March 30, 1988

Docket No. 50-354

Mr. Steven E. Miltenberger
Vice President and Chief Nuclear
Officer
Public Service Electric & Gas Company
P.O. Box 236
Hancocks Bridge, New Jersey 08038

Dear Mr. Miltenberger:

SUBJECT: CONTAINMENT PURGE VALVE TECHNICAL SPECIFICATIONS (TAC NO. 61397)

Re: HOPE CREEK GENERATING STATION

The Commission has issued the enclosed Amendment No. 16 to Facility Operating License No. NPF-57 for the Hope Creek Generating Station. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated June 4, 1986, as superseded and supplemented by letters dated November 21 and December 18, 1986 and February 20, March 19, May 15 and July 13, 1987.

This amendment revises Section 3/4.6.1.8 to permit the operation of the valves in one containment purge supply line and one containment purge exhaust line and a six-inch nitrogen supply valve for up to 120 hours in a 365 day period for pre-purge cleanup, inerting, deinerting or pressure control of the primary containment during plant Operational Conditions 1, 2 and 3. Additionally, it revises Table 3.6.3-1 to reflect a decrease in the maximum isolation time for the purge and supply valves.

A copy of our safety evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,
/s/
George Rivenbark, Project Manager
Project Directorate I-2
Division of Reactor Projects I/II

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PDR ADOCK 05000354
P PDR

Enclosures:
1. Amendment No. 16 to
   License No. NPF-57
2. Safety Evaluation

cc w/enclosures:
See next page

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WButler	JPartlow	CMiles, GPA/PA	
GRivenbark/RLo	TBarnhart (4)	RDiggs, ARM/LFMB	

Previously concurred*

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MO'Brien	GRivenbark:ca	EChan	WButler WB
07/21/87	07/21/87	07/29/87	3/30/87

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

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Sincerely,

George W Rivenbark

George Rivenbark, Project Manager
Project Directorate I-2
Division of Reactor Projects I/II

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2. Safety Evaluation

cc w/enclosures:
See next page

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

PUBLIC SERVICE ELECTRIC & GAS COMPANY

ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-354

HOPE CREEK GENERATING STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.16
License No. NPF-57

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

   A. The application for amendment filed by the Public Service Electric & Gas Company (PSE&G) dated June 4, 1986, as superseded and supplemented by letters dated November 21 and December 18, 1986 and February 20, March 19, May 15 and July 13, 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 set forth in 10 CFR Chapter I;

   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-57 is hereby amended to read as follows:

   (2) Technical Specifications and Environmental Protection Plan

   The Technical Specifications contained in Appendix A, as revised through Amendment No.16 , and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. PSE&G shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/s/

Walter R. Butler, Director
Project Directorate I-2
Division of Reactor Projects I/II

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 30, 1988

LA:PDI-2:DRPI/II
MO'Brien
7/21/87

PM:PDI-2:DRPI/II
GRivenbark
7/21/87

OGC
E. Chan
7/29/87

D:PDI-2:DRPI/II
WButler
3/30/87

7/29/87

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Walter R. Butler

Walter R. Butler, Director
Project Directorate I-2
Division of Reactor Projects I/II

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 30, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 16

FACILITY OPERATING LICENSE NO. NPF-57

DOCKET NO. 50-354

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change. Overleaf page(s) provided to maintain document completeness.*

Remove	Insert
3/4 6-11	3/4 6-11
3/4 6-12*	3/4 6-12*
3/4 6-23*	3/4 6-23*
3/4 6-24	3/4 6-24
3/4 6-25	3/4 6-25
3/4 6-26*	3/4 6-26*
B 3/4 6-1*	B 3/4 6-1*
B 3/4 6-2	B 3/4 6-2
B 3/4 6-3	B 3/4 6-3
B 3/4 6-4*	B 3/4 6-4*

DRYWELL AND SUPPRESSION CHAMBER PURGE SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.1.8 The drywell and suppression chamber purge system, including the 6-inch nitrogen supply line, may be in operation for up to 120 hours each 365 days with the supply and exhaust isolation valves in one supply line and one exhaust line open for containment prepurge cleanup, inerting, deinerting, or pressure control.*

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2 and 3.

ACTION:

a. With a drywell or suppression chamber purge supply and/or exhaust isolation valve and/or the nitrogen supply valve open, except as permitted above, close the valve(s) or otherwise isolate the penetration(s) within 4 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. With a drywell purge supply or exhaust isolation valve, or a suppression chamber purge supply or exhaust isolation valve or the nitrogen supply valve, with resilient material seals having a measured leakage rate exceeding the limit of Surveillance Requirement 4.6.1.8.2, restore the inoperable valve(s) to OPERABLE status within 24 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.8.1 Before being opened, the drywell and suppression chamber purge supply and exhaust, and nitrogen supply butterfly isolation valves shall be verified not to have been open for more than 120 hours in the previous 365 days.*

4.6.1.8.2 At least once per 6 months**, but no more than once per 92 days***, the 26-inch drywell purge supply and exhaust isolation valves and the 24-inch suppression chamber purge supply and exhaust isolation valves and the 6-inch nitrogen supply valve with resilient material seals shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than or equal to 0.05 L_a per penetration when pressurized to P_a 48.1 psig.

