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April 4, 1990

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

Subject: McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370
10 CFR 50.63; Requirements for Station Blackout (SBO)

Gentlemen:

On January 4, 1990 NUMARC issued a letter to all utilities requesting that supplemental information be provided to the NRC concerning SBO. Based on the NUMARC letter, Duke Power Company has performed a review of its previous SBO response to the NRC as well as the supporting documentation to verify that:

1. Implementation is consistent with the supplemental guidance provided by the attachments to the January 4, 1990 NUMARC letter,

2. Applicability of NUMARC 87-00 assumptions is documented in utility files, and

3. Departures from the accepted NUMARC 87-00 methodology are identified.

Attached is an updated version of my April 17, 1989 submittal which provides additional details concerning McGuire's SBO capabilities. This submittal is based on the NUMARC 87-00 guidance including the clarifications transmitted by the NUMARC letter dated January 4, 1990. Deviations from the NUMARC 87-00 guidance are specifically noted.

With regard to Emergency Diesel Generator target reliability, rigorous maintenance, operating, and testing programs exists within the Maintenance and Operations organizations to maintain the 0.95 reliability value.

A program to track the Alternate AC (SSF D/G) reliability target value per Appendix B of NUMARC 87-00 will be in place within 120 days after the

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notification provided by the Director, Office of Nuclear Reactor Regulation in accordance with 10 CFR 50.63(c)(3). There are no equipment modifications required or planned at McGuire to meet this rule.

Very truly yours,

Hal B. Tucker

RGM/03279001

Attachment

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A. Station Blackout Duration

NUMARC 87-00, Section 3 was used to determine the SBO required coping duration category. The results show that McGuire Units 1 and 2 are in the 4 hour coping duration category.

The following plant factors were identified in determining the proposed station blackout duration.

1. AC Power Design Characteristic Group is P1 based on:

   a. Expected frequency of grid-related LOOPS does not exceed once per 20 years (Section 3.2.1, Part 1A, p. 3-3);

   b. Estimated frequency of LOOPS due to extremely severe weather places the plant in ESW Group 1 (Section 3.2.1, Part 1B, p. 3-4); The estimated frequency is 1.08 x 10 -6 per year.

      Note: Site specific meteorological data was used in this evaluation.

   c. Estimated frequency of LOOPS due to severe weather places the plant in SW Group 1 (Section 3.2.1, Part 1C, p. 3-7); The estimated frequency is 0.00189 per year.

      Note: Site specific meteorological data was used in this evaluation.

   d. The offsite power system is in the I1/2 Group (Section 3.2.1, Part 1D, p. 3-10).

2. The emergency AC power configuration group is C based on: (Section 3.2.2, Part 2C, p. 3-13)

   a. There are 2 emergency AC power supplies per unit not credited as alternate AC power sources (Section 3.2.2, Part 2A, p. 3-15);

   b. 1 emergency AC power supply is necessary per unit to operate safe shutdown equipment following a loss of offsite power (Section 3.2.2, Part 2B, p. 3-15).

3. The target EDG reliability is 0.95.

   A target EDG reliability of 0.95 was determined based on having a nuclear unit average EDG reliability for the last 100 demands greater than 0.95 consistent with NUMARC 87-00, Section 3.2.4. Actual unit averages used in this determination were 0.985 for Unit 1 and 0.97 for Unit 2 (based on late 1988 data).

   With regard to maintaining the 0.95 reliability target value, a rigorous maintenance, operating, and testing program exists within the McGuire Maintenance and Operations organizations. Periodic

testing is done in accordance with Technical Specifications. A component expert is established within the Maintenance Organization to trend engine performance including oil analysis. The Operations organization is responsible for EDG testing and for maintaining a log pursuant to Reg. Guide 1.108 of all starts and their proper classification.

4. An alternate AC (AAC) source is provided at McGuire which meets the criteria specified in NUMARC 87-00, Appendix B. The AAC source is the Standby Shutdown Facility (SSF) diesel generator which is the power source for the Standby Shutdown System (SSS). The SSF diesel generator is available within 10 minutes from the recognition of an SBO event. However, it cannot be started from the McGuire main Control Room which is an exception to the NUMARC 87-00 guidance. The SSF diesel generator is manually started from the SSF Control Room. Testing has demonstrated the ability of plant operators to start the SSF diesel within 10 minutes from the recognition of the SBO event which satisfies the intent of the NUMARC guidance. The SSF diesel generator has sufficient capacity and capability to operate equipment necessary to maintain a safe shutdown condition for the 4 hour SBO event.

   The SSF was originally designed to provide an alternate means of achieving and maintaining hot standby conditions following a postulated fire or sabotage event. Loss of all normal and emergency station power (AC and DC) is assumed for the postulated fire and sabotage events; therefore, the SSF diesel generator and the SSF are also designed to handle the SBO event. Specifically, the SSF has the capability of maintaining hot standby conditions for a period of approximately 72 hours following a loss of plant power. This is well in excess of the SBO required coping duration of 4 hours.

   The NRC has previously reviewed and approved the SSF design as noted in the McGuire SER Supplement 6 dated February 1983.

B. Procedure Description

Plant procedures have been reviewed and modified, as necessary, to meet the guidelines in NUMARC 87-00, Section 4 in the following areas. The following procedures have been reviewed:

Station Blackout Response Guidelines

Emergency Procedure for Loss of All AC Power - EP/1(2)/A/5000/09
Standby Shutdown Facility Operations - OP/0/A/6100/17

AC Power Restoration

Emergency Procedure for Loss of All AC Power - EP/1(2)/A/5000/09
Emergency Procedures for Capacity Shortage

Severe Weather Guidelines

Procedure for Natural Disaster and Earthquake - RP/0/A/5700/06
Procedure for Earthquake - RP/0/A/5700/07

C. Proposed Modifications and Schedules

There are no plant modifications required to use the SSF diesel generator as the AAC power source. There are no procedure revisions necessary to utilize the AAC Power Source.

