DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY CRANE
300 HIGHWAY 361
CRANE IN 47522-5001

NSACRANEINST 8020.1E
N35
2 Jul 2019

NAVSUPPACT CRANE INSTRUCTION 8020.1E

From: Commanding Officer, Naval Support Activity Crane

Subj: EXPLOSIVES SAFETY PROGRAM AT NAVAL SUPPORT ACTIVITY CRANE

Ref: (a) DoDI 4000.19, Interservice and Intragovernmental Support
(b) DESR 6055.9 Defense Explosives Safety Regulation
(c) NAVSEA OP 5 Volume 1, Ammunition and Explosives Safety Ashore
(d) NOSSAINST 8020.14F Navy Shore Station Explosives Safety Compliance Program

Encl: (1) Explosives Safety Program at Naval Support Activity Crane

1. Purpose. To provide the host requirements for explosives safety in accordance with references (a) through (d).

2. Cancellation. NSACRANEINST 8020.1D.

3. Scope and Applicability. This instruction applies to Naval Support Activity Crane (NSA Crane), all tenants, and visitors. (Note: Each chapter provides specific program scope.)

4. Records Management. Records created as a result of this instruction, regardless of media and format, must be managed per Secretary of the Navy manual 5210.0 of January 2012.

5. Review and Effective Date. Per OPNAVINST 5215.17A, the NSA Crane Explosive Safety Department will review this instruction annually around the anniversary of its issuance date to ensure applicability, currency, and consistency with Federal, Department of Defense, Secretary of the Navy, and Navy policy and statutory authority using OPNAV 5215/40 Review of Instruction. This instruction will be in effect for 10 years, unless revised or cancelled in the interim, and will be reissued by the 10-year anniversary date if it is still required, unless it meets one of the exceptions in OPNAVINST 5215.17A, paragraph 9. Otherwise, if the instruction is no longer required, it will be processed for cancellation as soon as the need for cancellation is known following the guidance in OPNAV Manual 5215.1 of May 2016.

6. Forms. DD Form 1348-1A Disposal Turn-in-Document listed in Chapter 7 is available for download via http://www.esd.whs.mil/Directives/forms/.

T. J. POWERS

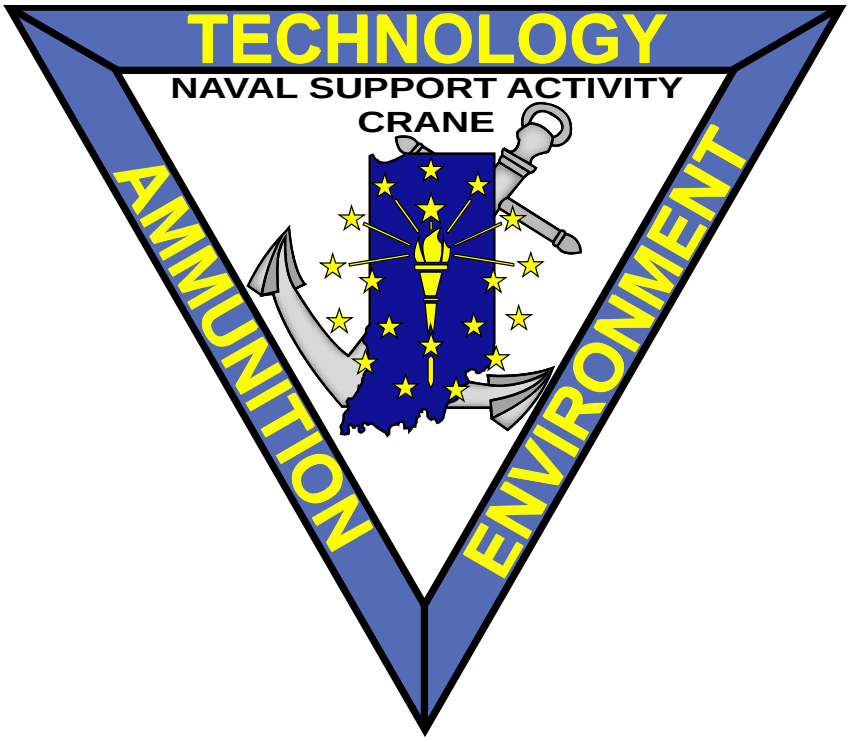
Releasability and distribution:
This instruction is cleared for public release and is available electronically only via NSA Crane G2 site, https://g2.cnic.navy.mil/NSACRANEIN/SitePages/Home.aspx.

THIS PAGE

INTENTIONALLY

LEFT BLANK

NAVAL SUPPORT ACTIVITY CRANE



EXPLOSIVES SAFETY MANAGEMENT PROGRAM

THIS PAGE

INTENTIONALLY

LEFT BLANK

TABLE OF CONTENTS

THIS PAGE

INTENTIONALLY

LEFT BLANK

CHAPTER 1
EXPLOSIVES SAFETY MANAGEMENT PROGRAM

1. References

a. DESR 6055.09 Edition 1 of 13 January 2019, DoD Ammunition and Explosives Safety Standards

b. DoD Instruction 4000.19 of 25 April 2013, Support Agreements

c. OPNAVINST 8020.14A, Department of the Navy Explosives Safety Management Policy Manual

d. NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore

e. DA PAM 385-64 of 24 May 2011, Ammunition and Explosives Safety Standards

f. NOSSAINST 8020.14F, Navy Shore Station Explosives Safety Compliance Program

g. Memorandum of Understanding (CNRMA/NSWC Crane) of 13 October 2015, Joint Explosives Safety Management Onboard Naval Support Activity Crane

2. Purpose. To provide the host requirements for explosives safety per references (a) through (f). Reference (g) and Inter-Service Support Agreements (ISSAs) will identify explosives safety programs that are the responsibility of the host and tenants.

3. Scope and Applicability. This chapter applies to Naval Support Activity Crane (NSA Crane) and all tenants.

4. Discussion. This chapter identifies responsibilities and provides the process for establishing and maintaining host Explosives Safety Management Program (ESMP) as required by reference (a) and assessing compliance to the policy per references (c), (d), and (f). In addition, it identifies the Explosives Safety Self-Assessment (ESSA) Program.

5. Definitions

a. Explosives Safety Management. A cost effective risk management process, including policies, procedures, standards, engineering, and resources that addresses potential probabilities and consequences of mishaps involving Department of Defense (DoD) military munitions or other encumbering explosives or munitions, to sustain operational capabilities and readiness and to protect people, property, and the environment.

b. Explosives Safety Self-Assessment (ESSA). Formal plans that enable the activity to conduct continual periodic assessments of safety and compliance appraisals in support of the command's explosives operations as well as the programs and processes that maintain a safe operational environment.

c. Explosives Safety Steering Group (ESSG). The ESSG serves as the Technical Authority for administration and development of host ESMP policy in concert with DoD requirements and amplifying Department of the Navy (DON) and Department of the Army policy.

6. Policy

a. Explosives Safety Programs that are the responsibilities of the host and the tenants are delineated in reference (g). Host programs require either program administration or program oversight by NSA Crane. (Note: Host oversight is necessary when the actions of one organization can affect the operations and safety of another organization.)

b. Crane's Joint ESMP identified by reference (g) is developed, implemented, managed, and assessed by the Explosives Safety Steering Group (ESSG). The ESSG ensures compliance with references (d), (e), and (f).

c. Host ESMP policy will be presented to applicable Crane organizations for review.

d. Reference (g) and Inter-service and ISSAs will reflect host ESMP policy. (Note: It is expected that policy and requirements will be effectively defined in reference (g), instructions, and ISSAs).

e. The ESSA program will emphasize the importance of maintaining a well-disciplined, proactive approach to explosives safety by applying the precepts of Operational Risk Management (ORM). Additionally, the ESSA program will promote the highest standards of Ammunition and Explosives (A&E) safety, integrity, and compliance and is a catalyst for creating and maintaining an operating environment that fosters concerted joint inter-service action in accomplishing safety-related goals at NSA Crane.

f. ESSAs will be conducted to evaluate the status of the 10 Explosives Safety Programs per reference (f). Crane Army Ammunition Activity (CAAA) will conduct assessments per Army policy and will participate in applicable host ESSA programs as appropriate.

g. Reference (f) requires the Explosives Safety Officer (ESO) to inform the Commanding Officer (CO) of the results of the annual ESSA associated findings and to keep the CO informed throughout the year on the progress made correcting the ESSA findings. A memorandum from the ESO documenting the meeting minutes from the quarterly ESSG meeting serves as the ESSA Program update to the CO. The update is provided to enhance the CO's awareness of the health of the ESMP at NSA Crane.

h. The ESO of Naval Surface Warfare Center, Crane Division (NSWC Crane), will serve as the ESO for NSA Crane and other Navy tenant activities.

i. The CAAA Chief, Safety Office, will serve as the Explosives Safety Manager for CAAA. The CAAA Commander is responsible for explosives safety within CAAA operations.

7. Responsibilities

a. Installation Commanding Officer (ICO). The ICO is ultimately responsbile for overall safety for the installation. ICO will:

(1) Appoint an ESO in writing, and if desired, an Assistant ESO (AESO) who will act as the ESO when the ESO is not present.

(2) Ensure that the Explosives Safety Program is effectivly implemented.

(3) Maintain a Memoradum of Understanding (MOU) that reflects the explosives safety roles and responbilities between the host and teanants that conduct explosive operations.

(4) Review results and risk assessments identified during the ESSA via quarterly ESSG meeting minutes provided by the ESO.

(5) Acknowledge concurrence of ESSA results and risk assessments by signing the CO Acknowledgement Block provided on the ESSG meeting minutes memorandum.

b. Heads of Tenant Activies will:

(1) Appoint an ESO in writing, and if desired, an Assistant ESO (AESO) who will act as the ESO when the ESO is not present.

(2) Ensure the requirements of this instruction and reference (d) are implemeneted, adhered to, and enforced within their respective orginizations.

(3) Promote hazard awareness and ORM of all processes involving A&E within their orginizations.

(4) Maintain a culture of Explosives Safety within their organization.

c. Host ESO. The host ESO is organizationally assigned to Naval Surface Warfare Center Crane Division, Infrastructure Division, Safety Branch. The ESO will manage the ESMP and provide reasoned and informed advice to the ICO regarding compliance with the exisiting Navy A&E safety standards and acceptable levels of risk with regard to explosive operations. The ESO is vested with the authority to act for the ICO in matters related to Explosives Safety and is to execute duties in accordnace with reference (d). Specific duties and responsbilities include but are not limited to, ESO will:

(1) Report to and have direct access to the ICO.

(2) Act as the ESO for all orginzations that are conducting A&E operations on NSA Crane, less CAAA.

(3) Conduct periodic safety inspections of A&E magazines, storage areas, operating buildings and ranges and provide reports to the ICO for his situational awareness and acknowledgement.

(4) Coordinate the submission of installation Explosives Safety Deviations to the appropriate approval authorites and maintain a file of all approvals.

(5) Chair the ESSG, submit meeting minutes to the ICO as required for acknowledgement, and maintain a file of meeting minutes.

(6) Schedule and conduct ESSG meetings.

(7) Accomplish the following for Explosives Safety Inspections (ESI):

(a) Serve as the Crane point of contact (POC) for liaison with the ESI Team Leader.

(b) Prepare and provide the ESI Information Book to the ESI Team Leader per reference (f).

(c) Prepare and submit the ESI Corrective Action Plan (CAP) electronically via the NOSSA Explosives Safety Compliance System (ESCS) within 45 calendar days from the date of the signed final ESI report, and 90-day CAP updates per reference (f).

(8) Maintain the individual ESSA deficiency/improvement actions. ESSA deficiencies will be entered into and tracked in Enterprise Safety Applications Management System (ESAMS). The Explosives Safety Office will enter all ESSA deficiencies into ESAMS. Systemic ESSA deficiencies will be tracked via the ESSG. Review Corrective Action Plans and Root Cause Analysis for findings identified during the ESSA.

(9) Provide ESSG meeting minutes via memorandum to the ICO. The minutes will identify current ESSA and ESI findings, their status, and action. The memorandum will include the ESAMS Deficiency Report for the current ESSA that identifies the Hazard, Severity, Probability, and Risk Acceptance Code (RAC) required by reference (f).

(10) Provide scheduling, execution plan, and team construct for the ESSA.

(11) Provide ESSG quarterly agenda and ESSA updates to the ICO and members of the ESSG prior to the quarterly meeting.

(12) Maintain ESSA Program checklists. ESSA Program Checklists will be the current Navy ESI Program Evaluation Guides from the Naval Ordnance Safety and Security Activity (NOSSA) website that has been customized by the Explosives Safety Office to include local instruction or directive specific questions.

(13) Maintain Regional Explosives Safety Review Board (RESRB) reports, ESI CAPs, and ESSA associated records for at least four years (two ESI cycles), per reference (f).

d. Supervisory Personnel. Supervisors at all levels must be thoroughly familiar with the provisions of this publication and applicable instructions. They must act positively to eliminate any potential accident-hazards that exist in operations under their jurisdiction. Supervisors have

no authority to waive or alter OPNAV/MCO, NAVSEASYSCOM, or station safety regulations, nor will they permit violation of these regulations by others. Each supervisor will:

(1) Ensure that all processes are conducted per a command-approved Standard Operating Procedure (SOP).

(2) Explain to all employees under their immediate supervision the standard safety regulations and precautions that they must follow and enforce. Explain the characteristics of the ammunition, explosives, or other hazardous materials involved as well as the selection, use, and care of the necessary tools, materials, protective equipment and handling equipment.

(3) Ensure that all employees are qualified and certified to perform the job assigned and that their certification is current. Report promptly to the immediate superior all employees who, in their opinion, are not qualified for their assigned work.

(4) Determine the specific hazards involved and assuring that the appropriate instruction and documents (explosives safety technical manuals, pamphlets, etc.) are available. Assure that the SOPs relate directly to the ordnance and to the proposed operations.

(5) Assist the command ESO in conducting investigations and preparing the reports of all accidents involving operations, equipment, or personnel under their supervision.

(6) Identify all persons who are entering or approaching the area in their charge and determining their authority to enter and remain in the area. Exercise the authority to evict any person whose presence or actions, in their opinion, are detrimental to safety.

(7) Enforce personnel and explosives limits for their facility. Cease operations if their limits are exceeded and take corrective action to rectify the situations.

(8) Permit the use of only those tools and handling equipment that are authorized for the operations and used in the manner specified by SOPs or NAVSEA Technical Manuals.

(9) Maintain cleanliness of the operating or magazine area. Maintain all safeguards and preventing the blocking of safety exits, aisles, and accesses to firefighting equipment.

(10) Prior to securing operations for the day, ascertain that all conditions in the cognizant areas comply with orders relating to operations shutdown or completion. When the operation is not relieved by an incoming shift, making certain that windows and doors are closed and locked, that interior lights and processing equipment are turned off and that red flags have been removed or taken down at the end of the shift. When their operation is relieved by an incoming shift or for any other reason, report to the relief any situation that requires immediate attention or that should be kept under observation.

(11) Enforce compliance with safety regulations that concern personal protective clothing and equipment (PPE). Inspect and maintain, or replace if necessary, PPE required for the safe performance of the work for which the person is responsible.

(12) Contact the Explosives Safety Office with any requests, suggestions, or comments they may have about safety standards.

(13) Alert their immediate supervisor of the need for Explosive Ordnance Disposal (EOD) personnel to remove defective or suspect ammunition from the work area.

e. Operating Personnel. It is recognized that operating personnel are the first lines of defense for identifying workplace safety hazards when involved in ammunition and explosive evolutions. Accordingly, operating personnel will:

(1) Only conduct operations that are covered by a command-approved SOP.

(2) Read, understand, and strictly observe all safety standards, requirements, and precautions applicable to their work or duty.

(3) Immediately report to their supervisor any of the following:

(a) An unsafe condition, employee action, or equipment or material that they consider unsafe.

(b) Any injury or evidence of impaired health, physical or mental, to themselves or other employees that could preclude them from performing their duties.

(c) The presence of unauthorized personnel in the area.

(4) Immediately warn other personnel when they are in danger by known hazards or by their failure to observe safety precautions.

(5) Wear or use approved PPE when it is required.

(6) Be prepared, in case of an unforeseen hazardous occurrence, to give an audible warning to the other employees and to exercise reasonable caution appropriate to the situation.

(7) Report any accident, incident, or near miss to their supervisor.

(8) Do not engage in horseplay or other unprofessional behavior while participating in explosives operations.

Note: If any person feels an unsafe condition exists, they must stop work until management reviews the task and determines that the risks are acceptable and it is a safe operation.

f. ESSG will:

(1) Consist of the following members:

(a) NSA/NSWC Crane ESO (Chairperson);

(b) NSWC Crane Special Warfare and Expeditionary Systems Department Director or Deputy Director;

(c) NSWC Spectrum Warfare Systems Department Director or Deputy Director;

(d) Naval Facilities and Engineering Command Mid-Atlantic Public Works Department Crane (NAVFAC MidLant PWD) Public Works Officer (PWO) or Deputy PWO;

(e) CAAA representative;

(f) NSA Crane representative;

(g) Explosives Ordnance Disposal Mobile Unit TWO Detachment Crane Officer-in-Charge.

(h) NSWC Inventory Accuracy Officer

(i) NSWC AA&E Physical Security Officer

(j) NSWC Occupational Health & Safety representative

(k) NSA Emergency Management Officer

(l) NSA/NSWC Range Safety Manager

(m) NSA Fire & Emergency Services

(n) NSA Force Protection Department

(2) Determine when host policy is required and ensure appropriate organizational representation during policy development. Review reference (g) annually to evaluate its effectiveness and determine if any modifications are needed. Document completion of review in the ESSG meeting minutes.

(3) Hold quarterly meetings. Meeting minutes will be recorded by the Chairperson and provided to the CO for awareness, review, and acknowledgment.

(4) Use subject matter experts to assist in policy development.

(5) Oversee the biennial process for NOSSA ESIs of Crane per reference (f).

(6) Oversee the implementation of Crane's ESI CAP process per reference (f).

(7) Oversee the ESSA process.

(8) Oversee the implementation of corrective actions with Command interest (e.g., issues resulting from accident investigations or external inspection findings).

(9) Oversee site plans and stipulations/mitigations for site approvals.

(10) Schedule and ensure completion of the ESSA for all functional areas within the calendar year, and culturally stress that the ESSA is a continual self-assessment process, not an annual event.

g. ESSG members will appoint at least one alternate who will attend ESSG meetings in the ESSG member's absence, having full authority to act during ESSG meetings in the ESSG member's absence.

8. The Process for ESI Inspections of Crane

a. The ESSG is responsible for the oversight of the process for ESI inspections at Crane.

b. The ESSG will track through completion, all ESI findings using Crane's CAP process.

9. Crane's CAP Process

a. Each ESI finding of Crane will be addressed via ESCS which identifies the following:

(1) The finding itself

(2) Discussion

(3) Root Cause

(4) Root Cause Analysis of the finding

(5) Corrective Action

(6) Current Status

b. The ESSG will track through completion, all ESI findings and all root cause analyses by use of the ESCS CAP.

c. The CAP and 90-day CAP update will be submitted to NOSSA per reference (f).

10. The ESSA Process

a. Annual ESSA schedule will be coordinated by the ESO and briefed at the ESSG.

b. Individual teams will be coordinated by the ESSG to conduct ESSAs. All tenant commands that perform explosives operations are expected to provide ESSA team members.

c. The ESSG will track the progress of the quarterly ESSAs.

d. The ESSG will establish the tasks to be performed by ESSA teams.

e. The ESSG will conduct final report review for each individual ESSA.

f. The ESSG will identify and track through completion via ESAMS, the individual deficiency and improvement actions for resolving explosives safety issues that were identified during the individual ESSAs as systemic, to include:

(1) Follow-Up;

(2) Root Cause Analysis (causative research);

(3) Trend Analysis as applicable.

g. Each ESSA Team Leader will:

(1) Perform the ESSA to identify process problems and to recommend solutions and process improvements associated with NSA Crane's ESMP.

(2) Use the Explosives Safety Office provided checklist. The checklist will be a customized version of the current NOSSA Navy Shore Station Explosives Safety Inspection Program Evaluation Guides that includes local instruction/directive specific questions. Team Leaders may request specific questions be added to the checklist if there are areas where they feel the checklist is not comprehensive enough to fully evaluate the program or program element.

(3) Ensure their Team, as required, obtains all instructions, documents, SOPs, Supplemental Documents (SDs), and records relevant to each program under assessment.

(4) Perform an initial desktop assessment of whether an effective process is in place via instructions, documents, SOPs, and SDs. Determine whether these documents provide adequate authority and direction to meet the requirements of each program and that an adequate ORM assessment/hazard analysis has been performed, as appropriate.

(5) Prepare and submit a draft report to the Explosives Safety Office.

(6) Present the final report to the ESSG.

h. ESSA Team Members will:

(1) Participate fully with the conduct of the ESSA.

(2) Provide assistance as required to aid in the implementation of internal controls and monitor processes to preclude recurrences of deficiencies.

(3) Monitor progress of enhancements identified during the ESSA process and ensure that corrective actions are adequate and accomplished expeditiously.

(4) Utilize appropriate sections of the Explosives Safety Office provided Navy ESI Program Evaluation Guide as the tool in performing the assessment.

(5) Evaluate the effectiveness of the assigned program document findings and provide comments and feedback for improvement as required.

(6) Perform the specific tasks assigned by the ESSG and Team Leader.

11. ESSA Reports: ESSA reports are a valuable tool in keeping leadership onboard the installation informed of the overall health of the ESMP. They will be published by the Explosives Safety Office before and in preparation for the quarterly ESSG meeting. Report formats for each year will be determined by the ESSG and completed by the ESSA Team Leader in conjunction with the Explosives Safety Office. Reports may be generated in the two formats below:

a. Organization Report: This type of report will be used when multiple programs are inspected within an organization, code or section.

b. Program Report: This type of report will be used when one program is inspected throughout an organization, across multiple groups or the entire installation.

12. ESSA Report Format. ESSA Reports will include the information below. Templates and example reports may be obtained from the Explosives Safety Office.

a. Draft ESO Memo that indicates the scope of the inspection (organization, program, functional area, etc.) and the methodology of how it was conducted. The first paragraph of the memo should include a summary that describes the overall explosives safety posture of the organization and program. Other required information is below and should be considered the minimum requirement for all reports.

(1) Dates the ESSA was conducted.

(2) Organization(s)/program(s) inspected.

(3) Names of the Team Leader and Team Members as required (including Codes).

(4) Two enclosures; current year findings and all open findings from previous ESIs/ESSAs.

(5) Full descriptions and references for the findings in the enclosures.

(6) If any ESI findings listed are still active, for each one provide:

(a) The ESI Finding number

(b) The ESI description of the finding

(c) The current status of the finding

ESSA Findings – State the number of individual findings identified during the ESSA, their status (open/closed) and that a full description of the ESSA Findings is provided in enclosure (1).

13. Corrective Action Plan (CAP). ESSA Reports will be sent to the responsible code or Division upon being signed by the ESO. CAPs will then be completed by the responsible code or division and returned to the Explosives Safety Office within 30 days. ESSA reports and CAPs are essential to and used during the quarterly ESSG meetings. If adjudication is required for any findings, it will be completed within the 30 days provided. Example formats of CAPs can be obtained from the Explosives Safety Office and the minimum requirements for them are below:

a. Finding – Identify the finding, finding number and current status for each.

b. Discussion – Finding explanation. Explain the "who", "what", "when", "where", "why", and "how" the finding came to exists.

c. Root Cause – Policy (federal, DoD, DON, or local; Resources (lack of funding, insufficient human resources, etc.); Training (lack of training, training was inadequate); Compliance (failed to comply, human error, does not fall into other categories).

d. Root Cause Analysis – Provide and explanation of the determination of the reason(s) why the finding exists.

e. Corrective Action(s) – Describe the actions that have been/will be taken to correct the deficiency.

14. ESSA Program Comments. Program comments are areas of concern noted by the inspection team that potentially could become a finding during and ESI or ESSA. Program comments can also be associated with an "unsafe" condition or act witnessed by the team during the assessment. They are provided for the leaderships information and situational awareness. Program comments do not require a CAP unless it is specifically requested in the ESO's memo or during the ESSG.

EXHIBIT 1-1
EXPLOSIVES SAFETY MANAGEMENT PROGRAM
RESPONSIBILITIES ORGANIZATION

EXPLOSIVE SAFETY PROGRAMS	NSA	NSWC	CAAA	NAVFAC	EOD
Program 1 - Explosives Safety Administration/Management					
1.1 - Explosive Safety Management	X				
1.2 - Mishap/Accident Reporting	X	X	X	X	X
1.3 - Emergency Management/Fire Plans/Maps	X				
1.4 - Inert Ordnance Management	X	X	X		X
1.5 - Safety Equipment/Fire Protection	X				
1.6 - Explosives Safety Self-Assessment	X	X	X	X	X
Program 2 - Facility Certification/Master Planning *(Pillar Program)*					
2.1 - Site Management	X			X	
2.2 - Site Compliance	X			X	
2.3 - New Construction/Modification to Site Planning	X			X	
2.4 - Deviations	X			X	
Program 3 - A&E Qual Cert and Training *(Pillar Program)*					
3.1 - Implementation	X	X	X*	X	X
3.2 - Training	X	X	X*	X	X
3.3 - Qualification	X	X	X*	X	X
3.4 - Certification	X	X	X*	X	X
3.5 - Qual/Cert Records	X	X	X*	X	X
Program 4 - A&E Standard Operating Procedures					
4.1 - Development	X	X	X*	X	X
4.2 - SOP Content Requirements	X	X	X*	X	X
4.3 - Review Process	X	X	X*	X	X
4.4 - Implementation	X	X	X*	X	X

EXPLOSIVE SAFETY PROGRAMS	NSA	NSWC	CAAA	NAVFAC	EOD
Program 5 - A&E Facilities/Operations					
5.1 - A&E Storage and Compatibility	X	X	X*		X
5-2 - Storage Procedure and Safety	X	X	X*		X
5.3 - PES Inspections	X	X	X*		X
5.4 - Operating Buildings	X	X	X*		
5.5 - Explosive Hazardous Waste & Waste Military Munitions Management	X	X	X		X
5.6 - Facilities Maintenance (Mag/Bldgs)	X	X	X*		X
Program 6 - Lightning Protection/Grounding/EMCON					
6.1 - EMCON/HERO	X				
6.2 - Lightning Protection/Grounding				X	
6.3 - LP/G Equipment/Maintenance				X	
Program 7 - MPPEH/Ranges					
7.1 - Training Ranges	X				
7.2 - Test/Treatment Ranges		X	X		X
7.3 - MPPEH Management	X	X	X		X
7.4 - Small Arms/Skeet Ranges	X	X			
Program 8 - AA&E Transportation & Equipment					
8.1 Motor Vehicles	X	X	X	X	X
8.2 - Ordnance/Material/Weight Handling Equipment				X	
8.3 - Equipment Safety Maintenance & Testing				X	
8.4 - Railroad Transportation			X*		
Program 9 - AA&E Physical Security					
9.1 - General Polices, Waivers, Exceptions & Surveys	X	X	X*		X
9.2 - Intrusion Detection System, Lighting, Construction, Storage	X	X	X*		X
9.3 - Security Force/Checks	X	X	X*		X
9.4 - Ready For Issue/Accountability	X				

EXPLOSIVE SAFETY PROGRAMS	NSA	NSWC	CAAA	NAVFAC	EOD
9.5 - Locks and Key Management	**X**	**X**	**X***		**X**
Program 10 - A&E Inventory Management ***(Pillar Program)***					
10.1 - Administrative Asset Management	**X**	**X**	**X***		**X**
10.2 - NAR Management	**X**	**X**	**X***		**X**
10.3 - Program Management	**X**	**X**	**X***		**X**
10.4 - Inventory Accuracy	**X**	**X**	**X***		**X**

***Annotates programs CAAA manages per Army regulations.**

CHAPTER 2
SAFETY REQUIREMENTS IN EXPLOSIVES AREAS

1. References

a. NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore

b. NSACRANEINST 5100.13A, NSA Crane Smoking and Tobacco Use Policy

c. NSWCCRANEINST 5100.1A, Occupational Safety and Health Program

d. OPNAVINST 5102.1D, Navy and Marine Corps Mishap and Safety Investigation, Reporting, and Record Keeping Manual

e. NAVSEA OP 3565 Vol 2 Electromagnetic Radiation Hazards (Hazards to Ordnance)

f. OPNAVINST F3100.6J, Special Incident Reporting (OPREP-3 PINNACLE, OPREP-3 NAVY BLUE, and OPREP-3 NAVY UNIT SITREP) Procedures

2. Purpose. To provide general safety requirements not included in specific program areas that apply to explosive operations conducted onboard Naval Support Activity (NSA) Crane.

3. Scope and Applicability. This chapter applies to NSA Crane, all tenants, contractors, and visitors.

4. Discussion. This chapter provides some of the general safety requirements that apply to the explosives operations conducted on NSA Crane. Reference (a) provides detailed information relative to ordnance operations and safety. Safety of operations must be the prime concern of all personnel during work involving explosive materials. Every effort will be made to eliminate unsafe practices and minimize risks. Improper handling of ammunition, ammunition components, and/or explosive materials may result not only in component malfunction, but also in catastrophic accidents, which may cause considerable damage and result in injury to personnel and/or loss of life.

5. Smoking and Flame Producing Devices. Smoking is not allowed at any time in any vehicle onboard NSA Crane, whether it be a Privately Owned Vehicle (POV) or Government Owned Vehicle (GOV). Smoking is permitted only in designated areas and is strictly prohibited within any areas where explosives and ammunition are present. The carrying of matches, lighters, or other spark/flame-producing devices is prohibited in any explosives area unless it is required for an operation such as hot work, welding, etc. Smoking areas must be authorized as required by references (a) and (b). The approval of designated smoking areas is delegated to the Explosives Safety Office. A smoking area authorization will be requested by the first line manager through the format provided by Exhibit 2-1. The smoking area should be located outside the fenced boundary of restricted areas and as far as possible from an explosives site. Smoking areas will meet the requirements of reference (a) including:

a. Posted with a "Designated Smoking Area" sign.

b. A posted copy of the approved Exhibit 2-1.

c. Installed electric, if electrical power is present or handheld flameless lighters of a type that can be lit only by a positive action. (Note: No flame producing devices are allowed in explosives containing facilities).

d. A 2½-gallon stored pressure water extinguisher or equivalent.

e. A metal receptacle for cigarette butts, preferably containing water or sand. Receptacles will be emptied at least weekly, or preferably at the end of the workday.

f. Personnel wearing clothing contaminated with metal powder, explosives, or dust that is explosive or highly flammable, are prohibited from entering a smoking area until contaminated clothing has been removed.

6. Explosives and Personnel Limits. Placard stating the maximum number of personnel (Operators/Transients) allowed in a building, cell, room or other similar space that contains ammunition, explosives, or other hazardous materials, will be conspicuously posted. Personnel limits do not need to be posted in magazines or magazine areas. Explosives and personnel limits should never be exceeded for any reason.

7. Safety Permits

a. For maintenance, repair, and construction work in and around explosives areas that involves hot work (e.g., work requiring soldering, melting of asphalt, welding, use of blow torches or other heat or spark-producing devices in and around explosives areas), a Safety Permit from the Explosives Safety Office is required prior to the commencement of work. The permit will be signed by the Building Supervisor, the person performing the work, and an Explosives Safety representative. The approved permit must be available at the work site.

> Note: The Crane Army Ammunition Activity (CAAA) Safety Office provides the permits within CAAA operations. Joint Safety permits issued by CAAA and Navy Explosives Safety may be required on a case-by-case basis.

b. For maintenance, repair, and construction work in and around explosives areas that does not involve hot work (e.g., work requiring soldering, melting of asphalt, welding, use of blow torches or other heat or spark-producing devices in and around explosives areas), a written Safety Permit is not required. The Building Supervisor’s approval is required prior to the commencement of work. Additionally, the Building Supervisor will contact the Explosives Safety Office for concurrence prior to approving the initiation of work.

> Note: The Crane Army Ammunition Activity (CAAA) Safety Office provides work permits within CAAA operations.) Joint Safety permits issued by CAAA and Navy Explosives Safety may be required on a case-by-case basis.

c. For maintenance, repair, and construction work in and around explosives areas, a Safety Permit from the Explosives Safety Office is required prior to the commencement of work. The permit will be signed by the facility custodian, the person performing the work, and an Explosives Safety representative. The approved permit must be available at the work site.

Note: The Crane Army Ammunition Activity (CAAA) Safety Office provides the permits within CAAA operations.) Joint Safety permits issued by CAAA and Navy Explosives Safety may be required on a case-by-case basis.

8. Process Supervisors. Process Supervisors of Navy Research, Development, Test, and Evaluation (RDT&E) operations conducted in explosives operating buildings will be appointed in writing by the Division Manager. The designation letter will assign clear authority and responsibility. The Process Supervisor is responsible for ensuring explosives operations are conducted per reference (a), Standard Operating Procedures (SOP), and other applicable directives. The designated Process Supervisor will assign another Process Supervisors upon leaving the building to ensure clear delegation of authority is transferred. If no Process Supervisor is available, all explosives operations will cease until a designated Process Supervisor is available. A Process Supervisor must hold a Team Leader (TL) explosives certification level in all Work Task Codes (WTC) and Ordnance Family Groups for explosive operations that are ongoing within their designated areas of responsibility. Process Supervisors must complete an approved Job Qualification Requirement (JQR) for Process Supervisor. An example of the JQR is located in Exhibit 2-2. Process Supervisors appointed in writing prior to issuance of revision "D" of this instruction are not required to complete the JQR.

9. Explosive Placard and Other Firefighting Symbols

a. Vehicle Placards. All government vehicles transporting Hazard Class 1 (explosives) material on NSA Crane will placard their vehicle. This includes placarding vehicles transporting all quantities of Hazard Class 1, Division 4 material. These placards will be displayed on the front, rear, and both sides of the vehicle. Specification for and the placement of these placards must be per reference (a).

Exception: Security vehicles and Security personnel transporting small arms ammunition for security purposes are not required to placard their vehicles.

b. Fire Symbols for Magazines and Explosive Operating Buildings. Appropriate fire symbols will be used to indicate the presence of ammunition or explosives material in any magazine or operating building. Additional placards may be required to indicate special firefighting techniques (no water symbols, respirators required, etc.) Reference (a) provides information related to symbols and posting requirements.

c. EMPTY or INERT signs will be posted outside magazines and operating buildings which do not contain explosives or energetic materials. EMPTY/INERT placards will not be the same shape as the designated fire symbols identified in reference (a).

10. Notification of After Hours Explosives Operations and Testing. When explosives operations or functional testing is planned outside of normal working hours, whether on a weekday or weekend, notify Explosive Ordnance Disposal (EOD), Explosives Safety Office, NSA Crane Force Protection Department, and NSA Crane Fire Department. The following information will be provided:

a. Building number or Range

b. Specific hours the operation will be underway

c. Type of explosive operation

d. Total number of personnel onsite

e. POC (Process Supervisor or Range Safety Officer) with contact phone number

11. Explosives Demonstrations. Demonstrations conducted on ranges, including the use of pyrotechnics, small arms live fire, etc., must be conducted per reference (a).

a. Demonstrations will be requested by the Division Manager or equivalent and approved by the Explosives Safety Office. If the requested range is external to the requesting management chain, the owning range organizational head will also be an approver.

b. Only personnel who are essential to the operation may be within the Explosives Safety Quantity Distance (ESQD) arc of the ordnance. Approval of personnel as essential to the operation will be determined by either:

(1) Department Director or equivalent

(2) Technical Director

(3) Commanding Officer

c. All approval requests will state the names of the individuals participating in the demonstration and a brief description of the need or value added to Crane.

d. Approval requests will reference the SOP that addresses the demonstration including the latest revision number and date. The SOP will address all aspects of the event and the protection of essential and nonessential personnel.

e. All personnel will be thoroughly briefed on the hazards of the ordnance demonstration.

f. Visitors will be under the constant supervision of the Range Safety Officer (RSO) and will be provided with protection necessary to meet the requirements of reference (a).

