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

March 4, 2009

Mr. Thomas Joyce
President and Chief Nuclear Officer
PSEG Nuclear
P.O. Box 236, N09
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION - ISSUANCE OF AMENDMENT RE: HYDROGEN WATER CHEMISTRY LOW POWER RESTRICTION (TAC NO. MD8576)

Dear Mr. Joyce:

The Commission has issued the enclosed Amendment No. 176 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 April 25, 2008, as supplemented by letter dated January 7, 2009. The amendment revises the TSs to remove the restriction on operation of the hydrogen water chemistry system at low power levels.

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

Sincerely,

Richard B. Ennis, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosures:
1. Amendment No. 176 to License No. NPF-57
2. Safety Evaluation

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

PSEG NUCLEAR LLC

DOCKET NO. 50-354

HOPE CREEK GENERATING STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 176
License No. NPF-57

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

   A. The application for amendment filed by PSEG Nuclear LLC dated April 25, 2008, as supplemented by letter dated January 7, 2009, 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. 176, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into the license. PSEG Nuclear LLC 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 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the License
and Technical Specifications

Date of Issuance: March 4, 2009

ATTACHMENT TO LICENSE AMENDMENT NO. 176

FACILITY OPERATING LICENSE NO. NPF-57

DOCKET NO. 50-354

Replace the following page of the Facility Operating License with the revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove	Insert
Page 3	Page 3

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	Insert
3/4 3-12	3/4 3-12
3/4 3-16a	3/4 3-16a
3/4 3-25	3/4 3-25

(4) PSEG Nuclear LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(5) PSEG Nuclear LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(6) PSEG Nuclear LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

PSEG Nuclear LLC is authorized to operate the facility at reactor core power levels not in excess of 3840 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 176, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into the license. PSEG Nuclear LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Inservice Testing of Pumps and Valves (Section 3.9.6, SSER No. 4)*

This License Condition was satisfied as documented in the letter from W. R. Butler (NRC) to C. A. McNeill, Jr. (PSE&G) dated December 7, 1987. Accordingly, this condition has been deleted.

*The parenthetical notation following the title of many license conditions denotes the section of the Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

TABLE 3.3.2-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION

TRIP FUNCTION	VALVE ACTUATION GROUPS OPERATED BY SIGNAL	MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM[a]	APPLICABLE OPERATIONAL CONDITION	ACTION
3. MAIN STEAM LINE ISOLATION				
a. Reactor Vessel Water Level - Low Low Low, Level 1	1	2	1, 2, 3	21
b. Main Steam Line Radiation - High, High	2[b]	2	1##, 2##, 3	28
c. Main Steam Line Pressure - Low	1	2	1	22
d. Main Steam Line Flow - High	1	2/line	1, 2, 3	20
e. Condenser Vacuum - Low	1	2	1, 2**, 3**	21
f. Main Steam Line Tunnel Temperature - High	1	2/line	1, 2, 3	21
g. Manual Initiation	1, 2, 17	2	1, 2, 3	25
4. REACTOR WATER CLEANUP SYSTEM ISOLATION				
a. RWCU Δ Flow - High	7	1/Valve[e]	1, 2, 3	23
b. RWCU Δ Flow - High, Timer	7	1/Valve[e]	1, 2, 3	23
c. RWCU Area Temperature - High	7	6/Valve[e]	1, 2, 3	23
d. RWCU Area Ventilation Δ Temperature-High	7	6/Valve[e]	1, 2, 3	23
e. SLCS Initiation	7[f]	1/Valve[e]	1, 2	23
f. Reactor Vessel Water Level - Low Low, Level 2	7	2/Valve[e]	1, 2, 3	23
g. Manual Initiation	7	1/Valve[e]	1, 2, 3	25

TABLE 3.3.2-1 (Continued)

NOTES

* When handling recently irradiated fuel in the secondary containment and during operations with a potential for draining the reactor vessel.

** When any turbine stop valve is greater than 90% open and/or when the key-locked bypass switch is in the Norm position.

Below 20% of RATED THERMAL POWER the Main Steamline Radiation Monitor setpoints shall not exceed the values determined using normal full power background radiation levels with the hydrogen water chemistry (HWC) system shut down. After reaching 20% of RATED THERMAL POWER the normal full power background radiation level and associated trip setpoints may be increased to levels previously measured during full power operation with hydrogen injection. Prior to decreasing below 20% of RATED THERMAL POWER the background level and associated setpoint shall be returned to the normal full power values. If the Main Steamline Radiation Monitor setpoints have been increased for HWC operation and a power reduction event occurs so that the reactor power is below 20% of RATED THERMAL POWER without the required setpoint change, control rod motion shall be suspended (except for scram or other emergency actions) until the necessary setpoint adjustment is made.

