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Revised 7/12/87 m.m.

SUBJECT: Forwards Rev 3 to facility CRDR final summary rept (FSR), consisting of revised pages to CRDR FSR & addl info re Auxiliary Equipment Panel 1 in response to discussions w/S Weiss & SN Saba on 860819.

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CP&L
Carolina Power & Light Company

SERIAL: NLS-86-328

AUG 2 9 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 3 to the Shearon Harris Nuclear Power Plant (SHNPP) Control Room Design Review (CRDR) Final Summary Report (FSR). Additional information regarding the Auxiliary Equipment Panel Number One (AEP-1) is also being provided. This material is in response to discussions with Dr. S. Weiss and Dr. S. N. Saba of your staff on August 19, 1986 at the SHNPP site.

Enclosure 1 provides the revised sections of the SHNPP CRDR FSR, which includes the relevant information required to complete the staff's review of the SHNPP CRDR Program. Each revised page is paginated such that it directly replaces the corresponding pages contained in the SHNPP CRDR FSR. Revisions are indicated by the vertical line in the right margin next to the changed areas.

Enclosure 2 provides a revision to the SHNPP AEP-1 Review submitted to you on May 30, 1986. Please note that the AEP-1 Review is additional information and is not part of the CRDR FSR.

The AEP-1 is currently scheduled to be photographed on September 3, 1986. The three different photographs to be taken are:

-- The entire AEP-1,
-- A closeup of Status Light Box #12, and
-- A closeup of the reactor vessel and pressurizer vent valve control portion of the AEP-1.

Two color 8" X 10" copies of each of the above will be submitted to you by September 15, 1986.

A003
1/1

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

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

Yours very truly,

S. R. Zimmerman
Manager
Nuclear Licensing Section

AWS/mf (4070AWS)

Enclosures

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

* cc Distribution With Enclosures

ENCLOSURE 1

ENCLOSURE 2

AEP-1 REVIEW

A review of Emergency Operating Procedures was conducted by plant operations personnel to determine which steps require actions on the part of an operator to interface with the Auxiliary Equipment Panel One (AEP-1). Each action was then reviewed to determine the necessity of using the AEP-1 (e.g., are other controls or indicators used) and whether there were any consequences of either misuse or nonuse of the AEP-1 controls or indicators. In addition, a review of all AEP-1 indicators and controls was conducted to determine safety consequences of nonuse or misuse and whether the AEP-1 control or indicator was the primary control or indicator for the required actions.

For all AEP-1 controls or indicators, excluding the reactor vessel and pressurizer vent valve controls, no safety consequences from misuse or nonuse were discovered. Since the reactor vessel and pressurizer vent valve controls are safety related, they were well labeled and physically separated from the rest of the AEP-1 controls. The vent valves have pull-to-lock switches requiring that two separate steps be performed before a vent valve could be opened. In addition, the reactor vessel and pressurizer vent valve control knobs have been painted red, and this section of the AEP-1 has been demarcated to further differentiate the valve controls from other AEP-1 controls.

Attached are the results of this AEP-1 review.

AEP-1 LIGHT BOXES

ALB-023 (Annunciator Light Box) has coordinate axis labels and will be read from directly in front. Operations has no trouble reading it.

DRPI (Digital Rod Position Indication) will be used during rod motion to recover dropped control rods and to verify a reactor trip. In all of the cases, DRPI will be the secondary source of information with the primary source being the ERFIS computer.

SLB-08 (Status Light Box) B Train indication of RAB HVAC damper position. These dampers are slaved to the two RAB normal supply fans which trip on a SI signal. During normal fan operation, the ERFIS computer will be used to verify the damper positions as the fans are started. The Status Light Box indications will be used as a secondary indication. If the damper position is misread on a fan start, temperature alarms on the ERFIS computer and/or alarms on the RMS computer would indicate the problem. If such an alarm is received, the damper will be locally checked before any action is taken. There is no safety consequence of error from misreading any damper position.

The same actions are taken on a SI signal, except it is for a fan stop and damper closure.

