

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

ORDER

DOE O 425.1F

Approved: 08-05-2026

**SUBJECT: VERIFICATION OF READINESS TO STARTUP OR RESTART HAZARD
CATEGORY 1 AND 2 NUCLEAR FACILITIES**

1. PURPOSE. This Order of the Department of Energy (DOE), including the National Nuclear Security Administration (NNSA), establishes the requirements for the DOE readiness reviews (RRs). RRs are used to verify the readiness for startup and restart of Hazard Category (HC) 1 and 2 nuclear facilities, operations, or activities as described within this Order. The final report documents the results of the RR and makes a conclusion as to whether startup or restart of the nuclear facility, activity, or operation can proceed safely.

2. CANCELS/SUPERSEDES. DOE O 425.1E, Verification of Readiness to Startup or Restart Nuclear Facilities, dated September 30, 2024.

Cancellation of an Order/directive does not, by itself, modify or otherwise affect any contractual or regulatory obligation to comply with the Order/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contract unless and until the contract or regulatory commitment is modified to either eliminate requirements that are no longer applicable or substitute a new set of requirements.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 is applicable to DOE within the provisions and restrictions of the NNSA Act, found at Title XXXII of Public Law (P.L). 106-65, National Defense Authorization Act for Fiscal Year 2000. This Order applies to all nuclear facilities, operations or activities as defined in Title 10 of the Code of Federal Regulations (CFR), Part 830, Nuclear Safety Management, that are classified as HC 1 and 2 nuclear facilities.

- (1) Activities regulated by the Department of Transportation; and transportation of onsite transportation packages authorized by 49 CFR, Part 173, Shippers—General Requirements for Shipments and Packagings, Subpart I. Onsite transportation activities may be excluded with Program Secretarial Officer or Cognizant Secretarial Officer approval, and Central Technical Authority (CTA) concurrence, provided an alternate process is identified.

- (2) The Administrator of the NNSA will assure that NNSA employees comply with their respective responsibilities under this Order. Nothing in this Order will be construed to interfere with the NNSA Administrator's authority under Section 3212(d) of P.L. 106-65 to establish Administration-specific policies, unless disapproved by the Secretary.
- b. DOE Contractors. The requirements of this Order shall be incorporated into applicable contracts, including Management and Operating contracts. The contractor is responsible for flowing down the requirements of this CRD, if applicable. Contractors shall comply with the requirements of applicable federal, state, and local laws and regulations in carrying out the requirements of this Order unless relief has been granted in writing. Omission of any applicable law or regulation from the Order does not affect the obligation of the contractor to comply with such law or regulation. Contractors must comply with the requirements of this Order, except to the extent modified by the equivalencies or exemptions identified herein or issued to the contractor in writing by DOE utilizing the process outlined in DOE Order (O) 251.1E, *Departmental Directives Program*, including as amended or updated.
 - c. Equivalencies and Exemptions for DOE O 425.1F. Equivalencies and exemptions to the requirements of this Order are processed in accordance with DOE O 251.1E. CTA (or designee) concurrence 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 United States Code §§ 2406, Deputy Administrator for Naval Reactors, and 2511, and to ensure consistency throughout the joint Navy and DOE organization of the Naval Nuclear Propulsion Program, the Deputy Administrator for Naval Reactors (Director) will implement and oversee all requirements and practices pertaining to this DOE Order for activities under the Director's cognizance, as deemed appropriate.
 - (2) Exemptions. This Order does not apply to the following:
 - (a) Activities regulated through a license by the Nuclear Regulatory Commission (NRC) or a state under an agreement with NRC, including activities certified by NRC under Section 1701 of the *Atomic Energy Act*.
 - (b) Activities in the Transportation Safeguards System in NNSA.
 - (c) Other Equivalencies/Exemptions. Any other equivalency or exemption to the Order requires the approval of the DOE's Safety Basis Approval Authority (SBAA). Requests for equivalencies/exemption will be adjudicated by DOE's SBAA within 14 calendar days of receipt of a substantially complete request.

- d. Government-Owned, Government-Operated Facilities. Attachment 1, CRD, of this Order sets forth requirements applicable to DOE government-owned, government-operated facilities. Government operators must comply with the requirements in Attachment 1 of this Order.

