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SUBJECT: Responds to Generic ltr 88-17, "Loss of DHR."

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DUKE POWER

February 2, 1989

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

Subject: Oconee Nuclear Station
Docket Nos. 50-269, 270 and 287
Generic Letter 88-17, Loss of Decay Heat Removal

Gentlemen:

On October 17, 1988, the NRC issued Generic Letter 88-17 which requested each licensee to respond to six programmed enhancements. These actions will aid in correcting deficiencies in procedures, hardware and training relating to prevention of loss of decay heat removal. This letter is the response for Oconee Nuclear Station.

I have provided in Enclosure 1 a description of the actions we have taken to implement each of the recommended programmed enhancements identified in the attachment to GL 88-17. If questions arise as a result of the actions we are taking, a meeting at Oconee can be arranged to show the programs and equipment being used to prevent and mitigate loss of decay heat removal events.

Very truly yours,

Hal B. Tucker

PGL/II/16

Attachment

xc: M. L. Ernst, Acting Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

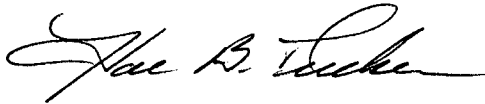
Mr. P. H. Skinner
NRC Resident Inspector
Oconee Nuclear Station

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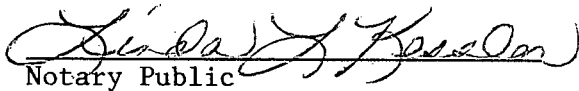
U. S. Nuclear Regulatory Commission
February 2, 1989
Page Two

HAL B. TUCKER, being duly sworn, states that he is Vice President of Duke Power Company; that he is authorized on the part of said Company to sign and file with the Nuclear Regulatory Commission this information; and that, all statements and matters set forth are true and correct to the best of his knowledge.



Hal B. Tucker, Vice President

Subscribed and sworn to before me this 2nd day of February, 1989.



Notary Public

My Commission Expires:

Mar 1, 1989



(1) Instrumentation

Provide reliable indication of parameters that describe the state of the RCS and the performance of systems normally used to cool the RCS for both normal and accident conditions. At a minimum, provide the following in the (Control Room) CR.

- (a) two independent RCS level indications
- (b) at least two independent temperature measurements representative of the core exit whenever the RV head is located on top of the RV (We suggest that temperature indications be provided at all times.)
- (c) the capability of continuously monitoring DHR system performance whenever a DHR system is being used for cooling the RCS
- (d) visible and audible indications of abnormal conditions in temperature, level and DHR system performance

Response:

Implementation of this recommendation requires the installation of a second, independent RCS level indication to supplement the single, existing indication (LT-5). Station Problem Report (SPR) 2539 was initiated on October 21, 1988 to select and install a redundant instrument. Current evaluations include a ultrasonic level detection device. An evaluation of getting this instrumentation is under way. Implementation is hoped for the Unit 2 1989 refueling outage scheduled to start May 19, 1989. However it is not known at this time whether this modification can be completed during the outage. Until a second level indication can be installed, the current RCS level instrumentation is adequate.

During the current unit 1 outage, existing incore thermocouples with output to the operator aid computer and/or inadequate core cooling monitor(s) were used to measure core temperature. This is as stated in my January 3, 1989 response to the expeditious actions. Pending revision of the appropriate procedures, similar provisions will be implemented for Units 2 and 3.

The existing instrumentation provides useful information for the operators so they may understand the performance of the RCS and DHR system. The following instrumentation is provided for the low pressure injection (LPI) system:

- pump motor current
- suction line pressure
- discharge header pressure
- discharge header flow
- discharge header low-flow annunciator
- pump low-delta-pressure annunciator

These indicators and alarms are located in the CR within the operator's normal range of vision. The low pressure service water (LPSW) system, which provides the ultimate heat sink, is instrumented with pump motor current, discharge header pressure low indicating light, and discharge header pressure low annunciator. While these LPSW indicators are located on the back and side panels, they are not blocked from the operator's field of view. These indications, combined with operable incore thermocouples, are sufficient to recognize a DHR system failure or degradation in accordance with existing abnormal procedures.

Visible and audible indications of abnormal incore temperatures are presently available via the operator aid computer (OAC). At present, use of this capability is optional. The controlling procedure for draining the RCS will be revised to require use of the OAC visible and audible alarm capability.

Visible and audible indicators of abnormal RCS level are being evaluated as a feature of the proposed ultrasonic level device. As this task is incomplete, the nature of the indicator and its schedule for implementation are unknown at this time. Current visible and audible indications of abnormal conditions in DHR system performance are adequate.

(2) Procedures

Develop and implement procedures that cover reduced inventory operation and that provide an adequate basis for entry into a reduced inventory condition. These include:

- (a) procedures that cover normal operation of the NSSS, the containment and supporting systems under conditions for which cooling would normally be provided by DHR systems.
- (b) procedures that cover emergency, abnormal, off-normal or the equivalent operation of the NSSS, the containment, and supporting systems if an off-normal condition occurs while operating under conditions for which cooling would normally be provided by DHR systems.

