

Commonwealt dison One First National Preza, Chicago, Illinois Address Reply to: Post Office Box 767 Chicago, Illinois 60690

May 1, 1985

Mr. Harold R. Denton, Director Office of Nuclear Reactor Regulation U.S. Nuclear Regulatory Commission Washington, DC 20555

Subject:	Dresden Station Units 2 & 3 Quad Cities Station Units 1 & 2 Detailed Control Room Design Review (DCRDR) Final Summary Reports NRC Docket Nos: 50-237, 50-249; 50-254 & 50-265
References: (a):	D. M. Crutchfield letter to D. L. Farrar dated June 12, 1984.
(b):	D. B. Vassallo letter to D. L. Farrar dated June 12, 1984.
(c):	B. Rybak letter to H. R. Denton dated March 21, 1984.
(d):	B. Rybak letter to H. R. Denton dated October 10, 1984
(e):	Cordell Reed letter to H. R. Denton dated April 14, 1983.
(f):	
(g):	Supplement 1 to NUREG 0737 dated December 17, 1982.

Dear Mr. Denton:

Enclosed please find the Detailed Control Room Design Review (DCRDR) Final Summary Reports for Commonwealth Edison Company's (CECo) Dresden Station (Units 2 & 3) and Quad Cities Station (Units 1 & 2). These reports meet the Section 9, Item II CECo commitment in Reference (e) and the regulatory requirements of Item 2 in References (a) and (b).

Volume 1 of these reports describes the methodology used and the qualifications of the personnel involved in the DCRDR review. Volume 2 of these reports includes all Human Engineering Discrepancies (HED's) our evaluation of the HEDS, and where corrective actions were required, the proposed schedule for implementation. This proposed schedule, as noted in Section 3, Item 5.3 of Reference (e), is predicated upon NRC approval of CECo's disposition of each of the HED's included in Volume 2 as the schedule is sensitive to the size of the current scope of work. Also, as noted in the same Reference (e) this schedule is subject to the availability of equipment, outage dates and engineering design lead time. Finally, the impact of Regulatory Guide 1.97 has not been factored into this schedule.

8505070401 850501

ADOCK

PDR

05000237

PDR

Therefore, our schedule is submitted as an proposed one and will be finalize after receipt of NRC input and completion of our 1.97 review.

The schedule for completion of the corrective actions has been designated as the completion of the first refueling outage or the second refueling outage. With some allowance for engineering and procurement lead time and assuming a two month NRC review period, the proposed schedule is as follows:

# First Refueling Outage

# Second Refueling Outage

Dresden Unit 2	September	1986	March	1988
Dresden Unit 3	October	1987	April	1989
Quad Cities Unit l	September	1987	October	1988
Quad Cities Unit 2	October	1986	March	1988

If a change to this schedule is necessitated CECo will notify the NRC.

The corrective actions to be taken to resolve many of the HED's involve the use of Hierarchal Labeling, Mimic, Lines of Demarcation and Background Shading. These control board enhancements should be integrated so that any one of these technics is consistent with all the others. Since this is a large effort and it is not "safety related" it is to be completed in the second refueling time frame.

If you have any additional questions, please contact this office.

One (1) signed original and sixty (60) copies of this letter are enclosed for your use. Due to the size of the DCRDR Final Summary Report, only seven (7) copies are provided.

Very truly yours,

Bikebak

B. Rybak Nuclear Licensing Administrator

Attachments

cc: R. Bevan - NRR R. Gilbert - NRR NRC Resident Inspector - Quad Cities NRC Resident Inspector - Dresden

0054K

	· · ·		· · · · · · · · · · · · · · · · · · ·
		the second se	
		50-237	
N 1999 - 199 - 299	a the second second	DETAILED CONTROL ROOM DESIGN REVIEW FINAL	
		SUMMARY REPORT PROGRAM IMPLEMENT VOL2 Par	+ TT
		A A A A A A A A A A A A A A A A A A A	
		. · ·	
1. 6. 19 19 19 19 19 19 19 19 19 19 19 19 19			
		and the second se	
	and the second sec		i a s y i y
		and the second	in the second second The second se The second se The second
	alter the state		
5. <b>6</b>	a stand and the		
	and the second secon I have a second secon		and the second sec
			A contraction of the contraction
	han na an the state of the stat	and the second	العوم مانيين روالاً مانين والارد. التي من الدين التي من الارد
	n na star de la servicio de la servi No servicio de la serv		
	and the second sec	and and a set of a se	
	and the second		
	್ ವಿವಿಶಾಲ್ಯ ಕೋಲ್ಯ 1566 ಗೇ - ಜಿಲ್ಗ್ ಕ್ರೈ ಕೋಲ್ ಗೇ		indentation de la filipie de
	and the state of	and the second	
10 <sup>3</sup> - 1	C. S.	and the first of the second second In the second	ອົ່ງເປັນ ເປັນເປັນຜູ້ສະຫຼັງ ເປັນເຫຼືອງອີງເຫຼືອງ
		A CARLE AND A CARLER AND A CARLER A CARLER AND A C	
	The second second	Val. 2 (Fast II)	and the stand of the stand of the stand
	and a start of the start of the	ULC (fait IL)	The Martin Charles The Martin
a	A Construction of the second		and an
	and a star of the second start of the second s	- NOTICE -	n Sangangar'i an San an An an An An an An
		THE ATTACHED FILES ARE OFFICIAL RECORDS OF THE	the arts the state of the sta
		DIVISION OF DOCUMENT CONTROL. THEY HAVE BEEN	
		CHARGED TO YOU FOR A LIMITED TIME PERIOD AND	
		MUST BE RETURNED TO THE <u>RECORDS FACILITY</u> BRANCH 016. <u>PLEASE DO NOT SEND DOCUMENTS</u>	
		CHARGED OUT THROUGH THE MAIL. REMOVAL OF ANY	
		PAGE(S), FROM DOCUMENT FOR REPRODUCTION MUST	a with the second se
	A CORPORATION AND A C	BE REFERRED TO FILE PERSONNEL. 50- マミア	
		5/1/35	
			and the second
	The state of the s	DEADLINE RETURN DATE <u>8505070401</u>	
		· · · · ·	A A A A A A A A A A A A A A A A A A A
		·	
			the second second second
	a state of the second stat		A REAL STREET
	the stand with the state		and the second sec
	and the second second		
		RECORDS FACILITY BRANCH	and the second s
		ACCORDS FACILITY BRANCH	
000059005	And the state of the	NATES AND AND THE ADDRESS OF A DESCRIPTION OF A DESCRIPTION OF A DESCRIPTION OF A DESCRIPTI	· · · · · · · · · · · · · · · · · · ·

COMMONWEALTH EDISON COMPANY DRESDEN STATION DETAILED CONTROL ROOM DESIGN REVIEW FINAL SUMMARY REPORT REVIEW FINDINGS VOLUME 2 SECTIONS 7-13 MAY 1985





# SECTION 7 PROCESS COMPUTERS

NDE	X NO.	: 0248	
12 H	ED:	7.1.3.E-2	

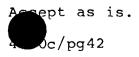
CATEGORY: 2 LEVEL: C

## FINDING:

File of all available operator requests is not available on the screen. For example, the ranges of setpoints for the various subsystems are not shown. All possible operator requests should be shown on the screen so all computer information and programs can be accessed quickly.

## **RESPONSE:**

The system is menu-driven. All menus are viewable on the monitor at the quest of the operator. This approach is preferable to one in which a ge number of commands must be memorized and which necessitates a hard copy index of commands.



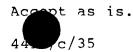
NO.:	0007	·		
12 GUIDE	NO.:_	7.1.4.1-1		
CATEGORY	: 2	LEVEL:	с	

# FINDING:

There are keys on the keyboard which the operators do not use. Nonrelevant keys should be avoided because they increase keyboard complexity and may induce operator errors.

## **RESPONSE:**

Only the keys relevant to operators are activated. The others have a physical barrier inside the keyboard to prevent their activation.



DEX NO.: 0238

12 HED NO.: 7.1.4.E.1.A-1

CATEGORY: 2 LEVEL: C

# FINDING:

Displacement of keys on numeric keypad of Ampex keyboard is 0.25 inches. Maximum recommended displacement is 0.19 inches. (Photo Log M-19)

## **RESPONSE:**

Key contact closure occurs at a displacement of 0.125 inches which is thin the recommended displacement range. Since possible inadvertent actuation is the prime consideration, this deviation from recommended addelines is not serious.



DEX	NO.:	0241		
·			 	

12 HED NO.: 7.1.4.E.2.A-3

CATEGORY: 2 LEVEL: C

## FINDING:

Resistance of Viewpoint/60 keyboard numeric keys is 2.0 ounces which is below the 3.5 ounce recommended resistance.

# **RESPONSE:**

These keyboards are used only by engineering personnel and not by crations. The consequences of inadvertent key actuation is negligible.



DEX NO.: 0242

12 HED NO.: 7.1.4.F-4

CATEGORY: 2 LEVEL: C

# FINDING:

The Honeywell keyboard, located on the computer table gives no positive key actuation feedback (e.g. change in resistance, audible or visual feedback).

. . . . .

# RESPONSE:

The Honeywell keyboard will be removed from the control room. The board was installed with the printer. However, since only the printer used, the keyboard serves no purpose.

# IMPLEMENTATION:

he completion of the second refueling outage.

4381c/pq64

DEX	NO.:	0243	

12 HED NO.: 7.1.4.G-5

CATEGORY: 2 LEVEL: C

#### FINDING:

The Ampex keyboard angle has a slope of 6 degrees. This is less than the guideline recommended keyboard angle of slope of 10 degrees. The Ampex keyboards are located at the unit desk and at the computer table. (Photo Log M-18)

## **RESPONSE:**

These keyboards are not used for extended periods of time or on a continuous basis. Therefore, the effect of keyboard slope on operator igue, and hence on operator error, is expected to be negligible. If these circumstances, the current keyboard slope is adequate.



DEX N	10:	0245	
12 HED	NO.:_	7.1.4.1-7	

CATEGORY: 2 LEVEL: C

#### FINDING:

Some keys on Ampex keyboards are not used by the operators. Only the A, B, C, D, E, F, G, H, L, N, Q, R, S, T, W, O, 1, 2, 3, 4, 5, 6, 7, 8, 9, comma, and return keys are used by the operators. Unused keys are not clearly differentiated from active keys. (Photo Log M-17)

# **RESPONSE:**

Measures will be taken to clearly differentiate unused keys from active in order to minimize possible operator confusion. These measures l include color coding of unused keys.

#### IMPLEMENTATION:

he completion of the second refueling outage.

	EX	NO.:	0259	
12	HED	NO.:	7.1.5.C.1-1	
		_		

CATEGORY: 2 LEVEL: B

## FINDING:

The Ampex terminal on the computer table (used by the crew operators) can be used to control displays on any of the four color monitors. When this terminal is used by the operator as a master control, the Unit operator is not informed on his Ampex terminal at the Unit desk. Also, after display selection the user is automatically returned to the top level of the display hierarchy rather than remaining at the current selected level.

#### **RESPONSE:**

The problems noted do not present the possibility of plant control errors since the accuracy of the displays is not compromised. However, in order increase the ease with which the system is used, the feasibility of appropriate software changes will be determined.

#### IMPLEMENTATION:

4381c/pg67

e completion of the second refueling outage.

DEX	NO.	:	0243
,			*

12 HED: 7.1.7.B-1

CATEGORY: 2 LEVEL: C

## FINDING:

Some response times exceed 3.0 seconds (such a full core scan varies from 5.6 to 8.9 seconds). No response delay messages are shown on the screen in these instances. Whenever the processing of the computer exceeds 3.0 seconds a delay message or some type of visual feedback should be on the screen.

## **RESPONSE:**

This is not considered a serious problem in that, where response time defined as the time between when the operator depresses the return key when the display is fully built) exceeds 3 seconds, the operator eives visual feedback that the computer is executing the program by means of the display frame being built. This has the same effect as an explicit verbal message.



EX	NO:	0261		

12 HED NO.: 7.2.1.A-1

CATEGORY: 2 LEVEL: C

#### FINDING:

The white and light blue alphanumeric characters are hard to read on display #3 Unit 2. All graphic characters are readable. All alphanumerics on all displays should be readable so operator can obtain the correct data from screen and not inadvertently make an incorrect reading. Photo Log (M-27)

#### **RESPONSE:**

A key factor that reduces the readability of the display is that the strical stroke widths are narrower than the horizontal stroke ths. As a result the vertical stroke widths will be revised.

### IMPLEMENTATION:

4424/c/21

e completion of the second refueling outage.

DEX	NO.:	262	•		

12 HED NO.: 7.2.1.B-2

CATEGOPY: 2 LEVEL: C

## FINDING:

There is an unacceptable level of glare, from various sources, on most of the CONRAC color monitors. This glare reduces readability of the displays and increases operator eye strain. Displays 3 and 4 on Unit 3 have anti-glare screens which significantly reduce glare and improve the contrast ratio of the displays. (Photo Log M-20/M-21).

#### **RESPONSE:**

Anti-glare screens, similar to those used on Displays 3 and 4 on Unit 3

## IMPLEMENTATION:

the completion of the second refueling outage.

12 HED NO.: 7.2.1.C.1-3

CATEGORY: 2 LEVEL: C

## FINDING:

Ambient illumination contributes more than 25% to total screen luminance on monitors with no non-glare screens in display areas which are red, dark blue, or purple. This problem reduces display contrast ratio which in turn reduces display readability. (Photo Log M-22).

### **RESPONSE:**

Anti-glare screens will be installed on all monitors to improve display intrast ratio. In addition, all monitors will be adjusted for optimum ghtness and contrast. Brightness and contrast levels will be insistent across all displays.

#### IMPLEMENTATION:

he completion of the second refueling outage.

DEX NO.: 0270

12 HED NO.: 7.2.1.C.3-4

CATEGORY: 2 LEVEL: C

## FINDING:

There is considerable difference in the luminance readings for all monitors, obtained for light-colored backgrounds. (Photo Log M-22).

# **RESPONSE:**

All monitors will be fitted with anti-glare screens and brightness and contrast adjustments will be made so that all monitors have similar inance values.

#### IMPLEMENTATION:

he completion of the second refueling outage.

DEX NO.: 0271

12 HED NO.: 7.2.1.C.4-5

CATEGORY: 2 LEVEL: C

FINDING:

There is considerable difference in the luminance readings obtained for light characters between different monitors. (Photo Log M-22).

## **RESPONSE:**

All monitors will be fitted with anti-glare screens and brightness and strast adjustments will be made so that all monitors have similar inance values.

## IMPLEMENTATION:

me completion of the second refueling outage.

