UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR SECURITY AND INCIDENT RESPONSE
WASHINGTON, D.C. 20555-0001

December 22, 2006

NRC INFORMATION NOTICE 2006-28: SIREN SYSTEM FAILURES DUE TO ERRONEOUS SIREN SYSTEM SIGNAL

ADDRESSEES

All holders of operating licenses or construction permits 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 the possibility that some or all of the offsite notification sirens may become inoperable if an erroneous siren system signal is continuously sent. 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

As a result of an NRC Emergency Preparedness operating experience trend review from October 1, 2003 through December 31, 2005, an issue was found regarding siren system failures. There were three instances of siren system failures in year 2005, as reported per Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.72(b)(3)(xiii), that were caused by an erroneous signal. These three instances occurred at plants Summer, Vogtle, and Crystal River with associated Event Report Numbers 41755, 41813, and 42122.

Lightning Strike Causes Single Siren to Continuously Transmit Signal

On June 7, 2005, Summer's Early Warning Siren System (EWSS) performed an automated poll of active early warning sirens. The polling indicated that not all of the sirens had responded to the automated signal. The licensee's communications personnel manually polled the active sirens and determined that twenty-eight (28) sirens were not responding. The licensee located the faulty siren and disabled its radio transponder. This restored the other twenty-seven (27) sirens to service.

During the evening hours of the event, a thunderstorm passed through the station's ten (10) mile Emergency Planning Zone (EPZ). It was determined that the faulty siren had been struck by lightning, causing the radio transponder to go into a continuous transmit mode. This errant radio signal blocked the polling signal from the other twenty-seven (27) sirens. Based on the licensee's Communications Department Report, if the EWSS had been actuated, all sirens, except the faulty siren struck by lightning, would have been activated. However, the siren feedback system may not have been able to determine if all sirens activated.

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Continuous Transmitter Signal Causes Siren System Failure

On June 30, 2005, during Vogtle's daily maintenance check of the Alert Notification Siren (ANS) System, a siren technician discovered that the radio transmitter used to communicate with the sirens was not available. Investigation revealed failure of an encoder that utilizes a T1 phone line to send signals from a siren encoder to the transmitter. This failure produced a signal to key the transmitter. After the transmitter is keyed for approximately 15 seconds, the transmitter locks out and is no longer available for use. Since the transmitter was unavailable, all offsite sirens became inoperable. The licensee made a notification per 10 CFR 50.72(b)(3)(xiii).

Single Siren Continuous Feedback Signal Renders Siren System Inoperable

On November 6, 2005, all offsite notification sirens for Crystal River Unit 3 were determined to be inoperable. The licensee determined that a single siren failed sending a continuous feedback signal that rendered all of the remaining sirens inoperable. The failed siren was bypassed, thereby restoring the remaining sirens.

BACKGROUND

Section 50.54(q) requires nuclear power plant licensees to follow and maintain in effect emergency plans that meet the standards in 10 CFR 50.47(b) and the requirements in Appendix E to 10 CFR Part 50. 10 CFR 50.47(b)(5) states that "Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and followup messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established." These requirements are amplified in Appendix 3 of NUREG-0654 FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" that states, "NRC and FEMA [Federal Emergency Management Association] recognize that the responsibility for activating the prompt notification system... is properly the responsibility of State and local governments. NRC and FEMA also recognize that the responsibility for demonstrating that such a system is in place rests with the facility licensee." The NUREG also states, "Wherever proposed as part of a system, subject to later testing by statistical sampling, the design concept and expected performance must be documented as part of plans submitted by licensees, States, and local governments."

DISCUSSION

Alert and Notification System failures may result from an erroneous signal generated as a result of equipment damage, a single point of failure or system maintenance activities. Prior equipment and maintenance activity assessments may identify system vulnerabilities and needed troubleshooting activities when determining system failure modes. These prior assessments may prevent or shorten siren system failures.

The ANS system provides for the timely notification of the affected population within the plume exposure pathway EPZ surrounding nuclear power reactor sites. The ANS system alerts the public of the emergency and provides a means for public officials to distribute emergency instructions and advisories. The ANS system may be a combination of fixed or mobile sirens, Tone Alert Radios (TAR), automatic telephone dialers, commercial broadcast media, and the Emergency Alert System. FEMA advises the NRC on the status of offsite emergency planning, including the suitability of the ANS system.

FEMA bases its finding of acceptability on the licensee's ANS system design report and the FEMA-REP-10, "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants." Furthermore, the NRC depends on FEMA's assessment of the licensee's commitments in the facility ANS system design report in finding that planning standard 10 CFR 50.47(b)(5) has satisfactorily been met.

FEMA's determination that the ANS system is acceptable is based, in part, on commitments made by the licensee in the ANS system design report. The NRC expects licensees to ensure that these ANS system program commitments continue to be met. Additionally, licensees are reminded that, according to 44 CFR 350, significant changes to the ANS system require FEMA's review and acceptance prior to implementation.

RELEVANT GENERIC COMMUNICATIONS

IN 2005-06, "Failure to Maintain Alert and Notification System Tone Alert Radio Capability," was intended to ensure that licensees using TARs maintain positive control over the distribution of the TARs.

IN 2002-25, "Challenges to Licensees' Ability to Provide Prompt Public Notification and Information During an Emergency Preparedness Event," addressed challenges related to the ANS system, including failure to test and maintain personal home alert devices.

CONTACTS

This information notice does not require any action or written response. Please direct any questions about this matter to the technical contacts listed below.

/RA/

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Note: NRC Generic Communications may be found on the NRC website, http://www.nrc.gov, under Electronic Reading Room/Document Collections.

Emergency Broadcast System. FEMA advises the NRC on the status of offsite emergency planning, including the suitability of the ANS system.

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