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RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 95-004-00:on 950426,Unit 1 brought from 100% full power to hot standby for testing CR trip insertion times.Cause due to data obtained from CR trip times on Unit 2 & equipment failure.Installed mod thermal barriers.W/950525 ltr.

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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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PRIORITY 1 DOCUMENT

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DUKE POWER

May 25, 1995

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
LER 269/95-04

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report (LER) 269/95-04, concerning control rods exceeding Technical Specification trip time limits.

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(i)(B). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

for

J. W. Hampton
Vice President

/ftr

Attachment

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NRC FORM 366 (5-92)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Oconee Nuclear Station, Unit 1	05000 269	1 OF 5

TITLE (4) Control Rods Exceed Technical Specification Trip Time Limits Due To Equipment Failure

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
04	27	95	95	-- 04 --	00	05	25	95		05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	100%

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)
	20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER
	20.405(a)(1)(iii)	X	50.73(a)(2)(i) (B)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
	20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
L. V. Wilkie, Safety Review Manager	(803) 885-3518

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
F	AA	66	D150	YES						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On April 26, 1995, Unit 1 was brought from 100% full power to Hot Standby for testing the control rod (CR) trip insertion times. The shut down decision was based upon a review of data obtained from CR trip times on a Unit 2 Reactor trip that occurred on April 14, 1995. On April 27, 1995, at 0600 hours, with Unit 1 at Hot Standby, the CR trip time test was performed. The CR's at five core locations did not meet the Technical Specification (TS) acceptance criteria. Also, an additional four CR's were slow but not outside the TS acceptance criteria. As a result, a decision was made to bring Unit 1 to Cold Shutdown and replace the thermal barriers on the affected CR's. The root cause of this event is Equipment Failure. The cause of the equipment failure is the presence of an accumulation of corrosion products in the thermal barrier region. The cause of the corrosion product buildup is being investigated. The corrective actions include the installation of modified replacement thermal barriers and continuation of the investigation/evaluation.

BACKGROUND

The pressurized water reactors at Oconee contain 61 full length control rods (CR) [EIIS:ROD] distributed among the 177 fuel assemblies. During normal reactor operation the control rod drive mechanism (CRDM) [EIIS:AA] is used to position the control rods. During abnormal reactor operating conditions or during testing the CRDM is designed to release the rods allowing them to drop into the core.

The thermal barrier inhibits the circulation of Reactor Coolant System (RCS) [EIIS:AB] water into the drive during normal operation. During a rod trip, four ports allow RCS flow up through the thermal barrier and other components to prevent hydraulic action from slowing the CR. These ports are blocked during normal operation by ball check valves. When the ball check valves are stuck closed or the thermal barriers are corroded, RCS water displacement is inhibited, causing the CR trip times to be slower.

Technical Specifications (TS) require that the maximum CR trip insertion time for an operable CR Drive Mechanism shall not exceed 1.66 seconds, from fully withdrawn to 3/4 insertion (104 inches of travel). TS Limiting Conditions For Operation permits operation with one inoperable CR. TS also require that if more than one CR is inoperable or misaligned, the reactor shall be shut down to the hot standby condition within 12 hours.

EVENT DESCRIPTION

A previous event, reported as LER 269/93-05 due to slow control rod (CR) drop times, included corrective actions that revised procedures to require an engineering evaluation on any CR trip times of 1.4 seconds or greater. A program was initiated to gather test data, record trends, and statistically predict future performance.

Following an April 14, 1995 Unit 2 reactor trip, it was noted that one CR exceeded the Technical Specification (TS) trip time limit, and eleven others were slower than 1.4 seconds. This was more degradation than predicted by prior trending. This problem was documented in a Problem Investigation Process Report. The information obtained from the CR trip times for Unit 2, was utilized in re-evaluating the Unit 1 CR situation. The Unit 1 projections were recalculated and showed that Unit 1 was potentially degraded beyond TS.

On April 20, 1995, with Unit 1 at 100% full power, a decision was made to schedule a shut down to test CR trip times.

On April 26, 1995, at 0200 hours, Unit 1 was shutdown from 100 % Full Power, after completing 301 Effective Full Power Days (EFPD) out of a 470 ± 10 EFPDs core.