NDEX	NO.:	0272	
------	------	------	--

12 HED NO.: 7.2.1.D.1-6

CATEGORY: 2 LEVEL: C

#### FINDING:

The contrast ratio between light characters and a dark screen background are not consistent across all monitors and some monitors have contrast ratios outside of the recommended limits of 15:1 and 20:1. (Photo Log M-22).

#### **RESPONSE:**

All monitors will be fitted with anti-glare screens and brightness and contrast adjustments made so that contrast ratios fall within recommended its and are consistent across all monitors in the control room.

## IMPLEMENTATION:

The completion of the second refueling outage.

DEX	NO.:	0273		•
-----	------	------	--	---

12 HED NO.: 7.2.1.F.2-7

CATEGORY: 2 LEVEL: C

#### FINDING:

CONRAC color monitors do not meet resolution guidelines of 100 elements/ inch, for displaying complex symbols and detailed graphics, so that display details are readable. (Photo Log M-23)

## **RESPONSE:**

Graphic displays currently in use are not considered to be comprised of maplex symbols. The CONRAC color monitors have a resolution of 20 ments/inch, which is adequate for present graphics displays. Should ture graphics requirements dictate more detailed displays, consideration will be given to the resolution limitations of the CONRAC and the replacement of these monitors with ones of higher resolution.



IDEX N	10:(	0589/0588
12 HED	NO.:	7.2.1.F.4-1/7.2.2.G.2-1

CATEGORY: 2 LEVEL: C

FINDING:

Alphanumeric characters for the ampex terminals have 7 picture elements per character height which is less than the required 10.

# **RESPONSE:**

The character height provides adequate readability from the operator's normal viewing position.

# IMPLEMENTATION:

Accept as is.  $\frac{1}{4}$  /c/22

IDEX NO.: 0274

12 HED NO.: 7.2.1.H.1-8

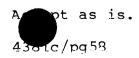
CATEGORY: 2 LEVEL: C

## FINDING:

Control room operators are not allowed to adjust brightness and contrast controls even though these controls are active. The present procedure is for OAD to made all adjustments of these controls.

#### **RESPONSE:**

Operators should be allowed to change brightness and contrast settings only under unusual circumstances (e.g. failure or malfunction of an RGB nnel) in order to maintain luminance levels and contrast ratios that within accepted human factors criteria. Operators will continue to be restricted from adjusting the brightness and contrast.



|--|

12 HED NO.: 7.2.2.A-1

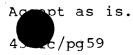
CATEGORY: 2 LEVEL: C

## FINDING:

Two symbols on the Ampex and Conrac monitors do not subtend the recommended angle of visual arc at the maximum viewing distance. (Photo Log M-29)

## **RESPONSE:**

The two symbols (a " + " on the Ampex display and a red value symbol on the Conrac) are not considered to be complex symbols. Thus, the angle the ch they subtend is sufficient even at greater viewing distances.



DEX NO.:_	0302	
12 HED NO.:	7.2.2.B.1-2	

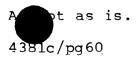
CATEGORY: 2 LEVEL: C

#### FINDING:

Alpha-numeric characters on the Conrac monitor on Unit #3, Panel #7 does not subtend the recommended visual arc at the maximum viewing distance of 10 feet 6 inches. (Photo Log M-30)

## **RESPONSE:**

This problem is not considered serious since the reading of a character light of 0.33 inches was obtained on a monitor which was out of ustment. When properly adjusted the character height still does not wet the guideline of visual arc to be met at the maximum possible viewing distance. However, if the viewing distance is 1/16 inch closer the guideline is met. Given that operators can call up the same display on a closer monitor or move forward this small amount, the problem is not serious.



INDEX NO.: 0304 HED: 7.2.2.D-4 CATEGORY: 2 LEVEL: C

FINDING:

The large characters on the Conrac color monitors do not meet the strokewidth-to-character-height ratio requirement of being between 1:5 and 1:10. Alphanumeric characters should be within these values for optimum readability. On one monitor, both large and small characters did not meet this requirement. (This monitor was not adjusted properly). Improper adjustment of the monitor thus contributes to this readability problem (Photo Log M-31). The Ampex monitor meets this requirement.

#### **RESPONSE**:

OAD will periodically review all monitors in the Control Room for proper adjustment.

#### IMPLEMENTATION:

4385/c/69

By e completion of the second refueling outage.

IDEX NO.: 0587

12 HED NO.: 7.2.2.E-1

CATEGORY: 2 LEVEL: C

## FINDING:

Conrac color monitors have 20 resolution elements per inch for presentation of graphic lines. The recommended resolution is 50 resolution elements per inch.

# **RESPONSE:**

Fine graphic detail is not required on the displays presented on these monitors so that 20 resolution elements per inch seems to be acceptable.



NDEX NO.:	0378			<u> </u>
12 HED NO.:_	7.2.3	.C.1.A-1		-
CATEGORY:	2	LEVEL:	C	

# FINDING:

Both Conrac and Ampex monitors do not meet the horizontal viewing angle requirement of not more than 35 degrees to the left or right of the operator's straight ahead view from a seated position. Photo Log (N-35,N-36).

## RESPONSE:

Monitors located in the control panels or suspended from the ceiling are plays that the operator periodically checks. Whether the operator is nding or sitting he visually scans the control panels. The cited display monitors are clearly visible. These monitors do not require constant attention such that constantly being turned to view the monitor would cause fatigue.



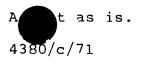
DEX NO.:	0379			
12 HED: 7	.2.3.D	.1.A-2		
CATEGORY:	2	LEVEL:	С	

FINDING:

Both Conrac and Ampex monitors do not meet the horizontal viewing angle requirement of not more than 35 degrees to the left or right of the operator's straight ahead view from a standing position.

#### **RESPONSE:**

Monitors located in the control panels or suspended from the ceiling are plays that the operator periodically checks. Whether the operator is ding or sitting he visually scans the control panels. The cited oreplay monitors are clearly visible. These monitors do not require constant attention such that constantly being turned to view the monitor would cause fatigue.



EX NO.: 0380

12 HED: 7.2.3.D.1.B-3

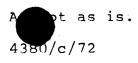
CATEGORY: 2 LEVEL: C

FINDING:

The Ampex monitor on the far left-hand side of the console does not meet the vertical viewing angle requirement of no more than 25 degrees below the operator's horizontal view from a standing position.

## **RESPONSE:**

This monitor is designed to be viewed from a sitting position. When the operator is standing, the monitor is 40 degrees below the operator's line light, but from a sitting position, the monitor meets the guideline recommendation. When the operator has a lot to do at the monitor it will be done from a seated position. The standing visual angle does not present a problem since that will not be used often.



INDEX NO.: 0251 2 HED: 7.2.4.C.2-1

CATEGORY: 2 LEVEL: C

FINDING:

Groups of numbers are not separated by 1 blank character space to make strings of 5 digits or more easy to read and to reduce probability of reading errors. Groups of 3 to 4 characters each should be separated by one blank character space. (Photo Log N-32)

# RESPONSE:

When the length of a string of digits exceeds 4, a period has been used to delineate the subgroups of numbers and to show that the subgroups constitute one entity. The use of blanks may not make this relationship ar. Moreover the period provides a clear perceptual separation of the groups.

#### IMPLEMENTATION:

Accept as is.



DEX NO.: 0252

12 HED NO.: 7.2.4.D-2

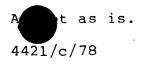
CATEGORY: 2 LEVEL: C

# FINDING:

**RESPONSE:** 

Some of the data presentations on the screen are not in logical order. Photo Log (N-33)

Alarm data is presented in an order logical to system design and mation.



DEX NO.: 0253

12 HED: 7.2.4.E.2-3

CATEGORY: 2 LEVEL: C

# FINDING:

When identical data is presented on both the Ampex display and on the Conrac color graphic monitors it is not presented in a consistent and standardized manner.

## **RESPONSE:**

The Conrac color graphic display has a greater area for display and thus present more specific information for a given data point and beyond which is displayed on the Ampex display. Thus, any inconsistencies come from the greater information conveyed by the Conrac display.



|--|--|

12 HED NO.: 7.2.4.J.2-4

CATEGORY: 2 LEVEL: C

#### FINDING:

Numeric data is not right justified and decimal points are not aligned within vertical columns. Numeric data should be right justified and have the decimal points aligned to reduce the possibility of reading errors and to increase speed that the operator can scan the data. Photo Log (N-34)

## **RESPONSE:**

The data displays will be reviewed and right justification or decimal

#### IMPLEMENTATION:

he completion of the second refueling outage.

4421/c/79

INDEX NO.:	0381		
HED: 7	.2.4.K-6		
CATEGORY:	2	LEVEL:	С

FINDING:

Sentences on Conrac display #90 have no periods at the end. (Photo Log M-33)

# RESPONSE:

The only monitor on which complete sentences are displayed is Conrac Display No. 90. This display is used primarily by programmers and very infrequently by operators. In emergency situations, operators would not this display. Thus, the potential impact of this deviation from elines on plant safety is marginal at best.

#### IMPLEMENTATION:

Accept as is.



INDEX NO.:_	0291			
HED: 7.2	.4.M.1-	5		
CATEGORY:	2	LEVEL:	С	_ ·

FINDING:

Some of the tables on the Ampex display have columns of data with no labels above each column. For example there are two columns of data on the alarm status display that should be labeled "current value" and "engr. units." All columns of data on all tables should be labeled to reduce the probability of reading errors. (Photo Log N-32)

## **RESPONSE:**

While the indicated columns on the Ampex terminals are not labeled, the content of the columns defines the context in which information in that column should be taken. In addition, similarity of this display to the display on the Conrac monitor provides further contextual informah. Thus, the lack of labels for these two columns does not present a serious problem for plant safety.

#### IMPLEMENTATION:

Accept as is.



INDEX NO.: 0382 HED: 7.2.5.A.2-1 CATEGORY: 2 LEVEL: C

FINDING:

On displays 41, 43, 48 and 49 on the Conrac color monitor the data points listed on the far left hand column are not in numerical order. (Photo Log M-32)

## **RESPONSE:**

The data points are listed in order of priority. This meaning supersedes numerical order and provides information to the operator. Thus, the impact on plant safety of data points not being in numerical order is ligible.

#### IMPLEMENTATION:

Accept as is.



INDEX NO.: 0383 HED: 7.2.5.B-2 CATEGORY: 2 LEVEL: C

FINDING:

The time code is not located consistently in the same place on all displays. Most displays have the time code in the upper right hand corner. On one Conrac display #4 the time code is in the lower left hand corner. (Photo Log M-26)

# **RESPONSE:**

The impact of this departure from guidelines on plant safety is minimal. Time of day is located in the lower left corner on only one display.

# IMPLEMENTATION:

Accept as is.



IDEX NO.: 0384

12 HED NO.: 7.2.5.H-3

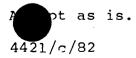
CATEGORY: 2 LEVEL: C

## FINDING:

When data is contained on multiple pages or when there are multiple pages of displays, each page has a display number but the total number of pages or displays are not shown. Total number of pages of data should be shown. Photo Log (M-28)

#### **RESPONSE:**

The multiple pages of displays are interspaced by many unused pages so re is not one continuous sequence. Also, the total number of pages or plays would have no meaning to the operator.



DEX NO.: 0255

12 HED: 7.2.6.H-1

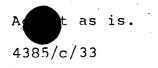
CATEGORY: 2 LEVEL: C

#### FINDING:

If an incorrect entry is made there is no back space capability to correct error. The "C" key must be pressed which clears the entire data entry field which can include correctly entered numbers and/or letters.

## **RESPONSE:**

This departure from guidelines has a negligible effect on plant safety. maximum number of characters in a command is four. Thus, the maximum er of correctly entered characters which must be re-entered is three. This requirement does not place a significant burden on operators.



DEX	NO.:	0256	

12 HED: 7.2.6.I-2

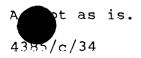
CATEGORY: 2 LEVEL: C

#### FINDING:

If process computer goes down there is no indication on the screen that this has occurred. A light on the console indicates the computer is down and also a message appears on the terminal in the computer room. A message should appear on the control room terminal that the computer is down so operator gets an immediate indication particularly while he may be using terminal and is looking at the screen.

#### **RESPONSE:**

While a specific message concerning computer system status would be preferrable, through training operators learn the meaning of the system is light on the console and the "RESET TIME AND DATE" message on the or monitors. The effect of this departure from guidelines, on plant safety, is negligible.



<b>T</b>	DEX	NO.:	0385	
12	HEL	NO.	: 7.2	.7.B.1-1

CATEGORY: 2 LEVEL: C

#### FINDING:

The CYAN (light blue) is used consistently to show alarm points that have been taken off of the computer. (Example, on some of the vertical bar charts a light blue bar appears in place of one of the green bars.) On some screens, such as the turbine symbols, on display #2 symbols are light blue implying that these items are not connected to the computer but, there are data points on the turbine. Colors should always have the same meaning on all displays. Photo Log (M-35)

#### **RESPONSE:**

Computer displays will be reviewed for consistent use of color and propriate change mode.

#### IMPLEMENTATION:

4421/c/83

he completion of the second refueling outage.

DEX NO.:	02	57, 0258		
12 HED: 7.2	2.8.A	.1-1, 7.2.8	A.2-2	
CATEGORY:	2	LEVEL:	С	

## FINDING:

Some displays scroll too fast to read the data. Any data that is to be displayed should remain on the screen a sufficient period of time for the operator to obtain all the information he needs.

## **RESPONSE:**

The information contained in these displays is also printed on hard copy acent to the terminal. Thus, the information is readily available to operator in a permanent format.



	DEX NO.	: 0292	
12	HED:	7.2.8.8-3	

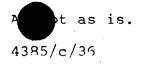
CATEGORY: 2 LEVEL: C

### FINDING:

There is no visual audit trail of two choices available to the operator. There are two possible paths available which are using the short menu or long menu. On long menu operator will be given a display of all options while with short menu operator must remember option number which is basically a shortcut.

#### **RESPONSE:**

This departure from guidelines is not a serious one in that there are y two forms of interaction. The first form (short menu) requires that operator has a clear understanding of the relationship among the displays. The second form requires little understanding of display relationship and allows the operator to explore various options. Moreover, the display hierarchy is not complex (there are many options at a given level but only three levels).



DEA NO.	:		· · · · · · · · · · · · · · · · · · ·	<u> </u>
12 HED:	7.2.8.D-4			
CATEGORY:	2	LEVEL:	С	

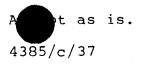
0000

#### FINDING:

Operator has no control over amount format and complexity of information. This has all been predetermined by the software design group. Ideally an operator should have some control over the amount of information as well as the complexity or level of detail so he can obtain all the information he needs to do his job.

