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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): Cordell Reed letter to H. R. Denton dated August 25, 1983.
(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.

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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 1	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,

B. Rybak

B. Rybak
Nuclear Licensing Administrator

Attachments

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

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50-237
DETAILED CONTROL ROOM DESIGN REVIEW FINAL SUMMARY REPORT PROGRAM IMPLEMENT VOL2 Part II

Vol. 2 (Part I II)

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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

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0248

12 HED: 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 request of the operator. This approach is preferable to one in which a large number of commands must be memorized and which necessitates a hard copy index of commands.

IMPLEMENTATION:

Accept as is.

DRESDEN CORRECTIVE ACTIONS

NO.: 0007

12 GUIDE NO.: 7.1.4.1-1

CATEGORY: 2 LEVEL: C

FINDING:

There are keys on the keyboard which the operators do not use. Non-relevant 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.

IMPLEMENTATION:

Accept as is.

44[illegible]/c/35

DRESDEN CORRECTIVE ACTIONS

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 within the recommended displacement range. Since possible inadvertent actuation is the prime consideration, this deviation from recommended guidelines is not serious.

IMPLEMENTATION:

Accept as is.

4381c/pg62

DRESDEN CORRECTIVE ACTIONS

INDEX 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 operations. The consequences of inadvertent key actuation is negligible.

IMPLEMENTATION:

Accept as is.

DRESDEN CORRECTIVE ACTIONS

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 keyboard was installed with the printer. However, since only the printer is used, the keyboard serves no purpose.

IMPLEMENTATION:

By the completion of the second refueling outage.

4381c/pg64

DRESDEN CORRECTIVE ACTIONS

[redacted]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 [redacted]igue, and hence on operator error, is expected to be negligible. [redacted]en these circumstances, the current keyboard slope is adequate.

IMPLEMENTATION:

A[redacted]pt as is.

[redacted]4381c/pg65

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0245

12 HED NO.: 7.1.4.I-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, 0, 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 keys in order to minimize possible operator confusion. These measures will include color coding of unused keys.

IMPLEMENTATION:

Prior to the completion of the second refueling outage.

4381c/pg66

DRESDEN CORRECTIVE ACTIONS

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 to increase the ease with which the system is used, the feasibility of the appropriate software changes will be determined.

IMPLEMENTATION:

By the completion of the second refueling outage.

4381c/pg67

DRESDEN CORRECTIVE ACTIONS

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 receives 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.

IMPLEMENTATION:

Accept as is.

4385/c/26

DRESDEN CORRECTIVE ACTIONS

[redacted]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 v[redacted]tical stroke widths are narrower than the horizontal stroke [redacted]hs. As a result the vertical stroke widths will be revised.

IMPLEMENTATION:

B[redacted]e completion of the second refueling outage.

4424/c/21

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 262

12 HED NO.: 7.2.1.B-2

CATEGORY: 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 will be installed on all monitors on Units 2 and 3.

IMPLEMENTATION:

Before the completion of the second refueling outage.

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0269

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 ntrast ratio. In addition, all monitors will be adjusted for optimum ghtness and contrast. Brightness and contrast levels will be consistent across all displays.

IMPLEMENTATION:

he completion of the second refueling outage.

DRESDEN CORRECTIVE ACTIONS

INDEX 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 luminance values.

IMPLEMENTATION:

Prior to the completion of the second refueling outage.

DRESDEN CORRECTIVE ACTIONS

INDEX 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 contrast adjustments will be made so that all monitors have similar luminance values.

IMPLEMENTATION:

Before completion of the second refueling outage.

DRESDEN CORRECTIVE ACTIONS

INDEX 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 limits and are consistent across all monitors in the control room.

IMPLEMENTATION:

By the completion of the second refueling outage.

DRESDEN CORRECTIVE ACTIONS

INDEX 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 complex symbols. The CONRAC color monitors have a resolution of 20 elements/inch, which is adequate for present graphics displays. Should future 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.

IMPLEMENTATION:

Accept as is.

DRESDEN CORRECTIVE ACTIONS

INDEX NO: 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.

4[illegible]/c/22

DRESDEN CORRECTIVE ACTIONS

INDEX 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 channel) in order to maintain luminance levels and contrast ratios that are within accepted human factors criteria. Operators will continue to be restricted from adjusting the brightness and contrast.

IMPLEMENTATION:

Accept as is.

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0301

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 which they subtend is sufficient even at greater viewing distances.

IMPLEMENTATION:

Accept as is.

45[illegible]c/pg59

DRESDEN CORRECTIVE ACTIONS

INDEX 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 height of 0.33 inches was obtained on a monitor which was out of adjustment. When properly adjusted the character height still does not meet 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.

IMPLEMENTATION:

Accept as is.

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 stroke-width-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:

By the completion of the second refueling outage.

4389/c/69

DRESDEN CORRECTIVE ACTIONS

INDEX 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.

IMPLEMENTATION:

Accept as is.

4381c/pg61

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0378

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 displays that the operator periodically checks. Whether the operator is standing 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.

IMPLEMENTATION:

Accept as is.

4402/c/82

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0379

12 HED: 7.2.3.D.1.A-2

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 standing position.