SLB-10 A Train (Same as SLB-08)

SLB-09 B Train indication of chilled water valves, HVAC dampers in the ESW intake structure, and HVAC dampers in the Fuel Handling Building (FHB). The indication will be used to verify proper automatic actions (open dampers or valves) during normal operation. There are no safety consequences from a misreading of the SLB since the indications have ERFIS temperature alarms to alert the operations that the automatic actions did not occur. If the alarms are received, the dampers or valves will be locally checked before any action is taken.

SLB-11 A Train (Same as SLB-09)

SLB-12 indication of HVAC dampers in the RAB. SLB-12 provides indication of inlet and outlet dampers for various fans throughout the plant. These indications would be used to verify automatic actions during normal fan starts. Fourteen of these status lights are backups to the air flow indication of the AEP-1. The rest of the lights have trouble alarms that annunciate if the proper automatic actions do not occur. In either case, the only consequence of these automatic actions not occurring would be a fan trip. This would also give an alarm in the Control Room. If a fan does trip, it would be monitored upon fan restart. There is no safety consequence of an incorrect reading of these indications. (These indications are not used in the EOPs.)

(3705AWS/vaw)

AEP-1 CONTROLS

Sample Isolations (Steam Generator, Accum., RCS, PRZ, CNMT atmos, and CNMT sump) - These sample lines have redundant isolation valves so there are no consequences from opening the wrong isolation valve. The sample isolation valves are normally open with the only consequence of an inadvertent closure being a small delay in obtaining a sample. There are no safety consequences from inadvertently operating the control of a sample isolation valve.

The sample isolation valves receive a Phase A CNMT isolation signal. The primary means of verifying the Phase A closure is on the ERFIS computer. The back up means is controlled by plant procedures. An extra operator in the Control Room, after the initial phases of the transient are over, is tasked with verifying items on a check list.

Post Accident Sample System (PASS) - The PASS is only mentioned once in the Emergency Operating Procedures (EOPs). This is in EOP-020 Step 7. This step states "Initiate Evaluation of Plant Status: . . . Obtain samples of RCS, SG, and CNMT Sump." The sample of the RCS would be obtained with the PASS.

If the operator does not properly line up the PASS valves from the AEP-1, the result would be that the chemist would not be able to draw his sample without delay. The chemist would then notify the Control Room of his inability to draw the sample. Upon receiving this information, the operator would correct his valve lineup at the AEP-1, and the chemist would then draw his sample.

The basis for this procedure step (from the Westinghouse Owners' Group) states "Since an evaluation of plant status may require some time to complete . . . it is initiated early in the recovery . . ." This sample would be used to help determine the long-term recovery actions. As a result of several plant emergency drills, it was determined that approximately one hour was required to obtain a sample. Should it require two hours (twice the normal time) to obtain this sample, it would still be completed before plant recovery was delayed. There is, therefore, no safety consequence from incorrect operation of this control.

Steam Generator Blowdown Isolation - Same as the sample isolations except these receive a SI signal instead of a Phase A isolation.

Chemical Addition to Steam Generator - These isolation valves must be opened and the ammonia and/or hydrazine metering pump locally started to add chemicals to the steam generators. If a valve is accidentally closed, the only consequence would be a delay in adding chemicals to the steam generator. There are no safety consequences from incorrectly operating the controls to these valves.

These valves receive a feedwater isolation signal and/or a SI signal and are verified closed the same way as the isolation valves.

RCDT - These are redundant isolation valves like the sample isolations and also receive a Phase A isolation which is verified in the same manner.

CNMT Fan Coolers - These valves isolate normal service water to the nonsafety CNMT fan coolers. The only consequence for inadvertently closing one of these valves would be the loss of cooling water to the nonsafety fan coolers. This would be

detected by a CNMT ambient temperature alarm located on the MCB. These are redundant valves, so there would be no affect from inadvertently opening one of these valves. There is no safety consequence from incorrectly operating a control of the CNMT fan coolers.

These valves receive a Phase A isolation signal and would be verified in the same manner as the sample isolation valves.

Fuel Pool Cooling Pumps - Inadvertent stoppage of a pump would be immediately detected by a low flow annunciator on the AEP-1. There would also be a high temperature annunciation on the AEP-1 before there was any danger of the pool overheating. If a pump was inadvertently started, the only consequence would be an increase in pool cooling flow. There are no safety consequences from incorrectly operating the controls of a fuel pool cooling pump.

