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Docket No. 50-271

BVY 06-019

TAC No. MC0761

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Subject: **Vermont Yankee Nuclear Power Station  
Extended Power Uprate – Regulatory Commitment  
Information Regarding Steam Dryer Monitoring and FIV Effects**

- References:
- 1) Entergy letter to U.S. Nuclear Regulatory Commission, "Vermont Yankee Nuclear Power Station, License No. DPR-28 (Docket No. 50-271), Technical Specification Proposed Change No. 263, Extended Power Uprate," BVY 03-80, September 10, 2003
  - 2) Entergy letter to U.S. Nuclear Regulatory Commission, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263 – Supplement No. 36, Extended Power Uprate – Response to NRC's Letter re: License Conditions," BVY 05-096, October 17, 2005
  - 3) Entergy letter to U.S. Nuclear Regulatory Commission, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263 – Supplement No. 33, Extended Power Uprate – Response to Request for Additional Information," BVY 05-084, September 14, 2005

This letter provides information pursuant to a regulatory commitment made in connection with the application by Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy) for a license amendment (Reference 1, as supplemented) to increase the maximum authorized power level of the Vermont Yankee Nuclear Power Station (VYNPS) from 1593 megawatts thermal (MWt) to 1912 MWt.

In Reference 2, Entergy proposed a license condition and made a regulatory commitment to provide information regarding potentially adverse flow effects on plant structures, systems, and components (SSCs) that might result from extended power uprate (EPU) operation. The subject regulatory commitment relates to actions required prior to exceeding 1593 MWt, and states in relevant part:

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*With regard to [proposed] License Condition 3.M, "Potential Adverse Flow Effects," Entergy will provide information on plant data, evaluations, walkdowns, inspections, and procedures associated with the individual requirements of that license condition to the NRC staff prior to increasing power above 1593 MWt or each specified hold point, as applicable...*

Attachment 1 to this letter is the Steam Dryer Monitoring Plan (SDMP) that will be applicable during power ascension to full EPU conditions. The SDMP will remain in effect until proposed License Condition 3.M expires. The SDMP, together with the EPU Power Ascension Test Procedure (PATP) provide for monitoring, inspecting, evaluating, and prompt action in response to potential adverse flow effects on the steam dryer as a result of power uprate operation. These actions provide assurance of the continued structural integrity of the steam dryer under EPU conditions.

Included in the SDMP are the "steam dryer stress limit curves." These curves establish operating limits in accordance with proposed License Condition 3.M (Reference 2). Continuous monitoring of pressure fluctuations from strain gage signals relative to the curves provides assurance of the structural integrity of the steam dryer. If necessary, changes to the SDMP will be made in accordance with the provisions of License Condition 3.M.

Attachment 2 to this letter are those portions of the power ascension test procedure (PATP) for EPU that are applicable to flow-induced vibration monitoring during power ascension testing for a representative power plateau. Any future changes to the PATP will be made in accordance with governing VYNPS change processes and will be available on-site to NRC inspectors.

Attachment 3 to this letter provides a description of the data acquisition system that will be used to collect and record signals indicative of pressure loads on the steam dryer. This description is an update to the information provided in Reference 3.

The information contained herewith is provided in accordance with the cited regulatory commitment and in anticipation of actions required to comply with proposed License Condition 3.M. There are no new regulatory commitments contained in this submittal.

If you have any questions or require additional information, please contact Mr. James DeVincentis at (802) 258-4236.

Sincerely,



Norman L. Rademacher  
Director, Nuclear Safety Assurance  
Vermont Yankee Nuclear Power Station

Attachments (3)

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**Attachment 1**

Vermont Yankee Nuclear Power Station  
Proposed Technical Specification Change No. 263  
Extended Power Uprate – Regulatory Commitment  
Information Regarding Steam Dryer Monitoring and FIV Effects  
Steam Dryer Monitoring Plan



# STEAM DRYER MONITORING PLAN

Vermont Yankee Nuclear Power Station

Revision 0

Preparer:

  
C. J. Nichols

Date:

02/26/06

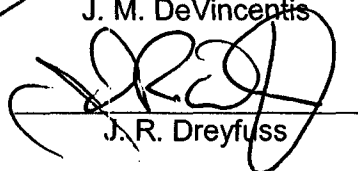
Reviewer:

  
J. M. DeVincentis

Date:

02/24/06

Approver:

  
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Date:

2-26-06

## VERMONT YANKEE NUCLEAR POWER STATION STEAM DRYER MONITORING PLAN

### **Introduction and Purpose**

The Vermont Yankee Steam Dryer Monitoring Plan (SDMP) describes the course of action for monitoring and evaluating the performance of the Vermont Yankee Nuclear Power Station (VYNPS) steam dryer during power ascension testing and operation above 100% of the original licensed thermal power (OLTP), i.e., 1593 MWt, to the full 120% extended power uprate (EPU) condition of 1912 MWt to verify acceptable performance. The SDMP also addresses long-term actions necessary to implement proposed License Condition 3.M. Through operating limits, periodic surveillances, and required actions, the impact of potentially adverse flow effects on the structural integrity of the steam dryer will be minimized.

Unacceptable steam dryer performance is a condition that could challenge steam dryer structural integrity and result in the generation of loose parts, cracks or tears in the steam dryer that result in excessive moisture carryover. During reactor power operation, performance is demonstrated through the measurement of a combination of plant parameters.

### **Scope**

The SDMP is primarily an initial power ascension test plan designed to assess steam dryer performance from 100% OLTP (i.e., 1593 MWt) to 120% OLTP (i.e., 1912 MWt) and to perform confirmatory inspections for a period of time following initial and continued operation at uprated power levels. Power ascension to 120% OLTP will be achieved in a series of power step increases and holds at plateaus corresponding to 80 MWt increments above OLTP. Elements of this plan will be implemented before EPU power ascension testing, and others may continue after power ascension testing.

There are three main elements of the SDMP:

1. Slow and deliberate power ascension with defined hold points and durations, allowing time for monitoring and analysis;
2. A detailed power ascension monitoring and analysis program to trend steam dryer performance (primarily through the monitoring of steam dryer load signals and moisture carryover); and
3. A long term inspection program to verify steam dryer performance at EPU operating conditions.

Several elements of the SDMP also provide for completion of the necessary actions to satisfy the requirements of license conditions associated with the EPU license amendment. A complete tabulation of the provisions of the license condition and the implementing strategy to complete them is contained in Table 3.

### Power Ascension

VYNPS procedure ERSTI-04-VY1-1409-000, "Power Ascension Test Procedure for Extended Power Conditions 1593 to 1912 MWth," (PATP) will provide controls during power ascension testing and confirm acceptable plant performance. Other procedures may be entered to conduct

specialized testing, such as condensate and feedwater testing. The VYNPS power ascension will occur over an extended period with gradual increases in power, hold periods, and engineering analyses of monitored data that must be approved by station management. Relevant data and evaluations will be transmitted to the NRC staff in accordance with the provisions of the license condition. The PATP includes:

1. Power ascension rate of 16 MWt/hr;
2. Hourly monitoring of steam dryer performance during power ascension (required by License Condition 3.M);
3. Four hour holds at each 40 MWt; and
4. Minimum 96 hour holds at each 80 MWt power plateau to perform steam dryer analysis allowing for NRC review, as appropriate (required by License Condition 3.M).

### Monitoring Plans

Table 1 outlines the steam dryer surveillance requirements during reactor power ascension testing for EPU. The monitoring of moisture carryover and main steam line (MSL) pressure data provide measures for ensuring acceptable performance of the steam dryer. Frequent monitoring of these parameters will provide early detection capability of off-normal performance.

Proposed License Condition 3.M will require that steam dryer performance criteria are met and prompt action is taken if unacceptable performance is detected. Entergy has established two performance levels (Level 1 criteria and Level 2 criteria) as described in Table 2 for evaluating steam dryer performance during EPU power ascension testing. The Level 1 criteria correspond to the limits specified in the proposed license condition, while the Level 2 criteria are operating action levels that may indicate reductions in margin.

The comparison of measured plant data against defined criteria, based on the steam dryer structural analysis of record, will provide predictive capabilities toward determining steam dryer structural integrity under EPU conditions.

- Main Steam Line Strain Gages
  - During power ascension, steam dryer performance will be monitored hourly through the evaluation of pressure fluctuation data collected from strain gages installed on the MSLs. Entergy has installed strain gages at eight locations on the MSLs in the primary containment and a data acquisition system (DAS) designed to reduce uncertainties in the evaluation of steam dryer loads.
  - The strain gage data collected hourly during power ascension will be compared against the stress limit curve that is provided as Figures 1 - 8 of the SDMP and is based on Entergy Calculation VYC-3001. If any frequency peak from the MSL strain gage data exceeds the stress limit curve (Level 1), Entergy will reduce the reactor power to a level at which the stress limit curve is not exceeded.
  - Additionally, Entergy will monitor data collected from accelerometers mounted to the main steam piping inside the drywell to provide additional insights into the strain gage signals.

- During hold points at each 80 MWt power level above current licensed thermal power, the collected data, along with a comparison to the steam dryer limit curve, will be transmitted to the NRC staff.
- For any circumstance requiring a revision to the steam dryer limit curve, Entergy will resolve uncertainties in the steam dryer analysis and provide the results of that evaluation to the NRC staff prior to further increases in reactor power.
- Entergy will resolve uncertainties in the steam dryer analysis with the NRC staff within 90 days of issuance of the EPU license amendment. If resolution is not made within this time interval, reactor operation will not exceed 1593 MWt. These planned actions are in compliance with proposed License Condition 3.M.
- Moisture Carryover
  - Moisture carryover trending provides an indicator of steam dryer integrity.
  - At each 40 MWt step, moisture carryover data will be taken and compared to the predetermined acceptance criteria (Table 2).
    - Level 1 criteria (0.35%) is based on the maximum analyzed value.
  - The data taken at each 80 MWt plateau will be evaluated and documented in the assessment sent to the NRC for information.
- Other Monitoring
  - Plant data that may be indicative of off-normal steam dryer performance will be monitored during power ascension (e.g., reactor water level, steam flow, feed flow, steam flow distribution between the individual steam lines). Plant data can provide an early indication of unacceptable steam dryer performance. The enhanced monitoring of selected plant parameters will be controlled by the PATP and other plant procedures.
- NRC Notifications
  - In accordance with proposed License Condition 3.M., at discrete power levels, and if the steam dryer stress limit curve (i.e., Level 1 criterion) is exceeded, Entergy will provide notifications to the NRC staff consisting of data and evaluations performed during EPU power ascension testing above 1593 MWt. Detailed discussions regarding new plant data, inspections, and evaluations will be held with NRC staff upon request. The designated NRC point of contact for such information is the NRC Project Manager for the VYNPS EPU.
  - The results of the SDMP will be submitted to the NRC staff in a report within 60 days following the completion of all EPU power ascension testing. In addition the final full EPU power performance criteria spectra (i.e., steam dryer stress limit curve) will be submitted to the NRC staff within 90 days of license amendment issuance. Contemporary data and results from steam dryer monitoring will be available on-site for review by NRC inspectors as it becomes available. The written report on steam dryer

performance during EPU power ascension testing will include evaluations or corrective actions that were required to obtain satisfactory steam dryer performance. The report will include relevant data collected at each power step, comparisons to performance criteria (design predictions), and evaluations performed in conjunction with steam dryer structural integrity monitoring.

#### Long Term Monitoring

The long-term monitoring of plant parameters potentially indicative of steam dryer failure will be conducted, as recommended by General Electric Service Information Letter 644, Rev. 1 and consistent with License Condition 3.M.

#### *Moisture Carryover*

Per VYNPS station operating procedure OP-0631, "Radiochemistry," moisture carryover is periodically monitored for moisture carryover during normal plant operations. VYNPS off-normal procedure ON-3178, "Increased Moisture Carryover," provides guidance to evaluate any elevated moisture carryover results including that resulting from potential vessel internals damage. This monitoring will also provide insight into changes in moisture carryover values during changing reactor core configurations (control rod patterns)

#### *Strain Gage Monitoring*

As the strain gages will remain operational and can provide for future data collection, additional strain gage monitoring will be performed as determined appropriate during the remainder of the operating cycle following EPU implementation.

#### *Inspections*

The VYNPS steam dryer will be inspected during the refueling outages scheduled for the Spring 2007, Fall 2008, and Spring 2010. The inspections conducted after power uprate implementation will be comparable to the inspection conducted during the Spring 2004 refueling outage and will be in accordance with the guidance in SIL 644, Rev. 1.

#### *Reporting to NRC*

Steam Dryer Visual Inspections: The results of the visual inspections of the steam dryer conducted during the next three refueling outages shall be reported to the NRC staff within 60 days following startup from the respective refueling outage.

**Table 1**  
**Steam Dryer Surveillance Requirements During Reactor Power**  
**Operation Above a Previously Attained Power Level**

Parameter	Surveillance Frequency
1. Moisture Carryover	Every 24 hours (Notes 1 and 2)
2. Main steam line pressure data from strain gages	Hourly when initially increasing power above a previously attained power level  AND  At least once at every 40 MWt (nominal) power step above 100% OLTP (Note 3)
3. Main steam line data from accelerometers	At least once at every 40 MWt (nominal) power step above 100% OLTP (Note 3)  AND  Within one hour after achieving every 40 MWt (nominal) power step above 100% OLTP

Notes to Table 1:

1. If a determination of moisture carryover cannot be made within 24 hours of achieving an 80 MWt power plateau, an orderly power reduction shall be made within the subsequent 12 hours to a power level at which moisture carryover was previously determined to be acceptable. For testing purposes, a power ascension step is defined as each power increment of 40 MWt, i.e., at thermal power levels of approximately 102.5%, 105%, 107.5%, 110%, 112.5%, 115%, 117.5%, and 120% OLTP. Power level plateaus are nominally every 80 MWt.
2. Provided that the Level 2 performance criteria in Table 2 are not exceeded, when steady state operation at a given power exceeds 168 consecutive hours, moisture carryover monitoring frequency may be reduced to once per week.
3. The strain gage surveillance shall be performed hourly when increasing power above a level at which data was previously obtained. The surveillance of both the strain gage data and MSL pressure data is also required to be performed once at each 40 MWt power step above 1593 MWt and within one hour of achieving each 40 MWt step in power, i.e., at thermal power levels of approximately 102.5%, 105%, 107.5%, 110%, 112.5%, 115%, 117.5%, and 120% OLTP (i.e., 1593 MWt). If the surveillance is met at a given power level, additional surveillances do not need to be performed at a power level where data had previously been obtained.

If valid strain gage data cannot be recorded hourly or within one hour of initially reaching a 40 MWt power step from at least three of the four MSLs, an orderly power reduction shall be made to a lower power level at which data had previously been obtained. Any such power level reduction shall be completed within two hours of determining that valid data was not recorded.

**Table 2**  
**Steam Dryer Performance Criteria and Required Actions**

Performance Criteria Not to be Exceeded	Required Actions if Performance Criteria Exceeded and Required Completion Times
<p><u>Level 2:</u></p> <ul style="list-style-type: none"> <li>Moisture carryover exceeds 0.1%</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>Moisture carryover exceeds 0.1% and increases by &gt; 50% over the average of the three previous measurements taken at &gt; 1593 MWt</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>Pressure data exceed Level 2 Spectra<sup>1</sup></li> </ul>	<ol style="list-style-type: none"> <li>Promptly suspend reactor power ascension until an engineering evaluation concludes that further power ascension is justified.</li> <li>Before resuming reactor power ascension, the steam dryer performance data shall be reviewed as part of an engineering evaluation to assess whether further power ascension can be made without exceeding the Level 1 criteria.</li> </ol>
<p><u>Level 1:</u></p> <ul style="list-style-type: none"> <li>Moisture carryover exceeds 0.35%</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>Pressure data exceed Level 1 Spectra<sup>1</sup></li> </ul>	<ol style="list-style-type: none"> <li>Promptly initiate a reactor power reduction and achieve a previously acceptable power level (i.e., reduce power to a previous step level) within two hours, unless an engineering evaluation concludes that continued power operation or power ascension is acceptable.</li> <li>Within 24 hours, re-measure moisture carryover and perform an engineering evaluation of steam dryer structural integrity. If the results of the evaluation of steam dryer structural integrity do not support continued plant operation, the reactor shall be placed in a hot shutdown condition within the following 24 hours. If the results of the engineering evaluation support continued power operation, implement steps 3 and 4 below.</li> <li>If the results of the engineering evaluation support continued power operation, reduce further power ascension step and plateau levels to nominal increases of 20 MWt and 40 MWt, respectively, for any additional power ascension.</li> <li>Within 30 days, the transient pressure data shall be used to calculate the steam dryer fatigue usage to demonstrate that continued power operation is acceptable.</li> </ol>

<sup>1</sup> The EPU spectra shall be determined and documented in an engineering calculation or report. Acceptable Level 2 spectra shall be based on maintaining  $\leq 80\%$  of the ASME allowable alternating stress ( $S_a$ ) value at  $10^{11}$  cycles (i.e., 10.88 ksi). Acceptable Level 1 Spectra shall be based on maintaining the ASME  $S_a$  at  $10^{11}$  cycles (i.e., 13.6 ksi).

**Table 3**  
**Steam Dryer License Conditions**

License Condition	Requirement	Implementing Actions
3.M.1.a	Entergy shall monitor hourly the 32 main steam line (MSL) strain gages during power ascension above 1593 MWt for increasing pressure fluctuations in the steam lines.	<p>During initial power ascension above 1593 MWt, data from at least 32 strain gages will be collected and evaluated by Entergy's power ascension test team to verify that acoustic signals indicative of increasing pressure fluctuations in the steam lines are not challenging the steam dryer stress limit curve. Monitoring will be conducted hourly during any power ascension above a previously attained power level.</p> <p>(Reference ERSTI-04-VY1-1409-000)</p> <p>(Reference PCRS tracking item WT-VTY-2005-00000-01803)</p>
3.M.1.b	Entergy shall hold the facility for 24 hours at 105%, 110%, and 115% of OLTP (i.e., 1593 MWt) to collect data from the 32 MSL strain gages required by License Condition 3.M.1.a, conduct plant inspections and walkdowns, and evaluate steam dryer performance based on these data; shall provide the evaluation to the NRC staff by facsimile or electronic transmission to the NRC project manager upon completion of the evaluation; and shall not increase power above each hold point until 96 hours after the NRC project manager confirms receipt of the transmission.	<p>The PATP has established test plateau increments of approximately 80 MWt (corresponding to 105%, 110%, and 115% of 1593 MWt). Reactor power will not be increased above the plateau for a minimum of 96 hours. During the first 24 hours of steady state operation at each plateau, strain gage data will be collected from all available strain gages (minimum of 32) and evaluated to demonstrate acceptable steam dryer performance. Additionally, moisture carryover measurements will be made at each plateau and every 24 hours during power ascension testing. At the 80 MWt plateau hold points, Entergy will conduct plant walkdowns and inspections of plant equipment, including piping and components identified as potentially vulnerable to flow-induced vibration (FIV) in accordance with the PATP and other plant procedures. Steam dryer performance will be evaluated based on these data.</p> <p>The 24-hour period and the 96-hour period may overlap once the transmittal is provided to the NRC staff.</p> <p>The evaluations of steam dryer performance, based on the data collected during each of the 80 MWt plateaus, as well as the results of walkdowns and other measurements of FIV for various piping and plant components, will be provided to the NRC staff. Arrangements have been made for electronic transmission through email and/or uploading to a</p>



License Condition	Requirement	Implementing Actions
		<p>designated website. Upon the NRC Project Manager confirming receipt of the steam dryer data and performance evaluation, the 96 hours of hold time will commence. Power will not be increased above each of the 80 MWt hold points until the expiration of the 96-hour hold.</p> <p>If during the hold periods, or at any other time, the NRC staff requests a discussion or requires clarification of the engineering evaluations provided in fulfillment of this requirement, Entergy will promptly arrange for such discussions. Entergy will maintain a power ascension control center, including management oversight, available 24/7 on-site during power increases to previously unattained power levels. (Reference ERSTI-04-VY1-1409-000) (Reference PCRS tracking item WT-VTY-2005-00000-01803)</p>
3.M.1.c	<p>If any frequency peak from the MSL strain gage data exceeds the limit curve established by Entergy Nuclear Operations, Inc. and submitted to the NRC staff prior to operation above OLTP, Entergy Nuclear Operations, Inc. shall return the facility to a power level at which the limit curve is not exceeded. Entergy Nuclear Operations, Inc. shall resolve the uncertainties in the steam dryer analysis, document the continued structural integrity of the steam dryer, and provide that documentation to the NRC staff by facsimile or electronic transmission to the NRC project manager prior to further increases in reactor power.</p>	<p>The steam dryer stress limit curve provided herewith contains Level 1 and Level 2 criteria. If frequency peaks from MSL strain gage data exceed either Level 1 or Level 2 criteria, prompt action will be taken in response to the potential adverse flow effects that might result. Similar actions will occur if moisture carryover is excessive and previously established Level 1 or Level 2 criteria are exceeded. The Level 2 criteria represent a conservative action level for evaluation and close monitoring of steam dryer performance—not a limit. The Level 1 criteria represent analytical limits and additional actions may be warranted.</p> <p>If any frequency peak from the MSL strain gage data exceeds the Level 1 steam dryer stress limit curve, Entergy will reduce reactor power to a power level at which the limit curve is not exceeded. (Reference ERSTI-04-VY1-1409-000)</p> <p>Prior to any further increase in power above the reduced power level, Entergy will (1) resolve the uncertainties in the steam dryer analysis, (2) evaluate and document the adequate structural integrity of the steam dryer, and (3) provide that documentation to the NRC staff. Any revision to the</p>

License Condition	Requirement	Implementing Actions
		<p>limit curve based on this evaluation will be provided to the NRC staff. (Reference PCRS tracking item WT-VTY-2005-00000-01803)</p>
3.M.1.d	<p>In addition to evaluating the MSL strain gage data, Entergy Nuclear Operations, Inc. shall monitor reactor pressure vessel water level instrumentation or MSL piping accelerometers on an hourly basis during power ascension above OLTP. If resonance frequencies are identified as increasing above nominal levels in proportion to strain gage instrumentation data, Entergy Nuclear Operations, Inc. shall stop power ascension, document the continued structural integrity of the steam dryer, and provide that documentation to the NRC staff by facsimile or electronic transmission to the NRC project manager prior to further increases in reactor power.</p>	<p>Accelerometers mounted on MSL piping will be monitored on an hourly basis during power ascension testing to identify if resonances are increasing above nominal levels in proportion to MSL strain gage data. If abnormally increasing resonant frequencies are detected, power ascension will be halted. Prior to any further increase in power, Entergy will (1) evaluate and document the adequate structural integrity of the steam dryer, and (2) provide that documentation to the NRC staff. (Reference ERSTI-04-VY1-1409-000) (Reference PCRS tracking item WT-VTY-2005-00000-01803)</p>
3.M.1.e	<p>Following start-up testing, Entergy Nuclear Operations, Inc. shall resolve the uncertainties in the steam dryer analysis and provide that resolution to the NRC staff by facsimile or electronic transmission to the NRC project manager. If the uncertainties are not resolved within 90 days of issuance of the license amendment authorizing operation at 1912 MWt, Entergy Nuclear Operations, Inc. shall return the facility to OLTP.</p>	<p>After collecting strain gage data at approximately the EPU full power level, Entergy will resolve the uncertainties in the steam dryer analysis and provide documentation of the resolution to the NRC staff. If these actions cannot be achieved within 90 days of issuance of the license amendment, reactor power will be limited to 1593 MWt. This uncertainty evaluation may be prepared and provided to the NRC prior to reaching EPU full power levels associated with any proposed revision to the steam dryer limit curve. (Reference PCRS tracking item WT-VTY-2005-00000-01803)</p>
3.M.2.a	<p>Prior to operation above OLTP, Entergy Nuclear Operations, Inc. shall install 32 additional strain gages on the main steam piping and shall enhance the data acquisition system in order to reduce the measurement uncertainty</p>	<p>To enhance performance and improve the accuracy of the steam dryer measurement system, Entergy has installed 48 strain gages on MSL piping and will maintain a minimum of 32 operable strain gages during power ascension testing. The data acquisition system (DAS) was upgraded to reduce the uncertainty associated with the ACM.</p>

License Condition	Requirement	Implementing Actions
	associated with the acoustic circuit model (ACM).	(Reference Entergy VYNPS Temporary Alteration TA-2005-15 R1)
3.M.2.b	In the event that acoustic signals are identified that challenge the limit curve during power ascension above OLTP, Entergy Nuclear Operations, Inc. shall evaluate steam dryer loads and re-establish the limit curve based on the new strain gage data, and shall perform a frequency-specific assessment of ACM uncertainty at the acoustic signal frequency.	If acoustic signals indicative of increasing pressure fluctuations in the steam lines are identified as challenging the steam dryer stress limit curve (i.e., Level 1 criterion), in addition to reducing reactor power to a previously acceptable power level, Entergy will conduct an evaluation and re-establish the limit curve based on the latest strain gage data. As part of the redevelopment of the limit curve, Entergy will prepare a frequency-specific assessment of ACM uncertainty at the acoustic signal frequency. This uncertainty evaluation may be prepared and provided to the NRC in advance of this condition being met. (Reference ERSTI-04-VY1-1409-000)
3.M.2.c	After reaching 120% of OLTP, Entergy Nuclear Operations, Inc. shall obtain measurements from the MSL strain gages and establish the steam dryer flow-induced vibration load fatigue margin for the facility, update the steam dryer stress report, and re-establish the steam dryer monitoring plan (SDMP) limit curve with the updated ACM load definition and revised instrument uncertainty, which will be provided to the NRC staff.	After collecting strain gage data at approximately the EPU full power level, Entergy will establish the steam dryer flow-induced vibration load fatigue margin for the facility, update the steam dryer stress report, and re-establish the stress limit curve with the updated ACM load definition and revised instrument uncertainty. This information will be included in the report to the NRC staff being made in accordance with License Condition 3.M.1.e. (Reference PCRS tracking item WT-VTY-2006-00000-00249)
3.M.2.d	During power ascension above OLTP, if an engineering evaluation is required in accordance with the SDMP, Entergy Nuclear Operations, Inc. shall perform the structural analysis to address frequency uncertainties up to $\pm 10\%$ and assure that peak responses that fall within this uncertainty band are addressed.	If an evaluation or analysis of the structural integrity of the steam dryer is required because acoustic signals indicative of increasing pressure fluctuations in the steam lines are identified as potentially challenging the steam dryer stress limit curve (i.e., Level 1 criterion), Entergy will address frequency uncertainties up to $\pm 10\%$ and assure that peak responses that fall within this uncertainty band are addressed. This uncertainty evaluation may be prepared and provided to the NRC in advance of this condition being met. (Reference ERSTI-04-VY1-1409-000)

License Condition	Requirement	Implementing Actions
3.M.2.e	Entergy Nuclear Operations, Inc. shall revise the SDMP to reflect long-term monitoring of plant parameters potentially indicative of steam dryer failure; to reflect consistency of the facility's steam dryer inspection program with General Electric Services Information Letter 644, Revision 1; and to identify the NRC Project Manager for the facility as the point of contact for providing SDMP information during power ascension.	<p>The revised SDMP provides long-term monitoring of steam dryer performance in accordance with GE SIL 644 Rev. 1. (Reference PCRS tracking item WT-VTY-2006-00000-00250)</p> <p>The SDMP and the PATP identify the NRC Project Manager for the VYNPS EPU as the point of contact for providing SDMP information during power ascension. (Reference ERSTI-04-VY1-1409-000)</p> <p>For moisture carryover, procedures OP-0631 and ON-3178 provide for long-term monitoring and controls.</p>
3.M.2.f	Entergy Nuclear Operations, Inc. shall submit the final extended power uprate (EPU) steam dryer load definition for the facility to the NRC upon completion of the power ascension test program.	<p>The final EPU steam dryer load definition will be included in the report provided to the NRC staff in accordance with License Conditions 3.M.1.e. and 3.M.2.c. (Reference PCRS tracking item WT-VTY-2006-00000-00251)</p>
3.M.2.g	Entergy Nuclear Operations, Inc. shall submit the flow-induced vibration related portions of the EPU startup test procedure to the NRC, including methodology for updating the limit curve, prior to initial power ascension above OLTP.	<p>Entergy letter BVI 06-019 forwards the FIV-related portions of the EPU power ascension test procedure to the NRC. (Reference ERSTI-04-VY1-1409-000)</p> <p>The methodology for updating the steam dryer stress limit curve is as follows:</p> <p>Prerequisite: Generate report resolving uncertainties in the steam dryer analysis.</p> <ol style="list-style-type: none"> <li>1. Collect representative data from 32 strain gages at eight MSL locations.</li> <li>2. Using a plant-specific ACM, analyze strain gage data to determine steam dryer loads.</li> <li>3. Input ACM loads into a finite element model to determine dryer stresses.</li> <li>4. Perform an updated uncertainty evaluation.</li> <li>5. Generate revised steam dryer stress limit curve(s).</li> </ol> <p>(Reference PCRS tracking item WT-VTY-2006-00000-00252)</p>

License Condition	Requirement	Implementing Actions
3.M.3(a)	Entergy shall prepare the EPU startup test procedure to include the stress limit curve to be applied for evaluating steam dryer performance.	The steam dryer stress limit curve to be applied for evaluating steam dryer performance during power ascension is provided herewith. The limit curve was developed on the basis of calculation VYC-3001, which is incorporated by reference into the EPU PATP. (Reference ERSTI-04-VY1-1409-000)
3.M.3(b)	Entergy shall prepare the EPU startup test procedure to include specific hold points and their duration during EPU power ascension.	Specific hold points and durations are specified in the PATP. (Reference ERSTI-04-VY1-1409-000)
3.M.3(c)	Entergy shall prepare the EPU startup test procedure to include activities to be accomplished during hold points.	Activities to be accomplished during hold points are specified in the PATP. (Reference ERSTI-04-VY1-1409-000)
3.M.3(d)	Entergy shall prepare the EPU startup test procedure to include plant parameters to be monitored.	Plant parameters to be monitored are specified in Attachment 9 to the PATP. (Reference ERSTI-04-VY1-1409-000)
3.M.3(e)	Entergy shall prepare the EPU startup test procedure to include inspections and walkdowns to be conducted for steam, feedwater, and condensate systems and components during the hold points.	Inspections and walkdowns to be conducted for steam, feedwater, and condensate systems and components during hold points are specified in Attachment 9 to the PATP. (Reference ERSTI-04-VY1-1409-000)
3.M.3(f)	Entergy shall prepare the EPU startup test procedure to include methods to be used to trend plant parameters.	Methods to be used to trend plant parameters are specified in Attachment 9 to the PATP. (Reference ERSTI-04-VY1-1409-000)
3.M.3(g)	Entergy shall prepare the EPU startup test procedure to include acceptance criteria for monitoring and trending plant parameters, and conducting the walkdowns and inspections.	Acceptance criteria for monitoring and trending plant parameters, and conducting the walkdowns and inspections are specified in Attachment 9 to the PATP. (Reference ERSTI-04-VY1-1409-000)
3.M.3(h)	Entergy shall prepare the EPU startup test procedure to include actions to be taken if acceptance criteria are not satisfied.	Actions to be taken if acceptance criteria are not satisfied are specified in the PATP. (Reference ERSTI-04-VY1-1409-000)

License Condition	Requirement	Implementing Actions
3.M.3(i)	Entergy shall prepare the EPU startup test procedure to include verification of the completion of commitments and planned actions specified in the license amendment application and all supplements to the application in support of the EPU license amendment request pertaining to the steam dryer.	Verification of the completion of commitments and planned actions specified in the license amendment application and all supplements to the application in support of the EPU license amendment request pertaining to the steam dryer is specified in the PATP. (Reference ERSTI-04-VY1-1409-000)
3.M.4	<p>When operating above OLTP, the operating limits, required actions, and surveillances specified in the SDMP shall be met. The following key attributes of the SDMP shall not be made less restrictive without prior NRC approval:</p> <ul style="list-style-type: none"> <li>a. During initial power ascension testing above OLTP, each test plateau increment shall be approximately 80 MWt;</li> <li>b. Level 1 performance criteria; and</li> <li>c. The methodology for establishing the stress spectra used for the Level 1 and Level 2 performance criteria.</li> </ul> <p>Changes to other aspects of the SDMP may be made in accordance with the guidance of NEI 99-04.</p>	These restrictions are provided in the PATP and/or the SDMP. (Reference ERSTI-04-VY1-1409-000)
3.M.5	During each of the three scheduled refueling outages (beginning with the spring 2007 refueling outage), a visual inspection shall be conducted of all accessible, susceptible locations of the steam dryer, including flaws left "as is" and modifications.	The VYNPS steam dryer will be inspected during the refueling outages scheduled for the Spring 2007, Fall 2008, and Spring 2010. The inspections conducted after power uprate implementation will be comparable to the inspections conducted during the Spring 2004 and Fall 2005 refueling outages and will be in accordance with the guidance in SIL 644, Rev. 1. (Reference PCRS tracking item WT-VTY-2006-00000-00253) (Reference PCRS tracking item WT-VTY-2006-00000-00254)

License Condition	Requirement	Implementing Actions
		(Reference PCRS tracking item WT-VTY-2006-00000-00255)
3.M.6	The results of the visual inspections of the steam dryer conducted during the three scheduled refueling outages (beginning with the spring 2007 refueling outage) shall be reported to the NRC staff within 60 days following startup from the respective refueling outage. The results of the SDMP shall be submitted to the NRC staff in a report within 60 days following the completion of all EPU power ascension testing.	The VYNPS steam dryer will be inspected during the refueling outages scheduled for the Spring 2007, Fall 2008, and Spring 2010. The inspections conducted after power uprate implementation will be comparable to the inspections conducted during the Spring 2004 and Fall 2005 refueling outages and will be in accordance with the guidance in SIL 644, Rev. 1. The results will be documented in a report and submitted to the NRC within 60 days following completion of all EPU power ascension testing. (Reference PCRS tracking item WT-VTY-2006-00000-00256) (Reference PCRS tracking item WT-VTY-2006-00000-00257) (Reference PCRS tracking item WT-VTY-2006-00000-00258)
3.M.7	The requirements of paragraph 3.M.4 above for meeting the SDMP shall be implemented upon issuance of the EPU license amendment and shall continue until the completion of one full operating cycle at EPU. If an unacceptable structural flaw (due to fatigue) is detected during the subsequent visual inspection of the steam dryer, the requirements of paragraph 4 shall extend another full operating cycle until the visual inspection standard of no new flaws/flaw growth based on visual inspection is satisfied.	When operating above 1593 MW/t, the operating limits, required actions, and surveillances specified in the SDMP will be met. Those key attributes of the SDMP specified in License Condition 3.M.4 will not be made less restrictive without prior NRC approval. (Reference PCRS tracking item WT-VTY-2006-00000-00259)
3.M.8	This license condition shall expire upon satisfaction of the requirements in paragraphs 5, 6, and 7 provided that a visual inspection of the steam dryer does not reveal any new unacceptable flaw or unacceptable flaw growth that is due to fatigue.	(Reference PCRS tracking item WT-VTY-2006-00000-00260)

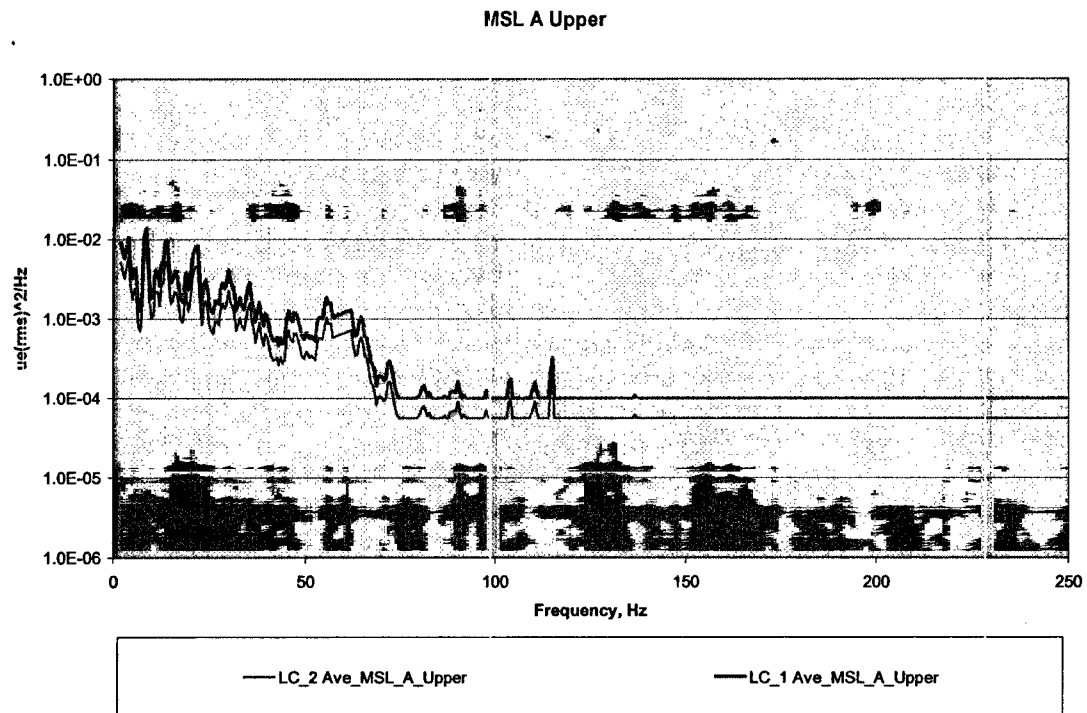


Figure 1: Steam Dryer Stress Limit Curve – MSL 'A' Upper

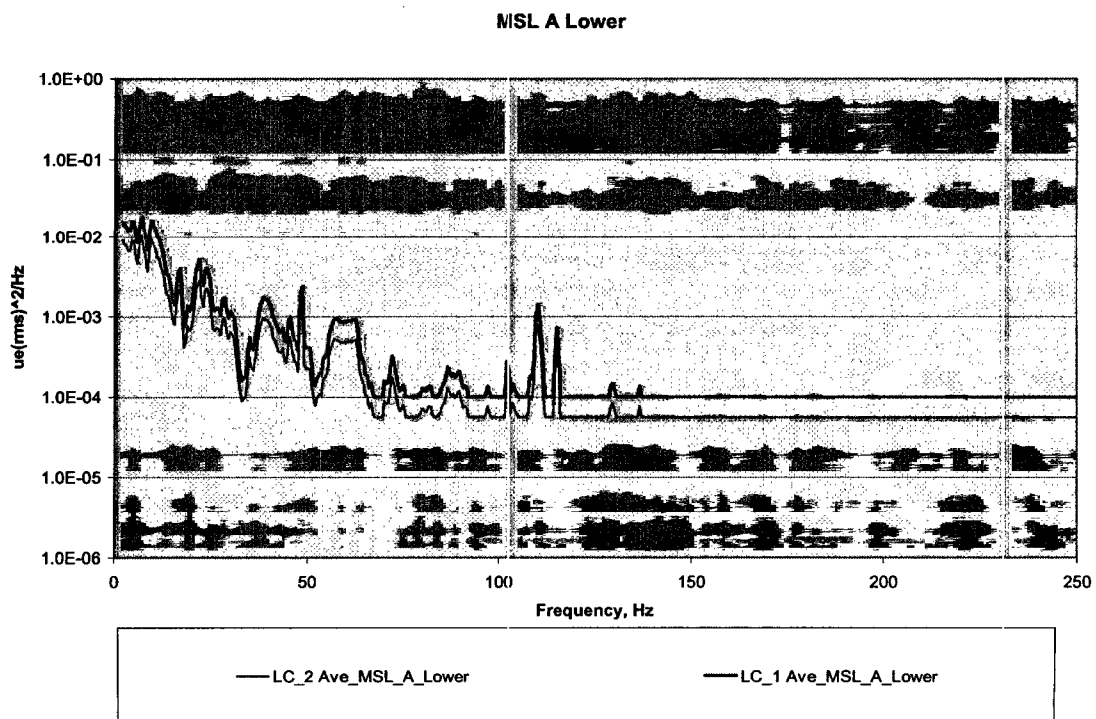
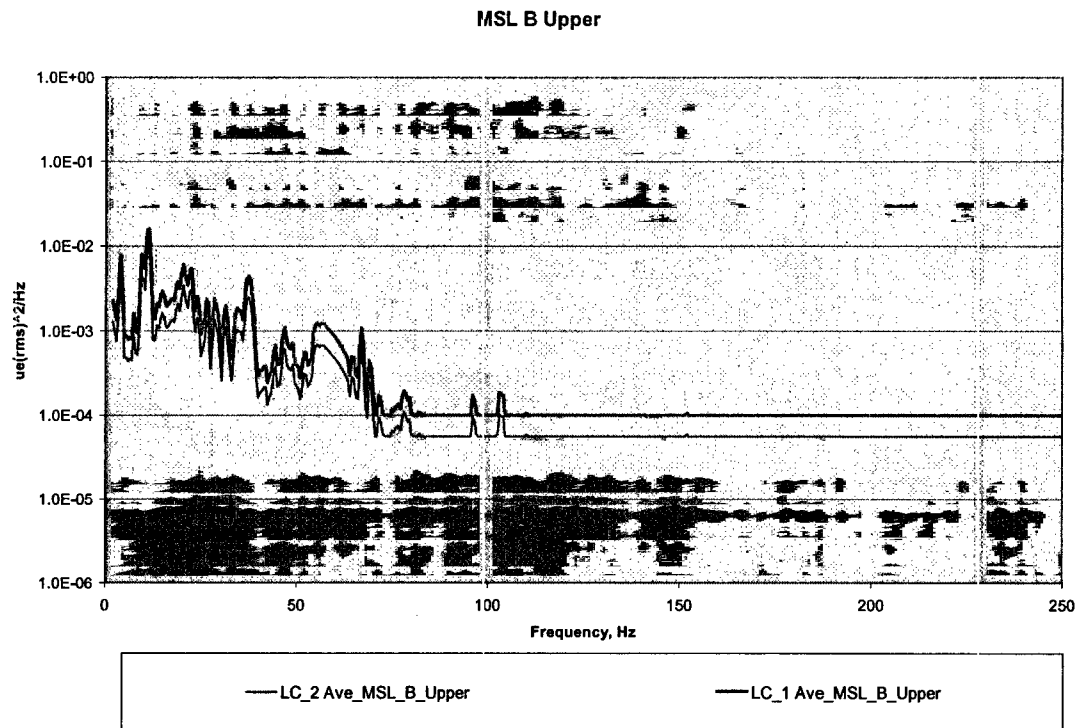
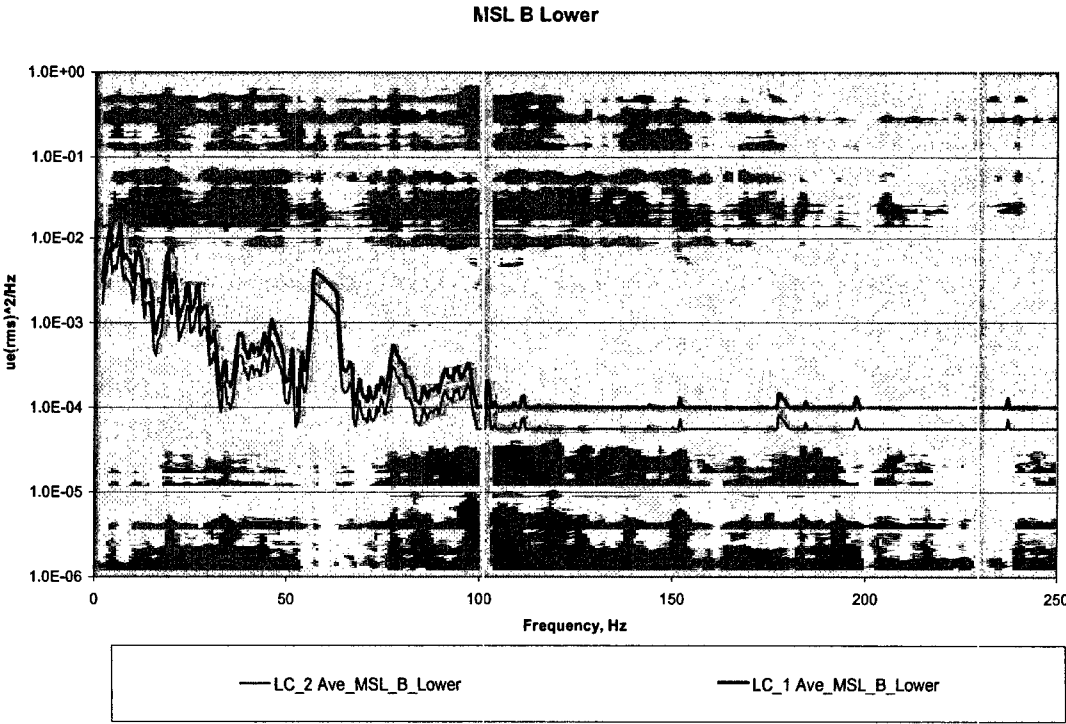


