

Temple-NRE-058

Mr. Harold W. Keiser  
Chief Nuclear Officer & President -  
Nuclear Business Unit  
Public Service Electric & Gas  
Company  
Post Office Box 236  
Hancocks Bridge, NJ 08038

March 6, 2000

SUBJECT: HOPE CREEK GENERATING STATION, ISSUANCE OF AMENDMENT  
RE: CONDENSATE STORAGE TANK LOW LEVEL SETPOINT CHANGE  
(TAC NO. MA6342)

Dear Mr. Keiser:

The Commission has issued the enclosed Amendment No. 124 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 August 26, 1999.

This amendment raises the condensate storage tank (CST) low level setpoint and the corresponding allowable value in TS Tables 3.3.3-2 and 3.3.5-2. The subject setpoint is associated with the automatic transfer of the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) pump suction from the CST to the suppression pool in the event of low CST level. These changes are being made to address concerns regarding potential vortexing in the HPCI and RCIC suction flowpaths.

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

Sincerely,

/RA/

Richard B. Ennis, Project Manager, Section 2  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosures: 1. Amendment No. 124 to  
License No. NPF-57  
2. Safety Evaluation

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 6, 2000

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Chief Nuclear Officer & President -  
Nuclear Business Unit  
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Sincerely,

A handwritten signature in cursive script, appearing to read "RB Ennis".

Richard B. Ennis, Project Manager, Section 2  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosures: 1. Amendment No. 124 to  
License No. NPF-57  
2. Safety Evaluation

cc w/encls: See next page

Hope Creek Generating Station

cc:

Jeffrie J. Keenan, Esquire  
Nuclear Business Unit - N21  
P.O. Box 236  
Hancocks Bridge, NJ 08038

Hope Creek Resident Inspector  
U.S. Nuclear Regulatory Commission  
Drawer 0509  
Hancocks Bridge, NJ 08038

Mr. Louis Storz  
Sr. Vice President - Nuclear Operations  
Nuclear Department  
P.O. Box 236  
Hancocks Bridge, NJ 08038

General Manager - Hope Creek Operations  
Hope Creek Generating Station  
P.O. Box 236  
Hancocks Bridge, NJ 08038

Director - Licensing Regulation & Fuels  
Nuclear Business Unit - N21  
P.O. Box 236  
Hancocks Bridge, NJ 08038

Regional Administrator, Region I  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

Dr. Jill Lipoti, Asst. Director  
Radiation Protection Programs  
NJ Department of Environmental  
Protection and Energy  
CN 415  
Trenton, NJ 08625-0415

Manager - Joint Generation  
Atlantic Energy  
6801 Black Horse Pike  
Egg Harbor Twp., NJ 08234-4130

Richard Hartung  
Electric Service Evaluation  
Board of Regulatory Commissioners  
2 Gateway Center, Tenth Floor  
Newark, NJ 07102

Lower Alloways Creek Township  
c/o Mary O. Henderson, Clerk  
Municipal Building, P.O. Box 157  
Hancocks Bridge, NJ 08038

Mr. Elbert Simpson  
Senior Vice President-  
Nuclear Engineering  
Nuclear Department  
P.O. Box 236  
Hancocks Bridge, NJ 08038



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

PUBLIC SERVICE ELECTRIC & GAS COMPANY

ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-354

HOPE CREEK GENERATING STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 124  
License No. NPF-57

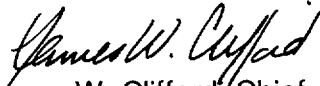
1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by the Public Service Electric & Gas Company (PSE&G) dated August 26, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's 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. 124 , and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into the license. PSE&G shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. The license amendment is effective as of its date of issuance, and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION



James W. Clifford, Chief, Section 2  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: **March 6, 2000**

ATTACHMENT TO LICENSE AMENDMENT NO. 124

FACILITY OPERATING LICENSE NO. NPF-57

DOCKET NO. 50-354

Replace the following pages of the Appendix "A" Technical Specifications with the attached revised pages. The revised pages are identified by Amendment number and contain marginal lines indicating the areas of change.

