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December 26, 1979

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

Attention: Mr. R. L. Baer, Chief
Light Water Reactor Project Branch #2

Re: McGuire Nuclear Station
Docket Nos. 50-369 and 50-370

Dear Mr. Denton:

Attached is Duke Power Company's initial response to the NRC letters of September 27, 1979 and October 30, 1979, implementing the short term TMI-2 requirements for McGuire Nuclear Station. This response is submitted in accordance with the McGuire response schedule which was transmitted to you in my letter of November 19, 1979. As discussed in my November 19, 1979 letter Duke Power Company will submit an additional response on January 25, 1980.

Very truly yours,

William O. Parker Jr.
William O. Parker, Jr.

by WAH

THH/sch
Attachment

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ELECTRICITY FOR A PROGRESSIVE PIEDMONT
5th Anniversary
DUKE POWER 1904-1979

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Duke Power Company
Response to NUREG 0578
Short Term Requirements
for McGuire Nuclear Station

2.1.1 Emergency Power Supply Requirements

Pressurizer Heaters

For each McGuire unit, two groups of pressurizer heaters with a capacity of 416Kw each are supplied from the redundant 600 VAC Essential Auxiliary Power System, one heater group per power train. Power is available to each heater group from the offsite power system or from the onsite emergency power system (Ref. FSAR Chapter 8). Each heater group has the capability to maintain natural circulation under hot standby conditions.

The pressurizer heaters are automatically shed from the emergency power sources via the diesel generator load sequencer upon the occurrence of a safety injection actuation signal (SIAS). The SIAS and diesel generator load sequencer must both be reset before the operator can manually reload the pressurizer heaters onto the emergency power sources. These resets, and the manual controls for the pressurizer heater feeder breakers are located in the control room. Procedures will be provided for the operator as necessary to manually load the pressurizer heaters onto the emergency power sources following an SIAS.

The Class 1E interfaces for main power and control power are protected by safety-grade circuit breakers.

A study was performed by Westinghouse to determine the heater capacity required to maintain Reactor Coolant System pressure with a loss of offsite power and the time frame when emergency power supplies must be available to the heaters.

Pressurizer heat losses can be divided into two basic components: 1) losses through the pressurizer walls, insulation, supports, connections, etc., and 2) losses due to continuous spray flow. Spray flow is driven to the top of the pressurizer by reactor coolant pump head; without offsite power, the pumps will coast down and no spray flow will be supplied. Thus, without offsite power, only heat losses through insulation, supports, etc., must be offset by heaters.

A review of heat loss calculations for a typical 1800 ft^3 pressurizer, such as that installed at McGuire, resulted in the determination that a heater capacity of 150 Kw will conservatively compensate for heat losses from the pressurizer at or below normal operating pressure with no allowance for continuous spray.

A transient analysis of the loss of offsite power event established that the ability to supply emergency power to heaters at 150 Kw capacity within four hours will prevent loss of subcooling in the primary. Conservative assumptions resulting in least margin to subcooling and rapid decrease in pressure were utilized in this analysis.

As demonstrated by the above discussion, the pressurizer heater system at McGuire Nuclear Station satisifies the requirements of NUREG 0578.

Pressurizer PORV

The pressurizer power-operated relief valves are air-operated with DC control solenoids. Power for the solenoid valves is supplied from the 125VDC Vital Instrumentation and Control Power System (Ref. FSAR Chapter 8). The solenoid operators and their controls are safety-related.

Pressurizer PORV Block Valves

The pressurizer PORV block valves are motor-operated valves with both motive and control power supplied from the 600VAC Essential Auxiliary Power System (Ref. FSAR Chapter 8). The block valves including their power and control circuits are safety-related.

Pressurizer Level Indication

Three redundant channels of pressurizer level instrumentation are provided. These channels are part of the safety-related portion of the Process Control System which receives its power from the Vital Instrumentation and Control Power System (Ref. FSAR Chapter).

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2.1.3b Instrumentation for Inadequate Core Cooling

An indication of the deviation from saturation conditions will be provided in the control room. This saturation readout will utilize output from the Operator Aid Computer and will be displayed on CRTs in conjunction with a graphic display of the margin to saturation conditions. A control room alarm is provided with two separate setpoints, one for operating conditions and one for shutdown conditions.

