

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

March 11, 1991

NRC INFORMATION NOTICE NO. 91-17: FIRE SAFETY OF TEMPORARY  
INSTALLATIONS OR SERVICES

Addressees:

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

Purpose:

This information notice is intended to alert licensees to the fire hazards that may arise because of inadequate engineering design and supervisory control of electrical and mechanical systems temporarily installed to support operational or maintenance activities at commercial nuclear power reactors. 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 do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On December 3, 1990, a fire occurred in the personnel access airlock between the Unit 1 reactor building and the drywell at the Brunswick Steam Electric Plant. Unit 1 was in a refueling outage and was defueled at the time. The fire lasted approximately two hours. Both the inside and outside doors of the airlock were open to accommodate the passage of numerous cables and hoses in support of refueling outage activities in the drywell. The fire spread along cables to just inside the drywell, but drywell damage was limited to smoke and soot deposits. Most of the cables and hoses in the airlock were destroyed and permanent airlock components were damaged. No significant effects were observed in the reactor building. The fire was caused by the overheating of electrical cables from the combined effects of excessive current and insufficient heat dissipation. These cables were supplying power to resistive heaters used for post-weld heat treatment (PWHT) of recirculation system piping welds and were rated at 100 amps (free air installation). At the time of the fire, two PWHT circuits were carrying approximately 150 to 170 amps each. The licensee had arranged 72 cables that supplied power to 36 PWHT circuits on a temporary fire-retardant wood cable tray along with numerous other lines and cables, such as welding leads, hydraulic hoses, drop cords, thermocouple lines,

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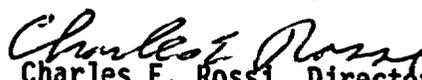
*TDAR-11C*

air hoses, and closed circuit television cables. All were enclosed in individual plastic sleeves for contamination control. Also passing through the airlock were miscellaneous other lines, cables, and ventilation ducts, such that personnel could not gain access through the airlock. Initially, the licensee had installed the cables and lines in an orderly manner, with cables neatly bundled. However, the bundling and use of plastic sleeves to control contamination significantly reduced the ability of the PWHT cables to dissipate heat. The guidance in the Institute of Electrical and Electronic Engineers (IEEE) Standard S-135 and the National Electric Code (Articles 400 and 630) indicates that the cables should have been derated by approximately 50 percent because of the spacing between them. The combination of excessive current and inadequate spacing resulted in the cables carrying over three times the recommended rated current. The licensee and the NRC staff concluded that the temporary services passing through the airlock were not properly engineered. Following the orderly initial installation of temporary services through the airlock, additional cables and hoses were pulled through in a haphazard manner wherever they would fit. Services no longer needed could not be easily removed because of the tangling and interference from other lines. These factors resulted in a disorganized, congested, and confined space that further restricted the heat dissipation of the PWHT cables and, once the fire started, seriously hampered efforts to extinguish it.

Discussion:

The use of temporary services at power reactor facilities is routine, especially in support of maintenance and other activities during outages. In view of the magnitude and complexity of some temporary services, proper engineering and, once installed, maintenance of the design basis become significant.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.

  
Charles E. Rossi, Director  
Division of Operational Events Assessment  
Office of Nuclear Reactor Regulation

Technical Contact: D. J. Nelson, RII  
(919) 457-9531

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED  
 NRC INFORMATION NOTICES

| Information Notice No. | Subject  | Date of Issuance | Issued to  |
|------------------------|--|------------------|--|
| 91-16                  | Unmonitored Release Pathways from Slightly Contaminated Recycle and Recirculation Water Systems at A Fuel Facility             | 03/06/91         | All fuel cycle facilities.   |
| 91-15                  | Incorrect Configuration of Breaker Operating Springs in General Electric AK-Series Metal-Clad Circuit Breakers                 | 03/06/91         | All holders of OLs or CPs for nuclear power reactors.  |
| 91-14                  | Recent Safety-Related Incidents at Large Irradiators   | 03/05/91         | All Nuclear Regulatory Commission (NRC) licensees authorized to possess and use sealed sources at large irradiators. |
| 91-13                  | Inadequate Testing of Emergency Diesel Generators (EDGs)   | 03/04/91         | All holders of OLs or CPs for nuclear power reactors.  |
| 91-12                  | Potential Loss of Net Positive Suction Head (NPSH) of Standby Liquid Control System Pumps                                      | 02/15/91         | All holders of OLs or CPs for boiling water reactors (BWRs).   |
| 91-11                  | Inadequate Physical Separation and Electrical Isolation of Non-safety-related Circuits from Reactor Protection System Circuits | 02/20/91         | All holders of OLs or CPs for W-designed nuclear power reactors.   |
| 86-99, Supp. 1         | Degradation of Steel Containments  | 02/14/91         | All holders of OLs or CPs for nuclear power reactors.  |
| 89-32, Supp. 1         | Surveillance Testing of Low-Temperature Overpressure-Protection Systems  | 02/12/91         | All holders of OLs or CPs for nuclear power reactors.  |

