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RLB-92-205

September 24, 1992

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

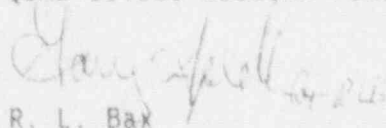
Reference: Quad Cities Nuclear Power Station
Docket Number 50-254, DPR-29, Unit One

Enclosed is Licensee Event Report (LER) 92-021, Revision 00, for Quad Cities Nuclear Power Station.

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(vii)(A). The licensee shall report any event where a single cause or condition caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a single system designed to shutdown the reactor and maintain it in a safe shutdown condition.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION



R. L. Bax
Station Manager

RLB/TB/plm

Enclosure

cc: J. Schrage
T. Taylor
INPO Records Center
NRC Region III

STMGR 448

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PDR ADDCK 05000254
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LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Quad Cities Unit One
 Title (4) 1/2 Diesel Generator Governor Instability

Docket Number (2) 0 | 5 | 0 | 0 | 0 | 2 | 5 | 4 | 1 | of | 0 | 5 |
 Page (3)

Event Date (5) 0 | 8 | 1 | 1 | 9 | 2 | 9 | 2 | LER Number (6) 0 | 2 | 1 | Revision Number 0 | 0 | Report Date (7) 0 | 9 | 2 | 4 | 9 | 2 | Other Facilities Involved (8)
 Month Day Year Year Sequential Number Revision Number Month Day Year Facility Names Docket Number(s)
 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |

OPERATING MODE (9) 4
 POWER LEVEL (10) 0 | 7 | 2
 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)
 20.402(b) 20.405(c) 50.73(a)(2)(iv) 73.71(b)
 20.405(a)(1)(i) 50.36(c)(1) 50.73(a)(2)(v) 73.71(c)
 20.405(a)(1)(ii) 50.36(c)(2) X 50.73(a)(2)(vii) Other (Specify
 20.405(a)(1)(iii) 50.73(a)(2)(i) 50.73(a)(2)(viii)(A) in Abstract
 20.405(a)(1)(iv) 50.73(a)(2)(ii) 50.73(a)(2)(viii)(B) below and in
 20.405(a)(1)(v) 50.73(a)(2)(iii) 50.73(a)(2)(x) Text)

LICENSEE CONTACT FOR THIS LER (12)

Name Steven K. Laughlin, Ext. 2029
 TELEPHONE NUMBER 3 | 0 | 9 | 6 | 5 | 4 | - | 2 | 2 | 4 | 1
 AREA CODE

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	
X	6	6	6	5	W	2	9	0	Y		

SUPPLEMENTAL REPORT EXPECTED (14)

Expected Submission Date (15) X | NO
 Yes (If yes, complete EXPECTED SUBMISSION DATE)

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

ABSTRACT:

On August 25, 1992, at 1315 hours, the Unit 1/2 Diesel Generator (DG) [EK] was running in accordance with QCOS 6600-1, Diesel Generator Monthly Load Test when governor instabilities were noted by the operator. As troubleshooting progressed, it was noted that conditions seen were similar to those observed on the Unit 1 DG on August 11, 1992. The System Engineer along with assistance from the DG vendor and Mechanical Maintenance (MM), determined that the cause of this event was the same as that which was determined for Unit 1 DG, air trapped in the governor compensation system. MM vented and readjusted the governor compensators and governor system operation returned to normal. Further corrective actions will include procedural revisions and fabrication of a locking device to prevent future occurrences of air entrainment.

This report is being submitted in accordance with 10CFR50.73(a)(2)(vii).

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TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]													

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 MWt rated core thermal power.

EVENT IDENTIFICATION: 1/2 Diesel Generator Governor Instability.

A. CONDITIONS PRIOR TO EVENT:

Unit: One	Event Date: August 25, 1992	Event Time: 1315
Reactor Mode: 4	Mode Name: RUN	Power Level: 72%

This report was initiated by Deviation Report D-4-01-92-084.

RUN Mode (4) - In this position the reactor system pressure is at or above 825 psig, and the reactor protection system is energized, with APRM protection and RBM interlocks in service (excluding the 15% high flux scram).

B. DESCRIPTION OF EVENT:

On August 25, 1992 at 1245 hours, Unit 1 was in the RUN mode at 72% rated core thermal power and Unit 2 was in the RUN mode at 98% rated core thermal power. The Unit 1/2 Diesel Generator (DG) [EK] was being run in accordance with QCOS 6600-1, Diesel Generator Monthly Load Test when the Unit Nuclear Station Operator (NSO) noticed that the DG speed was drifting abnormally. Speed would initially change with manual adjustment, but would continue to drift for 3-5 minutes, with up to 200 Kilowatts (KW) of total drift.

At 1305 hours, Mechanical Maintenance (MM) was contacted and made the recommendation to shut down the engine for adjustments on the governor [65]. The DG was declared inoperable and a 7 day Limiting Condition for Operation (LCO) was initiated in accordance with Technical Specification 3.9.E.1 and QCOS 6600-13, Shared Unit Diesel Generator Outage Report.

