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November 30, 1990
PY-CEI/NRR-1260 L

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
Completion of all DCRDR
Activities for PNPP Unit 1

Gentlemen:

In response to TMI Action Plan Item I.D.1, the Perry Nuclear Power Plant has actively conducted a Detailed Control Room Design Review (DCRDR) to identify and correct Human Engineering Deficiencies (HED's). This defined program has now been completed for the Perry Nuclear Power Plant (PNPP) Unit 1.

As documented in the NRC's SER Supplement 10 Section 18 "Control Room Design Review", and in the PNPP Operating License, Attachment 1 "Detailed Control Room Design Review", several activities remained to be completed in order to close out the DCRDR process for PNPP Unit 1.

As noted in SSER 10 Sections 18.2.4, 18.2.5, 18.2.6, 18.3 and 18.4 a Final Noise Survey was required to be conducted in the Control Room and Remote Shutdown location, any HED's resulting from this survey were to be identified, and implementation schedules for any HED's were to be submitted prior to restart from the first refueling outage. Documentation of the completion of these items was provided by letter dated July 11, 1989 (PY-CEI/NRR-1031L). This noise survey did result in the creation of one new HED (HED-617) which was scheduled for correction prior to restart from the second refueling outage. Documentation of the completion of this HED correction and of its augmented verification is included within the Attachment to this letter. This letter therefore documents completion of all work associated with the DCRDR Noise Survey as discussed in SSER 10 and the Operating License.

9012120153 901130
PDR ADOCK 05000440
P PDC

Operating Units
Cleveland Electric Illuminating
Toledo Edison

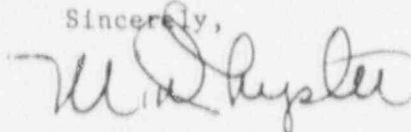
A003
1/1

November 30, 1990
PY-CEI/NRR-1260 L

As noted in SSER 10 Section 18.2.7, 18.3 and 18.4, a portion of the augmented verification process remained to be completed, on HED corrections that were to be implemented after full-power licensing. The augmented verification on these HED's, and any resulting corrective actions, were to be completed prior to startup from the second refueling outage. Documentation of the completion of this work is included in the Attachment to this letter. This letter therefore documents completion of all work associated with the DCRDR augmented verifications as discussed in SSER 10 and the Operating License.

Completion of the above described activities closes all commitments related to the DCRDR. Further Human Factors evaluations for the operations phase of Unit 1 will be conducted as part of an ongoing Human Factors program. If there are any further questions, please feel free to call.

Sincerely,



Michael D. Lyster

MDL:BSF:njc

Attachment

cc: USNRC Project Manager
USNRC Resident Office
USNRC Region III

Detailed Control Room Design Review Augmented Verification -
Summary Description of HED Changes

HED's implemented prior to 100 hour warranty run

<u>HED #</u>	<u>Rev.</u>	<u>Comment</u>
36	5	Documents completed augmented verification.
85	4	Documents completed augmented verification.
86	4	Documents completed augmented verification.
109	4	Documents completed augmented verification.
114	3	Augmented verification identified an additional improvement, which was implemented and reverified during the second refuel outage. Revision level has increased by 2 due to need for work, then reverification.
310	3	Documents completed augmented verification.
522	4	Augmented verification identified an additional improvement, which was implemented and reverified during the second refuel outage. Revision level has increased by 2 due to need for work, then reverification.
600	3	Documents completed augmented verification.

HED's implemented prior to restart from first refuel

29	4	Documents completed augmented verification.
33	4	Documents completed augmented verification.
72	2	Documents completed augmented verification.
74	2	Documents completed augmented verification.
76	5	Documents completed augmented verification.
77	3	Documents completed augmented verification.
80	4	Documents completed augmented verification.
81	4	Documents completed augmented verification.

<u>HED #</u>	<u>Rev.</u>	<u>Comment</u>
84	5	Augmented verification identified an additional improvement, which was implemented and reverified during the second refuel outage. Revision level has increased by 2 due to need for work, then reverification.
94	4	Augmented verification identified an additional improvement, which was implemented and reverified during the second refuel outage. Revision level has increased by 2 due to need for work, then reverification.
96	4	Documents completed augmented verification.
100	4	Documents completed augmented verification.
102	4	Documents completed augmented verification.
105	4	Documents completed augmented verification.
107	2	This HED was previously closed as documented in letter PY-CEI/NRR-0946 L dated 2/10/89. This newest revision documents the augmented verification's agreement with the closure basis.
110	3	Documents completed augmented verification.
158	5	Augmented verification identified an additional improvement, which was implemented and reverified during the second refuel outage. Revision level has increased by 2 due to need for work, then reverification.
182	4	Documents completed augmented verification.
195	3	This HED was previously closed as documented in letter PY-CEI/NRR-0946 L dated 2/10/89. This newest revision documents the augmented verification's agreement with the closure basis and the previous verification.
313	2	Documents completed augmented verification.
314	3	Documents completed augmented verification.
320	4	Documents completed augmented verification.

<u>HED #</u>	<u>Rev.</u>	<u>Comment</u>
328	2	This HED was previously closed as documented in letter PY-CEI/NRR-0946 L dated 2/10/89. This newest revision documents the augmented verification's agreement with the closure basis and the previous verification.
354	3	Documents completed augmented verification.
360	4	Documents completed augmented verification.
363	4	Augmented verification identified an additional improvement, which was implemented and reverified during the second refuel outage. Revision level has increased by 2 due to need for work, then reverification.
364	4	Augmented verification identified an additional improvement, which was implemented and reverified during the second refuel outage. Revision level has increased by 2 due to need for work, then reverification.
365	3	This HED was previously closed as documented in letter PY-CEI/NRR-0946 L dated 2/10/89. This newest revision documents the augmented verification's agreement with the closure basis.
366	4	Documents completed augmented verification.
370	4	Documents completed augmented verification.
408	2	Documents completed augmented verification.
501	2	This HED was previously closed as documented in letter PY-CEI/NRR-0946 L dated 2/10/89. This newest revision documents the augmented verification's agreement with the closure basis.
506	2	Documents completed augmented verification.
508	3	Documents completed augmented verification.
509	2	Documents completed augmented verification.
511	2	This HED was previously closed as documented in letter PY-CEI/NRR-0946 L dated 2/10/89. This newest revision documents the augmented verification's agreement with the closure basis.

<u>HED #</u>	<u>Rev.</u>	<u>Comment</u>
512	2	Documents completed augmented verification.
513	2	Documents completed augmented verification.
514	2	Documents completed augmented verification.
515	3	Documents completed augmented verification.
521	3	Documents completed augmented verification.
525	2	Documents completed augmented verification.
526	2	This HED was previously closed as documented in letter PY-CEI/NRR-0946 L dated 2/10/89. This newest revision documents the augmented verification's agreement with the closure basis.
527	3	Documents completed augmented verification.
528	2	Documents completed augmented verification.
529	2	Documents completed augmented verification.
601	2	Documents completed augmented verification.
602	3	Documents completed augmented verification.
603	2	Documents completed augmented verification.
604	2	Documents completed augmented verification.
606	3	Documents completed augmented verification.
607	3	Documents completed augmented verification.
608	2	This HED was previously closed as documented in letter PY-CEI/NRR-0946 L dated 2/10/89. This newest revision documents the augmented verification's agreement with the closure basis.
609	2	Documents completed augmented verification.
610	2	Documents completed augmented verification.
611	2	Documents completed augmented verification.

<u>HED #</u>	<u>Rev.</u>	<u>Comment</u>
612	2	This HED was previously closed as documented in letter PY-CEI/NRR-0946 L dated 2/10/89. This newest revision documents the augmented verification's agreement with the closure basis.
613	2	Documents completed augmented verification.
614	2	Documents completed augmented verification.
615	3	Documents completed augmented verification.
616	3	Documents completed augmented verification.
617	1	This HED was created as a result of the Final Noise Survey in the Control Room. This revision documents completion of the HED correction and its augmented verification.
1012	3	Documents completed augmented verification.
1019	4	Documents completed augmented verification.
1036	3	Documents completed augmented verification.

NJC/CODED/4154

HED REPORT SHEET

HED-36 REV. 5

HED DESCRIPTION: Several annunciator panels contain blank tiles which are illuminated.
B3.14

Annunciator window missing for "MST Turbine Area Temperature" annunciator. HEO-53

HUMAN FACTORS REVIEW: Inactive annunciator points will only illuminate during test.

H.P. GUIDELINES: NUREG 0700, Section 3; Annunciators

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
BLANK WINDOWS ON P870-7A-H1 and P870-5A-E4 ARE ILLUMINATED. THESE WINDOWS WILL BE DEACTIVATED.

WARRANTY RUN - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 8/27/85

PLANNED COMPLETION Prior to the beginning of the 100 hour
warranty run.
WORK COMPLETE 1/30/87

REFERENCES

- 1) Photo: M3
- 2) ECN 21075-86-393
- 3) WO 86-16153

HED REPORT SHEET

HED-85 REV. 4

HED DESCRIPTION: There currently exists no positive means for testing or detecting failed indicating lights. B5.34 (4.2.4.2) HEO-16

Ideally the M/A indicator lights on the controller on P680-3D should have a "push-to-test" function. HEO-151

HUMAN FACTORS REVIEW: Two indicating light bulbs are provided in almost all control applications (on-off, open-close). Neither light being lit is an indication of a burned out bulb or loss of control power. Valve mid-travel is indicated by both lights on. Throttle valves will be coded with silver glove hand operators and if an indicating light should fail during mid-travel the operator would be aware of the event by the feedback from the associated flow meter. During surveillances all indicating lights will be checked for safety systems. During shift change the panel status lights will be reviewed and failing or failed indicating lights replaced. Normally unlit indicators (i.e., white, blue, amber) for which failure cannot be detected will be checked and replaced if necessary at periodic intervals as recommended by the lamp manufacturer. Lamps will be tested prior to installation.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Modify

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
STRENGTHEN ADMINISTRATIVE PROCEDURES TO ENSURE THAT THE OPERATORS TAKE IMMEDIATE CORRECTIVE ACTION TO HAVE DEFECTIVE LIGHT BULBS REPLACED.

WARRANTY RUN - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 12/16/85

PLANNED COMPLETION Prior To The Beginning of the 100 Hour
Warranty Run.
WORK COMPLETE 8/31/87

REFERENCES:

- 1) PAP-0201 Rev. 3 TC-1
- 2) IMI-E2-41

HED REPORT SHEET

HED-36 REV. 4

HED DESCRIPTION: There is no lamp test capability provided for normally unlit indicators in the Control Room, at the remote shutdown panel, containment isolation status indicator panel and all other system status indication panels. B5.35

HUMAN FACTORS REVIEW: Two indicating light bulbs are provided in almost all control applications (on-off, open-close). Neither light being lit is an indication of a burned out bulb or loss of control power. Valve mid-travel is indicated by both lights on. Throttle valves will be coded with silver glove hand operators and if an indicating light should fail during mid-travel the operator would be aware of the event from the associated flow meter. The Inop & Bypass status lights are provided with a push-to-test feature. The containment isolation status panels and other status light boxes on P680, P870, and C22-PO01 & PO02 have 4 bulbs, 2 open and 2 close. The P601 SRV solenoid indicating lights have a lamp test pushbutton for both A and B groups. The full core display has status light test function. During surveillances all indicating lights will be checked for safety systems. During shift change the panel status lights will be reviewed and failing or failed indicating lights replaced. Normally unlit indicators (i.e., white, blue, amber) for which failure cannot be detected will be checked and replaced if necessary at periodic intervals as recommended by the lamp manufacturer. Lamps will be tested for proper operation prior to installation.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Modify

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
Strengthen administrative procedures to ensure operators take immediate corrective action to have defective light bulbs replaced.

WARRANTY RUN - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 12/16/85

PLANNED COMPLETION Prior to the beginning of the 100 hour
warranty run.
WORK COMPLETE 8/31/87

REFERENCES:

- 1) PAP-0201 Rev. 3 TC-1
- 2) IMI-E2-41

HED REPORT SHEET

HED-109 REV. 4

HED DESCRIPTION: Unlabeled white indicating lights are used on Panels 669 and 672 for both LPRM downscale and LPRM bypassed indications. Similarly, red hydrogen purge lights and amber high/low vacuum lights on Panel 845 are not individually labeled. B6.1 (4.1.4.3)

HUMAN FACTORS REVIEW: The closeness and size of the lights on P669 through P672 do not allow for individual labeling of LPRM detector status. A large plastic plaque will be provided for each panel showing the function of each LPRM detector status light set. This plaque will be mounted below the rows of lights to enable the operator or technician to identify the meaning of the three lights: downscale, bypass and upscale. The hydrogen level and vacuum lights on P845 will be individually identified by new nameplates.

H.P. GUIDELINES: NUREG 0700, Section 6; Labels and Aids

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
SPARE LIGHT BULBS SHOULD BE LABELLED "SPARE".

WARRANTY RUN - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 11/23/85

PLANNED COMPLETION Prior to the beginning of the 100 hour
warranty run.
WORK COMPLETE 8/19/87

REFERENCES:

- 1) Photos: S2, S3, S4, 45, 46
- 2) FDDR KL1-942

HED REPORT SHEET

HED-114 REV. 3

HED DESCRIPTION: The association of pen color to input parameter is generally not specified on recorder labels, except for those on Panel 680. B6.6 (4.2.3.8)

HUMAN FACTORS REVIEW: The recorders will be provided with nameplates which identify the parameters and pen color.

H.F. GUIDELINES: NUREG 0700, Section 6, Labels and Aids

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
B21-R623 PEN LABEL IS MISSING. LABEL WILL BE PROVIDED.

WARRANTY RUN - CORRECTS HED? No NEW HED? No
Identify pen color with parameter for 1B21-R623A/B.

SECOND REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 12/16/85

PLANNED COMPLETION Prior to the beginning of the 100 hour
warranty run.
WORK COMPLETE 11/3/86

PLANNED COMPLETION Prior to startup following second refuel
WORK COMPLETE 11/7/90

REFERENCES:

- 1) FDDR KL1-942

HED REPORT SHEET

HED-310 REV. 3

HED DESCRIPTION: SA4.3 Is extraneous information not included (e.g., manufacturer's trademark, patent notice, etc.)? Refer to HED Attachment Sheet. HEO-30

HUMAN FACTORS REVIEW: Manufacturer's trademarks do exist. Overall this extraneous information is unobtrusive. The vendor labels on P601 chart recorders are prominent and will be covered.

H.F. GUIDELINES: NUREG 0700, Section 6; Labels and Aids

IMPLEMENTATION: None and Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
B21-R623B LABEL IS MISSING. NEW LABEL WILL BE PROVIDED.

WARRANTY RUN - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 9/13/85

PLANNED COMPLETION Prior To The Beginning of the 100 hour
warranty run.
WORK COMPLETE 8/19/87

REFERENCES:

- 1) FDDR KL1-942

HED ATTACHMENT SHEET

HED-310-1 REV. 3

<u>Observation</u>	<u>Panel</u>
o Vendor labels on chart recorders, controllers	601/823
o GE label on range selector panel	842/680
o Chart recorder - manufacturer label and trademark	800/811
o Manufacturer's description	807/808 /809
o Some extra info in lower left corner of some labels	845
o All Bailey & GE units have logo	846/865
o Rosemont & Bailey	868/869
o All recorders have manufacturers logo & trademark	8F3
o Manufacturer's logos on equipment	902/906 /907
o PANALARM tempmatic (not too intrusive)	904
o Peak shock annunciator has manufacturer trademark, partially obscured by nameplate	969

HED REPORT SHEET

HED-522 REV. 4

HED DESCRIPTION: Nameplates are missing on P884 and P8C .

