SAIC-87/3091

TECHNICAL EVALUATION REPORT OF THE DETAILED CONTROL ROOM DESIGN REVIEW FOR OMAHA PUBLIC POWER DISTRICT'S FORT CALHOUN NUCLEAR STATION

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Science Applications International Corporation

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1.0 INTRODUCTION

The Omaha Public Power District submitted a Detailed Control Room Design Review (DCRDR) Program Plan to the Nuclear Regulatory Commission (NRC) on October 25, 1983 (Reference 1) in order to satisfy the Program Plan requirements of NUREG-0737, Supplement 1 (Reference 2) for the Fort Calhoun Nuclear Station (Fort Calhoun). The NRC staff reviewed the submittal with reference to the nine DCRDR requirements of NUREG-0737, Supplement 1, and the guidance provided in NUREG-0700 (Reference 3) and NUREG-0800 (Reference 4).

NUREG-0737, Supplement 1 requires that a Program Plan be submitted within two months of the start of the DCRDR. Consistent with the requirements of NUREG-0737, Supplement 1, the Program Plan should describe how the following elements of the DCRDR will be accomplished:

1. Establishment of a qualified multidisciplinary review team.

2. Function and task analyses to identify control room operator tasks and information and control requirements during emergency operations.

3. A comparison of display and control requirements with a control room inventory.

4. A control room survey to identify deviations from accepted human factors principles.

5. Assessment of human engineering discrepancies (HEDs) to determine which HEDs are significant and should be corrected.

6. Selection of design improvements.

7. Verification that selected design improvements will provide the necessary correction.

8. Verification that improvements will not introduce new HEDs.

9. Coordination of control room improvements with changes from other programs such as Safety Parameter Display System (SPDS), operator training, Regulatory Guide 1.97 instrumentation, and upgraded emergency operating procedures.

The staff comments on the Omaha Public Power District's DCRDR Program Plan review were forwarded to Omaha Public Power District by letter dated December 30, 1983 (Reference 5). Based on the Program Plan review, the staff concluded that an in-progress audit was necessary in order to address the concerns regarding Omaha Public Power District's approach for satisfying the nine requirements of a DCRDR specified in NUREG-0737, Supplement 1. An in-progress audit was conducted between February 4 and 8, 1985 at Fort Calhoun and the results of that audit were documented in an NRC memorandum dated March 12, 1985 (Reference 6). The audit team consisted of an NRC staff member, a Science Applications International Corporation (SAIC) representative, and a representative from Comex Corporation. Together, the team represented the disciplines of nuclear systems engineering, reactor operations, and human factors engineering.

NUREG-0737, Supplement 1 requires that a Summary Report be submitted at the end of the DCRDR. As a minimum, it shall:

1. Outline proposed control room changes.

2. Outline proposed schedules for implementation.

3. Provide summary justification for HEDs with safety significance to be left uncorrected or partially corrected.

Omaha Public Power District submitted a Summary Report for Fort Calhoun to the NRC on April 1, 1985 (Reference 7).

Based on the Summary Report review as documented in an NRC memorandum dated September 13, 1985 (Reference 8), the staff concluded that Omaha Public Power District should submit further documentation of its DCRDR in order to complete the staff's review. Omaha Public Power District submitted a supplement to its Summary Report dated February 26, 1987 (Reference 9). The supplement to the Summary Report was received by SAIC and a pre-implementation audit was conducted between September 14 and 17, 1987. The audit team was multidisciplinary and included NRC staff members, SAIC representatives, and a representative from Comex Corporation.

This Technical Evaluation Report reflects the consolidated observations, findings, and conclusions of the audit team members. A list of audit meeting attendees is provided in Attachment 1 and the audit agenda is provided in Attachment 2.

2.0 EVALUATION

The purpose of the evaluation was to determine whether the nine DCRDR requirements in NUREG-0737, Supplement 1 had been satisfied. The evaluation was performed by comparing the information provided by the licensee with the criteria in NUREG-0800, Section 18.1, Revision 0, Appendix A of the Standard Review Plan. The reviewers' evaluation of the DCRDR for Fort Calhoun and a summary of the criteria from the Standard Review Plan are provided below.

2.1 Establishment of a Qualified Multidisciplinary Review Team

The organization for conduct of a successful DCRDR can vary widely but is expected to conform to some general criteria. Overall administrative leadership should be provided by a utility employee. The DCRDR team should be given sufficient authority to carry out its mission. A core group of specialists in the fields of human factors engineering and nuclear engineering are expected to participate with assistance as required from personnel in other disciplines. Staffing for each technical task should bring appropriate expertise to bear. Human factors expertise should be included in the staffing for most, if not all, technical tasks. Finally,

the DCRDR team should receive an orientation briefing on DCRDR purpose and objectives which contributes to the success of the DCRDR. NUREG-0800, Section 18-1, Appendix A describes criteria for the multidisciplinary review team in more detail.

