December 13, 1991

Docket Nos. 50-338
and 50-339

DISTRIBUTION
See attached sheet

Mr. W. L. Stewart
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

Dear Mr. Stewart:

SUBJECT: NORTH ANNA UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: SERVICE WATER SYSTEM (TAC NOS. 81864 AND 81865)

The Commission has issued the enclosed Amendment Nos. 152 and 136 to Facility Operating License Nos. NPF-4 and NPF-7 for the North Anna Power Station, Units No. 1 and No. 2 (NA-1&2). The amendments revise the Technical Specifications (TS) in response to your letter dated October 3, 1991.

The amendments revise the current NA-1&2 TS to ensure the design basis is met for the NA-1&2 Service Water System.

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,

/s/
Leon B. Engle, Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 152 to NPF-4
2. Amendment No. 136 to NPF-7
3. Safety Evaluation

cc w/enclosures:
See next page

OFC	:LA:PDII-2	:PM:PDII-2	:SPLB:NRR	:C:SPLB:NRR	:D:PDII-2	:OGC	:
NAME	:DMiller	:LEngle:kdj	:WLefave	:CMcCracken	:HBerkow	:EHoller	:
DATE	:11/18/91	:11/12/91	:11/12/91	:11/18/91	:11/18/91	:11/26/91	:

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DATED: December 13, 1991

AMENDMENT NO. 152 TO FACILITY OPERATING LICENSE NO. NPF-4-NORTH ANNA UNIT 1
AMENDMENT NO. 136 TO FACILITY OPERATING LICENSE NO. NPF-7-NORTH ANNA UNIT 2

Docket File
NRC & Local PDRs
PDII-2 Reading
S. Varga, 14/E/4
G. Lainas, 14/H/3
H. Berkow
D. Miller
L. Engle
OGC-WF
D. Hagan, 3302 MNBB
G. Hill (8), P-137
Wanda Jones, MNBB-7103
C. Grimes, 11/F/23
W. Lefave, 8-D-1
C. McCracken, 8-D-1
ACRS (10)
GPA/PA
OC/LFMB
M. Sinkule, R-II

cc: Plant Service list

Mr. W. L. Stewart
Virginia Electric & Power Company

North Anna Power Station
Units 1 and 2

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

VIRGINIA ELECTRIC AND POWER COMPANY

OLD DOMINION ELECTRIC COOPERATIVE

DOCKET NO. 50-338

NORTH ANNA POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 152
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 October 3, 1991, 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.

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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. 152 , 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 the date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow

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: December 13, 1991

ATTACHMENT TO LICENSE AMENDMENT NO. 152

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 identified by amendment number and contain vertical lines indicating the area of change. The corresponding overleaf pages are also provided to maintain document completeness.

Page
3/4 7-18
3/4 7-18a (new)
3/4 7-18b (new)
B 3/4 7-4
B 3/4 7-4a(new)
B 3/4 7-4b(new)

3/4.7.3 COMPONENT COOLING WATER SUBSYSTEM

LIMITING CONDITION FOR OPERATION

3.7.3.1 At least two component cooling water subsystems (shared with Unit 2) shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only one component cooling water subsystem OPERABLE, restore at least two subsystems to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.7.3.1 At least two component cooling water subsystems shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power operated or automatic) servicing safety related equipment that is not locked, sealed, or otherwise secured in position, is in its correct position.

3/4.7.4 SERVICE WATER SYSTEM

3/4.7.4.1 SERVICE WATER SYSTEM - OPERATING

LIMITING CONDITION FOR OPERATION

3.7.4.1 Two service water loops (shared with Unit 2) shall be OPERABLE with each loop consisting of:

a. Two OPERABLE service water pumps (excluding auxiliary service water pumps) with their associated normal and emergency power supplies, and

b. An OPERABLE flow path capable of providing cooling for OPERABLE plant components and transferring heat to the service water reservoir.

APPLICABILITY: Either Unit in MODES 1, 2, 3, or 4.