12. Red (BRAVO) Flag, Flashing Lights, Barricades, and Signage

a. A red flag must be displayed prominently near the entrance of any explosive operating building, magazine and or magazine area whenever work connected with explosives or ammunition is in progress. The red flag is to indicate from a distance that personnel and explosives are in the building or magazine. Flags are to be removed when operations are completed for the day and all personnel have vacated the building or magazine.

b. A red flag will be displayed prominently near the entrance of any range or flown at the entry point of the range to indicate that the range area is "hot" (e.g., explosives testing is in progress or detonations are planned to occur). When operations cease, the flag will be hauled down or removed.

c. Red flashing lights that are visible from all normal approaches in addition to the red flags, warn personnel of the presence of a significant hazard such as a remotely controlled operation or a test firing/detonation in progress.

d. Barricades and gates are frequently used to secure a road or area during testing, burning, or demolition operations. These barricades or gates will not be passed in any fashion without specific clearance from the Range Control Officer (RCO) or RSO conducting the operation. Contact the appropriate RCO/RSO prior to entering and leaving these areas. Witnessing others pass through a barricade does not constitute permission to follow. They may be part of the team conducting the operation and have permission to re-enter the area. Certain areas may be closed for extended periods, including weekends and nights. Some test operations may be conducted continually.

e. Signage is posted on the installation to warn installation personnel and visitors of specific hazardous areas and areas requiring restricted access. Examples are:

(1) Ordnance Ranges have perimeter and entry point signage posted to warn personnel they are entering into a danger area and to check in with the RCO/RSO. Signage states, "Warning Explosives Test Area Do Not Enter."

(2) Entrance into the ordnance area is posted on roadways encumbered by explosives quantity distance arcs. Signage states "Warning Explosives Area Authorized Personnel Only". A portion of Highway 101 between highways 5 and 45 is only authorized for Ordnance Workers and it is posted as "Warning Explosives Area Explosive Related Worker Only."

(3) Hazard of Electromagnetic Radiation to Ordnance (HERO) signs are posted at any location where radar equipment or other possible sources of electromagnetic radiation (EMR) might create the potential for premature initiation of ordnance due to HERO. This symbol is placed along ordnance transportation routes at NSA Crane gates and at entrances to ordnance operations areas to alert operators of mobile and portable emitter systems such as radios and cellular telephones to a potential hazard when using radios and cellular telephones past this point. The sign specifies turning off any unauthorized transmitters.

(4) No Ordnance Transportation area signs are posted at the entrance to areas that have transmitters (radar or other source of EMR). This sign is used to alert ordnance truck drivers to the potential hazard of transporting ordnance in an area that might create the potential for premature detonation of the ordnance being transported.

13. Hazard Control Briefs for Visitors to Explosives Operating Buildings, Magazines, and Ranges. Visitors to explosives operating buildings, magazines, ranges or any other facility that has explosives present, must receive a Hazard Control Briefing (HCB) relevant for that facility.

a. Visitors are required to sign the HCB to acknowledge they are aware of the hazards present.

(1) Authorized Visitor – Personnel conducting project or mission related functions that require them to be present in the explosives area for a limited time. Examples are NAVFAC or contractor personnel performing maintenance or repairs and official tours by sponsors or other installation-related personnel.

(2) General Public – Persons not associated with a DoD installation's mission or operation such as visitors, to include guests of personnel assigned to the installation, or persons not employed by the DoD or contracted by the installation.

b. The visitor HCB should be given monthly for returning visitors; however, the frequency is dependent on the changing status of the building, area, or facility.

c. Process Supervisors will provide the HCB to visitors if explosives operations are ongoing in the facility. If no explosives operations are ongoing, any Team Leader permanently assigned to the facility may provide the visitor the HCB. The brief should include at a minimum: (see Exhibit 2-3 as an example of a visitor HCB):

(1) General awareness information pertaining to the area, building, or facility.

(2) Smoking policy for the area and that no flame or spark producing devices such as lighters and matches are allowed in the area.

(3) Cell phone, blackberry, and transmitter policy.

(4) Evacuation/emergency action plan and rally points in case of fire or other emergency.

(5) Personnel protective equipment (PPE) requirements.

(6) Location of explosives and if testing is ongoing or not.

d. Visiting personnel that are participating in hands-on work with explosives must receive and sign the HCB for the specific SOP being used for the operation they are participating in, and are not required to have the visitor HCB.

14. Housekeeping

a. All magazines and explosives operating buildings will be kept clean. Any combustible materials such as paper, oily rags, cotton waste, paints, wood, etc., needed to complete operations conducted within the area will be removed daily. All work areas will be cleaned and tools properly stowed prior to the end of each workday. Scrap materials (banding material scrap, pallets, etc.) will not be permitted to accumulate in or near magazines or explosive operating buildings.

b. During operating hours, doors will be fastened only with anti-panic latches or approved quick-acting devices. They will be kept in good working order.

c. Access to safety equipment such as fire alarms, fire hydrants, fire extinguishers, safety showers, eye wash stations, first aid kits, emergency stops, electrical panels and fire bills will not be blocked. The location of safety equipment will be appropriately and conspicuously marked to indicate the equipment's accessibility.

15. Employees Working Alone. During any operation involving explosives or energetic material, no employee will be permitted to work alone in a location where assistance from another cannot be given immediately in the event of an accident. Reference (a) allows for a Safe Person Plan for RDT&E explosives/energetic processes for situations that may warrant it. The plan must be documented in the applicable SOP per reference (c), Chapter 4.

16. Transmitting Devices. Transmitters operating in an explosives area must have HERO approval. Additional information on the HERO program and requirements are in Chapter 11.

17. Reporting Explosive Mishaps, Unsafe Conditions, and Near Misses

a. All employees are responsible for reporting any accident, unsafe conditions or unsafe acts observed to their supervisor and the Explosives Safety Office. When an unsafe condition exists, operations affected by the unsafe condition will cease until the condition can be corrected. Any person can request a delay or cessation of an explosive operation if they feel it is unsafe. Once reported, the supervisor or Explosives Safety will conduct a safety review prior to the resumption of operations. Employees can request a safety review without fear of reprisal. All Near Misses must be reported to the appropriate Safety Office.

b. All commands must report explosives mishaps and near misses to the Host Explosives Safety Office. The Explosives Safety Office will investigate, report, and maintain records of all mishaps and near misses per reference (d). CAAA will follow Army Regulations. Navy commands Near Misses will be reported using ESAMS by the appropriate supervisor of the explosives operation once investigated by Explosives Safety.

c. Explosive Mishap. Includes all of the occurrences, near-occurrences, or circumstances listed below.

(1) Dangerous Defect. A defect, found upon visual examination or local test, in an explosive material or system that is capable of resulting in an explosive mishap (e.g., ruptures of

explosive containers exposing filler, protruding primers, partially armed fuzes, safety devices missing or defective, etc.).

(2) Explosive Accident. An unplanned explosion or fire involving an explosive material/system. This includes inadvertent actuation, jettisoning, release or launching thereof resulting in a fatality or injury to personnel, fire, explosion or damage to property. Explosive accidents are broken down into two categories, Explosive Event and Explosives Mishap. They are defined as:

(a) Explosives Event. Any event involving conventional ordnance, ammunition, explosives, explosive systems, and devices resulting in an unintentional detonation, firing, deflagration, burning, launching of ordnance material (including all ordnance impacting off-range), leaking or spilled propellant, fuels, oxidizers, or chemical agent release. This pertains to all events that DO NOT MEET the severity classification of Class A, B, or C. They will be reported via an Explosives Event Report (EER).

(b) Explosives Mishap. Any event involving conventional ordnance, ammunition, explosives, explosive systems, and devices resulting in an unintentional detonation, firing, deflagration, burning, launching of ordnance material (including all ordnance impacting off-range), leaking or spilled propellant, fuels, oxidizers, or chemical agent release. Accidents and incidents defined as explosive mishaps and meeting the severity classification of a Class A, B, or C, will be reported via an Explosives Mishap Report (EMR).

(3) Explosive Incident. An occurrence that creates a potentially hazardous situation. Incidents include, but are not necessarily limited to:

(a) Human errors in processing, assembly, testing, loading, storing, transporting, handling, using or disposing of an explosive material or system.

(b) Unusual or unexpected occurrences, unnatural phenomena, unfavorable environments, or instances of equipment failure that may damage or affect safety or reliability of an explosive material or system.

(c) Loss or abandonment of an explosive material or system resulting in a potential hazard to untrained personnel who may find the item.

(d) Misused or unauthorized alteration of an explosive material or system.

(e) Any failure or malfunction of, or damage to, a launch device or associated hardware that occurs when an explosive material or system is being handled or otherwise manipulated.

(4) Explosive Near-Mishap. Any event that, except for chance, would have been an explosive mishap.

(5) Malfunction. The term applied to an explosive material or system when it fails to function in the manner for which it was designed. Malfunctions are considered major or minor as follows:

(a) Major Malfunction. Failure to function in the manner for which designed, resulting in, or potentially capable of resulting in, personal injury or material damage.

(b) Minor Malfunction. Failure to function in the manner for which designed and does not result in injury or material damage and for which the potential for injury or material damage is remote (duds, downrange premature detonation, etc.).

(6) Unsafe/Unhealthful Working Condition. Any condition, action, or circumstance that could cause harm to an employee or government property.

(7) Negligent Discharge. An unplanned discharge of a firearm caused by failure to observe the four universal weapon safety rules. Negligent Discharges are to be reported per reference (f) as either an OPREP-3 NAVY BLUE or OPREP-3 NAVY UNIT SITREP dependent on personnel injury or media attention.

18. Ordnance Handling Equipment. Only approved, authorized handling equipment may be used for the lifting or handling of ammunition, ammunition components, or explosives. Reference (a) applies to any procedures involving ordnance handling.

19. Clothing

a. Non-Static Producing. All personnel engaged in or in the immediate vicinity of explosive handling operations will wear non-static producing clothing (cotton clothing). This includes undergarments, socks, etc. Should the operation require additional PPE, only cotton clothing may be worn under the PPE per the applicable SOP.

b. Personnel Protective Equipment (PPE). Supervisors are responsible for ensuring all necessary PPE is available for and properly used by employees under their supervision. SOPs will identify appropriate PPE to be used for specific operations.

20. Handling Operations involving Explosives/Energetic Materials. The cardinal rule for explosive operations is ‘minimize”. That is, use only the minimum number of personnel necessary to perform the operation, expose them only for the minimum amount of time necessary to perform the operation, and expose them to only the minimum amount of explosive material needed to perform the operation.

a. Serviceable Ammunition and Explosives

(1) Ammunition and explosives, whether in containers, in bulk, or loaded into projectiles, cartridges, or ammunition components, must be handled carefully to prevent heat, shock, or friction, which may cause a fire or explosion, or which may damage the material or

item. These materials must not be thrown, dropped, walked upon, dragged, or tumbled over the floor or over other containers, or otherwise be subjected to shock or friction.

(2) Handling of ammunition and explosives will be reduced to a minimum in order to prevent damage and the creation of hazardous conditions. Every precaution will be taken to avoid their contact with sand, earth, gravel, or other abrasive substances. Explosives and ammunition must not be exposed unnecessarily to inclement weather or to direct rays of the sun. No explosives will be carried in or out of the area when there is snow or ice on the areas where personnel must walk.

(3) Ammunition that is carried by hand will be cradled in the handler's arms and carefully handled to prevent dropping or blows from external sources. Ammunition that can be readily carried in one hand will be handled with care to prevent dropping or strikes against objects.

(4) If any container is found to be in unsatisfactory condition, its contents must be transferred to an appropriate container and properly relabeled. Any evidence that explosives or ammunition have been roughly handled will be reported immediately.

b. Unserviceable Ammunition and Explosives. Special care will be taken when handling or transporting unserviceable items. Items of unknown safety will be inspected by EOD personnel in order to determine the final disposition.

21. Tools. Only non-sparking tools may be used in the presence of exposed explosive material. Use of electrically-powered tools is prohibited unless specifically permitted via an approved SOP. Only tools specifically authorized by an SOP may be used. To avoid misuse, tools not specifically referred to in the SOP must not be in the immediate vicinity of the operation.

22. Inspections of Explosives Facilities. To assess the effectiveness of the Explosives Safety Management Program (ESMP), Explosives Safety Office personnel will conduct and document regular inspections of all ordnance ranges, Navy explosive operating buildings, and magazines, ensuring that they meet the requirements of reference (a). Deficiencies will be reported to the supervisor of the area inspected and entered into ESAMS. CAAA will inspect their facilities and document deficiencies per Army policy.

23. Clearing Barrels. Clearing barrels will be provided at designated weapons clearing locations, which are generally located outside of arms rooms, Entry Control Points, and qualification and training ranges. Command must post positive control and procedural guidelines for all weapons at clearing barrels and ensure personnel use them during weapons clearing.

24. Amnesty Program

a. The Amnesty Program is not intended to circumvent standard ammunition accountability procedures. The Amnesty Program will be under the oversight of the Host Explosives Safety Office.

b. For an Amnesty Program to be effective, turn-ins must be made without fear of disciplinary action. Therefore, individuals making amnesty turn-ins will not be subject to investigation.

c. Military units discovering munitions after having completed their turn-ins and having their accounts reconciled are not authorized to use the Amnesty procedures outlined herein. These units must make amended turn-ins using their services governing directives.

d. Personnel requesting Amnesty turn-ins should contact the host Explosives Safety Office. The Host will then coordinate the Amnesty turn-in via EODMU TWO Detachment Crane or CAAA Quality Assurance Specialist Ammunition Surveillance (QASAS) personnel.

e. Amnesty days will be scheduled as often as deemed necessary for the collection of unauthorized munitions. The host Explosives Safety Officer (ESO) will establish a collection point at a location that affords Inhabited Building Distance (IBD) level of protection. To ensure that proper care is exercised, qualified and certified explosives handling personnel will be on site to supervise Amnesty turn-ins.

25. Explosives Safety Deviations. When explosives safety requirements cannot be met, an explosives safety deviation must be approved prior to commencement of the explosives operation. All explosives safety deviations will be per the requirements in reference (a) and are coordinated through the Installation Commanding Officer (ICO) via the Host Explosives Safety Office.

a. Exemption. A deviation from mandatory explosives safety requirements approved for the purpose of long-term satisfaction of recurring readiness or operational requirements. Exemptions are generally issued for a maximum of 5 years, but will not be granted for a period in excess of that estimated for correction of the deficiency.

b. Waiver. Written authority which provides a temporary exception and permits deviation from a mandatory requirement of this manual. It is generally granted for short periods of time not to exceed 2 years, pending cancellation as a result of termination of scheduled work commitments or correction of the waived conditions.

c. Explosives Safety Event Waivers. An event waiver is a deviation issued for a limited time, on a non-reoccurring basis, for a particular explosives operation encumbered by ESQD arcs that cannot otherwise be satisfied. Event waivers are submitted for compelling mission requirements not operational convenience. Requests for Event Waivers will be submitted via message by the ICO. Process for requesting an Event Waiver is provided in reference (a). Other non-explosives operations such as maintenance projects encumbered by explosive arcs will be approved under a Construction Worker Authorization.

d. Construction Worker Authorization (CWA). When construction personnel must, on a temporary basis, be within K18 intraline distance from a Potential Explosion Site (PES), they must be provided the maximum practical protection from the effects of an explosion at the PES. Approval authority for construction workers within K18 intraline distance of a PES is dependent

on the work involved, amount of time the workers will be present and type of facilities affected. CWA submission guidance is provided below.

(1) Routine maintenance and repair work conducted inside K18 intraline distance can be approved by the installation ESO. An Explosives Safety Site Approval Determination (ESARD) will document the review and provide additional mitigations. Examples of routine maintenance are provided in reference (a).

(2) Maintenance and repair work that is not routine and affects an explosives facility will be submitted to NOSSA (N5) as a CWA through Web-based automated site submission module.

26. Eating. Personnel will not eat, drink, bring food into, or store food in any area where explosives materials, ordnance, or hazardous materials are handled or stored.

27. Essential Personnel. Personnel whose duties require them to remain within the ESQD arcs during testing or operations for one or more of the following reasons:

a. Direct involvement in ammunition and explosive handling or testing operations.

b. Direct support of the operations (e.g., data collection, video operators, etc.)

c. Safety and Environmental Protection Specialists personnel.

d. Equipment operators that may be needed to position, remove or transport test items or equipment.

e. Visitors (e.g., sponsors) who are associated with the mission of the program and are performing oversight on the operation or test.

NOTE: Essential personnel do not include vendors, commercial deliveries (unless carrying mission related material), dependents, or non-DoD personnel except as categorized above.

28. Lean Processes for Navy Ordnance/Explosives Operations

a. Department Directors will ensure Lean core team members are knowledgeable of explosives (safety, environmental, and security) regulations. If a process change will or could be affected by regulation, the applicable regulatory program manager will be contacted to ensure requirements are met.

b. The Business Operations Excellence Division will inform the ESO and the Environmental Site Manager of all scheduled Lean events.

c. Prior to the implementation of changes, regulatory requirements will be met.

d. Lean process changes that involve ammunition, arms or explosives, will require the review of SOPs to ensure the changes are incorporated. The review/approval of the SOP by management and supporting disciplines (e.g., explosives safety, environmental management, physical security), will provide senior level review prior to implementation of Lean actions.

e. The following actions listed below will be accomplished during SOP review.

(1) Ensure process changes meet standards.

(2) Review hazard analysis to ensure proposed process changes identify risks and that mitigations are acceptable.

(3) Ensure changes are reviewed by the Materials, Processes, and Equipment Review Committee when applicable.

(4) Ensure personnel explosives qualification/certification is met.

(5) Ensure facility site approvals match the changes.

(6) Ensure conformance with physical security policy.

(7) Ensure conformance with environmental explosives policy.

(8) Ensure outstanding associated waivers are not violated.

(9) Conduct a pre-operational safety inspection of process changes as identified during SOP review.

f. Lean efforts within CAAA will coordinate any process changes that could affect the activity, such as explosives site plans, hazards of electromagnetic radiation to ordnance, transportation, etc., with the host ESO.

Exhibit 2-1

TEMPLATE REQUEST FOR AUTHORIZED SMOKING AREA IN EXPLOSIVES AREAS

Organizational Code: **JXRP**

Building/Area Requested (be specific):
North East side of the BLDG 2805 complex

Requestors:

Bldg/Area Supervisor(print): **John Doe**	Signature:	Date:
Department Director (print): **Jane Doe**	Signature:	Date:

Approvers: (write N/A if not applicable). If disapproved, state reason in comments and return to Bldg/Area supervisor.

Name (printed)	Signature	Date	Comments
Fire Department: **I.M. Fireman**			
Army Safety (Army requests only): N/a			
Navy Explosives Safety: **I. M. Safety**			

Distribution: Original to Building Supervisor; Copy to approvers.

Requirements:
1. OP 5, Volume 1, paragraph 4.1.6
2. DA PAM 385-64, paragraph 6-3

EXHIBIT 2-2
JQR SAMPLE FORMAT FOR PROCESS SUPERVISORS

(Tailor to include specific Division/Branch information)

Job Qualification Requirements (JQR)
For
Process Supervisor

Name: John E Example	Code:	Date: DD/MMM/YYYY

1. Purpose. This JQR will:

Establish a comprehensive process to document the progress of an Explosive Certified Team Leader (TL) seeking Appointment as a Process Supervisor for Research, Development, Test and Evaluation (RDT&E) explosive operations. The Process Supervisors will signify the completion of applicable sections of this JQR by observing the candidate's performance. Process Supervisors will only sign after the candidate has fully demonstrated a basic knowledge of the section under review. Awarding of signature validates the Process Supervisors have complete confidence in the nominee's ability to perform the duties and responsibilities of a Process Supervisor for RDT&E explosive operations.

2. Qualification Record

Candidate has been given indoctrination to this JQR, given and agreed to target completion date of _____
(DD/MMM/YYYY)

Signature _____Date_____
(Section or Branch Manager)

3. Nomination and Approval Process

a. Branch or Section Manager must:

(1) Nominate the Team Leader (TL) as a candidate or Process Supervisor.

(2) Maintain the signed and approved Process Supervisor Appointment Letter in the candidates Explosive Qualification/ Certification folder, Section 6.

b. Process Supervisors must:

(1) Document that the candidate meets all of the qualifications and possesses the knowledge and experience as indicated in this JQR.

(2) Sign and date each section of this JQR after the candidate has fully demonstrated by observation of explosive operations they possess a requisite knowledge and understanding of the responsibilities of a Process Supervisor.

(3) Submit this completed JQR to the Explosives Safety Officer for signature and approval.

c. Division Manager must approve JQR and appoint the candidate as a Process Supervisor by Division memorandum.

4. The Candidate must demonstrate their knowledge by appearing before a Process Supervisor Review Panel to include but not limited to:

a. An Explosive Safety Specialist from NSWC Crane Explosive Safety Office.

b. Qualification Certification Board Chairperson from NSWC Crane Explosive Safety Office.

c. Candidate's Process Supervisor

d. Candidate's Section Manager or Branch Manager

e. Process Supervisors over operations performed in other operating areas, as required by the Panel.

*NOTE: The candidate's Division/Branch Manager will coordinate the Review Panel and invite required attendees.

*NOTE: Line (1) and (2) may be the same Explosive Safety Office Representative.

*NOTE: Process Supervisor Review Panel Lead may be either the Primary Process Supervisor from the candidates Section/Branch or the Explosives Safety representative.

5. The Process Supervisor Review Panel must verbally test the Candidate's knowledge by presenting different scenarios and asking pertinent questions. Successful completion of the board will be documented by panel member's signature below. The Panel can also decline the Candidate's appointment if they agree the Candidate does not have the requisite knowledge to perform Process Supervisor responsibilities and request additional training.

a. The successful completion of this JQR is mandatory for a Candidate to transition to the Process Supervisor appointment for Operations of Explosive Sited Buildings in their respective Branch.

6. To complete this JQR, supervisors will ensure that nominee fully understands and displays a thorough working knowledge of the prerequisites listed in subparagraphs 6a(1) through 6a(8) before signifying completion.

a. Prerequisites. The Candidate must be a Team Leader (TL) in all Work Task Codes (WTC) and Ordnance Family Groups that as a Process Supervisor, he or she will be responsible for in their respective areas or facility. The Candidate must be familiar with and demonstrate a working knowledge of each applicable Facility License, Area, Process or Item SOP pertinent to the Explosives Operations that they are to be will be responsible for.

(1) Required reading:

(a) NAVSEA OP 5, Volume 1Appendix G Safety Regulations for using Energetic materials at Research, development and Test and Evaluation RDT&E) Activities

Signature/Date_____

(b) NAVSEA OP 5, Volume 1
Chapter 2, Paragraph 2-1 through 2-1.14 General Safety Regulations

Signature/Date_____

(c) NAVSEA OP 5, Volume 1
Chapter 2, paragraph 2-4 Personal Protective Equipment

Signature/Date_____

(d) NSWCCRANEINST 8000.1F Standard Operating Procedures Program for Processing of Expendable Ordnance

Signature/Date_____

(e) NSACRANEINST 8020.1 Explosives Safety Program at Naval Support Activity Crane.

Signature/Date_____

(2) The Candidate must successfully complete paragraph 4 of this JQR by supervising a minimum of three explosive operations under direct supervision of a Process Supervisor within their Section or Branch.

(3) Discuss the requirements for reporting of near misses, accidents, and incidents.

Signature/Date_____

(4) Explain the requirements and process for evacuation of you assigned facility and/or area.

Signature/Date_____

(5) Discuss actions for stopping any operation or task for any test anomaly, safety issue, or SOP discrepancy.

Signature/Date_____

(6) Discuss the concerns of intentional violation of the Facility License

Signature/Date_____

(7) Discuss the requirements of how to conduct a Hazard Control Briefing and periodicity

Signature/Date_____

(8) Discuss the importance of ensuring the SOP is present and being adhered to.

Signature/Date_____

7. Participate in Pre-Operational Safety Inspections, Line Check Safety Inspections,

8. Explosive Operation Observation

a. The Candidate must successfully complete this JQR and under direct supervision of a Process Supervisor and perform the duties of a Process Supervisor for a minimum of three explosive operations**.** The Process Supervisor must complete, sign and date each explosive operation successfully observed.

Explosive Operation Observed			
SOP Number	SOP Title	Process Supervisor	Date Completed

Explosive Operation Observed			
SOP Number	SOP Title	Process Supervisor	Date Completed

Mandatory Training for Process Supervisor	
Training/Class/Course	Date Completed
Naval Explosive Safety Orientation for Supervisors/Managers (AMMO-49)	
SOP Writer	
Hazard Analysis	

Recommended Training for Process Supervisor	
Training/Class/Course	Date Completed
Military Munitions Rule Awareness Training Course	
MPPEH Requirements Training Course	
Magazine Custodian Training	

Signature_____ Date_____

Section or Branch Manager Recommendation.

Signature_____ Date_____

Process Supervisor Review Panel Lead Recommendation.

Signature_____ Date_____

NSWC Explosive Safety Officer Concurrence.

Signature_____ Date_____

Division Manager Approval.

EXHIBIT 2-3

SAMPLE VISITOR HAZARD CONTROL BRIEF

BUILDING XXX CODE XXXX
VISITOR HAZARD CONTROL BRIEFING

1. You are currently in a NO Transmitting Zone. This area includes the parking lot and any areas this side of the NO Transmitting sign posted on the road coming into the area.

2. If you have a cell phone, Blackberry or any other transmitting device, turn them off and leave them here at the sign in desk.

3. If you have a key fob, leave them here at the sign in desk.

4. If you have any flame/spark producing devices such as lighters, matches etc., they must be left in the red container outside of front door or put back in your vehicle.

5. Smoking is only authorized in the designated smoke shelter located at the XXX end of the building.

6. General statement:

Building XXX is an explosive operating building and as such, at a minimum, safety glasses will be provided for you. Currently there is:

a. Explosive operations ongoing in bay/cell x?
b. Explosives out in bay/cell x?
c. No explosive operations or explosive out.

While proceeding through the building, you are being asked not to touch or pick up anything. If you want or need to see something specific, a Code XXX technician will perform the handling.

Stay with (whoever is escorting visitor) and if the alarms go off or if a need arises to evacuate the building, follow (whoever is escorting visitor) to the exit door on the front dock or back dock and gather in front of building XXXX.

There we will wait for disposition from the Fire Department or responding Emergency Services.

*NOTE: Walk them over and go through the Evacuation Plan, where they currently are, the route they will use, and the exits in each bay they will be going through.

*NOTE: If the visitor is involved in actual testing (hands on or observer), check their explosives certification card and give them a Hazard Control Briefing on the Area SOP and the Item SOP or Supplemental Document.

CHAPTER 3
GROUNDING SYSTEM TEST PLAN

1. References

a. DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards

b. NAVSEA OP 5, Volume I, Seventh Revision, Ammunition and Explosives Safety Ashore

c. NSACRANEINST 8020.1E, Chapter 6, Operations During Electrical Storms

d. NSWCCRANEINST 4855.20C, Calibration Program at Naval Surface Warfare Center Crane Division

e. NFPA 780, Standard for the Installation of Lightning Protection Systems

2. Purpose. To define requirements, responsibilities, and procedures for the testing of grounding and lightning protection systems as required by references (a) and (b). Exhibits 3-1 through 3-10 provide these requirements.

3. Scope and Applicability. This plan applies to Army and Navy ordnance facilities onboard NSA Crane.

4. Policy. Proper maintenance is critical for the efficient operation of lightning protection and other grounding systems. Testing of lightning protection and grounding systems must be performed per Exhibit 3-1 to ensure that all ordnance buildings and areas are maintained in a safe operating condition. Testing and Inspections must be performed per Exhibits 3-1 through 3-5. Visual inspections and electrical tests must be documented. The job plans are provided for reference in Exhibits 3-6 and 3-7. Testing requirements and results must be per Exhibit 3-8. Repairs of all discrepancies found during inspections must be made as soon as possible. Building supervisors must be informed of discrepancies in the lightning protection system so they can comply with the requirements for ordnance operations in reference (c).

5. Action

a. Explosives Safety Office will:

(1) Ensure that personnel performing inspections/testing have completed training course (AMMO-29), "Electrical Explosives Safety for Naval Facilities", via the Explosives Safety Self Assessment (ESSA). Completion of the annual explosives safety standdown is recommended. These requirements do not apply to personnel performing daily ground checks.

(2) Assist in the resolution of any problems with the implementation of this plan.

(3) Provide updates, revisions and changes/re-interpretations of the requirements of references (a) through (e).

(4) Provide advice and assistance in the implementation of training programs to increase the expertise of the personnel executing this test plan.

(5) Assess ongoing operations if deficiencies are found.

b. Naval Surface Warfare Center (NSWC) Crane Division will:

(1) Ensure that if personnel are performing inspections/testing, that they have completed training course (AMMO-29), "Electrical Explosives Safety for Naval Facilities". Completion of the annual explosives safety standdown is recommended. These requirements do not apply to personnel performing daily ground checks.

(2) Maintain a listing of their personnel qualified to perform inspections and testing. This listing of qualified personnel within each building will be maintained in the appropriate building grounding log.

(3) Perform inspections/testing as established in Exhibit 3-8.

c. Building Supervisor or a designated representative will:

(1) Ensure that the facility is available for the Grounding Crew.

(2) Participate in the Visual Inspection team for the facility.

(3) Ensure that conductive chairs, carts, and workstations used for bonding or grounding of ordnance or ordnance workers engaged in static-sensitive operations are labeled as conductive or anti-static.

(4) Notify NAVFAC MidLant PWD Crane Grounding Crew immediately of any major construction or modifications made to the facility that requires grounding and bonding or that affects existing grounding and bonding locations to ensure the log book drawings and test locations are correct.

(5) Maintain the grounding record/log book for the building/area. The NAVFAC grounding crew will provide a copy of the Visual Inspection and/or Electrical Test to the facility supervisor for insertion into the log book. Note, Magazine, PRM, and/or Ready Service Locker test records are maintained in the NAVFAC repository. A copy can be requested via the NAVFAC Grounding System Program Manager.

(6) Insert building Visual Inspection and/or Electrical Test Data Sheets into the grounding record/log book when received. The Grounding Record/Log Book will be maintained in the following format for consistency.

(a) Section 1 - Test Plan

(b) Section 2 - Grounding Test Points

(c) Section 3 – Current 6 Month Visual (Inspection)

(d) Section 4 - Current 24 Month Electrical (Test)

(e) Section 5 – Work Completed

(f) Section 6 – Grounding History (Previous 6 & 24 Month Inspections/Tests)

(g) Section 7 – Listing of Serialized Portable Grounding Straps (as applicable).

(7) Ensure that explosives are in their shipping/storage container and the area is safe for the NAVFAC MidLant PWD Grounding Crew to perform their testing/inspections.

(8) Remove any sources of flammable or combustible vapors as practical and brief the Grounding Crew personnel on the location and type of hazardous classified locations remaining in the facility.

(9) Brief the Grounding Crew personnel on any explosive hazards that may exist in the building/area at the time of the test/inspection.

(10) Ensure that the floor is clean and dry.

(11) Provide any personnel necessary to handle explosives.

(12) With the exception of safety shoes, provide protective equipment (safety glasses, cotton coveralls, legstats, etc.) required by the building SOP for grounding crew personnel working in the facility.

(13) Notify the Explosives Safety Office of suspected lightning damage to ordnance operating buildings or building contents.

(14) Notify the Explosives Safety Office of any deficiencies identified during visual inspections and electrical testing that the grounding crew cannot repair on the spot and that are submitted as a work request. The Explosives Safety Office will assess the impact of the deficiency to ongoing explosives operations.

d. NAVFAC MidLant PWD Crane Grounding System Program Manager will:

(1) Acquire engineering design services for correction of deficiencies.

(2) Provide assistance as required in interpretation of test results and testing methods.

(3) Update the requirements of this test plan as necessary.

(4) Ensure that minor repairs are performed on the spot. Notify facility supervisor to generate work requests to correct deficiencies identified during visual inspections and electrical testing that cannot be repaired on the spot per references (a) and (b).

(5) Receive visual and electrical test documentation results or readings upon completion of all repair work, and upload Test Data Sheets to the NAVFAC historic repository.

(6) Schedule visual inspections and testing per references (a) and (b).

(7) Ensure that personnel performing visual inspections and testing of grounding and lightning protection systems are qualified. Designate "Team Leaders" and "Team Members" as required per reference (b).

(a) Qualifications for performing inspections and testing will be completion of training course (AMMO-29), "Electrical Explosives Safety for Navy Facilities" and 4 hours of on-the-job training. If experiencing difficulty obtaining course quotas for entry-level attendees, contact NOSSA (N5) for permission to use the Web Based Training (WBT) as the primary qualifier. Personnel who are not directly involved in the lightning and grounding protection program, but have a need to understand the process and procedures, are authorized to use AMMO-29-DL for training.

(b) Completion of AMMO-18 "Basics of Naval Explosives Hazard Control" and an annual 8-hour explosives safety standdown is recommended.

(8) Provide all necessary test equipment and tools with personnel skilled in the operation of the equipment.

(9) Ensure that the test equipment used is calibrated per reference (d).

(10) Ensure that the testing is conducted per the requirements of this chapter and that the test results are properly documented.

(11) Select test points and prepare sketches showing their location.

(12) Analyze test results. A trend analysis will be performed if there is a significant increase in the readings. A significant increase would be: 5 ohms or greater on the 3-point earth resistance test, 0.5 ohms or greater on the continuity test and 100 K ohms or greater on the floor resistance test. Notify facility supervisor to generate work requests to correct deficiencies identified during trend analysis that cannot be repaired on the spot.

(13) Develop and make available inspection and test data and deficiencies, comments, and recommendations to the appropriate offices requiring the information as listed in subparagraphs 5d(13)(a) through 5d(13)(b)2.

(a) Army Facilities - JMCN-SF

(b) Navy Facilities

1. Buildings - Building Supervisor

2. Magazines - Appropriate Custodian

(14) Maintain all test and inspection data on file for at a least 6 inspection cycles or 12 years; however, it is recommended that the test records be maintained for the life of the structure to provide a better trend analysis. The main repository for this information is maintained by NAVFAC. The grounding record or log book will contain a minimum two inspection cycles of inspection or test data for the Building or Area. The remaining four inspection cycles results will be maintained by NAVFAC.

(15) Notify the Explosives Safety Office of damage to ordnance facilities from lightning strike, incident, or accident.

(16) Notify the Explosives Safety Office of defective lightning protection systems that would put the ordnance facility or operations at risk from lightning or static.

e. Grounding Crew Test Conductor will:

(1) Coordinate between the Building Supervisor and the Ground Crew personnel conducting visual inspections or electrical testing.

(2) After the completion of testing, check to ensure all tools are removed from test area.

(3) Inform the Building Supervisor or their designated representative and the Explosives Safety Office of items that fail test or inspection requirements prior to leaving the facility.

(4) Enter notations into the grounding record or log book for the building/area:

(a) "Performed 6 month visual inspection" and the results; or

(b) "Performed 24 month electrical test and 6 month visual inspection" and the results.

(c) Electrical test results or readings upon completion of all repair work.

