Regulatory File Cy:

50-220

NIAGARA MOHAWK POWER CORPORATION

NIAGARA MOHAWK

Nine Mile Point Nuclear Station
Post Office Box 32
Lycoming, New York 13093

September 25, 1971

Dr. Peter A. Morris, Director
Division of Reactor Licensing
United States Atomic Energy Commission
Washington, D. C. 20545

Dear Dr. Morris:

The compliance section has requested we write you regarding a maintenance item occurring during the outage of Nine Mile Point Nuclear Unit #1 in April-May 1971.

The turbine in this station is a General Electric, six flow, reheat type. Last stage buckets are 38" long with no shroud band but two tie-wires. Bucket shanks are in a five-finger pattern that fit into dove-tail grooves in the wheel. Attachment is accomplished by passing pins all the way through the wheel, catching each of the fingers, thereby creating ten shear planes in each pin. There are three pins between adjacent buckets around the circumference.

Ultrasonic testing of the 2646 pins in the six wheels disclosed that 92 were cracked. Upon removal, some of the pins were found to be broken in more than one location. Some were broken on the shear plane while others between the shear planes. Even though the pins were cracked, they could not work out of the hole axially on account of a light "staking" at each end.

Laboratory examination disclosed that the failure was caused by intergranular stress corrosion cracking due to chloride and sulphur substances in the cutting oil used during reaming of the holes. The material used in the pins is a high alloy chrome-moly-vanadium steel (5% chrome) hardened to 250-275,000 psi ultimate strength. Actual pin loading is computed at 40,000 psi. Hardening the pins ran them through the sensitizing range. A corrodent was present and the stress high enough to cause stress corrosion cracking.

All 2646 pins were removed and new pins fitted five mils oversize by reaming the holes using cutting oils free from chloride or sulphur. Replacement pins were made of less sensitive chrome-moly vanadium steel reduced to 1% chrome and hardened to only 175-200,000 psi, as the higher strength material was not required and decreased the possibility of cracking.

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At least a good sampling of the new pins, with the same type non-destructive testing will be done within one year's operation.

Very truly yours,

P. Allister Burt

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Station Superintendent

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