Directive Number and Title

DOE Order 433.1, "Maintenance Management Program for Nuclear Facilities."

Originating Office

Office of Environment Safety and Health

Review Team Members

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Background

The purpose of O 433.1 is to implement the department's statutory responsibility to maintain government property in good condition. O 433.1 is only applicable to DOE nuclear facilities. It complements O 430.1A for conventional facility maintenance and specifies criteria for maintaining vital safety systems of nuclear facilities in proper condition to control radioactive and other hazardous materials. O 433.1 was issued to update and clarify maintenance management program requirements for all types of DOE nuclear facilities (except as indicated in Paragraph 3.c of the Order). The Order covers all aspects of nuclear facility maintenance management programs and activities by tying together Federal regulations, other DOE directives and industry standards and best practices to govern appropriate maintenance and safety in nuclear facility lifecycles. The intended benefits of this are: (1) Greater flexibility for the specific needs of individual/unique facilities to conduct proper maintenance as part of an Integrated Safety Management System in collaboration with operational programs, other states of facility readiness and a comprehensive work control system; (2) Up-to-date Federal employee roles and responsibilities for oversight of DOE contractor maintenance activities are delineated more clearly and accurately; (3) Up-to-date requirements that Federal employees can impose on DOE contractors are specified; (4) To provide assurance that sufficient resources will be identified and budgeted to maintain vital safety systems of aging nuclear facilities in good condition; and (5) A more cost-effective and efficient maintenance program at DOE nuclear facilities through DOE approval of the Maintenance Implementation Plan (MIP).

Scope: Paragraph 3 of the Order describes its "APPLICABILITY." As stated above, the Order "is only applicable to DOE nuclear facilities... it clarifies maintenance requirements for all types of DOE nuclear facilities (except as indicated in Paragraph 3.c of the Order)... it covers all aspects of nuclear facility maintenance programs and activities by tying together Federal regulations, other DOE directives and industry standards and best practices to govern appropriate maintenance and safety in nuclear facility lifecycles."

After department-wide review and comment through the REVCOM system and Field Management Council (FMC) review and approval, O 433.1 was signed by the Secretary and issued on June 1, 2001 to replace O 4330.4B, Chapter II, which was issued in February 1994.

The following are improvements in O 433.1 over O 4330.4B, Chapter II:

Streamlined requirements for Federal employees which make them consistent with the DOE Manual of Safety Management Functions, Responsibilities and Authorities (FRAM - DOE M 411.1). This ensures that the responsibility, authority, and accountability for maintenance are clearly defined, appropriately assigned and executed.

A separate Contractor Requirements Document (CRD) which delineates specific requirements that Federal employees can impose on DOE contractors (Attachment 1).

An accompanying implementation guide (DOE G 433.1-1) which provides flexibility in the application of a graded approach and permit more efficacy in tailoring nuclear facility maintenance programs to fit the specific needs of individual/unique facilities (Paragraph 1).

Requirements for a system engineer program established for maintaining vital safety systems that is consistent with O 420.1A (Paragraph 4.a(9).

Requirements for contractors to provide DOE with data from the contractor's retreiveable and accurate maintenance history that compiles maintenance, resource and cost data in a system which is capable of supplying required-maintenance costs, actual maintenance costs, and availibility data and failure rates for mission critical and vital safety systems into the DOE Facility Information Management System so that DOE can track the reduction of failure rates and unavailability of vital safety systems (Paragraph 4.a(10).

Requirements for performance metrics to measure maintenance program performance and identify appropriate voluntary consensus standards that are incorporated into the program (Paragraph 4.b).

Requirements for conducting maintenance activities within an Integrated Safety Management System (ISMS) in collaberation with other operational programs such as configuration management, quality assurance program, the nuclear facility safety basis under 10 CFR 830, and a comprehensive work control system during all stages of nuclear facility life cycles (Paragraph 4.c).

Requirements for Federal employees to ensure that sufficient resources are budgeted in a timely manner to accomplish the nuclear facility maintenance management program objective (Paragraph 5a).

References to industry standards and best practices that have been adopted in DOE directives (DOE G 433.1-1) and related statutory requirements for preventive maintenance, quality assurance, radiation protection of the public and environment, occupational radiation protection, integrated safety management, process safety management for highly hazardous chemicals and nuclear facility safety basis (Paragraph 6).

