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DENTON, H. R. Office of Nuclear Reactor Regulation, Director (post 851125

Rec'd 7/10/86

SUBJECT: Forwards Rev 2 to CRDR final summary rept, in response to discussion w/SN Saba during wk of 860609. Further enhancement/demarcation of pressurizer & reaction head vent valve controls will be completed prior to fuel load.

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Carolina Power & Light Company

SERIAL: NLS-86-227

JUN 30 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
UNIT NO. 1 - DOCKET NO. 50-400
CONTROL ROOM DESIGN REVIEW
FINAL SUMMARY REPORT

Dear Mr. Denton:

Carolina Power & Light Company (CP&L) hereby submits Revision 2 to the Shearon Harris Nuclear Power Plant (SHNPP) Control Room Design Review (CRDR) Final Summary Report. This revision is in response to discussion with Dr. Saba N. Saba of your staff during the week of June 9, 1986.

Enclosure 1 provides the revised sections of the SHNPP CRDR Final Summary Report, which includes the relevant information required to complete the staff's review of the SHNPP CRDR Program. Each revised section is paginated such that it directly replaces the corresponding sections contained in the SHNPP CRDR Final Summary Report submitted to you on September 13, 1985 and Revision 1 submitted April 28, 1986. Revisions are indicated by the vertical line in the right margin next to changed areas.

Enclosure 2 provides the two HEDs revised to include specific information detailing the actions taken to resolve the discrepancy. Please note that Enclosure 2 is not a revision to the SHNPP CRDR Final Summary Report, Appendix A, but provides clarification only.

Further enhancement/demarcation of the Pressurizer and Reactor Head Vent Valve Controls on AEP-1 will be completed prior to fuel load. These changes will be consistent with the MCB design and applicable Human Factors criteria.

With this submittal, CP&L considers all outstanding NRC concerns regarding the SHNPP CRDR Program to be closed. Should you have any question concerning this submittal, please contact Mr. Arnold W. Schmich at (919) 836-8759.

Yours very truly,

S. R. Zimmerman
Manager
Nuclear Licensing Section

AWS/pgp (3979AWS)
Enclosures

cc: Mr. B. C. Buckley (NRC) W/E
Mr. G. F. Maxwell (NRC-SHNPP) W/E
Dr. J. Nelson Grace (NRC-RII) W/E
Wake County Public Library W/E
Dr. Saba N. Saba (NRC) W/2E

A003
1/1

411 Fayetteville Street • P. O. Box 1551 • Raleigh, N. C. 27602

ENCLOSURE 1

50-400
SHEARON HARRIS
EIA DHD. 6/30/87
SUPERSEDED PER REV. 2
TO CR 1/11 FINAL
SUMMARY REPORT

APPENDIX A-3

AUXILIARY EQUIPMENT PANEL HEDs

A3-6. HED NO: 31D9-1112
HED TITLE: LEGEND LIGHT ENGRAVING DOES NOT MEET CRITERIA; STROKE WIDTH IS TOO WIDE AND SPACE BETWEEN CHARACTERS IS TOO NARROW.

CATEGORY: III
DISPOSITION: EACH LEGEND WAS ASSESSED BY THE HEDAT TO DETERMINE IF THE NUMBER OF CHARACTERS COULD BE REDUCED WHICH WOULD IMPROVE READABILITY OF THE LEGENDS. LEGENDS WITH MORE THAN THREE LINES OF TEXT HAVE BEEN REDUCED TO THREE LINES OF TEXT. OTHER LEGENDS CANNOT FEASIBLY BE REDUCED FURTHER USING STANDARD ABBREVIATIONS. OPERATIONS, HUMAN FACTORS AND ENGINEERING FOUND NO PROBLEMS IN READING THE LEGENDS.

A3-18. HED NO: 31D9-2017
HED TITLE: ANNUNCIATOR LIGHT BOX LOCATED ABOVE HEIGHT CRITERIA

CATEGORY: III
DISPOSITION: OPERATIONS FINDS THE READABILITY OF THE ALB TO BE ACCEPTABLE AND FEELS THAT READING ACCURACY IS NOT IMPAIRED. HUMAN FACTORS CONCURS.

THESE ANNUNCIATORS ARE READ FROM DIRECTLY IN FRONT OF THE PANEL.