HUMAN FACTORS REVIEW: Nameplates will be provided.

H.F. GUIDELINES: NUREG 0700, Section 6, Labels

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY 1
SAFETY CONSEQUENCE? NO INCREASE ERROR POTENTIAL? NO

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NO NEW HED? YES
NAMEPLATE IS MISSING FROM RECORDER D19-R400. PERMANENT LABEL WILL BE PROVIDED.

WARRANTY RUN - CORRECTS HED? Partial NEW HED? No
NAMEPLATES PLACED UNDER RECORDERS - CANNOT READ FROM STANDING POSITION - PLACE
NAMEPLATES ON FRONT BEZEL

SECOND REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION - Fuel Load
WORK COMPLETE 12/16/85

PLANNED COMPLETION Prior to the beginning of the 100 hour
Warranty Run.

WORK COMPLETE 8/19/87

PLANNED COMPLETION - Prior to start up following second refuel.
WORK COMPLETE 11/7/90

REFERENCES:

HED REPORT SHEET

HED-600 REV. 3

HED DESCRIPTION: F1.11 When the operator is talking on the radio channel of the Control Room Communication Module, any Channel 5 PA page occurring at the same time will be transmitted over the top of the radio conversation.

HUMAN FACTORS REVIEW: Modify the communication module's circuitry to prevent PA messages from being transmitted over the top of Radio Conversations.

H.F. GUIDELINES: NUREG 0700, Section 2; Communications

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY 2
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? Yes

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to the beginning of the 100 hour warranty run.
WORK COMPLETE 8/31/87

REFERENCES:

1. DCP 860969

HED REPORT SHEET

HED-29 REV. 4

HED DESCRIPTION: While some attempt has been made at prioritizing annunciators with color coded windows, application of this technique does not appear to be well defined or consistent on all control panels. B3.5 (4.3.11)

HUMAN FACTORS REVIEW: A detailed review of Control Room annunciator windows has been conducted. Alarm prioritization, location, alarm logic, readability, terminology and adherence to standard abbreviations were reviewed to aid immediate operator response. The annunciator color code was revised taking into consideration the guidance of NUREG-0700 Exhibit 6.3.3. The revised annunciator color code was consistently applied on all control room panels. Currently with respect to the total of 1150 annunciators 3% are red and 12% are amber. Refer to HED attachment for definition of the three priority alarm coding description and the list of red and amber coded alarms.

H.F. GUIDELINES: NUREG 0700, Section 3; Annunciators

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? Yes
SOME RED ANNUNCIATORS ARE DIMMER THAN OTHERS AND ARE DIFFICULT TO DISTINGUISH. THE RED ANNUNCIATORS WILL BE MODIFIED TO PROVIDE BRIGHTER AND CONSISTENT VISIBILITY.

FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 9/11/85

PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 11/11/88

REFERENCES:

- 1) Visual Inspection

Annunciator Color Code Definitions

1. Red-First Priority Alarms

- a. Plant conditions which if not immediately corrected (within 2 minutes) will result in automatic plant shutdown, or will require manual plant shutdown.
- b. Plant conditions which will result in initiation or trip of RCIC or ECCS systems.

2. Amber-Second Priority Alarms

- a. Plant conditions which, if not corrected, may lead to:
 - 1) radiation release
 - 2) plant shutdown within 1/2 hour, or reduced power operation to 75% of rated or less.
 - 3) trip of RCIC or ECCS system.
- b. Plant conditions associated with a plant shutdown where the trip is separately alarmed and prioritized red.
- c. Plant electrical power disruption indicated by bus undervoltage.

3. White-Third Priority Alarms

- a. Plant conditions which are undesirable and may cause equipment damage or a decrease in unit reliability.

HED ATTACHMENT SHEET
FIRST PRIORITY - RED ALARM LIST

HED-29-2 REV. 4

<u>LOCATION</u>	<u>LEGEND</u>
P680-3A-A8	MAIN TURB & FEEDWATER TRIP - L8
P680-5A-A1	RRCS RX LEVEL LO L2
-A2	RRCS RX PRESS HI
-A3	RRCS MANUAL ARI
-A10	FULL SCRAM
P680-8A-A6	MAIN TURBINE TRIP
-B6	LOAD SET RUNBACK STATOR CLG
-B3	SEISMIC ALARM P869
-C3	SEISMIC MONITOR TRIP
P680-9A-A2	GENERATOR LOCKOUT RELAY TRIP
-D2	GEN BKUP REVERSE PWR TRIP
P601-16A-A5	HPCS PUMP AUTO START RECEIVED
-F4	HPCS PUMP TRIP
P601-21A-A5	RCIC AUTO START RECEIVED
-A1	RCIC TURB TRIP RCIC PUMP SUCT PRESSURE LOW
-A2	RCIC TURB TRIP SHTOF VLV CL RX LVL HI L8
-A3	RCIC TURB TRIP EXHAUST PRESSURE HIGH
-B1	RCIC ISOL DIAPHRAM RUPTURED
-C1	RCIC ISOL RX PRESSURE LOW
-D1	RCIC ISOL STEAM FLOW HIGH
-C2	RCIC ISOL STEAM TUNNEL TEMP HIGH
-D2	RCIC ISOL RCIC ROOM TEMP HIGH
-A6	LPCS AUTO START RECEIVED
-H6	LPCS PUMP OVER CURRENT
P601-20A-A3	LPCI A AUTO START RECEIVED
-A4	CNTMT SPRAY A AUTO START RECEIVED
-F6	RHR PUMP A TRIP
-D5	RCIC & RHR ISOL RHR RM A/B TEMP HIGH
P601-17A-A4	LPCI B & C AUTO START RECEIVED
-F4	RHR PUMP B TRIP
-G4	RHR PUMP C TRIP
-A3	CNTMT SPRAY B AUTO START RECEIVED
P601-19A-A1	MSIV ISOL AUTO CLOSE RECEIVED
-B7	SRV AUTO OPEN RECEIVED
-A7	SRV OPEN
-A9	ADS A AUTO OPEN RECEIVED
-A11	ADS B AUTO OPEN RECEIVED
P870-3A-H2	CIRW PUMP TRIP TB BASEMENT WATER LVL HIGH

SECOND PRIORITY - AMBER ALARM LIST

P680-2A-A1	LP CNDR VACUUM LO
-A2	IP CNDR VACUUM LO
-A3	HP CNDR VACUUM LO
-A5	HOTWELL PUMP A TRIP
-B5	HOTWELL PUMP B TRIP
-C5	HOTWELL PUMP C TRIP
-A6	CBP A TRIP

HED ATTACHMENT SHEETHED-29-3 REV. 4LOCATIONLEGEND

-B6	CBP B TRIP
-C6	CBP C TRIP
P680-3A-A9	RX LEVEL HI/LO L7/L4
-B9	RX PRESS HI
-A6	AUX CNDR A VACUUM LO
-A7	AUX CNDR B VACUUM LO
-D8	MFP TRIP
-D6	RFPT A TRIP
-D7	RFPT B TRIP
P680-4A-A3	RCIRC A HI TO LO SPEED XFER
-A12	RCIRC B HI TO LO SPEED XFER
-B2	RCIRC A BRG OIL LEVEL LO
-B11	RCIRC B BRG OIL LEVEL LO
-B3	RCIRC A MOTOR LOCKOUT
-B12	RCIRC B MOTOR LOCKOUT
-C2	RCIRC A MOTOR CLR LEAKAGE HI
-C11	RCIRC B MOTOR LEAKAGE HI
-E2	RCIRC A MOTOR VIB HI
-E11	RCIRC B MOTOR VIB HI
-A4	RCIRC A RRCS TRIP
-A13	RCIRC B RRCS TRIP
P680-4A-C4	PCIRC A MG SET LOCKOUT
-C13	PCIRC B MG SET LOCKOUT
-E4	RCIRC A AUTO XFER INCOMPLETE
-E13	RCIRC B AUTO XFER INCOMPLETE
-E7	NCC UNIT 1 HDR FLOW LO
P680-5A-A4	RPS TURB STOP VLV CLOSURE
-A5	RPS TURB CONT V FAST CLOSE
-B4	RPS RX LEVEL LO L3
-B5	RPS RX LEVEL HI L8
-A6	RPS MSIV CLOSURE
-A7	RPS INST VOL LEVEL HI
-A8	RPS RX PRESS HI
-A9	1/2 SCRAM A/C
-B6	RPS MSL RAD HI
-B7	RPS NEUTRON MON TRIP
-B8	RPS DW PRESS HI
-B9	1/2 SCRAM B/D
-B10	RPS MANUAL SCRAM
-D6	SCRAM VLV AIR HEADER PRESS LO
P680-6A-B1	SRM PERIOD SHORT
-C6	LPRM UPSCALE
P680-7A-B4	CNTMT VENT EXH RAD A/D HI HI/INOP
-C4	CNTMT VENT EXH RAD B/C HI HI/INOP
-B13	TURB/GEN/EXCTR VIB P823
-B14	RFPT A VIB/TEMP P823
-B15	RFPT B VIB/TEMP P823
-A1	STEAM BYPASS VLV OPEN
P680-8A-C6	LOAD LMT SETBACK VAC LO
-D6	MAIN TURB THRUST BRG WEAR HI

HED ATTACHMENT SHEETHED-29-4 REV. 4LOCATIONLEGEND

P680-15A-E1	MSP LOW SUCT PRESS AUTO START
-E2	EBOP LOW PRESS AUTO START
-E3	TGOP LOW PRESS AUTO START
P680-9A-B2	VOLTS TO HERTZ RATIO HI
-B3	GEN FIELD OVER VOLTAGE
-C3	GENERATOR FIELD GROUND
-C4	EXCITER FIELD GROUND
-D3	GENERATOR NEG SEQ OVERCURRENT
-E3	GENERATOR CORE MON P864
P680-15A-D4	MSOP QUILL SHAFT FAILURE
P601-16A-B5	HPCS DW PRESS HIGH
-C5	HPCS RX LEVEL LO L2
-E4	HPCS PUMP OVERCURRENT
-C1	BUS EH13 STRIPPED UNDERVOLTAGE
-A1	DIESEL GEN AUTO START RECEIVED
P601-20A-B3	LPCS & LPCI A DW PRESS HIGH
-C3	LPCS & LPCI A RX LEVEL LO L1
-B4	CNTMT SPRAY A CNTMT PRESSURE HIGH
P601-17A-B3	CNTMT SPRAY B CNTMT PRESSURE HIGH
-B4	LPCI B&C DW PRESS HI
-C4	LPCI B&C RX LEVEL LO L1
P601-18A-F2	DW/MSL GUARD PIPE LO AMB TEMP P632
P601-19A-A2	MSL ISOL MAIN STEAM LINE PRESSURE LOW
-A3	MSL ISOL MAIN STEAM LINE FLOW HIGH
-A4	MSL ISOL RX LVL LO L1
-B1	MSL ISOL MAIN CONDENSER VACUUM LOW
-B2	MSL ISOL MAIN STEAM LINE RAD HI/INOP
-B3	MSL ISOL TURB AREA TEMP HIGH
-B4	MSL & RWCU ISOL STEAM TUNNEL TEMP HIGH
-A6	BOP ISOL DW PRESS HIGH
-B6	BOP ISOL RX LEVEL LO L2
-A5	MSIV ISOL MANUAL
-B5	INBD/OTBD NS4 MAN ISOL RECEIVED
-C7	SRV LOGIC RX PRESSURE HIGH
-E6	ADS A 105 SEC TIME DELAY LOGIC INITIATED
-E10	ADS B 105 SEC TIME DELAY LOGIC INITIATED
-E9	ADS A INSTANTANEOUS LOGIC INITIATED
-E11	ADS B INSTANTANEOUS LOGIC INITIATED
-D8	ADS A TIMER 90 SEC & RUNNING
-D10	ADS B TIMER 90 SEC & RUNNING
P870-1A-C4	BUS L10 UNDERVOLTAGE
-C1	BUS L11 FAST TRANSFER UNDERVOLTAGE
-C2	BUS L12 FAST TRANSFER UNDERVOLTAGE

<u>LOCATION</u>	<u>LEGEND</u>
-F1	BUS H11 UNDERVOLTAGE
-F2	BUS H12 UNDERVOLTAGE
-E4	480 BUS UNDERVOLTAGE
-D5	DC BUS D-1-A UNDERVOLTAGE
-E5	DC BUS D-1-B UNDERVOLTAGE
P870-2A-B3	IA COMP START IA HEADER PRESSURE LOW
-H4	TBCC PUMP SUCTION FLOW LOW
P870-3A-H1	TURBINE BLDG BASEMENT WATER LEVEL HIGH
-G1	CIRCULATING WATER PUMP A TRIP
-G2	CIRCULATING WATER PUMP B TRIP
-G3	CIRCULATING WATER PUMP C TRIP
P870-5A-A1	MOISTURE SEPARATOR DRN TANK 1A LVL HI
-A2	MOISTURE SEPARATOR DRN TANK 2A LVL HI
-A3	MOISTURE SEPARATOR DRN TANK 1B LVL HI
-A4	MOISTURE SEPARATOR DRN TANK 2B LVL HI
P870-7A-F1	CNDR ISOL SJAE A ST FLOW LOW
-G1	CNDR ISOL SJAE B ST FLOW LOW
P870-8A-B2	RFPT A TRIP ACTIVE THRUST BRG WEAR HIGH
-E2	RFPT B TRIP ACTIVE THRUST BRG WEAR HIGH
-B3	RFPT A TRIP INACTIVE THRUST BRG WEAR HIGH
-E3	RFPT B TRIP INACTIVE THRUST BRG WEAR HIGH
P870-9A-D1	STATOR CLG STBY PUMP START PRESSURE LOW
-E3	LP TURBINE EXHAUST HOOD TEMP HIGH
-G2	EHC STBY PUMP START - HEADER PRESSURE LOW
P877-1A-A1	DIESEL GEN AUTO START RECEIVED
-C1	BUS EH11 STRIPPED UNDERVOLTAGE
-G4	BUS XH11 STRIPPED UNDERVOLTAGE
P877-2A-A1	DIESEL GEN AUTO START RECEIVED
-C1	BUS EH12 STRIPPED UNDERVOLTAGE
-G4	BUS XH12 STRIPPED UNDERVOLTAGE
P604-A5	OG ISOL TIMER OG POST-TREAT PRCS RAD A/B 3XHI
-D3	ESW LOOP A PRCS RAD MON RAD HIGH
-D4	ESW LOOP B PRCS RAD MON RAD HIGH
P800-D1	H2 ANAL A H2 LEVEL HIGH
-D2	H2 ANAL B H2 LEVEL HIGH
-E1	H2 ANAL A H2 LEVEL HI HI
-E2	H2 ANAL B H2 LEVEL HI HI
P845-F2	H2 ANALYZER A H2 HIGH
-F3	H2 ANALYZER B H2 HIGH
P906-A3	RW DISCH ISOL RADWASTE TO ESW PRCS RAD MON HI
-A4	DDS DISCH ISOL RW TO SEWAGE PRCS RAD MON HI
P970-B1	NCC PUMP DISCH HEADER PRESSURE LOW
-B8	SW PUMP DISCH HEADER PRESSURE LOW
-C1	NCC HX OUTLET TEMP HIGH

HED REPORT SHEET

HED-33 REV. 4

HED DESCRIPTION: Annunciator windows have not been grouped by type; i.e., informational and diagnostic alarms are not segregated from trips and warnings. B3.11 (4.3.4)

HUMAN FACTORS REVIEW: An integrated detailed review of Control Room annunciator windows has been conducted. Alarm prioritization, location, alarm logic, readability, terminology and adherence to standard abbreviations were reviewed to aid immediate operator response. Annunciator windows throughout the control room are grouped by panel section. Annunciator trip alarms that were rearranged into functional groups were the following: DG initiation and trip; ECCS initiation; RCIC initiation, turbine trip and isolation; SPMU initiation; Main Steam Line isolation; NS4 isolation; SRV; ADS; and RPS. This arrangement will improve the man-machine interface with those systems requiring prompt attention and immediate operator action. Annunciator priority has been established by a consistently applied color code. This annunciator improvement has been introduced at the simulator.

