ALLIANT ENERGY.

IES Utilities Inc.
Duane Arnold Energy Center
3277 DAEC Road
Palo, IA 52324-9785

Office: 319.851.7611
Fax: 319.851.7986
www.alliant-energy.com

November 24, 1999
NG-99-1659

Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station 0-P1-17
Washington, D. C. 20555-0001

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Licensee Event Report #1999-005
File: A-120

Dear Sirs:

Please find attached the subject Licensee Event Report submitted in accordance with 10CFR50.73. There are no new commitments made in this letter.

Should you have any questions regarding this report, please contact this office.

Sincerely,

Richard L. Anderson

Richard L. Anderson
Plant Manager - Nuclear

cc: Mr. James Dyer
Regional Administrator
Region III
U. S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, IL 60532

NRC Resident Inspector - DAEC
DOCU

IE22

PDR ADOCK 0500331

2NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(6-1998)

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

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)	DOCKET NUMBER (2)	PAGE (3)
Duane Arnold Energy Center	05000331	1 OF 4

TITLE (4)

Actuation of Engineered Safety Feature, Standby Diesel Generator, due to Lightning Strike

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
										05000
10	29	1999	1999	-- 005 --	00	11	24	1999	FACILITY NAME	DOCKET NUMBER
										05000

OPERATING	5
POWER LEVEL (10)	000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		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)(C)		Specify in Abstract below or in RC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Wendell Aldrich, Principal Licensing Specialist	(319) 851-7305

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

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

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

On October 29, 1999, with the plant in Refueling mode, the "A" Standby Diesel Generator (SBDG) automatically started but was not required to load.

The cause of the automatic start was a momentary under-voltage condition sensed by the 1A3 Essential Bus under-voltage relay that initiated the "A" SBDG start logic. The momentary under-voltage condition was caused by a lightning strike that induced a voltage transient on the 161KV switchyard bus.

Following verification that the essential buses were being powered from their normal source, the "A" SBDG was secured and returned to the standby readiness mode.

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

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Duane Arnold Energy Center	05000331	1999	-- 005 --	00	2 OF 4

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

I. DESCRIPTION OF EVENT:

On October 29, 1999, the plant was in Refueling mode (5), and with no Limiting Conditions for Operation (LCO) in effect, the Startup transformer providing power to the essential buses, and the Standby transformer in backup (normal alignment). The plant had been shut down for seven days and the reactor vessel water temperature was 91 degrees Fahrenheit.

A brief thunderstorm moved into the area producing heavy rain and lightning. At 0245, a lightning strike caused a phase to ground fault on the Vinton/Dysart 161KV transmission line sensed at the Duane Arnold Energy Center (DAEC) switchyard. The fault was about 47 milliseconds in duration, and was seen on the plant 4160V recording voltmeter. The "1A3" Essential Bus under-voltage relay sensed the decreased voltage and, as designed, initiated the "A" SBDG without sequencing it to the buses.

At the same time, the "A" Control Building Chiller and Low Level Radwaste Facility (LLRWF) ventilation system tripped. The DC/AC inverters also alarmed in the control room on "loss of synchronization". Fuel moving was suspended after a move in progress was completed. Fuel pool cooling and "A" side Shutdown Cooling remained in service.

At 0305, "A" Control Building Chiller was restored to service and at 0356, after performing a Running Checklist, "A" SBDG was secured and returned to the standby readiness mode. The DC/AC inverter alarms were reset as well as the LLRWF ventilation system.

II. CAUSE OF EVENT

The cause of the automatic start of "A" SBDG was a sensed momentary under-voltage condition on the 1A3 essential bus under-voltage relay which initiated and sealed in the SBDG start logic. The under-voltage also caused the Control Building "A" Chiller trip, the LLRWF ventilation trip, and the DC/AC inverter alarms for "loss of synchronization". The under-voltage transient was caused by lightning striking the 161KV transmission line, and its effects were propagated via the switchyard feeds to the plant.

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Duane Arnold Energy Center	05000331	1999	-- 005 --	00	3 OF 4

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

III. ANALYSIS OF EVENT

This event had no effect on safe operation of the plant, nor would it have had an effect on safe operation during any other plant conditions. The "A" SBDG started as designed in response to the sensed momentary voltage dip on the essential bus, but was not required to load. When voltage drops to 65% of nominal on the essential 4160 volt buses, the SBDG auto-start logic is satisfied and provides a SBDG start signal. The "B" SBDG under-voltage relay did not sense the transient. Surveillance Test Procedure 3.8.1-07 was performed November 18, 1999, which confirmed "B" SBDG under-voltage relay functionality.

The "A" SBDG reached rated frequency and voltage within 10 seconds as required by specification. Since the duration of the event was very brief (.047 seconds), the essential bus 1A3 had returned to nominal voltage before the SBDG came up to speed. Consequently, the "A" SBDG did not pick up loads from the 1A3 Essential Bus.

The under-voltage relays are normally energized and trip on reduced voltage. Since the transient was a voltage reduction, no equipment limits were exceeded, and the under-voltage relays operated as designed. Likewise, the Potential Transformers (PTs) in the switchyard saw no challenge to equipment limits, and functioned reliably as confirmed by data from other instruments fed by the same PTs.

The "A" Control Building Chiller tripped when the chiller's control power circuit breaker tripped in response to the line voltage transient caused by the lightning strike.

The DC/AC inverters went into alarm for "loss of synchronization" since the line and bus voltages mismatched for 0.047 seconds during the lightning induced transient.

The LLRWF ventilation system is not safety related and tripping of this system had no adverse consequences. There were no bus transfers or load sheds during this event. All alarms and auto actuations that were received were expected.

IV. CORRECTIVE ACTIONS

Following the "A" SBDG start, operators verified that the essential buses were being powered from their normal source and contacted the load dispatcher to share information and coordinate actions. After performing a Running Checklist, the "A" SBDG was secured and returned to the standby readiness mode. Operators took appropriate actions to restore the "A" Control Building Chiller and LLRWF ventilation. Engineering personnel walked down and inspected appropriate equipment in the switchyard and plant to verify there was no damage and that the equipment was operating properly. No further corrective actions were required.

V. ADDITIONAL INFORMATION

A. Previous Similar Events

LERs 91-08, 92-11, 93-01, and 95-01 report automatic SBDG starts due to weather conditions.

B. EIIS System and Component Codes

Systems: FK-Switchyard System
EK-Emergency Onsite Power Supply System (SBDG)
EE-Instrument and Uninterruptible Power System
VH-Radwaste Building Environmental Control System
VI-Control Building Environmental Control System

Components: EK-DG-Diesel Generator

This report is being submitted pursuant to 10CFR50.73(a)(2)(iv)