(5) Prior to the performance of testing, ensure that all test equipment to be used in the testing described in this document is properly calibrated and in good working condition and that electrodes meeting the specifications detailed in Exhibit 3-1 are available. The Test Instrument Make, Model, and Serial Number will be identified on the Test Data Sheet.

(6) Provide a copy of the Visual Inspection and/or Electrical Test to the facility supervisor for insertion into the log book. Note, Magazine, PRM, and/or Ready Service Locker test records are maintained in the NAVFAC repository.

(7) Provide a copy of the Visual Inspection and/or Electrical Test to the NAVFAC Grounding System Program Manager to upload to the NAVFAC historical repository.

EXHIBIT 3-1
CONDUCTIVE FLOOR TEST PROCEDURE

1. General Requirements. Conductive floor testing must be conducted per the procedures described below.

NOTE

PRIOR TO CONDUCTING THE TESTING DESCRIBED IN THIS PROCEDURE, THE BUILDING SUPERVISOR OR THEIR DESIGNATED REPRESENTATIVE MUST DISCONNECT ALL BONDING STRAPS BETWEEN THE SECONDARY GROUND GIRDLE AND METAL PALLETS THAT ARE RESTING ON THE SURFACES TO BE MEASURED

WARNING

INSTRUMENTS FOR CONDUCTIVE FLOOR TESTING WILL BE USED INSIDE THE ROOM ONLY IF IT IS FREE OF EXPOSED EXPLOSIVES, AND NO EXPLOSIVE DUSTS, FLAMMABLE OR EXPLOSIVE VAPORS, EXPOSED ELECTRO-EXPLOSIVE DEVICES (EED), OR ELECTRICALLY INITIATING DEVICES (EID). OTHERWISE THE TEST INSTRUMENT WILL BE PLACED OUTSIDE THE ROOM. THE FLOOR IN THE IMMEDIATE AREA OF THE ELECTRODE CONTACT WILL BE THOROUGHLY CLEANED OF ALL EXPLOSIVE MATERIAL, AND THE AIR MUST BE PURGED OF EXPLOSIVES DUST OR FLAMMABLE VAPORS.

WARNING

ENSURE THAT FLOOR IS CLEAN AND DRY

WARNING

ONLY AUTHORIZED ORDNANCE HANDLERS WILL HANDLE ANY EXPLOSIVES MATERIALS

2. Test Hardware

a. The conductive floor resistance will be measured with a Biddle Megger, Catalog 21805-1, or equivalent, with the associated test leads.

b. A total of two electrodes each weighing 5 pounds and having a dry, flat, circular contact area of 2.5 inches in diameter is required. The contact area will have a surface of aluminum or tin foil of a minimum 0.0005 to 0.001 inch thickness backed by a 1/4 inch thick layer of rubber. The surface of the electrode must measure between 40 and 60 inches durometer hardness as determined by a Shore Type A Durometer per ASTM D 2240 68.

c. Hardened file

d. Navy electrician's knife

3. Specific Test Requirements

a. Both electrode-to-electrode and electrode-to-ground measurements will be made.

b. Electrode-to-electrode measurements must be made at five or more locations in each area or room. The results of each measurement will be recorded on the test data sheet. Specific details on the procedures to be used in conductive floor testing are given in paragraph 4.

c. Electrode-to-ground measurements must be taken at a minimum of five locations (using a minimum of two grounding system reference points). The results of each measurement will be recorded on the test data sheet.

d. All measurements must be taken with the electrode(s) a minimum of 3 feet away from any ground connection or from a grounded object that is resting on the floor.

4. Specific Test Procedures

WARNING
THE BIDDLE MEGGER, CATALOG 21805-1, IS NOT APPROVED FOR USE IN HAZARDOUS CLASSIFIED LOCATIONS AND WILL NOT BE USED IN ANY LOCATIONS WHERE THERE ARE EXPLOSIVE DUSTS, OR FLAMMABLE OR COMBUSTIBLE VAPORS

a. The test conductor will select the electrode configuration and location from the sketch of the facility.

b. The leads of the megger will be configured as below, depending upon the type of test required.

(1) Electrode to Electrode Testing. Two electrodes will be placed 3 feet apart at 5 or more locations in each area or room. The electrodes are described in paragraph 2b. These electrodes must not be placed within 3 feet of a ground connection or from a grounded object that is resting on the floor. One of the test lead's alligator clips will be attached to each electrode.

(2) Electrode to Ground Testing. A conductive floor grounding point or structural steel member will be used as one of the electrodes and the other electrode will be as described in paragraph 2b. One of the test lead's alligator clips will be connected to an electrode as described in paragraph 2b. The other will be attached to the conductive floor ground reference point or structural steel member as detailed on the sketch of the facility's grounding system test points. The ground reference point will be properly prepared before testing. This may consist of filing the surface of the reference point or scraping paint or corrosion using a knife.

c. Once the test conductor has identified that the electrodes are properly connected, the test conductor will begin cranking the handle (or push the test button) to apply the proper test voltage. If the resistance value changes appreciably with time during a measurement, the value observed after the voltage has been applied for 5 seconds will be the value recorded on the data sheet.

d. The test conductor will record the resistance test value on the data sheet.

e. The test conductor will vary the electrode location and configuration and repeat steps 4a through 4d until all of the data points required have been measured.

5. Data Analysis

a. The test results will be averaged by the person reviewing the data and entered onto the test data sheet at the time of the review of the test data. Notify facility supervisor to generate work requests to correct deficiencies that cannot be repaired on the spot.

b. Requirement standards are listed in Exhibit 3-8.

EXHIBIT 3-2
EARTH RESISTANCE TEST PROCEDURE

1. General Requirements. Three point fall of potential earth resistance testing must be conducted per the requirements of references (a) and (b) using the methods below.

WARNING
ONLY AUTHORIZED ORDNANCE HANDLERS WILL HANDLE ANY EXPLOSIVES MATERIALS

2. Test Hardware. The following test hardware is required to conduct the testing described.

a. A Biddle DET2/2 Megger, or equivalent, will be used to conduct the earth resistance testing. The tester must be configured as shown in Figure 3-2-1.

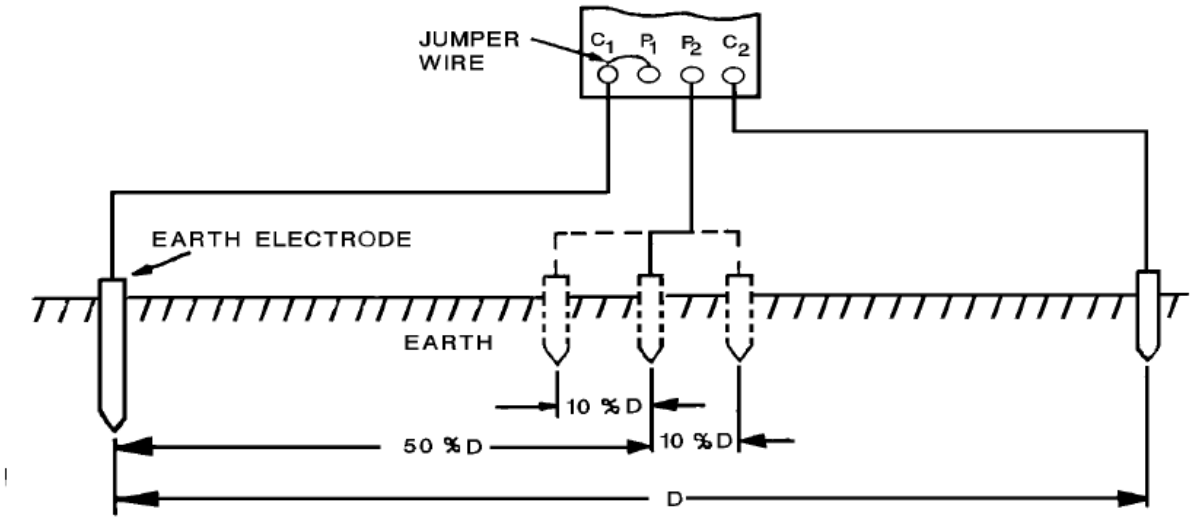


FIGURE 3-2-1: EARTH RESISTANCE TESTING EQUIPMENT CONFIGURATION

b. Two reference electrodes of l/2 inch diameter and minimum of 18 inches long of copper or steel (galvanized or stainless) will be used in the testing.

c. Three insulated test leads of sufficient length to meet the requirements of paragraph 4 are required for the performance of the testing detailed in this procedure. These leads may not be necessary for those locations in which permanent reference electrodes and interconnecting cable are provided at test wells.

3. Selection of Test Points. The test points requiring three point fall of potential testing are detailed on the test data sheet for the structure. These test points will be as detailed by the grounding system program manager.

4. Configuration for Reference Electrodes

a. The test conductor will ensure that the reference electrodes are configured as specified in the test package. The electrodes will be configured as indicated in Figure 3-2-2 with the direction and the spacing furnished by the grounding system program manager.

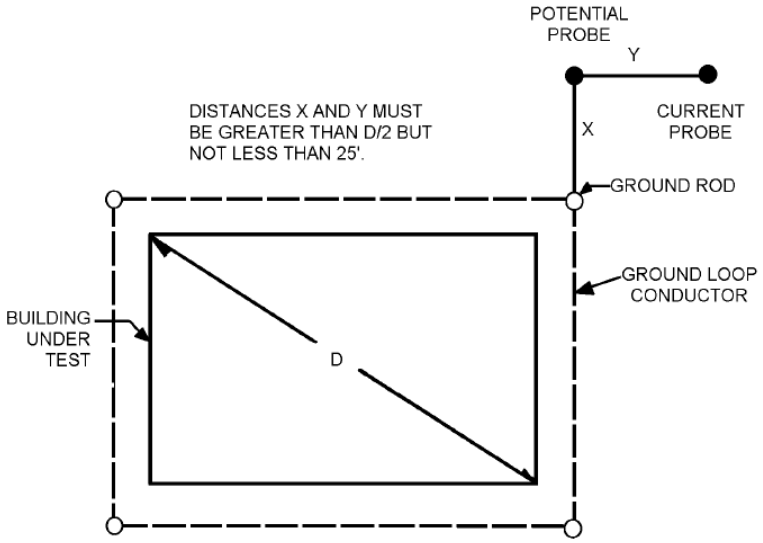


FIGURE 3-2-2: TEST PROBE LOCATIONS

b. The electrodes will be driven approximately 18 inches into the earth.

5. Specific Test Procedures

a. The test conductor will ensure that the Biddle DET2/2 megger is properly configured for three point fall of potential testing as shown in Figure 3-2-1. The test conductor will verify that the power to the tester is off and that the test lead for the C1/P1 electrode is disconnected from the tester.

b. The test conductor will identify the item under test and identify the locations of the reference electrodes.

c. The test conductor will install the reference electrodes described in paragraph 2b at a depth of approximately 18 inches. Specific electrode locations will be identified.

d. The test conductor operator will connect the C2 electrode of the test equipment to the most distant reference electrode (current probe). The test conductor will also connect the closest reference electrode to the P2 electrode (potential probe) of the test equipment. The item under test electrode (C1/P1 electrode) will remain disconnected.

e. The test conductor will prepare the test point and connect the test lead to the test point.

f. The test conductor will make the resistance measurement. Connect the test lead to the C1/P1 electrode and confirm that the TEST CURRENT is set at NORMAL and the FILTER is switched out.

g. The test conductor will switch the RANGE selector switch to the 2000-ohm range until the test value drops below the maximum value of the next lowest range. This process should continue until the resistance measurement is made on the lowest range possible.

h. The test conductor will record the value on the data sheet for the facility.

i. The test conductor operator will verify that the power to the test equipment is OFF and that the C1/P1 electrode has been disconnected.

j. Upon verification that the lead has been disconnected from the test equipment, the test conductor will remove the test lead from the test point and prepare the next test point.

k. The test conductor will check the location of the reference electrodes and determine whether they need to be moved for the next measurement. Should the electrodes be required to be moved, the test conductor will move the electrodes to the required locations. Electrode installation and test equipment configuration will be as detailed in paragraph 4 above.

l. Repeat steps 5b through 5k until all resistance to earth measurements have been made.

6. Data Analysis. Resistances to earth requirement standards are listed in Exhibit 3-8.

EXHIBIT 3-3
BONDING RESISTANCE TEST PROCEDURE

1. General Requirements. Point to point bonding measurements will be conducted per the requirements of references (a) and (b) using the methods below.

WARNING
ONLY AUTHORIZED ORDNANCE HANDLERS WILL HANDLE ANY EXPLOSIVES MATERIALS

2. Test Equipment. A Biddle DET2/2 megger tester, or equivalent, will be used in the measurement of point to point bonding resistances in ordnance storage and operating facilities. The C1 and P1 electrodes will be shunted together and the C2 and P2 electrodes will be shunted. All measurements will be made between the C1/P1 and C2/P2 terminals.

WARNING
THE BIDDLE DET2/2 MEGGER IS NOT APPROVED FOR USE IN HAZARDOUS CLASSIFIED LOCATIONS. THE TEST EQUIPMENT MUST NOT BE LOCATED IN ANY AREA WHERE THERE MAY BE EXPLOSIVE DUSTS, EXPOSED EEDs, OR FLAMMABLE OR COMBUSTIBLE VAPORS

3. Selection of Test Points

a. The test points to be used in the bonding resistance testing must be as specified on the test data sheet for the structure. Test points are intended to yield representative readings and will be used to document for testing metal masses not visually bonded. All metal masses will be electrically tested, either through direct reading or indirectly by reading an item that is bonded via connection to the item in question.

b. It is the responsibility of the test conductor to make the connection of the test leads to the items under test. The test conductor will have the ultimate responsibility to determine the specific test point location.

4. Specific Test Procedures

a. Prior to conducting any point to point resistance testing, the test conductor will ensure that the test equipment is configured as shown in Figure 3-3-1.

b. Prior to conducting any of the testing discussed in this section, the resistance of the test leads to be used will be measured and recorded onto the data sheet.

c. The test conductor will select the test points from the test data sheet provided by the grounding system program manager.

d. The test conductor will prepare the test points and make the connection between the test leads and the items under test.

WARNING

THE TEST LEADS MUST BE DISCONNECTED FROM THE TEST EQUIPMENT UNTIL SUCH TIME THAT THE LEADS HAVE BEEN CONNECTED TO THE TEST POINTS AND THE TEST CONDUCTOR HAS GIVEN THE COMMAND TO MAKE THE READING

e. Once the test conductor has made the connection between the test leads and the test points, the test conductor will make the measurement.

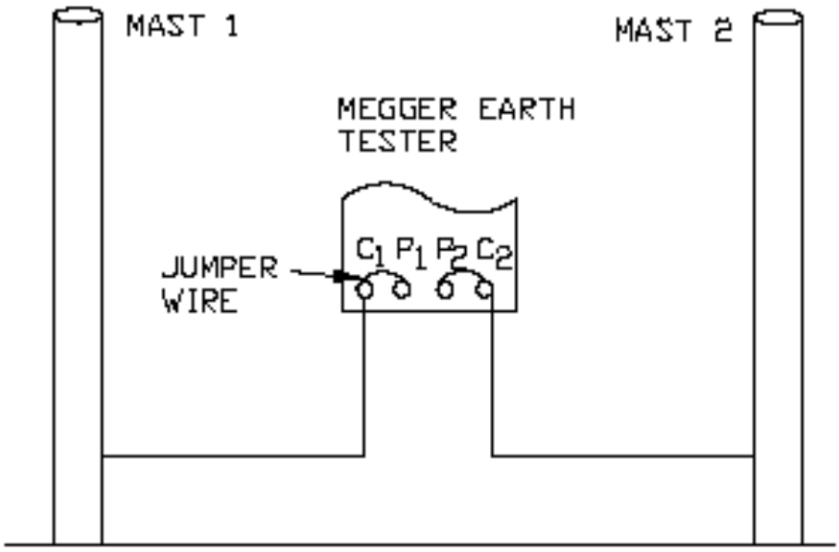


FIGURE 3-3-1: BONDING RESISTANCE TESTING EQUIPMENT CONFIGURATION

WARNING

PRIOR TO CONNECTING THE LEADS TO THE TEST EQUIPMENT, ENSURE THAT THE POWER TO THE TEST EQUIPMENT IS OFF

f. The test conductor will connect the test leads to the test equipment as described in paragraph 2.

g. Prior to applying power to the test leads, ensure that the C1 and P1 electrodes are shunted together and the C2 and P2 electrodes are shunted, that the TEST CURRENT is set on the NORMAL setting and the FILTER is OFF.

h. Switch the RANGE selector switch working down from the highest to lowest possible range.

i. Turn off the power to the test equipment and remove the test leads. The test conductor will record the test results on the data sheet.

j. The test conductor will prepare the next test point and repeat steps 4c through 4i until all the data is gathered on each of the test points specified.

5. Data Analysis. Bonding resistance requirement standards are listed in Exhibit 3-8.

EXHIBIT 3-4
VISUAL INSPECTION PROCEDURE

1. Purpose. This attachment provides detailed job plans to be used in the visual inspections of grounding systems for ordnance storage and operating facilities. The job plan must be used during the visual inspections to ensure all types of grounding systems are inspected and to provide documentation of the visual inspection.

2. Visual Inspection Procedures

a. The visual inspection job plan for buildings is provided as Exhibit 3-6 and for magazines as Exhibit 3-7. Both visual and physical (where practical) inspections of bonding connections must be conducted. The purpose of the inspection is to identify obvious points of non-compliance with the requirements of references (a) and (b). All bonding points must be visually inspected for potential isolation due to paint or corrosion. Any evidence of paint or corrosion will be noted in the Visual Inspection Checklist Comment column. The Grounding Crew must replace the bonding point to ensure that the corrosion or paint does not influence the effectiveness of the bonding connection.

b. Any modifications to the structure made within the last six months must be reviewed in detail to ensure they were made per the requirements of this test plan. Any bonding or grounding points' test results (from the last electrical test), which differed greatly from other test data gathered during the same test period, must also be examined in detail.

3. Records. The Visual Inspection data will be stored in a data file for retrieval for use as required for trend analysis or for use by inspection personnel. This information is located in the NAVFAC historical repository folder.

EXHIBIT 3-5
MAGAZINE TEST PROCEDURE

1. General Requirements

a. Conduct Earth Resistance Test per Exhibit 3-2.

b. Place reference rod C2 and P2 at the distances (in feet) from the ground girdle as shown in Table 3-5-1. Rods must be placed at right angles and 18" in depth.

MAGAZINE TYPE	C2	P2
Hi-Explosive	100	50
Smokeless	150	75
Ready	50	25
Portable	50	25
Above Ground	250	125

TABLE 3-5-1: MAGAZINE TYPE/REFERENCE ROD DISTANCES

c. The test reading will be taken to the left door on the left side of the magazine when facing the magazine. This door is considered door #1.

d. Perform bonding resistance tests per Exhibit 3-3. Readings are point to point from door #1.

e. Identify permanently affixed metallic masses over 400 square inches or 1000 cubic inches inside the magazine.

f. Perform a visual inspection per Exhibit 3-4. If magazine is loaded, note findings - testing may not be performed inside a loaded magazine. The Building Supervisor/Magazine Custodian will be responsible for requesting Open Flame Permits for loaded magazines or downloading of magazines so deficiencies can be corrected and inspections completed.

g. If magazine is not loaded, proceed with bonding resistance testing inside the magazine per Exhibit 3-3.

2. Magazine Test Points

a. Smokeless Magazines

(1) Exterior Magazine Bonding Resistance Tests:

(a) Door #1 to Door #2

(b) Door #1 to Door #3

(c) Door #1 to Door #4

(d) Door #1 to Dome Vent #1

(e) Door #1 to Dome Vent #2

(f) Door #1 to Dome Vent #3

(g) Door #1 to Dome Vent #4

(h) Door #1 to window grates outside

(i) Door #1 to railroad track

(2) Interior Magazine Bonding Resistance Tests

(a) Door #1 to inside window grates

(b) Door #1 to inside dome vent grates

(c) Grounding plate to pallets if bonded

b. High-Explosive/Ready Magazines

(1) Exterior Magazine Bonding Resistance Tests

(a) Grounding plate to doors

(b) Grounding plate to dome vents

(2) Interior Magazine Bonding Resistance Tests

(a) Grounding plate to inside dome vent grate

(b) Grounding plate to pallets if bonded

c. Portable Magazines - Interior Magazine Bonding Resistance Tests: Grounding plate to pallets if bonded.

d. Above Ground Magazines - Exterior Magazine Bonding Resistance Tests:

(1) CP1 to CP2

(2) CP1 to Door #1

(3) Door #1 to Flashing

(4) Door #1 to Door #2

(5) Door #1 to Door #3

(6) Door #1 to Door #4

(7) Door #1 to Door #5

(8) Door #1 to Door #6

(9) Door #1 to Door #7

(10) Door #1 to Door #8

(11) Door #1 to Left Window

(12) Door #1 to Right Window

(13) Door #1 to Guttering #1

(14) Door #1 to Guttering #2

(15) Door #1 to Guttering #3

(16) Door #1 to Guttering #4

(17) Door #1 to Railroad Track

(18) Door #1 to Inside Grates

EXHIBIT 3-6
BUILDING VISUAL INSPECTION CHECKLIST

DATE:_____ BUILDING:_____ INSPECTOR(S):_____

	ACCEPTABLE		
1. LIGHTNING PROTECTION SYSTEMS	**YES**	**NO**	**N/A**
A. Masts, overhead wires, air terminals, properly supported?			
B. Down conductors continuous? (Less than 1/3 of strands broken, no sharp bends or kinks less than 90 degrees in 8")			
C. No part of structure obviously outside of zone-of-protection?			
D. No non-bonded item within sideflash distance (six (6) feet) of lightning protection system or frame of structure?			
COMMENTS:			
2. ORDNANCE GROUNDING SYSTEM	**YES**	**NO**	**N/A**
A. Clearly marked to preclude misidentification?			
B. Isolated from other grounding systems internally?			
C. Connection to ground girdle intact?			
D. Sufficiently supported?			
E. Ground reels isolated from structure?			
F. Attachment to connector adequate?			
COMMENTS:			
3. EQUIPMENT/STRUCTURE BONDING	**YES**	**NO**	**N/A**
A. No isolated structural components?			
B. All equipment within sideflash distance of structure bonded?			
C. Structural bonding cables? #1/0?			
D. Equipment bonding cables? #6?			
E. Only braided straps installed on equipment that vibrates or is subject to significant movement?			
F. Paint on bond point? (If so, give pull test.)			
G. Paint or corrosion sufficient to provide isolation? (If so, conduct electrical test to verify continuity.)			
COMMENTS:			
4. POWER SERVICE GROUND	**YES**	**NO**	**N/A**
A. Ground attachment point free of corrosion? Tightly connected?			
B. No obvious breaks in bonding cables? (To ground rod or bond to secondary girdle.)			
C. Power service surge suppressors - properly installed, unit is operational.			
COMMENTS:			

	ACCEPTABLE		
5. STATIC GROUNDING SYSTEM	**YES**	**NO**	**N/A**
A. Bonding/Grounding cabling continuous? (Not grounded through gas, steam, air lines, dry sprinkler piping, or lightning down conductor.)			
B. Conductive floors/mats/table tops clean, relatively smooth, and free of cracks?			
C. Grab bars securely supported, not painted?			
D. Grab bars installed just outside at entrance to area with a conductive floor?			
E. Ground reel connectors attachment to cables adequate?			
F. Conductive chairs, carts, and work stations being/to be used for bonding/grounding of ordnance are clearly labeled as conductive/anti-static?			
COMMENTS:			
6. GROUNDING CABLE/STRAP	**YES**	**NO**	**N/A**
A. Electrical test performed when manufactured/repaired?			
B. Connectors properly attached?			
C. Attachment point(s) free of paint?			
COMMENTS:			
7. FENCES	**YES**	**NO**	**N/A**
A. Bond across gates?			
B. Gates grounded?			
C. Fences grounded at high tension power line crossing points and at 150-ft. intervals for parallel line runs?			
COMMENTS:			
8. RAILROAD TRACKS	**YES**	**NO**	**N/A**
A. Bonded across joints?			
B. Bonded to structure?			
COMMENTS:			
9. INSTRUMENTATION GROUND	**YES**	**NO**	**N/A**
A. Clearly marked to preclude confusion with ordnance ground?			
B. Isolated from other grounding systems?			
C. Bonded to secondary girdle?			
COMMENTS:			

EXHIBIT 3-7
MAGAZINE INSPECTION CHECKLIST

DATE:_____ BUILDING:_____ INSPECTOR(S):_____

	ACCEPTABLE		
1. EXTERIOR STRUCTURE BONDING	**YES**	**NO**	**N/A**
A. Door bonded to frame?			
B. Drip guard over door bonded?			
C. Window grates bonded?			
D. Dome vent metal flashing bonded to grounding system?			
E. No non-bonded item within sideflash distance (six (6) feet) of lightning protection system or frame of structure?			
F. Paint on bond point? (If so, give pull test.)			
G. Paint or corrosion sufficient to provide isolation? (If so, conduct electrical test to verify continuity.)			
COMMENTS:			
2. RAILROAD TRACKS	**YES**	**NO**	**N/A**
A. Bonded across joints?			
B. Bonded to structure?			
C. Rails bonded together with #2/0 cable?			
COMMENTS:			
3. INTERIOR STRUCTURE BONDING	**YES**	**NO**	**N/A**
A. No isolated metal mass greater than 400 square inches or 1000 cubic inches?			
B. Window grates bonded?			
C. Dome vent grates bonded?			
D. Paint on bond point? (If so, give pull test.)			
E. Paint or corrosion sufficient to provide isolation? (If so, conduct electrical test to verify continuity.)			
COMMENTS:			
4. GROUNDING CABLE/STRAP	**YES**	**NO**	**N/A**
A. Electrical test performed when manufactured/repaired?			
B. Connectors properly attached?			
C. Attachment point(s) free of paint?			
COMMENTS:			

Note: Embedded grounding strips, unless being used, are not considered metal masses per Explosives Safety Office.

EXHIBIT 3-8
INSPECTION/TEST REQUIREMENT STANDARDS

NOTE: For Army facilities, substitute "PW" for "NSWC" as the responsible organization throughout the table, unless otherwise noted.

GROUND SYSTEM	REQUIREMENTS (OHMS)	ELECTRICAL INSPECTION INTERVAL (NOTE 9)	VISUAL INSPECTION INTERVAL (NOTE 9)	RESPONSIBLE ORGANIZATION	NAVSEA OP-5 PARAGRAPH
PRIMARY	25 OHMS MAX TO EARTH	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL	5-4.1 5-8.2 5-8.3 6-9 6-9.1.1
	LESS THAN 1 OHM MAX TO SECONDARY	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL (NOTE 1)	5-4.1 5-8.2 5-8.3 6-9 6-9.1.1 6-9.2
SECONDARY	25 OHMS MAX TO EARTH	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL	5-5 5-8.2 5-8.3
	LESS THAN 1 OHM MAX TO ALL GNDS CONNECTED TO SECONDARY	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL (NOTE 1)	5-8.2 5-8.3
POWER SERVICE GROUND	25 OHMS MAX TO EARTH	NEW CONSTRUCTION OR REPLACING TRANSFORMER	6 MONTHS	PW – ELECTRICAL PW – VISUAL	5-5.1 5-5.1.1 5-5.1.2
	LESS THAN 1 OHM MAX TO SECONDARY	24 MONTHS	NONE	PW – ELECTRICAL	5-5.1 5-5.1.1 5-5.1.2
POWER SERVICE SURGE SUPPRESSORS	INSPECT UNIT FOR PROPER OPERATION (NOTE 8)	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL	5-8.3 6-7.2
INSTRUMENT GROUND	LESS THAN 1 OHM MAX TO SECONDARY	24 MONTHS	NONE	PW – ELECTRICAL (NOTE 5)	5.5-2
INSTRUMENTATION GROUND	LESS THAN 1 OHM MAX TO ALL GNDS CONNECTED TO SECONDARY	PRIOR TO TEST OR AFTER MODIFICATIONS	PRIOR TO TEST	– ELECTRICAL (NOTE 10) NSWC – VISUAL	5-5.2
STATIC GROUNDS (GENERAL)	LESS THAN 1 OHM MAX TO SECONDARY	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL	5-5.3 5-8.2 5-8.3
CONDUCTIVE FLOORS	1,000,000 OHMS MAX (NOTE 11)	24 MONTHS (NOTE 6)	6 MONTHS	PW – ELECTRICAL PW – VISUAL	5-5.3.1 5-8.1.9
CONDUCTIVE SHOES	500,000 OHMS MAX PER SHOE (NOTE 4)	PRIOR TO USE DAILY (NOTE 4)	PRIOR TO USE DAILY	OPERATING PERSONNEL	5-5.3.2.2 5-5.3.2.3

GROUND SYSTEM	REQUIREMENTS (OHMS)	ELECTRICAL INSPECTION INTERVAL (NOTE 9)	VISUAL INSPECTION INTERVAL (NOTE 9)	RESPONSIBLE ORGANIZATION	NAVSEA OP-5 PARAGRAPH
LEGSTATS	750,000 OHMS MAX 25,000 OHMS MIN	PRIOR TO USE OR RE-USE DAILY	PRIOR TO USE OR RE-USE DAILY	OPERATING PERSONNEL	5-5.3.3
WRIST STRAPS	1,200,000 OHMS MAX 25,000 OHMS MIN	PRIOR TO USE OR RE-USE DAILY	PRIOR TO USE OR RE-USE DAILY	OPERATING PERSONNEL	5-5.3.4
GROUND GRAB BARS	LESS THAN 1 OHM MAX TO SECONDARY	24 MONTHS	6 MONTHS	PW – ELECTRICAL	5-5.3.5
CONDUCTIVE TABLE TOPS	LESS THAN 1 OHM MAX BONDING TO STATIC GND (POINT TO POINT)	UPON INSTALLATION OR WHEN RELOCATED	NONE	– ELECTRICAL (NOTE 10)	5-8.2.6.1
	1,000,000 OHMS MAX (NOTE 3)	24 MONTHS	NONE	PW – ELECTRICAL	5-5.3.6.1
CONDUCTIVE MATS	LESS THAN 1 OHM MAX BONDING TO STATIC GND (POINT TO POINT)	UPON INSTALLATION OR WHEN RELOCATED	NONE	– ELECTRICAL (NOTE 10)	5-5.3.6.1
ORDNANCE GROUNDS	LESS THAN 1 OHM MAX TO SECONDARY	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL (NOTE 1)	5-5.4.5.1
	25 OHMS MAX TO EARTH (NOTE 2)	UPON INSTALLATION, AND 24 MONTHS THEREAFTER	NONE	PW – ELECTRICAL	5-5.4.5.2
	20,000 OHMS MIN ISOLATION (WHERE POSSIBLE)	24 MONTHS	NONE	PW – ELECTRICAL	5-5.4.6.2
METAL TABLE TOPS	LESS THAN 1 OHM MAX TO SECONDARY	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL	5-5.4.3
	LESS THAN 1 OHM MAX BONDING TO ORDNANCE GROUND (POINT TO POINT)	UPON INSTALLATION OR RELOCATION	NONE	– ELECTRICAL (NOTE 10)	5-5.4.5 5-5.4.6
STRUCTURAL GROUNDS	LESS THAN 1 OHM MAX TO SECONDARY	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL (NOTE 1)	5-5.5 5-8.3.2
MACHINERY AND EQUIPMENT	LESS THAN 1 OHM MAX TO SECONDARY	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL	5-7.1 5-8.3.2
	LESS THAN 1 OHM MAX BONDING TO SECONDARY GROUND (POINT TO POINT)	UPON INSTALLATION OR RELOCATION	NONE	– ELECTRICAL (NOTE 10)	5-8.3.2
BELTING	1,000,000 OHMS MAX (NOTE 3)	24 MONTHS	NONE	PW – ELECTRICAL	5-5.3.6.1 5-7.1
SPRAY PAINT EQUIPMENT GROUNDS	LESS THAN 1 OHM TO SECONDARY	24 MONTHS	NONE	PW – ELECTRICAL	5-7.2
PORTABLE EQUIPMENT (CHAIRS, CARTS, ETC.) ON CONDUCTIVE SURFACES	250,000 OHMS MAX	24 MONTHS	PRIOR TO USE DAILY AND/OR RELOCATION	PW – ELECTRICAL – VISUAL	5-9.4 5-9.5
GROUNDING CABLES/STRAPS	1 OHM MAX CLIP-TO-CLIP 25 OHM MAX REEL TYPE CABLES	WHEN MADE/REPAIRED AND PRIOR TO USE OR RE-CONNECT (NOTE 7)	PRIOR TO USE DAILY AND/OR RELOCATION	PW – ELECTRICAL (NOTE 10) – VISUAL	5-9.7.3 5-9.7.4 5-9.7.5

GROUND SYSTEM	REQUIREMENTS (OHMS)	ELECTRICAL INSPECTION INTERVAL (NOTE 9)	VISUAL INSPECTION INTERVAL (NOTE 9)	RESPONSIBLE ORGANIZATION	NAVSEA OP-5 PARAGRAPH
FENCES	25 OHMS MAX TO EARTH	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL	6-6.3.2 6-9.2
FENCE POST TO POST	LESS THAN 1 OHM MAX BONDING	24 MONTHS	NONE	PW – ELECTRICAL	5-8.3.2 6-6.3.2
RAILROAD TRACKS	LESS THAN 1 OHM MAX BONDING	24 MONTHS	6 MONTHS	PW – ELECTRICAL PW – VISUAL	6-6.3.1
MAGAZINES AND STORAGE FACILITIES	25 OHMS MAX TO EARTH	24 MONTHS	6 MONTHS (EXTERIOR) 6/12 MONTHS (INTERIOR)	PW – ELECTRICAL PW– VISUAL (NOTES 1)	5-4.1 6-8.2 6-9.1.2 6-9.3
	LESS THAN 1 OHM MAX BONDING	24 MONTHS	6 MONTHS (EXTERIOR) 6/12 MONTHS (INTERIOR)	PW – ELECTRICAL PW– VISUAL (NOTES 1)	5-9.1 6-9.3

Note (1): Visual inspection of lightning protection systems must be conducted by personnel trained in the inspection of DOD lightning protection systems (reference OP-5 paragraph 6-8.2 and 6-9).

Note (2): The measurements of the resistance to earth of the ordnance ground are not necessary if the earth resistance of the secondary ground girdle and the bonding resistance between the girdle and the ordnance bus bar are measured.

Note (3): The following are minimum resistance values when personnel are bonded to the static ground system and when electrical power is present in the area. The minimum resistance values are a function of the voltage encountered. When there is no electrical power present in the area, no minimum resistance is required.

- 110 VAC - 5,000 ohms
- 220 VAC - 10,000 ohms

Note (4): Test Log required. The information recorded on the log will indicate the wearer's name, the resistance reading or acceptable/unacceptable reading, date test conducted and initials of the person conducting the test. The test must be conducted at least once every 3 months.

Note (5): These grounds should be tested during new construction, prior to the first use, after repairs, and at the regular 24-month test interval. Upon completion of repair work, an electrical test will be performed and test results will be recorded.

Note (6): Consider reducing the frequency of testing to every seven months (or possibly more often under adverse conditions where insulating substances may build-up on the floor, i.e., dirt, dust, mud or inclement weather conditions) for those areas where there is a high volume of traffic on the floor or when conductive shoes are worn outside of the structure.

Note (7): Grounding cables/straps must be marked when they have been electrically tested, and put in service. A black cable tie is the preferred method for use for this purpose, however a serialized indicator can also be utilized to meet this requirement.

Note (8): Surge suppression units have lights, which indicate the status of the unit. Verify that unit is functional.

Note (9): Visual inspections must be performed as close as possible to 6 months from the previous inspection. 24 month electrical tests must be performed 24 months (+/- 30 days) from the previous test.