H.F. GUIDELINES: NUREG 0700, Section 3; Annunciators

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? NO INCREASE ERROR POTENTIAL? NO

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? Yes

Previous reviews had identified that the color coding used for demarcation around annunciator windows is too distinctive. Further operational experience reviews indicate that the color coded annunciator demarcation is not only too distinctive but it is of no real benefit to the operators and in some cases has caused confusion. It is felt that the regrouping of the annunciators into functional groups combined with the use of priority color coding of the annunciator windows is acceptable and that the demarcation around the annunciators should be removed.

FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 12/5/85

PLANNED COMPLETION Prior to startup following first refuel.
Delete annunciator demarcation.
WORK COMPLETE 4/21/89

REFERENCES:

1) DCP 880079

HED REPORT SHEET

HED-72 REV. 2

HED DESCRIPTION: RFP and MFP flow indicators on Panel 680-3B use different scale multipliers (x 100 and x 1000). B5.18

HUMAN FACTORS REVIEW: Scales will be made consistent.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to start-up following first refuel
WORK COMPLETE 6/25/88

REFERENCES:

- 1) Photo: P34

HED REPORT SHEET

HED-74 REV. 2

HED DESCRIPTION: The logarithmic CPM scales of the Rad Monitoring Recorders on Panel 907 have major markings at numbered 10^x values. There are no intermediate scale markings between 10^x values, and single minor marking between intermediate markings. Values between numbered 10^x values are difficult to read because of the large number of undifferentiated intermediate scale markings. B5.22

HUMAN FACTORS REVIEW: The scale will be corrected by adding an intermediate marking between 10^x values.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to startup following first refuel.
WORK COMPLETE 11/25/86

REFERENCES:

- 1) Photo: P30

HED REPORT SHEET

HED-76 REV. 5

HED DESCRIPTION: Process units are not specified on labels for the following indicators and recorders:

1. IRM/APRM recorders, Panel 680
2. LOOP A/B Flow, Panel 680
3. TOTAL RECIRC FLOW, Panel 680
4. PRESSURE, Panel 680
5. Hydrogen analyzer and glycol pump temperature displays, Panel 845
6. Indicators on Panel 811
7. The label for the drywell pressure recorder on the emergency shutdown panel does not specify whether the pressure is displayed in psig or psia. B5.24 (4.2.2.3)
8. REACTOR LEVEL, Panel 680
9. Bailey recorders on Panel 001
10. Indicators on Panel 619

HUMAN FACTORS REVIEW: The above indicators were reviewed to determine the process units that would provide the most meaning to the operator. See attached sheet for process units that will be specified on the above indicators and displays.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? NO

1. N64-R605 IS MISSING THE "%" PROCESS UNITS.
2. "°F" ON N41-R110 SHOULD BE INCREASED IN SIZE.

FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 12/5/85

PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 4/11/89

REFERENCES:

- 1) FDDR KL1-3895, 3832, 3891, 3837, 3368
- 2) DCP 850125

HED ATTACHMENT SHEETHED-76-1 REV. 5

<u>Item</u>	<u>MPL</u>	<u>Panel</u>	<u>Process Units</u>
1	C51-R603A,B,C,D	P680-6D2	%
2	C51-R614	P680-4D	GPMx1000
3	B33-R613	P680-4D	(LBS/HR)x10 ⁶ /PSID
4	C34-R605	P680-3B	PSIG
5	N64-R605	P845	%
	N64-R630	P845	°F
6	N41-R110	P811	°F
	S11-R010	P811	°F
7	D23-R230	C61-P001	PSIG-In Hg
8	C34-R608	P6803B	Inches
9	C61-R012	C61-P001	Inches/PSIG
	D23-R240	C61-P001	Feet/°F
	D23-R230	C61-P001	PSIG-In Hg/°F
10	B33-R610	A-W P619	%

HED REPORT SHEET

HED-77 REV. 3

HED DESCRIPTION: Scales on Panel 823/842 are not identified clearly. Units are small and often obscured from view. Sometimes the scales are not marked at all. B5.25 (4.2.2.6)

HUMAN FACTORS REVIEW: Proper scales and units will be added as shown on attached sheet.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No

FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel load - Provide process units.
WORK COMPLETE 9/3/85

PLANNED COMPLETION Prior to start-up following first refuel
WORK COMPLETE 4/11/89 - Increase parameter units size and
relocate to center of scale.

REFERENCES:

- 1) DCP 850125

HED ATTACHMENT SHEET

HED-77-1 REV. 3

1. The following instruments are missing process units which will be corrected by fuel load:

<u>MPL #</u>	<u>Panel</u>	<u>Process Units</u>
N31-R003	P823	%, RPM, MILS
N11-R050	P842	PSIG
N11-R055	P842	FSIG

2. The following instruments have process units which are small and obscured from view. The process units will be increased in size and move towards the center of the scale the scale by first refueling.

<u>MPL #</u>	<u>Panel</u>	<u>Process Units</u>
N31-R001	P823	°F
N31-R005	P823	°F
N27-R066	P842	°F
N21-R216	P842	°F
N71-R216	P842	°F

HED REPORT SHEET

ED-80 REV. 4

HED DESCRIPTION: The following indicators possess greater than 9 intermediate graduations between numbered scale divisions:

Panel 601:	C11R100 B/A CRD PUMPS A/B E51-R601 RCIC PUMP DISCH PRESS E51-R602 MST TO RCIC TURBINE PRESS E22-R601 HPCS PUMP DISCHARGE PRESS
Panel 001:	SUPPR POOL LEVEL - D23-R24G (PG 1.97)
Panel 622/623:	All meters
Panel 632:	EQUIPMENT AREA AMBIENT TEMP - E31-R603
Panel 642:	SUMP LEVEL - R31-R618 (RG 1.97)
Panel 669-672:	APRM Indicators
Panel 823/842:	Bailey Meters - N11-R050, R055 B5.28 (4.2.2.14)
Panel 845:	Several discrepant indicators
Panel 970:	FPCC SURGE TANK LEVEL A NCC PUMP A and B - G41-R366A,B
Panel 811:	Several discrepant indicators - N41-R110, S11-R010
Panel 821:	Several discrepant indicators

HUMAN FACTORS REVIEW: Instrument scales will be modified to possess less than or equal to 9 intermediate graduations between numbered scale divisions as shown on the attached sheet.

W.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No

FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - All RG 1.97 indicator scales
WORK COMPLETE 9/10/85

PLANNED COMPLETION Prior to start-up following first refuel
- Remaining indicator scales
WORK COMPLETE 4/25/89

REFERENCES:

- 1) Visual Inspection

HED ATTACHMENT SHEETHED-80-1 REV. 4PRIORITY 1 - FUEL LOAD

<u>MPL</u>	<u>PANEL</u>	<u>COMPLETE</u>
D23-R240	C61-PO01	X
E31-R618	H13-P642	X

PRIORITY 2 - PRIOR TO START-UP AFTER FIRST REFUEL

<u>MPL</u>	<u>PANEL</u>	<u>COMPLETE</u>
B21-R614	H13-P614	X
B33-R601	H13-P614	X
C11-R100A	H13-P601-22B	X
C11-R100B	H13-P601-22B	X
C61-R011	C61-PO01	X
E22-R601	H13-P601-16B	X
E31-R608	H13-P632	X
E31-R611	H13-P632	X
E51-R602	H13-P601-21B	X
N11-R050	H13-P842	X
N11-R055	H13-P842	X
N21-R216	H13-P842	X
N27-R066	H13-P842	X
N31-PO01	H13-P823	X
N31-RO02	H13-P823	X
N41-R110	H13-P811	X
N64-R602	H13-P845	X
N64-R610	H13-P845	X
N64-R613	H13-P845	X
N64-R630	H13-P845	X
N71-R216	H13-P842	X
S11-RO10	H13-P811	X

HED REPORT SHEET

HED-81 REV. 4

HED DESCRIPTION: Number scale divisions that were not in decimal multiples of 1, 2, or 5 are observed on the following panels:

001	680	870
601	800	5^4
622	821	970
669/672	823-842	

B5.29 (4.2.2.15)

HUMAN FACTORS REVIEW: Scales will be modified to meet the above criteria for the instruments identified in the attached sheet. A two stage implementation plan will take place. 1) All scales associated with RG 1.97 instrumentation or those found during the task analysis of the PEI's and IOI-11 will be fixed prior to fuel load. 2) The remaining instruments will be modified prior to startup following first refuel.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No
FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Priority 1
WORK COMPLETE 9/6/85
PLANNED COMPLETION Prior to start-up following first refuel
- Priority 2
WORK COMPLETE 4/25/89

REFERENCES:

- 1) Photos: 27, 28
- 2) ECN 28465-86-2240

Priority 1 - Fuel Load

<u>MPL</u>	<u>Panel</u>	
E12-R100C	P601-17B	
B21-R623B	P601-17B *	
C41-R600B	P601-18B	* RG 1.97 instrumentation
C41-R600A	P601-19B *	
B21-R623A	P601-20B *	
E51-R601	P601-21B	
E21-R100	P601-21B	
C61-R012	C61-P001	
E22-R601	P601-16B	
D23-R170A	P883 *	
D23-R170B	P883 *	

Priority 2 - Prior to Startup After First Refuel

<u>MPL</u>	<u>Panel</u>	<u>Complete</u>
B21-R610C	H13-P601-20B	X
B21-R610D	H13-P601-17B	X
B21-R659A	H13-P622	X
B21-R659B	H13-P622	X
B21-R659C	H13-P622	X
B21-R659D	H13-P622	X
B21-R660A	H13-P622	X
B21-R660B	H13-P622	X
B21-R660C	H13-P622	X
B21-R660D	H13-P622	X
B21-R661A	H13-P623	X
B21-R661B	H13-P623	X
B21-R661C	H13-P623	X
B21-R661D	H13-P623	X
B21-R662A	H13-P623	X
B21-R662B	H13-P623	X
B21-R662C	H13-P623	X
B21-R662D	H13-P623	X
B33-R602A	H13-P680-4B	X
B33-R602B	H13-P680-4B	X
B33-R603A	H13-P690-4B	X
B33-R603B	H13-P680-4B	X
B33-R605A	H13-P680-4B	X
B33-R605B	H13-P680-4B	X
B33-R651A	H13-P680-4B	X
B33-R651B	H13-P680-4B	X
C11-R100A	H13-P601-22B	X
C11-R100B	H13-P601-22B	X
C11-R601	H13-P601-22B	X
C11-R602	H13-P601-22B	X
C11-R603	H13-P601-22B	X

HED ATTACHMENT SHEET

HED-81-2 REV. 4

<u>MPL</u>	<u>Panel</u>	<u>Complete</u>
C61-R010	C61-P001	X
C61-P011	C61-P001	X
C85-R718A	H13-P680-7B	X
C85-R718B	H13-P680-7B	X
C85-R718C	H13-P680-7B	X
C85-R718D	H13-P680-7B	X
C85-R718E	H13-P680-7B	X
C85-R718F	H13-P680-7B	X
C85-R718G	H13-P680-7B	X
C85-R719A	H13-P680-7B	X
C85-R719B	H13-P680-7B	X
C85-R719C	H13-P680-7B	X
C85-R719D	H13-P680-7B	X
C85-R719E	H13-P680-7B	X
C85-R719F	H13-P680-7B	X
C85-R719G	H13-P680-7B	X
D23-R230	C61-P001	X
E12-R605-1	H13-P601-20B	X
E22-R011C	H13-P601-16B	X
E51-R602	H13-P601-21B	X
G33-R600	H13-P680-1B	X
G33-R605A	H13-P680-1B	X
G33-R605B	H13-P680-1B	X
G41-R016	H13-P970	X
G41-R031	H13-P970	X
G41-R077	H13-P970	X
G41-R082	H13-P970	X
G41-R098	H13-P870-2B	X
G41-R101A	H13-P970	X
G41-R101B	H13-P970	X
G41-R10C	H13-P870-2B	X
G41-R121	H13-P870-2B	X
G41-R366A	H13-P970	X
G41-R366B	H13-P970	X
G42-R053	H13-P870-2B	X
N11-R011A	H13-P601-19A	X
N11-R011B	H13-P601-19A	X
N11-R011C	H13-P601-19A	X
N11-R011D	H13-P601-19A	X
N11-R122A	H13-P870-6B	X
N11-R122B	H13-P870-6B	X
N11-R127A	H13-P870-6B	X
N11-R127B	H13-P870-6B	X
N11-R141A	H13-P870-6B	X
N11-R141B	H13-P870-6B	X
N11-R146A	H13-P870-6B	X
N11-R146B	H13-P870-6B	X
N11-R191A	H13-P870-6B	X
N11-R191B	H13-P870-6B	X
N11-R196A	H13-P870-6B	X
N11-R196B	H13-P870-6B	X

HED ATTACHMENT SHEET
Complete

HED-81-3 REV. 4

<u>MPL</u>	<u>Panel</u>	
N11-R243A	H13-P680-3B	X
N11-R243B	H13-P680-3B	X
N11-R251A	H13-P680-3B	X
N11-R251B	H13-P680-3B	X
N11-R301	H13-P680-3B	X
N11-R311	H13-P680-3B	X
N11-R382A	H13-P870-6B	X
N11-R382B	H13-P870-6B	X
N11-R387A	H13-P870-6B	X
N11-R387B	H13-P870-6B	X
N11-R406	H13-P870-7B	X
N21-R001	H13-P680-2B	X
N21-R002	H13-P680-2B	X
N21-R003	H13-P680-2B	X
N21-R028	H13-P680-2B	X
N21-R033	H13-P680-2B	X
N21-R051	H13-P680-3B	X
N21-R111	H13-P680-3B	X
N21-R181A	H13-P680-2B	X
N21-R181B	H13-P680-2B	X
N21-R181C	H13-P680-2B	X
N21-R183	H13-P870-7B	X
N21-R191A	H13-P870-2B	X
N21-R191B	H13-P870-2B	X
N21-R256A	H13-P680-2B	X
N21-R256B	H13-P680-2B	X
N21-R256C	H13-P680-2B	X
N21-R276A	H13-P680-2B	X
N21-R276B	H13-P680-2B	X
N21-R276C	H13-P680-2B	X
N21-R348	H13-P680-2B	X
N25-R351A	H13-P870-5B	X
N25-R351B	H13-P870-5B	X
N25-R451A	H13-P870-5B	X
N25-R451B	H13-P870-5B	X
N27-R146A	H13-P680-3B	X
N27-R146B	H13-P680-3B	X
N27-R191	H13-P680-3B	X
N27-R295	H13-P680-3B	X
N27-R401	H13-P823	X
N27-R416A	H13-P870-3B	X
N27-R416B	H13-P870-3B	X
N27-R421A	H13-P870-3B	X
N27-R421B	H13-P870-3B	X
N27-R426A	H13-P680-3B	X
N27-R426B	H13-P680-3B	X
N27-R431A	H13-P870-8B	X
N27-R431B	H13-P870-8B	X
N27-R436A	H13-P870-8B	X
N27-R436B	H13-P870-8B	X