The licensee's DCRDR staffing consists of a management team of three utility and two General Physics Corporation personnel, and a core working group of four utility personnel. The disciplines and experience provided by this DCRDR staff are those necessary for a qualified multidisciplinary DCRDR team. Members of the DCRDR team received DCRDR orientation and training through the plant General Employee Training Course, observation of plant operations, and use of emergency operating procedures.

It is the review team's judgment that the licensee has met the NUREG-0737, Supplement 1 requirement for establishment of a qualified multidisciplinary review team.

2.2 System Function and Task Analysis

The purpose of the system function and task analysis is to identify the control room operators' tasks during emergency operations and to determine the information and control capabilities the operators need in the control room to perform those tasks. An acceptable process for conducting the function and task analysis is as follows:

1. Analyze the functions performed by systems in responding to transients and accidents in order to identify and describe those tasks operators are expected to perform.

2. For each task identified in Item 1 above, determine the information (e.g., parameter, value, and status) which signals the need to perform the task, the control capabilities needed to perform the task, and the feedback information needed to monitor task performance.

3. Analyze the information and control capability needs identified in Item 2 above to determine appropriate characteristics for displays and controls to satisfy those needs.

The licensee based the function and task analysis upon the Combustion Engineering Emergency Procedure Guidelines and the Fort Calhoun specific upgraded Emergency Operating Procedures. The licensee identified and analyzed all tasks and subtasks and has adequately determined task/subtask information and control requirements and the appropriate characteristics for displays and controls.

It is the review team's judgment that the licensee has met the NUREG-0737, Supplement 1 requirement for a function and task analysis to identify control room operator tasks and information and control requirements during emergency operations.

2.3 Comparison of Display and Control Requirements with a Control Room Inventory

The purpose of comparing display and control requirements to a control room inventory is to determine the availability and suitability of displays and controls required to perform the Emergency Operating Procedures. The success of this element depends on the quality of the function and task analysis and the control room inventory. The control room inventory should be a complete representation of displays and controls currently in the control room. The inventory should include appropriate characteristics of current displays and controls to allow meaningful comparison to the results of the function and task analysis. Unavailable or unsuitable displays and controls should be documented as HEDs.

The display and control requirements identified from the task analysis were compared to a control room inventory provided by a photo mock-up of the control room. The mock-up was of sufficient fidelity to allow a successful verification of availability and suitability of displays and controls to meet the operator's information and control requirements.

It is the review team's judgment that the licensee has met the NUREG-0737, Supplement 1 requirement for a comparison of display and control requirements with the control room inventory.

2.4 Control Room Survey to Identify Deviations from Accepted Human Factors Principles

The key to a successful control room survey is a systematic comparison of the control room to accepted human engineering guidelines and human factors principles. One accepted set of human engineering guidelines is provided in Section 6 of NUREG-0700; however, other accepted human factors standards may be chosen. Discrepancies should be documented as HEDs.

Omaha Public Power District's control room survey used Section 6 of NUREG-0700 for its evaluation criteria. HEDs were identified using the control room mock-up, the actual control room, and remote shutdown panels. The survey process was systematic and complete.

It is the audit team's judgment that the licensee has met the NUREG-0737, Supplement 1 requirement for a control room survey to identify deviations from accepted human factors principles.

2.5 Assessment of Human Engineering Discrepancies (HEDs) to Determine Which Are Significant and Should Be Corrected

Based on the guidance of NUREG-0700 and the requirements of NUREG-0737, Supplement 1, all HEDs should be assessed for significance. The potential for operator error and the consequence of that error in terms of plant safety should be systematically considered in the assessment. Both the individual and aggregate effects of HEDs should be considered. The result of the assessment process is a determination of which HEDs should be corrected because of their potential impact on plant safety. Decisions on whether HEDs are safety-significant should not be compromised by consideration of such issues as the means and potential costs of correcting HEDs.

The initial step in the assessment process was to screen out those HEDs determined, after a review, to be invalid or not properly identified. Those

HEDs determined to be valid were screened to identify those that could be resolved through "obvious enhancement solutions." HEDs that could not be resolved through "obvious enhancement solutions" were assessed according to the potential for error and their impact on plant safety status. The HEDs were configured according to ratings resulting from these assessments and prioritized according to the "necessity for correction." The process for categorizing and prioritizing the HEDs is considered to be adequate.

It is the review team's judgment that the licensee has met the NUREG-0737, Supplement 1 requirement for an assessment of HEDs to determine which are significant and should be corrected.

2.6 Selection of Design Improvements

The purpose of selecting design improvements is to determine corrections to HEDs identified from the review phase of the DCRDR. Selection of design improvements should include a systematic process for the development and comparison of alternative means of resolving HEDs.

