



**Entergy Nuclear Generation Company**  
Pilgrim Nuclear Power Station  
600 Rocky Hill Road  
Plymouth, MA 02360

**J. F. Alexander**  
Director  
Nuclear Assessment

10CFR50.90

January 31, 2000  
ENG 2.00.012

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

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

**Subject: Pilgrim Response To NRC Request For Additional Information On-Site Fuel Storage For The Emergency Diesel Generators, (TAC No. MA5392)**

The Attachment to this letter responds to the NRC request for additional information (RAI) regarding the Technical Specification and licensing basis change request related to the on-site fuel storage for the emergency diesel generators.

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

Sincerely,

J. F. Alexander

WGL/vc

cc: Mr. Alan B. Wang, Project Manager  
Project Directorate I-3  
Office of Nuclear Reactor Regulation  
Mail Stop: OWFN 14B20  
1 White Flint North  
11555 Rockville Pike  
Rockville, MD 20852

Mr. Robert Hallisey  
Radiation Control Program  
Center for Communicable Diseases  
Mass. Dept. of Public Health  
305 South Street  
Jamaica Plain, MA 02130

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

Mr. Steve McGrail, Director  
Mass. Energy Management Agency  
400 Worcester Road  
P.O. Box 1496  
Framingham, MA 01701-0313

Senior Resident Inspector  
Pilgrim Nuclear Power Station

A001

ATTACHMENT  
PILGRIM RESPONSE TO NRC RAI ON PROPOSED TS CHANGE  
RELATED TO EDG FUEL STORAGE REQUIREMENT

INTRODUCTION

By letter dated May 5, 1999, Pilgrim requested a change to the Technical Specification Section 3.9.A.3, "Auxiliary Electrical Equipment", Section 4.9.A.1, "Auxiliary Electrical Equipment Surveillance," and the associated Bases section. In addition, Pilgrim proposed to modify the licensing basis for the Class I Emergency Diesel Generator (EDG) on-site fuel storage requirements to include fuel stored in the Class II Station Blackout Diesel Generator (SBODG) tanks for continuous seven days operation of each EDG at maximum bounding loads.

The NRC has reviewed this submittal and by a letter dated January 11, 2000, requested additional information to complete the review. This attachment provides response to the NRC requests.

NRC REQUEST

*The current licensing basis for the emergency diesel generator (EDG) on-site fuel storage requirement is 19,800 gallons of fuel stored in each of the EDG tanks. The 19,800 gallons was intended to be sufficient capacity to meet the EDG fuel requirements for 7 days of continuous operation. During the review of the EDG design basis information, the 19,800 gallon volume per EDG was determined to be insufficient for 7 days of operation and the cross-connection between the EDG tanks was determined to be non-single failure proof. As such Entergy (the licensee) has proposed to amend the licensing basis for the EDG on-site diesel storage requirements to credit the fuel in the Station Blackout diesel generator (SBODG) storage tanks. The licensee has stated that the proposed changes are based on Regulatory Guide 1.137, Rev.1 (10/1979) and ANSI N 195(ANS-59.51)- 1976. The staff has determined that the following information is needed to complete the review*

NRC QUESTION NO. 1

*As you want to credit the SBODG storage tanks for safety related applications, we need additional information regarding the design, construction, and maintenance of these tanks. In particular we need the following information:*

*(a) These SBODG tanks are Code Class II. What are the major differences between these tanks and the Code Class I EDG tanks with regards to design and construction? Do the SBODG tanks meet the RG guidance and ANSI requirements required for the EDG storage tanks? Will these tanks be included in your QA program as safety related components?*

PILGRIM RESPONSE

Entergy is seeking NRC approval to credit the existing diesel fuel stored on-site in the SBODG tanks to make up for the 7 days fuel supply to the EDGs by way of the proposed licensing basis and Technical Specification changes.

The technical basis for the proposed changes is the second methodology cited in Position 5.4 of RG 1.137, Rev.1 (10/1979) and Position 5.2 of ANSI N195 (ANS-59.51)- 1976 to provide sufficient quantity of ASTM qualified diesel fuel for seven days continuous operation of each EDG. RG1.137, Position 5.4 provides for fuel calculation methodology and ANSI N195 (ANS-59.51) Position 5.2 provides for the seven days EDG operational requirement.

