10 CFR 50.90

**Boston Edison**
A BEC ENERGY COMPANY

**T.A. Sullivan**
Vice President Nuclear
and Station Director

May 5, 1999
BECo Ltr. #2.99.029

US Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Docket No. 50-293
License No. DPR-35

Proposed License Amendment
to Revise On-site Fuel Storage Requirements for Emergency Diesel Generators

Boston Edison Company (BECo) hereby proposes to amend Pilgrim Operating License No. DPR-35 in accordance with 10CFR50.90. The proposed amendment modifies the licensing basis for the Emergency Diesel Generator (EDG) on-site diesel fuel storage requirement and corresponding Technical Specifications (TS), as described below.

1. BECo proposes to modify the licensing basis for the Class I EDG on-site fuel storage requirement described in Pilgrim UFSAR 8.5, "Standby AC Power Source," to include Class II Station Blackout Diesel Generator (SBODG) on-site fuel storage tanks described in UFSAR 8.10, "Blackout AC Power Source," to provide sufficient fuel for continuous seven days operation of both EDGs at rated loads.

   The current licensing basis requires sufficient diesel fuel to be stored on-site in EDG main tanks for continuous operation of each EDG for approximately seven days. The corresponding volume considered at the time of licensing the plant was 19,800 gallons per EDG (TS 3.9.A.3). Design basis review confirmed 19,800 gallons per EDG was not sufficient for seven days of continuous operation (LER 98-021-00) and the cross-connection between the EDG tanks was determined to be susceptible to single failure (LER 98-001-00). Therefore, a licensing basis revision for EDG fuel storage is requested based on R.G.1.137, Rev. 1 (10/79) and ANSI N195(ANS-59.51)-1976. The revised licensing basis requires 36,800 gallons of fuel per EDG to be stored on-site for continuous seven days operation of each EDG at the maximum bounding loads (2860 KW for 2 hours and 2750 KW for 166 hours). Of this volume, a minimum of 19,800 gallons of fuel will be stored in each Class I EDG tank and the balance will be stored in the Class II SBODG storage tanks.

2. Concurrent with the revised licensing basis proposed above, BECo proposes to modify TS 3.9.A.3 and 4.9.A.1.d specifying the total volume of diesel fuel required to be stored on-site in EDG Class I fuel system and Class II SBODG fuel storage tanks. TS Bases B3.9 is revised to include the proposed licensing basis for the EDG on-site diesel fuel supply system augmented by the Class II SBODG storage tanks.

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This revised licensing basis resolves the EDG on-site diesel fuel supply concerns discovered during the design basis review of EDGs and reported in License Event Reports, LER 98-001-00, dated March 3, 1998 and LER 98-021-00, dated October 2, 1998.

Attachment A provides a description of the proposed License Amendment, safety assessment, and no significant hazards consideration determination associated with the proposed change. Attachment B contains the marked-up UFSAR and Technical Specification pages. Attachment C contains amended Technical Specification pages. UFSAR will be updated in accordance with 10 CFR 50.71(e) upon approval of the proposed license amendment.

We request NRC approval of the proposed license amendment by September 1, 1999.

Should you have any questions regarding this letter, please contact Walter Lobo at (508) 830-7940.

T.A. Sullivan

Commonwealth of Massachusetts)
County of Plymouth )

Then personally appeared before me, T.A. Sullivan, who being duly sworn, did state that he is General Manager Production and Station Director of Boston Edison Company and that he is duly authorized to execute and file the submittal contained herein in the name and on behalf of Boston Edison Company and that the statements are true to the best of his knowledge and belief.

My commission expires: September 20, 2002 Peter M Kahler
DATE NOTARY PUBLIC

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Attachment A: Description of Proposed Changes
Attachment B: Marked-up UFSAR and Technical Specification Pages
Attachment C: Amended Technical Specification Pages

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ATTACHMENT A - BECo Letter 2.99.029

DESCRIPTION OF PROPOSED CHANGE

Proposed License Amendment
to Revise On-site Fuel Storage Requirements for Emergency Diesel Generators

## 1. SUMMARY OF PROPOSED CHANGE

A change to operating license DPR-35 is proposed that would modify UFSAR Sections 8.5 and 8.10 to clarify the acceptable sources and quantities of diesel fuel to meet the on-site diesel fuel storage requirements for the Emergency Diesel Generators (EDGs). The proposed change modifies the EDG licensing basis for diesel fuel requirements in UFSAR Section 8.5 specifying the on-site diesel fuel stored in EDG Class I fuel system, augmented by the Class II Station Blackout Diesel Generator (SBODG) storage tanks to permit operation of both EDGs at rated loads for seven days.

Changes to the Technical Specification (TS) are proposed to implement the above-modified on-site diesel fuel supply system for EDGs and SBODG. TS 3.9.A.3 and 4.9.A.1.d are modified to include the total volume of diesel fuel required to be on-site in the EDG Class I system and Class II SBODG diesel fuel storage tanks. TS Bases B3.9 is revised describing the EDG and the SBODG on-site storage of diesel fuel supply system to ensure availability of diesel fuel for seven days operation of the EDGs for emergency conditions and operation of SBODG for SBO conditions.

