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ILLINOIS POWER COMPANY

CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

February 5, 1985

Docket No. 50-461

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Clinton Power Station Unit 1
Preliminary Design Assessment (PDA)
of Control Room
SER Confirmatory Issue #38

Dear Mr. Schwencer:

In Letter U-0741, dated September 28, 1984, Illinois Power provided submittals of 1) the results of the PDA Human Engineering Discrepancies (HEDS) evaluation and 2) the Detailed Control Room Design Review (DCRDR) Program Plan.

The NRC Staff comments on the DCRDR Program Plan were sent to Illinois Power in your letter of January 9, 1985. Review of the Staff comments indicated that sections B-3 through B-9 of the PDA HEDS evaluation were not submitted for review. Sections B-3 through B-9 were included in the original report and apparently were omitted due to an administrative error in the original submittal. The original PDA report, including sections B-3 through B-9 are submitted for your review.

Please contact us if you have any questions on the information provided.

Sincerely yours,

F. A. Spangenberg

F. A. Spangenberg
Director - Nuclear Licensing
and Configuration
Nuclear Station Engineering



Attachment

PJT/1s

cc: B. L. Siegel, NRC Clinton Licensing Project Manager
NRC Resident Office
Regional Administrator, Region III, USNRC
Illinois Department of Nuclear Safety

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CLINTON POWER STATION

UNIT 1

ILLINOIS POWER COMPANY

Part A This Section contains those items which were deemed necessary to be corrected prior to issuance of an operating license. Following each item is a statement of Illinois Power Company (IP) corrective action.

## A-1. CONTROL ROOM WORKSPACE

1. Access to the Remote Shutdown Panel is not currently limited. (A.1.2)*

   Corrective Action

   The Remote Shutdown Panel is located in a vital security area to which access will be limited to approved personnel through the use of key cards and security doors.

2. There are no provisions for storage of procedures at the Remote Shutdown Panel. (C.1.4)

   Corrective Action

   Present plans are to provide adequate storage space for necessary procedures which would be accessible to the operators. This is to be done after the panel is released to Plant Staff.

* Throughout the report the use of parentheses, such as (C.1.2), refer to the part, section, and finding number used in the HFEB Control Room Design Review/Audit report, dated December 3, 1981.

## A-3. ANNUNCIATORS

1. The audible signals to indicate cleared alarms on the annunciator system do not have a finite duration of activation. Manual operator action is required to silence the cleared alarm signal. (C.3.4)

   Corrective Action

   CPS believes it is imperative that the operator promptly reset all cleared annunciators. This is necessary to eliminate a potential source of confusion during transients. For this reason, the CPS Control Room has been designed so that positive action is required by the operator to silence the "cleared" audible signal.

   The loudness of the cleared tone will be adjusted.

2. The vertical columns and horizontal rows of the annunciator panels have not been labeled with easily visible alphanumerics to facilitate visual location of each tile in a panel by its matrix coordinate designation. (C.3.5)

   Corrective Action

   Vertical columns and horizontal rows of the annunciator panels now have alphanumeric labeling.

3. Annunciator acknowledge, silence, test, and reset buttons are large, grey, and flat surfaced on some panels; and large, silver, and recessed on other panels. (A.3.10)

   Corrective Action

   The annunciator pushbutton's shape (large, square) distinguishes these controls from all other controls. Grey demarcation and label plates have been used to further distinguish annunciator pushbuttons.

4. The annunciator ACKNOWLEDGE pushbutton in the P803 annunciator control pushbutton group is not labeled to identify its function. (C.3.13)

   Corrective Action

   The annunciator ACKNOWLEDGE pushbutton has been labeled to identify its function.

A-3. ANNUNCIATORS (Continued)

5. The annunciator panel on P801 for the B system is missing the "Trouble VD System Local 1PL55J". (A.3.11)

Corrective Action

Engineering evaluation of this concern has revealed that only one annunciator alarm is necessary. The local panel services both A and B systems. Another alarm could prove confusing to the operator.

6. In section 21 on P601, "CST Water Level Low" is a misnomer; it should be RCIC tank. (A.3.12)

Corrective Action

Annunciator tile is now labeled "RCIC Storage Tank Level Low".

## A-4. CONTROLS

1. The use of the RHR B Shutdown Cooling Suction Valve 1E11-F006B was not apparent to operators. Remote Shutdown Panel. (A.4.1)

   Corrective Action

   The use of this valve is to allow the isolation of the RHR B HX from shutdown cooling if the Control Room must be evacuated. The labeling of this valve has been improved to enhance operator action. It reads "RHR B Shutdown Cooling Suction Valve E12-F006B".

2. There is little use of knob-coding on the Remote Shutdown Panel. (A.4.2)

   Corrective Action

   Throttle valve controls on the Remote Shutdown Panel (and in the Main Control Room) have been distinguished from "fixed position" controls by using the abbreviation "THROT" on their label.

3. There is not distinctive shape or color coding of controls for throttleable valves. (A.4.3)

   Corrective Action

   Throttle valve controls on the Remote Shutdown Panel (and in the Main Control Room) have been distinguished from "fixed position" controls by using the abbreviation "THROT" on their label.

4. Some pushbuttons light up when depressed. However, not all of these have lamp test capability. (A.4.4)

   Corrective Action

   All lamps with testing capabilities shall be tested periodically . Most backlit pushbuttons are lit with two bulbs and when lit, shall be checked periodically for both bulbs operable. Other indicating lights will have indirect functional checks (i.e., if breaker is energized, at least one light will be lit, otherwise the operator will investigate). If in doubt, the operators can change the bulbs to verify operability. All the above items will be administratively controlled.

A-4. CONTROLS (Continued)

5. An administrative control should be employed for key lock controls on P801 and other panels including storage of keys. (A.4.5)

Corrective Action

CPS Procedure 1432.01, Operations Department Key Control, outlines the administrative controls for all keys including keys for key lock controls.

6. On P601 insert 16, the "Norm" j-handle position on the HPCS WATER LEG PUMP is ambiguous. (A.4.6)

Corrective Action

New labels have been installed without the "Norm" position indicated.

7. On P601 insert 17, the "Neutral" j-handle position is ambiguous.
(A.4.7)

Corrective Action

New labels have been installed without the "Neutral" position indicated.

8. Several of the Bailey controllers in the Control Room appear to have the Manual and Automatic control positions reversed. There is an inconsistency from control to control.
Examples:
   a) RECIRC Loop A Flow Control on P680-04
   b) RECIRC Loop A Master Control on P680-04
   c) RECIRC Loop A Flux Control on P680-04
   d) RECIRC Loop B Flow Control on P680-04
(C.4.7)

Corrective Action

All the Bailey controllers follow the same convention. Foxboro controllers, which are also used in the Control Room, have the manual and automatic positions reversed in relation to the Bailey controllers. This deviation from the convention is countered by labeling and color coding. The manual and automatic positions of both types of controllers are consistently color coded and clearly labeled to identify their function. This should be adequate to enhance operator action.

A-4. CONTROLS (Continued)

9. The Manual and Automatic positions on several Bailey controllers on P680-03 are inconsistently color coded. Examples:

   a) RECIRC LOOP A FLOW CONTROL
   b) RECIRC LOOP A MASTER CONTROL
   c) RECIRC LOOP A FLUX CONTROL
   d) RECIRC LOOP B FLOW CONTROL

(C.4.9)

Corrective Action

All the Bailey controllers follow the same convention. The Foxboro controllers used in the Control Room have had the pushbutton lens changed so that manual and automatic have the same color convention as the Bailey controllers.