(a) A channel may be placed in an inoperable status for up to 6 hours for required surveillance without placing the trip system in the tripped condition provided at least one other OPERABLE channel in the same trip system is monitoring that parameter.

(b) Also trips and isolates the mechanical vacuum pumps.

(c) Also starts the Filtration, Recirculation and Ventilation System (FRVS).

(d) DELETED

(e) Sensors arranged per valve group, not per trip system.

(f) Closes only RWCU system isolation valve(s) HV-F001 and HV-F004.

(g) Requires system steam supply pressure-low coincident with drywell pressure-high to close turbine exhaust vacuum breaker valves.

(h) Manual isolation closes HV-F008 only, and only following manual or automatic initiation of the RCIC system.

(i) Manual isolation closes HV-F003 and HV-F042 only, and only following manual or automatic initiation of the HPCI system.

(j) Trip functions common to RPS instrumentation.

TABLE 3.3.2-2 (Continued)

ISOLATION ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
7. RHR SYSTEM SHUTDOWN COOLING MODE ISOLATION		
a. Reactor Vessel Water Level - Low, Level 3	≥ 12.5 inches*	≥ 11.0 inches
b. Reactor Vessel (RHR Cut-in Permissive) Pressure - High	≤ 82.0 psig	≤ 102.0 psig
c. Manual Initiation	NA	NA

* See Bases Figure B 3/4 3-1.
*** These setpoints are as follows:
160°F - RWCU pipe chase room 4402
140°F - RWCU pump room and heat exchanger rooms
135°F - RWCU pipe chase room 4505
\# 30 minute time delay.
15 minute time delay.
Below 20% of RATED THERMAL POWER the Main Steamline Radiation Monitor setpoints shall not exceed the values determined using normal full power background radiation levels with the hydrogen water chemistry (HWC) system shut down. After reaching 20% of RATED THERMAL POWER the normal full power background radiation level and associated trip setpoints may be increased to levels previously measured during full power operation with hydrogen injection. Prior to decreasing below 20% of RATED THERMAL POWER the background level and associated setpoint shall be returned to the normal full power values. If the Main Steamline Radiation Monitor setpoints have been increased for HWC operation and a power reduction event occurs so that the reactor power is below 20% of RATED THERMAL POWER without the required setpoint change, control rod motion shall be suspended (except for scram or other emergency actions) until the necessary setpoint adjustment is made.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 176 TO FACILITY OPERATING LICENSE NO. NPF-57

PSEG NUCLEAR LLC

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

1.0 INTRODUCTION

By application dated April 25, 2008, as supplemented by letter dated January 7, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML081430002 and ML090230629, respectively), PSEG Nuclear LLC (PSEG or the licensee) submitted a license amendment request for the Hope Creek Generating Station (HCGS). The proposed amendment would revise the Technical Specifications (TSs) to remove the current restriction on operation of the hydrogen water chemistry (HWC) system at low power levels.

The current restriction on HWC operation is shown in footnote ## in TS Table 3.3.2-1, "Isolation Actuation Instrumentation" and footnote ### in TS Table 3.3.2-2, "Isolation Actuation Instrumentation Setpoints." These footnotes pertain to Trip Function 3.b, "Main Steam Line Radiation - High, High" in each of these tables. Both footnotes currently read as follows:

> The hydrogen water chemistry (HWC) system shall not be placed in service until reactor power reaches 20% of RATED THERMAL POWER. After reaching 20% of RATED THERMAL POWER, and prior to operating the HWC system, the normal full power background radiation level and associated trip setpoints may be increased to levels previously measured during full power operation with hydrogen injection. Prior to decreasing below 20% of RATED THERMAL POWER and after the HWC system has been shutoff, the background level and associated setpoint shall be returned to the normal full power values. If a power reduction event occurs so that the reactor power is below 20% of RATED THERMAL POWER without the required setpoint change, control rod motion shall be suspended (except for scram or other emergency actions) until the necessary setpoint adjustment is made.

