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10 CFR 50.73

Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360

August 4, 1999
ENGC Ltr. 2.99.076

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

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

The enclosed supplemental Licensee Event Report (LER) 99-006-00, "Both Emergency Diesel Generators Inoperable Due to Ambient Air Temperature Exceeding 88 Degrees Fahrenheit," is submitted in accordance with 10 CFR 50.73.

This letter contains no commitments.

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

J.F. Alexander, Director
Nuclear Assement

DWE/sc
Enclosure: LER 99-006-00

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NRC Form 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/20

LICENSEE EVENT REPORT (LER)

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

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TITLE (4)
Both Emergency Diesel Generators Inoperable Due to Ambient Air Temperature Exceeding 88 Degrees Fahrenheit

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
									N/A	05000
07	05	1999	1999	006	00	08	04	99	FACILITY NAME: N/A	DOCKET NUMBER: 05000

		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)							
OPERATING MODE (9)	N		20.2201 (b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
POWER LEVEL (10)	22		22.2203(a)(1)		20.2203(a)(3)(i)	x	50.73(a)(2)(ii) B		50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)	x	50.73(a)(2)(v) D		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)	x	50.73(a)(2)(vii) D		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Douglas W. Ellis - Regulatory Affairs Senior Engineer	(508) 830-8160

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)				EXPECTED SUBMISSION DATE(15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

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

On July 5, 1999, both emergency diesel generators (EDG) were declared inoperable because the site ambient outside air temperature was greater than the EDG design and operability limit of 88 degrees Fahrenheit. An engineering evaluation concluded the EDGs would be operable up to a maximum temperature of 95 degrees if temporary modifications to the EDG control cabinets and radiators were implemented. The temporary modifications were implemented for EDG 'A' on July 5, 1999. On July 6, 1999, EDG 'B' was inoperable because the air temperature was greater than 88 degrees and the temporary modifications for EDG 'B' had not yet been implemented at that time.

The cause was inadequate EDG cooling and building ventilation design to support EDG operability when site ambient air temperature exceeded 88 degrees. Corrective actions planned include the implementation of permanent modification options to extend the operability of the EDGs to greater than 88 degrees Fahrenheit.

The events occurred during a plant startup while at about 22 percent reactor power with the reactor mode selector switch in the RUN position. The reactor vessel pressure was 950 psig with the reactor water temperature at the saturation temperature for that pressure. The event posed no threat to public health and safety.

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BACKGROUND

The Pilgrim Station Updated Final Safety Analysis Report (UFSAR) Table 10.9-2, "Design Temperatures (Summer)," identifies the summer design basis ambient air temperature as 88 degrees Fahrenheit. This temperature was used in the design specification for the emergency diesel generators (EDGs) and for nominal EDG building ventilation design. The 88 degree temperature was identified as a concern in 1997 and, as stated in LER 97-021-00 (EDG Ambient Air Temperature), 88 degrees had been considered a nominal design parameter rather than a design limit. Since then, engineering activities have been ongoing to increase the temperature limit.

LER 97-021-00 included instances prior to and including 1997 when the site ambient air temperature exceeded 88 degrees. As part of the corrective actions associated with the LER, an engineering evaluation was prepared based on EDG operational data and vendor communications, to establish a basis for operability of the EDGs up to an ambient temperature of 95 degrees Fahrenheit. The development of a detailed dynamic heat balance model was also initiated to further evaluate and verify the temperature limit.

The results of subsequent heat balance analysis concluded that with no change to the EDG building HVAC system configuration, the site ambient outside air temperature limit for EDG operability was less than or equal to 88 degrees. Based on the analysis, the maximum ambient outside air temperature limit of 95 degrees for EDG operability was changed to less than or equal to 88 degrees. Consequently, LER 98-018-01 reported that on July 22, 1998, both EDGs were inoperable because the Pilgrim Station ambient air temperature exceeded 88 degrees for less than one hour. Corrective action initiated included additional testing and calculations which resulted in the development of an engineering design modification. The modification (PDC 99-12) includes changes to applicable documents and hardware changes to the radiators of the EDGs and changes to the EDG building HVAC system. [The modification was issued for construction/approved on July 22, 1999, and was being scheduled for implementation when this report was prepared.]

