December 12, 1988

Docket Nos. 50-338
and 50-339

DISTRIBUTION
See attached sheet

Mr. W. R. Cartwright
Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

Dear Mr. Cartwright:

SUBJECT: NORTH ANNA UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: PRIMARY-TO-SECONDARY COOLANT SYSTEMS LEAKAGE LIMITS (TAC NOS. 67602 AND 67603)

The Commission has issued the enclosed Amendment Nos. 109 and 95 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 December 4, 1987.

The amendments implement more stringent primary-to-secondary coolant systems leakage limits and establish surveillance requirements to assure operability of the existing and new N-16 instrumentation necessary to assure compliance with the revised leakage limits.

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

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

Enclosures:
1. Amendment No. 109 to NPF-4
2. Amendment No. 95 to NPF-7
3. Safety Evaluation

cc w/enclosures:
See next page

LA:PDII-2	PM:PDII-2	D:PDII-2	OGC-WF
DMiller	LEngle	HBerkow	
12/ 1 /88	12/ 2 /88	12/2/88	12/9 /88

OGC
EHTB
CYcheng
12/2/88

Concur subject to change. JM

DF01
1/1

DATED: December 12, 1988

AMENDMENT NO. 109 TO FACILITY OPERATING LICENSE NO. NPF-4-NORTH ANNA UNIT 1
AMENDMENT NO. 95 TO FACILITY OPERATING LICENSE NO. NPF-7-NORTH ANNA UNIT 2

Docket File
NRC & Local PDRs
PDII-2 Reading
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G. Lainas, 14/H/3
H. Berkow
D. Miller
L. Engle
OGC-WF
D. Hagan, 3302 MNBB
E. Jordan, 3302 MNBB
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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. 109
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 December 4, 1987, 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. 109, 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 14 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 12, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 109

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.

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3/4 4-18d (new)
3/4 4-18e (new)
3/4 4-18f (new)
B 3/4 4-3
B 3/4 4-3a (new)
B 3/4 4-4
B 3/4 4-4a (new)

TABLE 3.3-14

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

	INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
1.	PROCESS VENT SYSTEM			
	a. Noble Gas Activity Monitor - Providing Alarm and Automatic Termination of Release	1	*	31,33
	b. Iodine Sampler	1	*	31,34
	c. Particulate Sampler	1	*	31,34
	d. Process Vent Flow Rate Measuring Device	1	*	30
	e. Sampler Flow Rate Measuring Device	1	*	30
2.	WASTE GAS HOLDUP SYSTEM EXPLOSIVE GAS MONITORING SYSTEM (Shared with Unit 2)			
	a. Hydrogen Monitor	1	**	32
	b. Oxygen Monitor	1	**	32

TABLE 3.3-14 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

	INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
3.	CONDENSER AIR EJECTOR SYSTEM			
	a. Gross Activity Monitor	1	*	31A
	b. Flow Rate Monitor	1	*	30
4.	VENTILATION VENT SYSTEM (Shared with Unit 2)			
	a. Noble Gas Activity Monitor	1a	*	31
	b. Iodine Sampler	1a	*	31
	c. Particulate Sampler	1a	*	31
	d. Flow Rate Monitor	1a	*	30
	e. Sampler Flow Rate Monitor	1a	*	30

a One per vent stack.

TABLE 3.3-14 (Continued)

TABLE NOTATION

* At all times.

** During process vent system operation (treatment for primary system offgases).

ACTION 30 - With the number of channels OPERABLE less than required by the minimum channels OPERABLE requirement, effluent releases via this pathway may continue provided the flow rate is estimated at least once per 4 hours.

ACTION 31 - With the number of channels OPERABLE less than required by the minimum channels OPERABLE requirement, effluent releases via this pathway may continue provided grab samples are taken at least once per 12 hours and these samples are analyzed for gross activity or gamma isotopic activity within 24 hours.

ACTION 31A- With the number of channels OPERABLE less than required by the minimum channels OPERABLE requirement, effluent releases via this pathway may continue provided the frequency of the grab samples required by Specification 4.4.6.3b is increased to at least once per 4 hours and these samples are analyzed for gross activity or gamma isotopic activity within 8 hours.

ACTION 32 - With the number of channnels OPERABLE less than required by the minimum channels OPERABLE requirement, operation of this system may continue for up to 14 days provided grab samples are taken and analyzed daily. With this channel inoperable, operation may continue provided grab samples are taken and analyzed: (1) every 4 hours during degassing operations and (2) daily during other operations.

ACTION 33 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, the contents of the Waste Gas Decay Tanks may be released to the environment provided that prior to initiating the release:

a. At least two independent samples of the tank's contents are analyzed, and

b. At least two technically qualified members of the Facility Staff independently verify the release rate calculations and discharge valve lineup;

Otherwise, suspend release of Waste Gas Decay Tank effluents.

ACTION 34 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases from the Waste Gas Decay Tanks may continue provided samples are continuously collected with auxiliary sampling equipment as required in Table 4.11-2.

