December 13, 2004

Rejane Spiegelberg Planer
Operational Safety Experience Specialist
IAEA IRS Coordinator
International Atomic Energy Agency
Division of Nuclear Installation Safety
International Atomic Energy Agency
Wagramer Strasse 5, P.O. Box 100
A-1400 Wien
AUTRICHE

Dear Ms. Spiegelberg Planer:

The following operating experience reports from United States reactors are enclosed for your consideration for including in the AIRS database:

NRC Information Notice 2004-19: Problems Associated with Back-up Power Supplies to Emergency Response Facilities and Equipment

NRC Information Notice 2004-21: Additional Adverse Effect of Boric Acid Leakage: Potential Impact on Post-accident Coolant pH

Each report is being submitted in the following two media: (1) a hard copy of the input file for the AIRS database; and (2) a 3.5-inch HD diskette containing the input file for the AIRS database in WordPerfect format.

If you have any questions regarding these reports, please call Brett Rini of my staff. He can be reached at 301-415-3931.

Sincerely,

/RA/
Patrick Hiland, Chief
Reactor Operations Branch
Division of Inspection Program Management
Office of Nuclear Reactor Regulation

Enclosures: As stated

cc w/enclosures:
Dr. Pekka T. Pyy
Administrator, Operating Experience & Human Factors
Nuclear Safety Division
Nuclear Energy Agency
OECD
Le Seine St. Germain, Batiment B
12, Boulevard des Iles
92130 - Issy-les-Moulineaux
FRANCE

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DATE	12/10/2004	12/10/2004	12/13/2004	12/13/2004	12/13/2004

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INCIDENT REPORTING SYSTEM

IRS NO.	EVENT DATE	N/A	DATE RECEIVED

EVENT TITLE

NRC Information Notice 2004-19: Problems Associated with Back-up Power Supplies to Emergency Response Facilities and Equipment

COUNTRY	PLANT AND UNIT	REACTOR TYPE
United States	Many	GEN

INITIAL STATUS	RATED POWER (MWe NET)
N/A	N/A

DESIGNER	1st COMMERCIAL OPERATION
N/A	N/A

ABSTRACT

The U.S. Nuclear Regulatory Commission is issuing this information notice to alert addressees to problems with back-up power supplies for emergency response facilities (ERFs) and equipment.

Please refer to the dictionary of codes corresponding to each of the sections below and to the coding guidelines manual.

1.	**Reporting Categories:**	**1.4**	**1.4**	**1.4**
2.	**Plant Status Prior to the Event:**	**2.1.1**	**2.1.1**	**2.1.1**
3.	**Failed/Affected Systems:**	**3.EF**	**3.EC**	**3.EE**
4.	**Failed/Affected Components:**	**4.3.7**	**4.3.0**	**4.3.0**
5.	**Cause of the Event:**	**5.4.11**	**5.6.4**	**5.3.1**
6.	**Effects on Operation:**	**6.0**	**6.0**	**6.0**
7.	**Characteristics of the Incident:**	**7.10**	**7.0**	**7.0**
8.	**Nature of Failure or Error:**	**8.1**	**8.1**	**8.1**
9.	**Nature of Recovery Actions:**	**9.1**	**9.1**	**9.1**

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

November 4, 2004

NRC INFORMATION NOTICE 2004-19: PROBLEMS ASSOCIATED WITH BACK-UP POWER SUPPLIES TO EMERGENCY RESPONSE FACILITIES AND EQUIPMENT

ADDRESSEES

All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to problems with back-up power supplies for emergency response facilities (ERFs) and equipment. Emergency response equipment and ERFs need to be functional in the event of an emergency. 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.

BACKGROUND

The ERF and emergency response equipment requirements must meet the following standard of Title 10 of the Code of Federal Regulations (CFR), Part 50, Paragraph 47(b)(8):

> Adequate emergency facilities and equipment to support the emergency response are provided and maintained.

