October 30, 1998

Mr. J. P. O'Hanlon
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

SUBJECT: NORTH ANNA POWER STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS - STARTUP OF ISOLATED LOOP BY BACKFILL (TAC NOS. M97187 AND M97188)

Dear Mr. O'Hanlon:

The Commission has issued the enclosed Amendment Nos. 215 and 196 to Facility Operating License Nos. NPF-4 and NPF-7 for the North Anna Power Station, Units No. 1 and No. 2. The amendments revise the Technical Specifications (TS) in response to your letter dated November 6, 1996, as supplemented April 15, July 14, and October 16, 1998.

The amendments address changes that modify the requirements for isolated loop startup to permit filling of a drained isolated loop via backfill from the Reactor Coolant System through partially opened loop stop valves.

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,

ORIGINAL SIGNED BY:

Nageswaran Kalyanam, Project Manager
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-338 and 50-339

DF01

Enclosures:
1. Amendment No. 215 to NPF-4
2. Amendment No. 196 to NPF-7
3. Safety Evaluation

cc w/enclosures: See next page

Distribution: See next page

FILENAME - G:\NOANNA\M97187-8.AMN

OFFICE	PM:PDII-1	LA:PDII-1	D:PDII-1	DSSA:SRXB	OGC
NAME	NKalyanam	EDunnington	PTKuo	EWeiss	RBachmann
DATE	09/ /98	09/ 17/98	09/ /98	09/ /98	09/22/98
COPY	YES / NO	YES / NO	YES / NO	YES / NO	YES / NO

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 30, 1998

Mr. J. P. O'Hanlon
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

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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,

Nageswaran Kalyanam, Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-338 and 50-339

Enclosures:
1. Amendment No. 215 to NPF-4
2. Amendment No. 196 to NPF-7
3. Safety Evaluation

cc w/enclosures: See next page

Mr. J. P. O'Hanlon
Virginia Electric & Power Company

North Anna Power Station
Units 1 and 2

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Virginia Department cf Health
P.O. Box 2448
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DATED: October 30, 1998

AMENDMENT NO. 215 TO FACILITY OPERATING LICENSE NO. NPF-4 - NORTH ANNA POWER STATION UNIT 1
AMENDMENT NO. 196 TO FACILITY OPERATING LICENSE NO. NPF-7 - NORTH ANNA POWER STATION UNIT 2

Docket File
PUBLIC
PDII-1 RF
J. Zwolinski
T. Harris (E. Mail SE only)
OGC
G. Hill (4)
ACRS
G. Tracy
L. Plisco, RII
E. Weiss
C. Jackson
S. Mazumdar

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-338

NORTH ANNA POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 215
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, (the licensee), dated November 6, 1996, as supplemented April 15, July 14, and October 16, 1998, 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.D.(2) of Facility Operating License No. NPF-4 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 215 , 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 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 30, 1998

ATTACHMENT TO LICENSE AMENDMENT NO. 215

TO FACILITY OPERATING LICENSE NO. NPF-4

DOCKET NO. 50-338

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

Remove Pages	Insert Pages
3/4 4-4	3/4 4-4
3/4 4-5	3/4 4-5
---	3/4 4-5a
---	3/4 4-5b
---	B 3/4 4-1a
B 3/4 4-2	B 3/4 4-2

ISOLATED LOOP

LIMITING CONDITION FOR OPERATION

3.4.1.4 The boron concentration of an isolated loop shall be maintained greater than or equal to the boron concentration of the operating loops, unless the loop has been drained for maintenance.

APPLICABILITY: MODES 3, 4 and 5.

ACTION:

With the requirements of the above specification not satisfied, do not open the isolated loop's stop valves; either increase the boron concentration of the isolated loop to within the limits within 4 hours or borate the unisolated portion of the RCS to a SHUTDOWN MARGIN equivalent to at least 1.77% $\Delta k/k$ at 200°F within the next 6 hours.

SURVEILLANCE REQUIREMENTS

4.4.1.4 The boron concentration of an isolated, undrained loop shall be determined to be greater than or equal to the boron concentration of the operating loops at least once per 24 hours and within 30 minutes prior to opening either the hot leg or cold leg stop valves of an isolated loop.

LIMITING CONDITION FOR OPERATION

3.4.1.5 A reactor coolant loop cold leg stop valve on an undrained loop shall remain closed with A.C. power removed and its breaker locked open* unless:

a. The isolated loop has been operating on a recirculation flow of greater than or equal to 125 gpm for at least 90 minutes and the temperature at the cold leg of the isolated loop is within 20°F of the highest cold leg temperature of the operating loops, and

b. The reactor is subcritical by at least 1.77 percent Δk/k, or

c. The loop is being backfilled in accordance with Specification 3.4.1.6.

APPLICABILITY: MODES 3, 4, 5 and 6.

ACTION:

With the requirements of the above specification not satisfied, suspend startup of the isolated loop. A.C. power shall be removed from the valve and the breaker locked open within 2 hours.

SURVEILLANCE REQUIREMENTS

4.4.1.5.1 The isolated loop cold leg temperature shall be determined to be within 20°F of the highest cold leg temperature of the operating loops within 30 minutes prior to opening the cold leg stop valve.

4.4.1.5.2 The reactor shall be determined to be subcritical by at least 1.77 percent Δk/k within 30 minutes prior to opening the cold leg stop valve.

---

* A cold leg stop valve in a reactor coolant loop may be closed for up to two hours for valve maintenance or testing. If the stop valve is not opened within two hours, A.C. power shall be removed from the valve and the breaker locked open.

LIMITING CONDITION FOR OPERATION

3.4.1.6 Whenever a reactor coolant loop is isolated and drained, A.C. power shall be removed from the loop stop valves and the associated breakers locked open.

a. The valves may be energized and/or opened to fill the loop from the active volume of the Reactor Coolant System, once the following conditions are met:

   1. The isolated loop shall be drained.

   2. Pressurizer water volume shall be at least 450 cubic feet.

   3. A source range neutron flux monitor shall be operable.

b. During backfilling of the isolated loop,

   1. Pressurizer water volume shall be maintained at or above 450 cubic feet.

   2. The source range neutron flux count rate shall be no more than a factor of 2 above the initial count rate.

   3. The hot and cold leg stop valves shall be fully opened within 2 hours after the backfill of the isolated loop has been completed.

APPLICABILITY: MODES 5 and 6.

ACTION:

a. If the isolated loop is not drained then it must be fully drained before initiating backfilling.

b. If the pressurizer water volume is not maintained at 450 cubic feet or greater, then the loop stop valves on the loop being backfilled shall be closed, A.C. power shall be removed from the loop stop valves and the breakers locked open.

c. If the loop stop valves are not fully open within 2 hours after the loop is filled, then the loop shall be isolated and drained or apply Specification 3.4.1.4 and 3.4.1.5.

d. If the source range count rate increases by a factor of two over the initial count rate, then the hot and cold leg loop stop valves shall be reclosed, power removed from the breakers and the breakers locked open. No attempt shall be made to reopen the loop stop valves until the reason for the count rate increase has been determined.

SURVEILLANCE REQUIREMENTS

4.4.1.6.1 The isolated loop shall be verified drained within 2 hours prior to opening the loop stop valve for backfilling the loop from the RCS.

4.4.1.6.2 The pressurizer water volume shall be verified to be ≥ 450 cubic feet at least once per 15 minutes during filling of the isolated loop.

4.4.1.6.3 The source range neutron flux monitor shall be demonstrated OPERABLE by performance of:

a. A CHANNEL FUNCTIONAL TEST within 8 hours prior to commencing isolated loop backfill, and

b. A CHANNEL CHECK at least once per 15 minutes during backfilling of an isolated loop.

within 20°F of the operating loops. Making the reactor subcritical prior to loop startup prevents any power spike which could result from this cool water induced reactivity transient.

An initially isolated and drained reactor coolant loop may be returned to service by partially opening the loop stop valves and filling the loop in a controlled manner from the Reactor Coolant System. Prior to partially opening the loop stop valves, the following measures are required to ensure no sudden positive reactivity addition or loss of Reactor Coolant System inventory occurs:

a) The isolated loop is verified to be drained, thus preventing the dilution of Reactor Coolant System boron concentration by liquid present in the loop.

b) Pressurizer level is verified to be greater than or equal to 450 cubic feet to ensure Reactor Coolant System inventory is maintained for decay heat removal. Pressurizer level is required to be maintained greater than or equal to 450 cubic feet during the backfill evolution. In addition, the backfill evolution is limited to one isolated loop at a time.

c) A source range neutron flux monitor channel is required to be monitored to detect any unexpected positive reactivity addition due to an inadvertent mismatch between RCS and blended makeup concentration.

After an initially drained loop is filled from the Reactor Coolant System by partially opening the loop stop valves, the loop is no longer considered to be isolated. Thus, the requirements for returning an isolated and filled loop to service are not applicable and the loop stop valves may be fully opened without restriction within two hours of completing the loop backfill evolution.

The initial pressurizer level requirement has been established such that, even if the stop valves are suddenly opened on all three loops with all of them drained, one of them under vacuum and no makeup available, the Reactor Coolant System water level will not drop below the middle of the reactor vessel nozzles. This ensures continued adequate suction conditions for the residual heat removal pumps.

The safety analysis assumes a minimum shutdown margin as an initial condition. Violation of the limiting conditions for loop stop valve operation could result in the shutdown margin being reduced to less than that assumed in the safety analysis. In addition, violation of the limiting conditions could cause a loss of shutdown decay heat removal.

3/4.4.2 AND 3/4.4.3 SAFETY AND RELIEF VALVES

The pressurizer code safety valves operate to prevent the RCS from being pressurized above its Safety Limit of 2735 psig. Each safety valve is designed to relieve 380,000 lbs per hour of saturated steam at the valve set point. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during hot shutdown. In the event that no safety valves are OPERABLE, an operating RHR loop, connected to the RCS, or the power operated relief valves (PORVs) will provide overpressure relief capability and will prevent RCS overpressurization.

During operation, all pressurizer code safety valves must be OPERABLE to prevent the RCS from being pressurized above its safety limit of 2735 psig. The combined relief capacity of all of these valves is greater than the maximum surge rate resulting from a complete loss of load assuming no reactor trip until the first Reactor Protective System trip setpoint is reached (i.e., no credit is taken for a direct reactor trip on the loss of load) and also assuming no operation of the power operated relief valves or steam dump valves.

Demonstration of the safety valves' lift settings will occur only during shutdown and will be performed in accordance with the provisions of Section XI of the ASME Boiler and Pressure Vessel Code.

The safety valve tolerance requirement for Modes 1-3 is expressed as an average value. That is, the as-found error (expressed as a positive or negative percentage) of each tested safety valve is summed and divided by the number of valves tested. This average as-found value is compared to the acceptable range of + 2% to - 3%. In addition, no single valve is allowed to be outside of ± 3%.

An average tolerance of + 2% / - 3% was confirmed to be adequate for Modes 1-3 accident analyses. For the overpressure events, the analyses considered several combinations of valve tolerance with the arithmetic average of the three valves' tolerance equal to + 2% (with no valve outside of ± 3%). The case of a + 2% tolerance on each of the three valves provided the most limiting results. The - 3% tolerance is limiting for the DNB acceptance criterion.

The power operated relief valves and steam bubble function to relieve RCS pressure during all design transients up to and including the design step load decrease with steam dump. Operation of the power operated relief valves minimizes the undesirable opening of the spring-loaded pressurizer code safety valves. Each PORV has a remotely operated block valve to provide a positive shutoff capability should a relief valve become inoperable.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-339

NORTH ANNA POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 196
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, (the licensee), dated November 6, 1996, as supplemented April 15, July 14, and October 16, 1998, 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.D.(2) of Facility Operating License No. NPF-7 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 196 , 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 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 30, 1998

ATTACHMENT TO LICENSE AMENDMENT NO. 196

TO FACILITY OPERATING LICENSE NO. NPF-7

DOCKET NO. 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 area of change.

