UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SEP 27 1979

MEMORANDUM FOR: Richard C. DeYoung, Deputy Staff Director, NRC/TMI Special Inquiry Group

FROM: Harold R. Denton, Director, Office of Nuclear Reactor Regulation

SUBJECT: RESPONSE TO NRC/TMI SPECIAL INQUIRY GROUP REQUEST NTFTM 790724-03

You requested certain information regarding the review and operating history of the Oconee plants in your memorandum to me dated July 24, 1979. The enclosed responses address Items 1 and 2 and the second part of Item 3 relating to three significant events for which DOR assumed the lead responsibility from IE. We understand that IE will separately respond to the remaining parts of Item 3.

Of the NRR staff who directly participated in the Oconee review, only Irving Peltier, Albert Schwencer and Mort Fairtile were available for background on Oconee on a "best-efforts" basis. Because of the limited time available, these people relied heavily on their recall and information available in the safety evaluation reports without any assistance from technical reviewers who had participated in the Oconee review. The responses to Items 1 and 2 that were not documented in the safety evaluation reports relied completely on recall and therefore we cannot assure you of the completeness of these responses.

However, we have included in the enclosure an index of significant Oconee review issues for which the issue itself and the resolution are reasonably summarized in the SER's and their supplements. The document and page numbers are given for each issue. In addition, the enclosure includes a brief summary of major items which fall outside of the normal review process but were raised because of a generic concern or operating experience at the Oconee facilities. For these items we have, where ever possible, however, cited references in readily available documents such as the SER and its supplements.

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Enclosures:
As Stated

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INDEX OF SIGNIFICANT OCONEE ISSUES DURING REVIEW

KEY: I - "Safety Evaluation of the Duke Power Company Oconee Nuclear Power Station, Unit 1" Docket No: 50-269 - December 29, 1970

I - 1 Supplement No. 1 - March 24, 1972

I - 2 Supplement No. 2 - December 19, 1972

I - 3 Supplement No. 3 - July 10, 1973

II - "Safety Evaluation of the Oconee Nuclear Power Station Units 2 and 3" Docket Nos: 50-270/287 - July 6, 1973

II - 1 Supplement No. 1 - August 3, 1973

II - 2 Supplement No. 2 - October 1, 1973

II - 3 Supplement No. 3 - January 29, 1974

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II-2	Steam Generator Subcompartment Overpressure
II-3	Fuel Densification, Unit 3.

ENCLOSURE

ITEM 1 RESPONSES

Issue: Flow induced failure of vessel internals

Description: During preoperational testing of Unit 1, failure of instrument guide tubes at the bottom of the reactor vessel was experienced. The failure resulted in damage to the top tube sheet and tube ends of both steam generators. The damage was major in one steam generator and minor in the second. The reactor core was not in place at the time.

It was also discovered that there was excessive movement of other internals such as the thermal shield during flow conditions.

Resolution: B&W made extensive modifications to beef up the instrument guide tubes and the top tube sheet of the steam generators were machined to repair the damage. The thermal shield and its installation anchors were modified to reduce movement and wear. An extensive internals vibration program was conducted at B&W facilities to better understand the problem and to improve analytical models. The fixes were apparently satisfactory and the staff approved the modification.

References: Safety Evaluation of the Duke Power Company Oconee Nuclear Power Station, Unit 1, Supplement No. 2, December 19, 1972.

Safety Evaluation of the Oconee Nuclear Power Station Units 2 and 3 - Docket Nos. 50-270/287, July 6, 1973 - Section 5.2.1.

Issue: Fuel densification effects

Description: The phenomenon of fuel densification was discovered and resulted in a generic program to study the effects of fuel densification on fuel rod integrity and thermal behavior.

Resolution: B&W developed analytical models to calculate the effects of fuel densification and B&W reactor fuel pellets were modified in design to minimize the densification phenomenon. The effects analysis resulted in some reactor operating restriction on linear heat rate, flux imbalance, etc. that were more restrictive than previous restrictions. The staff approved the B&W analytical models with the provision that certain conservative assumptions were incorporated with regard to gap conductance and other physical parameters. The staff concluded that densification effects on the integrity of the fuel for at least the first fuel cycle were acceptable.