TABLE 4.3-14

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. PROCESS VENT SYSTEM					
a. Noble Gas Activity Monitor - Providing Alarm and Automatic Termination of Release	D	P	R	Q(1)	*
b. Iodine Sampler	W	N.A.	N.A.	N.A.	*
c. Particulate Sampler	W	N.A.	N.A.	N.A.	*
d. Process Vent Flow Rate Measuring Device	D	N.A.	R	Q	*
e. Sampler Flow Rate Monitor	D(5)	N.A.	R	N.A.	*
2. WASTE GAS HOLDUP SYSTEM EXPLOSIVE GAS MONITORING SYSTEM					
a. Hydrogen Monitor	D	N.A.	Q(3)	M	**
b. Oxygen Monitor	D	N.A.	Q(4)	M	**

REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.2 Reactor Coolant System leakage shall be limited to:

a. No PRESSURE BOUNDARY LEAKAGE,

b. 1 GPM UNIDENTIFIED LEAKAGE,

c. 1 GPM total primary-to-secondary leakage through all steam generators not isolated from the Reactor Coolant System and 500 gallons per day through any one steam generator not isolated from the Reactor Coolant System,*

d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System,

e. 30 GPM CONTROLLED LEAKAGE at a Reactor Coolant System pressure of 2235 ± 20 psig, and

f. Leakage for the Reactor Coolant System Pressure Isolation Valves specified in Table 3.4-1.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE and leakage from the Reactor Coolant System Pressure Isolation Valves, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With any Reactor Coolant System Pressure Isolation Valve leakage greater than the above limit, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

*When in Mode 1 above 50% power, provisions of Specification 3.4.6.3 apply.

REACTOR COOLANT SYSTEM

PRIMARY TO SECONDARY LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.3 Primary to secondary leakage shall be limited to:

a. Total leakage from all steam generators of 300 gpd,

b. Leakage from an individual steam generator of 100 gpd,

c. Total leakage increase of 60 gpd between surveillance intervals, and

d. An increasing trend based on the latest surveillance that indicates 100 gpd would not be exceeded on an individual steam generator within 90 minutes.

APPLICABILITY: MODE 1 above 50% power.*

ACTION:

a. If the total leakage limit from all steam generators or the leakage limit from any individual steam generator is exceeded, be in HOT STANDBY within the next 6 hours and cold shutdown within the following 30 hours.

b. If the increase in total leakage from all steam generators exceeds 60 gpd between surveillance intervals, reduce power below 50% rated thermal power within 90 minutes.

c. If an increasing trend indicates that the limit of 100 gpd per steam generator is going to be exceeded within 90 minutes, reduce power to below 50% rated thermal power within 90 minutes, be in HOT STANDBY within the next 6 hours and cold shutdown within the following 30 hours.

*Once the limiting condition for operation has been exceeded, the corresponding action must be followed to completion.

SURVEILLANCE REQUIREMENTS

4.4.6.3 Primary to secondary leakage shall be demonstrated to be within each of the above limits by:

a. Primary to secondary leakage will be recorded and trended at least once during each 4 hour interval (e.g., 00:00-04:00, 04:00-08:00, 08:00-12:00, 12:00-16:00, 16:00-20:00, 20:00-24:00) from each OPERABLE N-16 continuous readout and alarm radiation monitoring system and the condenser air ejector exhaust continuous readout and alarm radiation monitor.

SURVEILLANCE REQUIREMENTS

b. Primary to secondary leakage will be determined from a condenser air ejector grab sample at least every 24 hours.

c. Primary to secondary leakage will be determined from steam generator and reactor coolant liquid samples at least every 72 hours.

d. If the above surveillance operations cannot be performed as specified, the limiting conditions for operation and associated action statements of Specification 3.4.6.4 shall apply.

PRIMARY TO SECONDARY LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.6.4 The following primary to secondary leakage detection systems shall be OPERABLE:

a. One of the two N-16 radiation monitoring systems (either the N-16 continuous readout and alarm radiation monitors on each steam line, or the N-16 continuous readout and alarm radiation monitor on the main steam header),

b. The condenser air ejector exhaust continuous readout and alarm radiation monitor,

c. The capability to obtain and analyze a condenser air ejector exhaust grab sample, and

d. The capability to obtain and analyze a liquid sample from each steam generator and from the RCS.

APPLICABILITY: MODE 1 above 50% power.

ACTION:

a. If both the N-16 radiation monitoring system on each steam line and the N-16 radiation monitoring system on the main steam header are INOPERABLE, increase the frequency of the condenser air ejector grab sample required by Specification 4.4.6.3b to at least once during each 4 hour interval (e.g., 00:00-04:00, 04:00-08:00, 08:00-12:00, 12:00-16:00, 16:00-20:00, 20:00-24:00) and return at least one of the systems to operation within seven days or reduce power to less than 50% within the next four hours.

b. If the condenser air ejector exhaust continuous readout and alarm radiation monitor is INOPERABLE, provided at least one of the N-16 monitoring systems is OPERABLE, increase the frequency of the condenser air ejector grab sample required by Specification 4.4.6.3b to at least once during each 4 hour interval (e.g., 00:00-04:00, 04:00-08:00, 08:00-12:00, 12:00-16:00, 16:00-20:00, 20:00-24:00) and return the system to operation within seven days or reduce power to less than 50% within the next four hours.

c. If the capability to obtain and analyze a condenser air ejector grab sample is lost, provided at least one of the N-16 monitoring systems is OPERABLE and the condenser air ejector exhaust continuous readout and alarm radiation monitor is OPERABLE, restore the capability within seven days or reduce power to less than 50% within four hours.

LIMITING CONDITION FOR OPERATION

d. If both N-16 monitoring systems are INOPERABLE and either the condenser air ejector exhaust continuous readout and alarm radiation monitor is INOPERABLE or the capability to obtain and analyze a condenser air ejector exhaust grab sample is lost, reduce power to less than 50% within the next 90 minutes.

e. If the condenser air ejector exhaust continuous readout and alarm radiation monitor is INOPERABLE and the capability to obtain and analyze a condenser air ejector exhaust grab sample is lost, reduce power to less than 50% within the next 90 minutes.

f. If the capability to obtain and analyze a liquid sample from each steam generator and the RCS is lost, increase the frequency of performance of the RCS water inventory balance in T.S. 4.4.6.2.1d to once every 24 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.4 The N-16 monitors and air ejector exhaust radiation monitoring instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST during the MODES and at the frequencies shown in Tables 4.4-2a and 4.3-14, respectively.

