NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Fort Calhoun Station Unit No. 1	0 5 0 0 0 2 8 5	1 OF 0 6

TITLE (4)
DG-2 Shutdown on High Coolant Temperature

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 NAMES	DOCKET NUMBER(S)
									N	0 5 0 0 0
0 9	2 3	8 7	8 7	— 0 2 5	— 0 0	1 0	2 3	8 7		0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)					
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(a)	50.73(a)(2)(iv)	73.71(b)		
		20.405(a)(1)(i)	50.36(a)(1)	50.73(a)(2)(v)	73.71(c)		
		20.405(a)(1)(ii)	50.36(a)(2)	XXX 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)		
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)			
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)			
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)			

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
T. L. Patterson, Supervisor Technical	4 0 2 — 4 2 6 - 4 0 1 1

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
X	E K	D G - 2	5 0 6 6	Y							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
XX	YES (If yes, complete EXPECTED SUBMISSION DATE)		1 2	1 5	8 7
	NO				

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

On September 23, 1987, at 0906 CDT, following repair of the exhaust pipe, Diesel Generator No. 2 (DG-2) was started and loaded per Operating Instruction OI-DG-2 as required by Surveillance Test ST-ESF-6. Approximately 14 minutes into the test, DG-2 automatically shutdown due to high coolant temperature. Investigations revealed that the air operated exhaust damper for the diesel generator radiator may not have fully opened automatically as designed when the diesel was running, thus restricting the required air flow through the radiator.

The cause of the damper malfunction was postulated to be the presence of residue causing the pilot valve that directs air flow to sometimes stick. On July 6, water was introduced into the instrument air system during the performance of a surveillance test on the fire protection system dry pipe valve for the diesel generator rooms. The water intrusion was limited to the auxiliary building at or below elevation 1025'. An extensive program was undertaken (in July) and was repeated as necessary during the months of August and September to blowdown air operated devices including air operated valves and to cycle those valves as allowed during power operation.

After the trip of DG-2, the pilot valve was inspected and cleaned and the accumulator drained. Similar actions were taken for DG-1. To prevent a possible recurrence, an extensive corrective action program is in progress.

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

At 0644 hours on September 22, 1987, when Fort Calhoun Station was operating at full power, Diesel Generator No. 1 (DG-1) was started to prove operability prior to performing maintenance on the exhaust pipe for Diesel Generator No. 2 (DG-2). At this time, a 7-day Limiting Condition for Operation was entered per Technical Specification 2.7. On September 23, 1987, at 0906 hours CDT, DG-2 was manually started, followed by synchronization and loading at 0911 hours per Operating Instruction OI-DG-2 as required by Surveillance Test ST-ESF-6. At 0920 hours, DG-2 automatically shutdown due to high coolant temperature. Personnel were immediately dispatched to determine the cause of the overheating. Investigations revealed that the air operated radiator exhaust air damper YCV-871F may not have automatically fully opened when the diesel was running, thus restricting the required air flow through the radiator, and subsequently overheating the diesel coolant.

The air to operate the damper is supplied via a pilot valve. As shown on Figure 1, the air to the pilot valve is provided by either the instrument air system or an accumulator. The damper is normally closed to limit the diesel's exposure to cold outside air and it is designed to be open when the diesel is running.

Investigations revealed that the pilot valve internals had a white, "lime-like" residue and the accumulator was partially filled with water. The pilot valve was cleaned, other associated valves and solenoids were inspected with no problems found, and the accumulator drained. The amount of water in the accumulator for DG-2 was not measured. It was approximately one-half full which represents two quarts of water. The cause of the damper malfunction was postulated to be the presence of the residue causing the pilot valve to sometimes stick. Since the potential existed for DG-1 to be similarly affected, the DG-1 exhaust dampers were cycled open without any problems and left open to ensure that if DG-1 was required to operate, adequate radiator cooling would be available. In accordance with the requirements of 50.73(a)(2)(vii), this event was determined to be reportable. DG-2 was successfully tested and returned to service at 1805 hours on September 24, 1987. At this time, the Technical Specification 2.7 seven day Limiting Condition for Operation was exited. Subsequently, DG-1 was removed from service and the instrument air valves associated with the radiator exhaust damper were inspected and approximately 12 ounces of water was drained from the accumulator.

On July 6, 1987, during the performance of surveillance test ST-FP-5, operations personnel became aware that water had entered the instrument air system and immediately took actions to isolate the source of water intrusion, i.e., the instrument air connection to the diesel generator fire protection system dry pipe valve FP-513. The piping arrangement is shown on Figure 2.

Immediate corrective actions were to inspect and clean both check valves (IA-575 and IA-576) and to restore the diesel generator fire protection system. The extent of the water in the air system was determined by blowing down selected air-operated components on the air risers. It was determined that water had not reached above elevation 1025'. This verified that no water entered containment since the

centerline of the containment penetration is located at elevation 1029'. No water was found in the instrument air system piping in the turbine building or the intake structure. An extensive program was undertaken to blow down the devices fed from the affected portions of the instrument air system in the auxiliary building. Two groups were tasked with the verification of operability effort. One group was responsible for the accumulators and the other group was responsible for devices such as dampers, instruments and valve operators including solenoids and regulators. Of the 17 air accumulators reviewed for operability, 6 were above the 1025 elevation and did not require draining. Seven of the remaining 11 had no water and 4 had some water. As the result of a summary report issued to the Plant Review Committee on August 3, 1987, five piston-operated air valves had required repair since July 6. These valves were HCV-485, FCV-269X, HCV-2928, HCV-2918 and HCV-2882. The problems associated with these valves were not necessarily determined to be associated with the instrument air system problem. A problem also existed with water in the bubbler that measures the diesel generator fuel storage tank. As allowed by procedure, an alternate method was used to verify tank level until the bubbler was repaired. Currently, 38 valves have yet to be cycled because of operating constraints. The majority of these valves are diaphragm operated rather than piston operated. It has been concluded that failure of the operators for these valves would not affect the plant's ability to mitigate the consequences of an accident or to bring the plant to a safe shutdown condition.

Corrective actions identified to date are as follows. These actions are or will be completed:

1. Determine the connections between water and air systems. Specifically the interface between instrument air and the diesel generator fire protection system has been removed. Isolate the connection between the instrument air and Room 19 deluge valve. Tagged closed the instrument air connection to the water plant. Lock closed the connection between plant air and instrument air, CA-151. The interface between wet systems and instrument air via the bubbler used to measure tank level does not pose a hazard in filling the instrument air system since they enter through the top of the tank and the elevation of the bubbler is higher than the top of the tank.

2. Walk down the instrument air system to ensure that more connections to the instrument air system do not exist. The walkdown is complete. No other similar wetted connections were found.

3. The blowdowns on the instrument air system devices located in the auxiliary building below elevation 1025 have been repeated.

4. More frequent ISI tests on applicable systems, including stroke testing and verification by local observation the functioning of Critical Quality Element (CQE) valves. Quarterly tests will be performed monthly beginning with the November testing schedule until it has been determined that the quarterly schedule may be resumed.

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

5. Stroke testing will also be performed on a selected sample of CQE valves not included in the ISI program. The scope has been determined and the procedure is being prepared.

6. The justification for continued operation for appropriate CQE valves that cannot be stroked during plant operation will be finalized.

7. Ensure that the ISI valves that cannot be cycled during operation will be cycled during the next scheduled or forced cold shutdown in excess of 48 hours.

8. Initiated a procedure change to MP-FP-7 to ensure check valves are inspected and are operable when the deluge valve is reset to ensure water does not enter the plant air system (plant air is a separate system from instrument air).

9. Expedite a modification to permanently remove the tie between fire protection and the plant air system.

10. Initially revise the abnormal operating procedure AOP-17 on loss of instrument air to provide needed clarifications. Ensure AOP-17 adequately addresses system operation and rewrite it per the guidance contained in the writers guide.

11. Implement a dew point testing program and ensure operability of the air dryer.

12. For predictive maintenance purposes, inspect two non-CQE valves that had water problems to determine if degradation occurred.

13. The investigation of events if the incident would have occurred during an actual diesel generator demand has been previously discussed.

14. Ensure that the findings from the items above are reviewed by the Plant Review Committee.

A supplement to this LER is scheduled for submittal by December 15, 1987.