4. REQUIREMENTS.

- a. DOE Head of Field Element or Designee. Ensure that properly scoped RRs are planned and conducted to verify readiness for the startup or restart of HC 1 and 2 nuclear facilities, activities, or operations.
- b. HC 1 and 2 nuclear facilities, activities, or operations may be started (or restarted) only after RRs have been conducted and the approvals specified in this Order have been received.
- c. RR Process. DOE Head of Field Element or designee will review the procedures that define the RR processes that will be utilized to implement this Order. The RR process must, in all cases, demonstrate there is a reasonable assurance for adequate protection of workers, the public, and the environment from adverse consequences from the startup (or restart) of an HC 1 and 2 nuclear facility, activity, or operation. The readiness process is illustrated within Attachment 2, Readiness Review Process Flow Chart.
 - (1) Communication. The prime contractor will communicate projected RR activities to the Startup Approval Authority (SAA) or designee.
 - (2) Notification of Intent to Startup. The prime contractor will provide formal correspondence to DOE, which should be at least 90 days prior to the start of the RR, but no earlier than SBAA approval of the Preliminary Documented Safety Analysis, if applicable. The SBAA will review the notification, inform the SAA, and coordinate the RR team. SAA determination is in accordance with Attachment 3, Startup Approval Authority and Readiness Review Determination Criteria.
 - (a) The notification of intent to startup will include the submittal of the Readiness Review Plan (RP).
 - (3) RP Content and Approval.
 - (a) Content. The prime contractor will develop an RP, using a graded approach to define the scope. The RP may take into consideration the maturity of the prime contractor's existing safety management programs that are in place to implement the Core Requirements (CRs). The level of detail should also be commensurate with the complexity of the startup or restart.

It may be appropriate to perform RRs in a segmented approach to allow flexibility in managing specific activities (e.g., fuel receipt, storage, and loading before initial startup). All listed documentation must be included unless it is not applicable to the specific scope of the activity. Contents of the RP must include:

- 1 A scope and purpose that addresses all Attachment 4, CRs. Exclusion of any CRs must be documented and justified within the RP.
 - 2 Prerequisites, as defined in Attachment 5, must be completed prior to the start of the RR or have compensatory measures that have been documented and approved. This should include documentation ensuring system operability verification and testing (to the extent practical).
 - 3 A description of the physical and administrative boundaries of the RR.
 - 4 A description of the structure, systems, and components covered by the RR.
 - 5 A description of safety management and security programs to be reviewed.
 - 6 Proposed activities for the onsite review including demonstrations, interviews, and drills as applicable.
- (b) RP Approval. For a contractor RR, the SAA will review and approve the RP with SBAA concurrence. For a DOE RR, the RP must be reviewed and approved by the SBAA. Both approvals are expected 30 days following the submittal.
- (4) DOE RR Team Composition. DOE Head of Field Element or designee will select the RR team leader. The team leader must then select the RR team members. The RR team leader must not be assigned to assess facilities, activities, or operations for which they have direct responsibilities. Team member should not be assigned to assess facilities, activities, or operations for which they have direct responsibilities to the maximum extent possible. Team leader and members' qualifications must be documented and shall address the following requirements:
- (a) Technical knowledge of the area assigned for evaluation, including experience working in the technical area.
 - (b) Knowledge of the performance-based assessment process and methods.

- (c) Knowledge of the facility, activity, or operations-specific information.
- (5) Prior to starting the DOE RR.
- (a) The prime contractor prerequisites will have been met or have compensatory measures that have been documented and approved.
 - (b) Specific events significant to the startup and restart process that occur prior to the formal commencement of the RR (e.g., site emergency response drills) may be reviewed by the RR team at the time they are conducted.
- (6) Readiness to Proceed. The SBAA must submit to the DOE RR Team Leader their authorization to commence the RR.
- (7) Commencement of RR.
- (a) Upon receipt of the authorization to commence the RR, the RR Team will initiate the RR, in accordance with the approved RP.
 - (b) The RR will be executed in accordance with the approved RP.
 - (c) The RR schedule will normally consist of:
 - 1 One week of document review.
 - 2 One week of onsite interviews and performance reviews as planned in the RP.
 - 3 One week to prepare the final report.
 - 4 Deviation from this schedule due to readiness segmentation may be justified and approved in the RP.
- (8) RR Final Report. The final report must be prepared and approved by the team leader; concurred on by each team member.
- (a) The final report documents the results of the DOE RR and makes a conclusion as to whether startup or restart of the nuclear facility, activity, or operation can proceed safely. The DOE RR final report must state whether the contractor has established the following:
 - 1 An agreed set of requirements to govern safe operations of the facility, activity, or operation has been formalized with DOE through the contract or other enforceable mechanism.

2 That, in the opinion of the RR team, adequate protection of the public health and safety, of worker safety, and the environment will be maintained.

- (b) If appropriate, the final report will include a Minority Opinion section that will give a means for team members to convey diverging opinions to the SBAA.
 - (c) Any lessons learned during the RR must be documented in a lessons learned section of the final report.
 - (9) Final Report Submittal. The final report must be submitted to the SAA to be used as a basis for approving the startup or restart of the nuclear facility, activity, or operation. A copy of the final RR report must be forwarded to the prime contractor and the Assistant Secretary of Energy for Nuclear Energy (NE-1). A copy must be forwarded to the appropriate CTA and may be forwarded to DOE Office of Environment, Health, Safety and Security and Office of Enterprise Assessments for information.
 - (10) Closure of Findings. The closure of findings must be consistent with the issues management process.
 - (11) Restart and Startup Approval. DOE Head of Field Element or designee must ensure that the prime contractor has satisfactorily resolved all prestart findings identified during the RRs prior to startup or restart of the facility, activity, or operation. The SAA, as identified in Attachment 3, approves startup or restart after compensatory measures (if needed) are in place and approved corrective action plans are in place to address any open post-start findings.
 - (12) Approval to Proceed. The SAA must provide an approval to proceed memorandum to the responsible prime contractor authorizing startup or restart.
- d. Records Management Program. Requirements for maintenance and disposition of federal records, such as those pertaining to RRs, are provided under the general guidance of DOE O 243.1, *Records Management Program*, current version. The disposition, including destruction, of federal records must be in accordance with:
 - (1) The General Records Schedules, as published by the National Archives and Records Administration (NARA), or

- (2) DOE records disposition authority (Standard Form 115, Request for Records Disposition Authority), as approved by NARA.