During the preimplementation audit, the licensee made a presentation showing 250 of the 496 HEDs generated by the DCRDR Project to be resolved. Of these 250 HED resolutions, which have occurred since submission of the Summary Report in 1985, none were corrected or resolved through the actual modification of any control room equipment or structures. Except for design engineering work, the Fort Calhoun DCRDR project entered a period of inactivity following submission of the Summary Report. The following are specific concerns and requests for licensee commitments.

Modification requests generated by the DCRDR team to correct HEDs were reviewed. Current requests for advance engineering planning to support the correction of safety-significant HEDs is oriented toward the 1990 refueling outage rather than the 1988 outage. The audit team specifically requested that the planning process for modification packages FC-85-143 and FC-85-150 be accelerated to correct HEDs 222 and 256 during the 1988 refueling outage. The licensee has agreed. HED 222 involves providing separation between the containment isolation emergency operation and override controls. HED 256 involves providing safeguards on the diesel generator emergency start and breaker controls.

The licensee should document scheduling of other HEDs which will be corrected by the modification requests, maintenance orders or other means as described during the preimplementation audit (Attachment 3).

HEDs 482 through 496 were generated as a result of the original task analysis performed using revisions 1 and 2 of the Combustion Engineering (CE) Emergency Procedure Guidelines (EPGs). Resolution of these HEDs was deferred until the completion of a task analysis using the Fort Calhoun version of the Emergency Operating Procedures (EOPs) generated from the EPGs. The licensee reports that the task analysis has been completed and the results were presented verbally during the preimplementation audit. The licensee should provide a summary description of the resolution of these HEDS in a supplemental DCRDR report.

In reviewing the Fort Calhoun control room mock-up, the NRC audit team noted several potential HEDs. In comparing these HEDs to those identified by the licensee, the team found that while most had been identified, the resolution was less than expected for nine HEDs. Also, the licensee assessed all of the subject HEDs as "no change recommended." Illustrative examples of this group of HEDs include HEDs 88 and 93, which relate to either dim control board lights or the fact that there is no lamp test feature for most of the normally off, single bulb indicators in the control room. The lack of a test feature for normally off, single bulb or filament indicator bulbs in control rooms is a concern. The NRC requested that the licensee reevaluate design decisions associated with correcting the deficiencies associated with HEDs 54, 88, 93, 97, 119, 122, 197, 207, and 262.

Several of the HEDs which were generated as a result of the operator questionnaires have been inadequately dispositioned. Several of the HEDs were resolved by means of the demarcation and labeling program. It was not possible for the NRC team to determine whether the proposed demarcation work seen in the control room mock-up addresses each of the specific operator concerns. The HED descriptions from the operator comments are too vague to permit an understanding about the concern in order to judge the nature of the required correction, and the HEDs have not been properly annotated with a description of the specific proposed control board demarcation and labeling changes that are intended to address the apparent problem.

Descriptions of the discrepancies such as that provided in HED 327, "CB-1-2-3 causes confusion" do not provide assurance that the DCRDR team fully understands the potential problem which they are attempting to correct with demarcation and labeling. The HEDs which should be better researched, documented, and annotated with specific corrective actions are: 294, 295, 302, 303, 304, 305, 306, 307, 310, 311, 312, 316, 317, 318, 327, and 331.

The NRC audit team reviewed the initial relabeling effort in place on the control room mock-up. The new labels contain numerous inconsistencies in the use of abbreviations and format. Some component and system labels still have as many as three different abbreviations applied. Additionally, electrical bus sources for equipment were not included in most of the labels on the mock-up while HED 303 suggests that such information may be desirable.

In summary, the selection of design improvements requirement of the Fort Calhoun DCRDR will require more effort to ensure that the DCRDR project proceeds to completion on schedule. It is therefore the review team's judgment that the licensee has not met the NUREG-0737, Supplement 1 requirement for selection of design improvements.

2.7 Verification that Selected Design Improvements Will Provide the Necessary Correction

A key criterion of DCRDR success is a consistent, coherent, and effective interface between the operator and the control room. One good way to satisfy that criterion is through iteration of the processes of selection of design improvements, verification that selected improvements will provide the necessary correction, and verification that the improvements will not introduce new HEDs. According to NUREG-0800, techniques for the verification process might include partial resurveys of mocked-up panels, applied experiments, engineering analyses, environmental surveys, and operator interviews. The consistency, coherence, and effectiveness of the entire operator-control room interface are important to operator performance. Thus, evaluation of both the changed and unchanged portions of the control room is necessary during the verification process.

Omaha Public Power District uses an iterative process to develop and verify HED corrections. Prior to installation of changes to the control room, the licensee modifies the control room mock-up to reflect the HED-corrected control boards. Human factors and operations personnel review the modified mock-up to verify that the intended improvements provide correction of the HEDs without introducing new HEDs.

It is the review team's judgment that the licensee has met the NUREG-0737, Supplement 1 requirement for verification that selected improvements will produce the necessary correction.

2.8 Verification that Selected Design Improvements Will Not Introduce New HEDs

As described above, it is the review team's judgment that the licensee has met the NUREG-0737, Supplement 1 requirement for verification that the selected improvements do not introduce new HEDs.

