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December 7, 2000

U. S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555-0001

SUBJECT: Duke Energy Corporation
Catawba Nuclear Station Unit 1
Docket No. 50-413
Licensee Event Report 413/00-005 Revision 0

Attached please find Licensee Event Report 413/00-005 Revision 0, entitled "Engineered Safety Feature Actuation - 1B 4160 Volt Bus De-Energized Due to 1B Emergency Diesel Generator Potential Transformer Failure". The only commitments in this Licensee Event Report are those described in the "Planned Corrective Actions" section. Questions regarding this Licensee Event Report should be directed to R. D. Hart at (803) 831-3622.

Sincerely,

G. R. Peterson

Attachment

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xc:

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LICENSEE EVENT REPORT (LER)

(See reverse for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)

Catawba Nuclear Station Unit 1

DOCKET NUMBER (2)

05000413

PAGE (3)

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TITLE (4)

Engineered Safety Feature Actuation - 1B 4160 Volt Bus De-Energized
Due to 1B Emergency Diesel Generator Potential Transformer Failure

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 NAME	DOCKET NUMBER
11	10	2000	2000	005	00	12	07	2000	NA	
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	6	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	0 %	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	X 50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

R. D. Hart, Regulatory Compliance

TELEPHONE NUMBER (Include Area Code)

(803) 831-3622

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	EK	IPT	P292	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	NO	EXPECTED	MONTH	DAY	YEAR
X		N/A			

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On November 10, 2000, Operations was performing "B" train engineered safety feature (ESF) testing per plant procedures. During the blackout/LOCA section, a non-licensed operator at the 1B diesel generator (DG) notified the control room that smoke was coming out of the 1B DG generator control panel. The 1B DG was immediately shutdown and Operations entered abnormal procedure, (AP) AP/1/A/5500/007, Loss of Normal Power, to remove control power from the 1B DG and reenergize the ESF bus 1ETB from offsite power. At the time of this event, the 1B DG was the only power source to ESF bus 1ETB. The shutdown on the 1B DG resulted in a loss of voltage to ESF bus 1ETB and actuation of its undervoltage relays. This is an ESF actuation and is reportable pursuant to 10 CFR 50.73(a)(2)(iv). The cause of this event was a failure of the 1B DG voltage regulator potential transformer. The apparent cause of the failure of the potential transformer was a turn - to - turn fault in one phase. Engineering performed a common mode failure analysis and determined that no common mode failure existed. The failed transformer was replaced and the 1B DG successfully tested and returned to service on November 13, 2000. Additional testing and inspections on the remaining DG voltage potential transformers (1A, 2A, & 2B DGs) will be conducted to determine if any additional corrective actions are required.

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

Background

Catawba Nuclear Station Unit 1 is a four loop Westinghouse Pressurized Water Reactor. Unit 1 has two emergency diesel generators (DGs) 1A and 1B [EIIS: EK]. Each DG is utilized as the standby emergency power source for each 4160-volt emergency bus. DGs 1A and 1B are dedicated to engineered safety feature (ESF) busses 1ETA and 1ETB [EIIS: EB], respectively. The DGs will start automatically on a safety injection (SI) signal or on an ESF bus loss of voltage or degraded voltage signal. Loads will be automatically connected to the ESF bus as required by the respective load sequencer [EIIS: EK]. After the DG has started, it will automatically tie to its respective bus after offsite power is tripped as a consequence of ESF bus undervoltage or degraded voltage, independent of or coincident with a SI signal.

The DG voltage regulator is used to control the voltage produced by the generator by varying the level of excitation applied to the generator field winding. This voltage must be maintained within certain limits at all times in order for the electrical equipment supplied from the 4160 volt ESF bus to operate properly. The voltage regulator is powered from a potential transformer located in the rear of the DG control panel. The potential transformer takes the 4160-volt output of the generator and provides roughly a 250-volt input to the voltage regulator.

The potential transformer was manufactured by Electric Products, Inc. (PORTEC). It is a three-phase wye-wye connection transformer. The transformer was originally supplied with the DG and the 1B DG has had approximately 1253 starts in its lifetime.

Technical Specifications require several surveillances to be performed every 18 months for each DG. One such surveillance is to verify, on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal, the de-energization of ESF buses, load shedding from emergency buses, and starting of the DG from standby condition. The DG must then reach rated speed and voltage, energize its respective ESF bus, and energize auto-connected loads through the emergency load sequencer. This testing is done to ensure that the respective DG can perform its intended function during a design basis event.

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On November 10, 2000, Operations was performing "B" train ESF testing per procedure PT/1/A/4200/009, "Engineered Safety Features Actuation Periodic Test." During the blackout/LOCA section, a non-licensed operator at the 1B DG notified the control room that smoke was coming out of the 1B DG generator control panel. The control room operators immediately shutdown the 1B DG from the control room. The non-licensed operators were instructed to exit the 1B DG room and the fire brigade captain was dispatched to the 1B DG room to determine the extent of the situation. The control room operators entered abnormal procedure, (AP) AP/1/A/5500/007, Loss of Normal Power, to remove control power from the 1B DG and reenergize the ESF bus 1ETB. At the time of this event, the 1B DG was the only power source to ESF bus 1ETB. The shutdown on the 1B DG resulted in a loss of voltage to ESF bus 1ETB and actuation of its undervoltage relays, which sent a start signal to the 1B DG. This constitutes an engineered safety feature actuation.

