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October 24, 2007

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

Subject: Duke Power Company LLC d/b/a Duke Energy Carolinas, LLC
(Duke)
Catawba Nuclear Station, Units 1 and 2
Docket No. 50-413, 414
Licensee Event Report 413/2007-003

Attached is Licensee Event Report 413/2007-003 entitled, "Under voltage Condition Resulted in the Actuation of the Emergency Diesel Generators."

There are no regulatory commitments contained in this letter.

This event is considered to be of no significance with respect to the health and safety of the public. If there are any questions on this report, please contact Marc Sawicki at (803) 831-5191.

Sincerely,

James R. Morris

Attachment

JE22
MRR

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xc (with attachment):

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Master File CN-801.01

LER File

RGC Date File

NCMPA-1

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SREC

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.

1. FACILITY NAME Catawba Nuclear Station, Unit 1	2. DOCKET NUMBER 050- 00413	3. PAGE 1 OF 7
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4. TITLE
Undervoltage Condition Resulted in the Actuation of the Emergency Diesel Generators

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	25	2007	2007	- 003 -	00	10	24	2007	Catawba Unit 2	05000414
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)				
10. POWER LEVEL 100%	20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)	
	20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)	
	20.2203(a)(1)	50.36(c)(1)(i)(A)	X 50.73(a)(2)(iv)(A)	73.71(a)(4)	
	20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)	
	20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A	
	20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)		
	20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)		
	20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)		
	20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)		

12. LICENSEE CONTACT FOR THIS LER

NAME M. J. Sawicki, Regulatory Compliance	TELEPHONE NUMBER (Include Area Code) (803) 831-5191
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO		MONTH	DAY	YEAR

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

On August 25, 2007 at approximately 10:58 am, both Unit 1 and Unit 2 experienced a voltage dip of approximately 0.462 second duration when a transformer at a merchant plant connected to Duke's grid faulted. The electrical grid disturbance caused all four Emergency Diesel Generators (EDGs) to actuate. The EDGs ran unloaded because the condition existed for less than the 8.5 seconds required for separation from offsite power. At 12:28, the Transmission Control Center (TCC) notified plant operations that the faulted busline was isolated, and by 12:36, all EDGs were secured and restored to standby. The response of plant equipment to this electrical grid disturbance was as expected.

A Duke Energy team was chartered to provide further investigation to verify that the Catawba switchyard is as secure as possible from similar external conditions.

The health and safety of the public were not adversely affected by this event.

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Catawba Nuclear Station, Unit 1	05000413	2007	- 003	- 00	2	OF 7

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

BACKGROUND

This event is being reported under the following criterion:

10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of the Reactor Protection System (RPS) including: reactor scram or reactor trip; PWR auxiliary or emergency feedwater system; and emergency ac electrical power systems, including: emergency diesel generators (EDGs).

Catawba Nuclear Station (CNS) Units 1 and 2 each is a Westinghouse four-loop Pressurized Water Reactor (PWR) [EIIS: RCT].

Throughout this document the actual names of grid components have been replaced with designators to protect grid design information.

A failure of a Main Step Up (MSU) Transformer [EIIS: EA] occurred at a merchant plant facility, which is connected to Duke Energy Switching Station A at the 230 kV system level [EIIS: FK]. The Alpha 1 and Alpha 2 transmission lines connect Switching Station A to Switching Station B. The Beta 1 and Beta 2 transmission lines connect Switching Station B to the CNS Switchyard. Thus, the faulted MSU Transformer was three switchyards away from the Catawba switchyard electrically. Two additional 230 kV lines connect Switching Station A to another portion of the Duke Energy grid; this additional grid connection is electrically remote from Catawba.

The Alpha relays and breakers operated correctly to isolate the fault from Switching Station B by Zone 2 phase distance protection. This relaying is located at Switching Station B and looks beyond Switching Station A. No additional relaying at Duke's Switching Station A, that serves the merchant plant, would have been called on to independently operate and isolate the fault prior to the remote Zone 2 operations. Switching Station A backup protection for the buslines feeding the merchant plant requires a trip signal from the merchant plant to operate. The next line of defense is the remote end, Zone 2 distance relaying that correctly operated at both stations that feed Switching Station A. This relaying operation was expected based on the failure of the merchant plant's relaying to clear the fault locally.

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The Beta 1 and Beta 2 relays are set up to respond to faults internal to the CNS switchyard; faults on these two transmission lines; and faults at, or slightly beyond, the remote end of the lines (i.e., faults in or slightly beyond Switching Station B). The relays were not designed to respond to faults at the next switching station beyond Switching Station B.

The 4160 VAC Essential Power System [EIIS: EB] supplies power to those loads important to safety that may be required during a LOCA or Blackout condition. This system consists of two separate and independent 4160V switchgear assemblies, 4160V/600V transformers, 600V load centers, and their associated loads. This system is divided into two trains (ETA and ETB), with each train normally powered from the 6900 VAC Normal Auxiliary Power System [EIIS: EA] via a separate 6900V/4160V transformer and feeder breaker. In the event that the normal (offsite power) source is not available, each Essential switchgear assembly can be supplied from a train related Emergency Diesel Generator (EDG) [EIIS: EK]. Upon the loss of the normal source to either train of the 4160V Essential switchgear, the associated EDG starts, all loads are shed, and the required loads are automatically connected to the appropriate 4160V Essential switchgear.