## 2. REASONS FOR THE PROPOSED CHANGE

Pilgrim Station is implementing a design basis information program for specific systems. During the design basis review process for the EDG system, the review showed additional electrical loads should be included on the EDGs. This led to a review of the corresponding fuel consumption calculation which revealed the calculation was based on assumptions that were different than those in UFSAR Chapter 14. A fuel consumption calculation based on UFSAR Chapter 14 assumptions demonstrated a single EDG will consume substantially more than 19,800 gallons over seven days and require the use of the fuel transfer cross-connect to transfer fuel from the idle EDG main storage tank. Further review revealed the fuel transfer cross-connect between the two EDG main storage tanks is vulnerable to single failure. Subsequently, LER 98-001-00 was submitted addressing the cross-tie concern.

Additional review of EDG loading confirmed PNPS is designed to respond to abnormal transients and accidents with a single EDG (single loop of ECCS). Sufficient diesel fuel is currently available in the two EDG diesel fuel storage tanks to meet this requirement. However, if both EDGs are used to respond to an accident under TS 3.9.A.3, the 19,800 gallons fuel stored in each EDG tank is insufficient to ensure continuous operation of both EDGs for seven days in response to a DBA LOCA in accordance with UFSAR Chapter 14. This fuel supply concern for both EDGs operating within the requirement of TS 3.9.A.3 was subsequently addressed in LER 98-021-00.

Both EDG and SBODG fuel storage tanks are located on-site with sufficient fuel capacity for operating both EDGs and SBODG. BECo is proposing to credit the SBODG on-site fuel capacity to ensure both EDGs can operate continuously at rated load for seven days. This proposed change resolves diesel fuel supply concerns included in LERs 98-001-00 and 98-021-00 and augments the diesel fuel supply system for the operation of both EDGs within the requirement of TS 3.9.A.3.

## 3. PROPOSED LICENSING BASIS AND TECHNICAL SPECIFICATION CHANGE

Licensing Basis Change:

The current licensing basis for the emergency diesel generators is described in UFSAR Section 8.5. The licensing basis for the station blackout diesel generator is described in UFSAR Section 8.10. TS 3.9.A.3 provides that both EDGs shall be operable and each EDG shall have a minimum of 19,800 gallons of diesel fuel on site. TS Bases B3.9. states that the diesel fuel oil supply system for the EDGs consists of two (2) 25,000 gallons tanks to ensure a minimum supply of 19,800 gallons in each tank. TS3/4.5.F.2 and B3/4.5.F provide the operability bases for the SBODG pursuant to License Amendment No. 179.

The current licensing basis for EDG on-site fuel storage requirement is 19,800 gallons of fuel stored in EDG tanks. The 19,800 gallons of fuel per EDG was intended to be of sufficient capacity to meet the EDG fuel requirements for approximately seven days. During the review of the EDG design basis information, the 19,800 gallon volume per EDG was determined to be insufficient for seven day continuous operation (LER 98-021-00) and the cross-connection between the EDG tanks was determined to be non-single failure proof (LER 98-001-00). Therefore, the licensing basis for the EDG on-site diesel fuel storage requirement is revised based on RG.1.137, Rev. 1(10/1979) and ANSI N195(ANS-59.51)-1976.

The proposed licensing basis is 36,800 gallons of diesel fuel per EDG (73,600 gallons total) required to be stored on-site for continuous seven day operation at rated loads. Of this volume, a minimum of 19,800 gallons of fuel will be stored in each EDG Class I tank and the balance will be stored in the Class II SBODG on-site storage tanks. The total on-site fuel requirement of 73,600 gallons will support operation of both EDGs continuously for seven days at rated load. The fuel in the SBODG storage tanks will be available for refilling the EDG storage tanks to ensure seven day continuous operation of each EDG, as described below.

- The revised fuel consumption calculations show 35,725 gallons per EDG, which is rounded up for conservatism to 36,800 gallons per EDG, is required for seven day operation at the maximum bounding loads (2860 KW for two hours and 2750 KW for 166 hours). Each EDG tank supplies 19,800 gallons of fuel to its diesel for approximately four days of operation at full rated load. The additional fuel supply to the EDG tanks from the SBODG tanks provides three days of fuel to operate the EDGs continuously for a total of seven days at rated loads.

- The refilling of the EDG tanks with fuel from the SBODG on-site storage tanks would be administratively controlled via a fuel management and transfer plan to ensure availability of diesel fuel to the EDGs. Fuel transfer equipment will be available when needed to support fuel transfer from the SBO fuel storage tanks to either EDG storage tank. Administrative controls will be implemented to ensure the additional quantity of fuel is continuously available. Pilgrim is planning to use an air-driven pump and hoses independent of station electrical systems. This Class II equipment will remain staged and dedicated to emergency fuel transfer.

