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DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

September 29, 1980

TELEPHONE: AREA 704
373-4083

Mr. J. P. O'Reilly, Director
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Reference: RII:JPO
IE Bulletin No. 80-18

Subject: McGuire Nuclear Station
Docket Nos. 50-369, -370

Dear Mr. O'Reilly:

In regard to your letter of July 24, 1980, please find attached our response to IE Bulletin 80-18.

Preparation of the response to this bulletin required approximately 52 manhours. This does not include manhours for installation of the required modifications.

Very truly yours,

William O. Parker, Jr.

LJB:scs

Attachment

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DUKE POWER COMPANY
MCGUIRE NUCLEAR STATION

Response to IE Bulletin No. 80-18

ITEM 1

Plant specific calculations outlined in the Westinghouse letter NS-TMA-2245 were performed for McGuire Nuclear Plant. The calculation results indicate that "Interim Modification II" is required to provide adequate miniflow for the centrifugal charging pumps.

ITEM 2

a. Modifications to equipment and to operating procedures, consistent with those described in "Interim Modification II," to ensure adequate minimum flow under all conditions, are being made at McGuire prior to fuel loading. The McGuire Volume Control Tank (VCT) relief valve is designed to relieve 350 gpm at a set pressure of 75 psig. This is adequate capacity to handle the miniflow for both centrifugal charging pumps and the Reactor Coolant Pump (RCP) seal return flow (320 gpm). The VCT relief valve has been verified to operate at the design setpoint stated above by both the valve manufacturer and the McGuire station operating personnel. (Periodic verification will be made through ASME Section XI Subsection IWV Testing.)

b. Since the centrifugal charging pumps miniflow isolation valves will remain open following a safety injection signal, operator action is not required initially for any transient.

c. The manipulation (closing) of the centrifugal charging pumps miniflow isolation valves can be accomplished from the control room using Reactor Coolant System wide range pressure (indication for RCP trip) instrumentation since emergency onsite power is available to the isolation valves and the pressure transmitters after a blackout.

d. Westinghouse has performed generic studies, which bound the McGuire Upper Head Injection (UHI) type plants, to evaluate the impact of the modifications on safety related analyses which take credit for flow from the centrifugal charging pumps. Feedline and steamline rupture analyses show that reduced safety injection flow due to normally open miniflow isolation valves have an insignificant effect on the plant transient response. The six-inch diameter and larger loss of coolant accident break sizes represent the worst break size range for UHI plants.

   LOCA analyses show negligible effect on peak clad temperature (PCT) if centrifugal charging pump miniflow is manually isolated at the RCP trip setpoint. A PCT penalty of $<10^{o}F$ results if miniflow isolation occurs prior to core uncovery, with the added benefit that this event occurs later in a UHI plant transient than for a non-UHI plant transient of the same break size, allowing more time for the operator to respond. A $40^{o}F$ PCT penalty for breaks of this size results from a 10 minute delay in miniflow isolation and is a

conservatively high and bounding value for UHI plants for the following reasons:

1. The 40°F penalty was based on sensitivity studies performed assuming an approximate 20% reduction in total high pressure injection flow. However, the anticipated 20% reduction actually applies only to the charging pumps. Intermediate head safety injection pumps are not affected. Therefore, total high pressure injection for plants with intermediate head safety injection pumps, which includes McGuire, will result in less total degradation, and thus a smaller PCT penalty. The high pressure accumulator on UHI plants has a similar effect on reducing the total HPI degradation due to the delay in miniflow isolation.

2. The UHI accumulator is a significant source of liquid mass inventory for breaks greater than or equal to six inches in diameter. This additional mass delays the core uncovery time as compared to the same size break occurring on a similar non-UHI plant, since more liquid mass must exit from the break prior to core uncovery. The delay in core uncovery results in clad heatup at a lower power level caused by the decay in residual core heat. Therefore, clad heatup rates are slower which also tends to reduce the sensitivity to changes in HPI delivery rate.

Adding [illegible]0°F PCT increase to the maximum PCT of 2146.9°F now listed in FSAR [illegible]e 15.4.1-1, gives a maximum PCT of 2186°F which is still consi[illegible]bly less than the 2200°F allowable.

e. Technical Specifications are based on verification of centrifugal charging pump runout flow delivery. This accounts for the miniflow line being open during flow balance testing. Therefore, the Technical Specifications for McGuire based on ITEM 2.d analyses remain valid.

ITEM 3

The results of calculations performed under ITEM 1 indicate that a total flow from both centrifugal charging pumps of 300 gpm is required to guarantee that the weak centrifugal charging pump can deliver at least 60 gpm. The pressurizer safety valve relief pressure, including a 1% setting tolerance, is 2510 psig. The maximum RCS pressurizer pressure at which 60 gpm miniflow can be maintained through the weak centrifugal charging pump was determined to be 2345 psig. Therefore, "Interim Modification II," is required for the McGuire Nuclear Plant.