Corresponding overleaf page 3/4 4-3a is also provided to maintain document completeness.

Remove Pages	Insert Pages
3/4 4-4	3/4 4-4
3/4 4-5	3/4 4-5
---	3/4 4-5a
---	3/4 4-5b
---	B 3/4 4-1a

SURVEILLANCE REQUIREMENTS

4.4.1.3.1 The required RHR subsystems shall be demonstrated OPERABLE per Specification 4.7.9.2.

4.4.1.3.2 The required reactor coolant pump(s), if not in operation, shall be determined to be OPERABLE once per 7 days by verifying correct breaker alignments and indicated power availability.

4.4.1.3.3 The required steam generator(s) shall be determined OPERABLE by verifying secondary side water level to be greater than or equal to 17% at least once per 12 hours.

4.4.1.3.4 At least once per 12 hours, verify at least one coolant loop to be in operation and circulating reactor coolant by:

a. Verifying at least one Reactor Coolant Pump is in operation.

   or

b. Verifying at least one RHR Loop is in operation and,

   1. if the RCS temperature > 140°F or the time since entry into MODE 3 is < 100 hours, circulating reactor coolant at a flow rate ≥ 3000 gpm.

      or

   2. if the RCS temperature ≤ 140°F and the time since entry into MODE 3 is ≥ 100 hours, circulating reactor coolant at a flow rate ≥ 2000 gpm to remove decay heat.

ISOLATED LOOP

LIMITING CONDITION FOR OPERATION

3.4.1.4 The boron concentration of an isolated loop shall be maintained greater than or equal to the boron concentration of the operating loops, unless the loop has been drained for maintenance.

APPLICABILITY: MODES 3, 4 and 5.

ACTION:

With the requirements of the above specification not satisfied, do not open the isolated loop's stop valves; either increase the boron concentration of the isolated loop to within the limits within 4 hours or borate the unisolated portion of the RCS to a SHUTDOWN MARGIN equivalent to at least 1.77% $\Delta k/k$ at 200°F within the next 6 hours.

SURVEILLANCE REQUIREMENTS

4.4.1.4 The boron concentration of an isolated, undrained loop shall be determined to be greater than or equal to the boron concentration of the operating loops at least once per 24 hours and within 30 minutes prior to opening either the hot leg or cold leg stop valves of an isolated loop.

ISOLATED LOOP STARTUP - FILLED

LIMITING CONDITION FOR OPERATION

3.4.1.5 A reactor coolant loop cold leg stop valve on an undrained loop shall remain closed with A.C. power removed and its breaker locked open* unless:

a. The isolated loop has been operating on a recirculation flow greater than or equal to 125 gpm for at least 90 minutes and the temperature at the cold leg of the isolated loop is within 20°F of the highest cold leg temperature of the operating loops, and

b. The reactor is subcritical by at least 1.77 percent $\Delta k/k$, or

c. The loop is being backfilled in accordance with Specification 3.4.1.6.

APPLICABILITY: MODES 3, 4, 5 and 6.

ACTION:

With the requirements of the above specification not satisfied, suspend startup of the isolated loop. A.C. power shall be removed from the valve and the breaker locked open within 2 hours.

SURVEILLANCE REQUIREMENTS

4.4.1.5.1 The isolated loop cold leg temperature shall be determined to be within 20°F of the highest cold leg temperature of the operating loops within 30 minutes prior to opening the cold leg stop valve.

4.4.1.5.2 The reactor shall be determined to be subcritical by at least 1.77 percent $\Delta k/k$ within 30 minutes prior to opening the cold leg stop valve.

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* A cold leg stop valve in a reactor coolant loop may be closed for up to two hours for valve maintenance or testing. If the stop valve is not opened within two hours, A.C. power shall be removed from the valve and the breaker locked open.

