ARKANSAS POWER AND LIGHT
ARKANSAS NUCLEAR ONE - UNIT 1
CONTROL ROOM DESIGN REVIEW
FINAL SUMMARY REPORT
HUMAN ENGINEERING DISCREPANCIES
VOLUME 2
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Category 1 HEDs

(42 HEDs)

CORRECTIVE ACTIONS

HED NO.: CK:1-1.012

GUIDE NO.: 1.5.5a(3)

RATING: 1

FINDING:

Too many people in the control room causes overcrowdedness and noise distractions.

RESPONSE:

The size of the ANO control room contributes to the potential for overcrowding. Due to this potential, a procedure for clearing unnecessary personnel from the control room is in use. This procedure gives the shift supervisor the authority and control of access to the control room to eliminate overcrowding. This procedure is not usually invoked during routine plant operation, but it can be at the shift supervisor's option. As a corrective measure, a reminder about the use of the existing procedure has been added to the operator's requalification training to help assure that use of the access procedure will be invoked when necessary.

IMPLEMENTATION:

Corrected.

4917/a/12

CORRECTIVE ACTIONS

HED NO.: CK:3-1.003

GUIDE NO.: 3.1.2.b(1); 3.3.4(b)

RATING: 1

FINDING:

Multipoint alarms require the control room operator to go to a given plant location (or local panel) for specific information.

RESPONSE:

Most of the multipoint alarms that require the operator to go to a given plant location (or local panel) do not cause operational problems since they allow adequate time for auxiliary operator action and subsequent control room operator action as required. Furthermore, inclusion of many of these multipoint alarms in the control room would aggravate the space problem and/or unnecessarily complicate the computer printout of alarms. However, the multipoint alarms for the following do require evaluation for possible design changes since a time factor can be significant in certain cases for these alarms: inverter 1Y13, 1Y23, 1Y11, 1Y22 trouble: Diesel Gen IDG1 and IDG2 trouble; and instrument air compressor trouble. These multipoint alarms are being evaluated for a design change to correct the HED. This action will also be related to HED CK:3-1.004.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.004

GUIDE NO.: 3.1.2c(1)+(2)

RATING: 1

FINDING:

Print-out capability is not provided for every computer multi-input annunciator alarms.

RESPONSE:

The only multipoint alarms that do not have print-out capability and may need some form of control room indication are the ones identified in HED No: CK:3-1.003. They are being evaluated for a design change as mentioned in HED No; CK:3-1.003.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.008

GUIDE NO.: 3.1.4

RATING: 1

FINDING:

There is no logical prioritization system in place for the annunciator windows within each annunciator panel so that the operator can differentiate the most important (or serious) alarms from less important ones.

RESPONSE:

Prioritization of alarms is to be evaluated as a design change to correct this HED.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.001

GUIDE NO.: 5.1.1c

RATING: 1

FINDING:

When panel instruments fail or become inoperative, the failure is not apparent to the operators. Some fail midscale.

RESPONSE:

The concern about the midscale failure mode due to instrument power loss (i.e., NNI-X or NNI-Y) has already been addressed by the addition of power supply indicating lights, annunciators, and an operating procedure. Upon loss of a power supply that could result in the midscale failure of instruments, an alarm occurs that directs the operator's attention to a set of power supply indicating lights. The operator then uses the operating procedure for loss of NNI-X or NNI-Y instrument power supply which identifies the instruments impacted by the power loss. This resolution of the midscale failure instruments was implemented prior to the CRDR program as part of AP&L's on-going commitment to the practical application of human factor's principles. Due to the significance of this HED, AP&L plans to further evaluate design alternatives. Therefore, the interim corrective action has already been completed and an evaluation is to be performed regarding further corrective action that may be desirable.

IMPLEMENTATION:

Additional corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.016

GUIDE NO.: 5.1.2b+c

RATING: 1

FINDING:

Some displays indicate values in a form which requires conversion. Some displays present % indication while other indicators which are related display information in "inches". The following displays are affected: Panel C-09; ID# LI2618, LI2620, LI2623, LI2624, LI2667, LI2669, LI2671, LI2673.

RESPONSE:

The identified steam generator displays all presented the level in percent while the operator needs the level in inches. The subject displays were replaced during 1R6 with displays presenting the level in inches. This design change was initiated prior to the CRDR program as part of AP&L's continuing commitment to the practical application of human factor's principles. Therefore, this HED has been corrected by a design change to eliminate the discrepancy.

IMPLEMENTATION:

Corrected.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.026

GUIDE NO.: 5.1.1b(1)

RATING: 1

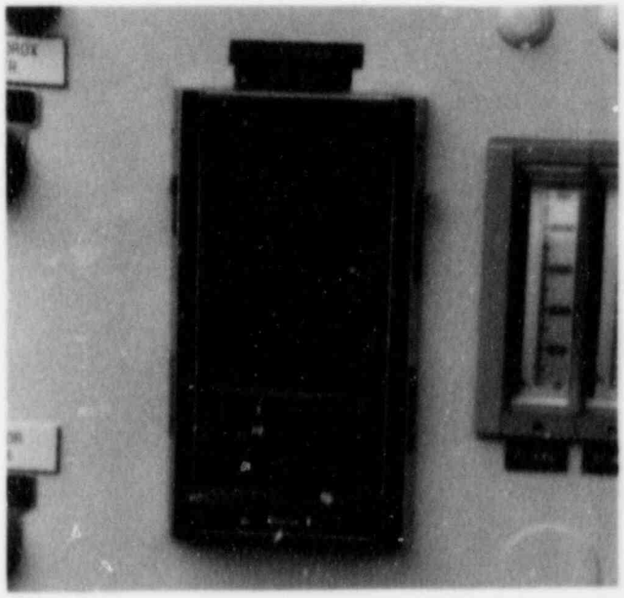
FINDING:

Some displays give demand status with no indication of actual status. The affected component are as follows:

PANEL	EQUIPMENT NAME
C14	DH Cooler E35A/B
C14	DH Cooler Bypass
C14	DH Cooler Bypass
C13	Reactor CT Loop A/B
C13	Feedwater Temp Loop A/B
C13	Steam Gen Downcomer Temp Loop A/B

RESPONSE:

The DH cooler valve demand status indicators have been supplemented with actual valve position indication lights during 1R6 as part of a design change initiated prior to the CRDR program. The design change was initiated as part of AP&L's on-going commitment to the practical application of human factors principles. The other displays identified in this HED are not demand indicators, they are actual status indicators. Therefore, the discrepancy has been corrected by a design change during 1R6. (See HEDs QS:A3.12-1.045, VR:1-1.017, VR:1-1.017 and VS:1-1.008).



IMPLEMENTATION:

Corrected.

4918/a/43

CORRECTIVE ACTIONS

HED NO.: CK:6-1.001

GUIDE NO.: Section 6

RATING: 1

FINDING:

The control room instrumentation is not clearly labeled to permit rapid and accurate human performance. Many instruments are unlabeled while others are labeled with inadequate information. The labels are inconsistent in letter style and size as well as wording, format, abbreviations, and placement. Readability is also a problem since many of the labels cannot be read from the required viewing distances.

RESPONSE:

This HED involves numerous problems with the labeling in the control room. Included are missing labels, dynotape labels, incorrect abbreviations, and numerous other related labeling problems. As part of AP&L's on-going commitment to the practical application of human factor's principles, a program to relabel the control room has already been planned. The development of an integrated guideline document has been completed to provide the needed information for a comprehensive relabeling of the ANO-1 control room. This effort will include use of lines of demarcation and background shading to address other HEDs involving association enhancement. Therefore, this HED is being addressed by a substantial modification program to correct the numerous discrepancies.

IMPLEMENTATION:

Corrective action will be taken per the labeling program.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.058

GUIDE NO.: 8.1.1a-b

RATING: 1

FINDING:

Related components from Panels C18; C16; and C14 are not grouped together; decay heat; sodium hydroxide; quench tank; BWST grouping of components relationships are not enhanced by spacing, demarcation or color shading.

RESPONSE:

The identified components will be evaluated for rearrangement or other association enhancement. (See also HED CK:8-1.050, CK:9-1.013, QS:B3.10-1.068, and VL:1-1.004).

IMPLEMENTATION:

Corrective action will be taken.

4917/a/77

CORRECTIVE ACTIONS

HED NO.: HR:1-1.002

RATING: 1

FINDING:

On B&W units, it is normal for the main steam relief valve to lift on a reactor trip from high power. There have been cases where these valves do not reseat properly or at the proper setpoint, and no position indication exists to identify this situation.

RESPONSE:

The need for valve position indication for the main steam safety valves has already been identified as a design change needed at ANO-1 based on Reg. Guide 1.97. The design change is being developed for installation during 1R7. (See QS:A3.2-1.020, and VR:1-1.028).

IMPLEMENTATION:

Corrective action will be taken.

4919/a/44

CORRECTIVE ACTIONS

HED NO.: QS:A1.17-1.001

RATING: 1

FINDING:

Atmospheric dump control (CO2) is not separate from condensor dump control, and therefore does not allow individual steam generator HDR pressure control. Presently both have to be transferred if atmospheric dump or condensor valve is selected in auto mode. They automatically transfer, but turbine bypass valve position indicator is not available. The operators, therefore, cannot readily identify the current alignment.

RESPONSE:

The control of the atmospheric dump and condensor dump valves has been corrected by a design change implemented during 1R6 as part of AP&L's on-going commitment to the practical application of human factors principles. This design change was initiated prior to the assessment of this HED. The concern about the lack of position indication for the turbine bypass valves will be evaluated for possible correction.

IMPLEMENTATION:

Corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A3.14-1.002

RATING: 1

FINDING:

During emergency situations, the margin to saturation chart recorder (CO4) does not display information in a timely manner. This "lag" time may affect the operator's ability to make appropriate decisions and responses during emergency conditions.

RESPONSE:

The margin to saturation chart recorder is backed-up by a graphic display on the safety parameter display system (SPDS). This feature was added to the SPDS as part of AP&L's on-going commitment to the practical application of human factors principles which was initiated prior to the identification of this HED. Therefore, this HED is resolved. (See also HED QS:B2.3-1.029)

IMPLEMENTATION:

Corrected.

4921/a/10

CORRECTIVE ACTIONS

HED NO.: QS:A1.7-1.018

RATING: 1

FINDING:

A remote control is needed for the DH1A and DH1B decay heat pump suction valves since these values may be inaccessible due to the accident in which they are needed because of flooding, high radiation, etc.

RESPONSE:

This HED will be evaluated for the possible addition of motor operators to the subject manual valves.

IMPLEMENTATION:

Corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A1.8-1.019

RATING: 1

FINDING:

Remote control, motor operated crossover valves are needed for high pressure injection/low pressure injection line up for piggyback operation.

RESPONSE:

This HED will be evaluated for the possible addition of motor operators to the subject manual valves.

IMPLEMENTATION:

Corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A3.2-1.020

RATING: 1

FINDING:

Indication of main steam relief valve position is not available in the control room. It may be useful in preventing overcooling transients. Operators indicated that such information would be useful in responding to and preventing overcooling transients.

RESPONSE:

The addition of main steam relief valve position indication is scheduled to be completed during 1R7 as part of the AP&L commitment to Reg. Guide 1.97. Therefore, a design change is being made to correct this HED. (See HR:1-1.002 and VR:1-1.028).

IMPLEMENTATION:

Corrective action will be taken.

4921/a/27

CORRECTIVE ACTIONS

HED NO.: QS:B2.1-1.028

RATING: 1

FINDING:

The emergency feedwater system requires two RO's to operate. One monitors indications while the other operates control valves. Controls and displays should be arranged to allow one-person operation.

RESPONSE:

The concern about the emergency feedwater controls was the subject of a design change initiated prior to the CRDR program. This design change includes the practical application of human factors principles such that this HED was resolved during 1R6. This effort reflects AP&L's continuing commitment to the practical application of human factors principles that will continue after the CRDR program.

IMPLEMENTATION:

Corrected.

CORRECTIVE ACTIONS

HED NO.: QS:B2.3-1.029

RATING: 1

FINDING:

Manual operation of high pressure injection requires two RO's. Operation should be simplified to allow one-person operation.

RESPONSE:

The margin to saturation chart recorder is backed-up by a digital display on the safety parameter display system (SPDS). This feature was added to the SPDS as part of AP&L's on-going commitment to the practical application of human factors principles which was initiated prior to the identification of this HED. The need for two operators was due to the location of the margin to saturation and pressurizer level recorders. The SPDS display was modified during 1R6 to provide pressurizer level with the existing margin to saturation display such that one operator can control the high pressure injection system using this SPDS display. Therefore, this HED has been corrected by a design change. (See QS:A3.14-1.002).

IMPLEMENTATION:

Corrected.

CORRECTIVE ACTIONS

HED NO.: QS:B7.10-1.030

RATING: 1

FINDING:

Main steam isolation valve position indications are too low on back panel. Operators presently have to walk around the front panels in order to check these position indicators. Consequently, inappropriate readings may go unnoticed.

RESPONSE:

The main steam isolation valve controls and indicator lights have been relocated to panel C-09 during 1R6 as part of AP&L's on-going commitment to the practical application of human factors principles. The new location on panel C-09 resolves this HED.

IMPLEMENTATION:

Corrected.

4921/a/37

CORRECTIVE ACTIONS

HED NO.: QS:A1.9-1.031

RATING: 1

FINDING:

A makeup tank isolation valve remote control is needed in the control room to prevent gas binding in high pressure injection pumps.

RESPONSE:

This HED will be evaluated for the possible addition of a motor operator to the subject valve such that it can be controlled from the control room. (See also VR:1-1.031)

IMPLEMENTATION:

Corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A1.14-1.036

RATING: 1

FINDING:

During loss of offsite power and multiple tube rupture events, high pressure injection to pressurizer spray is needed.

RESPONSE:

The need for the subject control was previously identified and a design change has been initiated. The completed system is expected to be operational by 1R7. This action represents AP&L's on-going commitment to the practical application of human factors principles that will continue after completion of the CRDR program.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A3.5-1.042

RATING: 1

FINDING:

A core exit thermocouple indicator (reading in Deg - F) is needed in the control room.

RESPONSE:

The need for core exit thermocouple indication was identified prior to the assessment of this HED and has been provided on the SPDS. This indication is considered an interim solution to this HED until an evaluation of the need for a backup display of this parameter is completed.

IMPLEMENTATION:

Corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A3.13-1.046

RATING: 1

FINDING:

An indicator is needed for the reactor coolant system pressure (on ESAS panel).

RESPONSE:

This HED involves the need for monitoring RCS pressure during the manipulation of controls on panel C-16/C-18. This problem has been addressed by providing the SPDS display near C-16/C-18. The operator can monitor the result of the control adjustments on C-16/C-18 without leaving the control panel area. Therefore, this HED has been addressed by a design feature that reflects AP&L's on-going commitment to the practical application of human factors principles that was in existence prior to the CRDR program.

IMPLEMENTATION:

Accept as is.

4921/a/53

CORRECTIVE ACTIONS

HED NO.: QS:A3.19-1.050

RATING: 1

FINDING:

Diagnostic instrumentation is needed for safety systems.

RESPONSE:

This HED involves several safety systems and the need for additional monitoring instrumentation to allow the operator to take corrective action if a particular safety component fails. Therefore, this HED will be evaluated for possible correction. (See also HED VR:1-1.007)

IMPLEMENTATION:

Corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A3.20-1.051

RATING: 1

FINDING:

A chart recorder is needed for reactor building sump level.

RESPONSE:

The existing indicator for the reactor building sump is a meter display. The operator is more interested in trend for this parameter than a discrete value. Therefore, this HED will be evaluated for correction.

IMPLEMENTATION:

Corrective action will be taken.

4921/a/58

CORRECTIVE ACTIONS

HED NO.: QS:A5.2-1.065

RATING: 1

FINDING:

The VSF9 fan is noisy and interferes with speech and annunciators.

RESPONSE:

The noise from VSF9 is excessive and creates operator distraction and other problems. Therefore, this HED will be evaluated for correction.

IMPLEMENTATION:

Corrective action will be taken.

4921/a/72

CORRECTIVE ACTIONS

HED NO.: QS:B3.12-1.070

RATING: 1

FINDING:

The emergency feedwater system is not functionally grouped.

RESPONSE:

The concern about the emergency feedwater controls was the subject of a design change initiated prior to the CRDR program. This design change includes the practical application of human factors principles such that this HED was resolved during 1R6. This effort reflects AP&L's continuing commitment to the practical application of human factors principles that will continue after the CRDR program.

IMPLEMENTATION:

Corrected.

4921/a/77

CORRECTIVE ACTIONS

HED NO.: QS:B3.17-1.071

RATING: 1

FINDING:

Service water instrumentation is not well laid out. Service water pump control is on one panel, pressure and flow indication on another (C16/C18/C19). Sluice gates and valves are on C26.

RESPONSE:

The instrumentation for the service water system will be evaluated for rearrangement and/or other association enhancement. (See CK:8-1.036).

IMPLEMENTATION:

Corrective action will be taken.

4921/a/78

CORRECTIVE ACTIONS

HED NO.: QS:D4.4-1.079

RATING: 1

FINDING:

Backup power for the phone system may become a problem during an emergency or seismic event and emergency procedures are heavily dependent upon speakers being operable.

RESPONSE:

The existing phone system is provided with backup power from the security diesel generator. Additionally, a design change has been implemented to provide a radio paging system that does not rely on the existing phone system. The new radio paging system will allow the operators to communicate with personnel outside the control room under severe loss of power events. Therefore, this HED has been resolved by a design change. This design change reflects AP&L's on-going commitment to the practical application of human factors principles which was in effect prior to the CRDR program.

IMPLEMENTATION:

Corrected.

4921/a/86

CORRECTIVE ACTIONS

HED NO.: QS:E2.1-1.083

RATING: 1

FINDING:

SPDS steam generator tube-to-shell delta T should be defined on the CRT as far as which temperature minus which temperature.

RESPONSE:

The SPDS display of steam generator tube-to-shell temperature differential will be evaluated for better labeling options to make it clear which temperature is higher (i.e., the tube or the shell).

IMPLEMENTATION:

Corrective action will be taken.

4921/a/90

CORRECTIVE ACTIONS

HED NO.: QS:E2.2-1.084

RATING: 1

FINDING:

Certain parameters that are presently available only on the plant computer or SPDS should be available in the control room with an indicator independent of a computer. (i.e., core exit thermocouples, steam generator tube-to-shell delta temp., and feedwater pump suction pressure).

RESPONSE:

The identified parameters will be evaluated for the addition of indicators separate from the computers.

IMPLEMENTATION:

Corrective action may be taken.

4921/a/91

CORRECTIVE ACTIONS

HED NO.: QS:1-1.097

RATING: 1

FINDING:

The diesel generator start/stop controls are not clearly associated with the other related controls on panel C-10, and there is no distinction between the diesel start/stop controls and the breaker controls.

RESPONSE:

An evaluation will be performed regarding relocation of the diesel generator start/stop controls and/or other association enhancement techniques.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:1-1.100

RATING: 1

FINDING:

The service water pump controls are located very low on panels C-16/C-18 such that status verification cannot be done from a front panel. Service water pump status is an important item for the operators during an emergency.

RESPONSE:

These controls and associated status lights will be evaluated for relocation such that they can be seen from the front panels.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:1-1.103

RATING: 1

FINDING:

The handswitches for all the motor-operated valves are the same type. However, some of the controls are for modulating valves while others are for valves with seal-in circuits. There is no indication on or near the control handswitches to distinguish between types of valves being controlled. This could lead to operator misoperation of certain valves.

RESPONSE:

An evaluation will be performed to consider possible design changes to make the modulation control a separate control function or to provide clear identification of the different types of valves being controlled.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.006

RATING: 1

FINDING:

During Task Analysis, the Subject Matter Expert stated a need for a legend light to aid in the task of identifying which makeup/HPI pump is the ES standby pump, but is not available.

RESPONSE:

The existing method of using magnetic disks to identify the makeup/HPI pump lineup is an interim solution to this HED. An evaluation will be performed regarding the addition of status lights activated by valve position indication on the makeup/HPI cross-connect valves and/or other identification enhancement.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.007

RATING: 1

FINDING:

An instrument is needed for the task of verifying ES standby HPI pump discharge pressure, but is not available.

RESPONSE:

An evaluation will be performed regarding the addition of instrumentation to display the ES standby makeup pump discharge pressure in the control room. (See QS:A3.19-1.050).

IMPLEMENTATION:

Corrective action may be taken.

4919/a/51

CORRECTIVE ACTIONS

HED NO.: VR:1-1.013

RATING: 1

FINDING:

A meter is needed for the task of determining turbine bypass valve position, but is not available.

RESPONSE:

The concern about the lack of position indication for the turbine bypass valves will be evaluated for possible correction. (See QS:A1.13-1.001 and VR:1-1.014).

IMPLEMENTATION:

Corrective action may be taken.

4919/a/57

CORRECTIVE ACTIONS

HED NO.: VR:1-1.027

RATING: 1

FINDING:

There is a low flow trip on the seal injection vlv at 22 GPM. This trip auto resets at about 28 GPM. If the vlv travels full open and flow has not reached 28 GPM, the vlv trips again. Manual override of the trip function is needed.

RESPONSE:

The design of an override feature to allow better control of the re-initiation of cooling water to the RCP seals will be evaluated.

IMPLEMENTATION:

Corrective action will be taken.

4919/a/71

CORRECTIVE ACTIONS

HED NO.: VR:1-1.028

RATING: 1

FINDING:

The control status light indicating main steam safety valve position is not available.

RESPONSE:

The need for valve position indication for the main steam safety valves has already been identified as a design change needed at ANO-1 based on Reg. Guide 1.97. The design change is being developed for installation during 1R7. Therefore, this HED will be corrected by a design change. (See QS:A3.2-1.020 and HR-1.002).

IMPLEMENTATION:

Corrective action will be taken.

4919/a/72

CORRECTIVE ACTIONS

HED NO.: VR:1-1.029

RATING: 1

FINDING:

An annunciator indicating service water pump trip status is not available in the control room.

RESPONSE:

This HED is in error. An annunciator is available indicating service water pump trip status (K10-D1).

IMPLEMENTATION:

Corrective action already exists.

4919/a/73

CORRECTIVE ACTIONS

HED NO.: VR:1-1.031

RATING: 1

FINDING:

Makeup Tank outlet valve (MU-13) must be operated locally by the waste control operator.

SPONSE:

This HED will be evaluated for the possible addition of a motor operator to t[illegible]bject valve such that it can be controlled from the cont[illegible]room. (See QS:A1.9-1.031).

IMPLEMENTATION:

Corrective action may be taken.

4919/a/75

CORRECTIVE ACTIONS

HED NO.: VS:1-1.008

RATING: 1

FINDING:

There is no indication of decay heat cooler outlet vlv status in the control room.

RESPONSE:

The DH cooler valve demand status indicators have been supplemented with actual valve position indication lights during 1R6 as part of a design change initiated prior to the CRDR program. The design change was initiated as part of AP&L's on-going commitment to the practical application of human factors principles. Therefore, the discrepancy has been corrected by a design change during 1R6. (See CK:5-1.026, QS:A3.12-1.045, VR:1-1.012 and VR:1-1.017).

IMPLEMENTATION:

Corrected.

4919/a/83

CORRECTIVE ACTIONS

HED NO.: VL:1-1.006

RATING: 1

FINDING:

When the operator resets SLBIC, controls are positioned so far away from each other that an uncomfortable arm spread is necessary.

RESPONSE:

The identified controls were moved to panel C-09 as part of a design change implemented during 1R6. This relocation corrected this HED regarding uncomfortable arm spread. This action reflects AP&L's on-going commitment to the practical application of human factor's principles that was in effect prior to the CRDR program and will remain in effect after the CRDR program. (See HED No: QS:A3.1-1.030)

IMPLEMENTATION:

Corrected.

4919/a/98

Category 2 HEDs

(51 HEDs)

CORRECTIVE ACTIONS

HED NO.: CK:2-1.002

GUIDE NO.: 2.1.6e(2)

RATING: 2

FINDING:

The audio gain controlling the loudspeaker volume of the P.A. system can be reduced to a volume below audible level.

RESPONSE:

This finding will result in corrective action to resolve the discrepancy.

IMPLEMENTATION:

Corrective action will be taken.

4917/a/15

CORRECTIVE ACTIONS

HED NO.: CK:3-1.001

GUIDE NO.: 3.1.2a(1)

RATING: 2

FINDING:

Nuisance alarms clutter annunciator panels making it difficult to spot critical alarms. In addition, spurious alarms come in and slowly flash when acknowledging or hitting horn silence for a valid alarm.

RESPONSE:

The spurious alarms have been eliminated by a design change that was implemented during 1R6 as part of the on-going AP&L program to achieve practical application of human factors principles. This AP&L commitment will continue after the CRDR program has been completed just as it existed prior to the CRDR program. The nuisance alarms are to be evaluated for design change to correct this HED.

IMPLEMENTATION:

Corrective action will be taken.

4919/a/1

CORRECTIVE ACTIONS

HED NO.: CK:3-1.012

GUIDE NO.: 3.3.2c

RATING: 2

FINDING:

In case of flasher failure of an alarmed tile; some of the tiles do not illuminate and burn steadily.

RESPONSE:

Window illumination during flasher failure is to be evaluated for a design change to correct this HED.

IMPLEMENTATION:

Corrective action will be taken.

4919/a/12

CORRECTIVE ACTIONS

HED NO.: CK:3-1.014

GUIDE NO.: 3.3.3b

RATING: 2

FINDING:

Visual alarm tiles are not grouped by function or system within each annunciator panel.

RESPONSE:

The grouping of annunciator windows is to be evaluated for a design change to correct this HED.

IMPLEMENTATION:

Corrective action will be taken.

4919/a/14

CORRECTIVE ACTIONS

HED NO.: CK:3-1.015

GUIDE NO.: 3.3.3d (2)

RATING: 2

FINDING:

Tiles within an annunciator panel matrix are not grouped by subsystem; function; or other logical organization.

RESPONSE:

The grouping of annunciator windows is to be evaluated for a design change to correct this HED.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.025

GUIDE NO.: 3.1.2c (3)

RATING: 2

FINDING:

A reflash capability is not provided for all subsequent alarms of the fire alarm to activate the auditory alert mechanism and reflash the visual tile even though the first alarm may have been cleared.

RESPONSE:

Some multipoint annunciators do not reflash when a subsequent alarm condition occurs before the initial condition has cleared. This involves more than just the fire alarm on K12(A02). A design change is to be evaluated to correct this HED for all important control room multipoint annunciators. (See also HED QS:C2.4-1.011).

IMPLEMENTATION:

Corrective action will be taken.

4919/a/25

CORRECTIVE ACTIONS

HFD NO.: CK:4-1.003

GUIDE NO.: 4.2.1

RATING: 2

FINDING:

Control movements do not conform to population stereotypes for some controls. ON; RAISE; OPEN should be located to the right of OFF; LOWER; and CLOSE. The equipment affected are as follows:

Equipment Name

VAC DEGASSIFIER VLV
CONTROL ROOM EMERGENCY VENTILATION (ON OFF AUTO)
DG 1 V. REG (RAISE LOWER)
DG 1 GOV (RAISE LOWER)
DG 2 V. REG (RAISE LOWER)
DG 2 GOV (RAISE LOWER)
MAIN CHILLER VCH1A PWR ACB (TRIP CLOSE)
CONT RM CHILLER VCH2B PWR ACB (TRIP CLOSE)
MAIN CHILLER VCH1B PWR ACB (TRIP CLOSE)
FIRE PP P6A PWR ACB
STARTUP TRANS 2 152-13 (TRIP CLOSE)
STARTUP TRANS 2 152-14 (TRIP CLOSE)
STARTUP TRANS 2 152-15 (TRIP CLOSE)
STARTUP TRANS 2 152-25 (TRIP CLOSE)
STARTUP TRANS 2 152-24
STARTUP TRANS 2 152-23 (TRIP CLOSE)
STARTUP TRANS 2 152-111 (TRIP CLOSE)
STARTUP TRANS 2 152-112 (TRIP CLOSE)
STARTUP TRANS 2 152-113 (TRIP CLOSE)
STARTUP TRANS 2 152-308 (TRIP CLOSE)
STARTUP TRANS 2 152-408 (TRIP CLOSE)
STARTUP TRANS 2 152-213 (TRIP CLOSE)
STARTUP TRANS 2 152-212 (TRIP CLOSE)
STARTUP TRANS 2 152-211 (TRIP CLOSE)
STARTUP TRANS 2 152-115 (TRIP CLOSE)
STARTUP TRANS 2 152-102 (TRIP CLOSE)
STARTUP TRANS 2 152-103 (TRIP CLOSE)
STARTUP TRANS 2 152-309 (TRIP CLOSE)
STARTUP TRANS 2 152-301
STARTUP TRANS 2 152-401 (TRIP CLOSE)
STARTUP TRANS 2 152-409 (TRIP CLOSE)
STARTUP TRANS 2 152-202 (TRIP CLOSE)
STARTUP TRANS 2 152-203 (TRIP CLOSE)
STARTUP TRANS 2 152-501 (TRIP CLOSE)
STARTUP TRANS 2 152-712
STARTUP TRANS 2 152-112 (TRIP CLOSE)

STARTUP TRANS 2 152-212 (TRIP CLOSE)
STARTUP TRANS 2 152-213 (TRIP CLOSE)
STARTUP TRANS 2 152-612 (TRIP CLOSE)
STARTUP TRANS 2 152-312 (TRIP CLOSE)
STARTUP TRANS 2 152-412 (TRIP CLOSE)
STARTUP TRANS 2 152-142 (TRIP CLOSE)
BUS A3-A4 TIE 152-310 (TRIP CLOSE)
BUS A4-A3 TIE 152-410 (TRIP CLOSE)
LOAD CTR B5-B6 TIE 52-513 (TRIP CLOSE)
LOAD CTR B6-B5 TIE 52-613 (TRIP CLOSE)
DH COOLER E35A (OPEN CLOSE)
DH COOLER E35B (OPEN CLOSE)
GLAND STEAM CONDENSER (OPEN CLOSE)
CONT RM CHILLER VCH2A PWR ACB (TRIP CLOSE)

RESPONSE:

All of the breaker controls listed are not being evaluated for change since their existing configuration of trip-close is equivalent to off-on and meets operator expectations. The control movement for the DG 1 V REG, DG 1 GOV, DG 2 V REG, and DG 2 GOV controls are contrary to operator expectations and are to be evaluated for a design change. The control movement for the gland steam condenser control is contrary to operator expectations and is to be evaluated for a design change. The control movement for valves CV-1428 and CV-1429 are okay, but the display movement is contrary to operator expectations and are to be evaluated for a design change. The control movement for the VSF9 handswitch is contrary to operator expectations and is to be evaluated for a design change. (See HED VS:1-1.017).

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: CK:4-1.009

GUIDE NO.: 4.3.3c(3)

RATING: 2

FINDING:

All legend pushbuttons are susceptible to inadvertent activation during lamp removal and/or replacement.

RESPONSE:

The plant operators are aware of this possibility and take special care in replacing the light bulbs. This care is sufficient to prevent inadvertent activation. Therefore, no further action is planned to address this HED.

IMPLEMENTATION:

Accept as is.

CORRECTIVE ACTIONS

HED NO.: CK:4-1.015

GUIDE NO.: 4.4.5f

RATING: 2

FINDING:

There are two switches for each action corresponding to the two channels on C16/C18. Currently they are interlocked so that you must open the valve with the same handswitch with which you closed the valve. The affected equipment is as follows: Panel C16/C18; CV-6202, CV-1065, CV-1607.

RESPONSE:

This HED is to be evaluated for a design change to address the problem. (See also HED QS:B8.2-1.006 and HED QS:B8.2-1.092).

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.017

GUIDE NO.: 5.1.2d(1)

RATING: 2

FINDING:

Some displays do not span the expected range of operational parameters. The following displays are affected: Panel C-09; ID# FI2218, FI2219, PIS2811, LI1224. LI12620.

RESPONSE:

Of the displays identified, only the P7A discharge pressure and the steam generator level indicators created a problem for the plant operators. The P7A discharge pressure indicator had a range of 0 to 1400 PSI and the operator needed a range of at least 0 to 1500 PSI. As a result of a design change already initiated prior to the CRDR program, the display was changed to a 0 to 1800 PSI range during 1R6. This change represents AP&L's continuing commitment to the practical application of human factors principles that will continue after completion of the CRDR program. Therefore, this HED has been corrected by a design change to eliminate the discrepancy.

The steam generator level indicators identified in this HED measured level in percent with a range of 0 to 100% (corresponding to 0 to 396 inches of level). The plant operator expected to see a level of approximately 500 inches corresponding to 100% since that is the location of the upper level tap. During 1R6, these level displays were changed to display a level range of 102 to 500 inches rather than in percent. This change corrected this HED and reflects AP&L's on-going commitment to the practical application of human factors principles that existed prior to the CRDR program.

The other display identified in this HED does not create a problem for the plant operator. The ICW flow indicators (nuc and non-nuc) are sometimes pegged high due to the system being operated at a flow higher than the original design. This is not a problem for the plant operator since the important variable for monitoring ICW performance is temperature which has a display covering the range of operation. Therefore, due to a lack of justification for making a change, no further action is planned to address this portion of the HED.

IMPLEMENTATION:

Corrected.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.044

GUIDE NO.: 5.1.1a 2)+(3)

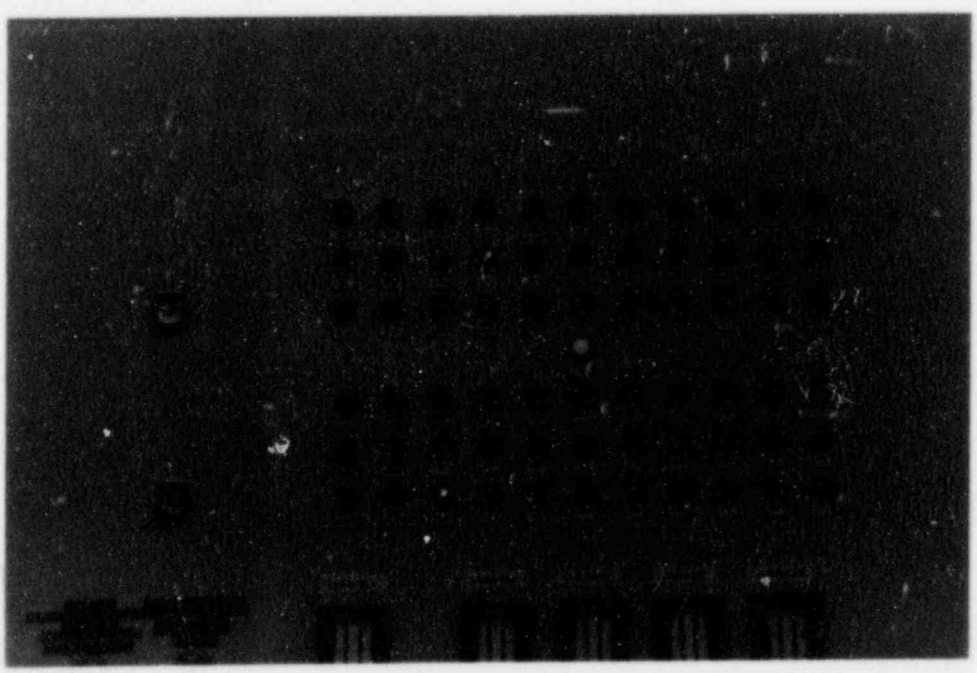
RATING: 2

FINDING:

The fire water detection system and water flow indication system includes some (but not all) of the information located on the fire control panel (back of control room). Having two panels is confusing to the operator.

RESPONSE:

The fire system panels are actually spread out over four different locations in the control room. This discrepancy is to be evaluated for correction. (See also HED QS:B3.18-1.072).



IMPLEMENTATION:

Corrective action will be taken.

4918/a/61

CORRECTIVE ACTIONS

HED NO.: CK:8-1.005

GUIDE NO.: 8.1.1.b

RATING: 2

FINDING:

The following equipment is better if functionally grouped with turbine bypass controllers on C-03; Panel 02: Equipment ID# CV2676/2619 and CV2668/2618.

RESPONSE:

The atmospheric dump isolation valves, CV-2676 and CV-2619, have been relocated to Panel C-09 during 1R6 as part of AP&L's on-going commitment to the practical application of human factor's principles. The location on C-09 is appropriate since related controls are also on C-09.

The band reset and steam dump selector controls are to be evaluated for relocation on C-02 next to the associated controls on C-03.

IMPLEMENTATION:

Corrective action will be taken.

4917/a/24

CORRECTIVE ACTIONS

HED NO.: CK:8-1.006

GUIDE NO.: 8.1.2.d

RATING: 2

FINDING:

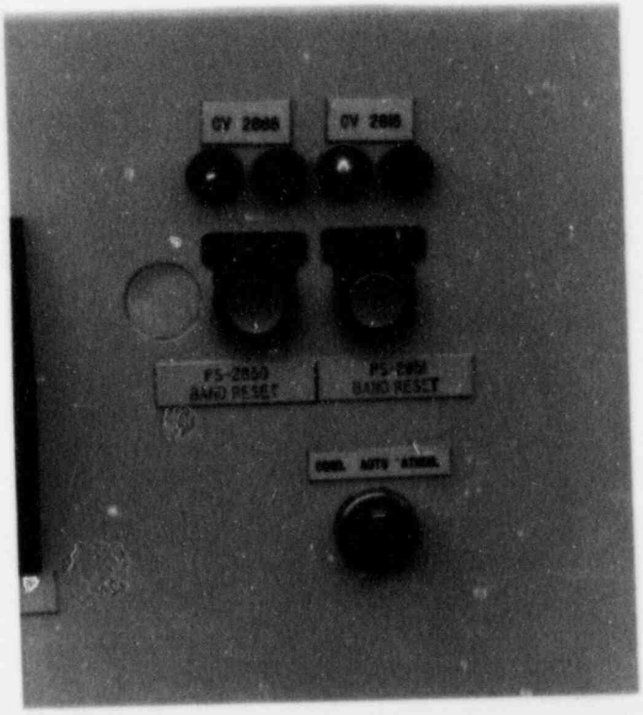
Distinctive enhancements for the emergency controls are not used in the control room. The affected components are as follows:

C02	Atmos Dump Isol
C02	PS-2850;2851;Band Reset
C02	Cond Auto Atmos Stm Dump Selector

RESPONSE:

The atmospheric dump isolation valves, CV-2676 and CV-2619, have been relocated to Panel C-09 during 1R6 as part of AP&L's on-going commitment to the practical application of human factor's principles. The location on C-09 is appropriate since related controls are also on C-09.

The band reset and steam dump selector controls are to be evaluated for relocation on C-02 next to the associated controls on C-03.



IMPLEMENTATION:

Corrective action will be taken.

4917/a/25

CORRECTIVE ACTIONS

HED NO.: CK:8-1.012

GUIDE NO.: 8.1.2b; 8.2.1b

RATING: 2

FINDING:

The ICS system on CO3 involves several systems. Some demarcation/hierarchical labeling techniques should be used to enhance recognition and identification of meters in vertical section.

RESPONSE:

Association enhancement of the ICS controls will be evaluated as part of the control room relabeling program.

IMPLEMENTATION:

Corrective action will be taken per the labeling program.

4917/a/31

CORRECTIVE ACTIONS

HED NO.: CK:8-1.025

GUIDE NO.: 8.1.2

RATING: 2

FINDING:

Appropriate techniques are not used to enhance recognition and identification of functional groups on C-04 (letdown; makeup pressurizer; and RCS), demarcation and/or hierarchical labeling is desirable.

RESPONSE:

The identification and enhancement of associated controls on Panel C-04 will be included as part of the control room relabeling program.

IMPLEMENTATION:

Corrective action will be taken per the labeling program.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.039

GUIDE NO.: 8.1.2.a;b;c;d; 8.2.1.b(2)

RATING: 2

FINDING:

C-19 consists of several systems and subsystems namely inst air; ventilation-CR; fuel handling radwaste area; chilled wtr; srvce wtr; exhaust & fire protection systems; subsystem functional associations are not visually apparent.

RESPONSE:

The systems and subsystems on panel C-19 will be evaluated for rearrangement and/or other association enhancement. (See also CK:8-1.046).

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.046

GUIDE NO.: 8.2.3a

RATING: 2

FINDING:

There are system functional relationships (ventilation; chilled water; service water; etc.) and equipment related associations on panel C-19. There are some components grouped by system; others by equipment relationship. A consistent approach is needed.

RESPONSE:

The systems and subsystems on Panel C-19 will be evaluated for rearrangement and/or other association enhancement. (See CK:8-1.039).

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.047

GUIDE NO.: 8.1a

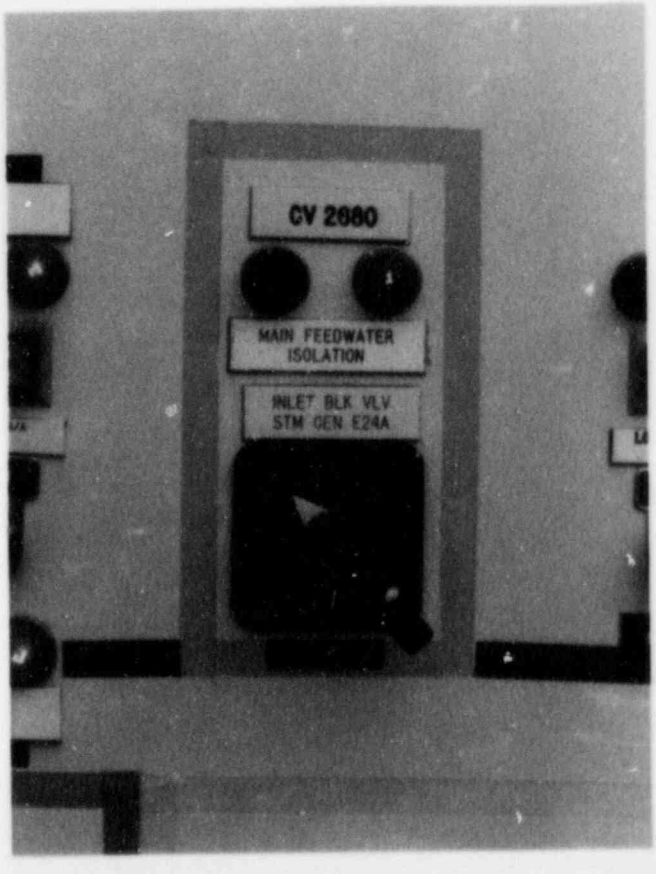
RATING: 2

FINDING:

Main feedwater and main steam isolation valve controls are grouped with ESAS actuated components on C-16/C-18 that are not ESAS actuated.

RESPONSE:

The identified controls have been relocated to Panel C-09 during 1R6 as part of AP&L's on-going commitment to the practical application of human factor's principles. This change was initiated prior to the evaluation of this HED. Therefore, this HED has been corrected by a design change.



IMPLEMENTATION:

Corrected.

4917/a/66

CORRECTIVE ACTIONS

HED NO.: CK:8-1.055

GUIDE NO.: 8.2.2.a

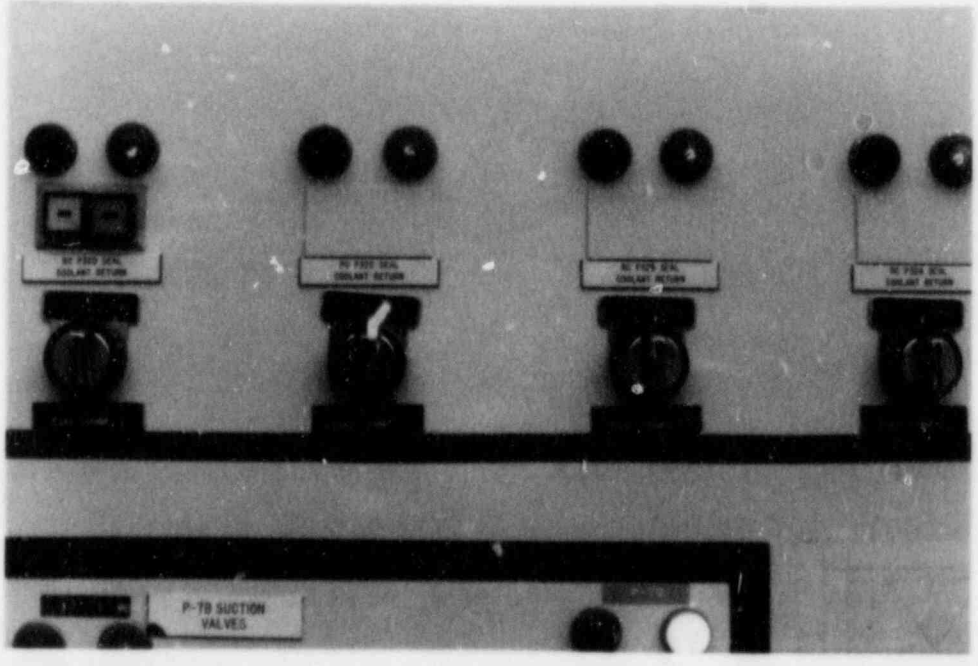
RATING: 2

FINDING:

R.C. Pump Seal return valve controls on C-18 are not arranged in logical alphabetic sequence. (See HEDs CK:8-1.061 and VL:1-1.001).

RESPONSE:

The identified components will be evaluated for rearrangement.



IMPLEMENTATION:

Corrective action will be taken.

