



March 6, 2014

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

Serial No. NA3-14-003R
Docket No. 52-017
COL/RGM

DOMINION VIRGINIA POWER
NORTH ANNA UNIT 3 COMBINED LICENSE APPLICATION
SRP 03.12: RESPONSE TO RAI LETTER 113

On February 10, 2014, the NRC requested additional information to support the review of certain portions of the North Anna Unit 3 Combined License Application (COLA), which consisted of one question. The response to the following Request for Additional Information (RAI) Question is provided in the enclosure:

- RAI 7414, Question 03.12-2 Piping Systems and Piping Components

This information will be incorporated into a future submission of the North Anna Unit 3 COLA, as described in the enclosure.

Please contact Regina Borsh at (804) 273-2247 (regina.borsh@dom.com) if you have questions.

Very truly yours,

Mark D. Mitchell
Vice President – Generation Construction

D089
N180

Enclosures:

1. Response to NRC RAI Letter No. 113, RAI 7414, Question 03.12-2

Commitments made by this letter:

1. This information will be incorporated into a future submission of the North Anna Unit 3 COLA, as described in the enclosures.

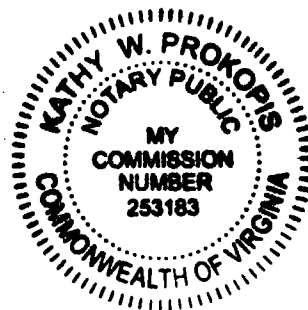
COMMONWEALTH OF VIRGINIA

COUNTY OF HENRICO

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Mark D. Mitchell, who is Vice President-Generation Construction of Virginia Electric and Power Company (Dominion Virginia Power). He has affirmed before me that he is duly authorized to execute and file the foregoing document on behalf of the Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 6TH day of MARCH, 2014
My registration number is 253183 and my
Commission expires: SEPTEMBER 30, 2016

Kathy W. Prokopia
Notary Public



cc: U. S. Nuclear Regulatory Commission, Region II
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ENCLOSURE 1

Response to NRC RAI Letter No. 113

RAI No. 7414, Question 03.12-2

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

**North Anna Unit 3
Dominion
Docket No. 52-017**

RAI NO.: 7414 (RAI LETTER NO. 113)

**SRP SECTION: 3.12 – ASME CODE CLASS 1, 2, AND 3 PIPING SYSTEMS AND
PIPING COMPONENTS AND THEIR ASSOCIATED
SUPPORTS**

DATE OF RAI ISSUE: 2/10/2014

QUESTION NO.: 03.12-2

FSAR 3.12 states that information on seismic category I and II, and nonseismic piping analysis and their associated supports is presented in DCD Sections 3.7, 3.9, 3D, 3K, 5.2 and 5.4.

The staff noted that referencing DCD Sections indicates that the applicant's seismic analysis will consider the CSDRS only and does not have to address the site-specific seismic exceedances which are identified in NAPS FSAR Section 3.7. The staff is requesting the applicant to address this issue by either revising the reference or providing justification for neglecting the site specific seismic exceedances. Where appropriate, other sections that use seismic response spectra for input should be similarly updated.

Dominion Response

The reference in the FSAR Section 3.12 text directing the reader to several "DCD" sections should have referred to FSAR sections and will be revised.

The seismic Category I and II, and non-seismic piping analysis, including associated supports, is addressed in FSAR Sections 3.7, 3.9, 3D, 3K, 5.2 and 5.4, which incorporate by reference, with supplements and departures, the corresponding DCD sections. As described in these FSAR sections, the piping analysis will consider the CSDRS and the site-specific seismic exceedances. This is further explained in COLA Part 7, Departure NAPS DEP 3.7-1, which states:

“The Unit 3 site-specific horizontal and vertical seismic response spectra exhibit exceedances at certain frequencies, when compared to the CSDRS. As a result of these exceedances, Dominion performed site-specific soil-structure interaction (SSI) analyses for the RB/FB, CB and FWSC structures and revised the SSE definition to include the ESBWR CSDRS and the site-specific foundation input response spectra (FIRS) for each seismically qualified structure for use in performing seismic design, analysis, and qualification of structures, systems and components (SSCs).”

FSAR Section 3.12 will be revised to remove the term “DCD” from the listing of FSAR references to which the reader is directed to clarify that both the CSDRS and the site-specific seismic exceedances are considered in North Anna Unit 3’s seismic analysis. By practice, cross-references within the FSAR from one FSAR section to another do not include “FSAR” in the citation.

Dominion reviewed the other sections of the FSAR, and identified similar instances in Table 1.9-203 that involve the seismic response spectra that are considered in the seismic analysis. These instances will also be revised to remove “DCD.”

