

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

ORDER

DOE O 452.1B

Approved: 08-06-01

Review: 08-06-03

SUBJECT: NUCLEAR EXPLOSIVE AND WEAPON SURETY PROGRAM

1. OBJECTIVES.

- a. To establish requirements and responsibilities for the Department of Energy (DOE) Nuclear Explosive and Weapon Surety (NEWS) Program to ensure adequate safety, security, and control of nuclear explosives and nuclear weapons.
- b. To maintain a formal, comprehensive, and systematic NEWS Program to protect the public and worker health and safety and the environment while supporting national defense requirements.
- c. To establish nuclear explosive surety standards, nuclear weapon design surety requirements, and appraisal requirements for the NEWS Program.
- d. To address requirements and responsibilities for planned nuclear explosive operations. Responses to unplanned events (e.g., Accident Response Group activities) are addressed in the 5530-series Orders and DOE O 151.1A, *Comprehensive Emergency Management System*, dated 11-01-00.

2. CANCELLATION. DOE O 452.1A, *Nuclear Explosive and Weapon Surety Program*, dated 1-17-97. 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 will remain in effect until the contract is modified to delete the reference to the requirements in the canceled Orders.

3. APPLICABILITY.

- a. DOE Elements. This Order applies to all DOE elements, including those in the National Nuclear Security Administration (NNSA), and all DOE contractors, including those in the NNSA, involved in the NEWS Program.
- b. Contractors. The Contractor Requirements Document (CRD), Attachment 1, applies to all DOE contractors, including those in the NNSA, involved in the NEWS Program. The CRD sets forth requirements to be applied to major facilities management contractors that conduct NEWS program activities. Regardless of the performer of the work, contractors are responsible for compliance with the requirements of this Order. Contractors are

DISTRIBUTION:

All Departmental Elements

INITIATED BY:

Office of Defense Programs

responsible for flowing down the requirements of this Order to subcontracts at any tier, to the extent necessary to ensure the contractor's compliance with the requirements. The applicability of this Order to a contractor is dependent on incorporation of the CRD into the relevant contract.

- c. Exclusions. None.

4. REQUIREMENTS.

- a. Nuclear Explosive Surety Standards. All nuclear explosive operations 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. Safety Standards, paragraphs 4a(1), (2), and (3), above, must be met for all nuclear explosive operations conducted by the Department and/or its contractors to ensure adequate nuclear explosive safety. The Nuclear Explosive Safety Study Group (NESSG) must evaluate the adequacy of controls to meet these standards, as described in DOE-STD-3015-2001, *Nuclear Explosive Safety Study Process*, dated February 2001. Additional requirements are specified in DOE O 452.2B, *Safety of Nuclear Explosive Operations*, dated 08-07-01.
- c. Nuclear Explosive Security. The Security Standard, paragraph 4a(4), above, must be met to ensure adequate nuclear explosive security for all nuclear explosive operations conducted by the Department and/or its contractors. Nuclear explosives must be secured in accordance with the requirements in the 470- and 5630-series Orders. These safeguards and security measures must be documented in the Site Safeguards and Security Plan. The adequacy of safeguards and security measures must be assessed and documented in operations office site security surveys and Office of Independent Oversight

and Performance Assurance inspections and evaluations. The NESSG must evaluate security operations for potential adverse impact on nuclear explosive safety.