Figure 2: Steam Dryer Stress Limit Curve – MSL 'A' Lower





**Figure 3: Steam Dryer Stress Limit Curve – MSL 'B' Upper**



**Figure 4: Steam Dryer Stress Limit Curve – MSL 'B' Lower**

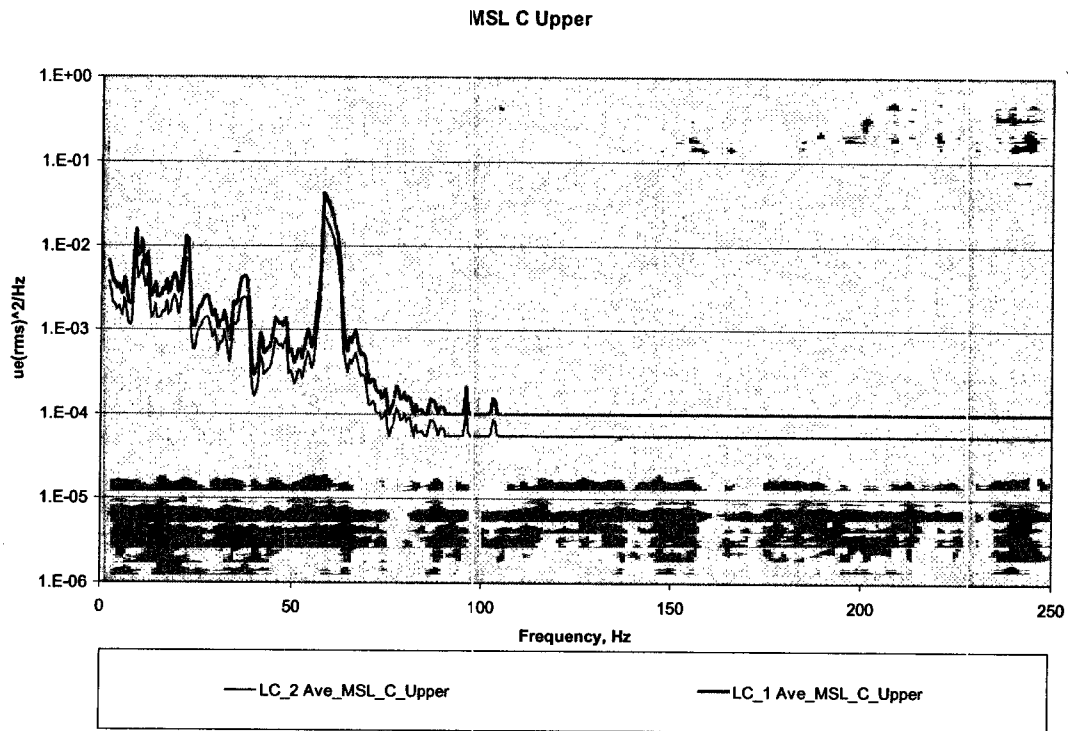


Figure 5: Steam Dryer Stress Limit Curve – MSL 'C' Upper

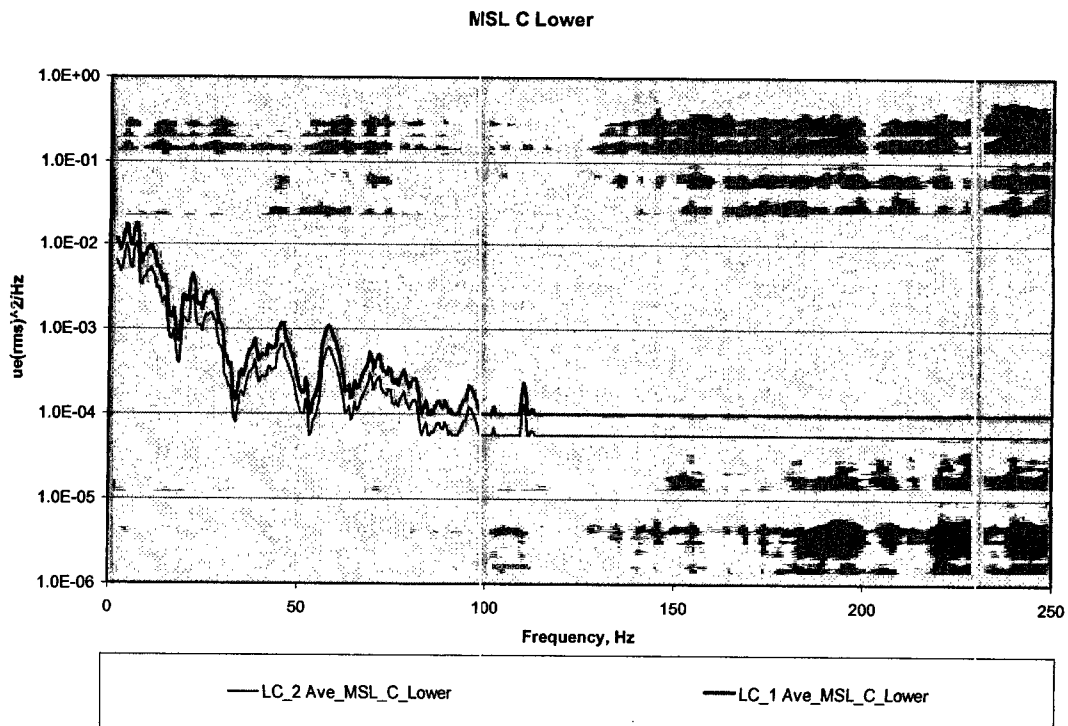


Figure 6: Steam Dryer Stress Limit Curve – MSL 'C' Lower

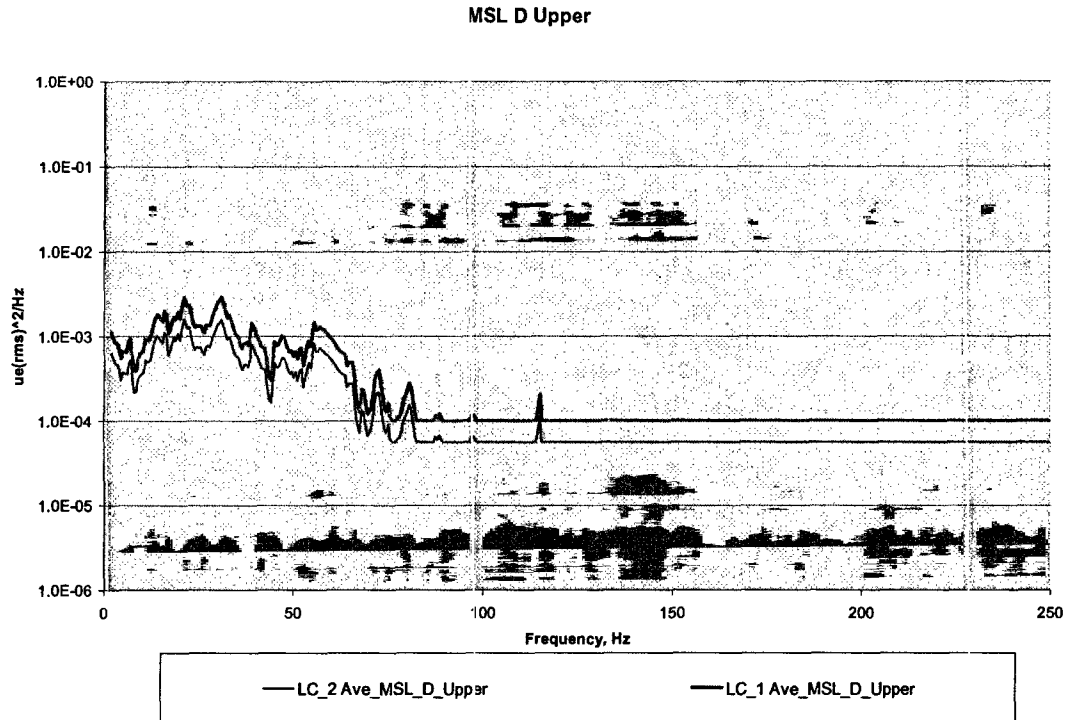


Figure 7: Steam Dryer Stress Limit Curve – MSL 'D' Upper

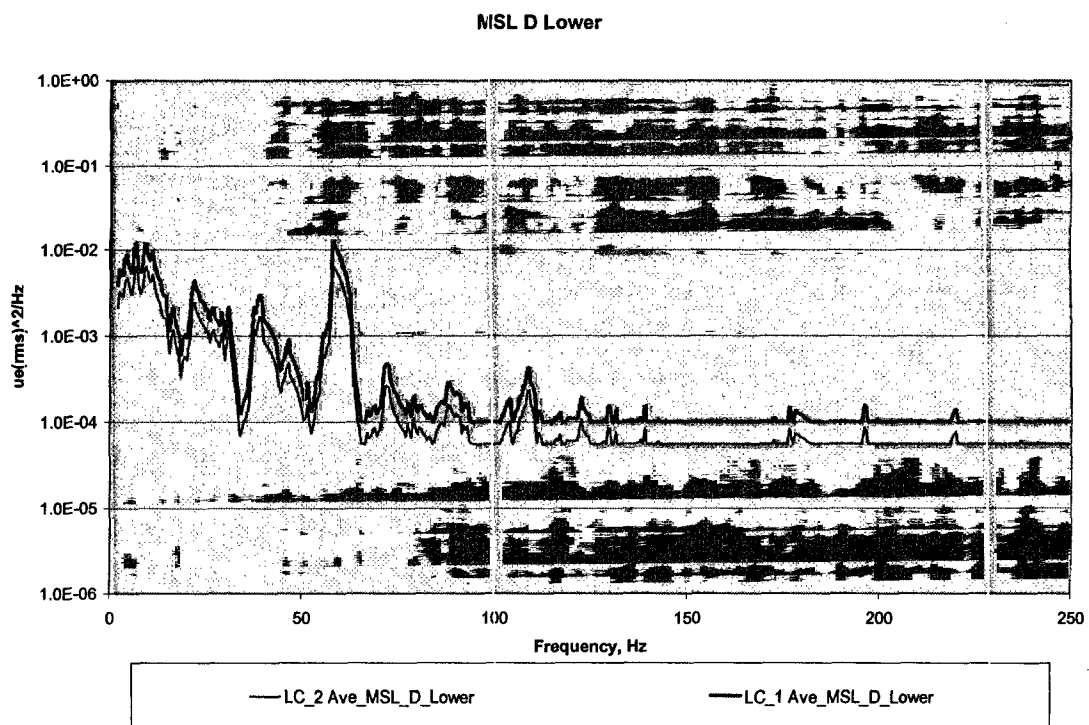


Figure 8: Steam Dryer Stress Limit Curve – MSL 'D' Lower

**Attachment 2**

Vermont Yankee Nuclear Power Station  
Proposed Technical Specification Change No. 263  
Extended Power Uprate – Regulatory Commitment  
Information Regarding Steam Dryer Monitoring and FIV Effects  
Power Ascension Test Procedure (FIV Portions)

# Power Ascension Testing for Extended Power Uprate Conditions

ATTACHMENT 9.6

TEST PROCEDURE COVER SHEET

Sheet 1 of 1

TEST COVER SHEET			
TEST TYPE:	<input type="checkbox"/> ERT Procedure <input checked="" type="checkbox"/> ERSTI Procedure	Page 1 of 118	
TEST #:	ERSTI-04-VY1-1409-000	Quality Class:	<input checked="" type="checkbox"/> QR <input type="checkbox"/> NQR
TEST TITLE:	Power Ascension Test Procedure for Extended Power Conditions 1593 to 1912 MWth		
<b>REVIEW</b> (Print/Sign/Date)			
Test Engineer (TE):	Bryan Croke	<i>Bryan Croke</i>	2/14/06
Technical Reviewer:	Paul Stello	<i>Paul Stello</i>	2-14-06
<b>CROSS-DISCIPLINE REVIEW</b>			
Operations Department:	<i>Ed L. Harris</i> 2/14/06	DE EITC	<i>U. M. Lyons</i> 2-15-06
Radiation Protection:	<i>J. J. Harris</i> 2/15/06	Chemistry:	<i>J. Harris</i> 2-10-06
Organization:		Organization:	
Quality Assurance:	<i>B. E. Hall</i> 2/10/06	Engineering:	<i>B. E. Hall</i> 2/15/06
Organization:		Organization:	
MECHANICAL DE FOR ATT 6A ONLY <i>P. G. Rainey</i> 2/14/06		Maintenance:	<i>F. E. L. L. L.</i> 2/15/06
		Civil/Struct DE	<i>R. G. Davis</i> 2/14/06 (Piping)
		ED Bath DE	<i>2/14/06</i> 177 / m4
<b>ADDITIONAL ERSTI (ONLY) PROCEDURE REQUIREMENTS</b>			
ENN-LI-100 Review:	<input checked="" type="checkbox"/> Attached	<input checked="" type="checkbox"/> Other (8891 Risk Review)	
10CFR50.59 Evaluation:	<input checked="" type="checkbox"/> Not Required	<input type="checkbox"/> Attached	
OSRC Approval	<input type="checkbox"/> Not Required	Mtg No 2006-007 Date: 2/24/06	Chairman: <i>Donna</i>
<b>APPROVAL</b> (Print/Sign/Date)			
TE Supervisor:	Craig Nichols	<i>Craig Nichols</i>	2/24/06
<b>TEST COMPLETION REVIEW / ACCEPTANCE</b>			
Summary of Test Results:			
Test Engineer (TE):	/		
TE Supervisor:	/		

ERSTI-04-VY1-1409-000

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# Power Ascension Testing for Extended Power Uprate Conditions

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1F Dryer Data Collection 1665 MWth	
1G Dryer Data Collection 1673 MWth	
1H Dryer Data Collection 1689 MWth	
1I Dryer Data Collection 1705 MWth	
1J Dryer Data Collection 1712 MWth	
1K Dryer Data Collection 1728 MWth	
1L Dryer Data Collection 1744 MWth	
1M Dryer Data Collection 1752 MWth	

### **Power Ascension Testing for Extended Power Uprate Conditions**

1N Dryer Data Collection 1768 MWth  
1O Dryer Data Collection 1784 MWth  
1P Dryer Data Collection 1792 MWth  
1Q Dryer Data Collection 1808 MWth  
1R Dryer Data Collection 1824 MWth  
1S Dryer Data Collection 1832 MWth  
1T Dryer Data Collection 1848 MWth  
1U Dryer Data Collection 1864 MWth  
1V Dryer Data Collection 1872 MWth  
1W Dryer Data Collection 1888 MWth  
1X Dryer Data Collection 1904 MWth  
1Y Dryer Data Collection 1912 MWth  
2A Flow Induced Vibration Data 1593 MWth  
2B Flow Induced Vibration Data 1633 MWth  
2C Flow Induced Vibration Data 1673 MWth  
2D Flow Induced Vibration Data 1712 MWth  
2E Flow Induced Vibration Data 1752 MWth  
2F Flow Induced Vibration Data 1792 MWth  
2G Flow Induced Vibration Data 1832 MWth  
2H Flow Induced Vibration Data 1872 MWth  
2I Flow Induced Vibration Data 1912 MWth  
3 Radiation Surveys  
4 Core Performance Data Sheet various MWth  
5A Moisture Carryover 1633 MWth  
5B Moisture Carryover 1673 MWth  
5C Moisture Carryover 1673 MWth  
5D Moisture Carryover 1673 MWth  
5E Moisture Carryover 1673 MWth  
5F Moisture Carryover 1712 MWth  
5G Moisture Carryover 1752 MWth  
5H Moisture Carryover 1752 MWth  
5I Moisture Carryover 1752 MWth  
5J Moisture Carryover 1752 MWth  
5K Moisture Carryover 1792 MWth  
5L Moisture Carryover 1832 MWth  
5M Moisture Carryover 1832 MWth  
5N Moisture Carryover 1832 MWth  
5O Moisture Carryover 1832 MWth  
5P Moisture Carryover 1872 MWth  
5Q Moisture Carryover 1912 MWth  
5R Moisture Carryover 1912 MWth  
5S Moisture Carryover 1912 MWth  
5T Moisture Carryover 1912 MWth

## **Power Ascension Testing for Extended Power Uprate Conditions**

- 6A Feedwater Runout Data Collection 1673 MWth
- 6B Feedwater Runout Data Collection 1752 MWth
- 6C Feedwater Runout Data Collection 1832 MWth
- 6D Feedwater Runout Data Collection 1912 MWth
- 7A Feedwater Level Changes 1673 MWth
- 7B Feedwater Level Changes 1752 MWth
- 7C Feedwater Level Changes 1832 MWth
- 7D Feedwater Level Changes 1912 MWth
- 8A MHC Pressure Change 1673 MWth
- 8B MHC Pressure Change 1752 MWth
- 8C MHC Pressure Change 1832 MWth
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- 9D System Data 1832 MWth
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- 10D Chemistry Data 1912 MWth
- 11A Recombiner Performance Data 1673 MWth
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- 14 Performance Summary
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- 16 ENN-LI-101, 10.59 Screen
- 17 Risk Management Worksheet VYAPF 0172.02



## **Power Ascension Testing for Extended Power Uprate Conditions**

### **1. Objective**

The objective is to confirm acceptable plant performance for operation at extended power uprate to 1912 MWth per Nuclear Change 2005-1409, EPU.

This Test Instruction provides step by step guidance and verification for performing Power Ascension Testing requirements for Extended Power Uprate (EPU) conditions. The Test Instruction supplements OP-0105, Reactor Operations, to provide direction to maneuver the plant from 1593 MWth [83.32% LPU] to 1912 MWth [100.00% LPU].

First and foremost is the safety of the reactor, nuclear plant and personnel. This procedure was written with this specifically in mind, providing the necessary criteria, instruction, oversight, and precautions to successfully execute the Power Ascension Testing for Extended Power Uprate Conditions.

Separate procedures are written to:

- Determine the maximum safe power level when MSIV, turbine bypass and turbine stop valve testing can be performed. This determination is accomplished separately from this procedure.
- Demonstrate plant response to a condensate pump trip.

#### **1.1. Intent**

- 1.1.1. Document the plant physical modifications, instrumentation setpoint changes, and prerequisite testing have been satisfactorily completed and to meet the established acceptance criteria to raise reactor power above 1593 MWth to 1912 MWth.
- 1.1.2. Implement tests contained in EPU Project Task Report VY-RPT-05-00041, "T1005: Startup Test Specifications"
  - 1.1.2.1. Maintain control of and knowledge of the reactor coolant chemistry and radiochemistry at extended uprate conditions.

## **Power Ascension Testing for Extended Power Uprate Conditions**

- 1.1.2.2. Monitor radiation levels at the extended uprate power conditions to assure that personnel exposures are maintained ALARA, radiation survey maps are accurate, radiation zones are properly posted, site boundary doses are as expected, and offsite boundary doses comply with state and federal regulations.
- 1.1.2.3. Measure and evaluate core thermal power and fuel thermal margins to ensure a careful, monitored approach to the next power uprate level.
- 1.1.2.4. Monitor feedwater level control system for acceptable reactor water level control.
- 1.1.2.5. Confirm acceptable calibration of the feedwater flow elements at uprated power conditions.
- 1.1.3. Demonstrate that affected plant parameters and equipment performance remains within the acceptable limits as power is increased from 1593 MWth to 1912 MWth.
- 1.1.4. Monitor plant system response via the System Engineering System Monitoring Plans.
- 1.1.5. Provide Shift Operations personnel clear instructions on testing and operational maneuvers to be performed as power level is increased in a step-wise manner to assure safe plant operation.
- 1.1.6. Provide management reviews and approvals of the test data and the authorization needed to increase power level in a safe, controlled, step wise manner.
- 1.1.7. Assure that procedures requiring revision to operate at uprated power conditions have been revised as required and are available to plant personnel.
- 1.1.8. Assure that regulatory commitments have been completed as required to increase power above 1593 MWth. This includes commitments contained within the License Amendment Request (LAR), correspondence to the NRC Request for Additional Information (RAI), the NRC issued Safety Evaluation Report (SER) and any license conditions. This will be accomplished via the Pre-requisite section of this procedure.

### **Power Ascension Testing for Extended Power Uprate Conditions**

- 1.1.9. Verify that training has been completed to meet licensing commitments and provide safe operation of the plant.
- 1.1.10. Document and collect data, including baseline data at 1593 MWth, which will be used to prepare an EPU Test Report to be submitted to the NRC upon completion.

## **Power Ascension Testing for Extended Power Uprate Conditions**

### **1.2. Discussion**

- 1.2.1. The EPU Project utilized a generic methodology from General Electric for evaluating plant systems and equipment for operating at uprated power levels. This methodology provided system, program, and equipment task evaluations, which identified the acceptability to operate at an increased power level. These task evaluation documents provided input into the testing program which is implemented by this test procedure.
- 1.2.2. The steps contained in this document were a culmination of inputs from numerous sources. The GE Licensing Topical Report (GELTR) required operational tests for systems which have revised performance requirements because of the extended power uprate. A test plan was submitted with the License Amendment Request, which specified the operational tests to be performed. A review of the original start-up test specifications was completed and tests were selected based on the change resulting from the extended power uprate. Test requirements were also added to this procedure based on the System Task Reports to ensure that analyses were accurate and closely monitored. Finally, test requirements were added based on Engineering judgment, discussion with plant personnel and Lessons Learned from other plant power uprates.
- 1.2.3. Test requirements that are satisfied by completion of existing surveillances, calibrations or post modification testing need not be repeated for the purposes of this procedure unless specifically identified in this procedure.
- 1.2.4. Plant maneuvers and operation shall be performed in accordance with applicable VY Station Procedures including power changes in accordance with OP 2404, Determination and Implementation of Rod Movement Sequences and OP 0105, Reactor Operations.
- 1.2.5. A Power Ascension Control Center (PACC) is established to support implementing this procedure. Personnel from various functional areas, together with senior managers, are assigned to provide continuously available resources to address issues that may arise during the performance of this procedure. Additional peer assessments and reviews will be available, if required.

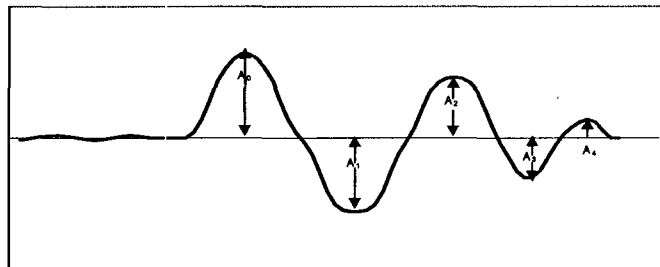
## Power Ascension Testing for Extended Power Uprate Conditions

### 1.3. Definitions

- 1.3.1. CPPU – Constant Pressure Power Uprate - Operating at increased steam and feedwater flows without increasing maximum reactor recirculation flow or reactor vessel operating pressure.
- 1.3.2. Decay ratio – is a term used to describe the amplitude dampening of an oscillatory signal.

Decay ratio is less than 0.25 if there are no more than two positive peaks. IF more than two positive peaks exist, THEN decay ratio must be calculated as follows:

- Draw baseline through inflection points of trace.
- Amplitudes of peaks should be measured from this reference line, e.g., A0, A1, A2, A3, and A4 as shown in Figure below.
- Calculate ratios of amplitudes between successive peaks of same polarity, e.g.,  $A_2/A_0$ ,  $A_3/A_1$ ,  $A_4/A_2$ .
- Decay ratio determined by averaging all ratios determined in previous step, e.g.,
- Decay Ratio =  $(A_2/A_0 + A_3/A_1 + A_4/A_2) / 3$ .



### **Power Ascension Testing for Extended Power Uprate Conditions**

- 1.3.3. EPR - Electrical Pressure Regulator - the electrical/mechanical system which controls the turbine control valves and turbine bypass valves based on main steam pressure. This is the primary turbine pressure control system.
- 1.3.4. FIV – Flow Induced Vibration
- 1.3.5. FRV – Feedwater Regulating Valves – air operated feedwater control valves FCV-6-12A and FCV-6-12B that throttle reactor feedwater flow based on signals received from the Feedwater Level Control System.
- 1.3.6. Intrusive Activities – activities that do have the potential to or change parameters associated with reactor power including backwashing and pre-coating condensate demineralizers, pump swaps, raising or lowering reactor power, changing reactor pressure, etc.
- 1.3.7. Lead Test Performer – In accordance with ENN-DC-117, a person or group assigned by the Test Engineer to assist in the performance of an ERT or STI. The Lead Test Performer may perform the duties of the Test Engineer, in performing the test, as directed by the Test Engineer.
- 1.3.8. LPU – License Power Uprate = 1912 MWth
- 1.3.9. MHC Mechanical Hydraulic Control – the combined pressure control system made up of the EPR and MPR.
- 1.3.10. MPR – Mechanical Pressure Regulator – the mechanical system which controls the turbine control valves and turbine bypass valves based on main steam pressure. This is the backup turbine pressure control system.
- 1.3.11. Non intrusive activities – activities that do not change any parameters associated with reactor power including data collection, obtaining chemistry samples, etc.
- 1.3.12. RE - Reactor/Computer Engineering
- 1.3.13. Responsible Engineer – in accordance with ENN-DC-117, an individual assigned primary responsibility and cognizance for development of an ER Response.

## **Power Ascension Testing for Extended Power Uprate Conditions**

### **1.3.14. Termination and Hold Criteria**

#### **1.3.14.1. Level 1: Criteria associated with plant safety.**

When a criterion is not met, TERMINATE the test and:

- 1.3.14.1.1. Hold at the most secure point and place the plant in a condition that is judged to be satisfactory and safe, based upon prior testing, reducing power if necessary.
- 1.3.14.1.2. Follow plant operating procedures, test procedures or the Technical Specifications on the decision of actions to be taken.
- 1.3.14.1.3. Generate a CR (condition report) and pursue resolution of the problem through investigating related adjustments as well as measurement and analytical methods.
- 1.3.14.1.4. Following resolution, repeat the applicable test portion to verify that the Level 1 requirement is satisfied.

### **Power Ascension Testing for Extended Power Uprate Conditions**

- 1.3.14.2. Level 2 Criteria is associated with design performance or plant parameters that are not expected to be exceeded while implementing this procedure and at that value are not immediately adverse to plant or equipment safety.

When a criterion is not met, place the test on HOLD and:

- 1.3.14.2.1. Hold at the most secure point and place the plant in a safe condition including reducing power if necessary.
- 1.3.14.2.2. Generate a CR and pursue resolution of the problem through investigating related adjustments as well as measurement and analytical methods.
- 1.3.14.2.3. Repeat the applicable test portion to verify that the Level 2 requirement is satisfied following the resolution unless the as-found condition is found to be satisfactory.



### **Power Ascension Testing for Extended Power Uprate Conditions**

- 1.3.14.3. Level 3: Criteria associated with plant surveillance acceptance criteria.

When criteria is not met:

- Normal plant procedures will be followed if Level 3 Acceptance Criteria is exceeded.

- 1.3.14.4. Level 4: Criteria associated with plant operating procedures, for example, operator rounds, operating procedures, alarm response sheets, etc.

When criteria is not met:

- Normal plant procedures will be followed if Level 4 Acceptance Criteria is exceeded.

- 1.3.15. Test Engineer – Per ENN-DC-117 a qualified individual for any organization, designated by the Testing Authority to perform the responsibilities of the Test Engineer. Qualifications for filling the Test Engineer function are in accordance with ENN-TQ-104.

- 1.3.16. Testing Authority – Per ENN-DC-117, the Testing Authority is the individual who owns the testing process. The System Engineering Manager is the Testing Authority.

## **Power Ascension Testing for Extended Power Uprate Conditions**

### **1.4. Responsibilities**

The roles and responsibilities established to support this procedure are as follows:

- 1.4.1. **Management Designee:** A management person who holds an SRO license/certification, DCO qualified, a superintendent or higher level member of the plant staff or other individual that has been designated by the General Manager Plant Operations with responsibility for management oversight as defined in this procedure. He/she shall provide overall line management authority for the safe conduct of an infrequently performed test or evolution. The Management Designee does not replace any individual involved in the test or evolution, nor supervise the evolution. The Management Designee's function is management oversight.
- 1.4.2. **Shift Manager –** The SM has the responsibility for the safe operation of the plant at all times. The SM's approval is required prior to performance of this test and has the authority to stop the test at any time. The SM's approval is also required to continue testing if a test was terminated.
- 1.4.3. **Control Room Supervisor (CRS)** provides direction to Licensed Operators and other on-shift Operations personnel involved in the performance of this test.

## **Power Ascension Testing for Extended Power Uprate Conditions**

1.4.1. Principal IPTE Coordinator [PIPTEC] - is responsible for overall implementation of the procedure. His responsibilities are spelled out in AP 6100. The PIPTEC will maintain control of all test activities and seek assistance from support departments as necessary. The PIPTEC or their designees will be responsible for signing off steps as completed within this procedure. The PIPTEC have the following duties and responsibilities with respect to the activities being controlled by this procedure. The SM shall not be assigned as a PIPTEC.

- Reports test status and significant issues to station management.
- Coordinates the activities requiring completion by this procedure to assure they are completed in a safe and timely manner.
- Responsible for assuring this procedure is updated and maintained current with work and testing activities controlled by this procedure.
- Reviews the exceptions to this procedure and expedites the resolution if exceptions affect power ascension testing.
- Authorizes the next step in power ascension testing if the test data results meet the acceptance criteria.
- May add additional equipment performance monitoring data collection at any time during the performance of this procedure.
- Assures that shift personnel are knowledgeable of test activities being controlled and performed by this procedure.

## **Power Ascension Testing for Extended Power Uprate Conditions**

1.4.2. Test Engineer – Per ENN-DC-117 a qualified individual for any organization, designated by the Testing Authority to perform the responsibilities of the Test Engineer. Qualifications for filling the Test Engineer function are in accordance with ENN-TQ-104. The Test Engineer will have the following duties and responsibilities with respect to the activities being controlled by this procedure.

- The Test Engineer may assist in the development and/or presentation of technical aspects of this evolution.
- Has administrative and physical control of this procedure.
- Maintains a log.
- Maintains technical control of this procedure and is authorized to make changes to the acceptance limits of the system and equipment following an engineering evaluation that justifies the change in accordance with ENN-DC-117

1.4.3. Operations Support Personnel (AO's) – Operations Control Room personnel and auxiliary operators will perform the necessary plant control manipulation to operate various valves, equipment, and systems.

1.4.4. Test Team [IPTE Team]: A team of individuals, led by the Management Designee, will monitor extended or complex IPTes. Oversight team members do not replace any individuals involved in the test or evolution. The team's function is to provide additional oversight.

1.4.5. Responsible Engineers, in conjunction with the Test Engineer and Shift Manager, have authority to change system and equipment acceptance limits or predicted performance values following an engineering evaluation that justifies the change in accordance with ENN-DC-117.

## **Power Ascension Testing for Extended Power Uprate Conditions**

### **2. References:**

- 2.1. AP 0020 Control Of Temporary And Minor Modifications
- 2.2. AP 0052 Pre Job Briefing
- 2.3. AP 0503 Establishing And Posting Restricted Areas
- 2.4. AP 6100, Infrequently Performed Test or Evolutions
- 2.5. DP 0636 Collection and Digestion of Metal Samples
- 2.6. DP 0643 Filterable Solids
- 2.7. EN-AD-103 Document Control and Records Management Activities
- 2.8. EN-LI-102 Corrective Action Process
- 2.9. ENN-DC-117 Post Modification Testing and Special Test Instructions
- 2.10. ENN-IT-104 Software Quality Assurance Program
- 2.11. ENN-OP-104 Resolution of Equipment Operability Concerns Related to Degraded or Nonconforming Conditions
- 2.12. ER 04-0529 ""EPU Instrumentation Upgrade Non Outage"
- 2.13. GE EPU Final Task Reports:
  - 2.13.1. VY-RPT-05-00041, "T1005: Startup Test Specifications"
  - 2.13.2. VY-RPT-05-00065, "T0500: Neutron Monitoring System"
  - 2.13.3. VY-RPT-05-00066, "T0504: Feedwater Control System"
  - 2.13.4. VY-RPT 05-00067, "T0506: NSSS TS Instrument Setpoints"
  - 2.13.5. VY-RPT-05-00104, "T0316: NSSS Piping Flow Induced Vibration Evaluation"
- 2.14. GE SIL 467, Recirculation System Bi-stable Flow in Jet Pump BWRs
- 2.15. GEI 88578 "Overspeed Operation Preparatory Procedure for Cold Starts"

## **Power Ascension Testing for Extended Power Uprate Conditions**

- 2.16. GEK 459371, "Recommendation for Reading and Recording Generator Resistance Temperature Detectors and Thermocouples"
- 2.17. GEK 75526A "Operator Action on High Temperature Alarms"
- 2.18. I&T 2003-004.01 FWH Level Control System Installation and Test procedure
- 2.19. Licensing Topical report, "Generic Evaluations for General Electric Boiling Water Reactor Extended Power Uprate," NEDC-32523P-A Class III, February 2000 (ELTR-2)
- 2.20. Licensing Topical report, "Generic Guidelines for General Electric Boiling Water Reactor Extended Power Uprate," NEDC-32424P-A Class III, February 1999 (ELTR-1)
- 2.21. MM 2004-002 "EPR Modification for EPU"
- 2.22. MM 2004-039 "NSSS/BOP Instrumentation Upgrades for EPU"
- 2.23. NF 102 Corporate Fuel Reliability
- 2.24. Nuclear Change ER 2004-1409, Extended Power Uprate
- 2.25. OP 2199 Hydrogen Water Chemistry System
- 2.26. OP 0105 Reactor Operations
- 2.27. OP 0631 Radiochemistry
- 2.28. OP 2172 Feedwater System
- 2.29. OP 2404 Determination And Implementation Of Rod Movement Sequences
- 2.30. OP 2429 Recirculation Flow System Baseline Data Collection and Instrument Calibration
- 2.31. OP 2457, PCIOMR Implementation
- 2.32. OP 2613, Sampling and Analysis of the Off Gas System
- 2.33. OP 4110 Reactor Recirc System Surveillance

### **Power Ascension Testing for Extended Power Uprate Conditions**

- 2.34. OP 4160 Turbine Generator Surveillance
- 2.35. OP 4401 Core Thermal Hydraulics Limits Evaluation
- 2.36. OP 4612 Sampling and Treatment of the Reactor Water System
- 2.37. OP 4617 Calculation of Chemistry Controlled Setpoints
- 2.38. OP 5399 I/C Calibration Of Important Computer Analog Inputs
- 2.39. Original GE Startup Test Instructions, Spec. No. 22A2219 KV Rev.0
- 2.40. Original GE Startup Test Instructions, Spec. No. 22A2219 KV Rev.0
- 2.41. OT 3110 Positive Reactivity Insertion
- 2.42. OT 3113 Reactor Low Level
- 2.43. OT 3114 Reactor High Level
- 2.44. OT 3115 Reactor Pressure Transients
- 2.45. PP 7401, Fuel Reliability Program
- 2.46. Safety Analysis Report for Vermont Yankee Nuclear Power Station Constant Pressure Power Uprate NEDC-33090P, dated September 2003.
- 2.47. STP 2002-004, Pressure Regulator Dynamic Testing.
- 2.48. STP 2003-004 Power Ascension Test Procedure
- 2.49. STP-22, Original Plant Startup Testing for the Pressure Regulator.
- 2.50. STP-23, Original Plant Startup Testing for the Feedwater Flow Control System
- 2.51. Technical Evaluation 2004-037, Benchmarking Feedwater FCV Performance for EPU.
- 2.52. VY EPU License Amendment Request, PC 263
- 2.53. VYDC 2000-027, Main Turbine EPR replacement.
- 2.54. VYDC 2001-002, Feedwater Level Controls Upgrade.

### **Power Ascension Testing for Extended Power Uprate Conditions**

- 2.55. VYDC 2002-007, Feedwater Control System Replacement - Phase 2.
- 2.56. VYDC 2003-003 "New Main Generator TC's and RTD's and the ERFIS Software Modification"
- 2.57. VYDC 2003-004 Feedwater Heater Level Control System
- 2.58. VYNPS Startup Test



## **Power Ascension Testing for Extended Power Uprate Conditions**

### **3. Apparatus/Test Equipment**

- 3.1. Dryer Data Collection per TA 2005-0015, Additional Strain Gauge Installation
- 3.2. Feedwater Heater Performance per TM 2003-035 Feedwater Heater Performance
- 3.3. Flow Induced Vibration Equipment per TM 2003-022, FIV Instrumentation
- 3.4. Hand held vibration equipment
- 3.5. Any other monitoring equipment required based on System Engineering System Monitoring Requirements
- 3.6. Calibrated Pressurized Ion Chamber (PIC)
- 3.7. Other instrumentation and equipment as required

## **Power Ascension Testing for Extended Power Uprate Conditions**

### **4. Precautions and Limitations**

- 4.1. Reactor power levels given in percent are a percentage of the Extended Power Uprate of 1912 MWth = 100.00% LPU.
- 4.2. System and equipment performance shall be closely monitored to assure that operating limits and test criteria are not exceeded. Condition reports shall be submitted as required. Any discrepancies noted are reported to the Test Engineer and the PIPTEC with an evaluation to determine plant impact (discrepancy resolved or power ascension terminated and/or power reduction commenced). Attach evaluations within Attachment 9 as discussed in Section 9.
- 4.3. If during power operation any of the following occurs, it may be indication of vessel internals damage and debris carry over. Notify the Shift Manager, the General Manager, Plant Operations, the Test Engineer and the PIPTEC immediately. (OE14300)
  - Unbalance of Main Steam Line steam flow indication ~ 5% greater than baseline values
  - Unbalance RPV water level ~3 inches between level instruments from different reference legs.
  - Sudden drop in steam dome pressure 2-3 psig.
  - Unexpected or unexplained step increase of moisture carryover.
- 4.4. Any pressure or level step changes at a power plateau shall be made first in the downward direction, then in the upward direction. This includes testing the EPR, the MPR, and the feedwater level control system.
- 4.5. IF during any pressure or level step changes, the system shows signs of becoming unstable or the acceptance limits are approached, THEN stabilize the condition, OTHERWISE exit the condition. The next larger step change shall not be performed until an acceptable response is achieved from the previous smaller steps. This may require repeating a previous step.
- 4.6. Reactor Engineering shall ensure the testing will avoid operation in the buffer and exclusion regions of the power to flow map.

### **Power Ascension Testing for Extended Power Uprate Conditions**

- 4.7. IF the EPR is inoperable (the MPR in control) for a time period greater than two hours per occurrence, THEN initiate a CR per ENN-LI-102. Ensure an operability determination, per ENN-OP-104, is completed within 24 hours.
- 4.8. The Test Engineer with the assistance of the Test Team shall coordinate the review and evaluation of the data package for each step of this procedure for acceptance criteria compliance.
- 4.9. ALARA principles should be balanced with observing plant systems during power ascension system inspections.
- 4.10. Power levels tolerances are -19 MWth, + 0 MWth.
- 4.11. Intentional operation greater than the current plateau (1593 MWth, 1673 MWth, 1752 MWth, 1832 MWth and 1912 MWth) is not permitted. The average CTP level over any eight-hour period shall not exceed the current plateau power level. It is permissible to inadvertently exceed current power plateau by as much as 2% (nominal 1912 MWth) for as long as 15 minutes. Lesser power excursions are permitted for longer periods (i.e., 1% excess for 30 minutes, 1/2% for one hour, etc.) as long as the 8 hour average does not exceed the current power plateau. (NRC Letter SSINS-0200, dated 8/22/80).
- 4.12. After any change in plant power level above 1593 MWth by the steps in this procedure, an approximate 60-minute stabilization period shall occur prior to recording system and equipment performance data with the exception of dryer and FIV data. Following the stabilization period and during the data collection period the plant shall be maintained in as stable a condition as is possible (i.e., no backwashing and pre-coating condensate demineralizers, pump swap-over, etc) until data collection has been completed.
- 4.13. Record dryer data collection every hour during power ascension (16 MWth change in reactor power) and within one hour of achieving the next power plateau per Attachment 1(A-Y).

## **Power Ascension Testing for Extended Power Uprate Conditions**

### **5. Termination Criteria**

- 5.1. If an unexpected action results during performance of this procedure:

**STOP, PLACE SYSTEM OR COMPONENT IN A SAFE CONDITION, AND NOTIFY THE SHIFT MANAGER, THE TEST ENGINEER AND THE PIPTEC.**

- 5.2. Terminate the IPTE upon the occurrence of:

5.2.1. Exceeding any Level 1 Criteria

5.2.2. Any specific termination/abort criterion defined in applicable procedures or attachments.

5.2.3. Any related event that causes an unexpected reactivity transient, such as that associated with reactor water level, pressure, core flow, temperature, or control rod position.

5.2.4. Any event which requires entering a Technical Specification Limiting Condition for Operation (LCO).

5.2.5. Any IPTE related event that is reportable or potentially reportable to the NRC, such as reactor scram, ECCS actuation, an uncontrolled radiation release or other Condition Report of noteworthy concern.

5.2.6. Any other condition which, in the determination of the PIPTEC, Management Designee, upper management or SM, requires the IPTE to be terminated.

- 5.3. IF this test is TERMINATED, THEN record and document the exception on test deficiency log in accordance with ENN-DC-117, and generate a CR. Any CRs effecting operability must be reviewed by SM and the Management designee. Notify the GMPO and 91-01 Coordinator (or equivalent).

### **Power Ascension Testing for Extended Power Uprate Conditions**

- 5.4. If the decision is made to restart or continue an IPTE which was terminated/aborted, the Management Designee and/or PIPTEC shall perform the following prior to proceeding with the test:
  - 5.4.1. Obtain GMPO approval and review by OSRC (if required).
  - 5.4.2. Obtain SM permission.
  - 5.4.3. Ensure resumption will not have unacceptable impact on plant status, operating equipment, or the remainder of the evolution.
  - 5.4.4. Verify prerequisites are met and conditions have not changed since entering the terminated/aborted condition. If conditions have changed, complete applicable steps on the original prerequisites page or on additional pages and attach to the procedure.
  - 5.4.5. Document the re-verification of prerequisites and continuation in the Control Room Log.
  - 5.4.6. Ensure the Operating crew has been re-briefed and has taken a Take Two to refocus on the task.
- 5.5. IF during the performance of this procedure, testing is stopped for whatever reason, THEN refer to Termination Criteria for actions to be taken PRIOR to resuming testing.

### **Power Ascension Testing for Extended Power Uprate Conditions**

- 5.6. If an unexpected event occurs at any time during system testing, the system shall be placed in a safe and stable mode using existing operating procedures. Testing activities shall be suspended and placed on HOLD until the event is understood and the SM and the PIPTEC has granted permission to resume testing. The test engineer shall document the decision making on test deficiency log, recording the resolution and approvals granted in accordance with ENN-DC-117. Submit a Condition Report per EN-LI-102. Some examples are;
- If inadequate manpower is available on site or via telephone to ensure successful completion of the evolution.
  - To resolve concerns with the evolution or with personnel assigned to the evolution.
  - Upon loss of required communications.
  - If plant impacts or conflicts with other procedures are identified that are not addressed by the procedures governing the special evolution.

## Power Ascension Testing for Extended Power Uprate Conditions

### 6. Prerequisites

Verify the following items identified in this section have been implemented and are complete and/or are operable, as appropriate:

#### NOTE

Prerequisites do not have to be completed in sequence up to step 6.17, Shift Manager's permission to commence license implementation for EPU. Steps prior to 6.17 can be signed off prior to the receipt of the license amendment.

- The following modifications have been completed in accordance with design engineering requirements.
- Applicable post modification testing has been scheduled or completed, based on plant conditions, and procedures revised as required.
- Operations has accepted the modified system and there are NO exceptions which preclude power operation up to 1912 MWth.
- Confirmation of the completion of a modification is initialed by the Test Engineer, another member of the Test Team, or the Responsible Engineer for the modification.