*Valves open for pressure control are not subject to the 120 hours per 365 days limit, provided the 2-inch bypass lines are being utilized.

**Provided that the valve has not been operated since the previous test.

***Applies only to a valve which has been operated since the previous test.

3/4.6.2 DEPRESSURIZATION SYSTEMS

SUPPRESSION CHAMBER

LIMITING CONDITION FOR OPERATION

3.6.2.1 The suppression chamber shall be OPERABLE with:

a. The pool water:

1. Volume between 118,000 ft^3 and 122,000 ft^3, equivalent to an indicated level between 74.5" and 78.5" and a
2. Maximum average temperature of 95°F during OPERATIONAL CONDITION 1 or 2, except that the maximum average temperature may be permitted to increase to:
   a) 105°F during testing which adds heat to the suppression chamber.
   b) 110°F with THERMAL POWER less than or equal to 1% of RATED THERMAL POWER.
3. Maximum average temperature of 95°F during OPERATIONAL CONDITION 3, except that the maximum average temperature may be permitted to increase to 120°F with the main steam line isolation valves closed following a scram.

b. A total leakage between the suppression chamber and drywell of less than the equivalent leakage through a 1-inch diameter orifice at a differential pressure of 0.80 psig.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2 and 3.

ACTION:

a. With the suppression chamber water level outside the above limits, restore the water level to within the limits within 1 hour or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. With the suppression chamber average water temperature greater than 95°F and THERMAL POWER greater than 1% of RATED THERMAL POWER, restore the average temperature to less than or equal to 95°F within 24 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours, except, as permitted above:

1. With the suppression chamber average water temperature greater than 105°F during testing which adds heat to the suppression chamber, stop all testing which adds heat to the suppression chamber and restore the average temperature to less than 95°F within 24 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
2. With the suppression chamber average water temperature greater than 110°F, place the reactor mode switch in the Shutdown position and operate at least one residual heat removal loop in the suppression pool cooling mode.

TABLE 3.6.3-1 (Continued)

PRIMARY CONTAINMENT ISOLATION VALVES

VALVE FUNCTION AND NUMBER	PENETRATION NUMBER	MAXIMUM ISOLATION TIME (Seconds)	NOTE(S)	P&ID
8. Group 8 - Torus Water Cleanup (TWC) System				
(a) TWC Suction Isolation Valves				M-53-1
Outside:				
HV-4680 (EE-V003)	P223	45	4	
HV-4681 (EE-V004)	P223	45	4	
(b) TWC Return Isolation Valves				M-53-1
Outside:				
HV-4652 (EE-V002)	P222	45	4	
HV-4679 (EE-V001)	P222	45	4	
9. Group 9 - Drywell Sumps				
(a) Drywell Floor Drain Sump Discharge Isolation Valves				M-61-1
Inside: HV-F003 (HB-V005)	P25	30	3	
Outside: HV-F004 (HB-V006)	P25	30	3	
(b) Drywell Equipment Drain Sump Discharge Isolation Valves				M-61-1
Inside: HV-F019 (HB-V045)	P26	30	3	
Outside: HV-F020 (HB-V046)	P26	30	3	
10. Group 10 - Drywell Coolers				
(a) Chilled Water to Drywell Coolers Isolation Valves				M-87-1
Inside:				
Loop A: HV-9531B1 (GB-V081)	P8B	60	3	
Loop B: HV-9531B3 (GB-V083)	P38A	60	3	

TABLE 3.6.3-1 (Continued)

PRIMARY CONTAINMENT ISOLATION VALVES

VALVE FUNCTION AND NUMBER	PENETRATION NUMBER	MAXIMUM ISOLATION TIME (Seconds)	NOTE(S)	P&ID
Outside:				
Loop A: HV-9531A1 (GB-V048)	P8B	60	3	
Loop B: HV-9531A3 (GB-V070)	P38A	60	3	
(b) Chilled Water from Drywell Coolers Isolation Valves				M-87-1
Inside:				
Loop A: HV-9531B2 (GB-V082)	P8A	60	3	
Loop B: HV-9531B4 (GB-V084)	P38B	60	3	
Outside:				
Loop A: HV-9531A2 (GB-V046)	P8A	60	3	
Loop B: HV-9531A4 (GB-V071)	P38B	60	3	
11. Group 11 - Recirculation Pump System				
(a) Recirculation Pump Seal Water Isolation Valves				M-43-1
Outside:				
Loop A: HV-3800A (BF-V098)	P19	45	3	
Loop B: HV-3800B (BF-V099)	P20	45	3	
12. Group 12 - Containment Atmosphere Control System				
(a) Drywell Purge Supply Isolation Valves				M-57-1
Outside:				
HV-4956 (GS-V009)	P22	5	3, 8	
HV-4979 (GS-V021)	P22/220	5	3, 8	
(b) Drywell Purge Exhaust Isolation Valves				M-57-1
Outside:				
HV-4951 (GS-V025)	P23	15	3	
HV-4950 (GS-V026)	P23	5	3, 8	
HV-4952 (GS-V024)	P23	5	3, 8	