Remove

3/4 3-36

3/4 3-54

Insert

3/4 3-36

3/4 3-54

TABLE 3.3.3-2

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

<u>TRIP FUNCTION</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
<u>1. CORE SPRAY SYSTEM</u>		
a. Reactor Vessel Water Level - Low Low Low, Level 1	≥ -129 inches*	≥ -136 inches
b. Drywell Pressure - High	≤ 1.68 psig	≤ 1.88 psig
c. Reactor Vessel Pressure - Low	461 psig	≤ 481 psig and ≥ 441 psig
d. Core Spray Pump Discharge Flow - Low (Bypass)	≥ 775 gpm	≥ 650 gpm
e. Core Spray Pump Start Time Delay - Normal Power	10 seconds	≥ 9 seconds and ≤ 11 seconds
f. Core Spray Pump Start Time Delay - Emergency Power	6 seconds	≥ 5 Seconds and ≤ 7 Seconds
g. Manual Initiation	NA	NA
<u>2. LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM</u>		
a. Reactor Vessel Water Level - Low Low Low, Level 1	≥ -129 inches*	≥ -136 inches
b. Drywell Pressure - High	≤ 1.68 psig	≤ 1.88 psig
c. Reactor Vessel Pressure - Low (Permissive)	450 psig	≤ 460 psig and ≥ 440 psig
d. LPCI Pump Discharge Flow - Low (Bypass)	≥ 1250 gpm	≥ 1100 gpm
e. LPCI Pump Start Time Delay - Normal Power	5 seconds	≥ 4 seconds and ≤ 6 seconds
f. Manual Initiation	NA	NA
<u>3. HIGH PRESSURE COOLANT INJECTION SYSTEM</u>		
a. Reactor Vessel Water Level - (Low Low, Level 2)	≥ -38 inches*	≥ -45 inches
b. Drywell Pressure - High	≤ 1.68 psig	≤ 1.88 psig
c. Condensate Storage Tank Level - Low	≥ 67,675 gallons	≥ 64,291 gallons
d. Suppression Pool Water Level - High	≤ 78.5 inches	≤ 80.3 inches
e. Reactor Vessel Water Level - High, Level 8	≤ 54 inches	≤ 61 inches
f. HPCI Pump Discharge Flow - Low (Bypass)	≥ 550 gpm	≥ 500 gpm
g. Manual Initiation	NA	NA

TABLE 3.3.5-2

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

<u>FUNCTIONAL UNITS</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
a. Reactor Vessel Water Level - Low Low, Level 2	≥ -38 inches*	≥ -45 inches
b. Reactor Vessel Water Level - High, Level 8	≤ 54 inches*	≤ 61 inches
c. Condensate Storage Tank Level - Low	≥ 67,675 gallons	≥ 64,291 gallons
d. Manual Initiation	NA	NA

\*See Bases Figure B 3/4 3-1.





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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 124 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 August 26, 1999, the Public Service Electric & Gas Company (PSE&G or the licensee) submitted a request for changes to the Hope Creek Generating Station (HCGS) Technical Specifications (TSs). The proposed amendment would raise the condensate storage tank (CST) low level setpoint and the corresponding allowable value in TS Tables 3.3.3-2 and 3.3.5-2. The subject setpoint is associated with the automatic transfer of the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) pump suction from the CST to the suppression pool in the event of low CST level. These changes are being made to address concerns regarding potential vortexing in the HPCI and RCIC suction flowpaths.

2.0 BACKGROUND

As described in the HCGS Updated Final Safety Analysis Report (UFSAR) Section 9.2.6, the CST is the normal source of water for the HPCI and RCIC systems for both operational use and for testing. The CST also supplies water to various other systems and components during normal plant operation and for refueling activities. In the event of low CST level, redundant safety grade level instrumentation has been provided to allow for the automatic transfer of the HPCI and RCIC pump suction from the CST to the suppression pool. The CST low level setpoint at which the HPCI and RCIC pump suction transfer occurs is shown in TS Tables 3.3.3-2 and 3.3.5-2.

As shown in UFSAR Table 3.2-1, page 14 of 42, the CST is classified as Quality Group D and is non-seismic. As explained in UFSAR Section 3.2.2.1, Quality Group D is considered as non-safety-related for HCGS components. This is consistent with UFSAR Section 9.2.6.3 which states that failure of the CST does not compromise any safety-related system or component, and does not prevent a safe shutdown of the plant. The safety grade source of water for the HPCI and RCIC systems is the suppression pool.

As described in UFSAR Sections 5.4.6 and 7.4.1, the RCIC system is used to achieve and maintain a safe shutdown condition of the plant. The system is designed to ensure that sufficient reactor water inventory is maintained in the reactor vessel to allow for adequate core cooling under the following conditions:

- (1) When the reactor vessel is isolated and maintained in the Hot Standby condition.
- (2) When the reactor vessel is isolated and is accompanied by a loss of normal feedwater flow.
- (3) When a complete plant shutdown is started under conditions of a loss of normal feedwater flow and prior to vessel depressurization sufficient for operation of the Residual Heat Removal (RHR) system shutdown cooling mode.

