July 8, 2005

Mr. David A. Christian
Senior Vice President and Chief Nuclear Officer
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

SUBJECT: NORTH ANNA POWER STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS ON REACTOR COOLANT SYSTEM PRESSURE AND TEMPERATURE LIMITS (TAC NOS. MC3705 AND MC3706)

Dear Mr. Christian:

The Commission has issued the enclosed Amendment Nos. 242 and 223 to Renewed Facility Operating License Nos. NPF-4 and NPF-7 for the North Anna Power Station, Unit Nos. 1 and 2, respectively. The amendments change the Technical Specifications (TS) in response to your letter dated July 1, 2004, as supplemented by letters dated October 28, 2004, and November 16, 2004.

These amendments revise the reactor coolant system pressure and temperature limits, low-temperature overpressure protection system (LTOPS) setpoint values, and LTOPS enable temperatures that are valid for 50.3 effective full-power years (EFPY) and 52.3 EFPY of operation for North Anna, Units 1 and 2, respectively.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

John Honcharik, Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-338 and 50-339

Enclosures:
1. Amendment No. 242 to NPF-4
2. Amendment No. 223 to NPF-7
3. Safety Evaluation

cc w/encls: See next page

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VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-338

NORTH ANNA POWER STATION, UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 242
Renewed License No. NPF-4

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Virginia Electric and Power Company et al., (the licensee) dated July 1, 2004, as supplemented by letters dated October 28, 2004, and November 16, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-4 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 242, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 6 months of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Evangelos C. Marinos, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 8, 2005

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-339

NORTH ANNA POWER STATION, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 223
Renewed License No. NPF-7

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Virginia Electric and Power Company et al., (the licensee) dated July 1, 2004, as supplemented by letters dated October 28, 2004, and November 16, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-7 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 223, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 6 months from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Evangelos C. Marinos, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 8, 2005

ATTACHMENT TO

LICENSE AMENDMENT NO. 242 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-4

AND

LICENSE AMENDMENT NO. 223 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-7

DOCKET NOS. 50-338 AND 50-339

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages as indicated. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

Remove Pages	Insert Pages
3.4.3-1	3.4.3-1
3.4.3-3	3.4.3-3
3.4.3-4	3.4.3-4
3.4.3-5	- - -
3.4.3-6	- - -
3.4.6-1	3.4.6-1
3.4.7-1	3.4.7-1
3.4.10-1	3.4.10-1
3.4.12-1	3.4.12-1
3.4.12-2	3.4.12-2
3.4.12-4	3.4.12-4

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO

AMENDMENT NO. 242 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-4

AND AMENDMENT NO. 223 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-7

VIRGINIA ELECTRIC AND POWER COMPANY

NORTH ANNA POWER STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-338 AND 50-339

1.0 INTRODUCTION

By letter dated July 1, 2004 [ADAMS Accession No. ML041950277], as supplemented by letters dated October 28, 2004 [ADAMS Accession No. ML043030072], and November 16, 2004 [ADAMS Accession No. ML043220062], Virginia Electric and Power Company (the licensee) submitted license amendments to change the North Anna Power Station, Units 1 and 2 Technical Specifications (TS). The proposed amendments would provide new reactor coolant system (RCS) pressure-temperature (P-T) limit curves, low-temperature overpressure protection system (LTOPS) setpoints, and LTOPS enable temperature (T_{enable}). The licensee revised the P-T limit curves to provide new limits that are valid to 50.3 effective full-power years (EFPY) and 52.3 EFPY for North Anna, Units 1 and 2, respectively, which include the periods of extended operation.

2.0 REGULATORY EVALUATION

The NRC has established requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 to protect the integrity of the reactor coolant pressure boundary in nuclear power plants. The NRC staff evaluates the P-T limit curves based on the following NRC regulations and guidance: 10 CFR Part 50, Appendix G; Generic Letter (GL) 88-11; GL 92-01, Revision 1; GL 92-01, Revision 1, Supplement 1; Regulatory Guide (RG) 1.99, Revision 2 (Rev. 2); and Standard Review Plan (SRP) Section 5.3.2. Appendix G to 10 CFR Part 50 requires that P-T limit curves and T_{enable} be at least as conservative as those obtained by applying the methodology of Appendix G to Section XI of the American Society of Mechanical Engineers (ASME) Code. Appendix G to 10 CFR Part 50 also provides minimum temperature requirements that must be considered in the development of the P-T limit curves. GL 88-11 advised licensees that the NRC staff would use RG 1.99, Rev. 2 “Radiation Embrittlement of Reactor Vessel Materials” to review P-T limit curves. RG 1.99, Rev. 2 contains methodologies for determining the increase in transition temperature and the decrease in upper-shelf energy resulting from neutron radiation. GL 92-01, Rev. 1 requested that licensees submit their reactor pressure vessel (RPV) materials property data for their plants to the NRC staff for review.

GL 92-01, Rev. 1, Supplement 1 requested that licensees provide and assess data from other licensees that could affect their RPV integrity evaluations. This data is used by the NRC staff as the basis for the review of P-T limit curves and T_{enable}.

SRP Section 5.3.2 provides an acceptable method of determining the P-T limit curves for ferritic materials in the beltline of the RPV based on the linear elastic fracture mechanics methodology of Appendix G to Section XI of the ASME Code. The basic parameter of this methodology is the stress intensity factor K_I, which is a function of the stress state and flaw configuration. ASME Code, Section XI, Appendix G requires a safety factor of 2.0 on stress intensities resulting from reactor pressure during normal and transient operating conditions, and a safety factor of 1.5 on these stress intensities for hydrostatic testing curves. The flaw postulated in the ASME Code, Section XI, Appendix G has a depth that is equal to 1/4 of the RPV beltline thickness and a length equal to 1.5 times the RPV beltline thickness. The critical locations in the RPV beltline region for calculating heatup and cooldown P-T limit curves are the 1/4 thickness (1/4T) and 3/4 thickness (3/4T) locations, which correspond to the maximum depth of the postulated inside surface and outside surface defects, respectively.

ASME Code Case N-641 allows the reference fracture toughness curve K_{Ic}, as found in Appendix A of Section XI of the ASME Code, to be used in lieu of the K_{Ia} reference fracture toughness curve in Appendix G of Section XI of the ASME Code for developing P-T limit curves. The K_{Ic} reference fracture toughness curve permits higher pressures (for a specified temperature) than the K_{Ia} reference fracture toughness curve. In the license amendment request, the licensee stated that it was invoking ASME Code Case N-641 as was performed for the current licensed P-T limit curves. Since the provisions of the ASME Code Case N-641 (which apply to P-T limit curve development) have been incorporated into the 1998 Edition of the ASME Code endorsed in 10 CFR 50.55a, an exemption to utilize Code Case N-641 is not required. In addition, RG 1.147, Revision 13, dated January 2004, identifies ASME Code Case N-641 as an acceptable Code case and allows licensees to use these acceptable ASME Code cases without a request for authorization by the NRC. The NRC staff's evaluation of the proposed P-T limit curves is, in part, based on the use of this Code case, and on the NRC staff's evaluation of the RPV neutron fluence (E > 1.0 MeV).

The methodology found in Appendix G to Section XI of the ASME Code requires that licensees determine the adjusted reference temperature (ART or adjusted RT_{NDT}) by evaluating material property changes due to neutron radiation. The ART is defined as the sum of the initial (unirradiated) reference temperature (initial RT_{NDT}), the mean value of the adjustment in reference temperature caused by irradiation (ΔRT_{NDT}) and a margin term. The ΔRT_{NDT} is a product of a chemistry factor (CF) and a fluence factor. The CF is dependent upon the amount of copper and nickel in the material and may be determined from tables in RG 1.99, Rev. 2, or from surveillance data. The fluence factor is dependent upon the neutron fluence at the maximum postulated flaw depth. The margin term is dependent upon whether the initial RT_{NDT} is a plant-specific or a generic value and whether the CF was determined using the tables in RG 1.99, Rev. 2, or surveillance data. The margin term is used to account for uncertainties in the values of the initial RT_{NDT}, the copper and nickel contents, the fluence, and the calculational procedures. RG 1.99, Rev. 2, describes the methodology to be used in calculating the margin term.

Section 50.61 of 10 CFR Part 50 defines RT_{PTS} as the reference temperature, RT_{NDT}, evaluated for the end-of-life fluence for each of the vessel beltline materials using the procedures in this

section. The pressurized thermal shock (PTS) screening criterion is defined as the value of RT_{PTS} for the vessel beltline material above which the plant cannot continue to operate without justification. The PTS screening criterion is 270EF for plates, forgings, and axial weld materials, and 300EF for circumferential weld materials. This section also specifies how the values of RT_{NDT} and RT_{PTS} are calculated.

