Department of Energy
Washington, DC 20585

December 6, 1999

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW.
Suite 700
Washington, D.C. 20004

Dear Mr. Chairman:

The Department of Energy (DOE) Implementation Plan (commitment 5.4.2(c)) for the Defense Nuclear Facilities Safety Board (Board) Recommendation 98-2, "Safety Management at the Pantex Plant," requires DOE to evaluate the program directives governing the composition and functioning of the Nuclear Explosive Safety Study Group (NESSG). A revision to the DOE-STD-3015-YY is forthcoming per Board Recommendation 98-2. The planned adjustments in the NESSG composition and activities were contained in the August 23, 1999, decision report to you.

Concurrent with these actions, DOE has completed the DOE biennial review to incorporate lessons learned since the implementation of the DOE 452 Series Orders. Enclosed for your information and use are the revised DOE Orders 452.1B, "Nuclear Explosive and Weapon Surety Program," and 452.2B, "Safety of Nuclear Explosive Operations." The revised directives are being forwarded to the DOE Directives Management Team, MA-4, for processing and publication.

In response to your October 15, 1999, letter, enclosed is the NESSG implementation guidance that describes and directs the restructuring of the NESSG. Also enclosed is a letter sent to the three national laboratory directors requesting their assistance in recruiting an senior panel to enhance the quality of the nuclear explosive operation review process.

If you have questions, please contact me or have your staff contact Dr. Helmut Filacchione at 301-903-7519.

Sincerely,

David E. Beck
Deputy Assistant Secretary
for Military Application and
Stockpile Operations
Defense Programs

4 Enclosures

cc w/enclosures:
[redacted]

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

ORDER

DOE O 452.1B

Issue Date: xx-xx-99
Review Date: xx-xx-xx

SUBJECT: NUCLEAR EXPLOSIVE AND WEAPON SURETY PROGRAM

1. OBJECTIVES.

   a. To establish requirements and responsibilities for the Department of Energy's (DOE's) Nuclear Explosive and Weapon Surety (NEWS) Program.

   b. To maintain a formal, comprehensive, and systematic DOE 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 DOE NEWS Program.

   d. To establish specific requirements for related elements of the DOE NEWS Program as provided in the 452-series Orders identified in paragraph 4a. Responses to unplanned events (e.g., Accident Response Group activities) are addressed in the 5530-series Orders and DOE O 151.1, COMPREHENSIVE EMERGENCY MANAGEMENT SYSTEM, dated 9-25-95.

2. CANCELLATION. DOE O 452.1A, NUCLEAR EXPLOSIVE AND WEAPON SURETY PROGRAM, dated 1-17-97 is canceled. Cancellation of the above 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 shall 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 DOE Headquarters and field elements involved in the DOE NEWS Program.

   b. Contractors. This Order applies to all contractors and subcontractors that manage, oversee, or conduct the DOE NEWS Program as provided by law and/or by contract as implemented by the appropriate contracting officer. Responsibilities are delineated for contractors and Federal employees with the Orders, referenced Rule, Technical Standards, and Implementation Guide. Responsibilities are in sufficient detail such that an additional document, such as

a Contractor Requirement Document, would not be beneficial and may hamper implementation.

c. Exclusions. None.

4. REQUIREMENTS.

a. Nuclear Explosive and Weapon Surety Orders. The DOE NEWS Program shall be governed by this Order, relevant Orders from the DOE Safeguards and Security Program (470- and 5630-series Orders), and the following DOE Orders.

(1) DOE O 452.2B , SAFETY OF NUCLEAR EXPLOSIVE OPERATIONS, dated xx-xx-99, which establishes DOE requirements and responsibilities for ensuring the safe conduct of DOE nuclear explosive operations.

(2) 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 the Department of Defense (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.

(3) DOE O 452.4, SECURITY AND CONTROL OF NUCLEAR EXPLOSIVES AND NUCLEAR WEAPONS, dated 6-05-97, which establishes DOE objectives, responsibilities and authorities, and requirements to prevent deliberate unauthorized use (DUU) of U.S. nuclear explosives and weapons.

(4) DOE O 461.1, DEFENSE PROGRAMS PACKAGING AND TRANSPORTATION, dated xx-xx-99, which establishes DOE requirements and responsibilities for the packaging of nuclear components and special assemblies and the transportation of nuclear explosives, nuclear components, Naval fuel elements, Category I and Category II special nuclear materials, special assemblies, and other materials of national security interest.

b. Integrated Safety Management. The requirements in this Order shall be implemented using the DOE-approved integrated safety management (ISM)

approach as described in DOE Policy P 450.4, SAFETY MANAGEMENT SYSTEM POLICY, dated 10-15-96.

c. Nuclear Explosive Surety Standards. All DOE nuclear explosive operations shall meet the following qualitative surety standards to prevent unintended nuclear detonation, fissile material dispersal from the pit, or loss of control. There shall be positive measures 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.

d. Nuclear Explosive Safety (NES). Safety Standards, paragraphs 4c(1), (2), and (3), above, shall be met for all nuclear explosive operations conducted by the Department and/or its contractors to ensure adequate nuclear explosive safety. The adequacy of positive measures to meet these standards shall be evaluated by the Nuclear Explosive Safety Study Group (NESSG) as described in DOE-STD-3015-~~9997~~, NUCLEAR EXPLOSIVE SAFETY STUDY PROCESS. Additional requirements are specified in DOE O 452.2B, SAFETY OF NUCLEAR EXPLOSIVE OPERATIONS.

e. Nuclear Explosive Security. The Security Standard, paragraph 4c(4), above, shall be met to ensure adequate nuclear explosive security for all nuclear explosive operations conducted by the Department and/or its contractors. Nuclear explosives shall be secured in accordance with the requirements in the 470- and 5630-series Orders. These safeguards and security measures shall be documented in the Site Safeguards and Security Plan. The adequacy of these safeguards and security measures shall be assessed and documented in Operations Office site security surveys and Office of Safeguards and Security Evaluations (OA-10~~EH-21~~) inspections and evaluations. The NESSG shall evaluate security operations for potential adverse impact on nuclear explosive safety.

f. Nuclear Explosive Use Control. Use Control Standards, paragraphs 4c(3) and (5), above, shall 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. Use control measures shall be evaluated in accordance with the provisions of DOE O 452.4, SECURITY AND CONTROL OF NUCLEAR EXPLOSIVES AND NUCLEAR WEAPONS, to assure that all use control objectives are achieved. The NESSG shall evaluate use control measures for potential adverse impact on nuclear explosive safety.

g. Nuclear Weapon Design Surety Goals.

(1) Surety shall be an integral part of design and development of new weapons and the modification of existing weapons. Explicit consideration of surety shall begin at the concept definition phase and continue throughout development and engineering.

(2) New nuclear weapon designs shall incorporate current surety features unless there are overriding reasons for not doing so and explicitly documented agreements to this effect are reached between the Secretaries of Energy and Defense. The following shall be implemented in the design of new nuclear weapons.

(a) Nuclear Detonation Safety. Nuclear weapons shall incorporate design features that minimize the possibility of accidental and/or inadvertent nuclear detonation. The following are design goals for nuclear weapons delivered to the DoD.

1 Normal Environment. Prior to receipt of the enabling stimuli and the arming signal, the probability of a premature nuclear detonation shall not exceed one in a billion (1E-09) per nuclear weapon lifetime.

2 Abnormal Environment. Prior to receipt of the enabling stimuli, the probability of a premature nuclear detonation shall 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 four pounds of trinitrotoluene (TNT) equivalent in the event of a one-point initiation of the weapon's high explosive shall not exceed one in a million (1E-06).

(b) Multi-Point Safety. Multi-point initiation in abnormal environments shall be evaluated as part of the design process.

(c) Fissile Material Dispersal Safety. Design features for reducing the possibility of fissile material dispersal from the pit under credible abnormal environments shall be incorporated for each new nuclear weapon unless the responsible military service requests and properly justifies an exception.

