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L-2011-081
10 CFR 50.90

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555-0001

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Response to NRC Request for Additional Information (RAI) Regarding Extended Power Uprate (EPU) License Amendment Request (LAR) No. 205 and Electrical Engineering Branch Issues

References:

(1) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request No. 205: Extended Power Uprate (EPU)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010.

(2) Email from J. Paige (NRC) to T. Abbatiello (FPL), "Turkey Point EPU – Electrical Engineering Branch (EEEB) Request for Additional Information – Round 1," Accession No. ML110610719, March 2, 2011.

By letter L-2010-113 dated October 21, 2010 [Reference 1], Florida Power and Light (FPL) requested to amend Facility Operating Licenses DPR-31 and DPR-41 and revise the Turkey Point Units 3 and 4 Technical Specifications (TS). The proposed amendment will increase each unit's licensed core power level from 2300 megawatts thermal (MWt) to 2644 MWt and revise the Renewed Facility Operating Licenses and TS to support operation at this increased core thermal power level. This represents an approximate increase of 15% and is therefore considered an extended power uprate (EPU).

By email from the U.S. Nuclear Regulatory Commission (NRC) Project Manager (PM) dated March 2, 2011 [Reference 2], additional information was requested by the NRC staff in the Electrical Engineering Branch (EEEB) to support the review of the EPU LAR. The RAI consisted of fourteen (14) questions regarding the electrical engineering section of the LAR Attachment 4, Licensing Report. These RAI questions and the applicable FPL responses are documented in the Attachment 1 to this letter. Attachment 2 contains a revised Generation Interconnection Service System Impact Study that supports the response to RAI 1-6.

In accordance with 10 CFR 50.91(b)(1), a copy of this letter is being forwarded to the State Designee of Florida.

This submittal does not alter the significant hazards consideration or environmental assessment previously submitted by FPL letter L-2010-113 [Reference 1].

This submittal contains no new commitments and no revisions to existing commitments.

Should you have any questions regarding this submittal, please contact Ms. Olga Hanek, Acting Licensing Manager, at (305) 246-6607.

A001
NRR

I declare under penalty of perjury that the foregoing is true and correct.

Executed on March 31, 2011.

Very truly yours,

Michael Kiley
Site Vice President
Turkey Point Nuclear Plant

Attachments (2)

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, Turkey Point Nuclear Plant
USNRC Resident Inspector, Turkey Point Nuclear Plant
Mr. W. A. Passetti, Florida Department of Health

Turkey Point Units 3 and 4

RESPONSE TO NRC RAI REGARDING EPU LAR NO. 205 AND EEEB ELECTRICAL ENGINEERING BRANCH ISSUES

ATTACHMENT 1

Response to Request for Additional Information

The following information is provided by Florida Power & Light (FPL) in response to the U. S. Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI). This information was requested to support the review of License Amendment Request (LAR) No. 205, Extended Power Uprate (EPU), for Turkey Point Nuclear Plant (PTN) Units 3 and 4 that was submitted to the NRC by FPL letter L-2010-113 on October 21, 2010 [Reference 1].

In an email dated March 2, 2011 [Reference 2], the NRC staff requested additional information regarding FPL's request to implement the Extended Power Uprate. The RAI consisted of fourteen (14) questions from the NRC Electrical Engineering Branch (EEEB). These RAI questions and the applicable FPL responses are documented below.

EEEB-1.1

Regarding Section 2.3.1.2.3.1 of Attachment 4 of the license amendment request (LAR) dated October 21, 2010:

a. **Explain the basis for the following statement: "Pressure effects are generally stress-related rather than age related."**

   Aging effects on non-metallic materials are typically caused by prolonged exposure to temperature and radiation or, in the case of loss of material, through excessive wear; these are all considered age-related where the non-metallic material exhibits signs of drying, cracking, embrittlement and loss of material (wear aging). Each are clearly defined in the Institute of Electrical and Electronics Engineers (IEEE) STD 323, "Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations" [Reference 3], as well as 10 CFR 50.49. Pressure is a stress-related effect, such as compression which unlike radiation, temperature and wear aging is more of a forcing function which can drive moisture into (or out of) an object/equipment. Pressure effects unto themselves have never been considered a detrimental qualification aging mechanism, but are to be considered as part of environmental qualification (EQ) with respect to a driving force for humidity and moisture during the event.

b. **Explain how the margins identified in the Institute of Electrical and Electronics Engineers Standard 323-1974 (i.e., Temperature, Pressure, etc.) are being maintained under EPU conditions.**

   PTN EQ program licensing basis was approved based on IEEE 323-1971 which does not require margins above the design basis accident profiles. FPL committed to meet NUREG-0588, "Interim Staff Position on Equipment Qualification of Safety-Related Electrical Equipment" [Reference 4], and the later version of IEEE 323-1974 for any EQ equipment installed after February 22, 1983 as part of the original NRC program approval. As identified in item 1.4 of NUREG – 0588, additional margin need not be added to the radiation parameter if the methods identified in Appendix D of NUREG-0588 are utilized. The methods used to determine the PTN radiation parameters are consistent with the Appendix D methodology for current and EPU conditions. As documented in the current PTN EQ Program Manual, the radiation margins required by section 6.3.1.5 of IEEE 323-1974 are not necessary.

Typically only the peak accident temperature and pressure are compared against the EQ qualification temperature to demonstrate qualification per IEEE 323-1974 as can be seen in example Figure 1 on page 16 of IEEE 323. Peak temperature and pressure present the most demanding environment and cause the greatest challenge to equipment. PTN EQ profiles were developed to show the limiting profile that would support equipment qualification for all EQ equipment.

The difference between the EQ Qualification (Qual) Envelope and the EPU LOCA temperature curves is that the EPU LOCA temperature curve does not drop below a 15°F margin until after at least 2.7 hours when the temperature is declining and any potential damage would have already occurred. In addition, the EQ Qual Envelope temperature steps show a higher temperature is maintained for significantly longer than the EPU LOCA tempature curve. This adds margin since electrical equipment aging is a function of temperature and duration. Therefore, the margin added due to maintaining a longer duration at higher temperatures is considered adequate for qualification.

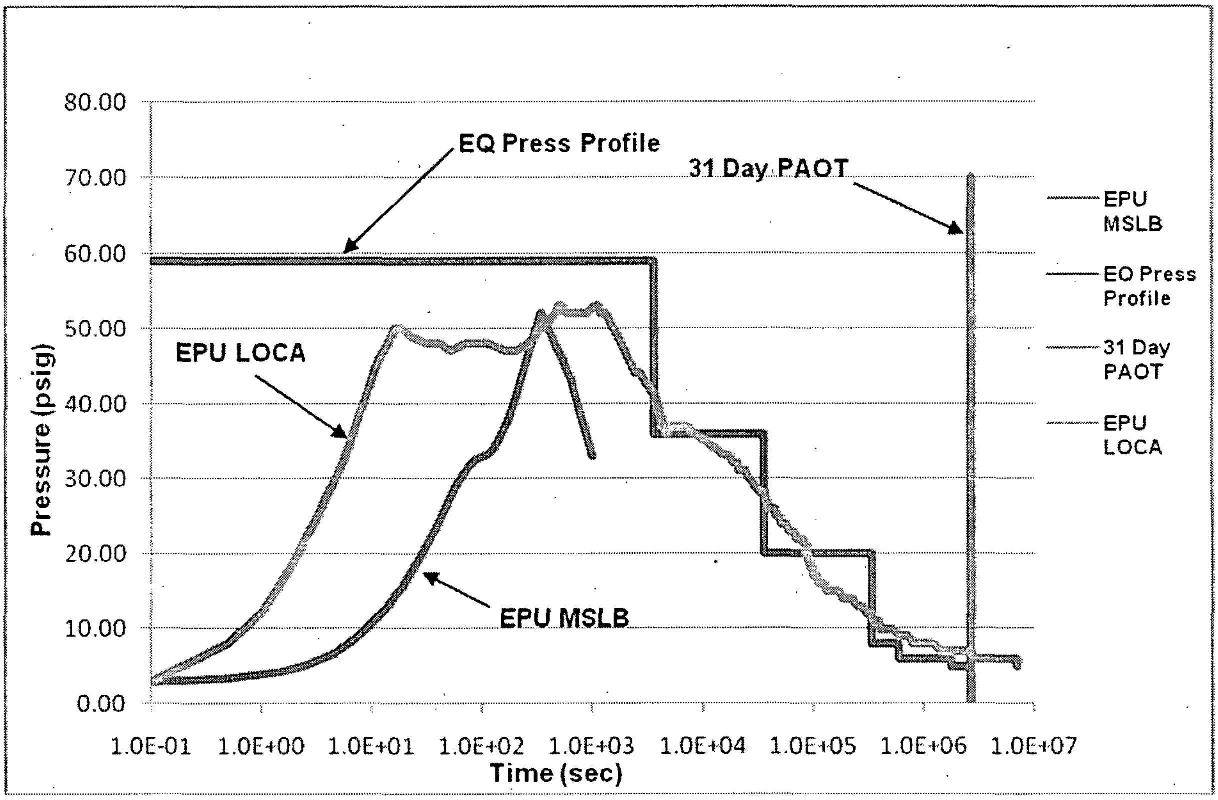
The difference between the EQ and the EPU pressure design curve is that the EPU pressure design curve does not drop below 10% margin until after at least 50 minutes at which time both the design and EQ curves decrease by at least 20 psi. Since the first time step, which is at the highest pressure, provides greater than 10% margin for the entire time step, additional margin over the 10% IEEE 323 guideline is provided. The remaining time steps maintain the EQ profile at constant pressure above the design profile for the majority of the time step and build margin greater than 10% that compensates for the subsequent time steps where the 10% margin is not achieved. As stated above, the damage mechanism associated with pressure is not age-related, but a function of the pressure magnitude which causes greater moisture intrusion. Since the EQ profile maintains the pressure above the design profile for a greater duration and the maximum pressure is above 10% of design, the developed margin is considered adequate for qualification.

c. **Figure 2.3.1-1 appears to show that the required temperature margin (15 degrees Fahrenheit) is not being maintained. Clarify the apparent deviation.**

See response EEEB-1.1.b above

d. **The licensee stated that while some EPU pressure points well after the peak EPU pressure slightly exceed EPU pressure envelope, the integrated EPU pressure curve remains below the current environmental qualification (EQ) envelope during Post Accident Operability Time (PAOT) period of 31 days. Provide the 'integrated EPU pressure curve'.**

The statement referencing the integrated EPU pressure curve is based on a qualitative assessment of the difference between the area under the EPU LOCA Profile and the area under the EQ Qualification Envelop. As can be seen from inspecting the pressure curve, the area under the EQ Pressure Profile exceeds the area under the EPU LOCA curve, even though there are a few points where the actual EPU LOCA curve does exceed the EPU Qualification curve.



e. **The licensee stated that following EPU, the containment submergence level or containment flood elevation has changed. The EPU maximum containment sump temperature is 4 degrees Fahrenheit higher than the current maximum due to thermal power increase. The licensee concluded that there is no impact on the EQ population or qualification of existing EQ equipment based on its review. Provide a summary of the evaluation used to determine that there would be no impact on the EQ population or qualification of existing EQ equipment.**

All Class IE electrical equipment locations inside containment were reviewed and compared against the postulated new flood levels. As stated in LR Section 2.3.1.2.3.1, the EPU maximum containment flood level is 2.2 inches higher than the pre-EPU flood level. FPL determined from the review of EQ documentation packages (Doc Pacs) for equipment inside containment and other configuration control documents that no EQ equipment is located below the flood level.

EEEB-1.2

In Section 2.3.1.2.3.2 of Attachment 4 of the LAR, the licensee stated that any Containment EQ equipment that could not meet new EPU bounding radiation dose level was assessed for dose reduction. Factors included consideration if a component was sealed, equipment shielding, and the actual distance from the radiation source.

Provide a list of equipment which could not meet the new EPU bounding radiation dose level and a brief summary of dose reduction factor(s) considered for each component including any planned modifications that shows that the resulting radiation dose will remain below the existing EQ level.

The initial screen of the below listed 18 Rosemount transmitters (nine in Unit 3 and nine in Unit 4) resulted in the determination that the bounding EPU in-containment gamma radiation environments exceeded the qualification levels for these transmitters.

PTN Doc Pac 1001-24.1, Rosemount Transmitters (18)

- LT-3-459, LT-3-460, and LT-3-461
- PT-3-403, PT-3-404, PT-3-405, and PT-3-406
- FT-3-932 and FT-3-933
- LT-4-459, LT-4-460, and LT-4-461
- PT-4-403, PT-4-404, PT-4-405, and PT-4-406
- FT-4-932 and FT-4-933

Thus, location-specific integrated gamma dose estimates were developed for these transmitters. Note that since these transmitters are sealed, exposure to in-containment beta radiation was not a concern.

The bounding EPU in-containment radiation environment is conservatively based on a spherical cloud model with no credit for shielding. The location-specific gamma dose to each of the 18 transmitters was developed taking into consideration the shielding provided by major walls and floors within the containment. Since the transmitters are mounted on the outside surface of the missile barrier wall, the dose model changes from an essentially finite spherical cloud to a finite hemispherical cloud, which reduces the source term and thus dose. The accident component-specific dose estimate included the contribution from the post-LOCA radioactivity airborne in the containment, as well as that mixed in the sump fluid. The EPU assessment demonstrated that the estimated location-specific 31-day integrated post-LOCA plus 60-year normal operation dose to the 18 Rosemount transmitters will remain below the qualification level.

In accordance with current licensing basis methodology, the EPU evaluation continued to take credit for shielding from beta radiation as described below. If deemed necessary, and in accordance with the guidance provided in NRC IE Bulletin (IEB) 79-01B, "Environmental Qualification of Class 1E Equipment," [Reference 5], the qualification assessment for cables took credit for the shielding provided by cable jacketing material, by other cables in the tray and by the tray itself. In addition, the contribution of beta radiation was ignored if the radiation sensitive portion of the component was sealed in an enclosure. The number of components that credited shielding to attenuate for beta was not impacted as a result of the higher radiation environments due to the EPU.

EEEB-1.3

Regarding Section 2.3.1.2.3.3 of Attachment 4 of the LAR:

a. **The licensee stated the normal operating gamma radiation dose in the Aux Building has increased in some EQ Zones due to the EPU. However, the EPU dose estimates in the worst case EQ zone has not changed and remains at 5.26E+04 Rads. Provide a summary of the evaluation of equipment that shows how the EQ of all equipment remains bounding for normal operating EPU conditions.**

As a screening tool, FPL used the radiation environment in the worst case zone for outside containment (Auxiliary Building) locations, recognizing that even as the integrated dose in some radiation zones changed, as long as the worst case zone was used for screening, and the equipment met the environmental qualification requirements for that zone, then the equipment in the lower dose zones would remain acceptable. The radiation zones used the normal 60-year dose plus the 31-day accident dose to get a total integrated dose (TID) for the purpose of qualification. This TID was compared against the qualification dose presented in the EQ Doc Pacs and, as long as the EQ Doc Pac qualification dose exceeded the worst case TID the equipment was considered qualified with no further review required.

b. The licensee stated that EPU gamma radiation dose in the Auxiliary Building has increased in the worse [worst] case EQ Zone from 7.50E+06 to 1.1E+07 Rads. Some mild areas have become harsh due to dose increases from EPU.

i. Provide a summary of the evaluation of equipment that shows how the EQ of all equipment remains bounding for accident EPU conditions.

The initial screening performed to evaluate the radiation qualification of EQ equipment used the accident radiation level for the worst case radiation zone outside containment for evaluation. The use of the worst case radiation zone recognizes that even as the radiation levels in other radiation zones may have changed, as long as the radiation level for the worst case zone was used and the equipment met the EQ radiation requirements for that zone, the lower zones were inconsequential. As described above in the response to EEEB-1.3.a, the 60-year normal dose was added to the worst case 31-day accident dose to get the total integrated dose (TID). For the initial screening the worst case TID was compared to the radiation level in the individual EQ Doc Pacs. As long as the EQ Doc Pac qualification dose was greater than the worst case TID, the equipment was considered qualified, with no further review required. This initial screening review identified five components outside containment that required further evaluation. These components included 1. cables manufactured by Okonite, 2. cables manufactured by General Cable, 3. cables manufactured by Kerite, 4. Masoneilan I/P Transducers, and 5. Valcor Solenoid Valves.

Okonite Cable

A new bounding integrated dose calculation was done for each of the areas outside containment containing EQ cables manufactured by Okonte by considering actual EPU radiation sources in the room and shine from adjacent rooms rather than using the most limiting dose for areas outside containment. A conservative bounding dose for an entire room was determined by calculating the dose 1 foot from a pipe that represented the entire volume of piping carrying post accident sump fluid in the room. The integrated dose from adjacent room shine and the normal 60-year dose was also calculated and added to the pipe dose in the room. This more detailed dose calculation showed all areas outside containment with EQ cables manufactured by Okonite were below the qualification levels for the ten cable codes involved.

General Cable

Areas containing EQ cables manufactured by General Cable had a detailed location specific dose calculation performed. The actual distance from each pipe containing post-LOCA fluid to the cable was measured and the dose contribution from each pipe was calculated and summed to provide a pipe dose in the room. The pipe dose contribution from adjacent rooms was also added to the pipe dose within the room to produce a pipe dose. The normal 60-year dose was also calculated and added to the pipe dose. This detailed location specific dose calculation showed that the dose for all areas outside containment with EQ cables manufactured by General Cable were below the qualification levels.

Kerite Cables

Qualification of EQ cables manufactured by Kerite to the higher radiation level requirements following EPU was demonstrated by a new EQ test report that envelopes the EPU higher dose.

Masoneilan I/P Transducers, and Valcor Solenoid Valves

The subject EQ devices are part of the Post Accident Sampling System (PASS). All PASS equipment has been removed from the PTN Technical Specifications and has been determined as not required to mitigate an accident or provide operator assessment capability. The devices in question were conservatively left on the EQ master list since they could still be operated. However, as part of the EPU implementation they will be removed from the master EQ list since they no longer provide a required post-accident function.

ii. **Provide a list of equipment that is being added to the master EQ list as a result of the new areas being designated as Harsh.**

The majority of the PTN EQ cables are identified on the EQ list by cable type and manufacturer. However, several cables are listed by manufacturer only. All cables in the new harsh radiation areas were reviewed and their specific cable type was checked against the EQ list. Seven cable types were found that did not exist on the EQ list and consequently were identified as new EQ cables. However, upon review of the EQ Doc Pacs for cables identified on the EQ list by manufacturer only, it was discovered that the 7 new cable types are included in the Doc Pacs for Rockbestos and Teledyne cables.

No new equipment was required to be added to the PTN EQ List as a result of the reviews performed for EPU since Rockbestos and Teledyne cables are on the existing EQ list.

iii. **Show how the newly added equipment meets EQ requirements under EPU conditions, and has been maintained as EQ for its installed life.**

No new equipment is being added to the PTN EQ List as a result of the reviews performed for EPU.

EEEB-1.4

In Section 2.3.1.2.3.4 of Attachment 4 of the LAR, the licensee stated that any Auxiliary Building EQ equipment that could not meet new EPU bounding radiation dose level was assessed for dose reduction. Factors included consideration for equipment shielding, and the actual distance from the radiation source.

Provide a list of equipment which could not meet the new EPU bounding radiation dose level and a brief summary of dose reduction factor(s) considered for each component including any planned modifications that shows that the resulting radiation dose will remain below the existing EQ level.

As described in EEEB-1.3.b above, Auxiliary Building equipment that could not meet the initial screening requirements for the increased radiation levels following EPU was identified. These components included EQ cables manufactured by Okonite, General Cable, and Kerite, and Masoneilan I/P transducers and Valcor solenoid valves. The Kerite cables were qualified by using an existing qualification report in EQ Doc Pac 34.2 that previously was not needed since higher radiation qualification was previously not required to qualify the cables at current licensed power level. As described in the response to EEEB-1.3.b above, the other Okonite and Genral cables had location-specific doses evaluated. As part of this evaluation, the distance of equipment from recirculation piping sources and shielding afforded by plant components was used to lower the effective radiation dose at the EQ devices. The Masoneilan I/P transducers and Valcor solenoid valves were removed from the EQ list since they are only required to support the PASS system which is no longer required to respond to a design basis LOCA.

No equipment modifications were determined to be necessary as a result of this review.

<u>EEEB-1.5</u>

In Section 2.3.1.2.4 of Attachment 4 of the LAR, the licensee stated that with respect to the license renewal described in NUREG-1779 [NUREG-1759], EPU activities do not add any new components, any new or previously unevaluated materials, nor introduce any new functions for existing components that would change the license renewal system evaluation boundaries.

Provide a summary of the evaluation that provides verification of above statement.

FPL evaluated impact of the EPU against the following License Renewal Program documents:

1. NUREG- 1759, "Safety Evaluation Report Related to the License Renewal of the Turkey Point, Units 3 and 4" [Reference 6]
2. "Turkey Point Nuclear Plant, Units 3 and 4, Application for Renewed Operating Licenses" [Reference 7]
3. Updated Final Safety Analysis Report, Chapter 16 "Aging Management Programs and Time Limited Aging Analysis" [Reference 8]
4. NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," US Nuclear Regulatory Commission [Reference 9]

The FPL evaluation focuses on identifying the potential impacts on the License Renewal Program elements due to the implementation of the FPL EPU Program.

No new aging effects have been identified for equipment in the EQ Program as a result of EPU. The evaluation for EPU conditions demonstrated the continued qualification of the existing equipment. The EQ program as described in FSAR Chapter 16.2.6 will continue to cover its scope of aging management through the license renewal period considering the EPU condition.

Some environmental parameters have changed due to EPU. Therefore, changes to some of the EQ Doc Pacs are required to incorporate the changes for LOCA, main steam line break (MSLB), high energy line break (HELB), and/or radiation dose changes. Therefore, the EPU will have an impact on the EQ of electrical equipment within the scope of the program.

FPL has assessed the effects of the proposed EPU on EQ of electrical equipment. FPL concludes that it has adequately addressed the effects of the proposed EPU on the environmental conditions and the qualification of electrical equipment. FPL further concludes that the electrical equipment will continue to meet the requirements of its current licensing basis with regard to 10 CFR 50.49 following implementation of the proposed EPU. Therefore, FPL finds the proposed EPU acceptable with respect to the EQ of electrical equipment.

EEEB-1.6

Explain why a maximum of 889 Megawatts Electric (MWe) generation of each unit was considered in the System Impact Study while the maximum main generator output is mentioned to be 899.8 MWe in Section 2.3.3.2.3 of Attachment 4 of the LAR.

The Generation Interconnection Service System Impact Study, submitted to the NRC by FPL letter L-2010-160 [Reference 10], was originally performed with heat balance data that represented the best information available at that time. That heat balance specified an EPU peak winter power level of 889 MWe under lowest cooling water temperature conditions. A subsequent heat balance performed after the original System Impact Study specified an EPU peak winter power level of 898.9 MWe under more stringent winter cooling water temperature assumptions. Addendum #2 to the System Impact Study (Attachment 2) addresses the impacts of using a revised more conservative power level of 899.8 MWe. No additional transmission reinforcements are required as a result of the higher generator output.

EEEB-1.7

Regarding Section 2.3.3.2.3 of Attachment 4 of the LAR, provide the existing and revised current transformer ratings of main generator.

The existing main generator current transformers (CTs) are rated 30000/5A with temperature rating of 130°C. The replacement CTs are rated 35000/5 A with ANSI accuracy classifications of C800 and temperature rating of 130°C (Class B insulation).

EEEB-1.8

Regarding Section 2.3.3.2.3 of Attachment 4 of the LAR, provide a summary of any major changes required to the main generator and main transformer protection, such as replacement of relays, as a result of the proposed EPU.

Since the generator and transformer nameplate rating increased in support of EPU, new CTs are required at the generator terminal. Therefore, 35000/5A CTs will replace the existing 30000/5A units. In addition, to accommodate the change in the generator capacitance, the generator neutral grounding transformer and resistor will be replaced. No major changes, such as protective relay replacements, are required.

EEEB-1.9

On page 2.3.3-7 of Attachment 4 of the LAR, the licensee stated that loads that will increase as a result of the proposed EPU include the heater drain pump, the intake cooling water pump, and the circulating water pump motors. However, no specific increase in loads for these pump motors is indicated in Table 2.3.3-15. Explain the apparent discrepancy.

The mechanical EPU evaluations determined the existing and EPU brake horsepower (BHP) loads of the heater drain pump, the intake cooling water pump, and the circulating water pump motors for comparison. The mechanical EPU evaluations determined that the BHP loads on these motors have increased under post-EPU conditions.

The information in Table 2.3.3-15 reflects the motor BHP loads used in the pre-EPU (existing) and post-EPU AC electrical distribution analyses. The motor loads used in the pre-EPU (existing) electrical analysis were modeled conservatively higher than the post-EPU loads determined in the mechanical EPU evaluations. The same conservative motor loads used in the pre-EPU (existing) electrical analysis were also used in the post-EPU electrical analysis. Therefore, the loads for these motors are viewed as unchanged values in the table. The increase in BHP load for these motors under post-EPU conditions remains bounded by the values credited in the pre-EPU electrical analysis.

EEEB-1.10

Regarding Page 2.3.3-7 and 2.3.3-8 of Attachment 4 of the LAR, provide the technical rationale for determining that it is acceptable for the maximum momentary short circuit currents exceeding the switchgear bus rating at 4.16 kV Buses 3AA1 and 3AB1 for existing conditions and at Buses 4AA1 and 4AB1 (Table 2.3.3-10) for both existing and EPU conditions.

As indicated in Table 2.3.3-10 below, in the pre-EPU configuration for PTN Units 3 and 4, the maximum momentary short circuit current exceeds the switchgear bus rating at 4.16 kV buses 3AA1, 3AB1, 4AA1 and 4AB1.

In addition, the electrical analysis which was originally presented in the EPU License Amendment Request (LAR) has been updated to reflect actual Unit Auxiliary Transformer (UAT) vendor test data. The new test data is the result of the plan to replace the UATs for non-EPU obsolescence reasons. As indicated in Table 2.3.3-10 below, the new UAT test data results in the buses 4AA1 and 4AB1 having a momentary overduty in the post-EPU configuration. This condition is eliminated for buses 3AA1 and 3AB1 in the post-EPU condition and, while still exceeding the buses' momentary rating. The severity is decreased for buses 4AA1 and 4AB1 in the post-EPU condition. Also, as shown in Table 2.3.3-12 below, the reactor coolant pump (RCP) and steam generator feed pump circuit breakers on bus 4AA1 have an interrupting short circuit current overduty in the pre-EPU and post-EPU configuration and the RCP circuit breakers on bus 4AB1 has an interrupting short circuit current overduty in the pre-EPU configuration.

These overduty conditions are still determined to be acceptable based on a very low likelihood of occurrence and low level of risk rationales as follows:

- The bus overload condition only exists when the associated Emergency Diesel Generator (EDG) is paralleled to the grid through the Unit Auxiliary Transformer (UAT). This condition occurs only during EDG testing which is one hour per month and 24 hours every 18 months. Sufficient margin on interrupting ratings exist when the EDG is not paralleled to the grid.

- When the EDG is paralleled to the grid it is considered inoperable since the EDG protective relaying response to an external system disturbance is not quick enough to trip the EDG circuit breaker.
- Paralleling an EDG to the grid does not overload the 4160 V buses or breakers.
- The 4160 V buses are connected in a delta phase configuration. This configuration will accommodate a grounded phase without creating a fault condition.
- There is a high resistance ground system that will provide indication of a ground event on any phase of the 4160 V buses with high sensitivity.
- Degradation of the insulation on the 4160 V buses will not be an acute event.
- The buses are enclosed in a ventilated compartment on top of the switchgear.
- The phase bus bars are sleeved with an insulated jacket and configured in a honeycomb insulating bus support arrangement. In this condition, a ground fault due to insulation board tracking would occur prior to a 3 phase fault.
- The 4160 V switchgear rooms have a closed ventilation system. Outside air is not forced through the room reducing potential contaminates or corrosion effects.
- The 4160V buses are thoroughly inspected on a 36 month interval.
- The 4160V breakers are thoroughly inspected on a 36 month interval.
- The Probabilistic Safety Analysis (PSA) model has a Core Damage Frequency (CDF) model that determined a probability of 4.5 E -07 per year for a fault occurring on a 4160 V bus when the EDG is loaded and paralleled with the grid. Even with this conservative assumption that the three-phase bolted fault occurs on a once per year interval, the change in the CDF is nearly three orders of magnitude less than what would be considered significant by the NRC.
- The EPU project and associated configuration changes are reducing the momentary short circuit loading on the 4160 V buses on both PTN units.

Based on the above, nuclear safety is not compromised for this condition. From the standpoint of personnel safety, there are many conservative factors used in the fault studies which, when combined and credited, lead FPL to conclude that exposure of the 3AA1, 3AB1, 4AA1 and 4AB1 buses to fault current levels exceeding their manufacturer's ratings is an event that can be deemed to be incredible.

Therefore, FPL concludes that no modification is needed to the bus and breaker capability to withstand the hypothetical fault levels that slightly exceed the manufacturers' ratings for infrequent EDG surveillance activities.

Table 2.3.3-10
4.16 kV Switchgear Bus Momentary Short Circuit Current

Bus	Maximum pre-EPU Momentary Duty, rms Asymmetrical (kA)	Maximum EPU Momentary Duty, rms Asymmetrical (kA)	Momentary Design Rating, rms Asymmetrical (kA)
Unit 3			
3AA1	79.799	77.632	78
3AA2	53.841	53.101	78
3AB1	79.014	76.169	78
3AB2	53.382	52.432	78
3AD	41.171	40.704	80
3C	68.448	68.291	78
Unit 4			
4AA1	84.252	82.503	78
4AA2	60.653	60.381	78
4AB1	83.398	80.041	78
4AB2	59.882	59.018	78
4AD	40.798	40.626	80
4C	66.364	66.212	78

Table 2.3.3-11
4.16 kV Switchgear Circuit Breaker Momentary Short Circuit Current

Bus	Maximum Pre-EPU Momentary Duty, rms Asymmetrical (kA)	Maximum EPU Momentary Duty, rms Asymmetrical (kA)	Momentary Design Rating, rms Asymmetrical (kA)
Unit 3			
3AA1	71.478	69.169	80
3AA2	53.527	52.785	80
3AB1	70.205	67.210	80
3AB2	53.075	52.123	80
3AD	40.885	40.416	60
3C	68.234	68.077	78
Unit 4			
4AA1	76.104	74.219	80
4AA2	60.343	60.069	80
4AB1	75.290	71.805	80
4AB2	59.571	58.706	80
4AD	40.545	40.370	60
4C	66.148	65.997	78

Table 2.3.3-12 4.16 kV Switchgear Circuit Breaker Interrupting Short Circuit Current				
Interrupting, Symmetrical (kA)				
Bus	**Pre-EPU**		**EPU**	
	Maximum Adjusted Duty	**Breaker Adjusted Rating**	**Maximum Adjusted Duty**	**Breaker Adjusted Rating**
Unit 3				
3AA1	44.165	46.119	44.702	46.215
3AA2	33.303	46.532	33.907	46.633
3AB1	43.304	46.136	43.183	46.248
3AB2	33.102	46.530	33.452	46.647
3AD	24.790	33.269	24.123	33.341
3C	42.318	45.135	42.261	45.172
Unit 4				
4AA1	47.169	46.429	47.825	46.505
4AA2	37.227	46.855	38.031	46.954
4AB1	46.691	46.325	46.057	46.446
4AB2	36.892	46.714	37.144	46.860
4AD	26.187	33.507	25.694	33.578
4C	41.276	44.966	41.224	44.991

EEEB-1.11

Regarding Page 2.3.3-10 of Attachment 4 of the LAR, provide a summary of calculations that shows that the degraded voltage relay and undervoltage relay settings at the 480 Volt load center buses are not adversely affected by operation under EPU conditions.

Motor starting analyses were performed to ensure sufficient bus voltages exist for proper functioning of the safety-related equipment.

If safety-related bus voltages drop to or below the maximum dropout setpoint limits of the degraded voltage (DGV) relays and of the under voltage (UV) relays – 327I, 327H, and 327T, then voltages at the safety-related buses must recover to or above the maximum pickup setpoint limits of the relays before the relaying time delay (timers or characteristic curves) expires.

Tables 1.11-1 and 1.11-2 show the existing relay setpoints for Relays 327I and 327H. Tables 1.11-3 and 1.11-4 show the resultant bus voltages for operation of Relays 327I and 327H under EPU motor starting conditions.

The relay settings in Tables 1.11-1 and 1.11-2 are compared against the EPU analysis resultant bus voltages in Tables 1.11-3 and 1.11-4 to ensure that the relays are able to pick-up, following a drop-out, within the minimum relay time setting.

The results in Tables 1.11-3 and 1.11-4 indicate that the DGV and UV relays are able to achieve pick-up, within the relay minimum time settings specified in Tables 1.11-1 and 1.11-2, following a drop-out. Therefore, the existing DGV and UV relay setpoints are demonstrated to be adequate under EPU.

Table 1.11-1
Degraded Voltage Relay (327I) Settings

Location - 480 V Load Center	Max Relay Dropout Setting	Max Relay Pickup Setting	Min Time Setting (Sec)
3A (3B01)	429 V	440.696 V	59.5
3B (3B02)	432 V	446.204 V	59.5
3C (3B03)	442 V	446.426 V	59.5
3D (3B04)	440 V	444.612 V	59.5
4A (4B01)	435 V	441.677 V	59.5
4B (4B02)	441 V	450.225 V	59.5
4C (4B03)	439 V	444.665 V	59.5
4D (4B04)	439 V	444.179 V	59.5

Table 1.11-2
Under Voltage Relay (327H) Settings

Location - 480 V Load Center	Max Relay Dropout Setting	Max Relay Pickup Setting	Min Time Setting (Sec)
3A (3B01)	435 V	439.047 V	9
3B (3B02)	443 V	447.046 V	9
3C (3B03)	439 V	443.046 V	9
3D (3B04)	439 V	443.046 V	9
4A (4B01)	440 V	444.046 V	9
4B (4B02)	439 V	443.046 V	9
4C (4B03)	439 V	443.046 V	9
4D (4B04)	435 V	439.047 V)	9

Table 1.11-3				
Loading Sequence Time (s)	**Bus Voltages for PSB-1/LOCA Motor Starts, (V)**			
	Train A		**Train B**	
	LC 3A (3B01)	**LC 3C (3B03)**	**LC 3B (3B02)**	**LC 3D (3B04)**
t = 0.0+	424	426	421	417
LB1: t = 0.11+	463	465	459	456
LB2: t = 3+	454	456	450	447
LB3: t = 11+	428	459	454	422
LB4: t = 18+	459	461	456	453
LB5: t = 25+	458	461	455	452
LB6: t = 32+	465	467	462	458
LB7: t = 39+	465	467	462	458
LB8: t = 44+	427	463	457	421
RCP: t = 48.1+	402	404	398	395
Steady State: t = 50+	466	468	463	459

Table 1.11-4				
Loading Sequence Time (s)	**Bus Voltages for PSB-1/LOCA Motor Starts, (V)**			
	Train A		**Train B**	
	LC 4A (4B01)	**LC 4C (4B03)**	**LC 4B (4B02)**	**LC 4D (4B04)**
t = 0.0+	424	427	423	422
LB1: t = 0.11+	463	466	460	461
LB2: t = 3+	434	454	448	432
Run: t = 4.1+	463	468	463	461
LB3: t = 11+	422	464	455	423
LB4: t = 18+	452	462	456	451
LB5: t = 25+	451	462	456	450
LB6: t = 32+	457	468	462	456
LB7: t = 39+	457	468	462	456
LB8: t = 44+	423	464	458	422
RCP: t = 48.1+	397	409	403	396
Steady State: t = 50+	458	469	463	457

Table 1.11-5 shows the existing relay setpoints and EPU analysis resultant bus voltages for operation of Relay 327T under EPU motor starting conditions. The time required for the bus voltage to increase from drop-out (D.O.), and exceed the maximum relay voltage setting, is determined from the relay characteristic curves. The relay settings are compared against the

tabulated resultant bus voltages to ensure that the relays are able to pick-up, following a drop-out, within the relay calculated pickup time.

The results in Table 1.11-5 indicate that the DGV 327T relays are able to achieve pick-up, within the relay calculated pickup time, following a drop-out. Note that the 327T relay on 480 V load center Bus 4D does not drop out under motor starting conditions. Therefore, the existing DGV 327T relay setpoints are demonstrated to be adequate under EPU.

Table 1.11-5

Load Center Bus	Max Relay Setting (V)	Calc D.O. Voltage (V)	Required Relay P.U. Time (Sec)	Calc P.U. Time (Sec)	Calc P.U. Voltage (V)
3A (3B01)	404	402	13	1.9	466
3B (3B02)	411.14	398	13	1.9	463
3C (3B03)	400.936	383	13	1.3	457
3D (3B04)	400.936	395	13	1.9	459
4A (4B01)	391	384	50	1.3	457
4B (4B02)	401	394	12	1.3	468
4C (4B03)	393	385	40	1.3	458

EEEB-1-12

Regarding Page 2.3.3-11 and 2.3.3-12 of Attachment 4 of the LAR, provide a summary of calculations that shows that emergency diesel generator (EDG) loading in the post-EPU state, after taking into account new loads and the loading on the 120 V alternating current vital (safety-related) instrument power systems, will remain within each EDG's capacity, even after taking into account EDG operation at extreme limits of revised frequency and voltage.

EDG Loading

EDG 3A, with the following ratings and the least margin among the EDGs at PTN is used as a bounding case.

Base Continuous Rating	2500 kW
Basic Overload Rating	2750 kW
2000 Hour Peaking Rating	2850 kW
168 Hour Emergency Rating	2950 kW
1/2 Hour Exceptional Rating	3050 kW

The EDG loadings for EDG 3A have been analyzed for changes under EPU conditions as shown below:

UNIT 3 MAXIMUM LOAD AT EPU EDG 3A		
Description	Load @ 60 Hz (kW)	Load @ 60.6 Hz (kW)
	Unit 3 LOOP with Unit 3 LOCA, 0-85.5 sec	Unit 3 LOOP with Unit 3 LOCA, 0-85.5 sec
Automatic Loads	1694.95	1741.08
Manual Loads	258.82	266.63
Automatic and Manual Loads	1953.77	2007.71

Notes:

1) The EDG load changes credit emergency containment filter fans 3V3A, B, C placed out of service under EPU and the intake cooling water pumps 3P9A, B, C load is increased to 271 kW under EPU
2) The EDG 3A SBO Pre-EPU and EPU Loading comparison is provided in the response to EEEB-1.14.

120 VAC Loading

For vital 120 VAC loadings for EPU, the changes are identified in EEEB-1.13 (EPU modifications, items 8 and 9). The new vital 120 VAC loads are powered through inverters and in the battery sizing calculation are configured for maximum loading. The highest calculated loading of any inverter pre-EPU is 93.74% loaded on a full load of 58.59A. The largest estimated load for any inverter from items 8 and 9 is 0.63A.

EEEB-1.13

Regarding Page 2.3.4-3 of Attachment 4 of the LAR, the licensee stated that both the safety related and non-safety related portions of the 125 V DC systems were evaluated to determine potential impacts due to EPU. The five non safety-related modifications discussed on Page 2.3.4-2 will have a small impact on the DC Power System. The current unused system capacity associated with the batteries and chargers is sufficient to accommodate the impact of these additional EPU loads on the DC Power System.

Provide a comparison of the existing loads to the EPU loads and the design rating for each safety related and non-safety related battery at Turkey Point Units 3 and 4.

There are no EPU plant modifications, or changes that adversely affect the DC Power system post EPU.

The batteries were calculated to have the following margins:

Safety Related Batteries

Battery	Actual Positive Plate	Pre-EPU Required Positive Plate	Margin	Post-EPU Required Positive Plate	Margin
3D03	12	10.72	10.6%	10.72	10.6%
3D24	8	6.378	20.3%	6.421	19.7%
4D24	8	7.005	12.4%	7.04	12.0%
4D03	12	11.91	0.8%	11.91	0.8%

Non-Safety Related Batteries

Battery	Actual Positive Plate	Pre-EPU Required Positive Plate	Margin	Post-EPU Required Positive Plate	Margin
3D34	16	12.291	23.2%	12.333	22.9%
4D34	16	12.214	23.7%	12.25	23.4%

The maximum load (worst period) on the batteries are as follows:

Safety Related Batteries		
Battery	Pre-EPU Highest Load (A)	Post-EPU Highest Load (A)
3D03	839	839
3D24	523	525.9
4D24	663	664.5
4D03	902	903.4

Non-Safety Related Batteries		
Battery	Pre-EPU Highest Load (A)	Post-EPU Highest Load (A)
3D34	842	844.08
4D34	841	843.08

There are nine (9) modifications being implemented for EPU that will result in minor changes to the safety related and non-safety related batteries as follows:

1. Replacement of the feedwater isolation valves will add DC solenoids to the safety related portion of the DC system. This modification is anticipated to have a small impact on the safety related portion of the DC power system.
2. Electro-hydraulic controls (EHC) upgrade will add DC solenoids, which have very low power requirements, to the non-safety related DC power system.
3. Leading edge flow meter (LEFM) feedwater flow metering will add AC loads to the non-safety related inverters.
4. Turbine digital controls upgrade will add AC loads to the non-safety related inverters.
5. Feedwater heater drains digital controls upgrade will add AC loads to the non-safety related inverters.
6. Re-powering of the alternate Spent Fuel Pool pump will add control circuit load to the safety related batteries.
7. Replacement of the Power System Stabilizer (PSS) will add load to the non-safety related batteries.
8. Replacement of the motor operated damper for the Normal Containment Coolers will add a momentary load to the vital inverters.
9. The pressurizer setpoint and control modification will replace 3 existing indicators on each unit, adding load to the vital inverters.

EEEB-1.14

Regarding Page 2.3.5-4 of Attachment 4 of the LAR, provide a summary of EDG station blackout (SBO) loads, with one unit in SBO and the other unit experiencing loss of offsite power event, for both existing and under EPU conditions.

The most limiting of the four Emergency Diesel Generators (EDGs) is EDG 3A. Therefore EDG 3A, with the least margin of the EDGs, is used for comparison:

Table 1.14-1
EDG SBO Loading Evaluation

Unit 3 Non Blackout (LOOP), Station Blackout on Unit 4 and only EDG 3A Available	90 Sec - 8 Hrs (kW)
Total - Unit 3 Automatic Loads	1035
Total - Unit 3 Manual Loads	510
Total - Unit 3 Auto and Manual Loads	1545
Total - Unit 4 Station Blackout Loads	1250
Total - Unit 3 Auto and Manual Loads and Unit 4 Station Blackout Loads	2795
EDG 3A 2000 Hour Rating	2850
EDG 3A 168 Hour Emergency Rating	2950
Design Margin for 2000 Hour Rating	55
Design Margin for 168 Hour Emergency Rating	155

Table 1.14-2
EDG SBO Loading Evaluation – Post-EPU with Overfrequency Operation

Unit 3 Non Blackout (LOOP), Station Blackout on Unit 4 and only EDG 3A Available	0.67% OF
	90 Sec - 8 Hrs (kW)
Total - Unit 3 Automatic Loads	1040
Total - Unit 3 Manual Loads	517
Total - Unit 3 Auto and Manual Loads	1557
Total - Unit 4 Station Blackout Loads	1264
Total - Unit 3 Auto and Manual Loads and Unit 4 Station Blackout Loads	2821
EDG 3A 2000 Hour Rating	2850
EDG 3A 168 Hour Emergency Rating	2950
Design Margin for 2000 Hour Rating	29
Design Margin for 168 Hour Emergency Rating	129

Note: Load center (LC) transformer losses were adjusted base on transformer actual loadings.

During an SBO event, after the automatic loads have been activated, manual loads are operator activated. The operator is required to verify that adequate kW margin is available prior to adding load to the EDG and adjust the frequency to be within the "Green Band" on the indicator as required. The "Green Band" provides a span of ±0.2 Hz, and when combined with a reading accuracy of ±0.2 Hz would maintain the frequency within ±0.4 Hz. The table above indicates that maintaining the frequency within 0.4 Hz (0.67 % over-frequency) the EDG load is under the 2000 hour rating by 29 kW.

References

1. M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request No. 205: Extended Power Uprate (EPU)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010
2. Email from J. Paige (NRC) to T. Abbatiello (FPL), "Turkey Point EPU – Electrical Engineering (EEEB) Request for Additional Information - Round 1," Accession No. ML110610719, March 2, 2011
3. IEEE 323 – 1974, "Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations"
4. NUREG-0588, "Interim Staff Position on Equipment Qualification of Safety-Related Electrical Equipment," February 5, 1980
5. NRC IE Bulleting 79-01B, "Environmental Qualification of Class 1E Equipment," January 14, 1980
6. NUREG- 1759, "Safety Evaluation Report Related to the License Renewal of the Turkey Point, Units 3 and 4," Accession No. ML021260004, April 2002
7. "Application for Renewed Operating Licenses", Turkey Point Nuclear Plant, Units 3 and 4, Accession No. ML003749538, September 8, 2000
8. Updated Final Safety Analysis Report, Chapter 16 "Aging Management Programs and Time Limited Aging Analysis"
9. NUREG-1801, "Generic Aging Lessons Learned (GALL) Report", US Nuclear Regulatory Commission, July 2001
10. M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-160), "Supplement to the Extended Power Uprate (EPU) License Amendment Request (LAR) No. 205: Regarding the EPU Related System Impact Study (SIS)," Accession No. ML103060107, October 29, 2010

Turkey Point Units 3 and 4

GENERATION INTERCOMMECTION SERVICE SYSTEM IMPACT STUDY

ATTACHMENT 2

This coversheet plus 47 pages

FPL EXTENDED POWER UPRATE PROJECTS
TURKEY POINT 3 & 4

SYSTEM IMPACT STUDY – ADDENDUM #2

3/23/2011

Summary:
Florida Power & Light Company ("FPL") has performed additional analysis to supplement the original System Impact Study ("SIS", dated 11/25/2008) and its first Addendum (dated 5/12/2010) regarding the increased power output of the Turkey Point 3 extended power uprate ("TP3 EPUP") & Turkey Point 4 extended power uprate projects ("TP4 EPUP"). This Addendum #2 incorporates FPL's latest revision to the Engineering Evaluation for the Extended Power Uprate, Revision 3 (March 9, 2011) which specifies a higher EPU Peak Winter Power output level for both TP3 EPUP and TP4 EPUP than was submitted in the original application for transmission service to add incremental generation at the Turkey Point ("TP") site. The original submission specified an EPU Peak Winter Power output level for both TP3 EPUP and TP4 EPUP of 889 MWe, while the revised output level for both TP3 EPUP and TP4 EPUP is specified as 899.8 MWe. The potential higher output of approximately 11 MW per nuclear unit under cold winter conditions was analyzed for both thermal and dynamic stability impacts. Short circuit impacts were not expected nor evaluated because the electrical characteristics of the generator components did not change significantly based on a review and comparison of the revised Engineering Evaluation against the original submittal. In summary, the results of these analyses indicate that the potential higher winter output (22 MWe total) of the EPU projects does not adversely impact the transmission system and does not require additional upgrading of facilities. This result was expected because the cold winter peak conditions are less severe to the transmission system in the geographic area of the Turkey Point site than hot summer conditions. Due to the relatively small incremental increase, output results are very similar to the results achieved in the original system impact study and the first Addendum.

This System Impact Study Addendum #2 includes:

- A review of the Engineering Evaluation Revision 3 Data Submittal;
- Revised Loadflow Analyses for Designation as an FPL Network Resource:
- Revised Dynamic Stability Analyses for selected contingencies

Theses additional analyses were performed in accordance with FPL's Facility Connection Requirements, NERC Reliability Standards (FAC-001, FAC-002, TPL-001, TPL-002, TPL-003 and NUC-001-2).

