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September 4, 1985
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File No.: G9.15

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Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Submittal of Revised Pages for the Control
Room Design Review Human Engineering
Discrepancy Resolution Report

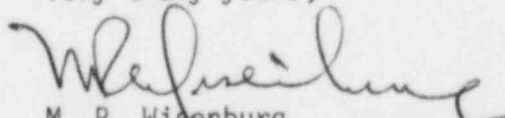
Reference: (1) HL&P letter to NRC; ST-HL-AE-1228; dated
April 15, 1985; submittal of NRC Question Responses
and Additional Information in Regard to DCRDR.

Dear Mr. Knighton:

By letter dated April 15, 1985 (reference (1) above), Houston Lighting & Power Company (HL&P) submitted the response to NRC Question 620.02N (parts a,h,i,j and k) and the Control Room Design Review (CRDR) Human Engineering Discrepancy (HED) Resolution Report. Per conversations with the NRC Human Factors Engineering Branch (HFEB) reviewer, HL&P agreed to clarify the wording on certain pages of the subject report. Attached is a copy of the revised pages to the subject report. These pages are being provided to recipients of the CRDR HED Resolution Report.

If you should have any questions on this matter, please contact Mr. M. E. Powell at (713) 993-1328.

Very truly yours,


M. R. Wisenburg
Manager, Nuclear Licensing

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PDR ADOCK 05000498
F PDR

MEP/as

Attachment: Revised Pages for the CRDR HED Report

W2/NRC2/q

A003
11

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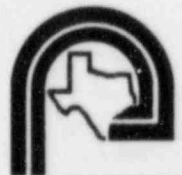
Docketing & Service Section
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555

REV. 1
AUGUST 12, 1985

Control Room Design Review

Human Engineering Discrepancy Resolution Report

The South Texas Project



HOUSTON LIGHTING & POWER COMPANY



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**CONTROL ROOM
DESIGN REVIEW**

HED RESOLUTION REPORT

REVISION LOG

Revision No.	Date	Description	Pages Affected
0	4/15/85	Initial Issue	
1	8/12/85	General Revision	i, vii 2-4, 2-5 A-2, A-5 A-6, A-8 A-9, A-10 A-11, A-12 B-3, B-4, B-5 B-8, B-9 B-18, B-19 B-25, B-29 D-5, D-6



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HED RESOLUTION REPORT
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HED RESOLUTION REPORT

SUMMARY

This report summarizes the results of the resolution of Category A, B, C and D Human Engineering Discrepancies (HEDs) approved by the Management Review Team in response to comments noted in NRC letter to Mr. J. H. Goldberg dated January 22, 1985 (Docket Nos. 50-498 and 499).

This report was prepared to address the NRC question 620.02N, part i to: "Discuss the results of the resolution of all unresolved human engineering deficiencies in Categories "B", "C", "D" and "E".

This report also includes an updated summary of all Category A HEDs and will be updated to include the resolution of any HEDs resulting from review of Category E criteria when they are addressed in the final phase of the program which requires access to the completed and operational control room.

A special task team reviewed all category A, B, C, and D HEDs and the corrective actions taken during the evaluation of the control room to date. The team noted that the bulk of the corrective actions were implemented during the design and manufacturing of the control room panels. The results of the many special studies were incorporated into the Criteria Report. The panel specifications were prepared using the design information in the Criteria Report. Detailed drawings were prepared showing labeling, demarcation, annunciator and other special studies recommendations. The equipment engineers consulted with the control room design review (CRDR) principal engineer during the design and manufacturing stages. The principal engineer visited the manufacturer to verify the proper interpretation of the Criteria Report and Special Studies Report material. The overall effort has resulted in a control room design that conforms to the NRC NUREG-0700 guidelines.



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CONTROL ROOM DESIGN REVIEW

PREFACE

The control room design review (CRDR) of the South Texas Project (STP) Nuclear Generating Station was started in September 1982. This review is being performed by Torrey Pines Technology for Houston Lighting & Power Company (HL&P) with Bechtel Energy Corporation (Bechtel) acting as agent.

The program plan was presented to the NRC at the STP mock-up in October 1982. The basic review work for operator experience review, system function and task analysis and control room survey was completed in October 1982. In November 1982 the management team put a hold on CRDR activities, and authorized a design study to correct mounting evolutionary engineering changes and discrepancies with the NUREG 0700 guidelines.

