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SUBJECT: Forwards response to NRC 860828 request for addl info re core flood tank boron concentration.

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October 28, 1986

Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTENTION: J.F. Stolz, Project Director
PWR Project Directorate No. 6

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Sir:

By letter dated September 12, 1985 Duke Power Company (Duke) submitted a proposed technical specification amendment for Oconee Nuclear Station concerning changes to Specification 3.3.3, Core Flood Tank (CFT) System. Supplemental information was provided by a letter dated November 22, 1985.

By letter dated August 28, 1986 the NRC staff requested additional information to complete their review of the subject proposed amendment. Please find attached Duke's response to your request for additional information.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

MAH/06/jgm

A001
1/1

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DUKE POWER COMPANY

OCONEE NUCLEAR STATION

RESPONSE TO THE NRC LETTER DATED AUGUST 28, 1986

REQUEST FOR ADDITIONAL INFORMATION

CORE FLOOD TANK BORON CONCENTRATION

REQUEST 1

"The NRC allows licensees and applicants to utilize the RETRAN computer code for licensing calculations if the intended user has demonstrated the ability to accurately model the plant and utilize the code. Since Duke apparently intends to justify the proposed Technical Specification change by the main steam line break (MSLB) calculation submitted, please submit the information required by Generic Letter (GL) 83-11, "Licensee Qualification for Performing Safety Analyses in Support of Licensing Actions," dated February 8, 1983, to demonstrate Duke's capability to properly use RETRAN. (A copy of GL 83-11 is attached.)"

RESPONSE 1

Duke Power Company has never intended to justify the proposed Technical Specification change on the basis of the main steam line break calculation which was sent to the NRC by letter of November 22, 1985 (Tucker to Denton). The proposed Technical Specification change allows a temporary degraded mode in the unlikely event that the core flood tank (CFT) boron concentration falls below the required concentration. Duke contends that it is preferable to correct any inadvertent decrease in CFT boron concentration expeditiously rather than immediately require a forced shutdown. The probability of a main steam line break event occurring during the additional time of operation being specified by the proposed technical specification revision is extremely small. The change in probability of a main steam line break occurring in a 12 hour period versus a 60 hour period is infinitesimally small.

After the original submittal of the proposed Technical Specification change, a conference call was held between Duke Power and the NRC reviewer on October 15, 1985. The reviewer expressed concern over the impact of a low core flood tank boron concentration on the consequences of a design basis steam line break. In August of 1985 Duke performed an analysis of a double-ended steam line break at Oconee for internal purposes not related to the proposed Technical Specification revision. This is not a design basis analysis, but one with more realistic plant conditions and more conservative operator action times. The NRC reviewer requested and Duke agreed to submit the results of this analysis to provide additional assurance that a low core flood tank boron concentration would not adversely affect plant safety following a large steam line break event.

Duke Power Company has been using the RETRAN code for various applications, including licensing, for more than six years. Extensive benchmarking against plant operational transient data has been performed in order to qualify the code and the plant model. Some of this work is documented in the September 1981 issue of "Nuclear Technology" magazine in an article entitled "Oconee RETRAN Model Comparisons with Plant Data." In addition, Duke Power intends to submit a comprehensive topical report to the NRC on transient analysis with RETRAN. The main objective of this topical report will be to respond to GL 83-11.

REQUEST 2

"Listed below are some of the more important parameters for the original and new MSLB analyses.

	SAR SLB	SBL REANALYSIS
MAXIMUM REACTIVITY	-.04	-.04
TIME OF MAXIMUM REACTIVITY	50 SEC	240 SEC
RCS TEMP AT END OF TRANSIENT	550 DEGF	400 DEGF

Explain the differences citing any different input parameters, different features of the codes used and any other relevant differences. Also include a comparison of the original and new analyses predicted DNBR. Is the new MSLB calculation intended to be the new licensing basis MSLB calculation? If so, describe how this MSLB case bounds other MSLB cases."

RESPONSE 2

The two steam line break analyses use different codes, different initial conditions, and different boundary conditions, and are therefore not directly comparable to one another. Some of the differences are shown in the following table.

Parameter	FSAR	Duke 1985
Initial SG inventory	55,000 lbm/SG	35,000 lbm/SG
Tripped rod worth	3.46% Delta k/k	6.57% Delta k/k
Feedwater isolation	Immediate	5 minutes
RCP trip	None	Low subcooled margin

The differences between the two analyses, particularly the assumed feedwater isolation times and the available rod worth, account for the significant differences between the results.

There was no DNBR calculation done for either the original or the new analyses. For the original base case analysis (with ICS and operator action) and the new analysis there is no return to power. The 1985 main steam line break calculation is not intended to be the new licensing basis calculation. As stated in the November 22, 1985 letter by which it was transmitted to the NRC, it is intended only to provide supplemental information for the proposed revision to Technical Specification 3.3.3. This information is not considered by Duke to be necessary, but it was requested over the phone by the NRC.