TABLE 3.6.3-1 (Continued)

PRIMARY CONTAINMENT ISOLATION VALVES

VALVE FUNCTION AND NUMBER	PENETRATION NUMBER	MAXIMUM ISOLATION TIME (Seconds)	NOTE(S)	P&ID
(c) Suppression Chamber Purge Supply Isolation Valves				M-57-1
Outside:				
HV-4980 (GS-V020)	P22/P220	5	3, 8	
HV-4958 (GS-V022)	P220	5	3, 8	
(d) Suppression Chamber Purge Exhaust Isolation Valves				M-57-1
Outside:				
HV-4963 (GS-V076)	P219	15	3	
HV-4962 (GS-V027)	P219	5	3, 8	
HV-4964 (GS-V028)	P219	5	3, 8	
(e) Nitrogen Purge Isolation Valves				M-57-1
Outside:				
HV-4974 (GS-V053)	J7D/J202	45	3	
HV-4978 (GS-V023)	P22/P220	5	3, 8	
13. Group 13 - Hydrogen/Oxygen (H2/02) Analyzer System				
(a) Drywell H2/02 Analyzer Inlet Isolation Valves				M-57-1
Outside:				
Loop A: HV-4955A (GS-V045)	J9E	45	3	
HV-4983A (GS-V046)	J9E	45	3	
HV-4984A (GS-V048)	J10C	45	3	
HV-5019A (GS-V047)	J10C	45	3	
Outside:				
Loop B: HV-4955B (GS-V031)	J3B	45	3	
HV-4983B (GS-V032)	J3B	45	3	
HV-4984B (GS-V034)	J7D/J202	45	3	
HV-5019B (GS-V033)	J7D	45	3	

TABLE 3.6.3-1 (Continued)

PRIMARY CONTAINMENT ISOLATION VALVES

VALVE FUNCTION AND NUMBER	PENETRATION NUMBER	MAXIMUM ISOLATION TIME (Seconds)	NOTE(S)	P&ID
(b) Suppression Chamber H2/02 Analyzer Inlet Isolation Valves				M-57-1
Outside:				
Loop A: HV-4965A (GS-V050)	J212	45	3	
HV-4959A (GS-V049)	J212	45	3	
Outside:				
Loop B: HV-4965B (GS-V041)	J210	45	3	
HV-4959B (GS-V040)	J210	45	3	
(c) H2/02 Analyzer Return to Suppression Chamber Isolation Valves				M-57-1
Outside:				
Loop A: HV-4966A (GS-V051)	J201	45	3	
HV-5022A (GS-V052)	J201	45	3	
Outside:				
Loop B: HV-4966B (GS-V042)	J202	45	3	
HV-5022B (GS-V043)	J202/J7D	45	3	
14. Group 14 - Containment Hydrogen Recombination (CHR) System				
(a) CHR Supply Isolation Valves				M-58-1
Outside:				
Loop A: HV-5050A (GS-V002)	P23	45	3	
HV-5052A (GS-V003)	P23	45	3	
Outside:				
Loop B: HV-5050B (GS-V004)	P22	45	3	
HV-5052B (GS-V005)	P22	45	3	
(b) CHR Return Isolation Valves				M-58-1
Outside:				
Loop A: HV-5053A (GS-V008)	P220	45	3	
HV-5054A (GS-V010)	P220	45	3	

3/4.6.1 PRIMARY CONTAINMENT

3/4.6.1.1 PRIMARY CONTAINMENT INTEGRITY

PRIMARY CONTAINMENT INTEGRITY ensures that the release of radioactive materials from the containment atmosphere will be restricted to those leakage paths and associated leak rates assumed in the accident analyses. This restriction, in conjunction with the leakage rate limitation, will limit the site boundary radiation doses to within the limits of 10 CFR Part 100 during accident conditions.

3/4.6.1.2 PRIMARY CONTAINMENT LEAKAGE

The limitations on primary containment leakage rates ensure that the total containment leakage volume will not exceed the value assumed in the accident analyses at the peak accident pressure of 48.1 psig, P_a. As an added conservatism, the measured overall integrated leakage rate is further limited to less than or equal to 0.75 L_a during performance of the periodic tests to account for possible degradation of the containment leakage barriers between leakage tests.

Operating experience with the main steam line isolation valves has indicated that degradation has occasionally occurred in the leak tightness of the valves; therefore the special requirement for testing these valves.

The surveillance testing for measuring leakage rates is consistent with the requirements of Appendix "J" of 10 CFR Part 50 with the exception of exemptions granted for main steam isolation valve leak testing and testing the airlocks after each opening.