The ANSI N195 (ANS-59.51) Position 5.2 states that, "*The on-site oil storage shall be sufficient to operate the minimum number of diesel-generators following the limiting design basis accident for either seven (7) days, or the time required to replenish the oil from sources outside the plant site following any limiting design-basis event without interrupting the operation of the diesel, whichever is longer.*"

Pilgrim will continue to provide 7 days fuel supply using the available *on-site oil storage* since there is additional fuel available in the SBODG storage tanks; even though, the preferred priority is to attempt to replenish EDG fuel from off-site sources as specified in Attachment 10 of Procedure 2.2.8. Both fuel oil supply methods meet the provision of

ANSI N195 (ANS-59.51) Position 5.2. The use of both EDGs operating for seven days and two methods for fuel supply is conservative in light of the minimum required one EDG operation for 7 days.

Emergency Diesel Generators and their on-site storage tanks are safety-related. Each safety-related EDG storage tank contains a minimum of 19,800 gallons of diesel fuel. The two underground EDG tanks are of single-wall, steel construction and 25,000 gallons capacity. The diesel fuel is procured as "Q". The quality of the fuel meets the ASTM D975-81 standard and is monitored on a monthly basis in accordance with TS 3/4.9.A.1.e.

Based upon the second methodology cited in Position 5.4 of RG 1.137, Rev.1 (10/1979), an additional 17,000 gallons of diesel fuel per EDG are required for seven days continuous operation of each EDG using Position 5.2 of ANSI N195(ANS-59.51)- 1976. The additional 17,000 gallons are available in the SBODG storage tanks. This fuel is procured as "Q" and meets the ASTM D975-81 standard and is monitored on a monthly basis in accordance with TS 3/4.9.A.1.e.

Thus, sufficient qualified diesel fuel is available on-site in the SBODG storage tanks to augment the quantity of qualified diesel fuel in the EDG tanks for seven days continuous operation of each EDG in accordance with Position 5.2 of ANSI N195 (ANS-59.51)-1976.

The SBODG system functions in accordance with the requirements of 10 CFR 50.63 (Station Blackout Rule). Each tank is of double-wall, fiberglass construction and 20,000 gallons capacity. The underground SBODG tanks were procured and installed as non-safety related components. However, the SBO tanks have been added to our Q-List as Management Quality Control Items (MQCI), which requires certain Appendix B criteria be applied for maintenance

NRC QUESTION NO. 1. b)

*Are the maintenance requirements for the SBODG tanks similar or equivalent to the EDG tanks?*

PILGRIM RESPONSE

The maintenance requirement for SBODG and EDG tanks is the same. Both sets of tanks require cleaning at ten-year intervals. The suction piping for each set of tanks is integrity tested at three-year intervals. Each set of tanks is checked monthly for accumulated water. The EDG fuel system cross-connect valves are also exercised annually.

NRC QUESTION NO. 1. c)

*What corrosion protection is provided for the SBODG tanks, piping, fittings, etc.?*

PILGRIM RESPONSE

The steel suction piping on both sets of tanks and the steel EDG tanks are cathodically protected by the impressed current method. Also, the exterior and lower interior portions of the EDG tanks are coated. The fiberglass SBO tanks require no corrosion protection.

NRC QUESTION NO. 2

*Will the fuel in the SBODG tanks be maintained and sampled like the fuel in the EDG tanks? How often do you flush the SBODG tanks?*

PILGRIM RESPONSE

The fuel in the SBO tanks will be sampled monthly and tested to the same ASTM standards as the fuel in the EDG tanks, as specified in TS surveillance TS 3/4.9.A.1.e. Also, diesel fuel deliveries will be tested to the same ASTM standard.

The SBO tanks are drained every ten years for cleaning.

