

**SUBJECT: NUCLEAR EXPLOSIVE AND WEAPON SURETY PROGRAM**

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1. OBJECTIVES.

- a. To prevent accidents and inadvertent or unauthorized use of U.S. nuclear explosives (including nuclear weapons). The Department of Energy (DOE) Nuclear Explosive and Weapon Surety (NEWS) Program is established for this and the subsequent objectives and is implemented through the following Orders:
  - (1) DOE O 452.2B, *Safety of Nuclear Explosive Operations*, dated 8-7-01;
  - (2) DOE O 452.4A, *Security and Control of Nuclear Explosives and Nuclear Weapons*, dated 12-17-01; and
  - (3) DOE 5610.13, *Joint Department of Energy/Department of Defense Nuclear Weapon System Safety, Security, and Control Activities*, dated 10-10-90.
- b. In conjunction with the Department of Defense (DoD), to protect the public health and safety by providing dual-Agency judgment and responsibility for the safety, security, and control (surety) of nuclear weapons.
- c. To establish nuclear explosive surety standards, nuclear weapon design surety requirements, and NEWS assessment requirements.
- d. To address surety vulnerabilities during all phases of the nuclear weapon life cycle and to upgrade surety during weapon stockpile refurbishments and/or new weapon development.
- e. To establish requirements and responsibilities for planned nuclear explosive operations (NEOs). [Responses to unplanned events (e.g., Accident Response Group activities) are addressed in the 5530-series Orders and DOE O 151.1B, *Comprehensive Emergency Management System*, dated 11-01-00.]

2. CANCELLATION. DOE O 452.1B, *Nuclear Explosive and Weapon Surety Program*, dated 8-06-01. Cancellation of this Order does not, by itself, modify or otherwise affect any contractual obligation to comply with the Order. Canceled Orders that are incorporated by reference in a contract remain in effect until the contract is modified to delete the references to the requirements in the canceled Orders.

3. APPLICABILITY.

- a. DOE Elements. Except for the exclusion in paragraph 3c, this Order applies to all those DOE elements that are involved with NEWS management (see

Attachment 1 for a complete list of DOE elements). This Order automatically applies to DOE elements created after it is issued.

The National Nuclear Security Administration (NNSA) Administrator will assure that NNSA employees and contractors comply with their respective responsibilities under this Order.

b. Nuclear Weapons Complex Contractors.

- (1) The Contractor Requirements Document (CRD), Attachment 2, applies to all DOE nuclear weapons complex contractors involved in the DOE NEWS Program whose contracts include the CRD.
- (2) This CRD must be included in all nuclear weapons complex contracts that require or include involvement with the NEWS Program.
- (3) This Order does not automatically apply to other than nuclear weapons complex contractors. Any application of requirements of this Order to other than nuclear weapons complex contractors will be communicated separately from the Order.
- (4) As the laws, regulations, and DOE directives clause of nuclear weapons complex contracts states, regardless of the performer of the work, nuclear weapons complex contractors with a CRD incorporated into their contracts are responsible for compliance with the requirements of the CRD. Affected nuclear weapons complex contractors are responsible for flowing down the requirements of the CRD to subcontracts at any tier to the extent necessary to ensure the nuclear weapons complex contractors' compliance with the requirements.

c. Exclusions. All DOE elements except those listed in Attachment 1. .

4. REQUIREMENTS.

- a. Nuclear Explosive Surety Standards. All NEOs must meet the following qualitative surety standards to prevent unintended nuclear detonation, fissile material dispersal from the pit, or loss of control. There must be controls to—
- (1) minimize the possibility of accidents, inadvertent acts, or authorized activities that could lead to fire, high-explosive deflagration, or unintended high-explosive detonation;
  - (2) minimize the possibility of fire, high-explosive deflagration, or high-explosive detonation, given accidents or inadvertent acts;
  - (3) minimize the possibility of deliberate unauthorized acts that could lead to high-explosive deflagration or high-explosive detonation;

