



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

March 30, 1995

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

SUBJECT: CHANGES TO TECHNICAL SPECIFICATIONS FOR EMERGENCY DIESEL GENERATORS  
 SURVEILLANCE TESTING AND EMERGENCY DIESEL GENERATOR FUEL OIL SUPPLY  
 AND SURVEILLANCE REQUIRMENTS, HOPE CREEK GENERATING STATION (TAC  
 NOS. M89219 AND M90272)

Dear Mr. Eliason:

The Commission has issued the enclosed Amendment No. <sup>72</sup> 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 applications dated March 31, 1994 and August 5, 1994. Since both of these applications deal with Emergency Diesel Generator Surveillance Requirement changes, they have been combined in one amendment.

This amendment revises: Technical Specification (TS) 3.8.1.1.b.2 which maintains diesel operability for a 48-hour period when the fuel storage system of one or more diesel generators contains less than a 7-day supply of fuel; TS 4.8.1.1.2.h.8 by deletion and replacement with surveillance requirement 4.8.1.1.2.k.1 which permits the 24-hour diesel generator endurance run to be performed in any operational condition; establish surveillance requirement 4.8.1.1.2.k.2 which allows the hot restart test to be conducted not only after surveillance requirement 4.8.1.1.2.k.1, but also after the diesel generator has operated between 4300 kw and 4400 kw for one hour or after any time the diesel generator operating temperature has stabilized; TS 3.8.1.1 to eliminate the requirements to start the Emergency Diesel Generator (EDG) with an inoperable offsite circuit(s) of AC electrical power; add a provision that eliminates required testing of remaining EDGs when one EDG is inoperable due to an inoperable support system or an independently testable component with no potential for common mode failure for the remaining EDGs. In addition, if testing of the EDGs is required, the surveillance will be performed within 16 hours instead of 24 hours as currently specified; delete the requirement to perform a Loss of Offsite Power (LOOP) test (Surveillance Requirement 4.8.1.1.2.h.b) following the 24-hour EDG endurance run test in its place, a hot restart test (no LOOP load sequencing) will be established.

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L. Eliason

- 2 -

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

You are requested to inform the NRC, in writing, when this amendment has been implemented.

Sincerely,

/S/

David H. Moran, Acting Project Manager  
Project Directorate I-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosures:

1. Amendment No. 72 to License No. NPF-57
2. Safety Evaluations

cc w/encls:  
See next page

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Sincerely,



David H. Moran, Acting Project Manager  
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Docket No. 50-354

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1. Amendment No. 72 to  
License No. NPF-57
2. Safety Evaluations

cc w/encls:  
See next page

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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. 72  
License No. NPF-57

1. The Nuclear Regulatory Commission (the Commission or the NRC) has found that:
  - A. The applications for amendment filed by the Public Service Electric & Gas Company (PSE&G) dated March 31, and August 5, 1994, 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. 72, 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.

FOR THE NUCLEAR REGULATORY COMMISSION



John F. Stolz, Director  
Project Directorate I-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: March 30, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 72

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.

Remove

Insert

3/4 8-1

3/4 8-1

3/4 8-2

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3/4 8-7

3/4 8-7

3/4 8-8

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3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

A.C. SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

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3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and
- b. Four separate and independent diesel generators, each with:
  - 1. A separate fuel oil day tank containing a minimum of 200 gallons of fuel,
  - 2. A separate fuel storage system consisting of two storage tanks containing a minimum of 48,800 gallons of fuel\*\*, and
  - 3. A separate fuel transfer pump for each storage tank.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

- a. With one offsite circuit of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. Restore the inoperable offsite circuit to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- b. With one diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the above required A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than an inoperable support system, an independently testable component, or preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining diesel generators by performing Surveillance Requirement 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5 separately for each diesel generator within 16 hours\* unless the absence of any potential common mode failure for the remaining diesel generators is demonstrated. Restore the inoperable diesel generator to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- c. With one offsite circuit of the above required A.C. sources and one diesel generator of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and

\*This test is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY.

