



**Entergy
Operations**

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March 22, 1991

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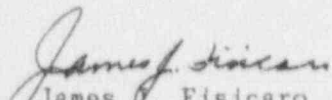
U. S. Nuclear Regulatory Commission
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SUBJECT: Arkansas Nuclear One - Unit 2
Docket No. 70-368
License No. NPF-6
Licensee Event Report 50-368/91-006-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(1)(B), attached is the subject report concerning the Core Protection Calculator Reactor Coolant System flow channels not being calibrated as required by Technical Specifications due to personnel error.

Very truly yours,


James C. Fisicaro
Manager, Licensing

JJF/RHS/mmg
Attachment

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Arkansas Nuclear One, Unit Two

DOCKET NUMBER (2) PAGE (3)
050003681 OF 04

TITLE (4) Core Protection Calculator Reactor Coolant System Flow Channels Not Calibrated
As Required By Technical Specifications Due To Personnel Error

EVENT DATE (5)			LER NUMBER (6)		REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)													
Month	Day	Year	Year	Sequential Number	Revision Number	Month	Day	Year	Facility Names	Docket Number(s)											
0	2	2	9	1	9	1	--	0	0	6	--	0	0	0	3	2	2	9	1		05000

OPERATING MODE (9) 1 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

POWER LEVEL (10)	Code	20.402(b)	20.405(a)(1)(i)	20.405(a)(1)(ii)	20.405(a)(1)(iii)	20.405(a)(1)(iv)	20.405(a)(1)(v)	20.405(c)	50.36(c)(1)	50.36(c)(2)	50.73(a)(2)(i)	50.73(a)(2)(ii)	50.73(a)(2)(iii)	50.73(a)(2)(iv)	50.73(a)(2)(v)	50.73(a)(2)(vii)	50.73(a)(2)(viii)(A)	50.73(a)(2)(viii)(B)	50.73(a)(2)(x)	73.71(b)	73.71(c)	Other (Specify in Abstract below and in Text, NRC Form 366A)	
	87																						

LICENSEE CONTACT FOR THIS LER (12)

Name	Telephone Number
Richard H. Scheide, Nuclear Safety and Licensing Specialist	Area Code: 501-964-5000

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

Cause	System	Component	Manufacturer	Reportable to NRCDS	Cause	System	Component	Manufacturer	Reportable to NRCDS

SUPPLEMENT REPORT EXPECTED (14)

Yes (If yes, complete Expected Submission Date)	No	EXPECTED SUBMISSION DATE (15)	Month	Day	Year
<input type="checkbox"/>	<input checked="" type="checkbox"/>				

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

On February 22, 1991, at approximately 0940, it was determined by Operations personnel that a violation of the ANO-2 Technical Specifications had occurred in that a calibration of the Core Protection Calculators (CPCs) had not been performed, as required, when CPC indicated Reactor Coolant System (RCS) flow was observed to be greater than Core Operating Limit Supervisory System (COLSS) indicated RCS flow. Operations personnel record the indicated RCS flow of each CPC channel and the calculated COLSS RCS flow every 8 hours and compare the two readings to ensure that CPC RCS flow is less than COLSS indicated flow. It was determined that CPC indicated flow had been slightly greater than COLSS calculated RCS flow for 4 consecutive 8 hour checks. The CPCs were declared inoperable and Technical Specification (TS) 3.0.3 was entered at 0940. New flow coefficient constants were calculated and entered into the CPCs, lowering CPC indicated flow to less than COLSS indicated RCS flow. TS 3.0.3 was exited at 1039. The root cause of this event was determined to be personnel error. The Operations Manager counseled the operators involved in this event. Additionally, the Operations Manager will discuss this event with Operations personnel in his weekly meetings during the next requalification cycle. Management expectations regarding operations log taking will be emphasized.

LICENSEE EVENT REPORT (LER) TEXT (CONTINUATION)

FACILITY NAME (1) Arkansas Nuclear One, Unit Two	DOCKET NUMBER (2) 0 5 0 0 0 3 6 8	LER NUMBER (6)			PAGE (3) 0 2 0E 0 4
		Year	Sequential Number	Revision Number	
		9 1 --	0 0 6 --	0 0	

TEXT (If more space is required, use additional NRC Form 366A's) (17)

A. Plant Status

At the time of this event, Arkansas Nuclear One, Unit Two (ANO-2) was at approximately 87 percent of rated power. Reactor Coolant System (RCS) [AB] temperature was approximately 575 degrees and RCS pressure was 2250 psia. Preparations were in progress for refueling outage 2R8 and reactor power was being allowed to coastdown prior to plant shutdown.

B. Event Description

On February 22, 1991, at approximately 0940, it was determined by Operations personnel that a violation of the ANO-2 Technical Specifications had occurred in that a calibration of the Core Protection Calculators (CPCs) [JC] had not been performed, as required, when CPC indicated RCS flow was observed to be greater than Core Operating Limit Supervisory System (COLSS) indicated RCS flow.