- (4) ensure adequate security of nuclear explosives; and
  - (5) minimize the possibility of or delay unauthorized nuclear detonation.
- b. Nuclear Explosive Safety (NES). Safety standards, paragraphs 4a(1), 4a(2), and 4a(3) above, must be met for all NEOs conducted by and for the Department to ensure adequate NES. Additional requirements are specified in DOE O 452.2B.
- c. Nuclear Explosive Security. NNSA implements Departmental requirements in accordance with the 470-series Orders and the provisions of Title 10 Code of Federal Regulations (CFR) 712, Human Reliability Program. Safeguards and security measures must be documented in site safeguards and security plans. The security standard, paragraph 4a(4) above, must be met to ensure adequate nuclear explosive security for all NEOs conducted by the Department and/or its contractors. A NES evaluation must be performed to assess security operations for potential adverse NES impact.
- d. Nuclear Explosive Use Control. Use control standards, paragraphs 4a(3) and 4a(5) above, must be met for all NEOs conducted by the Department and/or its contractors. Additional requirements are specified in DOE O 452.4A. Use control measures must be evaluated in accordance with the provisions of DOE O 452.4A to ensure all objectives are achieved. A NES evaluation must be performed to assess use control measures for potential adverse NES impact.
- e. Nuclear Weapon Surveillance Program. The stockpile will be evaluated continually to ensure that safety and use control devices and components meet specified requirements and are performing effectively.
- f. Nuclear Weapon Quality Assurance Program. Surety requirements must be addressed during all phases of the nuclear weapon life cycle.
- g. Nuclear Weapon Design Surety must be an integral part of the design and development of new weapons and the refurbishment of existing weapons.
- (1) Documented consideration of surety must begin at the conception phase and continue throughout all weapon program phases.
  - (2) Surety-related surveillance program information must be explicitly considered in nuclear weapon design and development activities.
  - (3) New or refurbished nuclear weapon designs must meet subsequent surety design requirements unless there are overriding reasons for not doing so and explicitly documented agreements to this effect are reached between the Secretary of Energy and the Secretary of Defense. The following must be incorporated in new or refurbished nuclear weapon designs.

- (a) Nuclear Detonation Safety. Nuclear weapons must incorporate design features that minimize the possibility of accidental and/or inadvertent nuclear detonation. The following are design requirements for nuclear weapons delivered to DoD.
- 1 Normal Environment. Prior to receipt of the enabling input signals and the arming signal, the probability of a premature nuclear detonation must not exceed one in a billion (1E-09) per nuclear weapon lifetime.
  - 2 Abnormal Environment. Prior to receipt of the enabling input signals, the probability of a premature nuclear detonation must not exceed one in a million (1E-06) per credible nuclear weapon accident or exposure to abnormal environments.
  - 3 One-Point Safety. The probability of achieving a nuclear yield greater than 4 pounds of TNT equivalent in the event of a one-point initiation of the weapon's high explosive must not exceed one in a million (1E-06).
- (b) Fissile Material Dispersal Safety. Nuclear weapons will incorporate design features for reducing fissile material dispersal from the pit under credible abnormal environments unless there are overriding reasons for not doing so and the responsible military service requests and adequately justifies an exception approved by the Secretary of Energy.
- (c) Use Control. Nuclear weapons must incorporate use control design features that allow timely authorized use of a nuclear weapon while precluding or delaying unauthorized nuclear detonation. The following are requirements for nuclear weapons delivered to DoD.
- 1 The protection of nuclear weapons shall include a combination of administrative (e.g., personnel security) and technical measures (e.g., physical security and use control) designed to prevent deliberate unauthorized nuclear detonation. These measures shall be consistent with DoD operational requirements and shall continually be assessed against existing and emerging threats as well as technological opportunities for improvement.
  - 2 Use control capabilities will be upgraded for all warheads during weapon refurbishment.

- (d) Inadvertent Criticality. Design nuclear weapons that will not inadvertently go critical in both normal and abnormal environments as verified by the design agency.
- (e) Multipoint Initiation in abnormal environments must be evaluated as part of the design process.
- (4) Surety Research and Development (R&D).
  - (a) Conduct R&D on a broad range of safety and control methods and devices to improve the surety of nuclear weapons and nuclear weapon systems significantly.
    - 1 Identify and characterize physical processes that can lead to unacceptable nuclear explosive response.
    - 2 Identify and address safety issues.
    - 3 Identify areas to improve safety.
  - (b) Provide use control options with delay or denial capability that, at a minimum, are equivalent to that associated with current nonviolent disablement systems.
  - (c) Pursue technologies that render the unauthorized use of U.S. nuclear weapons impossible without their remanufacture.
- h. NEO Authorization. Before a NEO can begin, the following documentation and activities must be completed and approved. Normally these activities should be completed in sequence, and the authorization agreement must be last.
  - (1) A documented safety analysis as defined in 10 CFR 830.
  - (2) An operation hazard analysis report (HAR) in compliance with 10 CFR 830.
  - (3) A system for the implementation of documented controls to ensure acceptably safe NEOs and associated activities.
  - (4) A readiness review in accordance with the requirements of DOE O 425.1C, *Startup and Restart of Nuclear Facilities*, dated 3-13-03.
  - (5) A nuclear explosive safety study report.
  - (6) A certification that all nuclear explosive surety standards have been met.
  - (7) An approved site safeguards and security plan.