\*\*With the fuel storage system of one or more diesel generators containing less than 48,800 gallons of fuel, but greater than 44,709 gallons, the associated diesel generator is considered operable for up to 48 hours to allow for fuel replenishment

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

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ACTION: (Continued)

at least once per 8 hours thereafter. If a diesel generator became inoperable due to any causes other than an inoperable support system, an independently testable component, or preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generators separately for each diesel generator by performing Surveillance Requirement 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5 within 16 hours unless the absence of any potential common mode failure for the remaining diesel generators is demonstrated\*. Restore at least two offsite circuits and all four of the above required diesel generators to OPERABLE status within 72 hours from time of the initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. A successful test(s) of diesel generator OPERABILITY per Surveillance Requirement 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5 performed under this ACTION statement for the OPERABLE diesel generators satisfies the diesel generator test requirements of ACTION Statement b.

- d. With both of the above required offsite circuits inoperable, restore at least one of the above required offsite circuits to OPERABLE status within 24 hours or be in at least HOT SHUTDOWN within the next 12 hours. With only one offsite circuit restored to OPERABLE status, restore at least two offsite circuits to OPERABLE status within 72 hours from time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. A successful test(s) of diesel generator OPERABILITY per Surveillance Requirement 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5 performed under this ACTION statement for the OPERABLE diesel generators satisfies the diesel generator test requirements of ACTION statement a.
- e. With two diesel generators of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the above required A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter and demonstrate the OPERABILITY of the remaining diesel generators by performing Surveillance Requirement 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5 separately for each diesel generator within 8 hours.\* Restore at least one of the inoperable diesel generators to OPERABLE status within 2 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours. Restore both of the inoperable diesel generators to OPERABLE status within 72 hours from time of initial loss or be in at least HOT SHUTDOWN within the next 12 hours and in

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\*This test is required to be completed regardless of when the inoperable diesel generator is restored, to OPERABILITY.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

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5. Verifying that on an ECCS actuation test signal, without loss of offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz within 10 seconds after the auto-start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test.
6. Simulating a loss of offsite power in conjunction with an ECCS actuation test signal, and:
  - a) Verifying loss of power is detected and deenergization of the emergency busses and load shedding from the emergency busses.
  - b) Verifying the diesel generator starts\* on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds after receipt of the start signal, energizes the autoconnected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz during this test.
7. Verifying that all automatic diesel generator trips, except engine overspeed, generator differential current, generator overcurrent, bus differential current and low lube oil pressure are automatically bypassed upon loss of voltage on the emergency bus concurrent with an ECCS actuation signal.\*
8. Deleted.
9. Verifying that the auto-connected loads to each diesel generator do not exceed the continuous rating of 4430 kW.

\*This diesel generator start (10 sec) and subsequent loading (130 sec) from ambient conditions may be preceded by an engine prelube period and/or other warmup procedures recommended by the manufacturer so that mechanical stress and wear on the diesel engine is minimized.

\*Generator differential current, generator overcurrent, and bus differential current is two-out-of-three logic and low lube oil pressure is two-out-of-four logic.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

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10. Verifying the diesel generator's capability to:
  - a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,
  - b) Transfer its loads to the offsite power source,
  - c) Be restored to its standby status, and
  - d) Diesel generator circuit breaker is open.
11. Verifying that with the diesel generator operating in a test mode and connected to its bus, a simulated ECCS actuation signal overrides the test mode by (1) returning the diesel generator to standby operation, and (2) automatically energizes the emergency loads with offsite power.
12. Verifying that the fuel oil transfer pump transfers fuel oil from each fuel storage tank to the day tank of each diesel via the installed cross connection lines.
13. Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within  $\pm 10\%$  of its design interval.
14. Verifying that the following diesel generator lockout features prevent diesel generator starting only when required:
  - a) Engine overspeed, generator differential, and low lube oil pressure (regular lockout relay, (1) 86R).
  - b) Backup generator differential and generator overcurrent (backup lockout relay, (1) 86B)
  - c) Generator ground and lockout relays-regular, backup and test, energized (breaker failure lockout relay, (1) 86F)
- i. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting all diesel generators simultaneously, during shutdown, and verifying that all diesel generators accelerate to at least 514 rpm in less than or equal to 10 seconds.
- j. At least once per 10 years by:
  1. Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypochlorite solution or equivalent, and

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

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2. Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code in accordance with ASME Code Section XI Article IWD-5000.
- k. At least once per refueling cycle\* by:
1. Verifying the diesel generator operates for at least 24 hours. During the first 22 hours of this test, the diesel generator shall be loaded to between 4300 and 4400 kW\*\* and during the remaining 2 hours of this test, the diesel generator shall be loaded to between 4800 and 4873 kW. The generator voltage and frequency shall be  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz within 10 seconds after the start signal; the steady state generator voltages and frequency shall be maintained within these limits during the test.
  2. Within 5 minutes after completing 4.8.1.1.2.k.1, verify that the diesel generator starts and achieves voltage and frequency of  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz within 10 seconds after the start signal. This test shall continue for at least five minutes.