Overview of Requirements

The purpose of O 433.1 is to implement the Department's statutory responsibility to maintain government property in good condition. It complements O 430.1A for conventional facility maintenance and specifies criteria for maintaining vital safety systems of nuclear facilities in proper condition to control radioactive and other hazardous materials.

The purpose of the Contractor Requirements Document (CRD) is to delineate specific requirements that Federal employees can impose on DOE contractors.

Analysis

This Order is one of the important DOE nuclear safety orders that are of interest to the Defense Nuclear Facilities Safety Board (DNFSB). We need to continue to apply it to DOE contractors in order to maintain adequate facility safety. While it requires a maintenance program, it allows flexibility on how to address and provide maintenance on systems and components important for nuclear safety. As such, it is outcome-oriented.

Overall, this is an excellent and useful Order which has only been in place for a few months. In the time since it was approved, the Department has undergone a great deal of expense to implement this CRD into DOE contracts. There are, however, areas in the CRD where the language could be more clear. Also, there are a number of places in the CRD where words implying that compliance with certain "requirements" is actually optional for the Contractor. Since the significance of the language problems is not great from both a cost and safety standpoint, and it would be extremely burdensome and costly to make the editorial changes and then implement a new CRD, the team feels strongly that changes to the CRD would not be justified at this time. The language changes should be delayed until this Order undergoes its periodic review pursuant to DOE O 251.1A, para 4.j.

Summary Recommendations

Retain Order and CRD as is.

Additional Views of the Majority of the Review Team

Following completion of the team's review, the team learned that some members of the GC-52

and EH-5 organizations recommended that this order and other safety-related orders be eliminated. The team is providing the following additional views for use in evaluating these suggestions.

Safety Management Orders Are Necessary Under Title 10 CFR Part 830. The GC-52 and EH-5 basis for elimination of key technical safety requirements is not technical in nature, but rather legalistic. Moreover, even the proffered legal basis is unfounded. GC-52 and EH-5 assert that because the 10 CFR § 830.201 requires contractors to perform work in accordance with hazard controls, then no additional safety requirements are necessary. This same logic, if valid, would support elimination of every single nuclear safety order. However, this logic is flawed and is not supported by the record associated with development of the 830 rule or the rule itself.

Specifically, the regulation clearly contemplated that relevant orders (including the maintenance order) would be retained and used in conjunction with the 830 rule. The preamble of the rule states that "DOE Orders for other nuclear safety management topics such as ... maintenance . . . will be retained so that the applicable and appropriate requirements of the Orders can continue to be referenced in contracts."

Further, the regulation itself reflects the need to retain this and other safety management orders to work in conjunction with Part 830. Appendix A, paragraph G.2. of the rule states: "The types and specific characteristics of the safety management programs necessary for a DOE nuclear facility will be dependent on the complexity and hazards associated with the facility and the work being performed. In most cases, however, a contractor should consider safety management programs covering topics such as quality assurance, procedures, maintenance, personnel training, conduct of operations, criticality safety, emergency preparedness, fire protection, waste management and radiation protection. In general DOE Orders set forth DOE's expectations concerning specific topics. For example, DOE Order 420.1 provides DOE's expectations with respect to fire protection and criticality safety."

The DEAR clause on Laws, Regulations and DOE Directives (48 CFR Part 970.5204-2) clearly contemplates addition of applicable DOE Orders and other standards, tailored to site-specific hazards and circumstances, to contracts to make expectations and requirements clear to contractors. A single top-level requirement, such as "Perform work in accordance with hazard controls," is not sufficient to ensure worker or public health and safety. A clear example that the 830 rule was not intended to replace all other safety requirements is the existence of 10 CFR Part 835 on Occupational Radiation Protection. Similarly, the Part 830 requirement for facility-specific "technical safety requirements" where applicable, shows that a single top-level safety policy and safety management program is not adequate to specify safety expectations.