Temporary modifications and supporting safety evaluations were prepared and approved for implementation should ambient air temperatures greater than 88 degrees occur prior to the implementation of the modification. Temporary modification (TM) 99-41 provided for improved EDG control cabinet cooling and TM 99-42 provided for improved EDG radiator core cooling and related EDG building HVAC system changes. TM 99-41 (and related safety evaluation #3364), and TM 99-42 (and related safety evaluation #3365) were prepared and approved in the July 2 - 3, 1999, timeframe.

EVENT DESCRIPTION

On July 5, 1999, at about 1130 hours, emergency diesel generator (EDG) 'A' and 'B' were declared inoperable because the site ambient outside air temperature exceeded 88 degrees, the EDG design and operability temperature limit.

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A corrective action program document (PR 99.9398) was written to document the event. The NRC Operations Center was notified in accordance with 10 CFR 50.72(b)(1)(ii)(B) at 1151 hours on July 5, 1999.

A 24 hour shutdown limiting condition for operation (LCO A99-398) was entered in accordance with Technical Specification 3.5.F. because both EDGs were inoperable. The logging of ambient outside air temperature every 10 minutes was initiated in accordance with procedure 2.2.8 (rev. 55), "Standby AC Power System (Diesel Generators)." By 2040 hours, the ambient outside air temperature had decreased to less than 88 degrees, and the 24 hour shutdown LCO (A99-398) was terminated at 2105 hours on July 5, 1999. The maximum temperature that occurred on July 5, 1999, was about 93 degrees.

Meanwhile, actions were initiated to implement temporary modifications that improved cooling of EDG control cabinets (TM 99-41) and improved EDG radiator cooling (TM 99-42). The cabinets and radiators are located in the EDG building.

A 72 hour LCO (A99-395) was entered at 2105 hours on July 5, 1999, to implement the temporary modifications for EDG 'A'. After the modifications (TM 99-41 and TM 99-42) for EDG 'A' were implemented, the LCO (A99-395) was terminated at 0614 hours on July 6, 1999. With the temporary modifications installed, EDG 'A' was operable with site ambient outside air temperatures up to 95 degrees.

After the temporary modifications were implemented for EDG 'A' but before the temporary modifications were implemented for EDG 'B', the ambient air temperature exceeded 88 degrees beginning at about 1400 hours on July 6, 1999. A corrective action program document (PR 99.9402) was written to document the event.

EDG 'B' was declared inoperable at 1400 hours on July 6, 1999, and a 72 hour LCO (A99-400) was entered in accordance with Technical Specification 3.5.F. This action was taken because the site ambient outside air temperature was greater than 88 degrees and the temporary modifications (TM 99-41 and TM 99-42) for EDG 'B' had not yet been implemented. The logging of ambient air temperatures was initiated in accordance with procedure 2.2.8. The maximum temperature that occurred on July 6, 1999, was about 93 degrees. By 1700 hours, the site ambient outside air temperature was less than 88 degrees and the LCO (A99-400) was terminated at 1846 hours on July 6, 1999. [The implementation of the temporary modifications for EDG 'B' were subsequently completed on July 8, 1999.]

The events occurred during startup from the 1999 refueling outage (RFO-12). The reactor power level was approximately 22 percent with the reactor mode selector switch in the RUN position. The reactor vessel pressure was approximately 950 psig with the reactor vessel water at the saturation temperature for that pressure.

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CAUSE

The cause was site ambient outside air temperatures that were greater than the EDG design and operability temperature limit of 88 degrees Fahrenheit. The temperatures experienced were consistent with site temperature variations that are described in UFSAR section 2.3.5 (regional temperatures). The outside design temperature of 88 degrees described in UFSAR section 10.9 (Pilgrim Station HVAC systems) and Table 10.9-2 (summer) appear to have been based on a 2.5 percent exceedance value from ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) tables. The tables provide recommended design temperatures as a function of exceedance values. By ASHRAE definition, the 88 degree design summer temperature would be expected to be exceeded 2.5 percent (i.e., about 73 hours) of the the summer hours.

