REV. 0
MARCH 7, 1984

Control Room Design Review

Operating Experience Review Validation Report

The South Texas Project

HOUSTON LIGHTING & POWER COMPANY

OPERATING EXPERIENCE REVIEW

VALIDATION REPORT

OPERATING EXPERIENCE REVIEW VALIDATION REPORT

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SUMMARY

During the May 1983 NRC Audit of the new layout of the STP control room panels, it was decided to have 33 percent or more of the operations personnel that provided the basic data for the Operator Experience Review (OER) report review and validate the new panel layouts. This report documents the review of the new panel layouts to determine if the problems identified in the OER had been corrected and if any new problems were created.

A validation questionnaire, addressing the 78 problems identified during the OER, was completed by 4 of the 11 operators that responded to the questionnaire in Reference 1. The operators responding to the validation questionnaire used the Bechtel full-scale mock-up and the current set of panel design drawings.

Results of the responses received from the validation questionnaire reveal that 74 problems generated during the OER were corrected to the operators' satisfaction. Four problems, two with controls, one with annunciator and one with Panel Layout/Integration were not corrected. The four problems are discussed herein and the disposition of each adequately resolved to satisfy the human factors specifications according to the Criteria Report, Reference 2.

Further, no new problems or human engineering observations were identified as a result of this OER validation effort.

ACRONYMS AND ABBREVIATIONS

ARO	Auxiliary Reactor Operator
ASSOC	Associated
ASST	Assistant
AUX	Auxiliary
CAT	Category
CLO	Checklist Observation
CONT	Control
CR	Control Room
CRDR	Control Room Design Review
CRT	Cathode Ray Tube
CVCS	Chemical Volume Control System
EES	Emergency Event Sequences
EOF	Emergency Operating Facility
EPRI	Electric Power Research Institute
ESF	Engineered Safety Feature(s)
EST	Estimate(d)
EXPER	Experience
FW	Feedwater
HE	Human Engineering
HED	Human Engineering Discrepancy
HHSI	High Head Safety Injection
HL&P	Houston Lighting and Power Company
HPSI	High Pressure Safety Injection
I&C	Instruments and Controls
INPO	Institute of Nuclear Power Operators
INSTR	Instrument
LDR	Leader
LHSI	Low Head Safety Injection
LOCA	Loss of Coolant Accident
LOSP	Loss of Offsite (AC) Power
LPSI	Low Pressure Safety Injection

ACRONYMS AND ABBREVIATIONS (Cont.)

LR01	Licensed Reactor Operator #1
LR02	Licensed Reactor Operator #2
M/M	Man/Machine
MCP	Main Control Panel
MON	Monitor
MSR	Moisture Separator Reheater
MT	Management Team
MW(e)	Megawatts (electric)
NOS	Numbers
NRC	Nuclear Regulatory Commission
OERT	Operating Experience Review Task Group
OSC	Operational Support Center
PORV	Power Operated Relief Valve
PRT	Project Review Team
PSAR	Preliminary Safety Analysis Report
RAS	Recirculation Actuation Signal
PZR	Pressurizer
RCB	Reactor Containment Building
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RECIRC	Recirculating
REQ'D	Required
RG	Regulatory Guide
RHR	Residual Heat Removal
RO	Reactor Operator
RWST	Refueling Water Storage Tank
RX	Reactor
SBCS	Standby Cooling System
SFTA	System Function and Task Analysis
SG	Steam Generator
SIS	Safety Injection System

ACRONYMS AND ABBREVIATIONS (Cont.)

SOE	Selected Operational Event(s)
SPDS	Safety Parameter Display System
SRO	Senior Reactor Operator
SS	Subsystem
STAT	Systems Task Analysis Team
SUPVR	Supervisor
SW	Switch
SYS	System
TMI	Three-Mile Island
TSC	Technical Support Center

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.