4917/a/74

CORRECTIVE ACTIONS

HED NO.: CK:8-1.061

GUIDE NO.: 8.2.2.a

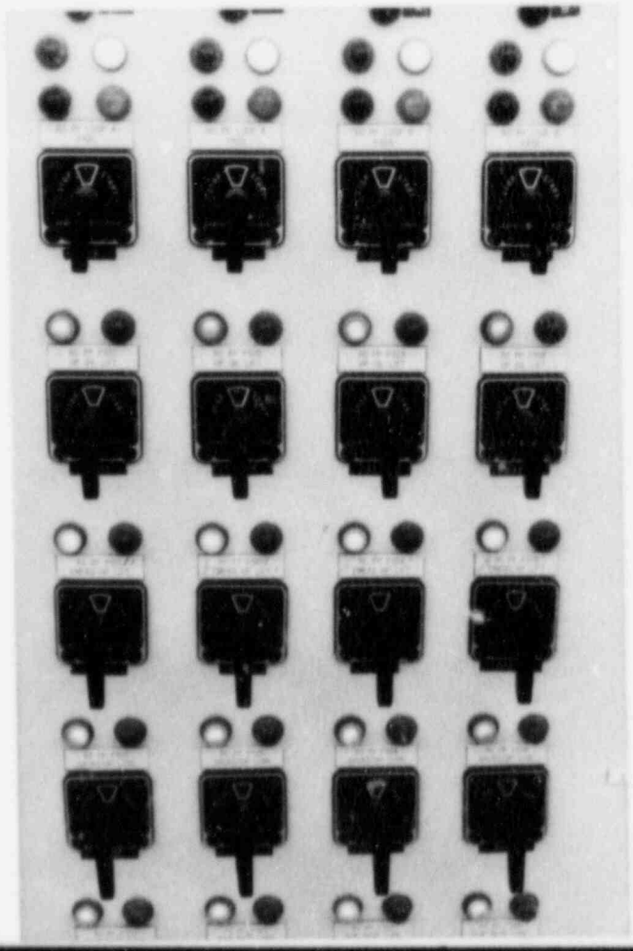
RATING: 2

FINDING:

RCP pump controls and associated lube oil pumps are not arranged in logical alphabetical order.

RESPONSE:

The arrangement of the RCP controls will be evaluated for rearrangement and/or other identification enhancement techniques. (See CK:8-1.055 and VL:1-1.001).



IMPLEMENTATION:

Corrective action will be taken.

4917/a/80

CORRECTIVE ACTIONS

HED NO.: CK:9-1.007

GUIDE NO.: 9.2.3.a

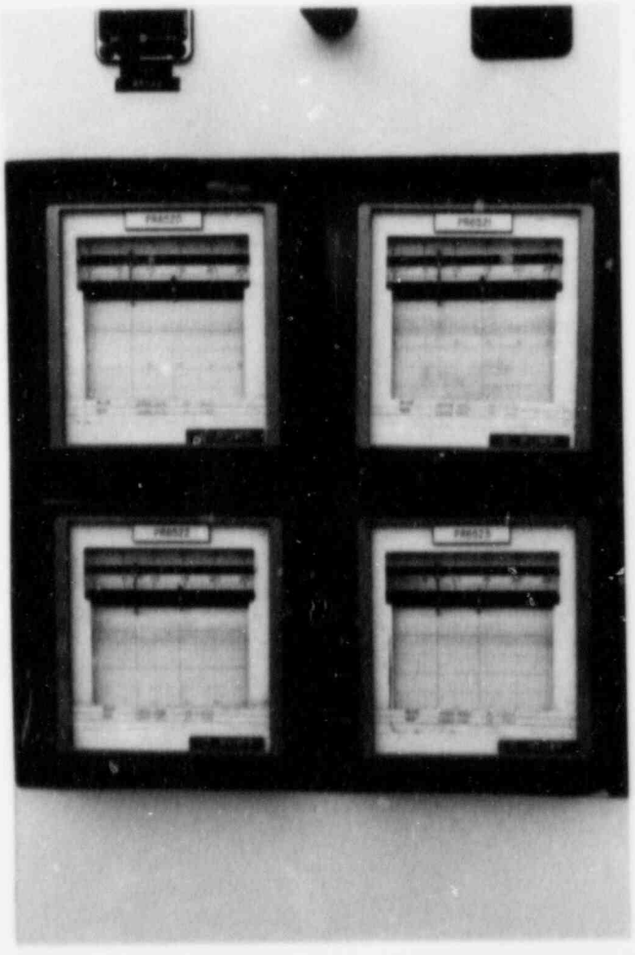
RATING: 2

FINDING:

Recorders located out of visible portion of C-14 associated with operations at C-04. The recorders affected by this are equipment #'s PR6220, PR6221, PR6222, and PR6223.

RESPONSE:

The identified recorders will be evaluated for possible relocation to Panel C-13 from Panel C-14.



IMPLEMENTATION:

Corrective action may be taken.

4919/a/33

CORRECTIVE ACTIONS

HED NO.: QS:B8.7-1.003

RATING: 2

FINDING:

Manual operation of the decay heat injection flow control (C14) results in an output which is inconsistent with the operators expectations. This makes decay heat injection temperature difficult to maintain.

RESPONSE:

The control movement for valves CV-1428 and CV-1429 are okay, but the display movement is contrary to operator expectations and are to be evaluated for a design change and/or identification enhancement techniques.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:B8.2-1.006

RATING: 2

FINDING:

Dual channel reactor building isolation valves (C16/C18) may be actuated at the handswitch or by the engineered safeguard actuation system. There are redundant controls for reactor building isolation valves but when operated manually, the valve can be opened only from the control switch which was closed previously. This method of operation is contrary to normal human factors principles.

RESPONSE:

This HED is to be evaluated for a design change to address the problem. (See QS:B8.2-1.092 and CK:4-1.015).

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:B8.3-1.007

RATING: 2

FINDING:

The integrated control system (CO2) for the reactor, feedwater and turbine controls require operator memory for recalling inputs to system components downstream of the control being operated. In addition, some portions of the system may be operated manually, but other components operate automatically without providing operator with status indications.

RESPONSE:

The ICS controls will be evaluated for the possible addition of some type of status indication to let the operator know when certain automatic actions occur inside the ICS that could impact the controls available. (See also QS:A3.30-1.061)

IMPLEMENTATION:

Corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: QS:C2.3-1.009

RATING: 2

FINDING:

Multipoint recorders (C11, C12, C13, C14) such as winding temperature and bearing temperature recorders are prone to failure. When these recorders fail, a non-valid alarm is received. These non-valid alarms may distract operator from acknowledging valid incoming alarms.

RESPONSE:

The identified recorders are to be evaluated for replacement on panels C-12, C-13 and C-19. The other recorders identified in this HED have already been replaced with more reliable recorders per AP&L's on-going commitment to the practical application of human factors principles which was in effect prior to the evaluation of these HEDs.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:C2.4-1.010

RATING: 2

FINDING:

The "FIRE ALARM" masks the "FIRE PROTECTION SYSTEM TROUBLE" alarm. When the "FIRE ALARM" lights, the "FIRE PROTECTION SYSTEM TROUBLE" annunciator light goes out, therefore, the operator may not be provided with appropriate status information regarding the fire protection system.

RESPONSE:

The alarm suppression feature of the fire protection system will be evaluated for corrective action.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A1.2-1.015

RATING: 2

FINDING:

These valves have two positions - open, close. Intermediate positions are needed to allow direct control of decay heat temperature during cooldown. The valves should be modified to be modulating valves. The affected valves are CV3822 on panel C16 and CV3821 on panel C18.

RESPONSE:

This HED will be evaluated for addition of modulating controls to the subject valves.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A3.10-1.021

RATING: 2

FINDING:

Reactor coolant system level indication during cold shutdown is not available in the control room. Presently, this indication is only available locally in containment via a tygon tubing arrangement. Operators indicated that reactor vessel level indication in the control room would provide them with timely information on which to make decisions and take action.

RESPONSE:

The addition of a reactor vessel level measuring system has been committed to as part of the inadequate core cooling instrumentation system. The ICC system will include a level indication of the RCS hot leg that will be operable during cold shutdown. This will resolve this HED and the installation of the ICC instrumentation is planned for 1R7.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A3.18-1.022

RATING: 2

FINDING:

T40A and T40B hi and low level alarms are not available to alert the operator of abnormal drain system operation. Operators indicated that this information is necessary to allow them to take timely and appropriate control of decreasing tank level which may result in P8A or P8B trip, or would alert operators to abnormally high tank levels.

RESPONSE:

This alarm is part of a multi-point alarm that requires an operator to go to the local panel to determine the specific cause of the alarm. This HED will be evaluated for correction as part of the annunciator upgrade program.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:C4.6-1.023

RATING: 2

FINDING:

Operators indicated that spurious alarms which come in and slowly flash when operators acknowledge or hit horn silence for a valid annunciator alarm are a nuisance.

RESPONSE:

The problem of spurious alarms has been the subject of an ongoing program to upgrade the annunciators in the control room. A check with operations personnel after 1R6 determined that this HED has been corrected as part of the annunciator upgrade program which reflects AP&L's on-going commitment to the practical application of human factors principles that was in effect prior to the CRDR program and will continue. (See CK:3-1.001).

IMPLEMENTATION:

Corrected

CORRECTIVE ACTIONS

HED NO.: QS:A1.10-1.032

RATING: 2

FINDING:

A motor operated heater drain pump discharge valve recirculation bypass is needed.

RESPONSE:

This HED does not involve the control room controls. (See QS:A1.11-1.033 and QS:B8.6-1.077).

IMPLEMENTATION:

Accept as is.

4921/a/39

CORRECTIVE ACTIONS

HED NO.: QS:A1.11-1.033

RATING: 2

FINDING:

A heater drain pump flow control is needed for normal operation.

RESPONSE:

This HED does not involve the control room controls. (See QS:A1.10-1.032 and QS:B8.6-1.077)

IMPLEMENTATION:

Accept as is.

4921/a/40

CORRECTIVE ACTIONS

HED NO.: QS:A1.13-1.035

RATING: 2

FINDING:

Auxiliary pressurizer spray valve remote control is needed in the control room. This control would allow the RO to control pressurizer cooldowns in a controlled manner instead of relying on the WCO.

RESPONSE:

The need for the subject control was previously identified and a design change has been initiated. The completed system is expected to be operational by 1R7. This action represents AP&L's on-going commitment to the practical application of human factors principles that will continue after completion of the CRDR program.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A1.19-1.038

RATING: 2

FINDING:

Breathing air to instrument air solenoid valve remote control is needed in the control room. This will supplement instrument air.

RESPONSE:

This HED will be evaluated for the possible addition of control room controls for the subject valve.

IMPLEMENTATION:

Corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A3.12-1.045

RATING: 2

FINDING:

Indicator lights are needed for reactor coolant pumps start interlock.

RESPONSE:

This HED will be evaluated to determine the corrective action necessary to provide adequate RC pump interlock status. (See HEDs CK:5-1.026, VR:1-1.012, VR:1-1.017 and VS:1-1.008)

IMPLEMENTATION:

Corrective action will be taken.

4921/a/52

CORRECTIVE ACTIONS

HED NO.: QS:A3.23-1.054

RATING: 2

FINDING:

Status lights are needed in the control room for instrument air, service air and breathing air cross-connects.

RESPONSE:

Since the identified components can be associated with time critical action during normal plant operation and there is currently no control room display of their status, this HED will be evaluated for correction.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:A3.30-1.061

RATING: 2

FINDING:

Integrated control system integral saturation indication lights are needed in the control room.

RESPONSE:

The ICS controls will be evaluated for the possible addition of some type of status indication to let the operator know when certain automatic actions occur inside the ICS that could impact the controls available. (See QS:B8.3-1.007).

IMPLEMENTATION:

Corrective action may be taken.

4921/a/68

CORRECTIVE ACTIONS

HED NO.: QS:B3.18-1.072

RATING: 2

FINDING:

Fire control instrumentation is not functionally grouped.

RESPONSE:

The fire system panels are actually spread out over four different locations in the control room. This discrepancy is to be evaluated for correction by rearrangement and/or other association enhancement. (See CK:5-1.044)

IMPLEMENTATION:

Corrective action will be taken.

4921/a/79

CORRECTIVE ACTIONS

HED NO.: QS:B8.5-1.076

RATING: 2

FINDING:

The rod control panel is confusing to operate.

RESPONSE:

The rod control panel is confusing to operate due the numerous functions controlled from the panel. This panel is a standard design that is used at the generic B&W simulator and at other B&W operating plants. Redesign of the panel would be impractical. Operator familiarity and the operator training program adequately prepares the operator to deal with the rod control panel. Furthermore, the manipulation of the control rods from this panel is not done during emergency operation where the pressure of time can make dealing with this panel a significant problem. Therefore, due to the adequacy of the existing arrangement, no further action is planned to address this HED.

IMPLEMENTATION:

Accept as is.

4921/a/83

CORRECTIVE ACTIONS

HED NO.: QS:B8.6-1.077

RATING: 2

FINDING:

The heater drain pump start system is difficult to use.

RESPONSE:

This HED does not involve the control room controls. (See QS:A1.10-1.032 and QS:A1.11-1.033).

IMPLEMENTATION:

Accept as is.

4921/a/84

CORRECTIVE ACTIONS

HED NO.: QS:B8.2-1.092

RATING: 2

FINDING:

Some control valves have a confusing logic for opening. These are dual controls, used for operating the same valves. Valves affected are: CV-6202, CV-1065, and CV-1667).

RESPONSE:

This HED is to be evaluated for a design change to address the problem. (See QS:B8.2-1.006 and CK:4-1.015).

IMPLEMENTATION:

Corrective action will be taken.

4921/a/99

CORRECTIVE ACTIONS

HED NO.: QS:1-1.093

RATING: 2

FINDING:

Core Flood Tank pressure meters need smaller divisions. Tech specs require operations during surveillances to read these meters in smaller increments than is available on meter scales at present.

RESPONSE:

An accurate reading is required for core flood tank pressure for technical specification surveillance and a design change is being evaluated. (See CK:9-1.011).

IMPLEMENTATION:

Corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: QS:1-1.095

RATING: 2

FINDING:

Core Flood Tank Level meter needs smaller divisions. Tech specs require operator during surveillances to read these meters in smaller increments that is available on meter scales at present.

RESPONSE:

The core flood tank level display is to be replaced due to a previous commitment related to R.G. 1.97.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: QS:1-1.096

RATING: 2

FINDING:

The lo-load feedwater controller has valve demand position only, no display of actual position is provided.

RESPONSE:

The possible addition of actual valve position indication for the lo-load feedwater control valve will be evaluated.

IMPLEMENTATION:

Corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: QS:1-1.098

RATING: 2

FINDING:

The reactor coolant pump start/stop controls are not distinctly different from the nearby auxiliary equipment controls. Due to the importance of these controls, some visual/tactual difference would be helpful to the operators.

RESPONSE:

An evaluation will be performed regarding modification of the control handles and/or other identification enhancement techniques.

IMPLEMENTATION:

Corrective action will be taken.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.008

RATING: 2

FINDING:

An instrument is needed for the task of verifying RCP Seal Return flow, but is not available.

RESPONSE:

The process computer has this parameter available for monitoring and trending. However, the need for a dedicated instrument was identifed prior to the CRDR program and a seal return flow display was added to the control room during 1R6. This action reflects AP&L's on-going commitment to the practical application of human factor's principles that was in effect prior to the CRDR program. This HED has been corrected per the described design change.

IMPLEMENTATION:

Corrected.

4919/a/52

CORRECTIVE ACTIONS

HED NO.: VR:1-1.017

RATING: 2

FINDING:

Control status lights are needed to indicate status of the startup feedwater control valve position but are not available. Only demand indication is given.

RESPONSE:

The addition of startup feedwater control valve position will be evaluated. (See also HEDs CK:5-1.026, A3.12-1.045 and VR:1-1.012 and VS:1-1.008).

IMPLEMENTATION:

Corrective action may be taken.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.018

RATING: 2

FINDING:

The operator should adjust demand to maintain turbine header pressure. A meter for main steam flow and turbine bypass valve position is not available for this purpose.

RESPONSE:

The concern about the lack of position indication for the turbine bypass valves will be evaluated for possible correction. The concern about steam flow indication is not valid as discussed in response to HED No. VR:1-1.014. (See VR:1-1.013 and QS:A1.13-1.001).

IMPLEMENTATION:

Corrective action may be taken.

4919/a/62

CORRECTIVE ACTIONS

HED NO.: VS:1-1.017

RATING: 2

FINDING:

Increasing control values for the diesel generator voltage regulators and governors is accomplished by a counter clockwise movement of the J handle. This direction is contrary to the established stereotype and to other comparable controls in the control room.

RESPONSE:

The control movement for the DG 1 V REG, DG 1 GOV, DG 2 V REG, and DG 2 GOV controls are contrary to operator expectations and are to be evaluated for a design change. (See CK:4-1.003)

IMPLEMENTATION:

Corrective action will be taken.

4919/a/92

CORRECTIVE ACTIONS

HED NO.: VL:1-1.001

RATING: 2

FINDING:

The reactor coolant pumps are in sequence C; D; A; B. The pumps should be positioned in alphabetical order A; B; C; D.

RESPONSE:

The alphabetical arrangement of the RCP controls will be evaluated for possible rearrangement and/or other identification enhancement. (See CK:8-1.055 and CK:8-1.061).

IMPLEMENTATION:

Corrective action will be taken.

4919/a/93

CORRECTIVE ACTIONS

HED NO.: VL:1-1.004

RATING: 2

FINDING:

The controls on C-16 are duplicated on C-18 for other channels. Often the operators must operate a control on C16 and then use the related one on C-18. Use of better enhancement techniques would result in quicker identification of controls.

RESPONSE:

This issue will be evaluated for corrective action. (See CK:8-1.050, CK:8-1.058, CK:9-1.013 and QS:B3.10-1.068).

IMPLEMENTATION:

Corrective action will be taken.

4919/a/96

Category 3 HEDs

(369 HEDs)

CORRECTIVE ACTIONS

HED NO.: CK:1-1.001

GUIDE NO.: 1.1.5a

RATING: 3

FINDING:

There is not an adequate supply of expendables and spare parts: fuses; bulbs; ink and inking pens; recorder charts; printer paper; etc. In addition; the EFIC ink pen steam generator lvl indicators do not have ink pen replacements.

RESPONSE:

1. For bulbs, ink and inking pens, printer paper, etc., an informal supply is maintained in the control room. Upon identification of a need for more supplies, the necessary parts are obtained from the ANO storeroom. The storeroom maintains a computerized inventory with minimum reordering levels. This system assures adequate supplies of all parts and supplies for ANO.

2. For recorder chart paper, a supply is maintained near the control room. The Shift Administrative Assistant (SAA) verifies the inventory of recorder chart paper once per month and reorders when supplies reach minimum levels defined on an inventory review form. This assures adequate supplies are available.

3. For fuses, the shift maintenance crew is responsible for fuse replacements, etc., that require tools for performing the work. These supplies are maintained by the ANO storeroom as mentioned above. The operations crew does not have any responsibility for fuse replacement or inventory verification.

CORRECTIVE ACTIONS

HED NO.: CK:1-1.002

GUIDE NO.: 1.1.5c

RATING: 3

FINDING:

All necessary tools needed to install spare parts are not always available. Specifically, often there is not a fuse puller; screwdriver; or crescent wrench.

RESPONSE:

Any time tools are needed to install spare parts such as fuses, the shift maintenance crew is called in by the operators. The shift maintenance crew has all the tools needed to perform spare parts replacement and are on call at all times (i.e., 24 hours per day).

CORRECTIVE ACTIONS

HED NO.: CK:1-1.003

GUIDE NO.: 1.1.5f

RATING: 3

FINDING:

An inventory is not kept as to the status of expendables and spare parts.

RESPONSE:

All expendables and spare parts (except recorder chart paper) are maintained by the ANO storeroom. A computerized inventory tracking system is used to maintain a minimum inventory such that adequate supplies are available. The recorder chart paper is maintained by the SAA and minimum inventory is assured by a monthly check and reorder system.

CORRECTIVE ACTIONS

HED NO.: CK:1-1.004

GUIDE NO.: 1.2.2e(2)

RATING: 3

FINDING:

Annunciator tiles are not readable from acknowledge buttons (out of the 45 degree line of sight).

RESPONSE:

The ANO control room is a relatively small work space. The distance from the acknowledge buttons to the most distant control panel is approximately 20 feet. Therefore, the operator can acknowledge an annunciator and take a few steps to read any annunciator in the control room. If annunciator acknowledge buttons were located on each control panel, the operator work flow path would be unnecessarily complicated and would result in a substantial increase in traffic, especially during an emergency situation. Therefore, the present arrangement is appropriate for the ANO control room.

CORRECTIVE ACTIONS

HED NO.: CK:1-1.005

GUIDE NO.: 1.2.3q

RATING: 3

FINDING:

There is no leg and foot room for operators when using the computers at the assistant plant operators desk/console.

RESPONSE:

The computer console is seldom used by the operator and is intended as a stand-up work station. It is primarily used to define trend points which takes very little time at the keyboard. Therefore, as a stand-up console, leg and foot room are adequate.

4917/a/5

CORRECTIVE ACTIONS

HED NO.: CK:1-1.006

GUIDE NO.: 1.2.5a(1)+(2)

RATING: 3

FINDING:

98 controls are located out of the 34"-70" recommended envelope.

RESPONSE:

The fact that the controls are located above or below the 34"-70" envelope does not create a significant problem for the control room operator. The controls were located based on available space on the panels where they were needed and the available space in the control room. Therefore, no changes are planned to address this HED since the control room size is limited. It should be noted that based on other HEDs, some of these controls may be relocated within the recommended envelope.

CORRECTIVE ACTIONS

HED NO.: CK:1-1.007

GUIDE NO.: 1.2.5b(1)

RATING: 3

FINDING:

23 displays are located out of the 41"-80" recommended envelope.

RESPONSE:

The fact that the displays are located above or below the 41"-80" envelope does not create a significant problem for the control room operator. The displays were located based on available space on the panels where they were needed and the available space in the control room. Therefore, no changes are planned to address this HED since the control room size is limited. It should be noted that based on other HEDs, some of these displays may be relocated within the recommended envelope.

CORRECTIVE ACTIONS

HED NO.: CK:1-1.008

GUIDE NO.: 1.2.8a

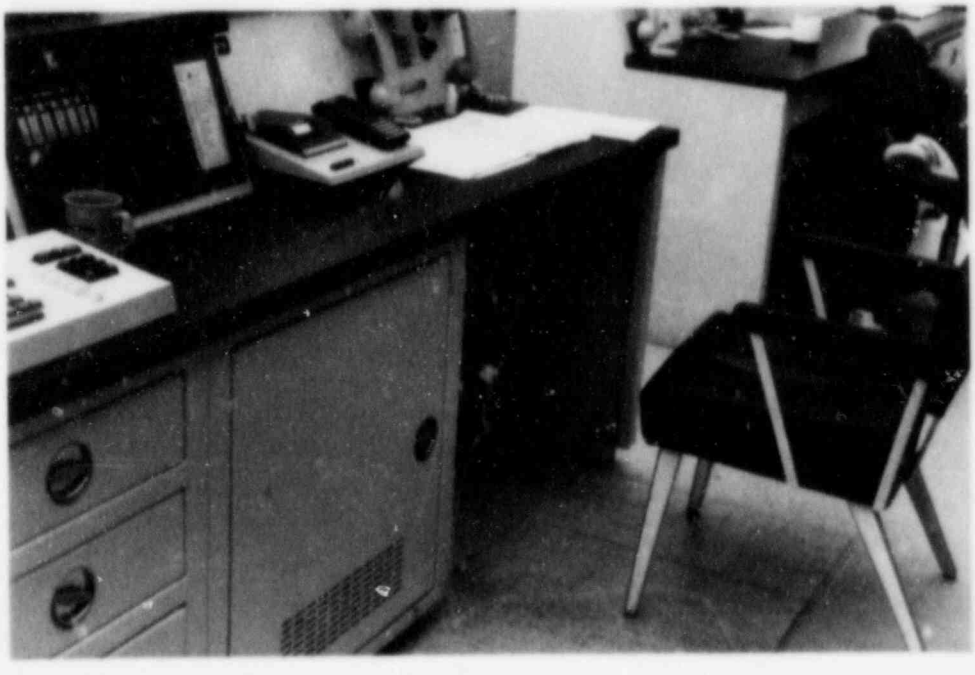
RATING: 3

FINDING:

The chair at the operator's workstation is not adjustable. Also, casters should be added to the chair so the operator can move around.

RESPONSE:

New operator chairs were ordered prior to the assessment of this HED. The new chairs have casters and are adjustable. The new chairs were ordered before this HED was identified as part of the on-going AP&L program to achieve practical application of human factors principles. This AP&L commitment will continue after the CRDR program has been completed just as it existed prior to the CRDR program. The new chairs are currently installed in the control room. (see also HED QS: A8.7-1.066).



4917/a/8

CORRECTIVE ACTIONS

HED NO.: CK:1-1.009

GUIDE NO.: 1.5.7a(5)

RATING: 3

FINDING:

There is no carpeting in the control room. Carpeting is important in order to lessen the fatigue from standing and walking.

RESPONSE:

The concern about operator fatigue while standing has previously been addressed by the addition of a rubber mat in front of the operating panels (front panels). This mat lessens operator fatigue in the area where most of the standing and walking takes place. The addition of the rubber mat accomplishes the intent of this human factors guideline and was installed prior to the CRDR program as part of AP&L's on-going commitment to human factor's principles.

CORRECTIVE ACTIONS

HED NO.: CK:1-1.010

GUIDE NO.: 1.5.7

RATING: 3

FINDING:

Several operators complained that smoke (cigarette) in the air makes the control room uncomfortable.

RESPONSE:

A special smoke exhaust ventilation system is available in the control room for use if smoke becomes a problem. Furthermore, the normal ventilation system does not allow stagnation since it maintains continuous air movement. Due to the small size of the control room and the NRC requirements for operator manning in the control room, it is not practical to designate smoking areas. Therefore, no additional corrective action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:1-1.011

GUIDE NO.: 1.1.3f(1)+(2)

RATING: 3

FINDING:

The back panels are separated by 36 inches of space. NUREG-0700 recommends 50 inches as a minimum separation for panels. In addition, there is only 28 inches of space between the fire control panel and the opposing cabinet.

RESPONSE:

The small size of the control room does not allow for additional separation between panels. Furthermore, the existing separation does not cause operator access problems. The controls and displays are positioned such that the plant operator has a minimum of bending or stooping to work with the panels and the potential for inadvertent actuation has been minimized. No additional provisions for addressing this HED are planned.

CORRECTIVE ACTIONS

HED NO.: CK:1-1.013

GUIDE NO.: 1.5.3.(a)

RATING: 3

FINDING:

The illumination levels at the horizontal slant of the front control panels exceed the recommended maximum of 50 ft-C. In addition, the levels at three panels behind the control room are in the 60-68 ft-C range.

RESPONSE:

The existing illumination levels do not result in a glare problem or problem for operator use of the displays. Therefore, since violation of this guideline does not significantly impact the control room operator, no additional provisions for addressing this HED are planned.

CORRECTIVE ACTIONS

HED NO.: CK:2-1.001

GUIDE NO.: 2.1.2b(5-6)

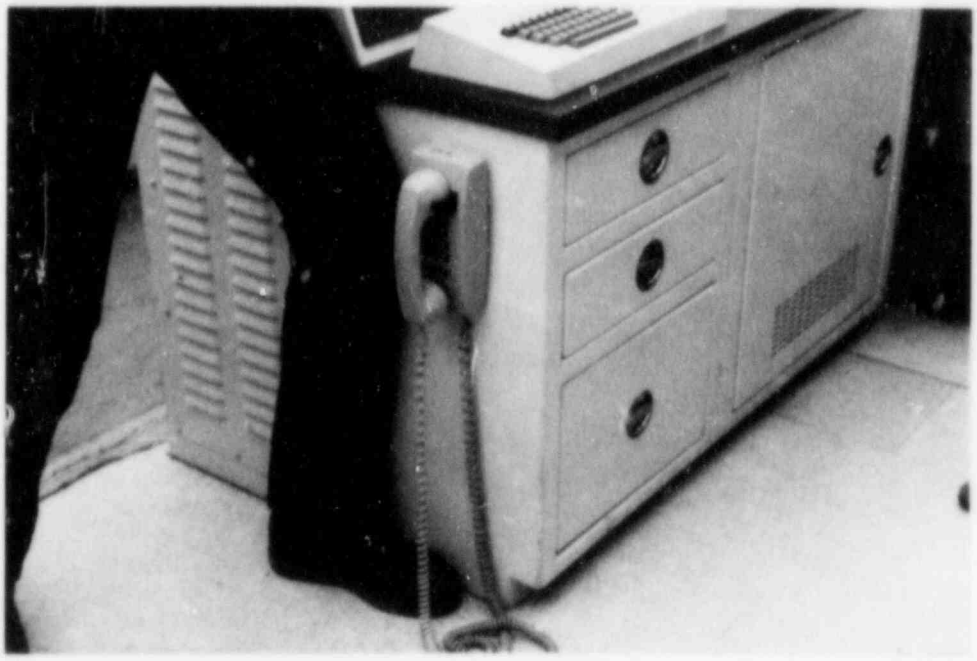
RATING: 3

FINDING:

The telephones mounted vertically on the operators' desks are located so that they are frequently knocked out of the cradle by passing traffic. Also the telephone cords are in the way of passing traffic.

RESPONSE:

This issue is to be evaluated for possible design change to correct the HED.



CORRECTIVE ACTIONS

HED NO.: CK:2-1.003

GUIDE NO.: 2.2.3a

RATING: 3

FINDING:

Electromatic Relief Valve (ERV) and quindar (from switchyard panel) alarms sound alike. When the operators are in the control room; they are not able to distinguish which one is alarming by the auditory coding.

RESPONSE:

The electromatic relief (ERV) and quindar alarms are behind the main operating area of the control room. The ERV alarm is accompanied by a front panel annunciator indication. Therefore, the plant operator at the control boards can quickly determine the source of the alarm based on the visual indication. Since the visual and auditory alarm work together to eliminate operator confusion, no further action is planned regarding this HED. (See also HED QS:D1.4-1.024).

CORRECTIVE ACTIONS

HED NO.: CK:2-1.004

GUIDE NO.: 2.1.1.c(1)

RATING: 3

FINDING:

Priority procedures are not in place for the transmission of emergency messages from the control room by any of the communication systems.

RESPONSE:

The gaitronics system is available for transmission of priority messages from the control room to the personnel onsite. This system has been added to the operator requalification training program to assure that operators are adequately trained in its use for transmitting priority messages from the control room.

CORRECTIVE ACTIONS

HED NO.: CK:2-1.005

GUIDE NO.: 2.1.2

RATING: 3

FINDING:

It is difficult to determine which telephone is ringing.

RESPONSE:

This issue is to be evaluated for possible design change to correct the HED.

CORRECTIVE ACTIONS

HED NO.: CK:2-1.006

GUIDE NO.: 2.1.6a(1)+(d)

CATEGORY: 3

FINDING:

There were numerous complaints on the P.A. System (Gaitronics) being inaudible. One source of the problem is insufficient operator training in using the system. Horseplay also causes noise and creates a nuisance.

RESPONSE:

This issue is to be evaluated for possible design change to correct the HED.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.002

GUIDE NO.: 3.1.2a(2)

RATING: 3

FINDING:

Setpoints are not established to give the operator adequate time to respond to a warning condition before a problem develops for the following annunciators: EH System Fltr 1P14A/1P14B DP Hi; Power Distribution Alarm; EH Fluid System Press Hi/LO.

RESPONSE:

The EH system alarms (differential and hi/lo pressure) were specifically identified due to a problem which occurred at ANO-1 recently involving the EH system. The alarms for the EH system are adequate based on a review of the transient which occurred. The real problem was that an unmonitored filter clogged in the EH system. This situation was resolved by the inclusion of the unmonitored filter in a preventative maintenance program to prevent reoccurance of the clogging problem. An alarm setpoint change for the EH system would not benefit the plant operators since the actual problem involved a filter that is not instrumented.

The power distribution system alarm has been optimized to prevent spurious alarms. During a slow transient, the operator is given ample warning that a problem is about to occur. However, during a fast transient, even a setpoint change would not benefit the operator since there is insufficient time for manual action.

The guideline referenced for this HED indicates that alarms should allow the plant operator sufficient time to adequately respond to out-of-tolerance plant conditions. Upon a more detailed review, these alarm setpoints are appropriate and do not require changes.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.005

GUIDE NO.: 3.1.2d(1)

RATING: 3

FINDING:

Alarm for shared plant system is not provided in Unit 1 control room, (Equipment name: Post Accident sampling system).

RESPONSE:

The alarm for the post-accident sampling system is provided in the back of the Unit 1 control room. This arrangement does not impact the control room operator since the system is used and controlled by the radiochemistry personnel in the post-accident sampling building where the alarm originates. Therefore, since the plant operators do not respond to this alarm and since the appropriate personnel for response will operate the system locally where the alarm originates, there is no need to relocate the alarm in the control room for this shared plant system.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.006

GUIDE NO.: 3.1.2d(2)

RATING: 3

FINDING:

A status display is not provided in Unit 1 to indicate that the item of shared equipment (Hydrogen Gas, Nitrogen, Fire Pump, Emergency Ventilation filter System, Chlorination) is being operated from Unit 2.

RESPONSE:

1. Hydrogen Gas. The hydrogen gas system does not have any controls in the control room for the shared portion of the system. The system is operated locally by manual valve alignments such that control room status of this shared system is not of significant value to the plant operators.

2. Nitrogen and chlorination. The nitrogen and chlorination systems do not have any controls in the control room and again are operated locally by manual valve alignments. Therefore, control room status of these shared systems is not of significant value to the plant operators.

3. Fire Pump. The fire pump system is shared by the two units but the controls can only be operated from Unit 1. Since this equipment cannot be operated from Unit 2, the existing control room status display is all that is needed for the plant operators.

4. Emergency Ventilation Filter System. The Unit 2 portion of the emergency ventilation filter system is not normally operated from Unit 1. A special case occurs when Unit 2 is shut down and one diesel is out for an extended duration. At that time the controls in Unit 1 for the Unit 2 Emergency Ventilation Filter System are energized and the display (indicating lights) becomes operable on Unit 1. However, during usual plant conditions, the lack of status display in Unit 1 is not a problem and when status display is needed the Unit 1 display is energized appropriately. Therefore, no changes to address this HED are needed.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.007

GUIDE NO.: 3.1.3

RATING: 3

FINDING:

No provisions have been made for identifying the initiating event (first out) associated with automatic plant shutdowns. Separate first out panels should be provided for reactor and turbine-generator systems.

RESPONSE:

There is a first out panel for the turbine-generator trips. This is located on a panel in the back of the control room. The cause of the reactor trips is available on the sequence of events print-out from the plant computer. This serves the purpose of a first out panel. For ANO, the cause of the turbine trip/or reactor trip is not needed to respond to the events. The procedures for emergencies are based on symptoms and not on identifying the specific accident or cause of the accident. This approach to emergency procedures makes the first out panels useful for post-trip diagnostics only, where time is not critical. Therefore, the existing arrangement for first out panels is sufficient for operator needs and post-trip evaluation.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.009

GUIDE NO.: 3.1.5a

RATING: 3

FINDING:

There is no dedicated distinctive audible signal in place in the annunciator system to indicate a cleared alarm.

RESPONSE:

Addition of an auditory signal to indicate a cleared alarm is to be evaluated for possible design change to correct this HED.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.010

GUIDE NO.: 3.2.1f

RATING: 3

FINDING:

The operators are not able to identify the work station or system where the auditory alert signal is coming in.

RESPONSE:

The ANO control room is relatively small and was designed as a single work station. When an annunciator auditory alert signal actuates, the operator can quickly scan the annunciator windows and identify the alarm. Having separate auditory signals for each control panel would not substantially improve operator response to an alarm condition. Based on the small size of the control room and relatively small viewing angle to scan the annunciator windows, no additional action is planned to address this HED. (See also HED CK:3-1.022).

CORRECTIVE ACTIONS

HED NO.: CK:3-1.011

GUIDE NO.: 3.3.2b

RATING: 3

FINDING:

The flash rate for annunciators ranges from one to two per second. The NRC recommendation is between three and five flashes per second.

RESPONSE:

The existing flash rate provides rapid operator identification of alarms. Changing the flash rate would not improve operator recognition of an alarm. Therefore, based on lack of justification for making a change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.013

GUIDE NO.: 3.3.2f

RATING: 3

FINDING:

There is no distinctive coding scheme or administrative procedure to indicate when an annunciator tile has been "ON" for an extended period of time.

RESPONSE:

The annunciator windows that are "ON" for an extended period of time and relate to important equipment being out-of-service are identified on the control room status board located in the front of the control room. This method provides sufficient indication to the plant operators since they check the status board during shift changes. Therefore, no additional action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.016

GUIDE NO.: 3.3.4c

RATING: 3

FINDING:

The Steam Generator 1E24A and 1E24B BTU limit and the Aux. Systems K15 and K16 trouble alarms do not refer to specific conditions.

RESPONSE:

The "STEAM GEN 1E24A and 1E24B BTU LIMIT" alarms are in fact for a specific condition. When certain system parameters for the integrated control system (ICS) are beyond certain values, the ICS reaches a BTU limit and begins operating in a different mode. This alarm alerts the operator that the default mode is in operation. The "AUX SYSTEMS TROUBLE" alarm tells the operator to check certain local alarms in the back of the control room. The specifics are on the local panels. Based on the operator usefulness of these alarms, no further action to address this HED is planned. (See also HED QS:C3.1-1.027).

CORRECTIVE ACTIONS

HED NO.: CK:3-1.017

GUIDE NO.: 3.3.5a (1)

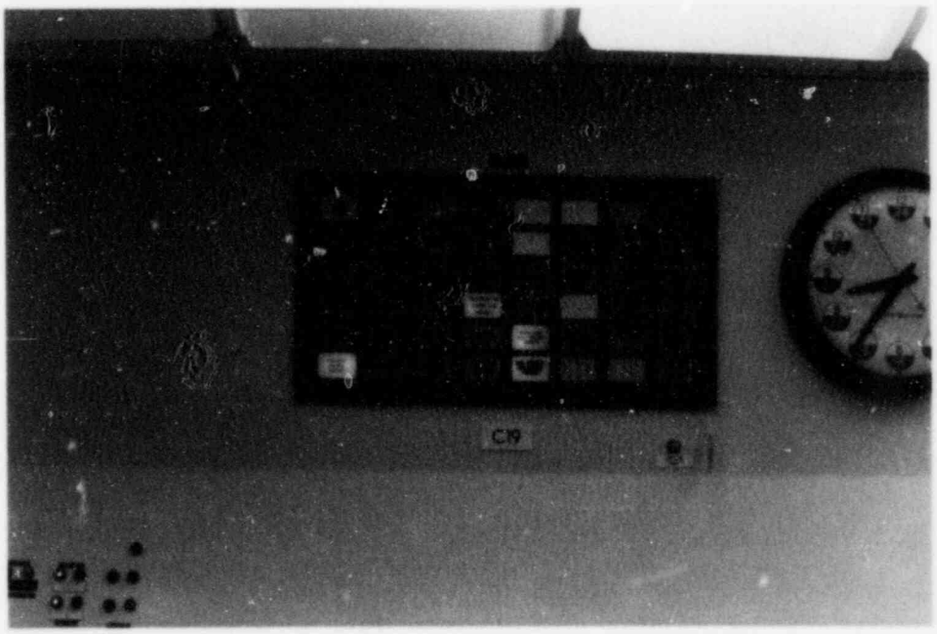
RATING: 3

FINDING:

The operator cannot read all of the annunciators from the front control panels. Letter heights range from .187-.375 inches. To meet the NRC recommendations of 15 minutes of arc the letter height should be at least .384 inches.

RESPONSE:

The annunciator window lettering is to be evaluated for a possible design change to correct this HED.



CORRECTIVE ACTIONS

HED NO.: CK:3-1.018

GUIDE NO.: 3.3.5a (2)

RATING: 3

FINDING:

The dimensions for letters (height; width; stroke width; spacing) varies throughout the annunciator panels. For example letter height varies between annunciator tiles from 3/16 - 6/16 inches on the tiles.

RESPONSE:

The annunciator window lettering is to be evaluated for a possible design change to correct this HED.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.019

GUIDE NO.: 3.3.5b (2)

RATING: 3

FINDING:

Type styles are not consistent for the lettering on annunciator tiles.

RESPONSE:

The type styles are all basic block fonts and are easily readable by the plant operators. Therefore, no additional action to address this HED is planned. However, if the annunciator windows are changed due to other HED's, the type styles will be made the same for all modified windows.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.020

GUIDE NO.: 3.3.5c (1)

RATING: 3

FINDING:

Some annunciators tiles have dynotape in place as a temporary engraving to append needed information.

RESPONSE:

The annunciator window lettering is to be evaluated for a design change to correct this HED.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.021

GUIDE NO.: 3.3.5d (3)

RATING: 3

FINDING:

Numeral width to height ratio on the annunciators is 2:3 NUREG-0700 recommends this ratio be 3:5.

RESPONSE:

The existing numeral width to height ratio does not cause operator difficulty in reading the windows. Therefore, no additional action to address this HED is planned.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.022

GUIDE NO.: 3.4.1b (2)

RATING: 3

FINDING:

The annunciators can be acknowledged from any work station. Acknowledgement should only be possible from the workstation where the alarm originated.

RESPONSE:

(See also HED CK: 3-1.010) The ANO-1 control room is relatively small and was designed as a single work station. When an annunciatior auditory alert signal actuates, the operator can quickly scan the annunciator windows and identify the alarm. Having separate auditory signals for each control panel would not substantially improve operator response to an alarm condition. Based on the small size of the control room and the relatively small viewing angle to scan the annunciator windows, no additional action is planned to address the HED.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.023

GUIDE NO.: 3.4.1d (2)

RATING: 3

FINDING:

Periodic testing of annunciators is not required or controlled by administrative procedures.

RESPONSE:

Testing of the annunciators is not routinely required due to the numerous alarms that are initiated by utilizing the test button. Therefore, a design change is to be evaluated to correct this situation such that routine testing can be implemented without creating invalid alarms.

CORRECTIVE ACTIONS

HED NO.: CK:3-1.024

GUIDE NO.: 3.4.2b

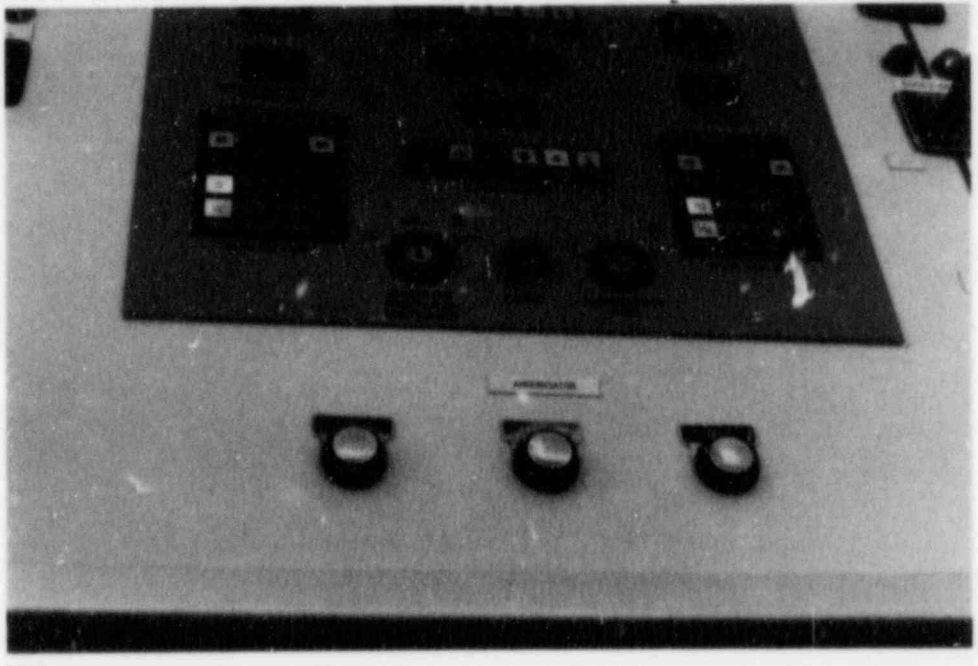
RATING: 3

FINDING:

There is no coding scheme (i.e., color coding, demarcation, or shape coding) in place for easy recognition of annunciator response controls.

RESPONSE:

The annunciator controls are labeled and are used quite frequently by the plant operators. The use of a coding scheme for easy recognition is not useful since the operators are very familiar with these controls. Since a change is not justified, no further action to address this HED is planned.



CORRECTIVE ACTIONS

HED NO.: CK:3-1.026

GUIDE NO.: 3.3.4d

RATING: 3

FINDING:

Abbreviations do not conform to the standard abbreviation list for some annunciator windows. In general there is a lack of consistencies between tiles. (ex. Main Feedwater; MN FW: MFW).

RESPONSE:

Annunciator window lettering is to be evaluated for a possible design change to correct this HED.

CORRECTIVE ACTIONS

HED NO.: CK:4-1.001

GUIDE NO.: 4.1.1a(2)

RATING: 3

FINDING:

The Generator H2 Coolers Aux. Circ. Water, unit load master and pressurizer spray valve controls cannot be easily adjusted with the required level of precision. They are oversensitive.

RESPONSE:

These controls do occasionally result in "overshooting" a desired value, but the consequence is not significant. The operator simply readjusts the control until the desired value is achieved. These controls have not resulted in operational problems and therefore do not warrant a design change to correct this HED.

4918/a/1

CORRECTIVE ACTIONS

HED NO.: CK:4-1.002

GUIDE NO.: 4.1.1b(1)

RATING:: 3

FINDING:

There is not a good reason to require a control for the function concerned for the following items:

Switch for 2VSF9 (Panel C-19)
Heat Stm Condensor A (Panel C-02)
Heat Stm Condensor B (Panel C-02)
Main Stm to E2B (Panel C-12)
Main Stm to E2A (Panel C-12)

RESPONSE:

The HED is valid for all the controls listed except the switch for 2VSF9. Although 2VSF9 is not normally utilized from the ANO-1 control room, under certain plant conditions it is necessary to be able to operate 2VSF9 from ANO-1. Therefore, this control must not be deleted. The controls on panel C-02 and C-12 are to be evaluated for removal as part of a possible design change.