In November 1982, a decision was made by HL&P to completely relayout six panels and upgrade the four remaining main control panels based on the design study. This redesign effort was required to accommodate design changes resulting from plant design evolution and Reg. Guide 1.97 requirements and to correct discrepancies with NUREG 0700. In December 1982 the management team selected one of five alternatives studied for design implementation.

The mock-up was revised considering the 441 identified HEDs and evolutionary engineering changes. As the Bechtel layout engineers advanced the layouts of the 10 panels, Torrey Pines Technology engineers reviewed the rework for correction of known discrepancies and compliance with good human factor principals. The redesign effort on the main control panels was completed in April 1983. The NRC performed an in progress audit in May 1983 after which the panel vendor was provided with firm layout drawings. The NRC audit comments required the addition of several special studies to those already in progress, i.e., demarcation, and hierarchial labeling. The most significant addition was the evaluation of specified parameters which resulted in a net reduction of 51 panel meters. The extensive relayout required a repeat of the System Function and Task



DISPOSITION NOTES

HF AREA Visual Displays HED CATEGORY N/A

NOTE NO.	DISPOSITION
VD-1	A meter task team is in the process of preparing new meter scale drawings and updating the Criteria Report Appendix F, Visual Displays General Guidelines. This appendix provides meter scale design criteria which is consistent with NUREG 0700, Section 6.5 and standard scale drawings.
VD-2	Some scales cannot be marked, to indicate scale values of 1's, 2's, 5's or 10's and are treated as special scales. For example, the wind direction meter requires major divisions as follows: N, E, S, W, N, E and S. Scales that cover English Units such as feet and inches cannot logically follow the guideline-marking system which is based on the metric system. Good human factors principles are being applied to these special scales.
VD-3	The engineering design documents that show the corrective action will be reviewed by the appropriate CRDR task team.
VD-4	Some meters have been eliminated.
VD-5	The meter task team is in the process of developing field modification techniques and a procedure for implementing the corrective action. Typical samples will be reviewed by the appropriate CRDR task team.

Reference - Criteria Report



DISPOSITION NOTES

HF AREA Labels HED CATEGORY N/A

NOTE NO.	DISPOSITION
L-1	<p>An extensive study corrected this HED. This study included:</p> <ul style="list-style-type: none">o Preparation of a labeling design guideo Review to correct and use standard abbreviations, subtended visual angles, stroke to width height ratio, space between characters and lines, dark characters on a white background, as noted in the Criteria Report Appendix Vo Application to standardize human factors type styleso Review to formulate optimal label messages including labels identified during the control room survey review of labelso Preparation of designs that integrated the hierarchical labeling techniques with the demarcation programo Preparation of all mock-up panel labels that accurately represented the design guide recommendations and installation on the mock-upo Review of all labeling by plant operations personnel and optimizing final labeling in an iterative process

Reference - Special Studies Report; Criteria Report



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**CONTROL ROOM
DESIGN REVIEW**

DISPOSITION NOTES

HF AREA _____ Labels _____ HED CATEGORY _____ N/A _____

NOTE NO.	DISPOSITION
	<p data-bbox="412 661 992 697">o Finalizing all labeling documentation</p> <p data-bbox="412 757 1401 842">The main control panels were delivered incorporating the results of the labeling design study.</p> <p data-bbox="412 902 1425 987">The Criteria Report now incorporates the results including tabulations of the labeling study report in Appendix V Tables 4-1, 4-3 and 4-4.</p> <p data-bbox="418 1906 1141 1942">Reference - Special Studies Report; Criteria Report</p>

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DISPOSITION NOTES

HF AREA Computer HED CATEGORY N/A

NOTE NO.	DISPOSITION
CPT-1	<p>The initial CRDR computer review included only the capabilities of the plant computer. The present plant computer capabilities now include the ERFDADS and QDPS computers.</p> <p>The following actions are in response to correcting HEDS:</p> <ul style="list-style-type: none">o The Westinghouse Proteus 2500 (plant computer) was upgraded from a 2 megaword drum to a 6 megaword solid state memory. This enhancement provides significant improvements in Computer Systems response times. This change was required to accommodate additional annunciator capabilities consistent with the recommendations of the annunciator study. Additional pages were added accordingly.o The ERFDADS was designed to include the critical safety functions not covered by the plant computer.o The QDPS, a Class 1E monitoring system, was designed to monitor critical safety functions and these functions are data-linked to the ERFDADS which provide redundant displays of critical safety functions previously processed by the plant computer. This unit was also changed to provide for consolidating plant parameter bar graph displays that allowed for the elimination of 61 meters. <p>Reference - Special Studies Report; Criteria Report</p>



