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AUTH. NAME AUTHOR AFFILIATION
HAMPTON, J.W. Duke Power Co.
RECIP. NAME RECIPIENT AFFILIATION
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SUBJECT: Responds to unresolved items identified in insp repts
50-269/93-13, 50-270/93-13 & 50-287/93-13. Created selected
licensee commitment to establish admin controls of various
activities based on lake level.

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Duke Power Company
Oconee Nuclear Site
P.O. Box 1439
Seneca, SC 29679

J. W. HAMPTON
Vice President
(803)885-3499 Office
(803)885-3564 Fax



DUKE POWER

August 2, 1993

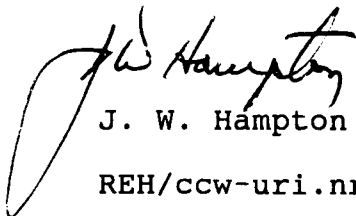
U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Subject: Oconee Nuclear Station, Units 1, 2 and 3
Docket Nos. 50-269, -270, -287
Emergency Condenser Cooling Water (ECCW) System
Unresolved Items

The purpose of this letter is to provide Duke Power's position regarding the issues associated with the Unresolved Items identified in Inspection Report Nos. 50-269/93-13, 50-270/93-13, and 50-287/93-13. The Unresolved Items are URI No. 269,270,287/93-13-03, ECCW System Design and Testing and URI No. 269,270,287/93-13-04, LPSW/ECCW Operability. The attachment contains Duke's response to these issues.

Please call Mark Patrick at (803) 885-3292, if there are any questions about this.

Very truly yours,


J. W. Hampton

REH/ccw-uri.nrc

attachment

cc: Mr. L. A. Wiens
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. S. D. Ebnetter
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, NW., Suite 2900
Atlanta, GA 30323

Mr. P. E. Harmon
Senior NRC Resident Inspector
Oconee Nuclear Station

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DUKE POWER RESPONSE TO UNRESOLVED ITEMS

URI No. 269, 270, 287/93-13-03, ECCW System Design and Testing

Example No. 1 on pp 10-11 of the inspection report:

"The ECCW system with respect to the condenser cooling mode of operation does not meet single failure criteria: the failure of the normally closed ECCW discharge valve at the outlet of the condenser to open or the failure of the normally closed discharge valve at the Keowee tailrace will prevent siphon flow from being established through the main condenser; the condenser discharge valves fail as is on a loss of instrument air or power; the turbine bypass valves fail closed on a loss of instrument air; and the power supply to the turbine bypass valves is not considered safety related. The licensee indicated that the ECCW system does not have to meet single failure criteria with respect to the condenser cooling mode of operation and that the original licensing basis did not require that the system meet single failure criteria. The licensee stated that sufficient water inventory exists in the upper surge tanks and condenser hotwell to relieve steam to atmosphere through the main steam relief valves or manual atmospheric dump valves until a CCW pump could be restarted. The inspectors requested the calculations and documentation supporting the licensee position. This item is still under review by the NRC and is identified as Unresolved Item 269,270,287/93-13-03: ECCW System Design and Testing."

Duke Power Response:

The condenser cooling mode of ECCW is not designed to be single failure proof. If a single failure prevented decay heat removal using the main condensers, decay heat removal would still be accomplished by relieving steam to the atmosphere via the main steam relief valves or the atmospheric dump valves.

Originally, decay heat removal via ECCW flow through the condenser was required only for a station blackout event involving loss of all on-site and off-site AC power. (Re: April 30, 1984 letter from John F. Stolz-NRC to Hal B. Tucker-Duke regarding license amendment nos. 128, 128, and 125.) Other design basis accidents involving loss of off-site power depend upon operators restarting a CCW pump. (Re: February 11, 1987 letter by J. Nelson Grace-NRC to H. B. Tucker-Duke regarding a December 22, 1986 enforcement conference. Also, see LER 269/86-11, page 6 of 6 submitted December 12, 1986 regarding restart of CCW pumps after load shed.)

During the interim period after a loss of off-site power before a CCW pump is restarted, decay heat removal via ECCW flow through the condenser is desirable but not required. If ECCW flow through the

condenser is not available, decay heat removal could be accomplished by relieving steam to the atmosphere as discussed above.

Sufficient water inventory exists to relieve steam to the atmosphere for this interim period. The volume of water required to be available per Technical Specification 3.4.4 is adequate to cope with a station blackout situation for at least 4 hours. (Re: March 10, 1992 letter from L. A. Wiens - NRC to J. W. Hampton - Duke, Safety Evaluation for Station Blackout). Four hours is more than enough time for operators to restart a CCW pump after a loss of off-site power situation.

In addition, the Auxiliary Service Water pumps can pump lake water directly into the steam generators after the secondary side is depressurized with the manual atmospheric dump valves. This feature ensures that decay heat removal through the secondary side can continue as long as necessary. (Re: Letter dated February 13, 1984 from Hal B. Tucker-Duke to Harold R. Denton-NRC regarding proposed Technical Specification 3.4.5.)

