

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

February 25, 1998

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Serial No. 96-516C
NL&OS/MWH R3
Docket No. 50-280, 281
50-338, 339
License No. DPR-32, 37
NPF-4, 7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
NORTH ANNA POWER STATION UNITS 1 AND 2
SUPPLEMENTAL RESPONSE TO GENERIC LETTER (GL) 96-06
ACCEPTANCE CRITERIA FOR DESIGN ADEQUACY EVALUATION

In our letter dated October 23, 1997 (Serial No. 96-516B), Virginia Electric and Power Company (Virginia Power) committed to selecting acceptance criteria to be used for evaluating the design adequacy for thermal fluid expansion pressure of piping systems that penetrate containment for both North Anna and Surry Power Stations. This effort is to address NRC Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design Basis Accident Conditions."

Virginia Power evaluated the use of the following criteria:

- (1) The proposed ASME Code Case, "Rules for Evaluating Fluid Thermal Expansion Effects, Section III, Division 1, Class 2 and Class 3" which proposes the use of a strain limit for thermal overpressure events associated with ASME Code Level C and D loading conditions.
- (2) The ASME Code, Section III, Appendix F, "Rules for Evaluation of Service Loading with Level D Service Limits" which provide criteria for elastic and inelastic analysis of components during faulted events.

At the joint NRC/NEI workshop held on December 4, 1997, the NRC Staff stated that their position concerning the methods which are used to evaluate the adequacy of piping systems is as follows:

The proposed ASME Code Case, which recommended a strain limit for Level C and D loading conditions, has not been accepted by the NRC Staff. The Staff

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believes that there is inadequate technical basis for acceptance at this time. The acceptance of the Code Case will remain open until an adequate technical basis has been established and approved by the Staff.

The NRC Staff is receptive to consider requests to use Appendix F criteria for evaluation / design of piping systems in order to address the thermal overpressure issue. Generic Letter 91-18, Revision 1, dated October 8, 1997, and Supplement 1 to the Generic Letter 96-06 will provide the frame work for the NRC Staff consideration.

The NRC Staff will evaluate other acceptance criteria which are proposed by utilities in accordance with existing NRC procedures in order to determine if their technical basis is appropriate and justified.

Due to the uncertainty of the adoption of the proposed ASME Code Case and the necessity to establish a corrective action schedule appropriate for the significance of the issue, Virginia Power will proceed to use the applicable acceptance criteria contained in Appendix F. The objective of this evaluation is to verify the existing piping system configuration. The Appendix F criteria to be used in the piping system evaluation is provided in Attachment A. It should be noted that Virginia Power will consider the use of the ASME Code Case discussed above if it is adopted by the NRC Staff.

The results of our evaluation and a revised UFSAR will be submitted by March 31, 1999. In the interim, our current evaluation for North Anna and Surry Power Stations has concluded that the piping systems which penetrate containment will not lose system integrity during the postulated one-time DBA event.

Commitments made in this letter are summarized on the following page under the heading "Commitment Summary." Please note that we are proceeding with the evaluation using criteria provided in this letter and we would appreciate that any concerns with our approach be identified in a timely manner. Should you have any questions or require additional information, please contact me

Very truly yours,



James P. O'Hanlon
Senior Vice President - Nuclear

Attachment

cc: U. S. Nuclear Regulatory Commission
Region II
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61 Forsyth Street, SW, Suite 23T85
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Mr. R. A. Musser
NRC Senior Resident Inspector
Surry Power Station

Mr. M. J. Morgan
NRC Senior Resident Inspector
North Anna Power Station

Commitment Summary

The following represents the specific commitments made in this letter:

1. The evaluation of the design adequacy for thermal fluid expansion pressure of the piping systems which penetrate containment for both North Anna and Surry Power Stations will be completed by March 31, 1999. Virginia Power will proceed to use the applicable acceptance criteria from ASME Code, Section III, Appendix F for this evaluation as identified in Attachment A of this letter.
2. The UFSAR changes which are based on the results of our evaluation for both North Anna and Surry Power Stations will be submitted by March 31, 1999.
3. If plant modifications are determined necessary as a result of the analysis, the NRC Staff will be informed of the modifications and the schedule for their implementation by March 31, 1999.