Requirements are also found in Section IV.E “Emergency Facilities and Equipment” of Appendix E to 10 CFR Part 50:

> Adequate provisions shall be made and described for emergency facilities and equipment, including:
>
> A licensee onsite technical support center (TSC) and a licensee near-site emergency operations facility from which effective direction can be given and effective control can be exercised during an emergency.

ML042730010

DESCRIPTION OF CIRCUMSTANCES AND DISCUSSION

TSC Emergency Diesel Generator Switch Misalignment

On June 14, 2004, as a result of a loss of offsite power (LOOP) event at Palo Verde Nuclear Generating Station, electrical power was lost to the TSC. The TSC diesel generator started as designed, but subsequently tripped due to high engine temperature. During troubleshooting, it was determined that the engine operating switch was in idle. With the switch in idle, the diesel generator started on loss of electrical power to the TSC, but did not come up to proper voltage and frequency and did not reenergize the TSC electrical distribution panel. As a result, the engine radiator cooling fan did not start; therefore, the engine overheated and tripped on high temperature.

The licensee determined that the engine operating switch was apparently left in the idle position following post-maintenance testing of the engine-starting system performed on June 8, 2004. After corrective maintenance was performed on one battery terminal and connector, the team leader allowed the electricians to test the engine starting system without a working copy of the test procedure in the field, since this test was routinely performed by the electricians. After the diesel generator was successfully started, the engine operating switch was moved from run to idle to allow the engine to run at a slower speed and cool down before being secured. A follow-up NRC inspection determined that the failure to have a working copy of the test procedure at the engine during this post-maintenance testing and failure to use the restoration guidance contained in the test procedure contributed directly to the failure to restore the TSC diesel generator to its normal standby condition. The NRC inspection also determined that the diesel generator failure contributed to a delay in staffing the TSC because the responding members of the emergency response organization were moved to an alternate TSC. This issue was documented in NRC Inspection Report 05000528/2004012; 05000529/2004012; 05000530/2004012. (ADAMS# ML042020061)

Procedural Changes Modifying the Effectiveness of the Emergency Operations Facility (EOF)

On June 25, 2001, the NRC resident inspector at the Cooper Nuclear Station observed the licensee's response to an alert declaration due to a fire affecting the station startup transformer. During the event, the inspector noted that the EOF had no alternating current (AC) power. The normal power supply to the EOF was deenergized when the startup transformer isolated following an electrical component failure. As a result, the EOF had limited communication abilities and emergency battery powered lighting.

Although a back-up power supply existed for the EOF, it was only allowed to supply power to necessary equipment when the plant was operating in Mode 4, cold shutdown or Mode 5, refueling. In operating Modes 1, 2, and 3, power operations, startup, and hot shutdown, respectfully, the back-up power supply was allowed to power only communication equipment due to electrical loading restrictions on the switchgear. The NRC resident inspector determined that this restriction significantly compromised the ability of the emergency operations facility to adequately function following a loss of normal power in Modes 1, 2, and 3.

In 1986, the licensee performed a design change to increase the reliability of the EOF and provide a back-up source of power during a loss of offsite power event. This design change originally placed no restrictions on using the back-up power supply to the EOF for any operating mode. On September 14, 1991, the licensee revised a system operating procedure which restricted the back-up power source to supply only the emergency operations facility communication system when operating in Modes 1, 2, and 3, due to power limitations on the electrical switchgear. This issue was documented in NRC Inspection Report 50-298/01-09. (ADAMS# ML043070372)

Failure to Maintain the TSC Batteries

On December 11, 2003, the NRC completed an inspection at the Indian Point Nuclear Generating Station, Unit 2. While reviewing condition reports, the inspection team noted that, during the quarterly surveillance tests performed on October 21, 2003, one cell in each of the two TSC battery banks did not meet the acceptance criteria specified in the test procedures. Although the cells were marginally out of specification, the team determined that the licensee did not take prompt corrective actions either to return the two cells to within specifications or to evaluate the impact of the out of specification conditions on the functionality of the battery banks. Although the TSC battery banks performed as designed during the northeastern grid blackout on August 14, 2003 (August 14 event), the team determined that the degraded cells had the potential to adversely affect the facilities and equipment required to support emergency response. This issue was documented in NRC Inspection Report 05000247/2004003. (ADAMS# ML040360248)

