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 NUCLEAR REGULATORY COMMISSION  
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MEMORANDUM FOR: Karl V. Seyfrit, Chief  
 Reactor Operations Analysis Branch  
 Office for Analysis and Evaluation  
 of Operational Data

FROM: Matthew Chiramal  
 Plant Systems Unit  
 Reactor Operations Analysis Branch

SUBJECT: EMERGENCY DIESEL GENERATOR SYSTEM PROBLEMS AT  
 JAMES A. FITZPATRICK NUCLEAR PLANT

REFERENCES:

- 1) Power Authority of the State of New York's Licensee Event Report 81-011/03L-0 dated May 28, 1981; Plant Unit: James A. Fitzpatrick Nuclear Plant.
- 2) Power Authority of the State of New York's Licensee Event Report 82-021-03X-1 dated June 21, 1982; Plant Unit: James A. Fitzpatrick Nuclear Plant.
- 3) USNRC Region I Inspection Report 50-333/82-10  
 Plant Unit: James A Fitzpatrick Nuclear Plant.

50-333

The referenced licensee event reports and inspection report provide description of events that occurred at the Fitzpatrick plant on May 1, 1982 involving both systems of emergency diesel generators.

The Emergency AC Power System at the Fitzpatrick plant consists of two independent and redundant systems. Each redundant system of Emergency AC Power consists of two diesel generator units, 4160 V switchgear and interconnecting cabling. As shown on attached FSAR Figure No. 8.5-1, the EDG System 'A' associated with 4160 V Emergency Bus 10500 consists of Emergency Diesel Generators A and C and the EDG System 'B' associated with 4160 V Bus 10600 of EDG-B and EDG-D.

On May 1, 1982 at approximately 0200 hours the licensee initiated routine monthly full load testing of the EDG systems. The licensee was testing both EDG System A (consisting of EDG-A and EDG-C) and EDG System B (consisting of EDG-B and EDG-D) concurrently. At 0245 hours the licensee declared EDG-A inoperable when its frequency and output power began oscillating. Simultaneously with the oscillations of EDG-A the licensee noted that the ground detector on the 'A' 125 V DC system indicated momentary grounds. Since the routine full load testing of EDG-B and EDG-D was in progress, the licensee continued to run them to meet the necessary requirements of Technical Specifications. At 0350 hours at the conclusion of testing of EDG-B and EDG-D the licensee discovered that Emergency Service Water (ESW) Pump 'B' could not be shut down. Investigation by the

licensee revealed that the speed sensing control relays of EDG-D, which should be de-energized when the EDG was shut down, were still in the energized position. This relay problem prevented the shutdown of the associated ESW pump. At 0600 hours the licensee declared EDG-D inoperable, because with the control relays energized the EDG-D starters could not be engaged to start the engine. With both EDG systems inoperable the licensee entered the Technical Specification requirement of initiating a plant shutdown within two hours. Within the two-hour period, the EDG-D control relay problem cleared itself and since the licensee could not duplicate the failure again, the EDG-D was declared operable at 0700 hours. EDG-B and EDG-D were tested again satisfactorily.

Investigation and additional tests of EDG-A were then conducted by the licensee, but no fluctuations were observed. In addition, no grounding of the 125 V DC system was found. At 0925 hours the EDG System A (EDG-A and EDG-C) was declared operable. The licensee conducted additional daily tests on EDG-A for four days in an attempt to duplicate the frequency and power oscillation problem. However, none of the tests resulted in a recurrence of that problem or exhibited any 125 V DC system grounding.

In my review of the event, I investigated the possibility of any common cause failure that could explain the problems, since both EDG systems were being operated concurrently. I was unable to find any. In their review of the events neither the licensee nor the resident inspector was able to find a common cause failure to account for the problems. Both EDG systems have since been declared operable. In my conversation with the licensee (W. Verne Childs of Fitzpatrick), it was intimated that the licensee will consider not running the two EDG systems concurrently during testing. This would preclude the possibility of a common mode failure affecting both EDG systems.

