Mr. Theodore A. Sullivan
Vice President Nuclear and Station Director
Boston Edison Company
Pilgrim Nuclear Power Station
RFD #1 Rocky Hill Road
Plymouth, MA 02360

December 11, 1998

SUBJECT: ISSUANCE OF AMENDMENT NO.179 TO FACILITY OPERATING LICENSE NO. DPR-35, PILGRIM NUCLEAR POWER STATION (TAC NO. M95277)

Dear Mr. Sullivan:

The Commission has issued the enclosed Amendment No. 179 to Facility Operating License No. DPR-35 for the Pilgrim Nuclear Power Station. This amendment is in response to your application dated April 25,1996, as supplemented on September 5, 1996, August 8, 1997, March 26, July 31, and August 24, 1998.

This amendment revises Technical Specifications (TSs) 3/4.5.F.1, "Core and Containment Cooling systems" to extend the allowed outage time (AOT) for the emergency diesels, TSs 3.9.B.1 and 3.9.B.4, "Auxiliary Electrical System" to reduce the AOT from 7 days to 3 days and reduce the AOT for the combination of an EDG and startup transformer or shutdown transformer from 72 hours to 48 hours, and add Configuration Risk Management Program in TS 5.5, "Programs and Manuals" of Section 5.0 "Administrative Controls". Various TS pages were re-numbered in Section 5.0. In addition, TSs 3.9, "Auxiliary Electrical System," and 3.9.A, "Auxiliary Electrical Equipment," have been reformatted to be consistent with TS 3.9.B approved in a previous amendment. The associated Bases sections have also been changed to reflect the new TSs.

A copy of the related Safety Evaluation is also enclosed. Notice of Is. nce will be included in the Commission's biweekly Federal Register Notice.

Sincerely,
ORIGINAL SIGNED BY:
Alan B. Wang, Project Ma ger
Project Directorate I-3
Division of Reactor Projec I/II
Office of Nuclear Reactor gulation

Docket No. 50-293

Enclosures: 1. Amendment No. 179 to License No. DPR-35
2. Safety Evaluation
3. Figure 1

cc w/encls: See next page

DFO1

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

December 11, 1998

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Sincerely,

Alan Wang

Alan B. Wang, Project Manager
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-293

Enclosures: 1. Amendment No. 179 to License No. DPR-35
2. Safety Evaluation
3. Figure 1

cc w/encls: See next page

DATED: Dec. 11, 1998

AMENDMENT NO. 179 TO FACILITY OPERATING LICENSE NO. DPR-35 - PILGRIM NUCLEAR POWER STATION

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

BOSTON EDISON COMPANY

DOCKET NO. 50-293

PILGRIM NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 179
License No. DPR-35

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

   A. The application for amendment filed by the Boston Edison Company (the licensee) dated April 25,1996, as supplemented on September 5, 1996, August 8, 1997, March 26, July 31, and August 24, 1998, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-35 is hereby amended to read as follows:

   B. Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 179 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Cecil O. Thomas, Director
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: December 11, 1998

ATTACHMENT TO LICENSE AMENDMENT NO. 179

FACILITY OPERATING LICENSE NO. DPR-35

DOCKET NO. 50-293

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
3/4.5-10	3/4.5-10
3/4.9-1	3/4.9-1
3/4.9-2	3/4.9-2
3/4.9-3	3/4.9-3
3/4.9-4	3/4.9-4
3/4.9-5	3/4.9-5
5.0-9	5.0-9
5.0-10	5.0-10
5.0-11	5.0-11
5.0-12	5.0-12
5.0-13	5.0-13
5.0-14	5.0-14
B3/4.5-22	B3/4.5-22
B3/4.5-23	B3/4.5-23
---	B3/4.5-24

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.5 CORE AND CONTAINMENT COOLING SYSTEMS (Cont)	4.5 CORE AND CONTAINMENT COOLING SYSTEMS (Cont)
F. Minimum Low Pressure Cooling and Diesel Generator Availability	F. Minimum Low Pressure Cooling and Diesel Generator Availability
1. During any period when one emergency diesel generator (EDG) is inoperable, continued reactor operation is permissible only during the succeeding 72 hours unless such EDG is sooner made operable, provided that all of the low pressure core and containment cooling systems shall be operable, and the remaining EDG shall be operable in accordance with 4.5.F.1. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be placed in the Cold Shutdown Condition within 24 hours. The 72 hours LCO can be extended to 14 days provided, in addition to the above requirements, the Station Black Out Diesel Generator is verified operable in accordance with 4.5.F.2.	1. When it is determined that one EDG is inoperable, within 24 hours, determine that the operable EDG is not inoperable due to a common cause failure, OR perform surveillance 4.9.A.1.a for the operable EDG, AND within 1 hour and once every 8 hours thereafter, verify correct breaker alignment and indicated power availability for each offsite circuit.
2. Any combination of inoperable components in the core and containment cooling systems shall not defeat the capability of the remaining operable components to fulfill the cooling functions.	2. Confirm the Station Black Out Diesel Generator (SBO-DG) has been demonstrated operable within the preceding 7 days OR within 72 hours of declaring an EDG inoperable, perform a surveillance to demonstrate that the SBO-DG is operable, AND within 1 hour of demonstrating the SBO-DG operability as specified above and once every 8 hours thereafter, verify normal breaker configuration.
3. When irradiated fuel is in the reactor vessel and the reactor is in the Cold Shutdown condition, both core spray systems, the LPCI and containment cooling systems may be inoperable, provided no work is being done which has the potential for draining the reactor vessel.	
4. During a refueling outage, for a period of 30 days, refueling operation may continue provided that one core spray system or the LPCI system is operable or Specification 3.5.F.5 is met.	

LIMITING CONDITIONS FOR OPERATION

3.9 AUXILIARY ELECTRICAL SYSTEM

Applicability

Applies to the auxiliary electrical power system.

Objective:

To assure an adequate supply of electrical power for operation of those systems required for safety.

Specification

A. Auxiliary Electrical Equipment

The reactor shall not be made critical unless all of the following conditions are satisfied:

1. At least one offsite transmission line and the startup transformer are available and capable of automatically supplying auxiliary power to the emergency buses.

2. An additional source of offsite power consisting of one of the following:

   a. A transmission line and shutdown transformer capable of supplying power to the emergency 4160 volt buses.

   b. The main transformer and unit auxiliary transformer available and capable of supplying power to the emergency 4160 volt buses.

3. Both diesel generators shall be operable. Each diesel generator shall have a minimum of 19,800 gallons of diesel fuel on site.

SURVEILLANCE REQUIREMENTS

4.9 AUXILIARY ELECTRICAL SYSTEM

Applicability

Applies to the periodic testing requirements of the auxiliary electrical systems.

Objective

Verify the operability of the auxiliary electrical system.

Specification:

A. Auxiliary Electrical Equipment Surveillance

1. Diesel Generators

   a. Each diesel generator shall be manually started and loaded once each month to demonstrate operational readiness. The test shall continue for at least a one hour period at rated load.

      During the monthly generator test the diesel generator starting air compressor shall be checked for operation and its ability to recharge air receivers. The operation of the diesel fuel oil transfer pumps shall be demonstrated, and the diesel starting time to reach rated voltage and frequency shall be logged.

   b. Once per operating cycle the condition under which the diesel generator is required will be simulated and test conducted to demonstrate that it will start and accept the emergency load within the specified time sequence. The results shall be logged.

LIMITING CONDITIONS FOR OPERATION

3.9 AUXILIARY ELECTRICAL SYSTEM

A. Auxiliary Electrical Equipment (Cont)

SURVEILLANCE REQUIREMENTS

4.9 AUXILIARY ELECTRICAL SYSTEM

A. Auxiliary Electrical Equipment Surveillance (Cont)

1. Verifying de-energization of the emergency buses and load shedding from the emergency buses.

2. Verifying the diesel starts from ambient condition on the auto-start signal, energizes the emergency buses with permanently connected loads, energizes the auto-connected emergency loads through the load sequence, and operates for ≥ 5 minutes while its generator is loaded with the emergency loads.

   During performance of this surveillance verify that HPCI and RCIC inverters do not trip.

   The results shall be logged.

c. Once per operating cycle with the diesel loaded per 4.9.A.1.b verify that on diesel generator trip, secondary (offsite) AC power is automatically connected within 11.8 to 13.2 seconds to the emergency service buses and emergency loads are energized through the load sequencer in the same manner as described in 4.9.A.1.b.1.