Prior to completion of the CRDR, a decision was made by HL&P to redesign six of the ten main control panels. This redesign effort was required to accommodate design changes resulting from plant design evolution and Reg. Guide 1.97 requirements. Human engineering discrepancies determined in the CRDR have been or are in the process of correction.

The CRDR is described in the Program Plan document. It contains a detailed description of the plans for the majors task elements. Due to the control room redesign effort, a modified approach was required to complete and document the CRDR program. The following changes have been made in the CRDR Program Plan:

A. The documentation program described in the Program Plan was changed to allow reporting of results on the individual CRDR tasks.

B. An Implementation Plan Report, was written to describe the background and reasons for the redesign effort. It outlines the approach to be used for implementing panel layout changes.

C. The tasks described in the Program Plan have been completed for the original design. The SFTA and the control room survey have been updated to validate any design revisions.

The following is a description of the documents covering this CRDR (see figure P-1):

A. Program Plan - Defines the plan for performing tne CRDR.

B. Criteria Report - Provides the detailed guidelines and basis for the CRDR and describes the interface between the control room and plant systems.

C. Operating Experience Review (OER) Report - Describes the review process results, conclusions and recommendations of the operating experience review (OER) task defined in the Program Plan.

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

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

F. Annunciator Report - Describes the review process, results, conclusions and recommendation of the annunciator review task defined in the Program Plan.

G. Special Studies Report - Describes details of miscellaneous studies performed as part of the CRDR. This includes the anthropometric study, the hierarchial labeling study and the demarcation study.

H. Implementation Plan Report - Summarizes the CRDR, the control room design changes, and the proposed methods of implementing the design changes.

I. SFTA Validation Report - Summarizes the second SFTA review based on relayed out panels and walk-through/talk-through validation.

J. OER Validation Report - Summarizes the review made by operators to determine if the redesigned panels corrected concerns reported in the OER Report and if any new problems were created.

K. CRS Validation Report - Summarizes the review made to determine if the category A and representative samples of the Category B HEDS are satisfactorily corrected and it any new problems were created.

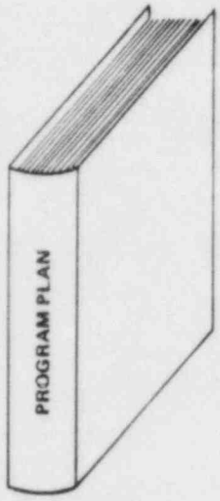
L. Executive Summary - Summarizes the CRDR, results, conclusions and recommendations. Technical details are in the Operating Experience Review Report, the System Function and Task Analysis Report, the Control Room Survey Report, the Special Studies Report, and the Annunciator Report.

HOUSTON LIGHTING & POWER CO.