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HF AREA Workspace HED CATEGORY A

SHEET NUMBER REFERENCE PARAGRAPH	OBSERVATION OR CRITERIA TITLE	DISPOSITION
S-875 P -6.1.1.1 1	1. Need AFW Flow Indication related to flow controller. 2. Need ECW pump disch. flow indication.	1. AFW flow controller was relocated on panel 006 near indicator. 2. ECW Flow Data was included in data base for display on QDPS plasma display.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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HF AREA Annunciator

HED CATEGORY A

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-510 P ₁ -6.2.2.1	System specification provides for only one D.C. buzzer.	Six horns have been installed in the control room.
S-511 P ₁ -6.3.3.4	Specific problems or deviation are not given in some tiles.	The annunciator study group reviewed each window engraving and modified them considering this problem. See annunciator report.
S-517 P ₁ -6.3.1.4	Annunciator windows lack prioritization.	The annunciator system design was changed to include three window colors to display priorities.
S-518 P ₁ -6.3.1.3	System specification does not include "First-Out" Annunciation.	The annunciator system design was changed to include "First-Out" annunciation of all reactor and turbine trips.
S-526 P ₁ - None P ₂ -8.5.1.1	Annunciators are not functionally grouped, not logical, and not consistent.	The annunciator study group rearranged each window box to correct this problem. See annunciator report.
S-530 P ₁ None P ₂ -8.5.1.2	ESF status lights difficult to read.	All status light boxes were placed significantly lower on the panels and the window messages were reduced from four lines to three lines.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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CONTROL ROOM DESIGN REVIEW

HF AREA Visual Displays HED CATEGORY A

SHEET NUMBER REFERENCE PARAGRAPH	OBSERVATION OR CRITERIA TITLE	DISPOSITION
		The Design Review Team will investigate the visibility of the green rototellite indicating lights in the STP control room under actual operating conditions. Disposition and corrective action will be taken if required.
S-726 P ₁ -6.5.3.3 & S-732 S-749 S-767	Bypass inoperable status lights are not readable due to narrow stroke width, character separation and line spacing.	The bypass inoperable status lights lettering stroke width has been revised to 0.02 inches and character separation and line spacing made to conform to Table 1-1 of Criteria Report Appendix V during the redesign of the ESF status monitoring window boxes.
S-727 P ₁ -6.5.3.3 & S-731 S-750 S-768	Legend messages contain more than three lines of text.	During the redesign of the ESF status monitoring window boxes, all bypass inoperable status light window messages were reduced from four lines to three lines of text.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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**CONTROL ROOM
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HF AREA Visual Displays

HED CATEGORY A

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-0075 P ₁ -6.5.1.6	Two indicating lights do not follow control room color conventions.	A check of the control schematic for the generator ground detector shows that the colors are correct for the applications. Reference Criteria Report Appendix S Sections S.3 and S.4.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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**CONTROL ROOM
DESIGN REVIEW**

HF AREA Labels HED CATEGORY A

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-054 P ₁ -6.6.1.2	Some components are unlabeled. CP-002	All components are now labeled as part of the labeling study.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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CONTROL ROOM DESIGN REVIEW

HF AREA Panel Layout

HED CATEGORY A

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-568 P ₁ -6.8.8.1 & S-576 S-603	Excess travel is required for ESF operational tasks among panels 001, 002 & 003.	The ESF panels have been redesigned to minimize travel among panels 001, 002, & 003 for operational tasks.
S-569 P ₁ -6.8.8.1	Related ESF displays and controls are spread over three separate panels (001, 002 & 003).	These displays and controls have been relocated on panel 001, consistent with the SFTA evaluation.
S-577 P ₁ -6.8.8.1	Related ESF displays and controls are spread over three separate panels (001, 002 & 003).	These displays and controls have been relocated on panel 002 consistent with the SFTA evaluation.
S-604 P ₁ -6.8.8.1	Related ESF displays and controls are spread over three separate panels (001, 002 & 003).	These displays and controls have been relocated on panel 003 consistent with the SFTA evaluation.
S-570 P ₁ -6.8.8.1	Controls and displays are not grouped by importance and frequency of use. CP-001	Panel CP-001 has been redesigned to group controls and displays by importance and frequency of use.

