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DOE STANDARD

NUCLEAR EXPLOSIVE SAFETY STUDY PROCESS

U.S. Department of Energy
Washington, D.C. 20585

AREA SAFT

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FOREWORD

This Department of Energy (DOE) Technical Standard is approved by the Assistant Deputy Administrator for Military Application and Stockpile Operations, National Nuclear Security Administration (NNSA), and is available for use with DOE Order 452.2B, SAFETY OF NUCLEAR EXPLOSIVE OPERATIONS, by all DOE and NNSA components and their contractors who are responsible for the nuclear explosive operations (NEOs) and associated activities and facilities.

Standards are used to identify methods that DOE and NNSA find acceptable for implementing the Department's requirements. Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be of use in improving this document should be addressed to:

Assistant Deputy Administrator for Military Application and Stockpile Operations
National Nuclear Security Administration
Office of Weapons Surety
(DP-21, GTN)
U.S. Department of Energy
19901 Germantown Road
Germantown, MD 20874-1290
Phone: (301) 903-3463
Fax: (301) 903-8628

All DOE NEOs require a Nuclear Explosive Safety (NES) Study as set forth in DOE O 452.2B. This DOE Technical Standard provides requirements and guidance for the NES Study Process.

DOE Technical Standards, such as this standard, do not establish requirements. However, all or part of the provisions in a DOE standard can become requirements under the following circumstances:

(1) they are explicitly stated to be requirements in a DOE requirements document; or

(2) the organization makes a commitment to meet a standard in a contract or in an implementation plan or program required by a DOE requirements document.

Throughout this standard, the word “must” is used to denote actions that must be performed if the objectives of this standard are to be met. If the provisions are made requirements through one of the two ways discussed above, then the word “must” statements would become requirements. Action statements containing the term “should” or a similar phrase would not automatically be converted to “must” statements as this action would violate the consensus process used to approve this standard.

1. PURPOSE

This technical standard provides specific requirements and guidance for nuclear explosive safety (NES) studies and is in accordance with DOE Order 452.2B, SAFETY OF NUCLEAR EXPLOSIVE OPERATIONS.

2. SCOPE

This technical standard describes the responsibilities and procedures for the NES study process. This standard does not apply to response to unplanned events (e.g., Accident Response Group activities), which are addressed in DOE 5300-series Orders and DOE O 151.1A, COMPREHENSIVE EMERGENCY MANAGEMENT SYSTEM. DOE O 452.2B defines the boundaries between planned and unplanned events which may require a different approach for a NES evaluation. Nuclear safety concepts and procedures contained in DOE O 452.2B, and this standard may be tailored to meet unique disposition requirements for a specific damaged nuclear explosive/weapon or improvised nuclear device.

3. BACKGROUND

Nuclear explosives, by their design and intended use, require collocation of high explosives and fissile material. The design agencies are responsible for designing safety into the nuclear explosive. The design and production agencies are responsible for designing safety into processes involving the nuclear explosive, including considerations of facility interfaces. In addition, safety is assured through comprehensive, independent safety reviews involving the DOE and NNSA national laboratories, Operations Offices, Headquarters, and applicable Area Offices and operating contractors with expertise in nuclear explosive safety.

The Nuclear Explosive Safety Study Group (NESSG) evaluates nuclear explosive operations against the NES Standards specified in DOE O 452.2B using systematic evaluation techniques. The NES Standards must be satisfied for nuclear explosive operations.

4. RESPONSIBILITIES

1. Assistant Deputy Administrator for Military Application and Stockpile Operations (DP-20) shall:

(1) Ensure NNSA/HQ personnel meet the qualification requirements for NESSG Membership delineated in Appendix A of this standard prior to being assigned to a NESSG.

(2) Approve NES Study Reports.

b. Managers, NNSA Operations Offices, as appropriate, shall:

(1) Recruit four qualified personnel to serve as NESSG senior technical advisors.

(2) Implement a special orientation program for new NESSG members and senior technical advisors.

(3) Ensure Operations Office personnel meet the applicable qualifications (chair, member, or senior technical advisors) delineated in this standard prior to being assigned to a NESSG.

(4) Appoint a NNSA employee as chair of a specific NESSG and maintain a minimum of one proficient NESSG chair for each Operations Office having NESSG responsibilities.

(5) Approve the proposed membership list for each NESSG.

(6) Schedule NESSG activities.

(7) Ensure that each NESSG has sufficient technical, administrative, and logistical resources.

(8) Evaluate NESSG reports, and make appropriate recommendations to DP-20.

(9) Provide copies of approved NES Operational Safety Reviews (OSR) reports to DP-20.

(10) Ensure appropriate action is taken on approved NESSG findings.

c. Operations Office NESSG chairperson shall:

(1) Organize, convene, and conduct the NESSG.

(2) Compile and forward the NESSG report, or NES OSR report to the manager of the Operations Office.

(3) Suspend an NESSG activity if unable to fulfill the requirements of DOE O 452.2B and this standard.

d. NNSA Management & Operating (M&O) Contractors and Design Agencies shall:

(1) Provide input documentation, briefings, and demonstrations to the NESSG, as required.

(2) Certify the accuracy of input documentation they provide.

(3) Ensure their personnel meet the qualification requirements for NESSG members delineated in this standard prior to being assigned as a NESSG member.

(4) Provide qualified technical advisors to support NESSG activities.

(5) Take appropriate action on approved NESSG findings for which they have responsibility.

(6) Provide NESSG member training support.

5. OBJECTIVES

The objective of a NES Study and other NES evaluations is to evaluate nuclear explosive operations to assess the adequacy of controls to meet the NES Standards.

a. A NES Study shall be performed:

(1) For all proposed nuclear explosive operations.

(2) When determined to be necessary by the NES change control process or a NES OSR.

b. A NES OSR must be conducted at least once every 60 months, typically every 48-60 months, for all programs, processes, or activities for which a NES Study without an expiration date was approved in accordance with DOE O 452.2B.

6. NESSG PERSONNEL REQUIREMENTS

6.1 NESSG COMPOSITION

a. The objective of the nomination and approval process is to ensure an acceptable mix of NESSG members. The NESSG should collectively provide the diversity of thought, continuity, experience and group dynamics to effectively evaluate specific operations. No organization will have more than one NESSG member per review,

and no member will be assigned solely to represent an organization. The members of each NESSG will be nominated by the NESSG chair in coordination with the member's organizations and approved by the Operations Office manager.