(d Use Control. Use control features shall 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 shall be evaluated by the design agency to document the intrinsic safety of the design in both normal and abnormal environments.

h. Nuclear Weapons Surveillance Program. The surveillance program contributes to assessing the surety of weapons and components in the stockpile. The DOE stockpile 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. While primarily a reliability program, the stockpile surveillance program may identify safety related issues of special concern to the DOE NEWS Program. The knowledge gained shall be used as appropriate to improve nuclear weapon surety.

i . Authorization for a Nuclear Explosive Operation.

(1) Before a nuclear explosive operation can begin, the following documentation and activities shall be completed and approved.

(a) Facility Safety Analysis Report, or equivalent interim document(s).

(b) Operation Hazard Analysis Report.

(c) A system of documented controls that assures acceptably safe nuclear explosive operations and associated activities.

(d) Nuclear explosive operation readiness review.

(e) Required facility readiness reviews.

(f) Nuclear Explosive Safety Study Report.

(g) Certification that all nuclear explosive surety standards are met.

(2) Operations Office managers may approve the safety basis for a nuclear explosive operation.

j. Appraisals. Organizations that have DOE NEWS Program responsibilities shall actively participate in an integrated DOE NEWS Appraisal Program consisting of, but not limited to, contractor self-assessments, oversight surveillance by responsible DOE field organizations and comprehensive compliance and performance based appraisals of the overall effectiveness of the DOE-contractor NEWS Programs and the DOE NEWS Program. These evaluations should 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 should be based on the guidance provided in DOE G 414.1-1, IMPLEMENTATION GUIDE FOR USE WITH THE INDEPENDENT AND MANAGEMENT ASSESSMENT REQUIREMENTS OF DOE 5700.6C AND 10 CFR PART 830.120 QUALITY ASSURANCE, dated 10-11-96, 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) Contractor self-assessments shall review the implementation of the DOE NEWS requirements.

(3) Oversight surveillance activities shall 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 (PAP), nuclear explosive-like assemblies (NELAs), training/qualifications, etc.

(4) Appraisals shall address the completeness of NEWS implementation identifying both noteworthy practices and areas for improvement. These efforts shall be performed by a team of individuals from DOE HQ, the field offices, the national laboratories, and support contractors. The customers for these appraisals are DP-1, DP-20, and the Operation/Area Office Managers. Appraisal reports shall be shared within the NEWS community to promote lessons learned.

(a) NES concerns, as described in DOE O 452.2B, shall be integrated into the process used to assess adequacy of the implementation of ES&H requirements on NES.

(b) NES personnel shall evaluate all corrective action plans on 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 shall develop a trainin_ and qualification program for appraisal personnel.

k. Implementation Requirements. This revision involves no substantive or programmatic changes from the previous directive, DOE O 452.1A, and no implementation plan is required.

5. RESPONSIBILITIES.

a. Secretary of Energy (S-1).

(1) Is responsible for the surety of all nuclear explosive operations conducted by the Department and/or its contractors.

(2) Exercises dual-agency responsibility with DoD for the surety of nuclear weapons in DoD custody in accordance with 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.

(3) Designates the DOE member to the Nuclear Weapons Council.

b. Assistant Secretary for Defense Programs (DP-1).

(1) Implements DOE policy for the DOE 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 (EH-1) to ensure that appropriate ES&H requirements are integrated with NEWS requirements and that divergence does not occur.

(4) Oversees appraisals of the DOE Headquarters Weapon Surety Program to evaluate management of the DOE NEWS Program.

c. Assistant Secretary for Environment, Safety and Health (EH-1).

(1) Provides assistance to DP-1 for ES&H disciplines.

(2) Coordinates with DP-1 on ES&H requirements to ensure that divergence between ES&H and DOE NEWS programs does not occur.

(3) Provides safeguards and security inspection reports related to the DOE NEWS Program through the Office of Safeguards and Security Evaluations (OA-10) to DP-20, Office of Security Affairs, and the cognizant Operations Offices.

d. Deputy Assistant Secretary for Military Application and Stockpile Operations (DP-20).

(1) Serves as the focal point for the Department's dual-agency responsibility with the 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 DOE NEWS Program directives.

(3) Provides overall DOE NEWS Program management and direction including implementing surety policy and developing surety directives.

(4) Ensures that there is an active and continuous review of the nuclear stockpile to identify surety concerns and a program to provide for stockpile improvements or positive measures to address identified concerns.

(5) Ensures that all surety actions related to nuclear weapons requiring a DOE concurrence to the DoD are thoroughly analyzed from a surety viewpoint by qualified experts.

(6) Establishes an integrated NEWS Appraisal Program which includes appraisals of DOE-contractor NEWS Programs to assure full integration of ISM and line management responsibilities.

(1) Conduct operational aspects of the DOE 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.

(3) Conduct NEWS appraisals of the Transportation Safeguards Division.

h. Manager, Nevada Operations Office, in addition to the responsibilities in paragraph 5f, above, is responsible to DP-20 for conducting operational aspects of the DOE NEWS Program and for the authorized detonation of test nuclear explosives.

i. Design Laboratories and Production Agencies provide support to the DOE NEWS Program. This includes providing qualified personnel to support the NESSG and similar activities.

6. REFERENCES.

a. DOE O 151.1, COMPREHENSIVE EMERGENCY MANAGEMENT SYSTEM, dated 9-25-95.

b. DOE O 414.1, Quality Assurance, dated 11-24-98.

c. DOE G 414.1-1, IMPLEMENTATION GUIDE FOR USE WITH THE INDEPENDENT AND MANAGEMENT ASSESSMENT REQUIREMENTS OF DOE 5700.6C AND 10 CFR PART 830.120 QUALITY ASSURANCE, dated August 1996.

d. DOE G 414.1-2, QUALITY ASSURANCE MANAGEMENT SYSTEM GUIDE for use with 10 CFR 830.120 and DOE O 414.1, dated 06-17-99.

e. DOE P 450.4, SAFETY MANAGEMENT SYSTEM POLICY, dated 10-15-96.

f. DOE P 450.5, LINE ENVIRONMENT, SAFETY, AND HEALTH OVERSIGHT, dated 6-26-97.

g. DOE O 452.2B, SAFETY OF NUCLEAR EXPLOSIVE OPERATIONS, dated xx-xx-99.

h. DOE O 452.4, SECURITY AND CONTROL OF NUCLEAR EXPLOSIVES AND NUCLEAR WEAPONS, dated 6-05-97.

i. DOE O 461.1, DEFENSE PROGRAMS PACKAGING AND TRANSPORTATION, dated xx-xx-99.

j. DOE O 470.1, SAFEGUARDS AND SECURITY PROGRAM, dated 9-28-95.

k. DOE O 470.2, SAFEGUARDS AND SECURITY INDEPENDENT OVERSIGHT PROGRAM, dated 12-23-98.

l. DOE 5610.13, JOINT DEPARTMENT OF ENERGY/DEPARTMENT OF DEFENSE NUCLEAR WEAPON SYSTEM SAFETY, SECURITY, AND CONTROL ACTIVITIES, dated 10-10-90.

m. "Memorandum of Understanding Between the DoD and the DOE on Objectives and Responsibilities for Joint Nuclear Weapon Activities," of 1-17-83.

n. 10 CFR 830.120, QUALITY ASSURANCE.

7. CONTACT. DP-20, Office of Weapons Surety (DP-21), 301-903-3463.

DEFINITIONS

This attachment provides definitions pertinent to DOE O 452.1B.

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

   In 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 Collocation. Pit and main charge high explosive are collocated when detonation or deflagration of the high explosive could result in fissile material dispersal.

3. Deliberate Unauthorized Use (DUU). An unauthorized nuclear detonation, high explosive detonation, or high explosive deflagration following loss of control or theft of a nuclear explosive or weapon

4. 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.

5. Fissile Material Dispersal. The aerosolization and transport of fissile material by a driving force, such as fire, high-explosive deflagration, or high-explosive detonation.

6. 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.

7. 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.

8. 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.

9. Nuclear Detonation. An energy release through a nuclear process, during a period of time on the order of one microsecond, in an amount equivalent to the energy released by detonating four or more pounds of trinitrotoluene (TNT).