Procedures will be written to provide redundant capability for determining the margin to saturation conditions. These procedures will contain both steam tables and instructions for calculating the degree of subcooling.

A detailed description of the plant computer subcooling monitoring package will be provided in our January 25, 1980 response. This description will include input parameters, calculator features, display features, and backup capability (NUREG 0578 clarification list).

2.1.4 Containment Isolation Provisions

Containment isolation at McGuire is initiated by any one of the following diverse parameters: (Figure 7.2.1-1 (8 of 16))

a. low steamline pressure (2/3)
b. low pressurizer pressure (2/4)
c. high containment pressure (2/4)
d. manual

Containment isolation valve control systems will be designed such that resetting of the containment isolation signal will not cause any containment isolation valve to automatically reposition. Deliberate operator action will be required to reposition a containment isolation valve following reset of a containment isolation signal

Table 6.2.4-1 of the McGuire FSAR lists the containment piping penetrations, their functions, and other pertinent information. The McGuire Containment Isolation System design has been reviewed with careful consideration given to the definition of essential and non-essential systems. Our review has resulted in no change in the list of systems considered essential. However, we will make the following modifications to the Containment Isolation System.

a. At present, the Containment Ventilation Unit Drain Header containment isolation valves (see item 102 of Table 6.2.4-1) close upon receipt of the high-high containment pressure signal (Phase B Isolation Signal). This will be changed to signal the valves to close on a Phase A Isolation Signal. The purpose of this line is only to prevent draining ventilation unit condensate to the containment floor sumps during normal operation and then having to process it through the waste system. It does not serve to protect the ventilation units. Therefore, since containment isolation takes priority over waste processing concerns, it is necessary to isolate this line as early as possible.

b. Two 50 gpm sump pumps are provided in each of two Containment Floor and Equipment Sumps and one 50 gpm pump is provided in the Incore Instrumentation Sump. These pumps start automatically on high sump level signals. They discharge to the 10,000 gallon Floor Drain Tank in the Auxiliary Building. The automatic start feature for these pumps will be replaced with manual start capability only. The automatic stop on low sump level will be retained. Sump level indication and high level alarm will be provided to the operator in the Control Room. For pump protection, an interlock will be provided to trip the pumps or prevent them from starting if one of the Containment isolation valves in the sump discharge header closes. The pumps will also be tripped on a high Containment radioactivity signal.

The three modifications described above will be complete prior to fuel loading.

2.1.7a Automatic Initiation of the Auxiliary Feedwater System

Automatic initiation and emergency power for the Auxiliary Feedwater System are included as part of the McGuire Nuclear Station design which meets the NUREG 0578 requirements.

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2.1.7b Auxiliary Feedwater Flow Indication to Steam Generators

Safety grade indication of auxiliary feedwater flow to each steam generator will be provided in the control room in accordance with NUREG 0578 requirements. However, for the short term, existing control grade flow instrumentation in the lines to each steam generator will be relied upon. Backup for these instruments, in case of single failure, is available from existing control grade flow instrumentation in the suction piping to each auxiliary feedwater pump. Further backup is available in the form of steam generator level indication.

The control room safety grade indication will be installed by January 1, 1981 contingent upon delivery of required instrumentation components.

2.2.1a Shift Supervisor Responsibilities

The command and control function of the shift supervisor in the safety of operations for both normal and emergency conditions has been re-emphasized. An administrative procedure (Station Directive 3.1.4, Conduct of Operations) has been written to accomplish this re-emphasis.

2.2.1c Shift and Relief Turnover Procedures

An administrative procedure (Station Directive 3.1.9, Relief of Duties) has been revised to incorporate a detailed checklist of applicable items for shift turnover. In addition, a periodic test procedure, Shift Turnover Verification, has been written to ensure an adequate evaluation of shift turnovers.

2.2.2a Control Room Access and Authority Succession

An adminstrative procedure (Station Directive 3.1.4, Conduct of Operations) has been written to limit personnel access to the control room and to establish a clear line of authority for coping with operational transients and accidents.