DCD

Iowa Electric Light and Power Company

March 4, 1993
NG-93-0929

Mr. A. Bert Davis
Regional Administrator
Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License DPR-49
Licensee Event Report #93-001, Rev. 0

IE22

Gentlemen:

In accordance with 10 CFR 50.73 please find attached a copy of the subject Licensee Event Report.

Very truly yours,

David L. Wilson

David L. Wilson
Plant Superintendent - Nuclear

DLW/RM/eah

cc: Director of Nuclear Reactor Regulation
Document Control Desk
U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D. C. 20555

NRC Resident Inspector - DAEC

160061

NRC Form 366
(5-92)

U.S. NUCLEAR REGULATORY COMMISSION

# LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104

EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH 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.

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| Duane Arnold Energy Center | 0 5 0 0 0 3 3 1 | 1 OF 0 4 |

TITLE (4): Automatic Standby Diesel Generator Starts Due to Momentary Essential Bus Under-Voltage During Ice Storm

| 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 NUMBERS |
| 0 2 | 1 1 | 9 3 | 9 3 | — 0 0 1 | — 0 0 | 0 3 | 0 4 | 9 3 | None | 0 5 0 0 0 |
| | | | | | | | | | | 0 5 0 0 0 |

| OPERATING MODE (9) | N | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11) | | | |
|---|---|---|---|---|---|
| POWER LEVEL (10) | 1 0 0 | 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: AREA CODE |
|---|---|
| John Kerr, Technical Support Specialist | 3 1 9 8 5 1 - 7 4 9 2 |

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 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 February 11, 1993, with the plant operating at 100% power, both Standby Diesel Generators (SBDGs) automatically started three separate times but were not required to load.

The cause of each of the automatic starts was a sensed momentary under-voltage condition on both essential buses which was monitored by bus under-voltage relays that feed the SBDG start logics. The sensed momentary under-voltage conditions were caused by momentary grid disturbances during an ice storm.

Following verification that the essential buses were being powered from their normal sources, the SBDGs were secured and returned to standby mode. Reactor power was temporarily reduced until the weather improved.

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

NRC Form 366A
(5-92)

U.S. NUCLEAR REGULATORY COMMISSION

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| 0 2 | 1 1 | 9 3 | 9 3 | - 0 0 1 | - 0 0 | 0 3 | 0 4 | 9 3 | None | 0 5 0 0 0 |
| | | | | | | | | | | 0 5 0 0 0 |

OPERATING MODE (9): N

POWER LEVEL (10): 1 0 0

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


On February 11, 1993, with the plant operating at 100% power, both Standby Diesel Generators (SBDGs) automatically started three separate times but were not required to load.

The cause of each of the automatic starts was a sensed momentary under-voltage condition on both essential buses which was monitored by bus under-voltage relays that feed the SBDG start logics. The sensed momentary under-voltage conditions were caused by momentary grid disturbances during an ice storm.

Following verification that the essential buses were being powered from their normal sources, the SBDGs were secured and returned to standby mode. Reactor power was temporarily reduced until the weather improved.

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

I. DESCRIPTION OF EVENT

On the evening of February 11, 1993, the plant was operating at 100% power and was in day 4 of a 30 day limiting condition for operation (LCO) on the "A" residual heat removal (RHR) pump. The weather conditions were rainy, icy, and windy with the temperature about 27 degrees F. An ice storm in the area had caused several grid disturbances but none that had yet directly affected the plant.

At 1721, both Standby Diesel Generators (SBDGs) automatically started but were not required to load, the emergency service water (ESW) pumps started for SBDG cooling, the "A" reactor water cleanup (RWCU) pump tripped, and the "B" and "D" well water pumps tripped. Also at this time, switchyard breakers 8090 ("A") and 3110 ("B") opened. At 1722, the "D" well water pump automatically restarted and the "A" and "C" well water pumps were manually started to restore well water flow to the plant. At 1733, the "A" RWCU pump was restarted and returned to service and the "A" well water pump was secured. At 1739, the "A" SBDG was secured and returned to standby mode after running for 18 minutes. At 1740, the "B" SBDG was secured and returned to standby mode after running for 19 minutes. The ESW pumps were then secured. At 1840, the "B" well water pump was restarted and the "C" well water pump was secured. At this time, plant conditions were the same as prior to the SBDG starts except that the "A" and "B" switchyard breakers remained open.