HED ATTACHMENT SHEETHED-81-4 REV. 4

<u>MPL</u>	<u>Panel</u>	<u>Complete</u>
N27-R441A	H13-P870-8B	X
N27-R441B	H13-P870-8B	X
N27-R451A	H13-P870-8B	v
N27-R451B	H13-P870-8B	X
N31-R005	H13-P823	X
N31-R011	H13-P680-15B	X
N31-R012	H13-P680-15B	X
N31-R013	H13-P680-15B	X
N31-R014	H13-P68C-15B	X
N31-R015	H13-P680-15B	X
N31-R016	H13-P680-15B	X
N31-R017	H13-P680-15B	X
N31-R018	H13-P680-15B	X
N31-R019	H13-P680-15B	X
N31-R020	H13-P680-15B	X
N31-R021	H13-P680-15B	X
N31-R022	H13-P680-15B	X
N32-R046	H13-P870-9B	X
N32-R704A	H13-P680-8B	X
N32-R704B	H13-P680-8B	X
N32-R704C	H13-P680-8B	X
N32-R704D	H13-P680-8B	X
N32-R706A	H13-P680-8B	X
N32-R706B	H13-P680-8B	X
N32-R706C	H13-P680-8B	X
N32-R706D	H13-P680-8B	X
N32-R708A	H13-P680-8B	X
N32-R708B	H13-P680-8B	X
N32-R708C	H13-P680-8B	X
N32-R708D	H13-P680-8B	X
N32-R708E	H13-P680-8B	X
N32-R708F	H13-P680-8B	X
N32-R709A	H13-P680-8B	X
N32-R709B	H13-P680-8B	X
N32-R709C	H13-P680-8B	X
N32-R709D	H13-P680-8B	X
N32-R709E	H13-P680-8B	X
N32-R709F	H13-P680-8B	X
N32-R710	H13-P680-8B	X
N32-R712	H13-P680-8B	X
N32-R713	H13-P680-8B	X
N32-R714	H13-P680-8B	X
N32-R715	H13-P680-8B	X
N33-R181	H13-P870-7B	X
N34-R135	H13-P680-15D	X
N36-R341A	H13-P870-4B	X
N36-R341B	H13-P870-4B	X
N36-R341C	H13-P870-4B	X
N36-R441A	H13-P870-5B	X

HED ATTACHMENT SHEETHED-81-5 REV. 4

<u>MPL</u>	<u>Panel</u>	<u>Complete</u>
N36-R441B	H13-P870-5B	X
N36-R481A	H13-P870-5B	X
N41-R016	H13-P680-9B	X
N41-R018	H13-P680-9B	X
N41-R019	H13-P680-9B	X
N42-R036	H13-P870-9B	X
N42-R041	H13-P870-9B	X
P11-R125	H13-P870-2B	X
P41-R010	H13-P970	X
P41-R011	H13-P970	X
P41-R012	H13-P970	X
P41-R013	H13-P970	X
P42-R043A	H13-P601-20B	X
P42-R043B	H13-P601-17B	X
P42-R045A	C61-P001	X
P42-R096A	H13-P601-20B	X
P42-R096B	H13-P601-17B	X
P43-R026A	H13-P970	X
P43-R026B	H13-P970	X
P43-R026C	H13-P970	X
P43-R194A	H13-P680-1B	X
P43-R194B	H13-P680-1B	X
P43-R221	H13-P970	X
P43-R350	H13-P970	X
P43-R351	H13-P970	X
P43-R352	H13-P970	X
P43-R6C2	H13-P800	X
P45-R010	H13-P601-20B	X
P45-R011	H13-P601-17B	X
P45-R033A	C61-P001	X
P45-R054A	H13-P601-20B	X
P45-R054B	H13-P601-17B	X
P45-R055A	C61-P001	X
P45-R102A	H13-P601-20B	X
P45-R102B	H13-P601-17B	X
P45-R178	H13-P601-16B	X
P46-R200	H13-P800	X
P46-R201	H13-P800	X
P47-R290	H13-P904	X
P47-R291	H13-P904	X
P47-P292	H13-P904	X
P51-R112	H13-P870-2B	X
P61-R212	H13-P970	X
P52-R010	H13-P870-2B	X
P52-R102	H13-P870-2B	X
P57-R026A	H13-P601-19B	X
P57-R026B	H13-P601-19B	X
R11-R010	H12-P870-1B	X
R11-R011	H12-P870-1B	X

HED ATTACHMENT SHEETHED-81-6 REV. 4

<u>MPL</u>	<u>Panel</u>	<u>Complete</u>
R11-R012	H12-P870-1B	X
R11-R013	H12-P870-1B	X
R11-R014	H12-P870-1B	X
R11-R015	H12-P870-1B	X
R11-R016	H12-P870-1B	X
R11-R017	H12-P870-1B	X
R11-R018	H12-P870-1B	X
R22-R010	H13-P870-1B	X
R22-R011	H13-P870-1B	X
R22-R012	H13-P870-1B	X
R22-R013	H13-P870-1B	X
R22-R020	H13-P870-1B	X
R22-R021	H13-P870-1B	X
R22-R022	H13-P870-1B	X
R22-R023	H13-P870-1B	X
R22-R024	H13-P870-1B	X
R22-R025	H13-P870-1B	X
R42-R010	H13-P870-1B	X
R42-R011	H13-P870-1B	X
R42-R012	H13-P870-1B	X
R42-R013	H13-P870-1B	X
R42-R020A	H13-P877-1B	X
R42-R021	H13-P877-1B	X
R42-R030B	H13-P877-2B	X
R42-R031	H13-P877-2B	X
R42-P040C	H13-P601-16B	X
R42-R041C	H13-P601-16B	X
R42-R100	H13-P877-1B	X
R42-R101	H13-P877-2B	X
R43-R010A	H13-P877-1B	X
R43-R011A	H13-P877-1B	X
R43-R012A	H13-P877-1B	X
R43-R020B	H13-P877-2B	X
R43-R021B	H13-P877-2B	X
R43-R022B	H13-P877-2B	X

HED REPORT SHEET

HED-84 REV. 5

HED DESCRIPTION: Indicator scales are generally not marked or color coded to indicate normal, marginal and abnormal ranges. B5.33 (4. 7.1)

HUMAN FACTORS REVIEW: Indicators will be reviewed for consistent and meaningful application of color banding where applicable to indicate normal, marginal and abnormal ranges. A two stage parsimonious implementation is planned since all the specific limits of indicator color banding have not been sufficiently determined. Initially the normal range and important limits will be marked on the scale cover as a temporary fix. Permanent color banding will be provided for selected plant emergency instruction and technical specification related instrumentation as shown on the attached sheets prior to start up following first refuel.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
TEMPORARY BANDING DOES NOT FULLY CORRECT THE HED. FURTHER REVIEWS WILL BE CONDUCTED TO ENSURE A CONSISTENT AND MEANINGFUL APPLICATION OF PERMANENT COLOR BANDING.

FIRST REFUEL - CORRECTS HED? PARTIAL NEW HED? NO
GREEN/RED BANDS DO NOT MEET-1G43-RO62A/B & R102 - ADD AMBER BANDING BETWEEN GREEN/RED.

SECOND REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Temporary color banding
WORK COMPLETE 11/23/85

PLANNED COMPLETION Prior to start-up following first refuel
- Permanent color banding
WORK COMPLETE 4/25/89

PLANNED COMPLETION Prior to start-up following second refuel
WORK COMPLETE 11/15/90

REFERENCES:

- 1) Visual Inspection

HED REPORT SHEETHED-84-1 REV.5

<u>HED</u>	<u>PANEL</u>	<u>COMPLETED</u>
B21-R623A	H13-P601-20B	X
B21-R623B	H13-P601-17B	X
C34-R606A	H13-P680-3B	X
C34-R606B	H13-P680-3B	X
C34-R606C	H13-P680-3B	X
C41-R601	H13-P601-19B	X
C61-R010	C61-P001	X
C61-R011	C61-P001	X
C61-R030	C61-P002	X
C61-R031	C61-P001	X
D23-R024A	H13-P601-20B	X
D23-R024B	H13-P601-17B	X
D23-R034A	H13-P601-20B	X
D23-R034B	H13-P601-17B	X
D23-R046A	H13-P601-20B	X
D23-R046B	H13-P601-17B	X
D23-R200A	H13-P601-20B	X
D23-R200B	H13-P601-17B	X
D23-R210A	H13-P601-20B	X
D23-R210B	H13-P601-17B	X
D23-R220A	H13-P601-20B	X
D23-R220B	H13-P601-17B	X
D23-R260	C61-P002	X
D23-R270	C61-P002	X
D23-R280	C61-P002	X
E22-R013C	H13-P601-16B	X
E22-R017C	H13-P601-16B	X
E31-R614C	H13-P680-1B	X
G43-R013A	H13-P601-20B	X
G43-R013B	H13-P601-17B	X
G43-R022A	H13-P601-20B	X
G43-R022B	H13-P601-17B	X
G43-R062A	H13-P601-20B	X
G43-R062B	H13-P601-17B	X
G43-R102	C61-P002	X
N11-R011A	H13-P601-19A	X
N11-R011B	H13-P601-19A	X
N11-R011C	H13-P601-19A	X
N11-R011D	H13-P601-19A	X
N21-R181A	H13-P680-2B	X
N21-R181B	H13-P680-2B	X
N21-R181C	H13-P680-2B	X
R22-R020A	H13-P87701B	X
R22-R020C	H13-P601-16B	X
R22-R030B	H13-P877-2B	X
R22-R043C	H13-P601-16B	X

HED REPORT SHEETHED-84-2 REV. 5

<u>HED</u>	<u>PANEL</u>	<u>COMPLETED</u>
R43-R013A	H13-P877-1B	X
R43-R017A	H13-P877-1B	X
R43-R020A	H13-P877-1B	X
R43-R023B	H13-P877-2B	X
R43-R027B	H13-P877-2B	X
R43-R030B	H13-P877-2B	X
R45-R011	H13-P601-16B	X
R45-R106	H13-P601-16B	X
R45-R131A	H13-P877-1B	X
R45-R131B	H13-P877-2B	X
R45-R191A	H13-P877-1B	X
R45-R191B	H13-P877-2B	X

HED REPORT SHEET

HED-94 REV. 4

HED DESCRIPTION: Printed values on recorder charts may be difficult to read on the following panels:

Panel 601 has minitrend recorders with very small numerals. B5.44a (4.2.3.1.a)

HUMAN FACTORS REVIEW: The minitrend recorder prints the points by color and although the numerals are small, they are distinct and readable. The frosted glass cover will be replaced with clear glass. ERIS also monitors these parameters on a display.

H.F. GUIDELINES: NUREG 0700, Section 5, Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No
COMPLETE VERIFICATION OF RECORDER READABILITY WHEN THIS SYSTEM IS OPERATIONAL. RECORDER IS OPERATIONAL AND RECORDER POINTS ARE DISTINCT AND READABLE.

FIRST REFUEL - CORRECTS HED? PARTIAL NEW HED? NO
NEED PERMANENT POINT IDENTIFICATION LABEL ON DOOR.

SECOND REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 9/3/85

PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETES 6/25/88

PLANNED COMPLETION Prior To Startup Following Second Refuel
WORK COMPLETE 11/7/90

REFERENCES:

- 1) PDDR KL1-3834

HED REPORT SHEET

HED-96 REV. 4

HED DESCRIPTION: Some chart recorders are provided with dual speed capability while others are not. The operator is given no indication from the front of the panel to distinguish between single and dual speed capabilities. More widespread application of dual speed capability may be desirable, particularly for those parameters closely monitored during transient conditions and the instruments on the emergency shutdown panel. B5.45 (4.2.3.4)

HUMAN FACTORS REVIEW: Dual speed recorders with a switch on the face are properly labeled. Other dual speed recorders with a internal switch will be identified with a nameplate to identify dual speed capability. The ERIS displays provide trending information for critical plant parameters.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Disagree and Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY 1
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to Start-Up after First Refuel
WORK COMPLETE 4/25/89

REFERENCES:

1) DCP 880079

HED REPORT SHEET

HED-100 REV. 4

HED DESCRIPTION: Recorder scales are generally not marked to indicate normal and abnormal range. B5.49 (4.2.3.10)

HUMAN FACTORS REVIEW: Reference HED-84 for Human Factors Review

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
SEE HED-84

FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Temporary color banding
WORK COMPLETE 9/13/85

PLANNED COMPLETION Prior to start-up following first refuel
- Permanent color banding
WORK COMPLETE 4/25/89

REFERENCES:

- 1) Visual Inspection
- 2) HED-84

HED REPORT SHEET

HED-102 REV. 4

HED DESCRIPTION: A given parameter covered by the guidelines may possess several action levels. Suppression Pool water level, for example, has at least eight limits of concern to the operator. Limits or action levels of immediate concern to the operator should be marked in fashion on the indicator or recorder. They may include such points as the top of active fuel for reactor water level, normal operating limits and vacuum breaker elevation for suppression pool level, and low pressure injection system shutoff head for reactor pressure. B5.51 (5.30), B5.52 (5.6)

HUMAN FACTORS REVIEW: Reference HED-84 for Human Factors Review.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
SEE HED-84

FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Temporary color banding
WORK COMPLETE 11/23/85

PLANNED COMPLETION Prior to start-up following first refuel
- Permanent color banding
WORK COMPLETE 4/25/89

REFERENCES:

- 1) Visual Inspection
- 2) HED-84

HED REPORT SHEET

HED-105 REV. 4

HED DESCRIPTION: Alarm points are generally not identified on recorder scales. B5.55
(4.2.3.2)

HUMAN FACTORS REVIEW: Reference HED-84 for Human Factors Review.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
SEE HED-84

FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 9/13/85

PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 4/25/89

REFERENCES:

- 1) Visual Inspection
- 2) HED-84

HED REPORT SHEET

HED-107 REV. 2

HED DESCRIPTION: Pointers partially obscure scale markings or numerals on round indicators located on Panel 680 and four indicators on Panel 632. B5.57 (4.2.2.7)

HUMAN FACTORS REVIEW: The four leak detection flow switch indicators (E31-R613A, B, C, D) pointers do not totally obscure the scale markings and do not significantly impair the readability of the scale. The indicators are primarily used for calibration and surveillance. The round indicators on P680 for RFPT control valve position, RFPT RPM, GEN FREQUENCY, GEN WATTS, GEN VARS, POWER FACTOR and SYNCHROSCOPE have the pointer obscuring the numerals. The scales are well marked with major and intermediate markings. The pointer partially obscuring the numerals on these non critical plant parameters introduces only very slight risk.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: None

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION
WORK COMPLETE N/A

REFERENCES:

- 1) Photos: C1, C2

HED DESCRIPTION: The following components are missing function labels:

- a. Four indicators on Panel 680-3 (Photo 6)
- b. Indicating lights on Panels 622 and 623 (Photo 46)
- c. Two meters on Panel 870-1
- d. Ten switches on Panels 881 and 882
- e. Four indicating lights on Panel 632 - Need 1 power nameplate
- f. One push-button on Panel 654
- g. Numerous components on Panel 845 (Photo 47)
- h. One switch on Panel 870-5 (Photo 48)
- i. Indicators on the right wing of Panel 680 (Photos 49, 50) - 5 spare meters are not labelled.
B6.2 (4.1.5.1)

HUMAN FACTORS REVIEW: Nameplates will be provided for all panel components.

