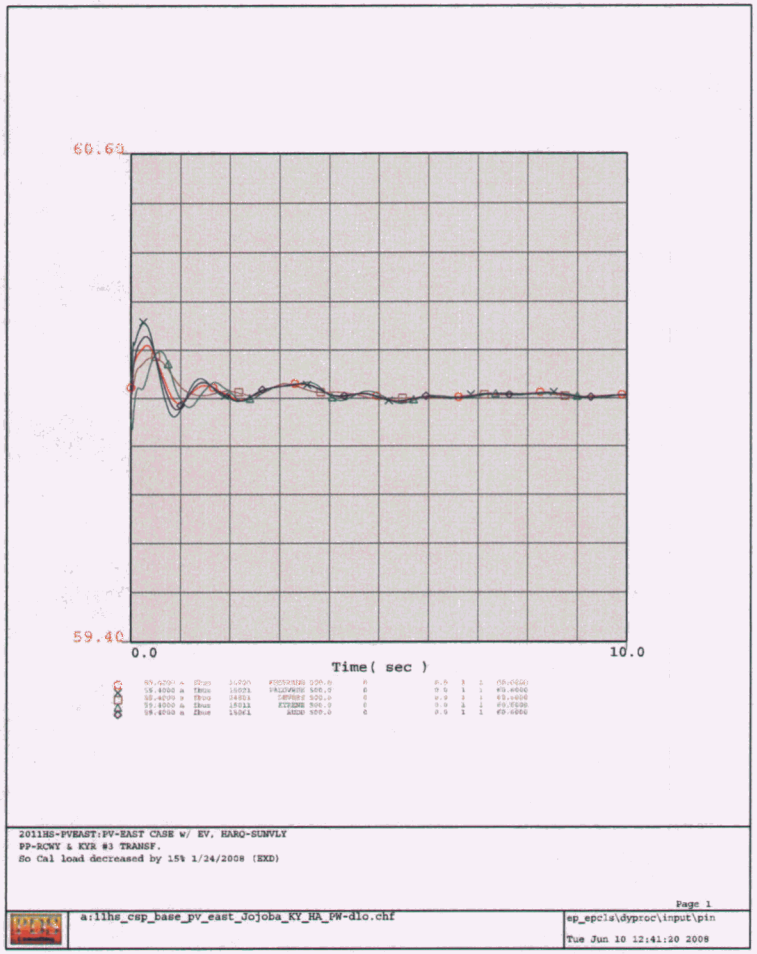
Pre-Project, PV East Max Case
HA-Pinal West, HA-Jojoba 500 kV lines outage
Transient Frequency Plots



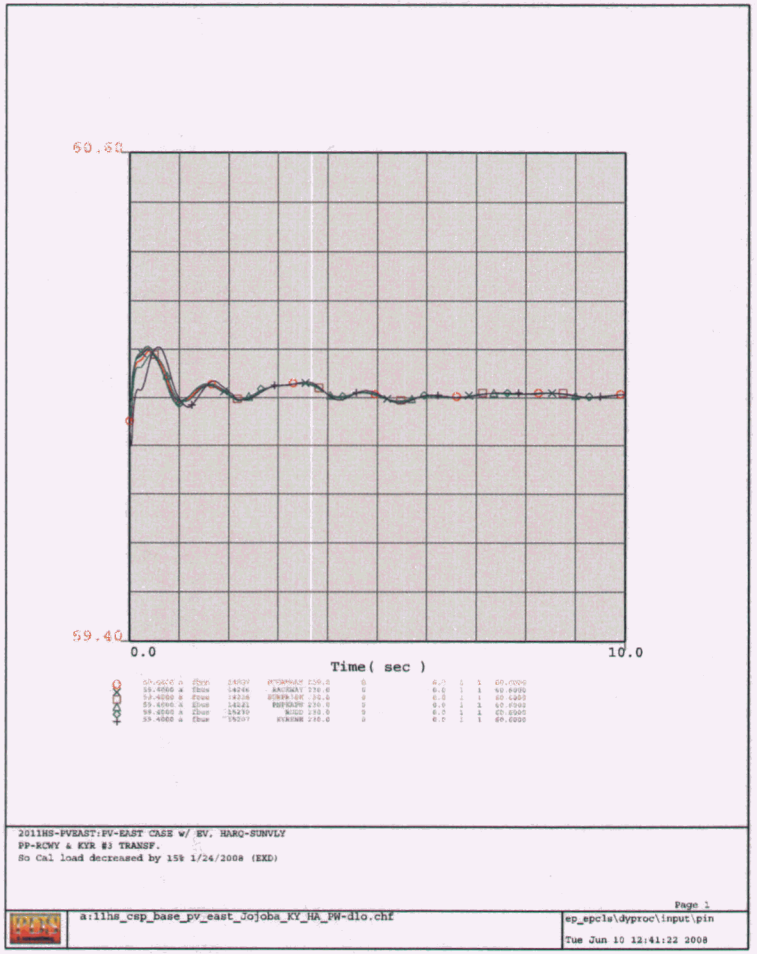
Pre-Project, PV East Max Case
HA-Pinal West, HA-Jojoba 500 kV lines outage
Transient Frequency Plots



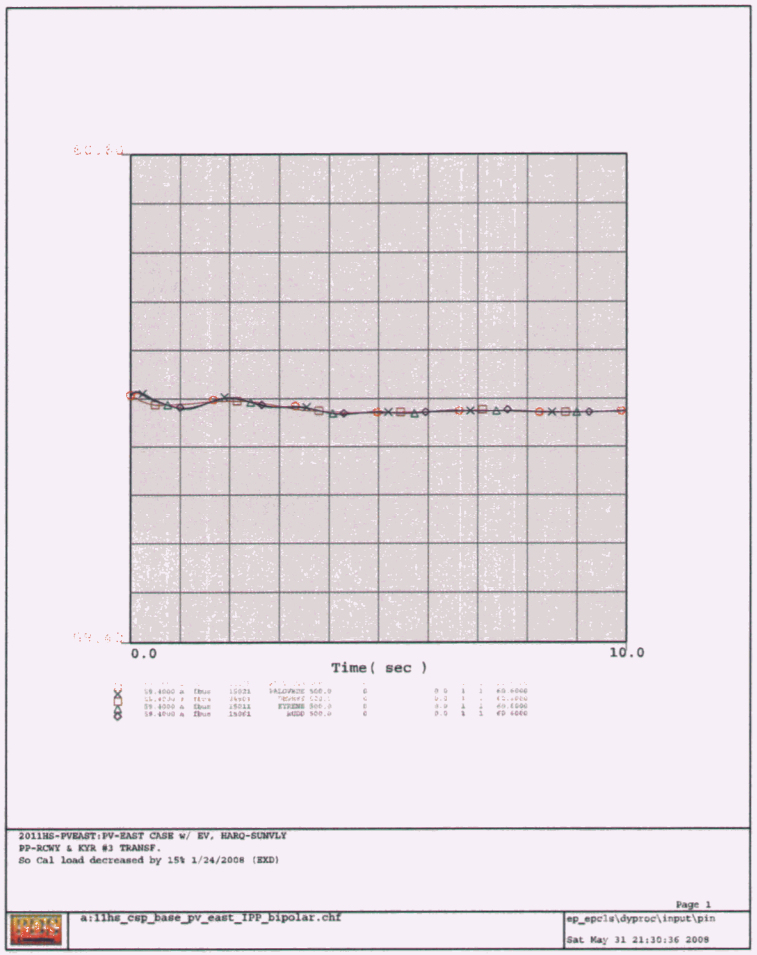
Pre-Project, PV East Max Case
HA-Pinal West, Jojoba-Kyrene 500 kV lines outage
Transient Frequency Plots



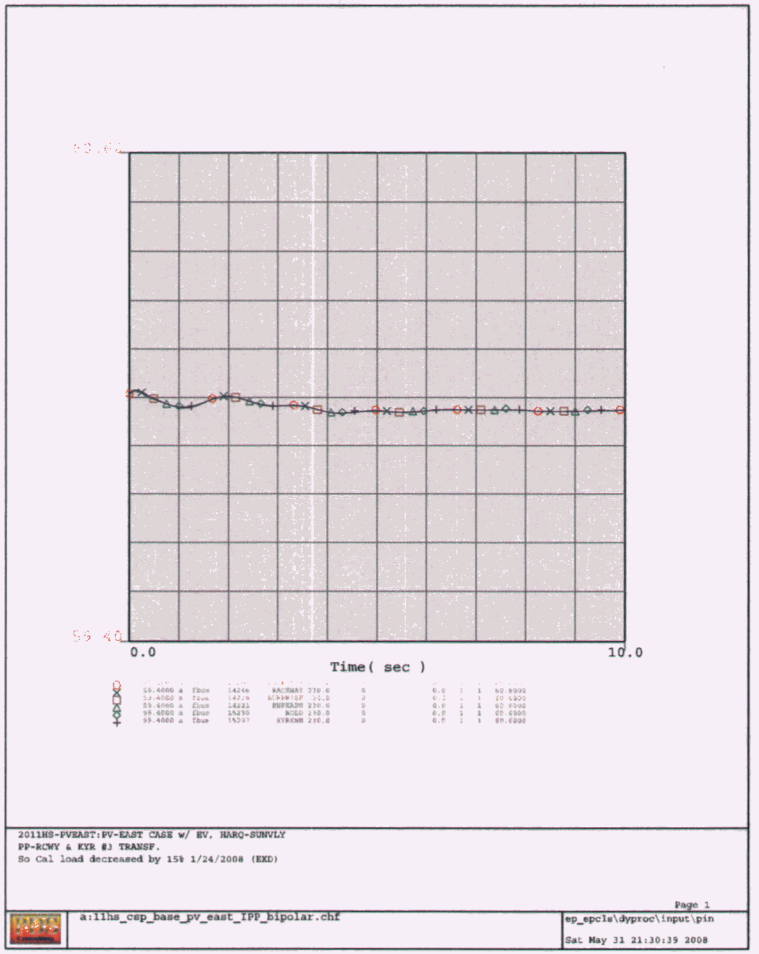
Pre-Project, PV East Max Case
HA-Pinal West, Jojoba-Kyrene 500 kV lines outage
Transient Frequency Plots



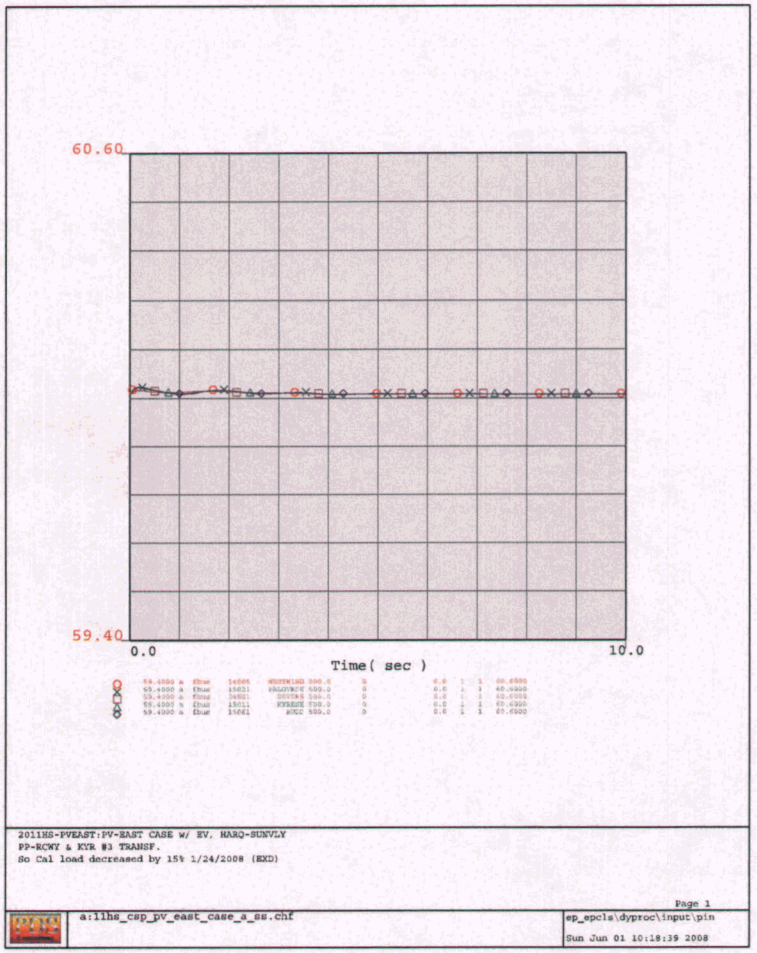
Pre-Project, PV East Max Case
IPP Bipole outage
Transient Frequency Plots



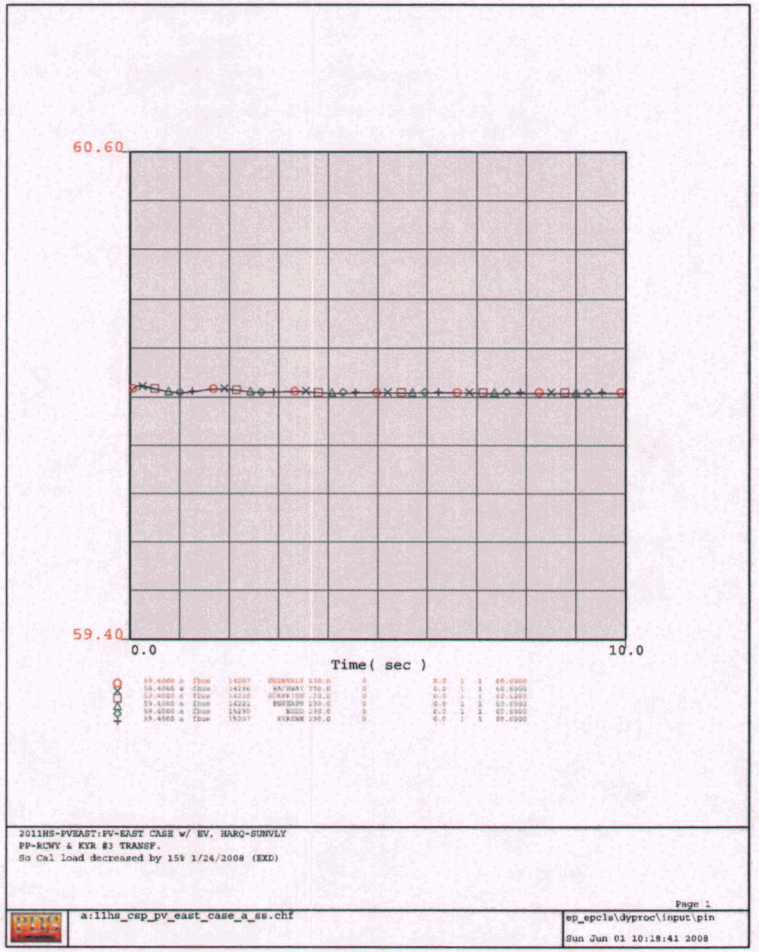
Pre-Project, PV East Max Case
IPP Bipole outage
Transient Frequency Plots



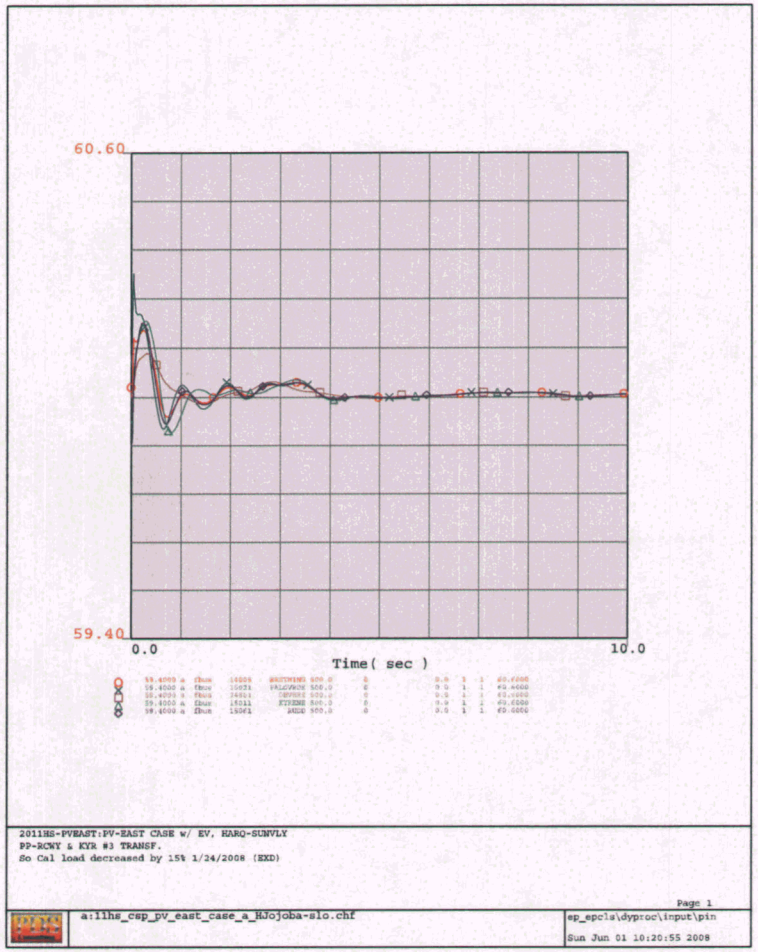
Post-Project, PV East Max Case A
No Outage
Transient Frequency Plots



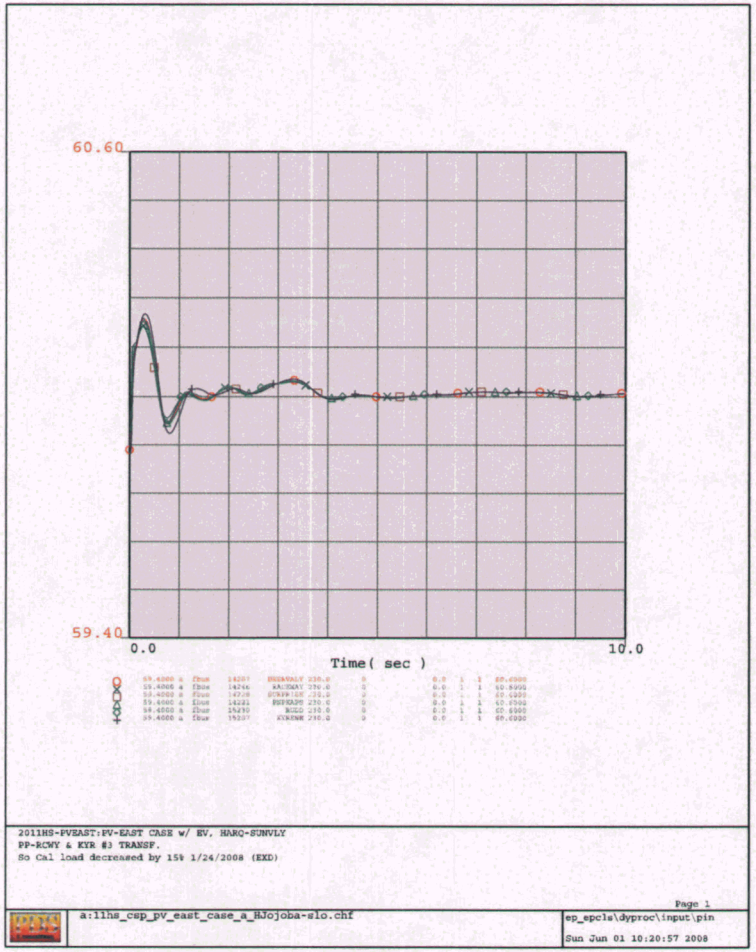
Post-Project, PV East Max Case A
No Outage
Transient Frequency Plots



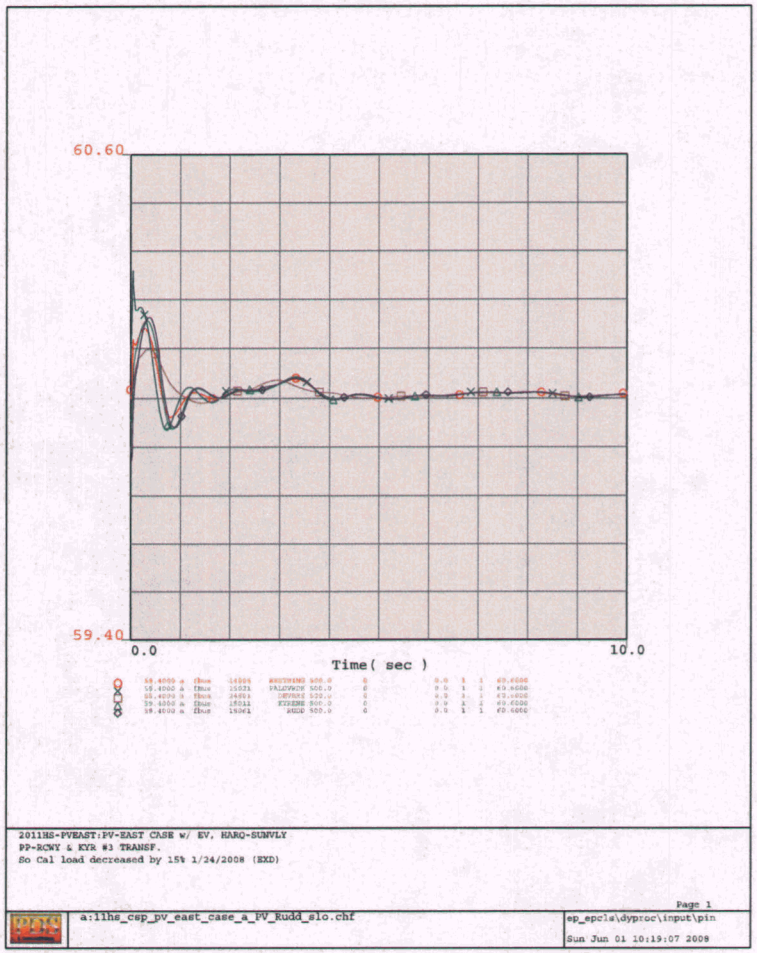
Post-Project, PV East Max Case A
Hassayampa-Jojoba 500 kV line outage
Transient Frequency Plots



Post-Project, PV East Max Case A
Hassayampa-Jojoba 500 kV line outage
Transient Frequency Plots



Post-Project, PV East Max Case A
Palo Verde-Rudd 500 kV line outage
Transient Frequency Plots



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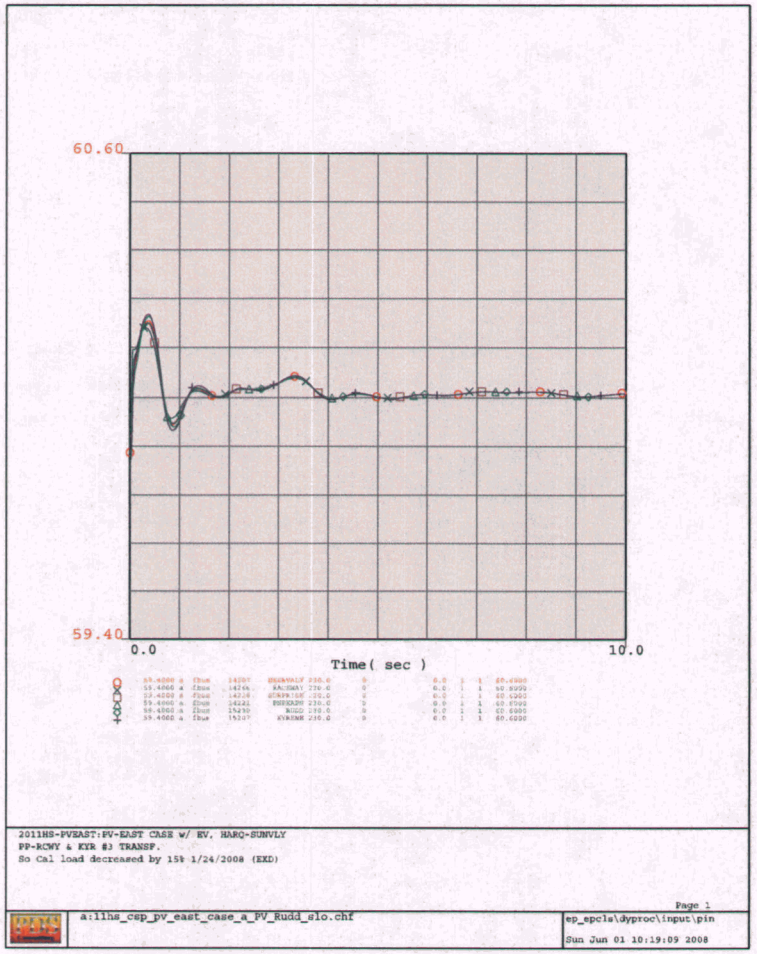
Palo Verde-Rudd 500 kV line outage
Transient Frequency Plots



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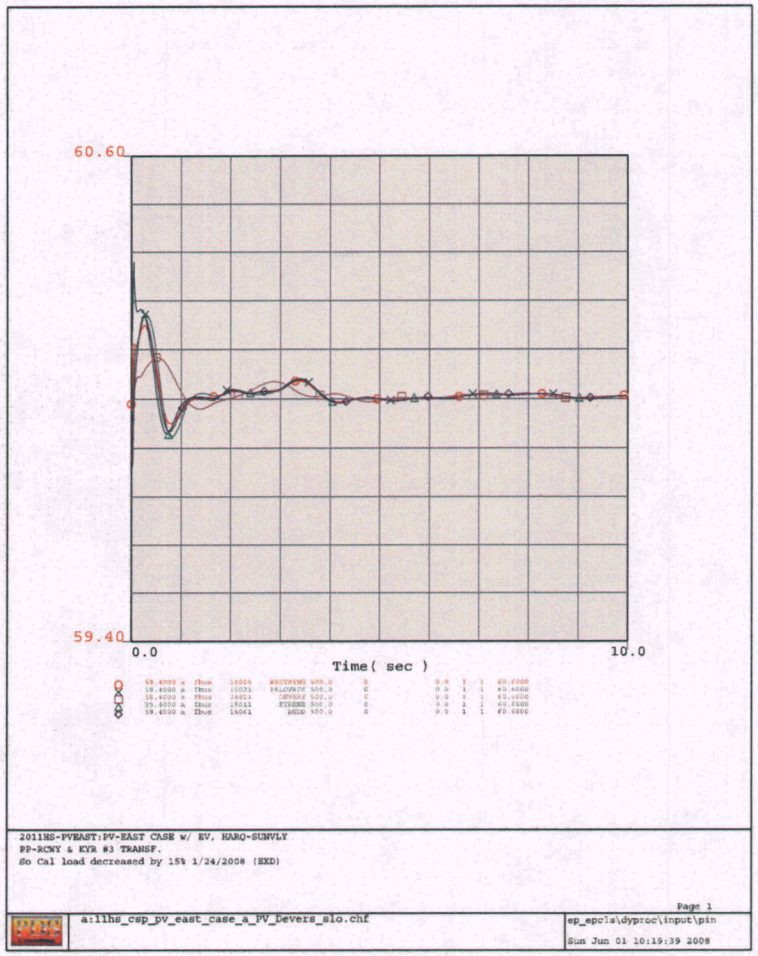
Palo Verde-Devers 500 kV line outage
Transient Frequency Plots



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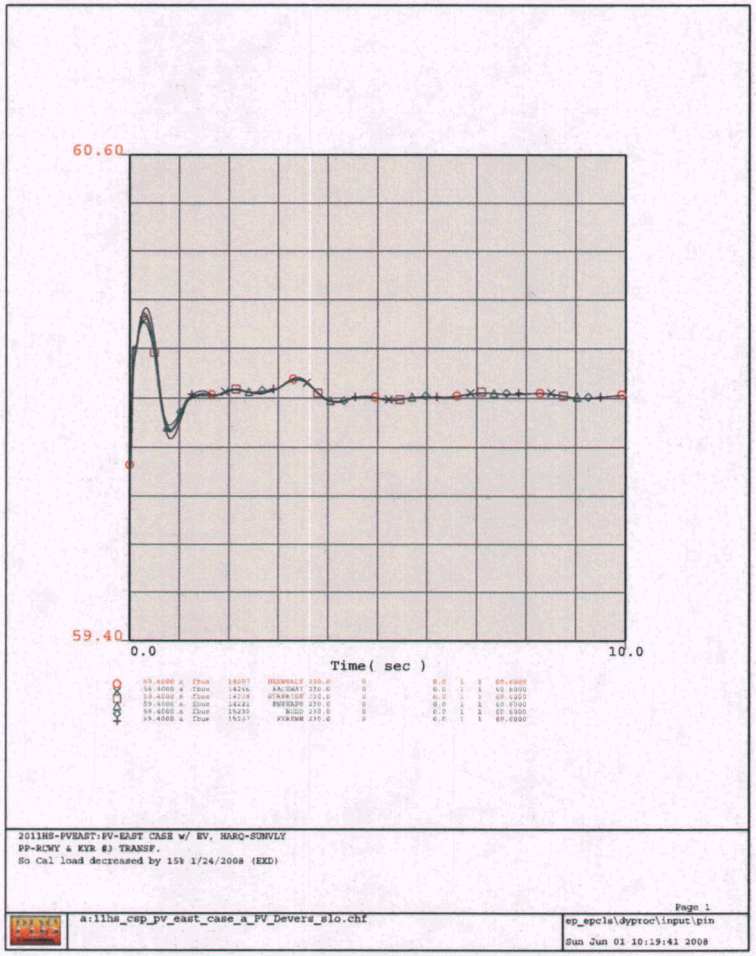
Palo Verde-Devers 500 kV line outage
Transient Frequency Plots



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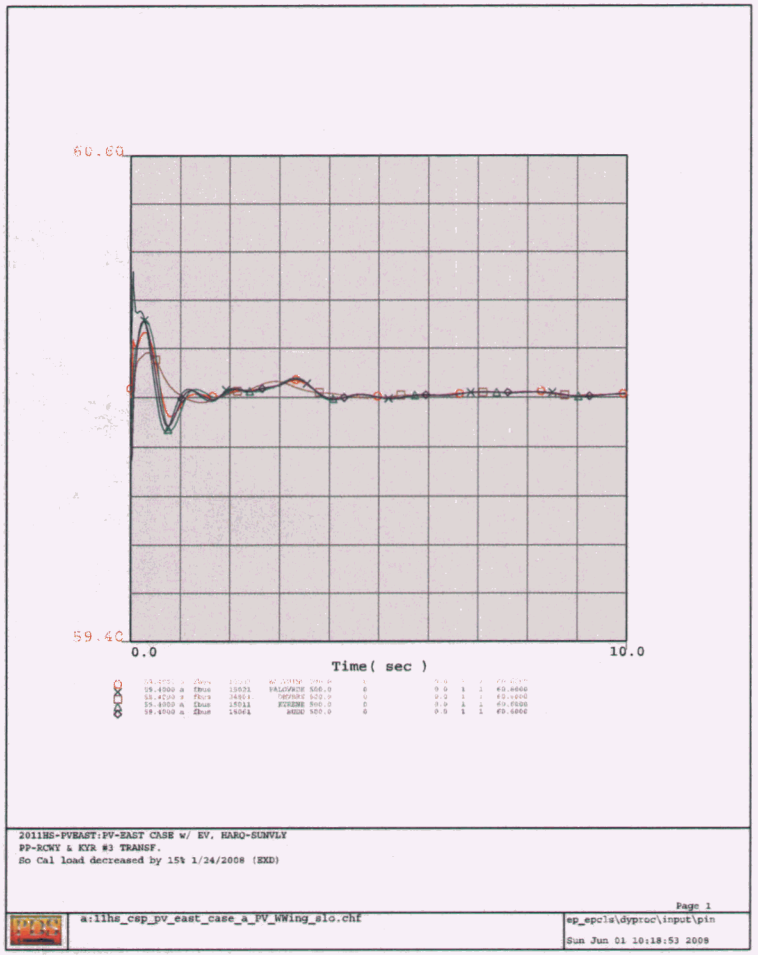
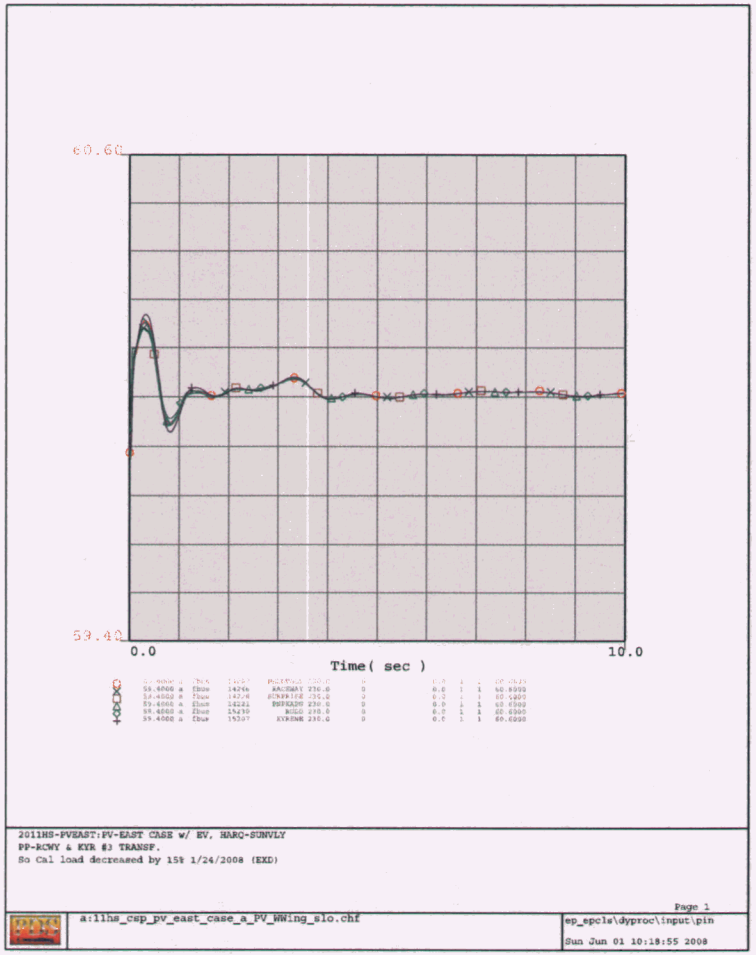
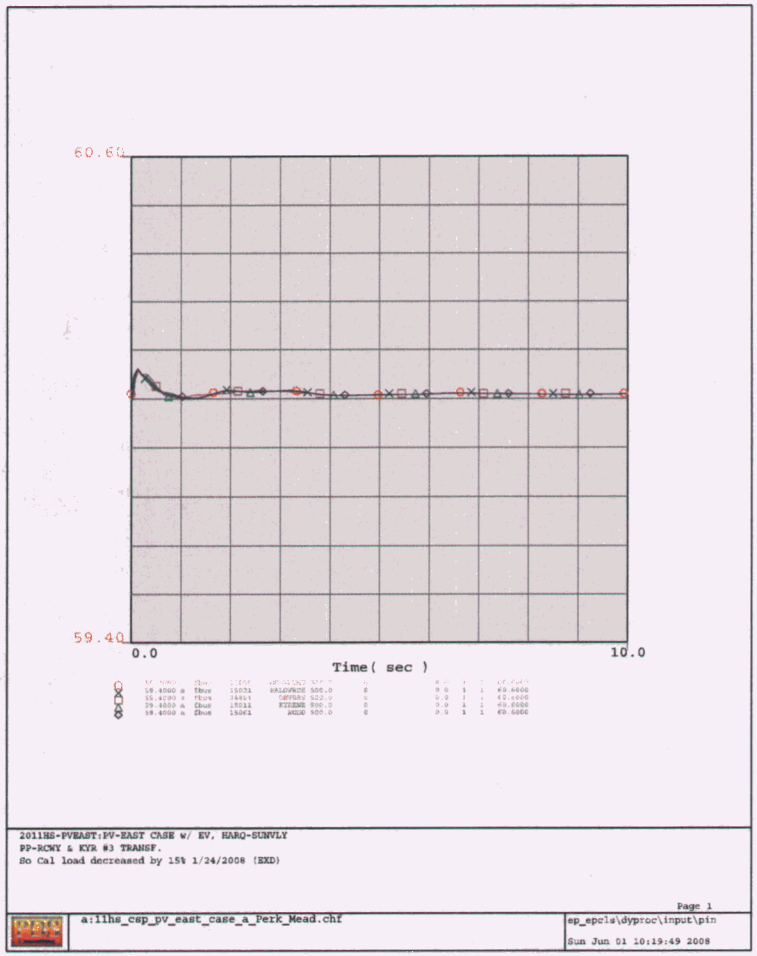
Palo Verde-Westwing 500 kV line outage
Transient Frequency Plots



Post-Project, PV East Max Case A
Palo Verde-Westwing 500 kV line outage
Transient Frequency Plots



Post-Project, PV East Max Case A
Perkins-Mead 500 kV line outage
Transient Frequency Plots



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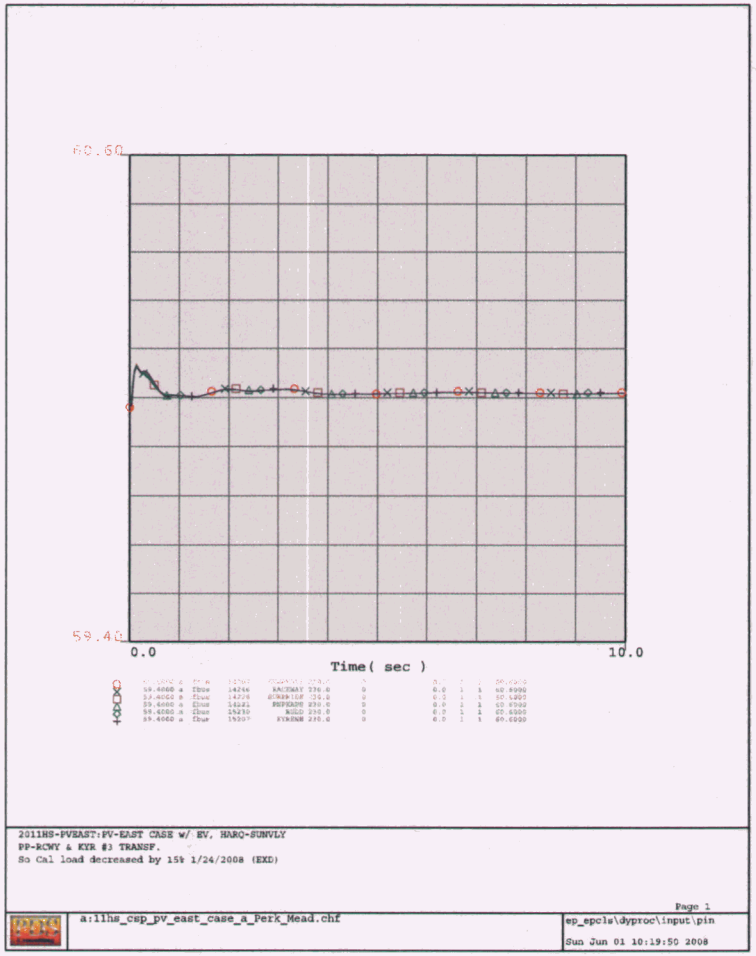
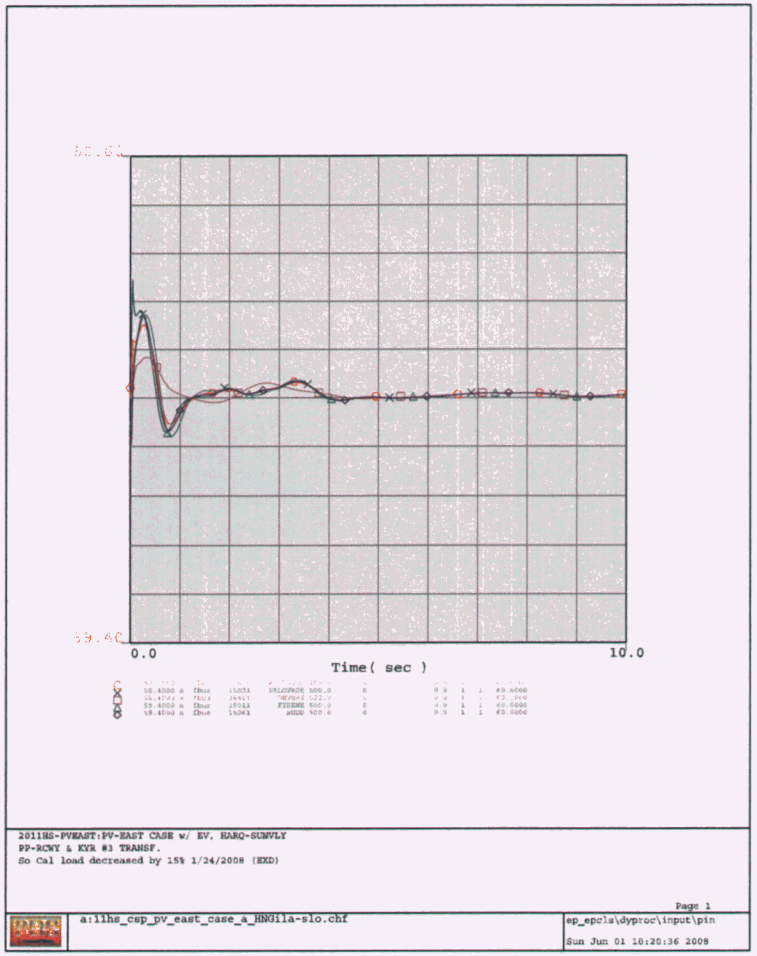
Perkins-Mead 500 kV line outage
Transient Frequency Plots



Post-Project, PV East Max Case A
Hassayampa -N. Gila 500 kV line outage
Transient Frequency Plots