RESPONSE:

Monitors located in the control panels or suspended from the ceiling are displays that the operator periodically checks. Whether the operator is standing 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.

IMPLEMENTATION:

Accept as is.

4380/c/71

DRESDEN CORRECTIVE ACTIONS

[redacted]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 of sight, 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.

IMPLEMENTATION:

A[redacted]ot as is.

4380/c/72

INDEX NO.: 0251

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 clear. Moreover the period provides a clear perceptual separation of the groups.

IMPLEMENTATION:

Accept as is.

/c/27

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0252

12 HED NO.: 7.2.4.D-2

CATEGORY: 2 LEVEL: C

FINDING:

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

RESPONSE:

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

IMPLEMENTATION:

A[redacted]t as is.

4421/c/78

DRESDEN CORRECTIVE ACTIONS

[redacted]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 can 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.

IMPLEMENTATION:

A[redacted]t as is.

4385/c/28

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0254

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 point alignment will be provided.

IMPLEMENTATION:

Prior to the completion of the second refueling outage.

4421/c/79

INDEX NO.: 0381

HED: 7.2.4.K-6

CATEGORY: 2 LEVEL: C

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 use this display. Thus, the potential impact of this deviation from guidelines on plant safety is marginal at best.

IMPLEMENTATION:

Accept as is.

4[illegible]c/29

INDEX NO.: 0291

SRP SECTION: 7.2.4.M.1-5

CATEGORY: 2 LEVEL: C

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 [redacted] display on the Conrac monitor provides further contextual information. Thus, the lack of labels for these two columns does not present a serious problem for plant safety.

IMPLEMENTATION:

Accept as is.

[redacted]/c/30

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 negligible.

IMPLEMENTATION:

Accept as is.

4/c/31

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.

4 c/32

DRESDEN CORRECTIVE ACTIONS

INDEX 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 there is not one continuous sequence. Also, the total number of pages or displays would have no meaning to the operator.

IMPLEMENTATION:

Accept as is.

4421/c/82

DRESDEN CORRECTIVE ACTIONS

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. The maximum number of characters in a command is four. Thus, the maximum number of correctly entered characters which must be re-entered is three. This requirement does not place a significant burden on operators.

IMPLEMENTATION:

Accept as is.

4385/c/33

DRESDEN CORRECTIVE ACTIONS

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 status light on the console and the "RESET TIME AND DATE" message on the color monitors. The effect of this departure from guidelines, on plant safety, is negligible.

IMPLEMENTATION:

Accept as is.

4385/c/34

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0385

12 HED 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 appropriate change mode.

IMPLEMENTATION:

By the completion of the second refueling outage.

4421/c/83

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0257, 0258

12 HED: 7.2.8.A.1-1, 7.2.8.A.2-2

CATEGORY: 2 LEVEL: C

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 adjacent to the terminal. Thus, the information is readily available to the operator in a permanent format.

IMPLEMENTATION:

Accept as is.

4385/c/35

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0292

12 HED: 7.2.8.B-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 only two forms of interaction. The first form (short menu) requires that the 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).

IMPLEMENTATION:

Accept as is.

4385/c/36

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0293

12 HED: 7.2.8.D-4

CATEGORY: 2 LEVEL: C

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.

IMPLEMENTATION:

A t as is.

4385/c/37

DRESDEN CORRECTIVE ACTIONS

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:

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

IMPLEMENTATION:

Accept as is.

4430/c/11

DRESDEN CORRECTIVE ACTIONS

INDEX 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 decision points in the display hierarchy but do not contain information relevant to an understanding of the display hierarchy or of the technical content of the displays.

IMPLEMENTATION:

Accept as is.

DRESDEN CORRECTIVE ACTIONS

INDEX 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 "Scram Results Log Recall" printout in the computer room. This is the only printout for which operators can request a remote printout. Therefore, 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.

IMPLEMENTATION:

Accept as is.

DRESDEN CORRECTIVE ACTIONS

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:

B[illegible]he completion of the second refueling outage.

4421/c/80

DRESDEN CORRECTIVE ACTIONS

INDEX 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 the computer output is sent to the printer. While this rate is slower than 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.

IMPLEMENTATION:

Accept as is.

DRESDEN CORRECTIVE ACTIONS

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 instruction plate on the printers is not considered necessary.

IMPLEMENTATION:

Accept as is.

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0299

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 consistent with computer alarm messages.

IMPLEMENTATION:

By the completion of the second refueling outage.

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0300

12 MED 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:

For the completion of the second refueling outage.

4421/c/81

DRESDEN CORRECTIVE ACTIONS

INDEX 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 unit but the keyboard was not intended for use.

IMPLEMENTATION:

Accept as is.

4380/c/77

SECTION 8
PANEL LAYOUT

DRESDEN CORRECTIVE ACTIONS

INDEX 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. [redacted] appropriate demarcation technique will be applied in accordance with findings of the background shading study.

IMPLEMENTATION:

B[redacted]e completion of the second refueling outage.

4385/c/55

DRESDEN CORRECTIVE ACTIONS

[redacted]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 [redacted]erator to discriminate the various systems, however lines of [redacted]rcation will be employed wherever necessary to enhance this interaction.

