

APR 8 1986

Gerald P. Nicholls, Ph. D.
Acting Chief
Bureau of Radiation Protection
Department of Environmental Protection
380 Scotch Road
Trenton, New Jersey 08628

Dear Dr. Nicholls:

I am pleased to respond to your letter dated February 18, 1986, in which you requested information relating to a potential water hammer event in the Oyster Creek Isolation Condenser (IC) system.

As I recall water hammer events were discussed at the November 25, 1985, meeting held at Region I. However, I believe a misunderstanding exists if your staff believes that at the meeting it was stated a water hammer event would not take place in the IC system. As you know all water hammer events in both BWR and PWR reactors have been extensively reviewed by the NRC. Four instances of water hammer in IC systems have been evaluated in detail. None of these events occurred at Oyster Creek and none resulted in through-wall pipe failures. In addition, the Oyster Creek FSAR states, because of the potential damage due to water hammer in the IC system, reactor water level should not be allowed to exceed 185 inches above the top of active fuel. The June 12 event is an example of a case where operators took action in response to a concern about the potential for water hammers during the period when reactor water level was uncertain. Facility procedures and the operator training program emphasize this precaution. Also, the licensee's IC system repair and failure analysis discusses procedure reviews which were conducted to minimize the probability of water hammer.

As noted in NUREG 1061 a total of approximately 150 water hammer occurrences have been reported. Two of these events, the Indian Point feedwater line rupture in 1972 and the Maine Yankee feedwater line event in 1983, resulted in pressure boundary failure. Our recollection of the November 25 meeting is that we pointed out that it is inappropriate; because of the materials, temperatures and pressures, and configurations involved; to draw analogies between these two events and a hypothesized water hammer in the Oyster Creek Core Spray or IC systems. The Maine Yankee and Indian Point events resulted from steam-bubble collapse or mixing of subcooled water and steam, conditions not probable in an IC system.

Since water hammer occurrences have resulted in damage to piping and piping supports in nuclear plants, water hammer was designated an Unresolved Safety Issue and was technically resolved in March 1984 (See NUREG 0927). We expect the frequency of water hammer events to decrease due to the actions taken to prevent it; however, the events are still possible, as acknowledged in NUREG 0927.

With regard to your staff concern that the IC piping might not be able to withstand a water hammer or other severe transient due to identified Intergranular

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Stress Corrosion Cracking, the NRR Safety Evaluation of the inspection and repair of the IC system concluded the piping has been inspected and repaired in accordance with all current staff guidelines and that the plant can be safely operated until the next refueling. Also, the NRR staff believes, based on the reported operating history, that the cracking probably occurred during a period when extensive leakage through isolation valves was observed. This conclusion was arrived at as a result of a review of the licensee's repair of the 27 crack-like indications in the IC system outside the containment. All 15 welds inside the containment were inspected and no indications identified.

The licensee's repair consisted of a weld overlay on 18 of the indications and the removal and replacement of the remaining 9 indications. The licensee will inspect each overlay repair during the next refueling outage. Region I reviewed the licensee's NDE procedure, selected radiographic films, ultrasonic test data, NDE personnel qualifications/certification records and the licensee's evaluation and disposition of NDE results to verify an acceptable evaluation and repair of IC system piping was conducted.

I hope this letter is responsive to your concerns. If I can be of any further assistance please feel free to contact me.

Sincerely,

Original Signed By:

Richard W. Starostecki, Director
Division of Reactor Projects

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*SEE PREVIOUS CONCURRENCES

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Sincerely,

Richard W. Starostecki, Director
Division of Reactor Projects

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