- d. Nuclear Explosive Use Control. Use Control Standards, paragraphs 4a(3) and (5), must be met for all nuclear explosive operations conducted by the Department and/or its contractors. Additional use control requirements are specified in DOE O 452.4, *Security and Control of Nuclear Explosives and Nuclear Weapons*, dated 6-5-97. Use control measures must be evaluated in accordance with the provisions of DOE O 452.4 to ensure that all use control objectives are achieved. The NESSG must evaluate use control measures for potential adverse impact on nuclear explosive safety.
- e. Nuclear Safety Coordination.
 - (1) The NEWS program involves application of DOE nuclear safety programs, policies, and standards and incorporates special aspects related to collocation of high explosives and fissile material under controls focused on the NEWS Surety Standards. Changes or modifications in DOE nuclear safety policies and/or the NEWS program should be coordinated to ensure that divergence does not occur.
 - (2) DOE exercises its dual-agency nuclear surety responsibility with the Department of Defense (DoD) for the surety of nuclear weapons in DoD custody in accordance with both the Memorandum of Understanding Between DoD and DOE on Objectives and Responsibilities for Joint Nuclear Weapons Activities, and the Joint Policy Statement on Nuclear Weapons Surety, through the Joint Nuclear Weapons Council and participation in the DoD Nuclear Weapons System Safety program activities.
- f. Nuclear Weapon Design Surety.
 - (1) Surety must be an integral part of the design and development of new weapons and the modification of existing weapons. Explicit consideration of surety must begin at the concept definition phase and continue throughout the development and engineering phases.
 - (2) New nuclear weapon designs must incorporate modern surety features 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 implemented in the design of new nuclear weapons.
 - (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 goals 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 trinitrotoluene (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) **Multi-Point Safety.** Multi-point initiation in abnormal environments must be evaluated as part of the design process.
 - (c) **Fissile Material Dispersal Safety.** Design features for reducing fissile material dispersal from the pit under credible abnormal environments must be incorporated for each new nuclear weapon unless the responsible military service requests and properly justifies an exception.
 - (d) **Use Control.** Use control features must include design features that allow timely authorized use of a nuclear weapon, while precluding or delaying unauthorized nuclear detonation.
 - (e) **Inadvertent Criticality.** The criticality safety of a nuclear weapon must be evaluated by the design agency to document the intrinsic safety of the design in both normal and abnormal environments.
- g. **Nuclear Weapons Surveillance Program.** The Nuclear Weapons Surveillance Program ("Surveillance Program") contributes to assessing the surety of weapons and components in the stockpile. The Surveillance Program involves routine periodic examination, evaluation, and testing of stockpile weapons and weapon components to ensure that they conform to performance specifications. It also identifies and evaluates the effect of unexpected or age-related changes. Although it is primarily a reliability program, the Surveillance Program may identify safety-related issues of special concern to the NEWS Program. The knowledge gained must be used to improve nuclear weapon surety.

h. Authorization for a Nuclear Explosive Operation.

Before a nuclear explosive operation can begin, the following documentation and activities must be completed and approved.

- (1) Facility Safety Analysis Report or equivalent interim document(s).
- (2) Operation Hazard Analysis Report.
- (3) A system of documented controls that ensures acceptably safe nuclear explosive operations and associated activities.
- (4) Readiness review in accordance with the requirements of DOE O 425.1B, *Startup and Restart of Nuclear Facilities*, dated 12-21-00.
- (5) Nuclear Explosive Safety Study Report.
- (6) Certification that all nuclear explosive surety standards have been met.
- (7) Authorization Agreement.

i. Appraisals. Organizations that have NEWS Program responsibilities must actively participate in an integrated NEWS Appraisal Program consisting of, but not limited to, contractor self-assessments, oversight surveillance by responsible organizations, and comprehensive compliance and performance-based appraisals of the overall effectiveness of the NEWS Program. These evaluations must be coordinated with the line management responsibilities described in DOE P 450.5, *Line Environment, Safety, and Health Oversight*, dated 6-26-97.

- (1) These evaluation processes must be based on the guidance provided in DOE G 414.1-1A, *Management Assessment and Independent Assessment Guide*, dated 5-31-01, and DOE G 414.1-2, *Quality Assurance Management System Guide for Use with 10 CFR 830.120 and DOE O 414.1*, dated 6-17-99.
- (2) Appraisals must ensure that contractor self-assessments include a review of the implementation of NEWS requirements.
- (3) Oversight surveillance activities must be documented and consist of monitoring NEWS documentation, walk-downs, contractor internal safety reviews, and special functional audits. The functional audit may be performed as local oversight and/or be integral to a complex wide evaluation of a particular generic NEWS activity (e.g., Personnel Assurance Program, nuclear explosive-like assemblies, training/qualifications).

