

Testimony

Good Morning Mr. Chairman and Members of the Board. For the record, my name is Roy Kasdorf, I am the Lead for the Nuclear Facilities Design and Infrastructure Group of the Board's technical staff. As the lead for this group, I am responsible for staff reviews of the Department of Energy design and construction projects.

The Board's staff reviews the design of new defense nuclear facilities as well as major modifications to existing facilities. These reviews focus on two primary areas—the identification of applicable safety related codes and standards, and the implementation of these codes and standards into the design. The staff participates in the development and revision of the DOE directives and standards, and in some cases the staff participates in the formulation of industry codes and standards.

The staff conducts reviews of projects to ensure that the selected set of codes and standards are implemented following accepted practices to ensure the overall safety of the design will protect the public, facility and co-located workers, and the environment from the hazards that exist within a nuclear facility. These reviews are performed throughout the design process, beginning during conceptual design, going through final design, and into the project's construction phase. The staff's primary focus during these reviews is the safety-related attributes of the design.

Having conducted reviews of many DOE defense nuclear facilities, the staff has gained considerable insight into the value of addressing safety early in the design process. The staff has learned that failure to properly identify and resolve safety-related issues early in the design process inevitably leads to increases in the project's cost and schedule. Further, when safety issues are not identified and resolved early, there is pressure to compromise on safety-related aspects of the design to contain cost or schedule increases.

The two primary directives related to facility design and construction are DOE Order 420.1, *Facility Safety*, and DOE Order 413.3, *Program and Project Management for the Acquisition of Capital Assets*. These two orders, along with their implementing manuals and guides, form the upper tier standards for incorporating safety into the design and construction activities undertaken by the DOE. There are also a number of more detailed DOE and industry codes and standards that will be applied to a design project.

The staff believes that DOE Order 413.3 is adequate for acquisition management purposes, however, it is not adequate for implementing Integrated Safety Management into design and construction projects nor does it adequately provide for the early integration of safety into the design process. Although DOE Order 413.3 clearly points to the appropriate DOE Policies which implement Integrated Safety Management, it does not provide specific requirements for applying Integrated Safety Management principles to the design and construction process. The staff believes that correction of this fundamental problem requires the development of more specific requirements and guidance based on DOE and industry experience and practice.

Through its critical decision process, DOE Order 413.3 appears to emphasize the benefits of addressing safety early in the design process. The Order calls for development of a process hazards analysis and documented safety analysis at appropriate times in the design process. The Order also calls for certain reviews and approvals to verify that safety, as well as other aspects of the project, have been adequately addressed. However, there have been several instances, minor as well as major, where the desired effect of the Order was not achieved. In these instances, the critical decision process, and the associated review and approval process, did not ensure that design and the review of design effectively addressed safety requirements early and often during the design process. Reasons for this may include inadequate types and timing of internal and external reviews, inadequate use of information gained from these reviews, or inadequate qualifications and experience of personnel. Furthermore, DOE Order 413.3 allows the requirements of the Order to be tailored as deemed appropriate to each project. As such, a requirement stated in Order 413.3 does not necessarily mean it will be met as written for a given project. For example, critical decisions can be combined or omitted. The staff believes that the critical decision process outlined by Order 413.3 needs to be strengthened.

In general, during the past decade, DOE has revised its design directives to be less prescriptive. DOE's facility safety order, Order 420.1, covers many different types of facilities and hazards, so the design requirements are necessarily broad, often providing general design goals rather than specific requirements. Although this approach can work, provided the project managers and designers appropriately evaluate and understand the design goals, it is the staff's belief that these less specific design requirements have resulted in confusion. In some cases, these less specific

design requirements have led to the misuse of safety analysis techniques to establish design requirements rather than as a tool to evaluate the design. This problem was described in the Board's recent Recommendation 2004-2 which addressed active confinement ventilation systems. To incorporate safety early in the design process, more specific design requirements need to be established at the start of the design. **As Dr. Matthews/Mr. Bader noted, [if they discuss]** an example might be specific requirements for the more hazardous nuclear facilities to establish a robust confinement boundary comprising the building structure, active ventilation system and its support electrical system. Further, specific requirements should be included to provide for safety-related systems such as fire protection systems that experience dictates should be required for facilities handling hazardous materials.

Implementing the existing Order 413.3 process and the safety specifications in Order 420.1 do not preclude an adequate facility design. However, the staff believes that a strengthened critical decision process and more specific design requirements for hazardous nuclear facilities will improve the DOE process for design and construction of defense nuclear facilities, and will help ensure safety is adequately addressed early in the design process.

This ends my remarks.