10. 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).

11. Nuclear Explosive Area. An area that contains a nuclear explosive or collocated pit and main charge high-explosive parts.

12. Nuclear Explosive and Weapon Surety (NEWS) Program. The DOE NEWS Program was established to ensure adequate safety, security, and control of nuclear explosives and nuclear weapons.

13. Nuclear Explosive-Like Assembly (NELA). An assembly that is not a nuclear explosive but that 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.

14. Nuclear Explosive Operation. Any activity involving a nuclear explosive, including activities in which main charge high-explosive parts and pit are collocated.

15. Nuclear Explosive Operation-Associated Activities. Activities directly associated with a specific nuclear explosive operation, such as work on a bomb nose or tail subassembly, even when physically separated from the bomb's nuclear explosive subassembly in an NEA.

16. Nuclear Explosive Safety (NES). The application of positive measures to control or mitigate the possibility of unintended or unauthorized nuclear detonation, high-explosive detonation or deflagration, or fire in a nuclear explosive area.

17. Nuclear Explosive Safety Study. A formal evaluation of the adequacy of positive measures to meet the DOE nuclear explosive Safety Standards.

18. Nuclear Weapon. A nuclear explosive configured for DoD use.

19. 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.

20. Pit (Live). A fissile component, or set of fissile components, designed to fit in the central cavity of an implosion system.

21. 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.

22. Safety Basis. The combination of information relating to the control of hazards in connection with a nuclear activity (including design, engineering analysis, and administrative controls) necessary to make the determination that the activity can be conducted safely. (10CFR830)

23. 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. (10CFR830)

24. Surety. Safety, security, and use control of nuclear explosives.

25. 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.

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

ORDER

DOE O 452.2B

Issue Date: xx-xx-99
Review Date: xx-xx-xx

SUBJECT: SAFETY OF NUCLEAR EXPLOSIVE OPERATIONS

1. OBJECTIVES.

   a. To establish the applicability, requirements, and responsibilities for ensuring the safety of the Department of Energy's (DOE's) nuclear explosive operations and associated activities and facilities, and for protecting the environment and the health and safety of workers and the public.

   b. In the context of this Order, to address the safety of nuclear explosive operations in two broad areas: nuclear explosive safety (NES) and environment, safety, and health (ES&H).

   c. To address routine and planned DOE nuclear explosive operations. Responses to unplanned events (e.g., Accident Response Group activities) are addressed in the 5530-series Orders and DOE O 151.1. COMPREHENSIVE EMERGENCY MANAGEMENT SYSTEM, dated 9-25-95.

2. CANCELLATION. DOE O 452.2A, SAFETY OF NUCLEAR EXPLOSIVE OPERATIONS, dated 1-17-97, is canceled. Cancellation of the above 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 shall 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 DOE Headquarters and field elements that manage, oversee, or conduct nuclear explosive operations and associated activities.

   b. Contractors. This Order applies to contractors and subcontractors that manage, oversee, or conduct DOE NEWS program as provided by law and/or contract, as implemented by the appropriate contracting officer. Responsibilities are delineated for contractors and Federal employees within the Orders, referenced Rule, Technical Standards, and Implementation Guide. Responsibilities are in sufficient detail such that an additional document, such as a Contractor Requirement Document, would not be beneficial, and may hamper implementation.

c. Exclusions. None.

4. REQUIREMENTS.

a. General.

(1) Nuclear explosive operations and associated activities and facilities shall be comprehensively reviewed and evaluated to identify hazards and potential accidents and to establish design, construction, and operational means to protect the public, worker health and safety, and the environment. Safety analyses for facilities in which nuclear explosive operations are performed shall be prepared using hazard category 2 nuclear facility guidance unless (i) a different hazard category is determined by DOE using applicable hazard classification guidance, or (ii) a different hazard category is justified for a facility within the context of an approved integrated safety management program. Additional guidance is provided in DOE G 452.2B-1B, IMPLEMENTATION GUIDE FOR DOE O 452.2B, SAFETY OF NUCLEAR EXPLOSIVE OPERATIONS, dated xx-xx-99.

(2) Operations Offices shall have a comprehensive safety program for nuclear explosive operations and associated activities under their purview and assure contractor implementation.

(3) The safety program shall integrate NES requirements from the 452-series Orders and ES&H requirements from other Orders if applicable under their own terms or invoked in this Order. Many of the ES&H Orders are directly applicable, and others exclude nuclear explosive operations. This Order adopts specified requirements from the excluded Orders to provide a complete safety program for nuclear explosive operations and associated activities and facilities. Requirements within or invoked by this Order are implemented by the contractor through means proposed by the contractor and become binding through approval and authorization by DOE line management.

(4) Implementation of a requirement to prevent or mitigate one hazard shall be assessed to ensure that the likelihood of a significant safety incident involving another hazard is not increased. If any such instance is identified, alternative methods shall be investigated to attempt to implement the requirement without increasing the risk associated with other hazards. Guidelines, graded approach, best management practices, or other nonmandatory implementation guidance shall be similarly assessed for potential impact on another hazard before being implemented.

(5) The requirements in this Order shall be implemented using the DOE approved integrated safety management approach as described in DOE P 450.4, SAFETY MANAGEMENT SYSTEM POLICY, dated 10-15-96 and DOE G-450.3-3, TAILORING FOR INTEGRATED SAFETY MANAGEMENT APPLICATIONS, 2-1-97.

b. Operational Safety Program. The safety program shall include the following elements, tailored for the operations.

(1) Experience Feedback. DOE and DOE contractors and laboratories shall evaluate the safety lessons to be learned from critical evaluations of operating experience and other sources of evidence. In the event that evidence is found that may affect the validity of the safety basis of one or more ongoing nuclear explosive operation, then it should be treated as a potential unreviewed safety question (USQ) under the terms of DOE 5480.21, UNREVIEWED SAFETY QUESTIONS, dated 12-24-91. In addition, such new information shall be evaluated for NES implications as specified in paragraph 4c(5) of this Order.

(2) Conduct of Operations. DOE 5480.19, CONDUCT OF OPERATIONS REQUIREMENTS FOR DOE FACILITIES, dated 7-9-90, provides DOE policy and requirements for conducting operations at DOE facilities. The guidelines in Attachment I to DOE 5480.19 shall be applied in a graded approach commensurate with their potential ES&H impact and their potential NES impact.

(3) Safety Controls. Nuclear explosive operations and associated activities shall be conducted and associated facilities shall be operated in accordance with a system of documented controls as described in section 4.c of this Order. This system shall be derived from facility and operation specific hazard analyses and incorporate the philosophies of independence, redundancy, and defense-in-depth.

(4) Training and Qualification of Personnel. Each organization responsible for and/or involved in nuclear explosive operations and associated activities (e.g., access, custody, etc.) shall implement a training and qualification program for their respective personnel that manage, oversee, perform, or directly support these operations and activities. These personnel include DOE and contractor management and technical support personnel, Personnel Assurance Program (PAP) supervisors, PAP medical personnel, and operations and maintenance personnel.

(a) Requirements for selecting, training, and qualifying personnel involved with nuclear explosive operations and associated

activities and for assuring their continuing fitness for duty shall be applied as contained in this Order and 10 CFR Part 711, Personnel Assurance Program, Final Rule.

(b) Training for DOE personnel involved in nuclear explosive operations and associated activities shall comply with applicable portions of DOE O 360.1, TRAINING, dated 5-31-95.

(c) DOE contractor and laboratory training and qualification programs shall comply with DOE 5480.20A, PERSONNEL SELECTION, QUALIFICATION, AND TRAINING REQUIREMENTS FOR DOE NUCLEAR FACILITIES, dated 11-15-94, except Chapters II and III (Reactor Operations), and develop requirements equivalent to those in Chapter IV. Training and qualification requirements shall be commensurate with the particular responsibilities assigned.

(5) Maintenance of Facilities, Tooling, and Equipment. A maintenance program shall be developed and implemented for facilities, tooling, and equipment used for nuclear explosive operations and associated activities in accordance with the nuclear facility requirements in DOE O 420.1, FACILITY SAFETY, dated 10-13-95.