- (4) Appraisals must address the completeness of NEWS implementation, identifying both noteworthy practices and areas for improvement. These efforts must be performed by a team of individuals from DOE Headquarters, the operations offices, the nuclear weapons laboratories, and support contractors. The customers for these appraisals are the Deputy Administrator for Defense Programs, the Assistant Deputy Administrator for Military Application and Stockpile Operations, and the operations/area office managers. Appraisal reports must be shared within the NEWS community to promote the use of lessons learned.
 - (a) Nuclear explosive safety concerns, as described in DOE O 452.2B, must be integrated into the process used to assess whether environment, safety and health (ES&H) requirements pertaining to nuclear explosive safety were properly implemented.
 - (b) Nuclear explosive safety personnel must evaluate all corrective action plans for nuclear explosive operations, associated activities, and associated facilities to ensure that proposed actions do not adversely affect nuclear explosive safety.
- (5) The organization responsible for conducting appraisals must develop a training and qualification program for appraisal personnel.
- j. Records. Maintain records (documentation) in accordance with National Archives and Record Administration-approved DOE or site-specific records retention and disposition schedules per DOE O 200.1, *Information Management Program*, dated 9-30-96.
- k. Tooling and Equipment. The layout design must preclude the possibility of the tooling or equipment making unintended contact with or striking the high explosive.
- l. Implementation Requirements. This revision involves no substantive administrative or programmatic changes from the previous directive, DOE O 452.1A, and no implementation plan is required. This revision is effective upon issue.

5. RESPONSIBILITIES.

- a. Secretary of Energy.
 - (1) Establishes policy to ensure the surety of all nuclear explosive operations conducted by DOE, including NNSA, and DOE contractors, including those in the NNSA.
 - (2) Responsible for the surety of all nuclear explosive operations conducted by DOE, including NNSA, and DOE contractors, including those in the NNSA.
- b. Administrator for Nuclear Security.

- (1) Responsible for the surety of all nuclear explosive operations conducted by NNSA elements and/or contractors.
- (2) Serves as a member of the Joint Nuclear Weapons Council under section 179 of Title 10, United States Code.
- (3) Exercises dual-agency responsibility with DoD for the surety of nuclear weapons in DoD custody in accordance with both the Memorandum of Understanding Between DoD and DOE on Objectives and Responsibilities for Joint Nuclear Weapons Activities and the Joint Policy Statement on Nuclear Weapons Surety.

c. Deputy Administrator for Defense Programs.

- (1) 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.
- (2) Reviews and concurs or does not concur on DoD-proposed nuclear weapon system safety rules.
- (3) 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.
- (4) Oversees appraisals of the Headquarters Weapon Surety Program to evaluate management of the NEWS Program.
- (5) Ensures that this Order applies, once an emergency situation for nuclear weapons in a damaged or abnormal state (or improvised nuclear device) has been terminated, in accordance with the provisions of DOE 5530/DOE O 150 series directives.

d. Assistant Secretary for Environment, Safety and Health

- (1) Assists the Deputy Administrator for Defense Programs for ES&H disciplines.
- (2) Coordinates with the Deputy Administrator for Defense Programs on ES&H requirements to ensure that divergence between DOE/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 as described in the Memorandum of Understanding Between DoD and DOE on Objectives and Responsibilities for Joint Nuclear Weapons Activities and the Joint Policy Statement on Nuclear Weapons Surety.
 - (2) Develops NEWS Program directives.
 - (3) Provides overall NEWS Program management and direction (including stop work authority), implements surety policy, and develops surety directives.
 - (4) Ensures that there is an active and continuous review of the nuclear stockpile to identify surety concerns and that there is a program to provide for stockpile improvements or controls to address identified concerns.
 - (5) Ensures that all surety actions related to nuclear weapons requiring a DOE concurrence with DoD are thoroughly analyzed from a surety viewpoint by qualified experts.
 - (6) Establishes an integrated NEWS Appraisal Program that includes appraisals of DOE contractor NEWS Programs.
 - (7) Coordinates nuclear explosive safety, security, and use control policies to ensure balance and consistency with the nuclear explosive surety standards.
 - (8) Approves Nuclear Explosive Safety Study Reports and Nuclear Explosive Safety Rules.
- f. Director, Office of Security Affairs.
- (1) Establishes safeguards and security directives for nuclear explosives, nuclear components, and special nuclear assemblies.
 - (2) Advises the Deputy Administrator for Defense Programs concerning the adequacy of DOE contractor safeguards and security programs.
- g. Director, Office of Independent Oversight and Performance Assurance 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, the Office of Security and Emergency Operations, and the cognizant operations offices.