UFSAR Sections 8.5 and 8.10 are revised describing the proposed EDG on-site diesel fuel supply system augmented by SBODG fuel capacity. The SBODG diesel fuel is procured as "Q" and it is the same oil currently used in the EDG tanks. The diesel fuel stored in the EDG and SBODG tanks will continue to meet the fuel oil quality specified in ASTM 975-1981 standard. This revised description modifies the licensing basis for the EDG on-site diesel fuel supply system taking into account the administrative procedure for refilling the EDG storage tanks with diesel fuel from the SBODG storage tanks and the availability of the cross-connection between the EDG tanks to transfer diesel fuel from one EDG tank to the other when off-site replenishment is unavailable for greater than 4 days. This function is not required

to meet single failure design requirements due to the requirements imposed on the SBO fuel tanks and transfer equipment.

Technical Specification Change:

TS 3.9.A.3 and 4.9.A.1.d are revised stating the revised on-site diesel fuel storage capacity to assure operability of both EDGs. TS Bases B3.9 is revised describing the proposed EDG and SBODG diesel fuel supply system and the fuel quantity requirement.

The marked-up pages of the UFSAR describing the EDG diesel fuel supply system and marked-up technical specifications are included in Attachment B. The proposed revisions to the technical specifications are included in Attachment C. The UFSAR will be updated in accordance with 10 CFR 50.71(e) upon approval of the proposed license amendment.

4. SAFETY ASSESSMENT OF PROPOSED CHANGE

PNPS has two EDGs that provide the standby AC requirements described in UFSAR Section 8.5. The safety objective for these diesels is to provide a Class IE, safety-related source of on-site AC power for the safe shutdown of the reactor following abnormal operational transients and postulated accidents. PNPS has one SBODG as described in UFSAR 8.10 to provide AC power during SBO transients pursuant to 10CFR50.63. TS 3/4.5.F.2 and B3/4.5.F provides SBODG operability bases requirements.

The current TS 3.9.A.3 requires that "Both diesel generators shall be operable" and "Each diesel generator shall have a minimum of 19,800 gallons of diesel fuel on site."

RG.1.137, Rev. 1, (10/1979), Regulatory Position 1.c, endorses ANSI N195-1976 standard and provides acceptable methods for determining the required on-site diesel fuel storage requirements to operate the minimum number of diesel generators continuously for seven days at rated capacity following the limiting design basis accident.

The diesel fuel consumption calculations performed in accordance with method (1) of Regulatory Position 1.c has shown the 19,800 gallons specified in the existing TS 3.9.A.3 is sufficient for approximately four days of continuous EDG operation at rated loads. The additional diesel fuel to be used for refilling the EDG storage tanks to provide for three additional days of continuous EDG operation is available on-site in the SBODG fuel storage tanks. The diesel fuel in the SBODG storage tanks meets the fuel quality requirement specified in Regulatory Position 2.a. Both EDG and SBODG diesel fuel storage tanks are located on-site in accordance with TS 3.9.A.3, with the combined capacity sufficient for continuous operation of both EDGs for seven days at rated loads. Accordingly, TS 3.9.A.3 and 4.9.A.1.d are revised specifying the total volume of diesel fuel required to operate both EDGs continuously for seven days based upon the revised fuel consumption calculations, the diesel fuel available in each EDG storage tank, and the diesel fuel available in the SBODG storage tanks. Revised surveillance 4.9.A.1.d provides verification there is a sufficient inventory of diesel fuel on-site in the EDG and SBODG storage tanks to support each EDG operation for seven days at full load. The seven-day period is sufficient time to place Pilgrim in a safe shutdown condition and replenish diesel fuel from an off-site location, in accordance with RG.1.137. TS Bases B3.9 is revised describing the EDG and SBODG on-site diesel fuel supply system and quantities of diesel fuel required to be on-site.

The need for refilling the EDG storage tanks with diesel fuel from the SBODG storage tanks would not occur until after the fourth day of a postulated seven day requirement. This would allow more than enough time to plan and transfer the required quantity of fuel in the absence of off-site sources. Refilling of the EDG storage tanks with diesel fuel from the SBODG storage tanks will be controlled by appropriate administrative procedures. The required fittings and hardware accessories will be provided to ensure diesel fuel can be supplied to the EDG storage tanks from the SBODG storage tanks under the most severe environmental conditions

expected at the facility. The most severe environmental condition expected at the facility during a design basis accident condition (LOCA with LOOP) is the radiological exposure due to accident releases. Radiological exposure to the crews involved in refilling the EDG tanks with diesel fuel from SBODG storage tanks is not expected to exceed the applicable guidelines or limits. A dose evaluation concluded it would be possible to install the transfer equipment and conduct the fuel transfer operation after day 3 (post-LOCA) without exceeding the GDC 19 limits. Sources of toxic hazardous materials at the facility have been previously evaluated and are controlled. Therefore, environmental conditions during a toxic gas release would not preclude the transfer of diesel fuel.