A review of previous EDG operating experiences at the Fitzpatrick plant showed that the problem of power output oscillations has occurred before, however, the licensee had determined the cause of the problem at each occasion. The problem of a 125 V DC system grounding occurring simultaneously with the power oscillations had not occurred previously. The problem of the speed auxiliary control relay not de-energizing is not a repetitive one.

Based on a review of the events of May 1, 1982 and the licensee's inability to find the root cause of the event, I recommend that the EDG systems occurrences at the Fitzpatrick plant be placed on a watch list and be continuously reviewed for such problems.

As requested by C. Michelson, a check on the extent of DG failures due to failures in Emergency Service Water (ESW) systems was conducted. The results of our search of 1981 LER's are shown in the attached enclosure. In comparing the data on ESW cooling water failure contribution to the total number of diesel generator

failure with that obtained from the ongoing USI-A44, it is seen that the ESW failure contribution are about the same. We believe that the ongoing USI-A44 efforts and other NRC efforts on flow blockage of cooling water to safety systems will adequately address this problem and no further AEOD actions are need at this time.



Matthew Chiramal  
Plant Systems Unit  
Reactor Operations Analysis Branch  
Office for Analysis and Evaluation  
of Operational Data

Enclosure:  
As Stated

cc: C. Michelson, AEOD  
C. Heltemes, AEOD  
F. Ashe, ROAB  
R. Majors, ACRS  
D. Okrent, ACRS  
S. Rosen, INPO





Diesel Generator Failure due  
to Failures in Emergency  
Service Water Systems

I - 1981 Licensee Event Reports

<u>No.</u>	<u>Component/Event Type</u>	<u>Plant Name</u>	<u>LER No.</u>
	A. Blockage of Cooling Water		
1.		Yankee Rowe	81-016
2.		Hatch 2	81-066
	B. Pipe and Hx Leaks		
3.		Connecticut Yankee	81-014
4.		Nine Mile Point 1	81-040
5.		Ginna	81-001
6.		Indian Point 2	81-016
7.		Indian Point 2	81-022
8.		Palisades	81-028
9.		Salem 1	81-018
10.		Peach Bottom 2	81-026
11.		Peach Bottom 2	81-030
12.		Zion 2	81-005
13.		Millstone 2	81-005
14.		Millstone 2	81-007
15.		North Anna 1	81-068
16.		McGuire 1	81-101
	C. Pumps		
17.		Dresden 2	81-033
18.		Calvert Cliffs 2	81-038

<u>No.</u>	<u>Component/Event Type</u>	<u>Plant Name</u>	<u>LER No.</u>
19.		Fitzpatrick	81-077
	D. Valves		
20.		Dresden 3	81-037
21.		Hatch 1	81-035
22.		Millstone 2	81-024
	E. Miscellaneous (Operator error, design deficiency, controller and relay failures etc.)		
23.		Kewaunee	81-033
24.		Salem 2	81-107
25.		TMI 2	81-002
26.		Hatch 1	81-010
27.		Brunswick 2	81-033
28.		Brunswick 2	81-066
29.		Sequoyah 1	81-078
30.		Sequoyah 1	81-101
31.		Hatch 2	81-134
32.		Palisades	81-005

Total number of Emergency Service Water System failures affecting DG operability = 32

Total number of EDG failures in 1981 = 232

ESW/Cooling Water Failure Contribution =  $\frac{32}{232}$

= 13.8%

Cooling Water Subsystem Failure  
Contributions Component/Event Type

	<u>Percentage</u>
Blockage	6.15%
Pipe and Hx Leaks	43.75%
Pumps	9.38%
Valves	9.38%
Miscellaneous	31.25%

II - Data from USI-A44 Study (Draft)

ESW/Cooling Water failure contributions = 11.6%

Cooling Water Subsystem Contributions

	<u>Percentage</u>
Blockage, Debris	22%
Pipe and Hx Leaks	14%
Pumps	17%
Valves	25%
Miscellaneous	22%

NOTE: The "Miscellaneous" category in I includes relay and controller failures which are in a separate category in item II.