

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

September 20, 1985

IE INFORMATION NOTICE NO. 85-77: POSSIBLE LOSS OF EMERGENCY NOTIFICATION
SYSTEM DUE TO LOSS OF AC POWER

Addressees:

All holders of a nuclear power plant operating license (OL) or a construction permit (CP).

Purpose:

This information notice is provided to alert licensees to the possibility that modifications to plant telephone systems may result in a change in the vulnerability of the Emergency Notification System (ENS) and other plant telephones to losses of ac power. It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On January 8, 1984, the Palisades Nuclear Plant interrupted its offsite power supply for maintenance activities. Subsequently all ac power from the emergency diesel generators was lost. (This event is described in detail in Information Notice No. 84-42.) As a result of the ac power problems, all onsite telephones were rendered inoperable for approximately 3 hours, except for two offsite-powered pay telephones. Loss of the ENS and normal communications significantly hampered the notification process.

On May 7, 1985, Quad Cities Unit 1 was operating at 90% power. The Unit 2 auxiliary transformer was inadvertently shorted while the unit was shut down with its associated emergency diesel generator out for maintenance. This caused the loss of offsite ac power to Unit 2 and a voltage transient in Unit 1 that subsequently caused that unit to scram about 15 minutes later. Unit 1 retained offsite ac power. One division of Unit 2 was promptly powered by autostart of the swing emergency diesel generator, and the other division was powered within about 20 minutes by crosstie to a 4kV bus of Unit 1. When the licensee attempted to notify the NRC Emergency Operations Center over the ENS, the circuit repeatedly disconnected. The Quad Cities plant also was unable to receive incoming calls from the NRC over commercial telephone lines.

These incidents indicate that the provisions of IE Bulletin 80-15 were not maintained at the affected facilities at the times of the events. The bulletin required verification that all ENS station packages that use onsite ac power were connected to a safeguards instrumentation bus backed up by automatic transfer to batteries and an inverter or an equally reliable power source. At the time the bulletin was issued, both plants had ENS packages that were powered by the local telephone company, making them independent of ac power sources at the plant sites.

Discussion:

The installation of the ENS requires a station package that operates on 110 Vac. In some cases, the station package is located at the local telephone company which supplies the required power for normal operation and emergency power for operation during abnormal situations. However, in many cases, the ENS package is located at the site and is served by ac power provided by the plant.

Earlier incidents involving loss of offsite power led to losses of emergency notification capabilities at the Davis-Besse facility on October 15, 1979, and at the Indian Point Unit 2 on June 3, 1980. These incidents prompted the issuance of IE Circular 80-09 and IE Bulletin 80-15. The bulletin contained a list of those stations with ENS packages powered by the telephone company and a list of those stations with ENS packages powered at the plant site. At that time, both the Palisades plant and the Quad Cities plant had ENS packages with power supplies provided by the telephone company.

Subsequent changes to provide additional circuits in the telephone system at the Palisades plant resulted in the ENS and commercial telephone system packages being powered at the plant site. Power was supplied from a bus supported by an emergency diesel generator. However, the modification was not controlled within the licensee's formal modification process and was thus completed without formal review. The modified ENS power supply was not backed by batteries and an inverter, as previously provided by Bulletin 80-15, and was not independent of the station's commercial telephone service as reflected in the licensee's Emergency Plan.

During the incident at Palisades on January 8, 1984, the unit was intentionally powered from a single emergency diesel generator on the 1C 2400-V bus to allow isolation of a faulty switchyard breaker. The unit was defueled, and the other diesel was inoperable due to maintenance. When the running diesel subsequently overheated and tripped, the station was without ac power with the exception of preferred ac. Although some other buses were repowered by offsite ac within an hour, difficulties in closing the breakers to the 1C and 1E 2400-V buses resulted in the extended loss of all telephones except for two pay telephones powered by the telephone company. The 1E bus was repowered after about 3 hours by successfully closing the breaker to the offsite source. This provided partial restoration of the telephone service. However, the ENS telephones on the 1C bus were not restored for 6 hours, when they were finally jumpered to an energized source.

At the Quad Cities plant, the local telephone company abandoned the copper wire cables that were in use in 1980 and installed a fiber optics communications system in its place. Because the fiber optics cable does not provide for electrical power transmission, the fiber optics package at the plant had to be provided with an onsite power source. Similarly, the site package for the ENS had to be shifted to onsite power. The licensee powered the fiber optics package from an instrument bus in Unit 2 and the ENS from an instrument bus in Unit 1. These buses are supported by emergency diesel generators, but the power supplies to the communications packages are not backed up by batteries and an inverter in accordance with Bulletin 80-15.

During the event on May 7, 1985, when the Unit 2 instrument bus powering the fiber optics package lost power, both the ENS and normal PBX telephones became inoperable. The Unit 1 bus supporting the ENS package remained powered by an offsite ac source through the switchyard, but could not communicate through the unpowered fiber optics system. Once power was restored to the Unit 2 bus through a crosstie, the ENS circuit repeatedly disconnected as the licensee attempted to make emergency notifications.

These events illustrate the need for careful review of changes to plant telephone equipment to ensure that the reliability of the ENS is not compromised. In those cases where offsite communications power that is supplied by the telephone company is replaced by an onsite power source, it is important to consider the reliability of the power sources for all segments of the ENS transmission path. Those plants that already supply the ENS from an onsite safeguards instrumentation bus should be aware that the introduction of a fiber optics connection by the local telephone company still may compromise the ENS if the plant-end fiber optics package is not similarly powered.

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



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

Technical Contacts: S. Long, IE
(301) 492-7159

R. Priebe, IE
(301) 492-4333

Attachment: List of Recently Issued IE Information Notices

LIST OF RECENTLY ISSUED
 IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-76	Recent Water Hammer Events	9/19/85	All power reactor facilities holding an OL or CP
85-75	Improperly Installed Instrumentation, Inadequate Quality Control And Inadequate Post-modification Testing	8/30/85	All power reactor facilities holding an OL or CP
85-74	Station Battery Problems	8/29/85	All power reactor facilities holding an OL or CP
84-70 Sup. 1	Reliance On Water Level Instrumentation With A Common Reference Leg	8/26/85	All power reactor facilities holding an OL or CP
85-73	Emergency Diesel Generator Control Circuit Logic Design Error	8/23/85	All power reactor facilities holding an OL or CP
85-72	Uncontrolled Leakage Of Reactor Coolant Outside Containment	8/22/85	All power reactor facilities holding an OL or CP
85-71	Containment Integrated Leak Rate Tests	8/22/85	All power reactor facilities holding an OL or CP
85-70	Teletherapy Unit Full Calibration And Qualified Expert Requirements (10 CFR 35.23 And 10 CFR 35.24)	8/15/85	All material licensees
85-69	Recent Felony Conviction For Cheating On Reactor Operator Requalification Tests	8/15/85	All power reactor facilities holding an OL or CP
85-68	Diesel Generator Failure At Calvert Cliffs Nuclear Station Unit 1	8/14/85	All power reactor facilities holding an OL or CP

OL = Operating License
 CP = Construction Permit