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NUCLEAR OPERATIONS DEPARTMENT  
PILGRIM NUCLEAR POWER STATION  
Procedure 1.3.37

POST TRIP REVIEWS

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Approved HF Brunner  
QA Manager

Approved Charles J. Watt  
ORC Chairman

Date August 24, 1984

8508190222 850813  
PDR ADOCK 05000293  
P PDR

1.3.37-1 Rev. 1

## I. PURPOSE

To provide instructions to personnel to perform Post Trip Reviews (PTR) following unplanned reactor trips or unexplained power reduction. Adherence to this procedure will ensure that consistent data will be collected, and that a uniform analysis and decision process will be applied after a reactor trip or unexplained power reduction and prior to granting permission to restart.

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## II. DISCUSSION

The analysis of the Salem Nuclear Station event of 1983 revealed that an unrecognized failure to scram (ATWS) event took place. Evaluations of the event by both the NRC and INPO have resulted in recommendations aimed at standardizing post trip reviews. BECo commitments to both INPO and NRC are directed to proceduralizing and standardizing post trip reviews. This procedure will formalize the existing post trip review method at PNPS.

The purpose of a post trip review is to determine the plant's readiness to return to power after an unscheduled reactor trip or unexplained power reduction. Station personnel must reasonably determine the cause of the trip, verify proper functioning of safety related and other equipment during the trip, and ensure that the trip/reduction did not have a detrimental effect on the plant.

Post trip reviews can also serve to provide lessons learned to the plant staff and other utilities.

## III. REFERENCES

- A. INPO Good Practice OP-211 "Post Trip Reviews" Draft.
- B. US NRC Generic Letter 83-28 "Generic Implications of Salem ATWS Events"
- C. BECo letter "Response to Generic Letter 83-28"
- D. Nuclear Operations Procedure NOP 8301 "Conduct of Operations"
- E. PNPS Operations Manual procedures:
  1. 1.3.3 "Authority to Shutdown and Startup Station"
  2. 1.3.9 "Reports"
  3. 1.3.12 "Notification and Recall of Personnel"
  4. 2.2.17 "Communications"

#### IV. APPLICABILITY

The requirements of this procedure will apply to all unplanned trips and unexplained power reduction from the "RUN" mode. The Chief Operations Engineer or the Nuclear Operations Manager may require that elements of this procedure be followed for other unit problems from other operating conditions.

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#### V. PREREQUISITES

- A. The post trip review (PTR) will be initiated after plant conditions are stabilized. The PTR shall not distract the Watch Engineer, the Operating Supervisor, the STA or operating personnel from their primary responsibility of monitoring plant parameters and maintaining the plant in a safe condition.
- B. Sufficient information shall be collected from personnel involved in the unit trip prior to permitting relief by the oncoming shift.
- C. A Scram Report shall be prepared by the Watch Engineer on duty at the time of the scram. (Scram Report is Att. A of this proc.). A scram report shall be prepared whenever the control rods are scrambled in from a situation where fuel is in the reactor vessel, and more than one control rod is withdrawn. A Scram Report is required for all conditions, planned or unplanned. Distribution of Scram Reports shall be per section VII.F of this procedure.

#### VI. RESPONSIBILITIES

- A. Nuclear Watch Engineer is responsible for ensuring that the post trip review is initiated. He is also responsible, along with the NOS and STA, for the investigation phase of the PTR and review of the results.
- B. Nuclear Operating Supervisor is responsible as part of the investigation phase to record the actions taken and preliminary information relating to the initiating event. He is also responsible for directing the Shift Administrative Assistant in obtaining statements from operating personnel and others involved in the trip.
- C. Shift Technical Advisor is responsible with the NWE and NOS for trip investigation. This includes interpretation of the Process Computer Data Recall Log and Sequence of Event Log. Additionally the STA will record the data required on Attachment B.
- D. Shift Administrative Assistant is responsible for collecting the required recorder charts and obtaining statements of involved personnel. Additionally the SAA is responsible to ensure that the PTR package is retained for records and distributed to the Nuclear Operations Manager and the OSS&P Group Leader.
- E. Operations Personnel and others (i.e., I&C Technicians) involved in the unplanned trip are responsible for providing the SAA with objective statements that describe their observations of and/or participation in the trip.