RG 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," March 2001, provides the methods acceptable to the NRC staff for determining the pressure vessel fluence. The calculated fluence is used to determine RT_{NDT} and RT_{PTS} as specified in 10 CFR 50.61. The RG allows the use of the deterministic discrete ordinates method and the Monte Carlo transport method. The RG explains the proper conditions for the use of each calculation method. The RG also states that the uncertainty of the fluence calculations must be 20 percent (1σ) or less if the fluence will be used to determine RT_{NDT} and RT_{PTS} for complying with 10 CFR 50.61 and RG 1.99, Rev. 2.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Evaluation

The proposed P-T limit curves in the licensee's letter dated July 1, 2004, as supplemented by letters dated October 28, 2004, and November 16, 2004, are based on the current P-T limit curves that were approved for 32.3 EFPY for North Anna, Unit 1 and 34.3 EFPY for North Anna, Unit 2 in an NRC letter dated May 2, 2001 [ADAMS Accession No. ML011230549]. The current set of P-T limit curves used a conservative margin in the RT_{NDT} calculation that included the use of an RT_{NDT} value of 218.5EF (representative of 50.3 EFPY and 52.3 EFPY for North Anna, Units 1 and 2, respectively) for the 1/4T location in lieu of an RT_{NDT} value of 209.4EF (representative of 32.3 EFPY and 34.3 EFPY for North Anna, Units 1 and 2, respectively) for the 1/4T location. The licensee limited the current P-T curves to 32.3 EFPY and 34.3 EFPY because North Anna, Units 1 and 2 were not yet approved for the extended period of operation (50.3 EFPY and 52.3 EFPY for North Anna, Units 1 and 2, respectively).

NUREG-1766, dated December 2002 [ADAMS Accession No. ML023090559], which approved the extension of the operating period for both units, stated that the licensee will request an amendment to the TS to include revised P-T limit curves and LTOPS setpoints applicable to the period of extended operation, and that this request will be submitted for NRC review and approval prior to the expiration of the existing TS limits in order to remain in compliance with the requirements of 10 CFR Part 50, Appendix G. The licensee's letter dated July 1, 2004, as supplemented by letters dated October 28, 2004, and November 16, 2004, provides this submittal of the revised P-T limit curves for the extended period of operation. In its letter dated July 1, 2004, the licensee submitted modified P-T limit curves for the RCS to include pressure and temperature measurement uncertainties, the pressure differences between the point of measurement and the point of interest, and to extend their applicability to 50.3 EFPY for North Anna, Unit 1 and 52.3 EFPY for North Anna, Unit 2. In its letter dated November 16, 2004, the licensee clarified the maximum allowable cooldown rate of 100EF/hr used in developing the P-T limit curves in Figure 3.4.3-2 of the North Anna, Unit 1 and 2 TS.

Based on similarities in construction, materials, and operation of the two units, the licensee has made the proposed P-T limit curves, LTOPS setpoint values, and the T_{enable} values common for both units to provide consistent operational requirements. The licensee determined that the

limiting ART that bounds the RPVs of both units is from the North Anna, Unit 2 lower shell forging as stated in the licensee's license renewal application dated May 29, 2001 [ADAMS Accession No. ML011500496], and supplemental information for the license renewal application dated October 15, 2002 [ADAMS Accession No. ML022960411]. These submittals documented that the limiting 1/4T RT_{NDT} value of 218.5EF for the North Anna, Unit 2 lower shell forging heat number 990533/297355 is the bounding material for the extended period of operation for both units. The licensee also stated in its July 1, 2004, letter that reviews of the North Anna, Units 1 and 2 RPV integrity data continue to confirm the limiting material properties. The critical parameters for the licensee's ART determination for each of these locations are shown in the table below.

Material	Location	Initial RT_{NDT} (EF)	Fluence at Inside Surface (n/cm^2)	Fluence at Location (n/cm^2)	Chemistry Factor [(1)] (EF)	ΔRT_{NDT} (EF)	Margin [(2)] (EF)	ART (EF)
Lower Shell Forging 990533/ 297355	¼T	56	5.91×10^{19}	3.728×10^{19}	96	128.5	34 ($\sigma_I = 0$, $\sigma_\Delta = 17$)	218.5
Lower Shell Forging 990533/ 297355	¾T	56	5.91×10^{19}	1.483×10^{19}	96	105.6	34 ($\sigma_I = 0$, $\sigma_\Delta = 17$)	195.6

(1) No credible surveillance specimen test data is available for lower shell forging from the licensee's RPV surveillance program. Therefore, the chemistry factor for this forging was determined using RG 1.99, Rev. 2, Position 1.1.

(2) The margin term for each ART calculation was based on the establishment of initial material property uncertainty (σ_I) and shift in material property uncertainty (σ_Δ) consistent with the guidance in RG 1.99, Rev. 2.