LIMITING CONDITION FOR OPERATION

3.4.1.6 Whenever a reactor coolant loop is isolated and drained, A.C. power shall be removed from the loop stop valves and the associated breakers locked open.

a. The valves may be energized and/or opened to fill the loop from the active volume of the Reactor Coolant System, once the following conditions are met:

   1. The isolated loop shall be drained.

   2. Pressurizer water volume shall be at least 450 cubic feet.

   3. A source range neutron flux monitor shall be operable.

b. During backfilling of the isolated loop,

   1. Pressurizer water volume shall be maintained at or above 450 cubic feet.

   2. The source range neutron flux count rate shall be no more than a factor of 2 above the initial count rate.

   3. The hot and cold leg stop valves shall be fully opened within 2 hours after the backfill of the isolated loop has been completed.

APPLICABILITY: MODES 5 and 6.

ACTION:

a. If the isolated loop is not drained then it must be fully drained before initiating backfilling.

b. If the pressurizer water volume is not maintained at 450 cubic feet or greater, then the loop stop valves on the loop being backfilled shall be closed, A.C. power shall be removed from the loop stop valves and the breakers locked open.

c. If the loop stop valves are not fully open within 2 hours after the loop is filled, then the loop shall be isolated and drained or apply Specification 3.4.1.4 and 3.4.1.5.

d. If the source range count rate increases by a factor of two over the initial count rate, then the hot and cold leg loop stop valves shall be reclosed, power removed from the breakers and the breakers locked open. No attempt shall be made to reopen the loop stop valves until the reason for the count rate increase has been determined.

SURVEILLANCE REQUIREMENTS

4.4.1.6.1 The isolated loop shall be verified drained within 2 hours prior to opening the loop stop valve for backfilling the loop from the RCS.

4.4.1.6.2 The pressurizer water volume shall be verified to be ≥ 450 cubic feet at least once per 15 minutes during filling of the isolated loop.

4.4.1.6.3 The source range neutron flux monitor shall be demonstrated OPERABLE by performance of:

a. A CHANNEL FUNCTIONAL TEST within 8 hours prior to commencing isolated loop backfill, and

b. A CHANNEL CHECK at least once per 15 minutes during backfilling of an isolated loop.

An initially isolated and drained reactor coolant loop may be returned to service by partially opening the loop stop valves and filling the loop in a controlled manner from the Reactor Coolant System. Prior to partially opening the loop stop valves, the following measures are required to ensure no sudden positive reactivity addition or loss of Reactor Coolant System inventory occurs:

a) The isolated loop is verified to be drained, thus preventing the dilution of Reactor Coolant System boron concentration by liquid present in the loop.

b) Pressurizer level is verified to be greater than or equal to 450 cubic feet to ensure Reactor Coolant System inventory is maintained for decay heat removal. Pressurizer level is required to be maintained greater than or equal to 450 cubic feet during the backfill evolution. In addition, the backfill evolution is limited to one isolated loop at a time.

c) A source range neutron flux monitor channel is required to be monitored to detect any unexpected positive reactivity addition due to an inadvertent mismatch between RCS and blended makeup concentration.

After an initially drained loop is filled from the Reactor Coolant System by partially opening the loop stop valves, the loop is no longer considered to be isolated. Thus, the requirements for returning an isolated and filled loop to service are not applicable and the loop stop valves may be fully opened without restriction within two hours of completing the loop backfill evolution.

The initial pressurizer level requirement has been established such that, even if the stop valves are suddenly opened on all three loops with all of them drained, one of them under vacuum and no makeup available, the Reactor Coolant System water level will not drop below the middle of the reactor vessel nozzles. This ensures continued adequate suction conditions for the residual heat removal pumps.

The safety analysis assumes a minimum shutdown margin as an initial condition. Violation of the limiting conditions for loop stop valve operation could result in the shutdown margin being reduced to less than that assumed in the safety analysis. In addition, violation of the limiting conditions could cause a loss of shutdown decay heat removal.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 215 AND 196 TO