   The results shall be logged.

LIMITING CONDITIONS FOR OPERATION

3.9 AUXILIARY ELECTRICAL SYSTEM

A. Auxiliary Electrical Equipment (Cont)

4. 4160 volt buses A5 and A6 are energized and the associated 480 volt buses are energized.

5. The station and switchyard 125 and 250 volt batteries are operable. Each battery shall have an operable battery charger.

6. Emergency Bus Degraded Voltage Annunciation System as specified in Table 3.2.B.1 is operable.

7. Specification:

Two redundant RPS Electrical Protection Assemblies (EPAs) shall be operable at all times on both inservice power supplies.

Action

a. With one EPA on an inservice power supply inoperable, continued operation is permissible provided that the EPA is returned to operable status or power is transferred to a source with two operable EPAs within 72 hours. If this requirement cannot be met, trip the power source.

b. With both RPS EPAs found to be inoperable on an inservice power supply, continued operation is permissible, provided at least one EPA is restored to operable status or power is transferred to a source with at least one operable EPA within 30 minutes. If this requirement cannot be met, trip the power source.

NOTE: Only applicable if tripping the power source would not result in a scram.

SURVEILLANCE REQUIREMENTS

4.9 AUXILIARY ELECTRICAL SYSTEM

Auxiliary Electrical Equipment Surveillance (Cont)

d. Once a month the quantity of diesel fuel available shall be logged.

e. Once a month a sample of diesel fuel shall be checked for quality in accordance with ASTM D4057-81 or D4177-82. The quality shall be within the acceptable limits specified in Table 1 of ASTM D975-81 and logged.

2. Station and Switchyard Batteries

a. Every week the specific gravity, the voltage and temperature of the pilot cell and overall battery voltage shall be measured and logged.

b. Every three months the measurements shall be made of voltage of each cell to nearest 0.1 volt, specific gravity of each cell, and temperature of every fifth cell. These measurements shall be logged.

c. Once each operating cycle, the stated batteries shall be subjected to a Service Discharge Test (load profile). The specific gravity and voltage of each cell shall be determined after the discharge and logged.

d. Once every five years, the stated batteries shall be subjected to a Performance Discharge Test (capacity). This test will be performed in lieu of the Service Discharge Test requirements of 4.9.A.2.C above.

LIMITING CONDITIONS FOR OPERATION

3.9 AUXILIARY ELECTRICAL SYSTEM (Cont)

B. Operation with Inoperable Equipment

Whenever the reactor is in Run Mode or Startup Mode with the reactor not in a Cold Condition, the availability of electric power shall be as specified in 3.9.B.1, 3.9.B.2, 3.9.B.3, 3.9.B.4, and 3.9.B.5.

1. From and after the date that incoming power is not available from the startup or shutdown transformer, continued reactor operation is permissible under this condition for:

   a. 3 days with the startup transformer inoperable

   or

   b. 7 days with the shutdown transformer inoperable

   During this period, both diesel generators and associated emergency buses must remain operable.

2. From and after the date that incoming power is not available from both startup and shutdown transformers, continued operation is permissible, provided both diesel generators and associated emergency buses remain operable, all core and containment cooling systems are operable, reactor power level is reduced to 25% of design and the NRC is notified within one (1) hour as required by 10CFR50.72.

3. From and after the date that one of the diesel generators or associated emergency bus is made or found to be inoperable for any reason, continued reactor operation is permissible in accordance with Specifications 3.4.B.1, 3.5.F.1, 3.7.B.1.c, 3.7.B.1.e, 3.7.B.2.c, and 3.7.B.2.e if Specification 3.9.A.1 and 3.9.A.2.a are satisfied.

SURVEILLANCE REQUIREMENTS

4.9 AUXILIARY ELECTRICAL SYSTEM (Cont)

Auxiliary Electrical Equipment Surveillance (Cont)

3 Emergency 4160V Buses A5-A6 Degraded Voltage Annunciation System.

   a. Once each operating cycle, calibrate the alarm sensor.

   b. Once each 31 days perform a channel functional test on the alarm system.

   c. In the event the alarm system is determined inoperable under 3.b above, commence logging safety related bus voltage every 30 minutes until such time as the alarm is restored to operable status.

4. RPS Electrical Protection Assemblies

   a. Each pair of redundant RPS EPAs shall be determined to be operable at least once per 6 months by performance of an instrument functional test.

   b. Once per 18 months each pair of redundant RPS EPAs shall be determined to be operable by performance of an instrument calibration and by verifying tripping of the circuit breakers upon the simulated conditions for automatic actuation of the protective relays within the following limits:

Overvoltage	$\leq$ 132 volts
Undervoltage	$\geq$ 108 volts
Underfrequency	$\geq 57 H_Z$

3.9 AUXILIARY ELECTRICAL SYSTEM (Cont)

4.9 AUXILIARY ELECTRICAL SYSTEM (Cont)

B. Operation with Inoperable Equipment (Cont)

4. From and after the date that one of the diesel generators or associated emergency buses and either the shutdown or startup transformer power source are made or found to be inoperable for any reason, continued reactor operation is permissible for 48 hours provided:

   a. The startup transformer and both offsite 345kV transmission lines are available and capable of automatically supplying auxiliary power to the emergency 4160 volt buses,

   OR

   b. The 23kV transmission line and associated shutdown transformer are available and capable of automatically supplying auxiliary power to the emergency 4160 volt buses

5. From and after the date that one of the 125 or 250 volt battery systems is made or found to be inoperable for any reason, continued reactor operation is permissible during the succeeding three days within electrical safety considerations, provided repair work is initiated in the most expeditious manner to return the failed component to an operable state, and Specification 3.5.F is satisfied.

6. With the emergency bus voltage less than 3958.5V but above 3878.7V (excluding transients) during normal operation, transfer the safety related buses to the diesel generators. If grid voltage continues to degrade be in at least Hot Shutdown within the next 4 hours and in Cold Shutdown within the following 12 hours unless the grid conditions improve.

5.5 Programs and Manuals

5.5.7 Configuration Risk Management Program (CRMP)

CRMP provides a proceduralized risk-informed assessment to manage the risk associated with equipment inoperability. The program applies to technical specification structures, systems, or components for which a risk-informed allowed outage time has been granted.

The CRMP includes the following elements:

a. Provisions for the control and implementation of a Level 1 at power internal event PRA-informed methodology. The assessment is capable of evaluating the applicable plant configuration.

b. Provisions for performing an assessment prior to entering the LCO Action Statement for preplanned activities.

c. Provisions for performing an assessment after entering the LCO Action Statement for unplanned entry into the LCO Action Statement activities.

d. Provisions for assessing the need for additional actions after the discovery of additional equipment out of service conditions while in the LCO Action Statement.

e. Provisions for considering other applicable risk significant contributors such as Level 2 issues and external events, quantitatively or qualitatively.

5.0 ADMINISTRATIVE CONTROLS

5.6 Reporting Requirements

The following reports shall be submitted in accordance with 10 CFR 50.4.

5.6.1 Occupational Radiation Exposure Report

A tabulation on an annual basis of the number of station, utility, and other personnel (including contractors) receiving exposures > 100 mrem/yr and their associated man rem exposure according to work and job functions (e.g., reactor operations and surveillance, inservice inspection, routine maintenance, special maintenance (including description), waste processing, and refueling). This tabulation supplements the requirements of 10 CFR 20.2206. The dose assignments to various duty functions may be estimated based on pocket dosimeter, thermoluminescent dosimeter (TLD), or film badge measurements. Small exposures totaling < 20% of the individual total dose need not be accounted for. In the aggregate, at least 80% of the total whole body dose received from external sources should be assigned to specific major work functions. The report shall be submitted by April 30 of each year.

5.6.2 Annual Radiological Environmental Operating Report

The Annual Radiological Environmental Operating Report covering the operation of the unit during the previous calendar year shall be submitted by May 15 of each year. The report shall include summaries, interpretations, and analyses of trends of the results of the Radiological Environmental Monitoring Program for the reporting period. The material provided shall be consistent with the objectives outlined in the Offsite Dose Calculation Manual (ODCM), and in 10 CFR 50, Appendix I, Sections IV.B.2, IV.B.3, and IV.C.