10. Labels on backlit indicator lights in the Control Room are easily removeable and are interchangeable. The labels do not have location identifier codes or keys to prevent interchanging the labels or to identify the correct location of each label. Example:

    UNIT 1 DMPR MTR on P801-66

(C.4.10)

Corrective Action

A set of panel front elevation drawings will be available for use in the Control Room. These drawings can be used to confirm proper pushbutton conventions.

## A-5. DISPLAYS

1. The informational transilluminated displays on the upper right of each section on P801 are missing some tiles. (A.5.1)

   Corrective Action

   The missing tiles on P801 have been installed.

2. On P870 insert 52, the 6900 V Bus 1B Voltage scale is limited to 5250. (A.5.2)

   Corrective Action

   A new meter has been installed with a scale range of 0-9000 volts.

3. The meter for DGB Output Watts for diesel generator output on P601 is scaled to 27.5 Kilowatts. (A.5.6)

   Corrective Action

   A new meter has been installed with scale range of 0-5800 Kilowatts. Generator rated power is approximately 3900 KW.

4. The DG1A & 1B OUTPUT WATTS meter on P877 has a scale reading from 0 to 27.50 with increments at 4.58, 9.17, 13.75, 18.33, and 22.92. (A.5.7)

   Corrective Action

   A new meter with scale range of 0-5800 Kilowatts has been installed with readily interpretable major and minor division markings.

5. The OS AIR TEMP RAD MON DIV 2 RAD LVL Meter on P800 has a scale reading .01 at the bottom with zero above it and increments of 10 to 100 above the zero. This also applies to DIV 1. (A.5.8)

   Corrective Action

   Meter scale has been changed to a log scale with a range of .1-10,000 mr/hr.

6. Suppression pool level meter on C61-P001 has a scale ranging from -24 inches to +6 inches. This scale is not consistent with similar Control Room indication, and reference point is unclear. (A.5.9)

   Corrective Action

   Scale has been changed to have a range from -45" to +55". The "0" on the scale represents a plant elevation of 731'5". The final disposition of this instrumentation will be presented in the DCRDR Summary Report.

A-5. DISPLAYS (Continued)

7. On the Reactor Water Level Recorder on P678, the scales appear incorrect for Wide Range values. (A.5.10)

Corrective Action

The scales on this recorder have been changed. The red pen will monitor UPSET RANGE with a 0-180 inch scale, and the blue pen will monitor NARROW RANGE with a 0-60 inch scale. The recorder and pens have been labeled appropriately.

8. The scale for JET PUMP FLOW on the JET PUMP FLOW/CORE PLATE DP Recorder on P678 is not high enough for the operating parameters. (A.5.11)

Corrective Action

Recorder scale of 0-100 mlbs/hr is correct. Normal operating flow rate is 84.5 mlbs/hr.

9. There are several meters that display mid-scale indications if the meter fails or becomes inoperative.
Examples:
   a) Battery Current meters on P877-15 fail to the +200 amp indication.
   b) The 4571 VARS meters on P870-15, P601-14X, and P601-15Y fail to a zero indication at mid-scale.

Corrective Action

Meter fail points on meters that fail at mid-scale points will be marked in red with the letters "FAIL POINT".

10. The small meters on the Bailey controllers on P870-54M are not labeled to identify what parameter is being indicated or the units of the parameter being displayed. (C.5.6)

Corrective Action

These meters have been labeled to identify both the parameter and its associated units.

11. On P601 insert 18, the Suppression Pool Level chart recorder is scaled in inches (0-80) while the procedures reference SP level in feet. (A.5.12)

Corrective Action

Illinois Power's Engineering Department is currently reviewing Suppression Pool Level instrumentation in the Control Room to assure appropriate scales and reference points will be consistent. The final disposition of this instrumentation will be presented in the DCRDR Summary Report.

A-5. DISPLAYS (Continued)

12. The scale on the COND BSTR PUMP DISCH HDR PRESSURE on P870 has a range reading from 0 to 200 (Insert #57), which is an inadequate range for operation. (A.5.13)

Corrective Action

The scale has been changed to 0-800 psig, rated operating pressure is approximately 490 psi.

13. Steam Flow/Feedwater Flow scales on P678 show a range that is too small for the actual operating values. (A.5.14)

Corrective Action

The scale range on the Steam Flow/Feedwater Flow recorder is 0-20 mlbs/hr, rated operating flow rate is 12.4 mlbs/hr. New chart paper has been installed to match this range.

14. The CCW PUMPS 1A, 1B, 1C Current meters on P801 should not show negative values. (A.5.15)

Corrective Action

The scales have been changed to eliminate the negative values.

15. Readability of instrumentation on P678 from the P680 position is difficult without the assistance of banding (i.e., at 120" letter height would have to be .48" to be read; no labels or scale numbers are larger than .25"). (A.5.16)

Corrective Action

Illinois Power's Operations and Engineering Departments have reviewed this situation and have identified appropriate instrumentation throughout the Control Room to be banded, the zones to be banded, and the appropriate color of the bands. Banding has been added in accordance with this evaluation.

16. MAIN STOP VALVE POSITION GROUP MILLIAMP METERS on P678 have a scale from 20 to 0 to 20. Positive and negative indications are not shown. (A.5.17)

Corrective Action

Positive and negative indication has been added.

A-5. DISPLAYS (Continued)

17. Some strip chart recorders do not have chart paper installed. (C.5.9)

Corrective Action

Strip chart recorders have appropriate paper installed. To aid the operator in replacing recorder paper, the type of paper has been marked on the recorder door.

18. The scales on some strip chart recorders do not match the scales on the recorder chart paper.
Example:
The ECC SPEED & CONT VLV POSITION recorder on P870-59L has two scales on the recorder, and the chart paper installed on the recorder has three scales.
(C.5.10)

Corrective Action

The appropriate paper with scales to match the recorder scales has been installed in all recorders.

19. The PMS TREND recorders 1 & 2 on P680-10E and the NEUTRON MONITORING SYSTEM strip chart recorders on P678 have multiple scales which are not aligned with each other or with the chart paper. (C.5.11)

Corrective Action

Appropriate paper with the scales aligned has been installed in the recorders.

20. A vertical series of 8 pairs of red and green indicator lights on the Remote Shutdown Panel alternate colors left-right down the two columns. In this arrangement, color and position do not provide any type of redundant information and do not conform to the Close/Green/Left - Open/Red/Right convention used in the Control Room. (C.5.15)

Corrective Action

The lights have been changed to conform with the Close/Green/Left and Open/Red/Right color convention.

21. One indicator needle on the steam control valve on the turbine control panel, P680, is very small and difficult to see. (A.5.18)

Corrective Action

Meter needle will be adjusted if possible; if not, it will be replaced with a larger one.

A-5. DISPLAYS (Continued)

22. Tolerance zones are not indicated on most meters in the Control Room. (A.5.20)

Corrective Action

IP's Operations and Engineering Departments have reviewed this situation and have identified appropriate instrumentation throughout the Control Room to be banded, the zones to be banded, and the appropriate color of the bands. Banding has been added in accordance with this evaluation.