NESSG size will be scooped to the number needed for an effective review of the topic at hand. The core NESSG is:

– One chair (responsible Operations Office for the nuclear explosive activity),

– Two senior technical advisors,

– One Sandia National Laboratories member,

– One Lawrence Livermore National Laboratory member,

– One Los Alamos National Laboratory member, and

– One Pantex Plant M&O Contractor member for NES Studies at the Pantex Plant.

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/NSSA Headquarters-
Office of Nuclear Weapons Surety

National Laboratories and Management & Operating Contractors
Lawrence Livermore National Laboratory
Los Alamos National Laboratory
Sandia National Laboratories
Pantex Plant M&O Contractor

b. NESSG members for a specific NES study or OSR should not be changed for its duration.

6.2 NESSG MEMBER QUALIFICATION REQUIREMENTS

To support the NESSG mission and desired group characteristics, individual members must qualify by technical ability, independence, and temperament. The requirements for technical background, knowledge, and independence are outlined in section 6.6 and Appendix A of this standard.

A key qualification is the ability to apply NES expertise in evaluating NEOs. NESSG members must have the ability and willingness to question and challenge the line management safety statement, line of logic, and justification for all issues with the potential to impact NES. Members must be able and willing to actively participate as part of a team and to take an unpopular stand when warranted. They also need the oral communication skills to participate effectively in deliberations and the written communication skills to clearly document findings.

Four NESSG senior technical advisors will be recruited based on their background and experience. NESSG senior technical advisors shall meet the requirements delineated in Appendix A of this standard and be certified by the AL Operations Office Manager prior to being assigned as a member of a NESSG.

6.3 TECHNICAL ADVISORS TO THE NESSG

The NESSG may use experts (non-voting participants) in specific technical disciplines to provide technical advice in their specialty as it relates to the specific nuclear explosive operation. Advisors in electrical design; one-point safety; high explosives risk assessment; environment, safety, and health; security; use control; mechanical design; and other disciplines may be required, as determined by the NESSG chairperson. Advisors should

meet the same criteria for independence as members. Advisors for a specific NES study or OSR should not be changed for its duration.

6.4 NESSG MEMBER TRAINING PROGRAM

a. Organizations providing NESSG members shall ensure all NESSG members meet the qualification requirements delineated in this standard.

b. Organizations providing NESSG members shall establish a mentoring or intern program to provide new personnel the opportunity to gain the necessary background and knowledge from experienced personnel.

c. A special orientation program shall be developed by NNSA Operations Office (Albuquerque) for NESSG senior technical advisors .

6.5 NESSG MEMBER CERTIFICATION

a. Management at NESSG member organizations will certify each of their NESSG members' abilities to participate as a productive NES study member. This certification will be based on the individual satisfying the qualification requirements delineated in this standard. Certification shall be in the form of a certification letter to the appropriate Operations Office.

b. Certification is valid for one year, and must be current for all NESSG members at the time the NESSG convenes.

c. Certifying authorities shall be designated by:

(1) DP-20.

(2) Operations Office Managers.

(3) Area Office Managers.

(4) Laboratory Directors.

(5) M&O Contractor General Managers.

6.6 NESSG MEMBER INDEPENDENCE

NESSG members shall not have current responsibility for the design, development, production, or testing of the specific nuclear explosive or operation being evaluated. Members shall not participate in the preparation of the input documentation or in the preparation or presentation of briefings. Members shall make unbiased and independent judgments regarding the nuclear explosive safety of the system, operation, or process under consideration. Members shall not have responsibility for advocacy of special interests of any organization, including their own.

7.0 NES STUDY PROCESS

7.1 PLANNING MEETING

The cognizant Operations Office shall conduct a planning meeting with the principal participants (appropriate Operations Office organizations, design agency, production agency, and Area Office, as needed). The purpose of the planning meeting is to define the scope and objectives of the NES Study; identify required input document contents; assign organizational responsibilities for input document consolidation and/or assembly; develop a schedule for input document preparation and submission; identify organizational points of contact; and plan briefings, demonstrations, and resources as required to support the study. This information shall be documented and distributed to appropriate agencies and personnel.

7.2 NESSG MEMBER AND ADVISOR PREPARATION

NESSG members and advisors are responsible for reviewing input documentation prior to commencing the study. Members and advisors shall be given sufficient time and resources to read and evaluate the input documentation, references, and applicable Master Studies prior to the start of the study. The NESSG chairperson shall schedule an input document adequacy review approximately 5-10 working days after receipt of the input document. Each member and each advisor shall provide an initial judgement of the adequacy of the input document to conduct the study. The NESSG shall document, to the preparing organizations, the need for any additional information or clarification.

After the NESSG judges the input document to be adequate, the NESSG shall coordinate with the Project Team to schedule the NES Study. Normally, the time needed to prepare for a NES Study is 15-20 working days after completion of the adequacy review. This period is for the members and advisors to perform a detailed review of the input document in preparation for the NES Study and for any additional preparation by the Project Team.

The above time frames are provided as general guidance. For specific NES studies, the time frames may differ depending on the scope and complexity of the study.

Preparation for, and conduct of, a NES Study shall be the primary responsibility of the designated NESSG members and advisors for the duration required to support a specific NES Study. Conflicts shall be resolved in favor of NESSG duties from the date the input document is scheduled to arrive until conclusion of the NES Study. However, individual technical advisors may be released early upon unanimous agreement by the NESSG members.

7.3 STUDY ELEMENTS

The following elements of nuclear explosive safety shall be considered in the NES Study, if applicable to the operation:

a. Isolation of nuclear explosives from unwanted energy sources. This includes, but is not limited to, electrical, thermal, mechanical, and chemical energy sources.

b. One-point safety, including the effect of process tooling.

c. High explosive safety.

d. Design safety features.

e. The nuclear explosive safety theme.

f. Electrical tester design and safety, including the interface between the tester and the nuclear explosive.

g. Design, safety, and use of materials, tooling, and mechanical and electrical equipment.

h. The adequacy of written procedures for the safe conduct of the operation.

i. The threat to nuclear explosive safety from human error and the presence or absence of performance shaping factors that could significantly affect human reliability in safety related aspects of the operation.

j. Potential threats to nuclear explosive safety from security operations.

k. The safety of the equipment and procedures for transporting nuclear explosives.

l. Potential threats to nuclear explosive safety from associated systems (e.g., spin or rocket motors, parachute deployment systems, use control features, and instrumentation for nuclear explosive test devices). Pathways and potential accident sequences leading to inadvertent nuclear detonation.

m. Adequacy of proposed tests and inspections to determine whether the condition of the nuclear explosive is safe to work on.

n. Other potential threats to nuclear explosive safety particular to the operation (e.g., high explosive dissolution process, command disablement tests, accelerated aging tests, and separation system tests). The adequacy of staffing, qualifications, and training for production technicians and first line management.

o. An analysis of pathways to inadvertent nuclear detonation (IND) and a vulnerability assessment.

