

LICENSEE EVENT REPORT (LER)

(See reverse for number of digits/characters for each block)

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FACILITY NAME (1)

PILGRIM NUCLEAR POWER STATION

DOCKET NUMBER (2)

05000-293

PAGE(3)

1 of 6

TITLE (4)

Inadequate Fuel Supply For Emergency Diesel Generators

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
09	02	98	1998	021	00	10	02	98	N/A	05000
									N/A	05000

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)											
N	100	<input type="checkbox"/> 20.2201 (b)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)	<input type="checkbox"/> 22.2203(a)(1)	<input checked="" type="checkbox"/> 20.2203(a)(3)(i)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 73.71
		<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> OTHER	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A		<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)

LICENSEE CONTACT FOR THIS LER (12)

NAME

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TELEPHONE NUMBER (Include Area Code)

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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

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)

NO

EXPECTED SUBMISSION DATE(15)

MONTH: 03, DAY: 31, YEAR: 99

ABSTRACT

The current minimum fuel requirements of 19,800 gallons for each emergency diesel generator (EDG) is insufficient to support the electrical loads assumed in the FSAR. However, the EDGs are considered operable based on how those loads would be operated using the Pilgrim Station emergency operating procedures (EOPs).

The original design basis calculation was non-conservative and focused on determining the minimum fuel required for seven days of EDG response to specific scenarios rather than establishing the bounding case for fuel consumption.

Corrective actions have been taken to revise the calculation control process to ensure consistency with the FSAR and how EDG load changes are addressed in fuel capacity calculations. A root cause analysis is being performed to determine the necessary corrective actions to resolve the EDG fuel supply concerns.

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 1034 psig with the reactor water temperature at the corresponding saturation temperature. This 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)

BACKGROUND

The safety objective of the standby AC power source is to provide a source of onsite AC power adequate for the safe shutdown of the reactor following abnormal operational transients and postulated accidents assuming a complete loss of offsite power. Two emergency diesel generators (EDGs) and their associated fuel supply systems provide this source of standby AC power.

The fuel supply associated with each EDG consists 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 cross-connecting the normally independent fuel oil systems. The design basis for the on-site fuel supply is to support EDG operations for seven days following a loss-of-offsite power (LOOP) to achieve and maintain safe shutdown of the reactor under accident conditions. A minimum capacity of 19,800 gallons per tank was established and used as the basis for Technical Specification 3.9.A.3 to ensure that the design basis requirements were met.

In 1987, Engineering Service Request ESR 87-585 was generated to provide the basis for T.S. 3.9.A.3 (minimum 19,800 gallons/tank). The Architect-Engineer and Constructor, Bechtel, was contacted regarding the derivation of the 19,800 gallon requirement and, in addition, safety-related calculation S&SA 55 "Minimum Onsite Diesel Fuel Requirement" was performed to verify that as of 1987, the original basis (19,800 gallons per tank) was still valid. Engineering Response Memorandum ERM 87-526, which responded to ESR 87-585, contained both the Bechtel correspondence and S&SA 55 as supporting documentation.

In 1989, Information Notice (IN) 89-50, "Inadequate Emergency Diesel Generator Fuel Supply" was issued. The IN was evaluated for the adequacy of the EDG fuel oil supply. The review referenced ESR 87-585 and ERM 87-526 and concluded that no further action was required to address IN 89-50.

Earlier in 1998, during a review of calculation S&SA 55 (rev. 5) several inconsistencies in design assumptions and FSAR statements were identified. Assumptions concerning operator actions had been made in S&SA 55 resulting in non-conservative conclusions regarding the minimum fuel requirements. It was assumed that operators would turn off several large pumps shortly into the event, thus minimizing the required quantity of fuel. Upon correcting the assumptions to be consistent with FSAR Chapter 14, it was realized that the resultant increase in fuel consumption required the availability of both fuel tanks and the fuel transfer cross-connection during the accident response to supply necessary fuel to the diesel carrying the greatest load. At that time, it was discovered that a single failure vulnerability existed in the cross-connection.

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This concern was documented in the PNPS corrective action program (PR 98.9052) and actions were initiated to address the single failure vulnerability identified. Specifically, it was discovered that failure of either main storage tank suction check valve (38-CK-101A/B) would eliminate the ability to draw fuel from either tank. LER 98-001-00, "Single Failure Vulnerability of the Emergency Diesel Generator Fuel Oil Supply System," was submitted on March 3, 1998 describing the condition.

Engineering evaluation (EE) 98-011 provided the basis for concluding the EDGs were operable for this single failure because the Technical Specification required minimum of 19,800 gallons of fuel in each tank was sufficient to ensure that either EDG can run at specified loads, using EOPs, for seven days without delivery of fuel from offsite sources.

A root cause analysis (PR 98.9052.01) was performed as part of the corrective actions associated with LER 98-001-00. The cause was attributed to lack of procedural guidance to require that calculations are consistent with the FSAR. A contributing cause was that the independence of the EDGs was assumed to include separation of supply tanks, and therefore, the Technical Specification value of 19,800 gallons of fuel per tank must be adequate. As part of the corrective actions, the design basis information (DBI) project established criteria to require assumptions used are in accordance with the FSAR. Another corrective action included a more comprehensive review of the fuel requirements addressing the impacts of additional electrical loads which had been added to the EDGs. A design change (PDC 98-24) to eliminate the single failure vulnerability was also initiated. Completion of PDC 98-24 may be impacted by resolution of the fuel capacity concern reported in this LER.

