

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

January 31, 1996

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

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50-339  
License Nos. NPF-4  
NPF-7

Gentlemen:

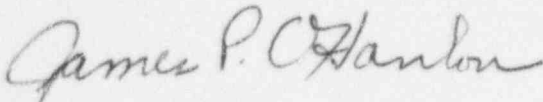
**VIRGINIA ELECTRIC AND POWER COMPANY**  
**NORTH ANNA POWER STATION UNITS 1 and 2**  
**PROPOSED TECHNICAL SPECIFICATIONS CHANGES**  
**EDG FUEL OIL AND SURVEILLANCE TESTING**

Pursuant to 10 CFR 50.90, the Virginia Electric and Power Company (Virginia Power) requests amendments, 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 revise the current minimum Emergency Diesel Generator fuel oil day tank volume and allow credit to be taken for surveillance testing performed while the unit is at power to satisfy portions of those surveillance requirements required during shutdown.

A discussion of the proposed Technical Specifications changes is provided in Attachment 1. The proposed Technical Specifications changes are provided in Attachment 2. It has been determined that the proposed Technical Specifications 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 these 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.

Virginia Power requests approval of the proposed Technical Specifications changes by August 1, 1996, in order to support continued plant operations. 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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ADD 1

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Mr. R. D. McWhorter  
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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 31<sup>ST</sup> day of January, 1996.  
My Commission Expires: May 31, 1998.

Vicki L. Hull  
Notary Public

(SEAL)

**Attachment 1**

**Discussion of Changes**

## Discussion of Changes

### Introduction

Pursuant to 10 CFR 50.90, Virginia Electric and Power Company requests changes to Technical Specifications 3/4.8.1.1 and 3/4.8.1.2 for North Anna Power Station Units 1 and 2. These proposed Technical Specification changes would revise the current minimum Emergency Diesel Generator (EDG) fuel oil day tank volume and EDG surveillance requirements:

- North Anna Technical Specifications require that the EDG day tank contain a minimum of 750 gallons of fuel oil. The proposed change will revise the minimum volume from 750 to 450 gallons because Technical Specification compliance issues arise due to the inability of the fuel oil transfer system to automatically maintain the day tank level above 750 gallons during EDG operation without operator intervention. The proposed change will also clarify in the applicable Technical Specifications Bases that the fuel oil transfer system is capable of automatically transferring fuel oil to the EDG day tanks.
- North Anna Technical Specifications require that each EDG be demonstrated operable by the performance of listed surveillance requirements, certain of which are required to be performed with the unit shut down. The proposed change will allow credit to be taken for surveillance testing performed while the unit is at power to satisfy portions of those surveillance requirements required during shutdown.

The proposed changes do not involve physical modifications to the plant or modifications in the methods of plant operation which would cause an accident or event of a different type than previously analyzed. The ability of the EDGs to perform their intended safety function is not affected by the proposed changes. The accident analyses assumptions are not affected by the proposed changes. The margin of safety for the various design basis accidents is unaffected by the proposed changes.

Therefore, the proposed changes do not result in an unreviewed safety question or a significant hazards consideration.

## **Background**

North Anna Power Station is a dual unit site with four EDGs. Two EDGs are dedicated for each unit with each EDG supplying a separate and independent emergency bus. North Anna Technical Specification 3/4.8.1.1 requires that while in Modes 1 through 4, as a minimum, each unit will have two separate and independent EDGs. North Anna Technical Specification 3/4.8.1.2 requires that while in Modes 5 and 6, as a minimum, each unit will have one EDG.

The EDGs are capable of starting automatically and providing a reliable source of emergency power for the required safety and shutdown loads in the event of a loss of offsite power or degraded bus condition. In addition, the EDGs start automatically, come up to speed, and are ready to accept load when a safety injection signal is present.

The fuel oil transfer system ensures that sufficient fuel oil is continuously provided to the day tank. Technical Specifications require that a minimum of 750 gallons of fuel oil are maintained in the day tank. However, since the level control points in the day tank allow the fuel oil level to drop below 750 gallons during EDG operation, operability questions have been raised, and an operator "work around" was identified to maintain the Technical Specification minimum level.