CORRECTIVE ACTION

The following interim corrective actions were taken:

Temporary Modifications, TM 99-41 and TM 99-42, implemented for EDG 'A' were completed by 0614 hours on July 6, 1999, and the 72 hour LCO (A99-395) entered for the modifications to EDG 'A' was terminated at 0635 hours.

A 72 hour LCO (A99-402) was entered at 2030 hours on July 7, 1999, for implementation of the temporary modifications (TM 99-41 and TM 99-42) to the EDG 'B' control cabinets and radiator. After the implementation of the modifications, the LCO (A99-402) was terminated at 1735 hours on July 8, 1999.

A written engineering evaluation (EE99-064) completed on July 15, 1999, in conjunction with the modifications (TM 99-41 and TM 99-42) made to the control cabinets and radiators of EDG 'A' and 'B', increased the outside ambient air temperature design limit to 95 degrees Fahrenheit. Therefore, after July 8, 1999, with the modifications installed for EDGs 'A' and 'B', site ambient outside air temperatures less than or equal to 95 degrees do not impact the operability of EDG 'A' or EDG 'B'.

The following long term corrective actions are planned and will be tracked as part of the corrective action program (PR 98.9395) and the modification process:

The permanent engineering design modification of the EDG 'A' and EDG 'B' cooling systems and EDG building HVAC system has been issued for implementation. The modification (PDC 99-12) includes hardware changes that achieve similar results to those implemented via the temporary modifications. Significantly, the permanent hardware modifications include replacement of the radiator cores and radiator fan of each EDG, and EDG building HVAC system changes. As part of the modification process, the results of post work testing will be evaluated for final determination of the maximum site ambient outside air temperature at which the EDGs are operable.

The modification process also includes changes to applicable procedures, drawings, specifications, and the UFSAR (section 10.9.3.9/Table 10.9-2). The safety evaluation (#3269) prepared in support of the modification (PDC 99-12) concluded the changes to be implemented by the modification result in no unreviewed safety question, and that changes to Technical Specifications are not required.

SAFETY CONSEQUENCES

The event/condition posed no threat to public health and safety.

There were no system or component failures that caused or resulted from the events.

EDGs 'A' and 'B' were both inoperable when and because the site ambient outside air temperature was greater than 88 degrees on July 5, 1999. A 24 hour LCO was entered and was terminated in less than 24 hours, on July 5, 1999.

During that period on July 5, 1999, the following configurations existed. The preferred offsite power source (345 Kv transmission lines 342 and 355) was energized and the Pilgrim 345 Kv switchyard ringbus was energized with ACBs 103, 104 and 105 in the closed position, and ACB 102 was open for mechanical disconnect maintenance. The Startup Transformer was energized from the switchyard ringbus, and the 4.16 KV auxilary power distribution system (APDS) was powered from the Startup Transformer. The secondary offsite power source (23 Kv distribution system) was energized, and the Shutdown Transformer was in standby service. The Main Transformer and Unit Auxiliary Transformer were not energized because the Main Generator had not yet been energized. Therefore, for those safety-related systems that are powered by AC power from the APDS, the systems were operable even while the EDG(s) was inoperable because the APDS was powered from the 345 Kv transmission system via the Startup Transformer. [Although not a factor for this report, the Station Blackout Diesel Generator was in standby service.]

EDG 'B' was declared inoperable on July 6, 1999, because the site ambient outside air temperatures exceeded 88 degrees, and a 72 hour LCO was entered. EDG 'A' was operable up to a maximum ambient air temperature of 95 degrees on July 6, 1999, when EDG 'B' was inoperable. The 72 hour LCO for EDG 'B' was terminated in less than 72 hours, on July 6, 1999, when the temperature was less than 88 degrees. The maximum temperature experienced on July 6, 1999, was less than 95 degrees.