23. There should be some way to positively diagnose a failed indicating light. Currently, there is no lamp test capability to do so. (A.5.21)

Corrective Action

All lamps with testing capabilities shall be tested periodically. Indicating lights will have indirect functional checks, (i.e., if breaker is energized at least one indicator light will be lit, otherwise the operator will investigate). If in doubt, the operators can change bulbs to verify operability. All the above steps will be administratively controlled.

24. Recorders are not always clearly marked with type of paper required. They should also provide appropriate chart paper. (A.5.22)

Corrective Action

Chart paper manufacturer and catalog number will be installed inside recorder doors.

25. The red zone marking on the GEN HYDROGEN PURITY meter on P870-55M obscures the minor division marks on the meter scale. (C.5.16)

Corrective Action

An Engineering evaluation was performed and has revealed that the system is not operated in the red zone, and therefore, should not be detrimental to any operator action. The red zone is an indication of danger from low hydrogen purity.

A-5. DISPLAYS (Continued)

26. The backlit indicators on P680-06 cannot readily be distinguished from backlit pushbuttons. The backlit pushbuttons and indicators are intermixed in the same matrix arrays. (C.5.17)

Corrective Action

New labels with black borders have been installed for the backlit pushbuttons to distinguish them from the indicators.

27. Some of the yellow alarm indicator lights on the Remote Shutdown Panel do not conform to color code convention. Examples:

a) RCIC TURBINE TRIP indicator light
b) RCIC TURBINE OIL TEMP HIGH indicator light
c) RCIC TURBINE BEARING OIL LOW PRESS indicator light

(C.5.18)

Corrective Action

As a result of IP's engineering evaluation, the yellow indicator lights should be acceptable and agree with NUREG-0700, paragraph 6.5.1.6(c) and GE Design Spec Data Sheet (MCB) 22A4200AC paragraph 4.1.2.3. Amber lights are used to indicate "hazard, caution, or attention required" and "cautionary information".

28. The REACTOR FUEL ZONE LEVEL recorder on P601-20 is not installed, and its space on the panel is not labeled. (C.5.19)

Corrective Action

Reactor fuel zone level recorder has been installed and labeled.

## A-6. LABELS AND LOCATION AIDS

1. Computer controls for OUTPUT SOURCE ON P680 panel are mislabeled. AUTO/MANUAL should be SELECT 1/SELECT 2 and MODE should be AUTO/MANUAL.

   Corrective Action

   Computer controls on P680 have been changed as described in this finding.

2. Review of a new label list for Remote Shutdown found significant improvements. (A.6.2)

   Corrective Action

   Permanent labels have been procured and installed.

3. The chart recorder for REACTOR WATER CLEANUP SYSTEM RWCU/RECIRC CONDUCTIVITY on P678 has a label reading "R - Red" and "R - Blue".

   Corrective Action

   Corrections have been made to label so that it reads "B - Blue".

4. COMBINED INTERMEDIATE VLV POSITION meters on P678 are not labeled. (A.6.4)

   Corrective Action

   Labels have been installed for all Combined Intermediate VLV position meters.

5. GEN MEGAWATTS Meter on P678 is not labeled. (A.6.5)

   Corrective Action

   GEN MEGAWATTS meter is in the "Turbine Section" of P678 and is labeled "Load".

6. The meters on the RCIC Section on P601 are not labeled. (A.6.6)

   Corrective Action

   Meters have been labeled.

## A-6. LABELS AND LOCATION AIDS

7. The switches on Westronics DW RTRN AIR/AREA TEMP Meter on P800 are not labeled. The same is true for the ECCS Pump RMS Temp Meter. (A.6.7)

   Corrective Action

   The switches on the meters have been labeled.

8. The discharge pressure meters on P601 insert 21 are unlabeled. (A.6.8)

   Corrective Action

   Meters have been labeled.

9. Tags are too large and tend to obscure adjacent indications. (A.6.9)

   Corrective Action

   Smaller tags which don't obscure adjacent indications are now being used.

10. The IRM insert and withdraw pushbuttons on P680 are not labeled (Insert 06). (A.6.10)

    Corrective Action

    Pushbuttons have been labeled.

11. RHR A Head Spray Flow on P601 is labeled incorrectly. (A.6.11)

    Corrective Action

    Label has been corrected to read RHR B HEAD SPRAY FLOW.

12. Test buttons for the Scram Discharge Volume Drain Valves on P680 are not labeled so (Insert 06). (A.6.12)

    Corrective Action

    Test buttons are now labeled "SCRAM DISCHARGE VOL DRAIN VALVE TEST SWITCH".

13. The Reactor Protection System Bypass keylock switches on P680 are mislabeled. (A.6.14)

    Corrective Action

    These switches have been labeled "RECIRC PUMP TRIP BYPASS".

A-6. LABELS AND LOCATION AIDS (Continued)

14. Reactor water level on P678 is a two-channel recorder but is only labeled for one channel. (A.6.15)

Corrective Action

Both channels have been labeled. (See response to A-5.7)

15. On P870 insert 54, the indicator lights for MS LEAD LO PT DRN VLVS are unlabeled. (A.6.16)

Corrective Action

Indicator lights have been labeled.

16. On P870 insert 55, several switches are unlabeled. (A.6.17)

Corrective Action

Labels have been added.

17. On P870 insert 56, one switch is unlabeled. (A.6.18)

Corrective Action

Switch has been labeled.

18. On P870 insert 59, a button on the bottom right is unlabeled. (A.6.19)

Corrective Action

Button has been labeled.

19. On P601 insert 19, the indicator lights for safety relief valve solenoid "B" activation are unlabeled. (A.6.20)

Corrective Action

Indicator lights have been labeled.

20. On P601 insert 21, a bank of meters on the left is unlabeled. (A.6.21)

Corrective Action

Meters have been labeled.

A-6. LABELS AND LOCATION AIDS (Continued)

21. Labels on P801 are not used to functionally group controls and displays. (A.6.22)

Corrective Action

Meters and labels have been functionally grouped and hierarchical labeling and demarcation have been used to distinguish the groups.

22. There is no hierarchical labeling scheme to aid operators in identification of systems and subsystems. (A.6.23)

Corrective Action

Hierarchical labeling has been incorporated in the panel layouts to aid operators.

23. Controls and components of similar or common function on P870 are not visually distinguishable by hierarchical labeling. (A.6.24)

Corrective Action

Hierarchical labeling has been incorporated to aid the operator in determining related components.

24. Functional groups are not indicated on each panel. (A.6.25)

Corrective Action

Functional groups have been indicated by using hierarchical labeling and/or demarcation lines where appropriate.

25. Labels on the MAIN STOP VLV POSITION/COMBINED INTERMEDIATE VLV POSITION SECTION on P678 are placed above the displays. (A.6.26)

Corrective Action

New labels have been placed below the meters.

26. Labels are placed below the trip buttons on P680. (A.6.27)

Corrective Action

Labels have been placed above the trip buttons.

A-6. LABELS AND LOCATION AIDS (Controlled)

27. Labels placed below recorders on C61-P001 are sometimes eclipsed by the recorder itself. (A.6.28)

Corrective Action

Panel C61-P001 is the Remote Shutdown Panel. This panel has no recorders installed. Labels on recorders in the Control Room have been changed so that the labels are placed on the recorder door and are not obstructed by the recorder.