The TS changes submitted by the July 1, 2004 letter, as supplemented by letters dated October 28, 2004, and November 16, 2004, include:

A. Modified RCS P-T limit curves to include pressure and temperature measurement uncertainty, as well as pressure differences between the point of measurement (RCS hot leg) and point of interest (RPV beltline).

B. P-T limit curves extended to 50.3 EFPY for North Anna, Unit 1 and 52.3 EFPY for North Anna, Unit 2.

C. LTOPS setpoints and LTOPS T_{enable} values to reflect the extended period using methodologies identical to those used for the approved current license.

D. Common TS P-T limit curves, LTOPS setpoint allowable values, and T_{enable} values for both units to provide consistent operational requirements.

E. Increase in the administrative cooldown rate limit from 50EF/hr to 75EF/hr.

3.2 Staff's Evaluation

3.2.1 Neutron Fluence

The licensee has a plant-specific vessel fluence methodology as shown in VEP-NAF-3A, "Reactor Vessel Fluence Analysis Methodology," November 1997, which was approved by the NRC staff by letter dated April 13, 1999 [ADAMS Accession No. 9904160216]. This methodology was approved before the issuance of RG 1.190. However, in the licensee's letter dated October 28, 2004, the licensee provided additional information and a detailed comparison of the attributes of the licensee's vessel fluence methodology in VEP-NAP-3A and the corresponding guidance in RG 1.190. The NRC staff review of this information indicates that the licensee's methodology followed the guidance of Draft Guide 1035, the technical contents of which did not change upon the issuance of RG 1.190 . Therefore, the NRC staff finds the bounding fluence value of 5.91×10^{19} n/cm^2 for the limiting material, lower shell forging heat number 990533/297355, cited by the licensee, acceptable for 50.3 EFPY and 52.3 EFPY for North Anna, Units 1 and 2, respectively. Therefore, this fluence value is acceptable for the purposes of developing P-T limit curves and calculating RT_{PTS} values.

The licensee demonstrated that the limiting material (North Anna, Unit 2 lower shell forging heat number 990533/297355) bounds both units' RPVs and will attain an RT_{PTS} value of 227.5EF. This RT_{PTS} value of 227.5EF was verified by the NRC staff and found acceptable by the NRC as outlined in the NRC staff's safety evaluation report, NUREG-1766, dated December 2002, for the extended period of operation since it is below the 10 CFR 50.61 screening criterion value of 270EF.

3.2.2 ART Value and P-T Limit Curves

To assess the validity of the licensee's proposed curves, the NRC staff performed an independent assessment of the licensee's submittal. The NRC staff first performed an independent calculation of the ART values for the limiting material using the methodology in RG 1.99, Revision 2. Based on these calculations, the NRC staff verified that the licensee's limiting material for both RPVs is the North Anna, Unit 2 lower shell forging heat number 990533/297355. The NRC staff's calculated ART values of 218.7EF at 1/4T and 196.5EF for the 3/4T location for the limiting material, using information in the NRC Reactor Vessel Integrity Database, was in good agreement with the licensee's calculated ART value of 218.5EF and 195.6EF for the 1/4T location and the 3/4T location, respectively.

The NRC staff then evaluated the licensee's P-T limit curves for acceptability by performing independent calculations using the methodologies of Appendix G of Section XI of the ASME Code and 10 CFR Part 50, Appendix G as modified by the methodology of ASME Code Case N-641. The licensee stated that the proposed P-T limit curves were based on the elements of Code Case N-641, which permit the use of an alternate reference fracture toughness (K_{IC}) curve instead of the K_{Ia} fracture toughness curve for RPV materials in determining the P-T limit curves. It should be noted that this is the same methodology that was used for the current P-T limit curves. The use of the K_{IC} fracture toughness curve is appropriate for evaluating the potential for crack initiation without imposing unnecessary conservatism. The K_{IC} curve appropriately implements the use of static initiation fracture toughness behavior to evaluate the controlled heatup and cooldown process of an RPV. The NRC staff concluded that P-T limit

curves based on the K_{IC} fracture toughness curve referenced by ASME Code Case N-641 will enhance overall plant safety by opening the P-T operating window with the greatest net safety benefit in the region of low-temperature operation. In addition, implementation of the proposed P-T limit curves, as allowed by ASME Code Case N-641, maintains appropriate margins of safety against brittle failure of the RPV as required by Appendix G to 10 CFR Part 50.