#### 6.1. Minor Modifications: Responsible Engineer

##### 6.1.1. MM 2003-017, Modify RHRSW A Motor Cooling Piping

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Initial Date Time

##### 6.1.2. MM 2003-018, Modify RHRSW B Motor Cooling Piping

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Initial Date Time

## **Power Ascension Testing for Extended Power Uprate Conditions**

### **6.2. Temporary Modifications/Alterations: Responsible Engineer**

6.2.1. TM 2003-022, FIV Instrumentation (Vibration sensors)

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Initial    Date    Time

6.2.2. TM 2003-035 Feedwater Heater Performance Monitoring.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

6.2.3. TA 2005-0015, Additional Strain Gauge Installation

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Initial    Date    Time

### **6.3. Technical Specification Changes**

6.3.1. PC-263, EPU

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Initial    Date    Time

6.3.2. PC-262, AST

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Initial    Date    Time

### **6.4. VYDC completed and implemented: Responsible Engineer**

6.4.1. VYDC 2003-020, Replacement 381 Breaker

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Initial    Date    Time

6.4.2. VYDC 2003-016, Alternate Source Term

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Initial    Date    Time



## **Power Ascension Testing for Extended Power Uprate Conditions**

### **6.5. Nuclear Changes**

6.5.1. ER 2004-0705, Cooling Tower Fans/Motors

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Initial    Date    Time

6.5.2. ER 2004-1298, LP Turbine 8<sup>th</sup> Stage Diaphragms

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Initial    Date    Time

6.5.3. ER 2004-1267, MS Low Point Sockolet  
Reinforcement

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

6.5.4. ER 2004-0971, Main Transformer (GSU)  
Differential Protection

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

6.5.5. ER 2005-0731, Isokinetic Sample Probes

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

6.5.6. ER 2005-0776, Feedwater Pump Trip

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

6.5.7. ER 2004-0975, Generator CT Upgrade

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

6.5.8. ER 2004-1409, EPU

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Initial    Date    Time

## **Power Ascension Testing for Extended Power Uprate Conditions**

- 6.5.9. ER 2004-0529, Setpoints and Scaling Changes  
Required by EPU (approval of document only,  
implementation is controlled by this procedure.)

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Initial    Date    Time

- 6.5.10. ER 2006-1099, Reactor Recirculation Runback  
Termination Point Change

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

- 6.5.11. ER 2005-1002 Modification to Feedwater Level  
Control System to Support EPU

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Initial    Date    Time

**Power Ascension Testing for Extended Power Uprate Conditions**

**6.6. OPERATIONS EPU TRAINING (Training)**

6.6.1. The required training to operate the plant under EPU conditions has been conducted. Classroom training includes plant design changes in support of EPU including setpoint changes, changes to parameters, procedures and system operation, all related Technical Specification changes, and this Power Ascension Special Test. Simulator training has provided Operators with a demonstration of transients that show the greatest change in plant response at EPU power levels compared to the original maximum power level.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

<p style="text-align: center;">NOTE</p> <p>This prerequisite does not pertain to any particular Just-in-Time training Operations Management chooses to conduct for Operations personnel performance of power ascension testing.</p>
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**6.6.2. Evaluation Comments:**


\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

### 6.7. EPU Project Action Items

- 6.7.1. Throughout the EPU Project, action items have been tracked on an internal Action Item List and via PCRS assignments. These tracking mechanisms have been reviewed for items requiring completion prior to or during power ascension testing. The items requiring completion prior to exceeding 1593 MWth have been completed or will be completed as controlled by this procedure. (EPU)

Comments:


\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

### 6.7.2. Steam Dryer Action Items (EPU)

The commitments and planned actions specified in the EPU license amendment pertaining to the steam dryer required prior to power ascension have been completed. This step shall be completed prior to increasing power above 1593 MWth.

Comments:


Verified By: \_\_\_\_\_  
Licensing Manager/Date

Verified By: \_\_\_\_\_  
EPU Project Manager/Date

## Power Ascension Testing for Extended Power Uprate Conditions

### 6.7.3. Technical Specifications and TRM (OPS)

LCO Tracking Database has been reviewed and evaluated for any impact on the ability of the plant to support power ascension testing and has been found acceptable for power increase. Exceptions requiring action shall be listed below by exception number and shall be annotated in Test Deficiency Log.

Comments:


\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

## 6.8. LOG REVIEWS

### 6.8.1. TEMPORARY ALTERATION (MODIFICATIONS) LOG REVIEW (System Engineering)

6.8.1.1. The Temporary Alteration (Modifications) Log has been reviewed and all installed Temp Alts have been evaluated for their impact on this Power Ascension Test and have been found acceptable. Exceptions requiring action shall be listed in Test Deficiency Log.

Comments:


\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

### 6.8.2. Operability Evaluation/ODMI Log Review: (OPS)

- 6.8.2.1. All Operability Evaluations/ODMIs that have EPU constraints been evaluated for their impact on Power Ascension and have been found acceptable. Exceptions requiring action shall be listed in Test Deficiency Log.

Comments:


Initial	Date	Time

## Power Ascension Testing for Extended Power Uprate Conditions

### 6.9. PROCEDURE REVIEW AND ISSUANCE

6.9.1. The EPU Project has resulted in the completion of many modifications, Technical Specification revisions and system operating parameter changes. These changes affect many Site procedures. This prerequisite requires the responsible Department Head review the procedures under their control and verify that:

- They have reviewed the procedures under their control for minor modifications, design changes, temp modifications, and license amendments.
- Have evaluated the impact of the differences between the Final License amendment and the proposed License amendment on various procedure changes.
- Training of personnel within their department has been completed as required by the revised procedures.
- Procedures required for power ascension have been issued and distributed for plant usage.
- By signing for their respective department procedures, the responsible department head verifies that plant procedures assigned to the department required for power ascension have been revised accordingly.

Functional Group	Dept Head/ Signature Date/Time	Exceptions <sup>1</sup>
Maintenance		
Operations		
Chemistry		
Radiation Protection		
Engineering		
Training		
Emergency Preparedness		
Reactor Engineering		
General Manager		
Licensing		
Safety		
Quality Assurance		
CA&A		

<sup>1</sup> Record exceptions on the Test Deficiency Log and enter the log number on this page.

## **Power Ascension Testing for Extended Power Uprate Conditions**

### **6.10. SER Review**

6.10.1. The NRC Final Safety Evaluation Report and License Amendment have been reviewed against the License Amendment Request and any differences have been evaluated for their affect on;

- Plant Operating Procedures
- Plant Processes and Programs
- This Power Ascension Test Procedure

This evaluation has been completed and there are no additional changes to the documents listed above prior to the start of Power Ascension Testing as performed by this procedure.

#### **Evaluation Comments**

**Comments:**


Verified By: \_\_\_\_\_  
Licensing Manager/Date

Verified By: \_\_\_\_\_  
EPU Project Manager/Date



**Power Ascension Testing for Extended Power Uprate Conditions**

**6.11. EQUIPMENT CLEARANCE ORDERS AND EQUIPMENT STATUS TAGS (OPS)**

6.11.1. The equipment that is Out-of-Service that can affect the ability of the plant to support power ascension testing has had its plant impact reviewed and evaluated and found acceptable for power increase. Exceptions requiring action shall be listed below by exception number and shall be annotated in Test Deficiency Log in accordance with ENN-DC-117.

6.11.2. Review Comments:


Initial	Date	Time

### Power Ascension Testing for Extended Power Uprate Conditions

6.12. Verify the following Instrumentation Prerequisites completed:

6.12.1. ERFIS is available for monitoring test parameters (RE) including:

6.12.1.1. VYOPF 0452.01 2005-037 ERFIS Condensate and Feedwater Pump and Motor Bearing Temperature Setpoint Increase for EPU.

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Initial Date Time

6.12.1.2. VYOPF 0452.01 2005-021, ERFIS F005, C008 Condensate Flow Re-range for EPU

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Initial Date Time

6.12.1.3. VYOPF 0452.01 2005-025, ERFIS Miscellaneous EPU Change

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

6.12.2. TA 2005-0015 Strain Gauges (DE)

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

6.12.3. TM 2003-0035, Feedwater Heater Performance Monitoring (DE)

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

6.12.4. TM 2003-022, FIV Monitoring (DE)

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

### 6.12.5. ER 04-529, EPU Instrument Changes: (I&C)

- 6.12.5.1. 2005E-060 Condensate Pump Motor  
Amp Control Room Indication  
Amber Band (Optional)

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

- 6.12.5.2. 2005C-005 Condensate Pump  
Discharge Pressure Control Room  
Pressure Indication Green Band  
(Optional)

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

- 6.12.5.3. 2004C-023 PT-6-56 Main Turbine  
Bowl Pressure Transmitter

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

- 6.12.5.4. Calibration of FS-6-95 Steam Leak  
Detection

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

- 6.12.5.5. Calibration Data Sheet for FT-102-4-  
1 and FI-102-9 Condensate flow  
input to Oxygen Injection System

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

### 6.13. Administrative Controls:

The signature below signifies that power ascension above 1593 MWth may commence with all issues resolved or otherwise addressed.

#### 6.13.1. Licensing Manager

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Signature / Date / Time

#### 6.13.2. EPU Manager

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Signature / Date / Time

#### 6.13.3. Engineering Director

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Signature / Date / Time

#### 6.13.4. Operations Manager

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Signature / Date / Time

#### 6.13.5. Reactor Engineering Superintendent

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Signature / Date / Time

#### 6.13.6. CA&A Manager

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Signature / Date / Time

#### 6.13.7. Quality Assurance Manager

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Signature / Date / Time

#### 6.13.8. Maintenance Manager

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Signature / Date / Time

## Power Ascension Testing for Extended Power Uprate Conditions

### 6.13.9. Chemistry Manager

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Signature / Date / Time

### 6.13.10. RP Manager

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Signature / Date / Time

### 6.14. All test team members have read and understood:

6.14.1. ERSTI-04-VY1-1409-000, Power  
Ascension Test Procedure for Extended  
Power Conditions 1593 to 1912 MWth

6.14.2. EN-DC-117 Post Modification Testing  
and Special Testing Instructions.

6.14.3. AP 6100 Infrequently Performed Tests or  
Evolutions

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Days Initial Date Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Nights Initial Date Time

## **Power Ascension Testing for Extended Power Uprate Conditions**

### **6.15. PRE-JOB BRIEFS:**

6.15.1. A pre-job brief has been performed per AP 6100 for  
PACC personnel involved on day shift.

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Initial    Date    Time

6.15.2. A pre-job brief has been performed per AP 6100 for  
PACC personnel involved on night shift.

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6.15.3. A pre-job brief has been performed per AP 6100 for  
day shift test team members.

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6.15.4. A pre-job brief has been performed per AP 6100 for  
night shift test team members.

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6.15.5. A pre-job brief has been conducted per AP 6100 for  
Operating Crews

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**Power Ascension Testing for Extended Power Uprate Conditions**

**6.16. Shift Manager's Permission to start:**

**6.16.1. THE SM'S PERMISSION HAS BEEN GRANTED TO  
COMMENCE LICENSE IMPLEMENTATION FOR  
EXTENDED POWER UPRATE.**

\_\_\_\_\_  
Shift Manager/Date /Time

**6.17. OSRC recommends license implementation for  
Extended Power Uprate to the GMPO.**

OSRC Review Meeting #: \_\_\_\_\_

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Initial Date Time

**6.18. The GMPO authorizes implementation of the:**

**6.18.1. The license change per PC 263**

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Initial Date Time

**6.18.2. The remaining prerequisites (Step 6.21)  
listed in this procedure which will  
effectively raised authorized reactor power  
limit to 1912 MWth**

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Initial Date Time

**6.19. Verify that new license has been implemented in the  
control room.**

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Initial Date Time

## **Power Ascension Testing for Extended Power Uprate Conditions**

6.20 Implement the following changes:

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**Power Ascension Testing for Extended Power Uprate Conditions**

6.21.3 Work orders that implement ER 2004-0529,  
Setpoints and Scaling Changes Required by EPU:

6.21.3.1 2005C-001APRM Flow Bias Scram  
(A/M)

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Initial Date Time

6.21.3.2 2005C-002 APRM Flow Bias Rod  
Block (A/M)

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Initial Date Time

6.21.3.3 2005C-003 MSL High Flow M/S in  
RUN

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Initial Date Time

6.21.3.4 2005C-004 MSL High Flow M/S  
Not in Run

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Initial Date Time

6.21. Confirm the following documents are approved  
after the receipt of the NRC License Amendment.

6.21.1. Nuclear Change 04-1493

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Initial Date Time

6.21.2. TRM

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Initial Date Time

6.21.3. Input Assumption Source Document

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Initial Date Time

6.21.4. Calculation VYC-308

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Initial Date Time

**Power Ascension Testing for Extended Power Uprate Conditions**

6.21.5. Calculation VYC-2374

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Initial Date Time

6.21.6. Calculation VYC-2398

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6.21.7. Calculations VYC-2405

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Initial Date Time

6.22. All prerequisites are complete and any exceptions are authorized and approved.

Verified By: \_\_\_\_\_  
Test Engineer/Date/Time

## Power Ascension Testing for Extended Power Uprate Conditions

### 7. Procedure

#### NOTES

- Power levels tolerances are -19 MWth, + 0 MWth.
- Intentional operation greater than the current plateau (1593 MWth, 1673 MWth, 1752 MWth, 1832 MWth and 1912 MWth) is not permitted. The average CTP level over any eight-hour period shall not exceed the current plateau power level. It is permissible to inadvertently exceed current power plateau by as much as 2% (nominal 1912 MWth) for as long as 15 minutes. Lesser power excursions are permitted for longer periods (i.e., 1% excess for 30 minutes, 1/2% for one hour, etc.) as long as the 8 hour average does not exceed the current power plateau. (NRC Letter SSINS-0200, dated 8/22/80).
- Data collection and evaluation at each power level may be performed in any order at that power level unless the section provides different direction.
- IF during the performance of this procedure, testing is stopped for whatever reason, THEN refer to Termination/Hold Criteria, for actions to be taken PRIOR to resuming testing.
- After any change in plant power level above 1593 MWth by the steps in this procedure, an approximate 60-minute stabilization period shall occur prior to recording system and equipment performance data with the exception of dryer data and FIV data. Following the stabilization period and during the data collection period the plant shall be maintained in as stable a condition as is possible (i.e., no backwashing and pre-coating condensate demineralizers, pump swap-over, etc.) until data collection has been completed.
- The Test Engineer with the assistance of the Test Team shall coordinate the review and evaluation of the data package for each step of this procedure for acceptance criteria compliance.

## Power Ascension Testing for Extended Power Uprate Conditions

### 7.1. 1593 MWth

With reactor power at 1574 MWth to 1593 MWth, and with three (3) Feedwater pumps running, perform the following:

- 7.1.1. Verify performed or perform dryer data collection per Attachment 1A.

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- 7.1.2. Verify performed or perform flow induced vibration measurement per Attachment 2A.

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- 7.1.3. Verify performed or request RP to perform Radiation Surveys per Attachment 3.

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- 7.1.4. Verify or request Operations to verify or place the "B" recombiner in service and the "A" recombiner in standby per OP 2150.

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- 7.1.5. Verify performed or request RE to predict anticipated thermal limits for 1673 MWth per Attachment 4.

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- 7.1.6. Verify performed or request Chemistry to obtain baseline offgas samples per OP 2613, Sampling and Analysis of the Off Gas System. Attach per Section 9.0.

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### **Power Ascension Testing for Extended Power Uprate Conditions**

- 7.1.7. Verify performed or request System Engineering to perform the System Engineering System Monitoring Plan baseline data at 1593 MWth and has been included within Attachment 9A.

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

### NOTES:

- EPU power ascension testing above 1593 MWth will be conducted in approximately 40 MWth steps and 80 MWth plateaus.
- The maximum power increase will not exceed a 80 MWth in a 24-hour period.
- Steam Dryer Moisture Carryover Analysis needs to be performed at least once daily when reactor power is greater than 1593 MWth per Attachment 5.

7.1.8. If needed, raise reactor power and maintain 1593 MWth (1574 MWth to 1593 MWth).

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7.1.9. Authorization for Power Ascension:

7.1.9.1. General Manager, Plant Operations permission has been granted to exceed 1593 MWth.

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Initial    Date    Time

7.1.9.2. Shift Manager's permission has been granted to implement power ascension testing.

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

### NOTE:

- Dryer data collection readings (strain gauge and accelerometer data) are to be taken and evaluated every hour during power ascension (16 MWth change in reactor power) and within one hour of achieving the next power plateau per Attachment 1.
- Reactor Power will need to be held constant, (within -19 MWth, +0 MWth) for approximately 2 minutes before and 15 minutes during the dryer data collection per Attachment 1.

### 7.2. Increasing to 1633 MWth

**Allowing no other concurrent intrusive activities, raise reactor power by 40 MWth to 1633 MWth (1614 MWth to 1633 MWth) in accordance with OP 0105, Reactor Operations, as follows:**

#### 7.2.1. While raising reactor power:

- 7.2.1.1. Perform dryer data collection after the first 16 MWth change in reactor power per Attachment 1B at 1609 MWth (1590 MWth to 1609 MWth).

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- 7.2.1.2. Perform dryer data collection after the second 16 MWth change in reactor power per Attachment 1C at 1625 MWth (1606 MWth to 1625 MWth).

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- 7.2.1.3. Perform dryer data collection per Attachment 1D after achieving 1633 MWth (1614 MWth to 1633 MWth).

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

7.2.2. Maintain reactor power (1614 MWth to 1633 MWth) for four hours while performing the following non intrusive activities:

7.2.2.1. Perform flow induced vibration measurement per Attachment 2B. (non intrusive)

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7.2.2.2. Request RE to :

7.2.2.2.1. Verify current reactor conditions are within acceptable values of the power-flow map (COLR figure 2.4-1). (non intrusive)

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7.2.2.2.2. Verify all inputs to the heat balance acceptable by reviewing ERFIS display HBI (Heat Balance Inputs). Attach HBI screen per Section 9.0. (non intrusive)

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7.2.3. One hour after achieving 1633 MWth (1614 MWth to 1633 MWth), perform moisture carryover determination per Attachment 5A. (non intrusive)

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## Power Ascension Testing for Extended Power Uprate Conditions

- 7.2.4. Four hours after achieving 1633 MWth (1614 MWth to 1633 MWth), perform Extraction Steam Reverse Current (RC) Valve Test in accordance with OP 4160 Section B, Extraction Steam Reverse Current Valve Test using VYOPF 4160.07. Hold each RCV test switch for 30 seconds or until a closed (green light) indication is observed. Record whether the valve indicated intermediate or closed. Attach VYOPF 4160.07 per Section 9.0. (Intrusive)

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- 7.2.5. Request Chemistry and RE to evaluate offgas levels for fuel integrity per PP 7401 Fuel Reliability Program and NF 102, Corporate Fuel Reliability. Both parties to sign when complete. (non intrusive)

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- 7.2.6. Request Chemistry to verify the Main Steam Line Radiation Monitor response is within the expected dose range per OP 4617, Calculation of Chemistry Controlling Setpoints or new Setpoint Change has been implemented (non intrusive)

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

### NOTE:

- Dryer data collection readings (strain gauge and accelerometer data) are to be taken and evaluated every hour during power ascension (16 MWth change in reactor power) and within one hour of achieving the next power plateau per Attachment 1.
- Reactor Power will need to be held constant, (within -19 MWth, +0 MWth) for approximately 2 minutes before and 15 minutes during the dryer data collection per Attachment 1.

### 7.3. Increasing to 1673 MWth

**Allowing no other concurrent intrusive activities, raise reactor power by 40 MWth to 1673 MWth (1654 MWth to 1673 MWth) accordance with OP-0105, Reactor Operations, as follows:**

#### 7.3.1. While raising reactor power:

- 7.3.1.1. Perform dryer data collection after the first 16 MWth change in reactor power per Attachment 1E at 1649 MWth (1630 MWth to 1649 MWth).

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- 7.3.1.2. Perform dryer data collection after the second 16 MWth change in reactor power per Attachment 1F at 1665 MWth (1646 MWth to 1665 MWth).

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Initial Date Time

- 7.3.1.3. Perform dryer data collection per Attachment 1G after achieving 1673 MWth (1654 MWth to 1673 MWth).

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

- 7.3.1.4. Notify the test team to complete report preparation that evaluates dryer data (strain gauge results, evaluations, acceptance criteria, etc,) and makes a recommendation to OSRC to continue power ascension.

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Initial    Date    Time

- 7.3.2. Perform flow induced vibration measurement per Attachment 2C. (Non intrusive).

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Initial    Date    Time

- 7.3.3. Maintain reactor power 1654 MWth to 1673 MWth for a total of four hours.

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- 7.3.4. Once each 24 hours:

- 7.3.4.1. Verify moisture carryover per Attachment 5B. (non intrusive)

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- 7.3.4.2. Verify moisture carryover per Attachment 5C. (non intrusive)

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- 7.3.4.3. Verify moisture carryover per Attachment 5D. (non intrusive)

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- 7.3.4.4. Verify moisture carryover for per Attachment 5E. (non intrusive)

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## Power Ascension Testing for Extended Power Uprate Conditions

7.3.5. Once the dryer data has been evaluated and approved by OSRC and the General Manager, Plant Operations, perform the following (non-intrusive):

7.3.5.1. For the transmission of small data files (i.e., < 5 MB), email directly to:

Rick Ennis at [rxen@nrc.gov](mailto:rxen@nrc.gov)  
Jim Shea at [jjs@nrc.gov](mailto:jjs@nrc.gov)  
Jim Devincentis at [jdevinc@entergy.com](mailto:jdevinc@entergy.com)  
Enrico Betti at [ebetti@entergy.com](mailto:ebetti@entergy.com)  
Tom Scarbrough at [tgs@nrc.gov](mailto:tgs@nrc.gov)  
John Wu at [ciw@nrc.gov](mailto:ciw@nrc.gov)  
Kamal Manoly at [kam@nrc.gov](mailto:kam@nrc.gov)

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Initial    Date    Time

7.3.5.2. For the transmission of large data files (i.e., 5 MB or larger), upload to web folder at [www.ibackup.com](http://www.ibackup.com)

Account name:    envydryer  
Password:        Later

and email the following persons the files have been uploaded on [ibackup.com](http://www.ibackup.com):

Rick Ennis at [rxen@nrc.gov](mailto:rxen@nrc.gov)  
Jim Shea at [jjs@nrc.gov](mailto:jjs@nrc.gov)  
Jim Devincentis at [jdevinc@entergy.com](mailto:jdevinc@entergy.com)  
Enrico Betti at [ebetti@entergy.com](mailto:ebetti@entergy.com)  
Tom Scarbrough at [tgs@nrc.gov](mailto:tgs@nrc.gov)  
John Wu at [ciw@nrc.gov](mailto:ciw@nrc.gov)  
Kamal Manoly at [kam@nrc.gov](mailto:kam@nrc.gov)

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

- 7.3.5.3. Confirm receipt via telephone to NRC Project Manager Rick Ennis (or acting NRC Project Manager) at one of the following numbers (start at top and proceed down list until a single contact is made. If Rick Ennis (or acting NRC PM) cannot immediately confirm receipt, ask for call back. Date stamp or other positive acknowledgment of NRC receipt.

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### Contact Order

1. 301-415-1420 (Rick Ennis office)
2. 301-972-8225 (Rick Ennis home)
3. 301-814-5965 (Rick Ennis cellular phone)
4. 301-415-1388 (Jim Shea office)
5. 609-220-0306 (Jim Shea cellular phone)
6. 301-415-0560 (Darrell Roberts office)
7. 301-385-3326 (Darrell Roberts cellular phone)
8. 301-415-1430 (NRC secretary—request contact with Ennis or Shea)
9. 301-415-0550 (NRC Operations Center-request contact Ennis or Shea)
10. 301-816-5100 (NRC Operations Center-request contact Ennis or Shea)

- 7.3.5.4. Once confirmation has been received, record below the start and end time of the 96 hour clock.

Start of 96 hour clock:

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Date / Time

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Initial    Date    Time

End of 96 hour clock:

\_\_\_\_\_  
Date / Time

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Initial    Date    Time

## **Power Ascension Testing for Extended Power Uprate Conditions**

- 7.3.6. Cognizant Engineers to perform walkdowns per Engineering Monitoring Plans, including inspections where practicable based on ALARA and safety reasons, a review of ERFIS indications, local indications, control room indications, etc., for systems (components) affected by EPU. An evaluation needs to be completed for ANY discrepancy noted. Include this documentation within Attachment 9 to this procedure as discussed in Section 9. (non intrusive)

System Engineering Mechanical

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Initial    Date    Time

System Engineering Electrical

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Initial    Date    Time

Programs and Component Engineering  
Plant Programs

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- 7.3.7. Perform feedwater runout data per Attachment 6A and complete the analysis. (non intrusive)

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Initial    Date    Time

- 7.3.8. Perform radiation surveys per Attachment 3. (non intrusive)

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## **Power Ascension Testing for Extended Power Uprate Conditions**

7.3.9. Contact Chemistry to perform the following and include data within Attachment 10A-10D, as appropriate, to this procedure as discussed in Section 9.0. (non intrusive):

7.3.9.1. Monitor and record site boundary dose rates in accordance with Attachment 10.

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7.3.9.2. Perform Reactor Coolant Iodine Activity in accordance with OP 0631, Radiochemistry.

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Initial    Date    Time

7.3.9.3. Perform Reactor Coolant Chloride and Conductivity Analysis in accordance with OP 4612, Sampling and Treatment of the Reactor Water System.

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Initial    Date    Time

7.3.9.4. Perform Reactor Coolant Filterable Solids Analysis per DP 0643, Filterable Solids, Section C.

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7.3.9.5. Perform Reactor Coolant Isotopic (8 hour decay) in accordance with OP 0631, Radiochemistry, Appendix B.

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7.3.9.6. Perform Reactor Coolant 2 liter Metals Sample per DP 0636, Collection and Digestion of Metal Samples.

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## **Power Ascension Testing for Extended Power Uprate Conditions**

- 7.3.9.7. Perform Feedwater Chemistry Analysis (O<sub>2</sub> and conductivity) in accordance with OP 4612, Sampling and Treatment of the Reactor Water System.

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Initial Date Time

- 7.3.9.8. Verify the Main Steam Line Radiation Monitor response is within the expected dose range per OP 4617 Calculation of Chemistry Controlling Setpoints or new Setpoint Change has been implemented.

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## Power Ascension Testing for Extended Power Uprate Conditions

### Note:

VY is one of several GE-designed BWRs which experience recirc bi-stable flow patterns on a periodic basis. With no change in pump speed, these fluctuations can produce step-changes in drive flow, typically ranging from 0.1 mlbs/hr to 0.35 mlbs/hr. Corresponding changes will also occur in jet pump flow, core flow, core power and electrical output, ranging from 0.1% (with short-lived flow changes) to 2% or more (with longer-lived flow changes and/or at core flows greater than 100%).

These fluctuations have been observed at VY and at other facilities with a duration lasting a few seconds to about 1 minute, and at frequencies typically ranging from one to ten occurrences per hour, although up to 200 occurrences per hour have been observed. The magnitude, duration, and frequency of each flow pattern is random and is sensitive to small changes in influencing parameters such as recirc flow rate or pump speed. GE has performed plant-specific safety analyses and has concluded that the occurrence of recirc bi-stable flow is neither a safety concern nor an operability issue.

- 7.3.10. Operations to observe control room indications including ERFIS for bi-stable flow for several minutes. If bi-stable flow is observed, submit a condition report. (non intrusive)

Observed / not observed

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Initial Date Time

- 7.3.11. Run 3-D Monicore Official Case. Perform Core Thermal Limits Verification in accordance with OP 4401. Attach per Section 9.0. (non intrusive)

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## Power Ascension Testing for Extended Power Uprate Conditions

### 7.3.12. Request RE to:

- 7.3.12.1. Verify current reactor conditions are within acceptable values of the power-flow map (COLR figure 2.4-1). (non intrusive)

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- 7.3.12.2. Verify all inputs to the heat balance are acceptable by reviewing ERFIS display HBI (Heat Balance Inputs). Attach HBI screen per Section 9.0. (non intrusive)

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- 7.3.12.3. Verify the ERFIS heat balance (C047) is +/- 3% to other alternate power indications by reviewing the APD display. Attach EFRIS APD screen per Section 9.0. (non intrusive)

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- 7.3.12.4. Submit a 3-D Monicore case and review thermal limits at 1673 MWth. Record and compare them against the predicted values on Attachment 4. Attach the 3-D Monicore case per Section 9.0. Predict anticipated thermal limits for 1752 MWth and record on Attachment 4. (non intrusive)

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### **Power Ascension Testing for Extended Power Uprate Conditions**

- 7.3.12.5. Verify that the Process Computer is using jet pump based core flow and not the core flow based upon the drive flow-core flow relationship. (non intrusive)

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Initial    Date    Time

- 7.3.12.6. After a minimum of 12 hours at this power plateau, save PCIOMR statepoint and compose the envelope per OP 2457, PCIOMR Implementation. (non intrusive)

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**Power Ascension Testing for Extended Power Uprate Conditions**

**7.3.13. Allowing no other concurrent intrusive activities,  
perform feedwater level control testing per  
Attachment 7A. (intrusive)**

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Initial Date Time

**7.3.14. Allowing no other concurrent intrusive activities,  
perform MHC demonstration per Attachment  
8A. (intrusive)**

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Initial Date Time

**7.3.15. Perform Recombiner Performance Monitoring per  
Attachment 11A. (non intrusive)**

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**7.3.16. Request Chemistry and RE to evaluate offgas levels  
for fuel integrity per PP 7401 Fuel Reliability  
Program and NF 102, Corporate Fuel Reliability.  
Both parties to sign when complete. (non intrusive)**

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Initial Date Time

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Initial Date Time

**7.3.17. Complete a report to be presented at OSRC used as  
a basis to recommend to the General Manager, Plant  
Operations, to continue the power ascension. (non  
intrusive)**

OSRC Review Meeting #: \_\_\_\_\_

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## **Power Ascension Testing for Extended Power Uprate Conditions**

### **7.3.18. Authorization for Power Ascension**

The results of testing and data collection performed at the last power level plateau have been analyzed and presented to the General Manager, Plant Operations, and approval to proceed has been obtained. (Non intrusive)

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

7.3.19. After 96 hours from the time NRC NRR received the dryer data and evaluation submittal and with no objections from NRC NRR, then call the NRC Project Manager Rick Ennis (or acting NRC Project Manager) at one of the following numbers (start at top and proceed down list until a single contact is made) and inform the NRC that VY is continuing with the power ascension. (non intrusive)

7.3.19.1. If Rick Ennis (or acting NRC PM) cannot immediately confirm receipt, ask for call back. Date stamp or other positive acknowledgment of NRC receipt.

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Initial    Date    Time

### Contact Order

1. 301-415-1420 (Rick Ennis office)
2. 301-972-8225 (Rick Ennis home)
3. 301-814-5965 (Rick Ennis cellular phone)
4. 301-415-1388 (Jim Shea office)
5. 609-220-0306 (Jim Shea cellular phone)
6. 301-415-0560 (Darrell Roberts office)
7. 301-385-3326 (Darrell Roberts cellular phone)
8. 301-415-1430 (NRC secretary—request contact with Ennis or Shea)
9. 301-415-0550 (NRC Operations Center-request contact Ennis or Shea)
10. 301-816-5100 (NRC Operations Center-request contact Ennis or Shea)

7.3.19.2. Email the following individuals to inform them VY is continuing with the power ascension. Attach email per step 9.

Rick Ennis at [rxen@nrc.gov](mailto:rxen@nrc.gov)  
Jim Shea at [jjs@nrc.gov](mailto:jjs@nrc.gov)  
Jim Devincentis at [jdevinc@entergy.com](mailto:jdevinc@entergy.com)  
Enrico Betti at [ebetti@entergy.com](mailto:ebetti@entergy.com)  
Tom Scarbrough at [tgs@nrc.gov](mailto:tgs@nrc.gov)  
John Wu at [ciw@nrc.gov](mailto:ciw@nrc.gov)  
Kamal Manoly at [kam@nrc.gov](mailto:kam@nrc.gov)

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Initial    Date    Time

**Power Ascension Testing for Extended Power Uprate Conditions**

7.3.19.3. Continue with the power ascension.

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Initial Date Time

Licensing: \_\_\_\_\_/  
(Print/Sign) (Date)

## Power Ascension Testing for Extended Power Uprate Conditions

### NOTE:

- Dryer data collection readings (strain gauge and accelerometer data) are to be taken and evaluated every hour during power ascension (16 MWth change in reactor power) and within one hour of achieving the next power plateau per Attachment 1.
- Reactor Power will need to be held constant, (within -19 MWth, +0 MWth) for approximately 2 minutes before and 15 minutes during the dryer data collection per Attachment 1.

#### 7.4. Increasing to 1712 MWth

**Allowing no other concurrent intrusive activities, raise reactor power by 40 MWth to 1712 MWth (1693 MWth to 1712 MWth) in accordance with OP 0105, Reactor Operations, as follows:**

##### 7.4.1. While raising reactor power:

- 7.4.1.1. Perform dryer data collection after the first 16 MWth change in reactor power per Attachment 1H at 1689 MWth (1670 MWth to 1689 MWth).

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Initial Date Time

- 7.4.1.2. Perform dryer data collection after the second 16 MWth change in reactor power per Attachment 1I at 1705 MWth (1686 MWth to 1705 MWth).

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Initial Date Time

- 7.4.1.3. Perform dryer data collection per Attachment 1J after achieving 1712 MWth (1693 MWth to 1712 MWth).

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Initial Date Time



## Power Ascension Testing for Extended Power Uprate Conditions

7.4.2. Maintain reactor power 1712 MWth (1693 MWth to 1712 MWth) for four hours while performing the following non intrusive activities:

7.4.2.1. Perform flow induced vibration measurement per Attachment 2D. (non intrusive)

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Initial Date Time

7.4.2.2. Request RE to :

7.4.2.2.1. Verify current reactor conditions are within acceptable values of the power-flow map (COLR figure 2.4-1). (non intrusive)

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Initial Date Time

7.4.2.2.2. Verify all inputs to the heat balance acceptable by reviewing ERFIS display HBI (Heat Balance Inputs). Attach HBI screen per Section 9.0. (non intrusive)

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Initial Date Time

7.4.3. One hour after achieving 1712 MWth (1693 MWth to 1712 MWth), perform moisture carryover determination per Attachment 5F. (non intrusive)

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## Power Ascension Testing for Extended Power Uprate Conditions

- 7.4.4. Four hours after achieving 1712 MWth (1693 MWth to 1712 MWth), perform Extraction Steam Reverse Current (RC) Valve Test in accordance with OP 4160 Section B, Extraction Steam Reverse Current Valve Test using VYOPF 4160.07. Hold each RCV test switch for 30 seconds or until a closed (green light) indication is observed. Record whether the valve indicated intermediate or closed. Attach VYOPF 4160.07 per Section 9.0. (Intrusive)

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Initial    Date    Time

- 7.4.5. Request Chemistry and RE to evaluate offgas levels for fuel integrity per PP 7401 Fuel Reliability Program and NF 102, Corporate Fuel Reliability. Both parties to sign when complete. (non intrusive)

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Initial    Date    Time

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Initial    Date    Time

- 7.4.6. Request Chemistry to verify the Main Steam Line Radiation Monitor response is within the expected dose range per OP 4617, Calculation of Chemistry Controlling Setpoints or new Setpoint Change has been implemented (non intrusive)

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Initial    Date    Time

NOTE:

- Dryer data collection readings (strain gauge and accelerometer data) are to be taken and evaluated every hour during power ascension (16 MWth change in reactor power) and within one hour of achieving the next power plateau per Attachment 1.
- Reactor Power will need to be held constant, (within -19 MWth, +0 MWth) for approximately 2 minutes before and 15 minutes during the dryer data collection per Attachment 1.

7.5. Increasing to 1752 MWth

**Allowing no other concurrent intrusive activities, raise reactor power by 40 MWth to 1752 MWth (1733 MWth to 1752 MWth) per hour in accordance with OP-0105, Reactor Operations, as follows:**

7.5.1. While raising reactor power:

- 7.5.1.1. Perform dryer data collection after the first 16 MWth change in reactor power per Attachment 1K at 1728 MWth (1709 MWth to 1728 MWth).

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- 7.5.1.2. Perform dryer data collection after the second 16 MWth change in reactor power per Attachment 1L at 1744 MWth (1725 MWth to 1744 MWth).

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Initial Date Time

- 7.5.1.3. Perform dryer data collection per Attachment 1M after achieving 1752 MWth (1733 MWth to 1752 MWth).

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### **Power Ascension Testing for Extended Power Uprate Conditions**

- 7.5.1.4. Notify the test team to complete report preparation that evaluates dryer data (strain gauge results, evaluations, acceptance criteria, etc.) and makes a recommendation to OSRC to continue power ascension.

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- 7.5.2. Perform flow induced vibration measurement per Attachment 2E. (Non intrusive).

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Initial Date Time

- 7.5.3. Maintain reactor power after achieving 1752 MWth (1733 MWth to 1752 MWth) for a total of four hours.

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

7.5.4. Once each 24 hours:

7.5.4.1. Verify moisture carryover per  
Attachment 5G. (non intrusive)

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Initial    Date    Time

7.5.4.2. Verify moisture carryover per  
Attachment 5H. (non intrusive)

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Initial    Date    Time

7.5.4.3. Verify moisture carryover per  
Attachment 5I. (non intrusive)

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7.5.4.4. Verify moisture carryover for per  
Attachment 5J. (non intrusive)

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Initial    Date    Time

## **Power Ascension Testing for Extended Power Uprate Conditions**

7.5.5. Once the dryer data has been evaluated and approved by OSRC and the General Manager, Plant Operations, perform the following (non-intrusive):

7.5.5.1. For the transmission of small data files (i.e., < 5 MB), email directly to:

Rick Ennis at [rxen@nrc.gov](mailto:rxen@nrc.gov)  
Jim Shea at [jjs@nrc.gov](mailto:jjs@nrc.gov)  
Jim Devincentis at [jdevinc@entergy.com](mailto:jdevinc@entergy.com)  
Enrico Betti at [ebetti@entergy.com](mailto:ebetti@entergy.com)  
Tom Scarbrough at [tgs@nrc.gov](mailto:tgs@nrc.gov)  
John Wu at [ciw@nrc.gov](mailto:ciw@nrc.gov)  
Kamal Manoly at [kam@nrc.gov](mailto:kam@nrc.gov)

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Initial    Date    Time

7.5.5.2. For the transmission of large data files (i.e., 5 MB or larger), upload to web folder at [www.ibackup.com](http://www.ibackup.com)

Account name:    envydryer  
Password:        Later

and email the following persons the files have been uploaded on [ibackup.com](http://www.ibackup.com):

Rick Ennis at [rxen@nrc.gov](mailto:rxen@nrc.gov)  
Jim Shea at [jjs@nrc.gov](mailto:jjs@nrc.gov)  
Jim Devincentis at [jdevinc@entergy.com](mailto:jdevinc@entergy.com)  
Enrico Betti at [ebetti@entergy.com](mailto:ebetti@entergy.com)  
Tom Scarbrough at [tgs@nrc.gov](mailto:tgs@nrc.gov)  
John Wu at [ciw@nrc.gov](mailto:ciw@nrc.gov)  
Kamal Manoly at [kam@nrc.gov](mailto:kam@nrc.gov)

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

- 7.5.5.3. Confirm receipt via telephone to NRC Project Manager Rick Ennis (or acting NRC Project Manager) at one of the following numbers (start at top and proceed down list until a single contact is made. If Rick Ennis (or acting NRC PM) cannot immediately confirm receipt, ask for call back. Date stamp or other positive acknowledgment of NRC receipt.

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Initial    Date    Time

### Contact Order

1. 301-415-1420 (Rick Ennis office)
2. 301-972-8225 (Rick Ennis home)
3. 301-814-5965 (Rick Ennis cellular phone)
4. 301-415-1388 (Jim Shea office)
5. 609-220-0306 (Jim Shea cellular phone)
6. 301-415-0560 (Darrell Roberts office)
7. 301-385-3326 (Darrell Roberts cellular phone)
8. 301-415-1430 (NRC secretary—request contact with Ennis or Shea)
9. 301-415-0550 (NRC Operations Center-request contact Ennis or Shea)
10. 301-816-5100 (NRC Operations Center-request contact Ennis or Shea)

- 7.5.5.4. Once confirmation has been received, record below the start and end time of the 96 hour clock.

Start of 96 hour clock:

\_\_\_\_\_  
Date / Time

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Initial    Date    Time

End of 96 hour clock:

\_\_\_\_\_  
Date / Time

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

- 7.5.6. Cognizant Engineers to perform walkdowns per the Engineering Monitoring Plans, including inspections where practicable based on ALARA and safety reasons, a review of ERFIS indications, local indications, control room indications, etc., for systems (components) affected by EPU. An evaluation needs to be completed for ANY discrepancy noted. Include this documentation within Attachment 9 to this procedure as discussed in Section 9. (non intrusive)

System Engineering Mechanical

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Initial Date Time

System Engineering Electrical

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Initial Date Time

Programs and Component Engineering  
Plant Programs

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- 7.5.7. Perform feedwater runout data per Attachment 6B and complete the analysis. (non intrusive)

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Initial Date Time

- 7.5.8. Perform radiation surveys per Attachment 3. (non intrusive)

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## Power Ascension Testing for Extended Power Uprate Conditions

7.5.9. Contact Chemistry to perform the following and include data within Attachment 10A-10D, as appropriate, to this procedure as discussed in Section 9.0. (non intrusive):

7.5.9.1. Monitor and record site boundary dose rates in accordance with Attachment 10.

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7.5.9.2. Perform Reactor Coolant Iodine Activity in accordance with OP 0631, Radiochemistry.

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Initial Date Time

7.5.9.3. Perform Reactor Coolant Chloride and Conductivity Analysis in accordance with OP 4612, Sampling and Treatment of the Reactor Water System.

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Initial Date Time

7.5.9.4. Perform Reactor Coolant Filterable Solids Analysis per DP 0643, Filterable Solids, Section C.

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Initial Date Time

7.5.9.5. Perform Reactor Coolant Isotopic (8 hour decay) in accordance with OP 0631, Radiochemistry, Appendix B.

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Initial Date Time

7.5.9.6. Perform Reactor Coolant 2 liter Metals Sample per DP 0636, Collection and Digestion of Metal Samples.

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

- 7.5.9.7. Perform Feedwater Chemistry Analysis (O<sub>2</sub> and conductivity) in accordance with OP 4612, Sampling and Treatment of the Reactor Water System.

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Initial Date Time

- 7.5.9.8. Verify the Main Steam Line Radiation Monitor response is within the expected dose range per OP 4617 Calculation of Chemistry Controlling Setpoints or new Setpoint Change has been implemented.

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

### Note:

VY is one of several GE-designed BWRs which experience recirc bi-stable flow patterns on a periodic basis. With no change in pump speed, these fluctuations can produce step-changes in drive flow, typically ranging from 0.1 mlbs/hr to 0.35 mlbs/hr. Corresponding changes will also occur in jet pump flow, core flow, core power and electrical output, ranging from 0.1% (with short-lived flow changes) to 2% or more (with longer-lived flow changes and/or at core flows greater than 100%).

These fluctuations have been observed at VY and at other facilities with a duration lasting a few seconds to about 1 minute, and at frequencies typically ranging from one to ten occurrences per hour, although up to 200 occurrences per hour have been observed. The magnitude, duration, and frequency of each flow pattern is random and is sensitive to small changes in influencing parameters such as recirc flow rate or pump speed. GE has performed plant-specific safety analyses and has concluded that the occurrence of recirc bi-stable flow is neither a safety concern nor an operability issue.

