



Highlights of [GAO-08-747](#), a report to congressional requesters

Why GAO Did This Study

After a 1975 fire at the Browns Ferry nuclear plant in Alabama threatened the unit's ability to shut down safely, the Nuclear Regulatory Commission (NRC) issued prescriptive fire safety rules for commercial nuclear units. However, nuclear units with different designs and different ages have had difficulty meeting these rules and have sought exemptions to them. In 2004, NRC began to encourage the nation's 104 nuclear units to transition to a less prescriptive, risk-informed approach that will analyze the fire risks of individual nuclear units. GAO was asked to examine (1) the number and causes of fire incidents at nuclear units since 1995, (2) compliance with NRC fire safety regulations, and (3) the transition to the new approach.

GAO visited 10 of the 65 nuclear sites nationwide, reviewed NRC reports and related documentation about fire events at nuclear units, and interviewed NRC and industry officials to examine compliance with existing fire protection rules and the transition to the new approach.

What GAO Recommends

GAO recommends that NRC obtain and monitor data on the status of compliance with its fire safety regulations, and address long-standing fire safety issues concerning interim compensatory measures, fire wrap effectiveness, and multiple spurious actuations. NRC commented the report was accurate and complete but did not address the recommendations.

To view the full product, including the scope and methodology, click on [GAO-08-747](#). For more information, contact Mark Gaffigan at (202) 512-3841 or gaffiganm@gao.gov.

NUCLEAR SAFETY

NRC's Oversight of Fire Protection at U.S. Commercial Nuclear Reactor Units Could Be Strengthened

What GAO Found

According to NRC, all 125 fires at 54 of the nation's 65 nuclear sites from January 1995 through December 2007 were classified as being of limited safety significance. According to NRC, many of these fires were in areas that do not affect shutdown operations or occurred during refueling outages, when nuclear units are already shut down. NRC's characterization of the location, significance, and circumstances of those fire events was consistent with records GAO reviewed and statements of utility and industry officials GAO contacted.

NRC has not resolved several long-standing issues that affect the nuclear industry's compliance with existing NRC fire regulations, and NRC lacks a comprehensive database on the status of compliance. These long-standing issues include (1) nuclear units' reliance on manual actions by unit workers to ensure fire safety (for example, a unit worker manually turns a valve to operate a water pump) rather than "passive" measures, such as fire barriers and automatic fire detection and suppression; (2) workers' use of "interim compensatory measures" (primarily fire watches) to ensure fire safety for extended periods of time, rather than making repairs; (3) uncertainty regarding the effectiveness of fire wraps used to protect electrical cables necessary for the safe shutdown of a nuclear unit; and (4) mitigating the impacts of short circuits that can cause simultaneous, or near-simultaneous, malfunctions of safety-related equipment (called "multiple spurious actuations") and hence complicate the safe shutdown of nuclear units. Compounding these issues is that NRC has no centralized database on the use of exemptions from regulations, manual actions, or compensatory measures used for long periods of time that would facilitate the study of compliance trends or help NRC's field inspectors in examining unit compliance.

Primarily to simplify units' complex licensing, NRC is encouraging nuclear units to transition to a risk-informed approach. As of April 2008, some 46 units had stated they would adopt the new approach. However, the transition effort faces significant human capital, cost, and methodological challenges. According to NRC, as well as academics and the nuclear industry, a lack of people with fire modeling, risk assessment, and plant-specific expertise could slow the transition process. They also expressed concern about the potentially high costs of the new approach relative to uncertain benefits. For example, according to nuclear unit officials, the costs to perform the necessary fire analyses and risk assessments could be millions of dollars per unit. Units, they said, may also need to make costly new modifications as a result of these analyses.