Note: Reference

P₁ is NUREG-0700 Section 6 number

P₂ is STP criteria report number



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CONTROL ROOM DESIGN REVIEW

HF AREA Panel Layout HED CATEGORY A

SHEET NUMBER REFERENCE PARAGRAPH	OBSERVATION OR CRITERIA TITLE	DISPOSITION
S-578 P ₁ -6.8.8.1	Controls and displays are not grouped by importance and frequency of use. CP-002	Panel CP-002 has been redesigned to group controls and displays by importance and frequency of use.
S-605 P ₁ -6.8.8.1	Controls and displays are not grouped by importance and frequency of use. CP-003	Panel CP-003 has been redesigned to group controls and displays by importance and frequency of use.
S-572 P ₁ -6.8.8.1	AFW related controls and displays for AFW pumps are widely separated.	The AFW related controls and displays for AFW pumps have been redesigned to accommodate operational task sequences.
S-573 P ₁ -6.8.2.3	Identical groups of sub-system displays are not arranged consistently from panel to panel.	Panel CP-001 has been redesigned with consistent sub-system grouping.
S-598 P ₁ 6.8.8.1	Same as S-573.	Panel CP-002 has been redesigned with consistent sub-system grouping.
S-593	Same as S-573.	Panel CP-003 has been redesigned with consistent sub-system grouping.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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HF AREA Panel Layout

HED CATEGORY A

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-574 P ₁ -6.8.2.4	Arrangement and location of controls and displays are not maintained from panel to panel. CP-001	Panel CP001 has been redesigned and controls and displays repositioned for standardization from panel to panel.
S-599 P ₁ -6.8.2.4	Arrangement and location of controls and displays are not maintained from panel to panel (MSIV; PURGE, VENT & H2). CP-002	Panel CP-002 has been redesigned and controls and displays repositioned for standardization from panel to panel.
S-575 P ₁ 6.8.3.1	Separation between adjacent switches is less than minimum allowed. CP-001	Panel redesign corrected the problem.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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HF AREA Panel Layout HED CATEGORY A

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-600 P ₁ -6.8.3.1	Separation between adjacent switches is less than minimum allowed. CP-002	Panel redesign corrected the problem. There are a few safety related switches on CP-002 that still do not meet the criteria. A review of their switch position versus function indicates there is no problem with switch handle interference or accidental actuation. The following switches are cited: Traveling SCR N - Start/Stop SCR N Wash Pump - Start/Stop (Train's A, B, & C)
S-0594 P ₁ -6.8.3.1	Separation between adjacent switches is less than minimum allowed. CP-003	Panel redesign corrected the problem.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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HF AREA Control/Display Integration

HED CATEGORY A

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-068 P ₁ 6.6.3.3	Labeling of control and associated displays do not contain the same wording. CP-003	Consistent labels for controls and displays have been provided to conform with the labeling design guide.
S-322 P ₁ 6.6.3.3	Labeling of controls and associated displays do not contain the same wording. CP-001	Consistent labels for controls and displays have been provided to conform with the labeling design guide.
S-408 P ₁ 6.6.3.3	Labeling of controls and associated displays do not contain the same wording. CP-002	Consistent labels for controls and displays have been provided to conform with the labeling design guide.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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**CONTROL ROOM
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HF AREA Annunciator HED CATEGORY B

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-528 P ₁ -6.3.3.5	Space between characters is not consistently one stroke width.	The labeling guide which is now Criteria Report Appendix M specifies in Table 1-1 a character spacing equal to the letter stroke width.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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HF AREA Annunciator

HED CATEGORY B

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-529 P ₁ -6.3.3.5	Space between lines is not one-half the character height.	The original annunciator tiles were 3" x 3", split in half which provided an area of 1 1/2" x 3". The new tiles are 2" x 3" which increased the message area by 33% and improved the readability of the message. With this configuration, the spacing between lines was maximized at 30%.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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CONTROL ROOM DESIGN REVIEW