In 1992, the NRC approved Duke's response to the station blackout rule that involves a 4-hour coping duration without reliance upon ECCW flow through the condenser. (Re: Letters dated March 10, 1992 and December 3, 1992 from L. A. Wiens-NRC to J. W. Hampton-Duke regarding the Safety Evaluation Report and Supplemental Safety Evaluation Report associated with the station blackout rule, 10 CFR 50.63.) Therefore, ECCW flow through the condenser is not required for any design basis accidents nor station blackout.

The power supply to the turbine bypass valves is not required to be safety related. The Oconee Nuclear Station FSAR, Section 3.1.1, identifies the systems that are classified as nuclear safety related.

In the event of a loss of off-site power, instrument air to operate the turbine bypass valves can be provided by the Auxiliary Instrument Air (AIA) system which is powered from non-safety related, non-load shed power sources.

Example No. 2 on pp. 11-12 of the inspection report:

"The inspectors identified that portions of the CCW/ECCW system and its support systems were not seismically qualified. In particular, the inspectors identified that the HPSW system, the continuous vacuum priming system, the CCW surge lines, and numerous systems attached to the CCW system were not seismically qualified. The licensee stated that design study ONDS 327 had been initiated to resolve the seismic concerns and that the study had been completed in December 1992. The inspectors reviewed Design Study ONDS 327 and determined that the seismic concerns had been identified by the

licensee in 1987 as the result of a self initiated technical audit (SITA) and that the concerns had not been resolved. The Design Study recommended that the isolation valves supplying cooling water to the radwaste facility be administratively controlled whenever lake level dropped below 787 feet. The Design Study qualified portions of the continuous vacuum priming system up to the first manual isolation valve on the CCW intake piping at the high and mid-point and recommended that the valves be shut during normal operation. The Design Study recommended that a station modification be implemented to provide cooling water and seal injection to the HPSW pumps from a source other than the HPSW system. None of the Design Study recommendations had been implemented as of the end of the inspection period. The lack of seismic qualification of portions of the CCW/ECCW and support systems is identified as another example of Unresolved Item 269,270,287/93-13-03."

Duke Power Response:

The non-seismic equipment and systems mentioned in the inspection report have been evaluated and are considered to be inherently rugged and capable of withstanding a seismic event. The non-seismic classification is consistent with the licensing basis for these support and interfacing systems. (See Oconee FSAR Section 3.2.) The original Oconee design did not necessarily apply mechanistic failure criteria to support systems, even though the major systems they supported did meet mechanistic criteria. Good engineering practice, in accordance with established codes and design methods, provided assurance that support systems were appropriately designed.

Duke Power is pursuing enhancements, however, to upgrade this equipment where practical. The recommendations for upgrades resulting from the self-initiated technical audit (SITA) in 1987 and the design study number ONDS-327 are some of the enhancements being considered. For information, the following is a discussion of the status of some of these enhancements:

A Selected Licensee Commitment (SLC) has been created to establish administrative controls of various activities based on lake level. Among other things, this SLC addresses the isolation valves supplying cooling water to the radwaste facility.

An engineering calculation is in progress to verify that the continuous vacuum priming system can be isolated during normal operation while maintaining the siphon capability in the event of a loss of off-site power. If this calculation indicates that the siphon would still be functional, we plan to isolate the continuous vacuum priming system during normal operation as recommended by Design Study ONDS-327.

Nuclear Station Modification (NSM) ON-2932 has been initiated to enhance the supply of cooling/seal water to the CCW pumps. This modification is in the early design phase. Duke Power is studying other design options that would also resolve this issue.

Example No. 3 on pp. 12-13 of the inspection report:

"The inspectors questioned the duration requirements for the ECCW flow under accident conditions. The licensee stated that ECCW siphon flow is only required to be maintained for four hours. The licensee stated that credit was taken for the restart of a CCW pump for accident mitigation under worst case design basis conditions. The licensee procedures direct the operators to restart a CCW pump within one hour following a load shed of the nonsafety related loads from the safety related 4160 volt switchgear. The inspectors expressed concern that the licensee was taking credit for nonsafety related and non-technical specification required equipment to mitigate the consequences of a design basis accident event. The inspectors were still reviewing this item at the end of the inspection period. The acceptability of restarting a CCW pump for accident mitigation is identified as another example of Unresolved item 269,270,287/93-13-03."

Duke Power Response:

It is Duke's position that ECCW siphon flow to the LPSW pumps is only required to be maintained until a CCW pump can be restarted after a loss of off-site power (LOOP) event. This position was discussed in a meeting with the NRC on December 22, 1986 and documented in a meeting summary dated February 11, 1987. A change was incorporated into the December 31, 1992 update of the Final Safety Analysis Report (FSAR) to clarify this.

The duration used for ECCW testing was initially based on the four hours needed to cope with a station blackout event (loss of all on-site and off-site power). Also, four hours was considered to be more than adequate to allow time for the operators to restart a CCW pump following a LOOP event. In 1992, the NRC approved Duke's response to the station blackout rule which does not depend on the operability of the ECCW siphon. Therefore, since the operators are expected to restart a CCW pump well within four hours, the duration used for testing exceeds the requirement.

