

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

June 18, 1993

NRC INFORMATION NOTICE 93-47: UNRECOGNIZED LOSS OF CONTROL
ROOM ANNUNCIATORS

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 to alert addressees to the potential problem of unrecognized loss of control room annunciators. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

Callaway

On October 16, 1992, while the Callaway Plant was operating at 100 percent power, approximately 75 annunciators on the main control board illuminated. After verifying that the annunciators were not valid, the shift supervisor (SS) notified the plant manager and the engineering duty officer of the condition and requested instrumentation and control (I&C) technicians to begin repairs. The I&C technicians found that one of four field power supplies for the annunciators had failed. The failed power supply was replaced and the annunciators appeared to return to normal. Two minutes later, while removing jumper cables installed during the replacement, an electrical short occurred. In the control room, 371 of the 463 main control board annunciators illuminated and remained lit. The I&C technicians inspected the power supplies and determined that the output fuses for all four field power supplies had blown. The blown fuses resulted in the loss of all main control board annunciators. This was not recognized by the plant staff.

Callaway procedure EIP-ZZ-00101, "Classification of Emergencies," describes those conditions which constitute entry into established emergency action levels (EALs). The procedure states that, for an initiating condition of "Most or All Alarms (Annunciators) Lost," the proper emergency classification is an Alert.

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Approximately one hour after the loss of all annunciators, the blown output fuses were replaced and power was restored to the annunciator system. Plant personnel verified that power was available to the annunciators by depressing test switches in the control room. However, this did not test the annunciator logic circuitry and, as a result, the operating crew was unaware that 164 annunciators with re-flash capability were completely inoperable. Apparently, the short that blew the output fuses in the field power supplies also blew fuses in eight annunciator logic power supplies. Later, while investigating problems with the annunciators, the I&C engineer found and replaced the blown fuses in the eight logic power supplies and an appropriate test was performed. However, there was not an approved procedure for this test nor was it properly documented. By 7:37 p.m. on October 17 the main control board annunciators had been restored to fully operable status.

Because the SS failed to recognize that all of the main control board annunciators were inoperable after the four field power supply output fuses had blown, an Alert was not declared on October 17, 1992. On October 19, the licensee determined that an Alert should have been declared and notified State and local authorities and the NRC of the event.

Inspection of this event by an NRC Augmented Inspection Team (AIT) found the following weaknesses: (1) insufficient knowledge of the annunciator system by the plant staff, (2) poor communications and inadequate teamwork, (3) lack of a questioning attitude, and (4) inadequate work performance. Contributing to the insufficient knowledge of the annunciator system was the failure to have an off-normal operating procedure or other procedure that addressed loss of annunciators.

Salem Unit 2

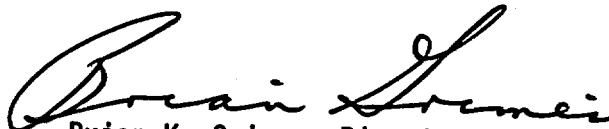
On December 13, 1992, control room operators at Salem Unit 2 Nuclear Station discovered that the overhead annunciators had been inoperable for about 90 minutes. The inoperable condition was detected when an alarm printer printed a change in alarm status which was not reflected by the overhead annunciators. The operators reset the annunciator system and restored it to operable status within two minutes. Subsequent inspection of the event by an NRC AIT identified several weaknesses that contributed to the problem. The operators were not adequately trained to verify proper operation of a recently installed micro-processor based annunciator system. The new system was not designed with annunciation as a priority task and therefore it did not indicate a critical mispositioned switch. Attempts by the operators to enter files, despite a procedure caution, contributed to locking up the system. The plant staff delayed in notifying plant management and the NRC. The licensee did not have a procedure to deal with the loss of annunciators. The AIT concluded that the overall knowledge of the system was inappropriate for a system that, if lost, required the declaration of an Alert.

Discussion

Although plant annunciators are not considered safety related, they are important for the safe operation of a nuclear power plant. Further, an unrecognized loss of annunciators may increase the difficulty of diagnosing problems in plant operations and equipment. In order for plant operators to recognize and respond properly to a loss of annunciators, it is important to have clear procedures, appropriate training, and effective communications between operators and plant support personnel. For the events described above, an off-normal operating procedure that clearly stated required actions would have significantly aided the operators to diagnose the extent of the problem, take necessary response actions, and make required notifications.

Loss of annunciator events were covered by the emergency classification procedures of both licensees, premised upon guidance of Appendix 1 of NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," (November 1980). The NRC recently issued Revision 3 to Regulatory Guide 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors" (August 1992). That revision endorsed NUMARC/NESP-007, Revision 2, "Methodology for Development of Emergency Action Levels," (January 1992), as an acceptable alternative. With respect to loss of annunciators, the NUMARC/NESP-007 guidance provides an alternative delineation of thresholds for declaring an Unusual Event, Alert or Site Area Emergency.

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.



Brian K. Grimes, Director
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Office of Nuclear Reactor Regulation

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(314) 676-3181

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(708) 790-5776

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Attachment:
List of Recently Issued NRC Information Notices

Attachment
IN 93-47
June 18, 1993
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LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
93-46	Potential Problem with Westinghouse Rod Control System and Inadvertent Withdrawal of A Single Rod Control Cluster Assembly	6/10/93	All holders of OLs or CPs for Westinghouse (W)-designed nuclear power reactors.
93-45	Degradation of Shutdown Cooling System Performance	06/16/93	All holders of OLs or CPs for nuclear power reactors.
93-44	Operational Challenges During A Dual-Unit Transient	06/15/93	All holders of OLs or CPs for nuclear power reactors.
93-43	Use of Inappropriate Lubrication Oils in Safety-Related Applications	06/10/93	All holders of OLs or CPs for nuclear power reactors.
93-42	Failure of Anti-Rotation Keys in Motor-Operated Valves Manufactured by Velan	06/09/93	All holders of OLs or CPs for nuclear power reactors.
93-41	One Hour Fire Endurance Test Results for Thermal Ceramics Kaowool, 3M Company FS-195 and 3M Company Interam E-50 Barrier Systems	05/28/93	All holders of OLs or CPs for nuclear power reactors.
93-40	Fire Endurance Test Results for Thermal Ceramics FP-60 Fire Barrier Material	05/26/93	All holders of OLs or CPs for nuclear power reactors.
93-39	Radiation Beams from Power Reactor Biological Shields	05/25/93	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

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*RPB:ADM
RSanders
03/17/93

*OGCB:DORS:NRR
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05/06/93

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05/27/93

D/DORS/NRR
BKGrimes
05/ /93 *mkw*

*R/RIII
BBartlett
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*RIII
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05/04/93

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DOCUMENT NAME: ANNUNCE8.JLB

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*RPB:ADM RSanders 03/17/93	OGCB:DORS:NRR JBirmingham 05/6/93 <i>820</i>	C/OGCB:DORS:NRR GHMarcus 05/ /93	D/DORS/NRR BKGrimes 05/ /93
*R/RIII BBartlett 04/21/93	RIII <i>JLB</i> RWestberg 05/ /93 <i>4-22-93</i>	PEPB:DRSS:NRR SABoynton 05/4 /93	OEAB:DORS:NRR TKoshy <i>dk</i> 05/5 /93

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