28. Division indication on all labels is too small to be seen without close scrutiny. (A.6.30)

Corrective Action

Illinois Power's Operations and Engineering Departments have evaluated this situation and determined the division indication on labels can easily be read from the position which the operator must be in order to operate the valve. The division indicators are located consistently in the same position to ensure fast operator identification and avoid confusion.

29. Division numbers on labels for C61-P001 are very small and difficult to read. (A.6.31)

Corrective Action

In order to remain consistent, the division indicators on the Remote Shutdown Panel are the same size as those in the Control Room. Demarcation will be added in order to show the divisional separation between sections.

30. Labels are written inconsistently for the SGTS UPSM & ONSM HEPA FILT for the A and B sections on P801. (A.6.32)

Corrective Action

Labels have been changed to be consistent.

31. The test switch for CGCS TEST on P800 is labeled "TEST" for division 1 and "INOP" for division 2. (A.6.33)

Corrective Action

In order to maintain consistency, the division 2 CGCS label was changed so the "INOP" position is now "TEST".

A-6. LABELS AND LOCATION AIDS (Continued)

32. Some abbreviations used on labels on C61-P001 are inconsistent. For example, shutdown service is abbreviated SX and SSW on remote shutdown and Control Room panels. (A.6.34)

Corrective Action

Labels have been changed so that the labels on C61-P001 are consistent with those in the Control Room.

33 MS TO SJAE 1A INLT VLV 1CA01AA in Aux and Extraction Steam Section on P870 is not labeled as to direction of operation. (A.6.35)

Corrective Action

"Close" and "Open" designations have been added.

34. Labels on C61-P001 are black on yellow and white on blue. (A.6.36)

Corrective Action

New labels which are silver letters on black background have been installed to be consistent with Control Room labeling.

35. Mimics on P601 are incomplete. (A.6.39)

Corrective Action

Mimics on P601 have been completed.

36. Labels on the Remote Shutdown Panels are black on yellow and other colors. Labels are also temporary. (A.6.37)

Corrective Action

All labels on the Remote Shutdown Panel and in the Control Room now have silver letters on a black background and are .032" thick aluminum plates with long life adhesive backing.

37. Front width on labels varies significantly from label to label on C61-P001. Some are very thick and cannot be read easily. (A.6.38)

Corrective Action

All labels on the Remote Shutdown Panel and in the Control Room now have silver letters on a black background and are .032" thick aluminum plates with long life adhesive backing.

A-6. LABELS AND LOCATION AIDS (Continued)

38. Mimics on several CRT displays lack origin or termination points. (C.6.14)

Corrective Action

Due to the construction and testing status of the Control Room and computer system, the CRT's will be evaluated as part of the DCRDR with results of this review included in the DCRDR Summary Report.

39. There is a temporary mimic on the Remote Shutdown Panel. (C.6.16)

Corrective Action

A permanent mimic similar to that used in the Control Room has been installed on the Remote Shutdown Panel.

40. Mimic line color coding is usually consistent within systems. In the steam/water systems:

Red - Steam
Green - Service (lake) water
Yellow - Condensed steam
Blue - Purified water
Orange - Extraction steam
Brown - Condensate piping
White - Gland sealing steam
Grey - Noncondensable gas vent to suppression pool from RHR heat exchanger

(A.6.42)

Corrective Action

A standard list of mimic colors has been developed and has been used in the design of Control Room mimics.

41. Some flow indications arrows on the mimic P680 are "cut off" and, therefore, not clear in their indication. (A.6.43)

Corrective Action

The mimic on P680 has been revised. Flow indicators have been added to aid operators.

42. Some flow direction indications are not present on mimic lines and some mimics are not complete on P801. (A.6.44)

Corrective Action

The mimic on P801 has been revised. Flow indicators have been added to aid operators.

A-6. LABELS AND LOCATION AIDS (Continued)

43. On P800 insert 62 has no flow direction indications on the mimic. (A.6.45)

Corrective Action

Flow indicators have been added.

44. Demarcation lines are not used to enclose related displays on P801. (A.6.46)

Corrective Action

Demarcation lines and hierarchical labeling have been incorporated to functionally group controls and displays where appropriate without adding confusion.

45. Backpanel 803 has a Switchyard Buses mimic which shows Unit 2 buses. However, Unit 2 does not yet exist. (C.6.17)

Corrective Action

The mimic which shows Unit 2 buses has been removed.

## A-7. PROCESS COMPUTERS

1. Character labels have worn off of some keys on the PMS keyboards on P680-10E. (C.7.2)

   Corrective Action

   Keys with worn labels will be replaced after construction of Control Room is complete.

2. A complete set of computer system operating procedures was not available in the Control Room and could not be evaluated. (C.7.4)

   Corrective Action

   Reference material on the operation of the computer system will be available to the operator in the Control Room.

3. The CRT-2 display for the RWCS SYS on P680 has poor contrast between the characters and background. (C.7.5)

   Corrective Action

   The contrast adjustment is accessible and will be adjusted if necessary upon installation and evaluation of permanent lighting in the Control Room. Evaluation will be performed as part of DCRDR.

4. There is no printer in the Control Room capable of printing trend data or plant status data. (C.7.10)

   Corrective Action

   Trend data and plant status data are provided by the PMS system's alarm processing software. As alarms occur, they can be displayed on any of the PMS CRT's (i.e., Control Room, Computer Room, TSC, EOF) and will be printed on a dedicated printer in the computer room directly adjacent to the main control area.

5. Dirt has accumulated on keys of keyboard for PMS on P680, making them difficult to read. (B.7.1)

   Corrective Action

   Keys will be cleaned and/or replaced after Control Room construction is complete.

## A-8. PANEL LAYOUT

1. Area Radiation Monitor and Process Radiation Monitor displays on P680 have not yet been installed. (A.8.1)

   Corrective Action

   The ARM and PRM displays have been installed on P678.

2. The Sump Discharge System is included on the section with the Control Rod Drive Hydraulics on P601. (A.8.3)

   Corrective Action

   Grey demarcation and hierarchical labeling have been incorporated to distinguish these two systems.

3. On P800 insert 63, several systems are placed on the panel. (A.8.4)

   Corrective Action

   Hierarchical labeling and grey demarcation have been incorporated to distinguish the different systems on the panel.

4. Meters in the top left bank on P801 are not separated according to function. There are nine meters in this bank, which makes it more difficult to identify a given indicator. (A.8.6)

   Corrective Action

   Meters have been functionally grouped. Hierarchical labeling has been added to aid in distinguishing the meter groups.

5. The Cont Bldg Exh Air Temp is grouped with six other unrelated meters on P800. (A.8.7)

   Corrective Action

   Meters have been functionally grouped. Hierarchical labels have been added to aid in distinguishing the meters.

6. The Condenser A CW Inlet Temp meter on P800 is not associated with other temperature readings. (A.8.8)

   Corrective Action

   The meters have been changed so that the condenser A CW Inlet Temp meter is now adjacent to the condenser A CW Outlet Temp meter.

A-8. PANEL LAYOUT (Continued)

7. The panel layout of functionally related meters and controls on P870-56 is poorly grouped, making association between controls and displays difficult. (C.8.1)

Corrective Action

Meters have been functionally grouped and hierarchical labeling has been added to improve meter/control associations.