- 7.5.10. Operations observe control room indications including ERFIS for bi-stable flow for several minutes. If bi-stable flow is observed, submit a condition report. (non intrusive)

Observed / not observed

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Initial Date Time

- 7.5.11. Run 3-D Monicore Official Case. Perform Core Thermal Limits Verification in accordance with OP 4401. Attach per Section 9.0. (non intrusive)

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## Power Ascension Testing for Extended Power Uprate Conditions

### 7.5.12. Request RE to:

- 7.5.12.1. Verify current reactor conditions are within acceptable values of the power-flow map (COLR figure 2.4-1). (non intrusive)

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- 7.5.12.2. Verify all inputs to the heat balance are acceptable by reviewing ERFIS display HBI (Heat Balance Inputs). Attach HBI screen per Section 9.0. (non intrusive)

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- 7.5.12.3. Verify the ERFIS heat balance (C047) is +/- 3% to other alternate power indications by reviewing the APD display. Attach EFRIS APD screen per Section 9.0. (non intrusive)

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- 7.5.12.4. Submit a 3-D Monicore case and review thermal limits at 1752 MWth. Record and compare them against the predicted values on Attachment 4. Attach the 3-D Monicore case per Section 9.0. Predict anticipated thermal limits for 1832 MWth and record on Attachment 4. (non intrusive)

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## **Power Ascension Testing for Extended Power Uprate Conditions**

- 7.5.12.5. Verify that the Process Computer is using jet pump based core flow and not the core flow based upon the drive flow-core flow relationship. (non intrusive)

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- 7.5.12.6. After a minimum of 12 hours at this power plateau, save PCIOMR statepoint and compose the envelope per OP 2457, PCIOMR Implementation. (non intrusive)

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- 7.5.13. Allowing no other concurrent intrusive activities, perform feedwater level control testing per Attachment 7B. (intrusive)**

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- 7.5.14. Allowing no other concurrent intrusive activities, perform MHC demonstration per Attachment 8B. (intrusive)**

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**Power Ascension Testing for Extended Power Uprate Conditions**

7.5.15. Perform Recombiner Performance Monitoring per Attachment 11B. (non intrusive)

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7.5.16. Request Chemistry and RE to evaluate offgas levels for fuel integrity per PP 7401 Fuel Reliability Program and NF 102, Corporate Fuel Reliability. Both parties to sign when complete. (non intrusive)

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7.5.17. Complete a report to be presented at OSRC used as a basis to recommend to the General Manager, Plant Operations, to continue the power ascension. (non intrusive)

OSRC Review Meeting #: \_\_\_\_\_

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7.5.18. Authorization for Power Ascension

The results of testing and data collection performed at the last power level plateau have been analyzed and presented to the General Manager, Plant Operations, and approval to proceed has been obtained. (Non intrusive)

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## Power Ascension Testing for Extended Power Uprate Conditions

7.5.19. After 96 hours from the time NRC NRR received the dryer data and evaluation submittal and with no objections from NRC NRR, then call the NRC Project Manager Rick Ennis (or acting NRC Project Manager) at one of the following numbers (start at top and proceed down list until a single contact is made) and inform the NRC that VY is continuing with the power ascension. (non intrusive)

7.5.19.1. If Rick Ennis (or acting NRC PM) cannot immediately confirm receipt, ask for call back. Date stamp or other positive acknowledgment of NRC receipt.

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Initial    Date    Time

### Contact Order

1. 301-415-1420 (Rick Ennis office)
2. 301-972-8225 (Rick Ennis home)
3. 301-814-5965 (Rick Ennis cellular phone)
4. 301-415-1388 (Jim Shea office)
5. 609-220-0306 (Jim Shea cellular phone)
6. 301-415-0560 (Darrell Roberts office)
7. 301-385-3326 (Darrell Roberts cellular phone)
8. 301-415-1430 (NRC secretary—request contact with Ennis or Shea)
9. 301-415-0550 (NRC Operations Center-request contact Ennis or Shea)
10. 301-816-5100 (NRC Operations Center-request contact Ennis or Shea)

7.5.19.2. Email the following individuals to inform them VY is continuing with the power ascension. Attach email per step 9.

Rick Ennis at [rxen@nrc.gov](mailto:rxen@nrc.gov)  
Jim Shea at [jjs@nrc.gov](mailto:jjs@nrc.gov)  
Jim Devincentis at [jdevinc@entergy.com](mailto:jdevinc@entergy.com)  
Enrico Betti at [ebetti@entergy.com](mailto:ebetti@entergy.com)  
Tom Scarbrough at [tgs@nrc.gov](mailto:tgs@nrc.gov)  
John Wu at [ciw@nrc.gov](mailto:ciw@nrc.gov)  
Kamal Manoly at [kam@nrc.gov](mailto:kam@nrc.gov)

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Initial    Date    Time

**Power Ascension Testing for Extended Power Uprate Conditions**

7.5.19.3. Continue with the power ascension.

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Initial    Date    Time

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                    (Print/Sign)                      (Date)



## Power Ascension Testing for Extended Power Uprate Conditions

### NOTE:

- Dryer data collection readings (strain gauge and accelerometer data) are to be taken and evaluated every hour during power ascension (16 MWth change in reactor power) and within one hour of achieving the next power plateau per Attachment 1.
- Reactor Power will need to be held constant, (within -19 MWth, +0 MWth) for approximately 2 minutes before and 15 minutes during the dryer data collection per Attachment 1.

### 7.6. Increasing to 1792 MWth

**Allowing no other concurrent intrusive activities, raise reactor power by 40 MWth to 1792 MWth (1773 MWth to 1792 MWth) in accordance with OP 0105, Reactor Operations, as follows:**

#### 7.6.1. While raising reactor power:

- 7.6.1.1. Perform dryer data collection after the first 16 MWth change in reactor power per Attachment 1N at 1768 MWth (1749 MWth to 1768 MWth).

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- 7.6.1.2. Perform dryer data collection after the second 16 MWth change in reactor power per Attachment 1O at 1784 MWth (1765 MWth to 1784 MWth).

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- 7.6.1.3. Perform dryer data collection per Attachment 1P after achieving 1792 MWth (1773 MWth to 1792 MWth).

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## Power Ascension Testing for Extended Power Uprate Conditions

7.6.2. Maintain reactor power 1792 MWth (1773 MWth to 1792 MWth) for four hours while performing the following non intrusive activities:

7.6.2.1. Perform flow induced vibration measurement per Attachment 2F. (non intrusive)

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Initial Date Time

7.6.2.2. Request RE to :

7.6.2.2.1. Verify current reactor conditions are within acceptable values of the power-flow map (COLR figure 2.4-1). (non intrusive)

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7.6.2.2.2. Verify all inputs to the heat balance acceptable by reviewing ERFIS display HBI (Heat Balance Inputs). Attach HBI screen per Section 9.0. (non intrusive)

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Initial Date Time

7.6.3. One hour after achieving 1792 MWth (1773 MWth to 1792 MWth), perform moisture carryover determination per Attachment 5K. (non intrusive)

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## Power Ascension Testing for Extended Power Uprate Conditions

- 7.6.4. Four hours after achieving 1792 MWth (1773 MWth to 1792 MWth), perform Extraction Steam Reverse Current (RC) Valve Test in accordance with OP 4160 Section B, Extraction Steam Reverse Current Valve Test using VYOPF 4160.07. Hold each RCV test switch for 30 seconds or until a closed (green light) indication is observed. Record whether the valve indicated intermediate or closed. Attach VYOPF 4160.07 per Section 9.0. (Intrusive)

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- 7.6.5. Request Chemistry and RE to evaluate offgas levels for fuel integrity per PP 7401 Fuel Reliability Program and NF 102, Corporate Fuel Reliability. Both parties to sign when complete. (non intrusive)

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Initial    Date    Time

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Initial    Date    Time

- 7.6.6. Request Chemistry to verify the Main Steam Line Radiation Monitor response is within the expected dose range per OP 4617, Calculation of Chemistry Controlling Setpoints or new Setpoint Change has been implemented (non intrusive)

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

### NOTE:

- Dryer data collection readings (strain gauge and accelerometer data) are to be taken and evaluated every hour during power ascension (16 MWth change in reactor power) and within one hour of achieving the next power plateau per Attachment 1.
- Reactor Power will need to be held constant, (within -19 MWth, +0 MWth) for approximately 2 minutes before and 15 minutes during the dryer data collection per Attachment 1.

### 7.7. Increasing to 1832 MWth

**Allowing no other concurrent intrusive activities, raise reactor power by 40 MWth to 1832 MWth (1813 MWth to 1832 MWth) in accordance with OP-0105, Reactor Operations, as follows:**

#### 7.7.1. While raising reactor power:

- 7.7.1.1. Perform dryer data collection after the first 16 MWth change in reactor power per Attachment 1Q at 1808 MWth (1789 MWth to 1808 MWth).

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Initial    Date    Time

- 7.7.1.2. Perform dryer data collection after the second 16 MWth change in reactor power per Attachment 1R at 1824 MWth (1805 MWth to 1824 MWth).

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Initial    Date    Time

- 7.7.1.3. Perform dryer data collection per Attachment 1S after achieving 1832 MWth (1813 MWth to 1832 MWth).

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

- 7.7.1.4. Notify the test team to complete report preparation that evaluates dryer data (strain gauge results, evaluations, acceptance criteria, etc.) and makes a recommendation to OSRC to continue power ascension.

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- 7.7.2. Perform flow induced vibration measurement per Attachment 2G. (Non intrusive).

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Initial Date Time

- 7.7.3. Maintain reactor power 1832 MWth (1813 MWth to 1832 MWth) for a total of four hours.

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Initial Date Time

- 7.7.4. Once each 24 hours:

- 7.7.4.1. Verify moisture carryover per Attachment 5L. (non intrusive)

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Initial Date Time

- 7.7.4.2. Verify moisture carryover per Attachment 5M. (non intrusive)

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Initial Date Time

- 7.7.4.3. Verify moisture carryover per Attachment 5N. (non intrusive)

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Initial Date Time

- 7.7.4.4. Verify moisture carryover for per Attachment 5O. (non intrusive)

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

7.7.5. Once the dryer data has been evaluated and approved by OSRC and the General Manager, Plant Operations, perform the following (non-intrusive):

7.7.5.1. For the transmission of small data files (i.e., < 5 MB), email directly to:

Rick Ennis at [rxen@nrc.gov](mailto:rxen@nrc.gov)  
Jim Shea at [jjs@nrc.gov](mailto:jjs@nrc.gov)  
Jim Devincentis at [jdevinc@entergy.com](mailto:jdevinc@entergy.com)  
Enrico Betti at [ebetti@entergy.com](mailto:ebetti@entergy.com)  
Tom Scarbrough at [tgs@nrc.gov](mailto:tgs@nrc.gov)  
John Wu at [ciw@nrc.gov](mailto:ciw@nrc.gov)  
Kamal Manoly at [kam@nrc.gov](mailto:kam@nrc.gov)

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Initial    Date    Time

7.7.5.2. For the transmission of large data files (i.e., 5 MB or larger), upload to web folder at [www.ibackup.com](http://www.ibackup.com)

Account name:    envydryer  
Password:        Later

and email the following persons the files have been uploaded on [ibackup.com](http://ibackup.com):

Rick Ennis at [rxen@nrc.gov](mailto:rxen@nrc.gov)  
Jim Shea at [jjs@nrc.gov](mailto:jjs@nrc.gov)  
Jim Devincentis at [jdevinc@entergy.com](mailto:jdevinc@entergy.com)  
Enrico Betti at [ebetti@entergy.com](mailto:ebetti@entergy.com)  
Tom Scarbrough at [tgs@nrc.gov](mailto:tgs@nrc.gov)  
John Wu at [ciw@nrc.gov](mailto:ciw@nrc.gov)  
Kamal Manoly at [kam@nrc.gov](mailto:kam@nrc.gov)

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## Power Ascension Testing for Extended Power Uprate Conditions

- 7.7.5.3. Confirm receipt via telephone to NRC Project Manager Rick Ennis (or acting NRC Project Manager) at one of the following numbers (start at top and proceed down list until a single contact is made. If Rick Ennis (or acting NRC PM) cannot immediately confirm receipt, ask for call back. Date stamp or other positive acknowledgment of NRC receipt.

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Initial    Date    Time

### Contact Order

1. 301-415-1420 (Rick Ennis office)
2. 301-972-8225 (Rick Ennis home)
3. 301-814-5965 (Rick Ennis cellular phone)
4. 301-415-1388 (Jim Shea office)
5. 609-220-0306 (Jim Shea cellular phone)
6. 301-415-0560 (Darrell Roberts office)
7. 301-385-3326 (Darrell Roberts cellular phone)
8. 301-415-1430 (NRC secretary—request contact with Ennis or Shea)
9. 301-415-0550 (NRC Operations Center-request contact Ennis or Shea)
10. 301-816-5100 (NRC Operations Center-request contact Ennis or Shea)

- 7.7.5.4. Once confirmation has been received, record below the start and end time of the 96 hour clock.

Start of 96 hour clock:

\_\_\_\_\_  
Date / Time

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Initial    Date    Time

End of 96 hour clock:

\_\_\_\_\_  
Date / Time

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

- 7.7.6. Cognizant Engineers to perform walkdowns per the Engineering Monitoring Plans, including inspections where practicable based on ALARA and safety reasons, a review of ERFIS indications, local indications, control room indications, etc., for systems (components) affected by EPU. An evaluation needs to be completed for ANY discrepancy noted. Include this documentation within Attachment 9 to this procedure as discussed in Section 9. (non intrusive)

System Engineering Mechanical

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Initial    Date    Time

System Engineering Electrical

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Initial    Date    Time

Programs and Component Engineering  
Plant Programs

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- 7.7.7. Perform feedwater runout data per Attachment 6C and complete the analysis. (non intrusive)

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Initial    Date    Time

- 7.7.8. Perform radiation surveys per Attachment 3. (non intrusive)

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Initial    Date    Time



## Power Ascension Testing for Extended Power Uprate Conditions

7.7.9. Contact Chemistry to perform the following and include data within Attachment 10A-10D, as appropriate, to this procedure as discussed in Section 9.0. (non intrusive):

7.7.9.1. Monitor and record site boundary dose rates in accordance with Attachment 10.

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Initial Date Time

7.7.9.2. Perform Reactor Coolant Iodine Activity in accordance with OP 0631, Radiochemistry.

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Initial Date Time

7.7.9.3. Perform Reactor Coolant Chloride and Conductivity Analysis in accordance with OP 4612, Sampling and Treatment of the Reactor Water System.

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Initial Date Time

7.7.9.4. Perform Reactor Coolant Filterable Solids Analysis per DP 0643, Filterable Solids, Section C.

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Initial Date Time

7.7.9.5. Perform Reactor Coolant Isotopic (8 hour decay) in accordance with OP 0631, Radiochemistry, Appendix B.

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Initial Date Time

7.7.9.6. Perform Reactor Coolant 2 liter Metals Sample per DP 0636, Collection and Digestion of Metal Samples.

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

- 7.7.9.7. Perform Feedwater Chemistry Analysis (O<sub>2</sub> and conductivity) in accordance with OP 4612, Sampling and Treatment of the Reactor Water System.

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Initial Date Time

- 7.7.9.8. Verify the Main Steam Line Radiation Monitor response is within the expected dose range per OP 4617 Calculation of Chemistry Controlling Setpoints or new Setpoint Change has been implemented.

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

### Note:

VY is one of several GE-designed BWRs which experience recirc bi-stable flow patterns on a periodic basis. With no change in pump speed, these fluctuations can produce step-changes in drive flow, typically ranging from 0.1 mlbs/hr to 0.35 mlbs/hr. Corresponding changes will also occur in jet pump flow, core flow, core power and electrical output, ranging from 0.1% (with short-lived flow changes) to 2% or more (with longer-lived flow changes and/or at core flows greater than 100%).

These fluctuations have been observed at VY and at other facilities with a duration lasting a few seconds to about 1 minute, and at frequencies typically ranging from one to ten occurrences per hour, although up to 200 occurrences per hour have been observed. The magnitude, duration, and frequency of each flow pattern is random and is sensitive to small changes in influencing parameters such as recirc flow rate or pump speed. GE has performed plant-specific safety analyses and has concluded that the occurrence of recirc bi-stable flow is neither a safety concern nor an operability issue.

- 7.7.10. Operations observe control room indications including ERFIS for bi-stable flow for several minutes. If bi-stable flow is observed, submit a condition report. (non intrusive)

Observed / not observed

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Initial Date Time

- 7.7.11. Run 3-D Monicore Official Case. Perform Core Thermal Limits Verification in accordance with OP 4401. Attach per Section 9.0. (non intrusive)

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

### 7.7.12. Request RE to:

- 7.7.12.1. Verify current reactor conditions are within acceptable values of the power-flow map (COLR figure 2.4-1). (non intrusive)

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- 7.7.12.2. Verify all inputs to the heat balance are acceptable by reviewing ERFIS display HBI (Heat Balance Inputs). Attach HBI screen per Section 9.0. (non intrusive)

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- 7.7.12.3. Verify the ERFIS heat balance (C047) is +/- 3% to other alternate power indications by reviewing the APD display. Attach EFRIS APD screen per Section 9.0. (non intrusive)

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Initial Date Time

- 7.7.12.4. Submit a 3-D Monicore case and review thermal limits at 1832 MWth. Record and compare them against the predicted values on Attachment 4. Attach the 3-D Monicore case per Section 9.0. Predict anticipated thermal limits for 1912 MWth and record on Attachment 4. (non intrusive)

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

- 7.7.12.5. Verify that the Process Computer is using jet pump based core flow and not the core flow based upon the drive flow-core flow relationship. (non intrusive)

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Initial Date Time

- 7.7.12.6. After a minimum of 12 hours at this power plateau, save PCIOMR statepoint and compose the envelope per OP 2457, PCIOMR Implementation. (non intrusive)

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Initial Date Time

**Power Ascension Testing for Extended Power Uprate Conditions**

- 7.7.13. Allowing no other concurrent intrusive activities, perform feedwater level control testing per Attachment 7C. (intrusive)**

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Initial    Date    Time

- 7.7.14. Allowing no other concurrent intrusive activities, perform MHC demonstration per Attachment 8C. (intrusive)**

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Initial    Date    Time

- 7.7.15. Perform Recombiner Performance Monitoring per Attachment 11C. (non intrusive)**

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Initial    Date    Time

- 7.7.16. Request Chemistry and RE to evaluate offgas levels for fuel integrity per PP 7401 Fuel Reliability Program and NF 102, Corporate Fuel Reliability. Both parties to sign when complete. (non intrusive)**

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Initial    Date    Time

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Initial    Date    Time

- 7.7.17. Complete a report to be presented at OSRC used as a basis to recommend to the General Manager, Plant Operations, to continue the power ascension. (non intrusive)**

OSRC Review Meeting #: \_\_\_\_\_

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Initial    Date    Time

## **Power Ascension Testing for Extended Power Uprate Conditions**

### **7.7.18. Authorization for Power Ascension**

The results of testing and data collection performed at the last power level plateau have been analyzed and presented to the General Manager, Plant Operations, and approval to proceed has been obtained. (Non intrusive)

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## Power Ascension Testing for Extended Power Uprate Conditions

7.7.19. After 96 hours from the time NRC NRR received the dryer data and evaluation submittal and with no objections from NRC NRR, then call the NRC Project Manager Rick Ennis (or acting NRC Project Manager) at one of the following numbers (start at top and proceed down list until a single contact is made) and inform the NRC that VY is continuing with the power ascension. (non intrusive)

7.7.19.1. If Rick Ennis (or acting NRC PM) cannot immediately confirm receipt, ask for call back. Date stamp or other positive acknowledgment of NRC receipt.

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Initial    Date    Time

### Contact Order

1. 301-415-1420 (Rick Ennis office)
2. 301-972-8225 (Rick Ennis home)
3. 301-814-5965 (Rick Ennis cellular phone)
4. 301-415-1388 (Jim Shea office)
5. 609-220-0306 (Jim Shea cellular phone)
6. 301-415-0560 (Darrell Roberts office)
7. 301-385-3326 (Darrell Roberts cellular phone)
8. 301-415-1430 (NRC secretary—request contact with Ennis or Shea)
9. 301-415-0550 (NRC Operations Center-request contact Ennis or Shea)
10. 301-816-5100 (NRC Operations Center-request contact Ennis or Shea)

7.7.19.2. Email the following individuals to inform them VY is continuing with the power ascension. Attach email per step 9.

Rick Ennis at [rxen@nrc.gov](mailto:rxen@nrc.gov)  
Jim Shea at [jjs@nrc.gov](mailto:jjs@nrc.gov)  
Jim Devincentis at [jdevinc@entergy.com](mailto:jdevinc@entergy.com)  
Enrico Betti at [ebetti@entergy.com](mailto:ebetti@entergy.com)  
Tom Scarbrough at [tgs@nrc.gov](mailto:tgs@nrc.gov)  
John Wu at [ciw@nrc.gov](mailto:ciw@nrc.gov)  
Kamal Manoly at [kam@nrc.gov](mailto:kam@nrc.gov)

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Initial    Date    Time



**Power Ascension Testing for Extended Power Uprate Conditions**

7.7.19.3. Continue with the power ascension.

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Initial    Date    Time

Licensing: \_\_\_\_\_/  
                    (Print/Sign)                      (Date)

## Power Ascension Testing for Extended Power Uprate Conditions

### NOTE:

- Dryer data collection readings (strain gauge and accelerometer data) are to be taken and evaluated every hour during power ascension (16 MWth change in reactor power) and within one hour of achieving the next power plateau per Attachment 1.
- Reactor Power will need to be held constant, (within -19 MWth, +0 MWth) for approximately 2 minutes before and 15 minutes during the dryer data collection per Attachment 1.

### 7.8. Increasing to 1872 MWth

**Allowing no other concurrent intrusive activities, raise reactor power by 40 MWth to 1872 MWth (1853 MWth to 1872 MWth) in accordance with OP 0105, Reactor Operations, as follows:**

#### 7.8.1. While raising reactor power:

- 7.8.1.1. Perform dryer data collection after the first 16 MWth change in reactor power per Attachment 1T at 1848 MWth (1829 MWth to 1848 MWth).

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- 7.8.1.2. Perform dryer data collection after the second 16 MWth change in reactor power per Attachment 1U at 1864 MWth (1845 MWth to 1864 MWth).

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- 7.8.1.3. Perform dryer data collection per Attachment 1V after achieving 1872 MWth (1853 MWth to 1872 MWth).

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## Power Ascension Testing for Extended Power Uprate Conditions

7.8.2. Maintain reactor power 1872 MWth (1853 MWth to 1872 MWth) for four hours while performing the following non intrusive activities:

7.8.2.1. Perform flow induced vibration measurement per Attachment 2H. (non intrusive)

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7.8.2.2. Request RE to :

7.8.2.2.1. Verify current reactor conditions are within acceptable values of the power-flow map (COLR figure 2.4-1). (non intrusive)

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7.8.2.2.2. Verify all inputs to the heat balance acceptable by reviewing ERFIS display HBI (Heat Balance Inputs). Attach HBI screen per Section 9.0. (non intrusive)

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Initial Date Time

7.8.3. One hour after achieving 1872 MWth (1853 MWth to 1872 MWth), perform moisture carryover determination per Attachment 5P. (non intrusive)

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## Power Ascension Testing for Extended Power Uprate Conditions

- 7.8.4. Four hours after achieving 1872 MWth (1853 MWth to 1872 MWth), perform Extraction Steam Reverse Current (RC) Valve Test in accordance with OP 4160 Section B, Extraction Steam Reverse Current Valve Test using VYOPF 4160.07. Hold each RCV test switch for 30 seconds or until a closed (green light) indication is observed. Record whether the valve indicated intermediate or closed. Attach VYOPF 4160.07 per Section 9.0. (Intrusive)

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Initial    Date    Time

- 7.8.5. Request Chemistry and RE to evaluate offgas levels for fuel integrity per PP 7401 Fuel Reliability Program and NF 102, Corporate Fuel Reliability. Both parties to sign when complete. (non intrusive)

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Initial    Date    Time

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Initial    Date    Time

- 7.8.6. Request Chemistry to verify the Main Steam Line Radiation Monitor response is within the expected dose range per OP 4617, Calculation of Chemistry Controlling Setpoints or new Setpoint Change has been implemented (non intrusive)

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

### NOTE:

- Dryer data collection readings (strain gauge and accelerometer data) are to be taken and evaluated every hour during power ascension (16 MWth change in reactor power) and within one hour of achieving the next power plateau per Attachment 1.
- Reactor Power will need to be held constant, (within -19 MWth, +0 MWth) for approximately 2 minutes before and 15 minutes during the dryer data collection per Attachment 1.

### 7.9. Increasing to 1912 MWth

**Allowing no other concurrent intrusive activities, raise reactor power by 40 MWth to 1912 MWth (1893 MWth to 1912 MWth) in accordance with OP-0105, Reactor Operations, as follows:**

#### 7.9.1. While raising reactor power:

- 7.9.1.1. Perform dryer data collection after the first 16 MWth change in reactor power per Attachment 1W at 1888 MWth (1869 MWth to 1888 MWth).

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- 7.9.1.2. Perform dryer data collection after the second 16 MWth change in reactor power per Attachment 1X at 1904 MWth (1885 MWth to 1904 MWth).

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Initial Date Time

- 7.9.1.3. Perform dryer data collection per Attachment 1Y after achieving 1912 MWth (1893 MWth to 1912 MWth).

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Initial Date Time

### **Power Ascension Testing for Extended Power Uprate Conditions**

- 7.9.1.4. Notify the test team to complete report preparation that evaluates dryer data (strain gauge results, evaluations, acceptance criteria, etc,) and makes a recommendation to OSRC to continue power ascension.

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- 7.9.2. Perform flow induced vibration measurement per Attachment 2I. (Non intrusive).

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- 7.9.3. Maintain reactor power 1912 MWth (1893 MWth to 1912 MWth) for a total of four hours.

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## Power Ascension Testing for Extended Power Uprate Conditions

7.9.4. Once each 24 hours:

7.9.4.1. Verify moisture carryover per  
Attachment 5Q. (non intrusive)

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Initial    Date    Time

7.9.4.2. Verify moisture carryover per  
Attachment 5R. (non intrusive)

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Initial    Date    Time

7.9.4.3. Verify moisture carryover per  
Attachment 5S. (non intrusive)

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Initial    Date    Time

7.9.4.4. Verify moisture carryover for per  
Attachment 5T. (non intrusive)

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

- 7.9.5. Cognizant Engineers to perform walkdowns per the Engineering Monitoring Plans, including inspections where practicable based on ALARA and safety reasons, a review of ERFIS indications, local indications, control room indications, etc., for systems (components) affected by EPU. An evaluation needs to be completed for ANY discrepancy noted. Include this documentation within Attachment 9 to this procedure as discussed in Section 9. (non intrusive)

System Engineering Mechanical

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Initial    Date    Time

System Engineering Electrical

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Initial    Date    Time

Programs and Component Engineering  
Plant Programs

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- 7.9.6. Perform feedwater runout data per Attachment 6D and complete the analysis. (non intrusive)

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Initial    Date    Time

- 7.9.7. Perform radiation surveys per Attachment 3. (non intrusive)

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Initial    Date    Time



## Power Ascension Testing for Extended Power Uprate Conditions

7.9.8. Contact Chemistry to perform the following and include data within Attachment 10A-10D, as appropriate, to this procedure as discussed in Section 9.0. (non intrusive):

7.9.8.1. Monitor and record site boundary dose rates in accordance with Attachment 10.

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Initial Date Time

7.9.8.2. Perform Reactor Coolant Iodine Activity in accordance with OP 0631, Radiochemistry.

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Initial Date Time

7.9.8.3. Perform Reactor Coolant Chloride and Conductivity Analysis in accordance with OP 4612, Sampling and Treatment of the Reactor Water System.

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Initial Date Time

7.9.8.4. Perform Reactor Coolant Filterable Solids Analysis per DP 0643, Filterable Solids, Section C.

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Initial Date Time

7.9.8.5. Perform Reactor Coolant Isotopic (8 hour decay) in accordance with OP 0631, Radiochemistry, Appendix B.

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Initial Date Time

7.9.8.6. Perform Reactor Coolant 2 liter Metals Sample per DP 0636, Collection and Digestion of Metal Samples.

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Initial Date Time

### **Power Ascension Testing for Extended Power Uprate Conditions**

- 7.9.8.7. Perform Feedwater Chemistry Analysis (O<sub>2</sub> and conductivity) in accordance with OP 4612, Sampling and Treatment of the Reactor Water System.

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Initial Date Time

- 7.9.8.8. Verify the Main Steam Line Radiation Monitor response is within the expected dose range per OP 4617 Calculation of Chemistry Controlling Setpoints or new Setpoint Change has been implemented.

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

### Note:

VY is one of several GE-designed BWRs which experience recirc bi-stable flow patterns on a periodic basis. With no change in pump speed, these fluctuations can produce step-changes in drive flow, typically ranging from 0.1 mlbs/hr to 0.35 mlbs/hr. Corresponding changes will also occur in jet pump flow, core flow, core power and electrical output, ranging from 0.1% (with short-lived flow changes) to 2% or more (with longer-lived flow changes and/or at core flows greater than 100%).

These fluctuations have been observed at VY and at other facilities with a duration lasting a few seconds to about 1 minute, and at frequencies typically ranging from one to ten occurrences per hour, although up to 200 occurrences per hour have been observed. The magnitude, duration, and frequency of each flow pattern is random and is sensitive to small changes in influencing parameters such as recirc flow rate or pump speed. GE has performed plant-specific safety analyses and has concluded that the occurrence of recirc bi-stable flow is neither a safety concern nor an operability issue.

- 7.9.9. Operations observe control room indications including ERFIS for bi-stable flow for several minutes. If bi-stable flow is observed, submit a condition report. (non intrusive)

Observed / not observed

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Initial Date Time

- 7.9.10. Run 3-D Monicore Official Case. Perform Core Thermal Limits Verification in accordance with OP 4401. Attach per Section 9.0. (non intrusive)

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Initial Date Time

## Power Ascension Testing for Extended Power Uprate Conditions

### 7.9.11. Request RE to:

- 7.9.11.1. Verify current reactor conditions are within acceptable values of the power-flow map (COLR figure 2.4-1). (non intrusive)

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- 7.9.11.2. Verify all inputs to the heat balance are acceptable by reviewing ERFIS display HBI (Heat Balance Inputs). Attach HBI screen per Section 9.0. (non intrusive)

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- 7.9.11.3. Verify the ERFIS heat balance (C047) is +/- 3% to other alternate power indications by reviewing the APD display. Attach EFRIS APD screen per Section 9.0. (non intrusive)

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Initial    Date    Time

- 7.9.11.4. Submit a 3-D Monicore case and review thermal limits at 1912 MWth. Record and compare them against the predicted values on Attachment 4. Attach the 3-D Monicore case per Section 9.0. (non intrusive)

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

- 7.9.11.5. Verify that the Process Computer is using jet pump based core flow and not the core flow based upon the drive flow-core flow relationship. (non intrusive)

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

- 7.9.11.6. After a minimum of 12 hours at this power plateau, save PCIOMR statepoint and compose the envelope per OP 2457, PCIOMR Implementation. (non intrusive)

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

**Power Ascension Testing for Extended Power Uprate Conditions**

- 7.9.12. Allowing no other concurrent intrusive activities, perform feedwater level control testing per Attachment 7D. (intrusive)**

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

- 7.9.13. Allowing no other concurrent intrusive activities, perform MHC demonstration per Attachment 8D. (intrusive)**

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Initial    Date    Time

- 7.9.14. Perform Recombiner Performance Monitoring per Attachment 11D. (non intrusive)**

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Initial    Date    Time

- 7.9.15. Request Chemistry and RE to evaluate offgas levels for fuel integrity per PP 7401 Fuel Reliability Program and NF 102, Corporate Fuel Reliability. Both parties to sign when complete. (non intrusive)**

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Initial    Date    Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

- 7.9.16. Complete a report to be presented at OSRC used as a basis to recommend to the General Manager, Plant Operations, to remain at 1912 MWth. (non intrusive)**

OSRC Review Meeting #: \_\_\_\_\_

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

### 7.10. Remaining at 1912 MWth

#### 7.10.1. Authorization to remain at 1912 MWth.

The results of testing and data collection performed at the last power level plateau have been analyzed and presented to the General Manager, Plant Operations, and approval to remain at 1912 MWth been obtained. (Non intrusive)

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

GMPO: \_\_\_\_\_/\_\_\_\_\_  
                    (Print/Sign)                      (Date)

#### 7.10.2. Prior to exceeding 168 hours of plant operation at the nominal full EPU reactor power level, with feedwater and condensate flow rates stabilized at approximately the EPU full power level, confirm through performance of transient testing that the loss of one condensate pump will not result in a complete loss of reactor feedwater. (intrusive)

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

#### 7.10.3. Test Complete.

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Initial    Date    Time

## Power Ascension Testing for Extended Power Uprate Conditions

### 8. Restoration

- 8.1. Perform an "End of Evolution" critique. Capture lessons learned

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

### 9. Attachments

#### Attachment Index Sheet Instructions:

This procedure requires that "data packages" and other performance monitoring data collection be attached to this procedure. Known attachments have been identified. For additional attachments, select the next sequential attachment number and record the attachment number in this index, with the document title, number of pages and associated procedure step and on the attached document. Indicate the consecutive page number and total attachment pages at the bottom of each page.

Verified By: \_\_\_\_\_  
Test Engineer/Date

- 1A Dryer Data Collection 1593 MWth
- 1B Dryer Data Collection 1609 MWth
- 1C Dryer Data Collection 1625 MWth
- 1D Dryer Data Collection 1633 MWth
- 1E Dryer Data Collection 1649 MWth
- 1F Dryer Data Collection 1665 MWth
- 1G Dryer Data Collection 1673 MWth
- 1H Dryer Data Collection 1689 MWth
- 1I Dryer Data Collection 1705 MWth
- 1J Dryer Data Collection 1712 MWth
- 1K Dryer Data Collection 1728 MWth
- 1L Dryer Data Collection 1744 MWth
- 1M Dryer Data Collection 1752 MWth
- 1N Dryer Data Collection 1768 MWth
- 1O Dryer Data Collection 1784 MWth
- 1P Dryer Data Collection 1792 MWth
- 1Q Dryer Data Collection 1808 MWth
- 1R Dryer Data Collection 1824 MWth
- 1S Dryer Data Collection 1832 MWth



## **Power Ascension Testing for Extended Power Uprate Conditions**

1T Dryer Data Collection 1848 MWth  
1U Dryer Data Collection 1864 MWth  
1V Dryer Data Collection 1872 MWth  
1W Dryer Data Collection 1888 MWth  
1X Dryer Data Collection 1904 MWth  
1Y Dryer Data Collection 1912 MWth  
2A Flow Induced Vibration Data 1593 MWth  
2B Flow Induced Vibration Data 1633 MWth  
2C Flow Induced Vibration Data 1673 MWth  
2D Flow Induced Vibration Data 1712 MWth  
2E Flow Induced Vibration Data 1752 MWth  
2F Flow Induced Vibration Data 1792 MWth  
2G Flow Induced Vibration Data 1832 MWth  
2H Flow Induced Vibration Data 1872 MWth  
2I Flow Induced Vibration Data 1912 MWth  
3 Radiation Surveys  
4 Core Performance Data Sheet various MWth  
5A Moisture Carryover 1633 MWth  
5B Moisture Carryover 1673 MWth  
5C Moisture Carryover 1673 MWth  
5D Moisture Carryover 1673 MWth  
5E Moisture Carryover 1673 MWth  
5F Moisture Carryover 1712 MWth  
5G Moisture Carryover 1752 MWth  
5H Moisture Carryover 1752 MWth  
5I Moisture Carryover 1752 MWth  
5J Moisture Carryover 1752 MWth  
5K Moisture Carryover 1792 MWth  
5L Moisture Carryover 1832 MWth  
5M Moisture Carryover 1832 MWth  
5N Moisture Carryover 1832 MWth  
5O Moisture Carryover 1832 MWth  
5P Moisture Carryover 1872 MWth  
5Q Moisture Carryover 1912 MWth  
5R Moisture Carryover 1912 MWth  
5S Moisture Carryover 1912 MWth  
5T Moisture Carryover 1912 MWth  
6A Feedwater Runout Data Collection 1673 MWth  
6B Feedwater Runout Data Collection 1752 MWth  
6C Feedwater Runout Data Collection 1832 MWth  
6D Feedwater Runout Data Collection 1912 MWth  
7A Feedwater Level Changes 1673 MWth  
7B Feedwater Level Changes 1752 MWth

## **Power Ascension Testing for Extended Power Uprate Conditions**

- 7C Feedwater Level Changes 1832 MWth
- 7D Feedwater Level Changes 1912 MWth
- 8A MHC Pressure Change 1673 MWth
- 8B MHC Pressure Change 1752 MWth
- 8C MHC Pressure Change 1832 MWth
- 8D MHC Pressure Change 1912 MWth
- 9A System Data 1593 MWth
- 9B System Data 1673 MWth
- 9C System Data 1572 MWth
- 9D System Data 1832 MWth
- 9E System Data 1912 MWth
- 10 Site Boundary Dose Measurements Various MWth
- 10A Chemistry Data 1673 MWth
- 10B Chemistry Data 1572 MWth
- 10C Chemistry Data 1832 MWth
- 10D Chemistry Data 1912 MWth
- 11A Recombiner Performance Data 1673 MWth
- 11B Recombiner Performance Data 1752 MWth
- 11C Recombiner Performance Data 1832 MWth
- 11D Recombiner Performance Data 1912 MWth
- 12 Signature Identification Log
- 13 Test Deficiency Log
- 14 Performance Summary
- 15 ENN-LI-100 Process Applicability Determination
- 16 ENN-LI-101, 10.59 Screen
- 17 Risk Management Worksheet VYAPF 0172.02

Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

NOTES:

- Additional data collection may be performed at other power levels as directed by the Test Coordinator.
- Strain gauges and accelerometers are assumed to be installed and tested via the work order process. The NI Data Acquisition Computer (NIDAC) and NI Hardware in the Reactor Building is on and operational. It is preferred that this system is controlled and monitored via a PC work station from outside the RCA.
- Reactor Power, steam flow, and recirc flow needs to be held steady, (within -19 MWth, +0 MWth) for approximately 2 minutes before and 15 minutes during the data collection at each test step. The data shall be recorded and evaluated within one hour of reaching each power step.
- The strain gauge and accelerometer surveillance shall be performed hourly when increasing power above a level at which data was previously obtained. Operations shall identify windows during power ascension when steam flow is approximately steady state for the hourly data collection.
- The process of increasing power from one step to the next level should be (but is not required) accomplished within one hour, including time to collect and evaluate data. If the step increase (including collection and evaluation of data) cannot be accomplished in one hour, then the collection and evaluation process should be repeated hourly until such time as the step increase is achieved.
- For each data collection Strain Gauges are calibrated and nulled. Then there are two sets of data collected; each set approximately 40 seconds in length. The first set will include bridge excitation to produce/measure signal and noise. This will be followed by a second set with zero bridge excitation. This second set of data is used to identify recirc power electrical noise and AC power electrical noise from the strain signal.
- The data is then processed and plotted by Steam Dryer Engineer within the hour. Engineering shall provide plots, a written summary of data changes. Engineering shall assess the margin to the limit curve, assess the rate of change in sequential data, and provide a recommendation whether power ascension should continue. The MSL accelerometer data shall also be compared with strain gauge data. Engineering shall assess whether accelerometer data provides evidence that there are acoustic frequencies not identified by the SG data.

Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

1.0 Test team to monitor the following ERFIS points:

- B064 Main Steam Line Flow A
- B065 Main Steam Line Flow B
- B066 Main Steam Line Flow C
- B067 Main Steam Line Flow D
- B022 Total Steam Line Flow
- C047 Core Thermal Power
- M134 Recirc Pump A Speed
- M135 Recirc Pump B Speed
- 3DMA015 Recirc Pump A Flow
- 3DMA018 Recirc Pump B Flow

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

2.0 Confirm that NI Data Acquisition Computer (NIDAC) and NI Hardware on 252' elevation of the Reactor Building are on and operational.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

3.0 Confirm that the Steam Dryer Engineer is prepared to acquire and process data

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

4.0 When the plant is at steady state power, confirm with the Steam Dryer Engineer to collect and evaluate strain gauge and accelerometer data.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

- 5.0 Confirm the with the reactor building data recorder station, and the Main Steam line strain gauge data collection, was successful. Record time and date below:

Time and date: \_\_\_\_\_

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

- 6.0 Confirm with the Steam Dryer Engineer the data evaluation has been completed within one hour of collecting the strain gauge and accelerometer data. Record date and time of data evaluation completion.

Date and time evaluation complete: \_\_\_\_\_

Determine time for evaluation: \_\_\_\_\_

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

- 7.0 IF valid strain gauge and accelerometer data cannot be recorded and evaluated hourly or within one hour of initially reaching a 80 MWth power step from at least three of the four main steam lines,

THEN an orderly power reduction shall be made to a lower power level at which data had previously been obtained. Any such power level reduction shall be completed within two hours of determining that valid data was not recorded.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

8.0 Evaluation:

8.1 IF the conditions of Table 1 can not be met,

8.1.1 THEN an orderly power reduction shall be made to a lower power level at which data had previously been obtained. Any such power level reduction shall be completed within two hours of determining that valid data was not recorded.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Verified Date Time

Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

8.2 If the Level 2 performance criteria is exceeded based on Table 2, THEN

8.2.1 Promptly suspend reactor power ascension until an engineering evaluation concludes that further power ascension is justified.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Verified Date Time

8.2.2 Initiate a condition report.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Verified Date Time

8.2.3 Evaluate the cause of any exceedance of the performance criteria.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Verified Date Time

8.2.4 Before resuming reactor power ascension, the steam dryer performance data shall be reviewed as part of an engineering evaluation to assess whether further power ascension can be made without exceeding the Level 1 criteria.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Verified Date Time

8.2.5 Obtain GMPO permission to continue the power ascension.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Verified Date Time

Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

8.3 If the Level 1 performance criteria is exceeded based on Table 2, THEN:

8.3.1 Promptly initiate a reactor power reduction to a previously acceptable power level (i.e., reduce power to a previous step level) within two hours, unless an engineering evaluation concludes that continued power operation or power ascension is acceptable.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Verified Date Time

8.3.2 Initiate a condition report.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Verified Date Time

8.3.3 Evaluate the cause of any exceedance of the performance criteria.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Verified Date Time

8.3.4 If the results of the engineering evaluation support continued power operation, reduce further power ascension step and plateau levels to nominal increases of 20 MWth and 40 MWth respectively, for any additional power ascension.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Verified Date Time



Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

- 8.3.5 Within 30 days, the transient pressure data shall be used to calculate the steam dryer fatigue usage to demonstrate that continued power operation is acceptable.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Verified Date Time

- 8.3.6 Obtain GMPO permission to continue the power ascension.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Verified Date Time

Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

8.4 IF any frequency peak from the MSL strain gage data exceeds the limit curve established by Entergy Nuclear Operations, Inc. and submitted to the NRC staff prior to operation above OLTP,

8.4.1 THEN reduce reactor power to where the limit curve was not exceeded. Engineering shall resolve the uncertainties in the steam dryer analysis, document the continued structural integrity of the steam dryer, and provide that documentation to the NRC staff by facsimile or electronic transmission to the NRC project manager prior to further increases in reactor power.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Verified Date Time

8.5 IF resonance frequencies are identified as increasing above nominal levels in proportion to strain gage instrumentation data,

8.5.1 THEN hold reactor power, and document the continued structural integrity of the steam dryer, and provide that documentation to the NRC staff by facsimile or electronic transmission to the NRC project manager prior to further increases in reactor power.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Verified Date Time

Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

8.6 IF the acoustic signals are identified that challenge the limit curve during power ascension above OLTP,

8.6.1 THEN Engineering to evaluate dryer loads and re-establish the limit curve based on the new strain gage data, and shall perform a frequency-specific assessment of ACM uncertainty at the acoustic signal frequency.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Verified Date Time

8.7 IF an engineering evaluation is required in accordance with the Steam Dryer Monitoring Plan,

8.7.1 THEN Entergy Nuclear Operations, Inc. shall perform the structural analysis to address frequency uncertainties up to +/- 10% and assure that peak responses that fall within this uncertainty band are addressed.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Verified Date Time

8.8 If the Level 1 or Level 2 performance criteria are NOT exceeded based on Table 2,

8.8.1 THEN recommend to OSRC that power ascension testing should continue.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial Date Time

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Verified Date Time

Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

**Table 1**

<b>Parameter</b>	<b>Surveillance Frequency</b>
1. Main steam line pressure data from strain gauges	Hourly when initially increasing power above a previously attained power level. -AND- At least once at every 40 MWth power step above 1593 MWth (Note 1)
2. Main steam piping accelerometer data from accelerometers in drywell	At least once at every 40 MWth LPU power step above 1593 MWth (Note 1) -AND- Within one hour after achieving every 40 MWth power step above 1593 MWth.