#### **RESPONSE:**

While operators do not have interactive control over the format and plexity of displayed information, they can control these factors to e extent by which displays they call up. Moreover, operations personnel had a significant amount of input in the display design process.



INDEX NO.: 0240

12 HED NO.: 7.2.9.E.2.A-2

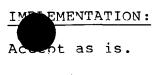
CATEGORY: 2 LEVEL: B

# FINDING:

Resistance of ampex keyboard numeric keys is 3.0 oz. which is below the 3.5 oz. guideline.

#### **RESPONSE:**

3.0 oz. resistance is very near the guideline. In addition, no plems of inadvertent actuation have been reported to date.



NDEX	NO.:	0294	

12 HED NO.: 7.3.1.B.1-1

CATEGORY: 2 LEVEL: C

## FINDING:

The system is designed so it is not possible to obtain a hard copy of all pages appearing on the CRT.

#### **RESPONSE:**

It is not critical that operators have a hard copy of menu pages. These pages merely summarize the choices available to the operator at various ision points in the display hierarchy but do not contain information evant to an understanding of the display hierarchy or of the technical content of the displays.



NDEX	NO.	:	0295	

12 HED: 7.3.1.B.2-2

CATEGORY: 2 LEVEL: C

### FINDING:

Operator does not receive a print confirmation or denial message on the display when requesting a "Scram Results Log Recall" which prints out in the computer room. There should be a feedback on the display to indicate status of this particular printout. (OD 39)

## **RESPONSE:**

Operators receive the message "Program Initiated" when requesting a cram Results Log Recall" printout in the computer room. This is the y printout for which operators can request a remote printout. Herefore, operators are aware of the limitations of the software in this specific case. Moreover, operators may also request this printout from the computer room. Thus, this limitation does not seriously jeopardize operator performance.



DEX NO.: 0296

12 HED NO.: 7.3.1.C-3

CATEGORY: 2 LEVEL: C

#### FINDING:

Printout resulting from selecting OD 76 provides a list of codes that must be looked up in a book in order for the operator to obtain all the information he/she needs. All information should be displayed on the screen.

## **RESPONSE:**

A proper cross-reference code matrix will be developed.

#### IMPLEMENTATION:

Beene completion of the second refueling outage.

-----

IDEX	NO.:	0297	

12 HED NO.: 7.3.1.D-4

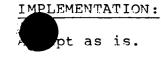
CATEGORY: 2 LEVEL: C

#### FINDING:

The current printer speed is below the requirement of 150 lines per minute.

## **RESPONSE:**

The rate at which printing takes place is essentially the same as which computer output is sent to the printer. While this rate is slower in the recommended 150 lines per minute, no information is lost in the interface between the two devices. In addition, information to be printed is stored in file until printing is completed.



4380c/pg37

DEX NO.: 0298

12 HED: 7.3.1.E.3-5

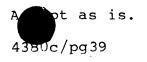
CATEGORY: 2 LEVEL: C

FINDING:

Instructions for reloading paper, ribbon, ink, etc., should appear on an instruction plate attached to the printer. The printers in the control room do not have such an instruction plate.

#### **RESPONSE:**

Operators do not perform printer maintenance tasks. The computer group is responsible for the condition of all printers. Therefore, an inclusion plate on the printers is not considered necessary.



|--|--|

12 HED: 7.3.2.F.1-1

CATEGORY: 2 LEVEL: C

#### FINDING:

The word on the printed-out alarm message may not always be the exact wording as the corresponding annunciator tile.

## **RESPONSE:**

An extensive review and, where necessary, revision of annunciator legends will be performed. This review will assure that annunciator legends are sistent with computer alarm messages.

## IMPLEMENTATION:

he completion of the second refueling outage.

4380c/pg40

DEX NO.: 0300

12 HED NO.: 7.3.3.D.1-1

CATEGORY: 2 LEVEL: C

## FINDING:

Column headings are not provided on alarm printouts. All columns should always be labeled on all printouts. Photo Log (M-25)

# **RESPONSE:**

Appropriate column headings will be provided on the typer.

#### IMPLEMENTATION:

he completion of the second refueling outage.

DEX	NO.	:	0244	•		

12 HED NO.: 7.4.1.H-6

CATEGORY: 2 LEVEL: B

#### FINDING:

Honeywell keyboard has no visual feedback that key actuation input has been received by the computer. Some visual feedback should be provided to the operator so he can verify his entry and know that the key input has been received. This keyboard is on computer table.

## **RESPONSE:**

This keyboard is not used. The keyboard and printer were installed as a **mathematically and set and se** 



# SECTION 8 PANEL LAYOUT

DEX	NO.	:	0373		
,				 	

12 HED: 8.1.2.A-1

CATEGORY: 2 LEVEL: C

#### FINDING:

The rotary displays on panel 8 are grouped and separated by spaces. The spaces are not the display widths suggested in the checklist. The space between the groups is 2.75 inches. However, the width of the displays is 4.25 inches. This applies to the displays associated with generator 2 busses and diesel generator 2.

### **RESPONSE:**

To visually segregate display groups, demarcation lines will be used. appropriate demarcation technique will be applied in accordance with findings of the background shading study.

#### IMPLEMENTATION:

4385/c/55

e completion of the second refueling outage.

DEX	#:	0167	
-----	----	------	--

12 GUIDE NO.: 8.1.2.A-2

CATEGORY: 2 LEVEL: C

### FINDING:

The space between groups of controls is below the minimum identified in the checklist. The space should be the width of a control. The width of the controls is 2.5 inches and the space between groups is 2.0 inches. Photo Log (N-2)

## **RESPONSE:**

The spacing between groups of controls is sufficient to permit the rator to discriminate the various systems, however lines of reation will be employed wherever necessary to enhance this interaction.



DEX NO.: 0168

12 HED: 8.1.2.A-3

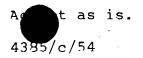
CATEGORY: 2 LEVEL: C

#### FINDING:

There are groups of displays on the identified panels which are separated by spaces. These spaces do not meet the minimum requirements identified in the checklist. The displays are 1.75 inches and the minimum space between groups is 1.0 inch as opposed to 1.75 inches.

#### **RESPONSE:**

To make spaces more visually apparent, demarcation lines and labels may bused. The differences between recommended and actual spacing are not be enough to warrant panel redesign. It is recommended that charcation lines and labels be used to differentiate among display groupings.



DEX NO.	:0448/0202	
12 HED NO.	.: <u>8.1.2.D-6/8</u>	.1.2.D-7

CATEGORY: 1 LEVEL: C

## FINDING:

The identified controls have been defined as "emergency" controls. These controls are not distinctively enhanced to differentiate them from other controls. Each of these controls is enhanced in some way. However, there are other "non-emergency" controls which employ the same enhancement techniques. Distinctively enhancing these controls would facilitate their location and use in emergency situations (Photo Log P-6, 11, 12, 13, 14, 15 and 16). HPCI Auto Initiate; A M.G. Emergency Trio; B M.G. Emergency Trip; ATWS ARI Valve A; ATWS ARI Valve B; ATWS ARI Valve C; ATMS ARL Valve D; SBLC Initiate; Manual Scram A B; "urbine Manual Trip; HPCI Auto Initiate; A M.G. Emergency Trip; B M.G. Emergency Trip; ATWS ARI Valve A; ATWS ARI Valve B; ATWS ARI Valve C; ATWS ARI Valve D; SBLC Initiate; Manual Scram A B; Turbine Manual Trip; Unit 1 Hydrogen Shut off; Unit 2 Hydrogen Shut off; Unit 3 Hydrogen Shut off.

#### **RESPONSE:**

ground shading of control panel areas surrounding emergency controls will be provided to enhance their visibility.

#### IMPLEMENTATION:

e completion of the second refueling outage.

DEX NO.: 0463/0209/0484

12 HED NO.:8.2.1.B.1-1/8.2.1.B.1-2/8.2.1.A-3

CATEGORY: 1 LEVEL: B

FINDING:

Controls and displays which are frequently used are not located near the center of the preferred visual and manual areas. Central location allows for easy access and minimizes delays in the use of the equipment.

## **RESPONSE:**

Controls and displays are grouped optimally for various operational succes.



INDEX NO.: 0361

12 HED: 8.2.2.A-1

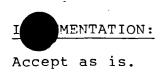
CATEGORY: 2 LEVEL: C

## FINDING:

There are sample valves located on panel 90X-3 that are not arranged in a logical sequence; i.e., left to right or top to bottom.

#### **RESPONSE:**

opposite sequence of controls is usually only critical when rapid and accurate responses are required. When controls are infrequently used and have minimal consequences for improper activation, sequencing is not critical, as in this case. As an alternative to logical sequencing, controls can be color coded to provide cues as to the proper sequence of use. Color coding is already being used with these controls so that no action need be taken.



DEX NO.: 0377

12 HED: 8.2.2.A-2

CATEGORY: 2 LEVEL: B

### FINDING:

The controls associated with absorber trains 1, 2, and 3 are not arranged in a logical order. They are not arranged according to numerical sequence or another user expectation, such as flow path.

# **RESPONSE:**

While there is no sequenced start-up for the absorber because the device put into service at once, there is need for logical ordering of bonents. Thus, a logical arrangement of components will be lemented.

#### IMPLEMENTATION:

4385/c/52

B

e completion of the second refueling outage.

INDEX NO.: 0397

12 HED: 8.2.2.A-3

CATEGORY: 2 LEVEL: C

FINDING:

The prefilter A and B differential pressure displays are arranged from right to left instead of from left to right. On unit 3, however, the two meters are arranged left to right, with the "A" meter on the left. Arranging components logically from left to right can facilitate the quick and accurate location and use of these components.

**RESPONSE:** 

earrangement of the components is required to bring them into a logical order. By swapping the displays, the left to right operating sequence can be obtained. To aid the operator in using these displays, labels will be modified to reflect the rearrangement.

MENTATION:

By the completion of the second refueling outage.

DEX NO.:	0170		
12 HED NO.:	8.2.3.	3-1	<u></u>
CATEGORY .	2	I.EVEL.	R

## FINDING:

The controls and the displays associated with the Unit 3 Reactor Building Drain Tank are mirror-imaged to those associated with Unit 2. Each group is comprised of one display and two controls that are of a different design. Photo Loq(N-9)

## **RESPONSE:**

The mirror-image problem must be addressed to prevent operator error. For can be minimized by accentuating the differences of the controls displays of the units. Background shading and lines of demarcation will be used as necessary.

## IMPLEMENTATION:

/c/7

By the completion of the second refueling outage.

INDEX NO.: 0173

12 HED NO.: 8.2.3.B-2

CATEGORY: 1 LEVEL: B

## FINDING:

The display recorder and control associated with the Unit 3 Nitrogen Inerting System are mirror-imaged to those associated with Unit 2. Photo Log (N-10)

## **RESPONSE:**

kground shading and lines of demarcation will be used as necessary.

# IMPLEMENTATION:

By the completion of the second refueling outage. 4409/c/8



NDEX NO.:_	0364			 •
12 HED: <u>9</u> .	.2.4.A-1			 -
CATEGORY:	1	LEVEL:	В	

#### FINDING:

Standardization is not maintained between Units 2 and 3 in terms of panel layout. As a result of mirror-image design of the two units, the location of components on the panels is not consistent; i.e., what is on the right of a panel on Unit 2 is on the left side of the same panel on Unit 3. In addition, some components appear in different relative locations on the panels.

#### RESPONSE:

Background shading and lines of demarcation will be used as necessary.

#### IMPLEMENTATION:

4335/c/59

we completion of the second refueling outage.

DEX NO.: 0585

12 HED: 8.2.4.B-1

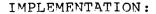
CATEGORY: 3 LEVEL: C

### FINDING:

Complete control room to simulator standardization is not used for units at this station. Such standardization helps in a more direct transfer-of-training when using the simulator.

#### **RESPONSE:**

For transfer of training to be effective, the simulated task elements match the actual task. This need not be done with a simulator of the identical appearance of the actual control room, as long as the simulated and actual task elements are identical. While appearance, or simulator fidelity, is useful, it is not the most important criterion in judging simulator effectiveness. Task accuracy as reflected in transfer of training is more important, as long as the simulator has a similiar appearance to the control room.





DEX NO.: 375

12 HED: 8.3.2.A-1

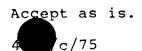
CATEGORY: 1 LEVEL: C

#### FINDING:

The rotary displays on panel 902-8 are arranged in vertical columns. All other displays are arranged in horizontal rows. The cited displays are lined up above the controls with which they are associated.

#### **RESPONSE:**

This small number of displays is appropriately positioned above the trols that they are associated with and arranged in a logical manner presents no difficulty to the operators.



INDEX NO.:	0171		
12 HED NO.:_	8.3.	2.A-2	
CATEGORY:	2	LEVEL:	С

## FINDING:

Rotary meters on the identified panel are arranged in vertical columns. There are six sets of columns with 3 columns containing 5 displays each 2 columns containing 7 displays each and 1 column with 6 displays.

## **RESPONSE:**

The electric panel is well laid out. Each column is identified with a label above each set of displays.



Accept as is.

<u>4425/c/11</u>

INDEX NO.:	0376			·
12 HED NO .:_	8.3.	2.C.1-3	·····	
CATEGORY:	2	LEVEL:	С	

#### FINDING:

There is a string of 8 pushbuttons on the 902-3 and 903-3 panels. The control one main steam isolation test values and are separated in two sub sets (i.e., 1A, 2A, 1B, 2B, 1C, 2C, 1D, 2D). The identified string of controls is not broken up by spacing or demarcation. Photo Log (N-15)

# **RESPONSE:**

The controls are not used during normal operations they are only used during surveillances of the Main Steam Isol System. However this group of controls will be separated and organized by lines of demarcation.

#### IMPLEMENTATION:

Completion by the second refueling outage.

INDEX NO.:	01	72		
12 HED NO.:_	8.3.	2.C.1-4		_
CATEGORY:	2	LEVEL:	C	_

## FINDING:

There are 2 columns on the identified panel which contain 7 rotary meters. The guidelines states there should be no more than 6 components. The string of meters is not broken up by spacing or line of demarcation. Photo Log (N-14)

### **RESPONSE:**

The column of displays will be separated by using lines of demarcation as a function of a control room wide enhancements package.

### IMPLEMENTATION:

By the completion of the second refueling outage.

INDEX NO.:	03	87		
12 HED NO.:_	8.3.	2.C.1-5		_
CATEGORY:	2	LEVEL:	с	
			·.	

# FINDING:

There are more than 6 rod position displays in a column on the full core display. In 5 of the columns there are 15 displays. The string of displays is not broken up by the use of spacing or demarcation lines. Photo Log (N-16)

## **RESPONSE:**

The axes of the matrix are appropriately labeled.

