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SUBJECT: Responds to NRC 920110 ltr re violations noted in Insp Rept 50-261/91-21.Corrective actions:breakers on Instrument Buses 2 & 4 to replaced w/breakers of higher current ratings in order to achieve adequate coordination.

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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
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NRC INSPECTION REPORT NO. 50-261/91-21 REPLY TO FINDINGS

Gentlemen:

Carolina Power and Light Company (CP&L) provides this reply to the Findings identified by NRC Inspection Report No. 50-261/91-21, dated January 10, 1992, which documents the results of the Electrical Distribution System Functional Inspection.

FINDING 91-21-01: Inadequate Coordination Between Safety and Non-Safety Circuit Breakers on the 120 Vital Bus System

DESCRIPTION:

The team noted that the supplies to instrument buses IB7 and IB9, from instrument buses IB2 and IB4 respectively, were through 30A circuit breakers and that non-safety loads connected to IB7 and IB9 also utilized 30A breakers. The team postulated that in the event of an earthquake both non-safety loads could fail short-circuit and because of lack of coordination the feeder breakers may trip, thus completely de-energizing both IB7 and IB9.

The design calculation RN 107-E-37-F, "Coordination Study for Instrument Buses," issued in 1986 had recognized the lack of coordination and had recommended changing the feeder breakers to new ones with a 50A rating with a corresponding increase in cable size. These recommendations had not been implemented at the time of the inspection. In response to the team's concern the licensee conducted an investigation into the effects on the station if the above situation developed. The licensee was able to demonstrate that the plant could be shutdown safely and that the auxiliary systems required for heat removal would remain available with instrumentation power provided by the remaining buses.



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The team accepted the licensee's position but was concerned that the above scenario had not been recognized by the licensee.

The team noted that the licensee had initiated a long term "Instrument Bus Upgrade" project (PCN 85-032/04) which proposes hardware changes and a possible system re-configuration under which the present problem would have been corrected. However the licensee indicated that they would not wait for the results of this project but would initiate action to purchase new 50A circuit breakers.

SAFETY SIGNIFICANCE:

A maximum hypothetical earthquake could result in the failure of redundant safety buses.

Action to be Taken

As identified above, questionable coordination exists between Instrument Busses 2 and 7, and between Instrument Busses 4 and 9. To address this concern, planned actions include the replacement of breakers on Instrument Busses 2 and 4 with breakers of higher current ratings in order to achieve adequate coordination. This replacement will be accomplished by implementation of Modification M-1119, "Instrument Bus 2 and 4 Breaker Replacement".

Date Action Will be Complete

Modification M-1119 will be implemented during Refueling Outage 14, which is currently scheduled to be complete in June, 1992.

FINDING 91-21-02: Marginal Service Water Flow Rate to Diesels for 110% Power

This finding is identified as an unresolved item.

DESCRIPTION:

Service water flow rates to the diesels for cooling under LOCA conditions have been shown by tests to be below the manufacturer's recommendation. While the manufacturer has documented a need for 600 GPM of 95 degrees F service water at 100% power operation and 700 GPM of 95 degrees service water at 110% power, the special SW tests showed that the maximum available flow to be expected under LOCA conditions would be in the order of 550 GPM.

The question of whether the lower SW flow rates are acceptable hinges on the performance of the heat exchangers. As no in-service tests of the heat exchangers are available (Reference D3-1), calculations were performed to ascertain whether the measured SW flow rates were sufficient under LOCA conditions.

A summary of the status of the calculations was given in the DBD validation report. The team disagreed with the validation conclusion that adequate SW is available for 110% power. Actual installed heat exchangers' performance data was not used in the analysis of low service water flow conditions. The analyses were based on ideal conditions related to a factory tested newly assembled EDG which may not be accurate for the present installed condition.

