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PRIORITY 1 (ACCELERATED RIDS PROCESSING)

SUBJECT: Forwards addl response to deviation noted in insp repts 50-259/93-31,50-270/93-31 & 50-287/93-31,addressing concerns identified in NRC 950106 ltr.Valves MS-33 & MS-84 closed on three units on 950109.

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DUKE POWER

February 8, 1995

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

Subject: Oconee Nuclear Station Docket Numbers 50-269, -270, and -287 Additional Response to Notice of Deviation Identified in Inspection Report 50-269, -270, -287/93-31

By letter dated January 25, 1994, the NRC issued a Notice of Deviation as described in Inspection Report No. 50-269/93-31, 50-270/93-31, and 50-287/93-31. This Notice of Deviation concerns a postulated break in the line downstream of the motor operated valves from the steam supply to the auxiliary steam header (MS-24 and MS-33) that would result in the simultaneous blowdown of both steam generators. Duke initially responded to the Notice of Deviation with a letter dated February 24, 994 and supplemented this response with a letter dated April 8, 1994.

By letter dated January 6, 1995, the NRC summarized its review of the Duke Power responses to Deviation 50-269,270,287/93-31-01. The NRC review concluded that a blowdown of both steam generators following a single line break constitutes an unreviewed safety question and that it should be reported under 10 CFR 50.72(b)(1)(ii)(B).

Your January 6, 1995 letter also requested that Duke Power submit a written statement describing steps which have been taken to correct this deviation and the results achieved, corrective steps which will be taken to avoid further deviations, and the date when corrective action will be completed. As requested, I am submitting a written response to address the concerns identified in your January 6, 1995 letter.

Very truly yours.

J. W. Hampton



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Document Control Desk February 8, 1995 Page 2

cc: Mr. S. D. Ebneter, Regional Administrator U. S. Nuclear Regulatory Commission, Region II

> Mr. L. A. Wiens, Project Manager Office of Nuclear Reactor Regulation

Mr. P. E. Harmon Senior Resident Inspector Oconee Nuclear Site

Deviation 269,270,287/93-31-03

Final Safety Analysis Report, Section 10.3.2 "Description", states in part that each of the lines leaving the main steam lines before the turbine stop valves has motor operated valves to complete the isolation of a steam generator. These lines include the steam supply for the auxiliary steam header. The arrangement of the valving and parallel piping prevents blowdown of both steam generators from a single leak in the system.

Final Safety Analysis Report, Section 10.3.4, "Inspection and Testing Requirements," states: "The motor operated valve on each of the lines connected to the main steam lines can be tested for operability when the unit is shutdown. These valves along with the main steam stop valves prevent uncontrolled blowdown of the unaffected steam generator in the unlikely event of a main steam line break."

Contrary to the above, a postulated break in the line downstream of the motor operated valves from the steam supply to the auxiliary steam header (MS-24 and MS-33) would result in simultaneously blowing down both steam generators. This is due to these valves being maintained in the open position, along with the time, approximately ten minutes, required for the control room operators to reach the step in the Emergency Operating Procedure (Step 5.4 of Section 503) which requires these valves to be closed.

RESPONSE:

1. The reason for the deviation, or if contested, the basis for disputing the deviation:

In our February 24, 1994 response, Duke Power originally stated that we do not believe a deviation exists with statements in Section 10.3.4 of the FSAR. Section 10.3.4 of the FSAR contains information on testing and inspection of the Main Steam System components. It states that the "motor operated valve on each of the lines connected to the main steam lines...along with the steam stop vales prevent uncontrolled blowdown of the unaffected steam generator in the unlikely event of a main steam line break.". Check valves are present in the steam supply lines to the auxiliary steam header, near motor operated valves MS-24 and MS-33. These check valves would prevent the simultaneous blowdown of both steam generators, following a break in a main steam line and automatic closure of the main steam stop valves. However, depending on operator action times and MS System pressure, the motor operator valves may not provide this function. Therefore, Duke Power believes that Section 10.3.4 of the FSAR needs clarification to indicate that the check valves perform this isolation function during a break in a main steam line. Currently, actions are being taken to include these check valves in the Oconee 10 CFR 50, Appendix B In-Severvice Testing Program to ensure their ability to perform this function.