- (8) An approved human reliability program implementation plan.
- (9) An authorization agreement.
- i. Training and Qualification of Personnel. Each organization responsible for and/or involved in NEOs and activities that may affect the safety and use control of a nuclear explosive or nuclear weapon must implement training and qualification programs for personnel.
  - (1) Training and qualification requirements must be commensurate with the particular responsibilities assigned.
  - (2) NEWS training must include specific training on the specific nuclear explosive and weapon hazards and controls for the responsibilities assigned.
  - (3) Training and qualification programs, as a minimum, must be based on the following.
    - (a) 10 CFR Part 712, "Human Reliability Program," final rule.
    - (b) DOE O 360.1B, *Federal Employee Training*, dated 10-11-01.
    - (c) DOE 5480.20A, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*, dated 11-15-94, except Chapters II and III.
    - (d) DOE P 426.1, *Federal Technical Capability Policy for Defense Nuclear Facilities*, dated 12-10-98.
    - (e) DOE M 426.1-1A, *Federal Technical Capability Manual*, dated 5-18-04.
    - (f) DOE M 473.2-2, *Protective Force Program Manual*, dated 6-30-00.
- j. Records. Records (documentation) must be maintained in accordance with National Archives and Records Administration-approved DOE or site-specific records retention and disposition schedules per DOE O 200.1, *Information Management Program*, dated 9-30-96.
- k. Implementation Requirements.
  - (1) This revision does not involve substantive administrative and programmatic changes from the previous directive, DOE O 452.1B, and an implementation plan is not required.
  - (2) This revision is effective upon issue.

5. RESPONSIBILITIES.

- a. Secretary of Energy is responsible for establishing and implementing the NEWS program.
- b. NNSA Administrator.
  - (1) Is responsible for the surety of all NEOs conducted by and for NNSA.
  - (2) Serves as a member of the Joint Nuclear Weapons Council under Title 10 United States Code (U.S.C.) Section 179.
  - (3) Exercises dual-Agency responsibility with DoD for the surety of nuclear weapons in DoD custody in accordance with both the Memorandum of Understanding (MOU) Between DoD and DOE on “Objectives and Responsibilities for Joint Nuclear Weapon Activities” and the “Joint Policy Statement on Nuclear Weapons Surety.”
- c. Deputy Administrator for Defense Programs.
  - (1) Serves as lead program Secretarial Office for environment, safety, and health (ES&H) matters at NNSA-owned facilities and has all the authorities delegated by order of the Secretary to cognizant and program Secretarial Offices.
  - (2) Implements DOE policy for the NEWS Program, including those aspects of the program related to public and worker health and safety and protection of the environment.
  - (3) Reviews and concurs or does not concur on DoD-proposed nuclear weapon system safety rules.
  - (4) Coordinates with the Assistant Secretary for Environment, Safety and Health to ensure that appropriate ES&H requirements are integrated with NEWS requirements and that divergence between ES&H and NEWS programs does not occur.
  - (5) Ensures that this Order applies once an emergency for nuclear weapons in a damaged or abnormal state (or improvised nuclear device) has been terminated in accordance with the provisions of the DOE 5530- and DOE 150-series directives.
  - (6) Develops, in coordination with the Chief of Defense Nuclear Safety, a prioritized list of necessary safety-related research needs, including nuclear explosive safety research needs, to be incorporated into the annual budget and planning cycle.

- d. Assistant Secretary for Environment, Safety and Health.
- (1) Assists the Deputy Administrator for Defense Programs in ES&H matters.
  - (2) Coordinates with the Deputy Administrator for Defense Programs on ES&H requirements to ensure that divergence between ES&H and NEWS programs does not occur.
- e. Assistant Deputy Administrator for Military Application and Stockpile Operations.
- (1) Serves as the focal point for DOE's dual-Agency responsibility with DoD for nuclear weapon surety, administers DOE's participation in the DoD nuclear weapon system safety program, and assists in the processing of DoD safety rules as described in the MOU Between DoD and DOE on "Objectives and Responsibilities for Joint Nuclear Weapon Activities" and the "Joint Policy Statement on Nuclear Weapons Surety" in accordance with DOE 5610.13.
  - (2) Develops NEWS Program directives.
  - (3) Provides overall NEWS Program management and direction (including stop work authority) and implements surety policies.
  - (4) Ensures an active and continuous review of the nuclear stockpile to identify surety concerns and ensures a program to provide for stockpile improvement or controls to address identified concerns.
  - (5) Ensures all nuclear-weapon-related surety actions requiring joint DOE-DoD concurrence are thoroughly analyzed from a surety viewpoint by qualified experts.
  - (6) Coordinates NES, nuclear explosive security, and nuclear explosive use control policies to ensure balance and consistency with the nuclear explosive surety standards.
  - (7) Conducts annual nuclear explosive use control program reviews.
  - (8) Conducts annual NEWS appraisals.
- f. Assistant Deputy Administrator for Research, Development and Simulation.
- (1) Conducts R&D on a broad range of safety and control methods and devices for nuclear warheads and weapon systems, including use control, and delay and denial capabilities.
    - (a) Identifies and characterizes physical processes that can lead to unacceptable nuclear explosive response.

