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FACIL:50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316
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RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-006-00:on 910801,reactor tripped as result of turbine trip generated by generator differential protective relays operating.Caused by failure of phase three current transformer.Testing conducted.W/910830 ltr.

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INDIANA MICHIGAN POWER

August 30, 1991

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

Operating Licenses DPR-74
Docket No. 50-316

Document Control Manager:

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

91-006-00

Sincerely,

A.A. Blind
Plant Manager

AAB:sb

Attachment

c: D.H. Williams, Jr.
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NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

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

TITLE (4) Reactor Trip-Turbine Trip from Main Generator Protective Relay Operation During Failure of a Main Generator Output Breaker Current Transformer

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
0 8	0 1	9 1	9 1	— 0 0 6	— 0 0	0 8	3 0	9 1		0 5 0 0 0

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)	9 7	20.402(b)	20.405(c)	[X] 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 (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	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
P. F. Carteaux - Safety and Assessment 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	
E	F K	- X C T	X 9 9 9	Y							

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 August 1, 1991, at 1931 hours, the Unit 2 reactor tripped as a result of a turbine trip generated by the generator differential protective relays operating caused by a fault/explosion of the phase three current transformer (CT) of the main generator output breaker. The CT was disassembled and inspected. The inspection revealed that the CT had an internal failure, possibly arising from past stresses imposed on the CT. The American Electrical Power Nuclear Organization will be taking responsibility for future scheduling of the predictive and preventive maintenance activities related to switchyard CT internal deterioration detection, an activity which had not been prudently applied to this particular CT prior to the event.

Abnormalities noted during the event included the electronic overspeed trip of the turbine-driven auxiliary feed pump as the operator was removing it from service, and closure of one of the four main steam isolation valves, which should have stayed open. The turbine-driven auxiliary feedwater pump was immediately reset and placed in standby, and the closed main steam isolation valve was promptly reopened.

Conditions Prior to Occurrence

Unit 2 was operating in Mode 1 at 97.5 percent of Rated Thermal Power.

Description of Event

On August 1, 1991, at 1931 hours, the Unit 2 reactor (EIIS/JE) tripped as a result of a turbine (EIIS/TA) trip generated by the generator differential protective relays operating caused by a fault/explosion of phase three current transformer (EIIS/FK-XCT) on the main generator (EIIS/EL) output breaker (EIIS/FK-BKR) A1. The output breaker is in the 765 KV switchyard which is approximately one mile from the major plant buildings.

Following the turbine trip/reactor trip sequence, [turbine (EIIS/TA-TRB) trip, opening of the reactor trip breakers (EIIS/JE-BKR), insertion of reactor control rods (EIIS/BA-P), and automatic start of the auxiliary feedwater pumps (EIIS/BA-P)], Operations personnel immediately implemented Emergency Operating Procedure 2 OHP 4023.E-0 to verify proper response of the automatic protection system and to assess plant conditions for indicated appropriate recovery actions.

Following the main generator trip and transfer to reserve feed (EIIS/FK), the 345 KV bus, via the Unit 1 switchyard, provided a stable power supply for the Unit 2 auxiliary loads.

Abnormalities noted during the event included the electronic overspeed trip of the turbine-driven auxiliary feedwater pump (EIIS-BA-P) as the operator was removing it from service, and closure of one of the four main steam isolation valves (EIIS/SB-ISV), which should have stayed open. The turbine-driven auxiliary feed pump was immediately reset and placed in standby. The main steam isolation valve was reopened promptly.

Cause of Event

The cause of the event was failure of phase three current transformer (CT) on main generator output breaker A1. The CT was disassembled and inspected. This CT experienced an internal electrical fault of indeterminate origin. The fault in the sealed oil volume produced a sharp pressure increase resulting in the explosive failure of the porcelain weathershed. It is most likely that initiation of the insulation deterioration began some time before the failure, possibly

as long as six months. A potential cause of the CT failure is the 5/12/91 current limiter failure on Unit 1. Evidence indicates that the May 12 event caused an overvoltage in excess of 120% for 23 seconds on the 765 KV equipment associated with the Unit 2. This could have hastened the deterioration of the CT insulation. It has also been discovered that preventive maintenance on some of the switchyard equipment has not been performed in accordance with published guidelines. This may have contributed to not discovering a degraded condition.

Analysis of Event

This report is being submitted in accordance with 10 CFR 50.73, paragraph (a)(2)(iv), as an event that resulted in an unplanned automatic actuation of the Engineered Safety Features, including the Reactor Protection System.

The automatic protection responses, including reactor trip and its associated actuations were verified to have functioned properly as a result of the reactor trip signal. The electronic overspeed trip of the turbine-driven auxiliary feedwater pump was immediately reset from the Control Room and it is believed that the pump would have been available if required. The main steam isolation valve, which drifted shut, was reopened promptly. Based on the above, it is concluded that the event did not involve an unreviewed safety question as defined in 10 CFR 50.59 (a)(2) nor did it adversely impact the health and safety of the public.

Corrective Actions

Testing was planned to investigate the cause of the TDAFP overspeed trip. This testing included overspeed trip setpoint verification. It was suspected that the governor was unable to control speed under the high steam pressure/low flow rate conditions experienced following the reactor trip. After an attempt to perform overspeed trip setpoint verification, which led to an inadvertent mechanical overspeed trip, the governor ceased to respond to Control Room signals to vary speed. This prevented further troubleshooting of the governor. The most likely cause of the overspeed trip was an improperly functioning governor. The governor was sent to Woodward Governor Company for further analysis.

A new governor was installed. After initial adjustments, all tests of the new governor have been satisfactory.

The cause of the CT failure was an internal electrical fault. Annual oil samples and gas-in-oil analysis to detect gassing and eliminate incipient failures had not been performed since 11/18/88. The responsibility for scheduling the predictive and preventive maintenance program for the 345 KV and 765 KV oil-filled current transformers is being transferred from from Indiana Michigan Power Transmission and Distribution group to the American Electric Power Nuclear Organization.

Failed Component Identification

Plant Designation: Main Generator Output Breaker A1 Phase Three Current Transformer
Manufacturer: Alsthom Savoisienne
Model: Type IHC-765-13
EIIS Code: EIIS/FK-XCT

Previous Similar Events

On May 24, 1990, at 0300 hours, the phase 2 current transformer on circuit breaker "L" in the 345 switchyard exploded and ignited the oil from the current transformer. No reactor trip resulted from this event. However, since the plant had to reduce power to recover due to system stability concerns, an "Alert" was declared per Emergency Plan Procedures. This event was not reportable per 10 CFR 50.73.