TABLE 4.4-2a

PRIMARY TO SECONDARY LEAKAGE DETECTION SYSTEMS SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. N-16 Radiation Monitors				
a. MS Header	S	R	M	1 (>50% Power)
b. MS Lines	S	R	M	1 (>50% Power)

3/4.4.5 STEAM GENERATORS

The Surveillance Requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.

The plant is expected to be operated in a manner such that the secondary coolant will be maintained within those parameter limits found to result in negligible corrosion of the steam generator tubes. If the secondary coolant chemistry is not maintained within these parameter limits, localized corrosion may likely result in stress corrosion cracking. The extent of cracking during plant operation would be limited by the limitation of steam generator tube leakage between the primary coolant system and the secondary coolant system (primary-to-secondary leakage = 500 gallons per day per steam generator). Cracks having a primary-to-secondary leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents. Operating plants have demonstrated that primary-to-secondary leakage of 500 gallons per day per steam generator can readily be detected by radiation monitors of steam generator blowdown.

It has been determined, however, that certain conditions within the steam generator may produce limited displacement fluidelastic instability in the tube bundle that may result in fatigue failure of a tube. Modifications have been accomplished in all steam generators consisting of installation of downcomer resistance plates and preventive plugging of potentially susceptible tubes. Even though these measures are considered to have been very conservative and highly effective in reducing the probability of fatigue induced tube rupture, enhanced leakage monitoring and more stringent leak rate limits have been established. Leakage is now limited to 100 gpd (rather than 500 gpd) per steam generator when operating at greater than 50% power. Cyclic life analysis of fatigue induced tube cracks has shown that, assuming a post-modification maximum stress amplitude of 7 ksi, a leak rate of up to 500 gpd would be reached some 90 minutes prior to tube rupture. Therefore, the 100 gpd leak rate limit is bounding since

a. the 100 gpd limit would be detected well in advance of reaching 500 gpd,

b. the time required for leak rate detection and power reduction to less than 50% is expected to be less than 90 minutes, and

c. the maximum stress amplitude is anticipated to lie in the 5 ksi range which would allow for much earlier leak before break warning than would occur in the assumed 7 ksi case.

These assumptions also include an appropriate allowance for measurement uncertainty. (References: Virginia Electric and Power Co., "North Anna Unit 1 July 15, 1987 Steam Generator Tube Rupture Event Report, Revision 1, September 15, 1987, and Westinghouse WCAP-11601, "North Anna Unit 1 Steam Generator Tube Rupture and Remedial Actions Technical Evaluation, September 1987").

This limit, along with the enhanced monitoring system, should provide sufficient notification to permit orderly shutdown prior to a potential tube rupture event. Leakage in excess of any of these limits will require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged.

Wastage-type defects are unlikely with the all volatile treatment (AVT) of secondary coolant. However, even if a defect of similar type should develop in service, it will be found during scheduled inservice steam generator tube examinations. Plugging will be required of all tubes with imperfections exceeding the plugging limit which, by the definition of Specification 4.4.5.4.a is 40% of the tube nominal wall thickness. Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that has penetrated 20% of the original tube wall thickness.

Whenever the results of any steam generator tubing inservice inspection fall into Category C-3, these results will be promptly reported to the Commission pursuant to Section 50.72 to 10 CFR Part 50 with a follow up report pursuant to Section 50.73 to 10 CFR Part 50. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications, if necessary.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are generally consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973.

3/4.4.6.2 OPERATIONAL LEAKAGE

Industry experience has shown that while a limited amount of leakage is expected from the RCS, the unidentified portion of this leakage can be reduced to a threshold value of less than 1 GPM. This threshold value is sufficiently low to ensure early detection of additional leakage.

The 10 GPM IDENTIFIED LEAKAGE limitation provides allowance for a limited amount of leakage from known sources whose presence will not interfere with the detection of UNIDENTIFIED LEAKAGE by the leakage detection systems.

The CONTROLLED LEAKAGE limitation restricts operation when the total flow supplied to the reactor coolant pump seals exceeds 30 GPM with the modulating valve in the supply line fully open at a nominal RCS pressure of 2235 psig. This limitation ensures that in the event of a LOCA, the safety injection flow will not be less than assumed in the accident analyses.

The total steam generator tube leakage limit of 1 GPM for all steam generators not isolated from the RCS ensures that the dosage contribution from the tube leakage will be limited to a small fraction of Part 100 limits in the event of either a steam generator tube rupture or steam line break. The 1 GPM limit is consistent with the assumptions used in the analysis of these accidents. In general, for plant operation at or below 50% power, the 500 gpd leakage limit per steam generator ensures that steam generator tube integrity is maintained in the event of a main steam line rupture or under LOCA conditions.

When operating at greater than 50% power, more stringent primary to secondary leakage limits of 300 gallons per day (GPD) total from all three steam generators and 100 gpd from an individual steam generator have been imposed. These limits ensure that in the event that a fatigue induced crack were to occur in one or more generators, the resulting leak would be detected in sufficient time to conduct an orderly shutdown prior to catastrophic tube failure. The limits on an increase in leakage of 60 gpd between surveillance intervals and for an increasing trend indicating that 100 gpd would be exceeded within 90 minutes ensure that, in the event of fatigue crack initiation, power can be reduced to a level below which propagation will not occur. In the latter case, the limit also provides for orderly shutdown since the 100 gpd limit is being approached. These leakage rates are conservative with regard to dosage contribution in that they are less than the previously analyzed total amount of 1 GPM and 500 GPD for any single steam generator.