· · ·

# IMPLEMENTATION:

Accept as is. 4425/c/14

14

INDEX NO.:	0388			
12 HED NO .:_	8.3.2	.C.1-6		_
CATEGORY:	2	_LEVEL:	С	

# FINDING:

There are more than 6 rod select pushbuttons laid out in rows and columns on the rod select matrix. In 5 rows and 5-columns there are up to 15 pushbuttons. The strings of controls are not separated by spacing or demarcation lines. Photo Log (N-17)

# **RESPONSE:**

The axes of the matrix are appropriately labeled.

# IMPLEMENTATION:

# Accept as is.

INDEX NO.:	04	403		<del></del>
12 HED NO.:_	8.3	.2.C.1-10		
CATEGORY:	2	LEVEL:	С	

# FINDING:

There are 8 displays associated with the control rod drive hydralic system which are laid out in an unbroken string. This is 2 more than the maximum as identified by the checklist. Photo Log (N-25)

#### **RESPONSE:**

Lines of demarcation or other enhancement techniques will be used to separate various displays.

# IMPLEMENTATION:

By the completion of the second refueling outage.

INDEX NO.:	04	04		
12 HED NO.:_	8.3.	2.C.1-11		
CATEGORY:	2	LEVEL:	С	

# FINDING:

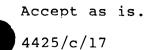
On Panel 902-2 there is up to 15 toggles laid out in an unbroken row and on Panel 902-21 there is up to 12 toggle switches in an unbroken row. The maximum identified in the checklist is 6 components. Photo Log (N-26)

# **RESPONSE:**



These controls are used to bypass points on 3 area rod monitors. They are infrequently used and warrant no further separation.

#### IMPLEMENTATION:



DEX NO.: 0389/0400

12 HED:8.3.2.D.1-7/8.3.2.D.1-9

CATEGORY: 2 LEVEL: B

# FINDING:

Coordinate axes labels are misplaced on the full core display and core matrix (Photo Log N-16, N-20).

#### **RESPONSE:**

Placement of labels will be addressed in the implementation of a sistent labeling package. Coordinate axes will be placed opriately for the full core display and core matrix.

#### IMPLEMENTATION:

e completion of the second refueling outage.

4380c/pg63

DEX NO.: 0390

12 HED: 3.3.2.D.1-8

CATEGORY: 2 LEVEL: B

FINDING:

The coordinate axes of the rod select matrix are not labeled (Photo Log N-17).

# RESPONSE:

Labels and correct placement will be addressed in the implementation of a sistent labeling package. The coordinate axes of the rod select rix will be labeled.

#### IMPLEMENTATION:

e completion of the second refueling outage.

4380c/pg64

# SECTION 9 CONTROL DISPLAY INTEGRATION

INDEX NO.: 0430

12 HED: 9.1.1.A-1

CATEGORY: 1 LEVEL: A

# FINDING:

From the primary work station at the 5 panel, the RWM Indicators are not in the primary line of sight and are not close enough to the seated operator to be easily monitored. Photo Log (P-20)

#### **RESPONSE:**

worth minimizer redesign program will correct this.

# MENTATION:

By the completion of the second refueling outage.

AI.	DEX	NO.	:	)477	_	 		_
12	HEI	):	9.1.	1.E-2			 	-

CATEGORY: 1 LEVEL: B

## FINDING:

Each display for steam flow associated with each steam isolation valve is not located close to the controls. The controls are located on the horizontal section of the 90X-3 Panel and displays are located on the vertical section of the 90X-5 Panel. (Photo Log P-21, P-22)

#### **RESPONSE:**

These values are not throttle values. The display is not needed for ration of this control. The display is optimally located for ler task sequences.

IMPLEMENTATION:



INDEX NO .:_	0217	
12 HED NO .:	9.2.2.A.1-1	

CATEGORY: 2 LEVEL: C

#### FINDING:

The displays for the Bus Phase Selectors are not consistently placed. Some are placed left of the associated control, some are placed right of the associated control, and some are placed directly above the associated control. Photo Log(P-21, P-22)

#### **RESPONSE:**

hancement will be made using relabeling to associate related controls displays for the Bus Phase Selectors.

## IMPLEMENTATION:

ompletion of the second refueling outage.

# SECTION 10 HISTORICAL REVIEW

INDEX NO.:	0462
12 HED NO.:	1.1.5.C HR 1
CATEGORY:	LEVEL: A

# FINDING:

In the first incident while changing the Closed Indication light bulb for the Electromagnetic Relief Valve the bulb shattered. The socket shorted and arced when the operator attempted to remove the broken glass with a scotch tape covered pen. In the second incident under similar shattered bulb circumstances, the operator removed most of the broken glass from the socket using plastic needle nosed pliers. Again, a piece of tape was place on the end of the pliers to retrieve the last pieces of glass.

#### **RESPONSE:**

A procedure for the proper replacement of bulbs will be developed. A be replacement tool has been provided.

# IMPLEMENTATION:

ne completion of the first refueling outage.

NDEX NO.:	0164	<u></u>	
12 HED NO.:_	3.1.2.	C	HR,1
CATEGORY:	1	LEVEL:	A

#### FINDING:

Historical review has revealed that during HPCI surveillance test, torus level increased to 1 inch, due to unintentional water induction. When testing is done using contaminated condensate storage water, it is introduced into the suppression pool through a valve labeled "Minimum Recirc Bypass Valve". Also the annunciator warning for min. recir. valve open is presently input through the tile reading "HPCI pump low flow".

## RESPONSE:

To correct this problem the labeling will be changed on the Minimum pirc. Bypass Valve to read Minimum Recirculation Valve. Also the "Min. irc. Valve open" annunciator function will be separated from the HPCI pump flow annunciator.

#### IMPLEMENTATION:

he completion of the second refueling outage.



NDEX NO.: 0061/0201

12 HED NO.:4.1.2.A-HR-1/4.1.2.B-OS-7

CATEGORY: 1 LEVEL: A

#### FINDING:

A response on the operator survey indictated that controls on the 923-2 panel have been accidentally bumped and possibly activated. The panel is in a high traffic area and does not have guard rails. Controls on the panel, therefore, could be accidentally activated.

#### **RESPONSE:**

A guard rail is to be installed to prevent operators from inadvertently uating controls while leaning over the benchboard and to protect from ng bumped by passers by.

#### IMPLEMENTATION:

e completion of the first refueling outage.

DEX NO .:	0446
12 HED NO .:	4.1.2.B-HR-2
CATEGORY:	LEVEL: A

## FINDING:

When attempting to reset a half scram, the operator inadvertently pushed the manual scram button, scraming the unit. This incident was also mentioned in the operator survey (response NO.B9-10). Critical or "emergency" controls should be guarded to prevent inadvertant actuation (Photo Log P-6).

#### **RESPONSE:**

Background shading is to be provided around "emergency" controls to ance their visibility on the control panel. This does not prevent cidental actuation, but it does cause the control to stand out from other controls, reducing the chance that it will be incorrectly selected.

# IMPLEMENTATION:

he completion of the first refueling outage.

INDEX NO.:	0164
12 HED NO.:_	6.3.2.A HR 7
CATEGORY: 1	LEVEL: A

# FINDING:

While conducting HPCI surveillance test, torus level increased to -1 inch due to repetitive starts of the HPCI turbine. Evaluation showed that the induction of water was unintentional. (Historical Review Index # 12-9)

# **RESPONSE:**

rocedural change for HPCI surveillance testing has been implemented. Ing the annunciator review, common terms for control systems on annunciator tiles will be established.

# IMPLEMENTATION:

he completion of the second refueling outage.

DEX NO.	.:	0280	· · · · · · · · · · · · · · · · · · ·	 
12 HED NO	) <b>.:</b> _	8.2.2.B,	HR 1	·

CATEGORY: 1 LEVEL: C

#### FINDING:

During emergency/abnormal operations utilizing the isolation condensor system, the reactor inlet isolation valve 2-1301-3 is used. In conjunction with isolation condensor make-up, the preferred source is the clean condensor fill valve 2-4399-74. Currently, the contaminated fill inlet valve 2-1301-10 is located directly below the 1301-3 control. In DVR 12-3-83-14, contaminated water was introduced into the isolation condensor. Therefore, the 4399-74 and 1301-10 valves should be exchanged to reduce the possibility of inadvertent introduction of contaminated water into the isolation condensor.

# **RESPONSE**:

Inadvertent operation of the wrong valve in critical sequences is a blem that requires correction. Correction can be accomplished by the of control guards or, where space is available, by reorganization of controls. As additional panel space is not available, the use of valve guards is necessary. The critical valve has been modified to include a guard cover.





# SECTION 11 OPERATOR SURVEY

· · · ·

INDEX NO.:	0349			
12 HED NO.:	0.0	os,	1	 

CATEGORY: 1 LEVEL: B

## FINDING:

Procedures are written so that "Caution" step instructions occasionally come after the step(s) they caution about.

#### **RESPONSE:**

The procedures will be reworded so that "cautions" precede the step to ich they relate. This is in progress as part of the normal procedural iew.

# IMPLEMENTATION:

completion of the second refueling outage.

\_\_\_4402/c/29

INDEX NO .:	0351		
12 HED NO .:_	0.0	os, 2	
CATEGORY:	1	LEVEL:	<u>B</u>

## FINDING:

Operator survey has shown that DOP-5600-1 does not show steps which delineate the process to be followed to accomplish synchronization of the diesel generator to the 4KV system.

#### **RESPONSE**:

cedure DOP 6600-1 will be reviewed and revised to delineate the ropriate processes.

# IMPLEMENTATION:

he completion of first refueling outage.

INDEX NO.:_	0352			
12 HED NO.	0.0	os,	3	 

CATEGORY: 1 LEVEL: B

# FINDING:

Operator survey indicated that Procedure DOP 1600-18, for equalizing the torus to drywell differential pressure, is unclear.

RESPONSE:

cedure DOP 1600-18 will be reviewed and clarified as necessary.

# IMPLEMENTATION:

he completion of first refueling outage.

	DEX NO.:	0358			
12	HED NO.:	0.0	、	os	4
	-				<u> </u>

CATEGORY: <u>3</u> LEVEL: <u>B</u>

## FINDING:

Operator survey indicated a lack of an effective preventive or corrective maintenance program for control room-installed equipment.

# RESPONSE:

A 24-hour maintenance program is already in effect, and is adequate to ever preventive and corrective maintenance in the control room.

IMPLEMENTATION:



DEX NO.:	0360		
12 HED NO.:_	0.0	05 6	
CATEGORY:	3	LEVEL: B	

# FINDING:

Operator survey indicated that the preventive and corrective maintenance program for lubrication, cleaning, replacement, or repair of chart drivers on the recorders is unreliable.

# **RESPONSE:**

The current 24-hour maintenance program has been determined to be ficient for covering problems arising with the chart recorder drives.

#### IMPLEMENTATION:



DEX NO.:_	0449			
12 HED NO.:	1.1.1	.A OS	, 2	
CATEGORY:	1	LEVEL:	A	

#### FINDING:

A response on the operator survey indicated that there should be a control switch with indicating lights (on trip off) on the 903-3 panel for the ECCS jockey pump. This control would facilitate response to a loss of ECCS discharge pressure. This is supported by task analysis data and was also found in the verification.

#### **RESPONSE:**

An annunciator breaker trip alarm to indicate circuit breaker condition will be added. This will effectively warn the operator of potential loss pressure, subsequently a low pressure alarm would occur which would quire the operator to check the pressure on the system jockey pump control switch.

#### IMPLEMENTATION:

The completion of the first refueling outage.

INDEX NO.:	0459
12 HED NO.:_	1.1.3.C.1 OS 5
CATEGORY:	3 LEVEL: B

# FINDING:

ł

Response to the operator survey identified the bookshelves, unit file cabinets, and an excess number of chairs in the primary operating areas as obstacles to movement.

## **RESPONSE:**

existing center desk will be replaced and will incorporate design tures which will remove obstacles in the control room.

# IMPLEMENTATION:

completion of the second refueling outage.

INDEX NO.:		0348
12 HED NO .:		1.1.7 - 0S-1
CATEGORY:	3	LEVEL: B

# FINDING:

Though a control room access procedure exists, a large number of questionnaire survey respondents (19) remarked that there is an excess of personnel and traffic in the control room, particularly during startups, shutdowns and emergency situations.

# **RESPONSE:**

A number of procedures are already in place to cover this concern.

IMPLEMENTATION:



DEX NO.:	0455	<u> </u>	
12 HED NO.:_	1.5.1	<u>os 3</u>	
CATEGORY:	3	LEVEL: B	

#### FINDING:

Operator survey has indicated that some locations in the main control room have temperature and humidity conditions which make it difficult to work. Guidelines state that temperature should be maintained between 73 and 77 degrees.

## **RESPONSE:**

Actual temperature readings taken show a variation of between 70 to 78 Prees. -3 to +1 degree variance outside the recommended range is not t to provide justification for modifying the climate control system.

## IMPLEMENTATION:

Accept as is.

NDEX NO.:	0370		···· · · · · · · · · · · · · · · · · ·	
12 HED NO.:_	2.1.4	<u>05, 1</u>		
CATEGORY:	2	LEVEL:	A	-

FINDING:

Operator surveys reported that the use of the operations department's radios by people from other departments interferes with operator and control room use of the system.

# **RESPONSE:**

administrative procedure will be developed to control the use of rating radios.

# IMPLEMENTATION:

he completion of the first refueling outage.

EX NO.	:03	372			
12 HED:	3.0	05,3			
CATEGORY:	2	·	LEVEL:	В	

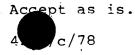
FINDING:

A number of responses to the operator survey indicated that the acknowledge and reset buttons occasionally stick. This causes a self-acknowledgement or self-reset which can directly lead to operational problems because the operator could be unaware that an alarm has been received (Photo Log M-16).

# **RESPONSE:**

Routine cleaning and maintenance is conducted by station personnel on a maintenance is conducted by station personnel on a

IMPLEMENTATION:



INDEX NO.:	0368			
12 HED NO .:_	3.2.1	os, 2		
CATEGORY:	2	LEVEL:	В	

FINDING:

Operator survey indicated that the alarms for the 902-6, 7, and 8 panels sometimes get confused with alarms for the 903-6, 7, and 8.

# **RESPONSE:**

proved auditory coding will be implemented, to reduce the confusion of must between panels.

# IMPLEMENTATION:

he completion of the second refueling outage.

	EX	NO.	.:	0437	•			
12	HEI	):	4.]	.1.A.1	os,	6	, ·	

CATEGORY: 1 LEVEL: A

# FINDING:

An operator survey response indicated that the Rod Worth Minimizer could be improved to allow operators to perform more effectively. Specifically, it should have the capability of following the Rod sequence to 100% power operations.

#### **RESPONSE:**

The Rod Worth Minimizer is presently being redesigned and will porporate sound human factors principles. It will have the ability to follow the Rod sequence to 100% power operations.

#### IMPLEMENTATION:

4424/c/28

he completion of the first refueling outage.

DEX NO.: 0	)396
12 HED: 4.1.	1.B.1 OS, 1
CATEGORY: 2	LEVEL: B

# FINDING:

An operator survey response indicated that the standby non-operating control rod drive pump should auto start when the running operating pump trips because there is insufficient time to manually start the pump in these instances. Employing the appropriate control logic capability can reduce operating problems particularly in abnormal and emergency type situations.

#### **RESPONSE:**

An auto start function will be installed on both CRD pumps.

#### IMPLEMENTATION:

e completion of the second refueling outage.

INDEX. NO.:	0401
12 HED NO .:_	4.1.1.B.1, OS-3
CATEGORY:	2 LEVEL: B

# FINDING:

The Hotwell Reheat Steam Return control is not used. Unnecessary controls not only occupy valuable space on the control panels, but can lead to operational confusion in an abnormal or emergency situation.

# **RESPONSE:**

Sthough the valves are not in use at this time, it is possible they may used in the future. Many initiatives are underway to reduce Intergranular stress corrosion cracking (IGSCC) on BWR plants. In as much as the final solution is not at hand, the station prefers to leave these controls in place at this time. Should they prove unuseable in the control of IGSCC, they may be removed at some time in the future.

## IMPLEMENTATION:

he completion of the second refueling outage.

DEX NO	.:0402	<u></u>	
12 HED:	4.1.1.B.3	os,	4

CATEGORY: 2 LEVEL: C

# FINDING:

A response on the operator survey indicated that the feedwater heater startup vents and drains should be automatic seal in open and close. The throttleable capability is not utilized and their operation requires a relatively considerable amount of operator time which does delay him/her in the performance of other duties.

#### **RESPONSE:**

The controls will be modified to seal in open and closed.

#### IMPLEMENTATION:

the completion of the second refueling outage.

bex	NO.:	0411
-----	------	------

12 HED: 4.1.1.B.3 OS, 5

CATEGORY: 2 LEVEL: A

#### FINDING:

Operator survey responses indicated that the feedwater regulating isolation values throttleability operation unduly restrict operator movement and availability to respond to other operational concerns. (Photo Log N-27)

## **RESPONSE:**

The control switch will be changed so that the valves are seal in and close but retain the throttleability option for operation having the control switches stop valve movement when the control handle is pulled out.

#### IMPLEMENTATION:

e completion of the first refueling outage.

DEX NO.:_	(	0450
12 HED NO.:		5.1.1.A.1 OS, 2
CATEGORY:	l	LEVEL: A

FINDING:

A response in the operator survey indicated that there is a lack of positive feedback for LPCI pump operation. The indicators with the switch show demand but not status, i.e., whether the pump is actually running. This is supported by task analysis data and was an observation recorded during validation.

# **RESPONSE:**

Indication of LPCI pump discharge pressure will be provided.

#### IMPLEMENTATION:

he completion of the second refueling outage.

I	)EX	NO.	:	0451					
									•
12	HEL	):	5.1	.1.A.1	L	os,	3		

CATEGORY: 1 LEVEL: A

#### FINDING:

The responses to the operator survey indicated that the drywell pneumatic air compressor system and the drywell pumpback compressor system lack sufficient feedback systems for operators to perform their duties with those systems efficiently. Specifically mentioned were the lack of a trip indicating light for the pumpback compressors and pressure gauges for both systems.

#### **RESPONSE:**

A pressure indicator for the drywell pumpback compressors will be stalled.

#### IMPLEMENTATION:

he completion of the first refueling outage.

DEX	NO.:	0452		
,		 		

12 HED: 5.1.1.A.1 OS, 4

CATEGORY: 1 LEVEL: B

## FINDING:

Responses to the operator survey indicated that there is a lack of positive feedback for CCSW pump operation. Specifically mentioned was the need for CCSW pressure indicators. Appropriate system feedback can facilitate operation and prevent operational problems.

## **RESPONSE:**

There is redundant indication of CCSW pump operation provided via



IDEX	NO.:	0453

12 HED NO.: 5.1.1.A.1 OS-5

CATEGORY: 2 LEVEL: B

## FINDING:

Responses to the operator survey indicated that there is a lack of positive feedback when adjusting the VARS on the 345KV system. The display used is located on the 923-2 panel as is a job performance aid used in the adjustment.

## **RESPONSE:**

This is not critical nor time critical to operations. In addition, it is requently operated.

#### IMPLEMENTATION:

Accept as is.

4430/c/24



DEX	NO.	:	0454

12 HED: 5.1.1.A.1 OS, 6

CATEGORY: 2 LEVEL: C

## FINDING:

A response to the operator survey indicated that there is a lack of positive turbine speed feedback for all modes of operation. It was further indicated that during a scram situation or continuous digital display of turbine speed would be helpful. The availability of adequate feedback can facilitate operations and prevent operational problems.

#### **RESPONSE:**

Sufficient turbine speed indications exist for all modes of operation.



DEX NO.: 0441		·	
12 HED: 5.1.2.A	05,1		
CATEGORY: 2	LEVEL:	В	

## FINDING:

A response from the operator survey indicated that the pressure set displays on the turbine panel do not have scales appropriate to tasks that require their use. The scale range is 150-1500 PSI in 20 lb. increments. The pressure setpoint for operations is 920lbs., an indeterminate value on the scale. (Photo Log 0-12)

## **RESPONSE:**

Banding indicating the setpoint will be added to the pressure set

#### IMPLEMENTATION:

4424/c/31

ne completion of the second refueling outage.

INDEX NO.:	0359		<u> </u>	
12 HED NO.:	5.3.1	os, 5		
CATEGORY:	1	LEVEL:	A	

# FINDING:

Operator survey has indicated that the procedural process for replacement of full core display lights is inadequate and non-systematic.

#### RESPONSE:

reventative maintenance program will be implemented.

# IMPLEMENTATION:

ompletion of the first refueling outage.

INDEX NO.:	0466	<u></u>
12 HED NO .:_	5.3.3.A.1	<u>05-7</u>
CATEGORY: 2	LEVE	L:

# FINDING:

A response on the Operator Survey indicated that the SCRAM lights on the Full Core display which are blue in color are difficult to see, i.e., it is difficult to detect that they have been illuminated.

#### **RESPONSE:**

situation will be reevaluated after other lighting changes have been pleted.

## IMPLEMENTATION:

he completion of the second refueling outage.

ADEX NO.: 0355

12 HED: 6.5.1.B-0S-1

CATEGORY: 2 LEVEL: B

#### FINDING:

Job performance aid information is not standardized and is not properly affixed to the control panels (Photo Log M-14, M-15).

## **RESPONSE:**

Placement of labels and information will be addressed in the lementation of a consistent labeling package. Included in the abeling of the control room will be a standard for job performance aid labels.

#### IMPLEMENTATION:

he completion of the second refueling outage.

4380c/pg50

NO.: 0433 12 GUIDE NO.: 6.6.3 OS, 3

CATEGORY: 1 LEVEL: B

#### FINDING:

A number of operator surveys indicated that all system mimics could be improved. This would facilitate operator effectiveness and system understanding.

#### **RESPONSE:**

Mimics will be redesigned to improve their usefulness to the operator. This will be examined and handled on a case by case basis as a function of instrol room wide evaluation.

#### IMPLEMENTATION:

he completion of second refueling outage.

DEX NO.: 0366

12 HED: 7.0 OS,1

CATEGORY: 2 LEVEL: B

#### FINDING:

Operating survey responses indicated that the computer system as an operating aid does not provide operators with the operating "aid" features they require. Specific features mentioned were that the computer should be able to: A.) Do simple math for surveillances including natural logs; B.) LPCI and CCSW pressure; C.) Heatup and cool down calculations in degrees F/HR; D.) Drywell sump leakage rates; and E.) Provide powerplex trend outputs. Providing the operators with the features they request will encourage and facilitate use of the computer system.

#### **RESPONSE:**

Computer system will be examined on a case-by-case basis to determine incorporate the features necessary to support operations. This lew to include the features noted above.

#### IMPLEMENTATION:

he completion of the second refueling outage.

INDEX NO.:	0371		
12 HED NO.:	7.0	0S, 2	
CATEGORY:	2	LEVEL:	B

# FINDING:

Operator survey has indicated that too many abbreviations are used in the plant computer system and these abbreviations are inconsistent with other abbreviations used in the control room.

#### **RESPONSE:**

is will be reviewed against the labeling package and a standardized reviation scheme (list) will be developed and applied to both control boards and plant computer.

## IMPLEMENTATION:

he completion of the second refueling outage.

INDEX NO.:	0444		
12 HED NO.:_	8.1.2	05, <u>11</u>	
CATEGORY:	2	LEVEL:	B

# FINDING:

Operator survey indicated that the feed water condensate and extraction sections of panel 6 are not arranged according to functional use, sequence of use, or other logical arrangement. Photo Log(P-5)

#### **RESPONSE:**

is not necessary for the relocation of controls on panel 6. However, ropriate labeling, demarcation lines, and background shading will be anded to enhance the grouping on the panel.

#### IMPLEMENTATION:

he completion of second refueling outage.

INDEX NO.:	0353		
12 HED NO.:_	8.2.1	OS, 1	·
CATEGORY:	2	LEVEL:	В

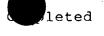
# FINDING:

Operator response indicated the Hydrogen Addition Panel is arranged without consideration of sequence of use, frequency of use, or other logical expectation. Photo Log(M-13)

## **RESPONSE**:

is panel is being replaced with a panel more effectively human ineered.

## IMPLEMENTATION:



NDEX	NO.:_	0416			
12 HED	NO.:_	8.2.1.	os	4	· · · · · · · · · · · · · · · · · · ·

CATEGORY: 1 LEVEL: B

# FINDING:

Operator survey response indicates that the core spray system controls and displays are not arranged according to function, sequence of use, or frequency of use. (Photo Log 0-27/28/29)

#### **RESPONSE:**

rticular core spray system controls will be re-arranged according to proper flow path.

## IMPLEMENTATION:

he completion of the second refueling outage.

INDEX NO.:_	0418			
12 HED NO.:	8.2.1	os,	5	

CATEGORY: 1 LEVEL: A

#### FINDING:

Operator survey responses indicated that the layout of the isolation condenser system does not conform to layout by function, sequence of use, or frequency of use. The present arrangement causes operator confusion and/or error during emergency situations. Photo Log (0-30)

#### RESPOMSE:

ic lines and background shading will be used to enhance these control buts. A label with correlated valve positions will be affixed to the panel.

## IMPLEMENTATION:

By the completion of the second refueling outage.

NDEX NO.:	0419			
12 HED NO .:_	8.2.1	05,6		
CATEGORY:	1	LEVEL:	A	

## FINDING:

The Operator survey has indicated that the LPCI system controls and displays are not arranged according to functional sequence, frequency of use, or other logical arrangement. Photo Log(0-31, 32, 33)

#### RESPONSE:

wimic lines and some system redesign will be used to enhance the LPCI tem. Also background shading will be used on the cross-tie controls.

#### IMPLEMENTATION:

he completion of the second refueling outage.

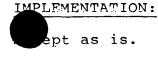
INDEX NO	•:	0422		
12 HED NO	.:8	.2.1-0S 8	<u> </u>	
CATEGORY:	1	LEVEL:	В	

# FINDING:

Operator survey response indicated that the unit 2 drywell inerting controls and displays are not functionally grouped. The controller for controlling flow is located on the 902-3 panel, while the indicators and displays for inertion flow are on the 923-5A panel. (Photo Log P-12)

## RESPONSE:

ese are only used during start-up and shut down, when two people are igned each of these tasks. The HED assumes a one-person operation, which is not the case.



DEX NO.:	0443		
12 HED NO.:_	8.2.1	OS, 10	
CATEGORY:	1	LEVEL:	В

## FINDING:

Operator survey indicated the ACAD/CAM panels are not grouped by sequence of use, frequency of use, or other logical arrangement. This can contribute to operator confusion and error. Photo Log(P-4)

#### **RESPONSE:**

appropriate mimics and labels will be added to enhance these panels ever necessary.

# IMPLEMENTATION:

By the completion of the second refueling outage.

INDEX NO.:_	0414		
12 HED NO.:	8.2.1	OS, 11	

CATEGORY: 1 LEVEL: A

# FINDING:

Operator Survey has shown that the HPCI system is not arranged by functional sequence, sequence of use, or other logical pattern. This present layout can laid to operator confusion and error. Photo Log(0-26)

## RESPONSE:

e of demarcation, redesign of mimic and background shading will be used enhance the HPCI control layout.

# IMPLEMENTATION:

by the completion of the second refueling outage.

TODEX	NO.:	0412		

12 HED NO.: 8.2.1 OS, 12

CATEGORY: 1 LEVEL: A

## FINDING:

Operator survey has indicated the Electrical Distribution Panel is not laid out by sequence of use, or frequency of use. Photo Log(0-19, 20, 21, 22, 23, 24, 25)

#### **RESPONSE:**

labeling, demarcation lines, and background shading will be used as essary to enhance this panel.

#### IMPLEMENTATION:

he completion of the second refueling outage.

DEX	NO.:	0179		

12 HED: 8.2.2.A OS 7

CATEGORY: 2 LEVEL: B

## FINDING:

An operator survey response indicated that the controls and displays of the oxygen analysis system are not arranged in functional groups. Specifically identified by the investigator are the oxygen analysis displays and automatic point selectors which are arranged by functions across units rather than within units. These poorly arranged panels can contribute to operator confusion and error in an emergency situation.

#### **RESPONSE:**

The criticality of this system is low in an emergency situation so that ' re is minimum potential for operator confusion or error. However, re is the potential for inadvertent control operation due to a poor arrangement. This can be overcome by proper delineation and background shading of the control panels. This remarking will be done in accordance with the background shading study.

#### IMPLEMENTATION:

he completion of the second refueling outage.

# SECTION 12 VALIDATION

DEX NO.: 0486	· · · · · · · · · · · · · · · · · · ·
12 HED: 1.1.1.A	VL, 7
CATEGORY: 1	LEVEL: B

## FINDING:

During validation when the water level was beyond the range of the narrow range, GEMAC and YARWAY instruments and the feedwater system were being used to maintain water level. It was observed that operators had to frequently traverse between the 3 and 5 and 6 panels to monitor water level. This excessive movement could contribute to delays in duty performance and adversely affect the operators ability to quickly and accurately maintain level.

#### **RESPONSE:**

Redundant instrumentation exists to monitor fuel zone water level. quate justification does not exist to install a redundant set of 1 zone water level instrumentation on panel 5.



INDEX NO.:_	0482
12 HED NO.:	1.1.5 VL, 6

CATEGORY: 1 LEVEL: B

## FINDING:

Validation determined that when the Recirculation System was tripped, difficulty occurred when determining Cool-Down Rate, due to the lack of a proper temperature indication. The appropriate temperature must presently be calculated/interpolated from steam tables.

#### **RESPONSE:**

omograph will be added to the EOP's to aid the operator in determining essary temperature for calculating cool-down rate.

#### IMPLEMENTATION:

he completion of first refueling outage.

INDEX NO.:	0480
12 HED NO.:_	1.2.2.E VL, 5
CATEGORY:	1 LEVEL: B

# FINDING:

Validation revealed that the present placement of the Reactor Vessel Level-Wide Range meter causes the operator to lean over panel 4, thereby creating difficulty reading the instrument, and creating a hazard of accidental activation of other controls. Photo Log(P-17)

#### **RESPONSE:**

is is not a serious problem as other redundant information is available the operator on the computer and SPDS.



DEX NO.	:	0479				 	
12 HED:	4.	1.1.A.1	VL,	4			
CATEGORY:	:	1	LEVEL		С		

# FINDING:

During validation events it was observed that the SRMs and IRMs were occasionally left out rather than being inserted following a scram. This temporarily negatively affected the crews ability to monitor power reduction below the power range. This could contribute to operational problems in an emergency situation.

## **RESPONSE**:

Operational procedures require manual insertion and monitoring lowing a trip.



INI	DEX 1		0475		<u> </u>	 
12	HED	NO.:	8.2.1	VL,	2	 
			_		_	

CATEGORY: 1 LEVEL: A

# FINDING:

From validation it was concluded that the clean-up system is arranged without consideration of sequence of use, frequency of use, or other logical arrangement. Photo Log(P-18)

# **RESPONSE:**

s system will be enhanced using re-labeling, demarcation lines, kground shading and/or mimic lines.

#### IMPLEMENTATION:

the completion of the second refueling outage.

INDEX NO.:	0476		
12 HED NO .:_	8.2.1	VL, 3	
CATEGORY:	1	LEVEL:	A

#### FINDING:

Validation revealed that the recirculation system is arranged without consideration of sequence of use, or frequency of use.

## **RESPONSE:**

This system will be enhanced using re-labeling, demarcation lines,

## IMPLEMENTATION:

4402/c/3

he completion of second refueling outage.

# SECTION 13 VERIFICATION

NDEX NO.: 0505

12 HED NO.: 1.0 V,1

CATEGORY: 1 LEVEL: B

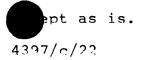
## FINDING:

Particular switches on the HPCI system do not have targets.

## **RESPONSE:**

This HED addresses the need to provide the operator with additional after ip/after close indications on some controls. The present system of ing an amber (yellow) light for trip indication is sufficient.





DEX NO.: 0503

12 HED NO.: 1.0 V,3

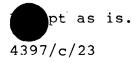
CATEGORY: 1 LEVEL: B

## FINDING:

A RWCU temperature recorder (multipoint) was required during the task analysis.

#### **RESPONSE:**

It has been determined that trending or recording is not necessary for tasks. The present meter and selector switch provide adequate berature information.



DEX NO.: 0502

12 HED: 1.0 V, 4

CATEGORY: 1 LEVEL: B

# FINDING:

At present there is no direct indication of ADS time elapsed logic in the control room.

RESPONSE:

# No time lapsed information is required.



DEX NO.: 0501

12 HED NO.: 1.0 V,5

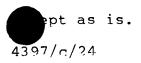
CATEGORY: 2 LEVEL: B

#### FINDING:

There is no wide range torus pressure recorder or torus pressure meter on the 90X-3 panel.

#### RESPONSE:

From the task analysis, it was determined that a wide range torus essure indication was needed on panel 90X-3. This stems from needing determine if the RPU/torus pressure differential is less than 50 PSID before reducing water injection from CS/LPCI to RPV. Our evaluation determined that the instrumentation provided which enables the operator to read wide range DW pressure is adequate. This is due to the parameters being sufficiently close for the needed purpose.



DEX NO.: 0500

12 HED NO.: 1.0 V,6

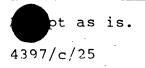
CATEGORY: 1 LEVEL: B

FINDING:

There is no indication for Rx H<sub>2</sub>0 temp during some emergency conditions.

## **RESPONSE:**

From task analysis, it was determined that an indication of reactor sel water temperature after the reactor is isolated would be useful. ever, further evaluation has shown that the present method of determining reactor water temperature from reactor pressure and steam tables is sufficient.



DEX NO.: 0499

12 HED NO.: 1.0 V,7

CATEGORY: 2 LEVEL: B

#### FINDING:

At present, the Rx feedpump suction valves are manually operated valves in the plant.

#### **RESPONSE:**

The reactor feedpump suction valves are presently manually operated from entside the control room. These valves may be inoperable or inaccessable ar emergency termination because of environmental factors in the area by are located. However, after further evaluation it was determined that the present method of monitoring and controlling reactor pressure vessel water level after a SCRAM, using the condensate/feedwater system, is adequate.



INDEX NO.: 0498

12 HED NO.: 1.0 V, 8

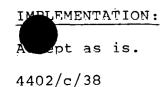
CATEGORY: 1 LEVEL: B

# FINDING:

There is no recorder (trend indication) for HPCI turbine exhaust pressure in the control room.

## **RESPONSE:**

uate indication exists to determine this parameter from the Make-Up SCFH/Drywell Pressure Recorder.



DEX NO.: 0497

12 HED NO.: 1.0 V,9

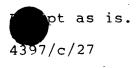
CATEGORY: 1 LEVEL: B

# FINDING:

No controls exist in the control room for core spray area sump pumps.

#### **RESPONSE:**

Because no controls exist in the control room for core spray area sump inps, there is no direct indication to the operator that these pumps are ning. However, further evaluation has concluded that the high level ararm in the sump provides adequate indication that the core area sump pumps are operating.



DEX NO.: 0495

12 HED NO.: 1.0 V,11

CATEGORY: 1 LEVEL: B

### FINDING:

During emergency situations, drywell (DW) temp is an important parameter which must be trended. However, at present, no instrumentation is provided for this.

# **RESPONSE:**

A DW wide angle range temp recorder will be installed in the control room satisfy this need. A multi-point temperature recorder will be talled.

#### IMPLEMENTATION:

ompletion of the first refueling outage.

EX NO.: 0494

12 HED NO.: 1.0 V,12

CATEGORY: 1 LEVEL: B

# FINDING:

During emergencies an indication of drywell (DW) water level may be required. At present, there is no direct indication of DW level in the control room.

#### **RESPONSE:**

A DW water level indicator is to be added to correct this discrepancy. This modification is in progress as per RG 1.97.

## IMPLEMENTATION:

Rγ

43977c/29

completion of the first refueling outage.

DEX NO.: 0493

12 HED: 1.0 V, 13

CATEGORY: 2 LEVEL: B

# FINDING:

From task analysis, indication was requested for NORMAC and emergency hotwell reject flow.

# RESPONSE:

Normal flow information exists, emergency overflow valve position is rmed.



DEX NO.: 0492

12 HED NO.: 1.0 V,14

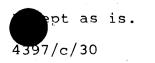
CATEGORY: 1 LEVEL: B

FINDING:

There is no redundant indication of IRMs and APRMs Rx power on the front panels.

# **RESPONSE:**

Redundant information is included on the back panels for IRMs and APRMs.



DEX NO.: 0491

12 HED NO.: 1.0 V,15

CATEGORY: 1 LEVEL: B

FINDING:

Task analysis indicated a lack of an intermediate range drywell (DW) pressure meter on panel 90X-3.

# RESPONSE:

Redundant information does not appear to be necessary due to a wide range meter plus a recorder (8540-2/4) on panel 90X-3. Existing instrumention is sufficient.



DEX NO.: 0490

12 HED NO.: 1.0 V,16

CATEGORY: 1 LEVEL: A

FINDING:

The full core display (ECD) is cited as being required in many task analysis action steps. Preventitive and/or corrective maintenance on this display is performed on "as needed" basis during outages.

#### **RESPONSE:**

A periodic maintenance schedule will be implemented to test bulb marability and critical display input.

#### IMPLEMENTATION:

he completion of the first refueling outage.

DEX NO.: 0507/0593

12 HED NO.: 3.0 V,1

CATEGORY: 2 LEVEL: B

#### FINDING:

Some annunciators use the word "discharge" in the legend when the word "instrument" would be more appropriate.

#### **RESPONSE:**

A comprehensive annunciator review package will be developed to address wording used in the annunciators and appropriate changes made.

# IMPLEMENTATION:

the completion of the second refueling outage.

	PEX	NO.:_	0506/	0593	 
12	HED	NO.:	3.0	V,2	

CATEGORY: 2 LEVEL: B

FINDING:

At present, the existing annunciator tile H-2, 902-3 reads "ISO Condenser Line Break". This should be referred to a Group 5 isolation. Also, at present annunciator tile D-3, 902-3 is blank.

#### **RESPONSE:**

Annunciator tile D-3, 902-3 will be worded to say "ISO Condenser Line Break (Group V Isolation)" as part of the station's comprehensive funciator review.

## IMPLEMENTATION:

Buccompletion of the second refueling outage.

DEX NO.: 0496/0592

12 HED NO.: 3.0 V,3

CATEGORY: 2 LEVEL: B

#### FINDING:

Several annunciators are presently in inappropriate locations or do not exist. Moving or adding these annunciators would enhance efficient operation. The following annunciators need to be added: 9472-West LPCI Room Sump Hi-Hi Level, 9473-East LPCI Room Sump Hi-Hi Level, 9475-West LPCI Room Sump Pump Tripped, 9476-East LPCI Room Sump Pump Tripped. These should be added on panel 923-4. Annunciator 9474 should be moved from panel 90X-4 to panel 923-4. Annunciator 9496-CRD Pump A/B Hi-Amps should be added to panel 90X-5. Annunciator 9999-ADS Defeated, should be added to panel 90X-3. If CS pump switches are installed (with indicating lights), annunciators 9477 and 9478 should be omitted.

#### **RESPONSE:**

Each of the annunciators will be renewed and appropriately changed as a function of the station's comprehensive annunciator evaluation.

#### IMPLEMENTATION:

the completion of the second refueling outage.



DEX NO.: 0510

12 HED: 4.0 V, 2

CATEGORY: 1 LEVEL: B

# FINDING:

Task analysis has revealed that a switch exists (RECIRC PUMP DIS-CHARGE VALVE) which should have a spring-return operation. This switch should include the positions open/close/neutral.

# **RESPONSE:**

The operators are trained to keep their hands on the valve switch til they have completed movement of the valve as desired. When the live has travelled to the desired position, they put it back to neutral. This is a manual operation versus a spring-return movement.



DEX NO.: 0509

12 HED: 4.0 V, 3

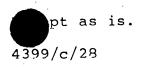
CATEGORY: 1 LEVEL: B

# FINDING:

At present the switch (RECIRC PMP DISCHARGE BYPASS VALVE) does not return; it is an as-is switch.

# RESPONSE:

The operators are trained to keep their hands on the valve switch il they have completed movement of the valve as desired. When the ve has travelled to the desired position, they put it back to neutral. This is a manual operation versus a spring-return movement.



DEX NO.: 0508

12 HED NO.: 4.0 V,4

CATEGORY: 2 LEVEL: B

# FINDING:

At present the  ${\rm H}_2$  addition control switch has dyno-tape labels and no indicating lights.

# RESPONSE:

This panel has been eliminated from the control room operations.



pleted.

DEX NO.: 0514
12 HED NO.: 5.0 V,1
CATEGORY: 2 LEVEL: B
FINDING:
L. The parameter GPM is not listed on the EM (response).
2. Divisions are "2" instead of "1".
3. The valve position demand does not have % valve opening listed.
. The thumbwheel type does not have GPM on it.
5. The deviation meter has no units and is not zone banded.

### **RESPONSE:**

The CRD flow control needs several modifications. First, the units of M will be placed on the EM. This is necessary to avoid confusion with ther set of units (e.g., % flow). Percent valve opening cue will be praced on the demand indicator. The thumbwheel will also be labeled with GPM. The deviation meter will be zone banded, and labeled with meaningful units (% deviation).

#### IMPLEMENTATION:

he completion of the second refueling outage.

VDEX NO.: 0515/0610
12 HED NO.: 5.0 V,2
CATEGORY: B LEVEL: 2
FINDING:
1. The EM scale reads 0-100. What measured is not listed.
2. There is no "what measured" on the demand EM.
3. The thumbwheel tape has 0-100 with no scale.
4. The deviation meter just has dots on it.

### **RESPONSE:**

The clean-up pressure controller requires several modifications. The response EM will be changed to read in units of PSIG and have a range of 200. The setpoint tape will also be modified to units of PSIG and a sige of 0-200. The controller demand meter will read in percent valve opening. The deviation meter will be zone banded and re-labeled with units of percent deviation. This will aid this controller in being consistent with operating priorities.

#### IMPLEMENTATION:

/c/39

But the completion of the second refueling outage.

INDEX NO.: 0516
12 HED: 5.0 V, 3
CATEGORY: 2 LEVEL: B
FINDING:
1. The demand meter has no units.
2. There is no response meter in flow.
3. The setpoint tape has no units.

4. The deviation tape has no units and is not banded.

#### **RESPONSE:**

The clean-up system flow controllers requires several modifications. The present controller is no longer used in the auto mode. A refered fix is to permanently defeat the auto function of the esent controller and put the appropriate units on the demand teter. While no response meter exists on the present controller, evaluation has shown that flow response on the trend recorder is sufficient, and therefore does not provide adequate justification for the installation of a separate response meter on the controller.

#### IMPLEMENTATION:

By\_completion of the second refueling outage.

. . .....



NDEX NO.: 0517

12 HED: 5.0 V, 4

CATEGORY: 2 LEVEL: B

FINDING:

The clean-up blowdown flow controllers have demand meters with no units, and do not have response meters for actual valve position.

## RESPONSE:

There is no need for units in this particular meter. Operator uses a redundant flow meter and recorder for adjustment.

# IMPLEMENTATION:

Accept as is



NDEX NO .:	0518		
12 HED NO .:_	5.0	V, 5	<u>_</u>
CATEGORY:	1	LEVEL:	В

# FINDING:

- 1. The response meter reads 0-100 (no units) although dynotape has been placed on the side 0-30.
- 2. No units on the demand meter.
- 3. The setpoint tape has 0-100 with no units.
- 4. The deviation meter has no units nor banding.

#### **RESPONSE:**

The containment cooling service water heat exchanger differential pressure ntroller requires several modifications. A new response meter which has its of PSID and a range of 0 to 30 in units of 1 will be installed. A percent valve opening on the Demand Meter will be added a setpoint tape with units of PSID, and a range of 0-30 with divisions of one will be added to the control boards. Also, the deviation meter will be zone banded and labeled with meaningful units (e.g. percent deviation). All dyno-tape presently around/associated with the controller should be replaced with permanent labels as a function of the station unit comprehensive labeling review.

#### IMPLEMENTATION:

the end of the second refueling outage.

INDEX NO.: 0520

12 HED: 5.0 V, 7

CATEGORY: 2 LEVEL: B

FINDING:

.

- 1. The response meter has insufficient divisions for low range operation.
- 2. The demand meter has no units.
- 3. The setpoint tape has no units.
- 4. The deviation meter has no units or banding.

### **RESPONSE:**

Further study has failed to indicate adequate need to make modifications to this meter.

#### IMPLEMENTATION:

rept as is.

INDEX NO.:					·
וי אד <u>ט: (</u> 1° אדי)	5.0	<u>v,</u>	8		
CATEGORY:	1		LEVEL:	В	

# FINDING:

The deviation meter has no units.

### **RESPONSE:**

The Torus/Drywell DP controller deviation meter requires modification. At present the meter has no units labeled. The parameter isplayed should be listed on the meter. The deviation meter will be ne banded and labeled with the appropriate units (e.g., percent neviation).

## IMPLEMENTATION:

Bu the completion of the second refueling outage.

 $\frac{9}{c}{2}$ 

NDEX NO	.:0522
12 HED:	5.0 V, 9
CAMEGORY	: LEVEL:B
FINDING:	
1.	The response meter is in % flow instead of GPM.
2.	The demand meter has no units.
3.	The setpoint tape has no units and units % flow (inferred).
4.	The deviation meter has no units.
	Task = 2300-03 REL/SEQ = 2.1 EPN = 2340-1 2300-05 3.1 2300-06 13.1 ECCS-01 31.1

ECCS-01 ECCS-02

# FPONSE:

The HPCI flow controller requires several modifications. The first modification will be to install a new response meter indicating flow in GPM, with a range of 0 to 6000 in divisions of 100 (or smaller). Second, the setpoint meter will be modified to match the new response meter. (Units = GPM, Range = 0 - 6000, Divisions = 100). The third modification will be to place Percent of Value Opening on the demand meter. At present, this meter has no units. Also, the deviation meter will be zone banded and labeled with appropriate units (e.g., % deviation).

32.1

40.1

IMPLEMENTATION:

the completion of the second refueling outage.

NDEX NO.	·	0523			
12 HED:	5.0	V,	10		
CATEGORY:	2		LEVEL:	в	

FINDING:

1. The demand meter has no units listed.

2. The deviation meter has no units and is not banded.

## **RESPONSE:**

The 'A' Feedwater Reg Valve Controller requires modifications. At present, neither the demand meter nor the deviation meter is labeled th units. The demand meter will be labeled with appropriate units .g., % of Valve Opening), and the deviation meter will be re-scaled with a scale of appropriate units (% deviation) and range of -10 to +10 in divisions of 1. This is because the deviation pertains to reactor level and the difference between demand on the master vs. slave controllers.

#### IMPLEMENTATION:

9/c/4

the completion of the second refueling outage.

NDEX NO.: 0525/0608

12 HED: 5.0 V, 12

CATEGORY: 2 LEVEL: B

# FINDING:

- 1. The demand meter does not have units listed.
- 2. The setpoint tape should be properly scaled 0-60 in inches. (The meter scale is now 1-100).
- 3. The deviation meter has no units.

#### **RESPONSE:**

The low load feedwater reg valve controller requires modification. The demand meter will be relabeled with appropriate units (% Valve ening). The setpoint meter will be re-scaled with a range of 0 inches; this meter presently reads 0 to 100. The new scale would match the narrow range GMACs.

### IMPLEMENTATION:

the completion of the second refueling outage.

INDEX NO.: 0526

12 HED: 5.0 V, 13

CATEGORY: 2 LEVEL: B

FINDING:

1. The demand meter has no units of measurement.

2. The response meter has no units of measurement.

3. The response meter only goes to 100 and can be overspeeded.

262-25A.

The Recirc. Pump Speed Controllers (A/B) require modifications. At present neither the response nor demand meter have units.

# **RESPONSE:**

The response meter will be re-scaled with a range of 20 to 110 in visions of 1, with units of % speed. The demand meter will be -scaled with a range of 0 to 100 in divisions of 1, with units of % peed.

#### IMPLEMENTATION:

/c/7

By the completion of the second refueling outage.

NDEX NO.: 0527

12 HED: 5.0 V, 14

CATEGORY: 1 LEVEL: B

FINDING:

- 1. The response meter is improperly labeled 0-100 and has dynotape on it (0 5).
- 2. The demand meter has no units.
- 3. The setpoint tape has no units.
- 4. The deviation meter has no units.

Task = ECCS-05 REL/SEQ 2.1 EPN = 8540-1

The Drywell N2 Make-up Controller requires modification. At present the response is improperly labeled and has dyno-tape on it.

PONSE:

The response meter will be re-scaled to read PSIG with a range of 0 to 5 in divisions of 1. Also, the dyno-tape will be removed and/or replaced with permanent labeling as a function of the labeling package for this requirement. The controller demand meter presently has no units. This meter will be relabeled with units of % valve opening. Also, the setpoint tape will be modified to match the response meter, units of PSIG, range of 0 to 5 and division of 1.

IMPLEMENTATION:

Buthe completion of the first refueling outage.

a/c/8

NDEX NO.: 0528

12 HED: 5.0 V, 15

CATEGORY: 2 LEVEL: B

FINDING:

1. The demand meter has no units on it.

The master recirc. flow controller requires modification. The demand meter for this controller presently has no units.

# **RESPONSE:**

This meter will be relabeled with units of % spread. Also the deviation meter presently has no units. However, further study has field to justify modifying this meter.

### IMPLEMENTATION:

By the completion of the second refueling outage.



NDEX NO.: 0529

12 HED: 5.0 V, 16

CATEGORY: 2 LEVEL: B

# FINDING:

1. The demand meter has no units listed.

2. The deviation meter has no units listed.

The FW Vessel Level Master Controller requires modification. At present the demand meter has no units.

### **RESPONSE:**

This meter will be re-labeled to have units of % valve position. Also the deviation meter presently has no units.

# IMPLEMENTATION:

Accept as is.



. . . . . . . . .

. .

NDEX NC	).: <u> </u>	0530/060	7	
12 HED:	5.0	V, 17		
_				

CATEGORY: 2 LEVEL: B

FINDING:

- 1. Indicating lights are not marked and follow a red/green board layout in a green board control room.
- 2. Open is not indicated on the pushbutton.

At present the control room utilizes a Green Board layout. However, some indicating lights exist which are not marked and follow a Red/Green Board layout. These lights represent the position of the SDV Drains (3-0302-156A, 156B, 157A, 157B) and SDV Vents (3-0302- 160A, 160B, 161A, 161B). The present layout may cause operator confusion.

## **RESPONSE:**

To correct this problem, indication of "Open" and "Closed" should be de more explicit and should follow the Green Board Concept. Also, pen" should be engraved on the pushbutton controls.

### IMPLEMENTATION:

/c/11

By the completion of the second refueling outage.

INDEX NO.: 0550

12 HED: 5.0 V, 21

CATEGORY: 1 LEVEL: B

### FINDING:

1. The range on this meter is too high for operating. Divisions are inadequate for the low end of the range.

The range on the Containment Cooling Heat Exchanger Service Nater Flow Meter (System I/II) is too high for proper operation. Divisions are inadequate for the low end of the range. (Equipment #s 1540-1A, 1540-1B).

#### **RESPONSE:**

These meters will be re-scaled with a range of 0 to 7500 in divisions of 100, with units of GPM. This will allow the meter to measure vels consistent with system operation.

#### IMPLEMENTATION:

By the completion of the first refueling outage.

INDEX NO.: 0549	·	
12 HED NO.: 5.0 V,22		
CATEGORY: 1 LEVEL:	<u>в</u>	
FINDING:		
l. Indicating lights on t	the cited meter are not	marked.
2. There are no units of	measurement listed on t	he meter.
Task = 1600-08 1600-18 1600-20	Rel/Seq. = 3.1 2.2 2.4	EPN = 2-1640-2

# **RESPONSE:**

A review of the labels throughout the control room will be conducted. The indicated status lights will be labeled to ensure that the meaning of the lights is clear. The cited meter will be labeled to clearly indicate the units of measurement being employed.

# IMPLEMENTATION:

By the completion of the second refueling outage.

- <sup>1</sup>	$\mathcal{D}$	NO •	:	0548	s	 	
12	ਸ਼ਸ਼ਾ	) <b>:</b>	5.0	v,	23		

CATEGORY: 2 LEVEL: B

FINDING:

Task = 1700-05 REL/SEQ = 3.1 EPN = 2-1705-13

The Offgas Recorder Log A/B (Equipment # 2-1705-13, 3-1705-13) have no units listed on them. The parameters and units should be made explicit.

RESPONSE:

correct this HED these recorders will be relabeled with the appropriate units MR/HR.

IMPLEMENTATION:

he completion of the second refueling outage.

NDEX NO	.:0	547	<u></u>	 	
12 HED:	5.0	v,	24		

CATEGORY: 2 LEVEL: B

FINDING:

There are no units listed on the Off Gas Linear recorder.

# **RESPONSE:**

The units will be added to the Off Gas Linear Recorder.

# IMPLEMENTATION:

Bu the completion of the second refueling outage.

IDEX NO.: 0546

12 HED: 5.0 V, 25

CATEGORY: 2 LEVEL: B

FINDING:

Task = 0500-04 REL/SEQ = 5.4 EPN = 2-4440-89

This HED concerns the Recirc. Loop "B" 02 Concentration Recorder. This recorder presently has no units labeled.

#### **RESPONSE:**

The recorder will be relabeled with unit of PPB, a range of 0 to 200, with divisions of 5 for wide range, and a range of 0 to 20, with visions of 0.5 for low range.

# IMPLEMENTATION:

h/c/15

The completion of the second refueling outage.

NDEX	NO.:	0545	

12 HED NO.: 5.0 V,26

CATEGORY: 2 LEVEL: B

FINDING:

Task = 1600-12

Rel/Seq = 20N0.1

# EPN = 2-8540-53-8540-5

The Primary Containment 02 Concentration Range Switches (2-8540-5, 3-8540-5) require re-labeling of the switch positionsNO. The present positions, 5%, 10%, 25%, result in confusion when reading the associated meter when "ranging up"NO. (5NO.1NO.2NO.ANO.2) (5NO.1NO.2NO.ENO.1)

### **RESPONSE:**

The switch positions will be relabeled as "SCALE XI", "SCALE X2", and "SCALE X5"NO.

#### IMPLEMENTATION:

/c/1

By the completion of the second refueling outage.

 NDEX NO.:
 0544

 12 HED NO.:
 5.0 V,27

 CATEGORY:
 2

 LEVEL:
 B

\_\_\_\_\_

FINDING:

Task = 1600-12

Rel/Seq = 20NO.2

### EPN = 2 - 8540 - 63 - 8540 - 6

The primary containment 02 Concentration recorders (2-8540-6, 3-8540-6) require re-sealing and re-labelingNO. At present, the recorder has no units and a scale of 0 to 50 in divisions of ONO.2NO. (5NO.1NO.4NO.ANO.1) (5NO.1NO.2NO.DNO.1)

#### **RESPONSE:**

This will be changed to make these recorders consistent with the 2-8540-5 d 3-8540-5 metersNO. The recorders will be corrected by re-scaling m with a range of 0 to 5 in divisions of ONO.2 and re-labeling the recorders with units of percent (%)NO. Also, a label reading "SCALE X1", "SCALE X2", and "SCALE X5" will be added. This will correspond with labeling in the range switch.

#### IMPLEMENTATION:

4397/c/2

he completion of the second refueling outage.

IDEX NO.: 0542

12 HED NO.: 5.0 V,29

CATEGORY: 2 LEVEL: B

FINDING:

- 1. Switch positions are presently (1, 2, 3).
- 2. The legend on the recirc and discharge valves is missing for red lights.

At present, the Red status lights on the Reactor Building EQ Drain Tank Discharge/Recirc Valve Control do not have legends. These lights should have legends as the two Red lights mean different things.

#### **RESPONSE:**

The switch positions will be renamed and relabeled as follows: RECIRC, DISCH, AUTO. Also, the appropriate legends will be placed on the dicator lights (Recirc Red = Open = 0, Disch Red = Closed = -).

#### IMPLEMENTATION:

97/c/4

the completion of the second refueling outage.

IDEX NO.: 0541

12 HED NO.: 5.0 V,30

CATEGORY: 2 LEVEL: B

FINDING:

Existing meter reads in atmosphere pressure.

Task = 5750-01	Rel/Seq = 2.1	EPN = 23 - 5 - 4
11	2.2	23-5-5

Some existing Atmospheric Differential Pressure Meters (23-5-4, 23-5-5) read in Atmospheric Pressure. This is confusing as Tech Specs require an atmospheric pressure at the locations measured to be negative relative to the Atmosphere. Therefore, the meter must read negative AP.

#### **RESPONSE:**

This meter will be changed to display "Negative Differential Pressure" during normal operations.

#### IMPLEMENTATION:

4397/c/5

The completion of the second refueling outage.

INDEX NO.: 0604	/0543	_	
12 HED NO.: 5.0	V,31/V,28	_	
CATEGORY: 1	LEVEL:B		
FINDING:	· ·		•
Task = 2500-01	Rel/	Seq = 7.1	EPN = 2540 - 1A
		22.1	
		22.2	2540-1B
		8.1	2540-2A
. u		19.1	
		19.2	2540-2B
		9.1	2540-3A
		20.1	
		20.2	2540-3B
		5.1	2540-4A
2500-02 2500-02		11.8 5.3	2540-4B
2300-02		11.9	2540-4B
н	•	5.2	2540-5A
·		11.10	2340-3A
н		5.4	2540-58
ш		11.11	2540-5B
2400-01		3.2	02-54-4
2400-02		4.4	
2400-03		1.4	н
2400-01		3.7	02-55-1
2400-02		4.9	. н
2400-03		1.9	
2400-01		3.5	02-55-2
2400-02		4.7	11
2400-03		1.7	
2400-01		3.8	02-55-3
2400-02		4.10	U , H
2400-03		1.10	
2400-01		3.6	02-55-4
2400-02		4.8	
2400-03 2400-01		3.3	02-56-1
2400-01		4.5	02-30-1
2400-02		1.5	н .
2400-01		3.1	02-56-2
2400-02		4.3	
2400-03		1.3	••
2400-01		3.4	02-56-3
2400-02		4.6	11
2400-03		1.6	_ <b>U</b> .

e listing of valves do not have a clear cut indication of open or osed under the Green Board concept. (5.3.2.A.1) (5.3.2.A.2)

. . -

**RESPONSE:** 

everal values in the CR do not have an explicit indication of Open or Close as it relates to the Green Board effect. Because of this, it is unclear and confusing whenever these values are normally open or closed. Legend light indicators will be added to these values so that they conform to a Green Board philosophy.

## IMPLEMENTATION:

By the completion of the second refueling outage.

IDEX NO.: 0539

12 HED NO.: 5.0 V,32

CATEGORY: 1 LEVEL: A

#### FINDING:

**RESPONSE:** 

The Rx mode switch has no indication other than switch position.

Switch has been replaced. A preventative maintenance program is in place provide improved reliability.



NDEX NO.: 0537

12 HED NO.: 5.0 V,34

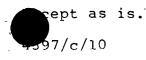
CATEGORY: 1 LEVEL: B

FINDING:

The Reactor Pressure Total Steam Flow Recorder has odd divisions of units, making it a difficult recorder to use.

#### **RESPONSE:**

Further investigation has revealed that this recorder is used for real time trending for historical review, and that redundant indication is lovided for Rx pressure total steam flow.



INDEX NO.: 0536

12 HED NO.: 5.0 V,35

CATEGORY: 1 LEVEL: B

FINDING:

The Drywell Pressure/Make-up Flow Recorder does not have its unit of measure printed on the faceplate where the divisions are located.

#### RESPONSE:

PSIG will be engraved on the recorder scale faceplate.

#### IMPLEMENTATION:

the completion of the second refueling outage.

r,c/11 وج

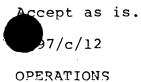
INDEX NO.: 053	35
12 HED NO.:	0 V,36
CATEGORY: 1	LEVEL: B

FINDING:

Several Peactor Building Valves have no positive indications in the Control Room. Having these indications would prevent sending an operator out into the plant and would enhance surveillance procedures. Indication of valve position is not located in the control room. Also there is no reset switch in the control room.

# **RESPONSE:**

Further study has indicated that these indications are not required in the CR.



INDEX NO.:_	0567
12 HED NO.:	6.0, V, 1
CATEGORY:	2 LEVEL: B

FINDING:

1. The switch position for manual operation reads "HAND" for hand control (pressure suppression).

# **RESPONSE:**

This switch will have the manual position re-labeled as "MANUAL".

IMPLEMENTATION:

By the completion of the second refueling outage.

DEX NO.: 0566		
12 HED NO.: 6.0	V,2	
CATEGORY: 1	LEVEL:	B

# FINDING:

1. The switch position plate for the SLC initiation switch has the labeled switch positions worn-off.

-46-11

#### **RESPONSE:**

A new switch position plate will be installed.

#### IMPLEMENTATION:

the completion of the first refueling outage.



NDEX NO.: 0565

CATEGORY: 2 LEVEL: B

FINDING:

# 1. The switch positions for the clean-up Filter Bypass are unreadable.

**RESPONSE:** 

New switch positions will be installed for the clean-up Filter Bypass.

IMPLEMENTATION:

the completion of the second refueling outage.

DEX NO.: 0564

12 HED NO.: 6.0 V,4

CATEGORY: 1 LEVEL: B

FINDING:

1. The following switches have unlabeled mid positions.

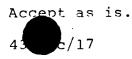
EPN = 1430-308A 1430-308B 1020-301A " 1020-302B " 1020-302C

1130-301

#### **RESPONSE:**



eral selector switches have unlabeled Mid-Positions. It has been In that operator training is sufficient to handle problems in this



NDEX NO.: 0563

The Mid-Position will be re-labeled "NORMAL".

1? HED NO.: 6.0 V,5

CATEGORY: 2 LEVEL: B

## FINDING:

**RESPONSE:** 

The mid-position on the Condenser Hotwell SW Supply Valves reads "OFF".

IMPLEMENTATION:

the completion of the second refueling outage.

NDEX NO.: 0562

12 HED NO.: 6.0 V,6

CATEGORY: 2 LEVEL: B

FINDING:

The mid-position on switches for Recirc Pump Suction Valves are labeled "STOP". This is an incorrect labeling, as the mid-position doesn't stop anything.

#### **RESPONSE:**

These positions will be re-labeled as "NORMAL".

IMPLEMENTATION:

the completion of the second refueling outage.

.97/c/19

DEX NO.:	0561	
----------	------	--

12 HED NO.: 6.0 V,7

CATEGORY: 2 LEVEL: B

#### FINDING:

Mid-position on switch plate reads "STOP". This is an as-is switch. The mid-position of switches for Manifold Crosstie Valves reads "STOP". This is incorrect as the mid-position stops nothing. When put in this position, the valve will go to Seal in Closed or Seal Open.

#### RESPONSE:

The mid-position will be re-labeled as "NORMAL".

#### IMPLEMENTATION:

the completion of the second refueling outage.

NDEX NO.: 0560

12 HED NO.: 6.0 V,8

CATEGORY: 2 LEVEL: B

FINDING:

1. The mid-position reads "STOP".

2. Switch function is "as-is".

The Manifold Crosstie Bypass Valve mid-position presently reads "STOP". This is incorrect as the mid-position doesn't stop anything. When put in this position, the valve will go to Seal in Close or Seal Open.

#### **RESPONSE:**

The switch positions will be labeled "OPEN", "CLOSE", and "NORMAL". The <u>switch</u> also requires a spring return function, which will be installed.

#### IMPLEMENTATION:

the completion of the second refueling outage.

INDEX NO.:	0559			
12 HED NO.:	6.0	V, 9		
CATEGORY:	1	LEVEL:	В	

#### FINDING:

The Manifold Crosstie selector switch currently read "EQUALIZER VALVES 202-6A, 6B, 9A, 9B." Switch Position A and B are masking tape labels on unit 2. No indicator lights are used.

#### **RESPONSE:**

n

"Manifold Crosstie Selector Switch" will be relabeled with its proper esignation. Permanent switch position labels (plate) for A and B will be Attached.

#### IMPLEMENTATION:

By the completion of the second refueling outage.

NDEX NO.:	0558			<b>-</b> +
12 HED NO .:_	6.0	V, 10		_
CATEGORY:	1	LEVEL:	В	

#### FINDING:

The Main Steam Line Outside Drain Valves on Unit 2 have no labeled switch position, while those on Unit 3 have no labels at all.

#### **RESPONSE:**

Unit 3 will be labeled with appropriate major label. Label positions will OPEN, CLOSE, NEUTRAL on both Unit 2 and Unit 3 switches.

#### IMPLEMENTATION:

the completion of the second refueling outage.

NDEX NO.:	0557			 -
12 HED NO.:	6.0	V, 11		 _
CATEGORY:	1	LEVEL:	В	

#### FINDING:

Several switches in the CR have positions labeled TRIP and CLOSE, when the positions STOP, START, NORMAL would be more appropriate and make switch positions more consistent in the CR.

#### **RESPONSE:**

e present convention is in place as part of the normal plant equipment a rations. It is not necessary to change these labels.

# IMPLEMENTATION:

# Accept as is.



DEX NO.:	0556			 • .
12 HED NO.:	6.0	V, 12		
CATEGORY:	1	LEVEL:	B	

#### FINDING:

At present the HPCI steam isolation valve switch is an inappropriate switch type for the needed function (switch function is PULL TO STOP for throttle OPEN). Also switch positions are presently dyno-tape labels.

#### **RESPONSE**:

The switch will be replaced with a throttle open, seal close, spring turn switch, and relabeled with appropriate labels OPEN, CLOSE, AUTO.

#### IMPLEMENTATION:

the completion of the first refueling outage.

NDEX NO.:	0555			
L2 HED NO .:_	6.0	V, 13		
CATEGORY:	1	LEVEL:	я	

#### FINDING:

At present the Recirc. Pump Loop A and B meters, and the Recirc. Pump Loop A/B chart recorder are labeled in units of GPM. For consistency sake these indications should be in the same units as the total core flow indications.

# **RESPONSE:**

The meters and recorder will be relabeled and rescaled appropriately.

#### IMPLEMENTATION:

But the completion of the second refueling outage.

3

NDEX NO.:	0554		
12 HED NO.:_	5.0	V, 14	
CATEGORY:	1	LEVEL:	B

#### FINDING:

The annunciators for the Main Steam Header areas presently have legends partially written in magic marker. Legend tiles or annunciators should be permanently engraved.

#### **RESPONSE:**

The following annunciator tiles will be relabeled to read appropriate gends as a function of the annunciator package:

Main Steam Header From Drywell X Area Main Steam Header West Wall X Area Main Steam Header East Wall X Area Main Steam Header Bypass Valves X Area

#### IMPLEMENTATION:

the completion of the second refueling outage.

NDEX NO.:	0553			
12 HED NO.:	6.0	V, 15		<u> </u>
CATEGORY:	2	LEVEL:	В	

# FINDING:

The Normal Hotwell Make-Up Valve, and the Emergency Hotwell Make-up Valves currently have valve positions which are not clearly indicated. Valve position should be explicit.

#### **RESPONSE:**

The controls with the appropriate switch positions will be relabeled and e demand meter will also be relabeled to read 0 to 100% valve open as a action of the control room labeling package.

# IMPLEMENTATION:

he completion of second refueling outage.

NDEX NO.:	0552	·		 -
12 HED NO .:	6.0	V,16		_
CATEGORY	1	LEVEL -	R	`

#### FINDING:

The Drywell Isolation Reset switch has labeling which is misleading and there are no labeled switch positions. This switch resets Group 2 and Group 3 isolations.

#### **RESPONSE:**

The switch will be relabeled "Group 2 and Group 3 Isolation Reset". The propriate switch positions CHANNEL A, CHANNEL B, NEUTRAL will also be beled as a function of the control room labeling package.

#### IMPLEMENTATION:

the completion of second refueling outage.

NDEX N	••••	0551			 <u>.</u>	
12 HED	NO.:_	6.0	v,	17	 	

LEVEL:

**B** 

FINDING:

CATEGORY: 2

The  $H_2$  Addition System Channel A (and B) selector switches have been added since the original study. At present switch positions and labels are listed in dyno-tape. Switch positions and labeling should be permanent.

#### **RESPONSE:**

e controls will be relabeled: HYDROGEN ADDITIONS SYSTEM CHANNEL "A" LECTOR, HYDROGEN ADDITION SYSTEM CHANNEL "B" SELECTOR. Also the positions will be relabeled : ON (High), OFF (Low), OFF, as a function of the control room labeling program.

#### MPLEMENTATION:

the completion of second refueling outage.

NDEX NO.:	0571		 
12 HED NO .:_	8.0	ν,ι	 
CATEGORY :	1	LEVEL:	 

# FINDING:

The placement and scale of the Torus Water Temperature Recorders for Units 2 and 3 need modification. At present the recorder for unit 3 is on a back panel, while the recorder for unit 2 is on panel 902-4, and only reads up to 200°F. These recorders display a very important parameter, used often in emergency procedures.

#### **RESPONSE:**

Unit 3's recorder will be placed on panel 903-4 and both recorders will ve appropriate scales.

# IMPLEMENTATION:

accordance with RG 1.97 implementation.

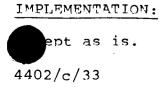
NDEX NO.:	0570			
L2 HED NO.:	8.0	V, 2		
CATEGORY:	1	LEVEL .	R	

#### FINDING:

At present Reactor Vessel Temperature indications are on the 21 panel. These recorders would be more useful if placed on the panels 902-4 and 903-4.

# **RESPONSE:**

Further investigation has shown adequate redundant information exists. so there is no room on the boards indicated to place these recorders. addition this information can be called up from the computer or put on computer printout.



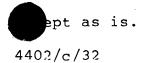
NDEX NO.:	0569			
12 HED NO .:_	8.0	V, 3		
CATEGORY.	1	LEVEL .	g	

#### FINDING:

The test button and indicating lights for the HPCI testable check valve are not located in close enough proximity to each other.

#### **RESPONSE:**

Further evaluation has determined this valve is not listed in a valve sting procedure. It is not necessary to require relocation of the propriate pushbutton or status lights.



VDEX NO.: 0568

12 HED NO.: 8.0 V, 4

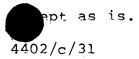
CATEGORY: 1 LEVEL: B

#### FINDING:

At present the Acoustic Monitor tile is not on the same annunciator panel as the relief valves.

#### **RESPONSE:**

This does not appear to be a problem, as the tile is within easy reading stance of appropriate controls.



NDEX NO.: 0512

12 HED: 8.2.2.B, V4

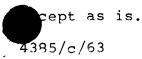
CATEGORY: 2 LEVEL: C

FINDING:

Rad monitors on panel 902-10 and 902-11 are not in the same order as they are on the 902-2 panel recorder. Likewise, panel 903-10 and 902-11 are not in the same order as 902-3.

#### **RESPONSE:**

The additional search time and time to respond to read a grouping of displays not properly organized is only a problem when rapid and highly curate human performance is required. Otherwise, there is sufficient time for an operator to identify and read displayed information, even if not optimally organized. Only when information is found in widely disparate locations, e.g., multiple panels, is there a performance problem. In this case, related information is found on the same panel, albeit not consistently organized among panels. This has only minimum impact on operations.



NDEX NO.: 0574

12 HED NO.: 9.0 V.1

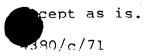
CATEGORY: 1 LEVEL: B

FINDING:

1. The LPCI flow recorder has inadequate divisions in the low ranges.

#### **RESPONSE:**

Recorders are used to provide trend information and not frequently specific values. Indications at the low end of the scale are sufficient indicate to the operator the operational status of LPCI flow.



DEX NO.: 0573

12 HED NO.: 9.0 V,2

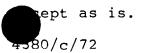
CATEGORY: 1 LEVEL: B

FINDING:

The range on the containment pressure portion of the wide range drywell pressure and torus level meter is apparently too high.

#### **RESPONSE:**

The meters have a range that is adequate for all operator tasks (NUREG-0737). The meters are not off scale, only reading at the low portion of scale.



NDEX NO.: 0572

12 HED NO.: 9.0 V,3

CATEGORY: 1 LEVEL: B

#### FINDING:

The "Medium Range Level A" and "Medium Range Level B" instruments presently read in divisions of 3.

#### **RESPONSE:**

The levels on these meters are easily read. This guideline is stated to sure that unusual divisions are not employed and thus, confuse the perators. The cited meters provide a clear display in consistent divisions of three.

