June 25, 1985

Docket Nos. 50-338
and 50-339

MEMORANDUM FOR: Edward J. Butcher, Acting Chief
Operating Reactors Branch No. 3
Division of Licensing

FROM: Leon B. Engle, Project Manager
Operating Reactors Branch No. 3
Division of Licensing

SUBJECT: SUMMARY OF MEETING WITH VIRGINIA ELECTRIC AND POWER COMPANY (VEPCO) REGARDING THE NORTH ANNA POWER STATION UNITS NO. 1 AND NO. 2 (NA-1&2) SERVICE WATER SYSTEM PIPING CORROSION AND PRESERVATION PROGRAM

Introduction

A meeting was held on Friday, June 7, 1985 with VEPCO and the NRC staff in Bethesda, Maryland regarding the subject as noted above. A list of attendees is provided in Enclosure 1.

VEPCO stated that the North Anna Power Station (NAPS) Service Water System (SWS) piping is continuing to experience severe corrosion and pitting. The corrosion rate is approximately 10 mils per year. The corrosion rate is being accelerated due to the aggressive nature of Lake Anna water (pH=6.8) and sulfate reducing bacteria. The corrosion is in the form of general wall thickness reduction and wide spread pitting.

VEPCO's proposed methodology and implementation plan for mechanical cleaning of the SWS was provided in a letter dated February 27, 1985.

Discussion

The SWS for the North Anna Power Station is a system that is shared between Units 1 and 2 and consists of two 100% capacity loops with four pumps in each loop. Pump suction is from a reservoir adjacent to Lake Anna and heated water is returned to the reservoir which has a cooling spray array. Makeup for the reservoir is from Lake Anna. The SWS provides cooling to various components and systems that perform a safety function, such as charging pump coolers, seal coolers, and component cooling water heat exchangers. The SWS is, therefore, a safety related system.

In order to preserve the integrity of the SWS piping, a corrosion inhibitor molybdate-based chemical treatment program was initiated at the service water reservoir in July 1984. Carbon steel test samples exposed to the treated service water for intervals up to 60 days have shown a corrosion rate of less than 1 mil per year. However, the treated service water cannot come into contact with the majority of the SWS piping internal surface because of the buildup of corrosion products, silt, and slime which has developed since the units were first licensed for full power operation.

In order for the molybdate-based corrosion inhibitor to be effective, the internal surfaces must be cleaned to bare metal, and until such time that the internal surfaces are cleaned, corrosion will continue to occur beneath the corrosion product buildup in spite of corrosion inhibiting chemicals in the service water.

The internal cleaning method chosen is a mechanical cleaning method known as hydrolasing. Hydrolasing is a process whereby a high pressure (4000 to 8000 psi) water jet is impinged at right angles to the internal surface of the piping. The dislodged corrosion products will be flushed out through openings in the pipe and discharged corrosion products will be collected in temporary collection troughs and settling drums.

VEPCO stated that the hydrolasing method was chosen because it is a flexible, effective, and the least likely method to remove metal from the piping walls. Hydrolasing is flexible in that both small and large sections of piping can be cleaned with only minor setup operations. In addition, the cleaning operations can be scheduled to comply with the NA-1&2 Technical Specification Limiting Conditions of Operation. Access requirements for hydrolasing require only minor modifications such as removing small sections of piping or valves.

NAPS operating experience indicates that many of the valves in the SWS do not provide tight shutoff. Failure to seat properly is causing problems in isolating equipment for maintenance and Type "C" testing.

The majority of SWS valves that create isolation problems are flanged or wafer type butterfly valves. The most probable causes of degradation in SWS valve integrity are (1) buildups of corrosion products around valve seating area, (2) corrosion attack of cast iron butterfly valve disc, and (3) valve discs being pulled through their seats thereby causing seat damage.

Therefore, VEPCO stated that the cleaning operations on the SWS piping will require that all valves in the SWS provide proper isolation. Any valves that do not seat properly will be repaired or replaced. In many cases, valve repair must be completed before piping can be hydrolased.

The NA SWS is required to operate in all modes of plant operation. The NA-1&2 TS 3/4.7.4 governs the operation of the system during operating Modes 1 through 4. Although the TS do not require two loops of the SWS to be operating in Modes 5 and 6, at least one loop must be operable to remove heat from the Residual Heat Removal system and fuel pool. The TS allow for one of the two redundant service water loops to be out of service for a period of 72 hours. The isolated loop must be placed back in service within 72 hours or both units must commence shutting down.