The required changes to the transmission system identified in the original SIS and the first Addendum were included as base assumptions in the additional analyses scenarios for this Addendum 2. The requirement to replace the existing power system stabilizers is also unchanged.

- The installation of two new 5 ohm inductors at the Turkey Point 230kV switchyard is required prior to the uprate of the second of two nuclear units (currently TP4, scheduled to occur on or about December, 2012), to reduce the available fault current at Turkey Point switchyard to acceptable levels with both of the TP nuclear units operating in their uprated configuration.
- Reduction of the existing breaker failure back-up (BFBU) total clearing time at Flagami 138kV substation from 15.3 cycles to 10.9 cycles is required.
- Reduction of the existing BFBU total clearing time at Davis 138kV substation from 13.3 cycles to 9.9 cycles is required.

- New Power System Stabilizers are required for TP units 3 & 4 to improve oscillations damping.

The results of the additional analyses for this SIS Addendum 2 are as follows:

Engineering Evaluation Revision 3 Data Submittal Review

A review of the revised data submittal indicated that the only significant change was that the EPU Peak Winter Power output level for both TP3 EPUP and TP4 EPUP was increased and would need to be evaluated. The EPU Summer Power output level was less than the previous submittal (851.7 MWe vs. 869 MWe) and did not need to be re-evaluated. The slight changes in some of the other modeling input parameters were incorporated in the analyses performed for the first Addendum and applicable analyses in this Addendum 2. They are not considered material and did not invalidate any of the results of the original SIS.

Loadflow Analyses

The loadflow analysis performed in the original SIS used in its assumptions the EPU winter peak and the EPU summer minimum output power levels reported in the Engineering Evaluation (Rev. 2, June 30, 2008). As a result of the submittal of a revised Engineering Evaluation (Rev. 3, March 9, 2011) with a slightly higher EPU winter peak output power level for each generator after EPU, the loadflow results portion of the original SIS is revised in this Addendum 2.

The results of the contingency power flow analysis indicated that there were no overloads of facilities that resulted from the increased EPU output levels that could not be mitigated by normal switching procedures. Also, no existing overloads in the cases were materially aggravated (more than 3%) due to the increased EPU output power levels. In addition, there were no low voltages observed due to the increased EPU output power.

Dynamic Stability Analysis

Dynamic simulations were performed using the latest available 2014 summer peak base case for dynamic simulations at both peak load and off peak (50% of peak) load levels with existing commitments of all the companies in Florida. The 2014 summer cases include the latest available transmission and generation assumptions for dynamic simulation and are appropriate for modeling the effects of increased EPU output levels. (Winter cases are not developed for dynamic stability simulations because the summer case models the most pessimistic scenario for stability.) The base cases are modified for study by modeling the higher EPU Peak Winter Power output level for both TP3 EPUP and TP4 EPUP (22 MWe incremental to original study cases).

The results of the dynamic stability analyses all indicate that the system remains stable with no load shedding under all conditions simulated, and the post-transient steady-state voltages after worst case contingencies are all within Nuclear Plant Interface Requirements ("NPIR") required ranges. The detailed results of the simulations are contained in the following tables.

Table 1 – 2014 Peak and Off-Peak Loading with TP3EPUP (simulates 2012 before TP4EPUP)
Table 2 – 2014 Peak and Off-Peak Loading with TP3EPUP and TP4EPUP
Table 3 – Power Flow Analysis, 2014 Summer Peak Loading with EPU Peak Winter Output for TP3 EPUP and TP4 EPUP

The following pages of this report contain the tables and associated plots for the analyses.

Table 1
2014 Summer with TP3EPUP (900 MWe)

Run ID	Description	Peak Loading	Off peak Loading
C_01/C_11	3-pha fault at Turkey Point on Turkey Point-Levee 230kV line, BRK 90 fails At 3 cy open Turkey Point-Levee line at Levee and convert fault to SLG, At 8.0 cy open Turkey Point-Levee line at Turkey Point & clear fault at Turkey Point 230kV.	System Stable Loadshed 0 MW	System Stable Loadshed 0 MW
C_02/C_12	3-pha fault at Levee 230kV on Turkey Point-Levee #1 230kV line. RELAY FAILURE at Turkey Point. At 4 cy open Levee end. At 28 cy clear fault and open Turkey Point end.	System Stable Loadshed 0 MW	System Stable Loadshed 0 MW
C_03/C_13	3-pha fault at Davis 230kVon Davis-Levee #1 line, Mid BRK 96 fails, at 4cy open Davis-Levee #1; at 9.0 cy open Davis-Turkey Point #3 & clear fault.	System Stable Loadshed 0 MW	System Stable Loadshed 0 MW
C_04/C_14	3-pha fault at Davis 138kV on Davis-Village Green line, Mid BRK 31 fails, at 4cy open Davis- Village Green; at 9.9 cy open Davis-Princeton & clear fault.	System Stable Loadshed 0 MW	System Stable Loadshed 0 MW
C_05/C_15	3-phase fault at Flagami capbank. Bus BRK 67 fails. 10.9 cycles open Flagami S 138kV bus brks & clear fault.	System Stable Loadshed 0 MW	System Stable Loadshed 0 MW

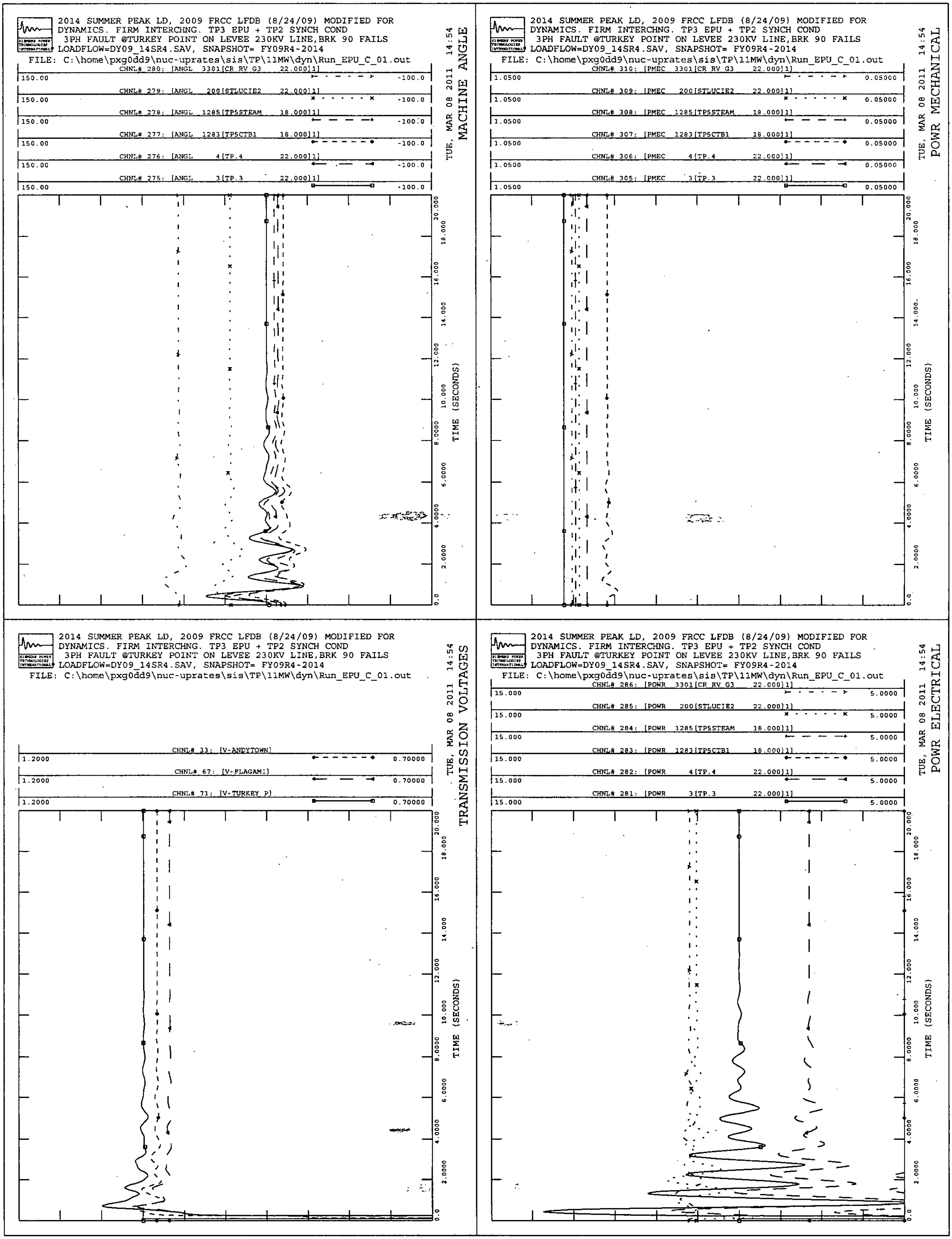
Table 2
2014 Summer with TP3EPUP and TP4EPUP (900 MWe each)

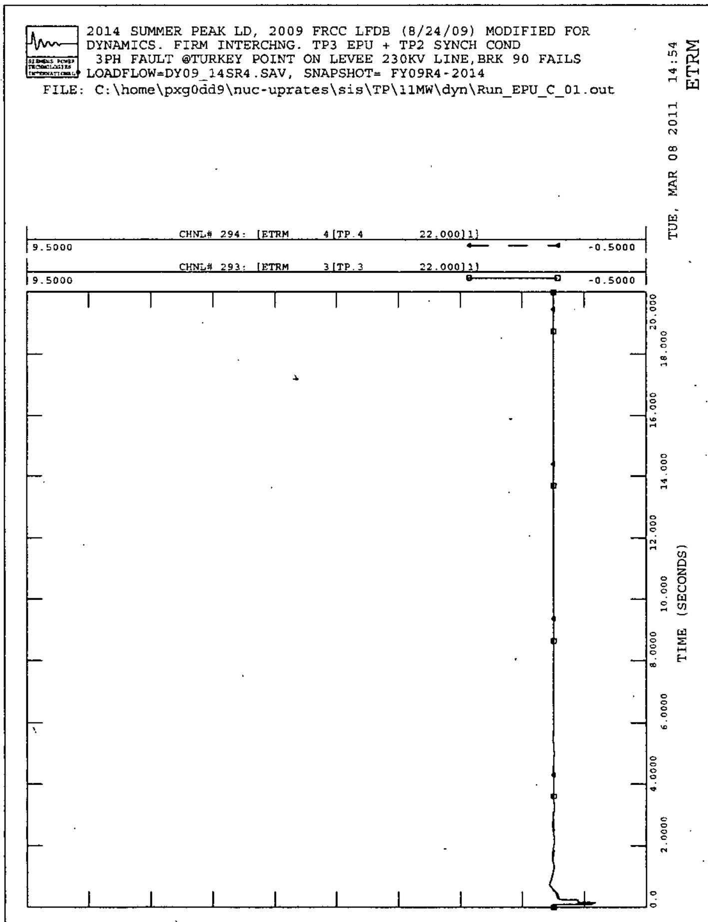
Run ID	Description	Peak Loading	Off peak Loading
C_06/C_16	3-pha fault at Turkey Point on Turkey Point-Levee 230kV line, BRK 90 fails At 3 cy open Turkey Point-Levee line at Levee and convert fault to SLG, At 8.0 cy open Turkey Point-Levee line at Turkey Point & clear fault at Turkey Point 230kV.	System Stable Loadshed 0 MW	System Stable Loadshed 0 MW
C_07/C_17	3-pha fault at Levee 230kV on Turkey Point-Levee #1 230kV line. RELAY FAILURE at Turkey Point. At 4 cy open Levee end. At 28 cy clear fault and open Turkey Point end.	System Stable Loadshed 0 MW	System Stable Loadshed 0 MW
C_08/C_18	3-pha fault at Davis 230kVon Davis-Levee #1 line, Mid BRK 96 fails, at 4cy open Davis-Levee #1; at 9.0 cy open Davis-Turkey Point #3 & clear fault.	System Stable Loadshed 0 MW	System Stable Loadshed 0 MW
C_09/C_19	3-pha fault at Davis 138kV on Davis-Village Green line, Mid BRK 31 fails, at 4cy open Davis- Village Green; at 9.9 cy open Davis-Princeton & clear fault.	System Stable Loadshed 0 MW	System Stable Loadshed 0 MW
C_10/C_20	3-phase fault at Flagami capbank. Bus BRK 67 fails. 10.9 cycles open Flagami S 138kV bus brks & clear fault.	System Stable Loadshed 0 MW	System Stable Loadshed 0 MW

Table 3
Power Flow Analysis – 2014 Summer Peak Loading with EPU Peak Winter Output for TP3EPUP and TP4EPUP

Scenario	Event	Turkey Point 230 voltage	Grid voltage or loading problems
TN3 EPU, TN4 EPU – 900 MW each	PTN @ 1800 MW gross	241.14	none
	PTN3 off, PTN4 tripped	239.53	none
	PTP5 off, PTN4 tripped	238.09	none

Dynamic Stability Plots for Table 1




2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
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TUE, MAR 08 2011 14:54
ETRM
CHNL# 294: [ETRM 4[TP.4 22.000]1]
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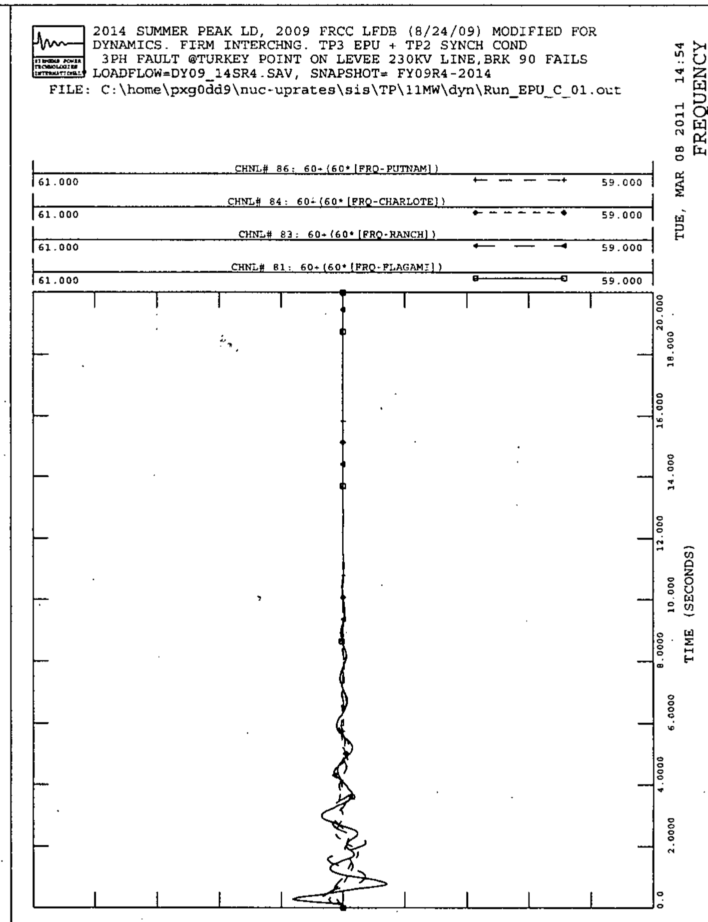
-0.5000
CHNL# 293: [ETRM 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
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TUE, MAR 08 2011 14:54
FREQUENCY
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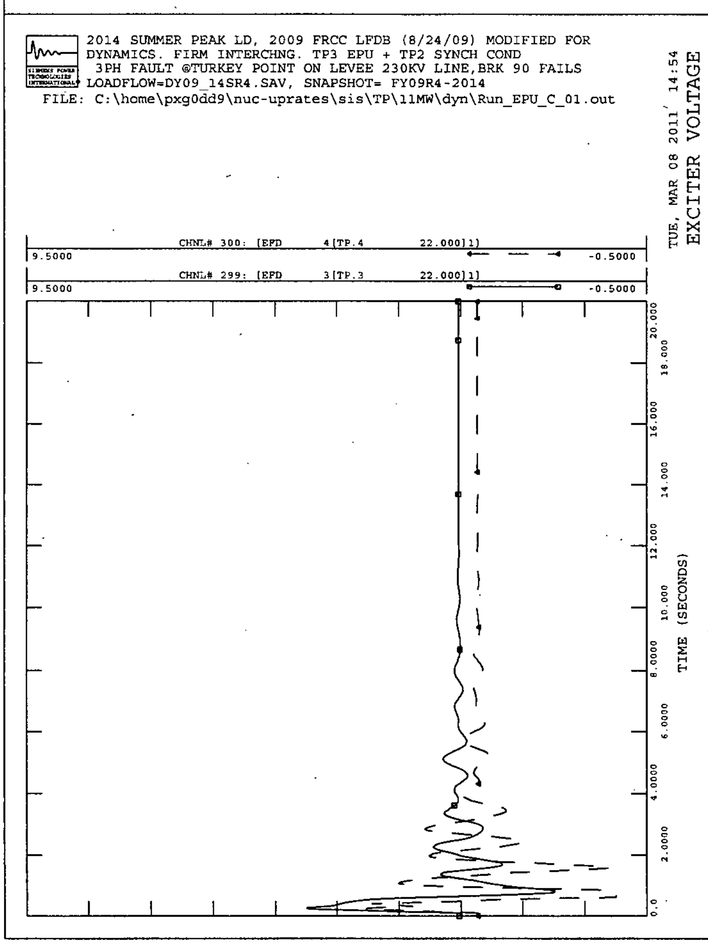
61.000
59.000
CHNL# 84: 60+(60*[FRQ-CHARLOTE])
61.000
59.000
CHNL# 83: 60+(60*[FRQ-RANCH])
61.000
59.000
CHNL# 81: 60+(60*[FRQ-FLAGAMI])
61.000
59.000
TIME (SECONDS)


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_01.out
TUE, MAR 08 2011 14:54
EXCITER VOLTAGE
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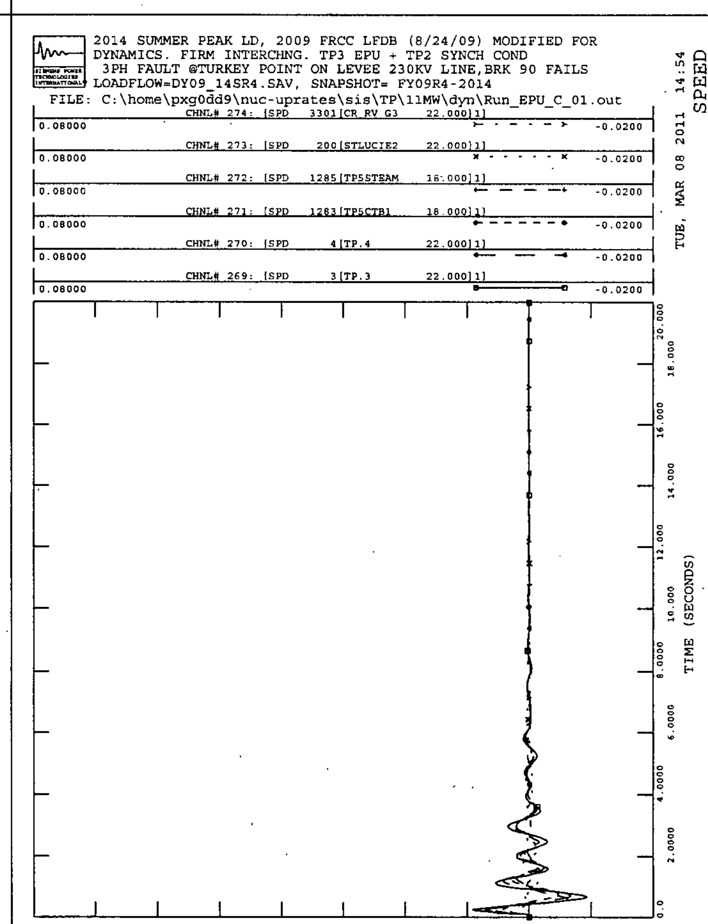
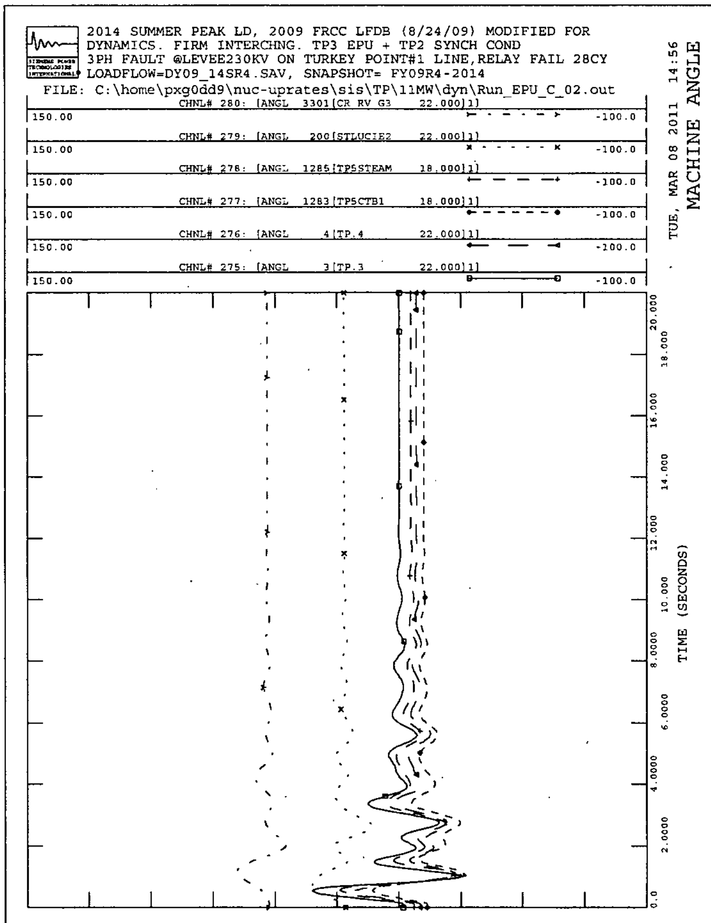
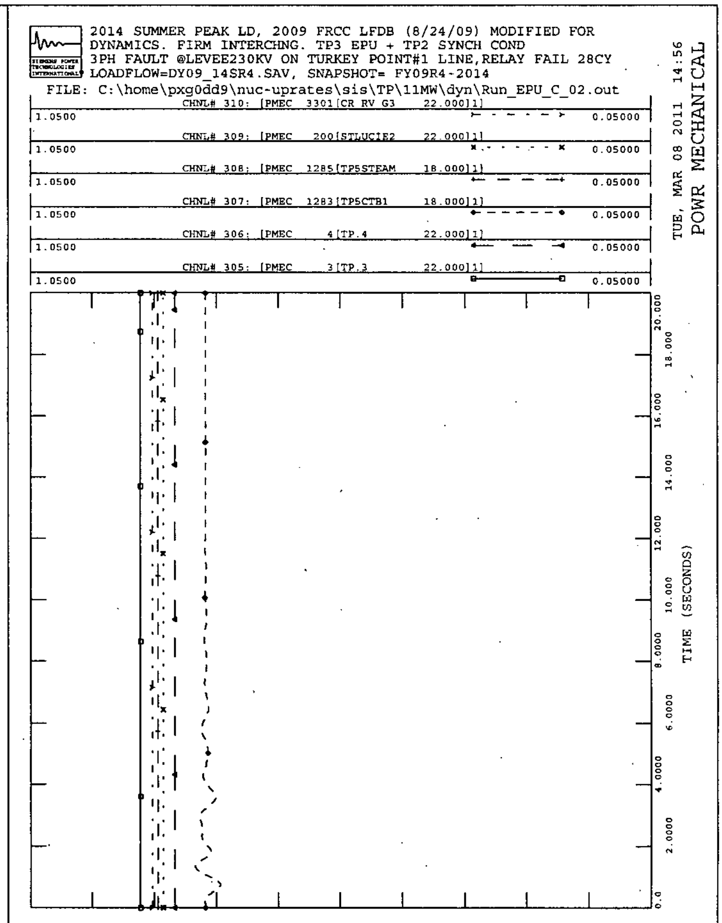
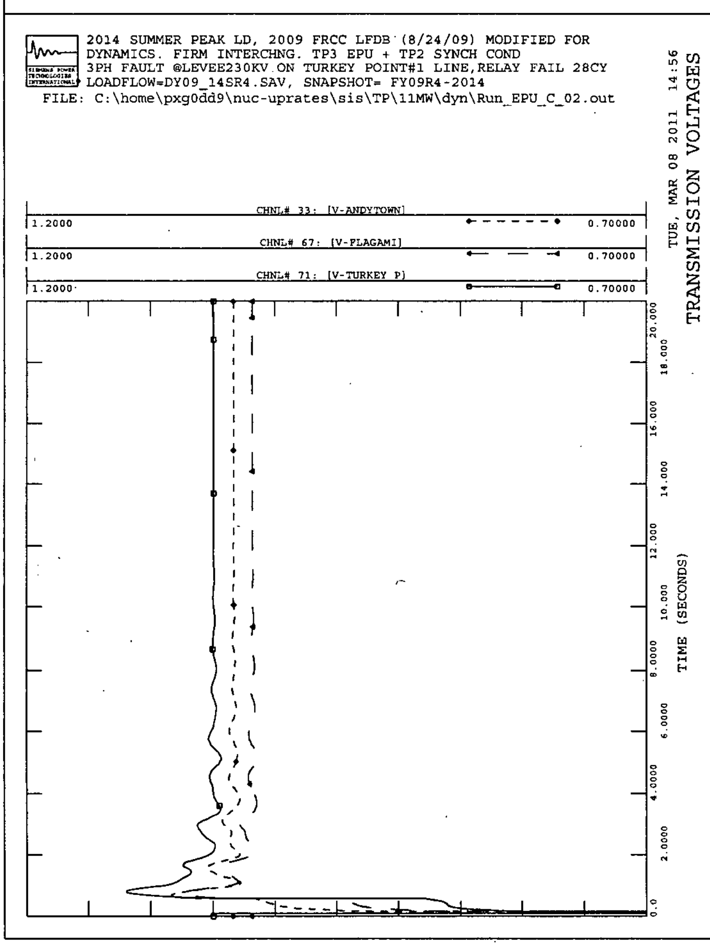
9.5000
-0.5000
CHNL# 299: [EFD 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)

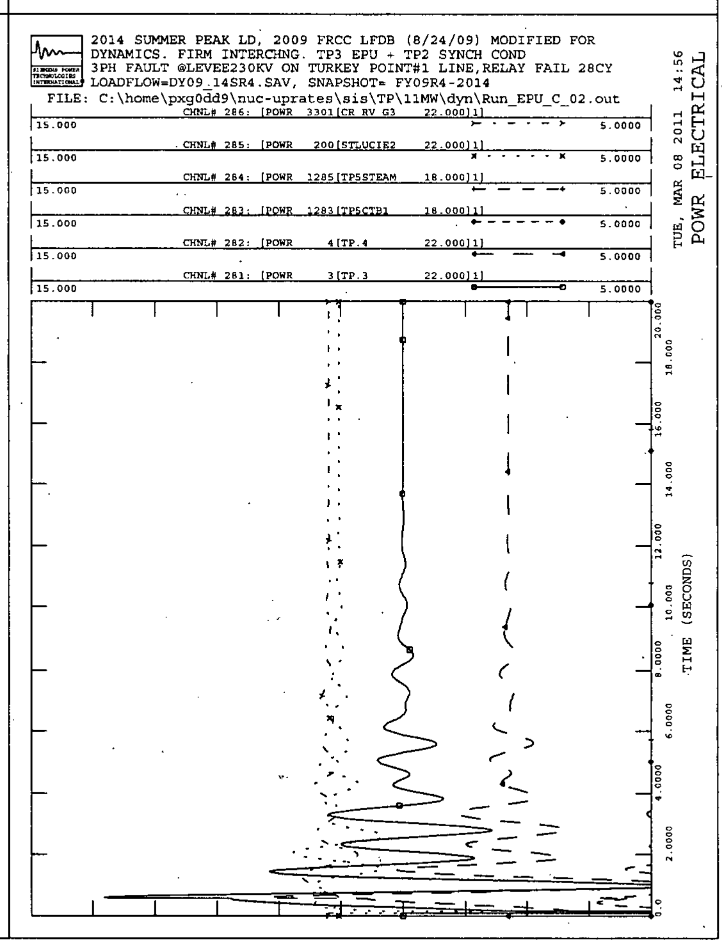

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_01.out
TUE, MAR 08 2011 14:54
SPEED
CHNL# 274: [SPD 3301[CR RV G3 22.000]1]
0.08000
-0.0200
CHNL# 273: [SPD 200[STLUCIE2 22.000]1]
0.08000
-0.0200
CHNL# 272: [SPD 1285[TP5STEAM 16.000]1]
0.08000
-0.0200
CHNL# 271: [SPD 1283[TP5CTB1 18.000]1]
0.08000
-0.0200
CHNL# 270: [SPD 4[TP.4 22.000]1]
0.08000
-0.0200
CHNL# 269: [SPD 3[TP.3 22.000]1]
0.08000
-0.0200
TIME (SECONDS)

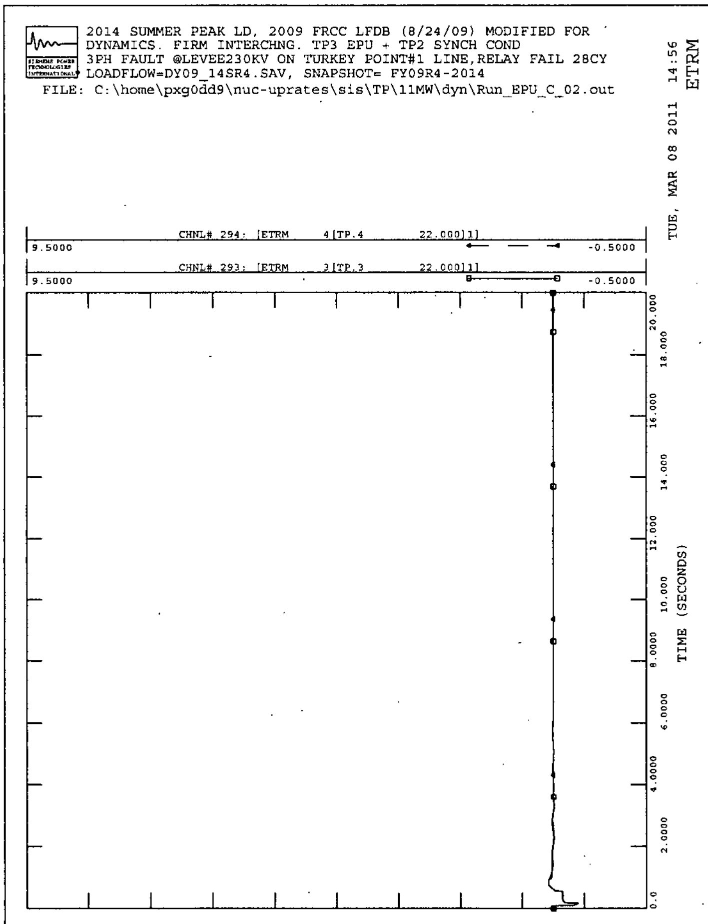
Dynamic Stability Plots for Table 1

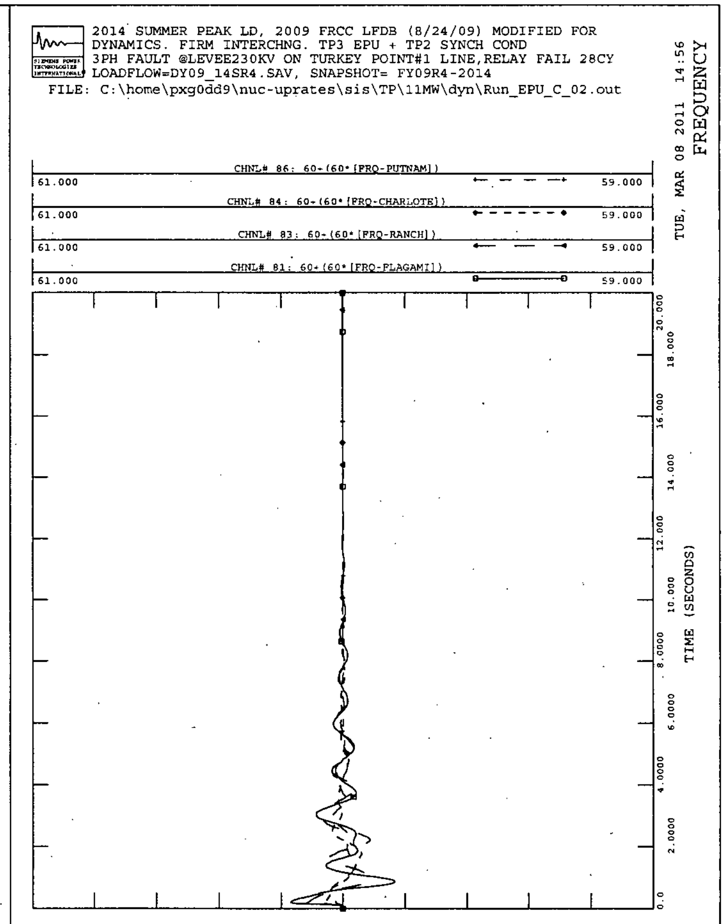


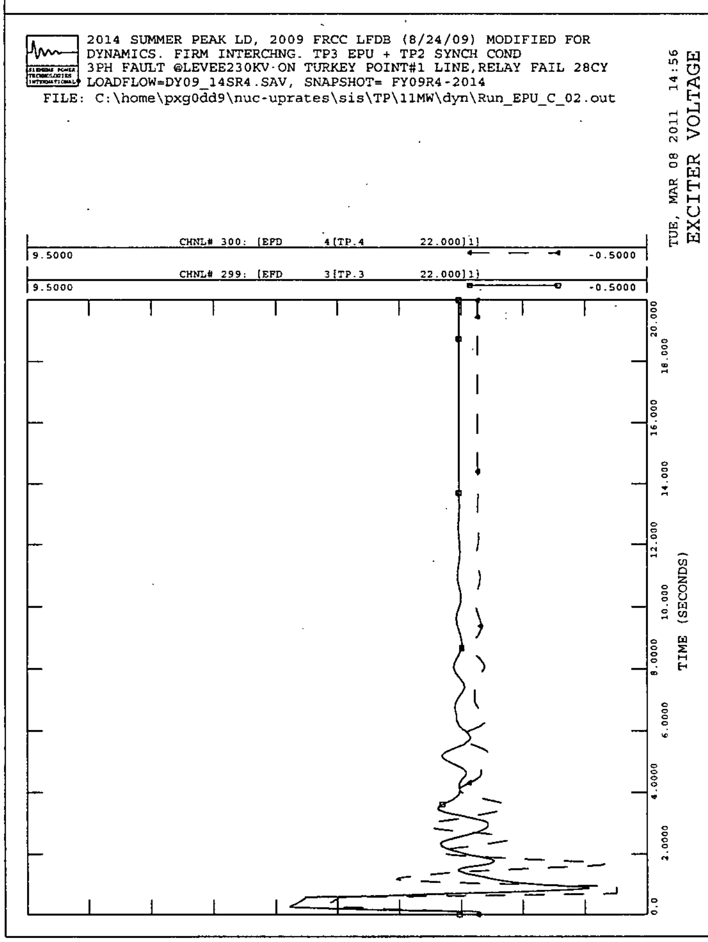


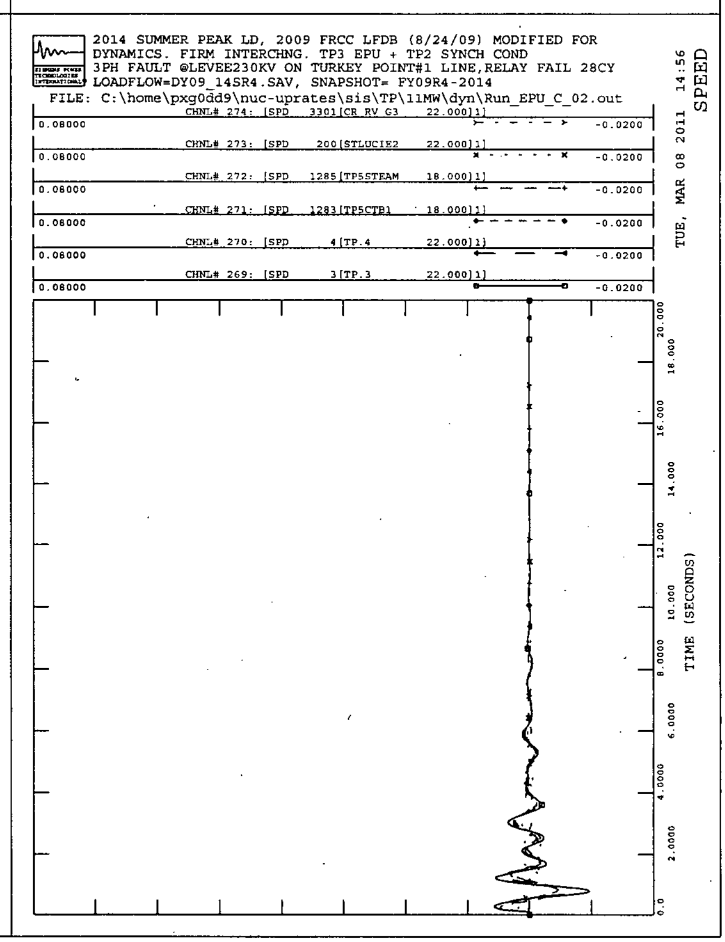


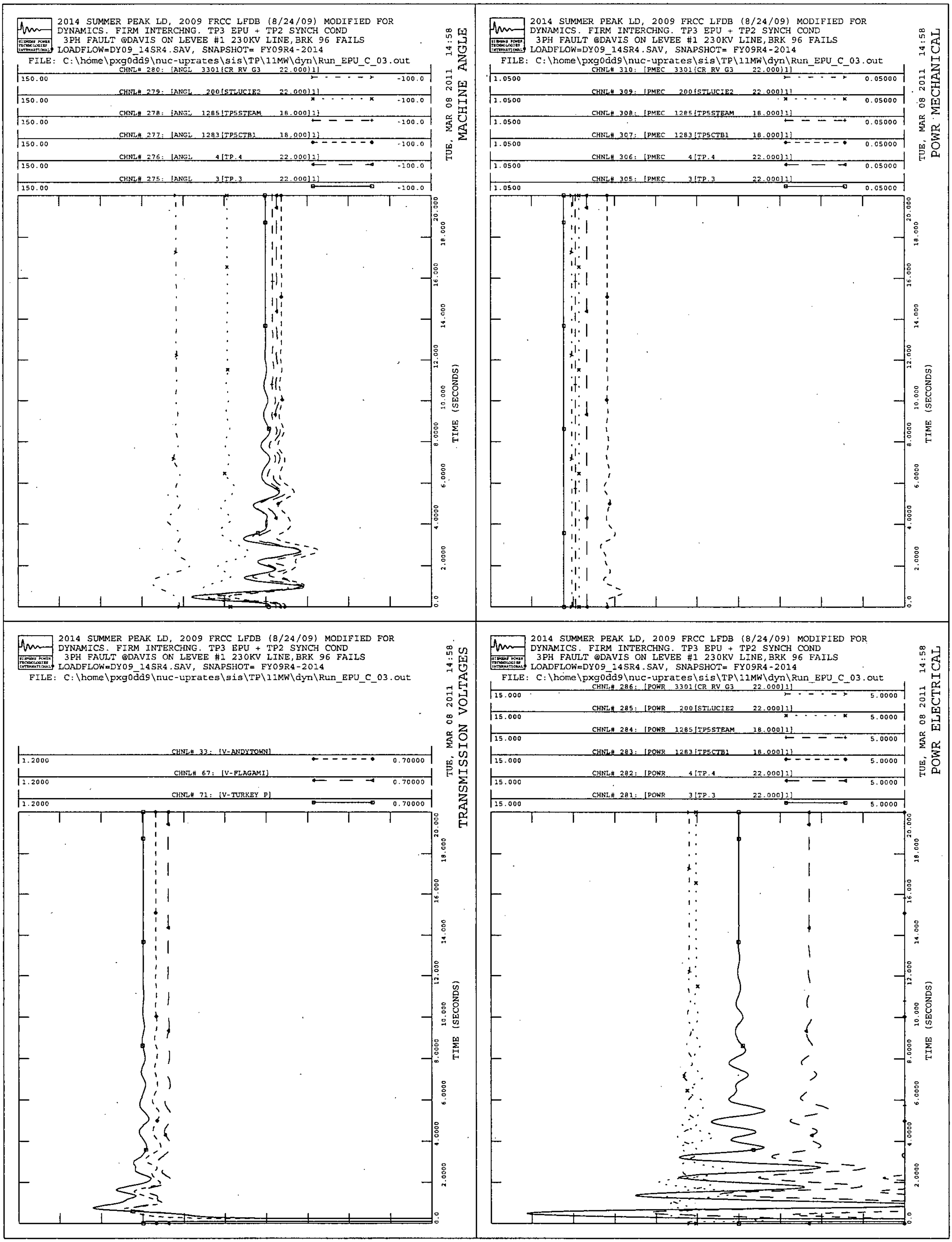



2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @LEVEE230KV ON TURKEY POINT#1 LINE,RELAY FAIL 28CY
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_02.out
TUE, MAR 08 2011 14:56
ETRM
CHNL# 294: [ETRM 4[TP.4 22.000]1]
9.5000
-0.5000
CHNL# 293: [ETRM 3[TP.3 22.000]1]
9.5000
-0.5000
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)

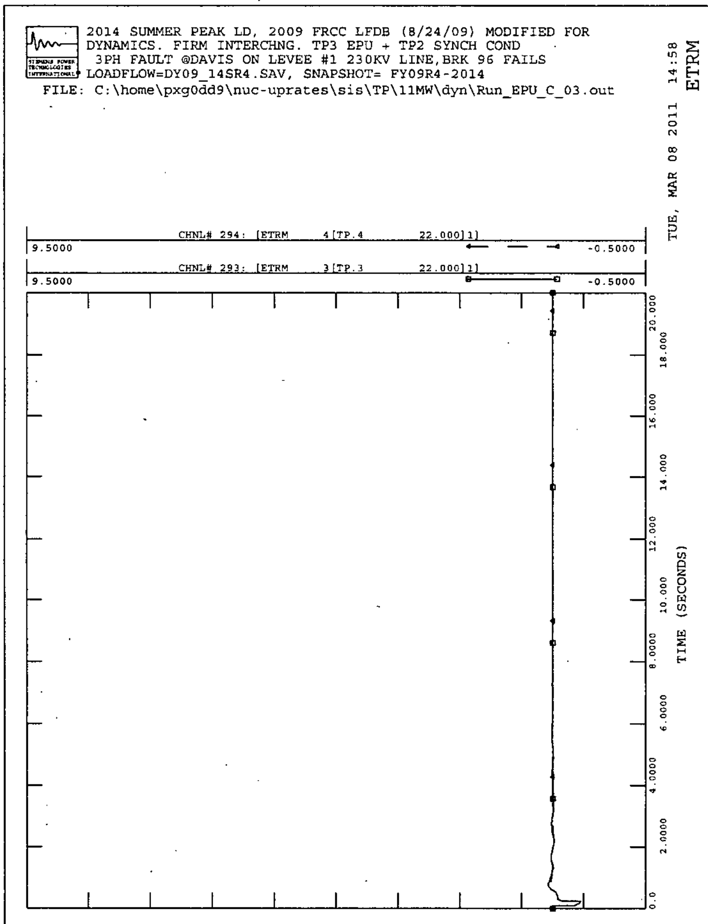

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @LEVEE230KV ON TURKEY POINT#1 LINE,RELAY FAIL 28CY
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_02.out
TUE, MAR 08 2011 14:56
FREQUENCY
CHNL# 86: 60+(60*[FRQ-PUTNAM])
61.000
59.000
CHNL# 84: 60+(60*[FRQ-CHARLOTE])
61.000
59.000
CHNL# 83: 60+(60*[FRQ-RANCH])
61.000
59.000
CHNL# 81: 60+(60*[FRQ-FLAGAMI])
61.000
59.000
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)

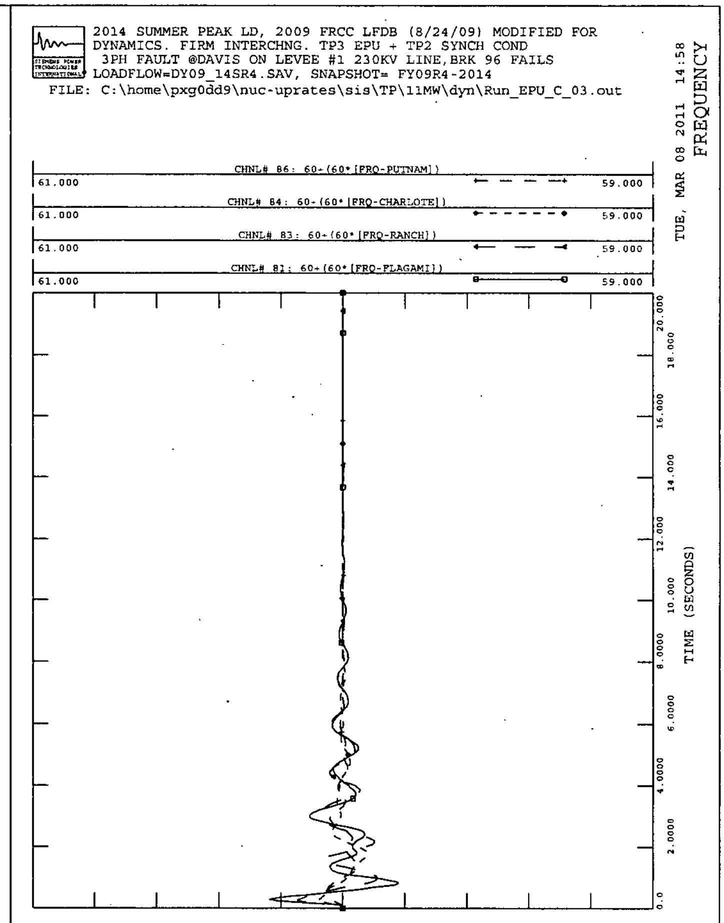

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @LEVEE230KV ON TURKEY POINT#1 LINE,RELAY FAIL 28CY
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_02.out
TUE, MAR 08 2011 14:56
EXCITER VOLTAGE
CHNL# 300: [EFD 4[TP.4 22.000]1]
9.5000
-0.5000
CHNL# 299: [EFD 3[TP.3 22.000]1]
9.5000
-0.5000
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)