Proposed COLA Revision

COLA Part 2, Table 1.9-203 and Section 3.12 and will be revised as shown on the attached markups.

Markup of North Anna COLA

The attached markup represents Dominion's good faith effort to show how the COLA will be revised in a future COLA submittal in response to the subject RAI. However, the same COLA content may be impacted by revisions to the DCD, responses to other COLA RAIs, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be somewhat different than as presented herein.

NAPS COL 1.9-3-A

Table 1.9-203 Conformance With the FSAR Content Guidance In RG 1.206

Section	Section Title	Conformance Evaluation
C.III.1 3.5.2	Structures, Systems, and Components To Be Protected from Externally Generated Missiles	Conforms. There are no SSCs outside the scope of the referenced certified design that are required to be protected from externally generated missiles.
C.III.1 3.5.3	Barrier Design Procedures	Conforms. There are no SSCs that require reanalysis for tornado, extreme wind, or site proximity missile impact or for aircraft impact.
C.III.1 3.6	Protection against Dynamic Effects Associated with the Postulated Rupture of Piping	Conforms
C.III.1 3.6.1	Plant Design for Protection against Postulated Piping Failures in Fluid systems Outside of Containment	Conforms
C.III.1 3.6.2	Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping	Conforms
C.III.1 3.6.3	Leak-Before-Break Evaluation Procedures	Not Applicable. ESBWR design does not rely on a Leak Before Break Evaluation.
C.III.1 3.7.1	Seismic Design Parameters	Conforms. Addressed in DCD Sections 3.7 and 3.7.1.
C.III.1 3.7.1.1	Design Ground Motion	Conforms
C.III.1 3.7.1.2	Percentage of Critical Damping Values	Conforms
C.III.1 3.7.1.3	Supporting Media for Seismic Category I Structures	Conforms
C.III.1 3.7.2	Seismic System Analysis	Conforms. Addressed in DCD Section 3.7.2.
C.III.1 3.7.2.1	Seismic Analysis Methods	Conforms
C.III.1 3.7.2.2	Natural Frequencies and Responses	Conforms. Addressed in DCD Section 3.7.2.2.

NAPS COL 1.9-3-A Table 1.9-203 Conformance With the FSAR Content Guidance In RG 1.206

Section	Section Title	Conformance Evaluation
C.III.1 3.7.2.3	Procedures Used for Analytical Modeling	Conforms
C.III.1 3.7.2.4	Soil/Structure Interaction	Conforms
C.III.1 3.7.2.5	Development of Floor Response Spectra	Conforms. Addressed in DCD Section 3.7.2.5 .
C.III.1 3.7.2.6	Three Components of Earthquake Motion	Conforms
C.III.1 3.7.2.7	Combination of Modal Responses	Conforms
C.III.1 3.7.2.8	Interaction of Nonseismic Category I Structures with Seismic Category I Structures	Conforms. There are no Seismic Category I structures outside the scope of the referenced certified design. In lieu of providing the plant-specific distances between structures and the heights of structures, the distance and height requirements for Non-Seismic Category I structures are addressed in DCD Section 3.7.2.8 .
C.III.1 3.7.2.9	Effects of Parameter Variations on Floor Response Spectra	Conforms. Addressed in DCD Section 3.7.2.9 .
C.III.1 3.7.2.10	Use of Constant Vertical Static Factors	Conforms
C.III.1 3.7.2.11	Method Used to Account for Torsional Effects	Conforms
C.III.1 3.7.2.12	Comparison of Responses	Conforms. Addressed in DCD Section 3.7.2.12 .
C.III.1 3.7.2.13	Methods for Seismic Analysis of Dams	Not applicable. There are no Seismic Category I dams in the ESBWR design per DCD Section 3.7.3.14 .
C.III.1 3.7.2.14	Determination of Dynamic Stability of Seismic Category I Structures	Conforms. Addressed in DCD Sections 3.7.2.14 and 3.8.5.5 .
C.III.1 3.7.2.15	Analysis Procedure for Damping	Conforms
C.III.1 3.7.3.1	Seismic Analysis Methods	Conforms

NAPS COL 1.9-3-A Table 1.9-203 Conformance With the FSAR Content Guidance In RG 1.206