- OR-

Operate the diesel generator between 4300 kW and 4400 kW for two hours. Within 5 minutes of shutting down the diesel generator, verify that the diesel generator starts and achieves voltage and frequency of  $4160 \pm 420$  volts and  $60 \pm 1.2$  Hz within 10 seconds after the start signal. This test shall continue for at least five minutes.

4.8.1.1.3 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission within 30 days pursuant to Specification 6.9.2. Reports of diesel generator failures shall include the information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977. If the number of failures in the last 100 valid tests, on a per nuclear unit basis, is greater than or equal to 7, the report shall be supplemented to include the additional information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977.

4.8.1.1.4 ~~The~~ buried fuel oil transfer piping's cathodic protection system shall be demonstrated OPERABLE at least once per 2 months and at least once per year by subjecting the cathodic protection system to a performance test.

\*For any start of a diesel generator, the diesel must be loaded in accordance with manufacturer's recommendations.

\*\*This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band shall not invalidate the test; the loads; however, shall not be less than 4300 kW nor greater than 4873 kW.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 72 TO FACILITY OPERATING LICENSE NO. NPF-57

PUBLIC SERVICE ELECTRIC & GAS COMPANY

ATLANTIC CITY ELECTRIC COMPANY

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

A. EMERGENCY DIESEL GENERATOR FUEL STORAGE SYSTEM

1.0 INTRODUCTION

By letter dated March 31, 1994, the Public Service Electric & Gas Company (the licensee) submitted a request for changes to the Hope Creek Generating Station (HCGS), Technical Specification (TS). The amendment, which proposed changes to Technical Specification (TS) Section 3.8.1.1.b.2 and TS Surveillance Requirement Section 4.8.1.1.2, will: (a) maintain emergency diesel generator (EDG) operability for a 48 hour period when the fuel storage system of one or more EDGs contains less than a seven day supply of fuel oil following a surveillance test, (b) permit the 24 hour EDG endurance run to be performed in any operational condition, and (c) permit the EDG five minute hot restart test. The following evaluation covers the applicable portions of the amendment for which the SPLB has the primary responsibility.

2.0 EVALUATION

The existing TS Section 3.8.1.1.b.2 at HCGS requires that a separate fuel storage system contains a minimum of 48,800 gallons of fuel which is sufficient for 7 days of EDG operation following the design basis accident. However, during or after EDG test runs per the surveillance requirement, full load operation required for an inadvertent start while at the minimum required fuel level, or feed and bleed operations that may be necessitated by increasing particulate levels or any number of other oil quality degradations, the fuel oil inventory in the fuel oil storage system may decrease to a level which is below the 7-day EDG run time capacity. In order to maintain the operability status of the EDGs at all times and preclude unnecessary entry into the TS action statements, the licensee proposed to add the following note to TS Section 3.8.1.1.b.2:

"With the fuel storage system of one or more diesel generators containing less than 48,800 gallons of fuel, but greater than 44,709 gallons, the associated diesel generator is considered operable for up to 48 hours to allow for fuel replenishment."

The addition of this note to TS Section 3.8.1.1.b.2 will allow the fuel oil inventory to fall below the 7-day supply, but above a 6-day supply, for a period of 48 hours. This restriction allows sufficient time to complete

restoration of the required fuel oil level prior to declaring the EDG inoperable and initiating a plant shutdown as required by the plant TS. The licensee stated that this period is acceptable based on: a minimum 44,709-gallon (more than 6 days) supply of fuel oil to be maintained for these 48 hours; the fact that procedures are in place to obtain replenishment of fuel oil when the level falls below 48,800 gallons of fuel; and the low probability of an event requiring the on-site power sources during this brief period. The licensee concluded that the addition of a 48-hour period to complete restoration of the required fuel oil level prior to declaring the EDG inoperable does not significantly increase the probability or consequences of an accident previously evaluated. The licensee further believed that the attendant risk of maintaining the EDG operable status under temporary conditions where fuel oil supply is below 48,800 gallons (but greater than 44,709 gallons) is less than the attendant risk of initiation and completion of shutdown actions currently required by TS under these conditions.