IMPLEMENTATION:

A[redacted]t as is.

4424/c/14

DRESDEN CORRECTIVE ACTIONS

INDEX 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 be used. The differences between recommended and actual spacing are not large enough to warrant panel redesign. It is recommended that demarcation lines and labels be used to differentiate among display groupings.

IMPLEMENTATION:

Accept as is.

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0448/0202

12 HED NO.: 8.1.2.D-6/8.1.2.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 Trip; B M.G. Emergency Trip; ATWS AR1 Valve A; ATWS AR1 Valve B; ATWS AR1 Valve C; ATWS AR1 Valve D; SBLC Initiate; Manual Scram A B; Turbine Manual Trip; HPCI Auto Initiate; A M.G. Emergency Trip; B M.G. Emergency Trip; ATWS AR1 Valve A; ATWS AR1 Valve B; ATWS AR1 Valve C; ATWS AR1 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:

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

IMPLEMENTATION:

e completion of the second refueling outage.

4397/c/46

DRESDEN CORRECTIVE ACTIONS

INDEX 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 sequences.

IMPLEMENTATION:

Accept as is.

4397/c/64

DRESDEN CORRECTIVE ACTIONS

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:

Logical 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.

IMPLEMENTATION:

Accept as is.

DRESDEN CORRECTIVE ACTIONS

INDEX 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 is put into service at once, there is need for logical ordering of components. Thus, a logical arrangement of components will be implemented.

IMPLEMENTATION:

By the completion of the second refueling outage.

4385/c/52

DRESDEN CORRECTIVE ACTIONS

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:

Rearrangement 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.

IMPLEMENTATION:

By the completion of the second refueling outage.

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0170

12 HED NO.: 8.2.3.B-1

CATEGORY: 2 LEVEL: B

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 Log(N-9)

RESPONSE:

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

IMPLEMENTATION:

By the completion of the second refueling outage.

4[illegible]/c/7

DRESDEN CORRECTIVE ACTIONS

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:

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

IMPLEMENTATION:

By the completion of the second refueling outage.

4409/c/8

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0364

12 HED: 8.2.4.A-1

CATEGORY: 1 LEVEL: B

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:

By the completion of the second refueling outage.

4385/c/59

DRESDEN CORRECTIVE ACTIONS

INDEX 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 must match the actual task. This need not be done with a simulator using 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.

IMPLEMENTATION:

Accept as is.

4385/c/62

DRESDEN CORRECTIVE ACTIONS

INDEX 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 controls that they are associated with and arranged in a logical manner presents no difficulty to the operators.

IMPLEMENTATION:

Accept as is.

4/c/75

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0171

12 HED NO.: 8.3.2.A-2

CATEGORY: 2 LEVEL: C

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.

IMPLEMENTATION:

Accept as is.

4425/c/11

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0376

12 HED NO.: 8.3.2.C.1-3

CATEGORY: 2 LEVEL: C

FINDING:

There is a string of 8 pushbuttons on the 902-3 and 903-3 panels. The control one main steam isolation test valves 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.

4425/c/12

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0172

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.

4425/c/13

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0387

12 HED NO.: 8.3.2.C.1-5

CATEGORY: 2 LEVEL: C

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

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0388

12 HED NO.: 8.3.2.C.1-6

CATEGORY: 2 LEVEL: C

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.

4425/c/15

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0403

12 HED NO.: 8.3.2.C.1-10

CATEGORY: 2 LEVEL: C

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.

4425/c/16

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0404

12 HED NO.: 8.3.2.C.1-11

CATEGORY: 2 LEVEL: C

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:

Accept as is.

4425/c/17

DRESDEN CORRECTIVE ACTIONS

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 consistent labeling package. Coordinate axes will be placed appropriately for the full core display and core matrix.

IMPLEMENTATION:

Before completion of the second refueling outage.

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0390

12 HED: 8.3.2.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 consistent labeling package. The coordinate axes of the rod select matrix will be labeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

SECTION 9
CONTROL DISPLAY INTEGRATION

DRESDEN CORRECTIVE ACTIONS

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.

IMPLEMENTATION:

By the completion of the second refueling outage.

4385/c/67

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0477

12 HED: 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 valves are not throttle valves. The display is not needed for operation of this control. The display is optimally located for other task sequences.

IMPLEMENTATION:

Accept as is.

4424/c/33

DRESDEN CORRECTIVE ACTIONS

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:

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

IMPLEMENTATION:

Completion of the second refueling outage.

4402/c/56

SECTION 10
HISTORICAL REVIEW

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0462

12 HED NO.: 1.1.5.C HR 1

CATEGORY: 1 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 bulb replacement tool has been provided.

IMPLEMENTATION:

By the completion of the first refueling outage.

4409/c/10

INDEX NO.: 0164

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 Recirc. Bypass Valve to read Minimum Recirculation Valve. Also the "Min. Recirc. Valve open" annunciator function will be separated from the HPCI pump flow annunciator.

IMPLEMENTATION:

The completion of the second refueling outage.