The Annual Radiological Environmental Operating Report shall include a summary of the results of analyses of all radiological environmental samples and of all environmental radiation measurements taken during the period pursuant to the locations specified in the table and figures in the ODCM, as well as summarized and tabulated results of these analyses and measurements in the format of the table in the Radiological Assessment Branch Technical Position, Revision 1, November 1979. In the event that some individual results are not available for inclusion with the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted in a supplementary report as soon as possible.

(continued)

5.6 Reporting Requirements

5.6.3 Radioactive Effluent Release Report

The Radioactive Effluent Release Report covering the operation of the unit shall be submitted in accordance with 10 CFR 50.36a by May 15th of each year. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the unit. The material provided shall be consistent with the objectives outlined in the ODCM and process control procedures and in conformance with 10 CFR 50.36a and 10 CFR 50, Appendix I, Section IV.B.1.

5.6.4 Monthly Operating Reports

Routine reports of operating statistics and shutdown experience shall be submitted on a monthly basis no later than the 15th of each month following the calendar month covered by the report.

5.6.5 Core Operating Limits Report (COLR)

a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:

1. Table 3.1.1 – APRM High Flux trip level setting
2. Table 3.2.C –APRM Upscale trip level setting
3. 3.11.A – Average Planar Linear Heat Generation Rate (APLHGR)
4. 3.11.B – Linear Heat Generation Rate (LHGR)
5. 3.11.C –Minimum Critical Power Ratio (MCPR)
6. 3.11.D – Power/Flow Relationship During Power Operation
7. 4.2 – Reactor Core

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel," (the approved version at the time the reload analyses are performed shall be identified in the COLR).

(continued)

5.6 Reporting Requirements

5.6.5 (continued)

2. NEDC-31852P, "Pilgrim Nuclear Power Station SAFER/GESTR-LOCA Loss of Coolant Accident Analysis", dated September, 1990 (the approved version at the time the reload analyses are performed shall be identified in the COLR), and

3. NEDC-31312-P, "ARTS Improvement Program Analyses for Pilgrim Nuclear Power Station", dated September 1987, (the approved version at the time the reload analyses are performed shall be identified in the COLR).

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as shutdown margin, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.0 ADMINISTRATIVE CONTROLS

5.7 High Radiation Area

5.7.1 Pursuant to 10 CFR 20, paragraph 20.1601(c), in lieu of the requirements of 10 CFR 20.1601, each high radiation area, as defined in 10 CFR 20, in which the intensity of radiation is > 100 mrem/hr but < 1000 mrem/hr, shall be barricaded and conspicuously posted as a high radiation area and entrance thereto shall be controlled by requiring issuance of a Radiation Work Permit (RWP). Individuals qualified in radiation protection procedures (e.g., Health Physics personnel) or personnel continuously escorted by such individuals may be exempt from the RWP issuance requirement during the performance of their assigned duties in high radiation areas with exposure rates ≤ 1000 mrem/hr, provided they are otherwise following plant radiation protection procedures for entry into such high radiation areas.

Any individual or group of individuals permitted to enter such areas shall be provided with or accompanied by one or more of the following:

a. A radiation monitoring device that continuously indicates the radiation dose rate in the area.

b. A radiation monitoring device that continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received. Entry into such areas with this monitoring device may be made after the dose rate levels in the area have been established and personnel are aware of them.

c. An individual qualified in radiation protection procedures with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area and shall perform periodic radiation surveillance at the frequency specified by the Radiation Protection Manager in the RWP.

5.7.2 In addition to the requirements of Specification 5.7.1, areas with radiation levels ≥ 1000 mrem/hr shall be provided with locked or continuously guarded doors to prevent unauthorized entry and the keys shall be maintained under the administrative control of the Nuclear Watch Engineer on duty or health physics supervision. Doors shall remain locked except during periods of access by personnel under an approved RWP that shall specify the dose rate levels in the immediate work areas and the maximum allowable stay times for individuals in those areas. In lieu of the stay time specification of the RWP, direct or remote (such as closed circuit TV cameras) continuous surveillance may be made by

(continued)

5.7 High Radiation Area

5.7.2 (continued)

personnel qualified in radiation protection procedures to provide positive exposure control over the activities being performed within the area.

5.7.3 For individual high radiation areas with radiation levels of > 1000 mrem/hr, accessible to personnel, that are located within large areas such as reactor containment, where no enclosure exists for purposes of locking, or that cannot be continuously guarded, and where no enclosure can be reasonably constructed around the individual area, that individual area shall be barricaded and conspicuously posted, and a flashing light shall be activated as a warning device.

(continued)

B 3/4.5CORE AND CONTAINMENT COOLING SYSTEMS

3/4.5.F. Minimum Low Pressure Cooling and Diesel Generator Availability BASES

BACKGROUND

The purpose of Specification 3/4.5.F is to assure that adequate core cooling equipment is available at all times. If, for example, one core spray were out of service and the diesel which powered the opposite core spray were out of service, only 2 LCPI pumps would be available. It is during refueling outages that major maintenance is performed and during such time that all low pressure core cooling systems may be out of service. This specification provides that should this occur, no work will be performed on the primary system which could lead to draining the vessel. This work would include work on certain control rod drive components and recirculation system.

Specification 3.4.F.5 allows removal of one CRD mechanism while the torus is in a drained condition without compromising core cooling capability. The available core cooling capability for a potential draining of the reactor vessel while this work is performed is based on an estimated drain rate of 300 gpm if the control rod blade seal is unseated. Flooding the refuel cavity and dryer/separator pool to elevation 114'-0" corresponds to approximately 305,000 gallons of water and will provide core cooling capability in the event leakage from the control rod drive does occur. A potential draining of the reactor vessel (via control rod blade leakage) would allow this water to enter into the torus and after approximately 243,000 gallons have accumulated (needed to meet minimum NPSH requirements for the LPCI and/or core spray pumps), the torus would be able to serve as a common suction header. This would allow a closed loop operation of the LPCI system and the core spray system (once re-aligned) to the torus. In addition, the other core spray system is lined up to the condensate storage tanks which can supplement the refuel cavity and dryer/separator pool water to provide core flooding, if required.

ACTION

The maximum allowed out-of-service (OOS) time for one EDG is 14 days, provided that one EDG and the SBO-DG are operable, in addition to all of the low pressure core and containment cooling systems as specified in 3.5.F.1. If the SBO-DG is determined to be inoperable, the maximum allowed OOS time for one EDG is 72 hours. A 24-hour LCO will control the plant for cold shutdown if the SBO-DG becomes inoperable anytime after 72 hours during a 14-day EDG LCO.

SURVEILLANCE

The SBO-DG shall be determined to be operable as defined below for extending the 3 days OOS time to 14 days for an EDG. The SBO-DG is operable if a surveillance was completed within the last seven days before extending to a 14-day OOS; otherwise, a surveillance must be completed to demonstrate that the SBO-DG is operable. The 72 hours period allows the operators to complete the required SBO-DG surveillance using the 23Kv offsite power source and to notify Commonwealth Electric of the needed use of the 23Kv line in the testing configuration. The SBO-DG is operable if it is capable of

SURVEILLANCE (continued)

energizing the safety bus associated with the inoperable EDG. Within one hour of demonstrating SBO-DG operability and once every eight hours thereafter, the normal breaker configuration for energizing the safety bus associated with the inoperable EDG should be verified. The SBO-DG is a non safety-related, manually started, 2000KW generator and is not a qualified replacement for an EDG.

3/4.5.G. Deleted

B 3/4.5CORE AND CONTAINMENT COOLING SYSTEMS

3/4.5.H. Maintenance of Filled Discharge Pipe BASES

BACKGROUND

If the discharge piping of the core spray, LPCI system, HPCI, and RCIC are not filled, a water hammer can develop in this piping when the pump and/or pumps are started. An analysis has been done which shows that if a water hammer were to occur at the time at which the system were required, the system would still perform its design function. However, to minimize damage to the discharge piping and to ensure added margin in the operation of these systems, this Technical Specification requires the discharge lines to be filled whenever the system is in an operable condition.