This Technical Specification change will provide an acceptable basis for the EDG day tank minimum volume, eliminate the present questions surrounding the requirements of this tank during operation of the EDG, and eliminate the need for the operators to manually override the automatic level control system to maintain the current Technical Specification minimum volume of 750 gallons of fuel oil during operation of the EDG.

An alternative to revising the Technical Specification minimum volume is to modify the level control system to operate in automatic to maintain the day tank level above the current Technical Specification limit while the EDG is operating. This alternative is not considered cost beneficial.

Some of the EDG surveillances require special system alignments such that the unit must be in a shutdown condition (Modes 3 through 6) to perform the surveillance, while other surveillances and portions of some surveillances can be performed at power (Modes 1 or 2) without any risk of jeopardizing the safe and stable operation of the plant. Thus, it is desired to provide for demonstrating the operability of each EDG by performing the required surveillances, independent of the operating mode, wherever implementing the surveillance in such a manner has no adverse impact on safety.

The description of the changes that follows is divided into two parts--A and B--to facilitate a better discussion of the issues. Note that minor editorial changes are also being made to improve readability and consistency for both units Technical Specifications.

**Part "A": EDG Day Tank Minimum Volume (Limiting Condition for Operation 3.8.1.1.b.1, Modes 1 - 4 and Limiting Condition for Operation 3.8.1.2.b.1, Modes 5 and 6)**

Design Basis

The EDG fuel oil system consists of underground fuel storage tanks, fuel transfer pumps, and various delivery and injection components. The fuel oil is stored in two shared safety-related underground fuel oil storage tanks which contain sufficient capacity to provide continuous operation of one EDG for each unit at full load for seven days. The underground fuel oil storage tanks are filled from the aboveground non-safety-related fuel oil system which provides fuel oil for all site needs. The fuel oil is delivered to the EDG by redundant, missile-protected, Seismic Category I systems. For each EDG, there is one "ready" fuel oil transfer pump and one "standby" fuel oil transfer pump. Either transfer pump fills and maintains the proper level of the day tank required for EDG operation. Each day tank has a nominal capacity of 1000 gallons which was sized to provide more than 3 hours of operation.

The only components in the fuel oil system that are shared with both units are the underground fuel oil storage tanks. The four ready fuel oil transfer pumps that supply each EDG in Units 1 and 2 take suction from one underground fuel

oil storage tank, and the four standby fuel oil transfer pumps that also supply each EDG in Units 1 and 2 take suction from the other underground tank. If an underground tank were lost, fuel would be supplied from the other tank by its associated ready or standby fuel oil transfer pump.

#### Current Licensing Basis

Current Technical Specifications require a minimum of 750 gallons of fuel oil in the day tanks. The Updated Final Safety Analysis Report (UFSAR) and the NRC's Safety Evaluation Report (NUREG 0053), dated June 1976, state that the EDG day tanks have the capacity to enable the diesel to run for approximately three hours. The UFSAR also states that the day tanks are generally maintained full at all times to limit the formation of condensate from any air vapor in the tank. The day tanks are located in their respective missile protected EDG rooms.

#### Discussion

The Virginia Power North Anna Power Station is not committed to a specific standard with respect to the design of the EDG fuel oil system. However, an ANSI standard (ANSI N195--1976, "Fuel Oil Systems for Standby Diesel Generators, and its successor, ANS 59.51--1989, "Fuel Oil Systems for Emergency Diesel Generators") was published about the time North Anna Unit 2 was being licensed. ANSI N195--1976 was referenced in the North Anna Updated Safety Analysis Report for comparison purposes only. ANSI N195--1976 and its successor, ANS 59.51--1989, provides some insight on the day tank design. The standard described the "performance requirement" for the EDG fuel oil day tank as "...one whose capacity is sufficient to maintain at least 60 minutes of operation after reaching the low level alarm setpoint." Although not explicitly stated in the standard, it is reasonable to infer that the intent of that requirement was that one hour provided sufficient time to replenish the diminishing fuel oil supply. Thus, the standard offers some basis for establishing an appropriate day tank volume.