7.4 MASTER NES STUDIES AND OPERATION-SPECIFIC NES STUDIES

There are two types of NES studies: Master and Operation-specific Studies. NES Master Studies evaluate processes, facilities, equipment and tooling, and management systems that are common to many nuclear explosive operations. Operation-specific NES Studies include the interfaces with applicable Master Studies and other studies to ensure that the three NES Standards are met. Operations Offices shall determine the scope of Master Studies appropriate for their operations. The following are examples of Master Studies:

a. Over-the-Road Transportation. Reviews of all DOE nuclear explosive offsite transportation operations. This study includes evaluation of equipment and procedures to accomplish this task and potential threats to nuclear explosive safety from the associated security operations (not security adequacy).

b. Electrical Equipment Control Program. Reviews of the design process, control, calibration, and maintenance of electrical equipment used during nuclear explosive operations.

c. Assembly, Storage, and Transportation. Reviews of the assembly and disassembly of generic nuclear explosive test devices; design, control, and maintenance of

facilities and common equipment; storage of components and assembled devices; and onsite transport of the test device.

d. Security Master Study. Reviews of security operations for potential threats to nuclear explosive safety. The NESSG does not evaluate the adequacy of security measures. Security adequacy is assessed through other processes.

e. Installation and Emplacement. Reviews of the installation of the test device in the test canister/rack and the emplacement at the test location.

f. Arming & Firing, Timing & Control. Reviews of the design process, control, calibration, operation, and maintenance of facilities and equipment used to accomplish detonation of nuclear explosive test devices.

7.5 NES STUDY INPUT DOCUMENTS

Input documentation shall include detailed information and analysis. A designated agency shall compile all input information into an integrated document and ensure delivery to the NESSG members and technical advisors. The Planning Meeting shall determine the technical information required. The following are examples of topics that should be addressed, if applicable to the specific study:

a. One-point safety analysis including a summary of test results and analysis of the interface of the nuclear explosive with process tooling, if available.

b. A description of the nuclear explosive, including non-DOE supplied components, when these components are a part of the nuclear explosive while it is in DOE custody.

c. Nuclear explosive safety theme and description of the nuclear explosive design safety features.

d. A description and process flow of the proposed nuclear explosive operation.

e. The nuclear explosive hazards assessment (e.g., NEO Hazards Analysis Report (HAR) and safety controls documentation) for the specific nuclear explosive operation.

f. Onsite and offsite transportation tie-down requirements and analysis/testing.

g. Approved specific nuclear explosive safety rules (NESRs).

h. Identification of controls and supporting rationale with analysis and/or test data, as applicable.

i. Approved immediate-action procedures (IAPs).

j. Analysis of electrical circuits in the nuclear explosive.

k. Description of electrical test equipment and interface connections.

l. Characteristics of electro-explosive devices.

m. Description of tooling and equipment.

n. Description of potential hazards associated with telemetry features/connectors.

o. Description of electromagnetic radiation/electromagnetic pulse susceptibilities.

p. Description of nuclear explosive shipping containers and description and analysis of tie-down patterns for transportation operations.

q. Description of any conditions unusual to the nuclear explosive or high explosive.

r. Safety considerations in surveillance evaluations and other inspection requirements.

s. Information from other applicable NES Study reports that may have a global application.

7.6 CONDUCTING THE NES STUDY

The NES Study process relies upon comprehensive input documentation and briefings; interaction among the NESSG, briefers, advisors, and individuals providing the demonstrations; and the NESSG deliberations to evaluate and judge the adequacy of nuclear explosive safety of the proposed operations and to determine whether the proposed operations meet the NES Standards. Based on this evaluation, the NESSG identifies any nuclear explosive safety concerns and writes appropriate findings.

Technical advisors to the NESSG contribute as consultants, sources of information, or participants in the evaluation. Technical advisors should participate in the evaluation of issues related to their expertise. NESSG members draw conclusions considering these evaluations and technical advice.

Demonstrations are often conducted to evaluate the nuclear explosive safety impacts of each operation. For a NES Study, demonstrations should be conducted in a manner that provides the most realistic simulation practicable. Demonstrations should be conducted as follows:

a. In an actual bay or cell representative of conditions under which the operations are to be conducted, or in a training facility set-up to accurately replicate the actual facility in size and layout. The actual bay or cell is the preferred option for demonstrations; however, if a representative or training facility is used, the accuracy of the replication will be verified.

b. By trained and qualified production technicians and production managers.

c. Employing actual or representative equipment, tools, tooling, and support equipment.

d. Using approved written procedures for the operation being evaluated. Procedures shall be in a condition ready for use after approval.

e. If applicable, address issues related to operations involving multiple nuclear explosives that might be collocated in the bay or cell.

7.7 NES STUDY REPORT

a. NES Study Reports shall include the NESSG conclusions and findings with supporting discussions concerning the adequacy of the controls to meet the DOE NES Standards of DOE O 452.2B. The findings shall be prepared by the NESSG members and senior technical advisors, who alone will make the final determination of their content.

b. NESSG member(s) who disagree with the majority shall submit a minority opinion to the chairperson prior to completion of the NES Study.

(1) Minority report(s) must be included in their entirety in the NESSG Report.

(2) The NESSG majority must prepare and include an evaluation of the technical merits of the minority report(s) in the NESSG Report.

(3) The Operations Office manager must address the minority report(s) in the endorsement letter to DP-20.

(4) DP-20 must comment on the actions taken regarding the minority report(s) in the approval or disapproval of the NES Study Report.

c. The NESSG members shall sign the NES Study Report. Signature represents concurrence with the NESSG conclusions and findings, unless noted in minority opinion(s). Signing the report does not imply that the signer's organization agrees with the contents. Changes made to the report after it is signed must be coordinated with the signing members.

d. The NESSG Report should contain the following information.

- Abstract
- Table of Contents
- Signature Page
- Identification of Input Documentation
- Purpose and Background (including identification of all existing NESSG reports that are applicable to the proposed nuclear explosive operation)
- Scope (a statement that defines the proposed operations evaluated by the NESSG)
- Criteria (a general statement of the criteria used to evaluate the nuclear explosive safety of the proposed operation; e.g., the NES Standards)
- Activities (a statement of the activities of the NESSG and the time and place the study was conducted)

- Summary Descriptions of the Nuclear Explosive and Studied Operations

- Findings (issues and conclusions, with supporting rationale, including any statement of applicability to other non-NES related NE activities, and summary of substantive discussions)

  – Adequacy of controls to meet the DOE NES Standards of DOE O 452.2B.
  – Applicability of Master Studies to the proposed operations.
  – Nuclear explosive safety concerns, if any.
  – Identify findings that should be closed prior to start.
  – Identify findings that may be deferred until after start.