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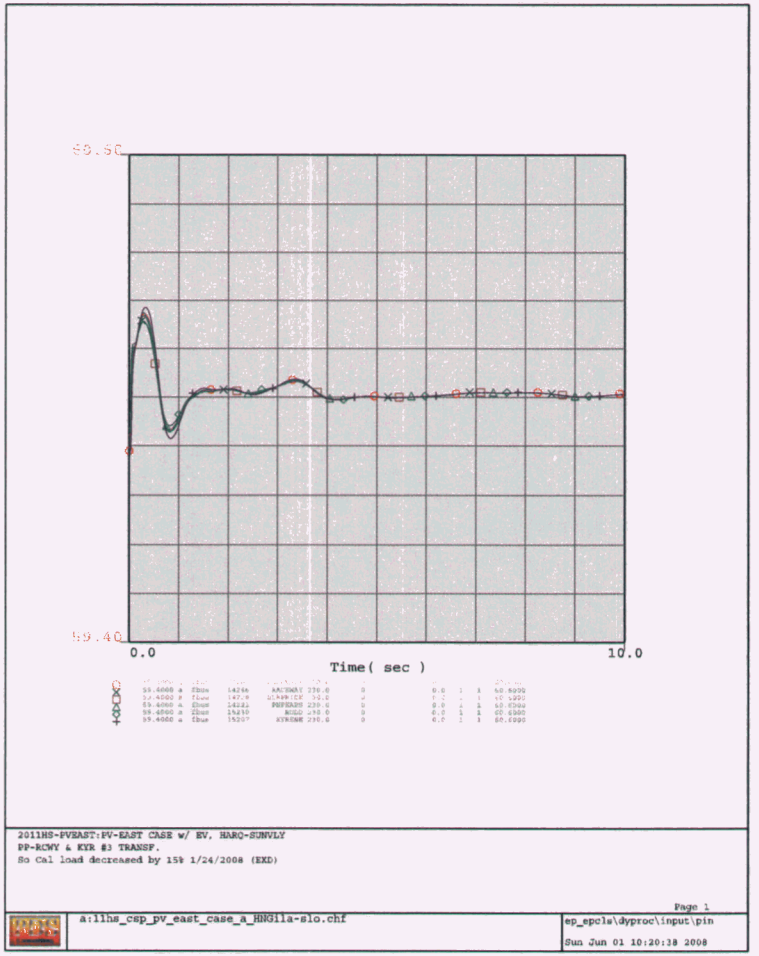
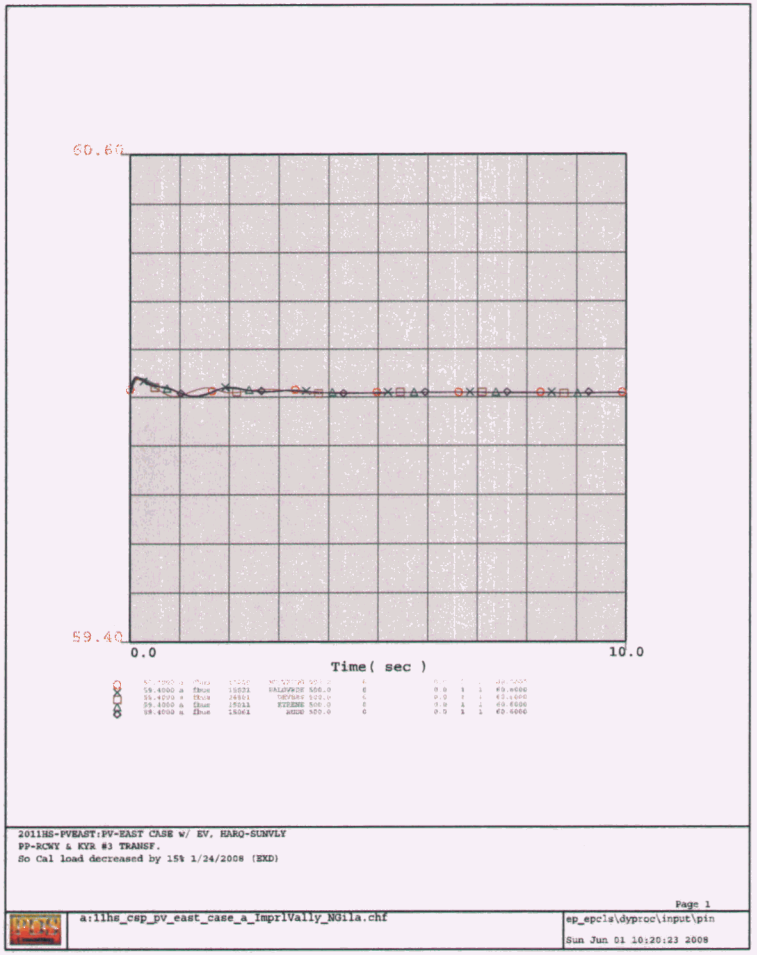
Hassayampa -N. Gila 500 kV line outage
Transient Frequency Plots



Post-Project, PV East Max Case A
N. Gila-Imperial Valley 500 kV line outage
Transient Frequency Plots



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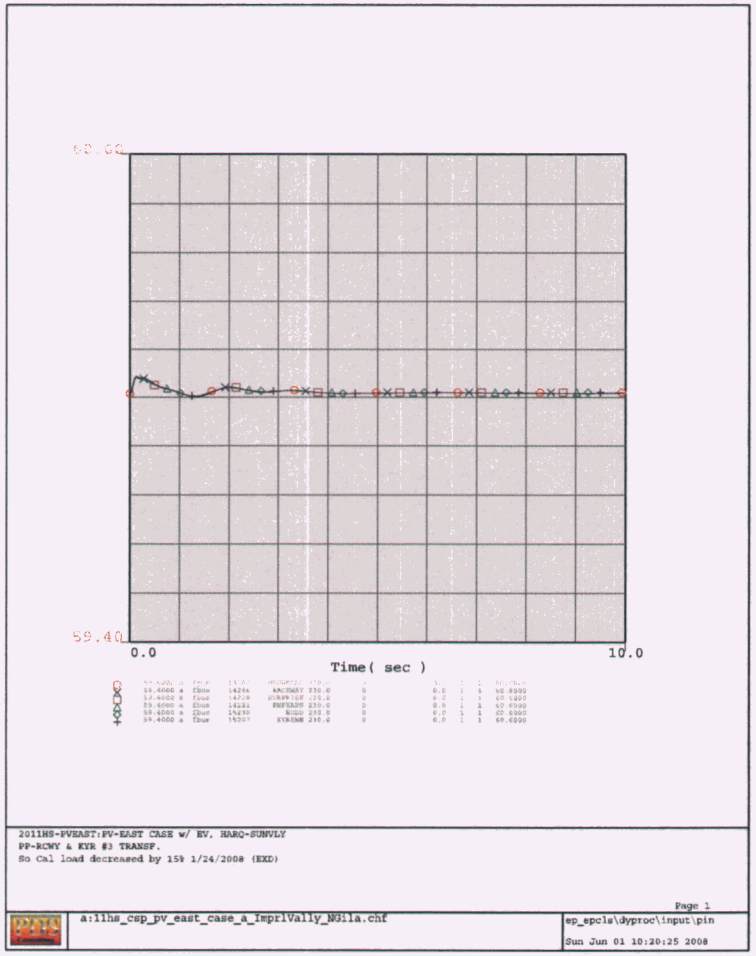
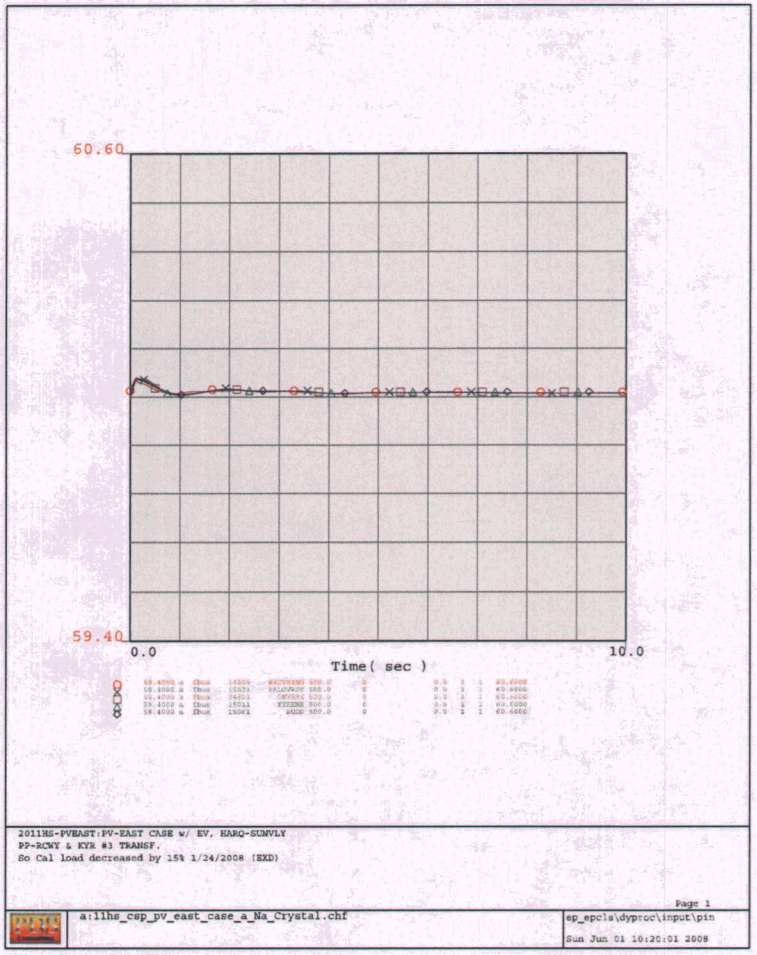
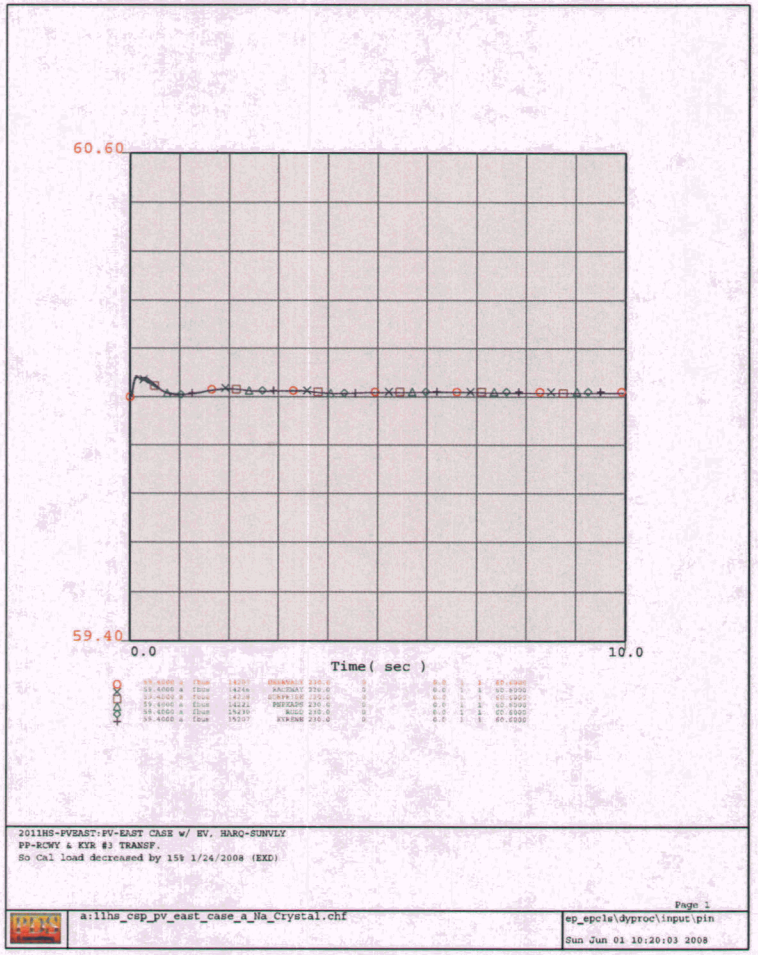
N. Gila-Imperial Valley 500 kV line outage
Transient Frequency Plots



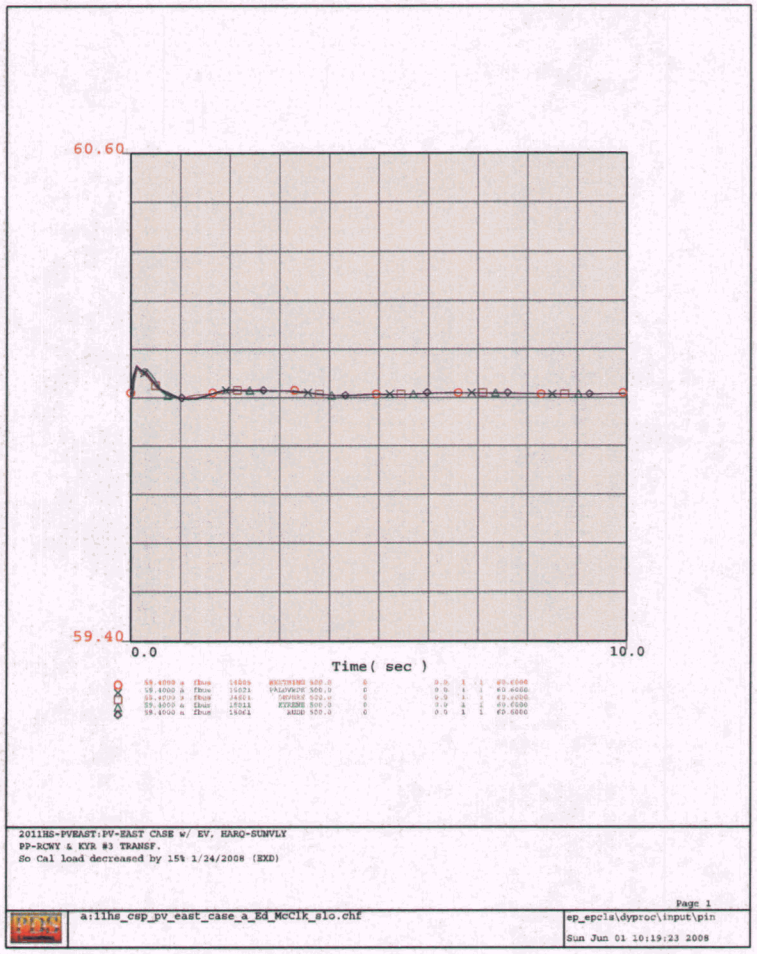
Post-Project, PV East Max Case A
Navajo-Crystal 500 kV line
Transient Frequency Plots



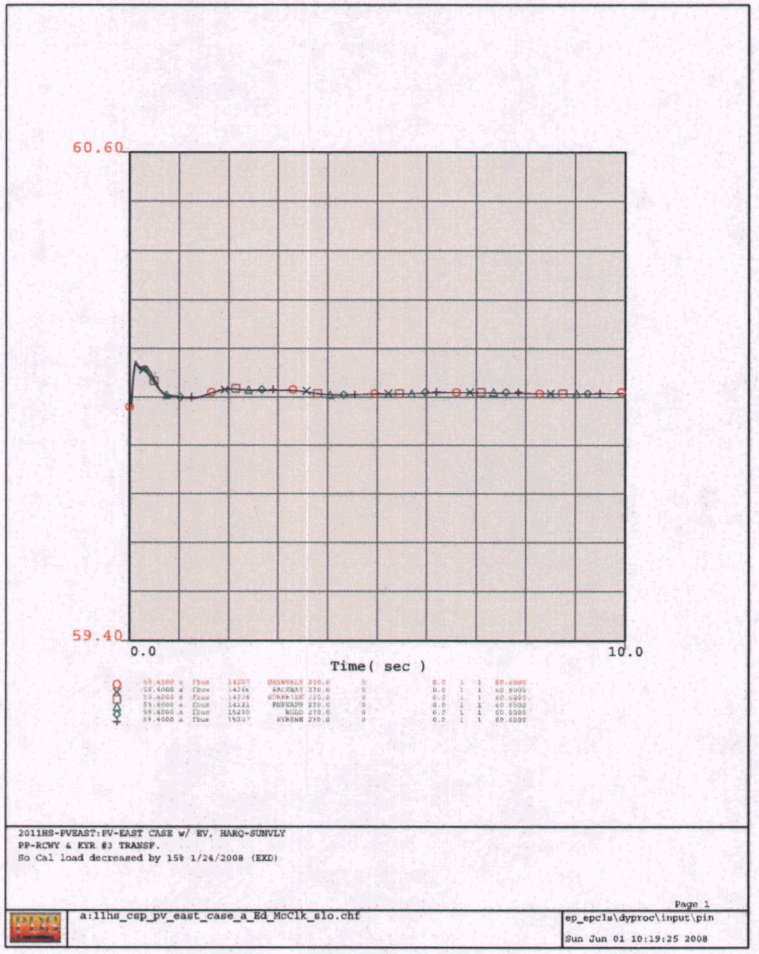
Post-Project, PV East Max Case A
Navajo-Crystal 500 kV line
Transient Frequency Plots



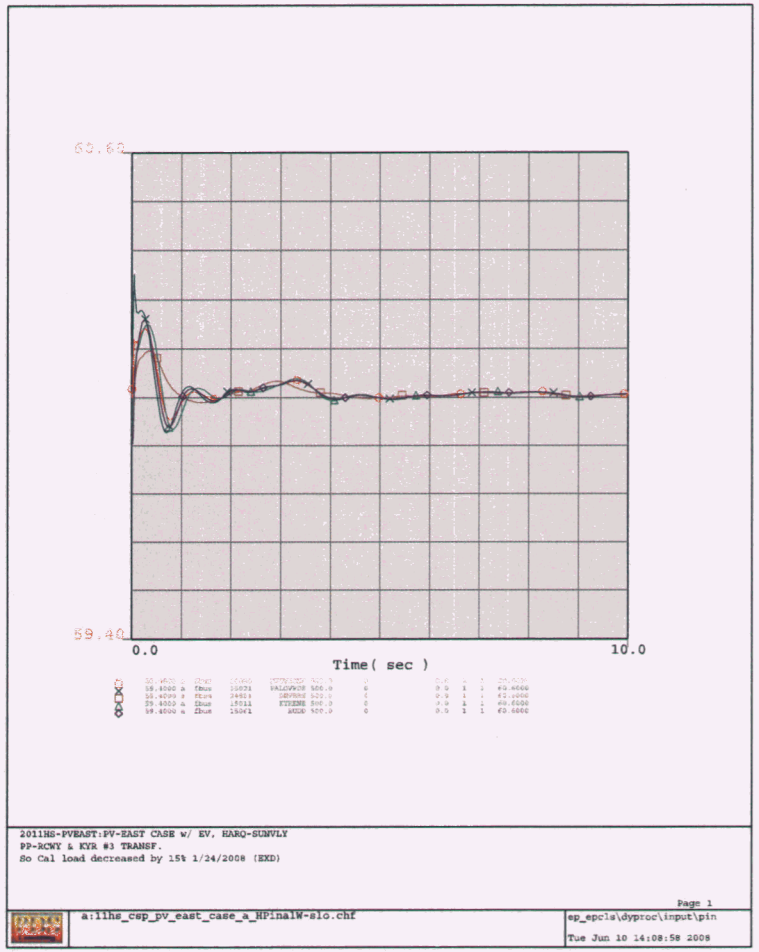
Post-Project, PV East Max Case A
El Dorado-McCullough 500 kV line outage
Transient Frequency Plots



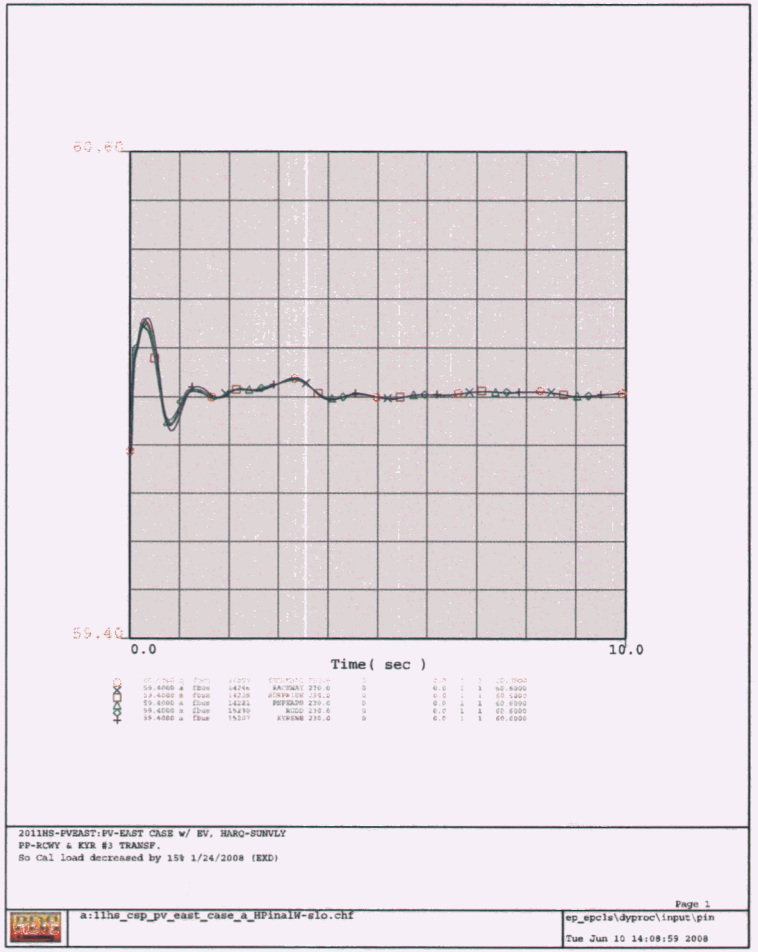
Post-Project, PV East Max Case A
El Dorado-McCullough 500 kV line outage
Transient Frequency Plots



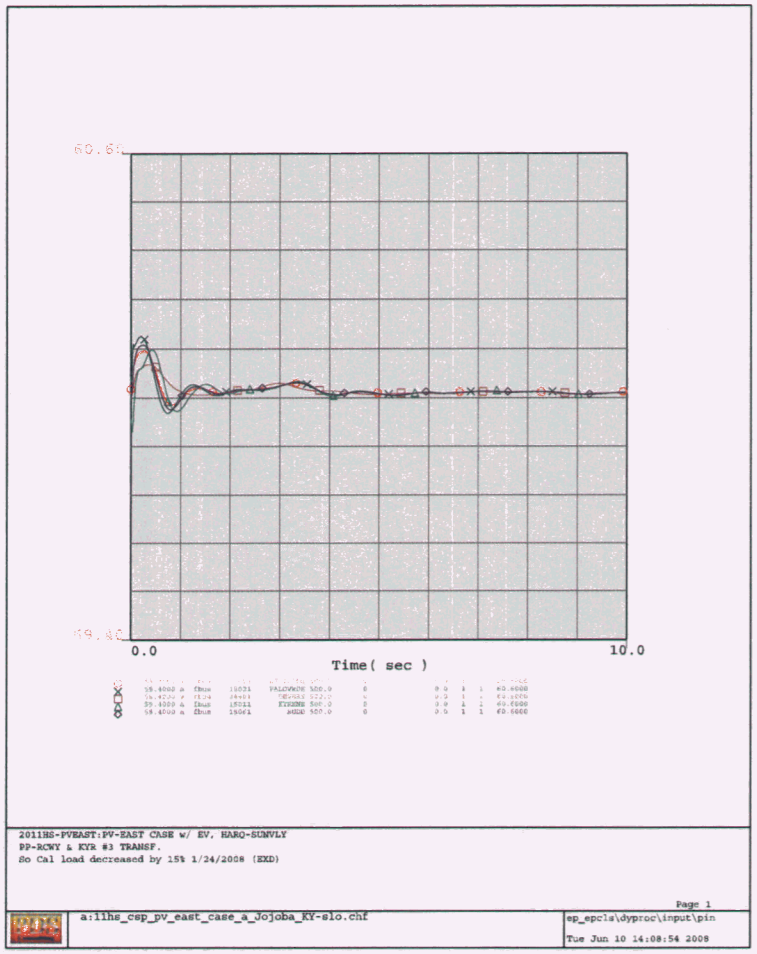
Post-Project, PV East Max Case A
Hassayampa-Pinal West 500 kV line outage
Transient Frequency Plots



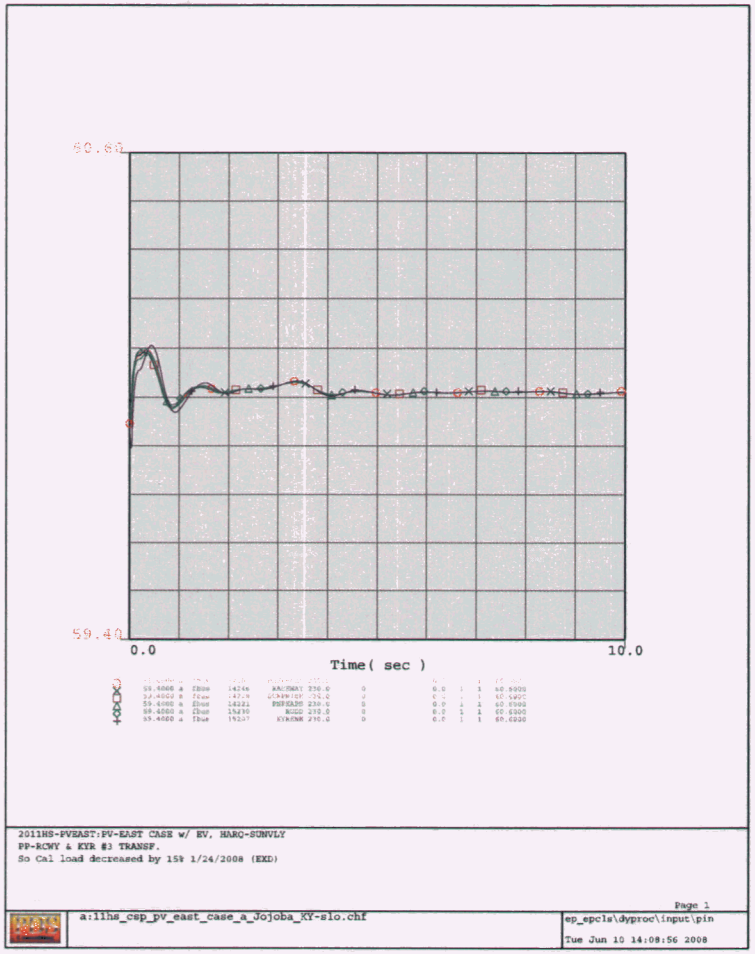
Post-Project, PV East Max Case A
Hassayampa-Pinal West 500 kV line outage
Transient Frequency Plots



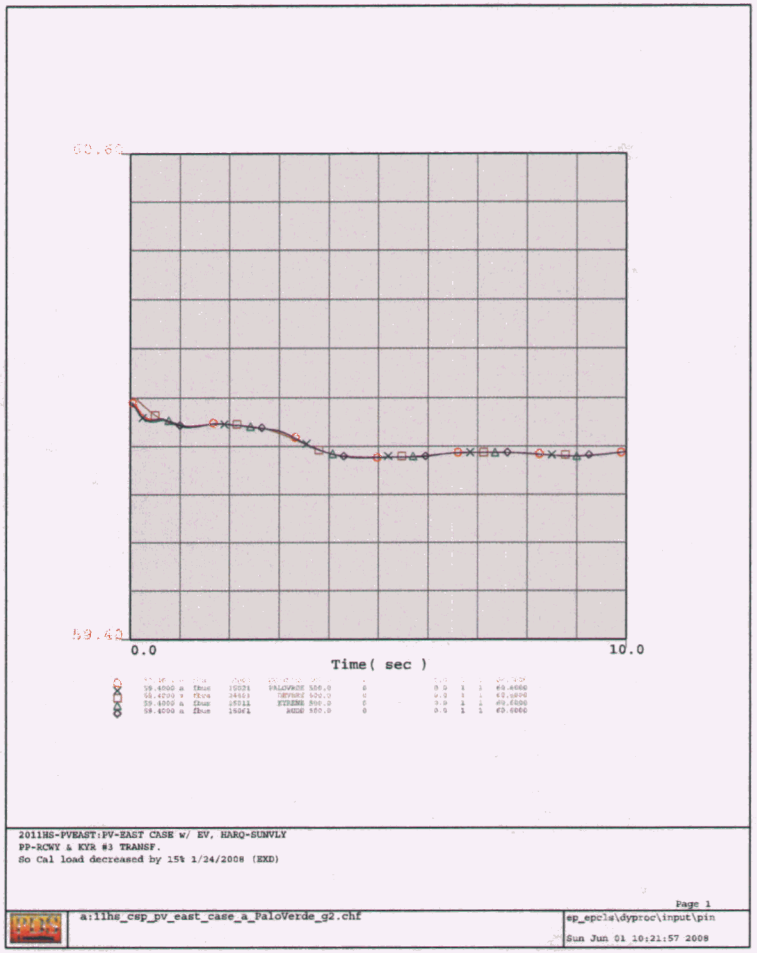
Post-Project, PV East Max Case A
Jojoba-Kyrene 500 kV line outage
Transient Frequency Plots



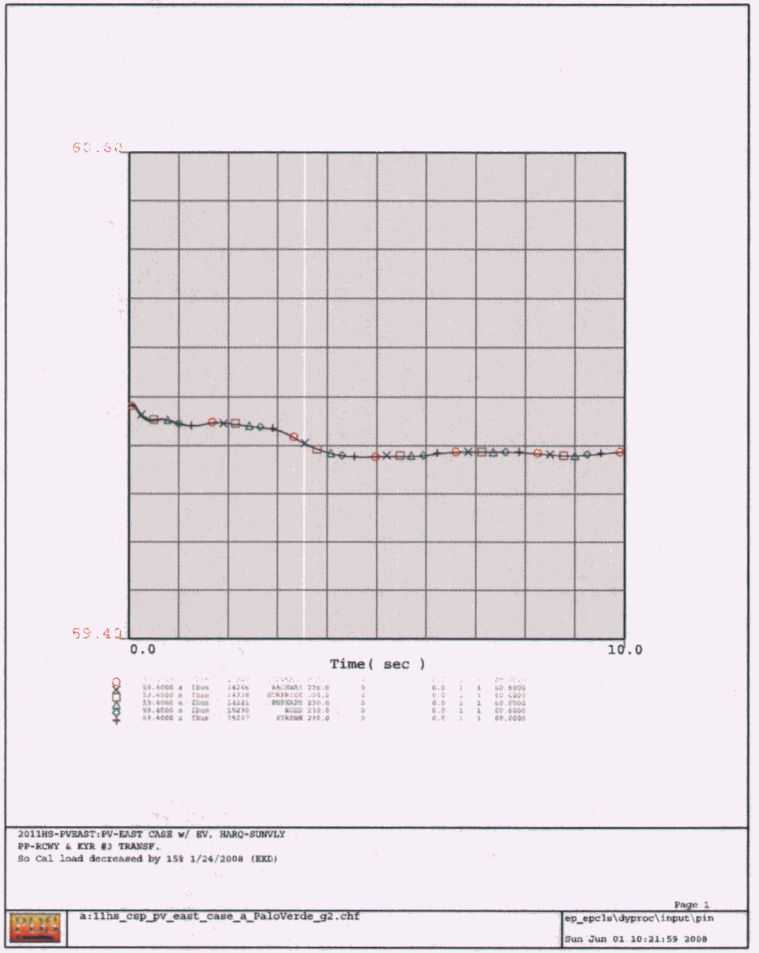
Post-Project, PV East Max Case A
Jojoba-Kyrene 500 kV line outage
Transient Frequency Plots



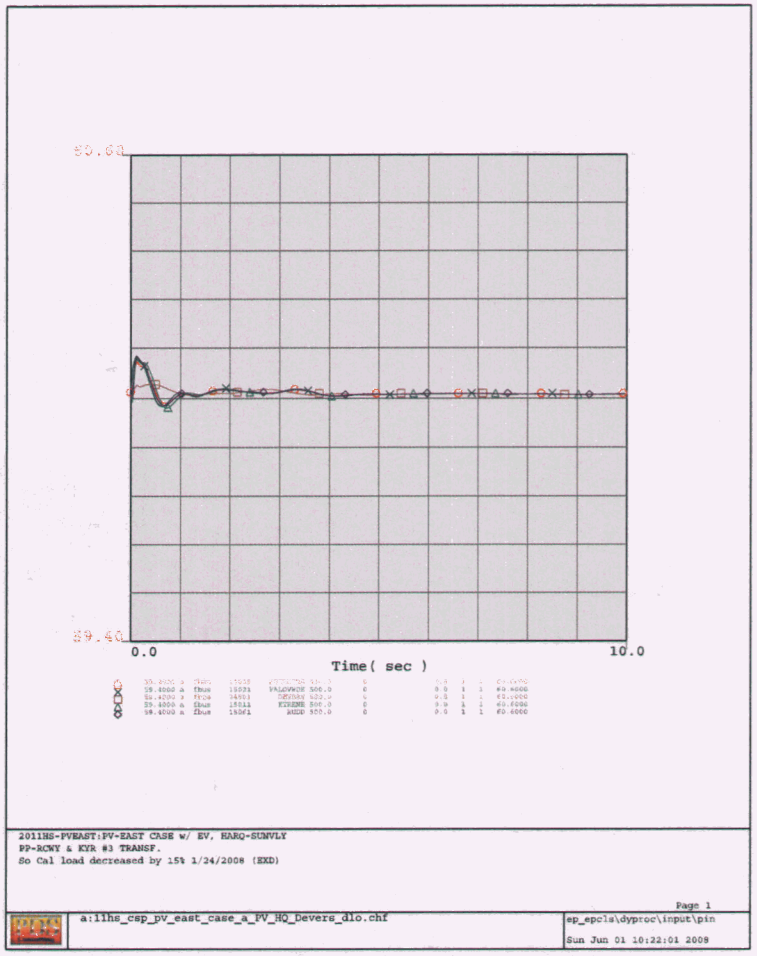
Post-Project, PV East Max Case A
Palo Verde G-2 outage
Transient Frequency Plots



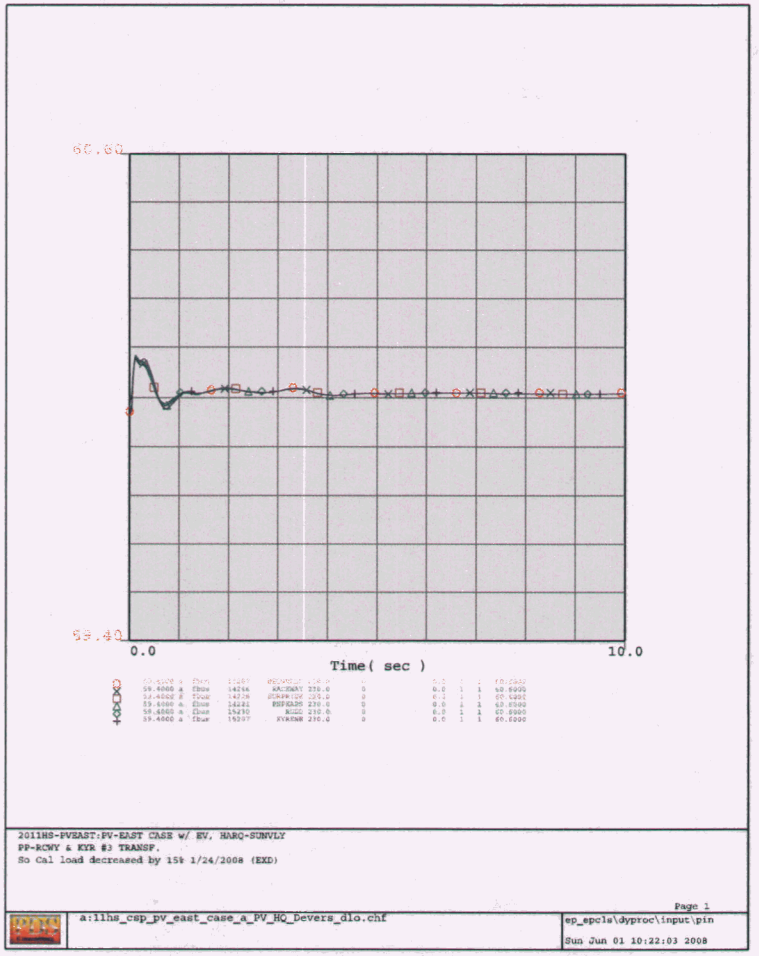
Post-Project, PV East Max Case A
Palo Verde G-2 outage
Transient Frequency Plots



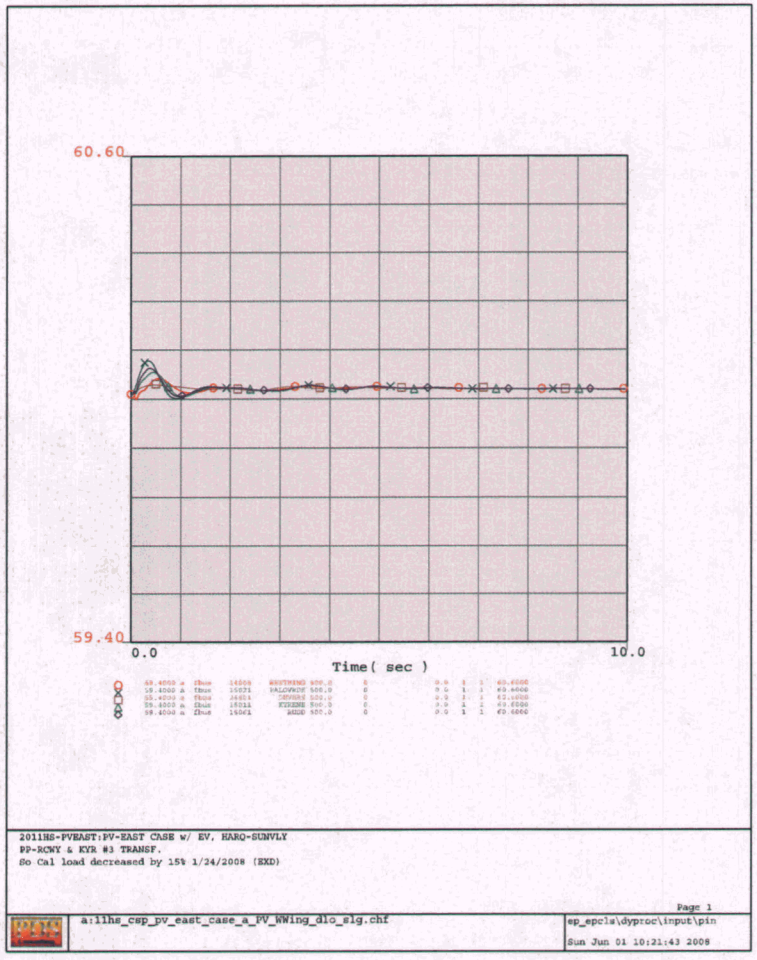
Post-Project, PV East Max Case A
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Frequency Plots



Post-Project, PV East Max Case A
PV-Devers, Haquahala-Devers 500 kV lines outage
Transient Frequency Plots



Post-Project, PV East Max Case A
PV-Westwing #1 & 2 500 kV lines outage
Transient Frequency Plots



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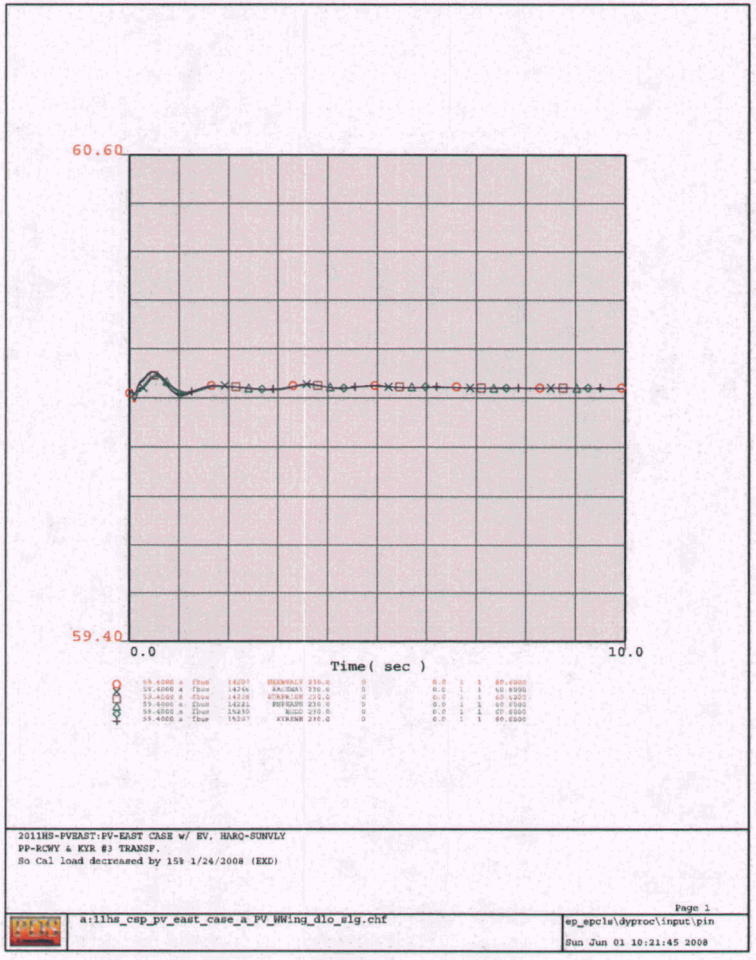
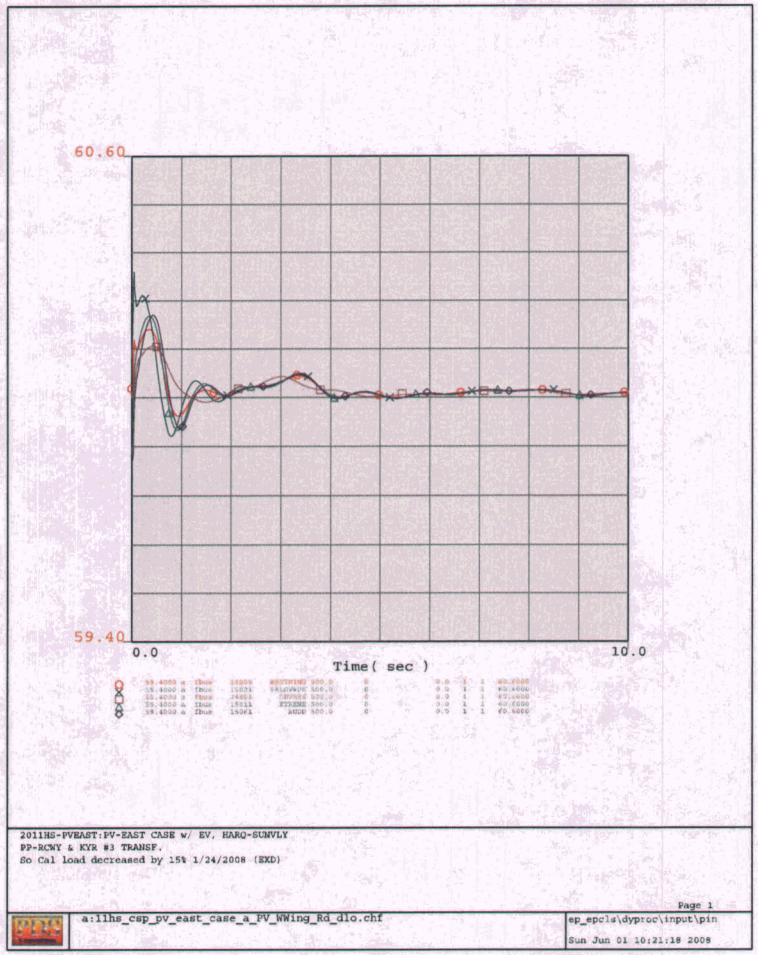
PV-Westwing #1 & 2 500 kV lines outage
Transient Frequency Plots