ACTION:

a. With one service water pump inoperable, within 72 hours throttle component cooling water heat exchanger flows, in accordance with approved operating procedures, to ensure the remaining service water pumps are capable of providing adequate flow to the recirculation spray heat exchangers.

b. With two service water pumps inoperable, perform ACTION 3.7.4.1.a within 1 hour and restore at least one service water pump to OPERABLE status within 72 hours, or place both units in HOT STANDBY within the next six hours and in COLD SHUTDOWN within the following 30 hours.

c. With one service water loop inoperable, except as provided in ACTION 3.7.4.1.a, restore the inoperable loop to OPERABLE status within 72 hours or place both units in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

d. The allowable time that one of the two service water loops can be inoperable as specified in ACTION 3.7.4.1.c may be extended beyond 72 hours up to 168 hours as part of service water system upgrades* provided 3 out of 4 service water pumps (the third pump does not require auto start capability) and 2 out of 2 auxiliary service water pumps have been OPERABLE since initial entry into the action statement and remain OPERABLE during the extended action statement or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

* Isolation of one service water loop for up to 168 hours is permitted only as part of service water system upgrades. System upgrades include modification and maintenance activities associated with the installation of new discharge headers and spray arrays, mechanical and chemical cleaning of service water piping and valves, pipe repair and replacement, valve repair and replacement, installation of corrosion mitigation measures and inspections of and repairs to buried piping interior coatings and pump or valve house components.

3/4.7.4 SERVICE WATER SYSTEM

3/4.7.4.1 SERVICE WATER SYSTEM - OPERATING

LIMITING CONDITION FOR OPERATION

e. With two service water loops inoperable for reasons other than described in ACTION 3.7.4.1.b, place both units in HOT SHUTDOWN within 12 hours and within the following hour, initiate actions to place both units in COLD SHUTDOWN and continue actions until both units are in COLD SHUTDOWN.

SURVEILLANCE REQUIREMENTS

4.7.4.1 At least two service water loops shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power operated or automatic) servicing safety related equipment that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. At least once per 6 months by measurement of the movement of the pumphouse and wing walls.

c. At least once per 18 months during shutdown, by:

1. Verifying that each automatic valve servicing safety related equipment actuates to its correct position on an actual or simulated safety injection signal.

2. Verifying that each automatic service water valve actuates to its correct position on an actual or simulated containment high-high signal.

d. Each service water pump will be tested in accordance with Specification 4.0.5.

3/4.7.4 SERVICE WATER SYSTEM

3/4.7.4.2 SERVICE WATER SYSTEM - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.7.4.2 One service water loop (shared with Unit 2) shall be OPERABLE consisting of:

a. Two OPERABLE service water pumps (or auxiliary service water pumps) with their associated normal and emergency power supplies, and

b. An OPERABLE flow path capable of providing cooling for OPERABLE plant components and transferring heat to the service water reservoir or, if using auxiliary service pumps, to the North Anna reservoir.

APPLICABILITY: Both Units in MODES 5 or 6.

ACTION:

a. With only one service water pump OPERABLE, restore an additional service water pump to OPERABLE status within 12 hours or immediately suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System.

b. With no service water pumps OPERABLE, immediately suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System.

SURVEILLANCE REQUIREMENTS

4.7.4.2 At least one service water loop shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power operated or automatic) servicing safety related equipment that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. At least once per 6 months by measurement of the movement of the pump house and wing walls.

c. Each service water pump will be tested in accordance with Specification 4.0.5.

available to remove decay heat and reduce the Reactor Coolant System temperature to less than 350°F when the Residual Heat Removal System may be placed into operation.

3/4.7.1.3 EMERGENCY CONDENSATE STORAGE TANK

The OPERABILITY of the emergency condensate storage tank with the minimum water volume ensures that sufficient water is available to maintain the RCS at HOT STANDBY conditions for 8 hours with steam discharge to the atmosphere concurrent with total loss of off-site power. The contained water volume limit includes an allowance for water not usuable because of tank discharge line location or other physical characteristics.

3/4.7.1.4 ACTIVITY

The limitations on secondary system specific activity ensure that the resultant off-site radiation dose will be limited to a small fraction of 10 CFR Part 100 limits in the event of a steam line rupture. This dose also includes the effects of a coincident 1.0 GPM primary to secondary tube leak in the steam generator of the affected steam line. These values are consistent with the assumptions used in the accident analyses.

