VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

February 18, 2009

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

Serial No. 08-0595B
NL&OS/ETS R0
Docket No. 50-338
License No. NPF-4

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNIT 1
REVISED RELIEF REQUEST CS-001 FOR SNUBBER EXAMINATION AND TESTING FOR THE FOURTH INTERVAL ISI PROGRAM

In a letter dated October 17, 2008 (Serial No. 08-0595), Dominion submitted the North Anna Power Station Unit 1 inservice inspection (ISI) program for the fourth inservice inspection (ISI) interval applicable to Class 1, 2, and 3 components and component supports. The ISI Plan described the programmatic aspects of ISI examinations of components and component supports. Included with the program were requests for alternatives or relief from the specific code requirements in accordance with 10 CFR 50.55a (a)(3)(i) and/or (ii) or 10 CFR 50.55a(g)(5)(iii). In a January 15, 2009 phone call with the NRC staff to discuss proposed alternative CS-001, the staff requested additional information to complete their review. The attachment to this letter provides Revision 1 to CS-001, which provides the additional information requested by the staff.

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

Sincerly,

J. Alan Price
Vice President – Nuclear Engineering

Attachment

Relief Request CS-001 - Revision 1

Commitments made in this letter:

1. None

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ATTACHMENT

FOURTH INTERVAL ISI PLAN
RELIEF REQUEST CS-001, REVISION 1

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNIT 1

RELIEF REQUEST CS-001 - Revision 1
(Submitted per 10 CFR 50.55a(a)(3)(i))

I. IDENTIFICATION OF COMPONENTS

Class 1, 2, and 3 Snubbers

II. CODE REQUIREMENT

The ASME Code, Section XI, 2004 Edition, paragraphs IWF-5200(a) & (b) and IWF-5300(a) & (b) require the use of the ASME/ANSI OM (Part 4), 1987 Edition with OMa-1988 Code to perform the preservice and inservice examinations and tests of Class 1, 2, and 3 Snubbers.

III. BASIS FOR ALTERNATIVE

Currently, the snubber examination and testing program is contained in the North Anna Power Station (NAPS) Technical Requirements Manual (TRM). The existing TRM test and examination requirements meet the intent of ASME OM Part 4 and provide an acceptable level of quality and safety. Integration of ASME Section XI and ASME OM Part 4 into an effective coherent examination and testing program along with associated required changes to the Technical Requirements Manual (TRM) would require a significant amount of administrative activity (e.g., administrative procedure changes, reconciliation of ASME Code requirement differences, technical procedure changes, etc.). These actions are considered a hardship given there is no commensurate increase in safety due to such integration.

A second alternative approach to implement these requirements for examination and testing would be to revise the Technical Requirements Manual to reference the appropriate paragraphs of OM Part 4. Many of the requirements that would require revision to the existing TRM are very similar to OM Part 4. However, this results in a significant amount of administrative activity, without enhancement in quality and safety. A third approach, which is proposed, is to implement the existing TRM snubber program, which provides a means to accomplish the examination and testing intended by the ASME Code and regulation with a minimum of burden. The significant technical differences are discussed herein. Administrative controls currently in place are sufficient and accomplish the same purpose.

GENERAL

The current safety related snubber testing requirements of TRM Section 3.7.5 form the basis of the North Anna Unit 1 inservice testing program for snubbers.

There are 326 small bore snubbers and 12 large bore snubbers (greater than 50 KIPS) installed in North Anna Unit 1. All the snubbers at NAPS Unit 1 are hydraulic snubbers.

Snubber maintenance and repair are controlled at NAPS by written maintenance procedures that are based on manufacturers' recommendations and industry good practices. These procedural requirements are similar to the requirements of OM Part 4, paragraph 1.5.6. Changing snubber maintenance procedures requires review and approval of the snubber engineer. Design engineering approval is required for any changes that could affect the snubber's ability to meet the functional (operability) test acceptance criteria or affect the snubber's ability to support the design load. Following maintenance and repair, snubbers are required to be functionally tested to demonstrate that they meet the acceptance criteria. Snubbers that are modified or replaced due to visual or functional testing deficiencies are subject to the requirements of IWA-4000 and must be evaluated for suitability as required by OM Part 4, paragraph 1.5.7. Replacement snubbers are functionally tested prior to installation and visually inspected following installation in accordance with the snubber visual inspection criteria.