The accident analyses assume that the EDG will be available when needed. Reasonable assurance that the fuel oil supply system is available when called



upon to perform its intended function is provided through Technical Specification required periodic surveillance of the fuel oil supply system.

The proposed change would revise the requirement from 750 gallons, which represents approximately three hours of EDG operation, to 450 gallons, which represents one hour operation. The value of 450 gpm is based on an EDG consuming fuel oil while operating at 100% load, plus other considerations. Those considerations include a 10% reserve volume, unusable volume in the tank, and the maximum indicated level errors that could exist (assuming the tank was full) due to allowable calibration error, instrument drift and variation in fuel oil density. The actual fuel consumption rate at maximum design load (3000 kW) is 251 gallons per hour. Because the 450 gallon value already accounts for all maximum inaccuracies and unusable volume, each additional 251 gallons would provide one hour of EDG operation.

The EDG fuel oil supply system has proven to be highly reliable with only one case of multiple failures of the fuel oil transfer pumps. This failure was due to maintenance deficiencies that resulted in overgreasing of the motor bearings compounded by extreme cold weather. This problem has been resolved and closed out under NRC Inspection Report 95-18, dated November 3, 1995. However, in the event of a complete fuel oil supply system failure, the one hour requirement has been determined adequate to provide sufficient time to implement any necessary compensatory measures. Those measures include manually cross connecting fuel oil transfer systems between EDGs with existing piping, the installation of jumper hoses to supply the EDG day tanks directly from the above ground fuel oil storage tanks, or supplying the day tanks via oil drums/tanker trucks. Specific procedures will be developed to provide guidance as to the alternate methods to be used in filling the EDG day tanks.

In addition, the proposed change has been compared with NUREG 1431, the Improved Standard Technical Specifications (ISTS), Westinghouse Plants, dated April 1995. The ISTS contains a surveillance requirement (SR 3.8.1.4) which addresses day tank level. The Bases for this surveillance requirement states that it provides verification that the level of the fuel oil in the day tank is at or above the level at which fuel oil is automatically added, and that the level is selected to ensure adequate fuel oil for a minimum of one hour of EDG

operation at full load plus 10%. The proposed change will continue to ensure that periodic surveillance of the EDG fuel oil day tank level is performed. However, the proposed change for North Anna is administratively different from the corresponding ISTS requirement in that a separate surveillance test will provide verification that the fuel oil is added to the day tank by the automatic level control system.

#### Fuel Oil Surveillance Requirement

The EDG day tanks at North Anna have a capacity of 1000 gallons each and the level is normally maintained greater than 800 gallons. The level control system for each EDG day tank functions to control the operation of the two makeup transfer pumps for the tank. The lead transfer pump will start when the day tank level decreases to 700 gallons and will stop when the tank level reaches 820 gallons. The backup fuel transfer pump will start when the tank level decreases to 580 gallons and will stop when the tank level reaches 830 gallons. Under normal operation the lead pump will provide all the makeup to the day tank with the backup pump acting as a standby and operating only if there is a malfunction in the lead transfer pump. The low level alarm will actuate if the day tank level decreases to 580 gallons and will be an indication of a malfunction of the automatic level control system.

As described above, the day tank level control system will serve to maintain the level of fuel oil in the day tank well above the revised minimum level of 450 gallons. Rather than modify the level control system to control tank level based on the revised minimum level, it has been determined that the level control system in its present form can function and will ensure that fuel oil level is maintained well above the minimum requirement. Assurance that the fuel oil system will continue to perform its intended function is provided through periodic surveillance required by the current Technical Specification Surveillance Requirement 4.8.1.1.2.a.3. Surveillance Requirement 4.8.1.1.2.a.3 verifies that the fuel transfer pumps can be started and transfer fuel from the storage system to the day tank. The periodic test which performs this surveillance requirement verifies the automatic makeup capability. The Technical Specifications Bases will be clarified to discuss that the surveillance test demonstrates fuel supply system operability through periodic verification of

the automatic makeup function. This automatic makeup function reduces the need for any operator intervention and ensures that the fuel level is maintained well above the minimum requirement. Utilizing the existing system in the manner described above provides a fuel supply within the day tank well in excess of the minimum level required.