PRESSURE BOUNDARY LEAKAGE of any magnitude is unacceptable since it may be indicative of an impending gross failure of the pressure boundary. Therefore, the presence of any PRESSURE BOUNDARY LEAKAGE requires the unit to be promptly placed in COLD SHUTDOWN.

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. 95
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 December 4, 1987, 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. 95 , 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 14 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 12, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 95

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

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3/4 4-18c (new)
3/4 4-18d (new)
3/4 4-18e (new)
3/4 4-18f (new)
B 3/4 4-3
B 3/4 4-3a (new)
B 3/4 4-4
B 3/4 4-4a (new)

TABLE 3.3-13

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

	INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
1.	PROCESS VENT SYSTEM			
	a. Noble Gas Activity Monitor - Providing Alarm and Automatic Termination of Release	1	*	31,33
	b. Iodine Sampler	1	*	31,34
	c. Particulate Sampler	1	*	31,34
	d. Process Vent Flow Rate Measuring Device	1	*	30
	e. Sampler Flow Rate Measuring Device	1	*	30
2.	WASTE GAS HOLDUP SYSTEM EXPLOSIVE GAS MONITORING SYSTEM (Shared with Unit 1)			
	a. Hydrogen Monitor	1	**	32
	b. Oxygen Monitor	1	**	32

TABLE 3.3-13 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
3. CONDENSER AIR EJECTOR SYSTEM			
a. Gross Activity Monitor	1	*	31A
b. Flow Rate Monitor	1	*	30
4. VENTILATION VENT SYSTEM (Shared with Unit 1)			
a. Noble Gas Activity Monitor	1[a]	*	31
b. Iodine Sampler	1[a]	*	31
c. Particulate Sampler	1[a]	*	31
d. Flow Rate Monitor	1[a]	*	30
e. Sampler Flow Rate Monitor	1[a]	*	30

[a] One per vent stack.

TABLE 3.3-13 (Continued)

TABLE NOTATION

* At all times.

** During process vent system operation (treatment for primary system offgases).

ACTION 30 - With the number of channels OPERABLE less than required by the minimum channels OPERABLE requirement, effluent releases via this pathway may continue provided the flow rate is estimated at least once per 4 hours.

ACTION 31 - With the number of channels OPERABLE less than required by the minimum channels OPERABLE requirement, effluent releases via this pathway may continue provided grab samples are taken at least once per 12 hours and these samples are analyzed for gross activity or gamma isotopic activity within 24 hours.

ACTION 31A- With the number of channels OPERABLE less than required by the minimum channels OPERABLE requirement, effluent releases via this pathway may continue provided the frequency of the grab samples required by Specification 4.4.6.3b is increased to at least once per 4 hours and these samples are analyzed for gross activity or gamma isotopic activity within 8 hours.

ACTION 32 - With the number of channnels OPERABLE less than required by the minimum channels OPERABLE requirement, operation of this system may continue for up to 14 days provided grab samples are taken and analyzed daily. With this channel inoperable, operation may continue provided grab samples are taken and analyzed: (1) every 4 hours during degassing operations and (2) daily during other operations.

ACTION 33 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, the contents of the Waste Gas Decay Tanks may be released to the environment provided that prior to initiating the release:

a. At least two independent samples of the tank's contents are analyzed, and

b. At least two technically qualified members of the Facility Staff independently verify the release rate calculations and discharge valve lineup;

Otherwise, suspend release of Waste Gas Decay Tank effluents.

ACTION 34 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases from the Waste Gas Decay Tanks may continue provided samples are continuously collected with auxiliary sampling equipment as required in Table 4.11-2.

TABLE 4.3-13

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. PROCESS VENT SYSTEM					
a. Noble Gas Activity Monitor - Providing Alarm and Automatic Termination of Release	D	P	R	Q(1)	*
b. Iodine Sampler	W	N.A.	N.A.	N.A.	*
c. Particulate Sampler	W	N.A.	N.A.	N.A.	*
d. Process Vent Flow Rate Measuring Device	D	N.A.	R	Q	*
e. Sampler Flow Rate Monitor	D(5)	N.A.	R	N.A.	*
2. WASTE GAS HOLDUP SYSTEM EXPLOSIVE GAS MONITORING SYSTEM					
a. Hydrogen Monitor	D	N.A.	Q(3)	M	**
b. Oxygen Monitor	D	N.A.	Q(4)	M	**

REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.2 Reactor Coolant System leakage shall be limited to:

a. No PRESSURE BOUNDARY LEAKAGE,

b. 1 GPM UNIDENTIFIED LEAKAGE,

c. 1 GPM total primary-to-secondary leakage through all steam generators not isolated from the Reactor Coolant System and 500 gallons per day through any one steam generator not isolated from the Reactor Coolant System,**

d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System,

e. 30 GPM CONTROLLED LEAKAGE at a Reactor Coolant System pressure of 2235 ± 20 psig, and

f. Leakage for the Reactor Coolant System Pressure Isolation Valves specified in Table 3.4-1.*

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE and leakage from the Reactor Coolant System Pressure Isolation Valves, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With any Reactor Coolant System Pressure Isolation Valve leakage greater than the above limit, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

*The leakage limit for any RHR system isolation valve shown in Table 3.4-1 shall be 5 GPM.

**When in Mode 1 above 50% power, provisions of Specification 3.4.6.3 apply.

PRIMARY TO SECONDARY LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.3 Primary to secondary leakage shall be limited to:

a. Total leakage from all steam generators of 300 gpd,

b. Leakage from an individual steam generator of 100 gpd,

c. Total leakage increase of 60 gpd between surveillance intervals, and

d. An increasing trend based on the latest surveillance that indicates 100 gpd would not be exceeded on an individual steam generator within 90 minutes.