SURVEILLANCE

An acceptable method of ensuring that the lines are full is to vent at the high points. The monthly frequency is based on the gradual nature of void buildup in the ECCS piping, the procedural controls, and operating experience.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 179 TO FACILITY OPERATING LICENSE NO. DPR-35

BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

1.0 INTRODUCTION

On April 25, 1996, the licensee requested an amendment to the Technical Specifications (TS) for the Pilgrim Nuclear Power Station (PNPS). The purpose of this amendment is to revise the definition of "operable-operability," revise the TS and associated "bases" section for TS 3.9.B.2 and 3.9.B.3 ("Auxiliary Electrical System"), TS 3.4.B.1 ("Standby Liquid Control System"), TS 3.7.B.1.a,c, and e, and 3.7.B.2.a, c, and e ("Standby Gas Treatment System and Control Room High Efficiency Air Filtration System"), and TS 4.5.F.1 ("Core and Containment Cooling Systems") and to delete TS 3.7.B.1.f ("Standby Gas Treatment System and Control Room High Efficiency Air Filtration System"). On February 10, 1997, the Commission issued Amendment No. 170 for the requested changes except for the changes to the allowed outage times for the emergency diesel generators (EDGs) and ac power sources as related to the TS and the associated "bases" section for TS 3.9.B.1 ("Auxiliary Electrical System") and TS 3.5.F.1 ("Core and Containment Cooling Systems"). This amendment covers proposed changes to TS Sections 3.5.F.1, 4.5.F.1, 3.9.B.1, 3.9.B.4, and 3/4.5.F bases. The proposed change will extend the allowed outage time (AOT) for EDGs from 3 days to 14 days provided the station blackout diesel (SBO) is verified operable in accordance with Surveillance 4.5.F.2. On September 5, 1996, the licensee responded to the staff's request for additional information (RAI) dated June 25, 1996. In response to the staff's concerns expressed during telephone calls on December 2, 1996, and January 10, 1997, the licensee sent additional information in support of the proposed TS changes for the EDG AOT by letter dated August 8, 1997. On September 24, 1997, the licensee and staff discussed the proposed TS change, issues related to EDG maintenance practices, and the licensee's previous responses. The licensee addressed these issues by letter dated March 26, 1998. On July 31, 1998, the licensee submitted additional information related to extending the AOT for the EDGs. Additionally, on August 24, 1998, the licensee sent information concerning the proposed configuration risk management program (CRMP) and revised the limiting condition for operation (LCO) time to 48-hours when one EDG and a shutdown or startup transformer are inoperable.

2.0 EVALUATION

The staff's evaluations of the licensee's proposed changes to the TS follow:

2.1 Proposed Change to TS Sections 3.5.F.1 and 4.5.F.1

The licensee proposed to change TS Sections 3.5.F.1 and 4.5.F.1. At present, TS Sections 3.5.F.1 and 4.5.F.1 read as follows:

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.5 CORE AND CONTAINMENT COOLING SYSTEMS (Cont.)	4.5 CORE AND CONTAINMENT COOLING SYSTEMS (Cont.)
F. Minimum Low Pressure Cooling and Diesel Generator Availability	F. Minimum Low Pressure Cooling and Diesel Generator Availability
1. During any period when one diesel generator is inoperable, continued reactor operation is permissible only during the succeeding 72 hours unless such diesel generator is sooner made operable, provided that all of the low pressure core and containment cooling systems and the remaining diesel generator shall be operable. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be placed in the Cold Shutdown Condition within 24 hours.	1. When it is determined that one diesel generator is inoperable, within 24 hours, determine that the operable diesel generator is not inoperable due to a common cause failure, OR perform surveillance 4.9.A.1.a for the operable diesel generator, AND within 1 hour and once every 8 hours thereafter, verify correct breaker alignment and indicated power availability for each offsite circuit.

The amended TS Section will read as follows:

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.5 CORE AND CONTAINMENT COOLING SYSTEMS (Cont.)	4.5 CORE AND CONTAINMENT COOLING SYSTEMS (Cont.)
F. Minimum Low Pressure Cooling and Diesel Generator Availability	F. Minimum Low Pressure Cooling and Diesel Generator Availability
1. During any period when one emergency diesel generator (EDG) is inoperable, continued reactor operation is permissible only during the succeeding 72 hours unless such EDG is sooner made operable, provided that all of the low pressure core and containment cooling systems shall be operable, and the remaining EDG shall be operable in accordance with 4.5.F.1. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be placed in the Cold Shutdown Condition within 24 hours. The 72 hours LCO can be extended to 14 days provided, in addition to the above requirements, the Station Blackout Diesel Generator is verified operable in accordance with 4.5.F.2	1. When it is determined that one EDG is inoperable, within 24 hours, determine that the operable EDG is not inoperable due to a common cause failure, OR perform surveillance 4.9.A.1.a for the operable EDG, AND within 1 hour and once every 8 hours thereafter, verify correct breaker alignment and indicated power availability for each offsite circuit. 2. Confirm the Station Black Out Diesel Generator (SBO-DG) has been demonstrated operable within the preceding 7 days OR within 72 hours of declaring an EDG inoperable, perform a surveillance to demonstrate that the SBO-DG is operable. AND within 1 hour of demonstrating the SBO-DG operability as specified above and once every 8 hours thereafter, verify normal breaker configuration.

2.1.1 Deterministic Evaluation of EDG AOT Extension

The licensee stated that TS 3.5.F.1 will be revised to increase the allowed outage time (AOT) for the emergency diesel generators (EDGs) from the currently allowed 3 days to 14 days. The purpose of increasing the AOT for the EDGs to 14 days is to provide more flexibility for maintenance and repair of the EDGs. The staff granted an EDG AOT extension on the basis of plants having an additional source of ac power that meets or exceeds the requirements of an alternate ac (AAC) source as established by NUMARC-8700 and NRC Regulatory Guide (RG) 1.155. The licensee has a station blackout diesel generator (SBO-DG) to cope with an SBO event. This SBO-DG will be utilized as a standby source of ac power during extended EDG maintenance. On June 25, 1996, the staff sent a request for additional information (RAI) containing several questions.

In response to Question 1, the licensee stated that scheduled periodic inspections and overhaul are performed together in accordance with Procedure 3.M.3-61.5, "Emergency Diesel Generator Refuel Outage Preventive Maintenance." The major portions of this procedure cover the following areas:

- wear indication measurements such as gear backlash, crankshaft deflection, and clearances
- rebuilding/inspecting the air start motors
- fuel injector cleaning and testing, fuel pump timing, and rack inspection
- generator inspection and insulation-resistance measurement

Historically, it takes approximately 6 days to complete this procedure. These activities are performed once every 2 years. Use of limiting condition for operation (LCO) AOT is governed by Procedure 1.2.2, "Administrative Operations Requirements," which limits LCO use to 50% of its total AOT. Hence, an AOT of 14 days is proposed.

Regarding Question 2a, the licensee stated that the current TS include an LCO that states that all of the low-pressure core and containment cooling systems are operable and the remaining EDG is operable. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be placed in the cold shutdown condition within 24 hours. The licensee stated that Surveillance 8.C.34, "Operations Technical Specification Requirements for Inoperable Systems/Components," will be revised to include the SBO-DG as the AAC power supply. Additionally, Procedure 1.2.2, "Administrative Operations Requirements," provides a positive measure to preclude subsequent maintenance/testing on redundant and backup equipment while the EDG is inoperable.

Regarding Question 2b, the licensee stated that the TS pages are revised to include compensatory measures for the AAC source before taking an EDG out of service for an extended period of time. These measures will require the AAC source to be verified operable either by confirming that it was demonstrated operable within the preceding 7 days or by performing a surveillance within 72 hours of declaring an EDG inoperable and capable of

being connected to the safety bus associated with the EDG to be taken out of service by verifying normal breaker configuration within 1 hour of demonstrating the SBO-DG operability and once every 8 hours thereafter.

The staff expressed concern regarding the operability of the SBO-DG 1 hour after the loss of offsite power, since the auxiliaries of the SBO-DG are fed from the offsite power. The event described in Licensee Event Report (LER) 97-004-00, "Loss of Preferred Power and Oil Spill Due to Main Transformer Fault While Shutdown," included a failure of the SBO-DG to start. As a result, the licensee (1) implemented procedural enhancement to provide guidance to operators regarding startup and operation of the SBO-DG unloaded, and (2) completed a plant design change, PDC 97-14, "Revised Power Supply for SBO Diesel Auxiliaries," to provide an alternate source of power to the SBO-DG auxiliaries to ensure startup and availability of the SBO-DG during partial or degraded offsite power conditions. The SBO-DG auxiliaries will require approximately 58 kW. The alternate source of power will be provided from the 400 kW security diesel generator. The current loading on the security DG is approximately 256 kW and there is a sufficient margin to add the extra 58 kW without challenging the security diesel rating.