At 1906 hours, Operations started the 1/2 DG for MM to make adjustments to the engine governor compensation. Adjustments to the compensation portion of the Unit 1/2 DG governor were done in accordance with the directions set forth in the Woodward Governor manual. By 2025 hours, the adjustments had been completed and the 1/2 DG was shut down when no signs of drifting or instability were observed.

At 0630 hours on August 26, 1992, the Unit 1/2 was declared operable and the 7 day LCO was terminated.

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Previous to this event, while running the Unit 1 DG on August 11, 1992, the Unit 1 NSO noticed that the DG would not load properly. The NSO tried four separate attempts at loading. Each time at approximately 1600 KW, the governor would only very slowly pick up load to 2500KW. With the Control Switch [CS] held in the raise position, it took approximately one minute for the DG to reach full load. In addition, the control room and local DG plant indications showed fluctuations of approximately 75KW at various load levels. These fluctuations worsened in severity with each successive load test. The DG was declared inoperable and adjustments made to the governor similar to those described above. This event is fully documented under Deviation Report 04-01-92-084.

Upon reviewing the two events, the station decided that a potential common mode failure had occurred. In order to ensure that the same problem did not exist on the Unit 2 DG, a twelve hour operability run was performed on August 26, 1992. The Unit 2 DG performed properly throughout this test.

C. APPARENT CAUSE OF EVENT:

This report is being submitted in accordance with 10CFR50.73(a)(2)(vii), "Any event where a single cause or condition caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a single system designed to shut down the reactor and maintain it in a safe shutdown condition."

In both cases, the cause of the governor instability events has been determined to be the presence of air pockets in the compensation dashpots in each of the engine governors. These air pockets were created when the fuel injector control (or "lay") shaft, was inadvertently cycled after the governor had been drained for the installation of new stainless steel lines for the booster pump. These lines were replaced under the minor design change program on July 11, 1992 on the Unit 1 DG and on August 1, 1992 in the Unit 1/2 DG.

A contributing factor to the event was a lack of understanding of the consequences of cycling the lay shaft with the governor drained and its effects on long term operation. This is evident in that the problem was not foreseen and consequently the original modification and operability tests did not bring this potential problem into view. Only after a longer run time was the load oscillations observed.

D. SAFETY ANALYSIS OF EVENT:

The safety significance of these events are minimal since the redundant safety systems required by the Technical Specifications were determined to be operable in both cases.

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Technical Specification 3.9.E.1 states that whenever the reactor is in the Startup/Hot Standby or Run mode and the Unit Diesel Generator is made or found to be inoperable, continued reactor operation is permissible only during the succeeding seven days provided all loops of the Containment Cooling mode of the Residual Heat Removal system associated with the operable Diesel Generator shall be operable and two offsite lines are available. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours.

Even though, for the period of August 1, 1992, to August 11, 1992, both engines could have potentially undergone the same fluctuations, it was determined by Technical Staff (TS), MM and vendor personnel that the design functions would have been carried out.

While in the normal standby lineup, the DG governors have a drop setting of 0 dialed in. If the engines were to auto start due to accident conditions in this lineup, the same governor instabilities that caused the observed kw oscillations would then have shown up as frequency oscillations. Under these conditions, instead of a 3% change in load, it is believed that a maximum 5% change in frequency would have occurred. These oscillations would still have been within the +5% frequency tolerance that is required by the Emergency Core Cooling System (ECCS) pumps. The DG vendor agrees with this assessment.

E. CORRECTIVE ACTIONS:

Immediate corrective actions in each case of governor oscillations included shutting down the engine, declaring it inoperable, initiating the appropriate outage report and writing a work request to investigate the cause of the problem. Upon investigation, it was determined by Tech Staff, MM Foreman, and vendor personnel, that the conditions seen were the result of trapped air in the governor. With the aid of the DG vendor representative, adjustments and corrective actions were made as specified in the governor vendor manual.

Follow-up corrective actions will include revising Mechanical Maintenance procedure QCMMS 6600-3, Emergency Diesel Generator Periodic Preventative Maintenance Inspection to include precautions and supplemental actions when work is done that requires draining the DG governor of oil (NTS #2542009209001). In addition, the MM Post Maintenance Test/Verification (PMT/V) Matrix will be revised to provide the same precautions in the event of any maintenance done to the governor not described in QCMMS 6600-3. These actions will include enhanced verification testing of governor adjustments (NTS #2542009209002). A locking device for the fuel oil control shaft will also be constructed to prevent inadvertent cycling of the fuel oil control shaft during maintenance activities (NTS #2542009209003).

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TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]							

F. PREVIOUS EVENTS:

A search of the Nuclear Plant Reliability Data System (NPRDS) revealed two similar events of compensation oscillations. One occurred at Kewaunee 1 and the other happened at Hatch 1. Both plants use Woodward model UG-8 dial governors. While both events showed similar symptoms, they were caused by the compensation needle valve being out of adjustment vice trapped air.

Deviation Report 04-01-90-018 documents a DG tripping on overspeed due to improper governor settings. This also was not a result of trapped air.

G. COMPONENT FAILURE DATA:

This event did not directly involve a component failure. The affected components for which this report is written are Woodward model UG-8 dial type hydraulic-mechanical speed governors.