Note (10): Daily and periodic ground checks performed by NSWC Explosive Building Operating Personnel prior to test setup and for maintaining operations within explosive test facilities must be performed using calibrated meters capable of reading 1 ohm ±10%. The meters will be used to verify specific grounding requirements for equipment, tabletops, carts, test hardware, fixtures, wrist straps, etc. Recording grounding test results are covered in the Standard Oprerating Procedures (SOP).

Note (11): In the review of conductive floor test results, it is recommended that any value which exceeds one million ohms or any value less than 5,000 ohms (for a facility serviced by 100 VAC) to 20,000 ohms (for a facility serviced by 440 VAC) be investigated and repaired, as appropriate.

EXHIBIT 3-9
ELECTRICAL TEST JOB PLANS

1. SMOKELESS MAGAZINE ELECTRICAL TEST JOB PLAN

a. EXTERIOR STRUCTURE BONDING

(1) What is the soil condition?

(2) Place rod 150' from Door 1 for Reference Point C.

(3) Place rod 75' from Door 1 for reference Point P.

(4) Point X Description?

(5) Door bonded to frame (exterior)?

(6) Drip guard over door bonded?

(7) Take Measurement for Door #1 to Door #2.

(8) Take Measurement for Door #1 to Door #3.

(9) Take Measurement for Door #1 to Door #4.

(10) Window grates bonded (exterior)?

(11) Take Measurement Door #1 to Window Grates (exterior).

(12) Dome vent metal flashing bonded to grounding system (exterior)?

(13) Take Measurement Door #1 to Dome Vent #1.

(14) Take Measurement Door #1 to Dome Vent #2.

(15) Take Measurement Door #1 to Dome Vent #3.

(16) Take Measurement Door #1 to Dome Vent #4.

(17) No non-bonded item within side flash distance (six (6) feet) of lightning protection system or frame of structure?

(18) Paint on bond point (exterior)? (If so, give pull test.)

(19) Paint or corrosion sufficient to provide isolation (exterior)? (If so, replace.)

b. RAILROAD TRACKS

(1) Are railroad tracks bonded across joints?

(2) Are railroad tracks bonded to structure?

(3) Take Measurement Door #1 to Railroad Track.

(4) Are rails bonded together with #2/0 cable?

c. INTERIOR STRUCTURE BONDING

(1) No isolated metal mass greater than 400 square inches?

Note: Embedded Grounding Strips/Bolts, unless being used, are not considered metal masses per ESO.

(2) Window grates bonded (interior)?

(3) Take Measurement Door #1 to Window Grates (interior)(If magazine is empty).

(4) Dome vent grates bonded (Interior)? (If Magazine is Empty)

(5) Take Measurement Door #1 to Dome vent Grates (interior)(If magazine is empty).

(6) Paint on bond point (interior)? (If so, give pull test.)

(7) Paint or corrosion sufficient to provide isolation (interior)? (If so, replace.)

2. HIGH-EXPLOSIVE MAGAZINE ELECTRICAL TEST JOB PLAN

a. EXTERIOR STRUCTURE BONDING

(1) What is the soil condition?

(2) Place rod 50' from Grid Plate for Reference Point C.

(3) Place rod 100' from Grid Plate for Reference Point P.

(4) Point X Description?

(5) Take measurement at Point X.

(6) Door bonded to frame (exterior)?

(7) Take measurement from Grounding Plate to Doors.

(8) Drip guard over door bonded (exterior).

(9) Dome Vent metal flashing bonded to grounding system.

(10) Take Measurement Grounding Plate to Dome Vent.

(11) Take Measurement Grounding Plate to Inside Dome Vent Grate (If magazine is empty).

(12) No non-bonded item within side flash distance (six (6) feet) of lightning protection system or frame of structure?

(13) Paint on bond point (exterior)? (If so, give pull test.)

(14) Paint or corrosion sufficient to prove isolation (exterior)? (If so, replace.)

b. INTERIOR STRUCTURE BONDING

(1) No isolated metal mass greater than 400 square inches?

Note: Embedded Grounding Strips/Bolts, unless being used, are not considered metal masses per ESO.

(2) Dome vent grates bonded (interior)?

(3) Paint on bond point (interior)? (If so, give pull test.)

(4) Paint or corrosion sufficient to provide isolation (interior)? (If so, replace.)

3. PORTABLE MAGAZINE ELECTRICAL TEST JOB PLAN

a. EXTERIOR STRUCTURE BONDING

(1) What is the soil condition?

(2) Place rod 25' from Door 1 for Reference Point C.

(3) Place rod 50' from door 1 for Reference Point P.

(4) Point X Description?

(5) Take measurement at Point X.

(6) Door bonded to frame (exterior)?

(7) No non-bonded item within side flash distance (six (6) feet) of lightning protection system or frame of structure?

(8) Paint on bond point (exterior)? (If so, give pull test.)

(9) Paint or corrosion sufficient to provide isolation (interior)? (If so, replace.)

b. GROUNDING CABLE/STRAP

(1) Electrical test performed when manufactured or repaired?

(2) Connectors properly attached?

(3) Attachment point(s) free of paint?

4. READY MAGAZINE ELECTRICAL TEST JOB PLAN

a. EXTERIOR STRUCTURE BONDING

(1) What is the soil condition?

(2) Place rod 25' from Door 1 for Reference Point C.

(3) Place rod 50' from Door 1 for Reference Point P.

(4) Point X Description?

(5) Take measurement at Point X.

(6) Door bonded to frame (exterior)?

(7) Take measurement from Grounding Plate to Doors.

(8) Drip guard over door bonded (exterior)?

(9) No non-bonded item within side flash distance (six (6) feet) of lightning protection system or frame of structure?

(10) Take Measurement Grounding Plate to Dome Vent.

(11) Paint on bond point (exterior)? (If so, give pull test.)

(12) Paint or corrosion sufficient to provide isolation (exterior)? (If so, replace.)

b. INTERIOR STRUCTURE BONDING

(1) No isolated metal mass greater than 400 square inches?

Note: Embedded Grounding Strips/Bolts, unless being used, are not considered metal masses per ESO.

(2) Take Measurement Grounding Plate to Inside Dome Vent Grate (If magazine is empty).

(3) Paint on bond point (interior)? (If so, give pull test.)

(4) Paint or corrosion sufficient to provide isolation (interior)? (If so, replace.)

c. GROUNDING CABLE/STRAP

(1) Electrical test performed when manufactured or repaired?

(2) Connectors properly attached?

(3) Attachment point(s) free of paint?

5. ABOVE GROUND MAGAZINE ELECTRICAL TEST JOB PLAN

a. EXTERIOR STRUCTURE BONDING

(1) Masts, overhead wires, air terminals, properly supported?

(2) Down conductors continuous? (Less than 1/3 of strands broken, no sharp bends or kinks less than 90 degrees in 6".)

(3) No part of structure obviously outside of zone-of-protection?

(4) No non-bonded item within sideflash distance (six (6) feet) of lightning protection system or frame of structure?

(5) Down conductors provided protection from damage or displacement from grade level up to a minimum of 6 feet?

(6) What is the soil condition?

(7) Place rod 125' from Door 1 for Reference Point C.

(8) Place rod 250' from Door 1 for Reference Point P.

(9) Point X Description?

(10) Take measurement at Point X.

(11) Take measurement CP1 TO CP2

(12) Take measurement CP1 TO Door #1.

(13) Take measurement Door #1 to Door #2.

(14) Take measurement Door #1 to Door #3.

(15) Take measurement Door #1 to Door #4.

(16) Take measurement Door #1 to Door #5.

(17) Take measurement Door #1 to Door #6.

(18) Take measurement Door #1 to Door #7.

(19) Take measurement Door #1 to Door #8.

(20) Take measurement Door #1 to Left Window.

(21) Take measurement Door #1 to Right Window.

(22) Take measurement Door #1 to Guttering #1.

(23) Take measurement Door #1 to Guttering #2.

(24) Take measurement Door #1 to Guttering #3.

(25) Take measurement Door #1 to Guttering #4.

b. EQUIPMENT/STRUCTURE BONDING

(1) No isolated structural components?

(2) All equipment within sideflash distance of structure bonded?

(3) Structural bonding cables are greater than or equal to #1/0?

(4) Equipment bonding cables are greater than or equal to #6?

(5) Only braided straps installed on equipment that vibrates or is subject to significant movement?

(6) Paint on bond point? (If so, give pull test.)

(7) Paint or corrosion sufficient to provide isolation? (If so, conduct electrical test to verify continuity.)

c. STATIC GROUNDING SYSTEM - Bonding/Grounding cabling continuous? (Not grounded through gas, steam, airlines, dry sprinkler piping, or lightning down conductor.)

d. RAILROAD TRACKS

(1) Bonded across joints?

(2) Bonded to structure?

(3) Take measurement Door #1 to Railroad Track.

EXHIBIT 3-10
GROUNDING SYSTEM TEST PLAN DESCRIPTIONS

1. Magazine - Any building or structure, except an operating building, used for the storage of ammunition and explosives.

2. Operating Building - Any structure, except a magazine, in which operations pertaining to manufacturing, processing, handling, loading, or assembling of explosives or ammunition is performed.

3. Production Building - Any building or structure, except a magazine, in which ammunition and explosives are manufactured, renovated, reconditioned, reclaimed, or demilitarized.

4. T&E Building - Any building or structure used for a Test & Evaluation function. These are operations that are a planned destructive or potentially destructive test intended to characterize an energetic material or ordnance item as to its sensitivity to known hazards, its physical properties, or its performance properties.

5. Ordnance Facilities - Operating buildings, magazines, test ranges, or where ordnance is tested, stored or handled.

6. Girdle - A continuous loop of cable buried around a facility.

7. Primary Grounding System - A series of ground rods and uninsulated buried copper cable interconnecting the rods which are installed to provide earth termination for lightning protection systems.

8. Secondary Grounding System - A buried copper conductor that interconnects all of the grounds and conductive bodies attached to or inside the structure that are to be bonded to a grounding system. The secondary grounding system provides a minimum of protection from the effects of lightning by providing a common grounding point for any item in the structure that requires grounding. The secondary grounding system is comprised of a girdle with the grounding subsystems listed below that may be present. These subsystems, when provided, must be bonded to the secondary ground:

a. Power Service Ground - A separate ground as required by the National Electrical Code, NFPA 70.

b. Instrumentation Ground - A ground bonded to the secondary grounding system, but isolated from other grounds in the facility, that provides error-free operation of sensitive electronics instrumentation.

c. Static Ground - A conductive path to dissipate any static charges that may be generated. Examples of static ground devices are conductive floors, conductive shoes, legstats, wrist straps,

ground grab bars, conductive table tops, conductive mats, portable ground cables and installed ground cables.

d. Ordnance Ground - A ground electrically separated from all other ground systems and bonded to the secondary girdle. The intent of the ordnance ground is to bring and maintain a zero potential difference between weapon components being mated. This will ensure that electric currents do not flow between ordnance components when they come into contact during mating, de-mating, assembly, disassembly or warheading.

e. Structural Ground - The structural steel in all ordnance facilities that is bonded to the secondary grounding system.

f. Grounding Cable/Strap - Cables used for the connecting of ordnance to the grounding system for the prevention of lightning sideflash or electrostatic spark discharge. These cables have a clamp on either or both ends.

g. Metal Masses - Conductive bodies within 6 feet of any portion of the lightning protection or grounding system with the exception of those having less than 400 square inches of surface area.

(1) Metal masses in office areas that are separated from ordnance handling areas do not require bonding.

(2) In Test and Evaluation Buildings, Explosives Safety Office, the Building Supervisor, and the Grounding System Program Manager must jointly determine the items that must be bonded.

9. Test Data Sheet - The record sheet developed by the Grounding Program Manager used to document test results.

10. Grounding Record/Log book - The record/log book for grounding in the building/area. This book contains the record of grounding work performed, grounding system waivers or items grandfathered, and a grounding system sketch of the facility.

11. Visual Inspection - A visual review of the grounding and lightning protection systems performed periodically to ensure they are in good condition.

12. Visual Inspection Team - The personnel who conduct the visual inspection of a facility. This team is comprised of the Grounding Crew Test Conductor and the Building Supervisor or his designated representative for operating buildings. For magazines, the team is comprised of only the Grounding Crew Test Conductor.

13. Grounding System Program Manager - The employee assigned to manage the Grounding System Program.

14. Grounding Crew - Personnel assigned to perform inspections and testing on lightning protection and grounding systems.

15. Test Conductor - The Grounding Crew member in charge of the testing/inspection.

THIS PAGE

INTENTIONALLY

LEFT BLANK

CHAPTER 4
PARKING OF PRIVATELY-OWNED VEHICLES IN EXPLOSIVE STORAGE MAGAZINE AREAS

1. References

a. NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore

b. OPNAVINST 5530.14E, Navy Physical Security and Law Enforcement Program

c. NSACRANEINST 11015.2N, Natural Resources Rules and Regulations

2. Purpose. To provide policy for the parking of privately-owned vehicles (POVs) near explosive storage magazines per references (a) and (b).

3. Scope and Applicability. This chapter applies to Naval Support Activity (NSA) Crane, all tenants, contractors, and visitors.

4. Discussion. The majority of land at NSA Crane is used for explosive storage magazines. Hunters, maintenance, and construction crews required to perform work in magazine areas necessitate the parking of POVs in these areas. To facilitate seasonal hunting, natural resources activities, and contractor work in magazine areas, POVs are allowed in explosive magazine areas. The dangers posed by POVs parking in magazine areas, primarily fire, must be controlled to prevent catastrophic loss of explosive assets. References (a) and (b) require minimum distances to be maintained for vehicles from explosive facilities in order to control the consequences of a vehicle fire and outline restrictions for parking in areas where the storage of certain security category arms and ammunition is maintained.

5. Policy. POVs are allowed to be parked in certain magazine areas where high-security control is not a factor only for specific reasons and only if certain precautions are taken. Failure to park POVs per the guidance established by this chapter can result in the driver being requested to leave the activity. Exhibit 4-1 provides specific guidance that must be followed by all drivers of POVs while in explosive storage magazine areas.

6. Action

a. NSA Crane Force Protection Department will:

(1) Enforce the requirements of Exhibit 4-1.

(2) Outline the security-controlled magazine areas where parking cannot be allowed. Areas such as Level II restricted areas will not be designated for POV entry, thus not available for parking under any circumstance.

(3) Assure drivers are provided a copy of Exhibit 4-1 when registering for any purpose that will require parking in explosive storage magazine areas.

b. NAVFAC MidLant PWD Crane will:

(1) Provide a copy of Exhibit 4-1 to all contractors that will be required to park in or near magazines as a function of the work to be accomplished.

(2) Assure the contractor adheres to the requirements during visits to job sites for the purpose of inspecting contract effort.

c. Navy and Army Explosives Safety Offices will:

(1) Brief contract personnel on the requirements during pre-construction meetings.

(2) Assure drivers of POVs (contract and other) are notified of noncompliance when vehicles are found closer to explosive storage magazines than allowed.

d. Natural Resources personnel will ensure that all personnel needing access to land areas near explosive storage magazines comply with reference (c), and read and sign a Hunting and Fishing Indoctrination and Declaration form with parking guidance, or are informed of the requirements for parking in writing and verbally at safety briefings.

EXHIBIT 4-1
PRIVATELY-OWNED VEHICLE PARKING IN EXPLOSIVE MAGAZINE STORAGE AREAS

1. Parking of privately-owned vehicles (POVs) in explosive magazine areas is permitted on this activity following established guidelines. All earth-covered magazines are to be considered explosives storage. Non-earth-covered explosives storage magazines can be recognized by posted orange Fire Symbol placards with a number 1, 2, 3, or 4. Because of the size of Crane and the nature of the land surface, accessibility to specific work areas and areas for hunting must be by POV. It is important that POVs be parked away from explosive storage magazines at a safe distance from the magazine door. The following guidance will be followed when you must park in explosive magazine areas:

a. Park your POV off to the side of the main roadway, allowing sufficient room on the roadway for emergency vehicles to pass. Do not park on any driveway leading to a magazine.

b. In periods of High, Very High and Extreme Fire Danger Levels (as stipulated by the fire danger signs at the entry control points), park only on graveled areas or areas where vegetation has been controlled by mowing to less than six inches. This will help prevent catalytic converter ignition of dry vegetation.

c. If an area is restricted from hunting or fishing and/or there are Danger/Warning signs, road block signs and barricades, you MUST NOT enter these areas or go around any road blocks/barricades. Part of our mission involves the functioning of explosives and ordnance items and it is extremely hazardous to enter these restricted areas.

WARNING TO POV OPERATORS

Incidents with explosive storage magazines are extremely rare. However, because of the close proximity to magazines that results when parking in the field, any major event could substantially damage your POV with total loss possible. The most significant risk of triggering a major explosive event is represented by your POV and not the contents of the magazine. For this reason alone, park carefully and responsibly by following the guidelines above.

THIS PAGE

INTENTIONALLY

LEFT BLANK

CHAPTER 5
WILDFIRE PREVENTION AND CONTROL

1. References

a. NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore

b. NAVORDSAFSECACT ltr 8020 Ser N7112/846 of 13 Aug 01, Control of Vegetation (N00164/326)

c. National Fire Prevention Association (NFPA) 1, Fire Code

2. Purpose. To implement Exhibit 5-1 and to meet the requirements of references (a) and (b).

3. Scope and Applicability. This chapter applies to NSA Crane, all tenants, contractors, and visitors.

4. Background. Reference (a) establishes 18 inches as the maximum height limit for vegetation in firebreaks within 50 feet of any Potential Explosion Site (PES) and 25 feet along both sides of on-station rail tracks carrying ammunition and explosives. The requirements are based upon the factors that have been determined locally to be important in the prevention and control of wildfires. To meet the requirements of reference (b), the installation conducts a minimum of two mowings a year. Dependent on weather conditions, mowing normally begins the first week of June and October.

a. Per reference (a), when the fire hazard is HIGH in wooded or grassy areas because of dry conditions, Burning Ground and Detonation Treatment Operations will be undertaken only if properly manned mobile firefighting equipment is standing by in a safe location or can be made readily available within five minutes.

b. In situations where fire hazard is LOW to MODERATE, tenant activities operating ranges will utilize either safety observers, or fire watches, or both in a limited but essential capacity. Exhibit 5-2 details requirements for Fire Watch and Fire Department Standby for each range on NSA Crane and Lake Glendora Test Facility.

c. Reference (b) provides authorization for NSA Crane to use a command-approved wildfire control plan. The authorization states that the implementation of such a plan meets the intent of reference (a) requirements. Exhibit 5-1 provides the guideline for vegetation control.

5. Policy. NSA Crane will execute a program for the prevention and control of wildfires. The wildfire prevention and control capability (personnel, equipment, water sources, etc.) will be maintained at a fully satisfactory level.

6. Action

a. Explosives Safety Office will review mowing specifications for compliance with this chapter.

b. NAVFAC MidLant PWD Crane will

(1) Ensure that the requirements of Exhibit 5-1 for control of vegetation are met.

(2) Ensure the mowing specifications are provided to the Explosives Safety Office for review before issuance.

(3) Ensure Forestry records Fire Danger Levels and maintain records for a minimum of 5 years.

c. NSA Crane Fire and Emergency Services (F&ES)

(1) NSA Crane Fire Protection is trained to respond to wildland fires that may occur. Per reference (a), under conditions when fire hazard ratings are HIGH or above, NSA Crane F&ES will be in a position to respond within 5 minutes for Burning Ground and Detonation Treatment Operations as determined by available NSA Crane F&ES resources.

(2) NSA Crane Fire Prevention will perform inspection of explosives areas for mowing compliance, downed trees, access to the areas, etc.

(3) NSA Crane Fire Prevention will perform detailed on-site inspections prior to issuing Flame Permits in explosives areas. Flame Permits may be withheld from requesting agencies due to fire risk levels or other hazardous conditions. Fire standbys will be evaluated on a case-by-case basis.

d. NSA Crane Emergency Management Office will notify Crane personnel via the Computer Desktop Notification System (CDNS) when Fire Danger level reaches HIGH or above.

e. Department Directors and Heads of Tenant Activities will:

(1) Implement the requirements of this chapter by ensuring fire watches are identified and present on ordnance ranges when required by the specific Fire Danger Rating and type of operation.

(2) Ensure fire watches have received Fire Warden Training provided by the NSA Crane Fire Department.

f. Range Safety Officers and/or Process Supervisors will:

(1) Ensure fire watch requirements are met per Exhibit 5-2 of this chapter.

(2) Per Chapter 4 of reference (a), report all fires starting in the vicinity of ammunition or explosives immediately to NSA Crane Emergency Dispatch Center. Firefighting will be initiated with all available means and without awaiting specific instructions. If the fire involves explosive material, if it is supplying heat to explosives, or if it is so large that it cannot be extinguished with the equipment at hand, personnel in the area must evacuate and seek safety.

(3) Ensure the fire watch remains on station a minimum of 30 minutes after the operation is complete to ensure no fire develops after operations are completed.

g. Fire Watches

(1) A fire watch is primarily a safety observer and may be stood concurrent with other duties; for instance, these duties may be included as part of Range Safety Officer or Process Supervisor duties. Fire watches will complete Fire Warden Training provided by the NSA Crane Fire Department. Fire watches will remain vigilant and if an emergency develops, their first duty is to alert the NSA Crane Emergency Dispatch Center who will dispatch NSA Crane F&ES as appropriate.

(2) Per reference (c), fire watch is the assignment of a person or persons to an area for the express purpose of notifying the fire department, building occupants, or both, of an emergency; preventing a fire from occurring; extinguishing small fires; or protecting the public from fire or life safety dangers.

(3) Fire watches will have suitable fire extinguishing equipment immediately available for extinguishing incipient fires of the type expected at that location, as required by reference (a).

(4) The fire watch must stand by and remain on station a minimum of 30 minutes after the operation is complete to ensure no fire develops after operations are completed.

EXHIBIT 5-1
WILDFIRE PREVENTION AND CONTROL PLAN

1. Introduction. This exhibit addresses the factors that affect the wildfire control program of NSA Crane. It outlines the total effort to ensure sound program practices are recognized and continued.

2. History of Wildfires for Crane and Surrounding Forests

a. The effort to determine what wildfire control program is right for NSA Crane included a review of the past history of wildfires on the installation and on surrounding land areas having similar characteristics. History shows that the bulk of the fires occurred during two peak periods of the year, which are:

(1) Late winter/early spring months of March and April

(2) Fall/early winter months of October, November, and December

b. For southern Indiana, the vegetation growth period generally begins in May and extends to the end of September.

c. The origin of the wildfires occurring on the NSA Crane installation were reviewed each year from 2001 to 2007. The purpose of the review was to ascertain that the prevention, detection, and control plans were effective. The review included NSA Crane's brush and grass fire history, fire danger ratings, and measurements of vegetation growth. Review of the six-year history data resulted in the conclusion that the mowing requirements are adequate in maintaining an effective wildfire control plan. Therefore, data on vegetation growth and fire history will no longer be maintained.

d. NSA Crane enjoys a relatively LOW to MODERATE risk of wildfires. Table 5-1-1 illustrates the number of days the installation has been subject to the various fire danger levels since 2008.

Fire Danger 2008-Current						
	Fire Danger Level					Total
	Low	Moderate	High	Very High	Extreme	
Number of Days	3318	465	199	33	0	4015
Percent of Time	82.6%	11.6%	5.0%	0.8%	0.0%	100%

Table 5-1-1

3. Mowing

a. As a result of the analysis pertaining to the history of wildfires and fire danger periods for NSA Crane, the most critical factor regarding the mowing plan is the completion dates for all mowing. Completion dates for all vegetation control efforts must be prior to the beginning of the HIGH fire danger period if control is to be effective. For NSA Crane, the completion dates to minimize the fire risk due to excess vegetation have been determined to be:

(1) Mowing of magazines and magazine roads, firebreaks, and other areas around buildings and ranges – 1 October

(2) Mowing of railroad right-of-way – 1 September

b. Past experience has shown that mowing in the early summer timeframe is needed so that vegetation is not allowed to grow to an untenable state for the fall mowing, e.g., new growth of trees, vines over magazine headwalls, etc. For this reason, a first-time mowing during the early summer months is needed to control vegetation growth.

c. Additional control of the vegetation around the magazine ventilators is needed to prevent vegetation from entering the magazine. The vegetation will be maintained to a maximum height of 18 inches for a circumference of 5 feet around the ventilators. Other vegetation need not be controlled to an 18-inch height; the implementation of mowing completion dates establishes effective vegetation control.

d. Mowing specifications that address all of the aspects of the control of vegetation along roadways, along railroad right-of-way, around buildings, around and over earth-covered magazines, and for other firebreaks are to be maintained by NAVFAC PWD Crane.

4. Wildfire Prevention and Danger Posting Plan. In order to be prepared for those times during the year when the possibility of brush and wildland fires are greatest, the following actions will be accomplished.

a. Fire Danger levels will be recorded daily. The Fire Danger levels and the subsequent actions required are:

(1) LOW, Color Green - Fire Danger is negligible with no problems anticipated. Fire could start from an open flame, but is not anticipated. Fire will spread, but very slowly and will tend to go out. No action required.

(2) MODERATE, Color Blue - Fire Danger is manageable. Some fires are probable and residents should take routine precautions when conducting approved outdoor burning. Fire will spread in dead grass or leaves. No control problems anticipated. Fire Watch may be required (Standard Operating Procedures will contain the requirements).

(3) HIGH, Color Yellow - Fire Danger is a concern. Fires are likely to occur and residents should take extra precautions when conducting any approved outdoor burning. Fires

that occur in heavy fuels will be difficult to control for responding fire suppression personnel. Fire can start readily, burn briskly and can spread rapidly. Action: Fire Danger Level will be electronically posted. NSA Security Dispatch will notify Crane personnel via CDNS when the fire danger level is at HIGH. Fire Watches required at the outdoor ranges. NSA Crane F&ES will be notified of scheduled range operations. For certain activities NSA Crane F&ES will be positioned or available within five minutes (Standard Operating Procedures will contain the requirements).

(4) VERY HIGH, Color Orange - Fire Danger is of greater concern. Many fires will occur and residents should refrain from doing any open burning. Most fires will be difficult to control for responding fire personnel and the Fire Department may be required to respond to multiple fires at the same time. Fire can start from a match or glowing cinder, etc., and spread very rapidly. Action: Fire Danger Level will be electronically posted. NSA Security Dispatch will notify Crane personnel via CDNS when the fire danger level is at VERY HIGH. Non-employees entering the installation will be cautioned. Only mission critical operations are to be performed. Outdoor ranges will have fire watches. NSA Crane F&ES will be notified of scheduled range operations. For certain activities NSA Crane F&ES will be positioned or available within five minutes.

(5) EXTREME, Color Red - Explosive Conditions exist. All wildland fuels (vegetation) are tinder dry. All outdoor burning should be prohibited. Most fires will require reinforced attack by responding fire suppression forces and extreme caution should be exercised by firefighters. Fire can start very easily from match, cinder, sparks, cigarette butts, etc. The flame will spread with extreme rapidity and burn fiercely, resulting in practically uncontrolled conditions. Action: Fire Danger Level will be electronically posted. NSA Security Dispatch will notify Crane personnel via CDNS when the fire danger level is at EXTREME. Non-employees entering the installation will be cautioned. Operations at ranges will be suspended unless approved by the NSA Commanding Officer. If approved, outdoor ranges will have a fire watch. NSA Crane F&ES will be notified of scheduled range operations. For certain activities, NSA Crane F&ES will be positioned or available within five minutes.

(6) RED FLAG WARNING – Extreme fire conditions exist. Fire-weather forecasters term that calls attention to weather conditions that may result in extreme fire behavior within the next 24 hours. Criteria include: Dry conditions in excess of one week, the Fire Danger Level is at or above "HIGH", sustained average wind of 15 MPH or greater, relative humidity is less than or equal to 25%, and temperature is greater than 75 degrees.

b. Signs indicating the level of Fire Danger will be posted at each of the gates, visible to traffic entering the installation. Signs will be similar in detail to those used by the State of Indiana Department of Natural Resources, using the same colors and Fire Danger Levels. NSA Crane Emergency Management Office (EMO) will notify Crane personnel via the CDNS when fire danger level reaches HIGH or above.

c. Glendora Lake Test Facility will not receive CDNS notifications; however, they will follow danger rating levels set forth by the Sullivan County Fire Department. The level requirements listed for the installation will be followed.

d. Crane Camp Grounds. Personnel staying in the Crane Camp Grounds will be notified of the Fire Danger rating by Morale, Welfare, and Recreation personnel upon check in. Campfires will not be allowed during EXTREME Fire Danger ratings.

5. Wildland Fire Control Plan

a. The NSA Crane F&ES is trained to respond to wildland fires that may occur. The number of wildland fires varies from year to year due to available fuel, weather, and the human factor.

b. The NSA Crane F&ES takes numerous measures in the effort to reduce wildland fires and to maximize preparedness when wildland fires do occur. These steps include Wildland firefighting classes for fire personnel, maintaining of wildland firefighting equipment, monitoring of weather conditions, and usage of the fire danger levels as weather conditions warrant.

c. The NSA Crane F&ES is manned 24 hours a day, 7 days a week.

EXHIBIT 5-2 RANGE REQUIREMENTS

Range	Operation	Fire Danger Level Low (Negligible)	Fire Danger Level Moderate (Manageable)	Fire Danger Level High (Concern)	Fire Danger Level Very High (Greater Concern)	Fire Danger Level Extreme (Explosive Condition)	Fire Department Response Time
Demolition (Demo) Range Primary	Buried Demolition	No Risk	Low Risk Fire Watch Required	Low Risk Fire Department Standby Required *	Low Risk Fire Department Standby Required	Low Risk Fire Department Standby Required	St1-8:36 St2-2:50
Demo Range (EOD Range) Secondary	White Phosphorous Disposal (Surface Shots)	Low Risk Fire Department Standby Required **	Medium Risk Fire Department Standby Required **	Serious Risk Fire Department Standby Required **	Serious Risk Fire Department Standby Required **	High Risk Fire Department Standby Required **	St1-8:36 St2-2:50
Demo Range	Flash Pit	No Risk	Low Risk Fire Watch Required	Low Risk Fire Department Standby Required *	Low Risk Fire Department Standby Required	Low Risk Fire Department Standby Required	St1-8:36 St2-2:50
Ammunition Burning Ground (ABG)	Burn Pan	No Risk	Low Risk Fire Watch Required	Low Risk Fire Department Standby Required ***	Low Risk Fire Department Standby Required	Medium Risk Fire Department Standby Required	St1-13:27 St2-9:35
ABG	Burn Cage	No Risk	Low Risk Fire Watch Required	Low Risk Fire Department Standby Required ***	Low Risk Fire Department Standby Required	Low Risk Fire Department Standby Required	St1-13:27 St2-9:35
Ordnance Test Area (OTA)	Pyrotechnic Functioning	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Medium Risk Fire Department Standby Required	Serious Risk Fire Department Standby Required	High Risk Fire Department Standby Required	St1-15:20 St2-8:10

Range	Operation	Fire Danger Level Low (Negligible)	Fire Danger Level Moderate (Manageable)	Fire Danger Level High (Concern)	Fire Danger Level Very High (Greater Concern)	Fire Danger Level Extreme (Explosive Condition)	Fire Department Response Time
Ordnance Test Area (OTA)	Pyrotechnic Functioning Aerial Devices	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Medium Risk Fire Department Standby Required	Serious Risk Fire Department Standby Required	High Risk Fire Department Standby Required	St1-15:20 St2-8:10
OTA	Slow/Fast Cook Off Test	No Risk	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Medium Risk Fire Department Standby Required	Serious Risk Fire Department Standby Required	St1-15:20 St2-8:10
OTA	Surface Detonations	No Risk	No Risk	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Low Risk Fire Watch Required	St1-15:20 St2-8:10
OTA Annex/Prototype Development Range	Surface Detonations	No Risk	No Risk	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Low Risk Fire Watch Required	St1-15:20 St2-8:10
Demil/Elemental Assessment Facility (EAF)	Surface Detonations	No Risk	No Risk	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Low Risk Fire Watch Required	St1-11:30 St2-7:35
Rocket Range Test Area	Surface Detonations	No Risk	No Risk	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Low Risk Fire Watch Required	St1-23:15 St2-7:35
Special Weapons Assessment Facility (SWAF)	Standard Ball Ammunition	No Risk	No Risk	No Risk	No Risk	No Risk	St1-12:18 St2-12:20

Range	Operation	Fire Danger Level Low (Negligible)	Fire Danger Level Moderate (Manageable)	Fire Danger Level High (Concern)	Fire Danger Level Very High (Greater Concern)	Fire Danger Level Extreme (Explosive Condition)	Fire Department Response Time
SWAF	Tracer and Flash Bang Functioning	No Risk	No Risk	Low Risk Fire Watch Required	Medium Risk Fire Department Standby Required	Medium Risk Fire Department Standby Required	St1-12:18 St2-12:20
Surveillance Function Test Range (SFTR)	Pyrotechnic Functioning	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Medium Risk Fire Department Standby Required	Serious Risk Fire Department Standby Required	High Risk Fire Department Standby Required	St1-15:20 St2-8:10
SFTR	Surface Detonations	No Risk	Low Risk Fire Watch Required	Low Risk Fire Watch may be Required	Medium Risk Fire Watch Required	Serious Risk Fire Watch Required	St1-15:20 St2-8:10
SFTR	Pyrotechnic Functioning Ariel Devices	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Medium Risk Fire Watch Required	High Risk Fire Department Standby Required	High Risk Fire Department Standby Required	St1-15:20 St2-8:10
Outdoor Wind Stream	Pyrophoric Devices Functioning	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Medium Risk Fire Watch Required	Serious Risk Fire Department Standby Required	Serious Risk Fire Department Standby Required	St1-15:41 St2-4:20
Outdoor Wind Stream	Pyrotechnic/Flare Functioning	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Medium Risk Fire Watch Required	Serious Risk Fire Department Standby Required	Serious Risk Fire Department Standby Required	St1-15:41 St2-4:20
Lake Glendora Test Facility	Underwater / Water Surface Shots	No Risk	No Risk	No Risk	No Risk	No Risk	Sullivan FD 10:00
Lake Glendora Test Facility	Pyrotechnic Open Test Pad	Low Risk Fire Watch Required	Low Risk Fire Watch Required	Medium Risk Fire Watch Required	Serious Risk Fire Department Standby Required	Serious Risk Fire Department Standby Required	Sullivan FD 10:00

* As per NAVSEA OP 5, Volume 1 reference (1a) chapter 13-3.2.5 as it pertains to demolition operations.
** When White Phosphorus is being detonated on any range the Fire Department must be on site.
*** As per NAVSEA OP 5, Volume 1 reference (1a) chapter 13-2.2.4 as it pertains to burning ground operations.

