

DUKE POWER COMPANY

POWER BUILDING

422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

September 19, 1978

TELEPHONE: AREA 704
373-4083

Mr. James P. O'Reilly, Director
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

RE: Oconee Unit 1
Docket No. 50-269

Dear Mr. O'Reilly:

Pursuant to Sections 6.2 and 6.6.2 of the Oconee Nuclear Station Technical Specifications, please find attached Reportable Occurrence Report RO-269/78-18.

Very truly yours,

William O. Parker, Jr.
William O. Parker, Jr. *By [Signature]*

RLG:scs

cc: Director, Office of Management Information
and Program Control

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DUKE POWER COMPANY
OCONEE UNIT 1

Report Number: RO-269/78-18

Report Date: September 19, 1978

Occurrence Date: August 18, 1978

Facility: Oconee Unit 1, Seneca, South Carolina

Identification of Occurrence: Excessive Quadrant Power Tilt

Conditions Prior to Occurrence: 100% Full Power

Description of Occurrence:

On August 18, 1978, Unit 1 was operating at 100% FP. At approximately 1130, the indicated quadrant power tilt in the W-X quadrant increased approximately 2.0% in a span of about 10 minutes and continued to increase slowly. At approximately 1600, in anticipation of the tilt exceeding the specified limit, a power reduction was initiated. By 1650 the tilt exceeded the applicable limit and by 1830 power was reduced to below the power level cutoff, in compliance with Specification 3.5.2.4b. (The error adjusted limit is 2.29% and equivalent to the specification limit of 3.41%.) Possible causes of the tilt including verification of incore and excore indications, misalignment of control rods, verification of core flow, and variation of RCS temperatures, were investigated. No anomalous conditions in any of these areas were observed, except for temperature. A comparison of level by level peaking indicated that the largest percentage change occurred in the Y-Z quadrant in the lower levels of the core. No significant changes occurred in the W-X quadrant. This analysis indicated that there might be a temperature variation causing the tilt. The unit control system was biased by a differential between the A and B cold leg inlet temperatures (ΔT_c) in 0.5°F increments to balance heat removal and core power. Indicated quadrant power tilt was reduced to 0.26% in the W-X quadrant with ΔT_c at 2.5°F by approximately 2200 on August 19. ΔT_c was reduced to zero over a period of about two days during which time the indicated maximum positive tilt reached 1.71% and leveled off at 0.9%. When ΔT_c was zero, reactor power was increased to 100% FP.

Duke personnel, with the assistance of Babcock and Wilcox, the Oconee NSSS vendor, subsequently continued the investigation into the cause of this tilt. An extensive investigation of the reactor internals has been accomplished during the current refueling outage with no anomalous results.

Cause of Occurrence:

The cause of the occurrence is unknown. Extensive investigation was conducted during power operation and during the current refueling outage with no anomalous results.

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Analysis of Occurrence:

The unit was operated in accordance with Specification 3.5.2.4 at all times. The highest indicated positive quadrant tilt, measured by the incore detectors 2.74%, was well below the transient and maximum tilt limits. Power was reduced, as required, to below the power level cutoff to 89%, providing additional safety margin. No design limits such as linear heat rate, were approached. The health and safety of the public were assured at all times.

Corrective Action:

A test program will be incorporated in startup physics testing and power escalation to look at RCS temperature variations and other possible mechanisms that could cause tilt changes.

A visual inspection has been conducted of the reactor relief valves, plenum, and core barrel flange during the refueling outage to look for possible channels where hot leg water can bypass the steam generator to the cold leg.

LICENSEE EVENT REPORT

EXHIBIT A

CONTROL BLOCK: _____ (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 | S | C | N | E | E | 1 | 2 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 3 | 4 | 1 | 1 | 1 | 1 | 4 | 5

CONT
01 | REPORT SOURCE | L | 6 | 0 | 5 | 0 | 0 | 0 | 2 | 6 | 9 | 7 | 0 | 8 | 1 | 8 | 7 | 8 | 8 | 0 | 9 | 1 | 9 | 7 | 8 | 9

02 | Quadrant power tilt in excess of error corrected limit of 2.29%. Power
03 | reduced as required by TS 3.5.2.4 and tilt reduced by insertion of delta T_c.
04 | Maximum tilt of 2.74% well below transient and maximum limits of specification.
05 | No adverse effects to the public could have resulted from this occurrence.
06 |
07 |
08 |

09 | SYSTEM CODE: R C 11 | CAUSE CODE: X 12 | CAUSE SUBCODE: X 13 | COMPONENT CODE: Z Z Z Z Z Z 14 | COMP. SUBCODE: X 15 | VALVE SUBCODE: Z 16
17 | LER/RO REPORT NUMBER: 7 8 | EVENT YEAR: 7 8 | SEQUENTIAL REPORT NO.: 0 1 1 8 | OCCURRENCE CODE: 0 3 | REPORT TYPE: L | REVISION NO.: 0
18 | ACTION TAKEN: X 18 | FUTURE ACTION: X 19 | EFFECT ON PLANT: B 20 | SHUTDOWN METHOD: Z 21 | HOURS: 0 0 0 22 | ATTACHMENT SUBMITTED: X 23 | NPRO-4 FORM SUB.: N 24 | PRIME COMP. SUPPLIER: L 25 | COMPONENT MANUFACTURER: 2 9 9 9 26

10 | The cause of the excessive tilt is unknown but is still under investigation.
11 | The investigation commenced during power operation and has continued during
12 | the scheduled refueling outage.
13 |
14 |

15 | FACILITY STATUS: E 28 | % POWER: 1 0 0 29 | OTHER STATUS: N/A 30 | METHOD OF DISCOVERY: B 31 | DISCOVERY DESCRIPTION: Operator Observation 32
16 | ACTIVITY CONTENT: Z 33 | AMOUNT OF ACTIVITY: N/A 35 | LOCATION OF RELEASE: N/A 36
17 | PERSONNEL EXPOSURES: NUMBER: 0 0 0 37 | TYPE: Z 38 | DESCRIPTION: N/A 39
18 | PERSONNEL INJURIES: NUMBER: 0 0 0 40 | DESCRIPTION: N/A 41
19 | LOSS OF OR DAMAGE TO FACILITY: TYPE: Z 42 | DESCRIPTION: N/A 43
20 | PUBLICITY ISSUED: N 44 | DESCRIPTION: N/A 45