VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

August 24, 1995

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

Serial No. 95-405
NL&P/CGL R2'
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
CLARIFICATIONS TO CORE UPRATE SAFETY EVALUATION

On August 3, 1995, the NRC issued Amendments 203/203 to the Surry Operating Licenses and Technical Specifications for operation at an increased core power level of 2546 MWt from 2441 MWt. We appreciate the NRC's expeditious review of our core uprate submittal. Implementation on Unit 2 is scheduled to be initiated on August 25, 1995, and Unit 1 implementation will be initiated during the upcoming Fall 1995 refueling outage.

We have reviewed the NRC's safety evaluation (SE) for core uprate and submit the clarifications discussed in Attachment 1. These clarifications, although minor, are being documented because of the significance and extent of this particular SE. It is hoped that these clarifications will preclude future ambiguity in the licensing basis for the Surry core uprate approval.

The attached clarifications have been discussed with Mr. Bart Buckley, the NRC Project Manager for Surry. Subsequently, some of the clarifications were also discussed with the applicable technical reviewers during telephone discussions on August 10, 1995 and August 14, 1995.

If you have questions regarding these clarifications, please contact us.

Very truly yours,

James P. O'Hanlon

James P. O'Hanlon
Senior Vice President - Nuclear

Attachment 1 - Clarifications to the NRC's Safety Evaluation for the Surry Core Uprate

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cc: U. S. Nuclear Regulatory Commission
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ATTACHMENT 1

CLARIFICATIONS TO THE NRC'S SAFETY EVALUATION (SE) FOR THE SURRY CORE UPRATE

Section 3.1.2 Reactor Coolant System

The NRC's Safety Evaluation (SE) states that "the lower flow is acceptable for the uprated power because it has been considered in the justifications for the uprating." As documented in Table 2.1-1 of the Surry Core Uprate Licensing Report , the Surry core uprating does not include a reduction in RCS flow.

Section 3.1.6.4 Chemical and Volume Control System Malfunction

Two discrepancies exist between the SE text for the Chemical and Volume Control System (CVCS) Malfunction and the text provided in the Surry Core Uprate Licensing Report. The first involves the use of "mode definitions" which are not used in the Surry Technical Specifications. The second involves the acceptance criteria employed in the Intermediate and Hot Shutdown CVCS malfunction accident analysis. These two items are discussed in the following paragraphs:

The Surry Core Uprate SE states:

> "The licensee reevaluated the administrative controls and alarms to ensure that there remains at least a 15 minute margin from positive indication of a dilution in progress to loss of shutdown margin for corrective operator action during Modes 1 through 4. For Modes 5 and 6, the licensee ensured that primary grade water will be isolated from the RCS 15 minutes after a planned dilution."

The SE refers to mode definitions (i.e., Modes 1 through 6) rather than operating conditions. The Surry Technical Specifications define operating conditions with the terms Power Operation, Reactor Critical, Hot Shutdown, Intermediate Shutdown, Cold Shutdown, and Refueling Shutdown. Although these terms correlate loosely with the Standard Technical Specification definitions for Modes 1 through 6, the Surry specific operating conditions are more appropriately described by the terms listed above.

The SE states that Virginia Electric and Power Company reevaluated the administrative controls and alarms to ensure that there remains at least a 15 minute margin from positive indication of a dilution in progress to loss of shutdown margin for corrective operator action during Modes 1 through 4 (i.e., Power Operation, Reactor Critical, Hot Shutdown, and Intermediate Shutdown). However, this statement is applicable only to Power Operation and Reactor Critical. For Hot Shutdown and Intermediate Shutdown, the analysis demonstrates that at least 15 minutes are available from initiation of dilution to loss of shutdown margin for corrective operator

action. This is the acceptance criterion described in Section 3.5.4.2.3 of the Surry Core Uprating Licensing Report and is the current licensing basis, as defined by the NRC in an SE transmitted by an April 11, 1991 letter (from B. C. Buckley to W. L. Stewart, "Surry Units 1 and 2 - Issuance of Amendments Re: Boron Concentration (TAC Nos. 79327 and 79328))." This SE states:

> "At intermediate and hot shutdown conditions, the licensee has shown that the present administratively implemented shutdown margin limits ensure that at least 15 minutes are available from initiation of dilution to loss of shutdown margin for corrective operator action. During startup and power conditions, at least 15 minutes are available for corrective operator action from positive indication of a dilution in progress (alarm or reactor trip) to loss of shutdown margin."

An uprated core power level does not cause postulated CVCS malfunctions at intermediate and hot shutdown to become more severe.

For the reasons described above, we recommend the following clarification of Surry Core Uprate SE text:

> "The licensee reevaluated the administrative controls and alarms to ensure that there remains adequate time for corrective operator action in response to inadvertent boron dilution. For Cold Shutdown and Refueling Shutdown, the licensee ensures that the primary grade water source will be isolated from the RCS 15 minutes after a planned dilution. At Intermediate and Hot Shutdown conditions, the licensee has shown that the present administratively implemented boron concentration limits ensure that at least 15 minutes are available from initiation of dilution to loss of shutdown margin for corrective operator action. For Reactor Critical and Power Operation, the licensee has demonstrated that at least 15 minutes are available for corrective operator action from positive indication of a dilution in progress (alarm or reactor trip) to loss of shutdown margin."