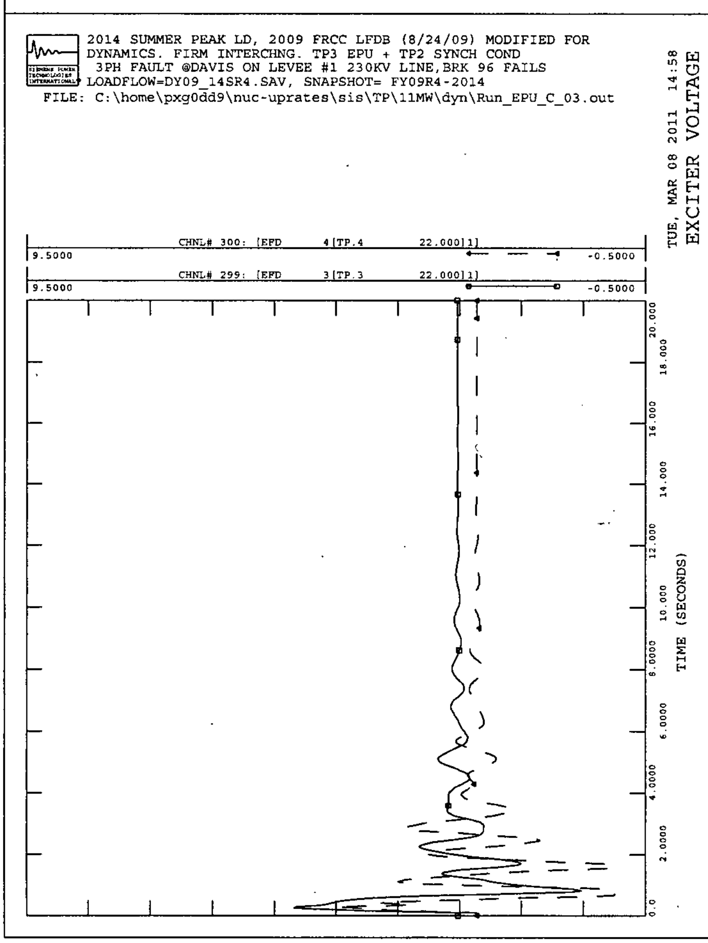

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @LEVEE230KV ON TURKEY POINT#1 LINE,RELAY FAIL 28CY
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_02.out
TUE, MAR 08 2011 14:56
SPEED
CHNL# 274: [SPD 3301[CR RV G3 22.000]1]
0.08000
-0.0200
CHNL# 273: [SPD 200[STLUCIE2 22.000]1]
0.08000
-0.0200
CHNL# 272: [SPD 1285[TP5STEAM 18.000]1]
0.08000
-0.0200
CHNL# 271: [SPD 1283[TP5CTB1 18.000]1]
0.08000
-0.0200
CHNL# 270: [SPD 4[TP.4 22.000]1]
0.08000
-0.0200
CHNL# 269: [SPD 3[TP.3 22.000]1]
0.08000
-0.0200
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)

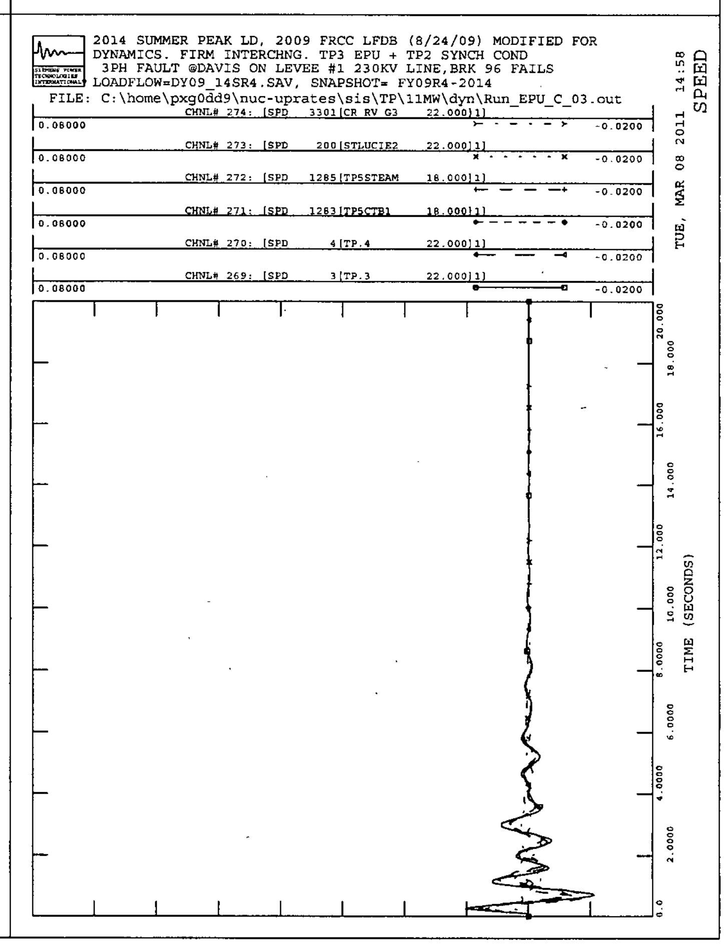


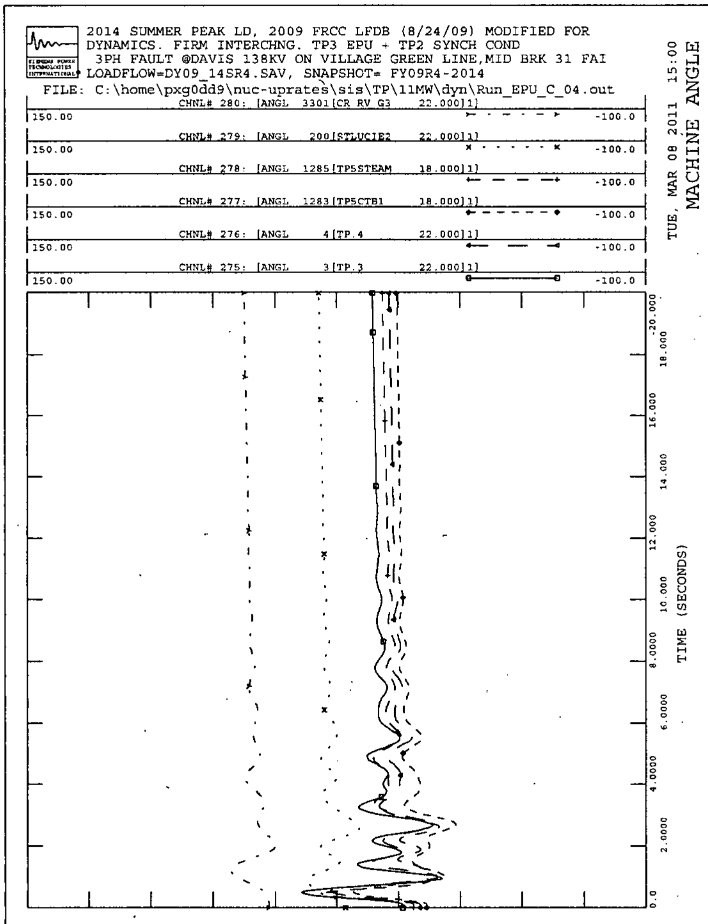
2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_03.out
TUE, MAR 08 2011 14:58
MACHINE ANGLE
CHNL# 280: [ANGL 3301[CR RV G3 22.000]1]
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1]
CHNL# 278: [ANGL 1285[TP5STEAM 18.000]1]
CHNL# 277: [ANGL 1283[TP5CTB1 18.000]1]
CHNL# 276: [ANGL 4[TP.4 22.000]1]
CHNL# 275: [ANGL 3[TP.3 22.000]1]
150.00
-100.0
POWR MECHANICAL
CHNL# 310: [PMEC 3301[CR RV G3 22.000]1]
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1]
CHNL# 308: [PMEC 1285[TP5STEAM 18.000]1]
CHNL# 307: [PMEC 1283[TP5CTB1 18.000]1]
CHNL# 306: [PMEC 4[TP.4 22.000]1]
CHNL# 305: [PMEC 3[TP.3 22.000]1]
1.0500
0.05000
TRANSMISSION VOLTAGES
CHNL# 33: [V-ANDYTOWN]
CHNL# 67: [V-FLAGAMI]
CHNL# 71: [V-TURKEY P]
1.2000
0.70000
POWR ELECTRICAL
CHNL# 286: [POWR 3301[CR RV G3 22.000]1]
CHNL# 285: [POWR 200[STLUCIE2 22.000]1]
CHNL# 284: [POWR 1285[TP5STEAM 18.000]1]
CHNL# 283: [POWR 1283[TP5CTB1 18.000]1]
CHNL# 282: [POWR 4[TP.4 22.000]1]
CHNL# 281: [POWR 3[TP.3 22.000]1]
15.000
5.0000
TIME (SECONDS)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000

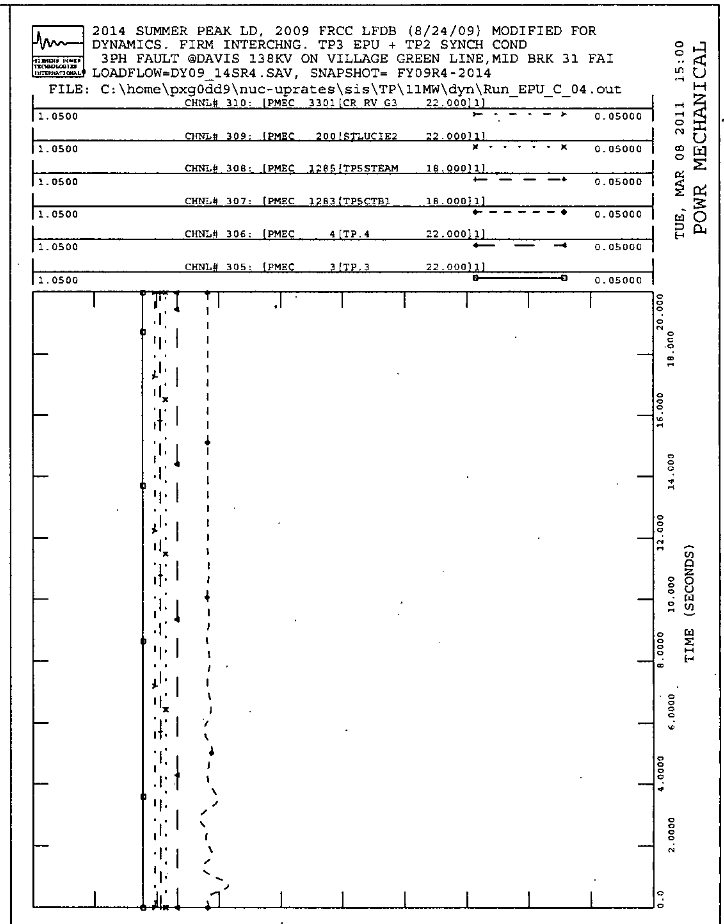

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_03.out
TUE, MAR 08 2011 14:58
ETRM
CHNL# 294: [ETRM 4[TP.4 22.000]1]
9.5000
-0.5000
CHNL# 293: [ETRM 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)

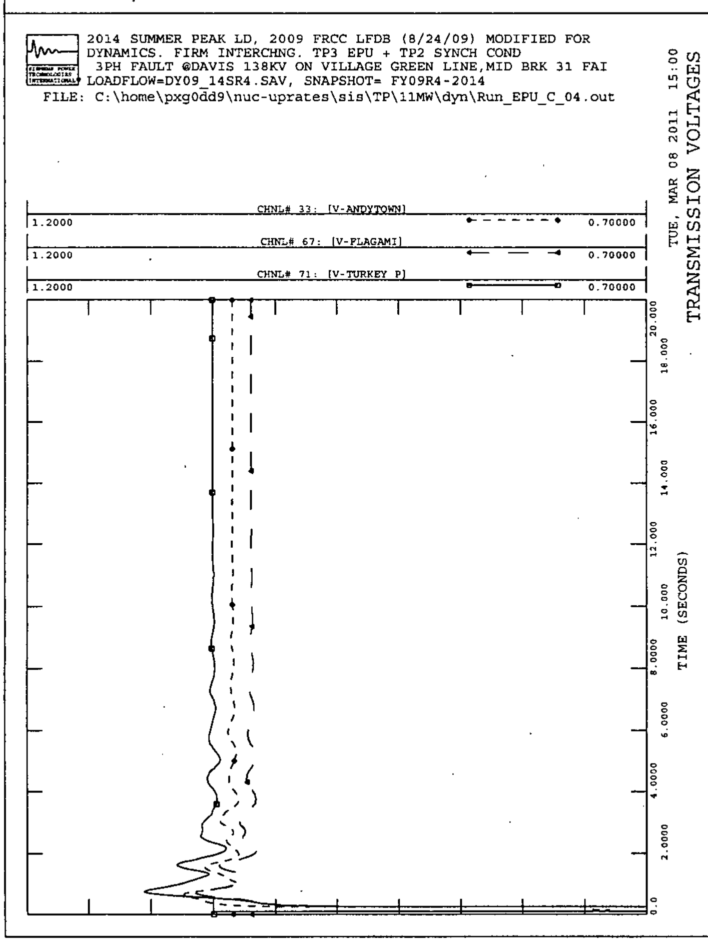

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_03.out
TUE, MAR 08 2011 14:58
FREQUENCY
CHNL# 86: 60+(60*[FRQ-PUTNAM])
CHNL# 84: 60+(60*[FRQ-CHARLOTE])
CHNL# 83: 60+(60*[FRQ-RANCH])
CHNL# 81: 60+(60*[FRQ-FLAGAMI])
61.000
59.000
TIME (SECONDS)

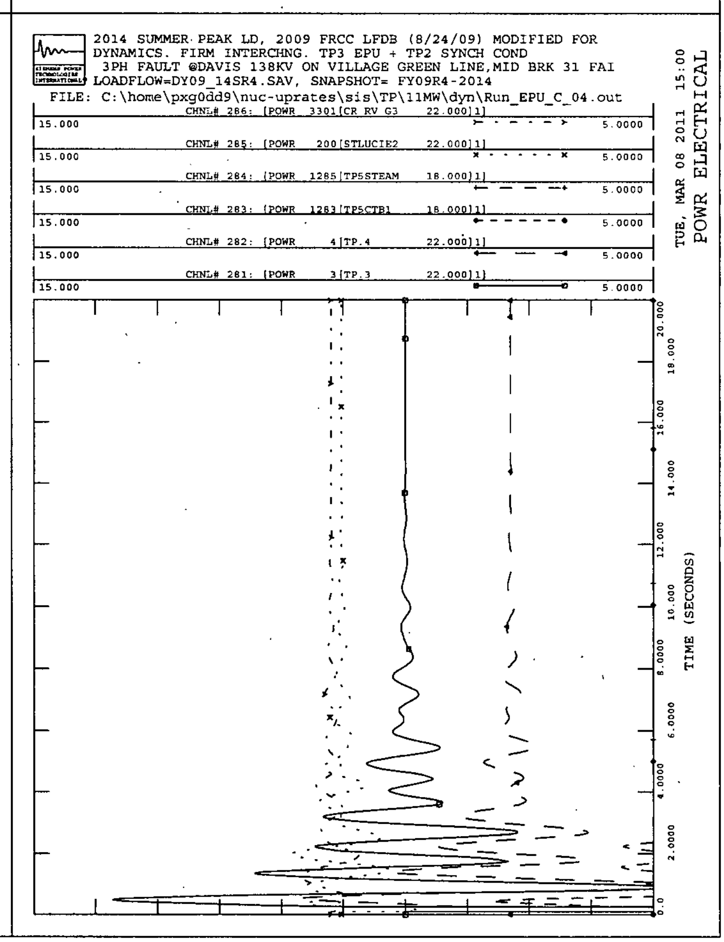

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_03.out
TUE, MAR 08 2011 14:58
EXCITER VOLTAGE
CHNL# 300: [EFD 4[TP.4 22.000]1]
9.5000
-0.5000
CHNL# 299: [EFD 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_03.out
TUE, MAR 08 2011 14:58
SPEED
CHNL# 274: [SPD 3301[CR RV G3 22.000]1]
CHNL# 273: [SPD 200[STLUCIE2 22.000]1]
CHNL# 272: [SPD 1285[TP5STEAM 18.000]1]
CHNL# 271: [SPD 1283[TP5CTB1 18.000]1]
CHNL# 270: [SPD 4[TP.4 22.000]1]
CHNL# 269: [SPD 3[TP.3 22.000]1]
0.08000
-0.0200
TIME (SECONDS)

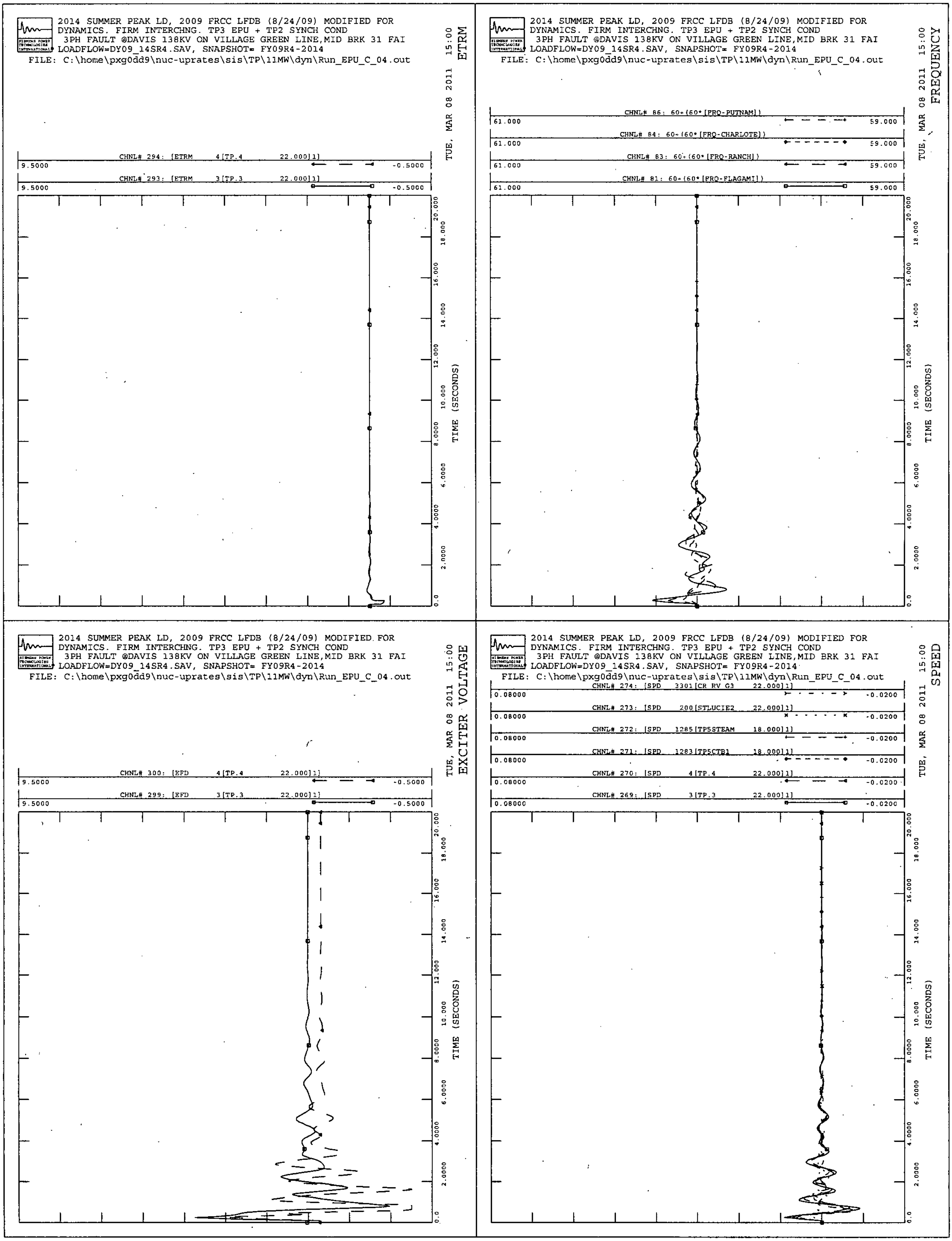

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_04.out
CHNL# 280: [ANGL 3301[CR RV G3 22.000]1]
150.00 -100.0
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1]
150.00 -100.0
CHNL# 278: [ANGL 1285[TP5STEAM 18.000]1]
150.00 -100.0
CHNL# 277: [ANGL 1283[TP5CTB1 18.000]1]
150.00 -100.0
CHNL# 276: [ANGL 4[TP.4 22.000]1]
150.00 -100.0
CHNL# 275: [ANGL 3[TP.3 22.000]1]
150.00 -100.0
TUE, MAR 08 2011 15:00
MACHINE ANGLE
TIME (SECONDS)
0.0 2.0000 4.0000 6.0000 8.0000 10.000 12.000 14.000 16.000 18.000 20.000

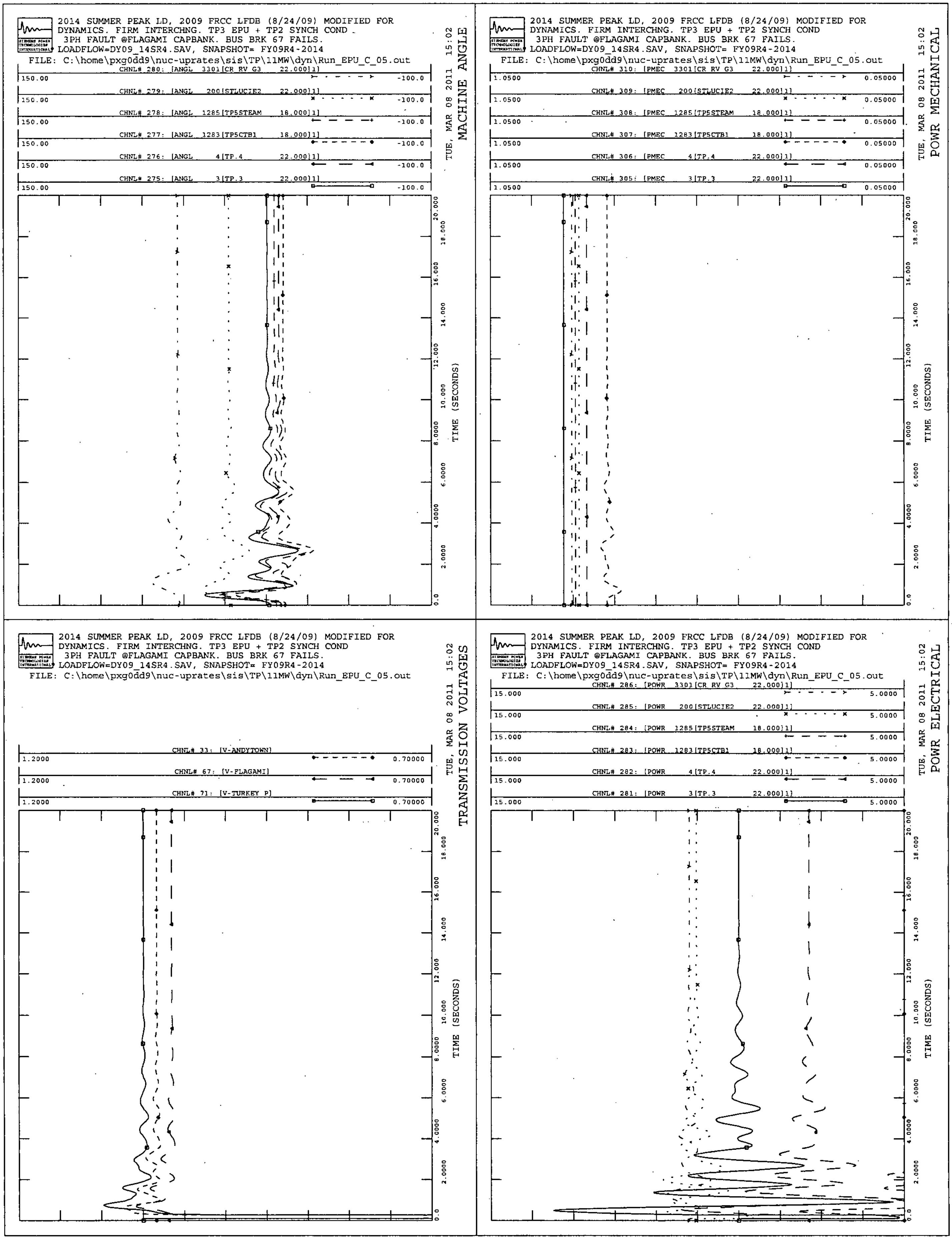

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_04.out
CHNL# 310: [PMEC 3301[CR RV G3 22.000]1]
1.0500 0.05000
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1]
1.0500 0.05000
CHNL# 308: [PMEC 1285[TP5STEAM 18.000]1]
1.0500 0.05000
CHNL# 307: [PMEC 1283[TP5CTB1 18.000]1]
1.0500 0.05000
CHNL# 306: [PMEC 4[TP.4 22.000]1]
1.0500 0.05000
CHNL# 305: [PMEC 3[TP.3 22.000]1]
1.0500 0.05000
TUE, MAR 08 2011 15:00
POWR MECHANICAL
TIME (SECONDS)
0.0 2.0000 4.0000 6.0000 8.0000 10.000 12.000 14.000 16.000 18.000 20.000


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_04.out
CHNL# 33: [V-ANDYTOWN]
1.2000 0.70000
CHNL# 67: [V-FLAGAMI]
1.2000 0.70000
CHNL# 71: [V-TURKEY P]
1.2000 0.70000
TUE, MAR 08 2011 15:00
TRANSMISSION VOLTAGES
TIME (SECONDS)
0.0 2.0000 4.0000 6.0000 8.0000 10.000 12.000 14.000 16.000 18.000 20.000

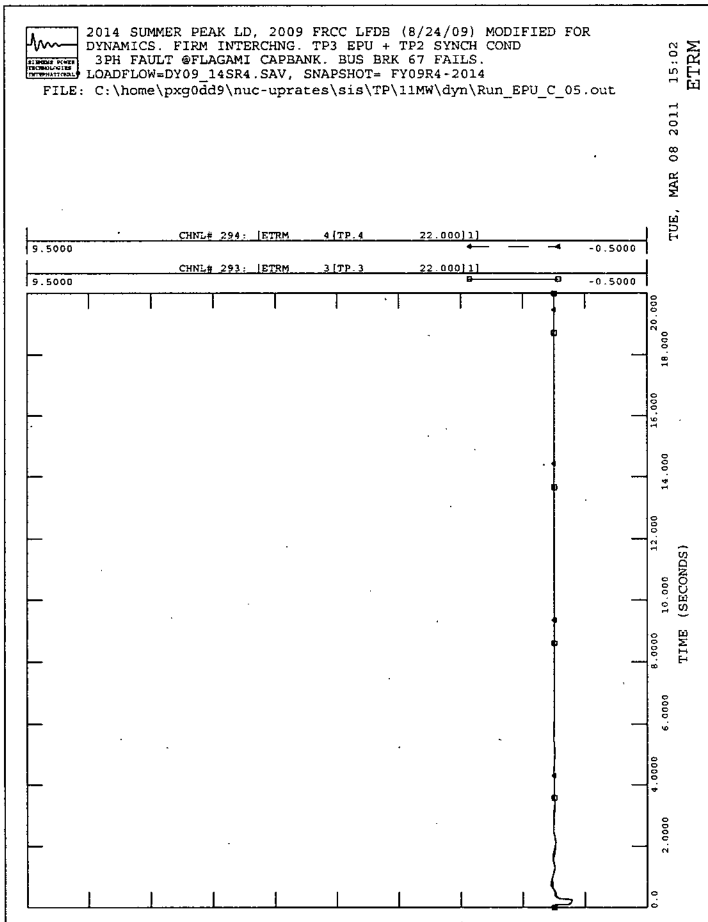

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_04.out
CHNL# 286: [POWR 3301[CR RV G3 22.000]1]
15.000 5.0000
CHNL# 285: [POWR 200[STLUCIE2 22.000]1]
15.000 5.0000
CHNL# 284: [POWR 1285[TP5STEAM 18.000]1]
15.000 5.0000
CHNL# 283: [POWR 1283[TP5CTB1 18.000]1]
15.000 5.0000
CHNL# 282: [POWR 4[TP.4 22.000]1]
15.000 5.0000
CHNL# 281: [POWR 3[TP.3 22.000]1]
15.000 5.0000
TUE, MAR 08 2011 15:00
POWR ELECTRICAL
TIME (SECONDS)
0.0 2.0000 4.0000 6.0000 8.0000 10.000 12.000 14.000 16.000 18.000 20.000

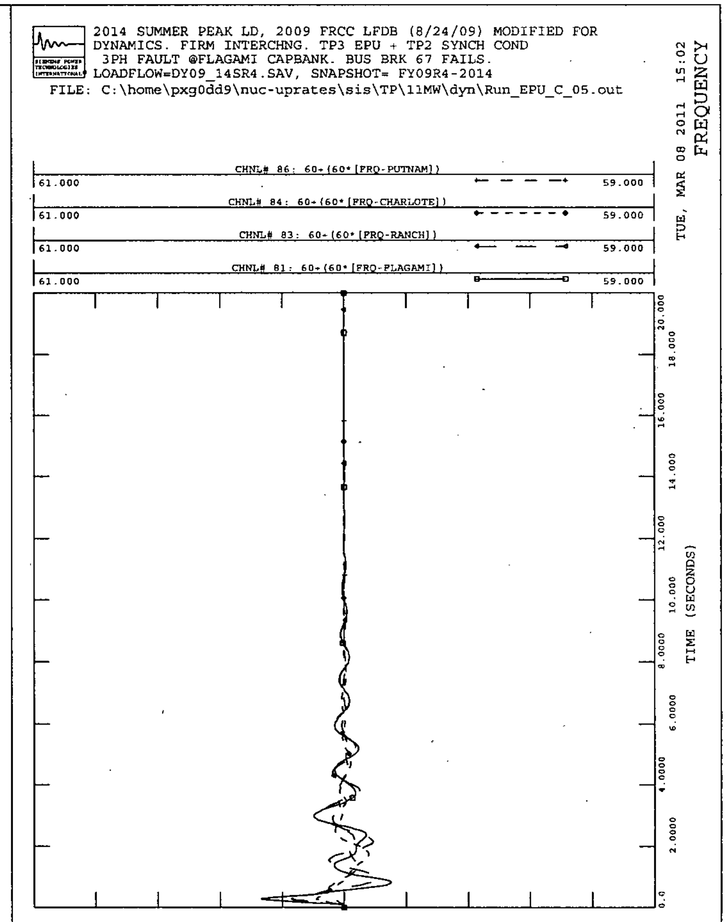
Dynamic Stability Plots for Table 1

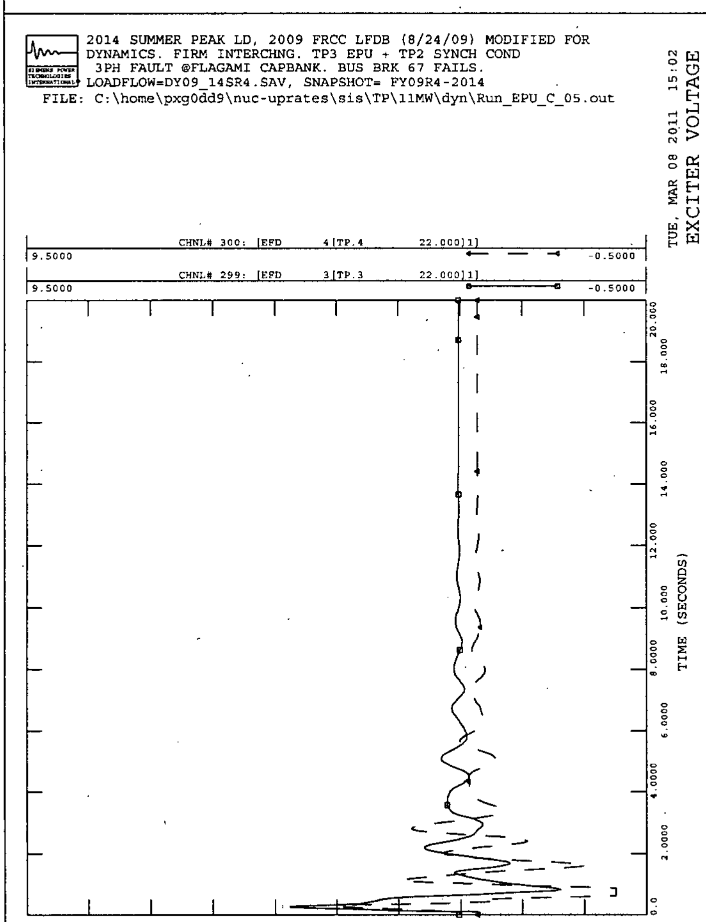


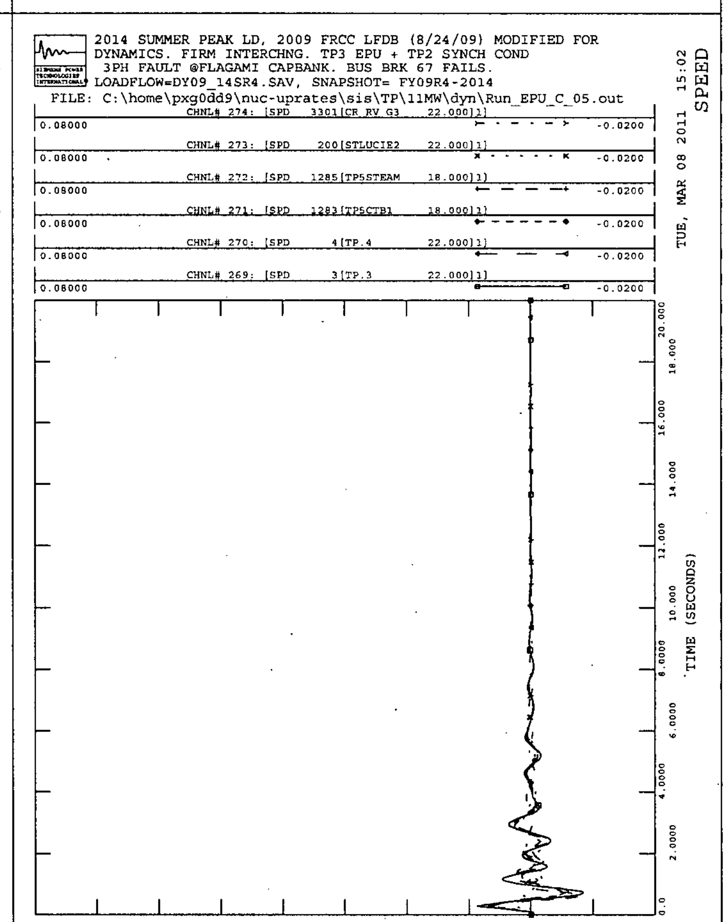

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_05.out
TUE, MAR 08 2011 15:02
MACHINE ANGLE
POWR MECHANICAL
TRANSMISSION VOLTAGES
POWR ELECTRICAL
TIME (SECONDS)
CHNL# 280: [ANGL 3301[CR RV G3 22.000]1]
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1]
CHNL# 278: [ANGL 1285[TP5STEAM 18.000]1]
CHNL# 277: [ANGL 1283[TP5CTB1 18.000]1]
CHNL# 276: [ANGL 4[TP.4 22.000]1]
CHNL# 275: [ANGL 3[TP.3 22.000]1]
CHNL# 310: [PMEC 3301[CR RV G3 22.000]1]
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1]
CHNL# 308: [PMEC 1285[TP5STEAM 18.000]1]
CHNL# 307: [PMEC 1283[TP5CTB1 18.000]1]
CHNL# 306: [PMEC 4[TP.4 22.000]1]
CHNL# 305: [PMEC 3[TP.3 22.000]1]
CHNL# 33: [V-ANDYTOWN]
CHNL# 67: [V-FLAGAMI]
CHNL# 71: [V-TURKEY P]
CHNL# 286: [POWR 3301[CR RV G3 22.000]1]
CHNL# 285: [POWR 200[STLUCIE2 22.000]1]
CHNL# 284: [POWR 1285[TP5STEAM 18.000]1]
CHNL# 283: [POWR 1283[TP5CTB1 18.000]1]
CHNL# 282: [POWR 4[TP.4 22.000]1]
CHNL# 281: [POWR 3[TP.3 22.000]1]