8. The most frequently used STEAM SEAL HDR PRESSURE and SSE SHELL LEVEL meters on P870-56 are buried within a string of meters instead of being placed in distinctive positions that facilitate operator reference to them. (C.8.2)

Corrective Action

The STM SEAL HDR PRESSURE and SSE SHELL LEVEL meters have been relocated on the end of the bank. Hierarchical labeling is also used to further facilitate operator actions.

9. In the lower bank of meters on P601 the Diesel Generator C panel, the three left most BUS VOLTAGE meters have no relation to the other meters. (A.8.10)

Corrective Action

The three bus voltage meters have been distinguished from the unrelated meters through the use of hierarchical labeling.

10. In the RHR sections on P601, the Containment Spray Delay Timer Reset switches are identical to the Containment Spray Manual Initiation switches and they are close in proximity. (A.8.11)

Corrective Action

The color of the Containment Spray Delay Timer Reset switches has been changed from red to black in order to distinguish them from the Containment Spray Manual Initiation.

11. The PWR SOURCE, PLANT SVC WTR, and CST sections of P601-16 are not separated by any type of functional or system demarcation. (C.8.3)

Corrective Action

The three systems on P601-16 now use different color mimic and hierarchical labels to aid in distinguishing them from each other.

A-8. PANEL LAYOUT (Continued)

12. The annunciators controls on several panels are located close to other system controls and surrounded by system mimics. There is no demarcation or color coding to set the annunciator controls apart from the plant system controls and mimics located in close proximity.
Example:
Annunciator controls on P870-51
(C.8.4)

Corrective Action

Grey demarcation has been added to distinguish the annunciator pushbuttons from other controls on the panel.

13. There is a lack of demarcation to separate two systems on P800-62P whose mimics are run together. Both system mimics have the same color flow paths. (C.8.5)

Corrective Action

Hierarchical labeling and a demarcation line have been added to distinguish the two systems.

14. The "A" System Valve control is located in an out of place position in the "B" System part of the RHR System mimic on P601-17 and is not included in the "A" System mimic. (C.8.6)

Corrective Action

The "RHR B SUPP TO RX HEAD SPRAY VALVE" on P601-17C was mislabeled as RHR "A". This has been corrected.

15. A string of nine environmental parameter meters on P801-66T is too long. Functionally related displays within the meter string are not grouped together. No demarcation is used to visually break up the long string into readily identifiable sections. (C.8.7)

Corrective Action

Functionally related displays have been grouped together and hierarchical labels added in three areas to distinguish their functions.

A-8. PANEL LAYOUT (Continued)

16. There is a lack of consistent left-right order of related adjacent watt and current meters in meter strings on P601-16. Examples:
    a) NORMAL SOURCE watt and current meters
    b) RESERVE SOURCE watt and current meters
(C.8.8)

Corrective Action

Meters have been rearranged to read consistently (watt, current) from left to right.

17. The labels for the CGCS CMPR 1A and 1B meters on P800 indicate that the B meter is on the left and the A meter is on the right, contrary to convention in the Control Room. Presently, it appears that these meters are criss-crossed with their controls below. (A.8.12)

Corrective Action

The meters have been changed so the A meter is on the left and the B meter is on the right so they are no longer criss-crossed.

18. Either the mimic labels for the 480V XFMRs J and R on P870-53 are reversed or their associated displays are reversed. (C.8.9)

Corrective Action

The displays associated with the 480V XFMRs J and R have been exchanged.

19. The display layout of 480 V BUS VOLTAGE meters in the second row of meters on the vertical panel on P870-52 is inconsistent with the layout of similar meters in the third row of meters on the panel. (C.8.10)

Corrective Action

The meter displays have been changed so that the meters are consistently arranged.

20. The control/display relationship layout of the DISCHARGE TEMP displays on P801-67 is reversed with respect to the control/display relationship on P801-66. Layout on both these panels should be the same. (C.8.11)

Corrective Action

The control/display relationship of the DISCHARGE TEMP displays on P801-67 and P801-66 is now consistent with each other.

A-8. PANEL LAYOUT (Continued)

21. The AUX & EXTRACTION STEAM panel on P870-56A has a general lack of demarcation. (C.8.12)

Corrective Action

Demarcation and hierarchical labeling have been added to group related controls together.

22. On P800 inserts 63 and 64, there are meter strings containing more than five meters. (C.8.13)

Corrective Action

Meter strings have been arranged by functionally grouping related meters and adding hierarchical labeling.

23. One group of 8 and one group of 7 meters on P601 are clustered together. (A.8.14)

Corrective Action

The group of 8 meters has been divided into 3 subgroups and the group of 7 meters has been divided into 2 subgroups. The subgroups have been distinguished by hierarchical labels.

24. There is a group of eight meters on C61-P001 grouped together. (A.8.15)

Corrective Action

This will be reviewed as part of our Detailed Control Room Design Review.

25. One group of 7 and two groups of 9 meters on P800 are clustered together. (A.8.16)

Corrective Action

The meters have been functionally grouped and distinguished by using hierarchical labeling.

26. There are two groups of 9 meters each and two groups of 6 meters each on P801. (A.8.17)

Corrective Action

Meters have been functionally grouped and distinguished using hierarchical labeling.

A-8. PANEL LAYOUT (Continued)

27. There are two groups of 9 and two groups of 6 meters located together on P870. (A.8.18)

Corrective Action

Meters have been functionally grouped and distinguished using hierarchical labeling.

28. Meters are grouped in sets of 6 or more on P870, which may make it difficult to locate a desired reading. For example, in the Aux and Extraction Steam section, there is a bank of 9 meters. (A.8.19)

Corrective Action

Meters have been functionally grouped and distinguished using hierarchical labeling.

29. Mirror imaging is used inconsistently in the Aux Power Emergency section on P870. Displays are arranged inconsistently between the A and B buses. (A.8.21)

Corrective Action

The following arrangements of meters have been established to comply with the changes recommended for the Aux Power Section and to afford consistency between the A and B buses.

A bus from left to right:
- 4160V BUS 1A Voltage
- 480 BUS, G, I, K & O Voltage
- Battery IE Current
- DC MCCIE Voltage

B bus left to right:
- DC MCCIF Voltage
- Battery IF Current
- 480 V BUS, H, J, I, & K
- 4160 V BUS 1B Voltage

A-8. PANEL LAYOUT (Continued)

30. In addition to the above, the upper bank of meters in the Aux Power Emergency Section on P870 is not fully mirror-imaged and should be changed to comply with the changes in the Aux Power Section. (A.8.22)

Corrective Action

In order to afford consistency both between and within panels, the meter for
UAT 1B FDR to 4160 V BUS 1B WATTS was swapped with
UAT 1B FDR to 4160 V BUS 1B CURRENT meter.
and the meter for
BUS 1RT4 FDR to 4160 V BUS 1B WATTS was swapped with
BUS 1RT4 FDR to 4160 V BUS 1B CURRENT.

Meters are now mirror imaged.

31. Mirror imaging is used in the Auxiliary Power section on P870 but its application is not consistent. (A.8.23)

Corrective Action

In order to assure consistency of arrangements and to avoid operator confusion,
the UAT 1B FDR to 6900 V BUS 1B WATTS meter was swapped with
UAT 1B FDR to 6900 V BUS 1B CURRENT meter, and
the BUS 1RT6 FDR to 6900 V BUS 1B WATTS meter was swapped with
BUS 1RT6 FDR to 6900 V BUS 1B CURRENT.

Meters are now mirror imaged.