H.F. GUIDELINES: NUREG 0700, Section 6; Labels and Aids

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No

- e. ONE INDICATING LIGHT IS UNLABELLED. LABEL WILL BE PROVIDED.
- i. FIVE INDICATORS ON P680-15B ARE UNLABELLED BECAUSE THE METERS ARE SPARES, THE METERS WILL BE REMOVED.

FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 12/16/85

PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 4/21/89

REFERENCES:

- 1) Photo: S5
- 2) FDDR KL1-942
- 3) DCP 880079

HED REPORT SHEET

HED-158 REV. 5

HED DESCRIPTION: Location aids (i.e., demarcation, hierarchical labeling, color padding) are not provided at the remote shutdown panel to aid the operator in identifying systems. B6.36

HUMAN FACTORS REVIEW: Panel P001 will be supplied with mimics, improved labeling and demarcation.

H.F. GUIDELINES: NUREG 0700, Section 6; Labels and Aids

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
YELLOW DEMARCATION IS CONFUSING TO THE OPERATOR SINCE IT REPRESENTS A DIVISION 1 COMPONENT AND IT IS LABELING A DIVISION 2 VALVE. A DIFFERENT COLOR WILL BE PROVIDED.

FIRST REFUEL - CORRECTS HED? PARTIAL NEW HED? NO
VALVE LABELS WILL BE CHANGED TO BLACK ON WHITE BACKGROUND TO BE CONSISTENT WITH OTHER MIMIC SYMBOLS/LABELS.

SECOND REFUEL - CORRECTS HED? Yes NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 11/23/85

PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 4/4/89

PLANNED COMPLETION Prior to startup following Second Refuel
WORK COMPLETE 11/7/90

REFERENCES:

- 1) Photo: I25
- 2) FDDR KL1-6122

HED REPORT SHEET

HED-182 PVV. 4

HED DESCRIPTION: Computer function keys on the process computer keyboard do not have engraved labels. Some of the keys have only temporary number labels. Functions for some keys are shown on a temporary diagram placed on the panel above the keys. B7.6

ERIS keys have numbers but no function indication. Process Computer function keys are unmarked; a legend sheet is loosely placed on the keyboard. HE0-42

HUMAN FACTORS REVIEW: The ERIS function keys will be provided with labels that will show display function and number. Process computer function keys will be provided with temporary function labels by fuel load. Engraved function keys will be provided prior to start-up after first refuel.

H.F. GUIDELINES: NUREG 0700, Section 7; Computers

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - ERIS function key labels and temporary process computer function labels.

WORK COMPLETE 12/16/85

PLANNED COMPLETION Prior To Startup After First Refuel
Engraved process computer function keys.

WORK COMPLETE 11/8/88

1) Photo: P5

HED REPORT SHEET

HED-195 REV. 3

HED DESCRIPTION: Printers must be turned "off" in order to reload paper. This may result in the loss of hard copy data during paper reloading. B7.20

HUMAN FACTORS REVIEW: Control room printers will have the capability to either store data in memory for later retrieval or have automatic transfer to a backup printer during those times that the printer is being reloaded with paper. Since the functions the printers provide is not safety significant or time critical, an alarm is not required.

H.F. GUIDELINES: NUREG 0700, Section 7; Computers

IMPLEMENTATION: FIX

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 9/9/85

REFERENCES:

HED REPORT SHEET

HED-313 REV. 2

HED DESCRIPTION: SB1.2 Is the use of multiscale indicators minimized? 4 Dual scale recorders are used on Panel P823.

HEO-35D

HUMAN FACTORS REVIEW: The following three recorder scales are immediately apparent:

- o Expansion & Temp Recorder uses two scales set apart, IN and °F.
- o Eccentricity & Vibration Recorder monitors vibration on 3 separate scales, but the right scale is labeled VIB & ECC - the ECC unit label will be deleted and a new recorder name plate provided indicating vibration.
- o Feedwater Turb Pump Vib & Ecc Recorder monitors both parameters but since the process units are the same only one scale is provided.

The multiscale Turbine Eccentricity Speed & Vlv Position Recorder has 3 scales to record 3 modes. Improved wording will be provided on the information tag. The missing plastic scale will be added to the recorder for eccentricity. The operator also uses the process computer to effectively monitor those parameters as needed.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix or disagree

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No

FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Turbine Eccentricity Speed & Vlv Position Recorder
WORK COMPLETE 12/16/85
PLANNED COMPLETION Prior to start-up following first refuel
- delete ECC unit label on Vibration recorder
WORK COMPLETE 7/7/88

REFERENCES:

- 1) DCP 850125
- 2) WO 88003551

HED REPORT SHEET

HED-314 REV. 3

HED DESCRIPTION: Process units are not identified or are labeled incorrect. Refer to HED Attachment List.

HUMAN FACTORS REVIEW: Process units will be correctly indicated. The percent of scale indication is adequate for back panel Rosemont calibration meters on P618, P625, P629, P691, P692, P693, and P694. The percent of scale is appropriate and sufficient for the jet pump monitors on P619 and the core monitor recorder on P864. The C34-R602 controller on P680-3D is typical of all Bailey controllers with deviation meters that are not scaled but indicate whether or not the demand and output are nulled. The SLC STRG TANK LEVEL, C41-R601 is correctly scaled in gallons. The percent units on the HOT SURGE LVL instruments N21-R475 and R323 should be referenced to level not GPM. The percent scale is appropriate for C34-R614 since this controls valve position and cannot be directly related to level.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix or disagree as noted.

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No

FIRST REFUEL - CORRECTS HED? YES NEW HED? NO

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - All except PSI to PSIG labeling (Pressure standard will be consistent as PSIG; PSI and PSIG are equivalent.)

WORK COMPLETE 11/23/85

PLANNED COMPLETION Prior to start-up following first refuel
- Remaining PSI to PSIG labeling

WORK COMPLETE 4/21/89

REFERENCES:

- 1) FDDR KL1-942
- 2) Visual Inspection

HED ATTACHMENT SHEET
PROCESS UNITS

HED-314-1 REV. 3

SB1.1	Are indicator scales easily read when stationed at the panel?	
	o Process unit labels small	907
SB1.4	Are process units and multipliers specified?	
	o Not process units on E31-R61	642
	o Not controllers	800/680
	o No process units specified in % [C11-N601A, C71-N652A, E31-686A, E31-N686(7)A, E31-N668(9)A]	691
	o Labeled in % (same as panel 691, for 'B's) (694 for D's)	692/694
	o Marked in % (C11-N601C, 652C)	693
	o N31-R003 no process units	823
	o Small process unit lettering on Tracor recorders (noted on all panels)	842
	o No process units are specified on recorders	600
	o No process units on B21-R643	614
	o Scale in % - (5 scales)	629
	o Scale in % - E22-N656	625
	o Scales in % - JET pump monitor - B33-R610A-W	619
	o Place units on controllers, e.g., GPM not noted	601
	o Five scales are in %	618
	o Not on controllers	845
	o Core monitor recorder has no process units	864
	o Tracor recorders (°F) are small	865/883
	o Controllers show no units	870
	o Bailey controller not labeled except for "0-100" on drum	969
	o Bailey controller (RCIC TURB flow control) no units	Remote S/D

HED ATTACHMENT SHEETHED-314-2 REV. 3

- | | | |
|---|--|--|
| o Drywell pressure meters in units of psia and procedure specifies psig. | P601-17B
P601-20B | D23-R046A
D23-R046B |
| o no units are indicated on the RECIRC flow rate recording meter. | P680-4D | C51-R614 |
| o CST tank level recorder has no units on scale. CST tank level is included on a 2 function recorder. Color coded legend is not specified. Proper color must be remembered by operator. | P870-2B | N21-R203 |
| o The meter scale is in psia while the procedure specifies psig. | P601-17B
P601-20B | D23-R046B
D23-R046A |
| o Feedwater flow recorder does not have process units identified on meters. Scale multiplier is not identified either. | P680-3B | C34-R607 |
| o Process units are not shown on pressure recorders. | P601-17B
P601-20B | B21-R623A
B21-R623B |
| o Operator is required to compare RPV pressure in psig to containment pressure in psia and determine the pressure difference. Inconsistent process units. | P601-17B
P601-20B
P601-17B
P601-20B | B21-R623B
B21-R623A
D23-R024B
D23-R024A |
| o No units are indicated on Fuel Zone Level Recorder. | P601-20B | B21-R615 |
| o Process units are not specified on controller tapeset. | P001 | C61-R001 |
| o Process units are not identified on the reactor water level recorder. | P001 | C61-R012 |
| o Process units are not identified on reactor pressure recorder. | P001 | NUC BLR
PRESS
Recorder
(C61-R012) |
| o CST level and Hotwell level are recorded on a 2 pen recorder which does not have labels to identify which pen and parameter correspond. Units are not labeled. Procedure does not as yet specify units or value for CST level setpoint, but tech. spec. is in gallons. Suitability could not be determined at time of review due to lack of this information. | Procedure
P870-2B | N21-R203 |
| o Panel meter in "RPM", procedure specifies "%". | P680-4B | B33-R651A,B |
| o No units on meter scale. | P680-3D | C34-R614 |

HED ATTACHMENT SHEET

HED-314-3 REV. 3

- | | | |
|---|----------|--|
| o Not process units shown on recorder scale; no MPL #, temporary labels. | P680-3B | C34-R608 |
| o Controller is scaled in 0-100 (% implied) and cannot be directly correlated to RPV level. | P680-3D | C34-R614 |
| o No units shown on C34-R614. | P680-3D | C34-R614 |
| o Meter scale should be "psig" vs. "psi". | P680-3B | N27-R096A,B |
| o No label of units used on C34-R602. | P680-3D | C34-R602 |
| o Scale is in % but not labeled as such. | P680-3D | C34-R614 |
| o Units not labeled on C34-R614. | P680-3D | C34-R614 |
| o Units on both meters should be PSIG. | P680-3D | N27-R191 |
| o The % units are not labeled but are assumed by units. | P680-3D | C34-R601-A,B
C34-R601C |
| o Deviation meter does not specify units, nor indicate range. It points to adjacent scale. (not suitable) | P680-3D | C34-R602 |
| o "PSI" is labeled on meters "PSIG" or "PSIA". This is insignificant considering graduation of scale. | P680-3B | N27-R096A,B |
| o Meter $1-5 \times 10^3$ gallons instead of %. | P601-19B | C41-R601 |
| o RCIC Pump Suction Pressure units need to be corrected. | P601-21B | E51-R604 |
| o The scale on level control should be in units of level, not %. | P870-2B | N21-F135
N21-F140
(N21-R208
N21-R137) |

HED ATTACHMENT SHEETHED-314-4 REV. 3

o No units labeled on controller.	P680-2D	N21-R475
o No units specified on N21-R323.	P680-2D	N21-R323
o No units or parameter labels on controller.	P680-2D	N21-R247
o Label is psi; should be psig.	P680-2B	N21-R276 A,B,C
o Indications are in % instead of GPM on the controller. No units or parameters labeled on controller. (not suitable)	P680-2D	N21-R475 N21-R323 N21-R247
o Range not given. Units not given and not on the controller.	P680-2C	N21-R475
o Units not labeled on level recorder.	P680-2C	N21-R323
o No units or parameter labeled on controller.	P680-2C	N21-R475
o Units should be "PSIG" vs. "PSI" on meters.	P680-3B	N27-R046A-D
o No labels on N27-R080. No units.	P680-3D	N27-R080
o Process units not on meter scale (%).	P680-3C	C34-R602
o No unit or parameter labels on N27-R090A(B) Recirc Flow Control tapeset and output meter.	P680-3D	N27-R090A,B
o Process unit disparity (not suitable) all vacuums should be in inches Hg. No disparity between procedure and panel meter currently.	P870-7B Procedure	N33-R181
o A psi graduation scale on pump discharge pressure meter is awkward.	P601-20B P601-17B	P42-R096A P42-R096B

HED REPORT SHEET

HED-320 REV. 4

HED DESCRIPTION: SE2 A = computer operating procedures available in the control room, etc.?

No procedures in place in the control room for ERIS or the process computer. Since ERIS will be incorporated into PO01, it may be necessary to incorporate ERIS procedural data.

HUMAN FACTORS REVIEW: Operators will be trained as users of ERIS and process computer. Computer failure will be the responsibility of the on shift I&C technician. Computer System Description Manuals will be available in the Control Room. The ERIS computer displays are user friendly.

H.F. GUIDELINES: NUREG 0700, Section 7; Computers

IMPLEMENTATION: Modify

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE: No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HFD? Partial NEW HED? No
Operating instructions should be written for the Process Computer and ERIS to ensure complete and up to date information.

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 11/23/85

PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 6/2/88

REFERENCES:

- 1) SOI-C91
- 2) FTI-10C

HED REPORT SHEET

HED-328 REV. 2

HED DESCRIPTION: PEI-1 () Generator breaker mimic is incorrect.

P680-9C S-610-PY-TIE

P680-9C S-611-PY-TIE

HEO-61

HUMAN FACTORS REVIEW: The generator breaker mimic will be corrected.

H.F. GUIDELINES: NUREG 0700, Section 6.6; Labels and Aids

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? N

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Provide permanent mimic
WORK COMPLETE 11/23/85

REFERENCES:

- 1) FDDR KL1-6100

HED REPORT SHEET

HED-354 REV. 3

HED DESCRIPTION: Questionnaire Item #II.B.
Control Room Difficult Controls
o The CNDS FILTER BYPASS control options are "close/open" while the
DEMIN BYPASS control options are "open/close". HEO-183E

HUMAN FACTORS REVIEW: The Perry convention for controller output signal meters is that 0% will represent valve closure and 100% will represent valve open. See attached list of controllers that violate this criteria. A two stage implementation plan will be performed.
1) Install nameplates on controllers where none exists to indicate the valve position on the output meters by fuel load. 2) Modify the internal circuitry of the controller to bring it into compliance with the Perry standard prior to startup after first refuel.

H.F. GUIDELINES: NUREG 0700, Section 4; Controls

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Labelling
WORK COMPLETE 12/16/85

PLANNED COMPLETION Prior To Startup After First Refuel
Hardware
WORK COMPLETE 4/11/89

REFERENCES:

1) FDDR KL1-942

HED ATTACHMENT SHEETHED-354-1 REV. 3

<u>MPL</u>	<u>LOCATION</u>	<u>DESCRIPTION</u>
N27-R080	P680-3D	MFP Feedwater Recirc Flow
N27-R090A	P680-3D	RFP A Feedwater Recirc Flow
N27-R090B	P680-3D	RFP B Feedwater Recirc Flow
N22-R065	P870-5B	Cross Around Steam Drain Valves
N22-R025	P870-5B	Moisture Separator Shell Drain Vlvs
N22-R185A	P870-5B	Exst to Htr 6A Drn Vlvs
N22-R185B	P870-5B	Exst to Htr 6B Drn Vlvs
N22-R215A	P870-5B	Exst to Htr 5A Drn Vlvs
N22-R215B	P870-5B	Exst to Htr 5B Drn Vlvs
N22-R115	P870-9B	Mn Stm Pipe Drn Vlvs
N22-R235	P870-9B	Mn Turb Stop Vlvs Before Seat Drn Vlvs
N22-R375	P870-9B	Mn Turb Cont Vlvs Before Seat Drn Vlvs
N24-R010	P870-4B	Cnds Demin Bypass

HED REPORT SHEET

HED-360 REV. 4

HED DESCRIPTION: Some equipment is not yet installed (or parts missing) or presently planned to change in near future. Refer to HED Attachment Sheet.