- h. Contracting Officers. Ensure the CRD is incorporated into major facilities management contracts where nuclear explosive operations are conducted.
- i. Operations Office Managers (Albuquerque, Nevada, and Oakland) are responsible to the Assistant Deputy Administrator for Military Application and Stockpile Operations to perform the following duties:
 - (1) Implement the provisions of this and related Orders.
 - (2) Ensure that NEWS Program responsibilities are assigned to operations office organizations, laboratories, contractors, and subcontractors.
 - (3) Ensure that management staff have full access and free communication with the operations office manager on NEWS matters.
 - (4) Develop and publish operations office directives to implement this and related Orders.
 - (5) Conduct operational aspects of the NEWS Program for onsite transportation activities.
 - (6) Approve hazard analysis reports for nuclear explosive operations, approve readiness reviews, and certify that all of the surety standards are met.
 - (7) Approve Facility Safety Analysis Reports and Technical Safety Requirements for nuclear explosive operations.
 - (8) Ensure the surety of nuclear explosives during nuclear explosive operations.
 - (9) Participate in the integrated NEWS Appraisal Program. Perform monitoring and oversight surveillance of the contractor's implementation of the NEWS Program.
 - (10) Certify that each nuclear explosive operation under their purview meets the nuclear explosive surety standards.
 - (11) Identify which contracts this Order applies to and ensure those contracts are modified to reflect the attached CRD within 6 months.
 - (12) Ensure that the identified contractors are responsible for compliance with the requirements of this Order, regardless of the performer of the work.
 - (13) Prepare and approve the Authorization Agreement.

- j. Operations Office Manager (Albuquerque), in addition to the responsibilities listed in paragraph 5i, is responsible to the Assistant Deputy Administrator for Military Application and Stockpile Operations to perform the following duties:
 - (1) Conduct operational aspects of the NEWS Program for offsite transportation activities.
 - (2) Administer DOE's participation in the DoD nuclear weapon system safety program and assist in the processing of DoD safety rules as described in the Memorandum of Understanding Between DoD and DOE on Objectives and Responsibilities for Joint Nuclear Weapons Activities and the Joint Policy Statement on Nuclear Weapons Surety in accordance with DOE 5610.13, *Joint Department of Energy/Department of Defense Nuclear Weapon System Safety, Security, and Control Activities*, dated 10-10-90.
 - (3) Conduct NEWS appraisals of the Office of Transportation Safeguards.
 - k. Operations Office Manager (Nevada), in addition to the responsibilities listed in paragraph 5i, is responsible to the Assistant Deputy Administrator for Military Application and Stockpile Operations for conducting operational aspects of the NEWS Program and for the authorized detonation of test nuclear explosives.
 - l. Nuclear Weapons Laboratories and Management and Operating Contractors and Support Contractors involved in the NEWS Program. Support the NEWS Program by providing qualified personnel to support the NEWS Program and related activities, such as readiness reviews, hazard analysis report and safety analysis report preparation, NESSG activities, program appraisals, and providing technical advice and expertise.
6. REFERENCES. The following list contains references that are relevant to the DOE NEWS Program.
- a. DOE O 151.1A, *Comprehensive Emergency Management System*, dated 11-01-00, which addresses responses to unplanned events.
 - b. DOE O 200.1, *Information Management Program*, dated 9-30-96, which provides a framework for managing information and approved DOE Records Schedules which provide requirements for the retention and disposition of Government records.
 - c. DOE O 414.1A, *Quality Assurance*, dated 9-29-99, which establishes performance requirements for DOE work.