F. The Nuclear Operations Manager or his designate is responsible to authorize restart of the reactor.

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G. The ORC shall review all post trip reviews. In the case of trips classified as Type 1 or 2, the ORC shall review the trip at its next scheduled meeting. If the trip is classified as Type 3, the NOM will convene ORC to provide independent assessments of the event, prior to authorizing restart.

## VII. POST TRIP REVIEW PROCEDURE

-NOTE: Event notification to appropriate agencies or persons shall be made consistent with procedure 2.2.17 "Communications".

### A. General

Post trip review is a 5 step process as follows:

1. Data Collection
2. Trip Investigation
3. Event Classification/Safety Assessment
4. Restart Authorization
5. Information Feedback

### B. Data Collection

1. The object of the data collection is to assemble enough information to reconstruct the trip/reduction, assess the response of systems, and identify the root cause of the event.
2. The SAA shall collect the following hard copy data:
  - a. Process Computer Data Recall Log (Attachment F identifies points on this Log) (not applicable to unexplained reduction)
  - b. Process Computer Sequence of Events Log and Alarm Typer Output
  - c. Recorder charts from:
    - i. One APRM recorder
    - ii. Feedwater flow
    - iii. Wide (or) narrow range reactor pressure
    - iv. Reactor level
    - v. Other recorders as identified by the STA or NWE
3. When recorder charts are collected, photo copies of the original strip may be made. Chart speed, reference time, date, scale values and pen channels will be recorded on the chart or copy.



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4. The SAA in conjunction with or under the direction of the NOS shall record statements from each individual involved in the event. These statements shall be obtained only after the plant is in a stable condition. Statements should include facts concerning the event relative to pretrip conditions or activities, initial indications of a problem, initial actions taken, equipment automatic and manual operation, observed malfunctions or procedural deficiencies.
  5. It may be appropriate for the NWE to interview involved personnel or to collect information from assembled individuals as a group.
  6. The STA shall complete part 1 of the PTR DATA Summary (Attachment B). If additional information is needed it shall be obtained at this time.
  7. Collected data and personnel statements shall be assembled into a package and delivered to the NWE to begin the trip investigation.

C. Trip Investigation (Attachment C)

1. The NWE, NOS, and STA shall reconstruct the event by preparing a chronology of the event. (Attachment C, part 1)
2. The NWE and NOS shall review the data package for proper system performance and note that appropriate automatic functions and equipment operation took place. The reviewers should look beyond the obvious indications to diagnose the cause of the trip and determine acceptability to restart the unit.
3. The STA shall analyze the data to determine if critical parameters remained within the bounds of the FSAR or the Cycle Reload Analysis. Peak reactor pressure, lowest water level, drywell pressure, steamline radiation are examples of what shall be recorded for this analysis. Departures from the bounds of the FSAR or reload analysis shall be noted on part 3 of Attachment C and brought to the immediate attention of the NWE. A potential unreviewed safety question may exist.
4. The NWE will complete the Scram Report (Attachment A) and summarize the event. The scram report shall identify the probable cause of the event, and identification of systems with inadequate performance (if applicable). This Scram Report shall become the cover sheet for the PTR package. The Scram Report is not used for reviews of unexplained power reductions.
5. Any equipment or processes identified with inadequate performance or abnormal response shall be reported on separate Failure and Malfunction Reports according to procedure 1.3.24.

#### D. Event Classification/Safety Assessment

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1. The preliminary Safety Assessment (Attachment D) form shall be completed by the STA and Watch Engineer.
2. The Event shall be classified as Type 1, 2, or 3 by the following criteria:

NOTE: Classifications are also applicable to unexplained power reductions.