HUMAN FACTORS REVIEW: Equipment not installed or to be changed as described on the HED Attachment Sheet will be properly installed. Surveys will be completed.

H.F. GUIDELINES: NUREG 0700

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - All except control room noise survey checklist item F7.1 F7.2 and communication checklist.

WORK COMPLETE 11/23/85

PLANNED COMPLETION Prior to Power Ascension - Communication checklist interim noise survey checklist Item F7.1 and F7.2.

WORK COMPLETE 5/28/86

PLANNED COMPLETION Prior To Startup After First Refuel Final Noise Survey Checklist Item F7.1 and F7.2.

WORK COMPLETE 2/10/89

REFERENCES:

- 1) BWROG Checklists
- 2) HED 601
- 3) HED 617

EQUIPMENT NOT INSTALLED (OR TO CHANGE)

- A1.3 When panel components are permanently removed, are spaces covered to prevent debris or dust from entering panel internals and repainted to avoid visual distinctiveness?
- o 2 slots will open 902, 906
- C5.1 For alarm response, is silence button provided?
- o No alarm silence button (to be added later) 902, 906
- C5.2 For alarm response, is acknowledge button provided?
- o No alarm acknowledge button (to be added later) 902, 906
- F7.3 Is there adequate, organized storage space for protective gear, personal belongings, spare parts, tools, etc.
- o Permanent storage space is not provided for protective gear or personal belongings.
- SE.i Are procedures, reference materials and other documents readable (i.e., not dirty, torn, dog-eared, or otherwise difficult to read)?
- o Procedures not at this station at present time. P001 Required reference materials to be determined.
- SF Communications
- o Section SF - these items could not be evaluated generic at the time of the survey. To be evaluated later.
- A&B Panel Layout and Design & Instrumentation and Hardware Review
- o These panels were not installed at the time of the survey: P884, P885
- F4 Control Room Heating and Ventilation Review
- o System . . . turned over.
- F7.1 Is the noise level routinely below an interference level for normal conversation?
- o Control room carpeting not yet installed.

HED ATTACHMENT SHEET

HED-360-2 REV. 4

- F7.2 Have noise distractions from both inside and outside the control room been reduced?
- o Control room HVAC system is not turned over.
- II.A.6 o Provide permanent floor plates in Control Room
- PEI-1 2.0.4 o Drywell pressure meter A currently missing P60*-20B D23-R046A
- PEI-1 2.0.4 o Pens/indicators missing on DW pressure recorders P883 D23-R180A D34-R180B
- PEI-1 2.0.4 o Annunciator currently not as indicated in check-list. (Due to be changed within 6 weeks.) P680-5A R61,C4,D4
- PEI-1 CS3.1.2 o ARI controls not currently installed P680-11E1 C22A-S4A P680-11E1 C22A-S4B P680-11E1 C22A-S4C P680-11E1 C22A-S4D
- PEI-1 CS3.1.2 o Manual ARI annunciator not currently installed P680-5A R61, A3
- PEI-1 CS3.1.4 o Turbine stop valve position meter number 1 is missing. P680-8B Main Stop Valve Position
- PEI-2 3.0.2 o Confusion in setpoints of SRV's. Operation could not remember closing setpoint which has changed. Setpoints are not indicated on panels. There are plans to identify setpoints on control switch escutcheons. P601-19C N/A

HED REPORT SHEET

HED-363 REV. 4

HED DESCRIPTION: Indicator scales are generally not marked or color coded to indicated normal, marginal, and abnormal ranges. Refer to HED Attachment Sheet.

HUMAN FACTORS REVIEW: Reference HED-84 for Human Factors Review.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No

FIRST REFUEL - CORRECTS HED? Partial NEW HED? No
Applicable Setpoints to be marked on Bailey Recorders C34R608, D23R240 and C61R012.

SECOND REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Temporary color banding
WORK COMPLETE 11/24/85

PLANNED COMPLETION Prior to start-up following first refuel
- Permanent color banding
WORK COMPLETE 4/25/89

PLANNED COMPLETION Prior to start-up following second refuel
WORK COMPLETE 11/7/90

REFERENCES:

- 1) WO 859489, 859788, 9790
- 2) HED-84

A5.2	Are labels, legend plated and escutcheons used to identify operational limits or warnings?		
	o Background colors used on panel meters; except on one ammeter.	904	
B2.1	Are indicating devices marked to show normal or abnormal, or unsafe, or expected to unexpected range of operation where applicable?		
	o Indicating devices not marked.	902,906	
	o No on chiller amps, yes on temp.	904	
PEI-1	2.0.1	Level 3 is not indicated on the following instruments:	
	A.	Wide range meters/recorders	P601 B21-R623A P601 B21-R623B
	B.	Wide range meter	P680-3B C34-R606A P680-3B C34-R606B P680-3B C34-R606C
	C.	Narrow range recorder	P680-3B C34-R604
	D.	Narrow range recorder	P680 C34-R608
	E.	Shutdown range level meter	P601 B21-R605
	F.	Upset range recorder	P601 C34-R608
PEI-1	A1-2	HPCS flow has same range as other injection subsystems, however, units are different (GPMx10, vs. GPMx100)	
PEI-1	A1-2	-145" setpoint on RPV water level recorder is not color coded or otherwise uniquely identified, but can be determined from recorder scale.	P601-17B B21-R623B P601-20B B21-R623A
PEI-1	A3-2	RPV pressure steam cooling limit (700 psig) is not banded or coded on the RPV pressure recorders. The value can be read off the meter <u>if</u> monitored.	P601-20 B21-R623A P601-17 B21-R623B
PEI-1	A4.0.14.b	Top of vessel is not identified on the SHUT-DOWN RANGE WL meter. Operator is required to find vessel height and calculate from instrument zero or remember.	P601-17 B21-R605

HED ATTACHMENT SHEETHED-363-2 REV. 4

PEI-2	2.0	Suppression pool temperature meter does not	P601	D23-R220B
PEI-2	3.0.4	indicate setpoint	P601	D23-R220A
PEI-6	2.0.1	Suppression pool water level scale on	P60i-20B	G43-R062A
PEI-6	2.0.2	instruments are not color coded to show	P601-17B	G43-R062B
PEI-6	CS3.0.1	setpoint.	P883	G43-R073A
			P883	G43-R073B
			Procedure	
IOI-11	4.3.12	No normal range band exists on meter for	P001	C61-R005
IOI-11	4.3.12	RHR A flow meter.	P001	C61-R025
IOI-11	4.3.12	Control range for suppression pool	P001	D23-R240
IOI-11	4.3.12	temperature is not indicated on meter face.	P002	D23-R270
IOI-11	4.4.1.10	Procedure directs operator to control RPV	P001	C61-R012
IOI-11	4.4.2.4	level between levels 4 and 7. Instrument	P001	C61-R012
IOI-11	4.4.3.1	scale is in inches with no indication of	P001	C61-R012
IOI-11	4.5 NOTE	level numbers. Operator must remember	P001	C61-R010
	(Pg. 9,	correspondence between levels numbers and	P001	C61-R012
	4.5.2)	following inches.		
IOI-11	NOTE 2	Suppression pool temperature trip (120°F)	P001	SUPR POOL
	Pg. 9	is not identified by colored band or stripe	P002	TEMP
		on meter.	(4.5)	Recorder
			after	D23-R270
			4.5.2	
SOI-B33	4b	No identification band or color bands on	P680-4B	B33-651A,B
Sect. 5.2		meter.		
SOI-C34	7	The 3800 RPM setpoint should be shown by	P680-3B	N27-R411A,B
6.3	NOTE 2&3	color banding on the meter scale.		
SOI-N27	5	Indication of 7,000 GPM critical flow on	P680-3E	N27-R088A,B
6.4		meter would be helpful.		

HED DESCRIPTION: Number scale divisions do conform to human factors standard.
Refer to HED Attachment Sheet.

HUMAN FACTORS REVIEW: Proper scales will be provided.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No

FIRST REFUEL - CORRECTS HED? Partial NEW HED? No
N27-R411A/B - Scales do not match each other

SECOND REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - All panels except P680
WORK COMPLETE 9/6/85

PLANNED COMPLETION Prior to start-up following first refuel
- P680
WORK COMPLETE 4/11/89

PLANNED COMPLETION Prior to start-up following second refuel.
WORK COMPLETE 11/7/90

REFERENCES:

- 1) Visual inspection

HED ATTACHMENT SHEET

HED-364-1 REV. 4

PEI-1	A1-3	Specifying WR indication in procedure step seems to restrict operator from using fuel zone ranges. Not that at -148" the wide range recorders are at bottom of scale. -148" can not be read on recorder scale since discrimination is 2 1/2 units. Operator will rely on level 1 annunciator for positive indication.	P601-17B P601-20B	B21-R623B B21-R623A
PEI-1	2.0.1	Scale increments on wide range level recorders are 2.5" with 5" and 25" highlights. Inconsistent with 1, 2 or 5 unit standard.	P601 P601	B21-R623A B21-R623B
PEI-1	A4-4	Inconsistent scale multipliers are used on HPCS flow meter (0-100x10) and RHR A,E,C flow meters (1-100x100).	P601-16B P601-20B P601-17B P601-17B	E22-R603 E12-R603A E12-R603B E12-R603C
PEI-1	A4.8.a.2)	LPCS pump ammeter has nonstandard scale graduations. Graduations are at 6 amp intervals with highlights at 30 amp intervals and numbers at 60 amp intervals.	P601-21B	E21-R100
PEI-1	A4.9.a	RHR pump ammeter has nonstandard scale graduations. 3 amp increments are used.	P601-17B	E12-R100C
PEI-1	A4-14.b	Containment temperature recorder/meters have non-standard 2 1/2°F scale increments.	P883 P883	1D23-R170A 1D23-R170B
PEI-1	Several: 3.3 Caution 2 3.1.b.1 Attach. 4-15	RPV Level/Pressure Recorder has awkward, nonstandard highlighting of level 2.5, 5, 25, 50.	P601-17B P601-20B	B21-R623B Not labeled but probably B21-R623A
PEI-5	Caution Pg. 1	RCIC pump discharge pressure meter has awkward, non-standard scale markings of 0,30,60,90....with 15 minor divisions between majors. Standard is 10 minor divisions between majors, and major increments of 1,2 or 5 or multiples thereof.	P601-21B	E51-R601
IOI-11	4.1.3	RPV level recorder (not meter) has non-standard scale graduations of 3 inches.	P001	C61-R012

HED ATTACHMENT SHEETHED-364-2 REV. 4

IOI-11	4.4.1.8	Awkward, non-standard 3 inch graduations on reactor water level recorder.	P001	C61-R012
IOI-11	4.4.1.10			
IOI-11	4.4.1.12			
IOI-11	4.4.2.4			
IOI-11	4.5.2	Reactor Pressure Meter has unacceptable scale progression. There are 15 indices between majors. There should be less than or equal to 10. Recorder portion of instrument has 20 indices between majors.	P001	NUCL BLR PRESS Recorder/ Meter (C61-R012)
IOI-11	4.6.32			
SOI-C34 Sect.4.2.1		Awkward graduations; 30 psi intervals; 5 psi graduations.	P680-3B	N27-R096A,B
SOI-C34 6.2		Units progression proceeds by 5, but there are only 3 indices between majors. Four (4) or Nine (9) are recommended.	P680-3D	C34-R601A,B C34-R601C
SOI-C34 6.2		The range of these two meters is identical but 'B' has twice the resolution. Operators feel 'A' has enough resolution. Therefore, consistency should be achieved by reducing resolution of 'B'.	P680-3D	N27-R411B
SOI-C34		The scales from MFP differs from RFP scales by an order of ten (10). They should all be scaled GPM x 1000 or GPM x 100. Don't mix.	P680-3B	N27-R088A,B
SOI-E12 5.2	1	Non-standard meter increments (not suitable).	P601-20B P601-17B P601-17B	1E12-R100A 1E12-R100B 1E12-R100C
SOI-E21 4.3	1b	Scale difficult to interpret with 6 amp intervals.	P601-21B	E21-R100
SOI-E21 5.2	1	LPCS Pump flow scale has non-standard 100's of GPM.	P601-21B	E21-R600
SOI-E22A 5.2	1	3,6,9 etc., scale progressions difficult to read.	P601-	E22-R601
SOI-G42 7.2	7	The proper flow range (950-1000) is encompassed by the smallest division on meter. The pump has a 2000 gpm capacity which determines the range.	P870-2B	G42-R053

HED ATTACHMENT SHEET

HED-364-3 REV. 4

SOI-N21 3
4 :

Operator cannot directly read GPMs on the
controller tapes or the recorder. This
requires conversion factors. (Not suitable)

P680-2D N21-R247

HED REPORT SHEET

HED-365 P1

HLD DESCRIPTION: PEI-4 (CS3.0.2) Indication of BOP isolation is not very salient. The positions of chilled water valve status lights in matrix differ from Panels 601-18B and P601-19B. Indicators P50-F150 and P50-F060 in P601-19B matrix are in reverse numerical order.

P601-18B
P50-F060

P50-F140 P601-19B

PEI-7 (3.0.1) Isolation matrices on P601 are not arranged to best identify isolation groups.

P601-19B
P601-18B

Containment Isolation matrix

HEO-109, HEO-119

HUMAN FACTORS REVIEW: The isolation matrices on P601 will be improved by rearranging valve position indication to identify isolation groups. Within each isolation group, valves will be organized by MPL alphanumeric designation with the exception of P53-F030, F035, F040, F045 which isolate open instead of closed. These indications have been separated from the other "CLOSE" valves to prevent confusion during the isolation

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix and None

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 9/19/85

REFERENCES:

- 1) ECN 24002-86-654, 655

HEL REPORT SHEET

HED-366 REV. 4

HED DESCRIPTION: Questionnaire Item #II.E
Annoying annunciator auditory alarm

HEO-186B

HUMAN FACTORS REVIEW: The volume of the annunciator horn has been reduced to a non-annoying level that is still audible and noticeable in the control room. Annunciator horn volume level will be re-evaluated during the environmental survey after fuel load. Adjustments will be made if alarm levels are not above the background levels by the recommended dB.

H.F. GUIDELINES: NUREG 0700, Section 3; Annunciators

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY 1
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Partial NEW HED? No
HORN SHOULD BE READJUSTED AFTER CARPET INSTALLATION

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Initial Adjustment
WORK COMPLETE 11/7/84

PLANNED COMPLETION Prior to start up following First Refuel -
final adjustment
WORK COMPLETE 6/19/89

REFERENCES:

- 1) WO 89-3875
- 2) DCP 87-0075

HED REPORT SHEET

HED-370 REV. 4

HED DESCRIPTION: SB4.2 Are key-operated switches used only where appropriate?
Concern that keys will be removed and stored in SS office. Prefer to leave keys in control room and use the key feature to highlight an important control.

HEO-39

HUMAN FACTORS REVIEW: PAP-0201 Conduct of Operations specifies in the key control section that the keys for keylocked switches that bypass a safety function will be under the control of the unit supervisor with emergency keys clearly differentiated; this is acceptable with the Human Factors Task Force since administrative control is required and the time to procure the keys is not restrictive. The Task Force did determine that keylocked switches were not consistently used in the control room. Inappropriate keylocked switches such as those used for the Inop and Bypass, and the SRV controls will be replaced. The inadvertent bumping and subsequent actuation of a keylocked SRV at Grand Gulf on 10/13/84 lead the team to assess the use of normal key-in-place keylocked switches on vertical panels as providing unsatisfactory safety and operability. Inappropriately used keylocked switches will be replaced. (CONTINUED ON ATTACHED SHEETS)

H.F. GUIDELINES: NUREG 0700, Section 4; Controls

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Key control procedure will direct all keys not in use on vertical panels be removed.