The conclusion that 550 GPM flow was adequate permits operation of EDG support systems in the alarm range at greater than the 100 percent EDG continuous rating of 2500 kw. In the alarm range the margin for error is limited before damage to the EDG could occur with subsequent impact on the EDG safety function. Calculation non-conservative assumptions discussed above may have consumed the available safety margin before instrument errors have been accounted for. Additionally, a recent licensee EDG loading analysis indicated possible loading above the continuous loading value. Based on the potential for greater than 100 percent continuous rating load in conjunction with high lake temperatures, the team concluded this specific scenario required more accurate analysis to verify the EDG could meet its required safety function under these conditions.

SAFETY SIGNIFICANCE:

A recently completed transient analysis by the licensee indicated that in certain scenarios EDG may be required to provide between 100 and 110 percent load. The licensee's analysis did not verify that service water flow was sufficient to support this EDG loading when heat sink temperature was 95 degrees F.

Action to be Taken

The EDGs are analyzed for operation at rated design capacity using 505 gpm service water flow at 95° F and 100° F. This analysis is documented in "Elevated Service Water Temperature Systems Analysis for Carolina Power and Light, H. B. Robinson Unit 2 Plant", dated September 1991. The term "rated design capacity" is defined in the Basis of Technical Specification 3.7.1 as ". . . 2500 kW for 22 hours and 2750 kW for 2 hours in any 24-hour period".

The resolution of this finding will consist of the following:

1. Review of pertinent analyses, specifically including "Elevated Service Water Temperature Systems Analysis for Carolina Power and Light, H. B. Robinson Unit 2 Plant", dated September 1991, to substantiate the conservative nature of assumptions made in those analyses.

2. Evaluation of the impact of 95° F and 100° F service water flow on the long-term capability of the EDGs to perform their safety-related function. The term "long-term" is defined in the Basis of Technical Specification 3.7.1 as ". . . operation of one diesel generator at its rated design capacity for seven days".

Review of the existing analyses will verify that the assumptions used in those analyses are both conservative and appropriate. The subsequent evaluation of the results of those analyses will provide further assurance that the EDGs will perform their safety-related function as described in the Basis of Technical Specification 3.7.1.

Date Action Will be Complete

The above actions will be complete by March 31, 1993.

FINDING 91-21-03: E1/E2 Equipment Room Ambient Conditions Not Evaluated

This finding is identified as an unresolved item.

DESCRIPTION:

The redundant 480 VAC safety-related buses, E1 and E2, are located in the same room in the auxiliary building. Equipment in this room included safety-related equipment breakers and inverters for vital control power and Reactor Protection and Safeguards Logic Cabinets. The ambient temperatures resulting from electrical equipment heat loads had not been analyzed to determine potential impact on equipment performance or if temperatures remained within equipment design requirements in normal and accident conditions. Ventilation in this room is non-safety, i.e. lost on a loss of offsite power.

Following NRC questions, the licensee initiated an evaluation of heat loads in this space for normal and abnormal conditions. An analysis based on industry reference values for equipment heat loads was performed. Additionally, an analysis based on informal testing accomplished in 1985 was performed. The results of these analysis varied considerably. The former indicated an ambient temperature of 136 degrees F in 7 hours, leveling at 166 degrees in 100 hours. The later analysis indicated 126 degrees F in 7 hours, leveling at 144 degrees in 100 hours. The difference in the computed heat loads was the cause of the variation. The industry reference heat loads were 52 KW, the test based value was 17 KW.

The team concluded that, although no operability issue was evident, further analysis was required to more accurately determine the heat loads and subsequent ambient temperatures. This was based on two factors: 1) the large variation in computed heat loads, and 2) the test was an uncontrolled, informal activity which required several assumptions to be made regarding actual ventilation flow and accuracy of instrumentation used. The licensee stated during the inspection that a controlled test would be performed and evaluation of equipment impact accomplished by the end of 1992.

SAFETY SIGNIFICANCE

Electrical equipment performance could be impacted when exposed to high ambient temperatures. This could require derating or other compensatory measures to assure adequate equipment functionality.