3/4.6.1.3 PRIMARY CONTAINMENT AIR LOCKS

The limitations on closure and leak rate for the primary containment air locks are required to meet the restrictions on PRIMARY CONTAINMENT INTEGRITY and the primary containment leakage rate given in Specifications 3.6.1.1 and 3.6.1.2. The specification makes allowances for the fact that there may be long periods of time when the air locks will be in a closed and secured position during reactor operation. Only one closed door in each air lock is required to maintain the integrity of the containment.

3/4.6.1.4 MSIV SEALING SYSTEM

Calculated doses resulting from the maximum leakage allowance for the main steamline isolation valves in the postulated LOCA situations would be a small fraction of the 10 CFR 100 guidelines, provided the main steam line system from the isolation valves up to and including the turbine condenser remains intact. Operating experience has indicated that degradation has occasionally occurred in the leak tightness of the MSIV's such that the specified leakage requirements have not always been maintained continuously. The sealing system will reduce the untreated leakage from the MSIVs when isolation of the primary system and containment is required.

3/4.6.1.5 PRIMARY CONTAINMENT STRUCTURAL INTEGRITY

This limitation ensures that the structural integrity of the containment will be maintained comparable to the original design standards for the life of the unit. Structural integrity is required to ensure that the containment will withstand the maximum pressure of 48.1 psig in the event of a LOCA. A visual inspection in conjunction with Type A leakage tests is sufficient to demonstrate this capability.

3/4.6.1.6 DRYWELL AND SUPPRESSION CHAMBER INTERNAL PRESSURE

The limitations on drywell and suppression chamber internal pressure ensure that the containment peak pressure of 48.1 psig does not exceed the design pressure of 62 psig during LOCA conditions or that the external pressure differential does not exceed the design maximum external pressure differential of 3 psid. The limit of -0.5 to +1.5 psig for initial positive containment pressure will limit the total pressure to 48.1 psig which is less than the design pressure and is consistent with the safety analysis.

3/4.6.1.7 DRYWELL AVERAGE AIR TEMPERATURE

The limitation on drywell average air temperature ensures that the containment peak air temperature does not exceed the design temperature of 340°F during LOCA conditions and is consistent with the safety analysis. The 135°F average temperature is conducive to normal and long term operation.

3/4.6.1.8 DRYWELL AND SUPPRESSION CHAMBER PURGE SYSTEM

The 120 hours/365 days limit for the operation of the purge valves and the 6" nitrogen supply valve during plant Operational Conditions 1, 2 and 3 is intended to reduce the probability of a LOCA occurrence during the above operational conditions when the applicable combination of the above valves are open.

Blow-out panels are installed in the CPCS ductwork to provide additional assurance that the FRVS will be capable of performing its safety function subsequent to a LOCA.

DRYWELL AND SUPPRESSION CHAMBER PURGE SYSTEM (Continued)

The use of the drywell and suppression chamber purge exhaust lines for pressure control during plant Operational Conditions 1, 2 and 3 is unrestricted provided 1) only the inboard purge exhaust isolation valves on these lines and the vent valves on the 2-inch vent paths are used and 2) the outboard purge exhaust isolation valves remain closed. This is because in such a situation, the vent valves will sufficiently choke the flow and additionally the applicable valves will close in a timely manner during a LOCA or steam line break accident and therefore the control room and the site boundary dose guidelines of applicable 10 CFR dose limits will not be exceeded in the event of an accident. The design of the purge supply and exhaust isolation valves and the 6-inch nitrogen supply valve meets the requirements of Branch Technical Position CSB 6-4, "Containment Purging During Normal Plant Operations".

Leakage integrity tests with a maximum allowable leakage rate for purge supply and exhaust isolation valves will provide early indication of resilient material seal degradation and will allow the opportunity for repair before gross leakage failure develops. The 0.60 L_a leakage limit shall not be exceeded when the leakage rates determined by the leakage integrity tests of these valves are added to the previously determined total for all valves and penetrations subject to Type B and C tests.

3/4.6.2. DEPRESSURIZATION SYSTEMS

The specifications of this section ensure that the primary containment pressure will not exceed the design pressure of 62 psig during primary system blowdown from full operating pressure.

The suppression chamber water provides the heat sink for the reactor coolant system energy release following a postulated rupture of the system. The suppression chamber water volume must absorb the associated decay and structural sensible heat released during reactor coolant system blowdown from 1020 psig. Since all of the gases in the drywell are purged into the suppression chamber air space during a loss of coolant accident, the pressure of the liquid must not exceed 62 psig, the suppression chamber maximum internal design pressure. The design volume of the suppression chamber, water and air, was obtained by considering that the total volume of reactor coolant to be considered is discharged to the suppression chamber and that the drywell volume is purged to the suppression chamber.

