

May 17, 2011

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

Serial No. 11-231
NL&OS/ETS R0
Docket No. 50-338
License No. NPF-4

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNIT 1
ASME SECTION XI INSERVICE INSPECTION PROGRAM
REQUEST FOR ALTERNATIVE TO ASME CODE PRESSURIZER
NOZZLE-TO-VESSEL WELD EXAMINATION REQUIREMENTS
RELIEF REQUEST N1-I4-NDE-003-R1

Pursuant to 10 CFR 50.55a(a)(3)(ii), Dominion hereby requests relief from certain ASME Code requirements. The 2004 Edition of ASME Code, Section XI, Table IWB-2500-1, Category B-D, Item B3.110, requires a volumetric examination of full penetration welded nozzles in vessels, but does not require an examination of the nozzle-inside-radius. However, 10 CFR 50.55a(b)(2)(xxi)(A) mandates use of the 1998 Edition of Section XI for the examination requirements of full penetration welded nozzles in vessels. Category B-D, Item B3.120 of the 1998 Edition requires a volumetric examination of the nozzle inside radius section of full penetration welded nozzles in vessels. In addition, 10 CFR 50.55a(b)(2)(xxi)(A) permits an enhanced visual VT-1 on the inside surface in lieu of the volumetric requirement, which is performed from the outside surface. The attachment to this letter provides 1) the basis for the relief from the ASME Code examination requirements for the Pressurizer nozzle-to-vessel weld and nozzle inner radius section and 2) a discussion of the proposed alternatives.

In accordance with 10 CFR 50.55a(a)(3)(ii), the proposed alternative to the referenced requirements may be approved by the NRC since compliance with the specified requirements of the ASME Code would result in hardship or unusual difficulty without a compensating increase in the level of safety for the facility.

Dominion requests to implement this alternative for the entire 4th ISI Interval for North Anna Unit 1. North Anna Unit 1 4th 10 Year Interval began May 1, 2009 and will end April 30, 2019.

If you have any questions or require additional information, please contact Mr. Thomas Shaub at (804) 273-2763.

Respectfully,


J. Alan Price
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Attachment

1. Request for Alternative - Relief Request N1-I4-NDE-003-R1

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Attachment

**INSERVICE INSPECTION PLAN
RELIEF REQUEST N1-I4-NDE-003-R1**

**North Anna Power Station
Unit 1
Virginia Electric and Power Company
(Dominion)**

RELIEF REQUEST N1-I4-NDE-003-R1

*Proposed Alternative in Accordance with 10 CFR 50.55a(a)(3)(ii)
-- Hardship or Unusual Difficulty without Compensating Increase
in Level of Quality or Safety --*

1.0 ASME CODE COMPONENTS AFFECTED

Pressurizer (1-RC-E-2) nozzle-to-vessel weld 9 and nozzle inner radius section 9NIR (see Figures N1-I4-NDE-003-1 and 2).

2.0 APPLICABLE CODE EDITION AND ADDENDA

The ASME Boiler and Pressure Vessel Code (ASME Code) Section XI of record for the North Anna Power Station Unit 1 fourth inspection interval is the 2004 Edition.

3.0 APPLICABLE CODE REQUIREMENTS

The 2004 Edition of ASME Code, Section XI, Table IWB-2500-1, Category B-D, Item B3.110, requires a volumetric examination of pressurizer surge line nozzle-to-vessel weld 9. The 2004 Edition of Section XI does not require an examination of the nozzle inside radius of weld 9 (9NIR). However, 10 CFR 50.55a(b)(2)(xxi)(A) mandates use of the 1998 Edition of Section XI for the examination requirements of full penetration welded nozzles in vessels. Category B-D, Item B3.120 of the 1998 Edition requires a volumetric examination of the nozzle inside radius section of the pressurizer surge nozzle, weld 9NIR. 10 CFR 50.55a(b)(2)(xxi)(A) allows an enhanced visual VT-1 on the inside surface in lieu of the volumetric requirement, which is performed from the outside surface.

4.0 REASON FOR REQUEST

The pressurizer surge line nozzle is integrally cast into the bottom head of the pressurizer, is located under the pressurizer skirt, and is surrounded by 78 heater penetrations. In addition, access to the North Anna Unit 1 pressurizer surge line nozzle is obstructed by multi-layered, stainless steel mirror insulation and the cables for the pressurizer heaters. Removal of the insulation and cables would be difficult as well as labor and time intensive. It is also likely that cable or heater pin damage could occur during removal.