The NRC staff also compared the information concerning the unadjusted P-T limit curves submitted by the licensee in its July 1, 2004, letter and found it consistent with the information previously approved by the May 2, 2001, letter. The proposed P-T limit curves in the licensee's July 1, 2004, letter modified the unadjusted P-T limit curves by including margins to account for temperature instrument errors (13.5EF), pressure instrument errors (70 psi), and for pressure differences between the point of measurement (RCS hot leg) and the RPV beltline (57 psi). The NRC staff also found that the minimum temperature requirements of Table 1 of Appendix G to 10 CFR Part 50 were properly implemented in the P-T limit curves. Therefore, the NRC staff verified that the licensee's proposed P-T limit methodology is in accordance with Appendix G to Section XI of the ASME Code, and the proposed P-T limits satisfy the requirements of Appendix G to 10 CFR Part 50.

Concerning the increase in the administrative cooldown rate limit from 50EF/hr to 75EF/hr, which is related to the operator's ability to control cooldown rates, the licensee states that this new limit is still within the maximum allowable RCS cooldown rate of 100EF/hr used in the development of the P-T limit curves. In addition, the licensee has determined that this increase continues to provide adequate margin (within 25EF/hr) to accommodate small unanticipated changes in cooldown rate due to short duration temperature changes of limited magnitude. Since this is an administrative limit on the cooldown rate and is still within the limits proposed by the P-T limits curves, the NRC staff has no objection to the licensee's proposed administrative change.

3.2.3 LTOPS Setpoint and T_{enable} Values

The LTOPS ensures that the RCS material integrity limits are not exceeded during design-basis accidents. The LTOPS setpoints are the pressures at which the PORVs will lift when the LTOPS is enabled to limit the peak RCS pressure within the acceptable limits during a pressurization transient. The licensee stated that the readjustments of the current RCS P-T limit curves, LTOPS setpoints, and LTOPS T_{enable} values proposed in this license amendment are performed in accordance with the ASME Code, Section XI and ASME Code Case N-641. To develop the proposed TS to be valid for 50.3 EFPY and 52.3 EFPY for North Anna, Units 1 and 2, respectively, the corresponding 1/4T RT_{NDT} value of 218.5EF is taken into account for the calculation of the pressure overshoot during the mass addition transient. Pressure and temperature instrument measurement uncertainties are taken into account, and the pressure differences between the point of measurement (RCS hot leg) and point of interest (RPV beltline) is added as a bias, as discussed below.

The pressure measurement uncertainty (channel statistical accuracy (CSA)) for the P-T limits is derived from the wide-range instrument, which includes the indication uncertainty for the 0 to 3000 psi range, which is calculated to be 2.336 percent or 70 psi. The wide-range pressure measurement uncertainty is accounted for in the RCS hot leg pressure.

The wide-range temperature measurement uncertainty (CSA) is calculated to be 1.93 percent or 13.5EF for the range of 0 to 700EF. This temperature is measured in the cold leg and is an input to the LTOPS T_{enable} calculation. In addition, the pressure difference between the point of measurement (RCS hot leg) and point of interest (RPV beltline) is estimated to be 57 psi and is the bounding value for either one, two, or three reactor coolant pump operation. The 57 psi is used as a bias in estimating the RPV beltline region pressure.

The NRC staff has determined that the T_{enable} value of 280EF for both units proposed in the license amendment application is more conservative than those permitted by ASME Code Case N-641 and thus is acceptable. In addition, the LTOPS setpoints of 540 psig at 280EF and 375 psig at 180EF for the two pressurizer power-operated relief valves accounted for the applicable instrument measurement uncertainties and are therefore acceptable. The NRC staff also finds that the methodology used in the adjustment of the calculated P-T limits to obtain the actual P-T limits applicable for 50.3 EFPY and 52.3 EFPY for North Anna, Units 1 and 2, respectively, accounted for instrument measurement uncertainties and therefore is acceptable.

The NRC staff concludes that the proposed P-T limits curves, and T_{enable} for North Anna, Units 1 and 2 satisfy the requirements in Appendix G to 10 CFR Part 50 and Appendix G to Section XI of the ASME Code, as modified by Code Case N-641. The proposed P-T limit curves and T_{enable} also satisfy GL 88-11,because the methodology in RG 1.99, Rev. 2 was used to calculate the ART. Hence, the proposed P-T limit curves are approved for incorporation into the North Anna, Units 1 and 2 TS and are valid through 50.3 EFPY and 52.3 EFPY for North Anna, Units 1 and 2, respectively, which include the periods of extended operation.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Virginia State official was notified of the proposed issuance of the amendment. The state official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

These amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (69 FR 53114). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: J. Honcharik
L. Lambros

Date: July 8, 2005

North Anna Power Station, Units 1 & 2

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