CORRECTIVE ACTIONS

HED NO.: CK:4-1.004

GUIDE NO.: 4.3.2(d)

RATING: 3

FINDING:

The resistance for round pushbuttons is 80 oz. NUREG-0700 recommends a maximum resistance of 40 oz.

RESPONSE:

The difference in pushbutton resistance is not noticeable to the plant operators and does not result in any problem activating the controls. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:4-1.005

GUIDE NO.: 4.3.3(a)

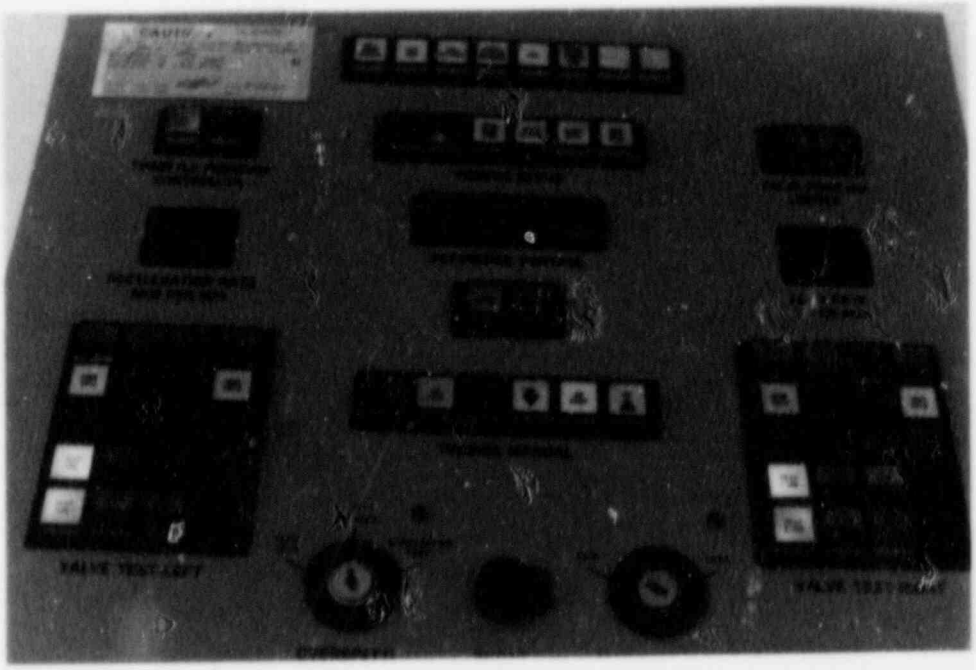
RATING: 3

FINDING:

Legend pushbuttons are not distinguishable from legend indicator lights on panel C-01 (Turbine Control Panel).

RESPONSE:

The panel insert that has the legend pushbuttons and legend indicator lights is part of vendor supplied controls for a particular piece of equipment. The operator procedure for use of this panel insert gives sufficient guidance on operation of the panel such that operator confusion is not a problem. Therefore, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:4-1.006

GUIDE NO.: 4.3.3b(1)

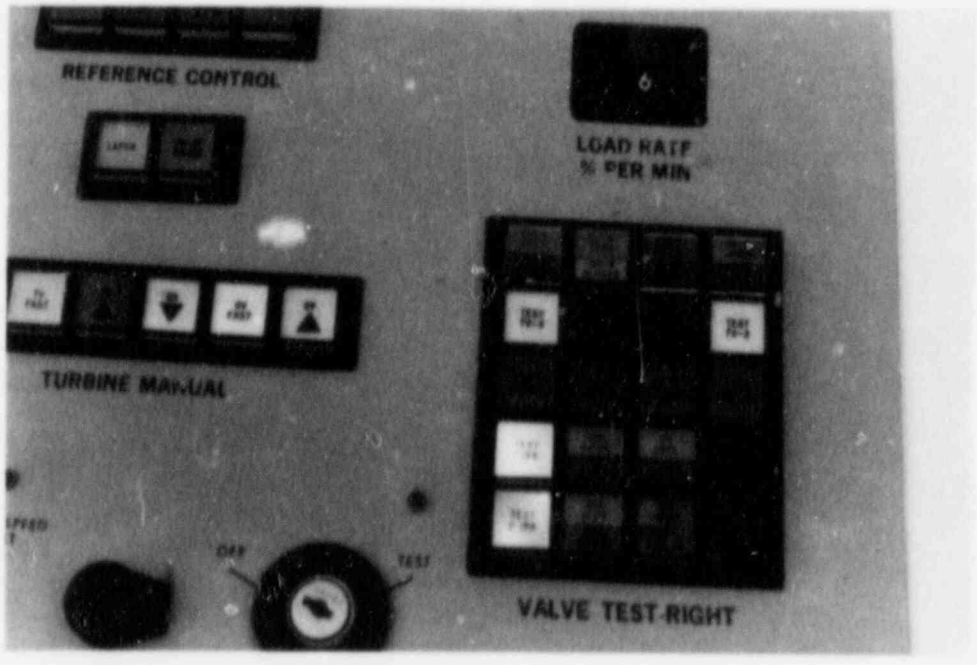
RATING: 3

FINDING:

The legend is not readable under ambient light conditions (gray lights) on some pushbuttons and indicator lights on C01 when there is no internal illumination.

RESPONSE:

Although the contrast between the lettering and the pushbutton background is not high, the legends are readable under the existing control room lighting conditions. Therefore, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:4-1.007

GUIDE NO.: 4.3.3b(5)

RATING: 3

FINDING:

The legend message on some pushbuttons contains more than three lines of lettering. The equipment affected are as follows: Panel C-100: Programmers typewriter failure; Panel C-11: Reheater Control System, valve position indicator light(s), valve test-left (8); valve test-right (8) Emergency Power Supply.

RESPONSE:

Although there are more than three lines of lettering on the referenced legends, they are not difficult to read. Also, the information provided in these four lines is important to the operator. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:4-1.008

GUIDE NO.: 4.3.3c(1)

RATING: 3

FINDING:

No method for determining lamp failure is provided for the pushbuttons.

RESPONSE:

The current method for determining lamp failure is by observation of the pushbutton illumination level. Since the pushbuttons have two lamps in each button, the failure of one results in a substantial and readily recognized reduction in intensity. Also, the pushbuttons on the diamond panel can be illuminated by a test feature to detect lamp failures. Since the current method of determining lamp failures is sufficient, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:4-1.010

GUIDE NO.: 4.3.3c(4)

RATING: 3

FINDING:

Provisions have not been made to prevent the possibility of interchanging the covers of pushbuttons during lamp replacement.

RESPONSE:

The replacement of pushbutton lamps is done for one pushbutton at a time such that the possibility of interchanging the covers is not a concern. Furthermore, the covers are hinged such that removal of the cover for bulb replacements is not required and is not usually done. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:4-1.011

GUIDE NO.: 4.3.3d(1)

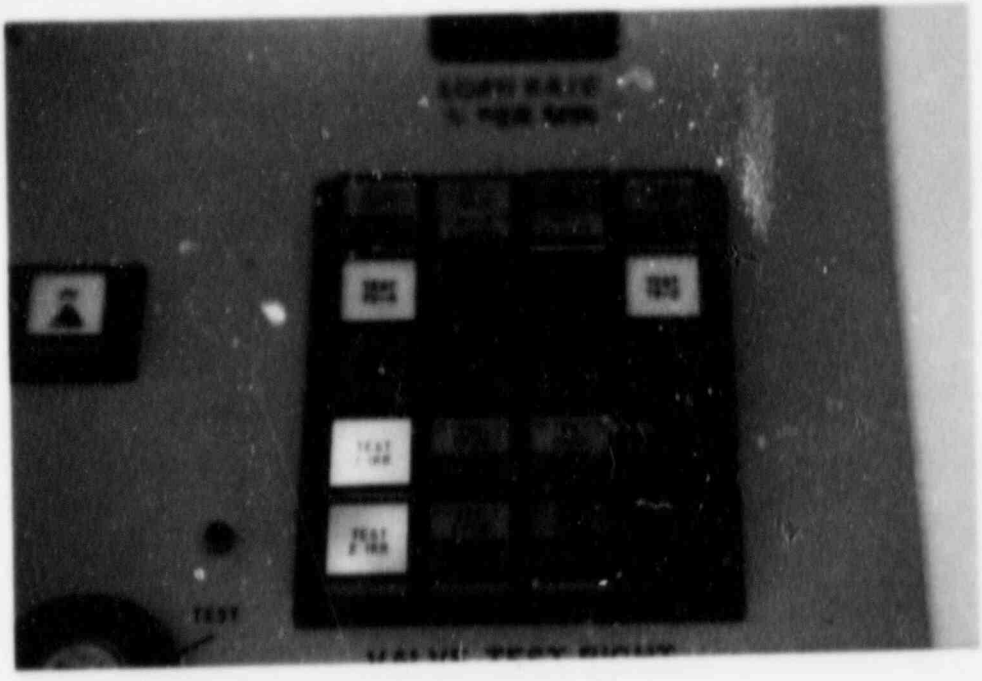
RATING: 3

FINDING:

In general, barriers are not used when pushbuttons are located side by side.

RESPONSE:

Although a raised barrier is not utilized for pushbuttons located side-by-side, they do have a grid barrier between each of the pushbuttons such that only one button can be depressed by a single finger. Therefore, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:4-1.012

GUIDE NO.: 4.4.3(b)

RATING: 3

FINDING:

The keys are inserted into the lock with the teeth pointing down. They should be designed so the teeth point up or forward to conform to population stereotypes.

RESPONSE:

The orientation of the keys does not cause operator difficulty in actuating the controls. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:4-1.013

GUIDE NO.: 4.4.3d

RATING: 3

FINDING:

All locks are oriented so that the switch is OFF (or SAFE) when the key is in a position other than the recommended vertical.

RESPONSE:

The key is always inserted in the switch and is used to select between AUTO and OPEN. Since the key is already inserted in the switch prior to utilization of the control, the orientation of the key is appropriately slanted toward the control selection being made. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:4-1.014

GUIDE NO.: 4.4.5f

RATING: 3

FINDING:

Knob for spring-loaded momentary contact rotary selector controls (C12) for the Cond CW in E11A and E11B WTRBR are not large enough to be held against the spring torque for as long as necessary to accomplish the control action.

RESPONSE:

The valve control switches that are identified are not used for time critical applications. The extended period of time required to hold the handswitch in the open or closed position is due to the size of the valves and the speed of the motor-operators. Also, the time involved in operating these valves is a few minutes which does not create a significant operator problem. The handswitches are the same as the other valve controls in the control room and would be confused with breaker controls if J-handle type switches were used. Based on the lack of a significant operator problem created by this HED, no further action is planned.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.002

GUIDE NO.: 5.1.3b2

RATING: 3

FINDING:

Type styles are not consistent between displays. The following displays are affected: Panel C-04; Equipment ID# PI1237, PI1236; Panel C-12; Equipment ID# VBI6500, TBWI6500, VI6500, UBI6501, TBWI6501, VI6501, VBI6502, TBWI6502, VI6502, VBI6503, TBWI6503, VI6503.

RESPONSE:

The type styles between the identified displays are not consistent but they do not create any difficulty in reading the displays or in using the presented information. Therefore, since the existing displays are easily read by the plant operator, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.003

GUIDE NO.: 5.1.3d(6)

RATING: 3

FINDING:

Gradient lines are too closely spaced on the MU Pump Discharge Header Pressure indicator.

RESPONSE:

The gradient lines on the makeup pump discharge header pressure display do not result in difficulty of use or readability to the extent required by the plant operator. Therefore, since the existing display is easily read by the plant operator, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.004

GUIDE NO.: 5.1.5b

RATING: 3

FINDING:

Graduation heights do not meet the minimums recommended for some indicators by NUREG-0700. The following meters are affected: Panel C-04; Equipment ID# FI1236/1237; Panel C16/C14: Equipment Name-Quench tank; Panel C-19: Equipment ID# LI4631/30, LI4630/31, LI4632/33, LI4636/37, LI4638/39, LI2004, FI4642; Panel C-01; Equipment Name-Turbine Generator Panel.

RESPONSE:

The existing gradient heights do not cause any difficulty in reading the displays. Therefore, since the existing displays are easily read by the plant operator, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.005

GUIDE NO.: 5.2.2b(2)

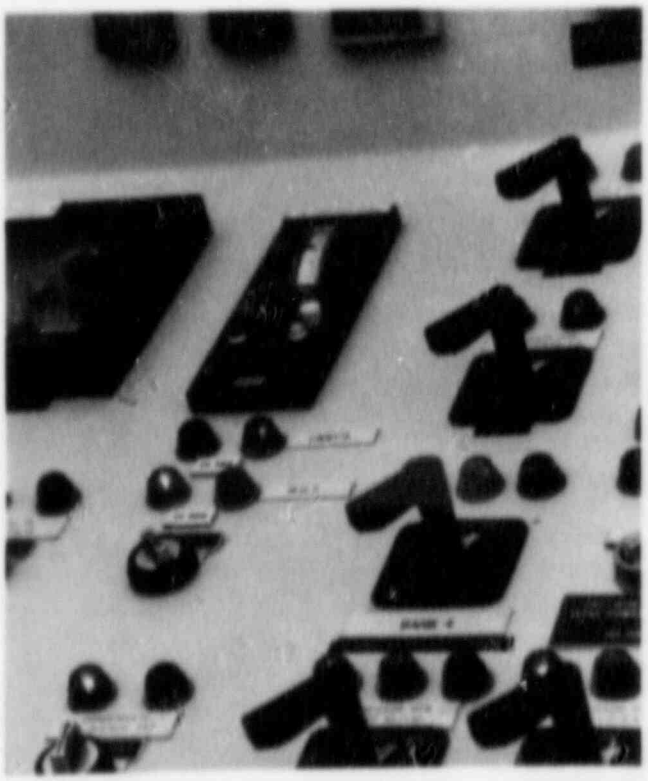
RATING: 3

FINDING:

Some displays are mounted to the rear of the benchboard requiring operators to lean to avoid parallax. The following displays are affected: Panel C-04; Equipment ID# LI1604, PI1608, CV1207, CV1235, PIC1004.

RESPONSE:

The identified displays are not difficult to read since the operator normally leans slightly to operate controls on the benchboard and/or to observe displays. Therefore, since the displays are easily read, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.006

GUIDE NO.: 5.2.3

RATING: 3

FINDING:

There are no zone markings to show the operational implications of various readings on meters.

RESPONSE:

The use of zone markings is not generally acceptable for the ANO-1 displays since the measured parameters on many of the instruments do not lend themselves to such markings. The "NORMAL" operating bands are a function of the plant conditions and vary widely. Zone markings have been utilized on a few instruments where operator needs dictate the practicality of use. Therefore, since the widespread use of zone markings is impractical, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.007

GUIDE NO.: 5.3.1a

RATING: 3

FINDING:

There is no provision made to indicate lamp failure. During normal operation only one light (out of red/green pair) is lit. If neither is lit you have indication of a lamp failure. However, there are cases where the red and green lights are both lit.

RESPONSE:

The red and green indicating lights are used to verify that a position change has occurred. In the case of valve indicating lights, both lights are lit when the valve is in the process of changing position such that a light failure would be noticed. In the case of breakers, the handswitch flag shows the last condition of the breaker such that a light failure would be noticed. Also, the light failure would be identified during the next routine operation of the control since the proper illumination would not occur. Furthermore, the purpose of operating a valve or breaker is to achieve a desired response which is measured in many cases by an independent indicator (e.g., flow, temperature, speed, etc.). By use of the independent indicator the operator can quickly determine the status of a questionable red/green indicating light pair. Therefore, due to the various methods for identifying lamp failures, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.008

GUIDE NO.: 5.3.1c(2)

RATING: 3

FINDING:

Provisions have not been made to prevent interchanging lens of indicator lights.

RESPONSE:

A standard convention for the location of the red and green indicating lights is utilized in the control room. If the lights were interchanged, the operator would quickly notice the discrepancy out of habit (pattern recognition). Furthermore, replacement of light bulbs is done one at a time such that both red and green indicating light covers are not removed at the same time. Therefore, inadvertent switching of red and green covers is not likely. Based on these factors, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.009

GUIDE NO.: 5.3.2a(1)

RATING: 3

FINDING:

Labeling is not positioned close enough to the EFW Pump P7B Elec. Drive light indicators to be meaningful.

RESPONSE:

The specific example cited involves a label that was added for the operator's convenience. Labels are not normally provided at all for indicating lights to describe their meaning since a standard convention is used which is known to the operators. The control room labeling effort will evaluate whether the specific label cited should remain or not. If it does remain, its location will also be evaluated to assure that it is appropriately located. Based on the fact that labeling of indicator lights is not needed to describe their meaning, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.010

GUIDE NO.: 5.4.1a

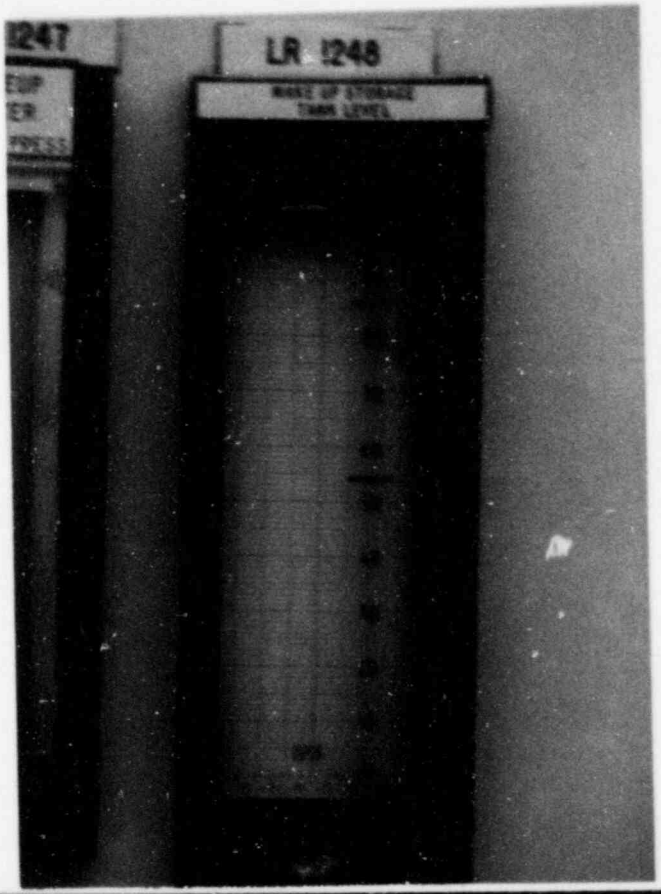
RATING: 3

FINDING:

The ink does not provide a clear, distinct and reliable marking for some recorders. The following are affected: Panel C-04; Equipment ID# LR1248, LR1000, PR1023, LOOP A, FR1239, AR1290, PR1038, PR1022, PR1011; Panel C-11, Cross Generator; Panel C-12; ID# TR6613; Panel C-13; ID# TR6501, LR2609; Panel C-18; ID# PR2408; Panel 19; ID# TR3651; Panel C-100, Trend Recorder 4; Panel C-04; ID# FR2032

RESPONSE:

The trend recorders are checked daily by the shift administrative assistant to assure that adequate markings are maintained. This procedure has been adequate to assure valid markings and will be continued. Due to the use of this administrative procedure, the condition observed was not permanent and no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.011

GUIDE NO.: 5.4.1b

RATING: 3

FINDING:

The scale printed on the recorder paper is not the same as the scale shown on some recorders. The following recorders are affected: Panel C-04: Equipment ID# AR1290; Panel C-11; ID# ZR6646, TR6644, PR6677; Panel C-12; ID# TR6613; Panel C-13; ID# LR2609.

RESPONSE:

The paper for the trend recorders is maintained by the control room operators. The scale printed on the paper is the same as the scale shown on the recorders. Occassionally, the wrong paper may be used but this is rare. The SAA maintains an adequate supply of the proper paper for all trend recorders such that an adequate inventory is available in the control room for the various trend recorders. Based on the existing procedure for maintaining adequate paper supplies for trend recorders and the operators control of the use of the paper, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.012

GUIDE NO.: 5.4.1c

RATING: 3

FINDING:

There are double scales on the RC Pressure meters. One scale is used as a backup for the steam table subcooling values. This scale has numbers which do not meet the stroke width ratio requirements.

RESPONSE:

The scale superimposed on the face of the reactor coolant pressure indicators provides an operator aid for determining subcooling margin. The lettering is intentionally small to prevent obscuring the primary display information of pressure. Furthermore, the primary display for subcooling margin is provided on a separated dedicated display for the operator's use. Therefore, since the purpose of the superimposed scale is purely as an operator aid, serves as a backup to a dedicated display and is not difficult to read, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.013

GUIDE NO.: 5.1.4d

RATING: 3

FINDING:

Abbreviations other than those on the standard abbreviation list are used on some displays. The affected components are as follows:

PANEL	EQUIPMENT NAME
C13	Displays (2) (M;A)
C09	Displays (2) (M;A)
C03	Rod Controller (REL)
C03	Rod Controller (AUXIL)
C03	Rod Controller (TRCF)
C03	Rod Controller (SY)
C03	Rod Controller (ASSYM)
C03	Rod Controller (CONF)
C03	Baileys (MEAS VAR)
C01	Turbine Panel (VVE)
C01	Turbine Panel (IRL)
C01	Turbine Panel (IRR)
C01	Turbine Panel (IL)
C01	Turbine Panel (RL)
C01	Turbine Panel (IR)
C01	Turbine Panel (RR)

RESPONSE:

The abbreviations identified are all associated with vendor supplied panels that are unique to the vendor equipment involved. The plant operators are familiar with these unique abbreviations and are not confused by their use. Since these abbreviations are associated with unique vendor supplied equipment and do not cause operator confusion, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.014

GUIDE NO.: 5.5.1a(3)

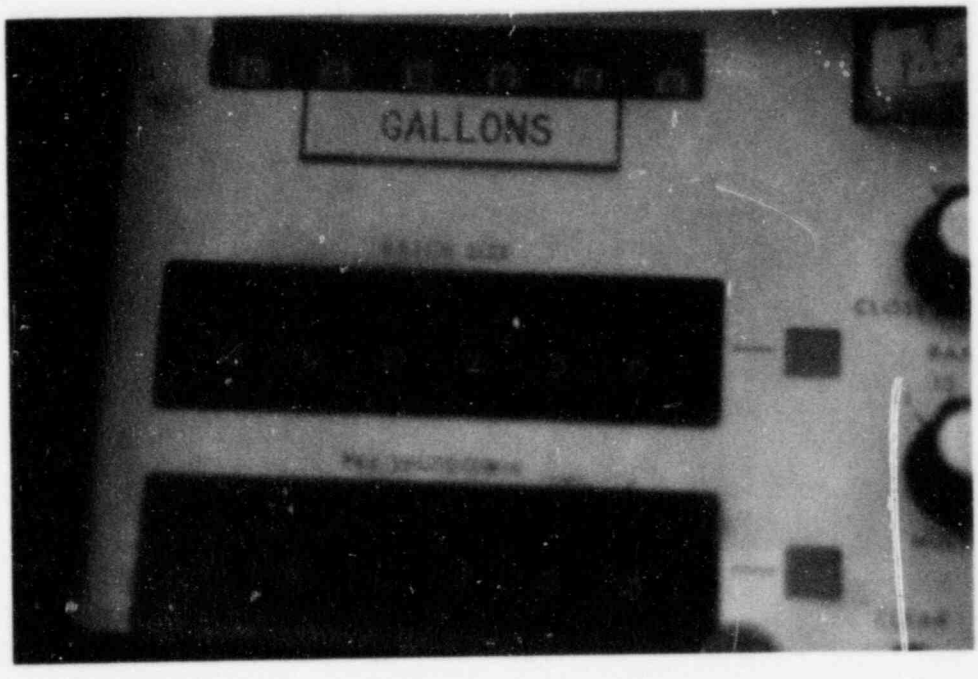
RATING: 3

FINDING:

On the Primary System Makeup Control drum type counter the strings of numbers exceed four digits and are not separated by commas.

RESPONSE:

The drum type counters have the capability to display up to six digits but the measured variable does not exceed four digits in actual use. Therefore, the displayed variable is within the 0700 guideline for not utilizing commas for separation. Furthermore, the plant operators report no difficulty in using the subject drum counter. Based on the lack of a justification for making a change, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.015

GUIDE NO.: 5.5.1b(2)

RATING: 3

FINDING:

Some drum-type counters are not mounted as close as possible to the panel surface. The following counters are affected: Panel C-04; ID# LV1249; Panel C37-1, Meters (6); Panel C37-2, Meters (6).

RESPONSE:

The identified drum type counters do not present any difficulty in reading the displayed information. Based on the lack of a justification for making a change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.018

GUIDE NO.: 5.1.2f

RATING: 3

FINDING:

Some displays are not dampened to prevent random fluctuations of the displayed parameter. The following displays are affected: Panel C09; Control Rod Outlet flow, FI 2218, FI 2219; Panel C19; LI4630; Panel C03: LT2651/2601; Panel C02: Turb K24 Steam In, Turb KAB Steam In.

RESPONSE:

The displays identified are not used for accurate reading of the parameters involved such that fluctuations in display do not present an operator problem. The steam generator full range level instrument fluctuates when the plant is at power but the instrument is not used under that condition. During S.G. wet layup when the instrument is used, the fluctuations do not occur. Since none of the identified displays create an operator problem in reading with the required accuracy, a change is not justified and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.019

GUIDE NO.: 5.1.3c(1)

RATING: 3

FINDING:

The scale on the Turbine Drive Controller Cover is yellowed and difficult to read.

RESPONSE:

HIC-6601 was purchased with a yellow background on the display and is not difficult to read. Therefore, based on the lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.020

GUIDE NO.: 5.1.5a(1)

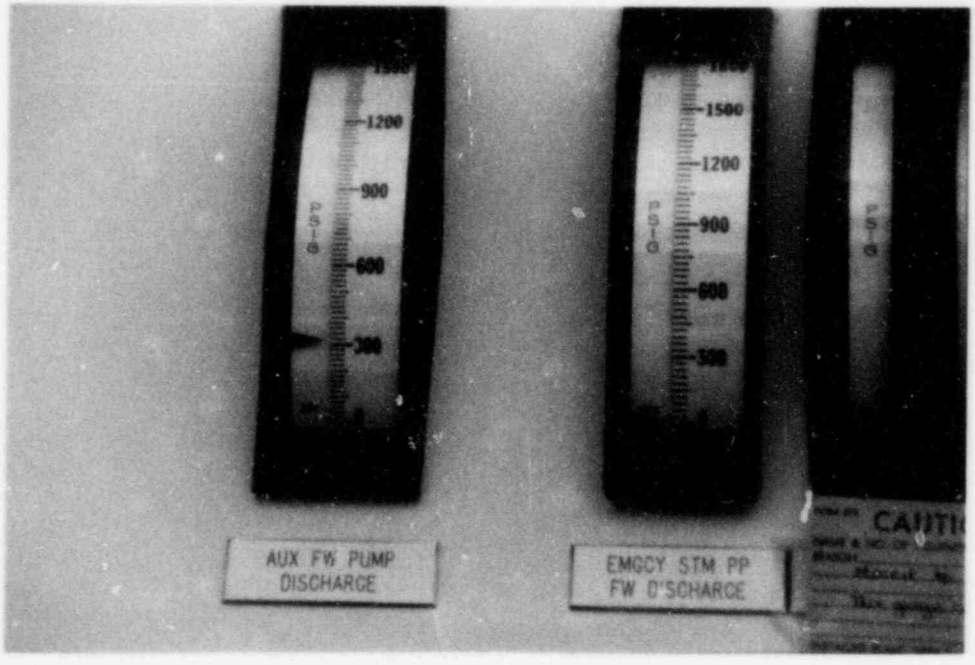
RATING: 3

FINDING:

More than 9 graduations separate numerals on some displays. The following displays are affected; Panel LO9:#PI3606, PI3607, PI3608; Panel C12: Aux FW Pump Discharge; Panel C16/C14: PI1050, PI1410, Emergency Injection Loop B1/B2, Core Flood Tank Level A2/B2, FI2620B, FI2670B; Panel C19; instrument air header, Gen L.O. CLRS Aux Circ Wtr, Gen H2 CLRS Aux Circ Wtr, Panel CO1: U EXC FLD; Panel C02: Turb K2A Steam In, Turb K2B Steam In.

RESPONSE:

The identified displays (except for the core flood tank level indicators) are all used for general monitoring and are not intended for accurate reading. The displays provide sufficient information for the operator's needs and, therefore, a change is not justified. No further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.021

GUIDE NO.: 5.1.5c

RATING: 3

FINDING:

Improper values are indicated by unit graduations for some displays. The following displays are affected: Panel C09: PI2620, PI2622, PI2677, FI2671; Panel C12: Em Stm PP FW Discharge, Emgcy Elec PP FW Discharge; Panel C18: FI2620A, FI2670A; Panel C01: Gen PH A, Gen PH B, Gen PH C, Gen Volts.

RESPONSE:

The identified displays do not present difficulty in reading for the following reasons:

(Panel C-09) The EFW flow display is presented in a log scale. This is not a problem since it is used primarily for trending of flow and not to get an accurate indication of a specific flow value.

(Panel C-12) The pump discharge pressure displays are no longer in use since they have been replaced by displays on C-09. The new displays have proper values indicated by unit graduation.

(Panel C-18) These flow indicators have been removed by a design change during 1R6 such that this discrepancy no longer exists.

(Panel C-01) The scales on these generator phase and voltage displays are not difficult to read and do not create operator confusion. Also, these displays are not utilized for any time critical information.

Based on the above, there is no justification for making additional changes to address this HED, so no further action is planned.

4918/a/38

CORRECTIVE ACTIONS

HED NO.: CK:5-1.022

GUIDE NO.: 5.1.5d

RATING: 3

FINDING:

Compared scales for EFW to SG Flow (C09) are not compatible in numerical progression.

RESPONSE:

The referenced instruments all have compatible log scales. Prior to 1R6, linear scales existed on some instruments that were not operational. During 1R6, the correct log displays were installed and the instruments were made operational. Therefore, the comparable displays have the same scales (i.e., log scales) such that this HED has been corrected.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.023

GUIDE NO.: 5.2.2b(1)

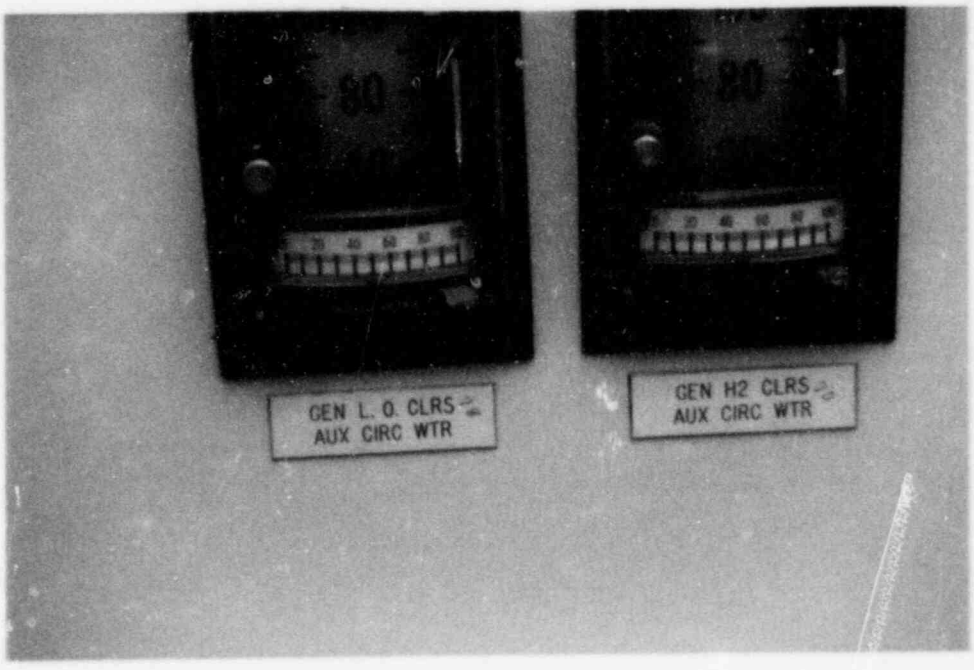
RATING: 3

FINDING:

The pointer tip overlaps minor markings on some displays. The following displays are affected: Panel C09: HIC6601; Panel C12: VBI6501; Panel C19: Gen L.O. CLRS Aux Circ Wtr, Gen H2 CLRS Aux Circ Wtr.

RESPONSE:

The identified displays are easily read by the operator even when the pointer tip overlaps minor markings on the display. These indicators are primarily for observation that a change in the measured variable is occuring and not for indication of a discrete value. Therefore, since a change is not justified, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.024

GUIDE NO.: 5.1.5a(3)

RATING: 3

FINDING:

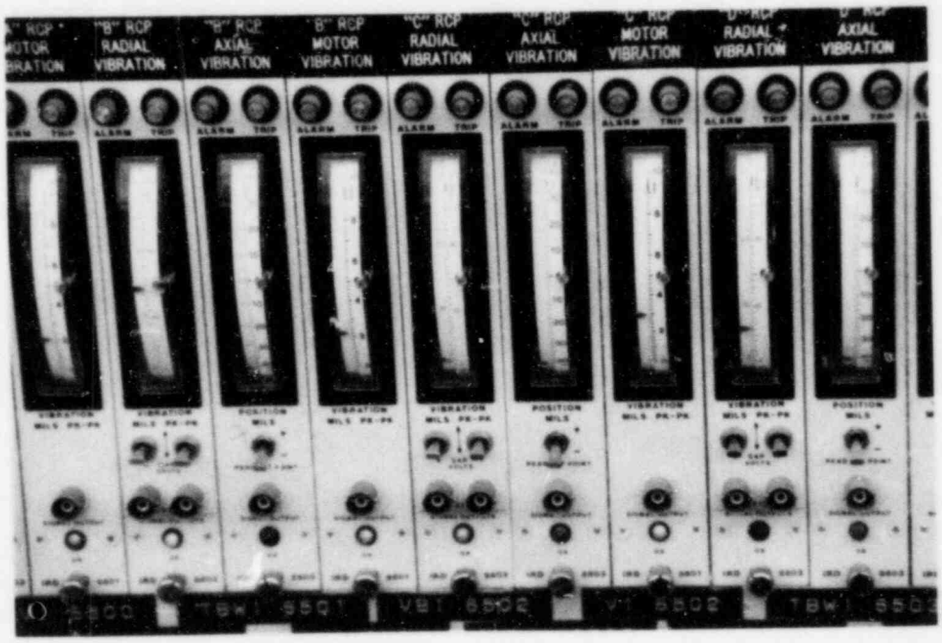
Three thicknesses of graduations (major, intermediate, and minor) are not used for some displays which contain five or more graduations between numerals. The following displays are affected:

Equipment ID #	Equipment Name
VBI6500	"A" RCP RADIAL VIBRATION
VI6500	"A" RCP MOTOR VIBRATION
VBI6501	"B" RCP RADIAL VIBRATION
VI6501	"B" RCP MOTOR VIBRATION
VBI6502	"C" RCP RADIAL VIBRATION
VI6502	"C" RCP MOTOR VIBRATION
VBI6503	"D" RCP RADIAL VIBRATION
VI6503	"D" RCP MOTOR VIBRATION
TI2629/2679	FEEDWATER TEMP LOOP A/B
	STEAM GENERATOR DOWNCOMER TEMP LOOP A/B
	EMERGENCY INJECTION LOOP B1/B2
	CORE FLOOD TANK LEVEL A2/B2
	REACTOR BUILDING SPRAY FLOW
	DH REMOVAL FLOW LOOP 2
	DH PUMP SUCTION TEMP
	SODIUM HYDROXIDE TANK TEMP
	BORATED WATER STORAGE TANK TEMP
PI1050	
PI1410	
	EMERGENCY INJECTION LOOP A1/2
	CORE FLOOD TANK LEVEL A1/B1
	REACTOR BUILDING SPRAY FLOW
FI2620A	
FI2670A	
	DH REMOVAL FLOW LOOP 1
	INSTRUMENT AIR HEADER
	GEN L.O. CLRS AUX CIRC WTR
	GEN H2 CLRS AUX CIRC WATER
	RC PRESS LOW RANGE
	INT RANGE SUR
	POWER RANGE (5)
	POWER RANGE (6)
	POWER RANGE (7)
	POWER RANGE (8)
TI1020/1043	REACTOR AVE TEMP LOOP A/B
TI1011/1039	RC OUTLET TEMP LOOP A/B

Equipment ID #	Equipment Name
TI1015/1046	RC INLET TEMP LOOP A/B
TI1016/1045	RC INLET TEMP LOOP A/B
PI2652/2602	MAIN STEAM PRESSURE LOOP A/B
TI2681/2631	MAIN STEAM TEMP LOOP A/B
LT2651/2601	STEAM GEN FULL RANGE LEVEL LOOP A/B
	STEAM GEN STARTUP LEVEL LOOP A/B
FI2628/2678	MAIN FEED FLOW A/B
	SOURCE RANGE SUR
	INT RANGE SUR
	TURB K2A STEAM IN
	TURB K2B STEAM IN
	GLAND STEAM CONDENSER
PI-2413	RX BLD PRESS
LI5646	RX BLD LEVEL
LI1405	B RX BLD SUMP
	EMERGENCY FEEDWATER INIT & CONT SYS (B) (12)
	EMERGENCY FEEDWATER INIT & CONT SYS (A) (12)
	EMERGENCY FEEDWATER INIT & CONT SYS (C) (12)
	EMERGENCY FEEDWATER INIT & CONT SYS (D) (12)

RESPONSE:

A review of the graduation markings on the identified displays verified that they were all easily read since the graduation heights do vary. The application of the checklist guideline was misinterpreted. Therefore, since a change is not appropriate, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.025

GUIDE NO.: 5.4.1i

RATING: 3

FINDING:

Recorders are not provided with a high speed option to run out records for detachment or a lower speed option to permit adjustment of the time scale so that the rate of change information can be identified.

RESPONSE:

The trend recorders have a paper pull-out release for collecting the recorded data. A high speed option is not needed to perform this task. The trend recorders are set up to provide the needed rate of change data without adjustment of the time scale. Such an adjustment could lead to misinterpretation of the data since the operators are familiar with the existing time scale. No problems with the existing time scales have been identified. Therefore, since a design change is not justified, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.027

GUIDE NO.: 5.1.5f

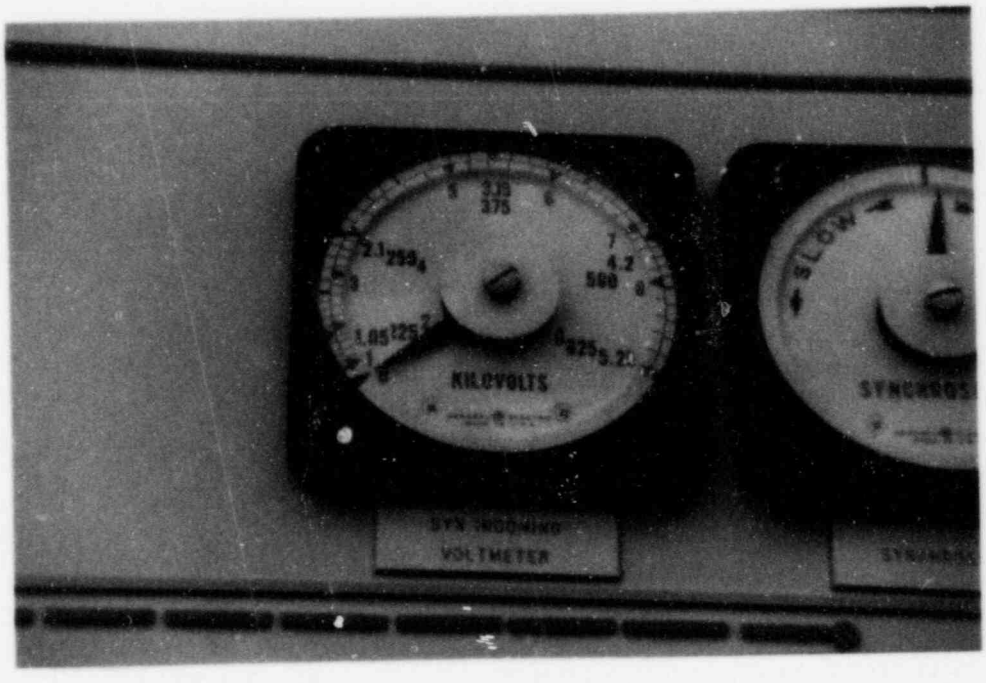
RATING: 3

FINDING:

There is too much information on the scale face of the Syn Incoming Voltmeter and the Syn Running Voltmeter. This multiscale indicator leads to operator confusion.

RESPONSE:

The multiscale indicators are difficult to use and a better display may be justified. Therefore, an evaluation of the available display options to correct this discrepancy is to be performed.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.028

GUIDE NO.: 5.2.1a

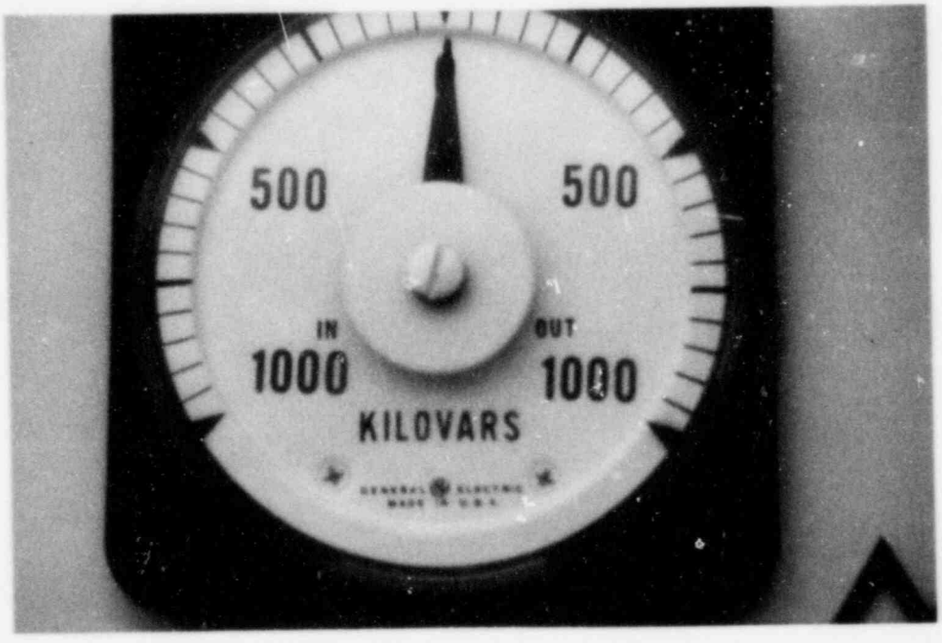
RATING: 3

FINDING:

Scale values on some meters do not increase with clockwise movement of the pointer. The following meters are affected: Panel C10: Kilovars; Panel C11: Eccentricity phase angle, Vibration phase angle; Panel C01: H2 purity, Reg. V. Bal.

RESPONSE:

The identified displays are all special application meters that do not lend themselves to the 0700 guideline for clockwise motion to indicate increasing values. They are designed to provide the operator with the information needed in a format that is easily read. A change to try to meet the 0700 guideline would create a confusing and difficult to read display. Therefore, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.029

GUIDE NO.: 5.1.2e(2)

RATING: 3

FINDING:

The scale for main steam pressure (C11) is not labeled to indicate values that must be multiplied by 10. (Label has worn off).

RESPONSE:

The lack of a label will be corrected as part of the comprehensive control room labeling effort.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.030

GUIDE NO.: 5.1.5f+5.4.2a(1)

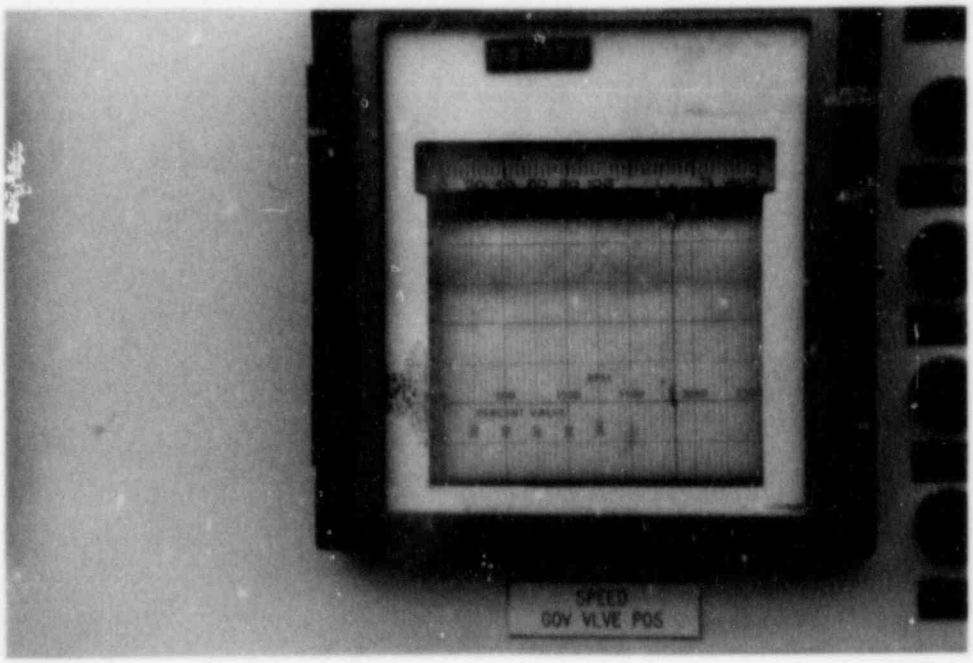
RATING: 3

FINDING:

There are two scales on the Speed Gov Valve Position recorder. The operator determines which scale is activated (being used) by controls on back panels. There is no control room indication of which scale is being used.

