Addendum 4

Control Room Design Review

Executive Summary

The South Texas Project

HOUSTON LIGHTING & POWER COMPANY

REVISION LOG

Revision No.	Date	Description	Pages Affected
0	1/30/84	Initial Issue	
Addendum No. 1	04/15/85	Provided Current Schedule Section 5.0	5-1,2,3
Addendum No. 2	12/22/86	Addendum Describing Results of Activities Between 04/15/85 and 12/22/86	N/A
Addendum No. 3	11/23/87	Addendum Describing Results of Activities Between 12/22/86 and 11/23/87	N/A
Addendum No. 4	09/30/88	Addendum Describing Results of Activities Between 11/23/87 and 09/30/88	N/A

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SUMMARY

This addendum summarizes the results of the South Texas Project (STP) Control Room Design Review (CRDR) activities since issuance of Addendum 3 (dated November 23,1987) to the Executive Summary.

The activities during this time period have been the following:

A. Completion of an evaluation against the Category E deferred criteria in the category of computers

B. SPDS Man-in-the-Loop Validation

C. Miscellaneous CRDR human factors work, including review of HED resolutions and implementation, and categorization of new human engineering observations

This addendum summarizes the methodology and results of these efforts and provides an updated schedule for completion of the remaining STP CRDR activities.

As this report is an addendum to the Executive Summary, section numbers of this addendum correspond generally to the section numbers used in the Executive Summary. This addendum also uses the same format as Addenda 1 through 3.

PREFACE

The control room design review (CRDR) of the South Texas Project (STP) Electric Generating Station was started in September 1982. This review was 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 main control panel 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 and authorized a design study to address mounting evolutionary engineering changes and correct discrepancies with the NUREG-0700 guidelines.

In November 1982, a decision was made by HL&P to completely relayout six main control panels and upgrade the remaining four based on the design study. This redesign effort was required to accommodate design changes resulting from plant design evolution and Regulatory 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 ten panels, Torrey Pines Technology engineers reviewed the rework for correction of known discrepancies and compliance with good human factors principles. 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, e.g., demarcation and hierarchical labeling. The most significant addition, 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 analysis with verification and walk-through/talk-through validation. Likewise, a specially structured control room review and human factors review of the corrective measures for all Category A and representative Category B discrepancies were performed. The demarcation and hierarchical labeling studies resulted in continued upgrading of the mock-up. The completion of the panel relayout allowed the design of the annunciator system consistent with the relocations of many systems and subsystems, and a reduction of active windows from 1055 to 642.

Following the completion of these major efforts, HL&P has continued the CRDR program, including resolution of human engineering deficiencies identified, using Bechtel and Torrey Pines Technology as required.

The documentation for this program was necessarily extensive in view of its design development nature. Documentation describing the work performed during the CRDR is summarized below and in Figure P-1:

1. Program Plan - Defines the plan for performing the CRDR.

2. Criteria Report - Provides the detailed guidelines and basis for the CRDR and describes the interface between the control room and plant systems. This report also includes review procedures, plant conventions, and human factors data developed during the CRDR that will facilitate future control room modifications.

3. Operating Experience Review (OER) Report - Describes the operations personnel review process, results, conclusions, and recommendations of this task defined in the Program Plan.

4. System Function and Task Analysis (SFTA) Report - Describes the methodology, results, conclusions, and recommendations for this SFTA effort defined in the Program Plan.

5. Control Room Survey (CRS) Report - Describes the review process, results, conclusions, and recommendations of this task defined in the Program Plan. This report also includes the final results and dispositions for the human factors observations obtained from the OER and the SFTA.

6. Annunciator Report - Describes the review process, results, conclusions, and recommendations of the annunciator review task defined in the Program Plan and the annunciator study guide.

7. Special Studies Report - Describes details of miscellaneous studies performed as part of the CRDR. This includes the anthropometric study, the hierarchical labeling study, the demarcation study, evaluation of specified parameters, and many minor studies to resolve NRC audit comments.

8. Implementation Plan Report - Summarizes the control panel design changes resulting from the implementation of Regulatory Guide 1.97 requirements, engineering design requirements, and preliminary observations of the CRDR design review team. It describes the reasons for major changes to the control panel layouts.

9. SFTA Validation Report - Summarizes the second review required because of the extensive revisions made to the control panel layouts and also includes walk-through/talk-through exercises performed in the mock-up area.

10. OER Validation Report - Summarizes the review made by operators to determine if the redesigned panels corrected reported operator concerns and evaluate if any new problems were created as a result of the corrective measures taken.

11. CRS Validation Report - Summarizes the review made to determine if the Category A and representative samples of the Category B HEDs were satisfactorily corrected and if any new problemr were created.

12. Executive Summary - Summarizes the CRDR results, conclusions, recommendations and schedules for remaining work. Technical details are in the Operating Experience Review Report, the System Function and Task Analysis Report, the Annunciator Report, the Control Room Survey Report, the Special Studies Report, the Implementation Plan Report, and various validation reports.

13. Human Engineering Discrepancy Resolution Report - Summarizes all Category A, B, C, and D HED resolutions (as of January 1, 1986).

14. Executive Summary Addenda - Summarize the results and remaining work schedules of the CRDR program following the submittal of the Executive Summary Report. Addendum 1 showed progress as of April 15, 1985; Addendum 2 as of December 22,1986; and Addendum 3 as of November 23, 1987. Addendum 4 shows progress as of September 30, 1988.

15. Emergency Operating Procedures (EOP) Validation Report - Summarizes the validation process used for the Emergency Operating Procedures and the results as they involve the control panels. This validation was conducted at the STP simulator during May 1986 using the draft EOPs.

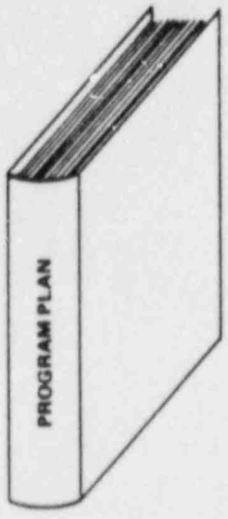
16. Human Engineering Discrepancy Resolution Report Addenda - Summarize resolutions for Category A, B, C, and D HEDs identified after January 1, 1986. Addendum 1 summarized the HED resolutions as of December 22, 1986, and Addendum 2 as of November 23, 1987. Addendum 3 summarizes the HED resolutions as of September 30, 1988. For clarity, each addendum shows resolutions for HEDs identified after January 1, 1986, thus superseding the previous addendum in its entirety.

HOUSTON LIGHTING & POWER CO.

SOUTH TEXAS PROJECT

CONTROL ROOM DESIGN REVIEW

PLANNING



REVIEW & DESIGN SUPPORT

ASSESSMENT IMPLEMENTATION EFFECTIVENESS

STP CRDR MAJOR REPORTS
Figure P-1

1.0 INTRODUCTION

This addendum reports the results of activities performed towards the completion of the CRDR of the South Texas Project since Executive Summary Addendum 3, dated November 23, 1987.

Since November 1987, activity related to CRDR has been completed in Unit 1 on the following:

- Safety Parameter Display System (SPDS) Man-in-the-Loop Validation (findings applicable to both units)
- Meter zone coding
- Miscellaneous control room modifications to support resolution of HEDs identified and to support design changes
- Completion of an evaluation against the Category E deferred criteria in the category of computers

Unit 1 was declared in commercial operation during August 1988.

Activities in Unit 2 have been proceeding to support fuel load in December 1988. Activities related to CRDR in Unit 2 have included miscellaneous control room modifications to support resolution of HEDs identified and to support design changes.

Certain differences exist by design between the control rooms of Unit 1 and Unit 2. Where systems or equipment are shared by both units, the associated control room equipment may be provided in Unit 1 only (e.g., seismic monitoring panel CP013, main cooling reservoir level indication, reservoir makeup pump control).

Electrical feeds to shared equipment are controlled from the appropriate unit control room only. Control switches in both unit control rooms are properly labeled. In addition, minor equipment differences exist between the two unit control rooms. For example, different manufacturers' recorders are provided, but the resulting differences are transparent to the operators.

A study was conducted to identify the differences between the Unit 1 and Unit 2 control rooms. It was determined that the differences did not result in any human factors concerns.