Miscellaneous Failures During the August 14 Event

During the August 14 event, the TSC back-up diesel generator at Indian Point Unit 2 failed to automatically start and subsequent operator actions to manually start and load the diesel failed. The Unit 2 TSC diesel generator failed to function due to electrical loading in excess of its design capacity. This condition was initially identified in February 2000 and was not resolved in a timely manner. Observations by the licensee during emergency planning training revealed a potential for the TSC back-up diesel generator to be overloaded. Also, a review by the licensee of the electrical power distribution drawings showed a potential existed for the TSC back-up diesel generator to be overloaded under some conditions. Long-term corrective actions for this diesel were postponed. The Unit 2 TSC and Operational Support Center remained without a back-up AC electrical power supply until September 15, 2003, when a temporary alteration was installed and satisfactorily tested.

Additionally during the August 14 event, the Indian Point Unit 3 TSC back-up diesel generator started and then tripped while being loaded and was unavailable for the duration of the blackout. The Unit 3 TSC diesel generator failed to function due to a malfunctioning overspeed controller. The diesel generator was repaired and restored to service on September 16, 2003.

During a refueling outage, on April 18, 2003, the Unit 3 TSC back-up diesel generator was tested under simulated blackout conditions and tripped while being loaded. Subsequently, a

licensee system engineer initiated a work order to replace a suspected faulty overspeed trip module. Seven hours later, the Unit 3 TSC diesel was retested in an unloaded condition and declared operable. The work order to replace the TSC diesel generator overspeed trip module was postponed by the licensee's maintenance planning organization until November 2003, based upon a determination that the diesel problem was "not an operability concern."

During an inspection at Indian Point Units 2 and 3, following the August 14 event, an NRC team identified that the licensee did not have a preventive maintenance program in place to ensure the continued functionality of the numerous Un-Interruptible Power Supplies (UPSs) in the EOF which provide back-up power to emergency response equipment. By design, there is no electrical back-up power supply to the EOF. Instead, the EOF has a number of UPSs which provide short-term battery back-up power to dedicated ERF communications and data transmission systems. During the August 14 event, the UPSs failed or functioned at only a fraction of their design capacity.

The failures of the Unit 2 and 3 TSC back-up diesel generators and the EOF UPSs were documented in NRC Inspection Report 05000247/2003013 and 05000286/2003010. (ADAMS# ML033570386)

CONCLUSION

Problems with back-up power supplies and equipment have the potential to impact the ability of ERFs to support a prompt and effective response to an emergency. The occurrence of these types of problems can be reduced by following restoration procedures after testing and maintenance, promptly resolving deficiencies identified during testing and maintenance, and reviewing design changes for impact on the operability of ERF back-up power supplies.

CONTACT

This information notice requires no specific action or written response. Please direct any questions about information in this notice to the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation project managers.

/RA/
Patrick L. Hiland, Chief
Reactor Operations Branch
Division of Inspection Program Management
Office of Nuclear Reactor Regulation

Technical Contact: Jason L. Flemming
(301) 415-5787
E-mail: jlf2@nrc.gov

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
2004-18	Recent Safety-related Event at Panoramic Wet-source-storage Irradiator	10/26/2004	All licensees authorized to possess and use sealed sources in panoramic wet-source-storage irradiators, and irradiator vendors.
2004-17	Loose Part Detection and Computerized Eddy Current Data Analysis in Steam Generators	08/25/2004	All holders of operating licenses for pressurized-water reactors (PWRs), except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor.
2004-16	Tube Leakage Due to a Fabrication Flaw in a Replacement Steam Generator	08/03/2004	All holders of operating licenses for pressurized-water reactors (PWRs), except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor.
2004-15	Dual-Unit Scram at Peach Bottom Units 2 and 3	07/22/2004	All holders of operating licenses for nuclear power reactors except those who have permanently ceased operation and have certified that fuel has been permanently removed from the reactor vessel.
2004-14	Use of less than Optimal Bounding Assumptions in Criticality Safety Analysis at Fuel Cycle Facilities	07/19/2004	All licensees authorized to possess a critical mass of special nuclear material.