At 1914, both SBDGs automatically started but were not required to load, the ESW pumps started for SBDG cooling, the "A" RWCU pump tripped, the "D" well water pump tripped and automatically restarted, and alarms were received from the instrument AC under-voltage and uninterruptible AC inverters. Also at this time, switchyard breaker 9180 ("G") opened and automatically re-closed, and switchyard breaker 0220 ("H") opened but did not re-close. At 1936, the "A" RWCU pump was restarted and returned to service. At 1937, after an electrician inspected the "H" breaker relays in the switchyard, the "H" breaker was re-closed with permission from the load dispatcher. At 1938, the instrument AC under-voltage and uninterruptible AC inverter alarms were reset. At 1941, the "A" SBDG was secured and returned to standby mode after running for 27 minutes. At 1942, the "B" SBDG was secured and returned to standby mode after running for 28 minutes. The ESW pumps were then secured. At this time, plant conditions were the same as they were just prior to the second start of the SBDGs. The "A" and "B" switchyard breakers remained open.

At 1950, both SBDGs automatically started but were not required to load, the ESW pumps started for SBDG cooling, the "A" RWCU pump tripped, the "D" well water pump tripped and automatically restarted, and alarms were received from the instrument AC under-voltage and uninterruptible AC inverters. Also at this time, switchyard breakers "G" and "H" opened.

At 1951, the "G" breaker automatically re-closed. At 1959, after an electrician inspected the "H" breaker relays in the switchyard, the "H" breaker was re-closed. The instrument AC under-voltage and uninterruptible AC inverter alarms were reset. At 2002, the "A" SBDG was secured and returned to standby mode after running for 12 minutes. At 2003, the "B" SBDG was secured and returned to standby mode after running for 13 minutes. The ESW pumps were then secured. At 2009, the "A" RWCU pump was restarted and returned to service. At this time, plant conditions were the same as they were just prior to the second and third starts of the SBDGs. The "A" "B" switchyard breakers remained open.

At 2010, the decision was made to begin reducing reactor power to 75% using the recirculation pumps, in anticipation that more severe grid disturbances may cause a plant trip. At 2120, reactor power was being held at 75%. At 0500 on February 12, 1993, after weather conditions had improved, operators began increasing reactor power using the recirculation pumps. At 0531, the plant was back to 85% power and by 0700 the plant was operating at 100% power. At 1015, after power line inspections were completed, the load dispatcher closed the "A" and "B" switchyard breakers. At this time, plant conditions were the same as prior to the first SBDG starts.

II. CAUSE OF EVENT

The cause of each of the automatic starts of the SBDGs was a sensed momentary under-voltage condition on both essential buses which was monitored by bus under-voltage relays. The relays feed directly into the SBDG start logics which seal in upon actuation. The ESW pumps started automatically when the SBDGs started. The sensed momentary under-voltage conditions were also the causes for the breakers opening in the switchyard, the RWCU and well water pump trips, and the alarms received. The sensed momentary under-voltage conditions were caused by momentary grid disturbances during an ice storm. High winds and ice buildup on transmission lines caused the lines to whip around and eventually touch each other causing grid disturbances.

III. ANALYSIS OF EVENT

This event had no effect on safe operation of the plant, nor would it have an effect on safe operation during any other plant conditions. The SBDGs started as designed in response to the sensed momentary voltage dips on the essential buses, but were not required to load. The ESW pumps started as designed when the SBDGs started. The RWCU and well water systems are not safety related and tripping of these pumps had no adverse consequences. The instrument AC under-voltage and uninterruptible AC

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inverter alarms were due to loss of sync between the instrument power sources, which is expected under these circumstances. The switchyard breakers opened as expected in response to the grid disturbances. There were no bus transfers or load sheds during these events. All alarms and auto actuations that were received were expected.

IV. CORRECTIVE ACTIONS

Following each of the SBDG and ESW pump starts, operators verified that the essential buses were being powered from their normal sources and contacted the load dispatcher to share information and coordinate actions. The SBDGs and their associated ESW pumps were secured, one at a time, after verifying that the grid was stable. Operators took appropriate actions to restore the RWCU and well water systems and to clear alarms as discussed above. The operators and the load dispatcher worked together to re-close the switchyard breakers at the appropriate times. The "A" and "B" breakers were not closed until the following day as a precaution due to very high winds in that direction from the plant. As discussed above, reactor power was reduced to mitigate the consequences of possible further grid disturbances until the weather improved. Since all equipment operated properly and personnel actions were appropriate, no further corrective actions were required.

V. ADDITIONAL INFORMATION

A. Previous Similar Events

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

B. EIIS System and Component Codes

Systems: FK-Switchyard System
EK-Emergency Onsite Power Supply System
CE-Reactor Water Cleanup System
EE-Instrument and Uninterruptible Power System
AD-Reactor Recirculation System
KG-Nonessential Service Water System
BI-Essential Service Water System

Components: EK-DG-Diesel Generator

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