SOUTH TEXAS PROJECT

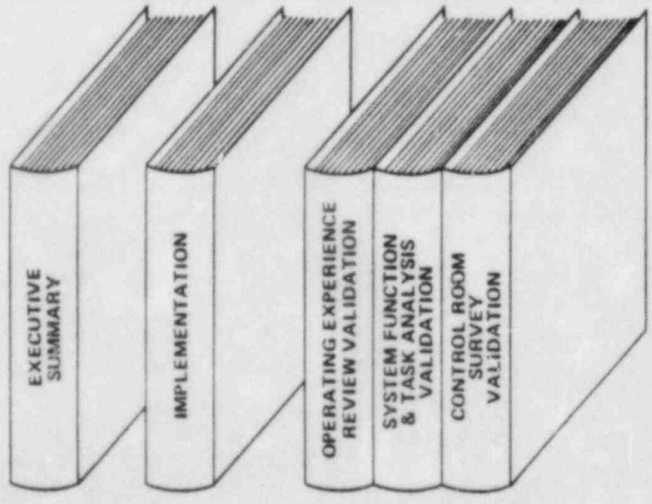
CONTROL ROOM DESIGN REVIEW

PLANNING



REVIEW & DESIGN SUPPORT

ASSESSMENT IMPLEMENTATION EFFECTIVENESS



STP CRDR MAJOR REPORTS

Figure P-1

1.0 INTRODUCTION

The STP Control Room Design Review (CRDR) Program Plan defined, "Operator Experience Review" (OER) was completed in the first quarter of 1983, Reference 1. This report was submitted to the NRC in support of their audit of the CRDR facility during May 1983. During this audit the NRC was advised that 33 percent or more of the operations personnel who provided the basic data for the OER report would be asked to review the new panel layouts. The objective of this review was to determine whether the reported discrepancies were corrected and if any new problems were created.

This document contains the data, analysis and results of the validation process.

2.0 METHODOLOGY

2.1 VALIDATION QUESTIONNAIRE

The problem areas identified by the eleven (11) operators in response to the questionnaire, Reference 1, were organized into a validation questionnaire, Appendix A. The problems used in this questionnaire were the result of 13 questions that were answered "No" by nine (82%) or more of the 11 respondents to the OER questionnaire.

The operators were given one week to study the questionnaire prior to the exercise. A short orientation was given to the operators to make sure they understood the objectives of the review.

The one half scale panels 001 - 010 mosaic was used to show the panel layout at the time the OER concerns were surfaced. The relayed out mock up, and revised panel layout drawings were used for comparison.

There was a short debriefing period and additional operator communications to clarify some of the questionnaire responses.

Table 2.1-1 shows the number of problems reported in the OER report by area.

TABLE 2.1-1

NUMBER OF PROBLEMS REPORTED IN THE OER REPORT

AREA	NUMBER OF PROBLEMS REPORTED	QUESTIONNAIRE SECTIONS*
WORKSPACE	7	A
CONTROLS	25	B, C and D
ANNUNCIATORS	28	E, F, G, H and I
LABELS & LOCATION AIDS	8	J and K
PANEL LAYOUT/INTEGRATION	10	L and M
TOTAL	78	

* Each section is associated with a specific question used in Appendix A of Reference 1.

Each of the 78 problems was identified separately and grouped by section to conform with the specific question used in Appendix A of Reference 1.

Operators were requested to address each problem and mark one or more of the following categories as appropriate.

- Problem Corrected
- Problem Not Corrected
- No New Problems
- Created New Problem

The operators were asked to clarify their response in the "Remarks" column for the Categories marked with "Problem Not corrected" or "Created New Problem."

2.2 DATA COLLECTION

On August 16, 1983, four (4) of the original eleven (11) operators that completed the initial questionnaire used for the OER report, Reference 1, completed the validation questionnaire, Appendix A at the mockup facility. A complete set of the current panel design drawings were continuously available for this review.

The operators verified the problems on the one-half scale mosiac, then examined the relayed out panels and answered each problem query.

2.3 DATA ANALYSIS

The responses to the 78 problem areas were consolidated onto one data collection form and summarized in Table B-1 of Appendix B. Table 2.3-1 shows the number of problems, by area, where operator consensus reported that the problems were corrected. Table 2.3-2 shows that four problems did not receive operator consensus as being corrected.

TABLE 2.3-1
PROBLEMS RECEIVING OPERATOR CONSENSUS

AREA	PROBLEMS PER AREAS	PROBLEM CORRECTED
WORKSPACE	7	7
CONTROLS	25	23
ANNUNCIATORS	28	27
LABELS & LOCATION AIDS	8	8
PANEL LAYOUT/INTEGRATION	10	9
TOTAL	78	74

TABLE 2.3-2
PROBLEMS NOT RECEIVING OPERATOR CONSENSUS

PROBLEM NUMBER	STATEMENT
Controls - C1	"Boards are too tall"
Controls - D8	"Feedpump Master Controller should be nearer the middle of 006"
Annunciators - E4	"Permissives need auditory tone when actuated and when reset"
Panel Layout/Integration - L6	"Feedpump Master Controller should be located between individual controls"

The category "Creates New Problem", received only three single responses, indicating that the new design did not introduce any new problem.