Station 1 Main Station (St1)
Station 2 Burns City Gate (St2)

MISHAP RISK ASSESSMENT

Mishap Probability Level	Mishap Severity Level			
	I Catastrophic	II Critical	III Marginal	IV Negligible
A – Frequent	**HIGH**	**HIGH**	SERIOUS	MEDIUM
B – Probable	**HIGH**	**HIGH**	SERIOUS	MEDIUM
C – Occasional	**HIGH**	SERIOUS	MEDIUM	LOW
D – Remote	SERIOUS	MEDIUM	MEDIUM	LOW
E – Improbable	MEDIUM	MEDIUM	MEDIUM	LOW

MISHAP RISK ACCEPTANCE LEVEL

MISHAP RISK CATEGORY	MISHAP RISK ACCEPTANCE LEVEL
High	**Commanding Officer**
Serious	Department Director
Medium	Division Manager
Low	Division Manager

THIS PAGE

INTENTIONALLY

LEFT BLANK

CHAPTER 6
OPERATIONS DURING ELECTRICAL STORMS

1. References

a. NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore

b. NAVSEA OP 3565 Volume 2, "Electromagnetic Radiation Hazards (Hazards to Ordnance)"

c. CAAAR 385-10, Safety Plan, Chapter 26, Procedures in Event of Electrical Storm

2. Purpose. To set forth policy and responsibilities for conducting explosives operations during an electrical storm.

3. Scope and Applicability. This chapter applies to NSA Crane, all tenants, contractors, and visitors.

4. Background. Naval Support Activity Crane (NSA Crane) is a large land mass (64,000 acres) where severe thunderstorms are expected to occur with significant frequency. Severe thunderstorms are more frequent between March and August, but can occur at any time. The acquisition of weather monitoring systems and lightning pre-strike warning systems enable advanced warnings to be available to critical explosives operations and functions per paragraph 6-2 of reference (a). This advanced warning, coupled with prior planning for shutting down sensitive operations will result in enhanced safety while reducing the amount of operational downtime.

5. Discussion. Chapter 6 of reference (a) emphasizes the importance of monitoring weather conditions and taking appropriate action to prevent catastrophic accidents with explosives/ordnance that can result from a lightning strike. Pre-strike warning systems and equipment have been purchased and installed at NSA Crane. Because this installation consists of a large land area and explosive operations can be on-going throughout, timely and effective notification must be made to operational areas when the potential for a lightning strike exists. The threat of an explosive incident because of a lightning strike is greatest for those operating areas not covered by a lightning protection system. The next greatest threat is for those operating areas equipped with a non-standard lightning protection system. For those fully equipped with a standard lightning protection system, a threat exists if Electrically Initiated Devices (EEDs) or Electro Explosive Devices (EIDs) are unprotected, flammable vapors are produced, or explosive dusts/powders are in process. Because of the multiple threats, actions to secure operations must be defined based on the operation and the operating area.

6. Definitions

a. Electro-Explosive Device (EED) - Any single discrete unit, device, or subassembly whose actuation is caused by the application of electric energy which, in turn, initiates an explosive, propellant or pyrotechnic material contained therein. The term electro-explosive device does not

include complete assemblies which have electric initiators as subassemblies, but includes only subassemblies themselves. Synonymous with electric initiator.

b. Electrically Initiated Device (EID) - A single unit, device or subassembly that uses electrical energy to produce an explosive, pyrotechnic, thermal, or mechanical output. Examples include: electro-explosive devices (such as hot bridgewire, semiconductor bridge, carbon bridge, and conductive composition), laser initiators, exploding foil initiators, burn wires, and fusible links.

c. Explosives Operation - Any operation that involves an explosive material. Examples include preparation of explosive materials, production, renovation, maintenance, re-work, demilitarization of explosive materials, test and evaluation of explosive materials, and the handling associated with transportation and magazine operations.

d. Non-Standard Lightning Protection System (LPS) - A lightning protection system that does not meet the current requirements of reference (a).

e. Standard Lightning Protection System (LPS) - A lightning protection system that meets the current requirements of reference (a).

7. Policy. All explosive operations are to be covered by a pre-strike warning system. Explosive operations are to be shut down per the requirements of Appendix A when the pre-strike warning system indicates a "Red Alert" for the area covered. Specific instructions for shut down will be a part of the Standard Operating Procedure (SOP). Operations can be resumed only after the same system reads an "All Clear". Appendix B provides the operational information for the system and provides other locations/coverage for the other identical systems currently in operation. Operating areas are permitted to have and operate pre-strike warning systems only if they comply with the requirements of Appendix B.

8. Action

a. Department Directors and Heads of Tenant Activities involved with explosive operations will:

(1) Implement the requirements of this chapter by providing the means to monitor the systems employed, either one at a central location or any identical system employed at other locations, and to pass the notification of "Red Alert" to applicable explosive operating areas.

(2) Ensure SOPs are prepared addressing the "Red Alert" shut down requirements.

(3) Ensure a risk assessment has been completed and documented for those facilities that are equipped with a non-standard lightning protection system. The assessment must address the relative threat posed by the deficient lightning protection system and the need for termination of explosive operations and evacuation of personnel. The risk assessment is to be a part of the SOP.

b. NSWC Crane Information Technology (IT) Services Division will:

(1) Maintain the NSA Crane site Thorguard pre-strike warning system currently located in Buildings 10, 198, 3284, 3461, and 3405. This effort will include maintaining the expertise to assure quality and timely information is always available to the installation. It also includes ensuring the system is operational at all times, or notification is made to affected departments/tenant activities when the system is non-functional.

(2) Budget for and assure the data stream is maintained from weather monitoring/distribution services.

c. Explosives Safety Office will:

(1) Ensure the SOPs (Process, or Item SOPs) used for the processing of ammunition and explosives, contain the appropriate risk assessment and/or shut down information based on the requirements of Appendix A. (Note: CAAA Safety Office will ensure the requirements are met within CAAA areas per reference (c).

(2) Ensure that additional systems employed by explosive operating areas comply with the requirements of Appendix B.

d. Supervisors of explosive operations will be aware of the shut down requirements of the applicable SOP and take pre-planned action when notified per department or tenant activity issued procedures. If all systems are down, the flash to bang process is to be employed.

APPENDIX A
REQUIREMENTS FOR SHUT DOWN OF EXPLOSIVE OPERATIONS

1. General. The requirement to shut down operations involving explosives/explosive materials depends on the nature of the operation and the presence of lightning protection. The following general guidance is derived from reference (a). When the "Red Alert" alarm is activated on the nearest available system, the following actions are minimal:

a. For operating buildings equipped with standard lightning protection:

(1) Shut down operations involving unprotected EEDs/EIDs.

(2) Shut down operations involving flammable vapors.

(3) Shut down operations involving exposed explosive powders or dusts.

b. For operating buildings equipped with non-standard lightning protection:

(1) Follow the shut-down requirements of paragraph 1a.

(2) Perform a risk assessment to determine what additional operations need to be shut down and if personnel need to be evacuated. The lightning risk assessment guide contained in NFPA 780 may be used to help determine the risk. Document the results in the applicable SOP for the operation.

c. For buildings not equipped with lightning protection:

(1) Shut down all operations involving explosives.

(2) Disconnect all main power systems not equipped with surge suppression.

(3) Evacuate personnel to a designated safe location meeting the requirements of reference (a), paragraph 6-3.1a.

(4) If possible, when small amounts of explosives are involved (as in Laboratory, T&E and R&D efforts), remove the material and place in a properly sited ready service magazine.

(5) Such action will preclude abandoning the operating building by personnel.

d. For Railcars and Motor Vehicles:

(1) If possible, place the load in an area with lightning protection. Explosive Holding yards (both truck and rail) are the preferred locations.

(2) If not possible, move to areas where detonation of their contents will not cause loss of life, and damage to adjacent areas will be minimized.

(a) For rail, locate the load at an earth covered magazine and pull away 1/4-mile minimum with the locomotive.

(b) For trucks, because they are rubber tired thus less likely to be struck, avoid traveling in the Industrial Area to reach an isolated location.

e. For magazine and open storage areas:

(1) Closed magazines containing ammunition and explosives will not be opened.

(2) If work is being performed in the magazine or open storage site, the work will stop and equipment will be safely secured. The magazine will be closed and locked, and personnel will be evacuated to a safe distance as soon as possible.

(3) For open storage sites, all work will be suspended and personnel evacuated to a safe location.

f. Disposal and explosives test operations: The destruction of ammunition, explosives, and other hazardous materials, as well as explosives tests and operations associated with the destruction of these materials, will not commence at the approach of, or during, and electrical storm.

APPENDIX B
OPERATIONAL CHARACTERISTICS
OF CRANE'S PRE-STRIKE SYSTEM

1. Specific Design Data. The system, commercially known as Thorguard, is a subscription type service that involves the placement of sensor and monitoring equipment at any preselected site. It measures on a dynamic index basis, the potential difference between the ground and the air at levels less than the 2000 volts per meter, established by reference (a) as the threshold for danger.

a. Measuring Dynamic Index (DI) levels of the Thorguard system:

(1) 0 Normal Safe (Clear)

(2) 0.1 - 2.3, Caution

(3) 2.4 - 2.9, Warning

(4) 3.0 or Higher, Red Alert

b. Measuring distance available:

(1) Low Range - 8 Miles

(2) Medium Range - 10 Miles

(3) High Range - 12 - 15 Miles

c. Warning Capability. Figure 6-B-1 illustrates the location of the five existing systems at NSA Crane. A ten-mile radius circle has been drawn around each of the systems to indicate the maximum effective coverage for the "Red Alert" alarm level. An additional stand-alone system is located at Lake Glendora Test Facility.

(1) The central system located in Building 10 provides coverage for the majority of the base. This system which is connected to the RDT&E network, provides real time display of the sensor for computers that have the applicable software, and has the capability of sending out automated “Red Alert” notifications via email, and is fully operational 24 hours a day, 7 days a week. When the warning level reaches the "Red Alert" stage, conditions are right within ten miles of the sensor that a lightning strike can occur at any time. Contact extension 8576 to be included to the email distribution list.

(2) The system at Building 3405 of the Ordnance Test Area (OTA) provides coverage for the outdoor testing conducted at OTA and for CAAA’s Surveillance Functional Test Range (SFTR). This is a ThorGuardian system that uses lights and sirens, and does not include the weather data stream. Contact can be made through extension 1548 to determine the status of the alert system. The system is monitored only when operations are on-going on the day shift. Therefore, use of the system is possible only from 0630 to 1600 Monday through Thursday (to

1500 on Friday) on non-payday weeks, and Monday through Thursday 0630 to 1600 for payday weeks.

(3) The system located at Bldg. 3461 of the Special Weapons Assessment Facility (SWAF), provides coverage for the outdoor testing of Small Arms. This system which is connected to the RDT&E network, provides real time display of the sensor for computers that have the applicable software, and has the capability of sending out automated "Red Alert" notifications via email. Contacting extension 3215 will provide access to the status of that alert system. The system is monitored only when operations are on-going.

(4) The system located at Bldg 198 provides coverage for the pyrotechnic RDT&E area. This system which is connected to the RDT&E network, provides real time display of the sensor for computers that have the applicable software, and has the capability of sending out automated "Red Alert" notifications via email. Contacting extension 3452 will provide access to the status of that alert system. The system is monitored only when operations are on-going.

(5) The system located at Bldg. 3284 provides coverage for the Southwestern portion of the base. This system which is connected to the RDT&E network, provides real time display of the sensor for computers that have the applicable software, and has the capability of sending out automated "Red Alert" notifications via email. Contact extension 6949 to be placed on the email distribution list.

(6) The system at Bldg. 8000 provides coverage for Operations at Lake Glendora Test Facility only. Contact can be made 812-268-5992, extension 225 to determine the status of the alert system. The system is monitored only when operations are on-going.

2. Specific Operational Characteristics. As an example, Figure 6-B-1 illustrates that the system located at Building 198, that covers the heart of the land mass of Crane. Using that system as an example, the movement of hazardous weather into the area is measured and the level of warning changes as the intensity of the threat changes. Should the conditions in the ten-mile arc reach the "Red Alert" level, conditions are right for a lightning strike to occur at any time. By the same token, should the hazardous system move beyond the area covered by the ten-mile arc, the "Red Alert" level returns to the "Normal Safe" position.

a. Recommended Systems for Different Operations:

(1) Motor vehicle transportation of explosives for the Army: Recommend using the system located in Building 10, or Building 198.

(2) Railroad transportation of explosives for the Army: Recommend using the central system located in Building 10, or Building 3284.

(3) SWAF range operations should follow the Building 3461 system information.

(4) Operations at the extreme south end of the base should use the OTA system for information.

(5) Operations in the Navy Pyrotechnic R&D area should follow the Building 198 system information.

(6) Navy Operations, except for those at the OTA, and SWAF, are adequately addressed using the central system in Building 10, and can receive Red Alert notification via email from Building 3284 during the weekdays (Monday through Friday 0600-1530). Contact extension 6949 to be placed on the email distribution list.

b. When in doubt, the central system can be consulted for hazard level accurate to cover 75% of the land mass. The systems have a built-in self checking/calibration feature that functions once every 24 hours. If the system is found not in calibration, it displays a fault signal and displays appropriate notifications to the field stating the non-availability of the system for use until fixes can be made.

3. When the Thorguard system is not available, there are other options available:

a. Handheld Storm/Lightning Detection Devices: Handheld lightning detection devices may be purchased for use in detecting storms.

b. The Flash to Bang Method: Determine the speed and direction of the storm with the flash to bang method. When you see a lightning flash, count the seconds (1001, 1002, 1003, etc.) until you hear the bang of thunder. Divide by five - sound travels about one mile every five seconds - and this will give you an approximation of the storm's distance from you. Repeating the process will tell you if the storm is getting closer and how fast it is moving.

c. For those operations that require shut down during electrical storms, sufficient time to secure operations must be allowed. Shut down should occur by the time the storm reaches ten miles of the explosives operation.

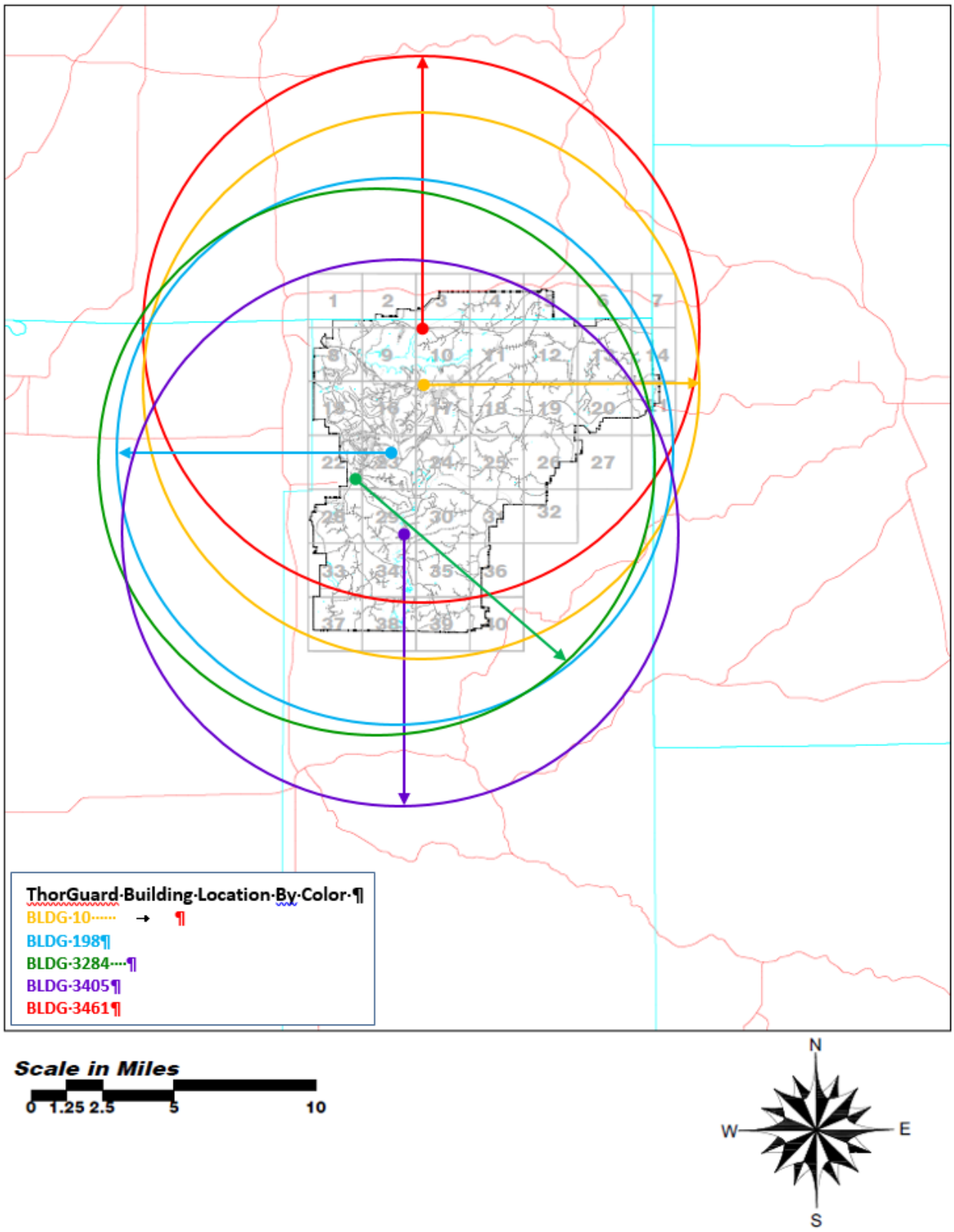


Figure 6-B-1: LOCATIONS OF THORGUARD SYSTEMS
(WITH 10 MILE ARCS)

THIS PAGE

INTENTIONALLY

LEFT BLANK

CHAPTER 7
MATERIAL POTENTIALLY PRESENTING AN EXPLOSIVES HAZARD DECONTAMINATION, INSPECTION, CERTIFICATION, AND VERIFICATION

1. References

a. OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore

b. JMC Regulation Number 385-1, US Army Joint Munitions Command (JMC) Safety/RAD Waste Directorate

c. DoD 4160.21-M-1, Defense Demilitarization Manual

d. NSA/NSWC/NAVFACCRANEINST 5090.2C, Hazardous Waste Management Plan

e. NAVSUP P-805 (Series), Navy and Marine Corps Conventional Ammunition Sentencing

2. Purpose. To provide policy, assign responsibilities, and establish procedures for the overall management (storage, decontamination, inspection, certification, and disposition) of Material Potentially Presenting an Explosive Hazard (MPPEH) for Naval Support Activity Crane (NSA Crane), per references (a) through (e).

3. Scope and Applicability. This chapter applies to NSA Crane, all tenant activities, and contractors, to the extent referenced in contract documents.

4. Policy

a. The guidelines set forth in this chapter will be followed to assure NSA Crane's compliance with regulations in references (a) through (e).

b. The demilitarization and disposition of MPPEH will be accomplished as required by references (a) and (e).

c. Per reference (a), expended small arms ammunition cartridge cases may be processed as a non-explosive operation prior to being assessed and determined safe, provided that they are screened before processing. Screening is intended to ensure that only .50-caliber and smaller are processed, and to remove unused cartridges. Screening will be done by locally determined methods included in approved written operating procedures. Personnel collecting brass from small arms ranges are not required to receive training on the Munitions Rule Implementation Policy.

5. Action

a. Department Directors and Heads of Tenant Activities will

(1) Ensure the requirements of this chapter, Chapters 9 and 10, and references (a) through (e) are met.

(2) Advise all personnel involved in any aspect of MPPEH management of the NSA Crane policy requirements as they are promulgated.

(3) Ensure that all personnel involved in any aspect of MPPEH management attend/complete appropriate training courses as identified in reference (a).

(4) Prepare appointment letters to identify those individuals who are qualified to inspect, certify/verify MPPEH as safe or as an explosive hazard. The appointment letter must include the appointed individual's sample signature, family groups, and/or type of MPPEH that they are approved to evaluate and document. Appointment letters will be signed by the Commanding Officer or by direction of the Commanding Officer, reviewed annually, and updated as necessary. A copy of the appointment letter must be retained by the generator and provided to the Defense Logistics Agency (DLA), and the Explosives Safety Office.

b. Supervisors of buildings/areas/equipment where explosives have been present will

(1) Ensure decontamination is performed per this chapter. Equipment and facility decontamination requirements and guidance are provided in Exhibit 7-4.

(2) Ensure written decontamination procedures are developed when required.

(3) Ensure all assets (ordnance, equipment, containers, etc.) are inspected, certified, and verified prior to storage, transfer, or disposal.

c. Personnel certifying assets will

(1) Inspect, certify, and verify materials as required by this chapter.

(2) Complete the “Navy MPPEH Requirements” online training course annually at My Navy Portal (http://my.navy.mil/) or classroom training course (as available).

(3) Complete the “Military Munitions Rule Awareness” online training course annually at My Navy Portal (http://my.navy.mil/) or classroom training (as available).

d. Explosives Safety Office will

(1) Administer the MPPEH management program at NSA Crane, including updating policy as new requirements are promulgated and enforcing policy guidelines to attain compliance with all pertinent regulations and Department of Defense requirements.

(2) Provide technical assistance for decontamination procedures.

(3) Verify, review, and maintain the MPPEH Management Form (MPMF), as appropriate for equipment/material being transferred off Center or being placed in storage. (Note: CAAA Safety Office issues and maintains forms for CAAA areas.) The link for this template is located in Exhibit 7-5.

(4) Conduct MPPEH facility evaluations and provide documentation identifying the explosives safety status.

(5) Provide Explosives Safety oversight of all MPPEH processing and storage locations.

(6) Maintain copies of all explosives safety site approved MPPEH locations.

(7) Provide standardized labels for MPPEH and Material Documented as Safe (MDAS).

(8) Provide consistent signage for areas that process MPPEH, and areas storing empty containers.

e. Environmental Protection (EP) Department will

(1) Assist in the development of procedures for decontamination (as requested).

(2) Review and approve explosive hazardous waste (EHW) profiles, and ensure treatment at the appropriate permitted unit.

f. Defense Logistics Agency (DLA) will

(1) Verify the DD Form 1348-1A contains required data and that all certificates contain authorized signatures and data identifying the certifying individuals.

(2) Keep range residue segregated from other property.

(3) Ensure a Memorandum of Agreement (MOA) is established with the installation Commander per reference (d).

(4) Ensure all MPPEH that has been inspected, certified, and verified as safe (MDAS) is either demilitarized or will be demilitarized as a condition of sale.

g. Munitions Analysis Branch will

(1) Provide laboratory analysis support for those situations where contamination is suspected.

(2) Assist in development of decontamination plans (as requested.

(3) Receive funding for contamination analysis from the requesting organization.

h. NAVFAC MidLant PWD Crane will

(1) Ensure maintenance workers and contract personnel are aware of the requirements outlined in this chapter.

(2) Submit site plans for locations used to process or store MPPEH.

i. The Property Management Team will ensure applicable personnel, e.g., equipment custodians, are familiar with and abide by the requirements of this chapter.

j. CAAA Permitted Open Burning/Open Detonation Facilities will maintain records for items flashed/treated for at least three years, per paragraph 6.3.c of reference (d).

EXHIBIT 7-1
MPPEH MANAGEMENT

1. Definitions

a. Material Documented as Safe (MDAS). MDAS is MPPEH that has been assessed and documented as not presenting an explosive hazard and for which the chain of custody has been established and maintained. The material is no longer considered MPPEH.

b. Material Documented as an Explosive Hazard (MDEH). MDEH is MPPEH that cannot be documented as MDAS, that has been assessed and documented as to the maximum explosive hazards the material is known or suspected to present, and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH.

c. MPPEH. Material owned or controlled by the DoD that, prior to determination of its explosives safety status, potentially contains explosives or munitions (for example, munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris) or potentially contains a high enough concentration of explosives that the material presents an explosive hazard (for example, equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization, or disposal operations). Excluded from MPPEH are military munitions within the DoD's established munitions management system and other hazardous items that may present explosion hazards (such as gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

d. Non-MPPEH Items. Articles, equipment, buildings, or other items (e.g., vehicles) that never contained ammunition or were never contaminated with explosives do not pose an explosive hazard and are not considered MPPEH. From an explosives safety perspective, it is safe to conduct welding, drilling, or sawing on these materials and to release them to the general public.

2. MPPEH Site Requirements

a. MPPEH processing includes any action or operation involving MPPEH, including but not limited to: Collecting, consolidating, sorting, segregating, separating by metal type, inspecting, storing, decontaminating, transferring, certifying, releasing, demilitarizing (shredding, shearing, chopping, crushing, flattening, cutting, melting), and transporting materials.

b. Processing of MPPEH is considered an operation involving ammunition and explosives handling, until the material is assessed and documented as safe. Storage of MPPEH is considered ammunition and explosives storage, and must comply with established criteria for such storage.

c. Locations used to process MPPEH must have site approval, based on the maximum explosives safety hazards that the material is known or expected to present, per the requirements of paragraph 8-1.2.1 of reference (a).

d. Locations used for processing MPPEH must be sited as:

(1) An exposed site (ES), at not less than intraline distance (ILD) from surrounding potential explosion sites (PES).

(2) A PES, when MPPEH has not been certified, or has been certified as posing an explosive hazard.

e. Areas where MPPEH is processed or stored must be designated as restricted areas and have the appropriate explosive limits and hazard classes posted.

f. The hazard classification and net explosive weight (NEW) of MPPEH must be based on characteristics of the type of MPPEH involved, it's packaging (if any), and the estimated amount of explosives potentially present.

g. The quantity and storage time for MPPEH must be minimized as much as feasible.

h. MPPEH, MDEH, and MDAS must be covered or stored in closed containers to prevent exposure to the collection of precipitation, and prevent run-off to the environment.

3. Assessment, Documentation, Labeling and Containerization

a. MPPEH must be assessed and documented as to its explosives safety status prior to being offered for transportation from the generation site, thermal treatment, demilitarization or recycling.

b. The locally developed MPMF will serve as the chain of custody for all MPPEH items declared as MDAS or MDEH. A link to the form is provided in Exhibit 5. This form must be completed and maintained, and must accompany the material during transfer within or release from DON control.

c. When an item is transferred by the generator to the DLA for demilitarization or recycling, it must be documented as "safe" on the MPMF, and be accompanied by a DD Form 1348-1A. An example of the DTID can be found in Exhibit 7-2. In conjunction with the MPMF, the MDAS Continuation Form can be used to document multiple items being placed in the same container. The link for this template is located in Exhibit 7-5.

d. Items that cannot be documented as MDAS will be managed as Explosive Hazardous Waste (EHW) per reference (d). The Hazardous Waste Profile Sheet (HWPS) found in reference (d) is required to be completed by the generator and provided to Environmental Protection for review and approval. EHW will be transferred to a permitted CAAA thermal treatment unit

using the Waste Transfer Manifest (WTM) [Appendix K of reference (d)]. A link to the WTM is provided in Exhibit 7-5.

e. Legible copies of all documents supporting the explosives safety status of MDAS and MDEH (such as the signed MPMF, DD Form 1348-1A, and any other supporting documents associated with the item assessment) must be maintained for a minimum of three years.

f. Containers of material whose explosive safety status has been documented (MDAS or MDEH) will have permanent marking and labeling, and container seals which are identified on the supporting documentation or type I/II traceable seals traceable to the individual and unit. The contents must be identified on the outside of the container and traceable seals should follow procedures similar to those for ordnance container traceable seals required by NAVSUP P-805 for read-for-issue ammunition. Large items, such as equipment, will have permanent weatherproof tags, or painted or engraved markings traceable to the certification document.

4. Material Documented as Safe (MDAS)

a. MDAS is MPPEH that has been assessed and documented as not presenting an explosive hazard and for which the chain of custody has been established and maintained. The material is no longer considered to be MPPEH.

b. MDAS must be assessed safe by, (1) a visual inspection which requires a 100% inspection by one individual, followed by an independent 100% re-inspection by another; or (2) by a NOSSA and DoD Explosives Board (DDESB)-approved technical method followed by a specified post-processing sampling inspection.

c. The initial visual inspection and certification must be conducted by DON personnel. Re-inspection and verification can be conducted by either a DON employee, or contractor personnel. Both DON and contractor personnel must be command-appointed to certify and verify items as safe or as an explosive hazard.

d. Items will only be classified as MDAS through visual inspection when every surface is visible and capable of being inspected. Visual inspection is only applicable to pieces of metal that have no cavities, holes, blind spaces, rivets, cracks, or other obscured features.

e. Probes must NOT be used to inspect any blind cavities. Probes must NOT be used to satisfy visual inspection requirements for purposes of documentation as having an explosives safety status of safe.

f. MDAS may contain residual explosives; however, these residues must not be in concentrations or configurations sufficient to pose an explosive hazard.

g. MDAS must be segregated from other MPPEH items in a location with controlled access, preferably a locked facility.

h. Containers used for the storage of MDAS will have appropriate labeling/signage applied. Blank label templates (link provided in Exhibit 5) and permanent signs are available from the Explosives Safety Office.

i. The MPMF must be completed and maintained for items documented as safe.

j. The MDAS certification documentation must identify the material type. For example, expended 9mm brass, mixed metal range gleanings, or expended MJU 32 decoy flare.

k. If the required documentation is incomplete or lost or if the chain of custody is compromised, this material is no longer considered MDAS and reverts back to MPPEH.

5. Material Documented as an Explosive Hazard (MDEH). MPPEH items will NOT be documented as MDEH at NSA Crane. Any MPPEH items that contain a high enough concentration of explosives material, present an explosives hazard and will be managed as EHW. EHW will be managed at a permitted, onsite treatment facility. Contact NSWC Environmental Protection concerning any questions on EHW.

6. Transportation of MPPEH

a. Prior to on-site movement, MPPEH must be evaluated and determined to be safe to move. This evaluation must be completed by personnel that are authorized by the CO for the particular type of MPPEH, (e.g., EOD, UXO qualified personnel, or other technically qualified and authorized personnel).

b. MDAS may be shipped over public traffic routes (PTRs) as inert material. Documentation of its explosive safety status must accompany the shipment.

7. Empty Containers and Packaging Materials. All empty ordnance containers (ammo cans, wooden ammo boxes, etc.) that were previously used for ammunition and explosives (A&E) and emptied as a result of the process must adhere to the following guidance.

a. If containers are to be reused for their intended purpose (A&E), MDAS certification is not required as long as the following requirements are met:

(1) Must be maintained within an established munitions management system or inventory. NSA Crane will utilize the Empty Munitions Containers for Reuse Control Log (link provided in Exhibit 5). The inventory acts as the chain-of-custody for the containers within the particular storage area, and must be maintained or the containers will revert back to being MPPEH; and

(2) Must be stored in a designated holding area with signage that reads “Empty Containers for Reuse”.

NOTE
IF A CONTAINER IS BEING HELD FOR REUSE, BUT NOT FOR THE EXACT SAME ITEM, THE ORIGINAL MARKINGS MUST BE OBLITERATED AND THE CONTAINER MARKED AS "EMPTY"

b. If being repurposed to another use, containers must:

(1) Be 100% visually screened for the presence of munitions by two different individuals;

(2) Have all previous markings removed or obliterated; and

(3) The container MUST be stenciled or labeled on two opposing sides reflecting the current use, or repainted in a manner that clearly indicates that the containers have been repurposed and do not contain ammunition and/or explosives.

c. Empty ordnance containers being transferred to DLA Disposition Services Crane, must:

(1) Have all explosive markings removed or obliterated;

(2) Marked as EMPTY on both ends and both sides;

(3) Be certified as EMPTY using the MPMF and the DLA required DD Form 1348-1A;

(4) Be stored in a designated holding area with signage that reads "Empty Container Storage"; and

(5) Be palletized, banded, and lids removed and placed in the center.

d. Empty ordnance containers being transferred to a host or tenant activity (NSA, NAVFAC, CAAA, etc.), or otherwise released from Navy control, must meet the following requirements:

(1) Have all explosive markings removed or obliterated;

(2) Be marked as EMPTY on both sides and both ends;

(3) Sealed with traceable seals;

(4) Have a properly certified material condition tag/label or an ammunition packaging label two dimensional barcode attached;

(5) Be stored in a designated holding area with signage that reads "Empty Container Storage"; and

(6) Be certified as EMPTY using the MPMF.

e. Approved cardboard, plastic, and plywood containers and packaging materials for HC/D 1.4S materials may be discarded as solid waste (that is, general trash) provided that the following criteria are met:

(1) The items are 100 percent visually screened for the presence of munitions by two different individuals per approved operating procedures;

(2) All previous markings are removed or obliterated;

(3) The items are broken down or otherwise deformed so that they may not be used for their original purposes; and

(4) There are no environmental regulations precluding such disposal.

f. Approved cardboard, plastic, and plywood containers and packaging materials for OTHER THAN HC/D 1.4S materials may be discarded as solid waste (that is, general trash) provided that the following criteria are met:

(1) The items are 100 percent visually screened for the presence of munitions by two different individuals per approved operating procedures;

(2) All previous markings are removed or obliterated;

(3) The items are broken down or otherwise deformed so that they may not be used for their original purposes; and

(4) There are no environmental regulations precluding such disposal;

(5) The items are certified as MDAS using the approved MPMF; and

(6) A chain of custody is maintained until the MDAS leaves the restricted area e.g., areas where munitions operations or MPPEH generation is occurring) and enters the facility's solid waste stream.

8. Personnel Designated to Assess and Document Explosives Safety Status

a. Personnel who are qualified and authorized to inspect MPPEH and document the explosives safety status as MDAS or MDEH, will be so designated in writing by the CO, Officer-in-Charge, or other designated personnel that have authority to sign by direction of the CO.

b. The designation letter must list the personnel who are qualified and authorized to assess and document the explosives safety status of MPPEH, will identify the type of MPPEH (by family group or groups) that they are authorized to inspect, and will include sample signatures.

c. A copy of the designation letter will be provided to the local DLA, and will be updated annually (based on the date of issue).

d. Exhibit 7-4 provides visual inspection guidance for explosive contamination, asking questions about the article, piece of equipment, or building under consideration, and providing general guidance on how to proceed based on the answers.

9. Qualification and Certification for Personnel Authorized to Process MPPEH

a. All personnel who are responsible to process, inspect and document MPPEH as either MDAS or MDEH, must be explosives qualified and certified per the applicable requirements outlined in Chapter 10 of this instruction.

b. Training to support personnel certification must be tailored to the specified MPPEH to be processed, inspected, or documented as to the explosives safety status and must include:

(1) Recognition and safe handling of used and unused military munitions of the type to be handled;

(2) Demilitarization and trade security controls and procedures for release from DoD control that apply to the type of material to be handled; and

(3) Management (e.g., marking, segregating, securing), processing, and transportation of MPPEH of the type to be handled.

10. Reporting MPPEH Incidents. Explosive incidents involving MPPEH or MDEH, or unauthorized transfer or release of uncertified MPPEH or MDEH, or transfer or release of MPPEH that presented an unintentional hazard to a qualified receiver, must be immediately reported. For Naval incidents, notify NOSSA at DNS 354-6003 or fax DSN 354-6749.