Notes to Table 1:

1. The strain gauge and accelerometer surveillance shall be performed hourly when increasing power above a level at which data was previously obtained. The surveillance of both the strain gauge data and accelerometer data is also required to be performed once at each 40 MWth power step above 1593 MWth and within one hour of achieving each 40 MWth step in power. If the surveillance is met at a given power level, additional surveillances do not need to be performed at that power level where data had previously been obtained.

If valid strain gauge data cannot be recorded hourly or within one hour of initially reaching a 40 MWth power step from at least three of the four main steam lines, an orderly power reduction shall be made to a lower power level at which data had previously been obtained. Any such power level reduction shall be completed within two hours of determining that valid data was not recorded.

Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

**Table 2**

Performance Criteria Not to be Exceeded	Required Actions if Performance Criteria Exceeded and Required Completion Times
<p><u>Level 2:</u></p> <ul style="list-style-type: none"> <li>Pressure data exceed Level 2 Spectra<sup>1</sup> per VYC-3001.</li> </ul>	<ol style="list-style-type: none"> <li>Promptly suspend reactor power ascension until an engineering evaluation concludes that further power ascension is justified.</li> <li>Before resuming reactor power ascension, the steam dryer performance data shall be reviewed as part of an engineering evaluation to assess whether further power ascension can be made without exceeding the Level 1 criteria.</li> </ol>
<p><u>Level 1:</u></p> <ul style="list-style-type: none"> <li>Pressure data exceed Level 1 Spectra<sup>1</sup> per VYC-3001.</li> </ul>	<ol style="list-style-type: none"> <li>Promptly initiate a reactor power reduction and achieve a previously acceptable power level (i.e., reduce power to a previous step level) within two hours, unless an engineering evaluation concludes that continued power operation or power ascension is acceptable.</li> <li>If the results of the engineering evaluation support continued power operation, reduce further power ascension step and plateau levels to nominal increases of 20 MWth and 40 MWth respectively, for any additional power ascension.</li> <li>Within 30 days, the transient pressure data shall be used to calculate the steam dryer fatigue usage to demonstrate that continued power operation is acceptable.</li> </ol>

<sup>1</sup> The EPU spectra shall be determined and documented in an engineering calculation or report. Acceptable Level 2 spectra shall be based on maintaining  $\leq 80\%$  of the ASME allowable alternating stress ( $S_a$ ) value at  $\leq 10^{11}$  cycles (i.e.,  $\leq 10.88$  ksi). Acceptable Level 1 Spectra shall be based on maintaining the ASME  $S_a$  at  $\leq 10^{11}$  cycles (i.e.,  $\leq 13.6$  ksi).

Attachment 1A  
Dryer Data Collection  
1593 MWth (1574 MWth to 1593 MWth)

Reactor power operation that results in Steam pressures that are less than the Level 2 performance criteria in Table 2 is representative of fully acceptable steam dryer performance.

Attachment 2A  
Flow Induced Vibration Data Collection  
At 1593 MWth (1574 MWth to 1593 MWth)

DRYWELL AREA			
<u>Accel No./Dir.</u>	<u>Measured Acceleration (g)</u>	<u>Acceptance Criteria (g)</u>	<u>Sat / Unsat</u>
MSA1 N-S		≤0.545	
MSA2 Vert		≤0.230	
MSA3 E-W		≤0.326	
MSB1 N-S		≤0.274	
MSB2 E-W		≤0.160	
MSB3 N-S		≤0.269	
MSB4 Vert		≤0.133	
MSB5 E-W		≤0.248	
MSB6 N-S		≤0.259	
MSB7 E-W		≤0.202	
MSB8 N-S		≤0.271	
MSB9 Vert		≤0.286	
MSB10 E-W		≤0.263	
MSC1 N-S		≤0.264	
MSC2 Vert		≤0.193	
MSC3 E-W		≤0.170	
MSD1 N-S		≤0.271	
MSD2 Vert		≤0.254	
MSD3 E-W		≤0.193	
MSD4 N-S		≤0.271	
MSD5 E-W		≤0.293	
FDWA1 N-S		≤0.123	
FDWA2 Vert		≤0.184	
FDWA3 E-W		≤0.068	
FDWB1 N-S		≤0.172	
FDWB2 Vert		≤0.198	
FDWB3 E-W		≤0.084	
FDWB4 N-S		≤0.184	
FDWB5 E-W		≤0.185	
FDWB6 N-S		≤0.162	
FDWB7 E-W		≤0.144	

Attachment 2A  
Flow Induced Vibration Data Collection  
At 1593 MWth (1574 MWth to 1593 MWth)

HEATER BAY AREA			
<u>Accel No./Dir.</u>	<u>Measured Acceleration (g)</u>	<u>Acceptance Criteria (g)</u>	Sat / Unsat
MSHB1 N-S		$\leq 0.057$	
MSHB2 E-W		$\leq 0.047$	
MSHB3 N-S		$\leq 0.048$	
MSHB4 E-W		$\leq 0.058$	
FDWHB1 N-S		$\leq 0.103$	
FDWHB2 Vert		$\leq 0.162$	
FDWHB3 E-W		$\leq 0.076$	

Performed by: \_\_\_\_\_  
Sign/Date (Design Engineering)

Verified by: \_\_\_\_\_  
Sign/Date (Design Engineering)

Note: Any UNSAT indication requires a Condition Report and an Engineering Evaluation. Request Operations to lower reactor power to the last tested power level.



Attachment 2A  
Flow Induced Vibration Data Collection  
At 1593 MWth (1574 MWth to 1593 MWth)

Turbine Building Branch Piping Vibration Acceptance Criteria				SRSS (g)	Acceptance Criteria mils	Sat Unsat
Valve(s) ID#	Measured Displacement mils (g) N-S	Measured Displacement mils (g) E-W	Measured displacement mils (g) Vertical			
V64-63B & V64-124					≤34	
V64-63A & V64-120					≤28	
V66-12E					≤44	
V64-127					≤6	
V63-812A & B					≤27	
V63-814A & B					≤26	
V63-808C, D					≤15	
V64-16A					≤4	
V64-16B					≤4	
V64-16C					≤4	

$$SRSS = \text{SQRT} [(N-S \text{ mils})^2 + (E-W)^2 + (\text{vertical}^2)]$$

Note: Any UNSAT indication requires a Condition Report and an Engineering Evaluation. Request Operations to lower reactor power to the last tested power level.

Performed by: \_\_\_\_\_  
Sign/Date (Design Engineering)

Verified by: \_\_\_\_\_  
Sign/Date (Design Engineering)

Attachment 2A  
Flow Induced Vibration Data Collection  
At 1593 MWth (1574 MWth to 1593 MWth)

Turbine Building FW Piping (FW Pump Room)  
Vibration Acceptance Criteria

Peak to Peak Displacements (mils)							
Location	N-S		Vertical		E-W		Sat/ Unsat
	Meas.	Accep. Crit.	Meas.	Accep. Crit.	Meas.	Accep. Crit.	
Pipe Support H-35		≤27.5		≤25.6		≤59.4	
FCV-6-12A		≤31.6		≤170.7		≤104.7	
FCV-6-12B		≤20.5		≤11.3		≤32.6	

Performed by: \_\_\_\_\_  
Sign/Date (Design Engineering)

Verified by: \_\_\_\_\_  
Sign/Date (Design Engineering)

Acceptance Criteria Met: \_\_\_\_\_  
Sign/Date (Design Engineering)

Note: Any UNSAT condition requires a Condition Report and an Engineering Evaluation. Request Operations to lower reactor power level to the last tested power level.

Attachment 2A  
Flow Induced Vibration Data Collection  
At 1593 MWth (1574 MWth to 1593 MWth)

FIV Walkdowns  
Heater Bay, Condensate and Feedwater Pump Rooms

Plant Location	Vibration Level Observation		
	Sat/Unsat	Sign/Date	Comments*
Condensate Pump Room Piping	_____	_____/____	_____
Feedwater Pump Room Piping	_____	_____/____	_____
Heater Bay Piping Systems:			_____
Condensate Piping	_____	_____/____	_____
Feedwater Piping	_____	_____/____	_____
Main Steam Piping	_____	_____/____	_____
MS Low Point Drains	_____	_____/____	_____
Extraction Steam	_____	_____/____	_____
Heater Drains	_____	_____/____	_____
Feedwater Heater Level Control	_____	_____/____	_____
Miscellaneous Remaining Systems	_____	_____/____	_____

Attachment 2A  
Flow Induced Vibration Data Collection  
At 1593 MWth (1574 MWth to 1593 MWth)

Acceptance Criteria:

Piping: For main piping, if the level of vibration is too small to be perceived, and the possibility of fatigue issues is judged to be minimal, the piping system is acceptable. Any observed vibration levels piping judged by walkdown personnel to be a potential concern will be monitored utilizing hand-held vibration meters and evaluated.

System/Components: Baseline inspections of systems and components were performed at OLTP (documented in Calculation VYC-2330). Results of EPU power ascension testing inspections/walkdowns will be compared to baseline inspection results to determine if acceptability is maintained.

Any UNSAT condition requires a Condition Report and an Engineering Evaluation. Request Operations to lower reactor power level to the last tested power level.

Performed by: \_\_\_\_\_  
Sign/Date (Design Engineering)

Verified by: \_\_\_\_\_  
Sign/Date (Design Engineering)

Acceptance Criteria Met \_\_\_\_\_  
Sign/Date (Design Engineering)

Record instruments used and calibration due dates:


\*Add additional pages as needed.

Attachment 5A  
Moisture Carryover  
1633 MWth (1614 MWth to 1633 MWth)

**CAUTIONS**

- Any of the following may be indications of vessel internals damage and potential debris generation (loose parts). (SIL 644 Revision 1)
  - Main Steam Line steam flow indication imbalance of 5% or more. (B064, B065, B066, B067)
  - RPV water level difference >3 inches step change between level instruments from different reference legs. (B040, B041, B047 versus B021, B042, B043)
  - Sudden drop ( $\leq 1$  minute) in steam dome pressure of >2 psig. (B048, B049)
  - Statistically significant step increase of moisture carryover >50% of previous value (per OP 0631, Radiochemistry, Appendix F)
  - Unexpected trends in parameter values that may be indicative of loss of steam dryer integrity, particularly unexplained changes in trends.

1.0 Monitor the following ERFIS points;

- B021 REACTOR WATER LEVEL 72A
- B040 REACTOR WATER LEVEL 72B
- B048 REACTOR PRESSURE 56B
- B049 REACTOR PRESSURE 56A
- B022 MAIN STEAM FLOW
- B064 MAIN STEAM LINE A FLOW
- B065 MAIN STEAM LINE B FLOW
- B066 MAIN STEAM LINE C FLOW

Attachment 5A  
Moisture Carryover  
1633 MWth (1614 MWth to 1633 MWth)

- B067      MAIN STEAM LINE D FLOW
- M084      RX A UPPER REF LEG TEMP
- M085      RX A LOWER REF LEG TEMP
- M086      RX B UPPER REF LEG TEMP
- M087      RX B LOWER REF LEG TEMP

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial    Date    Time

1.0    Hold Criteria:

1.1    Moisture carryover exceeds 0.10%.

2.0    Request Chemistry to perform moisture carryover testing per OP 0631, Appendix F. Attach results per Step 9.0 of the main body of the procedure.

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial    Date    Time

3.0    Record:                      reactor power: \_\_\_\_\_%

Recirc flow: \_\_\_\_\_%

Moisture carryover: \_\_\_\_\_%

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Initial    Date    Time

Attachment 5A  
Moisture Carryover  
1633 MWth (161.4 MWth to 1633 MWth)

4.0 Evaluate results as follows:

4.1 IF moisture carryover is equal to less than 0.10%,  
THEN no further actions are required.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Verified Date Time

4.2 IF moisture carryover is greater than 0.10%, THEN:

4.2.1 Notify Shift Manager and Test Engineer.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

4.2.2 Enter ON 3178, Increased Moisture  
Carryover

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Verified Date Time

4.2.3 Take actions per the Attachment, Table 2.  
Consult Technical Specifications.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial Date Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Verified Date Time

Attachment 5A  
Moisture Carryover  
1633 MWth (1614 MWth to 1633 MWth)

- 4.2.4 Request Reactor Engineering to store data for individual bundle powers and flows for the approximate time Chemistry obtained the moisture carryover samples per OP 0631. Attach results per Section 9 of the main body of the procedure.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Initial    Date    Time

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Verified    Date    Time

5.0 Acceptance Criteria:

5.1 Level 1: Moisture Carryover less than or equal to 0.35%

5.2 Level 2:

- 5.2.1 MSL moisture content ratio as determined by Chemistry shall be less than or equal to 0.10 %. (Reference 21A3317, Revision 0 Standard Requirements for Steam Dryer Units).
- 5.2.2 MSL moisture content ratio as determined by Chemistry shall be less than or equal to 0.35% WITH an approved engineering evaluation that supports continued plant operation.



Attachment 5A  
Moisture Carryover  
1633 MWth (1614 MWth to 1633 MWth)

**Table 1**

<b>Parameter</b>	<b>Surveillance Frequency</b>
1. Moisture Carryover	Every 24 hours (Notes 1 and 2)

Notes to Table 1:

1. If a determination of moisture carryover cannot be made within 24 hours of achieving an 80 MWth power plateau, an orderly power reduction shall be made within the subsequent 12 hours to a power level at which moisture carryover was previously determined to be acceptable.
2. Provided that the Level 2 performance criteria in Table 2 are not exceeded, when steady state operation at a given power exceeds 168 consecutive hours, moisture carryover monitoring frequency may be reduced to once per week.

Attachment 5A  
Moisture Carryover  
1633 MWth (1614 MWth to 1633 MWth)

**Table 2**

Performance Criteria Not to be Exceeded	Required Actions if Performance Criteria Exceeded and Required Completion Times
<p><u>Level 2:</u></p> <ul style="list-style-type: none"> <li>Moisture carryover exceeds 0.1%</li> </ul> <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> <li>Moisture carryover exceeds 0.1% and increases by &gt; 50% over the average of the three previous measurements taken at &gt; 1593 MWt</li> </ul>	<ol style="list-style-type: none"> <li>Promptly suspend reactor power ascension until an engineering evaluation concludes that further power ascension is justified.</li> <li>Before resuming reactor power ascension, the steam dryer performance data shall be reviewed as part of an engineering evaluation to assess whether further power ascension can be made without exceeding the Level 1 criteria.</li> </ol>
<p><u>Level 1:</u></p> <ul style="list-style-type: none"> <li>Moisture carryover exceeds 0.35%</li> </ul>	<ol style="list-style-type: none"> <li>Promptly initiate a reactor power reduction and achieve a previously acceptable power level (i.e., reduce power to a previous step level) within two hours, unless an engineering evaluation concludes that continued power operation or power ascension is acceptable.</li> <li>Within 24 hours, re-measure moisture carryover and perform an engineering evaluation of steam dryer structural integrity. If the results of the evaluation of dryer structural integrity do not support continued plant operation, the reactor shall be placed in a hot shutdown condition within the following 24 hours. If the results of the engineering evaluation support continued power operation, implement step 3 below.</li> <li>If the results of the engineering evaluation support continued power operation, reduce further power ascension step and plateau levels to nominal increases of 20 MWth and 40 MWth , respectively, for any additional power ascension.</li> </ol>

**TABLE 2 NOTES:**

IF the Level 1 or Level 2 performance criteria are exceeded, THEN either suspend reactor power ascension (Level 2 Performance Criteria) or reduce reactor power (Level 1 Performance Criteria), initiate a Condition Report, and evaluate the cause of any exceedance of the performance criteria.

Reactor power operation that results in moisture carryover that are less than the Level 2 performance criteria in Table 2 is representative of fully acceptable steam dryer performance.

BVY 06-019  
Docket No. 50-271

**VYNPS EPU**

**Portions of Test Procedure ERSTI-04-VY1-1409-000**

**Power Ascension Test Procedure for Extended Power Conditions 1593 to 1912 MWth  
(February 24, 2006)**

**Attachment 9 to PATP**

**Supplemental System Monitoring Plans for EPU  
Plan**

Total number of pages in this Attachment  
(excluding this cover sheet) is 85.

**VYNPS EPU Power Ascension Testing**

**345 KV System Monitoring Plan**

**(3 pages)**

## EPU Power Ascention Testing - 345K System Monitoring Plan

System Number: 345KV    System Engineer: Ken Sweet

Equipment Name	Para ID	Alert and Action Levels Basis	Level	Alert and Action Levels	Actions Required	Reason or other Info	1593 MwTh	1673 MwTh	1752 MwTh	1835 MwTh	1912 MwTh
340 Line	ERFIS Pt. E037 (MVAR)	Normal VELCO System Monitoring	2	Line Limits for Ambient and Reliable Grid	Increased Monitoring, VELCO to notify VY Operations of possible PA hold. VELCO may resolve by dispatching system load.	Monitored By SE by Contacting Velco					
340 Line	ERFIS Pt. E036 (MW)	Normal VELCO System Monitoring	2	Line Limits for Ambient and Reliable Grid	Increased Monitoring, VELCO to notify VY Operations of possible PA hold. VELCO may resolve by dispatching system load.	Monitored By SE by Contacting Velco					
379 Line	ERFIS Pt. E016 (MVAR)	Normal VELCO System Monitoring	2	Line Limits for Ambient and Reliable Grid	Increased Monitoring, VELCO to notify VY Operations of possible PA hold. VELCO may resolve by dispatching system load.	Monitored By SE by Contacting Velco					
379 Line	ERFIS Pt. E002 (MW)	Velco System Monitoring System	2	Line Limits for Ambient and Reliable Grid	Increased Monitoring, VELCO to notify VY Operations of possible PA hold. VELCO may resolve by dispatching system load.	Monitored By SE by Contacting Velco					

Equipment Name	Para	Alert and Action Levels Basis	Level	Alert and Action Levels	Actions Required	Reason or other Info	1593 MwTh	1673 MwTh	1752 MwTh	1835 MwTh	1912 MwTh
	ID										
	Circle A or B										
381 Line	ERFIS Pt. E017 (MVAR)	Normal VELCO System Monitoring	2	Line Limits for Ambient and Reliable Grid	Increased Monitoring, VELCO to notify VY Operations of possible PA hold. VELCO may resolve by dispatching system load.	Monitored By SE by Contacting Velco					
381 Line	ERFIS Pt. E003 (MW)	Normal VELCO System Monitoring	2	Line Limits for Ambient and Reliable Grid	Increased Monitoring, VELCO to notify VY Operations of possible PA hold. VELCO may resolve by dispatching system load.	Monitored By SE by Contacting Velco					
345 KV Voltage (South Bus)	VY Generator (Relay House)	VELCO Voltage Schedule	2	VELCO Voltage Schedule (123V light load, 125V peak load)	Increased Monitoring, VELCO to notify VY Operations of possible PA hold. VELCO may resolve by dispatching system load.	Monitored By SE by Contacting Velco					

1593 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1593 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1673 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1673 MWth Data Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

1752 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1752 MWth Data Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

1853 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1853 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1912 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1912 MWth Data Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

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**VYNPS EPU Power Ascension Testing**  
**AOG / AOGCCW/ System Monitoring Plan**  
**(9 pages)**



## EPU Power Ascention Testing - AOG / AOGCCW System Monitoring Plan

System Number: AOG: N/A AOGCCW: V70-xx System Engineer: Brian Naeck

Equipment Name	Para ID	Alert and Action Levels Basis	Alert and Action Levels	Actions Required	Reason or other info	1593 MwTh	1673 MwTh	1752 MwTh	1832 MwTh	1912 MwTh
	Circle A or B									
Recombiner Hz Detector	H2AN-2921A/B	OP 0150 ARS: 50-C-5 & 50-P-5	Both Units: 1. >25% 2. >50% 3. >10% Disagreement	1. Per ARS 50-C-6, Notify Engineering 2. Per ARS 50-C-6, Notify Engineering 3. Declare Inop & Swap Recombiners	Monitored by Ops Level 4	< 5%				
Recombiner Hz Detector	H2AN-2922A/B					< 5%				
Rad Monitors	RAN-OG-3127 RAN-OG-3128	OP 0150 ODCM 4.3.4 & T.4.1.2. ARS 50-M-4 & 50-M-6	1. 5,000 cpm 2. 10,000 cpm 3. 200,000 cpm	1. Notify RP & Engineering 2. Per ARS 50-M-4 3. Per ARS 50-M-6	Monitored by Ops Level 4	3127: ~ 600 cpm 3128: ~300 cpm w/ 10%				
Steam Temp to HE-100-1A/B	TE-OG-2301A/B	OP 0150	< 300 °F > 400 °F	1. Verify valve line-up 2. Thermography on MS-114-1A	Monitored by Ops Level 4	~ 350 °F				

Equipment Name	Para	Alert and Action Levels Basis	Alert and Action Levels	Actions Required	Reason or other Info	1593 MwTh	1673 MwTh	1752 MwTh	1832 MwTh	1912 MwTh
	ID									
	Circle A or B									
Recombiner Inlet Temperature	TE-OG-2302A/B	OP 0150 ARS 50-N-2 & 50-N-6	< 295 °F > 315 °F	Verify valve line-up, notify Engineering	Monitored by Ops Level 4	~ 313 °F				
Recombiner Top Temperature	TE-OG-2303A/B	OP 0150 ARS 50-A-3, A-4, N-3, & N-4	< 300 °F > 650 °F	Verify valve line-up, notify Engineering	Monitored by Ops Level 4	~ 535 °F				
Recombiner Bottom Temperature	TE-OG-2304A/B	OP 0150 ARS 50-A-3, A-4, B-6, N-3, N-4, O-6	< 450 °F > 650 °F	Verify valve line-up, notify Engineering	Monitored by Ops Level 4	~ 490 - 540 °F				
Recombiner Center Temperature	TE-OG-2305A/B	OP 0150 ARS 50-A-3, A-4, B-6, N-3, N-4, O-6	< 300 °F > 650 °F	Verify valve line-up, notify Engineering	Monitored by Ops Level 4	~ 530 - 550 °F				
MS-101-1A/B Outlet Temperature	TE-OG-2307A/B	OP 0150 ARS 50-A-3, A-4, A-5, B-6, N-3, N-4, N-5, O-6	< 75 °F > 145 °F	Verify valve line-up, notify Engineering	Monitored by Ops Level 4	80 - 95 °F				
Evaporator Glycol Inlet Temperature	TE-OG-5251A/B	OP 0150	< 35 °F > 50 °F	Verify valve line-up, notify Engineering	Monitored by Ops Level 4	35 - 45 °F				

Equipment Name	Para	Alert and Action Levels Basis	Alert and Action Levels	Actions Required	Reason or other Info	1593 MwTh	1673 MwTh	1752 MwTh	1832 MwTh	1912 MwTh
	ID									
	Circle A or B									
Evaporator Glycol Outlet Temperature	TE-OG-5252A/B	OP 0150	< 35 °F > 50 °F	Verify valve line-up, notify Engineering	Monitored by Ops Level 4	35 - 45 °F				
System Inlet Pressure	PI-1301	OP 0150	< 0 psig	Verify valve line-up, notify Engineering	Monitored by Ops Level 4	-0.75 psig				
Adsorber "G" Outlet Pressure	PI-1306	OP 0150	< -1 psig	Verify valve line-up, notify Engineering	Monitored by Ops Level 4	-1.25 psig				
System Outlet Pressure	PI-1307	OP 0150	-1 to 1 psig	Verify valve line-up, notify Engineering	Monitored by Ops Level 4	0 psig				

Equipment Name	Para	Alert and Action Levels Basis	Alert and Action Levels	Actions Required	Reason or other Info	1593 MwTh	1673 MwTh	1752 MwTh	1832 MwTh	1912 MwTh
	ID									
Delay Pipe / System Flow	FI-2002	OP 2150 OP 0150 ODCM Table 3.1.2	1. 25 scfm 2. 30 scfm 3. <100 scfm	1. notify engineering, verify valve line-up 2. initiate corrective actions to prevent exceeding 100 scfm 3. reduce power to maintain <100 scfm 4. Agree within 10 scfm of FI-2004	Monitored by Ops Level 4	18 scfm				
Delay Pipe / System Flow	FI-2004	OP 2150 OP 0150 ODCM Table 3.1.2	1. 25 scfm 2. 30 scfm 3. <100 scfm 4. Agree within 10 scfm of FI-2002	1. notify engineering, verify valve line-up 2. initiate corrective actions to prevent exceeding 100 scfm 3. reduce power to maintain <100 scfm	Monitored by Ops Level 4	18 scfm				
AOGCCW Temperature	TI-104-7153	OP 0150 OP 2150 RP 2188	50 °F - 90 °F, & (≤15 °F above ambient when >70 °F air temp)	Adjust temperature per OP 2150 & RP 2188 Notify Engineering	Monitored by Ops Level 4	50 - 90 °F				

1673 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1673 MWth Data Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

1752 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1752 MWth Data Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

1832 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1832 MWth Data Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

1912 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1912 MWth Data Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

System Monitoring Plan									
System Name: AOG / AOGCCW							Date Issued: 10/12/2004	Rev. 1	
System Number: AOG: N/A AOGCCW: V70-xx System Engineer: Brian Naeck									
Equipment Name	Equipment No./ ID	Parameter	Para ID	Source	M / T	Freq	Alert and Action Levels	Actions Required	Reason or other info
System Reliability	N / A	MRFFs	N / A	N / A	M	N / A	Per M-Rule Program	Per M-Rule Program	Scopping Basis
SJAE Flow	N / A	Flow Rate	ERFIS Pt. T032	Logs	M	OP 0150	OP 0150	OP 0150	Monitored by Ops
Recombiner H2 Detector	H2AN-2921A/B	% LEL H2	H2AN-2921A/B	Logs	M	OP 0150	OP 0150 ARS: 50-C-5 & 50-P-5	OP 0150 TS 3.8.J ARS: 50-C-6 & 50-P-6	Monitored by Ops
Recombiner H2 Detector	H2AN-2922A/B	% LEL H2	H2AN-2921A/B	Logs	M	OP 0150 TS 3.8.J	OP 0150 TS 3.8.J	OP 0150 TS 3.8.J ARS: 50-C-6 & 50-P-6	Monitored by Ops
Rad Monitors	RAN-OG-3127 RAN-OG-3128	CPS In Discharge Stream	RAN-OG-3127 RAN-OG-3128	Logs	M	OP 0150 ODCM 4.3.4 & T.4.1.2.	OP 0150 ODCM 4.3.4 & T.4.1.2.	OP 0150 ODCM 4.3.4 & T.4.1.2.	Monitored by Ops

Flow to Recombiner	FI-2001A / B	Flow Rate to Recombiner	FI-2001A / B	Logs	M	OP 0150	OP 0150	OP 0150	Monitored by Ops
Off Gas Inlet Temp	TE-OG-2340A/B	Temperature	TE-OG-2340A/B	Logs	M	OP 0150	OP 0150	OP 0150	Monitored by Ops
Steam Temp to HE-100-1A/B	TE-OG-2301A/B	Temperature	TE-OG-2301A/B	Logs	M	OP 0150	OP 0150	OP 0150	Monitored by Ops
Recombiner Inlet Temperature	TE-OG-2302A/B	Temperature	TE-OG-2302A/B	Logs	M	OP 0150	OP 0150	OP 0150	Monitored by Ops
Recombiner Top Temperature	TE-OG-2303A/B	Temperature	TE-OG-2303A/B	Logs	M	OP 0150	OP 0150	OP 0150	Monitored by Ops
Recombiner Bottom Temperature	TE-OG-2304A/B	Temperature	TE-OG-2304A/B	Logs	M	OP 0150	OP 0150	OP 0150	Monitored by Ops
Recombiner Center Temperature	TE-OG-2305A/B	Temperature	TE-OG-2305A/B	Logs	M	OP 0150	OP 0150	OP 0150	Monitored by Ops

[illegible]



[illegible]

**VYNPS EPU Power Ascension Testing**  
**Condensate Demineralizer System Monitoring Plan**  
**(2 pages)**

EPU Performance Monitoring for Condensate Demineralizer System

Equipment No.	Parameter	Alarm Values/Limits	Level	Increased Power Level Evaluation Points					Action
				1593 MWth (83.32%)	1673 MWth (87.48%)	1752 MWth (91.55%)	1832 MWth (95.81%)	1912 MWth (100%)	
DM-1-1A	dP	25psid	2	25	20	18	17	15	Evaluate margin to 55psid limit for system dP; Fluff resin; Backwash
			Data						
	Flow	3250gpm	2	~2600gpm	~2760gpm	~2925gpm	~3095gpm	~3250gpm	Investigate why flows are not ballanced
			Data						
DM-1-1B	dP	25psid	2	25	20	18	17	15	Evaluate margin to 55psid limit for system dP; Fluff resin; Backwash
			Data						
	Flow	3250gpm	2	~2600gpm	~2760gpm	~2925gpm	~3095gpm	~3250gpm	Investigate why flows are not ballanced
			Data						
DM-1-1C	dP	25psid	2	25	20	18	17	15	Evaluate margin to 55psid limit for system dP; Fluff resin; Backwash
			Data						
	Flow	3250gpm	2	~2600gpm	~2760gpm	~2925gpm	~3095gpm	~3250gpm	Investigate why flows are not ballanced
			Data						
DM-1-1D	dP	25psid	2	25	20	18	17	15	Evaluate margin to 55psid limit for system dP; Fluff resin; Backwash
			Data						
	Flow	3250gpm	2	~2600gpm	~2760gpm	~2925gpm	~3095gpm	~3250gpm	Investigate why flows are not ballanced
			Data						
DM-1-1E	dP	25psid	2	25	20	18	17	15	Evaluate margin to 55psid limit for system dP; Fluff resin; Backwash
			Data						
	Flow	3250gpm	2	~2600gpm	~2760gpm	~2925gpm	~3095gpm	~3250gpm	Investigate why flows are not ballanced
			Data						
System	dP	55psid	2	55psid	55psid	55psid	55psid	55psid	Evaluate prior data for which vessel put system into Flow Balance Override
			Data						
S-14-1A	dP	20psid	2	15	16	17	19	20	Backwash Filter; Evaluate replacement
			Data						
S-14-1B	dP	20psid	2	15	16	17	19	20	Backwash Filter; Evaluate replacement
			Data						
S-14-1C	dP	20psid	2	15	16	17	19	20	Backwash Filter; Evaluate replacement
			Data						
S-14-1D	dP	20psid	2	15	16	17	19	20	Backwash Filter; Evaluate replacement
			Data						
S-14-1E	dP	20psid	2	15	16	17	19	20	Backwash Filter; Evaluate replacement
			Data						
Conductivity	Monitored by Chemistry								

Comments:

1593 Mwth	Reviewed By: _____ Print/Sign/Date
	Approved By: _____ Print/Sign/Date
1673 Mwth	Reviewed By: _____ Print/Sign/Date
	Approved By: _____ Print/Sign/Date
1752 Mwth	Reviewed By: _____ Print/Sign/Date
	Approved By: _____ Print/Sign/Date
1832 Mwth	Reviewed By: _____ Print/Sign/Date
	Approved By: _____ Print/Sign/Date
1912 Mwth	Reviewed By: _____ Print/Sign/Date
	Approved By: _____ Print/Sign/Date

<p><b>General Guidance</b></p> <p>*Data can be collected at the Condemin control panel on the 232 level of the Turbine building. System dP and vessel flows are available on the recorder located at the panel. Vessel dP is visible along the upper right corner of the panel.</p> <p>*Data can be obtained shiftily via OP 0150.05 data sheets</p> <p>*Chemistry is performing additional daily trending of Condemin performance for the scheduling of vessel backwashes</p> <p>*It is the intent of this monitoring plan that any parameter approaching an evaluation limit be monitored on a more frequent basis to preclude the system from entering flow balance override at 55psid system dP before action is taken to reduce overall system dP.</p>
---

# SUMMARY OF CONDEMIN FILTERED BYPASS FLOW CASES

CASE	DESCRIPTION	MODELED TRAP dP (@ current flow)	TRAP Dp ACTUAL	DEMIN Dp PSID	HEADER Dp	TOTAL FLOW GPM	MASS FLOW E6 #/HR	OUTLET E VALVE %OPEN	AVE DEMIN FLOW GPM	BYPASS FLOW	BYPASS % OPEN
1	CURRENT POWER	7	8.7	5	27.5	13000	6.435	90	2600	0	
2	CURRENT POWER	7	8.7	20	41	13000	6.435	70	2600	0	
3	CURRENT POWER	12	13.4	5	32.5	13000	6.435	90	2600	0	
4	CURRENT POWER	12	13.7	20	46.5	13000	6.435	70	2600	0	
5	105% 5 demins online	7	9.8	5	29.5	13810	6.836	70	2760	0	
6	105% 5 demins online	7	10	17	40.7	13810	6.836	90	2760	0	
7	105% 5 demins online	12	15.6	5	37	13810	6.836	70	2760	0	
8	105% 5 demins online	12	15.5	17	46.5	13810	6.836	90	2760	0	
9	105% 4 demins online	12	NR	17	NR	13810	6.836	NR	NR	NR	
10	110% 5 demins online	7	9.8	5	29.7	14625	7.239	70	2925	0	
11	110% 5 demins online	7	10.1	17	41.7	14625	7.239	70	2925	0	
12	110% 5 demins online	12	17.2	5	39	14625	7.239	70	2925	0	
13	110% 5 demins online	12	17.1	17	51.7	14625	7.239	90	2925	0	
14	110% 4 demins online	12	15.5	17	45	14625	7.239	70	2755	3600	
15	115% 5 demins online	7	10.5	5	32.3	15465	7.655	70	3095	0	
16	115% 5 demins online	7	8.5	17	34	15465	7.655	70	3095	0	
17	115% 5 demins online	12	18.7	5	42.1	15465	7.655	70	3095	0	
18	115% 5 demins online	12	18.7	17	54	15465	7.655	90	3095	0	
19	115% 4 demins online	12	16.7	17	51.2	15465	7.655	90	2930	3845	50
19A	115% 5 demins online	7	11.5	5	35	15465	7.655	70	3095	0	
19B	115% 4 demins online	7	13	5	38.5	15465	7.655	70	3075	3170	50
20	120% 5 demins online	7	11.5	5	35.8	16250	8.044	70	3250	0	
21	120% 5 demins online	7	12	17	46.2	16250	8.044	90	3250	0	
22	120% 5 demins online	12	19.8	5	45.8	16250	8.044	70	3250	0	
23	120% 5 demins online	12	20.5	17	57.5	16250	8.044	90	3250	0	
23A	120% 5 demins online	10	17	15	51.5	16250	8.044	3250	3250	90	
23B	120% 5 demins online	10	17	17	53	16250	8.044	3250	3250	90	
23C	120% 5 demins online	10	17	20	57.5	16250	8.044	3250	3250	90	
23D	120% 5 demins online	12	20	15	54.5	16250	8.044	3250	3250	90	

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**VYNPS EPU Power Ascension Testing**

**Nuclear Boiler Vessel Instrumentation System Monitoring Plan**

**(2 pages)**

Asset ID	Parameter	Parameter ID (ERFIS)	Alert/ Action Levels	Source	Level	Actions Required	1593 MWth	1673 MWth	1752 MWth	1835 MWth	1912 MWth
						Date					
						Time					
Calculated Reference Leg A	Temp °F	C220		OP4390	4	Evaluate					
Calculated Reference Leg B	Temp °F	C221		OP4390	4	Evaluate					
RX A Upper Reference Leg	Temp °F	M084		OP4390	4	Evaluate					
RX A Lower Reference Leg	Temp °F	M085		OP4390	4	Evaluate					
RX B Upper Reference Leg	Temp °F	M086		OP4390	4	Evaluate					
RX B Lower Reference Leg	Temp °F	M087		OP4390	4	Evaluate					
Vessel Stud	Temp °F	S023			4	Evaluate					
Vessel Head Flange	Temp °F	S024			4	Evaluate					
Vessel Head Adjacent to Flange	Temp °F	S025			4	Evaluate					
Vessel Bottom Drain Temp	Temp °F	S026			4	Evaluate					
Vessel Skirt at MTG Flange	Temp °F	S027			4	Evaluate					
Vessel Bottom Head	Temp °F	S028			4	Evaluate					
Vessel Skirt Near Joint	Temp °F	S029			4	Evaluate					
Vessel Above Skirt Joint	Temp °F	S030			4	Evaluate					
Vessel Downcomer	Temp °F	S031			4	Evaluate					
Vessel Core	Temp °F	S032			4	Evaluate					
Nozzle N4C In Board	Temp °F	S033			4	Evaluate					
Vessel Below Water Level	Temp °F	S034			4	Evaluate					
Total Jet Pump Flow Loop A	M#/HR	B051			4	Evaluate					
Total Jet Pump Flow Loop B	M#/HR	B052			4	Evaluate					
Total RX Jet Pump Flow	M#/HR	B012	51.05 M#/HR?		4	Evaluate					
Flow to Ref Leg FIT-400-A	GPM	N/A	0.001-0.005 GPM	OP0150	4	Evaluate					
Flow to Ref Leg FIT-400-B	GPM	N/A	0.001-0.005 GPM	OP0150	4	Evaluate					

Asset ID	Parameter	Parameter ID (ERFIS)	Alert/ Action Levels		Level	Actions Required	1593 MWth	1673 MWth	1752 MWth	1835 MWth	1912 MWth
						Date					
						Time					
Flow to Ref Leg FIT-400-C	GPM	N/A	0.001-0.005 GPM	OP0150	4	Evaluate					
Flow to Ref Leg FIT-400-D	GPM	N/A	0.001-0.005 GPM	OP0150	4	Evaluate					

1593 MWth Data Recorded By:

Date:

1593 MWth Data Reviewed By:

Date:

1673 MWth Data Recorded By:

Date:

1673 MWth Data Reviewed By:

Date:

1752 MWth Data Recorded By:

Date:

1752 MWth Data Reviewed By:

Date:

1835 MWth Data Recorded By:

Date:

1835MWth Data Reviewed By:

Date:

1912 MWth Data Recorded By:

Date:

1912 MWth Data Reviewed By:

Date:

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**VYNPS EPU Power Ascension Testing**

**Core Spray System Monitoring Plan**

**(1 page)**



## EPU Supplemental Performance Monitoring Plan for the Core Spray System

System Engineer: Stephen Jonasch

Previously Monitored	Equip ID	Parameter	Pre EPU Range	5% 1673 Mwth	10% 1752 Mwth	15% 1832 Mwth	20% 1912 Mwth	Source	Remarks
Yes	DPIS - 14-43A	CS A Sparger DP	-3.2					OP 0150 pg 10	Note 1 Note 2 Note 3
Yes	DPIS - 14-43B	CS B Sparger DP	-2.9					OP 0150 pg 10	Note 1 Note 2

Note 1: A minus reading is normal. Gauge range is -5.0 to +5.0. Alarm setpoint is +0.6.

Note 2: GE SIL 300, Supplement 001 was provided to VY with GE's discussion on what will be the response of this gauge during power uprate. GE has stated that there should essentially be NO CHANGE in readings. Data collected during various down powers and post refuel indicate that this is probably correct.

Note 3: CR 2005-4023 reported that the 43A DP gauge was fluctuating. While not certain, there may be a small weep in the restricting orifice flange located in the drywell that is giving these fluctuating readings. Because it is located in the drywell, this cannot be confirmed. On/About Jan 4, the fluctuating stopped and was reading -4.5. Since that time, the reading has again changed and, as of 2/13/06, is reading -3.2. CR 2006-0460 was generated reporting this issue.