<u>Section 3.1.6.7 Locked Rotor</u>

In this section (second paragraph, first sentence) the Surry Core Uprate SE states:

> "In this analysis, the unaffected RCPs were assumed to trip, on low coolant flow, two seconds after generation of the reactor trip signal."

As described in Section 3.5.7 of the Surry Core Uprate Licensing Report, the accident analysis for the Locked Rotor incident assumes that the unaffected RCPs trip 2 seconds after the reactor trips. The reactor trip is assumed to occur on a low RCS flow signal in the coolant loop with the locked rotor. The unaffected RCPs are not tripped on any reactor protection signal, but are conservatively assumed to trip on an elapsed time of 2 seconds after generation of the reactor trip signal. This was further elaborated in our supplemental letter of May 5, 1995 (Serial No. 95-036E). It is recommended that the Surry Core Uprate SE text above be clarified as follows:

"In this analysis, the unaffected RCPs were assumed to trip two seconds after generation of the reactor trip signal."

Later in the same section (second paragraph, third sentence), the Surry Core Uprate SE states:

"The licensee stated that in the North Anna analysis no rods had an MDNBR less than the statistical DNBR design limit and the RCS and main steam peak pressures remained below 110% of design pressure."

The sentence as written refers to North Anna results instead of results for Surry. The results stated agree with those presented in Section 3.5.7 of the Surry Core Uprate Licensing Report, and the sentence above should be clarified to refer to Surry.

Section 3.3 Containment Integrity Analyses
Section 3.3.1 LOCA Containment Integrity Analysis
Section 3.3.2 MSLB Containment Integrity Analysis

These sections refer to the containment design pressure of 45.0 psig. It should be noted that the 45.0 psig design pressure is and remains the licensing basis for the Surry containment, as reflected in Surry Technical Specification 4.4.

Section 3.3.4 Safeguards Pumps Net Positive Suction Head Analysis

In the sixth sentence, the phrase "the minimum nat positive suction head" contains a typographical error and should read "the minimum net positive suction head."

Section 3.5.1 Electrical Systems Evaluation - Loss of Reactor Coolant Flow Incident

The electrical systems assumptions as modeled in this accident were the subject of a supplemental letter dated February 27, 1995 (Serial No. 95-036). That letter stated that only the low reactor coolant flow trip is assumed for reactor protection, but that the low frequency and low voltage signals are assumed to trip the reactor coolant pumps. This situation is correctly described in the following statement on page 18 of the Surry Core Uprate SE:

"Of these, only the low reactor coolant flow reactor trip is assumed in the analysis. The low frequency and low voltage signals are not credited for reactor protection, but are assumed to trip the RCPs at their appropriate setpoints."

This section of the SE concludes with two points (items numbered (1) and (2)) concerning the electrical systems circuit design and modeling. We believe item (2) could be subject to future misinterpretation and seen to be inconsistent with the above statement simply due to the placement of the initial prepositional phrase "For

protection of the reactor, ..." Since this phrase is meant to be used to denote that the underfrequency/undervoltage conditions are not credited for reactor protection, it is recommended that the first sentence in item (2) be clarified as follows:

> "(2) Circuitry for tripping the RCPs, other devices, and/or the reactor on underfrequency/undervoltage conditions is not credited for reactor protection in the Surry Station accident analysis for the Loss of Reactor Coolant Flow Incident. . . . "

Item (2) continues as follows:

> ". . . The original licensing basis for the Surry Station, thus, did not require this circuitry to meet IEEE 279 criteria. The licensing basis following core uprate will continue not to require this circuitry to meet IEEE 279 criteria.
>
> The staff concludes that the proposed changes to the TS clarify licensing basis requirements that will continue to be applicable after core uprate. The changes do not alter current TS requirements and are, therefore, considered acceptable."

In summary, the explicit assumptions regarding actuation of the undervoltage and underfrequency circuits for the Loss of Flow analysis are as follows:

1. No credit is taken for undervoltage or underfrequency circuits in generating a reactor trip.

2. Credit is taken for undervoltage and underfrequency circuits in generating a reactor coolant pump trip. This assumption is reflected in the calculated flow coastdown profile. The design of these circuits does not fully meet IEEE 279 criteria.

This clarification of the description of circuits and associated modeling is consistent with the Surry Core Uprate Licensing Report and our February 27, 1995 letter. This clarification also precludes the potential misinterpretation of item (2) as being inconsistent with the above-mentioned statement from page 18 of the SE.

<u>Section 3.10.1 Radiological Consequences Analyses - Design Basis Accidents</u>

In the third paragraph, first sentence, it states that "The radiological analysis was based upon 105 percent of the uprated power. . . ". The correct value, as identified in Section 3.7.1 of the Surry Core Uprate Licensing Report, is 102 percent of uprated power.