

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

April 18, 1997

NRC INFORMATION NOTICE 97-21: AVAILABILITY OF ALTERNATE AC POWER SOURCE DESIGNED FOR STATION BLACKOUT EVENT

Addressees

All holders of operating licenses for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to potential unavailability of an alternate ac (AAC) power source during a station blackout (SBO) event. It is expected that recipients will review this 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

On March 11-29, and May 13-22, 1996, a special inspection team from the NRC assessed the engineering and licensing activities at Millstone Nuclear Power Station. During a review of the Millstone Unit 3 SBO systems, the team identified a concern about the design of the AAC power source, the SBO diesel generator (DG), and its dedicated battery. The AAC power source may not be available if an SBO occurs as a result of a loss of onsite power, i.e., the EDGs, following 1 hour of loss of offsite (preferred) power (LOOP). The AAC power source at Millstone Unit 3 is controlled and monitored by a computer. The AAC power system includes two batteries, one 48-volt battery for the computer and one 125-volt battery for DG field flashing, oil pump, and breaker control power. The battery chargers for these batteries are fed from offsite power when the AAC power is not operating. If offsite power is lost for a significant period, these batteries will be depleted as a result of the connected loads (the computer for the 48-volt battery and the EDG oil pump for the 125-volt battery). If AAC power is needed more than 1 hour after the loss of offsite power, the batteries will be so depleted that the SBO DG cannot be started and therefore, will not be available if EDGs are lost.

On March 7, 1997, during a refueling outage at Pilgrim Unit 1 a main transformer failure resulted in both safety buses losing power. One safety bus was energized from the shutdown transformer and the other from EDG "B." Approximately 6 hours into the event, operators attempted to start the SBO DG, but failed. The SBO-DG failed to start because the

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DG support systems, particularly the lubricating oil system, was powered by a nonsafety-related power supply and had been out for an extended period during the loss of offsite power. This extended loss of auxiliary power caused the oil temperature to drop and that resulted in oil pressure below the minimum pressure required for DG operation.

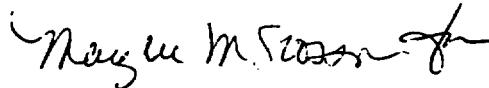
Discussion

The Millstone licensee reviewed the design and operation of the AAC power source at Millstone Unit 3 and determined that the AAC power source required modification to assure availability of the SBO DG for no less than 8 hours (the probable time needed to restore offsite power) following a postulated LOOP event.

The Pilgrim licensee discovered that the SBO DG was susceptible to a failure to start as a result of low oil temperature if power was lost to the lubricating oil keep-warm system for an extended period. The licensee is considering enhanced monitoring of SBO DG auxiliaries, procedural changes, or modifications to SBO DG start logic.

The SBO DG capability to start on demand depends on the availability of the necessary support systems to fulfill their required function. The SBO DG support systems may require varying combinations of dc or ac power for varying periods to maintain operational readiness. Prompt operator actions to conserve battery capacity, support system power supply modifications, use of special procedures, or start logic modifications may be necessary to preserve the operational readiness of the SBO DG under challenging environmental conditions. The staff is evaluating these events and the consequential need for additional generic communications.

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.



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Information Notice No.	Subject	Date of Issuance	Issued to
97-20	Identification of Certain Uranium Hexafluoride Cylinders that do not comply with ANSI N14.1 Fabrication Standards	04/18/97	All holders of OLs for nuclear power
97-19	Safety Injection System Weld Flaw at Sequoyah Nuclear Power Plant, Unit 2	04/18/97	All holders of OLs or CPs for nuclear power reactors
94-14, Supp. 1	Failure to Implement Requirements for Biennial Medical Examinations and Notification to the NRC of Changes in Licensed Operator Medical Conditions	04/14/97	All holders of OLs or CPs for nuclear power and non-power reactors and all licensed reactor operators and senior reactor operators
97-18	Problems Identified During Maintenance Rule Baseline Inspections	04/14/97	All holders of OLs, CPs, and decommissioning-stage licenses for nuclear power reactors
97-17	Cracking of Vertical Welds in the Core Shroud and Degraded Repair	04/04/97	All holders of OLs or CPs for boiling-water reactors

OL = Operating License

CP = Construction Permit

DG support systems, particularly the lubricating oil system, was powered by a nonsafety-related power supply and had been out for an extended period during the loss of offsite power. This extended loss of auxiliary power caused the oil temperature to drop and that resulted in oil pressure below the minimum pressure required for DG operation.

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The Millstone licensee reviewed the design and operation of the AAC power source at Millstone Unit 3 and determined that the AAC power source required modification to assure availability of the SBO DG for no less than 8 hours (the probable time needed to restore offsite power) following a postulated LOOP event.

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#### Discussion

The Millstone licensee reviewed the design and operation of the AAC power source at Millstone Unit 3 and determined that the AAC power source required modification to assure availability of the SBO DG for no less than 8 hours (the probable time needed to restore offsite power) following a postulated LOOP event.

The Pilgrim licensee discovered that the SBO DG was susceptible to a failure to start as a result of low oil temperature if power was lost to the lubricating oil keep-warm system for an extended period. The licensee is considering enhanced monitoring of SBO DG auxiliaries, procedural changes, or modifications to SBO DG start logic.

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