Section	Section Title	Conformance Evaluation
C.III.1 3.7.3.2	Procedures Used for Analytical Modeling	Conforms
C.III.1 3.7.3.3	Analysis Procedure for Damping	Conforms
C.III.1 3.7.3.4	Three Components of Earthquake Motion	Conforms
C.III.1 3.7.3.5	Combination of Modal Responses	Conforms. Addressed in DCD Section 3.7.3.7 .
C.III.1 3.7.3.6	Use of Constant Vertical Static Factors	Conforms
C.III.1 3.7.3.7	Buried Seismic Category I Piping, Conduits, and Tunnels	Conforms. Addressed in DCD Section 3.7.3.13 .
C.III.1 3.7.3.8	Methods for Seismic Analysis of Seismic Category I Concrete Dams	Not applicable. There are no Seismic Category I dams for Unit 3.
C.III.1 3.7.3.9	Methods for Seismic Analysis of Above-Ground Tanks	Conforms. Addressed in DCD Section 3.7.3.15 .
C.III.1 3.7.4	Seismic Instrumentation	Conforms
C.III.1 3.8.1	Concrete Containment	Conforms
C.III.1 3.8.2	Steel Containment	Conforms
C.III.1 3.8.3	Concrete and Steel Internal Structures of Steel or Concrete Containments	Conforms
C.III.1 3.8.4	Other Seismic Category I Structures	Conforms. There are no Seismic Category I structures that are outside the scope of the DCD.
C.III.1 3.8.5	Foundations	Conforms
C.III.1 3.9.1	Special Topics for Mechanical Components	Conforms. There are no Seismic Category I components or supports beyond those evaluated in the reference certified design.

NAPS COL 1.9-3-A Table 1.9-203 Conformance With the FSAR Content Guidance In RG 1.206

Section	Section Title	Conformance Evaluation
C.III.1 3.12.2	Codes and Standards	Conforms. Addressed in DCD Sections 3.2, 3.6, and 3.7, and Chapters 5 and 14.
C.III.1 3.12.3	Piping Analysis Methods	Conforms. Addressed in DCD Sections <u>Section 3.7.2.2</u> and <u>DCD Section 3.7.3.9</u> .
C.III.1 3.12.3.1	Experimental Stress Analyses	Conforms. Addressed in <u>DCD Section 3.9.1.3</u> .
C.III.1 3.12.3.2	Modal Response Spectrum Method	Conforms. Addressed in <u>DCD Section 3.7.2.1</u> .
C.III.1 3.12.3.3	Response Spectra Method (or Independent Support Motion Method)	Conforms. Addressed in <u>DCD Section 3.7.2.1.2</u> .
C.III.1 3.12.3.4	Time History Method	Conforms. Addressed in <u>DCD Section 3.7.2.1.1</u> .
C.III.1 3.12.3.5	Inelastic Analyses Method	Not Applicable. Per <u>DCD Section 3.9.1.4</u> (Inelastic Analyses Methods), except for pipe whip restraints, inelastic analyses methods are not used in the ESBWR piping design and analysis.
C.III.1 3.12.3.6	Small-Bore Piping Method	Conforms. Addressed in <u>DCD Section 3.7.3.16</u> .
C.III.1 3.12.3.7	Nonseismic/Seismic Interaction (II/I)	Conforms with the following exception: The location and distance between piping systems will be established as part of the completion of <u>ITAAC Table 3.1-1</u> .
C.III.1 3.12.3.8	Seismic Category I Buried Piping	Not Applicable. Per DCD Section 3.7.3.13, there is no buried Seismic Category I piping.
C.III.1 3.12.4	Piping Modeling Technique	Conforms. Addressed in <u>DCD Section 3.7.3.3.1</u> and <u>Appendix 3D</u> for the PISYS computer code.
C.III.1 3.12.4.1	Computer Codes	Conforms. Addressed in <u>DCD Appendix 3D</u> .
C.III.1 3.12.4.2	Dynamic Piping Model	Conforms. Addressed in <u>DCD Section 3.7.3.3.1</u> .
C.III.1 3.12.4.3	Piping Benchmark Program	Conforms. Addressed in <u>DCD Appendix 3D</u> .

NAPS COL 1.9-3-A Table 1.9-203 Conformance With the FSAR Content Guidance In RG 1.206