The "No New Problem" was marked by only three of the four operators when their response to the "Problem Corrected" category was marked. This category did not provide any differential or meaningful data; therefore, it was not used in this survey evaluation.

The data from the completed questionnaire reveals that four problems previously identified in the OER Report have not been changed. The reported problems are:

C-1 "Boards Are Too Tall":

Although the boards are still the same height, most of the controls have been lowered. Approximately 20 switch controls on panel CP-010 exceed the upper height limits for control according to the Criteria Report, Reference 2. An examination was conducted to determine the trade-off between (1) lowering the switches on CP-010 and (2), providing an effective mimic. Results of the examination revealed that the 20 switches are not safety-related nor critical and are used infrequently. Further, lowering the switches would disrupt an operationally effective mimic. Based on this examination, the results of the current design arrangement were selected as being optimum. Other operator comments regarding the board height concern the changing of recorder paper. It should be noted that recorder paper is not changed during high activity periods and an "operator aid" (mobile ladder) will be procured for the control room. This is a commonly accepted practice in current control rooms.

Two problems, D-8 and L6, are essentially the same but reported in two separate areas, i.e.:

D-8 "Feedpump Master Controller should be nearer the middle of 006", and

L6 "Feedpump Master Controller should be located between individual controls".

The Feedwater Pump Master Controller is located to the far right of panel 006. However, comments of the four operators associated with these queries indicate that the location of this control does not create a problem.

Subsequent to the completion of the questionnaire, a debriefing was conducted with four operational personnel regarding the control location. The operators were unanimous in stating that, "the current feedwater control arrangement is satisfactory".

E-4 "Permissives need auditory tone when activated and when reset." Specifications for the Westinghouse startup permissives, interlocks, and blocks "Permissive Panel" will be modified to include an auditory tone when an annunciator is activated and when the panel is reset.

Although not identified as a problem, two comments suggested that the labeling on the sample "Permissive" annunciator panel is not consistent. The Annunciator Study Group has reviewed this labeling and the necessary changes have been made.

Based on the responses to the validation questionnaire, no human engineering observations resulted from this review.

REFERENCES

1. Houston Lighting & Power Company, Operating Experience Review Report, March 25, 1983.

2. Houston Lighting & Power Company, Criteria Report, February 4, 1983.

3. Human Engineering Guide for Enhancing Nuclear Control Rooms, EPRI NP-2411, May 1982.

APPENDIX A

OPERATOR EXPERIENCE REVIEW
VALIDATION QUESTIONNAIRE

OPERATOR EXPERIENCE REVIEW
VALIDATION PHASE

1.0 INTRODUCTION

The STP Control Room Design Review (CRDR) Program Plan defined, "Operator Experience Review" (OER) and was completed in the first quarter of 1983. Rev. 0 of the OER report is dated March 15, 1983. This report was informally submitted to the NRC in support of their audit of the CRDR Facility on May 1983. During this audit the NRC was advised that 33 percent of the operations personnel who provided the basic data for the OER report would be asked, to review the new panel layouts and determine if the reported discrepancy had been corrected and if any new problems were created.

This document covers the "data input" portion of the validation process.

2.0 Methodology

2.1 The STP Operations Department is to designate four (4) of the original eleve. (11) operations personnel to complete the attached questionnaire.

2.2 Completed questionaires are to be submitted to TPT.

INSTRUCTION

1. Operator shall review stated problem by review of the mosaic.

2. Check the new panel layouts and determine if the revised layout corrects the problem. If it does not, state why in remarks column.

