

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

March 26, 2007

NRC INFORMATION NOTICE 2007-09: EQUIPMENT OPERABILITY UNDER DEGRADED  
VOLTAGE CONDITIONS

**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 (IN) to inform addressees of an event in which safety-related pump motors did not have adequate voltage at the starter circuit to ensure operability under degraded voltage conditions and a related deficiency involving a surveillance test procedure that specified an incorrect value for the emergency diesel generator (EDG) minimum acceptable voltage. NRC staff expects 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 IN are not NRC requirements; therefore, no specific action or written response is required.

**DESCRIPTION OF CIRCUMSTANCES**

On August 17, 2006, the licensee for the Fermi 2 nuclear power plant declared all four EDGs inoperable due to undersized control power transformers for each of the EDG service water pumps. The concern was that the EDG service water pump motors did not have adequate voltage at the starter circuit to ensure operability under degraded voltage conditions. The event was caused by a design error that occurred in 1998 when a design change was prepared for the replacement of motor control center buckets that did not account for the fact that the higher inrush current of replacement contactors would necessitate installation of a larger control power transformer. As part of the extent of condition review, the licensee also identified similar concerns with the Division 1 EDG room ventilation fans. Subsequent analysis further revealed a lack of a voltage margin on other potentially risk-significant components. The licensee submitted a licensee event report (LER) to describe the event (LER 50-341/2006-004-00, Agencywide Documents Access and Management System (ADAMS) Accession No. ML0629302170).

**ML070390066**

During a special inspection of the above event, the NRC inspectors identified that the Division 1 EDG surveillance test procedure specified minimum required EDG voltage of 3740 volts which was below the calculated minimum voltage required for component operability. As a result, the surveillance test would not ensure that the Division 1 EDGs would support the operability of the required components. To correct this deficiency, Fermi nuclear power plant established administrative controls, pending procedure and technical specifications revision, to ensure that future testing of the Division 1 EDGs would include a minimum required voltage acceptance criterion of 3873 volts. (NRC Special Inspection Report 05000341/2006015, dated November 7, 2006, ADAMS Accession No. ML0631204130).

## **BACKGROUND**

Branch Technical Position PSB-1 of the Standard Review Plan (NUREG-0800) recommends that the second level of undervoltage (degraded voltage) protection should be based on an analysis of the voltage requirements of the Class 1E loads at all onsite system distribution levels. The voltage levels at the safety-related busses should be optimized for the maximum and minimum load conditions that are expected throughout the anticipated range of voltage variations of the offsite power sources. Consequently, when powering the safety-related busses from EDGs, the minimum required EDG steady state voltage must be greater than or equal to the minimum established voltage for component operability.

## **DISCUSSION**

It is important that EDG surveillance procedures specify a minimum EDG steady state voltage that is greater than or equal to the calculated bus minimum voltage required for component operability.

## CONTACT

This IN requires no specific action or written response. Please direct any questions about this matter to one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

*/RA by TQuay for/*

Michael J. Case, Director  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Technical Contacts: Amar Pal, NRR/DE  
301-415-2760  
E-mail: [anp@nrc.gov](mailto:anp@nrc.gov)

Omid Tabatabai, NRR/DIRS  
301-415-6616  
E-mail: [oty@nrc.gov](mailto:oty@nrc.gov)

Note: NRC generic communications may be found on the NRC public Website, <http://www.nrc.gov>, under Electronic Reading Room/Document Collections.