Action to be Taken

CP&L will perform a test to determine the heat load generated by equipment located in the E1/E2 Equipment Room. The results of this test will be evaluated to determine what, if any, actions will be required.

In the above Finding, a temperature of "126 degrees F in 7 hours" is stated, however, the CP&L calculation actually utilizes a temperature of 122 degrees F.

Date Action Will be Complete

The test and evaluation identified above will be completed by December 18, 1992.

FINDING 91-21-04: Corrosion Protection of Underground Fuel Oil Piping

DESCRIPTION:

The cathodic protection system was installed in 1981 to prevent galvanic corrosion from piping to ground. However, the system is known to have been operating outside of its original specification since August 1988 and thus the duration of protection has only been about 7 years. The licensee was unable to provide documentation which specified what provisions for galvanic corrosion had been made at the time of the original installation. As a result, the licensee was unable to determine the present condition of the underground fuel piping. Degradation of the cathodic protection system in 1988 appeared to have been caused by installation of concrete in the yard.

The licensee stated that a sample of the underground fuel oil piping would be inspected during the 1992 refueling outage. Further action will be based on inspection results. The licensee scheduled a technical representative to review the onsite cathodic protection system and upgrade the site staff knowledge of the system.

SAFETY SIGNIFICANCE:

If corroded the underground piping could be susceptible to failure during a seismic event which could result in loss of fuel oil between the storage tanks and the EDG day tanks.

Action to be Taken

CP&L has contracted a cathodic protection system technical representative to inspect the existing system, make recommendations for repair and improvement, and to provide training for plant personnel. The results of the inspection revealed that the cathodic protection system was adequate for the lines located from the Unit No. 1 Fuel Oil Storage Tanks to the Unit No. 2 Diesel Fuel Oil Storage Tank (DFOST), and from the DFOST to the Emergency Diesel Generators. This cathodic protection system was taken out of service because of its questionable protection, but was returned to service in November 1991 following the technical representative inspection. The technical representative made recommendations for improvements to the cathodic protection system between the DFOST and the EDGs.

A training seminar was conducted which addressed corrosion, corrosion control, and the operation and maintenance of the cathodic protection system. This seminar included Technical Support Engineers and Instrumentation and Control Technicians.

Preventative Maintenance Procedures will be developed which will contain information on methods of rectifier surveillance and troubleshooting, soil-to-structure potential monitoring, and locations for potential monitoring.

Sections of fuel oil lines have been selected for inspection during Refueling Outage 14 to determine their condition. Any additional actions will be based on the results of this inspection.

Date Action Will be Complete

Selected fuel oil lines will be inspected during Refueling Outage 14, which is currently scheduled to be complete in June, 1992.

Improvements to the cathodic protection system, along with implementation of Preventive Maintenance Procedures, will be complete by December 17, 1993.

FINDING 91-21-06: Examples of Poor Maintenance Practices

DESCRIPTION:

The team conducted walkdown inspections of the electrical panels, motor control centers, switchgear, and relay racks to determine the material condition of the equipment and the wiring. During these walkdowns the following deficiencies were identified. A number of spare electrical cables, wires, leads, and conductors ends were not securely taped to last for the life of the plant. In several instances the tape appeared to be loose. The functional description on MCC compartment labels may vary substantially from that contained in OP-603 and in some cases are technically incorrect.

The licensee stated the standard practice for terminating spare cables and conductors at the site has been to wrap the ends with tape. The licensee agreed with the team's finding that some spare cables and conductors ends are not up to standards. As a result of this finding the licensee initiated ACR 91-370. ACR 91-370 required the practice of terminating spare wires be investigated and resolution be determined. In addition Work Requests WR/JO 91-APHG1, 91-APHH1, 91-APHI1, 91-APHJ1, and 91-APHK1 all dated October 23, 1991, had been written for corrective action.