Post-Project, PV East Max Case A
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Frequency Plots



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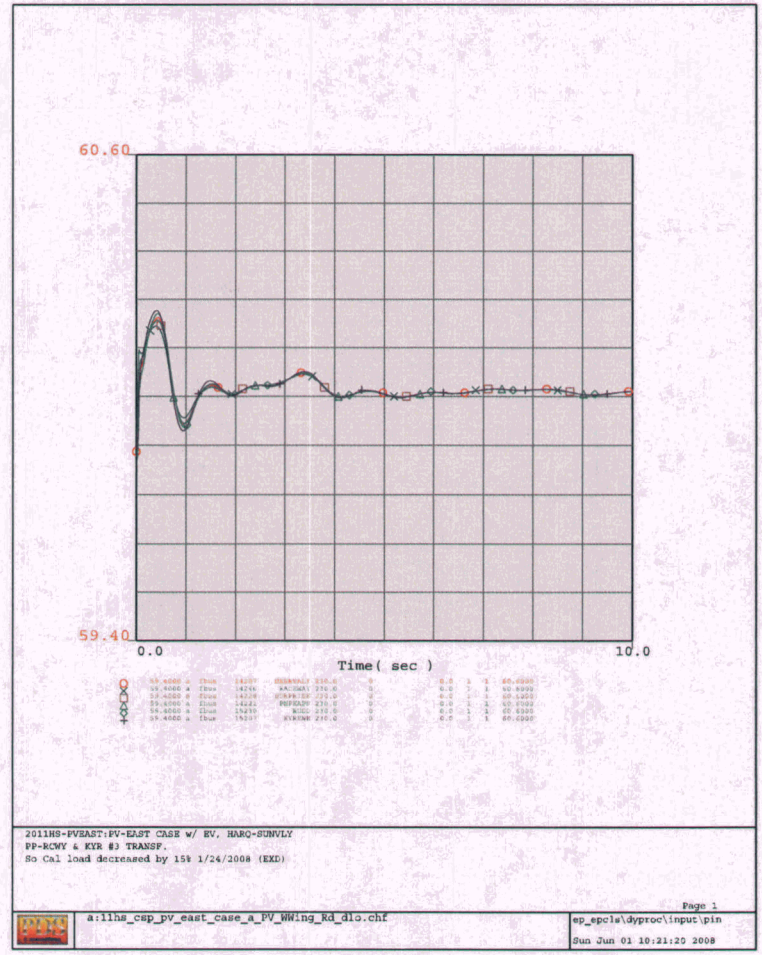
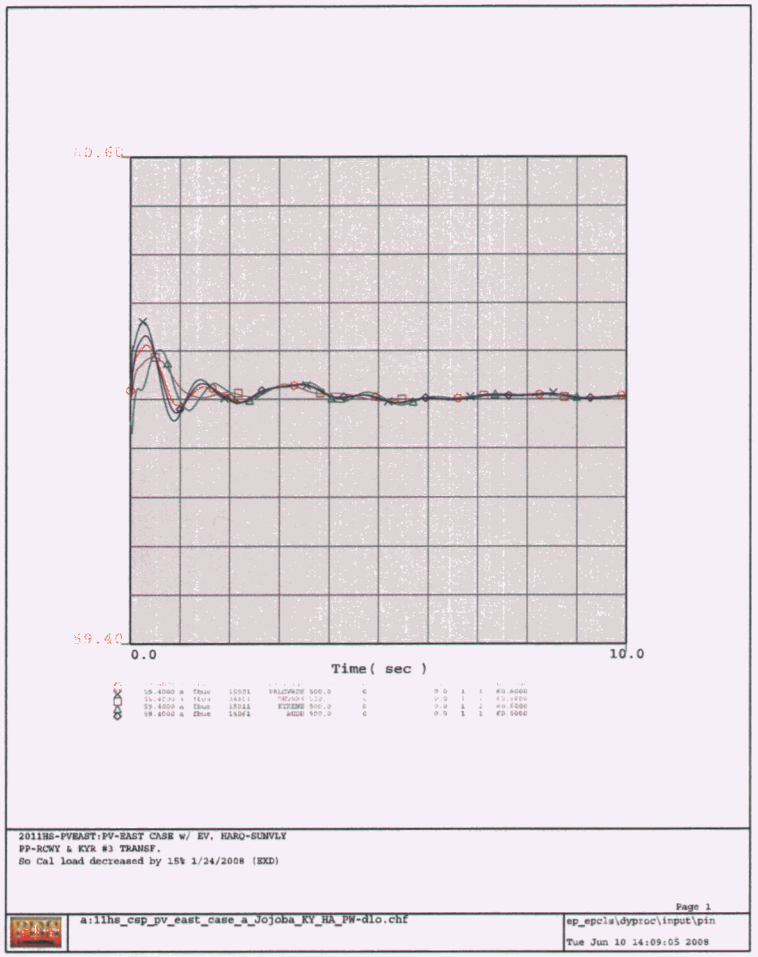
PV-Westwing, PV-Rudd 500 kV lines outage
Transient Frequency Plots



Post-Project, PV East Max Case A
HA-Pinal West, Jojoba- Kyrene 500 kV lines outage
Transient Frequency Plots



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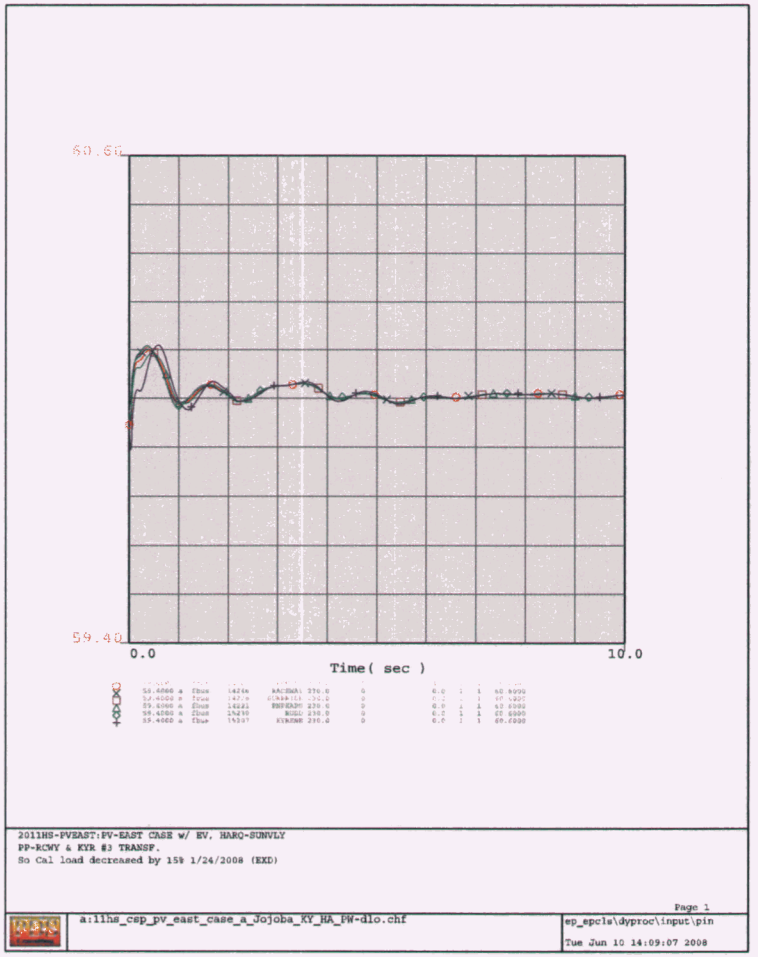
HA-Pinal West, Jojoba- Kyrene 500 kV lines outage
Transient Frequency Plots



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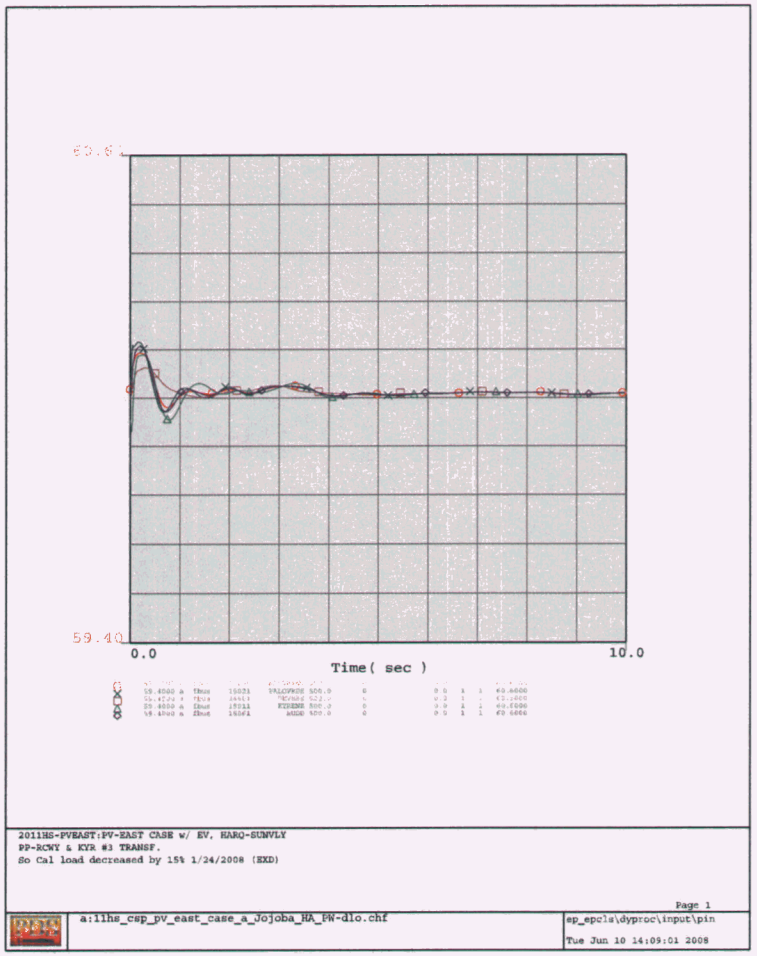
HA-Pinal West, HA- Jojoba 500 kV lines outage
Transient Frequency Plots



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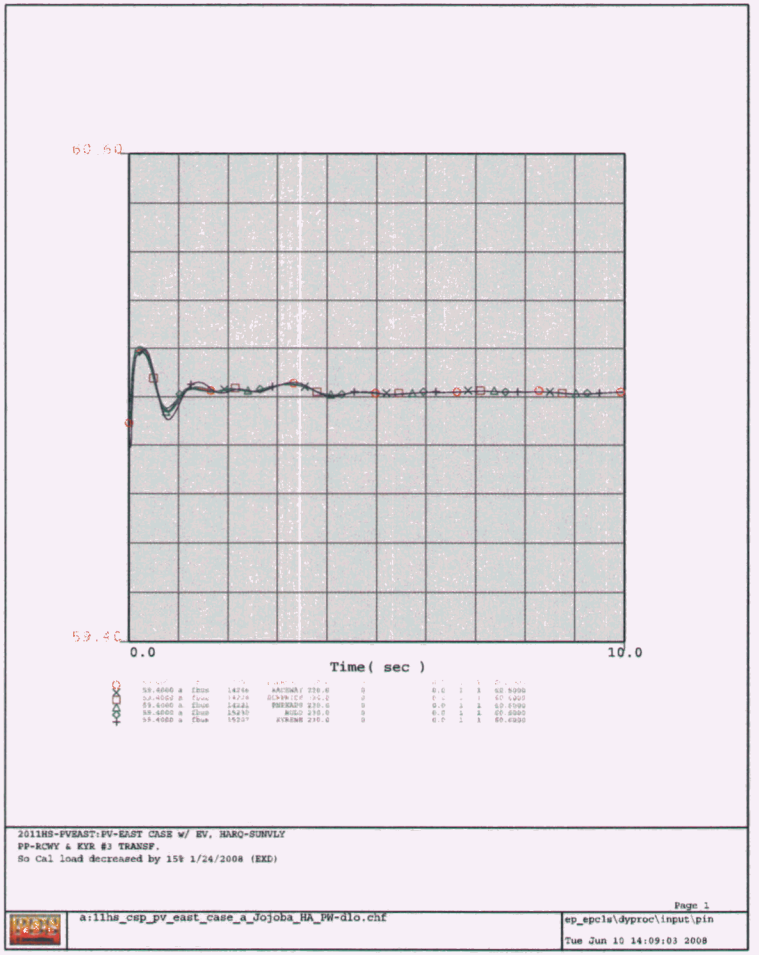
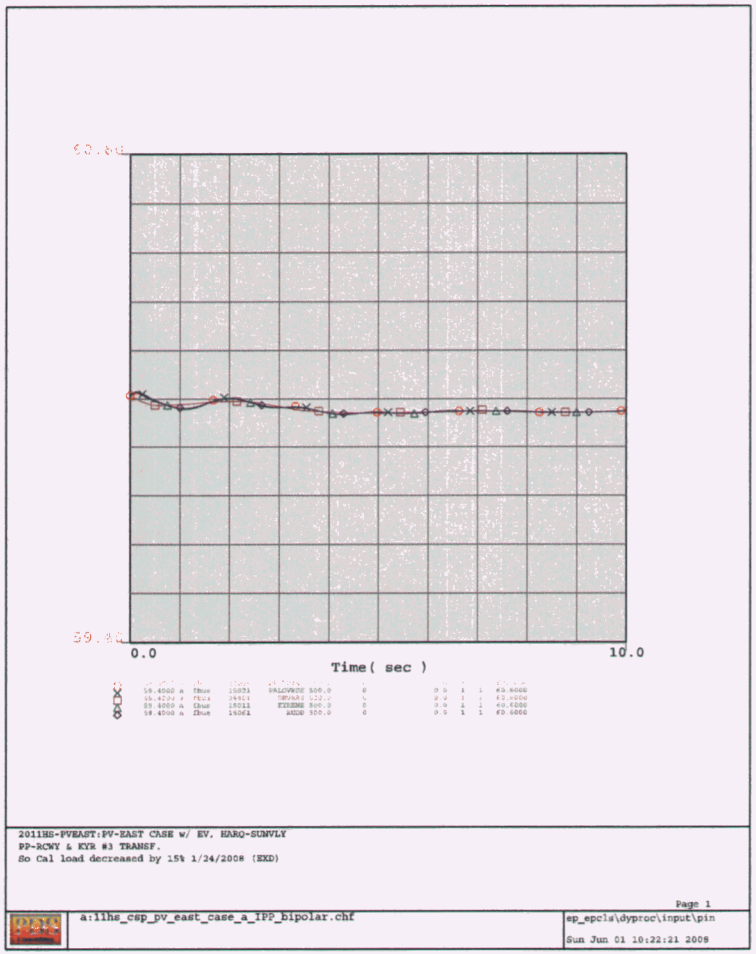
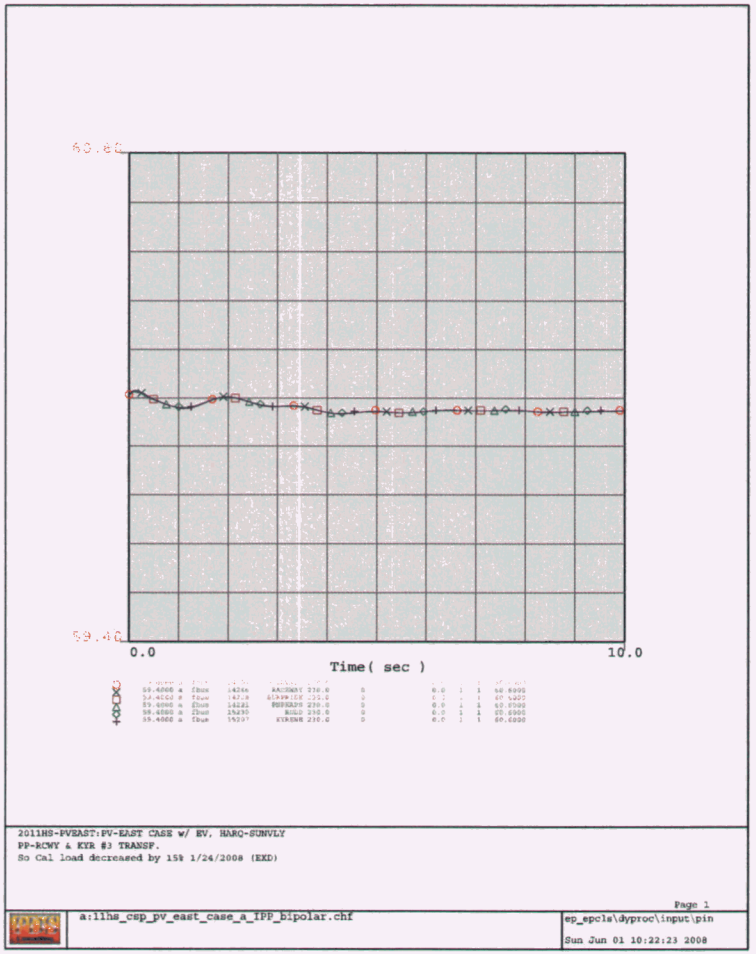
HA-Pinal West, HA- Jojoba 500 kV lines outage
Transient Frequency Plots



Post-Project, PV East Max Case A
IPP Bipole outage
Transient Frequency Plots



Post-Project, PV East Max Case A
IPP Bipole outage
Transient Frequency Plots



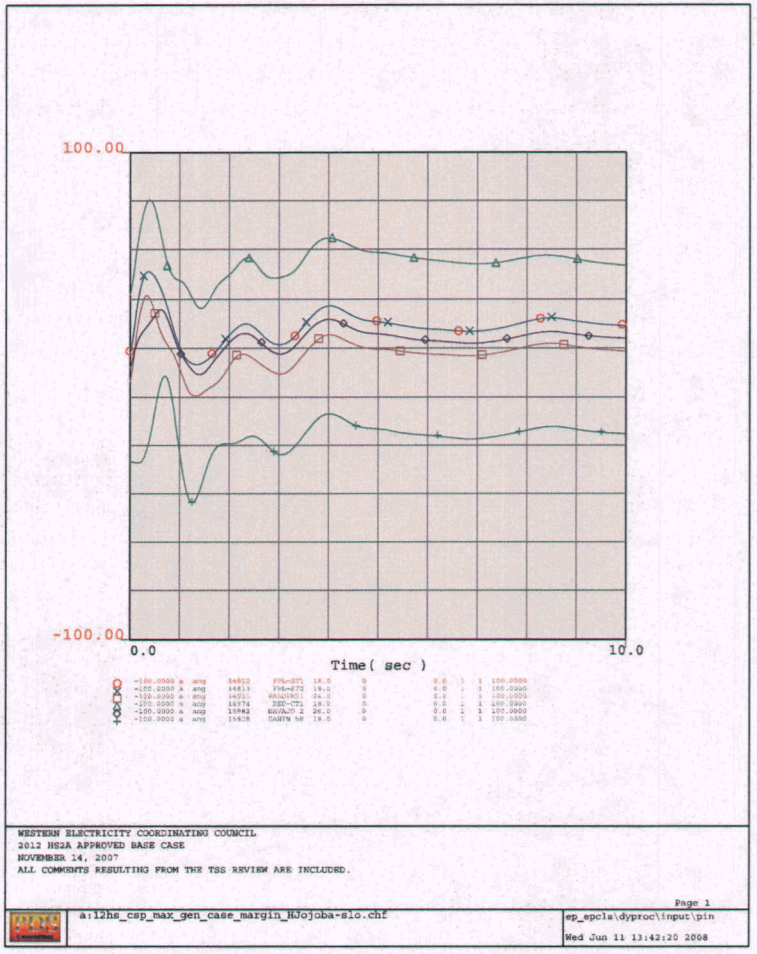
BUCKEYE CSP

Generator Interconnection Study

Attachment C

Transient Stability Plots
(Palo Verde UFSAR)

Palo Verde UFSAR
Hassayampa-Jojoba 500 kV line outage
Transient Generator Angular Plots



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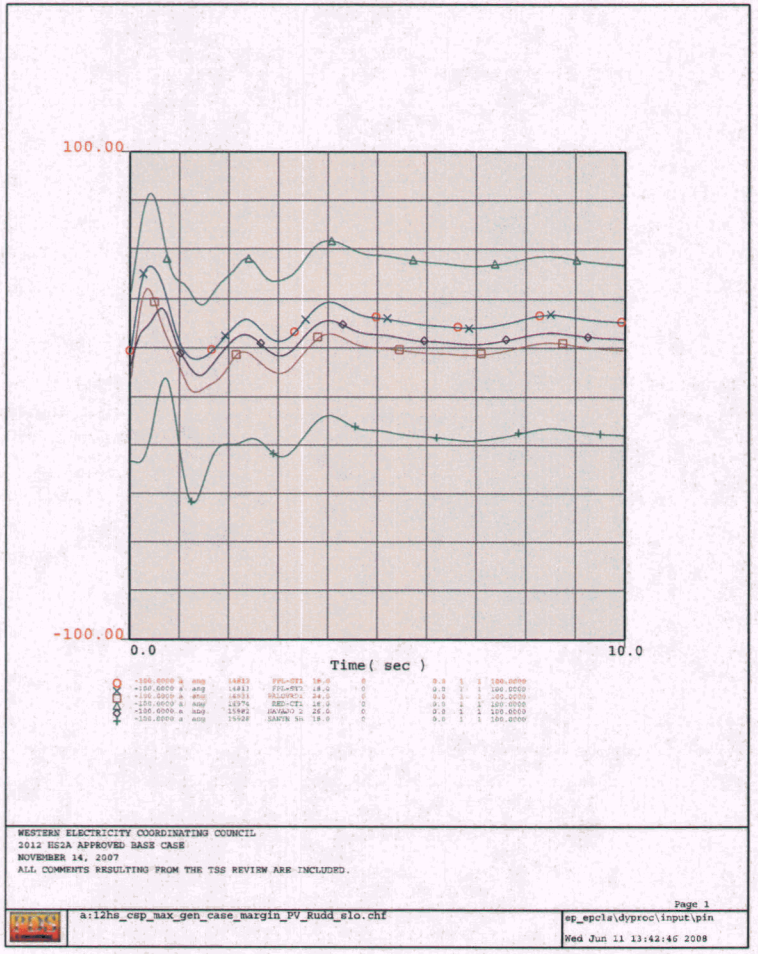
Palo Verde UFSAR
Palo Verde-Rudd 500 kV line outage
Transient Generator Angular Plots



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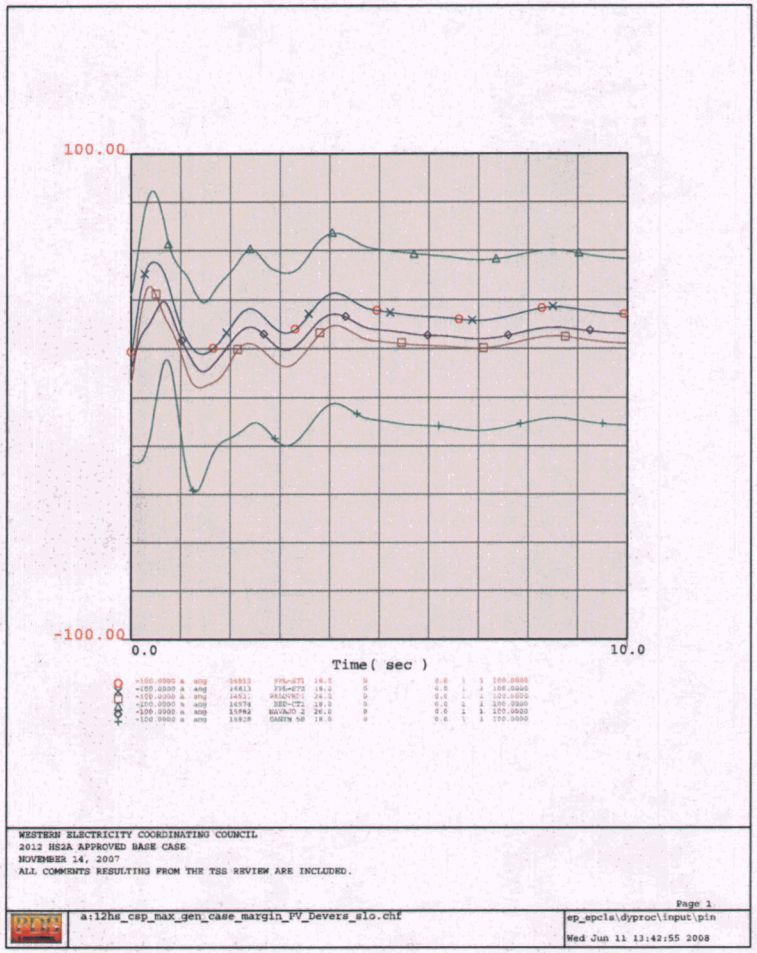
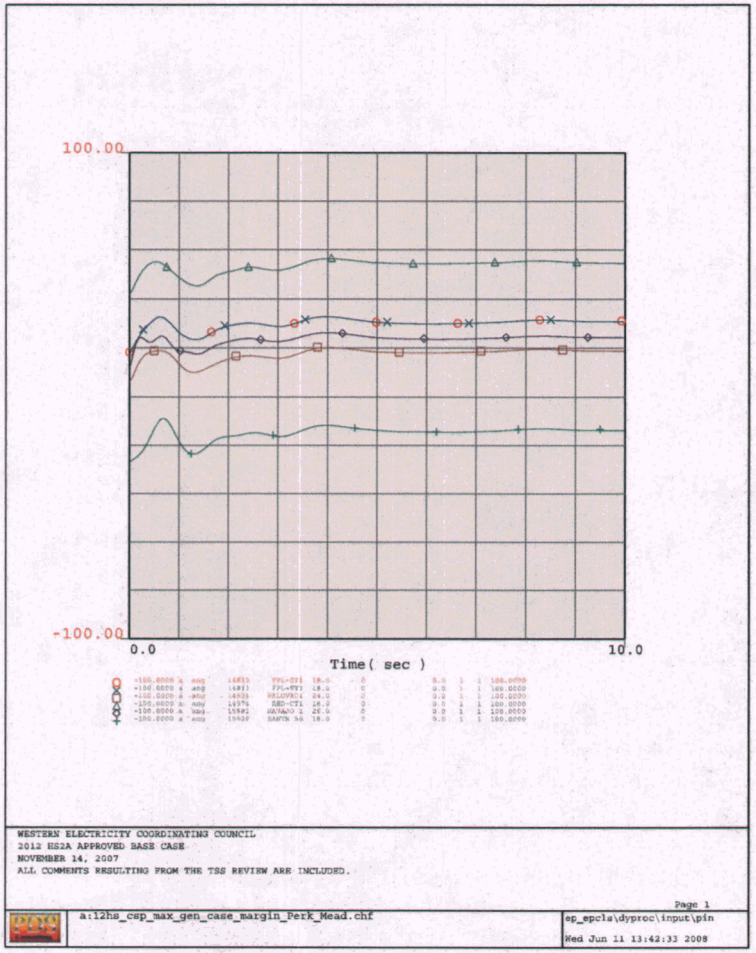
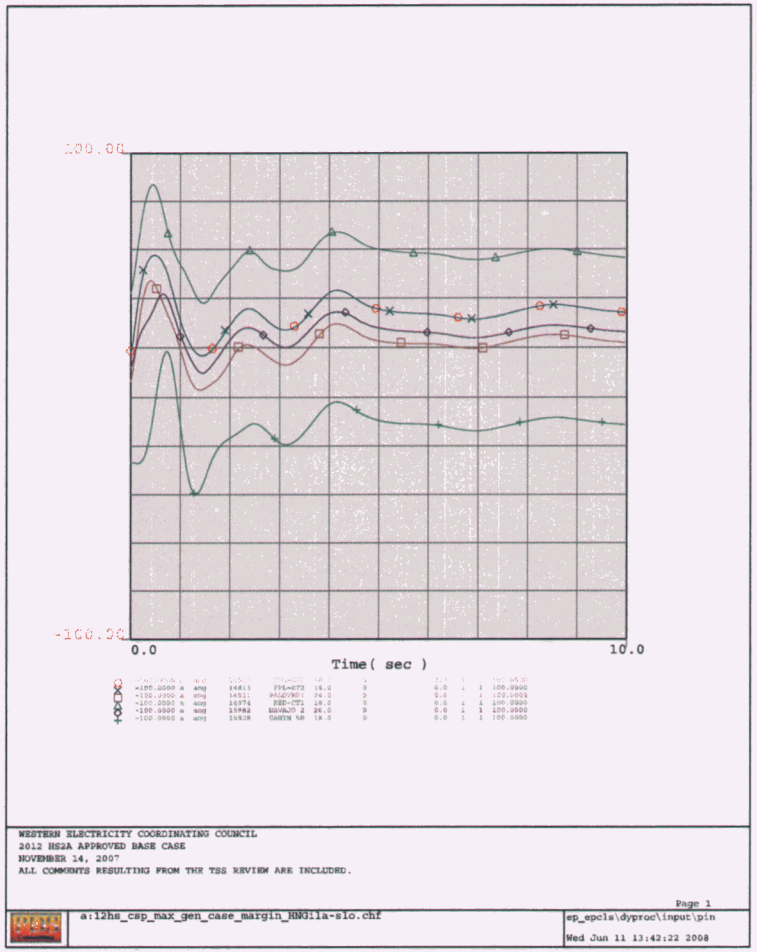
Palo Verde UFSAR
Palo Verde-Devers 500 kV line outage
Transient Generator Angular Plots



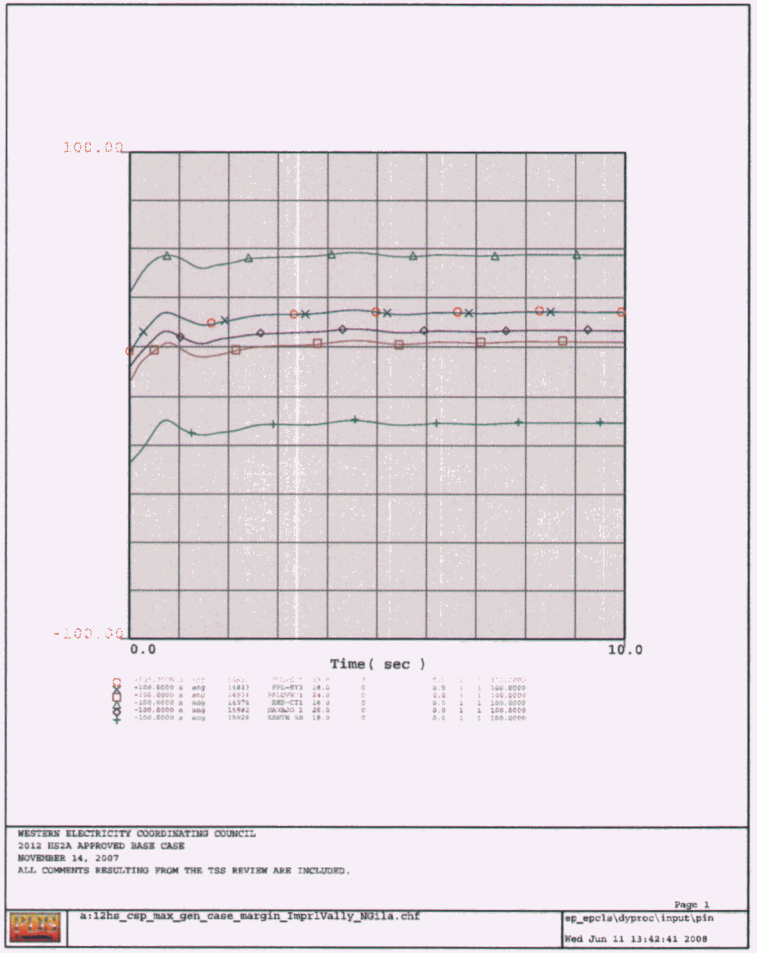
Palo Verde UFSAR
Perkins-Mead 500 kV line outage
Transient Generator Angular Plots



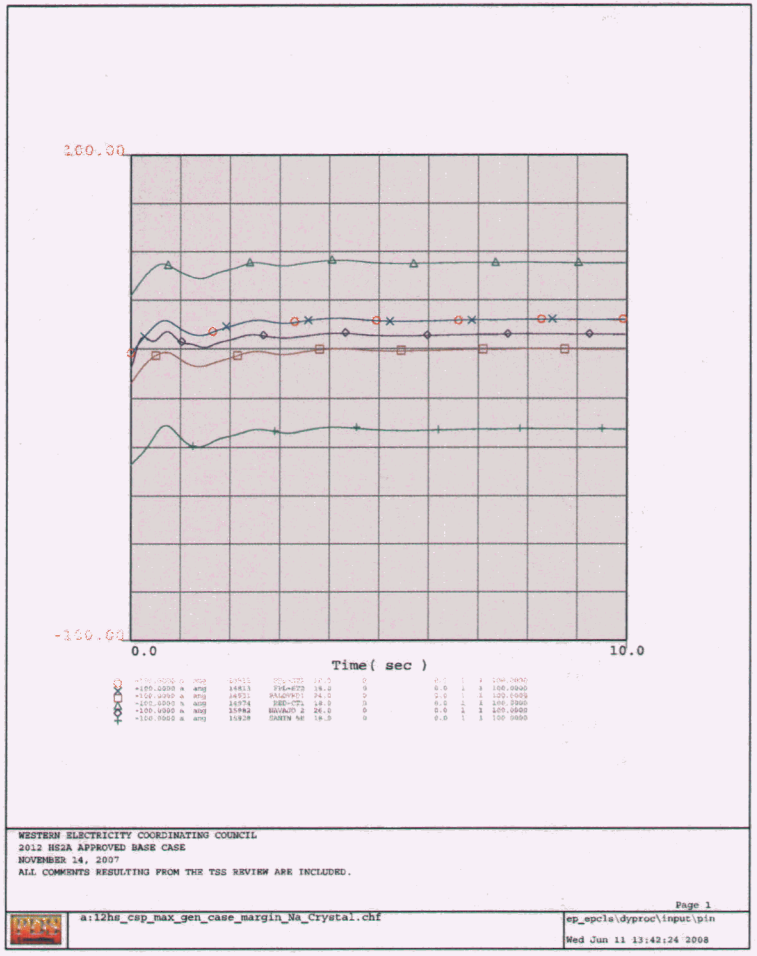
Palo Verde UFSAR
Hassayampa -N. Gila 500 kV line outage
Transient Generator Angular Plots



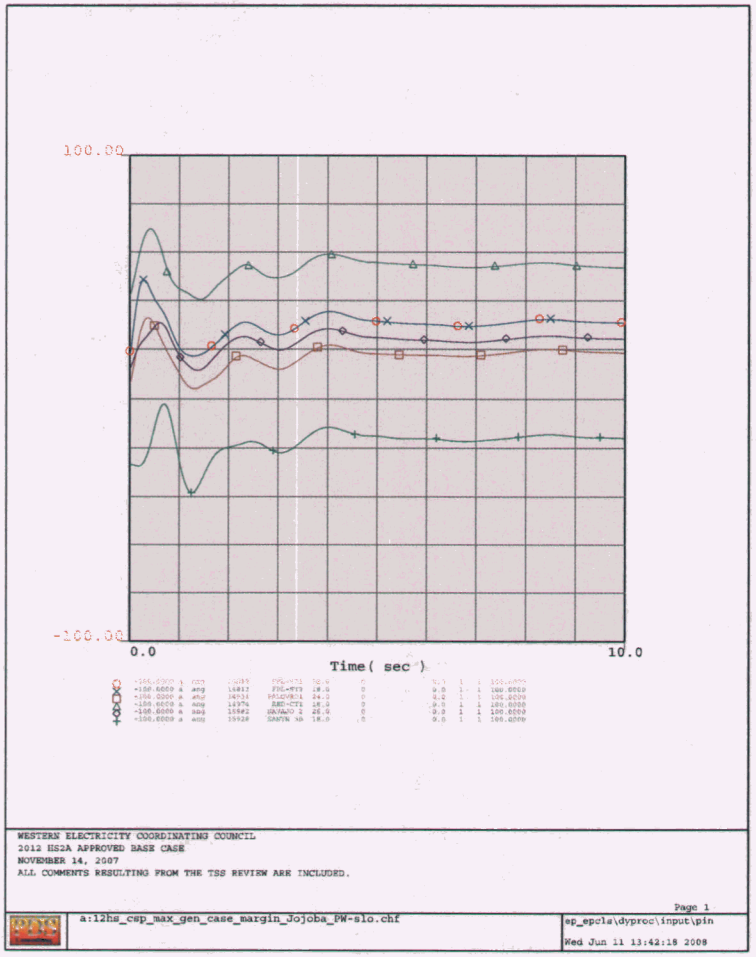
Palo Verde UFSAR
N. Gila-Imperial Valley 500 kV line outage
Transient Generator Angular Plots



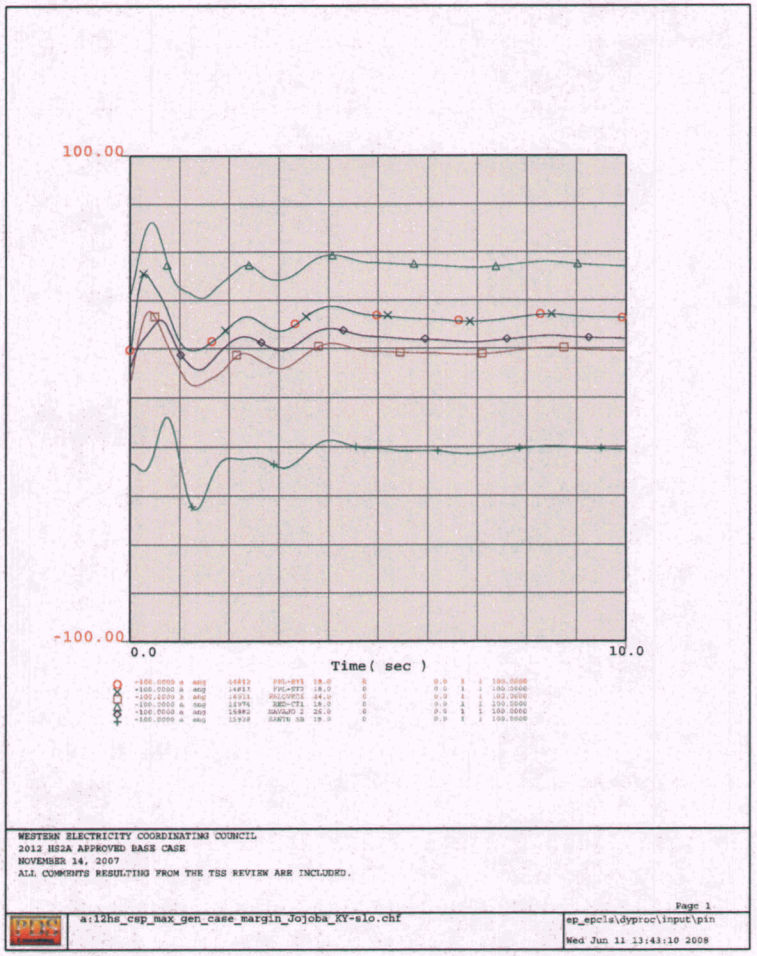
Palo Verde UFSAR
Navajo-Crystal 500 kV line
Transient Generator Angular Plots



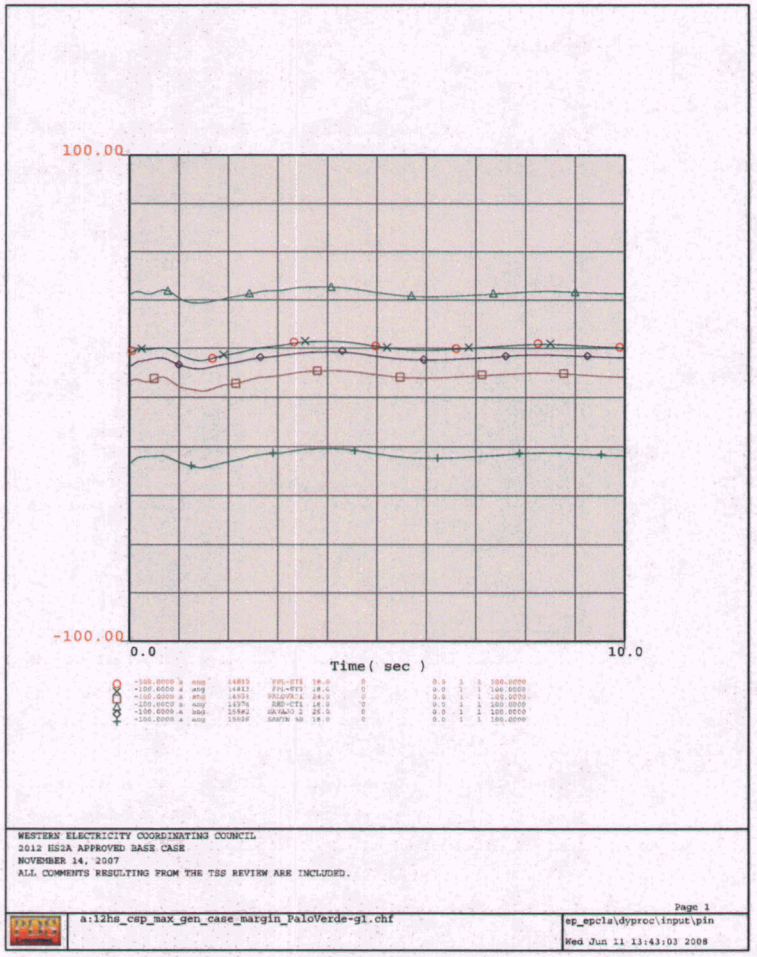
Palo Verde UFSAR
Jojoba-Pinal West 500 kV line outage
Transient Generator Angular Plots



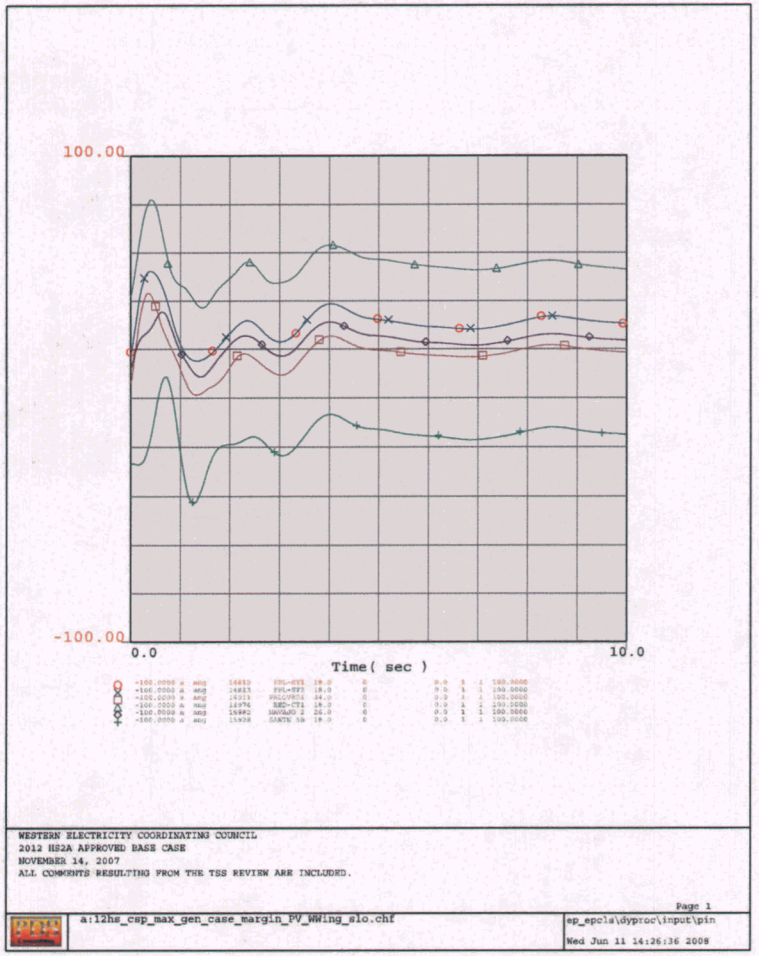
Palo Verde UFSAR
Jojoba-Kyrene 500 kV line outage
Transient Generator Angular Plots



Palo Verde UFSAR
Palo Verde G-1 outage
Transient Generator Angular Plots



Palo Verde UFSAR
Palo Verde - Westwing 500 kV line outage
Transient Generator Angular Plots



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ALL COMMENTS RESULTING FROM THE TSS REVIEW ARE INCLUDED.