WORK COMPLETE 9/7/85

PLANNED COMPLETION Prior to start-up following first refuel.
- Replace affected keylocked switch controls.

WORK COMPLETE 4/21/89

REFERENCES:

- 1) OAP 0216
- 2) DCP 860216 SCRAM Reset
- 3) DCP 880103
- 4) NR NEDS 3499

HED ATTACHMENT SHEETHED-370-1 REV. 4

HUMAN FACTORS REVIEW: All keylocked switches were evaluated for compliance with the Perry standard for the use of keylocked switches in bypass, restraint and test functions. The keylocked switches listed below did not meet the keylocked switch criteria and will be replaced with conventional switches. The two Standby Liquid Control and 38 safety relief valve control switches will remain as keylocked switches since they fall into the restraint category. The 19 SRV switches in the main horseshoe (non-vertical panels) will typically have their keys installed at all times. In addition, the Reactor mode switch will typically have its key installed. This will ensure timely operation of these switches, which are still shape-coded to prevent inadvertent operation. The remaining 19 SRV switches are located outside the primary operating area on vertical panels and are a backup to the other switches. These and all other keylocked switches will have their keys removed when not in use.

SWITCH CHANGES

<u>SWITCH</u>	<u>DESCRIPTION</u>	<u>PANEL</u>	<u>COMPLETE</u>
C71-S5A THRU D	SCRAM RESET-CH. A-D	H13-P680-11E1	X
E51A-S16	RCIC ISOLATION RESET - DIV. 1	H13-P601-21B	X
E51A-S25	RCIC ISOLATION RESET - DIV. 2	H13-P601-21B	X
E32A-S4	INITIATE OUTBOARD SYSTEM	H13-P654	X
E32A-S1A	SYSTEM A INITIATION	H13-P655	X
E32A-S1E	SYSTEM B INITIATION	H13-P655	X
E32A-S1J	SYSTEM C INITIATION	H13-P655	X
E32A-S1N	SYSTEM D INITIATION	H13-P655	X
B21H-S74	OTBD ISOLATION OUT OF SERVICE	H13-P601-19B	X
B21H-S75	INBD ISOLATION OUT OF SERVICE	H13-P601-18B	X
B21A-S1	RX HEAD TO DW VENT VALVE	H13-P601-18C	X

HED REPORT SHEET

HED-408 REV. 2

HED DESCRIPTION: A3.3 For controls and displays, are groupings arranged in functional or sequential relationships? The displays on P870-6B should be arranged by EXST TO 1ST STAGE RHTR and MST TO 2ND STAGE RHTR groupings.

HUMAN FACTORS REVIEW: Displays will be relocated to provide functional groupings.

H.F. GUIDELINES: NUREG 0700, Section 8; Panel Layout

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to start-up after first refuel.
WORK COMPLETE 11/17/86

REFERENCES:

1) DCP 850348

HED REPORT SHEET

HED-501 REV. 2

HED DESCRIPTION: PEI-1: A5-4 Several steps in the PEI's require that the operator determine if RPV water level has decreased to 26 inches. Consider adding mark on wide range water level scale.

HUMAN FACTORS REVIEW: The PEI's now require the operator to determine if water level has decreased to 0 inches which is clearly marked on the fuel zone range instrumentation.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Disagree

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION
WORK COMPLETE N/A

REFERENCES:

- 1) PEI B13 - Attachment 5

HED REPORT SHEET

HED-506 REV. 2

HED DESCRIPTION: IOI-11 (Sect 4.2.4.b and 4.4.7). Div 2 Remote Shutdown Switch positions are inconsistent with the switch positions in the Control Room.

1. E12-F006B should be a two position switch not a three position switch.
2. E12-C002B should be spring return to Normal four position switch, not a three position switch.

HUMAN FACTORS REVIEW: 1. E12-F006B will be changed to a two position switch and E12-C002B will be changed to a four position switch.

H.F. GUIDELINES: NUREG 0700, Section 4; Controls

IMPLEMENTATION: F¹--

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to start-up after first refuel
WORK COMPLETE 4/11/89

REFERENCES:

- 1) DCF 880107

HED REPORT SHEET

HED-508 REV. 3

HED DESCRIPTION: IOI-11 (Sect 4.3.2.10 and 4.3.1) Operator is required to control reactor water level between 197 and 205 inches. Resolution on scale is not adequate to see 197" and span is difficult to see on the upper end of meter C61-R010 due to parallax.

HUMAN FACTORS REVIEW: IOI-11 will be changed so that the operator will control water level between 180 and 215 inches. The scale resolution is adequate to read these numbers. Increasing the operating band, the addition of color banding, and the option to use Reactor Water Level Recorder C61-R012 which is less susceptible to parallax will help correct the problem. Reactor water level can also be monitored on ERIS. Reference HED-84 for Human Factors review response on color banding.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY 1
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? YES NEW HED? NO

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Temporary Banding, Procedure Change
WORK COMPLETE 11/25/85

PLANNED COMPLETION Prior to start-up after first refuel
Permanent Color Banding.
WORK COMPLETE 4/25/89

REFERENCES:

- 1) IOI-11 Rev. 2
- 2) HED-84

HED REPORT SHEET

HED-509 REV. 2

HED DESCRIPTION: SOI-C41 (Sect. 7.6) There is an extra pair of green and red indicating lights above C41-F004 for manual shut-off valve indication. They are unlabeled and misplaced.

HUMAN FACTORS REVIEW: The lights will be labelled prior to fuel load. The lights will be moved up slightly to allow labelling below the lights prior to first refuel.

A. F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY 1
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? YES NEW HED? NO

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Labelling
WORK COMPLETE 11/25/85

PLANNED COMPLETION Prior to start-up after first refuel -
hardware
WORK COMPLETE 4/11/89

REFERENCES:

- 1) FDDR KL1-942
- 2) DCP 880079

HED REPORT SHEET

HED-511 REV. 2

HED DESCRIPTION: IOI-11 (Sect 4.4.3) control switches and associated indicating lights are separated for the following control switches: C61-S121 and S122.

HUMAN FACTORS REVIEW: Functional demarcation and proper labeling will associate the indicating lights and control switches prior to fuel load.

H.F. GUIDELINES: NUREG 0700, Section 4; Controls

IMPLEMENTATION: Modify

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? PARTIAL NEW HED? NO
Further review of the present design indicates that the installation of the functional demarcation and labeling has provided adequate resolution of the deficiency. Since the control switches and indicating lights are relatively close to each other (operator is not required to move) movement of the lights is not necessary to support operator functions.

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 12/16/85

REFERENCES:

- 1) DCP 850526

HED REPORT SHEET

HED-512 REV. 2

HED DESCRIPTION: IOI-11 (Generic) Various steps in the procedure (4.4.7, 4.6.15, 4.7.6) require valve operation for a specific time limit. No clock is available in the Div 1 or 2 RSP areas. A clock would also be beneficial for logs.

HUMAN FACTORS REVIEW: A clock will be added in the Div 1 and 2 remote shutdown rooms. The clock in the Div 1 room could be used for logs and valve operation. However in the Division 2 RSP room, valve controls are spread out over a large area and there is not a single location to put a clock that can be seen from every valve location that requires a timed operation. Operators are directed to throttle valves from 5-20 seconds which can be determined without a clock. A clock will be added for logs in the Div 2 room.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY 1
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

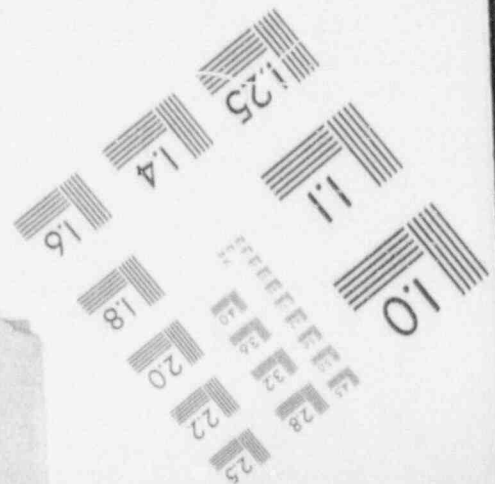
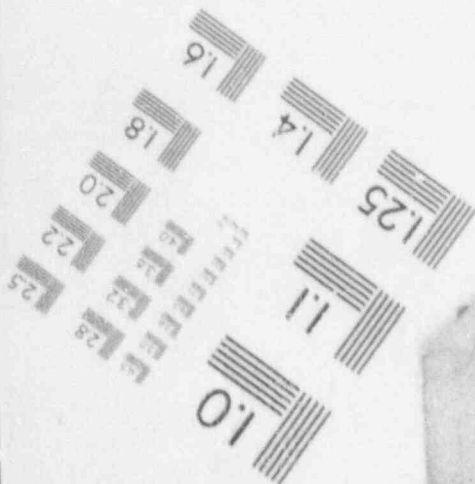
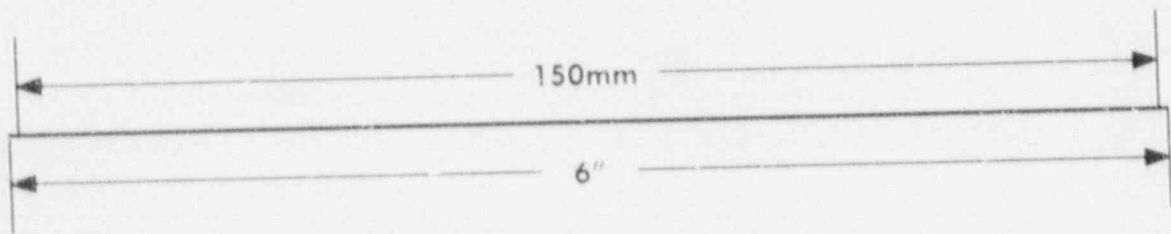
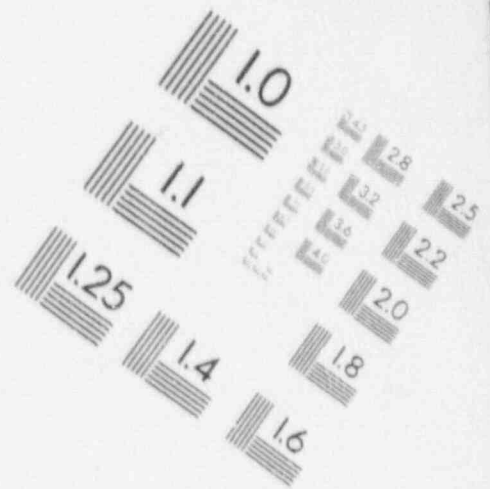
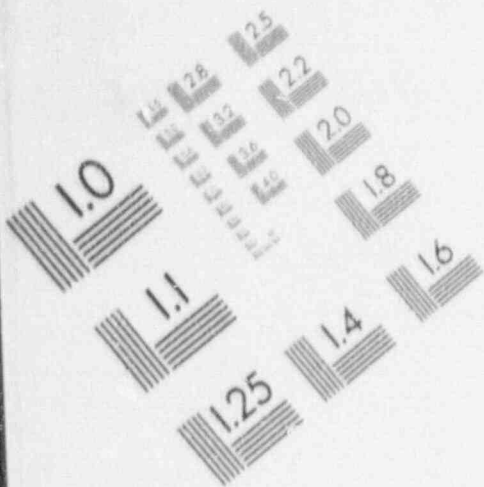
CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup After First Refuel
WORK COMPLETE 2/1/89

REFERENCES:

1) DCP 880081

1

IMAGE EVALUATION TEST TARGET (MT-3)



HED REPORT SHEET

HED-513 REV. 2

HED DESCRIPTION: IOI-11 (Generic) Rx pressure meter (C61-R031) has increments of 300, 600, 900 ...etc.

HUMAN FACTORS REVIEW: Scale will be corrected.

H.P. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY 1
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to start-up after first refuel
WORK COMPLETE 4/11/89

REFERENCES:

- 1) Visual Inspection

HED REPORT SHEET

HED-514 REV. 2

HED DESCRIPTION: IOI-11 (Sect 4.10.3.6) There is no distinction between throttleable and nontrottleable valve controls in the Division 1 and 2 shutdown rooms.

HUMAN FACTORS REVIEW: Switch handles on the remote shutdown throttle valve controls will be labeled on the handle for quick identification.

H.F. GUIDELINES: NUREG 0700, Section 4; Controls

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY 1
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to start-up after first refuel.
WORK COMPLETE 2/1/89

REFERENCES:

- 1) DCP 880081

HED REPORT SHEET

HED-515 REV. 3

HED DESCRIPTION: The blue permissive lights in the control room are very difficult to distinguish whether or not the light is on or off. In addition, other amber lights on P680-15C and green and blue lights on P870-8C are not consistent with the PNPP blue permissive light philosophy.

HUMAN FACTORS REVIEW: The amber permissive lights for the nine bearing lift pumps on P680-15C will be changed to blue lights. The RFPT A(B) turning gear green permissive lights on P870-8C will be changed to blue. The blue RFPT A(B) vacuum override trip lights on P870-8C will be changed to green. The CRD pump A(B) white lights will be changed to blue. A thorough Engineering review was performed to find an alternate replacement for the dark blue neon bulbs. The review failed to come up with a suitable replacement that would meet the design requirements and still maintain the Human Factors standards. Discussions with the operators identified that the neon bulbs glow dimmer over time and that after a new bulb was installed, visibility increased significantly. Therefore, we have decided to leave the present bulbs installed and issue a repetitive task that will periodically replace all blue bulbs to ensure maximum visibility.

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to start-up after first refuel
WORK COMPLETE 4/24/89

REFERENCES:

- 1) DCP 880079
- 2) Repetitive Task 89-542

HED REPORT SHEET

HED-521 REV. 3

HED DESCRIPTION: SOI-B33 (6.1) Trip and Stop pushbuttons on P680-4C and P680-1C are color coded black when the standard for trips is red.

HUMAN FACTORS REVIEW: Pushbutton colors will be changed from black to red for the following switches: B33A-S104 A(B)
B33A-S102 A(B)
B33A-S114 A(B)
B33A-S115 A(B)
G33A-S13
G33A-S14
G33A-S15
G33A-S16
G33A-S17

H.F. GUIDELINE: NUREG 0700, Sect. 4; Controls

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to start-up after first refuel.
WORK COMPLETE 4/11/89

REFERENCES:

1) DCP 880098

HED REPORT SHEET

HED-525 REV. 2

HED DESCRIPTION: Base of CO2 intrudes into the access way to the Division 1 and 2 remote shutdown panels.

HUMAN FACTORS REVIEW: Bright colored lines will be put on the floor around support to ensure the operator walks around the tripping hazard.

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup After First Refuel.
WORK COMPLETE 4/10/89

REFERENCES:

- 1) Visual Inspection

HED REPORT SHEET

HED-526 REV. 2

HED DESCRIPTION: No storage space or workstation has been provided in the Division 2 shutdown panel. May be useful for long term operation.

HUMAN FACTORS REVIEW: A workstation and adequate storage space has been provided at the Division 1 remote shutdown panel room. Sufficient storage space is available at this panel for procedures, supplies etc., that are necessary to support the remote shutdown operation. Additional storage space is not required at the Division 2 remote shutdown panel.