APPLICABILITY: MODE 1 above 50% power.*

ACTION:

a. If the total leakage limit from all steam generators or the leakage limit from any individual steam generator is exceeded, be in HOT STANDBY within the next 6 hours and cold shutdown within the following 30 hours.

b. If the increase in total leakage from all steam generators exceeds 60 gpd between surveillance intervals, reduce power below 50% rated thermal power within 90 minutes.

c. If an increasing trend indicates that the limit of 100 gpd per steam generator is going to be exceeded within 90 minutes, reduce power to below 50% rated thermal power within 90 minutes, be in HOT STANDBY within the next 6 hours and cold shutdown within the following 30 hours.

*Once the limiting condition for operation has been exceeded, the corresponding action must be followed to completion.

SURVEILLANCE REQUIREMENTS

4.4.6.3 Primary to secondary leakage shall be demonstrated to be within each of the above limits by:

a. Primary to secondary leakage will be recorded and trended at least once during each 4 hour interval (e.g., 00:00-04:00, 04:00-08:00, 08:00-12:00, 12:00-16:00, 16:00-20:00, 20:00-24:00) from each OPERABLE N-16 continuous readout and alarm radiation monitoring system and the condenser air ejector exhaust continuous readout and alarm radiation monitor.

SURVEILLANCE REQUIREMENTS

b. Primary to secondary leakage will be determined from a condenser air ejector grab sample at least every 24 hours.

c. Primary to secondary leakage will be determined from steam generator and reactor coolant liquid samples at least every 72 hours.

d. If the above surveillance operations cannot be performed as specified, the limiting conditions for operation and associated action statements of Specification 3.4.6.4 shall apply.

PRIMARY TO SECONDARY LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.6.4 The following primary to secondary leakage detection systems shall be OPERABLE:

a. One of the two N-16 radiation monitoring systems (either the N-16 continuous readout and alarm radiation monitors on each steam line, or the N-16 continuous readout and alarm radiation monitor on the main steam header),

b. The condenser air ejector exhaust continuous readout and alarm radiation monitor,

c. The capability to obtain and analyze a condenser air ejector exhaust grab sample, and

d. The capability to obtain and analyze a liquid sample from each steam generator and from the RCS.

APPLICABILITY: MODE 1 above 50% power.

ACTION:

a. If both the N-16 radiation monitoring system on each steam line and the N-16 radiation monitoring system on the main steam header are INOPERABLE, increase the frequency of the condenser air ejector grab sample required by Specification 4.4.6.3b to at least once during each 4 hour interval (e.g., 00:00-04:00, 04:00-08:00, 08:00-12:00, 12:00-16:00, 16:00-20:00, 20:00-24:00) and return at least one of the systems to operation within seven days or reduce power to less than 50% within the next four hours.

b. If the condenser air ejector exhaust continuous readout and alarm radiation monitor is INOPERABLE, provided at least one of the N-16 monitoring systems is OPERABLE, increase the frequency of the condenser air ejector grab sample required by Specification 4.4.6.3b to at least once during each 4 hour interval (e.g., 00:00-04:00, 04:00-08:00, 08:00-12:00, 12:00-16:00, 16:00-20:00, 20:00-24:00) and return the system to operation within seven days or reduce power to less than 50% within the next four hours.

c. If the capability to obtain and analyze a condenser air ejector grab sample is lost, provided at least one of the N-16 monitoring systems is OPERABLE and the condenser air ejector exhaust continuous readout and alarm radiation monitor is OPERABLE, restore the capability within seven days or reduce power to less than 50% within four hours.

LIMITING CONDITION FOR OPERATION

d. If both N-16 monitoring systems are INOPERABLE and either the condenser air ejector exhaust continuous readout and alarm radiation monitor is INOPERABLE or the capability to obtain and analyze a condenser air ejector exhaust grab sample is lost, reduce power to less than 50% within the next 90 minutes.

e. If the condenser air ejector exhaust continuous readout and alarm radiation monitor is INOPERABLE and the capability to obtain and analyze a condenser air ejector exhaust grab sample is lost, reduce power to less than 50% within the next 90 minutes.

f. If the capability to obtain and analyze a liquid sample from each steam generator and the RCS is lost, increase the frequency of performance of the RCS water inventory balance in T.S. 4.4.6.2.1d to once every 24 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.4 The N-16 monitors and air ejector exhaust radiation monitoring instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST during the MODES and at the frequencies shown in Tables 4.4-2a and 4.3-13 respectively.

TABLE 4.4-2a

PRIMARY TO SECONDARY LEAKAGE DETECTION SYSTEMS SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. N-16 Radiation Monitors				
a. MS Header	S	R	M	1 (>50% Power)
b. MS Lines	S	R	M	1 (>50% Power)

3/4.4.5 STEAM GENERATORS

The Surveillance Requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.

The plant is expected to be operated in a manner such that the secondary coolant will be maintained within those parameter limits found to result in negligible corrosion of the steam generator tubes. If the secondary coolant chemistry is not maintained within these parameter limits, localized corrosion may likely result in stress corrosion cracking. The extent of cracking during plant operation would be limited by the limitation of steam generator tube leakage between the primary coolant system and the secondary coolant system (primary-to-secondary leakage = 500 gallons per day per steam generator). Cracks having a primary-to-secondary leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents. Operating plants have demonstrated that primary-to-secondary leakage of 500 gallons per day per steam generator can readily be detected by radiation monitors of steam generator blowdown.