(6) Configuration Management (CM). Configuration management plans shall address the measures for managing the configuration of nuclear explosive assemblies; the configuration of tooling, equipment, and procedures used in nuclear explosive operations and associated activities; and the interface with the facilities in which these operations and activities are conducted. Additional guidance is provided in DOE G 452.2B-1B.

(7) Issues Management. DOE and DOE contractors and laboratories shall develop and implement corrective action and commitment tracking systems to assist in identifying, tracking, and monitoring required actions related to the safety of nuclear explosive operations and associated activities and facilities. Additional guidance is provided in DOE G 452.2B-1B.

(8) Occurrence Reporting. Operational occurrences shall be reported and processed in accordance with DOE O 232.1A, OCCURRENCE REPORTING AND PROCESSING OF OPERATIONS INFORMATION, dated 7-21-97, and DOE M 232.1-1A, OCCURRENCE REPORTING AND PROCESSING OF OPERATIONS

INFORMATION, dated 7-21-97. Additional guidance is provided in DOE G 452.2B-1B.

(9) Performance Indicators. A performance indicator program for nuclear explosive operations shall be implemented in accordance with the requirements of DOE O 210.1, PERFORMANCE INDICATORS AND ANALYSIS OF OPERATIONS INFORMATION, 9-27-95. Additional guidance is provided in DOE G 452.2B-1B.

c. Authorization Basis. (AB) As a minimum, the AB shall consist of the SAR, or equivalent interim document, HAR, and associated safety controls which document the safety basis of the operation.

(1) Analyses and Documentation. Safety analyses shall be performed for all DOE nuclear explosive operations, associated activities, and associated facilities (i.e., nuclear explosive facilities).

(a) The results of facility safety analyses shall be documented in a Safety Analysis Report (SAR) or equivalent interim document developed and approved in accordance with the requirements in DOE Order 5480.23 and the guidance in DOE-STD-3009-94.

(b) Hazards analyses performed for a specific nuclear explosive operation or associated activity shall be documented in a Hazards Analysis Report (HAR) developed and approved in accordance with the guidance in DOE-DP-STD-3016-99.

(c) For NTS ground zero operations, an Operational Analysis Report (OAR) shall be developed that documents the safety analysis of the nuclear explosive operation. The general requirements of paragraphs 4.c(1)-(3) shall apply.

(2) Controls Development and Implementation. Safety controls for facilities in which nuclear explosive operations are conducted shall be developed, approved, and implemented in accordance with the requirements of DOE Order 5480.22. Controls for specific nuclear explosive operations and associated activities shall be derived from the HAR.

(3) Documentation Reviews and Updates. HARs for ongoing operations shall be reviewed and updated as necessary to ensure the information in each HAR is current.

(4) Criticality Safety. Nuclear explosive operations and associated activities and facilities shall comply with the criticality safety requirements of DOE O 420.1, FACILITY SAFETY, dated 10-13-95.

(a) Criticality safety analyses of the facility and general nuclear explosive operations and associated activities shall be documented in the facility safety basis and authorization documents in accordance with DOE O 420.1.

(b) Criticality safety analyses of specific nuclear explosive operations and associated activities shall be documented in accordance with DOE-DP-STD-3016-99.

(c) Criticality safety of a specific nuclear explosive and its components is evaluated in the nuclear explosive design process and need not be discussed in the facility safety basis documents.

(5) Change Control. Operations Offices shall establish a change control process for nuclear explosive operations and associated activities and facilities. The USQ process shall be used, augmented by the additional NES evaluations listed below. NES evaluations shall be completed prior to implementation of the change. All proposed changes to nuclear explosive operations and associated facilities shall be evaluated against applicable nuclear explosive safety documents by operating contractor personnel assigned nuclear explosive safety responsibilities. The responsible laboratory performs this function at the Nevada Test Site.

(a) Proposed changes of a trivial or strictly administrative nature with no likelihood of significance to nuclear explosive safety may be approved by the operating contractor and shall require no further NES evaluation.

(b) Operations Offices shall specify the process for performing DOE NES evaluations of non-trivial proposed changes. These evaluations may result in a determination of the need for a NES Study.

(c) The change control process shall include provisions for incorporating approved changes into the appropriate safety documents.

d. Nuclear Explosive Safety Program. Nuclear explosive operations require special safety consideration because of the potential high consequences of an

accident or unauthorized act. Operations Offices shall implement a formal, comprehensive Nuclear Explosive Safety Program that includes the following.

(1) DOE Nuclear Explosive Safety Standards. All DOE nuclear explosive operations shall meet the following qualitative safety standards to prevent unintended nuclear detonation, fissile material dispersal from the pit, or loss of control. There shall be positive measures to:

(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;

(2) General Nuclear Explosive Safety Rules (NESRs). The general NESRs set forth in this paragraph are mandatory for all DOE nuclear explosive operations. Exemptions from these rules shall be approved in advance by the Assistant Secretary for Defense Programs (DP-1).

(a) Nuclear explosive operations shall not be performed until a NES Study or Survey is approved, and prestart recommendations have been closed.

(b) Nuclear explosive operations shall be performed in accordance with approved written procedures.

(c) Operations involving a nuclear explosive not known to be one-point safe shall be conducted only at the Nevada Test Site.

(d) Production plant operations shall not be started on a nuclear explosive until it is certified by the design laboratory to be one-point safe.

(e) If it is determined that a nuclear explosive no longer meets the one-point safety criteria, all production plant operations and offsite transportation with that nuclear explosive shall be discontinued in a safe manner. Before operations can be resumed with that nuclear explosive, a NES Study shall be conducted and approved.

(3) NES Studies, Surveys, and Revalidations. The Manager of the Operations Office responsible for a proposed nuclear explosive operation shall determine the type of independent nuclear explosive safety evaluation and shall convene the NESSG to evaluate the proposed operation. These evaluations shall meet the requirements in DOE-STD-3015-YY, Nuclear Explosive Safety Study Process.

(a) A NES Study shall evaluate proposed operations to determine the adequacy of positive measures to satisfy the DOE NES Standards in paragraph 4.d(1) above. NES Studies approved after December 1995 that used the requirements finalized and promulgated in DOE O 452.2A have no specific expiration date. All NES Studies approved prior to January 1996 are valid for five years.

(b) A NES Survey may be conducted as necessary for a proposed nuclear explosive operation that is essentially the same as a previously studied and approved operation. A NES Survey has the same expiration date as the NES Study(ies) on which it is based.

(c) NES Study Revalidations. For studies with expiration dates, a NES Study Revalidation may be conducted to determine whether a nuclear explosive operation has significantly changed since the NES Study was approved. A NES Study with an expiration date may be revalidated for a maximum of 5 years, not to exceed 10 years from the date of the original approval.

(4) NES Performance Reviews. A NES Performance Review shall be conducted once every 36 to 48 months for all ongoing nuclear explosive operations with a NES Study approved after December 1995.

(a) NES Performance Reviews shall evaluate existing nuclear explosive operations to ensure that operations continue to satisfy the nuclear explosive safety standards as evaluated during a NES study and maintained by a change control process.

(b) If the review does not occur within this prescribed time frame, justification for this non-compliance shall be provided to DP-20, and a review performed as soon as feasible.

(c) The Operations Office Manager shall establish a formal process for conducting and approving performance reviews.

(5) Personnel Assurance Program (PAP). Personnel assigned nuclear explosive duties shall meet the PAP requirements contained in 10 CFR Part 711, PAP, and certified for nuclear explosive duties.

(6) Two-Person Concept. The Two-Person Concept requires that a minimum of two authorized people shall be present during all nuclear explosive operations and during other operations designated by the Operations Office. Managers of the Operations Offices responsible for nuclear explosive operations shall establish implementing instructions for the Two-Person Concept. The two people must be in a position to detect incorrect or unauthorized acts and:

(a) be certified in the DOE PAP;

(b) have technical knowledge of the task being performed; and

(c) be knowledgeable of pertinent safety and security requirements.