The cognizant Field Element Records Officer can provide guidance.

5. RESPONSIBILITIES.

a. DOE Headquarters Line Management.

- (1) Oversee DOE field methods for verifying readiness to startup and restart nuclear facilities, activities or operations.
- (2) Exercise delegation of authority and document all delegations of authority made under the provisions granted by this Order.

b. DOE Head of Field Element or designee.

- (1) Ensure that the prime contractor properly implements the requirements of the CRD in this Order.
- (2) Establish procedures as necessary to manage the verification of readiness to startup or restart nuclear facilities, activities or operations in accordance with the requirements of this Order.

c. Contracting Officer.

- (1) For all applicable contracts and upon notification that a site/facility management contract is affected by this Order, 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 TECHNICAL 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 O 251.1, current version, provides a definition for “invoked technical standard.”

7. REFERENCES.

- a. Title 10 CFR Part 830, *Nuclear Safety Management*.
- b. 10 CFR Part 835, *Occupational Radiation Protection*
- c. 49 CFR, Part 173, Subpart I, Class 7 (Radioactive) Materials
- d. DOE O 243.1, *Records Management Program*, current version.
- e. DOE O 420.1, *Facility Safety*, current version.

- f. DOE O 422.1, *Conduct of Operations*, current version.
 - g. DOE O 433.1, *Maintenance Management Program for DOE Nuclear Facilities*, current version.
 - h. DOE-STD-1027-2025, Chg Notice 1, *Hazard Categorization of DOE Nuclear Facilities*.
 - i. DOE-STD-1073-2016, *Configuration Management*.
 - j. DOE-STD-1189-2016, *Integration of Safety into the Design Process*.
 - k. DOE-STD-3006-2010, *Planning and Conducting Readiness Reviews*.
 - l. DOE-STD-3007-2007, *Guidelines for Preparing Criticality Safety Evaluations at Department of Energy Non-Reactor Nuclear Facilities*.
8. DEFINITIONS. See Attachment 5.
9. CONTACT. Questions concerning this Order should be referred to the Director, Office of Nuclear Safety Policy and Assistance, at (301) 903-3331.



JAMES P. DANLY
Deputy Secretary

ATTACHMENT 1
CONTRACTOR REQUIREMENTS DOCUMENT
DOE O 425.1F, VERIFICATION OF READINESS TO STARTUP OR RESTART
HAZARD CATEGORY 1 AND 2 NUCLEAR FACILITIES

In addition to the requirements set forth in this Contractor Requirements Document (CRD), contractors are responsible for complying with Attachments 3 and 4 of this Order, referenced in and made a part of this CRD, which provide program requirements and/or information applicable to contracts in which this CRD is inserted.

1. Department of Energy (DOE), including the National Nuclear Security Administration (NNSA), Contractor Responsibilities. This CRD applies to all nuclear facilities, activities, and operations classified as Hazard Categories (HC) 1 and 2 as defined in 10 Code of Federal Regulations (CFR) Part 830. 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.

Contractor Requirements. Contractor line management must develop procedures to define the processes that will be used to implement the responsibilities of this CRD. The contractor must not develop RR processes similar to RRs that exempt facilities, activities, or operations from following the RR process described in this Order.

- a. RR Process. The RR process must, in all cases, demonstrate there is a reasonable assurance for adequate protection of workers, the public, and the environment from adverse consequences from the start (or restart) of a HC 1 and 2 nuclear facility, activity, or operation. The readiness process is described under Attachment 2, Readiness Review Process Flow Chart, and Attachment 5, Definitions. For an RR, the contractor must prepare: an intent to startup notification, a Readiness Review Plan (RP) and a final report. The contractor will perform the RR when the Startup Approval Authority (SAA) is the Senior Contractor Official. Attachment 3, Startup Approval Authority (SAA), and Readiness Review (RR) Determination Criteria, describes how to determine the appropriate SAA.
 - (1) Communication. Contractors must communicate projected RR activities to the appropriate Safety Basis Approval Authority (SBAA) or designee.
 - (2) Notification of Intent to Startup. The prime contractor will provide formal correspondence to DOE, which should be 90 days prior to the start of the RR, but no earlier than SBAA approval of the Preliminary Documented Safety Analysis, if applicable. The Senior Contractor Official will coordinate the RR.

