50-440/441

UNITED STATES
NUCLEAR REGULATORY COMMISSION
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December 1, 1995

MEMORANDUM TO: Jack E. Rosenthal, Chief
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Safety Programs Division
Office for Analysis and Evaluation
of Operational Data

FROM: John R. Boardman
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SUBJECT: TRIP REPORT OF SITE VISIT TO THE PERRY NUCLEAR STATION NOVEMBER 13, 1995

1. Licensee Personnel Contacted

Todd Henderson, Licensing Engineer

Robert Boyles, Systems Engineering Section

2. Background

Perry Nuclear Plant, Unit 1, Divisions 1 and 2 emergency diesel generators (EDGs) have Transamerica Delaval engines, Ideal generators, and Woodward EG-A governor control boxes with EG-B35C actuators. The static exciter/voltage regulator systems were supplied by Basler Electric of Highland, IL.

The Perry Division 3 EDG is a General Motors Electro-Motive Division (EMD) unit with a Woodward type UG8 mechanical governor.

3. Findings

Perry Nuclear Station has 2 generator control panels manufactured by RTE DELTA of Stockton, CA., in which the Basler and other components such as the Woodward EG-A control box, are installed. These cabinets are connected and have forced ventilation.

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Certain EDGs have Basler static exciter/voltage regulators installed in cabinets fabricated by others that only have convection cooling. Basler, in its manuals, states that adequate cooling must be provided, and that the minimum temperature for their equipment is 60 degrees Fahrenheit, and the maximum is 120 degrees.

The Perry Divisions 1 and 2 Transamerica-Delaval EDGs require starting air to operate certain EDG control functions, and the EDGs will shut down upon loss of starting air (which site personnel stated was safety-related). This is standard practice with Transamerica-Delaval EDGs.

The most significant failure mode for the Perry site appeared to be the five failures since 1989 of the Basler supplied K-1 breaker/contactor, which closes the generator field circuit and permits field flashing and voltage build-up. This field breaker is actually a Telemecanique "Lighting Contactor" and is so marked. A March 14, 1990, Basler report of their analysis of the 1989 K-1 breaker-relay failure at Perry stated that Telemecanique recommended cleaning/relubricating the relay latch/lever mechanism during every scheduled shutdown (approximately 12-18 months), using a contact cleaner with a silicone lubricating agent. The four subsequent failures of the K-1 field breaker (contactor) were of the trip latch mechanism switching contact, which rendered the EDGs inoperable. Licensee Event Report 50-440/91-009 addresses one of these generator field contactor K-1 failures of the Division 2 emergency diesel resulting in loss of the generator's field excitation.

Perry personnel stated that failures of the K-1 field breaker have occurred at Fermi. The K-1 relay was also discussed with Cooper Bessemer/Transamerica Delaval personnel and is addressed in that trip report.

A tour was made of the Division 2 and 3 EDGs, which included opening the Division 2 EDG control cabinets.

4. Documents Reviewed

4.1 Perry Nuclear Plant Procedures (PNPP)

Procedure Number	**Title**
SOI-R43	DIVISION 1 AND 2 DIESEL GENERATOR SYSTEM (UNIT 1), Revision August 1995

SOI-E22B	DIVISION 3 DIESEL GENERATOR (UNIT 1), Revision 6, September 29, 1995
PMI-0011	DIVISION 1 AND 2 EMERGENCY DIESEL GENERATOR WOODWARD GOVERNOR MAINTENANCE, Revision 4, March 3, 1994
IMI-E3-23	DIVISION 3 HPCS DIESEL GENERATOR GOVERNOR MAINTENANCE, Revision 1, February 24, 1994
IMI-E2-39	WOODWARD MOTOR OPERATED POTENTIOMETER

4.2 Basler Electric, Highland, IL, Procedures

Operation Manual for Generator Control and Neutral Ground Cubicles, Part Number 9 1185 00 100, dated August 12, 1977.

Instruction Manual for Voltage regulators Models SR4A and SR8A, Revised January 13, 1975.

Instruction Manual for Excitation Support system Models SBO 181-186, dated December 6, 1974.

Instruction manual for Motor Operated Potentiometer Models MOC21XX through MOC24XX and MOC29XX, dated February 12, 1976.

4.3 Woodward Governor Company Bulletins

Bulletin Number	**Title**
37706J	EG-A CONTROL BOX, 1970
37712A	EG-B35 and EG-B50 HYDRAULIC ACTUATORS, 1964
03032A	UG8 DIAL GOVERNORS, 1976

4.4 Licensee Event Report 50-440/91-009 concerning failure of the Division 2 emergency diesel caused by the failure of generator field contactor K-1, resulting in loss of the generator field excitation.

4.5 Condition Report CR-94-353, March 19, 1994, which addresses the fifth failure of the K-1 EDG field breaker/contactor (the fourth failure of the K-1 EDG field breaker/contactor relay contacts in four years) at the Perry site.

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