3/4.7.1.5 MAIN STEAM TRIP VALVES

The OPERABILITY of the main steam trip valves ensures that no more than one steam generator will blowdown in the event of a steam line rupture. This restriction is required to 1) minimize the positive reactivity effects of the Reactor Coolant System cooldown associated with the blowdown, and 2) limit the pressure rise within containment in the event the steam line rupture occurs within containment. The OPERABILITY of the main steam trip valves within the closure times of the surveillance requirements are consistent with the assumptions used in the accident analyses.

3/4.7.1.6 and 3/4.7.1.7 STEAM TURBINE and OVERSPEED PROTECTION

The turbine generator at the North Anna facility is arranged in a nonpeninsular orientation. Analysis has shown that this arrangement is such that if a turbine failure occurs as a result of destructive overspeed, potentially damaging missles could impact the auxiliary building, containment, control room and other structures housing safety related equipment. The requirements of these two specifications provide additional assurance that the facility will not be operated with degraded valve performance and/or flawed turbine material which are the major contributors to turbine failures.

3/4.7.2 STEAM GENERATOR PRESSURE/TEMPERATURE LIMITATION

The limitation on steam generator pressure and temperature ensures that the pressure induced stresses in the steam generators do not exceed the maximum allowable fracture toughness stress limits. The limitations of 70°F and 200 psig are based on average steam generator impact values at 10°F and are sufficient to prevent brittle fracture.

3/4.7.3 COMPONENT COOLING WATER SUBSYSTEM

The OPERABILITY of the component cooling water subsystem ensures that sufficient cooling capacity is available for continued operation of safety related equipment during normal and accident conditions.

3/4.7.4 .1 SERVICE WATER SYSTEM - OPERATING

The OPERABILITY of the service water system ensures that sufficient cooling capacity is available for safety related equipment during normal and accident conditions. The system is designed to meet the assumption of a single failure. During a design basis accident, both loops of service water cross-connect at the affected units recirculation spray heat exchangers to create a single large service water system. The affected units component cooling heat exchangers isolate so that sufficient flows are provided to both the non-affected and affected units components.

With four normal service water pumps OPERABLE, the unthrottled flow resistance of the system is such that greater than design flows are achieved if a single pump or power supply failure occurs following an accident. When three normal service water pumps are OPERABLE, the flow resistance of the system is adjusted to ensure that design flows are achieved if a single pump or power supply failure occurs following an accident. The required resistance is determined during periodic flow balance testing and is obtained by throttling flow through the component cooling water heat exchangers. Rather than marking and specifying exact component cooling water heat exchanger outlet throttle valve positions, operating procedures have been established to set system resistance at or greater than the required resistance. When only two normal service water pumps or a single loop are OPERABLE, the design basis function can still be met provided that the flow resistance of the system is adjusted and no additional failures occur. The allowed outage time of 72 hours is consistent with other LCOs for loss of one train of ESF systems, and is based upon an industry accepted practice considering the low probability of an accident occuring.

If more than two normal service water pumps or both service water loops are inoperable, the units are not prepared to respond to the design bases events for which the service water system is required. Both units must be placed in HOT SHUTDOWN within twelve hours and actions initiated within one hour thereafter to place the units in COLD SHUTDOWN. Twelve hours is a reasonable time based on operating experience to place the units in HOT SHUTDOWN from full power without challenging safety systems or operators. The units may remain in HOT SHUTDOWN until a method to further cool the units becomes available, but actions to develop the method must be started within one hour after reaching HOT SHUTDOWN.

Auxiliary service water pumps are strictly a backup subsystem and are not taken credit for in a design basis accident. However, these pumps are taken credit for in the 10 CFR 50, Appendix R, analysis. Therefore, these pumps are maintained OPERABLE in MODES 1, 2, 3, and 4 to meet these requirements.

3/4.7.4.2 SERVICE WATER SYSTEM - SHUTDOWN

The OPERABILITY of the service water system when both units are in COLD SHUTDOWN or REFUELING ensures that an adequate heat sink is maintained for the residual heat removal system. Requiring two service water pumps to be OPERABLE is consistent with the residual heat removal system requirements.

If only one service water pump is OPERABLE, an additional service water pump must be restored to an OPERABLE status within 12 hours. If an additional service water pump cannot be restored within the 12 hour time frame, all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System should be immediately suspended.

With no service water pumps OPERABLE, all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System must be immediately suspended.