Using the minimum or maximum water volumes given in this specification, containment pressure during the design basis accident is approximately 48.1 psig which is below the design pressure of 62 psig. Maximum water volume of 122,000 ft^3 results in a downcomer submergence of 3.33 ft and the minimum volume of 118,000 ft^3 results in a submergence of approximately 3.0 ft. The majority of the Bodega tests were run with a submerged length of four feet and with complete condensation. Thus, with respect to the downcomer submergence, this specification is adequate. The maximum temperature at the end of the blowdown

DEPRESSURIZATION SYSTEMS (Continued)

tested during the Humboldt Bay and Bodega Bay tests was 170°F and this is conservatively taken to be the limit for complete condensation of the reactor coolant, although condensation would occur for temperatures above 170°F.

Should it be necessary to make the suppression chamber inoperable, this shall only be done as specified in Specification 3.5.3.

Under full power operating conditions, blowdown from an initial suppression chamber water temperature of 95°F results in a water temperature of approximately 135°F immediately following blowdown which is below the 200°F used for complete condensation via mitered T-quencher devices. At this temperature and atmospheric pressure, the available NPSH exceeds that required by both the RHR and core spray pumps, thus there is no dependency on containment overpressure during the accident injection phase. If both RHR loops are used for containment cooling, there is no dependency on containment overpressure for post-LOCA operations.

Experimental data indicates that excessive steam condensing loads can be avoided if the peak local temperature of the suppression pool is maintained below 200°F during any period of relief valve operation. Specifications have been placed on the envelope of reactor operating conditions so that the reactor can be depressurized in a timely manner to avoid the regime of potentially high suppression chamber loadings.

Because of the large volume and thermal capacity of the suppression pool, the volume and temperature normally changes very slowly and monitoring these parameters daily is sufficient to establish any temperature trends. By requiring the suppression pool temperature to be frequently recorded during periods of significant heat addition, the temperature trends will be closely followed so that appropriate action can be taken. The requirement for an external visual examination following any event where potentially high loadings could occur provides assurance that no significant damage was encountered. Particular attention should be focused on structural discontinuities in the vicinity of the relief valve discharge since these are expected to be the points of highest stress.

In addition to the limits on temperature of the suppression chamber pool water, operating procedures define the action to be taken in the event a safety-relief valve inadvertently opens or sticks open. As a minimum this action shall include: (1) use of all available means to close the valve, (2) initiate suppression pool water cooling, (3) initiate reactor shutdown, and (4) if other safety-relief valves are used to depressurize the reactor, their discharge shall be separated from that of the stuck-open safety relief valve to assure mixing and uniformity of energy insertion to the pool.

In conjuction with the Mark I containment Long Term Program, a plant unique analysis was performed which demonstrated that the containment, the attached piping and internal structures meet the applicable structural and mechanical acceptance criteria for Hope Creek. The evaluation followed the design basis loads defined in the Mark I Load Definition Report, NEDO-21888, December 1978, as modified by NRC SER NUREG 0661, July 1980 and Supplement 1, August 1982, to ensure that hydrodynamic loads, appropriate for the life of the plant, were applied.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 16 TO FACILITY OPERATING LICENSE NO. NPF-57

PUBLIC SERVICE ELECTRIC & GAS COMPANY

ATLANTIC CITY ELECTRIC COMPANY

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

1.0 INTRODUCTION

By letter dated June 4, 1986, Public Service Electric & Gas Company (the licensee) requested an amendment to Facility Operating License No. NPF-57 for the Hope Creek Generating Station. The proposed amendment would change plant Technical Specification (TS) 3/4.6.1.8 and its associated bases. These changes deal with the Limiting Condition for Operation (LCO) and Surveillance Requirements (SR) for the drywell and Suppression Chamber (SC) purge systems. Specifically, the proposed LCO would allow the primary containment (drywell and SC) butterfly isolation valves on either the 26-inch drywell purge supply and exhaust lines, or on the 24-inch SC purge supply and exhaust lines, to be opened for pre-purge cleanup or deinerting of the primary containment during reactor Operational Conditions 1, 2, and 3. Also, it would allow the butterfly isolation valve on the six-inch nitrogen supply line to the primary containment, the inboard butterfly isolation valves on the 26 and 24-inch purge supply lines, and the butterfly isolation valves on the 26 and 24-inch purge exhaust lines, to be opened if needed, for inerting the primary containment during the above operational conditions. The licensee proposed the above LCO in lieu of the existing LCO 3.6.1.8 which requires the above valves to be operable and sealed closed during plant Operational Conditions 1, 2, and 3. The proposed change would require the above valves to be kept administratively controlled closed at all other times during Plant Operational conditions 1, 2, and 3. The licensee additionally proposed changes to HCGS TS Table 3.6.3-1, "Primary Containment Isolation Valves". Specifically, the licensee proposed changing the existing 15 seconds maximum isolation time for these valves given in the table to five seconds maximum isolation time.

Based on discussions of the above proposed changes in a meeting with the licensee on October 23, 1986, the staff noted that the LCO should not only specify the permitted functions, but also should specify a cumulative annual time limit (number of hours in a 365-day period) for the use of the purge lines during plant Operational Conditions 1, 2, and 3. The staff requested that justification for the time chosen be also provided. The staff further suggested that the LCO should restrict the use of the purge lines to one supply line and one exhaust line at any one time, for performing any one of the above functions to comply with the requirements of Branch Technical Position (BTP) CSB 6-4, "Containment Purging During Normal Operations," NUREG-0800, Revision 2, July 1981.