1673 Mwth Data Recorded BY: \_\_\_\_\_

Date: \_\_\_\_\_

1673 Mwth Data Reviewed BY: \_\_\_\_\_

Date: \_\_\_\_\_

1752 Mwth Data Recorded BY: \_\_\_\_\_

Date: \_\_\_\_\_

1752 Mwth Data Reviewed BY: \_\_\_\_\_

Date: \_\_\_\_\_

1832 Mwth Data Recorded BY: \_\_\_\_\_

Date: \_\_\_\_\_

1832 Mwth Data Reviewed BY: \_\_\_\_\_

Date: \_\_\_\_\_

1912 Mwth Data Recorded BY: \_\_\_\_\_

Date: \_\_\_\_\_

1912 Mwth Data Reviewed BY: \_\_\_\_\_

Date: \_\_\_\_\_

**VYNPS EPU Power Ascension Testing**

**22 KV System Monitoring Plan**

**(2 pages)**

Asset ID	Parameter	Parameter ID (ERFIS)	Alert/ Action Levels	Level	Actions Required	1593 MWth (83.32%)	1593 MWth (83.32%)	1593 MWth (83.32%)	1673 MWth (87.48%)	1673 MWth (87.48%)	1673 MWth (87.48%)	1752 MWth (91.65%)	1752 MWth (91.65%)	1752 MWth (91.65%)
					Date									
					Time									
Phase A Bus	Amps	(G006)	Expected: 17.95 KA Design / Operating Limit: 19 KA		Evaluate									
Phase B Bus	Amps	(G007)	Expected: 17.95 KA Design / Operating Limit: 19 KA		Evaluate									
Phase C Bus	Amps	(G008)	Expected: 17.95 KA Design / Operating Limit: 19 KA		Evaluate									
Phase A Bus	Return Air Temp °F	Local Indication TI-22KV-1A	Alarm @ 176°F Alert @ > 180°F	Alert	Evaluate									
Phase B Bus	Supply Air Temp °F	Local Indication TI-22KV-1B or TI-22KV-1D	Alarm @ 176°F Alert @ > 120°F	Alert	Evaluate									
Phase C Bus	Return Air Temp °F	Local Indication TI-22KV-1C	Alarm @ 176°F Alert @ > 180°F	Alert	Evaluate									
Isophase Bus Cooler A (TBCCW)	Outlet Temp °F	Local Indication TI-104-31A	Alert @ > 110°F		Evaluate									
Isophase Bus Cooler B (TBCCW)	Outlet Temp °F	Local Indication TI-104-31B	Alert @ > 110°F		Evaluate									
Isophase Bus Cooler A (TBCCW)	Flow (GPM)	Local Indication FI 104-2A	Alert @ < 90 GPM		Evaluate									
Isophase Bus Cooler B (TBCCW)	Flow (GPM)	Local Indication FI 104-2B	Alert @ < 90 GPM		Evaluate									
Isophase Bus Fan (GLF-1A) or (GLF-1B)	Air Flow (CFM)	Local Indication FI 22KV-3A or FI-22KV-3B	Alert @ < 18000 CFM		Evaluate									
Thermography performed by Component Engineering														
1593 MWth Data Recorded by: _____ Date: _____														
1593 MWth Data Reviewed by: _____ Date: _____														
1673 MWth Data Recorded by: _____ Date: _____														
1673 MWth Data Reviewed by: _____ Date: _____														
1752 MWth Data Recorded by: _____ Date: _____														
1752 MWth Data Reviewed by: _____ Date: _____														

Asset ID	Parameter	Parameter ID (ERFIS)	Alert/ Action Levels	Level	Actions Required	1832 MWth (95.81%)	1832 MWth (95.81%)	1832 MWth (95.81%)	1912 MWth (100%)	1912 MWth (100%)	1912 MWth (100%)			
					Date									
					Time									
Phase A Bus	Amps	(G006)	Expected: 17.95 KA Design / Operating Limit: 19 KA		Evaluate									
Phase B Bus	Amps	(G007)	Expected: 17.95 KA Design / Operating Limit: 19 KA		Evaluate									
Phase C Bus	Amps	(G008)	Expected: 17.95 KA Design / Operating Limit: 19 KA		Evaluate									
Phase A Bus	Return Air Temp °F	Local Indication TI-22KV-1A	Alarm @ 176°F Alert @ > 180°F	Alert	Evaluate									
Phase B Bus	Supply Air Temp °F	Local Indication TI-22KV-1B or TI-22KV-1D	Alarm @ 176°F Alert @ > 120°F	Alert	Evaluate									
Phase C Bus	Return Air Temp °F	Local Indication TI-22KV-1C	Alarm @ 176°F Alert @ > 180°F	Alert	Evaluate									
Isophase Bus Cooler A (TBCCW)	Outlet Temp °F	Local Indication TI-104-31A	Alert @ > 110°F		Evaluate									
Isophase Bus Cooler B (TBCCW)	Outlet Temp °F	Local Indication TI-104-31B	Alert @ > 110°F		Evaluate									
Isophase Bus Cooler A (TBCCW)	Flow (GPM)	Local Indication FI 104-2A	Alert @ < 90 GPM		Evaluate									
Isophase Bus Cooler B (TBCCW)	Flow (GPM)	Local Indication FI 104-2B	Alert @ < 90 GPM		Evaluate									
Isophase Bus Fan (GLF-1A) or (GLF-1B)	Air Flow (CFM)	Local Indication FI 22KV-3A or FI-22KV-3B	Alert @ < 16000 CFM		Evaluate									
Thermography performed by Component Engineering														
1832 MWth Data Recorded by: _____ Date: _____														
1832 MWth Data Reviewed by: _____ Date: _____														
1912 MWth Data Recorded by: _____ Date: _____														
1912 MWth Data Reviewed by: _____ Date: _____														

**VYNPS EPU Power Ascension Testing**

**AE / RWCU System Monitoring Plan**

**(12 pages)**

Asset ID	Parameter	Parameter ID (ERFIS)	Alert/ Action Levels	Level	Actions Required	1593 MWth (83.32%)	1593 MWth (83.32%)	1593 MWth (83.32%)	1673 MWth (87.48%)	1673 MWth (87.48%)	1673 MWth (87.48%)	1752 MWth (91.65%)	1752 MWth (91.65%)	1752 MWth (91.65%)
					Date									
					Time									
SJAE	SJAE Off Gas Radiation	(BOPM002)	n/a		n/a									
SJAE	SJAE Off Gas Lin Rad (Ci/sec)	RM-17-151 CRP 9-10 OP 0150.03 [pg. 16]	Alert - > 1E-6 Action - > 2E-5 ODCM = 1.6E-1Ci/sec	2	> 2E-5 - restore to < 1E-6; CR [TS 4.8.K.1 = ODCM]									
SJAE	SJAESTeam Flow (lbm/hr)	(T032) OP 0150.03 [pg.25]	n/a		n/a									
SJAE	SJAE Press	PI 101-23 CRP 9-6 OP 0150.03 [pg. 4]	Alert <111, >119 Action <110, >120 psig		<110, >120 adjust PCV-1									
(RWCU) DI Inlet	Conductivity	CR 12-132 CRP 9-4 OP 0150.03 [pg. 8]	Alert/Action - > 0.3		Notify Chemistry									
(RWCU) DI Outlet	Conductivity A	CR 12-135 CRP 9-4 OP 0150.03 (pg. 8)	Alert - > 0.1		Notify Chemistry									
	Conductivity B	CR 12-135 CRP 9-4 OP 0150.03 (pg. 8)	Alert - > 0.1		Notify Chemistry									
(RWCU) Pt 1	Temperature	TI 12-137 CRP 9-4 OP 0150.03 (pg. 8)	per TS Fig. 3.6.1	1	CR [TS 3.6.A.1]									
(RWCU) Pt 3		TI 12-137 CRP 9-4 OP 0150.03 (pg. 8)	Alert/Action - > 140 F		Isolate Demineralizer WR/CR									
(RWCU) P-49-1A	Amps	12-A-M1/M2 CRP 9-4 OP 0150.03 (pg. 8)	Alert/Action > 52 Amps		WR, CR									
(RWCU) P-49-1B	Amps	12-A-M1/M2 CRP 9-4 OP 0150.03 (pg. 8)	Alert/Action > 52 Amps		WR, CR									
(RWCU) Avg of Demin Flows	GPM	(3DMA009)	n/a		n/a									
RWCU Flow	M# / HR	(C009)	Alert/Action > 0.060 mtb/hr		CR									
RWCU System Inlet Temp	F	(B023)	Alert/Action > 550 F		CR									
RWCU System Outlet Temp	F	(B024)	Alert/Action > 450 F		CR									
(RWCU) Demin Flow A	M# / HR	(B017)	n/a		n/a									
(RWCU) Demin Flow B	M# / HR	(B018)	n/a		n/a									
(RWCU) ROC	F / HR	(C039)	n/a		n/a									
(RWCU) Flow	GPM	(B054)	n/a		n/a									
Asset ID	Parameter	Parameter ID (ERFIS)	Alert/ Action Levels	Level	Actions Required	1593 MWth (83.32%)	1593 MWth (83.32%)	1593 MWth (83.32%)	1673 MWth (87.48%)	1673 MWth (87.48%)	1673 MWth (87.48%)	1752 MWth (91.65%)	1752 MWth (91.65%)	1752 MWth (91.65%)

					Date														
					Time														
RHX Outlet Temp to NRHX	F	(B055)	n/a		n/a														
NRHX Outlet Temp	F	(B056)	n/a		n/a														
(RWCU) Thermal Power	%	(BOP014)	n/a		n/a														
(RWCU) A Flow	F	FT-75A Local [280]	n/a		n/a														
(RWCU) B Flow	F	FT-75B Local [280]	n/a		n/a														
(RWCU) Demin A D/P	F	dPIS-94A Local [280]	n/a		n/a														
(RWCU) Demin B D/P	F	dPIS-94B Local [280]	n/a		n/a														
(RWCU) Resin Trap A D/P	F	dPIS-72A Local [280]	n/a		n/a														
(RWCU) Resin Trap B D/P	F	dPIS-72B Local [280]	n/a		n/a														
Reactor Pressure	PSIG	PI-2-3-60B S of Rk 25-6	n/a		n/a														
RWCU Pump Suct	PSIG	PI-12-114 Rk 25-2	n/a		n/a														
(RWCU) 'A' Pump Brg Clr Out	F	TIS-12-89A Rk 25-2	n/a		n/a														
(RWCU) 'B' Pump Brg Clr Out	F	TIS-12-89B Rk 25-2	n/a		n/a														
RWCU Pump Disch	PSIG	PI-12-87 Rk 25-2	n/a		n/a														
Regen HX Out	PSIG	PI-12-95 Rk 25-2	n/a		n/a														
Non-Regen HX Out	PSIG	PI-12-96 Rk 25-2	n/a		n/a														
Non-Regen HX Out	F	TIS-12-99 Rk 25-2	n/a		n/a														
NRHX (RBCCW) Out	F	TC-104-5 Rk 25-2	n/a		n/a														
RWCU Demin Inlet	F	TIS-12-115 Rk 25-2	n/a		n/a														
(RWCU) Demin Effluent	PSIG	PI-12-113 Rk 25-2	n/a		n/a														

Asset ID	Parameter	Parameter ID (ERFIS)	Alert/Action Levels	Level	Actions Required	1832 MWh (95.81%)	1832 MWh (95.81%)	1832 MWh (95.81%)	1912 MWh (100%)	1912 MWh (100%)	1912 MWh (100%)
					Date						
					Time						
SJAE	SJAE Off Gas Radiation	(BOPM002)	n/a		n/a						
SJAE	SJAE Off Gas Lin Rad (Ci/sec)	RM-17-151 CRP 9-10 OP 0150.03 [pg. 16]	Alert - < 1E-6 Action - < 2E-5 ODCM = 1.6E-1Ci/sec	2	< 2E-5 - restore to > 3E-2; CR [TS 4.8.K.1 = ODCM]						
SJAE	SJAE Steam Flow (lbm/hr)	(T032) OP 0150.03 [pg.25]	n/a		n/a						
SJAE	SJAE Press	PI 101-23 CRP 9-6 OP 0150.03 [pg. 4]	Alert <111, >119 Action <110, >120 psig		<110, >120 adjust PCV-1						
(RWCU) DI Inlet	Conductivity	CR 12-132 CRP 9-4 OP 0150.03 [pg. 8]	Alert/Action - > 0.3		Notify Chemistry [TS 4.6.B.3.b]						
(RWCU) DI Outlet	Conductivity A	CR 12-135 CRP 9-4 OP 0150.03 (pg. 8)	Alert - > 0.1		Notify Chemistry						
	Conductivity B	CR 12-135 CRP 9-4 OP 0150.03 (pg. 8)	Alert - > 0.1		Notify Chemistry						
(RWCU) Pt 1	Temperature	TI 12-137 CRP 9-4 OP 0150.03 (pg. 8)	per TS Fig. 3.6.1	1	CR [TS 3.6.A.1]						
(RWCU) Pt 3		TI 12-137 CRP 9-4 OP 0150.03 (pg. 8)	Alert/Action - > 140 F		Isolate Demineralizer WR/CR						
(RWCU) P-49-1A	Amps	12-A-M1/M2 CRP 9-4 OP 0150.03 (pg. 8)	Alert/Action > 52 Amps		WR, CR						
(RWCU) P-49-1B	Amps	12-A-M1/M2 CRP 9-4 OP 0150.03 (pg. 8)	Alert/Action > 52 Amps		WR, CR						
(RWCU) Avg of Demin Flows	GPM	(3DMA009)	n/a		n/a						
RWCU Flow	M# / HR	(C009)	Alert/Action > 0.060 mlb/hr		CR						
RWCU System Inlet Temp	F	(B023)	Alert/Action > 550 F		CR						
RWCU System Outlet Temp	F	(B024)	Alert/Action > 450 F		CR						
(RWCU) Demin Flow A	M# / HR	(B017)	n/a		n/a						
(RWCU) Demin Flow B	M# / HR	(B018)	n/a		n/a						
(RWCU) ROC	F / HR	(C039)	n/a		n/a						



Asset ID	Parameter	Parameter ID (ERFIS)	Alert/ Action Levels	Level	Actions Required	1832 MWth (95.81%)	1832 MWth (95.81%)	1832 MWth (95.81%)	1912 MWth (100%)	1912 MWth (100%)	1912 MWth (100%)
					Date						
					Time						
(RWCU) Flow	GPM	(B054)	n/a		n/a						
RHX Outlet Temp to NRHX	F	(B055)	n/a		n/a						
NRHX Outlet Temp	F	(B056)	n/a		n/a						
(RWCU) Thermal Power	%	(BOP014)	n/a		n/a						
(RWCU) A Flow	F	FT-75A Local [280°]	n/a		n/a						
(RWCU) B Flow	F	FT-75B Local [280°]	n/a		n/a						
(RWCU) Demin A D/P	F	dPIS-94A Local [280°]	n/a		n/a						
(RWCU) Demin B D/P	F	dPIS-94B Local [280°]	n/a		n/a						
(RWCU) Resin Trap A D/P	F	dPIS-72A Local [280°]	n/a		n/a						
(RWCU) Resin Trap B D/P	F	dPIS-72B Local [280°]	n/a		n/a						
Reactor Pressure	PSIG	PI-2-3-60B S of Rk 25-6	n/a		n/a						
RWCU Pump Suct	PSIG	PI-12-114 Rk 25-2	n/a		n/a						
(RWCU) 'A' Pump Brg Clr Out	F	TIS-12-89A Rk 25-2	n/a		n/a						
(RWCU) 'B' Pump Brg Clr Out	F	TIS-12-89B Rk 25-2	n/a		n/a						
RWCU Pump Disch	PSIG	PI-12-87 Rk 25-2	n/a		n/a						
Regen HX Out	PSIG	PI-12-95 Rk 25-2	n/a		n/a						
Non-Regen HX Out	PSIG	PI-12-96 Rk 25-2	n/a		n/a						
Non-Regen HX Out	F	TIS-12-99 Rk 25-2	n/a		n/a						
NRHX (RBCCW) Out	F	TC-104-5 Rk 25-2	n/a		n/a						
RWCU Demin Inlet	F	TIS-12-115 Rk 25-2	n/a		n/a						
(RWCU) Demin Effluent	PSIG	PI-12-113 Rk 25-2	n/a		n/a						

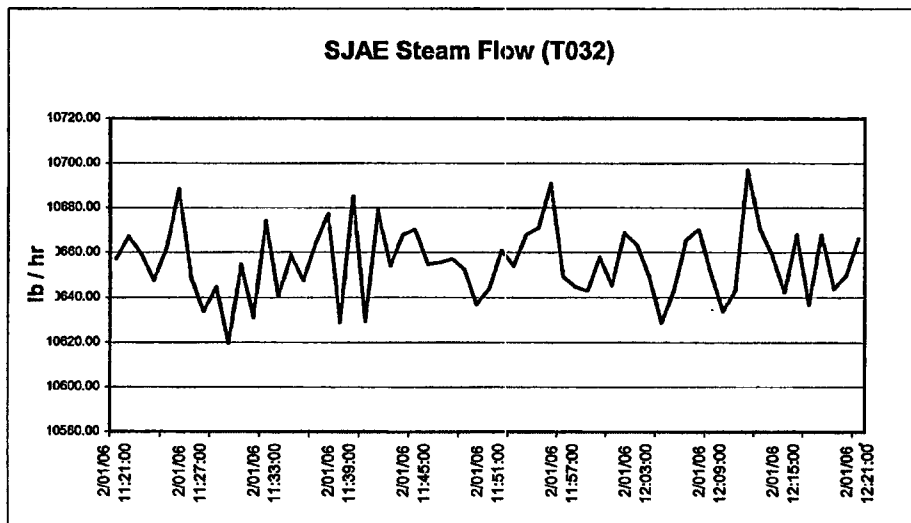
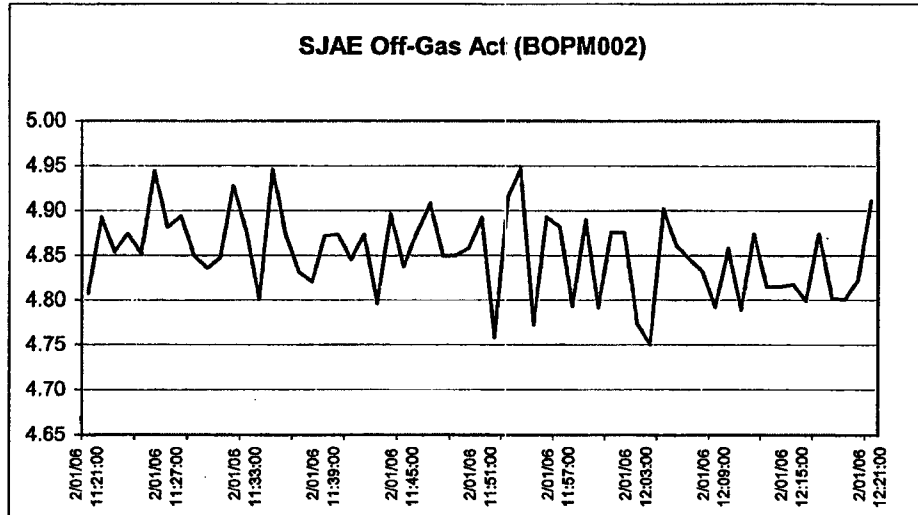
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 1752 MWth Data Recorded by: \_\_\_\_\_ / \_\_\_\_\_ Reviewed by: \_\_\_\_\_ / \_\_\_\_\_  
 1832 MWth Data Recorded by: \_\_\_\_\_ / \_\_\_\_\_ Reviewed by: \_\_\_\_\_ / \_\_\_\_\_  
 1912 MWth Data Recorded by: \_\_\_\_\_ / \_\_\_\_\_ Reviewed by: \_\_\_\_\_ / \_\_\_\_\_

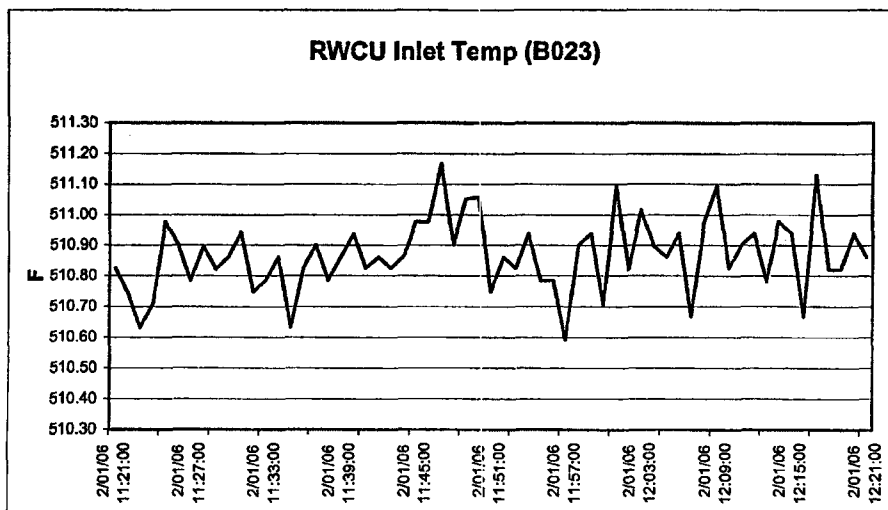
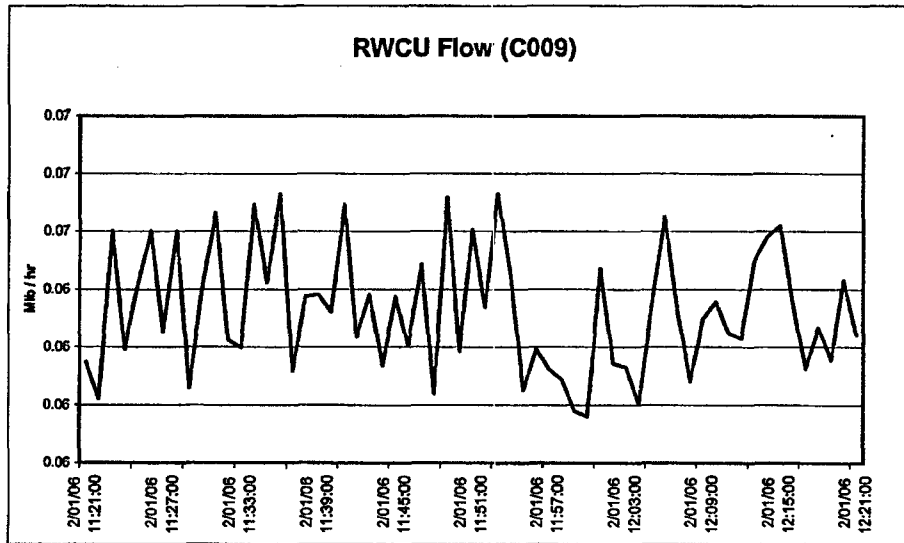
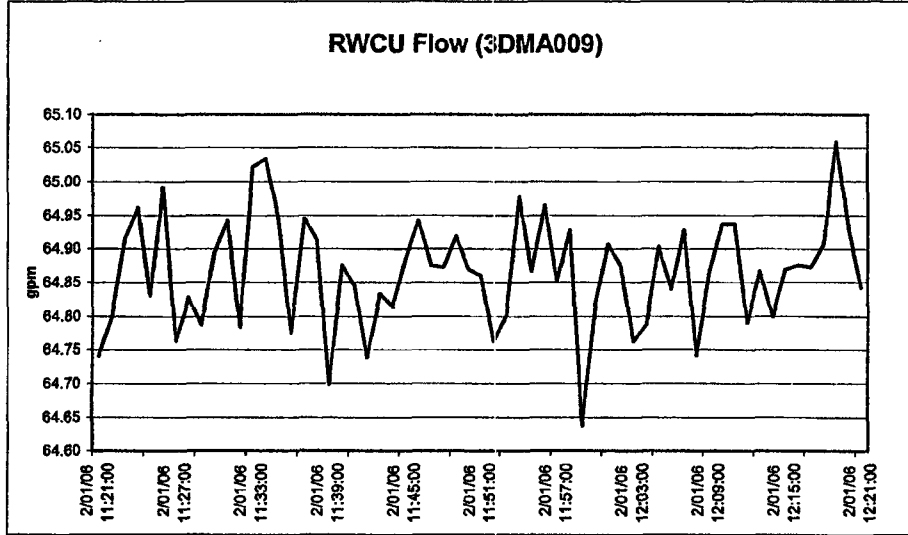
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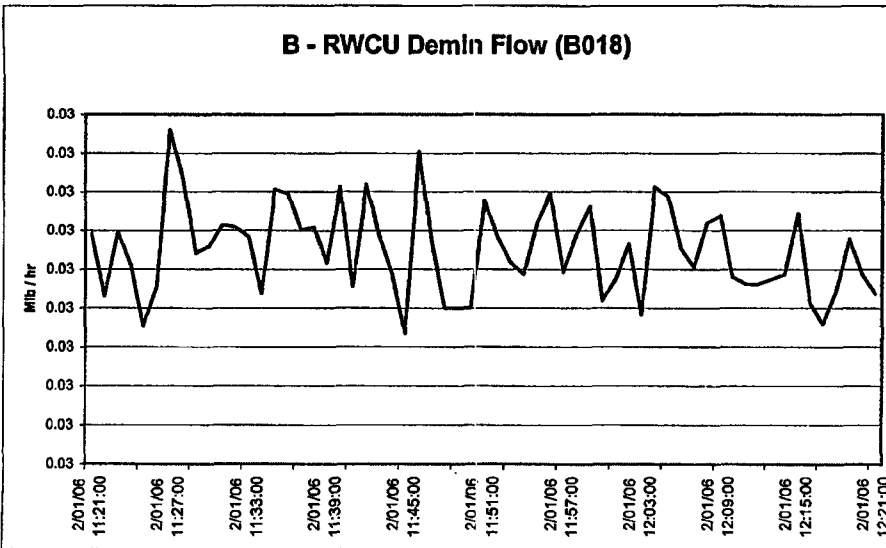
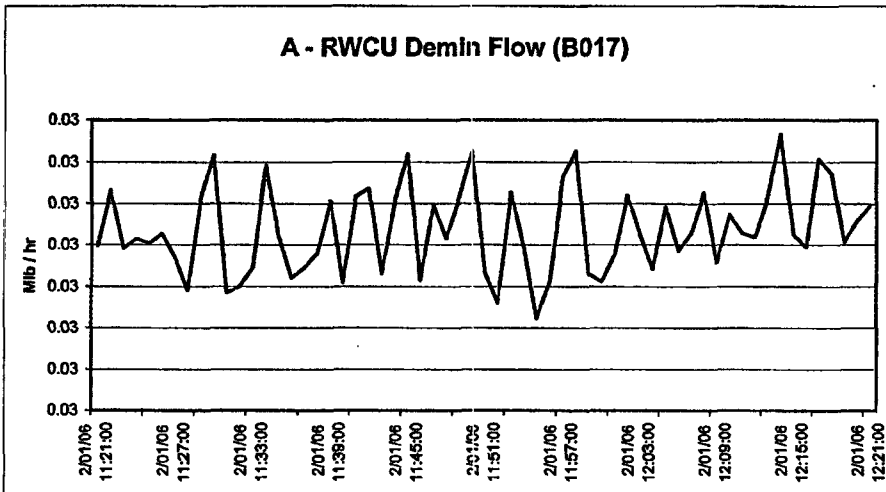
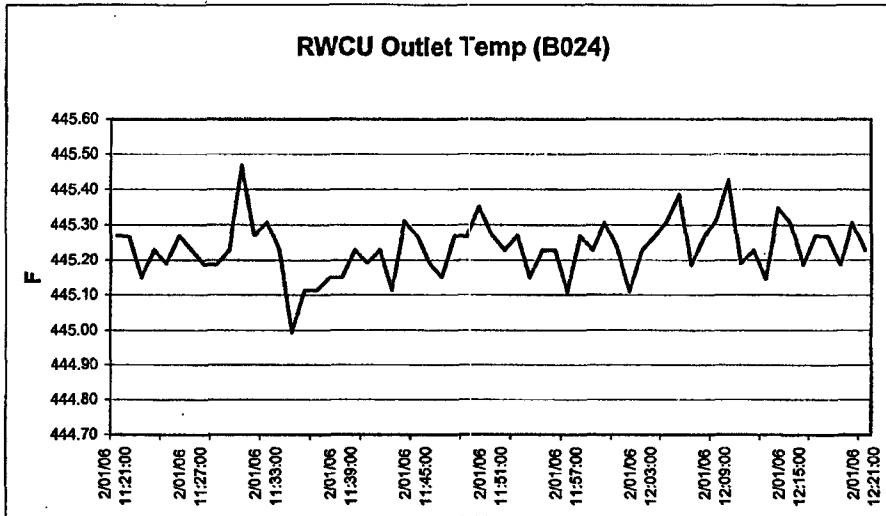
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		BOPM002	T032	3DMA009	C009	B023	B024	B017	B018	C039	B054	B055	BOP014
		SJAE								RWCU INLET			
		OFF								TEMP			
		GAS	SJAE	RWCU		RWCU	RWCU	RWCU	RWCU	RATE	RWCU	RWCU	RWCU
		ACT	STEAM	SYSTEM		SYSTEM	SYSTEM	DEMIN	DEMIN	OF	RECIRC	REGEN	LOOP
Point Description	1AV	1AV	FLOW	FLOW	FLOW	INLET	OUTLET	FLOW	FLOW	CHANGE	PUMP	HX	THERMAL
Engineering Units		LB/HR	GPM	MLB/HR	DEG F	DEG F	M#/HR	M#/HR	A	B	F/HR	GPM	DEG F
2/01/06 11:21:00	4.81	10657.03	64.74	0.06	510.82	445.27	0.03	0.03		0.01	154.49	184.35	1.43
2/01/06 11:22:00	4.89	10667.19	64.80	0.06	510.74	445.27	0.03	0.03		-0.19	154.49	184.16	1.43
2/01/06 11:23:00	4.85	10659.38	64.92	0.07	510.63	445.15	0.03	0.03		-0.12	154.49	184.21	1.44
2/01/06 11:24:00	4.87	10647.65	64.96	0.06	510.71	445.23	0.03	0.03		-0.99	154.49	184.45	1.43
2/01/06 11:25:00	4.85	10661.72	64.83	0.06	510.98	445.19	0.03	0.03		-0.94	154.49	184.12	1.43
2/01/06 11:26:00	4.94	10688.28	64.99	0.07	510.90	445.27	0.03	0.03		-0.77	154.49	184.64	1.44
2/01/06 11:27:00	4.88	10648.44	64.76	0.06	510.78	445.23	0.03	0.03		-0.38	154.49	184.16	1.43
2/01/06 11:28:00	4.89	10633.59	64.83	0.07	510.90	445.19	0.03	0.03		-0.18	154.49	184.16	1.44
2/01/06 11:29:00	4.85	10644.53	64.79	0.06	510.82	445.19	0.03	0.03		0.40	154.49	184.16	1.43
2/01/06 11:30:00	4.84	10619.53	64.89	0.06	510.86	445.23	0.03	0.03		0.73	154.49	184.21	1.43
2/01/06 11:31:00	4.85	10654.68	64.94	0.07	510.94	445.47	0.03	0.03		0.62	154.49	184.45	1.44
2/01/06 11:32:00	4.93	10631.25	64.78	0.06	510.75	445.27	0.03	0.03		0.68	154.49	184.26	1.43
2/01/06 11:33:00	4.88	10674.21	65.02	0.06	510.78	445.31	0.03	0.03		0.44	154.49	184.16	1.43
2/01/06 11:34:00	4.80	10640.62	65.03	0.07	510.86	445.23	0.03	0.03		0.00	154.49	184.49	1.43
2/01/06 11:35:00	4.95	10658.59	64.94	0.06	510.63	444.99	0.03	0.03		-0.58	154.49	184.16	1.43
2/01/06 11:36:00	4.87	10647.65	64.77	0.07	510.82	445.11	0.03	0.03		-0.58	154.49	184.26	1.44
2/01/06 11:37:00	4.83	10664.06	64.95	0.06	510.90	445.11	0.03	0.03		-0.65	154.49	184.16	1.43
2/01/06 11:38:00	4.82	10677.34	64.91	0.06	510.78	445.15	0.03	0.03		-0.53	154.49	184.07	1.43
2/01/06 11:39:00	4.87	10628.90	64.70	0.06	510.86	445.15	0.03	0.03		-0.25	154.49	184.21	1.43
2/01/06 11:40:00	4.87	10685.15	64.88	0.06	510.94	445.23	0.03	0.03		-0.08	154.49	184.17	1.43
2/01/06 11:41:00	4.85	10629.69	64.84	0.07	510.82	445.19	0.03	0.03		0.16	154.49	184.26	1.44
2/01/06 11:42:00	4.87	10678.91	64.74	0.06	510.86	445.23	0.03	0.03		0.51	154.49	184.21	1.43
2/01/06 11:43:00	4.80	10653.91	64.83	0.06	510.82	445.11	0.03	0.03		0.07	154.49	184.16	1.43
2/01/06 11:44:00	4.90	10667.97	64.81	0.06	510.86	445.31	0.03	0.03		0.07	154.49	184.54	1.43
2/01/06 11:45:00	4.84	10670.31	64.88	0.06	510.98	445.27	0.03	0.03		0.00	154.49	184.12	1.44
2/01/06 11:46:00	4.88	10654.68	64.94	0.06	510.98	445.19	0.03	0.03		-0.02	154.49	184.21	1.43
2/01/06 11:47:00	4.91	10655.47	64.88	0.06	511.17	445.15	0.03	0.03		0.16	154.49	184.40	1.44
2/01/06 11:48:00	4.85	10657.03	64.87	0.06	510.90	445.27	0.03	0.03		0.31	154.49	184.36	1.43
2/01/06 11:49:00	4.85	10652.34	64.92	0.07	511.05	445.27	0.03	0.03		0.46	154.49	184.21	1.43

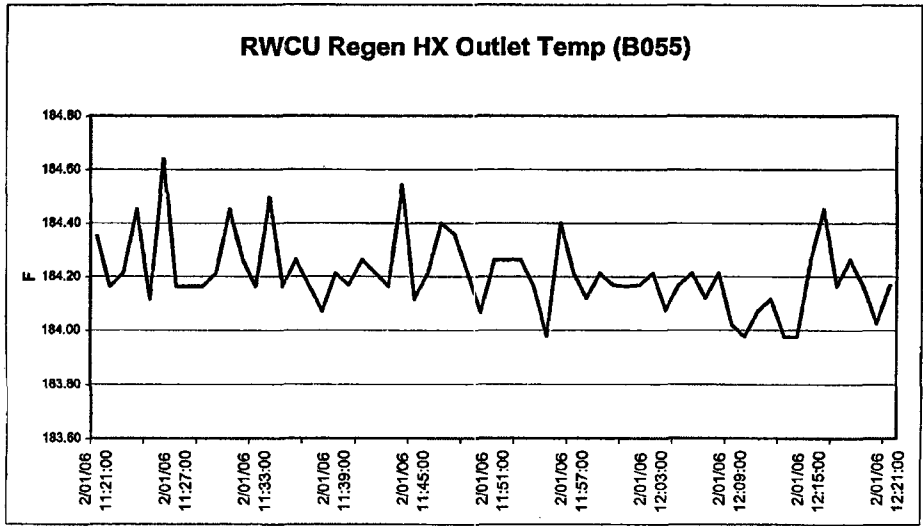
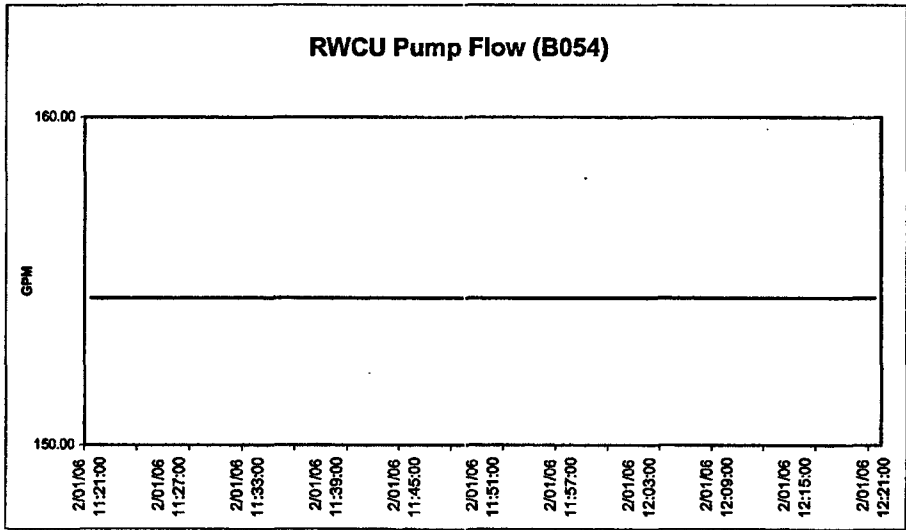
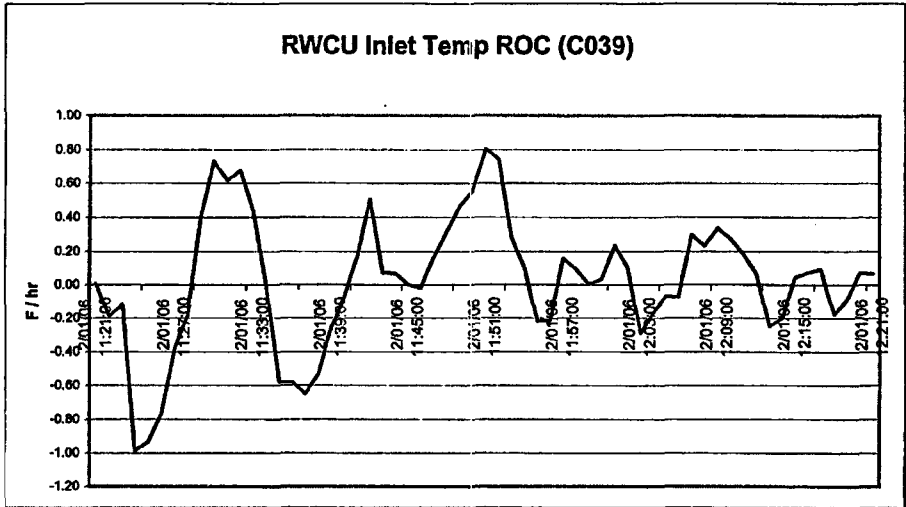
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2/01/06 11:51:00	4.89	10643.75	64.86	0.07	510.75	445.27	0.03	0.03	0.80	154.49	184.26	1.43
2/01/06 11:52:00	4.76	10660.94	64.76	0.06	510.86	445.23	0.03	0.03	0.74	154.49	184.26	1.44
2/01/06 11:53:00	4.91	10653.91	64.80	0.07	510.82	445.27	0.03	0.03	0.28	154.49	184.26	1.44
2/01/06 11:54:00	4.95	10667.97	64.98	0.06	510.94	445.15	0.03	0.03	0.10	154.49	184.16	1.43
2/01/06 11:55:00	4.77	10671.09	64.87	0.06	510.78	445.23	0.03	0.03	-0.22	154.49	183.98	1.43
2/01/06 11:56:00	4.89	10690.63	64.96	0.06	510.78	445.23	0.03	0.03	-0.22	154.49	184.40	1.43
2/01/06 11:57:00	4.88	10649.22	64.85	0.06	510.59	445.11	0.03	0.03	0.16	154.49	184.21	1.43
2/01/06 11:58:00	4.79	10644.53	64.93	0.06	510.90	445.27	0.03	0.03	0.09	154.49	184.12	1.43
2/01/06 11:59:00	4.89	10642.97	64.64	0.06	510.94	445.23	0.03	0.03	0.00	154.49	184.21	1.43
2/01/06 12:00:00	4.79	10657.81	64.82	0.06	510.71	445.31	0.03	0.03	0.03	154.49	184.17	1.43
2/01/06 12:01:00	4.88	10645.31	64.91	0.06	511.09	445.23	0.03	0.03	0.24	154.49	184.16	1.43
2/01/06 12:02:00	4.88	10668.75	64.88	0.06	510.82	445.11	0.03	0.03	0.10	154.49	184.17	1.43
2/01/06 12:03:00	4.77	10663.28	64.76	0.06	511.01	445.23	0.03	0.03	-0.29	154.49	184.21	1.43
2/01/06 12:04:00	4.75	10649.22	64.79	0.06	510.90	445.27	0.03	0.03	-0.17	154.49	184.07	1.43
2/01/06 12:05:00	4.90	10628.90	64.90	0.06	510.86	445.31	0.03	0.03	-0.07	154.49	184.17	1.44
2/01/06 12:06:00	4.86	10642.97	64.84	0.07	510.94	445.39	0.03	0.03	-0.07	154.49	184.21	1.44
2/01/06 12:07:00	4.85	10665.62	64.93	0.06	510.67	445.19	0.03	0.03	0.30	154.49	184.12	1.44
2/01/06 12:08:00	4.83	10670.31	64.74	0.06	510.97	445.27	0.03	0.03	0.23	154.49	184.21	1.43
2/01/06 12:09:00	4.79	10650.78	64.87	0.06	511.09	445.31	0.03	0.03	0.33	154.49	184.02	1.43
2/01/06 12:10:00	4.86	10633.59	64.94	0.06	510.82	445.43	0.03	0.03	0.27	154.49	183.98	1.44
2/01/06 12:11:00	4.79	10642.97	64.94	0.06	510.90	445.19	0.03	0.03	0.18	154.49	184.07	1.43
2/01/06 12:12:00	4.87	10696.87	64.79	0.06	510.94	445.23	0.03	0.03	0.06	154.49	184.12	1.43
2/01/06 12:13:00	4.81	10671.09	64.87	0.06	510.78	445.15	0.03	0.03	-0.25	154.49	183.98	1.43
2/01/06 12:14:00	4.81	10658.59	64.80	0.06	510.98	445.35	0.03	0.03	-0.20	154.49	183.98	1.44
2/01/06 12:15:00	4.82	10642.19	64.87	0.07	510.94	445.31	0.03	0.03	0.04	154.49	184.26	1.44
2/01/06 12:16:00	4.80	10667.97	64.88	0.06	510.67	445.19	0.03	0.03	0.07	154.49	184.45	1.43
2/01/06 12:17:00	4.87	10636.72	64.87	0.06	511.13	445.27	0.03	0.03	0.09	154.49	184.16	1.43
2/01/06 12:18:00	4.80	10667.97	64.91	0.06	510.82	445.27	0.03	0.03	-0.18	154.49	184.26	1.43
2/01/06 12:19:00	4.80	10643.75	65.06	0.06	510.82	445.19	0.03	0.03	-0.09	154.49	184.16	1.43
2/01/06 12:20:00	4.82	10650.00	64.93	0.06	510.94	445.31	0.03	0.03	0.07	154.49	184.03	1.44
2/01/06 12:21:00	4.91	10666.41	64.84	0.06	510.86	445.23	0.03	0.03	0.07	154.49	184.17	1.43

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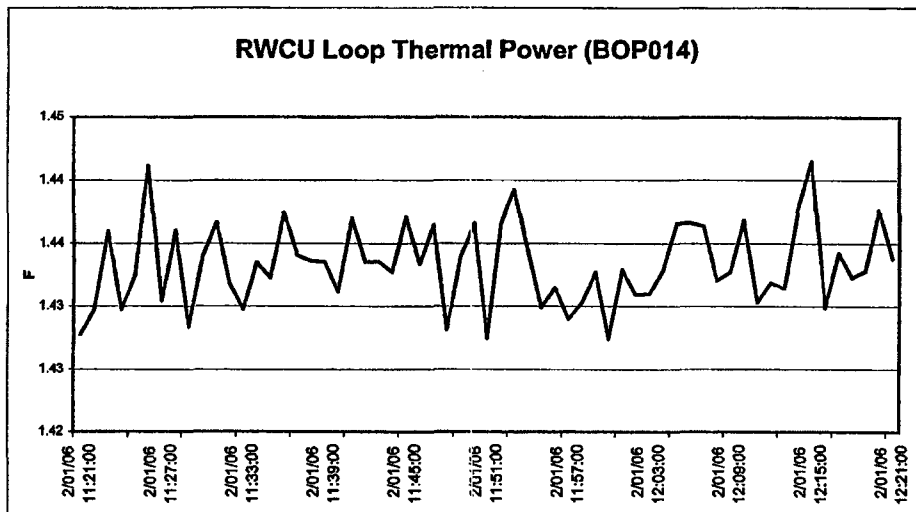












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**VYNPS EPU Power Ascension Testing  
Feedwater Control System Monitoring Plan  
(2 pages)**

## EPU Steady-State Nominal Operating Conditions

ERFIS PTID	Plant Parameter [Units]	Steady-State Nominal	CLTP [%]	EPU [%]	CLTP [%]	EPU [%]	CLTP [%]	EPU [%]	CLTP [%]	EPU [%]	CLTP [%]	EPU [%]	CLTP [%]	EPU [%]	CLTP [%]	EPU [%]	CLTP [%]	EPU [%]	CLTP [%]	EPU [%]	CLTP [%]	EPU [%]
			100.0	83.3	100.0	83.3	102.5	85.4	105.0	87.5	107.5	89.6	110.0	91.6	112.5	93.7	115.0	95.8	117.5	97.9	120.0	100.0
	Core Power Level (MWt)	Predicted																				
		Actual																			1133 MWt	
B060 B061	Core Power Level (MWt)	Predicted																				
		Actual																			1133 MWt	
C000	Total Steam Flow [Mlb/hr] (baseline)	Predicted	6.458	6.458	6.638	6.620	7.001	7.182	7.363	7.544	7.725	7.906										
		Actual	6.475	6.475	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<									
B065 B066	Loop B/C Steam Flow [Mlb/hr] (baseline / 4)	Predicted	1.615	1.615	1.660	1.705	1.750	1.796	1.841	1.886	1.931	1.977										
		Actual	1.615	1.615	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<									
B064 B067	Loop A/D Steam Flow [Mlb/hr] (baseline / 4) * 1.047	Predicted	1.690	1.690	1.736	1.785	1.833	1.880	1.927	1.975	2.022	2.069										
		Actual	1.699	1.699	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<									
C001	Total Feed Flow [Mlb/hr] (baseline)	Predicted	6.430	6.430	6.611	6.792	6.973	7.154	7.335	7.516	7.697	7.878										
		Actual	6.448	6.448	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<									
B015	Loop A Feed Flow [Mlb/hr] (baseline / 2) * 1.0152	Predicted	3.264	3.264	3.356	3.448	3.539	3.631	3.723	3.815	3.907	3.999										
		Actual	3.264	3.264	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<									
B016	Loop B Feed Flow [Mlb/hr] (baseline / 2) * 0.991	Predicted	3.198	3.198	3.276	3.366	3.455	3.545	3.634	3.724	3.814	3.904										
		Actual	3.185	3.185	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<									
B060	"A" Feed (Valve) Demand [%] (3 feed pump baseline)	Predicted	48.50	42.00	45.25	48.50	51.75	55.00	58.25	61.50	64.75	68.00										
		Actual	48.48	>> ALERT <<	>> ALERT <<	48.48	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<									
B061	"B" Feed (Valve) Demand [%] (3 feed pump baseline)	Predicted	48.50	42.00	45.25	48.50	51.75	55.00	58.25	61.50	64.75	68.00										
		Actual	48.51	>> ALERT <<	>> ALERT <<	48.51	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<									
B062	FRV "A" Stem Position [%] (3 feed pump baseline)	Predicted	48.50	42.00	45.25	48.50	51.75	55.00	58.25	61.50	64.75	68.00										
		Actual	47.83	>> ALERT <<	>> ALERT <<	47.83	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<									
B063	FRV "B" Stem Position [%] (3 feed pump baseline)	Predicted	48.50	42.00	45.25	48.50	51.75	55.00	58.25	61.50	64.75	68.00										
		Actual	47.50	>> ALERT <<	>> ALERT <<	47.50	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<	>> ALERT <<									

\*\*\* ALL PREDICTED DATA ASSUMES LINEAR EXTRAPOLATION BETWEEN 1983 AND 1912 \*\*\*

1673 MWh  
(87.5% EPU)

Date Recorded By / Date

Date Reviewed By / Date

1832 MWh  
(95.6% EPU)

Date Recorded By / Date

Date Reviewed By / Date

1752 MWh  
(91.6% EPU)

Date Recorded By / Date

Date Reviewed By / Date

1912 MWh  
(100.0% EPU)

Date Recorded By / Date

Date Reviewed By / Date

<b>ENN-DC-159</b>	<b>ENN System Monitoring Procedure</b>	<b>Performance Goals/Indicator:</b>	<b>Drawings and Procedures</b>
System Name:	Feedwater Flow Control System	as per System Health Reporting	5020-204
System Code:	FWC		OP 2172
System Engineer:	Stasolla		QT 3113
This Revision Is:	1.0 dtd 01/27/06		QT 3114
Date Approved:	Rev 1 PENDING (Rev 0.1 was June 2004)		OP 4172
System Is:	NNS, CDF-risk significant, single-failure vulnerable, RTG		QP 5353