It has been determined, however, that certain conditions within the steam generator may produce limited displacement fluidelastic instability in the tube bundle that may result in fatigue failure of a tube. Modifications have been accomplished in all steam generators consisting of installation of downcomer resistance plates and preventive plugging of potentially susceptible tubes. Even though these measures are considered to have been very conservative and highly effective in reducing the probability of fatigue induced tube rupture, enhanced leakage monitoring and more stringent leak rate limits have been established. Leakage is now limited to 100 gpd (rather than 500 gpd) per steam generator when operating at greater than 50% power. Cyclic life analysis of fatigue induced tube cracks has shown that, assuming a post-modification maximum stress amplitude of 7 ksi, a leak rate of up to 500 gpd would be reached some 90 minutes prior to tube rupture. Therefore, the 100 gpd leak rate limit is bounding since

a. the 100 gpd limit would be detected well in advance of reaching 500 gpd,

b. the time required for leak rate detection and power reduction to less than 50% is expected to be less than 90 minutes, and

c. the maximum stress amplitude is anticipated to lie in the 5 ksi range which would allow for much earlier leak before break warning than would occur in the assumed 7 ksi case.

These assumptions also include an appropriate allowance for measurement uncertainty. (References: Virginia Electric and Power Co., "North Anna Unit 1 July 15, 1987 Steam Generator Tube Rupture Event Report, Revision 1, September 15, 1987, and Westinghouse WCAP-11601, "North Anna Unit 1 Steam Generator Tube Rupture and Remedial Actions Technical Evaluation, September 1987").

This limit, along with the enhanced monitoring system, should provide sufficient notification to permit orderly shutdown prior to a potential tube rupture event. Leakage in excess of any of these limits will require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged.

Wastage-type defects are unlikely with all volatile treatment (AVT) of secondary coolant. However, even if a defect of similar type should develop in service, it will be found during scheduled inservice steam generator tube examinations. Plugging will be required of all tubes with imperfections exceeding the plugging limit which, by the definition of Specification 4.4.5.4.a is 40% of the tube nominal wall thickness. Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that has penetrated 20% of the original tube wall thickness.

Whenever the results of any steam generator tubing inservice inspection fall into Category C-3, these results will be promptly reported to the Commission pursuant to Section 50.72 to 10 CFR Part 50 with a follow up report pursuant to Section 50.73 to 10 CFR Part 50. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications, if necessary.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are generally consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973.

3/4.4.6.2 OPERATIONAL LEAKAGE

Industry experience has shown that while a limited amount of leakage is expected from the RCS, the unidentified portion of this leakage can be reduced to a threshold value of less than 1 GPM. This threshold value is sufficiently low to ensure early detection of additional leakage.

The 10 GPM IDENTIFIED LEAKAGE limitation provides allowance for a limited amount of leakage from known sources whose presence will not interfere with the detection of UNIDENTIFIED LEAKAGE by the leakage detection systems.

The surveillance requirements for RCS Pressure Isolation Valves provide added assurance of valve integrity thereby reducing the probability of gross valve failure and consequent intersystem LOCA. Leakage from the RCS Pressure Isolation Valves is IDENTIFIED LEAKAGE and will be considered as a portion of the allowed limit.

The CONTROLLED LEAKAGE limitation restricts operation when the total flow supplied to the reactor coolant pump seals exceeds 30 GPM with the modulating valve in the supply line fully open at a nominal RCS pressure of 2235 psig. This limitation ensures that in the event of a LOCA, the safety injection flow will not be less than assumed in the accident analyses.

The total steam generator tube leakage limit of 1 GPM for all steam generators not isolated from the RCS ensures that the dosage contribution from the tube leakage will be limited to a small fraction of Part 100 limits in the event of either a steam generator tube rupture or steam line break. The 1 GPM limit is consistent with the assumptions used in the analysis of these accidents. In general, for plant operation at or below 50% power, the 500 gpd leakage limit per steam generator ensures that steam generator tube integrity is maintained in the event of a main steam line rupture or under LOCA conditions.

When operating at greater than 50% power, more stringent primary to secondary leakage limits of 300 gallons per day (GPD) total from all three steam generators and 100 gpd from an individual steam generator have been imposed. These limits ensure that in the event that a fatigue induced crack were to occur in one or more generators, the resulting leak would be detected in sufficient time to conduct an orderly shutdown prior to catastrophic tube failure. The limits on an increase in leakage of 60 gpd bewteen surveillance intervals and for an increasing trend indicating that 100 gpd would be exceeded within 90 minutes ensure that, in the event of fatigue crack initiation, power can be reduced to a level below which propagation will not occur. In the latter case, the limit also provides for orderly shutdown since the 100 gpd limit is being approached. These leakage rates are conservative with regard to dosage contribution in that they are less than the previously analyzed total amount of 1 GPM and 500 GPD for any single steam generator.

PRESSURE BOUNDARY LEAKAGE of any magnitude is unacceptable since it may be indicative of an impending gross failure of the pressure boundary. Therefore, the presence of any PRESSURE BOUNDARY LEAKAGE requires the unit to be promptly placed in COLD SHUTDOWN.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 109 AND 95 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

INTRODUCTION

By letter dated December 4, 1987, the Virginia Electric and Power Company (the licensee) requested amendments to the Technical Specifications (TS) for the North Anna Power Station, Units No. 1 and No. 2 (NA-1&2). The amendments would implement more stringent primary-to-secondary coolant system leakage limits than presently specified in the NA-1&2 TS and establish surveillance requirements to assure operability of the existing and new N-16 instrumentation used to assure compliance with the revised leakage limits. The more stringent leakage limits and increased instrumentation requirements were put in place for both NA-1&2 by the licensee's Standing Order No. 155 following the steam generator (SG) tube rupture event at NA-1 on July 15, 1987. The failure mechanism was determined to be fatigue induced by limited displacement fluidelastic instability. A number of corrective actions were taken at both NA-1&2 to minimize the probability of recurrence. These measures included installation of downcomer flow resistance plates to reduce the source of loads associated with the fatigue mechanism in the U-bend area and the preventive plugging of potentially susceptible tubes. Even though these measures are considered to be very conservative and highly effective in reducing the probability of fatigue-induced tube rupture, enhanced leakage monitoring and more conservative leakage limits were also established. In the low probability event that the downcomer modification and preventive plugging are unsuccessful in preventing occurrence of a similar fatigue failure, the enhanced monitoring system should provide sufficient notification to the licensee in order to permit orderly shut down prior to a tube rupture. The specific changes are described below.