APPENDIX A-16

AUXILIARY CONTROL PANEL HEDs

A16-1. **HED NO:** 31AC-0101
HED TITLE: DISTANCE FROM WALL TO BENCHBOARD OF PANEL IS 36.3 INCHES, WHICH IS LESS THAN THE CRITERION OF 50 INCHES.

CATEGORY: III
DISPOSITION: THE HEDAT VERIFIED THAT CLEARANCE IS ACCEPTABLE FOR THE REQUIRED OPERATOR TRAFFIC AT THIS TIME. ENGINEERING WILL ENSURE THAT NO PROTRUDING EQUIPMENT IS ADDED TO THE FACING WALL THAT WILL INTERFERE WITH REQUIRED OPERATOR ACTIONS. EQUIPMENT THAT IS CURRENTLY MOUNTED ON THE FACING WALL WILL BE REMOVED BY THE FIRST REFUELING OUTAGE.

A16-2. **HED NO:** 31AC-1101
HED TITLE: LABELS FOR SWITCH POSITION(S) MISSING

CATEGORY: III
DISPOSITION: SWITCHES ARE SPRING-RETURN-TO-CENTER SWITCHES WHICH ARE USED FOR 'NORMAL' CENTER POSITION. IT IS A SHNPP-1 CONVENTION NOT TO LABEL THESE CENTER POSITIONS ON THE SPRING-RETURN-TO-CENTER SWITCHES. THIS CONVENTION IS CONSISTENTLY CARRIED OUT ON THE MCB, AEP-1 AND THE ACP.

A16-14. **HED NO:** 31AC-1113
HED TITLE: UNLABELED SWITCH POSITIONS ON ROTARY CONTROLS

CATEGORY: III
DISPOSITION: SWITCHES ARE SPRING-RETURN-TO-CENTER SWITCHES WHICH ARE USED FOR 'NORMAL' CENTER POSITION. IT IS A SHNPP-1 CONVENTION NOT TO LABEL THESE CENTER POSITIONS ON THE SPRING-RETURN-TO-CENTER SWITCHES. THIS CONVENTION IS CONSISTENTLY CARRIED OUT ON THE MCB, AEP-1 AND THE ACP.

50-400
SHEARON HARRIS NUCLEAR PLANT
Response to Per Question 2 to CRDR Final Report

1.3 INTEGRATION OF CRDR WITH OTHER ACTIVITIES

Although the CRDR was specifically directed toward evaluating the Control Room (CR) (including the auxiliary shutdown panel), CP&L recognizes the interface between the CRDR and other related activities, such as the design of a Safety Parameter Display System (SPDS), implementation of REG. GUIDE 1.97 requirements, development of Emergency Operating Procedures (EOPs), operator training, and the implementation of Emergency Response Facilities (ERF). The organization of the CRDR considers the coordination of the CRDR with these related efforts. This report reflects the balanced and orderly approach CP&L followed to implement the NUREG-0737 requirements. It is not the intent of this report to describe all the detailed information related to SPDS, REG. GUIDE 1.97, and EOPs development and implementation. This report is limited to the man/machine interface requirements and the integration of these requirements as they affect plant operation.

The integration of REG. GUIDE 1.97, SPDS and the ERF took place in conjunction with the human factors review of the MCB and the subsequent redesign.

These items are discussed below:

a. Safety Parameter Display System

SPDS has been and continues to be reviewed with its companion items (EOPs and Control Board modifications) for continuity. (See Section 6.3.3.10 for discussions on the human factors review of the SPDS.)

The SPDS consists of the six critical safety functions as defined by Westinghouse. Each of these critical safety functions is associated with a fault tree, which was developed and coordinated with the EOPs.

The SPDS was developed as a set with the EOPs. It functions as a companion to the EOPs and as an aid to the operator.

The revised MCB layout includes six colorgraphic CRTs. One of these CRTs is designated as the primary SPDS display, and a second CRT serves as the alternate SPDS display. The placement of these CRTs was considered in the redesign effort to ensure maximum readability of the displays.

The EOPs and the SPDS display formats (hard copy) have been tested as a set for over 200 hours on several simulators as well as over 80 hours in table-top exercises.

