

Summary of the Indian Point Unit 2 Special Team Inspection of the  
February 15, 2000, Steam Generator Tube Failure Event  
8/25/2000

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The NRC team determined that Con Edison returned Indian Point 2 to service in 1997 in a condition that deteriorated with time to the point that a steam generator tube failure occurred within approximately 19 months of operation.

A failure by Con Edison's technical management and oversight of the SG inspection program resulted in Con Edison not identifying significant SG testing program performance issues during the 1997 SG inspection and not ensuring an adequate, integrated technical understanding of the SG conditions.

Con Edison did not recognize and take appropriate corrective actions for significant conditions adverse to quality that adversely affected eddy current data collection/analysis. Collectively failure to modify and adjust the inspection based on these three conditions decreased the probability of detection of U-bend indications and increased the probability that detectable flaw would be left in-service. Con Edison did not properly: respond to a PWSCC indication in the U-bend area of tube R2C67 in SG 24; assess eddy current probe restrictions in the upper support plate with respect to the potential for flow slot hour-glassing; and evaluate poor quality eddy current data (low signal to noise ratios).

From a safety consequence and risk perspective an event must be broken down into three segments all of which are some what related, but have different meaning and may be misconstrued. From the agencies perspective they deal with core damage and a release of radiative material offsite.

1. The actual consequence determines how consequential the event actually was..

Was there any release of radioactive material was there any core damage? If there was no core damage and no release this means that at least one of the barriers to core damage and release did not fail. Operators took appropriate actions and systems performed to the extent that no core damage occurred.

In the case of IP2 SGTF there was no actual consequence.

2. Risk significance of an event - this means what was the probability of core damage at the time of the event. This probability is based on the actual plant conditions and the probability that operators or systems would not perform properly given the actual event. This is referred to as the Conditional core damage probability (CCDP).

In this case there was low to moderate risk significance to the event.

3. Risk significance of an inspection finding, here the significance of the finding is used to develop a risk of core damage over a year of reactor operation. This is referred to as the change in core damage frequency (delta-CDF). The revised reactor oversight process requires the use of this method to complete the significance determination process (SDP). The ROP also contains the criteria to which the finding delta CDF is compared to

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determine the risk ranking of the finding.

In this case at IP2 the team found that there was an increase in the chance of a tube rupture due to the poor quality of the tube inspection and failure to act on the three significant conditions discussed above. This analysis modifies the assumed frequency for a steam generator tube rupture and thus changes the associated core damage frequency to calculate the effect of the finding on core image probability over a year.

**The inspection finding being a potential red indicates that there was a substantial increase in the probability core damage following a steam generator tube rupture during operating cycle 14. The NRC estimates that, given the conditions of the SG tubes, a SGTR would occur once per year of operation vice the once per 80 years of operation assumed in the plants risk analysis. The chance that a SGTR event goes to core damage remains constant.**

**This increased frequency of a SGTR increases the probability of core damage following a SGTR, above the once in 1,000,000 years of reactor operation to once in 10,000 years of operation.**

The NRC ROP allow Con Edison the opportunity to prove additional information that bares on the inspection finding at a Regulatory Conference. This Conference is currently scheduled for September 26, in NRC Region and will be open fro public observation.

As you are aware, Indian Point 2 is an agency-focus plant and has a Long Term Improvement Program in progress. In accordance with the NRC letter issued May 23, 2000 (subsequent to the NRC Senior Management Meeting), we expect to be reviewing the progress of the licensee's Improvement Program which is aimed at improving overall station performance. In that vein, a meeting, open to public observation, will be conducted on September 11 between the NRC and the licensee to further understand the results of the licensee's assessment of their progress towards improvement, to review the status of the licensee's progress, and to understand remaining planned actions regarding completing their Long Term Improvement Program.