The SPDS Man-in-the-Loop Validation was performed during the last quarter of 1987 and the results evaluated in the first quarter of 1988. This validation was performed at the STP simulator, using licensed unit supervisors, shift technical advisors, and reactor operators and using the issued STP Emergency Operating Procedures. The purpose of the validation testing is to determine the effectiveness of the SPDS to its user in assessing and responding to challenges to the safety status of the plant. Additionally, the validation testing assessed the SPDS based on the design requirement for the displays to be human factored, function oriented, and to permit the SPDS to perform its principal functions. The CRDR categorization process was used to evaluate the findings from the validation testing. The HEDs identified in the SPDS Man-in-the-Loop Validation are shown in Table 2-2 and in HED Resolution Report Addendum 3.

In addition to these activities, various human engineering observations have been evaluated and categorized, as indicated in Table 2-2 and the HED Resolution Report Addendum 3. The methodology used for the evaluation against the Category E criteria for computers, for the SPDS Man-in-the-Loop Validation, and for the various human engineering observations is described in Section 2.

An additional task has been undertaken, as shown in Section 5, Item 26, regarding alarms presentation to the operator. This effort (called the Annunciator Study Task Force) has been initiated to identify problems, study alternatives, and resolve issues related to alarms and messages presented to the operator by the following systems:

- Annunciator, including both annunciators and status/permissive windows
- ESF Status Monitoring
- Bistable Status Monitoring
- Plant computer
- ERFDADS computer

This effort is a long-term project, initially identifying problems associated with existing alarms/messages, and later identifying alarms/messages that could be added to enhance operator effectiveness.

The schedule for remaining CRDR activities is provided in Section 5.

2.0 METHODOLOGY AND RESULTS

2.1 METHODOLOGY

The methodology for the Category E evaluations and other planned CRDR activities varies from that used prior to January 1, 1986, since the tasks involve evaluations deferred from earlier phases in the CRDR and verification of appropriate resolution of previous HEDs.

To proceed with the "Planned Activities" remaining from January 1986 (identified in Section 5, Items 1 through 16) in an orderly fashion, each activity or HED was tabulated separately and a reference/comment form provided for it. This form is shown as Figure 2-1. During the review process, each activity or HED reference/comment form was annotated regarding compliance using one of the following:

- o N/A - Not applicable
- o Yes - In compliance
- o No - Not in compliance

If the item is identified as not in compliance, a human engineering observation (HEO) form is filled out for disposition of the observation. (The HEO form is shown as Figure 2-2.)

In some instances, the item is again deferred, since it can not be evaluated due to the current control room status. In this case, no compliance status is indicated; the item identification and the reference/comment form are retained for later evaluation.

Additional comments and observations are made by operators or by engineering personnel. These observations are also documented on HEO forms. Observations generated during the EOP Validation (Section 5, Item 17) and the SPDS Man-in-the-Loop Validation were also documented on HEO forms.

The HEOs generated are then submitted for project assessment in the same manner as during the previous CRDR phases.

2.2 RESULTS

The status of the remaining evaluations of the "Planned Activities" (Section 5, Items 1 through 16), is summarized in Table 2-1. Only one Category E HED was evaluated since November 1987: the ERFDADS speed and accuracy were identified as meeting criteria.

A total of 20 HEDs have been identified as a result of the SPDS Man-in-the-Loop Validation. In addition, a total of 26 HEDs have been identified since November 1987 through operator or engineering observations or other means. Table 2-2shows the categorization of these HEDs, which are shown in more detail in the HED Resolution Report Addendum 3 (beginning with HED-1097).

The remaining Unit 1 deferred Category E items are shown in Table 2-3 (Workspace), Table 2-4 (Computers), Table 2-5 (Visual Displays), and Table 2-6 (Control/Display Integration). In addition, there are 9 deferred items in the Visual Displays criteria that were previously categorized and therefore not included as Category E items (refer to Table 2-7).

The Category E and deferred items evaluations for Unit 2 are scheduled to be complete prior to fuel load in Unit 2, with exceptions generally expected to be the same as those for Unit 1 (refer to Tables 2-3 through 2-7).

For clarity in the HED assessment factors, Figure 2-3 presents the revised assessment factor criteria and implementation commitments.