- Minority Report(s), if any

- References (including specific publication date, revision number, etc.)

e. Appendices:

  – Appointment documentation for NESSG members and advisors
  – Participants (name, organization, and function)

8. NES OPERATIONAL SAFETY REVIEW PROCESS

8.1 PURPOSE AND OBJECTIVE

The overall purpose of a NES OSR is to provide independent validation that management systems are maintaining an adequate level of nuclear explosive safety in ongoing nuclear explosive operations.

The immediate objective is to evaluate an authorized NEO to determine whether the operation (as presented during a NES study and evolved through the change control process) continues to satisfy the three DOE NES Standards.

8.2 ADMINISTRATION

A NES OSR shall be conducted once every four to five years on all authorized nuclear explosive operations evaluated by a program-specific NES Study.

a. The NES organization is tasked to develop schedules, coordinate planning, conduct the OSRs, and report OSR results. Line organizations shall support the NES OSRs and collaborate on the OSR schedule.

b. An approved NEO may continue between OSRs unless there is evidence that undermines confidence the operation continues to satisfy the three DOE NES Standards. (Such new information is evaluated and acted upon through the change control process.)

c. The NES OSR team shall consist of individuals certified as NESSG members. The chair shall determine the specific team size and composition for each OSR. At the discretion of the chair, technical advisors may be used to support the OSR team.

d. The chair will present the NES OSR report to the Operations Office Manager. The Operations Office Manager shall forward a copy of the OSR report to DP-20 and inform DP-20 of the planned disposition of any findings and minority opinions and his decision regarding continuing NEO authorization.

e. Actions on OSR findings accepted by the Operations Office Manager shall be tracked and reported in the same manner as approved NES Study findings.

8.3 NES OSR REQUIREMENTS

a. OSR Focus.

The focus of an OSR is the adequacy of NES controls as evidenced in the written procedures, equipment design, facilities, and performance of the operations. Although the OSR team is not tasked to evaluate the adequacy of the safety basis documentation, concerns can and should be raised if identified. The OSR team serves in an advisory capacity to the authorizing official. It is tasked to identify any NES deficiencies but does not recommend specific corrective actions. A NES OSR shall reach one of the following conclusions:

- The operation continues to meet the three DOE NES Standards
- The operation continues to meet the NES Standards, but actions (post-start) should be taken to address specific NES concerns.
- The operation does not meet the NES Standards and should be suspended. Actions (pre-start) should be taken to meet the NES Standards before resuming operations.

b. OSR Team Preparation

The OSR team will review available data such as the applicable NESSG reports, actions taken on applicable NESSG findings, other approved non-trivial process changes, occurrence reports, Weapon Safety Specification (WSS), HAR, and Activity-Based Control Document (ABCD). Additionally, OSR team members should be current on the recent evolution of NES issues and apply that new knowledge to the OSR evaluation.

c. Line Management Involvement

An OSR is intended to have minimal impact on line management organizations. To that end, it will rely heavily on use of existing analyses, existing documentation, and observation of scheduled nuclear explosive operations. However, the OSR team may require line management assistance such as gathering needed documentation or presenting briefings on selected topics based on existing information. While some line management effort may be needed to prepare and present briefings to the OSR team, the content of those briefings should be existing data; generation of new data solely to support an OSR is specifically discouraged.

d. Conduct of the OSR

The OSR will center on direct observation of nuclear explosive operations. Observation of actual NEOs is essential to the OSR concept credibility.

8.4 SUPPORTING DOCUMENTATION

The following information will be made available to the OSR review team:

- The applicable NES Study Report and associated input documents.
- Applicable NES Master Study reports.
- Applicable written operating procedures.
- Documentation of non-trivial changes since the NES Study.
- Applicable occurrence reports.
- Summary of applicable surveillance and reliability testing results.
- Current Safety Basis documents.

8.5 NES OSR REPORT

The NES OSR Report includes:

- Signature Page.
- Purpose and Background (including identification of the applicable NES Study reports).
- Scope (a statement that identifies the ongoing operations evaluated by the OSR team).
- Activities (a statement of the OSR activities and the dates and places of the review).

OSR Results

- Findings, if any (NES deficiencies that require action, with supporting rationale).
- Deliberations (summary of substantive discussions that did not result in a finding).
- Overall Conclusion (as indicated in paragraph 4a above).
- Minority opinions, if any.

9. NESSG FINDINGS

a. Operations Offices shall define a process to resolve issues identified by formal NES reviews.

b. All approved findings designated as pre-start must be closed by the cognizant Operations Office prior to commencement or continuation of operations.

c. Status reports on approved NESSG findings that require actions shall be provided quarterly to DP-20.

10. DOE APPROVAL PROCESS

The NESSG chairperson shall provide the NESSG report to the Operations Office Manager for review and action. Within 60 days, the Operations Office Manager shall concur and forward the report to DP-20, or notify DP-20 of non-concurrence. The manager's endorsement letter shall contain a statement that the proposed operation meets the DOE Nuclear Explosive Safety Standards, the status and resolution plan for NESSG findings, and other appropriate recommendations the manager may have. DP-20 is the approval authority for NES Studies. Within 30 days of receipt, DP-20 shall notify the appropriate Operations Office Manager of the NESSG report approval, or the reasons for its disapproval. The Operations Office Manager is the approval authority for NES OSRs and shall provide copies of approved NES reports to DP-20.

Appendix A

NESSG Member
Qualification Requirements

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Table of Contents

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1.0 INTRODUCTION

This document specifies the core set of competencies and supporting knowledge and/or skill elements that must be met to successfully complete qualification as NESSG member and chair. Each organization should have additional requirements necessary to satisfy prior to qualifying NESSG member/chair that is specific for their site. This document also contains the requirements for certifying NESSG senior technical advisors.

1.1 Purpose

This document establishes the DOE/NNSA requirements for qualifying NESSG members, chair, and senior technical advisors. Satisfactory and documented completion of the competency requirements and the knowledge and skill evaluation elements contained in this document ensures that the NESSG members/chair possess the minimum requisite competence (as augmented by site specific requirements) to fulfill their related duties and responsibilities.

1.2 Evaluation Requirements

The competency statements and supporting knowledge and/or skill evaluation elements included in this document define the required knowledge and/or skill that an individual must possess.

The competency statements may be completed through performance demonstrations, formal training, exams, self-study, and/or previous experience, training, education, or qualification.