- (b) Identifies and addresses safety issues.
  - (c) Identifies areas to improve safety.
- (2) Pursues technologies that render the unauthorized use of nuclear weapons impossible without their remanufacture.
- g. Associate Administrator for Defense Nuclear Security.
  - (1) Directs and manages overall safeguards and security programs at NNSA facilities.
  - (2) Serves as NNSA security authority.
  - (3) Provides, engineering, technical, operational and administrative support to both line management and field elements to ensure effective security at NNSA facilities, including the physical security, personnel, materials control and accounting, classified and sensitive information protection, and technical security programs.
- h. Director of the Office of Security and Safety Performance Assurance.
  - (1) Provides safeguards and security inspection reports related to the NEWS Program to the NNSA Administrator, the Assistant Deputy Administrator for Military Application and Stockpile Operations, and the managers of cognizant site offices.
  - (2) Develops safeguards and security policy.
- i. Chief of Defense Nuclear Safety.
  - (1) Provides an independent source of information to assure the Administrator that site office managers are effectively meeting their responsibilities in the area of nuclear safety.
  - (2) Develops in coordination with the Deputy Administrator for Defense Programs a prioritized list of necessary safety-related research needs, including nuclear explosive safety research needs, to be incorporated into the annual budget and planning cycle.
- j. Site Office Managers are responsible to the Assistant Deputy Administrator for Military Application and Stockpile Operations for performing the following duties.
  - (1) Implementing the provisions of this and related Orders.
  - (2) Ensuring that NEWS Program responsibilities are assigned to site office organizations, laboratories, contractors, and subcontractors.

- (3) Developing and publishing site office directives to implement this and related Orders.
  - (4) Ensuring that identified contractors are responsible for compliance with the requirements of this Order, regardless of the performer of the work.
  - (5) Monitoring/overseeing contractor implementation of the NEWS Program.
  - (6) Telling contracting officers which nuclear weapons complex contractors are affected by this Order.
- k. Contracting Officers, once notified by site office managers, ensure that this Order's CRD is incorporated into the contracts of affected nuclear weapons complex contractors involved with NEOs.
- l. Pantex Site Office and Nevada Site Office Managers. In addition to the responsibilities listed in paragraph 5j, each manager is responsible to the Assistant Deputy Administrator for Military Application and Stockpile Operations for the following duties at his/her site.
- (1) Conducting all operational aspects of the NEWS Program and specifically operational aspects of the NEWS Program for onsite transportation activities.
  - (2) Approving facility safety analysis reports (SARs) and Technical Safety Requirements (TSRs) for NEOs.
  - (3) Approving NEO HARs.
  - (4) Approving readiness reviews for NEOs.
  - (5) Certifying that each NEO under his/her purview meets nuclear explosive surety standards.
  - (6) Preparing and approving NEO authorization agreements.
  - (7) Approving site safeguards and security plans and the human reliability program implementation plans.
- m. Assistant Deputy Administrator for Secure Transportation is responsible to the Deputy Administrator for Defense Programs for the following duties specifically related to the Office for Secure Transportation (OST).
- (1) Implementing the provisions of this and related Orders.
  - (2) Ensuring that NEWS Program responsibilities are assigned to OST organizations.

- (3) Developing and publishing OST directives to implement this and related Orders.
- (4) Conducting operational aspects of the NEWS Program for offsite transportation activities.
- (5) Approving SARs and TSRs for NEOs.
- (6) Approving readiness reviews for NEOs.
- (7) Certifying that each NEO under his/her purview meets the nuclear explosive surety standards.
- (8) Preparing and approving NEO authorization agreements.
- (9) Approving the site safeguards and security plan and the human reliability program implementation plan.

6. DEFINITIONS. See Attachment 3, Definitions.

7. REFERENCES.

- a. DOE O 151.1B, *Comprehensive Emergency Management System*, dated 11-01-00, provides the framework for development, coordination, control, and direction of all emergency planning, preparedness, readiness assurance, response, and recovery actions.
- b. DOE O 200.1, *Information Management Program*, dated 9-30-96, provides a framework for managing information and National Archives and Records Administration approved DOE or site-specific records schedules.
- c. DOE O 414.1C, *Quality Assurance*, dated 6-17-05, requires the implementation of quality assurance criteria.
- d. DOE G 414.1-1A, *Management Assessment and Independent Assessment Guide*, dated 5-31-01, provides guidance concerning the establishment and implementation of effective assessment processes.
- e. DOE G 414.1-2A, *Quality Assurance Management System Guide for Use with 10 CFR 830.120 and DOE O 414.1*, dated 6-17-05, provides guidance concerning the establishment and implementation of an effective quality assurance program or quality management systems and ensures the integrated approach required by DOE P 450.4 (cited below).
- f. DOE O 425.1C, *Startup and Restart of Nuclear Facilities*, dated 3-13-03, establishes the requirements for startup of new nuclear facilities and for the restart of existing nuclear facilities that have been shut down.