4402/c/28

DRESDEN CORRECTIVE ACTIONS

INDEX 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 [illegible]uating controls while leaning over the benchboard and to protect from [illegible]ng bumped by passers by.

IMPLEMENTATION:

B[illegible]e completion of the first refueling outage.

4397/c/50

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0446

IEP HED NO.: 4.1.2.B-HR-2

CATEGORY: 1 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 enhance their visibility on the control panel. This does not prevent accidental actuation, but it does cause the control to stand out from other controls, reducing the chance that it will be incorrectly selected.

IMPLEMENTATION:

Upon completion of the first refueling outage.

4397/c/49

DRESDEN CORRECTIVE ACTIONS

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:

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

IMPLEMENTATION:

By the completion of the second refueling outage.

4409/c/16

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0280

12 MED NO.: 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 problem that requires correction. Correction can be accomplished by the use 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.

IMPLEMENTATION:

Completed.

4385/c/60

SECTION 11
OPERATOR SURVEY

DRESDEN CORRECTIVE ACTIONS

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 which they relate. This is in progress as part of the normal procedural review.

IMPLEMENTATION:

Upon completion of the second refueling outage.

4402/c/29

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0351

12 MED NO.: 0.0 OS, 2

CATEGORY: 1 LEVEL: B

FINDING:

Operator survey has shown that DOP-6600-1 does not show steps which delineate the process to be followed to accomplish synchronization of the diesel generator to the 4KV system.

RESPONSE:

Procedure DOP 6600-1 will be reviewed and revised to delineate the appropriate processes.

IMPLEMENTATION:

By the completion of first refueling outage.

4402/c/22

DRESDEN CORRECTIVE ACTIONS

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:

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

IMPLEMENTATION:

By the completion of first refueling outage.

4402/c/21

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0358

12 HED NO.: 0.0 , OS 4

CATEGORY: 3 LEVEL: B

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 cover preventive and corrective maintenance in the control room.

IMPLEMENTATION:

Accept as is.

4421/c/12

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0360

12 HED NO.: 0.0 OS 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 sufficient for covering problems arising with the chart recorder drives.

IMPLEMENTATION:

Accept as is.

4421/c/13

DRESDEN CORRECTIVE ACTIONS

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 of pressure, subsequently a low pressure alarm would occur which would require the operator to check the pressure on the system jockey pump control switch.

IMPLEMENTATION:

[redacted]the completion of the first refueling outage.

4421/c/60

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0459

12 HED NO.: 1.1.3.C.1 OS 5

CATEGORY: 3 LEVEL: B

FINDING:

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:

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

IMPLEMENTATION:

Upon completion of the second refueling outage.

4430/c/5

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0348

12 HED NO.: 1.1.7 - OS-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:

pt as is.

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0455

12 HED NO.: 1.5.1 OS 3

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 degrees. -3 to +1 degree variance outside the recommended range is not felt to provide justification for modifying the climate control system.

IMPLEMENTATION:

Accept as is.

/c/14

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0370

12 HED NO.: 2.1.4 OS, 1

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:

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

IMPLEMENTATION:

By the completion of the first refueling outage.

4402/c/18

DRESDEN CORRECTIVE ACTIONS

[redacted]EX NO.: 0372

12 HED: 3.0 OS,3

CATEGORY: 2 LEVEL: B

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 [redacted]iodic basis.

IMPLEMENTATION:

Accept as is.

[redacted]c/78

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0368

12 HED NO.: 3.2.1 OS, 2

CATEGORY: 2 LEVEL: B

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:

Improved auditory coding will be implemented, to reduce the confusion of alarms between panels.

IMPLEMENTATION:

By the completion of the second refueling outage.

4402/c/16

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0437

12 HED: 4.1.1.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 incorporate sound human factors principles. It will have the capability to follow the Rod sequence to 100% power operations.

IMPLEMENTATION:

By the completion of the first refueling outage.

4424/c/28

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0396

12 MED: 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:

Before completion of the second refueling outage.

4399/c/21

DRESDEN CORRECTIVE ACTIONS

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:

Although the valves are not in use at this time, it is possible they may be 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:

By the completion of the second refueling outage.

4430/c/21

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0402

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:

he completion of the second refueling outage.

4424/c/29

DRESDEN CORRECTIVE ACTIONS

INDEX 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 valves 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 open and close but retain the throttleability option for operation having the control switches stop valve movement when the control handle is pulled out.

IMPLEMENTATION:

Before completion of the first refueling outage.

4424/c/30

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0450

12 HED NO.: 5.1.1.A.1 OS, 2

CATEGORY: 1 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:

The completion of the second refueling outage.

4397/c/68

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0451

12 HED: 5.1.1.A.1 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 installed.

IMPLEMENTATION:

By the completion of the first refueling outage.

4424/c/25

DRESDEN CORRECTIVE ACTIONS

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 delta "P" and valve indication.

IMPLEMENTATION:

A[illegible]ot as is.

4424/c/24

DRESDEN CORRECTIVE ACTIONS

INDEX 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 frequently operated.

IMPLEMENTATION:

Accept as is.

4430/c/24

DRESDEN CORRECTIVE ACTIONS

INDEX 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.