2.9 Coordination of Control Room Improvements With Changes From Other Programs, such as the Safety Parameter Display System, Operator Training, Regulatory Guide 1.97 Instrumentation, and Upgraded Emergency Operating Procedures

Improvement of emergency response capability requires coordination of the DCRDR with other activities. Satisfaction of Regulatory Guide 1.97 requirements and the addition of the Safety Parameter Display System (SPDS) necessitate modifications and additions to the control room. The modifications and additions should be specifically addressed by the DCRDR. Exactly how the modifications are addressed depends on a number of factors including the relative timing of the various emergency response capability upgrades. Regardless of the means of coordination, the result should be integration of Regulatory Guide 1.97 instrumentation and SPDS equipment into a consistent, coherent, and effective control room interface with the operators.

The licensee has a designated individual who controls the emergency upgrade programs. In addition, the studies are being coordinated and integrated in the simulator of the control room. Training associated with

the various modifications resulting from the DCRDR occurs as modifications are installed, after each refueling outage and prior to plant startup.

It is the review team's judgment that the licensee has met the NUREG-0737, Supplement 1 requirement for coordination of the DCRDR with other Supplement 1 improvement programs such as SPDS, operator training, Regulatory Guide 1.97 instrumentation, and upgraded EOPs.

3.0 CONCLUSIONS

Omaha Public Power District submitted to the NRC a supplement to the DCRDR Summary Report for Fort Calhoun on February 26, 1987. In order to resolve the concerns resulting from the review of that supplement, a pre-implementation audit was conducted between September 14 and 17, 1987. The NRC staff, SAIC, and Comex representatives performed a detailed evaluation of Omaha Public Power District's DCRDR. The evaluation included examination of Omaha Public Power District's DCRDR documentation, discussions with the licensee's DCRDR team, inspection of the existing control room, and inspection of mock-ups and proposed corrective action modifications. This report reflects the consolidated findings and conclusions of the NRC review team. The conclusions are provided below, organized by the nine NUREG-0737, Supplement 1 DCRDR requirements.

1. It is the review team's judgment that the Omaha Public Power District has met the NUREG-0737, Supplement 1 requirement for establishment of a qualified multidisciplinary review team.

2. It is the review team's judgment that the Omaha Public Power District has met the NUREG-0737, Supplement 1 requirement for a function and task analysis to identify control room operator tasks and information and control requirements during emergency operations.

3. It is the review team's judgment that the Omaha Public Power District has met the NUREG-0737, Supplement 1 requirement for a comparison of display and control requirements with the control room inventory.

4. It is the review team's judgment that the Omaha Public Power District has met the NUREG-0737, Supplement 1 requirement for a control room survey to identify deviations from accepted human factors principles.

5. It is the review team's judgment that the Omaha Public Power District has met the NUREG-0737, Supplement 1 requirement for an assessment of HEDs to determine which are significant and should be corrected.

6. It is the review team's judgment that the Omaha Public Power District has not met the NUREG-0737, Supplement 1 requirement for selection of design improvements. As discussed in section 2.6, there are a number of specific concerns which should be addressed by the licensee in the form of commitments and supplemental information submissions. A summary listing of required actions is provided in Section 4.0 below.

7. It is the review team's judgment that the Omaha Public Power District has met the NUREG-0737, Supplement 1 requirement for verification that selected improvements will produce the necessary correction.

8. It is the review team's judgment that the Omaha Public Power District has met the NUREG-0737, Supplement 1 requirement for verification that the selected improvements do not introduce new HEDs.

9. It is the review team's judgment that the Omaha Public Power District has met the NUREG-0737, Supplement 1 requirement for coordination of the DCRDR with other Supplement 1 improvement programs such as SPDS, operator training, Regulatory Guide 1.97 instrumentation and upgraded EOPs.

4.0 DOCUMENTATION NEEDED IN SUPPLEMENTAL SUBMITTAL

1. Reevaluate and outline the design improvements which would correct the following HEDs: 54, 88, 93, 97, 119, 122, 197, 207, and 262.

2. Document the commitment by Omaha Public Power District at the September audit to reschedule safety-related HEDs 222 and 256 in the Fall of 1988 versus Spring of 1990.

3. Document the schedules for correcting HEDs being processed by engineering: (Items 1 through 32 for modification summary presentations, items in the maintenance orders and items under the "Other" section in Attachment 3 to this report).

4. Determine if any control room indicator lights (normally off and non-testable) are safety-related. If the bulbs are safety-related, provide an outline of what action will be taken to correct the problem. See NUREG-0700 guideline 6.5.3.1 regarding precautions to assure availability of indicator bulbs.

5. Outline the changes to the proposed control room improvements described in task analysis related HEDs 482 through 496. This section should include a description of proposed modification changes resulting from the upgraded EOP task analysis.