EXHIBIT 7-2
DISPOSAL TURN-IN DOCUMENT, DD FORM 1348-1 (EXAMPLE)

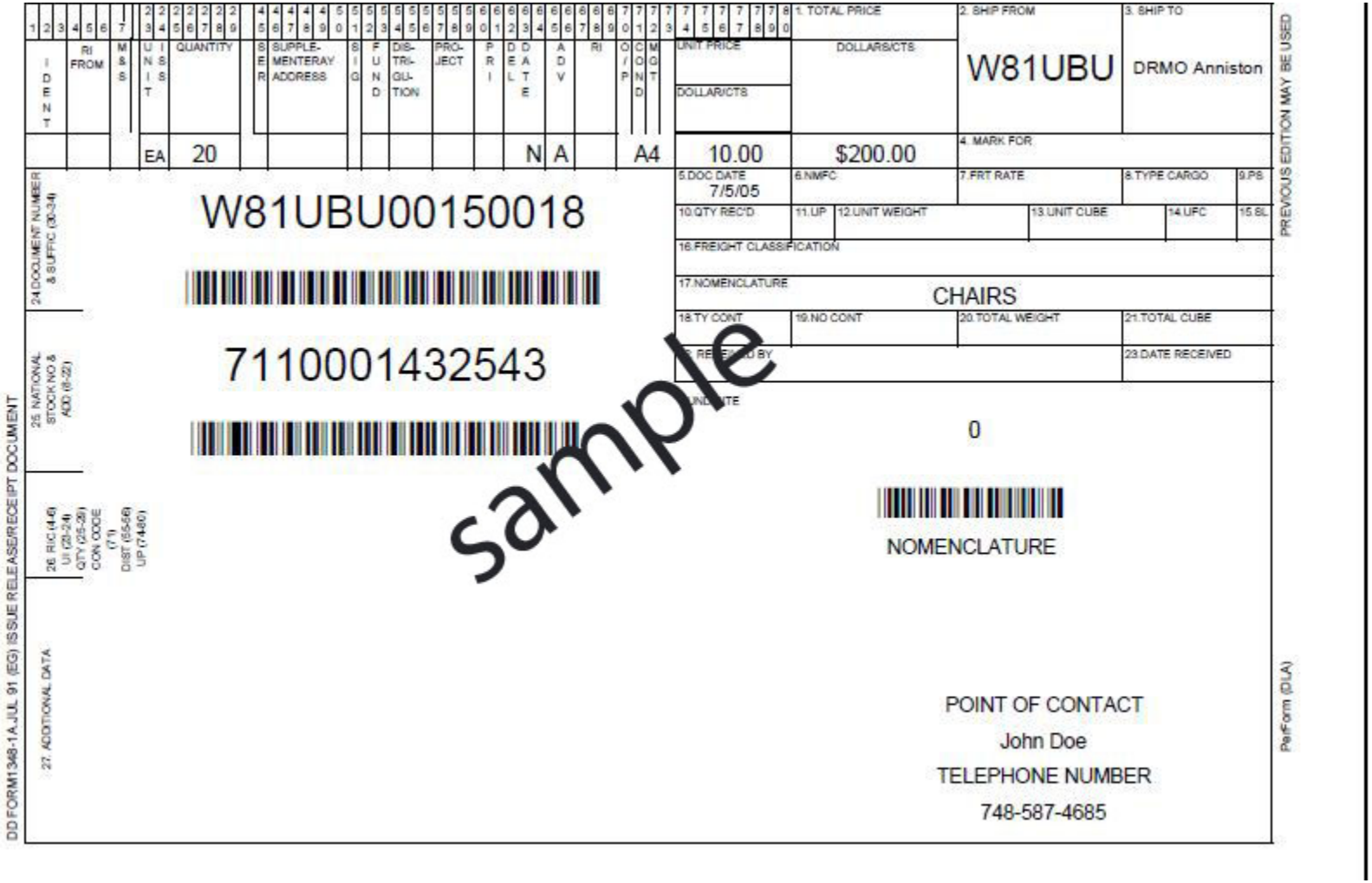


EXHIBIT 7-3
DECONTAMINATION OF EQUIPMENT AND/OR FACILITY

1. Definitions

a. Contamination - The presence of explosives/explosive residue in, on, or about equipment, facilities, and real estate, that have been used in or exposed to explosives operations.

b. Decontamination - The partial or complete removal, neutralization, or destruction of explosives/explosive residue by flashing, steaming, neutralization, or other approved desensitizing methods.

c. Uncontaminated - Free of contamination or never having been exposed to contamination.

2. Examples of Decontamination Processes. Only knowledgeable individuals familiar with the explosive contaminants, the articles, equipment, or buildings involved, and decontamination methods, are qualified to determine specific decontamination plans and efforts. The procedures described below are general and must be augmented by an approved SOP or instructions on a Safety Permit. Generally, there are only three decontamination processes, which are:

a. Chemical/biological alteration. These processes chemically alter the contaminant to produce a non-explosive substance.

b. Physical removal of contaminants. Washing, scraping, and vacuuming are examples of the processes which remove the contaminant unchanged. Water-jet technologies have been effective in removing surface contamination.

c. Heat. This process heats the item or piece of equipment to a level above the decomposition temperature of the contaminant, and holds it there long enough to assure the largest mass is at the temperature for consuming the contaminants by oxidation. For many items this means total destruction by burning.

3. Empty Tubes and Pipelines

a. Flash propagation through empty tubes and pipelines has occurred. Throughout the installation there are many "empty" lines which have processed materials such as RDX, TNT, NG, Comp B, or Black Powder, which were thoroughly washed out at the end of production but remain intact. This situation may give a false sense of safety from a propagation viewpoint.

b. "Cleaned" empty tubes or pipelines connecting explosives or hazardous material process buildings or equipment may provide paths through which a "Flash" may propagate. Several previous incidents of this nature have been reported.

c. Past experience has proven that inactive explosives or hazardous material process lines which have been decontaminated, still contain sufficient contamination to support flame

propagation. Even after a thorough rinsing with water or steam cleaning, a thin film of residue may still remain in the process lines in sufficient quantity to support propagation from one source to another.

EXHIBIT 7-4
VISUAL INSPECTIONS

1. The information provided in this Exhibit is ONLY guidance and not required to be utilized when determining the explosives safety status of MPPEH items. The guidance addresses visual inspection for explosive contamination, asking questions about the article, piece of equipment, or building under consideration, and providing general guidance on how to proceed based on the answers. The objective is to provide an inquiry process, which results in logical and defensible classifications and remediation measures. This process is in the form of a series of questions, evaluating the potentially contaminated material and the contaminants.

2. Porous or not. The first question in evaluating contaminated articles, equipment, or buildings is, "Is the material porous to the contaminant(s)?"

a. The division of "porous" from "nonporous" affects the depth/detail of the visual examination. Porous generally refers to building materials, such as wood, gypsum board, etc., and paper products, like cardboard. Porous materials have a surface which is not smooth, not hard, nor resistant to contaminant absorption. Porous material lends to easy, visual examination because porous material seldom has hidden surfaces. Nonporous refers to metal, glass, plastics or other materials with hard, smooth, and resistant surfaces.

NOTE

POROUS MATERIAL COVERED WITH A NONPOROUS FINISH MAY RESIST CONTAMINATION AND CLEAN TO ACCEPTABLE LEVELS FOR REUSE OR RELEASE.

(1) POROUS RULE 1: You must assume physical removal cannot decontaminate porous material contaminated by solids, unless a smooth nonporous coating covers the exposed surface.

(2) POROUS RULE 2: If evidence of a liquid or vapor contaminant is present, you must assume the contaminant penetrates the porous material surface, and physical cleaning will not decontaminate the material.

(3) POROUS RULE 3: For partially contaminated porous material, you may carefully cut away or separate the contaminated part from the rest and appropriately label each part.

(4) POROUS RULE 4: You must assume porous material exposed to an explosive contaminant that leaves no visible trace or signature is contaminated. Testing and evaluation may change this assumption.

b. Nonporous materials often have blind areas and discontinuities not readily accessible to visual examination where contaminants may be present. In some cases, careful disassembly of articles and pieces of equipment will reveal hidden surfaces and contaminants. In other cases, cracks may hide contamination. Cracks often occur in welds or joints, but can occur in other areas as well. Experience has shown the amount of explosive contaminant in cracks is insufficient to create a hazard where the outside surfaces are clean and the nonporous material is 1/8-inch thick or less. Experience with nonporous materials created these rules:

(1) CRACK RULE 1: In nonporous materials greater than 1/8-inch thick, the quantity of explosives contained in cracks may be sufficient to cause an explosive hazard.

NOTE
CRACK RULE 1 IS ONLY A GUIDE. USE TESTING AND EVALUATION TO DEVIATE FROM THE VISUAL EVALUATION RULE.

(2) CRACK RULE 2: You must assume all nonporous materials over 1/8- inch thick have cracks, unless a detailed visual inspection proves otherwise.

3. Presumed contaminated or not. The second question in evaluating contaminated articles, equipment, or buildings is, "By virtue of environment, must you presume the material under consideration is contaminated or can you presume the material is not contaminated?" The answer determines the extent of visual inspection required for proof of the contamination status. You must base the presumption of contaminated or not contaminated on use, the properties of the contaminants, and the environment. If a doubt exists, you must presume articles, equipment, and buildings contaminated.

a. Presumed contaminated applies to everything in rooms or bays with uncontrolled or uncontained explosives, propellants, and pyrotechnics. Exposure need not be continuous to require a presumed contaminated evaluation. Mixer bays are examples of presumed contaminated locations. Even closed mixers allow many opportunities for explosive contamination of the area during loading and unloading. Explosive dusts and vapors potentially contaminate all areas they contact.

(1) PRESUMED CONTAMINATED RULE 1: You must label presumed contaminated articles, pieces of equipment, and buildings MPPEH or EHW unless evaluation establishes otherwise.

(2) PRESUMED CONTAMINATED RULE 2: To assign a MDAS classification to presumed contaminated articles, pieces of equipment, and buildings, you must inspect and/or test every surface.

(3) PRESUMED CONTAMINATED RULE 3: Where a doubt exists, organizations will presume explosive contamination exists on articles, pieces of equipment, and buildings.

b. A presumed not contaminated evaluation results from evidence the article, piece of equipment, or building had no exposure to uncontrolled or uncontained explosive contaminants or has been completely decontaminated by a verified and repeatable process. Organizations will normally presume articles from an equipment room or equipment properly labeled MDAS have no explosive contamination.

(1) PRESUMED NOT CONTAMINATED RULE 1: You may label presumed not contaminated articles, pieces of equipment, and buildings MDAS only after inspection and/or testing reveals no contamination on all surfaces where contamination is likely to exist.

(2) PRESUMED NOT CONTAMINATED RULE 2: If you find contamination on a presumed not contaminated article, piece of equipment, or building, you must change the presumption and inspect/treat the item as presumed contaminated.

4. In a presumed contaminated area, contaminants may pass to interiors, collecting in places not accessible to visual examination. In presumed not contaminated areas, few or no transmittable contaminants are present to accumulate in hard-to-see places. You cannot visually inspect all surfaces of articles or equipment containing holes, blind spaces, rivets, open seams, cracks, etc. Nor can you visually inspect buildings with hollow walls (stud-type walls with both sides covered).

5. How accidents and abnormal operations affect the decision if an organization presumes explosive contamination on an article, piece of equipment, or building depends on the accident frequency, the extent of potential contamination, the ease of detection, and the impact of a wrong decision. All these factors depend on local knowledge and judgment. Local judgment will prevail. These examples may assist you in coming to a logical decision.

a. Nitroglycerine (NG) nitrator bay (Biazzi process). During normal operations, NG remains totally enclosed within the process equipment and sealed well enough to prevent migration; but during abnormal operations, the process may dump NG to a drowning tank, thereby exposing the atmosphere briefly. Although process upsets of this type are rare, the contaminant NG leaves no visible trace when absorbed in porous material. The effects of a wrong decision are potentially catastrophic, so the situation appears prudent to label this operation presumed contaminated.

b. Shipping building. During normal shipping operations, there are no exposed explosives, but a container could rupture and contaminate a small area. This is most likely when handling bulk material. Because the possibility of accidental contamination is small and organizations can readily identify and clean the contaminant, you would probably be safe in classifying the building as presumed not contaminated.

6. Visual detection. The third question in evaluating contaminated articles, pieces of equipment, and buildings is does the contaminant leave a visible trace or signature? In most instances, the answer is yes, but there is one notable exception, NG. NG is a milky, oily liquid at ambient temperatures above 54 degrees Fahrenheit. The milky color is visible in large batches but virtually disappears when a small amount spreads over a surface. This makes contamination hard to detect in cracks and crevices. NG absorbed into porous material leaves no visible trace. When you heat materials containing NG, some of the NG will vaporize and condense on cooler objects. This leads to the NG rule.

7. NG RULE: You must consider any porous material totally contaminated if the material was in direct contact with NG-containing material or from an environment where the process heated the NG-containing material.

8. What if a non-explosive material looks similar to an explosive one? If research shows both materials could be present, two options exist. The first is to assume any material noted during visual examination is the explosive material and proceed on that assumption. The second option

is to perform chemical tests on the found material to determine if the material is an explosive. One of the simplest chemical tests is the use of an indicator solution. These solutions change color in response to specific chemicals or compounds. You must take care to select an indicator solution that correctly identifies the explosive contaminant while minimizing false positive indications. For example, Webster's reagent detects substances with high nitrogen, from nitrated explosives to some fertilizer. Before using any indicator solution, consult a chemist or other knowledgeable person concerning what solution to use and the procedures for solution.

9. Visual examination. The primary objective of visual examination is to assist in proper classification of articles, pieces of equipment, or buildings, following the guidance and rules.

10. Only trained and knowledgeable individuals following a documented process and familiar with the explosive contaminants; the articles, equipment, or buildings involved; and decontamination methods qualify to conduct visual examinations. The light and equipment at the inspection site must be sufficient to assure a proper and detailed examination.

11. The visual inspection requirements for porous material are much the same for both the presumed contaminated and the presumed not contaminated categories when you are looking at individual pieces of material where normally all surfaces are readily visible.

12. Special Cases. These cases present grave hazards because, generally, visual examination cannot identify contamination on the listed articles or pieces of equipment. These types of items can only be documented as MDAS if a technical method or process has been approved by NOSSA and DDESB. Approved methods or processes can bring items to a “safe” status in lieu of visual inspection. Examples include thermal processing (furnace, hot fire flashing, hot gas decontamination) and chemical treatments.

13. Pipe

a. Explosive-carrying pipe. No amount of flushing, steaming, or "roto-rooting" can positively remove all explosive contamination in such pipe. Additionally, visual inspection cannot identify pipe interior contamination beyond two diameters in depth.

b. Pipes not carrying explosives, but passing through or located in a "presumed contaminated" area. Generally, pipes filled with inert material pose no threat of interior contamination because the inert material blocks entry of explosive contamination. However, empty pipes may pose a problem if entry points exist in "presumed contaminated" areas. The clearest examples are dry-pipe sprinkler or deluge systems. Experience has shown that explosive material may migrate into these systems. You must consider any dry pipe system that protects an explosive operation to have interior explosive contamination until demonstrated otherwise. This includes all piping, valves, etc., from the nozzle back to the water valve.

14. Thick metal objects in a "presumed contaminated" area. There is no precise definition of the term "thick", but anything over one inch should be suspect. Many times in the casting of thick metal objects, subsurface voids form. Cracking in the area weakened by the void is likely. Cracks

leading to voids and those voids can contain hazardous quantities of contaminants. Only special testing can prove voids/cracks do not exist in thick metal objects.

15. Welded overlapping plates in a "presumed contaminated" area. Regardless of thickness, items containing overlapping welds may contain hazardous contaminants in the area between the welds. Only heat processes decontaminate overlapping welds unless organizations open the overlap for inspection.

16. You must be aware of potential material incompatibilities when evaluating contaminants and developing decontamination plans, as these can create new hazards, which are difficult to identify. Smooth metal resists most contaminants, but may experience a chemical change, which creates a hazard, as in the case of copper contacted by moist lead azide, which creates copper azide at the contact zone. Organizations must develop special processes to address incompatibilities.

EXHIBIT 7-5
CONTROLLED DOCUMENT LINKS

Templates for the following document controlled forms are available at the Environmental Protection Controlled Documents site using the provided link:

1. MPPEH Management Form (MPMF) *CR-1023-EHW-FM-05090-000004 06FEB2017*
2. MDAS Continuation Form *CR-1023-EHW-FM-05090-000005 06FEB2017*
3. Waste Transfer Manifest (WTM) *CR-1023-EHW-FM-05090-000001 02FEB2017*
4. MDAS Labels *CR-1023-EHW-FM-05090-000017 07FEB2017 and CR-1023-EHW-FM-05090-000018*
5. Empty Munitions Containers for Reuse Control Log *CR-1023-EHW-FM-05090-000022 02FEB2017*

https://sharepoint.cran.nmci.navy.mil/function/environmental/Controlled%20Documents/Forms/AllItems.aspx?RootFolder=%2ffunction%2fenvironmental%2fControlled%20Documents%2fExternal%20Environmental%2fExplosive%20Hazardous%20Waste%20%28EHW%29%2fForms&FolderCTID=&View=%7b0C16057D%2dC738%2d41ED%2d9B8E%2d2A419DE833ED%7d

A template for the following document controlled form is available at the Environmental Protection Controlled Documents site using the provided link:

1. Hazardous Waste Profile Sheet (HWPS) *CR-1023-HWM-FM-05090-000001 06FEB2017*

https://sharepoint.cran.nmci.navy.mil/function/environmental/Controlled%20Documents/Forms/AllItems.aspx?RootFolder=%2ffunction%2fenvironmental%2fControlled%20Documents%2fExternal%20Environmental%2fHazardous%20Waste%20%28HW%29%2fForms%2fHW%20Logbooks&FolderCTID=&View=%7b0C16057D%2dC738%2d41ED%2d9B8E%2d2A419DE833ED%7d.

CHAPTER 8
EXPLOSIVES SAFETY SITE PLANS

1. References

a. NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore

b. DA PAM 385-64, Ammunition and Explosives Safety Standards

c. NAVFACINST 11010.45, Comprehensive Regional Planning Instruction, Site Approval Process

d. NOSSAINST 8020.22, Explosives Safety Site Approval Documentation Requirements, Submittal, Review, Approval, and Oversight

e. NOSSAINST 8020.15D, Explosives Safety Review, Oversight, and Verification of Munitions Responses

f. MIL-STD 882E, System Safety

2. Purpose. To provide policy and procedures for the siting of facilities and the maintenance of site plan records at Naval Support Activity Crane (NSA Crane) and to establish a facility licensing program that defines critical requirements for siting compliance.

3. Scope and Applicability. This chapter pertains to NSA Crane and all tenant activities.

4. Discussion. References (a) and (b) provide policy for the design and siting of explosives facilities. References (c) and (d) assign responsibility and procedures for submitting Explosives Safety Site Approval Requests (ESAR), maintaining Activity level Explosives Site Approval (ESA) administrative records, and monitoring deviations and compensatory measures involving an ESA. Construction features and location are important safety considerations when planning for explosives facilities or facilities that are exposed to the damaging effects of potential explosions. Proper location of exposed sites reduces the risk of unacceptable damage and personnel injuries in the event of an incident. Completion of ESARs requires process planning, integration of applicable safety considerations, and acquisition of final approval. Reference (e) provides policy and reporting requirements for Munitions Response Sites (MRS). This chapter provides the responsibilities and processes to establish and maintain ESAs for facilities used for the support of missions involving explosives/ordnance. It establishes a licensing program that involves the periodic checking of field conditions to ensure the original facility siting parameters are met. Renewal of the license is dependent on continued compliance with the siting parameters.

5. Definitions. See Appendix A.

6. Policy

a. All facilities used in support of explosives operations, including storage, must be properly sited for their purpose.

b. Facility Licensing

(1) The basis for the granting of a facility license must be in compliance with critical siting parameters.

(2) The basis for renewal of the license must be continued compliance with those same critical certification parameters.

(3) A facility license can be revoked at any time if field conditions are such that non-compliance with critical certification parameters is clearly evident.

(4) Each active facility, excluding explosives storage magazines, must display a current facility license in a prominent location. That location can be within an approved area or building Standard Operating Procedure (SOP), if applicable. Explosives storage magazines can have the facility license posted in a central location.

(5) A facility license must be valid for a period not exceeding four years for any explosives facility that is officially site approved and does not have a waiver. Facilities that are waivered or covered by a "Grandfathered" approval will have the license valid for two years only. Temporary licenses that have specific short-term parameters are valid for one year only.

c. Facilities that are used for the storage of Class/Division 1.4S only will be authorized by an ESAR that is approved by the host Explosives Safety Office.

d. Deactivation:

(1) Sited or Grandfathered Explosive Operating Building or Explosive Storage Magazine/Location that no longer store or process energetic material.

(2) Memorandum to the file documenting the facility requested to be deactivated and the effective date and approved by the NSA Explosives Safety Officer (ESO).

(3) The NSA Crane Explosives Safety Quantity Distance (ESQD) manual and Explosives Facility License issued by the Explosives Safety Office will be updated

(4) Grounding/bonding checks may be suspended.

e. Reactivation:

(1) Previously deactivated Sited or Grandfathered facilities that are reinstated to resume operations or storage of energetic material.

(2) Site visit/inspection by the ESO or Assistant ESO and appropriate Explosives Safety Specialist.

(3) Perform initial Bonding and Grounding check and enact six-month visual and twenty-four month testing cycles.

(4) Memorandum to the file documenting the facility reactivation and the effective date and approval by the NSA ESO or Assistant ESO that all explosives safety criteria are met.

(5) Update the NSA Crane ESQD manual and Explosives Facility License.

7. Action

a. Installation Commanding Officer will:

(1) Assign by-direction authority approval for ESARs to the Public Works Officer (PWO) for review and approval of ESARs within the Department of the Navy's Web-based automated site submission module (WebSAR).

(2) Accept the risk of loss, via a CO-to-CO NOSSA letter, of facilities and/or assets, in the case of accidental detonation for explosives operating facilities sited without lightning protection.

b. Commander, Crane Army Ammunition Activity (CAAA) will:

(1) Ensure new explosives processes or changes to existing processes are developed and documented such that ESQD determinations can be made.

(2) Ensure an effective hazard analysis is conducted of new processes and changes to existing processes such that personnel protection requirements can be determined, e.g., protective structures, shields, and ultra-high speed suppression systems.

(3) Ensure all new processes and changes to processes are coordinated through the appropriate local safety office (Army, Navy, or both).

(4) Ensure concurrence with the ESARs prior to submission to higher authority.

(5) Establish a field verification effort, using Appendix B as a guide to determine and record compliance to the critical siting parameters for facilities licensed from the Navy.

(6) Ensure a facility license is posted in each active explosives facility (except magazines) or in an area/building SOP if one is applicable.

(7) Ensure compliance with facility licenses. Approval may be delegated to the appropriate department.

(8) Assign the appropriate technical representative to the Site Approval Development Team (SADT), to define requirements for the facility and/or operation being sited.

(9) Endorse any compensatory measures used to meet ESQD requirements. Endorsement of compensatory measures is the Operational Activity CO's acceptance of responsibility that the compensatory measures will be incorporated into all SOPs. All compensatory measures and associated SOPs must be maintained until a request to cancel the ESA is approved by NOSSA.

c. Operational (Tenant) Activity (Navy) Commanding Officer will:

(1) Assign the appropriate technical representative to the SADT, to define requirements for the facility and/or operation being sited.

(2) Endorse any compensatory measures used to meet ESQD requirements. Endorsement of compensatory measures is the Operational Activity CO's acceptance of responsibility that the compensatory measures will be incorporated into all SOPs. All compensatory measures and associated SOPs must be maintained until a request to cancel the ESA is approved by NOSSA.

d. Division Managers (Navy) of operations involving explosives/Officer-in-Charge EODMU TWO Detachment Crane will:

(1) Ensure new explosive processes or changes to existing processes are developed and documented such that ESQD determinations can be made.

(2) Ensure an effective hazard analysis is conducted of new processes and changes to existing processes such that personnel protection requirements can be determined, e.g., protective structures, shields, and ultra-high speed suppression systems.

(3) Ensure all new processes and changes to processes are coordinated through the Explosives Safety Office.

(4) Ensure concurrence with the site approval request prior to submission.

(5) Approve the facility license.

(6) Ensure the facility license is posted in each active explosives facility (except magazines) or in the main facility or complex.

(7) Ensure compliance with facility licenses.

(8) Provide EOD services required by reference (e) when requested. (EOD Only)

(9) As required by reference (e), submit to NOSSA by 31 March of each year for the previous calendar year copies of all EOD Incidents Reports, Form 8027/3, or equivalent, for emergency responses involving military munitions either on or off their assigned military facility (EOD only).

e. Explosives Safety Officer (ESO) will:

(1) Review each new process or process change requiring major facility change to determine compliance with ESQD criteria.

(2) Review the process hazard analysis to assist in determining the proper personnel protection required to meet reference (a) requirements.

(3) Review final facility design drawings to ensure the design/design analysis is correct to meet explosives safety criteria.

(4) Determine when review by higher authority is required for facility and/or process changes and new construction.

(5) Review and approve the ESAR package to include Hazard Class/Division 1.4S Local Site Approvals.

(6) Maintain a file of ESAs and current licenses for facilities used for explosives storage and explosives operations.

(7) Represent NSA Crane for all questions and requests for information (RFI) from higher authority regarding ESARs in the approval process.

(8) Track all ESARs as they are processed through the required levels of review.

(9) Ensure hazards of electromagnetic radiation to ordnance (HERO) considerations are properly addressed.

(10) Perform field inspections of Navy explosives facilities using Appendix B information to determine the state of compliance to facility certification requirements.

(11) Review the field data generated by CAAA for the purpose of determining whether a facility license can be renewed.

(12) Be responsible for the establishment of the critical facility certification parameters and grant/renew all facility licenses.

(13) Maintain records of those facilities constructed prior to May 1967, per reference (a) paragraph 8-1.2.6, that have not undergone major modifications or the original use of the facility has not changed.

(14) Participate as a member in the Site Approval Development Team (SADT).

(15) Monitor the PWD work reception process and make the final Activity-level decision on whether proposed projects within 110 percent of IBD require an ESA, per reference (a),

paragraphs 8-1.2.1. and 8-1.2.2. The ESO may allow for PWD-level determination of whether an ESAR is required through the use of enterprise geospatial data from the GIS/enterprise mapping system and checklists, provided ESO oversight of the process is maintained. A permanent record of the evaluation will be maintained by the Activity.

(16) Maintain copy of the Explosives Safety Site Approval Request Determination (ESARD).

(17) Verify stipulations and mitigations identified in final site approvals are included on the appropriate Facility Licenses and SOPs.

f. Naval Facilities and Engineering Command Mid-Atlantic Public Works Department Crane (NAVFAC MidLant PWD Crane) Public Works Officer (PWO) will ensure:

(1) Assign by-direction authority approval for ESARs to Deputy Public Works Officer (DPWO), Facility Management Division (FMD) Branch Manager, or other qualified representative for review and approval of ESARs with WebSAR.

(2) Assign by-direction authority approval for ESARs as NAVFAC MidLant.

(3) Site plans are prepared per references (c) and (d) and released by personnel meeting the training requirements of reference (a).

(4) Records are maintained of all facility ESAs.

(5) Appropriate engineering support to develop required personal protective designs.

(6) Facility design records are maintained which illustrate the current facility condition.

(7) Review and approval of all ESARs prior to submission to include Hazard Class/Division 1.4S Local Site Approvals.

(8) The Potential Explosion Sites (PES) Maps are accurate and up-to-date with current existing field conditions validated by site visit, and generated using the Navy's GeoReadiness geographic information system (GIS) illustrating the latest ESA information and controlling ESQD arcs.

(9) The Explosives Safety Office is consulted during the design process. Ensure the Explosives Safety Office identified requirements are included in the contract documents, to include site access, construction trailer locations, etc.

(10) The Explosives Safety Office is invited to all pre-construction conferences and informed of construction activities and modifications, e.g., timelines, scope, etc.

(11) The prompt removal of all equipment, material, trailers, etc., from the site at the completion of the contract.

(12) Assign a planner to the SADT.

(13) Utilize Appendix C for documenting Explosives Safety Site Approval Request Determination (ESARD). A copy of the ESARD will be provided to the ESO.

(14) Have a written process in place to monitor the design and construction phase for all approved explosive site projects.

(15) Have a documented process in place to evaluate repair, maintenance, and construction work performed within 110% of Inhabited Building Distance (IBD) of any PES, to determine if an ESAR is required.

g. Site Approval Development Team (SADT) will:

(1) At a minimum, include the ESO, a planner from NAVFAC MIDLANT PWD (SADT Leader), and a technical representative from the Operational (generally Tenant) Activity/Command that will be conducting the explosives operations being sited.

(2) Be responsible for the development of the ESAR.

(3) Assess any changes to the ESAR during review, endorsement, and approval process, to assure that the operational use of the facility is not compromised by the proposed project changes.

(4) Document SADT initiation for all projects requiring ESARS.

EXHIBIT 8-1
CRITICAL PARAMETERS
FOR
ESTABLISHING AND MAINTAINING A FACILITY LICENSE

General. The basis for the determination of critical parameters is from three different sources. They are:

1. Site Plan/Safety Submission Approved Facilities. In the process of gaining approval for a facility, a number of parameters need to be considered and appropriate information placed in the submission package. During the review process, additional parameters may be placed on the facility by one or more reviewing offices. It is the compilation of these parameters that represents the basis for determining what is critical. Some of the parameters from this source are:

a. Number of personnel exposed at the potential explosive site (PES).

b. Explosive limits for the entire site.

c. Allowance for overnight storage of explosive materials.

d. Bay limits based on the presence of substantial dividing walls used in the establishment of the maximum credible event.

e. Cell limits and conditions set for remote controlled operations.

f. Cell limits and conditions set for isolated operations and the holding of explosives.

g. Primary lightning protection designed as per the regulations established at the time of the approval.

h. Number of personnel exposed outside of the PES that required consideration/justification based on the mission(s).

i. Deviations or compensatory measures for the conducting of concurrent operations.

j. Deviations or compensatory measures for roadways, railroads, utility lines, vegetation or other encroachments.

k. In the case of storage magazines, the allowable explosive Hazards Class/Division and their respective maximum limits. The data must include the nature of the restriction, the appropriate distances, and the maximum explosive quantity.

2. Grandfathered Facilities. Unsited Facilities constructed prior to May 1967, are "Grandfathered" and can continue to operate under the following conditions:

a. The function of the facility remains the same as it was originally built to support, and the associated hazards have not increased.

b. Explosive limits are established that generate inhabited building arcs and intraline arcs within the original mission guidelines.

c. Compliance to current regulations are as per the Command approved discrepancy list for the facility.

d. Any special situation that was unique to the original facility and does not involve non-compliance with the personal protection standard.

e. Any updates made to meet the latest regulations and standards.

3. Waivered Facilities. Facilities either site approved or Grandfathered that have a waiver. For these situations, any stipulations of the waiver are added to the other critical parameters previously listed.

EXHIBIT 8-2

EXPLOSIVES SAFETY SITE APPROVAL REQUEST DETERMINATION (ESARD) PROJECT ASSESSMENT TOOL

(For Facilities within 110% of an Inhabited Building Arc)

The following tool and guide enables correct decisions to be made regarding the need for the development and filing of official site approval documentation addressing Naval Facilities Engineering Command projects for Naval Support Activity (NSA) Crane customers.

Requester: NAVFAC	Date:

1. Brief Project Description. (Provide the facility number and Tenant Involved: NSWC)		
2. Pertinent Questions.	Yes	No
a. Does the project involve maintenance & repair efforts meeting guidelines of OP5 Volume 1 Paragraph 8-1.2.1.a?		
b. If "Yes", is the facility a Potential Explosion Site (PES's) or encumbered by at least one K18 ESQD arc?		
Decision #1: If the answer to b. is "No", the project can be conducted with only local Safety Office oversight using work permits.		
Decision #2: If the facility is not a PES but encumbered by at least one K18 arc, and that arc cannot be reduced by the customer, develop a construction authorization request site plan for approval by NOSSA.		
c. Does the PES project involve a change of hazards (addition of remote control operation) or an increase in limits?		
d. Will there be new construction with a change in footprint for the facility?		
Decision #3: If the answer is yes to either question c or d, a formal site plan/safety submission must be developed and filed for approval by NOSSA and the DDESB.		
e. Does the new construction involve substantial dividing walls or other personal protection design?		
Decision #4: If the answer is "Yes" to e, either the Army Corps of Engineers or the Naval Facilities Engineering Service Center must be consulted and the design validated prior to submission of a formal site approval document for approval by NOSSA and the DDESB.		
f. If the answer is "No" to questions c, d & e, and no other K18 arc encumbers the project site, can the PES operations be shut down and explosives removed?		
Decision #5: If the answer is "Yes" to question f, the project can proceed under guidance and control of the local Safety Office through the permit system. If the answer is "No", a construction authorization request site plan must be developed and filed for approval by NOSSA.		
3. Action Recommended for this Project.		
4. Signatures		

SADT Leader	Date	
Host Explosives Safety Officer/Assistant Explosive Safety Officer	Date	
NSWC Representative	Date	

CHAPTER 9
INERT ORDNANCE CERTIFICATION

1. Reference

(a) NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore.

2. Purpose. Per reference (a), this chapter provides policy for the certification of ordnance items for official purposes, such as display, training, demonstrations, public functions, or patriotic occasions. This includes inert ordnance used for operational purposes, e.g., during test set development, verification of equipment operability, and qualification certification proficiency demonstrations. Inert ordnance used for these purposes must not contain other hazardous items such as batteries of any type, high pressure vessels, or other devices such as high tension spring assemblies which may injure personnel.

3. Scope and Applicability. This chapter applies to all items that normally contain explosive material in their service or functional configuration. Ordnance being certified for use as described in paragraph 2 of this chapter is specifically excluded if it is assigned a DoD Identification Code (DODIC) or Navy Ammunition Logistics Code (NALC) that identifies it as inert.

4. Discussion. Throughout the military and civilian communities, a number of accidents have occurred involving explosive materials in displays, for training, or sold as non-hazardous, that were thought to be inert or non-explosive. Ordnance items have been discovered to be, in fact, "live" items that presented unnecessary exposure to military and civilian communities.

5. Policy

a. Inert certification for display, training, or disposal must be performed by appointed explosives certified personnel. They must be certified per Chapter 10 of this instruction.

b. All ordnance items on this installation for display or training must be inspected and certified to be "Inert Ordnance" and labeled per Exhibit 9-1.

c. Exhibit 9-2 must be used to obtain approval for the certification of ordnance as inert. Items manufactured as inert by or purchased as inert cut-away models from non-DoD agencies must have a letter from the manufacturer stating that no energetics or hazardous materials were used in manufacturing the item.

d. When an ordnance item requires inerting for display or training, the inerting must be performed per an approved SOP. Personnel performing the inerting operation must be qualified and certified per Chapter 10 of this directive.

6. Action

a. Officer-in-Charge of EODMU TWO Detachment Crane will

(1) Provide assistance when requested in performing the requirement of this chapter.

(2) Provide an appointment letter to the Explosive Safety Office that identifies personnel approved to certify ordnance as inert for display or training. The appointment letter must be updated and revised as personnel changes occur.

(3) Generate Exhibit 9-5 to appoint an Inert Ordnance Inventory Manager to maintain the Inert Ordnance Inventory. Provide a copy to the Inert Ordnance Inventory Program Manager.

b. Explosives Safety Office will:

(1) Concur with the appointment of individuals who are qualified to certify ordnance as inert.

(2) Approve Requests for Inert Certification of Ammunition and Explosives (A&E).

(3) Maintain lists of civilian personnel who have been appointed to certify ordnance as inert for display/training.

(4) Maintain the official installation inventory of items certified inert for display or training.

(5) Control and issue Inert Ordnance Certification Serial Numbers to EOD and appointed Inert Ordnance Certifiers.

(6) Provide training to Inert Ordnance Inventory Managers.

(7) Provide copies of Inert Ordnance Inventories to Inert Ordnance Inventory Managers for use in conducting annual and/or turnover inventories.

(8) Perform inventory spot checks (one branch at a minimum) during annual Inert Ordnance Inventories.

c. Department Directors and Heads of Tenant Activities will:

(1) Approve individuals (with concurrence from the ESO) who are qualified to certify ordnance as inert for display or training.

Note: Only Special Warfare and Expeditionary Systems Department (SWESD) and EOD have qualified individuals. Provide copies of approval letters to the ESO.

(2) Ensure that the requirements of this chapter are implemented.

(3) Ensure compliance with the development and approval process outlined by Exhibit 9-2.

d. Division Managers or equivalent will:

(1) Generate Exhibit 9-2 to request certification of ordnance as inert for display or training.