3. Check to see that the revision does not create a new problem. If it does, indicate why in the remarks column.

PROBLEM REPORTED IN OER REPORT

A. WORKSPACE

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. INDICATORS (PRESSURE, TEMPERATURE, FLOW) TOO HIGH ON PANELS				
2. ANNUNCIATORS HARD TO READ				
3. PERMISSIVE PANEL HARD TO READ FROM RO PANEL				
4. RECORDERS TOO HIGH ON PANEL				
5. SYNCH. SCOPE ON 010 TOO HIGH				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

A. WORKSPACE

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
6. BISTABLE STATUS LIGHTS HARD TO READ				

REMARKS: _____

7. AUXILIARY FEED FLOW INDICATORS HARD TO READ				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

B. CONTROLS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. TURBINE CONTROLS AND GENERATOR VOLTAGE AND BREAKER CONTROLS ARE TOO FAR APART				
2. AUXILIARY FEEDWATER CONTROLS ARE SCATTERED				
3. CONTROLS ARE NOT MIMICED AND HARD TO IDENTIFY				
4. VCT CONTROLS ARE POORLY ARRANGED				
5. MAIN FEEDWATER SYSTEM CONTROLS NOT GROUPED PROPERLY				

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

B. CONTROLS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
6. ESF CONTROLS INCONSISTENT ACROSS 001, 002, AND 003				
7. STEAM DUMP CONTROL SWITCHES ARE TOO FAR AWAY FROM STEAM DUMP CONTROLLERS				
8. ONE SET OF MANUAL SI SWITCHES SHOULD BE ON ESF PANELS				
9. HVAC SPREAD ALL OVER PANELS				
10. CONTROLS REQUIRE EXCESSIVE OPERATOR MOVEMENT				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

B. CONTROLS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
11. CONTROLS ARE NOT STANDARDIZED BY CONTROL FUNCTION				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

C. CONTROLS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. BOARDS ARE TOO TALL				
2. SMALL OPERATORS WILL HAVE PROBLEMS REACHING CERTAIN CONTROLS ON VERTICAL PANELS				
3. SOME CONTROLS AND ALL RECORDERS ARE HARD TO REACH, EVEN FOR TALL PERSONS				
4. ORPI CONTROLS ON 005 IMPOSSIBLE TO REACH				
5. BTRS CONTROLS ON 004 HARD TO REACH				

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

D. CONTROLS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. 004 ILLOGICALLY ARRANGED				
2. TURBINE DRAIN SWITCHES ARE SCATTERED				
3. GENERATOR CONTROLS SHOULD BE NEARER TURBINE CONTROLS				
4. CONTROLS FOR SAME SYSTEM ARE ON DIFFERENT PANELS OR SPREAD TOO MUCH ON ONE PANEL				
5. RESET SWITCHES ON ESF BOARDS POORLY ARRANGED				

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

D. CONTROLS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
6. CVCS SYSTEM CONTROLS NOT INTEGRATED				
7. AUXILIARY FEEDWATER SYSTEM ILLOGICAL				
8. FEEDPUMP MASTER CONTROLLER SHOULD BE NEARER THE MIDDLE OF 006				
9. CONTROLS ARE TOO SCATTERED ABOUT THE PANELS				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

E. ANNUNCIATORS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. ANNUNCIATORS SHOULD BE ARRANGED BY DEGREE OF IMPORTANCE (NEED PRIORITIZATION)				
2. LAYOUT IS INCONSISTENT WITH WESTINGHOUSE DESIGN FOR PERMISSIVES AND IS NOT LABELED FOR CLEAR UNDERSTANDING				
3. PERMISSIVES SHOULD BE ON SEPARATE PANEL WITH PERMISSIVE NUMBER				
4. PERMISSIVES NEED AUDITORY TONE WHEN ACTUATED AND WHEN RESET				
5. NEED FIRST-OUT INDICATIONS				