As noted in the licensee's application, the RCIC system is also required for safe shutdown during station blackout (SBO) scenarios and for remote shutdown from outside the control room. As noted in UFSAR Section 7.4.1.4.5.2, during a reactor shutdown from the remote shutdown panel (RSP), RCIC pump suction transfer from the CST to the suppression pool is not automatic and must be initiated manually. An indicating light on the RSP illuminates when the CST low level is reached.

As described in Section 5.4.6 of the HCGS Safety Evaluation Report (NUREG-1048), the safety grade automatic transfer of the RCIC pump suction from the CST to the suppression pool ensures a water supply to the RCIC system in the event of a safe shutdown earthquake and concurrent failure of the CST.

As described in UFSAR Sections 6.3.1.2.1, 6.3.2.2.1, and 7.3.1.1.1.1, the HPCI system, which is one of the Emergency Core Cooling System (ECCS) subsystems, maintains reactor vessel inventory after small breaks that do not depressurize the reactor vessel. The HPCI system also serves as a backup to the RCIC system by maintaining reactor vessel inventory following a reactor isolation and coincident failure of the RCIC system. The TS Bases for Sections 3/4.5.1 and 3/4.5.2, "ECCS - Operating and Shutdown," states that no credit is taken in the safety analyses for the CST water.

As described in UFSAR Sections 5.4.6.2.2.2, 6.3.2.2.1, 7.4.1.4.5.2, and 9.2.6.1, the CST has the design basis requirement to provide a minimum of 135,000 gallons for use by the RCIC and HPCI systems. As noted in UFSAR Section 7.4.1.4.5.2, a CST volume of 135,000 gallons will allow over 3 hours of RCIC operation at the design flow rate of 600 gallons per minute. Three hours of RCIC operation is adequate to cool the reactor from the operating temperature to the RHR shutdown cooling initiation temperature, assuming a maximum cooldown rate of 100 degrees Fahrenheit per hour (°F/hr).

As described in TS 3/4.5.2, "ECCS - Shutdown," during Operational Condition 4 or 5 (i.e., cold shutdown or refueling) with the suppression pool water level below the TS limits or drained, the Core Spray system can utilize the CST volume for a suction source. When relying on the CST under such conditions, the CST must have a minimum available volume of 135,000 gallons.

Section 1.15.1 of the UFSAR describes the ability to cope with a SBO event and the basis for compliance with 10 CFR 50.63. As described in the licensee's submittal, the HCGS SBO analysis requires a 4-hour coping period. The plant's ability to cope for that duration and safely recover is due in part to providing adequate condensate inventory for decay heat

removal. Reactor coolant inventory control and decay heat removal are accomplished by operation of RCIC and HPCI to achieve a maximum cooldown rate of 100°F/hr, with an assumed CST inventory of 135,000 gallons. The SBO procedure notes that HPCI and RCIC take suction from the CST or suppression pool; however, the procedure also cautions that the suppression pool should only be used if CST water is unavailable and sufficient net positive suction head (NPSH) is available, or as directed by the emergency operating procedures.

On October 26, 1998, the Nuclear Regulatory Commission (NRC) issued Information Notice (IN) 98-40, "Design Deficiencies Can Lead To Reduced ECCS Pump Net Positive Suction Head During Design Basis-Accidents." This IN was issued to alert nuclear power plant licensees that incorrect level instrument setpoints or other design deficiencies could render ECCS pumps inoperable during certain design-basis accidents. As described in NRC Inspection Report (IR) 50-354/99-03 dated June 21, 1999, PSE&G reviewed IN 98-40 for HCGS and determined that the CST low level transfer setpoint did not appropriately account for instrument inaccuracies and that vortexing in the CST was not considered with respect to HPCI and RCIC pump performance. As described in the licensee's submittal, PSE&G determined that vortexing could occur before the suction would transfer from the CST to the suppression pool and that a potential for air entrainment into the HPCI or RCIC pump suctions existed. PSE&G concluded that the CST level instrumentation could not be considered to be "fully qualified" as defined by Generic Letter (GL) 91-18, "Information To Licensees Regarding NRC Inspection Manual Section On Resolution Of Degraded And Nonconforming Conditions." As stated in GL 91-18, full qualification constitutes conforming to all aspects of the current licensing basis, including codes and standards, design criteria, and commitments. PSE&G addressed the vortexing concerns and restored full qualification to the instrumentation by implementing plant design changes that raised the CST low level setpoint to a value above the point of vortex formation. The setpoint change was made in accordance with the provisions in 10 CFR 50.59.