- (c) administrative controls that support and supplement the procedures in items (a), (b) and all other actions identified in this communication, as appropriate.

Response:

Guidance for normal operation of the NSSS, the containment and support systems is provided in the following procedures:

- OP/1102/01 Controlling Procedure for Unit Startup
- OP/1102/10 Controlling Procedure for Unit Shutdown
- OP/1103/11 Draining and Nitrogen Purging of the RCS
- OP/1104/04 Low Pressure Injection System
- PT/115/08 Reactor Building Containment Isolation and Verification

These procedures control operation of the subject systems and structures over a range of operating modes for which cooling would normally be provided by DHR systems. OP/1/A/1103/11 was extensively revised to incorporate elements of our response to the expeditious actions. The corresponding procedures for Unit 2 and Unit 3 will be similarly revised. Additionally, minor changes to OP/1103/11 are planned based on our initial experience with Unit 1. Any additional, major changes to these procedures will be based on future analyses and experience.

Guidance for operation of the NSSS, the containment and support systems during off-normal conditions is provided in the following procedures:

- AP/1700/07 Loss of Low Pressure Injection System
- AP/1700/24 Loss of Low Pressure Service Water

These procedures generally address the suggested entry criteria of Enclosure 2 of Generic Letter 88-17. AP/1/A/1700/07 was extensively revised to incorporate elements of our response to the expeditious actions. The corresponding procedures for Units 2 and 3 will be similarly revised. Additionally, minor changes to AP/1700/07 may result from our initial experience with Unit 1. Any additional, major changes will be based on future analysis and experience.

The expectation of core damage, a sustained loss of DHR, or a valid symptom of significant core damage would activate the existing Emergency Plan. A broad spectrum of activities would be initiated to provide for the health and safety of the public.

Administrative training programs have been utilized to disseminate information to plant operators and other affected personnel. Additional training and other administrative controls will be implemented as analysis and experience dictate. Recurrent training will be provided as outlined in our response to the expeditious actions.

(3) Equipment

- (a) Assure that adequate operating, operable, and/or available equipment of high reliability is provided for cooling the RCS and for avoiding a loss of RCS cooling.
- (b) Maintain sufficient existing equipment in an operable or available status so as to mitigate loss of DHR or loss of RCS inventory should they occur. This should include at least one high pressure injection pump and one other system. The water addition rate capable of being provided by each equipment item should be at least sufficient to keep the core covered.
- (c) Provide adequate equipment for personnel communications that involve activities related to the RCS or systems necessary to maintain the RCS in a stable and controlled condition.

Response:

During reduced inventory conditions, two Low Pressure pumps shall be operable to one or more operable headers. To improve reliability of these pumps, electrical redundancy shall be as follows:

- both safety-related main feeder buses (AC power) will remain energized
- two sources of power will be available to supply each main feeder bus

Additional equipment necessary to mitigate and recover from loss of DHR system shall include:

- A gravity flow path from the Borated Water Storage Tank (BWST) will be available. Procedural guidance for establishing flow will be provided in the applicable abnormal procedures and/or controlling procedures.
- One Bleed Transfer Pump (BTP) and connecting piping to the RCS will be available. Procedural guidance for establishing flow will be provided in the applicable abnormal procedures and/or controlling procedures.

To compensate for the lack of a high pressure make up source, either one High Pressure Injection pump will be available or both steam generator upper primary side handholes will be removed before establishing a reduced inventory condition. This will ensure either a high pressure makeup source is available or the possibility of having the RCS pressurize is extremely unlikely. This will be accomplished by providing guidance and controls in the appropriate controlling procedure.

Adequate communication equipment exists for activities related to the RCS. Telephone and page systems are employed and, radios are available for evolutions which require direct and constant communications.

(4) Analyses

Conduct analyses to supplement existing information and develop a basis for procedures, instrumentation installation and response, and equipment/NSSS interactions and response. The analyses should encompass thermodynamic and physical (configuration) states to which the hardware can be subjected and should provide sufficient depth that the basis is developed. Emphasis should be placed upon obtaining a complete understanding of NSSS behavior under nonpower operation.

Response:

Analyses being performed by our Design Engineering specifically for Oconee Nuclear Station include core heat-up projections to core boil and uncover, required makeup rates to offset core boil, viability of additional makeup systems and definition of containment conditions considering various core conditions. The results of the analyses along with industry experience will form the bases of procedure refinement and development for normal, abnormal and emergency operation in a reduced inventory condition. These analyses will be completed by June 5, 1989.

(5) Technical Specifications

Technical specifications (TSs) that restrict or limit the safety benefit of the actions identified in this letter should be identified and appropriate changes should be submitted.

Response:

No TS changes are planned for Oconee Nuclear Station.

(6) RCS perturbations

Item (5) of the expeditious actions should be reexamined and operations refined as necessary to reasonably minimize the likelihood of loss of DHR.

Response:

We will continue to refine all of our actions taken to mitigate the possibility of loss of DHR events. As our and industry's experience from loss of DHR events and analyses is increased, we will include this experience in our processes.