The functional description on MCC compartment labels may vary substantially from that contained in OP-603 and in some cases are technically incorrect. An example of the former was MCC compartment label which read "SAT SUCTION VLV SI-845B" whereas OP-603 referred to this compartment as "SPRAY ADDITIVE TANK OUTLET ISOL. SI-845B." An example of the latter involved a spelling error on a MCC label (section misspelled as suction) resulting in an MOV compartment label of "AUX. FWP SUCTION VA. V2-20A." The OP-603 reference, "Motor Driven AFW Pump Discharge Cross-Connect V2-20A," was technically incorrect. The licensee initiated a project to upgrade identification of plant equipment in the first quarter of 1991. This project will include mechanical components such as valves as well as electrical components such as MCC and electrical distribution panel breaker labels. However, the licensee has not determined the style, type or means of attachment of labels to be used nor developed a schedule for the labeling of electrical components.

SAFETY SIGNIFICANCE:

Spare dangling electrical conductors could potentially cause a short resulting in the failure of a safety system. In addition these conductors could potentially shock plant personnel if voltage was present. Incorrect or inconsistent labeling could result in improper component isolation for maintenance or maintenance on incorrect equipment.

Action to be Taken

CP&L has corrected the improperly terminated spare cables identified by the EDSFI Team by completing WR/JOs 91-APHG1, 91-APHH1, 91-APHI1, 91-APHJ1 and 91-APHK1.

As this finding indicated, ACR 91-370 was initiated to investigate and determine an appropriate practice for terminating spare cables. This investigation is ongoing. Following the completion of this investigation, all identified corrective actions will be scheduled, tracked, implemented, and closed in accordance with existing plant procedures and guidelines.

The labeling inconsistencies identified by the EDSFI Team will be corrected by the Plant Labeling Program. A walkdown of the safety-related electrical distribution labeling is scheduled for Refueling Outage 14. Any additional inconsistencies identified during this walkdown will also be corrected. An administrative procedure addressing labeling is scheduled to be implemented following Refueling Outage 14, and will be based partially upon guidance contained in NUREG 0700, "Guidelines for Control Room Design Review," and EPRI NP6209, "Effective Plant Labeling and Coding."

Date Action Will be Complete

The investigation and determination of an appropriate methodology for terminating spare cables as required by ACR 91-370 will be complete by March 31, 1992.

Completion of a walkdown of the safety-related electrical distribution labeling will be completed during Refueling Outage 14, which is currently scheduled to be complete in June, 1992.

Implementation of a labeling administrative procedure will be complete by September 30, 1992.

FINDING 91-21-07: The Motor Starters For Motor Operated RHR Valves 744A and 744B Are Undersized

DESCRIPTION:

The team identified that in MCC 5 Compartment 1J and MCC 6 Compartment 12J 50 ampere motor protector circuit breakers were feeding Size 1 motor starters. The licensee was requested to verify that this configuration was correct. The licensee's engineering staff performed an Operability Determination 91-022 to analyze this condition. The licensee determined the motor starters should be a Size 2. The licensee analyzed the affect of having undersized motor starter in the circuits and concluded that the valves were operable. However, the licensee stated the motor starters will be replaced with Size 2 starters no later than refueling outage No. 14. Until then, the existing motor starters are to be inspected each time the valves are cycled. The team agreed with the licensee's analysis and proposed corrective action.

SAFETY SIGNIFICANCE:

A failure of the motor starters would prevent the motor operated RHR Valves 744A and/or 744B from cycling which could compromise the Low Head Safety Injection flow path.

Action to be Taken

CP&L will replace the size 1 motor starters with size 2 motor starters, in accordance with Modification M-1110, during the upcoming Refueling Outage.