Page 1

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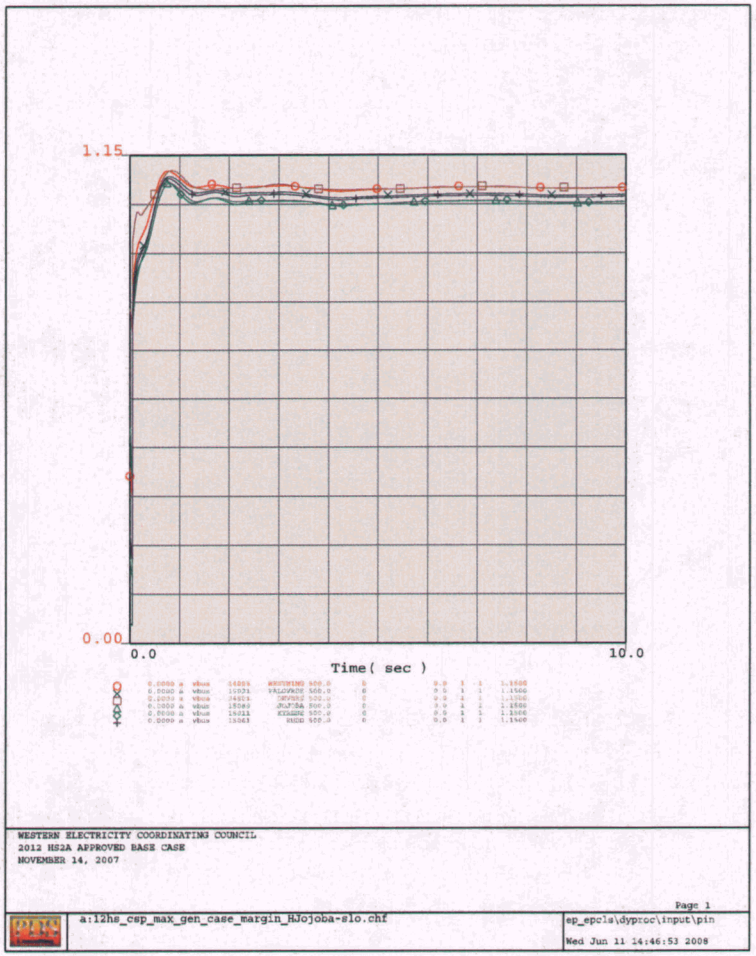
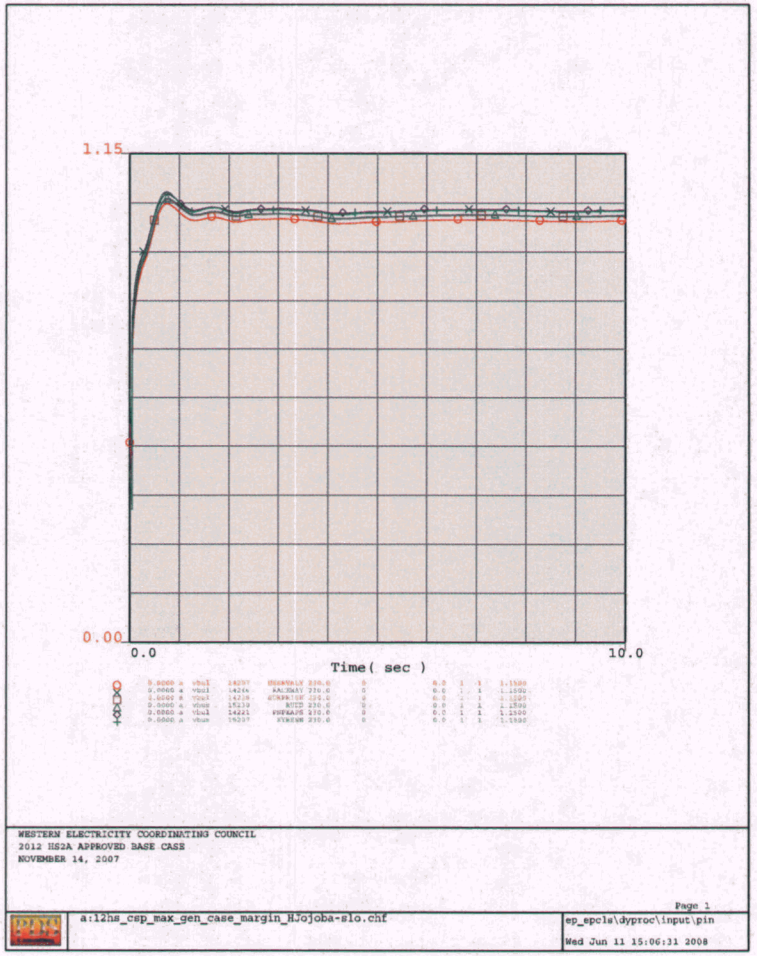
Wed Jun 11 14:26:36 2008

Transient Bus Voltage Plots

Palo Verde UFSAR
Hassayampa-Jojoba 500 kV line outage
Transient Bus Voltage Plots



Palo Verde UFSAR
Hassayampa-Jojoba 500 kV line outage
Transient Bus Voltage Plots



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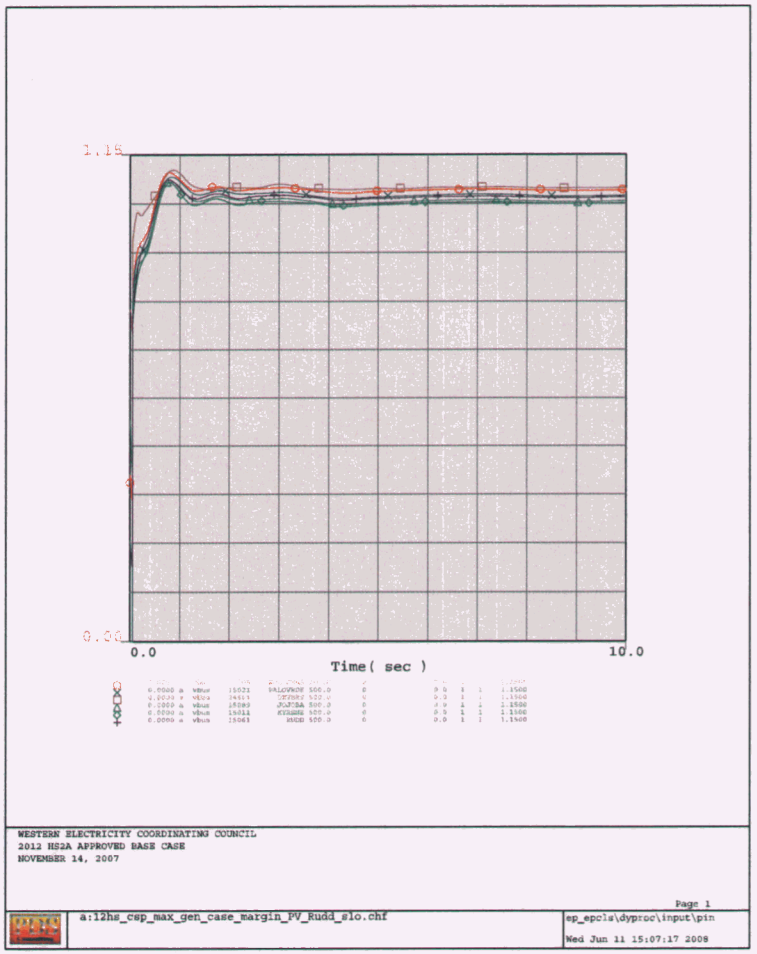
Palo Verde-Rudd 500 kV line outage
Transient Bus Voltage Plots



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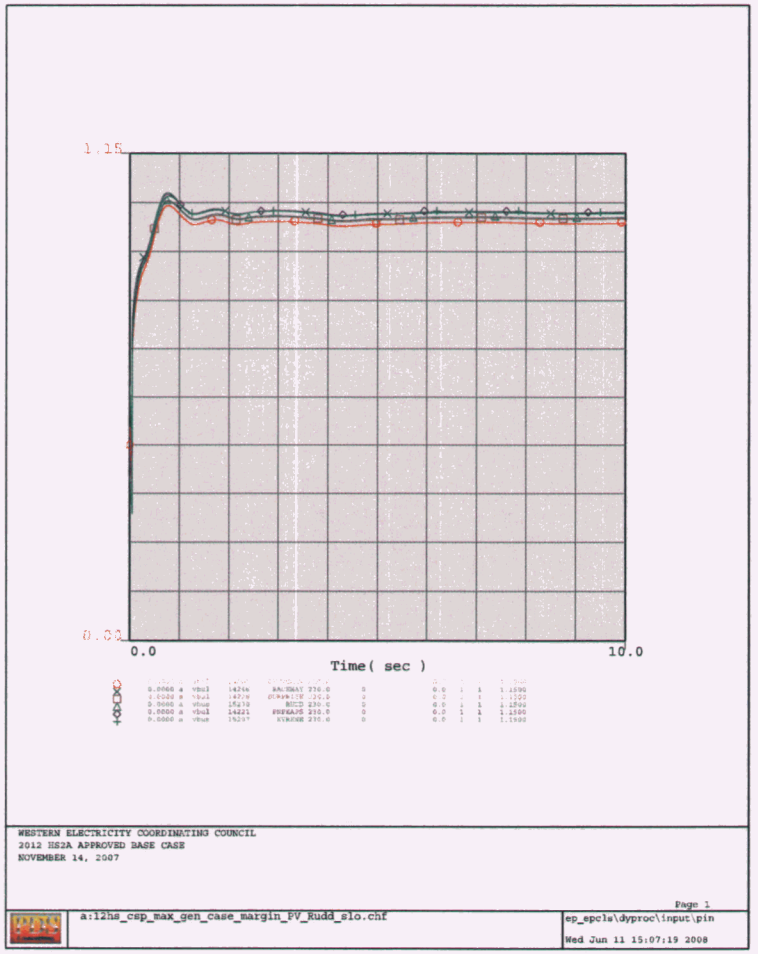
Palo Verde-Rudd 500 kV line outage
Transient Bus Voltage Plots



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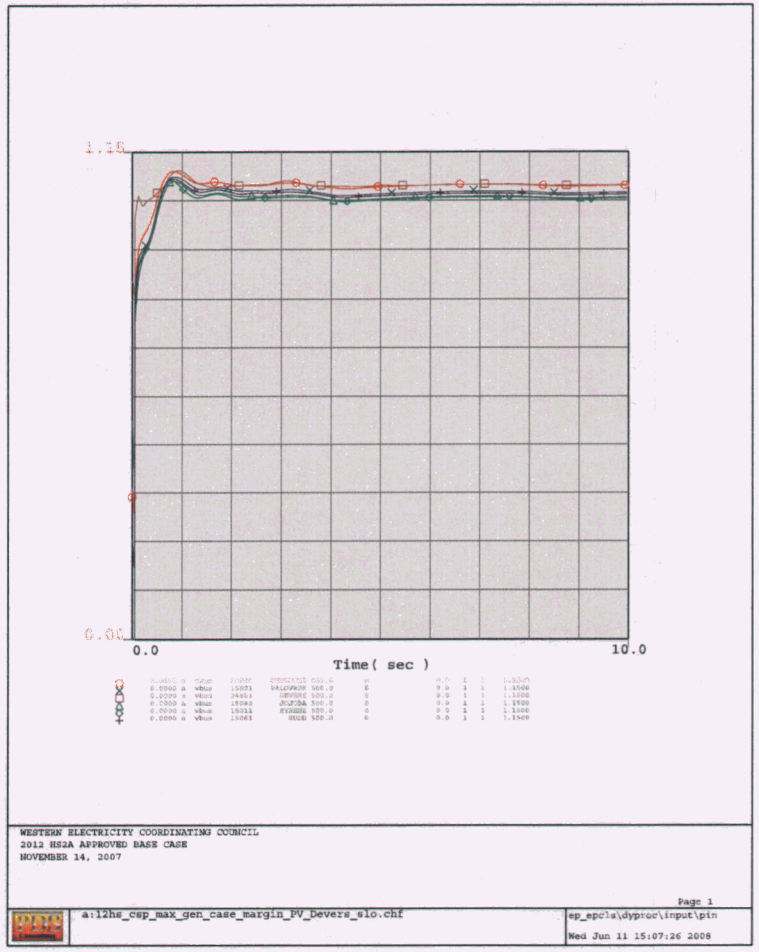
Transient Bus Voltage Plots



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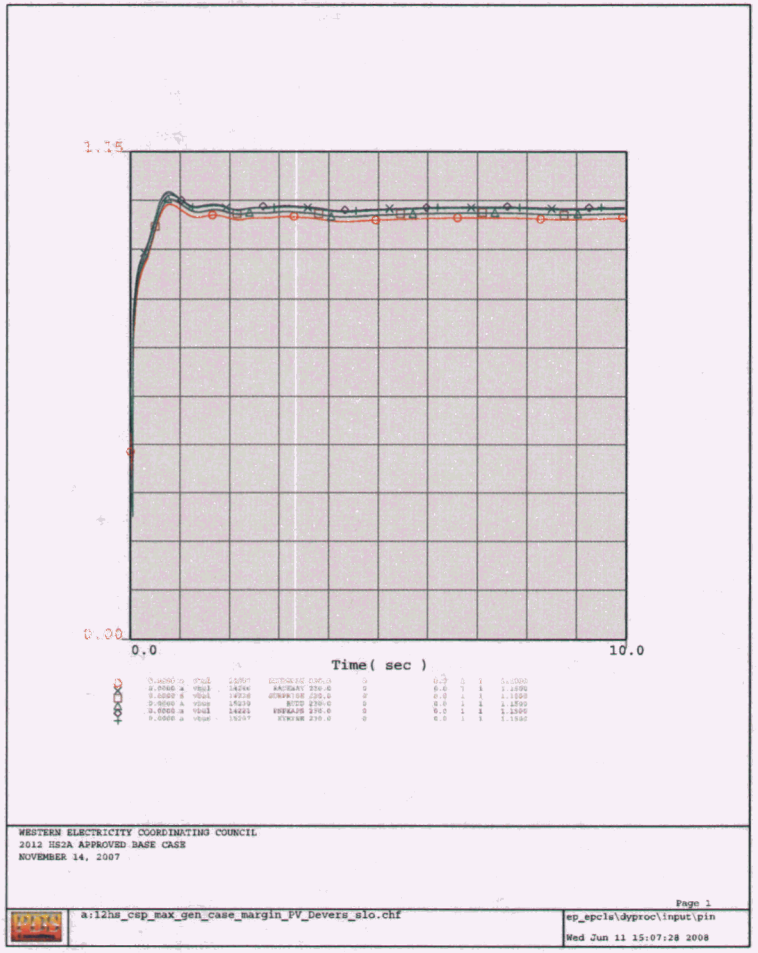
Transient Bus Voltage Plots



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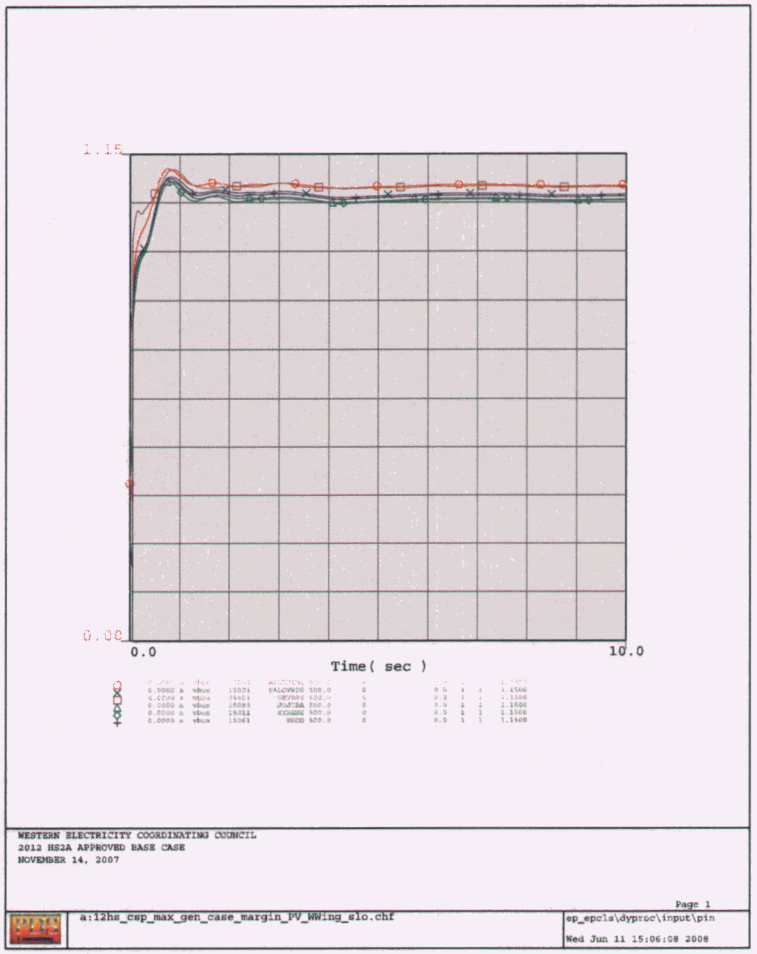

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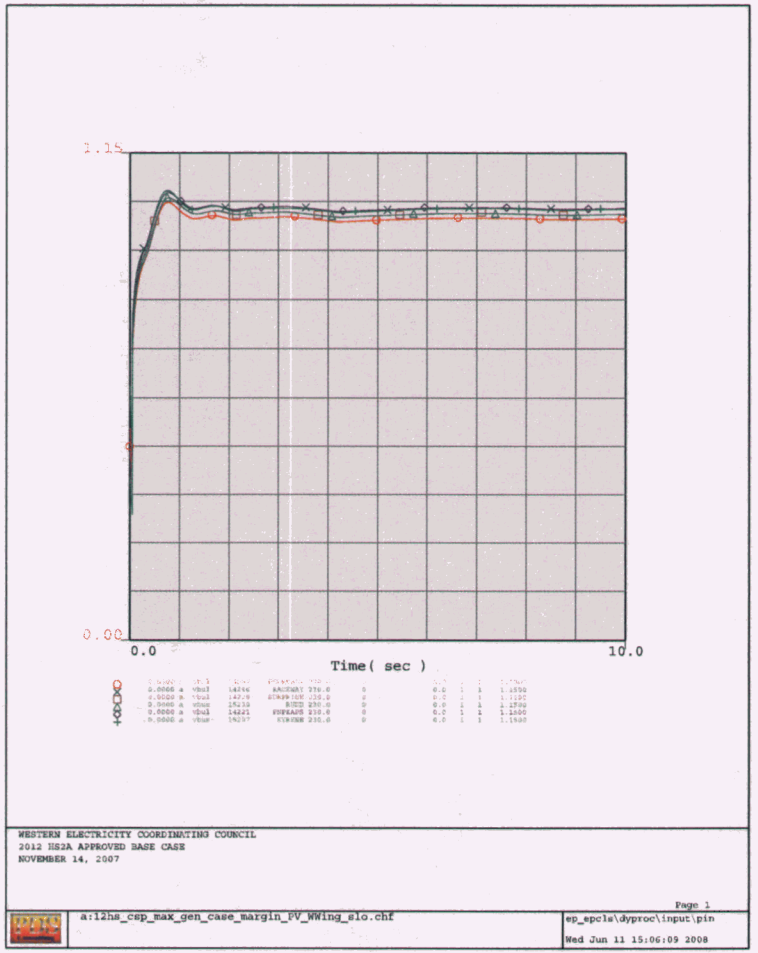
Transient Bus Voltage Plots



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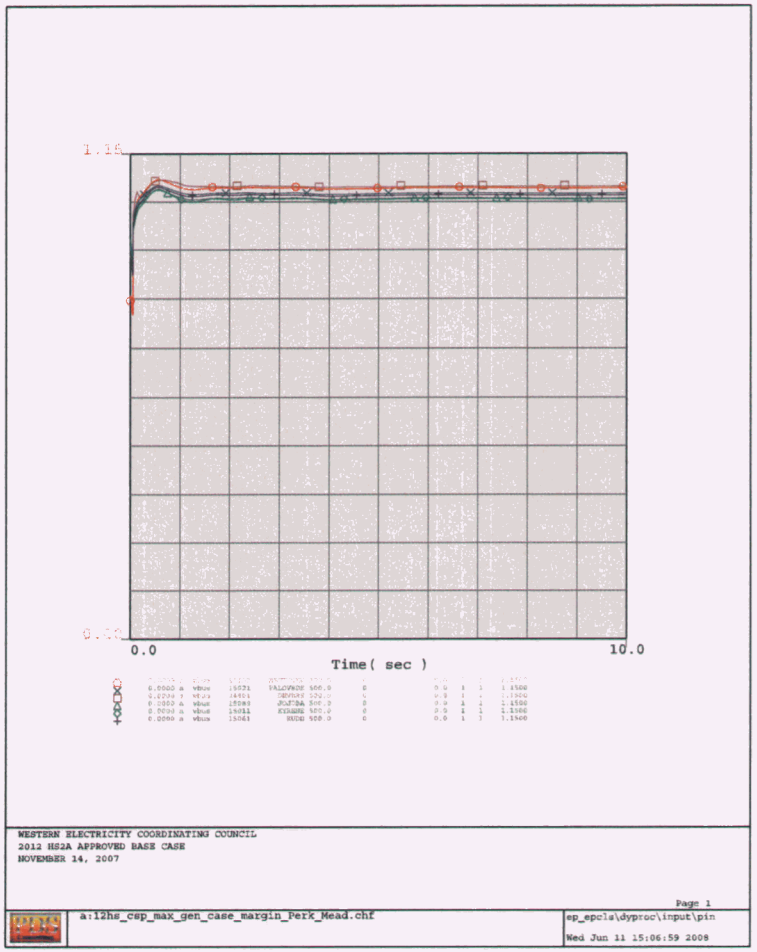
Perkins-Mead 500 kV line outage
Transient Bus Voltage Plots



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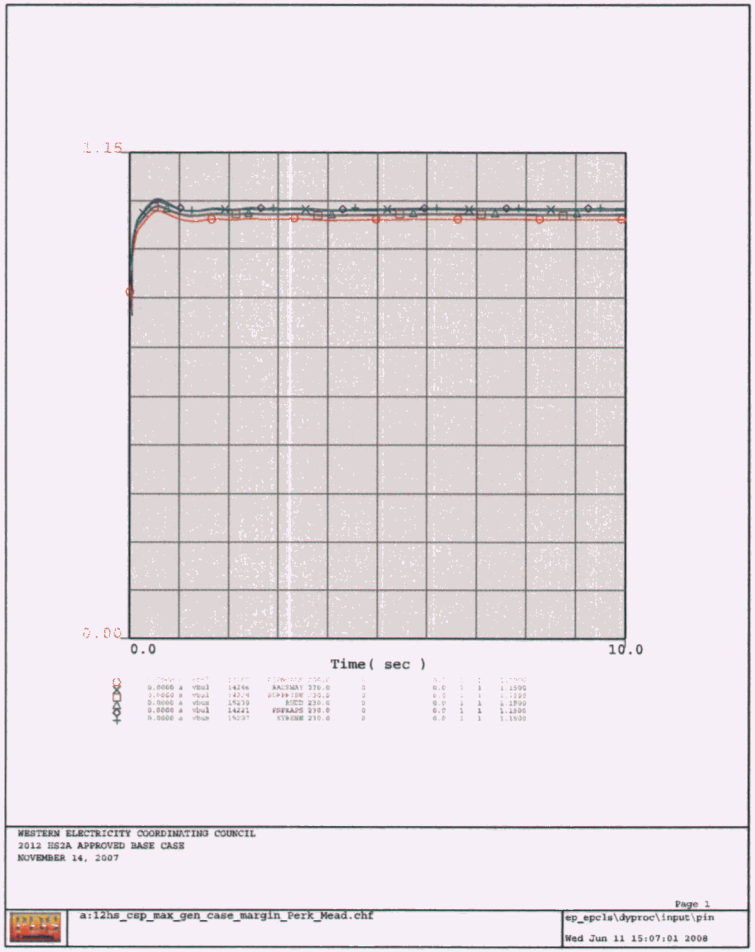

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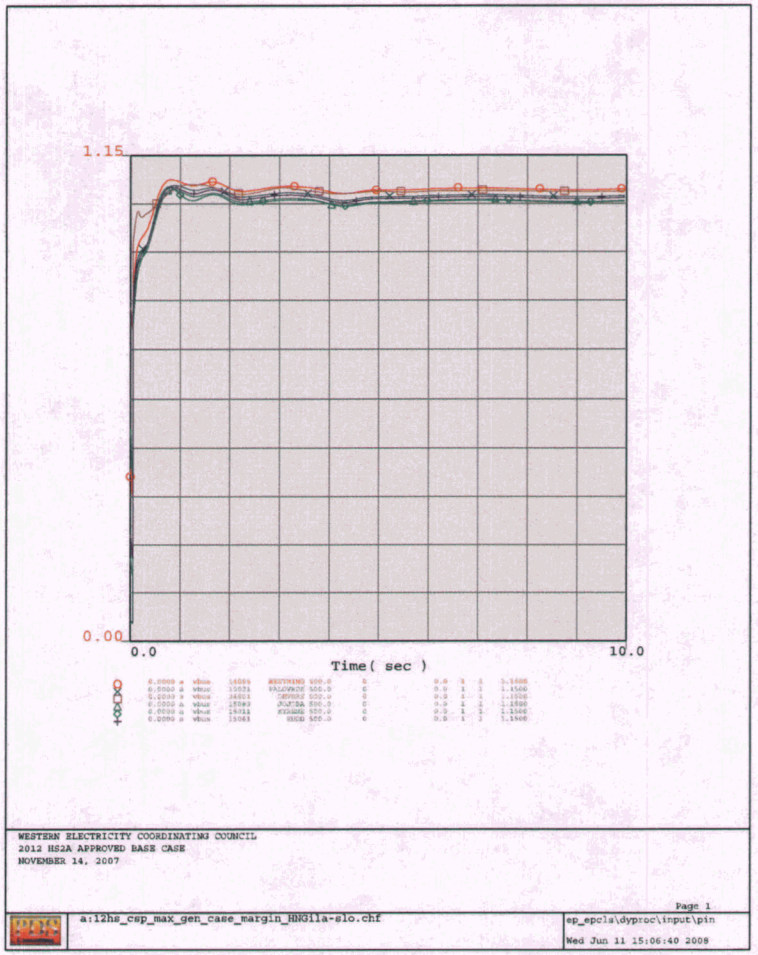
Hassayampa -N. Gila 500 kV line outage
Transient Bus Voltage Plots



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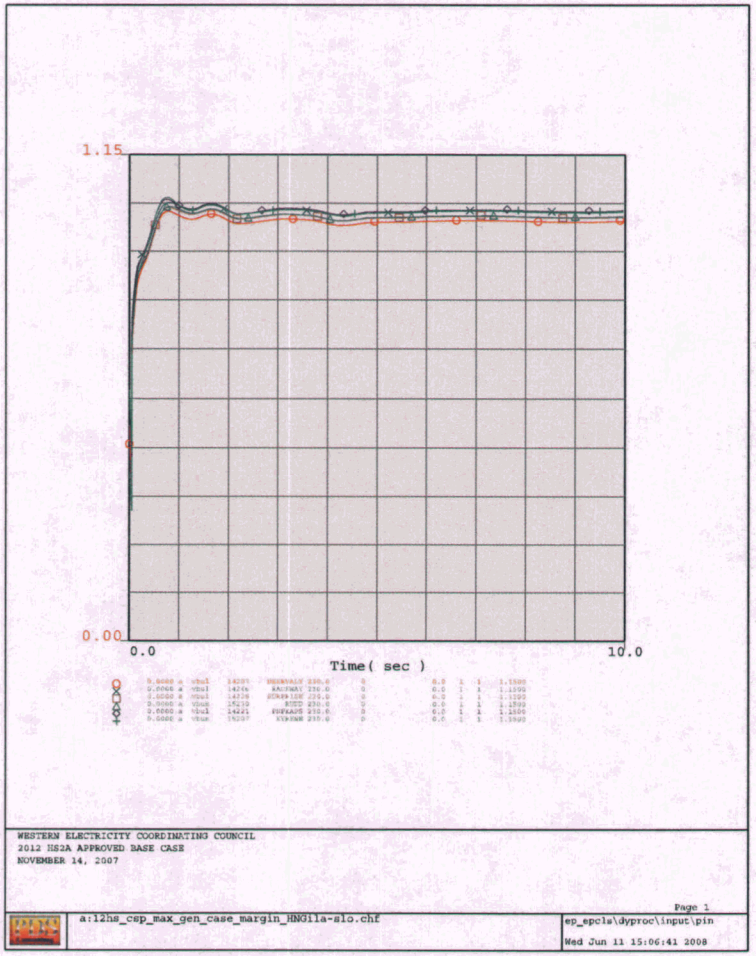
Transient Bus Voltage Plots



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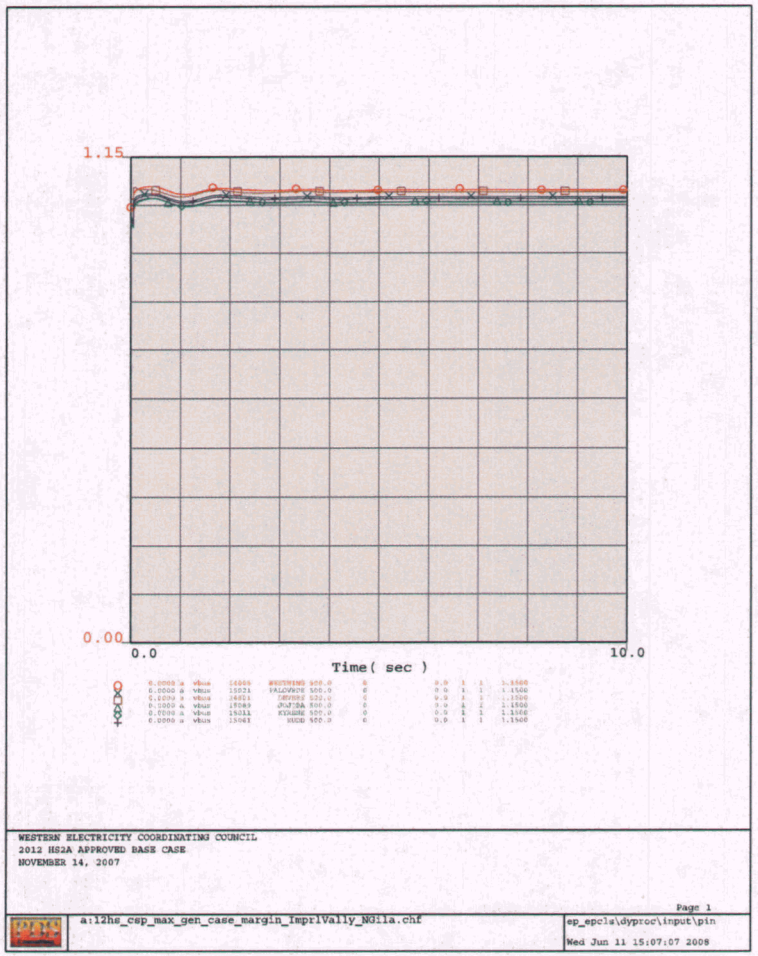
N. Gila-Imperial Valley 500 kV line outage
Transient Bus Voltage Plots



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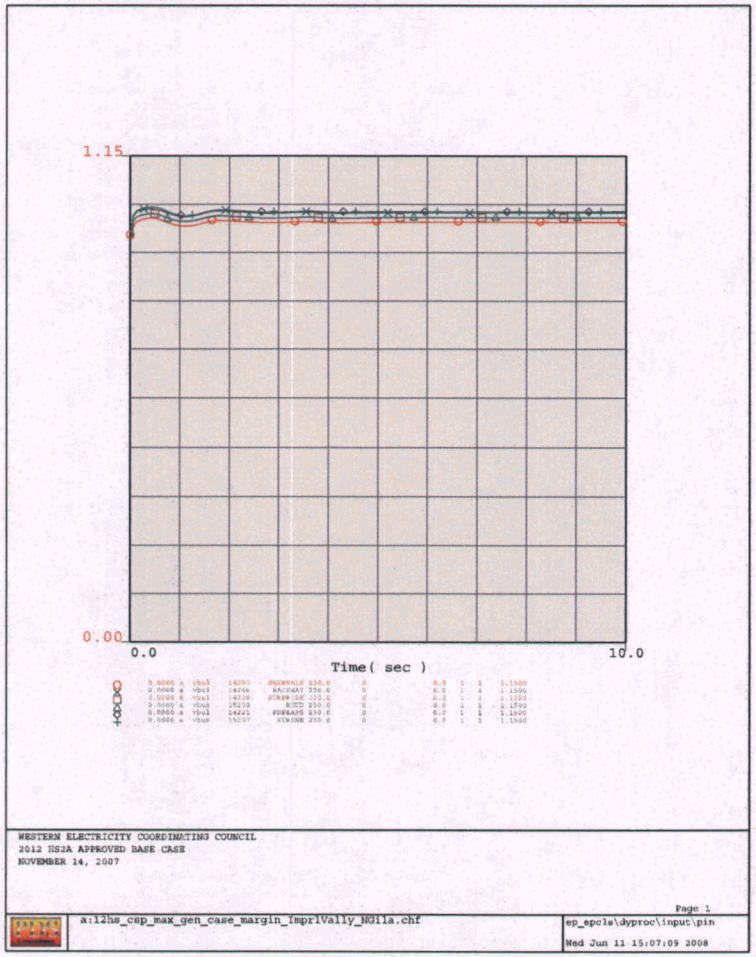
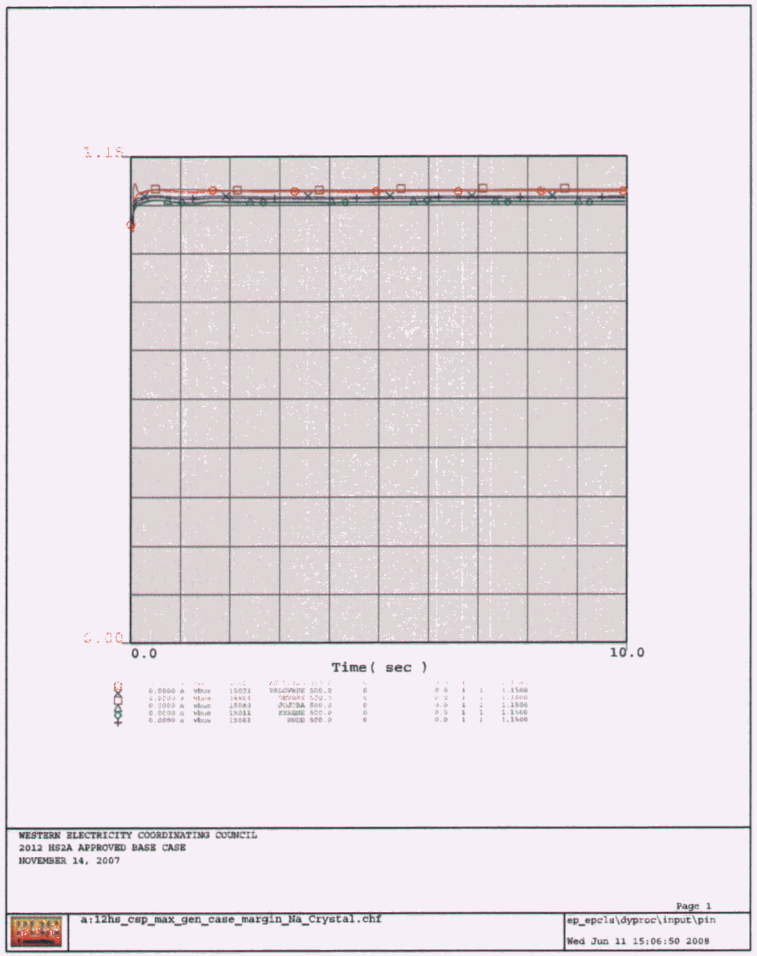
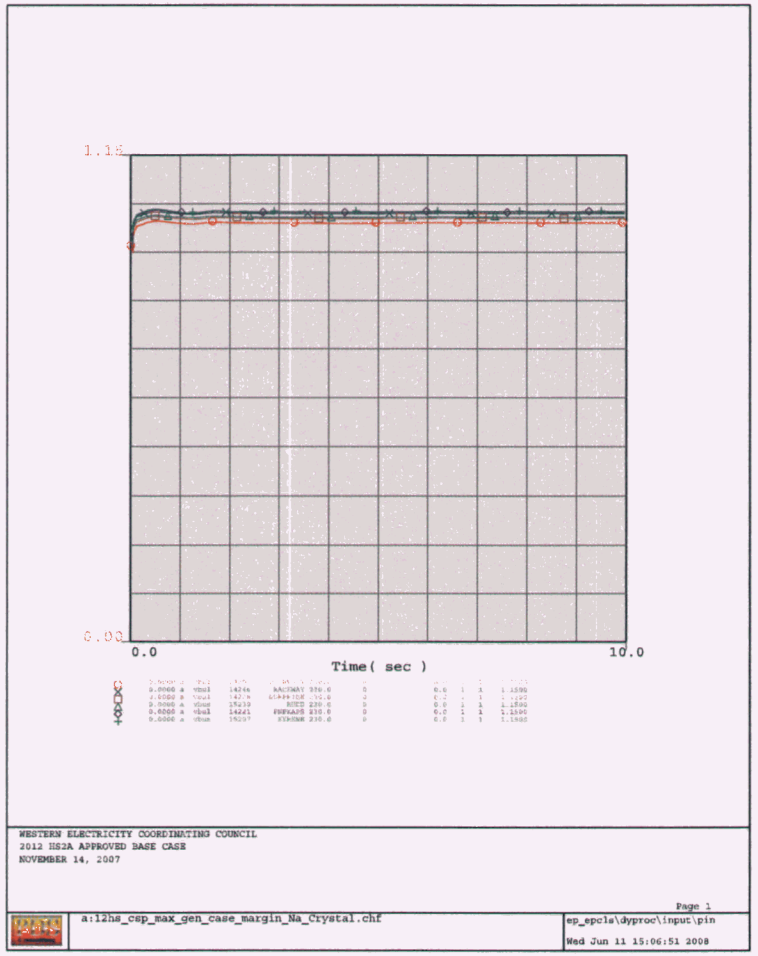
N. Gila-Imperial Valley 500 kV line outage
Transient Bus Voltage Plots



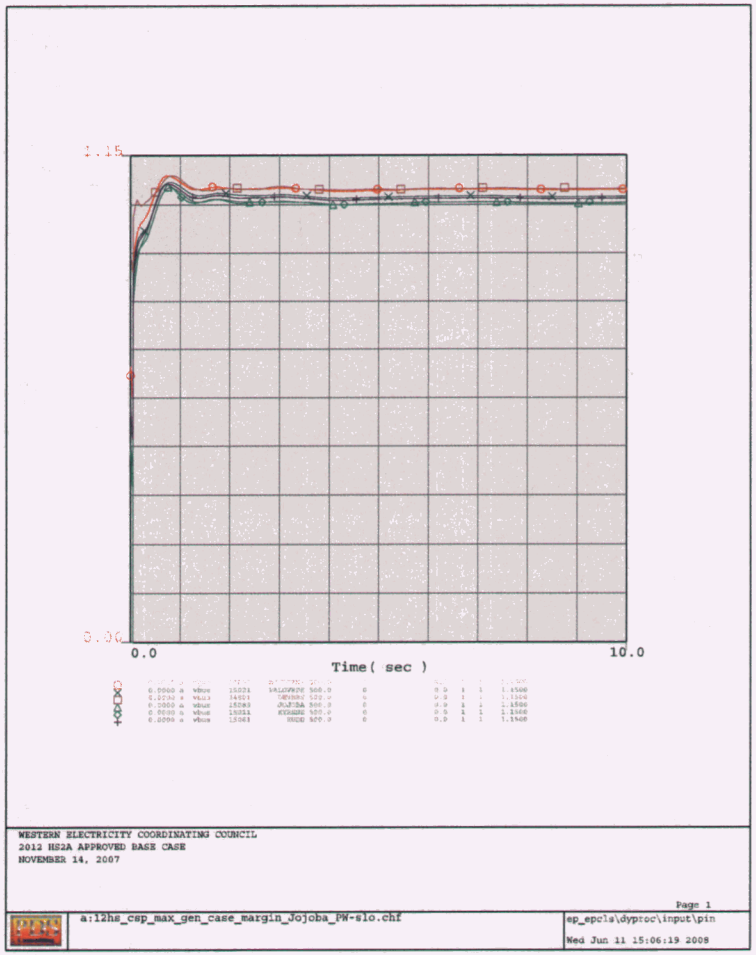
Palo Verde UFSAR
Navajo-Crystal 500 kV line
Transient Bus Voltage Plots