- g. DOE P 450.4, *Safety Management System Policy*, dated 10-15-96, describes DOE's commitment that safety management systems be used to integrate safety into management and work practices at all levels so that missions are accomplished while protecting the public, the worker, and the environment.
- h. DOE P 450.5, *Line Environment, Safety and Health Oversight*, dated 6-26-97, sets forth DOE's expectations for line management ES&H oversight and for the use of contractor self-assessment programs as the cornerstone of this oversight.
- i. DOE O 452.2B, *Safety of Nuclear Explosive Operations*, dated 08-7-01, establishes requirements and responsibilities for ensuring the safety of both routine and planned DOE NEOs.
- j. DOE O 452.4A, *Security and Control of Nuclear Explosives and Nuclear Weapons*, dated 12-17-01, establishes DOE requirements and responsibilities to prevent the deliberate unauthorized use of U.S. nuclear explosives and weapons.
- k. DOE O 461.1A, *Packaging and Transfer or Transportation of Materials of National Security Interest*, dated 4-26-04, establishes DOE requirements and responsibilities for the Transportation Safeguards System Program.
- l. DOE O 470.1, *Safeguards and Security Program*, dated 9-28-95, establishes the DOE Safeguards and Security Program.
- m. DOE O 470.2B, *Independent Oversight and Performance Assurance Program*, dated 10-31-02, establishes requirements and responsibilities for the DOE Independent Oversight and Performance Assurance Program that provides DOE and contractor managers, Congress, and other stakeholders with an independent evaluation of the adequacy of DOE policy and the effectiveness of line management performance in safeguards and security and other critical functions.
- n. DOE O 473.1, *Physical Protection Program*, dated 12-23-02, establishes objectives, requirements, and responsibilities for the physical protection of safeguards and security interests.
- o. DOE 5530.1A, *Accident Response Group*, dated 9-20-91, establishes DOE policy for response to accidents and significant incidents involving nuclear weapons or nuclear weapon components.
- p. DOE 5610.13, *Joint Department of Energy/Department of Defense Nuclear Weapon System Safety, Security, and Control Activities*, dated 10-10-90, establishes DOE policy, procedures, authorities, and responsibilities for addressing joint nuclear weapon and nuclear weapon system safety, security, and control activities in conjunction with DoD.
- q. DoD-DOE "Joint Policy Statement on Nuclear Weapons Surety," dated 6-27-91. [Document is available from the Office of Nuclear Weapon Surety and Quality (NA-121).]

- r. MOU between DoD and DOE on “Objectives and Responsibilities for Joint Nuclear Weapon Activities,” dated 1-17-83. [Document is available from the Office of Nuclear Weapon Surety and Quality (NA-121).]
  - s. 10 CFR 712, “Human Reliability Program.”
  - t. 10 CFR 830, Nuclear Safety Management.
  - u. 10 U.S.C. 179, “Nuclear Weapons Council.”
  - v. DOE-STD-3015-2004, *Nuclear Explosive Safety Evaluation Process*, dated November 2004, provides requirements and guidance for NES studies, operational safety reviews, and nuclear explosive safety change evaluations.
  - w. Title XXXII of P.L. 106-65, National Nuclear Security Administration Act, as amended, establishes the National Nuclear Security Administration.
  - x. National Security Presidential Directive–28, dated June 20, 2003.
8. CONTACT. Questions concerning this Order should be addressed to the Assistant Deputy Administrator for Military Application and Stockpile Operations, Office of Nuclear Weapon Surety and Quality, 202-586-5624.



SAMUEL W. BODMAN  
Secretary of Energy

**DOE ELEMENTS TO WHICH DOE O 452.1C IS APPLICABLE**

Office of the Secretary  
Departmental Representative to the Defense Nuclear Facilities Safety Board  
National Nuclear Security Administration  
Office of Chief Financial Officer  
Office of Chief Information Officer  
Office of Congressional and Intergovernmental Affairs  
Office of Environment, Safety and Health  
Office of General Counsel  
Office of Hearings and Appeals  
Office of Human Capital Management  
Office of Management  
Office of Public Affairs  
Office of the Inspector General  
Secretary of Energy Advisory Board

**CONTRACTOR REQUIREMENTS DOCUMENT**  
**DOE O 452.1C, *NUCLEAR EXPLOSIVE AND WEAPON SURETY PROGRAM***

Nuclear Weapons Complex contractors, including National Nuclear Security Administration (NNSA) contractors that conduct Department of Energy (DOE) Nuclear Explosive and Weapon Surety (NEWS) Program activities must comply with the requirements in this Contractor Requirements Document (CRD). Regardless of the performer of the work, contractors are responsible for compliance with the requirements of this CRD. Contractors are responsible for flowing down the requirements of this CRD to subcontracts at any tier to the extent necessary to ensure the contractors' compliance with the requirements. Contractors must not flow down requirements to subcontractors unnecessarily or imprudently. That is, contractors will ensure that they and their subcontractors comply with the requirements of the CRD and incur only those costs that would be incurred by a prudent person in the conduct of competitive business.

