Department of Energy
Washington, DC 20585

February 21,2001

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW
Suite 700
Washington, D.C. 20004

Dear Mr. Chairman:

Consistent with the Department's implementation plan for the Defense Nuclear Facilities Safety Board Recommendation 2000-2, I am forwarding information concerning Deliverable 14, due in November 2000.

Commitment 14 calls for the Department to issue interim direction to designate System Engineers for vital safety systems.

Enclosed is a memorandum from the Secretary of Energy directing the establishment of System Engineer Programs at the department's defense nuclear facilities. The Department has completed Commitment 14 and proposes closure of this commitment.

Sincerely,

Steven V. Cary
Acting Assistant Secretary
Office of Environment, Safety and Health

Enclosure

cc:
D. Burnfield, DNFSB Staff
K. Fortenberry, DNFSB Staff
J. DeLoach, DNFSB Staff
M. Whitaker, S-3.1

The Secretary of Energy
Washington, DC 20585

February 20, 2001

MEMORANDUM FOR ADMINISTRATOR, NATIONAL
NUCLEAR SECURITY ADMINISTRATION

ACTING ASSISTANT SECRETARY FOR
ENVIRONMENTAL MANAGEMENT

ACTING DIRECTOR
OFFICE OF SCIENCE

FROM: Spencer Abraham SA

SUBJECT: Establishment of System Engineer Programs under Implementation Plan for Defense Nuclear Facilities Safety Board (Board) Recommendation 2000-2, *Configuration Management, Vital Safety Systems.*

As part of the Implementation Plan for Board Recommendation 2000-2, the Department committed to developing Department of Energy (DOE) Directive changes to institutionalize the System Engineer concept. Since directive changes require considerable time for completion, the Department committed to expeditiously promulgate interim direction, in order to establish System Engineer programs in advance of the formal directive changes.

Accordingly, I am forwarding interim direction in the form of the attached *Conceptual Design for a System Engineer Program* for implementation at defense nuclear facilities, including milestones and dates. While initially applicable to defense nuclear facilities, the System Engineer concept may also have merit for other high hazard activities.

If successfully implemented, the System Engineer concept is a mechanism for applying technical expertise to maintain the design basis, control configuration, and trend performance of systems essential for safe operations of a facility. Many DOE contractors already have System Engineer programs in some form. The forthcoming DOE Directive changes and the direction provided today in this memorandum will institutionalize and reinforce these programs, for all defense nuclear facilities.

Attachment

Conceptual Design for the System Engineer Program under Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2000-2

Introduction and Background

This program design draws on the Implementation Plan for Board Recommendation 2000-2. System Engineers in this context are contractor personnel assigned responsibilities for Vital Safety Systems in defense nuclear facilities. As used within the implementation plan, *vital safety systems* is understood to mean safety-class systems, safety-significant systems, and systems that perform an important defense in depth safety function. These terms are further defined in Appendix C of the Implementation Plan for Board Recommendation 2000-2.

Line management is responsible for facility safety, and the system engineer should be responsible for ensuring the assigned safety system(s) remains reliable and receives the care and maintenance necessary to support the facility mission. DOE STD 1073-93, *Guide for Operational Configuration Management Program*, which provides guidance related to the elements of a contractor configuration management program, includes a brief, general discussion of the system engineer concept. Appendix B of Part I of the standard describes the potential value added by the system engineers in managing change control at DOE facilities and outlines the key attributes of a system engineer program. The following discussion supplements and reinforces the guidance contained within the Standard.

Program Elements

Identification of Vital Safety Systems: This function should normally be completed during facility or process design. One of the deliverables under the Implementation Plan for Board Recommendation 2000-2 is a list of vital safety systems in defense nuclear facilities, due in November 2000.

Assignment of System Engineers: System engineer assignments should be developed in accordance with the considerations discussed under the Graded Approach section. Facilities should develop cross-reference lists of vital safety systems and assigned system engineers. If no system engineer is assigned, the reason should be noted. It is anticipated that facilities would be able to initially assign system engineers from within existing staff. Initial assignments should be completed by March 2001.

Budget or other impacts due to reassignments or new hiring to meet this requirement shall be expeditiously communicated to responsible Contractor and DOE management. Sites or facilities unable to complete initial assignments by March 2001 shall provide appropriate justification and any compensatory actions to the responsible Program Secretarial Officer.