The February 24, 1994 letter did acknowledge that a deviation exists between statements in Section 10.3.2 of the Oconee FSAR and the actual plant configuration. Historically, Oconee has operated with the auxiliary steam header and the turbine driven emergency

feedwater pump (TDEFWP) steam header connected to both steam generators. This is accomplished on the auxiliary steam header by maintaining valves MS-24 and MS-33 open and on the TDEFWP steam header by maintaining valves MS-82 and MS-84 open. With this lineup, it is possible to have a break in either header which could result in the blowdown of both steam generators. This issue was identified by the NRC as Deviation 93-31-01, in that the FSAR states that the piping arrangement on the Main Steam System prevents blowdown of both steam generators from a single leak in the system. The focus of Deviation 93-31-01 was the blowdown of both steam generators through the auxiliary steam header, although the issue is also relevant to the TDEFWP steam header. Duke initially responded to Deviation 93-31-01 with a February 24, 1994 letter. This letter acknowledged the deviation and stated that the FSAR would be revised, under the guidelines of 10 CFR 50.59, to address the double blowdown scenario. Based on discussions with the NRC, Duke supplemented this response with an engineering analysis of the double blowdown scenario in an April 8, 1994 letter.

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Chapter 15 of the FSAR presents bounding accident analyses for ONS. These analyses assume conservative initial conditions and boundary conditions to ensure that the predicted consequences conservatively encompass the expected plant response during any of these hypothetical accidents. In the case of the steam line break accident, the double-ended rupture of one 34 inch main steam line is analyzed. The FSAR states that this is the worst case steam line break because it results in the maximum cooldown of the RCS. Since smaller break sizes are bounded by the double-ended rupture of a main steam line, analyses of these smaller steam line breaks are not included in the FSAR. The analysis documented in the April 8, 1994 submittal to the NRC demonstrates that the initial RCS response is clearly bounded by the steam line break analyses presented in Section 15.13 of the FSAR. It also concludes that the current Emergency Operating Procedure provides appropriate guidance to restore heat transfer from the RCS and safely shut down the plant following the blowdown of both steam generators.

On January 6, 1995, the NRC issued a letter which stated that the blowdown of both steam generators following a single line break constitutes an unreviewed safety question and that it should be reported under 10 CFR 50.72(b)(1)(ii)(B). A conference call was held between Duke and the NRC to discuss the actions that Duke would take based on the January 6, 1995 letter. During this phone call, Duke indicated that additional review of the NRC letter would be necessary to determine whether, in our opinion, an unreviewed safety question exists. Duke committed to conservatively report the issue under 10 CFR 50.72 and to immediately close valves on the common steam headers to prevent the postulated accident from occurring. Shortly after the phone call valves MS-33 and MS-84 were closed on each of the three Oconee units. This action will prevent the postulated blowdown of both steam generators, but at the same time reduces the level of redundancy in the steam supply to the TDEFWP.

During our review of the January 6, 1995 letter, Duke identified additional licensing correspondence which may be relevant in the ultimate resolution of this issue. In a December 15, 1972 letter from the AEC to Duke Power, the AEC requested that Duke

analyze the effects of high energy line breaks outside containment. This AEC letter stated that "a nuclear plant should be designed so that the reactor can be shut down and maintained in a safe shutdown condition in the event of a postulated rupture, outside containment, of a pipe containing a high energy fluid, including the double ended rupture of the largest pipe in the main steam and feedwater systems. Plant structures, systems, and components should be designed and located in the facility to accommodate the effects of such a postulated pipe failure to the extent necessary to assure that a safe shutdown condition of the reactor can be accomplished and maintained."

Duke responded to this letter by submitting a report (OS-73.2) on April 25, 1973 titled "Analysis of Effects Resulting from Postulated Piping Breaks Outside Containment for Oconee Units 1, 2, and 3". This report recognized the potential of a double steam generator blowdown resulting from a single steam line break that impinged on the opposite header. In this report, Duke presented an analysis of a double blowdown of both steam generators. The analysis of this accident concluded that the reactor can be safely shut down and "the operator would not need to take immediate action other than verify that the automatic actions have occurred. The operator within a few minutes will take action to regulate feedwater to steam generators to affect an orderly plant cooldown". This statement specifically addresses the issue of restoring heat transfer to two steam generators which have blown down. In the Oconee Units 2 and 3 Safety Evaluation, the AEC stated that Report No. OS-73.2 contained "operational analyses which describe the sequence of events following a piping break including the resultant reactor and primary system transients." No modification due to the main steam line impingement was required to meet the staff criteria for safe shutdown following a postulated break in a high energy pipe.

