DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

April 4, 1988

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: McGuire Nuclear Station
Docket Nos. 50-369, -370
Change of Commitment Regarding
Diesel Generator Turbocharger
Rotor Assembly Replacement

Gentlemen:

By letter dated September 9, 1986, Duke Power Company reported the valid failure of Diesel Generator (D/G) 2B that occurred during routine operability testing on July 25, 1986 due to a failed turbocharger. Among the corrective actions that Duke stated would be taken was:

> The turbocharger rotor assembly will be replaced once every five refueling outages starting with the last replacement, and dye penetrant inspection of all diffuser blades and repair or replace them as necessary. If two replacements occur in the same outage, the replacement and inspection of the least operated of the two may be deferred until the sixth outage.

The investigation into the cause of the fatigue failure of the turbocharger compressor impeller blades is continuing. Having been constructed of aluminum, the impeller blades have a finite life. While Brown Boveri (BBC) turbochargers are known for their reliability, it is not fully known what effect frequent fast starts and the uprating of the engine by 500kw has had on them. Replacing the rotor assembly at a maximum of six outages (six years) should limit the engine to about 2000 hours and 2000 starts. This is well within the 5600 hours that the 2B turbocharger had at failure and the 8000 hour bearing limit recommended by BBC. The practice of replacing the rotors periodically will continue until more data is obtained on compressor impeller life.

Without information from the manufacturer, Duke conservatively assumed the impeller (inducer) had a limited fatigue life due to its composition. Subsequently, Duke has obtained data from the manufacturer, Brown Boveri. Metallurgical photos were sent to Brown Boveri for review of the fracture surfaces and to answer questions about the physical properties of the impeller. Brown Boveri agreed that fatigue failure had occurred. In reply to the question, "Is the replacement of compressor impellers after a given number of hours, fast starts, or thermal cycles recommended?" Their reply was,



IE22
1/0

"THE INDUCER FAILED BY HIGH FREQUENCY VIBRATION. THEREFORE WE DO NOT RECOMMEND TO REPLACE THEM PERIODICALLY. WE WOULD RATHER SUGGEST TO REPLACE THE AIR INLET CASINGS BY (with) THE NEWLY DESIGNED EXECUTION WHICH HAS BEEN INTRODUCED IN ORDER TO REDUCE THE EXCITATION OF THE INDUCER BLADES OF VTR..1 SERIES TURBOCHARGERS. THIS COULD WITHOUT DOUBT ALSO INCREASE THE RELIABILITY OF THE VTR 500 TC'S IN THE CASE OF THE McGUIRE POWER STATION"

Duke has replaced the turbocharger inlet casings on all four engines at McGuire with this new design and have had no further problems. Therefore Duke considers the commitment to be completed. Dye penetrant testing will continue to be performed on a five year (five outage cycle) basis. Duke feels this change provides a conservative solution to our turbocharger compressor impeller problem and is in keeping with the intent of the original commitment.

Should you have any questions concerning this matter, contact S.E. LeRoy at (704) 373-6233 of Duke's Nuclear Production Department Licensing staff.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

SEL/254/jgc

xc: Dr. J. Nelson Grace, Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
101 Marietta St., NW, Suite 2900
Atlanta, Georgia 30323

Mr. Darl Hood
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. W.T. Orders
NRC Resident Inspector
McGuire Nuclear Station