Each organization must establish an evaluation process to determine when the candidate has acquired the competencies outlined in this document. This evaluation process shall include specific methods to document successful completion of competency statement requirements. This may include a process for documenting equivalencies (satisfy requirements through prior education, training, qualification, or experience). The following are examples of documents that may be used for this evaluation:

- Previously completed qualification
- Documented evaluation of equivalencies
- Written examination results
- Documented oral evaluation

- Documented observation of performance (initialed evaluation element and/or signed competency statement)
- Training certificates of completion
- Professional certification certificates

1.3 Final Qualification/Certification

Final qualification shall occur after all competencies have been satisfied through the evaluation process.

1.3.1 Final qualification shall consist of:

- **Comprehensive final written examination.** A comprehensive written exam shall be administered to evaluate the candidates overall knowledge. The examination will consist of questions based on a representative sample of the competency statements from this document (and site specific requirements).
- **Oral board.** An oral board shall be conducted to assess the candidate's mastery of the NES discipline, ability to communicate, and think on their feet. The board will consist of questions based on a representative sample of the competency statements from this document (and site specific requirements). (NESSG chair only).
- **Operations Office Manager interview.**

  Following completion of the final qualification process, a senior manager designated by the applicable organization shall formally certify the individual. Certification will consist of verification that the individual has met all qualification and proficiency requirements. This certification is valid for one year and must be current at the time an NESSG chair convenes an NESSG activity.

  NESSG chair only. A final interview shall be conducted by the Operations Office Manager to ensure the candidate is ready to lead reviews and assume the duties and responsibility as NESSG chair.

1.3.2 Senior Technical Advisors. NESSG senior technical advisors will be selected from private industry, the academic community, and other government agencies and have

recognized superior technical backgrounds with varied experience in high consequence operations (qualities sought after in the selection process are provided in section 1.4). These members are added to the NESSG to provide a more diversified perspective on NES Studies. Therefore, NESSG senior technical advisors shall have distinctly different qualification requirements than other NESSG members and chair. Senior technical advisors shall be provided general orientation training on nuclear explosive operations and the NES Study process prior to assignment to an NESSG.

Following completion of this orientation training, the Operations Officer Manager, or designee, shall formally certify the senior advisors. This consists of verifying that the individual has met the qualification requirements. This certification is valid for one year and must be current at the time an NESSG activity convenes.

1.4 Background and Experience

1.4.1 The minimum education and experience for NESSG chair and members is listed below.

a. Education:

Bachelor of Science degree in engineering or a related technical discipline from an accredited college or university, or equivalent and relevant on-the-job experience. Advanced technical degrees are preferred.

b. Experience:

Must have a minimum of five years of experience in the operation, management, or oversight of high consequence operations (e.g., nuclear explosives, nuclear reactors, etc.).

1.4.2 The following are the types of qualities sought in selecting NESSG senior technical advisors:

- Recognized senior-level scientist or engineer with broad technical and managerial experience.
- Expert knowledge of relevant technical disciplines, such as seismic phenomena, lightning, high explosives, or electrical engineering.
- Experience with the review, approval, operation, and management of high-consequence production, manufacturing, and/or power plant operations.

- Demonstrated active participation and value-added participation 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/or academic communities.

1.5 Continuing Training and Proficiency Requirements

NESSG chairmen and members shall maintain proficiency through a continuing training program that includes the following elements:

a. Members – Participate in at least one NESSG activity every two years as an NESSG member.

Chair – Lead at least one NESSG activity every two years as the NESSG chair.

b. Participate in informal annual NES training to cover new technical information, NES issues, lessons learned, weapon updates, and other selected refresher topics.

c. Complete a minimum of 24 hours annually of relevant technical classroom training.

The annual certification letter shall document successful completion of the above continuing training requirements in order to designate that NESSG members/chair remain proficient. For individuals unable to satisfy these requirements, a tailored requalification process shall be established.

2.0 COMPETENCIES

The following establishes the minimum core set of competencies and supporting knowledge and/or skill elements for NESSG members and chair. Those competencies applicable only to NESSG chair are annotated as appropriate.

2.1 NES Program

2.1.1 The candidate must have the ability to identify potential threats to nuclear explosive safety and evaluate the adequacy of controls to assure nuclear explosive safety. The candidate shall be able to:

a. Evaluate nuclear detonation safety design and configuration during nuclear explosive operations including:

- Isolation:
  - Identify when barriers are breached during assembly/disassembly.
  - Identify when strong links are absent or potentially bypassed.
- Incompatibility:
  - Identify available energy sources and their effects on nuclear explosive components.
  - Identify available signals that could drive a unique signal discriminator.
- Inoperability:
  - Identify defined weak links in various nuclear explosives.
  - Describe the features and safety role of the weak link(s).

b. Evaluate the NES contributions of the design safety features of a nuclear explosive.

c. Evaluate electrical tester designs, safety analyses, and tester/nuclear explosive interfaces.

d. Evaluate special tooling and written procedures used for nuclear explosive operations.

e. Evaluate facilities and associated equipment used for nuclear explosive operations.

f. Review and understand the significance of NES Study Input Documents, including, for example, the Safety Analysis Report (SAR), HAR, Fire Hazards Analysis (FHA), Safety Evaluation Report (SER). Evaluate the associated:

- Hazard analyses
- Accident analyses
- Identification of safety-class and safety-significant structures, systems, components
- Derivation of Technical Safety Requirements (TSRs), Operational Safety Controls, and NESRs.

g. Evaluate the safety analyses of nuclear explosive pre-arming, arming, timing, and firing systems and procedures.

h. Analyze security operations for potential threats to NES.

i. Evaluate the on-site and off-site transportation of nuclear explosives.

j. Evaluate analyses of nuclear detonation responses of nuclear explosives to an abnormal environment.