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

VIRGINIA ELECTRIC AND POWER COMPANY

OLD DOMINION ELECTRIC COOPERATIVE

DOCKET NO. 50-339

NORTH ANNA POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 136
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 October 3, 1991, 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 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. 136 , 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 the 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: December 13, 1991

ATTACHMENT TO LICENSE AMENDMENT NO. 136

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. The corresponding overleaf pages are also provided to maintain document completeness.

Page
3/4 7-15
3/4 7-15a (new)
3/4 7-15b (new)
3/4 7-16*
B 3/4 7-4
B 3/4 7-4a(new)
B 3/4 7-4b(new)

* There are no changes on this page. It is included to maintain document completeness.

3/4.7.4 SERVICE WATER SYSTEM

3/4.7.4.1 SERVICE WATER SYSTEM - OPERATING

LIMITING CONDITION FOR OPERATION

3.7.4.1 Two service water loops (shared with Unit 1) shall be OPERABLE with each loop consisting of:

a. Two OPERABLE service water pumps (excluding auxiliary service water pumps) with their associated normal and emergency power supplies, and

b. An OPERABLE flow path capable of providing cooling for OPERABLE plant components and transferring heat to the service water reservoir.

APPLICABILITY: Either Unit in MODES 1, 2, 3, or 4.

ACTION:

a. With one service water pump inoperable, within 72 hours throttle component cooling water heat exchanger flows, in accordance with approved operating procedures, to ensure the remaining service water pumps are capable of providing adequate flow to the recirculation spray heat exchangers.

b. With two service water pumps inoperable, perform ACTION 3.7.4.1.a within 1 hour and restore at least one service water pump to OPERABLE status within 72 hours, or place both units in HOT STANDBY within the next six hours and in COLD SHUTDOWN within the following 30 hours.

c. With one service water loop inoperable, except as provided in ACTION 3.7.4.1.a, restore the inoperable loop to OPERABLE status within 72 hours or place both units in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

d. The allowable time that one of the two service water loops can be inoperable as specified in ACTION 3.7.4.1.c may be extended beyond 72 hours up to 168 hours as part of service water system upgrades* provided 3 out of 4 service water pumps (the third pump does not require auto start capability) and 2 out of 2 auxiliary service water pumps have been OPERABLE since initial entry into the action statement and remain OPERABLE during the extended action statement or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

* Isolation of one service water loop for up to 168 hours is permitted only as part of service water system upgrades. System upgrades include modification and maintenance activities associated with the installation of new discharge headers and spray arrays, mechanical and chemical cleaning of service water piping and valves, pipe repair and replacement, valve repair and replacement, installation of corrosion mitigation measures and inspections of and repairs to buried piping interior coatings and pump or valve house components.

3/4.7.4 SERVICE WATER SYSTEM

3/4.7.4.1 SERVICE WATER SYSTEM - OPERATING

LIMITING CONDITION FOR OPERATION

e. With two service water loops inoperable for reasons other than described in ACTION 3.7.4.1.b, place both units in HOT SHUTDOWN within 12 hours and within the following hour, initiate actions to place both units in COLD SHUTDOWN and continue actions until both units are in COLD SHUTDOWN.

SURVEILLANCE REQUIREMENTS

4.7.4.1 At least two service water loops shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power operated or automatic) servicing safety related equipment that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. At least once per 6 months by measurement of the movement of the pumphouse and wing walls.

c. At least once per 18 months during shutdown, by:

1. Verifying that each automatic valve servicing safety related equipment actuates to its correct position on an actual or simulated safety injection signal.

2. Verifying that each automatic service water valve actuates to its correct position on an actual or simulated containment high-high signal.

d. Each service water pump will be tested in accordance with Specification 4.0.5.

3/4.7.4 SERVICE WATER SYSTEM

3/4.7.4.2 SERVICE WATER SYSTEM - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.7.4.2 One service water loop (shared with Unit 1) shall be OPERABLE consisting of:

a. Two OPERABLE service water pumps (or auxiliary service water pumps) with their associated normal and emergency power supplies, and

b. An OPERABLE flow path capable of providing cooling for OPERABLE plant components and transferring heat to the service water reservoir or, if using auxiliary service pumps, to the North Anna reservoir.

APPLICABILITY: Both Units in MODES 5 or 6.

