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SUBJECT: Forwards addl info re accumulator tank level & pressure, pressurizer level, pressurizer heater status & safety relief valve position or mainstream flow, per NRC 880315 SER. Revised schedule for Reg Guide 1.97, Rev 2 implementation stated.

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May 18, 1988

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

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
Regulatory Guide 1.97

Dear Sir:

By letter dated March 15, 1988, the NRC transmitted to Duke a Safety Evaluation Report (SER) addressing Oconee Nuclear Station's Conformation to Regulatory Guide 1.97, Revision 2. The NRC SER concluded that the instrumentation provided by Duke for Oconee met the recommendations of Regulatory Guide 1.97, Revision 2 or the proposed deviation/exceptions were acceptable except for the following variables: 1) accumulator tank level and pressure, 2) pressurizer level, 3) pressurizer heater status, and 4) safety relief valve position or mainstream flow. Additional information regarding the above noted Staff exceptions is provided (see Attachment).

In addition, the March 15, 1988 NRC letter requested Duke to submit a schedule for implementing Regulatory Guide 1.97 instrumentation. Please be advised that Duke has provided an initial implementation schedule for those instruments that required a modification to the existing design by a letter dated September 28, 1984. For several instruments, the implementation schedule was integrated with changes resulting from the Detailed Control Room Design Review (DCRDR). As stated in the September 28, 1984 Duke letter, the Regulatory Guide 1.97, Revision 2 related changes will be completed prior to or in conjunction with the final completion of Human Engineering Discrepancy (HED) solutions. For these instrument modifications, a Duke letter dated April 20, 1988 provides Duke's latest commitment for completing their installation. By the April 20, 1988 letter, Duke advised the NRC that the remaining instrumentation will be implemented no later than the beginning-of-cycle (BOC) 15 for Unit 1; BOC 14 for Unit 2; and BOC 14 for Unit 3. A more detailed implementation schedule for each outstanding instrument modification is not available at this time. A more detailed implementation schedule for each outstanding instrument modification will be available, if required, no later than September 15, 1988. Duke anticipates that the schedule provided by this letter satisfies NRC's request; if not, please advise through normal Licensing channels.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

PFG/9/sbn
Attachment

A003
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Conformance to Regulatory 1.97, Revision 2
Response to NRC Staff Exceptions

VARIABLE: Accumulator Tank Level and Pressure

NRC Staff Position

The acceptability of instrumentation for accumulator tank level and pressure will remain open pending the outcome of the staff's generic review of the need for environmentally qualified Category 2 instrumentation to monitor this variable. The Staff's conclusion will be reported on when the generic review is complete.

Duke's Response

Duke has no comment at this time. Comments will be provided, if necessary, when the result of the Staff's generic review of this item has been provided to Duke.

VARIABLE: Pressurizer Level

NRC Staff Position

It is the Staff's position that the information provided by pressurizer level instrumentation is useful to an operator in the evaluation of proper pressurizer operation. Instrumentation that will remain on scale during all anticipated transient or accident conditions should be supplied for this variable. It is also the Staff's position that the licensee shall provide additional analysis to support the deviation from the recommended range. This analysis should be submitted within 90 days of the receipt of this report.

Duke's Response

The pressurizer level instrumentation has a span of 0 to 400 inches, which represents from 11% to 84% of the pressurizer volume. The level tap locations were selected such that pressurizer level remains on scale following a reactor trip or a turbine trip. The NRC has requested additional analysis to demonstrate that the current 0-400 inch range is adequate for all anticipated transient or accident conditions. To this end, a discussion of the assumptions associated with pressurizer level in Oconee's design basis accident analysis and the various pressurizer level setpoints in Oconee's Emergency Procedures is provided below.

The design basis accident analyses are presented in Chapter 15 of the Oconee Nuclear Station Final Safety Analysis Report (FSAR). These design basis accident analyses do not assume any operator action based on pressurizer level. Therefore, extending the pressurizer level range to cover 0% to 100% of the pressurizer volume would have no effect on Oconee's design basis accident analysis.

