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U.S. NUCLEAR REGULATORY COMMISSION

DOCKET NUMBER: 50-287

FILE NUMBER: INCIDENT REPORT

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TO:
Mr. Norman C. Moseley

FROM:
Duke Power Company
Charlotte, North Carolina
William O. Parker, Jr.

DATE OF DOCUMENT: 2/28/77

DATE RECEIVED: 3/9/77

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DESCRIPTION

Ltr. trans the following:

PLANT NAME:

Oconee Unit No. 3 (1-P)

ENCLOSURE

Licensee Event Report (RO 50-287/77-2) on 2/14/77 concerning primary-to-secondary system leakage in "3B" once-through steam generator....

ACKNOWLEDGED

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(2-P)

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FOR ACTION/INFORMATION 3/10/77 RJL

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DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

TELEPHONE: AREA 704
373-4083

February 28, 1977

Mr. Norman C. Moseley, Dorector
U. S. Nuclear Regulatory Commission
Suite 818
230 Peachtree Street, Northwest
Atlanta, Georgia 30303

Re: Oconee Unit 3
Docket No. 50-287

Dear Mr. Moseley:

Pursuant to Sections 6.2 and 6.6.2 of the Oconee Nuclear Station Technical Specifications, please find attached Reportable Occurrence Report RO-287/77-2.

Very truly yours,

William O. Parker, Jr.

William O. Parker, Jr.

LJB:vr
Attachment

cc: Director, Office of Management Information
and Program Control

2550

DUKE POWER COMPANY
OCONEE UNIT 3

Report No.: RO-287/77-2

Report Date: February 28, 1977

Occurrence Date: February 14, 1977

Facility: Oconee Unit 3, Seneca, South Carolina

Identification of Occurrence: Primary-to-secondary system leakage in "3B" once-through steam generator

Conditions Prior to Occurrence: Unit at 100 percent full power

Description of Occurrence:

On February 14, 1977, an increase in radiation levels as registered by air ejector monitor 3RIA-40 indicated a possible primary-to-secondary system leak. Sampling of the steam lines and portable instrument readings confirmed that primary-to-secondary leakage was occurring in the "3B" once-through steam generator (OTSG). Within two hours from the time that increasing readings were observed on 3RIA-40, a reactor shutdown was initiated. Within six hours, reactor shutdown was completed and preparations were made to drain the Reactor Coolant System and investigate the source of the steam generator leakage.

The Reactor Coolant System was cooled and drained within 2½ days following the initial high radiation indication and an internal inspection of the "3B" OTSG was initiated.

Apparent Cause of Occurrence:

Eddy current testing was performed and revealed one leaking tube, identified as tube number 19 in row 77. A fiber optics examination of this tube was also made. The leaking tube was discovered to have a 45° circumferential crack approximately three feet below the upper tube sheet at the fifteenth support plate. The tube is located along the "open tube lane" towards the outer circumference of the tube bundle.

Eddy current examinations of 142 adjacent tubes which included all tubes on either side of the "open tube lane," revealed no additional tube leaks. However, characteristic eddy current signal distortions were found on tube 2 of row 75 and tubes 12, 13, 14, 15, 16, 17, 18, 20 and 21 of row 77. Therefore, as a precautionary measure, these ten tubes were plugged.

With regard to this and previous Oconee steam generator tube leaks, evaluation by Duke and the OTSG vendor, the Babcock & Wilcox Company, is continuing. However, there is no evidence to date to indicate that the leaks have resulted from tube wastage/thinning, chemical attack, or intergranular stress-corrosion cracking.

Analysis of Occurrence:

Primary-to-secondary system leakage, resulting from this occurrence, was approximately 0.2 gallons per minute and was detected by installed radiation monitoring equipment. The leakage did not exceed the operational limits of Oconee Technical Specification 3.1.6.1, however, a reactor shutdown was initiated within two hours after the initial leakage indication, following sampling and monitoring of components and systems during this period.

The calculated gaseous activity released to the environment via the air ejectors was 0.079 curies. This amount is considered insignificant in comparison to the station's annual release limit.

This report describes the sixth occurrence of steam generator tube leakage experienced on the three Oconee units. Defective tubes were previously reported in Reportable Occurrence Reports RO-287/76-10, RO-269/76-17, RO-270/76-15, RO-269/76-19, and RO-269/77-2 submitted by our letters of August 5, 1976, November 15, 1976, December 20, 1976, December 22, 1976, and January 31, 1977, respectively. In the first three occurrences and the fifth and sixth occurrences, the defective tubes edged an open tube lane (a radial row with no tubes, used for inspection purposes). In the fourth instance, the leaking defective tube was angularly located approximately 150° from the locations of the other defective tubes and was not adjacent to an open tube lane.

It is considered that this incident did not affect the health and safety of the public.

Corrective Action:

The leaking defective tube and ten other tubes with questionable eddy current signals were explosive plugged in the bottom of the tube and plugged from the top by insertion of a metal rod in accordance with a vendor modification package. This method of plugging increases the tube's stability during operation.

As stated in RO-269/77-2 submitted by my letter of January 31, 1977, the OTSG vendor, Babcock & Wilcox, is currently involved in a program to further evaluate the cause of the tube failures. This program includes a review of deposit samples, a computer evaluation of all available eddy current data, a review of visual observations from fiber-optics and videotapes, and macro-microscopic analysis of two of the defective tubes that were removed from the Oconee Unit 2 "2B" OTSG. Additionally, the open lane flow characteristics are being analyzed and a detailed stress/vibration analysis is being conducted on the tubes in rows 75 and 77. A review has been made of the Oconee station operating history, the Oconee steam generator manufacturing history and previously conducted OTSG analysis and testing results and no explanation of the phenomena has been determined to date.