

Illinois Power Company
Clinton Power Station
P.O. Box 678
Clinton, IL 61727
Tel 217 935-8881

**ILLINOIS
POWER**

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L45-92(07-17)-LP
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July 17, 1992
10CFR50.73

Docket No. 50-461


Document Control Desk
Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Clinton Power Station - Unit 1
Licensee Event Report No. 92-007-00

Dear Sir:

Please find enclosed Licensee Event Report No. 92-007-00:
Inadequate Logic System Functional Testing and Improper Loss-of-Offsite-
Power Simulation Due to Misinterpretation of Test Requirements by
Procedure Writers. This report is being submitted in accordance with
the requirements of 10CFR50.73.

Sincerely yours,



F. A. Spangenberg, III
Manager, Licensing and Safety

RSF/alh

Enclosure

cc: NRC Clinton Licensing Project Manager
NRC Resident Office, V-690
NRC Region III, Regional Administrator
Illinois Department of Nuclear Safety
INPO Records Center

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PDR ADOCK 05000461
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Handwritten initials/signature

LICENSEE EVENT REPORT (LER)

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) **Clinton Power Station** DOCKET NUMBER (2) **0 5 0 0 9 4 6 1 1** PAGE (3) **1 OF 0 6**

TITLE (4) **Inadequate Logic System Functional Testing and Improper Loss-of-Offsite-Power Simulation Due to Misinterpretation of Test Requirements by Procedure Writers.**

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 NUMBER(S)													
0	5	1	5	9	2	9	2	0	0	7	0	0	7	1	7	9	2	None	0	5	0	0	0

OPERATING MODE (9) **4**

POWER LEVEL (10) **0 0 0**

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

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)
<input type="checkbox"/> 20.406(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME **D.M. Nelson, System Engineer, extension 3952**

TELEPHONE NUMBER **2 1 7 9 3 5 - 8 8 8 1**

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

On June 23, 1992, Illinois Power (IP) determined that previously-performed surveillance test procedures for loss-of-offsite-power testing were not in accordance with Technical Specifications (TS) 4.8.1.1.2.e.4 and 4.8.1.1.2.e.6 and that this condition is reportable under the provisions of 10CFR50.73(a)(2)(i)(B). Potentially inadequate testing was identified on May 15, 1992, with the plant in COLD SHUTDOWN, by a group of engineers who were assisting in a review of a similar event at another facility. The group identified the procedures were potentially deficient with respect to testing the Emergency Diesel Generator (EDG) start circuitry and 4.16 kilovolt (KV) emergency bus feed breaker trip circuitry in response to a loss of offsite power. A second condition was identified on June 25, with the plant in COLD SHUTDOWN, when IP personnel identified that relay contact-level testing of the 4.16 KV emergency bus undervoltage instruments had not been performed as required by the logic system functional test requirements of TS 4.3.3.2. The cause of the event is improper interpretation of TS surveillance testing requirements by IP and contractor procedure writers. Corrective actions include revising procedures to add the testing requirements, testing the circuitry which had not been properly tested, and reviewing surveillances to ensure no other deficiencies exist.

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APPROVED OMB NO. 3150-0104

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TEXT (If more space is required, use additional NRC Form 306A's) (17)

DESCRIPTION OF EVENT

On June 23, 1992, Illinois Power (IP) determined that previously-performed surveillance test procedures for loss-of-offsite-power testing were not in accordance with the plant Technical Specifications and that this condition was reportable under the provisions of 10CFR50.73(a)(2)(i, (B). Specifically, these procedures were deficient with respect to testing the Emergency Diesel Generator (EDG) [EK] [DG] start circuitry and 4.16 kilovolt (KV) emergency bus [BU] feed breakers [BKR] trip circuitry in response to a loss of offsite power.