VISUAL INSPECTIONS

For visual inspections, the TRM states that snubbers are categorized as accessible or inaccessible during reactor operation and may be examined independently. This is the same requirement as OM Part 4, paragraph 1.6.

The TRM does not address snubber preservice examinations. However, snubbers are rotated from service in accordance with Code Case N-508-3 (approved by Reg. Guide 1.147) and following replacement a visual examination is required to be performed in accordance with maintenance procedures and the post maintenance testing program. This visual examination is similar to the preservice examination requirements described in OM Part 4, paragraph 2.1.1. Additional preservice operability testing proposed by Virginia Electric and Power Company (Dominion) is described later in this section. Repair/Replacements activities will be performed as required by Code Case N-508-3 and IWA-4000. Replacement snubbers are functionally tested prior to installation to demonstrate that they meet engineering acceptance criteria.

The intervals for snubber visual inspections are conducted in accordance with the TRM visual examination table which meets Generic Letter 90-09. The inspection interval is based on the snubber population and the number of unacceptable snubbers. Historically, the number of unacceptable visual snubber inspections at NAPS Unit 1 is one or less and based on the snubber population, the current inspection interval is 48 months (every other refueling outage). The OM Part 4, paragraph 2.3.2.2 bases the inspection frequency on the number of unacceptable snubbers but does not take into consideration the snubber

population. Generic Letter (GL) 90-09 acknowledges that the visual inspection schedule as contained in OM Part 4 is excessively restrictive and that plants with large snubber populations have spent a significant amount of resources and subjected plant personnel to unnecessary radiological exposure to comply with the visual examination requirements of OM Part 4. GL 90-09 states that its alternative schedule for visual inspection provides the same confidence level as that provided in OM Part 4.

TRM requirements in conjunction with procedural inservice visual inspection requirements are similar to OM Part 4, paragraphs 2.3.1.1 and 2.3.1.2 and examinations are conducted with VT-3 Level II or III visually qualified examiners. Visual examinations encompass as a minimum the following inspection items:

> Fluid level, cylinder body defects, tie rod defects, valve block defects, hydraulic leaks, wiper seal deterioration/damage, snubber orientation, snubber misalignment, interferences, freedom of rotational movement, boric acid, bent piston rod, scored piston rod, painted piston rod and structural attachment defects.

The small bore snubbers at NAPS Unit 1 are manufactured by ITT Grinnell and are of similar design. Large bore snubbers are manufactured by Lisega and are also of similar design. Snubbers which fail visual inspections are evaluated and a root cause analysis is completed in accordance with administrative procedures and the corrective action program. Snubber failures are not specifically characterized into failure mode groups as defined in OM Part 4, paragraph 2.3.4.3. However, failures are evaluated to determine if the failure mechanism has the potential to affect other snubbers and whether the cause of the failure is from the application, maintenance practices, manufacturing defect, isolated or unexplained. Snubbers that may be subject to similar failure mechanisms are evaluated for continued service and operability in accordance with the corrective action program.

FUNCTIONAL TESTING

For the purposes of functional testing, the TRM identifies small bore snubbers (snubbers with load capacities of 50 Kips or less) and large bore snubbers (snubbers with load capacities greater than 50 Kips). This separation of snubbers is based on NRC Generic Letter 84-13, Technical Specification for Snubbers." OM part 4 does not separate snubbers into small and large bore groups.

