

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Dresden Nuclear Power Station, Unit 2
 Docket Number (2) 0 5 0 0 0 2 3 7
 Page (3) 1 of 0 4

Title (4) Improper Setpoint of Second Level Undervoltage Relays Due to Management Deficiency

| 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 7 | 3 1 | 9 1 | 9 1 | 0 2 1 | 0 1 | 0 8 | 2 2 | 9 1 | Dresden Unit 3 | 0 5 0 0 0 2 4 9 |

OPERATING MODE (9) N

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

| | | | |
|-------------------|------------------|----------------------|---|
| 20.402(b) | 20.405(c) | 50.73(a)(2)(iv) | 73.71(b) |
| 20.405(a)(1)(i) | 50.36(c)(1) | X 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) |
| 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 Emory Johnson, Technical Staff Safety System Engineer, Ext. 2603
 TELEPHONE NUMBER AREA CODE 8 1 5 9 4 2 - 2 9 2 0

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) X NO

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

On July 31, 1991 at 1530 hours with Unit 2 at 99% and Unit 3 at 59% rated core thermal power during Electrical Distribution System Functional Inspection (EDSFI), an NRC inspection team questioned whether the setting of the 4KV emergency bus Second Level Undervoltage relays (set at 3708 volts) would provide adequate protection to Class 1E equipment. An Emergency Notification System (ENS) notification was performed concerning preliminary calculations performed by the Nuclear Engineering Department (NED) which indicated that the existing Second Level Undervoltage setpoints for 4kV Emergency buses were too low to provide adequate protection to the most limiting Safety Related component. The most limiting component was determined to be the Unit 2 Diesel Generator Cooling Water Pump (DGCWP), which is fed from Unit 2 Division II AC Distribution System. Dresden Station was notified by NED on November 20, 1991, that further Unit 2 Division II calculations had identified additional loads more limiting than the DGCWP; this was reported via Emergency Notification System (ENS). Both Unit 2 and Unit 3 were in cold shutdown at the time.

On January 22, 1992, NED notified the Station that degraded voltage calculations had been completed for Unit 3 Divisions I and II. These calculations, which included credit for planned modifications to improve the available voltage to critical Safety Related components, indicated minimum required 4kV safety bus voltages for Buses 33-1 and 34-1 to be 3832 Volts and 3792 Volts, respectively. Additional information is being provided in Commonwealth Edison's letter to Dr. Thomas E. Murley dated March 3, 1992 (attached) and Commonwealth Edison's letter dated March 18, 1992 to Dave Butler (attached).

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TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

On January 22, 1992, CECO Nuclear Engineering Department (NED) notified Dresden Station that additional degraded voltage calculations were completed for Unit 3 Divisions I and II. Based on calculations, which included credit for modifications to improve the available voltage to critical Safety Related components, the minimum 4 kV required safety bus voltage for Buses 33-1 and 34-1 were 3832 Volts and 3792 Volts respectively. Consequently, based on the fact that these critical voltages are greater than the existing relay setting, Dresden has determined that this condition was reportable due to being in an unanalyzed condition.

C. APPARENT CAUSE OF EVENT:

This report is submitted in accordance with 10CFR50.73(a)(2)(v)(D) which requires the reporting of any event or condition that could have prevented the fulfillment of the safety function of systems that are needed to mitigate the consequences of an accident. The apparent cause of the event is attributed to inadequate design control due to management deficiency. Based on a review of the modification that installed the second level undervoltage relays, the following management deficiencies were identified which resulted in inadequate undervoltage relaying configuration control:

1. The setpoint calculation was not performed to an approved Quality Assurance (QA) program.
2. The setpoint calculation was not documented in accordance with 10CFR50 Appendix B.

The setpoint calculation methodology was determined to be inadequate due to the following factors:

1. Increased motor currents due to lower motor voltage were not accounted for.
2. Transformer voltage drops were not accurately modeled.
3. The loading assumptions were non-conservative.
4. The limiting case load selected was not bounding.

D. SAFETY ANALYSIS OF EVENT:

NED has performed a review of Dresden Switchyard voltages and the relative frequency of degraded grid voltage which results in degraded 4 kV safety bus voltage. It has been determined that the existing Second Level Undervoltage Relay settings were inadequate to assure proper protection of all Safety Related equipment, and that in order to assure adequate protection, modifications were needed to be performed on both Unit 2 and Unit 3. Both units were in cold shutdown when Dresden was notified of the calculations, and it was immediately recognized that these modifications were needed to be performed prior to unit startup. The safety significance of this event continues to be a topic of discussion between Region III, Commonwealth Edison and NRR.

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TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

E. CORRECTIVE ACTIONS:

As immediate corrective actions, based on preliminary calculations, Operations personnel were informed through Daily Orders and given guidance to take action at 4000 Volt, 3900 Volt, and 3850 Volt levels. Training was provided to the Operating crews prior to assuming their shift. An Operating order was written on August 1, 1991 detailing the actions to be taken as above.

The relays were installed and the settings were established for Unit 2 and Unit 3 in 1982 and 1983 respectively. As a result of an internal Quality Assurance Audit in 1985, a Stop Work Order had been placed on in-house engineering activities for design document preparation on December 3, 1985. This required all safety related design documents be prepared by architect-engineers with 10CFR50 App. B Quality Assurance programs approved by CECo Nuclear Quality Programs. This Stop Work Order was clarified on September 5, 1986 to include calculations for setting or sizing of safety related protective relays, trip devices, thermal overloads, fuses and any other protective device calculation performed by either CECo System Planning Department or Station Electrical Engineering Department. The Stop Work Order was removed on November 19, 1986 on the condition that appropriate procedures be developed, independently reviewed and approved prior to in-house design document preparation. This requirement was included in Station Nuclear Engineering Department Procedure Q.51.

Detailed procedures for design document preparation and control have since been implemented. Of interest to the setting of the degraded voltage protection relay are:

- ENC-QE-51 Design Document Preparation
- ENC-QE-51.D Controlled Analysis by Nuclear Engineering Department
- ENC-QE-59 Nuclear Engineering Department Responsibilities for Auxiliary Power Settings
- QE-59 Exhibit 0 Undervoltage and Overvoltage Relay Section and Settings

It is further believed that the technical inadequacies of the degraded voltage relay setpoint calculation are an isolated incident as the device is unique, having not previously been utilized on the CECo System. It is further unique as the relays on the 4KV system would typically be controlled by the System Planning Department; however, as this relay protects only station equipment, and does not have any function which would impact the transmission system, the setpoint design activity was assigned to the Station Electrical Engineering Department. Station Electrical setting calculations were otherwise limited to low voltage breaker trip settings. The setpoints of the degraded voltage relays are currently being reviewed by Engineering for all CECo nuclear Units in accordance with IE Notice 91-29 (237-200-91-12801).

Upon completion of final calculations, corrective actions were to design and install necessary modifications prior to any mode change on either unit. On January 22, 1992, LER 92-004 was submitted following completion of calculations for Unit 3. Additional information is provided in Commonwealth Edison's letter to Dr. Thomas E. Murley dated March 3, 1992 and letter to Dave Butler (Region III) dated March 18, 1992.

F. PREVIOUS OCCURENCES:

No previous errors involving this calculation have been indentified.

G. COMPONENT FAILURE DATA:

There were no component failures during this event: therefore, this section is not applicable.