IMPLEMENTATION:

Accept as is.

4399/c/24

OPS

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0441

12 HED: 5.1.2.A OS, 1

CATEGORY: 2 LEVEL: B

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 O-12)

RESPONSE:

Banding indicating the setpoint will be added to the pressure set displays on the turbine panel.

IMPLEMENTATION:

Prior to the completion of the second refueling outage.

4424/c/31

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0359

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:

A preventative maintenance program will be implemented.

IMPLEMENTATION:

By completion of the first refueling outage.

4402/c/13

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0466

12 HED NO.: 5.3.3.A.1 OS-7

CATEGORY: 2 LEVEL: C

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:

The situation will be reevaluated after other lighting changes have been completed.

IMPLEMENTATION:

By the completion of the second refueling outage.

4409/c/03

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0355

12 HED: 6.5.1.B-OS-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 implementation of a consistent labeling package. Included in the relabeling of the control room will be a standard for job performance aid labels.

IMPLEMENTATION:

The completion of the second refueling outage.

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 control room wide evaluation.

IMPLEMENTATION:

By the completion of second refueling outage.

4402/c/26

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0366

12 MED: 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 and incorporate the features necessary to support operations. This review to include the features noted above.

IMPLEMENTATION:

By the completion of the second refueling outage.

4399/c/14

DRESDEN CORRECTIVE ACTIONS

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:

[redacted]'s will be reviewed against the labeling package and a standardized [redacted]reviation scheme (list) will be developed and applied to both control [redacted]oards and plant computer.

IMPLEMENTATION:

[redacted]he completion of the second refueling outage.

4402/c/10

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0444

12 HED NO.: 8.1.2 OS, 11

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:

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

IMPLEMENTATION:

By the completion of second refueling outage.

4402/c/9

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0353

12 HED NO.: 8.2.1 OS, 1

CATEGORY: 2 LEVEL: B

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:

This panel is being replaced with a panel more effectively human engineered.

IMPLEMENTATION:

Completed

4402/c/8

DRESDEN CORRECTIVE ACTIONS

INDEX 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:

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

IMPLEMENTATION:

The completion of the second refueling outage.

4430/c/12

DRESDEN CORRECTIVE ACTIONS

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)

RESPONSE:

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

IMPLEMENTATION:

By [redacted]he completion of the second refueling outage.

4402/c/25

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0419

12 HED NO.: 8.2.1 OS, 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:

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

IMPLEMENTATION:

Upon completion of the second refueling outage.

4402/c/24

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0422

12 HED NO.: 8.2.1-OS 8

CATEGORY: 1 LEVEL: B

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:

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

IMPLEMENTATION:

Accept as is.

4430/c/13

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0443

12 HED NO.: 8.2.1 OS, 10

CATEGORY: 1 LEVEL: B

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 wherever necessary.

IMPLEMENTATION:

By the completion of the second refueling outage.

DRESDEN CORRECTIVE ACTIONS

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.

4402/c/23

DRESDEN CORRECTIVE ACTIONS

INDEX 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:

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

IMPLEMENTATION:

By the completion of the second refueling outage.

4402/c/5

DRESDEN CORRECTIVE ACTIONS

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.

4385/c/50

SECTION 12
VALIDATION

DRESDEN CORRECTIVE ACTIONS

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 l zone water level instrumentation on panel 5.

IMPLEMENTATION:

pt as is.

4424/c/26

DRESDEN CORRECTIVE ACTIONS

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:

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

IMPLEMENTATION:

By the completion of first refueling outage.

4402/c/20

DRESDEN CORRECTIVE ACTIONS

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:

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

IMPLEMENTATION:

Accept as is.

4402/c/18

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0479

12 MED: 4.1.1.A.1 VL, 4

CATEGORY: 1 LEVEL: C

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 following a trip.

IMPLEMENTATION:

Not as is.

4399/c/21

TECH SERV

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0475

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:

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

IMPLEMENTATION:

By the completion of the second refueling outage.

4402/c/4

DRESDEN CORRECTIVE ACTIONS

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, background shading and/or mimic lines.

IMPLEMENTATION:

By the completion of second refueling outage.

4402/c/3

SECTION 13
VERIFICATION

DRESDEN CORRECTIVE ACTIONS

INDEX 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 trip/after close indications on some controls. The present system of using an amber (yellow) light for trip indication is sufficient.

IMPLEMENTATION:

Kept as is.

4397/c/22

DRESDEN CORRECTIVE ACTIONS

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 perature information.

IMPLEMENTATION:

pt as is.

4397/c/23

DRESDEN CORRECTIVE ACTIONS

INDEX 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.

IMPLEMENTATION:

Accept as is.

4399/c/23

OPS

DRESDEN CORRECTIVE ACTIONS

INDEX 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 pressure indication was needed on panel 90X-3. This stems from needing to determine if the RPV/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.

IMPLEMENTATION:

Kept as is.

4397/c/24

DRESDEN CORRECTIVE ACTIONS

[redacted]DEX NO.: 0500

12 HED NO.: 1.0 V,6

CATEGORY: 1 LEVEL: B

FINDING:

There is no indication for Rx H_2O temp during some emergency conditions.