HF AREA Controls

HED CATEGORY B

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-354 P ₁ -6.4.2.1 & S-463	The auto position on eighteen rotary selector switches on panel CP-008 are on the left position	These switches were changed to CLOSE/AUTO/OPEN.
S-460 P ₁ -6.4.1.1 & S-701	Twelve selector switches are not rotary selector switches on panel CP-006 and CP-007	These switches were changed to rotary selector switches and are now all located on CP-006.
S-461 P ₁ -6.4.1.1 & S-713 S-736 S-706	The following reset, actuation or trip switches are not pushbutton switches: 7S-0022 Stm Ln Isol Reset 7S-0023 Stm Ln Isol Reset 7S-0017 Turb Trip 1S-0136 Lo T Avg FW Isolation Reset 1S-0137 SI/Excess Cooldown FW Isolation Reset	Changed to pushbuttons prior to panel fabrication: 6S-0119 and moved to CP-006 6S-0120 and moved to CP-006 7S-0017 stayed on CP-007 6S-0177 and moved to CP-006 6S-0175 and moved to CP-006

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
	1S-0140 Containment Isolation Phase A Reset	2S-0308 and moved to CP-002
	1S-0142 Containment Vent. Isolation Reset	2S-0153 and moved to CP-022
	1S-0138 Turb-Gen Trip Reset	7S-0057 and moved to CP-007
	1S-0143 Containment Spray Reset	2S-0181 and moved to CP-002
		Not changed since there is no pushbutton capable of matching the switch development of the pistol grip switch. The following location and item number changes are noted:
	7S-0011 Stm Ln Isol Act	6S-0117 moved to CP-006
	7S-0012 Stm Ln Isol Act	5S-0099 moved to CP-005
	5S-0048 Full Length Rod Control Startup Reset	5S-0048 stayed on CP-005
	5S-0066 SI Actuation Switch No. 1	5S-0066 stayed on CP-005
	5S-0067 SI Actuation Switch No. 2	1S-0309 and moved to CP-001
	5S-0068 CS/CIB/CVI Actuation Switch No. 1	5S-0068 stayed on CP-005
	5S-0069 CS/CIB/CVI Actuation Switch No. 2	5S-0069 stayed on CP-005

Note: Reference

P₁ is NUREG-0700 Section 6 number

P₂ is STP criteria report number



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HED CATEGORY B

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
	5S-0070 CS/CIB/CVI Actuation Switch no. 3	2S-0323 and moved to CP-002
	5S-0071 CS/CIB/CVI Actuation Switch No. 4	2S-0324 and moved to CP-002
	5S-0072 CIA/CVI Actuation Switch No. 1	5S-0072 stayed on CP-005
	5S-0073 CIA/CVI Actuation Switch No. 2	2S-0325 and moved to CP-002
	5S-0074 Reactor Trip Switch No. 1	5S-0074 stayed on CP-005
	5S-0075 Reactor Trip Switch No. 2	7S-0067 and moved to CP-007
	1S-0141 Containment Isolation Phase B	Not used

Note: Reference P₁ is NUREG-0700 Section 6 number
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HF AREA Controls

HED CATEGORY B

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-703 P ₁ -6.4.3.3	Legend pushbuttons are not readily distinguishable from legend lights.	Special study recommended the "Close Corner Octagon" for marking the controls. This recommendation is in the process of being implemented. Refer to Special Studies Report, Section 7, titled "Distinguishing Legend Pushbutton from Legend Lights."
S-712 P ₁ -6.4.1.1 & S-735 S-696	Fifty-seven switches used for pump or fan operations or for breaker control are rotary selector type switches instead of J-handled switches.	These switches have been changed to J-handled switches. A few of these switches were eliminated due to deletion of control function.

Note: Reference P₁ is NUREG-0700 Section 6 number
P₂ is STP criteria report number



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HED CATEGORY B

SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-711 P ₁ -6.4.1.1	"Select" function switch not provided with knurled handles on panel CP-001	These switches were initially changed to knurled handles for "select" functions and J-handles for pump or fan control. Special study recommended lever handles for "select" functions. This recommendation is in the process of being implemented. Refer to Special Studies Report, Section 6, titled "Knurled Knob Position Indicator."
S-734	"Select" function switches and pump or fan control switches not provided with knurled or J-handles respectively on panels CP-001 and CP-003	
S-695	Ditto for CP-004	
S-705	Ditto for CP-005	
S-699	Ditto for CP-006	
S-459	Ditto for CP-007	
S-660 P ₁ -6.4.1.1	Forty switches used for pump or fan operations are rotary selector type switches instead of J-handled switches	These switches have been changed to J-handled switches. A few of these switches were eliminated due to deletion of control function.