The above restriction was incorporated into the TSs as part of HCGS Amendment No. 23 dated April 3, 1989 (ADAMS Accession No. ML011760187). That amendment supported permanent installation of the HWC system. As discussed in the licensee's application dated April 25, 2008, this restriction on HWC operation was intended to prevent increases in main steam line (MSL) radiation background levels before the MSL radiation monitor (MSLRM) setpoints were adjusted

because it was assumed that the MSL radiation would increase significantly with HWC operation. The licensee's application stated that the present HWC injection rate does not cause an appreciable increase in MSL radiation, therefore, the reason for prohibiting HWC operation below 20% of rated thermal power (RTP) no longer exists. As such, the licensee proposes to revise both footnotes to read as follows:

> Below 20% of RATED THERMAL POWER the Main Steamline Radiation Monitor setpoints shall not exceed the values determined using normal full power-background radiation levels with the hydrogen water chemistry (HWC) system shut down. After reaching 20% of RATED THERMAL POWER, the normal full power background radiation level and associated trip setpoints may be increased to levels previously measured during full power operation with hydrogen injection. Prior to decreasing below 20% of RATED THERMAL POWER the background level and associated setpoint shall be returned to the normal full power values. If the Main Steamline Radiation Monitor setpoints have been increased for HWC operation and a power reduction event occurs so that the reactor power is below 20% of RATED THERMAL POWER without the required setpoint change, control rod motion shall be suspended (except for scram or other emergency actions) until the necessary setpoint adjustment is made.

In addition to the above proposed change, the licensee has proposed a change to the current location of footnote ## on TS page 3/4 3-12 (Table 3.3.2-1, Trip Function 3.b). Currently the "Applicable Operational Condition" (i.e., mode applicability) column for the Main Steam Line Radiation - High, High function is shown as:

> 1, 2, 3##

This could be interpreted that note "##" is applicable to Modes 1, 2 and 3, or to just Mode 3. The licensee proposes to clarify that the footnote only applies to the power operation and startup modes (i.e., Modes 1 and 2) as follows:

> 1##, 2##, 3

The supplement dated January 7, 2009, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards determination as published in the *Federal Register* on July 29, 2008 (73 FR 43957).

2.0 REGULATORY EVALUATION

As discussed in HCGS Updated Final Safety Analysis Report (UFSAR) Section 11.5.2.1.1, the MSLRM system monitors the radiation level next to the MSLs. The normal radiation level is produced primarily by coolant activation products plus smaller quantities of fission products being transported with the steam. In the event of a gross release of fission products from the fuel, this monitoring system provides channel trip signals to the primary containment and reactor vessel isolation control system (PCRVICS), to initiate protective action.

The PCRVICS is discussed in UFSAR Section 7.3.1.1.2. The MSLRM system consists of four detectors, one for each MSL. Each detector provides an input to one of the four PCRVICS trip logic channels. Each monitoring channel consists of a gamma-sensitive ion chamber and a log radiation monitor. Each radiation channel has four trip circuits (low, high, high-high, and inoperative). The high-high and inoperative trip circuits are combined in an "or" configuration and either trip circuit will initiate closure of the reactor water sample valves and tripping of the mechanical vacuum pumps (MVPs).

As discussed in UFSAR Sections 10.4.2.2.1, 11.3.2.1.1, and 11.3.2.2.3, two 50-percent capacity MVPs are used during startup to establish a vacuum in the condenser. Each MVP discharges to the south plant vent. The tripping of the MVPs on the MSLRM high-high signal is credited to mitigate the radiological consequences of a control rod drop accident (CRDA) as described in UFSAR Section 15.4.9. As required by TS 3/4.3.10, "Mechanical Vacuum Pump Trip Instrumentation," the MSLRM high-high function for the MVP trip must be operable in operational conditions 1 and 2 (i.e., power operation and startup) with any MVP in service (i.e., taking suction on the main condenser) and any MSL not isolated. When the MVPs are not in service or the MSLs are isolated, fission product releases via the MVP pathway would not occur. As described in the Bases for TS 3/4.3.10, in operational conditions 3, 4, and 5 (i.e., hot shutdown, cold shutdown and refueling), the consequences of a control rod drop are insignificant and are not expected to result in any fuel damage or fission product releases.