The SBO-DG battery is designed to carry the load for 7 hours. The SBO-DG battery charger is powered by the output of either the SBO-DG or security DG during loss of offsite power.

Regarding the target reliability of 95% for the SBO-DG, the staff noticed that adequate testing was not done to establish the target reliability of 95%. The staff has accepted 25 tests with one failure to establish reliability of 95%. The licensee stated that 25 consecutive start and load run tests without a failure were completed on June 1997.

Additionally, the SBO-DG is within the scope of the maintenance rule. The licensee stated that performance of the SBO-DG is monitored against established criteria in accordance with the maintenance rule. Furthermore, the breakers that would be required to energize safety-related buses when the SBO-DG is operable are included in the maintenance rule monitoring procedures. The licensee stated that these breakers have a good operating history and have proven to be highly reliable. They have position indication locally at the switchgear and in the control room. These breakers have spring charge indication lights on the outside of the switchgear door to indicate that the breaker's closing springs are charged and the breaker is ready to function on a demand signal. The breakers that interface between the SBO-DG, 23 kV power source, and 4160 volt emergency buses are shown in Figure 1 (enclosed). Breakers 152-501 and 152-601 are safety related and undergo preventive maintenance every 2 years and overhaul every 6 years. Breakers 152-600, 152-801 and 152-802 are not safety related and undergo preventive maintenance every 4 years and overhaul every 8 years.

Additionally, the SBO-DG is manually started and feeds one emergency bus through the same breakers used for the shutdown transformer. When the SBO-DG is required to feed a bus, the breaker to one emergency bus (A501 or A601) is manually opened and the SBO-DG is started. Aligning the breakers for SBO-DG operation isolates one emergency bus from the shutdown transformer. This is undesirable because the shutdown transformer is capable of automatically supplying power to either emergency bus; whereas, the SBO-DG requires operator action and is capable of supplying only one emergency bus with 2000 kW. Therefore, Surveillance 4.5.2

has been modified to require once every 8 hours, verify normal breaker configuration. Modifying the surveillance in this manner assures the breakers are configured so the SBO-DG is capable of being connected to a safety bus without interrupting the normal function of the shutdown transformer.

In response to Questions 2c, d, e, and f, the licensee stated that LCO entry conditions and the relationship of interfacing safety-related systems and important non-safety-related systems are addressed as operating philosophies in Procedure 1.2.2, Attachment 11, Items [2], [3], and [4].

Item [2] states that an LCO-Planned Maintenance action on-line is acceptable if it is expected that the reliability of the equipment will improve to such a degree that the overall risk to the safe operation of the plant decreases. Item [3] indicates that scheduled repeated entry and exit from the LCO for the purpose of resetting the clock for AOT will not be allowed. Item [4] states that other maintenance and testing that increases the likelihood of a plant transient should be avoided. Confidence in the operability of the independent equipment that is redundant to (or diverse from) the affected equipment should be high.

In response to Question 3, the licensee stated that EDG overhauls are performed in accordance with Procedure 3.M.3-61.5. Any major components such as a governor would only be replaced if its condition indicated that this was necessary. The EDG is not fully disassembled. The testing that would be conducted after the overhaul would be an extended surveillance of Procedure 8.9.1, "Manually start and load the EDGs." This procedure is currently performed monthly to satisfy TS 4.9.A.1.a. The licensee stated that full load rejection tests are not routinely performed on EDGs at PNPS. However, following postulated replacement of a governor, a full load rejection test will be performed. Additionally, improper maintenance would be detected during post-work testing (PWT) before exiting the EDG LCO. The potential for damage to other equipment is minimized by the progressive steps in the PWT process. Work that is not commonly performed is reviewed by the system engineer and the level of PWT is determined by the type of work that is being done. On March 26, 1998, the licensee provided details of PWT steps, which included the following: (1) Preliminary Testing, (2) Functional Testing, (3) Pre-operational Testing, (4) Operational Test, (5) Load Rejection Test. The licensee stated that the philosophy behind PWT is to minimize the risk of damaging any equipment. These steps ensure that the component and system are functional. Any problems found would be corrected before proceeding to the next level of testing. The licensee stated that the level of PWT will ensure that no damage will occur to the emergency buses and associated connecting equipment as a result of improperly performed maintenance.

Furthermore, the licensee stated that no unacceptable voltage transients have occurred at PNPS as a result of improper maintenance activities. On March 25, 1991, during monthly surveillance, the automatic voltage regulator on the Train B EDG failed; and as a result, the kW indication increased to approximately 3500 kW, the unit auxiliary transformer breaker to A6 tripped on Phase B overcurrent which caused lockout on bus A6, and the EDG shut down on overspeed and the EDG output breaker tripped. The voltage transient produced by this event had no negative effect on the 4160-V safety buses or loads.

In response to Question 6, the licensee stated that EDG extended maintenance during degraded grid and extreme weather conditions is addressed in Procedure 1.2.2, Attachments 9

and 11. Attachment 9 of Procedure 1.2.2 is modified to include that EDG LCO shall not be entered for planned maintenance while severe weather (e.g., hurricane or tornado) notices or warnings are in effect for the area in which PNPS is located. The nuclear watch engineer (NWE) has the authority to ensure that concurrent activities/conditions will not compromise plant safety or performance. The NWE's decision would be supported by senior plant management. All the guidelines in Procedure 1.2.2 support prudent scheduling taking into account all activities that would likely extend a given maintenance activity. Procedure 5.2.2 is modified to include plans to restore standby power quickly if necessary.

On the basis of the above review, the staff finds that the licensee satisfactorily resolved the staff's concerns.

2.1.2 Risk Evaluation of the DG AOT Extension

To gain a risk perspective, the staff used a three-tiered approach to evaluate the risk associated with the proposed amendment. The first tier evaluated the probabilistic risk assessment (PRA) model and the impact of the change on plant operational risk. The second tier addressed the need to preclude potentially high-risk configurations, should additional equipment outages occur during the AOT period. The third tier evaluated the licensee's configuration risk management program (CRMP) to ensure that equipment removed from service before entering or during the proposed AOT will be appropriately assessed from a risk perspective. RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications," addresses each tier; the associated findings are discussed below.

Tier 1: PRA Evaluations of AOT Extensions

The licensee used traditional PRA methodology to evaluate the requested AOT extension for EDGs. The Tier 1 NRC staff review of the licensee's PRA involved two aspects: (1) evaluation of the PRA model and application to the proposed AOT extension and (2) evaluation of PRA results and insights stemming from the application. The review did not warrant an assessment of any unconventional PRA practices or unique features that could significantly impact the PRA findings and conclusions.

(1) Evaluation of PRA Model and Application to the AOT Extension

The staff focused its review on the capability of the licensee's PRA model to analyze the risk stemming from the proposed AOT changes for EDGs, and did not involve an in-depth review of the licensee's PRA. This review was based on the staff's initial screening process wherein the staff examined the licensee's internal events PRA results, recent operational experience regarding loss of offsite power (LOOP) and EDG reliability and availability, and plant-specific features such as EDG configurations, offsite sources, and other systems critical to mitigation of a LOOP event. The staff concludes that the licensee's PRA results are reasonable, and the scope and depth of the PRA analysis support such a finding. Recent data for EDG and offsite ac power reliability and availability did not indicate any adverse trends. The EDGs and SBO-DG are fully capable of safely shutting down the plant given a LOOP.

The licensee's PRA includes both a Level 1 and a modified Level 2 analysis. For front-end analysis, PNPS used a Level 1 PRA; the small event tree/large fault tree technique with fault tree linking was used, and accident sequence quantification was performed with the Cut Set and Fault Tree Analysis (CAFTA) computer code. The analysis modeled 23 initiating events exclusive of internal flooding (also included) and dependencies that exist between initiating events and the associated mitigating systems. These initiators are consistent with those identified in previous PRAs.