The schedule for the remaining work is addressed in Section 5.

TABLE 2-1

SUMMARY OF STATUS
PLANNED ACTIVITY EVALUATIONS
(Items 1 through 16, Section 5)

ACTIVITY	REMAINING NUMBER OF ITEMS (Sheets) (As of 11/87)	NUMBER OF CRITERIA MET (Evaluation between 11/87 & 9/88)	NUMBER OF HEDs REPORTED	NUMBER OF ITEMS DEFERRED (Tables 2-3 thru 2-7)
Criteria to Evaluated (Category E)				
Workspace	4	0	0	4
Computers	2	1	0	1
Visual Displays	8	0	0	8
Control/Display Integration	13	0	0	13
HEDs to be Resolved	9	0	0	9
TOTAL	36	1	0	35

TABLE 2-2

NEW HEDs

ACTIVITY	CATEGORY A	B	C	D	TOTAL
HEDs Identified through SPDS Man-in-the-Loop Validation	1	0	14	5	20
HEDs Identified by Operators/Engineering/Others	1	9	10	6	26
TOTAL	2	9	24	11	46

TABLE 2-3

DEFERRED CRITERIA ITEMS

HF AREA: WORKSPACE

CRITERIA TITLE	STP CRITERIA	SHEET NUMBER	REMARKS
Emergency Equipment	Appendix C.1.H	0165	Deferred until storage area is reviewed
Environment/ Ventilation	Appendix D.1.1	0166	Deferred for review during the first operating cycle
Expendables	6.1.1.5	0105	Deferred until storage area is reviewed
Emergency Equipment	Appendix C.1.B	0158	Deferred until storage area is reviewed

TABLE 2-4

DEFERRED CRITERIA ITEMS
HF AREA: COMPUTERS

CRITERIA TITLE	STP CRITERIA	SHEET NUMBER	REMARKS
Plant Computer - Access Needs	Appendix P, P.4	0824	Deferred pending further review of documents required versus those provided in control room

TABLE 2-5

DEFERRED CRITERIA ITEMS
HF AREA: VISUAL DISPLAYS

CRITERIA TITLE	STP CRITERIA	SHEET NUMBER	REMARKS
Visual Displays	I.3	0296 0307 0318 0375 0488 0685 0770 0793	Deferred until storage area for expendables is reviewed

TABLE 2-6

DEFERRED CRITERIA ITEMS

HF AREA: CONTROL/DISPLAY INTEGRATION

CRITERIA TITLE	STP CRITERIA	SHEET NUMBER	REMARKS
Control/Display Ratio	6.6.3.2.A	0425 0326 0502 0072 0049 0509 0087 0403 0387 0397	Deferred for review during the first operating cycle
Control/Display Ratio	6.6.3.2.B	0050 0073 0327	Deferred for review during the first operating cycle

TABLE 2-7

PREVIOUSLY CATEGORIZED DEFERRED ITEMS

HF AREA: VISUAL DISPLAYS

CRITERIA TITLE	STP CRITERIA	SHEET NUMBER	REMARKS
Visual Displays - Scale Marking	Appendix F	0331 0362 0477 0652 0721 0745 0761 0784 0673	Deferred for review during the first operating cycle

FIGURE 2-1

DETAILED CONTROL ROOM DESIGN REVIEW
CONTROL ROOM SURVEY
REFERENCE/COMMENT FORM

OBSERVER: ______________________ DATE: __________ PAGE ___ OF ____

LOCATION: ______________________

GUIDELINE CRITERIA ITEM NO.: ______________ HED REFERENCE NO.: __________

COMPLIANCE: N/A _____ YES _____ NO _____

CRITERIA ELEMENT NO.	PANEL/ CONSOLE NO.	SUBPANEL	REFERENCE/COMMENT

DIAGRAM/PHOTO NO.:

DETAILED CONTROL ROOM DESIGN REVIEW
CONTROL ROOM SURVEY
REFERENCE/COMMENT FORM

FIGURE 2-2

SOUTH TEXAS PROJECT — HUMAN ENGINEERING OBSERVATION ASSESSMENT — HEO NO_____ REV____

TITLE _____
REF_____ ITEM _____
ORIGINATOR _____
DATE _____

HED DESCRIPTION

POTENTIAL OPERATOR ERROR

RECOMMENDED REVISION

TECHNICAL REVIEW

HED CATEGORY_____

[ ] CONCUR
[ ] CONCUR WITH COMMENTS
[ ] REEVALUATE AND RESUBMIT FOR THE FOLLOWING REASON

COMMENT / REASON:

CHAIRMAN DATE

MANAGEMENT REVIEW

[ ] CONCUR
[ ] CONCUR WITH COMMENTS
[ ] REEVALUATE AND RESUBMIT FOR THE FOLLOWING REASON

COMMENT / REASON:

CHAIRMAN DATE

RECOMMENDED IMPLEMENTATION

( ) MANDATORY IMMEDIATE CORRECTIVE ACTION
( ) AT EARLIEST OPPORTUNITY (HIGH PRIORITY)
( ) CONVENIENT REFUELING OUTAGE (NOT TO EXCEED 2 YEARS)(ROUTINE)
( ) OPTIONAL
( ) OTHER _____

HUMAN ENGINEERING OBSERVATION ASSESSMENT FORM

FIGURE 2-3

HED ASSESSMENT FACTOR CRITERIA		
CATEGORY	ASSESSMENT FACTOR	IMPLEMENTATION (RATING)
A	SAFETY CONSEQUENCES	MANDATORY IMMEDIATE CORRECTIVE ACTION
B	PLANT AVAILABILITY ENHANCEMENT	AT EARLIEST OPPORTUNITY (HIGH PRIORITY)
C	EQUIPMENT / PLANT RELIABILITY ENHANCEMENT	CONVENIENT REFUELING OUTAGE (NOT TO EXCEED 2 YRS) (ROUTINE)
D	MINOR	OPTIONAL

5.0 SCHEDULE

This section lists the activities planned for completion as part of this CRDR. HL&P will submit an executive summary report addendum approximately December 1989. That addendum will identify status and schedule after approximately 1-1/2 years of Unit 1 commercial operation and an anticipated 6 months of Unit 2 commercial operation.

Items 1 through 17 are those initially listed in Section 5 of Addendum 1 and updated in Addendum 2. For clarity, no items have been deleted from the list. As items become resolved, the resolution will be shown rather than the schedule for completion. Items have been added as required to reflect additional planned activities.

	Planned Activity	Resolution/Completion Timeframe
1.	Check visibility of green rototellite indicating lights (Category A HEDs S-367, 484, 679, 725, and 748)	COMPLETED 12-86. Meets criteria. Evaluation is applicable to Unit 1 and Unit 2. Refer to HED Resolution Report Current Addendum.
2.	Correct poor readability of bypass inoperable status lights (Category A HEDs S-726, 732, 749, and 767)	COMPLETED 04-85. Meets criteria. Evaluation is applicable to Unit 1 and Unit 2. Refer to HED Resolution Report, Page A-5.
3.	Completion of meter zone coding (Category B HEDs S-006, 288, 676, 299, 310, 764, 787, 480, 364, 060, 912, 961, and 998)	Unit 1: COMPLETED 12-86. METHODOLOGY meets criteria. Evaluation is applicable to Unit 2. Implementation COMPLETED for (cont.)

	PLANNED ACTIVITY	RESOLUTION/COMPLETION TIMEFRAME
		Unit 1, 11-87. Refer to HED Resolution Report Current Addendum. Unit 2: Implementation prior to commerical operation.
4.	Random sample label checkout to verify readability	COMPLETED 12-86. Meets criteria. Evaluation is applicable to Unit 1 and Unit 2.
5.	Review of QDPS plasma displays as replacement for panel meters	COMPLETED 12-86. Meets criteria. Evaluation is applicable to Unit 1 and Unit 2.
6.	Check effectiveness of annunciator horns (Category A HED S-510)	COMPLETED 12-86. Meets criteria. Evaluation is applicable to Unit 1 and Unit 2. Refer to HED Resolution Report Current Addendum.
7.	Random sample annunciator tile checkout to verify readabiltiy	COMPLETED 12-86. Meets criteria. Evaluation is applicable to Unit 1 and Unit 2.
C.	Random sample review of demarcation painting	COMPLETED 12-86. Evaluation is applicable to Unit 1 and Unit 2. Resulted in new HED.