2.1.2 The candidate must have knowledge of the fission process. The candidate shall be able to:

a. Define the following terms:

- Excitation energy
- Critical energy
- Fissile material
- Fissionable material
- Fertile material

b. Describe the curve of binding energy per nucleon vs. mass number and give a qualitative description of the reasons for its shape.

c. Explain why only the heaviest nuclei are easily fissioned.

d. Explain why uranium-235 fissions with thermal neutrons, and uranium-238 fissions only with fast neutrons.

e. Discuss the following processes and their application in nuclear explosive design:

- Nuclear fission
- Nuclear fusion

f. Define the term “fissile materials” and give examples applicable to nuclear explosive design.

g. Describe the effects of each of the following on critical mass:

- Reflectors
- Absorbers
- Moderators
- Stray neutrons
- Geometry
- Poisons
- Enrichment

2.1.3 The candidate must have knowledge of the various types of radiation interaction with matter. The candidate shall be able to:

a. Describe the interactions of the following with matter:

- Alpha particle
- Beta particle
- Positron
- Neutron

b. Describe the following ways that gamma radiation interacts with matter:

- Compton scattering
- Photoelectric effect
- Pair production

2.1.4 The candidate must have knowledge of the internal design of a nuclear explosive. The candidate shall be able to:

a. Discuss the function, purpose, and design of the following systems and components:

- Arming

- Fusing
- Firing
- High explosives
- Fusionable material
- Fissile material – primary and secondary
- Detonators
- Boosting device
- Neutron generators (zippers)
- Ancillary hazardous systems

b. Describe the nuclear explosive use control features with respect to the following:

- Personnel
- Electronics
- Mechanics/required signals - PAL (permissive action link)

c. State and discuss the nuclear weapon design safety criteria from DOE O 452.1B, Nuclear Explosive and Weapon Surety Program, including:

- Normal environment
- Abnormal environment
- One-point safety
- Dispersal safety

d. Discuss nuclear detonation safety design principles and describe nuclear explosive components/features that have been employed to provide isolation, inoperability, and incompatibility, including:

- Barriers
- Weak links
- Strong links
- Unique signals

e. Discuss the role of independence and first principles in the implementation of the nuclear detonation safety design principles (safety theme).

f. Describe nuclear explosive design features that have been employed to prevent/mitigate fissile material dispersal including:

- Insensitive high explosives (IHE)
- Fire resistant pits

2.1.5 The candidate must have knowledge of high explosives and their applicability in nuclear explosives. The candidate shall be able to:

a. Define the following terms:

- Conventional high explosives (CHE)
- IHE
- One point detonation

b. Discuss the difference between IHE and CHE used in nuclear explosives.

c. Describe the function of primary and secondary explosives in nuclear explosive design.

d. Define and compare the effects of the following interrelated high explosive terms that apply to nuclear explosive design:

- Detonations
- Violent reactions
- Deflagration
- Combustion

e. Describe the response of high explosives used in nuclear explosive design to the following external stimuli:

- Mechanical
- Electrical
- Thermal

f. Discuss the effects of aging on the high explosive materials used in nuclear explosive design.

2.1.6 The candidate must have a knowledge of the failure modes and effects of weapon components. The candidate shall be able to:

a. Understand front door and back door pathways to nuclear detonation.

b. Understand the effects of component aging on failure modes, thresholds and effects.

c. Understand how component failure modes and/or external insults can combine to realize pathways to nuclear detonation.

2.1.7 The candidate must have knowledge of the effects of abnormal environments on nuclear explosives. The candidate shall be able to:

a. Define the term "abnormal environment."

b. List the categories of credible abnormal environments specific to nuclear explosive operations and storage, and describe the characteristics of each.

2.1.8 The candidate must have knowledge of the following documents related to the master tester list:

a. Interagency Engineering Procedure, EP401075/A, Electrical Testers for Use with Nuclear Explosives at DOE facilities.

b. DG 10001, Design Guide, Electrical Testers for Use with Nuclear Explosives.

(The candidate shall be able to discuss the purpose and scope of the listed documents.)

2.1.9 The candidate must have knowledge to evaluate requests for approval of changes/modifications to a nuclear explosive operation. The candidate shall be able to:

a. Evaluate requests for changes to a nuclear explosive operation.

b. List the various approval levels for changes.

c. Describe the NES Change Evaluation Process.

2.1.10 The candidate must have knowledge of the following documents:

- DOE O 452.2B, Safety of Nuclear Explosives Operations
- DOE O 452.1B, Nuclear Explosive and Weapons Surety Program

The candidate shall be able to:

a. Discuss the purpose and scope of the listed documents.

b. Discuss this position's roles and responsibilities regarding implementation of and compliance with the listed documents. Be able to define the following terms:

- High Explosive Deflagration
- High Explosive Detonation
- Nuclear Detonation
- Nuclear Explosive
- Nuclear Explosive Area
- Nuclear Explosive Operation
- Nuclear Explosive Safety
- Nuclear Explosive Safety Study
- Nuclear Weapon
- Personnel Assurance Program
- Surety
- Use Control

c. Discuss the purpose of the two-person concept and requirements as specified in DOE O 452.2B.

d. Discuss the general nuclear explosive safety rules established for all Department nuclear explosive operations.

2.1.11 The candidate must have knowledge of the concepts of SS-21 as contained in TBP-901. The candidate shall be able to explain why the following are needed to ensure the safe conduct of nuclear explosive operations and associated activities:

a. Strict adherence to weapon-specific nuclear explosive safety rules and nuclear explosive safety standards.

b. Seamless interface with environment, safety, and health initiatives within facilities utilized to conduct nuclear explosive operations.

d. Assurance of a Fail-Safe Design of nuclear explosive tooling and ergonomic nuclear explosive assembly process.

e. Comprehensive tracking of procedural and design modifications to the accepted nuclear explosive design, and significant incidents identified during a nuclear explosive operation.

2.1.12 The candidate must have a knowledge of human reliability analysis and human performance shaping factors that affect the safety. The candidate shall be able to:

a. Understand how the design of tooling and the person-machine interface can affect the kind and frequency of possible human errors.

b. Understand how the work environment affects human reliability.

c. Understand how staffing, team structure/dynamics, communications, and personnel qualifications affect human reliability.

d. Understand how the style of documentation and use of procedures affects human reliability.

e. Understand how training can affect human reliability.

f. Understand how management, organization, and workplace attitudes can affect human reliability.

2.1.13 The candidate must have knowledge of DOE Nuclear Explosive Safety Standards in DOE O 452.2B, Safety of Nuclear Explosive Operations. The candidate shall be able to:

a. Discuss what the focus of NES Standards is.

b. Discuss the three NES standards that all NEOs must meet as stated in DOE O 452.2B.

2.1.14 The candidate must have knowledge of DOE Nuclear Explosive-Like Assembly (NELA) requirements. The candidate shall be able to:

a. Discuss the difference between a nuclear explosive assembly and a NELA.

b. Discuss the NELA standards and specific NELA requirements stated in DOE O 452.2B.

2.1.15 The candidate must have knowledge of the general and specific NESRs. The candidate shall be able to:

a. State the approval authority for exemptions from the DOE General (NESRs).

b. Define the term “nuclear explosive safety rules.”

c. Discuss the different types of NESRs (DOE General, Ops Office General, Specific) and examples of each.

d. Discuss the site limitations for NEOs not known to be one-point safe.