(2) Generate Exhibit 9-3 to nominate individuals for appointment to certify ordnance as inert for display or training. (Note: Only SWESD and EOD personnel can certify ordnance as inert).

(3) Generate Exhibit 9-5 to appoint an Inert Ordnance Inventory Manager to maintain the Inert Ordnance Inventory. Provide copy to the Inert Ordnance Inventory Program Manager.

e. Branch Managers or equivalent will: Verify the Inert Ordnance Inventories (annual and/or turnover of Inert Ordnance Inventory Manager) are completed for their branch and document their completion by signing Exhibit 9-4.

f. Inert Ordnance Inventory Managers will:

(1) Maintain custody of all inert ordnance within their designated area.

(2) Institute a log-in/log-out process.

(3) Ensure Record of Inert Ordnance Certification and Identification Exhibit 9-1 is maintained for all items within their custody.

(4) When transfer/disposition of an inert ordnance item occurs, complete information in Exhibit 9-1. Provide copy to the Inert Ordnance Inventory Program Manager.

(5) Document the completion of Inert Ordnance Inventories (annual and/or turnover of Inert Ordnance Inventory Manager) via Exhibit 9-4. Exhibit 9-4 is to be signed by the Branch Manager.

g. Individuals appointed to certify ordnance as Inert will:

(1) Know and comply with the requirements of this chapter and reference (a).

(2) Be certified as a Team Leader (TL) in the Ordnance Family Group for which they are appointed. EOD does not require reference to specific Ordnance Family Groups due to their extensive formal ordnance training.

(3) Ensure completed Exhibit 9-1 is provided to the Inert Ordnance Inventory Program Manager, when ordnance items are certified inert.

EXHIBIT 9-1
IDENTIFICATION AND CONTROL OF INERT ORDNANCE

1. Inert Ordnance for Display or Training. The data identified on Exhibit 9-1 must be recorded for all ordnance certified as inert for display or training purposes.

a. Inerted ordnance that is shipped off-site must be shipped with a completed copy of Exhibit 9-1. Columns 10 and 11 of the form must be completed by the recipient. Once completed, the original form will be returned to the originator, and a copy provided to the Inert Ordnance Inventory Program Manager to update the official registry. The recipient must keep a copy for their records.

b. When inert ordnance is received at Crane from another activity (government or non-government) the receiver must:

(1) Verify that the inert ordnance data required by paragraph 1 (a) above is provided.

(2) Ensure the received item matches the provided data.

(3) Retain the inert ordnance data information and provide a copy to the Inert Ordnance Inventory Program Manager.

(4) Maintain traceability between the inert ordnance and the required inert certification data.

Note: If the received item does not provide the data required by paragraph (1) above, the ordnance must be certified inert by an approved individual.

2. Marking of inert ordnance for display or training must be accomplished by:

a. Ordnance that was manufactured with explosive material and had all explosive material removed will be physically identified with the original color code; Mk/Mod, and other identification must not be removed. This will ensure that the item reverts to its original explosive identification if traceability is lost.

Note: Inerted items that have had their color changed to signal an inert round per previous policy need not have the explosive color code reapplied.

b. The item must be identified by serial number. The serial number will consist of the unit identification code (UIC) and a unique number. An example of serial number identification is N00164-001.

Note: Items identified with the activity identifier, e.g., NSWC Crane as previously required, do not require re-identification with the UIC.

c. The method of identification, in order of precedence, will be by laser engraving, steel engraving tool, steel stamping or indelible ink, or a locally produced label. For items that are too small for physical serial number identification, a copy of the data provided in Exhibit 9-1 will accompany the item.

RECORD OF INERT ORDNANCE CERTIFICATION AND IDENTIFICATION

1. COMMAND: **NSWC CRANE**		2. CERTIFYING OFFICIAL (Print): **JOHN DOE**			3. CERTIFYING OFFICIAL (Signature):		
4. ITEM INSPECTED (Include NSN, DODIC, NALC [if known])	5. SERIAL NUMBER	6. DATE CERTIFIED INERT	7. METHOD OF INSPECTING/INERTING (See Reverse)	8. ITEM LOCATION (NAME/ CODE/BUILDING)	9. SIGNATURE OF RECEIVER	TRANSFER/DISPOSITION	
						10. DOCUMENT #/DATE/NAME/CODE/ LOCATION	11. PRINT/SIGNATURE OF RECEIVER
D563, Projectile, 155MM HEDP ICM Apers M483A1	N00164-6461	11Sep2013	Visual Inspection	Jane Doe Code 1024 BLDG 2		11Sep2014 Wright Industries Nashville, TN	Larry Doe
GG21, Grenade, Hand ASM MK14-0	N00164-6462	11Sep2013	Disassembly, Chemical Dissolution	Jane Doe Code 1024 BLDG 2		29Jun2015 James Doe Code JXRR BLDG 142	James Doe
L541, Signal, Illum Marine GRN Star MK2-0	N00164-6463	11Sep2013	Disassembly, Visual Inspection	Jane Doe Code 1024 BLDG 2			

DISTRIBUTION: Originator, Receiver, Code 1024

CR-1024-SA-FM-08020-000016 18JUL2017

INSTRUCTIONS FOR FILLING OUT THE TEMPLATE

1. COMMAND - The Command of the Certifying Official.

2. CERTIFYING OFFICIAL - The printed name of the certifying individual.

3. CERTIFYING OFFICIAL- The certifying individual's signature.

4. ITEM INSPECTED - The specific nomenclature of the item being certified as inert, e.g., MK 58-0, Marine Location Marker, NSN, DODIC, and/or NALC.

5. SERIAL NUMBER - The Inert Certification Number. These numbers are generated by ESO and provided to each inspecting unit – EOD and Special Warfare and Expeditionary Systems Department.

6. DATE CERTIFIED INERT - The date the item was certified as inert.

7. METHOD OF INSPECTING/INERTING - A description of the method used on the item to inert it or to verify it as inert, e.g., visual inspection, disassembly, functioning, chemical dissolution, etc.

8. ITEM LOCATION - The specific name, code, and retention building of the inert item.

9. SIGNATURE OF RECEIVER - Individual receipting the item.

10. TRANSFER DATE/NAME/CODE/LOCATION - If and when the inert item is transferred to another person/code/building at Crane or at another command, this information must be provided to the Inert Ordnance Inventory Program Manager to update the Official Registry. Include the shipping/receiving documents, if applicable.

11. SIGNATURE OF RECEIVER - Individual to whom the item is transferred to.

CR-1024-SA-FM-08020-000016 18JUL2017

EXHIBIT 9-2
SAMPLE REQUEST FOR INERT ORDNANCE CERTIFICATION

From: Division Manager
To: Code 1024, Explosives Safety Office

Subj: REQUEST FOR INERT CERTIFICATION OF AMMUNITION OR EXPLOSIVES

Ref: (a) NSACRANEINST 8020.1E, Explosive Safety Program at NSA Crane, Chapter 9

1. Per reference (a), inert certification of the ammunition and explosive (A&E) device(s) listed below is requested.

QUANTITY	**INERT MODEL NAME**	**SERIAL NUMBERS** N00164-XXX
5	MJU-57A/B Decoy Flare Cut-away View	(will be issued by ESO or EOD)

2. Statement of Requirement. State the specific requirement for the inert A&E. If the A&E is to be used in support of a limited-time program, state disposition when the A&E is no longer required.

3. Specific Description of the Item. Provide all available information concerning the A&E, such as item description, NALC, NSN, origin, and history. State quantity of A&E items requiring inert certification.

4. Procedure for Certification

a. State the procedure to be used for the inerting operation. NOTE: You must have an approved SOP for inerting operations. Procedure does not have to be finalized at this point, but you must determine whether you will use an existing procedure (with modification if applicable) or whether a new procedure must be developed.

b. Provide a description of the action necessary to prevent reassembly of the item in a functional mode, such as crimping of detonator holders or partial destruction of fuze threads.

c. Provide the name of the individual who will be certifying the ordnance as inert. State the qualifications of the individual in the applicable Ordnance Family Group and specific operations required to render the item inert.

Note: Individual must be EOD or an appointed Special Warfare and Expeditionary Systems Department (SWESD) employee.

5. Means of Securing the A&E. State how A&E will be secured. (e.g., locked display case, locked room, etc.)

(Signature)
DIVISION MANAGER

APPROVAL	SIGNATURE	DATE
Inert Ordnance Inventory Mgr.		
Explosives Safety Office		

EXHIBIT 9-3
NOMINATION OF INDIVIDUAL FOR CERTIFYING ORDNANCE INERT

From: Division Manager
To: Department Director
Via: Explosives Safety Office

Subj: Nomination of (individual's name) for Inert Certification of Ordnance for Display or Training Purposes

Ref: (a) NSACRANEINST 8020.1E
(b) NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore

1. Per reference (a), (individual's name) is nominated for appointment to certify ordnance as inert as stated below.

a. State specific Ordnance Family Groups for which the individual is being nominated as qualified to perform inert certification.

b. Provide information that demonstrates the individual's technical capabilities within each nominated Ordnance Family Group.

Note**:** Individual must demonstrate extensive experience performing operations within the Ordnance Family Group.

c. Provide evidence that the individual has been trained in the requirements of references (a) and (b) and demonstrates the knowledge to effectively complete the administrative requirements, i.e., completion of Record of Inert Ordnance Certification and Identification (Reference (a) Exhibit 9-1).

2. State point of contact information.

(Signature)
DIVISION MANAGER

EXHIBIT 9-4
SAMPLE OF COMPLETED INERT ORDNANCE INVENTORY MEMORANDUM

8020
Ser XXXX/XXX
Date

MEMORANDUM

From: Name of Branch (Code XXXX)
To: Code 1024, Explosives Safety Office

Ref: (a) NSWC Memo 8020 Ser 1024/XXX dtd ddmmyyyy

Encl: (1) Inert Ordnance Inventory Listing
(2) Detailed changes to Inert Ordnance Inventory

Subj: INERT ORDNANCE INVENTORY

1. As per reference (a), an inventory of all inert ordnance items was conducted on (date). All items listed in enclosure (1) were accounted for, or enclosure (2) details changes to the inventory.

2. Point of contact is (Name of Inert Ordnance Manager), Code XXXX, extension XXXX.

(Signature)
BRANCH MANAGER

Copy to:
Name of Inert Ordnance Inventory Manager

EXHIBIT 9-5
SAMPLE OF INERT ORDNANCE INVENTORY MANAGER APPOINTMENT LETTER

8020
Ser XXX/XXX
Date

MEMORANDUM

From: Manager, Specialized Munitions Division (*or assigned Division*)
To: First and Last Name

Subj: APPOINTMENT AS INERT ORDNANCE INVENTORY MANAGER FOR MUNITIONS DIVISION ORDNANCE SUSTAINMENT BRANCH

Ref: (a) NSACRANEINST 8020.1E
(b) Inert Ordnance Appointment Memo 8020 Ser XXXX/XXX of dd mmm yy

1. Per reference (a), you are appointed as the Inert Ordnance Inventory Manager for the Specialized Munitions Division Ordnance Sustainment Section of the Special Warfare and Expeditionary Systems Department, (*or assigned Branch/Section and Department*). The duties for this position are described in chapter 9, paragraph 6.f of reference (a).

2. This memorandum cancels reference (b).

3. Specialized Munitions Division (*or assigned Division*) point of contact is (name), ext XXXX.

(Signature)
DIVISION MANAGER

Copy to
1024
XXXX (Assigned Division)

CHAPTER 10
EXPLOSIVES PERSONNEL QUALIFICATION AND CERTIFICATION PROGRAM

1. References

a. OPNAVINST 8023.24C, Navy Personnel Conventional Ammunition and Explosives Handling Qualification and Certification Program

b. NAVSEAINST 8020.9C, Ammunition and Explosives Personnel Qualification and Certification Program for Research, Development, Test and Evaluation Activities

c. NSWCCRANEINST 8023.1A, Ammunition and Explosives Qualification and Certification Program for Research, Development, Test and Evaluation Personnel

d. AMCR 350-4, Training and Certification Program for Personnel Working in Ammunition Operations

e. CAAAR 350-1, Certification of Personnel Involved with Explosives Operations

2. Purpose. To provide policy for the Explosives Personnel Qualification and Certification (Qual/Cert) Program for Naval Support Activity (NSA) Crane, as directed by references (a) through (e).

3. Scope and Applicability. This chapter applies to NSA Crane, all tenants, visitors, and contractor personnel (both permanently assigned and visiting) whose duties include explosives operations or tasks.

4. Action

a. Commanding Officer and Heads of Tenant Activities will ensure Command's Qual/Cert program complies with the requirements of the appropriate reference:

(1) NSA Crane will utilize reference (a) for management of the Qual/Cert program.

(2) EODMU TWO Detachment Crane will utilize reference (a) for management of the Qual/Cert program.

(3) Naval Surface Warfare Center (NSWC) Crane Division will utilize references (b) and (c) for management of the Qual/Cert program.

(4) CAAA will utilize references (d) and (e) for management of the Qual/Cert program.

b. Host Explosives Safety Office will:

(1) Review and oversee the Qual/Cert program in compliance with reference (a) for NSA Crane and EODMU TWO Detachment Crane. Note: CAAA Safety Office will provide oversight of their own Qual/Cert Program.

(2) Establish, review, and oversee the Qual/Cert program in compliance with references (b) and (c) for NSWC Crane.

(3) Monitor the Qual/Cert program and notify applicable supervisors when individual certifications are deficient.

(4) Review all contract documents addressing contractor personnel performing hands-on work with explosives materials at NSA Crane, to assure contractor compliance with references (a) and (b).

(5) Review and approve all visiting contractor Qual/Cert packages for personnel performing hands-on work with explosives materials at NSA Crane sites to include Camp Atterbury and Lake Glendora.

c. Naval Branch Health Clinic, Crane, will:

(1) Ensure personnel in the Qual/Cert program receive physical examinations as required by references (a), (b), and (d). Documentation of examination will be provided to the cognizant supervisor.

(2) Notify the appropriate Explosives Certification Board Chairperson of any personnel whose physical examination results in a not medically qualified status. Notification must be in writing.

CHAPTER 11
HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE (HERO) PROGRAM

1. References

a. NAVSEA OP 3565, Volume II, Nineteenth Revision, Technical Manual, Electromagnetic Radiation Hazards (Hazards to Ordnance)

b. NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore

c. NSACRANEINST 8020.4A, Naval Support Activity Crane HERO Emission Control (EMCON) Bill

d. CR-1024-SA-SOP-8020-000004, Hazards of Electromagnetic Radiation to Ordnance (HERO) Request and Approval Process

2. Purpose. To provide operational procedures and limitations for radio frequency (RF) transmissions at Naval Support Activity (NSA) Crane per references (a) through (c).

3. Scope and Applicability. This chapter applies to NSA Crane, all tenants, contractors, and visitors.

4. Discussion

a. Modern radio and radar transmitters produce high-intensity RF fields. Such fields can cause inadvertent initiation of sensitive electrically initiated devices (EID).

b. Hazards of electromagnetic radiation to ordnance (HERO) stem from the improper protection of sensitive EIDs used in some ordnance systems.

c. Typical ordnance items sensitive to RF fields include rocket igniters, squibs, primers, blasting caps, flash signals, tracking flares, and photo-flash cartridges.

d. Ordnance items are most sensitive to inadvertent initiation during breakdown for testing, maintenance, or repair. In addition, fleet return items, items subjected to dropping, or those involved in a transportation incident represent risks for inadvertent initiation due to RF exposures.

e. Proper control of transmitters exhibiting the potential for HERO exposure is essential to prevent inadvertent initiation of ordnance items.

5. Policy

a. Operation of a radio frequency transmitter (e.g., government radio, cellular phone, blackberry, citizens band (CB) radio, radar unit, etc.) at NSA Crane will be per the requirements

of reference (a) as described by Exhibit 11-1. Visitors are not to transmit at NSA Crane except per the provisions set forth in Exhibit 11-1.

b. All employees involved in ordnance operations will receive training on HERO requirements annually.

6. Action

a. Commanding Officer NSA Crane will:

(1) Ensure that all operators of antenna/transmitter systems comply with this instruction.

(2) Ensure that personnel operating antenna/transmitter systems are properly instructed in their use during HERO EMCON conditions.

(3) Notify the Explosive Safety Officer (ESO) and the HERO Officer prior to installing and using new radiating electronic equipment.

(4) Promulgate supplementary instructions pertaining to their own equipment, personnel, and operating procedures as required for compliance with this instruction.

b. Heads of tenant commands and activities will:

(1) Be responsible for notifying the ESO and HERO Officer of any operation involving HERO Susceptible Ordnance or HERO Unsafe/Unreliable Ordnance that would require the setting of a HERO EMCON Condition.

(2) Be responsible for ensuring HERO Unsafe/Unreliable Ordnance is completely enclosed in sealed, all-metal containers during storage and during transfer between designated safe areas.

c. The ESO will:

(1) Act as the central POC for determination of compliance with the appropriate references as it relates to all forms of ordnance safety at this installation. As such, the ESO will act as a HERO liaison with the HERO Officer and NSA Crane Frequency Manager to track and monitor all future ordnance facilities (or handling locations) changes.

(2) Designate a HERO Officer.

(3) Coordinate the HERO program.

(4) Account for all command and tenant information concerning ordnance operations and antenna/transmitter systems present.

(5) Assist the HERO Officer and Frequency Manager in ensuring future antenna/transmitter system changes at the installation are submitted for HERO review. This includes, but is not limited to, the following: Approve/disapprove (on recommendations from the Frequency Manager) all new or modified antenna/transmitter system installations and frequency coordination at this installation. Contact the Naval Ordnance Safety and Security Activity (NOSSA) (N8) at INHDNOSSA-HERO@navy.mil for all questions concerning HERO.

d. The HERO Officer will:

(1) Maintain the HERO program, notifying the appropriate personnel of potential problems.

(2) Review the potential use of transmitters and provide guidance on the safety requirements and approval/disapproval, in writing, for their operation on a case-by-case basis. In areas where no ordnance is present, such as the downtown area or administrative conference rooms, the use of such transmitters is approved as there is no RADHAZ concern. Transmitter purchase requests for portable transmitters, and temporary transmitters used for a project may be processed and approved with a local HERO Approval Memo and HERO Basic Training Brief. This process is done per reference (d). All other requests are sent to NSWC Dahlgren for guidance and potential NOSSA approval.

(3) Maintain the official file of approved transmitters and provide a copy to the NSA Crane Frequency Manager.

(4) Maintain the official file of Station Photographs of Antenna and Transmitter Systems and Antenna and Transmitter Systems list.

(5) Provide HERO Warning Labels (Exhibit 11-2) for installation on all government-owned cell phones and Blackberries furnished by this activity.

(6) Provide a HERO Warning Label for every mobile or portable two-way communication device issued onboard NSA Crane.

(7) Forward pertinent information regarding the HERO Program (e.g., approvals for transmitters, frequencies) to the NSA Crane Frequency Manager for comment, information, or input as early as possible in the approval process.

(8) Prior to conducting geophysical surveys for UXO using equipment with electromagnetic transmitting detection/location (ground-penetrating radar, ground conductivity meters, etc.) systems, contact NOSSA (N8) at INHDNOSSA-HERO@navy.mil for HERO safety guidance.

(9) The HERO Officer will be responsible for notifying the appropriate personnel of the setting of a HERO EMCON condition per reference (c). After normal hours, duties convey to the Security Watch Commander (SWC).

(10) Review RADHAZ requirements and request HERO surveys when required.

(11) Provide annual training on EMCON procedures and conditions to Emergency Management Working Group.

(12) Approve/disapprove any request to operate amateur radio equipment at the installation.

(13) Inform NOSSA, N8 of any changes to the installation's antenna/transmitter system configuration for review of their impact on HERO. This applies even if an activity moves from one site to another within the confines of the installation.

e. The NSA Crane Frequency Manager will:

(1) Analyze planned alterations in NSA Crane's existing communication system configuration and advise the Explosives Safety Office of the impact to the Electromagnetic Radiation Emissions Control (EMCON) Bill.

(2) Assist in coordinating frequency assignment matters with the appropriate DON Area Frequency Coordinator for tenant commands, contractors, and their representatives.

(3) Inform the ESO, HERO Officer, and the Safety Department when stationary transmitters/antenna systems are relocated or new equipment is obtained. These changes should be submitted for HERO review and approval.

f. NSA Crane Force Protection Department will:

(1) Maintain a check-in procedure for commercial truck drivers entering NSA Crane. Drivers will be informed that no radio transmissions are allowed without prior HERO approval. Approval for radio transmissions may be requested using the procedures defined in Exhibit 11-1.

(2) Enforce the HERO requirements for installation personnel and visitors who have mobile transmitters on the highways of NSA Crane.

(3) Assist in the activation and enforcement of the HERO EMCON Bill when notified by the Senior Fire Officer of an accident/incident scene.

h. The Security Watch Commander (SWC) will:

(1) Be responsible for notifying the appropriate personnel of the setting of a HERO EMCON Condition after normal working hours. This will be done per reference (d). In addition, the SWC will receive reports that the ordered HERO condition is set and report to the HERO Officer.

(2) Maintain liaison with tenant commands to resolve any conflicts in setting HERO EMCON Conditions.

i. The Fire Department will, in the event of an ordnance accident or incident, act as on-scene commander until such time as the situation has been resolved (e.g., Explosive Ordnance Disposal [EOD] responds and the item is rendered safe, or the item is determined safe to transport).

j. The Senior Fire Officer will be in communication with the onsite Process Supervisor, Range Control Officer (RCO), or Range Safety Officer (RSO) in order to be aware of the HERO classification of all ordnance at an accident/incident scene. If HERO unsafe or susceptible ordnance is observed or suspected, the Senior Fire Officer will notify the HERO Officer/Explosives Safety Office immediately to activate the HERO EMCON Bill as required. If after normal working hours, the Senior Fire Officer will notify the SWC.

k. Onsite Process Supervisors, RCO, and RSO will:

(1) Be responsible for identifying the HERO classification at the scene of an incident/accident and will inform the Senior Fire Officer. Items suspected or known to be HERO unsafe or susceptible requires the activation of the EMCON Bill.

(2) Ensure all ordnance personnel are familiar with HERO restrictions applicable to ordnance operations.

(3) Ensure visitors are made aware of HERO restrictions in ordnance areas (operating buildings, magazines, ranges) when issuing the Hazard Control Brief.

l. The Antenna Range personnel will be responsible for transmitter and antenna parameters of any radar antenna test site at NSA Crane and will notify the Explosives Safety Office of test configuration changes that could affect field strengths employed.

m. Supervisors will:

(1) Notify each government vehicle operator onboard NSA Crane having a mobile transmitter, that all operators of mobile transmitter systems must know and understand the HERO safe separation distance requirements for the transmitters under their control. These distances must be maintained between ordnance and the transmitter; otherwise, the transmitter system must be turned off. Ensure that every government-owned mobile and portable transmitter on board NSA Crane is conspicuously marked with the HERO Warning Label showing the appropriate standoff distance.

(2) Ensure government-owned cell phones and blackberries used by individuals that would be in ordnance areas are marked with a HERO Warning Label showing the appropriate standoff distance.

(3) Ensure each operator of a government vehicle containing a mobile transmitter is notified that the transmitter is not to be energized within the safe separation distances to ordnance or ordnance facilities.

(4) Ensure employees complete annual HERO training and that all ordnance personnel are familiar with HERO restrictions applicable to ordnance operations

(5) Ensure no new or modified RF transmitters are energized on NSA Crane without prior approval by the Explosives Safety Office and the NSA Crane Frequency Manager.

(6) Utilize the Transmitter Purchase and HERO Request Form located on the Code 102 Safety Branch Quality Documents site when requesting the purchase of transmitters to ensure compliance with this chapter.

n. Organizations performing work with explosives/explosive ordnance at NSA Crane will be responsible for ensuring HERO unsafe ordnance is completely enclosed in metal containers during storage and transportation. (See Exhibit 11-4)

o. The NSWC Contracts Department will ensure all NSWC transmitter purchase requests have been approved by the NSA Crane Frequency Manager and the HERO Officer prior to purchase.

p. The Crane Army Ammunition Activity (CAAA) Communications Officer will ensure all CAAA transmitter purchase requests have been approved by the NSA Crane Frequency Manager and the HERO Officer prior to purchase.

q. The Credit Card Buyer for NAVFAC MidlLant PWD Crane will ensure all NAVFAC MidLant PWD Crane transmitter purchase requests have been approved by the Base Communications Office and the HERO Officer prior to purchase.

r. NAVFAC MidLant PWD Crane will place HERO warning signs prohibiting RF transmissions at the entrances of ordnance handling and storage areas. Locations, time of replacement, and sign type will be determined by the Explosives Safety Office. See Exhibit 11-3 for the HERO warning symbol types.

EXHIBIT 11-1
HERO PROGRAM PROCEDURES

1. Application. The following procedures are to be followed when executing the HERO program at NSA Crane. Any deviation of the HERO program procedures must be approved by the Explosives Safety Office.

2. Transmitter Purchase

a. Government Radios. All purchase requests for portable and fixed radio transmitters for use at NSA Crane are to be routed through the NSWC Explosives Safety Office and the NSA Crane Frequency Manager for approval. (See the Code 102 Safety Branch Quality Documents site for the Transmitter Purchase and HERO Request Form.)

(1) Permission to use transmitting devices (CB, mobile, short wave, etc.) will be requested via the sponsoring government agent (e.g., NAVFAC MidLant PWD Crane Acquisition Office, Contracting Officer, Department), to the Explosives Safety Office and the NSA Crane Frequency Manager, in writing, providing:

(a) Frequency and output power for the transmitter;

(b) Gain of the antenna; and

(b) Proposed use of the transmitter (area or areas of NSA Crane).

(2) The HERO Officer will be advised of all new transmitters prior to activation or usage for approval. Approval or disapproval of the request will be issued by the Explosives Safety Office and the NSA Crane Frequency Manager, in writing, with instructions and precautions provided along with the HERO unsafe and susceptible stand-off distances that pertain to the transmitter. These approvals should be kept by the requesting group for each transmitter. Any changes to the station's antenna/transmitter system or ordnance configurations must be provided to the HERO Officer for re-approval. This applies even if an activity moves from one site to another within the confines of the facility.

b. Government Cellular Phones. Since modern cellular phones are not as serious a threat to ordnance material as radio transmitters, their purchase can be made without prior approval for HERO purposes. However, prior to their operation at NSA Crane, they must be properly labeled with the standard HERO Warning Label (Exhibit 11-2) illustrating the most conservative protective standoff distances for such devices if the devices will be in an ordnance area. The labels are available from the Explosives Safety Office.

3. Transmitter Use. All operators/users of mobile and portable transmitter systems (such as cellular phones, citizens band radios, and pagers who have access to or are able to pass close to ordnance operation areas (e.g., storage and assembly areas)) must know and understand the HERO Unsafe or HERO Unreliable and HERO Susceptible Ordnance safe separation distance requirements for the transmitters under their control. These distances must be maintained

between ordnance and the transmitter system; otherwise, the transmitter system must be turned off. Radio transmitters installed in personal vehicles are to be turned off prior to entering the installation. At no time will privately owned radios be operated in any restricted area or in other parts of the station while in sight of a vehicle (train or truck) that exhibits an explosive placard.

a. Ensure that radio systems installed in ordnance handling vehicles maintain the minimum 10-foot antenna to ordnance separation distance required for HERO Safe Ordnance per reference (a).

b. Ensure that operators, handlers, and riggers transferring ordnance maintain a minimum safe separation distance of 33 feet (10 meters) from HERO Unsafe/Unreliable Ordnance when using single portable radios operating in the 136 – 174 MHz frequency range and at a maximum output power of 2 watts. For use of the other single portable radios, submit a HERO transmitter purchase request for HERO approval.

c. Institute of Electrical and Electronics Engineers 802.11A/B/G/N (i.e., WiFi) devices should not be operated within magazines or ordnance operation buildings without written approval from NOSSA (N8).

d. Each civilian employee or military person having a radio transmitter installed in his/her personal vehicle is responsible for its registration with the Explosives Safety Department, in accordance with reference (a). (Note: Registration does not authorize use.) One copy of the registration form must be kept in the vehicle with the radio at all times while at the installation; the second copy will remain on file at the Pass and Identification Office. Privately owned radios will not be operated in any restricted area or in other parts of the installation while in sight of a vehicle (train or truck) that exhibits an explosive placard.

4. Government Transmitter Use

a. Use of hand-held radios as passive listening devices in RF emissions-controlled areas specifically marked with HERO signs (Exhibit 11-3) is not permitted except as otherwise authorized.

b. Use of hand-held radios in emergency situations involving ordnance facilities or ordnance transportation equipment will be used as authorized by the Incident Commander (IC) after evaluation of the scene.

c. Use of radar transmitting devices in free space will be used only with the approval of the Antenna Range Personnel (Code WXPT) working in conjunction with the Explosives Safety Office.

d. Use of hand-held radios and cellular phones in explosive operating buildings or explosive storage magazines is not permitted except as otherwise authorized.

e. Keyless entry systems should not be radiated within ordnance facilities. These systems are not allowed into the ordnance facility work areas.

f. Never place a cellular phone on the tailgate or exterior surfaces of an ordnance-transporting vehicle.

g. Disable all transmitting features when using laptops and wireless printers when in ordnance areas.

5. Other than Government Transmitter Use

a. Contractors

(1) Cellular phones and Blackberries can be used except in explosive operating buildings or in explosive storage magazines.

(2) Keyless entry systems should not be radiated within ordnance facilities. These systems are not allowed into the ordnance facility work areas.

(3) Other emerging technologies such as Personal Electronic Devices (PED), Personal Wearable Fitness Devices (PWFD), and Personal Wireless Medical Devices (PWMD) can be used except in explosive operating buildings or in explosive storage magazines. Notify the building supervisor prior to use of these items.

(4) Unmanned Aircraft Systems (UAS) with radar transmitting devices are authorized for use only in specified designated areas and must meet all NSA Crane requirements for UAS.

b. Government Employees and Visitors

(1) Personal radio transmitting devices are not to be used at any time at NSA Crane.

(2) Cellular phones and Blackberries can be used except in explosive operating buildings or in explosive storage magazines.

(3) Keyless entry systems should not be radiated within ordnance facilities. These systems are not allowed into the ordnance facility work areas.

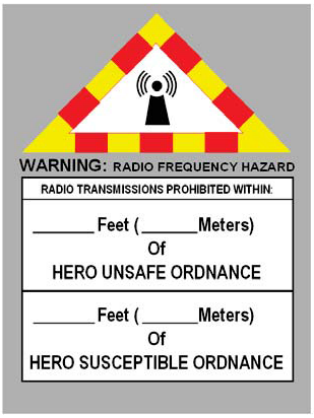
(4) Other emerging technologies such as PED, PWFD, and PWMD can be used except in explosive operating buildings or in explosive storage magazines. Notify the building supervisor prior to use of these items.

(5) UAS with radar transmitting devices are authorized for use only in specified designated areas and must meet all NSA Crane requirements for UAS.

EXHIBIT 11-2
HERO WARNING LABEL

The HERO warning label shown below is to be affixed to mobile and portable emitter systems such as radio and cellular phones. Additionally, HERO Approval Memos are provided to the operators and kept for the duration of each transmitter's use. The warning label and approval memo alerts the emitter operator to a potential hazard if the emitter is operated within the prescribed distance of ordnance operations.

The label has blank spaces for inserting HERO UNSAFE/UNRELIABLE ORDNANCE and HERO SUSCEPTIBLE ORDNANCE safe separation distances.



The HERO warning label shown below is for emitters that meet the zero-distance exception of reference (a). Per reference (a), all emitter systems used in the vicinity of ordnance require that a HERO warning label be affixed to the device.

HERO warning labels may be downloaded from the NOSSA's web-site at www.nossa.navsea.navy.mil and generated by the user with word processing software.

EXHIBIT 11-3
RADIO FREQUENCY HAZARD SIGNS

1. HERO Warning Symbol. A HERO Warning Symbol is posted at any location where radar equipment or other possible sources of electromagnetic radiation (EMR) might create the potential for premature initiation of ordnance due to HERO. This symbol is placed along ordnance transportation routes at NSA Crane gates and at entrances to ordnance operations areas to alert operators of mobile and portable emitter systems such as radios and cellular telephones to a potential hazard when using radios and cellular telephones past this point. Guidance for manufacturing symbols is provided below.

Materials: Anodized aluminum, adhesive backing optional.

Colors: Base material of anodized silver background; black anodized messages in bottom triangle: alternating colored blocks of anodized red and yellow in a border surrounding black anodized logogram in top triangle.

Logogram: Design will be a pictorial presentation of a radar antenna consisting of a pylon with a dot simulating an antenna and concentric area simulating pulsed energy.

Wording: The title, WARNING: RADIO FREQUENCY HAZARD, is standard for all symbols; the messages in the low triangle will vary according to particular situation; use of descriptive wording or warning information is the user's option.

2. No Ordnance Sign. This sign is posted at the entrance to areas that have transmitters (radar or other sources of EMR). This sign is used to alert ordnance truck drivers to the potential hazard of transporting ordnance in an area that might create the potential for premature detonation of the ordnance being transported.

Exhibit 11-4
ORDNANCE OPERATIONS GENERAL HERO REQUIREMENTS

1. To ensure safety, precautions must be taken to limit EMEs in and around ordnance handling areas. The following requirements apply to all ordnance operations involving the presence, handling, and loading/unloading of ordnance unless otherwise specified in reference (a).

a. Ordnance evolutions must be planned so that there is a minimum of ordnance exposure to EMEs.

b. Avoid touching any exposed firing contact, wiring, or other exposed circuitry with any part of the body or with any metallic object.

c. Ensure all open electrical connectors on the ordnance are covered with non-shorting caps.

d. Ordnance will not be assembled/disassembled in an EME.

e. Ignitors, primers, detonators, and other items containing EIDs will not be stowed in magazines that have flexible waveguides through them.

2. When ordnance is being assembled, handled, or transported within the confines of the station, emissions from various mobile and portable antenna/transmitter systems should be silenced or the HERO UNSAFE/UNRELIABLE and HERO SUSCEPTIBLE ORDNANCE safe separation distances should be maintained.

3. Transport and store HERO UNSAFE/UNRELIABLE ORDNANCE in sealed, all metal containers. HERO UNSAFE/UNRELIABLE or HERO SUSCEPTIBLE ORDNANCE cannot be moved, transported, or loaded except as specified by the ESO, and the HERO Officer. HERO EMCON guidance can be found in reference (d).

4. Transmitters operating in an explosives area must have HERO approval. All transmitters will display an appropriate sticker indicating the required safe separation distance for HERO UNSAFE ORDNANCE and HERO SUSCEPTIBLE ORDNANCE.

5. In addition to personal transceiver devices such as cell phones and pagers, there are emerging technologies such as Personal Electronic Devices (PED) (e.g., Apple Watch, and Google Glass), Personal Wearable Fitness Devices (PWFD) (e.g., Fitbits, Nike Fuel Band, and Jawbone Up), and Personal Wireless Medical Devices (PWMD) (e.g., hearing aids, body monitors, and artificial limb controls) that can automatically transmit Radio Frequency (RF) energy without operator action. These devices, while typically authorized for use in Navy and DoD spaces, must be turned off prior to entering magazine and assembly areas, or encroaching the established HERO separation distance for ordnance. All operators/users of these devices must know and understand the HERO UNSAFE or HERO SUSCEPTIBLE ORDNANCE safe separation distance requirements for the transmitters under their control. These distances must be maintained between ordnance operation areas and the transmitter system; otherwise, the transmitter system must be turned off. As is stated in chapter 3 of reference (e), the use of RF

devices inside magazines and assembly areas is prohibited, unless Commanding Officer, Naval Ordnance Safety and Security (NOSSA) Weapons and Explosives Safety Office (Code N8) approval is granted. Certification of these devices does not constitute approval for use in a magazine unless specifically stated in the certification.