Plant-specific data were used where possible for component failure rates and test/maintenance unavailabilities. Component unavailability estimates were derived for the period between 01/01/81 and 09/30/89 with one major exception. The data for the high-pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) systems came from a 5-year moving average database for the period between 03/31/87 and 03/31/92. The data for these two systems were blended with the more recent data to reflect their improved availability since 1990. The data collection period of 01/01/81 to 09/30/89 was used to ensure the equivalent of 5 full years of plant operation.

Generic component failure data were used if no plant-specific data were available. The primary source of generic component unavailability data was NUREG-CR-4550 ("Analysis of Core Damage Frequency Internal Events Methodology"). Additional data were extracted from IEEE-500 ("Guide to the Collection and Presentation of Electrical, Electronic, Sensing, Component, and Mechanical Equipment Reliability Data for Nuclear Power Generating Stations," December 1983) and the "Technical Specification Improvement Analysis for BWR Reactor Protection System," NEDC-30851P-A, GE Nuclear Energy, 1988.

For common-cause failure analysis, a multiple Greek letter methodology was used. The analysis conservatively assumed that even with one EDG unavailable, a common-cause failure from the idled EDG contributed to core damage.

The two EDGs and the SBO-DG were treated as a group of three similar structures, systems, or components (SSCs). The analysis derived a beta factor of 6.7E-02 and a gamma factor 2.4E-02 for diesel failure-to-run, and a beta factor of 2.2E-02 and a gamma factor of 6.E-02 for diesel failure-to-start.

(2) Evaluation of PRA Results and Insights

The staff estimates that, with the licensee-furnished annual average core damage frequency (CDF) associated with the proposed 14-day AOT of 2.87E-05 per year, an approximate ΔCDF is 3E-07per year, and is within the guidelines in RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Current Licensing Basis."

The baseline large early-release frequency (LERF) calculated by the licensee is 3.69E-06 per year, and for the proposed 14-day AOT is 3.73E-06 per year. The ΔLERF of 3.9E-08 per year is within the guidelines in RG 1.177.

The incremental conditional core damage probability (ICCDP) calculated by the licensee is 1.65E-07, well within the staff's guideline value of 5E-07.

The incremental conditional large early release probability (ICLERP) was calculated to be 8.6E-09, also within guidelines contained in approved RG 1.177 (5E-08).

Additionally, the licensee will implement, before implementation of the extended (14-day) EDG AOT, a procedure that will prohibit entry into the AOT for scheduled maintenance purposes if severe weather conditions are expected.

In a licensee sensitivity analysis, an evaluation of the impact of revised LOOP initiating-event frequencies was made on the original individual plant examination (IPE) model, without consideration of other performance updates and enhancements. The original IPE used frequencies of 0.475 per year and 0.142 per year, respectively, for loss of preferred offsite power (345 kV) and total LOOP. Using a revised frequency of 0.643 per year for loss of preferred offsite power; the CDF in the original IPE increased by about 8.5% (from 5.85E-05 per year to 6.35E-05 per year). Using a revised frequency of 0.135 per year for total LOOP, the original IPE CDF decreased by no more than about 1%.

On the basis of the preceding Tier 1 review and the related information presented, the staff concludes that the PRA model used for the proposed AOT extension for single inoperable EDGs is considered to be reasonable, and the risk impact of the change is small and supports the AOT extension.

Tier 2: Avoidance of Risk-Significant Plant Configurations

As previously stated, the licensee will implement a procedure, before use of the EDG AOT, that will prohibit entry into an extended EDG AOT (14 days) for scheduled maintenance purposes if severe weather conditions are expected. This will reduce the likelihood of weather-related, risk-significant plant configurations.

The licensee will have TS Required Actions (3.5.1) for the following conditions:

(1) During any period when one emergency diesel generator (EDG) is inoperable, continued reactor operation is permissible only during the succeeding 72 hours unless such EDG is sooner made operable, provided that all the low-pressure core and containment cooling systems shall be operable, and the remaining EDG shall be operable in accordance with Surveillance Requirement (SR) 4.5.F.1. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be placed in the cold shutdown condition within 24 hours.

The 72-hour AOT can be extended to 14 days provided that in addition to the above requirements, the station blackout diesel generator is verified operable in accordance with SR 4.5.F.2.

(2) SR 4.5.F.2: Confirm the station blackout diesel generator (SBO-DG) has been demonstrated operable within the preceding 7 days or within 72 hours of declaring an EDG inoperable, perform a surveillance to demonstrate that the SBO-DG is operable, and within 1 hour of demonstrating the SBO-DG operability as specified above and once every 8 hours thereafter, verify normal breaker configuration.

The staff has concluded that these restrictions are necessary to preclude high-risk situations associated with having one EDG inoperable for more than 72 hours.

Tier 3: Risk-Informed Plant Configuration Management

The licensee has provided reasonable assurance that risk-significant plant equipment outage configurations will not occur while the plant is subjected to the extended EDG AOT.

The licensee utilizes its CRMP to integrate the applicational capability of the "equipment out of service" (EOOS) risk monitor, which uses a Level 1, at-power, internal events, PRA-informed methodology. EOOS facilitates planning and scheduling strategies to maximize equipment performance, reliability, and availability during the EDG extended AOT.

A Level 1 PRA supports the determination of CDF. A Level 2 PRA supports the determination of LERF. The licensee's Level 1, at-power, internal-events PRA forms the basis for its EOOS monitor. The licensee's Level 1 model includes input to containment system event trees. This allows containment system dependencies to be identified by EOOS.

The scope of SSCs in the CRMP will include all SSCs modeled in the PRA as well as those SSCs deemed risk significant by the Maintenance Rule Expert Panel not modeled in the PRA. As not all maintenance rule in-scope SSCs are modeled in EOOS, the EOOS calculation is only one tool available for assessing risk. Although the scope of the CRMP is as described, the portion of CRMP to which TS apply is limited to those SSCs for which risk-informed AOTs have been granted. Specifically, the CRMP must be used whenever the 14-day EDG LCO is entered.

The licensee uses the EOOS model to provide risk calculations for plant configurations. It allows plant personnel to calculate risk impacts of inoperable equipment combinations. For any identified plant configuration of SSCs modeled in the PRA, EOOS provides risk importance measures associated with the unavailable equipment as well as those SSCs still in service. The staff reviewed this portion of the process in detail during the maintenance rule inspection (IR-98-04 dated June 29, 1998) with favorable results.

In addition to the previously mentioned risk-significant SSCs, the CRMP will include provisions to consider other applicable risk-significant contributors such as Level 2 issues and external events, qualitatively or quantitatively. The Level 2 issues relate to those accident sequences that lead to a large, early, unscrubbed release from containment. Accident sequences of concern are relatively fast acting, such as anticipated transients without scram (ATWS-type sequences, 20%) and loss of high-pressure injection with either failure to depressurize (TQUX-

type sequences, 57%) or loss of low-pressure injection (TQUV-type sequences, 23%). The EDGs are marginal contributors to TQUV-type sequences and do not contribute to ATWS and TQUX sequences. Therefore, maintaining the availability of low-pressure injection systems at an optimum during the EDG AOT will adequately address Level 2 issues.

External events of concern include severe weather and fire. The CRMP will ensure that appropriate attention is placed on scheduled maintenance activities when severe weather approaches or when activities are planned for areas with high fire hazards. Although not specifically included in the CRMP, the risk-importance measure capability of CRMP can be used to identify key equipment to protect.

As always, the qualitative assessment of the entire work scope by trained and experienced personnel will continue to play a key role in ensuring that scheduled work does not place the plant in an unsafe condition.

By procedure, the licensee will require a risk assessment before removing equipment from service for planned maintenance activities. The requirement to perform a risk assessment following unplanned equipment failures will also be proceduralized. This requirement will apply to SSCs within the scope of the CRMP.

The PRA is periodically updated in accordance with the engineering design guide (SBO3) to account for modifications to the plant as well as plant equipment performance. The EOOS program is updated following an update of the licensee's PRA model.

The CRMP is intended as a means to understand the relative instantaneous risk level during a maintenance configuration. Currently, cumulative maintenance risk is limited to an acceptable level of conformance to the maintenance rule unavailability performance criteria.

Therefore, the staff concludes that the licensee's Tier 3 approach is reasonable for the purpose of the proposed extended EDG AOT. The staff expects the licensee to implement these TS changes in accordance with the three-tiered approach described above. The AOT extension will allow efficient scheduling of online maintenance within the boundaries established by implementing the maintenance rule. The licensee will monitor EDG performance in relation to the maintenance rule performance criteria. Therefore, application of implementation and monitoring strategies will help to ensure that extension of the TS EDG AOT does not degrade operational safety over time and that the risk incurred when an EDG is taken out of service is acceptable.