- d. DOE G 414.1-1A, *Management Assessment and Independent Assessment Guide*, dated 5-31-01, which provides guidance concerning the establishment and implementation of effective assessment processes.
- e. DOE G 414.1-2, *Quality Assurance Management System Guide for Use with 10 CFR 830.120 and DOE O 414.1*, dated 6-17-99, which provides guidance on how to develop and implement effective management systems that are consistent with DOE's quality expectations and that support DOE P 450.4, *Safety Management System Policy*.
- f. DOE O 425.1B, *Startup and Restart of Nuclear Facilities*, dated 12-21-00, which 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, which describes DOE safety management systems that must be used to integrate safety into management and work practices at all levels so that missions will be 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, which 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 08-07-01, which establishes DOE requirements and responsibilities for ensuring the safe conduct of DOE nuclear explosive operations.
- j. DOE O 452.4, *Security and Control of Nuclear Explosives and Nuclear Weapons*, dated 6-5-97, which establishes DOE objectives, responsibilities and authorities, and requirements to prevent deliberate unauthorized use of U.S. nuclear explosives and weapons.
- k. DOE O 461.1, *Packaging and Transfer or Transportation of Materials of National Security Interest*, dated 9-29-00, which establishes DOE policies for and implementation of the management and operation of the Transportation Safeguards System Program.
- l. DOE O 470.1, *Safeguards and Security Program*, dated 9-28-95, which establishes the DOE Safeguards and Security Program.
- m. DOE O 470.2A *Security and Emergency Management Independent Oversight and Performance Assurance Program*, dated 3-1-00, which establishes the DOE Safeguards and Security Independent Oversight Program that provides DOE and contractor managers, Congress, and other stakeholders with an independent evaluation of the effectiveness of DOE safeguards and security policy and programs and the implementation of those policies and programs.

- n. DOE 5530.1A, *Accident Response Group*, dated 9-20-91, which establishes DOE policy for response to accidents and significant incidents involving nuclear weapons or nuclear weapon components.
 - o. DOE 5610.13, *Joint Department of Energy/Department of Defense Nuclear Weapon System Safety, Security, and Control Activities*, dated 10-10-90, which establishes DOE policy, responsibilities and authorities, and requirements for addressing joint nuclear weapon and nuclear weapon system safety issues in conjunction with DoD. It covers DOE participation in DoD Nuclear Weapon System Safety Groups, which conduct safety studies of DoD-operated nuclear weapon systems and develop weapon system safety rules governing those operations.
 - p. DOE 5632.1C, *Protection and Control of Safeguards and Security Interests*, dated 7-15-94, which establishes policy and responsibilities for the protection and control of safeguards and security interests.
 - q. DoD-DOE Joint Policy Statement on Nuclear Weapons Surety, dated 6-27-91.
 - r. Memorandum of Understanding Between DoD and DOE on Objectives and Responsibilities for Joint Nuclear Weapon Activities, dated 1-17-83.
 - s. 10 CFR 711, Personnel Assurance Program.
 - t. 10 CFR 830; Subpart A, Quality Assurance Requirements.
 - u. 10 U.S.C. 179, Nuclear Weapons Council.
 - v. DOE-STD-3015-2001, *Nuclear Explosive Safety Study Process*, dated February 2001, which provides requirements and guidance for nuclear explosive safety studies and associated activities.
7. CONTACT. Questions concerning this Order should be addressed to the Assistant Deputy Administrator for Military Application and Stockpile Operations, Office of Weapons Surety, 301-903-3463.
8. DEFINITIONS. See Attachment 2, Definitions.

BY ORDER OF THE SECRETARY OF ENERGY:



FRANCIS S. BLAKE
Deputy Secretary

CONTRACTOR REQUIREMENTS DOCUMENT

DOE O 452.1B, *NUCLEAR EXPLOSIVE AND WEAPONS SURETY PROGRAM*

Major facilities management contractors that conduct Department of Energy (DOE) Nuclear Explosive and Weapons 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 contractor's compliance with the requirements.