Palo Verde UFSAR
Navajo-Crystal 500 kV line
Transient Bus Voltage Plots



Palo Verde UFSAR
Jojoba-Pinal West 500 kV line outage
Transient Bus Voltage Plots



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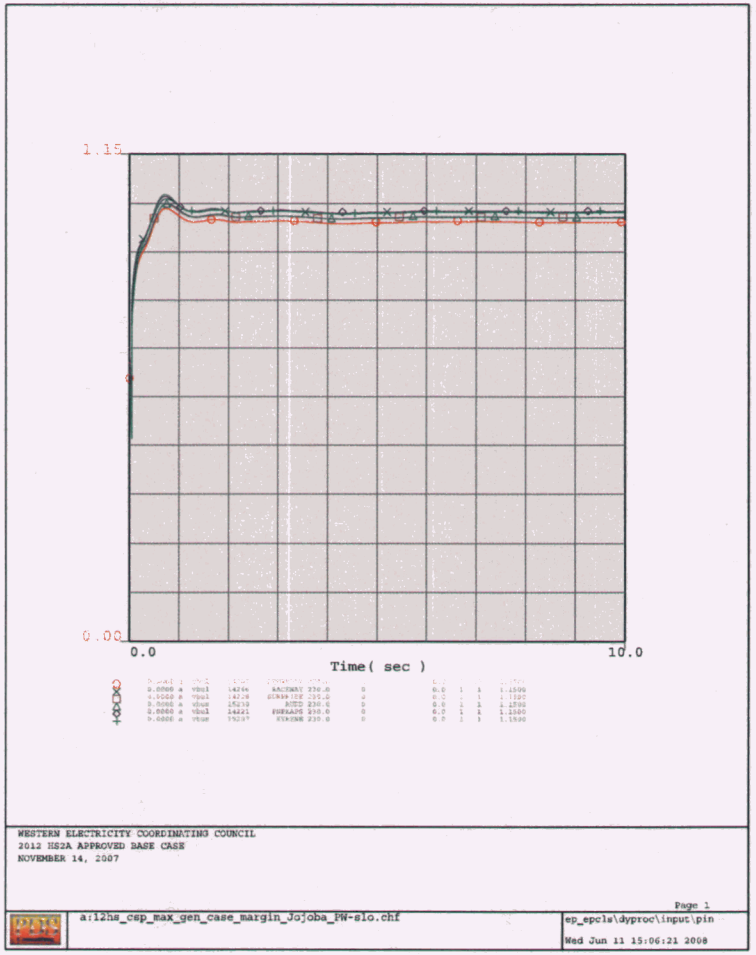
Jojoba-Pinal West 500 kV line outage
Transient Bus Voltage Plots



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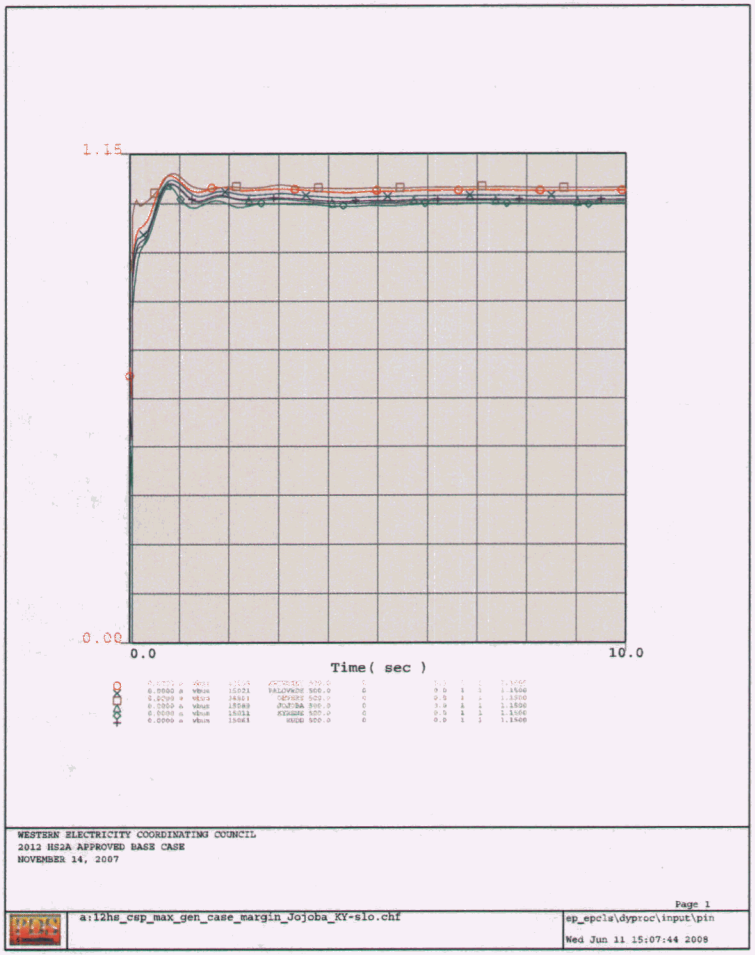
Jojoba-Kyrene 500 kV line outage
Transient Bus Voltage Plots



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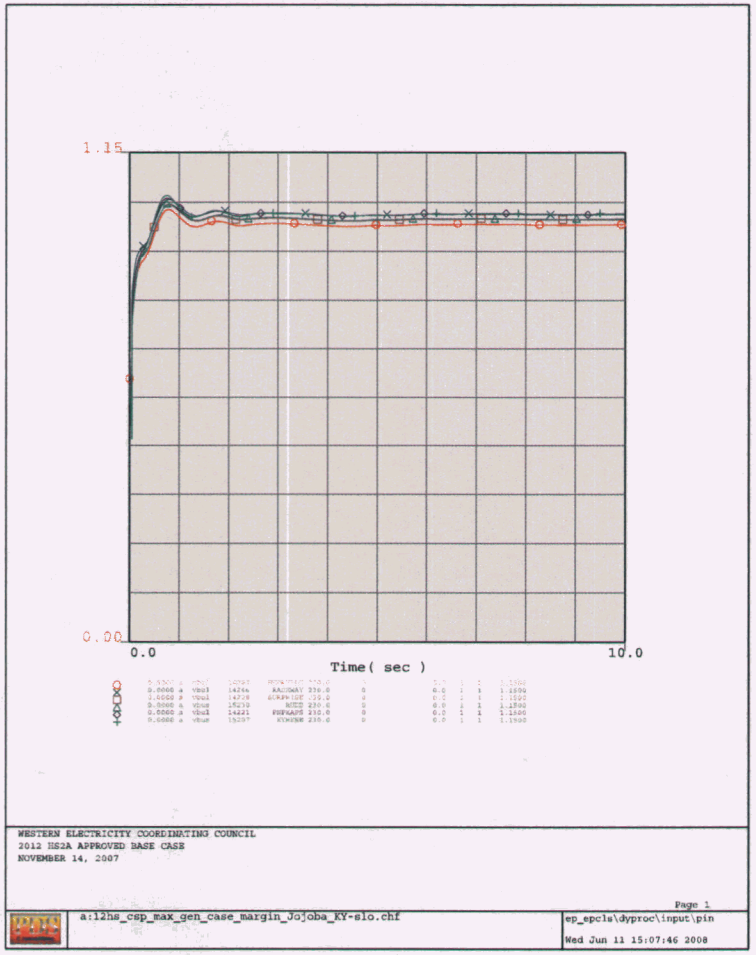
Jojoba-Kyrene 500 kV line outage
Transient Bus Voltage Plots



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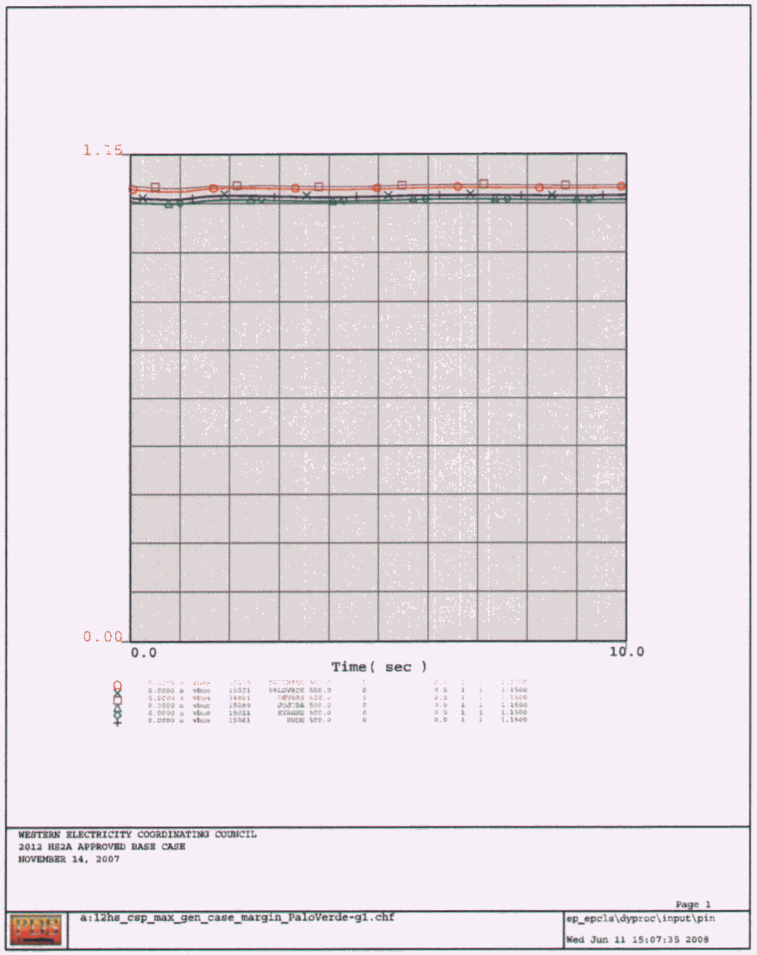

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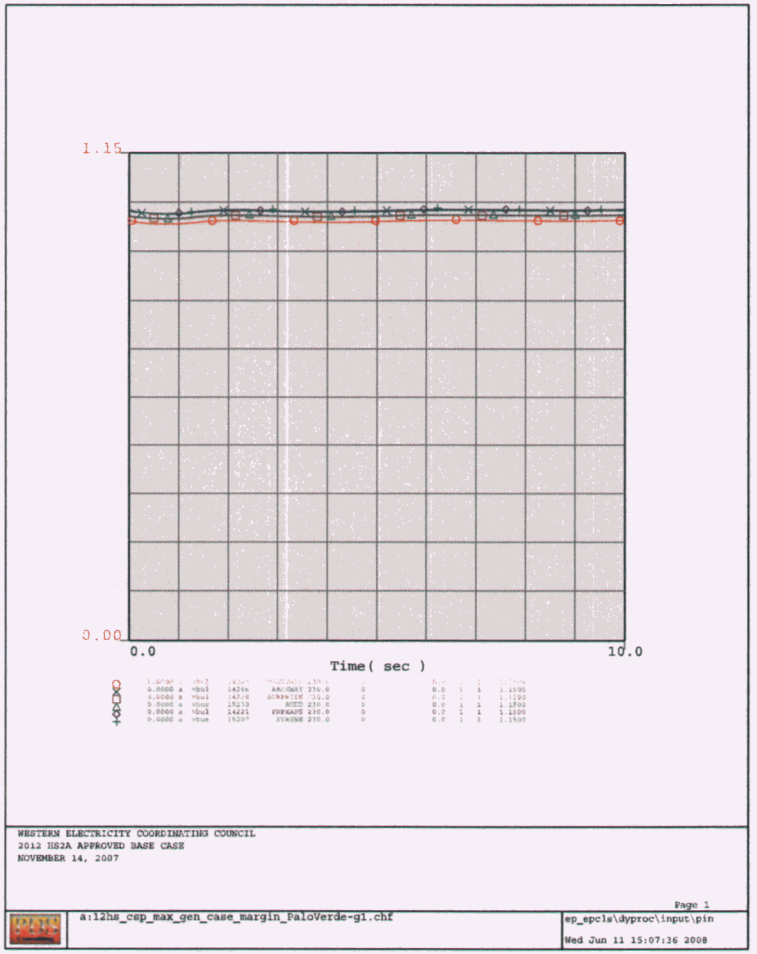
Palo Verde G-1 outage
Transient Bus Voltage Plots



Transient Frequency Plots

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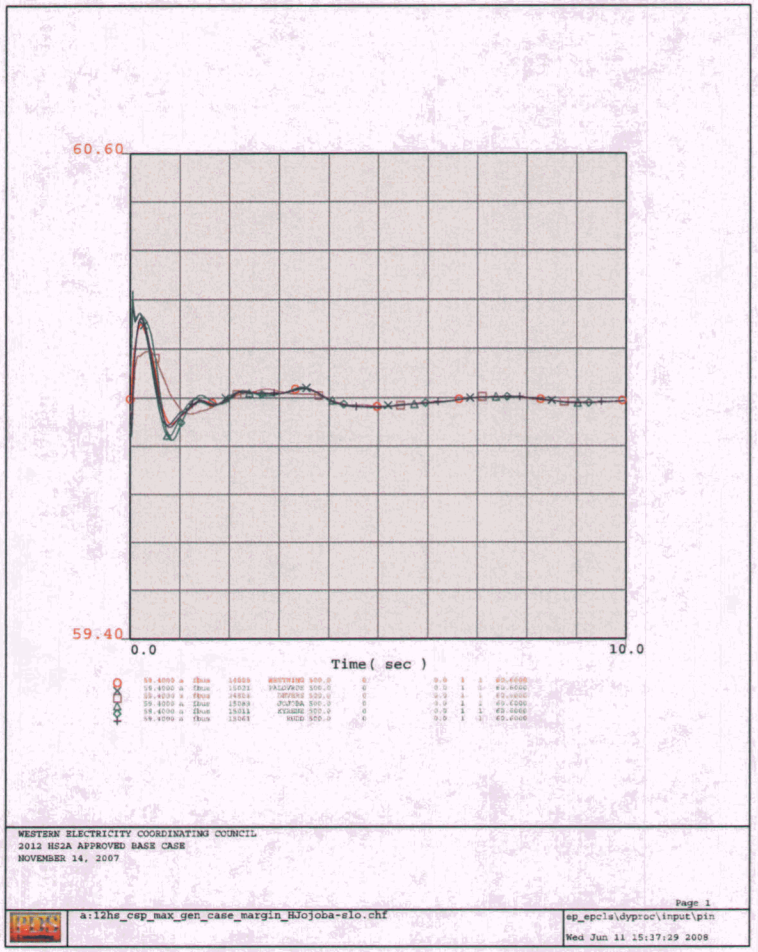
Hassayampa-Jojoba 500 kV line outage
Transient Frequency Plots



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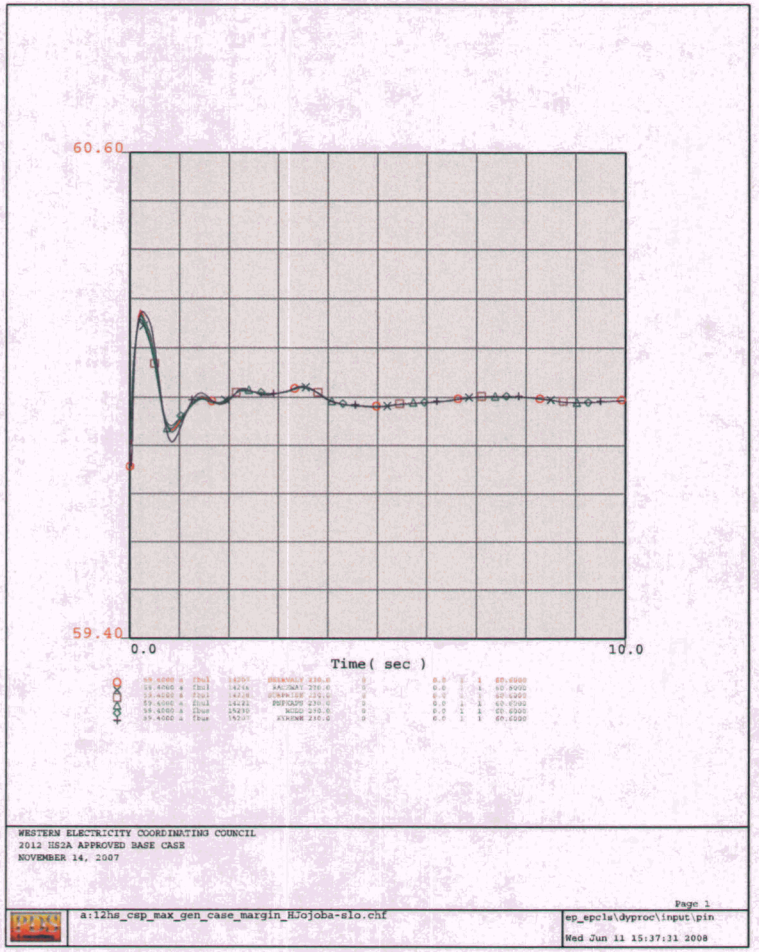
Hassayampa-Jojoba 500 kV line outage
Transient Frequency Plots



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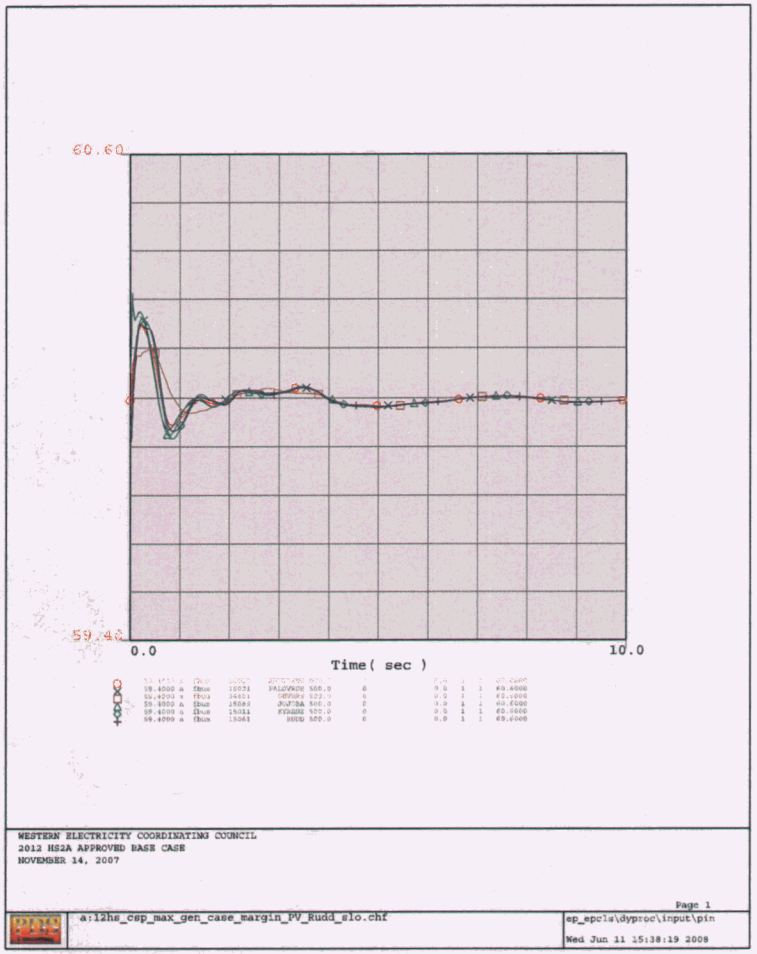

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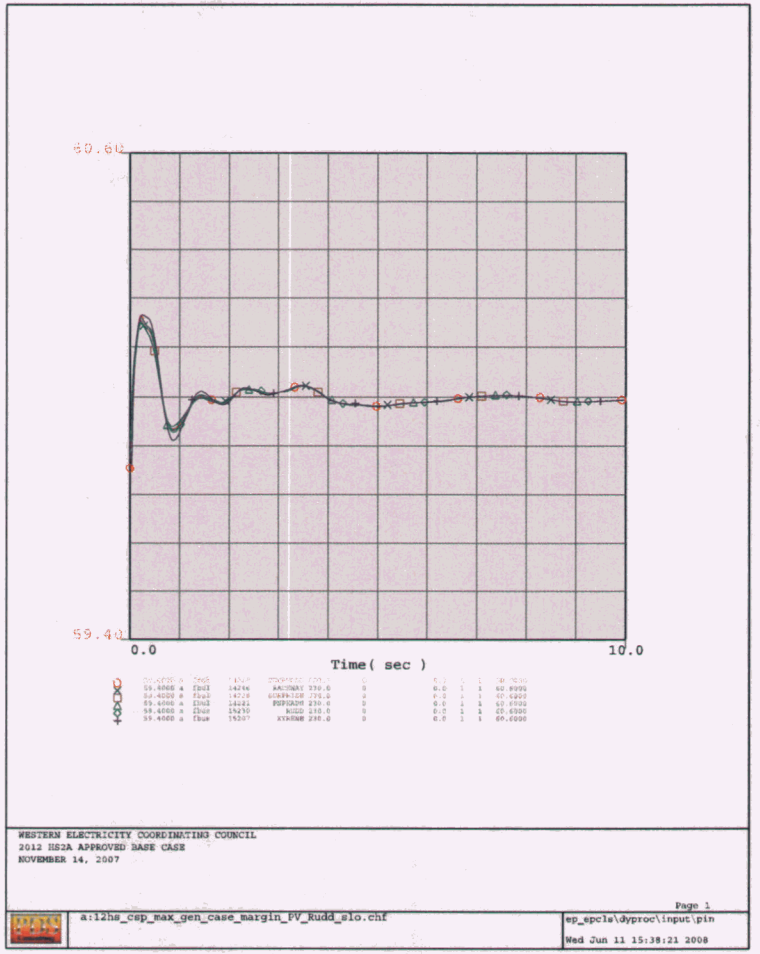
Transient Frequency Plots



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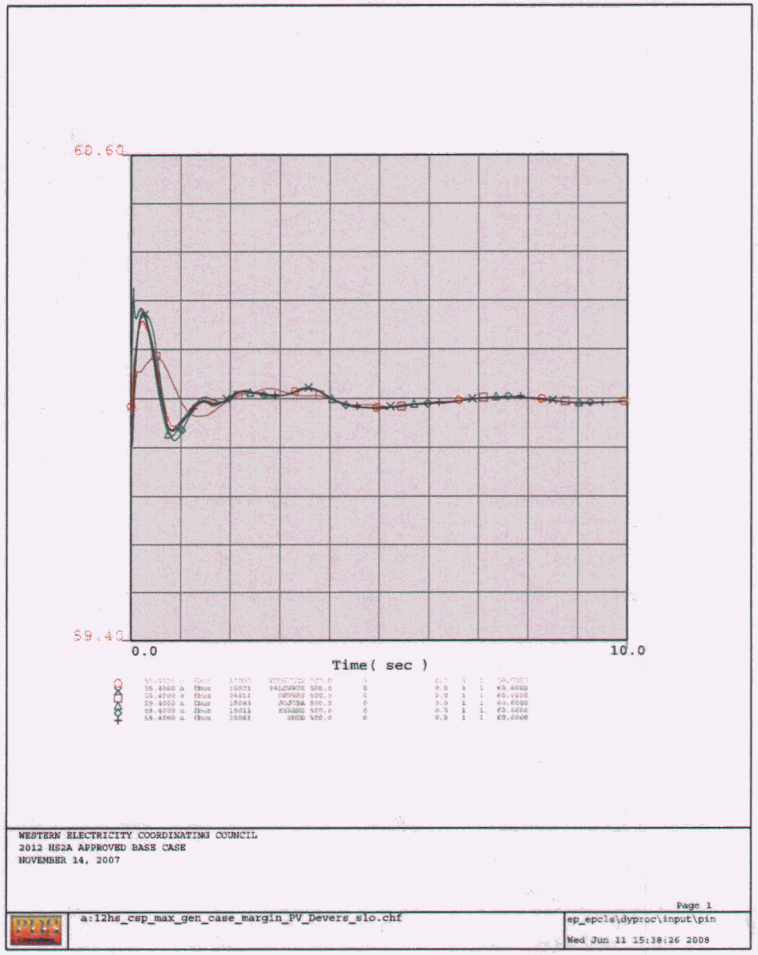
Transient Frequency Plots



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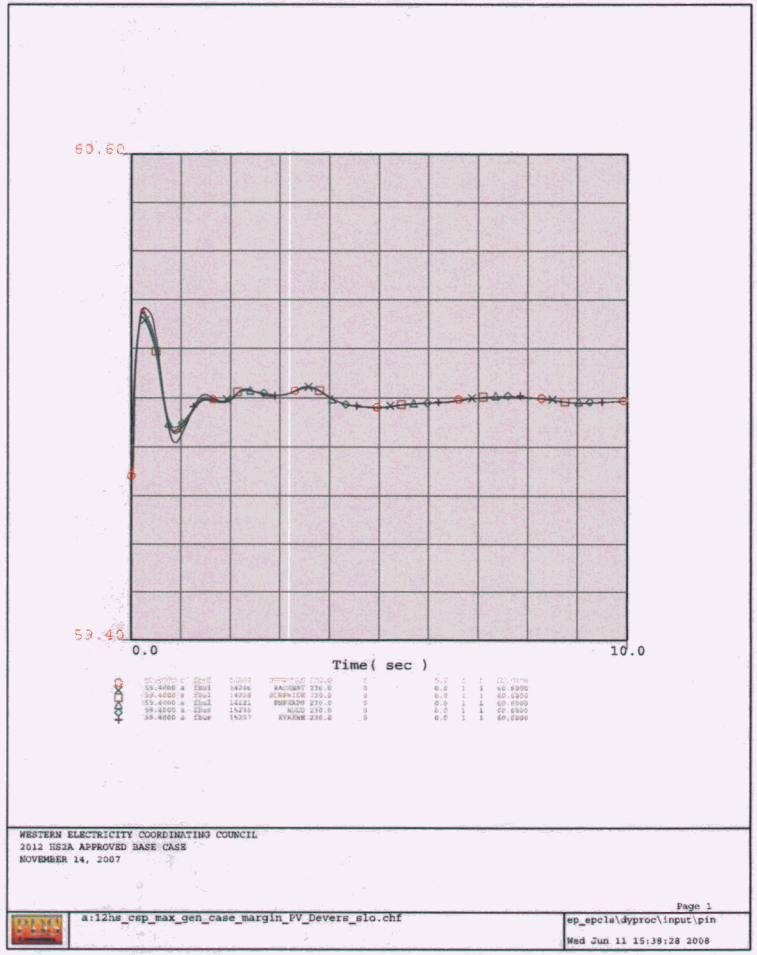

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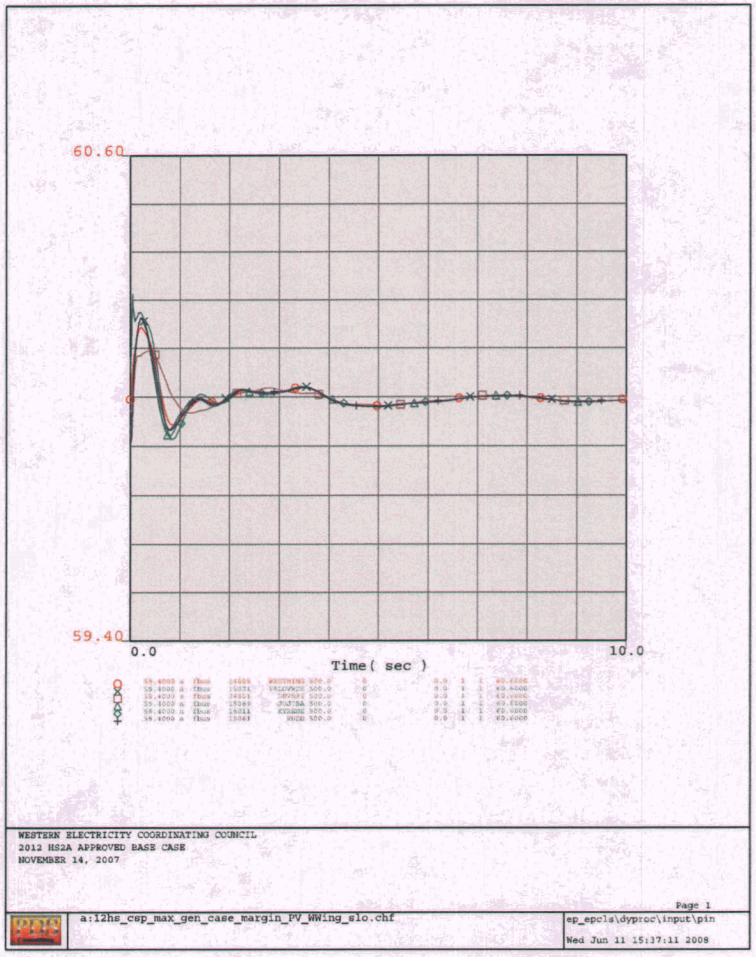

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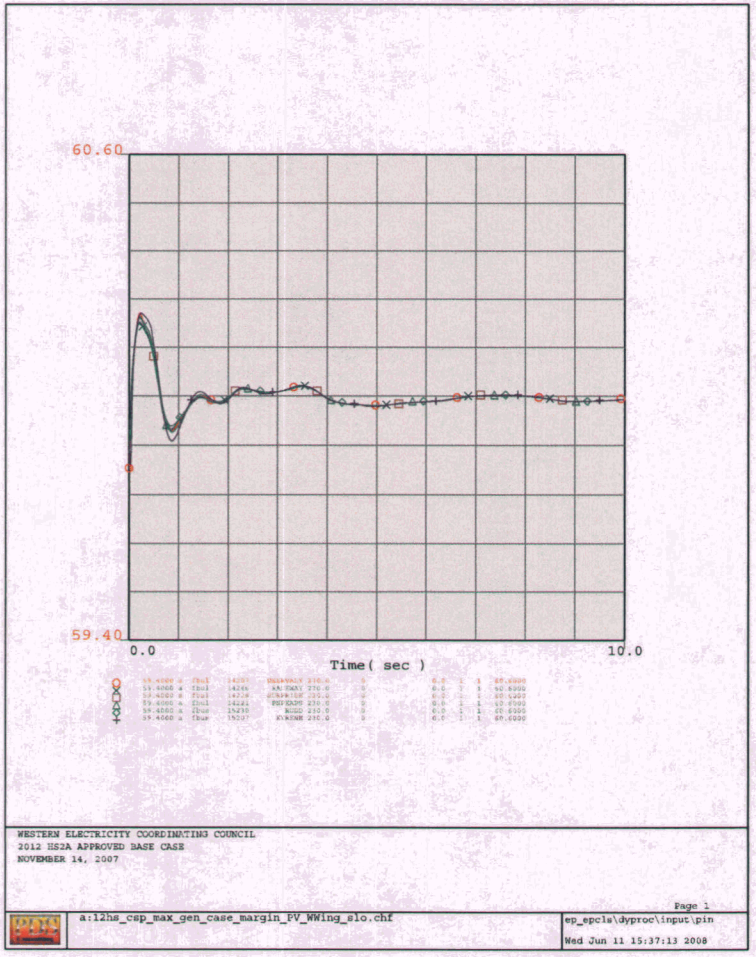
Transient Frequency Plots



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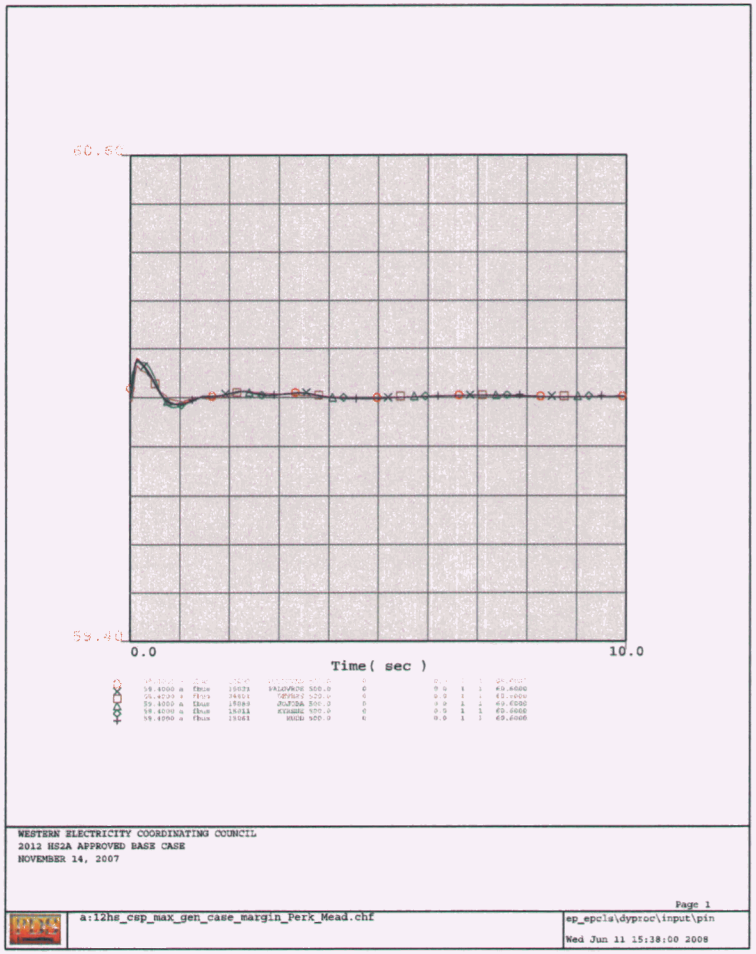

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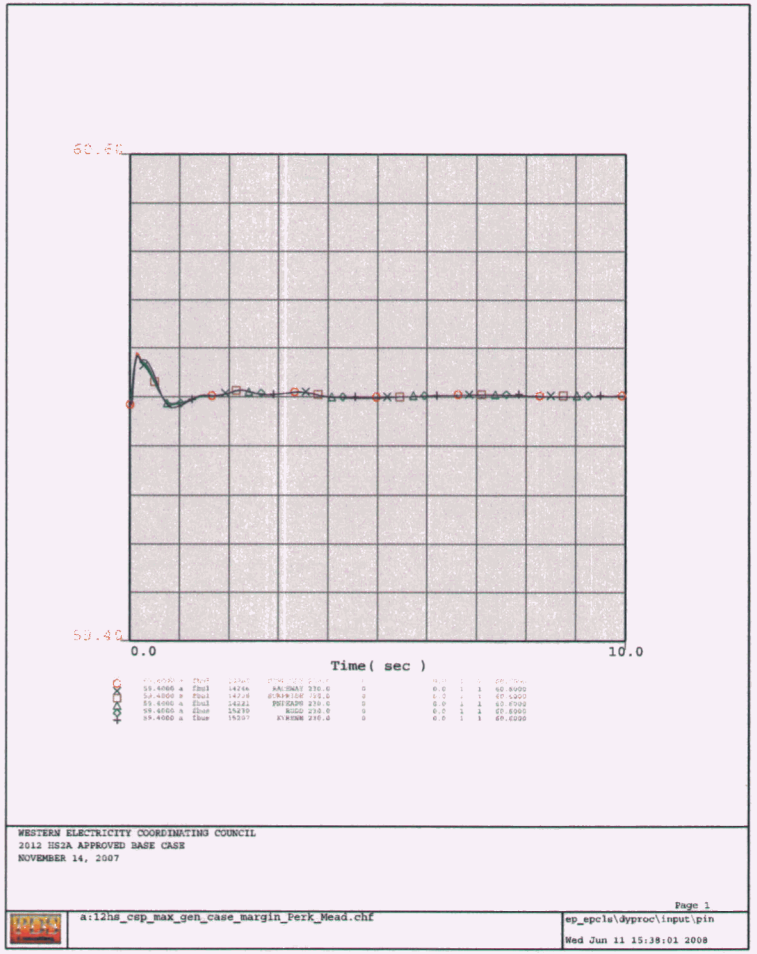

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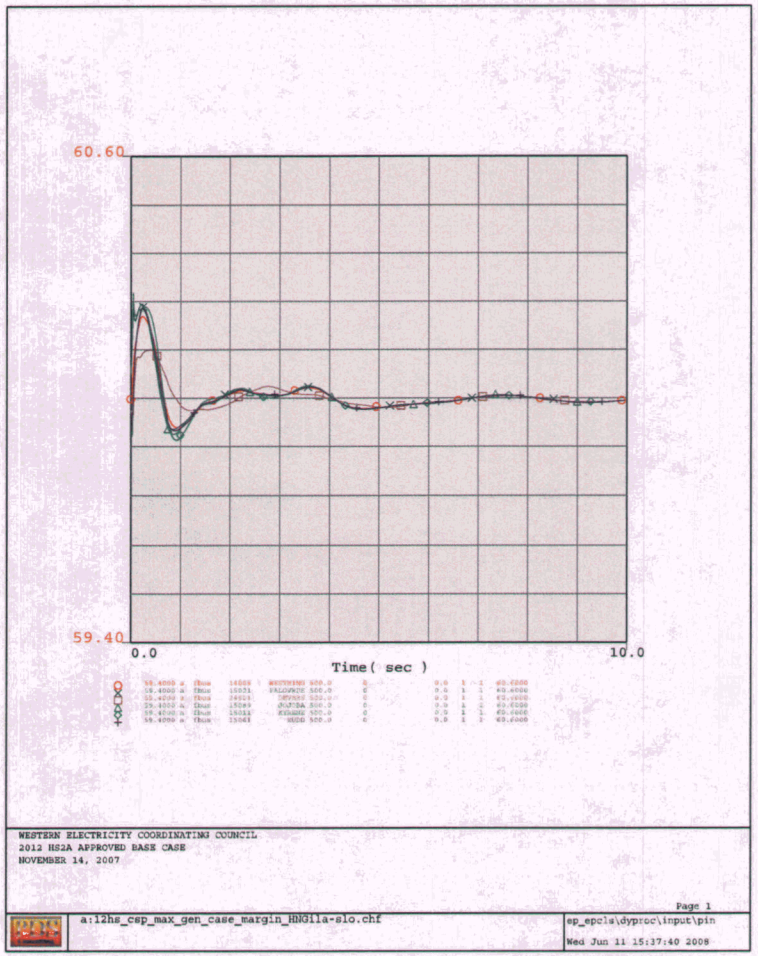
Hassayampa -N. Gila 500 kV line outage
Transient Frequency Plots



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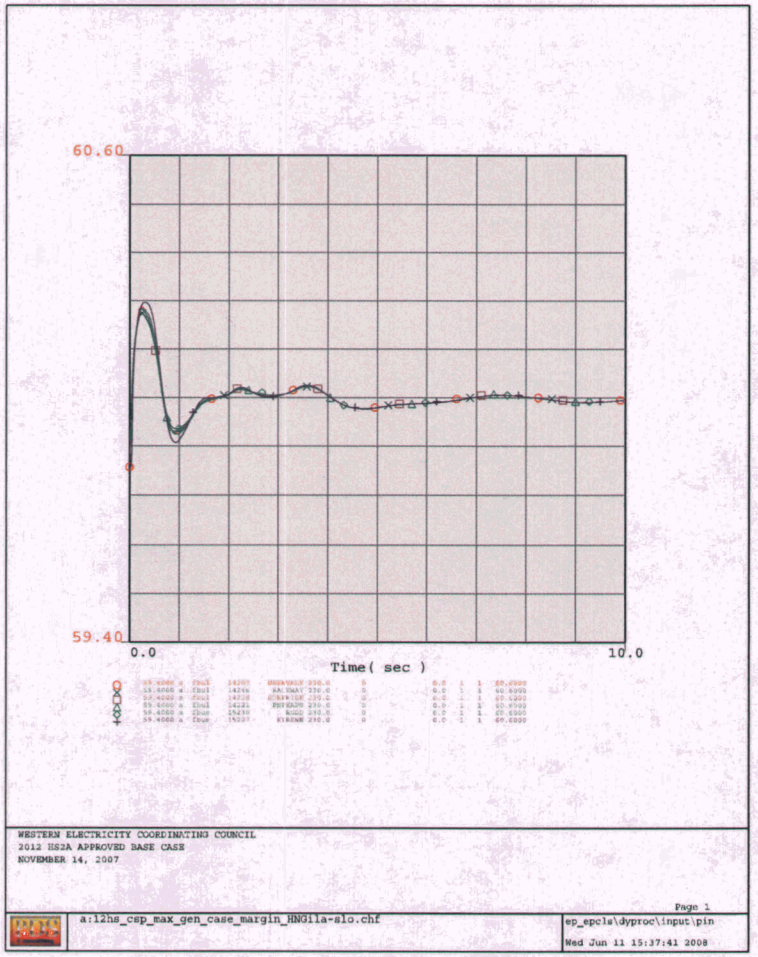