RESPONSE:

The identified recorder is being evaluated for removal as part of a design change currently being prepared. Therefore, this discrepancy is being corrected.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.031

GUIDE NO.: 5.3.3c

RATING: 3

FINDING:

Illuminated legend indicators are not distinguishable from legend pushbuttons by form, size, or other factors.

RESPONSE:

The panel insert that has the legend pushbuttons and legend indicator lights is part of vendor supplied controls for a particular piece of equipment. The operating procedure for use of this panel insert gives sufficient guidance on operation of the panel such that operator confusion is not a problem. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.032

GUIDE NO.: 5.1.1a(2)

RATING: 3

FINDING:

Spare meters are not used and therefore should be removed from the panels. The following meters are affected: Panel C12: PI 6601; Panel C14: Spare Meters (2).

RESPONSE:

The identified displays are not in service and should be removed from the panels. This removal is to be evaluated.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.033

GUIDE NO.: 5.2.1b

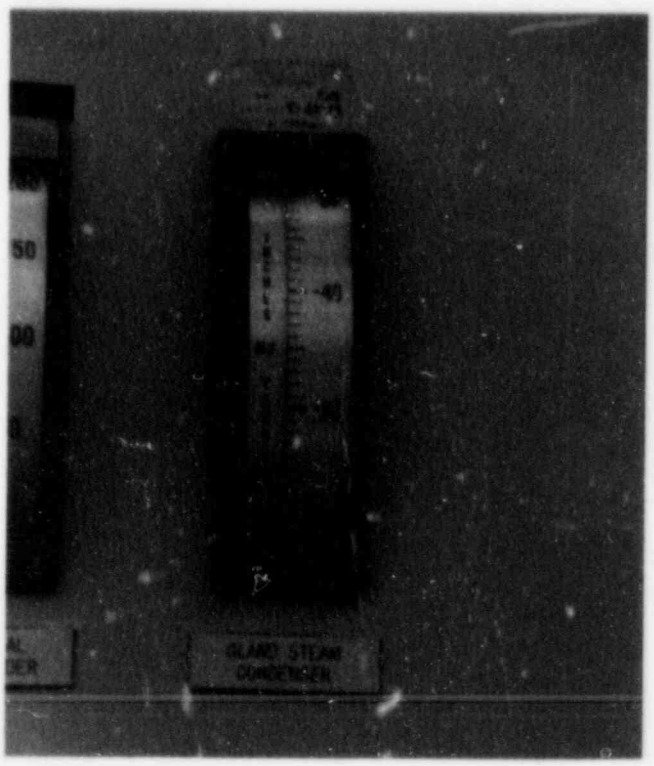
RATING: 3

FINDING:

The scale values for three displays do not increase with upward movement of the pointer. The following displays are affected: Panel C12: Gland Steam Condenser; Panel C13: TDI1033; Panel C19: LI2004.

RESPONSE:

The identified displays are all special application meters that do not lend themselves to the 0700 guideline for upward motion to indicate increasing values. They are designed to provide the operator with the information needed in a format that is easily read. A change to try to meet the 0700 guideline would create a confusing and difficult to read display. Therefore, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.034

GUIDE NO.: 5.4.1k

RATING: 3

FINDING:

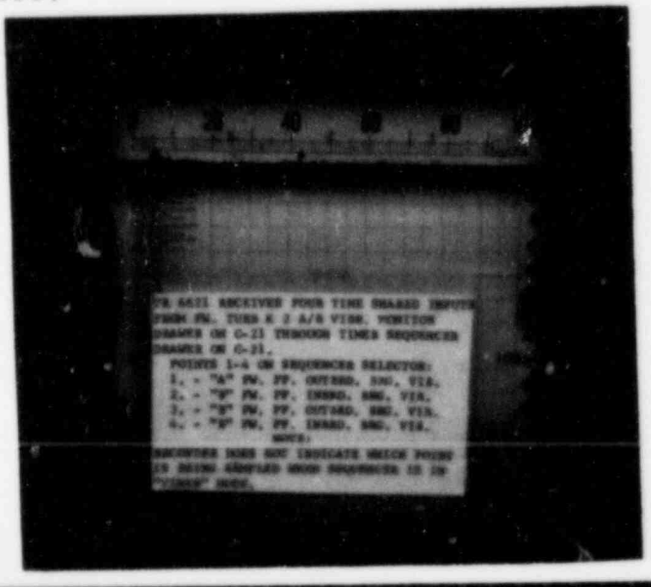
All data is not visible through the window of some recorders. The recorder covers are foggy and the operator must open the cover to see the information clearly. In addition, there is a label obscuring the chart on VR6621 and TR6612. The following recorders are affected; Panel C12: VR6621, TR6612; Panel C13: TR6501; Panel C19: TR2890, TR2808, TR3629, TR3651; Panel C02: LRZ87.

RESPONSE:

The subject recorders will be evaluated during the comprehensive control room relabeling program to correct the labeling that obscures the viewing of the chart paper. The following recorders are to be evaluated for possible replacement.

TR-6612 (Panel C-12)
TR-6501 (Panel C-13)
TR-2890 (Panel C-19)
TR-2808 (Panel C-19)
TR-3629 (Panel C-19)
TR-3651 (Panel C-19)

Therefore, based on the control room relabeling program and the above described design change evaluations, the discrepancies will be corrected as appropriate.



4918/a/51

CORRECTIVE ACTIONS

HED NO.: CK:5-1.035

GUIDE NO.: 5.4.2a(1)

RATING: 3

FINDING:

The parameters recorded on some recorders are not identified by labels. The following recorders are affected:

Equipment ID#	Equipment Name
TR 6612	Temperatures FW PPS Turbs
LR 2609	Steam Generator B Level
LR 2659	
FR 1032	Reactor Coolant Total Flow
TR 1024	Reactor Ave Temp
TR 1023	Reactor Outlet Temp
PR 6520	A Pump
PR 6521	B Pump
PR 6522	C Pump
PR 6523	D Pump
PR 2408	Reactor Bldg Pressure
	Trend Recorder 1
	Trend Recorder 2
	Trend Recorder 3
	Trend Recorder 4
	Trend Recorder 5
FR 2632	Feedwater Flow/Loop A
FR 2682	Feedwater Flow/Loop B
PR 2634	Turbine Throttle Pressure
	Intermediate Range
	Power Range 0
LR 2871	Condenser Level
PR 2412	RX Bld Press
LR 5645	RX Bld Level

RESPONSE:

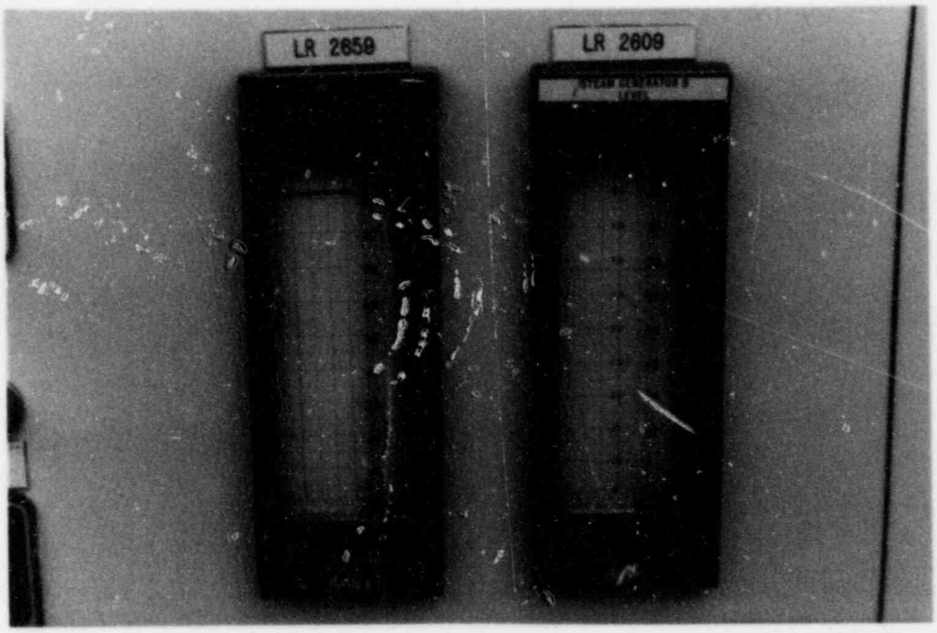
The parameters recorded for the identified recorders will be or have been corrected as follows:

The recorders on C-16/C-18 (PR-6520, PR-6521, PR-6522 & PR-6523) have been replaced with new recorders during 1R6 that have the parameters identified by labeling. The recorders on C-100 (trend recorders 1 thru 5) do not have the parameters permanently labeled since these recorders are available for

trending any of several computer points. They are provided with labels that have temporary marker type labeling written in by the plant operators. This arrangement provides the needed flexibility for these addressable trend recorders.

The other trend recorders identified will be evaluated during the comprehensive control room relabeling program to assure that adequate parameter identification is provided. Therefore, the discrepancies will be or have been corrected.

4918/a/52



CORRECTIVE ACTIONS

HED NO.: CK:5-1.036

GUIDE NO.: 5.2.4b(2)

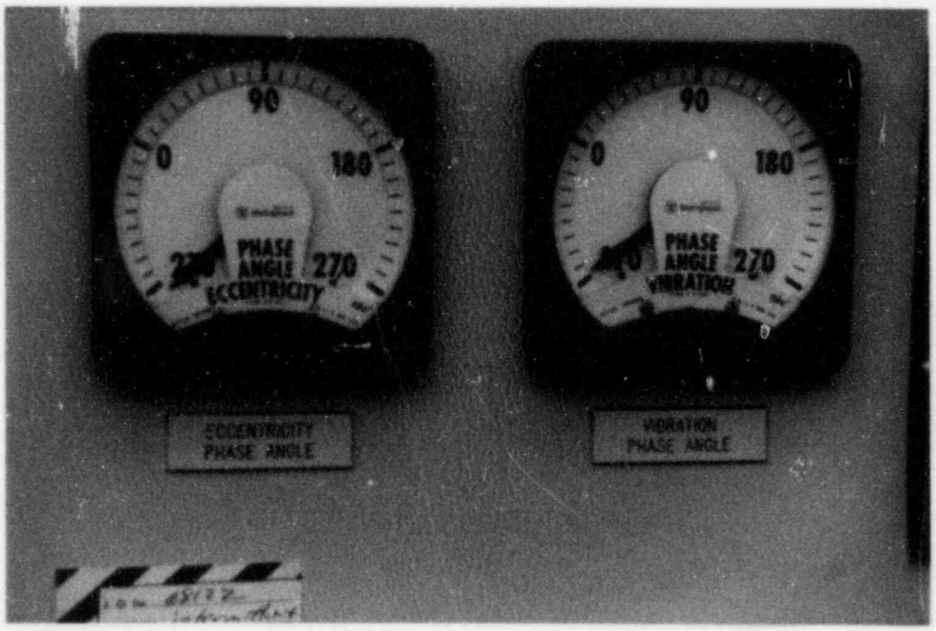
RATING: 3

FINDING:

Values on the Eccentricity Phase angle and the Vibration Phase angle meters are positioned around a zero point but the zero is not located at the 12 o'clock position.

RESPONSE:

The identified displays are not utilized by the control room operators. They are used for turbine-generator diagnostics by the vendor representatives and maintenance personnel and are special application meters that do not lend themselves to the 0700 guideline. Therefore, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.037

GUIDE NO.: 5.4.2a(2)

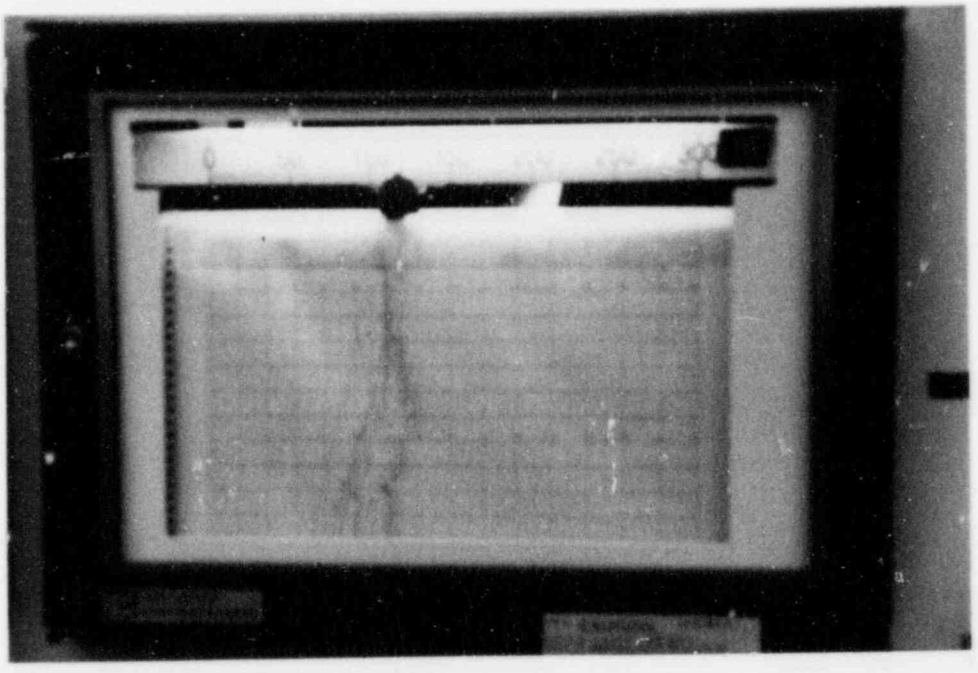
RATING: 3

FINDING:

The pens on multi-point recorders do not use a different colored ink to aid in rapid identification. The following recorders are affected: Panel C11: EXR6649, TR 6644, TR 9001, TR 6630; Panel C13: NRO 516, NR0517, TR 6500, TR 1241; Panel C19: TR 3651, TR 3629.

RESPONSE:

The identified multi-point recorders are all discrete type recorders and not pen type recorders. Therefore, the HED does not apply. Each of the multi-points are appropriately identified by a letter designator in accordance with 0700 guidelines. No further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.038

GUIDE NO.: 5.1.2b

RATING: 3

FINDING:

The RCP Stand Pipe Leak Flow (drum-counters) displays require operator conversion.

RESPONSE:

The drum-counters are part of a specialized flow measurement device that does not require conversion. The "drinking bird" log has a conversion factor to be used to meet the requirements for another measured parameter (i.e., RCS identified leakage determination. Therefore, the conversion is for purposes other than the parameter being measured and no further action is needed to correct this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.039

GUIDE NO.: 5.1.4a(1)+(2)

RATING: 3

FINDING:

There is not a message communicated on either the display face or an appropriate adjacent label for some displays. The following displays are affected:

EQPT ID#	EQUIPMENT NAME
	Seal Wtr to Main Feedpump
CV1433	DH Cooler Bypass
CV1432	DH Cooler Bypass
CV1428	DH Cooler E35A
LI4631/30	
LI 4430/31	
LI4432/33	
LI4636/37	
LI4638/39	
LI 2004	
FI4642	
FIC-2832	FW Pump PIB Recirc Valve
FIC-2843	FW Pump PIA Recirc Valve
	Unit Load Master
	Low Load Limit
	Hi Load Limit
	Steam Gen Reactor Master
	Reactor Demand
	Steam Generator Load Ratio
	Feedwater Demand A
	FW Pump Speed A
	Start Up FW Valve A
	Turbine Bypass System A
	Low Load FW Valve A
	Main Steam Pressure
	Feedwater Demand B
	FW Pump Speed B
	Start Up FW Valve B
	Turbine Bypass System B
	Low Load FW Valve B
PDIC 2905	Gland Steam Condenser

RESPONSE:

The identified displays are adequate as-is or will be evaluated for corrective action as follows:

The displays on C-02, C-03, C-13, and C-16/C-18 are all okay as-is. The displays do not require labels since they are easily understood by the operators without labels. This is accomplished by the operator training and the obvious relation of some of the displays to the controller that they are associated with. The existing labels for the control devices convey sufficient information that the display is meaningful to the operators and no further action is planned to address these discrepancies.

The displays on C-19 will be evaluated as part of the comprehensive control room relabeling program to determine the need for additional labeling. Therefore, these discrepancies will be corrected through the relabeling effort.

4918/a/56

CORRECTIVE ACTIONS

HED NO.: CK:5-1.040

GUIDE NO.: 5.2.1c

RATING: 3

FINDING:

On some horizontal scales "OPEN" is located to the left and "CLOSED" to the right. This is opposite to population stereotypes. The following displays are affected: Panel C13: Seal Water to Main Feedpump; Panel C19: Gen L.O. CLRS Aux Circ. Wtr, Gen H2 CLRS Aux Circ Wtr.

RESPONSE:

This reverse arrangement is to be evaluated for possible corrective action.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.041

GUIDE NO.: 5.2.2a+b(1)

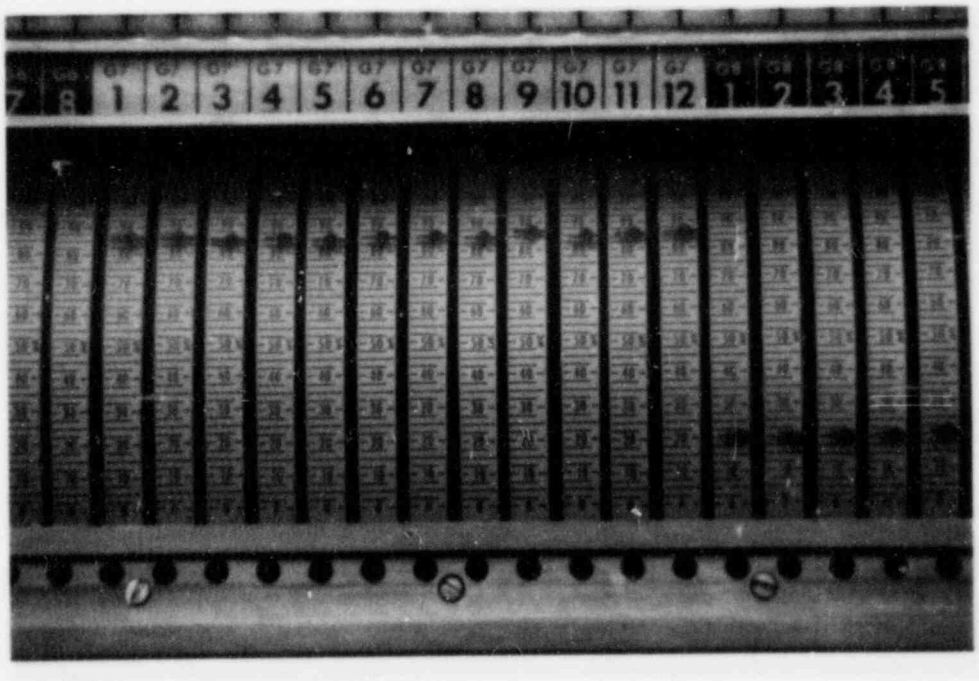
RATING: 3

FINDING:

The pointer tips on the PI panel are complex and can obscure scale graduation marks and numbers.

RESPONSE:

The identified display is provided to give the operator a general idea of the relative location of the control rods and is not used for determining exact or discrete values. Therefore, the complex pointer shape and overlapping with the scale marks and numbers does not impact the operators ability to obtain the desired data. Based on the lack of justification for a change, no further action is planned to address this HED.



4918/a/58

CORRECTIVE ACTIONS

HED NO.: CK:5-1.042

GUIDE NO.: 5.1.3a

RATING: 3

FINDING:

The labeling on some displays is too small. The print does not subtend the recommended 15 minutes of arc. The following displays are affected: Panel C16/C14: Emergency injection, core flood tank level, core flood tank pressure, reactor building, FI2620B, FI26700, DH Removal Flow; Panel C18: Emergency injection loop A1/A2, core flood tank level A1/B1, core flood pressure A1/B1, reactor building spray flow; DH Removal Flow.

RESPONSE:

The identified display labeling is easily readable by the plant operators even though it does not meet the 0700 guideline. Based on a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.043

GUIDE NO.: 5.1.3c

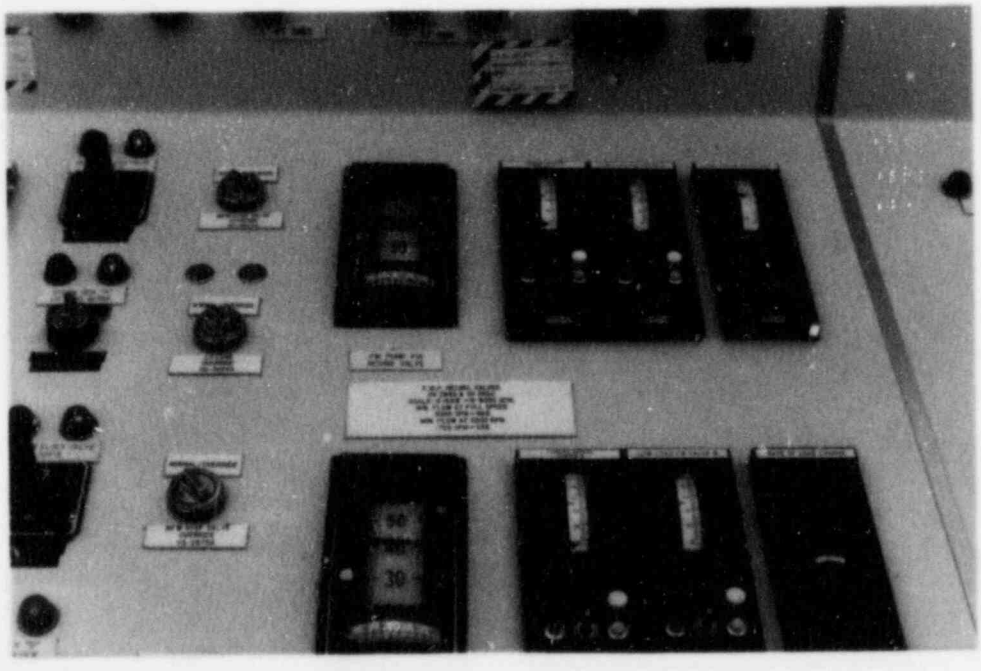
RATING: 3

FINDING:

The Bailey meters have black print on a gray background. This causes poor contrast and readability.

RESPONSE:

The Bailey meters do have black on a gray background, but they are easily readable by the plant operators. Based on a lack of justification, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.045

GUIDE NO.: 5.1.2b+e(1)

RATING: 3

FINDING:

The units (scale ranges) for Steam Generator full range level loop A/B are expanded on this display by multiplying values by 14.72.

RESPONSE:

The identified display is difficult for the operators to use and is to be evaluated for correction.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.046

GUIDE NO.: 5.3.3a(2)+(3)

RATING: 3

FINDING:

Legend lettering does not contrast well with the background for the Controlling Tav controls (pushbuttons). This causes difficulty in reading the indication.

RESPONSE:

The legend lettering is practically illegible unless it is lit. This is adequate however since the particular display provides status only and is not of significant importance to the operator. The legend display does serve its function by being easily readable when lit. Based on a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:5-1.047

GUIDE NO.: 5.5.1c(1)

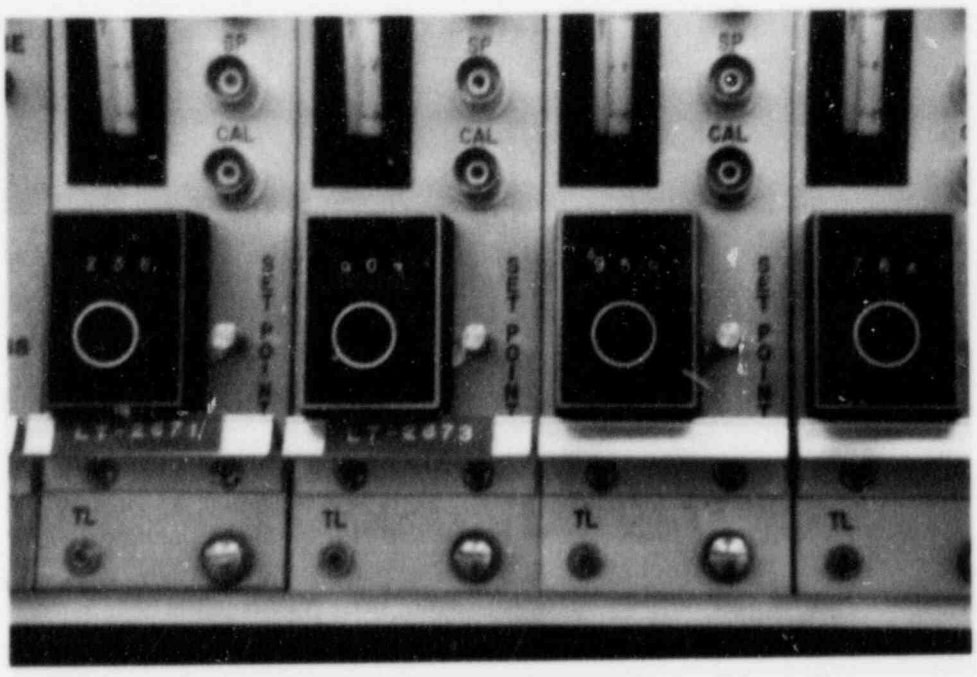
RATING: 3

FINDING:

The numbers on drum counters change by continuous movement rather than by snap action. The following displays are affected: Panel 37-1, 37-2, 37-3, 37-4: all drum counters.

RESPONSE:

The identified drum counters are easily read and provide sufficient information for the operators needs. Modifying them to snap action type displays would be of no benefit to the plant operators. Based on a lack of justification for change, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:5-1.048

GUIDE NO.: 5.1.6

RATING: 3

FINDING:

There are some inconsistencies in color coding the control room. On Bailey meters, red is used for auto and white is used for manual. The LED displays use white, red, and orange numerals. Also, on the turbine panel there is a wide variety of colors used for lights and pushbuttons.

RESPONSE:

The variety of colors are due to the use of several different suppliers for the various displays and controls. The colors do not create operator confusion since they are consistent within groups or types of display devices and there is no expectation that they all mean the same thing. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.001

GUIDE NO.: 7.1.1a

RATING: 3

FINDING:

The SPDS and GERMS do not include safeguards to prevent unauthorized system access.

RESPONSE:

The SPDS computer is intended to be available to essentially all ANO personnel. The use of a generic password would not significantly limit the access to the system since personnel authorized to be on-site are also authorized to have access to the SPDS. Therefore, no further action is planned to address this HED regarding the SPDS.

GERMS utilizes a generic password to limit access since it is accessible by outside telephones. The generic password prevents unauthorized external access to the system.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.002

GUIDE NO.: 7.1.2b

RATING: 3

FINDING:

Some input words on SPDS and process computer exceed entry length of seven characters (e.g., numbers on Saxon program).

RESPONSE:

The SPDS and process computer input words are based on the existing instrument labeling system. These labels are 8 characters in length and are easy for the plant operators to use since they correspond to the labels used on P&IDs and elsewhere in the control room. Therefore, the existing input words are easier to use than some other system utilizing input words of 7 characters or less. No change is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.003

GUIDE NO.: 7.1.3a

RATING: 3

FINDING:

The SPDS and GERMS are deficient in providing prompting and structuring features by which an operator can request additional information. An "ALL" or "NONE" output appears to characterize requested system output.

RESPONSE:

The SPDS does contain system prompts for the primary displays used by the control room operators (touch-screen features). The other SPDS features are addressed via the SPDS console. These features are primarily the addressable trend points used with the available graphic trend display. These features are relatively simple to use and the operators have received extensive training in their use. The addition of more system prompts would be of very little value to the plant operators and would require extensive software changes. Therefore, due to a lack of justification for change, no further action is planned to address this HED for the SPDS.

GERMS is a relatively complex system and has a great deal of operator interaction involved to use properly. Therefore, the need for system prompts is a significant concern on the GERMS. Based on the complexity of the operator interaction involved with GERMS and the need for a more "user friendly" design for GERMS, a study has already been initiated to evaluate correcting this and other discrepancies with GERMS. This study was initiated prior to the evaluation of the HEDs for GERMS as a result of AP&L's continuing effort to achieve practical application of human factor's principles at ANO. The overall evaluation is to determine whether GERMS should be replaced with an easier to use and more flexible system. Therefore, this discrepancy is to be evaluated for correction per the GERMS evaluation program.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.004

GUIDE NO.: 7.1.3b

RATING: 3

FINDING:

There is an absence of prompting features on SPDS, Process Computer and GERMS by which operator can request corrected information upon detection of an error.

RESPONSE:

The SPDS and process computer do not involve substantial operator interaction to perform their functions. The majority of the interaction involves selecting trend points to monitor on both systems. Therfore, the addition of prompting features or error-checking features would be of little benefit to the plant operators. The software changes would be substantial. Based on the lack of sufficient justification for change, no further action is planned to address this HED for the SPDS and process computer.

The GERMS computer is being evaluated for possible replacement and this HED will be considered in that evaluation.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.005

GUIDE NO.: 7.1.4f

RATING: 3

FINDING:

There is a lack of positive feedback on SPDS, Process Computer and GERMS regarding key actuation - entry is displayed before key bottoms out.

RESPONSE:

The SPDS, GERMS and process computer involve very little data entry to operate and the keyboards are primarily used as finger-typing tools rather than as touch-typing tools. The addition of an audible click would not provide a useful aid to the operator and would tend to increase the already high ambient noise level in the control room. Therefore, due to the lack of justification for a change and negative implications of corrective action, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.006

GUIDE NO.: 7.1.4g

RATING: 3

FINDING:

The SPDS keyboard slope is 9 degrees from horizontal (below the required 10-25 degree slope range).

RESPONSE:

The identified deviation from the 0700 guideline is not significant enough to warrant corrective action. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.007

GUIDE NO.: 7.1.4i

RATING: 3

FINDING:

The SPDS auxiliary keypad (to right of main QWERTY board) contains one key not used by operator.

RESPONSE:

The identified irrelevant key does not cause operator confusion nor potentially degrade system operation. Therefore, due to the lack of justification for a change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.008

GUIDE NO.: 7.1.5a

RATING: 3

FINDING:

Regarding the SPDS dedicated function controls (directory selection pushbuttons to right of QWERTY keyboard). 1) There is no positive indication of key activation; 2) Labels are unclear as to function; and 3) There is an unused key.

RESPONSE:

1. The lack of an audible click is not a problem for the operator and the suggested corrective action would create unnecessary additional ambient noise to an already noisy environment.
2. The existing labels are clear regarding the function of the keys and have not created operator confusion. A change to the labels would not make their meaning any more clear to the operators.
3. The identified irrelevant key does not cause operator confusion nor potentially degrade system operation. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.009

GUIDE NO.: 7.2.1.c(2)

RATING: 3

FINDING:

Ambient illumination in the control room is in medium range (11.5 ft. L) but SPDS CRT characters are in light on dark format.

RESPONSE:

The SPDS CRTs are not difficult to read and do not justify being changed. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.010

GUIDE NO.: 7.2.1d

RATING: 3

FINDING:

Contrast between light characters and dark background on SPDS console CRTs is relatively low (4.6:1) and below 15:1 to 20:1 preferred range.

RESPONSE:

The SPDS CRTs are not difficult to read and do not justify being changed. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.011

GUIDE NO.: 7.2.1f(4)

RATING: 3

FINDING:

SPDS and Process Computer alphanumeric characters fail to achieve recommended ten resolution elements/character height (have seven).

RESPONSE:

The alpha-numeric characters on the SPDS and process computer CRTs are not difficult to read and do not justify being changed. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.012

GUIDE NO.: 7.2.2c

RATING: 3

FINDING:

The width to height ratio for SPDS and Process Computer alpha-numerics (between 3:5 and 1:1) does not meet recommended guideline. Width/height ratio = .4.

RESPONSE:

The alpha-numeric characters on the SPDS and process computer CRTs are not difficult to read and do not justify being changed. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.013

GUIDE NO.: 7.2.4b

RATING: 3

FINDING:

Illustrations are not used on the SPDS console CRT to supplement or explain text output.

RESPONSE:

The original layout of the computer console and the color graphic displays included recognition of this problem. Due to the space limitation in the control room, the console was designed to work with the nearby non-graphic displays while the more remote graphic displays were arranged for ease of operator viewing from the various control panels during normal operation and/or transients based on limited availability of space. Therefore, the locations of the SPDS displays have already been optimized based on the available space in the control room and no further action is planned to address this HED

CORRECTIVE ACTIONS

HED NO.: CK:7-1.014

GUIDE NO.: 7.2.4c(1)

RATING: 3

FINDING:

SPDS, Process Computer and GERMS strings of alphanumerics frequently exceed five characters but are not grouped in three to four character groups.

RESPONSE:

The current practice of grouping alphanumerics is based on plant numbering and labeling that is familiar to the operators and consistent with other plant procedures, drawings, etc. A change in grouping would unnecessarily confuse personnel working with the computers and, therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.015

GUIDE NO.: 7.2.4C

RATING: 3

FINDING:

SPDS character strings longer than five characters are not grouped into groups separated by one or more blank character space or 3 to 4 element groups.

RESPONSE:

The current practice of grouping character strings is based on plant labeling and names that are familiar to the operator and consistent with other plant procedures, drawings, etc. A change in grouping would unnecessarily confuse personnel working with the computers. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.016

GUIDE NO.: 7.2.4f(4)

RATING: 3

FINDING:

SPDS and Process Computer alphabetic menu designates are not alphabetically ordered beginning with letter "A".

RESPONSE:

Mnemonic arrangement was chosen to make operator selection easier. Therefore, since the existing arrangement is easier to use than the arrangement recommended by 0700, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.017

GUIDE NO.: 7.2.4j(2)

RATING: 3

FINDING:

When SPDS and Process Computer numeric data is presented in tabular form, it is appropriately right justified, but decimals do not align vertically unless there are the same number of significant numbers right of the decimal.

RESPONSE:

Alignment of decimal points is not practical for the SPDS and process computer data since the numeric data is not generally of the same order of magnitude (e.g., one data point may be indicating a range of 10,000,000 to 1,000,000 and the next data point may be indicating a range of .001 to .0001). Since the CRT display and printer output have limited space for displaying numeric data using acceptable formats, aligning decimal points would be counterproductive. Furthermore, the data points are not generally compared between points of a single display such that decimal alignment would not be of particular benefit to the operators. Therefore, no further action is planned to address these HEDs.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.018

GUIDE NO.: 7.2.4p(1)

RATING: 3

FINDING:

SPDS and Process Computer data group labels are not highlighted or accentuated to facilitate operator identification (they are simply top center-justified).

RESPONSE:

The current practice of top center-justified group labels provides appropriate identification of the data group for the plant operators. Since there is a lack of justification for a change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.019

GUIDE NO.: 7.2.5

RATING: 3

FINDING:

SPDS, Process Computer and GERMS menu items or options are not ranked in order of decreasing frequency of likely selection.

RESPONSE:

Since the menu items generally fit on one page of display there is no need to explicitely rank the items. For the menus that do occupy more than one page of display, the more commonly used selections are on the first page and the less frequently used selections are on the second page. Therefore, since this guideline is generaly complied with and since explicit ranking is not easily determined, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.020

GUIDE NO.: 7.2.5g

RATING: 3

FINDING:

Selection designates on SPDS menus are separated from associated text by hyphens rather than a blank space (guideline).

RESPONSE:

The use of a hypen provides a clear connection between the selection designator and associated text. The use of a space would not be as obvious to the system user. Based on the lack of justification for a change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.021

GUIDE NO.: 7.2.5h

RATING: 3

FINDING:

When data on SPDS and the Process Computer are presented on multiple pages, pages are not numbered as to page number in relation to page count. Instead pages are numbered as "NO.: MORE" or for last page "NO.: LAST".

RESPONSE:

The data provided by the computer is generally less than four or five pages of output. The longer outputs are primarily the annunciator alarm displays that are listed by the sequence for easy reference. The addition of page numbers or remaining pages would involve substantial software changes and use of available memory. Since the benefit to the operator is marginal at best, no further action is planned to resolve this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.022

GUIDE NO.: 7.2.6c

RATING: 3

FINDING:

Lack of SPDS system prompts to inform operator regarding initation of steps to complete an action or sequence of additional possible actions.

RESPONSE:

The SPDS computer does not require substantial operator interaction to perform its function. The most common interaction is the selection of trend points to add or change for the addressable graphic trend display. The addition of system prompts regarding initiation, steps to completion, etc. is primarily of benefit when substantial operator interaction or selection choices are available. Since this is not the case for the SPDS computer, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.023

GUIDE NO.: 7.2.6i

RATING: 3

FINDING:

System status feedback messages are not provided to operator on SPDS CRT.

RESPONSE:

Prior to the identification of this HED, AP&L had already initiated action to correct this problem as part of the on-going effort to provide practical application of human factors's principles to ANO. Since the identification of this HED, status panel lights have been added for the SPDS to provide feedback on CPU status, printer status, CRT status, computer room temperature, etc. Therefore, action has been taken to correct this discrepancy.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.024

GUIDE NO.: 7.2.8c(1)

RATING: 3

FINDING:

When scrolling long lists or logical records, and SPDS, Process Computer and GERMS, viewable list location references are not provided.

RESPONSE:

The only commonly displayed long lists are the annunciator alarms and trend data which are all listed by time sequence. Since the time sequence is the best list location aid for these types of listings, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.025

GUIDE NO.: 7.2.8d

RATING: 3

FINDING:

SPDS, Process Computer and GERMS lack capability for operator control of information amount, format and complexity.

RESPONSE:

The SPDS, process computer and GERMS all have operator control of the data that is desired for display. The format for the data display is standard based on the original evaluation of the data format needs. Since the data is primarily trend data, the format selection is based on giving the operator the information needed in a concise and usable manner. The operators are satisfied with the existing arrangement. Therefore, since there is insufficient justification for adding the format flexibility beyond that which is already available, no further action is planned to address this portion of the HED. The concern about providing a quality hard copy plot for the heat-up/cool-down curves is an area where the operators job could be made easier by the addition of a graphics copier for the SPDS displays. Therefore, an evaluation is to be performed to determine if a useful graphics copier can be provided for the control room operators. (See also HED QS:E1.5-1.082).

CORRECTIVE ACTIONS

HED NO.: CK:7-1.026

GUIDE NO.: 7.2.2.g(2)

RATING: 3

FINDING:

Dot matrix characters on SPDS are on a 5 x 7 rather than a 7 x 9 dot matrix layout.

RESPONSE:

The dot matrix layout (5x7) is a function of the hardware and the existing layout provides easily readable displays with good character resolution. Due to the adequacy of the existing dot matrix characters and the lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.027

GUIDE NO.: 7.3.1a(1)

RATING: 3

FINDING:

Printers are not located in the primary operating area. The SPDS printer is located behind main control room panels and the backup printer for the process computer is located one floor above the control room.

RESPONSE:

The existing printer location is based on reducing unnecessary background noise in the control room, reducing unnecessary obstructions in the control room, and the available space in the control room workspace. Therefore, the existing location provides the best solution to the practical limitations of the ANO-1 control room and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.028

GUIDE NO.: 7.3.1b(2)

RATING: 3

FINDING:

SPDS printer is remote from operator, but no print conformation or denial is presented at CRT.

RESPONSE:

Prior to the identification of this HED, AP&L had already initiated action to correct this problem as part of the on-going effort to provide practical application of human factor's principles to ANO. Since the identification of this HED, status panel lights have been added for the SPDS to provide feedback on printer status. Therefore, corrective action has been taken to correct this discrepancy.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.029

GUIDE NO.: 7.3.1e(3)

RATING: 3

FINDING:

There are no instructions for reloading paper, ribbon, etc., on an instruction plate attached to SPDS printer.

RESPONSE:

The control room operators only have to load paper into the printers since the ribbon replacement, etc. is part of routine maintenance by a dedicated group on-site. The reloading of paper is not a problem for the operators since it is done regularly. When new operators have to change paper there is plenty of help available from the other more experienced operators if a problem should arise. Therefore, the addition of printer instructions for the loading of paper would not be of benefit to the operators and would be another administrative detail to maintain in addition to the already burdensome administrative details associated with a plant operator's job. No further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.030

GUIDE NO.: 7.3.1.e(4)

RATING: 3

FINDING:

When SPDS printer is down during reloading, data and information to be printed may be lost. If LP7A is not selected to print (in SPDS computer room) see OP1105.14.

RESPONSE:

Operating procedure 1105.14 provides the administrative controls regarding assuring that the peripheral switch is aligned to the backup printer prior to taking the main printer out of service. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.031

GUIDE NO.: 7.3.1e(5)

RATING: 3

FINDING:

Collection cage capacity on SPDS printer is lower than the feed supply (original carton of paper).

RESPONSE:

The collection cage capacity does not present a problem to the control room operators. Therefore, since there is insufficient justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.032

GUIDE NO.: 7.3.2

RATING: 3

FINDING:

Alarm messages on SPDS do not provide optimal identification of alarm type.

RESPONSE:

The SPDS alarms are written to provide sufficient information to the plant operators to identify the meaning of the alarm. Furthermore, the alarms are listed in operating procedure 1105.14 for additional cross referencing. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.033

GUIDE NO.: 7.3.3d(2)

RATING: 3

FINDING:

Long table columns on SPDS are not separated into spaced grouped of five.

RESPONSE:

The long table columns are not difficult for the operators to read and do not cause operator confusion. The data is not used in time critical operations. Therefore, since there is insufficient justification for a change and the cost of making the software changes would be significant, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.034

GUIDE NO.: 7.1.2c(3)

RATING: 3

FINDING:

Some abbreviations are used in SPDS output text.

RESPONSE:

The use of abbreviations and acronyms are an inherent part of the vocabulary for a nuclear plant operator. It is often more meaningful to the operator and allows quicker comprehension when abbreviations are used rather than unabridged words. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.035

GUIDE NO.: 7.2.1b

RATING: 3

FINDING:

Reflected glare on the SPDS CRTs reduces contrast by luminance summation. This problem is exacerbated by considerable distance (approximately 8.5 ft. from SPDS operator console).

RESPONSE:

The concern about reflected glare is obvious in the ANO-1 control room. Therefore, an evaluation will be performed to determine if some means of reducing reflected glare is practical. This evaluation will involve the control room lighting and the possible addition of "egg-crate" screens on the lights.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.036

GUIDE NO.: 7.2.1c(3)

RATING: 3

FINDING:

Character luminance on SPDS for the brightest characters at time of test was 16.2 ft. L., below 23 L. required luminance.

RESPONSE:

The character luminance is adjustable by the control room operators such that the displays can be easily read from the control room panels. Again, it should be noted that the color graphic CRTs are not intended to be used with the SPDS consoles. Since the character luminance can be adjusted to provide sufficient brightness for the operators's use. No further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.038

GUIDE NO.: 7.2.1f(4)

RATING: 3

FINDING:

Alphanumeric characters on SPDS have eight resolution elements per character height, below the minimum of ten.

RESPONSE:

The alphanumeric characters on the SPDS displays are easily readable by the control room operators. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.039

GUIDE NO.: 7.2.1g

RATING: 3

FINDING:

The refresh rate on SPDS is too low generating a chronic and visually disturbing flicker with certain displays.

RESPONSE:

The flicker is not disturbing to the plant operators since the displays are used for trend information, etc. and do not involve significant time "studying" or reading the displays. This flicker is due to the limitations of the SPDS hardware and would require expensive hardware changes to eliminate. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.040

GUIDE NO.: 7.2.1h(1)

RATING: 3

FINDING:

Color and contrast controls on SPDS are located inside cabinet on a sliding drawer along with other associated CRT hardware. They are not practically adjustable by the operator in this location.

RESPONSE:

The color and contrast controls are not utilized by the plant operators since they are preset to provide the correct color definition. The operator only needs the brightness control since it is normally turned down to preserve CRT life. Therefore, due to the lack of justification for change and the potential for color misadjustment if the controls are "too" convenient, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.041

GUIDE NO.: 7.2.1h(2)

RATING: 3

FINDING:

Controls on SPDS for color and contrast do not conform to appropriate guidelines (Section 4) by type or access.

RESPONSE:

The color and contrast controls are not utilized by the plant operators since they are preset to provide the correct color definition. The operator only needs the brightness control since it is normally turned down to preserve CRT life. Therefore, due to the lack of justification for change and the potential for color misadjustment if the controls are "too" convenient, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.042

GUIDE NO.: 7.2.2b(1)

RATING: 3

FINDING:

Due to possible viewing distances (8.5 ft. from SPDS operator console, 18.5 ft. from the end of panel C19), alphanumerics, on the SPDS CRT subtend six and three minutes of arc respectively. This is significantly below requirement of twelve minutes.

RESPONSE:

The SPDS color graphic CRTs are located to provide the optimal viewing arrangement for the operators at the control boards based on the limited space available in the control room. The SPDS consoles have monochrome CRTs for use with the keyboards. Therefore, the identified viewing distance HED is not appropriate for these CRTs and the operator does not have a difficult time reading the CRTs from the locations that they are intended to be used from. Additionally, the SPDS color graphic CRTs are controlled at the CRT via a touch-screen feature. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.043

GUIDE NO.: 7.2.2e

RATING: 3

FINDING:

Graphic lines on SPDS do not contain minimum 50 resolution elements per inch.

RESPONSE:

The SPDS monitor is a relatively large CRT such that it can be easily viewed from the control boards. This 0700 guideline does not recognize the size of the CRT and as such is inappropriate. A smaller CRT could be provided to meet this guideline but it would not be as easy for the operator to read from the distance required. Therefore, due to the inappropriateness of this guideline for the SPDS CRTs, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.044

GUIDE NO.: 7.2.3c.1(a)

RATING: 3

FINDING:

Display QI9005 is 90° and 60° to the left of line of sight from panel C02 and SPDS oper./cons. respectively; QI9004 is 130° and 75° to the left from the same positions. All exceed 35° horizontal deviation requirement. The view of QI9005 is obstructed (1/2 screen by panel C09).

RESPONSE:

The SPDS color graphic CRTs are intended for operator use from the control boards and not specifically for use from the SPDS console. This arrangement was necessary due to the limited space available in the control room. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.045

GUIDE NO.: 7.2.3f

RATING: 3

FINDING:

Data on QI9005 (panel C19) obstructed (1/2 screen) by panel C09 from seated SPDS console position.