Note: NRC generic communications may be received in electronic format shortly after they are issued by subscribing to the NRC listserver as follows:

To subscribe send an e-mail to <listproc@nrc.gov >, no subject, and the following command in the message portion:

subscribe gc-nrr firstname lastname

OL = Operating License
CP = Construction Permit

INCIDENT REPORTING SYSTEM

IRS NO.	EVENT DATE	1990s	DATE RECEIVED

EVENT TITLE

NRC Information Notice 2004-21: Additional Adverse Effect of Boric Acid Leakage: Potential Impact on Post-Accident Coolant pH

COUNTRY	PLANT AND UNIT	REACTOR TYPE
US	Davis-Besse	PWR
INITIAL STATUS	**RATED POWER (MWe NET)**	
Shutdown	882	
DESIGNER	**1st COMMERCIAL OPERATION**	
Babcock & Wilcox	07/31/1978	

ABSTRACT

The U.S. Nuclear Regulatory Commission is issuing this information notice to inform addressees of potential adverse effects of boric acid leakage that may not have been previously considered and to reemphasize concerns regarding boric acid accumulations on reactor plant equipment inside containment.

NRC INFORMATION NOTICE 2004-21

Please refer to the dictionary of codes corresponding to each of the sections below and to the coding guidelines manual.

1.	**Reporting Categories:**	**1.4**		
2.	**Plant Status Prior to the Event:**	**2.0**		
3.	**Failed/Affected Systems:**	**3.AE**	**3.BG**	
4.	**Failed/Affected Components:**	**4.0**		
5.	**Cause of the Event:**	**5.1.3.1**	**5.1.3.4**	
6.	**Effects on Operation:**	**6.0**		
7.	**Characteristics of the Incident:**	**7.0**		
8.	**Nature of Failure or Error:**	**8.0**		
9.	**Nature of Recovery Actions:**	**9.0**		

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, DC 20555-0001

November 24, 2004

NRC INFORMATION NOTICE 2004-21: ADDITIONAL ADVERSE EFFECT OF BORIC ACID LEAKAGE: POTENTIAL IMPACT ON POST-ACCIDENT COOLANT pH

ADDRESSEES

All holders of operating licenses or construction permits for pressurized water reactors (PWRs), except those who have ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice (IN) to inform addressees of potential adverse effects of boric acid leakage that may not have been previously considered and to reemphasize concerns regarding boric acid accumulations on reactor plant equipment inside containment. The primary concern regarding boric acid leakage is corrosion of ferritic steel components. However, if boric acid deposits of sufficient magnitude are present in containment, dissolution of these deposits may also affect the pH of the reactor coolant in the containment sump. The NRC anticipates that recipients will review the information for applicability to their facilities and consider appropriate actions. However, suggestions contained in this IN do not constitute NRC requirements; therefore, no specific action or written response is required.

DESCRIPTION OF CIRCUMSTANCES

During refueling outages throughout the 1990s, personnel at the Davis-Besse nuclear power plant performed visual inspections of the reactor pressure vessel (RPV) head surface that was accessible through the service structure weep holes. Visual inspections performed below the RPV head insulation found some accumulation of boric acid deposits on the RPV head. The boric acid buildup was due to leaking control rod drive mechanism flanges and reactor coolant pressure boundary leakage. Many areas of the RPV head were not visible because of persistent boric acid deposits that the licensee did not clean. In addition to the significant buildup of boric acid on the reactor pressure vessel head, a substantial amount of boric acid built up inside the containment at Davis-Besse.