In response to IN 79-22 and a September 17, 1979 letter from the NRC, Duke performed an evaluation of potential non-safety-grade control system interactions during design basis high energy line break accidents. The Duke evaluation was submitted to the NRC on October 5, 1979 and included an evaluation of the impact of non-safety-grade equipment on the mitigation of a steam line break accident. The Duke response addressed the inadvertent opening of a TBV during a steam line break. The letter states that this scenario would "result in additional blowdown of the steam system. A scenario involving the blowdown of both steam generators during a steam line break in the turbine building was previously analyzed for the Oconee units in the High Energy Line Break Analysis Report. The conclusions of this analysis were that the core would remain within its thermal limits and that the reactor damage criteria were met. The postulated inadvertent opening of the turbine bypass valve as a result of potential control system interactions during a steam line break accident is enveloped by the aforementioned safety analysis." Although the NRC did not directly respond to this submittal, NUREG-0649 stated that all licensees responded to IN 79-22 and that the NRC screened the responses. The NRC review concluded that no specific event leading to unacceptable consequences was identified.

On July 9, 1986, Duke submitted a B&W analysis that concludes the SSF can cope with a double steam line break. This analysis was submitted in response to an inspection finding from the NRC. The SSF analysis conservatively assumes a loss of offsite power, which results in natural circulation conditions in the RCS. Although the SSF steam line break analysis has some assumptions which differ from those in the steam line break analysis presented in Section 15.13 of the FSAR, the general conclusion regarding restoration of heat transfer to two steam generators which have blown down remains valid. In fact, based on the limited equipment available to mitigate the double steam line break accident during the SSF scenario, one can conclude that the results of this analysis are bounding for the steam line break scenario described in the January 6, 1995 letter. For instance, the break area is an order of magnitude larger for the SSF scenario than the break area in the auxiliary steam or TDEFWP header scenarios. In addition, assuming a single failure, at least one train of ES equipment and one motor driven EFW pump would be available to mitigate a break in the auxiliary steam or TDEWP headers. Therefore, it is concluded that this SSF analysis also demonstrates the ability to maintain the reactor in a safe shutdown condition by restoring heat transfer to two blown down steam generators.

2. Corrective steps that have been taken and the results achieved:

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On January 9, 1995, Valves MS-33 and MS-84 were closed on all three units. This action was conservatively taken to prevent the postulated blowdown of both steam generators if a break were to occur on either the auxiliary steam header or the TDEFWP steam header.

As recommended in the subject letter, the vulnerability to blow down both steam generators was conservatively reported under 10 CFR 50.72(b)(1)(ii)(B). In this report, Duke Power stated that it had not completed its evaluation of the January 6, 1995 NRC letter and was reporting the issue as a conservative action.

3. Corrective steps that will be taken to avoid further deviations and the date when corrective actions will be completed:

As stated in the February 24, 1994 response to Deviation 93-31-01 and this letter, Duke Power acknowledges that a deviation exists between statements in Section 10.3 of the Oconee FSAR and the actual plant configuration. Unfortunately, previous submittals related to Deviation 93-31-01 did not provide a more complete picture of the licensing correspondence which has addressed the consequences of blowing down both steam generators. Based on the analyses previously submitted to the NRC that are summarized in this response, Duke Power plans to revise the FSAR, under the guidelines of 10 CFR 50.59, to clarify the capabilities of the Main Steam System during a steam line break accident. It is our intention to incorporate this revision into the 1994 FSAR update, to be submitted to the NRC later this year.

Duke Power is performing an engineering analysis to determine the safest configuration of valves MS-24, MS-33, MS-82, and MS-84 during normal operation. A probabilistic risk analysis of several potential lineups will be considered. This analysis will quantify

the impact of different valve lineups on TDEFWP reliability. In addition, the probability and impact of breaks in the common header will be analyzed for each potential valve lineup. Preliminary results indicate that the pipe breaks of interest have a probability in the range of 10^{-4} to 10^{-5} per reactor year and the risk of core damage is in the range of 10^{-7} to 10^{-8} per reactor year. Except for periodic stroke tests, valves MS-33 and MS-84 will remain closed until this analysis is completed. These analyses will be completed by March 30, 1995 and will be available, upon request, for your review.