

L I C E N S E E E V E N T R E P O R T (L E R)

FACILITY NAME (1) Arkansas Nuclear One, Unit Two DOCKET NUMBER (2) PAGE (3)
101510101 31 61 8110F1012

TITLE (4) CPC/COLSS Non-conservative Fxy Constants

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)
01	2	84	84	01	01	01	2	84		01510101
OPERATING THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5:										
MODE (9) 1 (Check one or more of the following) (11)										
POWER				20.402(b)		50.73(a)(2)(iv)				73.71(b)
LEVEL				20.405(a)(1)(i)		50.73(a)(2)(v)				73.71(c)
(10)				20.405(a)(1)(ii)		50.73(a)(2)(vii)				Other (Specify in Abstract below and in Text, NRC Form 366A)
				20.405(a)(1)(iii)		50.73(a)(2)(viii)(A)				
				20.405(a)(1)(iv)		50.73(a)(2)(viii)(B)				
				20.405(a)(1)(v)		50.73(a)(2)(x)				

LICENSEE CONTACT FOR THIS LER (12)
Name Patrick C. Rogers, Plant Licensing Engineer Telephone Number
Area
Code
510119164-1311010

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

SUPPLEMENT REPORT EXPECTED (14)
Yes (If yes, complete Expected Submission Date) No
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At 1430 on 03/20/84, Arkansas Power and Light (AP&L) was notified by Combustion Engineering (CE) of an error in the CECOR computer code. CECOR is a CE computer code which utilizes incore detector signals to synthesize reactor core parameters (e.g. axial and radial power distribution, azimuthal tilt and flux peaking). The CECOR computer code is used by AP&L Nuclear Engineering for beginning of cycle physics testing, Technical Specification power distribution surveillances and core follow. The specific error was incorporation of incorrect pin-to-box factors into a CECOR coefficient library. These factors are used to determine peak pin power from fuel assembly average power. Peak pin power is then utilized to determine Fxy, the planar radial peaking factor. Calculations of Fxy were performed with CECOR as part of Cycle 4 startup testing for rodged and unrodged conditions. As a result of the non-conservative calculation of these Fxy values, non-conservative addressable constants were input for Fxy versus rod configuration lookup tables in the Core Protection Calculators (CPC's) and Core Operating Limit Supervisory System (COLSS). Upon notification of the error, conservative values for Fxy constants were immediately incorporated into the COLSS and CPC's. Calculations other than Fxy by CECOR were not affected by this error. To prevent recurrence, effective 04/30/84, CE included a specific checklist which requires uniform, systematic review of CECOR input data relative to design specifications.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Arkansas Nuclear One, Unit Two		Sequential	Revision		
		Year	Number	Number	
	0501003618	84	--	010--	010210F012

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

At 1430 on 3/20/84, AP&L was notified by Combustion Engineering (CE) of an error in the CECOR code which resulted in installed non-conservative values of planar radial factors, Fxy, for the Core Protection Calculators (CPC's) and the Core Operating Limit Supervisory System (COLSS). CECOR is CE computer code which synthesizes core parameters from incore detector signals (e.g., axial and radial power distributions, azimuthal tilt and flux peaking). The CECOR coefficient library for Cycle 4 contained an error in the pin-to-box factor coefficients for the F* fuel subbatch (16 low enrichment new fuel assemblies). This error resulted in a non-conservative calculation by CECOR of Fxy. Calculations of Fxy were performed at 50% power during cycle 4 initial power ascension testing for all rods out (ARO) and all Technical Specification permissible rodged configurations. Fxy values were input via addressable constants into lookup tables of Fxy versus rod configuration in the CPC's and COLSS and are utilized in calculating DNBR and linear heat rate. The error originated from incorrect geometry input in the DIT model used to generate fine mesh cross sections for the F* fuel subbatch which are then used in the MC code. The MC code performs fine mesh imbedded diffusion/depletion calculations of the pin power distribution for the individual fuel assemblies and produces the pin-to-box factors used in the CECOR library. CECOR coefficients are obtained from core diffusion theory calculations performed with the MC computer code.

The error was discovered by CE during an evaluation to determine whether MC cross section data for the F* fuel subbatch would be applicable for use in the calculations for the Cycle 5 G* fuel subbatch. The cause of the error was a failure to adequately review the geometry input data to the DIT mode. Subsequent review of the models and calculations used to generate the CECOR library revealed no other errors. The error affected only the Fxy measurements. Other uses of CECOR were not affected.

Upon discovery of the non-conservatism, the CPC's and COLSS were immediately updated such that conservative penalties were applied. A 3% increase in the ARO Fxy and a 5% increase in the rodged Fxy values were applied until further analyses and calculations could be made. Non-conservative factors existed from 2/7/84, when the power escalation test results were entered into the COLSS and CPC's until 3/20/84, when the error was discovered and conservative penalties applied.

On 3/30/84, CE submitted correspondence to AP&L which demonstrated the results of an evaluation of offsetting conservatisms contained in the COLSS and CPC's based upon cycle dependent analysis data. This correspondence then compared the non-conservative Fxy values with conservative values contained in the cycle 4 reload analysis. The evaluation clearly showed that the non-conservatisms of the Fxy error were more than offset by the conservatisms contained in other analysis within the COLSS and CPC data. Therefore, the safety consequences for the period of time in question were negligible.

A corrective measure to prevent recurrence of this event was developed by CE and became effective within the CE organization on 04/30/84, in that a specific checklist which requires uniform, systematic review of model input data relative to design specifications was included as part of recorded calculations.



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September 20, 1985

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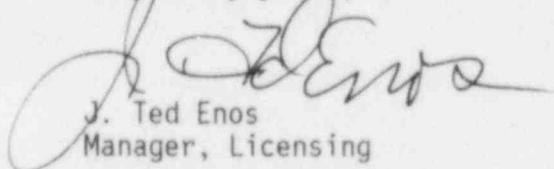
U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Licensee Event Report
No. 84-010-01

Gentlemen:

In accordance with 10CFR50.73(a)(2)(i), 50.73(a)(2)(v), and 50.73(a)(2)(vii), attached is the subject report concerning Core Protection Calculators and Core Operating Limit Supervisory System non-conservative Fxy Constants. This is a revision to a previous submittal dated April 19, 1984.

Very truly yours,


J. Ted Enos
Manager, Licensing

JTE:RJS:ds

Attachment

cc: Mr. James M. Taylor
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, DC 20555

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