- a. Type 1 - The cause of the trip is positively known and has been or is in the process of being, corrected; all safety related and other important equipment functioned properly during the trip.
  - b. Type 2 - The cause of the trip is positively known and has been or is in the process of being, corrected except some safety related or other important equipment did not function properly. The malfunction has been or is in the process of correction or a Tech. Spec. Constraint does not prohibit startup.
  - c. Type 3 - The cause of the trip is not positively known and/or some safety related or important equipment functioned abnormally during the trip, or the malfunction cannot be readily corrected, or startup is precluded due to Tech. Spec. Constraints, or the transient did not remain within the bounds of the FSAR or Reload Analysis.
3. The NOM and the COE will be notified of the classification of the event and their concurrence shall be obtained. If the event is classified as Type 3, the COE or his designate will take charge of the investigation until the cause of the event and corrective action has been determined.

#### E. Restart Authorization

1. The NOM will be informed of the results of the PTR and classification. The NOM may then authorize restart if the event is classified as Type 1 or 2.
2. If the NOM is not satisfied with the results of the PTR he will take actions necessary to satisfy his concerns.
3. In the case of a Type 3 event the NOM will convene the ORC for further evaluation and independent review of the event prior to authorizing restart.
4. In the case of Type 1 or 2 events the ORC will review the PTR at the next scheduled meeting.

#### F. Information Feedback

1. After the PTR is completed, the SAA will ensure that the assembled package is forwarded as follows:

- a. Original to the NOM
  - b. Copy to ORC Secretary for ORC review
  - c. Copy to OSS&P Group Leader - for operating experience review per NOP 8401
2. After ORC review is complete the OSS&P Group Leader will review the PTR package, summarize it and route the information within the Nuclear Organization. Additionally any information of general interest to the industry will be entered into the operating experience category of NUCLEAR NOTEPAD. A final copy shall be sent to Document Control Center.
  3. A Scram Report prepared for a planned trip not requiring a PTR shall be routed as follows:

The original of the Scram Report with control rod position computer printout (OD-7) or the scram attached, should be routed through the Station Manager, a copy filed in the Control Room and a copy routed to the Reactor Engineer.

#### VIII. ACCEPTANCE CRITERIA

- A. The PTR will be performed as described in the procedure.
- B. Event Classification will key appropriate actions prior to restart of the unit.

#### IX. ATTACHMENTS

- A. Scram Report
- B. PTR Data Summary
- C. Investigation and Evaluation
- D. Preliminary Safety Assessment/Startup Authorization
- E. Sample PTR Package Organization
- F. Data Recall Log Point ID Summary

## SCRAM REPORT

**FOR INFORMATION  
ONLY** RTYPE - G7.49

RTYPE - G7.49

Date \_\_\_\_\_ Time \_\_\_\_\_ Number \_\_\_\_\_

<p align="center">—CAUSE—</p> <input type="checkbox"/> Operator Error <input type="checkbox"/> Testing Error <input type="checkbox"/> Equipment Failure <input type="checkbox"/> Other _____ _____	<p align="center">—MODE SWITCH— POSITION</p> <input type="checkbox"/> Run <input type="checkbox"/> Start-Up <input type="checkbox"/> Refuel	<p align="center">—REACTOR STATUS—</p> <input type="checkbox"/> Critical _____ MWT <input type="checkbox"/> Subcritical	<p align="center">—FLOW CONTROL STATUS—</p> <input type="checkbox"/> Loop Manual <input type="checkbox"/> Master Manual <input type="checkbox"/> Master Automatic
<p align="center">—STATION STATUS—</p> <input type="checkbox"/> Starting-Up <input type="checkbox"/> Shutting-Down <input type="checkbox"/> Changing Power <input type="checkbox"/> Steady State <input type="checkbox"/> Surveillance Testing <input type="checkbox"/> Other _____ _____	<p align="center">—SCRAM TIMES— (for monitored CRD'S)</p> <input type="checkbox"/> none available Average _____ Sec. Fastest Rod _____ Time _____ Sec. Slowest Rod _____ Time _____ Sec.	<p align="center">—STATION CONDITIONS—</p> Core Flow (263-10) _____ Lb/Hr. Reactor Pressure (640-27) _____ Psig. Steam Flow (640-27) _____ Lb/Hr. Vessel Level (640-26) _____ Inches Feedwater Flow (640-26) _____ Lb/Hr. Off Gas Activity Level _____ Mr/Hr. Stack Gas Activity Level _____ Cps. Building Vent Activity Level _____ Cps. Generator Output _____ MWe (gross) <input type="checkbox"/> Off	