The 220' meteorological tower 33' level temperature sensor (data point MTR006) is used to sense the site outside ambient air temperature and is used for temperature logging required by procedure 2.2.8. From the log for July 5, 1999, the highest temperature recorded was 92.4 degrees (1310, 1320, and 1330 hours). For July 6, 1999, the highest temperature logged per procedure 2.2.8 was 92.5 degrees (1610 hours). In addition to the temperatures logged by procedure 2.2.8, printouts of the temperatures at the 33' level of the 220' meteorological tower were obtained for the July 4 - 7, 1999,

timeframe. The highest temperatures above 88 degrees were experienced on July 5, 1999, and July 6, 1999. The highest 15 minute temperature on July 5, 1999, was 93.1 degrees (1215 hours); the highest one hour temperature was 92.6 degrees (1200 hours); and the daily average temperature was 86.3 degrees. On July 6, 1999, the highest 15 minute temperature was 93.1 degrees (1445 hours); the highest one hour temperature was 92.5 degrees (1500 hours); and the daily average temperature was 79.3 degrees. These temperatures are consistent with UFSAR section 2.3.5 and Table 2.3-15. The table represents a 53 year record of temperatures for Plymouth. The temperature regime is influenced by the proximity of Plymouth (Pilgrim Station) to the adjacent Cape Cod Bay and as such, does not exhibit the wider diurnal and seasonal variations of nearby inland locations. The table identifies July as the month with the highest temperatures (Fahrenheit) with a maximum mean of 79 degrees, and an extreme maximum of 102 degrees.

REPORTABILITY

This report was submitted in accordance with 10 CFR 50.73 (a)(2)(ii)(B) because the EDGs 'A' and 'B' were outside the design basis because the temporary modifications (TM 99-41 and TM 99-42) had not yet been implemented and site ambient outside air temperature was greater than 88 degrees on July 5, 1999. On July 6, 1999, EDG 'B' was outside the design basis because the temporary modifications had not yet been implemented and the site ambient outside air temperature was greater than 88 degrees. After the temporary modifications were implemented, the temperature limit for the respective EDG became 95 degrees.

This report was also submitted in accordance with 10 CFR 50.73 subparts (a)(2)(v)(D) and (vii)(D). EDGs 'A' and 'B' were both inoperable on July 5, 1999, because the temporary modifications (TM 99-41 and TM 99-42) were not installed and the outside ambient air temperature was greater than the operability limit of 88 degrees. The EDGs are designed to provide a source of emergency power to safety-related systems requiring AC power that function to mitigate the consequences of an accident.

CURRENT LICENSING BASIS AND FUTURE REPORTING CONSIDERATION

Generic Letter 91-18 (rev. 1) contains guidance regarding operability, design basis, current licensing basis, corrective actions, and reporting. This LER communicates the current operability limit for the EDGs (relative to site ambient outside air temperatures up to 95 degrees) by describing the operability evaluation (EE 99-064), design basis, and corrective actions (interim and long term). Therefore, based on this report and the corrective actions described in it, additional notifications (10 CFR 50.72) or written reports (10 CFR 50.73), relative to operation outside the design basis for the EDGs, are not necessary if the site ambient outside air temperature is less than or equal to 95 degrees after July 8, 1999. The determination of the maximum site ambient outside air temperature at which the EDGs are operable will be determined after the completion of testing following the implementation of the permanent modification options (PDC 99-12).

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SIMILARITY TO PREVIOUS EVENTS

A review for similarity was conducted of Pilgrim Station Licensee Event Reports (LERs). The review focused on LERs involving design basis problems. The review identified numerous LERs submitted, particularly in the 1997 - 1998 timeframe, that involved the design basis of various systems or structures. Of those reports, LERs 97-021-00 and 98-018-01 involved the operability of the EDGs with the site ambient outside air temperature greater than 88 degrees. Moreover, LERs 97-027-00, 98-002-00, and 98-004-00 involved the operability of EDG 'A' and/or EDG 'B' with EDG room temperature less than 60 degrees.

ENERGY INDUSTRY IDENTIFICATION CODES

The EIIS codes for this report are as follows:

COMPONENTS	CODES
Cabinet	CAB
Generator, diesel (EDG)	DG
Radiator (EDG)	HX

SYSTEMS	CODES
Emergency Onsite Power Supply Building (EDG)	NB
Emergency Onsite Power Supply System (EDGs)	EK
Medium Voltage Power System (APDS)	EA