Based on a review of the above UFSAR Sections; NUREG-0800, Standard Review Plan (SRP), Section 15.4.9, "Spectrum of Rod Drop Accidents [Boiling Water Reactors]", Revision 3, dated March 2007; and the licensee's application dated April 25, 2008, the Nuclear Regulatory Commission (NRC or the Commission) staff identified that General Design Criterion (GDC) 13, "Instrumentation and control," of Appendix A to Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR) is applicable to the proposed amendment. Specifically, GDC 13 requires, in part, that instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety. Consistent with the discussion in Section II, "Acceptance Criteria," in SRP 15.4.9 regarding GDC 13, the NRC review focused on whether the CRDA mitigation function provided by the MSLRM high-high trip (i.e., MVP trip) would be adversely impacted by the proposed change in HWC system operation.

3.0 TECHNICAL EVALUATION

Power Levels of Interest for CRDA

As discussed in Section 3.1 of General Electric (GE) Report NEDO-10527, "Rod Drop Accident Analysis for Large Boiling Water Reactors," dated March 1972 (ADAMS Accession No. ML010870249), "peak fuel enthalpy is the most important single parameter for determining the severity of a transient and the onset of fuel pin failure." The report states that the following design and fuel failure criteria have been established by GE:

Enthalpy = 170 calories/gram (cal/gm), cladding failure threshold
Enthalpy = 280 cal/gm, specific energy design limit

The HCGS accident analysis for a CRDA is described in UFSAR Section 15.4.9. The analysis is based on GE methods and confirms that the peak fuel enthalpy for a postulated CRDA is below the design limit of 280 cal/gm.

As discussed in UFSAR Section 7.7.1.1.5, operation of the rod worth minimizer (RWM) reduces the consequences of the postulated CRDA to an acceptable level by constraining control rod movement to predetermined patterns and sequences. As shown in TS 3/4.1.4, "Control Rod Program Controls," the RWM is required to be operable when thermal power is less than or equal to 8.6% of RTP. This value is referred to as the low power setpoint (LPSP). The associated TS Bases indicate that when thermal power is greater than the LPSP, there is no possible rod worth which, if dropped at the design rate of the velocity limiter, could result in a peak enthalpy of 280 cal/gm.

Based on the above, the NRC staff finds that the power levels of interest for a postulated CRDA at HCGS are from 0 to 8.6% of RTP.

HWC System Operation Changes

Currently, the existing HCGS TSs (footnote ## in TS Table 3.3.2-1 and footnote ### in TS Table 3.3.2-2) prohibit operation of the HWC system below 20% of RTP. These restrictions were put into place as part of the issuance of HCGS Amendment No. 23 dated April 3, 1989 (ADAMS Accession No. ML011760187), which supported permanent installation of the HWC system. As discussed in the licensee's application associated with Amendment No. 23 (letter NLR-N88154 dated September 28, 1988), the restriction was based on guidelines from the Electric Power Research Institute (EPRI) for hydrogen water chemistry. Based on these guidelines, the application stated that the hydrogen injection system should not be operated below the LPSP. At the time when Amendment No. 23 was issued, the LPSP for HCGS was 20% of RTP. The LPSP was changed from 20% to 10% of RTP by HCGS Amendment No. 105 dated September 30, 1997 (ADAMS Accession No. ML011760577). The LPSP was changed from 10% to its current value of 8.6% of RTP as part of the HCGS extended power uprate (EPU) amendment (Amendment No. 174 dated May 14, 2008 (ADAMS Accession No. ML081230540)).

As discussed in UFSAR Section 10.4.7.2.1, the HWC system is provided to inject gaseous hydrogen into the suction side of the secondary condensate pumps at an injection rate necessary to provide intergranular stress corrosion cracking (IGSCC) protection of the recirculation piping. The addition of hydrogen reduces the oxygen content in the reactor water and reduces the corrosion potential of the water. However, a consequence of hydrogen injection is an increase in the MSL background radiation levels due to Nitrogen 16 (N-16) carryover in the steam.

The original HWC system hydrogen injection rates caused significant increases in the MSL background radiation levels. As discussed in the licensee's application dated September 28, 1988, associated with HCGS Amendment No. 23, the normal full power background radiation levels at that time ranged from 33 to 45 millirem/hour (mR/hr) for the four MSLs. During a hydrogen injection test, with an injection rate of 18 to 20 standard cubic feet per minute (scfm), the full power MSL background radiation levels increased to approximately 75 to 80 mR/hr. Since the MSLRMs setpoints were established at 3 times normal full power background (i.e., 99 to 135 mR/hr), sufficient margin was not afforded for any occasional radiation spiking or inherent

instrument inaccuracies or drift to justify HWC operation at power levels where a CRDA may be of consequence. As such, as part of HCGS Amendment No. 23, HWC system operation was prohibited below 20% of RTP (i.e., the LPSP at that time).

