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Washington, D.C. 20555

Subject: Duke Power Company
Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

Gentlemen:

Please find attached five copies of Revision 6 to the Duke Power Company Response to Supplement 1 to NUREG-0737 for Catawba Nuclear Station. This document was originally submitted as an enclosure to my letter of April 14, 1983.

The attachment contains additional revisions to the original solutions for HED's (Human Engineering Discrepancies) on Catawba Unit 1. Each of the new final solutions are in accordance with good human engineering practices and are not considered to be any less adequate than originally proposed.

Instructions for inserting Revision 6 into the Catawba document are included as part of the attachment.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

JSW/99/jgm

Attachment

A003
1/1

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DUKE POWER COMPANY

CATAWBA NUCLEAR STATION

RESPONSE TO SUPPLEMENT 1 TO NUREG-0737

REVISION 6

INSTRUCTIONS

Insert all pages designated as Revision 6 behind Tab 3.4, "Control Room Review Supplemental Report Unit 1". Revision 6 forms a new Appendix E pages E-1 through E-11.

Discard all existing Appendix E pages designated as Revision 5.

Appendix E

Revisions to HED Solutions

REVISIONS TO HED SOLUTIONS DOCUMENTED IN DUKE POWER COMPANY'S RESPONSE TO SUPPLEMENT 1 TO NUREG-0737 FOR CATAWBA NUCLEAR STATION, UNIT 1

Details in system design, operation, or equipment requirements revealed during the design and installation process indicated that ten Catawba Nuclear Station HEDs required revisions to their respective solutions as documented in Duke Power Company's Response to Supplement 1 to NUREG-0737. Each of these revisions was reviewed by the appropriate line organization to ensure that the final solution was in accordance with good human engineering practices. The revisions to the HED Solutions documented in the Response to Supplement 1 are as follows:

C-1-83 The HED solution recommended the addition of a label containing NARROW RANGE (NR) STEAM GENERATOR LEVEL information to be installed next to the WIDE RANGE (WR) S/G LEVEL meters on the Auxiliary Shutdown Panel. This information was intended to be used by the operator as a convenient reference when transferring operation from Control Room NR instrumentation to the WR instrumentation on this panel. In addition, the HED solution recommended a similar NR scale label be installed next to the WR S/G LEVEL meters in the Control Room for convenience. NR and WR S/G LEVEL meters are provided in the Control Room.

During implementation of the HED, it was determined that the WR meters are calibrated at a different temperature than the NR meters. This difference in calibration complicates the use of

the scale information. The scale labels have been added to the Auxiliary Shutdown Panel and are configured to compensate for the calibration difference so that, along with procedures, operators can use these scales as a point of reference.

Since both NR and WR meters are provided in the Control Room where direct comparison of pointer position can be made and since the use of the reference label is somewhat complicated, it was determined that the label would not provide additional information useful in the Control Room. Therefore, it was decided not to include the label in the Control Room.

C-1-104 The HED solution recommended the addition of a Steam Bypass Controller to the Auxiliary Shutdown Panel (ASP). This controller is provided in the Control Room and allows the operator to bypass steam from the Steam Generators to the Condenser during start-up and shutdown, conserving fluid levels on the secondary side of the Steam Generators by not releasing steam to the atmosphere. The installation of an additional controller on the ASP would allow the operator to use his normal cooldown instrumentation in the event of a shutdown from the ASP. There is no safety significance to the use of the Steam Bypass Controller.

Individual controls for each of the four Steam Generator Power Operated Relief Valves (PORVs) are provided both in the Control Room and on the Auxiliary Feedwater Pump Turbine Control Panel (located near the ASPs) for manual control of Steam Generator Pressure. In

addition the PORVs can be used to cool down the reactor in an emergency.

During the detailed design of the HED solution, it was determined that, in order to maintain the existing level of equipment protection and prevent overpressure of the Condenser, interlocks provided for the Control Room Steam Bypass Controller would need to be duplicated for the additional controller to be added to the ASP. The duplication of these protection interlocks, however, made the implementation of this solution significantly more complex and costly than could have been determined during the Control Room Review; and, in addition, could possibly degrade the original protection scheme due to the complexity required.