ML043280614

After a loss-of-coolant accident (LOCA) at a pressurized water reactor, chemical agents would be used to ensure that the reactor coolant pH is kept neutral or slightly basic. At the Davis-Besse plant, trisodium phosphate (TSP) is used. The TSP is kept in designated storage baskets in the containment building. However, large deposits of boric acid in containment may adversely affect the pH of the reactor coolant in the containment sump.

DISCUSSION

Boric acid deposits can occur inside a pressurized water reactor containment as a result of reactor coolant system leakage. The deposits typically accumulate at any point where moisture condenses inside containment (e.g., cooling water pipes, ventilation systems, containment liner surfaces). If these deposits are not promptly identified and routinely removed, they could accumulate and impact the sump pH. Therefore, it is important to have procedures and programs to routinely identify and remove boric acid deposits.

After a LOCA, the iodine released from the damaged core is removed from the containment atmosphere by spraying borated water accumulated in the containment sump. To keep iodine in solution, the pH of the sump water should be at least 7. Maintaining a pH of 7 or slightly greater is also necessary to minimize chloride stress corrosion cracking in austenitic stainless steel components exposed to the sump water. The amount of TSP depends on how much boric acid from all sources has accumulated in the containment. Failure to control and remove accumulations of boric acid deposits inside containment may challenge whether the reactor coolant in the containment sump is chemically neutral or slightly basic.

Boron concentration in the reactor coolant and the impact on containment sump pH are discussed in NRC Bulletin 77-04, "Calculational Error Affecting the Design Performance of a System for Controlling pH of Containment Sump Following a LOCA," available at ADAMS Accession No. ML031200570 and on the NRC Web site at http://www.nrc.gov/reading-rm/doc-collections/gen-comm/bulletins/1977/bl77004.html.

During recent years, the nuclear power industry has become more sensitive to leakage of borated water from the reactor coolant system or auxiliary systems. The NRC issued several generic communications to inform the industry of the serious consequences of such leakage and took other actions to ensure that such leakage is addressed if and when it occurs. Several actions to address boric acid leakage are described in Attachment 1 of Regulatory Issue Summary (RIS) 2003-13, "NRC Review of Responses to Bulletin 2002-01, 'Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity.'" This RIS is available at ADAMS Accession No. ML032100653 and the NRC Web site at http://www.nrc.gov/reading-rm/doc-collections/gen-comm/reg-issues/2003/ri200313.pdf.

CONTACT

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 project manager from the NRC's Office of Nuclear Reactor Regulation (NRR).

/RA/
Patrick L. Hiland, Chief
Reactor Operations Branch
Division of Inspection Program Management
Office of Nuclear Reactor Regulation

Technical Contacts: K. Parczewski, NRR
301-415-2705
E-mail: kip@nrc.gov

C. Vernon Hodge, NRR
301-415-1861
E-mail: cvh@nrc.gov

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
2004-20	Recent Issues Associated with NRC Medical Requirements for Licensed Operators	11/24/2004	All holders of operating licenses for nuclear power reactors and research and test reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.
2004-19	Problems Associated with Back-up Power Supplies to Emergency Response Facilities and Equipment	11/04/2004	All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.
2004-18	Recent Safety-related Event at Panoramic Wet-source-storage Irradiator	10/26/2004	All licensees authorized to possess and use sealed sources in panoramic wet-source-storage irradiators, and irradiator vendors.
2004-17	Loose Part Detection and Computerized Eddy Current Data Analysis in Steam Generators	08/25/2004	All holders of operating licenses for pressurized-water reactors (PWRs), except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor.
2004-16	Tube Leakage Due to a Fabrication Flaw in a Replacement Steam Generator	08/03/2004	All holders of operating licenses for pressurized-water reactors (PWRs), except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor.

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