



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 201 TO FACILITY OPERATING LICENSE NO. DPR-26
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
DOCKET NO. 50-247

1.0 INTRODUCTION

By letter dated December 7, 1998, as supplemented by letter dated May 12, 1999, Consolidated Edison Company of New York, Inc. (the licensee), submitted a request to modify the Technical Specifications (TS) for Indian Point Nuclear Generating Unit No. 2 (IP2). The proposed amendment would allow a one-time extension of the steam generator (SG) inspection interval in TS 4.13A.2.a. The amendment involves adding a statement allowing the SG inspection interval to coincide with the year 2000 refueling outage (the unit's 14th refueling outage) and no later than June 3, 2000. The amendment would also remove the requirement of receiving NRC staff concurrence on the licensee's proposed SG examination program in TS 4.13C.1. The May 12, 1999, supplemental letter did not change the initial proposed no significant hazards consideration.

IP2 is a Westinghouse four-loop pressurized-water reactor with Model 44 SGs. Each SG contains 3260 mill-annealed (MA) Inconel 600 tubes.

2.0 BACKGROUND

The SG surveillance requirement for IP2 is specified in TS 4.13A.2.a. It requires that the SG inspections are to occur at intervals not exceeding 24 calendar months. The licensee's last surveillance was performed during the 13th refueling outage and was completed on June 13, 1997. IP2 was shut down for an unscheduled maintenance outage from October 1997 until August 1998.

3.0 EVALUATION

The objective of the NRC staff's evaluation is to determine the impact of the proposed extended inspection interval on the structural and leakage integrity of the tubes considering the extended period that the plant was shut down. The staff has focused its evaluation on the licensee's evaluations of 1) SG tube integrity for the previous and current operating cycles, 2) SG lay-up in accordance with industry guidelines and the present cycle (cycle 14) chemistry control, and 3) leakage monitoring and leakage guidelines.

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3.1 June 1997 SG Inspection

The licensee performed an extensive eddy current inspection in June 1997 (end of cycle 13). The inspection included 100 percent examination using a bobbin probe on all inservice tubes. If the tight-radius U-bends in rows two and three precluded passage of the Cecco-5/bobbin probe, a rotating pancake coil (RPC) was utilized. Row one tubes were previously preventively plugged. Any locations with distorted bobbin coil signals were resolved by the Cecco-5 coils. An RPC probe was utilized for further characterization of indications as necessary.

Tubes with indications evaluated at 40 percent of the wall thickness or larger, linear indications (axial or circumferential), Cecco-5 indications at tube support plate intersections, and tube roll transition cracks that were not rerolled, or indications that did not meet the F* distance were plugged. Twenty tubes were plugged due to passage restrictions of the 610 mil diameter bobbin probe. Seventeen tubes were administratively plugged due to passage restrictions of the Zetec +point dent inspection probe (gimbaled +point probe). These tubes were examined by the Cecco-5/bobbin probe but did not allow access of the +point probe. Eighteen tubes were preventively plugged based upon an IP2 study of tube support plate deformation.

Prior to tube plugging, the licensee performed in-situ pressure testing on selected tubes exceeding EPRI/Westinghouse screening criteria. Four tubes in the tubesheet crevice area were found to have exceeded the screening criteria and were subsequently in-situ tested. Two additional tubes were in-situ tested even though they were below the screening criteria. Those two tubes were selected because one was typical of tube roll transition cracking, and the other was an axial indication above the top of the tubesheet. No leakage was detected from the six tubes that were in-situ tested. Test pressures of 1710 psi, 2500 psi, 2840 psi, and 5075 psi were used to simulate indications under normal operating differential pressure, intermediate pressure, steam line break pressure, and three times normal operating pressure, respectively. Each pressure was met and held for 2 minutes. The in-situ pressure tests showed that the SG tubes have maintained adequate structural integrity in accordance with Regulatory Guide (RG) 1.121. The in-situ pressure tests demonstrated that RG 1.121 margins were met over the past operating cycle (cycle 13). On the basis of the licensee's assessment, the staff finds that the structural and leakage integrity of tubes during cycle 13 was acceptable.

The licensee assessed the SG tube integrity for the remainder of the present operating cycle (cycle 14) on the basis of the end of cycle (EOC) 13 inspection and testing results. The severity of degradation at the EOC 14 was projected considering beginning of cycle (BOC) degradation status, degradation growth rates, and EOC allowable degradation. The severity of degradation at the EOC 14 was projected to determine if required structural and leakage integrity margins would be maintained. The scope of the licensee's evaluation included the following forms of degradation: 1) top of tubesheet (TTS) pitting, 2) outer diameter stress corrosion cracking (ODSCC) in the TTS sludge pile region, 3) ODSCC in the tubesheet crevice, 4) primary water stress corrosion cracking (PWSCC) at the roll transition region, 5) PWSCC at dented TSP intersections, 6) ODSCC at dented TSP intersections, 7) PWSCC at row two U-bends, and 8) wear. The licensee's evaluation determined that the forms of degradation listed above did not present a challenge to the 3ΔP structural margin criteria for the expected operating cycle length of 21.4 effective full power months (EFPM). Based on a review of this portion of the licensee's assessment, the staff expects the SG tubes will continue to satisfy structural and leakage integrity requirements under normal and accident conditions through the end of the current operating cycle (cycle 14). This conclusion is based on: 1) the

licensee's comprehensive eddy current examination and plugging practice at EOC 13; 2) the growth rates of the degradation mechanisms are expected to be similar to what was seen for cycle 13 operation; and 3) the licensee's acceptable in-situ testing results on the limiting EOC 13 indications.