ATTACHMENT A
CRITERION FOR USE OF ASME CODE, SECTION III, APPENDIX F
CONTAINMENT PIPE PENETRATION EVALUATIONS
NORTH ANNA AND SURRY POWER STATIONS

Appendix F of the ASME Code contains criteria for elastic and inelastic analysis of components. The criterion is stress based and applies to primary type loads. The use of the inelastic criterion will require development of the material stress-strain curves and it will be necessary to include all identified loads (faulted pressure and deadweight) simultaneously in the evaluation. Virginia Power is proposing to utilize the elastic analysis method in the evaluation of the design adequacy for thermal fluid expansion pressure of the piping systems which penetrate containment for both North Anna and Surry Power Stations

Piping susceptibility to thermal overpressurization was not specifically evaluated earlier for the DBA faulted event at either North Anna or Surry Power Stations. It is believed that there is an inherent strength in the piping and components to withstand such a one time faulted event. Consequently, the loading combinations and criteria for an evaluation of such a faulted event were not included in the plant UFSAR for either facility. Therefore, the use of Appendix F criteria will result in a UFSAR update and a submittal for NRC Staff approval. The UFSAR update will include explicit references to load combinations and code acceptance criteria.

Appendix F is referenced only for Class 1 components in most ASME Code editions. However, most of the Virginia Power containment piping system penetrations are ANSI B31.7 Code Class 2 or 3, or USAS B31.1 designation. In order to use Appendix F, Virginia Power intends to adopt the allowable stresses, analysis method, and Code compliance for Class 1 components and apply this criterion/methodology to the installed B31.7 or B31.1 components for this evaluation. Specifically, the following load combinations and Appendix F criteria will be used to verify the adequacy of the existing design to accommodate the potential thermal expansion of fluid during the postulated one time faulted event for North Anna and Surry Power Stations:

Appendix F Event

- Large Break LOCA
- Main Steam Line Break

Appendix F Loading Combinations

- Dead weight and faulted pressure loading is to be considered
- Earthquake loading is not to be considered concurrent with the above loading.

ATTACHMENT A
CRITERION FOR USE OF ASME CODE, SECTION III, APPENDIX F
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NORTH ANNA AND SURRY POWER STATIONS

Appendix F - Elastic Analysis for Piping and Components

- $P_m \leq 2.4 S_m$ or $0.7 S_u$, whichever is lower, and
- $P_L, P_L + P_b \leq 3.6 S_m$ or $1.05 S_u$, whichever is lower,
(The variables are as defined in the Code.)

Appendix F - Valve Analysis

- The valve body structural integrity is verified by comparison of valve section and material properties with that of the connected piping.
- The valve crotch stress intensity, $S_n \leq 3.6 S_m$ or $1.05 S_u$, whichever is lower.

Virginia Power believes that this acceptance criterion is satisfactory for demonstrating the adequacy of the piping design and to resolve the thermal overpressure concerns of NRC Generic Letter 96-06. Virginia Power is proceeding with the piping system evaluation using the above stated criteria. It is requested that any concerns which the NRC Staff identifies with the Virginia Power approach be addressed in a timely manner in order to facilitate a prompt closure of this issue.

In summary, Virginia Power has elected to use the appropriate acceptance criteria contained in ASME Code, Section III, Appendix F, "Rules for Evaluation of Service Loading with Level D Service Limits" for the containment penetration piping system evaluation with the objective to verify the existing piping system configuration. If plant modifications are determined necessary as a result of the analysis, the NRC Staff will be informed of the modifications and the schedule for their implementation. In addition, Virginia Power will revise the design basis and update the UFSAR for North Anna and Surry Power Stations to address the use of the stated criterion for this particular faulted loading condition. In the interim, our current evaluation for North Anna and Surry Power Stations has concluded that piping systems that penetrate containment will not lose system integrity during the postulated one-time DBA event.