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 FACIL: 50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316
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SUBJECT: LER 87-013-00: on 871010, reactor tripped due to turbine trip.
 Caused by bistable setpoint being set too conservatively due
 to setpoint calculation error. Setpoint recalculated &
 bistable calibr to correct value. W/871105 ltr.

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

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	NRR/DRIS/SIB	1 1	NRR/PMAS/ILRB	1 1
	REG FILE 02	1 1	RES DEPY GI	1 1
	RES TELFORD, J	1 1	RES/DE/EIB	1 1
	RGN3 FILE 01	1 1		
EXTERNAL:	EG&G GROH, M	5 5	H ST LOBBY WARD	1 1
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	NSIC HARRIS, J	1 1	NSIC MAYS, G	1 1

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
D. C. COOK NUCLEAR PLANT - UNIT 2	0 5 0 0 0 3 1 6	8 7	— 0 1 3	— 0 0	0 2	OF 0	4

TEXT (If more space is required, use additional NRC Form 308A's) (17)

Conditions Prior To Occurrence

Unit Two - Mode One (power operation) 8 percent reactor thermal power.

Description of Event

On October 10, 1987 the Unit Two turbine (EIIS/EL-TRB) was being rolled in preparation for turbine overspeed testing. Power was being held below Permissive P-7 in order to prevent a reactor trip from a turbine trip. The turbine trip/reactor trip is blocked below Permissive P-7, which is fed from Permissive P-10 (2/4 Power Range Nuclear Instrumentation Channels (EIIS/IG-CHA) \geq 11 percent reactor power) or Permissive P-13 (1/2 turbine impulse pressure channels (EIIS/IT-CHA) \geq 51 psig). The operators were bumping up turbine speed and at approximately 1523 rpm, the turbine tripped and the reactor tripped as a result.

Investigation determined that the setpoint for P-13 was too conservative, thus allowing the turbine trip/reactor trip to become unblocked prematurely while power was at approximately 8 percent. The setpoint as called for by the procedure was found to be the equivalent of 31.132 psig instead of 45 psig as intended (Technical Specification requires that P-7 be active at \geq 51 psig). The incorrect setpoint was calculated in 1986 as a result of an investigation that found that P-13, P-10 and P-6 were set non-conservative due to misinterpretation of the Technical Specification setpoint requirements. This was reported in LER 315/86-002-1 for both Unit One and Unit Two. As part of the corrective actions at that time, the setpoints were recalculated to make them conservative with respect to Technical Specifications (i.e. 45 psig). However, during calculation of the new setpoint, it appears probable that the 45 psig was not converted to absolute pressure for the calculation. This resulted in a much lower setpoint equivalent to 31.132 psig.

Following the discovery of the incorrect setpoint for Unit Two, Unit One's calibration procedures were checked and the P-13 setpoint was found to be too conservative due to the same calculational error found on Unit Two.

The exact cause of the turbine trip could not be determined with certainty. Post-trip review indicated it was the result of a mechanical trip (either the vacuum trip or overspeed trip). The vacuum trip devices were inspected and found to operate correctly. It was concluded that the turbine trip was most probably the result of a spurious overspeed trip.

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D. C. COOK NUCLEAR PLANT - UNIT 2		87	013	00	03	OF	04

TEXT (If more space is required, use additional NRC Form 368A's) (17)

Cause of the Event

The cause of the reactor trip was the turbine trip. The reactor trip occurred because the setpoint for P-13 was set too conservatively due to a calculation error. This defeated the block of the reactor trip from the turbine trip prematurely.

Analysis of Event

This Engineered Safety Features Actuation, which resulted in a reactor trip sequence, is reportable pursuant to 10 CFR 50.73 (a)(2)(iv).

Because of the calculation error, P-13 was set too conservative. On increasing power P-13 reached its setpoint value well below the Technical Specification required setpoint. This resulted in the premature activation of P-7 which defeated the automatic block of reactor trip on low reactor coolant flow, reactor coolant pump under-voltage and under-frequency, turbine trip, pressurizer low pressure and pressurizer high water level.

On a power increase P-7 is developed when either Reactor Trip System interlocks P-10 or P-13 (turbine first stage pressure) reach their setpoint values. The Technical Specifications require that P-7 is functioning to defeat the automatic blocks of the above P-7 related trips prior to reactor thermal power reaching 11 percent RTP or turbine impulse pressure reaching 37 psig in Unit 1, or 51 psig in Unit 2.

The Operations Sequence Monitor functioned as designed. A time study of parameters monitored concluded that all automatic protection system responses; reactor trip, and resulting actuations functioned properly as a result of the Engineered Safety Features actuation.

Based on the above, it is concluded that the event did not constitute an unreviewed safety question as defined in 10 CFR 50.59 (a)(2), nor did it adversely impact health and safety.

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

Corrective Actions

Immediate corrective actions involved Operations personnel implementing plant procedures to verify proper response of the automatic protection system and to assess plant conditions for initiating appropriate recovery actions.

The setpoint for P-13 was recalculated for Unit Two and the procedure changed to reflect the correct setpoint. Subsequently, Unit Two started up and no further problems with P-13 occurred.

Unit One P-13 setpoint is being reviewed and if appropriate, it will be revised to eliminate unnecessary conservatism.

Failed Component Identification

None.

Previous Similar Events

None.

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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:

87-013-0

Sincerely,


W. G. Smith, Jr.
Plant Manager

WGS:afh

Attachment

cc: John E. Dolan
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