Caution caps were installed on the RTGB control switches for RHR-744A&B which require an inspection of the motor starters, per our verbal commitment, each time the valves are cycled. The valves were cycled on January 2, 1992 during the performance of OST-252, "RHR Component Test (Quarterly)", and the motor starters were inspected at that time. However, since the caution tag instructions did not explicitly specify the need for, or method of, documenting the results of the inspection, the inspection was not documented. On January 31, 1992, a question was raised concerning the inspection status of the motor starters. In the absence of any documentation that the starters had been inspected with satisfactory results following January 2, 1992, Work Request WR/JO 92-ABKE1 was generated, the inspection performed, and the starters found to be acceptable. ACR 92-030 was initiated to resolve the issue of documentation. The ACR is currently being evaluated.

Date Action Will be Complete

Modification M-1110 will be implemented during Refueling Outage 14, which is currently scheduled to be complete in June, 1992.

FINDING 91-21-08: Undetectable Failure Mechanism on MOVs

DESCRIPTION:

The team identified that there is no indication provided to plant operators to detect a tripped overload relay in a motor starter circuit. This was identified by the team during the review of the motor starters for MOV 744A and MOV 744B. The power to position indication lights (OPEN and CLOSED) is fed directly from the fuse side of the circuit. It is not interlocked to the overload relay and therefore the position lights can not be used. The licensee agreed with the team that a tripped overload relay could not be identified. The licensee was requested to address this concern by the team. The licensee stated that an adverse condition report (ACR) would be issued to investigate this concern. However, the licensee stated that the MOV circuits were of original plant design and did not represent an operability concern. The team considered this finding as a potential "undetectable failure."

SAFETY SIGNIFICANCE:

A tripped overload relay would not be detected and the valve would be inoperable due to a loss of electrical power.

Action to be Taken

CP&L generated ACR 91-374, and has evaluated the condition stated above. As this condition is one of design criteria, Westinghouse was contacted for their input. Westinghouse stated that the configuration at Robinson has been the standard configuration, i.e., wiring the thermal overload contact in series with the contactor which still allows operation of the indicator lights, if the thermal overloads were actuated. No general design criteria or standard could be identified which specifies the exact wiring configuration of the thermal overload contact.

Based on the scenario identified, a review was performed of the possible effects resulting from the failure of a torque switch to stop a valve motor operator, thereby resulting in a thermal overload trip. This condition would not be applicable in many cases where a motor operated valve might utilize a limit switch for closing control, versus the use of a torque switch. However, for those valves that use torque switches for closing control, the valve would be in its desired position, and the position indicating lights would show that position. The probability of the torque switch failing after the limit switch has indicated closed, with the thermal overloads tripping and the breaker not tripping, has a low probability of occurrence and was not relevant to the Westinghouse design. A short duration fault current above the starting current will trip the instantaneous protective device, which will also trip the breaker and cause a loss of indication, thus alerting the control operator.

Regulatory Guide 1.106, "Thermal Overload Protection for Electric Motors on Motor-Operated Valves", provides methods that would ensure that the thermal overload protection devices will not needlessly prevent the motor from performing its safety-related function. However, the wiring configuration for MOV position indicating lights is not addressed within the Regulatory Guide.

Preventive Maintenance Procedures for safety-related motor operated valves include verification of torque switch setting, inspections of Limitorque motor actuators, lubrication, limit switch compartment inspection, periodic testing of operators using the Valve Operator Test and Evaluation System (VOTES), electrical inspection of motor operators, and pre-inspection/post inspection testing. These procedures are used in conjunction with Corrective Maintenance Procedures to provide assurance that the valves are operable.

Based on the above, corrective actions are not considered necessary.

Date Action Will be Complete

No actions are considered necessary with regard to this Finding.

FINDING 91-21-09: EDGs Not Tested at Name Plate Rating as Required by TS 4.6.1.1

This finding is identified as a unresolved item, Failure to meet TS requirements for EDG testing.