As described in the licensee's submittal, the proposed amendment would raise the CST low level setpoint and the corresponding allowable value in TS Tables 3.3.3-2 and 3.3.5-2. The setpoint would be raised from 22,558 gallons (99' 8") to 67,675 gallons (103' 10"), and the allowable value would be raised from 19,174 gallons (99' 5") to 64,291 gallons (103' 7"). The proposed amendment would result in TS values that are consistent with the setpoint that was implemented under 10 CFR 50.59.

The licensee's submittal also states that raising the CST low level setpoint impacted the previously established methods of maintaining the 135,000-gallon CST reserve volume described in the UFSAR. Prior to the setpoint change, a standpipe inside the CST physically limited tank level at the required point. By raising the low level setpoint, the standpipe is no longer able to maintain the required reserve volume. As an alternative, a control room low level alarm and operator action are being relied upon to maintain a minimum operational level above 203,000 gallons. A volume of 203,000 gallons ensures that 135,000 gallons are available while taking the new low level setpoint of 67,675 gallons into account (i.e.,  $203,000 - 67,675 > 135,000$ ). The control room low level alarm actuates at 266,000 gallons and provides advanced indication of decreasing level. A procedure change crediting the CST low level alarm function and subsequent operator actions to maintain a sufficient reserve volume was

implemented. The procedure requires that operators preemptively transfer the HPCI and RCIC suction flowpaths to the suppression pool if the CST level decreases below 203,000 gallons during plant operation with no actuation of HPCI or RCIC.

### 3.0 EVALUATION

As described in the Bases for TS 3/4.3.3, "Emergency Core Cooling System Actuation Instrumentation," the ECCS actuation instrumentation is provided to initiate actions to mitigate the consequences of accidents that are beyond the ability of the operator to control. Table 3.3.3-2 provides trip setpoints and allowable values for the ECCS system (which includes the HPCI system) and provides the low level setpoint and allowable value for the CST.

The Bases for TS 3/4.3.5, "RCIC System Actuation Instrumentation," states that the RCIC system actuation instrumentation is provided to initiate actions to assure adequate core cooling in the event of reactor isolation from its primary heat sink and the loss of feedwater flow to the reactor vessel. Table 3.3.5-2 provides trip setpoints and allowable values for the RCIC system and provides the low level setpoint and allowable value for the CST.<sup>1</sup>

For TS Tables 3.3.3-2 and 3.3.5-2, the CST low level trip setpoint specifies the point at which the HPCI and RCIC pump suctions automatically transfer from the non-safety grade source of water (i.e., the CST) to the safety grade source of water (i.e., the suppression pool). The proposed TS changes provide a CST low level trip setpoint and allowable value that are more conservative than the current TSs and that are consistent with the current plant CST low level trip setpoint that was established in accordance with 10 CFR 50.59. Raising the setpoint above the point of potential vortex formation in the HPCI and RCIC pump suction flowpaths protects against air entrainment into the pump suctions at low CST levels. This will help ensure that the HPCI and RCIC systems function as intended.

As discussed above, the CST has the UFSAR design basis requirement to have a minimum reserve volume of 135,000 gallons for use by the HPCI and RCIC systems during normal operation. The licensee has stated that this requirement is met by administratively maintaining a minimum operational level above 203,000 gallons. The reliance on operator action to maintain the required reserve volume does not adversely affect any of the HPCI and RCIC safety functions. The CST is non-safety-related and non-seismic. Failure of the CST does not compromise any safety-related system or component, and does not prevent a safe shutdown of the plant. No credit is taken in the plant safety analyses for the CST water. In all cases where the CST is utilized as the normal source of water, the safety-related automatic transfer to the suppression pool as a safety grade source of water is relied on. The proposed method of maintaining the 135,000-gallon reserve volume does not affect the automatic transfer function and therefore, does not adversely affect the capability of the HPCI and RCIC systems to perform their intended safety functions.

Based on the above evaluation, the staff concludes that the proposed amendment is acceptable.

#### 4.0 STATE CONSULTATION

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

#### 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC 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 the amendment involves no significant hazards consideration, and there has been no public comment on such finding (64 FR 51348). Accordingly, the 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 the amendment.

#### 6.0 CONCLUSION

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

Principal Contributor: R. Ennis

Date: March 6, 2000