<u>Dynamic Stability Plots for Table 1</u>

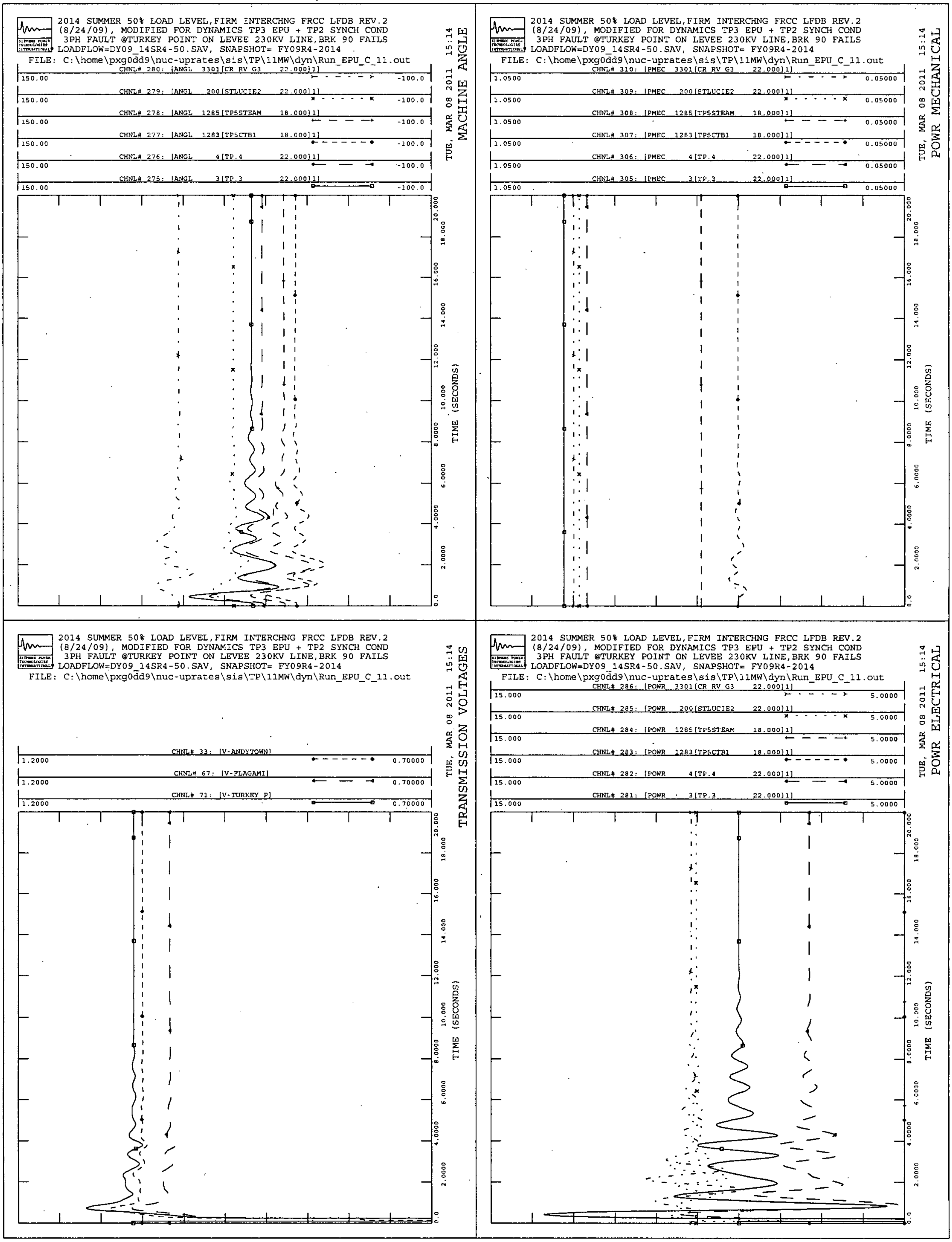




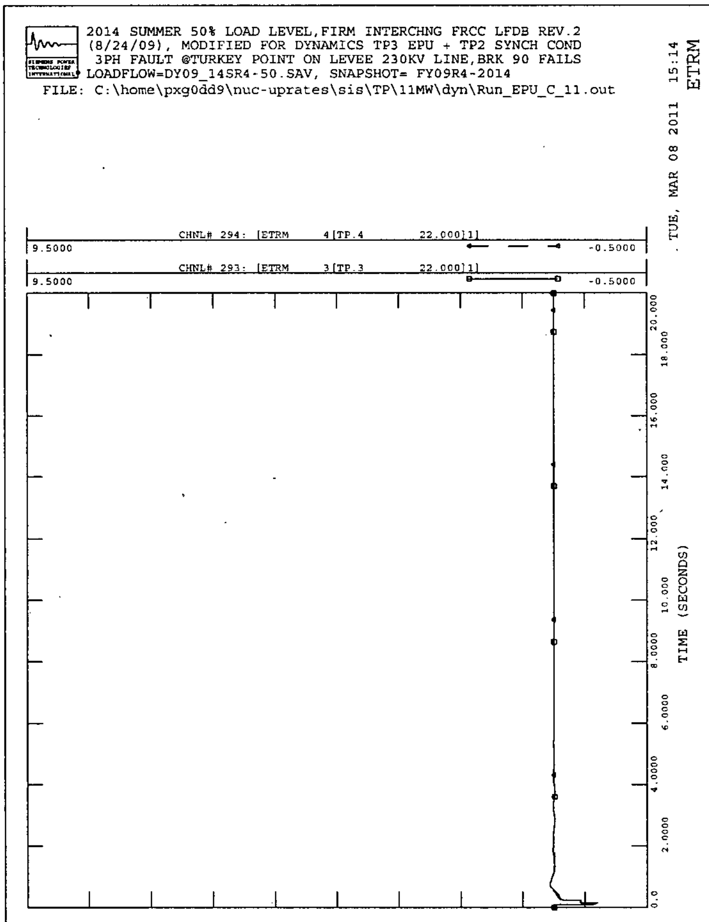


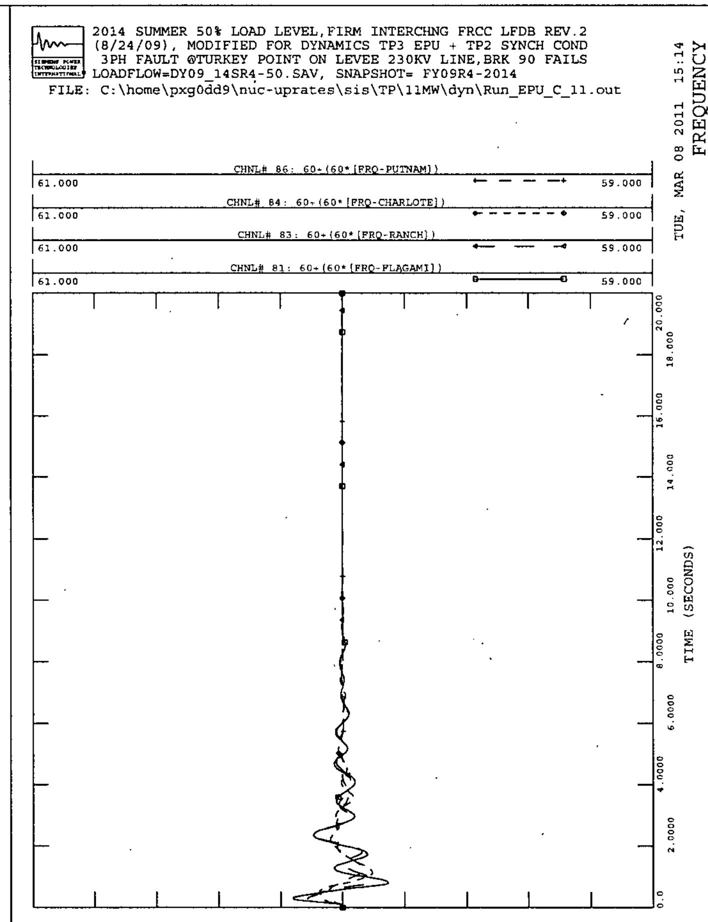


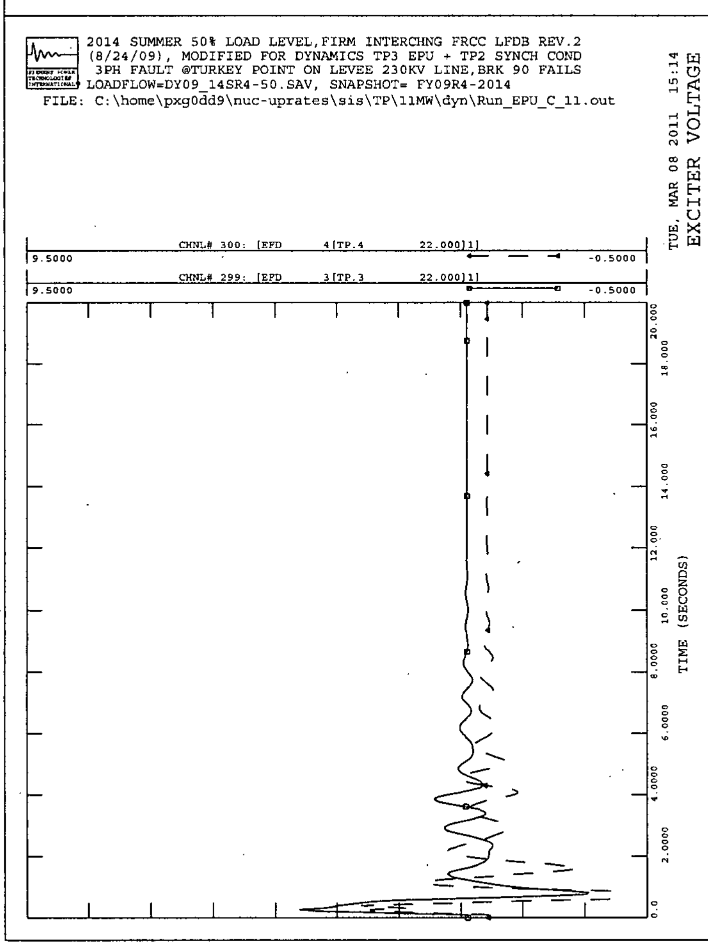
Dynamic Stability Plots for Table 1

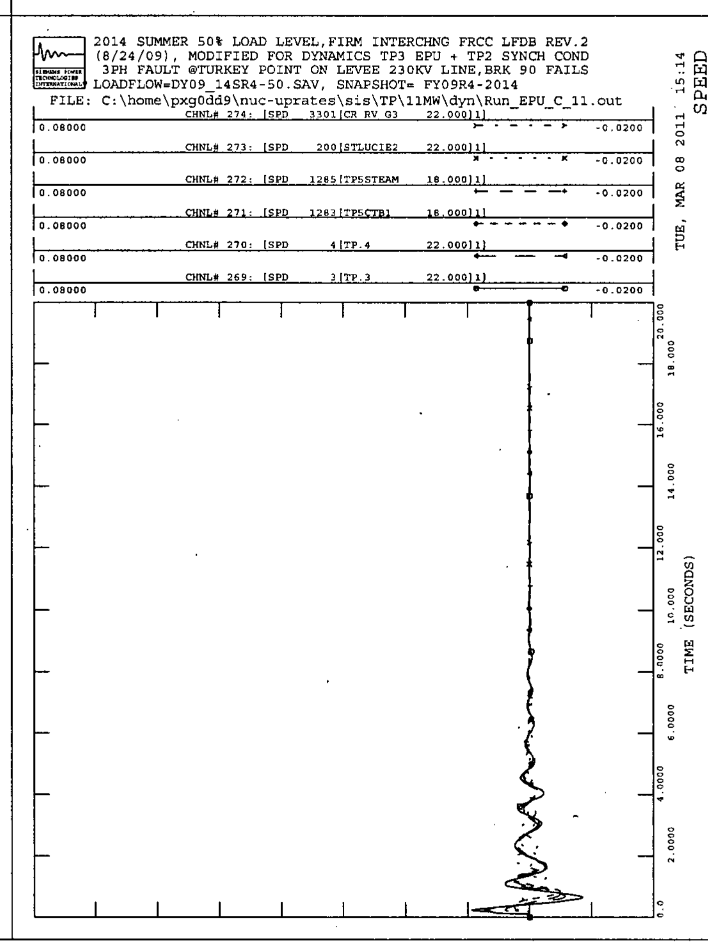


Dynamic Stability Plots for Table 1

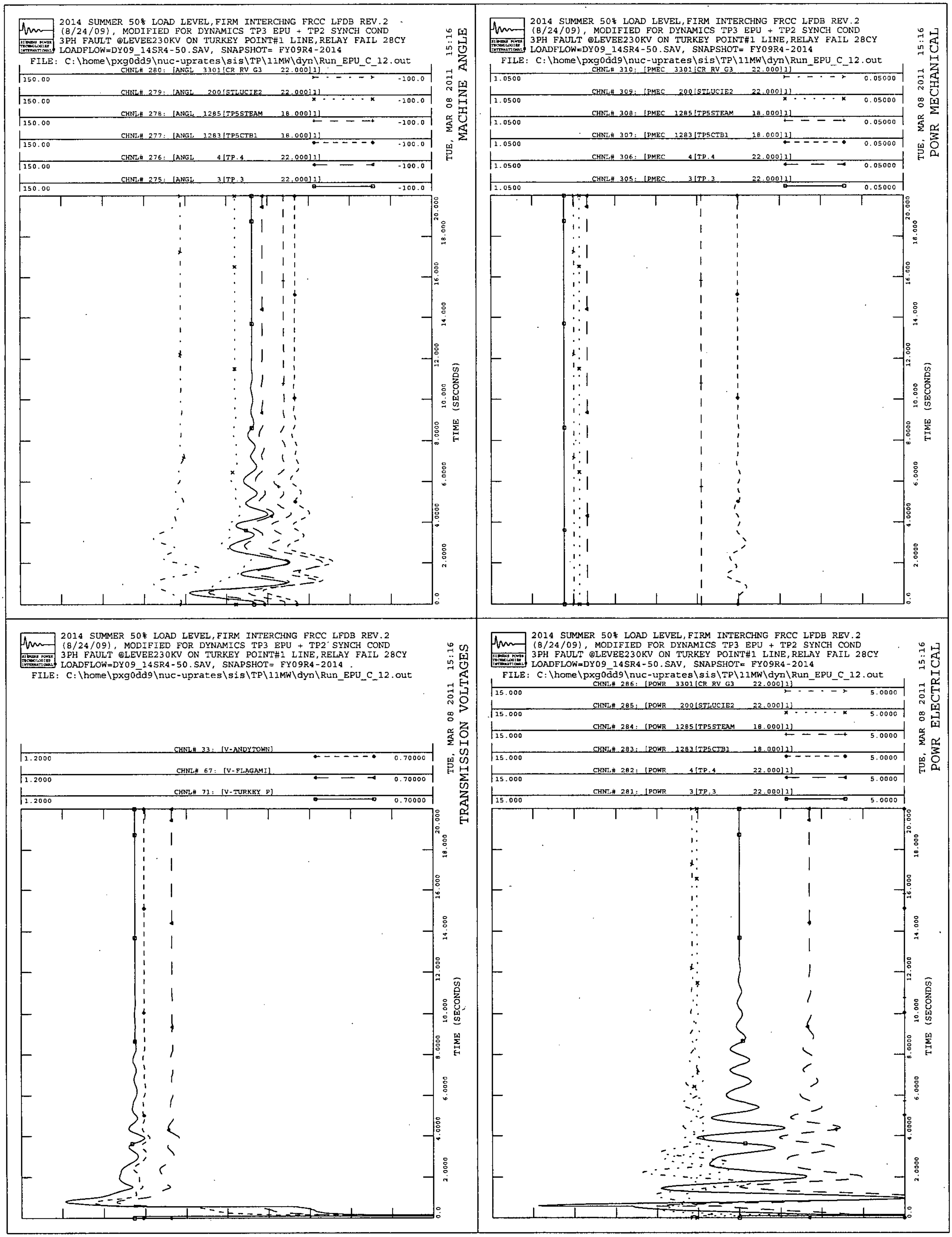




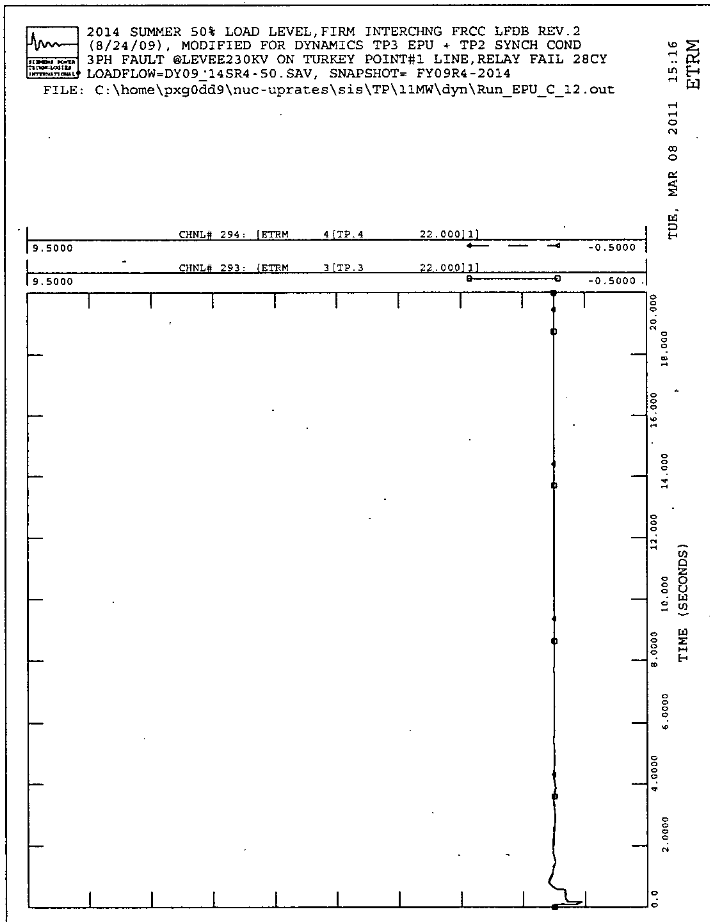


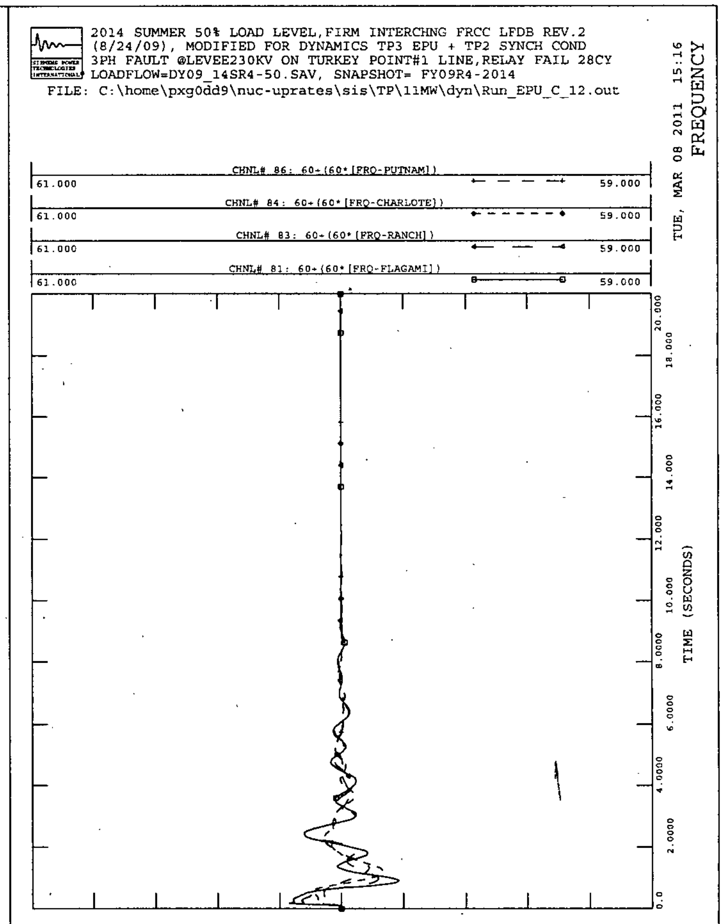


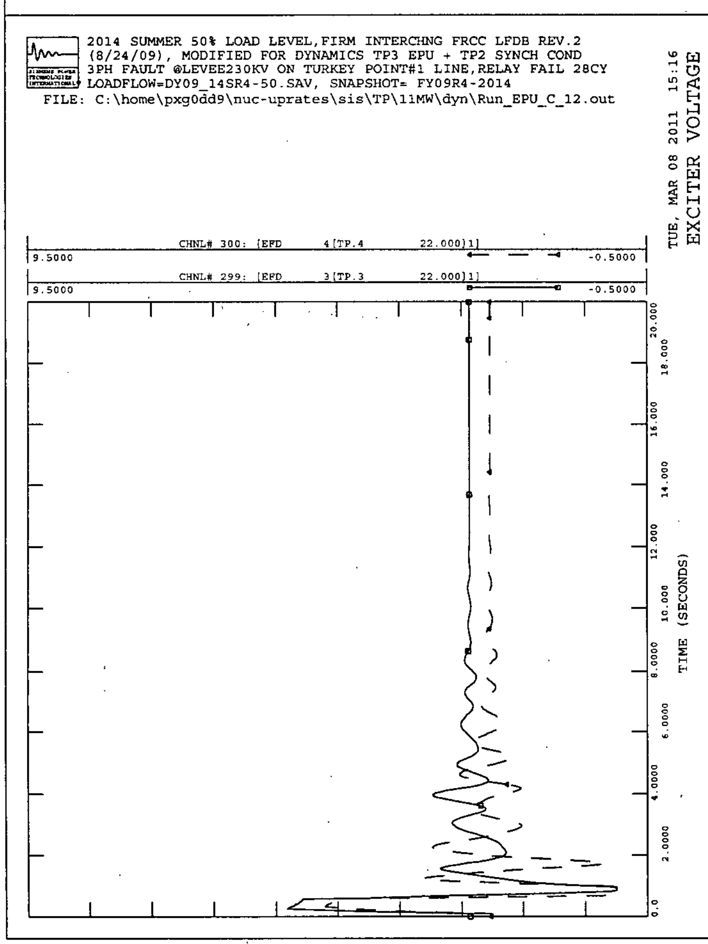
Dynamic Stability Plots for Table 1

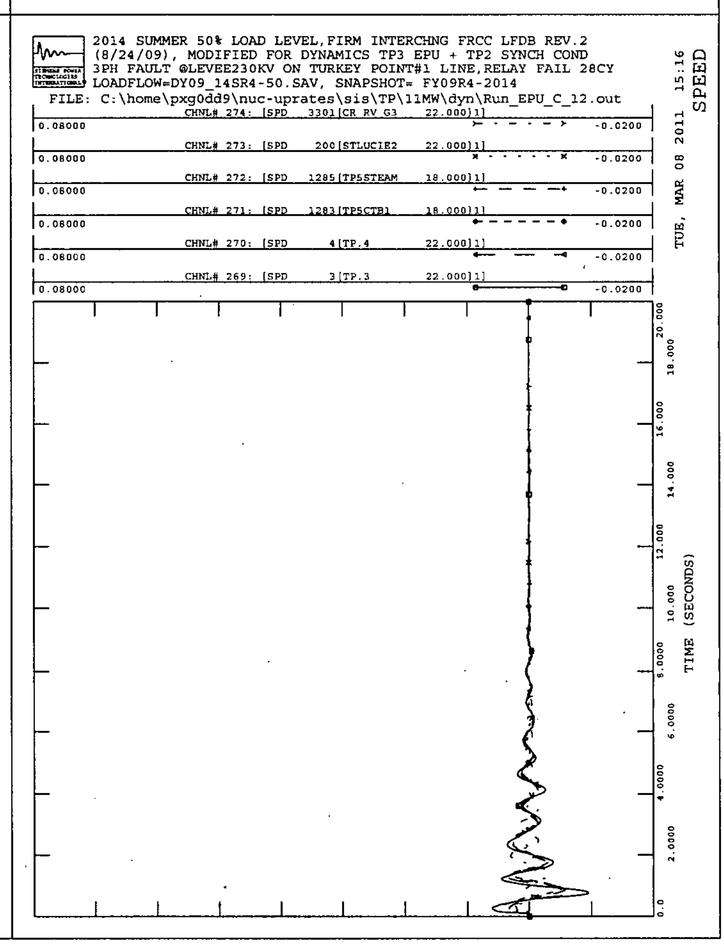


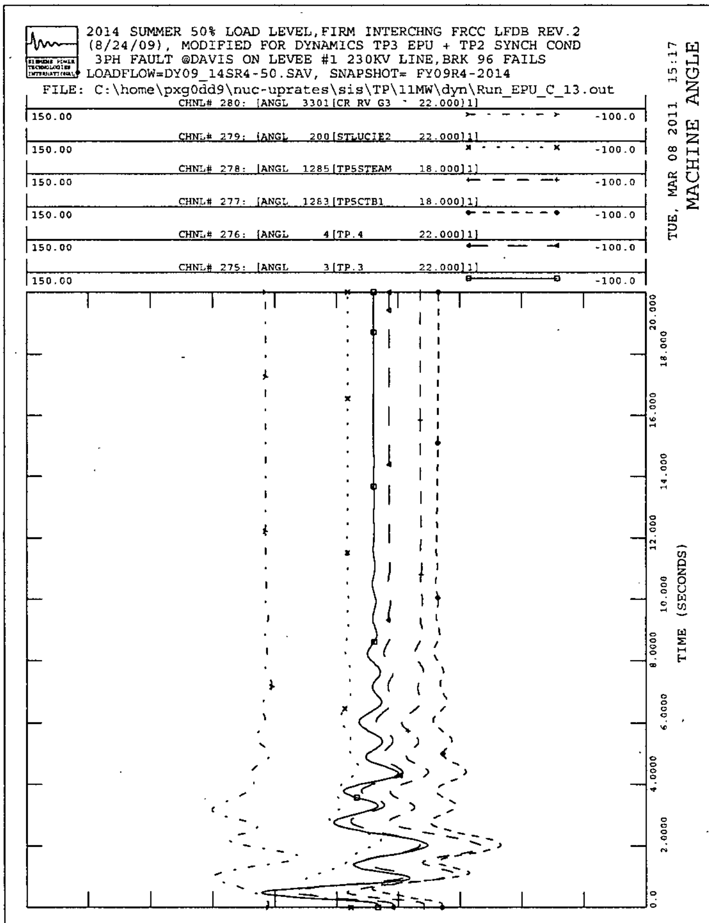
<u>Dynamic Stability Plots for Table 1</u>

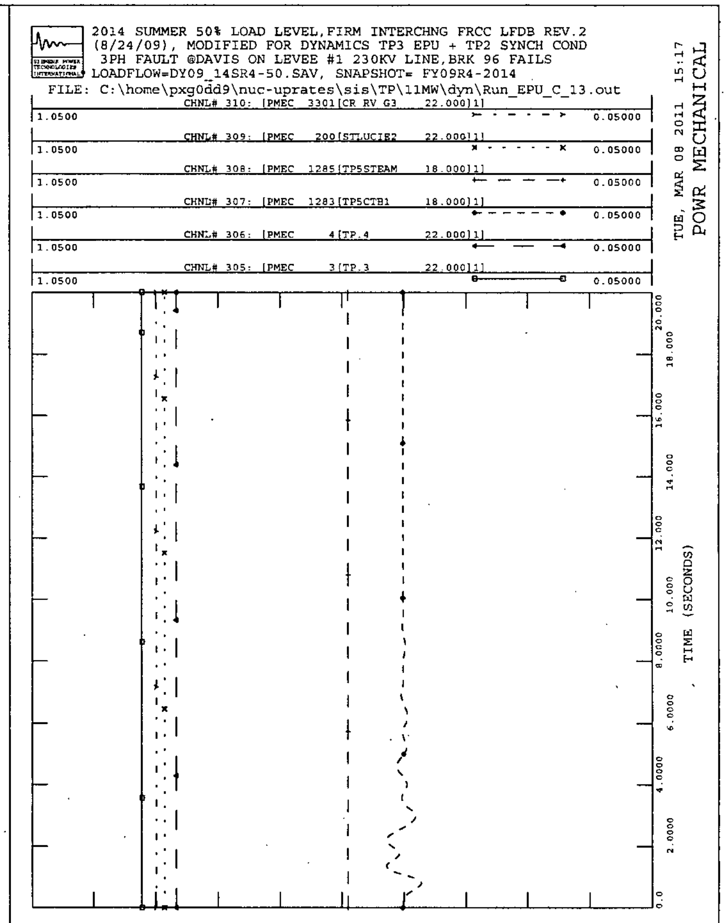


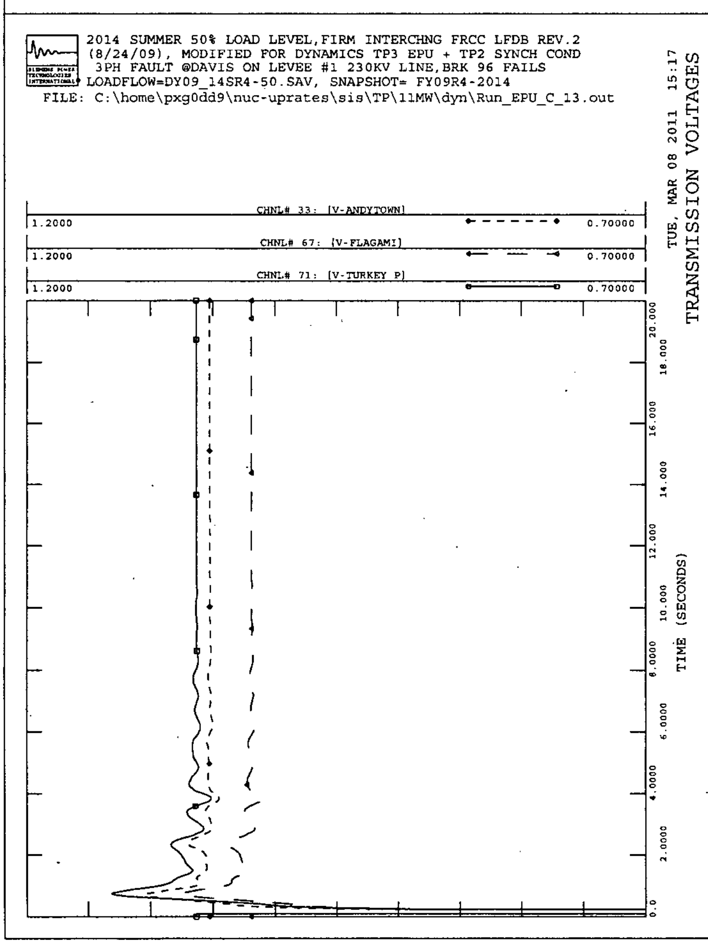


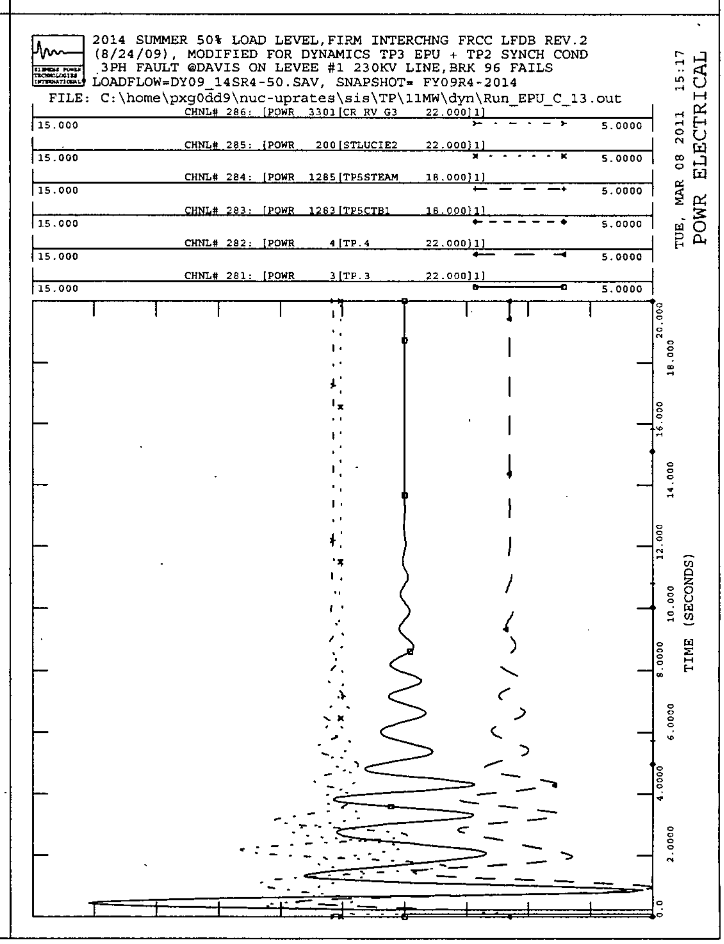


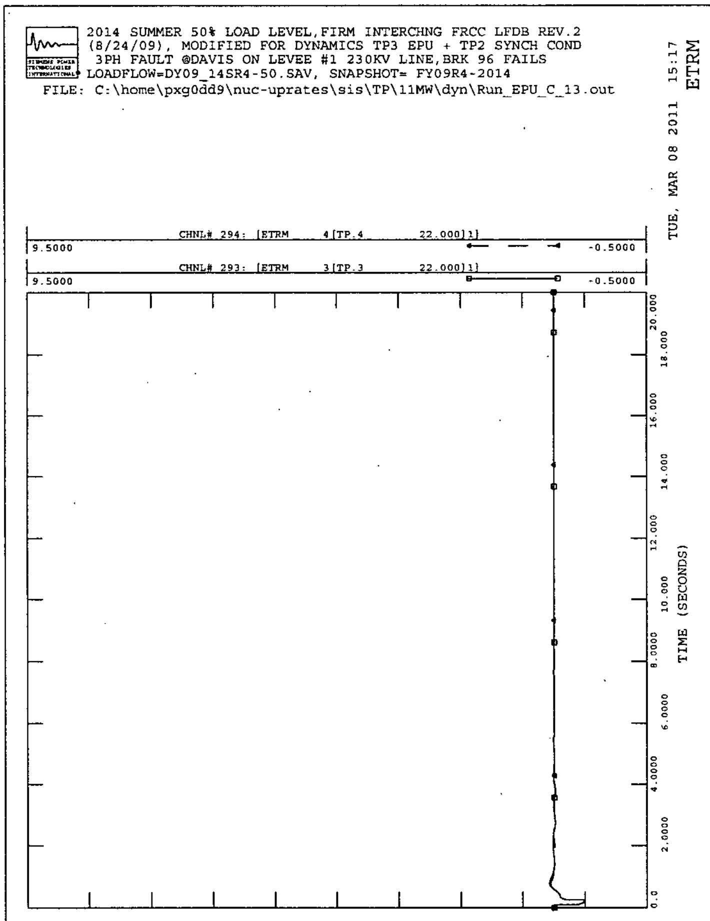


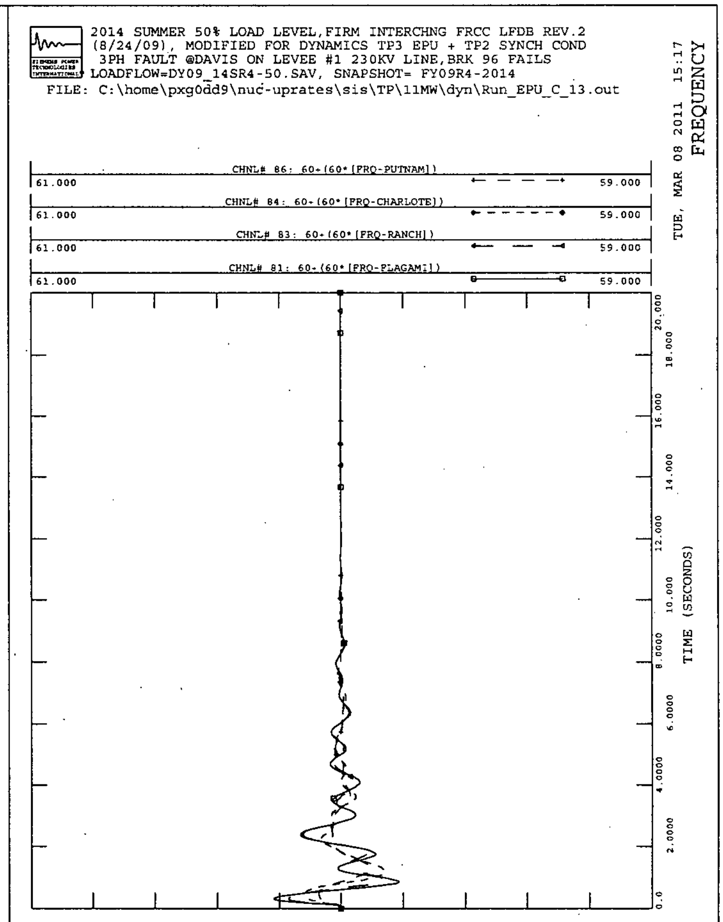

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_13.out
CHNL# 280: [ANGL 3301[CR RV G3 22.000]1]
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1]
CHNL# 278: [ANGL 1285[TP5STEAM 18.000]1]
CHNL# 277: [ANGL 1283[TP5CTB1 18.000]1]
CHNL# 276: [ANGL 4[TP.4 22.000]1]
CHNL# 275: [ANGL 3[TP.3 22.000]1]
150.00
-100.0
TIME (SECONDS)
TUE, MAR 08 2011 15:17
MACHINE ANGLE

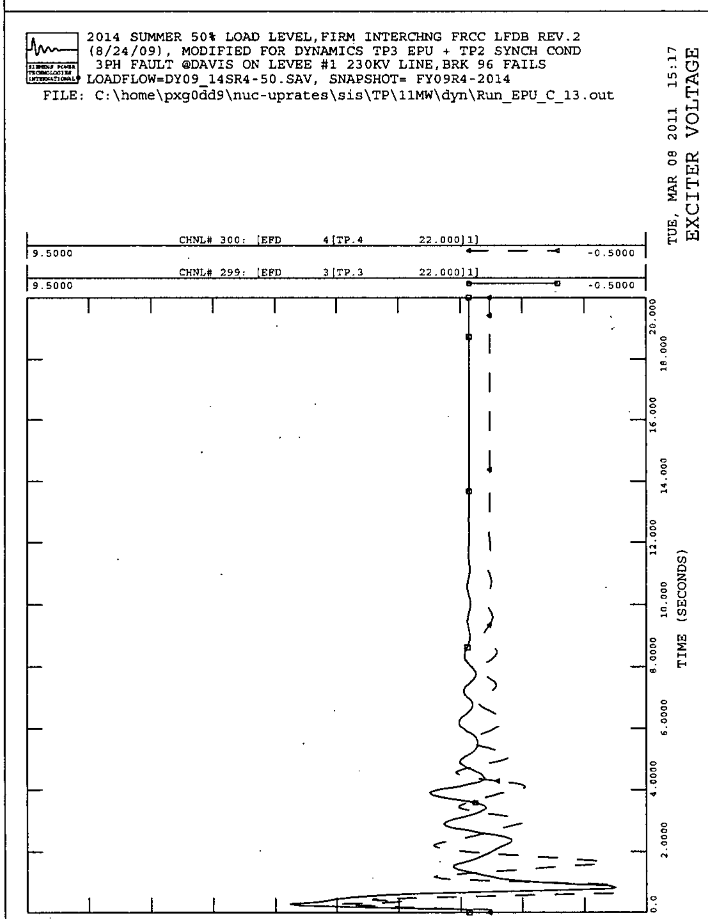

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_13.out
CHNL# 310: [PMEC 3301[CR RV G3 22.000]1]
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1]
CHNL# 308: [PMEC 1285[TP5STEAM 18.000]1]
CHNL# 307: [PMEC 1283[TP5CTB1 18.000]1]
CHNL# 306: [PMEC 4[TP.4 22.000]1]
CHNL# 305: [PMEC 3[TP.3 22.000]1]
1.0500
0.05000
TIME (SECONDS)
TUE, MAR 08 2011 15:17
POWR MECHANICAL

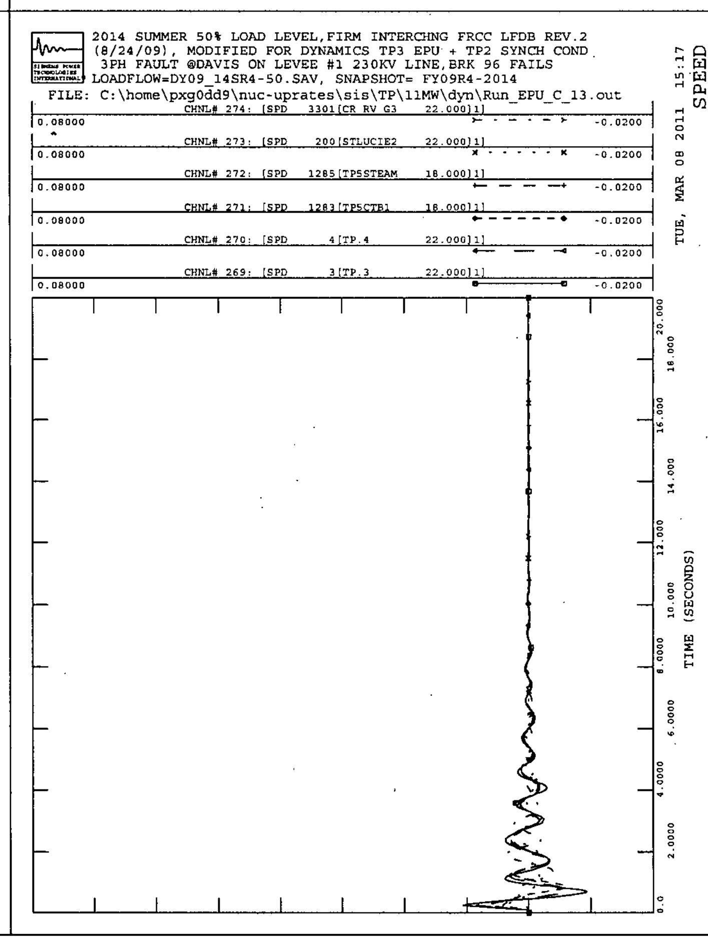

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_13.out
CHNL# 33: [V-ANDYTOWN]
CHNL# 67: [V-FLAGAMI]
CHNL# 71: [V-TURKEY P]
1.2000
0.70000
TIME (SECONDS)
TUE, MAR 08 2011 15:17
TRANSMISSION VOLTAGES

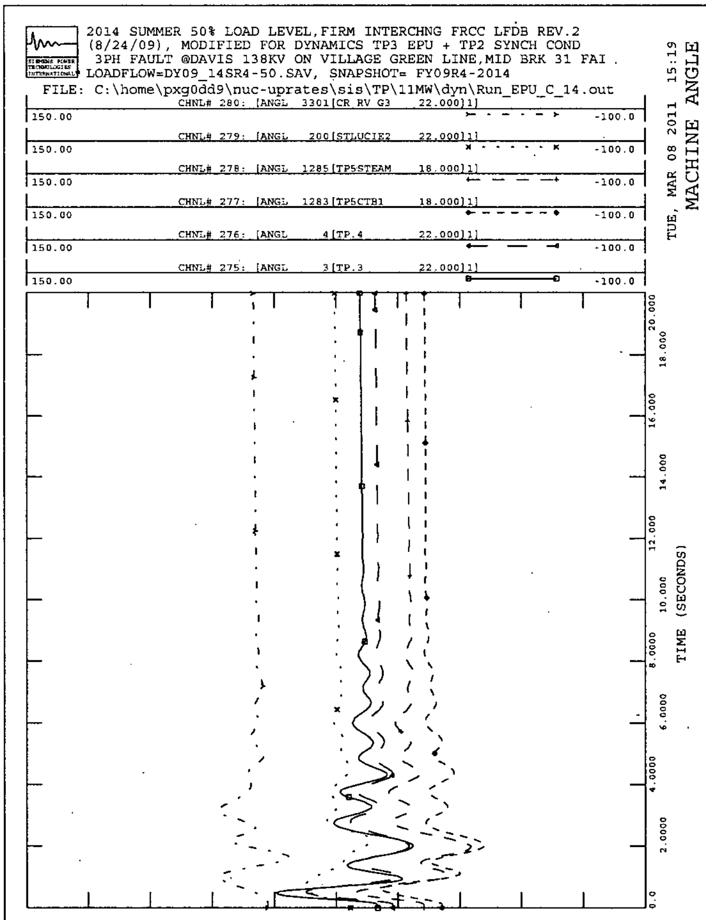

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_13.out
CHNL# 286: [POWR 3301[CR RV G3 22.000]1]
CHNL# 285: [POWR 200[STLUCIE2 22.000]1]
CHNL# 284: [POWR 1285[TP5STEAM 18.000]1]
CHNL# 283: [POWR 1283[TP5CTB1 18.000]1]
CHNL# 282: [POWR 4[TP.4 22.000]1]
CHNL# 281: [POWR 3[TP.3 22.000]1]
15.000
5.0000
TIME (SECONDS)
TUE, MAR 08 2011 15:17
POWR ELECTRICAL

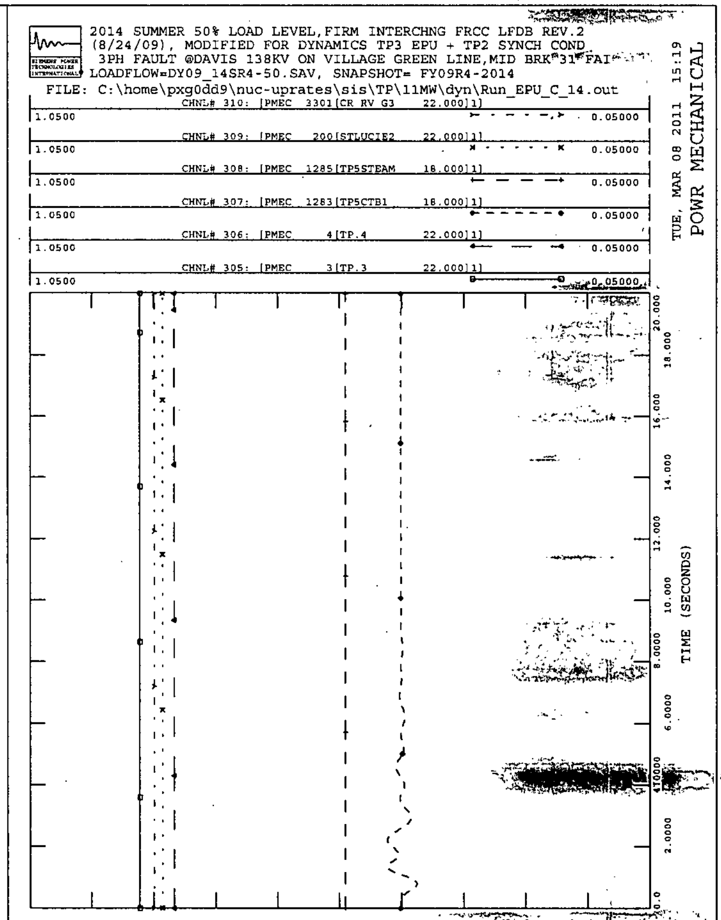

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_13.out
TUE, MAR 08 2011 15:17
ETRM
CHNL# 294: [ETRM 4[TP.4 22.000]1]
9.5000
-0.5000
CHNL# 293: [ETRM 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000

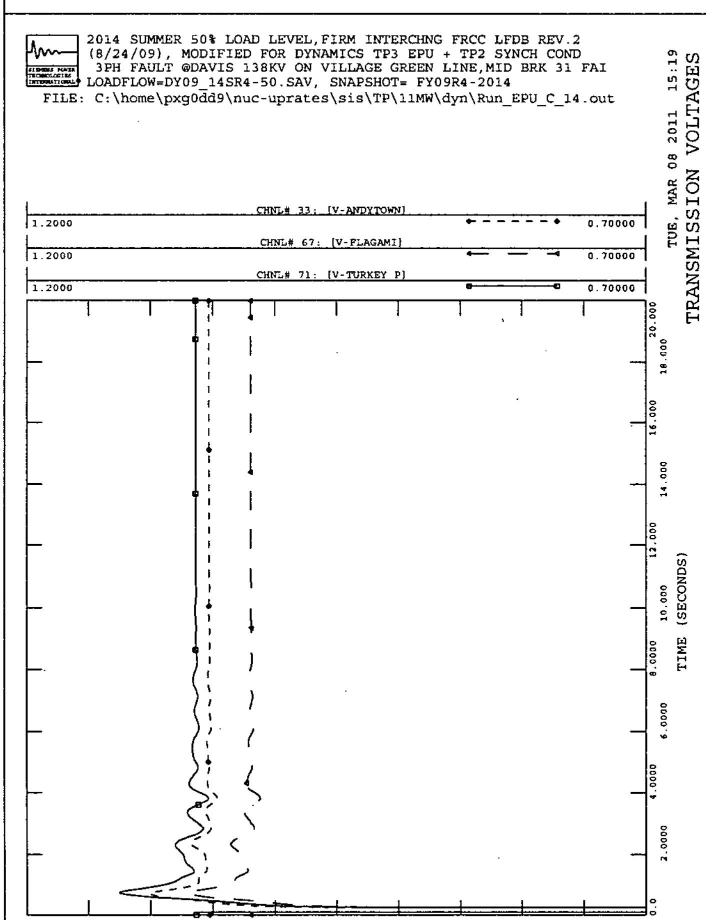

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_13.out
TUE, MAR 08 2011 15:17
FREQUENCY
CHNL# 86: 60+(60*[FRQ-PUTNAM])
61.000
59.000
CHNL# 84: 60+(60*[FRQ-CHARLOTE])
61.000
59.000
CHNL# 83: 60+(60*[FRQ-RANCH])
61.000
59.000
CHNL# 81: 60+(60*[FRQ-PLAGAMI])
61.000
59.000
TIME (SECONDS)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000

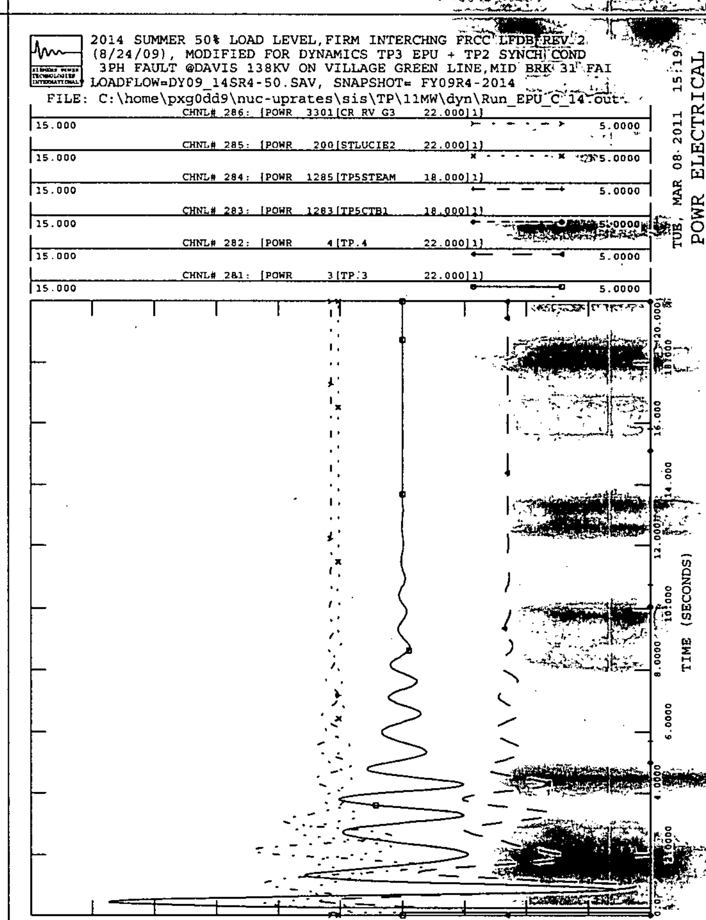

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_13.out
TUE, MAR 08 2011 15:17
EXCITER VOLTAGE
CHNL# 300: [EFD 4[TP.4 22.000]1]
9.5000
-0.5000
CHNL# 299: [EFD 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_13.out
TUE, MAR 08 2011 15:17
SPEED
CHNL# 274: [SPD 3301[CR RV G3 22.000]1]
0.08000
-0.0200
CHNL# 273: [SPD 200[STLUCIE2 22.000]1]
0.08000
-0.0200
CHNL# 272: [SPD 1285[TP5STEAM 18.000]1]
0.08000
-0.0200
CHNL# 271: [SPD 1283[TP5CTB1 18.000]1]
0.08000
-0.0200
CHNL# 270: [SPD 4[TP.4 22.000]1]
0.08000
-0.0200
CHNL# 269: [SPD 3[TP.3 22.000]1]
0.08000
-0.0200
TIME (SECONDS)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000

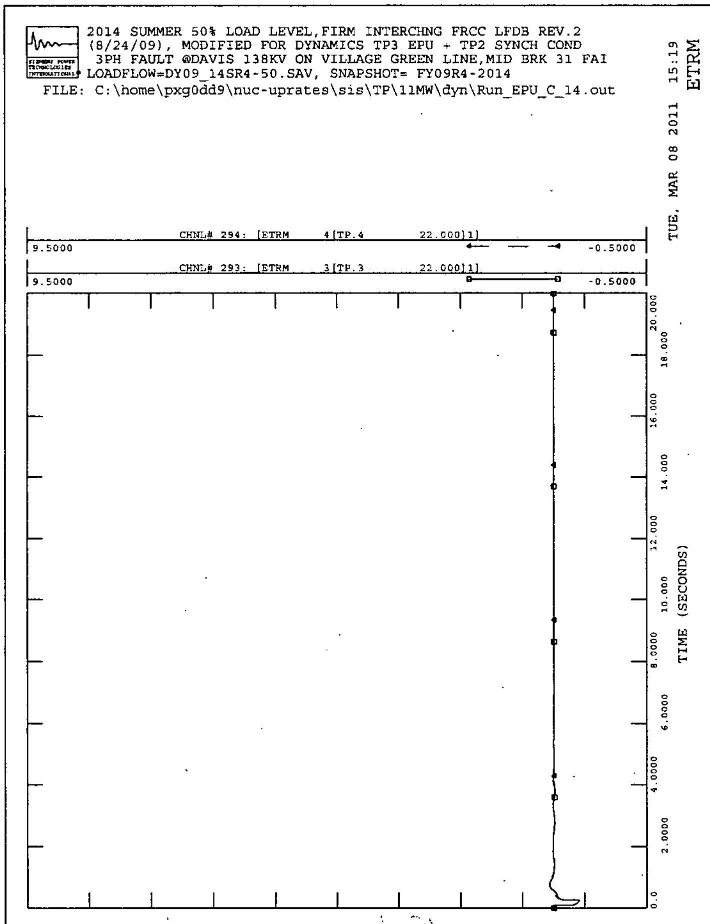

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_14.out
CHNL# 280: [ANGL 3301[CR RV G3 22.000]1]
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1]
CHNL# 278: [ANGL 1285[TP5STEAM 18.000]1]
CHNL# 277: [ANGL 1283[TP5CTB1 18.000]1]
CHNL# 276: [ANGL 4[TP.4 22.000]1]
CHNL# 275: [ANGL 3[TP.3 22.000]1]
150.00
-100.0
TUE, MAR 08 2011 15:19
MACHINE ANGLE
TIME (SECONDS)

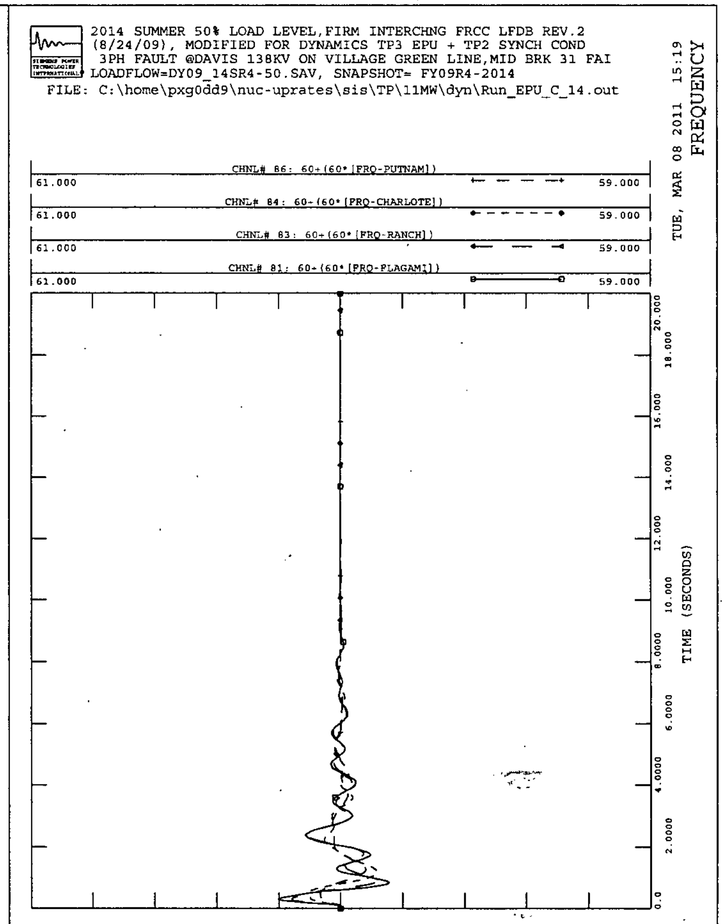

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_14.out
CHNL# 310: [PMEC 3301[CR RV G3 22.000]1]
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1]
CHNL# 308: [PMEC 1285[TP5STEAM 18.000]1]
CHNL# 307: [PMEC 1283[TP5CTB1 18.000]1]
CHNL# 306: [PMEC 4[TP.4 22.000]1]
CHNL# 305: [PMEC 3[TP.3 22.000]1]
1.0500
0.05000
TUE, MAR 08 2011 15:19
POWR MECHANICAL
TIME (SECONDS)

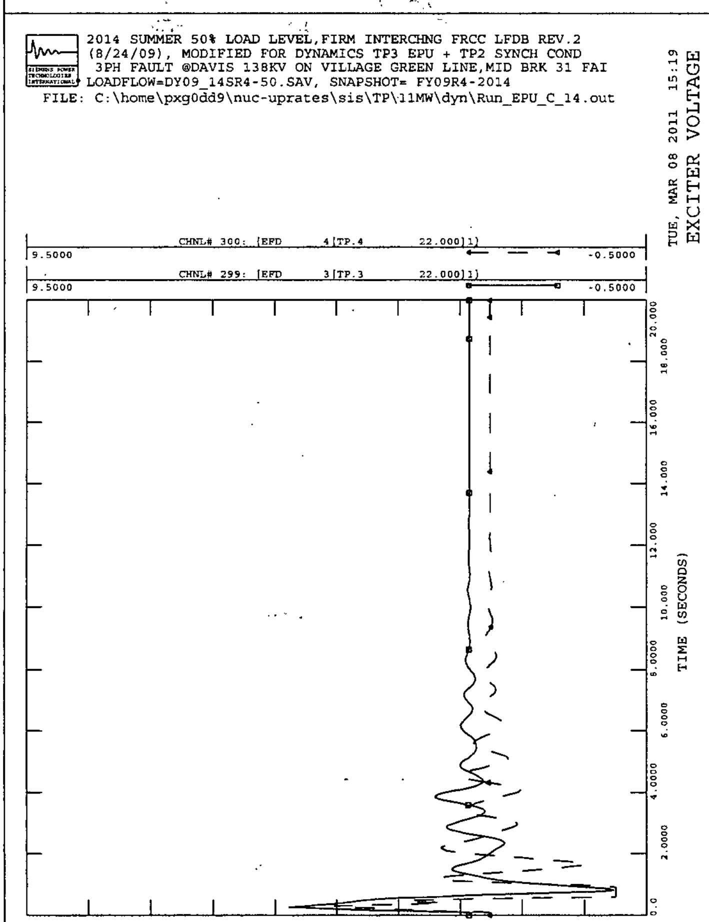

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_14.out
CHNL# 33: [V-ANDYTOWN]
CHNL# 67: [V-FLAGAMI]
CHNL# 71: [V-TURKEY P]
1.2000
0.70000
TUE, MAR 08 2011 15:19
TRANSMISSION VOLTAGES
TIME (SECONDS)

