

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

January 30, 1996

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

Serial No. 96-025  
NL&OS/JBL: R1  
Docket Nos. 50-338  
50-339  
License Nos. NPF-4  
NPF-7

Gentlemen:

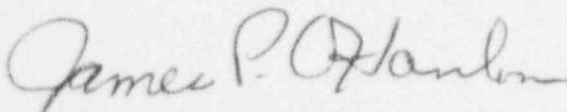
**VIRGINIA ELECTRIC AND POWER COMPANY**  
**NORTH ANNA POWER STATION UNITS 1 AND 2**  
**PROPOSED TECHNICAL SPECIFICATIONS CHANGES**  
**MINIMUM REACTOR COOLANT SYSTEM TOTAL FLOW RATE**

Pursuant to 10 CFR 50.90, Virginia Electric and Power Company requests an amendment, in the form of changes to the Technical Specifications, to Facility Operating License Nos. NPF-4 and NPF-7 for North Anna Power Station Units 1 and 2, respectively. The proposed changes will modify Table 3.2-1 of Technical Specification 3.2.5 to increase the minimum allowable reactor coolant system (RCS) total flow rate from 284,000 gpm (Unit 1) and 275,300 gpm (Unit 2) to 295,000 gpm (Units 1 and 2). These changes will increase the available analysis margin and make the Technical Specifications for RCS total flow rate consistent between the North Anna Units. The additional analysis margin will allow future improved reload core design limits.

A discussion of the proposed changes is provided in Attachment 1. The proposed Technical Specifications changes are provided in Attachment 2. It has been determined that the proposed changes do not involve an unreviewed safety question as defined in 10 CFR 50.59 or a significant hazards consideration as defined in 10 CFR 50.92. The basis for our determination that the changes do not involve a significant hazards consideration is provided in Attachment 3. The proposed Technical Specifications changes have been reviewed and approved by the Station Nuclear Safety and Operating Committee and the Management Safety Review Committee.

Should you have any questions or require additional information, please contact us.

Very truly yours,



James P. O'Hanlon  
Senior Vice President - Nuclear

Attachments

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cc: U.S. Nuclear Regulatory Commission  
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Mr. R. D. McWhorter  
NRC Senior Resident Inspector  
North Anna Power Station

Commissioner  
Bureau of Radiological Health  
Room 104A  
1500 East Main Street  
Richmond, Virginia 23219

COMMONWEALTH OF VIRGINIA )  
 )  
COUNTY OF HENRICO )

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by J. P. O'Hanlon, who is Senior Vice President - Nuclear, of Virginia Electric and Power Company. He is duly authorized to execute and file the foregoing document in behalf of that Company, and the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 30<sup>TH</sup> day of January, 1996.

My Commission Expires: May 31, 1998.

Vicki L. Hull  
Notary Public

(SEAL)

**ATTACHMENT 1**

**DISCUSSION OF CHANGES**

**VIRGINIA ELECTRIC AND POWER COMPANY**

## Discussion of Changes

### Introduction

As required by Technical Specifications 3.2.5 and 4.2.5.2 [1], Virginia Electric and Power Company performs Reactor Coolant System (RCS) flow measurements at each of North Anna Units 1 and 2 once per 18 months. The safety analyses are based in part on verifying, via the Technical Specifications surveillance, that the RCS Total Flow Rate is greater than or equal to 284,000 gallons per minute (gpm) for Unit 1 and 275,300 gpm for Unit 2.

The proposed Technical Specifications change increases the minimum allowable RCS Total Flow Rate from 284,000 gpm (Unit 1) and 275,300 (Unit 2) to 295,000 gpm (Units 1 and 2). This change when implemented will increase the available analysis margin and make the Technical Specifications for RCS total flow rate consistent for North Anna Units 1 and 2. The additional analysis margin will allow future improved reload core design limits (such as FΔh and MTC).

