

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, D.C. 20555-0001

August 29, 1995

**NRC INFORMATION NOTICE 95-36: POTENTIAL PROBLEMS WITH POST-FIRE EMERGENCY LIGHTING**

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice (IN) to alert addressees to potential problems regarding emergency lighting for plant areas needed for operation of post-fire safe shutdown equipment and in access and egress routes thereto. It is expected that recipients will review the information for applicability to their facilities and consider actions as appropriate. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

Several licensees have reported problems regarding post-fire emergency lighting. The most recent example is herein described. Additional examples are described in Attachment 1. In Licensee Event Report (LER) 94-034, dated December 12, 1994, and Revision 1, dated February 8, 1995, Nebraska Public Power District, the licensee for Cooper Nuclear Station, reported problems with the batteries, lamps, and battery charger circuit boards associated with emergency lights that were installed to satisfy the technical requirements of Section III.J, "Emergency Lighting," of Appendix R to Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR Part 50). Specifically, the licensee reported that (1) it did not consider the effect of temperature in the performance or in the life of the batteries, (2) the existing maintenance program did not ensure that the lamps had a minimum of 8 hours of life remaining after completion of the functionality test, and (3) the circuit control boards for trickle charging may be undercharging or overcharging the batteries. As a result of these conditions, the licensee determined that the emergency lighting, as designed and maintained, would not fully satisfy design requirements. The licensee attributed these deficiencies to inadequate administrative controls on design and preventive maintenance practices. The licensee initiated corrective actions that included a review of the design basis for the emergency lighting system and replacement of batteries, lamps, and charger circuit cards, where required. The licensee also conducted a test to ensure that emergency lighting was adequate to support operator actions for plant shutdown in the event of fire. As a result of the test, the licensee

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added emergency lights in 14 areas and upgraded 21 other lights in order to comply with Appendix R requirements. The licensee stated it would also revise its plant procedures as needed to prevent recurrence.

In addition to the deficiencies reported by licensees, NRC inspections have also uncovered emergency lighting deficiencies. For example, at South Texas Project, Units 1 and 2, an inspector found inoperable indicating lights on battery packs. This deficiency led the licensee to perform a comprehensive walkdown inspection of the emergency lighting system, which uncovered a large number of deficiencies. This inspection is documented in NRC Inspection Report 50-498, 499/94-27, dated September 9, 1994.

### Discussion

This notice alerts addressees to potential problems regarding emergency lighting for plant areas needed for operation of post-fire safe shutdown equipment and in access and egress routes thereto.

NRC requirements and guidelines for emergency lighting in the event of a fire are contained in various documents including Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," to 10 CFR Part 50; Appendix A to Branch Technical Position Auxiliary Power Conversion Systems Branch, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976"; and NUREG-0800, "Standard Review Plan." The extent to which these requirements or guidelines are applicable to a specific nuclear power plant depends on plant age, commitments established by the licensee in developing its fire protection plan, the staff safety evaluation reports and supplements, and the license conditions pertaining to the fire protection plan.

The objective of these requirements and guidelines for emergency lighting is to ensure that in the event of a fire, plant personnel can access and operate equipment and components that must be manually operated to effect safe plant shutdown. Because such activities may extend over a considerable period of time both during and after the fire, 8-hour battery emergency lighting capability is specified to allow sufficient time for normal lighting to be restored, with a margin for unanticipated events.

### Related Generic Communications

The NRC issued IN 90-69, "Adequacy of Emergency and Essential Lighting," dated October 31, 1990, to alert addressees to a possible problem concerning the adequacy of emergency and essential lighting at commercial power reactor facilities. IN 90-69 described how the failure of emergency lighting delayed recovery from a reactor trip at Palo Verde Nuclear Generating Station, Unit 3. IN 90-69 also discussed deficiencies in the maintenance and testing of emergency lighting and emphasized the importance of adequate lighting conditions.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

*Dennis M. Crutchfield*  
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Office of Nuclear Reactor Regulation

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(301) 415-3731

Neal K. Hunemuller, NRR  
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Attachments:

1. Additional Examples of Licensee Reported Problems  
Regarding Post-Fire Emergency Lighting
2. List of Recently Issued NRC Information Notices

*Attachments Filed in Jacket*

### Vermont Yankee Nuclear Power Station (Vermont Yankee)

In LER 94-011, dated October 5, 1994, Vermont Yankee Nuclear Power Corporation, the licensee for Vermont Yankee, reported that 8-hour battery-powered emergency lighting units required by Section III.J of Appendix R to 10 CFR Part 50 were not installed in several areas. The licensee attributed this condition to its failure to properly identify all areas requiring post-fire safe shutdown lighting units. The licensee had not considered areas for fire scenarios that do not require control room evacuation. Subsequently, in LER 95-003, dated February 17, 1995, the licensee reported that while reviewing procedures to ensure operator actions in response to cable vault or control room fires, it discovered that the existing emergency lighting in the intake structure did not meet the technical requirements of Section III.J of Appendix R to 10 CFR Part 50. The licensee attributed this condition to a lack of comprehensive review of an emergent issue and a lack of comprehensive documentation of its Appendix R program. The corrective actions include (1) a comprehensive walkdown inspection to ensure that appropriate emergency lighting was provided; (2) the addition of emergency lighting units in the areas in which, during a fire, shutdown would require manual action; (3) review and evaluation of its processes to ensure that when new issues are identified, they receive a comprehensive review to identify all areas and programs to which they apply. The licensee also requested an exemption for certain areas from the technical requirements of Section III.J on the basis that existing security lighting satisfies the underlying safety objective. The NRC staff will evaluate the exemption request.

### Indian Point Nuclear Generating Unit No. 3 (IP3)

In LER 93-007, dated February 8, 1993, New York Power Authority, the licensee for IP3, determined that two operator egress pathways did not have the 8-hour battery-powered emergency lighting units required by Section III.J of Appendix R to 10 CFR Part 50. The licensee reported that it made erroneous assumptions about operator pathways out of the control room in the event of a fire and overlooked these two egress routes. The licensee revised the modification procedures to include an assessment of Appendix R requirements and revised its Appendix R operating procedures so that an assessment of emergency lighting will be performed after procedure revisions and during biannual reviews. Another event was reported by the licensee in LER 93-055, dated January 26, 1994 and Revision 1, dated July 21, 1994. The licensee found that 1-1/2-hour emergency lights were installed in three areas in which Appendix R requires at least an 8-hour battery power supply. The licensee identified this error during an emergency lighting blackout test. According to the licensee, the error occurred during installation of the lights and its modification closeout process failed to recognize the deficiency. The licensee changed the insufficient emergency lights to 8-hour emergency lights. Other licensee actions included (1) a blackout test for fire scenarios that require alternate shutdown, (2) a blackout test for fire scenarios that do not require control room evacuation, and (3) a revision of the Modification Control Manual Program to ensure that modifications comply with Appendix R requirements.

**Washington Public Power Supply System Nuclear Project No. 2 (WNP-2)**

In LER 92-018, dated May 28, 1992, Washington Public Power Supply System, the licensee for WNP-2, reported that 8-hour battery-powered emergency lighting units required by Appendix R to 10 CFR Part 50 were not installed in six areas that would require manual operator actions for fire scenarios not requiring control room evacuation. In addition, the licensee reported that it had failed to incorporate into its procedures the operator actions that were identified during followup reviews. The licensee attributed this oversight to inadequate design and lack of interdepartmental communication. For corrective actions, the licensee (1) added emergency lighting units in the six deficient areas, (2) reviewed procedures to ensure that all operator actions required by the plant shutdown analysis were addressed, and (3) evaluated the process by which design information is incorporated into plant procedures.