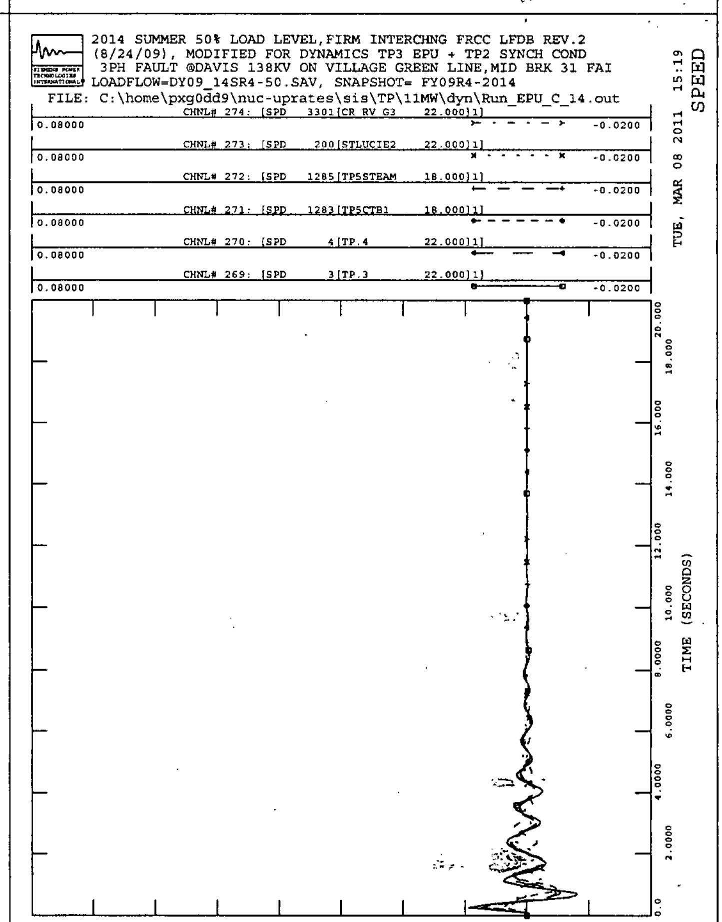

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_14.out
CHNL# 286: [POWR 3301[CR RV G3 22.000]1]
CHNL# 285: [POWR 200[STLUCIE2 22.000]1]
CHNL# 284: [POWR 1285[TP5STEAM 18.000]1]
CHNL# 283: [POWR 1283[TP5CTB1 18.000]1]
CHNL# 282: [POWR 4[TP.4 22.000]1]
CHNL# 281: [POWR 3[TP.3 22.000]1]
15.000
5.0000
TUE, MAR 08 2011 15:19
POWR ELECTRICAL
TIME (SECONDS)

Dynamic Stability Plots for Table 1

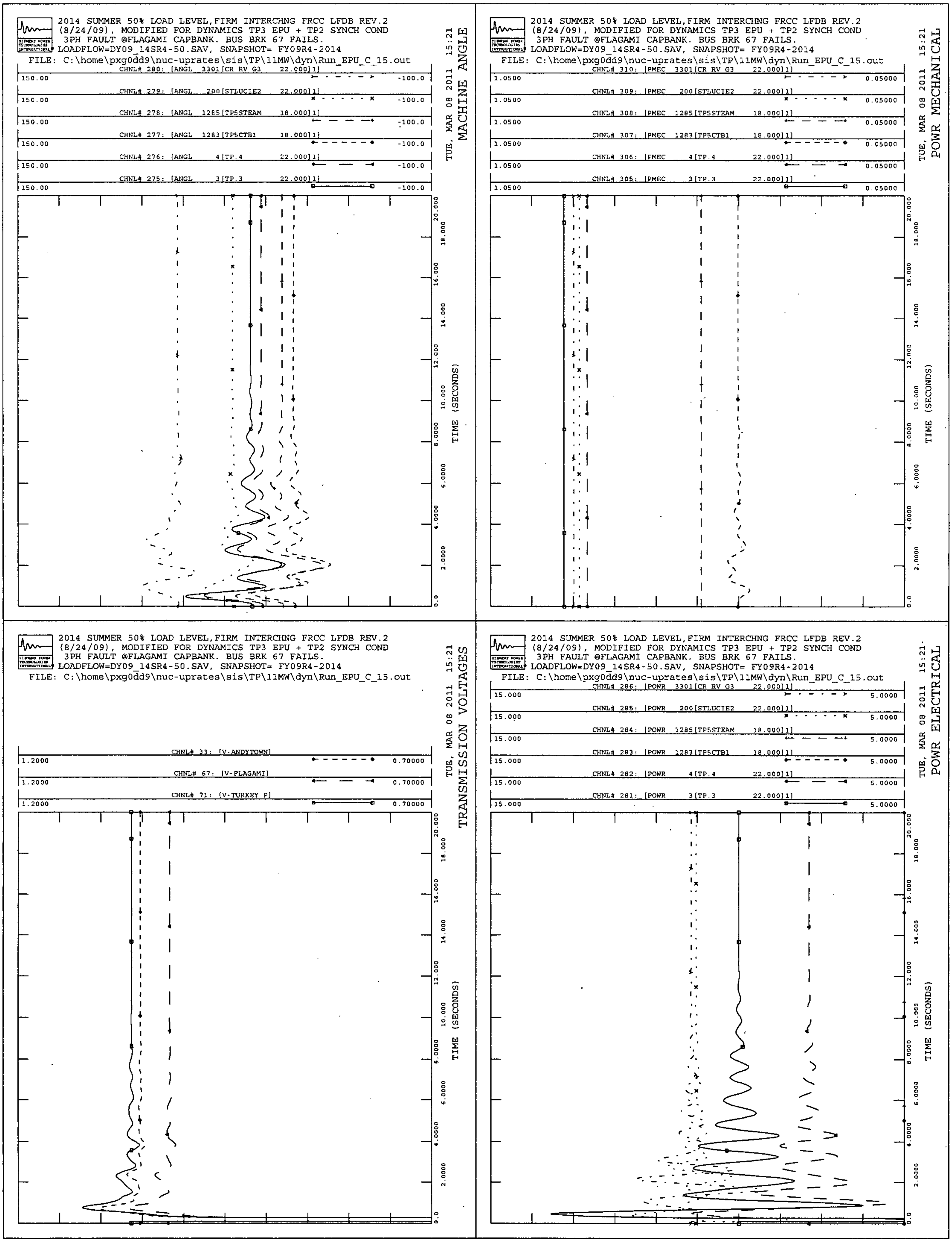




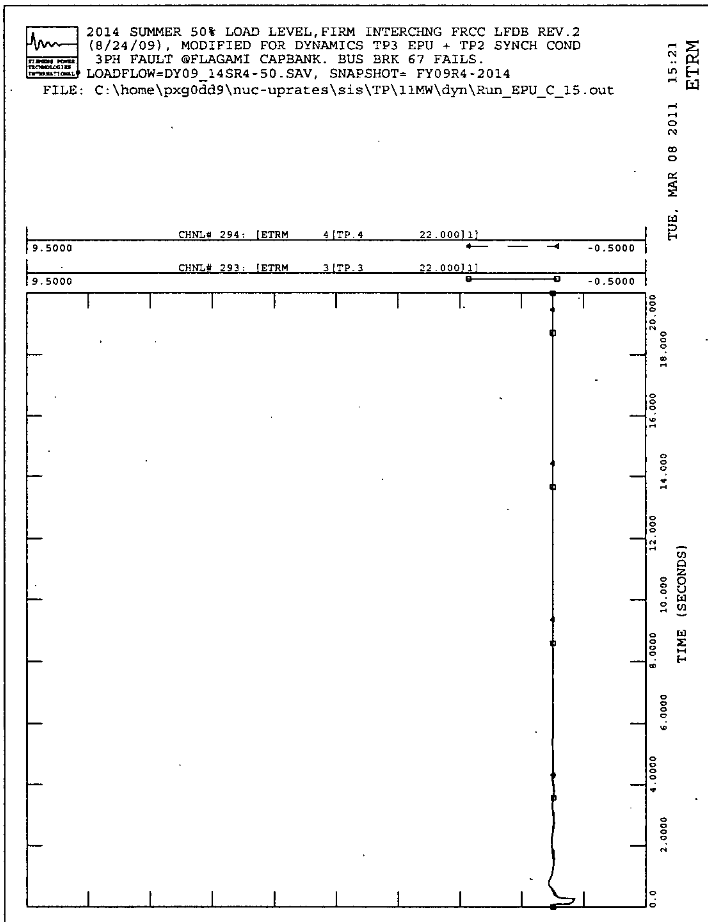


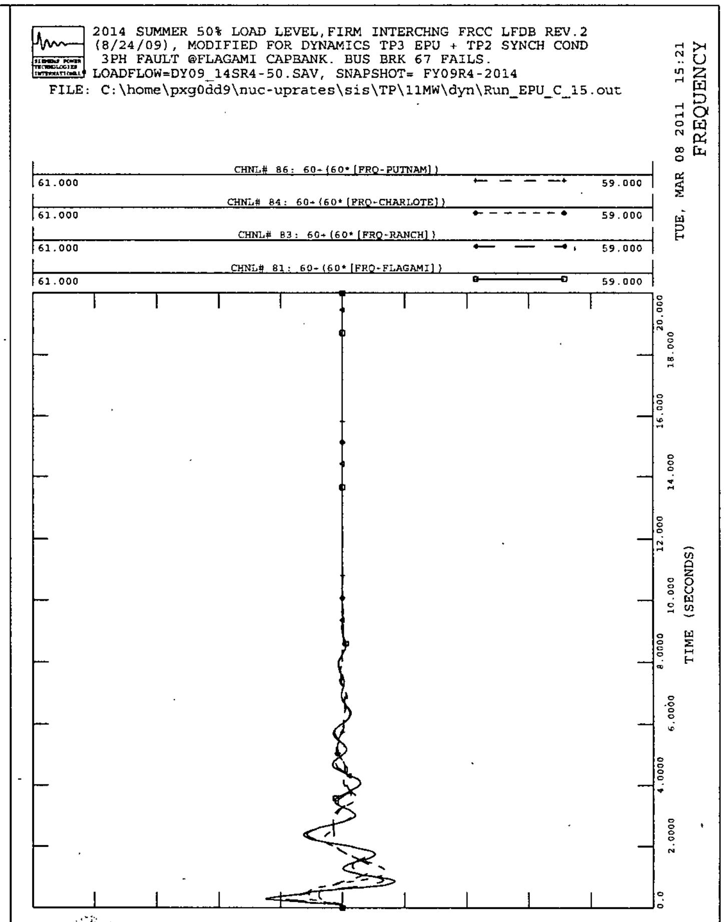


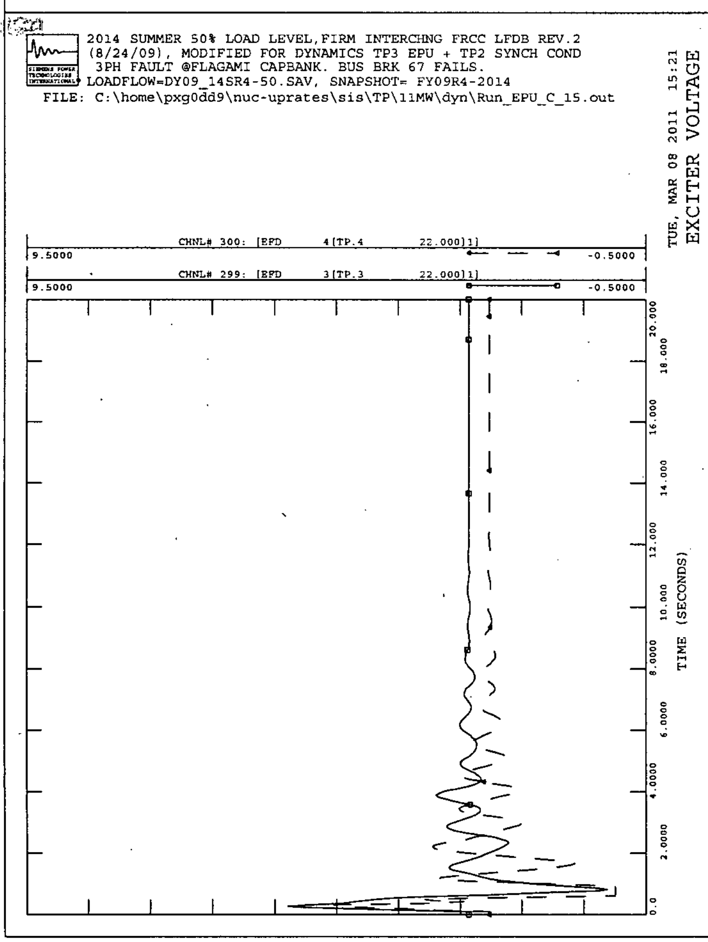
Dynamic Stability Plots for Table 1

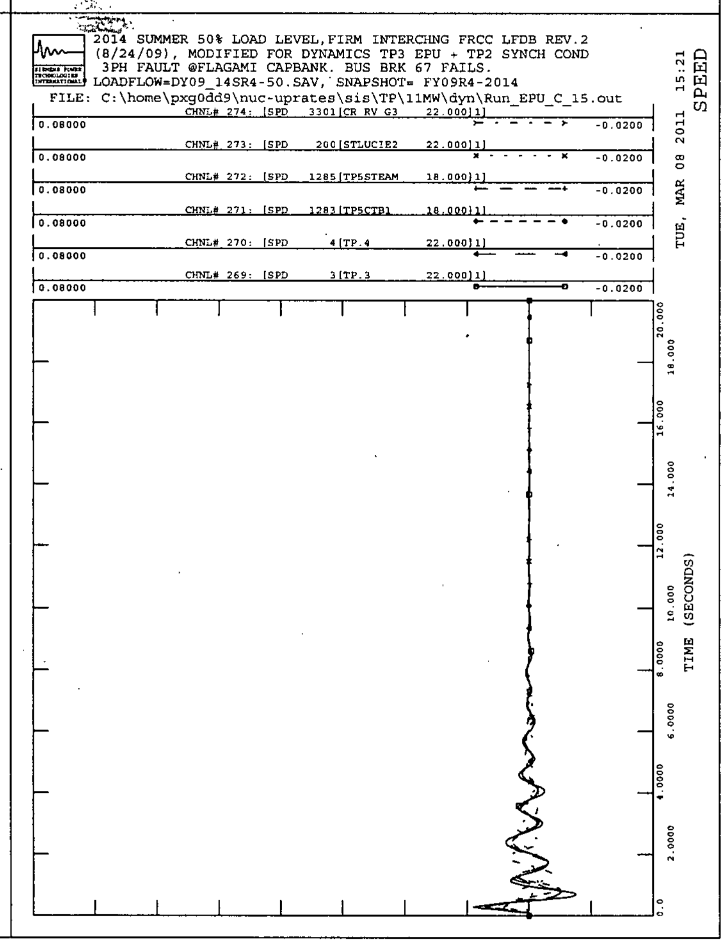


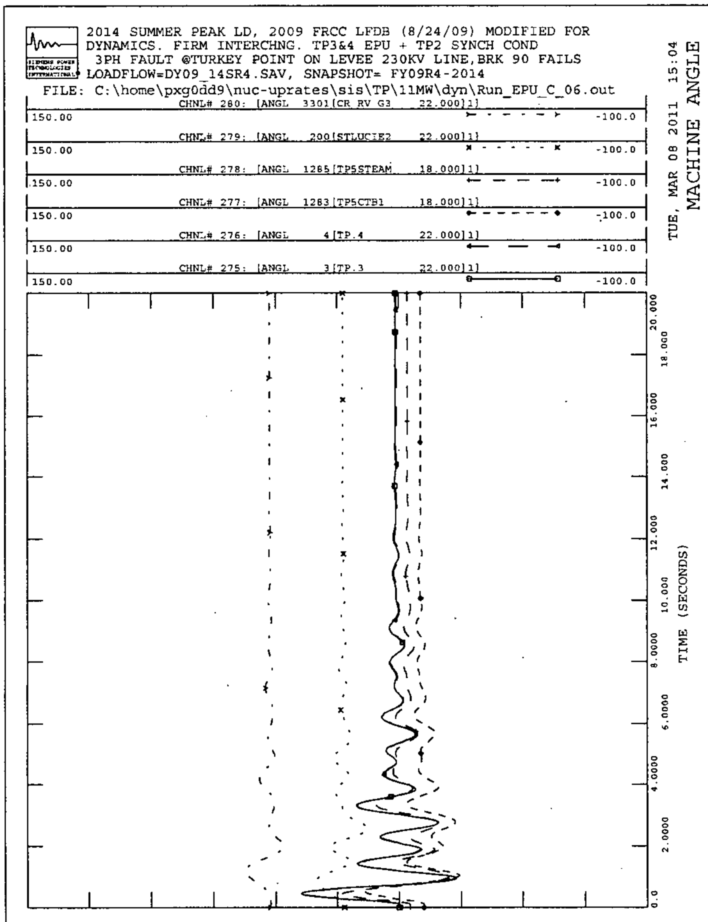
Dynamic Stability Plots for Table 1

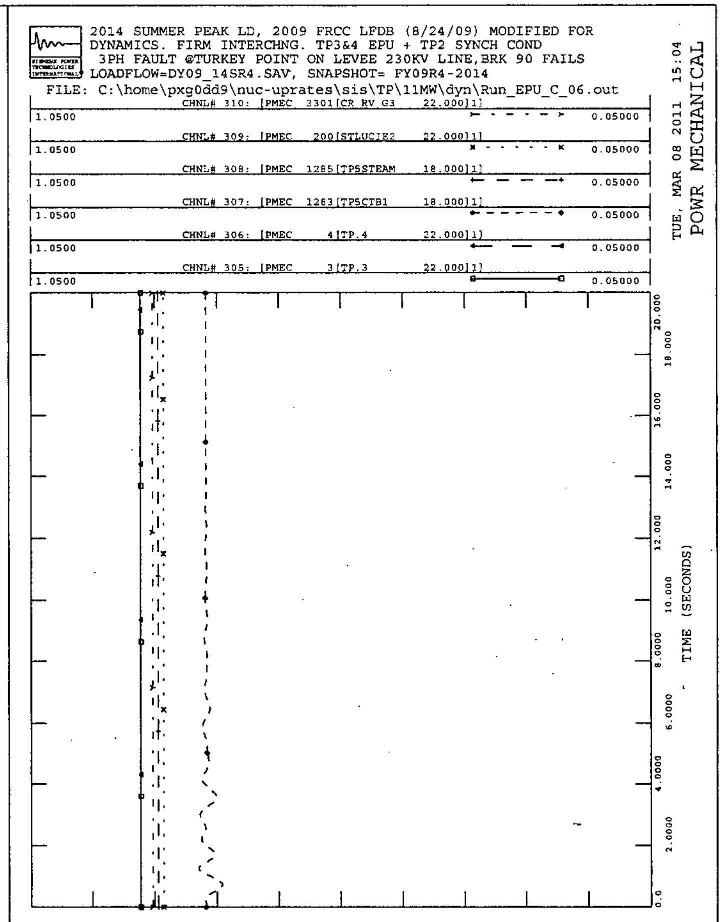


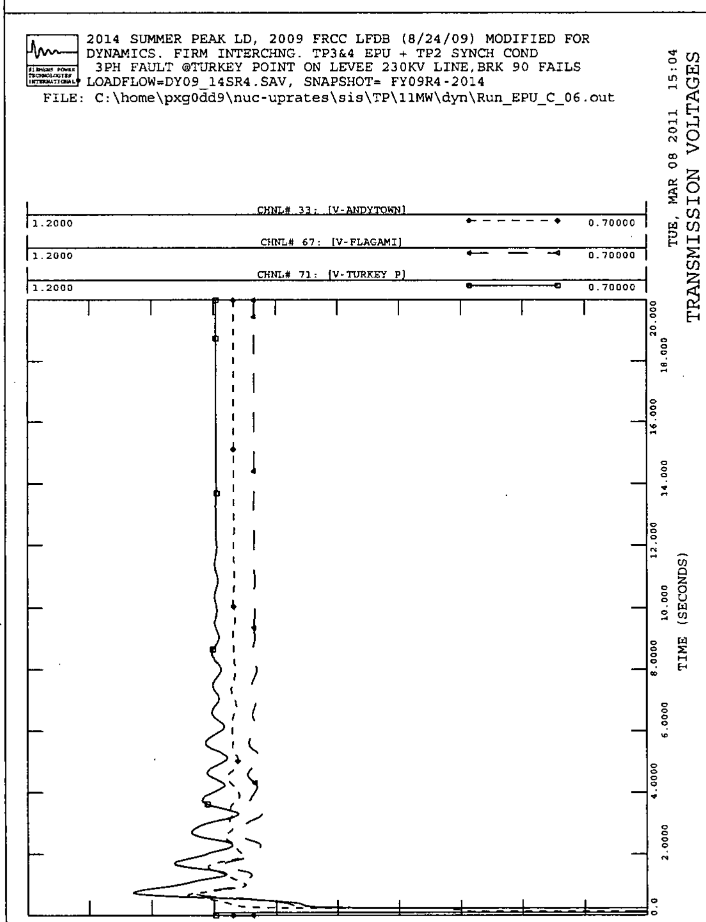


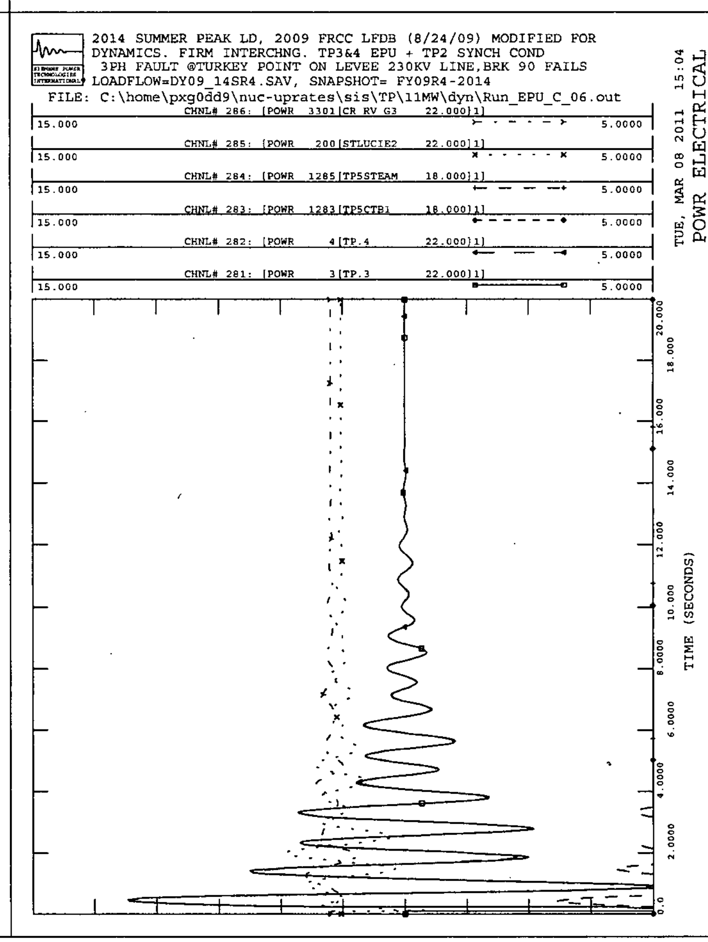


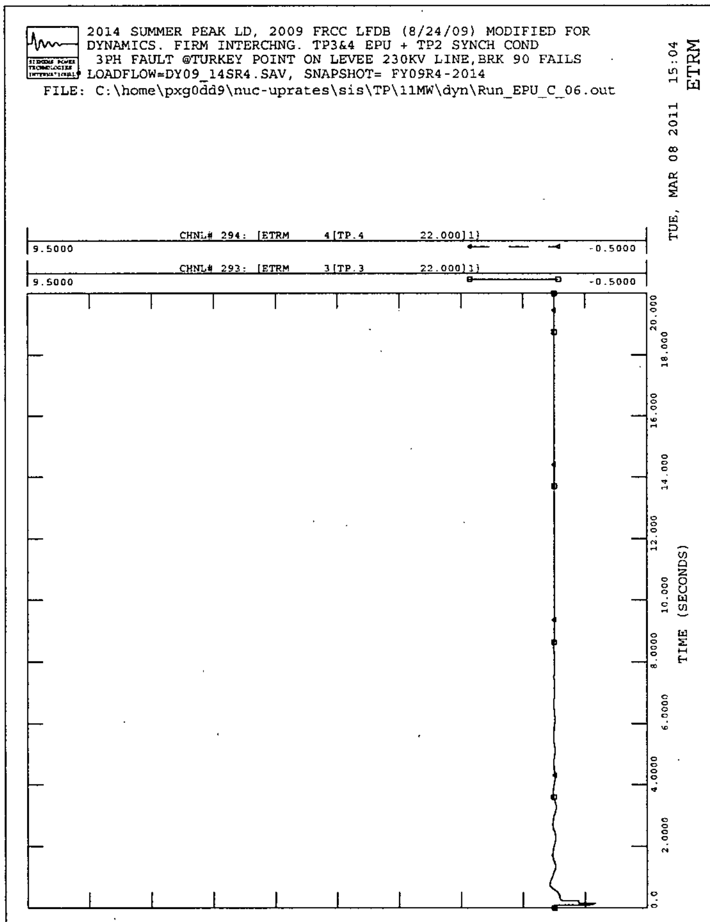



2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_06.out
CHNL# 280: [ANGL 3301[CR RV G3 22.000]1] 150.00 -100.0
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1] 150.00 -100.0
CHNL# 278: [ANGL 1285[TP5STEAM 18.000]1] 150.00 -100.0
CHNL# 277: [ANGL 1283[TP5CTB1 18.000]1] 150.00 -100.0
CHNL# 276: [ANGL 4[TP.4 22.000]1] 150.00 -100.0
CHNL# 275: [ANGL 3[TP.3 22.000]1] 150.00 -100.0
0.0 2.0000 4.0000 6.0000 8.0000 10.000 12.000 14.000 16.000 18.000 20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:04
MACHINE ANGLE


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_06.out
CHNL# 310: [PMEC 3301[CR RV G3 22.000]1] 1.0500 0.05000
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1] 1.0500 0.05000
CHNL# 308: [PMEC 1285[TP5STEAM 18.000]1] 1.0500 0.05000
CHNL# 307: [PMEC 1283[TP5CTB1 18.000]1] 1.0500 0.05000
CHNL# 306: [PMEC 4[TP.4 22.000]1] 1.0500 0.05000
CHNL# 305: [PMEC 3[TP.3 22.000]1] 1.0500 0.05000
0.0 2.0000 4.0000 6.0000 8.0000 10.000 12.000 14.000 16.000 18.000 20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:04
POWR MECHANICAL


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_06.out
CHNL# 33: [V-ANDYTOWN] 1.2000 0.70000
CHNL# 67: [V-FLAGAMI] 1.2000 0.70000
CHNL# 71: [V-TURKEY P] 1.2000 0.70000
0.0 2.0000 4.0000 6.0000 8.0000 10.000 12.000 14.000 16.000 18.000 20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:04
TRANSMISSION VOLTAGES


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_06.out
CHNL# 286: [POWR 3301[CR RV G3 22.000]1] 15.000 5.0000
CHNL# 285: [POWR 200[STLUCIE2 22.000]1] 15.000 5.0000
CHNL# 284: [POWR 1285[TP5STEAM 18.000]1] 15.000 5.0000
CHNL# 283: [POWR 1283[TP5CTB1 18.000]1] 15.000 5.0000
CHNL# 282: [POWR 4[TP.4 22.000]1] 15.000 5.0000
CHNL# 281: [POWR 3[TP.3 22.000]1] 15.000 5.0000
0.0 2.0000 4.0000 6.0000 8.0000 10.000 12.000 14.000 16.000 18.000 20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:04
POWR ELECTRICAL


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_06.out
TUE, MAR 08 2011 15:04
ETRM
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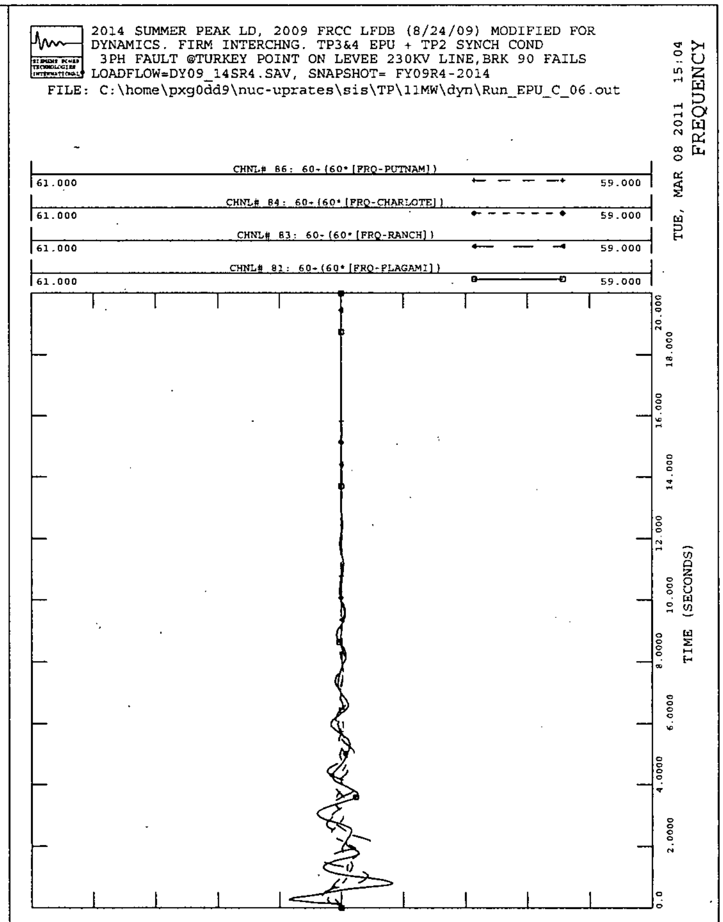
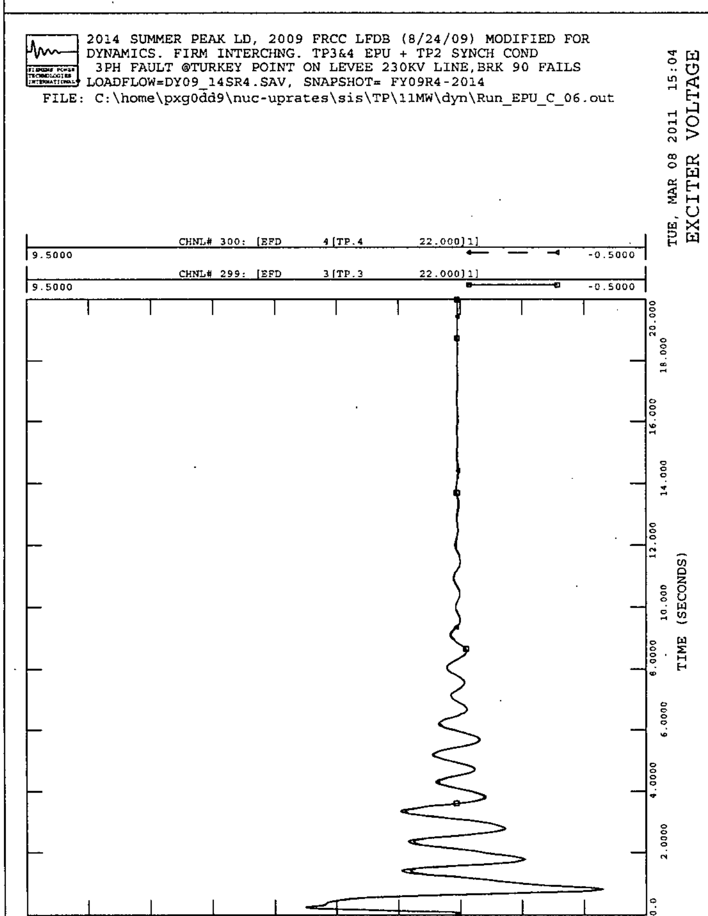
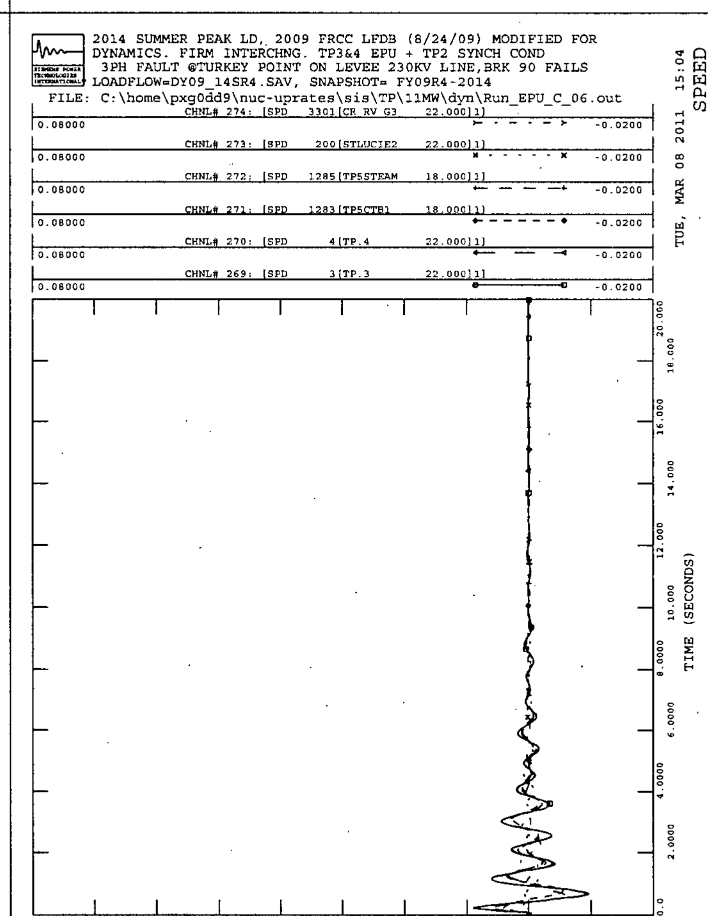
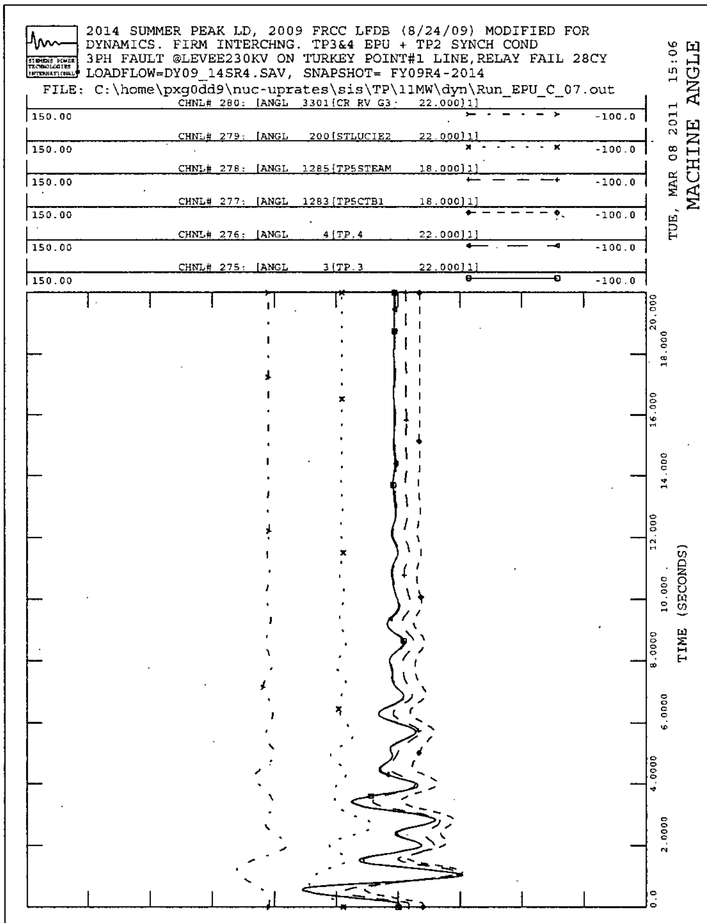
CHNL# 293: [ETRM 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)

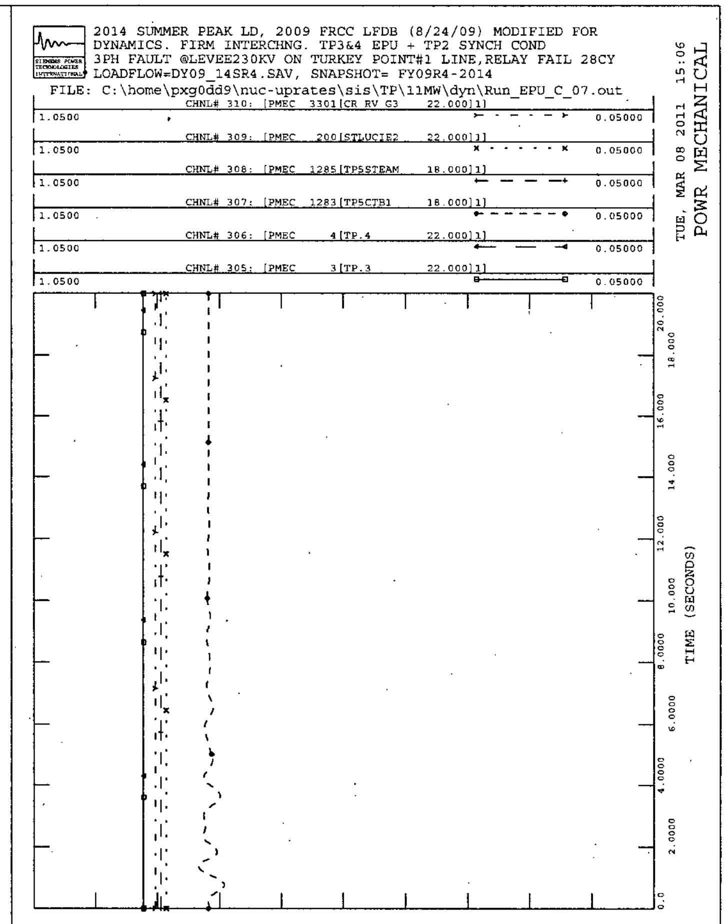

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_06.out
TUE, MAR 08 2011 15:04
FREQUENCY
CHNL# 86: 60-(60*[FRQ-PUTNAM])
CHNL# 84: 60-(60*[FRQ-CHARLOTE])
CHNL# 83: 60-(60*[FRQ-RANCH])
CHNL# 81: 60-(60*[FRQ-PLAGAMI])
61.000
59.000
TIME (SECONDS)

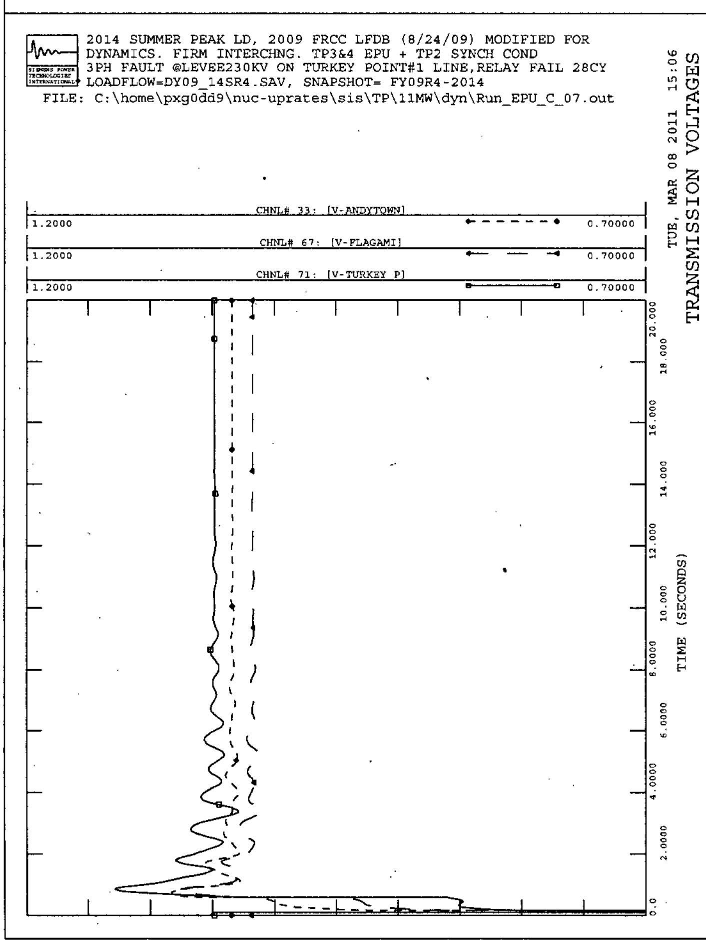

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_06.out
TUE, MAR 08 2011 15:04
EXCITER VOLTAGE
CHNL# 300: [EFD 4[TP.4 22.000]1]
CHNL# 299: [EFD 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)

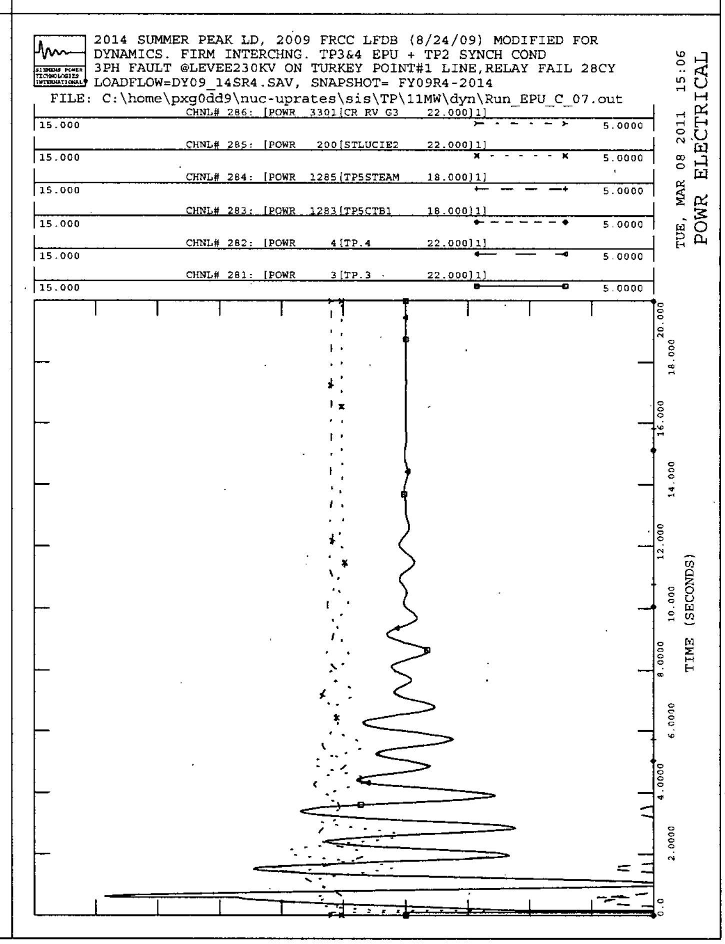

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_06.out
TUE, MAR 08 2011 15:04
SPEED
CHNL# 274: [SPD 3301[CR RV G3 22.000]1]
CHNL# 273: [SPD 200[STLUCIE2 22.000]1]
CHNL# 272: [SPD 1285[TP5STEAM 18.000]1]
CHNL# 271: [SPD 1283[TP5CTB1 18.000]1]
CHNL# 270: [SPD 4[TP.4 22.000]1]
CHNL# 269: [SPD 3[TP.3 22.000]1]
0.08000
-0.0200
TIME (SECONDS)

