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DUKE POWER

June 4, 1993

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

Subject: McGuire Nuclear Station, Unit 2
Docket Nos. 50-370
Section XI Inservice Inspection (ISI)
Hydrostatic Testing Following Repair
Relief Request 93-03

Dear Sir;

Pursuant to 10 CFR 50.55(g)(5)(iii), I am submitting the attached relief request for NRC review and approval. This request for relief from the requirements of Section XI of the ASME code involves a system hydrostatic test of a repair to a class B weld within the letdown header of the Chemical and Volume Control System (NV). Specifically, the required hydrostatic test pressure of 1.25 times the design pressure can not be achieved. Alternate tests have been proposed, which provide an equivalent level of quality and safety.

I would like to request that the NRC staff promptly review and approve this submittal by June 4, 1993. The basis for this request is the need to return this portion of the NV system to service so that the unit will not have to be shutdown due to primary side chemistry problems.

The need to do a repair of the weld was due to a crack within the weld which resulted in a leak of approximately 7 gpm. The cause for the crack in the weld was determined to be fatigue failure due to severe vibration. The reason for the severe vibration was determined to be caused by cavitation in a letdown orifice. As a final resolution to this problem a modification will be implemented during the upcoming refueling outage for Unit 2, currently scheduled to start July 1, 1993.

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The modification will replace letdown orifices 2NVFE6210 and 2NVFW6200 with new orifices that have been redesigned to have reduce cavitation. A prototype orifice was recently successfully tested. All piping in the vicinity of the orifices will be replaced with new piping. The current plan is to use bent piping to reduce the number of welds and where possible, replace socket welds with butt welds.

Should there be any questions regarding this matter, please contact Paul Guill at (704) 875-4002.

Very truly yours,

T. C. McMeekin

xc: Mr. S. D. Ebneter
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U. S. Nuclear Regulatory Commission
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John C. Brooks, Commissioner of Labor
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ATTACHMENT

DUKE POWER COMPANY
MCGUIRE NUCLEAR STATION, UNIT 2

Request for Relief From
ASME Code Section XI Requirements

I. Component for Which Relief is Requested

A. Name and Identification Number
90° elbow socket weld, Weld Number: NV2FW216-27, Pipe Schedule 40, Pipe Size 2" SA-312/TP 304. The weld in question is within the Letdown Header of the Chemical and Volume Control System (NV), between letdown orifice 2NVFE 6200 and valve 2NV-458.

B. Function
The letdown function of the NV system, along with the charging function, are employed to maintain a predetermined water level in the Reactor Coolant System pressurizer, thus maintaining proper reactor coolant inventory during all phases of unit operation. A more detailed description of the functions of the NV system is provided within Section 9.3.4 of the FSAR.

C. ASME Section XI Code Class
Class 2

D. Valve Category
Not applicable

II. ASME Code Section XI Requirement That Has Been Determined To Be Impractical

ASME Code Section XI, 1980 Edition through Winter 1980 Addenda, Subsection IWC, Subarticle IWC-5222(a) System Hydrostatic Test

III. Basis for Requesting Relief

On May 31, 1993 Weld Number NV2FW216-27 developed a crack which resulted in about 1 gpm leak. The leak was located downstream of the 2NVFE6200 letdown orifice in one of the socket welds associated with a 90° elbow within the piping system. In response, the normal letdown flowpath was isolated and the alternate letdown flowpath (excess letdown) was established. Following isolation of the leak, the weld was repaired. A liquid penetrant examination of the final pass of the weld repair was performed.

IWA-5214 specifies that a system hydrostatic test be performed of the component that was repaired prior to resumption of service. Subsequent to the repair of the weld a system hydrostatic test was attempted. Since this is a class 2 weld, IWC-5222 specifies the pressure and temperature at which the test is to be performed. IWC-5222 requires that the test pressure be at least 1.25 times the design pressure for the system. The design pressure specified for this portion of the system is 2485 psig. Accordingly, the pressure range for the hydrostatic test would be 3100 psig.

When the system hydrostatic test was performed, a pressure of 2150 psig could only be achieved. The suspected reasons for not being able to reach the required test pressure was attributed to packing leakoff and/or to leakage past one or more of the valves used to form the boundary for conducting the test. At this pressure of 2150 psig, a VT-2 exam was performed and no evidence of leakage from the repaired weld area was observed. This test pressure is well above the normal operating pressure that the weld would experience. The location of the repaired weld is downstream of the letdown orifice. When the reactor coolant system fluids passes through this letdown orifice, a large pressure reduction occurs, resulting in an operating pressure of approximately 335 psig. The test pressure that was achieved (2150 psig) is significantly greater than 1.25 times the expected normal operating pressure of 335 psig. Since there was no evidence of any leakage, reasonable assurance of the integrity of the weld repair to withstand the expected normal operating pressure of approximately 335 psig is provided.

In addition to the reduced pressure system hydrostatic test, a liquid penetrate test of the final pass of the weld repair was also performed. When the system is returned to service, another VT-2 exam will be performed. The expected test pressure for this exam is approximately 335 psig. These two alternate tests, in combination with the reduced pressure system hydrostatic test, provides an equivalent means of verifying the adequacy of the weld repair.

If the requirement specified by the code was imposed, a significant burden could occur. To achieve the test pressure as specified by the code would require a significant effort to identify what is causing the inability to achieve this pressure, and possible an extensive amount of time and effort to correct the problem. There exists an immediate need to return to service this portion of the NV system. Operating for an extended period of time (24 to 72 hours) with normal letdown isolated and only excess letdown flowpath inservice will result in primary side chemistry problems that may result in the need to shutdown the unit pursuant to technical specifications 3.4.7 or 3.4.8.

IV. Alternate Testing

In lieu of the system hydrostatic test to be performed, the following alternate testing is proposed:

1) A VT-2 exam at a reduced test pressure of 2150 psig.

2) A liquid penetrate test of the final pass of the weld repair.

3) A VT-2 exam at normal operating temperature and pressure (650°F and 335 psig)

4) Observe for possible leakage by monitoring inputs to the containment sump once every 12 hours.

V. Implementation Schedule

The proposed alternate tests 1 and 2 have already been performed. The proposed alternate test 3 will be performed when the system is returned to service. The proposed alternate test 4 will be implemented when the system is returned to service and will be continued until the unit is shutdown for the start of the refueling outage, currently scheduled to begin July 1, 1993.