(7) Reader Worker Procedure and Check-off. Reader worker procedures and check-off shall be used for those nuclear explosive operations specified by the cognizant Operations Office manager.

(8) Control of Electrical Testers/Equipment. Managers of Operations Offices responsible for nuclear explosive operations shall establish safety requirements for electrical testers/electrical equipment used in nuclear explosive areas (NEAs).

(a) Testers that introduce electrical energy into a nuclear explosive or high-explosive subassemblies in an NEA shall meet the following requirements as a minimum.

1 Each tester shall have independent safety characteristics that do not rely on the nuclear explosive's safety features.

2 A single-point failure within a tester shall not result in the application of unintended stimuli.

3 Testers shall use the lowest practical values of internal and output currents and voltages that will adequately perform their intended functions.

4 A comprehensive safety analysis shall be performed and documented for each electrical tester and its interface with a nuclear explosive or HE.

5 Procedures shall be established to control, store, maintain, calibrate, and operate testers.

6 Each model of electrical tester and its interface with a nuclear explosive or high explosive shall be evaluated by an NESSG.

7 Operations Offices shall establish and maintain a record of approved electrical testers.

8 Computer-controlled testers shall have positive measures that preclude inadvertent or unauthorized actuation of nuclear explosive safety critical components (e.g., strong-link switches).

(b) The process used to evaluate and approve any electrical energy source or electrical equipment intended for use within an NEA shall be evaluated in a NES Study.

(9) Offsite Transportation of Nuclear Explosives. The Manager, Albuquerque Operations Office, is responsible for all DOE offsite transportation of nuclear explosives. Offsite transportation operations begin when the loaded conveyance is closed and ends with the opening of the conveyance at its destination. Offsite transportation operations shall be reviewed and approved through the Nuclear Explosive Safety Study process. The following requirements shall be met.

(a) Nuclear explosives shall not be transported offsite in the same conveyance with any other cargo.

(b) Nuclear explosives shall be transported offsite in Safe-Secure-Trailers/Safe-Guard-Transporters (SSTs/SGTs) or other conveyances specifically reviewed and approved through the nuclear explosive safety study process. Nuclear explosive conveyances shall be validated as acceptable for conveying hazardous material in conformance with applicable Department of Transportation regulations.

(c) Nuclear explosives shall be transported and restrained in compliance with the general instructions of Technical Publication (TP) 35-51, General Instructions Applicable to Nuclear Weapons; the specific procedures, equipment descriptions, and restraint requirements specified in TP 45-51, Transportation of Nuclear Weapons Material, General Shipping and Limited Life

Components, TP 45-51A, Transportation of Nuclear Weapons Material (Supplement), Shipping and Identification Data for Stockpile Major Assemblies, and TP 45-51D, Transportation of Nuclear Weapons Material (Supplement), Shipment by Safe-Secure-Trailer (SST); and TP 20-7, Nuclear Safety Criteria.

(10) Onsite Transportation of Nuclear Explosives. Managers of Operations Offices responsible for nuclear explosive operations shall establish requirements and procedures to ensure safe onsite transportation of nuclear explosives at their respective sites. Onsite transportation operations shall be reviewed and approved through the nuclear explosive safety study process.

(11) Nuclear Explosive-Like Assembly (NELA) Requirements.

(a) Technical criteria for NELA requirements shall be established and issued by the Manager, Albuquerque Operations Office, in coordination with Headquarters and the Nevada (NV) and Oakland (OAK) Operations Offices. These requirements shall support the following qualitative NELA Standards.

1 There shall be positive measures to minimize the possibility of accidental, inadvertent, or deliberate unauthorized assembly of a nuclear explosive in place of a NELA configuration.

2 There shall be positive measures to minimize the possibility of accidental, inadvertent, or deliberate unauthorized transfer of a nuclear explosive in place of a NELA configuration.

(b) Managers of Operations Offices responsible for NELA operations shall implement the NELA requirements.

(12) Marking Instructions. Marking nuclear explosives and NELAs is intended to provide a rapid and accurate method to distinguish between configurations capable of a nuclear detonation and those that are not.

(a) NELAs that are routinely assembled and disassembled for training, development, testing, evaluation, or demonstration purposes need not be permanently marked provided the NELA is not shipped offsite; however, temporary markings shall be applied.

(b) Permanent and temporary marking instructions shall be established and issued by the Manager, Albuquerque Operations Office. Managers of Operations Offices shall implement these marking instructions.

(13 Configuration Verification. The configuration and condition of a nuclear explosive and its components shall be known or determined during any planned operation.

(14 Explosive Safety Manual. Requirements and guidance appropriate for nuclear explosive operations contained in DOE M 440.1-1, DOE EXPLOSIVES SAFETY MANUAL, dated 9-30-95, shall be followed.

(15) Reporting Nuclear Explosive Occurrences. DOE O 232.1A and DOE M 232.1-1A provide requirements for categorizing and reporting nuclear explosive occurrences under Group 9, Nuclear Explosive Safety. The detailed classification for emergencies and the emergency responses to be taken are provided in DOE O 151.1A. Additional guidance is provided in DOE G 452.2B-1B.

e. Internal Safety Reviews. DOE contractors and laboratories shall perform internal, objective, and independent safety reviews of nuclear explosive operations and associated activities. The safety review system shall include items of potential safety significance from the perspectives of both NES and ES&H. Additional guidance is provided in DOE G 452.2B-1B.

f. Readiness Reviews.

(1) Facility Readiness Reviews.

(a) Readiness reviews for facilities shall be performed in accordance with DOE O 425.1A, STARTUP AND RESTART OF NUCLEAR FACILITIES, dated 12-28-98, and Operations Office implementing directives and procedures. Requirements for hazard category 2 nuclear facilities shall be used for this purpose.

(b) A facility readiness review is generally not required when a new nuclear explosive operation is introduced and there are no changes to the facility or its safety basis.

(2) Nuclear Explosive Operation Readiness Reviews.

(a) A readiness review shall be performed for startup of a nuclear explosive operation, restarting an operation following a shutdown

greater than one year, after a significant change to the operation, or after an unplanned shutdown due to significant safety concerns.

(b) Operations Offices shall develop and implement an operations readiness review process that addresses nuclear explosive operations. The process shall incorporate the attributes of facility readiness reviews from DOE O 425.1A by adopting appropriate requirements from the Orders. Requirements unique to nuclear explosive operations shall be specified. Additional guidance is provided in DOE G 452.2B-1B.

g. Occupational Safety and Health Program.

Nuclear explosive operations and associated activities and facilities shall comply with DOE O 231.1, ENVIRONMENT, SAFETY, AND HEALTH REPORTING, dated 9-30-95; DOE O 440.1A, WORKER PROTECTION MANAGEMENT FOR DOE FEDERAL AND CONTRACTOR EMPLOYEES, dated 3-27-98; 10 CFR Part 835, Occupational Radiation Protection; and DOE N 441.1, RADIOLOGICAL PROTECTION FOR DOE ACTIVITIES, dated 9-30-95.

h. Exemptions.

(1) Exemptions shall be requested when release is sought from a requirement in this Order or in a referenced mandatory Manual or Standard. DOE M 251.1A, DIRECTIVES SYSTEM MANUAL, dated 1-30-98, shall be used to prepare, process, and approve exemption requests. The approval authority is as follows.

(a) The cognizant Operations Office manager responsible for the activity when an equivalent level of safety has been demonstrated.

(b) The Deputy Assistant Secretary for Military Application and Stockpile Operations (DP-20) when the exemption would ensure adequate protection, but would not result in an equivalent level of safety. If the Operations Office manager concurs with the exemption request, the request will be forwarded to DP-20 for approval.

(c) Exemptions from general NESRs require DP-1 approval.

(2) Release from a requirement that has been adopted by reference into this Order shall be processed as relief from this Order and not from the referenced Order.

j. Implementation. This revision involves no substantive or programmatic changes from the previous directive, DOE O 452.1A, and no implementation plan is required.

5. RESPONSIBILITIES.

a. Assistant Secretary for Defense Programs (DP-1).

(1) Ensures that safety programs are implemented.