The SBODG storage tanks (40,000 gallons capacity total) are maintained in accordance with NRC guidance published in Generic Letter 85-06, in compliance with 10 CFR 50.63 requirements. These Class II tanks are rugged, double-wall fiberglass tanks. While not designed to safety-related requirements, the failure of these tanks under extreme environmental conditions, such as an earthquake, has been evaluated to be very unlikely. No permanently attached piping is needed for the refilling operation. The required fittings and hardware accessories for refilling operations are prestaged. Therefore, the SBODG diesel fuel storage tanks will be available to provide an additional source of diesel fuel for refilling the EDG tanks, as necessary.

As stated above, the total on-site diesel fuel requirement of 73,600 gallons is sufficient to support continuous operation of both EDGs for seven days. The use of the SBODG storage tanks to augment the EDG fuel supply and the refilling operation are feasible under extreme environmental conditions.

The probability of concurrent events is low (i.e., LOCA, sustained loss of off-site power greater than 4 days, inability to replenish fuel from off-site sources during a nuclear emergency, inability to manage fuel in the Class I tanks through EDG load management, etc.) to the extent it is reasonable to credit reliable Class II equipment for supplying approximately 3 days of fuel for operation of each EDG. This conclusion is further substantiated by the fact only one EDG is required to mitigate the consequences of a DBA LOCA yet the seven day on-site fuel requirement will be met for both EDGs.

UFSAR Section 8.5 describes the safety design bases for the standby AC power source. This section is revised describing the revised licensing basis and resolves inconsistencies reported in LERs 98-001-00 and 98-021-00. UFSAR Section 8.10 is revised indicating the SBODG fuel storage tanks are used to augment EDG fuel supply for continuous seven days operation of both EDGs.

## 5. CONCLUSIONS

Implementing this change to approve the use of the additional quantity of on-site stored fuel to meet the EDG fuel requirements will improve operational flexibility. The use of 34,000 gallons of existing on-site stored fuel from the SBODG fuel tanks would provide a total capability of 73,600 gallons which, as previously stated, is more than enough fuel to run both EDGs at rated load continuously for seven days.

## 6. COMMITMENTS TO IMPLEMENT THE LICENSING BASIS AND TECHNICAL SPECIFICATION CHANGES

The proposed licensing basis and technical specification changes require the implementation of an administrative procedure for the refilling operation to transfer diesel fuel from the SBODG storage tanks to the EDG storage tanks and changes to the operating procedures, maintenance, and design bases documentation. The administrative procedure for refilling EDG tanks includes the required fittings and hardware accessories for refilling operations and prestaging of the refilling operation. Pilgrim is planning to use an air-driven pump independent of station electrical systems and hoses all of which will remain staged. These procedural

changes will be completed and implemented within 30 days upon approval of the proposed license amendment.

7. SCHEDULE OF CHANGE

This proposed change, including the training of operators and administrative procedure for refilling operation, will be effective within 30 days of receipt of approval from the NRC.

8. DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

BECo has evaluated the proposed licensing basis and technical specification changes and has determined that they involve no significant hazards. This determination has been performed in accordance with the criteria set forth in 10 CFR 50.92. The following analysis is provided in accordance with the 10 CFR 50.91 and 10 CFR 50.92 for the proposed amendment.

a. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed change affects only the on-site diesel fuel storage capacity for the operation of emergency diesel generators. The on-site storage capacity is not associated with an accident precursor/initiator; thus, it has no impact on the probability of accident occurring. The consequences of an accident would not be significantly increased because reasonable measures will be available to ensure the EDGs are supplied with enough fuel from the on-site sources to operate for seven days at rated capacity.

b. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed change does not affect normal plant operation or the immediate response to an accident. The only change is the proposed refilling operation to transfer fuel from the Class II SBODG storage tanks to the Class I EDG tanks. The refilling operation would occur entirely outdoors through above ground hoses connecting the EDG and SBODG tanks. This operation would only be required following a LOCA, an accident already analyzed. Since the proposed refilling operation is a post-accident evolution, it would not be in place to cause an accident of a different type during non-accident conditions. No reasonable malfunction of equipment associated with the evolution could create a new or different kind of accident than previously evaluated.

c. The proposed amendment does not involve a significant reduction in the margin of safety.

The proposed amendment for licensing basis change and TS change does not significantly reduce the margin of safety. The proposed change restores the licensing basis to provide sufficient fuel in on-site storage tanks for continuous operation of each EDG for approximately seven days. The revised licensing basis requires 36,800 gallons of fuel per EDG to be stored on-site. A minimum of 19,800 gallons of fuel will be stored in Class I EDG storage tanks and the remaining will be stored in Class II SBODG on-site storage tanks. The storage of fuel in Class I tanks does not reduce the margin of safety. The only potential reduction in the margin of safety is due to the use of Class II SBODG tanks and associated transfer equipment for the storage and transfer of additional fuel. These Class II tanks are rugged, double-wall fiberglass tanks. While not designed to safety-related requirements, the failure of these tanks under extreme environmental conditions, such as an earthquake, has been evaluated to be very unlikely. Thus, on-site storage of sufficient fuel for operation of both EDGs is assured to mitigate the consequences of an accident previously evaluated. All stored fuel is maintained at the same quality standard. The proposed diesel fuel refilling operation is a post design basis accident activity, which does not create the possibility of a new accident or impact an accident previously evaluated. Therefore, there is no significant reduction in the safety margin.