RESPONSE:

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

IMPLEMENTATION:

[redacted]ot as is.

4397/c/25

DRESDEN CORRECTIVE ACTIONS

INDEX 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 outside the control room. These valves may be inoperable or inaccessable after emergency termination because of environmental factors in the area they 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.

IMPLEMENTATION:

Accept as is.

4377/c/26

DRESDEN CORRECTIVE ACTIONS

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:

Adequate indication exists to determine this parameter from the Make-Up [illegible] SCFH/Drywell Pressure Recorder.

IMPLEMENTATION:

Accept as is.

4402/c/38

DRESDEN CORRECTIVE ACTIONS

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 pumps, there is no direct indication to the operator that these pumps are running. However, further evaluation has concluded that the high level alarm in the sump provides adequate indication that the core area sump pumps are operating.

IMPLEMENTATION:

Accept as is.

4397/c/27

DRESDEN CORRECTIVE ACTIONS

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.

4397/c/28

DRESDEN CORRECTIVE ACTIONS

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:

By completion of the first refueling outage.

4397/c/29

DRESDEN CORRECTIVE ACTIONS

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.

IMPLEMENTATION:

pt as is.

4399/c/22

OPS

DRESDEN CORRECTIVE ACTIONS

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. These indicators are available on the back panels.

IMPLEMENTATION:

Kept as is.

4397/c/30

DRESDEN CORRECTIVE ACTIONS

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 instrumentation is sufficient.

IMPLEMENTATION:

Accept as is.

4397/c/31

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0490

12 HED NO.: 1.0 V,16

CATEGORY: 1 LEVEL: A

FINDING:

The full core display (FCD) 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 operability and critical display input.

IMPLEMENTATION:

Prior to the completion of the first refueling outage.

4397/c/32

DRESDEN CORRECTIVE ACTIONS

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 the wording used in the annunciators and appropriate changes made.

IMPLEMENTATION:

the completion of the second refueling outage.

4397/c/33

DRESDEN CORRECTIVE ACTIONS

INDEX 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 annunciator review.

IMPLEMENTATION:

By completion of the second refueling outage.

[redacted]/c/34

DRESDEN CORRECTIVE ACTIONS

INDEX 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.

4397/c/35

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0510

12 HED: 4.0 V, 2

CATEGORY: 1 LEVEL: B

FINDING:

Task analysis has revealed that a switch exists (RECIRC PUMP DISCHARGE 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 ve has travelled to the desired position, they put it back to neutral. This is a manual operation versus a spring-return movement.

IMPLEMENTATION:

ept as is.

4399/c/29

OPS

DRESDEN CORRECTIVE ACTIONS

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 until they have completed movement of the valve as desired. When the valve has travelled to the desired position, they put it back to neutral. This is a manual operation versus a spring-return movement.

IMPLEMENTATION:

Accept as is.

4399/c/28

OPS

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0508

12 HED NO.: 4.0 V,4

CATEGORY: 2 LEVEL: B

FINDING:

At present the H_2 addition control switch has dyno-tape labels and no indicating lights.

RESPONSE:

This panel has been eliminated from the control room operations.

IMPLEMENTATION:

pleted.

4397/c/37

DRESDEN CORRECTIVE ACTIONS

DEX NO.: 0514

12 HED NO.: 5.0 V,1

CATEGORY: 2 LEVEL: B

FINDING:

1. 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.
4. 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 GPM will be placed on the EM. This is necessary to avoid confusion with other set of units (e.g., % flow). Percent valve opening cue will be placed 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:

the completion of the second refueling outage.

4397/c/38

DRESDEN CORRECTIVE ACTIONS

INDEX 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 0-200. The setpoint tape will also be modified to units of PSIG and a range 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:

By the completion of the second refueling outage.

7/c/39

DRESDEN CORRECTIVE ACTIONS

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 preferred fix is to permanently defeat the auto function of the present controller and put the appropriate units on the demand meter. 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.

/c/30

OPS

DRESDEN CORRECTIVE ACTIONS

INDEX 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

9/c/27

OPS

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0518

12 HED NO.: 5.0 V, 5

CATEGORY: 1 LEVEL: B

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 controller requires several modifications. A new response meter which has units 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.

4402/c/47

DRESDEN CORRECTIVE ACTIONS

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:

Accept as is.

4099/c/1

OPS

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0521

IR HED: 5.0 V, 8

CATEGORY: 1 LEVEL: B

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 displayed should be listed on the meter. The deviation meter will be one banded and labeled with the appropriate units (e.g., percent deviation).

IMPLEMENTATION:

By the completion of the second refueling outage.

9/c/2

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0522

12 HED: 5.0 V, 9

CATEGORY: 1 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
	2300-03	3.1	
	2300-05	3.1	
	2300-06	13.1	
	ECCS-01	31.1	
	ECCS-01	32.1	
	ECCS-02	40.1	

RESPONSE:

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).

IMPLEMENTATION:

By the completion of the second refueling outage.

4[illegible]9/c/3

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0523

12 HED: 5.0 V, 10

CATEGORY: 2 LEVEL: B

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 with units. The demand meter will be labeled with appropriate units (e.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:

By the completion of the second refueling outage.