1. Ensure that hazards and security vulnerabilities associated with nuclear explosive operations (NEOs) are identified, mitigated, and/or controlled to prevent unintended nuclear detonation, fissile material dispersal from the pit, or loss of control. Ensure that all NEOs meet the following surety standards.
  - a. Minimize the possibility of accidents, inadvertent acts, or authorized activities that could lead to fire, high-explosive deflagration, or unintended high-explosive detonation.
  - b. Minimize the possibility of fire, high-explosive deflagration, or high-explosive detonation, given accidents or inadvertent acts.
  - c. Minimize the possibility of deliberate unauthorized acts that could lead to high-explosive deflagration or high-explosive detonation.
  - d. Ensure adequate security of nuclear explosives.
  - e. Minimize the possibility of or delay unauthorized nuclear detonation.
2. Before a NEO can begin, the following documentation and activities must be completed and approved. These requirements and relevant sources are compiled in the list below. Normally these activities should be completed in sequence, and the authorization agreement must be last.
  - a. A documented safety analysis as defined in 10 CFR 830.
  - b. An operation hazard analysis report (HAR) in compliance with 10 CFR 830.
  - c. A system for the implementation of documented controls to ensure acceptably safe NEOs and associated activities.

- d. A readiness review in accordance with the requirements of DOE O 425.1C, *Startup and Restart of Nuclear Facilities*, dated 3-13-03.
  - e. A nuclear explosive safety study report.
  - f. A certification that all nuclear explosive surety standards have been met.
  - g. An approved site safeguards and security plan.
  - h. An approved human reliability program implementation plan.
  - i. An authorization agreement.
3. Provide qualified personnel to participate in readiness reviews and preparation and/or reviews of NEOs hazards analysis reports, safety analysis reports, military Nuclear Weapon System Safety Groups, nuclear weapon surveillance program, nuclear explosive safety evaluation activities, and nuclear explosive safety change evaluation process, and provide other specialized nuclear explosive technical support and assistance.
  4. For nuclear weapons delivered to the Department of Defense (DoD), ensure the following.
    - a. Positive measures are consistent with DoD operational requirements.
    - b. Positive measures are continually assessed against existing and emerging threats as well as technological opportunities for improvement.
    - c. Surety capabilities are enhanced during weapon refurbishment.
  5. National laboratories with design responsibilities will do the following.
    - a. Incorporate use control design features that allow timely authorized use of a nuclear weapon while precluding or delaying unauthorized nuclear detonation.
    - b. Conduct research and development on a broad range of safety and control methods and devices to significantly improve the surety of nuclear weapons and nuclear weapon systems.
    - c. Pursue technologies that render the unauthorized use of U.S. nuclear weapons impossible without their remanufacture.
    - d. Evaluate the criticality safety of a nuclear weapon in both normal and abnormal environments to document the intrinsic safety of the design.
    - e. Ensure that the surety standards are met during Joint DoD/DOE field operations.
  6. Provide inputs when required to the applicable site office manager to assist updating an implementation plan.

7. Ensure that an assessment program is developed and updated annually. Incorporation of the quality assurance program (QAP) required by 10 CFR 830; DOE O 414.1B, *Quality Assurance*, dated 4-29-04; or DOE/AL QC-1, *Quality Criteria* is preferred. If included in the QAP, the NEWS-based assessment requirements must be specifically addressed in the QAP and subsequent QAP updates. If a NEWS-based assessment program will be developed separately from the QAP, ensure approval by the Office of the Deputy Administrator for Defense Programs, unless approval authority is delegated to another organization, and updated annually.
  - a. NEWS requirements must be included in the self, management, and independent assessments required by 10 CFR 830, DOE 414.1B, or QC-1.
    - (1) The results of these assessments must be made available to support assessments conducted by DOE/NNSA upon request.
    - (2) NEWS assessment results must be analyzed and acted upon.
  - b. NEWS nonconformance must be noted and tracked to closure. Good practices must be noted and disseminated using the DOE/NNSA lessons learned process (Society for Effective Lessons Learned Sharing).
  - c. NEWS assessment results, nonconformance, and closures must be maintained as quality records.
8. Each organization responsible for and/or involved in NEOs and activities that may affect the safety and use control of a nuclear explosive or nuclear weapon must implement training and qualification programs for its personnel.
  - a. Training and qualification requirements must be commensurate with the particular responsibilities assigned.
  - b. NEWS training must include specific training on the specific nuclear explosive and weapon hazards and controls for the responsibilities assigned.
9. Definitions. See Appendix A, Definitions.

## DEFINITIONS

This attachment provides definitions pertinent to the Contractor Requirements Document in DOE O 452.1C, *Nuclear Explosive and Weapon Surety Program*, dated 9-20-05.

