NIAGARA MOHAWK POWER CORPORATION

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

December 13, 1971

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

Dear Dr. Morris:

Re: Provisional Operating License DPR-17
Docket No. 50-220
Nine Mile Point Nuclear Station

After returning to power following a "scram" on August 30, 1971, it was observed that the steam flow indication of one of the two main steam lines was only two thirds the value of the other. Investigation revealed erroneous pressure differential readings being produced by the primary measuring device, a Builders Iron Foundry 24 (21.564) X 12.45 Venturi insert nozzle, Model NZ1W. In this design, a casting having a smooth contour to the "throat" is welded at one end only, fastening it to the inner circumference of the steam pipe and permitting expansion at the unwelded end. A cavity is formed between the steam pipe inner surface and the casting at the throat. Therefore, it is necessary to carry the static pressure at the throat, K_2, through this cavity in tubing. The leading edge of the casting is the unwelded one and therefore, the outside of the tubing carrying the K_2 pressure is surrounded by K_4 pressure. A leak in the tubing would reduce the differential pressure and cause the steam flow meter to read low.

Shortly thereafter, with the unit shutdown, examination disclosed an open crack in the tubing at a point where a bend had been provided for expansion. Subsequent examination of the similar tube in the other steam line venturi revealed a tight crack in the same location. (However, it had not apparently started to leak.) The failed tubes were seamless type 304 per ASTM-A269-63T with nominal dimensions of 7/8" O.D. and .035" wall thickness. All other parts of the assembly, except a stainless steel insert at the throat, were of carbon steel.

Metallurgical analysis of the failed tubes revealed that failure had occurred by stress corrosion cracking of heavily sensitized material that had been cold worked prior to sensitization.

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In manufacture, the entire assemble was welded together and then subjected to a normalizing heat. It is then readily apparent as to how the stainless steel tubes became sensitized.

Replacement of both tubes was made with Inconel tubing, non-sensitized and of slightly heavier wall. The slight bend was not included as stress analysis indicated a lower stress level with straight configuration.

Very truly yours,

P. A. Burt

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Station Superintendent

PAB:pw