The notification of Intent to Startup will include the submittal of the RP to the SBAA.

(3) RP Content and Approval.

- (a) Content. The prime contractor will develop an RP, using a graded approach to define the scope. The RP may take into consideration the maturity of the prime contractor existing safety management programs that are in place to implement the Core Requirements (CRs). The level of detail should also be commensurate with the complexity of the startup or restart. It may be appropriate to perform RRs in a segmented approach to allow flexibility in managing specific activities (e.g., fuel receipt, storage, loading before initial startup). All listed documentation must be included unless it is not applicable to the specific scope of the activity. Contents of the RP must include:

- 1 A scope and purpose that addresses all Attachment 4, Core Requirements (CRs). Exclusion of any CRs must be documented and justified within the RP.
- 2 Prerequisites, as defined in Attachment 5, that must be completed prior to the start of the RR or have compensatory measures that have been documented and approved. This should include documentation ensuring system operability verification and testing (to the extent practicable).
- 3 A description of the physical and administrative boundaries of the RR.
- 4 A description of the structures, systems, and components covered by the RR.
- 5 A description of safety management and security programs to be reviewed.
- 6 Proposed activities for the onsite review, including demonstrations, interviews, and drills as applicable.

- (b) RP Approval. For a contractor RR, the SAA will approve the RP with SBAA concurrence. For a DOE RR, the RP must be reviewed and approved by the SBAA. Both approvals are expected 30 days following the submittal.

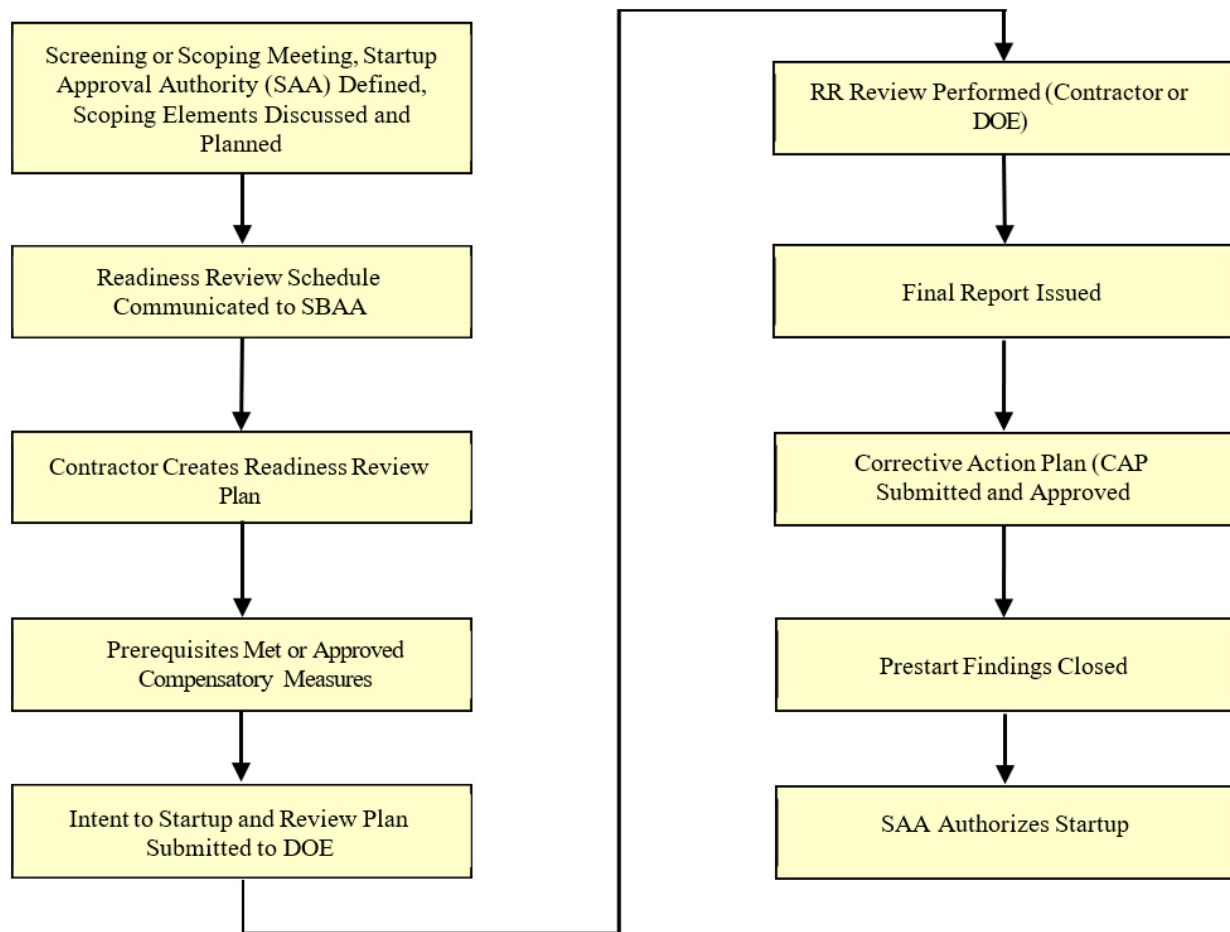
- (4) Contractor RR Team Composition. The contractor RR team leader must select the RR team members. RR team leader and team members must not be assigned to assess facilities, activities or operations for which they have direct responsibilities. Team leader and members' qualifications must be documented and shall address the following requirements:

- (a) Technical knowledge of the area assigned for evaluation, including experience working in the technical area.
 - (b) Knowledge of the performance-based assessment process and methods.
 - (c) Knowledge of the facility, activity, or operations-specific information.
- (5) Prior to starting the Contractor RR.
- (a) The prime contractor prerequisites have been met or have compensatory measures that have been documented and approved.
 - (b) Specific events significant to the startup and restart process that occur prior to the formal commencement of the RR (e.g., site emergency response drills) may be reviewed by the RR team at the time they are conducted.
- (6) Readiness to Proceed. The SAA must submit to the contractor RR team leader their authorization to commence the contractor RR.
- (7) Commencement of Contractor RR.
- (a) Upon receipt of the authorization to commence the contractor RR, the contractor RR Team will initiate the contractor RR, in accordance with the approved RP.
 - (b) The RR will be executed in accordance with the approved RP.
- (8) Contractor RR Final Report. The final report must be prepared and approved by the team leader and receive concurrence from each team member, and each team member must approve the section for which the team member is responsible.
- (a) The final report documents the results of the contractor RR and draws a conclusion as to whether startup or restart of the nuclear facility, activity, or operation can proceed safely. The contractor RR final report must state whether the contractor has established the following:
 - 1 An agreed set of requirements to govern safe operations of the facility, activity, or operation has been formalized with DOE through the contract or other enforceable mechanism.

- The cognizant Field Element Office Records Officer will provide guidance as needed.

ATTACHMENT 2 READINESS REVIEW FLOWCHART

This Attachment provides information associated with this Order as well as information applicable to contracts in which the associated Attachment 1, Contractor Requirements Document, is inserted. The flow chart describes the Readiness Review (RR) process. Either a contractor RR or a DOE RR will be performed in accordance with the determination criteria of Attachment 3, Startup Notification Report, Startup Authorization Authority (SAA), and Readiness Review (RR) Determination Criteria.



ATTACHMENT 3
STARTUP APPROVAL AUTHORITY (SAA), AND READINESS REVIEW (RR)
DETERMINATION CRITERIA

This Attachment provides information and/or requirements associated with this Order as well as information and/or requirements applicable to contracts in which the associated Attachment 1, Contractor Requirements Document, is inserted.

1. For nuclear facility, activity, or operation startups or restarts, the Approval Authority must be determined using the criteria in Attachment 3, Table 1, SAA and RR Determination Criteria. Determining the level of authority, the SAA, must be commensurate with RR criteria.
2. DOE Head of Field Element or designee must ensure that a properly scoped RR is planned and conducted to verify readiness for the restart of Hazard Category (HC) 1 and 2 nuclear facilities, activities, or operations, unless both of the following conditions are met:
 - a. The restart is a resumption of routine operations after a short interruption (such as maintenance activities governed by existing maintenance procedures and processes) as defined in local procedures; and
 - b. The restart is conducted using contractor approved operating procedures that provide specific direction for operating systems and equipment during normal conditions.
3. Justification for the SAA and RR determination must be documented in writing to the SBAA 90 days prior to the RR, beginning with a copy sent to the Program Secretarial Officer (PSO) and Central Technical Authority. If an RR is not to be performed, the contractor's standard operating procedures for startup or restart will be used.
4. If any of the following conditions occur, a RR must be conducted in accordance with this Order. Additional criteria are included in Attachment 3, Table 1:
 - a. Initial reactor startup.
 - b. Initial startup of a newly constructed HC 1 or 2 non-reactor nuclear facility. For the purpose of this criterion, a newly constructed HC 1 or 2 non-reactor nuclear facility refers to a new facility (not operation or activity) with a new safety-basis documentation—that is, a safety evaluation report (SER), documented safety analysis (DSA), and technical safety requirements (TSRs).
 - c. Initial startup after conversion of an existing facility to a new nuclear mission with a new safety-basis documentation (new SER, DSA and TSRs).
 - d. Restart of nuclear facility, activity, or operation that has upgraded its hazard categorization to HC 1 or 2.

- e. Restart after a DOE management official directs the shutdown of a nuclear facility, activity, or operation for safety reasons.
- f. Restart after an extended shutdown for an HC 1 or 2 nuclear facility, activity, or operation. Extended shutdown for an HC 1 or 2 nuclear facility, activity, or operation is defined as 24 months.
- g. Restart of an HC 1 or 2 nuclear facility, activity, or operation after major modification (determination of “major modifications” is made per DOE-STD-1189).
- h. Initial startup of a new HC 1 or 2 activity or operation after major modification (determination of “major modifications” is made per DOE-STD-1189 within an HC 1 or 2 nuclear facility).
- i. Startup or restart of facility, activity, or operation as directed by DOE line management.
- j. The SAA level will determine the type of RR, either a DOE RR or contractor RR.