1. **Abnormal Environment.**
  - a. In Department of Energy operations, an environment that is not expected to occur during nuclear explosive operations and associated activities.
  - b. In Department of Defense operations, as defined in a weapon's stockpile-to-target sequence and military characteristics, those environments in which the weapon is not expected to retain full operational reliability.
2. **Authorization Agreement.** The formal DOE-contractor agreement documenting the conditions of operation for a nuclear explosive operation. As a minimum, authorization agreements—
  - a. define the scope of operations;
  - b. list the applicable authorization basis documents;
  - c. list other documents that support the decision to authorize operations such as standards/requirements identification documents, applicable readiness review reports, nuclear explosive safety reports, National Environmental Policy Act documents, and certifications that all nuclear explosive surety standards are met; and
  - d. define any other terms and conditions.
3. **Collocation.** Pit and main charge high explosives are collocated when detonation or deflagration of the high explosive could result in fissile material dispersal.
4. **Cognizant Secretarial Officers.** Departmental senior outlay program officials.
5. **Controls.** Design features, safety rules, Technical Safety Requirements, procedures, or other positive measures that individually or collectively contribute to nuclear explosive surety.
6. **Deflagration.** A rapid chemical reaction in which the output of heat is sufficient to enable the reaction to proceed and accelerate without input of heat from another source. Deflagration is a surface phenomenon, with the reaction products flowing away from the unreacted material along the surface at subsonic velocity. The effect of a true deflagration under confinement is an explosion. Confinement of the reaction increases pressure, rate of reaction, and temperature and may cause transition into a detonation.

7. **Deliberate Unauthorized Use.** A deliberate malevolent act that could lead to unauthorized nuclear detonation, high-explosive detonation, high-explosive deflagration, or theft of a nuclear explosive or weapon.
8. **Documents.** Recorded information that describes, specifies, reports, certifies, requires, or provides data or results. A document is not considered a record until it meets the definition of a record per 10 CFR 830.
9. **Environment, Safety, and Health (ES&H).** The application of risk reduction measures to control or mitigate the possibility of exposing the public, workers, and environment to hazardous materials or hazardous energy. This includes, for example, environmental protection, nuclear safety, criticality safety, occupational safety, fire protection, industrial hygiene, health physics, occupational medicine, industrial safety, and radioactive and hazardous waste management.
10. **Functional Audit.** An independent review, performed on a required basis, that is detailed and technical in nature and evaluates a specific area (e.g., tester operations or training and qualifications). The audit team is specialized and includes operations/area office personnel.
11. **Hazard Analysis Report.** A report that documents the systematic evaluation of hazards to workers, the public, and the environment for a specific nuclear explosive operation and its associated activities.
12. **High-Explosive Detonation.** A violent chemical reaction within a chemical compound or mechanical mixture evolving heat and pressure. A detonation is a reaction that proceeds through the reacted material toward the unreacted material at a supersonic velocity. The result of the chemical reaction is exertion of extremely high pressure on the surrounding medium, forming a propagation shock wave that is originally of supersonic velocity.
13. **Normal Environment.**
  - a. In Department of Energy operations, the environment in which nuclear explosive operations and associated activities are expected to be performed.
  - b. In Department of Defense operations, the expected logistical and operational environments, as defined in a weapon's stockpile-to-target sequence and military characteristics, that the weapon is required to survive without degradation in operational reliability.
14. **Nuclear Detonation.** An energy release through a nuclear process, during a period of time on the order of 1 microsecond, in an amount equivalent to the energy released by detonating 4 or more pounds of trinitrotoluene (TNT).
15. **Nuclear Explosive.** An assembly containing fissionable and/or fusionable materials and main charge high-explosive parts or propellants capable of producing a nuclear detonation (e.g., a nuclear weapon or test device).

16. **Nuclear Explosive Area.** An area that contains a nuclear explosive or collocated pit and main charge high-explosive parts.
17. **Nuclear Explosive-Like Assembly (NELA).** An assembly that is not a nuclear explosive but represents a nuclear explosive in its basic configuration (main charge high explosive and pit) and any subsequent level of assembly up to its final configuration or represents a weaponized nuclear explosive such as a warhead, bomb, reentry vehicle, or artillery shell. A NELA does not contain an arrangement of high-explosive and fissile material capable of producing a nuclear detonation.
18. **Nuclear Explosive Operation.** Any activity involving a nuclear explosive including activities in which main charge high-explosive parts and pit are collocated.
19. **Nuclear Explosive Operation Associated Activities.** Activities directly associated with a specific nuclear explosive operation in a nuclear explosive area, such as work on a bomb nose or tail subassembly, even when physically separated from the bomb's nuclear explosive subassembly.
20. **Nuclear Explosive Safety.** The application of positive measures or controls to prevent or mitigate the possibility of unintended or unauthorized nuclear detonation or fissile material dispersal from the pit in a nuclear explosive area.
21. **Nuclear Explosive Safety Study.** A formal evaluation of the adequacy of controls to meet the DOE/nuclear explosive safety standards.
22. **Nuclear Weapon.** A nuclear explosive configured for Department of Defense use.
23. **Nuclear Weapons Complex.** The collection of DOE laboratories, Nevada Test Site, production plants, and processing facilities involved in the design, production, and testing of nuclear weapons.
24. **Nuclear Yield.** The nuclear energy released in the detonation of a nuclear explosive measured in terms of the weight of trinitrotoluene (TNT) required to produce the same amount of energy release.
25. **Pit (Live).** A fissile component or set of fissile components designed to fit in the central cavity of an implosion system.
26. **Plutonium Dispersal.** The aerosolization and transport of plutonium by a driving force, such as fire, high-explosive deflagration, or high-explosive detonation.
27. **Positive Measures.** Design features, safety rules, procedures, or other controls used individually or collectively to provide nuclear explosive surety. Positive measures are intended to ensure a safe response in applicable operations. Some examples of positive measures are strong-link switches; other safety devices; administrative procedures and controls; general and specific nuclear explosive safety rules; design control of electrical equipment and mechanical tooling; and physical, electrical, and mechanical restraints incorporated in facilities and transport equipment.

