

INDIAN POINT UNIT 3

Buchanan, NY

Owner: New York Power Authority

Outage dates (duration): March 25, 1982 to June 8, 1983 (1.2 years)

Reactor type: Pressurized water reactor

Reactor age when outage began: 5.0 years

Commercial operations began: August 30, 1976

Fleet status: Youngest of two reactors owned by the company

Synopsis

This outage began on March 25, 1982, with a small (approximately 1.5 gallons-per-minute) steam generator tube leak that allowed primary coolant water to leak into the secondary coolant water side. A far more serious steam generator tube leak had occurred at the Ginna nuclear power plant in Rochester, NY, just two months earlier and influenced how the NRC handled the smaller Indian Point event. The Unit 3 outage lengthened when water was found leaking from the secondary side through the steam generator shell onto the containment floor. This discovery led to the identification of significant cracking in the girth weld areas on all four steam generators. The prolonged outage required to resolve the girth weld problems enabled pending repairs to degraded steam generator tubes to occur during this outage rather than a future outage.

After repairing the girth welds and plugging or sleeving hundreds of degraded steam generator tubes, Unit 3 was connected to the electrical grid on June 8, 1983. Approximately two weeks later, Unit 3 had to be removed from service for another multi-month outage, this time caused by damage to the main generator.

Process Changes

Degraded steam generator tubes were an industry-wide problem before and after this outage. Unit 3 merely added to the empirical database of steam generator tube problems.

The secondary side upper girth weld problem in the steam generator was new and prompted the NRC to expand the scope of inspection efforts. As a result of that expansion, a similar problem at the Surry nuclear power plant in Virginia was identified.

Commentary

The steam generator girth weld problems at Indian Point Unit 3 marked the first time the NRC dealt with such a problem. The NRC did a thorough job of ensuring the extent of the problem had been determined and in verifying that the repairs restored the required structural integrity. The NRC had previously dealt with steam generator tube plugging and sleeving efforts, and so it did a thorough job of ensuring the methods employed on Unit 3 were consistent with past practices.

The missing element from the NRC's regulatory oversight was answering one of its own questions. In Information Notice 82-37, the NRC raised the question of why ultrasonic inspections of the steam generator

girth weld areas in 1978 had failed to detect anything. This relevant question went unanswered; no one ever determined if the inspection scope had been overly narrow, if the inspection method had been unreliable, or if the numerous cracks developed subsequent to 1978. Had the NRC been able to answer this question, the agency would have been able to better inform future regulatory decision making on the scope and frequency of steam generator inspections.

NRC Systematic Assessment of Licensee Performance (SALP) History

Date	Operations	Radiological Controls	Maintenance	Surveillance Testing	Emergency Preparedness	Fire Protection	Security	Outage Management	Quality Assurance	Licensing	Training
4/1/1981	2	3	3	2	2	2	3	2	2	n/a	n/a
8/1/1982	2	1	1	1	2	1	2	n/a	n/a	2	n/a
8/1/1983	1	1	1	1	1	1	1	1	n/a	3	n/a
12/1/1984	1	1	1	1	1	n/a	1	1	2	2	n/a
3/1/1986	2	1	1	1	1	n/a	1	1	2	2	2
2/1/1988	2	1	1	1	1	n/a	1	n/a	2	1	2
	Operations	Radiological Controls	Maintenance/Surveillance Testing	Emergency Preparedness		Security	Engineering and Technology		Safety Assessment and Quality Verification		
1/1/1989	2	1	2	1		1	3		2		
7/1/1990	2	1	2	1		3	2		2		
	Operations		Maintenance	Engineering			Plant Support				
10/1/1991	2		2	2			1/1/2				
12/1/1992	2		2	3			1/2/2				
4/1/1996	3		2	3			1				

NOTE: A rating of 1 designated a superior level of performance where NRC attention may be reduced. A 2 rating designated a good level of performance with NRC attention at normal levels. A rating of 3 designated an acceptable level of performance where increased NRC attention may be appropriate.