(2) Adjudicates any appeals of the Operations Office manager's decisions to deny or revoke PAP certifications.

(3) Approves requests for exemptions from general NESRs.

(4) Authorizes sites for the assembly, disassembly, and storage of nuclear explosives.

b. Assistant Secretary for Environment, Safety and Health (EH-1) assists DP-1 in ES&H disciplines concerning the safety of nuclear explosive operations and associated activities and facilities.

c. Deputy Assistant Secretary for Military Application and Stockpile Operations (DP-20).

(1) Approves NES Study Reports and resolves minority opinions.

(2) Approves proposed membership for a specific Nuclear Explosive Safety Study Group from a list proposed by the sponsoring operations office manager.

(3) Approves revalidations of NES Study Reports.

(4) Approves administrative extensions to NES Studies.

(5) Approves exemptions to the requirements of this Order in accordance with the provisions of 4 h, above.

(6) Evaluates reported nuclear explosive occurrences and corrective actions for safety implications.

(7) Interfaces with EH in the future development of ES&H Orders to ensure that the requirements are integrated with the requirements of DOE O 452.1 B, NUCLEAR EXPLOSIVE AND WEAPON SURETY PROGRAM, and that divergence does not occur.

d. Managers of Operations Offices.

(1) Establish a cadre of experienced technical professionals to serve as permanent members on the Nuclear Explosive Safety Study Group.

(2) Ensure that responsibilities and authorities are clearly defined and delegated at appropriate management and supervisory levels.

(3) Authorize nuclear explosive operations in accordance with the requirements of this Order.

(4) Approve the nuclear explosive operation authorization basis.

(5) Ensure that ES&H requirements are integrated into nuclear explosive operations and associated activities while maintaining appropriate focus on nuclear explosive safety.

(6) Assure that NES Performance reviews are conducted within 36-48 months following approval of NESSG reports and provide the NES Performance Review report to DP-20.

(7) Approve NES Survey Reports.

(8) Designate PAP certifying officials.

(9) Approve exemptions to the requirements of this Order in accordance with the provisions of 4.h, above.

6. REFERENCES.

a. DOE O 151.1, COMPREHENSIVE EMERGENCY MANAGEMENT SYSTEM, dated 9-25-95.

b. DOE O 210.1, PERFORMANCE INDICATORS AND ANALYSIS OF OPERATIONS INFORMATION, dated 9-27-95.

c. DOE O 231.1, ENVIRONMENT, SAFETY, AND HEALTH REPORTING, dated 9-30-95.

d. DOE O 232.1A, OCCURRENCE REPORTING AND PROCESSING OF OPERATIONS INFORMATION, dated 9-21-97.

e. DOE M 232.1-1A, OCCURRENCE REPORTING AND PROCESSING OF OPERATIONS INFORMATION, dated 9-21-97.

f. DOE M 251.1A, DIRECTIVES SYSTEM MANUAL, dated 1-30-98.

g. DOE O 360.1, TRAINING, dated 5-31-95.

h. DOE O 420.1 FACILITY SAFETY, dated 10-13-95.

i. DOE O 425.1A, STARTUP AND RESTART OF NUCLEAR FACILITIES, dated 12-28-98.

j. DOE O 440.1A, WORKER PROTECTION MANAGEMENT FOR DOE FEDERAL AND CONTRACTOR EMPLOYEES, dated 3-27-98.

k . DOE M 440.1-1, DOE EXPLOSIVES SAFETY MANUAL, dated 3-29-96 .

l.. DOE N 441.1, RADIOLOGICAL PROTECTION FOR DOE ACTIVITIES, dated 9-30-95.

ml. DOE G-450.3-3, TAILORING FOR INTEGRATED SAFETY MANAGEMENT APPLICATIONS, 2-1-97.

n. DOE P 450.4, SAFETY MANAGEMENT SYSTEM POLICY, dated 10-15-96.

o. DOE O 452.1B , NUCLEAR EXPLOSIVE AND WEAPON SURETY PROGRAM, dated xx-xx-99 .

p. DOE G 452.2B-1B , IMPLEMENTATION GUIDE FOR DOE O 452.2B, SAFETY OF NUCLEAR EXPLOSIVE OPERATIONS, dated xx-xx-99.

q. DOE O 461.1, DEFENSE PROGRAMS PACKAGING AND TRANSPORTATION, dated xx-xx-99.

r. DOE O 470.1, SAFEGUARDS AND SECURITY PROGRAM, dated 9-28-95.

s. DOE O 470.2, SAFEGUARDS AND SECURITY INDEPENDENT OVERSIGHT PROGRAM, dated 12-23-98.

t. DOE 5480.19, CONDUCT OF OPERATIONS REQUIREMENTS FOR DOE FACILITIES, of 7-9-90.

u. DOE 5480.20A, PERSONNEL SELECTION, QUALIFICATION, AND TRAINING REQUIREMENTS FOR DOE NUCLEAR FACILITIES, dated 11-15-94.

v. DOE 5480.21, UNREVIEWED SAFETY QUESTIONS, dated 12-24-91.

w. DOE 5480.22, TECHNICAL SAFETY REQUIREMENTS, dated 2-25-92.

x. DOE 5480.23, NUCLEAR SAFETY ANALYSIS REPORTS, dated 4-10-92.

y. DOE-STD-1073-93, Guide for Operational Configuration Management Programs, dated 11/93.

z. DOE-STD-3009-94, Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports, dated 7/94.

aa. DOE-STD-3015-YY, Nuclear Explosive Safety Study Process, dated 1/97.

bb. DOE-DP-STD-3016-99, Hazard Analysis Reports for Nuclear Explosive Operations, dated 2/99.

cc. 10 CFR Part 711, Personnel Assurance Program, Final Rule, published on 9-8-98.

dd. 10 CFR Part 830, Nuclear Safety Management, Section 120, "Quality Assurance Requirements."

ee. 10 CFR Part 835, Occupational Radiation Protection.

ff. G-830.120, Implementation Guide for use with 10 CFR Part 830.120, Quality Assurance, dated 4-15-94.

gg. Joint Department of Energy/Department of Defense (DOE/DoD) Technical Publication 20-7, Nuclear Safety Criteria, dated 9-1-86.

hh. Joint DOE/DoD Technical Publication 35-51, General Instructions Applicable to Nuclear Weapons, dated 11-27-89.

ii. Joint DOE/DoD Technical Publication 45-51, Transportation of Nuclear Weapons Material, General Shipping and Limited Life Components (LLC), dated 3-16-84.

jj. Joint DOE/DoD Technical Publication 45-51A, Transportation of Nuclear Weapons Material (Supplement), Shipping and Identification Data for Stockpile Major Assemblies, dated 2-1-80.

kk. Joint DOE/DoD Technical Publication 45-51D, Transportation of Nuclear Weapons Material (Supplement), Shipment by Safe-Secure-Trailer (SST), dated 7-14-89.

7. CONTACT. DP-20, Office of Weapons Surety (DP-21), 301-903-3463.

DEFINITIONS

This attachment provides the definitions pertinent to DOE O 452.2B.

1. Access. The proximity to a nuclear explosive that affords a person the opportunity to tamper with it or to cause a detonation.

2. Certified Personnel (for nuclear explosive duties). Operations personnel who are current with respect to Personnel Assurance Program (PAP) certification and the training and qualification program for the specific nuclear explosive operation to which they are assigned.

3. Collocation. Pit and main charge high explosive are considered to be collocated if detonation or deflagration of the high explosive could result in fissile material dispersal.

4. Custody. Responsibility for control of and access to nuclear explosives.

5. Defense-In-Depth. Multiple layers of protection (e.g., equipment design, procedures, and training) to prevent accidents and/or to mitigate the consequences of an accident.

6. Electrical Equipment. Custom designed and fabricated devices or commercial devices (both modified and unmodified) used in performing operations on a nuclear explosive that do not connect to the electrical circuitry of the nuclear explosive.

7. Electrical Testers. Custom designed and fabricated devices or commercial devices (both modified and unmodified) used in performing operations on the electrical circuitry of a nuclear explosive.