EVENT DESCRIPTION

On September 2, 1998, while revising calculation S&SA 55 (to Rev. 6), original design calculations for EDG fuel consumption and supply were reviewed. It was discovered that a more limiting fuel consumption case had not been included in the original Bechtel tank sizing calculations. The original calculations focused on the minimum amount of fuel required on site for both EDGs to ensure safe shutdown of the reactor. Furthermore, assumptions used in the original calculations were non-conservative and inconsistent with the corresponding assumptions in FSAR Chapter 14. The Bechtel calculations assumed fewer emergency core cooling system (ECCS) pumps running than does FSAR Chapter 14 when two EDGs are running.

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To establish the design basis requirements, the bounding 7 day fuel consumption assumptions should have been consistent with the those discussed in FSAR Chapter 14. A calculation (S&SA 55, Rev. 6) was performed in September 1998, consistent with FSAR Chapter 14 assumptions, and preliminary results indicate that a minimum of 48,000 gallons is required, rather than approximately the 34,000 gallons originally calculated. The original Technical Specification requirement of 39,600 gallons had been used as a conservative measure to ensure the 34,000 gallon requirement was met.

Problem report (PR) 98.9462 was written to document this condition and to initiate corrective actions.

The NRC Operations Center was notified in accordance with 10 CFR 50.72(b)(1)(ii)(B), at 1.44 hours on September 2, 1998, due to the identification of a condition that was outside the design basis.

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 1034 psig with the reactor water temperature at the saturation temperature.

CAUSE

The original design basis calculations used non-conservative assumptions regarding operator actions and electrical loads that would be powered in response to a design basis accident recirculation line break loss-of-coolant accident (LOCA) over the first seven days. These assumptions were not consistent with those used in the FSAR Chapter 14 accident response when both EDGs are available.

A contributing factor was failure to consider the impact on fuel requirements for additional electrical loads added to the EDGs through revisions to electrical load analyses.

CORRECTIVE ACTIONS TAKEN

Engineering evaluation (EE) 98-0076 provided the basis for operability evaluation (OE) 98-08 which concluded that, using approved EOPs, sufficient fuel was available in each tank to achieve safe shutdown of the plant following postulated accidents.

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Previous corrective actions taken as a result of LER 98-001-00 include:

- Criteria have been incorporated into the design basis information (DBI) program to ensure that assumptions used are consistent with the FSAR. The design engineering verification procedure, NSEG 3.06, was revised (to Rev. 7) to require that verification activities include comparison with FSAR requirements.
- Interim controls, established due to the single failure concern, remain in place to provide guidance for transfer of fuel from one main supply tank to another.

CORRECTIVE ACTION PLANNED

A bounding EDG fuel consumption calculation (S&SA 55 Rev. 6) has been initiated to establish the design basis for the fuel supply system.

A root cause analysis (PR 98.9462.00) is being performed in accordance with the corrective action program. The recommended corrective actions will be reviewed to ensure that the design basis issues are adequately addressed. Credit for existing additional sources of on-site fuel storage will be evaluated as part of this process.

A supplement to this LER will be submitted after the corrective actions have been reviewed and approved.

SAFETY CONSEQUENCES

This condition did not result in any component or system failure and posed no threat to public health and safety.

Engineering evaluation (EE) 98-0076 provided a basis for determining the EDGs were operable based on consideration of EOP actions. When the response to postulated accidents is in accordance with the EOPs, the existing Technical Specification Limiting Condition For Operation (LCO) 3.9.A.3, provides adequate fuel without any compensatory actions.

Additional sources of fuel oil are currently available on-site (station black-out diesel fuel storage capacity of approximately 40,000 gallons) which can be used to augment the existing EDG fuel supply. Therefore, the safety significance of the error in the design basis calculations is low.

This information is being reported in accordance with 10 CFR 50.73(a)(2)(ii)(B) to describe a condition that represented operation outside the design basis of the plant.

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SIMILARITY TO PREVIOUS EVENTS

A review of Pilgrim Station LERs submitted since 1994 was conducted based on the plant being outside its design basis. The review of LERs focused on those submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B) involving the EDGs or EDG fuel supply system. The review identified the following:

- LER 97-021-00 "Emergency Diesel Generator Ambient Air Temperature"
- LER 97-027-00 "Emergency Diesel Generator Winter Ambient Temperature"
- LER 98-001-00 "Single Failure Vulnerability of the Emergency Diesel Generator Fuel Oil Supply System"
- LER 98-002-00 "Emergency Diesel Generator Room Air Temperature Below Design Basis"
- LER 98-004-00 "Emergency Diesel Generator Room Air Temperature Below Design Basis" and
- LER 98-018-00 "Emergency Diesel Generators Inoperable When Ambient Air Temperature Exceeds 88 Degrees Fahrenheit."

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

COMPONENTS	CODES
Generator, diesel	DG
Tank	TK
SYSTEMS	
Emergency on-site power supply system	EK
Fuel receiving storage, and transfer system	DE