Note: Reference P₁ is NUREC-0700 Section 6 number
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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-701 P ₁ -6.4.1.1 & S-460	Twelve controls for valves are not rotary selector switches.	These switches have been changed to rotary selector switches.
S-661 S-888 P ₁ -6.4.1.1	J-handle switches used for other than pumps, fans or breakers. Switch was: 22S-0153 Containment Ventilation Isolation Reset 22S-0154 Containment Ventilation Isolation Reset 22S-0155 Containment Ventilation Isolation Reset 2S-0122 Lo T Avg FW Isolation Reset 2S-0123 SI/excess cooldown FW Isolation Reset 2S-0124 Turb-Gen Trip Reset	These switches have been changed to pushbuttons. Switch change: 22S-0153 stayed on CP-022 22S-0154 stayed on CP-022 22S-0155 stayed on CP-022 6S-0178 and moved to CP-006 6S-0176 and moved to CP-006 7S-0058 and moved to CP-007

Note: Reference P₁ is NUREG-0700 Section 6 number
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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-719 S-670 S-742 S-649 S-759 S-781 S-475 S-359 S-334 S-329 P ₁ -6.5.1.5	There are more than nine graduations between scale numerals.	See notes VD-1 and VD-3.
S-671 S-743 S-650 S-782 S-360 S-392 P ₁ -6.5.1.5	Intermediate graduation marks are not used on scales with five or more graduations between numerals.	See notes VD-1 and VD-3.

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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-720 S-672 S-744 S-651 S-760 S-783 S-476 S-361 S-391 S-330 P ₁ -6.5.1.5	It is difficult to distinguish between intermediate and minor graduation marks on meter scale.	The meter task team has applied the following criteria to meter scale redesign effort (graduation mark thickness): Major graduations 3-point or 3/64-inch; Intermediate graduations 2-point or 1/32-inch; Minor graduations - 1-point or 1/64-inch. Meter scales are being purchased to meet the above criteria.
S-721 S-673 S-745 S-652 S-761 S-784 S-477 S-362 S-331 P ₁ -6.5.1.5	Meter scales do not progress in parameter units of 1's, 2's, 5's, or 10's.	See notes VD-1, VD-2 and VD-3.

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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-871 S-885 P ₁ -6.5.1.5	Parameters for meter scales with incompatible numerical progression and scale organization.	See notes VD-1, VD-2 and VD-3.
S-724 S-675 S-747 S-655 S-763 S-786 S-479 S-408 S-911 S-960 S-997 P ₁ -6.5.2.2	Meter pointers are black instead of red.	The meter task team is integrating the field painting of the few meter pointers not already red with the installation of new meter scales. Some vendor-furnished meters that are part of a special module or controller will not be repainted red. These meters are not used for the main plant parameters required for plant operation. See note VD-3.
S-656 P ₁ -6.5.4.1	Strip chart recorders are too high and hard to reach for paper and ink replenishment.	These recorders have been moved to a lower position for easier maintenance. Boric acid tank level recorder was moved to panel CP-018.

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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-688 P ₁ -6.5.4.1	Viewing of strip recorder is difficult.	Recorder LR-0931 has been relocated to panel CP-001 in a lower position. AR-4105 and PR-0934 have been relocated out of the primary area to Panel CP-018. The recorder type has been upgraded to L & N series 100 recorders. These recorders are used for historical purposes. TR-0875 was relocated on panel CP-001 and the total panel layout program resulted in a higher location; however, provisions have been made for trend indication on the plasma display.
S-609 P ₁ -6.5.1.6	Test and reset lights are colored red instead of white for test and amber for reset.	The test lights have been changed to white and the reset lights have been deleted. The circuit design did not require reset lights.

