

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

March 20, 1981



Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
Attention: Mr. Robert A. Clark, Chief
Operating Reactors Branch No. 3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Serial No. 159
NO/FMA, JCH
Docket No. 50-338
License No. NPF-4

Gentlemen:

MULTI-STRUCTURE ARS REANALYSIS
NORTH ANNA UNIT 1

The purpose of this letter is to report progress of the Multi-Structure ARS reanalysis required by the NRC and discussed in our meeting with the NRC staff in Bethesda, Maryland on November 7, 1980.

Completion of the Phase I evaluation identified 28 of 66 stress problems that were acceptable. The following is the status and the schedule of the remaining 38 stress problems that are presently undergoing detailed Phase II evaluation. Phase I and II evaluation procedures are defined in Vepco to NRC letter Serial No. 510 dated June 6, 1980. The stress problem groups are defined in Vepco to NRC letter Serial No. 872 dated October 28, 1980.

The North Anna Unit 1 upgrading of seismic piping systems affected by Multi-Structure ARS is consistent with our approach used to upgrade the seismic piping systems in other plants (Vepco letter to NRC Serial No. 972, dated November 28, 1979). Stress and support calculations are considered preliminary until final documentation is completed in accordance with Vepco QA Program requirements. All preliminary pipe stress analysis results used in support evaluations and all preliminary support modification sketches are subject, at a minimum, to a supervisory review. Based upon our experience and the status of the analysis as detailed below, we have a high degree of confidence (above 95%) that conclusions concerning hardware modifications based on preliminary calculations will not be altered adversely upon final documentation.

We have completed the preliminary pipe stress and pipe support reanalysis of all 16 problems in Groups 1-5 and all 5 problems in Groups 6-8 inside the containment. We will install all the preliminary support modifications for these problems within the present refueling outage.

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We have completed preliminary pipe stress and pipe support reanalysis of all eight problems in Groups 1-5 outside the containment. The piping problems in this category contain Safety Class Q1, Q2, and Q3 piping as defined in FSAR Section 3.2.2, and also Non-Safety Class piping. In some cases, the non-safety class piping has been included because it is not always feasible or practical in stress analysis calculations to isolate the Q piping from the non-Q piping. In such cases, the adjacent non-Q piping is seismically analyzed together with the Q piping. Within the present refueling outage, we will install the preliminary support modifications for all problems in groups 1-5 except for the Main Steam (MS) and the Feedwater (FW) lines where we will install all modifications in the valve house and any modification required to maintain operability of piping and supports. The MS and FW lines outside the valve house are non-Q.

We will complete preliminary reanalysis and design of support modifications for the remaining Unit 1 piping outside of containment by May 31, 1981. Depending upon plant accessibility, we will install the support modifications as their designs are completed. We will complete all pipe stress and pipe support documentation by July 31, 1981 and complete installation of the remaining modifications by the Fall '81 maintenance outage.

In the course of reanalysis and final documentation, if any piping or support fails to meet the Technical Specifications operability criteria, we will take appropriate action in accordance with the station Technical Specifications.

The attached Table 1 gives the status of North Anna Unit 1 Multi-Structure ARS effort. Table 2 gives the number of changes required by type of change. Multi-Structure ARS Phase II detailed reanalysis for Unit 1 is based upon conservative analysis methods. This has resulted in more pipe support modifications than might have been necessary if more time had been available to devote to this effort. Because of schedule restraints, no attempt has been made to "fine tune" the piping systems or use more sophisticated analysis methods such as utilization of independent support motion.


The extremely short schedule for reanalysis requested by the NRC and the refueling outage of Unit 1 required that design of modifications be expedited, rather than detailed review for operability be performed. Our review indicates that all piping, without any modifications, meets operability requirements. All supports were reviewed for updated loads from the stress analysis of piping systems with support function changes, if any. Our review indicates that for supports inside the containment, 298 of 300 met operability requirements and for supports outside the containment 186 of 189 met operability requirements.

Detailed review of these supports is continuing and we are installing support modifications to insure that all supports evaluated to date will meet operability criteria prior to the start up of Unit 1. The operability criteria for this review is given in Table 3.

We have made significant progress in completing the Multi-Structure ARS evaluation of North Anna Unit 1 and remain committed to completion of the effort in a timely manner. Our reanalysis continues to confirm that the operability of Unit 1 is not in jeopardy and that the NRC's position on operability, as detailed in NRC letter to Vepco (Serial No. 117 dated February 10, 1981) regarding Unit 2 is valid for Unit 1 also.