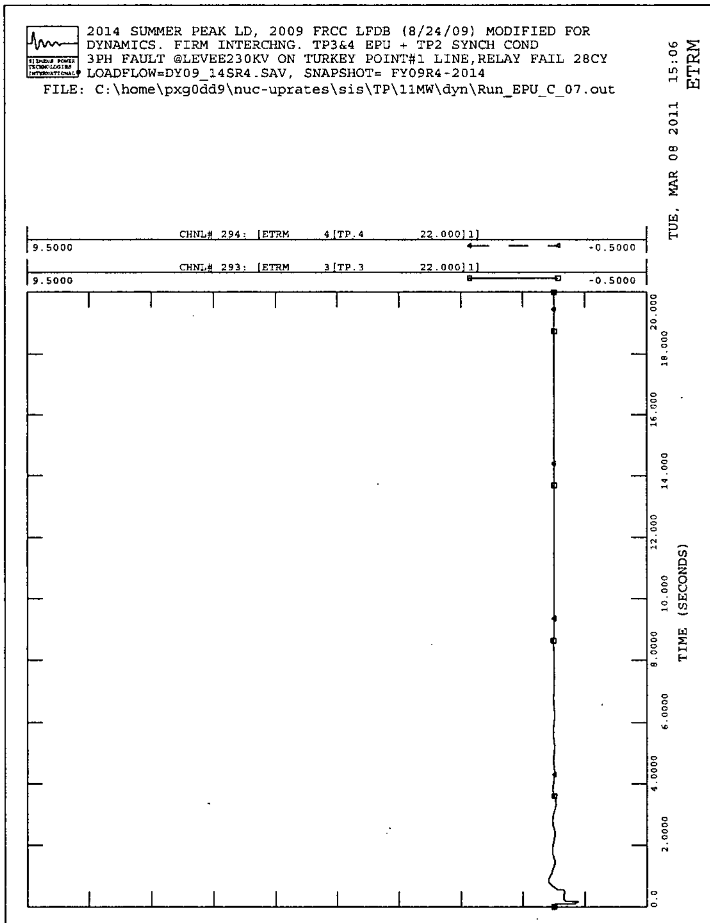
Dynamic Stability Plots for Table 2

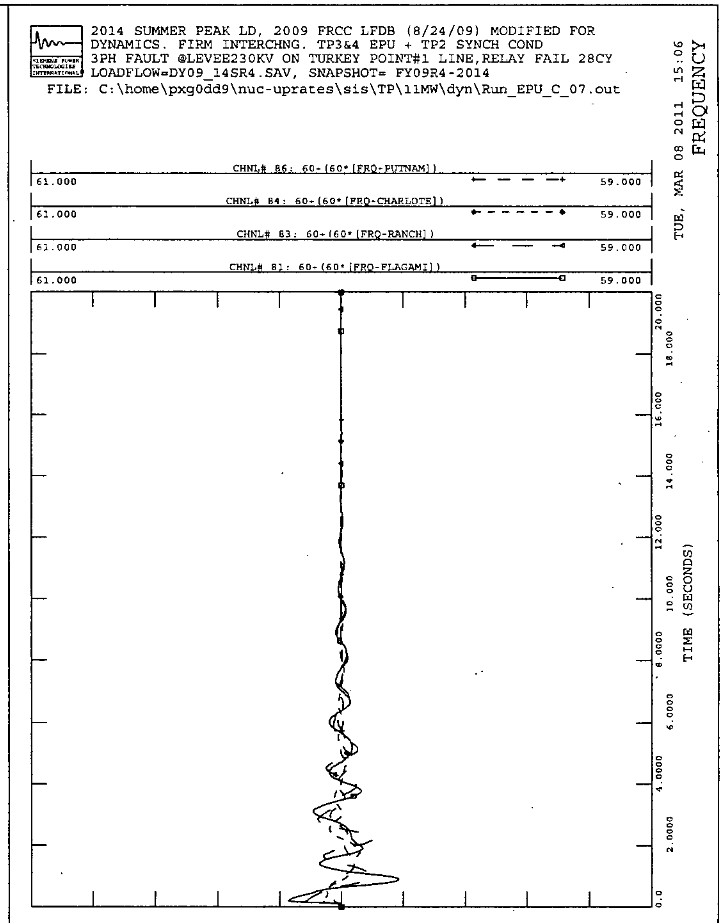


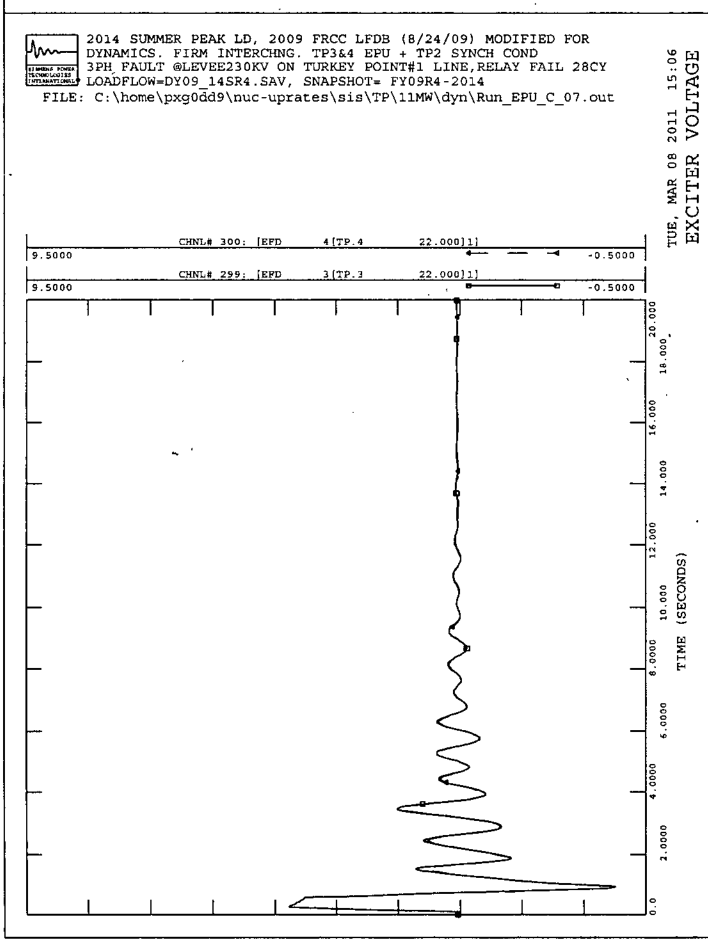


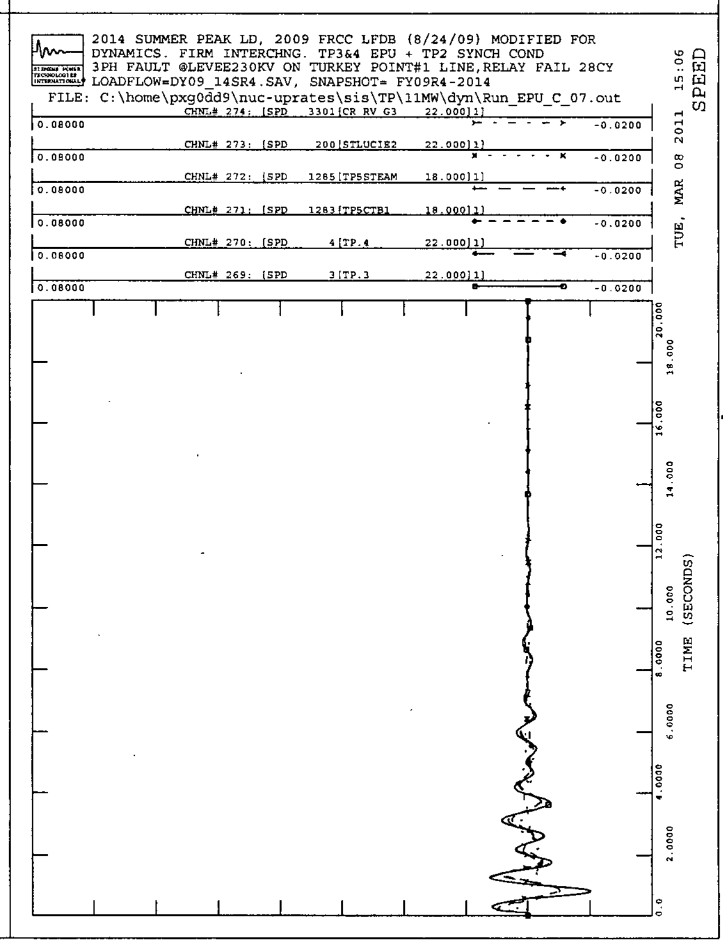


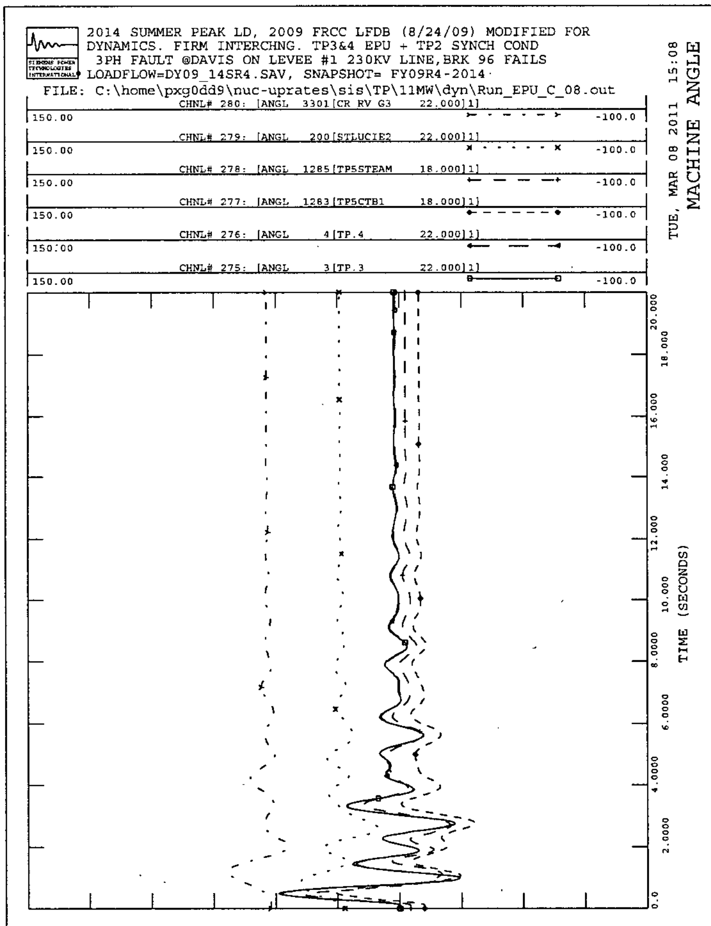


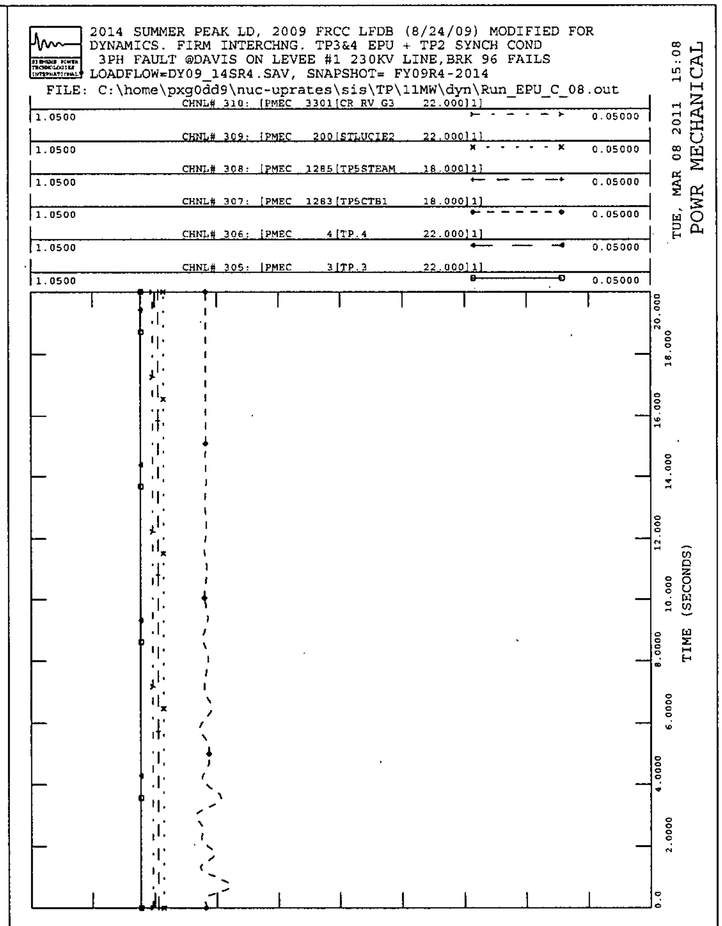

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @LEVEE230KV ON TURKEY POINT#1 LINE,RELAY FAIL 28CY
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_07.out
TUE, MAR 08 2011 15:06
ETRM
CHNL# 294: [ETRM 4[TP.4 22.000]1]
9.5000 -0.5000
CHNL# 293: [ETRM 3[TP.3 22.000]1]
9.5000 -0.5000
TIME (SECONDS)

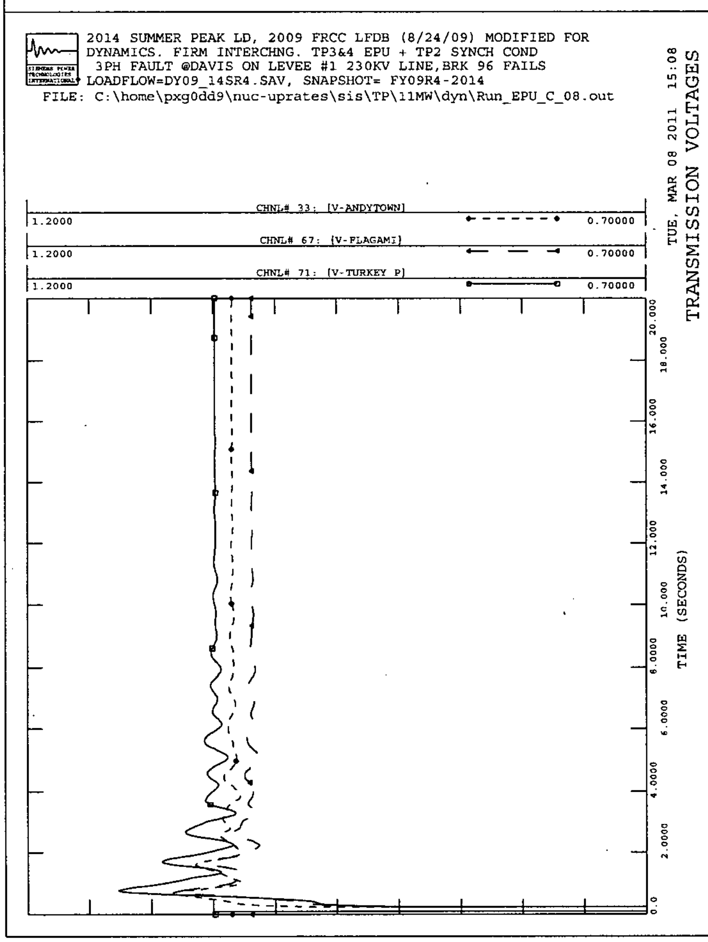

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @LEVEE230KV ON TURKEY POINT#1 LINE,RELAY FAIL 28CY
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_07.out
TUE, MAR 08 2011 15:06
FREQUENCY
CHNL# 86: 60+(60*[FRQ-PUTNAM])
61.000 59.000
CHNL# 84: 60+(60*[FRQ-CHARLOTE])
61.000 59.000
CHNL# 83: 60+(60*[FRQ-RANCH])
61.000 59.000
CHNL# 81: 60+(60*[FRQ-FLAGAMI])
61.000 59.000
TIME (SECONDS)

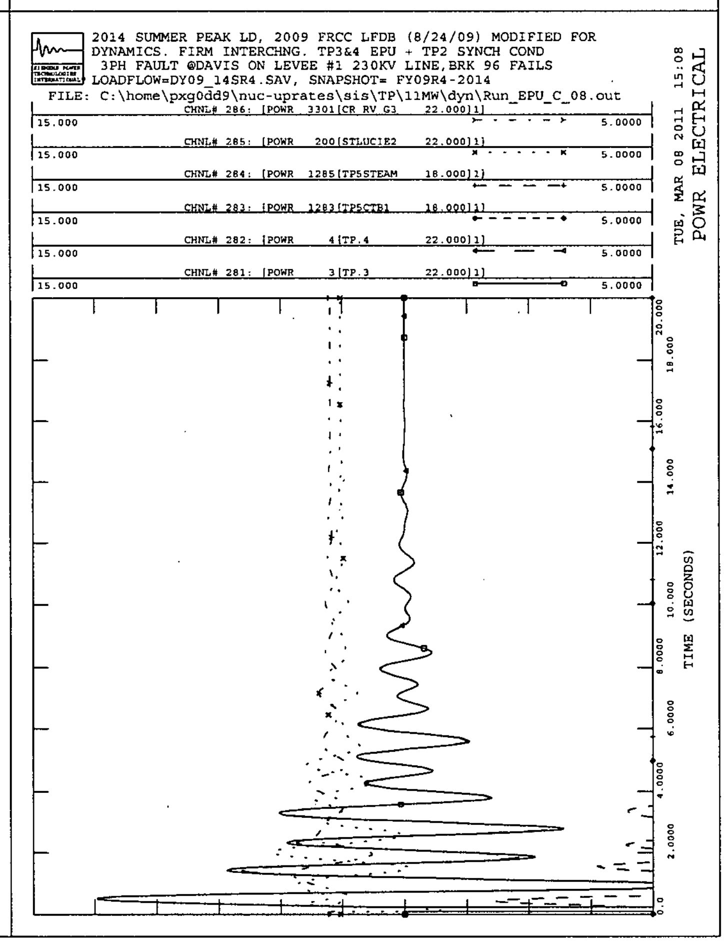

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @LEVEE230KV ON TURKEY POINT#1 LINE,RELAY FAIL 28CY
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_07.out
TUE, MAR 08 2011 15:06
EXCITER VOLTAGE
CHNL# 300: [EFD 4[TP.4 22.000]1]
9.5000 -0.5000
CHNL# 299: [EFD 3[TP.3 22.000]1]
9.5000 -0.5000
TIME (SECONDS)


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @LEVEE230KV ON TURKEY POINT#1 LINE,RELAY FAIL 28CY
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_07.out
TUE, MAR 08 2011 15:06
SPEED
CHNL# 274: [SPD 3301[CR RV G3 22.000]1]
0.08000 -0.0200
CHNL# 273: [SPD 200[STLUCIE2 22.000]1]
0.08000 -0.0200
CHNL# 272: [SPD 1285[TP5STEAM 18.000]1]
0.08000 -0.0200
CHNL# 271: [SPD 1283[TP5CTB1 18.000]1]
0.08000 -0.0200
CHNL# 270: [SPD 4[TP.4 22.000]1]
0.08000 -0.0200
CHNL# 269: [SPD 3[TP.3 22.000]1]
0.08000 -0.0200
TIME (SECONDS)

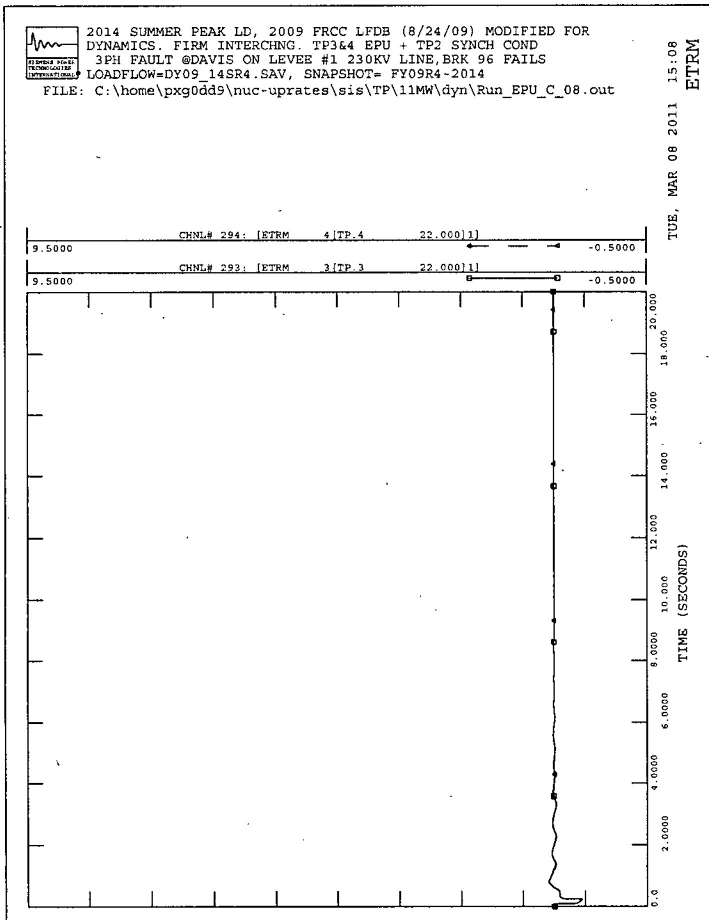

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_08.out
CHNL# 280: [ANGL 3301[CR RV G3 22.000]1]
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1]
CHNL# 278: [ANGL 1285[TP5STEAM 18.000]1]
CHNL# 277: [ANGL 1283[TP5CTB1 18.000]1]
CHNL# 276: [ANGL 4[TP.4 22.000]1]
CHNL# 275: [ANGL 3[TP.3 22.000]1]
150.00
-100.0
TUE, MAR 08 2011 15:08
MACHINE ANGLE
TIME (SECONDS)

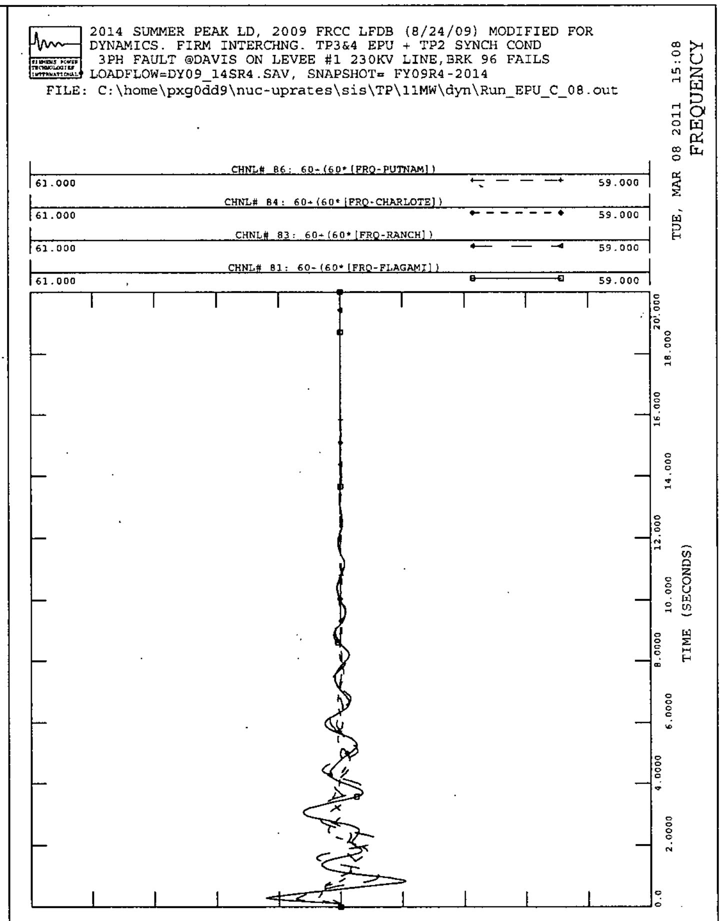

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_08.out
CHNL# 310: [PMEC 3301[CR RV G3 22.000]1]
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1]
CHNL# 308: [PMEC 1285[TP5STEAM 18.000]1]
CHNL# 307: [PMEC 1283[TP5CTB1 18.000]1]
CHNL# 306: [PMEC 4[TP.4 22.000]1]
CHNL# 305: [PMEC 3[TP.3 22.000]1]
1.0500
0.05000
TUE, MAR 08 2011 15:08
POWR MECHANICAL
TIME (SECONDS)

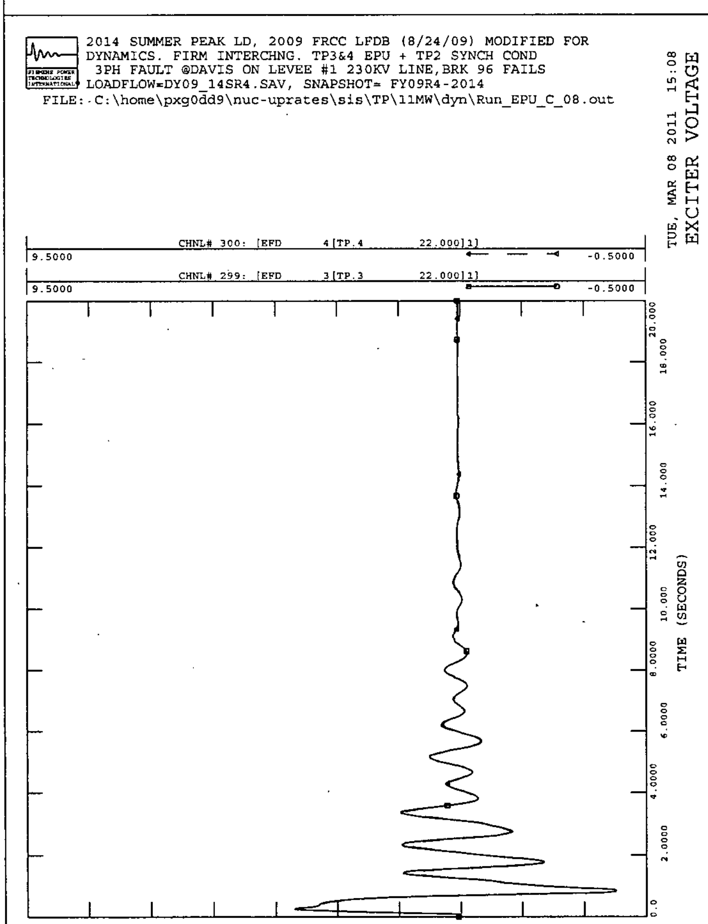

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_08.out
CHNL# 33: [V-ANDYTOWN]
CHNL# 67: [V-FLAGAMI]
CHNL# 71: [V-TURKEY P]
1.2000
0.70000
TUE, MAR 08 2011 15:08
TRANSMISSION VOLTAGES
TIME (SECONDS)

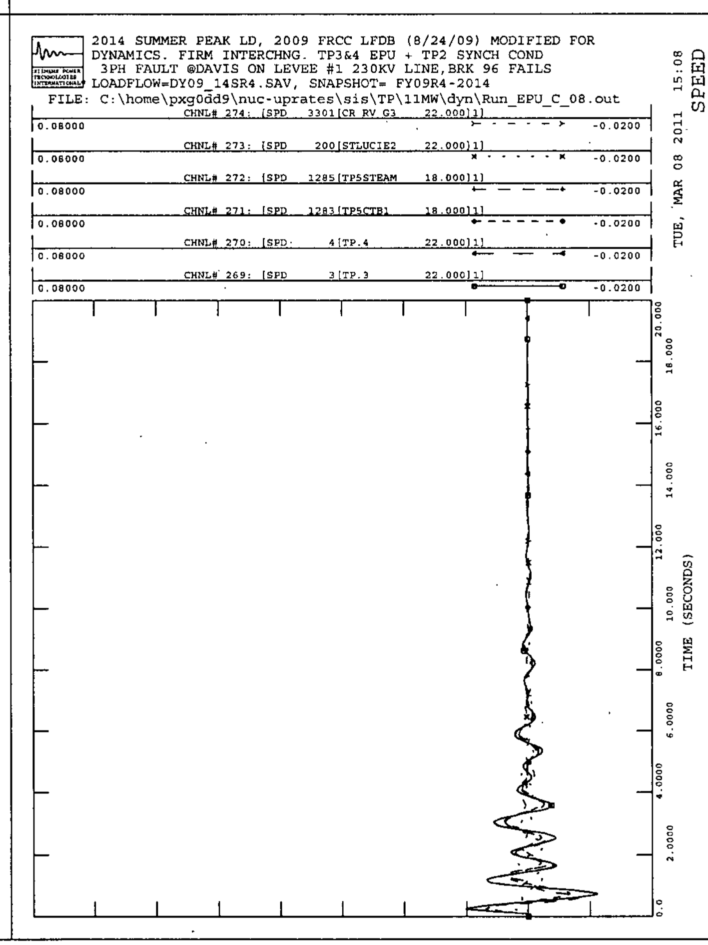

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_08.out
CHNL# 286: [POWR 3301[CR RV G3 22.000]1]
CHNL# 285: [POWR 200[STLUCIE2 22.000]1]
CHNL# 284: [POWR 1285[TP5STEAM 18.000]1]
CHNL# 283: [POWR 1283[TP5CTB1 18.000]1]
CHNL# 282: [POWR 4[TP.4 22.000]1]
CHNL# 281: [POWR 3[TP.3 22.000]1]
15.000
5.0000
TUE, MAR 08 2011 15:08
POWR ELECTRICAL
TIME (SECONDS)

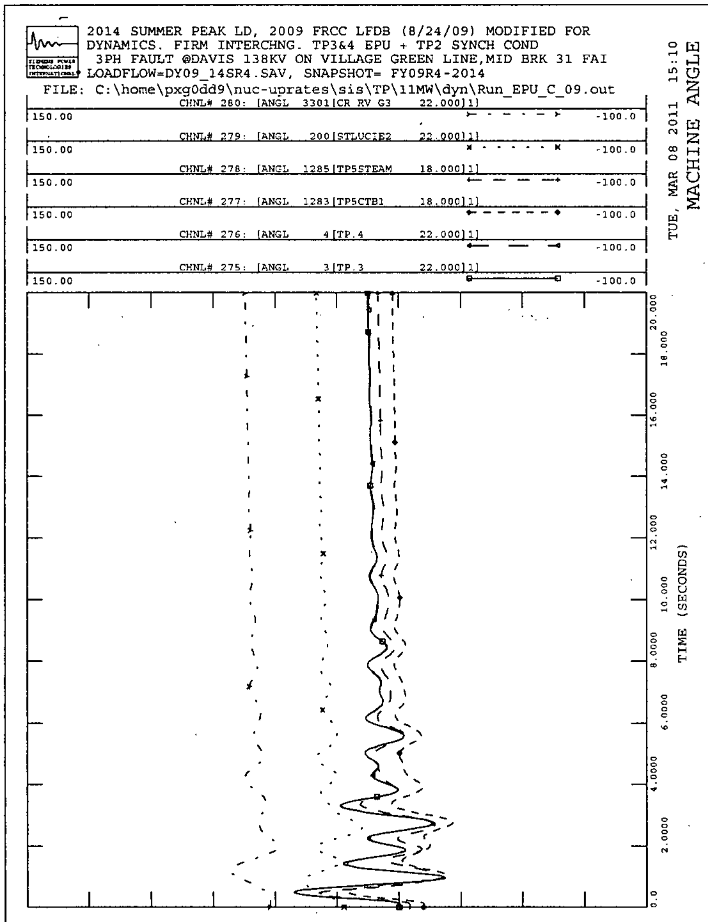
Dynamic Stability Plots for Table 2










2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_09.out
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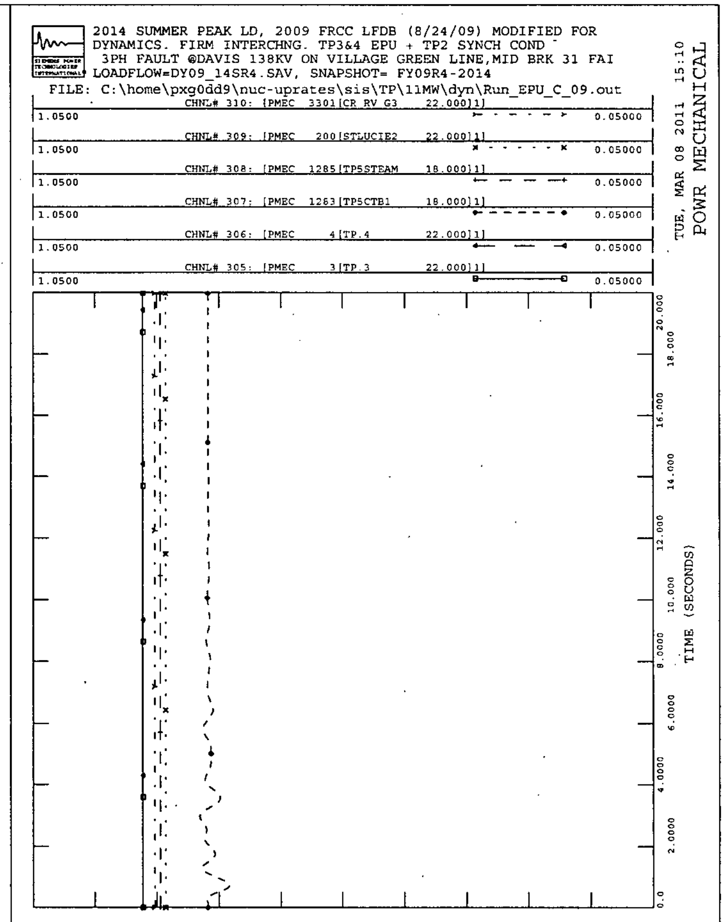
150.00 -100.0
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1]
150.00 -100.0
CHNL# 278: [ANGL 1285[TP5STEAM 18.000]1]
150.00 -100.0
CHNL# 277: [ANGL 1283[TP5CTB1 18.000]1]
150.00 -100.0
CHNL# 276: [ANGL 4[TP.4 22.000]1]
150.00 -100.0
CHNL# 275: [ANGL 3[TP.3 22.000]1]
150.00 -100.0
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:10
MACHINE ANGLE


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_09.out
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1.0500 0.05000
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1]
1.0500 0.05000
CHNL# 308: [PMEC 1285[TP5STEAM 18.000]1]
1.0500 0.05000
CHNL# 307: [PMEC 1283[TP5CTB1 18.000]1]
1.0500 0.05000
CHNL# 306: [PMEC 4[TP.4 22.000]1]
1.0500 0.05000
CHNL# 305: [PMEC 3[TP.3 22.000]1]
1.0500 0.05000
0.0
2.0000
4.0000
6.0000
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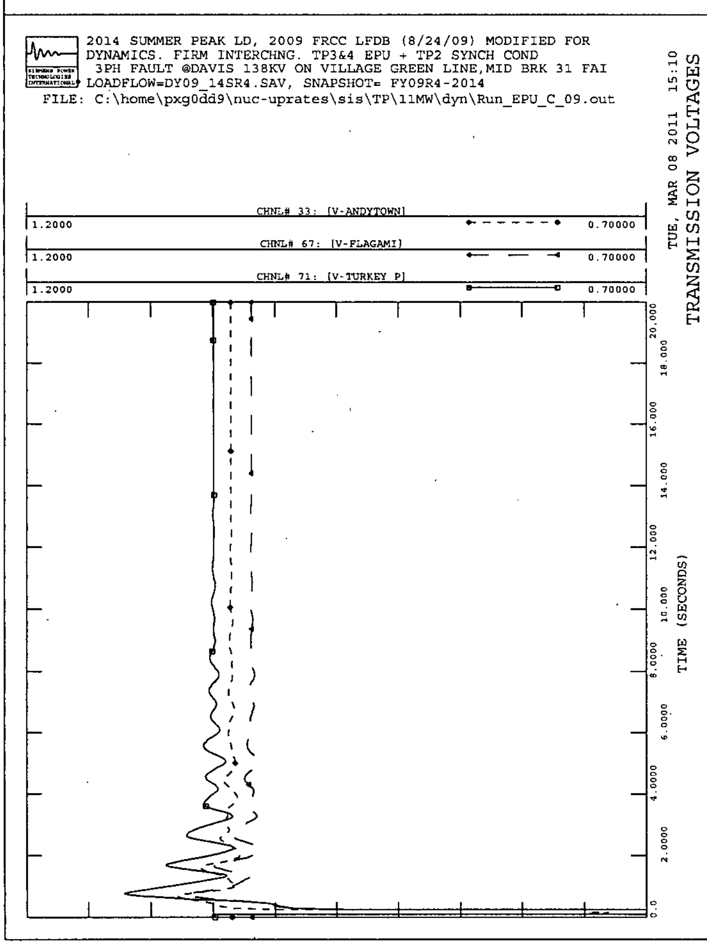
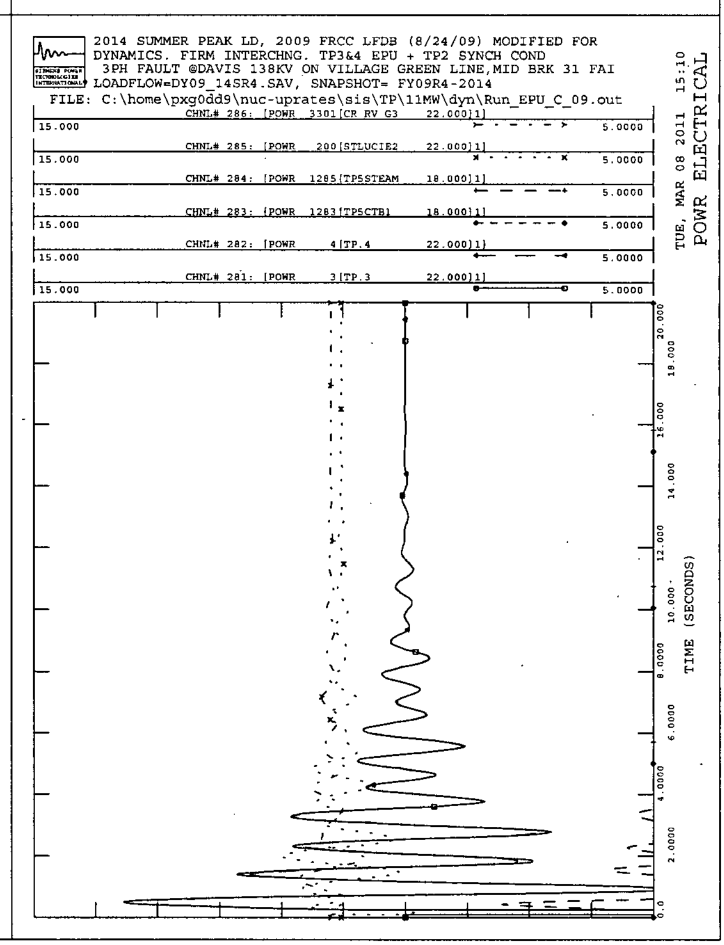
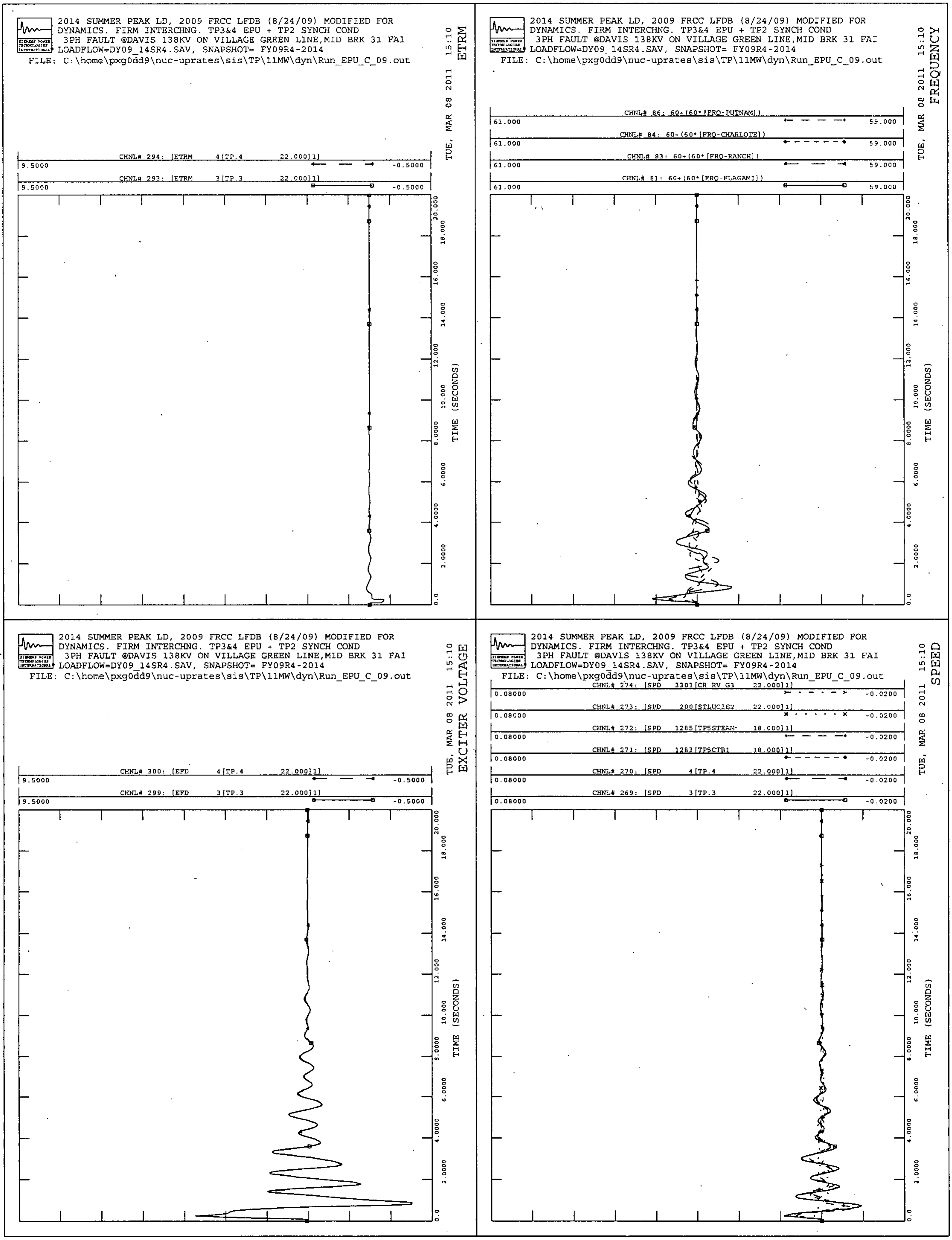
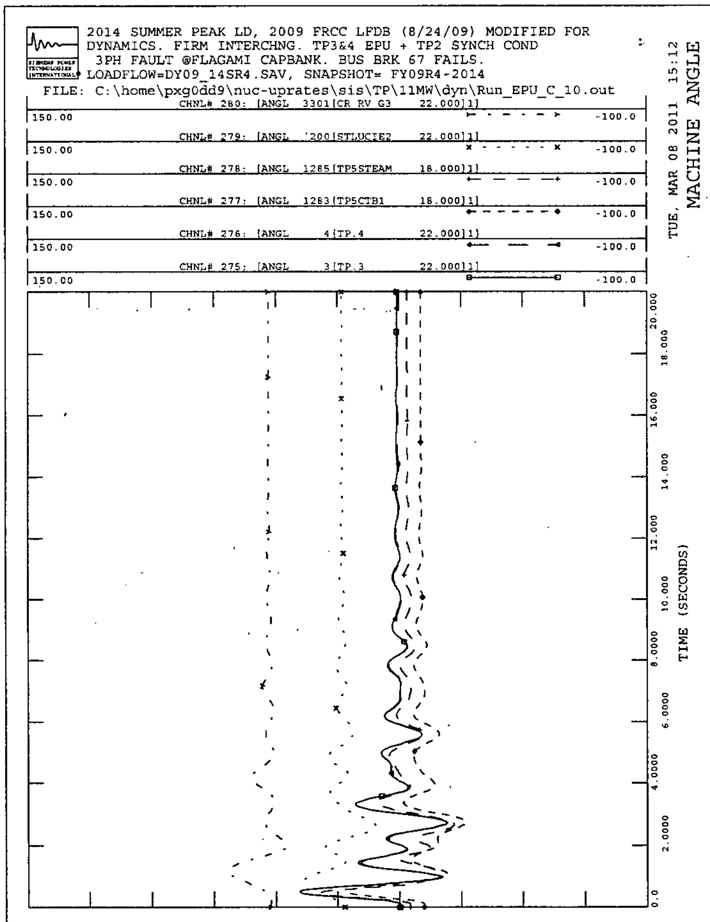
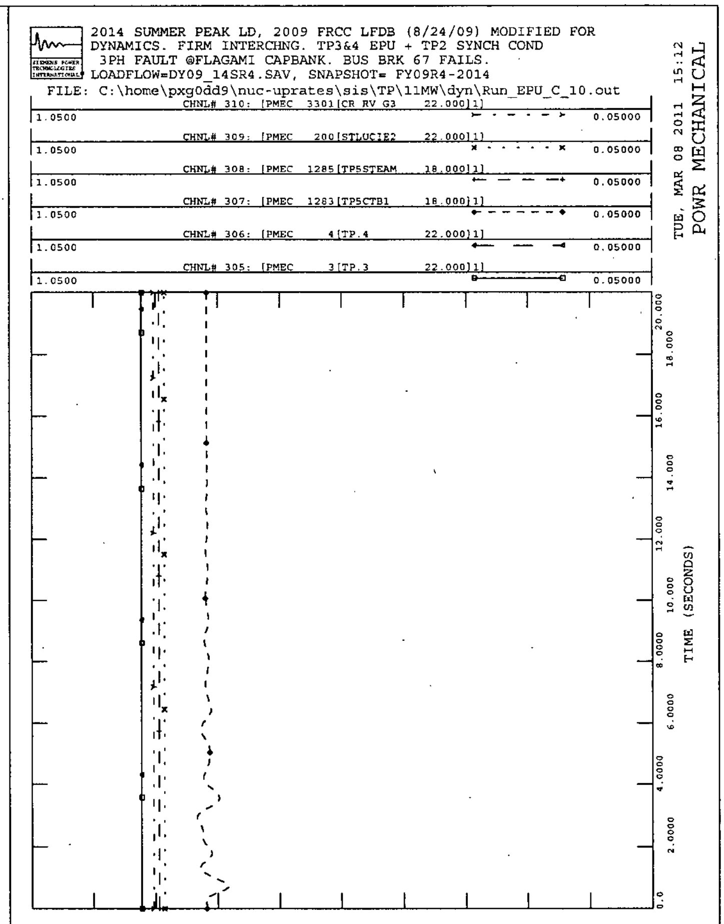
14.000
16.000
18.000
20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:10
POWR MECHANICAL


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_09.out
CHNL# 33: [V-ANDYTOWN]
1.2000 0.70000
CHNL# 67: [V-FLAGAMI]
1.2000 0.70000
CHNL# 71: [V-TURKEY P]
1.2000 0.70000
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:10
TRANSMISSION VOLTAGES


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_09.out
CHNL# 286: [POWR 3301[CR RV G3 22.000]1]
15.000 5.0000
CHNL# 285: [POWR 200[STLUCIE2 22.000]1]
15.000 5.0000
CHNL# 284: [POWR 1285[TP5STEAM 18.000]1]
15.000 5.0000
CHNL# 283: [POWR 1283[TP5CTB1 18.000]1]
15.000 5.0000
CHNL# 282: [POWR 4[TP.4 22.000]1]
15.000 5.0000
CHNL# 281: [POWR 3[TP.3 22.000]1]
15.000 5.0000
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:10
POWR ELECTRICAL


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS 138KV ON VILLAGE GREEN LINE,MID BRK 31 FAI
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_09.out
TUE, MAR 08 2011 15:10
ETRM
CHNL# 294: [ETRM 4[TP.4 22.000]1]
CHNL# 293: [ETRM 3[TP.3 22.000]1]
9.5000
-0.5000
FREQUENCY
CHNL# 86: 60+(60*[FRQ-PUTNAM])
CHNL# 84: 60+(60*[FRQ-CHARLOTE])
CHNL# 83: 60+(60*[FRQ-RANCH])
CHNL# 81: 60+(60*[FRQ-FLAGAMI])
61.000
59.000
EXCITER VOLTAGE
CHNL# 300: [EFD 4[TP.4 22.000]1]
CHNL# 299: [EFD 3[TP.3 22.000]1]
SPEED
CHNL# 274: [SPD 3301[CR RV G3 22.000]1]
CHNL# 273: [SPD 200[STLUCIE2 22.000]1]
CHNL# 272: [SPD 1285[TPSSTEAM- 18.000]1]
CHNL# 271: [SPD 1283[TP5CTB1 18.000]1]
CHNL# 270: [SPD 4[TP.4 22.000]1]
CHNL# 269: [SPD 3[TP.3 22.000]1]
0.08000
-0.0200
TIME (SECONDS)
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_10.out
CHNL# 280: [ANGL 3301[CR RV G3 22.000]1]
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1]
CHNL# 278: [ANGL 1285[TP5STEAM 18.000]1]
CHNL# 277: [ANGL 1283[TP5CTB1 18.000]1]
CHNL# 276: [ANGL 4[TP.4 22.000]1]
CHNL# 275: [ANGL 3[TP.3 22.000]1]
150.00
-100.0
TIME (SECONDS)
TUE, MAR 08 2011 15:12
MACHINE ANGLE