ACTION:

a. With only one service water pump OPERABLE, restore an additional service water pump to OPERABLE status within 12 hours or immediately suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System.

b. With no service water pumps OPERABLE, immediately suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System.

SURVEILLANCE REQUIREMENTS

4.7.4.2 At least one service water loop shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power operated or automatic) servicing safety related equipment that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. At least once per 6 months by measurement of the movement of the pump house and wing walls.

c. Each service water pump will be tested in accordance with Specification 4.0.5.

3/4.7.5 ULTIMATE HEAT SINK

LIMITING CONDITION FOR OPERATION

3.7.5.1 The ultimate heat sinks shall be OPERABLE:

a. Service Water Reservoir with:

1. A minimum water level at or above elevation 313 Mean Sea Level, USGS datum, and

2. An average water temperature of less than or equal to 95°F as measured at the service water pump outlet.

b. The North Anna Reservoir with:

1. A minimum water level at or above elevation 244 Mean Sea Level, USGS datum, and

2. An average water temperature of less than or equal to 95°F as measured at the condenser inlet.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the requirements of the above specification not satisfied, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.7.5.1 The ultimate heat sinks shall be determined OPERABLE at least once per 24 hours by verifying the average water temperature and water level to be within their limits.

4.7.5.2 Data for calculating the leakage from the service water reservoir shall be obtained and recorded at least once per 6 months.

Each electric driven auxiliary feedwater pump is capable of delivering a total feedwater flow of 340 gpm at a pressure of 1064 psig to the entrance of the steam generators. The steam driven auxiliary feedwater pump is capable of delivering a total feedwater flow of 700 gpm at a pressure of 1064 psig to the entrance of the steam generators. This capacity is sufficient to ensure that adequate feedwater flow is available to remove decay heat and reduce the Reactor Coolant System temperature to less than 350°F when the Residual Heat Removal System may be placed into operation.

3/4.7.1.3 EMERGENCY CONDENSATE STORAGE TANK

The OPERABILITY of the emergency condensate storage tank with the minimum water volume ensures that sufficient water is available to maintain the RCS at HOT STANDBY conditions for 8 hours with steam discharge to the atmosphere concurrent with total loss of off-site power. The contained water volume limit includes an allowance for water not usuable because of tank discharge line location or other physical characteristics.

3/4.7.1.4 ACTIVITY

The limitations on secondary system specific activity ensure that the resultant off-site radiation dose will be limited to a small fraction of 10 CFR Part 100 limits in the event of a steam line rupture. This dose also includes the effects of a coincident 1.0 GPM primary to secondary tube leak in the steam generator of the affected steam line. These values are consistent with the assumptions used in the accident analyses.

3/4.7.1.5 MAIN STEAM TRIP VALVES

The OPERABILITY of the main steam trip valves ensures that no more than one steam generator will blowdown in the event of a steam line rupture. This restriction is required to 1) minimize the positive reactivity effects of the Reactor Coolant System cooldown associated with the blowdown, and 2) limit the pressure rise within containment in the event the steam line rupture occurs within containment. The OPERABILITY of the main steam trip valves within the closure times of the surveillance requirements are consistent with the assumptions used in the accident analyses.

3/4.7.1.6 and 3/4.7.1.7 STEAM TURBINE and OVERSPEED PROTECTION

The turbine generator at the North Anna facility is arranged in a nonpeninsular orientation. Analysis has shown that this arrangement is such that if a turbine failure occurs as a result of destructive overspeed, potentially damaging missles could impact the auxiliary building, containment, control room and other structures housing safety related equipment. The requirements of these two specifications provide additional assurance that the facility will not be operated with degraded valve performance and/or flawed turbine material which are the major contributors to turbine failures.

3/4.7.2 STEAM GENERATOR PRESSURE/TEMPERATURE LIMITATION

The limitation on steam generator pressure and temperature ensures that the pressure induced stresses in the steam generators do not exceed the maximum allowable fracture toughness stress limits. The limitations of 70°F and 200 psig are based on average steam generator impact values at 10°F and are sufficient to prevent brittle fracture.

3/4.7.3 COMPONENT COOLING WATER SUBSYSTEM

The OPERABILITY of the component cooling water subsystem ensures that sufficient cooling capacity is available for continued operation of safety related equipment during normal and accident conditions.

