



Carolina Power & Light Company

SERIAL: NLS-84-061

FEB 09 1984

Director of Nuclear Reactor Regulation  
Attention: Mr. D. B. Vassallo, Chief  
Operating Reactors Branch No. 2  
Division of Licensing  
United States Nuclear Regulatory Commission  
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2  
DOCKET NOS. 50-325 & 50-324/LICENSE NOS. DPR-71 & DPR-62  
FAST COLD STATUS OF DIESEL GENERATORS (GENERIC LETTER 83-41)

Dear Mr. Vassallo:

In a letter dated January 12, 1984, Carolina Power & Light Company (CP&L), provided a partial response to part 1 of Generic Letter 83-41 for Brunswick Steam Electric Plant, Units No. 1 and No. 2 and committed to provide the remaining information as soon as it could be compiled.

In the above letter, CP&L supplied your staff with the total number of starts for each diesel generator from December 1, 1982 through November 30, 1983 and categorized these starts for the January 1, 1983 to May 31, 1983 time frame. Carolina Power & Light Company has evaluated the categories of starts for the remaining months and has concluded that the percentage of starts for surveillance activities, maintenance activities, and actual demand did not change significantly for the semester following May 31, 1983.

Enclosure 1 provide you with CP&L's assessment of the effects of frequent fast cold starts on the diesel generator reliability and availability. Should you have any questions concerning this letter, please do not hesitate to contact a member of our Licensing Staff.

Yours very truly,

S. R. Zimmerman  
Manager

Nuclear Licensing Section

PPC/ccc (9442PPC)  
Enclosures

cc: Mr. D. O. Myers (NRC-BSEP)  
Mr. J. P. O'Reilly (NRC-RII)  
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ENCLOSURE 1

RESPONSE TO ITEM 2  
OF GENERIC LETTER 83-41

The diesel generator engines at Brunswick are Nordberg model FS-1316-HSC. The lube oil system utilizes a filter and prelube which continually circulates oil at 145°F to 155°F through the engine crankcase for 40 minutes each hour when the engine is not running. In addition, a jacket water heater pump circulates water at 135°F to 150°F through the engine when not running. These features preclude "cold" starts from ambient temperature without prelubrication and warmup. We feel that even with these features, fast starts to rated load capacity at the frequencies required in the Technical Specification action and surveillance statements create cumulative deleterious effects on the engine through the following means:

1. Rapid engine accelerations and deceleration to and from rated speed produce excessive mechanical stress on vital engine parts contributing to component wear and fatigue.
2. Carbon buildup in the combustion area and exhaust system components is excessive for engines experiencing repeated starts. The governor system drives the fuel racks to the full open position for the fast start resulting in a rich fuel mixture and subsequent carbon buildup.
3. The lubrication properties of the lube oil change slightly as a result of the temperature effect on viscosity in the range of the temperature differential between lube oil at startup (145°F-155°F) and at normal operating temperature (165°F). Fast starts at reduced lubrication properties contribute to mechanical wear on moving components as a result of increased friction.

The manifestation of these effects has been the common mode failure on all four Brunswick diesels of one or more accessory pump dowel pins and cap screws in the flex drive coupling drive plate. The failure occurred at 1659 engine starts and was a result of metal fatigue of the dowel pin material due to the excessive number of engine starts (see LER 1-82-78).

While we have experienced no other common mode failures, we feel that the fast starts significantly degrade the engine/generator reliability and availability by increasing the probability for single component failure. Isolated failures of piston connecting rod bearing bolts, exhaust and inlet valve of seats, and fuel injector parts have occurred to date on the Brunswick engines. Failures of this type are not expected on stationary diesel engines, procured with rigid purchase specifications, having such relatively short run times (average 625 hours per engine). The failures of the components can most likely be attributed to the effects of the fast starts followed by immediate loading to rated capacity as discussed above. The average number of lifetime starts on the Brunswick diesels is 1632.