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October 16, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Byron Generating Station Units 1 and 2
Braidwood Generating Station Units 1 and 2
Diesel Generator Vibration
NRC Docket Nos. 50-454/455 and 50-456/457

References (a): January 3, 1984 letter from T. R. Tramm to H. R. Denton.

(b): May 14, 1984 letter from T. R. Tramm to H. R. Denton.

Dear Mr. Denton:

This letter provides additional information regarding the design of the Byron/Braidwood emergency diesel generators with respect to the effects of vibration. NRC review of this information is necessary so that the Byron SER may be revised.

Attachment A to this letter is an evaluation of the LaSalle County diesel generator instrumentation qualification with respect to the Byron/Braidwood diesel instruments. It concludes that vibrations due to engine operation are not potentially harmful to devices in the Byron/Braidwood diesel control panels. Additional information supporting this conclusion was provided in references (a) and (b).

Please address any questions regarding this matter to this office.

One signed original and fifteen copies of this letter and the Attachment are provided for NRC review.

Very truly yours,



T. R. Tramm

T. R. Tramm
Nuclear Licensing Administrator

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## ATTACHMENT A

The fatigue effect of Byron/Braidwood Diesel-Generator (D-G) operational vibrations on the D-G panels is evaluated, using the dynamic test results of skid mounted instruments of the Emergency Diesel Generator (ED-G) for LaSalle County Nuclear Power Station. The LaSalle's EDG test program is part of the Stewart & Stevenson's Owner Group for Boiling Water reactor with Mark II Containment. The purpose of the EDG program is to qualify the D.G. units for the fatigue and dynamic effects of both seismic, and suppression pool dynamic loads. The following steps were adopted in order to evaluate the fatigue effect of B/B D.G.'s operational vibration on the control cabinets.

1) Actual vibration measurements were taken on the control panels due to engine operation

2) Comparison of the actual operational vibration measurement to the seismic test results

3) Generic Comparison of the devices tested in LaSalle EDG program to the devices mounted in the B/B control panel

4) Comparison of the fatigue damange potential of both LaSalle EDG program and actual operational vibration of B/B D-G's control panel

Actual operational vibration measurements for Step 1 were made at 2 hour intervals, during a 24 hour test of the D.G. The measurements were recorded at seven locations on the control panel as plot of peak-to-peak acceleration versus frequency in the range of 3-2000 hz.

Comparison of these acceleration values to the seismic Test Response Spectra (TRS) of the control cabinet revealed that the Zero Period Acceleration (ZPA) of TRS (0.8g) is more than twice the maximum value of the operational acceleration (0.31g). Hence, it could be concluded that the seismic test had enough margin for operational vibration.

Generic comparison of B/B control panel devices to LaSalle EDG tested instruments yielded favorable results. The types of essential devices found in the control panel were switches, relays, fuses, diode, circuit breakers, shunt and potentiometers. The types of devices aged and tested in LaSalle program were switches, relay, fuse, diode, solenoid, rectifier, terminal board, and signal generator. LaSalle test results revealed no loss of function or failure of any of the tested devices.

Finally, Step 4 compared the damage potential for the panel devices and the tested devices. Synthetic time histories were created by summing sinusoidal signals at frequencies and accelerations comparable to the measured values. A time history was also created for the LaSalle test vibration. Then, using the S&L computer program RFC, fatigue damage was calculated by both Mean Value Crossing Cycle Counting and Range Reversal Cycle Counting Techniques for both the simulated panel and test time histories. After taking

into account the 10,000 hours of possible diesel operation and the 11 hours of test, it was found that the test program fatigue damage was at least 6.38 times greater than the control panel fatigue damage.

In conclusion, based on this comparison, and on the fact that no vibration aging related failures have been found in the LaSalle Emergency Diesel Generator Qualification Program, it can be concluded that vibrations due to engine operation are not potentially harmful to devices in the Byron Diesel Generator Control Panel.