According to a primary author of the regulation, the reason Part 830 was written with only generalized requirements which were intended to work in conjunction with the Orders is that it would have been unwieldy to have the level of detail necessary for safety included in a regulation. Regulations apply by operation of law and are, by their natures, inflexible. To vary

from any regulatory requirement in Part 830 would require that the contractor go through the exemption process provided in Part 820. The exemption process often takes months or more and exemptions are not necessarily granted. Also, exemptions are often made conditional upon accepting alternative requirements at the discretion of the Secretarial Officer granting the exemption. In contrast, by including the more specific safety requirements in DOE Orders, the requirements are far more amenable to tailoring and the appropriate requirements can be designated and agreed upon through the more expedient and adaptable contract process. Moreover, newer consensus standards are much more easily adopted through changes in Orders than changes in the regulations. The latter typically requires the lengthy and arduous Administrative Procedure Act notice and comment process. Consequently, the intention of retaining the Orders to operate in conjunction with 830 is well reasoned and is quite evident in the regulation itself.

The approach suggested by GC-52 and EH-5 is not consistent with a 50-year history of development of requirements to ensure facility and worker safety. To maintain public trust and to withstand outside scrutiny, the basis for eliminating nuclear safety requirements should be technical and conservative, and the process should be deliberate, thorough, inclusive, and open.

Guidance Does Not Contain Requirements. Another argument GC-52 and EH-5 made for eliminating key technical safety requirements is based on the assertion that sometimes guidance documents are used as de-facto requirements or regulations. While the team agrees that this may sometimes be a problem, GC-52 and EH-5 did not identify a single instance where this occurred in relation to this order. Instead, they relied on the number of pages in the guidance rather than noting any actual problem with the guidance.

Even if there were a problem with the guidance associated with this order being used as a requirement, it would have to arise from misapplication of the guidance rather than the guidance itself. By definition, guidance does not contain requirements. The Department's Policy on the Directives System, DOE P 251.1, states at paragraph 4. that "Requirements contained in directives other than regulations *are applicable to Department contractors only to the extent provided in the relevant contract.*" [emphasis supplied]. Guides do not have requirements and are not included in contracts. At paragraph 6., the same policy states, in pertinent part: "Guides and technical standards are limited to the identification of useful or acceptable methods for implementing directives' requirements *and do not establish requirements or constitute a basis for a finding of noncompliance with a specific requirement.*" [emphasis supplied].

Similarly, the DOE Order on the Directives System, DOE O 251.1A, states at para. 4.g. that "*Provisions in Guides shall not be construed as requirements in any audit or appraisal for compliance with the Order, Notice or Manual concerned.* Guides describe suggested approaches to meeting requirements." [emphasis supplied] Regarding defense nuclear facilities, para. m. (1) of the same order states, "guidance provided in implementation guides (including referenced standards) describes acceptable methods to satisfy intended requirements contained in Orders, Notices and Manuals. Alternative methods that satisfy the requirements of an Order, Notice, or

Manual are also acceptable. Any implementation method selected must ensure an adequate level of safety commensurate with the hazards associated with the work."

Finally, the Directives System Manual, DOE M 251.1-1A, Chapter I, para. 3.b. (1) states that "Guides provide *nonmandatory*, supplemental information about acceptable methods for implementing requirements, including lessons learned, suggested practices, instructions, and suggested performance measures. Guides may identify acceptable ways to implement requirements by referencing appropriate Technical Standards, *but they shall not impose additional requirements*." [emphasis supplied].

The Department's directives are clear that guides do not impose requirements on contractors, de facto or otherwise. Even if EH-5 and GC-52 were able to identify a problem with the use of the guidance associated with this order as a "de facto regulation," the elimination of all related requirements is not a logical solution. Appropriate solutions include: 1) monitoring and counseling on the appropriate use of guidance documents, and 2) elimination of any unnecessary guidance documents.

Path Forward. EH-5 is on record as supporting the establishment of a "Working Group to pursue this alternative approach using a deliberative and inclusive process that includes the DNFSB." This approach seems far superior to a rush to judgment based a flawed, incomplete, and non-technical analysis. The team believes that public trust and public health and safety demand a deliberate, thorough, inclusive, open, and technical evaluation before safety requirements are eliminated.

Minority Views

None.

Originating Office Comments

None.

Summary of Concerns and Statement of Whether They Are Reflected in the Summary Recommendations

1. Westinghouse Savannah River Company (WSRC) expressed concern over O 433.1 CRD requirement 1.k, requring DOE contractors to maintain accurate maintenance history that compiles structures, systems and components data and other maintenance, resource, and cost data in a system which is retreivable and capable of entering required-maintenance costs, actual maintenance costs, availability data and failure rates of vital safety systems into the DOE Facility Information Management System (FIMS) for the purpose of tracking the reduction of vital safety system unavailability. WSRC believes that accumulation and maintenance of the data in FIMS is at an excessive level of detail and not cost effective.