FACILITY OPERATING LICENSE NOS. NPF-4 AND NPF-7

VIRGINIA ELECTRIC AND POWER COMPANY

NORTH ANNA POWER STATION, UNIT NO. 1 AND NO. 2

DOCKET NOS. 50-338 AND 50-339

1.0 INTRODUCTION

By letter dated November 6, 1996 the Virginia Electric and Power Company, the licensee for the North Anna Power Station, proposed changes to the plant technical specifications (TS). Additional information was provided by letters dated April 15, July 14, and October 16, 1998. The requested changes included: (1) the modification of the existing TS addressing reactor coolant system (RCS) loop stop valve operation and (2) adding an additional TS that allows RCS loop stop valve operation with the associated isolated portion of the RCS drained. The existing TS relating to loop stop valve operation prohibits operation of the loop stop valves when the associated loops are not full. The Westinghouse Standard Technical Specifications do not address or permit this particular evolution. The Pressurized Water Reactor (PWR) Section of the Reactor Systems Branch (SRXB), with the help of the Instrumentation and Controls Branch (HICB), has reviewed the submittals and the TS changes and concluded that the changes to the TS and licensing basis are acceptable.

2.0 BACKGROUND

The original North Anna design and was intended to allow power operation with one of the reactor coolant loops isolated from the RCS. This configuration has never been permitted at North Anna and is now prohibited by the TS. As a result, the TS that currently address loop stop valve operation while at power or in startup (modes 1 and 2) are no longer necessary because TS 3.4.1.1 requires all three loops in service and power removed from the open stop valves during these modes. The original design basis requires that a loop be filled with the reactor coolant pump (RCP) having been operated with a flow of greater than 125 gpm for at least 90 minutes prior to opening a loop stop valve. Additionally, the specification requires that the temperature and boron concentration of the isolated portion of the loop be sampled frequently prior to putting an isolated loop into service. These restrictions are necessary to assure there are no boron dilution or temperature excursions when the filled loop is unisolated. However, if the loops are drained, all of these restrictions are not necessary. A new specification has been added to allow loop stop valve operation with drained loops in cold shutdown and in refueling (modes 5 and 6). With a drained loop, there is no possibility of diluted water from the isolated loop entering the reactor. Additionally, the potential for a volume of cold water from the isolated loop entering the reactor is also not possible. If the loops are not

drained, the modified TS continue to require that all of the same current restrictions are maintained, regardless of the mode of operation. The new specification does require the removal of some of the loop stop valve interlocks; however, these restrictions will continue to be maintained administratively in the TS.

Although allowing the opening of a loop stop valve with the loop drained and the removal of the interlocks preventing this is not addressed in the Westinghouse standard TS, a similar specification was approved by the staff in April of 1993 for the Surry Nuclear Power Station.

The benefit of this new specification is that it prevents the necessity of always requiring 90 minutes of relief line flow using the RCPs and reduces the number of RCP starts necessary to unisolate a loop. This increases the useful life of the RCPs and speeds up the startup process.

3.0 EVALUATION

Opening the loop stop valves in a drained loop in modes 5 and 6 is acceptable because the licensee has addressed the safety issues associated with the evolution. The new TS 3.4.1.6 limits the evolution to modes 5 and 6. This bounds the temperature extremes where the evolution can occur and requires a minimum amount of shutdown margin. The licensee performed an evaluation to show that, if the evolution occurs at the temperature extremes permitted by the specification, the temperature excursions are acceptable. For a colder secondary side than primary side, the reactivity addition associated with the cooldown was found to be acceptable (see below). Additionally, when the primary system is colder than the secondary system, the heatup was evaluated and verified to be acceptable. The expansion of the RCS due to the heatup will not cause an unacceptable system pressure transient and the expansion rate is well within the capacity of both one pressurizer power-operated relief valve and one residual heat removal (RHR) relief valve.

TS 3.4.1.6.a.1 will require that the loops be drained and verified drained prior to opening a stop valve and this will prevent a boron dilution from occurring and causing a reactivity excursion. Additionally, a calculation performed by the licensee indicated the worst possible temperature change that could occur as a result of opening the isolation valves will not cause a significant reactivity excursion. The calculated reactivity change caused by the temperature change is less than one half the minimum shutdown margin required by the TS for these modes. Additionally, TS 3.4.1.6.a.3 requires the source range instrumentation to be operable and monitored to provide some assurance that, even if a reactivity excursion occurs, it will be identified and mitigated.