Conclusion: The proposed change represents increased on-site diesel fuel capacity for continuous operation of both emergency diesel generators at rated loads and improves the plant's capability to respond to previously evaluated accidents.

ATTACHMENT B - BECo Letter 2.99.029

MARKED-UP UFSAR AND TECHNICAL SPECIFICATION PAGES

UFSAR PAGES (total five pages)

Page 8.5-1
Page 8.5-2
Page 8.5-8
Table 8.5-3, page 1 of 1
Page 8.10-1

TECHNICAL SPECIFICATION PAGES (total three pages)

TS Page No. 3/4.9-1 (Revised TS 3.9.A.3)
TS Page No. 3/4.9-3 (Revised TS 4.9.A.1.d)
TS Page No. B3/4.9-1 (Revised Bases 3.9 for Auxiliary Electrical System)

## 8.5 STANDBY AC POWER SOURCE

### 8.5.1 Safety Objective

**The safety objective of the standby ac power source is to provide a single failure proof source of onsite ac power adequate for the safe shutdown of the reactor following abnormal operational transients and postulated accidents.**

### 8.5.2 Safety Design Basis

1. **The Standby AC Power System consists of two independent ac power sources that are self-contained within the station site and which are independent of offsite power sources.**

2. **Each standby generator unit is capable of providing sufficient power to its emergency bus, upon failure of all offsite power, to satisfy the load on the bus.**

3. **Each standby generator unit is designed in accordance with Class I criteria.**

4. **The generator sets are capable of automatic start at any time and capable of continued operation at rated load, voltage, and frequency until manually stopped.**

5. **The generator sets have the ability to pick up loads as described on Table 8.5-1 in the sequence and time period outlined on Table 8.5-2.**

6. The generators are capable of being independently synchronized for parallel operation with the unit auxiliary transformer or the startup transformer (preferred ac power source). This synchronization is done manually for system performance tests. Provisions were made in the design to prevent: (a) the electrical interconnection of both generators and (b) the electrical interconnection of either generator with the secondary ac power source.

7. Each engine generator unit has a unit fuel storage (day tank) tank. Each day tank is supplied from its main fuel storage tank. Provisions are made ~~at both the suction and discharge of the transfer pumps for cross connecting the normally independent fuel oil systems by opening normally closed manual valves. Further details are shown on Figure 8.5-1.~~ A hydroturbine, driven by Diesel Fire Pump P-140 drives the Backup Diesel Fuel Transfer Pump (P-181). This pump takes suction from the emergency diesel generator fuel oil storage tanks, bypasses Diesel Transfer Pump P-141A and discharges to Day Tank T-123. The purpose of this hydroturbine driven pump is to provide a redundant (non-electric power dependent) diesel fuel oil transfer pump for the Diesel Fire Pump P-140. This redundant pump will allow extended operation of the diesel fire pump as a water source for the RHR system during extended station blackout and severe accident scenarios beyond

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Item 8. A manual cross connection between the EDG storage tanks is provided to transfer diesel fuel from one EDG tank to the other, when necessary.



INSERT A
to refill the EDG storage tanks from the two station blackout diesel generator storage tanks. The combined on-site diesel fuel supply provides continuous seven days operation of both EDGs at full rated capacity.

design basis. Each main fuel {Subsystem} ~~storage tank~~ is capable of providing sufficient fuel for seven days of operation of one engine generator unit under postulated accident conditions. Each day tank provides enough fuel for a minimum of 2.5 hrs of full load operation of the engine generator unit.

~~8.~~ 10 Control power required for the startup and operation of each unit is supplied from the 125 V station DC Power System. Other auxiliaries necessary to ensure continuous operation are supplied as required from the diesel generator through the emergency service buses.

~~9.~~ 11 **The units are capable of being started or stopped manually from local control stations near the engines or remotely started from the control room. The engines are normally connected to the emergency service buses from the control room. The engines start automatically upon the loss of both the preferred power source and the unit auxiliary power source or low-low reactor water level, or high drywell pressure.**

~~10.~~ 12 **The Standby AC Power System conforms to the applicable sections of IEEE-308, Standard Criteria for Class IE Electrical Systems for Nuclear Power Generating Stations.**

~~11.~~ 13 **Provisions shall be included to minimize the probability of losing power from the remaining sources as a result of, or coincident with the loss of power generated by the unit, loss of power from the transmission network, or loss of power from the onsite electric power supplies.**

8.5.3 Description

There are two normal power sources available to each 4,160 V emergency bus; the unit power source and the preferred power source (startup transformer). A fourth power source is from the secondary power source discussed in Section 8.3. This source is a backup to the standby diesel generator. The breaker is interlocked to prevent synchronization or interconnected with the diesel generator, or with the normal power sources. The loss of the unit power source results in automatic fast transfer to the preferred power source. The loss of both the startup transformer source and the unit auxiliary power source to either emergency service bus results in automatic starting of the diesel generator associated with that bus. The diesel generator supply breaker will close approximately 10 sec later, if the diesel generator has reached rated speed and voltage. The diesel generator, the third power source, now supplies power to the affected emergency bus.