Prompt Notification Via Telephone Required \_\_\_\_\_ T/Limit \_\_\_\_\_ T/Notified \_\_\_\_\_ Person Contacted \_\_\_\_\_

On Call Individual \_\_\_\_\_ Required \_\_\_\_\_ 1 hr. \_\_\_\_\_

NRC \_\_\_\_\_ Required \_\_\_\_\_ 1 hr. \_\_\_\_\_

Brief Description of Scram \_\_\_\_\_

Corrective Action Taken \_\_\_\_\_

Watch Engineer\_\_\_\_\_



## PNPS PTR DATA SUMMARY

Date of Occurrence \_\_\_\_\_ Time of Occurrence \_\_\_\_\_

By STA: \_\_\_\_\_

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

### Part 1

#### INITIAL CONDITIONS

The status of safety systems and a selected set of important plant parameters, pump running combinations control switch positions, chemistry results, and radiation readings that existed prior to the unscheduled reactor trip must be recorded. The data to be selected should be based on the following considerations:

- o the data is not directly available on control room strip charts or computer printouts
- o the data is necessary to ascertain the cause of the trip or abnormal response and proper functioning of safety-related equipment
- o the data is necessary to effectively reconstruct plant status prior to the trip or unexplained power reduction

#### Examples

- (a) Reactor Power (mw<sub>th</sub>)\* \_\_\_\_\_ %
- (b) Unit Generator Load\* \_\_\_\_\_
- (c) Mode Switch Position\* \_\_\_\_\_
- (d) Reactor Vessel Pressure\* \_\_\_\_\_
- (e) Reactor Feed Pumps Operating (Circle)      A   B   C
- (f) Vessel Level\* \_\_\_\_ on Instrument \_\_\_\_\_ in
- (g) Main Circulating Water Pumps  
Running (Circle)      A   B

\* Also contained on Scram Report

Attachment B  
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## (h) Status of Control Stations (Circle)

1. Recirculation pump control mode (Circle)
2. Vessel level control (Circle)
3. Turbine Control

Master	Local
Manual	Manual
Auto	Manual

Pressure Setpoint

\_\_\_\_\_

Load Limiter Setpoint

\_\_\_\_\_

## (i) Torus Temperature (C7)

\_\_\_\_\_ °F

## (j) Off normal status of any trains/ portions of a safety system prior to event :

From Oper. 28

### Details

1. RPS
2. ECCS
3. SBGTS
4. Emergency Buses/Diesels
5. DC Buses

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## 1. Testing/Surveillances in Progress from Oper. 28 or other

Test Number	Status/Step
-------------	-------------

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Attachment B  
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Part 2 PLANT RESPONSE

- Data selected to be documented for determining plant response should include the following:

- o list of strip charts to be retained
- o printouts from devices such as the process control computer, alarm printer, and event recorders
- o safety systems activations and performance information
- o manual, radiological, and control system actions

Examples

- (a) Obtain a copy of the applicable parameter plots given below for every Event:

Panel

- 905 1. 1 Channel APRM (recorders 750-10A, B, C or D)
- 905 2. Recorder 640-26 - Reactor Vessel Level (black pen), Feedwater Flow (red pen)
- 905 3. Reactor Vessel Pressure
  - a. Narrow range - 640-28 (red pen)
  - b. Wide range - 640-27 (black pen)  
Steam flow is also on this recorder.