3/4.7.4 .1 SERVICE WATER SYSTEM - OPERATING

The OPERABILITY of the service water system ensures that sufficient cooling capacity is available for safety related equipment during normal and accident conditions. The system is designed to meet the assumption of a single failure. During a design basis accident, both loops of service water cross-connect at the affected units recirculation spray heat exchangers to create a single large service water system. The affected units component cooling heat exchangers isolate so that sufficient flows are provided to both the non-affected and affected units components.

With four normal service water pumps OPERABLE, the unthrottled flow resistance of the system is such that greater than design flows are achieved if a single pump or power supply failure occurs following an accident. When three normal service water pumps are OPERABLE, the flow resistance of the system is adjusted to ensure that design flows are achieved if a single pump or power supply failure occurs following an accident. The required resistance is determined during periodic flow balance testing and is obtained by throttling flow through the component cooling water heat exchangers. Rather than marking and specifying exact component cooling water heat exchanger outlet throttle valve positions, operating procedures have been established to set system resistance at or greater than the required resistance. When only two normal service water pumps or a single loop are OPERABLE, the design basis function can still be met provided that the flow resistance of the system is adjusted and no additional failures occur. The allowed outage time of 72 hours is consistent with other LCOs for loss of one train of ESF systems, and is based upon an industry accepted practice considering the low probability of an accident occuring.

If more than two normal service water pumps or both service water loops are inoperable, the units are not prepared to respond to the design bases events for which the service water system is required. Both units must be placed in HOT SHUTDOWN within twelve hours and actions initiated within one hour thereafter to place the units in COLD SHUTDOWN. Twelve hours is a reasonable time based on operating experience to place the units in HOT SHUTDOWN from full power without challenging safety systems or operators. The units may remain in HOT SHUTDOWN until a method to further cool the units becomes available, but actions to develop the method must be started within one hour after reaching HOT SHUTDOWN.

Auxiliary service water pumps are strictly a backup subsystem and are not taken credit for in a design basis accident. However, these pumps are taken credit for in the 10 CFR 50, Appendix R, analysis. Therefore, these pumps are maintained OPERABLE in MODES 1, 2, 3, and 4 to meet these requirements.

3/4.7.4.2 SERVICE WATER SYSTEM - SHUTDOWN

The OPERABILITY of the service water system when both units are in COLD SHUTDOWN or REFUELING ensures that an adequate heat sink is maintained for the residual heat removal system. Requiring two service water pumps to be OPERABLE is consistent with the residual heat removal system requirements.

If only one service water pump is OPERABLE, an additional service water pump must be restored to an OPERABLE status within 12 hours. If an additional service water pump cannot be restored within the 12 hour time frame, all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System should be immediately suspended.

With no service water pumps OPERABLE, all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System must be immediately suspended.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 152 AND 136 TO

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

VIRGINIA ELECTRIC AND POWER COMPANY

OLD DOMINION ELECTRIC COOPERATIVE

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

DOCKET NOS. 50-338 AND 50-339

1.0 INTRODUCTION

By letter dated October 3, 1991, the Virginia Electric and Power Company (the licensee) proposed changes to the Technical Specifications (TS) for the North Anna Power Station, Units No. 1 and No. 2 (NA-1&2). The proposed changes would revise the current NA-1&2 TS to ensure the design basis is met for the Service Water System (SWS).

The proposed changes are being made as a result of an NRC violation regarding the NA-1&2 SWS. In the Notice of Violation dated February 1, 1991, the NRC identified that the operating procedures for the SWS were inadequate by not ensuring design basis flows to the recirculation spray heat exchangers during periods when an SW pump is inoperable. This indicated that the licensee's control of the SWS design basis was inadequate. In the licensee's response to the NRC Notice of Violation dated March 1, 1991, the licensee committed to changes in the NA-1&2 TS to clarify the SWS operability requirements and, in the interim, to provide adequate administrative controls to ensure the SWS design basis is met. A description of the NA-1&2 SWS, discussion of the proposed changes and the staff's evaluation are provided below.

1.1 SWS Background

The SWS is common to both NA-1&2 and is designed for the simultaneous operation of various subsystems and components of both units. The purpose of the SWS is to provide long-term cooling after a loss-of-coolant accident (LOCA) and to supply cooling water to various safety-related components during normal plant operation.