Unit 1 operated in Mode 6, "Refueling" during this event. No additional structures, systems, or components were out of service at this time that contributed to the event. This event was reported to the NRCOC at 0454 on November 10, 2000 pursuant to 10 CFR 50.72(b)(2)(ii) "any event or condition that results in a manual or automatic actuation of any Engineered Safety Feature, including the reactor protection system." This event is also reportable pursuant to 10 CFR 50.73(a)(2)(iv) as an actuation of an ESF.

Event Description

11-10-00

- ~0207 PT/1/A/4200/009, ESF Testing "B" train Blackout/LOCA started.
- ~0217 During 1B DG loading sequencing and subsequent pump runs, the non-licensed operator noticed smoke coming from the 1B DG generator control cabinet. The non-licensed operator notified the control room and the 1B DG was immediately shutdown from the control room.
- ~0217 The control room dispatched the fire brigade captain to determine the extent of the situation. Operations entered AP/1/A/5500/007, "Loss of Normal Power," to remove control power from the 1B DG and restore offsite power to the ESF 4160 volt bus 1ETB.

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11-10-00 (continued)

~0454 The control room notified the NRCOC of the 4160 volt ESF bus 1ETB undervoltage actuation pursuant to 10 CFR 50.72 (b)(2)(ii) as an ESF actuation.

~0606 A clearance was issued for the 1B DG for repair of the voltage regulator potential transformer.

11-11-00

~0309 The replacement of the voltage regulator potential transformer was completed and Operations removed the clearance for this work.

11-13-00

~0831 Associated testing of the 1B DG was completed and the 1B DG was declared operable.

Causal Factors

The apparent cause of the potential transformer failure was a turn - to - turn fault in one of the three phases. The DG voltage regulator potential transformer is of three-phase construction and mounted horizontally in the bottom of the generator control cabinet. The phase in the transformer that failed was disassembled to investigate the failure. The following presents the most significant observations from the disassembly. The secondary winding suffered a turn-to-turn failure where the last turn stops and exits the winding. Each turn in the secondary winding is made up of four conductors. The last conductor in the last turn and the first conductor in the second to last turn suffered damage to the point that there was melting of the copper. The balance of the winding showed signs of extreme heat. Apparently, the last turn suffered mechanical interaction with the second to last turn that broke down the magnet wire enamel insulation.

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Operating Experience DataBase (OEDB) searches were performed for industry reports of similar failures. These searches covered external industry reports, INPO databases, and the Duke Energy nuclear system problem investigation process (PIP) databases. These searches did not find any other potential transformer failures from the same manufacturer. The McGuire Nuclear Station did have one failure of a potential transformer from a different manufacturer. Disassembly by McGuire personnel identified corrosion inside the transformer as the cause of the failure.

This event is EPIX reportable. A review of licensee event reports for the past three- (3) years indicates no similar events that were reported as LERs. Based on the above, at this time the event is considered not recurring.

Corrective Actions

Immediate

1. After the failure of the DG 1B potential transformer, Operations initiated work request (W/R) 98156319 and PIP C-00-05691.

Subsequent

1. On November 10, 2000, Engineering performed a common mode failure analysis for the failure of the 1B DG voltage regulator potential transformer to determine if additional testing of the other DGs was required. This analysis did not find any common mode failure issue and no further testing of DGs was required.
2. The potential transformer was replaced. Testing for DG 1B was performed satisfactorily and DG 1B was declared operable at 0831 on November 13, 2000.
3. The failed transformer was disassembled to investigate the root cause of the failure. Materials removed from the failed transformer were sent to a laboratory for analysis to assist in determining future corrective actions.

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Planned

1. The results of the laboratory analysis along with additional testing on the remaining DG voltage regulator potential transformers (1A, 2A, & 2B) will be evaluated to determine if any additional corrective actions are required. The CNS corrective action program (PIP C-00-05691) will track any further corrective actions.

Safety Analysis

There was no safety significance to this event. Prior to the 1B DG potential transformer failure Unit 1 was in Mode 6 with the reactor coolant system [EIIS: AB] temperature at 97 degrees Fahrenheit and a boron concentration of 2791 ppm. Core cooling was being provided by the "A" train of the residual heat removal system [EIIS: BP] and was unaffected by this event. A boration flow path from the "A" train equipment was available as required by Technical Specifications. The plant operators responded to the event by implementing abnormal procedure, AP/1/A/5500/007. No problems were encountered in the process of responding to and securing from the loss of power to 4160-volt bus 1ETB.

Based on the above, this event had no effect on the health and safety of the public.