	PLANNED ACTIVITY	RESOLUTION/COMPLETION TIMEFRAME
		Refer to HED Resolution Report Current Addendum, HED-1043.
9.	Implementation of use of lever handles for "select" functions and review to confirm correction of switch position readability (Category B HEDs S-711, 734, 695, 705, 699, and 459)	COMPLETED 12-86. Meets intent of criteria. Evaluation is applicable to Unit 1 and Unit 2. Refer to HED Resolution Report Current Addendum.
10.	Review corrective action to address live zero indication (Category B HEDs S-715, 665, 718, 646, 754, 777, 469, 356, 332, 328, 891, 941, and 977)	COMPLETED 04-85. Evaluation is applicable to Unit 1 and Unit 2. Refer to HED Resolution Report Report, page B-14.
11.	Complete corrective action to replace meter scales and random sample checkout to verify readability (Category B HEDs S-878, 879, 881, 870, 874, 883, 799, 803, 807, 892, 716, 666, 739, 776, 470, 877, 880, 882, 872, 873, 884, 800, 804, 808, 718, 668, 741, 757, 778, 471, 404, 406, 719, 670, 742, 649, 759, 781, 475, 359, 334, 329, 671, 743, 650, 782, 360, 392, 720, 672, 744, 651, 760, 783, 476, 361, 721, 673, 745, 652, 761, 784, 477, 362, 331, 871, and 885)	Partial completion 12-86. All items have been evaluated. Evaluation is applicable to Unit 1 and Unit 2. Refer to Table 2-7 for remaining open items, which have been deferred for resolution during the first operating cycle. Refer to HED Resolution Report Current Addendum.

	PLANNED ACTIVITY	RESOLUTION/COMPLETION TIMEFRAME
12.	Random sample legend light engraving checkout to verify readability	COMPLETED 12-86. Meets criteria. Evaluation is applicable to Unit 1 and Unit 2.
13.	Complete corrective action on recorder chart paper (Category B HEDs S-376 and 771) and random sample checkout to verify readability and accessibility of supplies.	After completion of recorder chart paper replacement, in conjunction with Table 2-5 items, prior to end of first refueling outage on each unit. Refer to HED Resolution Report Page B-21.
14.	Implementation of corrective action to paint all meter pointers red and random sample checkout (Category B HEDs S-724, 675, 747, 655, 763, 786, 479, 408, 911, 960, and 997)	Painting pointers leads to instrument inaccuracies. Meters without red pointers are to be replaced by the end of the first refueling outage on each unit. Refer to HED Resolution Report Current Addendum.
15.	Operator review of status light interpretation on SGFP Turbine Control Panel	COMPLETED 12-86. Meets criteria. Evaluation is applicable to Unit 1 and Unit 2.
16.	Completion of Category E Criteria reviews:	Complete prior to end of first refueling outage on each unit.
	A. Workspace criteria including:	Unit 1: Partial completion 12-86, 01-87 and 06-87. Some evaluations

PLANNED ACTIVITY	RESOLUTION/COMPLETION TIMEFRAME
	applicable to Unit 2. See Table 2-3 for remaining open items. Preliminary lighting studies were performed during January, 1987. Resulted in new HEDs. Refer to HED Resolution Report Current Addendum, HED-1029, 1030, 1060, 1061, 1061, 1063, 1086, and 1087.
o Furniture and equipment layout o Document organization and storage o Spare parts, operating expendables and tools o Nonessential personnel access o Reference material placement o Desk dimensions o Chair dimensions o Emergency equipment o Ventilation o Illumination o Emergency lighting o Auditory o Ambience and comfort	Unit 2: Review prior to fuel load for criteria that could not be evaluated with Unit 1 reviews (e.g., ventilation, illumination, auditory). Note that modifications made to Unit 1 in response to HEDs have been incorporated into Unit 2 design.
Workspace criteria reviews for the sit-down consoles and work stations and for the vertical panels	
Random sample check of accessibility to controls and potential for inadvertent actuation	