The following events occur under Loss of Coolant Accident (LOCA) conditions in the order indicated:

1. **The diesel generators are automatically started (independent of availability of offsite ac power)**

located in separate sections (SA and SB) of an additional main control room panel which has three wiring sections (SA, SB, and SX) separated by fire barriers. Some engineered safeguard loads are affected by these relays and these circuits will be tested periodically.

Each diesel generator is capable of starting and continuously operating at full rated capacity ~~under postulated accident conditions~~ for a period of 7 days using fuel stored onsite in underground storage tanks. The starting air supply is stored in receivers and maintained at proper pressure. Independent sources of 125 V dc power are used to supply electrical control power to the air starting system for diesel generator units. See Section 8.6.4 for a more detailed description of the 125 V system. The units and all necessary auxiliaries are housed in Class I structures.

The minimum quantity of fuel maintained in each EDG storage tank is sufficient to ensure continuous operation at full rated capacity of the corresponding EDG for approximately four days. The combined quantity of fuel in the two EDG and two SBODG tanks is sufficient to ensure continuous seven days operation of both EDGs at full rated capacity. A manual refilling method to transfer diesel fuel from SBODG storage tanks to the EDG storage tanks is available to provide the operating EDG with the additional fuel necessary to support continuous operation.

The engineered safeguard loads are divided between the two 4,160 V emergency service buses so that the failure of one diesel generator or one 4,160 V emergency service bus would not prevent a safe shutdown of the reactor. Each diesel generator and its associated system is separated so that failure of any one component will not affect the operation of the redundant system.

The capability of the diesel generator to start and attain rated voltage and frequency within 10 sec, to accept the necessary engineered safeguard loads, and to start and accelerate the emergency core cooling system pumps in the required time, meets the necessary requirements for the standby ac power system.

### 8.5.5 Inspection and Testing

Since the diesel generators are utilized as standby units, readiness ~~is of~~ prime importance. Readiness can best be demonstrated by periodic testing, which insofar as practical, simulates actual emergency conditions. The testing program is designed to test the ability to start the system as well as to run under load for a period of time long enough to bring all components of the system into equilibrium conditions to assure that cooling and lubrication are adequate for extended periods of operation. Functional tests of the automatic circuitry are conducted on a periodic basis to demonstrate proper operation.

Provisions are included for manual synchronization of an individual diesel generator unit with the unit auxiliary transformer or the startup transformer to provide the capability to functionally test the diesel generator performance at full rated output.

Interlocks are provided to preclude the synchronization or interconnection of both diesel generators with each other, or of either diesel generator with the secondary ac power source.

An initial system test will be performed to demonstrate that the standby ac power system can start and accept design load within the design basis time.

TABLE 8.5-3

STANDBY AC POWER SOURCE
EQUIPMENT LIST

| | |
|---|---|
| **Diesel Engine** | |
| Rated Speed | 900 rpm |
| Continuous Rated Capacity | 2,600 kW |
| Overload Capacity | 2,750 kW for 2,000 hr/yr |
| Maximum Overload Capacity | 3,000 kW for 2 hr/yr |
| Fuel Consumption at Rated Capacity | .0764 gal/kW-hr |
| **Generator** | |
| Continuous Rated Capacity | 2,600 kW |
| Power Factor | 0.8 |
| Frequency | 60 Hz |
| Voltage | 4,160 V |
| Phase (connection) | 3 (wye) |
| Overload Capacity | 2,860 kW for 2,000 hr/yr<br>3,250 kW for 30 min/day<br>3,900 kW for 1 min/day |
| **Exciter** | |
| Size | 21 kW |
| **Diesel Generator Startup** | |
| Starting time to rated speed and voltage, and ready to accept load | ≤10 sec |
| Starting time to rated load | ≤30 sec |
| On-site Fuel Oil Storage | |
| Day Tank | greater than 600 gallons |
| ~~Main~~ Storage Tank EDG | 25,000 gallons (each) |
| SBODG Storage Tanks | 20,000 gallons (each) |

8.10.1 Power Generation Objective

The Blackout AC Power Source consists of an independent diesel generator which provides a non-safety related source of onsite AC power to the 4.16kV emergency service buses through a two breaker 4.16kV bus in the event of a station blackout.

8.10.2 Power Generation Design Basis

1. The blackout diesel generator has the capacity to carry the load associated with one of three ECCS pumps on either emergency service bus A5 or A6 and all associated loads on that train required for loss of offsite power without a LOCA. Some loads associated with buses A5 or A6 (See Table 8.10-1 for ratings) are one salt service water pump (SSW), one reactor building closed cooling water pump (RBCCW) and various electrically operated valves. Operator action is required to limit blackout diesel generator loading and automatic start of the 4kV-ECCS pumps.