Table 1: SAA and RR Determination Criteria

Activity	Startup Approval Authority
	Hazard Category 1 and 2
Off Site	
Initial reactor startup	Secretary of Energy or designee
Any other activity listed below	PSO or designee
On Site	
Initial Reactor Startup	Secretary of Energy or designee
Initial startup of a newly constructed HC 1 or 2 non-reactor nuclear facility. For the purpose of this criterion, a newly constructed HC 1 or 2 non-reactor nuclear facility refers to a new facility (not operation or activity) with a new safety-basis documentation (new SER, DSA, and TSRs).	DOE SBAA or designee
Initial startup after conversion of an existing facility to a new nuclear mission with a new safety-basis documentation (new SER, DSA and TSRs). ¹	DOE SBAA or designee
Restart of nuclear facility, activity, or operation that has upgraded its hazard categorization to HC 1 or 2.	DOE SBAA or designee
Restart after a DOE management official directs the shutdown of a nuclear facility, activity, or operation for safety reasons.	DOE SBAA or designee

Activity	Startup Approval Authority
	Hazard Category 1 and 2
Restart after extended shutdown for an HC 1 or 2 nuclear facility, activity, or operation. ²	>24 months Senior Contractor Official
Restart of an HC 1 or 2 nuclear facility, activity, or operation after major modification. ³	Senior Contractor Official
Initial startup of a new HC 1 or 2 activity or operation after major modification within a HC 1 or 2 facility. ³	Senior Contractor Official
Startup or restart of a facility, activity, or operation as directed by DOE line management.	DOE SBAA or designee
For all other cases:	Senior Contractor Official
Note 1: New includes new construction. Note 2: Extended shutdown for an HC 1 or 2 nuclear facility, activity, and operation is defined as 24 months. Note 3: Determination of “major modifications” is made per DOE-STD-1189.	

ATTACHMENT 4 CORE REQUIREMENTS (CRS)

This Attachment provides information and/or requirements applicable to contracts in which Attachment 1, Contractor Responsibilities Document, is inserted. This Attachment defines the CRS used in this Order.

1. CRs verify the readiness of personnel, procedures, programs, and equipment within the scope of the RR to safely startup or restart a nuclear facility, activity, or operation. The CRs are aligned according to specific functional areas (FAs) or safety management programs (SMPs) that are developed and implemented across Department of Energy (DOE) sites to ensure activities are performed in a manner that adequately protects workers, the public, and the environment. Cross-cutting requirements are applicable to each of these programs and need to be evaluated to ensure their success.
 - a. Each CR listed as applicable must be evaluated against the following cross-cutting requirements (cross-cutting requirements may be excluded and documented in the RP with appropriate justifications):
 - (1) FA or SMP documents have been approved by DOE, if required by DOE Order, Codes of Federal Regulations (CFRs), or direction.
 - (2) FA or SMP implementing procedures have been effectively implemented in support of the facility and clearly define roles, responsibilities, and reporting relationships.
 - (3) A sufficient number of qualified personnel are available to effectively implement the FA or SMP in support of the facility.
 - (4) Adequate facilities and equipment are available to ensure that the FA or SMP can be performed adequately for safe facility operation.
 - (5) Line management and personnel level of knowledge is adequate based on examination results, direct observation during performance demonstrations, and interviews.
 - (6) Line management and personnel exhibit an awareness of public and worker safety and health and environmental protection requirements and, through their actions, demonstrate a high-priority commitment to comply with these requirements.
 - (7) Periodic assessments (independent and/or self) of FA or SMPs are performed to verify continued robust performance. Issues (e.g., findings, deficiencies, observations, or recommendations) from assessments, both internal and external, are effectively resolved.

b. The CRs are as follows:

- (1) Conduct of Operations, Procedures, and Work Control. A conduct of operations program meets the requirements of DOE O 422.1, *Conduct of Operations*. The formality and discipline of operations are adequate to conduct work safely, and programs are in place to maintain this formality and discipline for site/facility processes in accordance with the approved Conduct of Operations Implementation Matrix.

Procedures are approved and in place for operating the facility and systems. The procedures reflect all modifications that have been made to the facility systems. Only the most current revision of each procedure is in use.

- (2) Contractor Assurance. An effective Contractor Assurance System (CAS) meets the requirements is necessary. A CAS has been established to identify, evaluate, and resolve deficiencies and recommendations made by contractor line management and independent contractor audit and assessment groups. The process also provides for resolution of issues and recommendations by external official review teams and audit organizations.

- (3) Criticality Safety. A Criticality Safety Program (CSP) that meets the requirements of DOE O 420.1, *Facility Safety*, including DOE approval of the CSP document, have been developed, implemented, and maintained.