RESPONSE:

The SPDS color graphic CRTs are intended for operator use from the control boards and not specifically for use from the SPDS console. This arrangement was necessary due to the limited space available in the control room. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.046

GUIDE NO.: 7.2.4.0

RATING: 3

FINDING:

Labels on SPDS are printed vertically not horizontally on graphical presentations.

RESPONSE:

The use of vertical labels for the vertical axis of a graph is appropriate and provides for the best utilization of screen space. Therefore, due to the inappropriateness of this guideline for graphic displays, no further action is planned to address this HED. (Also refer to HED CK:7-1.067).

CORRECTIVE ACTIONS

HED NO.: CK:7-1.047

GUIDE NO.: 7.2.7k(1)

RATING: 3

FINDING:

Colors on QI9004 and 9005 are not consistent with rest of control room, e.g., grid for graphs is done in red, a color used for critical information in other control room functions.

RESPONSE:

The colors used on the SPDS display were selected based on the need for good contrast to make operator use easier. The colors have no meaning or coding associated with them and are not relatable to other uses of color in the control room. An effort to standardize color usage between the SPDS graphics and the other control room indicators would unnecessarily restrict the color choices available for the SPDS. This would result in a display that would be harder to read. Therefore, due to the bases for the use of color on the SPDS displays, this 0700 guideline is inappropriate and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.048

GUIDE NO.: 7.2.7k(2)

RATING: 3

FINDING:

Same color used on SPDS for a variety of purposes on same CRT, e.g., red for grid, some labels and trend lines.

RESPONSE:

The colors used on the SPDS display were selected based on the need for good contrast to make operator use easier. The colors have no meaning or coding associated with them and are not relatable to other uses of color in the control room. An effort to standardize color usage between the SPDS graphics and the other control room indicators would unnecessarily restrict the color choices available for the SPDS. This would result in a display that would be harder to read. Therefore, due to the bases for the use of color on the SPDS displays, this 0700 guideline is inappropriate and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.049

GUIDE NO.: 7.2.7.1(2)

RATING: 3

FINDING:

Green is used on SPDS for purposes other than safe status or position (see checklist item 5.1.6c(2)).

RESPONSE:

The colors used on the SPDS display were selected based on the need for good contrast to make operator use easier. The colors have no meaning or coding associated with them and are not relatable to other uses of color in the control room. An effort to standardize color usage between the SPDS graphics and the other control room indicators would unnecessarily restrict the color choices available for the SPDS. This would result in a display that would be harder to read. Therefore, due to the bases for the use of color on the SPDS displays, this 0700 guideline is inappropriate and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.050

GUIDE NO.: 7.2.7.1(3)

RATING: 3

FINDING:

Yellow is used on SPDS for other purposes than indicating status (e.g., hazard, caution) or position (see checklist item 5.1.6c(2)).

RESPONSE:

The colors used on the SPDS display were selected based on the need for good contrast to make operator use easier. The colors have no meaning or coding associated with them and are not relatable to other uses of color in the control room. An effort to standardize color usage between the SPDS graphics and the other control room indicators would unnecessarily restrict the color choices available for the SPDS. This would result in a display that would be harder to read. Therefore, due to the bases for the use of color on the SPDS displays, this 0700 guideline is inappropriate and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.051

GUIDE NO.: 7.2.7m(1)

RATING: 3

FINDING:

Red and green are used together on several SPDS displays.

RESPONSE:

The colors used on the SPDS display were selected based on the need for good contrast to make operator use easier. The colors have no meaning or coding associated with them and are not relatable to other uses of color in the control room. An effort to standardize color usage between the SPDS graphics and the other control room indicators would unnecessarily restrict the color choices available for the SPDS. This would result in a display that would be harder to read. Therefore, due to the bases for the use of color on the SPDS displays, this 0700 guideline is inappropriate and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.052

GUIDE NO.: 7.1.3d

RATING: 3

FINDING:

The Process Computer does not permit correction of individual errors without requiring re-entry or correctly entered data. Only the last entered whole line can be corrected this way.

RESPONSE:

The process computer does not involve substantial operator interaction to perform the available functions. The need for random access error correction is not justified for such a system and the usefulness of such a feature would be minimal. The cost of the software changes and the use of available memory space would substantial. Therefore, based on a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.053

GUIDE NO.: 7.1.4e(2)(a)

RATING: 3

FINDING:

Key resistance for numeric keys on the process computer is 2.8 oz., below the 3.5 to 14.0 oz. range required.

RESPONSE:

The difference between the guideline criteria and the actual key resistance is very small and there is no apparent impact on the plant operator's use of the keyboard. Therefore, due to a lack of need for change, no further action is planned.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.054

GUIDE NO.: 7.1.4i

RATING: 3

FINDING:

Several keys are present on the Process Computer keyboard and auxiliary pad (directory selection pushbuttons), which are irrelevant to operator.

RESPONSE:

The identified irrelevant keys do not cause operator confusion nor potential system degradation. Therefore, due to a lack of justification for a change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.055

GUIDE NO.: 7.1.5a;d(3)

RATING: 3

FINDING:

Two keys are unlabeled on the Process Computer directory selection pushbuttons (auxiliary keyboard) - (one which generates question marks, the other "S").

RESPONSE:

The identified irrelevant keys do not cause operator confusion nor potential system degradation. Therefore, due to the lack of justification for a change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.056

GUIDE NO.: 7.1.5d(4)

RATING: 3

FINDING:

Inconsistency of function controls for Process Computer consoles alarm acknowledge and reset different from the SPDS.

RESPONSE:

The inconsistency of the function controls for the alarm acknowledge and reset between the SPDS and the process computer does not present operator difficulty in there use. Therefore, due to the lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.057

GUIDE NO.: 7.1.8a;b(1)

RATING: 3

FINDING:

Computer procedures for plant process computer are not well organized, formally revised or prepared from operator point of view. Codes or addresses by which data displays can be called up by an operator are not cross indexed.

RESPONSE:

The control room operators receive on the job training in the use of the process computer and this training is formally documented. As stated previously, the process computer does not require extensive operator interaction to operate. Therefore, due to the operator training and relative ease of use of the process computer, the existing computer procedure is adequate for the operator's needs and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.058

GUIDE NO.: 7.2.1c(2)

RATING: 3

FINDING:

Ambient illumination is in medium range but Process Computer CRTs use light characters on a dark background rather than required reverse contrast relationship.

RESPONSE:

Since character legibility is not a problem for the process computer CRTs, this discrepancy does not create a problem for the control room operator. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.059

GUIDE NO.: 7.2.1c(4)

RATING: 3

FINDING:

Luminance of the characters on Process Computer is below requirement (8.3 ft.l vs. 23 ft.l respectively).

RESPONSE:

Since character legibility is not a problem for the process computer CRTs, this discrepancy does not create a problem for the control room operator. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.060

GUIDE NO.: 7.2.1d(1)

RATING: 3

FINDING:

Contrast relationship on Process Computer between characters and screen (4.2:1) is below 15:1 to 20:1 minimum range.

RESPONSE:

Since character legibility is not a problem for the process computer CRTs, this discrepancy does not create a problem for the control room operator. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.061

GUIDE NO.: 7.2.1h(1)(2)

RATING: 3

FINDING:

Process Computer CRT display controls are not adjustable by the operator. Control is possible through the back of the console panel presenting an electrical hazard to use.

RESPONSE:

The process computer CRT controls are preset to provide an easily readable display for the control room operators. The relocation of the controls would therefore not benefit the operators since the CRTs are quite legible as is. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.062

GUIDE NO.: 7.2.3c(1)(a)

RATING: 3

FINDING:

The left and right edges of the Process Computer alarm CRT and display CRT respectively are 42.5° off the straight line of sight, well above 35° limit.

RESPONSE:

The identified displays are used for monitoring purposes and are not intended for use with the keyboard. The operator console CRT is within the 0700 guidelines for use with the keyboard. Therefore, based on the purpose of the identified CRTs, this discrepancy is not appropriate and no further action is planned to correct this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.063

GUIDE NO.: 7.2.4f(1)

RATING: 3

FINDING:

On Process Computer "interactive terminal" words rather than numbers are frequently used as item designators.

RESPONSE:

The use of word designators provides a readily recognized description of the menu selection. The operator quickly comprehends the menu item and knows what purpose it serves. Using numbers for menu selection would add an abstract feature to the menu selection that would slow down choice selections, especially since the word designators have been in use for several years. Therefore, due to a lack of justification for a change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.064

GUIDE NO.: 7.2.4f(2)

RATING: 3

FINDING:

Numerical designators from Process Computer menus do not always begin with "1", e.g., "BORON" on interactive terminal uses 0 as first designator.

RESPONSE:

The process computer does use the letter "O" but does not use the number "0" in menu designators. Therefore, this discrepancy does not apply to the process computer and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.065

GUIDE NO.. 7.2.4g(2)

RATING: 3

FINDING:

Indentation on Process Computer is not used consistently for subclassifications.

RESPONSE:

The process computer does not use subclassifications such that indentation would be needed. Therefore, this HED does not apply to the process computer and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.066

GUIDE NO.: 7.2.4m(2)

RATING: 3

FINDING:

Some Process Computer and GERMS messages lack descriptive labels (e.g., LEAK RATE, HEAT- UP, COOL-DOWN, PLOTS NO LABEL).

RESPONSE:

The process computer provides all plots on trend recorders that have provisions for the operator to label the recorder with a temporary label. This label is provided by the operator based on a review of the trend recorders in use in the control room. Therefore, the existing arrangement for labeling plots from the process computer is adequate and no further action is planned to address this HED.

The GERMS displays are generally labeled but they will be further evaluated for possible correction as part of the on-going GERMS evaluation effort.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.067

GUIDE NO.: 7.2.4n;o

RATING: 3

FINDING:

Process Computer data label placement is not consistent, some labels are horizontal, some are vertical.

RESPONSE:

The data label placement for the process computer does not present difficulty in reading for the plant operator. Also, as stated in response to HED CK:7-1.046, the use of vertical labels is appropriate for the vertical axis of graphs. Therefore, due to the lack of justification for a change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.068

GUIDE NO.: 7.2.6a(2)

RATING: 3

FINDING:

Error messages on Process Computer may inform operator that something is incorrect but not how to correct or complete sequence.

RESPONSE:

The operator interaction with the process computer is not substantial and the error messages are therefore minimal. The operator will attempt to correct the mistake (e.g., typographical error) and try again. If he is unsuccessful in correcting the error, additional assistance is available from the other operators or the on-site computer specialist. This discrepancy does not create any significant operator problems in working with the process computer and the cost of providing the software changes to provide error message instructions would be substantial and would utilize significant memory space which is already limited. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.069

GUIDE NO.: 7.2.6c-g

RATING: 3

FINDING:

System prompt/error message procedures on Process Computer are inadequate, e.g., invalid data can be input in the interactive terminal mode (e.g., boron concentration change) without an error message. System will proceed with calculations anyway.

RESPONSE:

The process computer does not involve substantial operator interaction to perform its functions. The majority of the interaction involves selecting trend points to monitor on both systems. Therfore, the addition of prompting features or error-checking features would be of little benefit to the plant operators. The software changes would be substantial. Based on the lack of sufficient justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.070

GUIDE NO.: 7.2.6i

RATING: 3

FINDING:

System status feedback messages on Process Computer provided in part only on lights adjacent to CRT. Operator must interrogate on operator CRT to discern specifics.

RESPONSE:

The system status lights provide the needed information for operator use of the process computer. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.071

GUIDE NO.: 7.2.6k

RATING: 3

FINDING:

Process Computer feedback messages or indications are not provided to tell the operator that there is a system delay.

RESPONSE:

The operator is provided with system status by the lights on the operating console. The addition of software to display a message regarding system status is not warranted for the small benefit gained. The process computer does not require substantial operator interaction to provide the needed level of support for the plant operator. Therefore, due to the lack of justification for a change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.072

GUIDE NO.: 7.2.61

RATING: 3

FINDING:

There is a lack of positive feedback indication on Process Computer and GERMS upon the completion of a print command.

RESPONSE:

Due to the lack of substantial operator interaction with the process computer, status messages such as "end of print run" would not be a substantial benefit to the operators. Furthermore, the printer status light provides the needed level of information that the printer is on-line. Therefore, due to the lack of justification for a change, no further action is planned to address this HED for the process computer.

The GERMS computer does require substantial operator interaction and the system delay during certain operations is confusing to the operator. Therefore, the need for system status messages will be considered as part of the GERMS evaluation program.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.073

GUIDE NO.: 7.3.1d

RATING: 3

FINDING:

Control room printer below speed requirement of 300 lines/minute (capability = 200 lines/minute; backup capable of 600 lines/minute).

RESPONSE:

Prior to the identification of this HED, AP&L had already budgeted the purchase of a 600 lines/minute printer to replace the process computer printer. Therefore, this HED will be resolved by corrective action.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.074

GUIDE NO.: 7.3.1e(2)

RATING: 3

FINDING:

There is no positive indication of remaining supply of paper for Process Computer printer. Paper supply inside cabinet.

RESPONSE:

The backup printer is automatically selected when the main printer runs out of paper. Therefore, no data is lost when the paper runs out. No further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.075

GUIDE NO.: 7.3.1e(3)

RATING: 3

FINDING:

Instructions for reloading Process Computer printer paper, ribbon, etc., are not available on a plate attached to the printer.

RESPONSE:

The control room operators only have to load paper into the printers since the ribbon replacement, etc. is part of routine maintenance by a dedicated group on-site. The reloading of paper is not a problem for the operators since it is done regularly. When new operators have to change paper there is plenty of help available from the other more experienced operators if a problem should arise. Therefore, the addition of printer instructions for the loading of paper would not be of benefit to the operators and would be another administrative detail to maintain in addition to the already burdensome administrative details associated with a plant operator's job. No further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.076

GUIDE NO.: 7.3.1e(5)

RATING: 3

FINDING:

The takeup device for printed materials on both control room and back-up printers have a capacity less than the capacity of the feed supply.

RESPONSE:

The collection cage capacity does not present a problem to the control room operators. However, the new printer being purchased in 1985 will have a full capacity collection cage. Therfore, this discrepancy is being resolved.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.0 7

GUIDE NO.: 7.3.1f(4)

RATING: 3

FINDING:

Recorded matter on the Process Computer printer output is obstructed in both control room and backup printers preventing direct reading of printed material.

RESPONSE:

The new printer being purchased will have a larger opening for viewing the printer output. However, due to the speed of the printer it will not be possible to read the output as it is being printed. The printer cover is hinged to read the output if it is not desired to remove the printout from the printer. The existing printer also has a hinged cover which makes reading the output convenient. Therefore, since printer output is easily read by lifting the printer cover, no further corrective action is needed to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.078

GUIDE NO.: 7.3.2f(2)

RATING: 3

FINDING:

There is a lack of consistency between the wording of printed alarm message on the process computer and the information presented on the annunciators.

RESPONSE:

The process computer and the annunciator windows do not necessarily receive the same alarm input from the various systems around the plant. Therefore, the alarm messages are sometimes worded differently. The alarm messages are clear in both cases and do not cause operator confusion. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.108

GUIDE NO.: 7.2.4o

RATING: 3

FINDING:

Some labels are oriented vertically rather than horizontally on GERMS.

RESPONSE:

The use of vertical labels for the vertical axis of a graph is appropriate and provides for the best utilization of screen space. Therefore, due to the inappropriateness of this guideline for graphic displays, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.109

GUIDE NO.: 7.2.4p(2)

RATING: 3

FINDING:

The technique used to highlight labels on GERMS is not consistently and easily distinguishable from that used for emergency or critical messages.

RESPONSE:

The technique for highlighting labels and emergency data will be considered in the GERMS evaluation program.

CORRECTIVE ACTIONS

HED NO.: CK:7-110

GUIDE NO.: 7.2.5b

RATING: 3

FINDING:

Physical location of specific data groups on GERMS screen are not consistent.

RESPONSE:

The location of specific data groups will be considered in the GERMS evaluation program.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.111

GUIDE NO.: 7.2.5d

RATING: 3

FINDING:

Lists of options on GERMS are not ranked in decreasing probability of selection.

RESPONSE:

The listing of options is generally presented on one screen of display such that prioritizing them would not be a significant benefit to the SAA. Also, the identification of the frequency of use is not practical for many of the options since their use is dependent on the situation that activates GERMS. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.112

GUIDE NO.: 7.2.5e

RATING: 3

FINDING:

Equal probability options on GERMS are not consistently presented in alphabetical or numerical order.

RESPONSE:

The use of alphabetical and/or numeric ordering for option lists will be considered in the GERMS evaluation program.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.113

GUIDE NO.: 7.2.5k(1)

RATING: 3

FINDING:

Urgent messages on GERMS requiring immediate operator response are not properly highlighted to attract operator attention.

RESPONSE:

Prior to the evaluation of this HED, AP&L had already initiated action to resolve this discrepancy as part of the on-going effort for the practical application of human factor's principles. The changes made to the GERMS display were to display the emergency action levels (a reverse video box on the map display) according to the following: red - general emergency; yellow - site area emergency; Cyan - alert; white - notification of unusual event; and green - o.k. Therefore this HED has been corrected.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.114

GUIDE NO.: 7.2.6a(2);b; d

RATING: 3

FINDING:

Messages and prompts on GERMS do not consistently present operator with information necessary to complete specific action sequence.

RESPONSE:

The need for additional messages and prompts will be considered in the GERMS evaluation program.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.115

GUIDE NO.: 7.2.6g

RATING: 3

FINDING:

In event of error on GERMS, operators are not provided with required corrective action for the computer. Operator must initiate error corrections.

RESPONSE:

The need for error message instructions will be considerd in the GERMS evaluation program.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.116

GUIDE NO.: 7.2.6i-k

RATING: 3

FINDING:

GERMS does not provide feedback to the operator regarding changes in status of computer system nor periodic feedback during system delays.

RESPONSE:

The need for system status messages will be considered in the GERMS evaluation program.

CORRECTIVE ACTIONS

HED NO.: CK:7.1.117

GUIDE NO.: 7.2.7b(1)

RATING: 3

FINDING:

Highlighting methods that provide information on GERMS don't have same meaning in all applications.

RESPONSE:

The consistency of highlighting methods will be considered in the GERMS evaluation program.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.118

GUIDE NO.: 7.2.7d

RATING: 3

FINDING:

Blinking for highlighting on GERMS is not reserved for emergency or critical situations.

RESPONSE:

The use of blinking will be considered in the GERMS evaluation program.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.119

GUIDE NO.: 7.2.7(1)

RATING: 3

FINDING:

Color used on GERMS CRT are not consistent with other color codes in control room (e.g., red not necessarily indicative of an alarm state).

RESPONSE:

The colors used on the GERMS displays (i.e., maps) were selected based on the need for good contrast for viewing ease. The colors have no meaning or coding associated with them (with the exceptions described in the comments for HED: CK:7-1.113) and are not relatable to other uses of color in the control room. An effort to standardize color usage between the GERMS graphics and the other control room indicators would unnecessarily restrict the color choices available for the GERMS. This would result in a display that would be harder to read. Therefore, due to the bases for the use of color on the GERMS displays, this 0700 guideline is inappropriate and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.120

GUIDE NO.: 7.2.7k(2)

RATING: 3

FINDING:

Color coding not consistent within the GERMS system.

RESPONSE:

The colors used on the GERMS displays (i.e., maps) were selected based on the need for good contrast for viewing ease. The colors have no meaning or coding associated with them (with the exceptions described in the comments for HED: CK:7-1.113) and are not relatable to other uses of color in the control room. An effort to use color coding would unnecessarily restrict the color choices available for the GERMS. This would result in a display that would be harder to read. Therefore, due to the bases for the use of color on the GERMS displays, this 0700 guideline is inappropriate and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:7-1.121

GUIDE NO.: 7.2.71(1-3)

RATING: 3

FINDING:

Use of red, green, and yellow is not reserved to indicate criticality or danger, safe or no action required and hazard or caution respectively on the GERMS.

RESPONSE:

The colors used on the GERMS displays (i.e., maps) were selected based on the need for good contrast for viewing ease. The colors have no meaning or coding associated with them (with the exceptions described in the comments for HED: CK:7-1.113) and are not relatable to other uses of color in the control room. An effort to use color coding would unnecessarily restrict the color choices available for the GERMS. This would result in a display that would be harder to read. Therefore, due to the bases for the use of color on the GERMS displays, this 0700 guideline is inappropriate and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.001

GUIDE NO.: 8.1.1.a; 8.1.1.b; 8.2.1.c(1)

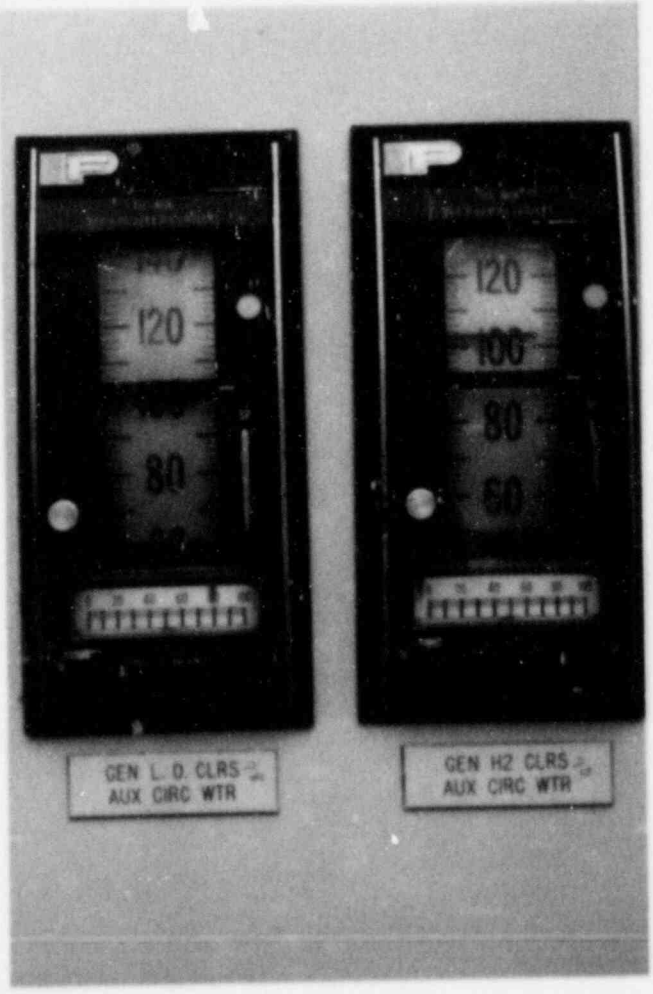
RATING: 3

FINDING:

The following components are not grouped with associated components; Panel C-19: Equipment ID# T1C4026 and T1C4018.

RESPONSE:

The identified controls are to be evaluated for possible relocation to Panel C-11 from Panel C-19.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.002

GUIDE NO.: 8.1.1c

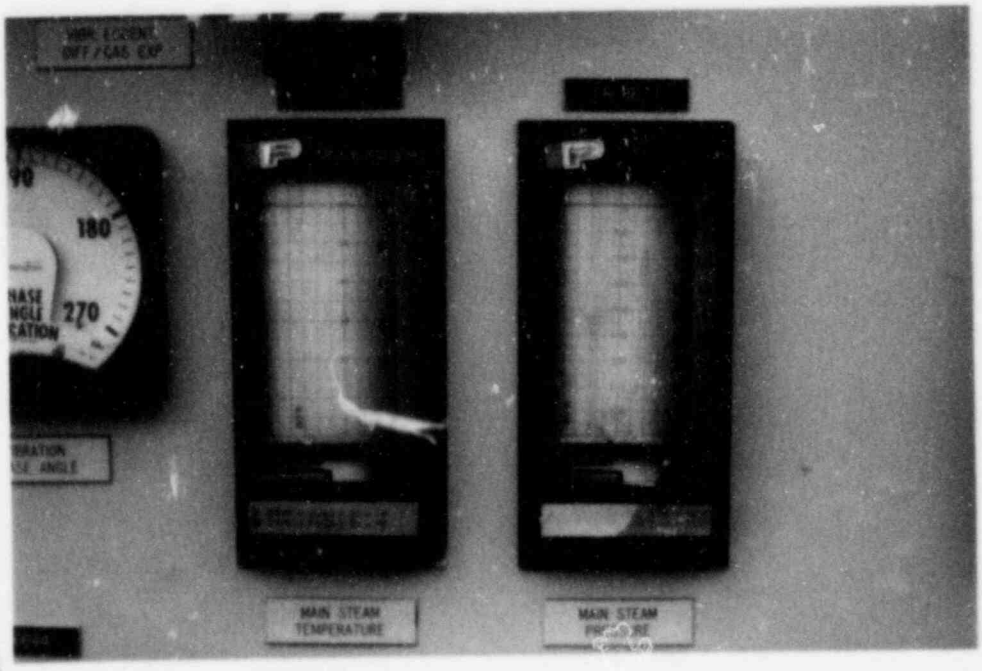
RATING: 3

FINDING:

Important indications for mainsteam temperature and pressure for operations at C-01 are located on C-11.

RESPONSE:

The controls and displays on C-01 and C-11 are intended to work together. Therefore, the location of the identified displays on C-11 was intentional such that they can be viewed from Panel C-01 where related controls are located. No further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.003

GUIDE NO.: 8.2.2.a

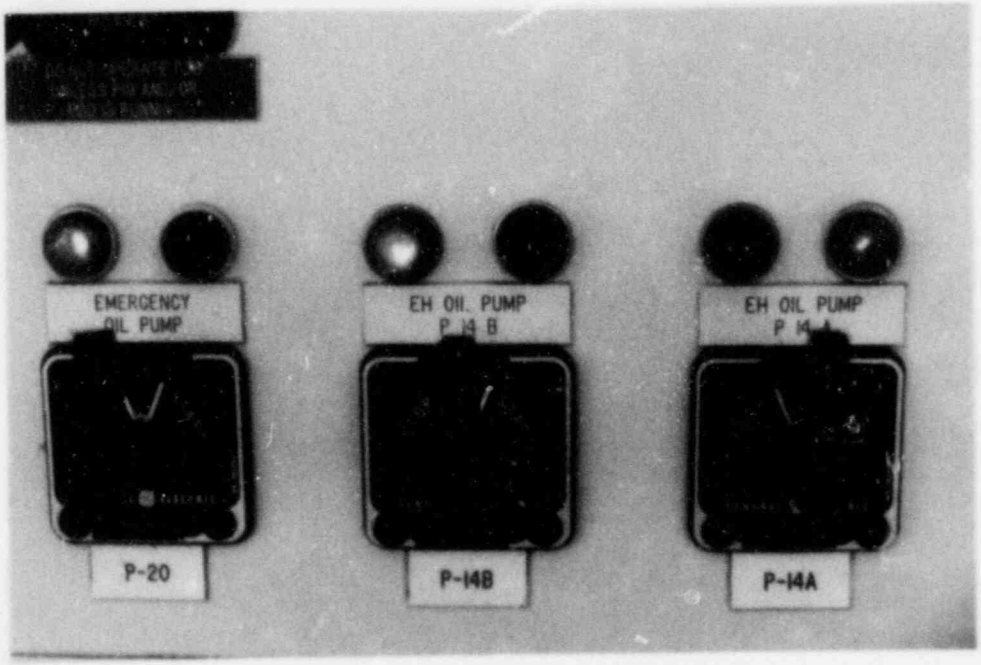
RATING: 3

FINDING:

The EH oil pump controls on C-01 are not arranged in logical order: alphabetical.

RESPONSE:

The identified controls will be evaluated for possible rearrangement in logical alphabetical order.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.004

GUIDE NO.: 8.2.2.a

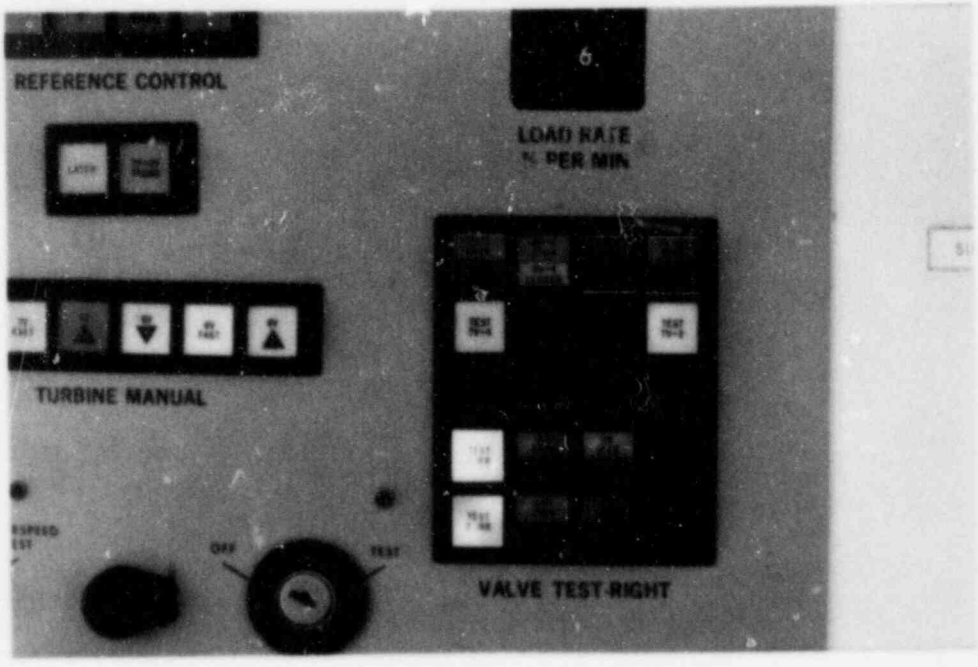
RATING: 3

FINDING:

Components on C-01 are not arranged in numeric sequence; TV-1; GV-1; GV-3; TV-3; TV-4; GV-4; GV-2; TV-2.

RESPONSE:

The arrangement of the legend lights and legend buttons on the turbine control panel mimics the physical arrangement of the turbine valves. Therefore, the arrangement is logical from a physical representation viewpoint rather than from an alphabetical viewpoint. No further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.007

GUIDE NO.: 8.2.2.a

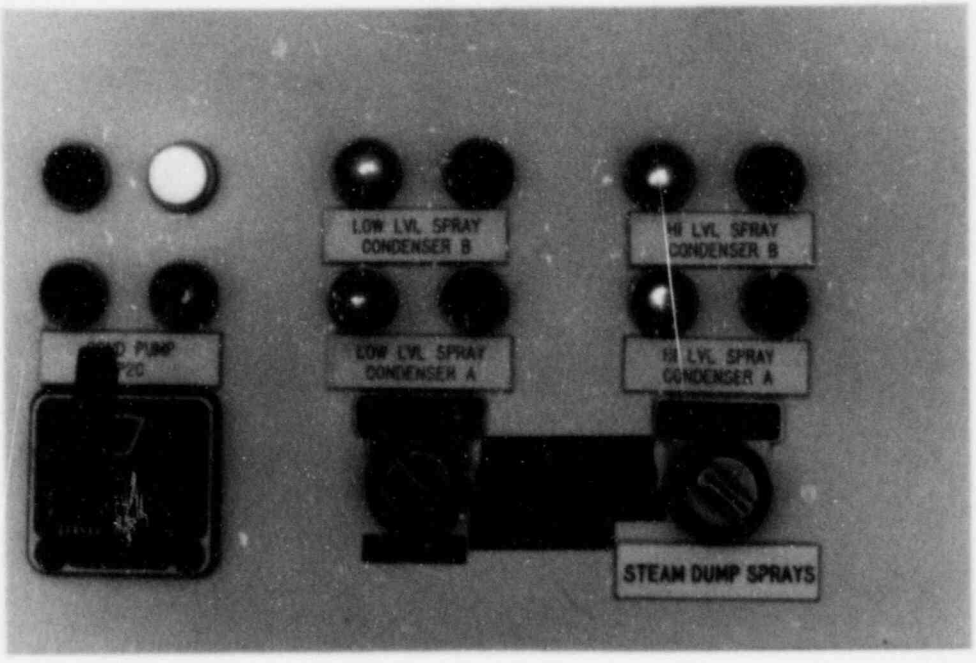
RATING: 3

FINDING:

Top-to-bottom; left-to-right convention is used except for the following controls: Panel C-02; Equipment ID# HS2907, Low Level Spray Condenser B; Low Level Spray Condenser A; High Level Spray Condenser B, High Level Spray Condenser A; FW Turbines Pref Trip.

RESPONSE:

The identified control and indicating lights will be evaluated for rearrangement into a logical alphabetical order. (See also HED CK:9-1.002).



CORRECTIVE ACTIONS

HED NO.: CK:8-1.008

GUIDE NO.: 8.2.2.b

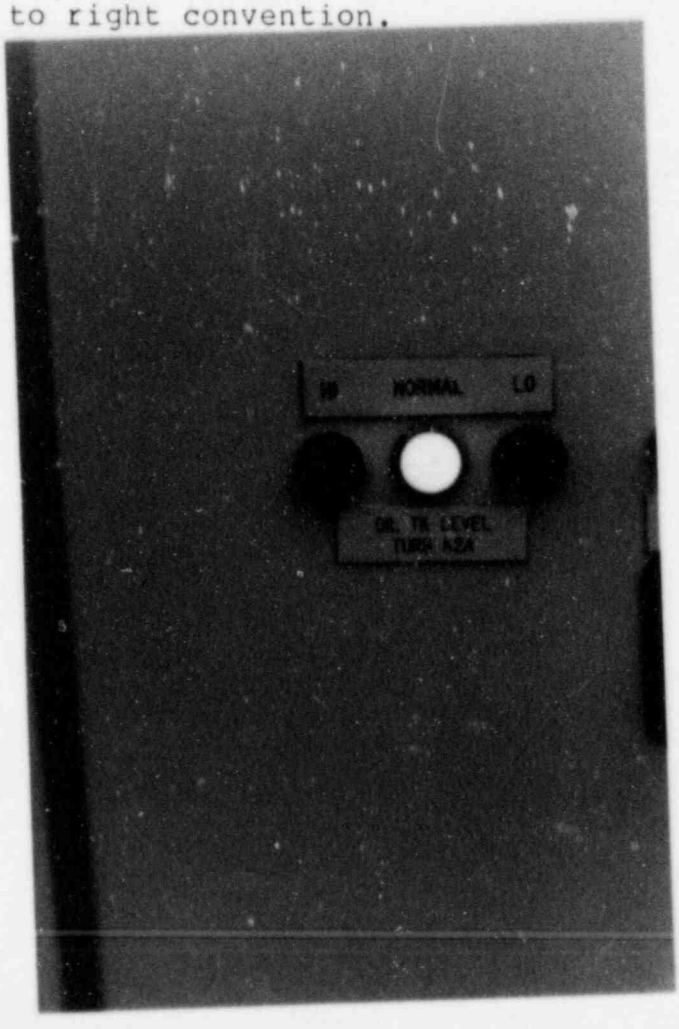
RATING: 3

FINDING:

The arrangement of the feed pump turbine oil tank level indicator lights is counter to operator expectations. HI-NORMAL-LO is backward from left- to-right convention.

RESPONSE:

These indicator lights will be evaluated for rearrangement to the normal left to right convention.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.009

GUIDE NO.: 8.1.1.b

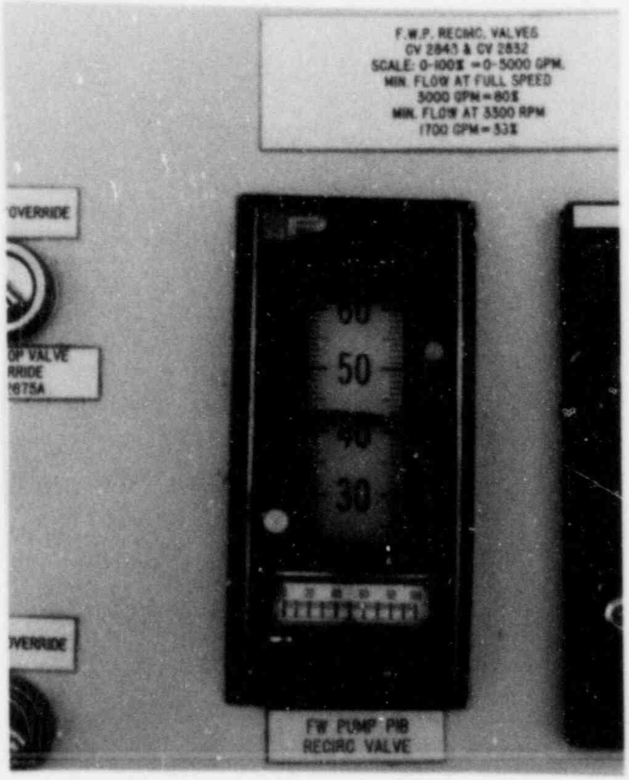
RATING: 3

FINDING:

FW recirc vlvs are not functionally associated with FW pumps K2A; K2B on CO2. Do not have major function on CO3.

RESPONSE:

The feedwater pumps are on Panel C-03 which is where the recirc valve controls are located. Some of the feedwater pump auxiliary systems are controlled from C-02. Therefore, the location of the identified controls is appropriate for the purpose they serve.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.010

GUIDE NO.: 8.1.1.a

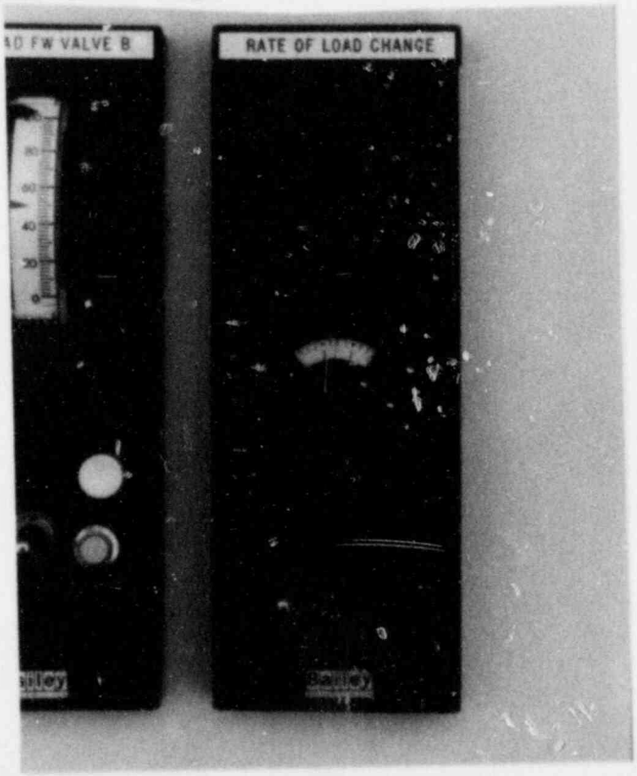
RATING: 3

FINDING:

Rate of load change controller should be in between unit load master and lo-load limit for proper logical sequence.

RESPONSE:

The identified controller is clearly labeled to show the purpose and has not created operator confusion in the present location. Since the existing arrangement is not troublesome for the operators and operator training adequately covers the operation of this control, relocation could result in operator confusion due to negative training transfer. Therefore, due to a lack of justification for a change, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.011

GUIDE NO.: 8.1.2.d

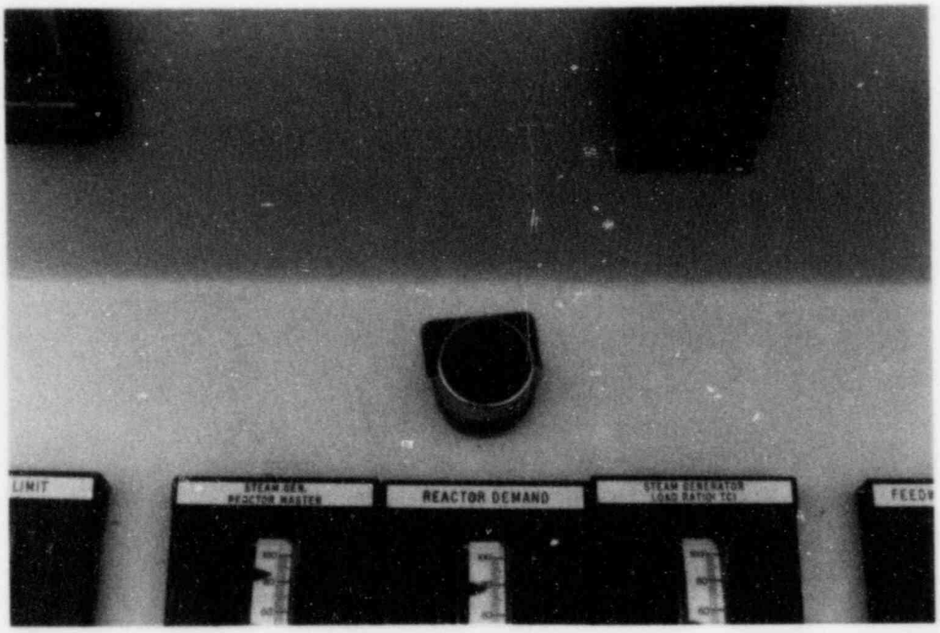
RATING: 3

FINDING:

Reactor trip button does not have a distinguishing enhancement that is readily visible. Button is red and label is red but label is not readily visible.

RESPONSE:

The labeling and enhancement of the reactor trip button will be evaluated for improved enhancement as part of the control room relabeling program.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.013

GUIDE NO.: 8.2.2.a

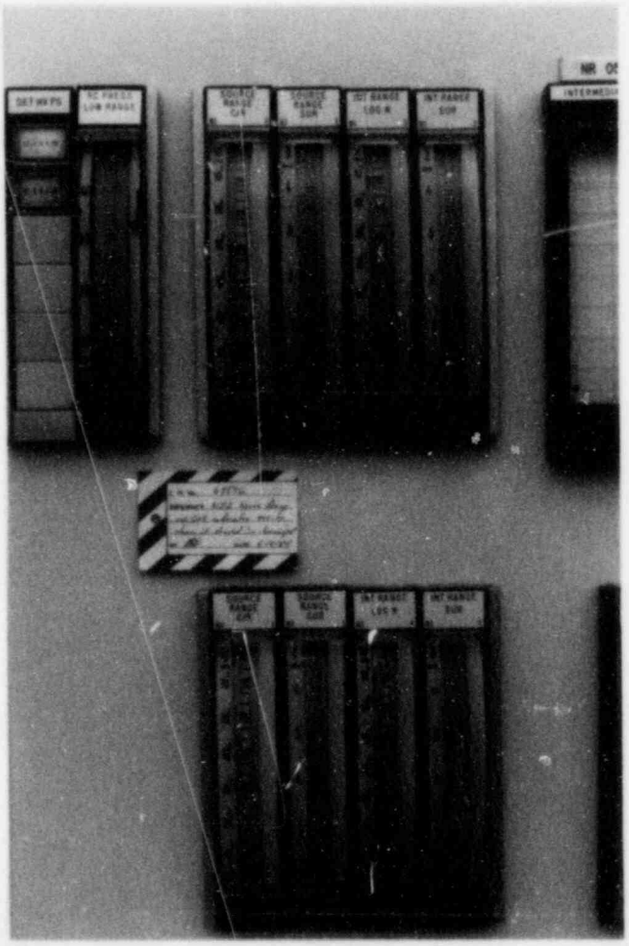
RATING: 3

FINDING:

The source range instruments on C-03 violate top-to-bottom numeric convention. This is a problem when recording instrument readings.

RESPONSE:

These instruments will be evaluated for possible rearrangement to conform with top to bottom numeric convention.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.014

GUIDE NO.: 8.2.2.b

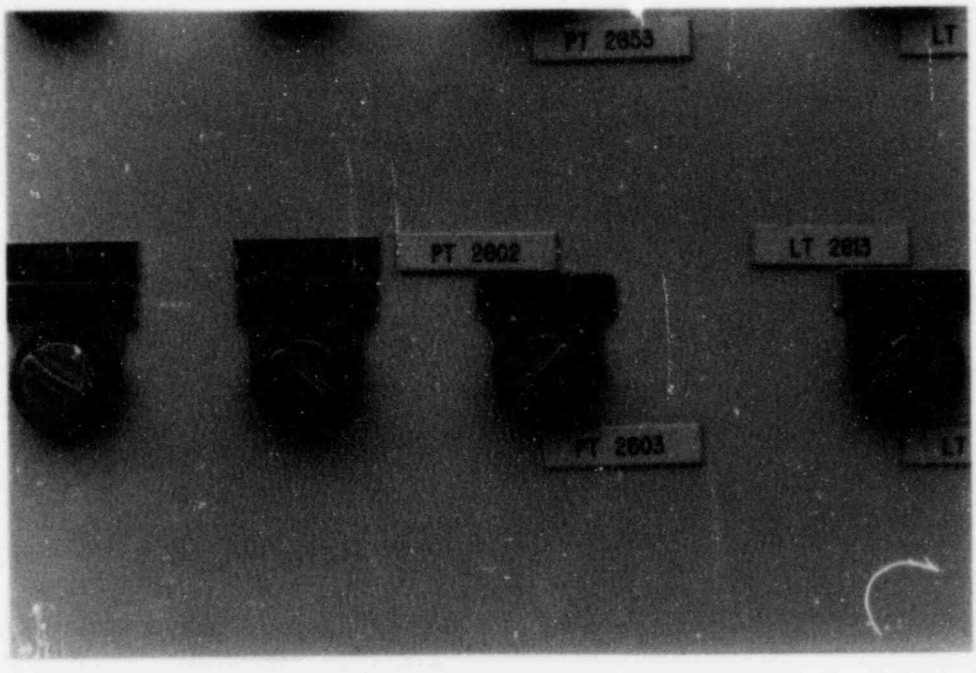
RATING: 3

FINDING:

Meter select switches have preferred powered supply instruments in the left position (NNIX). One instrument is contrary to this operator expectation, Panel C-03; SG B/MN STM PR (PT1/PT2).