9/c/4

DRESDEN CORRECTIVE ACTIONS

INDEX 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 Opening). The setpoint meter will be re-scaled with a range of 0 - 60 inches; this meter presently reads 0 to 100. The new scale would match the narrow range GMACs.

IMPLEMENTATION:

By the completion of the second refueling outage.

9/c/6

DRESDEN CORRECTIVE ACTIONS

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

IMPLEMENTATION:

By the completion of the second refueling outage.

9/c/7

DRESDEN CORRECTIVE ACTIONS

INDEX 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.

RESPONSE:

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:

By the completion of the first refueling outage.

[redacted]/c/8

DRESDEN CORRECTIVE ACTIONS

INDEX 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 failed to justify modifying this meter.

IMPLEMENTATION:

By the completion of the second refueling outage.

4 c/9

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0529

12 MED: 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.

9/c/10

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0530/0607

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 made more explicit and should follow the Green Board Concept. Also, "Open" should be engraved on the pushbutton controls.

IMPLEMENTATION:

By the completion of the second refueling outage.

9/c/11

DRESDEN CORRECTIVE ACTIONS

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 Water 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 levels consistent with system operation.

IMPLEMENTATION:

By the completion of the first refueling outage.

4399/c/12

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0549

12 HED NO.: 5.0 V,22

CATEGORY: 1 LEVEL: B

FINDING:

1. Indicating lights on the cited meter are not marked.

2. There are no units of measurement listed on the meter.

Task = 1600-08	Rel/Seq. = 3.1	EPN = 2-1640-2
1600-18	2.2	"
1600-20	2.4	"

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.

0/c/76

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0548

12 HED: 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:

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

IMPLEMENTATION:

By the completion of the second refueling outage.

4399/c/13

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0547

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:

By the completion of the second refueling outage.

4/c/32

DRESDEN CORRECTIVE ACTIONS

INDEX 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 divisions of 0.5 for low range.

IMPLEMENTATION:

By the completion of the second refueling outage.

4[illegible]9/c/15

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0545

12 HED NO.: 5.0 V,26

CATEGORY: 2 LEVEL: B

FINDING:

Task = 1600-12 Rel/Seq = 20NO.1 EPN = 2-8540-5
3-8540-5

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:

By the completion of the second refueling outage.

/c/1

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0544

12 MED NO.: 5.0 V,27

CATEGORY: 2 LEVEL: B

FINDING:

Task = 1600-12 Rel/Seq = 20NO.2 EPN = 2-8540-6
3-8540-6

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 0NO.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 and 3-8540-5 metersNO. The recorders will be corrected by re-scaling them with a range of 0 to 5 in divisions of 0NO.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:

The completion of the second refueling outage.

4397/c/2

DRESDEN CORRECTIVE ACTIONS

INDEX 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 indicator lights (Recirc Red = Open = 0, Disch Red = Closed = -).

IMPLEMENTATION:

the completion of the second refueling outage.

0397/c/4

DRESDEN CORRECTIVE ACTIONS

INDEX 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
"	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:

By the completion of the second refueling outage.

4397/c/5

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0604/0543

12 HED NO.: 5.0 V,31/V,28

CATEGORY: 1 LEVEL: B

FINDING:

Task =	Rel/Seq =	EPN =
2500-01	7.1	2540-1A
"	22.1	"
"	22.2	2540-1B
"	8.1	2540-2A
"	19.1	"
"	19.2	2540-2B
"	9.1	2540-3A
"	20.1	"
"	20.2	2540-3B
"	5.1	2540-4A
2500-02	11.8	"
2500-02	5.3	2540-4B
"	11.9	"
"	5.2	2540-5A
"	11.10	"
"	5.4	2540-5B
"	11.11	2540-5B
2400-01	3.2	02-54-4
2400-02	4.4	"
2400-03	1.4	"
2400-01	3.7	02-55-1
2400-02	4.9	"
2400-03	1.9	"
2400-01	3.5	02-55-2
2400-02	4.7	"
2400-03	1.7	"
2400-01	3.8	02-55-3
2400-02	4.10	"
2400-03	1.10	"
2400-01	3.6	02-55-4
2400-02	4.8	"
2400-03	1.8	"
2400-01	3.3	02-56-1
2400-02	4.5	"
2400-03	1.5	"
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	"
2400-03	1.6	"

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:

Several valves 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 valves are normally open or closed. Legend light indicators will be added to these valves so that they conform to a Green Board philosophy.

IMPLEMENTATION:

By the completion of the second refueling outage.

/c/7

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0539

12 HED NO.: 5.0 V,32

CATEGORY: 1 LEVEL: A

FINDING:

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

RESPONSE:

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

IMPLEMENTATION:

Completed.

4397/c/8

OPERATIONS

DRESDEN CORRECTIVE ACTIONS

INDEX 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 provided for Rx pressure total steam flow.

IMPLEMENTATION:

Accept as is.

4597/c/10

DRESDEN CORRECTIVE ACTIONS

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:

By the completion of the second refueling outage.