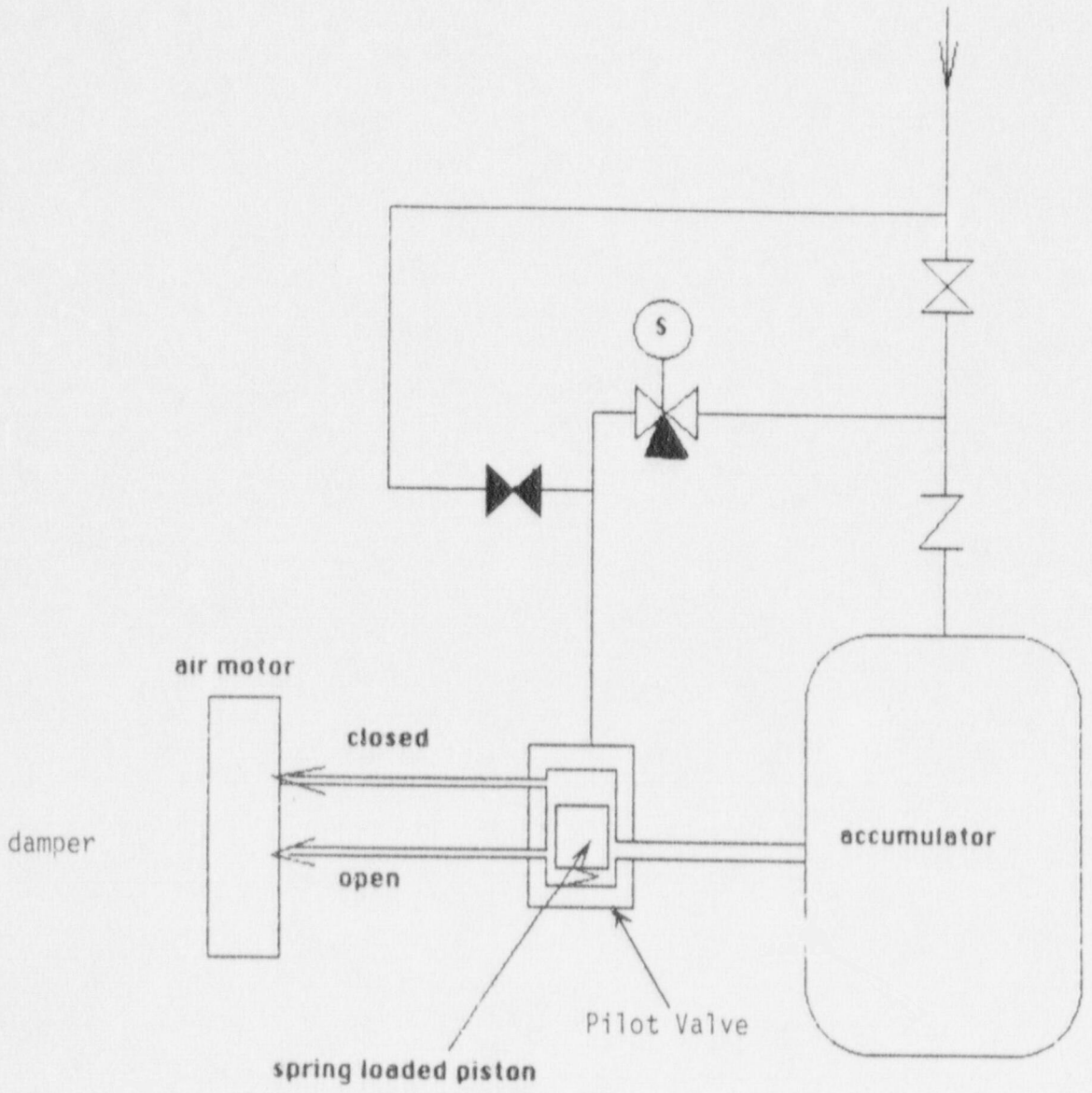
S
air motor
closed
damper
open
accumulator
Pilot Valve
spring loaded piston

