



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

DIESEL FIRE PUMP FUEL LINE RUPTURE PROTECTION

BRUNSWICK STEAM ELECTRIC PLANT UNITS 1 & 2

CAROLINA POWER & LIGHT CO.

DOCKET NOS. 50-324/325

1.0 BACKGROUND

By letter dated June 23, 1977, Carolina Power & Light (CP&L), the licensee for Brunswick Units 1 & 2 (BSEP 1 & 2), committed to install an excess flow switch and automatic shutoff valve in the fuel supply line for the diesel fire pump. The purpose of this modification was for the protection of the electric fire pump in the case of a rupture of the fuel supply line. In this event a flow switch was to detect rupture flow and initiate closure of the shutoff valve and thus stop flow.

By letter dated September 19, 1985, CP&L advised that technical difficulties prevented the use of a flow switch to initiate closure of a shutoff valve in the diesel fire pump supply line when a rupture occurred because normal flow was within 97% of rupture flow. A switch capable of detecting such a small flow differential was indicated as not practicable. This would allow the possibility of disruption of the fuel to the diesel engine during normal operation. CP&L requested relief from this commitment and provided supporting information to show that rupture of the fuel line would not adversely affect the fire protection at BSEP 1 & 2.

2.0 EVALUATION

The staff agrees with CP&L that distinguishing the quantitative rupture flow from normal flow when they are so close could be difficult in practice. The licensee did provide an alternative to assure isolation of the diesel fuel and its adverse effects upon the electric fire pump as follows:

- 1) automatic sprinklers provide fire suppression capability for the area;
- 2) the diesel fire pump is separated from the electric fire pump by a curb and flame impingement barrier;
- 3) the diesel and electric fire pumps are separated from the diesel fuel tank by a three-hour fire barrier;
- 4) the floor around the diesel fire pump drains into a sump, thus limiting the amount of fuel oil which could be directly exposed to

the pump and driver;

- 5) fire detection instrumentation located in the area annunciates in the Control Room;
- 6) fire extinguishers and hose stations are located in the immediate vicinity; and
- 7) a well-trained fire brigade exists at BSEP1&2.

The above provisions, with the exception of the "curb" in Item 2, were all available in June, 1977. The curb in conjunction with the sump provides the capability for containing the accidental release of diesel fuel.

The licensee also notes that the National Fire Protection Association (NFPA) discourages use of any valves in the fuel supply line with the exception of a valve at the supply tank outlet. By including the "curb" in the total protection as noted above, the staff considers this a practical alternative to that of the automatic isolation of line rupture. The staff recommends acceptance of this protection in place of CP&L's prior commitment for automatic isolation, since the electric fire pump will not be adversely affected in the event of a diesel fire pump fuel supply break.

3.0 CONCLUSION

CP&L has provided an acceptable alternative to their previous commitment for automatic isolation of diesel fuel upon supply line rupture for protection of the electric fire pump. This alternative includes reliance on existing design features, existing manual and automatic fire protection capabilities, and the addition of a curb and sump to trap spilled oil. The staff recommends its acceptance since, in the event of a diesel fire pump fuel supply line rupture, the alternative protection will not adversely affect the electrically driven fire pump.

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