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September 22, 1995
NG-95-2906

Mr. Hubert J. Miller
Regional Administrator
Region III
U. S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, IL 60532

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Licensee Event Report #95-009.
File: A-118a

Gentlemen:

Please find attached a copy of the subject Licensee Event Report in accordance with 10CFR50.73. The following new commitment is made in this letter.

Exciter diodes on the "A" RPS MG set (1G-51) will be inspected at the next available time.

Sincerely,

Gary VanMiddlesworth
Plant Superintendent - Nuclear

cc: Director of Nuclear Reactor Regulation
Document Control Desk
U. S. Nuclear Regulatory Commission
Mail Station P1-37
Washington, D. C. 20555-0001

NRC Resident Inspector - DAEC

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PDR ADDCK 05000331
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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: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND 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.

FACILITY NAME (1) Duane Arnold Energy Center	DOCKET NUMBER (2) 05000-331	PAGE (3) 1 OF 4
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TITLE (4)
PCIS Groups 2 through 5 Isolations Due to EPA Breaker Trip on "Undervoltage"

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
08	29	95	95	009	00	09	22	95	FACILITY NAME	DOCKET NUMBER 05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)									
POWER LEVEL (10) 100	20.2201(b)	20.2203(a)(2)(v)	<input checked="" type="checkbox"/>	50.73(a)(2)(i)	50.73(a)(2)(viii)					
	20.2203(a)(1)	20.2203(a)(3)(ii)		50.73(a)(2)(ii)	50.73(a)(2)(x)					
	20.2203(a)(2)(i)	20.2203(a)(3)(iii)		50.73(a)(2)(iii)	73.71					
	20.2203(a)(2)(iii)	20.2203(a)(4)		50.73(a)(2)(iv)	OTHER					
	20.2203(a)(2)(iii)	50.36(c)(1)		50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A					
	20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)						

LICENSEE CONTACT FOR THIS LER (12)

NAME Bruce Klotz, Principal Licensing Specialist	TELEPHONE NUMBER (Include Area Code) (319) 851-7599
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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	MONTH	DAY	YEAR

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

On August 29, 1995, the plant was operating at 100% power when a Primary Containment Isolation System (PCIS) actuation (Groups 2 through 5) occurred. All automatic actions were completed satisfactorily, and all systems functioned as required. Investigation found Electrical Protection Assembly (EPA) breaker EPA-B2 had tripped on undervoltage, de-energizing the "B" Reactor Protection System (RPS) bus which powers the Division 2 sensors for PCIS Groups 2 through 5. The "B" RPS bus was placed on its alternate power supply, and all isolations reset.

Extensive troubleshooting following the event did not conclusively reveal a root cause for the undervoltage trip of the EPA breaker. A loose (finger tight) diode found in the exciter rectifier circuit of the "B" RPS MG set is a possible cause. The diode was tightened to its proper torque value. On September 8, 1995, the "B" RPS bus was returned to its normal power source ("B" RPS MG set).

This event had no effect on the safe operation of the plant.

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

I. DESCRIPTION OF EVENT

On August 29, 1995, at 10:50 hours, the plant was operating at 100% power when Primary Containment Isolation System (PCIS) actuations Groups 2 through 5 (Radwaste, Containment Atmosphere Isolation, RHR Shutdown Cooling, and Reactor Water Cleanup) occurred along with a "B" side Reactor Protection System (RPS) 1/2 SCRAM. In plant investigations found electrical protection assembly (EPA) breaker EPA-B2 tripped on undervoltage, causing the "B" RPS bus to be deenergized. Loss of power to the "B" RPS bus resulted in Group 2-5 PCIS Isolations and a "B" side RPS 1/2 SCRAM. At 11:18 hours, the "B" RPS bus was placed on its alternate power supply (bus 1B42 via regulating transformer 1Y2A). At 11:20 hours, the 1/2 SCRAM and all isolations were reset.

On September 8, 1995, after 10 days of troubleshooting and testing of the "B" RPS MG set (1G061) and "B" Side EPA breakers, the "B" RPS bus was returned to its normal source of power ("B" RPS MG set).