NRC QUESTION NO. 3

*Provide a copy of Attachment 10 of Procedure 2.2.8. Also, provide the supporting Procedures for Attachment 10 for the 4 concurrent actions (ordering of fuel, load shedding, shut down one EDG and transfer fuel from tank, and transfer of oil from SBODG tanks). Is there a preferred order of priority for the options to refill the EDG tanks?*

PILGRIM RESPONSE

The following attachments to the Pilgrim Procedures 2.2.8, "Standby AC Power System (Diesel Generators)" are enclosed.

1. Attachment 8, "Diesel Oil Transfer Operations with Alternate Suction Paths"
2. Attachment 9, "Diesel Oil Transfer from SBO Diesel Storage Tanks to EDG Storage Tanks"
3. Attached 10, "EDG Fuel Management Strategy"

The preferred priority is to attempt replenishment from off-site sources as specified in Attachment 10 of Procedure 2.2.8. All other options would be considered concurrently.

NRC QUESTION NO. 4

*The transfer of fuel from the SBODG tank is by air-driven pump and hoses independent of station electrical systems. What is the source of air for the pump? Is it safety grade? If not what other sources of air are available for the pump or are other pumps available for backup?*

PILGRIM RESPONSE

The primary source is a portable, non-safety grade diesel air compressor. Other backup sources include the MQCI, SBO air receiver and the non-safety grade station air system.

NRC QUESTION NO. 5

*What are the instrumentation requirements for the EDG tanks? Is there low level indication for minimum level? Do the SBODG tanks have instrumentation? How do you assure the required minimum level in the SBODG tanks?*

PILGRIM RESPONSE

Commonwealth of Massachusetts requires leak detection instrumentation for the single-wall EDG tanks, but there are no federal requirements.

The EDG tanks do have a low-level alarm prior to reaching the TS minimum level of fuel. It will annunciate locally and in control room.

THE SBO tanks have leak detectors in the annulus between the double-walls for leak detection. It will annunciate locally and in control room.

Pilgrim uses a measuring stick to check SBO fuel volume.

ENCLOSURE

ATTACHMENT 8 to 2.2.8: DIESEL OIL TRANSFER OPERATIONS WITH ALTERNATE SUCTION PATHS

ATTACHMENT 9 to 2.2.8: DIESEL OIL TRANSFER FROM SBO DIESEL GENERATOR STORAGE TANKS TO EDG STORAGE TANKS

ATTACHMENT 10 to 2.2.8 EDG FUEL MANAGEMENT STRATEGY

DIESEL OIL TRANSFER OPERATIONS WITH ALTERNATE SUCTION PATHS

**CAUTION**

This Attachment shall only be performed during a Cold Shutdown or accident condition when one EDG is inoperable and the opposite (operational) EDG requires additional fuel oil. Additionally, the inoperable EDG fuel oil supply is not known to be degraded. OSS permission is required.

- [1] Auto-operation of P-141A with Suction from T-126B
  - (a) **OPEN** 38-HO-103, Diesel Oil Transfer Pumps Suction Cross-Tie Block Valve.
  - (b) **OPEN** Breaker B1446, DG "B" Diesel Oil Transfer Pump P-141B.
  - (c) **CLOSE** 38-HO-102A, Diesel Generator A Oil Storage Tank Outlet Valve, **AND** 38-HO-104B, DG B Diesel Oil Transfer Pump P-141B Suction Valve.
  
- [2] Auto-operation of P-141B with Suction from T-126A
  - (a) **OPEN** 38-HO-103, Diesel Oil Transfer Pumps Suction Cross-Tie Block Valve.
  - (b) **OPEN** Breaker B1556, DG "A" Diesel Oil Transfer Pump P-141A.
  - (c) **CLOSE** 38-HO-102B, Diesel Generator B Oil Storage Tank T-126B Outlet Valve, **AND** 38-HO-104A, DG A Diesel Oil Transfer Pump P-141A Suction Valve.
  