The controls in TS 3.4.1.6 include the requirement to maintain a water volume of 450 ft^3 in the pressurizer prior to and during the loop filling. This amount of water is sufficient to maintain an adequate RHR suction source even if all three RCS loops were opened simultaneously. The value of 450 ft^3 ensures that there continues to be a good deal of margin if all three loops are opened simultaneously with one of the three loops at a vacuum. The licensee has evaluated the instrument uncertainty associated with the safety-related pressurizer level instrumentation that will be used to verify that the TS-required volume in the pressurizer is sufficient. The 450 ft^3 in the TS includes sufficient margin to account for the instrument uncertainties associated with the hot-calibrated channel adjusted for cold conditions with

considerable margin. The analysis to support volume of 450 ft^3 is conservative because the TS bases allow the backfill evolution in a controlled manner to one isolated loop at a time, while the analysis is performed assuming that all three loops are fully opened at once. Therefore the volume of 450 ft^3 is acceptable. The backfill evolution should not reduce inventory sufficiently to challenge RHR cooling and is acceptable.

The portion of the loop isolation valve interlocks that deals with the temperature and relief line flow will be eliminated. These interlocks are not required while operating the isolation valve in a drained loop. However, Specification 3.4.1.5 and the associated operating procedures retain the restrictions previously imposed by the interlocks for the case of restoring a filled and isolated loop in a controlled manner such that the potential for inadvertant criticality during restoration of a filled, isolated loop has not increased.

The requirements in the TS and the administrative controls are acceptable for these applications and the elimination of those portions of the interlocks is acceptable.

4.0 TS Changes

Each TS was individually reviewed and found to be acceptable. A summary of the changes and justifications are provided below.

TS 3.4.1.4

The specification has been modified to change the modes of applicability of the isolated loop specification from all modes to modes 3, 4, 5, and 6. The modes of applicability modification is acceptable because the TS do not permit mode 1 or 2 operation with loops isolated. As a result, the specification is not applicable in modes 1 and 2 and the change is acceptable.

The references to the boron sampling of an isolated loop were modified to require boron sampling of an isolated undrained loop. It is not necessary to sample the boron concentration in a drained loop and, as a result, this change is acceptable.

TS 3.4.1.5

The specification has been modified to change the modes of applicability of the isolated loop specification from all modes to modes 3, 4, 5, and 6. The modes of applicability modification is acceptable because the TS do not permit mode 1 or 2 operation with loops isolated. As a result, the specification is not applicable in modes 1 and 2 and the change is acceptable.

The specification is also being changed to only apply when the loops are not drained. This is acceptable because a new specification TS 3.4.1.6 is being added to address loop startup while drained. Additionally, the specification is being modified to require that an isolated loop have the A.C. power removed and the breaker locked open for the associated loop stop valves. This prevents inadvertent operation of the isolation valves and is acceptable. A note has been added to allow the valve to be closed for 2 hours for maintenance or testing without power being removed and the breaker being locked open. Two hours is acceptable to perform maintenance and testing with power to the valves. As a result, the specification is acceptable.

TS 3.4.1.6

This specification has been added to allow opening a loop stop valve with the associated loop being drained. The new specification is acceptable because sufficient controls are in place to assure the filling of the isolated loop is performed safely. The controls in TS 3.4.1.6 include the verification of the loop being drained, a pressurizer water volume of 450 ft^3 (includes sufficient margin to account for expected instrument uncertainty), and the source range neutron flux monitor being operable. During the loop filling, the specification requires that pressurizer water volume remain above 450 ft^3, the source range count rate shall be monitored and not increase by a factor of more than two, and the hot and cold leg stop valves shall be fully opened within 2 hours after the filling of the drained loop is complete. The licensee has performed conservative analyses to show that the potential temperature and reactivity changes that may occur as a result of the evolution are acceptable. As a result, the staff finds the specification acceptable.

5.0 STATE CONSULTATION

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

6.0 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 and change surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluent 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 these amendments involve no significant hazards consideration and there has been no public comment on such finding (61 FR 64396). Accordingly, these 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.

7.0 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.

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Date: October 30, 1998