## 2.1 Summary

The staff has reviewed the above cited licensee's proposal and concludes that the proposed change to TS Section 3.8.1.1.b.2 is acceptable. This conclusion is based on the retention of the minimum 7-day requirement in accordance with Regulatory Guide (RG) 1.137 and a 48-hour "grace period" which provides a degree of flexibility before declaring an EDG inoperable which is also consistent with NUREG-1433, "Standard Technical Specifications, General Electric Plants, BWR/4". The staff is presently reevaluating this TS requirement in the improved standard TS (STS) on a generic basis to possibly provide more flexibility than having to declare an EDG inoperable after 48 hours when the fuel oil is only a few gallons below the 7-day supply volume limit.

Principal Contributor: D. Shum

## B. EMERGENCY DIESEL GENERATOR TESTING AND SURVEILLANCE REQUIREMENTS

### 1.0 INTRODUCTION

By letter dated August 5, 1994, the Public Service Electric and Gas Company (the licensee) proposed changes to the Technical Specifications (TS) for Hope Creek Generating Station. The proposed changes would eliminate certain surveillance requirements for the emergency diesel generators (EDGs) which have been determined to be unnecessary and revise the TS for an EDG hot restart test. These changes are in accordance with the Standard Technical Specification Improvement Program as documented in Generic Letter (GL) 93-05, "Line-Item Technical Specifications Improvements For Testing During Power Operation," dated September 27, 1993, and NUREG-1366, "Improvements To Technical Specifications Surveillance Requirements," dated December 1992.

The safety function of the EDGs is to supply AC electrical power to plant safety systems whenever the preferred AC power supply is unavailable. Consistent with GL 93-05, Item 10.1 and NUREG-1366, the licensee is requesting revision to the TS for EDG surveillance testing for Hope Creek. Our evaluation of these changes follows.

## 2.0 EVALUATION

### TS 3.8.1.1 ACTION STATEMENT a

This action statement currently requires that EDGs be started and loaded to demonstrate their operability in the event an offsite power circuit becomes inoperable. The licensee has proposed to delete the TS requirement to start and load EDGs when an offsite power circuit is inoperable. The deletion of the TS requirement to test EDGs when an offsite power circuit becomes inoperable does not increase the probability that the EDGs will be unable to perform their safety function. The staff finds the proposed change to be consistent with GL 93-05 and acceptable.

### TS 3.8.1.1 ACTION STATEMENT b

This action statement currently requires testing of the remaining EDGs within 24 hours whenever one EDG is inoperable due to any cause other than preplanned preventive maintenance or testing. The licensee has proposed to delete testing of the remaining EDGs when one EDG is declared inoperable due to any cause other than preplanned preventive maintenance or testing, and it has been demonstrated that there is no common mode failure vulnerability between the remaining EDGs and the inoperable EDG. In addition, if testing of the EDGs is required, then the surveillance will be performed within 16 hours instead of 24 hours as currently required. The staff finds the proposed change to be consistent with GL 93-05 and NUREG-1366 and acceptable.

### TS 3.8.1.1 ACTION STATEMENT c

This action statement currently requires testing of the remaining EDGs within 24 hours whenever one EDG and one offsite power circuit become inoperable. The licensee has proposed to delete testing of the remaining EDGs when one EDG is declared inoperable due to any cause other than preplanned preventive maintenance or testing, and it has been demonstrated that there is no common mode failure vulnerability between the remaining EDGs and the inoperable EDG. Also, if testing is required, then the surveillance will be performed within 16 hours instead of 24 hours as currently required. The staff finds the proposed change to be consistent with GL 93-05 and NUREG-1366 and acceptable.

### TS 3.8.1.1. ACTION STATEMENT d

This action statement currently requires testing of the remaining EDGs within 24 hours whenever both required offsite power sources are inoperable. The licensee has proposed to delete testing of the remaining EDGs while in this action statement. The deletion of the TS requirements to start and load the EDGs when offsite power sources become inoperable does not increase the probability that the EDGs will be unable to perform their safety function. The staff finds the proposed change to be consistent with GL 93-05 and acceptable.