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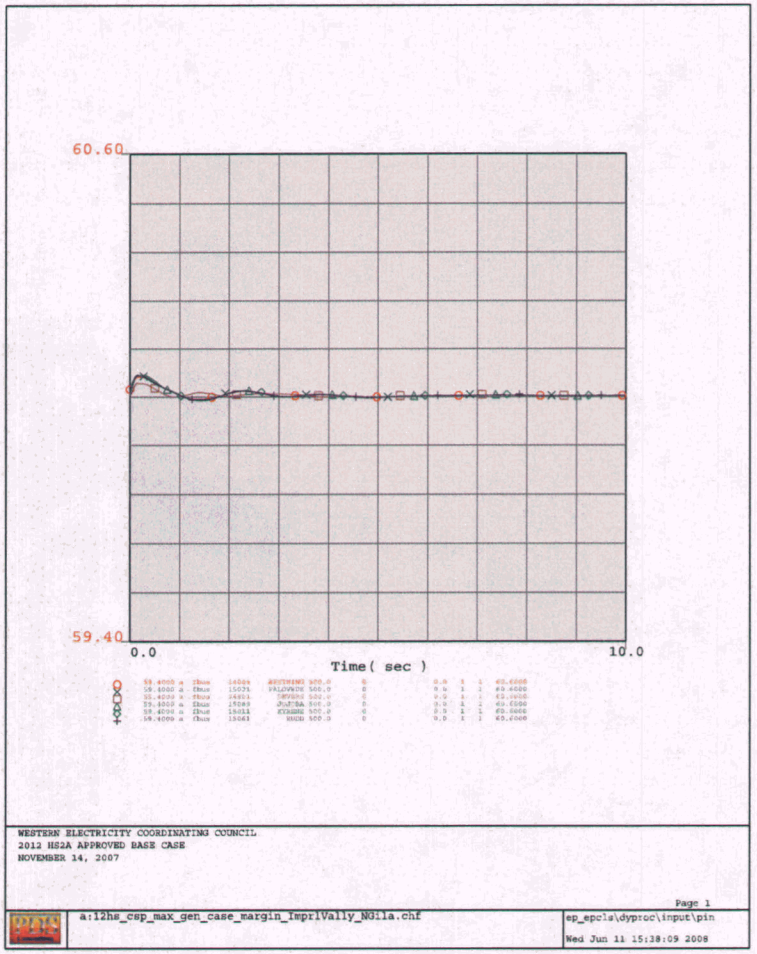
N. Gila-Imperial Valley 500 kV line outage
Transient Frequency Plots



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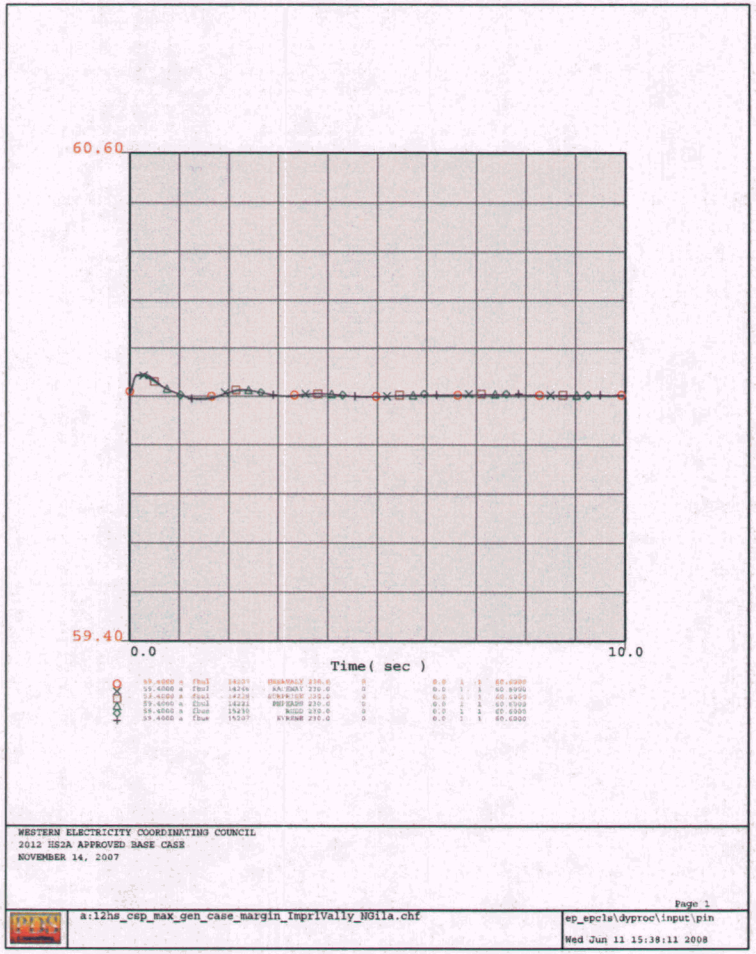
Transient Frequency Plots



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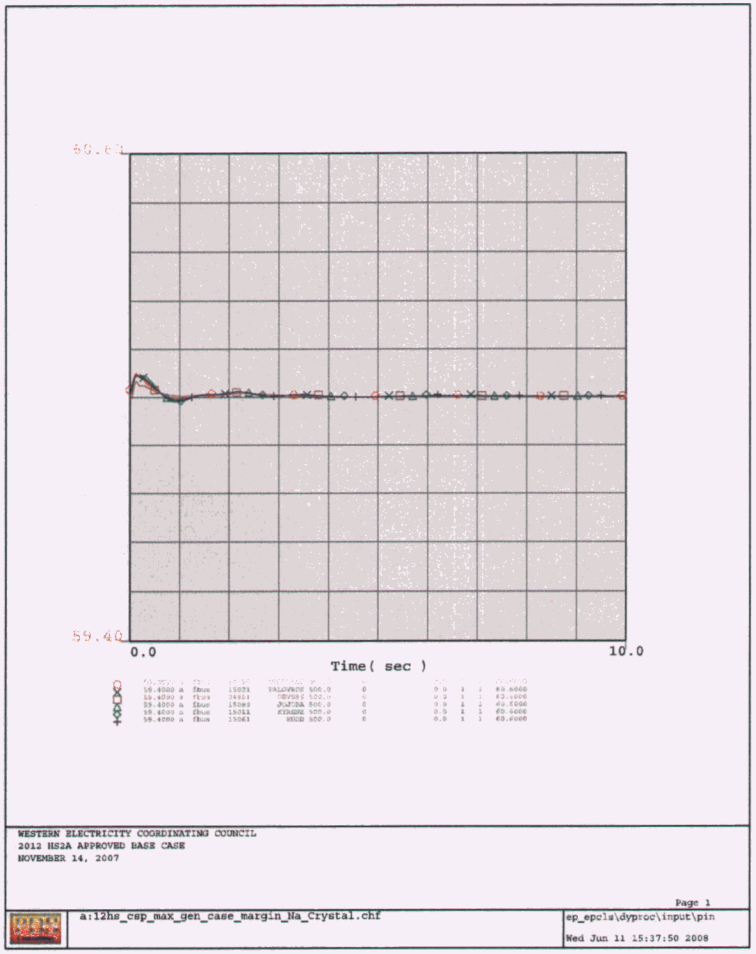
Navajo-Crystal 500 kV line
Transient Frequency Plots



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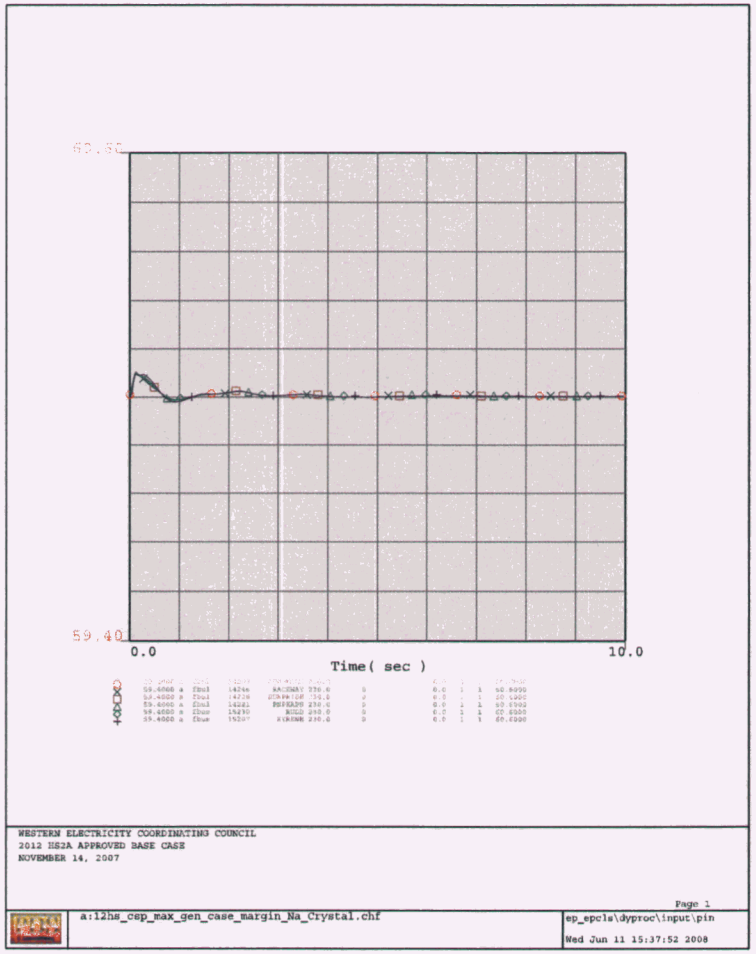
Navajo-Crystal 500 kV line
Transient Frequency Plots



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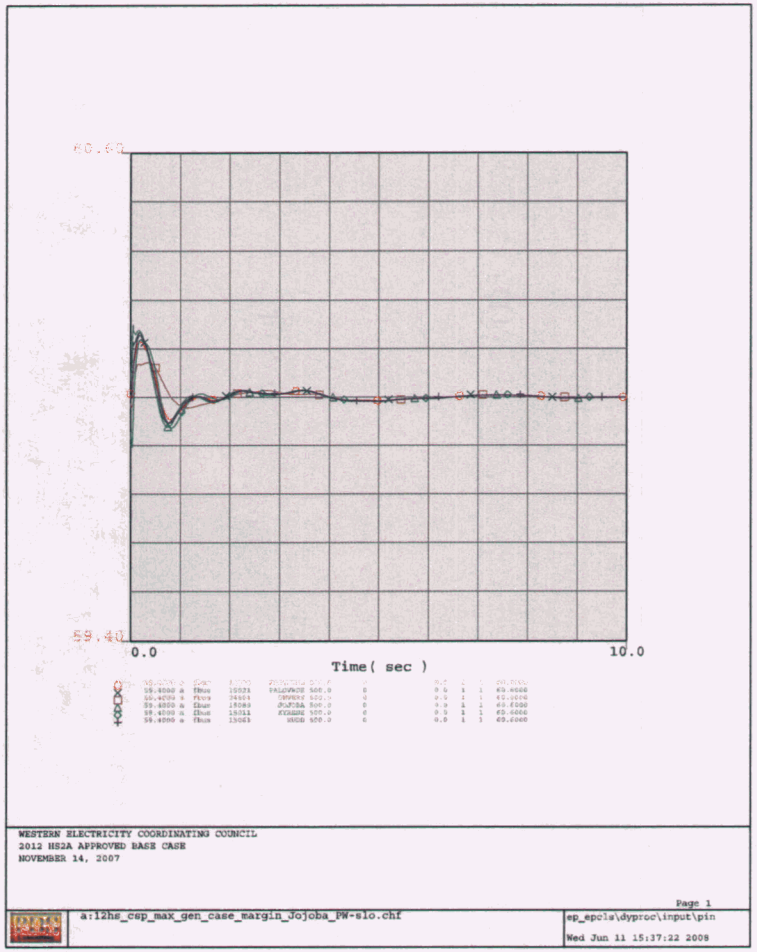
Transient Frequency Plots



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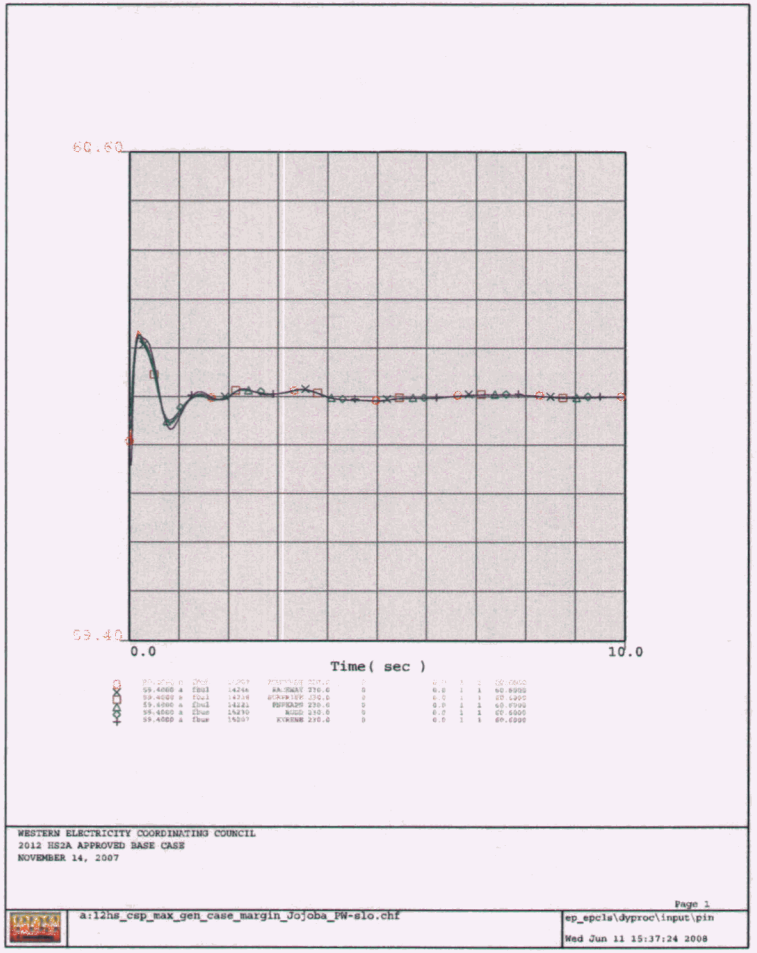

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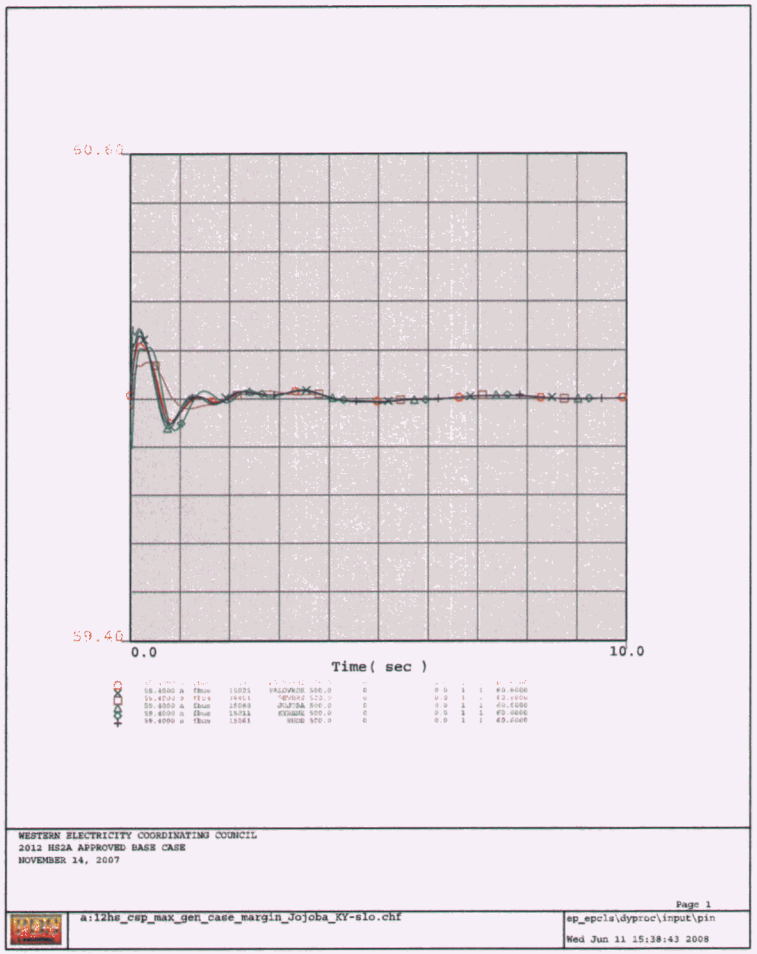

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Jojoba-Kyrene 500 kV line outage
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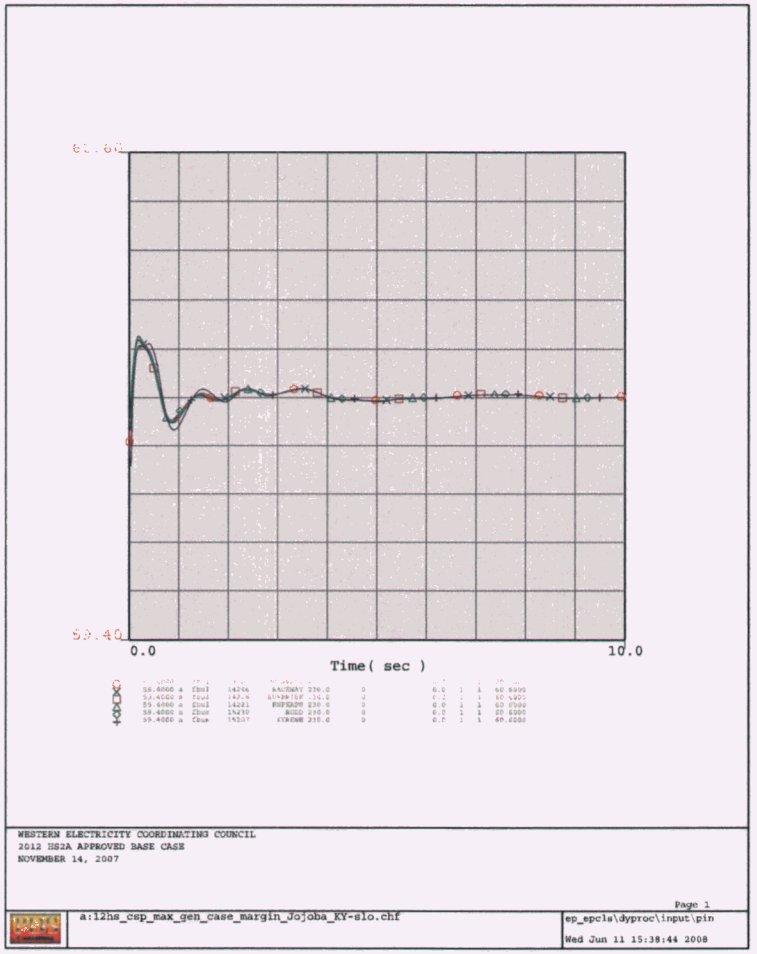
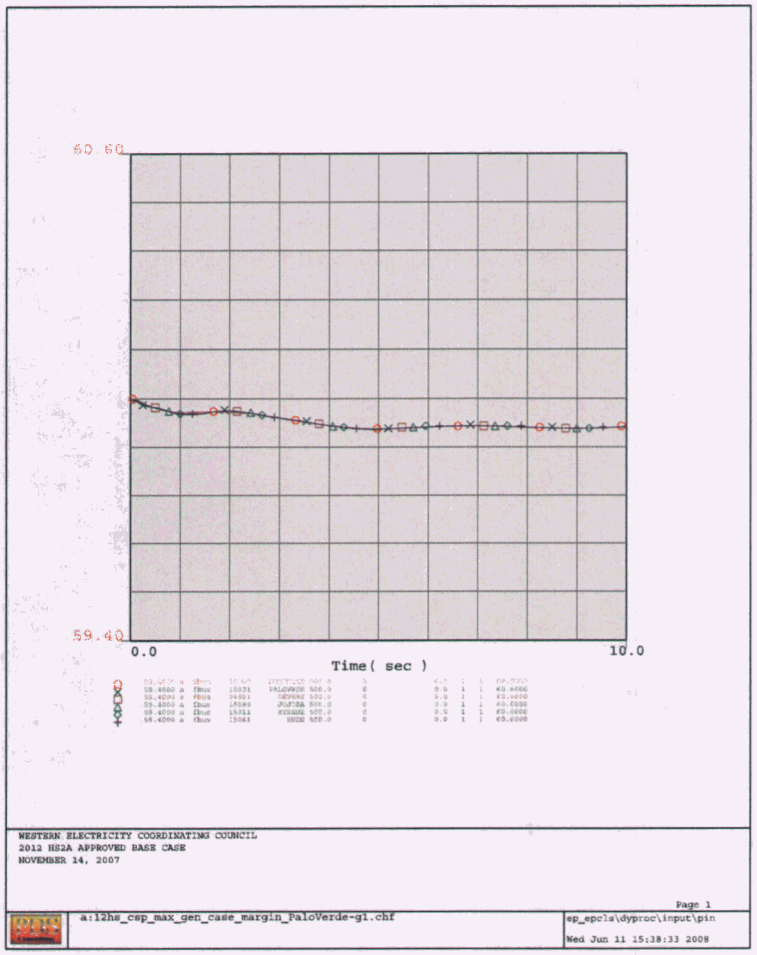
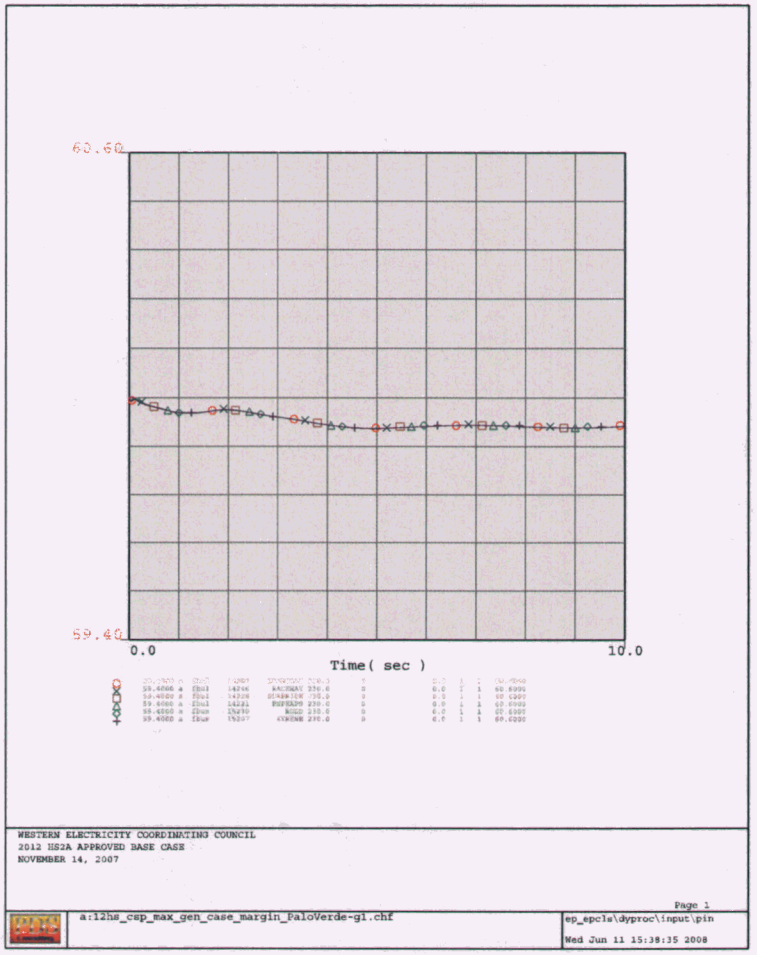