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. Facility. Any equipment, structure, system, process, or activity that fulfills a specific purpose.

10. Fissile Material Dispersal. The aerosolization and transport of fissile material by a driving force, such as fire, high-explosive deflagration, or high-explosive detonation.

11. Graded Approach. A process by which the level of analysis, documentation, and actions necessary to comply with a requirement are commensurate with:

    a. The relative importance to safety, safeguards, and security;
    b. The magnitude of any hazard involved;
    c. The life cycle of the facility;
    d. The programmatic mission of the facility;
    e. The particular characteristics of a facility;
    f. Any other relevant factor.

12. Hazard Analysis. The determination of material, system, process, and plant characteristics that can produce undesirable consequences, followed by the assessment of hazardous situations associated with a process or activity.

13. Hazard Analysis Report (HAR). 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.

14. High-Explosive Deflagration. A rapid chemical reaction in which the output of heat is sufficient for 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.

15. 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.

16. Main Charge. The high explosive whose explosive energy implodes the pit.

17. Nuclear Detonation. An energy release through a nuclear process, during a period of time on the order of one microsecond, in an amount equivalent to the energy released by detonating four or more pounds of trinitrotoluene (TNT).

18. 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).

19. Nuclear Explosive Area (NEA). Any area that contains a nuclear explosive or collocated pit and main charge high-explosive parts.

20. Nuclear Explosive Duty. Work assignments that allow custody of a nuclear explosive or access to a nuclear explosive area.

21. Nuclear Explosive-Like Assembly (NELA). An assembly that is not a nuclear explosive but that 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.

22. Nuclear Explosive Operation. Any activity involving a nuclear explosive, including activities in which main charge high-explosive parts and pit are collocated.

23. Nuclear Explosive Operation-Associated Activities. Activities directly associated with a specific nuclear explosive operation, such as work on a bomb nose or tail subassembly, even when physically separated from the bomb's nuclear explosive subassembly in an NEA.

24. Nuclear Explosive Safety (NES). The application of positive measures to control or mitigate the possibility of unintended or unauthorized nuclear detonation, high-explosive detonation or deflagration, or fire in a nuclear explosive area.

25. Nuclear Explosive Safety Performance Review. An independent NES evaluation to assure that nuclear explosive operations continue to satisfy the nuclear explosive safety standards as established during the NES Study and maintained by the change control process.

26 Nuclear Explosive Safety Rules (NESRs). Requirements that significantly contribute to minimizing the possibility of nuclear detonation, high-explosive detonation, deflagration or fire in nuclear explosive operation.

27. Nuclear Explosive Safety Study. A formal evaluation of the adequacy of positive measures to meet the DOE Nuclear Explosive Safety Standards.

28. Nuclear Explosive Safety Study Revalidation. A formal evaluation to determine whether a nuclear explosive operation has significantly changed since its Nuclear Explosive Safety Study was approved.

29. Nuclear Explosive Safety Survey. A formal nuclear explosive safety evaluation based on a comparative analysis of the operation with the nuclear explosive operation evaluated in a current and approved Nuclear Explosive Safety Study Report.

30. Nuclear Weapon. A nuclear explosive configured for DoD use.

31. One-Point Safe Nuclear Explosive. A nuclear explosive that, in the event a detonation is initiated at any one point in the high-explosive system, presents no greater probability than one in a million of producing a nuclear detonation.

32. Permanent Marking. A durable method, normally by metal deformation, of indicating on an external area of an assembly whether it is a nuclear explosive or a nuclear explosive-like assembly.

33. Personnel Assurance Program (PAP). A program that establishes the requirements and responsibilities for screening, selecting, and continuously evaluating employees assigned to or being considered for assignment to nuclear explosive duties.

34. Pit (Live). A fissile component, or set of fissile components, designed to fit in the central cavity of an implosion system and which if placed therein will create a nuclear explosive.

35. 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.

36. Reader Worker Procedure and Check-Off. A procedure used during specified nuclear explosive operations in which one person reads the description of the operation to be performed, the operation is performed, and the reader checks off on a list that the operation has been performed.

37. Readiness Review. A disciplined, systematic, documented, performance-based examination of facilities, equipment, personnel, procedures, and management control systems to ensure that a facility will be operated within its approved safety envelope as defined by the facility safety basis.

38. Risk. The qualitative or quantitative expression of possible loss that considers both the likelihood that an event will occur and the consequence of that event.

39. Safety Analysis. A documented process to: (1) provide systematic identification of hazards within facilities in which nuclear explosive operations and associated activities are conducted and during specific nuclear explosive operations and associated activities; (2) describe and analyze the adequacy of measures taken to eliminate, control, or mitigate identified hazards; and (3) analyze and evaluate potential accidents and their associated risks.

40. Safety Analysis Report (SAR). 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.

41. Safety Basis. The combination of information relating to the control of hazards in connection with a nuclear explosive activity (including design, engineering analysis, and administrative controls) necessary to make the determination that the activity can be conducted safely.

42. Temporary Marking. A nondurable marking method on an external area, attached to an assembly, or otherwise marked, indicating the configuration of a nuclear explosive-like assembly.

43. 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.

Department of Energy
Washington, DC 20585

December 1, 1999

Dr. John Browne
U. S. Department of Energy
Los Alamos National Laboratory
P.O. Box 1663
Los Alamos, New Mexico 87545

Dear Dr. Browne:

Confidence in the safety of our nuclear explosive operations is one of the Department's most important responsibilities in support of the nuclear weapons stockpile. The Department is committed to conducting nuclear explosive operations while minimizing safety risks. To strengthen the review process, the Nuclear Explosive Safety Study Group (NESSG) will be augmented with senior members. They will be recognized senior level scientists and engineers with broad technical and managerial experience. Guidelines on the expected qualities of senior members are enclosed.

Your assistance to recruit, designate, and assign senior distinguished individuals based on your professional associations with private industry, the academic community, and the other government agencies is requested. Consideration should be given to those senior individuals within your organization who could serve on the panel. These individuals must possess a strong technical and managerial background with varied experience that would provide the NESSG a diversified perspective on NESSGs. The goal is to have three individuals serve on this panel and have two of the three participate on each study to the maximum extent possible. I have tasked the Manager, Albuquerque Operations Office (AL), to select the three panel members from the nominations. Please submit at least three nominee resumes to AL by January 31, 2000. The Sandia and Lawrence Livermore National Laboratories will also submit three nominees from which one will be chosen from each laboratory.

To support this activity, I am providing $330,000 for each laboratory above the current Fiscal Year 2000 funding levels. The duration of the senior members' assignments can be from 1-3 years depending on the members' availability and performance. The senior members are expected to be available by March 31, 2000.

I appreciate your assistance and support in meeting these objectives.

Sincerely,

David E. Beck
Deputy Assistant Secretary
for Military Application and
Stockpile Operations
Defense Programs

Enclosure

cc w/enclosure:
G. Hurley, LANL
R. Glass, AL
BGGioconda, DP-1
G. Weigand, DP-10

Qualities for Senior NESSG Members on the NESSG

- Recognized senior-level scientists and engineers that have broad technical and managerial experience.
- Expert knowledge in technical disciplines, such as, seismic phenomena, lightning, high explosives, electrical engineering, etc.
- Experience with the review, approval, operation, and management of high consequence production and manufacturing operations.
- Demonstrated active participation and value added in expert panels, peer reviews, etc.
- Technical investigative skills to support safety evaluations and challenge line management's safety case.
- Upper level management experience with the ability to seek technical expertise and advice from national laboratories, industry, and academic communities.

Department of Energy
Washington, DC 20585

December 1, 1999

Ambassador C. Paul Robinson
U.S. Department of Energy
Sandia National Laboratories
P.O. Box 5800
Albuquerque, NM 87185-5800

Dear Ambassador:

Confidence in the safety of our nuclear explosive operations is one of the Department's most important responsibilities in support of the nuclear weapons stockpile. The Department is committed to conducting nuclear explosive operations while minimizing safety risks. To strengthen the review process, the Nuclear Explosive Safety Study Group (NESSG) will be augmented with senior members. They will be recognized senior level scientists and engineers with broad technical and managerial experience. Guidelines on the expected qualities of senior members are enclosed.

