NRC FORM 366
(7 77)

U. S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

EXHIBIT A

CONTROL BLOCK: (1)

(PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

0 1 | LICENSEE CODE: A R A N 0 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

0 1 | REPORT SOURCE: L (6) | DOCKET NUMBER: 0 5 0 0 0 3 1 3 (7) | EVENT DATE: 0 6 0 7 7 9 (8) | REPORT DATE: 0 6 2 0 7 9 (9)

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

0 2 While in a refueling shutdown, the Emergency Diesel Generator vendor
0 3 notified this utility that under certain repeat start operating modes;
0 4 eg., fast hot starts from 15 minutes to 3 hours after shutdown,
0 5 after draining the accessory oil system for any reason, or if a
0 6 leak at the top of the oil cooler occurred, there was a
0 7 possibility that the turbocharger thrust bearing could be damaged.
0 8 No similar occurrences. Reportable per T.S. 6.12.3.1 (i).

0 9 | SYSTEM CODE: E E (11) | CAUSE CODE: B (12) | CAUSE SUBCODE: A (13) | COMPONENT CODE: E N G I N E (14) | COMP SUBCODE: Z (15) | VALVE SUBCODE: Z (16)

(17) LER/RO REPORT NUMBER | EVENT YEAR: 7 9 | — | SEQUENTIAL REPORT NO.: 0 0 6 | / | OCCURRENCE CODE: 0 1 | REPORT TYPE: T | — | REVISION NO.: 0

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

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

1 0 Testing revealed that the reported repeat start operating modes
1 1 would create a loss of the accessory lubricating oil system, "prime"
1 2 causing a loss of lubrication at the turbocharger thrust bearing.
1 3 Procedures were modified to insure no repeat start operating modes would
1 4 exist. An improved lube oil system is being designed.

1 5 | FACILITY STATUS: H (28) | % POWER: 0 0 0 (29) | OTHER STATUS (30): NA | METHOD OF DISCOVERY: D (31) | DISCOVERY DESCRIPTION (32): Vendor Notification

1 6 | ACTIVITY RELEASED: Z (33) | CONTENT OF RELEASE: Z (34) | AMOUNT OF ACTIVITY (35): NA | LOCATION OF RELEASE (36): NA

PERSONNEL EXPOSURES
1 7 | NUMBER: 0 0 0 (37) | TYPE: Z (38) | DESCRIPTION (39): NA

PERSONNEL INJURIES
1 8 | NUMBER: 0 0 0 (40) | DESCRIPTION (41): NA

LOSS OF OR DAMAGE TO FACILITY (43)
1 9 | TYPE: Z (42) | DESCRIPTION: NA

2238 240

PUBLICITY
2 0 | ISSUED: N (44) | DESCRIPTION (45): NA

NRC USE ONLY

NAME OF PREPARER Chris N. Shively PHONE 501/968-2519

POOR ORIGINAL

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1. Reportable Occurrence Report No. 50-313/79-006

2. Report Date: 06/20/79 3. Occurrence Date: 6/7/79

4. Facility: Arkansas Nuclear One - Unit One
Russellville, Arkansas 72801

5. Identification of Occurrence:

Condition degrading reliability of the Emergency Diesel Generator Engine that requires remedial action and corrective measures to prevent possible operation in a manner less conservative than assumed in the Technical Specifications.

6. Conditions Prior to Occurrence:

Steady-State Power	_____	Reactor Power	_____ MWth
Hot Standby	_____	Net Output	_____ MWe
Cold Shutdown	_____	Percent of Full Power	_____ %
Refueling Shutdown	X	Load Changes During Routine Power Operation	_____
Routine Startup Operation	_____		
Routine Shutdown Operation	_____		
Other (specify)			

7. Description of Occurrence:

The Emergency Diesel Generator Engine vendor notified this utility that recent lubricating oil system tests conducted at Electro Motive Division, General Motors Corporation, indicate that certain repeat start operating modes could result in turbocharger thrust bearing damage which might ultimately cause a turbocharger failure.

8. Designation of Apparent Cause of Occurrence:

Design	X	Procedure	
Manufacture		Unusual Service Condition Including Environmental	
Installation/ Construction		Component Failure (See Failure Data)	
Operator			
Other (specify)			

9. Analysis of Occurrence:

When the engine is in the normal standby mode, the lubricating oil is supplied to the turbocharger bearings at about 115°F through a relief valve which serves to keep the entire accessory lubricating oil system primed to support a fast start. If the engine receives a repeat rapid start within 15 minutes to 3 hours after a hot shutdown from a previous run, the lube oil could exceed 160°F, as normal operating temperature is about 200°F. Under these circumstances, due to the reduced flow resistance created by the lower viscosity of the hot lubricant, the relief valve would not supply the oil. During the cooling period following a full load run, some of the oil contained in the cooler and filter will drain back to the engine sump via the lube oil scavenging pump, and some of the oil from the strainer box will be sucked into the cooler by the vacuum that develops. The result is that when a fast start occurs from a minimum of 15 minutes to a maximum of 3 hours after a hot shutdown, sufficient "prime" oil will have drained to retard the buildup of engine oil pressure in the event a restart is required. Restarting prior to adequate cooling may cause some smearing of the bearing metal, so that cumulative damage from several similar starts could result in a turbocharger failure.

10. Corrective Action:

Immediate action included procedure changes to ensure that:

(1) Repeat fast hot starts from 15 minutes to 3 hours after shutdown is avoided.

(2) Operate circulating oil pump for at least 30 minutes following changing oil filter elements for draining the accessory oil system for any reason to ensure strainer box is full before starting engine.

(3) Correct any small leaks at top of oil cooler as soon as it is noticed to make sure air is not sucked into the cooler during shutdown.

(4) Maintain one diesel in the running mode for a minimum of 3 hours following the shutdown of the other diesel if both diesels are run concurrently.

Final corrective action will include a design change of the lube oil system.

11. Failure Data:

There have been no similar occurrences.