PRA Quality

There were several levels of review performed on the PRA. Initially, the licensee reviewed the consistency and correctness of the assumptions and results, with minor consultant contributions. This first level of review was done to ensure a complete technology acquisition by the licensee.

An independent internal peer review was performed to ensure content accuracy and to validate the PRA process and results. This peer review team consisted of seven individuals with backgrounds in PRA, engineering, operations, training, licensing, and management.

An external peer review of the PRA was also considered. The external review team consisted of five outside individuals with backgrounds in PRA, operations, reactor engineering, and thermal-hydraulics analysis. These individuals were associated with Yankee Atomic Electric, Northeast Utilities, New Hampshire Yankee, Tenera, and Gabor, Kenton, and Associates.

Routine PRA quality is ensured by application of Engineering Design Standard SBO3, "Maintaining the Living PRA."

A general staff audit of the PRA did not indicate any irregularities in the SBO sequences. The staff's audit did not indicate any aspects of the accident initiation and progression analysis that would alter the licensee's change in CDF or LERF calculation results for this application.

2.1.3 Conclusion

The staff has granted an EDG AOT extension on the basis of plants having an additional source of ac power that meets or exceeds the requirements of an AAC source as established by NUMARC-8700 and NRC RG 1.155. The licensee has an SBO-DG (AAC power source) to cope with an SBO event. This SBO-DG will be utilized as a standby source of ac power during an extended EDG maintenance. The licensee amended the TS to include the operability and connectability of the SBO-DG before entering an extended EDG AOT. Additionally, the compensatory measures being taken by the licensee during the extended EDG AOT will ensure that the safe-shutdown capability is available. In addition, the staff evaluated the EDG AOT extension from a risk perspective and concludes that the AOT extension will not result in a significant increase in plant risk. On the basis of the three-tiered approach, the staff finds the following:

- The proposed EDG AOT modifications have only a minimal quantitative impact on plant risk. The calculated ICCDP for a single EDG AOT is small, primarily because of the redundancy in EDG configuration and the availability of the SBO-DG.

- The licensee has implemented a procedure that will prohibit entry into an extended EDG AOT for scheduled maintenance purposes if severe weather conditions or warnings are in effect. The licensee's procedure also includes several compensatory measures and normal plant practices that help avoid potentially high-risk configurations during the proposed extended EDG AOT.

- The licensee has proposed a risk-informed plant CRMP to assess the risk associated with the removal of equipment from service during the extended EDG AOT. The program provides the necessary assurances that appropriate assessments of plant-risk configurations using the EOOS software and PRA are sufficient to support the proposed AOT extension request for EDGs.

The staff concludes that the EDG AOT extension will result in a very small increase in plant risk.

The licensee has a process for scheduling and controlling maintenance activities into which plant risk is incorporated that compensates for the small risk increase and uncertainty associated with the proposed AOT change. The staff, therefore, finds that the PRA insights support the proposed EDG AOT extension.

On the basis of this evaluation, the staff finds that the proposed EDG AOT extension from 3 days to 14 days is acceptable.

2.2 Proposed Change to TS Section 3.9.B.1

The licensee proposed to change TS Section 3.9.B.1. At present, TS Section 3.9.B.1 reads as follows:

> From and after the date that incoming power is not available from the startup or shutdown transformer, continued reactor operation is permissible under this condition for seven days. During this period, both diesel generators and associated emergency buses must remain operable.

The amended TS Section would read:

> From and after the date that incoming power is not available from the startup or shutdown transformer, continued reactor operation is permissible under this condition for:
>
> a. 3 days with the startup transformer inoperable
>
> or
>
> b. 7 days with the shutdown transformer inoperable
>
> During this period, both diesel generators and associated emergency buses must remain operable.

Evaluation

The licensee stated that TS Section 3.9.B.1 is divided into two individual AOTs, one for the startup transformer and the other for the shutdown transformer, based upon their contribution to risk in relation to the EDG 14-day AOT risk assessment analysis. The AOT for the startup transformer inoperable was reduced from 7 days to 3 days (TS 3.9.B.1.a) and the AOT for the shutdown transformer inoperable remained at 7 days (TS 3.9.B.1.b).

On the basis of its review, the staff finds that the proposed amendment is more conservative than the present TS, and therefore is acceptable.

2.3 Proposed Change to TS Section 3.9.B.4

The licensee proposed to change TS Section 3.9.B.4. At present, TS Section 3.9.B.4 reads as follows:

> From and after the date that one of the diesel generators or associated emergency buses and either the shutdown or startup transformer power source are made or found to be inoperable for any reason, continued reactor operation is permissible in accordance with Specification 3.5.F, provided either of the following conditions are satisfied:
>
> a. The startup transformer and both offsite 345 kV transmission lines are available and capable of automatically supplying auxiliary power to the emergency 4160 volt buses.
>
> b. A transmission line and associated shutdown transformer are available and capable of automatically supplying auxiliary power to the emergency 4160 volt buses.

The amended TS Section 3.9.B.4 would read as follows:

> From and after the date that one of the diesel generators or associated emergency buses and either the shutdown or startup transformer power source are made or found to be inoperable for any reason, continued reactor operation is permissible for 48 hours provided:
>
> a. The startup transformer and both offsite 345 kV transmission lines are available and capable of automatically supplying auxiliary power to the emergency 4160 volt buses.
>
> or
>
> b. The 23 kV transmission line and associated shutdown transformer are available and capable of automatically supplying auxiliary power to the emergency 4160 volt buses.

Evaluation

The licensee stated that an additional reduction from 72 hours to 48 hours is proposed in the AOT for a simultaneous loss of both a startup transformer and an EDG (TS 3.9.B.4.b) or shutdown transformer and an EDG (TS 3.9.B.4.a) based upon the startup transformer's contribution to risk in relation to the EDG 14-day AOT risk assessment analysis and that two power sources have been removed from the associated bus. The proposed ac power equipment AOT change does not alter the ac power distribution configuration required for declaring the operability of systems/subsystems under the existing Specification 3.5.F, but more accurately reflects the AOTs based upon the individual risk contributors as determined by the PSA for the ac power equipment.

On the basis of its review, the staff finds that the proposed amendment is more conservative than the present TS and therefore is acceptable.

2.4 Configuration Risk Management Program (CRMP)

The licensee has proposed a new TS 5.5.18, "Configuration Risk Management Program." The Configuration Risk Management Program (CRMP) provides a proceduralized risk-informed assessment to manage the risk associated with equipment inoperability. The program applies to technical specification structures, systems, or components for which a risk-informed allowed outage time has been granted. The proposed program includes the following elements:

a. Provisions for the control and implementation of a Level 1, at power, internal events, PRA-informed methodology. The assessment shall be capable of evaluating the applicable plant configuration.

b. Provisions for performing an assessment prior to entering the LCO Condition for preplanned activities.

c. Provisions for performing an assessment after entering the LCO Condition for unplanned entry into the LCO Condition.

d. Provisions for assessing the need for additional actions after the discovery of additional equipment out-of-service conditions while in the LCO Condition.

e. Provisions for considering other applicable risk significant contributors such as Level 2 issues and external events, qualitatively, or quantitatively.

In addition, the CRMP is used to assess changes in core damage frequency resulting from applicable plant configurations. The CRMP uses the EOOS software or, if necessary, the full PRA to aid in the risk assessment of online maintenance and to evaluate the change in risk from a component failure. The equipment out-of-service risk monitor uses the plant probabilistic risk assessment model to evaluate the risk of removing equipment from service based on current plant configuration and equipment condition. The CRMP is used when an EDG is intentionally taken out of service for a planned activity excluding short duration activities (e.g., performing an air roll on the EDG prior to a routine surveillance). In addition, the CRMP is used for unplanned maintenance or repairs of an EDG.

The licensee has committed to implementation of the CRMP as described below.