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

E. ANNUNCIATORS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
6. ANNUNCIATORS ARE HARD TO READ				
7. COMMON SYSTEMS ARE NOT GROUPED TOGETHER				
8. MANY ALARMS ON 007 (e.g. RCB AND LOOSE PARTS MONITORING) SHOULD BE ON 005				
9. ANNUNCIATOR LAYOUT IS ILLOGICAL WITH RESPECT TO SYSTEMS				
10. SHOULD BE ABLE TO SILENCE AN ALARM FROM ANY PANEL AND ACKNOWLEDGE FROM SYSTEM PANEL				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

E. ANNUNCIATORS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
11. RECOMMEND COLOR CODED ANNUNCIATOR SYSTEM				

REMARKS: _____

12. PANELS CONTAIN TOO MANY MISCELLANEOUS ALARMS				

REMARKS: _____

13. CONTROLS FOR A GIVEN SYSTEM ARE ON DIFFERENT PANEL FROM THEIR CORRESPONDING ANNUNCIATOR WINDOWS				

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

F. ANNUNCIATORS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. TOO MANY HIGH/LOW INPUTS (NEED INDICATION OF STATUS NEARBY IF MULTIPLE INPUT ALARMS ARE TO BE USED)				

REMARKS: _____

2. COMMON ALARM ANNUNCIATORS SHOULD BE CAREFULLY REVIEWED				

REMARKS: _____

3. THESE ARE SEVERAL GENERAL CATEGORY ALARMS				

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

G. ANNUNCIATORS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. THERE ARE NO FIRST-OUTS (THEY ARE NEEDED BADLY)				

REMARKS: _____

2. HIGHLY RECOMMEND THAT FIRST-OUT FEATURE BE INCORPORATED INTO DESIGN				

REMARKS: _____

3. IN THE EVENT OF COMPUTER OUTAGE, OPERATOR HAS NO WAY TO DIAGNOSE WHAT CAUSED A PLANT TRIP				

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

H. ANNUNCIATORS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. NO ANNUNCIATOR PRIORITIES HAVE BEEN ESTABLISHED				
2. ANNUNCIATORS NEED TO BE COLOR-CODED BY PRIORITY				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

I. ANNUNCIATORS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. TILES ARE TOO SMALL AND TOO CLUTTERED				
2. TOO MANY LETTERS IN SMALL AREA				
3. DIFFICULT TO DISTINGUISH AMONG TILES				
4. POOR LABELING				
5. INCONSISTENT ABBREVIATIONS				

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

I. ANNUNCIATORS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
6. HARD TO READ AND IDENTIFY				

REMARKS: _____

7. LABELS ARE INCONSISTENT WITHIN PANELS AND ACROSS PANELS				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

J. LABELS AND LOCATION AIDS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. LABELING NEEDS TO BE REVIEWED FOR ACCURACY AND CONSISTENCY WITH FSARs AND WESTINGHOUSE TECH MANUALS				
2. RECORDERS (e.g. STEAM GENERATOR LEVEL, STEAM FLOW) ARE POORLY LABELED				
3. NEED MAJOR SYSTEM LABELS (ESPECIALLY ON ESFs)				
4. LABELS ON CONTROLLERS NEED TO INCLUDE THE SYSTEM OR FUNCTION BEING CONTROLLED				
5. RECORDER LABELS DO NOT INDICATE WHAT IS RECORDED (RCP AND SG)				

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

K. LABELS AND LOCATION AIDS

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. VERY LITTLE DEMARCATION IS USED				
2. DEMARCATION IS USED ONLY ON ESF PANELS AND IT IS NOT LABELED				
3. DEMARCATION IS NEEDED ON PANELS 004, 005, 007, 008 AND 009				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

L. PANEL LAYOUT/INTEGRATION

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. NEED MORE LOGICAL AND FUNCTIONAL GROUPINGS				
2. NEED BETTER DEMARCATION AND BETTER LABELING				
3. 004, 005, 006 AND 007 ARE ESPECIALLY POORLY LAID OUT				
4. MANY OF PERIPHERAL PANELS THAT ARE OUTSIDE OF THE PRIMARY OPERATING AREA NEED TO BE INCLUDED IN MAIN PANEL LAYOUT				
5. ELECTRICAL CONTROLS ARE MUCH TOO FAR FROM TURBINE CONTROLS				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