Some, and possibly all, heater cables would have to be disconnected so that the cables can be pulled back to allow access for removing insulation and performing the exam. Dose rates are predicted using a step approach to build the total projected exposure. The worst case option assumes that all 78 heater cables have to be disconnected and pulled back. These cables have brazed

connections that will be time consuming to remove and replace following the exam. This option carries a dose estimate of 54.320 rem. If the outer ring of heaters can be left intact during the examination (disconnect/reconnect 46 heaters), then the dose estimate is 34.144 rem. If only the first ring of heaters has to be dealt with (20 heaters), then the dose estimate is 17.751 rem. Even if all the cables are removed, examination coverage would still be limited due to the weld joint design and heater penetration interferences.

Other personnel safety concerns potentially involved in this examination include the increased risk for an unexpected exposure event and increased likelihood of contamination with personnel wedged between the surge line and the exposed portion of the pressurizer heaters. Temporary shielding to reduce the dose is considered impractical because placement of the shielding material would obstruct and potentially preclude accessibility to the examination surface.

In conjunction with license renewal, Westinghouse has performed an evaluation to address the impact of operational transients for North Anna Unit 1 to account for insurge/outsurge transients in addition to design transients in the pressurizer lower head. The results of the evaluation show that the Cumulative Usage Factor (CUF), after service equivalent to 60 years of operation for the lower head to nozzle weld, is 0.32 for the inside surface and 0.07 for the outside surface. The CUFs for the nozzle inner radius are 0.25 (inside surface) and 0.09 (outside surface). These CUFs are considerably less than the design limit of 1.0. The Westinghouse evaluation is documented in WCAP-15607 which analyzed the insurge/outsurge transients for North Anna and Surry. The title of WCAP-15607 is "*Evaluation of Pressurizer Insurge/Outsurge Transients for Surry and North Anna.*" The WCAP was prepared in December 2000 for license renewal as a Westinghouse proprietary class 2 document and was not part of the Westinghouse Owners Group work.

We do not consider that the alternative visual VT-1 examination on the inside of the pressurizer nozzle to vessel weld can be reasonably or satisfactorily performed. The pressurizer manway at the top of the vessel would have to be removed and a boroscope threaded down the length of the pressurizer through the support plates and through a screen device located at the outlet of the surge line near the bottom of the vessel. The examination would be partially obscured by the thermal sleeves and the examination would only be of the non-structural cladding covering the welds. If performed, the examination would provide only marginal benefit as a result. The added exposure, the risk of foreign material intrusion into the reactor coolant system and the unusual difficulties attempting this examination are not commensurate with the limited benefit that may be obtained.

Due to the fact that compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety, an alternative is requested.

5.0 **PROPOSED ALTERNATIVES AND BASIS FOR USE**

Dominion is applying per 10 CFR 50.55a(a)(3)(ii) for the following alternative:

The pressurizer surge line nozzle-to-vessel (weld and nozzle inner radius) will be examined as part of the normally scheduled ASME Class 1 system leakage test each refueling (ASME Code VT-2). In addition, the surveillance requirements of Technical Specifications that determine the reactor coolant system leak rate and the containment atmosphere radioactivity will be satisfied. The pressurizer surge line weld to the reactor coolant hot leg will also be examined as part of augmented inspections (associated with the EPRI-sponsored Materials Reliability Program) to detect environmentally affected fatigue (EAF) and will be used as the leading indicator of EAF. The inspection of the pressurizer surge line connection to the hot leg piping is already a part of the commitment for license renewal aging management at North Anna Power Station.

The results of examination of the pressurizer surge line will be monitored through implementation of the North Anna Augmented Inspection Program and corrective action system, as necessary. NUREG-1801 provides various options for managing aging. Inspection is a valid, approved method for monitoring potential age-related degradation and may be preferred over analysis at times for validation. Dominion has elected to manage age-related degradation, i.e., potential fatigue cracking, of the pressurizer surge line through inspection of the welds that connect the surge line in lieu of evaluation using Environmentally Assisted Fatigue Factors. This approach is acceptable because an evaluation using Environmentally Assisted Fatigue Factors would be used to determine if inspection is needed. In this case, Dominion has proactively included the welds that connect the surge line to the hot leg in the North Anna Augmented Inspection Program.