2.1.16 The candidate must have knowledge of NES principles and technologies. The candidate shall be able to:

a. Describe the purpose and methods of isolating nuclear explosives from the facilities in which nuclear explosive operations are performed.

b. Describe the impact of nuclear explosive design safety features during the various stages of assembly/disassembly.

c. Identify circumstances that could result in unintended nuclear detonation, or high explosive detonation/deflagration in a nuclear explosive area.

2.1.17 The candidate must have knowledge of PAP described in 10 CFR 711. The candidate shall be able to:

a. Discuss the following terms as they relate to PAP:

- Nuclear explosive duty.
- PAP certification.
- Temporary removal.
- Due process.

b. Discuss the relationship between PAP certification and other job qualification requirements.

c. Identify the prerequisites for PAP certification and describe the PAP certification process.

d. Discuss the responsibilities of PAP-certified personnel and their supervisors.

e. Describe the approval process and the notification process for the immediate temporary removal and permanent removal from the PAP.

2.1.18 The candidate must have knowledge of the NES study and NES OSR processes. The candidate shall be able to:

a. Describe the organization requirements for a NESSG.

b. Describe the scope of the NESSG responsibilities.

c. Explain the functions of an NES study and NES OSR.

d. Discuss the requirements for conducting a NES study and NES OSR.

e. Provide examples of situations that would require a NES study and NES OSR.

f. Describe the approval level requirements for a NES study and a NES OSR.

g. Explain the relationship between a master study and an operation-specific study.

2.1.19 The candidate must have knowledge of the control of electrical equipment used in a nuclear explosive area (NEA). The candidate shall be able to:

a. Discuss the various types of electrical equipment that may be present in a NEA and the controls placed on them.

b. Discuss the approval process for Master Tester List (MTL) testers and Master Equipment List (MEL) equipment used at the Pantex Plant.

2.1.20 The candidate must have knowledge of tooling, testers, rigging, and hoisting equipment used for handling nuclear explosives. The candidate shall be able to:

a. Explain how the design of each of the following is important in minimizing or eliminating the potential for mishandling nuclear explosives and preventing accidents:

- Tooling
- Testers
- Rigging equipment
- Hoisting equipment

b. Read and interpret design drawings and technical specifications for the tooling, testers, rigging, and hoisting equipment used in handling nuclear explosives.

c. Explain the importance of proper certification of slings and hoisting equipment used in handling nuclear explosives.

d. Explain the importance of proper certification of testers used in NEOs.

2.1.21 The candidate must have knowledge of DOE-STD-3015-2001, *Nuclear Explosive Safety Study Process*. The candidate shall be able to:

a. Discuss the purpose and scope of this standard.

b. Discuss member and advisor's roles and responsibilities regarding compliance with this standard.

2.1.22 The candidate must have knowledge of the requirements for the safe offsite and onsite transportation of nuclear explosives. The candidate shall be able to:

a. Discuss the scope and content of the applicable NES master studies that address over-the-road transportation and on-site transportation of nuclear explosives.

b. Describe hazards associated with the design and construction of vehicles authorized to transport nuclear explosives and the positive measures to control hazards.

c. Discuss the tie-down requirements for nuclear explosives during offsite and onsite transportation.

2.2 Associated Technical Areas

2.2.1 The candidate must have knowledge of the radiological and equipment hazards associated with nuclear explosives and their potential impact on NES. The candidate shall be able to:

a. Discuss the radiological characteristics and related hazards from the following materials used in nuclear explosives/weapons:

- Uranium
- Plutonium
- Tritium

b. Identify the hazards from each of the following features of nuclear explosive design:

- Spin rockets
- Retarding devices
- Pre-flight controllers
- Boosting device

2.2.2 The candidate must have knowledge of DOE Order 5480.21, Unreviewed Safety Questions, with respect to its impact on NEOs and associated activities and facilities. The candidate shall be able to:

a. Discuss the reasons for performing an Unreviewed Safety Question (USQ) determination.

b. Define the following terms:

- Accident analyses
- Safety evaluation
- TSRs

c. Describe the situations for which a safety evaluation is required to be performed.

d. Define the conditions for a USQ.

e. Discuss the actions to be taken if it is determined that a USQ is involved.

f. Discuss the relationship of the USQ process to the NES Change Evaluation Process.

g. Use of controlling DOE guidance, such as:

- DOE-STD-1104-96, *Review and Approval of Nonreactor Nuclear Facility Safety Analysis Reports.*
- DOE-STD-3009-94, *Preparation Guide for U.S. DOE Nonreactor Nuclear Facility Safety Analysis Reports.*
- DOE-DP-STD-3016-99, *Hazard Analysis Reports for Nuclear Explosive Operations.*

2.2.3 The candidate must have knowledge of the Technical Safety Requirements (TSRs) as described in DOE Order 5480.22, Technical Safety Requirements, with respect to its impact on NEOs and associated activities and facilities. The candidate shall be able to:

a. Discuss the purpose of TSRs.

b. Define the following terms and discuss the purpose of each:

- Safety limit.
- Limiting control settings.
- Limiting conditions for operation.
- Surveillance requirements.

c. Discuss the conditions that constitute a violation of the TSRs.

d. Discuss the requirements for administrative control of the TSRs.

e. Discuss the possible source documents that may be used in developing TSRs.

2.2.4 The candidate must have knowledge of safety analysis techniques and their application to NEOs, facilities, and associated activities. The candidate shall be able to:

a. Describe the following hazard evaluation techniques and the types of results they produce:

- Checklist analysis
- Preliminary hazard analysis
- What-if analysis
- Hazard and operability analysis
- Failure modes and effects analysis
- Fault tree analysis
- Event tree analysis
- Human reliability analysis

b. Describe the bases upon which to judge the adequacy of a hazard evaluation including:

- Thoroughness of hazard identification
- Rigor of analysis versus complexity of operation and potential consequences of accidents
- Conservatism of assumptions
- Applicability of data
- Consistency and control of expert elicitation process
- Validity and conservatism of scenario screening criteria
- Reflection of lack of knowledge in uncertainty estimates

2.2.5 The candidate must have knowledge of DOE Order 5480.23, Nuclear Safety Analysis Reports, with respect to its impact on Department nuclear safety. The candidate shall be able to:

a. Discuss the four basic purposes and objectives of nuclear SAR identified in DOE Order 5480.23.

b. Describe the responsibilities of contractors authorized to operate defense nuclear facilities for the development and maintenance of a nuclear SAR.

c. Define the following terms and discuss the purpose of each:

- Design basis.
- Engineer safety features.
- Safety analysis.

d. Describe the requirements for the scope and content of a nuclear SAR and discuss the general content of each of the required sections of the report.