FIGURE 1

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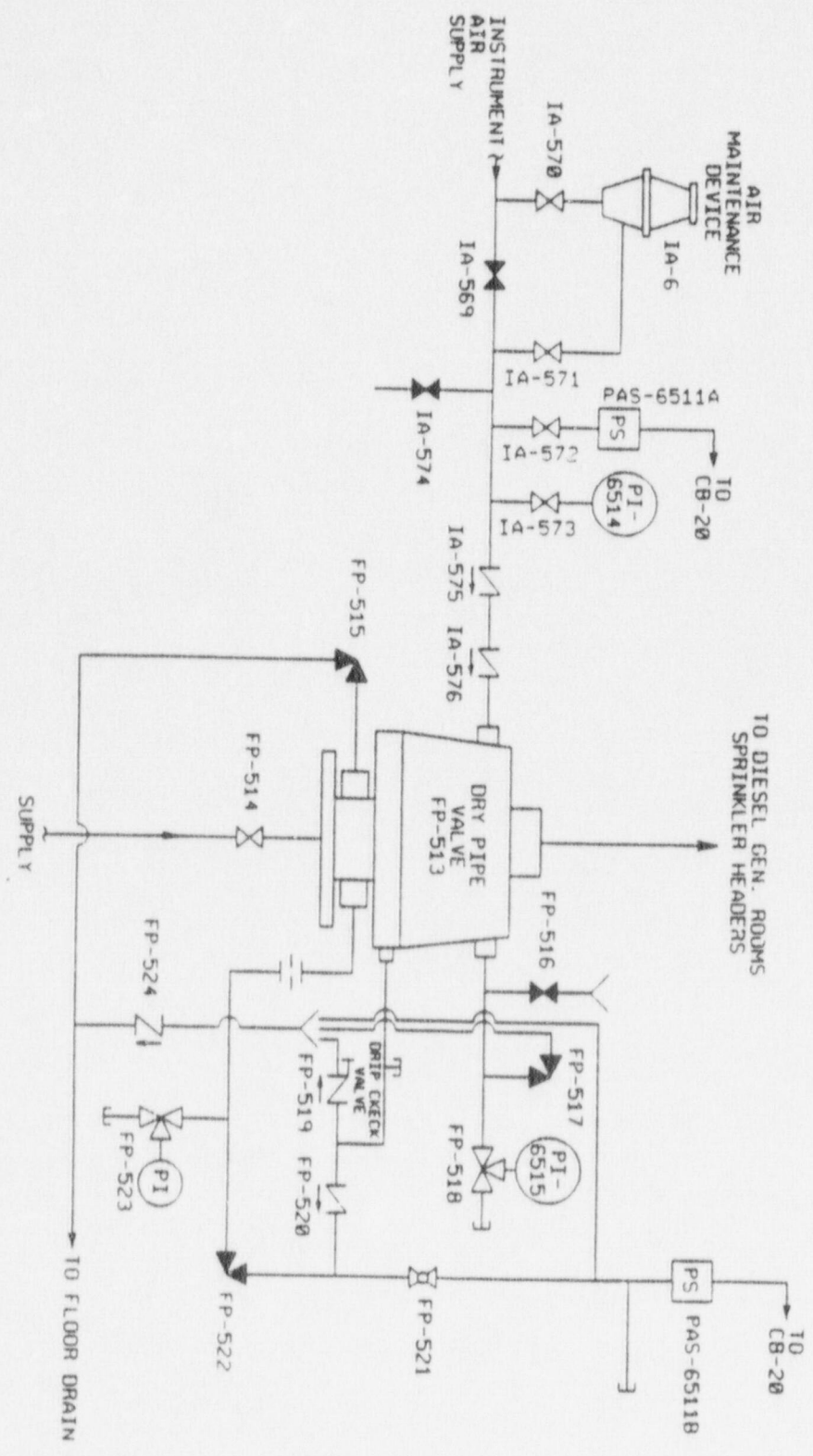

FIGURE 2

Omaha Public Power District
1623 Harney Omaha, Nebraska 68102
402/536-4000

October 23, 1987
LIC-87-720

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

Reference: Docket No. 50-285

SUBJECT: Licensee Event Report for the Fort Calhoun Station

Gentlemen:

Please find attached Licensee Event Report 87-025 dated October 23, 1987. This report is being submitted per requirements of 10 CFR 50.73.

Sincerely,

R. L. Andrews
Division Manager
Nuclear Production

RLA:rge

Attachment

c: R. D. Martin, NRC Regional Administrator
A. Bournia, NRC Project Manager
P. H. Harrell, NRC Senior Resident Inspector
INPO Records Center
American Nuclear Insurers
SARC Chairman
PRC Chairman, % R. G. Ellis
Fort Calhoun File (2)
S. Clayton
Fort Calhoun Station Training, % J. J. Fluehr

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