2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_10.out
CHNL# 310: [PMEC 3301[CR RV G3 22.000]1]
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1]
CHNL# 308: [PMEC 1285[TP5STEAM 18.000]1]
CHNL# 307: [PMEC 1283[TP5CTB1 18.000]1]
CHNL# 306: [PMEC 4[TP.4 22.000]1]
CHNL# 305: [PMEC 3[TP.3 22.000]1]
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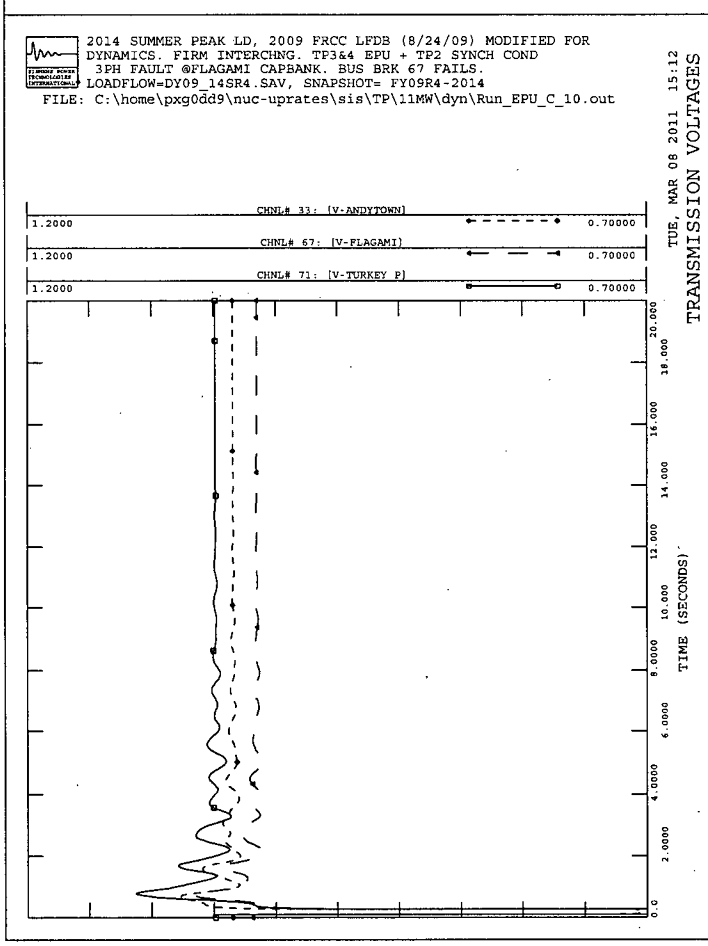
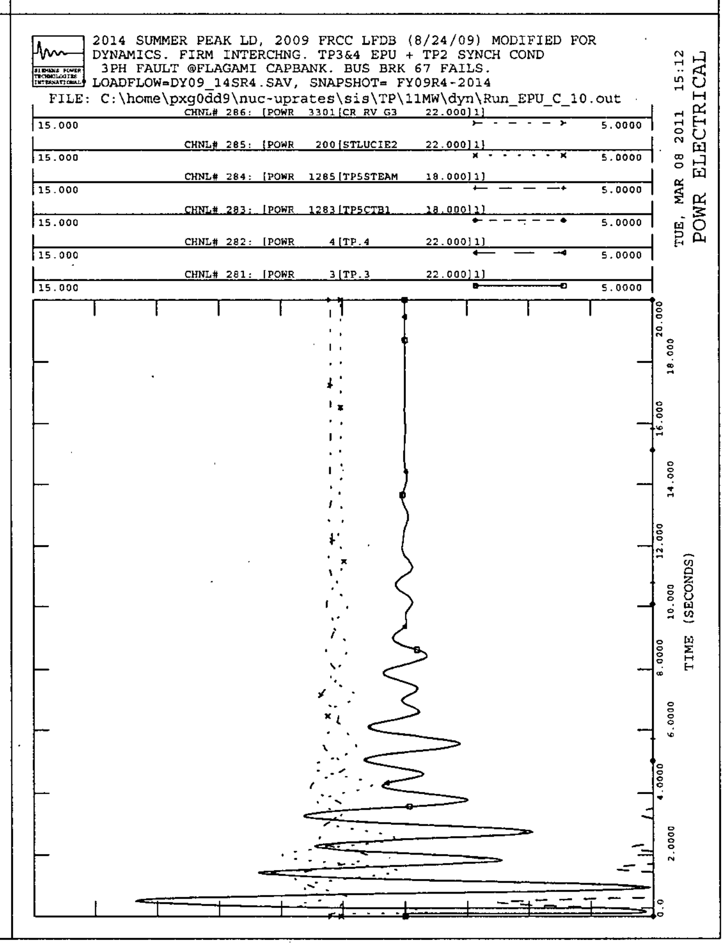
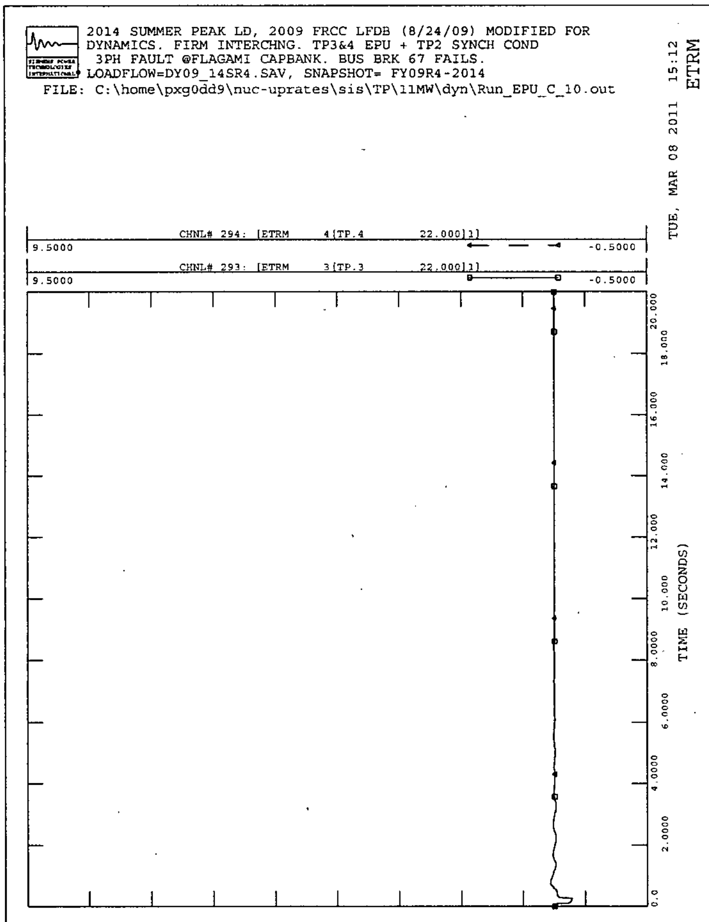
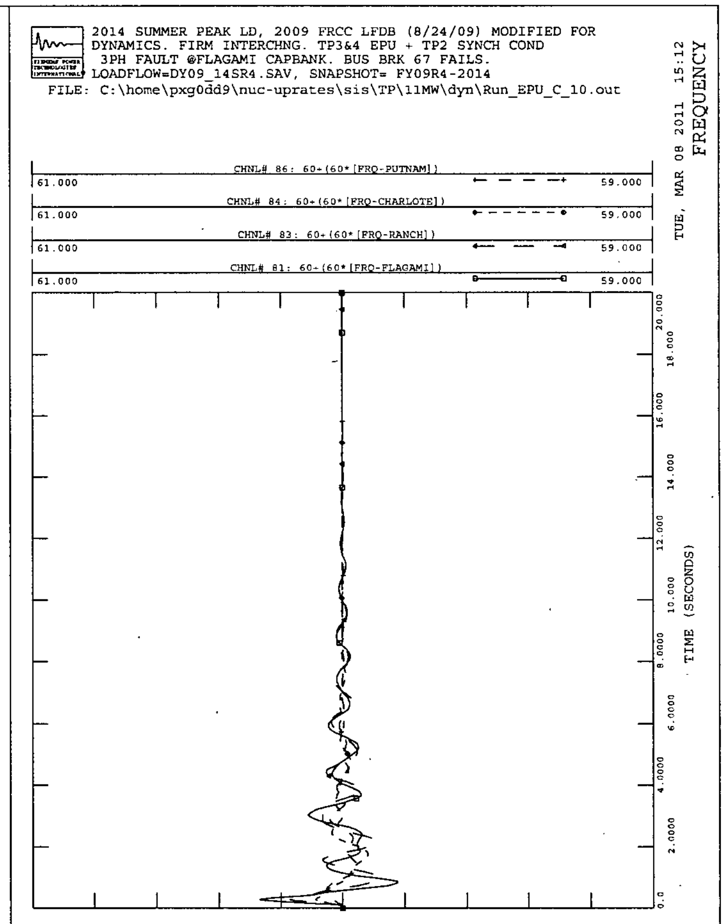
0.05000
TIME (SECONDS)
TUE, MAR 08 2011 15:12
POWR MECHANICAL

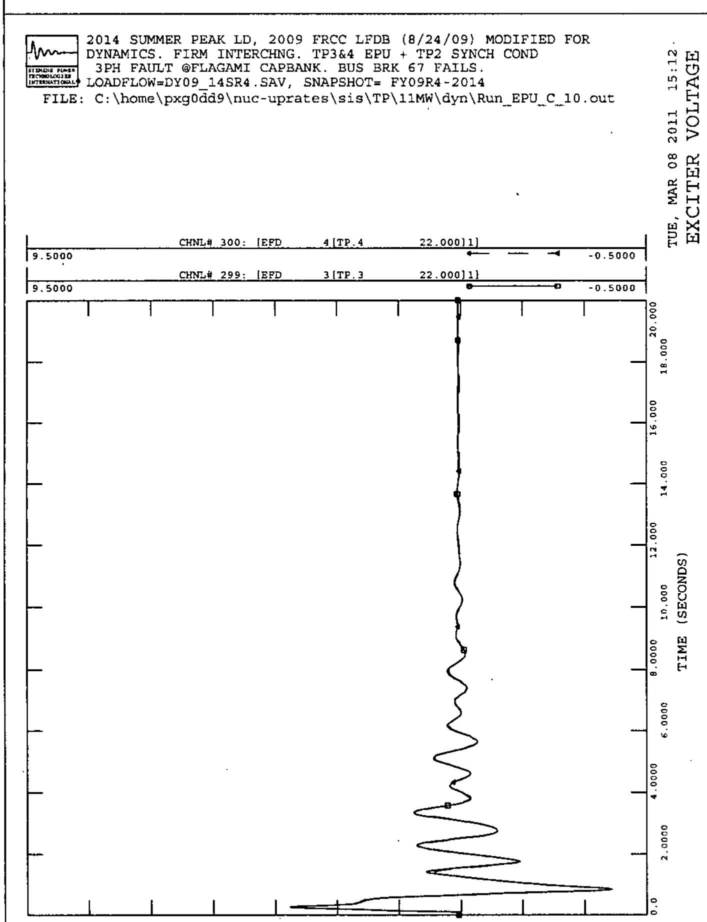

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_10.out
CHNL# 33: [V-ANDYTOWN]
CHNL# 67: [V-FLAGAMI]
CHNL# 71: [V-TURKEY P]
1.2000
0.70000
TIME (SECONDS)
TUE, MAR 08 2011 15:12
TRANSMISSION VOLTAGES

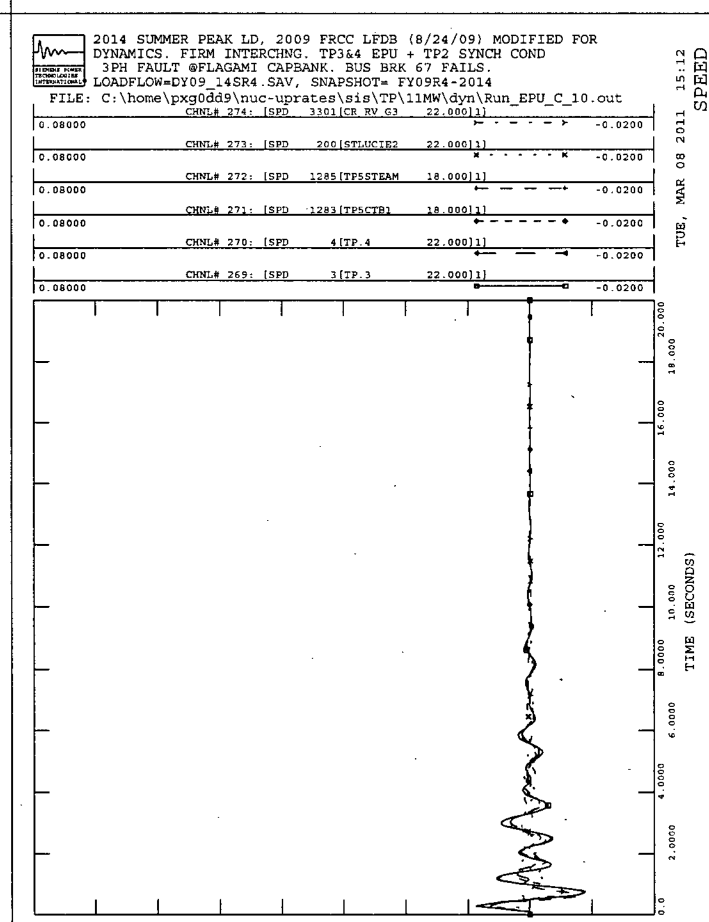

2014 SUMMER PEAK LD, 2009 FRCC LFDB (8/24/09) MODIFIED FOR
DYNAMICS. FIRM INTERCHNG. TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_10.out
CHNL# 286: [POWR 3301[CR RV G3 22.000]1]
CHNL# 285: [POWR 200[STLUCIE2 22.000]1]
CHNL# 284: [POWR 1285[TP5STEAM 18.000]1]
CHNL# 283: [POWR 1283[TP5CTB1 18.000]1]
CHNL# 282: [POWR 4[TP.4 22.000]1]
CHNL# 281: [POWR 3[TP.3 22.000]1]
15.000
5.0000
TIME (SECONDS)
TUE, MAR 08 2011 15:12
POWR ELECTRICAL

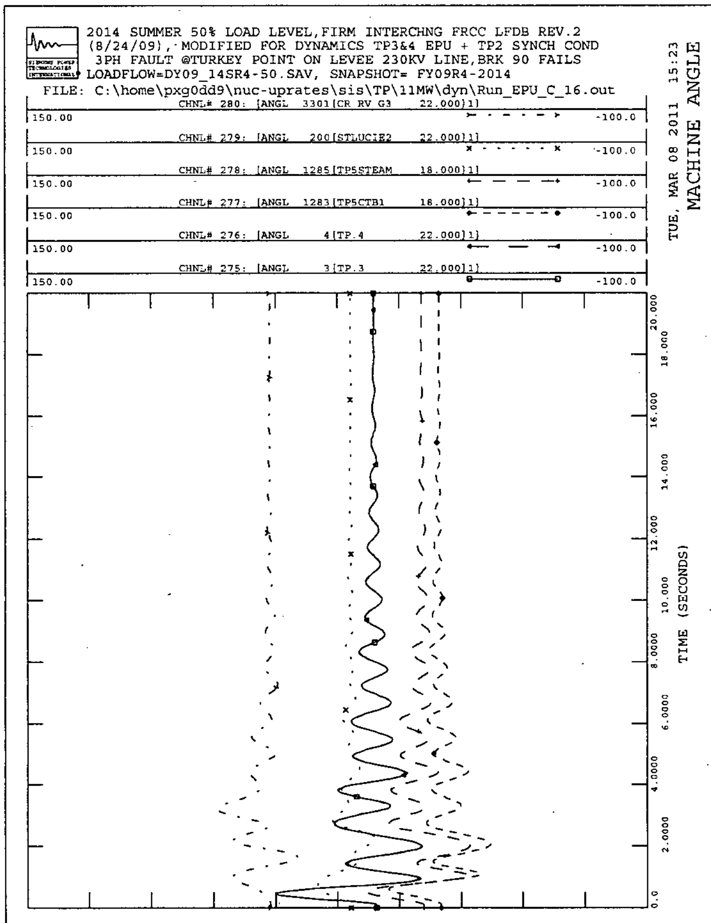
Dynamic Stability Plots for Table 2

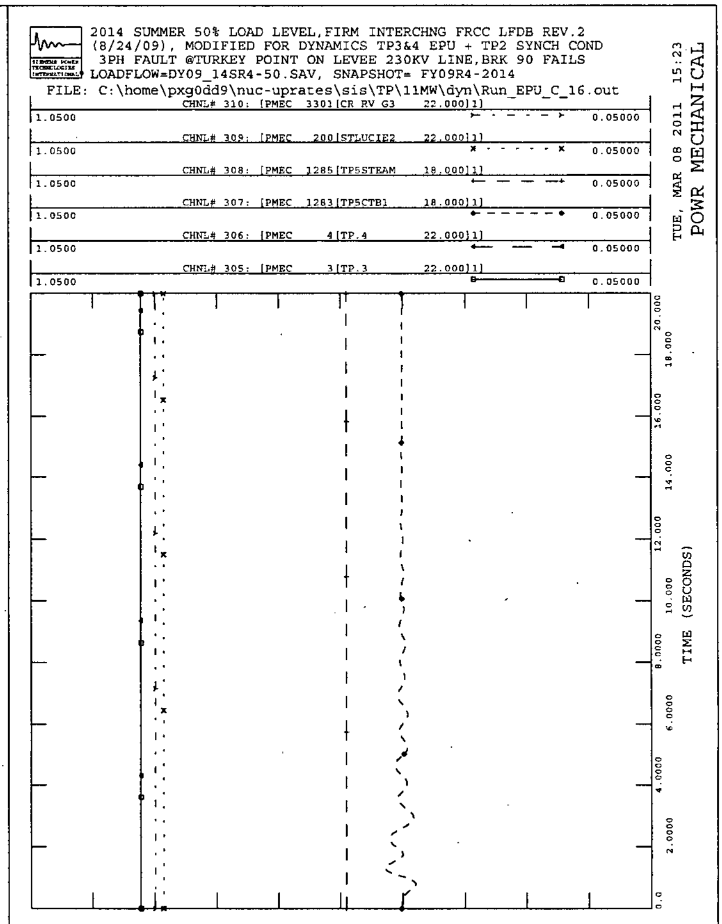









2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_16.out
CHNL# 280: [ANGL 3301[CR RV G3 22.000]1]
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1]
CHNL# 278: [ANGL 1285[TP5STEAM 18.000]1]
CHNL# 277: [ANGL 1283[TP5CTB1 18.000]1]
CHNL# 276: [ANGL 4[TP.4 22.000]1]
CHNL# 275: [ANGL 3[TP.3 22.000]1]
150.00
-100.0
TIME (SECONDS)
TUE, MAR 08 2011 15:23
MACHINE ANGLE


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_16.out
CHNL# 310: [PMEC 3301[CR RV G3 22.000]1]
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1]
CHNL# 308: [PMEC 1285[TP5STEAM 18.000]1]
CHNL# 307: [PMEC 1283[TP5CTB1 18.000]1]
CHNL# 306: [PMEC 4[TP.4 22.000]1]
CHNL# 305: [PMEC 3[TP.3 22.000]1]
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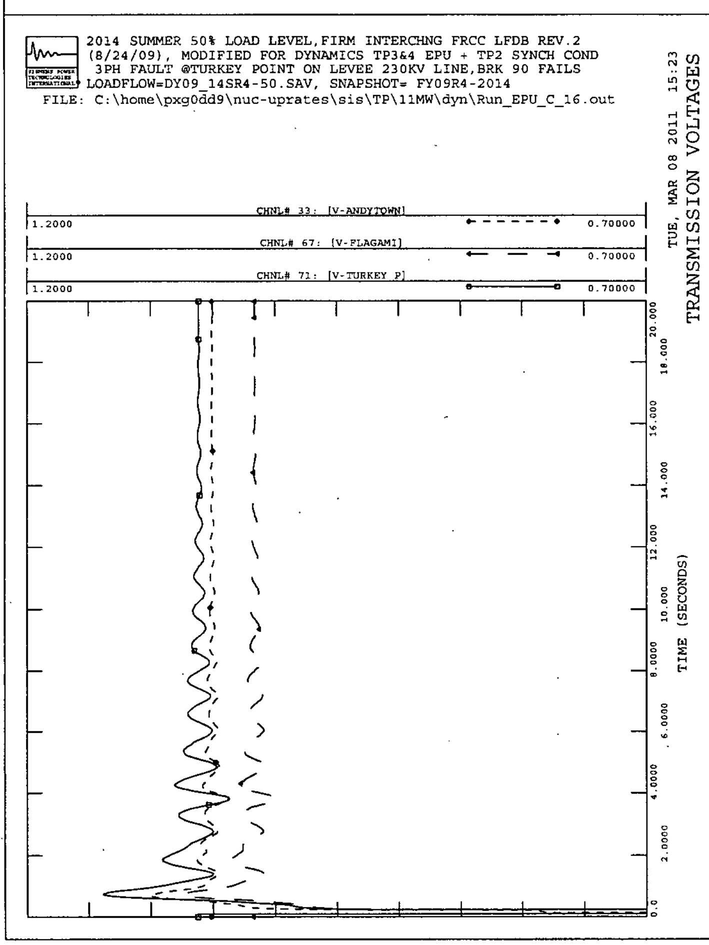
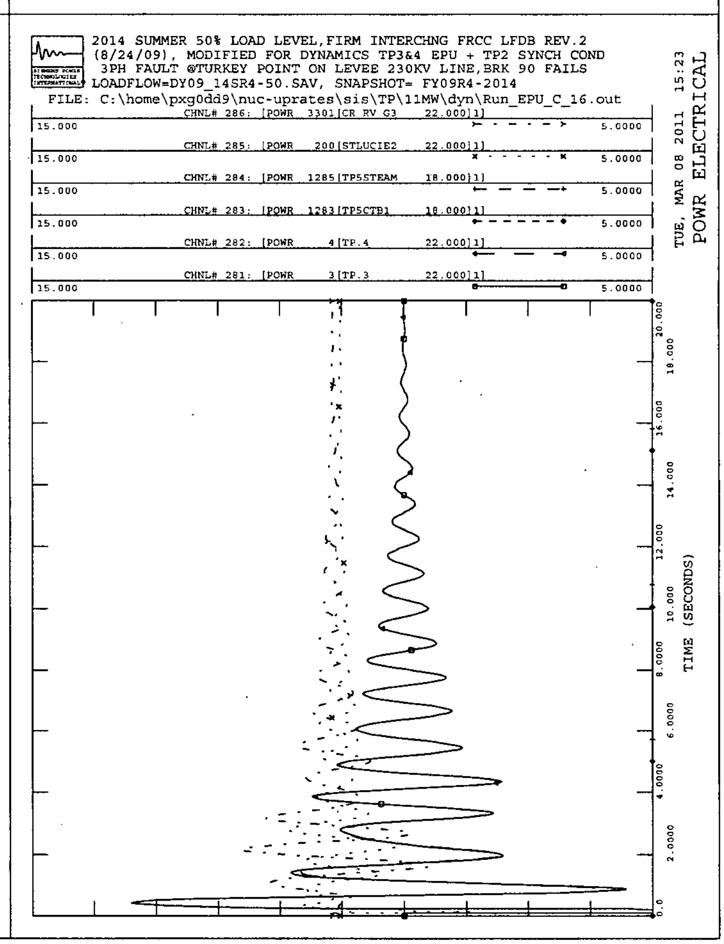
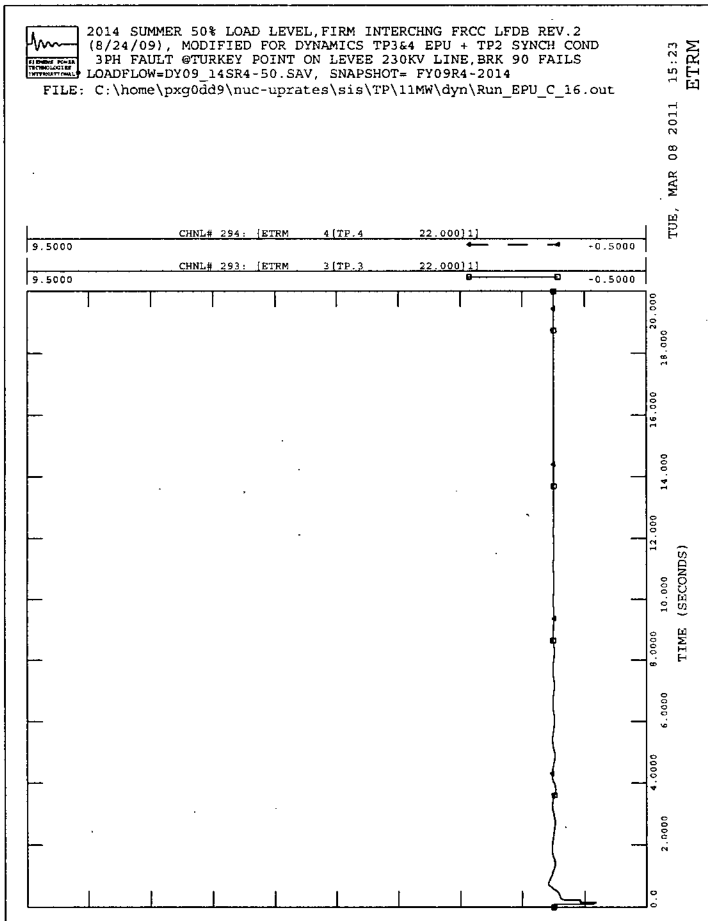
0.05000
TIME (SECONDS)
TUE, MAR 08 2011 15:23
POWR MECHANICAL


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_16.out
CHNL# 33: [V-ANDYTOWN]
CHNL# 67: [V-FLAGAMI]
CHNL# 71: [V-TURKEY P]
1.2000
0.70000
TIME (SECONDS)
TUE, MAR 08 2011 15:23
TRANSMISSION VOLTAGES


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_16.out
CHNL# 286: [POWR 3301[CR RV G3 22.000]1]
CHNL# 285: [POWR 200[STLUCIE2 22.000]1]
CHNL# 284: [POWR 1285[TP5STEAM 18.000]1]
CHNL# 283: [POWR 1283[TP5CTB1 18.000]1]
CHNL# 282: [POWR 4[TP.4 22.000]1]
CHNL# 281: [POWR 3[TP.3 22.000]1]
15.000
5.0000
TIME (SECONDS)
TUE, MAR 08 2011 15:23
POWR ELECTRICAL


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_16.out
TUE, MAR 08 2011 15:23
ETRM
CHNL# 294: [ETRM 4[TP.4 22.000]1]
9.5000
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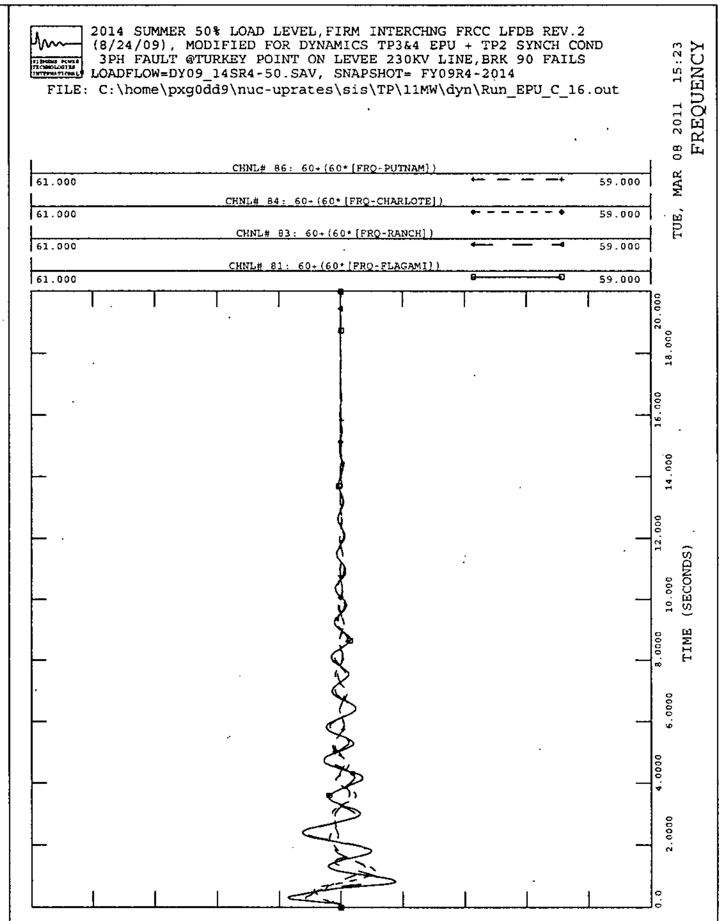
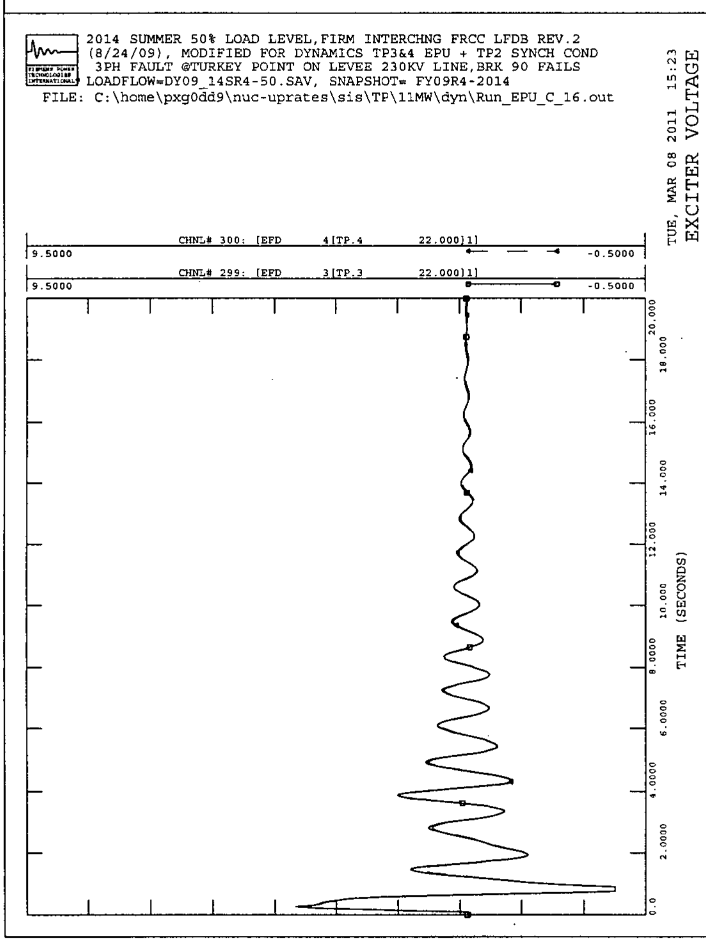
CHNL# 293: [ETRM 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_16.out
TUE, MAR 08 2011 15:23
FREQUENCY
CHNL# 86: 60+(60*[FRQ-PUTNAM])
61.000
59.000
CHNL# 84: 60+(60*[FRQ-CHARLOTE])
61.000
59.000
CHNL# 83: 60+(60*[FRQ-RANCH])
61.000
59.000
CHNL# 81: 60+(60*[FRQ-FLAGAMI])
61.000
59.000
TIME (SECONDS)


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_16.out
TUE, MAR 08 2011 15:23
EXCITER VOLTAGE
CHNL# 300: [EFD 4[TP.4 22.000]1]
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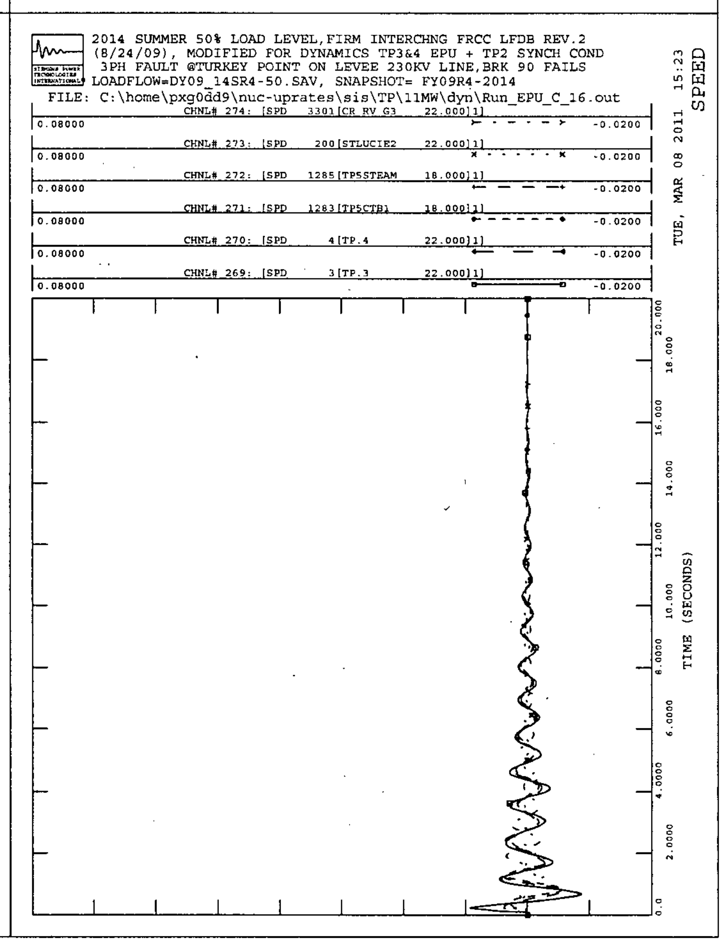
-0.5000
CHNL# 299: [EFD 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @TURKEY POINT ON LEVEE 230KV LINE,BRK 90 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_16.out
TUE, MAR 08 2011 15:23
SPEED
CHNL# 274: [SPD 3301[CR RV G3 22.000]1]
CHNL# 273: [SPD 200[STLUCIE2 22.000]1]
CHNL# 272: [SPD 1285[TP5STEAM 18.000]1]
CHNL# 271: [SPD 1283[TP5CTB1 18.000]1]
CHNL# 270: [SPD 4[TP.4 22.000]1]
CHNL# 269: [SPD 3[TP.3 22.000]1]
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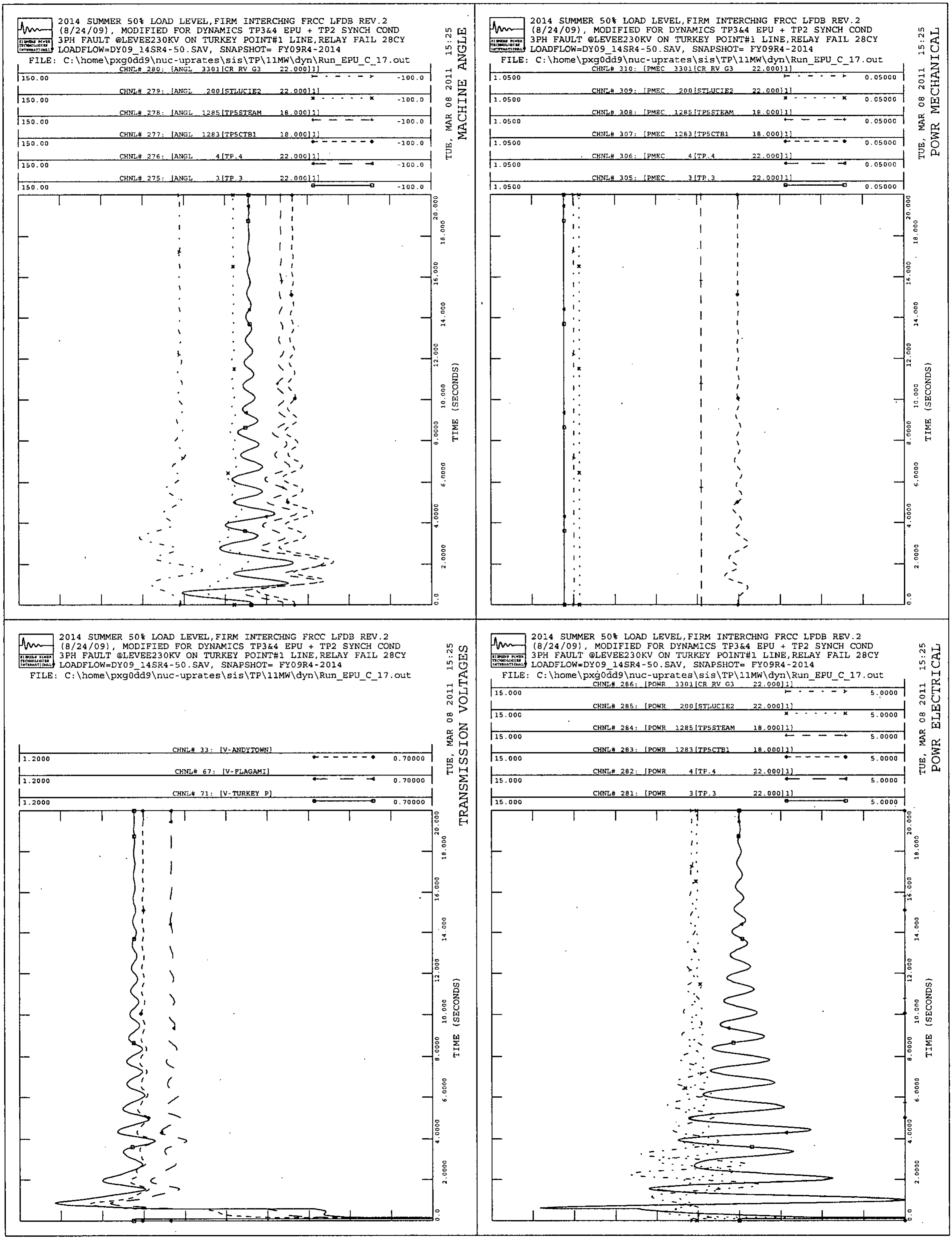
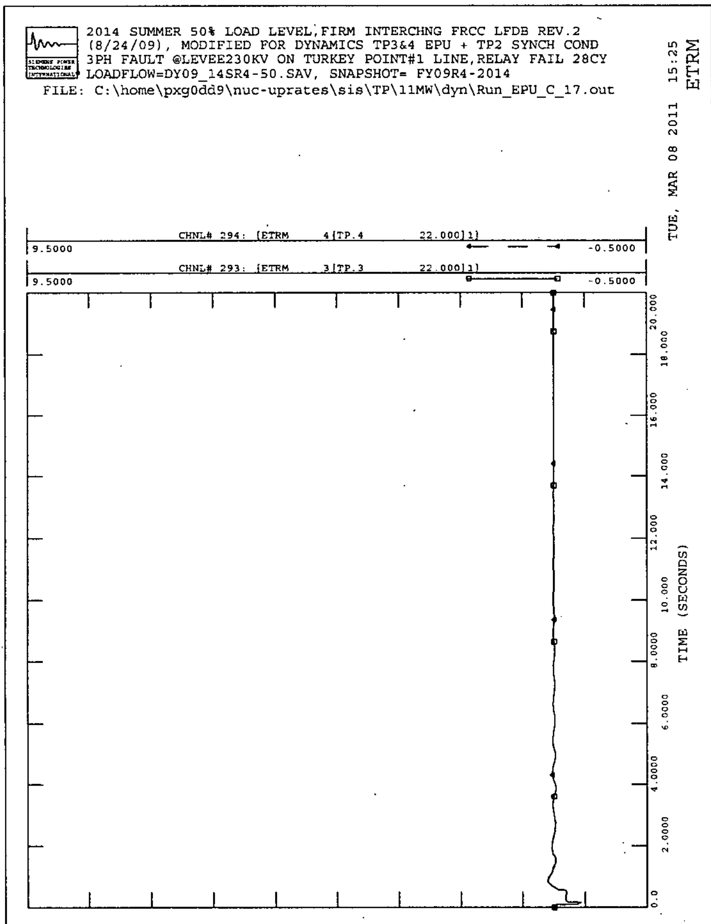
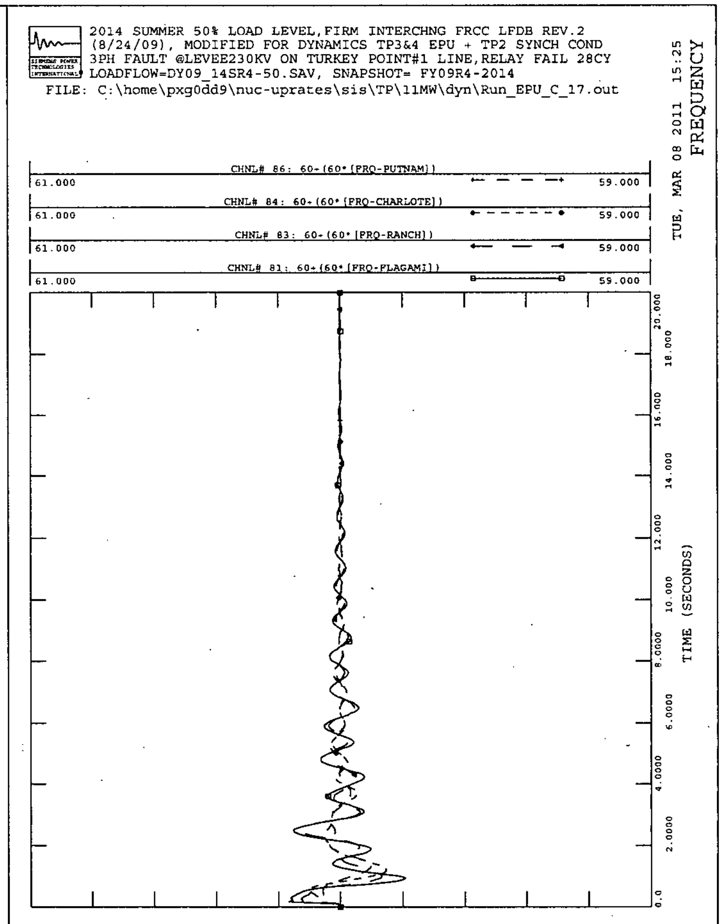
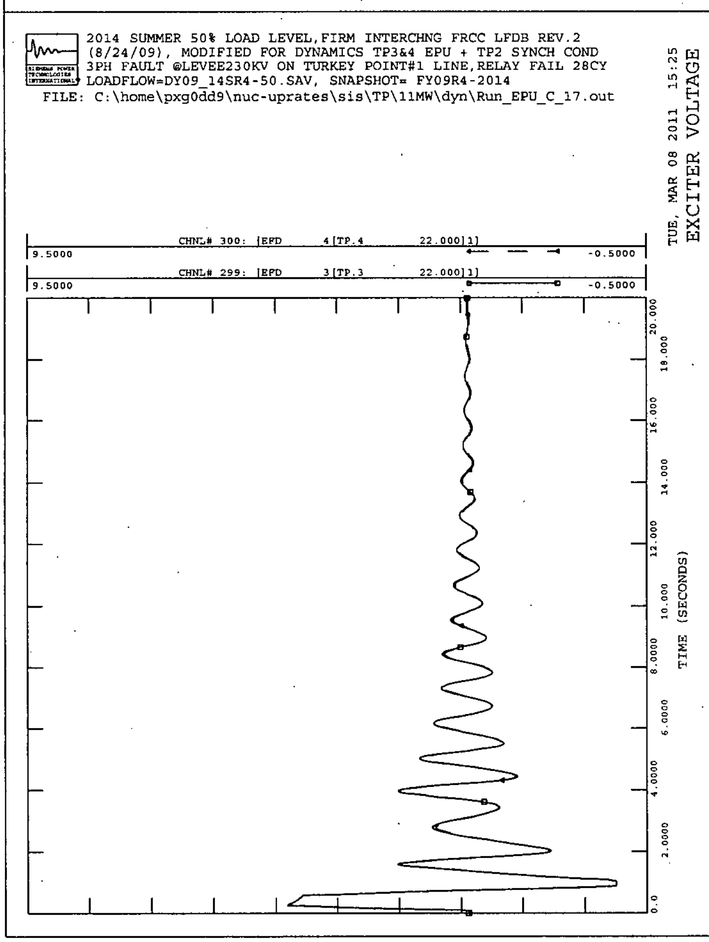
TIME (SECONDS)

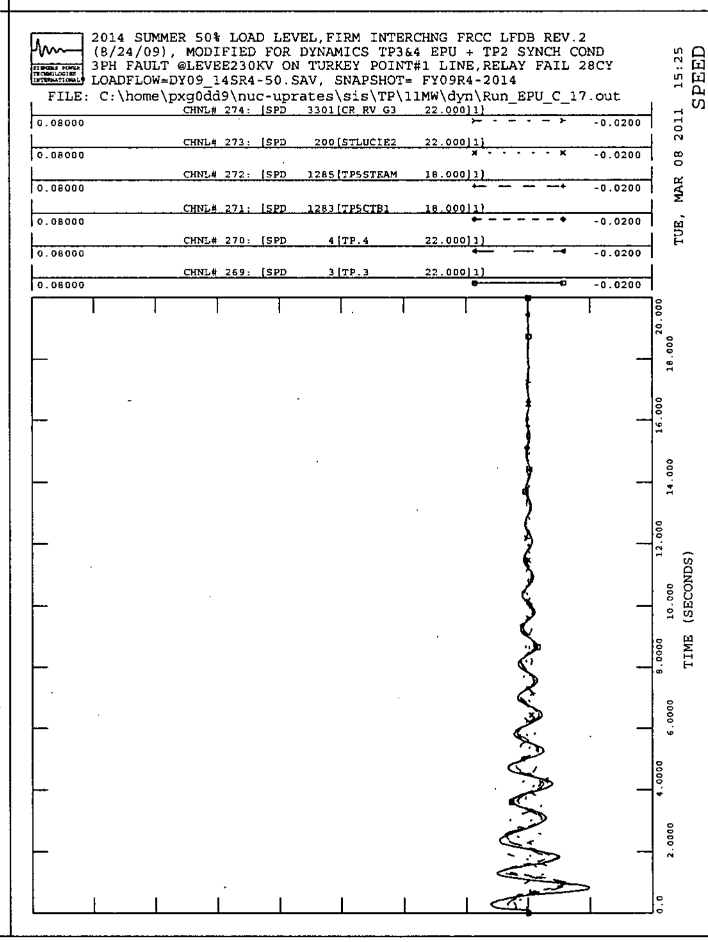

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @LEVEE230KV ON TURKEY POINT#1 LINE,RELAY FAIL 28CY
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_17.out
TUE, MAR 08 2011 15:25
MACHINE ANGLE
POWR MECHANICAL
TRANSMISSION VOLTAGES
POWR ELECTRICAL
TIME (SECONDS)