DISCUSSION

Bases 3/4.4.5 and 3/4.4.6

The Bases would be revised to include a discussion of the bases for the new leakage limits. Bases 3/4.4.5, Steam Generators, would include the discussion that, under certain conditions, the SG may produce limited displacement fluidelastic instability in the tube bundle that may result in fatigue failure

of a tube. Modifications have been accomplished in all SGs consisting of installation of downcomer resistance plates and preventive plugging of potentially susceptible tubes. Even though these measures are considered to have been conservative and highly effective in reducing the probability of fatigue-induced tube rupture, enhanced leakage monitoring and more stringent leak rate limits have been established. Leakage is now limited to 100 gallons per day (gpd) (rather than 500 gpd) per SG when operating at greater than 50% power. Cyclic life analysis of fatigue-induced tube cracks has shown that, assuming a post-modification maximum stress amplitude of 7 ksi, a leak rate of up to 500 gpd would be reached some 90 minutes prior to tube rupture. Therefore, the 100 gpd leak rate limit is bounding since: (a) the 100 gpd limit would be detected well in advance of reaching 500 gpd; (b) the time required for leak rate detection and power reduction to less than 50% is expected to be less than 90 minutes; and (c) the maximum stress amplitude is anticipated to lie in the 5 ksi range, which would allow for much earlier leak-before-break warning than would occur in the assumed 7 ksi case.

These assumptions also include an appropriate allowance for measurement uncertainty stated in the licensee and SG vendor reports entitled, "North Anna Unit 1, July 15, 1987 Steam Generator Tube Rupture Event Report, Revision 1, September 15, 1987," and Westinghouse WCAP-11601, "North Anna Unit 1 Steam Generator Tube Rupture and Remedial Actions Technical Evaluation, September 1987."

Bases 3.4.4.6.2, Operational Leakage, would include a discussion that when operating at greater than 50% of full power, more stringent primary-to-secondary leakage limits of 300 gpd total from all three SGs and 100 gpd from an individual SG would be imposed. These limits ensure that in the event that a fatigue-induced crack were to occur in one or more generators, the resulting leak would be detected in sufficient time to conduct an orderly shutdown prior to catastrophic tube failure. The limits on an increase in leakage of 60 gpd between surveillance intervals and for an increasing trend indicating that 100 gpd would be exceeded within 90 minutes ensure that, in the event of fatigue crack initiation, power can be reduced to a level below which propagation will not occur. In the latter case, the limit also provides for orderly shut down, since the 100 gpd limit is being approached. These leakage rates are conservative with regard to dosage contribution in that they are less than the previously analyzed total amount of 1 gallon per minute (gpm) and 500 gpd for any single SG.

Specification 3.4.6.2

The Limiting Condition for Operation (LCO) specifying primary-to-secondary SG leakage limits would be footnoted to refer to Specification 3.4.6.3 when operating at greater than 50% power. The purpose of this change is to impose more stringent leakage limits when operating at greater than 50% power as explained in Bases 3/4.4.6.2, Operational Leakage, and as discussed above.

Specification 3.4.6.3

A new LCO and Action would be added which imposes more stringent leakage limits and trends when operating at greater than 50% power. The purpose of these more stringent limits is to provide sufficient notification of leakage to permit orderly shut down prior to potential tube rupture. The more stringent primary-to-secondary leakage limits would specify: (a) total leakage from all SGs to be 300 gpd; (b) leakage from an individual SG to be 100 gpd; (c) total leakage increase of 60 gpd between surveillance intervals; and (d) an increasing trend based on the latest surveillance that indicates 100 gpd would not be exceeded on an individual SG within 90 minutes. Once the LCO would be exceeded, the corresponding action must be followed to completion as specified below:

(a) If the total leakage limit from all SGs or the leakage limit from any individual SG is exceeded, be in hot standby within the next 6 hours and cold shutdown within the following 30 hours.

(b) If the increase in total leakage from all SGs exceeds 60 gpd between surveillance intervals, reduce power below 50% rated thermal power within 90 minutes.

(c) If an increasing trend indicates that the limit of 100 gpd per SG is going to be exceeded within 90 minutes, reduce power to below 50% rated thermal power within 90 minutes, be in hot standby within the next 6 hours and cold shutdown within the following 30 hours.

Specification 4.4.6.3

New surveillance requirements would be added to assure that the more stringent leakage limits described above (Specification 3.4.6.3) are properly monitored and trended. Primary-to-secondary leakage would be demonstrated to be within each of the limits specified in 3.4.6.3 by stating:

(a) Primary-to-secondary leakage would be recorded and trended at least every 4 hours from each operable N-16 continuous readout and alarm radiation monitoring system and the condenser air ejector exhaust continuous readout and alarm radiation monitor.

(b) Primary-to-secondary leakage would be determined from a condenser air ejector grab sample at least every 24 hours.

(c) Primary-to-secondary leakage would be determined from SG and reactor coolant liquid samples at least every 72 hours.

(d) If the above surveillance operations cannot be performed as specified, the LCO and associated action statements of Specification 3.4.6.4 (described below) would apply.