Criticality safety evaluations conducted in accordance with DOE-STD-3007-2017, *Guidelines for Preparing Criticality Safety Evaluations at Department of Energy Non-Reactor Nuclear Facilities*, or by other documented methods approved by DOE, must show that entire processes involving fissionable materials will remain subcritical under normal and credible abnormal conditions, including those initiated by design-basis events. Implementation of the Criticality Safety Evaluation credited controls is reviewed annually for all operations.

Facilities that conduct operations using fissionable material in a form that could inadvertently accumulate in significant quantities must include procedures for detecting and characterizing accumulations.

- (4) Emergency Planning and Preparedness, and Operational Drills. A routine operations drill program and an emergency management drill and exercise program have been established and implemented. Records for each program are adequate to demonstrate the effectiveness of completed drills and exercises as well as planning for future drills and exercises.

- (5) Conduct of Engineering. Structures, systems, and components (SSCs) required for safe and compliant operations have been identified, and programs are in place to ensure adequate maintenance, operations, and modifications. These programs include requirements for demonstrating compliance with the design requirements, verifying operability of SSCs, availability of replacement and spare parts, and configuration management of documents and equipment.
- (a) The facility has implemented a maintenance program compliant with DOE O 433.1, *Maintenance Management Program*, for DOE nuclear facilities. A program is in place to confirm and periodically assess the condition and operability of SSCs. This includes examinations of records of tests and calibration of these systems. A documented evaluation of maintenance items open before the declaration of readiness (if any) has been conducted to determine if the failure to complete the maintenance item could adversely influence operations.
 - (b) Provisions have been established for storage, issuance, and availability of an adequate and readily available supply of tools and critical spare parts.
 - (c) Credited safety equipment being started up or restarted meets the requirements of DOE O 420.1, *Facility Safety*, for the safety functions and process controls credited in the safety documentation, the design has been analyzed to demonstrate compliance with the design inputs, and design outputs provide specific limits, controls, and technical directions for SSCs to the constructor, operator, or modifier.
 - (d) A configuration management program in accordance with DOE-STD-1073, *Configuration Management*, is defined and implemented to control facility modifications with emphasis on SSCs. Authorized modifications within the scope of the RR have been completed and fully closed or evaluated and determined not to affect the ability to safely start up or restart nuclear operations.
- (6) Fire Protection. A documented fire protection program in accordance with DOE O 420.1, *Facility Safety*, that includes the elements and requirements identified in the Order for design, operations, emergency response, fire analysis and assessments, wildland fire, and specific Fire Protection Program criteria has been developed, implemented, and maintained by the contractor.

- (7) Nuclear Safety. Facility/process safety-basis (SB) documentation (documented safety analysis [DSA], hazard analysis report [HAR], and technical safety requirements [TSRs]) characterizes the hazards/risks associated with the facility/process; identifies preventive and mitigating measures to adequately protect workers, the public, and the environment from those hazards/risks; describes the safety envelope of the facility/process; is approved; and controls are implemented as required by 10 CFR Part 830, Nuclear Safety Management, Subpart B.

A DOE approved Unreviewed Safety Question procedure has been effectively implemented.

Offsite and onsite shipments of hazardous and/or radioactive materials meet applicable requirements as cited in SB documents.

- (8) Personnel and Management Training and Qualifications. The selection, training, and qualification programs for personnel performing work at or managing the facility, activity, or operation that is starting or restarting have been established, documented, and effectively implemented, and they meet the requirements of DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*. Training and qualification requirements for each position encompass the range of assigned duties and activities.

Modifications to the facility, process, or system have been reviewed for potential impacts on training and qualifications. Training has been performed to incorporate all aspects of these changes.

- (9) Quality Assurance. A contractor Quality Assurance Program (QAP) meeting the requirements of 10 CFR Part 830 is in place and has been approved by DOE. The Quality Assurance (QA) criteria described in the QAP have been implemented via the contractor's QA Program and integrated with other SMPs. If applicable, the contractor has submitted to DOE their basis of the graded approach used to implement nuclear safety requirements.
- (10) Radiation Protection. A Radiation Protection Program compliant with 10 CFR Part 835, Occupational Radiation Protection, regulations has been documented, approved by DOE, and implemented.

- (11) Startup/Restart Startup Plan. An adequate startup plan (if applicable) has been developed that includes plans for graded operations and testing after startup or resumption to simultaneously confirm operability of equipment, the viability of procedures, description of compensatory measures required during the approach to full operations, and the performance and knowledge of the operators. The plans should indicate validation processes for equipment, procedures, and operators after startup or resumption of operations, including any required restrictions and additional oversight.
- (12) Safety and Health. Other SMPs identified in the SB or FAs deemed important to the safety and protection of workers, the public, and the environment are documented, implemented, and maintained. This may include, but is not limited to, areas such as environmental protection; safeguards and security; waste management; and transportation and packaging.
- (13) Federal Qualifications (DOE Only). The personnel at the DOE Field Element assigned responsibilities for providing direction and guidance to the contractor and those individuals assigned oversight responsibilities (including facility representatives) within the scope of the RR, possess appropriate qualification, knowledge and competence to perform those functions.
- (14) DOE Management System (DOE Only). DOE Field Element management systems for oversight of facility operations, such as oversight and assessment programs, facility representatives, technical qualification program, corrective action management system, and quality assurance programs, are adequate.

ATTACHMENT 5 DEFINITIONS

This Attachment provides information applicable to contracts in which the Attachment 1, Contractor Requirements Document, is inserted. This Attachment defines the terms used in and pertinent to this Order. Additional definitions can be found in DOE-STD-3006-2010, *Planning and Conducting Readiness Reviews*.

1. Core Requirement (CR). A fundamental area or topic evaluated during a Readiness Review (RR). CRs verify the readiness of personnel, procedures, programs, and equipment within the scope of the RR to safely start or restart a nuclear facility, activity or operations. The CRs are aligned according to specific functional areas/safety management programs. See Attachment 4 for a detailed description of CRs.
2. Line Management. Refers the unbroken chain of responsibility that extends from the Secretary of Energy to the Deputy Secretary, to the Secretarial Officers who set program policy and plans and develop assigned programs, to the program and Field Element Managers, and to the contractors and subcontractors who are responsible for execution of these programs.
3. Finding. Nonconformance with a stated requirement that represents either: (1) a systematic failure to establish or implement an adequate program or control or (2) a failure that could result in unacceptable impact on the safety of personnel, the facility, the general public, or the environment during nuclear operations. Findings are categorized as either pre-start or post-start (DOE-STD-3006-2010, Planning and Conducting Readiness Reviews, includes pre- and post-start finding screening criteria):
 - a. Pre-start finding. A finding that reflects a programmatic or implementation deficiency that requires corrective action to ensure operations are conducted safely when started.
 - b. Post-start finding. A finding that requires corrective action to mitigate longer-term concerns or programmatic deterioration.
4. New Nuclear Facility. This is a reactor or a nonreactor nuclear facility where an activity is initiated for or on behalf of DOE that includes any related area, structure, facility, or process to the extent necessary to ensure proper implementation of the requirements established in 10 CFR 830, Nuclear Safety Management. The term refers to an entire new facility (or conversion of an existing non-nuclear facility to a nuclear mission) devoted to the operation and maintenance of a new program activity, which is generally covered by a unique Documented Safety Analysis.
5. Nuclear Operations. As used in this Order, nuclear operations means nuclear facilities, operations, and/or activities that fall within the scope of this Order.

6. Prerequisites. A set of specific, measurable actions or conditions, that the RP has included as part of the scope of the RR. The prerequisites, when completed, provide assurance that readiness has been achieved. The prerequisites should include verification of engineering reviews, safety-basis implementation, procedures, training, system operability, and integrated testing. The prerequisites are to be completed prior to the start of the respective RR or have compensatory measures that have been documented and approved.
7. Program work. Work in a reactor or non-reactor nuclear facility that is accomplished to further the goals of the facility mission or the program for which the facility is operated. Program work may include deactivation and decommissioning or environmental restoration activities when that is the mission of the facility. Program work is not accomplished when an operational facility is shut down. Program work does not include work that would be required to maintain the facility in a safe shutdown condition, minimize radioactive material storage, or accomplish modifications and correct deficiencies required before program work can resume.
8. Restart. The resumption of program work. Restarts requiring an RR can occur in operating facilities if the activity or operation to be resumed meets RR requirements. A restart may be required even if the same program work is ongoing in another portion of the operating facility.
9. Scope. The overall magnitude of the RR. This is defined by the physical breadth and depth of the facilities, activity, or operation to be started/restarted, the breadth of CRs selected, and the depth of evaluation of these CRs during the RR.
10. Shutdown. (1) A situation in which a reactor is taken subcritical, either manually or automatically, to a safe shutdown condition; (2) a condition in which a non-reactor nuclear facility, activity or operation ceases; or (3) a condition in which a programmatic nuclear operation or activity ceases, but the structure containing the process may remain operational (i.e., not shut down). In a shutdown condition, a facility must still meet all applicable technical safety requirements and environmental, safety, and health requirements.

A shutdown condition does not exist if all the following apply:

- a. Safety Class and Safety Significant SSCs are operable and have been maintained via an effective maintenance and surveillance program;
- b. Operator and support staff knowledge, skills, and qualifications are maintained through an approved training and proficiency program;
- c. Operating, alarm response, and abnormal/emergency procedures are current;
- d. Configuration management and safety basis controls (including TSRs) are fully implemented; and

- e. Existing performance gaps affecting operational readiness are identified and mitigated through compensatory actions and tracked in an approved corrective action management process.
11. Startup Approval Authority (SAA). The line manager is designated in accordance with Attachment 3 of this Order to authorize the start of nuclear operations when all requirements of the Order have been met. The SAA may range from a Senior Contractor Official to the Secretary of Energy.