Palo Verde UFSAR
Palo Verde G-1 outage
Transient Frequency Plots



Palo Verde UFSAR
Palo Verde G-1 outage
Transient Frequency Plots



BUCKEYE CSP

Generator Interconnection Study

Attachment D

Power Flow Analysis Contingency List

LINE OUTAGES

```
**** CASE NUMBER ****  0
DONE

**** CASE NUMBER ****  1
OPEN LINE
"BROWNING 500.00"  "SILVERKG 500.00"  "1"  1
DONE

**** CASE NUMBER ****  2
OPEN LINE
"CHOLLA   500.00"  "SAGUARO  500.00"  "1"  1
DONE

**** CASE NUMBER ****  3
OPEN LINE
"CORONADO 500.00"  "SECNOL   500.00"  "1"  1
DONE

**** CASE NUMBER ****  4
OPEN LINE
"CORONADO 500.00"  "SILVERKG 500.00"  "1"  1
DONE

**** CASE NUMBER ****  5
OPEN LINE
"DINOSAUR 500.00"  "BROWNING 500.00"  "1"  1
DONE

**** CASE NUMBER ****  6
OPEN LINE
"DRPP     500.00"  "FCW      500.00"  "1"  1
DONE

**** CASE NUMBER ****  7
OPEN LINE
"DRPP     500.00"  "FCW      500.00"  "2"  1
DONE

**** CASE NUMBER ****  8
OPEN LINE
"FOURCORN 500.00"  "FCW      500.00"  "1"  1
DONE

**** CASE NUMBER ****  9
OPEN LINE
"HARQJNCT 500.00"  "HARQUAHA 500.00"  "1"  1
DONE

**** CASE NUMBER ****  10
OPEN LINE
"HARQJNCT 500.00"  "SNVLY    500.00"  "1"  1
DONE

**** CASE NUMBER ****  11
OPEN LINE
"HASSYAMP 500.00"  "ARLINTON 500.00"  "1"  1
DONE

**** CASE NUMBER ****  12
OPEN LINE
"HASSYAMP 500.00"  "JOJOBA   500.00"  "1"  1
DONE

**** CASE NUMBER ****  13
OPEN LINE
"HASSYAMP 500.00"  "MESQUITE 500.00"  "1"  1
DONE

**** CASE NUMBER ****  14
OPEN LINE
"HASSYAMP 500.00"  "N.GILA   500.00"  "1"  1
DONE

**** CASE NUMBER ****  15
OPEN LINE
"HASSYAMP 500.00"  "PALOVRDE 500.00"  "1"  1
DONE
```

```
**** CASE NUMBER ****  16
OPEN LINE
"HASSYAMP 500.00"  "PALOVRDE 500.00"  "2"  1
DONE

**** CASE NUMBER ****  17
OPEN LINE
"HASSYAMP 500.00"  "PALOVRDE 500.00"  "3"  1
DONE

**** CASE NUMBER ****  18
OPEN LINE
"HASSYAMP 500.00"  "PINAL_W  500.00"  "1"  1
DONE

**** CASE NUMBER ****  19
OPEN LINE
"HASSYAMP 500.00"  "REDHAWK  500.00"  "1"  1
DONE

**** CASE NUMBER ****  20
OPEN LINE
"HASSYAMP 500.00"  "REDHAWK  500.00"  "2"  1
DONE

**** CASE NUMBER ****  21
OPEN LINE
"JOJOBA   500.00"  "GILARIVR 500.00"  "1"  1
DONE

**** CASE NUMBER ****  22
OPEN LINE
"JOJOBA   500.00"  "GILARIVR 500.00"  "2"  1
DONE

**** CASE NUMBER ****  23
OPEN LINE
"JOJOBA   500.00"  "KYRENE   500.00"  "1"  1
DONE

**** CASE NUMBER ****  24
OPEN LINE
"KYRENE   500.00"  "BROWNING 500.00"  "1"  1
DONE

**** CASE NUMBER ****  25
OPEN LINE
"MEAD     500.00"  "MARKETPL 500.00"  "1"  1
DONE

**** CASE NUMBER ****  26
OPEN LINE
"MEAD     500.00"  "PERKINS  500.00"  "1"  1
DONE

**** CASE NUMBER ****  27
OPEN LINE
"MOENKOPI 500.00"  "ELDORDO  500.00"  "1"  1
DONE

**** CASE NUMBER ****  28
OPEN LINE
"MOENKOPI 500.00"  "RME      500.00"  "1"  1
DONE

**** CASE NUMBER ****  29
OPEN LINE
"MOENKOPI 500.00"  "YAVAPAI  500.00"  "1"  1
DONE

**** CASE NUMBER ****  30
OPEN LINE
"NAVAJO   500.00"  "CRYSTAL  500.00"  "1"  1
DONE

**** CASE NUMBER ****  31
OPEN LINE
"NAVAJO   500.00"  "RME      500.00"  "1"  1
DONE
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**** CASE NUMBER ****  32
OPEN LINE
"NAVAJO   500.00"  "VV1      500.00"  "1"  1
DONE

**** CASE NUMBER ****  33
OPEN LINE
"PALOVRDE 500.00"  "RUDD     500.00"  "1"  1
DONE

**** CASE NUMBER ****  34
OPEN LINE
"PALOVRDE 500.00"  "WESTWING 500.00"  "1"  1
DONE

**** CASE NUMBER ****  35
OPEN LINE
"PALOVRDE 500.00"  "WESTWING 500.00"  "2"  1
DONE

**** CASE NUMBER ****  36
OPEN LINE
"PERK PS2 500.00"  "PERKINPS 500.00"  "1"  1
DONE

**** CASE NUMBER ****  37
OPEN LINE
"PERKINPS 500.00"  "PERK PS1 500.00"  "1"  1
DONE

**** CASE NUMBER ****  38
OPEN LINE
"PINALSPS 500.00"  "PINALSPS 500.00"  "1"  1
DONE

**** CASE NUMBER ****  39
OPEN LINE
"PINALSPS 500.00"  "PINALSPS 500.00"  "1"  1
DONE

**** CASE NUMBER ****  40
OPEN LINE
"PERKINPS 500.00"  "WESTWING 500.00"  "1"  1
DONE

**** CASE NUMBER ****  41
OPEN LINE
"PERKINS  500.00"  "PERKINPS 500.00"  "1"  1
DONE

**** CASE NUMBER ****  42
OPEN LINE
"PINAL_SO 500.00"  "SES      500.00"  "1"  1
DONE

**** CASE NUMBER ****  43
OPEN LINE
"PINAL_SO 500.00"  "TORTOLIT 500.00"  "1"  1
DONE

**** CASE NUMBER ****  44
OPEN LINE
"PINAL_W  500.00"  "SNTAROSA 500.00"  "1"  1
DONE

**** CASE NUMBER ****  45
OPEN LINE
"RACEWAY  500.00"  "PNPKAPS  500.00"  "1"  1
DONE

**** CASE NUMBER ****  46
OPEN LINE
"RACEWAY  500.00"  "WESTWING 500.00"  "1"  1
DONE

**** CASE NUMBER ****  47
OPEN LINE
"RME      500.00"  "FCW      500.00"  "1"  1
DONE
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**** CASE NUMBER ****  48
OPEN LINE
"SAGUARO  500.00"  "TORTOLIT 500.00"  "1"  1
DONE

**** CASE NUMBER ****  49
OPEN LINE
"SAGUARO  500.00"  "TORTOLIT 500.00"  "2"  1
DONE

**** CASE NUMBER ****  50
OPEN LINE
"SECNOL   500.00"  "CHOLLA   500.00"  "1"  1
DONE

**** CASE NUMBER ****  51
OPEN LINE
"SES      500.00"  "DINOSAUR 500.00"  "1"  1
DONE

**** CASE NUMBER ****  52
OPEN LINE
"SNTAROSA 500.00"  "PINAL_SO 500.00"  "1"  1
DONE

**** CASE NUMBER ****  53
OPEN LINE
"VV1      500.00"  "RACEWAY  500.00"  "1"  1
DONE

**** CASE NUMBER ****  54
OPEN LINE
"YAVAPAI  500.00"  "WESTWING 500.00"  "1"  1
DONE

**** CASE NUMBER ****  55
OPEN LINE
"CHOLLA   345.00"  "PNPKAPS  345.00"  "1"  1
DONE

**** CASE NUMBER ****  56
OPEN LINE
"CHOLLA   345.00"  "PRECHCYN 345.00"  "1"  1
DONE

**** CASE NUMBER ****  57
OPEN LINE
"FLAGSTAF 345.00"  "GLENCANY 345.00"  "1"  1
DONE

**** CASE NUMBER ****  58
OPEN LINE
"FLAGSTAF 345.00"  "GLENCANY 345.00"  "2"  1
DONE

**** CASE NUMBER ****  59
OPEN LINE
"FLAGSTAF 345.00"  "PINPKBRB 345.00"  "1"  1
DONE

**** CASE NUMBER ****  60
OPEN LINE
"FLAGSTAF 345.00"  "PINPKBRB 345.00"  "2"  1
DONE

**** CASE NUMBER ****  61
OPEN LINE
"FOURCORN 345.00"  "CHOLLA   345.00"  "1"  1
DONE

**** CASE NUMBER ****  62
OPEN LINE
"FOURCORN 345.00"  "CHOLLA   345.00"  "2"  1
DONE

**** CASE NUMBER ****  63
OPEN LINE
"FOURCORN 345.00"  "SAN_JUAN 345.00"  "1"  1
DONE
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**** CASE NUMBER ****  64
OPEN LINE
"GREENLEE 345.00"  "COPPERVR 345.00"  "1"  1
DONE

**** CASE NUMBER ****  65
OPEN LINE
"GREENLEE 345.00"  "WILLOW   345.00"  "1"  1
DONE

**** CASE NUMBER ****  66
OPEN LINE
"GREENLEE 345.00"  "WINCHSTR 345.00"  "1"  1
DONE

**** CASE NUMBER ****  67
OPEN LINE
"LIBERTY  345.00"  "PEACOCK  345.00"  "1"  1
DONE

**** CASE NUMBER ****  68
OPEN LINE
"MAZATZAL 345.00"  "PNPKAPS  345.00"  "1"  1
DONE

**** CASE NUMBER ****  69
OPEN LINE
"MCKINLEY 345.00"  "SPRINGR  345.00"  "1"  1
DONE

**** CASE NUMBER ****  70
OPEN LINE
"MCKINLEY 345.00"  "SPRINGR  345.00"  "2"  1
DONE

**** CASE NUMBER ****  71
OPEN LINE
"PEACOCK  345.00"  "MEAD     345.00"  "1"  1
DONE

**** CASE NUMBER ****  72
OPEN LINE
"PINALWES 345.00"  "SOUTH    345.00"  "1"  1
DONE

**** CASE NUMBER ****  73
OPEN LINE
"PRECHCYN 345.00"  "MAZATZAL 345.00"  "1"  1
DONE

**** CASE NUMBER ****  74
OPEN LINE
"SAN_JUAN 345.00"  "MCKINLEY 345.00"  "1"  1
DONE

**** CASE NUMBER ****  75
OPEN LINE
"SAN_JUAN 345.00"  "MCKINLEY 345.00"  "2"  1
DONE

**** CASE NUMBER ****  76
OPEN LINE
"SHIPROCK 345.00"  "FOURCORN 345.00"  "1"  1
DONE

**** CASE NUMBER ****  77
OPEN LINE
"SOUTH    345.00"  "GATEWAY  345.00"  "1"  1
DONE

**** CASE NUMBER ****  78
OPEN LINE
"SOUTH    345.00"  "GATEWAY  345.00"  "2"  1
DONE

**** CASE NUMBER ****  79
OPEN LINE
"SPRINGR  345.00"  "CORONADO 345.00"  "1"  1
DONE
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**** CASE NUMBER ****  80
OPEN LINE
"SPRINGR  345.00"  "GREENLEE 345.00"  "1"  1
DONE

**** CASE NUMBER ****  81
OPEN LINE
"SPRINGR  345.00"  "VAIL2    345.00"  "1"  1
DONE

**** CASE NUMBER ****  82
OPEN LINE
"VAIL     345.00"  "SOUTH    345.00"  "1"  1
DONE

**** CASE NUMBER ****  83
OPEN LINE
"WESTWING 345.00"  "PINALWES 345.00"  "1"  1
DONE

**** CASE NUMBER ****  84
OPEN LINE
"WILLOW   345.00"  "BOWIE    345.00"  "1"  1
DONE

**** CASE NUMBER ****  85
OPEN LINE
"WILLOW   345.00"  "BOWIE    345.00"  "2"  1
DONE

**** CASE NUMBER ****  86
OPEN LINE
"WINCHSTR 345.00"  "VAIL     345.00"  "1"  1
DONE

**** CASE NUMBER ****  87
OPEN LINE
"WINCHSTR 345.00"  "WILLOW   345.00"  "1"  1
DONE

**** CASE NUMBER ****  88
OPEN LINE
"AGUAFRIA 230.00"  "ALEXANDR 230.00"  "1"  1
DONE

**** CASE NUMBER ****  89
OPEN LINE
"AGUAFRIA 230.00"  "WESTWNGW 230.00"  "1"  1
DONE

**** CASE NUMBER ****  90
OPEN LINE
"AGUAFRIA 230.00"  "WHITETNK 230.00"  "1"  1
DONE

**** CASE NUMBER ****  91
OPEN LINE
"ANDERSON 230.00"  "KYR-NEW  230.00"  "1"  1
DONE

**** CASE NUMBER ****  92
OPEN LINE
"AVERY    230.00"  "RACEWAY  230.00"  "1"  1
DONE

**** CASE NUMBER ****  93
OPEN LINE
"AVERY    230.00"  "TS6      230.00"  "1"  1
DONE

**** CASE NUMBER ****  94
OPEN LINE
"BRANDOW  230.00"  "KYRENE   230.00"  "1"  1
DONE

**** CASE NUMBER ****  95
OPEN LINE
"BRANDOW  230.00"  "PAPAGOBT 230.00"  "1"  1
DONE
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**** CASE NUMBER ****  96
OPEN LINE
"BRANDOW  230.00"  "WARD     230.00"  "1"  1
DONE

**** CASE NUMBER ****  97
OPEN LINE
"BRANDOW  230.00"  "WARD     230.00"  "2"  1
DONE

**** CASE NUMBER ****  98
OPEN LINE
"BROWNING 230.00"  "DINOSAUR 230.00"  "1"  1
DONE

**** CASE NUMBER ****  99
OPEN LINE
"BROWNING 230.00"  "SANTAN   230.00"  "1"  1
DONE

**** CASE NUMBER ****  100
OPEN LINE
"BUCKEYE  230.00"  "LIBERTY  230.00"  "1"  1
DONE

**** CASE NUMBER ****  101
OPEN LINE
"BUCKEYTP 230.00"  "LIBERTY  230.00"  "1"  1
DONE

**** CASE NUMBER ****  102
OPEN LINE
"CACTUS   230.00"  "OCOTILLO 230.00"  "1"  1
DONE

**** CASE NUMBER ****  103
OPEN LINE
"CHOLLA   230.00"  "LEUPP    230.00"  "1"  1
DONE

**** CASE NUMBER ****  104
OPEN LINE
"COOLIDGE 230.00"  "SUN ARIZ 230.00"  "1"  1
DONE

**** CASE NUMBER ****  105
OPEN LINE
"COOLIDGE 230.00"  "SUN ARIZ 230.00"  "2"  1
DONE

**** CASE NUMBER ****  106
OPEN LINE
"COPPERVR 230.00"  "FRISCO   230.00"  "1"  1
DONE

**** CASE NUMBER ****  107
OPEN LINE
"CORBELL  230.00"  "KYRENE   230.00"  "1"  1
DONE

**** CASE NUMBER ****  108
OPEN LINE
"CTRYCLUB 230.00"  "GRNDTRML 230.00"  "1"  1
DONE

**** CASE NUMBER ****  109
OPEN LINE
"CTRYCLUB 230.00"  "LINCSTRT 230.00"  "1"  1
DONE

**** CASE NUMBER ****  110
OPEN LINE
"CTRYCLUB 230.00"  "MEADOWBK 230.00"  "1"  1
DONE

**** CASE NUMBER ****  111
OPEN LINE
"DAVIS    230.00"  "MCCULLGH 230.00"  "1"  1
DONE
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**** CASE NUMBER ****  112
OPEN LINE
"DAVIS    230.00"  "MEAD N   230.00"  "1"  1
DONE

**** CASE NUMBER ****  113
OPEN LINE
"DAVIS    230.00"  "TOPOCK   230.00"  "2"  1
DONE

**** CASE NUMBER ****  114
OPEN LINE
"DBG      230.00"  "CASGRAPS 230.00"  "1"  1
DONE

**** CASE NUMBER ****  115
OPEN LINE
"DBG      230.00"  "PINAL_S  230.00"  "1"  1
DONE

**** CASE NUMBER ****  116
OPEN LINE
"DEERVALY 230.00"  "ALEXANDR 230.00"  "1"  1
DONE

**** CASE NUMBER ****  117
OPEN LINE
"DEERVALY 230.00"  "PINPKSRP 230.00"  "1"  1
DONE

**** CASE NUMBER ****  118
OPEN LINE
"DEERVALY 230.00"  "WESTWNGE 230.00"  "1"  1
DONE

**** CASE NUMBER ****  119
OPEN LINE
"EAGLEYE  230.00"  "BUCKEYTP 230.00"  "1"  1
DONE
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**** CASE NUMBER ****  120
OPEN LINE
"EL SOL   230.00"  "AGUAFRIA 230.00"  "1"  1
DONE

**** CASE NUMBER ****  121
OPEN LINE
"EL SOL   230.00"  "WHTNKAPS 230.00"  "1"  1
DONE

**** CASE NUMBER ****  122
OPEN LINE
"FORTROCK 230.00"  "JUNIPRMT 230.00"  "1"  1
DONE

**** CASE NUMBER ****  123
OPEN LINE
"FORTROCK 230.00"  "ROUNDVLY 230.00"  "1"  1
DONE

**** CASE NUMBER ****  124
OPEN LINE
"FOURCORN 230.00"  "PILLAR   230.00"  "1"  1
DONE

**** CASE NUMBER ****  125
OPEN LINE
"PRSCOTWA 230.00"  "GAVILNWA 230.00"  "1"  1
DONE

**** CASE NUMBER ****  126
OPEN LINE
"GAVILNPK 230.00"  "GAVILNWA 230.00"  "1"  1
DONE

**** CASE NUMBER ****  127
OPEN LINE
"PRSCOTWA 230.00"  "PRESCOTT 230.00"  "1"  1
DONE
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**** CASE NUMBER ****  128
OPEN LINE
"GILARIVR 230.00"  "GILABEND 230.00"  "1"  1
DONE

**** CASE NUMBER ****  129
OPEN LINE
"GLEN PS  230.00"  "NAVAJO   230.00"  "1"  1
DONE

**** CASE NUMBER ****  130
OPEN LINE
"GLENDALE 230.00"  "GLENDALW 230.00"  "1"  1
DONE

**** CASE NUMBER ****  131
OPEN LINE
"GLENDALE 230.00"  "GRNDTRML 230.00"  "1"  1
DONE

**** CASE NUMBER ****  132
OPEN LINE
"GLENDALW 230.00"  "AGUAFRIA 230.00"  "1"  1
DONE

**** CASE NUMBER ****  133
OPEN LINE
"GOLDFELD 230.00"  "SILVERKG 230.00"  "1"  1
DONE

**** CASE NUMBER ****  134
OPEN LINE
"GOLDFELD 230.00"  "THUNDRST 230.00"  "1"  1
DONE

**** CASE NUMBER ****  135
OPEN LINE
"GOLDFELD 230.00"  "THUNDRST 230.00"  "2"  1
DONE

**** CASE NUMBER ****  136
OPEN LINE
"GRIFFITH 230.00"  "PEACOCK  230.00"  "1"  1
DONE

**** CASE NUMBER ****  137
OPEN LINE
"HARCUVAR 230.00"  "HASSYTAP 230.00"  "1"  1
DONE

**** CASE NUMBER ****  138
OPEN LINE
"HASSYTAP 230.00"  "LIBERTY  230.00"  "1"  1
DONE

**** CASE NUMBER ****  139
OPEN LINE
"HILLTOP  230.00"  "MCCONICO 230.00"  "1"  1
DONE

**** CASE NUMBER ****  140
OPEN LINE
"HOVRA1A2 230.00"  "MEAD S   230.00"  "1"  1
DONE

**** CASE NUMBER ****  141
OPEN LINE
"HOVRA5A6 230.00"  "MEAD S   230.00"  "1"  1
DONE

**** CASE NUMBER ****  142
OPEN LINE
"HOVRA7-9 230.00"  "MEAD S   230.00"  "1"  1
DONE

**** CASE NUMBER ****  143
OPEN LINE
"HOVRN1N2 230.00"  "MEAD S   230.00"  "1"  1
DONE
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**** CASE NUMBER ****  144
OPEN LINE
"HOVRN3N4 230.00"  "MEAD S   230.00"  "1"  1
DONE

**** CASE NUMBER ****  145
OPEN LINE
"HOVRN5N6 230.00"  "MEAD S   230.00"  "1"  1
DONE

**** CASE NUMBER ****  146
OPEN LINE
"HOVRN7N8 230.00"  "MEAD S   230.00"  "1"  1
DONE

**** CASE NUMBER ****  147
OPEN LINE
"JOJOBA   230.00"  "GILARIVR 230.00"  "1"  1
DONE

**** CASE NUMBER ****  148
OPEN LINE
"JUNIPRMT 230.00"  "SELIGMAN 230.00"  "1"  1
DONE

**** CASE NUMBER ****  149
OPEN LINE
"KAYENTA  230.00"  "LNGHOUSE 230.00"  "1"  1
DONE

**** CASE NUMBER ****  150
OPEN LINE
"KAYENTA  230.00"  "SHIPROCK 230.00"  "1"  1
DONE

**** CASE NUMBER ****  151
OPEN LINE
"KYR-NEW  230.00"  "KNOX     230.00"  "1"  1
DONE

**** CASE NUMBER ****  152
OPEN LINE
"KYR-NEW  230.00"  "OCOTILLO 230.00"  "1"  1
DONE

**** CASE NUMBER ****  153
OPEN LINE
"KYRENE   230.00"  "SCHRADER 230.00"  "1"  1
DONE

**** CASE NUMBER ****  154
OPEN LINE
"LEUPP    230.00"  "COCONINO 230.00"  "1"  1
DONE

**** CASE NUMBER ****  155
OPEN LINE
"LIBERTY  230.00"  "PHXWAPA  230.00"  "1"  1
DONE

**** CASE NUMBER ****  156
OPEN LINE
"LIBERTY  230.00"  "TS4      230.00"  "1"  1
DONE

**** CASE NUMBER ****  157
OPEN LINE
"LIBERTY  230.00"  "WESTWNGW 230.00"  "1"  1
DONE

**** CASE NUMBER ****  158
OPEN LINE
"LIBTYPHS 230.00"  "LIBERTY  230.00"  "2"  1
DONE

**** CASE NUMBER ****  159
OPEN LINE
"LINCSTRT 230.00"  "WPHXAPSN 230.00"  "1"  1
DONE
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**** CASE NUMBER ****  160
OPEN LINE
"LONE BUT 230.00"  "LIBERTY  230.00"  "1"  1
DONE

**** CASE NUMBER ****  161
OPEN LINE
"LONE BUT 230.00"  "SUN ARIZ 230.00"  "1"  1
DONE

**** CASE NUMBER ****  162
OPEN LINE
"LONE BUT 230.00"  "TESTTRAK 230.00"  "1"  1
DONE

**** CASE NUMBER ****  163
OPEN LINE
"LONEPEAK 230.00"  "SUNYSLOP 230.00"  "1"  1
DONE

**** CASE NUMBER ****  164
OPEN LINE
"MCCONICO 230.00"  "DAVIS    230.00"  "1"  1
DONE

**** CASE NUMBER ****  165
OPEN LINE
"MCCONICO 230.00"  "GRIFFITH 230.00"  "1"  1
DONE

**** CASE NUMBER ****  166
OPEN LINE
"MEAD N   230.00"  "HVRA3A4  230.00"  "1"  1
DONE

**** CASE NUMBER ****  167
OPEN LINE
"MEAD S   230.00"  "MEAD N   230.00"  "1"  1
DONE

**** CASE NUMBER ****  168
OPEN LINE
"MEAD S   230.00"  "MEAD N   230.00"  "2"  1
DONE

**** CASE NUMBER ****  169
OPEN LINE
"MEADOWBK 230.00"  "SUNYSLOP 230.00"  "1"  1
DONE

**** CASE NUMBER ****  170
OPEN LINE
"N.WADDEL 230.00"  "RACEWAY  230.00"  "1"  1
DONE

**** CASE NUMBER ****  171
OPEN LINE
"NAVAJO   230.00"  "LNGHOUSE 230.00"  "1"  1
DONE

**** CASE NUMBER ****  172
OPEN LINE
"OCOTILLO 230.00"  "LINCSTRT 230.00"  "1"  1
DONE

**** CASE NUMBER ****  173
OPEN LINE
"OCOTILLO 230.00"  "PNPKAPS  230.00"  "1"  1
DONE

**** CASE NUMBER ****  174
OPEN LINE
"ORME     230.00"  "ANDERSON 230.00"  "1"  1
DONE

**** CASE NUMBER ****  175
OPEN LINE
"ORME     230.00"  "ANDERSON 230.00"  "2"  1
DONE
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**** CASE NUMBER ****  176
OPEN LINE
"ORME     230.00"  "RUDD     230.00"  "1"  1
DONE

**** CASE NUMBER ****  177
OPEN LINE
"ORME     230.00"  "RUDD     230.00"  "2"  1
DONE

**** CASE NUMBER ****  178
OPEN LINE
"PAPAGOBT 230.00"  "KYR-NEW  230.00"  "1"  1
DONE

**** CASE NUMBER ****  179
OPEN LINE
"PAPAGOBT 230.00"  "PINPKSRP 230.00"  "1"  1
DONE

**** CASE NUMBER ****  180
OPEN LINE
"PARKER   230.00"  "BLK MESA 230.00"  "1"  1
DONE

**** CASE NUMBER ****  181
OPEN LINE
"PARKER   230.00"  "EAGLEYE  230.00"  "1"  1
DONE

**** CASE NUMBER ****  182
OPEN LINE
"PARKER   230.00"  "GENE     230.00"  "1"  1
DONE

**** CASE NUMBER ****  183
OPEN LINE
"PARKER   230.00"  "HARCUVAR 230.00"  "1"  1
DONE

**** CASE NUMBER ****  184
OPEN LINE
"PARKER   230.00"  "HAVASU   230.00"  "1"  1
DONE

**** CASE NUMBER ****  185
OPEN LINE
"PARKER   230.00"  "N.HAVASU 230.00"  "1"  1
DONE

**** CASE NUMBER ****  186
OPEN LINE
"PD-MORNC 230.00"  "FRISCO   230.00"  "1"  1
DONE

**** CASE NUMBER ****  187
OPEN LINE
"PEACOCK  230.00"  "HILLTOP  230.00"  "1"  1
DONE

**** CASE NUMBER ****  188
OPEN LINE
"PHXWAPA  230.00"  "LONE BUT 230.00"  "1"  1
DONE

**** CASE NUMBER ****  189
OPEN LINE
"PINPK    230.00"  "GAVILNWA 230.00"  "1"  1
DONE

**** CASE NUMBER ****  190
OPEN LINE
"PINPK    230.00"  "PINPKSRP 230.00"  "1"  1
DONE

**** CASE NUMBER ****  191
OPEN LINE
"PINPK    230.00"  "PINPKSRP 230.00"  "2"  1
DONE
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```
**** CASE NUMBER ****  192
OPEN LINE
"PINPKSRP 230.00"  "BRANDOW  230.00"  "1"  1
DONE

**** CASE NUMBER ****  193
OPEN LINE
"PINPKSRP 230.00"  "BRANDOW  230.00"  "2"  1
DONE

**** CASE NUMBER ****  194
OPEN LINE
"PNPKAPS  230.00"  "CACTUS   230.00"  "1"  1
DONE

**** CASE NUMBER ****  195
OPEN LINE
"PNPKAPS  230.00"  "LONEPEAK 230.00"  "1"  1
DONE

**** CASE NUMBER ****  196
OPEN LINE
"PNPKAPS  230.00"  "PINPK    230.00"  "1"  1
DONE

**** CASE NUMBER ****  197
OPEN LINE
"PNPKAPS  230.00"  "PINPK    230.00"  "2"  1
DONE

**** CASE NUMBER ****  198
OPEN LINE
"PNPKAPS  230.00"  "PINPKSRP 230.00"  "1"  1
DONE

**** CASE NUMBER ****  199
OPEN LINE
"PNPKAPS  230.00"  "PINPKSRP 230.00"  "2"  1
DONE

**** CASE NUMBER ****  200
OPEN LINE
"PNPKAPS  230.00"  "REACH    230.00"  "1"  1
DONE

**** CASE NUMBER ****  201
OPEN LINE
"RNDVLYTP 230.00"  "PRSCOTWA 230.00"  "1"  1
DONE

**** CASE NUMBER ****  202
OPEN LINE
"RNDVLYTP 230.00"  "ROUNDVLY 230.00"  "1"  1
DONE

**** CASE NUMBER ****  203
OPEN LINE
"RACEWAY  230.00"  "WESTWNGE 230.00"  "1"  1
DONE

**** CASE NUMBER ****  204
OPEN LINE
"REACH    230.00"  "LONEPEAK 230.00"  "1"  1
DONE

**** CASE NUMBER ****  205
OPEN LINE
"ROGERSWA 230.00"  "PINPK    230.00"  "1"  1
DONE

**** CASE NUMBER ****  206
OPEN LINE
"ROGERSWA 230.00"  "PINPK    230.00"  "2"  1
DONE

**** CASE NUMBER ****  207
OPEN LINE
"ROGERSWA 230.00"  "SPOOKHIL 230.00"  "1"  1
DONE
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```
**** CASE NUMBER ****  208
OPEN LINE
"ROGERSWA 230.00"  "ROGERS   230.00"  "1"  1
DONE

**** CASE NUMBER ****  209
OPEN LINE
"ROGERSWA 230.00"  "ROGERS   230.00"  "2"  1
DONE

**** CASE NUMBER ****  210
OPEN LINE
"ROGERS   230.00"  "THUNDRST 230.00"  "1"  1
DONE

**** CASE NUMBER ****  211
OPEN LINE
"RNDVLYTP 230.00"  "PEACOCK  230.00"  "1"  1
DONE

**** CASE NUMBER ****  212
OPEN LINE
"RUDD     230.00"  "PLMVLY   230.00"  "1"  1
DONE

**** CASE NUMBER ****  213
OPEN LINE
"RUDD     230.00"  "WHITETNK 230.00"  "1"  1
DONE

**** CASE NUMBER ****  214
OPEN LINE
"RUDD     230.00"  "WPHXAPSS 230.00"  "1"  1
DONE

**** CASE NUMBER ****  215
OPEN LINE
"SAGUARO  230.00"  "TATMOMLI 230.00"  "1"  1
DONE

**** CASE NUMBER ****  216
OPEN LINE
"SANTAN   230.00"  "CORBELL  230.00"  "1"  1
DONE

**** CASE NUMBER ****  217
OPEN LINE
"SANTAN   230.00"  "THUNDRST 230.00"  "1"  1
DONE

**** CASE NUMBER ****  218
OPEN LINE
"SCHRADER 230.00"  "SANTAN   230.00"  "1"  1
DONE

**** CASE NUMBER ****  219
OPEN LINE
"MILLIGAN 230.00"  "CASGRAPS 230.00"  "1"  1
DONE

**** CASE NUMBER ****  220
OPEN LINE
"SNTAROSA 230.00"  "DBG      230.00"  "1"  1
DONE

**** CASE NUMBER ****  221
OPEN LINE
"SNTAROSA 230.00"  "KNOX     230.00"  "1"  1
DONE

**** CASE NUMBER ****  222
OPEN LINE
"SNTAROSA 230.00"  "TATMOMLI 230.00"  "1"  1
DONE

**** CASE NUMBER ****  223
OPEN LINE
"SNTAROSA 230.00"  "TESTTRAK 230.00"  "1"  1
DONE
```

```
**** CASE NUMBER ****  224
OPEN LINE
"SPOOKHIL 230.00"  "COOLIDGE 230.00"  "1"  1
DONE

**** CASE NUMBER ****  225
OPEN LINE
"SUN ARIZ 230.00"  "PINAL_S  230.00"  "1"  1
DONE

**** CASE NUMBER ****  226
OPEN LINE
"SURPRISE 230.00"  "EL SOL   230.00"  "1"  1
DONE

**** CASE NUMBER ****  227
OPEN LINE
"SURPRISE 230.00"  "WESTWNGW 230.00"  "1"  1
DONE

**** CASE NUMBER ****  228
OPEN LINE
"TESTTRAK 230.00"  "CASAGRND 230.00"  "1"  1
DONE

**** CASE NUMBER ****  229
OPEN LINE
"TOPOCK   230.00"  "BLK MESA 230.00"  "1"  1
DONE

**** CASE NUMBER ****  230
OPEN LINE
"TOPOCK   230.00"  "N.HAVASU 230.00"  "1"  1
DONE

**** CASE NUMBER ****  231
OPEN LINE
"TOPOCK   230.00"  "SOPOINT  230.00"  "1"  1
DONE

**** CASE NUMBER ****  232
OPEN LINE
"TOPOCK   230.00"  "SOPOINT  230.00"  "2"  1
DONE

**** CASE NUMBER ****  233
OPEN LINE
"TS1      230.00"  "TS2      230.00"  "1"  1
DONE

**** CASE NUMBER ****  234
OPEN LINE
"TS2      230.00"  "PLMVLY   230.00"  "1"  1
DONE

**** CASE NUMBER ****  235
OPEN LINE
"TS4      230.00"  "JOJOBA   230.00"  "1"  1
DONE

**** CASE NUMBER ****  236
OPEN LINE
"TS4      230.00"  "PLMVLY   230.00"  "1"  1
DONE

**** CASE NUMBER ****  237
OPEN LINE
"SNVLY    230.00"  "HASSYAMP 230.00"  "1"  1
DONE

**** CASE NUMBER ****  238
OPEN LINE
"SNVLY    230.00"  "TS1      230.00"  "1"  1
DONE

**** CASE NUMBER ****  239
OPEN LINE
"TS6      230.00"  "PNPKAPS  230.00"  "1"  1
DONE
```

```
**** CASE NUMBER ****  240
OPEN LINE
"VERDE S  230.00"  "COCONINO 230.00"  "1"  1
DONE

**** CASE NUMBER ****  241
OPEN LINE
"VERDE S  230.00"  "VERDE N  230.00"  "1"  1
DONE

**** CASE NUMBER ****  242
OPEN LINE
"WESTWNGW 230.00"  "PINPK    230.00"  "1"  1
DONE

**** CASE NUMBER ****  243
OPEN LINE
"WHTNKAPS 230.00"  "RUDD     230.00"  "1"  1
DONE

**** CASE NUMBER ****  244
OPEN LINE
"WILOWLKE 230.00"  "WILOWLKW 230.00"  "1"  1
DONE

**** CASE NUMBER ****  245
OPEN LINE
"WILOWLKE 230.00"  "YAVAPAI  230.00"  "1"  1
DONE

**** CASE NUMBER ****  246
OPEN LINE
"WILOWLKW 230.00"  "PRESCOTT 230.00"  "1"  1
DONE

**** CASE NUMBER ****  247
OPEN LINE
"WPHXAPSN 230.00"  "WHTNKAPS 230.00"  "1"  1
DONE

**** CASE NUMBER ****  248
OPEN LINE
"YAVAPAI  230.00"  "VERDE N  230.00"  "1"  1
DONE

**** CASE NUMBER ****  249
OPEN LINE
"GILA     230.00"  "NGL-W    230.00"  "1"  1
DONE

**** CASE NUMBER ****  250
OPEN LINE
"GILA     230.00"  "NGL-E    230.00"  "1"  1
DONE

**** CASE NUMBER ****  251
OPEN LINE
"SLRC     230.00"  "GILA     230.00"  "1"  1
DONE

**** CASE NUMBER ****  252
OPEN LINE
"SLRC     230.00"  "GILA     230.00"  "2"  1
DONE

**** CASE NUMBER ****  253
OPEN LINE
"APACHE   230.00"  "BUTERFLD 230.00"  "1"  1
DONE

**** CASE NUMBER ****  254
OPEN LINE
"APACHE   230.00"  "RED TAIL 230.00"  "1"  1
DONE

**** CASE NUMBER ****  255
OPEN LINE
"APACHE   230.00"  "WINCHSTR 230.00"  "1"  1
DONE
```

```
**** CASE NUMBER ****  256
OPEN LINE
"BICKNELL 345.00"  "VAIL     345.00"  "1"  1
DONE

**** CASE NUMBER ****  257
OPEN LINE
"BUTERFLD 230.00"  "SAN RAF  230.00"  "1"  1
DONE

**** CASE NUMBER ****  258
OPEN LINE
"GREEN-SW 345.00"  "GREENLEE 345.00"  "1"  1
DONE

**** CASE NUMBER ****  259
OPEN LINE
"MORENCI  230.00"  "PD-MORNC 230.00"  "1"  1
DONE

**** CASE NUMBER ****  260
OPEN LINE
"MORENCI  230.00"  "GREEN-SW 230.00"  "1"  1
DONE

**** CASE NUMBER ****  261
OPEN LINE
"RED TAIL 230.00"  "DOSCONDO 230.00"  "1"  1
DONE

**** CASE NUMBER ****  262
OPEN LINE
"BUTERFLD 230.00"  "SLOAN    230.00"  "1"  1
DONE

**** CASE NUMBER ****  263
OPEN LINE
"DOSCONDO 230.00"  "HACKBERY 230.00"  "1"  1
DONE

**** CASE NUMBER ****  264
OPEN LINE
"PANTANO  230.00"  "SAHUARIT 230.00"  "1"  1
DONE

**** CASE NUMBER ****  265
OPEN LINE
"HACKBERY 230.00"  "MORENCI  230.00"  "1"  1
DONE

**** CASE NUMBER ****  266
OPEN LINE
"SAHUARIT 230.00"  "BICKNELL 230.00"  "1"  1
DONE

**** CASE NUMBER ****  267
OPEN LINE
"SLOAN    230.00"  "PANTANO  230.00"  "1"  1
DONE

**** CASE NUMBER ****  268
OPEN LINE
"DAVIS    230.00"  "RIVIERA  230.00"  "1"  1
DONE

**** CASE NUMBER ****  269
OPEN LINE
"DAVIS    230.00"  "ZORB     230.00"  "1"  1
DONE

**** CASE NUMBER ****  270
OPEN LINE
"ZORB     230.00"  "TOPOCK   230.00"  "1"  1
DONE

**** CASE NUMBER ****  271
OPEN LINE
"HASSYAMP 500.00"  "HARQUAHA 500.00"  "1"  1
DONE
```

```
**** CASE NUMBER ****  272
OPEN LINE
"SEV      230.00"  "DINOSAUR 230.00"  "1"  1
DONE

**** CASE NUMBER ****  273
OPEN LINE
"SAGUARO  230.00"  "MILLIGAN 230.00"  "1"  1
DONE

STOP
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TRANSFORMER OUTAGES

```
**** CASE NUMBER ****  0
DONE

**** CASE NUMBER ****  1
OPEN XFMR
"SES      500.00"  "SEV      230.00"  "1"  0
DONE

**** CASE NUMBER ****  2
OPEN XFMR
"BROWNING 500.00"  "BROWNING 230.00"  "1"  0
DONE

**** CASE NUMBER ****  3
OPEN XFMR
"BROWNING 500.00"  "BROWNING 230.00"  "2"  0
DONE

**** CASE NUMBER ****  4
OPEN XFMR
"CHOLLA   500.00"  "CHOLLA   345.00"  "1"  0
DONE

**** CASE NUMBER ****  5
OPEN XFMR
"CHOLLA   500.00"  "CHOLLA   345.00"  "2"  0
DONE

**** CASE NUMBER ****  6
OPEN XFMR
"CORONADO 500.00"  "$CORONAD  69.00"  "1"  0
DONE

**** CASE NUMBER ****  7
OPEN XFMR
"CORONADO 500.00"  "CORONADO 345.00"  "1"  0
DONE

**** CASE NUMBER ****  8
OPEN XFMR
"CORONADO 500.00"  "CORONADO 345.00"  "2"  0
DONE

**** CASE NUMBER ****  9
OPEN XFMR
"FOURCORN 500.00"  "FOURCORN 345.00"  "1"  0
DONE

**** CASE NUMBER ****  10
OPEN XFMR
"GILARIVR 500.00"  "GILARIVR 230.00"  "1"  0
DONE

**** CASE NUMBER ****  11
OPEN XFMR
"KYRENE   500.00"  "KYRENE   230.00"  "6"  0
DONE

**** CASE NUMBER ****  12
OPEN XFMR
"KYRENE   500.00"  "KYRENE   230.00"  "7"  0
DONE
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```
**** CASE NUMBER ****  13
OPEN XFMR
"MEAD     500.00"  "MEAD N   230.00"  "1"  0
DONE

**** CASE NUMBER ****  14
OPEN XFMR
"MEAD     500.00"  "MEAD N   230.00"  "2"  0
DONE

**** CASE NUMBER ****  15
OPEN XFMR
"MESQUITE 500.00"  "MESQUITE 230.00"  "1"  0
DONE

**** CASE NUMBER ****  16
OPEN XFMR
"N.GILA   500.00"  "N.GILA    69.00"  "1"  0
DONE

**** CASE NUMBER ****  17
OPEN XFMR
"N.GILA   500.00"  "N.GILA    69.00"  "2"  0
DONE

**** CASE NUMBER ****  18
OPEN XFMR
"NGL-E    230.00"  "N.GILA   500.00"  "1"  0
DONE

**** CASE NUMBER ****  19
OPEN XFMR
"NGL-W    230.00"  "N.GILA   500.00"  "1"  0
DONE

**** CASE NUMBER ****  20
OPEN XFMR
"PINAL_SO 500.00"  "PINAL_S  230.00"  "1"  0
DONE

**** CASE NUMBER ****  21
OPEN XFMR
"PINAL_W  500.00"  "PINALWES 345.00"  "1"  0
DONE

**** CASE NUMBER ****  22
OPEN XFMR
"PNPKAPS  500.00"  "PNPKAPS  230.00"  "1"  0
DONE

**** CASE NUMBER ****  23
OPEN XFMR
"PNPKAPS  500.00"  "PNPKAPS  230.00"  "2"  0
DONE

**** CASE NUMBER ****  24
OPEN XFMR
"PNPKAPS  500.00"  "PNPKAPS  230.00"  "3"  0
DONE

**** CASE NUMBER ****  25
OPEN XFMR
"RACEWAY  500.00"  "RACEWAY  230.00"  "1"  0
DONE

**** CASE NUMBER ****  26
OPEN XFMR
"RACEWAY  500.00"  "RACEWAY  230.00"  "2"  0
DONE

**** CASE NUMBER ****  27
OPEN XFMR
"RUDD     500.00"  "RUDD     230.00"  "1"  0
DONE

**** CASE NUMBER ****  28
OPEN XFMR
"RUDD     500.00"  "RUDD     230.00"  "2"  0
DONE
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```
**** CASE NUMBER ****  29
OPEN XFMR
"RUDD      500.00"  "RUDD      230.00"  "3"  0
DONE

**** CASE NUMBER ****  30
OPEN XFMR
"RUDD      500.00"  "RUDD      230.00"  "4"  0
DONE

**** CASE NUMBER ****  31
OPEN XFMR
"SAGUARO   500.00"  "SAG.EAST 115.00"  "1"  0
DONE

**** CASE NUMBER ****  32
OPEN XFMR
"SAGUARO   500.00"  "SAG.WEST 115.00"  "1"  0
DONE

**** CASE NUMBER ****  33
OPEN XFMR
"SECNOL    500.00"  "SECNOL     69.00"  "1"  0
DONE

**** CASE NUMBER ****  34
OPEN XFMR
"SILVERKG 500.00"  "SILVERKG 230.00"  "1"  0
DONE

**** CASE NUMBER ****  35
OPEN XFMR
"SNVLY     500.00"  "SNVLY     230.00"  "1"  0
DONE

**** CASE NUMBER ****  36
OPEN XFMR
"VV1       500.00"  "VV1        69.00"  "1"  0
DONE
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```
**** CASE NUMBER ****  37
OPEN XFMR
"WESTWING 500.00"  "WESTWING 345.00"  "1"  0
DONE

**** CASE NUMBER ****  38
OPEN XFMR
"WESTWING 500.00"  "WESTWNGE 230.00"  "1"  0
DONE

**** CASE NUMBER ****  39
OPEN XFMR
"WESTWING 500.00"  "WESTWNGW 230.00"  "2"  0
DONE

**** CASE NUMBER ****  40
OPEN XFMR
"WESTWING 500.00"  "WESTWNGW 230.00"  "3"  0
DONE

**** CASE NUMBER ****  41
OPEN XFMR
"YAVAPAI   500.00"  "YAVAPAI   230.00"  "1"  0
DONE

**** CASE NUMBER ****  42
OPEN XFMR
"YAVAPAI   500.00"  "YAVAPAI   230.00"  "2"  0
DONE

**** CASE NUMBER ****  43
OPEN XFMR
"CHOLLA    345.00"  "CHOLLA    230.00"  "1"  0
DONE

**** CASE NUMBER ****  44
OPEN XFMR
"CHOLLA    345.00"  "CHOLLA2    69.00"  "1"  0
DONE
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```
**** CASE NUMBER ****  45
OPEN XFMR
"COPPERVR 345.00"  "COPPERVR 230.00"  "1"  0
DONE

**** CASE NUMBER ****  46
OPEN XFMR
"FLAGSTAF 345.00"  "FLAGSTAF  69.00"  "2"  0
DONE

**** CASE NUMBER ****  47
OPEN XFMR
"FOURCORN 345.00"  "FOURCORN 230.00"  "1"  0
DONE

**** CASE NUMBER ****  48
OPEN XFMR
"FOURCORN 345.00"  "FOURCORN 230.00"  "2"  0
DONE

**** CASE NUMBER ****  49
OPEN XFMR
"GATEWAY  345.00"  "GATEWAY  115.00"  "1"  0
DONE

**** CASE NUMBER ****  50
OPEN XFMR
"GLENCANY 345.00"  "GLENCANY 230.00"  "1"  0
DONE

**** CASE NUMBER ****  51
OPEN XFMR
"GLENCANY 345.00"  "GLENCANY 230.00"  "2"  0
DONE

**** CASE NUMBER ****  52
OPEN XFMR
"LIBERTY  345.00"  "LIBTYPHS 230.00"  "1"  0
DONE
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```
**** CASE NUMBER ****  53
OPEN XFMR
"MAZATZAL 345.00"  "MAZATZAL  69.00"  "2"  0
DONE

**** CASE NUMBER ****  54
OPEN XFMR
"MEAD     345.00"  "MEAD N   230.00"  "1"  0
DONE

**** CASE NUMBER ****  55
OPEN XFMR
"PEACOCK  345.00"  "PEACOCK  230.00"  "1"  0
DONE

**** CASE NUMBER ****  56
OPEN XFMR
"PINPKBRB 345.00"  "PINPK    230.00"  "1"  0
DONE

**** CASE NUMBER ****  57
OPEN XFMR
"PINPKBRB 345.00"  "PINPK    230.00"  "2"  0
DONE

**** CASE NUMBER ****  58
OPEN XFMR
"PINPKBRB 345.00"  "PINPK    230.00"  "3"  0
DONE

**** CASE NUMBER ****  59
OPEN XFMR
"PNPKAPS  345.00"  "PNPKAPS  230.00"  "1"  0
DONE

**** CASE NUMBER ****  60
OPEN XFMR
"PNPKAPS  345.00"  "PNPKAPS  230.00"  "2"  0
DONE
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```
**** CASE NUMBER ****  61
OPEN XFMR
"PNPKAPS  345.00"  "PNPKAPS  230.00"  "3"  0
DONE

**** CASE NUMBER ****  62
OPEN XFMR
"PRECHCYN 345.00"  "PRECHCYN  69.00"  "1"  0
DONE

**** CASE NUMBER ****  63
OPEN XFMR
"PRECHCYN 345.00"  "PRECHCYN  69.00"  "2"  0
DONE

**** CASE NUMBER ****  64
OPEN XFMR
"SHIPROCK 345.00"  "SHIPROCK 230.00"  "1"  0
DONE

**** CASE NUMBER ****  65
OPEN XFMR
"SOUTH    345.00"  "SOUTH    138.00"  "1"  0
DONE

**** CASE NUMBER ****  66
OPEN XFMR
"SOUTH    345.00"  "SOUTH    138.00"  "2"  0
DONE

**** CASE NUMBER ****  67
OPEN XFMR
"VAIL     345.00"  "VAIL     138.00"  "1"  0
DONE

**** CASE NUMBER ****  68
OPEN XFMR
"VAIL2    345.00"  "VAIL     138.00"  "1"  0
DONE
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```
**** CASE NUMBER ****  69
OPEN XFMR
"AGUAFRIA 230.00"  "AFRAAPSN  69.00"  "1"  0
DONE

**** CASE NUMBER ****  70
OPEN XFMR
"ALEXANDR 230.00"  "ALEXNDR   69.00"  "1"  0
DONE

**** CASE NUMBER ****  71
OPEN XFMR
"AVERY    230.00"  "AVERY  E  69.00"  "1"  0
DONE

**** CASE NUMBER ****  72
OPEN XFMR
"BUCKEYE  230.00"  "BUCKEYE   69.00"  "1"  0
DONE

**** CASE NUMBER ****  73
OPEN XFMR
"BUCKEYE  230.00"  "BUCKEYE   69.00"  "2"  0
DONE

**** CASE NUMBER ****  74
OPEN XFMR
"CACTUS   230.00"  "CACTUS C  69.00"  "1"  0
DONE

**** CASE NUMBER ****  75
OPEN XFMR
"CACTUS   230.00"  "CACTUS E  69.00"  "1"  0
DONE

**** CASE NUMBER ****  76
OPEN XFMR
"CACTUS   230.00"  "CACTUS W  69.00"  "1"  0
DONE
```

```
**** CASE NUMBER ****  77
OPEN XFMR
"CASAGRND 230.00"  "CASAGRND 115.00"  "1"  0
DONE

**** CASE NUMBER ****  78
OPEN XFMR
"CASGRAPS 230.00"  "CASGRAPS  69.00"  "1"  0
DONE

**** CASE NUMBER ****  79
OPEN XFMR
"CHOLLA   230.00"  "CHOLLA1   69.00"  "1"  0
DONE

**** CASE NUMBER ****  80
OPEN XFMR
"CHOLLA   230.00"  "CHOLLA2   69.00"  "1"  0
DONE

**** CASE NUMBER ****  81
OPEN XFMR
"COCONINO 230.00"  "COCONINO  69.00"  "1"  0
DONE

**** CASE NUMBER ****  82
OPEN XFMR
"COCONINO 230.00"  "COCONINO  69.00"  "2"  0
DONE

**** CASE NUMBER ****  83
OPEN XFMR
"COOLIDGE 230.00"  "COOLIDGE 115.00"  "1"  0
DONE

**** CASE NUMBER ****  84
OPEN XFMR
"COOLIDGE 230.00"  "COOLIDGE 115.00"  "2"  0
DONE

**** CASE NUMBER ****  85
OPEN XFMR
"CTRYCLUB 230.00"  "CTRYCLBN  69.00"  "1"  0
DONE

**** CASE NUMBER ****  86
OPEN XFMR
"CTRYCLUB 230.00"  "CTRYCLBS  69.00"  "1"  0
DONE

**** CASE NUMBER ****  87
OPEN XFMR
"DEERVALY 230.00"  "DEERVALC  69.00"  "2"  0
DONE

**** CASE NUMBER ****  88
OPEN XFMR
"DEERVALY 230.00"  "DEERVALE  69.00"  "1"  0
DONE

**** CASE NUMBER ****  89
OPEN XFMR
"DEERVALY 230.00"  "DEERVALW  69.00"  "1"  0
DONE

**** CASE NUMBER ****  90
OPEN XFMR
"EAGLEYE  230.00"  "EAGLEY E  69.00"  "1"  0
DONE

**** CASE NUMBER ****  91
OPEN XFMR
"EAGLEYE  230.00"  "EAGLEY W  69.00"  "1"  0
DONE

**** CASE NUMBER ****  92
OPEN XFMR
"EL SOL   230.00"  "EL SOLMN  69.00"  "1"  0
DONE
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```
**** CASE NUMBER ****  93
OPEN XFMR
"EL SOL   230.00"  "EL SOLMS  69.00"  "1"  0
DONE

**** CASE NUMBER ****  94
OPEN XFMR
"FOURCORN 230.00"  "FCORNERS  69.00"  "1"  0
DONE

**** CASE NUMBER ****  95
OPEN XFMR
"GAVILNPK 230.00"  "GAVILNPK  69.00"  "1"  0
DONE

**** CASE NUMBER ****  96
OPEN XFMR
"GILABEND 230.00"  "GILABEND  69.00"  "1"  0
DONE

**** CASE NUMBER ****  97
OPEN XFMR
"GILABEND 230.00"  "GILABEND  69.00"  "2"  0
DONE

**** CASE NUMBER ****  98
OPEN XFMR
"GLEN PS  230.00"  "GLENCANY 230.00"  "1"  0
DONE

**** CASE NUMBER ****  99
OPEN XFMR
"GOLDFELD 230.00"  "GOLDFELD 115.00"  "1"  0
DONE

**** CASE NUMBER ****  100
OPEN XFMR
"GOLDFELD 230.00"  "GOLDFELD 115.00"  "2"  0
DONE
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```
**** CASE NUMBER ****  101
OPEN XFMR
"HARCUVAR 230.00"  "HARCUVAR 115.00"  "1"  0
DONE