In addition to the design basis accidents, the adequacy of the current 0-400" level span during any transient or accident condition is demonstrated by discussing the use of pressurizer level in Oconee's Emergency Procedure. A decrease in pressurizer level can be caused by either a loss of RCS inventory or an overcooling event. Following reactor trip, the operator isolates RCS letdown. If pressurizer level can not be maintained above 100 inches, the standby HPI pump is started and aligned to the RCS to deliver additional makeup. If level continues to decrease and reaches 30 inches, the third HPI pump is started. At this point, the operator has done all he can to restore level. Therefore, no additional operator actions would evolve if the lower tap were moved to the bottom of the pressurizer.

The pressurizer heaters are automatically de-energized when pressurizer level decreases to 80 inches. This ensures that the heaters are only energized while they are submerged. If, in the mitigation of an accident, the heaters are desired for RCS pressure control, the Emergency Procedure instructs the operator to maintain pressurizer level above 80 inches. If the possibility of voids in the RCS exists, the Emergency Procedure requires a level of 200-300 inches prior to restarting any reactor coolant pump. A 300 inch setpoint is used as an indication that a steam bubble exists in the pressurizer. Since all of these are mid-span setpoints, an extended range of 0 to 100% of the pressurizer volume would not be of any benefit.

Oconee's Emergency Procedure uses a setpoint of 375 inches as an indication of the potential for water solid conditions in the RCS. Even with instrument uncertainties assumed to be at their worst values, a level less than 375 inches provides the operator with a high level of confidence that the RCS is not water solid. If pressurizer level is greater than 375 inches, the Emergency Procedure alerts the operator to the fact that the pressurizer may be water solid. In order to avoid the rapid pressure transient associated with a potentially water solid system, RCS pressure must be decreased and the PORV unblocked prior to restarting any reactor coolant pump.

Moving the upper tap to the top of the pressurizer would not result in any new operator actions related to water solid operation. Even if the upper tap was moved to the top of the pressurizer, instrument uncertainties would make it impossible for the operator to know, by the level indication itself, whether the RCS is water solid. An unusually high level in the pressurizer is only used to caution the operator about the possibility of being water solid. The high level setpoint is not intended as an absolute indication of water solid conditions. Therefore, the current 0-400 inch span is adequate.

Provided that noncondensible gases have not created a void in the RCS and the subcooled margin in the reactor vessel and both hot legs is greater than 0°F, pressurizer level can provide the operator with a reliable indication of RCS inventory. However, if the subcooled margin is zero for either loop or the reactor vessel, the possibility of voiding in the RCS makes pressurizer level an unreliable indication of RCS inventory. Oconee's Emergency Procedure recognizes this fact and requires the operator to initiate HPI if the indicated subcooled margin is lost. In addition, the volume of water between the current tap location and the bottom of the pressurizer is less than 2% of the RCS inventory. Therefore, relocating the lower tap would result in less than a 2% increase in RCS inventory monitoring capability.

In summary, the current 0 to 400" inch span provides adequate coverage of the pressurizer volume for all anticipated transient and accident conditions. Even if the taps were relocated to the top and bottom of the pressurizer, the effect of instrument uncertainties would make it impossible to know if the pressurizer was completely drained or water solid. In addition, doses associated with relocating the taps would be excessive and would not be consistent with ALARA practices. Therefore, based on the above discussion, Duke Power maintains that the present tap locations remain adequate.

VARIABLE: Pressurizer Heater Status

NRC Staff Position

It is the Staff's position that pressurizer heater current indication is useful to the operator in determining that the heaters are in fact energized when the switch is turned on and how many heaters in the group are functioning. It is also the Staff's position that the licensee shall install, and have operational, pressurizer heater current instrumentation in the control room at the first scheduled outage of sufficient duration, but no later than startup following the second refueling outage after receipt of this report.