The Configuration Risk Management Program (CRMP) includes the following key elements:

Key Element 1. Implementation of CRMP

The intent of the CRMP is to implement (a)(3) of the Maintenance Rule (10 CFR 50.65) with respect to on-line maintenance for risk-informed technical specifications, with the following additions and clarifications:

a. The scope of the structures, systems and components (SSCs) to be included in the CRMP will be those SSCs modeled in the licensee's plant PRA in addition to those

SSCs considered risk significant in accordance with the North Anna Maintenance Rule Program that are not modeled in the PRA.

b. The CRMP is PRA informed, and may be in the form of either an EOOS analysis, an on-line assessment, or a direct PRA assessment.

c. CRMP will be invoked as follows for:

Risk-Informed Inoperability: A risk assessment will be performed prior to entering the LCO Condition for preplanned activities. For unplanned entry into the LCO Condition, a risk assessment will be performed in accordance with plant procedures, utilizing the maintenance configuration matrix, augmented by appropriate engineering judgement.

Additional SSC Inoperability and/or Loss of Functionality: When in the risk-informed Completion Time, if an additional SSC within the scope of the CRMP becomes inoperable/non-functional, a risk assessment shall be performed in accordance with plant procedures.

d. Tier 2 commitments apply for planned maintenance only, but will be evaluated as part of the Tier 3 assessment for unplanned occurrences.

Key Element 2. Control and Use of the CRMP

a. Plant modifications and procedure changes will be monitored, assessed, and dispositioned as part of the normal PRA update process:

- Evaluation of changes in plant configuration or PRA model features can be dispositioned by implementing PRA model changes or by the qualitative assessment of the impact of the changes on the CRMP. This qualitative assessment recognizes that changes to the PRA take time to implement and that changes can be effectively compensated for without compromising the ability to make sound engineering judgments.

- Limitations of the CRMP are identified and understood for each specific Completion Time extension.

b. Procedures exist for the control and application of CRMP, including description of the process when outside the scope of the CRMP.

Key Element 3. Level 1 Risk-Informed Assessment

The CRMP is based on a Level 1, at power, internal events PRA model. The CRMP assessment may use any combination of quantitative and qualitative input. Quantitative assessments can include reference to EOOS, pre-existing calculations, or new PRA analyses.

a. Quantitative assessments should be performed whenever necessary for sound decision making.

b. When quantitative assessments are not necessary for sound decision making, or are beyond the scope of the PRA model, qualitative assessments will be performed. Qualitative assessments will consider applicable, existing insights from quantitative assessments previously performed.

Key Element 4. Level 2 Issues/External Events

External events and Level 2 issues are treated qualitatively and/or quantitatively.

The staff has reviewed the proposed CRMP TS 5.5.18, "Configuartion Risk Management Program," and concluded that the CRMP program provides the necessary assurances that appropriate assessments of plant risk configurations using the EOOS software, augmented by appropriate engineering judgment, are sufficient to support the proposed AOT extension request for EDGs. In addition, this TS is a new requirement providing additional or new requirements and is more conservative than the current TS. Based on the above we conclude that the proposed TS change is acceptable.

2.5 ADMINISTRATIVE CHANGES

The licensee has reformatted TS 3.9 and 3.9.A to be consistent with TS 3.9.B. TS 3.9.B was modified by Amendment 170. The staff has reviewed these changes and agrees that these sections were only reformatted. The staff considers these changes adminstrative in nature and therefore, are acceptable.

2.6 EDITORIAL CHANGES

TS pages B3/4.5-23 and 5.0-9 through 13 have been renumbered to B3/4.5-24 and 5.0-10 through 14 respectively. This is an editorial change and therefore, is acceptable.

2.7 BASES

The licensee modified the bases sections for the action and surveillance to reflect the EDG AOT change from 3 days to 14 days. These changes are controlled by TS 5.5.6, "Technical Specifications Bases Control Program."

3.0 SUMMARY

On April 25, 1996, the licensee requested an amendment to the TS for PNPS. On February 10, 1997, the Commission issued Amendment No. 170 for the requested changes, except for the changes to the allowed outage times for the emergency diesel generators (EDGs) and ac power sources as related to the TS and the associated bases section for TS 3.9.B.1, "Auxiliary Electrical System," and TS 3.5.F.1, "Core and Containment Cooling Systems." This amendment covers proposed changes to TS Sections 3.5.F.1, 4.5.F.1, 3.9.B.1, 3.9.B.4, and 3/4.5.F bases.

The staff has reviewed this request from deterministic and probabilistic standpoints and based on our review as discussed above, the staff concludes that the proposed TS changes are acceptable.

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. 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 (63 FR 50934). 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.

Principal Contributors: A. Pal
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Date: December 11, 1998

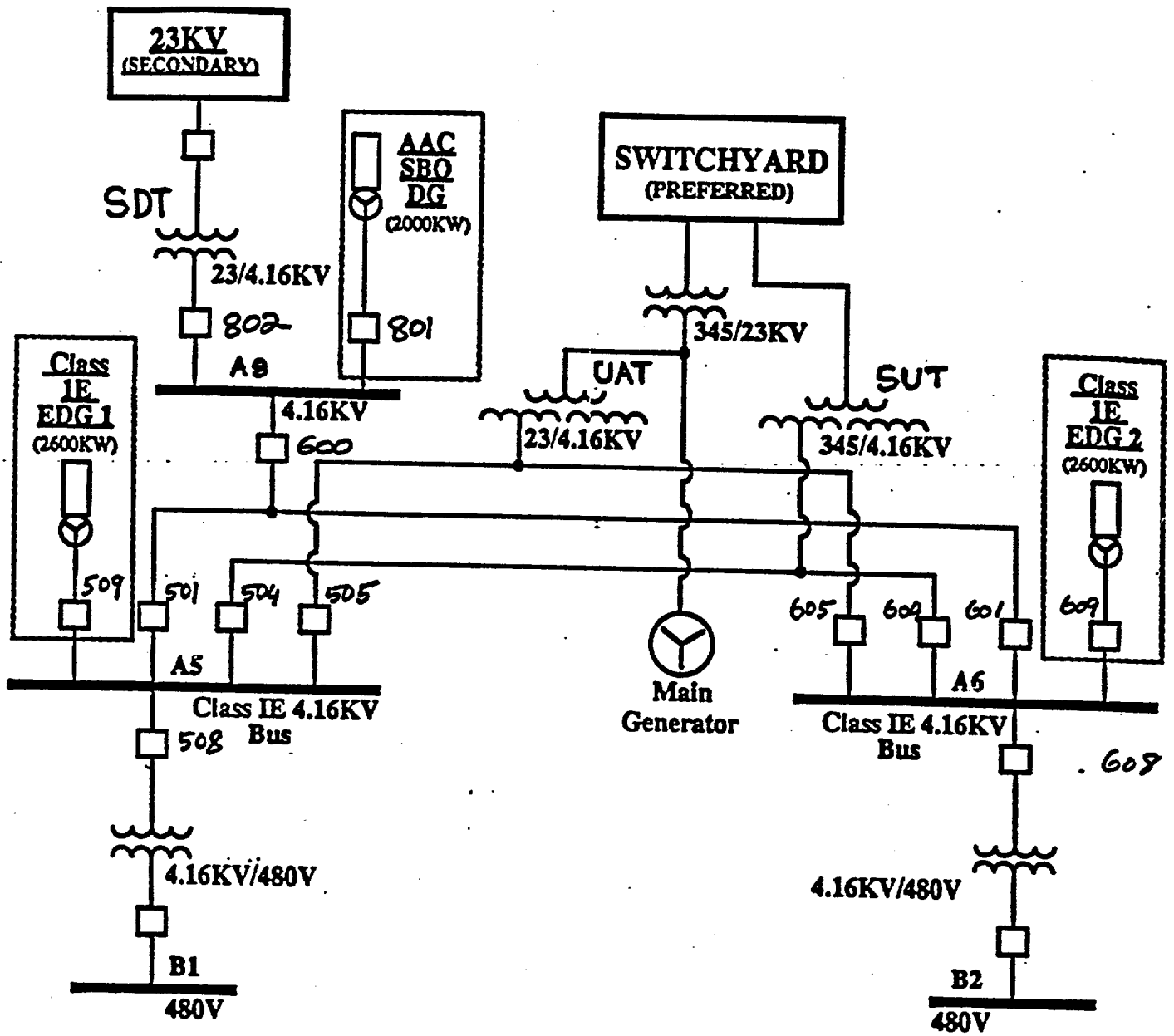

FIGURE 1
ALTERNATE AC (AAC) CONFIGURATION
NON CLASS 1E DIESEL GENERATOR