Chilled Water Isolation Valves - These normally-open valves isolate a non-essential portion of the chilled water system from the essential portion. The only consequence of inadvertent closure of a valve would be a high temperature alarm on the ERFIS computer. These valves close on a SI signal and will be verified in the same manner as the sample isolation valves. The operator must accidentally open four valves before there is any potential for a problem. There is no safety consequence from incorrectly operating the controls of the chilled water isolation valves.

Essential Chillers and Expansion Tanks - There are two redundant 100-percent capacity chillers and associated expansion tanks. If make-up water is inadvertently stopped or started to either expansion tank, the results will be a hi-hi or lo-lo level alarm on the AEP-1. The affect of inadvertently stopping the running chiller would be the activation of several annunciators on the AEP-1 and eventual initiation of high area temperature alarms on the ERFIS computer. Dependent upon the plant operating mode, either three or four annunciators for each of the two chillers would be activated on the AEP-1. If an idle chiller is inadvertently started, the chiller's automatic control system would shut it off because there would be no service water to cool the chiller. There are no safety consequences from incorrectly operating the controls of a chiller.

Both chillers start on a safety injection signal and would be verified in the same manner as the sample isolation valves.

RAB HVAC - Local Air Handling Units (AHU) - These are two 100-percent capacity automatic cooling trains. There will normally be one train in operation with each AHU cycling on and off based on the ambient temperature in each area. If a fan is inadvertently stopped, the result would be an ERFIS computer high temperature alarm for the respective area or the area fan automatically starting. If a fan is inadvertently started, the result would be the fan automatically stopping or extra cooling in a room in the plant. There are no safety consequences from incorrectly operating the controls of one of the AHUs.

Both trains of the AHUs start on a SI signal and would be verified in the same manner as the sample isolation valves.

RAB HVAC - Normal Supply and Exhaust Fans - There are two 100-percent capacity supply fans and four 50-percent capacity exhaust fans. Each fan has flow instrumentation and flow alarms on the AEP-1 that will alert the operator if the

wrong fan is inadvertently stopped. Both supply fans and/or the four exhaust fans must be stopped for a period of time before there is any potential for a problem. If a fan is inadvertently started, the only consequence would be an increase in the air flow through the RAB. There are no safety consequences or potential for radiation release from incorrectly operating the control of a fan.

These fans stop on a SI signal and would be verified in the same manner as the sample isolation valves.

One function of these fans is to ventilate the RAB to minimize the airborne radiation levels. If these fans should trip, it would take from several minutes to several hours before the airborne radiation could pose a significant problem. The time factor is dependent upon plant conditions, work in progress, and the time in core life. Airborne radiation would be detected by the extensive plant radiation monitoring system prior to it becoming a significant problem.

RAB HVAC - Emergency Exhaust Fans - These are two 100-percent capacity exhaust fans used during emergency operation. Both fans must be stopped for a period of time before there is any potential for a problem. If a fan is inadvertently started during normal operation, the only result would be an increase in the air flow through the RAB. There are no safety consequences from incorrectly operating the controls of the emergency exhaust fans.

Both of these fans start on a SI signal and would be verified in the same manner as the sample isolation valves.

One function of these fans is to ventilate the RAB to minimize the airborne radiation levels. If these fans should trip, it would take from several minutes to several hours before the airborne radiation could pose a significant problem. The time factor is dependent upon plant conditions, work in progress, and the time in core life. Airborne radiation would be detected by the extensive plant radiation monitoring system prior to it becoming a significant problem.

RAB HVAC - Room Exhaust Fans - Each room has two 100-percent capacity exhaust fans. Both fans must be stopped for a period of time before there is any potential for a problem. The only consequence of inadvertently starting a fan would be an increase in the air flow through the individual room. There are no safety consequences from incorrectly operating the control of a fan.