6. Outline the general enhancement program at Fort Calhoun, including: labeling, demarcation, color coding, and meter banding. Describe specifically, what enhancement modifications will be selected to correct the following HEDs: 294, 295, 302, 303, 305, 306, 307, 310, 311, 312, 316, 317, 318, 327, and 331.

5.0 REFERENCES

1. "Program Plan for the Fort Calhoun Control Room Design Review," attached to Letter from W.C. Jones, Omaha Public Power District, to J.R. Miller, USNRC, October 25, 1983.

2. NUREG-0737, Supplement 1, "Requirements for Emergency Response Capability" (Generic Letter No. 82-33), December 17, 1982.

3. NUREG-0700, "Guidelines for Control Room Design Reviews," September 1981.

4. NUREG-0800, "Standard Review Plan," Section 18.1, "Control Room," and Appendix A, "Evaluation Criteria for Detailed Control Room Design Reviews (DCRDR)," September 1984.

5. "Review of the Fort Calhoun Station Detailed Control Room Design Review Program Plan," U.S. Nuclear Regulatory Commission, December 30, 1983.

6. "In-Progress Audit of the Detailed Control Room Design Review for Omaha Public Power District's Ft. Calhoun Station," attached to Memorandum from W.H. Regan, USNRC, to J.R. Miller, USNRC, dated March 12, 1985.

7. "Control Room Design Review Summary Report for the Omaha Public Power District Fort Calhoun Nuclear Station," Omaha Public Power District, April 1, 1985.

8. "Human Factors Engineering Branch Detailed Control Room Design Review Input to the Safety Evaluation Report for the Fort Calhoun Station," attached to Memorandum from D.L. Ziemann, USNRC, to G. Lainas, USNRC, September 13, 1985.

9. "Fort Calhoun Station Control Room Design Review Summary Report Supplement," attached to Letter from R.L. Andrews, Omaha Public Power District to USNRC, February 26, 1987.

ATTACHMENT 1

ATTENDEES AT THE FORT CALHOUN AUDIT FOR THE
DETAILED CONTROL ROOM DESIGN REVIEW
(SEPTEMBER 14-17, 1987)

AUDIT ATTENDEES

Name	Affiliation
Anthony Bournia	NRC/PD-4 - Project Manager
Richard J. Eckenrode	NRC/DLPQE/HFAB
Garmon West, Jr.	NRC/DLPQE/HFAB
Joseph DeBor	SAIC - HF/Systems Engineer
Jim O'Connor	OPPD - Project Manager
Mike Elzway	OPPD - Senior Engineer
Bill Gartner	OPPD
Linda Gondrum	OPPD
Mark Gutierrez	OPPD - STA/Systems Engineer
Tom Heng	OPPD - Senior Engineer Reactor Physics
Larry Sealock	OPPD - Supervisor Computer Applications
Robert Johnston	OPPD - Programmer Analysis RCTS
Gary Bethke	COMEX - Plant Operations/Nuclear Engineer
Joe Moyer	SAIC - Human Factors Engineer
James J. Fisicaro	OPPD - Supervisor Nuclear Regulatory and Industry Affairs
Deborah Munderloh	OPPD - Senior Engineer Nuclear Regulatory and Industry Affairs
Larry Kusek	OPPD - Acting Plant Manager
Joe Gasper	OPPD - Administrative & Training Services
Nina Thomas	SAIC - System Analysis
Phil Harrell	NRC/SRI/FCS/R-IV
Randy Mueller	OPPD - Plant Engineer
W. Garry Gates	OPPD - Manager Fort Calhoun Station
Kevin Holthaus	OPPD - Manager Reactor and Computer Technical Services
Robert Liddle	GPC - HF Engineer

ATTACHMENT 2

TENTATIVE AGENDA FOR OMAHA PUBLIC POWER DISTRICT'S
FORT CALHOUN SEPTEMBER 1987 AUDIT

Tentative Agenda for the Combined DCRDR/SPDS Audit
at Omaha Public Power District's Fort Calhoun Station, Unit 1

September 14 through September 17, 1987

DAY 1

DCRDR Audit Schedule

2 pm - Introduction of the NRC Audit Team (NRC)
2:15 pm - Presentation on individual DCRDR requirements (NRC)
3 pm - Brief presentation on the DCRDR program by the licensee
4 pm - Tour of Control Room*

DAY 2

8:30 am - Selection of Design Improvements

a. Discuss the selection of design improvement process (licensee).

b. Review the results of the selection of design improvements.

- Discuss the licensee's prepared responses to the staff's HED concerns.

- Discuss the schedules for implementing design improvements.

12 noon - BREAK FOR LUNCH

1 pm - Conduct Sample Survey of the Control Room Modifications in the Control Room (Consider use of mockup)

- NRC Audit team caucus
- Comparison of current NRC Audit Team's findings with licensee's DCRDR team

- Concurrently, it is requested that the following SPDS-related documentation be available for review:

- Functional Requirements
- Data Requirements
- System/Subsystem Specifications
- Program Specifications
- Data Base Specifications

*Obtain authorization to use camera to take pictures of the control room.