Specification 3.4.6.4

A new LCO and Action would be added which defines operability of the primary-to-secondary leakage detection systems when operating at greater than 50% power. The purpose of this specification is to assure adequate capability for monitoring and trending of leakage in order to comply with the limits of Specification 3.4.6.3 as discussed above. Operability would be defined as: (a) one of the two N-16 radiation monitoring systems (either the N-16 continuous readout and alarm radiation monitors on each steam line, or the N-16 continuous readout and alarm radiation monitor on the main steam header); (b) the condenser air ejector exhaust continuous readout and alarm radiation monitor; (c) the capability to obtain and analyze a condenser air ejector exhaust grab sample; and (d) the capability to obtain and analyze a liquid sample from each SG and from the RCS.

The corresponding actions for the LCO's stated above for Mode 1 at greater than 50% power would specify:

(a) If both the N-16 radiation monitoring system on each steam line and the N-16 radiation monitoring system on the main steam header are inoperable, increase the frequency of the condenser air ejector grab sample required by Specification 4.4.6.3b to at least once every 4 hours and return at least one of the systems to operation within 7 days or reduce power to less than 50% within the next 4 hours.

(b) If the condenser air ejector exhaust continuous readout and alarm radiation monitor is inoperable, provided at least one of the N-16 monitoring systems is operable, increase the frequency of the condenser air ejector grab sample required by Specification 4.4.6.3b to at least once every 4 hours and return the system to operation within 7 days or reduce power to less than 50% within the next 4 hours.

(c) If the capability to obtain and analyze a condenser air ejector grab sample is lost, provided at least one of the N-16 monitoring systems is operable and the condenser air ejector exhaust continuous readout and alarm radiation monitor is operable, restore the capability within 7 days or reduce power to less than 50% within 4 hours.

(d) If both N-16 monitoring systems are inoperable and either the condenser air ejector exhaust continuous readout and alarm radiation monitor is inoperable or the capability to obtain and analyze a condenser air ejector exhaust grab sample is lost, reduce power to less than 50% within the next 90 minutes.

(e) If the condenser air ejector exhaust continuous readout and alarm radiation monitor is inoperable and the capability to obtain and analyze a condenser air ejector exhaust grab sample is lost, reduce power to less than 50% within the next 90 minutes.

(f) If the capability to obtain and analyze a liquid sample from each SG and the RCS is lost, increase the frequency of performance of the RCS water inventory balance in TS 4.4.6.2.1d to once every 24 hours.

Specification 4.4.6.4

A new surveillance requirement would be added to assure operability of the detection systems addressed in Specification 3.4.6.4 (discussed above). The N-16 monitors and air ejector exhaust radiation monitoring instrumentation channels would be demonstrated operable by the performance of the channel check, channel calibration and channel functional test during the modes and at the frequencies shown in Tables 4.4-2a and 4.3-14 for NA-1 and Tables 4.4-2a and 4.3-13 for NA-2. Table 4.4-2a has been added to address the surveillance requirements for the newly installed N-16 radiation monitors.

Table 3.3-14 (NA-1) and Table 3.3-13 (NA-2)

The action statement in Tables 3.3-14 and 3.3-13 would be revised to require more frequent sampling of the air ejector exhaust (every 4 hours instead of 12 hours) when the condenser air ejector system gross activity monitoring system is inoperable.

EVALUATION

The proposed changes, as discussed above, provide significantly more stringent primary-to-secondary leakage limits and surveillance requirements than presently specified in the NA-1&2 TS. An integral part of the more stringent primary-to-secondary leakage limits is the installation of N-16 monitors which provide new and advanced detection capability for detecting a significant increase in primary-to-secondary leakage. The N-16 monitors have been installed on the main steam header and on each of the main steam lines. The N-16 monitor should provide more direct indication of primary-to-secondary leakage as it relies on detecting high energy gamma rays with rate ranging linearly with power as opposed to fission product or other activated isotopes buildup in the RCS. N-16 also has a very short half life which better assures that the N-16 detected has leaked through a relatively large tube crack in the SG as opposed to a pin hole leak. Therefore, the N-16 monitor should be especially effective in detecting significant increases in primary-to-secondary leak rate which might be a precursor to a fatigue failure and subsequent rupture of an SG tube. The N-16 monitor will have continuous readout in the control room and up to three preset alarms.

Based on all of the above, the staff finds the proposed changes to be a significant improvement in the ability to detect primary-to-secondary leak rates with surveillance requirements in place to assure operability of the existing and new N-16 instrumentation necessary to assure compliance with the revised leakage rates. The changes should provide added assurance that sufficient notification can be provided to permit an orderly plant shut down prior to an SG tube rupture. Therefore, the staff finds these changes to be acceptable.

As a result of the July 15, 1987 SGTR, the licensee committed by letter dated September 15, 1987, to implement certain SG leak rate detection and action procedures. The licensee's commitment was specified in Standing Order No. 155. By Letter dated November 19, 1987, the NRC confirmed its understanding with the licensee regarding the new NA-1&2 SG leak rate procedures

and the licensee's Standing Order No. 155. The NRC letter stated that the licensee would continue to implement the procedures specified in the Standing Order until such time that NA-1&2 TS were issued which addressed the SG leak rate detection procedures and Standing Order as appropriate. Therefore, upon implementation of the NA-1&2 TS as specified in the above Safety Evaluation, the licensee's commitment to implement Standing Order No. 155 is no longer necessary.

ENVIRONMENTAL CONSIDERATION

These amendments involve a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to surveillance requirements. 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 published a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding. 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.

CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Date: December 12, 1988

Principal Contributor:

Leon B. Engle