Dominion is an active member of the EPRI MRP and has access to research results, and is therefore aware of industry trends of failure or indications in this area. A search on the INPO website of operating experience involving degradation at the inside radius section of the surge line nozzle in a Westinghouse designed pressurizer as well as a query among industry experts identified no known indications for pressurizer nozzle inside radius sections on any reactor or steam generator nozzle NIRs at Pressurized Water Reactor (PWR) plants.

Furthermore, Dominion has an active Boric Acid Corrosion Control Program that identifies and monitors borated water leakage to prevent boric acid related degradation of the Reactor Coolant System. These programs ensure that a small amount of leakage will be identified and corrected prior to adversely affecting the overall level of plant quality and safety.

6.0 DURATION OF PROPOSED ALTERNATIVE

The proposed alternative to the ASME Code is applicable for the duration of the fourth 10-year inservice inspection (ISI) interval at North Anna Unit 1.

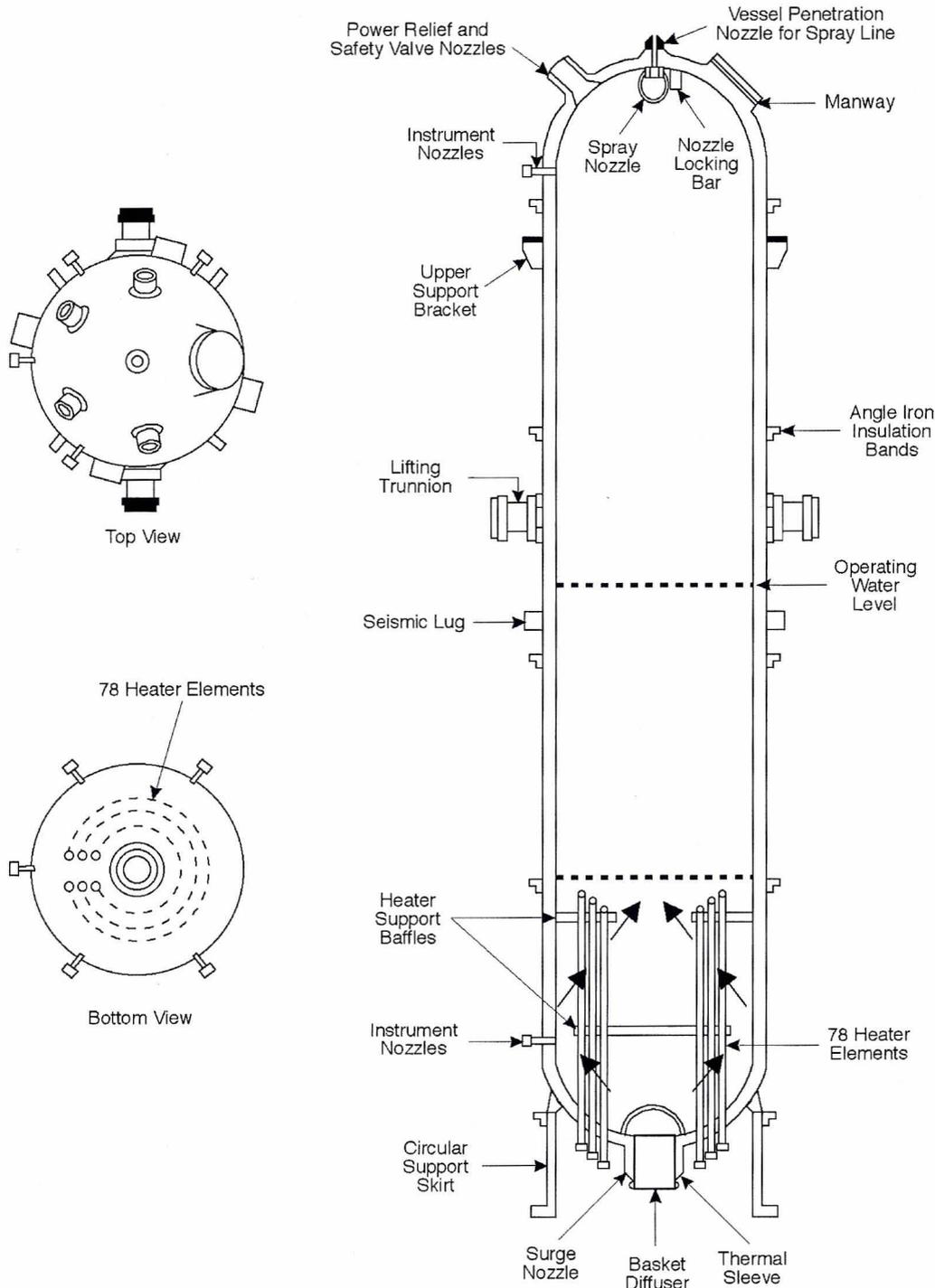
7.0 PRECEDENTS

An NRC letter dated October 6, 2010 granted relief for the same component on North Anna Power Station Unit 2, Relief Request N2-I4-NDE-001 (TAC No. ME3292).