Personnel Qualification and Succession:. The qualification/requalification requirements for system engineers should be consistent with those defined for senior engineering positions described in DOE O 5480.20A, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities.* These requirements should be incorporated into the contractor training programs required by DOE O 5480.20A. Succession and development plans for system engineers should be part of the overall training and development program. Initial qualification/requalification requirements for system engineers should be established by June 2001. Training and succession programs should incorporate these requirements by September 2001. When evaluating an individual's qualification for assignment as a system engineer, appropriate consideration should be given to an individual's formal education and prior training and work experience, thereby reducing the time and resources needed to obtain fully qualified system engineers.

Budget or other impacts due to developing additional training or qualification programs to meet this requirement shall be expeditiously communicated to responsible Contractor and DOE management. Sites or facilities unable to meet the scheduled dates shall provide appropriate justification and any compensatory actions to the responsible Program Secretarial Officer.

System Engineer Duties and Responsibilities

Configuration Management: Conceptually, this program function is associated with maintaining consistency among the system's design basis and requirements, system documentation, and physical configuration. The system engineer would be responsible for identifying documents (e.g., drawings, calculations, applicable portions of documented hazard and accident analyses, and vendor manuals) that define the design basis for a system important to facility safety, identifying additional documents needed, and ensuring system documentation is kept up to date using a formal work control/change control process. Where a facility's design basis has not been clearly defined, the system engineer would be responsible for identifying system requirements, performance criteria, and documents considered to be essential to system operation. DOE STD 3024-98, *Content of System Design Descriptions*, provides guidance regarding the identification and consolidation of key design documents. The system engineer will also be responsible for ensuring work control and change control processes are followed and for regular assessments of the system to ensure continued operational readiness as detailed in the following paragraph.

Assessment of System Status and Performance: Conceptually, this program function is associated with being cognizant of ongoing maintenance and operations activities, evaluating system performance, and involvement in the identification and correction of equipment deficiencies. To be effective, the system engineer must remain apprised of the system's operational status and ongoing modification activities. The system engineer would also assist operations to review key system parameters, evaluate system performance, and initiate actions to correct problems. System material condition should also be periodically reviewed by the system engineer during implementation of facility condition inspections required by DOE O 4330.4B, *Maintenance Management Program.*

These periodic reviews should include a review of component classification and an assessment of the system's ability to perform design and safety basis functions.

Technical Support for Operations and Maintenance Activity: Conceptually, this program function is associated with providing technical assistance in support of maintenance and operations activities. Once established, a system engineer would function as the individual cognizant of the system-specific maintenance/operations history as well as industry operating experience. The system engineer would be actively involved in day-to-day activities to identify emerging trends and would provide technical assistance, as necessary, in determining operability or correcting out-of-specification conditions or evaluating questionable data. When a safety system is suspected to be inoperable or degraded, the system engineer provides an analysis or supports an analysis, which determines operability. The system engineer will also be responsible for reviewing and concurring with design changes and providing input to the development of special operating/test procedures.

Graded Approach

Implementation of these system engineer program elements should be tailored to facility hazards and the systems relied upon to prevent or mitigate those hazards. A graded approach is defined within DOE Rules and orders, and should consider factors such as:

- *Remaining facility lifetime and the safety significance of remaining operations.* For example, it might not be practicable to designate a system engineer for a facility scheduled to be decommissioned or demolished in a couple of years. On the other hand, hazards posed by planned operations and decommissioning activities should be reviewed to determine whether a specific safety system would continue to be relied upon following facility decommissioning. A system engineer should be assigned to safety system(s) where operability is required following facility decommissioning.
- *Systems that are important to safety in non-nuclear facilities.* For example, it would be prudent to designate a system engineer for a confinement ventilation system in a facility with significant non-nuclear hazards (e.g., chemical or industrial hazards).
- *Multiple systems and facilities.* A system engineer can be assigned responsibility for multiple systems and/or facilities, depending upon the scope of system support needed and the individual engineer's experience and expertise.
- *Multiple Systems.* Where several systems important to safety are connected to form a chemical or mechanical process, one system engineer could be designated for the entire process rather than designating a number of system engineers to cover each sub-system.