FUNCTIONAL TESTING OF SMALL BORE SNUBBERS

Functional testing of small bore snubbers is defined in the TRM as follows:

At least once per 18 months during shutdown, an initial representative sample of small bore snubbers shall be functionally tested either in-place or in a bench test. The size of the initial sample shall follow the expression:

$$Ni = 35[1 + C/2]$$

Where

Ni is the initial number of snubbers to be tested, and

C (C = 1) is the **allowable** number of small bore snubbers not meeting the acceptance criteria selected by the operator from the initial sample of Ni snubbers.

For each number of small bore snubbers above "C" which does not meet the functional test criteria, the sample to be functionally tested is expanded according to the expression:

$$N = 35(1 + C/2)(2/(C + 1))^2(A-C)$$

Where

N is the total number of snubbers to be tested in the expanded sample and

A is the total number of small bore snubbers found inoperable during functional testing of the representative sample and

C (C = 1) is the **allowable** number of small bore snubbers not meeting the acceptance criteria selected by the operator from the initial sample of Ni snubbers.

C = 1 is currently the value used in our TRM and was previously approved for use by the NRC in the third interval. This value was selected to take advantage of the historical performance experienced at NAPS where the number of failures has not exceeded 1 failure per refueling outage surveillance cycle since 1992.

As noted above, the C value establishes, when exceeded, snubber functional test expansion requirements, as well as the initial sample size. When the number of failures exceeds 1, the TRM requires that the sample size increase in accordance with the above equation.

COMPARISON OF TRM SAMPLE SIZE TO OM PART 4 FOR SMALL BORE SNUBBERS

OM Part 4 uses different formulas for establishing the number of snubbers to be initially functionally tested. These formulas are referred to as the 10% plan and the 37 and 55 testing sample plans. The determination of which plan to use is determined by the number of snubbers installed in the station. If the number of snubbers is less than 370, the 10% plan is the preferred plan. When the snubber population is over 370 the 37 testing sample plan is used and if the snubber population is over 550 the 55 testing sample plan is used. The total number of snubbers at NAPS for Unit 1 is 326; therefore the 10% plan will be used for comparison to the TRM formula.

OM Part 4 states that for the initial sample lot tested, 10% of the snubbers in the general population shall be selected. The additional sample size shall be at least one-half the size of the original sample. So the total number of snubbers to be tested, including initial test group, is

$N \geq 0.1n + C(0.1n/2)$

Where

N is the total number of snubbers to be tested,

n is total number of snubbers in defined test group plan, and

C is the number of unacceptable snubbers found through functional testing.

Reviewing the OM Part 4 formula, it can be seen that OM Part 4 does not define a pre-set number of allowable failures as the TRM does. OM Part 4 only requires that a minimum number of snubbers be tested, based on the population [the 0.1n factor], and an additional number of snubbers be tested for scope expansion based on the number found inoperable by testing [the C(0.1n/2) factor]. Substituting the number of small bore snubbers (326) for NAPS Unit 1, this formula reduces to:

$N \geq 32.6 + 16.3C$

The initial sizes and expanded sample sizes, once a functional test failure is found, are provided in the comparison below.

(Note: in the table below the value "A" or functional test failures as defined by the TRM would be equivalent to the value "C" in the OM Part 4 formula.)

Functional test failures	TRM formula with C=1 (C=allowable test failures before expansion)	OM Code
A = 0	53 (Note 1)	33
A = 1	53 (Note 1)	49
A = 2	106 (Note 2)	66
A = 3	158 (Note 2)	82

NOTE 1: TRM formula is $N_i = 35[1 + C/2]$
NOTE 2: TRM formula is $N = 35(1 + C/2)(2/(C + 1))^2 (A-C) + 35[1 + C/2]$

From the above table, it can be seen that the TRM formula with C = 1 will test more of the snubbers than OM Part 4. This demonstrates that the existing value of C in the TRM formula will provide an adequate degree of testing when compared to the OM Part 4.

Thus, the proposed TRM Section 3.7.5 (C=1) functional testing requirements provides an acceptable level of quality and safety for inservice testing of small bore snubbers.