**Diablo Canyon Nuclear Power Plant, Units 1 and 2 (Diablo Canyon)**

In LER 2-92-001-01, dated October 29, 1992, Pacific Gas and Electric Company, the licensee for Diablo Canyon, reported that it found a number of emergency lighting deficiencies during its Appendix R Design-Basis Documentation Enhancement Project and a self-assessment of the Diablo Canyon fire hazards safe shutdown analysis. Later, in submittals of March 15, 1994, and May 25, 1994, the licensee stated that it would install permanent emergency lighting units in certain areas and requested an exemption from the technical requirements of Section III.J of Appendix R for other areas. (Diablo Canyon is not an Appendix R plant; therefore, the NRC staff treated the exemption request as a deviation from a commitment to meet the requirements of Section III.J of Appendix R.) On the basis of its evaluation of the deviation, which included reviews of the licensee's submittals and walkdown inspections during a site visit, the NRC staff concluded that the licensee did not provide an adequate technical justification for the proposed deviation. The staff also concluded that the alternative proposed by the licensee (the use of hand-held flashlights rather than fixed emergency lighting units) did not provide a level of safety equivalent to that provided by Section III.J of Appendix R to 10 CFR Part 50. The NRC staff transmitted its denial of the deviation request and its safety evaluation to the licensee in a letter dated May 5, 1995. By letter dated May 9, 1995, the licensee committed to install battery-operated lights where required.

LIST OF RECENTLY ISSUED  
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
95-35	Degraded Ability of Steam Generators to Remove Decay Heat by Natural Circulation	08/28/95	All holders of OLs or CPs for pressurized water reactors (PWRs).
95-34	Air Actuator and Supply Air Regulator Problems in Copes-Vulcan Pressurizer Power-Operated Relief Valves	08/25/95	All holders of OLs or CPs for nuclear power reactors.
93-83, Supp. 1	Potential Loss of Spent Fuel Pool Cooling After a Loss-of-Coolant Accident or a Loss of Offsite Power	08/24/95	All holders of OLs or CPs for nuclear power reactors.
95-33	Switchgear Fire and Partial Loss of Offsite Power at Waterford Generating Station, Unit 3	08/23/95	All holders of OLs or CPs for nuclear power reactors.
95-10, Supp. 2	Potential for Loss of Automatic Engineered Safety Features Actuation	08/11/95	All holders of OLs or CPs for nuclear power reactors.
95-32	Thermo-Lag 330-1 Flame Spread Test Results	08/10/95	All holders of OLs or CPs for nuclear power reactors.
95-31	Motor-Operated Valve Failure Caused by Stem Protector Pipe Interference	08/09/95	All holders of OLs or CPs for nuclear power reactors.
95-30	Susceptibility of Low-Pressure Coolant Injection and Core Spray Injection Valves to Pressure Locking	08/03/95	All holders of OLs or CPs for nuclear power reactors.
94-66, Supp. 1	Overspeed of Turbine-Driven Pumps Caused by Binding in Stems of Governor Valves	06/16/95	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License  
 CP = Construction Permit

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original signed by  
 Dennis M. Crutchfield, Director  
 Division of Reactor Program Management  
 Office of Nuclear Reactor Regulation

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Attachments:

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DOCUMENT NAME: 95-36.IN

\*See previous concurrence

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NAME	NHunemuller*		BCalure*		RDennig*		SWest*		CMcCracken*	
DATE	06/08/95		06/12/95		06/16/95		06/16/95		06/16/95	
OFFICE	PECB/DRPM	E	C/PECB:DRPM	N	D/DRPM	N				
NAME	RKiessel*		ACHaffee*		DCrutchfield					
DATE	08/10/95		08/17/95		08/27/95					

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OFFICE	PECB/DRPM	E	C/PECB:DRPM	N	D/DRPM	N				
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OFFICE	PECB/DRPM	E	C/PECB/DRPM	N	D/DRPM	N				
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DATE	06/08/95		06/12/95		06/16/95	06/16/95	6/16/95
OFFICE	OECEB/DOPS	C/OECEB:DOPS	D/DOPS				
NAME	RKiesel <i>RK</i>	AChaffee	BGrimes				
DATE	8/10/95	/ /95	/ /95				

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DATE	/ /95	/ /95	6/12/95	/ /95	/ /95

OFFICE	C/SPLB:DSSA	OECEB:DOPS	C/OECEB:DOPS	D/DOPS	
NAME	CMcCracken	RKiessel	AChaffee		
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