FIMS requires listing all real property structures with a capital value greater than $5000.00. WSRC recommends that FIMS establish a higher capital value threshold of greater than $500,000.00.

FIMS is the Department's only real property database containing specific facility information such as facility type, age, usage, square footage, maintenance, financial and safety data. FIMS is audited by the DOE Inspector General (IG) and managed by the Chief Financial Officer (CFO). It is the team's understanding that the CFO and IG maintain a firm position that the structure and format of FIMS is adequate for DOE needs and no changes are anticipated at this time. Therefore, WSRC's concern regarding the appropriateness of the structure and format of FIMS should be directed to the IG and CFO for resolution.

2. A comment from Chicago Operations Office (CH) suggests that the requirement for the contractor to prepare and submit a Maintenance Implementation Plan (MIP) documenting all relevant systems and procedures be eliminated on the basis that this focus on written plans rather than desired outcomes is inconsistent with performance-based management. The commentor rationalizes that Maintenance Management is an area that seems particularly suited to management oversight through the use of performance measures, data tracking (as is effected by FIMS), inspections and self-assessment. The commentor also notes that O 433.1 exempts nuclear facilities regulated by other agencies, but not nuclear facilities that are regulated by DOE, and concludes that this gives the impression that DOE doesn't consider its nuclear safety rules or enforcement capability to be adequate. The commentor further states that if nuclear facilities subject to regulation by DOE were exempt, there would be no facilities subject to the Order, therefore no need for the Order.

   However, O 433.1 CRD requirements 1 through 5 do not require that contractors submit a MIP to DOE documenting all relevant systems and procedures. The requirements only address those systems and procedures related to vital safety systems. None of the requirements tell contractors how to do the work and therefore are not inconsistent with performance-based management concepts. Guidance for the format and content of the MIP is discussed in Section 3.1 of DOE G 433.1-1, which accompanies O 433.1. The facility features and management systems to be included in the MIP are clearly those derived from the Documented Safety Analysis (DCA) and establish the nuclear facility safety basis required by 10 CFR 830. These facility features and management systems are needed to preserve the design integrity and reliable performance of vital safety systems that control the release of radioactive and other hazardous materials. Federal Aquisition Regulation (FAR) 48 CFR 45.104, "Review and Correction of Contractor's Property Control System," requires government agencies to review and approve contractor's property control systems at facilities the contractors operate. DOE's approval of such mission and safety related maintenance priorities in a MIP as well as contractor maintenance budget requests is consistent with the Department's obligations under 48 CFR 45.104, 10 CFR 830, and Section 161 of the U.S. Atomic Energy Act of 1954.

O 433.1 relies on DOE oversight through the use of performance measures, data tracking (as is effected by FIMS), inspections and self-assessments as discussed in DOE G 433.1-1, Section 3.2. The commentor suggests that this is particularly suitable.

Some DOE nuclear facilities have recently been placed under the regulatory cognizance of the U.S. Nuclear Regulatory Commission (NRC) and are therefore regulated by the NRC's maintenance regulation 10 CFR 50.65 or other NRC criteria. O 433.1 exclusion 3.c clarifies that DOE maintenance requirements are no longer applicable to these facilities. This exclusion does not imply in any way that the adequacy of DOE's nuclear safety rules or enforcement capability is in question at DOE facilities. Rather, it avoids placing duplicative, conflicting or overlapping requirements on DOE's contractors.

3. A comment from EFCOG implies that the the maintenance requirements of 48 CFR 45.509 are sufficient for contractors and that the O 433.1 CRD is another layer of requirements that DOE is imposing on its contractors. The commentor states that the Order is overly prescriptive and will impose significant cost impacts because of its requirements to: (a) develop an availability number for each nuclear facility; (b) develop failure normal and failure rate standby numbers for each nuclear facility; (c) collect annual maintenance costs at the facility level for facilities; (d) estimate maintenance costs at the facility level; (e) to place all of the above information in FIMS; and (f) electronically interface the maintenance management system to FIMS.