32. Two arrays of backlit indicators on P801-66T and 67U that have the identical functions do not have corresponding indicators in the same locations in both arrays. (C.8.15)

Corrective Action

The backlit indicators have been changed so that corresponding indicators on both panels are in the same location.

## A-9. CONTROL/DISPLAY INTEGRATION

1. Meters on P601 are not optimally lined up with controls on the Diesel Generator C panel. (A.9.1)

   Corrective Action

   The middle bank of meters has been rearranged (from left to right) as listed below to better correspond to their associated controls.

| DIESEL GEN VARS | DIESEL GEN WATTS | DIESEL GEN AMPS | HPCS MOTOR AMPS |
|---|---|---|---|

Part B This section contains items which IP had committed to perform an evaluation of in order to resolve them prior to licensing. Following each item is a statement of Illinois Power Company (IP) corrective action. Some items, as indicated, will be further evaluated as part of the Detailed Control Room Design Review (DCRDR). The results of the evaluation, proposed corrective action, and schedule for implementing the actions will be submitted as part of the DCRDR Summary Report not later than 120 days prior to issuance of an operating license.

## B-1. CONTROL ROOM WORKSPACE

1. Passageways between P800, P801 and P870, P877 respectively are 26" wide; passageways between P680 and P601, P870 respectively are 27" wide. (A.1.1)*

   Corrective Action

   The Control Room is a vital security area where key card access will be used. A CPS procedure will allow the Assistant Shift Supervisor and Control Room Operators control over who and when someone is allowed in the operating area, thus restricting the traffic flow between panels. Therefore, current passageways are acceptable.

2. There is inadequate separation between the front surface of the Remote Shutdown Panel and the backpanel surface of the adjacent electrical panel. The distance between the opposing surfaces is approximately 32 inches. This is an inadequate amount of work space for easy operation of the Remote Shutdown Panel by one or more operators. The minimum recommended separation distance between a single row equipment panel and a wall or other opposing surface is 50 inches. (C.1.1)

   Corrective Action

   The Remote Shutdown Panel has been rotated 180 degrees and there now exists a 48" distance between opposing surfaces. This separation distance has been considered acceptable by the NRC's Human Factors Engineering Branch.

*Throughout the report the use of parentheses, such as (C.1.2), refer to the part, section, and finding number used in the HFEB Control Room Design Review/Audit report, dated December 3, 1981.

B-1. CONTROL ROOM WORKSPACE (Continued)

3. The J-handle Transfer Switches on the Remote Shutdown Panel are mounted too low. They are located between approximately 20" and 33" above the floor. This low control height makes them inconvenient to operate. (C.1.2)

Corrective Action

The transfer switches on Remote Shutdown Panel (RSP) are used only to transfer control functions from the Main Control Room to the RSP. Therefore, they are actuated once and left in this position while operations are performed at this panel. Due to this infrequent use, they are positioned relatively low and out of the way to allow the frequently used controls and displays to be optimally positioned on this panel.

4. The shiny surface of control pushbuttons and CR2 40 switches results in glare (9.5:2.6 against panel background). (A.1.6)

Corrective Action

This will be reevaluated as part of the Detailed Control Room Design Review (DCRDR) after completion of lighting installation.

5. The keyboard for the PMS System on P680 has significant glare which obscures the legends. (A.1.7)

Corrective Action

This will be reevaluated as part of the DCRDR following installation of permanent lighting.

6. The minimum reading distance for meters should be seven feet. The glare problem makes this difficult. (A.1.8)

Corrective Action

This will be reevaluated as part of the DCRDR after permanent lighting and "egg-crate" diffusers are installed.

7. Significant glare is occurring on all meters in the Control Room. (A.1.9)

Corrective Action

This will be reevaluated as part of the DCRDR after permanent lighting and "egg-crate" diffusers are installed.

## B-3. ANNUNCIATORS

1. No separate first out annunciator panel has been provided for the reactor system to identify initiating events that cause a reactor trip. (C.3.1)

   Corrective Action

   First out annunciator information is typed on a dedicated alarm typer in the computer room directly adjacent to the main control area and can be used for post trip analyses.

2. The source of audibles for annunciators is presently in panel P680. (A.3.2)

   Corrective Action

   Due to the compact design of the Control Room, all annunciators can be easily seen by the operator. Although the only source of the audible signal is P680, the operator must acknowledge the alarm at the panel from which it originated.

3. In case of an annunciator flasher failure, flashing annunciator tiles do not necessarily illuminate and remain steadily illuminated after flasher failure occurs. (C.3.6)

   Corrective Action

   Flasher failures should be detected on the shift test of annunciators. If a flasher fails, the audible alarm will still occur. The operator should then perform an annunciator test to determine the failed flasher, and thus the cause of the alarm.

4. Some annunciator tile legends are confusing.
   Example:
   TRU BYPASS/DISAGREE DISABLE on P680
   (C.3.8)

   Corrective Action

   As a result of Operations Staff's detailed review of the Control Room, annunciator tiles which appeared to cause confusion have been changed to present a more meaningful message to the operators.

B-3. ANNUNCIATORS (Continued)

5. Abbreviations and acronyms are not used consistently within the Control Room. Some annunciator legends use abbreviations not contained on the list of standard abbreviations. (C.3.10)

Corrective Action

A new standard list of abbreviations for CPS has been prepared and has been used in the preparation of new annunciator tiles so they are consistent throughout Control Room.

6. Annunciator control pushbutton groups are not laid out with the same arrangement of pushbuttons in the control group on all panels. (C.3.11)

Corrective Action

Annunciator control pushbuttons will be labeled and gray demarcation provided to distinguish the pushbuttons on each of the panels.

7. Presently, there is no "first-out" indication other than the alarm print-out. (A.3.1)

Corrective Action

First out annunciator indication can also be referenced by the operator on a CRT on the PMS computer system.

8. On P801 Annunciator Panel U, the tiles labeled TROUBLE VX SYSTEM LOCAL PNL IPL65JA are duplicated in Division 1 and Division 2. The Division 2 annunciator tile should probably be for PNL IPL65JB. (C.3.16)

Corrective Action

Annunciator tile has been changed to show the correct panel designation PNL IPL65JB.

B-3. ANNUNCIATORS (Continued)

9. There are no annunciators at the Remote Shutdown Panel for conditions that are annunciated in the Control Room. Examples:
   a) Suppression Pool Temperature
   b) Reactor Vessel Water Level
   (C.3.17)

   Corrective Action

   Suppression Pool Level and Temperature and Reactor Vessel Level and Pressure meters will be added to the panel. If the plant is being operated from this panel, the Control Room Operator will monitor the panel continuously, watching the indicators, and taking the necessary actions. Based on the continuous surveillance of this panel, annunciators should not be necessary.

B-4. CONTROLS

1. The pushbuttons on the Start Up Level Bailey controller on P680-03 are hard to depress because they are too small in diameter and are recessed too far. (C.4.2)

   Corrective Action

   Engineering evaluation of the Bailey controllers design has shown the buttons are recessed to avoid inadvertent actuation during manual operation. Also, the manufacturer indicates there have been no problems with these controllers in the past.

2. Controls are consistently located too close to the front edge of the benchboard throughout the Control Room. Controls are approximately 1 3/4 inches from the edge of the protective rail and approximately 7/8 inch from the edge of the benchboard. (C.4.3)

   Corrective Action

   IP has reviewed the present layout of the controls on the panels and has found the design adequate. The controls are recessed far enough back from the edge of the panel and personnel in the Control Room is limited so that inadvertent actuation should not occur.