On April 27, 1995, at approximately 0600 hours, the CR trip time testing was performed at hot standby conditions. The Operator Aid Computer and Events Recorder were used for timing the initial CR trip time. CR Group 1 rods 2 and 7, Group 3 rod 8, Group 5 rods 8 and 10 exceeded the TS limit of 1.66 seconds. The times recorded were 1.980, 1.676, 2.084, 1.953, and 1.953 seconds respectively. Four additional CRs had trip times ranging from 1.509 to 1.612 seconds. At approximately 0930 hours, Plant Management decided that the unit would be taken to cold shutdown and that a total of nine thermal barriers should be replaced. On April 28, 1995, at 1200 hours, Unit 1 reached cold shutdown.

On May 8, 1995, the repairs had been completed and Unit 1 returned to hot shutdown condition at 2047 hours.

On May 9, 1995, at approximately 0600 hours, the CR trip time test was completed. The CR's that were replaced had trip times from 1.202 to 1.344 seconds. One CR (Group 5 rod 10) did not record a time. This CR was one which had been replaced but did not record a time due to a defective position indication switch. The switch was replaced and a retest of the CR for group 5 rod 10 recorded a trip time of 1.384 seconds. For the other CRs which were not replaced, the slowest trip time recorded was 1.420 seconds. This testing demonstrated the operability of all CRs and the Unit was returned to service.

CONCLUSIONS

The root cause of this event is Equipment Failure due to corrosion product buildup within the thermal barriers. The cause of the corrosion buildup has not been determined at this time. A review of industry operating experience, problem reports, and Licensee Event Reports of the past two years indicates that additional incidents of slow control rods (CR) have occurred. LER 269/93-05 concerned two inoperable CR's due to slow trip times. Five other Problem Identification Process Reports have been written to document slow trip times at Oconee. Thus, this event is considered recurring. Duke Power Company along with the BWNT Owners Group has been

evaluating the problems associated with the CR trip times. The evaluation and assessment is continuing as data is acquired.

The decision to shut down Unit 1 and test the CR trip times considering the new trend data was timely and conservative. Also, during a forced outage on Unit 2, twelve thermal barriers were replaced. Unit 3 has different model CRs and has not shown this type of problem.

The slow CR's in this event are NPRDS reportable. The Control Rod Drive Mechanism is model number 703253-1058, manufactured by Diamond Power Specialty Company.

There were no radioactive releases, overexposures, or personnel injuries associated with this event.

CORRECTIVE ACTIONS

Immediate

None

Subsequent

1. Unit 1 was taken to cold shutdown condition for replacement of control rod thermal barriers. A total of nine control rod thermal barriers were replaced including the five which were determined to be inoperable.

Planned

1. Continue the evaluation of available control rod data and take corrective action as appropriate.

2. Review Nuclear Engineering's tracking and trending methods and continue applying data to forecast future control rod trip time performance.

SAFETY ANALYSIS

The Final Safety Analysis Report (FSAR) Chapter 15 analyses assumes that a reactor trip results in the insertion of negative reactivity consistent with the 1% shutdown margin Technical Specification (TS), including an allowance for the most reactive Control Rod (CR) stuck in the fully withdrawn position. The rate of negative reactivity insertion is based on the combination of an assumed rod position versus time curve and a reactivity worth versus position curve, both of which are conservative for the core design and CR design. The rod position versus time curve includes the effect of the rod trip time. It has been confirmed that the rod trip time in TS is consistent with the accident analysis assumption. Therefore, any combination of CR worth and rod trip time can be evaluated against the FSAR assumed reactivity versus time curve.

In order to quantify the CR worth for Cycle 16, nuclear design computer simulation models were used. These were the same models used to design Cycle 16, and are NRC approved methods. With five rods in question, plus the worst additional stuck rod assumed to be stuck out, the worth of the remaining operable rods were calculated at several points in core life prior to the time of the event. The results of the analysis indicated that the remaining operable CR's had significantly more than the required reactivity to maintain the 1% TS shutdown margin throughout the cycle. Therefore, the TS shutdown margin was preserved.

Since the operable CR's fell at trip times that are significantly less than the time required by TS, the FSAR assumed reactivity versus time curve was also preserved.

Therefore, since both the CR total worth and worth versus time were within the FSAR assumptions, there is no safety significance associated with the possibility that these five CR's may have rod trip times greater than the current TS limit.

There were no releases of radioactive material and the health and safety of the public was not affected due to this event.