FUNCTIONAL TESTING OF LARGE BORE SNUBBERS

At least once per 18 months during shutdown, the TRM requires that 10% or 2 large bore snubbers (snubbers greater than 50 Kips) be functionally tested. For each large bore snubber that does not meet the functional test criteria, an engineering evaluation is required to determine the failure mode. If the failure is determined to be generic, an additional 10% or 2 snubbers will be tested. If the failure is determined to be non-generic, an additional 10% or 2 snubbers will be tested the next functional test period (next refueling outage). A non-generic failure has the same meaning as an isolated failure as defined in OM Part 4, paragraph 1.4. A generic failure is any failure that is not determined to be non-generic. A comparison of the TRM requirements for large bore snubbers to the OM Part 4 10% sample plan is as follows:

Generic functional test failures	TRM for Large Bore snubbers	OM Code
A = 0	2	2
A = 1	4	2
A = 2	6	3
A = 3	8	3

From the above table, it can be seen that the TRM formula with generic failures will test a greater number of large bore snubbers than OM Part 4. The OM Code paragraph 3.2.5.1(b) does not count isolated (non-generic) for the purpose of determining the number of additional sample lots. This demonstrates that the existing TRM formula will provide an adequate degree of testing when compared to OM Part 4.

Thus, the proposed TRM Section 3.7.5 functional testing requirements provide an acceptable level of quality and safety for inservice testing of large bore snubbers. Additionally the continued implementation of a program based on the TRM requires minimal administrative program change or TRM changes.

PRESERVICE OPERABILITY TESTING

To comply with the preservice testing requirements of OM Part 4, section 3.1 verbatim, additional testing activity is required beyond the above proposal for inservice activities. Therefore Dominion proposes the inclusion of the preservice operability testing requirements into the current snubber surveillance as follows:

General, Preservice Operational readiness testing shall be performed on all snubbers. Testing may be performed at the manufacturer's facility.

Test Parameters, Tests shall verify the following:

(a) activation is within the specified range of velocity or acceleration in tension and in compression.
(b) Release rate, when applicable, is within the specified range in tension and in compression. For units specifically required not to displace under continuous load, ability of the snubber to withstand load without displacement.
(c) For mechanical snubbers, drag force is within specified limits in tension and compression.
(d) For hydraulic snubbers, if required to verify proper assembly drag force is within specified limits in tension and in compression.

Test Failure Evaluations, Snubbers that fail the preservice operational readiness test shall be evaluated for the cause(s) of failures(s).

Design Deficiency, If a design deficiency in a snubber is found, it shall be corrected by changing the design or specification, or by other appropriate means.

Other Deficiencies, Other deficiencies shall be resolved by adjustment, modification, repair, replacement, or other appropriate means.

Retest Requirements, Adjusted, modified, repaired, or replacement snubbers shall be tested to meet the requirements of the **Test Parameters** stated above.

The inclusion of these requirements into the current snubber surveillance program provides an alternative to OM Part 4, section 3.1 with an acceptable level of safety and quality for the preservice testing requirements with only small administrative impact.

IV ALTERNATIVE REQUIREMENTS

Dominion proposes as an alternative to the Code requirements stated above in Section II, a snubber testing program comprised of the following elements:

1) The preservice testing requirements stated in Section III "Preservice Operability Testing," and

2) The continued implementation of the surveillance requirements of TRM Section 3.7.5, "Snubbers," (C = 1), without change.

No other requirements of OM Part 4 will be implemented as part of this alternative for snubber testing.

Dominion submits that the proposed alternative snubber testing program described in the basis of this request and documented in the TRM provides an acceptable level of quality and safety without the burden of substantial administrative changes to comply with Code requirements that add little or no value to quality or safety. Therefore, having met the criteria of 10 CFR 50.55a(a)(3)(i), an authorization to implement the alternative is requested for the fourth inspection interval.

V PRECEDENTS

Similar relief requests were approved for Virginia Electric and Power Company (Dominion), North Anna Power Station Units 1 & 2, Relief Requests CS-001 Rev. 1 and CS-003 Rev. 1. (SER dated August 24, 2005, TAC No. MC5451 and MC5452)