The sources of cooling water for the SWS are the SW reservoir or Lake Anna. These two, independent sources of water form the ultimate heat sink for the units.

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The normal SWS alignment consists of four normal SW pumps taking suction from the SW reservior, supplying various components through the supply header, and then returning to the SW reservoir through the return header to the spray arrays or bypass valves. A backup subsystem is available in the event of unavailability of the SW reservior. This backup subsystem consists of two auxiliary SW pumps which take suction from Lake Anna, supplying various components through the alternate supply header, and then returning to Lake Anna through the alternate return header.

The cooling capacity of the SWS is based on the cooling requirements assuming one unit sustains a LOCA with a simultaneous loss of offsite power to both units. The SW cooling requirements following a LOCA on one unit dictate that two normal SW pumps operate to supply adequate cooling flow to the affected unit and unaffected unit heat loads.

In the event of the LOCA a safety injection would be initiated. To ensure that sufficient SW cooling is available to both units, the safety injection signal actuates the following.

a. All four normal SW pumps start on receipt of a safety injection signal from either unit or on a loss of reserve station service power. Operation of all four pumps provides maximum system cooling capacity and flexibility.

b. The SW spray header isolation valves automatically open and the bypass isolation valves automatically close after receipt of a safety injection signal. With all spray arrays in operation, the SWS can reject heat at the maximum rate.

During a design basis accident, the supply valves from both loops of SW to the affected unit's recirculation spray heat exchangers are opened automatically upon receipt of a containment depressurization signal. A safety injection signal will occur prior to the containment depressurization signal.

With four normal SW pumps operable, the unthrottled head loss of the system to components other than the recirculation spray heat exchangers is such that design flows are achieved through the recirculation spray heat exchanger if a failure to a single pump or power supply occurs. With three normal SW pumps operable, the flow of the system to components other than the recirculation spray heat exchangers must be restricted to ensure that design flow will be available if a single pump or power supply failure occurs. This is achieved by reducing SW flow through the component cooling heat exchangers and must be done if either or both of the units are in operating modes 1 through 4. With two normal SW pumps operable, design flows will not be achieved if a single normal SW pump failure occurs. With one normal SW pump operable, design flows are not achieved. In the last two cases, more conservative actions are required by the specifications.

2.0 DISCUSSION

The proposed changes enhance the availability of the SWS and ensure design basis flows are available to the recirculation spray heat exchangers. The proposed changes further ensure the availability of shutdown cooling by requiring one operable SW loop when both units are in modes 5 or 6.

The Limiting Condition for Operation of TS 3.7.4.1 is changed to define what constitutes an operable SW loop. Each SW loop must contain two operable SW pumps (excluding auxiliary SW pumps) with their associated normal and emergency power supplies, and an operable flow path capable of providing cooling for operable plant components and transferring heat to the SW reservoir to ensure design basis flows are achievable.

The applicability statement of TS 3.7.4.1 is changed to clarify that this applies if either unit is in mode 1 through 4. This change will ensure that sufficient cooling capacity is available for both units during power operation.

Action statement 3.7.4.1.a is added to require that if one of the four required normal SW pumps becomes inoperable, the component cooling heat exchanger SW flows must be throttled, within 72 hours, to ensure that the normal SW pumps remain capable of providing design basis flows to the recirculation spray heat exchangers. This allows design basis flows to be delivered by two normal SW pumps with the failure of the third operable normal SW pump.

Action statement 3.7.4.1.b is added to require that if two of the four required SW pumps become inoperable, Action 3.7.4.1.a must be performed within 1 hour. Performing this action ensures the design basis flows can be met if no subsequent pump failures occur. In addition, at least one SW pump must be restored to operable status within 72 hours, or both units shall be placed in hot standby within the next 6 hours and in cold shutdown within the following 30 hours.

Action statement 3.7.4.1.c is modified to add the phrase "except as provided in 3.7.4.1.a" for clarification. In addition, this action statement is changed to clarify that the inoperable loop must be returned to operable status within 72 hours or both units will be placed in hot standby.