4997/c/11

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0535

12 HED NO.: 5.0 V,36

CATEGORY: 1 LEVEL: B

FINDING:

Several Reactor 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.

IMPLEMENTATION:

Accept as is.

97/c/12

OPERATIONS

DRESDEN CORRECTIVE ACTIONS

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.

97/c/14

DRESDEN CORRECTIVE ACTIONS

INDEX 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.

RESPONSE:

A new switch position plate will be installed.

IMPLEMENTATION:

By the completion of the first refueling outage.

7/c/15

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0565

12 HED NO.: 6.0 V,3

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:

By the completion of the second refueling outage.

4997/c/16

DRESDEN CORRECTIVE ACTIONS

INDEX 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:

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

IMPLEMENTATION:

Accept as is.

43 c/17

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0563

IE HED NO.: 6.0 V,5

CATEGORY: 2 LEVEL: B

FINDING:

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

RESPONSE:

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

IMPLEMENTATION:

the completion of the second refueling outage.

4397/c/18

DRESDEN CORRECTIVE ACTIONS

INDEX 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:

By the completion of the second refueling outage.

0297/c/19

DRESDEN CORRECTIVE ACTIONS

INDEX 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:

[illegible] the completion of the second refueling outage.

4597/c/20

DRESDEN CORRECTIVE ACTIONS

INDEX 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 switch also requires a spring return function, which will be installed.

IMPLEMENTATION:

By the completion of the second refueling outage.

7/c/21

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0559

12 HED NO.: 6.0 V, 9

CATEGORY: 1 LEVEL: B

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:

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

IMPLEMENTATION:

By the completion of the second refueling outage.

402/c/39

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0558

12 HED NO.: 6.0 V, 10

CATEGORY: 1 LEVEL: B

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 be OPEN, CLOSE, NEUTRAL on both Unit 2 and Unit 3 switches.

IMPLEMENTATION:

the completion of the second refueling outage.

4402/c/40

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0557

12 HED NO.: 6.0 V, 11

CATEGORY: 1 LEVEL: B

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:

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

IMPLEMENTATION:

Accept as is.

2/c/41

DRESDEN CORRECTIVE ACTIONS

INDEX 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 return switch, and relabeled with appropriate labels OPEN, CLOSE, AUTO.

IMPLEMENTATION:

the completion of the first refueling outage.

4402/c/42

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0555

12 HED NO.: 6.0 V, 13

CATEGORY: 1 LEVEL: B

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:

By the completion of the second refueling outage.

2/c/44

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0554

12 HED NO.: 6.0 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 legends 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.

4402/c/43

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0553

12 HED NO.: 6.0 V, 15

CATEGORY: 2 LEVEL: B

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 the demand meter will also be relabeled to read 0 to 100% valve open as a function of the control room labeling package.

IMPLEMENTATION:

The completion of second refueling outage.

4402/c/37

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0552

12 MED NO.: 6.0 V,16

CATEGORY: 1 LEVEL: B

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 appropriate switch positions CHANNEL A, CHANNEL B, NEUTRAL will also be labeled as a function of the control room labeling package.

IMPLEMENTATION:

The completion of second refueling outage.

4402/c/36

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0551

12 HED NO.: 6.0 V, 17

CATEGORY: 2 LEVEL: B

FINDING:

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:

The controls will be relabeled: HYDROGEN ADDITIONS SYSTEM CHANNEL "A" SELECTOR, 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.

IMPLEMENTATION:

By the completion of second refueling outage.

4402/c/35

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0571

12 HED NO.: 8.0 V, 1

CATEGORY: 1 LEVEL: B

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 have appropriate scales.

IMPLEMENTATION:

In accordance with RG 1.97 implementation.

[illegible]2/c/34

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0570

12 HED NO.: 8.0 V, 2

CATEGORY: 1 LEVEL: B

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. Also there is no room on the boards indicated to place these recorders. In addition this information can be called up from the computer or put on computer printout.

IMPLEMENTATION:

Kept as is.

4402/c/33

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0569

12 HED NO.: 8.0 V, 3

CATEGORY: 1 LEVEL: B

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 testing procedure. It is not necessary to require relocation of the appropriate pushbutton or status lights.

IMPLEMENTATION:

Kept as is.

4402/c/32

DRESDEN CORRECTIVE ACTIONS

INDEX 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 distance of appropriate controls.

IMPLEMENTATION:

Kept as is.

4402/c/31

DRESDEN CORRECTIVE ACTIONS

INDEX 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 accurate 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.

IMPLEMENTATION:

Accept as is.

4385/c/63

DRESDEN CORRECTIVE ACTIONS

INDEX 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 to indicate to the operator the operational status of LPCI flow.

IMPLEMENTATION:

Accept as is.

4380/c/71

DRESDEN CORRECTIVE ACTIONS

INDEX 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 the scale.

IMPLEMENTATION:

Accept as is.

4580/c/72

DRESDEN CORRECTIVE ACTIONS

INDEX 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 ensure that unusual divisions are not employed and thus, confuse the operators. The cited meters provide a clear display in consistent divisions of three.

IMPLEMENTATION:

Accept as is.

4380/c/74