L. PANEL LAYOUT/INTEGRATION

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
6. FEED PUMP MASTER CONTROLLER SHOULD BE LOCATED BETWEEN INDIVIDUAL CONTROLS				
7. PANELS NEED EXTENSIVE REARRANGEMENT				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

M. PANEL LAYOUT/INTEGRATION

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
1. THE FOLLOWING SYSTEMS ARE ILLOGICALLY GROUPED: RHR AND CVCS				
TURBINE TO GENERATOR				
MAIN FEEDWATER				
AUXILIARY FEEDWATER				
EHC CONTROLS				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

PROBLEM REPORTED IN OER REPORT

M. PANEL LAYOUT/INTEGRATION

	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM
2. STEAM GENERATOR CONTROLS AND DISPLAYS ARE SPLIT				

REMARKS: _____

3. ROD POSITION INDICATION AND CONTROLS COULD BE BETTER INTEGRATED				

REMARKS: _____

REMARKS: _____

REMARKS: _____

REMARKS: _____

APPENDIX B

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	PROBLEM NUMBER	RESPONSES: PROBLEM CORRECTED	RESPONSES: PROBLEM NOT CORRECTED	RESPONSES: NO NEW PROBLEM	RESPONSES: CREATES NEW PROBLEM	REMARKS/COMMENT
A	1	4		3		
W	2	4		3		
O R K S P A C E	3	3		3	1	Markings not consistent for "P" numbers. New permissive not on panel; cannot evaluate. Permissives should be readily available e.g., P4 Rx TRP.
	4	3		2		
	5	3	1	2		Synch OK on 007. No problem with Synch on 007.
	6	3	1	2		New lights not on panel.
	7	4		3		Interchange FI indicators. (Note: Indicators fell off mock-up).

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	RESPONSES: PROBLEM NUMBER	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM	REMARKS/COMMENT
B	1	4		3		
C O N T R O L S	2	3		3		Still scattered, but improved.
	3	3		3		In general, mimics incorporated where necessary. All controls and systems not mimiced.
	4	4		3		
	5	4		3		
	6	4		3		
	7	4		3		
	8	1	1	2		No SI switch on ESF panels. Gone on 005.
	9	4		3		
	10	4		3		
	11	4		3		

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	RESPONSES: PROBLEM NUMBER	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM	REMARKS/COMMENT
C	1	1	2	3		Do not know what can be done. Cannot correct problem. Yes
CONTROLS	2	3	1	2		Possibly, with short operators changing recorder paper, CP-010 and 006 still have problems.
	3	3	1	2		Some controls and generator recorder PORV on 006; current and voltages on 010; valve leak on 001, surge tank 002 and some on 004.
	4	4		3		
	5	4		3		

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	PROBLEM NUMBER	RESPONSES: PROBLEM CORRECTED	RESPONSES: PROBLEM NOT CORRECTED	RESPONSES: NO NEW PROBLEM	RESPONSES: CREATES NEW PROBLEM	REMARKS/COMMENT
D	1	4		3		Mimics help a lot. Very good.
C O N T R O L S	2	4		3		
	3	4		3		
	4	4		3		Situation still exists but layed out best.
	5	4		3		
	6	4		3		
	7	4		3		
	8	1	2	2		The control is functional where it is.
	9	4		3		

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	PROBLEM NUMBER	RESPONSES: PROBLEM CORRECTED	RESPONSES: PROBLEM NOT CORRECTED	RESPONSES: NO NEW PROBLEM	RESPONSES: CREATES NEW PROBLEM	REMARKS/COMMENT
E	1	4		3		
	2	4		2	1	See A-3 Permissives
A	3	4		2	1	See A-3 Permissives
N	4	1	2	1		Not ready yet
U	5	4		3		
N C I A T O R S	6	4		3		Should be OK, if 2" x 3".
	7	4		3		
	8	4		3		
	9	4		3		
	10	4		3		True
	11	3	1	3		
	12	4		3		
	13	4		3		

