



Entergy Nuclear Generation Company
Pilgrim Nuclear Power Station
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Director
Nuclear Assessment

10 CFR 50.73

August 14, 2000
ENG C Ltr. 2.00.008

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

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

The enclosed supplemental Licensee Event Report (LER) 98-001-01, "Single-Failure Vulnerability of the Emergency Diesel Generator Fuel Supply System," is submitted in accordance with 10 CFR Part 50.73.

This supplemental report is submitted in accordance with a commitment contained in the letter transmitting LER 98-021-00 (Ltr. 2.98.132) and identifies actions taken to resolve the single-failure concern reported in LER 98-001-00. License amendment No. 184 was issued on March 17, 2000, and resolves the single-failure vulnerability reported in the enclosed supplemental LER and a related on-site EDG fuel supply concern reported in LER 98-021-01.

This letter contains no commitments.

Please do not hesitate to contact me if there are any questions regarding this report.

Sincerely,

J. F. Alexander

JRH/
Enclosure

cc: Mr. Hubert J. Miller
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IE22

LICENSEE EVENT REPORT (LER)(See reverse for number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)

PILGRIM NUCLEAR POWER STATION

DOCKET NUMBER (2)

05000-293

PAGE(3)

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TITLE (4)

Single-Failure Vulnerability of the Emergency Diesel Generator Fuel Supply System

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | |
|--------------------|-----|------|---|-------------------|-----------------|-----------------|-----|------|-------------------------------|---------------|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| 01 | 27 | 1998 | 1998 | 001 | 01 | 08 | 14 | 00 | N/A | 05000 |
| OPERATING MODE (9) | | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11) | | | | | | | |
| N | | | 20.2201 (b) | | | | | | | |
| POWER LEVEL (10) | | | 22.2203(a)(1) | | | | | | | |
| 100 | | | 20.2203(a)(2)(i) | | | | | | | |
| | | | 20.2203(a)(2)(ii) | | | | | | | |
| | | | 20.2203(a)(2)(iii) | | | | | | | |
| | | | 20.2203(a)(2)(iv) | | | | | | | |
| | | | 20.2203(a)(3)(i) | | | | | | | |
| | | | 20.2203(a)(3)(ii) | | | | | | | |
| | | | 20.2203(a)(4) | | | | | | | |
| | | | 50.73(a)(2)(i) | | | | | | | |
| | | | 50.73(a)(2)(ii)(B) | | | | | | | |
| | | | 50.73(a)(2)(iii) | | | | | | | |
| | | | 50.73(a)(2)(iv) | | | | | | | |
| | | | 50.73(a)(2)(v) | | | | | | | |
| | | | 50.73(a)(2)(vii) | | | | | | | |
| | | | OTHER | | | | | | | |
| | | | Specify in Abstract below or in NRC Form 366A | | | | | | | |

LICENSEE CONTACT FOR THIS LER (12)**NAME**

James R. Haley - Regulatory Affairs Senior Engineer

TELEPHONE NUMBER (Include Area Code)

(508) 830-8143

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX |
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SUPPLEMENTAL REPORT EXPECTED (14)YES
(If yes, complete EXPECTED SUBMISSION DATE)

NO

X

**EXPECTED
SUBMISSION
DATE(15)**

| MONTH | DAY | YEAR |
|-------|-----|------|
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On January 27, 1998, a review of emergency diesel generator (EDG) fuel calculations determined that both EDG main supply tanks and the use of a manual cross-connection were required to meet design basis requirements. Further review identified a potential single-failure vulnerability in the EDG fuel tanks' cross-connection. An engineering evaluation concluded the EDGs were operable using emergency operating procedures.

The root cause determined that a procedure used in 1987 did not require the calculation assumptions to be in accordance with the UFSAR. A contributing cause was the assumed independence of the EDGs, including the respective EDG fuel supply.

