VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

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VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNIT 2
ORDER – EA 03-009 SIXTY-DAY REPORT
REACTOR PRESSURE VESSEL (RPV) HEAD INSPECTION RESULTS

On February 20, 2004 the NRC issued the first revised Order (EA-03-009) establishing interim requirements for reactor pressure vessel heads. In accordance with the Order's inspection and reporting requirements, this letter provides the results of the visual inspections performed to identify potential boric acid leaks both above and on the reactor pressure vessel head (RPVH) during the Unit 2 Fall 2011 refueling outage.

The inspections identified surface discolorations at Penetrations 8, 15 and 23 not associated with boric acid. Leakage was identified on a spare penetration at the canopy seal weld associated with Penetration 18. A clamp was installed at the canopy seal weld to prevent further leakage. Additionally, boric acid deposits from the canopy seal weld leak were present on the RVPH at Penetrations 18 and 41. Subsequent inspections confirmed there was no leakage from the RPVH or material degradation at RPVH Penetrations 18 and 41. Corrective actions were performed and as left conditions are acceptable.

If you have any questions or require additional information, please contact Mr. Michael Whalen at (540) 894-2572.

Sincerely,

Gerald T. Bischof
Site - Vice President

Attachment: Sixty-Day Report Reactor Pressure Vessel Head Inspection Results North Anna Power Station Unit 2

Commitments made in this letter: None

A101
NRR

Cc:

U.S. Nuclear Regulatory Commission
Region II
Marquis One Tower
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, Georgia 30303-1257

Ms. K. R. Cotton
NRC Project Manager North Anna and Surry
U.S. Nuclear Regulatory Commission, Mail Stop 08 G-9A
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Mr. R. E. Martin
NRC Project Manager North Anna and Surry
U.S. Nuclear Regulatory Commission, Mail Stop 08 G-9A
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

NRC Senior Resident Inspector
North Anna Power Station

Mr. J. E. Reasor, Jr.
Old Dominion Electric Cooperative
Innsbrook Corporate Center
4201 Dominion Blvd.
Suite 300
Glen Allen, Virginia 23060

Mr. M. M. Grace
Authorized nuclear Insurance Inspector
North Anna Power Station

ORDER EA-03-009 SIXTY-DAY REPORT
REACTOR PRESSURE VESSEL HEAD (RPVH) INSPECTION RESULTS
NORTH ANNA POWER STATION UNIT 2

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)

ORDER – EA 03-009 SIXTY-DAY REPORT
REACTOR PRESSURE VESSEL HEAD (RPVH) INSPECTION RESULTS
NORTH ANNA POWER STATION UNIT 2

Introduction

During the North Anna, Unit 2, 2011 refueling outage (N2R21), Virginia Electric Power Company (Dominion) performed a comprehensive examination of the reactor pressure vessel head (RPVH) and head penetrations to meet the first revised NRC Order EA-03-009 issued February 20, 2004. This examination included a bare metal visual examination of 100 % of the head surface (including 360 degrees around each RPV head Penetration nozzle). The examination also included visual inspections of accessible areas on top of the RPVH with the insulation in place.

Inspections

Bare Metal Visual Examinations

Visual inspections were performed on components above the RPVH for leakage which could potentially create corrosion concerns on the vessel head. For any boron deposits on the insulation above the RPVH, commensurate examinations were performed to ensure RPVH and Penetration integrity.

The bare metal visual examination of the vessel head surface looked for the presence of relevant conditions which include areas of corrosion, boric acid deposits, discoloration, and other evidence of penetration nozzle leakage. Loose debris or other materials not related to penetration nozzle leakage are considered non-relevant conditions.

The bare metal visual examination used remote techniques to examine the RPVH surface and penetration areas behind the shroud. Direct visual examination techniques were performed to examine the RPVH surface outside the shroud down to the vessel flange. In accordance with the examination procedure, 100% of the areas around each nozzle penetration were examined.

Examination Results

Bare Metal Visual Examinations above the Reactor Pressure Vessel Head

Penetrations 18 and 41:
During the leakage inspection above the RPVH, boric acid was discovered at the canopy seal weld area of Penetration N2-18, located inside the Control Rod Drive Mechanism (CRDM) cooler door at 0 Degrees. Penetration 18 is a spare penetration. Subsequently, the area was cleaned and a canopy seal clamp was installed. Additionally, a small stain of white material was discovered during the Bare Head Visual Inspection around the bottom of the N2-18 nozzle at the head penetration.

Based on Isotopic analysis results and visual examinations showing evidence of boric acid trails from down the side of the drive tube from the canopy seal weld leak, boric acid staining on top of the insulation around the drive tube for Penetration 18, and by Penetration 41 (downhill side of Penetration 18), it was concluded that the boric acid deposits on the RPVH at Penetrations 18 and 41 originated from the canopy seal weld leak associated with Penetration 18. This is supported by the visual appearance of the boric acid build up at both Penetration 18 and Penetration 41.

A clamp was installed at the canopy seal weld of Penetration 18 to prevent further leakage. The areas around Penetrations 18 and 41 were decontaminated and inspected. No degradation was observed on the RPVH and no further action is recommended.

Bare Metal Visual Examinations of the Reactor Pressure Vessel Head

During the examination paint chips and pieces of tie wraps were indentified on the RPVH surface. Pressurized air cleaning was used in accordance with the examination procedure to perform the evaluation of the area of interest. This material was removed and did not interfere with the evaluation of the examination data.

Discoloration and staining were observed at nozzle Penetrations 8, 15 and 23, not associated with Boric Acid.

Penetration 8:
There were two areas of discoloration/staining that appear to be minor surface corrosion on the RPVH at Penetration 8, at approximately 180 degrees and 225 degrees. Some residue also appeared to be on the drive tube itself at this location. There were no visual indications of any leakage from the penetration and there was no boric acid found at this location.

Penetration 15:
There were three areas of discoloration/staining that appear to be minor surface corrosion on the RPVH at Penetration 15, at approximately 0, 105 and 180 degrees and there was a larger area of light colored residue noted when looking from 330 degree location, which may have been left over residue following the 2007 canopy seal weld leak at this location. Some staining residue also appeared to be on the drive tube itself at some of the locations having the darker staining. There were no visual indications of any leakage from the penetration and there was no boric acid found at this location.

Penetration 23:
There was one area of discoloration/staining that appeared to be dirt/corrosion product residue on the RPVH at Penetration 23, at approximately 180 degrees. No residue was noted on the drive tube itself at this location. There were no visual indications of any leakage from the penetration and there was no boric acid found at this location.

For each of these penetrations it was concluded that the staining (light and dark) resulted from moisture/water droplets that would have dripped down onto the RPVH from the insulation openings above. Possible sources for the moisture have been postulated to be previous maintenance activities during repair of the adjacent spare Penetration 15 canopy seal weld leak in 2007, reactor cavity decontamination activities conducted since the 2007 RPVH inspections, or condensation.

For each of these penetrations best effort carbon dioxide blast cleaning was performed without complete removal of the insulation to allow full access. Although some of the staining could not be removed, the as-left surface provided additional confirmation that no degradation was present below the staining. These conditions are acceptable and will be closely monitored in future visual inspections until additional cleaning can be performed to completely remove the staining.