REQUEST 3

"How is it concluded that other design basis transients and accidents need not be re-examined to support the proposed Core Flood Tank (CFT) Technical Specification change? For example, if any other design basis event assumes a non-zero CFT boron concentration, why shouldn't the impact of the proposed change be examined in that event?"

RESPONSE 3

All design basis transients were reviewed to determine the impact of core flood tank boron concentration on the results. CFT boron concentration does not affect any other design basis transient. The only other transient in which the core flood tanks have any role is the loss of coolant accident. In that case the core remains subcritical due to primary system voids and boron from other sources (high pressure injection and low pressure injection). The only effect of the core flood tanks is to provide water for core cooling.

REQUEST 4

"The CFT boron concentration specification in the B&W Standard Technical Specifications (STS) is a good model to use in writing Technical Specifications. (A copy of the CFT boron concentration STS is attached. Please explain Duke's position on modeling the boron concentration Technical Specification after the STS.

The STS has a provision for sampling CFT boron concentration whenever appropriate as dictated by the CFT level fluctuations. Please explain Duke's position on having this feature in the Technical Specification.

Is keeping a high boron concentration in the CFT on a permanent basis a practical way to reduce incidences of low CFT boron concentration?

Given the (presumably known) valve leak rates and assuming you use a good boron monitoring procedure, how low could the CFT boron concentration go before being detected? From this concentration, how long would it take to get the boron concentration up to 1835 ppm?

Has Duke investigated any hardware change that would mitigate the low boron problem such as (1) adding heat tracing so that a higher boron concentration could be kept in the CFT, (2) getting bigger supply lines to the CFT so that the boron concentration could be adjusted more quickly, (3) putting boron meters in the CFTs?

In the STS the action required for a CFT low boron situation is to attempt to correct the problem within one hour, after which an orderly shutdown must be commenced if the problem is not resolved. The STS allows 6 hours to sample the CFT boron concentration. Discuss Duke's ability to control the CFT boron concentration on this time scale."

RESPONSE 4

Duke feels that Oconee's current technical specification in conjunction with the proposed amendment is an acceptable alternative to the B&W Standard Technical Specifications (STS) for two reasons. First, Duke believes that it is unnecessary to increase the boron concentration specification from the 1835 ppm required by present Oconee Technical Specifications to the 2270 ppm required by STS. Second, the one hour allowed to correct out of specification conditions is not sufficient time to take corrective action, analyze the results of the corrective action, and verify compliance with the specification or take additional corrective actions as necessary.

The sampling requirements specified by Oconee's present technical specification (Specification 4.1.3) are consistent with those specified by the STS. Additionally, by procedures Operators initiate boron analysis samples within 4 hours after any liquid addition to the CFT. Also, the Operators are trained to investigate the cause and evaluate the consequences of any unexplained level increases in the CFT. Part of this evaluation is to analyze the boron concentration. Statalarms alert the Operators when any CFT level increases 0.3 feet above normal operating level. The statalarm response procedures direct the Operator to determine the cause of the alarm condition. With these administrative and procedural controls, monitored by Quality Assurance, Duke feels that the current program meets or exceeds that dictated by the sampling provision specified in the STS.

Procedure changes are being implemented to raise the normal operating CFT boron concentration to greater than 2500 PPM. This concentration is well below the solubility concentration for the temperatures in the CFT without the need for heat tracing. Changes are also being made to all Operating Procedures dealing with the positive displacement pumps used to make up to the CFTs. These changes will provide assurance that the pump is adequately filled and vented with the desired make up fluid prior to starting the pump to make up to the CFT. At present, we have neither evidence nor suspicion of any valves leaking into the Core Flood Tanks. Evidence points to uncertainty in the actual make-up flow rate due to inadequate venting of the positive displacement make up pumps and the presence of flush water with no boron in the make up pumps as being the cause of the Core Flood Tanks boron fluctuations. The procedural changes described above will correct this situation. Duke feels that administrative and procedural controls can effectively control the low boron problem without the need for hardware modifications.

As stated above, one hour is insufficient time to correct a low boron condition. This short time for correction will result in unnecessary power reductions and shutdowns.

REQUEST 5

"Describe the extent of back leakage past the two CFT discharge check valves that is being observed. Does this leakage meet the requirements of the In-Service Testing (IST) program? What attempts have been made to rectify the leakage problem? What analyses or tests have been done to ensure that, given the leakage problem, the check valves will not either fail to properly open or fail in the fully open position?"

RESPONSE 5

Duke verifies the operability of the CFT check valves on each startup from cold shutdown. This is accomplished by raising the CFT pressure slightly above RCS pressure and observing RCS level increase due to the "burp" from the CFT. Duke also performs a performance test to verify acceptable back leakage through the check valves on each startup from cold shutdown provided this test has not been performed in the last 90 days. The acceptance criteria for this test is less than or equal to 0.1 gpm. With successful completion of these tests, Duke feels the CFT check valves are always operable without excessive back leakage through the valves.