Corrective actions completed after the initial report was submitted included establishing the maximum bounding EDG fuel requirements, and the submittal and approval of a license amendment that resolved the single-failure concern.

This condition was identified while at 100 percent reactor power with the reactor mode selector switch in the RUN position. The reactor vessel pressure was approximately 1035 psig with the reactor water temperature at the saturation temperature for that pressure. The condition posed no threat to public health and safety.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

REASON FOR THE SUPPLEMENT

This supplemental report is submitted in accordance with a commitment made in the letter (Ltr. 2.98.132) transmitting LER 98-021-00. This supplement describes corrective actions taken. A proposed license amendment was submitted on May 5, 1999 (Ltr. 2.99.029) and the approved license amendment was issued on March 17, 2000. The amendment resolved the single-failure vulnerability reported in this LER and the EDG fuel supply concerns reported in LER 98-021-00.

BACKGROUND

The safety objective of the standby AC power source is to provide a single-failure proof source of on-site AC power adequate for the safe shutdown of the reactor following abnormal operational transients and postulated accidents assuming a complete loss of off-site power (UFSAR section 8.5). Two emergency diesel generators (EDGs) were installed to provide this source of standby AC power.

Each EDG is equipped with a fuel supply system consisting of a separate main fuel storage tank (T-126A/B) with a capacity of approximately 25,000 gallons, a transfer pump (P-141A/B), and a day tank (T-124A/B) with a capacity of approximately 600 gallons. Provisions exist for manually cross-connecting the normally independent fuel oil systems. The original design requirement was to have sufficient fuel on-site to support EDG operations for seven days due to a loss-of-off-site power (LOOP) to achieve and maintain safe shutdown of the reactor under accident conditions. A minimum supply of 19,800 gallons per tank (T-126A/B) is maintained by Technical Specification 3.9.A.3.

During an engineering review of calculation S&SA-55 (rev. 5), "Minimum On-Site Diesel Fuel Requirement," several inconsistencies between design assumptions and UFSAR statements were identified. The review concluded that 19,800 gallons was inadequate and the cross-connection had been assumed to be available in design calculations to meet the design basis fuel requirement for single EDG operation. A problem report (PR 98.9052) was written to document these inconsistencies in fuel requirement assumptions.

The licensing basis for the EDGs was reviewed. The original design calculation for fuel storage tank Technical Specification capacity appears to have credited the manual cross-connect and availability of both main storage tanks for fuel consumption by either EDG. The documentation did not clearly state that the cross-connect needed to be integrated into system operation.

The cross-connect valves are routinely surveilled in accordance with existing procedures 8.C.13, "Locked Component Lineup Surveillance," for the normally locked-closed valve (38-HO-103), and the In-service Testing (IST) program per procedure 8.I.1.1, "Inservice Pump and Valve Testing Program," for the foot check valves (38-CK-101A/B).

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EVENT DESCRIPTION

While reviewing problem report PR 98.9052, documenting inconsistencies between design assumptions and the UFSAR, a potential single-failure vulnerability in the EDG fuel oil supply system was identified. Specifically, on January 27, 1998, it was determined that failure of either main storage tank suction check valve (38-CK-101A/B) would eliminate the ability to cross-connect the tanks (T-126A/B).

The NRC Operations Center was notified in accordance with 10 CFR 50.72(b)(1)(ii)(B), at 1850 hours on January 27, 1998, due to a condition identified to be potentially outside the design basis.

Engineering evaluation (EE 98-011) and calculation S&SA-119 (rev. 0) were originally prepared to document the operability of the EDG fuel supply based on use of emergency operating procedures (EOPs) to limit fuel consumption.