Day 3

8:30 am - Introduction and Briefing (NRC)

- Presentation on individual SPDS requirements (NRC)

9:15 am - Overview of SPDS Implementation (Licensee)

- Definition of SPDS (scope)
- Parameter Selection Process
- Human Factors Engineering Program
- Reliability
- Verification and Validation Program
- Implementation Program
- Project Milestones

12 noon - BREAK FOR LUNCH

1 pm - Critical Safety Function/Parameter Selection (Licensee)

- Parameter Selection
- Critical Safety Functions (vs. NUREG-0737)
- Critical Safety Functions/Parameter Relationships
- Range of Events/Conditions covered by parameters
- Safety Evaluation Report Concerns

2:30 pm - Visit Control Room (CR)/Technical Support Center (TSC)

- SPDS Demonstration
- Human Factors Engineering Review

  - Display Location (CR)
  - Display Format (TSC)
  - Display Techniques (TSC)
  - Open Concerns of SER of June 7, 1985: human factors review, report, and implementation schedule

- Operations Review

  - Concise Display (TSC)
  - Parameter identified in SAR on SPDS (TSC)
  - Critical Safety Functions (0737 and Plant) (TSC)
  - Reliability (Hardware/Software) (CR)
  - Response Times (Display Call-up and Screen Update) (CR)
  - Integrated into Emergency Operations (CR)
  - SPDS Parameter Values vs. Fixed Panel Values (Comparison) (CR)
  - Procedures and Training
  - Control Room SPDS vs. Simulator SPDS Comparison

DAY 4

8:30 am - System Design (Licensee)

- System Description
- Display Configuration
- Data Validity
- Security

System Verification and Validation (Licensee)

- Verification Test Plan
- Validation
- Maintenance and Configuration Control

Electrical Isolation

- Provide feedback on licensee's response on March 13, 1987 to request for additional information

10:30 am - Operator Interviews

- Shift Supervisor
- Reactor Operator
- Shift Technical Advisor

12 noon - BREAK FOR LUNCH

1 pm - Audit Team Caucus

4 pm - Exit Briefing (covering both DCRDR and SPDS)

ATTACHMENT 3

OMAHA PUBIC POWER DISTRICT HANDOUT FOR
RESOLUTIONS BY MODIFICATION, MAINTENANCE
ORDERS, AND OTHER MEANS

MODIFICATIONS

1. Modification Request FC-B1-51 will resolve HED 285 by increasing the capacity of the air conditioning units so that only one unit needs to be operating at a time. (1988 on line)

2. Modification Request FC-B4-159 will resolve HED 89 by replacing the metrascopes with new ones. (1988 outage)

3. Modification Request FC-85-125 will resolve HED 1 by relocating the steam generator blowdown controller to a lower position to make it easy to operate. Also labeling will be added. (1988 outage)

4. Modification Request FC-85-126 will resolve HED 5 by providing an alarm to annunciate the "OFF-AUTO" position of the condensate and feedwater selector switch. (1988 outage)

5. Modification Request FC-85-127 will resolve HED 16 by inserting a stop after position 10 on the vibration phase selector switch and painting positions 11 through 16 black so they do not show. (1988 outage)

6. Modification Request FC-85-128 will resolve HED 18 by modifyirg scales, if possible, or replacing the meters as necessary. (1988 outage)

7. Modification Request FC-85-129 will resolve HED 25 by reversing turbine drain valves indicating lights and legends position to conform to Fort Calhour color coding convention. (1988 outage)

8. Modification Request 85-130 will resolve HED's 31, 239 and 240 by implementing the recommendations stated in Appendix C (attached). (1988 outage)

9. Modification Request FC-85-131 will resolve HED's 42, 43 and 67 by replacing the process and area radiation monitor recorders with newer technology recorders or ERF computer input display. (1988 outage)

10. Modification Request FC-85-132 will resolve HED's 56, 162 and 164 by replacing the RC cold leg temperature analog meter with digital readout meters. (1988 outage)

11. Modification Request FC-85-133 will resolve HED 62 by reversing the logic of the lights so that light is illuminated when the cutout switch is in the engaged position. (1988 outage)

12. Modification Request FC-85-134 will resolve HED 64 by investigating the utilization of a different type of bulb to meet the NUREG-0700 luminance contrast ratio requirement. (1988 outage)

13. Modification Request FC-85-136 will resolve HED 80 by providing new instrumentation to increase margin of operation between the permissive and initiation setpoints. (1988 outage)

14. Modification Request FC-85-137 will resolve HED 81 by installing an easy to remove guard over the reactor trip pushbutton. (1988 outage)

15. Modification Request FC-85-138 will resolve HED's 82, 101, 120 and 274 by installing a rail on the front edge of benchboards CB-4 and CB-1-2-3 to prevent accidental operation of controls. (1988 outage)