3.2 Chemistry Assessment for the SG During Shutdown and the Present Operating Cycle

After the June 13, 1997, inspection, IP2 commenced operation. The Unit was subsequently shut down for an extended maintenance outage. During the outage, the Unit remained in cold shutdown condition for 304 days prior to restart on August 5, 1998. The licensee maintained the SG in wet lay-up conditions in accordance with EPRI guidelines by adding the appropriate quantities of ammonium hydroxide and carbonylhydrazide. The ammonium hydroxide was added to control pH and the carbonylhydrazide was added as an oxygen scavenger. For 1 hour each day, when conditions permitted, each of the SGs were sparged with nitrogen. This was done to drive off any air that may have entered the SG gas space.

The licensee performed routine sampling and analysis of the lay-up solution and determined that the lay-up solution was maintained at acceptable alkaline and reducing conditions during the outage. However, the licensee did detect a slight depression of the pH which was attributed to dissolved carbon dioxide in the lay-up solution. The carbon dioxide was due to the reaction of the carbonylhydrazide and oxygen. The samples taken during the outage indicated that no detectable dissolved oxygen (less than 10 ppb) was identified in any of the SGs.

The concentrations of other potentially corrosive impurities in the lay-up solution were routinely monitored during the outage period. The concentrations of chloride, sulfate, and sodium were each maintained well below the 1000 ppm maximum that the EPRI guidelines recommend.

The staff believes that the SG lay-up was maintained in accordance with industry guidelines which were designed to minimize the potential for corrosion during wet lay-up conditions. Based on the above, the staff concludes that, during shutdown, the SG were maintained at reduced temperatures and with water chemistry conditions that should have prevented further degradation of the SG tubes.

Chemistry Control During Operation of Cycle 14 (August 1998 - June 1999)

Each of the SGs were drained and refilled with condensate quality water prior to exceeding 200 °F during startup for resuming cycle 14. SG chemistry has been maintained in accordance with EPRI guidelines for the present operating period (August 1998 - June 1999). SG impurities have been maintained well below EPRI recommended action levels. No intrusions of impurities into the secondary plant have been observed that would indicate a condenser tube leak (chloride, sulfate, or sodium). Iron and copper corrosion products during this operating period have been below the EPRI guideline recommended action levels for these corrosion products.

The staff finds that the licensee's water chemistry monitoring and procedures provide assurance that corrosion during the operation period of August 1998 - June 1999 has been minimized.

3.3 Leakage Monitoring and Leakage Guidelines

The licensee stated that, should unforeseen circumstances cause SG tube leakage, there are multiple methods available to monitor primary-to-secondary leakage through the SGs. They employ radiation monitors in the condenser air ejector, the SG blowdown line, and the main steamline (MSL). In addition, MSL N-16 monitors are installed, which significantly enhance monitoring of MSL activity. In addition, TS 3.1.F.2.a.(1) limits the primary-to-secondary leakage to 0.3 gallons per minute (gpm) for any one SG. However, the licensee maintains an administrative limit of 0.1 gpm. This administrative limit provides added assurance that, should a leak develop during the operating cycle, it would be quickly detected to allow immediate mitigating actions to be taken.

The staff finds the licensee's leakage monitoring program provides assurance that should a leak develop during the operating cycle it would be quickly detected allowing immediate mitigating actions to be taken before tube rupture occurs.

4.0 MODIFICATION OF THE PLANT TSs

The licensee proposes to add the following footnote to page 4.13-2:

*Examinations scheduled for 1999 only, shall be conducted during the 2000 refueling outage which will commence no later than June 3, 2000. The scheduled examinations will be completed prior to return to service from the 2000 Refueling Outage.

The licensee proposes to modify TS 4.13C.1. to state:

The proposed steam generator examination program shall be submitted for NRC staff review at least 60 days prior to each scheduled examination.

The modification will require the licensee to submit for staff review their proposed SG examination program 60 days prior to the scheduled examination. However, the licensee will no longer be required to get formal NRC approval for their proposed SG examination program. The 60-day notice of the licensee's proposed SG examination program provides time for the NRC to review the examination program and determine if there are any concerns to be addressed.

Modifications to TSs Sections 4.13A.2.e, 4.13A.4.2.a, and Bases Section 4.13 will be modified to be consistent with other licenses regarding NRC approval of the proposed SG examination program.

The staff has reviewed the proposed modifications and finds them acceptable.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New York State official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (64 FR 6694). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Date: June 9, 1999

DATED: June 9, 1999

AMENDMENT NO. 201 TO FACILITY OPERATING LICENSE NO. DPR-26-INDIAN POINT
UNIT 2

Docket File

PUBLIC

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