Since (1) operation from the ASP is a very infrequent event, (2) the Steam Bypass Controller would provide no safety significant function, (3) emergency cooldown means (Steam Generator PORVs) is provided, and (4) the interlocks required significantly increase the complexity and cost of this solution, and may degrade the original equipment protection scheme, it was decided not to add the Steam Bypass Controller to the ASP.

C-1-124 The HED solution recommended that consistent labeling of recorder pen color (red, green, blue) versus the pen function (Main Steam Pressure, for example) be provided. In addition, since Westinghouse recorders have Red, Green, and Blue pens (top to bottom) and L&N recorders have Green, Blue and Red pens (top to bottom) the HED

solution also recommended that pen color order be standardized between these two types of recorders.

Labels have been added to each recorder to identify the function of each pen color and each label's color order (top to bottom) matches the pen color order for its recorder.

Example: Red - MAIN STEAM PRESSURE
Green - MAIN STEAM TEMPERATURE
Blue - THROTTLE PRESSURE

The labels installed on each recorder provide a clear, easily readable, reference between pen color and function.

During implementation of the HED solution, however, it was determined that the pens on both Westinghouse and L&N recorders are not interchangeable due to physical differences in the pen mechanisms. Therefore, pen color order between these two types of recorders cannot be standardized.

C-1-125 The original HED solution recommended the addition of a mode selector switch to each Auxiliary Shutdown Panel (ASP) for manually placing Pressurizer Power Operated Relief Valves (PZR PORVs) NC-34A and NC-32B in the Low Pressure Mode during cooldown. These switches would duplicate existing switches in the Main Control Room. The control room mode selector switches have two positions, NORM and LO PRESS. In the NORM position the setpoint for NC-34A and NC-32B is

2385 PSIG. In the LO PRESS position the setpoint for these two PORVs is reduced to 400 PSIG. The operator is alerted to place the mode selector switches to the LO PRESS position by Control Room Annunciator AD6-B.10 (PORV LO PRESSURE MODE NOT SELECTED) which alarms when Reactor Coolant Temperature is below 300° F.

A preliminary review of the HED solution by the Duke Design Engineering Department in June, 1983, indicated that it was not practical to implement the original solution. The control signals for the automatic actuation of the PZR PORVs at the NORM and LO PRESS mode setpoints originate in the Westinghouse 7300 Process Cabinets located in the Main Control Room. Since these cabinets are located in the control room and are assumed to be unavailable during the Loss of Control Room Accident for which the ASPs were designed, a separate process system would have to be developed and installed to provide the automatic actuation signals for the PZR PORVs during operations at the ASPs. A meeting between personnel from the Duke Control Room Review Team, Catawba Nuclear Production, and Design Engineering was held on July 7, 1983 to develop an alternative solution.

The alternate solution developed was to add a status light to each of the ASPs which would illuminate when Reactor Coolant System Temperature was below 300° F. This status light would alert the operator at each ASP that NC-34A and/or NC-32B should be manually operated as necessary to maintain Reactor Coolant System Pressure below the required 400 PSIG limit. The HED Solution Package was

amended July 28, 1983, to reflect this alternate solution; however, a revision to the solution shown in Duke Power Company's Response to Supplement 1 to NUREG-0737, Revision 1 submitted to the NRC June 1, 1983, was inadvertently omitted. Therefore, the description in Duke Power Company's Response to Supplement 1 to NUREG-0737 is hereby revised as follows:

HED No. C-1-125

Problem Description: The Auxiliary Shutdown Panels lack NORM/LO PRESS mode switches for PORVs NC-34A and NC-32B

Solution Description: Provide LO PRESS MODE status lights on the Auxiliary Shutdown Panels

C-1-204 The HED solution was to provide range markings on meters. It was recognized that the Catawba Nuclear Production Department (NPD) could best identify the appropriate range markings and the specific meters on which range markings would be beneficial to the operator. The commitment to provide range markings was generic and did not commit Duke Power Company to marking specific meters. Catawba NPD determined that the most beneficial range markings would be to provide red bands indicating abnormal ranges based on the normal operating conditions of the plant at a high power level. Because of this marking criteria, it was determined that the meters on the Auxiliary Shutdown Panels (ASPs) should not be marked with red abnormal range markings for the following reasons:

1. Operations' philosophy/utilization of red-range markings is for "normal" system operation; i.e., the operator is able to scan the boards during normal operation in which red-range markings on meters facilitates the identification of a potential system problem. For abnormal system operation the operator is procedurally directed to specific system instrumentation and provided with specific limitations for the respective system parameters.