- (b) Optionally the following may be requested depending on the Event:

Panel

Parameter

- |     |  |
|-----|--|
| 905 | 1. Core Flow FR 263-110                |
| C-1 | 2. Control valve position ZR 9027      |
| 903 | 3. Recirc. pump suction TR 151 A and B |
| 904 | 4. Drywell pressure TRU 9045           |
| 905 | 5. Torus Level LR 5038                 |

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6. Relief/Safety Valve Temperature TH 460-2
  7. Reactor Water conductivity CAS-129-25
  8. Main Steam Line Radiation PR 1705-11
  9. ECCS System Performance (if system actuated)

Parameter

HPCI Flow  
RCIC Flow  
LPCI Flow  
CS Flow

10. Condenser Vacuum PR 3392

11. Vessel Metal Temperature

(c) Obtain a printout from:

1. Process Computer Sequence of Events Log (not applicable to unexplained reductions)
2. Process Computer Data Recall Log (not applicable to unexplained reductions)
3. Alarm Printer Output (with c.1 above)
4. Control Rod Position (program OD-7 output)
5. Scram time output

(d) Safety System Actuation and Performance

1. Reactor Protection System

RPS Trips giving scram \_\_\_\_\_ Actuation Time \_\_:\_\_

2. Containment Isolations

	<u>Cause</u>	<u>Time</u>
Group I	_____	_____
Group II	_____	_____
Group III	_____	_____
Group IV	_____	_____
Group V	_____	_____
Group VI	_____	_____

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3. ECCS

Actu  
Sign  
Time  
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HPCI

RCIC

CS

LPCI

ADS

(e) Control Systems (Circle)

- |                                       |     |    |
|---------------------------------------|-----|----|
| 1. Turbine Runback                    | Yes | No |
| 2. Turbine Trip Time ____ Signal ____ | Yes | No |
| 3. Recirculation Pump Runback         | Yes | No |
| 4. Recirculation Pump Trip            | Yes | No |

Cause

(f) Manual Actions

Were any control stations taken from auto to manual? (Specify station time at time/sequence)

Yes No  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(g) Radiological Response (include abnormal area radiation monitoring, process radiation monitoring and environmental radiation monitoring indications \_\_\_\_\_)

(h) Chemistry Response

1. Reactor Coolant Chemistry

(i) Scram Times

Data copied for this report original output to the Reactor Engineer check that available computer printout scram times meet Tech. Spec. 3.3.C.3.

Other STA Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Attachment B

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

Part 1 Chronology of Event

. Attach written copy

Part 2 PROBABLE CAUSE OF TRIP \_\_\_\_\_

Comments: \_\_\_\_\_

Attach statements of involved personnel.

By Watch Engineer \_\_\_\_\_ NOS \_\_\_\_\_ STA \_\_\_\_\_

Part 3 UNEXPECTED ASPECT OF TRANSIENT BEHAVIOR  
(if event compared with previous similar  
transient note, the transient with which  
compared)

NOTE: Unexplained power  
reductions will not have  
correlation with analyzed  
transients or prior  
scrams. Examine para-  
meters appropriate to the  
event to ensure safety  
limits not jeopardized.

Reload Analysis or FSAR Transient Page Number  
-or- Previous Trip on \_\_\_\_\_

Compared With \_\_\_\_\_

Date \_\_\_\_\_

Time \_\_\_\_\_

By: STA \_\_\_\_\_ F&amp;M issued if required by: \_\_\_\_\_

Part 4 IDENTIFICATION OF SYSTEMS WITH INADEQUATE PERFORMANCE

System/ComponentDescription of Problem

WE

Signature \_\_\_\_\_

Date \_\_\_\_\_

Time \_\_\_\_\_

NOS

Signature \_\_\_\_\_

Date \_\_\_\_\_

Time \_\_\_\_\_

Note: A separate F&amp;M is required for each malfunction above.

Attachment C  
Page 1 of 1

PRELIMINARY SAFETY ASSESSMENT  
STARTUP AUTHORIZATION

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Part 1 TRANSIENT DATA FOR PERTINENT PLANT PARAMETERS

	Maximum	Minimum
(a) RCS pressure	Loop A___ B___	Loop A___ B___
(b) Reactor vessel water level		_____
(c) Reactor coolant flow	Loop A___ B___	Loop A___ B___
(d) Reactor core thermal power	_____	

Part 2 PRELIMINARY SAFETY ASSESSMENT (Circle)

(a) RCS pressure remained above 880	Yes	No
(b) Reactor isolation occurred	Yes	No
(c) RCS pressure increased to safety/ relief valve operating pressure	Yes	No
(d) RCS temperature decrease less than 100°F/hr	Yes	No
(e) HPCI/RCIC initiated	Yes	No
(f) ADS timer initiated	Yes	No
(g) Primary containment	press _____	
	temp _____	
(h) Torus water	level _____	
	temp _____	

Part 3 EVENT CONDITION

Classify trip as 1, 2 or 3 according to guidelines in procedure section VII.D.