RESPONSE:

The identified selector switch will be evaluated for possible rearrangement of the selection positions.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.015

GUIDE NO.: 8.1.1.b

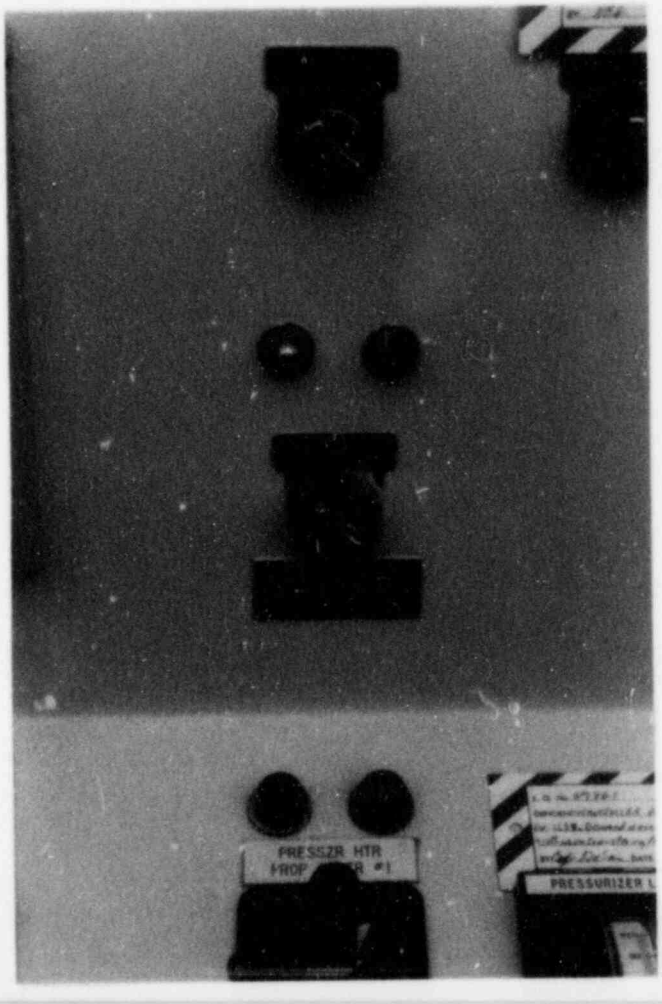
RATING: 3

FINDING:

Component associated with pressurizer relief controls PSV1000 and CV1000 are not grouped by systems function. They are physically separated from each other. Panel C-04; Equipment ID# HS1013, Pressurizer Electromatic Relief Setpoint Selector.

RESPONSE:

These controls will be evaluated for possible association enhancement as part of the control room relabeling program.



4917/a/34

CORRECTIVE ACTIONS

HED NO.: CK:8-1.016

GUIDE NO.: 8.1.1b

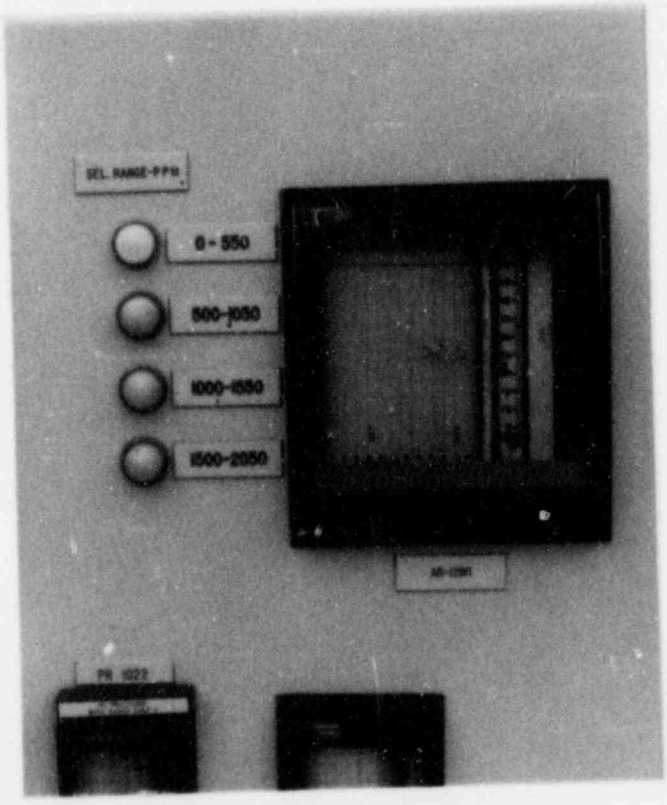
RATING: 3

FINDING:

Boronometer is not located with letdown components TI1237; FI1236; PI1237; LI1604; PI1608; P39A; P39B and is functionally related to these components.

RESPONSE:

The identified recorder is not utilized in conjunction with the operation of the letdown controls. It is primarily a monitoring display not directly associated with control devices. The current location provides for convenient viewing and does not create operator problems. Therefore, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.017

GUIDE NO.: 8.1.1.b

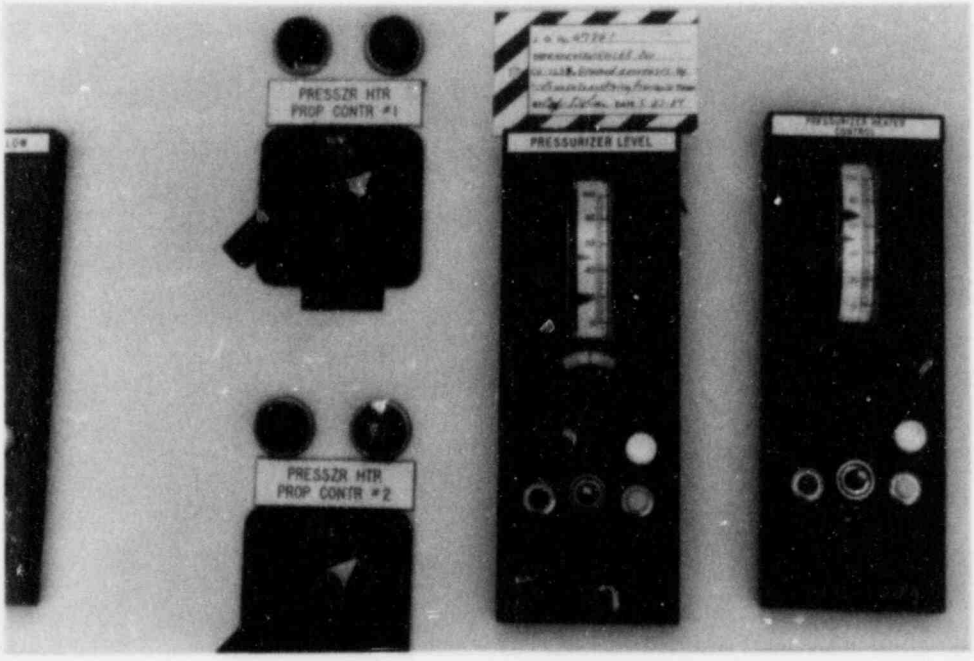
RATING: 3

FINDING:

Pressurizer heater control is not located adjacent to associated heater bank controls.

RESPONSE:

The identified related controls will be evaluated for possible association enhancement as part of the control room relabeling program.



CORRECTIVE ACTIONS

HED NO.: CK:1.018

GUIDE NO.: 8.1.1.b

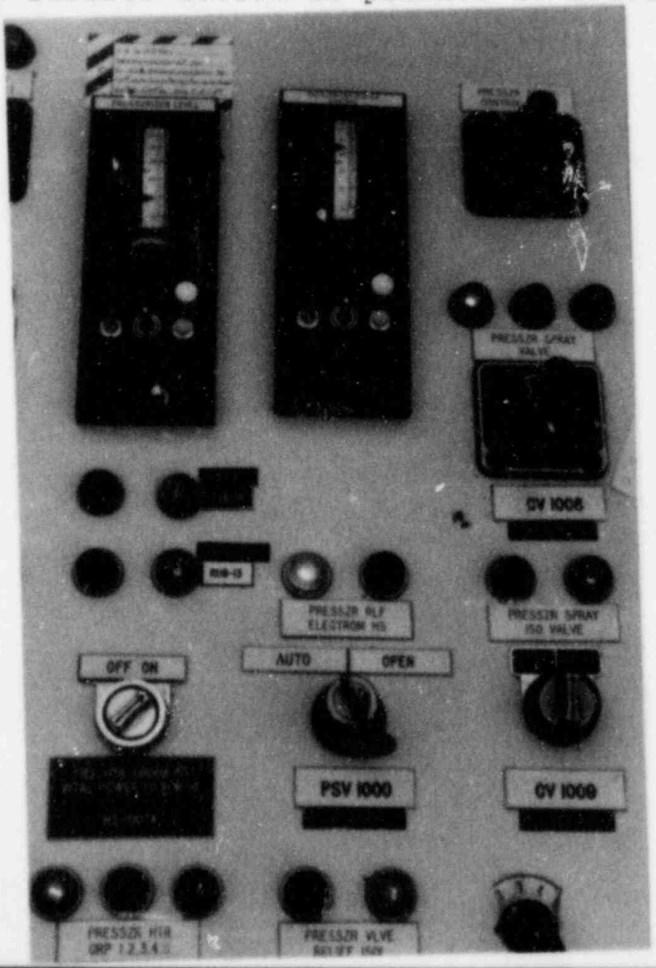
RATING: 3

FINDING:

Pressurizer level controller not located with associated pressurizer spray controls.

RESPONSE:

The pressurizer level controller (LIC-1000) is not functionally associated with the pressurizer spray valve control (CV-1008). Therefore, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.019

GUIDE NO.: 8.1.1.b

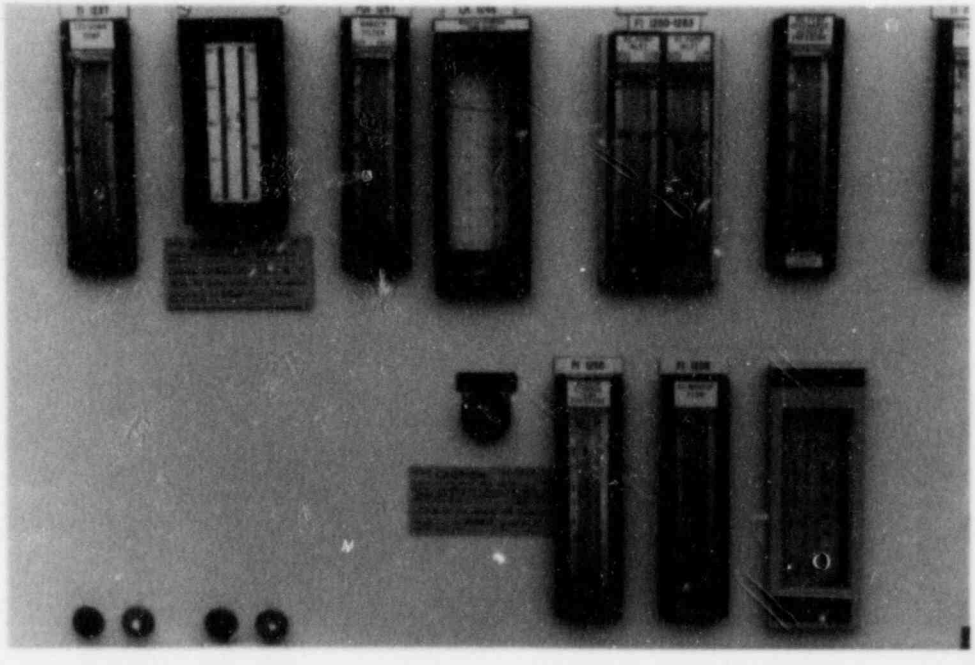
RATING: 3

FINDING:

Letdown, makeup and seal flows are related and should be located adjacent to one another on C-04 for comparison.

RESPONSE:

The identified displays are not used for comparison purposes (i.e., mass balance checks) since they are not accurate enough for that purpose. They are used in conjunction with controllers located below the displays such that the existing location is appropriate. Therefore, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.020

GUIDE NO.: 8.1.1.b

RATING: 3

FINDING:

Components are related and should be located adjacent for comparisons.

The components affected are equipment #'s: FI1280, FI1281, FI1282, FI1283, FR1239, RC pump seal Flow CV1207 controller.

RESPONSE:

The identified indicators are not located adjacent but are located near enough to make comparisons easily. The current locations do not create operator confusion or difficulty in reading. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.021

GUIDE NO.: 8.1.1b

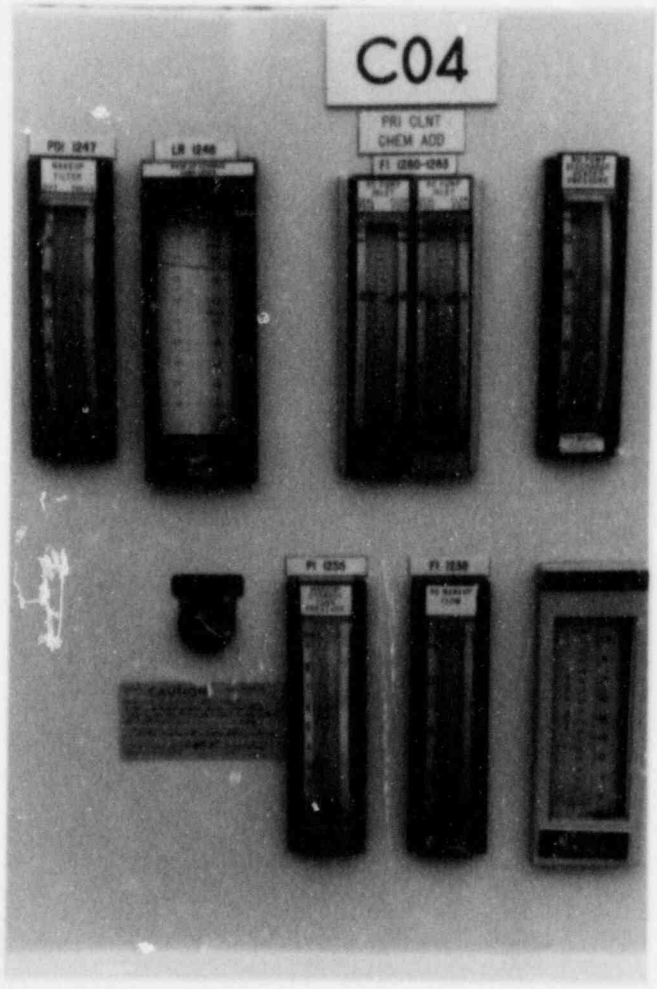
RATING: 3

FINDING:

The following components are related and should be grouped together: Panel C-04; Equipment ID# LR1248, PDI1247, PI 1255, MU PMP Discharge HDR Pressure.

RESPONSE:

The identified non-adjacent indicators are not related. Therefore, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.022

GUIDE NO.: 8.1.1.b

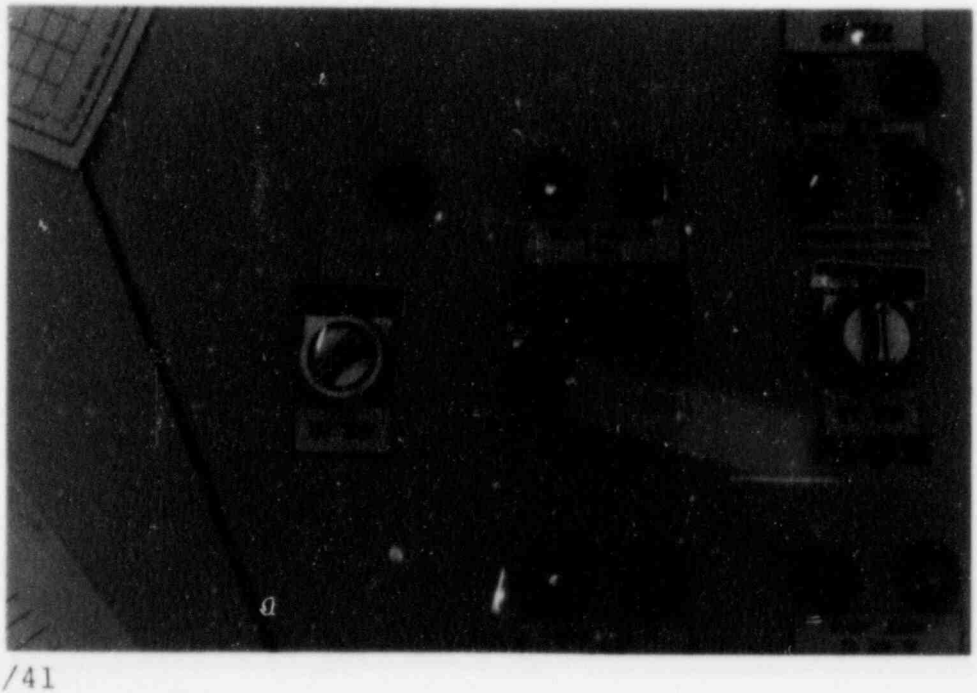
RATING: 3

FINDING:

Components are related and should be grouped together; also valve control is not associated with letdown and could be better located to the left of boric acid pumps on CO4. Panel C-04 - Local/Remote Selector - Condensate to Make-up Tank.

RESPONSE:

The identified controls are to be evaluated for: 1) deletion of CV-1251 local/remote selector switch (not used by plant operators), and 2) relocation of CV-1251 valve control switch to be closer to the associated controls.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.023

GUIDE NO.: 8.1.1.b

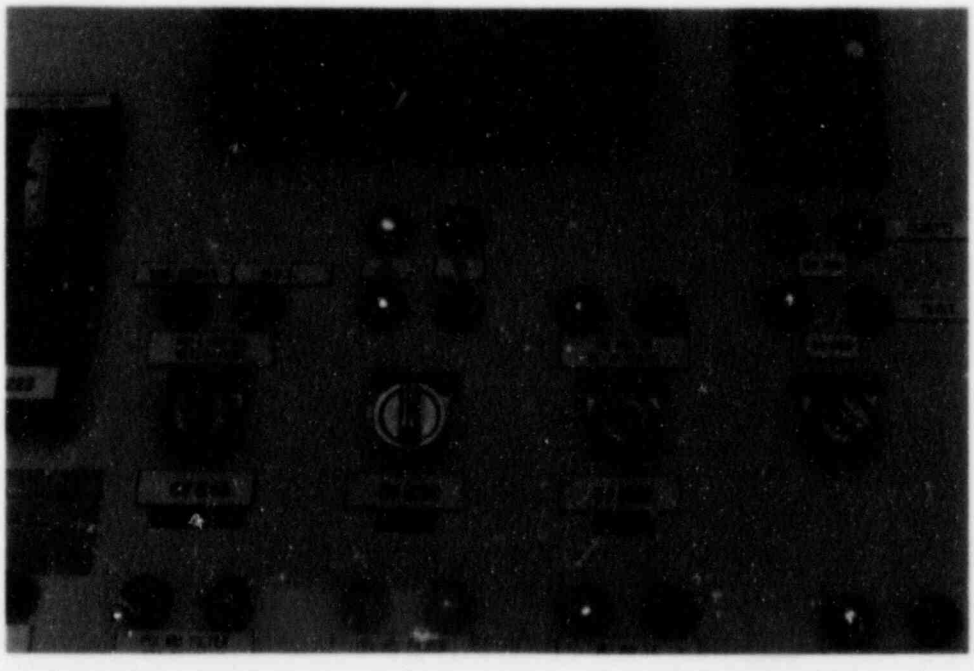
RATING: 3

FINDING:

The following components are related and should be grouped together: Panel C-04; Make-up Letdown Bleed/Feed, CWRT/MUT Selector Switch.

RESPONSE:

The identified components will be evaluated for rearrangement or association enhancement.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.024

GUIDE NO.: 8.1.1.b

RATING: 3

FINDING:

Condensate to quench tank valve control not associated with functional groups on C-04 but is associated with quench tank components on C-14.

RESPONSE:

The identified control will be evaluated for relocation from Panel C-04 to Panel C-14.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.026

GUIDE NO.: 8.2.2.a

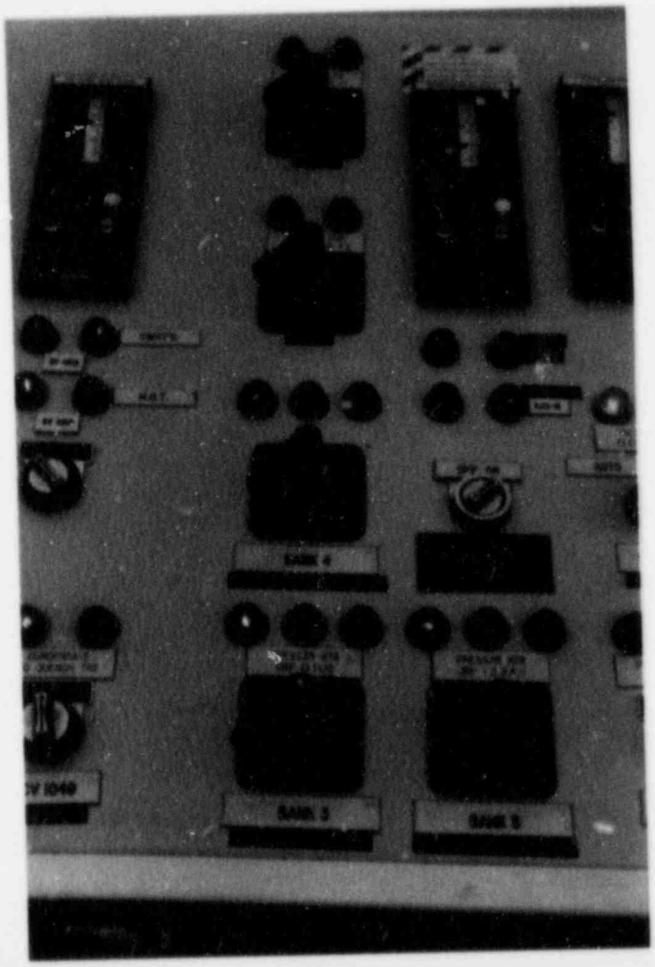
RATING: 3

FINDING:

Pressurizer heater banks violate top to bottom numeric sequence (1;2;4;3;5).

RESPONSE:

The pressurizer heater bank controls will be evaluated for rearrangement to a top to bottom numeric sequence.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.027

GUIDE NO.: 8.3.1.a

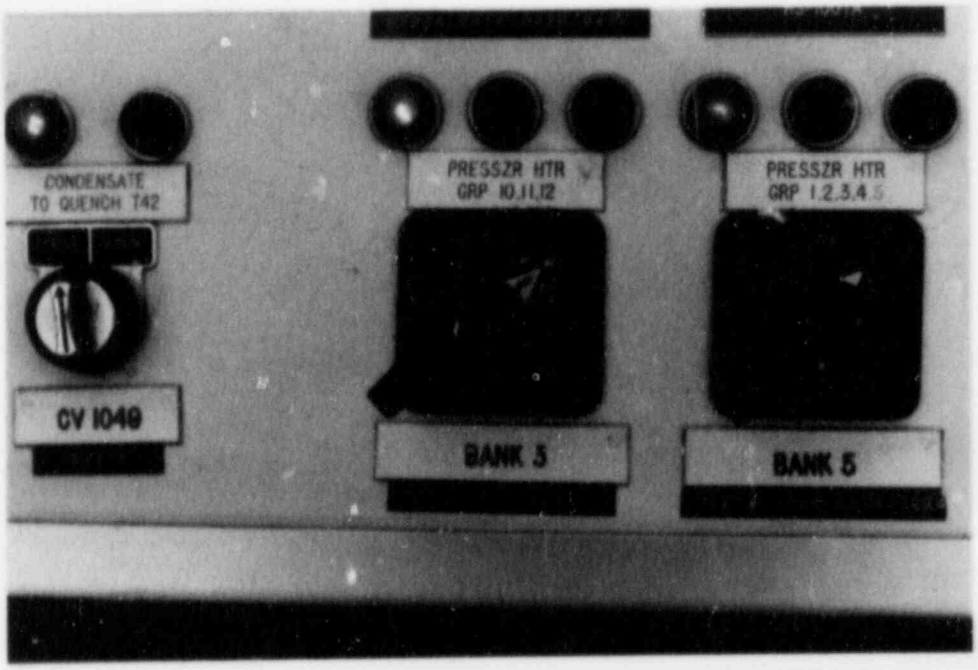
RATING: 3

FINDING:

Adjacent J handles for pressurizer heater controls (bank 3 and 5) on panel C-04 violate 3" min. separation in distance. These are not spring return and also represent possible inadvertent activation because of location on bottom row of controls.

RESPONSE:

The identified J-handle controls are not operated simultaneously and are not located such that inadvertent actuation is a problem. The controls are easily accessible even though they violate the 3 inch minimum separation. Therefore, due to a lack of justification for change, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.028

GUIDE NO.: 8.1.1.a

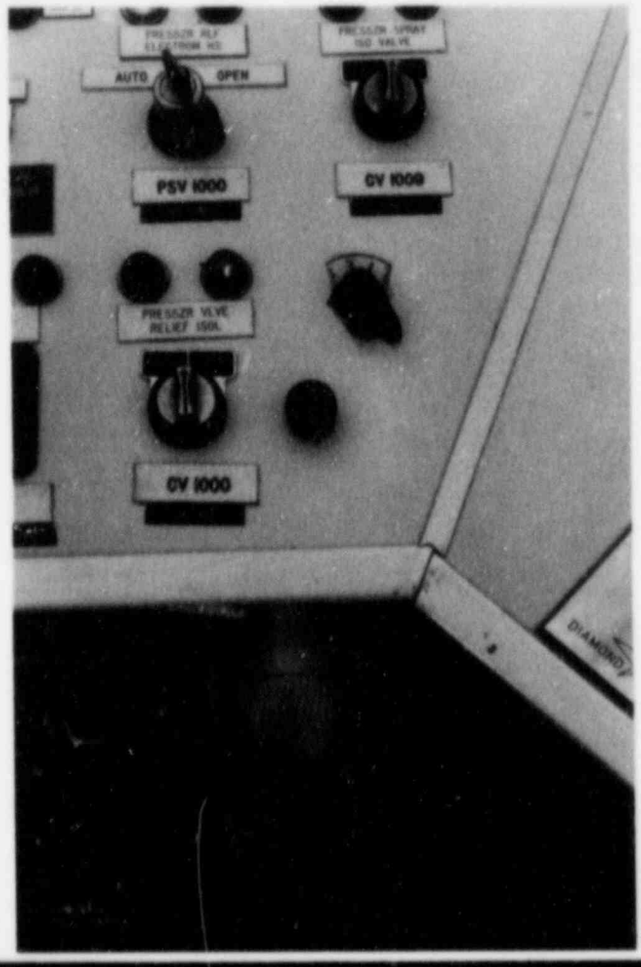
RATING: 3

FINDING:

The page selector and volume control are located on panel benchboard. The phone which they control is located on the vertical section of the board. The relationship is not clearly associated.

RESPONSE:

The controls for the gaitronics page/phone will be evaluated for association enhancement as part of the control room relabeling program.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.029

GUIDE NO.: 8.1.1.a

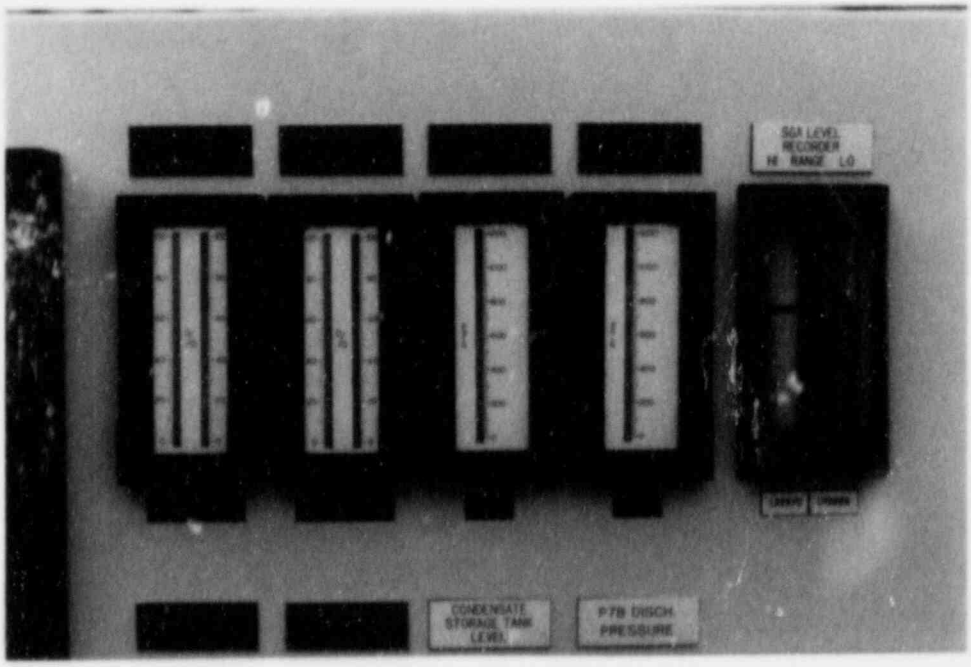
RATING: 3

FINDING:

SG level recorders not grouped with associated level meters. Comparisons are more difficult because not adjacent.

RESPONSE:

The steam generator level recorders and level meters are not used for comparison purposes. The level meters are used to get a reading of the level on an instantaneous basis while the recorders are used to get a trend of the level changes over a period of time. Therefore, due to a lack of justification for change, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.030

GUIDE NO.: 8.2.2.a

RATING: 3

FINDING:

SGB indications on left of SGA indications violating left to right alphabetic ordering.

RESPONSE:

The original plant design had the "A" emergency feedwater pump supplying the "B" steam generator and the "B" emergency feedwater pump supplying the "A" steam generator. Due to this arrangement the steam generator components were arranged in reverse alphabetical order to correspond to the plant layout. Since that time, the emergency feedwater system has been redesigned and the emergency feedwater pumps supply both steam generators. Therefore, the reason for the reverse orientation of the steam generator components on the C-09 has been eliminated. However, due to the fact that the instrumentation is consistently arranged in reverse alphabetical order for the steam generators and due to the major panel rearrangement necessary to correct this discrepancy, no further action is planned.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.031

GUIDE NO.: 8.2.3.a;b

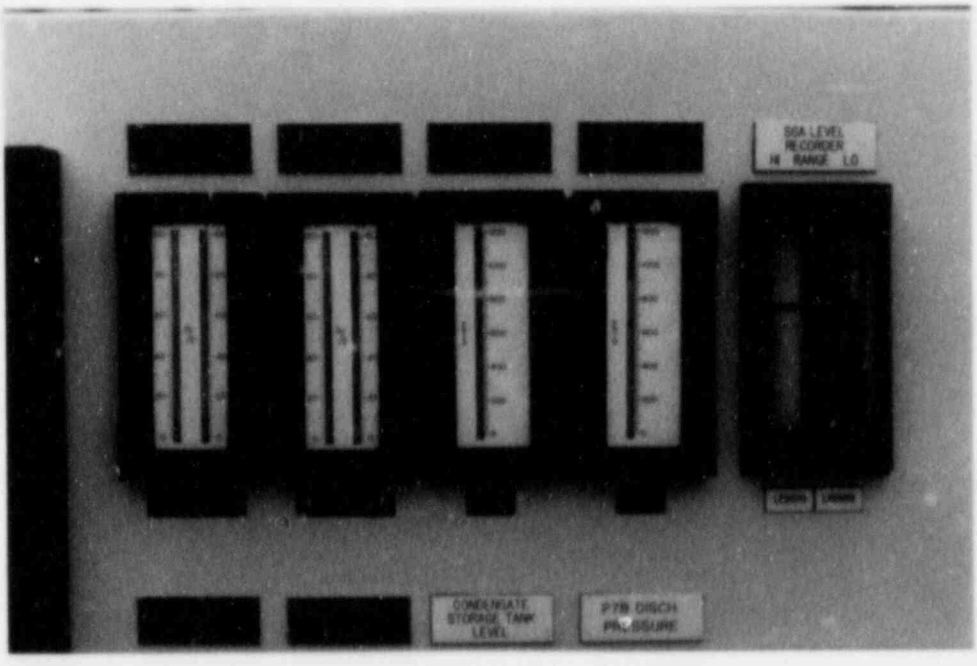
RATING: 3

FINDING:

SG A&B indications are mirror imaged for SGA; level; level; pressure; pressure for SGB; pressure; pressure; level; level.

RESPONSE:

The use of mirror imaging on panel C-09 was done to make the comparison of indicators easier when standing in front of the SPDS display. The operator uses the SPDS display as a center point and reads outward to his left and right to get information on the steam generators and EFW pumps. This arrangement is considered beneficial by the plant operators. Therefore, due to a lack of justification for change, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.032

GUIDE NO.: 8.3.1.a

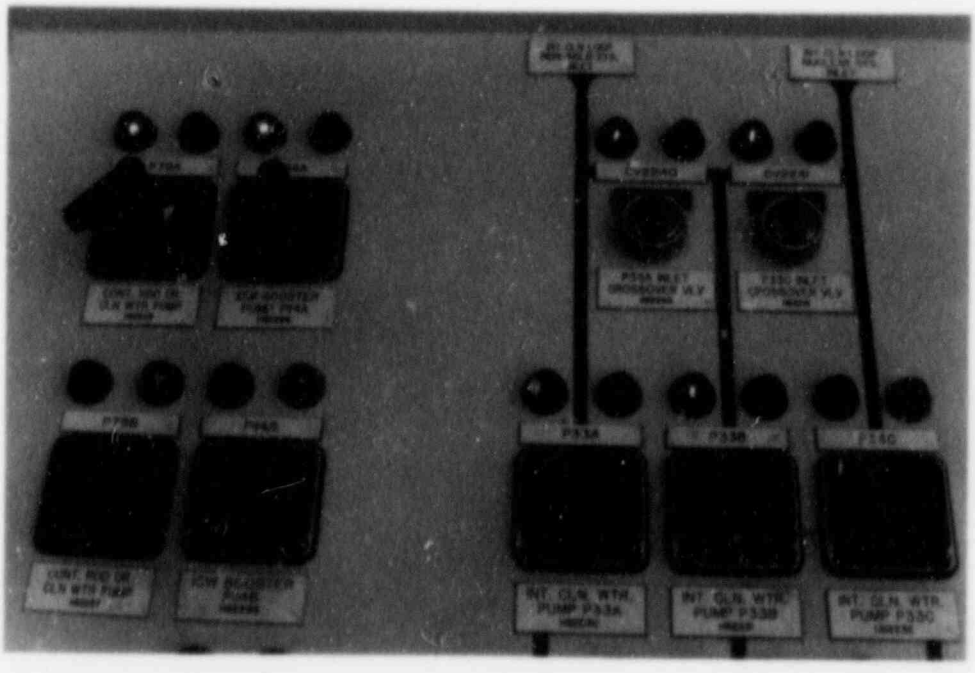
RATING: 3

FINDING:

J-handles violate minimum distance separation. P79A and P79B are not spring return and may hinder operation of P114A and P114B. P33A; P33B; P33C are spring return and should be OK as long as simultaneous operation is not required.

RESPONSE:

The identified J-handle controls are not operated simultaneously and do not cause operator difficulty in using them. They are arranged to facilitate mimics and to optimize use of the limited available space. Therefore, due to a lack of justification for change, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.033

GUIDE NO.: 8.1.1.A

RATING: 3

FINDING:

Recorders provide trend and indication for various pump bearing and motor winding temps which are observed after pump trouble alarms. The annunciators are located in different parts of the control room (e.g., FW pump alarms are on panel C-13 box K07). Panel C-19; Equipment ID# TR3629, TR2890, TR2808, TR3651.

RESPONSE:

The identified recorders will be evaluated for possible relocation or other association enhancement.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.034

GUIDE NO.: 8.1.1.b

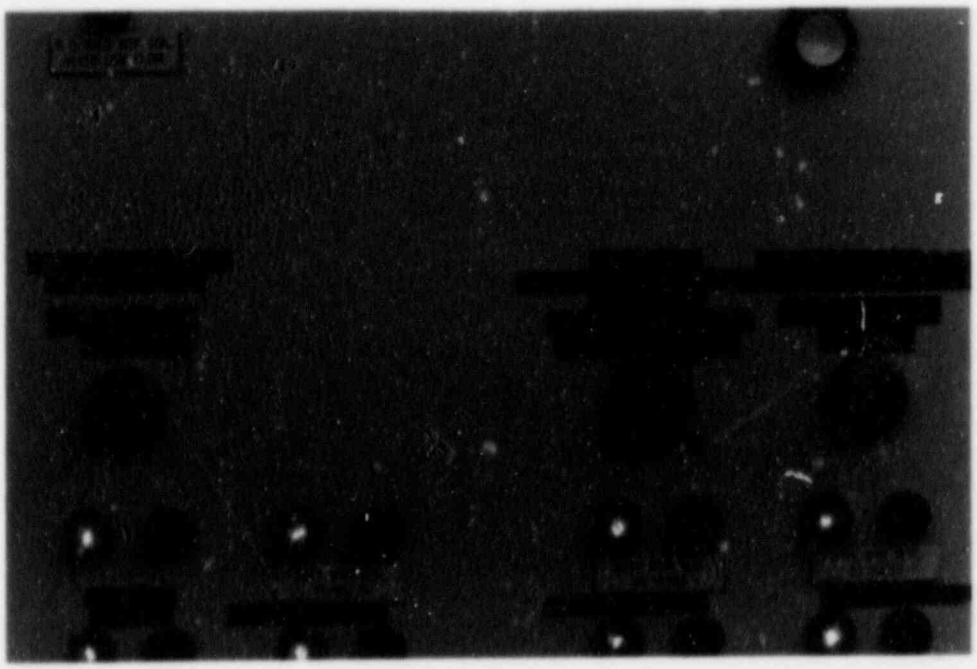
RATING: 3

FINDING:

Components are associated with CR ventilation controls VSF8A; VSF8B: etc. and should be grouped with them. Panel C-19; Equipment ID# HS7811, HS7910 and HS7812.

RESPONSE:

The identified controls will be evaluated for possible relocation or other association enhancement.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.035

GUIDE NO.: 8.1.1.b

RATING: 3

FINDING:

Fire pump controls are separated from associated fire detection system and fire water flow indicating lights.

RESPONSE:

The identified components are located such that they do not represent difficulty in reading or associating with other related components. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.036

GUIDE NO.: 8.1.1.b

RATING: 3

FINDING:

Service water discharge to flume and to emergency pond valve controllers are associated with service water systems but separated by unrelated controls.

RESPONSE:

The service water system controls will be evaluated for possible rearrangement and/or other association enhancements. (See also HED QS:B3.17-1.071).

CORRECTIVE ACTIONS

HED NO.: CK:8-1.037

GUIDE NO.: 8.1.1.b

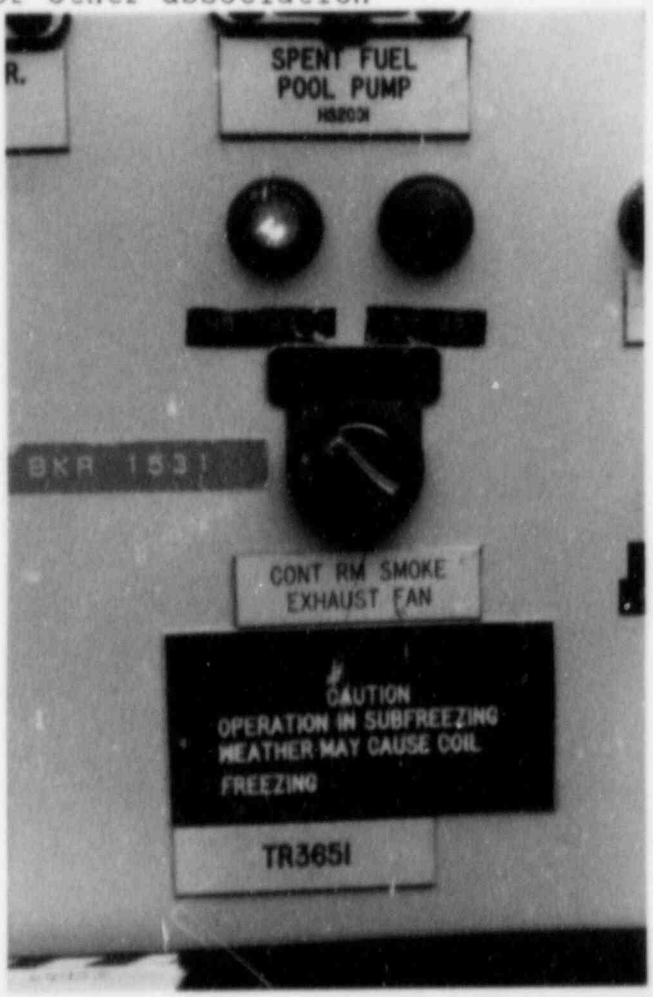
RATING: 3

FINDING:

Smoke exhaust fan controls are not located with functionally related CR ventilation controls (CR fans; CR filter airflows; CR emerg ventilation; etc.).

RESPONSE:

The control room smoke exhaust fan control will be evaluated for possible rearrangement and/or other association enhancement. (See CK:8-1.034).



CORRECTIVE ACTIONS

HED NO.: CK:8-1.038

GUIDE NO.: 8.1.1.b

RATING: 3

FINDING:

Instrument Air Header Pressure indicator is not located with associated service air instrumentation on upper left of vertical panel.

RESPONSE:

The Instrument Air Header Pressure indicator will be evaluated for possible rearrangement and/or other association enhancement.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.040

GUIDE NO.: 8.1.1.b

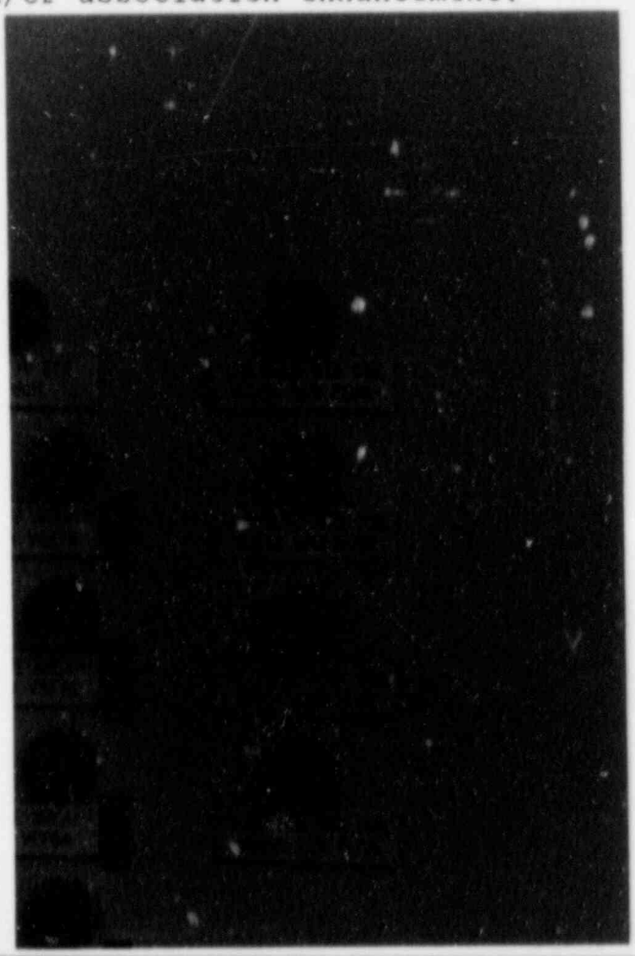
RATING: 3

FINDING:

R.B. chill water flow indicators are not located with associated chilled water instrumentation.

RESPONSE:

The identified components will be evaluated for possible rearrangement and/or association enhancement.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.041

GUIDE NO.: 8.2.1.c(1)

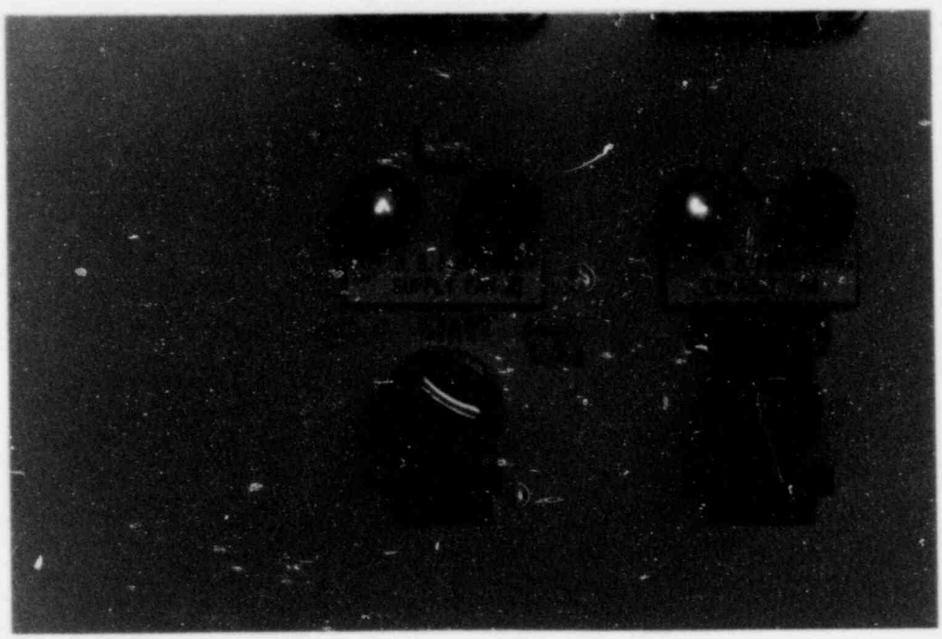
RATING: 3

FINDING:

R.B. ventilation and exhaust instrumentation and emgcy diesel exhaust fans separated from other ventilation and exhaust instrumentation by chilled water system.

RESPONSE:

The identified components will be evaluated for possible rearrangement and/or other association enhancement.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.043

GUIDE NO.: 8.2.2.a

RATING: 3

FINDING:

Main and control room chiller controls are not in logical left-to-right numerical sequence.