The existing safety analyses are analyzed for a lower RCS flow rate limit, and are bounding with respect to expected actual plant behavior and to analyses at the proposed RCS total flow rate. Therefore, no unreviewed safety question or significant hazard consideration is generated by the proposed Technical Specifications change to the RCS Total Flow Rate.

### Background

Through the 1980's and into the 1990's, the North Anna Unit 1 and 2 steam generators experienced increasing levels of steam generator tube plugging (SGTP). There was a corresponding decrease in the RCS flow rate. As a result, the Technical Specifications minimum RCS total flow rate was reduced at both units [2,3,4]. These reductions in minimum allowable RCS total flow rate reduced the available DNBR margin.

Virginia Electric and Power Company replaced the North Anna Unit 1 steam generators during the refueling shutdown between Cycles 9 and 10, and replaced the North Anna Unit 2 steam generators during the refueling shutdown between Cycles 10 and 11. The replacement steam generators have an increased number of tubes and primary side flow area (approximately 6%) than the old Model 51 steam generators, and therefore, less flow resistance. The predicted RCS total flow rate with the replacement steam generators was 308,550 gpm.

The reactor coolant system (RCS) total flow was measured in accordance with Technical Specifications subsequent to startup following the last refueling for each unit. The measured results of the RCS total flow were found to be greater than 308,000 gpm for these tests.

The proposed Technical Specification change increases the minimum RCS Total Flow Rate to 295,000 gpm. The Technical Specification change when implemented will increase the available analysis margin and make the Technical Specifications for RCS total flow rate consistent between the North Anna units.

#### Current Licensing Basis

As required by Technical Specifications 3.2.5 and 4.2.5.2 [1], Virginia Electric and Power Company performs RCS flow measurements at each of North Anna Units 1 and 2 once per 18 months. The Technical Specifications RCS total flow rate has been reduced at both units to accommodate the steam generator tube plugging (SGTP) which had existed in the previous steam generators [2,3,4]. The Technical Specifications require an RCS Total Flow Rate greater than or equal to 284,000 gpm for Unit 1 and greater than or equal to 275,300 gpm for Unit 2.

#### Current Design Basis

The safety analyses are based in part on verifying, via the Technical Specifications surveillance, that the measured RCS total flow rate is greater than or equal to 284,000 gpm for Unit 1 and greater than or equal to 275,300 gpm for Unit 2. This verification ensures that the as-measured RCS flow rate is bounded by the assumed RCS flow rate in the applicable safety analyses.

#### Discussion

The proposed Technical Specifications change increases the minimum allowable RCS Total Flow Rate from 284,000 gpm (Unit 1) and 275,300 (Unit 2) to 295,000 gpm (Units 1 and 2). This change when implemented will increase the available analysis margin and make the Technical Specifications for RCS total flow rate consistent between the North Anna units. The additional analysis margin will allow future improved reload core design limits (such as  $F\Delta h$  and MTC).

The proposed minimum RCS total flow rate (295,000 gpm) was chosen such that the possibility of a violation of the requirement was minimal. The measured RCS flow rate with the replacement steam generators is in excess of 308,000 gpm for both units. Hence, there exists approximately 4.2% margin between the measured flow and the proposed Technical Specifications limit. This is sufficient to accommodate the variability in the RCS measurement, and potential changes which may affect RCS flow resistance.

### Specific Changes

The following specific Technical Specification (TS) changes apply to Units 1 and 2 as noted:

#### Unit 1, Table 3.2-1, DNB Parameters, of TS 3.2.5

- Change the existing criterion for Reactor Coolant System Total Flow Rate from " $\geq 284,000$ \*\*\*" to " $\geq 295,000$ ."
- Remove the following note from the bottom of Table 3.2-1 (page 3/4 2-15):

"\*\*\* The value for the minimum allowable Reactor Coolant System Total Flow Rate is reduced to 268,500 gpm until steam generator replacement."