As discussed in the licensee's application dated April 25, 2008, and the supplement dated January 7, 2009, in 2007, HCGS implemented the GE NobleChem™ process which allows the HWC system hydrogen injection rate to be reduced significantly. The HWC system hydrogen injection rate is increased proportionately to power level; injection rates are lower power levels. Main steam line radiation levels drop approximately in proportion to the hydrogen injection rate. The licensee stated that, after implementation of the NobleChem™ process, the resulting MSL background radiation levels at full power (post-EPU) during HWC system operation, at the maximum hydrogen injection rate, is approximately 10.7% higher than MSL background radiation levels at full power (post-EPU) without HWC system operation.

The licensee's application dated April 25, 2008, stated that EPRI has developed new recommendations on HWC system operation to enhance IGSCC protection. One of these enhancements is to begin hydrogen injection at lower power levels to increase the time that hydrogen is injected thereby improving protection against IGSCC. Based on the EPRI recommendations, the licensee stated that it would modify plant operating procedures to begin hydrogen injection when sufficient condensate flow is available to transport the hydrogen to the reactor coolant system (at approximately 5% of RTP). Specifically, PSEG proposes to commence HWC system operation when at least one secondary condensate pump and a steam jet air injector (SJAE) are in service. As discussed in UFSAR Section 10.4.2.2, during plant startup, after condenser vacuum is established by the MVPs, one SJAE is placed in service to maintain the vacuum and the MVPs are shut down.

To implement the proposed increased use of the HWC system, the licensee proposes to remove the restriction on HWC system operation currently contained in footnote ## in TS Table 3.3.2-1 and footnote ### in TS Table 3.3.2-2. Therefore, although plant operating procedures would limit HWC system operation to when the MVPs are not in service (i.e., greater than approximately 5% of RTP), the proposed TSs would allow HWC system operation at any power level. As such, the NRC staff evaluated the proposed amendment under the assumption that the HWC system could be in operation with the MVPs in service.

Impact of Change in HWC System Operation on MSLRM CRDA Mitigation Function

Currently, below 20% of RTP, the MSLRM high-high trip setpoint is required to be set at less than or equal to 3.0 times the normal full power background radiation, measured without the HWC system in operation, in accordance with TS Table 3.3.2-2. The proposed amendment does not change these requirements.

Currently, footnote ## in TS Table 3.3.2-1 and footnote ### in TS Table 3.3.2-2 prohibit HWC system operation below 20% of RTP. The proposed amendment would revise these footnotes such that HWC system operation would be allowed at any power level. As such, background radiation levels in the vicinity of the MSLs will be slightly higher below 20% of RTP than under current plant operating conditions.

The licensee's supplement dated January 7, 2009, provided the following information:

- The HWC system will be operated at 2.2 scfm hydrogen flow from approximately 5% of RTP, when it is first placed in service, to 20% of RTP, at which point hydrogen injection will be increased linearly from 20% of RTP to 100% of RTP to a final value of 11 scfm.

- Typical normal full power background radiation in the vicinity of the MSLRMs (without the HWC system in operation) is in the range of approximately 36 to 39 mR/hr.

- The MSLRM high-high setpoint is 105 mR/hr for the lowest of the four channels.

- Background radiation in the vicinity of each of the MSLRMs (without the HWC system in operation), recorded during a recent plant startup, was 1.0 mR/hr from 0 to 14% of RTP and increased to an average of 1.69 mR/hr at 20% of RTP.

- Background radiation in the vicinity of the MSLRMs (with the HWC system in operation at the planned injection rates) for 0% to 20% of RTP is expected to be no more than 1.87 mR/hr.

- Total instrument loop uncertainty for the MSLRMs is ± 20.69% of signal.

- Loop drift for the MSLRMs is 4.28% of signal.