16. Modification Request FC-85-139 will resolve HED's 85 and 160 by installing stop pins to prevent the use of more than four positions on the make-up water selector switch. Also, the positions will be labeled accordingly. (1988 outage)

17. Modification Request FC-86-051 will resolve HED's 4, 14 and 244 by replacing all G.E. "J" handle switches with larger switch handles. (1988 outage)

18. Modification Request FC-85-140 will resolve HED 92 by altering the pointers on the wide range CPS/PWR indicators and DPM indicators so as not to obscure scale markings. (1990 outage)

19. Modification Request FC-85-142 will resolve HED 110 by modifying the scales on Sigma meters to only have nine graduations between numerals. (1990 outage)

20. Modification Request FC-85-143 will resolve HED's 113 and 263 by replacing neon bulbs or increasing the luminance of existing indicators. (1990 outage)

21. Modification Request FC-85-146 will resolve HED's 125, 282, 283 and 385 by installing acoustical ceiling tile and/or sound deadening enclosures for computer equipment or relocating/replacing noise producing equipment to lower noise level type. (1990 outage)

22. Modification Request FC-85-148 will resolved HED 222 by separation of controls, either by moving the containment isolation emergency operate buttons downward or moving the override switch upward. (1990 outage)

23. Modification Request FC-85-149 will resolve HED's 219 and 250 by replacing the logarithmic scale FW-10 recirculation flow indicator with a linear scale indicating meter. (1990 outage)

24. Modification Request FC-85-150 will resolve HED 256 by providing guards on the top and bottom that will meet NUREG-0700 guidelines. (1990 outage)

25. Modification Request FC-85-151 will resolve HED 265 by replacing control handles with ones that are shape coded and consistent with other plant control handles. (1990 outage)

26. Modification Request FC-85-152 will resolve HED 266 by either modifying RC pressure meter scales to read in psia not in percent, or replacing the meters if altering the scales is not possible. (1990 outage)

27. Modification Request FC-85-153 will resolve HED 267 by either modifying the controller's pointer movement or replacing the controllers. (1990 outage)

28. Modification Request FC-85-154 will resolve HED 268 by interchanging the position of level and pressure meters. (1990 outage)

29. Modification Request FC-85-156 will resolve HED 467 by extending the meter pointer arm to bring the pointer closer to meter scale. (1990 outage)

30. Modification Request FC-85-158 will resolve HED 482 by providing containment temperature indication in the control room. Also, ERF computer display will be considered. (1990 outage)

31. Modification Request FC-87-08 will resolve 44 HED's associated with the annunciator upgrade study. (1990 outage)

32. Modification Requests will be issued to resolve 130 HED's associated with Labeling/Demarcation, Color Padding, Mimics/Meter Banding Study. (1990 outage)

MAINTENANCE ORDERS

1. MO No. 870519 will resolve HED's 103, 112 and 481 by applying labels to the rotary valve controllers.

2. MO No. 870520 will resolve HED's 8, 17, 87 and 246 by applying a white enamel paint to the embossed pointers on "J" handle switches.

3. MO No. 863619 has been completed and closed out. It has resolved HED's 124 and 288 by cleaning light fixtures and replacing light bulbs with higher Lumen types as needed.

4. MO No. 871099 will resolve HED's 26 and 27 by installing new indicators with different letters and style to replace the old indicators.

OTHERS

1. HED 480 has been resolved by purchasing six voice amplifiers with throat microphones (P.O. No. 5017323). Also, procedure change No. 20548 has been made to ST-RM-3 "Emergency Plan Radiation Instruments and Equipment," Table H-1, to document the addition of the amplifiers and throat mikes to the control room emergency locker.

2. HED 41 will be resolved by providing paper with printed scales and graduations corresponding to the recorder's scalar graduations. P.O. No. 19934 has been generated to purchase paper with proper scaling. Will install when paper arrives.

3. HED 127 has been resolved by posting operating instructions in EPIP-EOF-2, "Radio Communications" V.G.1 f, g, h, and i next to the radio handset in the control room. Also, procedure change "P.C. 19316 has been made to Standing Order O-41 to include these instructions for periodic updating.

4. HED 472 will be resolved by collecting and reviewing humidity data during the 1987-1988 winter months. Data will then be compiled and averaged to arrive at a better representation of humidity in the control room.

5. HED 445 has been partially resolved by stamping the system description as "Uncontrolled Document." This action has been accepted by the NRC as a short term solution (NRC letter, dated August 5, 1986, D2.1-9." OPPD is currently working on long term corrective action which will be reviewed by the NRC.

6. HED 459 has been resolved by applying correct labels to HCV-883A and HCV-884A. The new labels read "Hydrogen Analyzer Isolation Valve HCV-883A/884A."