Section	Section Title	Conformance Evaluation
C.III.1 3.12.4.4	Decoupling Criteria	Conforms. Addressed in DCD Sections 3.7.2.3 and 3.7.3.16.
C.III.1 3.12.5.1	Seismic Input Envelope vs. Site-Specific Spectra	Conforms. Addressed in DCD Section 3.7.1.
C.III.1 3.12.5.2	Design Transients	Conforms. Addressed in DCD Section 3.9.1.1 and DCD Table 3.9-1.
C.III.1 3.12.5.3	Loadings and Load Combination	Conforms. Addressed in DCD Section 3.9.1.1 and DCD Table 3.9-8.
C.III.1 3.12.5.4	Damping Values	Conforms. Addressed in DCD Section 3.7.1.2 and DCD Table 3.7-1.
C.III.1 3.12.5.5	Combination of Modal Responses	Conforms. Addressed in DCD Section 3.7.3.7.
C.III.1 3.12.5.6	High-Frequency Modes	Conforms. Addressed in DCD Sections 3.7.1.1 and 3.7.1.2.
C.III.1 3.12.5.7	Fatigue Evaluation of ASME Code Class 1 Piping	Conforms. Addressed in DCD Section 3.9.3.4 and DCD Table 3.9-8.
C.III.1 3.12.5.8	Fatigue Evaluation of ASME Code Class 2 and 3 Piping	Conforms. Addressed in DCD Section 3.9.
C.III.1 3.12.5.9	Thermal Oscillations in Piping Connected to the Reactor Coolant System	Conforms
C.III.1 3.12.5.10	Thermal Stratification	Conforms. Addressed in DCD Section 3.9.2.1.2.
C.III.1 3.12.5.11	Safety Relief Valve Design, Installation, and Testing	Conforms. Addressed in DCD Figures 5.2-3 and 5.4-3, and DCD Table 3.9-8.
C.III.1 3.12.5.12	Functional Capability	Conforms. Addressed in DCD Table 3.9-2, Note 13, and DCD Chapters 5 and 6.
C.III.1 3.12.5.13	Combination of Inertial and Seismic Anchor Motion Effects	Conforms. Addressed in DCD Section 3.7.3.9.
C.III.1 3.12.5.14	Operating-Basis Earthquake as a Design Load	Not applicable. The SSE establishes the design load for the ESBWR.

NAPS COL 1.9-3-A Table 1.9-203 Conformance With the FSAR Content Guidance In RG 1.206

Section	Section Title	Conformance Evaluation
C.III.1 3.12.5.15	Welded Attachments	Conforms. Addressed in DCD Section 3.9.3.7.1 .
C.III.1 3.12.5.16	Modal Damping for Composite Structures	Conforms. Addressed in DCD Section 3.7.2.13 .
C.III.1 3.12.5.17	Minimum Temperature for Thermal Analyses	Conforms. Addressed in DCD Sections 3.9.1.1 and 3.9.3.1 .
C.III.1 3.12.5.18	Intersystem Loss-of-Coolant Accident	Conforms. Addressed in DCD Appendix 3K .
C.III.1 3.12.5.19	Effects of Environment on Fatigue Design	Conforms. Addressed in DCD Section 3.9.3.4 . The reference in RG 1.206 to 1.76 appears to be in error, and should have referenced 1.207.
C.III.1 3.12.6.1	Applicable Codes	Conforms. Addressed in DCD Section 3.9.3.7.1 .
C.III.1 3.12.6.2	Jurisdictional Boundaries	Conforms. Addressed in DCD Section 3.9.3.7.1 .
C.III.1 3.12.6.3	Loads and Load Combinations	Conforms. Addressed in DCD Section 3.9 and DCD Appendix 3B .
C.III.1 3.12.6.4	Pipe Support Baseplate and Anchor Bolt Design	Conforms. Addressed in DCD Section 3.9.3.7 .
C.III.1 3.12.6.5	Use of Energy Absorbers and Limit Stops	Conforms. Addressed in DCD Section 3.9.3.7 .
C.III.1 3.12.6.6	Use of Snubbers	Conforms. Addressed in DCD Section 3.9.3.7.1(3) .
C.III.1 3.12.6.7	Pipe Support Stiffnesses	Conforms. Addressed in DCD Section 3.9.3.7.1 .
C.III.1 3.12.6.8	Seismic Self-Weight Excitation	Conforms. Addressed in DCD Section 3.9.3.7.1 .
C.III.1 3.12.6.9	Design of Supplementary Steel	Conforms. Addressed in DCD Section 3.9.3.7.1 .
C.III.1 3.12.6.10	Consideration of Friction Forces	Conforms. Addressed in DCD Section 3.9.3.7.1(5) .
C.III.1 3.12.6.11	Pipe Support Gaps and Clearances	Conforms. Addressed in DCD Section 3.9.3.7.1 .
C.III.1 3.12.6.12	Instrumentation Line Support Criteria	Conforms. Addressed in DCD Section 3.9.3.7.1 .

3.11.7 COL Information

3.11-1-A Environmental Qualification Document

STD COL 3.11-1-A

This COL item is addressed in [Section 3.11.4.4](#).

~~STD~~ CWR SUP 3.12-1

3.12 Piping Design Review

Information on seismic Category I and II, and nonseismic piping analysis and their associated supports is presented in ~~DCD~~ [Sections 3.7, 3.9, 3D, 3K, 5.2 and 5.4](#).

STD SUP 3.13-1

3.13 Threaded Fasteners - ASME Code Class 1, 2, and 3

Criteria applied to the selection of materials, design, inspection and testing of threaded fasteners (i.e., threaded bolts, studs, etc.) are presented in [DCD Section 3.9.3.9](#), with supporting information in [DCD Sections 4.5.1, 5.2.3, and 6.1.1](#).