28. **Program Secretarial Officers (PSOs).** Heads of major Headquarters line organizations—Assistant Secretaries, office directors, or NNSA Deputy Administrators. In the context of field operations, a PSO funds work at a particular site, facility, or laboratory and is a “customer” of the field office.
29. **Refurbishment.** Any nuclear weapon alterations or modifications including life extension, modernization, and revised military requirements. Refurbishments will be assigned a new alteration or modification number for stockpile management purposes.
30. **Safety Analysis Report.** A report that documents the results of safety analysis to ensure that a facility can be constructed, operated, maintained, shut down, and decommissioned safely and in compliance with applicable laws and regulations.
31. **Safety Controls Document.** A document that fulfills the requirement to define the conditions, safe boundaries, and management or administrative controls necessary to ensure that a nuclear activity is conducted safely and to reduce the potential risk to the public and workers from uncontrolled releases of radioactive materials or from radiation exposure due to inadvertent criticality. Safety controls documents should include operating limits, surveillance requirements, administrative controls, use and application instructions, and the bases for each of these.
32. **Site.** A geographical area consisting of a DOE-controlled land area including DOE-owned facilities (e.g., the Nevada Test Site, etc.)
33. **Surety.** Safety, security, and use control of nuclear explosives.
34. **Use Control.** The application of systems, devices, or procedures that allow timely authorized use of a nuclear explosive while precluding or delaying unauthorized nuclear detonation.

## DEFINITIONS

This attachment provides definitions pertinent to DOE O 452.1C, *Nuclear Explosive and Weapon Surety Program*, dated 9-20-05.

1. **Abnormal Environment.**
  - a. In Department of Energy operations, an environment that is not expected to occur during nuclear explosive operations and associated activities.
  - b. In Department of Defense operations, as defined in a weapon's stockpile-to-target sequence and military characteristics, those environments in which the weapon is not expected to retain full operational reliability.
2. **Authorization Agreement.** The formal DOE-contractor agreement documenting the conditions of operation for a nuclear explosive operation. As a minimum, authorization agreements—
  - a. define the scope of operations;
  - b. list the applicable authorization basis documents;
  - c. list other documents that support the decision to authorize operations such as standards/requirements identification documents, applicable readiness review reports, nuclear explosive safety reports, National Environmental Policy Act documents, and certifications that all nuclear explosive surety standards are met; and
  - d. define any other terms and conditions.
3. **Collocation.** Pit and main charge high explosives are collocated when detonation or deflagration of the high explosive could result in fissile material dispersal.
4. **Cognizant Secretarial Officers.** Departmental senior outlay program officials.
5. **Controls.** Design features, safety rules, Technical Safety Requirements, procedures, or other positive measures that individually or collectively contribute to nuclear explosive surety.
6. **Deflagration.** A rapid chemical reaction in which the output of heat is sufficient to enable the reaction to proceed and accelerate without input of heat from another source. Deflagration is a surface phenomenon, with the reaction products flowing away from the unreacted material along the surface at subsonic velocity. The effect of a true deflagration under confinement is an explosion. Confinement of the reaction increases pressure, rate of reaction, and temperature and may cause transition into a detonation.

7. **Deliberate Unauthorized Use.** A deliberate malevolent act that could lead to unauthorized nuclear detonation, high-explosive detonation, high-explosive deflagration, or theft of a nuclear explosive or weapon.
8. **Documents.** Recorded information that describes, specifies, reports, certifies, requires, or provides data or results. A document is not considered a record until it meets the definition of a record per 10 CFR 830.
9. **Environment, Safety, and Health (ES&H).** The application of risk reduction measures to control or mitigate the possibility of exposing the public, workers, and environment to hazardous materials or hazardous energy. This includes, for example, environmental protection, nuclear safety, criticality safety, occupational safety, fire protection, industrial hygiene, health physics, occupational medicine, industrial safety, and radioactive and hazardous waste management.
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