3. Transfer switch J-handles on the Remote Shutdown Panel are vulnerable to inadvertent activation. The J-handles project approximately 4 inches into a workspace that is only 32 inches deep and they are located approximately at knee level. (C.4.4)

   Corrective Action

   The Remote Shutdown Panel has been rotated 180 degrees to increase the workspace between panels to 48 inches. Furthermore, the transfer switches require a high torque to operate thereby minimizing any inadvertent actuation.

4. There are controls whose control movements do not conform with established direction of movement population stereotypes. Example:

   Main Steam Line D on P601-19 is OPEN/Left-CLOSE/Right according to its label.

   (C.4.5)

   Corrective Action

   Controls have been changed where necessary to agree with the OPEN/Right-CLOSE/Left convention.

B-4. CONTROLS (Continued)

5. Throttle valves on P601 are hard to hold open for periods of time. (A.4.8)

   Corrective Action

   Extended handle adapters are available in the Control Room for operator use to make the valves easier to hold open.

6. Panels P601-21, P801-66 and P801-67 contain key operated switches oriented with key teeth pointing downward. These violate the general convention of key teeth up orientation of key switches in the Control Room. (C.4.11)

   Corrective Action

   The few switches with key teeth in the down direction are a minor deviation from the standard and will not cause confusion. This will be further evaluated as part of the DCRDR.

7. Gear shaped control switch knobs used in the Control Room do not have distinctive visible pointers to indicate switch position.
   Examples:
   a) 4160V BUS 1A control on P870-53
   b) 4160V BUS 1B control on P870-53
   c) 480V BUS control on P870-53
   (C.4.12)

   Corrective Action

   Gear shaped control switch knobs have had white indicator pointers added to them.

B-5. DISPLAYS

1. The CYC COND STOR TNK 1B LEVEL meter on P870-57 is unnecessary. (C.5.1)

   Corrective Action

   The meter has been removed and the space in the panel replaced with a cover plate.

2. The meters for the LP HTR's on P870 read as follows:
   2A, 2B -10 to 10
   3A, 3B -10 to 10
   4A, 4B -10 to 10
   5A, 5B -7.5 to 7.5
   (A.5.3)

   Corrective Action

   IP Engineering Department has evaluated these scales and has determined they are adequate, as they were installed per the design basis of the system.

3. On P870, decimal fractions are used on the scales for the following meters:
   UAT 1A FDR to 4160 BUS 1A WATTS
   BUS 1RT4 FDR to 4160 BUS 1A WATTS
   BUS 1RT4 FDR to 4160 BUS 1B WATTS
   UAT 1B FDR to 4160 BUS 1B WATTS
   (A.5.4)

   Corrective Action

   Meter scales have been installed with major increments of 5 MW and minor increments of 1 MW so these meters can be readily interpreted.

4. On P678, servo current meters on the STM BYPASS PRESS REG SYSTEM is in % from 0-1100. (A.5.5)

   Corrective Action

   The servo current meters on P678 now have a scale from -50 to +50 DC milliamps.

B-5. DISPLAYS (Continued)

5. Some displays are not scaled in numerical segments that are readily useable by the operator without mental conversion. Examples:
   a) The COND POLISHER INLET FLOW meter on P870-57 is scaled in units of 225 per major division and 45 per minor division.
   b) The CDSR VACUUM recorder on P870-58K has unconventional scale division in sequence of 6----11----16----21----26.

   (C.5.3)

   Corrective Action

   For the examples cited, the COND POLISHER INLET FLOW meter will have the scale changed to have major increments of 500 and minor increments of 100. The CDSR VACUUM recorder scale has been changed to have scale divisions of 5----10----15----20----25----30. Other displays were reviewed and scales changed where necessary.

6. The HP HTR 6A and 6B LEVEL meters on Panel P870-59 have incorrect full scale values compared to intermediate values shown on the meter scales. Intermediate values on the scale range from -6.0 to +6.0 while the full scale values are -65 to +65.

   Corrective Action

   A correct scale range of -6.5 to +6.5 inches has been incorporated.

7. The scale on the unlabeled pressure/vacuum meter on Panel 601-21 is improperly labeled. The meter displays pressure above the zero marking and displays vacuum below the zero mark. The scale label for vacuum is adjacent to the 0 - 15 psi pressure portion of the scale instead of adjacent to the 0 - 30 inches Hg vacuum portion of the scale. (C.5.5)

   Corrective Action

   Scale label has been changed so as to only indicate Inches Hg Vacuum below the zero mark and "PSI" above the zero mark.

B-5. DISPLAYS (Continued)

8. The labels identifying units of the scales on some displays are incorrect.
Examples:
   a) The blue pen CORE PLATE DP scale on the JET PUMP FLOW/CORE PLATE DP recorder on P678 should not be a % scale.
   b) The units of the vacuum portion of the scale on the unlabeled pressure/vacuum meter on P601-21 are erroneously labeled InHgA instead of InHg Vacuum.

(C.5.7)

Corrective Action

A review of Control Room scales has been conducted. The scales that were found to be labeled incorrectly have been changed. The CORE PLATE DP Scale has been labeled as a PSID scale. The vacuum portion of the pressure vacuum scale has been labeled: Inches Hg Vacuum.

9. The scales of multi-pen strip chart recorders are not labeled to clearly identify the variable and units associated with each scale.
Examples:
   a) The scale labels for the ECC SPEED & CONT VLV POSITION recorder on P870-59L do not clearly identify the variable associated with each scale.
   b) The RX LEVEL & PRESS RECORDER A on P601-20 does not have labels that identify the variables displayed on either display channel and does not identify the units associated with the -160 to +60 scale.
   c) The recorder labels for two pen SUPPRESSION POOL LEVEL recorders on P601-18 and P601-20 do not identify the second variable displayed on these recorders and there are no labels identifying the variable associated with each display channel.
   d) The blue pen channel on the REACTOR WATER LEVEL recorder on P678 is not identified.
   e) Scales are not identified on the PMS TREND recorders 1 & 2 on P680-10E.
   f) Scales are not identified on the NEUTRON MONITORING SYSTEM strip chart recorders on P678.

(C.5.8)

Corrective Action

As a result of the CPS Operations Staff's review of the multi-pen strip chart recorders, the recorders have been labeled to identify the variable and the units associated with each scale.

B-5. DISPLAYS (Continued)

10. The label of scale units on the CDSR VACUUM recorder on P870-58K is not visible when the recorder door is closed. (C.5.12)

Corrective Action

The recorder label has been moved so that the label can be read when the door is closed.

11. Voltmeters on P870 have nonlinear scales.
Examples:
    a) 0-250V RUNNING VOLTAGE on insert 57F
    b) 0-250V INCOMING VOLTAGE on insert 57F
    c) 480V BUS VOLTAGE on insert 52G
    d) 4160V BUS VOLTAGE on insert 53H
(C.5.14)

Corrective Action

Voltmeters have been reviewed and the scales changed where appropriate. For the examples above, the Running Voltage and Incoming Voltage scales have been changed to a 0-100% scale as they are monitored when synchronizing various voltages (345KV, 22KV, 6.9KV, 4.16KV). The 480V BUS VOLTAGE and 4160V BUS VOLTAGE scales do not warrant changes. Only the lower portion of the scale, is nonlinear. The buses will not be operational in these voltage ranges, therefore, the nonlinearity of the lower end will not be detrimental to any operator actions.