PLANNED ACTIVITY	RESOLUTION/COMPLETION TIMEFRAME
B. Communications criteria including: o Information exchange o Convenience of use o Reliability o Interference o Allocation of functions o Voice communication links o Conventional powered telephone system o Sound powered telephone system o Radio transceivers o Walkie-talkie radio transceivers o Fixed-base UHF transceivers o Announcing system o Background noise o Emergency face masks	COMPLETED 06-87. Evaluation is applicable to Unit 1 and Unit 2. Resulted in new HEDs. Refer to HED Resolution Report Current Addendum, HED-1083, 1084, and 1085.
C. Annunciation criteria for: o Computer display/ annunciation/printer features	COMPLETED 12-86. Meets criteria. Evaluation is applicable to Unit 1 and Unit 2.

PLANNED ACTIVITY	RESOLUTION/COMPLETION TIMEFRAME
D. Controls criteria for compatibility with emergency gear	COMPLETED 12-86. Meets criteria. Evaluation is applicable to Unit 1 and Unit 2.
E. Visual display criteria for: o Meters o Ambient light sources/ light intensity o Interchanging of indicator lenses o Expendable materials	Unit 1: Partial completion 12-86. Some evaluations applicable to Unit 2. See Table 2-5 for remaining open items. Unit 2: Review prior to fuel load for criteria that could not be evaluated with Unit 1 reviews (e.g., ambient light sources/ light intensity).
F. Labels criteria	COMPLETED 12-86. Meets criteria. Evaluation is applicable to Unit 1 and Unit 2.
G. Computer criteria for: o Plant computer o ERFDADS, including SPDS o QDPS	Unit 1: Partial completion 12-86. Some evaluations applicable to Unit 2. See Table 2-4 for remaining open items. Resulted in new HEDs. Refer to HED Resolution Report Current Addendum, HED-1033, 1034, 1037, 1038, 1039, 1040, 1041, and 1042.

	PLANNED ACTIVITY	RESOLUTION/COMPLETION TIMEFRAME
		Unit 2: Review prior to fuel load for criteria that could not be evaluated with Unit 1 reviews (e.g., glare on CRT).
H.	Control/display integration criteria	Partial completion 12-86. Evaluation is applicable to Unit 1 and Unit 2. See Table 2-6 for remaining open items.
17.	EOP Validation (including confirmation of instrumentation and control functions)	COMPLETED 05-86. Evaluation is applicable to Unit 1 and Unit 2. Refer to EOP Validation Report.
18.	Label reviews for accuracy, adequacy, and conformance to standard abbreviations	Ongoing. Reviews and implementation prior to end of first refueling outage on each unit.
19.	Computer display reviews	Reviews prior to end of first refueling outage of Unit 1. Revisions prior to end of second refueling outage on each unit, with exception of QDPS (revisions prior to end of third refueling outage on each unit).

	PLANNED ACTIVITY	RESOLUTION/COMPLETION TIMEFRAME
20.	Implementation of Category A HED resolutions (excluding QDPS)	Unit 1: COMPLETED prior to commercial operation (August 1988). Unit 2: Implementation prior to fuel load (December 1988).
21.	Implementation of Category B HED resolutions (excluding QDPS)	Unit 1: COMPLETED prior to commercial operation (August 1988), for HEDs up to and including HED-1096. For HEDs after HED-1096, implementation is in accordance with Figure 2-3, with implementation prior to end of first refueling outage. Unit 2: Implementation prior to commercial operation.
22.	QDPS HED resolutions (Refer to HED Resolution Report Current Addendum, Disposition Note CPT-1.)	Implementation prior to end of first refueling outage on each unit. Exceptions are resolutions for HED-1022, 1041, and 1126 for which implementation is prior to end of third refueling outage on each unit.

	PLANNED ACTIVITY	RESOLUTION/COMPLETION TIMEFRAME
23.	Implementation of Category C HED resolutions	Implementation integrated into plant modification schedule, with implementation targeted for prior to end of second refueling outage on each unit.
24.	Implementation of Category D HED resolutions	Implementation integrated into plant modification schedule based on priority.
25.	Category E evaluations for Auxiliary Shutdown Panel	Review prior to the end of 1988 for Unit 1 and Unit 2.
26.	Annunciator Study Task Force	Ongoing.