In response to the above suggestions, by letter dated November 21, 1986, the licensee revised and superseded their earlier proposed changes to HCGS TS 3/4.6.1.8. Subsequently, by letters dated December 18, 1986 and February 20, March 19, May 15 and July 13, 1987, the licensee made minor revisions to HCGS TS 3/4.6.1.8 and the associated bases as identified in the November 21, 1986 submittal or provided additional information in support of the proposed changes. Staff's evaluation of the proposed changes to HCGS TS 3/4.6.1.8, TS Table 3.6.3-1 and bases for TS 3/4.6.1.8 is given below.

2.0 EVALUATION

Demonstration of operability of the containment purge and vent valves, particularly the ability of these valves to close during a design basis accident, is necessary to assure containment isolation. This demonstration of operability is required by Branch Technical Position (BTP) CSB 6-4 "Containment Purging During Normal Operations," NUREG-0800, Revision 2, July 1981, and Standard Review Plan (SRP) 3.10 for containment purge and vent valves which are not sealed closed during Operational Conditions 1, 2, 3, and 4.

The valves identified as the containment isolation valves in the Hope Creek purge and vent system are as follows:

Valve Tag No.	Valve Size	Use	Valve Location
1-GS-HV-4950	26"	Drywell Purge Exhaust	Outside Contmt.
1-GS-HV-4952	26"	Drywell Purge Exhaust	Outside Contmt.
1-GS-HV-4956	26"	Drywell Purge Exhaust	Outside Contmt.
1-GS-HV-4979	26"	Drywell Purge Exhaust	Outside Contmt.
1-GS-HV-4978	6"	Nitrogen Purge	Outside Contmt.
1-GS-HV-4958	24"	Suppression Chamber Supply	Outside Contmt.
1-GS-HV-4962	24"	Suppression Chamber Supply	Outside Contmt.
1-GS-HV-4964	24"	Suppression Chamber Supply	Outside Contmt.
1-GS-HV-4980	24"	Suppression Chamber Supply	Outside Contmt.

All the purge and vent valves are butterfly valves manufactured by the BIF Corporation and are equipped with Matryx rotary hydraulic actuators. The actuators are controlled by ASCO solenoid valves.

The licensee has provided purge and vent valve operability demonstration in its June 4 and November 21, 1986 submittals related to this amendment request and in its April 7, 1986 submittal in support of its application for an operating license.

The licensee's approach to operability demonstration of the purge and vent valves is based on testing a 26-inch BIF valve under simulated DBA/LOCA conditions at Wyle Laboratories. Test Report No. 47962-1, provided as Attachment 3 to its June 4, 1986 submittal, documents the test setup, instrumentation used, the acceptance criteria, the test procedure and a summary of the test results. The valve (26-inch) assembly used in the test was subjected to saturated steam flow against the curved side of the valve disc and closed against a differential pressure ranging from 57.5 psia to 131.7 in 3.92 seconds. Subsequent physical examination after testing checked:

a) The resilient rubber seat for cuts or tears.
b) The exposed shaft for cracks and deformation.
c) Both sides of the disc for cracks or failure indicators.
d) The internal surface of the body of the valve for cracks.
e) The external actuator surface for cracks and deformation.

No physical damage or failure was noted.

Even though the Hope Creek valves differ in size, they are manufactured using similar materials, valve body styles, and actuators as shown in drawings provided in the licensee's June 4, 1986 submittal.

To assure that the 26-inch and 24-inch valves close in less than five seconds, the tubing size was increased from ½-inch to ¾-inch between the solenoid and the actuator's hydraulic cylinder, and tubing was rerouted to decrease the number of fittings. Based on the closure time documented in Wyle Laboratories Test Report No. 47962-1 and Hope Creek's surveillance testing, all the containment vent/purge valves close in less than five seconds.

Seismic qualification for the 26-inch, 24-inch, and 6-inch purge and vent valve assemblies at Hope Creek is confirmed in the licensee's April 7, 1986 submittal.

The licensee's approach to operability demonstration is to test the largest size purge and vent valve (26-inch), used for containment isolation at Hope Creek under postulated DBA/LOCA conditions of flow, pressure and temperature. Since all of the purge and vent valves used at Hope Creek are similar in design and materials, the results of testing the largest valve under LOCA conditions can be applied to the smaller valves (24-inch and 6-inch).

The test demonstrated the ability of the valve to close against a peak differential pressure of 131.7 psia in 3.92 seconds. Since the peak containment pressure is 48.1 psig during LOCA conditions, the test at 131.7 psia provides a large safety margin for the valve's critical parts and the ability to close against the increase in containment pressure during a LOCA.

BTP CSB 6-4 also requires a post-test valve examination to establish structural integrity of the key valve/actuator components. Upon completion of testing, the licensee, physically examined the rubber seat, valve shaft, valve body, valve disc and actuator for cracks and deformation. No physical damage or failure was noted.