Duke's Response

The Pressurizer Heater Status Instrumentation consists of on/off status lights for the pressurizer heater groups. The on/off status provides the operator with adequate information in regards to Pressurizer heater status. The Technical Evaluation Report attached to the NRC SER states that NUREG-0737 Item II.E.3.1 requires that a number of pressurizer heaters be capable of being powered by the emergency power source. Additionally, the report implies that the purpose of the instrumentation was to prevent overloading the site emergency power source (i.e., Keowee hydro units), and that NUREG-0737 required that current monitors be installed for the pressurizer heaters. As such, the NRC requested that Duke install the recommended Regulatory Guide 1.97 current instrumentation.

By an April 7, 1980 letter, NRC transmitted to Duke the Staff's evaluation for Oconee of the actions Duke has taken to satisfy the category "A" items of the NRC recommendations resulting from TMI-2 lessons learned. One of the items addressed by the Staff's evaluation concerned the emergency power supply requirements for the pressurizer heaters. The following is an excerpt from the Staff's evaluation:

> The pressurizer heaters for each unit are supplied from non-safety-related motor control centers (MCC). The MCC are in turn powered via load centers from the 4160-volt engineered safeguard buses. These buses are powered from a hydro station which is the emergency generation source (EGS) in the event of loss of offsite power. This emergency source has ample capacity to provide emergency power to all pressurizer heaters and is capable of doing so promptly following an accident. The pressurizer heaters are divided among the three 4160 volt EGS buses such that the loss of one entire 4160 volt bus will not preclude the capability to supply sufficient pressurizer heaters to maintain natural

circulation under hot standby conditions. We find this design is in conformance with the requirements for this item. Therefore, no modifications are necessary to meet the requirements of this item.

In addition, the NRC Staff agreed with Duke's position that the most direct and effective measure of heater performance is reactor coolant system (RCS) pressure; however, the Staff stated that there was another reason for the recommended instrumentation. The apparent reason given by the Staff is that the on/off status lights do not indicate that the heaters are in fact energized or how many heaters are working. In response, Duke respectively offers the following comments. The Variable Pressurizer heater status has been identified as a type D variable per Regulatory Guide 1.97, Revision 2, Table 3. As such, the variable should be able to provide information to indicate the operation of the system and be able to help the operator make appropriate decisions in using the system in mitigating the consequences of an accident. As the Staff agreed, the most direct and effective means of monitoring heater performance is to monitor RCS pressure. Knowing which or how many heaters are energized will not help the operator in any decision-making processes in mitigating the consequences of any accident. Although the current to a pressurizer heater would be nice to know when analyzing the event after-the-fact, it is of no importance or use to the operator in responding to the event. Duke continues to believe that the current parameters monitored, on/off status of pressurizer heaters and RCS pressure, provides the most effective means of monitoring this variable. Knowing the current to each heater is not as important as knowing how effective the heaters are performing, and as the Staff agrees, the most direct and effective measure of heater performance is the RCS pressure.

Based on the above discussions, Duke contends that the current means of monitoring the pressurizer heater status is adequate. Accordingly, Duke will not be pursuing the installation of additional instrumentation to monitor the pressurizer heater status variable.

VARIABLE: Safety Relief Valve Position Or Main Steam Flow

NRC Staff Position

It is the Staff's position that the description and implementation schedule for monitoring the main steam relief valves promised by the licensee should be submitted so an evaluation of the proposed instrumentation can be made. This description and implementation schedule should be submitted within 60 days of the receipt of this report.

Duke's Response

By a letter dated April 20, 1988, Duke advised the NRC of a change to a commitment made to install additional instrumentation for monitoring Main Steam Relief Valve (MSRV) open/closed status. The reason for this change is provided by the April 20, 1988 letter. Please note that the April 20, 1988 letter referred to in this response is a separate letter from the April 20, 1988 letter referred to in the transmittal letter for this attachment. Briefly, as stated in the April 20, 1988 letter, the current means of determining the open/closed status of the MSRVs are consistent with the criteria of Regulatory Guide 1.97 for this variable. As such, Duke will not be installing additional instrumentation to monitor the open/closed status for each of the MSRVs.