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Sincerely,

David E. Beck
Deputy Assistant Secretary
for Military Application and
Stockpile Operations
Defense Programs

Enclosure

cc w/enclosure:
D. Olson, SNL
R. Glass, AL
BG Gioconda, DP-1
G. Weigand, DP-10

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Department of Energy
Washington, DC 20585

December 1, 1999

Dr. C. Bruce Tarter, Director
University of California
Lawrence Livermore National Laboratory
7000 East Avenue
P.O. Box 808
Livermore, CA 94551

Dear Dr. Tarter:

Confidence in the safety of our nuclear explosive operations is one of the Department's most important responsibilities in support of the nuclear weapons stockpile. The Department is committed to conducting nuclear explosive operations while minimizing safety risks. To strengthen the review process, the Nuclear Explosive Safety Study Group (NESSG) will be augmented with senior members. They will be recognized senior level scientists and engineers with broad technical and managerial experience. Guidelines on the expected qualities of senior members are enclosed.

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I appreciate your assistance and support in meeting these objectives.

Sincerely,

David E. Beck
Deputy Assistant Secretary
for Military Application and
Stockpile Operations
Defense Programs

Enclosure

cc w/enclosure:
M. Anastasio, LLNL
R. Glass, AL
BGGioconda, DP-1
G. Weigand, DP-10

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Department of Energy
Washington, DC 20585

December 1, 1999

MEMORANDUM FOR MANAGER, ALBUQUERQUE OPERATIONS OFFICE
MANAGER, NEVADA OPERATIONS OFFICE

FROM: DAVID E. BECK
DEPUTY ASSISTANT SECRETARY
FOR MILITARY APPLICATION AND
STOCKPILE OPERATIONS
DEFENSE PROGRAMS

SUBJECT: NUCLEAR EXPLOSIVE SAFETY STUDY GROUP (NESSG)
RESTRUCTURING IMPLEMENTATION

The attached NESSG restructuring guidance has been developed for all nuclear explosive operations (NEOs). The purpose of this memorandum is to immediately implement the Department's decision regarding the NESSG structure rather than waiting for the order and standard change process to be completed. This memorandum is to be implemented by all Department of Energy, national laboratories, and contractor organizations that support NEOs. These changes were outlined in the Department of Energy response to the Defense Nuclear Facilities Safety Board Recommendation 98-2, subrecommendation 5.

The Albuquerque (AL) and Nevada Operations Offices shall take action to implement the provisions of this memorandum by March 31, 2000. In conjunction with this implementation direction, I have requested assistance from the national laboratories in recruiting the senior members for the restructured NESSG. The AL Manager will select the members of the senior panel. This request is also attached to this memorandum.

If you have questions, please contact me or have your staff contact Dr. Helmut Filacchione of my staff at 301-903-7519.

2 Attachments

cc w/attachments:
J. Conway, Chairman, DNFSB

DEPARTMENT OF ENERGY (DOE)
NUCLEAR EXPLOSIVE SAFETY STUDY GROUP (NESSG)
RESTRUCTURING IMPLEMENTATION

PURPOSE

To clarify the DOE NESSG mission and goals. Based on the Defense Nuclear Facilities Safety Board Recommendation 98-2, "Safety Management at the Pantex Plant," subrecommendation 5, the Deputy Assistant Secretary for Military Application and Stockpile Operations (DP-20) has modified the NESSG. On August 23, 1999, DP-20 issued a decision report that directed:

(a) restructuring of the NESSG to enhance its effectiveness;
(b) enhancing the stature of the NESSG and its members; and
(c) retaining DP-20 approval authority of NESS reports.

MISSION OBJECTIVES

Confidence in the safety of our nuclear explosive operations is one of the most important responsibilities in support of the nuclear weapons stockpile. The Department is accountable for ensuring that its nuclear explosive operations are safe to its workers, the general public, the environment, and can meet the national security requirements. To accomplish these objectives, the Department has developed and implemented the DOE 452 series orders to provide clear and uniform Department policy for the NES Program and commissioned an independent NESSG to review the NES of all proposed nuclear explosive operations prior to their commencement.

SCOPE

The NESSG shall conduct reviews on all DOE nuclear explosive operations.

FUNCTIONS AND GOALS

The general function of the NESSG is to evaluate nuclear explosive operations to assess the adequacy of positive measures to meet the NES standards. Upon establishment of an adequate safety basis, a NES review takes place to independently evaluate the NES of the operation. At the completion of the NES review, the NESSG submits a report, which documents its observations and conclusions to the operations office manager for review and action. The operations office manager shall concur and forward the NES report to DP-20 for final approval or notify DP-20 of nonconcurrence.

The specific functions and goals of the NESSG are defined in the DOE 452 series orders and the DOE-Standard-3015-97, "Nuclear Explosive Safety Study Process."

DP-20 NESSG RESTRUCTURING

The DP-20 decision report consists of the following five actions to be jointly implemented by Headquarters Defense Programs and the DOE field organizations charged with NES responsibilities.

Action 1 - Senior Members

The Manager, Albuquerque Operations Office, shall confer and appoint three senior members to the NESSG based on their background and experience. The senior members are expected to contribute their technical diversity to the NESSG process. They shall carry the same responsibilities as other NESSG members. At least two senior members will participate in each NESSG review. The training, qualification, and certification requirements of the DOE Standard 3015 will continue to apply to all nonsenior members. A special NES orientation program for senior members shall be developed.

Action 2 - NESSG Composition

NESSG size will be scoped to the number needed for an effective review of the topic at hand. The NESSG shall consist of not less than 7 persons and no more than 11 persons per review. The core NESSG is:

- one chairperson (responsible operations office for the nuclear explosive activity);
- two senior members;
- one Sandia National Laboratories member;
- one Lawrence Livermore National Laboratory member;
- one Los Alamos National Laboratory member; and
- one Pantex Plant Management and Operating (M&O) Contractor for AL NESSs.

If a larger NESSG membership is desired, it will be assembled around the core members.

Additional NESSG members can be drawn from the following organizations with NES responsibilities:

Federal Government

Albuquerque Operations Office
Amarillo Area Office
Nevada Operations Office
Oakland Operations Office
DOE Headquarters Associate Deputy
Assistant Secretary for Nuclear Weapons Surety

National Laboratories and Contractors

Lawrence Livermore National Laboratory
Los Alamos National Laboratory
Sandia National Laboratories
Pantex Plant M&O Contractor

Note: NESSG members from DOE organizations will be Federal employees.

NESSG Chairperson

Shall be a Federal employee with NES responsibilities and certified in accordance with DOE Standard 3015. The chairperson will oversee the conduct of the NES review.

Observers

Organizations with NES responsibilities are encouraged to provide an observer for each NESS, if they are not a member of the NESSG. It is especially important for the Nevada Operations Office to maintain its NES expertise in support of its national security mission.

Action 3 - Selection Process for NESSG Membership

The members of each NESSG will be selected by the respective operations office manager in coordination with the member organizations, and approved by the operations office manager. The operations office manager will give consideration to the individual member's professional experience, NES qualifications, and dynamic traits (e.g., inquisitive personality). The objective of this nomination and approval process is to ensure an acceptable mix of NESSG members who collectively will provide the diversity of thought, continuity, NESSG qualifications, and group dynamics to effectively evaluate the specific operations submitted for NESSG review.

Action 4 - Incentives for NESSG Participation

Each organization will develop an incentive program for NESSG participation. The purpose of this program is to improve NESSG performance, elevate the stature of NESSG members within DOE and other sponsoring organizations, encourage highly qualified individuals to seek long-term NESSG assignments.

Action 5 - Approval Authority for Nuclear Explosive Safety Study Reports

DP-20 will retain approval authority for all NESS reports.

The operations office manager's endorsement signifies his/her confidence in the study process and acceptance of the risk associated with the operation.

DP-20 approval signifies his/her agreement that the operations office manager executed the review process as intended and made appropriate risk acceptance decisions.