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Docket No. 50-423
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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Millstone Nuclear Power Station, Unit No. 3
Leak Repair Plan for Check Valve - 3RCS*V146

The purpose of this letter is to inform the NRC Staff of Northeast Nuclear Energy Company's (NNECO) repair plan regarding check valve, 3RCS*V146. Specifically, this submittal documents information relevant to the discussions that took place in conference calls between NNECO and the NRC Staff on November 21 and 22, 1995. NNECO plans to shutdown Millstone Unit No. 3 on or about November 30, 1995, to install a seal weld on the valve to stop minor leakage which is being experienced by the valve. It is our intent to perform this repair in the lower pressure and temperature conditions of Mode 4 or otherwise in Mode 5.

Background

On August 21, 1995, the "D" reactor coolant pump (RCP) motor stator temperature started to increase approximately 10°F per month. On September 6, 1995, there was a slight increase in containment activity, indicating a very small leak in the reactor coolant system (RCS). Radionuclide sampling of the containment atmosphere characterized the leak as being very small. Subsequent monitoring of the leak showed a slight decrease in the leak rate. On or about September 12, 1995, the "C" RCP motor stator temperature started to increase approximately 4°F per month. It was postulated that the RCP stator temperature increases could be the result of boric acid deposition on the stator air cooling paths.

On October 11, 1995, the "D" and "C" RCP loop areas were inspected from the operating floor (51'6" level) of the containment, using binoculars. The "D" RCP motor cubicle (24'6" level) was also entered to look through the view-port between the motor stator and the motor air discharge cooler. Neither inspection showed any apparent boron accumulation.

On November 7, 1995, a cross discipline group reviewed the data associated with the rising RCP stator temperature. The conclusion reached due to a lack of any other evidence or apparent cause to the contrary was that the most likely cause of the increases was boric acid deposition. Action items were assigned, including a

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closer inspection of the "D" loop area during the monthly containment entry, at that time, scheduled for November 28, 1995.

On November 9, 1995, a containment entry was made to determine the source of the suspected leakage observed earlier that day in the 'D' RCS loop using a containment video camera. Dry boric acid was found on the insulation for check valve, 3RCS*V146. Pipes and components within six feet of the check valve were also partially coated (dusted) with boric acid.

The most likely source of the leakage and resultant boric acid deposition is a body-to-bonnet leak on 3RCS*V146. Less likely sources include cracks in the valve body or bonnet. These less likely sources were ruled out because the plant has not experienced significant thermal cycling, water hammer or an other significant upset condition during the current operating cycle which would typically cause this type of problem. Additionally, this 10" safety injection line was determined not to be susceptible to thermal stratification concerns outlined in NRC Bulletin 88-08. This valve experienced a body-to-bonnet leak in June 1995, during the startup from the last refueling outage. The leak was stopped by re-tightening the bonnet studs to the maximum torque allowed by the valve vendor.

Based on the November 9, 1995, observations, it appears that the leak has recurred. As stated above, the current leak was discovered by a visual inspection. Since the discovery of this condition, the leak rate has been well within our technical specification allowed unidentified leak rate limit of one gallon per minute (gpm) and has not changed appreciably. Both identified and unidentified leakage presently total approximately 0.2 gpm. Further, degradation of a leaking mechanical joint of this type would not result in a catastrophic failure. An operability determination was performed which concluded that there would be ample warning for the unit to take action to prevent exceeding the allowed leak rate. Additional actions were initiated to make preparations for a repair plan to stop the leak and to prepare a means of preventing the boric acid from reaching the RCP motors while the repair plan was under development. The NRC Staff was kept informed of this situation on a frequent basis.

Discussion

Based on discussions with the NRC Staff on November 21 and 22, 1995, NNECO has reassessed our plan for dealing with the check valve leakage issue. NNECO plans to commence a shutdown of Millstone Unit No. 3 on or about November 30, 1995, to seal weld the check valve. During shutdown in Mode 3, as close as practical to normal operating pressure and temperature (NOP and NOT), NNECO

will remove the insulation on the check valve to locate and characterize the leak as well as the environmental conditions around the main valve body-to-bonnet studs. The actual repair plan to the check valve will be performed at the lower energy end of Mode 4 or otherwise in Mode 5. A seal weld repair is planned. While performing the repair plan, the valve studs will be removed and examined for evidence of degradation. This examination will include review for boron corrosion wastage, steam cutting, and subsequent off-site testing for intergranular stress corrosion cracking (IGSCC). NNECO and Westinghouse, if available, will perform this examination.

NNECO has also contracted with Westinghouse to perform an industry wide literature search and an internal review of Westinghouse applications of the subject stud material (SA 453 Gr. 660 Class A or B) for any evidence of IGSCC in similar applications. NNECO is also in the process of contacting other licensees through the INPO Nuclear Network to determine if any licensee has experienced IGSCC on this stud material due to primary coolant leaks.

NNECO has concluded that from a personnel safety and nuclear safety perspective, the repair plan should not be performed at power and/or NOP/NOT. The seal weld to the valve will be performed at the low end of Mode 4 or otherwise in Mode 5. The intended repair plan specifies adding seal welds to the valve body to bonnet joint. The original valve design drawings provide details (including weld thickness) for the option of seal welding. Stud replacements and seal welds will be implemented in accordance with the applicable portions of Section XI of the ASME Code. The preliminary information from Westinghouse indicates that the seal weld is intended as a leakage seal and is not considered as an engineered code pressure boundary. Preliminary reviews of the intended repair plan indicate that there are no personnel safety or public safety issues associated with the repair plan or the seal weld evolution as planned. Preliminary calculations indicate that leak tightness would be maintained with as many as six of the 18 studs removed from the valve at 400 psia. However, NNECO has conservatively decided to remove only two studs at a time. Each set of studs removed will be diametrically opposed to provide the maximum level of safety and leak tightness. NNECO notes however, that some of the subject valve studs have galled on removal during previous refueling outages. If valve body threads become damaged and repair or replacement of the valve should become necessary, then a midloop repair may become necessary. A midloop operation is a less desirable condition for the plant to be placed in, considering the energy level of the fuel (i.e., due to the decay heat available since the plant has been operating for 173 days at about 100% power).

The details of the repair plan are being finalized at this time and will be provided to the Millstone Senior Resident Inspector by November 30, 1995.

Compensatory Measures

Since the discovery of the leakage, NNECO has taken the following measures to monitor any change in the check valve leakage.

- The operating crews in the control room have been sensitized to this situation and the leak continues to be closely monitored.
- A containment video camera is used to periodically check any visible signs of leakage.
- The containment airborne particulate and gaseous radioactivity monitors continue to monitor the atmosphere and will immediately respond to any significant increase in airborne radioactivity resulting from the reactor coolant pressure boundary leakage.
- The RCS water inventory balance program provides an indication of a sudden increase in the RCS leakage.
- Containment drain sump pumps run times provide an indication of an increase in the RCS leakage.

The above measures will continue to be used until the plant is shutdown to perform the check valve seal weld. During this period, if there is an indication of a sustained increase in RCS leakage, NNECO will take actions to shutdown the plant.

Summary

NNECO plans to shutdown Millstone Unit No. 3 on or about November 30, 1995, to add a seal weld to the check valve. Until the seal weld is completed, we conclude that there is reasonable assurance that the plant can be operated safely and that the continued operation of Millstone Unit No. 3 will not involve any undue risk to the health and safety of the public.

We note that there are no regulatory commitments contained within this letter. If the NRC Staff should have any questions or comments regarding this letter, please contact Mr. Ravi Joshi at (860) 440-2080.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

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BY: [signature]
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