Seismic qualification for the purge and vent valves at Hope Creek is confirmed in the licensee's April 7, 1986 submittal.

The licensee's June 4, 1986 submittal demonstrates the ability of these valves to close from the (90°) full open position against the rise in containment pressure in the event of a DBA/LOCA, thereby meeting the requirements of T.M.I. II.E.4.2.

On the basis of the above information, the staff finds that the licensee has demonstrated the operability of the 26-inch, 24-inch and six-inch purge and vent valves at Hope Creek.

The proposed LCO would allow primary containment isolation valve(s) on one purge supply line (26 or 24-inch), the isolation valve on the six-inch nitrogen supply line, and the isolation valves on one purge exhaust line (26 or 24-inch) to be open, as appropriate, for up to 120 hours in a 365 day period, for pre-purge cleanup, inerting, deinerting or pressure control of the primary containment during plant Operational Conditions 1, 2, and 3. There is no separate primary containment penetration for the six-inch nitrogen supply line, which is used only during inerting. The line has a common primary containment butterfly isolation valve shared by two nitrogen supply branches, which are connected to the drywell and SC purge supply lines between the inboard and outboard purge supply isolation valves on the lines. The LCO restrictions on time and number of purge system exhaust lines that can be used at any one time are not applicable when the in-board purge exhaust isolation valves alone (outboard purge exhaust isolation valves remain closed) are used in conjunction with the two-inch bypass vent valves to vent the primary containment atmosphere for pressure control. Also, the proposed revision to TS Table 3.6.3-1 reduces the existing maximum isolation time (includes instrument delay time) of 15 seconds to five seconds for all the butterfly isolation valves.

The licensee justified their proposed excess time of 30 hours per year over the 90 hours per year normally suggested by the staff (Acceptance Criteria of SRP 6.2.4). The basis for the extra time is due to the additional time needed for pre-purge cleanup of the primary containment for HCGS. The licensee stated that HCGS utilizes a unique atmosphere recirculation Containment Pre-purge Cleanup System (CPCS) to maintain lower offsite doses from releases anticipated during normal operations than purging such release through charcoal filters. In addition, the CPCS would be used only either prior to purging, or during plant Operational Conditions 1, 2, and 3, prior to deinerting. The licensee estimated that the 90-hour-per-year limit would permit about six inert/deinert cycles per year. Based on the CPCS design parameters and drywell volume, the licensee determined that roughly four hours of pre-purge cleanup would be required prior to each deinert cycle giving roughly a total of 24 hours for six deinert cycles per year for the pre-purge cleanup operation.

The licensee has also analyzed the effect of a postulated LOCA, during the time when the purge isolation valves are open, on structures and safety-related equipment beyond the purge system isolation valves. Assuming a closure time of five seconds for the valves, the analysis showed that rupture of the CPCS ductwork would occur at a pressure of 3-4 psid due to LOCA. The resulting peak pressure of $\leqq$ 1 psid in the safety-related Filtration-Recirculation- Ventilation System (FRVS) will have a minimal effect upon the recirculation function of the FRVS and will not affect the filtration, exhaust and drawdown functions of the FRVS. Since the HCGS design does not require the FRVS operation during pre-purge cleanup, deinerting or inerting, the inlet and outlet dampers for all the FRVS fan/filter units are in a closed condition during the above operations. This would protect the FRVS fan filter units from the pressure surge due to the LOCA.

However, to provide added safety margin to the FRVS ductwork, the licensee committed to install blow-out panels rated at 1.00 ± 0.25 psid in the CPCS ductwork upstream of the purge supply isolation valves and downstream of the purge exhaust isolation valves prior to implementation of the proposed TS changes. These panels will lower the pressure rise across the FRVS dampers and/or ductwork. Estimated peak pressure in the FRVS ductwork is 0.2 psid. These panels, therefore, provide added safety margin to further assure the integrity of the FRVS ductwork. Also, these panels are expected to lower the pressure surge on the FRVS fan/filter units which are also protected by the closed inlet and outlet dampers on each unit. The licensee has also evaluated the effect of increased relative humidity resulting from the LOCA blowdown on the FRVS filter units. Assuming that 100 percent relative humidity will be reached due to steam release in the rooms where the blowdown from the CPCS ducts takes place, the licensee determined that due to mixing in the FRVS inlet ductwork, the relative humidity at the filter units will remain below their design limits and, therefore, their efficiency will not be compromised. The licensee has also committed to refit the FRVS isolation dampers with new pressure differential switches in lieu of the existing ones to prevent the isolation of the FRVS ducts to the torus and connecting compartments following a LOCA. The LOCA analysis considered the possible effects of pressurization of the rooms in which the blowdown of the drywell/SC fluid through the blow-out panels will occur, and the connecting rooms. The licensee determined that the pressure buildup in the subject rooms will not be sufficient to affect either the integrity of the ducts or the operability of the safety equipment in the rooms, provided that the flow paths from the drywell and the SC areas are limited to a total of one purge supply line and one purge exhaust line from both the areas.

