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FACIL:50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316
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SUBJECT: LER 89-018-00:on 891108,rated thermal power exceeded on Unit 2 due to unanticipated computer constant change.
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INDIANA MICHIGAN POWER

December 8, 1989

United States Nuclear Regulatory Commission
Document Control Desk
Rockville, Maryland 20852

Operating License DPR-74
Docket No. 50-316

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Reporting System, the following report is being submitted:

89-018-00

Sincerely,

A.A. Blind
Plant Manager

AAB:clw

Attachment

cc: D.H. Williams, Jr.
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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
D. C. Cook Nuclear Plant - Unit Two	0 5 0 0 0 3 1 6	1 OF 0 4

TITLE (4)
Rated Thermal Power Exceeded on Unit Two Due to Unanticipated Computer Constant Change

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 5 0 0 0
1 1	0 8	8 9	8 9	0 1 8	0 0	1 2	0 7	8 9		0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 1 0 0	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 (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	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
C. A. Ross Computer Sciences Superintendent	AREA CODE 6 1 6 4 6 5 - 5 9 0 1

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	

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 fifteen single-space typewritten lines) (16)

On November 8, 1989, with Unit Two operating at 100 percent reactor thermal power, it was discovered that the P-250 computer contained incorrect blowdown constants for the Thermal Output Program. These incorrect values had been entered into the P-250 computer on October 25, 1989. During maintenance in the P-250, a core image tape was loaded. This load tape contained a value of 32 gpm for blowdown flow rather than 0 gpm that is currently required. As described in LER 50-316/89-009, a value of 0 gpm is required for blowdown compensation to prevent exceeding rated thermal power due to a missing term in the Thermal Output Program. The worst case analysis indicated a potential 0.67 percent difference between the P-250 calculated and actual thermal power. Unit Two is again operating conservatively using no compensation for blowdown flow (actual reactor thermal power is less than P-250 calculated thermal power). The blowdown constants have been added to a list of safety constants that, if changed, will print out informing the technician to change to the correct value as required. Additional administrative controls have been implemented to control input/changes to P-250 constants.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
D. C. Cook Nuclear Plant - Unit Two	0 5 0 0 0 3 1 6	8 9	— 0 1 8	— 0 0	0 2 OF 0 4

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

CONDITIONS PRIOR TO OCCURRENCE

Unit One in Mode 1 (Power Operation) at 100 percent power

Unit Two in Mode 1 (Power Operation) at 100 percent power

DESCRIPTION OF EVENT

On November 8, 1989, with Unit Two operating at 100 percent reactor thermal power, it was discovered that the thermal output program on the Westinghouse P-250 computer (EIIS/ID) contained incorrect values for steam generator blowdown flow constants. The values were 32 gpm and not 0 gpm as required by procedure. The 0 gpm value was required as reported in LER 50-316/89-009. Due to an inaccurate formula within the program, there exist the possibility of exceeding the Rated Thermal Power by compensating for blowdown flow.

The wrong values for the blowdown constants were entered into the computer on October 25, 1989. During maintenance on the computer a core image tape was loaded into the computer. This load tape had been made when Unit Two came out of the last refueling outage in January 1989. When the tape is loaded into the P-250, the computer prints out inconsistencies between the tape value and the current computer value for a select group of safety constants. The computer technician checked this printout and changed those constants that had changed to the proper value. Since the blowdown constants were not a part of the safety constant list and he did not know about the need to have a zero entered, he did not change the blowdown constants.

The incorrect blowdown constants remained in the computer until November 8, 1989. When discovered, the correct value of 0 gpm was entered in the P-250. As detailed in LER 50-316/89-009 the P-250 calculated reactor thermal power can be affected non-conservatively when blowdown compensation is used. The calculated thermal power is affected to a greater extent when blowdown is not in service and the constants are any positive value. During this event the unit was on the Normal Flash Tank (EIIS/TK-WI) for the majority of the time. There was one period of Start Up Flash Tank (EIIS/TK-WI) operation and a number of short periods of time with no blowdown in service. The non-conservative errors caused by having this wrong blowdown constant are 10 MWT or 0.29 percent of rated thermal power (normal flash tank), and 23 MWT or 0.67 percent of rated thermal power with no blowdown in service.

$$\text{Real SGTO} = (M_{fw} - M_{bd})h_{stm} - M_{fw}h_{fw} + M_{bd}\,h_{bd}$$

$$\text{P-250} = (M_{fw} - M_{bd})h_{stm} - M_{fw}h_{fw}$$

$$\text{error} = M_{bd}h_{bd}$$

SGTO = Steam Generator Thermal Output

M_{fw} = Mass of Feed Water

M_{bd} = Mass of Blowdown

h_{stm} = Enthalpy of Steam

h_{fw} = Enthalpy of Feed Water

h_{bd} = Enthalpy of Blowdown

CAUSE OF EVENT

While the corrective action described in LER 50-316/89-009 was in place to ensure that the blowdown constants contained the proper 0 gpm value during normal operation, it was not anticipated that the P-250 computer would be reinitialized using an outdated core image tape. The cause of this event was not having administrative controls in place to prevent the Computer Technician from inserting incorrect values into the P-250 computer.

ANALYSIS OF EVENT

The Unit Two accident analyses were performed for LER 89-009. This event is bounded by the assumption and results of that analysis. The analyses were performed with consideration of the fact that actual core power may deviate from rated thermal power. This means that the reactor was assumed to be at 102 percent of rated thermal power, unless the limiting case was a lower power level or a spectrum of powers was analyzed. The 2 percent allowance is intended to cover calorimetric error or short term drifts in power. The largest P-250 calculated reactor thermal power deviation caused by this event is 23 MWT or 0.67 percent difference between actual and P-250 calculated thermal power. During this event, the highest Reactor Power level (as calculated by the P-250) was 100.06 percent.

This maximum power deviation, due to blowdown error, of 0.67 percent of rated thermal power is bounded by the 2 percent allowance in the accident analysis and therefore no significant threat to public health and safety existed. The condition is determined to be reportable per 10 CFR 50.73 (a)(2)(i)(B), as operation prohibited by the plant's Technical Specifications (T/S). (T/S 3.2.6 requires power to be less than or equal to 100 percent power. License conditions C(1) clarifies this to be a steady state power of 100 percent). The report is considered necessary only because of literal interpretation of the T/S and license requirements. The safety analysis assumed a 2 percent error in steady state reactor power to account for calorimetric errors. We believe the intent of the T/S was to ensure steady

state reactor power did not exceed 100 percent power as indicated to the operators, with the 2 percent allowance accounting for deviations between the indicated and actual power.

CORRECTIVE ACTION

Immediate corrective action occurred on November 8, 1989 by reentering the zero value for the blowdown constants. To preclude this specific type of event from recurring, the blowdown constants have been added to the safety constant list. This will cause a printout if any of these constants are changed. This will cause a review of the constants and correction if required. To prevent other types of computer errors, additional administrative controls have been implemented to control the input/changes to P-250 constants.

FAILED COMPONENT IDENTIFICATION

NONE

PREVIOUS SIMILAR EVENTS

LER 50-316/89-009

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