VEPCO has prepared detailed work packages during the time that an SWS component or subsystem would be within the TS 72-hour action statement for mechanical cleaning. A detailed schedule has been prepared for each work package covering every activity to be performed during any period of isolation of one of the two redundant SWS loops. A stop-work point is specified to provide adequate time for system closure and pressure testing to ensure the TS action statement for 72 hours is not violated. Work will be subdivided into small portions to provide ample margin for completion within the allowable time limit. Equipment setup will be completed and a thorough check-out of all equipment and tools performed prior to isolating a SWS segment. All personnel performing any portion of the work will be thoroughly briefed prior to commencing start of work. Finally, work will be performed with shifts overlapping to ensure continuity of a detailed work package.

Each work package includes a detailed review in conformance with 10 CFR 50.59 to ensure that the particular work does not create an unreviewed safety question. In addition, work packages involving isolation of main or branch headers will include an emergency contingency plan. These contingency plans provide instructions for installing temporary devices such as spool pieces and pipe couplings to insure flow conditions for (1) Loss-of-Coolant Accident, (2) failure of remaining operational SWS loop, and (3) flooding through an opened portion of the system as a result of valve or operator failure.

Administrative controls to prevent flooding through an opened loop include "tag-out" procedures which require the notification of the Shift Supervisor and placement of a tag on a component or valve and tagging the component's control room indicators and/or switches. In addition, valves that are 18 inches or greater in diameter and are closed to provide main header isolation will be locked closed. The locking of these valves is delineated in the detailed work packages.

VEPCO's Plan 4 for completing the mechanical cleaning of the SWS requires six main header isolations and 12 branch header isolations. Ten of the 12 branch header isolations are expected to be approximately 5 hours in duration. Each period of isolation required to complete pipe cleaning and valve repairs will be separated by a minimum separation of 14 days of normal operation.

By letter dated March 29, 1985, VEPCO submitted a proposed TS revision which would revise the SWS LCO from 72 hours (3 days) to 168 hours (7 days). The safety evaluation supporting the proposed change is based on a probabilistic safety assessment. If approved by the NRC, VEPCO would use the SWS 168 hour LCO for the mechanical cleaning plan. VEPCO has committed to revising its submittal by footnoting the appropriate NA-1&2 TS for the proposed 168 hour LCO by stating that the revised LCO is applicable for the time period applicable for mechanical cleaning and refurbishment of the SWS only.

Conlusions

Based on the above, the NRR and Region II staff caucused and informed VEPCO on their findings. The licensee was informed that NRR finds that portion of VEPCO's mechanical cleaning program for the NA-1&2 SWS that can be performed under the presently specified NA-1&2 TS LCO of 72 hours to be acceptable.

The cleaning program as documented in VEPCO's submittal of February 27, 1985 was not considered an inappropriate use of the 72 hour LCO given the current conditions which exist at the plant. This finding for the NA SWS mechanical cleaning program is a plant specific interpretation and does not imply any generic approval for frequent repeated use of LCO's to perform routine maintenance which could be performed during normal plant shutdowns with the appropriate advance planning.

Finally, the staff informed VEPCO that the March 29, 1985 submittal proposing a 168 hour LCO in lieu of the presently stipulated 72 hour LCO will receive a full review based on a probablistic risk assessment. Until such time as this review is complete, VEPCO agreed that the use of the 72 hour LCO would be limited to the number of time specified in option 4 of their plan described above with a reusable allowance (one or two additional uses of the LCO) for contingencies. The mechanical cleaning of the major portion of the SWS main leaders will not be performed until the staff completes its review of the proposed LCO for the system. The meeting then adjourned.

Original signed by:

Leon B. Engle, Project Manager
Operating Reactors Branch #3
Division of Licensing

Enclosure:
As stated

ORB#3:DL	ORB#3:DL	ORB#3:DL
PKreutzer	LEngle:dd	EJButcher
6/24/85	6/25/85	6/25/85

MEETING SUMMARY DISTRIBUTION

Licensee: Virginia Electric and Power Company, (VEPCO) North Anna Unit Nos. 1&2

*Copies also sent to those people on service (cc) list for subject plant(s).

Docket File
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