## B-6. LABELS AND LOCATION AIDS

1. A number of labels are missing on controls and displays on P680-01, P680-02A, P680-12, P870-56, and P870-59. (C.6.1)
   Examples:
   a) Pushbutton controls
   b) Throttle handle
   c) Bailey meters
   d) OUTPUT SOURCE control
   e) MN STM TO AUX STM SYS VLV 1B21-F395

   Corrective Action

   As a result of the CPS Operations Staff review, all labels which were identified as missing have been procured and installed.

2. Inconsistent labeling hierarchy and poor label positioning make it difficult to associate labels with components on P678. (C.6.2)

   Corrective Action

   Label positions which were identified as being a problem have been relocated to enhance operator actions. Hierarchical labels have also been added where deemed appropriate.

3. Many controls on P680 are as yet unlabeled, as examples, the exciter breaker in the generator section, and the standby pump selector joystick.

   Corrective Action

   As a result of the CPS Operations Staff review, all labels which were identified as missing have been procured and installed.

4. Some permanent labels for the Transfer switches on the Remote Shutdown Panel do not have switch numbers on them. Some switches are labeled with numbers using temporary embossed tape labels. Those labels with switch numbers appear to have numbers which are different from the switch numbers cited in the procedures. (C.6.3)

   Corrective Action

   The Remote Shutdown Panel has had permanent labels installed with the correct switch numbers on them.

B-6. LABELS AND LOCATION AIDS (Continued)

5. Labels on the status legend lights on P877-15 do not correspond to the labels on the associated circuit breaker controls. (C.6.5)

Corrective Action

This will be further evaluated as part of the DCRDR.

6. Indicator lights on P800 obscure the first line of print on many indicator light labels because the lights are cut into the labels themselves directly above the characters. (A.6.29)

Corrective Action

Operators review of this concern reveals the indicator lights do not significantly obscure the printing on the legend plates. This will be further evaluated as part of the DCRDR.

7. Mimics are incomplete. This is due to the unfinished state of the board and because some mimic pieces have become detached. Also, not all mimics make use of arrows when they could be helpful to operators. (A.6.40)

Corrective Action

Panel mimics have been reviewed and have been completed with flow direction indicators added where it is helpful for the operators.

8. Abbreviations on labels, location aids, and CRT displays are used inconsistently throughout the Control Room.
   a) Abbreviations that are not on the standard abbreviation list are used.
   b) Different abbreviations are used for the same word.

(C.6.6)

Corrective Action

A new list of standard Control Room abbreviations has been prepared and has been used to procure new labels in order to make the labeling in the Control Room consistent.

B-6. LABELS AND LOCATION AIDS (Continued)

9. There is inconsistent use of abbreviations in meter labels on P801-66 and -67. In some cases, a word is spelled out and in other cases it is abbreviated.
Examples:
   a) P801-66 SGTS TRAIN A
   b) P801-67 SGTS TRN A
   c) CONT RM MV TRN B
   d) SGTS TRAIN B
(C.6.7)

Corrective Action

The labels have been changed using the new list of standard abbreviations in order to obtain consistency.

10. The MSR 1A DRN VLV RSDV-1 control on P870-56 is not labeled as to direction of operation. (C.6.8)

Corrective Action

A new label has been installed to show the direction of operation for the valve.

11. The mimic for the Reactor Water Cleanup System on P680-01 has missing mimic lines and termination points. (C.6.9)

Corrective Action

Mimic for the Reactor Water Cleanup System has been completed.

12. The Vent System mimic on P800-64 contains a possible error in color coding. Purple should be used for the Drywell Vent. (C.6.11)

Corrective Action

The Drywell Vent portion of the mimic is now purple.

B-6. LABELS AND LOCATION AIDS (Continued)

13. Some color coding used on mimics does not conform to color code conventions. The colors used in mimics are not used consistently.
Examples:
    a) On the Water System mimic on P870-56A, the SSW Feedwater is blue (purified water) when it should be green (service water/cooling water).
    b) The RCIC mimic on P601 uses a yellow line from the pumps at the bottom to the RCIC pump. The line should be blue according to the color coding scheme.
    c) Purified water flow to the CYC COND XFER PUMPS is shown in green on the water system mimic on P870-57J. It should be blue.
    d) The Electrical System mimic on P870-51F shows the 4160V buses in white. According to the color code, white is used for 345KV and green is used for 4160V.
    e) The mimic on P870-57J contains inconsistent color coding and is incomplete.

(C.6.10)

Corrective Action

A standard list of mimic color code conventions has been developed and has been used to revise Control Room mimics to maintain consistency.

14. Some of the arrows are backwards from the actual direction of flow and some line segments and arrows are missing in the RX HD mimic on P601-18. (C.6.12)

Corrective Action

A review of P601 mimics has been conducted. The mimic flow indicators that were incorrect have been changed, and where appropriate, additional flow indication arrows have been added.

15. Insufficient flow direction indicator arrows make it difficult to follow the flow paths of the mimic on P800-64R. (C.6.13)

Corrective Action

The mimic on P800 has been reviewed and additional flow indication arrows have been added where appropriate.

B-6. LABELS AND LOCATION AIDS (Continued)

16. No graphic representation of a termination point for flow into the suppression pool is provided in the mimic on P601-17. (C.6.15)

Corrective Action

Graphic representation of suppression pool termination points has been installed on P601.

## B-7. PROCESS COMPUTERS

1. A few display formats appear to be too dense in hardcopy. For example, Feedwater A display (3A), parameter listing on left of screen is extremely compact; and for the Turbine & Aux Sys Startup & Shutdown display (8B), the mimic itself may be too dense. (A.7.1)

   Corrective Action

   Display formats will be further evaluated as part of the DCRDR.

2. The CRT controls on P680 are not labeled. (C.7.1)

   Corrective Action

   CRT controls on P680 are now labeled.

## B-8. PANEL LAYOUT

1. The CDSR LINE B CW INLET TEMP meter on P800 insert 63 is not arranged consistently with other nearby meters. (A.8.13)

   Corrective Action

   Condenser line A and B meters have been rearranged in order to provide consistency between them.

2. On P800 insert 63, the CGCS SYS TEST switches are not mirror-imaged like the rest of the switches there. (A.8.20)

   Corrective Action

   CGCS SYS TEST switches have been rearranged to be mirror imaged.

B-9. CONTROL/DISPLAY INTEGRATION

1. The annunciator tile LOSS OF INSTR AIR ADS RELIEF VLVS is located on P870-56 and its associated controls are located across the Control Room in the Main Steam Section on P601-19. (C.9.1)

   Corrective Action

   The LOSS OF INSTR AIR ADS RELIEF VLVS is now located on P601-19A.

2. The meters in the BOP section at the right end of the Remote Shutdown Panel cannot be read from the locations of associated NSSS Division 1 controls in the middle and left sections of the panel. (C.9.3)

   Corrective Action

   Reactor Water Level and Pressure along with Suppression Pool Temperature and Level meters will be added to the NSSS Division 2 section. These meters will be able to be read from the position of their associated controls. This modification was previously proposed to NRC's HFEB (letter of April 8, 1982 from John G. Cook, IP to Ann Ramey-Smith, HFEB) and deemed acceptable.