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

March 10, 1986

IE INFORMATION NOTICE NO. 86-15: LOSS OF OFFSITE POWER CAUSED BY PROBLEMS IN FIBER OPTICS SYSTEMS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This notice is to alert addressees to recent instances of loss of offsite power caused by problems with fiber optics systems used to control switchyard circuit breakers. Recipients are expected to 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 notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Three recent instances of total loss of offsite power at nuclear power plants were caused by problems with fiber optics control systems. Fiber optics systems are sometimes thought to be immune to radio frequency interference problems. However, at least one of these instances was probably caused by interference from a hand-held radio in close proximity to the tone relaying trip receivers of the fiber optics system.

On October 3, 1985, the Palo Verde Unit 1 nuclear power plant tripped from 52 percent power because of a total loss of offsite power. The loss of offsite power was caused by the apparent malfunction of a multiplexer in the fiber optics system that in turn controlled breakers in the plant switchyard. The loss of offsite power caused the starting and loading of the emergency diesel generators that restored power to the engineered safety features buses.

On October 7, 1985, while shut down in Mode 3, Palo Verde Unit 1 again experienced a loss of offsite power apparently because of a failure of the multiplexer. Although some failed components were identified, the ultimate cause of these failures of the fiber optics multiplexer was never determined. As a corrective measure, control of the affected switchyard breakers was hardwired and the multiplexer control was bypassed.

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On January 1, 1986, the River Bend nuclear power station experienced a total loss of offsite power caused by the tripping of the preferred station transformers A and C at 0941, and approximately 1 hour later, the tripping of the preferred station transformers B and D. The plant was shut down at the time because of a reactor scram that occurred approximately 6 hours earlier for unrelated reasons.

Investigation indicated that the loss of offsite power event was not caused by a valid signal. Testing did show that hand-held radios could have caused the loss of offsite power event. Two hand-held radios, one 4 watts at 150 MHz and the other 5 watts at 450 MHz, caused system trips when keyed within 12 feet of the transmitters and receivers for the fiber optics system. Mobile radios of greater power located outside the building containing the fiber optics system would not cause spurious trips.

At River Bend, the fiber optics transmitting and receiving equipment is located in the turbine building and the Fancy Point substation, a distance of about 0.8 miles. The corrective measures adopted at River Bend include shielding of the fiber optics transmitters and receivers, posting signs that prohibit use of radios near the fiber optics equipment, rewiring the equipment so that two channels instead of one are required for tripping, providing control room annunciation of system status, training personnel on restricted use of radios, installing a sequence-of-events recorder to diagnose any future events, and training personnel on resetting lockouts, including posting of operator aids.

Other problems caused by use of hand-held radios in nuclear power plants were discussed in IE Information Notice No. 83-83, "Use of Portable Radio Transmitters Inside Nuclear Power Plants," published on December 19, 1983.

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

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

Technical Contact: Eric Weiss, IE
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Attachment: List of Recently Issued IE Information Notices

LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-14	PWR Auxiliary Feedwater Pump Turbine Control Problems	3/10/86	All power reactor facilities holding an OL or CP
86-13	Standby Liquid Control System Squib Valves Failure To Fire	2/21/86	All BWR facilities holding an OL or CP
86-12	Target Rock Two-Stage SRV Setpoint Drift	2/25/86	All power reactor facilities holding an OL or CP
86-11	Inadequate Service Water Protection Against Core Melt Frequency	2/25/86	All power reactor facilities holding an OL or CP
84-69 Sup. 1	Operation Of Emergency Diesel Generators	2/24/86	All power reactor facilities holding an OL or CP
86-10	Safety Parameter Display System Malfunctions	2/13/86	All power reactor facilities holding an OL or CP
86-09	Failure Of Check And Stop Check Valves Subjected To Low Flow Conditions	2/3/86	All power reactor facilities holding an OL or CP
86-08	Licensee Event Report (LER) Format Modification	2/3/86	All power reactor facilities holding an OL or CP
86-07	Lack Of Detailed Instruction And Inadequate Observance Of Precautions During Maintenance And Testing Of Diesel Generator Woodward Governors	2/3/86	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit