

U.S. Department of Energy
Washington, D.C.

ORDER

DOE O 433.1C

Approved: 08-05-2026

**SUBJECT: MAINTENANCE MANAGEMENT PROGRAM FOR DOE
NUCLEAR FACILITIES**

1. PURPOSE. Federal Regulations (CFR) § 830.204(b)(5) for maintenance and the reliable performance of structures, systems, and components (SSCs) that are part of the safety basis required by 10 CFR § 830.202, Safety Basis, at Hazard Category 1, 2 and 3 Department of Energy (DOE) nuclear facilities.
2. CANCELS/SUPERSEDES. DOE O 433.1B, Maintenance Management Program for DOE Nuclear Facilities, dated March 12, 2013. Cancellation of a directive does not, by itself, modify or otherwise affect any contractual or regulatory obligation to comply with the Directive. Contractor Requirements Documents (CRDs) that have been incorporated into a contract remain in effect throughout the term of the contract unless and until the contract or regulatory commitment is modified to either eliminate requirements that are no longer applicable or substitute a new set of requirements.
3. APPLICABILITY.

- a. Departmental Applicability. This Order applies to all DOE elements involved in the maintenance of DOE Hazard Category 1, 2, and 3 nuclear facilities and automatically applies to DOE elements created after it is issued. This includes both government-owned and government-operated (GOGO) and government-owned and contractor-operated (GOCO) nuclear facilities.

The Administrator of the National Nuclear Security Administration (NNSA) must ensure that NNSA employees comply with their respective responsibilities under this Directive. Nothing in this Directive will be construed to interfere with the NNSA Administrator's authority under section 3212(d) of Public Law (P.L.) 106-65, National Defense Authorization Act for Fiscal Year 2000, to establish Administration-specific policies, unless disapproved by the Secretary.

- b. DOE Contractors. Except for the equivalencies/exemptions in paragraph 3.c., the CRD, Attachment 1, sets forth requirements of this Order that will apply to contracts that include the CRD. The CRD requirements apply to all contractors responsible for managing and maintaining DOE-owned or -leased Hazard Category 1, 2, and 3 nuclear facilities. Contractors must comply with the requirements listed in the CRD to the extent set forth in their contracts.

- c. Equivalencies/Exemptions for DOE O 433.1C. Equivalencies and exemptions to this Order are processed in accordance with DOE O 251.1, Departmental Directives Program, current version. Concurrence by the Central Technical Authority (CTA) or designee is required for both exemptions and equivalencies to this Order for nuclear facilities.
 - (1) Equivalency. In accordance with the responsibilities and authorities assigned by Executive Order 12344, Naval Nuclear Propulsion Program, codified at 50 U.S.C. §§ 2406, Deputy Administrator for Naval Reactors, and 2511, Naval Nuclear Propulsion Program, and to ensure consistency through the joint Navy/DOE Naval Nuclear Propulsion Program, the Deputy Administrator for Naval Reactors (Director) will implement and oversee requirements and practices pertaining to this Directive for activities under the Director's cognizance, as deemed appropriate.
 - (2) Exemption. This Order does not apply to those portions of the nuclear facility maintenance programs that are subject to regulation by other federal agencies such as the United States (U.S.) Nuclear Regulatory Commission.
 - (3) Exemption. This Order does not apply to the Bonneville Power Administration (BPA), in accordance with S1-DEL-BPA1-2016, Delegation to the Administrator and Chief Executive Officer of Bonneville Power Administration, dated August 12, 2016, to the BPA Administrator and Chief Executive Officer.
- 4. REQUIREMENTS. DOE Guide (G) 433.1-1, Nuclear Facility Maintenance Management Program Guide for Use with DOE O 433.1, current version, provides acceptable examples of approaches for meeting the requirements of this Order. DOE G 433.1-1 references federal regulations, DOE Directives, and industry best practices using a graded approach regarding implementation of requirements for maintaining DOE-owned government property. Graded approach is defined in 10 CFR § 830.3, Definitions, and guidance for applying it is provided in DOE G 433.1-1.
 - a. All Hazard Category 1, 2, or 3 nuclear facilities, as defined in DOE-Standard (STD)-1027-2018, Chg. 1, dated January 2019, must conduct all maintenance of SSCs that are part of the safety basis in compliance with a Nuclear Maintenance Management Program (NMMP) through tailored application (e.g., graded approach) of the requirements.
 - b. NMMPs for GOCO facilities must demonstrate compliance with the requirements contained in the CRD of this Order (Attachment 1). NMMPs for GOGO facilities must demonstrate compliance with the requirements contained in Attachment 2.

- c. Changes to NMMPs must be reviewed under the unreviewed safety question (USQ) process to ensure that SSCs are maintained and operated within the approved safety basis, as required by 10 CFR § 830, Subpart B, Safety Basis Requirements. Changes that would result in a USQ must be approved prior to the change taking effect.
- d. Assessments of NMMP implementation should be conducted in accordance with DOE O 226.1, Implementation of Department of Energy Oversight Policy, current version, to evaluate whether all CRD requirements are appropriately implemented. Periodic self-assessments in accordance with DOE O 226.1 should be conducted to evaluate the effectiveness of oversight of NMMPs.
- e. A single maintenance program may be used to address the requirements of this Order and the requirements of DOE O 430.1, Real Property Asset Management, current version.
- f. Full implementation of the requirements in this Order must be accomplished within 1 year of its issuance, unless a different implementation schedule is approved by the Secretarial Officer with concurrence of the CTAs.

5. RESPONSIBILITIES.

- a. Secretarial Officers, including NNSA Administrator and Deputy Administrator for Defense Programs.
 - (1) Ensure that the requirements of this Order are implemented for facilities, activities, or programs under their cognizance.
 - (2) For GOGO activities under their cognizance, approve or designate the approval authority for NMMP documentation prepared in accordance with the CRD (Attachment 1).
 - (3) Ensure that contractors conduct maintenance of SSCs in accordance with a DOE/NNSA-approved NMMP.
 - (4) Review and approve requests for equivalencies and exemptions from requirements of this Order after resolving comments in accordance with DOE O 251.1, current version.
 - (5) Ensure that Field Office Managers notify Contracting Officers when contracts are affected by this Order.
- b. Central Technical Authorities.
 - (1) Concur with decisions regarding applicability of CRDs related to this Order, in accordance with DOE O 410.1, *Central Technical Authority Responsibilities Regarding Nuclear Safety Requirements*, current version.

- (2) Concur with exemptions and equivalencies to this Order for nuclear facilities.

c. Field Office Managers (including NNSA).

- (1) Ensure that maintenance activities and programs at Hazard Category 1, 2, and 3 nuclear facilities under their purview are conducted in compliance with the requirements of this Order.
- (2) Ensure that sufficient resources are requested to meet the requirements of this Order and to ensure that safety SSCs are sufficiently maintained to perform their assigned safety function.
- (3) Ensure that the requirements of this Order are incorporated into contracts, subcontracts, and support services contracts for Hazard Category 1, 2, and 3 nuclear facilities, as appropriate.
- (4) Notify Contracting Officers when contracts are affected by this Order.
- (5) Review and approve NMMP program description documentation that demonstrates compliance with the CRD, Attachment 1, with Specific Requirements found in the sources listed in section 7, below.
- (6) Conduct comprehensive self-assessments and assessments of contractor maintenance management programs as specified in section 4.

d. Contracting Officers.

- (1) For all applicable contracts and upon notification that a site/facility management contract is affected by this Order, the Contracting Officers shall incorporate the requirements into the affected contract(s) via the “Laws, Regulations, and DOE Directives” clause of the contract, or through negotiation and modification, as appropriate.

6. INVOKED STANDARDS. This Order does not invoke any DOE technical standards or industry standards as required methods. Any technical standard or industry standard that is mentioned in or referenced by this Order is not invoked by this Order. Note: DOE 251.1D, Appendix J, provides a definition for “invoked technical standard.”

7. REFERENCES.

- a. Title XXXII, National Nuclear Security Administration Act, of P.L. 106-65, as amended, established a separately organized agency within the Department of Energy.
- b. 10 CFR § 830, Nuclear Safety Management; Subpart A, “Quality Assurance Requirements.”

- c. 10 CFR § 830, Nuclear Safety Management; Subpart B, “Safety Basis Requirements.”
- d. 10 CFR § 835, Occupational Radiation Protection.
- e. 10 CFR § 850, Chronic Beryllium Disease Prevention Program.
- f. 10 CFR § 851, Worker Safety and Health Program.
- g. 48 CFR § 970.5223-1, “Integration of Environment, Safety and Health into Work Planning and Execution.”
- h. Executive Order 12344, “Naval Nuclear Propulsion Program.”
- i. DOE O 226.1, *Implementation of Department of Energy Oversight Policy*, current version.
- j. DOE O 227.1, *Independent Oversight Program*, current version.
- k. DOE O 251.1, *Departmental Directives Program*, current version.
- l. DOE O 410.1, *Central Technical Authority Responsibilities Regarding Nuclear Safety Requirements*, current version.
- m. DOE O 414.1, *Quality Assurance*, current version.
- n. DOE O 420.1, *Facility Safety*, current version.
- o. DOE O 422.1, *Conduct of Operations*, current version.
- p. DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, current version.
- q. DOE G 424.1-1, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements*, current version.
- r. DOE O 430.1, *Real Property Asset Management*, current version.
- s. DOE G 433.1-1, *Nuclear Facility Maintenance Management Program Guide for Use with DOE O 433.1B*, current version.
- t. DOE O 440.1, *Worker Protection Program for DOE (Including the National Nuclear Security Administration) Federal Employees*, current version.
- u. DOE G 450.4-1, *Integrated Safety Management System Guide*, current version.
- v. DOE O 450.2, *Integrated Safety Management*, current version.

- w. DOE O 458.1, *Radiation Protection of the Public and the Environment*, current version.
 - x. DOE-STD-1027-2018, Chg 1, *Hazard Categorization of DOE Nuclear Facilities*, dated January 2019.
8. CONTACT. Questions concerning this Directive should be addressed to the Office of Nuclear Safety, Quality Assurance and Environment at 202-586-5680.

BY ORDER OF THE SECRETARY OF ENERGY:



JAMES P. DANLY
Deputy Secretary

ATTACHMENT 1
CONTRACTOR REQUIREMENTS DOCUMENT
DOE O 433.1C, *MAINTENANCE MANAGEMENT PROGRAM FOR*
DOE NUCLEAR FACILITIES

Contractors at Hazard Category 1, 2, and 3 nuclear facilities must comply with the requirements listed in this Contractor Requirements Document (CRD) to the extent set forth in their contracts. Maintenance Management Program requirements applicable to this CRD are provided in Attachment 2. Regardless of the performer of the work, the contractor is responsible for complying with the requirements of this CRD and flowing down CRD requirements to subcontractors at any tier to the extent necessary to ensure contractor compliance.

The provisions of this CRD apply to Department of Energy (DOE) and National Nuclear Security Administration (NNSA) contractors.

ATTACHMENT 2
MAINTENANCE MANAGEMENT PROGRAM REQUIREMENTS FOR DOE
NUCLEAR FACILITIES

1. GENERAL REQUIREMENTS.

- a. Federal and contractor organizations responsible for Hazard Category 1, 2, or 3 nuclear facilities, as defined by Department of Energy (DOE) Standard (STD) 1027-2018 Chg1, Hazard Categorization of DOE Nuclear Facilities, dated January 2019, must develop and implement a Nuclear Maintenance Management Program (NMMP) through tailored application (e.g., graded approach) of the Specific Requirements in this Attachment. The definition of graded approach is provided in Title 10 Code of Federal Regulations (CFR) § 830.3, Definitions. The NMMP must describe the Safety Management Program for maintenance and the reliable performance of structures, systems and components (SSCs) that are part of the safety basis at Hazard Category 1, 2 and 3 DOE nuclear facilities.
- b. Federal and contractor organizations must conduct all maintenance of SSCs that are part of the safety basis in compliance with an approved NMMP.
- c. Federal and contractor organizations must ensure that equivalencies and exemptions from the Maintenance Management Program elements of this Attachment are identified, formally documented with supporting justification, and approved.
- d. Federal and contractor organizations must implement the NMMP through federal or contractor-approved documents, respectively.
- e. Federal and contractor organizations must submit NMMP description documentation to DOE/NNSA for review prior to the startup of new Hazard Category 1, 2, and 3 nuclear facilities. NMMP description documentation must be, at a minimum, an applicability matrix or a combination of multiple documents. The following elements must be covered:
 - (1) Correlation of the Specific Requirements in this Attachment to the applicable facilities;
 - (2) Correlation of the implementing documents (procedures, work instructions, etc.) to the Specific Requirements in this Attachment; and
 - (3) Documentation of the basis for applying a graded approach, if applicable.
- f. Federal and contractor organizations must conduct assessments of NMMP implementation, in accordance with DOE Policy (P) 226.1, *Implementation of Department of Energy Oversight Policy*, current version and 10 CFR § 830, Nuclear Safety Management, Subpart A, Quality Assurance Requirements.

- g. Federal and contractor organizations must ensure that NMMPs are identified in the applicable documented safety analysis in accordance with 10 CFR § 830.204, Documented Safety Analysis.
- h. Federal and contractor organizations must review proposed changes to the NMMP, which could affect the performance of safety SSCs, as part of the ongoing unreviewed safety question (USQ) process. This review is intended to evaluate whether safety SSCs are maintained and operated within the approved safety basis, as required by 10 CFR § 830.203, Unreviewed Safety Question Process. Changes that would result in a positive USQ must be submitted to the Secretarial Officer for approval prior to the change taking effect.

2. SPECIFIC REQUIREMENTS. The NMMP must clearly address the following:

- a. The NMMP must be integrated with applicable federal regulations and DOE Directives governing nuclear safety, quality assurance, worker protection, radiation protection, conduct of operations, and integrated safety management. Integration requirements are determined through the facility's safety basis documentation.

Implementation shall be integrated with applicable documents identified in section 7, References.

- b. Maintenance Organization and Administration. The management structure that applies sufficient resources (e.g., oversight and independent assessment, management involvement, funding, assignment of personnel roles and responsibilities, facilities, tools, and equipment) necessary to support the requirements described in this Attachment and ensure integration with other programs.
- c. Planning, Scheduling, and Coordination of Maintenance. The process for planning, scheduling, coordination, and control of maintenance activities, and properly emphasizing equipment availability. The process must describe the application of a System Engineer Program in the planning and execution of maintenance activities.
- d. Types of Maintenance. The process for utilization of appropriate types of maintenance (e.g., preventive maintenance, predictive maintenance, reliability-centered maintenance, surveillance and testing, and corrective maintenance) to provide for safe, efficient, and reliable operation of safety SSCs.
- e. Maintenance Procedures. The process for developing and implementing documented and approved work instructions for work on safety SSCs (e.g., work packages, procedures, work instructions, and drawings).
- f. Training and Qualification. The Training and Qualification Program for maintenance positions specified in DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, current version.

- g. Configuration Management. The incorporation of the Configuration Management Program to control approved modifications and to prevent unauthorized modifications to safety SSCs.
- h. Suspect and Counterfeit Items. The incorporation of the process to prevent the use of suspect and counterfeit items into maintenance procedures and work instructions.
- i. Maintenance Tool and Equipment Control. The process for control of maintenance tools including calibration of measuring and test equipment.
- j. Maintenance History. The process for developing and maintaining documented and retrievable maintenance history (e.g., cost data, system availability data, and failure data) to support work planning, performance trending, analysis of problems to determine root causes of unplanned occurrences related to maintenance, and continuous program improvement. Tracking and trending of deferred maintenance on safety SSCs, including aging of deferred items and risk significance, to support resource planning and priority setting.
- k. Performance Measures. Establishment and use of performance measures to assess NMMP effectiveness, identify adverse trends, and drive corrective action.
- l. Facility Condition Inspection. The process for conducting and implementing routine assessment of facilities to identify issues related to operability, and reliability.
- m. Post-Maintenance Testing. The process for conducting post-maintenance testing to verify that safety SSCs can perform their intended function when returned to service.