An NRC letter dated February 18, 2005 granted similar relief for the fourth ten-year inservice inspection interval for Kewaunee Power Station. Similar relief was also granted for North Anna Power Station Unit 1 during the second and third inservice inspection intervals (TAC Nos. M71066 and MA5750, respectively) and for North Anna Power Station Unit 2 for the second and third inservice inspection intervals (TAC Nos. M79147 and MB2280, respectively). Similar relief was also granted for Surry Power Station Units 1 and 2 for the third inservice inspection intervals (TAC Nos. M87312 and M89085, respectively), and for the fourth inspection interval (TAC Nos. MD3673 and MD3674). Byron Station Units 1 and 2 were also granted relief for the second inservice inspection intervals (TAC Nos. M94830 and M94831, respectively), and the Haddam Neck Plant was granted relief for the third inservice inspection interval (TAC No. M80457). Beaver Valley Power Station was also granted relief for their third inservice inspection interval in an NRC letter dated October 8, 1997.

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FIGURE N1-I4-NDE-003-1

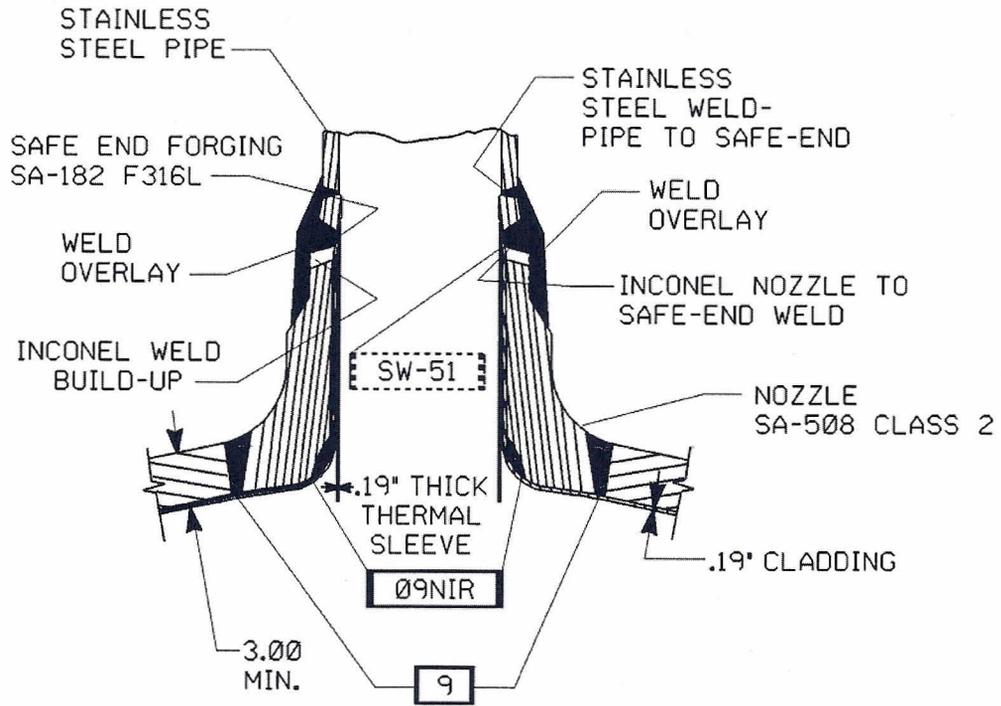


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PRESSURIZER

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FIGURE N1-I4-NDE-003-2



SURGE NOZZLE