The event on \_\_\_\_\_ at \_\_\_\_\_:\_\_\_\_ is a type \_\_\_\_\_  
Date Time 1, 2 or 3

Signature indicates agreement with  
type classification

\_\_\_\_\_  
Watch Engineer Date Time

\_\_\_\_\_  
STA Date Time

NOM \_\_\_\_\_ COE \_\_\_\_\_  
Notification

NOM notified of event classification \_\_\_\_\_  
Date Time

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NOM concurrence? YES \_\_\_\_ NO \_\_\_\_

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If Type 3 COE notified to take over investigation

Time \_\_\_\_\_ By \_\_\_\_\_

**Part 4 STARTUP AUTHORIZATION**

**Type 1, 2 EVENTS**

Plant manager notified and permission granted to startup the reactor.

\_\_\_\_\_  
Watch Engineer

\_\_\_\_\_  
Date

\_\_\_\_\_  
Time

Comments: \_\_\_\_\_

**Type 3 EVENT**

ORC review of event on \_\_\_\_\_, meeting number \_\_\_\_\_

Minutes of the meeting(s) are attached.

\_\_\_\_\_  
ORC Chairman

\_\_\_\_\_  
Date

Permission is granted to startup the reactor

\_\_\_\_\_  
NOM

\_\_\_\_\_  
Date

\_\_\_\_\_  
Time

Comments: \_\_\_\_\_

Attachment D  
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SAMPLE PTR PACKAGE  
ORGANIZATION

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1. Scram Report (Attachment A)
2. PTR Data Summary (Attachment B)
3. Recorder Chart Copies
4. Investigation Evaluation (Attachment C)
5. Chronology of Event (separate sheet)
6. Statement of Involved Personnel (separate sheet)
7. Preliminary Safety Assessment/Startup Authorization (Attachment D)

Attachment E

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B000	APRM "A" (% PWR)
B001	APRM "C" (% PWR)
B013	Rx. Pressure (PSIG)
B014	Core Plate D/P (PSI)
B015	Rx. Core Flow (M#/H)
B017	CRD Flow (M#/H)
B018	Rx. FW Inlet Flow "A" (M#/H)
B019	Rx. FW Inlet Flow "B" (M#/H)
B024	Rx. Water Level
B025	Rx. Outlet Steam Flow (M#/H)
B028	FW Inlet Temp. "A1" (°F)
B030	FW Inlet Temp. "B1" (°F)
B038	Recirc. Flow Loop "A2" (M#/H)
B039	Recirc. Flow Loop "B1" (M#/H)
C002	Rx. Saturation Temp. (°F)
C023	Seawater Flow (GPM)
C027	Hotwell Outlet Temp. (°F)
C050	Condenser $\Delta$ T (°F)
M071	Torus Level

LINE 2

G012	Stator Cooler Inlet Temp (°F)
G013	Stator Cooler Outlet temp (°F)
G019	Alternator Air to Cooler (°F)
G020	Alternator Air from Cooler (°F)
F002	Condensate Demineralizer D/P
F007	RFP Suction Pressure (PSIG)
F011	Condensate Pump Header Pressure
F012	West Condenser Pressure (In Hg)
F013	East Condenser Pressure (In Hg)
F028	RBCCW Loop "A" Flow
F029	RBCCW Loop "B" Flow
F030	RBCCW To RHR Hx. Loop "A" Flow
F031	RBCCW To RHR Hx. Loop "B" Flow
F077	RBCCW Hx. Outlet Temp. "A"
F078	RBCCW Hx. "B" Outlet Temp
M034	Torus Pressure
M035	Drywell Pressure
M042	SSW Flow Loop "A"
M043	SSW Flow Loop "B"