AEOD TECHNICAL REVIEW REPORT*

UNIT: James A. Fitzpatrick
DOCKET NO.: 50-333
LICENSEE: New York Power Authority
NSSS/AE: General Electric/Stone & Webster

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SUBJECT: DIESEL GENERATOR INOPERABILITY DUE TO OVERHEATING OF VENTILATION COWLING

EVENT DATE/LER NO.: August 23, 1982 (LER 82-039)

SUMMARY

On August 23, 1982, following modification and subsequent energization of Emergency Diesel Generator (EDG) winding space heaters on EDG-A and C, the EDGs were declared inoperable when an odor was noted to be emitting from the vicinity of the heaters. The modification involved the updating of the winding space heaters from 750 to 3000 watts. Overheating of the ventilation cowling adjacent to the heaters was determined to be the cause of the problem. The cowling was found to be bulged out at this location due to long-term degradation of the cowling. The increased heater capacity also contributed to the overheating problem. The space heaters were deenergized and the EDGs were declared operable.

On March 11, 1984, the damaged fiberglass lower cowling was replaced with a stainless steel sheet metal cowling and the space heaters were modified to a 2250 watts capacity. Since sufficient number of space heaters were not available, only EDG-A and C were modified. The other pair of EDGs are planned to be modified in the Spring 1985 refueling outage.

The EDGs at Fitzpatrick are Bruce-GM units. The space heaters are provided to reduce long-term degradation of generator insulation. The cowling controls cooling air flow in the generator as well as shields the stator winding from the radiant heat of the space heaters. There are no immediate safety consequences due to these problems. The loss or inadequate capacity of the space heaters could lead to long-term degradation of the insulation of the stator windings of the corresponding EDG and the bulge in the cowling could lead to restriction in the cooling air flow during operation of the generator. Our review of operating experience of GM diesel generator units at other nuclear plants did not find any other similar problems. Hence, we believe that this problem has little generic implication and consider that no further action is necessary. We also feel that the corrective actions taken by the licensee at the Fitzpatrick plant to address the problem were adequate.

*This document supports ongoing AEOD activities and does not represent the position or requirements of the responsible NRC program office.

DISCUSSION

During normal operation of the Fitzpatrick plant on August 23, 1983, following installation of a modification to upgrade the EDG winding space heater capacity on EDG-A and C from 750 watts to 3000 watts, EDG-A and C were declared inoperable. Shortly after performing the modification and energization of the winding space heaters, an odor was noted coming from the vicinity of the heaters. The modification to increase the generator winding space heaters' capacity was prompted by a review of insulation resistance measurements and a review of the vendor drawings. The odor was caused by overheating of the ventilation cowling. Although the overheating was caused directly by the increased heater capacity, it actually resulted from the previous long-term degradation of the cowling which caused it to bulge in the direction of the space heaters. As an immediate corrective action, the space heaters were deenergized and the diesel generators were declared operable after a detailed inspection.

By LER 82-039/03X-1 dated March 21, 1984, the licensee submitted additional information regarding the long-term corrective action performed on the EDGs at the station. On March 11, 1984, the cowling of EDG-A and C was modified with assistance from the vendor. This modification consisted of replacement of the damaged fiberglass lower cowling with a stainless steel sheet metal cowling. The space heaters were also modified as recommended by the vendor. The space heating requirements were reduced from 3000 watts to 2250 watts thereby allowing for the use of lower watt density electric space heaters. Because a sufficient number of space heaters was not available during a ten-day outage which commenced on March 2, 1984, only one pair of generators (EDG-A and C) was modified. The other pair of generators (EDG-B and D) will be modified before startup from the 1985 spring refueling outage.

The function of the space heaters in the generator ventilation cowling is to reduce long-term degradation of generator insulation. The space heaters maintain the temperature of the generators above ambient temperature which reduces the absorption of moisture by the stator winding insulation. The ventilation cowling controls the cooling air flow through the generator and the bulging of the cowling could affect the cooling of the generator winding. In addition, the cowling provides shielding of the generator stator winding from the radiant heat of the space heaters.

The diesel generators at the Fitzpatrick plant are Bruce-GM units. Since GM units are utilized as EDGs in many operating nuclear plants, we conducted a review of operating experience of EDGs. (LER and other operational data on EDGs at nuclear plants which was obtained for another recent study was used for this review.) We did not find any other similar problem (i.e., a problem with degraded insulation or degraded generator ventilation system). Hence, we believe that the problem experienced by the Fitzpatrick EDG is not generic in nature.

FINDINGS

1. The ventilation cowling was found to be bulged in the direction of the modified space heaters and the cowling overheated due to the increased capacity of the modified space heaters.

2. On EDG-A and C, the damaged fiberglass cowling was replaced with a stainless steel sheet metal cowling and the space heaters were replaced with lower density electric space heaters.

3. EDG-B and D will be modified similarly during the Spring 1985 refueling outage.

4. Our review of operational data of diesel generators at operating nuclear plants did not find any other similar failures.

CONCLUSION

We believe the corrective actions taken by the licensee on the Fitzpatrick EDGs to be adequate to correct the problem. Based on our review of operational data, we consider that the problem is not generic and that no further action is necessary.