As discussed above, the power levels of interest for a postulated CRDA at HCGS are from 0 to 8.6% of RTP. Based on the information provided by the licensee, at power levels less than 20% of RTP, the increase in background radiation due to HWC operation is expected to be less than 0.2 mR/hr (i.e., 1.87 mR/hr versus 1.69 mR/hr). The combined instrument uncertainties (including drift) are approximately 25% of the signal (i.e., 20.69% + 4.28%). Since background radiation in the vicinity of each of the MSLRMs is expected to be no more than 1.87 mR/hr, at power levels less than 20% of RTP, the instrument uncertainties would be less than 0.5 mR/hr (i.e., 25% x 1.87 mR/hr). Given that the high-high setpoint for the lowest of the four MSLRM channels is set at 105 mR/hr, there is considerable margin (greater than 102 mR/hr) between the existing setpoint and the normal background radiation levels (including any instrument uncertainties). Based on the available margin, the NRC staff finds that there is reasonable assurance that the proposed change in HWC operation will not adversely impact the MSLRM CRDA mitigation function. Therefore, the NRC staff concludes that the proposed changes to footnote ## in TS Table 3.3.2-1 and footnote ### in TS Table 3.3.2-2, to remove the current restriction on HWC system operation, are acceptable.

The proposed amendment would also modify the location of footnote ## in TS Table 3.3.2-1 to clarify that it only applies to operational conditions 1 and 2 (i.e., power operation and startup). As discussed above in Section 2.0, as required by TS 3/4.3.10, "Mechanical Vacuum Pump Trip Instrumentation," the MSLRM high-high function for the MVP trip must be operable in operational conditions 1 and 2 with any MVP in service and any MSL not isolated. When the MVPs are not in service or the MSLs are isolated, fission product releases via the MVP pathway would not occur. As described in the Bases for TS 3/4.3.10, in operational conditions 3, 4, and 5 (i.e., hot shutdown, cold shutdown and refueling), the consequences of a CRDA are insignificant and are not expected to result in any fuel damage or fission product releases. The proposed change to

clarify that footnote ## in TS Table 3.3.2-1 only applies to operational conditions 1 and 2 is consistent with the requirements for operability of the MSLRM high-high function for the MVP trip specified in TS 3/4.3.10. Therefore, the proposed change is acceptable.

Based on the above evaluation, the NRC 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. By letter dated December 3, 2008 (ADAMS Accession No. ML083460136), the State official provided the following comment:

> Hope Creek should provide verification that the implementation of the power uprate in 2008 did not result in a significant increase in Main Steam Line background radiation at full power with HWC in service and that the power uprate did not have any adverse impact on the operation of the HWC system at low power.

On page 5 of Attachment 1 of PSEG's letter dated January 7, 2009 (ADAMS Accession No. ML090230629), the licensee provided the following information to address the comment from the State official:

> Dose rates measured by each MSLRM channel at RTP with HWC in service, are as follows:

MSLRMS CHANNEL	Pre-EPU DOSE RATE WITH HWC (mR/hr)	Post-EPU DOSE RATE WITH HWC (mR/hr)
A	37	41.2
B	39.4	42.8
C	38.5	41.2
D	39.1	44.7

> The average difference in dose rates is 9.3%. This is not considered to be significant since the total loop accuracy is 20.69% and the alarm setpoint is at 150% of NFPB [normal full power background].
>
> The HWC system was operated successfully from 30% to 100% RTP after all EPU modifications were implemented. The EPU did not make physical changes to the BOP [balance of plant] systems that interface with HWC other than increased flow rates in the feedwater/condensate systems at 100% RTP which will have no impact on HWC operation below 20% RTP. An evaluation of post-EPU HWC low power operation, based on EPRI BWRVIP -156 guidelines, has determined that there will be no adverse impacts. This evaluation is part of the design change that is in final development to implement low power HWC and will be further validated as part of the final design change approval process. The

design change that implemented the EPU determined that there were no adverse effects on HWC operation.

On January 28, 2009, the State official notified the NRC staff that PSEG's response was satisfactory.

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 (73 FR 43957). 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 4, 2009

March 4, 2009

Mr. Thomas Joyce
President and Chief Nuclear Officer
PSEG Nuclear
P.O. Box 236, N09
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION - ISSUANCE OF AMENDMENT RE: HYDROGEN WATER CHEMISTRY LOW POWER RESTRICTION (TAC NO. MD8576)

Dear Mr. Joyce:

The Commission has issued the enclosed Amendment No. 176 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 April 25, 2008, as supplemented by letter dated January 7, 2009. The amendment revises the TSs to remove the restriction on operation of the hydrogen water chemistry system at low power levels.

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, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosures:
1. Amendment No. 176 to License No. NPF-57
2. Safety Evaluation

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