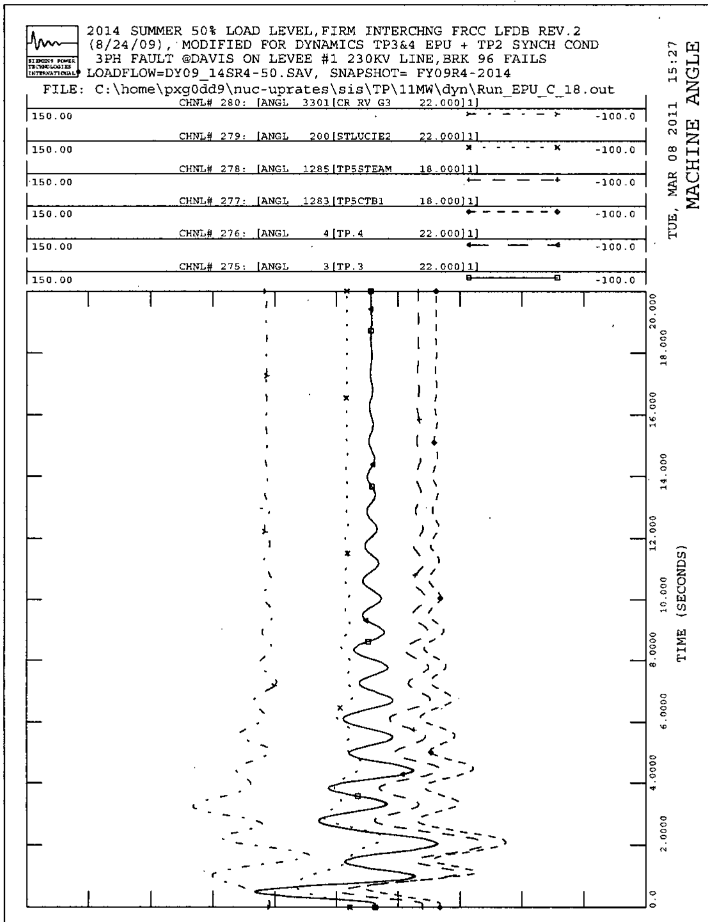
Dynamic Stability Plots for Table 2

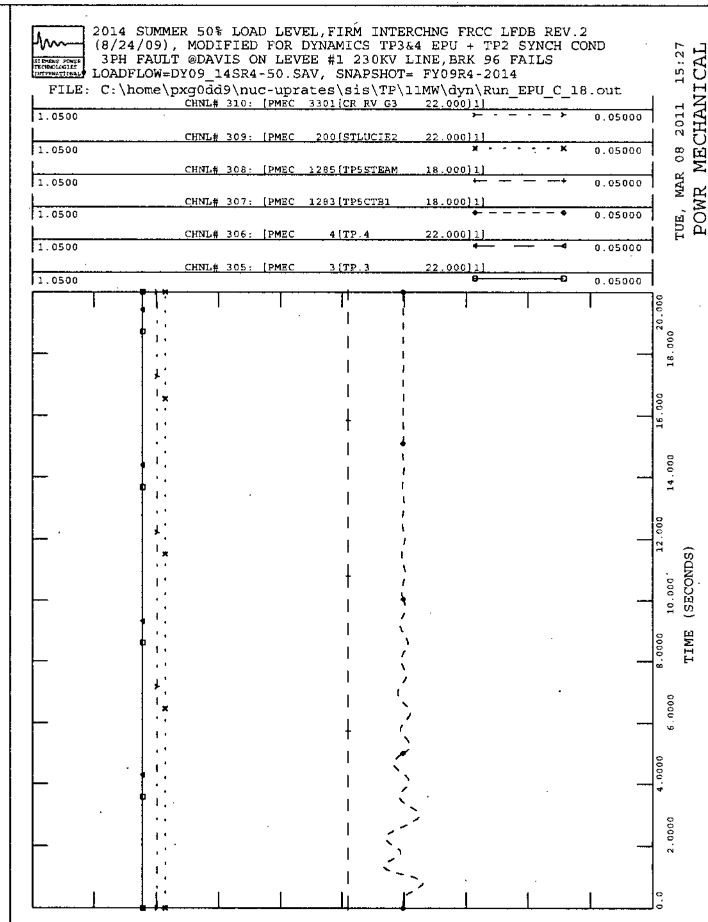


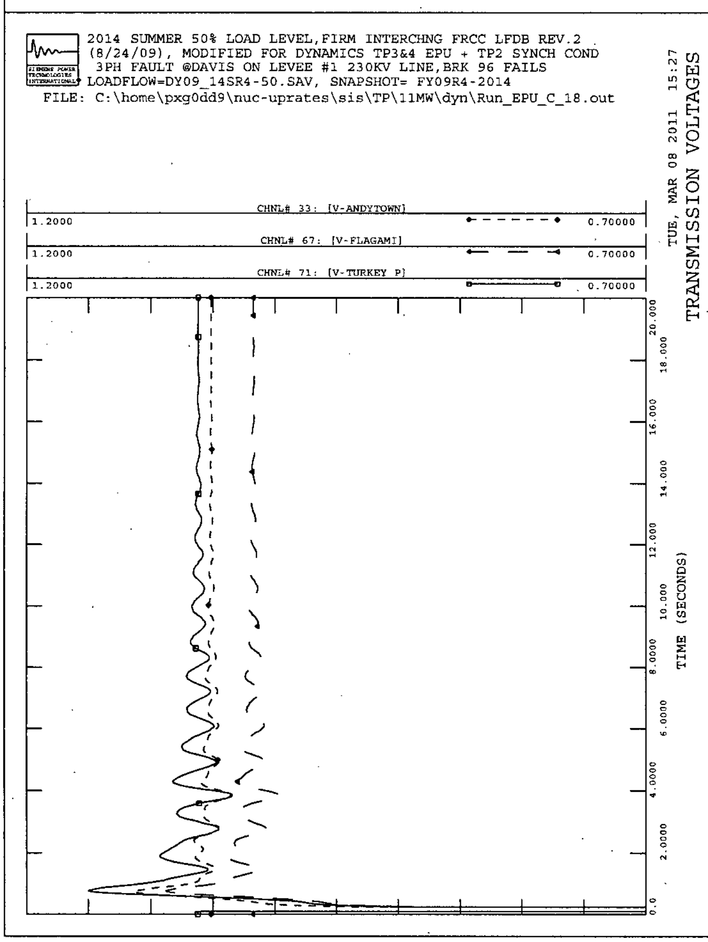


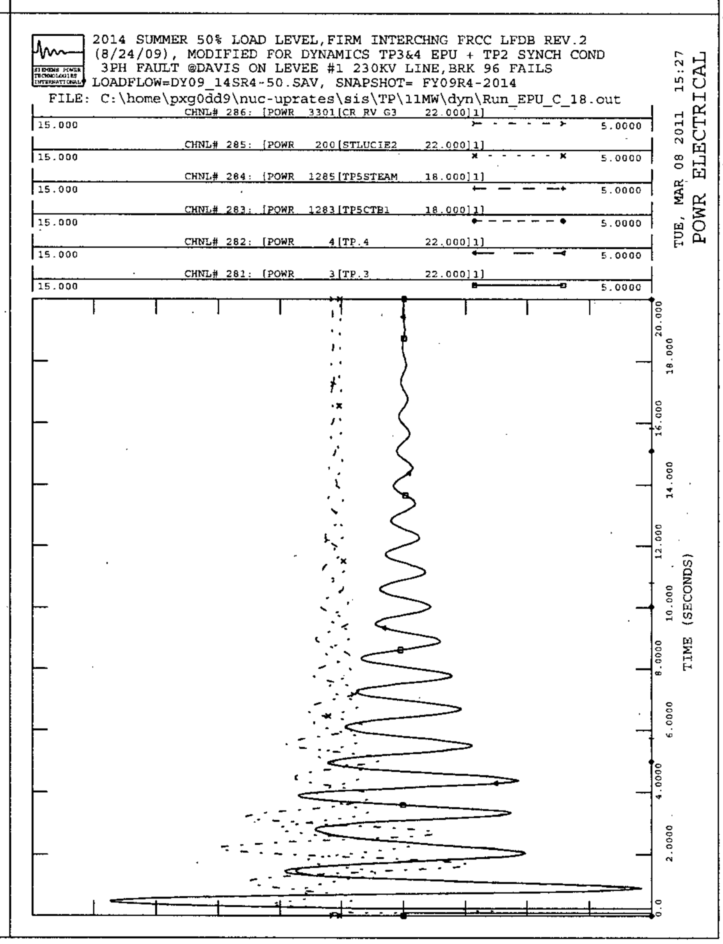




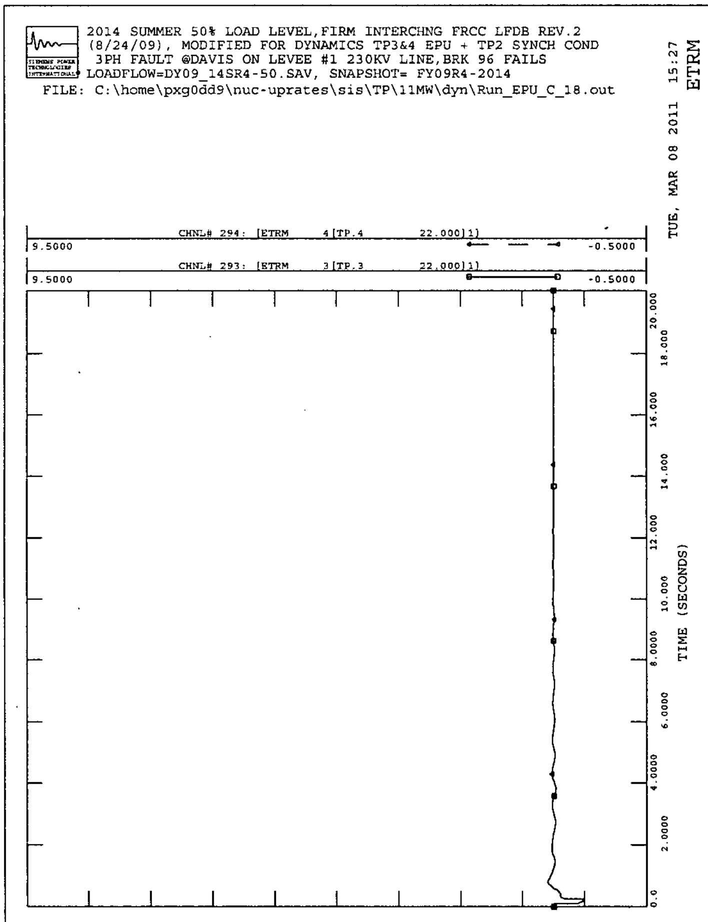

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_18.out
CHNL# 280: [ANGL 3301[CR RV G3 22.000]1]
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1]
CHNL# 278: [ANGL 1285[TP5STEAM 18.000]1]
CHNL# 277: [ANGL 1283[TP5CTB1 18.000]1]
CHNL# 276: [ANGL 4[TP.4 22.000]1]
CHNL# 275: [ANGL 3[TP.3 22.000]1]
150.00
-100.0
TIME (SECONDS)
TUE, MAR 08 2011 15:27
MACHINE ANGLE

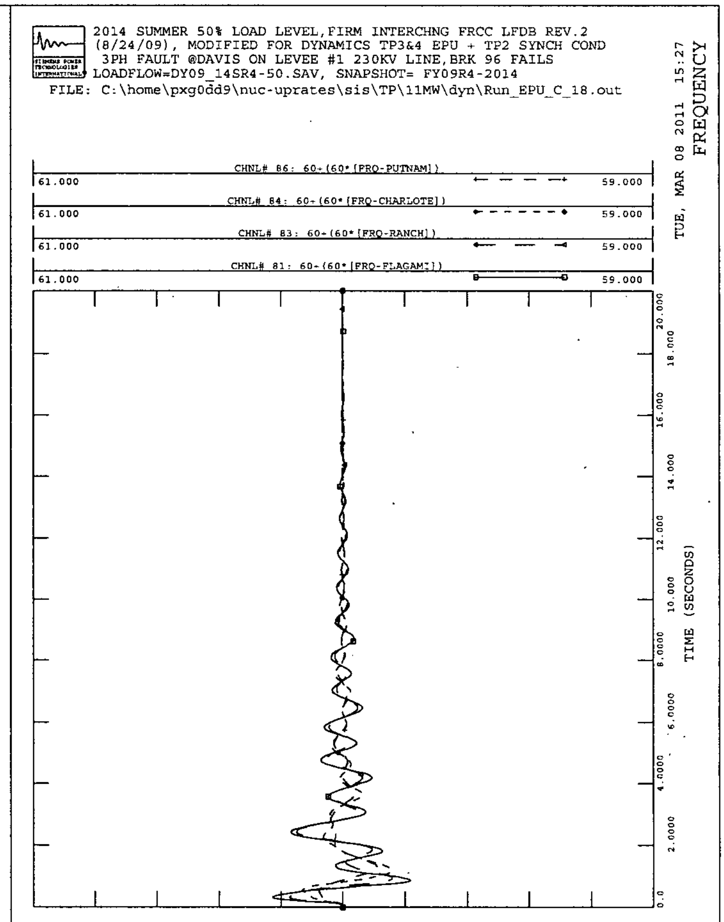

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_18.out
CHNL# 310: [PMEC 3301[CR RV G3 22.000]1]
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1]
CHNL# 308: [PMEC 1285[TP5STEAM 18.000]1]
CHNL# 307: [PMEC 1283[TP5CTB1 18.000]1]
CHNL# 306: [PMEC 4[TP.4 22.000]1]
CHNL# 305: [PMEC 3[TP.3 22.000]1]
1.0500
0.05000
TIME (SECONDS)
TUE, MAR 08 2011 15:27
POWR MECHANICAL

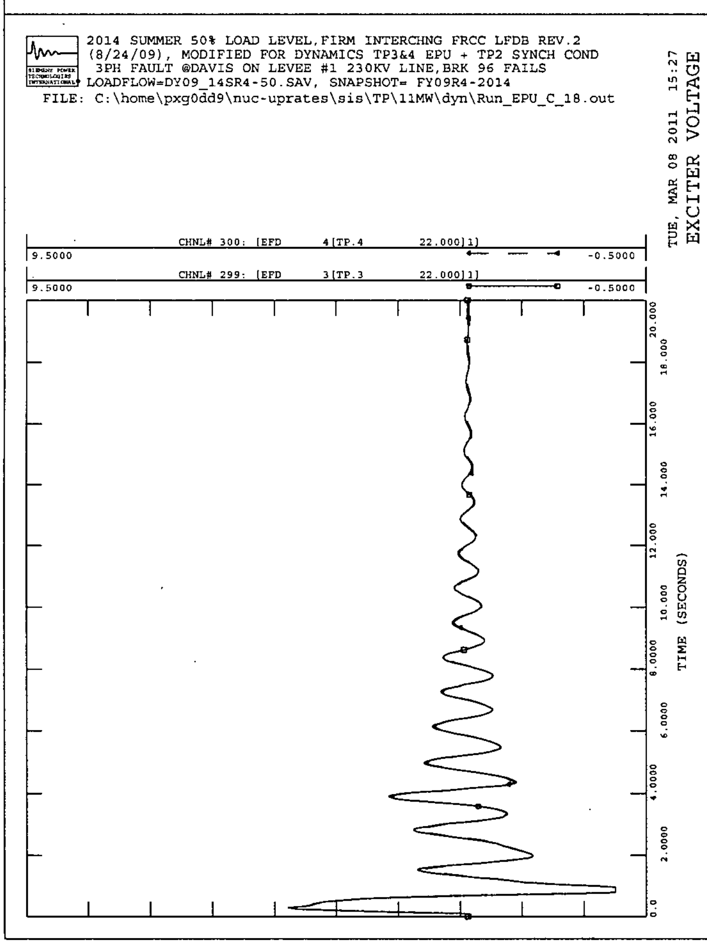

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_18.out
CHNL# 33: [V-ANDYTOWN]
CHNL# 67: [V-FLAGAMI]
CHNL# 71: [V-TURKEY P]
1.2000
0.70000
TIME (SECONDS)
TUE, MAR 08 2011 15:27
TRANSMISSION VOLTAGES

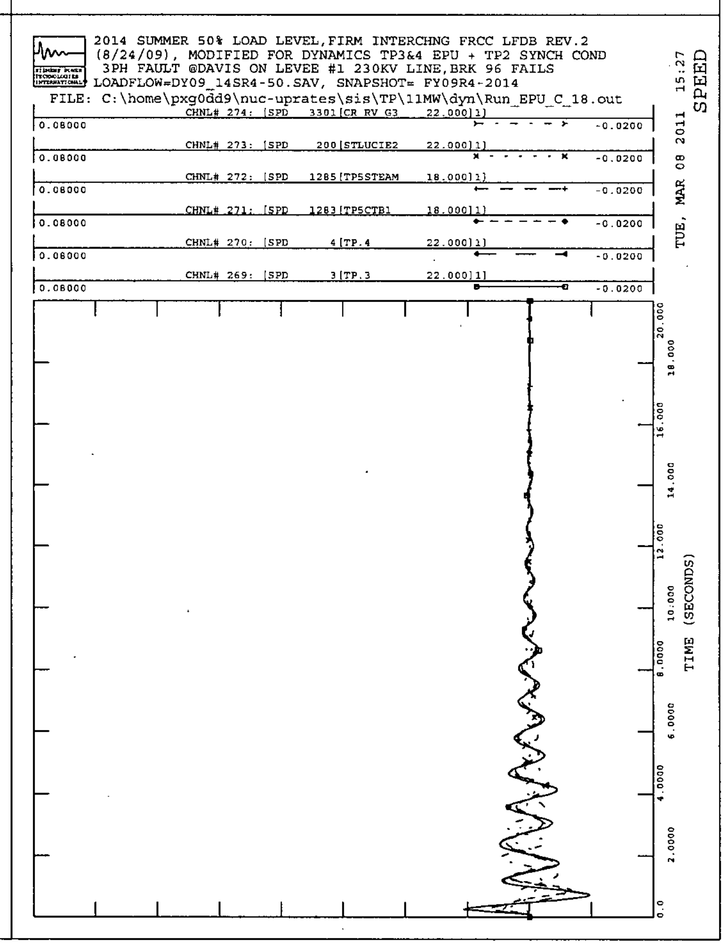

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @DAVIS ON LEVEE #1 230KV LINE,BRK 96 FAILS
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_18.out
CHNL# 286: [POWR 3301[CR RV G3 22.000]1]
CHNL# 285: [POWR 200[STLUCIE2 22.000]1]
CHNL# 284: [POWR 1285[TP5STEAM 18.000]1]
CHNL# 283: [POWR 1283[TP5CTB1 18.000]1]
CHNL# 282: [POWR 4[TP.4 22.000]1]
CHNL# 281: [POWR 3[TP.3 22.000]1]
15.000
5.0000
TIME (SECONDS)
TUE, MAR 08 2011 15:27
POWR ELECTRICAL

Dynamic Stability Plots for Table 2

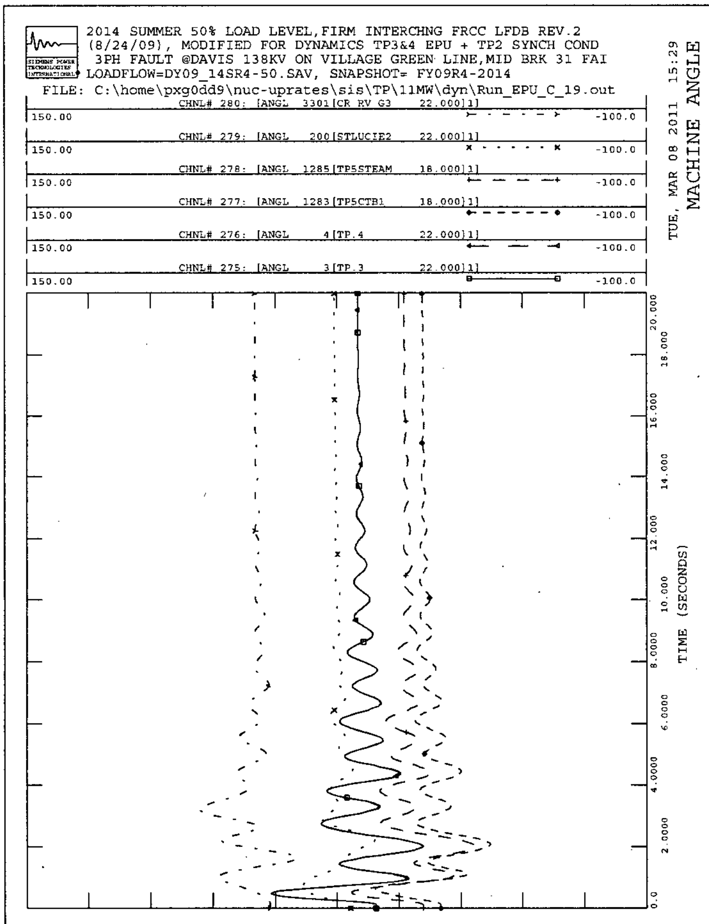


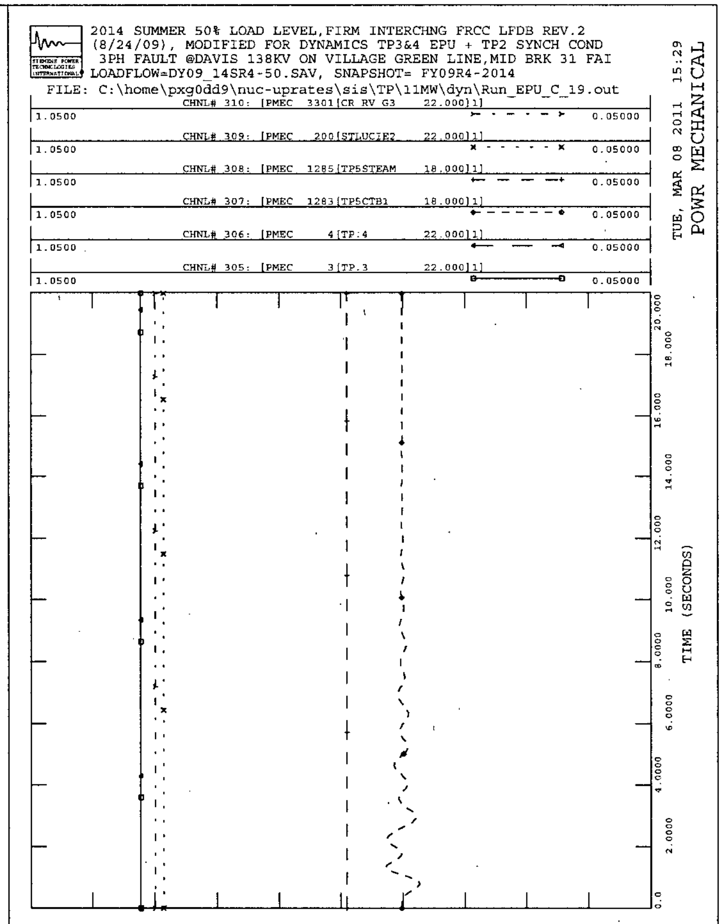


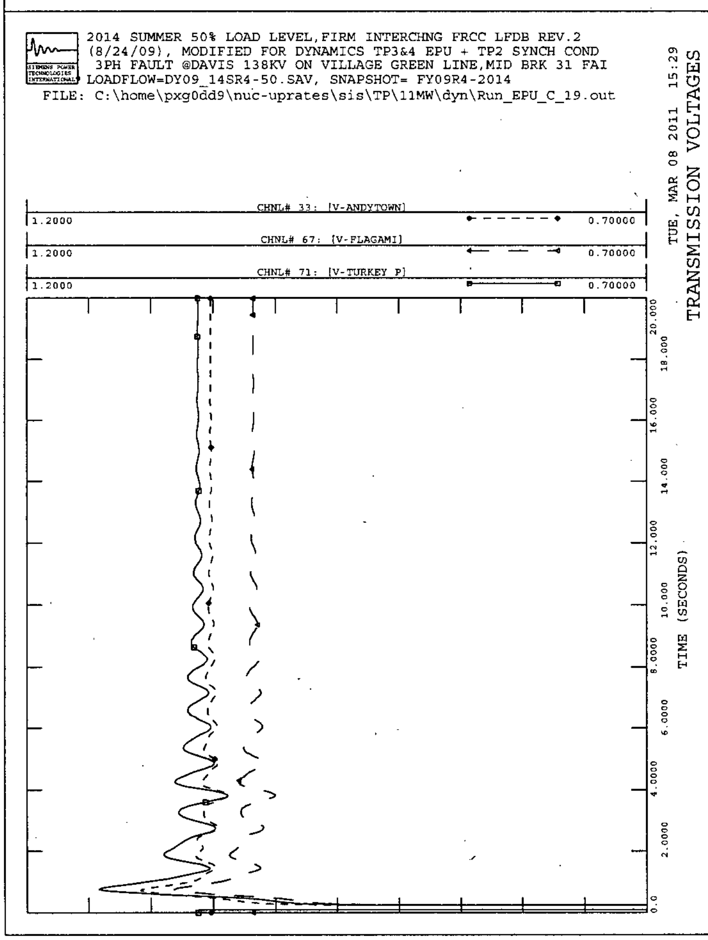


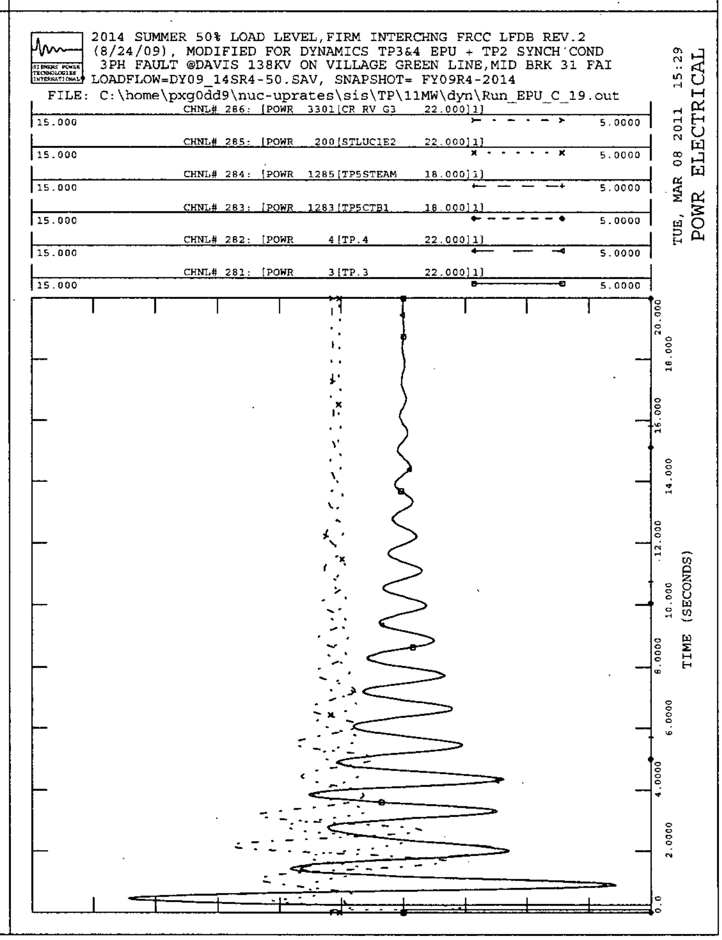


Dynamic Stability Plots for Table 2

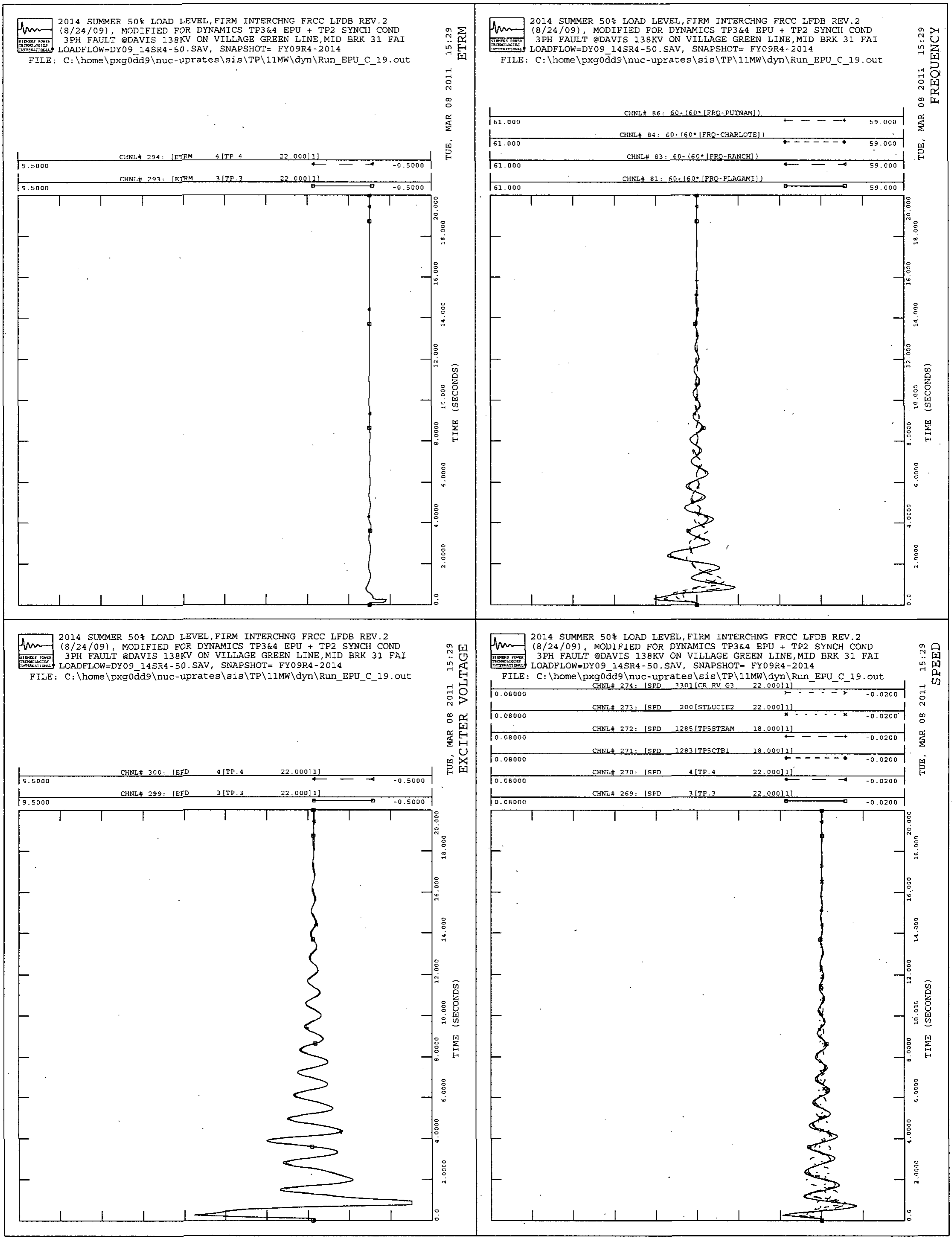


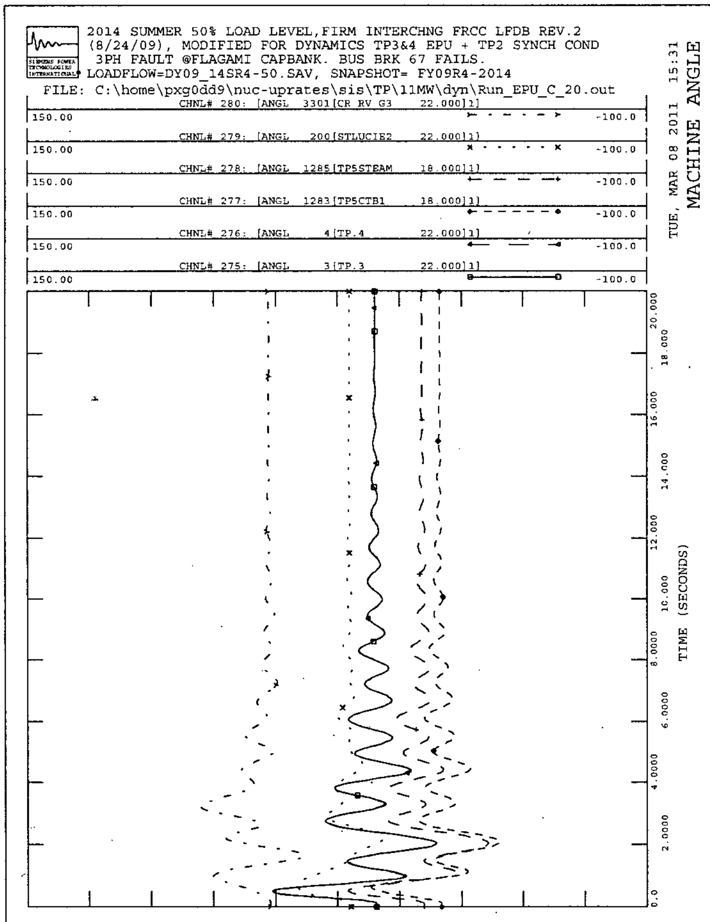


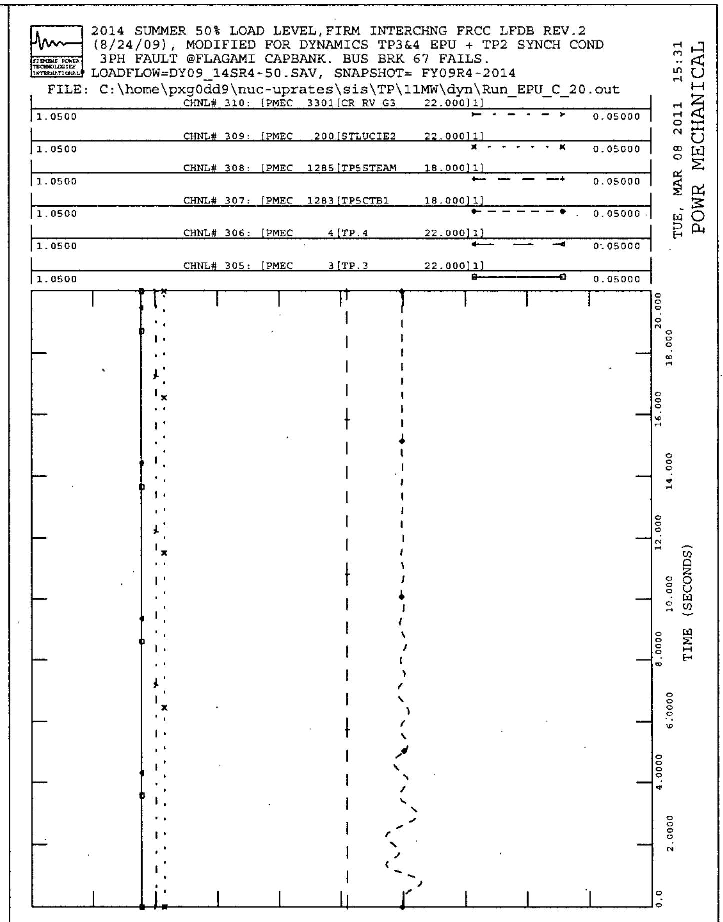


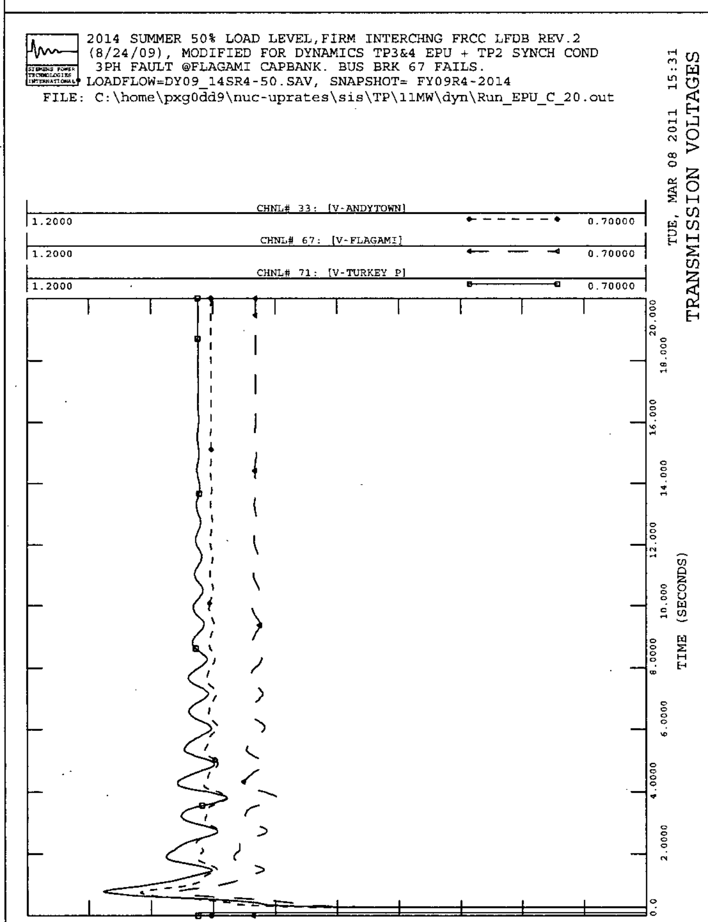


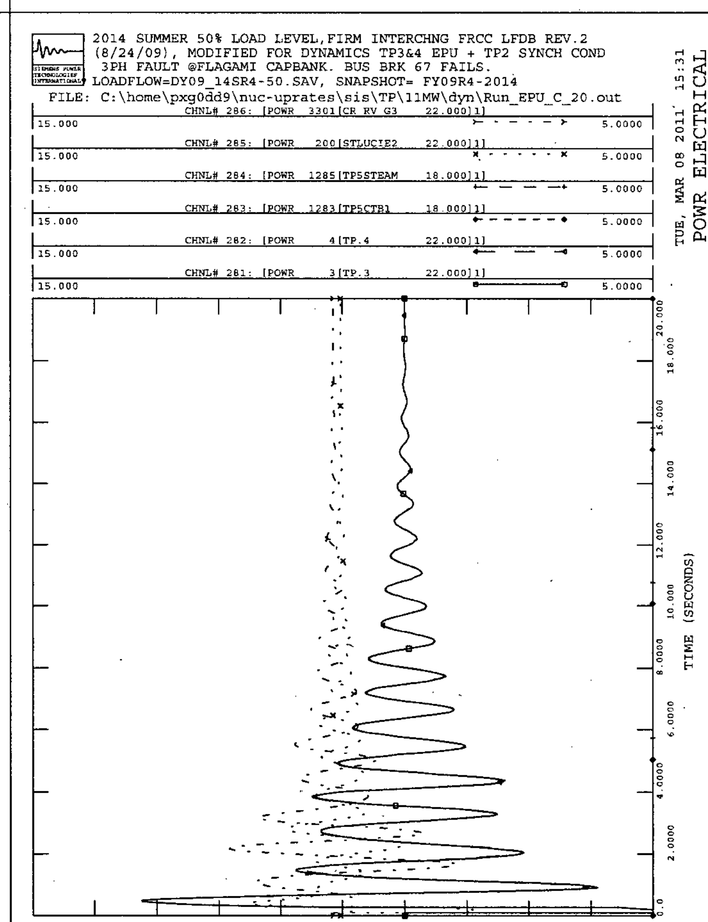
Dynamic Stability Plots for Table 2

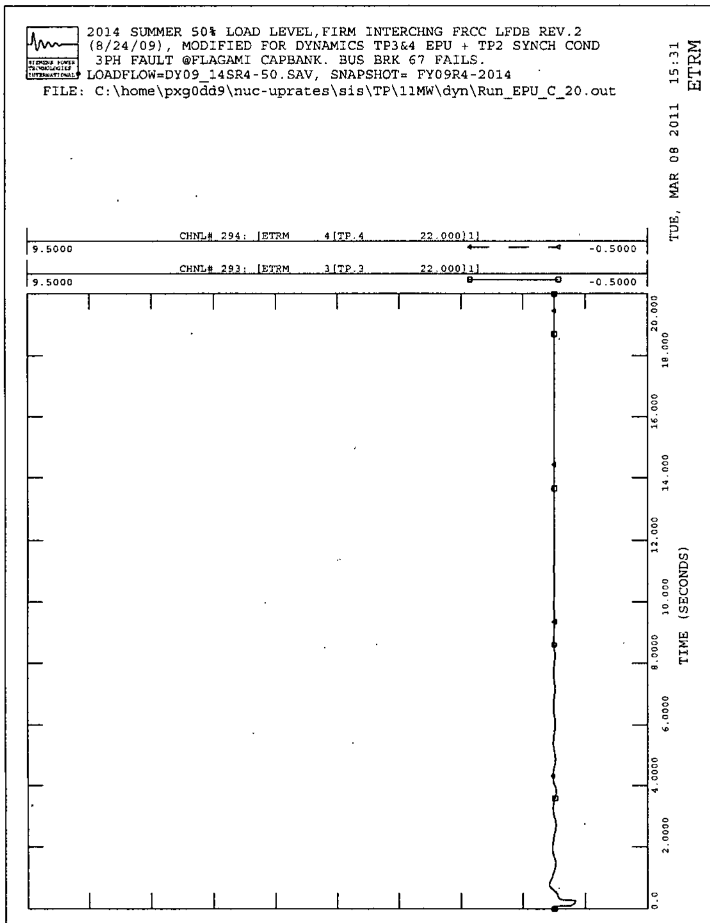


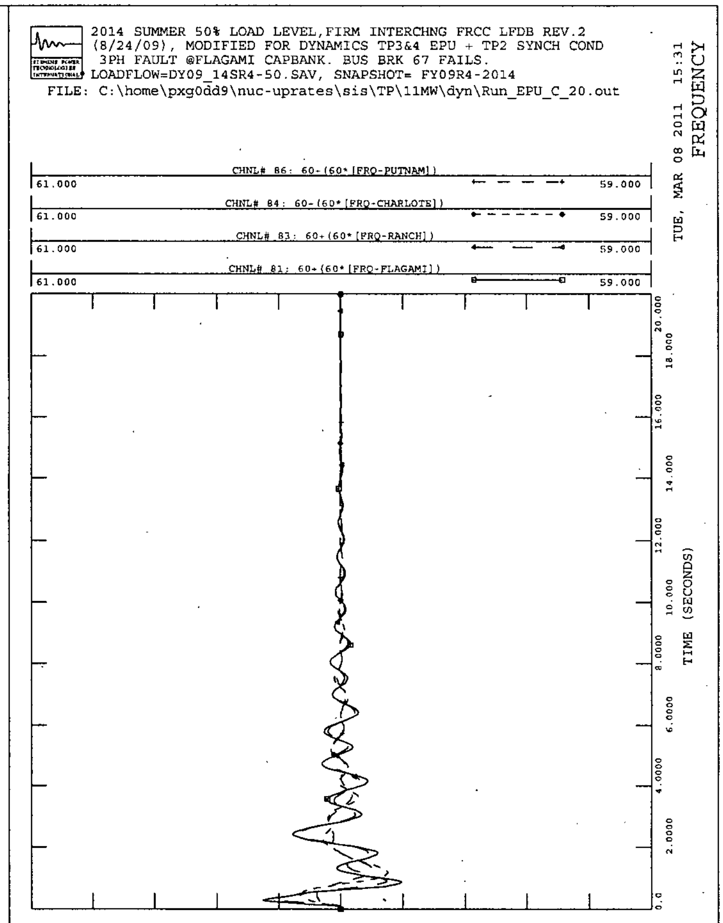

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_20.out
CHNL# 280: [ANGL 3301[CR RV G3 22.000]1]
150.00 -100.0
CHNL# 279: [ANGL 200[STLUCIE2 22.000]1]
150.00 -100.0
CHNL# 278: [ANGL 1285[TPSSTEAM 18.000]1]
150.00 -100.0
CHNL# 277: [ANGL 1283[TPSCTB1 18.000]1]
150.00 -100.0
CHNL# 276: [ANGL 4[TP.4 22.000]1]
150.00 -100.0
CHNL# 275: [ANGL 3[TP.3 22.000]1]
150.00 -100.0
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:31
MACHINE ANGLE

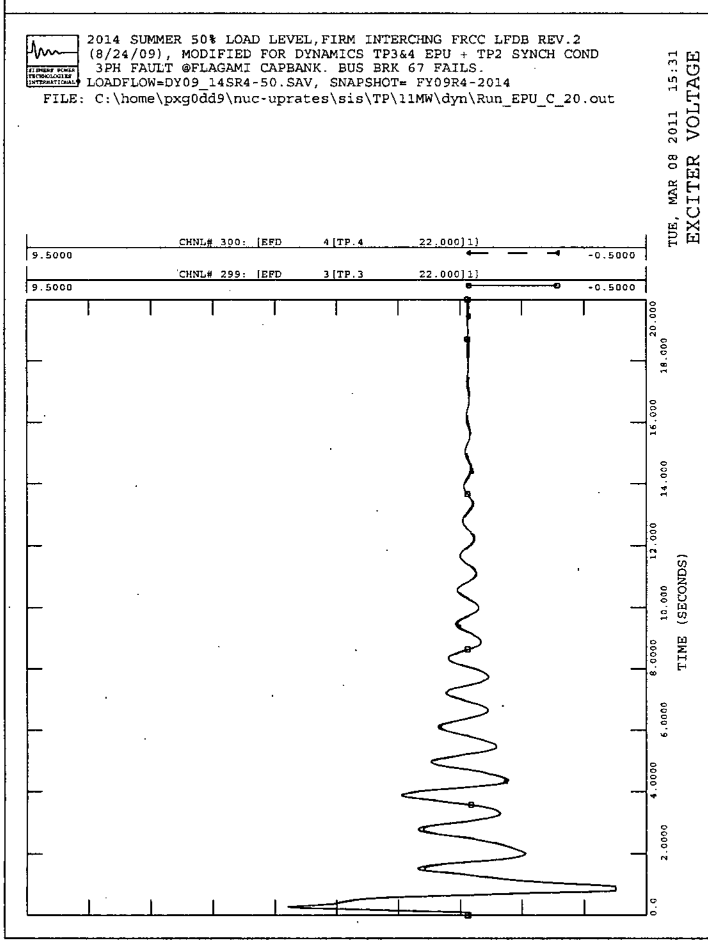

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_20.out
CHNL# 310: [PMEC 3301[CR RV G3 22.000]1]
1.0500 0.05000
CHNL# 309: [PMEC 200[STLUCIE2 22.000]1]
1.0500 0.05000
CHNL# 308: [PMEC 1285[TPSSTEAM 18.000]1]
1.0500 0.05000
CHNL# 307: [PMEC 1283[TPSCTB1 18.000]1]
1.0500 0.05000
CHNL# 306: [PMEC 4[TP.4 22.000]1]
1.0500 0.05000
CHNL# 305: [PMEC 3[TP.3 22.000]1]
1.0500 0.05000
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:31
POWR MECHANICAL

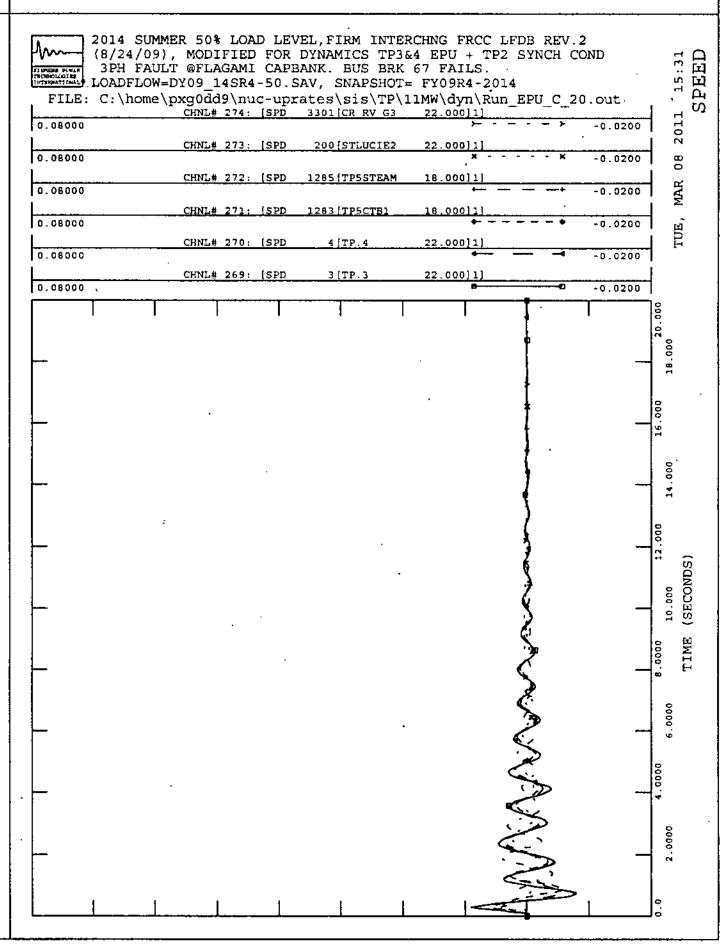

2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_20.out
CHNL# 33: [V-ANDYTOWN]
1.2000 0.70000
CHNL# 67: [V-FLAGAMI]
1.2000 0.70000
CHNL# 71: [V-TURKEY P]
1.2000 0.70000
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:31
TRANSMISSION VOLTAGES


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_20.out
CHNL# 286: [POWR 3301[CR RV G3 22.000]1]
15.000 5.0000
CHNL# 285: [POWR 200[STLUCIE2 22.000]1]
15.000 5.0000
CHNL# 284: [POWR 1285[TPSSTEAM 18.000]1]
15.000 5.0000
CHNL# 283: [POWR 1283[TPSCTB1 18.000]1]
15.000 5.0000
CHNL# 282: [POWR 4[TP.4 22.000]1]
15.000 5.0000
CHNL# 281: [POWR 3[TP.3 22.000]1]
15.000 5.0000
0.0
2.0000
4.0000
6.0000
8.0000
10.000
12.000
14.000
16.000
18.000
20.000
TIME (SECONDS)
TUE, MAR 08 2011 15:31
POWR ELECTRICAL


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_20.out
TUE, MAR 08 2011 15:31
ETRM
CHNL# 294: [ETRM 4[TP.4 22.000]1]
9.5000
-0.5000
CHNL# 293: [ETRM 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_20.out
TUE, MAR 08 2011 15:31
FREQUENCY
CHNL# 86: 60-(60*[FRQ-PUTNAM])
61.000
59.000
CHNL# 84: 60-(60*[FRQ-CHARLOTE])
61.000
59.000
CHNL# 83: 60+(60*[FRQ-RANCH])
61.000
59.000
CHNL# 81: 60+(60*[FRQ-FLAGAMI])
61.000
59.000
TIME (SECONDS)


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_20.out
TUE, MAR 08 2011 15:31
EXCITER VOLTAGE
CHNL# 300: [EFD 4[TP.4 22.000]1]
9.5000
-0.5000
CHNL# 299: [EFD 3[TP.3 22.000]1]
9.5000
-0.5000
TIME (SECONDS)


2014 SUMMER 50% LOAD LEVEL,FIRM INTERCHNG FRCC LFDB REV.2
(8/24/09), MODIFIED FOR DYNAMICS TP3&4 EPU + TP2 SYNCH COND
3PH FAULT @FLAGAMI CAPBANK. BUS BRK 67 FAILS.
LOADFLOW=DY09_14SR4-50.SAV, SNAPSHOT= FY09R4-2014
FILE: C:\home\pxg0dd9\nuc-uprates\sis\TP\11MW\dyn\Run_EPU_C_20.out
TUE, MAR 08 2011 15:31
SPEED
CHNL# 274: [SPD 3301[CR RV G3 22.000]1]
0.08000
-0.0200
CHNL# 273: [SPD 200[STLUCIE2 22.000]1]
0.08000
-0.0200
CHNL# 272: [SPD 1285[TP5STEAM 18.000]1]
0.08000
-0.0200
CHNL# 271: [SPD 1283[TP5CTB1 18.000]1]
0.08000
-0.0200
CHNL# 270: [SPD 4[TP.4 22.000]1]
0.08000
-0.0200
CHNL# 269: [SPD 3[TP.3 22.000]1]
0.08000
-0.0200
TIME (SECONDS)