7. HED 460 has been resolved by Modification Request No. FC-82-45. A limit switch has been installed to monitor and annunciate the back pressure trip level position, giving continuous surveillance for auxiliary feedwater pumps. A test was conducted to check the operability by tripping the limit switch arm which triggered the alarm (Annunciator 18 on Panel AI-66B). It has been operating properly since the installation of the limit switch arm on January 7, 1983.

8. HED's 13 and 39 will be resolved by the plant staff, either by a change in Standing Order O-29 or issuing an operation memorandum to address only removing one lens at a time.

9. HED's 78, 95, 114, 123, 129, 463 and 478 have been turned over to the plant for implementation under Licensing Action Document No. 850338.

APPENDIX C

KEY LOCK SWITCHES ADDRESSED

THE FOLLOWING KEY LOCK SWITCHES PROVIDE A SECURITY FUNCTION FOR OVERRIDE OR TEST SPECIFIC PARAMETERS AND AS SUCH SHOULD REMAIN KEY OPERATED SWITCHES

ARE ADMINISTRATIVELY CONTROLLED IN KEY LOCKER

PANEL AI-65A
- RC VENTING HCB-181 CONTAINMENT
- RC VENTING HCV-178 PZR VENT
- RC VENTING HCV-176 HEAD

PANEL AI-65B
- RC VENTING HCV-180 QUENCH TANK
- RC VENTING HCV-179 PZR VENT
- RC VENTING HCV-177 HEAD

PANEL AI-31A
- RPS BYPASS SWITCHES (CHANNELS 1 - 12)
- A CHANNEL
  - ZERO POWER MODE TRIP BYPASS
  - LOW SG PRESSURE TRIP BYPASS

PANEL AI-31B
- RPS BYPASS SWITCHES (CHANNELS 1 - 12)
- B CHANNEL
  - ZERO POWER MODE TRIP BYPASS
  - LOW SG PRESSURE TRIP BYPASS

PANEL AI-31C
- RPS BYPASS SWITCHES (CHANNELS 1 - 12)
- C CHANNEL
  - ZERO POWER MODE TRIP BYPASS
  - LOW SG PRESSURE TRIP BYPASS

PANEL AI-31D
- RPS BYPASS SWITCHES (CHANNELS 1 - 12)
- D CHANNEL
  - ZERO POWER MODE TRIP BYPASS
  - LOW SG PRESSURE TRIP BYPASS

ARE UNDER ADMINISTRATIVE CONTROL

PANEL AI-31E
- HC-102/2A
- HC-102/2B

CB-4
- HC 102/1A
- HC 102/1B

ARE CAPTURED AND ANNUNCIATED

ESF PANEL
- ALL

CB-1-2-3
- SHUTDOWN COOLING INTERLOCK PC-105A FAILURE MODE OVERRIDE HC-347/348
- RCP BLEEDOFF TO RCDT HCV-208
- PPLS BLOCK C70A

KEY LOCK SWITCHES ADDRESSED

ARE CAPTURED AND ANNUNCIATED(CONT)

FPLS BLOCK, KEY HOLDER C78A

CB-4

SCLS BLOCK, KEY HOLDER C79A

SCLS BLOCK, C79A

ALL OPERATE WITH SAME KEY WHICH IS CAPTURED IN HCV-326 WHICH IS ANNUNCIATED ON REMOVAL IN NORMAL POSITION

CB-1-2-3

SHUTDOWN COOL SHUTOFF HCV-347
SHUTDOWN COOL SHUTOFF HCV-348
SHUTDOWN HX OUT L HCV-341
SHUTDOWN HX BYPASS SELECT HCV-326

THE FOLLOWING KEY LOCK SWITCHES SHOULD BE MODIFIED TO INCLUDE ANNUNCIATED KEY HOLDER

PANEL AI-66A

RC-2A CH.A. AFWS AUTO SIG OVERRIDE FW-6 & FW-10
RC-2B CH.A. AFWS AUTO SIG OVERRIDE FW-6 & FW-10
RC-2A CH.A. AFWS AUTO SIG OVERRIDE RELAY TEST
RC-2B CH.A. AFWS AUTO SIG OVERRIDE RELAY TEST

PANEL AI-66B

RC-2A CH.B. AFWS AUTO SIG OVERRIDE FW-6 & FW-10
RC-2B CH.B. AFWS AUTO SIG OVERRIDE FW-6 & FW-10
RC-2A CH.B. AFWS AUTO SIG OVERRIDE RELAY TEST
RC-2B CH.B. AFWS AUTO SIG OVERRIDE RELAY TEST

CB-1-2-3

PRESSURIZER RELIEF PC 102-2
PRESSURIZER RELIEF PC 102-1

THE FOLLOWING KEY LOCK SWITCHES SHOULD BE REPLACED WITH NON-KEY LOCK SWITCHES

PANEL AI-33C

HCV 922 MAIN STEAM LINE B

CB-1-2-3

LET DOWN VALVE CHANNEL SELECT SWITCH