The process CP&L followed in the SPDS development is outlined in Figure 1-1.

b. REG. GUIDE 1.97

The REG. GUIDE 1.97 items have been discussed by CP&L and the NRC (See LAP-83-405).

The majority of the REG. GUIDE 1.97 instrumentation was added to the MCB during the MCB rearrangement. Additional 1.97 instrumentation was incorporated into the MCB layout using the same human factors guidelines used in the MCB redesign effort. CP&L has ensured that no HEDs have been introduced with these modifications. This was verified during the completion/reassessment phase within the verification and validation activities. The Post Accident Monitoring instruments have been highlighted on the MCB with yellow bezels. It should also be noted that the 1.97 parameters can also be displayed on the CRTs as each parameter has been incorporated into the ERFIS. Attachment 1-1 contains a listing of the 1.97 parameters and their locations.

c. Emergency Operating Procedures

The EOPs were written specifically to adhere to the Westinghouse (W) Emergency Response Guidelines (ERGs), REV.-1 and have been tested on the same simulator on which the W generic procedures were tested. The results provided evidence that any deviation taken by CP&L in making the procedures plant-specific resulted in expected responses and ensured that safe conditions were achieved.

The ERFIS/SPDS information has also been incorporated into the EOPs (see Figure 1-2). The Critical Safety Function Status trees contained in the SPDS are tied directly into the EOPs.

EOP revisions are made using the methodology specified in the EMERGENCY OPERATING PROCEDURE WRITER'S GUIDE (OMM-006). Notifying the appropriate departments of these changes is also a requirement of OMM-006.

d. Operator Training

The training program for the operators on the EOPs was written for SHNPP-1 and was tailored to the recently completed EOPs. The Element Tables in the task analysis (see Section 6.4 of this report) also provide a top-level indication of the area of training for each EOP step. In addition, the Hot License training program reflects the recently updated EOPs. As the plant continues toward completion and as background/operating information becomes available, the training material is updated.

The training department is notified of all Control Room and plant modifications through the distribution of Field Change Requests (FCRs) and Design Change Notices (DCNs). Plant modifications and procedure changes will be reviewed by training to determine the need for either dissemination of the information or inclusion in training.

e. Emergency Response Facilities

The ERF has been coordinated with the CRDR in the areas of information and communication needs. The same integrated plant computer system (Emergency Response Facilities Information System or ERFIS) that drives the MCB CRTs also drives the CRTs in the Technical Support Center (TSC) and the Emergency Operating Facility (EOF). All CRT displays available on the MCB can be called up in the TSC or EOF without affecting the MCB displays. This information is displayed (real time) in the TSC and EOF, which ensures maximum coordination of facilities.

The communication systems between the Control Room and the ERF conform to the requirements of 10CFR50, Appendix E. The communication devices to be provided include: dedicated telephones (Hot Lines), dial-up telephones, the Emergency Notification System, company radios, sound-powered telephones, and the ERFIS.

A summary of CP&L design standards and criteria for the TSC (which was also used for the EOF) is contained in Attachment 1-2.

7.1.1 Method used for recording HEDs

HEDs are recorded on Human Engineering Discrepancy Report forms, which are included in each Task Plan as Appendix B9 (see Figure 7-2). A discrepancy/deviation from the guidelines is recorded on the HED form with the items/components involved. The form also contains a place for recording the data collection method (e.g. Observation, Operator Interview, etc.) and a place for listing potential human errors that may exist because of the discrepancy. The second page of the HED form contains a place for the suggested backfit and the disposition of the HED.

A summary sheet called the "HED Prioritization" form (see Table 7-1), is attached to each HED. This form contains a record of the final disposition of the HED. The Category Number, Final Corrective Action, and Implementation rating/schedule are recorded on these forms.

7.1.2 Method used for tracking HEDs

The HED numbering scheme (described in Figure 7-3) identifies the component type within the HED number. This allowed for easy grouping of HEDs that addressed the same components. HEDs addressing component labels, for example, were resolved with the re-engraving of the component labels.

HEDs were also verified for consistencies across panels. For example, an HED addressing a particular type of rotary control on the MCB was grouped with any HEDs for the same type of component that was on the ACP or AEP. These HEDs were assessed together and the same resolution was assigned to each HED.