D. Coping With a Station Blackout

McGuire is a 4 hour coping duration category plant with 10 minute alternate AC capability. The AAC source (i.e, the SSF diesel generator) has the capacity and capability to power equipment necessary to achieve and maintain hot standby conditions for the 4 hour required coping duration. This capability is independent of any normal or emergency plant power system (AC or DC) and fully bounds any postulated SBO scenario up to and including evacuation of the main control room.

A more probable SBO scenario would utilize a combination of normal plant systems and certain SSF capability to achieve and maintain hot standby conditions from the main control room. Therefore, all of the NUMARC 87-00 coping aspects are discussed in the following paragraphs.

1. Condensate Inventory for Decay Heat Removal

It has been determined from Section 7.2.1 of NUMARC 87-00 that 75,452 gallons of water are required for decay heat removal for the four hour required coping duration.

Plant Systems

During an SBO event at McGuire the turbine-driven auxiliary feedwater pumps would be aligned to the following normal sources of condensate grade water:

1. Auxiliary feedwater condensate storage tank - 45,000 gals. (This tank is shared between Units)
2. Upper Surge Tanks - 85,000 gals.
3. Condenser Hotwell - 170,000 gals.

Therefore, there is sufficient condensate inventory available for the four hour required coping duration. No plant modifications or procedure changes are necessary to use these water sources.

SSF Feature

In addition to the normal condensate sources noted above, the SSF also has the ability to align to the Condenser Circulating Water System (RC) which has the capability to maintain hot standby conditions for approximately 72 hours. No plant modifications or procedure changes are necessary to use these water sources.

2. Class 1E Battery Capacity

Plant System

The vital I & C batteries power the 125 VDC and 120 VAC vital I & C power system, as described in FSAR Section 8.3.2.1.4. This system in turn supplies power to the Class 1E instruments and controls that would be used to achieve and maintain hot standby conditions from the main Control Room following an SBO event. A plant specific battery capacity calculation is not required because the design of the vital battery system allows cross-tieing the blacked-out Unit's batteries to the non-SBO Unit battery charger.

SSF Feature

The SSF is also provided with a 250/125 VDC power system which is separate from the 125 VDC and 120 VAC vital I & C power system. The SSF DC power system batteries are charged by the AAC source and are also available to power the SSF instruments and controls necessary to achieve and maintain hot standby conditions from the SSF Control Room following an SBO event.

3. Compressed Air

No air operated valves are relied upon to maintain hot standby conditions from the SSF.

4. Effects of Loss of Ventilation

Plant System

With regard to the main Control Room complex, the assumption in NUMARC 87-00, Section 2.7.1 that the Control Room will not exceed 120°F has been assessed. The main Control Room will not exceed 120° during an SBO event; therefore, the main Control Room is not a dominant area of concern. The main Control Room is shared between units and is served by a shared ventilation system (VC/YC). This ventilation system is capable of being powered from either unit; therefore, the Control Room temperature will be maintained at approximately 75°F with a possible short duration excursion above 75°F (but not exceeding 120°F) for the period required to realign VC/YC to an operable EDG (approximately 45 minutes).

The Train "A" Unit 1 and 2 essential switchgear rooms will not exceed 120°F during an SBO event, therefore, the Train "A" switchgear rooms are not dominant areas of concern.

The Turbine Building is not a dominant area of concern as there would not be a significant change in the Turbine Building environment as a result of a SBO.

The outboard Doghouses are not a dominant area of concern as they are vented to the outside environment and are not provided with forced ventilation. Therfore, the SBO environment would not be different from the normal operating environment. The inboard Doghouses, however, are dominant areas of concern and temperatures would be expected to exceed 151°F.

The turbine-driven auxiliary feedwater pump room is a dominant area of concern at McGuire. Using a plant specific calculation, the steady state ambient air temperature in this area during an SBO induced loss of ventilation is 143°F.

The following dominant areas of concern (DACs) were identified at McGuire (Note: Plant specific calculations and assumptions were used to determine these DAC temperatures):

DAC	Temperature
Containment	201°F
Annulus	176°F
Auxiliary Feedwater Pump Rooms	143°F
Mechanical Penetration Rooms	188°F
Inboard Doghouses	151°F

Reasonable assurance of the operability of SBO response equipment in the above dominant areas of concern has been addressed using NUMARC 87-00, Appendix F and/or the Topical Report. No modifications or procedure changes are required to provide reasonable assurance for equipment operability.

SSF Feature

The SSF has its own ventilation system which is powered from the AAC source (SSF diesel generator), therefore, the SSF is not a dominant area of concern. Areas other than the SSF that contain SBO response equipment that is used in conjunction with the SSF are addressed above.

5. Containment Isolation

Plant System

The plant list of containment isolation valves has been reviewed to verify that valves which must be capable of being closed or that must be operated under station blackout conditions can be positioned (with indication) independent of the preferred and blacked-out unit's Class 1E power supplies. No plant modifications and/or associated procedure changes were determined to be required to ensure that appropriate containment integrity can be provided under SBO conditions.

SSF Feature

Same as above.

6. Reactor Coolant Inventory

SSF Feature

The AAC source powers the necessary make-up system to maintain adequate reactor coolant system inventory to ensure that the core is cooled for the 4 hour required coping duration.

A standby makeup pump powered from the SSF diesel generator is located in the annulus of each unit to supply makeup to the Reactor Coolant System. The pump is sized to accommodate normal system leakage, Reactor Coolant Pump seal leakage, and additional flow for system makeup.