<b>System Functions:</b>	MR-1 Provide the necessary instrumentation and control to maintain a pre-established water level in the reactor vessel during planned operation MR-2 Provide for both automatic and manual control of the system MR-3 Provide the necessary instrumentation inputs for Thermal Power calculations MR-4 Provide an essentially leak free reactor coolant pressure boundary for directly interfacing instrumentation MR-5 Provide the necessary controls to interlock with recirculation flow control (RR) system
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Equipment Name	Equipment No./ID	Critical	Parameter	Instrument	ERT	Freq	Acceptance Bands (Note 1)	Source	Reason or other info (Note 2)
SYSTEM	System	No	MRule Unavailability	N/A	T	M	0.64% / 3-year period	MRule	Scoping Basis
SYSTEM	System	No	MRule Reliability	N/A	T	M	3 MRFFs / 3-year period	MRule	Scoping Basis
STEAM FLOW 7P TRANSMITTERS; LOOPS A THROUGH D	FT-6-51A thru 51D	Yes	Steam Flow Detector 7P; Loops A thru D	ERFIS B022, B064-B067	MT	DW	[CLTP: ~ 1,820 Mib/hr @ 100%] [EPU: ~ 1,960 Mib/hr @ 100%]	ERFIS	Can be Trended via PSS; proportional to CTP
STEAM FLOW AMPLIFIERS / SQUARE ROOT EXTRACTORS; LOOPS A THROUGH D	FTA-6-73A thru 73D	Yes	Steam Flow; Loops A thru D	ERFIS B022 B064-B067	MT	DW	[CLTP: ~ 1,820 Mib/hr @ 100%] [EPU: ~ 1,960 Mib/hr @ 100%]	ERFIS	Can be Trended via PSS; proportional to CTP
TOTAL STEAM FLOW SUMMER	FSUM-6-75	Yes	Total Steam Flow	ERFIS B022; C000	MT	DW	[CLTP: ~ 6,460 Mib/hr @ 100%] [EPU: ~ 7,910 Mib/hr @ 100%]	ERFIS	Can be Trended via PSS; proportional to CTP
FEED FLOW 7P TRANSMITTERS; LOOPS A AND B	FT-6-50A / 50B	Yes	Feed Flow Detector 7P; Loops A and B	ERFIS B015, B016	MT	DW	[CLTP: ~ 3,210 Mib/hr @ 100%] [EPU: ~ 3,940 Mib/hr @ 100%]	ERFIS	Can be Trended via PSS; proportional to CTP
FEEDWATER FLOW AMPLIFIERS / SQUARE ROOT EXTRACTORS; LOOPS A AND B	FTA-6-110A / 110B	Yes	Feed Flow; Loops A and B	ERFIS B015, B016	MT	DW	[CLTP: ~ 3,210 Mib/hr @ 100%] [EPU: ~ 3,940 Mib/hr @ 100%]	ERFIS	Can be Trended via PSS; proportional to CTP. Also via Crossflow.
TOTAL FEEDWATER FLOW SUMMER	FPAM-6-103	Yes	Total Feed Flow	ERFIS C001	MT	DW	[CLTP: ~ 6,430 Mib/hr @ 100%] [EPU: ~ 7,880 Mib/hr @ 100%]	ERFIS	Can be Trended via PSS; proportional to CTP
STEAM FLOW - FEED FLOW ERROR AMPLIFIER	FPAM-6-74	Yes	Steam Flow / Feed Flow Mismatch	ERFIS B022, C001; C127	MT	DW	Internal	ERFIS	Can be Trended via PSS
VESSEL WATER LEVEL 7P TRANSMITTERS; CHANNELS A AND B	LT-6-52A / 52B	Yes	Level Detector 7P; Channels A and B	ERFIS B041, B042	MT	DW	165 - 165 inches	ERFIS	Can be Trended via PSS; dependent upon plant mode
3-ELEMENT ERROR AMPLIFIER	FPAM-6-104	Yes	Level Dominant - Flow Sensitive Control Signal Input	ERFIS B060, B061	MT	DW	Internal	ERFIS	Can be Trended via PSS
MASTER WATER LEVEL CONTROLLER	LC-6-63	Yes	Master Feed Flow Demand	ERFIS B060, B061	MT	DW	Internal	ERFIS	Can be Trended via PSS
INDIVIDUAL WATER LEVEL CONTROLLERS; LOOPS A AND B	RWC-6-84A / 84B	Yes	Demand to Individual Positioners; Loops A and B	ERFIS B060, B061	MT	DW	[CLTP: ~ 47% @ 100% (2 pumps) ~ 42% @ 100% (3 pumps) [EPU: ~ 66% @ 100% (3 pumps)]	ERFIS	Can be Trended via PSS
FRV POSITIONERS; LOOPS A AND B	VP-6-12A / 12B	Yes	Actual Valve Stem Position; FRV-A and FRV-B	ERFIS B062, B063	MT	DW	[CLTP: ~ 47% @ 100% (2 pumps) ~ 42% @ 100% (3 pumps) [EPU: ~ 66% @ 100% (3 pumps)]	ERFIS	Can be Trended via PSS

Note 1: Alert Level = Greater than Expected (> - 5%) Deviation from nominal @ 100% CTP; Action = Investigate Cause and/or Increase Monitoring  
 Action Level = Surveillance Requirements; Action = Initiate CR

Note 2: Process trending found in [\\vsbared1\data\enr\enr\System Engineering\System Performance Monitoring\Stasolla](#)

Note 3: Supplemental Monitoring for EPU Power Ascension found in [\\vsbared1\data\enr\enr\System Engineering\System Performance Monitoring\Stasolla\EPU Power Ascension.xls](#)

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**VYNPS EPU Power Ascension Testing**

**Nuclear Boiler System Monitoring Plan**

**(2 pages)**

Equipment Name	Equipment No./ID	Parameter	Para ID	Source	Freq	Alert and Action Level	Action Level	Actions Required	Reason or other info	1593 MwTh	1673 MwTh	1752 MwTh	1832 MwTh	1912 MwTh
Recirc MG Set	MG-1-1A/B	MG Set Motor and Generator Winding Temperatures	S000,S001 S002,S003 S004,S005 S006,S007	ERFIS	Recorded continuously / incorporate data into xls and graph	Motor Alarms at 220F, Gen alarms at 240F	Level 4	Evaluate	High temp degrades insulation					
Recirc MG Set	MG-1-1A/B	MG Set Motor and Generator Bearing Temperatures	S035-S050	ERFIS	Recorded continuously / incorporate data into xls and graph	Alarms at 160F	Level 4	Evaluate	High temp indicates bearing degradation					
Recirc MG Set	MG-1-1A/B	Vibration	N/A	AP-0211	Recorded continuously / incorporate data into xls and graph	Compare to baseline	Level 4	Evaluate						
Recirc MG Set	MG-1-1A/B	Thermography	N/A	AP-0211	Baselined @ 1593 MWth, Recorded Continuously, Incorporate Data into DB	Compare to baseline	Level 4	Evaluate						
Recirc Pump Motors	P-18-1A/B	Vibration	N/A	AP-0211	Recorded continuously / incorporate data into xls and graph	Per DP-0211	Level 4	Evaluate						
Recirc Pump Motors	P-18-1A/B	Winding Temperature	N/A	ERFIS	Recorded continuously / incorporate data into xls and graph	216F	Level 4	Evaluate						
Recirc Pump Motors	P-18-1A/B	Bearing Temperature	N/A	ERFIS	Baselined @ 1593 MWth, Recorded Continuously, Incorporate Data into DB	160F	Level 4	Evaluate						
Recirc Pumps	P-18-1A/B	Seal Stage Pressures	N/A	TM-2003-023	Recorded continuously / incorporate data into xls and graph	Deviation	Level 4	Evaluate						
Recirc Pumps	P-18-1A/B	Seal Stage Temperatures	N/A	ERFIS	Recorded continuously / incorporate data into xls and graph	160F	Level 4	Evaluate						

Jet Pumps	A-K, L-W	Pump dP	N/A	OP-4110	Daily	Per Procedure	Level 4	Evaluate						
									OE 17950 - The M-ratio of a jet pump is its suction flow divided by its drive flow.					
Jet Pumps	A-K, L-W	M-ratio	N/A	This is Proposed add to OP-4110	Daily	Per Procedure	Level 4	Evaluate						
SRVs		Tailpipe Temp	Tailpipe Baseline Dt	ERFIS	Continuous	Per OP-2122	Level 4	Evaluate / repair / rebaseline						
Pressure Boundary		Drywell Unidentified Leakage	N/A	OP 4152	Daily (recorded 4 times daily)	Per tech spec	Level 4	Per tech spec						
Steam Dryer		Moisture Carryover	N/A	Sample	Per STP	Attach 4	Level 2							
Steam Dryer		Dryer Failure	Numerous	ERFIS	ON 3178	Change from baseline	Level 4	Investigate	GE SIL 644 Supp 1					
AOG Recomb O2	CP-HWC-5	O2% $\geq 10\%$ to $< 15\%$		OP 0150	OP 2199	Change from baseline	Level 4	Evaluate						

1673 MwTh Data Recorded By: \_\_\_\_\_ Date: \_\_\_\_\_  
1673 MwTh Data Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_

1752 MwTh Data Recorded By: \_\_\_\_\_ Date: \_\_\_\_\_  
1752 MwTh Data Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_

1832 MwTh Data Recorded By: \_\_\_\_\_ Date: \_\_\_\_\_  
1832 MwTh Data Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_

1912 MwTh Data Recorded By: \_\_\_\_\_ Date: \_\_\_\_\_  
1912 MwTh Data Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_

NB EPU Performance Monitoring Plan



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**VYNPS EPU Power Ascension Testing**

**HVAC System Monitoring Plan**

**(2 pages)**



EPU Supplemental Performance Monitoring Plan for the HVAC System

Previously Monitored	Equipment No.	Parameter	Alarm Values/Limits	Level	1593 MWth 3-FDW Pmp (83.32%)	Increased Power Level Evaluation Points				Source
						1673 MWth (87.48%)	1752 MWth (91.65%)	1832 MWth (95.8%)	1912 MWth (100%)	
X	2 Computer Points	DW Average Temp elevation 250'	< 135 °F	4						VYOPF 4115.05
X	10 Computer Points	DW Average Temp below elevation 270'	< 150 °F	4						VYOPF 4115.05
X	6 Computer Points	DW Average Temp elevation 270' to 315'	< 185 °F	4						VYOPF 4115.05
X	4 Computer Points	DW Average Temp above elevation 315'	< 270 °F	4						VYOPF 4115.05
X	MN STM TE-2-126A	Steam Tunnel Temp	< 160 °F	4						VM-12-1 CRP 9-21
X	HPCI TE-23-105A	HPCI Steam Tunnel Temp	< 175 °F	4						VM-12-1 CRP 9-21
X	HPCI TE-23-105B	HPCI Steam Tunnel Temp	< 175 °F	4						VM-12-1 CRP 9-21
X	RCIC TE-13-77A	RCIC Steam Tunnel Temp	< 175 °F	4						VM-12-1 CRP 9-21
X	RCIC TE-13-77B	RCIC Steam Tunnel Temp	< 175 °F	4						VM-12-1 CRP 9-21
	TB Rm B-6	Feed Pumps Room average temp	< 105 °F	4						Hand Held Thermometer
	TB Rm B-3	Cond Pumps Room average temp	< 105 °F	4						Hand Held Thermometer

EPU Supplemental Performance Monitoring Plan for the HVAC System

Previously Monitored	Equipment No.	Parameter	Alarm Values/Limits	Level	1593 MWth 3-FDW Pmp (83.32%)	Increased Power Level Evaluation Points				Source
						1673 MWth (87.48%)	1752 MWth (91.65%)	1832 MWth (95.8%)	1912 MWth (100%)	

1593 MWth Data Recorded By:	_____	Date:	_____
1593 MWth Data Reviewed By:	_____	Date:	_____
1673 MWth Data Recorded By:	_____	Date:	_____
1673 MWth Data Reviewed By:	_____	Date:	_____
1752 MWth Data Recorded By:	_____	Date:	_____
1752 MWth Data Reviewed By:	_____	Date:	_____
1832 MWth Data Recorded By:	_____	Date:	_____
1832 MWth Data Reviewed By:	_____	Date:	_____
1912 MWth Data Recorded By:	_____	Date:	_____
1912 MWth Data Reviewed By:	_____	Date:	_____

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**VYNPS EPU Power Ascension Testing**

**Motors Monitoring Plan**

**(25 pages)**

Entergy Nuclear - Vermont Yankee  
Power Uprate Power Ascension Testing Performance Monitoring Plan

Component Engineer: Chris Kowal  
Component Engineer: Ron Scherman

						Power level							
						1630	1635	1640	1645	1650	1655	1660	1665
						85.40%	85.40%	85.40%	85.40%	85.40%	85.40%	85.40%	85.40%
						Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response								
Visual Inspection (VIS)	Engineer	Each Power level hold point	CE, SE	Evaluate	Evaluate motor material condition, audible noise.								
Vibration Motor (VIB)	AP 0211 CSI 2115, 2120	Each Power level hold point	CE		Evaluate motor material condition								
A Motor													
B Motor													
C Motor													
Vibration Pump (VIB)	AP 0211 CSI 2115, 2120	Each Power level hold point	CE		Evaluate Pump material condition								
A Pump													
B Pump													
C Pump													
Thermography (Therm)	Thermography cameras	Each Power level hold point	CE	Hot spots <10 Deg c	Investigate cause of high temp								
Pump Bearing Temp, Driven	ERFIS Points	Each Power level hold point	CE	180<deg F [200<deg F EPU] 212 S/D									
A	W027												
A	W028												
B	W033												
B	W034												
C	W039												
C	W040												
Pump Bearing Temp, Opp.	ERFIS Points	Each Power level hold point	CE	180<deg F [200<deg F EPU] 212 S/D									
A	W029												
B	W035												
C	W041												
Motor Thrust Bearing (front) Temp (B-Temp)	ERFIS Points W031, W037, W043	Each Power level hold point	CE	180<deg F [200<deg F EPU] 212 S/D	Investigate cause of high temp								
A	W031												
B	W037												
C	W043												
Motor Guide bearing (Rear) Temp (B-Temp)	ERFIS Points W032, W038, W044	Each Power level hold point	CE	178<deg F [200<deg F EPU] 212 S/D	Investigate cause of high temp								
A	W032												
B	W038												
C	W044												
Winding Temps (W-Temp)	ERFIS Points E026, E027, E028	Each Power level hold point	CE	<83 DEG C norm [100 deg C EPU] 93.4 exp @EPU	Investigate cause of high temp								
A	E026												
B	E027												
C	E028												
Equipment Status (Equip. Status)	Engineering Judgement	Periodic	Motor CE		Evaluate motor material condition								
Comments													

Functional Group: Condensate Pumps/Motors (P-22)						1685	1687	1712	1752	1782	1832	1872	1912
						85.40%	85.56%	89.56%	91.26%	93.73%	95.81%	97.60%	100%
						Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response								
Visual Inspection (VIS)	Craft / Engineer	Each Power level hold point	CE,SE	Evaluate	Evaluate motor material condition								
Vibration Motor (VIB)	AP 0211 CSI 2115, 2120	Each Power level hold point	CE		Evaluate motor material condition								
A													
B													
C													
Vibration Pump (VIB)	AP 0211 CSI 2115, 2120	Each Power level hold point	CE		Evaluate Pump material condition								
A													
B													
C													
Thermography (Therm)	Thermography cameras	Each Power level hold point	CE	Hot spots <10 Deg c	Investigate cause of high temp								
Upper Bearing Temp (B-Temp)	ERFIS Points E067, E069, E071	Each Power level hold point	CE	172 (160) <Deg F [163 (170) EPU] 200 lim	Investigate cause of high temp								
A	E067												
B	E069												
C	E071												
Lower bearing Temp (B-Temp)	ERFIS Points E068, E070, E072	Each Power level hold point	CE	150 (190) Deg F [172 (201) EPU] 200 Lim	Investigate cause of high temp								
A	E068												
B	E070												
C	E072												
Winding Temps (W-Temp)	ERFIS Points E029, E030, E031	Each Power level hold point	CE	108 (100) <deg C [115 (95) EPU] 120 lim	Investigate cause of high temp								
A	E031												
B	E030												
C	E031												
Equipment Status (Equip. Status)	Engineering Judgement	Periodic	Motor CE		Evaluate motor material condition								
Comments													

Function Group: W045, W047, W049, W048, W050, Motor CE							163%	171%	175%	179%	183%	187%	191%
							85.40%	87.40%	89.68%	93.73%	95.81%	97.90%	100%
							Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response								
Upper Bearing Temp (B-Temp)	ERFIS Points W045, W047, W049	Last power level	CE		Investigate cause of high temp								
A	W045												
B	W047												
C	W049												
Lower bearing Temp (B-Temp)	ERFIS Points W048, W048, W050	Last power level	CE		Investigate cause of high temp								
A	W048												
B	W048												
C	W050												
Equipment Status (Equip. Status)	Engineering Judgement	Periodic	Motor CE		Evaluate motor material condition								
Comments													

						1633	1712	1792	1853	1872	1912
						85.40%	89.58%	93.73%	95.81%	97.90%	100%
Functional Group: Circ Motor Boost Pump Motor (Pre)						Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response						
Visual Inspection (VIS)	Motor Engineer	Last power level	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition						
Upper Bearing Temp (B-Temp)	ERFIS Points W073, W076, W077	Last power level	CE	Run 176 <deg F Alarm 194 deg F S/D 210 deg F.	Investigate cause of high temp						
A	W073										
B	W076										
C	W077										
Lower bearing Temp (B-Temp)	ERFIS Points W074, W076, W078	Last power level	CE	Run 178 <deg F Alarm 194 deg F S/D 210 deg F.	Investigate cause of high temp						
A	W074										
B	W076										
C	W078										
Equipment Status (Equip. Status)	Engineering Judgement	Last power level	Motor CE		Evaluate motor material condition						
Comments											

Functional Group: Safety/Water Pump/Motors (R-7-4)						1633	1633	1712	1712	1792	1792	1872	1872
						85.40%	85.40%	89.56%	89.56%	93.73%	93.73%	97.90%	97.90%
						Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response								
Visual Inspection (VIS)	SE,CE	Each Power level hold point	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition								
Vibration (VIB)	AP 0211 CSI 2115, 2120	Each Power level hold point	CE	by others	Evaluate motor material condition								
A													
B													
C													
D													
Winding Temps (W-Temp)	ERFIS Points A: F070, F071, F072 B: F064, F065, F066 C: F067, F068, F069 D: F061, F062, F063	Each Power level hold point	CE	220 deg F	Investigate cause of high temp								
A	A: F070												
A	A: F071												
A	A: F072												
B	B: F064												
B	B: F065												
B	B: F066												
C	C: F067												
C	C: F068												
C	C: F069												
D	D: F061												
D	D: F062												
D	D: F063												
Pump Amperage	OP 0150		SE	<32 Amps	Evaluate motor material condition								
A													
B													
C													
D													
Equipment Status (Equip. Status)	Engineering Judgement	Each Power level hold point	Motor CE		Evaluate motor material condition								
Comments													





Functional Group	Motor/Pump/Motor (P-10)	Frequency	Plant Org	Alert/Action levels (range)	Response
Vibration (VIB)	BENTLY NEVADA	Each Power level hold point	CE	by others	Evaluate motor material condition
A					
Pump bearing temperatures @ speed	ERFIS Points S069, S071, M134, S072, S074, M135	Each Power level hold point	CE		
A	M134				
A	A: S069				
A	A: S071				
B	M135				
B	B: S072				
B	B: S074				
Motor Upper Bearing Temp	ERFIS Points S051, S052, S053, S054,	Each Power level hold point	CE	140 deg f	Investigate cause of high temp
A	S051				
A	S052				
B	S053				
B	S054,				
Motor Lower bearing Temp	ERFIS Points S055, S056, S057, S058	Each Power level hold point	CE	140 deg f	Investigate cause of high temp
A	S055				
A	S056				
B	S057				
B	S058				
Winding Temps (W-Temp)	ERFIS Points S060, S060, S061, S062, S063, S064	Each Power level hold point	CE	220 deg F	Investigate cause of high temp
A	S059				
A	S060				
A	S061				
B	S062				
B	S063				
B	S064				
Equipment Status (Equip. Status)	Engineering Judgement	Each Power level hold point	Motor CE		Evaluate motor material condition
Comments					

Functional Group: Code Spray Pump Motors (P-4ds)						1653	1712	1792	1872	1912
						85.40%	89.66%	89.73%	97.90%	100%
						Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response					
Visual Inspection (VIS)	CE, SE	Last power level	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition					
Equipment Status (Equip. Status)	Engineering Judgement	Last power level	Motor CE		Evaluate motor material condition					
Comments										
Functional Group: Resin MG-5A Motors (MG-5A) MG-5B										
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response					
Visual Inspection (VIS)	CE, SE	Each Power level hold point	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition					
Vibration (VIB)	AP 0211 CSI 2115, 2120	Each Power level hold point, and during power level changes	CE		Evaluate motor material condition					
A Motor										
A Generator										
B Motor										
B Generator										
Motor Bearing Temp	ERFI S points A: S043, S044 B: S045, S046	Each Power level hold point	CE	<200 deg F, S/d	Investigate cause of high temp					
A	S043									
A	S044									
B	S045									
B	S046									
Generator Bearing Temp	ERFI S points A: S047, S048 B: S049, S050	Each Power level hold point	CE	<200 deg F, S/d	Investigate cause of high temp					
A	S047									
A	S048									
B	S049									
B	S050									
Motor Winding Temps	ERFI S points S000, S001, S002, S003	Each Power level hold point	CE	220 deg F Lim	Investigate cause of high temp					
A	S000									
A	S001									
B	S002									
B	S003									
Generator Winding Temps (W-Temp)	ERFI S Points S004, S005, S006, S007	Each Power level hold point	CE	220 deg F Lim	Investigate cause of high temp					
A	S004									
A	S005									
B	S006									
B	S007									
Equipment Status (Equip. Status)	Engineering Judgement	Each Power level hold point	Motor CE		Evaluate motor material condition					
Comments										

						1633	1712	1792	1872	1912
						65.40%	82.59%	83.73%	97.90%	100%
						Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:
Functional Group: CRD Pump Motors (R38)										
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response					
Visual Inspection (VIS)	CE, SE	Periodic	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition					
Equipment Status (Equip. Status)	Engineering Judgement	Last Power Level	Motor CE		Evaluate motor material condition					

**Entergy Nuclear - Vermont Yankee  
Performance Parameter Spreadsheet  
Component Type: Motors**

Component Engineer: Chris Kowal

Functional Group: All Functional Groups		Performance Parameters (Color)									
(Assigned Color)		Deferred PM's	CM Backlog	EM Backlog	VIS	Oil	Temp	Pressure	B-Temp	W-Temp	WCIR
Equipment	Description										
P-1-1A	Feed Water Pump 5500HP	0	0	2		W					
P-1-1B	Feed Water Pump 5500HP	0	0	3		W					
P-1-1C	Feed Water Pump 5500HP	0	0	0		W					
P-2-1A	Condensate Pump 1500HP	0	0	0		W					
P-2-1B	Condensate Pump 1500HP	0	0	0		W					
P-2-1C	Condensate Pump 1500HP	0	0	0		Y					
P-5-1A	Circ Water Pump 1250HP	0	0	0		W					
P-5-1B	Circ Water Pump 1250HP	0	0	0		W					
P-5-1C	Circ Water Pump 1250HP	0	0	0		W					
P-6-1A	Circ Water Booster Pump 2500HP	0	0	0		W					
P-6-1B	Circ Water Booster Pump 2500HP	0	0	0		W					
P-6-1C	Circ Water Booster Pump 2500HP	0	0	0		W					
P-7-1A	Service Water Pump 250HP	0	0	0		W					

[illegible]

P-38-1B	CRD pump 250HP	0	0	0	0	0	0	0	0				
UB	TC	0	0	0	0	0	0	0	0				
LB	TC	0	0	0	0	0	0	0	0				

NOTES: UB = upper bearing, LB = Lower bearing, TC = Thermocouple, SG = Sight glass, DP = drain pipe

Report for Quarter: 2005-Q4

			Reason for Assigned Color	Notes	
MEG	CS	Equip. Status			
C	Later		Leak - OP supply line OB Ret SG, OB BRG IB ret line SG		
	Later		Leak at oil supply line to Band OB		
	Later	W	Wedges showed cracking	MAJOR or 5.65 small leak IB oil supply line	
	Later		slight leak at bottom of motor		
	Later		New seal on leaking	MAJOR or 5.65	
	Later	W	Oil analysis showed increased sulfur wear		
	Later		UB or lower SG DV leaking		
	Later		UB or lower Sight gauge SG DV IB leaking		
	Later		UB or lower level overhaul lower IB DV		
	Later		UB SG in leaking		
C	Later				
	Later				
	Later	C	UB SG pipe leaking		
C	Later	C	Top cover and base wet - source unknown - possibly ratchet plate		



C	Later	C	Top cover and base wet - source unknown - possibly ratchet plate		
C	Later	C	slight oil leak at ubdp	Top cover wet - source unknown	
C	Later	C	1st Vibs on pump pad - motor OK	no tendon or threads - ubic vent - greens dirty	
C	Later	C	Base covered in oil - LB, DV or TC leak		
	Later		LB SG threaded fitting - weeping oil	Cooling coil needs replacement	groundnel cement
	Later		LB SG threaded fitting - weeping oil	Cooling coil needs replacement	groundnel cement
	Later			Cooling coil needs replacement	groundnel cement
	Later			Cooling coil needs replacement	groundnel cement
	Later		LB DV leak - war		
	Later				
	Later		LB DV leaks water	NO MORE WATER	NO MORE WATER
	Later		LB DV elbow joint - threads leaking		
	Later		Vibration increases - badly indicate - worse on several units		
	Later		Vibration increases - badly indicate - worse on several units		
	Later				
	Later				
	Later	W	Equipment on watch - 1st vibration on coupling		
C	Later	C	SG pipe between Motor and Excr		
C	Later	C			

	Later	Y	1. Oil Leak 2. Motor windings found degraded in visual inspection during OP 5235	Budget for new motor cut until 2007	
G	Later	C			
	Later	C			

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Functional Group 2 Cold Water Booster Pump Motors						85.40%	87.48%
						Time: Date:	Time: Date:
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response		
Visual Inspection (VIS)	Motor Engineer	Last power level	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition		
Upper Bearing Temp (B-Temp)	ERFIS Points W073, W075, W077	Last power level	CE	Run 176 <deg F Alarm 194 deg F S/D 210 deg F.	Investigate cause of high temp		
A	W073						
B	W075						
C	W077						
Lower bearing Temp (B-Temp)	ERFIS Points W074, W076, W078	Last power level	CE	Run 178 <deg F Alarm 194 deg F S/D 210 deg F.	Investigate cause of high temp		
A	W074						
B	W076						
C	W078						
Equipment Status (Equip. Status)	Engineering Judgement	Last power level	Motor CE		Evaluate motor material condition		
Comments							

Functional Group 3 Sewer Water Pump Motors						1633	1673
						85.40%	87.48%
						Time: Date:	Time: Date:
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response		
Visual Inspection (VIS)	SE, CE	Each Power level hold point	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition		
Vibration (VIB)	AP 0211 CSI 2115, 2120	Each Power level hold point	CE	by others	Evaluate motor material condition		
A							
B							
C							
D							
Winding Temps (W-Temp)	ERFIS Points A: F070, F071, F072 B: F064, F065, F066 C: F067, F068, F069 D: F061, F062, F063	Each Power level hold point	CE	220 deg F	Investigate cause of high temp		
A	A: F070						
A	A: F071						
A	A: F072						
B	B: F064						
B	B: F065						
B	B: F066						
C	C: F067						
C	C: F068						
C	C: F069						
D	D: F061						
D	D: F062						
D	D: F063						
Pump Amperage	OP 0180		SE	<32 Amps	Evaluate motor material condition		
A							
B							
C							
D							
Equipment Status (Equip. Status)	Engineering Judgement	Each Power level hold point	Motor CE		Evaluate motor material condition		
Comments							

1633	1673
85.40%	87.48%
Time: Date:	Time: Date:

Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response
Visual Inspection (VIS)	SE, CE	Last Power level	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition
Equipment Status (Equip. Status)	Engineering Judgement	Last Power level	Motor CE		Evaluate motor material condition
Comments					

Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response
Visual Inspection (VIS)	SE, CE	Last Power level	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition
Equipment Status (Equip. Status)	Engineering Judgement	Last Power level	Motor CE		Evaluate motor material condition
Comments					

1633	1673
85.40%	87.48%
Time: Date:	Time: Date:

Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response
Vibration (VIB)	BENTLY NEVADA	Each Power level hold point	CE	by others	Evaluate motor material condition
A					
B					
Pump bearing temperatures @ speed	ERFIS Points S069, S071, M134, S072, S074, M135	Each Power level hold point	CE		
A	M134				
A	A: S069				
A	A: S071				
B	M135				
B	B: S072				
B	B: S074				
Motor Upper Bearing Temp	ERFIS Points S051, S052, S053, S054	Each Power level hold point	CE	140 deg f	Investigate cause of high temp
A	S051				
A	S052				
B	S053				
B	S054				
Motor Lower bearing Temp	ERFIS Points S055, S056, S057, S058	Each Power level hold point	CE	140 deg f	Investigate cause of high temp
A	S055				
A	S056				
B	S057				
B	S058				
Winding Temps (W-Temp)	ERFIS Points S059, S060, S061, S062, S063, S064	Each Power level hold point	CE	220 deg F	Investigate cause of high temp
A	S059				
A	S060				
A	S061				
B	S062				
B	S063				
B	S064				
Equipment Status (Equip. Status)	Engineering Judgement	Each Power level hold point	Motor CE		Evaluate motor material condition
Comments					

Functional Group: Core Spray Pump Motors (P-40s)						1633	1673
						85.40%	87.48%
						Time: Date:	Time: Date:
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response		
Visual Inspection (VIS)	CE, SE	Last power level	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition		
Equipment Status (Equip. Status)	Engineering Judgement	Last power level	Motor CE		Evaluate motor material condition		
Comments							

Functional Group: Recirc. MG Set Motors (MG-1A, MG-1B)						1633	1673
						85.40%	87.48%
						Time: Date:	Time: Date:
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response		
Visual Inspection (VIS)	CE, SE	Each Power level hold point	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition		
Vibration (VIB)	AP 0211 CSI 2115, 2120	Each Power level hold point, and during power level changes	CE		Evaluate motor material condition		
A Motor							
A Generator							
B Motor							
B Generator							
Motor Bearing Temp	ERFI S points A: S043, S044 B: S045, S046	Each Power level hold point	CE	<200 deg F, 212 S/d	Investigate cause of high temp		
A	S043						
A	S044						
B	S045						
B	S046						
Generator Bearing Temp	ERFI S points A: S047, S048 B: S049, S050	Each Power level hold point	CE	<200 deg F, 212 S/d	Investigate cause of high temp		
A	S047						
A	S048						
B	S049						
B	S050						
Motor Winding Temps	ERFI S points S000, S001, S002, S003	Each Power level hold point	CE	220 deg F Lim	Investigate cause of high temp		
A	S000						
A	S001						
B	S002						
B	S003						
Generator Winding Temps (W-Temp)	ERFI S points S004, S005, S006, S007	Each Power level hold point	CE	220 deg F Lim	Investigate cause of high temp		
A	S004						
A	S005						
B	S006						
B	S007						
Equipment Status (Equip. Status)	Engineering Judgement	Each Power level hold point	Motor CE		Evaluate motor material condition		
Comments							

Functional Group: Recirc. Pump Motors (P-30s)						1633	1673
						85.40%	87.48%
						Time: Date:	Time: Date:
Parameter	Source	Frequency	Plant Org	Alert/Action levels (range)	Response		
Visual Inspection (VIS)	CE, SE	Periodic	Maint. E, CE, SE, ops	Evaluate	Evaluate motor material condition		
Equipment Status (Equip. Status)	Engineering Judgement	Last Power Level	Motor CE		Evaluate motor material condition		
Comments							

[illegible]





[illegible]

1712	1754	1792	1830	1867	1905
89.56%	93.89%	93.73%	93.85%	97.90%	98.00%
Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:	Time: Date:

[illegible]

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**VYNPS EPU Power Ascension Testing**

**Service Water System Monitoring Plan**

**(4 pages)**

EPU Supplemental Performance Monitoring Plan for the SW System

Previously Monitored	Equipment No.	Parameter	Alarm Values/Limits	Level	Pre PA Activity	Increased Power Level Evaluation Points				Source
						1593 MWth (83.32%)	1673 MWth (87.48%)	1752 MWth (91.65%)	1912 MWth (100%)	
	P-7-1A-D	Number of Pumps Running	2 during Feb/Mar (Note1)	2	Record # of Running Pumps	3 Pumps Running	3 Pumps Running	3 Pumps Running	3 Pumps Running	ERFIS - E516, E517, E518, E519
	PI-104-20A/B	SW Header Pressure	97-117 psig	2	Record Header Pressure	Pressure < 97 psig	Pressure < 97 psig	Pressure < 97 psig	Pressure < 97 psig	OP 0150.03 CRP 9-6
X	RD-17-332	SW Rad Monitor Flow	1.0 - 2.0 gpm (Note 2)	3	Record Flow	Flow > 2 gpm	Flow > 2 gpm	Flow > 2 gpm	Flow > 2 gpm	OP 0150.05 FI-104-332
X	P-7-1A	Running Amps	32 (Note 2)	2	Record Amps	Amps 31	Amps 31	Amps 31	Amps > 31	OP 0150.03 CRP 9-6
X	P-7-1B	Running Amps	32 (Note 2)	2	Record Amps	Amps 31	Amps 31	Amps 31	Amps > 31	OP 0150.03 CRP 9-6
X	P-7-1C	Running Amps	32 (Note 2)	2	Record Amps	Amps 31	Amps 31	Amps 31	Amps > 31	OP 0150.03 CRP 9-6
X	P-7-1D	Running Amps	32 (Note 2)	2	Record Amps	Amps 31	Amps 31	Amps 31	Amps > 31	OP 0150.03 CRP 9-6
X	P-7-1A-D	Motor Winding Temp	Monitored by Components							
	E-10-1A-D	H2 Temp	Monitored by Turbine Generator Program							
	E-25-1A&B	TLO Outlet Temp	Monitored by Turbine Generator Program							
	E-26-1A&B	SC Outlet Temp	Monitored by Turbine Generator Program							
	Alterex	Temp	Monitored by Turbine Generator Program							
	TRU-5	Condensate Pump Room	Monitored by HVAC Program							
	TRU-1,2,3,4	Feed Pump Room	Monitored by HVAC Program							
	RRU-17A&B	Steam Tunnel Temp	Monitored by HVAC Program							
	TCV-104-20	H2 Cooler Outlet	N/A	2	Record Valve Stem Position	75% Open	75% Open	75% Open	75% Open	TCV-104-20
	TCV-104-21	TLO Cooler Outlet	N/A	2	Record Valve Stem Position	75% Open	75% Open	75% Open	75% Open	TCV-104-21
X	E-22-1A&B	TBCCW Outlet Temp (TBCCW not SW)	< 100 °F (Note 3)	3	Record Outlet Temp	> 95° F	> 95° F	> 95° F	> 95° F	ERFIS - M042

EPU Supplemental Performance Monitoring Plan for the SW System

Previously Monitored	Equipment No.	Parameter	Alarm Values/Limits	Level	Pre PA Activity	Increased Power Level Evaluation Points				Source
						1593 MWth (83.32%)	1673 MWth (87.48%)	1752 MWth (91.65%)	1912 MWth (100%)	
	TCV-104-3	"A" TBCCW HX Outlet	N/A	3	Record Valve Stem Position	75% Open	75% Open	75% Open	75% Open	TCV-104-3
	TCV-104-6	"B" TBCCW HX Outlet	N/A	3	Record Valve Stem Position	75% Open	75% Open	75% Open	75% Open	TCV-104-6
X	E-8-1A	RBCCW Outlet Temp (RBCCW not SW)	< 100 °F (Note 3)	3	Record Outlet Temp	> 95° F	> 95° F	> 95° F	> 95° F	ERFIS - M008
X	E-8-1B	RBCCW Outlet Temp (RBCCW not SW)	< 100 °F (Note 3)	3	Record Outlet Temp	> 95° F	> 95° F	> 95° F	> 95° F	ERFIS - M009
X	E40-1A	"A" MGLO Outlet Temp (Oil not SW Temp)	< 140 °F (Note 2)	3	Record Outlet Temp	> 130° F	> 130° F	> 130° F	> 130° F	ERFIS - W082 ODMI CR-VTY-2005-02391
X	E40-1B	"B" MGLO Outlet Temp (Oil not SW Temp)	< 140 °F (Note 2)	3	Record Outlet Temp	> 130° F	> 130° F	> 130° F	> 130° F	ERFIS - W085 ODMI CR-VTY-2005-02391

Note 3	- From USFAR/TS
Note 2	- From Procedure or Alarm Set Point
Note 1	- Based on Review of Trending Data
	Manual adjustment of valve positions to control flow/temperature must be recorded

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_  
Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_

**SW EPU  
Monitoring Logs**

Equipment No.	Parameter	Alarm Values/Limits	Level	Increased Power Level Evaluation Points					Source
				1593 MWth	1673 MWth	1752 MWth	1832 MWth	1912 MWth	
P-7-1A-D	Number of Pumps Running	> 2 during Feb/Mar	2	2 Pumps Running					ERFIS - E516, E517, E518, E519
PI-104-20A/B	SW Header Pressure	97-117 psig	2	Pressure < 97 psig					OP 0150.03 CRP 9-6
RD-17-332	SW Rad Monitor Flow	1.0 - 2.0 gpm	3	Flow < 2 gpm					OP 0150.05 FI-104-332
P-7-1A	Running Amps	32	2	< 31					OP 0150.03 CRP 9-6
P-7-1B	Running Amps	32	2	< 31					OP 0150.03 CRP 9-6
P-7-1C	Running Amps	32	2	< 31					OP 0150.03 CRP 9-6
P-7-1D	Running Amps	32	2	< 31					OP 0150.03 CRP 9-6
TCV-104-20	H2 Cooler Outlet	N/A	2	<75% Open					TCV-104-20
TCV-104-21	TLO Cooler Outlet	N/A	2	<75% Open					TCV-104-21
E-22-1A&B	TBCCW Outlet Temp (TBCCW not SW)	< 100 °F	3	< 95° F					ERFIS - M042
TCV-104-3	"A" TBCCW HX Outlet	N/A	3	< 75% Open					TCV-104-3
TCV-104-6	"B" TBCCW HX Outlet	N/A	3	< 75% Open					TCV-104-6
E-8-1A	RBCCW Outlet Temp (RBCCW not SW)	< 100 °F	3	< 95° F					ERFIS - M008
E-8-1B	RBCCW Outlet Temp (RBCCW not SW)	< 100 °F	3	< 95° F					ERFIS - M009
E40-1A	"A" MGLO Outlet Temp (Oil not SW Temp)	< 140 °F	3	< 130° F					ERFIS - W082 ODMI CR-VTY-2005-02391



**SW EPU  
Monitoring Logs**

Equipment No.	Parameter	Alarm Values/Limits	Level	Increased Power Level Evaluation Points					Source
				1593 MWth	1673 MWth	1752 MWth	1832 MWth	1912 MWth	
E40-1B	"B" MGLO Outlet Temp (Oil not SW Temp	< 140 °F	3	< 130° F					ERFIS - W085 ODMI CR-VTY- 2005-02391

1673 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1673 MWth Data Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

1752 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1752 MWth Data Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

1832 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1832 MWth Data Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

1912 MWth Data Recorded By: \_\_\_\_\_

Date: \_\_\_\_\_

1912 MWth Data Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

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**VYNPS EPU Power Ascension Testing**  
**Turbine Generator System Monitoring Plan**  
**(6 pages)**

System Name: Stator Cooling  
System Code: SC  
System Engineer: Bob Swanson

Date Issued:

System Functions: MR-1 Provide cooling for the main generator  
MR-2 Provide necessary instrumentation to allow for identification of operational status.  
MR-3 Provide necessary signals to initiate a timed turbine trip

System Performance Goals/Indicator:

[SCW P&ID Click Here](#)

Equipment Name	Equipment No./ID	Critical	Parameter	Instrument	M/T	Freq	Acceptance Bands	Source	Reason or other info
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>Generator MWe</u>	ERFIS G002	M/T	D	~550 MWE	ERFIS	Can be Trended via PSS.
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>Stator Cooling Deionizer dP</u>	DPI-110-YGA-6	T	D	≤14 psid	<a href="#">OP 0105</a>	
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>Stator Cooling Filter dP</u>	DPI-110-YGA-4	T	D	<9 psid	<a href="#">OP 0105</a>	
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>Stator Winding Inlet Temperature</u>	ERFIS G021	T	D	~ 40 Deg C	ERFIS	Can be Trended via PSS.
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>Stator Winding Inlet Pressure</u>	PI-110-YGA-2	T	D	34-38 psig	<a href="#">OP 0105</a>	
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>Stator Winding Coolant Flow</u>	FIS-110-YFL-1	T	D	274-288 gpm	<a href="#">OP 0105</a>	
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>Generator Outlet Conductivity</u>	CDR-110-1, pt. 3	T	D	<0.3 µmho/cm	<a href="#">OP 0105</a>	
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>Deionizer Outlet Conductivity</u>			D			
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>H2 Purity</u>	ERFIS G001	M	D	> 95%	ERFIS	Can be Trended via PSS.
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>Machine Gas Temp</u>	ERFIS	M/T	D	30-50°C	<a href="#">OP 0105</a>	Can be Trended via PSS.
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>Machine Gas Pressure</u>	ERFIS G010	M/T	D	~ 45 psig	ERFIS	Can be Trended via PSS. ER950525_02
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	<u>H2 Usage</u>	FTT-110-H-1	T	D	~ .277 scfm	<a href="#">OP 0105</a>	

System Name: Turbine Lube Oil  
System Code: TLO  
System Engineer: Bob Swanson

Date Issued:

System Functions: MR-1 Provide lube oil for lubrication of the main turbine.  
MR-2 Provide sufficient oil pressure for control of MS system turbine control and turbine bypass valves and other MHC equipment.  
MR-3 Provide for emergency DC powered lube oil supply

System Performance Goals/Indicator:

[TLO P&ID Click Here](#)

Equipment Name	Equipment No./ID	Critical	Parameter	Instrument	M/T	Freq	Acceptance Bands	Source	Reason or other info
TG-1-1A	Turbine Lube Oil Cooler	Yes	Turbine Oil to Cooler Temperature	T024	T	D	130-140	ERFIS	
TG-1-1A	Turbine Lube Oil Cooler	Yes	Turbine Oil from Cooler Temperature	T025	T	D	110-120	ERFIS	
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	Turbine Brg Oil Pressure	W008	T	D	20-30	ERFIS	
TB-1	High Pressure Turbine	Yes	Turbine Brg 1 Oil Outlet	W011	T	D	10 / 15 / 35 deg Diff	ERFIS	Difference between Brg Metal and Oil drain temp
TB-1	High Pressure Turbine	Yes	Turbine Brg 2 Oil Outlet	W012	T	D	10 / 15 / 35 deg Diff	ERFIS	Difference between Brg Metal and Oil drain temp
TB-1A	Low Pressure Turbine	Yes	Turbine Brg 3 Oil Outlet	W013	T	D	10 / 15 / 35 deg Diff	ERFIS	Difference between Brg Metal and Oil drain temp
TB-1A	Low Pressure Turbine	Yes	Turbine Brg 4 Oil Outlet	W014	T	D	10 / 15 / 35 deg Diff	ERFIS	Difference between Brg Metal and Oil drain temp
TB-1B	Low Pressure Turbine	Yes	Turbine Brg 5 Oil Outlet	W015	T	D	10 / 15 / 35 deg Diff	ERFIS	Difference between Brg Metal and Oil drain temp
TB-1B	Low Pressure Turbine	Yes	Turbine Brg 6 Oil Outlet	W016	T	D	10 / 15 / 35 deg Diff	ERFIS	Difference between Brg Metal and Oil drain temp
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	Generator Brg 7 Oil Outlet	W017	T	D	10 / 15 / 35 deg Diff	ERFIS	Difference between Brg Metal and Oil drain temp
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	Generator Brg 8 Oil Outlet	W018	T	D	10 / 15 / 35 deg Diff	ERFIS	Difference between Brg Metal and Oil drain temp
Alterrex	Exciter	Yes	Exciter Brg 9 Oil Outlet	W019	T	D	10 / 15 / 35 deg Diff	ERFIS	Difference between Brg Metal and Oil drain temp
Alterrex	Exciter	Yes	Exciter Brg 10 Oil Outlet	W020	T	D	10 / 15 / 35 deg Diff	ERFIS	Difference between Brg Metal and Oil drain temp

System Name: Seal Oil  
System Code: SO  
System Engineer: Bob Swanson

Date Issued:

System Functions: MR-1 Provide shaft sealing for the main generator.