2. The Blackout AC Power Source is completely self-contained, not relying on any permanent system for operation. The blackout diesel generator is mounted on a skid and housed in a pre-engineered enclosure for protection from the environment. The unit is capable of providing rated power (See Table 8.10-2) for a minimum period of one week without refueling.

The blackout diesel storage tanks are used to augment the emergency diesel generator fuel capacity (i.e. the seven-day on-site fuel requirement.

3. Maintenance loads for the blackout diesel generator are provided by a 480V feed from the station during normal operations. However, upon loss of power, the unit is capable of "blackstart" automatically picking up the maintenance loads. The Blackout AC Power Source is a manual start system either from the main control room or locally from the diesel enclosure.

4. The Blackout AC Power Source will operate in parallel with the shutdown transformer during load testing of the blackout diesel.

8.10.3 Description

The Blackout AC Power Source is connected to PNPS through a two breaker 4.16V bus A8 with the blackout diesel generator connected to the first breaker, A801, and the shutdown transformer secondary connected to the second breaker, A802. The 4.16V bus A8 is connected by cable to breaker A600 of the emergency service buses. Power from the secondary ac power source (shutdown transformer or the blackout diesel generator) to the 4.16kV emergency service buses is controlled by breakers A600, A501 and A601.

The controls of circuit breakers A801 and A802 are interlocked to prevent interconnection of the diesel generator with the shutdown transformer except for testing of the diesel generator. The blackout diesel generator is interlocked, as is the shutdown transformer, to prevent operation in parallel with the unit AC power source, the preferred offsite power source, or the standby AC power source.

## 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 off-site transmission line and the startup transformer are available and capable of automatically supplying auxiliary power to the emergency buses.

2. An additional source of off-site 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~~ 36,800 gallons of diesel fuel on site.

   Of this volume, at least 19,800 gallons of fuel shall be stored in each EDG Class I fuel system. The balance of the 36,800 gallons/EDG shall be available in the Station Blackout diesel generator tanks.

## 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 simulate 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)

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 Protectio 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

A. Auxiliary Electrical Equipment Surveillance (Cont)

   d. Once a month the quantity of diesel fuel available on-site 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 performe in lieu of the Service Discharge Test requirements of 4.9.A.2.C above.

BASES:

3.9 AUXILIARY ELECTRICAL SYSTEM

The general objective of this Specification is to assure an adequate source of electrical power to operate the auxiliaries during plant operation, to operate facilities to cool and lubricate the plant during shutdown, and to operate the engineered safeguards following an accident. There are three sources of a-c electrical energy available; namely, the startup transformer, the diesel generators and the shutdown transformer. The d-c supply is required for switchgear and engineered safety feature systems. Specification 3.9.A states the required availability of a-c and d-c power; i.e., an active off-site a-c source, a back-up source of off-site a-c power and the maximum amount of on-site a-c and d-c sources.

INSERT NEXT PAGE

~~The diesel fuel supply consists of two (2) 25,000 gallons tanks. Level instrumentation provides operators the information necessary to ensure a minimum supply of 19,800 gallons in each tank.~~

Auxiliary power for PNPS is supplied from two sources; either the unit auxiliary transformer or the startup transformer. Both of these transformers are sized to carry 100% of the auxiliary load. If the startup transformer is lost, the unit can continue to operate since the unit auxiliary transformer is in service, the shutdown transformer is available, and both diesel generators are operational.

If the startup and shutdown transformers are both lost, the reactor power level must be reduced to a value whereby the unit could safely reject the load and continue to supply auxiliary electric power to the station.

In the normal mode of operation, the startup transformer is energized, two diesel generators and the shutdown transformer are operable. One diesel generator may be allowed out of service based on the availability of power from the startup transformer, the shutdown transformer and the fact that one diesel generator carries sufficient engineered safeguards equipment to cover all breaks. With the shutdown transformer and one diesel generator out of service, both 345kV supply lines must be available for the startup transformer.

Upon the loss of one on-site and one off-site power source, power would be available from the other immediate off-site power source and the one operable on-site diesel to carry sufficient engineered safeguards equipment to cover all breaks. In addition to these two power sources, removal of the Isolated Phase Bus flexible connectors would allow backfeed of power through the main transformer to the unit auxiliary transformer and provide power to carry the full station auxiliary load. The time required to perform this operation is comparable to the time the reactor could remain on RCIC operation before controlled depressurization need be initiated.

## INSERT TO B3.9 to Page B3/4.9-1

The on-site diesel fuel supply system consists of two (2) 25,000 gallons Class I EDG storage tanks and two (2) 20,000 gallons Class II SBODG storage tanks. Level instrumentation provides operators the information necessary to ensure a minimum supply of 19,800 gallons in each Class I storage tank.