SURVEILLANCE REQUIREMENT 4.8.1.1.2.h.8

The current Surveillance Requirement 4.8.1.1.2.h.8 requires that within 5 minutes of shutting down the EDG following the once-per-refueling-outage 24-hour endurance test run, a simulated loss of offsite power (LOOP) surveillance test be conducted. Performing the LOOP test per the present TS requires the ESF loads sequenced during LOOP to be available immediately following the 24-hour endurance run. This requirement creates scheduling demands by reducing flexibility and imposes unnecessary operational burdens without a corresponding increase in EDG reliability.

The licensee has proposed to delete Surveillance Requirement 4.8.1.1.2.h.8 and replace it with Surveillance Requirement 4.8.1.1.2.k.2. This surveillance will eliminate the requirement for the LOOP test following the 24-hour loaded run, and will provide an option to perform within 5-minutes the hot restart test either following the 24-hour endurance test or following a 2-hour loaded run of the EDG. The revised surveillance requirement will verify EDG hot restart capability by starting the EDG and verifying that it attains rated voltage and frequency within the required time.

The proposed surveillance for the EDG hot restart test could be performed during any mode of plant operation. Since the hot restart, LOOP test, and 24-hour endurance test objectives will continue to be met at Hope Creek, the modified test would result in improved scheduling flexibility with no reduction in demonstration of EDG operability. Therefore, the staff finds this test to be consistent with GL 93-05 and acceptable.

Additionally, the licensee has proposed to perform the 24-hour EDG endurance test during any mode of operation. Surveillance Requirement 4.8.1.1.2.h.8 currently requires that a 24-hour EDG endurance test be performed once every 18 months during shutdown conditions. The proposed change would reduce the amount of required critical path surveillance testing during outage periods with heavy maintenance schedules and increase operational flexibility in scheduling surveillance testing activities. This scheduling flexibility is estimated to save 4 days of critical path time per refueling.

The staff has always expressed concern regarding performance of the 24-hour EDG endurance test with the unit at power. When an EDG is operated in parallel with the offsite power, the emergency power system is not independent of disturbances on the offsite power systems that can adversely affect emergency power availability. In this condition, a disturbance in the non-emergency power system (offsite system) could result in loss of offsite power and disabling of the emergency power source.

If a fault develops while the EDG is connected to non-emergency buses, EDG availability for subsequent emergency demands may be affected. In some design configurations, the EDG would trip as a result of overcurrent or reverse power, actuate a lockout device, and require local operator actions to reset the lockout. In such cases, the EDG is recoverable, but the timeliness of its availability is not comparable to that of having the EDG in its normal standby service.

In other design configurations the EDG may not trip, but the operation of the load sequencer may be adversely affected. The load sequencer timers are often linked with the closing of the EDG output breaker or with detection of loss of voltage on the bus. If the EDG does not trip, conditions are not proper for the designed operation of the load sequencer. Consequently, the EDG can not perform automatically in a manner comparable to that of having the EDG in its normal standby mode. Another potential concern deals with the vulnerability of the EDG to trip signals which are bypassed for emergency demands, but are operable for manual starts and during running for test purposes. The EDG would be more vulnerable to such trips.

Hope Creek is a single unit site with four emergency diesel generators. The licensee indicated that any 2 out of the 4 EDGs can supply adequate power to mitigate the consequences of design bases accidents, with few exceptions. The design of the EDG incorporates features that enable an EDG to automatically switch from the test mode to the emergency mode. As such, if an EDG is running in the test mode and an emergency demand EDG start signal is received, the EDG controls will automatically trip the EDG output breaker thus disconnecting its output from the offsite power system, switch the EDG governor from the droop (i.e., parallel) to isochronous mode and place the voltage regulator in the automatic mode to avoid the droop. In addition, the Hope Creek design provides the following features:

- 1) During surveillance tests, no more than one EDG is operated in parallel to the offsite power grid and the remaining safety buses are aligned to the alternate offsite power source. In this configuration, only one EDG is susceptible to perturbations in the offsite power grid causing an EDG to trip and lock out. The operator will have to manually reset the lock out relay so that the affected EDG can be restarted. In this scenario alone, or coincident with a LOCA, the shutdown can be achieved with any three of the four EDGs.
- 2) If a fault develops while the EDG is in the test mode and the EDG does not trip, then that safety bus will not respond to a loss of power (LOP) condition since this bus has not experienced an LOP. However, the other three safety buses will respond if an LOP condition exists.
- 3) In the event of a complete LOP affecting both offsite sources while the EDG is in the test mode, the non-test safety buses and the balance of plant loads will sense the output of the EDG under test and fast transfer to the EDG. When the fast transfer occurs, the loads will cause the EDG under the test to trip on overcurrent in less than one second. At this time the remaining (non-test) safety bus breakers (offsite) will open, and their associated EDGs will start and sequence their respective loads appropriately.
- 4) If a partial LOP occurs affecting only the offsite source, the EDG under test which is operating in parallel with, the non-test safety buses will not be affected since they are connected to the other offsite source. However, if a partial LOP occurs affecting only the offsite

source that non-test safety buses are tied to, a fast transfer of the vital buses and the balance of plant (BOP) loads will take place, and the EDGs associated with non-test buses will not get a commanded signal to start. If the transfer is unsuccessful, causing the alternate offsite source to be lost, the EDG under test will trip on overcurrent in one second as discussed in item (3) above, the non-test safety bus breakers will open and their associated EDGs will start and sequence loads appropriately.

## 2.1 Summary

Based on the above, the staff concludes that although performance of the 24-hour endurance test during power operation is contrary to the Standard Technical Specifications, in the case of Hope Creek the performance of this test during power operation is acceptable because of the unique EDG design features provided at Hope Creek. However, the staff will require the licensee to revise its test procedures to ensure that no other testing or maintenance activities are undertaken that would increase the chance of a transient, while performing this test. This conclusion is based on 1) inclusion of an emergency override of the test mode to permit response to bona fide signals while the EDG under test is paralleled with the offsite power source, 2) alignment of three non-test safety buses on the alternate offsite source when one EDG is paralleled with one offsite source for testing so that perturbation in that source affects only one EDG, and 3) the excess capacity provided by four EDGs is such that any two out of four EDGs can supply adequate power to mitigate the consequences of a design-basis accident with an additional single failure of another EDG, with few exceptions.

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## 3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New Jersey State Official was notified of the proposed issuance of the amendment. The staff responded by telephone conference to the state official's questions and to a suggestion contained in a letter from Mr. Kent W. Tosch, Manager, New Jersey Bureau of Nuclear Engineering, to the NRC Document Control Desk, dated July 13, 1994. The telephone consultation was held February 24, 1995 between the staff and Mr. Dennis J. Zannoni of the New Jersey Bureau of Nuclear Engineering. During the consultation, the state official asked the questions: 1) What is the experience of existing plants? E.g., Limerick was approved for 24-hour endurance testing online; and 2) Is the one-hour, monthly test as risky as the 24-hour endurance test? The state official made the suggestion: the NRC should better quantify the risk associated with 24-hour emergency diesel generator testing during power operation to estimate the relative impact on plant safety at Hope Creek. The staff's response during the consultation was acceptable to the state official who concluded there were no more questions or comments.

The staff's response to the state official's questions and suggestion was as follows: The Limerick Plant Unit 1 Commercial License was granted on August 8, 1985, and the Unit 2 Commercial License was on granted August 25, 1989. The licensee has performed both the monthly one-hour test and the 24-hour endurance test, in any mode, on each emergency diesel generator since the Unit 1 Commercial License was granted on August 8, 1985. Limerick has not reported any difficulty as a consequence of these tests.

As to the risk associated with emergency diesel generator one-hour monthly tests and 24-hour endurance tests at 18-month intervals in any mode, the staff responded: The emergency diesel generator being tested is isolated from the emergency safety equipment for which the diesel generator is installed to provide emergency power; the diesel is then started and connected in parallel to the grid via the 4160 volt safety bus. This provides a load for the power the emergency diesel generator generates (some plants use resistance load banks, Hope creek will connect in parallel to the grid). The risk during either the one-hour test or the 24-hour endurance test with the plant at power, is the same risk the plant turbine generator is subjected to when the plant is operating at power.

#### 4.0 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 and changes the surveillance requirements. 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 (59 FR 29630) and (59 FR 51625). 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.

#### 5.0 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.

Date: March 30, 1995