2.2.6 The candidate must have knowledge of DOE M440.1-1, DOE Explosive Safety Manual. The candidate shall be able to:

a. Discuss the purpose and scope of the manual.

b. Discuss the applicability of the requirements in the manual to nuclear explosive operations.

2.2.7 The candidate must have knowledge of DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities, necessary to ensure implementation. The candidate shall be able to:

a. Discuss the purpose and major sections of DOE Order 5480.19.

b. Referring to DOE Order 5480.19 and its attachments, describe the methods of measuring performance.

c. Discuss the concept of graded approach and how it applies to the implementation of conduct of operations.

d. Discuss 10 CFR 830 and its relationship to the Price-Anderson Act.

e. Explain the role of lessons learned to operations and sources for identifying lessons learned and industry experience.

2.2.8 The candidate must have knowledge of fire protection systems and their effects on nuclear explosive safety. The candidate shall be able to:

a. List the various types of fire protection systems that service NEAs and describe the effects of their use on the safety of NEOs and associated activities.

b. Discuss the provisions contained in joint DOE/DoD Technical Publication 20-11, General Fire Fighting Guidance, and apply each to a fire situation involving nuclear explosives in DOE custody.

2.2.9 The candidate must have knowledge of facility system interfaces and their potential effects on nuclear explosives. The candidate shall be able to:

a. Identify the facility systems which may interface with a nuclear explosive.

b. Describe the hazards presented to the safety of NEOs and associated activities by the introduction of electrical energy sources, or equipment using any electrical source, into a NEA.

c. Describe the controls and design measures to prevent or limit the introduction of electrical energy into a NEA.

2.2.10 The candidate must have knowledge of the requirements for protection, security, and control of nuclear explosives and nuclear weapons as described in DOE O 452.4, Security and Control of Nuclear Explosives and Nuclear Weapons. The candidate shall be able to:

a. Discuss the objectives of DOE O 452.4.

b. Discuss the relationship between NES and deliberate unauthorized use (DUU) measures.

2.3 General

2.3.1 The candidate must be proficient in technical communications. The candidate shall be able to:

a. Demonstrate proficiency in written communication, including business and technical writing.

b. Demonstrate proficiency in oral communications, including briefings, one-on-one presentations, and formal presentations.

c. Demonstrate knowledge of interpersonal communications necessary to effectively communicate verbally and nonverbally with DOE management, DOE technical personnel, and all levels of contractor personnel.

2.3.2 (Chair only) The candidate must have knowledge of DOE M140.1-1A, Interface with Defense Nuclear Facilities Safety Board. The candidate shall be able to:

a. Discuss the scope and purpose of this manual.

b. Discuss this positions role and responsibilities regarding this manual.

2.3.3 (Chair only) The candidate must have knowledge of problem-solving and decision-making techniques, and the ability to manage activities ensuring that organizational issues are resolved and closed-out in a timely manner. The candidate shall be able to:

a. Identify and discuss the various problem analysis techniques used in the Department.
b. Define the term "root cause" and explain the significance of the term to the safe management of nuclear facilities.
c. Describe the elements of an effective issue management system.
d. Discuss the importance of issues management to safety, quality, and productivity.
e. Discuss the necessary considerations that must be addressed when developing a corrective action.
f. Given the data for an event, determine the root cause and develop corrective actions. Compare the results with that of the originator and discuss any differences.

2.4 Performance Requirements

2.4.1 (Chair only) The candidate must participate in a minimum of two NESSG activities as an NESSG chair-in-training in the three years preceding initial qualification to the requirements in this document. This shall be accomplished as follows:

a. Involvement in all phases of the NESSG activity in order to understand the review process and role of the NESSG chair. These phases include: planning meetings, member selection, Adequacy Review, briefings, demonstrations, deliberations, report writing, management briefings, report coordination, and report production process.
b. The candidate is expected to be actively involved in the above phases in order to demonstrate a clear understanding of the roles and responsibilities of a NESSG chair. This active involvement includes reviewing input documentation, questioning briefers, identifying potential safety concerns, engaging in deliberations, drafting findings, and assisting with report coordination and production.
c. For a minimum of one of the required NESSG activities, the candidate shall participate as an NESSG chair under instruction (UI). NESSG chair UI shall

perform duties as a chair under the direction of a certified chair. This participation shall include all phases of the NESSG activity listed above necessary to demonstrate a clear understanding of and ability to carry out the roles and responsibilities of an NESSG chair. This activity shall occur after successful involvement described in paragraphs 2.4.1 a. and b.

d. During the activity described in c (above), the candidate shall lead the NESSG activity under the guidance and direction of the certified NESSG chair. The NESSG chair shall provide feedback to the candidate regarding performance and, if appropriate, document successful completion of this requirement.

e. NESSG chair-in-training shall not sign NESSG reports. The certified chair acting as a mentor during these activities retains all responsibilities, including signing the report.

2.4.2 (NESSG member only) The candidate must participate in a minimum of two NESSG activities in the three years immediately preceding final qualification to the requirements in this document. This shall be accomplished as follows:

a. Involvement in all phases of the NESSG activity in order to understand the review process and role of the NESSG member. These phases include: Adequacy Review, briefings, demonstrations, deliberations, and report writing.

b. For a minimum of one of the required NESSG activities, the candidate shall participate as an NESSG member-in-training. As a member-in-training, the candidate is expected to be actively involved in the above phases in order to demonstrate a clear understanding of the roles and responsibilities of a NESSG member. This active involvement includes reviewing input documentation, questioning briefers, identifying potential safety concerns, engaging in deliberations, and writing issues, such as:

- Demonstrate proficiency at identifying areas for further inquiry following review of NESS input documentation.
- Demonstrate proficiency in questioning briefers during NESSG presentations, including following up open issues to reach closure.
- Demonstrate proficiency in engaging in deliberations with other NESSG members and reaching consensus.
- Demonstrate proficiency in writing issues for inclusion in the NESS final report.

- The candidate shall be under the guidance and direction of the certified NESSG member from the candidate's organization. The certified NESSG member and NESSG chair shall provide feedback to the candidate regarding performance. If appropriate, the NESSG chair will document successful completion of this requirement.

c. NESSG member-in-training shall not sign NESSG reports.

CONCLUDING MATERIAL

Review Activity:

DOE	Field Offices
DP	Albuquerque Operations Office
EH	Amarillo Area Office
EM	Kirtland Area Office
NE	Los Alamos Area Office
NN	Nevada Operations Office
	Oakland Operations Office

National Laboratories
LANL
LLNL
SNL

Preparing Activity:
DOE-DP-21

Project Number:
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U.S. Department of Energy

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