On May 15, 1992, the plant was in mode 4 (COLD SHUTDOWN) with the reactor [RCT] depressurized and reactor temperature being maintained between 90 and 100 degrees Fahrenheit. The third refueling outage (RF-3) was in progress. In support of preparations for an Electrical Distribution System Functional Inspection (EDSFI) at Clinton Power Station (CPS), a group of engineers was assisting in a review of EDSFI findings identified at another plant regarding loss of power instrument testing.

The engineers determined that loss-of-offsite-power testing of the Divisions I, II and III EDGs at CPS may not have been adequately performed as required by Technical Specification Surveillance Requirements 4.8.1.1.2.e.4 and 4.8.1.1.2.e.6. Specifically, the engineers determined that a "loss of offsite power" may not have been properly simulated and "de-energization of the emergency buses and load shedding from emergency buses" may not have been properly verified as required by the above Technical Specification surveillance requirements and as interpreted by the NRC during recent EDSFI inspections. The NRC has interpreted Surveillance Requirements 4.8.1.1.2.e.4 and 4.8.1.1.2.e.6 as requiring verification that the bus undervoltage logic automatically opens the offsite source feeder breakers to isolate offsite power from the onsite distribution network. The Director - Plant Operations was notified of the potentially inadequate testing, and he directed that procedures be prepared to cover the possible testing inadequacy and that the testing be performed prior to startup from RF-3. The potentially inadequate testing was determined not to be an operability concern at that time. (The additional testing was completed by May 20, 1992 with satisfactory results.)

Investigation determined that Clinton Power Station had previously performed these surveillance tests by manually opening the feeder breakers which initiates an automatic EDG start only through the second-level undervoltage (degraded voltage) logic. In addition, CPS had not verified that the undervoltage logic initiated an automatic trip of the feeder breakers.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

The following surveillance test procedures were revised under the temporary change program to expedite demonstration that the circuits would function as designed.

- ° CPS 9333.01, "Division I 4.16 KV Bus Undervoltage Relay Calibration"
- ° CPS 9333.02, "Division II 4.16 KV Bus Undervoltage Relay Calibration"
- ° CPS 9333.03, "Division III 4.16 KV Undervoltage Protective Relay Calibration"
- ° CPS 9080.04, "Diesel Generator IC Operability - 24 Hour and LOP Test"

Circuit testing in accordance with the temporarily-revised procedures was completed by May 20, 1992. This testing demonstrated that the circuits function per design.

On June 25, 1992, the plant was in Mode 4 with the reactor at about 105 degrees Fahrenheit and depressurized. A maintenance outage was in progress to repair a Reactor Recirculation [AD] pump [P]. While performing a root cause and generic corrective action evaluation for the inadequate testing issue described above, IP personnel identified that relay [RLY] contact-level testing of the 4.16 KV emergency bus undervoltage (loss of voltage and degraded voltage) instruments had not been fully performed as required by the logic system functional test requirements of Technical Specification 4.3.3.2. This Technical Specification addresses logic system functional testing of Emergency Core Cooling System (ECCS) actuation instrumentation. The circuitry involved consists of the second-level undervoltage trip circuitry for the two (offsite source) feeder breakers for each of the Divisions I and II 4.16 KV buses, and wiring between certain contacts for four relays in the Division III loss of voltage/degraded voltage logic (associated with both the automatic EDG start and feeder breaker trip functions).

The shift supervisor was informed by the Assistant Director - Plant Operations that additional testing would be necessary to demonstrate that the circuitry would function per design.

Procedures CPS 9333.01, CPS 9333.02, and 9333.03 were revised under the temporary change program to include the required, additional testing and to expedite demonstration that the circuits would function as designed.

Circuit testing in accordance with the temporarily-revised procedures was completed prior to plant startup from the maintenance outage. This additional testing demonstrated that these circuits also function per design.

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

No automatic or manually initiated safety system responses were necessary to place the plant in a safe and stable condition. No equipment or components were inoperable at the start of this event such that their inoperable condition contributed to this event.

