

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

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U.S. Nuclear Regulatory Commission
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VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
CHANGE OF COMMITMENT ON THE LEAK DETECTION SYSTEM
FOR PROTECTION AGAINST DYNAMIC EFFECTS ASSOCIATED
WITH POSTULATED RUPTURE OF HIGH-ENERGY PIPING OUTSIDE CONTAINMENT

To address high-energy line break concerns outside containment, Virginia Electric and Power Company (Dominion) committed to inspect and monitor specific circumferential welds on the Main Steam (MS) and Main Feedwater (FW) System piping, located in each unit's Mechanical Equipment Room (MER). The inspection of the required welds is performed as part of an Augmented Inservice Inspection (ISI) Program. The associated MS and FW piping in the MER are included in the Secondary Piping and Component Inspection Program (SPCIP). In addition, this piping is monitored by a leak detection system (LDS).

This letter notifies the NRC of a commitment change regarding the monitoring of high-energy lines outside containment. The commitment change eliminates the LDS portion of the commitment while maintaining the two existing inspection programs as the means for early detection of an adverse condition. In addition, the commitment change modifies the requirements for inspection and includes a daily operator inspection of the MS and FW lines in the MER. The following paragraphs discuss the basis for the change in commitment.

Licensing Basis

Commitments for protection against dynamic effects associated with the postulated rupture of high-energy piping outside containment were first addressed in the initial plant licensing of North Anna Power Station. Specifically, piping associated with the MS and FW Systems routed through the MER were identified as high-energy lines, which required evaluation in a response to draft general design criteria (GDC 4).

The commitments for an Augmented ISI Program and LDS were made in lieu of a piping modification to address pipe whip or jet impingement associated with high-energy line leak or break. These commitments were intended to ensure that leakage from the associated MS and FW lines would be detected and isolated before becoming a pipe break that could result in damage to equipment in areas adjacent to the MER. These commitments were made as part of the licensing basis for the MS and FW piping

welds at postulated break point locations in the MER and were identified in the Final Safety Analysis Report (FSAR). The NRC accepted the augmented inspection approach as an alternative to modifications of the high-energy piping systems in this area.

By letter dated September 23, 1996 (Serial No. 96-444) and supplemented by letters dated February 5, 1997 (Serial No. 96-444A) and March 25, 1998 (Serial No. 98-123), Dominion proposed a modification to the commitment of the augmented inspection program regarding protection against the dynamic effects associated with a postulated rupture of high-energy MS and FW piping in the MER. Specifically, the proposed commitment change reduced the scope of the Augmented ISI Program for the MS and FW systems in the MER but added a requirement to include these sections of piping in the SPCIP, the flow-accelerated corrosion (FAC) program. The number of welds subject to inspection in the Augmented ISI Program was reduced from 100% per ISI period to 25% per ISI period (75% per ISI interval).

The staff evaluated the proposed commitment change and issued a Safety Evaluation Report (SER) on July 7, 1998, which documented their review and approval of the change in commitment. The SER stated that experience to date had found these welds to be acceptable, the welds would continue to be subject to the same environmental conditions and, therefore, examination of a lesser number of welds would be adequate to ensure piping structural integrity. The SER also noted that the existing LDS and SPCIP would be available to provide additional assurance of structural integrity of the portion of the MS and FW piping in the MER located outside containment.

Background

The LDS tape is located near the circumferential welds in the MS and FW high-energy lines in the MER to monitor for indication of leakage. The LDS operates by sensing leakage via a moisture-detecting tape that is located on the pipe insulation. The leak detection function of LDS is intended to provide time for operator action to place the plant in a safe condition prior to a pipe break that could result in damage to equipment in areas adjacent to the MER. Normally, the LDS sensing tape is dry, but moisture between the two electrodes of the tape causes the system to alarm in the control room and locally in the MER. Moisture from sources other than the piping weld (e.g., valve packing leakage, etc.) may also cause the LDS to alarm.

Operator tours of the MER are currently scheduled and conducted during every shift. These operator tours have been modified to document the inspection of the MS and FW piping insulation on a daily basis. If a leak in the MS or FW system piping were to occur, the operator conducting the tour can detect leakage and investigate the source. The documented inspections provide another redundant means to monitor the high-energy lines for increased assurance of line integrity.

The SPCIP includes the MS and FW lines. The SPCIP was added as part of the commitment change to reduce the percentage of welds inspected in the Augmented ISI

Program for MS and FW piping in the MER outside of containment. Addition of the SPCIP was based on the fact that flow-accelerated corrosion is the most likely failure mechanism associated with the carbon steel piping in the MS and FW systems. The SPCIP is specifically designed to detect flow-accelerated corrosion.

The Augmented ISI inspections are performed on the circumferential welds, identified as potential break point locations, in the MS and FW systems. Since initial plant licensing, no unacceptable inservice weld indications have been identified to date. Based on at least 20 years of inspection experience on each unit, we have concluded that weld failure due to operational stress or material defects is highly unlikely.

We conclude that the reduced Augmented ISI inspections committed to and approved by the staff in the SER dated July 7, 1998, concurrent with the SPCIP and operator tours of the MER will provide adequate assurance of MS and FW line integrity during the remaining life of the facility.

Current Concern

The LDS was designed, purchased, and installed in the 1970s. The manufacturer of the system is no longer in business and no manufacturer is known that currently produces the type of detector that is compatible with the existing LDS. Furthermore, a search of the obsolete parts network has not found any similar type detector that could be used as a replacement. Spare detectors are unavailable to support the remaining life of the units. The remaining option to maintain the existing LDS commitment is a complete replacement of the LDS.

Given the alternate means of early detection of leakage by operator walkdown, the programmatic inspection of affected piping and the established operational experience, we consider continued operation of the LDS to be of minimal benefit and the cost of total LDS replacement to be incommensurate with the safety benefit. Furthermore, we consider elimination of the LDS to be of minimal safety significance given the alternate detection and operational experience.

Specific Commitment Change

As a consequence, the commitment regarding the monitoring of high-energy lines outside containment is modified as follows: The Augmented ISI Program of designated circumferential welds, SPCIP, and daily operator tours will continue to monitor the MS and FW systems' piping located in each unit's MER. The operators will be provided with specific guidance for the examination of the MS and FW lines. These actions should provide adequate assurance that a defect or leak in the MS and FW piping in the MER will be detected before a pipe break could result in damage to electrical equipment in areas adjacent to the MER. Current program requirements are adequate to ensure future welds added to these high-energy lines do not result in failure due to operational stress or material defects. The Leak Detection System on the MS and FW systems' piping, located in each unit's MER, will no longer be required.

This commitment change has been reviewed in accordance with 10 CFR 50.59 and does not require a license amendment. The change has been incorporated and will be provided in a future revision of the UFSAR in accordance with the requirements of 10 CFR 50.71(e).

If you have any questions or require further information, please contact us.

Very truly yours,



Leslie N. Hartz
Vice President - Nuclear Engineering

Commitments made in this letter: Daily operator's logs have been modified to document no piping or weld leakage from MS or FW lines in the MER during daily tours.

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