- [3] Manual/Auto-Operation of Fuel Oil Transfer System
  - (a) Operation of P-141A with Suction from T-126B
    - (1) **OPEN** 38-HO-103, Diesel Oil Transfer Pumps Suction Cross-Tie Block Valve.
    - (2) **OPEN** Breaker B1446, DG "B" Diesel Oil Transfer Pump P-141B.
    - (3) **CLOSE** 38-HO-102A, Diesel Generator A Oil Storage Tank Outlet Valve, **AND** 38-HO-104B, DG B Diesel Oil Transfer Pump P-141B Suction Valve.
    - (4) **OPEN** AO-4521 by placing the control switch for AO-4521 to the "OPEN" position.
    - (5) **PLACE** control switch for P-141A to the "RUN" position.

- (6) **WHEN** the tank level is at the desired level, **PLACE** control switch for P-141A to the "AUTO" position.
- (7) **PLACE** control switch for AO-4521 to the "AUTO" position.
- (b) Operation of P-141B with Suction from T-126A
  - (1) **OPEN** 38-HO-103, Diesel Oil Transfer Pumps Suction Cross-Tie Block Valve.
  - (2) **OPEN** Breaker B1556, DG "A" Diesel Oil Transfer Pump P-141A.
  - (3) **CLOSE** 38-HO-102B, Diesel Generator B Oil Storage Tank Outlet Valve, **AND** 38-HO-104A, DG A Diesel Oil Transfer Pump P-141A Suction Valve.
  - (4) **OPEN** AO-4522 by placing the control switch for AO-4522 to the "OPEN" position.
  - (5) **PLACE** control switch for P-141B to the "RUN" position.
  - (6) **WHEN** the tank level is at the desired level, **PLACE** control switch for P-141B to the "AUTO" position.
  - (7) **PLACE** control switch for AO-4522 to the "AUTO" position.
- [4] Diesel Oil Transfer From Storage Tank To Storage Tank Via External Portable System
  - (a) **IF** the operational EDG requires additional fuel oil and the transfer system or fuel oil vendor is unable to supply that oil, **THEN CONTACT** OSS and Production Maintenance/Station Services.
  - (b) **HAVE** a storage tank (from inoperable diesel) to storage tank (operable diesel) portable transfer system consisting of hoses and a small auxiliary pump set up at storage tank fill stations (in yard).

- (c) **IMPLEMENT** the transfer of fuel to the operable diesel as required to maintain operability.

NOTES

1. Hoses, pumps, and extension cords are stored in storage box (CR110) in "A" EDG Compressor Room.
2. Portable system may require a portable generator for operation.

CAUTION

Ensure that level indication is monitored during fuel transfer to prevent tank from overflowing. To prevent pumping from bottom of tank and possibly introducing contaminants, the suction hose should be inserted such that the end is at least 6 inches from tank bottom.

Should oil be spilled, the OSS shall be notified immediately and steps shall be taken to stop and contain the spill. Absorption booms, pillows, pads, etc., are stored in blue barrels marked "HAZARDOUS MATERIAL SPILL KITS - EMERGENCY USE ONLY". On the occurrence of any oil spill, the Report Dispatcher shall be notified as soon as possible and within 2 hours. Additional reporting requirements are established in PNPS 1.3.22.

- (1) **REMOVE** (northernmost "old" fill) manhole covers.
- (2) **ENSURE** area surrounding fill connection is reasonably clean and dry so that water or debris will not enter either tank during the fuel transfer process.
- (3) **UNLOCK** (CR107) **AND REMOVE** fill covers.
- (4) With one end of hose attached to suction side of portable pump, **INSTALL AND SUBMERGE** suction end of hose into fill hole of (inoperable) EDG storage tank.
- (5) With one end of other hose attached to discharge side of portable pump, **INSTALL AND SUBMERGE** discharge end of hose into fill hole of (operable) EDG storage tank.
- (6) **COVER** fill holes with appropriate FME barrier in accordance with PNPS 1.4.35 to prevent foreign material from entering.

- (7) **IF** local power is not available via extension cord to power pump, **THEN** **OBTAIN** a portable generator **AND OPERATE** as required.
- (8) **START** pump **AND MONITOR** tank levels as required.
- (9) **DO NOT FILL** tank above 23,612 gallons indicated.
- (10) **STOP** transfer operation when no longer required.