**** CASE NUMBER ****  102
OPEN XFMR
"JOJOBA   230.00"  "JOJOBA    69.00"  "1"  0
DONE

**** CASE NUMBER ****  103
OPEN XFMR
"LINCSTRT 230.00"  "LINCOLNE  69.00"  "1"  0
DONE

**** CASE NUMBER ****  104
OPEN XFMR
"LONE BUT 230.00"  "LONEBUTT  69.00"  "1"  0
DONE

**** CASE NUMBER ****  105
OPEN XFMR
"LONEPEAK 230.00"  "LONEPK E  69.00"  "1"  0
DONE

**** CASE NUMBER ****  106
OPEN XFMR
"LONEPEAK 230.00"  "LONEPK W  69.00"  "1"  0
DONE

**** CASE NUMBER ****  107
OPEN XFMR
"MEAD S   230.00"  "MEAD A    69.00"  "1"  0
DONE

**** CASE NUMBER ****  108
OPEN XFMR
"MEAD S   230.00"  "MEAD B    69.00"  "1"  0
DONE
```

```
**** CASE NUMBER ****  109
OPEN XFMR
"MEADOWBK 230.00"  "MEADOWBN  69.00"  "1"  0
DONE

**** CASE NUMBER ****  110
OPEN XFMR
"OCOTILLO 230.00"  "OCOTIL N  69.00"  "1"  0
DONE

**** CASE NUMBER ****  111
OPEN XFMR
"OCOTILLO 230.00"  "OCOTIL S  69.00"  "1"  0
DONE

**** CASE NUMBER ****  112
OPEN XFMR
"PLMVLY   230.00"  "PLMVLY    69.00"  "1"  0
DONE

**** CASE NUMBER ****  113
OPEN XFMR
"PNPKAPS  230.00"  "PINNPK E  69.00"  "1"  0
DONE

**** CASE NUMBER ****  114
OPEN XFMR
"PNPKAPS  230.00"  "PINNPK W  69.00"  "1"  0
DONE

**** CASE NUMBER ****  115
OPEN XFMR
"PNPKAPS  230.00"  "PINPKEST  69.00"  "1"  0
DONE

**** CASE NUMBER ****  116
OPEN XFMR
"PNPKAPS  230.00"  "PINPKEST  69.00"  "2"  0
DONE
```

```
**** CASE NUMBER ****  117
OPEN XFMR
"PRESCOTT 230.00"  "PRESCOTT 115.00"  "1"  0
DONE

**** CASE NUMBER ****  118
OPEN XFMR
"PRESCOTT 230.00"  "PRESCOTT 115.00"  "2"  0
DONE

**** CASE NUMBER ****  119
OPEN XFMR
"RACEWAY  230.00"  "RACEWAY   69.00"  "1"  0
DONE

**** CASE NUMBER ****  120
OPEN XFMR
"REACH    230.00"  "REACH     69.00"  "1"  0
DONE

**** CASE NUMBER ****  121
OPEN XFMR
"REACH    230.00"  "REACH     69.00"  "2"  0
DONE

**** CASE NUMBER ****  122
OPEN XFMR
"ROUNDVLY 230.00"  "ROUNDVLY  69.00"  "1"  0
DONE

**** CASE NUMBER ****  123
OPEN XFMR
"SAGUARO  230.00"  "SAG.EAST 115.00"  "1"  0
DONE

**** CASE NUMBER ****  124
OPEN XFMR
"SAGUARO  230.00"  "SAG.WEST 115.00"  "1"  0
DONE
```

```
**** CASE NUMBER ****  125
OPEN XFMR
"MILLIGAN 230.00"  "MILLIGAN  69.00"  "1"  0
DONE

**** CASE NUMBER ****  126
OPEN XFMR
"SHIP PS  230.00"  "SHIPROCK 230.00"  "1"  0
DONE

**** CASE NUMBER ****  127
OPEN XFMR
"SHIPROCK 230.00"  "SHIPROCK 115.00"  "1"  0
DONE

**** CASE NUMBER ****  128
OPEN XFMR
"SILVERKG 230.00"  "SILVERK1 115.00"  "1"  0
DONE

**** CASE NUMBER ****  129
OPEN XFMR
"SILVERKG 230.00"  "SILVERK2 115.00"  "1"  0
DONE

**** CASE NUMBER ****  130
OPEN XFMR
"SNTAROSA 230.00"  "SNTAROSA  69.00"  "1"  0
DONE

**** CASE NUMBER ****  131
OPEN XFMR
"SNTAROSA 230.00"  "SNTAROSA 115.00"  "1"  0
DONE

**** CASE NUMBER ****  132
OPEN XFMR
"SPOOKHIL 230.00"  "SPOOKHIL  69.00"  "1"  0
DONE

**** CASE NUMBER ****  133
OPEN XFMR
"SPOOKHIL 230.00"  "SPOOKHIL  69.00"  "2"  0
DONE

**** CASE NUMBER ****  134
OPEN XFMR
"SUNYSLOP 230.00"  "SUNYSLPE  69.00"  "1"  0
DONE

**** CASE NUMBER ****  135
OPEN XFMR
"SUNYSLOP 230.00"  "SUNYSLPW  69.00"  "1"  0
DONE

**** CASE NUMBER ****  136
OPEN XFMR
"SURPRISE 230.00"  "SURPRISC  69.00"  "1"  0
DONE

**** CASE NUMBER ****  137
OPEN XFMR
"SURPRISE 230.00"  "SURPRISN  69.00"  "1"  0
DONE

**** CASE NUMBER ****  138
OPEN XFMR
"SURPRISE 230.00"  "SURPRISS  69.00"  "1"  0
DONE

**** CASE NUMBER ****  139
OPEN XFMR
"TESTTRAK 230.00"  "TESTTRAK  69.00"  "1"  0
DONE

**** CASE NUMBER ****  140
OPEN XFMR
"TS1      230.00"  "TS1       69.00"  "1"  0
DONE
```

```
**** CASE NUMBER ****  141
OPEN XFMR
"TS6       230.00"  "TS6       69.00"  "1"  0
DONE

**** CASE NUMBER ****  142
OPEN XFMR
"VERDE N   230.00"  "VERDE     69.00"  "1"  0
DONE

**** CASE NUMBER ****  143
OPEN XFMR
"VERDE S   230.00"  "VERDE     69.00"  "1"  0
DONE

**** CASE NUMBER ****  144
OPEN XFMR
"WESTWNGE 230.00"  "WESTWING  69.00"  "1"  0
DONE

**** CASE NUMBER ****  145
OPEN XFMR
"WESTWNGE 230.00"  "WESTWING  69.00"  "2"  0
DONE

**** CASE NUMBER ****  146
OPEN XFMR
"WHTNKAPS 230.00"  "WHTNKAPN  69.00"  "1"  0
DONE

**** CASE NUMBER ****  147
OPEN XFMR
"WHTNKAPS 230.00"  "WHTNKAPS  69.00"  "1"  0
DONE

**** CASE NUMBER ****  148
OPEN XFMR
"WILOWLKE 230.00"  "WILOWLKE  69.00"  "1"  0
DONE
```

```
**** CASE NUMBER ****  149
OPEN XFMR
"WILOWLKW 230.00"  "WILOWLKW  69.00"  "1"  0
DONE

**** CASE NUMBER ****  150
OPEN XFMR
"WPHXAPSS 230.00"  "WPHXAPSC  69.00"  "1"  0
DONE

**** CASE NUMBER ****  151
OPEN XFMR
"WPHXAPSS 230.00"  "WPHXAPSN  69.00"  "1"  0
DONE

**** CASE NUMBER ****  152
OPEN XFMR
"WPHXAPSS 230.00"  "WPHXAPSS  69.00"  "1"  0
DONE

**** CASE NUMBER ****  153
OPEN XFMR
"YAVAPAI  230.00"  "YAVAPAI   69.00"  "1"  0
DONE

**** CASE NUMBER ****  154
OPEN XFMR
"BLACK PK 161.00"  "BLACK PK  69.00"  "1"  0
DONE

**** CASE NUMBER ****  155
OPEN XFMR
"GILA     161.00"  "GILA$     69.00"  "1"  0
DONE

**** CASE NUMBER ****  156
OPEN XFMR
"GILA     161.00"  "GILA$     69.00"  "2"  0
DONE
```

```
**** CASE NUMBER ****  157
OPEN XFMR
"KOFA     161.00"  "KOFA      69.00"  "1"  0
DONE

**** CASE NUMBER ****  158
OPEN XFMR
"PARKER   161.00"  "PARKER   230.00"  "1"  0
DONE

**** CASE NUMBER ****  159
OPEN XFMR
"PARKER   161.00"  "PARKER   230.00"  "2"  0
DONE

**** CASE NUMBER ****  160
OPEN XFMR
"PARKER   161.00"  "PARKERAZ  69.00"  "1"  0
DONE

**** CASE NUMBER ****  161
OPEN XFMR
"IRVMID3  138.00"  "IRVNGTN  138.00"  "1"  0
DONE

**** CASE NUMBER ****  162
OPEN XFMR
"IRVMID4  138.00"  "IRVNGTN  138.00"  "1"  0
DONE

**** CASE NUMBER ****  163
OPEN XFMR
"TORTOLIT 138.00"  "TORTOLIT 500.00"  "1"  0
DONE

**** CASE NUMBER ****  164
OPEN XFMR
"TORTOLIT 138.00"  "TORTOLIT 500.00"  "2"  0
DONE
```

```
**** CASE NUMBER ****  165
OPEN XFMR
"COL-SCIP 115.00"  "COL-SCIP  69.00"  "1"  0
DONE

**** CASE NUMBER ****  166
OPEN XFMR
"COL-SCIP 115.00"  "COL-SCIP  69.00"  "2"  0
DONE

**** CASE NUMBER ****  167
OPEN XFMR
"ORACLE   115.00"  "ORACLE    69.00"  "1"  0
DONE

**** CASE NUMBER ****  168
OPEN XFMR
"ORACLE   115.00"  "ORACLE    69.00"  "2"  0
DONE

**** CASE NUMBER ****  169
OPEN XFMR
"PINAL    115.00"  "PINAL     69.00"  "1"  0
DONE

**** CASE NUMBER ****  170
OPEN XFMR
"SNMANUEL 115.00"  "SNMANUEL 100.00"  "1"  0
DONE

**** CASE NUMBER ****  171
OPEN XFMR
"VLYFARMS 115.00"  "VLYFARMS  69.00"  "1"  0
DONE

**** CASE NUMBER ****  172
OPEN XFMR
"AF-NORTH  69.00"  "AGUAFRIA 230.00"  "3"  0
DONE
```

```
**** CASE NUMBER ****  173
OPEN XFMR
"AF-NORTH  69.00"  "AGUAFRIA 230.00"  "4"  0
DONE

**** CASE NUMBER ****  174
OPEN XFMR
"ALEXANDR  69.00"  "ALEXANDR 230.00"  "1"  0
DONE

**** CASE NUMBER ****  175
OPEN XFMR
"ALEXANDR  69.00"  "ALEXANDR 230.00"  "2"  0
DONE

**** CASE NUMBER ****  176
OPEN XFMR
"ANDERSRS  69.00"  "ANDERSON 230.00"  "1"  0
DONE

**** CASE NUMBER ****  177
OPEN XFMR
"ANDERSRS  69.00"  "ANDERSON 230.00"  "2"  0
DONE

**** CASE NUMBER ****  178
OPEN XFMR
"ANDERSRS  69.00"  "ANDERSON 230.00"  "3"  0
DONE

**** CASE NUMBER ****  179
OPEN XFMR
"ANDERSRS  69.00"  "ANDERSON 230.00"  "4"  0
DONE

**** CASE NUMBER ****  180
OPEN XFMR
"BGDADTWN  69.00"  "BAGDAD   115.00"  "1"  0
DONE

**** CASE NUMBER ****  181
OPEN XFMR
"BLKMESA1  69.00"  "BLK MESA 230.00"  "1"  0
DONE

**** CASE NUMBER ****  182
OPEN XFMR
"BLKMESA2  69.00"  "BLK MESA 230.00"  "1"  0
DONE

**** CASE NUMBER ****  183
OPEN XFMR
"BLKMSA34  69.00"  "BLK MESA 230.00"  "1"  0
DONE

**** CASE NUMBER ****  184
OPEN XFMR
"BLKMSA34  69.00"  "BLK MESA 230.00"  "2"  0
DONE

**** CASE NUMBER ****  185
OPEN XFMR
"BRANDOW   69.00"  "BRANDOW  230.00"  "1"  0
DONE

**** CASE NUMBER ****  186
OPEN XFMR
"BRANDOW   69.00"  "BRANDOW  230.00"  "2"  0
DONE

**** CASE NUMBER ****  187
OPEN XFMR
"BRANDOW   69.00"  "BRANDOW  230.00"  "3"  0
DONE

**** CASE NUMBER ****  188
OPEN XFMR
"BROWNING  69.00"  "BROWNING 230.00"  "4"  0
DONE
```

```
**** CASE NUMBER ****  189
OPEN XFMR
"CORBELRS  69.00"  "CORBELL  230.00"  "2"  0
DONE

**** CASE NUMBER ****  190
OPEN XFMR
"CORBELRS  69.00"  "CORBELL  230.00"  "3"  0
DONE

**** CASE NUMBER ****  191
OPEN XFMR
"CORBELRS  69.00"  "CORBELL  230.00"  "4"  0
DONE

**** CASE NUMBER ****  192
OPEN XFMR
"DINOSAUR  69.00"  "DINOSAUR 230.00"  "1"  0
DONE

**** CASE NUMBER ****  193
OPEN XFMR
"GRIFFITH  69.00"  "GRIFFITH 230.00"  "1"  0
DONE

**** CASE NUMBER ****  194
OPEN XFMR
"HEADGATE  69.00"  "HEADGATE 161.00"  "1"  0
DONE

**** CASE NUMBER ****  195
OPEN XFMR
"HILLTOP1  69.00"  "HILLTOP  230.00"  "1"  0
DONE

**** CASE NUMBER ****  196
OPEN XFMR
"HILLTOP2  69.00"  "HILLTOP  230.00"  "1"  0
DONE
```

```
**** CASE NUMBER ****  197
OPEN XFMR
"KYRENEGT  69.00"  "KYRENE   230.00"  "2"  0
DONE

**** CASE NUMBER ****  198
OPEN XFMR
"KYRENEGT  69.00"  "KYRENE   230.00"  "3"  0
DONE

**** CASE NUMBER ****  199
OPEN XFMR
"KYRENEGT  69.00"  "KYRENE   230.00"  "4"  0
DONE

**** CASE NUMBER ****  200
OPEN XFMR
"MURAL     69.00"  "MURAL    115.00"  "1"  0
DONE

**** CASE NUMBER ****  201
OPEN XFMR
"N.HAVASU  69.00"  "N.HAVASU 230.00"  "1"  0
DONE

**** CASE NUMBER ****  202
OPEN XFMR
"ORME  RS  69.00"  "ORME     230.00"  "1"  0
DONE

**** CASE NUMBER ****  203
OPEN XFMR
"ORME  RS  69.00"  "ORME     230.00"  "2"  0
DONE

**** CASE NUMBER ****  204
OPEN XFMR
"ORME  RS  69.00"  "ORME     230.00"  "3"  0
DONE
```

```
**** CASE NUMBER ****  205
OPEN XFMR
"ORME  RS  69.00"  "ORME     230.00"  "4"  0
DONE

**** CASE NUMBER ****  206
OPEN XFMR
"PAPAGOBT  69.00"  "PAPAGOBT 230.00"  "1"  0
DONE

**** CASE NUMBER ****  207
OPEN XFMR
"PAPAGOBT  69.00"  "PAPAGOBT 230.00"  "2"  0
DONE

**** CASE NUMBER ****  208
OPEN XFMR
"PAPAGOBT  69.00"  "PAPAGOBT 230.00"  "3"  0
DONE

**** CASE NUMBER ****  209
OPEN XFMR
"PAPAGOBT  69.00"  "PAPAGOBT 230.00"  "4"  0
DONE

**** CASE NUMBER ****  210
OPEN XFMR
"ROGERS    69.00"  "ROGERS   230.00"  "2"  0
DONE

**** CASE NUMBER ****  211
OPEN XFMR
"ROGERS    69.00"  "ROGERS   230.00"  "4"  0
DONE

**** CASE NUMBER ****  212
OPEN XFMR
"SANTAN    69.00"  "SANTAN   230.00"  "3"  0
DONE
```

```
**** CASE NUMBER ****  213
OPEN XFMR
"SANTAN    69.00"  "SANTAN   230.00"  "4"  0
DONE

**** CASE NUMBER ****  214
OPEN XFMR
"SANTAN    69.00"  "SANTAN   230.00"  "5"  0
DONE

**** CASE NUMBER ****  215
OPEN XFMR
"SCHRADER  69.00"  "SCHRADER 230.00"  "1"  0
DONE

**** CASE NUMBER ****  216
OPEN XFMR
"SCHRADER  69.00"  "SCHRADER 230.00"  "3"  0
DONE

**** CASE NUMBER ****  217
OPEN XFMR
"SCHRADER  69.00"  "SCHRADER 230.00"  "4"  0
DONE

**** CASE NUMBER ****  218
OPEN XFMR
"THUNDRST  69.00"  "THUNDRST 230.00"  "1"  0
DONE

**** CASE NUMBER ****  219
OPEN XFMR
"THUNDRST  69.00"  "THUNDRST 230.00"  "2"  0
DONE

**** CASE NUMBER ****  220
OPEN XFMR
"THUNDRST  69.00"  "THUNDRST 230.00"  "3"  0
DONE
```

```
**** CASE NUMBER ****  221
OPEN XFMR
"THUNDRST  69.00"  "THUNDRST 230.00"  "4"  0
DONE

**** CASE NUMBER ****  222
OPEN XFMR
"WARD  RS  69.00"  "WARD     230.00"  "1"  0
DONE

**** CASE NUMBER ****  223
OPEN XFMR
"WARD  RS  69.00"  "WARD     230.00"  "2"  0
DONE

**** CASE NUMBER ****  224
OPEN XFMR
"WHITETNK  69.00"  "WHITETNK 230.00"  "1"  0
DONE

**** CASE NUMBER ****  225
OPEN XFMR
"YUCCA  W  69.00"  "YUCCA    161.00"  "1"  0
DONE

**** CASE NUMBER ****  226
OPEN XFMR
"YUCCA  W  69.00"  "YUCCA    161.00"  "2"  0
DONE

**** CASE NUMBER ****  227
OPEN XFMR
"WINCHSTR 345.00"  "WINCHSTR 230.00"  "1"  0
DONE

**** CASE NUMBER ****  228
OPEN XFMR
"APACHE   230.00"  "APACHE   115.00"  "1"  0
DONE

**** CASE NUMBER ****  229
OPEN XFMR
"APACHE   230.00"  "APACHE   115.00"  "2"  0
DONE

**** CASE NUMBER ****  230
OPEN XFMR
"BICKNELL 230.00"  "BICKNELL 115.00"  "1"  0
DONE

**** CASE NUMBER ****  231
OPEN XFMR
"BICKNELL 345.00"  "BICKNELL 230.00"  "1"  0
DONE

**** CASE NUMBER ****  232
OPEN XFMR
"GREEN-SW 345.00"  "GREEN-SW 230.00"  "1"  0
DONE

**** CASE NUMBER ****  233
OPEN XFMR
"GREEN-SW 345.00"  "GREEN-SW 230.00"  "2"  0
DONE

**** CASE NUMBER ****  234
OPEN XFMR
"PANTANO  230.00"  "PANTANO  115.00"  "1"  0
DONE

**** CASE NUMBER ****  235
OPEN XFMR
"TOPOCK    69.00"  "TOPOCK   230.00"  "1"  0
DONE

**** CASE NUMBER ****  236
OPEN XFMR
"APACH-SW  69.00"  "APACHE   115.00"  "1"  0
DONE
```

```
**** CASE NUMBER ****  237
OPEN XFMR
"BICKNELL 230.00"  "BICKNELL 115.00"  "2"  0
DONE

**** CASE NUMBER ****  238
OPEN XFMR
"RIVIERA   69.00"  "RIVIERA  230.00"  "1"  0
DONE

**** CASE NUMBER ****  239
OPEN XFMR
"RIVIERA   69.00"  "RIVIERA  230.00"  "2"  0
DONE

**** CASE NUMBER ****  240
OPEN XFMR
"DOSCONDO  69.00"  "DOSCONDO 230.00"  "1"  0
DONE

**** CASE NUMBER ****  241
OPEN XFMR
"DOSCONDO  69.00"  "DOSCONDO 230.00"  "2"  0
DONE

**** CASE NUMBER ****  242
OPEN XFMR
"KARTCHNR  69.00"  "KARTCHNR 115.00"  "1"  0
DONE

**** CASE NUMBER ****  243
OPEN XFMR
"RED TAIL  69.00"  "RED TAIL 230.00"  "1"  0
DONE

**** CASE NUMBER ****  244
OPEN XFMR
"SAN RAF   69.00"  "SAN RAF  230.00"  "1"  0
DONE

**** CASE NUMBER ****  245
OPEN XFMR
"BICKNELL  69.00"  "BICKNELL 115.00"  "1"  0
DONE

**** CASE NUMBER ****  246
OPEN XFMR
"SLOAN     69.00"  "SLOAN    230.00"  "1"  0
DONE

**** CASE NUMBER ****  247
OPEN XFMR
"S.BRKRCH  69.00"  "S.BRKRCH 115.00"  "1"  0
DONE

**** CASE NUMBER ****  248
OPEN XFMR
"DAVIS    230.00"  "BANK 10   69.00"  "1"  0
DONE

**** CASE NUMBER ****  249
OPEN XFMR
"GILA     161.00"  "GILA     230.00"  "1"  0
DONE

**** CASE NUMBER ****  250
OPEN XFMR
"HACKBERY  69.00"  "HACKBERY 230.00"  "1"  0
DONE

**** CASE NUMBER ****  251
OPEN XFMR
"HACKBERY  69.00"  "HACKBERY 230.00"  "2"  0
DONE

**** CASE NUMBER ****  252
OPEN XFMR
```

```
"KYRENE    500.00"  "KYR-NEW  230.00"  "8"  0
DONE

**** CASE NUMBER ****  253
OPEN XFMR
"WHITETNK  69.00"  "WHITETNK 230.00"  "3"  0
DONE

**** CASE NUMBER ****  254
OPEN XFMR
"KNOX      69.00"  "KNOX     230.00"  "2"  0
DONE

**** CASE NUMBER ****  255
OPEN XFMR
"SEV       69.00"  "SEV      230.00"  "1"  0
DONE

STOP
```

EXHIBIT "3"

NextEra Energy

Sonoran Solar Energy Project

Generator Interconnection Study

Supplemental Study Report

10/5/2009

EXECUTIVE SUMMARY

NextEra (Customer) submitted a completed generator interconnection application to the Palo Verde Eastern Transmission System Operating Agent (PVETS), the Salt River Project (SRP) for the Sonoran Solar Energy Project (formerly Buckeye Concentrating Solar Project) in February 2008. The Sonoran Solar Energy Project (SSEP) was initially proposed to consist of two 270 MW steam turbines fueled via a solar collector system. The total maximum net plant output will be 500 MW. The SSEP will be located in Maricopa County, Arizona and its output will be connected to the Jojoba 500kV switchyard via a 3-mile radial 500 kV line. The planned commercial operation date for the Project is December 2012.

PVETS approved of the generator interconnection study report for the project in August 2008. Following the approval of the study report, the customer has indicated to replace one of the 270 MW steam turbine generators with two (2) 135 MW steam turbine units. The PVETS has requested that additional studies be performed due to the change in number and size of the generators to determine the impact of the project on the Palo Verde East Transmission System. The Customer, in consultation with SRP elected a third party contractor, PDS Consulting, PLC (PDS), to perform the requested supplemental study for the Project. The supplemental study included transient stability and short circuit analyses using the revised project configuration. The stability analysis was performed using approved Western Electricity Coordination Council (WECC) 2012 heavy summer base case used for the previous analysis. Two operating scenarios were studied: the maximum Palo Verde hub generation scenario (PV Gen Max Case) and the maximum Palo Verde East Path flow (PV East Max Case) scenario. The performance of the transmission system was measured using the WECC and the North American Electric Reliability Council (NERC) reliability Standards.

The results of the transient stability analysis showed that the addition of the Sonoran Solar Energy Project did not impact the stability of the existing transmission system. Stable and adequately damped transient stability performances were achieved following all the outages simulated.

The Palo Verde Updated Final Safety Analysis (UFSAR) was performed to determine the simultaneous Palo Verde Transmission System (PVTS) safety operating limits following the addition of the SSEP. The results of the UFSAR analysis showed that the stability of the Palo Verde Nuclear plant is not impacted following the addition of the SSEP.

The results of the short circuit analysis showed that the expected fault duty at the point of interconnection to the Jojoba 500kV switchyard is approximately 31,526 A (three-phase) and 27,072A (single-phase-to ground). The incremental fault duties due to the Sonoran Solar Energy Project were found to be 1,885A (three-phase) and 3,091A (single-phase-to-ground). The available margins at the vicinity breakers indicate that the

interconnection of the SSEP will not cause any of the breakers to exceed their interruption capabilities.

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ATTACHMENTS

Attachment A: Transient Stability Plots (PV Max Generation Case)
Attachment B: Transient Stability Plots (PV East Max Case)
Attachment C: Transient Stability Plots (Palo Verde UFSAR)

INTRODUCTION

NextEra (Customer) submitted a completed generator interconnection application to the Palo Verde Eastern Transmission System Operating Agent (PVETS), the Salt River Project (SRP) for the Sonoran Solar Energy Project (formerly Buckeye Concentrating Solar Project) in February 2008. The Sonoran Solar Energy Project (SSEP) was initially proposed to consist of two 270 MW steam turbines fueled via a solar collector system. The total maximum net plant output will be 500 MW. The SSEP will be located in Maricopa County, Arizona and its output will be connected to the Jojoba 500kV switchyard via a 3-mile radial 500 kV line. The planned commercial operation date for the Project is December 2012.

PVETS approved of the generator interconnection study report for the project in August 2008. Following the approval of the study report, the customer has indicated to replace one of the 270 MW steam turbine generators with two (2) 135 MW steam turbine units. The PVETS has requested that additional studies be performed due to the change in number and size of the generators to determine the impact of the project on the Palo Verde East Transmission System. The Customer, in consultation with SRP has elected a third party contractor, PDS Consulting, PLC (PDS), to perform the requested supplemental study for the SSEP. The supplemental study included transient stability and short circuit analyses using the revised project configuration. The stability analysis was performed using approved Western Electricity Coordination Council (WECC) 2012 heavy summer base case used for the previous analysis.

The scope of the supplemental study is to identify the transmission system impacts caused solely by the addition of the Sonoran Solar Energy Project, and to identify the system reinforcements, if any, necessary to mitigate the adverse impact of the project under different system operating conditions.

PROJECT AND INTERCONNECTION INFORMATION

Table 1 provides general project and interconnection information about the SSEP.

Project Location	Maricopa County, Arizona
Number and Type of Generators	3, One 270MW and two 135 MW Steam Turbines
Maximum Generator Output	540MW
Generator Auxiliary Load	40MW
Maximum Net Output	500 MW
Power Factor	0.85 leading/lagging
Step-up Transformer	One (1) 240/300MVA, 18/500 kV 3-phase transformers, Z=12% (180MVA Base) and two (2) 133/167 MVA, 13.8/500 kV 3-phase transformers, Z=9% (100 MVA Base)
Interconnection Configuration	3-mile 500kV tie line from the SSEP switchyard to the existing Jojoba 500kV switchyard.
Interconnection Voltage	500 kV

Table 1: The Sonoran Solar Energy Project General Information

Figure 1 depicts the SSEP's interconnection point and the existing transmission system at the interconnection vicinity. A one line diagram of the project at the proposed interconnection point is shown in Figure 2.

Figure 1: Sonoran Solar Energy Project Interconnection point and Vicinity Transmission

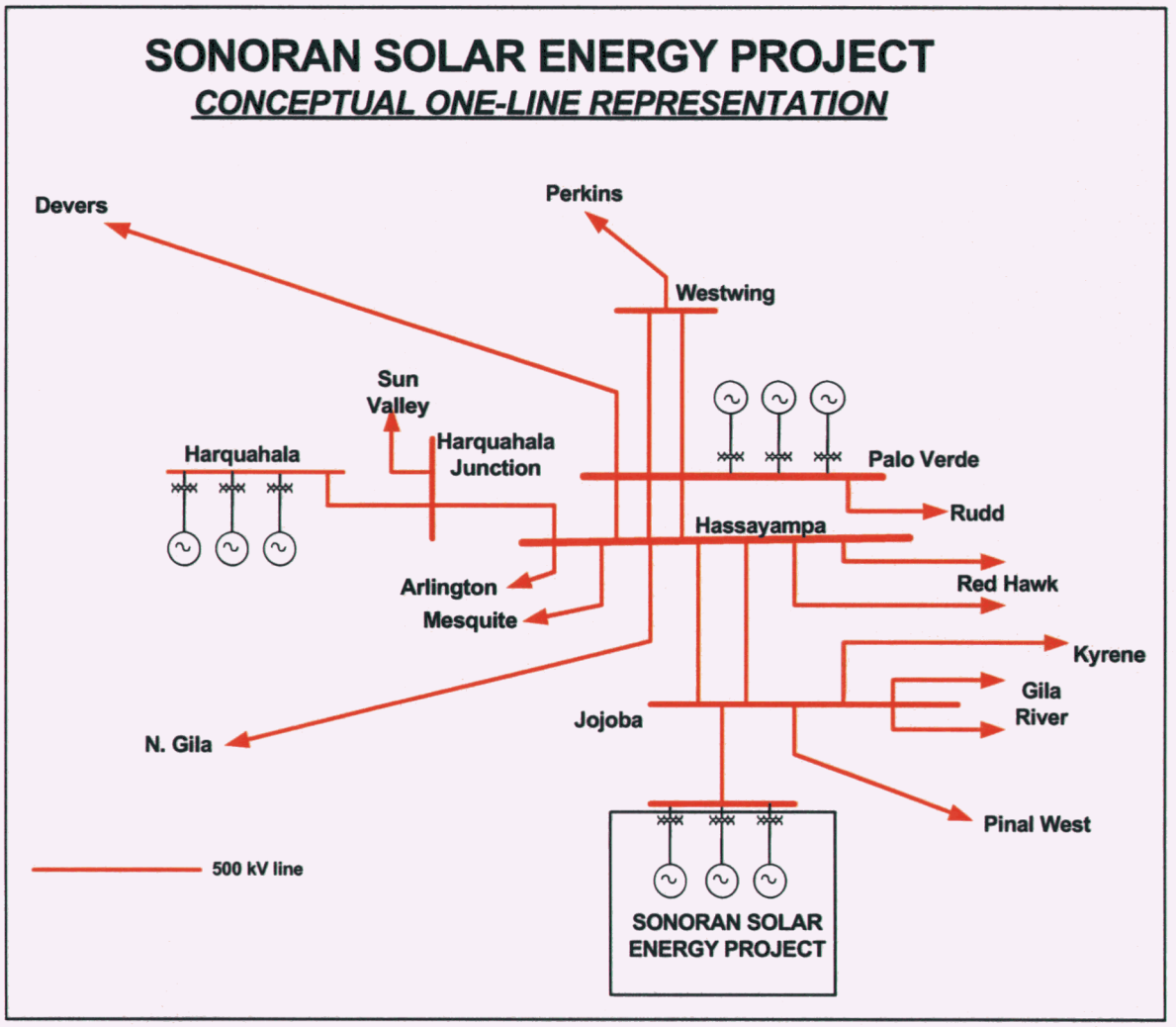

Figure 2: One-Line Representation of the SSEP at the Interconnection point

STUDY BASE CASE DESCRIPTION AND ASSUMPTIONS

The Supplemental study was conducted using two heavy summer base cases: Western Electricity Coordination Council (WECC) approved 2012 heavy summer base case (12hs2a1) and Southwest Area Transmission (SWAT) group approved 2011 heavy summer base case as the starting base cases. The 2012 heavy summer base case was be updated to reflect 2013 heavy summer operating conditions. Proposed generation projects in SRP and APS control areas that have interconnection queue date ahead of the Sonoran Solar Energy Project and also have commercial operation date earlier than autumn 2012 were modeled. Also approved transmission projects that have online date prior to autumn of 2012 were modeled. Approved transmission projects modeled included:

- Harquahala Junction-Sun Valley-Raceway-Pinnacle Peak 500 kV lines and the associated 230 kV lines
- Hassayampa – Pinal West 500 kV (including the Jojoba loop-in)
- Pinal West – Pinal Central – Abel – Browning 500kV

Pre-project Base Cases

Following the addition of the proposed queued generation projects and approved transmission projects, a maximum Palo Verde hub generation case (PV Gen Max Case) was developed from the 2012 heavy summer starting base case. The *PV Gen Max Case* modeled all the commercially operating generating units at Palo Verde-Hassayampa hub at their maximum outputs. The units were also be modeled to buck a total of 800 MVar of reactive power. A second pre-project base case, *PV East Max Case* was developed from the 2011 heavy summer base case which was originally approved by SWAT and was used for the Palo Verde East Path (which comprises of Palo Verde-Rudd, Palo Verde-Westwing #1 & #2 and Jojoba-Kyrene 500 kV lines) studies. The *PV East Max Case* modeled the Palo Verde East flow at its current rating of 7510 MW.

Post-project base Cases

Post-project base cases were developed from the pre-project cases. The post-project base cases modeled the proposed SSEP as depicted in Figure 2. Two scheduling scenarios were studied. These scheduling scenarios are depicted in Table 2. The 500 MW output of the proposed project was scheduled to displace Phoenix area and/or merchant generators in the Palo Verde hub as requested by the customer.

Scheduling Scenarios	SSEP Net Output (MW)	Power Scheduled to Palo Verde (MW)	Power Scheduled to Phoenix (MW)	Displaced Generation
Scenario A	500	0	500	Phoenix Area Peaking Units
Scenario B	500	250	250	Phoenix Area Peaking Units and Palo Verde Hub Generation

Table 2: Generation Scheduling Scenarios

In all three (3) post-project base cases were developed. These base cases and their descriptions are provided in Table 3.

Post-Project Base Cases	Base Case Description
PV Gen Max Case A	Developed from pre-project base case PV Gen Max Case and models scheduling scenario A
PV Gen Max Case B	Developed from pre-project base case PV Gen Max Case and models scheduling scenario B
PV East Max Case A	Developed from pre-project base case PV East Max Case and models scheduling scenario A. The PV East flow was adjusted to be within its7510 MW rating

Table 3: Post-project Base Cases

Palo Verde Updated Final Safety Analysis Report (UFSAR) Cases

The Palo Verde Updated Final Safety Analysis was performed to determine the simultaneous PVTS safety operating limits following the addition of the SSEP. This includes operating the Palo Verde Nuclear Units at 7% above the maximum generation output. The *PV Gen Max Case A* was used to determine the operating limits (if any) following the interconnection of the Sonoran Solar Energy Project. The objective of this analysis is to ensure the stability of the Palo Verde Nuclear plant.

STUDY METHODOLOGY AND EVALUATION CRITERIA

Transient stability and short circuit analyses were performed on both the pre-project and the post-project cases to determine the impact of the Sonoran Solar Energy Project on the interconnected transmission system. Specific studies conducted and their evaluation criteria are outlined below:

Transient Stability Analysis

Transient stability studies were conducted on both the pre-project cases, PV Gen Max Case A and PV East Max Case A. Transient stability runs were simulated for 10 seconds excluding a 1 second pre-outage run to ensure the system is stable and positively damped.

Selected critical contingencies were simulated. Provided below are the outages simulated:

- Palo Verde-Devers 500 kV Line
- Hassayampa-North Gila 500 kV Line
- Moenkopi- Eldorado 500 kV Line
- Navajo-Crystal 500 kV Line
- Hassayampa – Jojoba 500kV line

- Hassyampa-Pinal West 500 kV line[1]
- Jojoba – Pinal West 500 kV line[2]
- Jojoba – Kyrene 500 kV line
- Palo Verde – Rudd 500 kV line
- Mead-Perkins 500 kV Line
- Palo Verde – Westwing # 1 500 kV line
- Palo Verde-Westwing 500 kV #1 & 2 Lines
- IPPDC Bi-Pole
- Palo Verde Generating units 1 and 2
- Hassayampa-Jojoba #1 & 2 500 kV lines
- Hassyampa-Jojoba & Hassayampa-Pinal West 500 kV lines
- Palo Verde-Westwing #1 & Palo Verde – Rudd 500 kV Lines
- Jojoba – Kyrene & Hassayampa – Pinal West 500 kV lines

The transient stability evaluation criteria used to evaluate the impact of the project included:

- All machines in the interconnected system shall remain in synchronism as demonstrated by their relative rotor angles.
- System stability is evaluated based on the damping of the relative rotor angles and the damping of the voltage magnitude swings.

- WECC transient voltage dip criteria: The transient voltage dip must not exceed 25% at load buses or 30% at non-load buses for N-1 contingency. For N-2 contingency, the transient voltage dip must not exceed 30% at any bus. The maximum duration of the voltage dip of 20% at load buses must not exceed 20 cycles for N-1 contingency or 40 cycles for N-2 contingency.
- WECC transient frequency criteria: The minimum transient frequency for N-1 contingency is 59.6 Hz; if below 59.6 Hz, the duration must not exceed 6 cycles at load bus. For N-2 contingencies, the minimum transient frequency is 59.0 Hz; if below 59.0 Hz, the duration should not exceed 6 cycles at load bus.

A summary of the transient stability analysis evaluation criteria is provided in Table 4 and depicted graphically in Figure 3.

[1] The Hassayampa – Pinal West 500 kV line is applicable to PV East Max Case only
[2] The Jojoba-Kyrene 500 kV line outage is applicable to PV Gen Max Case only

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
A System normal	Not Applicable	Nothing in addition to NERC		
B One element out-of-service	≥ 0.33	Not to exceed 25% at load buses or 30% at non-load buses. Not to exceed 20% for more than 20 cycles at load buses.	Not below 59.6Hz for 6 cycles or more at a load bus.	Not to exceed 5% at any bus.
C Two or more elements out-of-service	0.033 – 0.33	Not to exceed 30% at any bus. Not to exceed 20% for more than 40 cycles at load buses.	Not below 59.0Hz for 6 cycles or more at a load bus.	Not to exceed 10% at any bus.
D Extreme multiple-element outages	< 0.033	Nothing in addition to NERC		

Table 4: Stability and Post-transient Analysis Evaluation Criteria

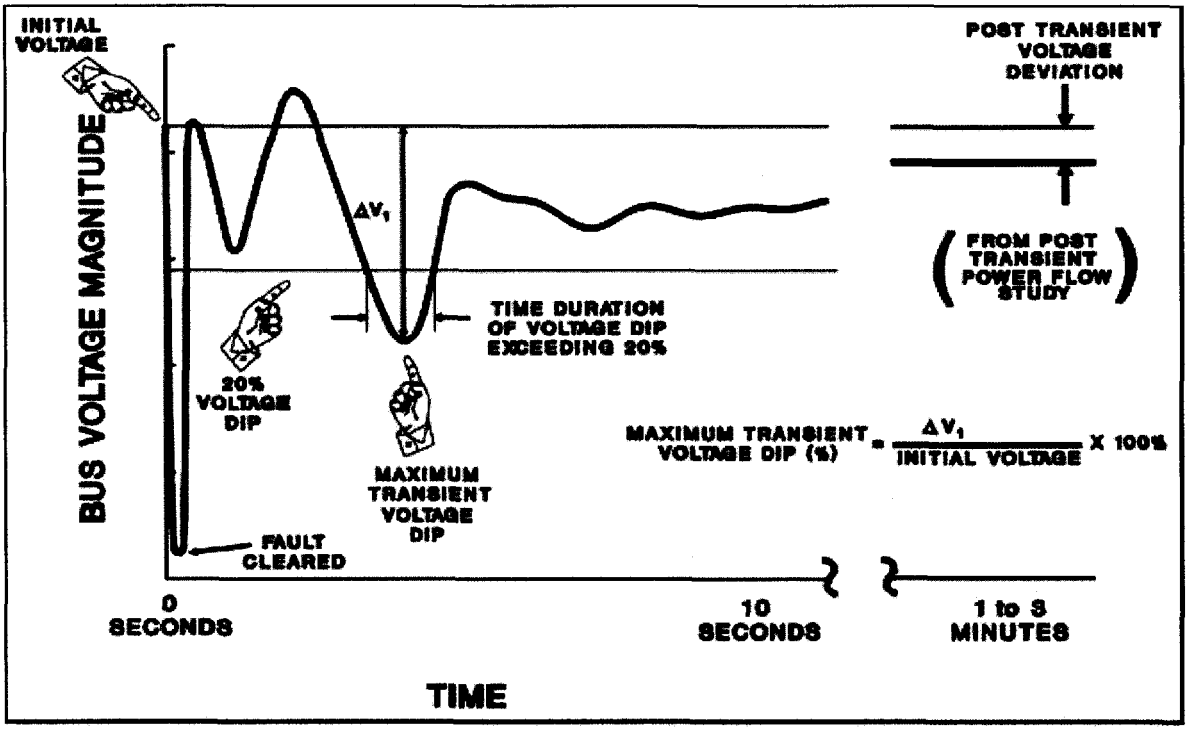

Figure 3: Graphical Representation of Stability Analysis Evaluation Criteria

Short Circuit Analysis

Short circuit studies were performed to evaluate the impact of the addition of the SSEP on selected PVETS participant's substation breaker duties. The studies were conducted in accordance with PVETS requirements.

Southwest utilities (e.g. SRP, TEP, APS, EPE, PNM, WAPA, IID, etc.) participate in the SWAT Short Circuit Work Group. Within the group, members agree to solution assumptions and options (i.e. phase shifter modeling, series capacitor flashing, pre-fault voltages, etc.) for performing fault duty studies and evaluating results. Members use PTI and ASPEN programs and routinely convert databases for use between the two programs.

For the PVETS and this Supplemental Study, PDS used the current short circuit data base with updated system equivalent data and incorporated the revised Sonoran Solar Energy Project for the assessment of the post-project scenario. For the pre-project case, PDS used the current data base for the 2013 time frame and included system upgrades as required.

Palo Verde Updated Final Safety Analysis Report (UFSAR)

The methodology and evaluation criteria used for the UFSAR analysis included:

- Dispatching of the Palo Verde Nuclear Units at 7% above its maximum operating limit of 4227 MW
- Dispatching at maximum of all the commercially operating generating units (PVTS Interconnections) in the Palo Verde hub up to 6884 MW.
- Modeling of the Palo Verde Nuclear Units and the PVTS Interconnections to buck up to 800 MVAR
- Dispatching of the Sonoran Solar Energy Project at 540 MW
- Determining the maximum total net generation that can safely be injected by Palo Verde Nuclear Units and the PVTS Interconnections without exceeding any of the PVTS thermal capability.
- Determine the Palo Verde plant stability limit and/or a transient voltage dip limit

STUDY RESULTS

Transient Stability Analysis Results

The transient stability analysis was performed on both *PV Gen Max* and *PV East Max* pre- and post-project base cases. A set of bus voltage, frequency and machine angle plots for each contingency simulated can be found at Attachments A and B. Key findings following the transient stability analysis are:

- Stable and adequately damped transient stability performances were achieved following all the outages simulated. Summary of the transient stability analysis are provided in Appendix A.
- No violation of WECC transient voltage dip and frequency criteria was found following all the outages simulated.

Palo Verde UFSAR Analysis

The Palo Verde URSAR analysis showed that the stability of the Palo Verde Nuclear plant would not be compromised following the addition of the Buckeye CSP. The results of the stability analysis are provided in Attachment C.

Short Circuit Analysis Results

To perform the short circuit study, the SSEP addition was modeled in the SWAT 2008 short circuit case using the ASPEN One-Liner software. The short circuit study results indicated that the expected fault duty at the point of interconnection to the Jojoba 500kV switchyard is approximately 31,526 A (three-phase) and 27,072A (single-phase-to ground). The incremental fault duties due to the Sonoran Solar Energy Project were found to be 1,885A (three-phase) and 3,091A (single-phase-to-ground). Table 5 provides a summary of the fault duties of the breakers at the interconnection point and the nearby substations. Also provided in Table 5 are the breaker ratings of some of the nearby substations.

It is evident from the breaker ratings of the nearby substations that the addition of the Sonoran Solar Energy Project would not cause any of the existing breakers to exceed their interruption capabilities.

Per the request of the WATS members, a summary of the incremental contributions of the SSEP using both the initial 2 units and the revised 3 units configurations are provided in Table 6.

BUS NAME	AREA	BREAKER RATING (A)	PRE-PROJECT		POST-PROJECT		PROJECT CONTRIBUTION	
			3-PHASE (A)	SLG (A)	3-PHASE (A	SLG (A)	3-PHASE (A)	SLG (A)
SONORAN 525kV	14		0	0	26,750	22,457	26,750	22,457
JOJOBA (POI) 525kV	14	63,000	29,641	23,980	31,526	27,072	1,885	3,091
GILA_RIVER 525kV	14	63,000	24,833	23,271	25,806	24,383	973	1,112
HASSYAMP 525kV	14	63,000	52,387	53,798	53,181	54,467	794	669
PALOVRDE 525kV	14	63,000	53,659	56,260	54,368	56,821	709	561
KYRENE 230kV	14	63,000	52,396	49,068	52,716	49,310	320	243
KYRENENEW 230kV	14		50,258	45,380	50,529	45,582	271	203
KYRENE 525 kV	14	40,000	20,107	18,173	20,321	18,349	214	176
RUDD 230 kV	14	63,000	52,750	45,996	52,964	46,104	214	108
WESTWING 525kV	14	40,000	31,931	26,867	32,108	26,948	177	81
WESTWING_W1 230kV	14	63,000	50,248	47,117	50,419	47,215	170	98
PERKINPS 525kV	14	40,000	31,341	26,015	31,510	26,091	169	76
WESTWING_E1 230kV	14		49,988	46,850	50,156	46,947	168	97
PERKINSSOUTH 525kV	14		30,636	25,526	30,797	25,598	161	72
PINPK_SRP 230kV	14	63,000	48,148	46,526	48,269	46,597	121	71
WHTTANKS_SRP 230kV	14	44,000	34,994	27,508	35,097	27,542	104	35
ORME 230kV	14	40,000	35,482	24,861	35,584	24,896	102	35
PINPK_WAPA_S 230kV	14		48,366	47,361	48,467	47,434	101	73
PINPK_WAPA_N 230kV	14		48,288	47,256	48,389	47,329	101	73
PP230_WEST 230kV	14		48,150	47,191	48,250	47,264	100	73
BROWNING 525kV	14	40,000	15,626	13,100	15,726	13,156	100	57

Table 5: Fault Duties at the POI and nearby substations

BUS NAME	AREA	PROJECT (2 UNITS, OLD CONFIGURATION) CONTRIBUTION		PROJECT (3 UNITS, NEW CONFIGURATION) CONTRIBUTION	
		3-PHASE (A)	SLG (A)	3-PHASE (A)	SLG (A)
SONORAN 525kV	14	26,464	21,861	26,750	22,457
JOJOBA (POI) 525kV	14	**1,605**	**2,580**	**1,885**	**3,091**
GILA_RIVER 525kV	14	813	945	973	1,112
HASSYAMP 525kV	14	663	558	794	669
PALOVRDE 525kV	14	589	462	709	561
KYRENE 230kV	14	278	209	320	243
KYRENENEW 230kV	14	233	174	271	203
KYRENE 525 kV	14	184	151	214	176
RUDD 230 kV	14	184	93	214	108
WESTWING 525kV	14	152	70	177	81
WESTWING_W1 230kV	14	146	85	170	98
PERKINPS 525kV	14	145	66	169	76
WESTWING_E1 230kV	14	144	84	168	97
PERKINSSOUTH 525kV	14	138	62	161	72
PINPK_SRP 230kV	14	101	62	121	71
WHTTANKS_SRP 230kV	14	73	31	104	35
ORME 230kV	14	88	31	102	35
PINPK_WAPA_S 230kV	14	101	64	101	73
PINPK_WAPA_N 230kV	14	101	64	101	73
PP230_WEST 230kV	14	99	64	100	73
BROWNING 525kV	14	87	50	100	57

Table 6: Project (2 Units Vs 3 Units) Contributions at the POI and nearby substations

Appendix A:Summary of Transient Analysis Results

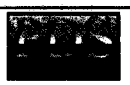

Table A1: Summary of Transient Stability Study Results for PV Gen Max Case Vs PV Gen Max Case A

OUTAGE	PV GEN MAX CASE			PV GEN MAX CASE A		
	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING
CATEGORY B						
PALO VERDE-DEVERS 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP-N. GILA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE - RUDD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
NAVAJO – CRYSTAL 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
MOENKOPI – ELDORDO 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP – JOJOBA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PERKINS – MEAD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
JOJOBA – KYRENE 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
JOJOBA – PINAL_W 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
CATEGORY C						
PALO VERDE G-2	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 &2 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
IPPDC BIPOLE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP - JOJOBA #1 & 2 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE

Table A2: Summary of Transient Stability Study Results for PV Gen Max Case Vs PV Gen Max Case B

OUTAGE	PV GEN MAX CASE			PV GEN MAX CASE B		
	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING
CATEGORY B						
PALO VERDE-DEVERS 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP-N. GILA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE - RUDD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
NAVAJO – CRYSTAL 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
MOENKOPI – ELDORDO 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP – JOJOBA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PERKINS – MEAD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
JOJOBA – KYRENE 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
JOJOBA – PINAL_W 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
CATEGORY C						
PALO VERDE G-2	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 &2 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
IPPDC BIPOLE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP - JOJOBA #1 & 2 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE

Table A3: Summary of Transient Stability Study Results for PV East Max Case Vs PV East Max Case A

OUTAGE	PV EAST MAX CASE			PV EAST MAX CASE A		
	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING
CATEGORY B						
PALO VERDE-DEVERS 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP-N. GILA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE - RUDD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
NAVAJO – CRYSTAL 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
MOENKOPI – ELDORDO 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP – JOJOBA 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
PERKINS – MEAD 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
JOJOBA – KYRENE 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
HASSYAMP – PINAL_W 500 KV LINE	NO	NO	POSITIVE	NO	NO	POSITIVE
CATEGORY C						
PALO VERDE G-2	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 &2 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE
IPPDC BIPOLE	NO	NO	POSITIVE	NO	NO	POSITIVE
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	NO	NO	POSITIVE	NO	NO	POSITIVE