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April 20, 1979  
IPN-79-18

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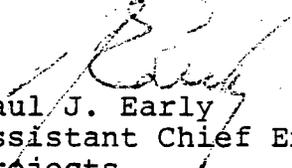
Attention: Mr. Albert Schwencer, Chief  
Operating Reactors Branch No. 1  
Division of Operating Reactors

Subject: Indian Point 3 Nuclear Power Plant  
Docket No. 50-286  
Steam Generator Tube Leak

Dear Sir:

In response to your letter of February 21, 1979 on the  
subject item, enclosed please find ten (10) copies of Attachment 1  
which responds to the information you requested.

Very truly yours,

  
Paul J. Early  
Assistant Chief Engineer-  
Projects

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ATTACHMENT 1  
RESPONSES TO NRC REQUEST OF FEBRUARY 21, 1979  
FOR INFORMATION REGARDING  
STEAM GENERATOR OPERATING EXPERIENCE

POWER AUTHORITY OF THE STATE OF NEW YORK  
INDIAN POINT 3 NUCLEAR POWER PLANT  
APRIL 19, 1979

## QUESTION 1

Provide your analysis of secondary water chemistry to assess the cause of tube denting, and to identify if a new phenomenon of tube denting is occurring.

## RESPONSE

The Indian Point 3 feedwater system involves extensive use of copper alloys starting with an arsenical admiralty brass condenser and a series of feedwater heaters which are composed of admiralty brass, 90-10 cupro nickel and 80-20 cupro nickel alloys. At the Indian Point location the Hudson River is essentially a tidal saline estuary. The Indian Point 3 plant does not have any condensate polishers in the feedwater train. As is inevitable with any power plant, we have experienced some condenser leakage which resulted in saline water from the river entering the feedwater train at the Indian Point 3 plant. Westinghouse has informed the Power Authority that denting is caused by a combination of, among other things, copper alloys in the feedwater train and saline water intrusion into the feedwater train of Westinghouse pressurized water reactors. Since the IP-3 plant has all of the ingredients to cause denting, we can safely conclude that any denting present has not been caused by a new unknown phenomenon.

The Power Authority is presently conducting an extensive review process to evaluate the cause of any denting occurring at Indian Point 3 and to recommend corrections or modifications to the plant to alleviate or eliminate this problem. The Power Authority has recently let a contract to the Nuclear Water and Waste Technology Company to perform an intensive investigation of the feedwater chemistry at Indian Point 3. This study is expected to be completed in a period of approximately 6 months. Information obtained from this study will be used in evaluating corrective measures to alleviate the potential for additional future denting in the steam generators at IP-3. During the next refueling outage of Indian Point 3, we will be installing a special continuous chemical monitoring instrumentation panel for the steam generators of the IP-3 plant. This new monitoring system will provide to plant chemistry personnel additional information necessary for controlling and reducing effects of any condenser inleakage at the plant. Plant personnel have also instituted a program of periodically performing helium leak detection on the plant condenser in order to reduce and eliminate small, low levels of saline water inleakage.

A review of plant chemistry monitoring data from initial criticality, indicates that condenser leaks since that time have resulted in considerably less than 50 ppm chloride days of operation over the entire plant operating history. It is our understanding that other plants with severe or moderate denting have had an experience of several hundred to several thousand ppm chloride days of feedwater contamination by saline intrusion in the condensers.

QUESTION 2

Provide a commitment to submit your inspection program for the next scheduled inservice inspection at least two months prior to the inspection for NRC staff comments. This submittal should include a map indicating the tubes to be inspected and the extent of eddy current testing and gauging to be performed.

RESPONSE

At least 60 days prior to the next scheduled refueling outage inservice inspection, the Authority will submit the second Refueling Outage Steam Generator Inservice Inspection Program to the NRC. This submittal will contain information on the extent of eddy current testing and gauging to be performed, as well as a map indicating the tubes to be inspected.

### QUESTION 3

Provide a summary of any tentative remedial actions intended to eliminate or control denting, such as secondary water chemistry controls or chemical cleaning which may be under consideration.

### RESPONSE

After discovering minor denting during the 1978 Refueling Outage the Authority formed an internal task force to determine viable solutions to preclude or control additional denting in the steam generators. This committee was formed in December, 1978 and the membership consists of the following disciplines:

- 1) Plant Operations
- 2) Mechanical Engineering
- 3) Plant Chemistry
- 4) Staff Mechanical Engineering
- 5) Staff Nuclear Engineering
- 6) Safety Review Committee Chairman (chairing this committee).

This committee has recommended to the Authority's upper management the following items:

- 1) Surveillance of condenser tube leaks with isolation and plugging upon detection.
- 2) Decrease air in-leakage by constant monitoring.
- 3) The Westinghouse Boric Acid Program to be implemented following the 1979 Refueling Outage scheduled to begin September 1, 1979.
- 4) Maximize blow down during or following transients in order to remove corrodents from the bulk liquid of the steam generators.
- 5) Increasing steam generator chemistry sampling frequency to determine chemistry spectrum following transients to establish base line data.

Four out of the five above listed items have been implemented. The Boric Acid Program is currently undergoing staff review prior to implementation.

The long term studies being evaluated by the Authority are:

- 1) Deep bed ion exchanges or condensate polishers
- 2) High temperature filters
- 3) Change of high pressure feed water heater tube material in conjunction with change of reheater tube bundle

material

- 4) Status of condenser integrity and change of the condenser tube and tube sheets
- 5) Chemical cleaning of steam generators

The Authority is a member of the EPRI Steam Generator Owners Group with representation on the Technical Advisory Committee as well as the Executive Committee.