Additionally, existing administrative controls ensure that the level control system performs in an optimum manner and effectively maintains tank level between approximately 700 and 800 gallons. This is accomplished by the operations requirement that an operator verify EDG day tank level every 12 hours while the EDG is in standby and the assignment of an operator to the EDG room during EDG operation.

### **Description Of Specific Changes**

These Technical Specification changes apply to both Unit 1 and Unit 2.

- Technical Specification 3.8.1.1.b.1, Limiting Condition for Operation. Delete "750" gallons and replace with "450" gallons.
- Technical Specification 3.8.1.2.b.1, Limiting Condition for Operation. Delete "750" gallons and replace with "450" gallons.
- Technical Specification 3.8.1.2, Action b.1: Replace the period (.) with a comma (,) following "...once per 12 hours."

This Technical Specification Bases change applies to both Units 1 and 2.

- Technical Specification Bases 3/4.8.1 and 3/4.8.2 A.C. and D.C. Power Sources and Distribution, page B 3/4 8-1: Following the first paragraph add a new paragraph stating "For each EDG, the fuel oil transfer system shall be capable of automatically transferring fuel oil to the associated EDG day tank in sufficient quantities to maintain adequate day tank level to support full load operation of the EDG."

## Part "B": Selected EDG Surveillance Tests At Power

### Design Basis

The EDG system shall be designed to permit appropriate periodic inspection and testing of electrical, mechanical, I&C, and structural features associated with the system to assess and ensure the reliability of the system and its capability to continue to support its minimum performance requirements.

### Licensing Basis

The Surveillance Requirements for demonstrating the operability of the EDGs are in accordance with the recommendations of Regulatory Guide 1.9 "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, and Regulatory Guide 1.108 "Periodic Testing of Diesel Generator Units Used as Onsite Electrical Power Systems at Nuclear Power Plants" Rev. 1, August 1977, as modified by approved Technical Specifications amendments.

### Discussion

Surveillance Requirement 4.8.1.1.2.d states that each EDG shall be demonstrated operable "At least once per 18 months during shutdown by:" and then lists the surveillance requirements. Some of these surveillances require special system alignments such that the unit must be in a shutdown condition (Modes 3 through 6) to perform the surveillance, while other surveillances and portions of some surveillances can be performed at power (Modes 1 or 2) without any risk of jeopardizing the safe and stable operation of the plant. Thus, it is desired to provide for demonstrating the operability of each EDG by performing the required surveillances, independent of the operating mode, wherever implementing the surveillance in such a manner has no adverse impact on safety.

As an example, Surveillance Requirement 4.8.1.1.2.d.4.a (performed every 18 months during shutdown) requires that by simulating a loss of offsite power that de-energization of the emergency busses and load shedding from the

emergency busses is verified. Surveillance Requirement 4.3.2.1.1 for Engineered Safety Feature Actuation System (ESFAS) Instrumentation requires that, in part, monthly Channel Functional Tests be performed for Loss of Power of the emergency busses. This ESFAS testing is performed at power. The same test signal is used for both surveillances and overlapping components are functionally tested by these two surveillances. To prevent redundant testing of these components, credit would be taken for the monthly testing of SR 4.3.2.1.1 to satisfy a portion of the testing performed under SR 4.8.1.1.2.d.4.a.

Similarly, portions of the load shedding of the emergency bus can be performed at power without affecting emergency bus operability or stable plant operation. Items such as ventilation fans and boric acid tank heaters, that are supplied by the emergency busses, can be tested at power. Having the flexibility to perform portions of these shutdown surveillances tests while at power greatly reduces the complexity of the testing performed during shutdown, minimizes the impact on outage scheduling, and reduces the likelihood of errors during the testing. There is no specific technical or safety reason that would prevent portions of these surveillance requirements from being performed at power. The intent of the surveillance requirements are satisfied regardless of the operating mode of the unit at the time of the performance of the surveillance.

These surveillance requirements will continue to be performed in the modes required for the safe and stable operation of the plant and within the restrictions of the Technical Specifications associated with other safety-related components affected by these EDG surveillances.