Details

June 27, 1980: The NRC issued Amendment 31 to the Indian Point Unit 3 (IP3) operating license requiring the New York Power Authority (NYPA) to perform a mid-cycle inspection of one steam generator and inspections of all steam generators at end of cycle.

January 15, 1981: The NRC issued Amendment 34 to the IP3 operating license requiring NYPA to perform steam generator inspections at the next refueling outage.

November 31, 1981: The NRC issued Amendment 40 to the IP3 operating license allowing Unit 3 to continue operating with up to 12 percent of the steam generator tubes plugged.

January 25, 1982: The Ginna nuclear power plant in upstate New York experienced a significant steam generator tube rupture event. This event, which garnered national media attention and Congressional interest, shaped how the NRC handled the Indian Point 3 event.¹

March 25, 1982: Unit 3 shut down due to a 1.5 gallons-per-minute steam generator tube leak. The unit had been scheduled to enter a 90-day refueling outage on March 26, 1982.^{2,3} A leak was identified in the shell of one steam generator's upper transition cone girth weld. Examination of these areas on the other three steam generators revealed extensive cracking. NYPA subsequently initiated efforts to sleeve or plug degraded steam generator tubes and to repair the steam generator secondary side upper girth welds.⁴

September 16, 1982: The NRC issued Information Notice No. 82-37 about the steam generator secondary side upper girth weld cracks discovered at Indian Point Unit 3. The NRC reported "an average of 170 crack indications per steam generator, typically ¾-inches deep by 4 to 6 inches long" with one through-wall penetration. The NRC reported that no indications were found during ultrasonic inspections in 1978. The NRC reported that the cause of the cracking had not been definitively determined, but an event at Indian Point 3 in January 1981 where a turbine blade failed and damaged condenser tubes causing a massive intrusion of chlorides into the secondary water may have played a role.⁵

October 18, 1982: NYPA submitted a license amendment request to the NRC to allow steam generator tubes with greater than 50 percent wall thickness degradation to remain in service if they have been sleeved.⁶

January 19, 1983: NYPA provided information to the NRC on the steam generator secondary side upper girth weld repairs. NYPA reported that approximately 1,200 inches' worth of defective welds had been grinded out and re-welded.⁷

May 3, 1983: NYPA submitted information to the NRC on the inspection program for the steam generator secondary side upper girth welds.⁸

May 27, 1983: The NRC issued Amendment 47 to the operating license requiring NYPA to implement a water chemistry monitoring program for the secondary side of the steam generators.⁹

June 8, 1983: Unit 3 was connected to electrical grid to end its extended outage.¹⁰

June 22, 1983: Unit 3 was shut down to repair damage to its main generator.¹¹

July 31, 1985: The NRC issued Information Notice No. 85-65 about cracks in the steam generator girth welds at Indian Point Unit 3 and Surry Unit 2.¹²

Notes

- ¹ Dircks, W.J. 1982. Letter, to Bob Pollard, Union of Concerned Scientists, March 19. William J. Dircks was executive director for operations at the Nuclear Regulatory Commission (NRC).
- ² NRC. 1982. Shutdown resulting from steam generator tube leak. Preliminary Notice of Occurrence PNO-I-82-026, March 25.
- ³ NRC. 1982. Leak in the steam generator – secondary shell. Preliminary Notice of Occurrence PNO-I-82-027, March 29.
- ⁴ NRC. 1983. Steam generator tube and girth weld repairs at the Indian Point Nuclear Generating Plant, Unit No. 3. Amendment No. 47 to Operating License No. DPR-64, May 27.
- ⁵ NRC. 1982. Cracking in the upper shell to transition cone girth weld of a steam generator at an operating pressurized water reactor. Information Notice No. 82-37, September 16.
- ⁶ NRC, 1983.
- ⁷ NRC, 1983.
- ⁸ NRC, 1983.
- ⁹ NRC, 1983.
- ¹⁰ Spieler, Cliff. 1983. New York Power Authority Press Release, June 8.
- ¹¹ Wald, M.L. 1983. Indian Pt. 3 shut for 5 months. *New York Times*, June 23.
- ¹² NRC. 1985. Crack growth in steam generator girth welds. Information Notice No. 85-65, July 31.