Note: Reference P₁ is NUREG-0700 Section 6 number
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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-584 P ₁ -6.6.4.1 & S-216 S-692 S-637 S-615 S-626 S-449 S-437 S-345 S-342	One hundred and seventy three labels on CP-003 use 0.125 inch letter which allows a viewing distance of only 21 inches.	See note L-1. Component labels are now suitable for a viewing distance of 42 inches as identified in Criteria Report Appendix V Table 4-1.
S-591 P ₁ -6.6.4.1 S-693 S-602 S-639 S-618 S-630 S-447 S-440 S-343 S-346	Stroke - width-to-character height ratio is not between 1:6 and 1:8 on the service engravings and engraving is inconsistent.	See note L-1. Stroke width-to-character height ratio is now between 1:6 and 1:8 as identified in Criteria Report, Appendix V Section 4.3

Note: Reference P₁ is NUREG-0700 Section 6 number
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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-619 P ₁ -6.6.4.1 S-595 S-691 S-581 S-643 S-629 S-453 S-441 S-347	Space between characters on the service engraving is not at least one stroke width.	See note L-1.
S-592 S-694 S-607 S-640 S-620 S-631 S-451 S-442 S-334 S-348 P ₁ -6.6.4.1	Space between lines of text is less than one-half the character height.	See note L-1.

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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-412 P ₁ -6.8.2.1	Steam Dump Selector Switches are separated from the Steam Dump Controllers.	See Note P-1. A review of the rearranged Steam Dump Subsystem shows this problem is corrected. Reference 1. Main Control Panel Equipment Layout Drawing: Panel: ZCP007 Drawing: 5-Z34-1-Z44506 Zone: 1C, 2B Reference 2. Main Control Panel Demarcation/Labeling Drawing: Panel: ZCP007 Drawing: 9-Z34-1-Z44606
S-413 P ₁ -6.8.1.3	Enhancement techniques are not used to separate turbine controls from main steam control.	See Note P-1. Major redesign of panel CP-007 resulted in separation and demarcation of the turbine control and main Steam Systems.

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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
		<p>Reference 1. Main Control Panel Equipment Layout Drawing: Panel: ZCP007 Drawing: 5-Z34-1-Z44506 Zone: Main Steam 2D Turbine Control 4A, 5A, 2B, 3B, 4B, 5B, 4D, 5D</p> <p>Reference 2. Main Control Panel Demarcation/Labeling Drawing: Panel: ZCP007 Drawing: 9-Z34-1-Z44606</p>
S-035 P ₁ -6.8.1.3	No spacing or other method of demarcation used to set apart groups of controls	<p>See Note P-1. Panel CP-005 has been totally re- designed resulting in separation and demarcation of the listed components Item 2 has been relocated on CP-001 Item 4 has been relocated on CP-002 Item 6 has been relocated on CP-007 Items 1, 3, 5 remain on panel CP-005</p> <p>Reference 1. Main Control Panel Equipment Layout Drawing: a) Panel: ZCP001 Drawing: 5-Z34-1-Z44500</p>

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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-717 S-667 S-740 S-647 S-756 S-779 S-468 S-357 S-390 P ₁ 6.5.1.3	Type style is not consistent on all vertical meter display faces.	See note VD-1.
S-871 P ₁ 6.5.1.5	Compared displays are not compatible in numerical progress and scale organization.	See note VD-1 and VD-3.
S-289 S-667 S-300 S-311 S-765 S-481 S-366 S-061 S-005 S-915 S-962	A bulb test capability or dual bulb/dual filament bulb is not provided.	An industry sampling indicates no real practical solution to this problem is currently available. The project is attempting to find a lamp manufacturer willing to furnish dual filament lamps. Those will be used when they prove reliable and become commercially available. Component status is presently indicated using a 2 lamp system with one lamp lit at all times. The two lamps are operated from separate devices. If both lamps are

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SHEET NUMBER	OBSERVATION OR CRITERIA TITLE	DISPOSITION
REFERENCE PARAGRAPH		
S-999 P ₁ 6.5.3.1		not illuminated, the status of all safety related components can be verified by the ESF Status Monitoring System or the ERF computer.
S-380 P ₁ 6.5.4.1	Number printing on recorder is crowded because numbers are printed on top of each other.	The generator megawatt recorder is a single pen recorder, therefore no problem exists. The turbine generator mechanical parameter recorder was relocated to Panel CP-018. This recorder normally prints in a confined area. When a parameter goes out of normal, it is easy to distinguish and is further alarmed. In addition, the operator can manually move the chart to develop a print out with all numbered points recorded.
S-596 S-690 S-583 S-638 S-616 S-627 S-438 S-443 P ₁ 6.6.4.1	Letter heights are not identical on annunciator control labels.	New escutcheon plates have been provided with identical letter heights for the different annunciator control functions.

Note: Reference P₁ is NUREG-0700 Section 6 number
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