To eliminate any concerns associated with the conduct of the surveillance described above, it is proposed that a clarifying note be added to Surveillance Requirement 4.8.1.1.2.d that will allow credit to be taken for at-power testing (Mode 1 or 2) performed in accordance with other applicable surveillance requirements, and if performance at power does not jeopardize emergency bus operability or continued stable plant operation.

#### **Description Of Specific Changes**

This Technical Specification change applies to both Unit 1 and Unit 2.

Technical Specification Surveillance Requirement 4.8.1.1.2.d: Add an asterisk following "during shutdown." At the bottom of the page add the footnote:

- \* These surveillances may be satisfied by at-power testing (Modes 1 or 2) performed in accordance with other applicable surveillance requirements if performance at power does not jeopardize emergency bus OPERABILITY or continued stable plant operation.

### Safety Significance

These Technical Specification and Bases changes will 1) reduce Technical Specification minimum EDG Day Tank volume from 750 to 450 gallons and clarify in the Technical Specification Bases that the fuel oil transfer system is capable of automatically transferring fuel oil to the EDG day tanks, and 2) allow credit to be taken for EDG surveillances performed while the unit is at power (Modes 1 and 2) in satisfying portions of surveillance requirements previously required to be performed while the unit was shut down (Modes 3 through 6).

The revised minimum day tank volume takes into account information provided by relevant national standards and the reasonable assurance that the fuel oil supply system will perform its intended function. The proposed change will also provide guidance by adding information to the applicable Technical Specifications Bases to clarify surveillance requirements associated with the minimum EDG day tank fuel oil volume change.

The second change facilitates surveillance testing by permitting the conduct of certain tests associated with the EDGs during modes other than when the unit is shutdown if it can be determined that the surveillance test, when conducted during power operations, have no potential to jeopardize emergency bus operability or continued stable plant operation and is not technically required to be performed at shutdown.

It has been determined that the proposed changes **do not**:

**1. Involve an increase in the probability of occurrence of an accident previously evaluated.**

The proposed changes do not result in any physical modifications to any plant systems or components nor change the operation of any plant equipment. The EDG fuel oil supply system will continue to provide adequate fuel supply to the EDGs in a manner consistent with applicable accident analyses. Performing surveillance tests or portions of surveillance tests at power that do not jeopardize stable plant operations does not increase the probability of occurrence of previously analyzed accidents.

Therefore, there is no increase in the probability of occurrence of any accident.

**2. Increase the consequences of an accident previously evaluated.**

The proposed changes do not result in any physical modifications to any plant systems or components nor change the operation of any plant equipment. The EDG fuel oil system remains capable of supplying the EDGs with sufficient quantities of fuel oil to provide power for long term loss of offsite power. The EDG surveillances will continue to be performed in a manner that will ensure that the EDGs will be capable of performing their intended safety functions. The proposed changes to the electrical distribution system surveillances will continue to ensure that the electrical distribution system remains operable to power the required safety systems.

Therefore, these proposed changes will not result in an increase in the consequences of any evaluated accidents.

**3. Create the possibility for an accident of a different type than was previously evaluated.**

The proposed changes do not result in any physical modifications to any plant systems or components nor change the operation of any plant equipment. Only those surveillance tests or portions of surveillance tests that do not jeopardize stable plant operation will be performed at power. Overlap testing to fully test the electrical distribution system protection functions does not introduce any unique accident precursors. The EDG fuel oil system remains capable of supplying the EDGs with sufficient quantities of fuel oil to provide power for long term loss of offsite power. The

EDG surveillances will continue to be performed in a manner that will ensure that the EDGs will be capable of performing their intended safety functions.

Therefore, there are no new precursors generated that would result in the possibility of a different type of an accident than was previously evaluated in the SAR.

**4. Decrease the margin of safety as described in the bases section of Technical Specifications.**

The EDG fuel oil system will continue to provide adequate fuel supply in a manner consistent with applicable accident analyses. The EDG surveillances will continue to be performed in a manner that will ensure that the EDGs are capable of performing their intended safety functions. The proposed changes to the electrical distribution system surveillances will continue to ensure that the electrical distribution system remains operable to power the required safety systems.

Therefore, the margin of safety as described in the Technical Specifications is not reduced.



**Attachment 2**  
**Technical Specifications Changes**