   However, O 433.1 CRD is not another layer of requirements over those in 48 CFR 45.509. Federal Aquisition Regulation 48 CFR 45.509 "Care, Maintenance and Use," generally establishes the contractor's responsibility for the proper care, maintenance and use of Government property in its possession that is owned by any Federal agency in accordance with sound industrial practice and the terms of the contract. It does not address specific maintenance management programs for vital safety systems that control the release of radioactive or other hazardous materials at unique, one of a kind DOE nuclear facilities. These vital safety systems are part of a required safety basis at DOE nuclear facilites pursuant to 10 CFR 830 and have to be maintained at a high degree of reliability to provide adequate protection for workers, the public and the environment when the facilities are operating, on standby, shutdown or undergoing decommissioning and dismantlement. Therefore, they are addressed in O 433.1, which should be included in the terms of facilities management contract as permitted by 48 CFR 45.509 and DEAR 970.5204-2.

   Contrary to the EFCOG comment, O 433.1 CRD is not overly prescriptive because of the following:

   a. "Availability" as used for the "availability data" in the CRD is defined in DOE G 433.1-1, Section 4.15.3.5 as the fraction of time that a mission critical or vital safety system is capable of providing service. Availability is determined by dividing the number of hours in a specific time interval that the mission critical or vital safety system is capable of

providing service by the total number of hours in the time interval examined. Or, more simply put, "availability" is a percentage of the amount of time that vital safety systems and mission critical equipment is operable versus the amount of time it is not. This is not a new requirement and there should be no additional cost associated with it if existing maintenance management programs meet the intent of O 4330.4B, Chapter II. Availability data is needed for tracking the reduction of vital safety systems and mission critical equipment unavailability, and identification of required maintenance as discussed in DOE G 433.1-1, Section 4.15.3.5. O 4330.4B, Chapter II, Section 5.2 required availability data to be considered in establishing an effective and efficient balance on the types of maintenance on vital safety systems and mission critical equipment using methods such as Reliability Center Maintenance (RCM). This is commonly accepted sound industrial practice.

b. "Failure Rate" is defined in DOE G 433.1-1, Section 4.15.3.5 as the total number of mission critical and vital safety system failures divided by an interval such as time or cycles , expressed as probability per hour per year (IEEE Std 380-1975). Because some vital safety systems are not normally operating, but are on standby, failure rates have to be assessed in two categories: normally in-use and standby (NUREG/CR 2300). This is not a new requirement and there should be no additional cost associated with it if existing maintenance management programs meet the intent of O 4330.4B, Chapter II. Failure rate data is needed for tracking the reduction of vital safety system amd mission critical equipment failures and identification of required maintenance as discussed in DOE G 433.1-1, Section 4.15.3.4. O 4330.4B, Chapter II, Section 5.2 required failure rate data to be considered in establishing an effective and efficient balance on the types of maintenance on vital safety systems and mission critical equipment using methods such as Reliability Center Maintenance (RCM). This is commonly accepted sound industrial practice.

c. There is no requirement in O 433.1 to collect annual maintenance costs at the facility level for facilities. The requirement for contractors to report annual maintenance costs is in O 430.1A. It has been institutionalized within the Department for several years by the CFO. DOE G 433.1-1, Section 4.15.3.5 states this data should be reported as part of property management and financial accounting reporting requirements.

d. There is no requirement in O 433.1 to estimate required maintenance costs at the facility level. The requirement to report required maintenance costs is in O 430.1A. It has been institutionalized within the Department for several years by the CFO. DOE G 433.1-1, Section 4.15.3.5 states this data should be reported as part of property management and financial accounting reporting requirements.

e. There is no requirement in O 433.1 to place all of the above information in FIMS. Since maintenance cost data is reported as part of property management and financial accounting reporting requirements, and this is already institutionalized within the

Department, O 433.1 only requires contractors to provide DOE with availability and failure rate data for DOE to incorporate into FIMS as discussed in DOE G 433.1-1, Section 4.15.3.5. The data can be retreived from the contractor's maintenance management system and manually provided to DOE. There should be no additional cost to contractors to provide DOE this data if the contractors' existing maintenance management programs meet the intent of O 4330.4B, Chapter II.

f. There is no requirement in O 433.1 to electronically interface the contractor's maintenance management system with FIMS.