NRC FORM 366
(7-77)

U. S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

CONTROL BLOCK: [| | | | | |] (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 — LICENSEE CODE: F L S L S 1 (2) — LICENSE NUMBER: 0 0 - 0 0 0 0 0 - 0 0 (3) — LICENSE TYPE: 4 1 1 1 1 (4) — CAT: (5)

CON'T 01 — REPORT SOURCE: L (6) — DOCKET NUMBER: 0 5 0 0 0 3 3 5 (7) — EVENT DATE: 0 6 2 5 7 9 (8) — REPORT DATE: 0 7 0 9 7 9 (9)

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

02 During an investigation resulting from previous diesel-generator (DG) fail-
03 ures (LER 335-77-42), the Electro Motive Division of General Motors re-
04 ported that the turbocharger thrust bearing was susceptible to damage un-
05 der repeated hot start conditions while the lube oil is above 160 degrees
06 F. This is not a report that damage has occurred, nor has emergency
07 start capability been impaired, therefore, there has been no adverse
08 affect on the safety of the plant.

	SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP. SUBCODE	VALVE SUBCODE
09	E E (11)	X (12)	Z (13)	E N G I N E (14)	Z (15)	Z (16)

(17) LER/RO REPORT NUMBER	EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
	7 9	—	0 2 1	/	0 1	T	—	0

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS (22)	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
G (18)	F (19)	Z (20)	Z (21)	0 0 0 0	Y (23)	N (24)	A (25)	E 1 1 4 7 (26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

10 The potential for damage to the DG turbocharger thrust bearing is es-
11 tablished because the circulating oil pump cannot produce the 30 PSI re-
12 quired to maintain flow to the oil filter and cooler at the lower viscosi-
13 ty of the oil above 160 degrees F. Electro Motive has recommended interim
14 action to eliminate non-emergency hot starts and is working on a new design.

	FACILITY STATUS	% POWER	OTHER STATUS (30)	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION (32)
15	E (28)	1 0 0 (29)	NA	D (31)	Notification From Vendor

	ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY (35)	LOCATION OF RELEASE (36)
16	Z (33)	Z (34)	NA	NA

PERSONNEL EXPOSURES

	NUMBER	TYPE	DESCRIPTION (39)
17	0 0 0 (37)	Z (38)	NA

PERSONNEL INJURIES

	NUMBER	DESCRIPTION (41)
18	0 0 0 (40)	NA

LOSS OF OR DAMAGE TO FACILITY (43)

	TYPE	DESCRIPTION
19	Z (42)	NA

PUBLICITY

	ISSUED	DESCRIPTION (45)	NRC USE ONLY
20	N (44)	NA	

NAME OF PREPARER: M. A. Schoppman PHONE: (305)552-3802

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ADDITIONAL CAUSE DESCRIPTION AND CORRECTIVE ACTION

The Electro Motive Division of General Motors has reported via Stewart and Stevenson Services and the Florida Power & Light Company Power Plant Engineering Department that their investigations into previous DG turbocharger failures have shown that the turbocharger thrust bearing is susceptible to damage under certain repeat hot start conditions which could ultimately result in turbocharger failure. This condition is encountered only when restarting the engines between 15 minutes and 3 hours after a hot shutdown while the lube oil temperature is above 160° F. Due to the lower viscosity of the oil above 160° F, the circulating oil pumps cannot produce the 30 PSI required to maintain flow to the oil filter and cooler system and the system drains to the engine sump. The oil normally in this system provides a "prime" for the main oil pump and without this "prime" the main pumps cannot establish full oil pressure to the turbocharger thrust bearing before operating speed is reached and ensuing damage could occur. If the engines are started within 15 minutes, the oil has not had time to drain and the situation does not exist. The damage occurs as cumulative wear on the bearings, not as an immediate failure. Therefore, an "emergency" start from a hot shutdown would not be prevented.

Electro Motive has recommended the following corrective actions which will be incorporated into the plant maintenance, test, and operations procedures.

(1) After hot shutdown, either restart within 15 minutes or allow the engine 3 hours to cool after it has been operated before restarting. This is not applicable to emergency starts.

(2) Ensure circulating oil pump operation for a minimum of 30 minutes after changing oil filters or draining the accessory oil system. Idle start the engine if possible to ensure accessories are completely filled before rapid starting.

(3) Identify and correct all leaks at the top of the oil coolers to avoid rapid draining of the cooler.

In addition to the above, Electro Motive is currently working on the development of a modification package, which is to be available in about 6 months.

It should be noted that, although we are reporting this development as a prompt reportable occurrence, it is the result of investigation of a previous occurrence and is being reported to supplement the previous report (335-77-42).