The proposed SR revision requires the licensee to verify that the applicable butterfly isolation valves have not been opened for more than 120 hours in the previous 365 days prior to opening them during plant Operational Conditions 1, 2, and 3. The licensee's proposed Action Statement deletes reference to sealed closed state for the isolation valves during plant Operational Conditions 1, 2, and 3. These valves can be open as permitted by the proposed LCO.

In its proposed Amendment to the HCGS Final Safety Analysis Report (FSAR), the licensee also discussed how the proposed TS revision complies with the requirements of BTP CSB 6-4. By submittal dated December 18, 1986, the licensee provided LOCA dose analysis. The licensee determined that the peak doses (thyroid doses) at the site boundary and at the control room resulting from a postulated LOCA due to unfiltered release to the environment during the five-second purge valve closure time, are well below the applicable 10 CFR dose limits.

The staff has independently analyzed the radioactivity release to the environment during a LOCA for the duration of the first five seconds before the vent/purge valves are isolated, and before the onset of fuel failure. Therefore, the radioactivity source associated with this release is based on the maximum primary coolant activity, including the iodine spiking factor. On the basis of this analysis, incremental 30-day control room doses were estimated. The calculated incremental control room thyroid dose is 6.6×10^{-3} rem. The incremental whole body dose is negligible. The calculated incremental two-hour exclusion area boundary and 30-day low population zone boundary doses are 0.270 rem and 0.013 rem respectively. The staff previously estimated control room, exclusion area boundary and low population zone boundary total LOCA doses are respectively 1.6 rem, 124 rem and six rem to the thyroid. Therefore, the revised control room, exclusion area boundary and low population zone boundary LOCA doses are practically unchanged as a result of the proposed Technical Specification revision.

The licensee also proposed changes to the SR dealing with the time interval between leak rate integrity tests for the butterfly isolation valves with resilient material seals. The request is consistent with current SRs for such valves and is, therefore, acceptable.

Based on the review as discussed above, the staff finds that:

1. The licensee has demonstrated the operability of the 26-inch, 24-inch and six-inch purge and vent valves used at Hope Creek.

2. The proposed cumulative annual time limit when the applicable combination of the butterfly isolation valves can be open is a reasonable value based upon the time required for inerting, deinerting, pressure control or pre-purge cleanup of the primary containment during plant Operational Conditions 1, 2, and 3. This restriction in conjunction with restriction on the number of purge supply and exhaust lines that can be utilized at any one time, and the proposed five-seconds closure time (including the instrument delay time) for all the above valves, provides reasonable assurance that containment integrity will be maintained and radiological releases will be either prevented or limited to within acceptable limits should a LOCA occur while the valves are open for these purposes.

3. The proposed time of 120 hours per year exceeds the 90 hours per year suggested in SRP 6.2.4 Acceptance Criterion II.6.n. However, the design of the HCGS pre-purge cleanup system and the proposed utilization of the system only prior to deinerting during Operational Conditions 1, 2, and 3, justify the proposal.

4. The licensee's LOCA analysis demonstrates that the FRVS will essentially maintain its functional capability even without blow-out panels in the CPCS ductwork.

5. The proposed installation of the blow-out panels will increase the safety margin for the FRVS ductwork.

6. With the restriction on the number of purge supply and exhaust lines that can be utilized at any one time, possible pressurization of the applicable rooms resulting from LOCA blowdown through the blow-out panels will have no unacceptable effects on the integrity of the ducts or operability of safety-related equipment in the subject rooms.

7. The proposed SR changes adequately protect against inadvertent opening of the subject valves in excess of the allowed annual time limit.

8. The proposed time interval between leak rate integrity tests for the applicable isolation valves with resilient material seals is consistent with the staff's position on such tests.

9. Keeping open only the inboard purge exhaust valve(s) for achieving pressure control need not be subjected to the restrictions identified in the proposed LCO since, during such operations, the outboard purge exhaust isolation valves will remain closed and only the smaller vent line(s) (two-inch) will be used. Also, the inboard purge exhaust isolation valve(s) can be closed within five-seconds and the vent valve(s) can be closed within 15 seconds following LOCA.

10. The proposed changes will not result in any significant changes to the previously estimated LOCA doses for the control room, exclusion area boundary and low population zone boundary. Therefore, the control room habitability system will still meet the GDC 19 requirements and the site boundary and offsite doses continue to meet the guidelines of 10 CFR Part 100.

11. The proposed TS changes satisfy the intent and purpose of BTP CSB 6-4.

Based on the above, the staff concludes that the proposed changes to HCGS TS 3/4.6.1.8 and the associated bases and to the TS Table 3.6.3-2 are acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendment involves 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets 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 this amendment.

4.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (52 FR 9582) on March 25, 1987 and consulted with the State of New Jersey. No public comments were received and the State of New Jersey did not have any comments.

The staff 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, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security nor to the health and safety of the public.

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