Enclosure

REVIEW OF RESULTS OF STEAM GENERATOR INSPECTION PROGRAM FOR INDIAN POINT UNIT 2

Ref: Consolidated Edison Co. of N. Y., Inc.
Letter Dated February 17, 1983

INTRODUCTION:

By letter dated February 17, 1983, Consolidated Edison Company of New York, Inc. submitted the results of the December 1982 steam generator examination program. The entire program consisted of eddy current examinations, profilometry examinations, flow slot and lower support plate inspections, sludge analysis and secondary side examinations. These examinations and inspections were conducted in accordance with Consolidated Edison Company letter submittal dated August 18, 1982.

DISCUSSION:

Eddy current examinations for both defects and dents were conducted on tubes in all four steam generators. The number of tubes examined were as follows:

	S.G. 21	S.G. 22	S.G. 23	S.G. 24
Hot Leg	543 tubes	495 tubes	508 tubes	509 tubes
% of Active Tubes	17.1%	15.7%	16.1%	16.1%
AND				
Cold Leg	141 tubes	181 tubes	133 tubes	143 tubes

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The examination to identify tube dents was performed nominally at 400 KHz and at a reduced gain. The eddy current examination to identify tube defects was performed nominally at 400 KHz and at standard gain.

In addition, eddy current examination of selected tubes was conducted at 500 KHz absolute for wall thinning in the crevice between the tubes and the tubesheet, and of other selected tubes at 100 KHz single frequency and at multi-frequency for pitting.

A standard 700 mil eddy current probe was used to perform the eddy current testing. If any tube did not permit passage of this standard 700 mil probe, the tube was eddy current tested with a 610 mil probe. In addition, the tubes immediately adjacent to any tube that did not pass the 610 mil probe were also subjected to an eddy current examination.

Results of the examinations indicated that the average dent size in all four steam generators was not substantially different from that measured during previous inspections, and cold leg dent sizes were generally smaller than those on the hot leg.

A total of 530 tubes did not permit passage of the standard 700 mil eddy current probe. These were examined with a 610 mil probe, and the surrounding tubes were also examined. Forty tubes of the latter group did not permit passage of a 610 mil probe and were included in the profilometry examination.

A profilometry examination of the forty tubes that did not pass the 610 mil probe indicated that strain was acceptably low (≦ 25%) in twenty tubes. The remaining twenty were plugged. Two additional tubes were inadvertently plugged for a total of 22 tubes plugged.

Profilometry examination of 311 tubes was performed on tubes where prior strain calculations had been made. Changes in strain over the prior operating period were found to be small.

Four tubes in steam generator 22 which had failed to allow passage of the 610 mil probe during the December 1980 inspection and had an acceptably low enough strain to be kept in service, were now found to allow passage of the 610 probe in 3 of the 4 tubes and all still had an acceptable low strain.

Visual examinations with photographic measurements of the lower support plate flow slots indicated that "hour-glassing" is continuing. Cracks in the ligaments between the flow slot and the first row tube holes appear to have opened slightly when comparing photographs taken during the 1980 inspections with those taken in the December 1982 inspections.

Video camera examination of the secondary side of all steam generators revealed small amounts of sludge in all steam generators and a small piece of wire in steam generator 22.

Sludge removed from the tubesheets during lancing operations indicated that 70% of the sludge was iron oxide and 20% copper with the remainder unidentified.

EVALUATION:

Eddy current profilometry and visual examinations indicate that the Indian Point Unit 2 steam generators had performed in a satisfactory manner in the interval between the December 1980 inspection and the December 1982 inspection.

Inspection of more than the required 12% of the hot leg tubes in each steam generator revealed no tube defects. Profilometry measurements and strain calculations of previously dented tubes indicated no measurable increase in strain in these tubes.

Secondary side inspections of all the steam generators only revealed a small piece of wire. Visual and photographic examination of the flow slots and the lower support plates did not indicate any acceleration of previously observed degradation.

Results of the chemical analyses of the sludge were consistent with previous analyses; iron oxide and copper were the major constituents found in the sludge.

Twenty tubes were plugged because they did not permit passage of the 610 mil probe, and they also exceeded the newly imposed strain-based criterion of 25%.

CONCLUSIONS:

We have concluded that Indian Point Unit 2 has successfully completed the required Technical Specification steam generator inspections and tube plugging and may therefore continue power operation for the remainder of the current fuel cycle without undue risk to public health and safety.