#### Unit 2, Table 3.2-1, DNB Parameters, of TS 3.2.5

- Change the existing criterion for Reactor Coolant System Total Flow Rate from " $\geq 275,300$ " to " $\geq 295,000$ ."

### Safety Significance

The RCS flow rate is an assumption in safety analyses, affecting UFSAR Chapter 15 transient analyses, Reactor Core Safety Limits (RCSLs), and thermal overtemperature and overpower  $\Delta T$  protection functions.

An increase in the minimum RCS flow rate limit generates a benefit for safety analyses which have a DNBR acceptance criterion. For other safety analyses which are limited by considerations such as heat sink or pressurization criteria, an increased RCS flow rate limit is either a benefit, or the event is insensitive to RCS flow rate. The existing safety analyses are analyzed for a lower RCS flow rate limit, and are bounding with respect to expected actual plant behavior and to analyses at the proposed RCS total flow rate. Therefore, no reanalyses are required to support the proposed Technical Specifications change.

The proposed changes have been reviewed against the criteria of 10 CFR 50.59. This review concluded that these proposed changes do not result in an unreviewed safety question. The basis for this determination is as follows:

1. The probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report would not increase. The proposed Technical Specifications change only increases the minimum allowable RCS total flow rate in the applicable Limiting Condition of Operation. No other changes are being made to allowable operating conditions defined by Technical Specifications, procedures, or to any plant design

feature by the implementation of this change. There is no impact on the actual plant performance. Changes in the assumed initial conditions for the accident have no bearing on the probability of occurrence of the assumed accident or malfunction. The RCS flow rate is an assumption in applicable safety analyses. Existing analyses of record have assumed RCS flow rates which are bounding with respect to expected actual plant behavior. Therefore, the implementation of the proposed Technical Specifications change does not affect the probability nor increase the consequences of an accident previously evaluated.

2. The possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report would not be created. The proposed change to North Anna Units 1 and 2 Technical Specifications Table 3.2-1 does not involve any alterations to the physical plant which would introduce any new or unique operational modes or accident precursors. Only the allowable value for measured Reactor Coolant System Total Flow Rate will be changed.
3. The margin of safety as defined in the basis for any technical specifications is not reduced. The proposed Technical Specifications change only increases the minimum allowable RCS total flow rate in the applicable Limiting Condition of Operation. The RCS flow rate is an assumption in applicable safety analyses. Existing analyses of record have assumed RCS flow rates which are bounding with respect to expected actual plant behavior. Therefore, the margin of safety is not reduced by the proposed increase in the allowable RCS Total Flow Rate.

#### References

- [1] North Anna Units 1 and 2 Technical Specifications.
- [2] Letter from L. B. Engle (USNRC) to W. R. Cartwright (Virginia Electric and Power Company), "North Anna Units 1 and 2 - Issuance of Amendments Re: Minimum Measured Flow Rate in Reactor Coolant System," dated July 31, 1989 (North Anna Unit 1 Amendment #120; North Anna Unit 2 Amendment #104).
- [3] Letter from L. B. Engle (USNRC) to W. L. Stewart (Virginia Electric and Power Company), "North Anna Unit 1 - Issuance of Amendment Re: Reduced Minimum Reactor Coolant System Flow Rate Limit," dated March 3, 1992 (North Anna Unit 1 Amendment #154).
- [4] Letter from L. B. Engle (USNRC) to W. L. Stewart (Virginia Electric and Power Company), "North Anna Unit 2 - Issuance of Amendment Re: Reduction in Reactor Coolant System (RCS) Flow Rate," dated August 30, 1993 (North Anna Unit 2 Amendment #152).



**ATTACHMENT 2**

**PROPOSED TECHNICAL SPECIFICATIONS CHANGES  
NORTH ANNA UNITS 1 AND 2**

**VIRGINIA ELECTRIC AND POWER COMPANY**