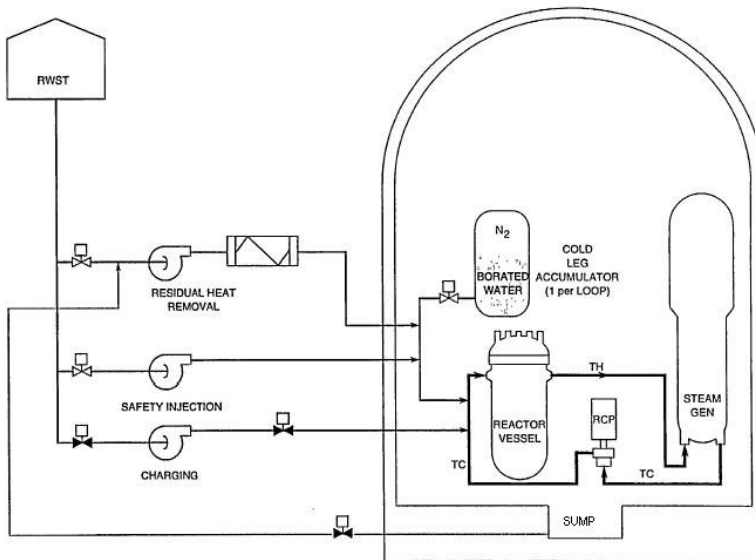




## INDIAN POINT: PAST SOME GAS

### EVENT DESCRIPTION

Workers shut down Indian Point Unit 2 on October 22, 2005, for a refueling outage. During restart of the unit, workers initiated Condition Report CR-IP2-2004-06364 on November 21, 2004, because one of the four accumulators (specifically, the No. 24 SI accumulator) had to be re-pressurized and re-filled far more often than usual in order to maintain the required pressure and level conditions.



The accumulators are part of the emergency core cooling systems (ECCS) at Indian Point. As shown in the simplified diagram, each accumulator is partially filled with water and covered by nitrogen gas. The accumulators are attached to the cold legs – the piping connecting the discharge of the reactor coolant pumps (RCPs) to the reactor vessel. In event that a pipe breaks and water drains from the reactor vessel, nitrogen “pushes” the accumulator’s water into the cold leg and then into the reactor vessel. The water level and nitrogen pressure in the accumulators is monitored to ensure they remain as high as is needed.

On December 1, 2004, operators wrote Condition Report CR-IP2-2004-06531 because the No. 24 SI accumulator continued to leak. They estimated the leak rate at 0.14 gallons per minute. Workers determined on December 10, 2004, that the accumulator was leaking through a test valve inside containment. On December 30, 2004, workers concluded that the leaking valve could not be repaired with the reactor operating. It was decided by management to wait until the next refueling outage (in 2006) to fix the leak.

On January 12, 2005, workers identified several valves on the piping between the accumulators and the safety injection pumps (valves not shown in the graphic). The safety injection pumps also form part of the ECCS. Indian Point has three safety injection pumps (represented by a single pump in the drawing) that can transfer water from the Refueling Water Storage Tank (RWST) to the reactor vessel in event of an accident. Work orders were written to examine other locations in the safety injection system, but those examinations were not completed for two weeks.

While performing the examinations on January 26, 2005, workers found gas pockets in the piping on the discharge side of the safety injection pumps. Nitrogen gas was vented from the piping and from the pump casings on the following day. Condition Report CR-IP2-2005-00370 was written to assess the potential impact of the gas on the system’s performance.

On February 18, 2005, the engineering department concluded that one of the three safety injection pumps had been disabled by the amount of nitrogen gas. Basically, the gas would have allowed the pump's impeller to spin freely without causing any water to move through the piping. The last time that this safety injection pump was successfully tested was on December 24, 2004, so it was assumed the pump became inoperable sometime between then and January 27, 2005, when the gas was vented from the pump casing and attached piping.

#### **PLANT OWNER'S EXPLANATION**

Entergy attributed the causes of this event as follows:

*The apparent cause was the organization was too narrowly focused and overconfident. The focus of all involved station personnel was to identify and repair a leak from 24 SI Accumulator. There was a latent organizational weakness in that gas intrusion from the SI accumulator to the SI pump suction was not considered a credible event.*

*Contributing to this concern was ineffective use of operating experience in the operability evaluation of the 24 SI accumulator inventory loss. Operating experience relating to backleakage was not assimilated and acted upon in a timely manner.*

#### **NUCLEAR REGULATORY COMMISSION REACTION**

The NRC heard about this event and looked into it. The NRC was unable to reach definitive conclusions about the seriousness of this event because workers conveniently destroyed the evidence when they vented the nitrogen gas on January 27<sup>th</sup> without recording how much had been present. The NRC guessed that the probable amount of nitrogen in the piping disabled one of the safety injection pumps and created a 75 percent chance that the other two safety injection pumps were also disabled had they been needed during an accident. Thus, there was a high likelihood that the safety injection system would not have functioned had there been an accident during that 17-day period. The NRC assigned a WHITE finding to this event.

#### **UCS COMMENTARY**

On one hand, Entergy deserves credit for pursuing this problem until they fully understood its causes and consequences. But the time needed to figure it out is longer than is justifiable. The condition report written on November 21, 2004, documented the frequent need to re-pressurize the accumulator with nitrogen *every shift* to compensate for the leakage. They knew the nitrogen was not leaking into the atmosphere and that it had to be going into the ECCS piping. But it took them nearly three months to figure out that the nitrogen was doing to the ECCS pumps. When a leak develops that prevents Indian Point from restarting or returning to full power, it gets fixed lightning quick. But when a leak challenges or compromises safety margins, it gets fixed whenever convenient. That's just wrong.

#### **SOURCES**

Letter dated April 14, 2005, from Fred R. Dacimo, Site Vice President, Indian Point Energy Center, to Nuclear Regulatory Commission, "Licensee Event Report # 2005-002-00, "Technical Specification Prohibited Condition Due to Exceeding the Allowed Completion Time for One Inoperable Train of ECCS Caused by an Inoperable Safety Injection Pump.""

Letter dated June 17, 2005, from A. Randolph Blough, Director – Division of Reactor Safety, Nuclear Regulatory Commission, to Fred Dacimo, Site Vice President, Entergy Nuclear Operations, Inc., "Indian Point 2 – NRC Inspection Report 05000247/2005006 Preliminary White Finding."

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