The potential single-failure vulnerability and its impact on fuel transfer between the main supply tanks (T-126A/B) was addressed in Supplement 1 to engineering evaluation EE 98-011. Additional fuel supply concerns were raised in September 1998 and documented in a problem report (PR 98.9462). Engineering evaluation (EE 98-076) was written to document EDG operability assuming use of emergency operating procedures (EOPs). Subsequently, a more limiting fuel consumption case was identified and documented in PR98.9530. Engineering evaluation, EE 98-083, was prepared and incorporated the two previous engineering evaluations (EE 98-011 and EE 98-076). The evaluation provided the basis for operability evaluation (OE 98-067) which concluded the EDGs were operable using the EDG Fuel Management Strategy added as Attachment 10 to revision 54 of procedure 2.2.8, "Standby AC Power Systems (Diesel Generators)."

The condition was identified while at 100 percent reactor power with the reactor mode selector switch in the RUN position. The reactor vessel pressure was approximately 1035 psig with the reactor water temperature at the saturation temperature for that pressure.

CAUSE

The root cause analysis determined the calculation/verification procedure in effect in December 1987, when calculation S&SA-55 (rev. 0) was prepared, did not specifically require the assumptions to be in accordance with the UFSAR. A contributing cause was the assumed independence of the EDG that included separation of supply tanks (T-126A/B), and therefore 19,800 gallons of fuel was adequate for each EDG.

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CORRECTIVE ACTION TAKEN

- The design basis information project modified its review criteria to ensure that assumptions used are in accordance with the UFSAR.
- EDG procedure 2.2.8 was revised (rev. 47 and rev. 54) to provide instructions for transfer of fuel between the main tanks and to provide a fuel management strategy.
- The design basis fuel requirement for each EDG was revised to 36,800 gallons based on approved calculation S&SA-55 (rev. 6).
- A proposed license amendment was submitted (Ltr. 2.99.029) on May 5, 1999. License Amendment 184 was issued on March 17, 2000. The amendment provides 36,800 gallons of diesel fuel for each EDG by augmenting the EDG main fuel supply with the available station blackout (SBO) diesel fuel. The quantity, 36,800 gallons for each EDG, is more than adequate fuel for EDG operation at the maximum bounding loads without use of the cross-connection between the EDG fuel tanks and therefore, resolves both the single-failure concern associated with the cross-connection, and the fuel capacity concern reported in LER 98-021-00.

SAFETY CONSEQUENCES

This condition posed no threat to public health and safety.

Sufficient fuel has been available in each EDG fuel tank to provide approximately 4 days of operation for each diesel at full rated load and 7 days at managed load. The potential failure of a foot check valve would not have prevented manual transfer of fuel to the operating diesel.

Engineering Evaluation EE 98-011 (rev. 1) provided the basis for determining that the EDGs were operable based on consideration of EOP response capabilities, assuming the loss of one EDG and its associated fuel storage tank. When a more limiting fuel consumption case was identified, another engineering evaluation (EE 98-083) was prepared which encompassed EE 98-011 and provided the basis for operability evaluation OE 98-067. Revisions were made to the EDG procedure 2.2.8 to ensure an adequate fuel supply. In addition, instructions were developed for an alternate method of fuel transfer between the EDG main supply tanks in the event of the failure of one of the foot check valves.

The license amendment issued on March 17, 2000 and associated procedure changes permit use of the on-site SBO diesel fuel supply to augment the main EDG fuel supply to meet the design basis fuel requirements. This additional capacity provides greater accident response flexibility than previously existed and therefore, improves the safe operation of Pilgrim Station.

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REPORTABILITY

This report is being submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B) because the EDG fuel supply single-failure vulnerability represented a condition that was outside the design basis.

SIMILARITY TO PREVIOUS EVENTS

A review of Pilgrim Station LERs submitted since 1994 was conducted. The review focused on LERs submitted in accordance with 10 CFR 50.73(a)(2)(ii) involving the EDG fuel supply system. The review identified LER 98-021-00, "Inadequate Fuel Supply For Emergency Diesel Generators."

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

COMPONENTS

CODES

Generator, diesel
Pump
Tank

DG
P
TK

SYSTEMS

Emergency on-site power supply system
Fuel receiving storage, and transfer system

EK
DE