[5] Restoration

- (a) **RESTORE** Diesel Oil Transfer System to normal lineup in accordance with Breaker and Valve Checklists.
- (b) **IF** portable transfer system was utilized, **THEN RETURN** covers to normal **AND RETURN** hoses, pumps, cords, and portable generator (if used) to normal storage area(s).

DIESEL OIL TRANSFER FROM SBO DIESEL GENERATOR STORAGE TANKS  
TO EDG STORAGE TANKS

**CAUTION**

This Attachment shall only be performed as directed by the OSS/EPOS when EDG fuel oil capacity is in question during postaccident conditions. TSC support personnel will determine the need for fuel transfer within 24 hours of initiating event using Attachment 10 (EDG Fuel Management Strategy).

- [1] Diesel Oil Transfer From SBO Diesel Storage Tanks To EDG Storage Tanks Via External Portable System
- (a) **IF** the EDGs require additional fuel oil and the transfer system or fuel oil vendor is unable to supply that oil, **THEN CONTACT** the OSS and Production Maintenance/Station Services.
  - (b) **HAVE** a storage tank (from SBO Diesel) to storage tank (EDG) portable transfer system consisting of hoses and a small auxiliary pump set up at storage tank fill stations (in yard).
  - (c) **IMPLEMENT** the transfer of fuel to the EDG as required to maintain operability.

**NOTES**

- 1. Equipment needed for fuel transfer is stored in the SEP Building (near the SBO DG Enclosure) and is labeled "Diesel Generator Fuel Transfer Equipment".
- 2. Equipment and general layout are identified on drawing M100C76.

**CAUTION**

Ensure that level indication is monitored during fuel transfer to prevent tank from overflowing. To prevent pumping from bottom of tank and possibly introducing contaminants, the suction hose should be inserted such that the end is at least 6 inches from tank bottom.

Should oil be spilled, the OSS shall be notified immediately and steps shall be taken to stop and contain the spill. Absorption booms, pillows, pads, etc., are stored in blue barrels marked "HAZARDOUS MATERIAL SPILL KITS - EMERGENCY USE ONLY". On the occurrence of any oil spill, the Report Dispatcher shall be notified as soon as possible and within 2 hours. Additional reporting requirements are established in PNPS 1.3.22.

- (1) **REMOVE** (northernmost "old" fill) manhole cover of EDG Storage Tank to be filled.
- (2) **REMOVE** manhole cover for SBO Diesel Storage Tank.
- (3) **ENSURE** area surrounding fill connection is reasonably clean and dry so that water or debris will not enter either tank during the fuel transfer process.
- (4) **UNLOCK** (CR107) **AND REMOVE** fill cover of EDG Storage Tank to be filled.
- (5) **REMOVE** interior manhole cover for SBO Diesel Storage Tank.
- (6) **INSTALL** flanged pipe to portable pump (suction side).
- (7) **INSTALL** foot valve with coupling to 2" black wire reinforced suction hose.
- (8) With other end of 2" hose attached to suction side of portable pump, **SUBMERGE** suction end of hose into fill hole of SBO Diesel Storage Tank.
- (9) With one end of 1-1/2" Redskin 500 fire hose attached to discharge side of portable pump, **SUBMERGE** discharge end of hose into fill hole of EDG Storage Tank.
- (10) **COVER** fill holes with appropriate FME barrier in accordance with PNPS 1.4.35 to prevent foreign material from entering.
- (11) **INSTALL** pressure gauge manifold to the air supply connection on the pump, ensuring that the valve is closed.

- (12) **CONNECT** 3/4" Bosflex hose to Chicago fitting on pressure gauge manifold and the other end to the diesel powered air compressor.
- (13) **START** pump by opening air supply valve **AND** **MONITOR** tank levels as required.
- (14) **DO NOT FILL** tank above 23,612 gallons indicated.

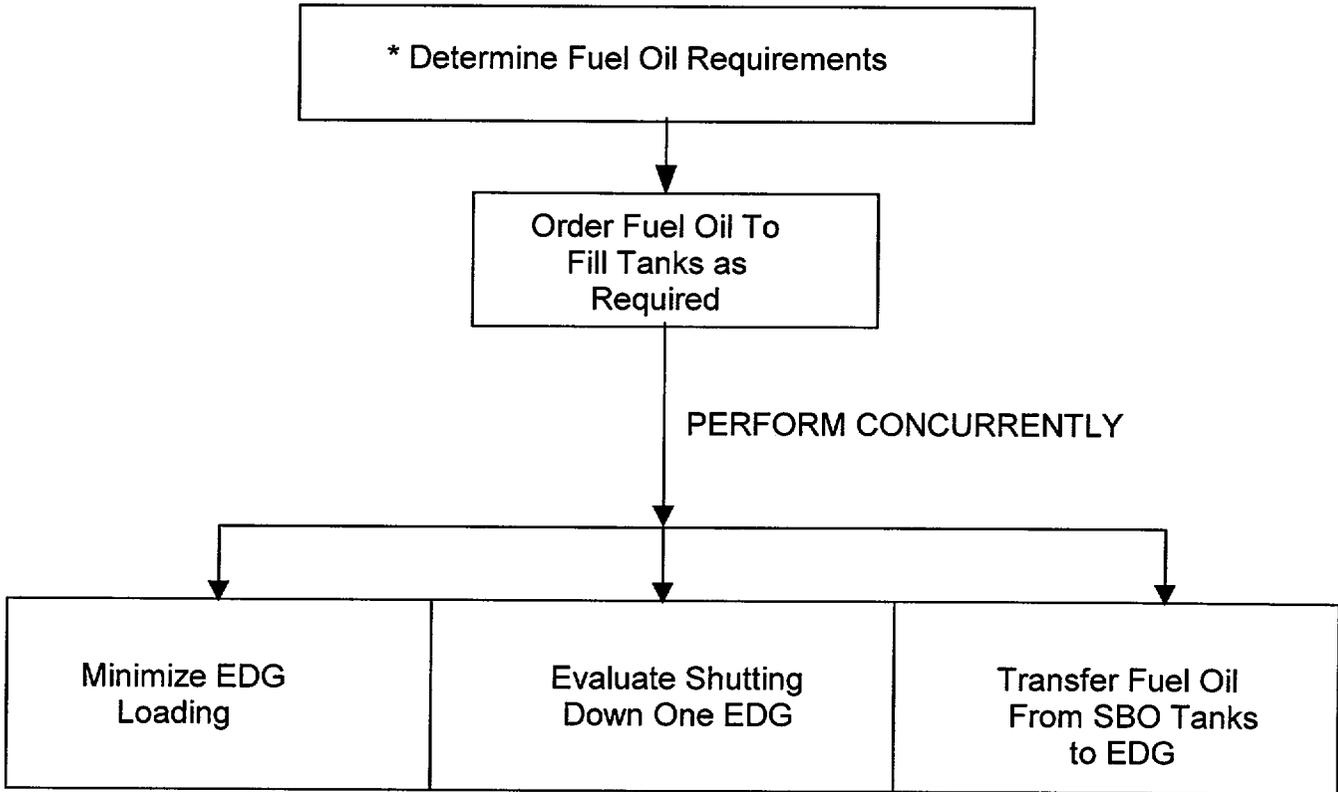
[2] **STOP** transfer operation when no longer required.

[3] Restoration

- (a) **RETURN** covers to normal **AND** **RETURN** hoses and pump to normal storage area(s).

EDG FUEL MANAGEMENT STRATEGY

Fuel Management Strategy will be used by the OSS/EPOS and/or TSC support personnel when EDG fuel oil capacity is in question during postaccident conditions. These options will be considered within the first 24 hours after the event.



- Secure Loads
- Reduce Flow Rates
- Stop one EDG
- Place SBO on Bus A5 or A6

\* Use EDG Load vs. Fuel Oil Consumption Curve (Attachment 10 Sheet 2)

Conservative Estimates of EDG fuel burn rate assuming 110 degrees F combustion air temperature

Loading	Gal per hour
2860	222
2750	213
2600	199
2500	191
2400	184
2300	176
2200	168
2100	161
2000	154
1900	147
1800	140
1700	134
1600	127
1500	120
1400	114
1300	107
1200	101
1100	94