The EDGs operate to supply emergency power for the continued operation of specific important plant equipment. Each Unit has two EDGs, designated A and B. Each EDG is used as the standby emergency power source for the corresponding 4160 V Essential bus [EIIS:EB]. EDGs A and B are dedicated to essential busses ETA and ETB [EIIS:EB], respectively. The EDGs will start automatically on a Safety Injection signal (LOCA), on a bus Loss of Voltage (LOV) signal, or on a Degraded Voltage signal (following a time delay). The EDGs started due to the LOV signal in this event. Loads will automatically connect to the bus as required by the respective load sequencer [EIIS:EK]. In this case, with an EDG start due to a LOV condition, the EDG starts immediately. However, no load shed or loading of the Essential busses onto their respective EDG occurs, if the Essential bus voltage has recovered within 8.5 seconds. Since the event was over in 0.462 seconds, no load shedding or EDG loading occurred.

The EDGs started on a valid two-out-of-three LOV signal. The setpoint for the LOV relays is 84.1% voltage for 167 msec. The other set of relays that monitor the Essential bus voltage, the Degraded Voltage relays, are set at 90.5% voltage and employs two time delays. The

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first delay at 5 seconds establishes the existence of a sustained voltage condition, and the second time delay occurs at 10 minutes and permits corrective operator action prior to separating the offsite power systems. Therefore, both the LOV and Degraded Voltage relay voltage setpoints were reached. As stated previously, all four EDGs were actuated. The EDGs ran unloaded because the condition was less than the 8.5 seconds required for separation from offsite power.

When this event occurred on 08/25/07, Units 1 and 2 were in Mode 1 at 100% power. No structures, systems, or components were out of service that contributed to this event.

EVENT DESCRIPTION

(Times are approximate, as there are two non-synced time recorders)

8/25/07 10:58:46	A failure of a MSU Transformer occurred at a merchant plant facility. Initial fault was a Z phase to ground fault. The merchant plant's relay/breaker equipment did not isolate the failed transformer locally.
8/25/07 10:58:46	1A blackout logic was initiated.
8/25/07 10:58:46	1B blackout logic was initiated.
8/25/07 10:58:46	2A blackout logic was initiated.
8/25/07 10:58:46	Fault evolved into a Y-phase to Z-phase to ground fault.
8/25/07 10:58:47	2B blackout logic was initiated.
8/25/07 10:58:47	Fault evolved into a three phase to ground fault. The Catawba 230kV bus voltage dropped to approximately 75% of the pre-fault magnitude.
8/25/07 10:58:47	Fault isolated from Catawba switchyard (due to the clearing of the Alpha 1 and Alpha 2 lines out of Switching Station B).
8/25/07 10:58:47	Startup of all four EDGs.
8/25/07	The Transmission Control Center (TCC) notified

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11:27	the control room that a transformer had failed at a merchant plant and efforts were initiated to isolate the faulted merchant plant busline.
8/25/07 12:28	Transmission Control Center notified Catawba Operations that the faulted merchant plant busline was isolated.
8/25/07 12:36	All four EDGs were secured and restored to standby.
8/25/07 15:14	Eight hour notification was made for system actuation of the EDGs as required per Emergency Notification System (ENS).

CAUSAL FACTORS

The causal analysis for this electrical grid disturbance event was protective relaying failed to locally isolate a merchant plant's failed MSU Transformer causing a long duration voltage sag and the blackout signal. The relay/breaker equipment at the merchant plant did not isolate the failed transformer locally as expected.

CORRECTIVE ACTIONS

Immediate:

1. Operations entered procedure AP/1(2)/A/5500/007, Loss of Normal Power Case 1.
2. Plant operators verified proper operation of both units' EDGs following the undervoltage, and then returned them to standby.

Subsequent:

1. Power Delivery verified the proper operation of the relaying at Switching Station A and found no problems with the Duke Energy protection equipment.

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2. A Switchyard walk-down on August 25th by Operations showed no relays or targets actuated and no problems were noted with any of the power circuit breakers (PCBs).

Planned:

1. A team has been established to provide further investigation to ensure that the Catawba switchyard is as secure as possible from similar external conditions.

There are no NRC commitments contained in this LER.

SAFETY ANALYSIS

The response of the Catawba plant equipment to this electric grid disturbance was appropriate. All four EDGs experienced valid actuations due to bus voltages dropping below relay setpoints, which are established to protect against loss of voltage.

The Conditional Core Damage Probability (CCDP) associated with this event was evaluated to be well below 1E-6, and the Conditional Large Early Release Probability (CLERP) associated with this event was evaluated to be well below 1E-7.

This event was of no significance with respect to the health and safety of the public.

ADDITIONAL INFORMATION

Within the last three years, there have not been any previous similar occurrences of an event of this nature at Catawba.

However, on May 20, 2006, both Catawba units tripped automatically from 100% power following a Loss of Offsite Power (LOOP) event. The event began when a fault occurred internal to a current transformer associated with one of the switchyard power circuit breakers. A second current transformer failure, along with the actuation of differential relaying associated with both switchyard

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busses, cleared both busses and separated the units from the grid. Although both EDGs on each unit were actuated, as in the current instance, the May, 2006 actuations were required due to sustained loss of voltage. The root cause for the 2006 event determined that certain switchyard relay tap setting changes were never implemented at Catawba. Due to the causes of these two events being unrelated, it can be concluded that this event is non-recurring in nature.

Energy Industry Identification System (EIIS) codes are identified in the text as [EIIS: XX]. There are no EPIX reportable equipment failures associated with this report.

This event did not involve a Safety System Functional Failure.

There were no releases of radioactive materials, radiation exposures, or personnel injuries associated with this event.