OL = Operating License  
 CP = Construction Permit

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Discussion:

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Original Signed by  
Charles E. Rossi, Director Charles E. Rossi  
Division of Operational Events Assessment  
Office of Nuclear Reactor Regulation

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(919) 457-9531

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\*SEE PREVIOUS CONCURRENCES

|   |   |                                      |                                      |                                  |
|---|---|--------------------------------------|--------------------------------------|----------------------------------|
| D/DOEA-NRR<br>CERossi<br>03/5/91        | *C/OGCB:DOEA:NRR<br>CHBerlinger<br>03/01/91 | *RPB:ADM<br>TechEd<br>02/28/91       | *SELB:DST:NRR<br>FRosa<br>03/ /91    | *D/DE:RES<br>LCShao<br>03/ /91   |
| OGCB:DOEA:NRR<br>*NPKadamb1<br>03/01/91 | RESINSP/RII<br>DJNelson<br>02/26/91         | EMEB:DE:RES<br>SAggarwal<br>02/26/91 | *C/EMEB:DE:RES<br>MVagins<br>03/ /91 | *DD/DE:RES<br>RBosnak<br>03/ /91 |

DOCUMENT NAME: IN 91-17

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Discussion:

The use of temporary services at power reactor facilities is routine, especially in support of maintenance and other activities during outages. In view of the magnitude and complexity of some temporary services, proper engineering of such services and, once installed, maintenance of the design basis become more significant. Temporary services that supplement or replace permanent plant systems or components may require special considerations and supervisory controls to ensure that the systems are properly designed, perform as expected, and are maintained in a manner consistent with the systems they support. Licensees may wish to consider detailed installation, operating and removal procedures; post-installation and periodic testing; the use of existing work control processes; and training for temporary installations or services.

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\*SEE PREVIOUS CONCURRENCES Document Name: INFO NOTICE - AGGARWAL, KADAMBI

|               |                 |             |               |           |
|---------------|-----------------|-------------|---------------|-----------|
| D/DOEA:NRR    | C/OGCB:DOEA:NRR | *RPB:ADM    | SELB:DST:NRR  | D/DE:RES  |
| CERossi       | CHBerlenger     | TechEd      | FRosa *       | LCShao *  |
| 03/ /91       | 03/ /91         | 02/28/91    | 03/ /91       | 03/ /91   |
| OGCB:DOEA:NRR | RESINSP/RII     | EMEB:DE:RES | C/EMEB:DE:RES | DD/DE:RES |
| NPKadambi     | DJNelson        | SAggarwal   | MVagins *     | RBosnak * |
| 03/ / 91      | 02/26/91        | 02/26/91    | 03/ /91       | 03/ /91   |

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| D/DOEA:NRR    | C/OGCB:DOEA:NRR | RPB:ADM                               | SELB:DST:NRR  | D/DE:RES  |
| CERossi       | CHBerlinger     | TechEd <sup>JMah</sup> <sub>9th</sub> | FRosa         | LCShao    |
| 02/ /91       | 02/ /91         | 02/29/91                              | 02/ /91       | 02/ /91   |
| OGCB:DOEA:NRR | RESINSP/RII     | EMEB:DE:RES                           | C/EMEB:DE:RES | DD/DE:RES |
| NPKadambi     | DJNelson        | SAggarwal                             | MVagins       | RBosnak   |
| 02/ / 91      | 02/ /91         | 02/ /91                               | 02/ /91       | 02/ /91   |

No specific written response is required by this information notice. If you have any questions regarding this matter, please contact the technical contact listed below or the appropriate Regional office.

Charles E. Rossi, Director  
Division of Operational Events Assessment  
Office of Nuclear Reactor Regulation

Technical Contacts: D. J. Nelson, Region II  
919-457-9531

S. K. Aggarwal  
Office of Nuclear Regulatory Research  
301-492-3829

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RBosnak  
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CERossi  
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Discussion:

The use of temporary services at power reactor facilities is routine, especially in support of maintenance and other activities during refueling. In view of the magnitude and complexity of some temporary services, it is imperative that the licensees should ensure that installations are properly engineered and, once installed, that the design basis be maintained. Temporary services that supplement or replace permanent plant systems/components require special considerations and supervisory controls to ensure that the systems are properly designed, perform as expected, and are maintained in a manner consistent with the systems they support. Consideration and appropriate attention should be given to detailed installation and removal procedures, post-installation and periodic testing, use of existing work control processes, training, and adherence to established operating procedures for temporary installations or services.

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Office of Nuclear Reactor Regulation

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S. K. Aggarwal  
Office of Nuclear Regulatory Research  
301-492-3829

N. B. Le  
Office of Nuclear  
Reactor Regulation  
(301) 492-1458

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