Please contact us if you have any questions.

Very truly yours,


for B. R. Sylvia
Manager - Nuclear
Operations and Maintenance

smv:WM2

Attachments

cc: Mr. James P. O'Reilly, Director
Office of Inspection and Enforcement
Region II
Atlanta, Georgia 30303

TABLE 1
NORTH ANNA UNIT 1
MULTI-STRUCTURE ARS
SUPPORT MODIFICATION STATUS

TOTAL NO. OF STRESS PROBLEMS	STRESS PROBLEMS EVALUATED**	TOTAL NO. OF SUPPORTS	TOTAL SUPPORTS EVALUATED AND NOT REQUIRING MOD.	TOTAL SUPPORTS IDENT. REQUIRING FUNCTIONAL CHANGES	TOTAL SUPPORTS IDENT. REQUIRING MODIFICATION	TOTAL SUPPORTS COMPLETED BY CONSTRUCTION
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INSIDE CONTAINMENT

GROUPS 1-5	16	16(13)	262	217	4	41	45
GROUPS 6-8	5	5(4)	38	30	1	7	8

OUTSIDE CONTAINMENT

GROUPS 1-5	8	8(5)	189	108	26***	54	18
GROUPS 6-8*	9	5(5)	75	25	0	2	0

*Evaluation to be completed by May 31, 1981.

**The number in parenthesis represent the number of stress problems requiring no support functional changes.

***15 of these 26 are displacement limiting devices on the MS and FW lines in the valve house.

Notes: (1) Final documentation of all calculations to be completed by July 31, 1981.

(2) Our review indicates that for supports inside the containment, 298 of 300 met operability requirements and for supports outside the containment 186 of 189 met operability requirements.

TABLE 2
NORTH ANNA UNIT 1
MULTI-STRUCTURE ARS
SUPPORT MODIFICATION TYPE

TYPE OF MODIFICATION	NUMBER OF MODIFICATIONS				TOTAL
	GROUPS 1-5 INSIDE CONTAINMENT	GROUPS 6-8 INSIDE CONTAINMENT	GROUPS 1-5 OUTSIDE CONTAINMENT	GROUPS 6-8 OUTSIDE CONTAINMENT*	
A. BASEPLATES					
1. Add Gussets to simplify Analysis	6	1	7	0	14
2. Add Gussets or Bolts	3	2	1	2	8
3. Replace Plate	3	0	9	0	12
B. PIPE SUPPORTS					
1. Add or Replace Strap, U-Bolt or Clamp or Spring	10	1	4	0	15
2. Modify Member welded to Pipe	4	0	5	0	9
3. Replace or Reinforce member	6	2	4	0	12
4. Add Displ. Limiting Restrnt. in MSVH	0	0	15	0	15
5. Change Hanger Function	0	0	5	0	5
6. Add struts to reduce load on existing support	0	0	6	0	6
C. ADD SHIM	0	0	4	0	4
D. ADD SNUBBER	3	1	3	0	7
E. DELETE SNUBBER	1	0	3	0	4
F. CHANGE SNUBBER	9	1	14	0	24
TOTAL	<u>45</u>	<u>8</u>	<u>80</u>	<u>2</u>	<u>135</u>

*Evaluation to be completed by May 31, 1981.

Note: Final documentation of all calculations to be completed by July 31, 1981.

TABLE 3
NORTH ANNA UNIT 1
MULTI-STRUCTURE ARS
OPERABILITY CRITERIA

Operability review shall be performed for the Design Basis Earthquake (DBE) loadcase. Non-linear static and dynamic analysis is permissible for operability review.

Maximum Allowable Stress in Pipe	2.4 S _h Class 2 & 3 or 3.0S _m Class 1 (Note 1)
Maximum Allowable Stress in Pipe Support & Base Plate	Greater of .7 Ultimate Stress or 1.2 Yield Stress (Note 2)
Maximum Allowable Bolt Tensile Load	½ Ultimate Pullout Load (Note 3)
Maximum Load on Snubber	One-Time Allowable Load Rating given in Grinnell Catalog PH-74
Maximum Load on Pumps and Valves	Operability check in accordance with vendor requirements

NOTES:

- 1) Based on Subsection NB-3600 (Class 1) and NC-3600 (Class 2 & 3) of the AMSE Section III Boiler & Pressure Vessel Code 1980.
- 2) Based on Appendix F, Article F 1370 of the ASME Section III Boiler & Pressure Vessel Code 1977 and Addenda up to summer 1979.
- 3) Based on I&E Bulletin 79-02.