RAB HVAC - Smoke Purge Fans - There are two smoke purge fans which are used after a fire is extinguished to assist in the recovery effort. Upon detection of a fire, all HVAC for the area is automatically secured by fire dampers and/or operators in the Control Room. After the fire is extinguished, the fire brigade leader will inform the Control Room to begin the smoke purge. The fire brigade leader will remain on the scene until the smoke has been cleared. During fan use, only fire brigade personnel will be in the affected area. The result of accidentally stopping a smoke purge fan would be an increase in the time needed to remove the smoke. If a fan is inadvertently started, the only result would be an increase in air flow through the RAB. There are no safety consequences from incorrectly operating the control of a smoke purge fan.

Fuel Handling Building HVAC - There are two parallel trains of normal HVAC for the FHB. If a fan is inadvertently stopped, there is a high temperature annunciator on the AEP-1 for the spent fuel pool (SFP) area and ERFIS alarms for the SFP pump

room temperatures. Accidental starting will only result in an increased air flow. There are no safety consequences of incorrectly operating the controls of the fans.

ESW Intake Structure HVAC - There is one train of HVAC for each train of ESW. These fans are used when the associated ESW pump is running or the room temperature is above 90°F. No single failure can disable both trains of HVAC. If one train is inadvertently stopped, it would be detected by an auxiliary operator on his normal rounds or by a high temperature alarm on the ERFIS computer. The operators normally go on rounds twice per 12-hour shift or approximately every 6 hours. Continuous operation of these fans is not required so it is acceptable for these fans to be stopped until the operator makes his next set of rounds. If a fan is started, the only consequence would be an increased air flow through the building. There are no safety consequences from incorrectly operating the control of one fan.

These fans start on a SI signal and would be checked in the same manner as the sample isolation valves.

Diesel Fuel Oil Pump Exhaust Fan - There are two exhaust fans in each train. Both fans in one train must be stopped before there is any potential for a problem. If one fan is inadvertently stopped, it would be detected by an auxiliary operator on his normal rounds or by a high temperature alarm on the ERFIS computer. The operators normally go on rounds twice per 12-hour shift or approximately every 6 hours. Continuous operation of these fans is not required so it is acceptable for these fans to be stopped until the operator makes his next set of rounds. There is no safety consequence from incorrectly operating the control of one of these exhaust fans. These fans start on a SI signal and would be checked in the same manner as the sample isolation valves.

Pressurizer and Reactor Head Vent Valves - During normal operation, if these valves were incorrectly opened (two series valves must be open for an RCS release path), the Control Room would receive an alarm. This alarm would either be immediate or within approximately 30 minutes depending on which valves were opened. In either case, an alarm on the MCB would be received before any action would need to be taken to correct the situation.

The vent valves can be aligned to discharge to two different locations. The preferred location is to the Pressurizer Relief Tank (PRT). When there is vent flow to the PRT, there will be a "REACTOR VESSEL VENT FLOW" alarm on the main control board. This alarm will be used to verify flow and, therefore, a proper valve lineup. The second location, which should only be used if the PRT cannot be lined up, is to discharge to the CNMT atmosphere.

EOP use of the head vent valves occurs in two different ways. The first use is as an RCS bleed path, that is to deliberately create a controlled release in the RCS. The EOPs tell the operator to open all pressurizer PORVs and vent valves. If the vents are not properly lined up to the PRT and there is no flow, the flow alarm will not be received. If the vents are supposed to be discharging to the CNMT atmosphere (secondary source), but are not, the error would be comparatively insignificant because the PORVs should have about 25 times the flow as the vents.

The second use of the vents is to release a gas bubble from the RCS (increase the water level in the vessel). Implementation of this procedure would be a very slow and deliberate process in which the water level in the vessel will be constantly monitored. If the valves are not properly lined up, the operator monitoring the

vessel level will notice it is not increasing and stop the venting process to check the valve lineup for the vents.

Since the reactor vessel and pressurizer vent valve controls are safety related, they were well labeled and placed on the AEP-1 such that they were physically separated from the remainder of the panel. In addition, the vent valves have pull-to-lock switches which require that two separate steps be performed before a vent valve could be opened. In order for these switches to be turned, they must first be pushed in to unlock them. These are the only pull-to-lock switches on the AEP-1 and are normally locked closed. As a result of the Control Room Design Review, the reactor vessel and pressurizer vent valve control knobs have been painted red, and this section of the AEP-1 has been further demarcated to differentiate the vent valve controls from other AEP-1 controls.