MR-2 Provide for emergency DC powered seal oil supply.

System Performance Goals/Indicator:

[SO P&ID Click Here](#)

Equipment Name	Equipment No./ID	Critical	Parameter	Instrument	M/T	Freq	Acceptance Bands	Source	Reason or other info
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	Hydrogen Seal Oil Pressure Bearing	W009	T	D	45-51	ERFIS	Trending Available In System 1
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	Hydrogen Seal Oil Pressure Bearing	W010	T	D	45-52	ERFIS	Trending Available In System 1
TG-1-1A	STEAM TURBINE GENERATOR UNIT	Yes	Seal Oil / Gas Pressure Differential	Calculation	T	D	8 PSID	ERFIS	Trending Available In System 1

<b>System Name:</b>	Turbine Generator	<b>Date Issued:</b>		<b>TG System Functions:</b>	MR-1 Convert the thermodynamic energy of steam to provide electrical energy MR-2 Provide automatic and manual controls via both the EPR and the MPR MR-3 Control steam flow and pressure to the turbine to protect the turbine from overpressure or excessive speed MR-4 Provide for automatic turbine generator trip under appropriate conditions MR-5 Provide for automatic and manual control of turbine speed, load, and trip MR-6 Provide for monitoring and control of generator hydrogen (H2) purity and
<b>System Code:</b>	TG				
<b>System Engineer:</b>	Bob Swanson				
<b>System Performance Goals/Indicator:</b>		<b>Main Steam Functions Below</b>			
<a href="#">MS P&amp;ID Click Here</a>					

#### MS Functions

- 1) Conduct steam provided from the NB system to the main turbine at a controlled pressure during normal operation.
- 2) Provide a supply of steam to the Extraction Steam (ES) system.
- 3) Provide a supply of steam to the Auxiliary Steam (AS) system.
- 4) Provide a supply of steam at a controlled pressure for turbine shaft sealing.
- 5) Bypass steam directly to the main condenser to control reactor pressure via automatic and local-manual control.
- 6) Control steam flow and pressure to the the main turbine to protect the turbine from overpressure or excessive speed.
- 7) Provide signal for MSIV closure on low turbine inlet pressure.
- 8) Provide signal for Turbine Trip on high exhaust hood temperature.
- 9) Provide necessary mechanical support to ensure accomplishment of other safety related functions (i.e., piping integrity to ensure reactor coolant pressure boundary and containment boundry functions).

Main Turbine	TB-1	Yes	Turb/Gen Brng 9 Vibration	System 1	T	D	< 6 mils, 1 Mil Delta	ERFIS	Reason or other info
Main Turbine	TB-1	Yes	Turb/Gen Brng 10 Vibration	System 1	T	D	< 6 mils, 1 Mil Delta	ERFIS	
Main Turbine	TB-1	Yes	Turb/Gen Front Thrust Oil Outlet	W021	T	D	< 130,150 deg F	ERFIS	Can be Trended via PSS.
Main Turbine	TB-1	Yes	Turb/Gen Rear Thrust Oil Outlet	W022	T	D	< 130,150 deg F	ERFIS	
Main Turbine	TB-1	Yes	Turb/Gen Front Thrust Bearing Metal	W023	T	D	< 130,150 deg F	ERFIS	
Main Turbine	TB-1	Yes	Turb/Gen Rear Thrust Bearing Metal	W024	T	D	< 130,150 deg F	ERFIS	Can be Trended via PSS.
Main Turbine	TB-1	Yes	Thrust Bearing Wear	Turbine End	T	D	20, 40 mils	ERFIS	
Main Turbine	TB-1	Yes	Thrust Bearing Wear	Generator End	T	D	20, 40 mils	ERFIS	
Intercept Valve	CIV 1/2	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 1/2	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 3/4	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 3/4	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 1	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 1	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 2	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 2	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 3	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 3	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 4	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	

Intercept Valve	CIV 4	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 1	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 1	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 2	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 2	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 3	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 3	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 4	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Intercept Valve	CIV 4	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1A-1	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1A-1	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1B-2	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1B-2	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1A-3	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1A-3	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1B-4	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1B-4	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1A-5	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1A-5	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1B-6	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1B-6	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1A-7	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1A-7	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1B-8	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1B-8	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1A-9	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1A-9	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1B-10	Yes	Stroke Time Open	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Bypass Valves	Z-1B-10	Yes	Stroke Time Closed	StopWatch	T	Q	OP 4160 (10% 20%)	OP-4160	
Alterrex	Alterrex	Yes	ALTERREX EXCITER TEMP SLOT 1	G025	T	D	5 Deg, 10 deg dev	ERFIS	
Alterrex	Alterrex	Yes	ALTERREX EXCITER TEMP SLOT 2	G026	T	D	5 Deg, 10 deg dev	ERFIS	
Alterrex	Alterrex	Yes	ALTERREX EXCITER TEMP SLOT 3	G027	T	D	5 Deg, 10 deg dev	ERFIS	
Alterrex	Alterrex	Yes	GENERATOR SLOTS	G039 - G158	T	D	2 deg, 5 deg dev	ERFIS	
Generator	TG-1-1A	Yes	GENERATOR HYD PRESSURE psig	G010	T	D	>43, >41	ERFIS	
Generator	TG-1-1A	Yes	HYDROGEN TEMP TO COOLER A	G012	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	HYDROGEN TEMP OUT COOLER A	G017	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	Cooler A Delta	Calculation	T	D	2 deg, 5 deg dev	Calculation	
Generator	TG-1-1A	Yes	HYDROGEN TEMP TO COOLER B	G013	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	HYDROGEN TEMP OUT COOLER B	G018	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	Cooler B Delta	Calculation	T	D	2 deg, 5 deg dev		
Generator	TG-1-1A	Yes	HYDROGEN TEMP TO COOLER C	G014	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	HYDROGEN TEMP OUT COOLER C	G019	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	Cooler C Delta		T	D	2 deg, 5 deg dev		

Generator	TG-1-1A	Yes	HYDROGEN TEMP TO COOLER D	G015	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	HYDROGEN TEMP OUT COOLER D	G020	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	Cooler D Delta	Calculation	T	D	2 deg, 5 deg dev		
Generator	TG-1-1A	Yes	Stator Coolant Temp Rise		T	D	2 deg, 5 deg dev	ERFIS	
Generator	TG-1-1A	Yes	ALTERREX AIR OUT TEMP	G023	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	ALTERREX AIR IN TEMP	G024	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	Alterex Air Temp Rise	Calculation	T	D	2 deg, 5 deg dev		
Generator	TG-1-1A	Yes	COOLANT TEMP OUT STATOR WINDING G022	G022	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	COOLANT TEMP IN STATOR WINDING G021	G021	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	COOLANT TEMP Rise STATOR WINDING	Calculation	T	D	2 deg, 5 deg dev		
Generator	TG-1-1A	Yes	GEN H2 GAS TEMP RISE	C027	T	D	2 deg, 5 deg dev	ERFIS	
Generator	TG-1-1A	Yes	GEN HOT GAS AVERAGE TEMP	C028	T	D	5 Deg, 10 deg dev	ERFIS	
Generator	TG-1-1A	Yes	GEN COLD GAS AVERAGE TEMP	C063	T	D	5 Deg, 10 deg dev	ERFIS	



**Attachment 3**

Vermont Yankee Nuclear Power Station  
Proposed Technical Specification Change No. 263  
Extended Power Uprate – Regulatory Commitment  
Information Regarding Steam Dryer Monitoring and FIV Effects  
Data Acquisition System for Steam Dryer Pressure Signals

Vermont Yankee Nuclear Power Station  
Data Acquisition System for Steam Dryer Pressure and Accelerometer Signals

In Reference 1<sup>1</sup> Entergy committed to installing 32 additional strain gages (SG) on the main steam piping during the Fall 2005 refueling outage (RFO-25) to enhance the data acquisition system (DAS) and improve the accuracy of the steam dryer measurement system. The improvements in detection accuracy will reduce the measurement uncertainty associated with the acoustic circuit model. The commitment was met through the installation of 48 new strain gages and upgrades to the data acquisition system. Temporary Alteration change number TA-2005-15 R1 installed 48 new strain gages during RFO-25.

The DAS consists of strain gages, instrument cabling located inside the drywell, and a computer located in the reactor building. There is second data acquisition system in the turbine building to collect accelerometer data from piping in the heater bay area. Both systems are remotely accessed over a local area network thereby minimizing test engineer dose during power ascension testing.

Weldable, 350 ohm, high temperature strain gages with shielded high temperature cables were installed on the outside circumference of each of the four main steam lines inside the drywell at 60 degrees apart from at the locations described in Figure EMEB-B-77-1, Sheet 2 (see Attachment 3 to Reference 1). Installation of 6 strain gauges at each data input location provides for improved assessment of internal pressure. Each strain gage is configured in a quarter bridge arrangement rather than 1/2 bridge arrangement. The quarter bridge arrangement and 6 gages provide margin for signal failures. An update to Figure EMEB-B-77-1, Sheet 2 is included in the attached portions of the Temporary Alteration.

The upgrades to the DAS included 16-bit USB Digitizer with a sample rate of 200 kS/s. mounted in each chassis. Mounting the digitizer in the chassis eliminates noise introduced by the computer. There are 3 DC chassis for the SG signals and 1 AC chassis for the accelerometer signals. The SG chassis noise was eliminated by providing external power to the DC powered fans in the chassis. The Endevco 7703A-100 accelerometer units are each screwed to a mounting block that is strapped to the pipe. The accelerometer signal is routed to a charge converter in the drywell. The charge converter connects to an Endevco power supply located outside the drywell. The accelerometer signals are then routed to NI voltage conditioning cards then to a 16 bit digitizer. There is one personal computer controlling the 48 strain gages and 31 accelerometers for temporal collection of acceleration and strain data from the drywell.

Strain acquisition software allows for automatic Wheatstone bridge null and calibration prior to each data acquisition. The data acquisition software allows variation in acquisition rate, acquisition period, and voltage span to best define the input signal. The accelerometer circuits are tested with a calibrated shaker to confirm the hardware and software are functioning properly. The data is processed with two software packages—MatLab and LabView—for cross checking results.

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<sup>1</sup> Entergy letter to U.S. Nuclear Regulatory Commission, "Vermont Yankee Nuclear Power Station, Technical Specification Proposed Change No. 263 – Supplement No. 33, Extended Power Uprate – Response to Request for Additional Information," BVS 05-084, September 14, 2005

The Labview software will also calculate and plot the power spectral density data for each channel and display this data while running. Batch files have been developed efficiently to process the archived data with MatLab for Engineering evaluation and reporting.

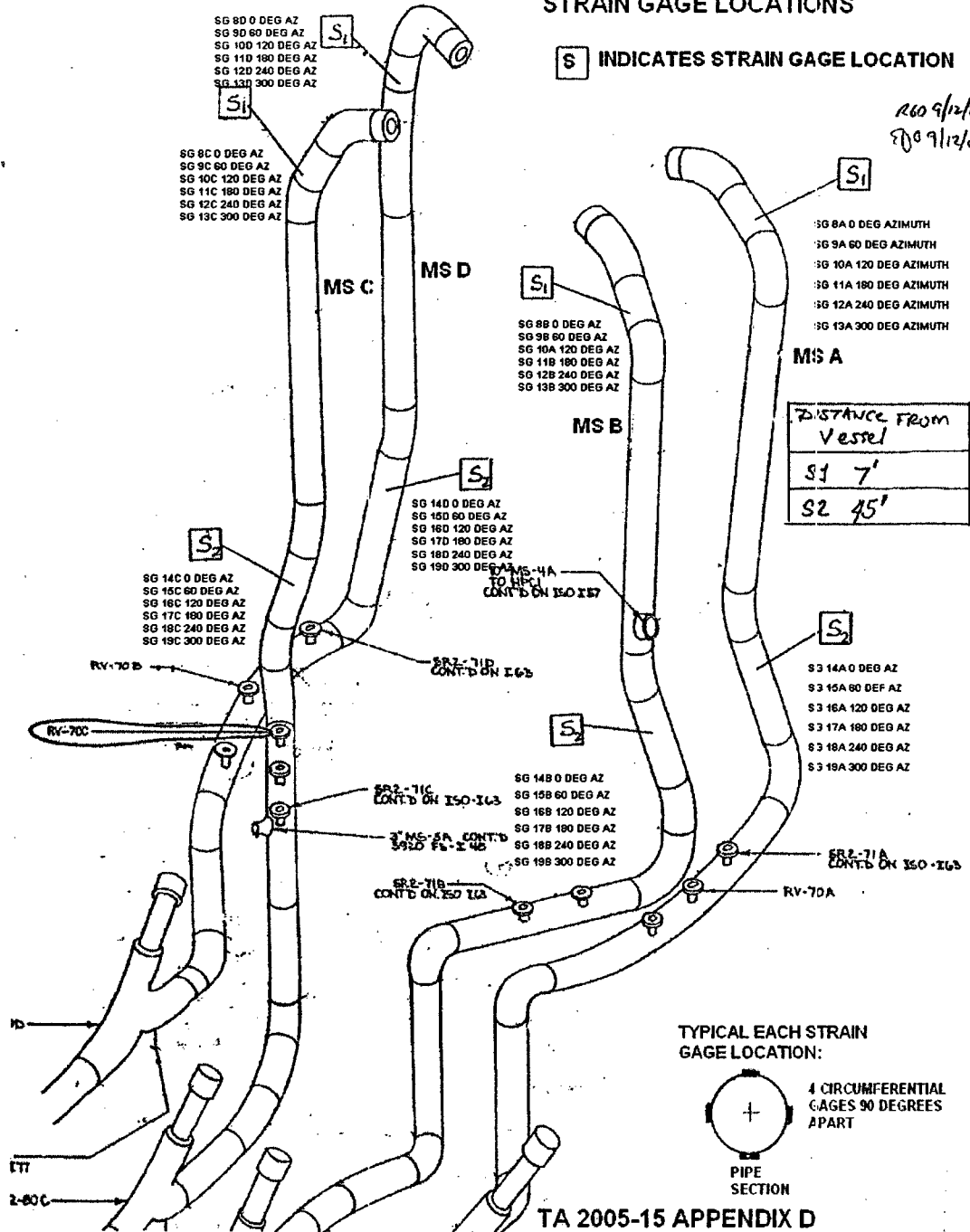
Temporary Alteration 2005-15 Installation of Strain Gages on the Main Steam Line  
Piping in the Drywell REV-01

**APPENDIX 'D'**  
**TEMPORARY ALTERATION SKETCHES**

Temporary Alteration 2005-15 Installation of Strain Gages on the Main Steam Line  
Piping in the Drywell REV-01

VY MAIN STEAM LINES PROPOSED  
STRAIN GAGE LOCATIONS

**S** INDICATES STRAIN GAGE LOCATION

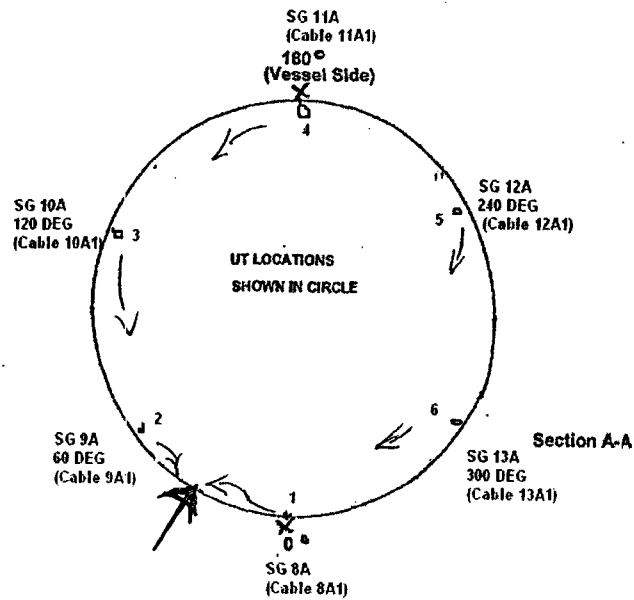
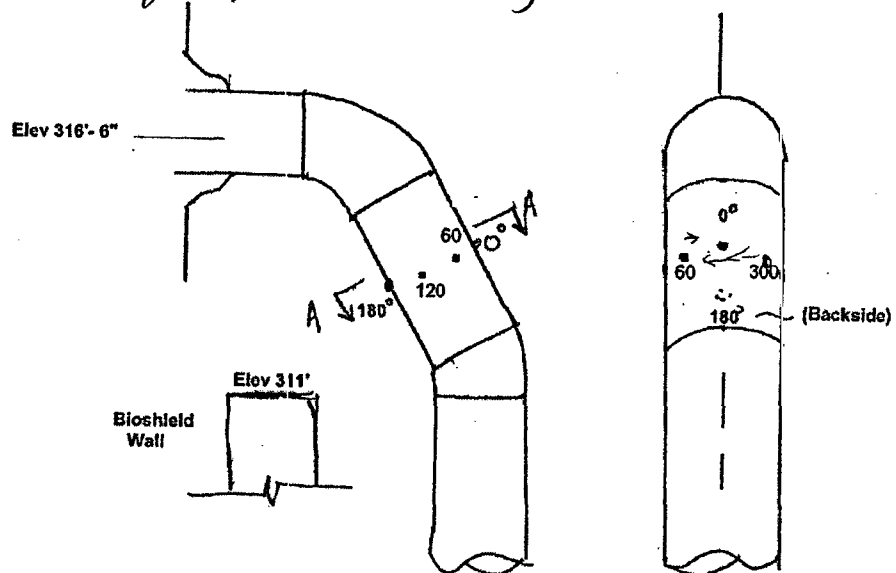


Temporary Alteration 2005-15 Installation of Strain Gages on the Main Steam Line  
Piping in the Drywell REV-01

TA 2005-15 APPENDIX D SKETCH 04 PAGE 1 OF 8 MAIN STEAM LINE 'A'

UPPER STRAIN GAGE LOCATION AND "UT" TEMPLATE

Prepared By Larry Spence Reviewed By E J B. H.  
10/18/05 10/18/05

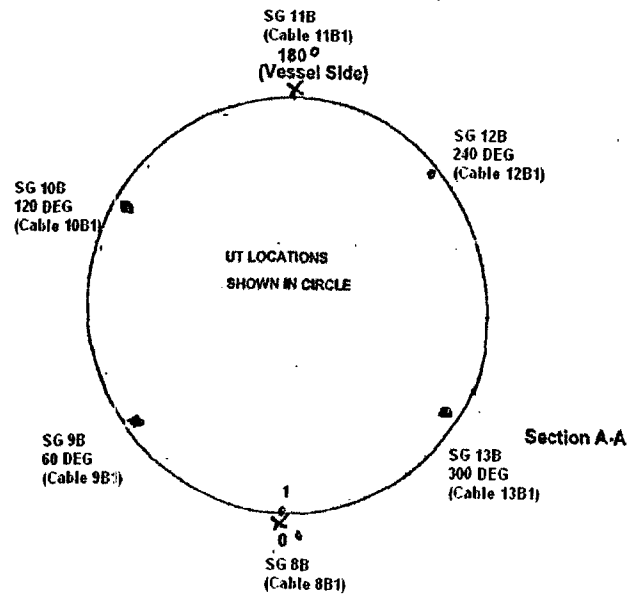
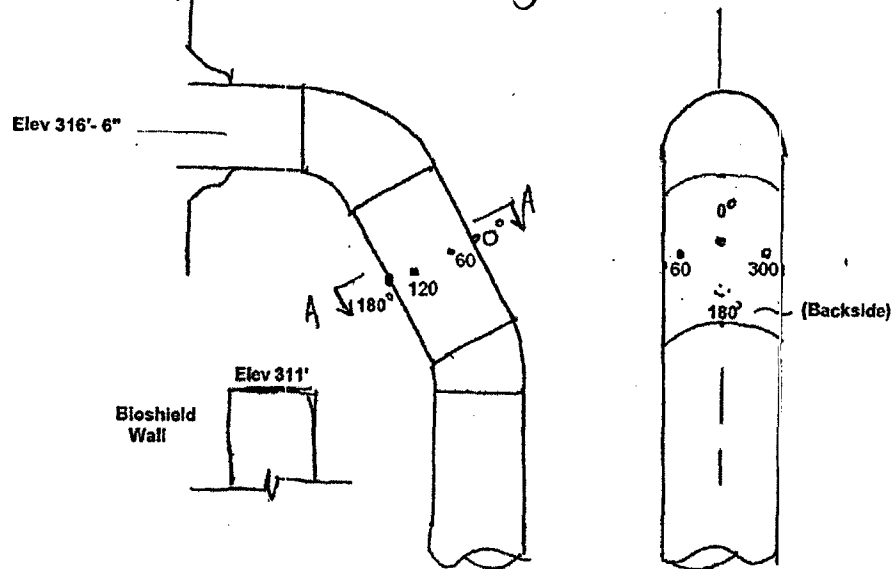


# Temporary Alteration 2005-15 Installation of Strain Gages on the Main Steam Line Piping in the Drywell REV-01

TA 2005-15 APPENDIX D SKETCH 04 PAGE 2 OF 8 MAIN STEAM LINE 'B'

UPPER STRAIN GAGE LOCATION AND "UT" TEMPLATE

Prepared By Larry Spencer Reviewed By ES Bratti  
Larry Spencer 10/18/05 ES Bratti 10/18/05

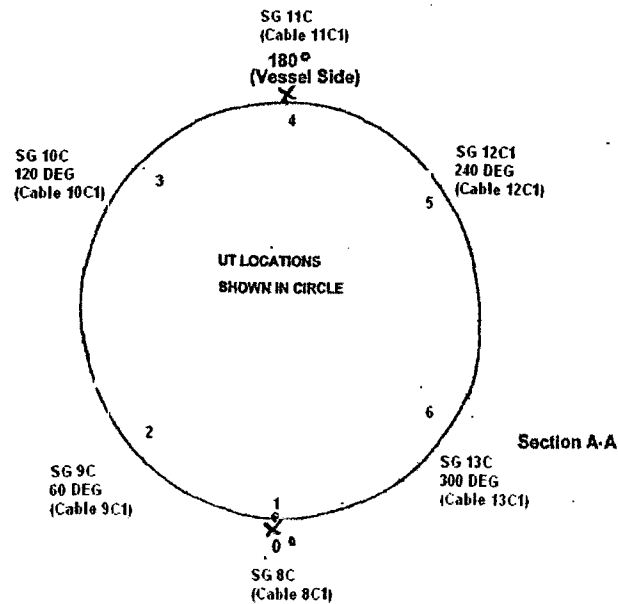
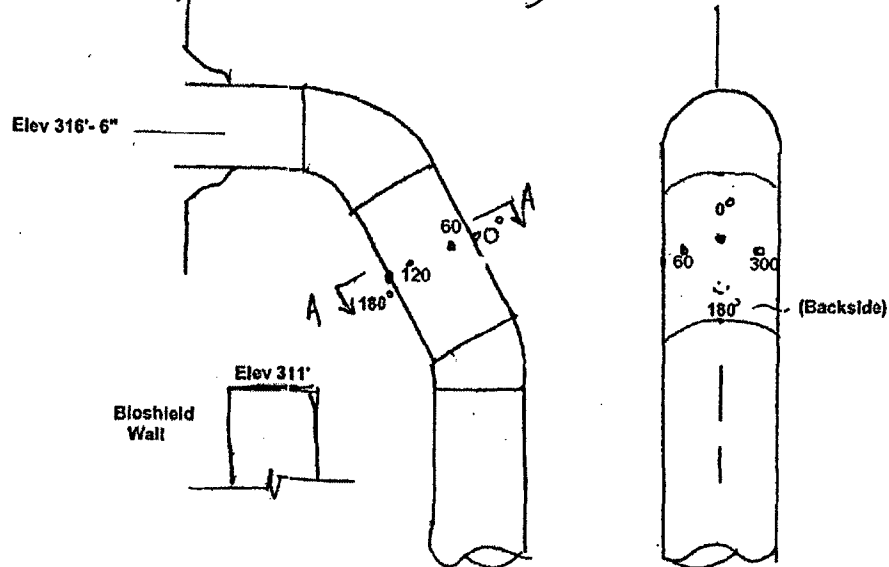


Temporary Alteration 2005-15 Installation of Strain Gages on the Main Steam Line  
Piping in the Drywell REV-01

TA 2005-15 APPENDIX D SKETCH 04 PAGE 3 OF 8 MAIN STEAM LINE 'C'

UPPER STRAIN GAGE LOCATION AND "UT" TEMPLATE

Prepared By Larry Spencer Reviewed By ES Beth  
Jan/Jan 10/18/05 02/20/10/18/05



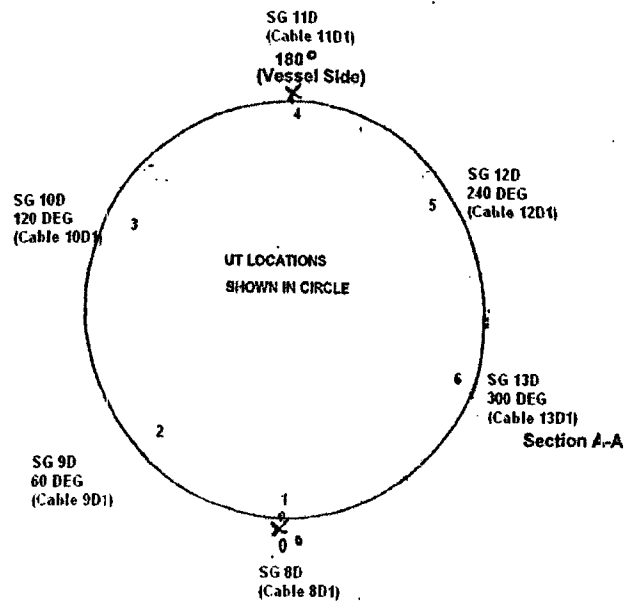
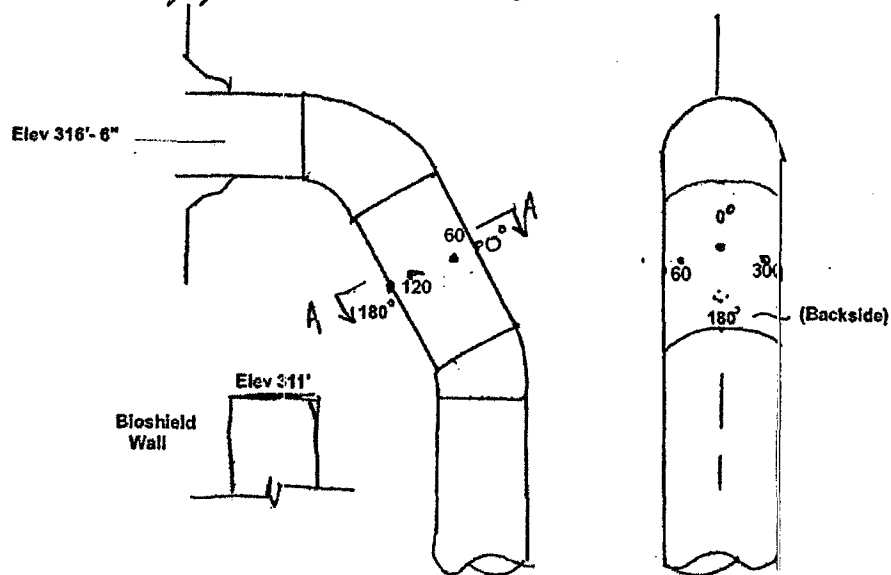


# Temporary Alteration 2005-15 Installation of Strain Gages on the Main Steam Line Piping in the Drywell REV-01

TA 2005-15 APPENDIX D SKETCH 04 PAGE 4 OF 8 MAIN STEAM LINE 'D'

UPPER STRAIN GAGE LOCATION AND "UT" TEMPLATE

Prepared By Larry Spencer Reviewed By ES Beth  
Jerry Spencer 10/18/05 SDA 10/18/05



# Temporary Alteration 2005-15 Installation of Strain Gages on the Main Steam Line Piping in the Drywell REV-01

TA 2005-15 APPENDIX D SKETCH 04 PAGE 5 OF 8 MAIN STEAM LINE 'A'

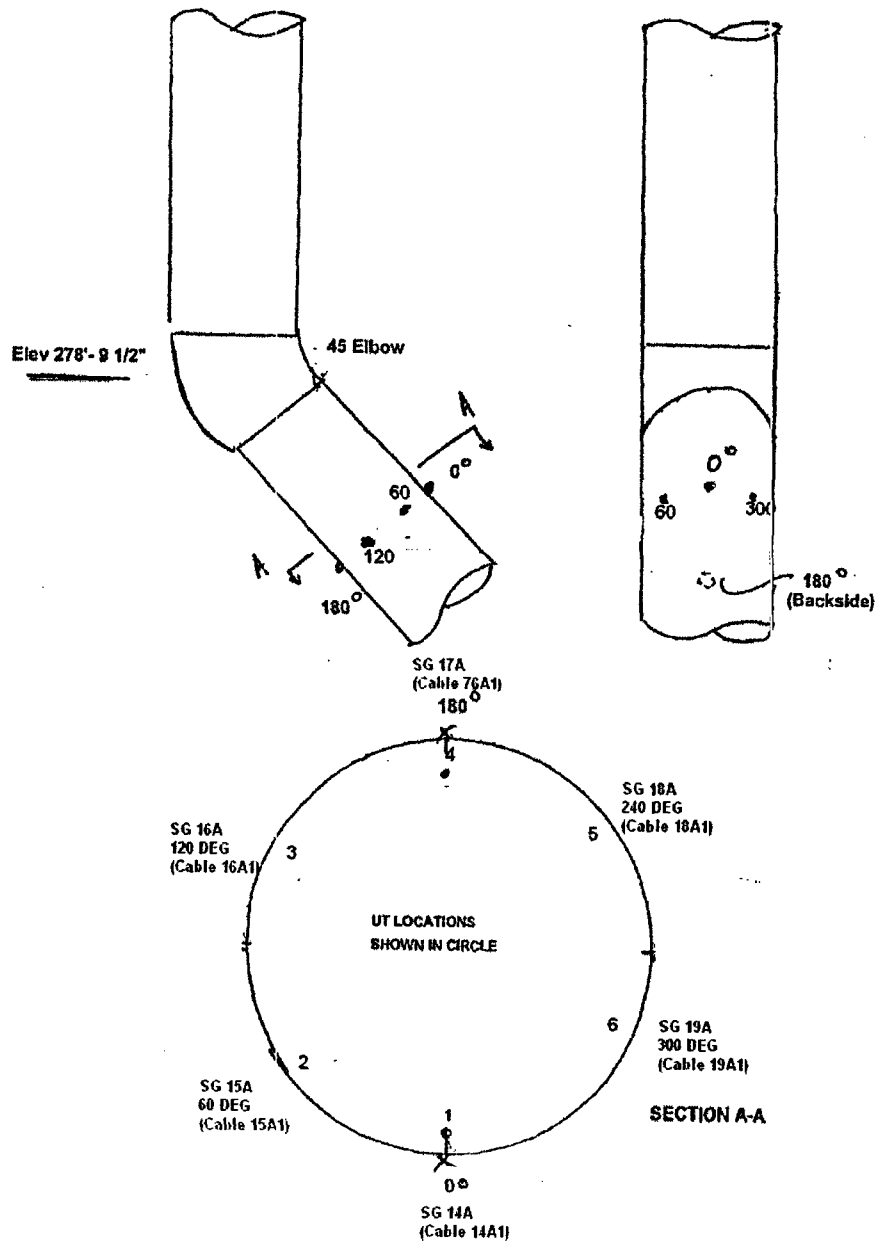
LOWER STRAIN GAGE LOCATION AND "UT" TEMPLATE

Prepared By Larry Spence

Reviewed By ES Beth

10/18/05

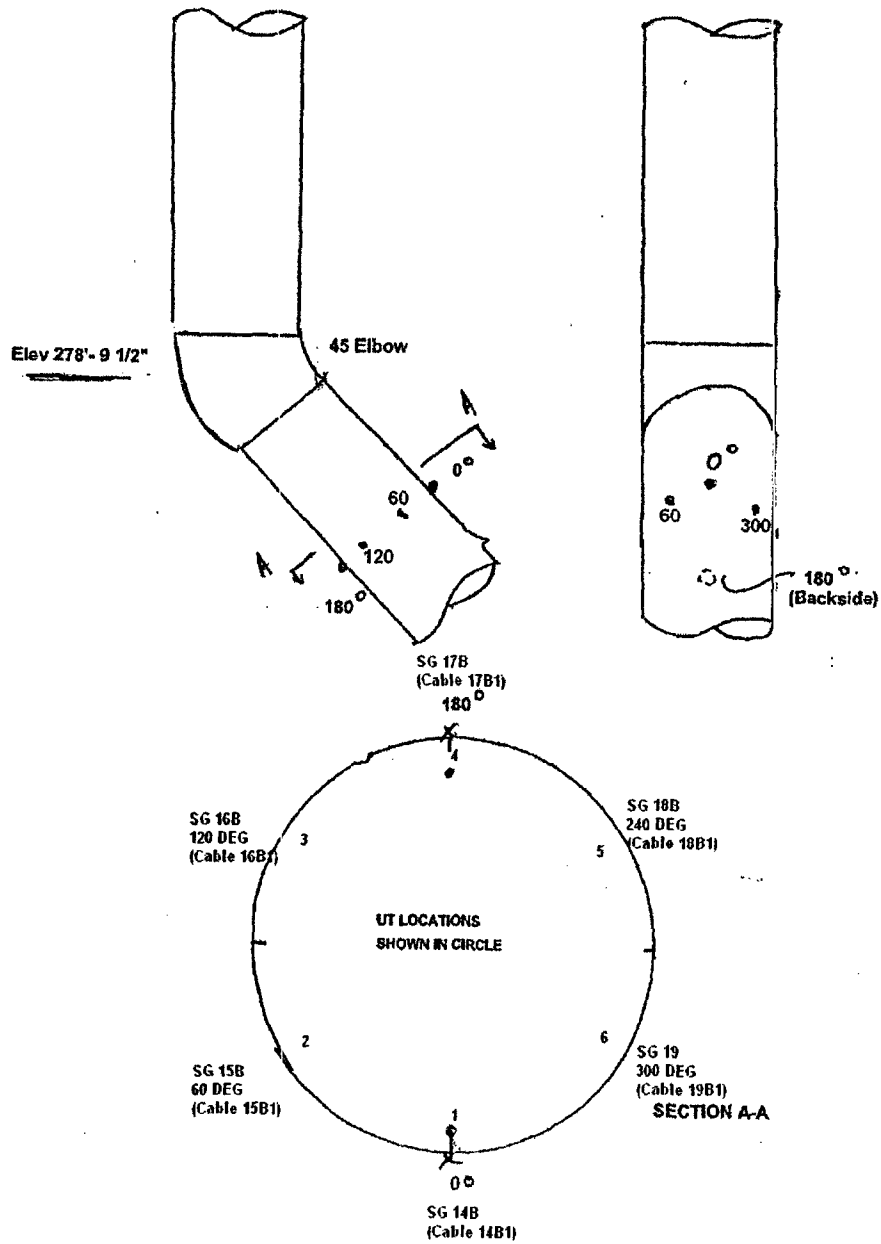
10/18/05



Temporary Alteration 2005-15 Installation of Strain Gages on the Main Steam Line  
Piping in the Drywell REV-01

TA 2005-15 APPENDIX D SKETCH 04 PAGE 6 OF 8 MAIN STEAM LINE 'B'  
LOWER STRAIN GAGE LOCATION AND "UT" TEMPLATE

Prepared By Larry Sauer Reviewed By EJ Beth  
10/18/05 10/18/05

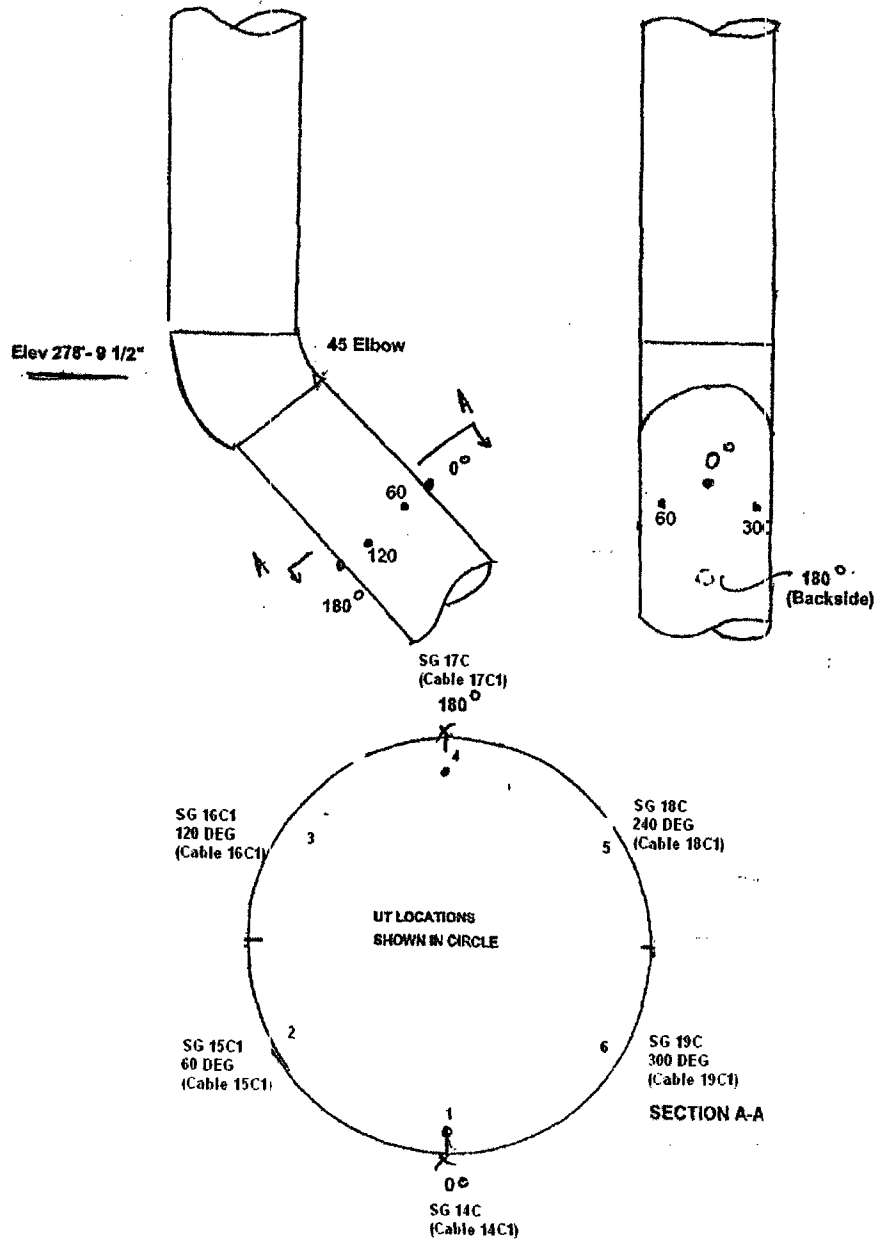


Temporary Alteration 2005-15 Installation of Strain Gages on the Main Steam Line  
Piping in the Drywell REV-01

TA 2005-15 APPENDIX D SKETCH 04 PAGE 7 OF 8 MAIN STEAM LINE 'C'

LOWER STRAIN GAGE LOCATION AND "UT" TEMPLATE

Prepared By Larry Spencer Reviewed By EJ B. Hi  
10/18/05 10/18/05

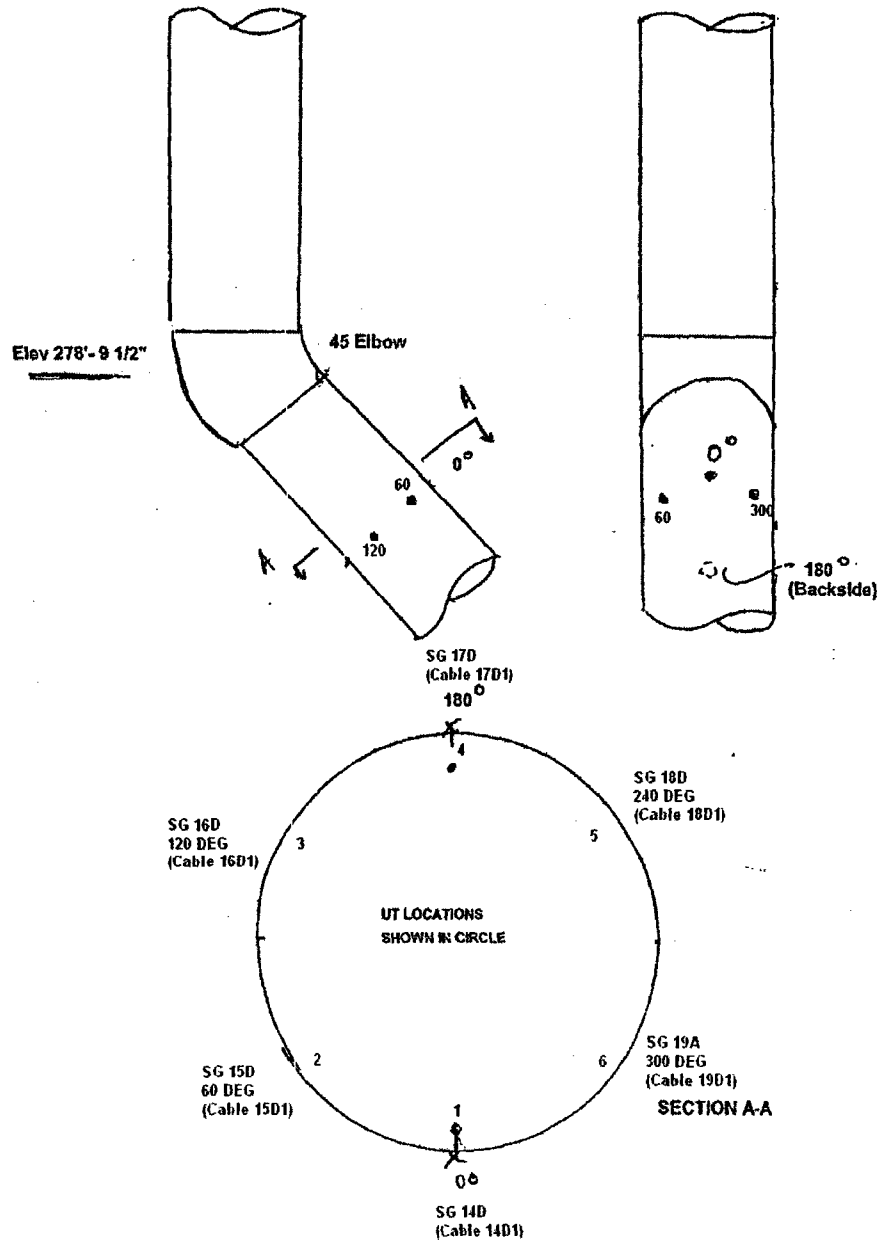


Temporary Alteration 2005-15 Installation of Strain Gages on the Main Steam Line  
Piping in the Drywell REV-01

TA 2005-15 APPENDIX D SKETCH 04 PAGE 8 OF 8 MAIN STEAM LINE 'D'

LOWER STRAIN GAGE LOCATION AND "UT" TEMPLATE

Prepared By Larry S. Smith Reviewed By ESB/TH  
Jay Smith 10/18/05 ESB/TH 10/18/05



# Temporary Alteration 2005-15 Installation of Strain Gages on the Main Steam Line Piping in the Drywell REV-01