Action statement 3.7.4.1.d is modified to allow not having auto-start capability on the third normal SW pump and require two-out-of-two auxiliary SW pumps to be operable. Not requiring the third normal SW pump to have an auto-start capability is considered a clarification of the current TS and is needed to protect the normal SW pumps from a low flow condition with the three pumps are aligned to the same supply header. The probabilistic risk assessment that was performed for the original amendment on this issue only required that the pump be available for service. Requiring two-out-of-two auxiliary SW pumps will provide for a complete backup system to be available and will ensure that a manually initiated backup system exists which can deliver design basis flows during an accident condition. In addition, the footnote for this action statement is modified to include the SW valve house components.

Action statement 3.7.4.1.e is added to require that if both SW loops become inoperable, that both units must be placed in hot shutdown within the next 12 hours and that actions be initiated to place both units in cold shutdown within the next hour and continue to cold shutdown. With two SW loops inoperable, the units are not prepared to respond to the design basis events for which the SWS is required. The units must be placed in a mode in which the risk to the unit and the environment is minimized. Depending on the actual state of the SWS, the recirculation spray heat exchangers may not have a safety-grade heat sink and the unit should be placed in hot shutdown, a condition where decay heat can be removed by the steam generators.

The action to place both units in hot shutdown and continue actions until both units are in cold shutdown addresses the condition if the SWS is unavailable to perform its intended function. In this situation, the unit may remain in hot shutdown until a method to further cool the units becomes available.

Surveillance Requirement 4.7.4.1.c.1 is changed to add that the automatic valve servicing safety-related equipment actuates on both an actual or simulated safety injection signal. In addition, Surveillance Requirement 4.7.4.1.c.2 is modified to clarify that the automatic SW valves should be verified to be in the correct position on a actual or simulated containment high-high signal.

Surveillance Requirement 4.7.4.1.d is added to specify surveillance testing for operability determination of the SW pumps in accordance with Specification 4.0.5, the ASME Section XI program.

TS 3.7.4.2 is added to support the Updated Final Safety Analysis Report (UFSAR) design basis for both units in modes 5 or 6. When both units are in cold shutdown or refueling, the design basis requires that the SWS be operable. This will ensure an adequate heat sink is maintained for the residual heat removal (RHR) system.

The requirements for modes 5 and 6 differ from TS 3.7.4.1 by requiring that one SW loop be operable. SW is required to provide a heat sink for the RHR system to remove decay heat from the reactor core. However, there is a significant reduction in potential heat loading on the SWS. Therefore, only one SW loop is required to be operable. The components required for one loop to be operable are the same as defined in TS 3.7.4.1 except that credit for the operable auxiliary SW pump may be taken to satisfy the operability requirement of the LCO. This allows removing the SW reservoir from service for maintenance and utilizing the Lake Anna reservoir as the heat sink for core heat removal. Requiring that two SW pumps be operable allows for a single pump or power failure while still providing the heat sink for the RHR system. This is consistent with the RHR system requirements.

Action Statement 3.7.4.2.a requires that if there is only one operable SW pump, at least one inoperable SW pump must be restored to operable status within 12 hours. This is consistent with the action requirements for a partial loss of RHR capability during shutdown conditions.

Action Statement 3.7.4.2.b requires that if no SW pumps are operable, all operations involving an increase in the reactor decay heat load or a reduction

in boron concentration of the Reactor Coolant System (RCS) must be immediately suspended because of total loss of shutdown cooling may have occurred. This is consistent with the action requirements for a total loss of RHR capability during shutdown conditions.

Surveillance requirements to demonstrate the operability of one SW loop are included in TS 3.7.4.2.

The existing bases section (B3/4.7-4) is expanded to provide a more detailed description of the SW system. This bases section is also split to provide a description for operating and shutdown conditions (3/4.7.4.1 and 3/4.7.4.2, respectively).

3.0 EVALUATION

The proposed changes document the licensee's commitment to clarify the SWS operability requirements. The proposed changes modify the NA-1&2 TS to be consistent with the design basis and result in additional limitations not currently included in the NA-1&2 TS. Also, the proposed changes further ensure the availability of shutdown cooling by requiring one operable SW loop when both units are in mode 5 or 6. Finally, the proposed changes enhance the availability of the SWS and ensure UFSAR design basis flows are available to the recirculation spray heat exchangers. Based on all of the above, the staff finds the proposed changes to be acceptable.

4.0 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.

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 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 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 (56 FR 55950). 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 these 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.

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