1. Assist in managing the NEWS Program. The Nuclear Weapons Laboratories and other management and operating contractors and support contractors involved in the NEWS program must ensure that hazards associated with nuclear explosive operations are identified, mitigated, and/or controlled to prevent inadvertent or accidental nuclear detonations, high-explosive detonation or deflagration, or fissile materials dispersal (meet the NEWS standards for all nuclear explosive operations).
2. Provide personnel to perform NEWS duties as members of Nuclear Explosive Safety Study Groups and/or technical teams responsible for preparing hazard and safety analysis information and reports to evaluate nuclear explosive and weapons surety of DOE operations.
3. Provide personnel to participate in NEWS appraisals, assessments and readiness reviews, and preparation and/or reviews of nuclear explosive operations hazards analysis reports, safety analysis reports, Nuclear Explosive Safety Study Group activities, and other specialized nuclear explosive technical support and assistance.
4. Contractor self-assessments must include a review of the implementation of DOE NEWS requirements.
5. Support NEWS activities related to onsite and offsite transportation of nuclear explosives.

DEFINITIONS

This attachment provides definitions pertinent to DOE O 452.1B, *Nuclear Explosive and Weapon Surety Program*.

1. Abnormal Environment. In Department of Energy (DOE) operations, abnormal environment means an environment that is not expected to occur during nuclear explosive operations and associated activities.

In Department of Defense (DoD) operations, abnormal environments are defined in a weapon's stockpile-to-target sequence and military characteristics as those environments in which the weapon is not expected to retain full operational reliability.

2. Authorization Agreement. The Authorization Agreement documents the DOE and contractor agreement to the conditions of operation and as a minimum will—

- define the scope of operations;
- list the applicable Authorization Basis documents;
- 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 certification that all nuclear explosive surety standards are met; and
- 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. Controls. Design features, safety rules, Technical Safety Requirements, procedures, or other positive measures that individually or collectively contribute to nuclear explosive surety.
5. Deflagration. A rapid chemical reaction in which the output of heat is sufficient to enable the reaction to proceed and be accelerated 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.
6. Deliberate Unauthorized Use. An unauthorized nuclear detonation, high-explosive detonation, or high-explosive deflagration following loss of control or theft of a nuclear explosive or weapon.

7. Documents. Recorded information (records), regardless of physical form or characteristics, made or received in connection with the transaction of public business and preserved or appropriate for preservation as evidence of the organization, functions, policies, decisions, procedures, operations, or other activities or because of the informational value of data in them.
8. 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.
9. Fissile Material Dispersal. The aerosolization and transport of fissile material by a driving force, such as fire, high-explosive deflagration, or high-explosive detonation.
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 Deflagration. A rapid chemical reaction in which the output of heat is sufficient for 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.
13. 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.
14. Normal Environment. In DOE operations, normal environment means the environment in which nuclear explosive operations and associated activities are expected to be performed.

In DoD operations, normal environment means 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.

15. 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).

16. 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).
17. Nuclear Explosive Area. An area that contains a nuclear explosive or collocated pit and main charge high-explosive parts.
18. 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 which 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.
19. Nuclear Explosive Operation. Any activity involving a nuclear explosive, including activities in which main charge high-explosive parts and pit are collocated.
20. 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.
21. Nuclear Explosive Safety. The application of positive measures or controls to prevent or mitigate the possibility of unintended or unauthorized nuclear detonation, or fissile materials dispersal from the pit in a nuclear explosive area.
22. Nuclear Explosive Safety Study. A formal evaluation of the adequacy of controls to meet the DOE/nuclear explosive safety standards.
23. Nuclear Weapon. A nuclear explosive configured for DoD use.
24. Nuclear Yield. The nuclear energy released in the detonation of a nuclear explosive, measured in terms of the weight of 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. 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.

27. 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.
28. Safety Controls Document. Those requirements that define the conditions, safe boundaries, and the 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. A safety control document consists of operating limits, surveillance requirements, administrative controls, use and application instructions, and the bases for each of these.
29. Surety. Safety, security, and use control of nuclear explosives.
30. 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.