References: Safety Evaluation of the Duke Power Company Oconee Nuclear Power Station Unit 1 - Docket No. 50-269, Supplement No. 3, July 10, 1973.

Safety Evaluation of the Oconee Nuclear Powe Station Units 2 and 3 - Docket Nos. 50-270/287, Supplement No. 1 & 3, January 29, 1974.

Issue: High Energy line breaks

Description: As a result of an anonymous letter to the ACRS, the issue was raised that high energy line breaks outside of containment could either by direct pipe whip or jet impingment of by environmental effects such as pressure, temperature, flooding or moisture impair the operation of safety systems required to mitigate the consequences of the accident or cause the loss of function of safety systems.

Resolution: The licensee made extensive modifications to the Oconee facility which included additional pipe restraints, methods for venting penetration rooms containing safety systems, etc. The corective measures were extended to include low and moderate energy systems for the protection against environmental effects.

The staff established criteria for the postulation of pipe break locations and the type of pipe breaks and acceptance criteria for the protection of safety related equipment. The licensee's corrective modifications were acceptable to the staff.

References: Safety Evaluation of the Oconee Nuclear Power Station Units 2 and 3 - Docket Nos. 50-270/287, July 6, 1973 - Section 7.1.11.

Issue: Primary pump seal failure

Description: As a consequence of loss of cooling water to primary pump seals, Oconee 1 suffered a primary pump seal failure which dumped a large quantity of slightly radioactive water on the containment floor. The liquid rad waste system was not adequate to process the volume of water and therefore, it had to be trucked to a reprocessing plant.

Resolution: Measures were taken to assure pump seal cooling and the licensee instituted design modifications to increase the capacity of the liqued rad waste storage and processing facilities. Temporary increased storage capacity was added to the facilities and long term permanent increased capacity was planned.

References: Operating reports

Issue: Onsite power

Description: The Oconee onsite power system is the Keowee hydroelectric generators in combination with one dedicated Lee Steam Station gas turbine as back up during periods when the hydro station is down for maintenance. Following the review it was learned that a single failure or inadvertent closing of the water intake gate for the Keowee Station could make the Keowee hydro units unavailable for emergency onsite power.

Resolution: The applicant agreed to chain and lock open the intake gate to prevent inadvertent or accidental closing of the gate during nuclear power plant operation.

References: Safety Evaluation of the Duke Power Company Oconee Nuclear Power Station Unit 1 - Docket No. 50-269, December 29, 1970 - Section 8.4.

Issue: Control rod drive motors

Description: Oconee 1 experienced burnout of control rod drive stepping motors.

Resolution: Control rod drive motors were replaced by a more advanced improved model and performed satisfactorily.

References: Operating Reports

Issue: Pump lube oil fires

Description: On at least two occasions Oconee suffered fires inside containment resulting from lube oil for the main coolant pump motors overflowing the sumps and spilling onto hot reactor coolant piping. The first time was prior to providing sump overflow capacity and the second was subsequent to the fix as a result of maintenance error.

Resolution: Overflow from sumps was collected in barrels by way of installed piping. Procedures were instituted to prevent overflow valves from being left closed.

References: Operating Reports

ITEM 2 RESPONSES

It would be difficult, after the fact, to wed any of the issues and recommendations of NUREG-0560 and NUREG-0578 to the staff's review of the Oconee plants prior to July 1974. However, during the review and early operations of these plants, there was a general concern about the availability and reliability of auxiliary feedwater and the operation of power operated relief valves on the pressurizer. A brief discussion of these two matters follows.

Auxiliary Feedwater

The staff became concerned about the availability and reliability of auxiliary feedwater during review of the hydrology of the intake canal weir and its potential for failure subsequent to a loss of Lake Keowee water level and during the review of high energy line ruptures external to containment. Discussion and resolution of these concerns can be found in "Safety Evaluation of the Oconee Nuclear Power Station Units 2 and 3" - Docket Nos. 50-270/287 - Page 3-9, 7-36, and 7-38, Dated July 6, 1973.

Power Operated Relief Valves

On at least one occasion during operation of the Oconee plant, Unit 1, the power operated relief valve was opened and failed to close. The block valve was closed and could not be reopened against system pressure. The plant continued operation on pressurizer heaters and sprays. The PORV was removed and examined. Operating reports should provide information on the resolution of this problem.