RESPONSE:

The identified components are not associated with each other in their purpose or operation. Therefore, the numerical sequence guideline does not apply to these components. No further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.044

GUIDE NO.: 8.2.2.a

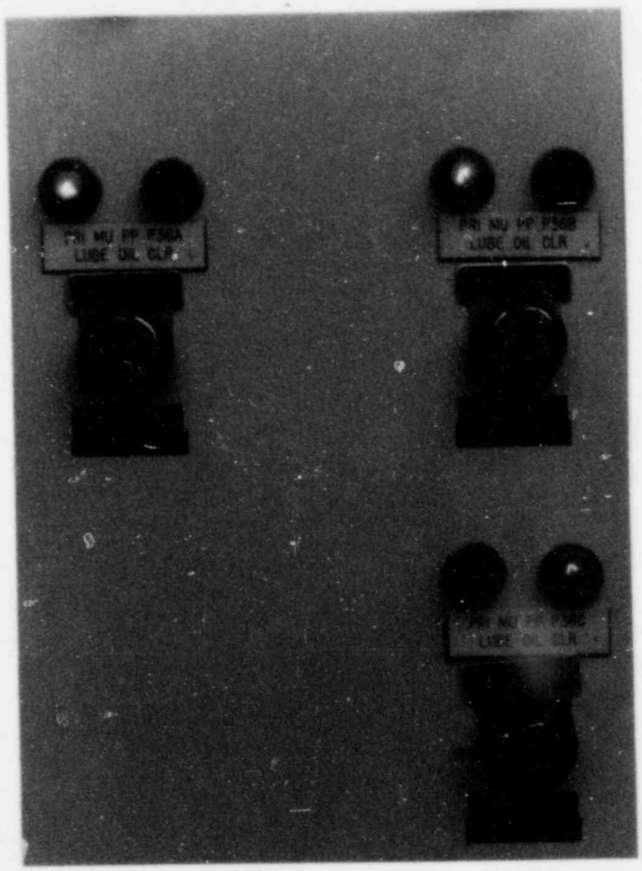
RATING: 3

FINDING:

Makeup pump lube oil cooler controls are not arranged in left-to-right; top-to-bottom order.

RESPONSE:

The identified components are arranged in left to right and top to bottom sequence. The arrangement does not present any difficulty for the operator to locate or actuate these controls. Therefore, due to a lack of justification for change, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.045

GUIDE NO.: 8.2.2

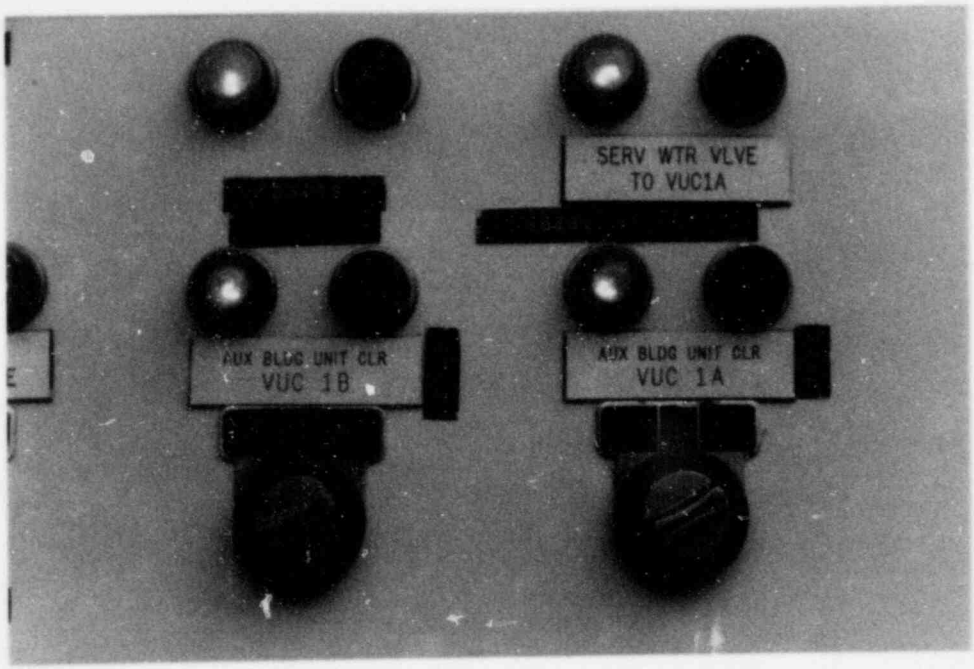
RATING: 3

FINDING:

VUC 1A and VUC 1B controls are not arranged in appropriate alphabetical order.

RESPONSE:

The identified concrols will be evaluated for possible rearrangement.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.048

GUIDE NO.: 8.1.1.b

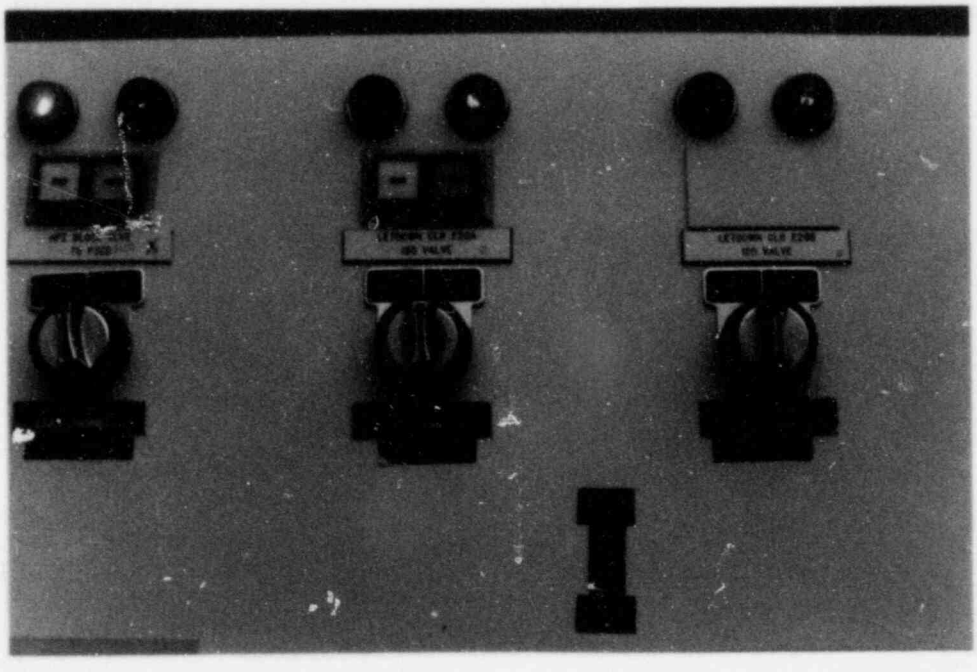
RATING: 3

FINDING:

Related letdown system components on C-16/C-18 are located in different ESAS channel groupings.

RESPONSE:

The arrangement of components by ES grouping was the original design for panel C-16 and C-18. However, due to the potential problems created by this arrangement pattern and subsequent design changes which made the original arrangement pattern partially obsolete, an evaluation will be performed to determine if other arrangement schemes would be better.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.049

GUIDE NO.: 8.1.1.B

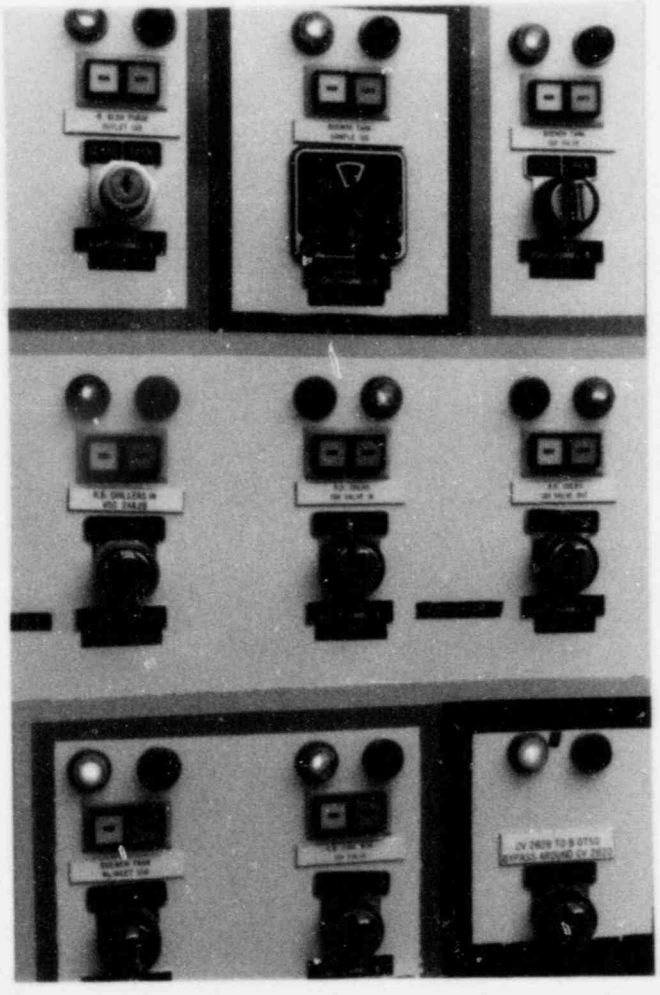
RATING: 3

FINDING:

Related quench tank system components on C-16/C-18 are not grouped in the same ESAS channels

RESPONSE:

The identified components will be evaluated for possible rearrangement and/or other association enhancement.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.050

GUIDE NO.: 8.1.1.b

RATING: 3

FINDING:

Decay heat removal/low press injection components on C-16/C-18 are not grouped.

RESPONSE:

The identified components will be evaluated for possible rearrangement and/or other association enhancement. (See also HED CK:8-1.058, CK:9-1.013, QS:B3.10-1.068 and VL:1-1.004).

CORRECTIVE ACTIONS

HED NO.: CK:8-1.051

GUIDE NO.: 8.1.1.b

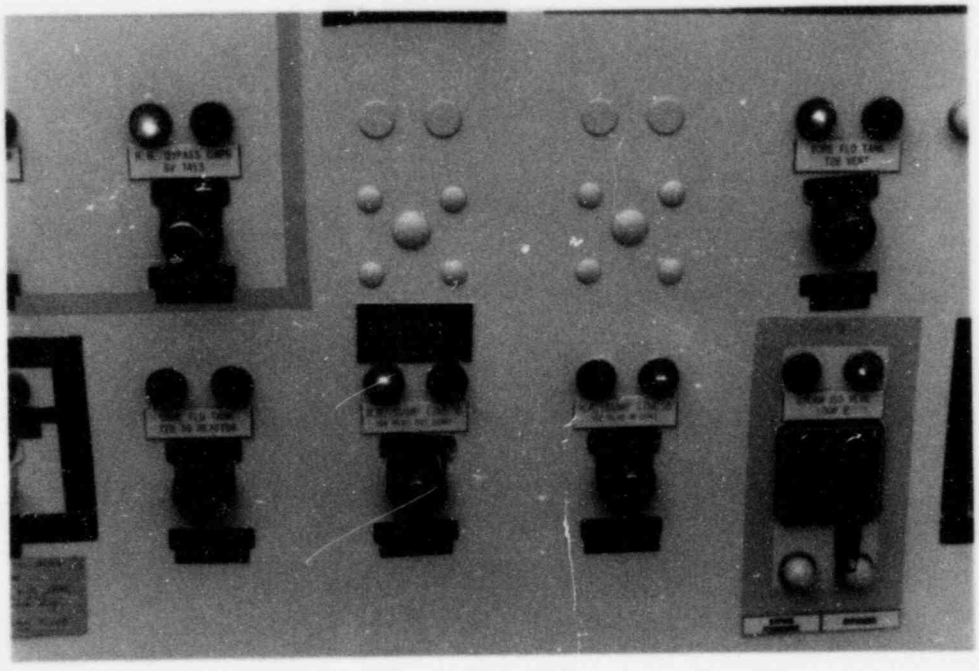
RATING: 3

FINDING:

Core flood tank vent and outlet controls association is not readily apparent by grouping. They are separated by unrelated components.

RESPONSE:

The identified components will be evaluated for possible rearrangement and/or other association enhancements.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.052

GUIDE NO.: 8.1.1.a-b

RATING: 3

FINDING:

CV-1206 control is not grouped with associated RCP instrumentation on C-03.

RESPONSE:

The identified components will be evaluated for possible rearrangement and/or association enhancement.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.053

GUIDE NO.: 8.1.2.b

RATING: 3

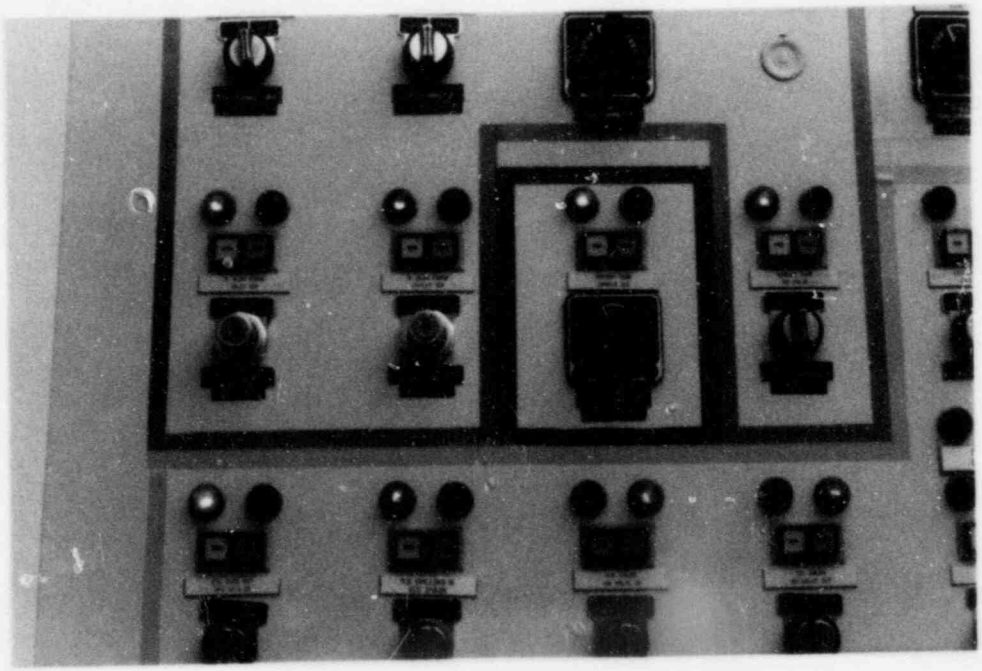
FINDING:

Components not appropriately demarcated according to convention. Component labels indicate different channel from demarcation grouping labels. Panel C18/C16. The affected components are as follows:

PANEL	EQUIPMENT NAME
C18/C16	R.Bldg Purge Inlet Iso
C18/C16	R.Bldg Purge Outlet Iso
C18/C16	Quench Tank Sample Iso
C18/C16	Quench Tank ISO Valve
C18/C16	Quench Tank N2 Inlet Iso
C18/C16	RB Fire Wtr Iso Valve
C18/C16	RB Sump Drn To Aux Sump
C18/C16	RB Vent

RESPONSE:

The identified label error will be corrected as part of the control room relabeling effort.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.054

GUIDE NO.: 8.2.1.b

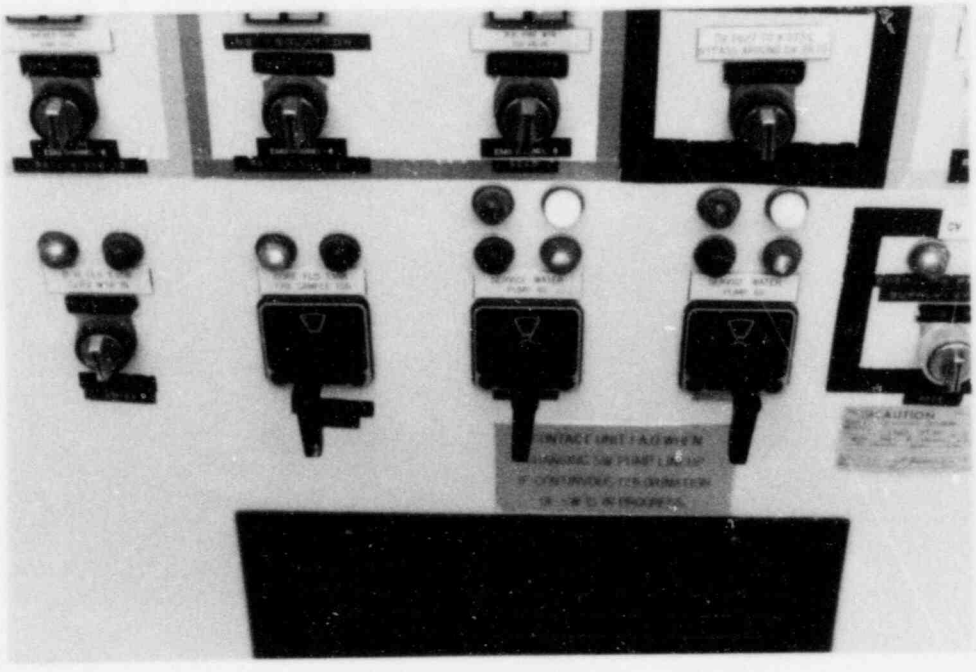
RATING: 3

FINDING:

Frequently used service water pump controls located very low on vertical panel out of preferred manual areas.

RESPONSE:

The subject service water pump controls are not used very often by the plant operators. Therefore, being located low on the panel does not create undue difficulty for actuation and no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.056

GUIDE NO.: 8.2.2.a

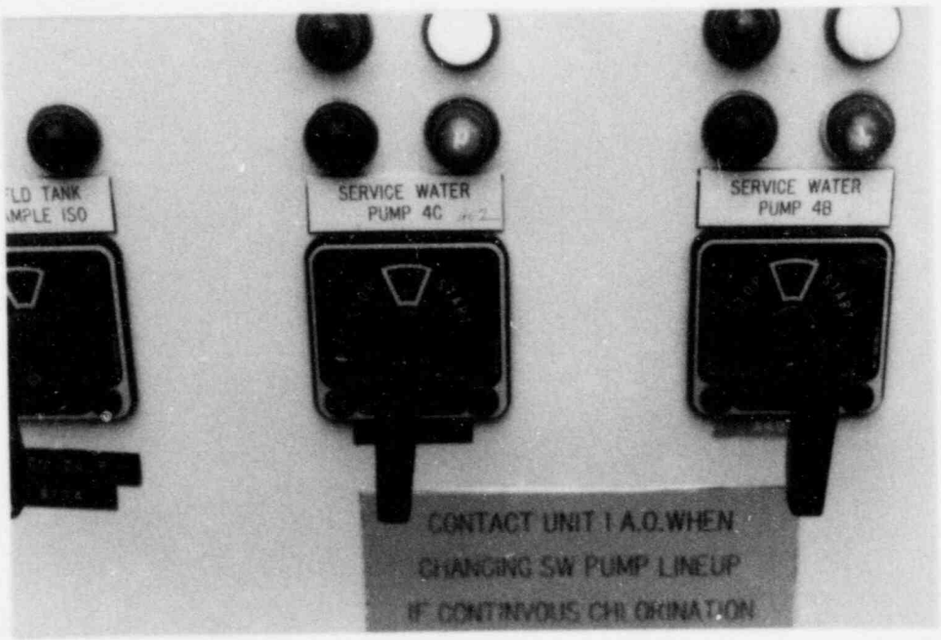
RATING: 3

FINDING:

HPI pumps, S.W. pumps and HPI block valve controls are not arranged in logical alphabetical sequence.

RESPONSE:

The "B" pumps for the service water and HPI system are the "swing" pumps and are consistently located to the right of the "dedicated" pump controls. Therefore, for these pumps, the existing arrangement is logical to the plant operators. The HPI block valve controls, however, will be evaluated for possible arrangement.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.057

GUIDE NO.: 8.2.3a

RATING: 3

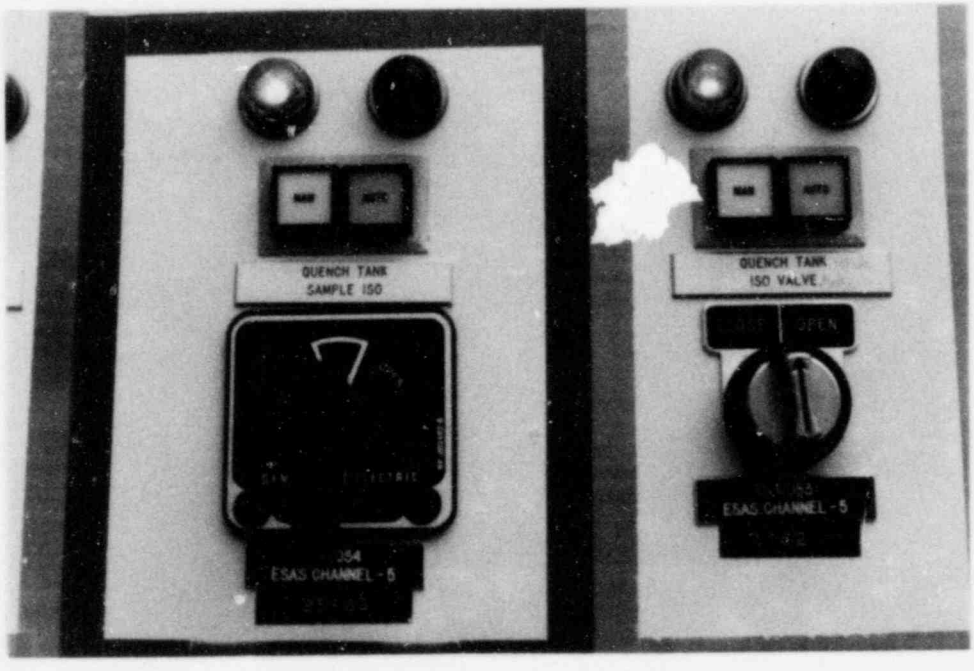
FINDING:

Components within an ESAS channel grouping are not arranged in the same manner as those within the duplicate ES channel grouping on Panel C-16 and C-18. The affected components are as follows:

PANEL	EQUIPMENT NAME
C18/C16	Mu Blk Vlve
C18/C16	Mu Pumps Rcirc Iso
C18/C16	Loop 1/2 Service Water to IVW Coolers
C18/C16	Quench Tank Sample ISO
C18/C16	Quench Tank ISO Valve

RESPONSE:

The identified components will be evaluated for possible rearrangement or other association enhancement.



4917/a/76

CORRECTIVE ACTIONS

HED NO.: CK:8-1.059

GUIDE NO.: 8.1.1.b

RATING: 3

FINDING:

R.C. leak pump and R.C. leak pump alternator controls are separated from RCP instrumentation and located within S.G./FW instrumentation on panel C-13.

RESPONSE:

The identified components will be evaluated for possible rearrangement and/or other association enhancement.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.060

GUIDE NO.: 8.1.1.b

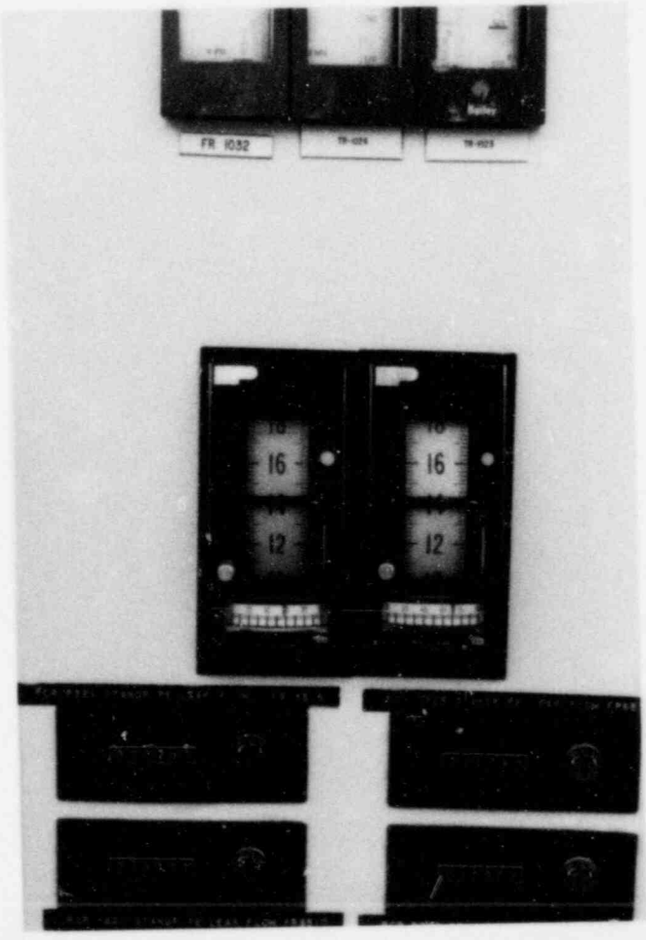
RATING: 3

FINDING:

Controllers for seal flow to feedwater pump seals are not functionally grouped within ICS section of Panel C-13.

RESPONSE:

The identified components are not associated with the ICS section of the panel. However, the components will be evaluated for possible relocation to Panel C-12 from Panel C-13.



CORRECTIVE ACTIONS

HED NO.: CK:8-1.062

GUIDE NO.: 8.1.1.b

RATING: 3

FINDING:

RCP vibration monitors are not located with RCP instrumentation in C13.

RESPONSE:

The identified components will be evaluated for possible rearrangement and/or association enhancement.

CORRECTIVE ACTIONS

HED NO.: CK:8-1.063

GUIDE NO.: 8.2.2.a

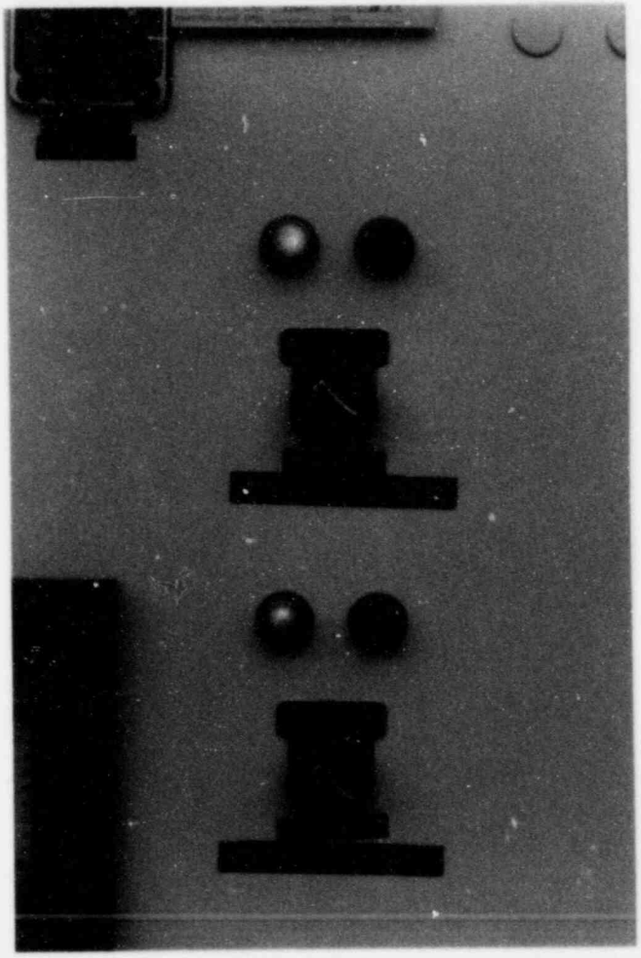
RATING: 3

FINDING:

Bottom-to-top alphabetical order of mainsteam to E2A and E2B controls violates top-to-bottom convention.

RESPONSE:

The identified controls are not utilized by the control room operators and will therefore be evaluated for possible deletion. (See QS: A2.3-1.005).



4917/a/82

CORRECTIVE ACTIONS

HED NO.: CK:8-1.064

GUIDE NO.: 8.3.1.a

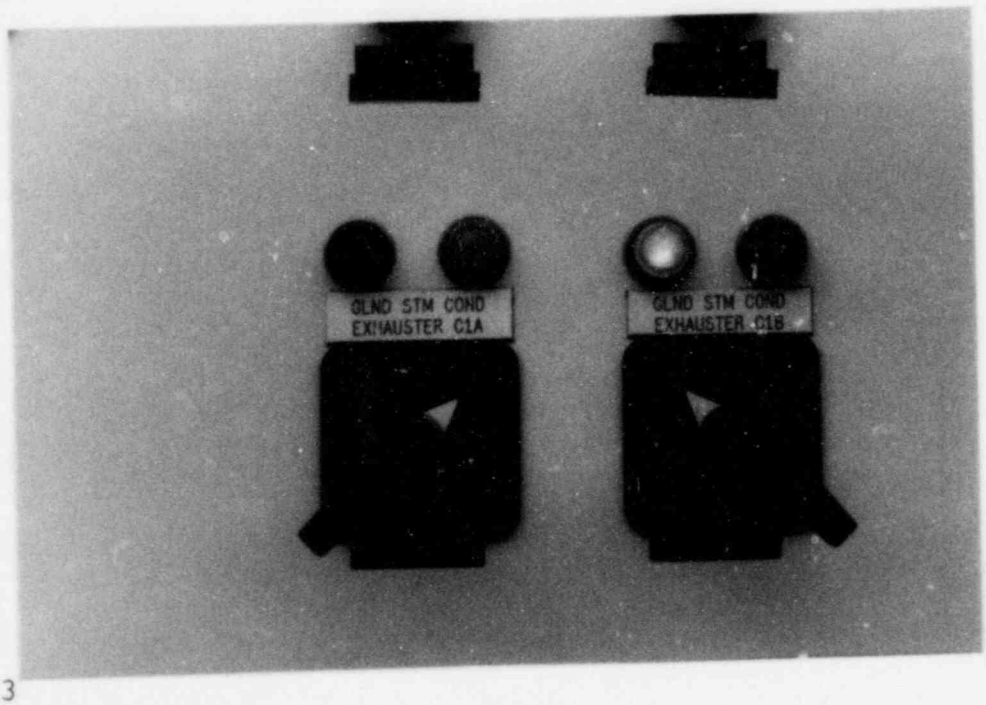
RATING: 3

FINDING:

Water box vacuum pump and gland steam condenser exhauster controls violate minimum separation distance and are not spring return. May cause interference.

RESPONSE:

The identified J-handle controls are not operated simultaneously and do not cause operator difficulty during operation. Therefore, due to a lack of justification for change, no further action is planned to address this HED.



4917/a/83

CORRECTIVE ACTIONS

HED NO.: CK:8-1.065

GUIDE NO.: 8.2.3.b

RATING: 3

FINDING:

Electrical board C10 is in a mirror mimic arrangement.

RESPONSE:

The mirror image arrangement of Panel C-10 with use of mimics has not created operator problems with its use. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:9-1.001

GUIDE NO.: 9.2.3a

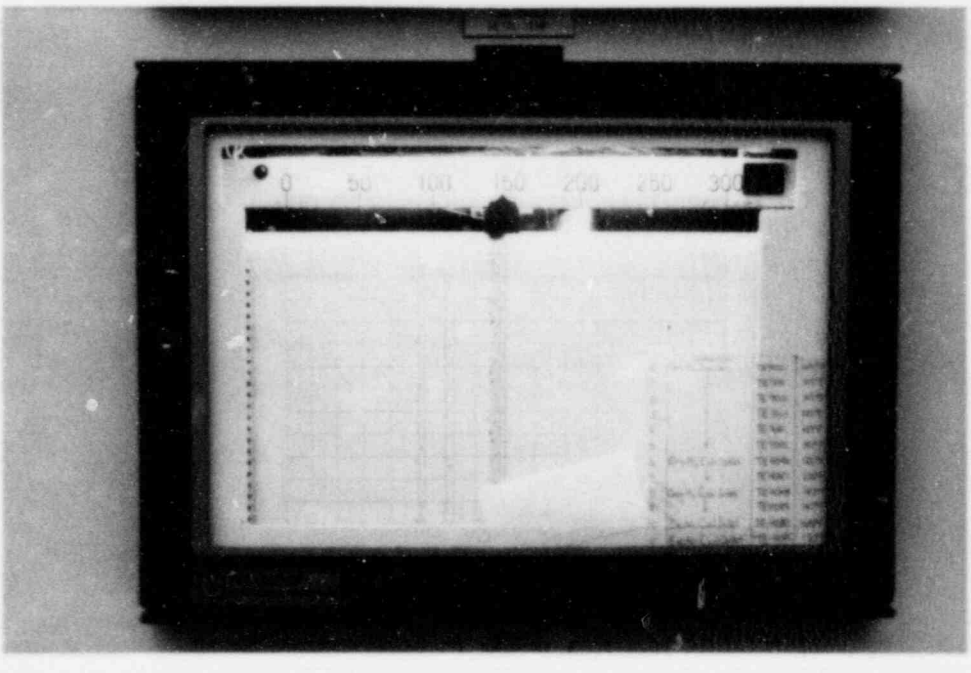
RATING: 3

FINDING:

Generator temperatures on recorder TR-9001 not visible from C01 workstation (below front panel edge).

RESPONSE:

The identified recorder is not required to be visible from panel C-01 since the recorded parameters are primarily associated with controls on C-19. Furthermore, the recorder is used for trending of data that is not needed as immediate feedback for operation of controls. Therefore, due to the limited space available on the control panels and the lack of need for immediate feedback from this recorder, the present location is appropriate. No further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:9-1.002

GUIDE NO.: 9.2.2.b (2)

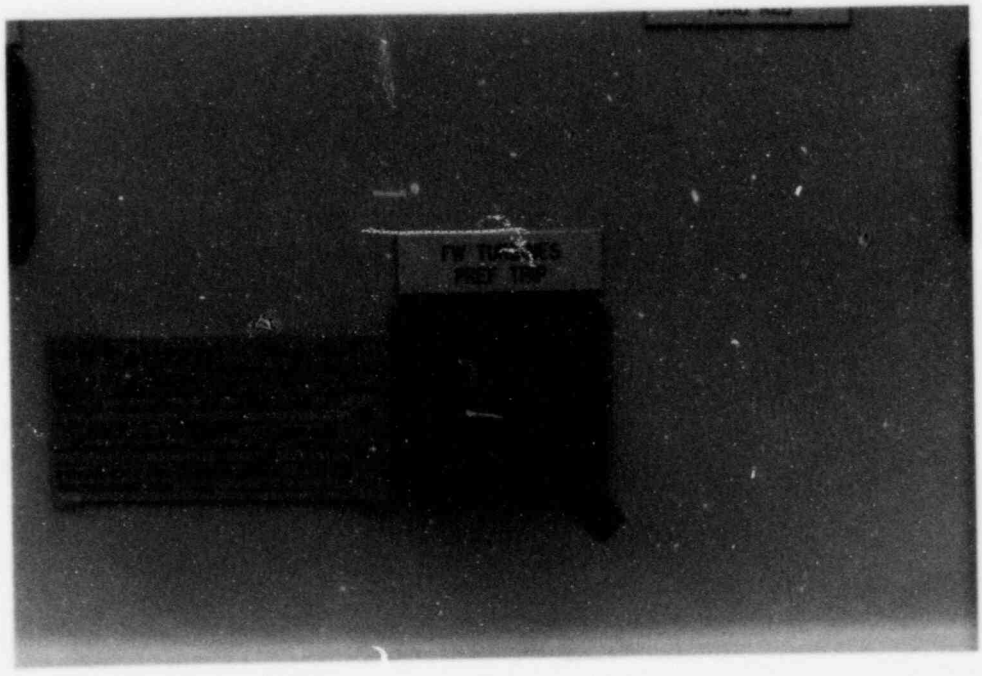
RATING: 3

FINDING:

FW Turbine prefer trip selector switch position labels B, A are not arranged consistently with their associated functional control groups (i.e. Pump K2A located to left: K2B to right whereas label positions are B to the left: A to the right.

RESPONSE:

The identified control will be evaluated for modification to correct this HED. (See CK: 8-1.007)



CORRECTIVE ACTIONS

HED NO.: CK:9-1.003

GUIDE NO.: 9.2.3.b

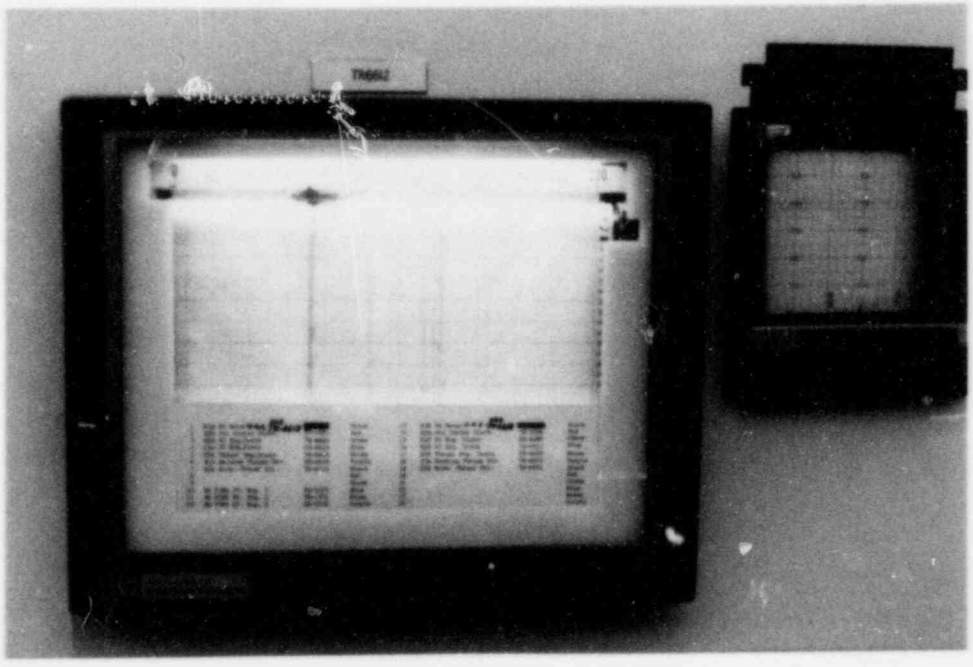
RATING: 3

FINDING:

Associated recorder for feedwater pump controls on CO2 is not located in upper vertical panel section. Not visible from CO2 workstation. The recorders affected are Equipment ID# TR6612 and TR6613.

RESPONSE:

The identified recorders are not required to be visible from panel C-02 since the operation of controls on C-02 do not rely on feedback from these recorders. The recorder TR-6612 is located appropriately for the intended use. The recorder TR-6613 is not used by the plant operators and is to be evaluated for deletion per HED No.: QS:A4.9-1.064. Therefore, due to a lack of justification for change, no further action is planned to address this HED.



4919/a/29

CORRECTIVE ACTIONS

HED NO.: CK:9-1.004

GUIDE NO.: 9.1.1.c(1)

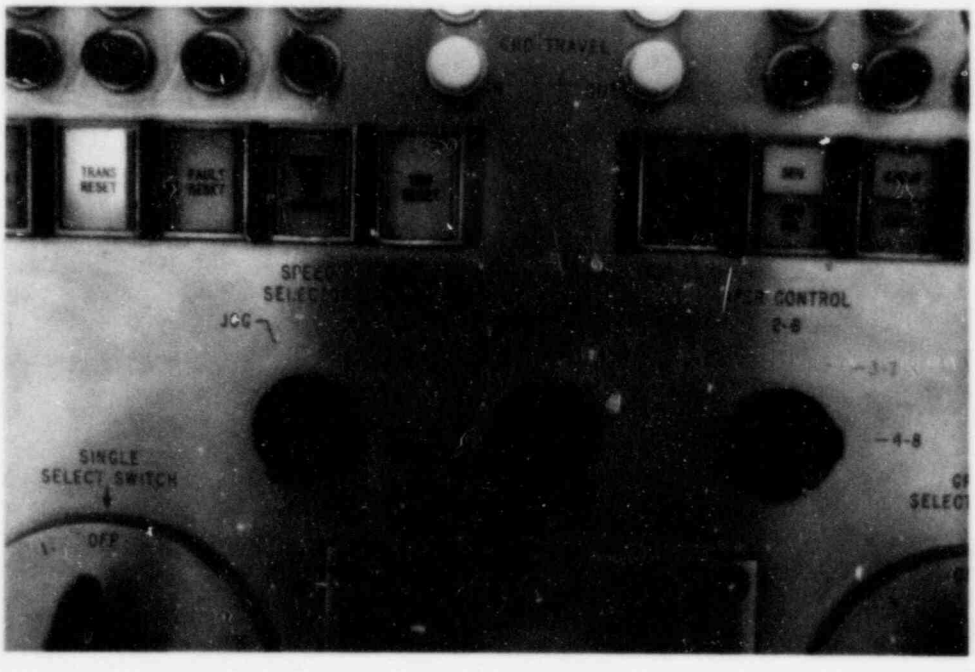
RATING: 3

FINDING:

The association of the control rod group selector switch on the rod controller, with the control rod group average indication meters is not readily apparent.

RESPONSE:

The identified control is not used routinely by the plant operators in conjuction with the group average indication meters. The back panel rod position is the source of rod position information relied upon by the operators which is readily visible and the association is clear through operator training. Therefore, due to a lack of justification for change, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:9-1.005

GUIDE NO.: 9.2.2.a(1); b(2)

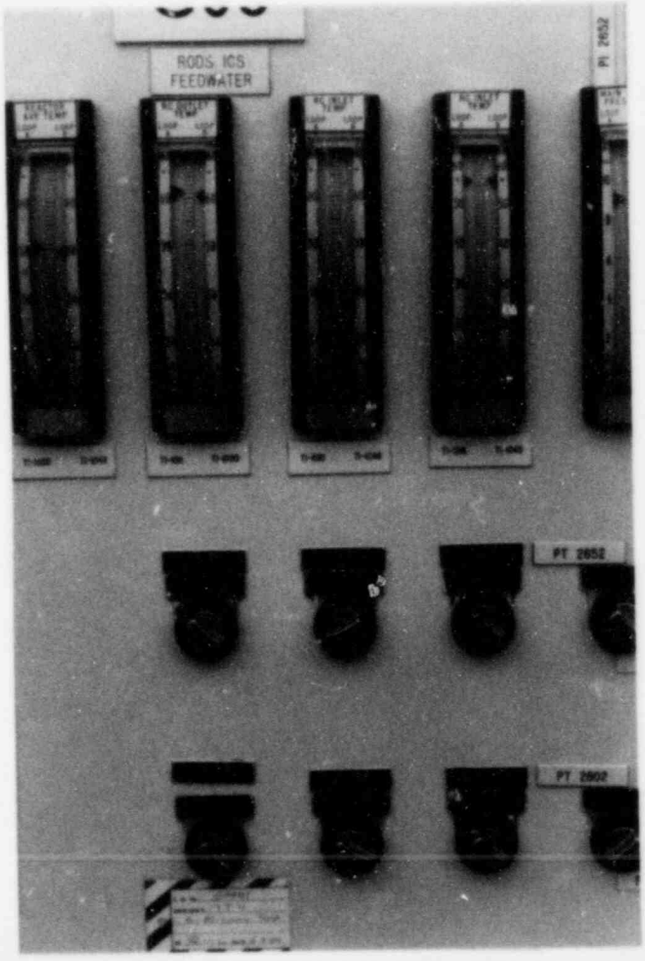
RATING: 3

FINDING:

The Loop B meter selectors are not located directly below meters. All the selector switches (A&B) have different label conventions with respect to their associated meter names. Loop A Th; RC outlet Temp; Loop A Tc Narrow: RC Temp. . . etc.. The affected selector switches are Equipment #'s HS1039, HS1044, and HS1045.

RESPONSE:

The identified problems will be evaluated for correction as part of the control room relabeling effort.



CORRECTIVE ACTIONS

HED NO.: CK:9-1.006

GUIDE NO.: 9.2.2.a (1)

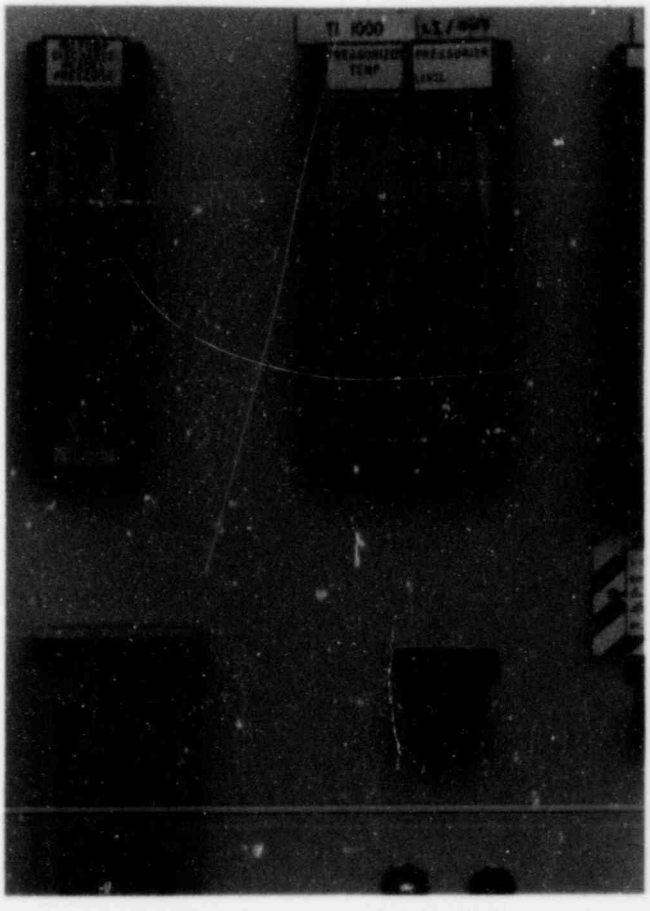
RATING: 3

FINDING:

PRZR temp selector not located directly below associated indicator. Located below PRZR level. The indicator associated with the PRZR temp selector is TI 1000, PRZR temperature.

RESPONSE:

The existing location of the control relative to the display is sufficient for easy operator association of the components. Therefore, due to a lack of justification for change, no further action is planned to address this HED.