The minimum diesel fuel requirement per Class I storage tank (19,800 gallons) ensures that one EDG can operate continuously for approximately four days at rated capacity. Seven days of continuous operation of both EDGs at rated capacity is ensured by augmenting the EDG fuel supply with the minimum quantity of fuel maintained in Class II storage tanks. The minimum fuel quantity in each EDG storage tank provides adequate time to plan and execute transfer of fuel from the SBO storage tanks. Therefore, if either EDG storage tank contains less than 19,800 gallons of fuel prior to a diesel start in response to a valid start signal, the respective EDG is declared inoperable.

When one EDG is inoperable, the quantity of fuel available to the operable EDG shall consist of the volume of the fuel in the operable EDG storage tank and the SBODG storage tanks and must be at least 36,800 gallons. The use of the SBODG storage tanks permits periodic draining of a EDG storage tank for inspection without declaring both EDGs inoperable.

ATTACHMENT C - BECo Ltr. 2.99.029

AMENDED TECHNICAL SPECIFICATION PAGES

TS Page No. 3/4.9-1 (Revised TS 3.9.A.3)
TS Page No. 3/4.9-3 (Revised TS 4.9.A.1.d)
TS Page No. B3/4.9-1(Revised Bases 3.9 for Auxiliary Electrical System)

Note: Amended UFSAR pages will be issued in accordance with 10 CFR 50.71(e) upon approval of the proposed License Amendment.

## 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 off-site transmission line and the startup transformer are available and capable of automatically supplying auxiliary power to the emergency buses.

2. An additional source of off-site 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 36,800 gallons of diesel fuel on site. Of this volume, at least 19,800 gallons of fuel shall be stored in each EDG Class I fuel system. The balance of the 36,800 gallons/EDG shall be available in the Station Blackout diesel generator tanks.

## 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 simulate 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)

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 Protectio 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

A. Auxiliary Electrical Equipment Surveillance (Cont)

d. Once a month the quantity of diesel fuel available on-site 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 performe in lieu of the Service Discharge Test requirements of 4.9.A.2.C above.

BASES:

3.9 AUXILIARY ELECTRICAL SYSTEM

The general objective of this Specification is to assure an adequate source of electrical power to operate the auxiliaries during plant operation, to operate facilities to cool and lubricate the plant during shutdown, and to operate the engineered safeguards following an accident. There are three sources of a-c electrical energy available; namely, the startup transformer, the diesel generators and the shutdown transformer. The d-c supply is required for switchgear and engineered safety feature systems. Specification 3.9.A states the required availability of a-c and d-c power; i.e., an active off-site a-c source, a back-up source of off-site a-c power and the maximum amount of on-site a-c and d-c sources.

The on-site diesel fuel supply system consists of two (2) 25,000 gallons Class I EDG storage tanks and two (2) 20,000 gallons Class II SBODG storage tanks. Level instrumentation provides operators the information necessary to ensure a minimum supply of 19,800 gallons in each Class I storage tank.

The minimum diesel fuel requirement per Class I storage tank (19,800 gallons) ensures that one EDG can operate continuously for approximately four days at rated capacity. Seven days of continuous operation of both EDGs at rated capacity is ensured by augmenting the EDG fuel supply with the minimum quantity of fuel maintained in Class II storage tanks. The minimum fuel quantity in each EDG storage tank provides adequate time to plan and execute transfer of fuel from the SBO storage tanks. Therefore, if either EDG storage tank contains less than 19,800 gallons of fuel prior to a diesel start in response to a valid start signal, the respective EDG is declared inoperable.

When one EDG is inoperable, the quantity of fuel available to the operable EDG shall consist of the volume of the fuel in the operable EDG storage tank and the SBODG storage tanks and must be at least 36,800 gallons. The use of the SBODG storage tanks permits periodic draining of a EDG storage tank for inspection without declaring both EDGs inoperable

Auxiliary power for PNPS is supplied from two sources; either the unit auxiliary transformer or the startup transformer. Both of these transformers are sized to carry 100% of the auxiliary load. If the startup transformer is lost, the unit can continue to operate since the unit auxiliary transformer is in service, the shutdown transformer is available, and both diesel generators are operational.

If the startup and shutdown transformers are both lost, the reactor power level must be reduced to a value whereby the unit could safely reject the load and continue to supply auxiliary electric power to the station.

In the normal mode of operation, the startup transformer is energized, two diesel generators and the shutdown transformer are operable. One diesel generator may be allowed out of service based on the availability of power from the startup transformer, the shutdown transformer and the fact that one diesel generator carries sufficient engineered safeguards equipment to cover all breaks. With the shutdown transformer and one diesel generator out of service, both 345kV supply lines must be available for the startup transformer.

Upon the loss of one on-site and one off-site power source, power would be available from the other immediate off-site power source and the one operable on-site diesel to carry sufficient engineered safeguards equipment to cover all breaks. In addition to these two power sources, removal of the Isolated Phase Bus flexible connectors would allow backfeed of power through the main transformer to the unit auxiliary transformer and provide power to carry the full station auxiliary load. The time required to perform this operation is comparable to the time the reactor could remain on RCIC operation before controlled depressurization need be initiated.