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	PROBLEM NUMBER	RESPONSES: PROBLEM CORRECTED	RESPONSES: PROBLEM NOT CORRECTED	RESPONSES: NO NEW PROBLEM	RESPONSES: CREATES NEW PROBLEM	REMARKS/COMMENT
F	1	3	1	3		Still have Hi/Lo but with indication, agree with parenthesis statement.
ANNUNCIATORS	2	3	1	3		Reviewed with respect to "1F" indication on function i.e., flow Hi/Lo is near annunciator.
	3	4		3		

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	PROBLEM NUMBER	RESPONSES: PROBLEM CORRECTED	RESPONSES: PROBLEM NOT CORRECTED	RESPONSES: NO NEW PROBLEM	RESPONSES: CREATES NEW PROBLEM	REMARKS/COMMENT
GANNUNCIATORS	1	4		3		
	2	4		3		
	3	4		3		Should have enough indication on board.

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	PROBLEM NUMBER	RESPONSES: PROBLEM CORRECTED	RESPONSES: PROBLEM NOT CORRECTED	RESPONSES: NO NEW PROBLEM	RESPONSES: CREATES NEW PROBLEM	REMARKS/COMMENT
H	1	4		3		
ANNUNCIATORS	2	4		3		

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

	RESPONSES					
QUESTIONNAIRE SECTION	PROBLEM NUMBER	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM	REMARKS/COMMENT
I	1	4		3		
A	2	4		3		
N	3	4		3		
N	4	4		3		
U	5	4		3		
N	6	4		3		
C	7	4		3		
I						
A						
T						
O						
R						
S						

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	PROBLEM NUMBER	RESPONSES: PROBLEM CORRECTED	RESPONSES: PROBLEM NOT CORRECTED	RESPONSES: NO NEW PROBLEM	RESPONSES: CREATES NEW PROBLEM	REMARKS/COMMENT
J	1	3	1	3		"Blank"
L	2	4		3		
A						
B	3	4		3		
E						
L	4	4		3		
S						
	5	3	1	3		"Blank"
A						
N						
D						
L						
O						
C						
A						
T						
I						
O						
N						
A						
I						
D						
S						

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	RESPONSES: PROBLEM NUMBER	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM	REMARKS/COMMENT
K	1	4		3		
LABELS	2	3	1	3		Too much on 003-subsystem labels. Should be the same color as their demarcation lines.
AND	3	3		3		Single color demarcation inadequate.
LOCATION AIDS						

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	RESPONSES: PROBLEM NUMBER	PROBLEM CORRECTED	PROBLEM NOT CORRECTED	NO NEW PROBLEM	CREATES NEW PROBLEM	REMARKS/COMMENT
PANEL LAYOUT/INTEGRATION	1	4		3		
	2	3	1	3		"Blank"
	3	4		3		
	4	4		3		Cannot determine if there are any new problems at this time.
	5	4		3		
	6	1	2	2		See D-8. Located on side but OK. "Blank". No.
	7	4		3		

TABLE B-1

SUMMARY OF OPERATOR RESPONSES TO OER VALIDATION QUESTIONNAIRE

QUESTIONNAIRE SECTION	PROBLEM NUMBER	RESPONSES: PROBLEM CORRECTED	RESPONSES: PROBLEM NOT CORRECTED	RESPONSES: NO NEW PROBLEM	RESPONSES: CREATES NEW PROBLEM	REMARKS/COMMENT
PANEL LAYOUT/INTEGRATION	1	4		3		
	2	4		3		With exception of feedwater.
	3	4		3		

Control Room Design Review

Operating Experience Review Report

The South Texas Project

HOUSTON LIGHTING & POWER COMPANY