The CCW pumps are not safety-related. This is consistent with the licensing basis for Oconee, as described in the FSAR Section 3.1.1.

The CCW/ECCW system supply to LPSW is designed so that no single failure of an active component would prevent emergency operation. Each unit contains four pumps that have been demonstrated to be highly reliable. Frequent starts and extensive, continuous run

times during normal operation provide a high level of confidence that at least one of the four pumps could be restarted after a LOOP event.

In addition, if a LOOP event did not affect all three units, the CCW pumps on the unaffected unit(s) could supply CCW flow to the affected unit(s) via the CCW crossover lines. Therefore, the CCW/ECCW system is designed with substantial defense-in-depth.

Example No. 4 on p. 13 of the inspection report:

"The inspectors questioned the adequacy of the ECCW system flow test presently conducted. The test procedure does not require that a predetermined LPSW flow be maintained throughout the four hour test duration. The Unit 3 test procedure requires that the Unit 3 LPSW system be aligned to the Unit 3 CCW system but does not require that LPSW flow be maintained. The Unit 1 and Unit 2 test procedures require that the LPSW pumps be aligned to the opposite Unit prior to performing the ECCW flow test. The inspectors determined that ECCW system flow tests conducted in 1986 had required that significant LPSW flow rates be maintained throughout the tests. The tests conducted in 1986 were a result of a loss of siphon flow event on Unit 2 during a load shed test conducted during a refueling outage...The inspectors also questioned the testing with regards to the continuous vacuum priming system. The ECCW system flow test does not verify proper operation of the continuous vacuum priming system. While this is conservative with respect to air removal the system would not be isolated from ECCW during an accident. A single failure of certain components in the vacuum priming system could adversely affect the siphon. The licensee is reviewing the testing conducted on the ECCW system as a result of the inspector's concerns. The adequacy of the testing performed on the ECCW system is identified as another example of Unresolved Item 269,270,287/93-13-03."

Duke Power Response:

The ECCW system flow test for Units 1 and 2 is normally performed with LPSW aligned to take suction from the opposite unit. This is done so that any problems or equipment failures that might be encountered during the test would not jeopardize the LPSW pumps needed for the operating unit. During the Unit 2 outage in June 1993, testing was performed to verify the ability of the ECCW system to supply LPSW while the LPSW flow was the maximum that would be expected during a design basis accident. This condition existed for a limited period of time, approximately 30 minutes.

Since Unit 3 does not have a shared LPSW system, the concern about jeopardizing an operating unit does not apply. Therefore, Duke Power plans to test ECCW on Unit 3 with the LPSW flow demand at the

maximum expected accident flow. This will be done during the next outage scheduled for early 1994.

Testing of ECCW is conducted with the continuous vacuum priming (CVP) system isolated from the CCW system. As stated in the inspection report, this is done to avoid taking any credit for air removal by the continuous vacuum priming system. A LOOP event and a single failure in the continuous vacuum priming system would not cause a loss of suction to the LPSW pumps, because flow would be provided from one of the other units via the CCW crossover. In May 1993, it was decided to keep the CCW crossover connections between the units normally open due to discovery of a potential single failure in the CVP system. (See response to URI No. 269, 270, 287/93-13-04 below.)

URI No. 269, 270, 287/93-13-04, LPSW/ECCW Operability

From p. 11 of the inspection report:

"On April 9, 1993, a conference call was held between NRC and the licensee to discuss the operability of the LPSW systems and proposed actions to return the LPSW systems to operability. The licensee proposed that the LPSW suction cross connect valves between units be opened to supply a common suction to the LPSW pumps from all three Units' CCW systems. These valves were originally required to be open during system operation but had been closed in 1982 as a result of turbine building flood concerns to minimize the flow available to feed a line break in the turbine building. The licensee performed a safety evaluation that determined that operation with the suction cross connect valves open for a 30 day period until a long term corrective action could be implemented was acceptable based on present plant conditions. The licensee agreed to provide the NRC with the safety evaluation performed and determine appropriate corrective actions within 30 days. Based on these actions the cross connect valves were opened and the LPSW systems declared operable at 5:37 p.m. on April 9, 1993. This item was still under review by the licensee and the NRC at the conclusion of the inspection period. This item is identified as Unresolved item 269,270,287/93-13-04: LPSW/ECCW Operability."

Duke Power Response:

In a letter dated April 14, 1993, J. W. Hampton of Duke Power provided to the NRC a copy of the safety evaluation that justified operation for up to 30 days with the CCW crossover valves (1CCW-40 and 3CCW-42) open while long-term corrective actions could be studied. On May 7, 1993, Mr. Hampton provided a letter to the NRC stating that Duke Power had decided to keep these valves normally

open on a long-term basis. This decision was based on a safety evaluation that determined that there is insignificant additional risk associated with a turbine building flood with the valves open, and keeping the valves open increases the ability to withstand a LOCA/LOOP event.

This event is discussed in more detail in Licensee Event Report No. 269/93-04 which was submitted on May 10, 1993.