2. The ASP's are used during "abnormal" system operations or during tests; hence, as mentioned in (1) the applicable procedures provide the operator the necessary information concerning limits of system parameters.

3. If directed to the ASP's, operator actions are to bring the unit to cold shutdown conditions. During the ensuing system transients prior to cold shutdown conditions, various system parameters cover most of the respective meter's range.

C-1-283E The HED solution recommended the addition of position indicating lights to the controller for NV-403.

This HED solution has already been adequately addressed since an E30 control switch for this valve with position indicating lights is located above and to the right of this controller.

C-1-344 The HED solution recommended the replacement of two Cutler Hammer E30 pushbutton switches which had confusing pushbutton configurations (two latching pushbuttons engraved OPEN and CLOSE, with a

common release bar engraved OFF). Two 2-position Cutler Hammer 10250T rotary selector switches were originally proposed because the control circuits for the valve groups operated by these switches (each switch operates a group of four valves) required switches with maintained contacts. However, during the detailed design of the HED solution, it was determined that an engineering revision to the circuit for one valve group required the use of momentary switch contacts. Therefore the HED solution was modified to replace one of the original E30s with another E30 having two momentary push-buttons. The other E30 was replaced by the 10250T selector switch proposed in the HED solution.

C-1-366 The HED solution recommended the installation of valve position status lights for Turbine Stop and Control valves to be located near their associated meters. The Turbine Stop Valve status indication was recommended because the meters for these valves, supplied on the vendor panel, were small and status lights would be more visible to the operator for quick verification that the Turbine Stop Valves have closed after a trip. Also, the HED solution recommended the addition of status lights for the Turbine Control Valves, so that, during testing, as the operator strokes the Control Valves and observes the valve position meter movement to check for proper valve operation, the status lights for closed indication would be available as additional indication.

The Stop Valve position status lights were added under DCA ECSP-058. During implementation of the HED solution, investigation

of the location for the Control Valve status lights revealed that the space for status light indication was limited. Since the Control Valve status indication was included as an additional indication for convenience during valve testing, status lights for these valves were not added. There is no safety significance to this revision of the HED solution.

C-1-430 The HED solution recommended the moving of the RL (Low Pressure Service Water) DISCHARGE FLOW meter and the RL DISCHARGE HEADER TEMPERATURE recorder from 1MC9 to 1MC13 to group these devices with other RL devices.

The HED will not be done for the following reasons:

a) Device RN12 (RL DISCHARGE FLOW meter) requires vertical mounting because it must be pulled out daily by the Control Room Operators to adjust flow setpoints as required by the Catawba Technical Specifications. The setpoint adjustments are on top of the meter after it is partially removed from its case which would make these adjustments difficult to reach if the meter was mounted on the sloped turret section of 1MC13 (1MC13 does not have a vertical section), thus creating a potential maintenance HED. An RL DISCHARGE PRESSURE meter is located above the RL controls on 1MC13 providing indication of RL pump operation and the RL Discharge Flow meter on 1MC9 can be seen by the operator at 1MC13.

b) Device RN9 (the recorder for RL INLET AND DISCHARGE TEMPERATURES), which is used primarily for historical records and the determination of heat exchanger tube leaks, is not closely related to the RL devices on 1MC13 and does not need to be grouped with these devices.

c) Devices RN9 and RN12 are related and should be kept together on MC9.

d) These devices have no safety significance.

C-1-526 The HED solution recommended the addition of indicating lights to provide status information on the devices operated by the unit vent EMF TRAIN A INTLK key switches and the UNIT VENT EMF TRAIN B INTLK key switches and to clarify device functions on the nameplates for these switches. However, during the detailed design it became evident that the only function of these switches was to provide contacts which bypassed interlock contacts in the starting circuits for the Auxiliary Building Exhaust Fans. Thus, there is no device actuation associated with these switches such as a pump starting or a valve opening which requires a feedback status. In this case the switch position is the feedback status of whether or not the Interlock Contacts have been bypassed. In addition, contacts on the switches provide switch position status to the Operator Aid Computer. Therefore this HED was modified to delete the requirement for status lights but re-engrave the nameplates for these switches to more clearly indicate their association with the Auxiliary Building Exhaust Fan Controls.