IMPLEMENTATION: Disagree

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION
WORK COMPLETE N/A

REFERENCES:

HED REPORT SHEET

HED-527 REV. 3

HED DESCRIPTION: Division 2 remote shutdown panel indicators have not been marked to show normal, abnormal ranges.

HUMAN FACTORS REVIEW: Reference HED-84 for Human Factors Review.

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FULL POWER - CORRECTS HED? Partial NEW HED? No
See HED-84

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to Full Power License-temporary
color banding

WORK COMPLETE 12/6/85

PLANNED COMPLETION Prior to start-up after first refuel.
Permanent color banding

WORK COMPLETE 4/25/89

REFERENCES:

- 1) Visual Inspection
- 2) HED-84

HED REPORT SHEET

HED-528 REV. 2

HED DESCRIPTION: The following meters on C61-P002 are not scaled in decimal multiples of 1, 2 or 5: D23-R260 and C61-R031.

HUMAN FACTORS REVIEW: Scales will be corrected.

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup After First Refuel.
WORK COMPLETE 4/11/89

REFERENCES:

- 1) Visual Inspection

HED REPORT SHEET

HED-529 REV. 2

HED DESCRIPTION: C61-P002 panel has inadequate normal lighting - 11 footcandles.

HUMAN FACTORS REVIEW: Lighting levels will be increased to 20 footcandles.

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to start-up after first refuel.
WORK COMPLETE 8/22/88

REFERENCES:

1) EDCR 88-83

HED REPORT SHEET

HED-601 REV. 2

HED DESCRIPTION: F7.1 - Noise levels at the EHC instrument panel (P821) are 9 dB(A) above recommended maximum noise levels of 65 dB(A). This panel is not near an operating area, however it is close to the unit supervisors workstation and may be causing elevated conversation levels. Noise levels at the unit supervisors work station were just below 65 dB(A) due mostly to people standing at the reception desk processing work orders.

HUMAN FACTORS REVIEW: The reception desk at the unit supervisors workstation was moved farther away from P821 and the primary operating area and work order processing was revised to reduce noise levels at the workstation. After carpeting is installed a final noise survey will be performed to evaluate whether or not improvements must be made to reduce the noise from P821.

The final noise survey conducted during power operations showed that the noise levels near the EHC (H13-P821) panel are at 76 dBA which is above the recommended maximum noise levels of 65 dBA. In addition the Unit Supervisors workstation had a 66 dBA level which could be lowered by reducing the EHC panel noise. The noise levels near the back of H13-P821 and at the Unit Supervisors workstation will be reduced to the maximum allowable through resolution of HED 617.

H.F. GUIDELINES: NUREG 0700, Section 1, Workspace

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Final Noise Survey-Prior to startup following first refuel.
WORK COMPLETE 2/10/89

REFERENCES:

- 1) Control Room/Remote Shutdown Room Final Noise Survey
- 2) HED 617

HED REPORT SHEET

HED-602 REV. 3

HED DESCRIPTION: SF1.2 There is insufficient number of Maintenance and Calibration Jacks in the primary operating area. Long cords provide tripping hazards and are draped across controls.

HUMAN FACTORS REVIEW: An additional maintenance and calibration jack will be added to the diesel/generator panel.

H.F. GUIDELINES: NUREG 0700, Section 2; Communications

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 4/10/89

REFERENCES:

- 1) Visual Inspection

HED REPORT SHEET

HED-603 REV. 2

HED DESCRIPTION: F1.10 The PBX and OPX phones are not properly labelled at the Division 1 and 2 Remote Shutdown Panels.

HUMAN FACTOR REVIEW: PBX and OPX phones will be appropriately labelled. In addition, the phones are color coded for easy recognition.

H.F. GUIDELINES: NUREG 0700, Section 6; Labels

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 11/8/88

REFERENCES:

HED REPORT SHEET

HED-604 REV. 2

HED DESCRIPTION: Fl.1 There is no PA phone located near the Division 2 shutdown panel.

HUMAN FACTORS REVIEW: A PA phone will be installed next to the Division 2 remote shutdown panel.

H.F. GUIDELINES: NUREG 0700, Section 2; Communications

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 11/8/88

REFERENCES:

- 1) Visual Inspection

HED REPORT SHEET

HED-606 REV. 3

HED DESCRIPTION: PA page broadcasts can be heard through four control room communication module loudspeakers and two ceiling speakers in the control room. The two ceiling speakers monitor all PA channels whereas the four modules monitor Channel 5 only. In addition, PA messages cannot be heard in all areas of the CR.

HUMAN FACTORS REVIEW: All control room PA loudspeakers will be modified to monitor Channel 5 only. PA messages can be adequately heard in the primary operating area. There is always an operator stationed in this area. Therefore to minimize noise in the control room, no additional speakers will be installed outside the primary operating area.

H.F. GUIDELINES: NUREG 0700, Section 2; Communications

IMPLEMENTATION: Fix and disagree.

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to Startup Following First Refuel
- Monitor Channel 5 only.
WORK COMPLETE 4/11/89

REFERENCES:

- 1) Visual Inspection

HED REPORT SHEET

HED-607 REV. 3

HED DESCRIPTION: Operators cannot quickly determine the position of the rotating collar on some Cutler Hammer Rotary pushbuttons.

HUMAN FACTORS REVIEW: Position collars will be installed on all control room Cutler Hammer rotary pushbuttons.

H.F. GUIDELINES: NUREG 0700, Section 4; Controls

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 4/11/89

REFERENCES:

1) DCP 880360

HED REPORT SHEET

HED-608 REV. 2

HED DESCRIPTION: The operator has no method of denoting which parameters have been selected on the three process computer digital displays.

HUMAN FACTORS REVIEW: The operators use the process computer CRT to determine the current parameter being displayed on the digital display. In addition, during shift turnover, the oncoming operators are informed of the current assignment of the process computer digital displays. A scribble plate was installed for a short time to assist the operators in keeping track of the parameters being displayed. However, this method was found to cause confusion since the scribble plate was not always updated. The scribble plate has been removed.

H.F. GUIDELINES: NUREG 0700, Section 6; Labels

IMPLEMENTATION: Modify

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 11/8/88

REFERENCES:

1) DCP 880079

HED REPORT SHEET

HED-609 REV. 2

HED DESCRIPTION: Hotwell Level Controller pushbuttons could be changed from "CLOSE-OPEN" to "RAISE-LOWER" which more clearly reflects actual change in plant condition.

HUMAN FACTORS REVIEW: Controller pushbutton labels will be changed to "RAISE-LOWER".

H.F. GUIDELINES: NUREG 0700, Section 6; Labels and Aids.

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 4/11/89

REFERENCES:

1) DCP 880079

HED REPORT SHEET

HED-610 REV. 2

HED DESCRIPTION: Heirarchical labeling on vertical panels where demarcation is used would be beneficial for quick recognition of systems.

HUMAN FACTORS REVIEW: Heirarchical labeling will be provided on vertical panels where beneficial.

H.F. GUIDELINES: NUREG 700, Section 6; Labels and Aids.

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 4/11/89

REFERENCES:

1) DCF 880079

HED REPORT SHEET

HED-611 REV. 2

HED DESCRIPTION: Feedwater A/B Pressure (N27-R146A/B) and Reactor Pressure (C34-R605) meters are compared during system operation. The feedwater pressure is scaled 1-1500 while Rx pressure is scaled 1-1200 making it difficult for comparison.

HUMAN FACTORS REVIEW: The meter scales will be modified so that they will both have the same scale numbers and increments. In addition, a large digital meter and the ERIS CRT both display reactor pressure in close proximity to the feedwater pressure meter. The new scales and the redundant instrumentation provide suitable information to the operator.

H.F. GUIDELINES: NUREG 700, Section 5; Displays.

IMPLEMENTATION: FIX

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? NO INCREASE ERROR POTENTIAL? NO

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 2/1/89

REFERENCES:

HED REPORT SHEET

HED-612 REV. 2

HED DESCRIPTION: Recirculation pump vibration reset switch (B33-S110) is not consistent with other Recirc System reset indication. The switch does not have two indicating lights to indicate the vibration status as do the other switches.

HUMAN FACTORS REVIEW: Indicating lights are not required to show recirculation pump vibration status for the following reasons:

1. Annunciators will alarm on high vibration which eliminates the need for indicating lights.
2. The primary purpose of the switch is to reset the alarm not to reset the control system interlocks which is why indicating lights are provided on the other switches.

H.P. GUIDELINES: NUREG 700, Section 5; Displays

IMPLEMENTATION: Disagree

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION
WORK COMPLETE N/A

REFERENCES:

HED REPORT SHEET

HED-613 REV. 2

HED DESCRIPTION: Validation - The digital displays for reactor vessel level on 1H13-P680 do not indicate when they are off range and the range selector switch should be changed.

HUMAN FACTORS REVIEW: Provide indication to the operator that the display is off range so he can switch to a different range.

H.F. GUIDELINES: NUREG 0700, Section 5; Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 5/9/89

REFERENCES:

1) DCP 880080

HED REPORT SHEET

HED-614 REV. 2

HED DESCRIPTION: Validation - The upper pool level scales on meters G43-R022A(B) and recorders G43-R073A(B) are nonstandard with zero referenced to the normal surface level.

HUMAN FACTORS REVIEW: The upper pool scale zero reference will be changed to reference a spot near the bottom of the pool which will be more meaningful to the operator.

H.F. GUIDELINES: NUREG 0700, Section 5: Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 4/11/89

REFERENCES:

1) DCP 880093

HED REPORT SHEET

HED-615 REV. 3

HED DESCRIPTION: Validation - The P680 SO attempted to restore the feedwater system to maintain vessel level however, he did not realize that the RCIC initiation had tripped the RFPT's since the RFPT trip alarm clears after the discharge valve closes.

HUMAN FACTORS REVIEW: The RFPT trip annunciator logic has been modified so that the alarm will remain in for a specific time delay after the trip. This ensures that the operator is reminded of the trip and also eliminates the nuisance alarm feature. In addition, a RCIC initiation contact will be added to the "Main Turb & Feedpump Trip L8" annunciator on P680-3A-A8 to alert the operator that the RCIC initiation has tripped the RFPT's. The alarm window will be changed to "MAIN TURB & FDW Trip RCIC/L8".

H.F. GUIDELINES: NUREG 0700, Section 3; Annunciators

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 4/11/89

REFERENCES:

- 1) DCP 870275
- 2) DCP 880372

HED REPORT SHEET

HED-616 REV. 3

HED DESCRIPTION: Validation - The RCIC manual initiation pushbutton must be held in for two seconds before RCIC will initiate to ensure that the Main and Feedpump Turbines have tripped. However the RCIC real in light comes in immediately which causes operator confusion.

HUMAN FACTORS REVIEW: A nameplate has been provided on the pushbutton, as an interim fix, alerting the operator that he has to hold in the pushbutton for two seconds. A permanent modification of the circuitry will be provided so that the operator does not have to hold in the pushbutton for two seconds.

H.F. GUIDELINES: NUREG 0700, Section 4; Controls

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 5/9/89

REFERENCES:

1) DCP 880097

HED REPORT SHEET

HED-617 REV. 1

HED DESCRIPTION: F7.1 - During performance of the final noise survey in the Control Room, noise levels at the EHC instrument panel (H13-P821) and the Unit Supervisor's workstation were above recommended maximum noise levels. The noise levels near the EHC (H13-P821) panel were at 76 dBA, which is above the recommended maximum noise level of 65 dBA. In addition, the Unit Supervisor's workstation had a 66 dBA level. The panel is not near an operating area, however it is close to the Unit Supervisor's workstation and may be causing elevated conversation levels.

HUMAN FACTORS REVIEW: The noise level near the back of H13- '821 will be reduced to approximately 65 dBA. The noise level at the Unit Supervisor's workstation will be reduced to \leq 65 dBA.

H.F. GUIDELINES: NUREG 0700, Section 1, Workspace

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior to startup following second refuel.
Reduce EHC panel noise levels
WORK COMPLETE 2/23/90

REFERENCES:

- 1) HED-360
- 2) HED-601
- 3) TAF 80737

HED REPORT SHEET

HED-1012 REV. 3

HED DESCRIPTION: The following valve nameplates are labelled close, open. However the open position is actually automatic:

B33-F019
B33-F020
E12-F060 A, B
E12-F075 A, B

The following valve nameplates are labeled close, open however the close position is automatic:

E51-F005 (PPD-OPS 1/28/83)

HUMAN FACTORS REVIEW: Relabel nameplates to show close, auto and auto level, open respectively by fuel load. Install three position switches "CLOSE, AUTO, OPEN" by first refuel for valves B33-F019, 20, E12-F060A(B) and E12-F075A(B). E51-F005 will remain as a two position switch which is consistent with other drain valve control switches.

H.F. GUIDELINES: NUREG 0700, Section 5, Labels Locations and Aids

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? No

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load - Labelling
WORK COMPLETE 12/16/85

PLANNED COMPLETION Prior to start-up after first refuel
Install new switches
WORK COMPLETE 7/18/88

REFERENCES:

- 1) Nameplate List - P05A001, A002, P1A001, A002, P13A022, P111A001, P112A001.
- 2) FDDR KL1-942

HED REPORT SHEET

HED-1019 REV. 4

HED DESCRIPTION: The operational sequence of the annunciator system provides return to normal indications for satellite subsystems on the main panel. At "Flasher Reset on Main" the status is steady which directs the operator to the satellite panel, but the alarmed condition has not been acknowledged at that panel. At "Flasher Reset on Subsystem", the status is slow flash, which when reset by the operator will change to off, which masks the abnormal condition existing on the satellite panel. This sequence fails to attract the operators attention to plant variables that are out of established operating limits. (PPD-OPS 6/1/83).

HUMAN FACTORS REVIEW: The Control Room annunciator system will remain as presently designed. The Perry control room annunciator design philosophy is that all important plant alarms are provided in the control room. Local satellite panel alarms which do not clear during the shift are logged on the operator round sheets in accordance with OAP-1702. Further review indicated that it would be beneficial to provide a local reset feature on three local annunciator panels. H51-P052, P063, and P035A will be modified so that the control room alarm can be reset allowing any future local panel alarms to come in.

H.F. GUIDELINES: NUREG 0700, Section 3, Annunciators

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 12/10/88

REFERENCES:

- 1) DCP 870731

HED REPORT SHEET

HED-1036 REV. 3

HED DESCRIPTION: The C34-R609 recorder on P680-3B has a pen for TURB 1ST STAGE MASS FLOW (20 Mlbs/hr). Operators have been trained to read Turbine 1st Stage Pressure and Tech Specs are also referencing pressure. (PPD-OPS 7/3/84).

HUMAN FACTORS REVIEW: For consistency the TURB 1ST STAGE scale will be changed to 0-800 psig.

H.F. GUIDELINES: NUREG 0700, Section 5; Visual Displays

IMPLEMENTATION: Fix

SAFETY AND OPERABILITY ASSESSMENT: CATEGORY I
SAFETY CONSEQUENCE? No INCREASE ERROR POTENTIAL? No

VERIFICATION: FUEL LOAD - CORRECTS HED? Yes NEW HED? Yes
PROVIDE MORE RESOLUTION ON TURBINE FIRST STAGE PRESSURE SCALE.

FIRST REFUEL - CORRECTS HED? Yes NEW HED? No

CORRECTION SCHEDULE: PLANNED COMPLETION Fuel Load
WORK COMPLETE 9/5/85

PLANNED COMPLETION Prior To Startup Following First Refuel
WORK COMPLETE 4/11/89

REFERENCES:

- 1) F4 1006
- 2) Visual Inspection