

# LIS ORIGINAL

SSINS No.: 6835  
IN 86-87

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT  
WASHINGTON, D.C. 20555

October 10, 1986

IE INFORMATION NOTICE NO. 86-87-<sup>2</sup> LOSS OF OFFSITE POWER UPON AN AUTOMATIC  
BUS TRANSFER

Addressees:

All nuclear power reactor facilities holding an operating license or a construction permit.

Purpose:

This notice is to alert recipients of a potentially significant problem involving the loss of offsite power following an automatic bus transfer. It is expected that recipients will review this information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem occurring at their facilities. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On January 28, 1986 the Carolina Power and Light (CP&L) Company's H. B. Robinson Unit 2 nuclear power plant experienced a reactor trip from 80% power followed by a loss of offsite power. The event was initiated when the emergency diesel generator (EDG) "B" output breaker was removed to install a solid-state over-current trip device. The breaker had just been racked out when emergency bus "E-2" tripped because of a blown potential transformer fuse. The subsequent loss of an instrumentation channel followed by turbine rollback led to the reactor trip on high pressurizer pressure.

One minute after the reactor trip, the plant auxiliaries were transferred automatically, as designed, from the auxiliary transformer to the startup transformer. However, the startup transformer differential protective relay subsequently operated, which opened the source and load supply breakers and isolated the plant from all offsite power. EDG "A" started and loaded Emergency Bus "E-1." EDG "B" was restored to service approximately 1 hour later. After investigation revealed no transformer faults, offsite power was restored approximately 2 hours after the initiating trip. The dedicated shutdown diesel (EDG "A") was available throughout the event.

Discussion:

The licensee investigation concluded that the two primary events (loss of E-2 bus and the loss of offsite power) were separate events. The loss of the E-2 bus was attributed to a loose fuse holder which caused the fuse to blow when the EDG "B" breaker was racked out. In addition to replacement of the loose fuse holders the licensee is investigating long-term changes to increase the reliability of the potential transformer circuitry.


The investigation into the loss of offsite power revealed no faults in the transformer, no faults in the auxiliary loading, and no problems in the functioning of the differential relay. The licensee determined that the current transformers (CTs) had saturated as a result of the dc component of the in-rush current when the startup transformer was loaded. The saturated CT provided an erroneous indication to the differential relay. The differential relay, by design, then isolated the startup transformer. Since this condition had never occurred in the approximately 15 years of commercial operation, the system was reviewed and four conditions that apparently contributed to an in-rush current higher than previously experienced were noted.

1. The CP&L system voltage was recently increased so voltage was higher than had been the case in most prior transfers. The adjacent fossil unit was also at full load so the system was at its lowest impedance which would tend to maximize in-rush current.
2. Auxiliary loading has slowly increased over the years due to various modifications and additions.
3. The cold weather on the day of the event required the freeze protection circuits to run near maximum, which added further to the auxiliary loading.
4. The transfer of auxiliary power uses a typical break-before-make scheme with a normal dead bus time of approximately six cycles. The additional resistive heating load on that day may have slowed the induction motors down more than normal during the dead bus time and would have increased the dc component and magnitude of the in-rush current.

After obtaining all of the operating parameters the licensee's calculations verified that the startup transformer current transformers were susceptible to dc saturation during loading. Similar calculations or verification of existing calculations could assist in preventing other licensees from experiencing a transformer isolation. The H. B. Robinson plant has made some CT modifications (increased turn ratios) and has planned others to eliminate this potential for loss of offsite power.

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No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

  
Edward L. Jordan, Director  
Division of Emergency Preparedness  
and Engineering Response  
Office of Inspection and Enforcement

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Attachment: List of Recently Issued IE Information Notices

Attachment 1  
 IN 86-87  
 October 10, 1986

LIST OF RECENTLY ISSUED  
 IE INFORMATION NOTICES

| Information Notice No. | Subject  | Date of Issue | Issued to  |
|------------------------|--|---------------|--|
| 86-86                  | Clarification Of Requirements For Fabrication And Export Of Certain Previously Approved Type B Packages                  | 10/10/86      | All registered users of NRC certified packages   |
| 86-85                  | Enforcement Actions Against Medical Licensees For Willful Failure To Report Misadministrations                           | 10/3/86       | All NRC medical licensees  |
| 86-84                  | Rupture Of A Nominal 40-Millicurie Iodine-125 Brachytherapy Seed Causing Significant Spread Of Radioactive Contamination | 9/30/86       | All NRC medical institution licensees  |
| 86-83                  | Underground Pathways Into Protected Areas, Vital Areas, Material Access Areas, And Controlled Access Areas               | 9/19/86       | All power reactor facilities holding an OL or CP; fuel fabrication and processing facilities |
| 86-82                  | Failures Of Scram Discharge Volume Vent And Drain Valves   | 9/16/86       | All power reactor facilities holding an OL or CP   |
| 86-81                  | Broken Inner-External Closure Springs On Atwood & Morrill Main Steam Isolation Valves                                    | 9/15/86       | All power reactor facilities holding an OL or CP   |
| 86-80                  | Unit Startup With Degraded High Pressure Safety Injection System   | 9/12/86       | All power reactor facilities holding an OL or CP   |
| 86-79                  | Degradation Or Loss Of Charging Systems At PWR Nuclear Power Plants Using Swing-Pump Designs                             | 9/2/86        | All power reactor facilities holding an OL or CP   |

OL = Operating License  
 CP = Construction Permit

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