II. CAUSE OF EVENT (See Fig. 1 on Page 4)

The immediate cause of the Groups 2 through 5 PCIS Isolations and the "B" side RPS 1/2 SCRAM was the loss of power to the "B" RPS bus. The loss of power to the bus was caused by EPA breaker EPA-B2 tripping on undervoltage. A conclusive reason for the undervoltage trip was not determined.

Troubleshooting associated with this event included the following:

Trip points for breakers EPA-B2 and EPA-B1 (located in series between 1G061 and the "B" RPS bus) were checked for Overvoltage, Undervoltage, Underfrequency, and repeatability. All results were within specification. All terminations on the breaker cards were found tight and in good shape. Note: General Electric (the EPA breaker manufacturer) was consulted about testing and troubleshooting to be done on the breakers.

The voltage regulator for 1G061 was opened and inspected. No obvious degradation was found. All components on the voltage regulator card checked out satisfactory. The end bell of 1G061 was removed to inspect the exciter rectifier diodes for damage. All diodes checked out satisfactory. One of the three diodes was found to be only finger tight in its mounting. This loose connection could possibly have caused an undervoltage condition that was detected by the EPA-B2 breaker. A review of the maintenance history on this MG set did not reveal any specific actions that might have caused a diode to be left only finger tight.

The "Common Transfer Panel" (1Y30) was opened and terminations inspected. All were found satisfactory. Transfer(between normal "B" RPS power supply and alternate) relay (C71-K001B) was inspected and coil resistance verified to be of proper value. No problems, which could have caused the event, were found in the panel.

1G061 was run unloaded for approximately 132 hours. The generator's output was connected to EPA-B1 and EPA-B2 with voltage being monitored by a strip chart recorder. During the test period, no EPA breaker trips were experienced and no change to the voltage output was recorded.

1G061 (through EPA-B1 and EPA-B2) was connected to a load bank and run for approximately 10 hours. Step changes were introduced into the load (in both the up and down direction). Voltage regulation (1G061) and the EPA cards operated properly at all times.

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

III. ANALYSIS OF EVENT

Following the EPA breaker trip, the "B" RPS bus de-energized and "B" side PCIS groups 2 through 5 isolations occurred. Following verification that the isolations occurred as designed, the "B" RPS bus was placed on its alternate power supply. The 1/2 SCRAM and all isolations were reset at 11:20.

The EPA breakers protect the RPS and associated downstream components from abnormal overvoltage, undervoltage, and underfrequency conditions. Loss of the RPS bus power supply does not cause the loss of a safety function on a loss of power. This event had no effect on the safe operation of the plant.

"Shutdown cooling" (Group 4 isolation) would have been affected had this event occurred during "Shutdown" or "Refuel" modes of operation. Existing procedures are in place which direct operator actions should such an event occur. No effect on the safe operation of the plant would have resulted.

IV. CORRECTIVE ACTION

Immediate corrective action associated with the loss of power to the "B" RPS bus was to place the bus on its alternate power supply.

The loose (finger tight) diode found during troubleshooting of the "B" RPS MG set was tightened to its proper torque value. On September 8, 1995, the "B" RPS bus was returned to its normal power source ("B" RPS MG set).

Temporary instrumentation has been installed on the "B" RPS bus to monitor for possible voltage fluctuations.

Exciter diodes on the "A" RPS MG set will be inspected at the next available time.

V. ADDITIONAL INFORMATION

A) PREVIOUS SIMILAR EVENTS

A review of DAEC Licensee Event Reports since 1984 identified two other trips of an RPS MG set EPA breaker (Ref LERs 88-18 and 92-14). No specific reason for the previous trips was identified (Note: following the 1992 event, upgraded EPA cards with seal in trip signals to aid in troubleshooting were installed).

B) EIS SYSTEM AND COMPONENT CODES

Systems: JM - Containment Isolation Control System
JC - Plant Protection System

Components: BKR - Electrical Protection Assembly (EPA)
MG - Motor-Generator Set

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Figure 1