CAUSE OF EVENT

As further discussed below, the cause of this event is attributed to improper interpretation of specific Technical Specification surveillance testing requirements by IP and contractor Electrical Maintenance procedure writers. The test practice stemming from this misinterpretation appears to be a practice utilized by many utilities for satisfying the surveillance test requirements associated with bus undervoltage/diesel generator start relay logic. The misinterpretation, however, appears to be limited to testing of the undervoltage relay logic, and therefore, the event is considered to be an isolated event. It appears that other Technical Specification requirements (i.e., logic system functional tests) are being and have been properly interpreted.

The failure to fully satisfy Technical Specification Surveillance Requirements 4.8.1.1.2.e.4 and 4.8.1.1.2.e.6 was caused by an initial interpretation by CPS personnel that these surveillance requirements may be adequately satisfied by simulating a loss-of-offsite-power condition via opening the feeder breakers. It is evident through discussions with other utilities and from published EDSFI findings themselves (which led to IP's identification of the problem) that other utilities have similarly misinterpreted these surveillance requirements and performed testing in a similar manner.

With respect to misinterpretation of Technical Specification 4.3.3.2, an investigation identified that the IP Electrical Maintenance procedure writers for the original procedures developed before initial plant startup, did not address the surveillance requirements of Technical Specification 4.3.3.2 in electrical maintenance surveillance procedures. In addition, the investigation identified that the contractor Electrical Maintenance procedure writers who later revised the procedures misinterpreted these surveillance requirements. The undervoltage relays (both degraded voltage and loss-of-voltage relays) are listed in the ECCS instrumentation tables associated with Technical Specification 3/4.3.3, and the Channel Functional and Calibration requirements are specified for these relays under Technical Specification 4.3.3.1. However, the procedure writers did not fully understand how these relays were to be included within the scope of the logic system functional test requirements for ECCS actuation instrumentation. Although the relay logic was always actuated and the overall function was verified to occur [through the surveillance tests as previously performed], each and every electrical pathway or logic combination at the relay contact level was not tested relative to the safety/design function for these relays. It

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was not clear to the procedure writers that such testing is required under this Technical Specification.

Discussions with CPS Electrical and Control and Instrumentation personnel indicate that the above misinterpretation of logic system functional testing is limited to testing performed in accordance with Electrical Maintenance procedures. Control and Instrumentation Maintenance procedure writers had (and have) a correct understanding of logic system functional testing during procedure development since Control and Instrumentation personnel are responsible for performance of most of the logic system functional testing required by the Technical Specifications.

CORRECTIVE ACTION

System Engineering and Design Engineering groups performed independent reviews of electrical surveillances and identified no other areas where additional testing was needed to meet surveillance requirements.

Surveillance test procedures CPS 9333.01; CPS 9333.02; CPS 9333.03; CPS 9080.03; CPS 9080.04; CPS 9080.07, "Diesel Generator 1A(1B) Operability - LOP and ECCS Actuation"; and CPS 9080.08, "Diesel Generator 1C Operability - LOP With ECCS Actuation," will be revised in accordance with the normal revision program to incorporate the required Technical Specification testing.

All circuits initially found to be inadequately tested were properly tested and demonstrated they would perform as designed.

ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73(a)(2)(i)(B) due to the failure to perform surveillance testing in accordance with the plant's Technical Specifications.

Assessment of the safety consequences and implications of this event indicates that this event was not nuclear safety significant. Performance of the proper surveillance testing confirmed that the untested circuitry would have functioned as designed. As a result, the emergency diesel generators would have been capable of performing their intended functions in response to a loss of offsite power.

Clinton Power Station was not in strict compliance with the identified Technical Specifications from initial plant operation until June 29, 1992 when all required circuit testing was successfully completed.

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ADDITIONAL INFORMATION

No equipment failed during this event.

LERs 87-044 and 87-046 describe events involving incorrect translation of Technical Specification surveillance requirements into surveillance procedures due to apparent misinterpretation of the requirements. However, neither of these LERs involved a surveillance prepared or performed by Electrical Maintenance personnel.

For further information regarding this event, contact D. M. Nelson, System Engineer at (217)935-8881, extension 3952.