CORRECTIVE ACTIONS

HED NO.: CK:9-1.008

GUIDE NO.: 9.2.2.b(2)

RATING: 3

FINDING:

Association and meaning of lights above the VSF-9 control is not apparent.

RESPONSE:

The identified lights will be evaluated for labeling changes as part of the control room relabeling effort.

CORRECTIVE ACTIONS

HED NO.: CK:9-1.009

GUIDE NO.: 9.2.2.b(2)

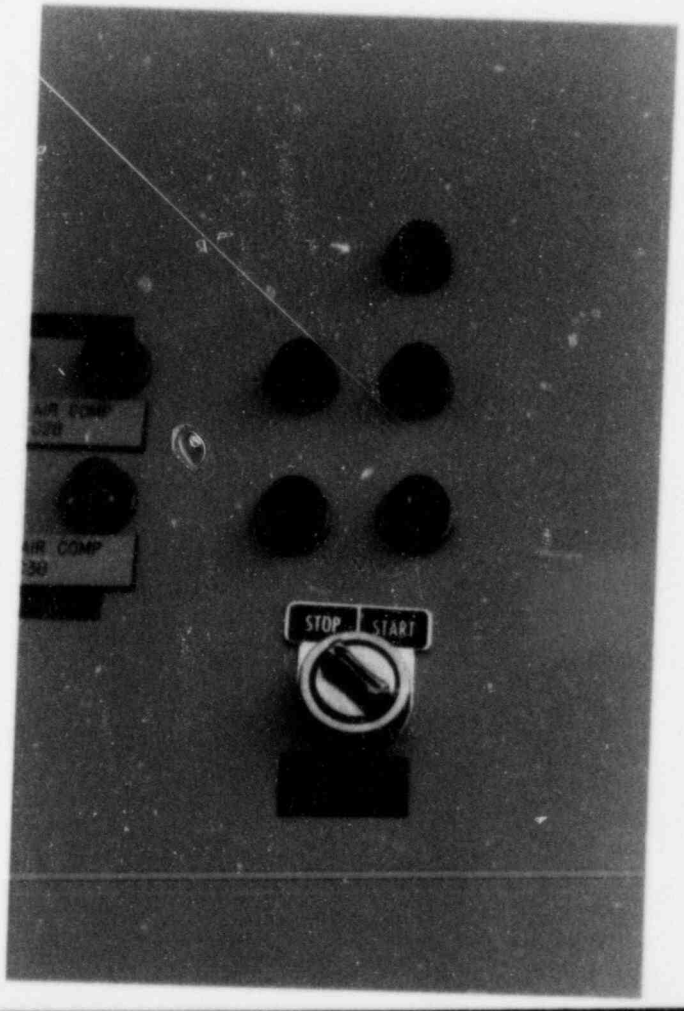
RATING: 3

FINDING:

Association and meaning of lights above the 2VSF-9 control is not apparent.

RESPONSE:

The identified lights will be evaluated for labeling changes as part of the control room relabeling effort.



CORRECTIVE ACTIONS

HED NO.: CK:9-1.010

GUIDE NO.: 9.2.2.b(2)

RATING: 3

FINDING:

Association and meaning of lights above the Main Chiller VCH1A PWR ACB, VCH1B PWR ACB and Fire Pump Power ACB control is not apparent.

RESPONSE:

The identified lights are not labeled since they are arranged as part of the standard convention for breaker indicators such that operators know what they mean. It would not add to the meaning of the light to label them since their color and arrangement meets the standard convention. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: CK:9-1.011

GUIDE NO.: 9.1.1.a

RATING: 3

FINDING:

Top row of meters on C-16/C-18, used in control operations, is too high on panel and cause parallax problem.

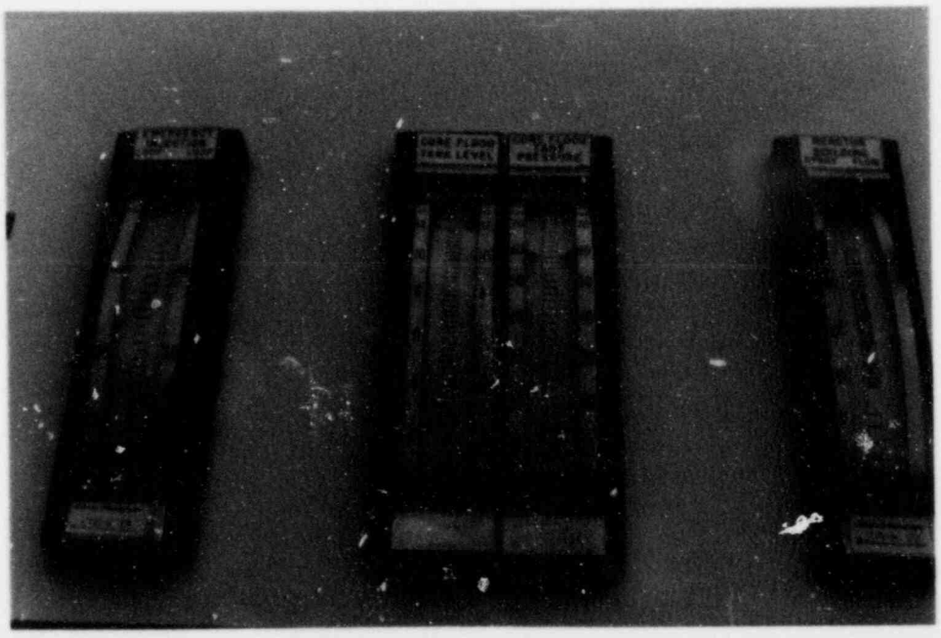
RESPONSE:

The identified meters have been or will be corrected as follows:

- The emergency injection, reactor building spray flow, and decay heat removal flow meters were replaced with "sigma" type meters that are less susceptible to parallax since they have flat display faces. This design change was initiated prior to the evaluation of this HED are part of AP&L's on-going commitment to the practical application of human factors's principles. Therefore, this part of the HED has been corrected by a design change.

- The core flood tank level and pressure displays are to be evaluated for possible replacement.

- The reactor building pressure meter does not require accurate readings that would be impacted by parallax. Therefore, the existing meter is acceptable and no further action is planned to address this part of the HED. (See HED VL:1-1.005)



CORRECTIVE ACTIONS

HED NO.: CK:9-1.012

GUIDE NO.: 9.2.2.a

RATING: 3

FINDING:

Relationship between reactor bldg spray flow controls and flow meter is not apparent. Display not directly above controls and separated by unrelated components.

RESPONSE:

The association of the identified controls and displays will be evaluated for relocation or other association enhancement.

CORRECTIVE ACTIONS

HED NO.: CK:9-1.013

GUIDE NO.: 9.2.2.a

RATING: 3

FINDING:

Relationship between low pressure injection flow controls and meter on C-16/C-18 is not apparent. Display not directly above controls and separated by unrelated components.

RESPONSE:

The identified components will be evaluated for relocation or other association enhancement. (See also HED CK:8-1.050, CK:8-1.058, QS:B3.10-1.068, and VL:1-1.004)

CORRECTIVE ACTIONS

HED NO.: CK:9-1.014

GUIDE NO.: 9.2.1.a

RATING: 3

FINDING:

Association of sodium hydroxide tank and BWST temperature display with associated heater controls is not apparent.

RESPONSE:

The identified components will be evaluated for relocation or other association enhancement.

CORRECTIVE ACTIONS

HED NO.: CK:9-1.015

GUIDE NO.: 9.2.1.a

RATING: 3

FINDING:

Heater drain tank and pump displays and associated controls on C-12 are not grouped together. The affected components are as follows:

PANEL	EQUIPMENT NAME
C12	Heater Drain Tank T-40A
C12	Heater Drain Tank T-40B
C12	Htr Drn PP P8A
C12	Htr Drn PP P8B

RESPONSE:

The identified controls and displays are not used together since the controls do not control the displayed parameters. They are part of the same system and are located accordingly. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: HR:1-1.001

RATING: 3

FINDING:

Problem occurred due to a control room operator intending to match a switch flag position with the breaker indication light caused an inadvertent tripped breaker which reduced the electrical distribution to less than tech spec requirement.

RESPONSE:

The identified LER involved an operator turning the breaker control in the wrong direction. The breaker controls at ANO are standardized configurations for breaker controls used at all generating plants (nuclear, fossil, and hydro) and conform to the operator's expectations. The breakers are closed (i.e., on or energized) to the right and open (i.e., off or de-energized) to the left. Therefore, the existing configuration provides the best arrangement to prevent the type of situation identified in the LER. No further action is planned to address this HED. (See CK:4-1.003)

CORRECTIVE ACTIONS

HED NO.: QS:A2.1-1.004

RATING: 3

FINDING:

Heating steam to "A" condenser is not used by the operators and is, therefore, an extraneous control in the control room and should be removed.

RESPONSE:

The controls on panel C-02 are to be evaluated for removal as part of a possible design change.

CORRECTIVE ACTIONS

HED NO.: QS:A2.3-1.005

RATING: 3

FINDING:

Main steam to E2 feedwater heaters is not used by the operators and is an extraneous control and should be removed.

RESPONSE:

The controls on panel C-12 are to be evaluated for removal as part of a possible design change. (See also HED CK:8-1.063)

CORRECTIVE ACTIONS

HED NO.: QS:B8.4-1.008

RATING: 3

FINDING:

Turbine EHC control panel (C01) depends on tiny plastic indicator/pushbuttons with short life bulbs inside. Replacement of light bulbs frequently results in damage to the pushbutton. Operators have reported that lack of indication due to burned out bulbs has led to operator confusion during transient conditions.

RESPONSE:

The indicator pushbuttons for the governor and throttle valves are backed-up by valve position indication meters such that the operator can quickly determine the status of the valves and thus respond to a transient. Therefore, due to a lack of justification for a change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:C2.4-1.011

RATING: 3

FINDING:

The "FIRE ALARM" does not reflash with the second input. This does not provide the operators with time critical information regarding fires in all other areas of the plant.

RESPONSE:

The alarm reflash feature of the fire protection system will be evaluated for possible corrective action. (See CK:3-1.025).

CORRECTIVE ACTIONS

HED NO.: QS:C3.2-1.012

RATING: 3

FINDING:

SPDS "TUBE TO SHELL DELTA T" alarm does not give operators sufficient time to diagnose the problem and take appropriate action to mitigate the consequences of a transient situation.

RESPONSE:

The setpoint for the SPDS "TUBE TO SHELL DELTA T" alarm will be evaluated for possible setpoint change. (See also HED QS:C3.2-1.090)

CORRECTIVE ACTIONS

HED NO.: QS:C3.3-4.013

RATING: 3

FINDING:

The B-5 and B-6 undervoltage alarms come in at less than or equal to 88%, which is the same time the undervoltage action begins. This does not give operators sufficient time to take appropriate action. The alarm in question is on annunciator box K01, tile A5.

RESPONSE:

Undervoltage alarm is intended to alert the operator that an undervoltage action has occurred. There are other control room indications of approach to an undervoltage action. Therefore, the existing setpoint is appropriate and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:C3.5-1.014

RATING: 3

FINDING:

The "EHC Filter Delta P-Hi" alarm comes in too late to allow operators to diagnose the problem and take appropriate action. The affected alarm is on annunciator box K05, tile B7.

RESPONSE:

The specific setpoints for alarm were the EH system filter differential pressure and hi/lo pressure and the power distribution alarm. The EH system alarms (differential and hi/lo pressure) were specifically identified due to a problem which occurred at ANO-1 recently involved the EH system. The alarms for the EH system are adequate based on a review of the transient which occurred. The real problem was that an unmonitored filter clogged in the EH system and not the filter that is monitored. This situation was resolved by the inclusion of the unmonitored filter in a preventative maintenance program to prevent reoccurance of the clogging problem. An alarm setpoint change for the EH system would not benefit the plant operators since the actual problem involved a filter that is not instrumented. (See HED CK:3-1.002)

CORRECTIVE ACTIONS

HED NO.: QS:A1.4-1.016

RATING: 3

FINDING:

Feedwater Heater high level dump valve switches are needed in the control room to be used during a feedwater heater tube rupture.

RESPONSE:

The existing design has automatic action to handle the heater high level dump valves. The addition of manual control in the control room is not warranted based on past operating history. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:D1.4-1.024

RATING: 3

FINDING:

Operators indicated that the "RELIEF VALVE OPEN" alarm is not readily distinguishable from the QUINDAR alarm. This may impair the operator's ability to determine the criticality of the alarm involved.

RESPONSE:

The electromatic relief (ERV) and QUINDAR alarms are behind the main operating area of the control room. The ERV alarm is accompanied by a front panel annunciator indication. Therefore, the plant operator at the control boards can quickly determine the source of the alarm based on the visual indication. Since the visual and auditory alarm work together to eliminate operator confusion, no further action is planned regarding this HED. (See CK:2-1.003).

CORRECTIVE ACTIONS

HED NO.: QS:D1.5-1.025

RATING: 3

FINDING:

Operators indicated the "CORE FLOOD TANK OUTLET VALVE INTERLOCK" alarm and QUINDAR/computer alarm cannot be readily distinguished from each other. This may impair the operator's ability to determine the cause of the alarm.

RESPONSE:

The "CORE FLOOD TANK OUTLET VALVE INTERLOCK" and QUINDAR alarms are behind the main operating area of the control room. The outlet valve position indication is provided on the front panels (C-16/C-18). Furthermore, the only time the interlock alarm is useful is during heat-up/cooldown at which time the operator is especially interested in the valve interlock status. Therefore, the visual aid of the valve position indication and the operator's special interest in the valve interlock alarm makes the rapid determination of the source of the alarm possible such that operator confusion is not a problem. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:D1.6-1.026

RATING: 3

FINDING:

Operators indicated that the cardox C-02 fire alarm and the plant evacuation alarm cannot be readily distinguished from each other. This may impair ability of personnel to determine whether to evacuate.

RESPONSE:

The identified problem does not involve the control room. The evacuation alarm is initiated from the control room so the only personnel affected are those outside the control room. Therefore, this issue is not part of the CRDR effort. However, due to the significance of this issue, this HED has been identified for further evaluation outside the scope of the CRDR program.

CORRECTIVE ACTIONS

HED NO.: QS:C3.1-1.027

RATING: 3

FINDING:

K12, F5 annunciator is vague. (Aux System Trouble)

RESPONSE:

The "AUX SYSTEMS TROUBLE" alarm tells the operator to check certain local alarms in the back of the control room. The specifics are on the local panels. Based on the operator usefulness of this alarm, no further action to address this HED is planned. (See CK:3-1.016).

CORRECTIVE ACTIONS

HED NO.: QS:A1.12-1.034

RATING: 3

FINDING:

A start-up boiler remote control is needed for feedwater temperature control.

RESPONSE:

This HED will be evaluated for the possible addition of modulating control for the steam supply from the startup boiler. (See also HED VR:1-1.021)

CORRECTIVE ACTIONS

HED NO.: QS:A1.16-1.037

RATING: 3

FINDING:

Motor operated condensate pump discharge valve controls are needed in the control room.

RESPONSE:

The identified need for control room control of the condensate discharge valves is not cost justified. The current procedure of manual operation of the subject valves does not impact plant operation in such a way to cause or contribute to operator error. Therefore, due to a lack of justification for change, no further action is planned to address this HED. (See HED VR:1-1.034)

CORRECTIVE ACTIONS

HED NO.: QS:A1.20-1.039

RATING: 3

FINDING:

Remote control is needed for waste processing equipment.

RESPONSE:

The waste processing equipment is designed for use during normal plant conditions. The system is controlled locally and does not require the addition of control in the control room to serve its intended function. Therefore, the existing arrangement of local control is adequate and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A3.3-1.040

RATING: 3

FINDING:

An indicator is needed for sealing steam on reheater reliefs.

RESPONSE:

During plant trips and startup, the sealing steam to the reheater reliefs is verified manually by operation of a manual valve. This procedure is considered adequate and does not contribute to operator errors. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A3.4-1.041

RATING: 3

FINDING:

Incore detectors reading in % power are needed for degraded core and natural circulation conditions.

RESPONSE:

The reactor power is measured in % power at the process computer and the SPDS. These indications provide the needed operator information during degraded core and/or natural circulation conditions. Therefore, due to the lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A3.8-1.043

RATING: 3

FINDING:

An indicator is needed for service water flow through decay heat coolers.

RESPONSE:

The need for control room indication of this parameter has previously been evaluated in accordance with Reg. Guide 1.97. It was concluded that the existing indication of the service water supply valve position and the service water system pressure provided the needed information regarding system operation. In addition, flow is not relevant to the operation of this system since decay heat cooler temperature is the key variable. Temperature is available to the plant operator. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A3.11-1.044

RATING: 3

FINDING:

An indicator is needed for the reactor coolant system flow to detect low flow during natural circulation.

RESPONSE:

The emergency operating procedure adequately addresses this problem by requiring verification of primary to secondary heat transfer using the existing instrumentation for hot leg temp., cold leg temp., steam generator pressure, etc. These parameters provide the needed operator information to assure adequate heat removal without the need for monitoring RCS flow rate. Therefore, due to a lack of justification for adding RCS flow instrumentation for natural circulation, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A3.15-1.047

RATING: 3

FINDING:

There needs to be an indicator for feedwater pump suction pressure (other than on computer).

RESPONSE:

The identified parameter, feedwater pump suction pressure, is currently available as an addressable trend on the process computer. However, this parameter is utilized by the plant operator often enough to warrant consideration of installing a dedicated indicator on panel C-02. Therefore, this HED will be evaluated for possible corrective action.

CORRECTIVE ACTIONS

HED NO.: QS:A3.16-1.048

RATING: 3

FINDING:

Indications are needed for delta P across feedwater pumps high efficiency filters.

RESPONSE:

This HED involves equipment maintenance that is not directly related to the control room operators. Therefore, no control room corrective actions related to the plant operators is involved.

CORRECTIVE ACTIONS

HED NO.: QS:A3.17-1.049

RATING: 3

FINDING:

An indication is needed for heater drain pump flow.

RESPONSE:

This parameter is currently available as an addressable trend on the process computer. However, it is not important enough to warrant a dedicated indicator, although it is normally trended during operation. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A3.21-1.052

RATING: 3

FINDING:

A display for condenser vacuum is needed in the control room.

RESPONSE:

This HED is incorrect since a display of condensor vaccum is provided on panel C-02. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A3.22-1.053

RATING: 3

FINDING:

Status lights are needed in the control room for condensate transfer pumps.

RESPONSE:

One of the condensate transfer pumps is assumed to be running at all times but there is no control room indication of the pump status. Therefore, this HED will be evaluated for correction.

CORRECTIVE ACTIONS

HED NO.: QS:A3.24-1.055

RATING: 3

FINDING:

Indicators are needed in the control room for exciter air cooler outlet temperature.

RESPONSE:

The identified indicator is not necessary in the control room since a multipoint alarm requires the operator to check a local panel indication. This arrangement is adequate because the response to the alarm is taken at the local panel and it is not a time critical situation. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A3.25-1.056

RATING: 3

FINDING:

Status lights are needed for isophase bus coolers.

RESPONSE:

The identified indicator is not necessary in the control room since a multipoint alarm requires the operator to check a local panel indication. This arrangement is adequate because the response to the alarm is taken at the local panel and it is not a time critical situation. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A3.26-1.057

RATING: 3

FINDING:

An indicator is needed for seal oil pressure at the generator.

RESPONSE:

The identified indicator is not necessary in the control room since the backup seal oil pump automatically starts on low seal oil pressure and an alarm comes into the control room. This indication is sufficient for the operator to deal with the situation. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A3.27-1.058

RATING: 3

FINDING:

Indicators are needed in the control room for delta P across EH pump discharge filter.

RESPONSE:

The EH system differential pressure alarm was specifically identified due to a problem which occurred at ANO-1 recently involving the EH system. The alarms for the EH system are adequate based on a review of the transient which occurred. The real problem was that an unmonitored filter clogged in the EH system and not the filter that is monitored. This situation was resolved by the inclusion of the unmonitored filter in a preventative maintenance program to prevent reoccurrence of the clogging problem.

CORRECTIVE ACTIONS

HED NO.: QS:A3.28-1.059

RATING: 3

FINDING:

Trend recorders are needed near APO for use with SPDS.

RESPONSE:

The SPDS has a trend display that allows the continuous monitoring of several data points. This serves the same purpose as a trend recorder. Additionally, the SPDS has recently been modified to allow for rapid retrieval of many of the monitored points during the past 24 hours even if those points were not being trended on the graphic display. This historical retrieval arrangement reflects AP&L's on-going commitment to the practical application of human factors principles in effect prior to the CRDR program.

CORRECTIVE ACTIONS

HED NO.: QS:A3.29-1.060

RATING: 3

FINDING:

Digital displays are needed to monitor computer points.

RESPONSE:

The addition of digital displays for addressable computer points is not a necessary addition to the control room. The existing computer CRT displays provide digital output and the trend recorders provide analog readings that are easily read by the plant operators. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A4.5-1.062

RATING: 3

FINDING:

These instruments presently in the control room are unnecessary. The affected instruments are the level and temperature indications for the Na Thio sulphate tank and instrument #PI-6601.

RESPONSE:

The identified displays are not in service and should be removed from the panels. This removal is to be evaluated.

CORRECTIVE ACTIONS

HED NO.: QS:A4.8-1.063

RATING: 3

FINDING:

The indicator lights for 2V5F9 are extraneous.

RESPONSE:

These indicator lights are not normally used but they are needed during certain rare conditions. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:A4.9-1.064

RATING: 3

FINDING:

The feedpump turbine stop valve pin temperature is not needed in the control room.

RESPONSE:

This recorder is not useful to the plant operators. Therefore, this HED will be evaluated for removal.

CORRECTIVE ACTIONS

HED NO.: QS:A8.7-1.066

RATING: 3

FINDING:

The area around the control panels is poorly designed. The desks obstruct the board, do not have adequate knee space for computer operation, and much of the equipment/furniture is described as an obstacle.

RESPONSE:

This HED is the result of the small workspace available in the control room. The arrangement of the desks, furniture, and control boards provides the best utilization of the limited space. The chairs have already been upgraded as discussed in HED CK:1-1.008. Therefore, due to the lack of justification for additional corrective action, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:B1.3-1.067

RATING: 3

FINDING:

Intermediate cooling water pumps and crossover valves need manual override.

RESPONSE:

The identified manual control action performed outside the control room is done only once or twice per year. Therefore, the benefit of control room operation is not substantial and the existing arrangement does not potentially contribute to operator errors. As a result, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:B3.10-1.068

RATING: 3

FINDING:

The decay heat system components are not functionally grouped.

RESPONSE:

The possible rearrangement or other association enhancement of the decay heat system controls will be evaluated.
(See CK:8-1.050, CK:8-1.058, CK:9-1.013 and VL:1-1.004).

CORRECTIVE ACTIONS

HED NO.: QS:B3.11-1.069

RATING: 3

FINDING:

The layout for condensate, service water, and heater drain recorders for pumps is confusing.

RESPONSE:

The identified recorders will be evaluated for rearrangement or other association enhancement.

CORRECTIVE ACTIONS

HED NO.: QS:B5.1-1.073

RATING: 3

FINDING:

Fuel handling, radwaste and reactor building supply and exhaust fans should have controls on C-25 so that flow can be observed when starting these fans and, in the case of fuel handling or radwaste, so that flow can be started or stopped remotely.

RESPONSE:

The identified ventilation system controls are not associated with time critical operator actions. Therefore, the existing arrangement is considered adequate and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:B7.5-1.074

RATING: 3

FINDING:

Turbine drains and bleeder trip CVs should be moved from C-02 to the back panel.

RESPONSE:

The identified controls on C-02 are actuated automatically when needed while the controls on C-12 (the back panel) include manually actuated controls. Therefore, the existing arrangement does not require excessive operator interaction between the two panels. As a result, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:B7.8-1.075

RATING: 3

FINDING:

Miscellaneous and intermediate cooling water should be moved to the back panels.

RESPONSE:

The identified controls are located on panel C-09 and are associated with controls on the back panel. However, the C-09 controls are useful in their present location under certain operating conditions. Therefore, it is not appropriate to relocate them from C-09, but it would be appropriate to provide better association enhancement with the back panel controls. This evaluation of association enhancement will be done as part of the control room labeling effort.

CORRECTIVE ACTIONS

HED NO.: QS:B9.6-1.078

RATING: 3

FINDING:

These handswitches on the control room panels could be inadvertently activated; Equipment Name: Reactor coolant pump handswitch; MSIV handles; Base adjust on generator; EH oil pump control; Air side seal oil pump; Emergency oil pump; governor valves.

RESPONSE:

The reactor coolant pump handswitches are located such that there is plenty of room to avoid them, the MSIV controls have been moved to panel C-09 where they are not prone to inadvertent activation, the base adjust on generator control is not a J-handle control such that inadvertent activation is not a problem, and the other J-handle controls on the EH oil pump control, air side seal oil pump, emergency oil pump, and governor valve conrols have the J-handles turned upside down to prevent inadvertent activation. Therefore, the identified controls are adequately protected from inadvertent activation and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:E1.3-1.080

RATING: 3

FINDING:

Decay heat suction and injection temperatures should be added to the computer or SPDS.

RESPONSE:

The addition of the decay heat suction and injection temperatures will be evaluated for possible addition to the SPDS.

CORRECTIVE ACTIONS

HED NO.: QS:E1.4-1.081

RATING: 3

FINDING:

A computer program for leak rate (combination of trend and saxon type program that would allow start/stop times and a calculated leak rate for that period) is needed.

RESPONSE:

The addition of a program for RCS leak rate calculation will be evaluated for possible addition to the process computer.

CORRECTIVE ACTIONS

HED NO.: QS:E1.5-1.082

RATING: 3

FINDING:

A computer hard-copy plot of sufficient quality to use for heat-up and cooldown curves is needed to attach to plant start-up and shutdown procedures.

RESPONSE:

The addition of a graphics copier for the SPDS displays will be evaluated. (See CK:7-1.025).

CORRECTIVE ACTIONS

HED NO.: QS:E3.1-1.085

RATING: 3

FINDING:

Inconsistency in computer terminology: SPDS computer uses F or R, etc. as a prefix. Plant computer uses P as the only prefix.

RESPONSE:

The plant computer point IDs have been in use for many years and are available to the operators in a procedure for calling up points. It is not based on plant numbering of components, but it is relatively easy for the operators to use. The SPDS point IDs were more recently placed into service and they are based on the plant numbering of components such that consistency with other plant documents is maintained. In order to correct the inconsistency, the plant computer point ID system would need to be changed. This would involve extensive software modifications and considerable time to check out the thousands of changes. Due to the adequacy of the documentation available for the operators to quickly find the appropriate point IDs and the lack of significant operator problems with the existing system, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:E3.2-1.086

RATING: 3

FINDING:

Some of the colors used for SPDS indications are very close in shade and color to other indications, causing some confusion.

RESPONSE:

The SPDS trend graphs will be evaluated to determine if a better arrangement of colors can be established to reduce the confusion of the trend displays when multiple points are being trended.

CORRECTIVE ACTIONS

HED NO.: QS:E5.1-1.087

RATING: 3

FINDING:

During xenon calculation to get transient or steady state information on xenon reactivity, the printer must print many pages to produce the information needed, which normally is only part of one page.

RESPONSE:

The existing software for xenon calculations has operator selection of the quantity of data to be printed. This allows the operator to print only the information needed. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:E5.2-1.088

RATING: 3

FINDING:

If any alarm points are bad, computer prints information that is unimportant to the operators. This slows down post-trip reviews and other vital printouts.

RESPONSE:

The post-trip reviews are not significantly impacted by the bad alarm data and such reviews are not time critical. Furthermore, the bad alarm data can be useful in certain situations including normal plant operation. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:B8.8-1.089

RATING: 3

FINDING:

Intermediate range meters have different divisions from chart recorders for same parameter.

RESPONSE:

The meters and recorders have the same units but the recorder has finer divisions of the units than the meters. Therefore, comparison of the two display devices is not a problem and no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:C3.2-1.090

RATING: 3

FINDING:

SPDS tube-to-shell delta T alarm does not give operator time to act.

RESPONSE:

The setpoint for the SPDS "TUBE TO SHELL DELTA T" alarm will be evaluated for possible setpoint change. (See QS:C3.2-1.012).

CORRECTIVE ACTIONS

HED NO.: QS:1.091

RATING: 3

FINDING:

Use of log scales for certain flow meters in the control room is inappropriate. At the low end of the scale, it is difficult to get readings. (HPI Flow and Emergency Feedwater Flow).

RESPONSE:

The EFW flow display on C-09 is presented in a log scale. This is not a problem since it is used primarily for trending of flow and not to get an accurate indication of a specific flow value.

The Emergency Feedwater flow indicators on C-16/C-18 have been removed by a design change during 1R6 such that this discrepancy no longer exists.

The HPI Flow indicators were replaced during 1R6 with linear scale meters such that this discrepancy no longer exists.

Based on the above, there is no justification for making additional changes to address this HED, so no further action is planned.

CORRECTIVE ACTIONS

HED NO.: QS:1-1.094

RATING: 3

FINDING:

Pressurizer Temperature meters should have finer divisions. Rate of change that operators is looking for is so slow that it is hard to detect changes on the present scale. Also, for surveillances to check validity of meter, tech specs call for meter to be read in 7 degree tolerances.

RESPONSE:

The level of precision needed for the pressurizer temp. meter is easily read from the existing meter. The technical specification requirement is that the instrumentation be operable and administratively this is checked by comparing the two temperature readings to assure that they are within 7 degrees of each other. Since the single meter displays both temperature inputs by use of a selector switch, it is easy to verify if the displays are within 7 degrees by flipping the selector switch. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: QS:1-1.099

RATING: 3

FINDING:

The incore detector recorders on panel C-13 are not used by the plant operators. They are used by the I&C technicians.

RESPONSE:

The identified recorders will be evaluated for possible relocation to a panel in the back of the control room to make space for instrumentation needed by the plant operators.

CORRECTIVE ACTIONS

HED NO.: QS:1-1.101

RATING: 3

FINDING:

The HPI flow indicators on panels C-16/C-18 give a false indication of flow during certain system conditions.

RESPONSE:

These indicators will be evaluated for possible design changes or some form of warning that the flow information is invalid during certain system conditions.

CORRECTIVE ACTIONS

HED NO.: QS:1-1.102

RATING: 3

FINDING:

The spent fuel pool level indicator (LI-2004) is displayed in feet above normal pool level. Other instrumentation located outside the control room is displayed in feet of elevation above sea level. The operators prefer the display in feet of elevation above sea level which would make comparison of readings between the various displays convenient.

RESPONSE:

This indicator will be evaluated for a possible design change to display in feet above sea level.

CORRECTIVE ACTIONS

HED NO.: QS:1-1.104

RATING: 3

FINDING:

The recorder for the wide range containment radiation monitor (RR-8060) is located on panel C-498 while the other related radiation monitor displays are located on panel C-486.

RESPONSE:

The identified recorder will be evaluated for possible relocation or other association enhancement.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.001

RATING: 3

FINDING:

An annunciator is needed for the task of identifying need for reactor trip on high flux/delta flux/flow, but is not available.

RESPONSE:

The ANO-1 Reactor Trip Annunciator is a multi-point alarm that includes the high flux/delta flux/flow trip input and the process computer has a sequence of events feature that provides information on the source of the trip (i.e., which input initiated the trip). The trip procedure requires the plant operator to assure that the monitored parameters indicate that a successful reactor trip has occurred. The addition of a separate alarm on high flux/delta flux/flow would not provide any useful information beyond that already provided by the reactor trip multi-point alarm and the process computer since the requirement to verify success would still exist. Therefore, the existing arrangement provides the operator with the needed information to accomplish the task.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.002

RATING: 3

FINDING:

An annunciator is needed for the task of identifying need for reactor trip on variable low RCS pressure, but is not available.

RESPONSE:

The ANO-1 Reactor Trip Annunciator is a multi-point alarm that includes the variable low RCS pressure trip input and the process computer has a sequence of events feature that provides information on the source of the trip (i.e., which input initiated the trip). The trip procedure requires the plant operator to assure that the monitored parameters indicate that a successful trip has occurred. The addition of a separate alarm on variable low RCS pressure would not provide any useful information beyond that already provided by the reactor trip multi-point alarm and the process computer since the requirement to verify success would still exist. Therefore, the existing arrangement provides the operator with the needed information to accomplish the task.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.003

RATING: 3

FINDING:

An annunciator is needed for the task of identifying the need for reactor trip on high power/pump, but is not available.

RESPONSE:

The ANO-1 Reactor Trip Annunciator is a multi-point alarm that includes the high power/pumps trip input and the process computer has a sequence of events feature that provides information on the source of the trip (i.e., which input initiated the trip). The trip procedure requires the plant operator to assure that the monitored parameters indicate that a successful reactor trip has occurred. The addition of a separate alarm on high power/pumps would not provide any useful information beyond that already provided by the reactor trip multi-point alarm and the process computer since the requirement to verify success would still exist. Therefore, the existing arrangement provides the operator with the needed information to accomplish the task.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.004

RATING: 3

FINDING:

An annunciator is needed for the task of verifying the need for reactor trip on steam generator level, but is not available.

RESPONSE:

A separate steam generator level alarm comes in to alert the operator that a manual trip point is being approached. There is no automatic trip on steam generator level. The existing arrangement provides the needed information for the operator to manually trip the reactor when steam generator level conditions warrant such action. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.009

RATING: 3

FINDING:

Instrument is needed for the task of verifying RCP motor cooling water flow, but is not available.

RESPONSE:

The procedure requires the verification of RCP motor cooling water flow which is done by observing that the low flow annunciator is not actuated. There is no need to monitor flow rate since this parameter is not controlled by the plant operator. Therefore, the existing arrangement provides the needed information to the operator to perform the task.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.011

RATING: 3

FINDING:

An instrument is needed for the task of overriding the RCP interlock, but is not available.

RESPONSE:

The RCP interlock system prevents the operation of the reactor coolant pumps under conditions that could result in pump damage. During an emergency it is usually desirable to be able to re-start an RCP, but it is not imperative. Therefore, the addition of an interlock override switch could result in pump damage witout providing a necessary benefit. No further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.012

RATING: 3

FINDING:

During Task Analysis the Subject Matter Expert stated that a legend light is needed for the task of identifying the source of the RCP interlock condition, but is not available.

RESPONSE:

This HED will be evaluated to identify possible corrective action to provide RC pump interlock status. (See CK:5-1.026, QS:A3.12-1.045, VR:1-1.017 and VS:1-1.008).

CORRECTIVE ACTIONS

HED NO.: VR:1-1.014

RATING: 3

FINDING:

A meter is needed for the task of determining main steam flow, but is not available.

RESPONSE:

Steam flow is indirectly indicated by valve position and by monitoring main steam pressure . It is important to maintain control of the secondary system pressure which is done by controlling the release of steam through atmospheric dump valves, bypass valves, and/or safety valves. It is not important nor useful to know the steam flow rate. Therefore, due to the adequacy of the existing arrangement, no further action is planned to address this HED. (See also HED QS:A1.13-1.001 and VR:1.1-013)

CORRECTIVE ACTIONS

HED NO.: VR:1-1.015

RATING: 3

FINDING:

An annunciator is needed for the task of determining completion of the batch controller operation, but is not available.

RESPONSE:

The operator manually initiates the boric acid controller system, continues to monitor the progress of the process, and the system automatically terminates when the process is complete. This process originally included an annunciator to alert the operator upon completion. As a result of the annunciator upgrade program, the alarm was removed since it was not useful to the plant operators (i.e., extraneous information). Therfore, the subject of this HED has been previously evaluated and the existing arrangement serves the operators needs. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.019

RATING: 3

FINDING:

An annunciator is needed for the task of identifying the need for reactor trip on high power level, but is not available.

RESPONSE:

The ANO-1 Reactor Trip Annunciator is a multi-point alarm that includes the high reactor power trip input and a power distribution alarm indicates that the source of the trip is a reactor power problem. Procedures require the operator to assure that the monitored parameters indicate that a successful trip has occurred. The addition of a separate alarm on high reactor power would not provide any useful information beyond that already provided by the reactor multi-point alarm and the power distribution alarm since the requirement to verify success would still exist. Therefore, the existing arrangement provides the operator with the needed information to accomplish the task.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.020

RATING: 3

FINDING:

There is no control room indication available for start-up boiler control.

RESPONSE:

The addition of startup boiler status will be evaluated.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.021

RATING: 3

FINDING:

The meter necessary for the task of observing startup boiler steam supply valve position is not available in the control room.

RESPONSE:

This HED will be evaluated for the possible addition of valve position indication for the steam supply from the startup boiler. (See QS:A1.12-1.034).

CORRECTIVE ACTIONS

HED NO.: VR:1-1.022

RATING: 3

FINDING:

During Task Analysis, the Subject Matter Expert stated that a control status light for gland seal steam supply valve position indication is needed for the task but is not available.

RESPONSE:

The supply of gland seal steam is from the startup boiler via manual valve lineup during plant startup and is transferred manually to the main steam system as the unit goes into power operation. The operator does not need a gland seal steam supply valve position indication since the valves are controlled by manual operator action. If the plant trips during startup and the operator doesn't know if the gland seal steam is being supplied from the startup boiler or the main steam system, he can watch the gland seal steam pressure annunciator to determine status. If the alarm comes in, he sends an operator to open the startup boiler supply valves. Therefore, the existing arrangement provides the needed information for the operator to perform the task. No further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.023

RATING: 3

FINDING:

There is no status meter available for monitoring main feedwater pump recirc. valve position - only a demand meter.

RESPONSE:

The addition of recirc. valve position indication will be evaluated.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.024

RATING: 3

FINDING:

There is no zero speed annunciator available for the main feed pumps.

RESPONSE:

The operator can confirm the feedwater pump coastdown by observing the status light for the automatic turning gear engagement. Since the turning gear engagement is automatic, there is no real need to know when zero speed is reached. If the turning gear status light does not come on, there is plenty of time to manually engage the turning gear locally before any concern about turbine damage is involved. Therefore, since this is not a time critical situation and the existing turning gear status light provides control room indication of the termination of the coastdown, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.025

RATING: 3

FINDING:

A switch is needed for the task of verifying steam header and extraction drains valve position, but is not available.

RESPONSE:

The subject valves for drains are operated locally by the operator. Their position is also checked locally. This operation step is not time critical and the control room status of their position is not needed. Therefore, due to a lack of justification for change, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.030

RATING: 3

FINDING:

An annunciator indicating the status of feeder breakers to A2 is not available in the control.

RESPONSE:

The action of placing the feeder breaker controls in pull to lock brings in an annunciator for transformer not available. This multi-point annunciator provides the needed indication of the status of the system such that an additional annunciator is not needed. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.032

RATING: 3

FINDING:

No ICW cooler service water flow control is available in the control room.

RESPONSE:

The need to adjust the cooling water supply to the ICW coolers is a rare operation. The existing local controls and indicator are sufficient for these rare situations. Adding these controls and indicators to the control room would unnecessarily contribute to the already crowded control boards and would be of little benefit to the operators. Therefore, due to the adequacy of the existing local control arrangement, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VR:1-1.034

RATING: 3

FINDING:

There is no control for the condensate pump discharge valves in the control room to allow throttling of these valves. The valves are controlled locally by an AO.

RESPONSE:

The identified need for control room control of the condensate discharge valves is not cost justified. The current procedure of manual operation of the subject valves does not impact plant operation in such a way to cause or contribute to operator error. Therefore, due to a lack of justification for change, no further action is planned to address this HED. (See QS:A1.16-1.037).

CORRECTIVE ACTIONS

HED NO.: VS:1-1.003

RATING: 3

FINDING:

The valve which controls whether letdown will be directed to makeup tank or clean waste storage tank does not have a green CSL as called for in TA.

RESPONSE:

The status lights for the subject valve do not conform to the standard configuration since the valve involved is a 3-way valve. However, the existing status lights do clearly indicate the direction of the letdown flow. Therefore, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VS:1-1.004

RATING: 3

FINDING:

All indications in the primary CR area of RCS flow are in LBS/HR. The task analyst indicated that RCS flow should be in percent.

RESPONSE:

The use of the RCS flow instrumentation is to confirm the number of operating RCPs (i.e., 1, 2, 3, or 4 pump operation). The actual quantity of flow is not that important except that the LB/HR value is used when performing a heat balance. Therefore, since the LB/HR units are used for heat balance and since the use of % flow is not clearly superior to the existing arrangement, no further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VS:1-1.005

RATING: 3

FINDING:

The terminology used in this annunciator's label is not consistent with operators' terminology. (ICS and Auxiliary System Power Supply Trouble).

RESPONSE:

The correction of the labeling of the subject annunciator will be evaluated.

CORRECTIVE ACTIONS

HED NO.: VS:1-1.006

RATING: 3

FINDING:

There is no direct indication (i.e., a green CSL) that the pressurizer electromatic relief valve is closed. There are two CSLS present (red means open; amber means control circuit is armed). However, if the valve is closed the PRZR pressure remains constant as does quench tank level; temperature; and pressure.

RESPONSE:

The pressurizer electromatic relief valve does not have a positive position indication due to the valve design. As a result, the valve has been fitted with an acoustic monitor in addition to the indirect valve position indication to provide an unambiguous valve position indication. Therefore, the existing arrangement has been arrived at by a careful evaluation of the options available to provide unambiguous indication of the valve position. This design feature reflects AP&L's on-going commitment to the practical application of human factor's principles that was in effect prior to CRDR program.

CORRECTIVE ACTIONS

HED NO.: VS:1-1.007

RATING: 3

FINDING:

Range that is needed on the EFW pump discharge pressure meter is 500 - 1500 PSIG. Range on existing meter is 0 - 1400 PSIG.

RESPONSE:

The need to extend the range of this instrument was identified by AP&L prior to the assessment of this HED and a design change was implemented during 1R6 to correct this problem. This design change reflects AP&L's on-going commitment to the practical application of human factor's principles that was in effect prior to the CRDR program.

CORRECTIVE ACTIONS

HED NO.: VS:1-1.009

RATING: 3

FINDING:

There is no direct indication that the core flood tank valve breaker is open (this is its normal operating state). When breaker is open the red-green indicator lights are both unlit.

RESPONSE:

The status of the core flood tank valve breakers is confirmed during each operation of the valves (i.e., during each shutdown and startup). If the bulbs fail while power is available to the breakers, the operator is at the breaker and can observe its position locally. Therefore, the existing arrangement will alert the operator if simultaneous failure of the bulbs occurs in conjuction with an operating procedure error. No further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VS:1-1.010

RATING: 3

FINDING:

Temperature on the reactor coolant pump motor temperature recorder is in degrees centigrade. Operators convert this reading to degrees fahrenheit.

RESPONSE:

This HED is incorrect in that the recorder does measure in degrees F. Therefore, no further action is needed to resolve this HED.

CORRECTIVE ACTIONS

HED NO.: VS:1-1.011

RATING: 3

FINDING:

Meter registers condensate storage tank level in percent while corresponding tech spec is in feet.

RESPONSE:

The need for this change was previously identified by AP&L and a change was implemented to correct this HED. This reflects AP&L's on-going commitment to the practical application of human factors principles that was in effect prior to the CRDR program. Therefore, this HED has been corrected.

CORRECTIVE ACTIONS

HED NO.: VS:1-1.012

RATING: 3

FINDING:

RCP Seal Flow recorder has two incompatible scales. One scale corresponds to range shown on instrument label. The other does not. GPM scale is preferred over percent.

RESPONSE:

This recorder will be evaluated for changing to a GPM scale.

CORRECTIVE ACTIONS

HED NO.: VS:1-1.013

RATING: 3

FINDING:

Numerous continuous control operations are done with discrete switches (rotary switches). Throttling vlvs is done by throwing switches to one extreme and watching meter until pressure or flow reaches desired level; then throwing switch to another position.

RESPONSE:

The control of modulating valves is normally done with a discrete switch that is held in position until the desire value is reached. This is a standard arrangement that is familiar and easily utilized by the plant operators. Therefore, this HED does not reflect a problem to the plant operator and no need for change has been identified. No further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VS:1-1.014

RATING: 3

FINDING:

The letdown orifice bypass valve is not currently controlled from the control room.

RESPONSE:

The letdown system has three paths, two of which are controlled from the control room. The bypass valve is a manual valve that is normally closed and is not normally used. Therefore, since the bypass valve is not used as part of operating procedures and is not needed to control letdown, control room control of this valve is not appropriate. No further action is planned to address this HED.

CORRECTIVE ACTIONS

HED NO.: VS:1-1.016

RATING: 3

FINDING:

The meter on the feedwater pump controller reads out in either percent or PSID depending on the position of a slide switch on the controller. However, the units and scales on the meter are only in percent.

RESPONSE:

This HED is associated with the feedwater pump controller which will be evaluated for better labeling as part of the control room relabeling effort. Therefore, this HED will be resolved by the relabeling program.

CORRECTIVE ACTIONS

HED NO.: VL:1-1.002

RATING: 3

FINDING:

Meters for different buses are scattered across the electrical power distribution panel C-10.

RESPONSE:

The association enhancement of the identified components will be evaluated.

CORRECTIVE ACTIONS

HED NO.: VL:1-1.003

RATING: 3

FINDING:

The MSIV controls are located too low on these panels. The operators must bend into uncomfortable positions to operate these controls.

RESPONSE:

The main steam isolation valve controls and indicator lights have been relocated to panel C-09 during 1R6 as part of AP&L's on-going commitment to the practical application of human factors principles. The new location on panel C-09 resolves this HED.

CORRECTIVE ACTIONS

HED NO.: VL:1-1.005

RATING: 3

FINDING:

The HPI and LPI flow meters on C16 and C18 are located at an awkward height for operators to read.

RESPONSE:

The HPI and LPI flow meters were replaced with "sigma" type meters that are less susceptible to parallax since they have flat display faces. This design change was initiated prior to the evaluation of this HED are part of AP&L's on-going commitment to the practical application of human factors's principles. Therefore, this HED has been corrected by a design change. (See CK:9-1.011).