DESCRIPTION:

TS 4.6.1.1 requires operation of the EDGs with an assumption of load up to the nameplate rating. The EDGs nameplate specified a rating of 2500 KW at 80 percent power factor and 3125 kVA. OST 401 and 409 which implemented this TS requirement tested the EDGs at 2500 KW at an unspecified power factor or kVA loading. Subsequently, the licensee attempted tests at 3125 kVA and found this caused very high voltages on equipment due to light loading on the E buses. It is not the NRCs intention to cause the licensee to push test conditions to the point of causing equipment damage. Therefore the correct intention of the TS surveillance requirement needs further consideration by the NRC and CP&L. This item will be considered unresolved.

SAFETY SIGNIFICANCE:

Failure to perform testing of the generator at the nameplate rating of 3125 kVA could result in a failure to detect degradation of the alternator, i.e. the EDGs ability to carry accident loads.

Action to be Taken

CP&L agrees that testing methodology to meet Technical Specification (TS) required surveillance should not result in subjecting equipment to possible damage. It has been CP&L's position that, for the purpose of meeting TS 4.6.1.1, "nameplate rating" meant 2500 KW, and therefore the EDGs' monthly surveillance tests were written accordingly.

As stated in this Finding, attempts were made to revise the existing surveillance test methodology to perform kVA load testing; however, high impedance on the lightly loaded Emergency Bus necessitated a higher than expected EDG voltage. Increasing the Emergency Bus loading would require operation of additional safety-related pumps in a recirculation mode. The amount of time for operating these safety-related pumps in recirculation is limited to prevent equipment damage, and therefore, this electrical alignment could not be maintained for the entire duration of the EDG monthly test.

Regulatory Guide 1.108, Revision 1, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants", Section C.2.c.(2) states that periodic testing of diesel generator units during normal plant operation should, "Demonstrate full-load-carrying capability (continuous rating) for an interval of not less than one hour. The test should also verify that the cooling system functions within design limits. This test could be accomplished by synchronizing the generator with the offsite power and assuming a load at the maximum practical rate."

IEEE Standard 387-1984, "IEEE Standard Criteria for Diesel-Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations", Section 6.5.1 states, "The diesel-generator unit shall be started and loaded, as stated in 6.3.3 (1), at intervals of no longer than 1 month to the capacity recommended by the manufacturer, for a period necessary to normalize all operating temperatures to demonstrate its continued availability for operation."

IEEE Standard 749-1983, "IEEE Standard Periodic Testing of Diesel-Generator Units Applied as Standby Power Supplies in Nuclear Power Generating Stations", Section 5.2.1.1 (2) states that Availability Tests shall be performed at intervals of 31 days or less, and shall require that the EDG "Demonstrate the full load carrying capability (continuous rating) of a diesel-generator unit. The test should run for a sufficient interval to allow the diesel engine to reach equilibrium temperature for a minimum of 1 hour thereafter. The load test should be conducted immediately after the start test has brought the diesel-generator unit to the prescribed voltage and frequency."

It is apparent from the above Regulatory Guide and Industry Standards that the intent of the monthly EDG Availability Test is to verify that the diesel engine and its auxiliary systems are performing within their design limits. Based on the generator's efficiency curve, operating the generator at a 0.8 power factor would cause an increase of less than two percent in the diesel engine's brake horsepower loading. This increase is not significant, and would have a minimal effect on the test results. As stated previously, CP&L's position is that loading the EDGs to their 2500 KW continuous rating meets the intent of TS 4.6.1.1.

However, CP&L also appreciates the necessity of periodically testing the emergency diesel generators to verify their ability to carry analyzed accident loads. An effort is ongoing to determine the optimum electrical distribution system configuration and loading methodology for performing this test on a refueling interval frequency.

Date Action Will be Complete

The subject test will be ready for performance at Refueling Outage 15, which is currently scheduled for late 1993.

Should you have any questions regarding this submittal, please contact Mr. C. T. Baucom at (803) 383-1491.

Very truly yours,

Charles R. Dietz
Vice President
Robinson Nuclear Project Department

DHB:sgk

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INPO