Each of the four independent CPCs monitors RCS flow, temperature and pressure and reactor power in order to calculate Departure From Nucleate Boiling Ratio (DNBR) and Local Power Density (LPD). The CPCs provide reactor trip signals to the Reactor Protection System (RPS) [JC] when these parameters reach predetermined values to ensure that fuel design limits are not exceeded.

The ANO-2 Technical Specifications require that, above 70 percent rated thermal power, the total RCS flow rate as indicated by each CPC shall be verified to be less than or equal to the actual RCS total flow rate as determined by Reactor Coolant Pump (RCP) differential pressure instrumentation or calorimetric calculations at least once every 12 hours. The specification also requires that, if necessary, the CPC addressable constant flow coefficients shall be adjusted such that each CPC indicated flow is less than or equal to the actual flow rate.

The CPCs calculate RCS flow rate based on input from the RCP speed sensors. However, the COLSS calculates total RCS flow utilizing RCP differential pressure instrumentation and provides a more accurate indication of actual RCS flow than the CPCs.

Operations personnel are required to record the indicated RCS flow on each CPC channel and the calculated COLSS RCS flow on the "Power Distribution and Burnup Log" once every 8 hours and compare the two readings to ensure that the above referenced Technical Specifications requirements are satisfied.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Arkansas Nuclear One, Unit Two	DOCKET NUMBER (2) 0 5 0 0 0 3 6 8	LER NUMBER (6)			PAGE (3) 0 3 OF 0 4
		Year 9 1 --	Sequential Number 0 0 6 --	Revision Number 0 0	
TEXT (If more space is required, use additional NRC Form 366A's) (17)					

At the time of this event, the present reactor core was close to the end of life and RCS boron concentration was extremely low. As the fuel concentration decreased, reactor power was allowed to coastdown instead of further attempting to lower RCS boron concentration. As power decreased, the COLSS calculated RCS flow decreased while CPC calculated flow remained relatively constant. When the midnight shift logs were taken on February 21, 1991, COLSS RCS flow was logged as less than channel 'D' CPC flow. As reactor power was further reduced during the midnight shift, COLSS flow became less than all four CPC flow channels. This condition continued until the day shift logs were taken at 0940 on February 22 at which time the out of specification readings were detected by the operator. At that time, all four channels of CPCs were declared inoperable, and Technical Specification 3.0.3 was entered. This Limiting Condition for Operation requires that Technical Specifications requirements be satisfied within 1 hour or the plant must be placed in Hot Standby within 6 hours. Reactor Engineering calculated new flow coefficient addressable constants and Operations entered the new constants into the CPCs (i.e., calibrated the CPCs). The new constants reduced the CPCs calculated RCS flow to less than COLSS RCS flow, and at 1039, all four channels of CPC were declared operable and Technical Specification 3.0.3 was exited.

The fact that CPC indicated RCS flow was greater than COLSS indicated RCS flow was not detected on four different eight hour checks performed by the licensed control room operators and one Shift Supervisor log review which was performed on the February 21 log.

C. Root Cause

The root cause of this event was determined to be personnel error. All of the operators involved stated that they understood the relevant Technical Specification and the requirement to compare CPC and COLSS RCS flow. However, due to the increased activity level in the Control Room due to preparations for plant shutdown and the gradual decrease in COLSS generated RCS flow indication, the Technical Specification noncompliance was not immediately detected.

D. Corrective Action

As previously stated, new flow coefficient addressable constants were calculated and entered into the CPCs, returning them to operable status at 1039 on February 22, 1991.

The ANO-2 Operations Manager counselled the operators involved in this event. The importance of limits associated with Technical Specifications related log readings and the required actions when these limits are not met was stressed.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Arkansas Nuclear One, Unit Two	DOCKET NUMBER (2) 0500036891	LER NUMBER (6)			PAGE (3) 04 OF 04
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		91	06	00	

TEXT (If more space is required, use additional NRC Form 366A's) (17)

In addition, the Operations Manager will review this event with Operations personnel in his weekly meetings during the first requalification cycle following refueling outage 2R8. Management expectations regarding operations log taking will be emphasized. This action, which should aid in preventing the occurrence of similar events, is expected to be completed by June 30, 1991.

E. Safety Significance

Following calibration of the CPC channels and their return to operable status, Reactor Engineering personnel performed a calorimetric flow calculation, which is more accurate than the COLSS flow calculation and is the standard at ANO for indication of actual RCS flow. This calculation verified that the CPCs indicated RCS flow had been conservative with respect to actual RCS flow during the time that they were in noncompliance with Technical Specifications. Therefore, the safety significance of this event is minimal since the CPCs were capable of performing their design function of initiating a reactor trip prior to exceeding any fuel design limits.

F. Basis For Reportability

Since CPC indicated RCS flow was not calibrated as required by Technical Specifications requirements, this event is reportable pursuant to 10CFR50.73(a)(2)(i)(B) as operation in a condition prohibited by the plant's Technical Specifications.

G. Additional Information

A previous similar event in which a CPC calibration was not performed as required by the plant's Technical Specifications due to personnel error was reported in LER 50-368/88-021-00. The corrective actions taken with respect to that event did not prevent the event discussed in this report because they were of a specific nature and did not address the generic implications of the event.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].