6. Other conditions necessitating deviations from the requirements outline in reference (a) must be reported to NOSSA, N84, per reference (a).

THIS PAGE

INTENTIONALLY

LEFT BLANK

CHAPTER 12
RANGE SAFETY MANAGEMENT

1. References

a. NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore

b. DoD Directive 4715.11, Environmental and Explosives Safety Management on Operational Ranges within the United States

c. OPNAVINST 3770.2L, Airspace Procedures and Planning Manual

d. OPNAVINST 3591.1F , Small Arms Training and Qualification

e. NSWCCRANEINST 8027.2B, NSWC Crane Division Operations at Camp Atterbury-Muscatatuck Center for Complex Operations

f. DAPAM 385-63, Range Safety

g. NSWCCRANEINST 5100.1A, Occupational Safety and Health Program, Chapter 24 Non-Ionizing Radiation

h. NSACRANEINST 3571.1, Operational Range Management

j. CNICINST 3551.1 Small Arms Range Small Arms Weapons Simulators and Ammunition Reporting Requirements Management on Navy Installations

2. Purpose. To provide policy on the qualification requirements, duties, and responsibilities of personnel using ordnance ranges of Naval Support Activity Crane (NSA Crane) and Camp Atterbury, in accordance with references (a) through (j).

3. Scope and Applicability. This chapter applies to NSA Crane, all tenants, contractors, and visitors.

4. Definitions. See Appendix B.

5. Discussion

a. Primary safety support for single range evolutions can be provided by a Range Safety Officer (RSO). A Range Control Officer (RCO) is needed for ranges where multiple explosive operations are conducted concurrently. The role of the RCO and RSO are critical. In addition, it is important that a Command appointed Range Safety Manager (RSM), be employed to oversee all of the ranges on behalf of the Installation Commanding Officer (ICO) to ensure outside encroachments and range hazards are controlled in accordance with safety requirements. The Command Airspace Liaison Officer (CALO) is responsible for the command's Special Use

Airspace (SUA), Controlled Firing Area (CFA), and other airspace issues. For this reason, it is essential to outline the functions and responsibilities of these key personnel.

b. Ranges (land or water) are finite resources whose continuing viability is critical to the Army and Navy missions. This long-term viability is predicated upon various factors, including the extent and type of unexploded ordnance (UXO) contamination present. Range contamination to the point of saturation (or near saturation) can seriously degrade mission readiness and ultimately result in the closing of that range with attended consequences. In view of this, NSA Crane and tenants must follow references (b), (h), and (i) requirements and take steps to safeguard the long-term viability of these essential assets. UXO clearance operations are hazardous and place personnel and material at direct risk. Accordingly, they must be undertaken with the utmost caution, awareness of safety, and meticulous attention to detail.

c. NSA Crane hosts several types of ranges that conduct various missions. These include Open Burn/Open Detonation Demilitarization, Quality Assurance, and Surveillance Test Ranges operated by Crane Army Ammunition Activity (CAAA); Research, Test, Development and Evaluation (RDT&E) Ranges operated by Naval Surface Warfare Center, Crane Division (NSWC Crane); a Small Arms Qualification and Training Range operated by NSA Crane; and nine Explosive Ordnance Disposal (EOD) proficiency training sites.

d. NSWC Crane is authorized to conduct explosive operations at Camp Atterbury Maneuver Training Center (CAMTC), Edinburgh, Indiana, in accordance with an executed Memorandum of Understanding (MOU). As such, all personnel that conduct ordnance operations at the facility will be familiar with the contents of reference (e). NSWC Crane personnel assigned as Range Officer in Charge (ROIC) and RSOs for Camp Atterbury will be designated in writing in accordance with this chapter and reference (e). All tours and testing operations (explosive and non-explosive) for Camp Atterbury will be requested in accordance with reference (e).

6. Policy. All operations involving the functional testing, burning or detonation of explosives/explosive components on Crane Site ranges, explosives areas, or on any other range operated by NSA Crane and tenant personnel, will be accomplished in accordance with the requirements of references (a) and (f) using approved standard operating procedures (SOPs) and controlled by designated personnel assigned as per the requirements of this chapter.

> Note: Small Arms Training and Qualification Ranges are to be operated in accordance with references (d), (j), and command approved SOP. Specific requirements for Small Arms Qualification and Training Range is addressed in paragraph 7.e. CAAA personnel will use pertinent Army guidance as applicable. To that end:

a. All evolutions on a range will be under the control of a designated RSO as required by the SOP.

b. Notification of range events will be provided to the Range Safety Manager (RSM) or the Assistant RSM (ARSM) prior to execution. This will be provided via e-mail or phone message.

c. Changes in range mission requiring site approval considerations will be coordinated with the RSM and Explosives Safety Officer (ESO).

d. Range operations, especially clearance of UXO, will meet the requirements of references (b), (h), and (i).

e. All outdoor ranges will use positive controls to prevent unauthorized personnel from entering the Surface Danger Zone (SDZ), Target Area, Ricochet Area, and Primary Danger Area. Controls include:

(1) "WARNING" or "DANGER" signs identifying the hazard areas. Signage will be posted at the range entry point and at 200 meter intervals around the perimeter of the range. The nomenclature on the signs will be coordinated with the RSM and meet the requirements identified in reference (f).

(2) A red flag will be displayed prominently near the entrance of any outdoor ranges or flown at the entry point of the range to indicate that the range is "hot". When operations cease, the flag will be hauled down or removed.

(3) A red flashing light(s) that is visible from all normal approaches in addition to the red flags to warn personnel of the presence of a significant hazard such as a remotely controlled operation or a test firing/detonation in progress.

(4) Barriers, barricades, and/or gates will be used to secure roads or areas during testing, burning or demolition operations.

7. Action

a. ICO will:

(1) Appoint a Range Safety Program Manager and Assistant Range Safety Program Manager in writing

(2) Appoint a Primary Range Safety Officer (PRSO) and RSOs for the Qualification and Training Range (QTR) in accordance with reference (d).

(3) Appoint Small Arms Marksmanship Instructors (SAMI) for the QTR in accordance with reference (d).

(4) As required by reference (j), approve the Standard Operating Procedure for operation of the QTR.

(5) Per reference (j), ensure the QTR is maintained in a high state of readiness and adequately staffed.

b. The RSM and ARSM will be Command-appointed. The duties and responsibilities of the RSM/ARSM are:

(1) To review and approve RCO/RSO nominations and training plans or Job Qualification Requirement (JQR). Draft RCO/RSO letters of designation for the Commanding Officer, Department Director/Head of Tenant Activity signature, as applicable. (See Exhibit 12-1 for designation letter sample format.) Ensure ROIC letters for Camp Atterbury and Muscatatuck are issued with an effective date of 1 October through 30 September each year.

(2) To work with the RCOs to coordinate range operations with personnel/functions external to the range (i.e., Natural Resources, Public Affairs, Force Protection Department, Community Planning and Liaison Office, etc.) but potentially affected by range hazards for:

(a) NSA Range: Small Arms Qualification and Training Range (QTR) Building 2524

(b) NSWC Ranges:

1. Ordnance Test Area (OTA),

2. Elemental Analysis Facility (EAF)

3. Prototype Test Facility (PTF)

4. Rocket Range Test Area (RRTA)

5. Special Weapons Assessment Facility (SWAF) Building 3461

6. Small Arms Indoor Test Range (ITR) Building 2521

7. Small Arms Underground Test Range (UTR) Building 2521

8. Lake Glendora Test Facility (LGTF)

9. Building 198 Burn Cage

10. Windstream Test Complex Building 3606

11. Camp Atturbery Range 22 Building 22411 (See Definitions)

(c) CAAA Ranges:

1. Surveillance Function Test Range (SFTR)

2. Primary/Secondary Demolition Ranges

3. Explosives Burning/Flashing Pad Complex (Demo Range)

4. Ammunition Burning Ground (ABG)

5. Quality Assurance Inspection and Testing Complex, Building 2167

(d) EOD Water Driven Percussion Actuated Neutralization (PAN) Training Sites

1. Building 150

2. Building 365

3. Building 1045

4. Building 2119

5. Building 2532

6. Building 2721

7. Building 2907

8. Building 2925

9. Building 3165

(3) To work as liaison between tenants. For Camp Atterburry, liaison will be coordinated with NSWC Crane Single Point Of Contact (SPOC).

(4) Ensure the requirements of reference (b) are met by review and approval of operational plans and Area SOPs for Crane Site ranges, Lake Glendora and Camp Atterbury.

(5) Ensure the requirements of reference (b) are met. Specifically ensure that: (except for Camp Atterbury)

(a) An outreach program is established and maintained to educate installation personnel and the surrounding general public (where applicable) on the dangers of trespassing on ranges and the hazards associated with UXO in general.

(b) All mishaps are recorded that are attributed to UXO that occur on or off the installation from range operations.

(c) All areas containing known or suspected UXO are indicated on installation master planning documents.

(d) Installation personnel and the public, as appropriate, are informed if any range operation presents a potential explosive hazard off range.

(e) That before leasing, selling, transferring, or changing the use of a range, a clearance of UXO and other explosive ordnance or materials is accomplished to the extent necessary to provide a level of protection of human health and the environment that is consistent with the reasonably anticipated future use of the property.

(f) Conduct annual explosives safety inspection and self assessment of all ranges and provide an inspection report to the applicable Commanding Officer.

(g) Coordinate reporting process for Daily Range Reports with RCOs/RSOs.

c. The RCO will:

(1) Be designated in writing by the applicable Commanding Officer, Department Director or Head of Tenant Activity.

(2) Oversee multiple ordnance operations on a single range. Ensure that concurrent operations are conducted meeting safety requirements established for such operations, and ensure that a RSO is designated for each functional range, firing position, and/or firing line. This includes total control of range coordination and access.

(3) Coordinate explosive and test functions of the assigned range to ensure safe operations with unassociated functions occurring around the range and on portions of the range.

(4) Work with the RSM for issues involving potential operations that are not addressed in the existing official site approval documents for the range.

(5) Be certified for the applicable ordnance family and Work Task Code in accordance with Chapter 10 of this instruction.

d. The RSO for RDT&E and Demilitarization and Quality Assurance/Surveillance Ranges will:

(1) Be designated in writing by the applicable Commanding Officer, Department Director or Head of Tenant Activity, and be present during all live firing/explosive operations.

(2) Be certified for the applicable ordnance family and Work Task Code in accordance with Chapter 10 of this instruction. Note: CAAA personnel will be certified in accordance with CAAAR 350-1.

(3) Have the appropriate SOP and any Supplemental Documentation available at the site and ensure they are followed.

(4) Coordinate single evolution operations at the range, firing line, firing position, or ordnance test area.

(5) Have control of the number of personnel uprange/downrange on the designated range or ordnance test area and the conditions under which they are permitted access to those areas.

(6) Be responsible for all energetic materials on the designated range or ordnance test area and when they are allowed to be delivered to those areas.

(7) Determine when it is safe to connect the initiating device to the ordnance item/main charge.

(8) Request permission from RCO prior to designated range or ordnance area going "hot".

(9) Notify RCO when designated range or ordnance area is "Cold" upon completion of range operations.

(10) Give team lead permission to open fire/function firing device.

(11) Follow safety procedures established by the SOP and supplemental documentation when dud, misfired, or malfunctioned ordnance is present in the designated range or ordnance test area.

(12) Ensure SOP provides detailed steps for the disposal of inert, expended or unexploded ordnance and other material potentially presenting an explosive hazard (MPPEH).

(13) Ensure that no operations are conducted without the use of an approved SOP and properly certified personnel in accordance with Chapter 10 of this instruction. Note: CAAA personnel will be certified in accordance with CAAAR 350-1.

(14) Ensure no explosive operations commence on the assigned range/ordnance test area(s) until the RCO/RSM has been informed.

(15) Ensure all operations are stopped, by issuing a Cease Fire or Check Fire, as appropriate, when in his/her opinion, they pose an imminent danger either to essential or non-essential personnel.

(16) Ensure the immediate actions for hang fires are executed and appropriate wait times are observed for misfires.

(17) Act on behalf of the RCO in his/her absence only when officially designated in writing by the RCO

(18) When Laser or Radio Frequency operations are being performed, there must be a qualified Laser Range Safety Officer or a Range Frequency Safety Officer present. For qualifications refer to reference (g).

(19) Notify the RCO/RSM (as applicable) of any misfires, malfunctions, cook-offs, or premature detonation/functioning's.

(20) Communicate to and ensure personnel on the range understand and acknowledge range status (Hot/Cold).

(21) Do not allow range personnel to go downrange, enter into or transit through Surface Danger Zones (SDZ) when range is "hot".

(20) Ensure personnel occupying mission essential areas within the SDZ are properly briefed on emergency procedures and have two way communications with the RSO.

(21) Ensure proper housekeeping and habitability of bunkers and personnel protective shelters/barricades located within the mission-essential area.

(22) Ensure no personnel are allowed in the Primary Danger Area during live fire explosive operations.

(23) Be familiar with hot gun, cold, gun and immediate action misfire procedures for weapon system being operated on the range.

(24) Ensure the target area is maintained and free of ricochet producing material. Ensure sacrificial cladding is installed on impact pits and bullet traps as necessary.

e. RSOs for the QTR will:

(1) Be designated in writing by the ICO.

(2) Be certified Small Arms Instructors.

(3) Not act as a Line Coach while performing RSO duties.

(4) Ensure a current copy of reference (d) and QTR Emergency Action Plan are available onsite while conducting weapons qualification.

(5) Ensure no tracer (T) or armor piercing (AP) ammunition is fired in the QTR.

f. Range Officer in Charge (ROIC) will:

Note: ROICs will only apply to operations being performed at Camp Atterbury and Muscatatuck.

(1) Be designated and present during all testing operations.

(2) Check out the range/training area.

(3) Ensure Command appointed RSO, Laser Range Safety Officer (LRSO), and Radio Frequency Safety Officer (RFSO) are present during operations.

(4) Maintain communications with Range Control.

(5) Enforce all applicable safety requirements and ensure the safety of all NSWC Crane assigned personnel.

g. The Command Airspace Liaison Officer (CALO) will be Command-appointed and be familiar with reference (c). The duties and responsibilities of the CALO will be to:

(1) Provide direct liaison to the appropriate Regional Airspace Coordinator (RAC) and Naval Representative (NAVREP) on airspace initiatives envisioned or initiated by the command.

(2) Document and maintain usage data of all Department of the Navy Special Use Airspace (SUA) controlled or scheduled by the command. Submit annual usage of MOA/Restricted Area and Military Training Route (MTR) usage data to the RAC as appropriate.

(3) Review all FAA-generated aeronautical studies, obstacle evaluations or proposed landing zone evaluations to determine the impact on the commands' facilities, airspace, or mission capabilities.

(4) Initiate SUA or MTR proposals/modifications to the RAC for consolidation. Include permanent changes due to changing operational requirements and temporary SUA modifications for exercises.

(5) Coordinate airspace issues with other organizations, e.g., public affairs, environmental, legal, etc.

(6) Represent the RAC or NAVREP at local coordination meetings with non-DON activities when requested.

(7) Submit required reports in accordance with reference (d).

h. Department Directors and Heads of Tenant Activities who operate ranges or outdoor test areas will:

(1) Designate a RCO for each range(s) or outdoor test area(s) where multiple evolutions may be performed once qualifications are verified (i.e., approved JQR/training plan attached to the nomination/designation letter).

(2) Ensure comprehensive training requirements for each RCO based on the ordnance family group, type of explosive operation to be performed and ranges assigned.

(3) Designate RSO(s) for the appropriate ordnance family group and explosives operation once qualifications are verified (i.e., review of JQR/training plan attached to the designation

letter). Note: EOD RSO designations do not require reference to specific ordnance family groups due to their extensive formal ordnance training.

(4) Designate Range Officer in Charge (ROIC)(s) for the appropriate operation (ordnance, laser, RF) once qualifications are verified (i.e., review of JQR/training plan attached to the designation letter). ROIC designation letters are only required for Camp Atterbury and Muscatatuck operations. ROIC letters are valid 1 October through 30 September and are reissued annually in October.

(5) Appoint in writing the primary NSWC Crane Division Single Point of Contact (SPOC) and Back-Up SPOC for Camp Atterbury and Muscatatuck operations. (Special Warfare and Expidetionary Systems Deaprtment only)

(6) Ensure comprehensive training requirements for each RSO is based on the specific ordnance family group and type of operation to be performed.

(7) Provide written revocation of RCO or RSO designation in the event of an explosive mishap or other unsafe act where the individual is found to be negligent in the performance of his/her duty. Further, should an RCO or RSO have their explosive certification revoked per applicable Qual/Cert instruction for cause, they will also have their designation revoked in writing. To regain their RCO or RSO designation, they will first regain their explosive certification and then begin their RCO or RSO retraining anew until deemed retrained and qualified as an RCO or RSO. Note: CAAA personnel will be certified/de-certified in accordance with CAAA-R 350-1.

(8) Comply with the requirements of reference (b) to:

(a) Safely clear UXO from ranges consistent with the stated mission of the range and for continuing viability of the range.

(b) Perform a thorough risk assessment in preparation for range clearance operations. At a minimum, the risk assessment must include the number of personnel involved, types of ordnance anticipated to be encountered and/or recovered, support requirements, expected levels of contamination on the range, and a clearly-articulated rationale for the clearance. For Crane Site ranges and Lake Glendora, the SOP for a given test and item can include this information. References (h) and (i) provide more detail on UXO and posttest remains clearance.

(c) Prohibit unauthorized access to ranges and impact areas. Post UXO hazard-warning signs (when applicable) as directed by the RSM.

(d) Maintain permanent records of all expenditures (types, quantities, locations, and estimated dud rates when applicable) of ammunition and explosives.

i. Division Managers or equivalent who operate ranges or outdoor test areas will:

(1) Develop a comprehensive training plan or JQR for each RCO and RSO based on the specific ordnance family group, type of explosive operation to be performed and ranges assigned.

(2) Submit RCO nominations to the RSM, for each range(s) or outdoor test area(s) where multiple evolutions may be performed. A summary of the nominee's qualifications and training will be included as an enclosure to their nomination letter for review by the RSM. (See Exhibit 12-2 for nomination letter sample format.)

(3) Submit RSO nominations to the RSM, for appropriate ordnance family group and explosives operations. A summary of the nominee's qualifications and training will be included as an enclosure to their nomination letter for review by the RSM. (See Exhibit 12-2 for nomination letter sample format.)

j. The Explosive Ordnance Disposal (EOD), Detachment Crane, will:

(1) Ensure the CAAA RSO and RSM are informed of the use of the Demolition Range prior to the event.

(2) Report all EOD incidents occurring on ranges or UXO clearance operations conducted on Crane Site ranges to the RSM.

(3) Respond promptly to protect personnel and property from any UXO hazard located on or off NSA Crane as per Navy policy.

(4) Ensure the ESO, RSM, Base Security, and Fire Department are notified via email prior to functioning the Percussion Actuated Neutralizer (PAN) for training and qualifications. Notification will include the location, date, and time of proposed functioning, estimated number of shots, designated RSO, and SOP being utilized.

k. Natural Resources and host/tenant Public Affairs personnel will coordinate all events with the RSM that can potentially encroach on the areas used for range/test operations. Such events include, but are not limited to deer hunts, visitor flyovers, small game hunting, and VIP visits.

l. The Explosives Safety Officer will:

(1) Maintain and support the RSM as a member of the Safety Office.

(2) Perform as the RSM in the absence of the Command-appointed individual.

(3) Ensure the CO NSA Crane is involved with conflicts between explosives safety and other requirements.

m. Environmental Protection Office will:

(1) Ensure procedures are in place to respond in accordance with the DoD's response authorities under 10 USC 172, 10 USC 2701, and 42 USC 9604 to a release or substantial threat

of a release of munitions constituents from an operational range to off-range areas, when such release poses an imminent and substantial threat to human health or the environment.

(2) Maintain references (h) and (i) and update as necessary. Coordinate annual review and updates with the ESO, RSM, and ARSM

8. RSO and RCO Qualification Requirements:

a. Qualify as a Team Leader (TL) in accordance with Chapter 10 of this instruction for the specific ordnance family group and explosive operation for which being designated.

b. Complete Standard Operating Procedure training.

c. Complete Hazard Analysis training.

d. Complete an RSM approved Division RCO/RSO training plan or JQR for the specific ordnance family group and explosive operation.

e. Complete RSO requirements for host activity (Camp Atterbury, etc.) if performing RSO duties on other than NSA Crane ranges.

9. Reporting Requirements. At the end of the fiscal year, CAAA will report to the CALO the use of the Demolition Range for the completed year. The following information is to be reported:

a. Total number of days area was:

(1) Scheduled

(2) Activated

(3) Utilized

b. Total number of hours area was:

(1) Scheduled

(2) Activated

(3) Utilized

c. Total number of hours area was released to the controlling agency for public use:

(1) Number of hours

(2) Number of weekdays area was not activated

(3) Number of weekend days area was not activated

(4) Number of holiday days area was not activated

10. Reports. In accordance with reference (c), the CALO will file the following reports:

a. Annual Report of Special Use Airspace and Target Utilization.

b. Usage Report for Controlled Firing Area Utilization.

EXHIBIT 12-1
SAMPLE FORMAT

(Tailor to specific Ordnance Family Group and Explosive Operation)

8020/16
Ser 1024-RH/#####

From: Director, Special Warfare and Expeditionary Systems Department
To: John E. Example

Subj: RANGE SAFETY OFFICER DESIGNATION FOR TESTING OPERATIONS PERFORMED BY SMALL ARMS WEAPONS SYSTEMS DIVISION

Ref: (a) NSACRANEINST 8020.1E
(b) Range Safety Officer Designation Request ICO John E. Example, memo 8020 Ser JXNM/???? Of DD MMM YYYY
(c) NSWC Range Safety Officer Designation memo, 8020/16 Ser 1024-RH/???? of DD MMM YYYY

1. Per Chapter 12 of reference (a), and based on your qualifications provided in reference (b), you are designated as Range Safety Officer (RSO) in support of Research, Development, Testing, and Evaluation (RDT&E) Operations for the Special Warfare and Expeditionary Systems Department, Naval Surface Warfare Center (NSWC), Crane. This appointment covers all RDT&E Ordnance Testing Operations conducted by the Small Arms Weapons Systems Division for the following Ordnance Family Group:

J Small Arms Ammunition

2. This designation covers testing operations at the Underground Test Range (UTR), and the Indoor Test Range (ITR) and the Special Weapons Assessment Facility (SWAF).

3. As RSO, you will perform safety oversight duties. Specific responsibilities include, but are not limited to:

a. Oversee range operations and ensure that no operations are conducted without the presence of the appropriate and approved Standard Operating Procedures and applicable Supplemental Documents.

b. Ensure that all operators possess the proper certification for the work to be accomplished.

c. Ensure no firing operations are initiated at the UTR, ITR, or SWAF until the Small Arms Weapons Systems Division Range Control Officer or Acting Range Control Officer, and the Range Safety Manager have been informed.

Subj: RANGE SAFETY OFFICER DESIGNATION FOR TESTING OPERATIONS PERFORMED BY SMALL ARMS WEAPONS SYSTEMS DIVISION

d. Ensure all operations are ceased that pose an imminent danger to either essential or non-essential personnel.

4. Other Responsibilities. The Small Arms Weapons Systems Division Manager will ensure you are provided with sufficient technical and administrative support and guidance as required while performing your RSO duties.

5. Your designation will remain in effect as long as you are assigned to the Small Arms Weapons Systems Division unless specifically revoked by the NSWC Crane Explosives Safety Officer or by the Director, Special Warfare and Expeditionary Systems Department.

6. This designation letter supersedes reference (c).

I.M. Charge

From: John E. Example

To: Director, Special Warfare and Expeditionary Systems Department

1. I certify that I am familiar with reference (a) and all current instructions, standard operating procedures and regulations pertaining to my designation.

2. I have assumed the duties as a Range Safety Officer for operations at the Indoor and Underground Test Ranges and the Special Weapons Assessment Facility.

John E. Example

Copy to:
1024
JX
JXN
JXNM

EXHIBIT 12-2
SAMPLE FORMAT

(Tailor to specific Ordnance Family Group and Explosive Operation)

8020/16
Ser JXNM/#####

MEMORANDUM

From: Manager, Small Arms Weapons Division

To: Range Safety Manager

Subj: RANGE SAFETY OFFICER DESIGNATION NOMINATION ICO JOHN E. EXAMPLE

Ref: (a) NSACRANEINST 8020.1E

Encl: (1) Range Safety Officer, Job Qualification Requirements (JQR) for John E. Example

1. In accordance with reference (a) and based on qualifications provided in enclosure (1), request John E. Example be designated as a Small Arms Weapons Division Range Safety Officer (RSO) for Ordnance Testing Operations at the Indoor and Underground Test Ranges and the Special Weapons Assessment Facility for the following Ordnance Family Groups:

A - Gun Ammunition

F - Landing Force and Artillery Ammunition

J - Small Arms Ammunition

2. Point of contact is XXXXX. Range Control Officer, Small Arms Maintenance and Overhaul Branch, who can be reached at XXXXX@navy.mil or 812-854-XXXX

D. M. Manager

CHAPTER 13
SHIELD CERTIFICATION

1. References

a. NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore.

b. MIL-STD-398A Shield, Operational for Ammunition Operations, Criteria for Design of and Tests for Acceptance.

2. Purpose. To provide policy and procedures for certification of personnel protective shields used in explosives operations.

3. Scope and Applicability. This chapter applies to all Navy operations involving ordnance and energetic materials. It provides clarification of requirements of reference (b), and additional local guidance for minimum design criteria and test methods for acceptance of operational shields developed to protect personnel and assets from accidental or intentional detonations of explosives during ammunition surveillance, maintenance, renovation, testing, and demilitarization.

4. Policy. All personnel protective shields will be certified.

a. Appendix G of reference (a) provides guidance regarding the design, development, and certification of personnel protective shields.

b. Reference (b) provides the requirements for the design and acceptance testing of personnel protective shields.

c. Exhibit 13-1 describes the requirement and procedures to obtain Explosives Safety Office certification of personnel protective shields.

5. Action

a. NSWC Crane, Special Warfare and Expeditionary Systems Department will ensure the requirements for personnel shields described by Exhibit 13-1 are followed when shields are a part of the Research, Development, Test, and Evaluation (RDT&E) operations.

b. Explosives Safety Office will

(1) Review and provide documented certification of all personnel shields that are a part of RDT&E operations.

(2) Maintain copies of approved test plans, test reports and certification documentation.

EXHIBIT 13-1
CERTIFICATION OF PERSONNEL PROTECTIVE SHIELDS

1. The hazard assessment performed on all operations and facilities that involve ammunition and explosives must determine the requirement for personnel protective shields. The primary need for shielding is dependent upon such factors as the quantity and types of explosives or other hazardous materials being handled and the nature of the operation being performed. Design, fabrication, and certification of operational shields must comply with the requirements of reference (b) and Appendix G of reference (a). Operational shields must be designed to conform to the following requirements as applicable:

a. Blast Attenuation

b. Fragmentation Confinement

c. Thermal Effect Attenuation

2. Personnel protective shields must be certified prior to use. The certification process involves the development and approval of a test plan, shield testing, development of a shield test report, and a request for shield certification to the Explosives Safety Office with final certification by the Explosives Safety Officer (ESO).

3. Documentation

a. Test Plan. No operational shield will be tested until a test plan has been developed and approved by the ESO. The test plan will include:

(1) Statement of purpose, including pertinent background information.

(2) Outline of objectives to include the energetics to be tested, description of shield to be tested, design criteria, and operational use of shield.

(3) Step-by-step instructions to achieve test objectives, layout of equipment, location, and purpose of instrumentation, list of data to be recorded during test, data sheets for recording test results, and any special considerations.

(4) Method to be used to interpret test data and observations to evaluate shield design.

(5) Hazard analysis (NSWC Crane requirement.)

b. Test Report. A test report will be generated and must include the test set up, test procedure, test results, and analysis of test results. Also included will be:

(1) Design drawing with construction details, including shield securing method and shield hardware.

(2) Equipment manual giving instructions for set up, operation, regular maintenance and inspection criteria, including description of the shield's relationship to and interface with any allied equipment.

(3) Overpressure and thermal measurements.

(4) Still camera color pictures of the operational shield before and after test, including any pictures needed to illustrate and clarify the set-up, discussion, conclusion, and recommendations sections of the test report.

(5) High-speed camera coverage taken of each test with at least one camera. Additional cameras or multiple test with camera(s) at different locations will be used to provide required coverage. Cameras should record event in color at a speed of at least 400 frames (pictures) per second.

c. Equipment Controls

(a) The drawing number.

(b) The words "Explosives Certified" and the explosives limits for which the shield is certified, e.g., "Explosives Certified for 6 grams of Class/Division 1.1".

4. The identification of the applicable ordnance items that the shield is certified for is to be listed on the design drawing. The design engineer will be responsible for assuring this requirement is accomplished.

5. If a shield is to be certified for multiple items, an analysis must be performed that compares the test data on the tested item to the additional items. This "certification by analogy" must be approved by the ESO.

THIS PAGE

INTENTIONALLY

LEFT BLANK

CHAPTER 14
MATERIALS, PROCESSES, EQUIPMENT, AND FACILITIES REVIEW COMMITTEE (MPERC)

1. References

a. NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives Safety Ashore

b. NSWCCRANEINST 8000.1F, Standard Operating Procedures Program for the Processing of Expendable Ordnance

c. NAVSEAINST 8020.5C, Qualification and Final (Type) Qualifications Procedures for Navy Explosives (High Explosives, Propellants, Pyrotechnics and Blasting Agents)

d. MIL-STD-1751A, Department Of Defense Test Method Standard: Safety and Performance Tests for the Qualification of Explosives (High Explosives, Propellants, and Pyrotechnics)

2. Purpose. To provide policy and procedures for the Materials, Processes, Equipment and Facilities Review Committee (MPERC). The MPERC process is described in Exhibit 14-1.

3. Scope and Applicability. This chapter applies to all Naval Surface Warfare Center (NSWC) Crane, Research, Development, Test and Evaluation (RDT&E) operations involving ordnance and energetic materials.

4. Policy. As required by Appendix G of reference (a), this chapter consolidates peer reviews by implementing a formal review and approval program for the design and development of materials, processes, equipment, and facilities directly associated with RDT&E explosive operations performed at NSWC Crane. Exhibit 14-1 describes the organization structure and operational format of the MPERC and the requirements and procedures used to obtain peer review approval.

a. For R&D (Research & Development) operations, the procedures to be followed are described in Exhibit 14-2. The chapter describes the nature of information required to be submitted for peer review before using new materials as well as before scale-up from one stage to the next larger stage can be completed.

b. For T&E (Test & Evaluation) operations, peer review will be required when the introduction of new materials, processes, equipment, and/or facilities into the T&E function are planned. Peer review will also be required on existing equipment that has not previously been MPERC approved or has not been used for six or more years. Peer review will also be required on MPERC approved equipment that has been modified. The MPERC process for processes, equipment, and facilities is described in Exhibit 14-3.

5. Action

a. Special Warfare and Expeditionary Systems Department will:

(1) Appoint the Chairperson and Alternate Chairperson of the MPERC.

(2) Ensure that project engineers and technicians follow the requirements outlined in this chapter for obtaining peer review approval for materials, processes, equipment (new and modified), and all new facilities and facilities that are being used for a process not previously performed in that facility.

b. Explosives Safety Office will ensure:

(1) Explosives Safety MPERC representation.

(2) Approved RDT&E equipment has been reviewed as indicated by assigning an Evidence of Compliance (EOC) number and verifying the number is shown in the equipment list of SOPs per reference (b). The EOC number will be posted on the equipment prior to use.

(3) RDT&E operations involving new equipment are not conducted with live explosives or explosive components unless the equipment has been approved through the peer review process.

c. The Material, Processes, Equipment, and Facilities Review Committee will

(1) Consist of the members lised in subparagraphs 4.c.(1)(a) through 4.c.(1)(d):

(a) A chairperson appointed by the Special Warfare and Expeditionary Systems Department to preside over all correspondence/meetings of the MPERC.

(b) At least one peer who is technically qualified to review and provide authoritative recommendation for approval of items reviewed by the committee. The chairperson will appoint the peer(s) who will be independent of the developer.

(c) One or more members provided by the Explosives Safety Office.

(d) Any ad hoc member(s) appointed by the chairperson of the MPERC to provide review and authoritative recommendation for item approval on an as-needed basis.

(2) Review and provide documented approval or requests for additional data, restrictions, etc., for:

(a) Processes planned for scale-up from laboratory to pilot plant or from pilot plant to full-scale production.

(b) New processing technology planned for use.

(c) Processes, equipment, or facilities that have not been used previously for energetic materials.

(d) Processes, equipment, or facilities which have been modified to test/produce an energetic material or product.

(e) Existing equipment that has not been used for six or more years.

(f) Pilot plant equipment or facilities that have not been maintained according to the Preventative Maintenance (PM) plan.

(g) New material (product) of a development effort.

(h) Material of an unknown origin.

(i) Material that the organization has no experience in handling.

(3) Determine level of review for item approval on a case-by-case basis.

(4) Ensure training material is electronically available.

EXHIBIT 14-1
THE MPERC PROCESS

1. Materials, Processes, Equipment and Facilities Review Committee Procedures

a. Initiating the Peer Review Process. The engineer, scientist, or technician wanting to initiate operations with not previously approved material, process, equipment, facility, or combination thereof, must initiate the peer review committee action by making a written request to the committee. This request will be initiated by an e-mail or MPERC package sent to the Chairperson (or Alternate Chairperson) requesting review and approval of the proposed action. The MPERC package should include any required information/data as specified by Exhibits 14-2 and 14-3. The e-mail or MPERC package should also include any requested waivers and justification for deviating from safety requirements.

b. Peer Review Process

(1) Upon receipt of the formal submission for action, the Chairperson (or Alternate Chairperson) will assign a specific individual peer review committee (if needed) to address the individual request. The make-up of the assigned peer review committee will be influenced by the nature of the request.

(2) Peer review committee actions will be documented and the MPERC historical file, electronic or hard-copy, will be maintained in the division office of the current MPERC Chairperson.

c. Committee Action. The Chairperson will provide the committee members with MPERC packages and schedule committee meetings as needed. The peer review committee Chairperson (or Alternate Chairperson) also will convene and chair all meetings. If the request is minor, the Chairperson (or Alternate Chairperson) can make a "MPERC not Required" determination. Alternately, the assigned peer review committee, after reviewing the submitted MPERC package, can vote by e-mail. In all cases the peer review committee action, including a "MPERC not Required" determination, will be documented and maintained in the MPERC historical file.

d. Meeting Format. The initiating party will make informational presentations at the committee meetings. The presentation should summarize the proposed process, evaluate the potential safety hazards and make recommendations based on the safety evaluation.

e. Committee Action. After discussion and evaluation, the peer review committee will issue a written response to the request (e.g., approval, request for more data, request for site visit, request for formal presentation by initiating party, restrictions, etc). The written response must include a statement of the rationale upon which the approval is based. Committee responses will be documented and retained in the MPERC historical file maintained in the division office of the current MPERC Chairperson.

f. Records. The outcome of the review will be a “MPERC not Required” format (Exhibit 14-4) or an approved MPERC package. These final determinations will be maintained as part of

the Division's MPERC historical file. The Explosives Safety Office will also maintain a copy on Safety Branch MPERC SharePoint site..

2. Material Peer Review Requirements

a. Peer reviews are required for approval of the use of new materials. New materials are defined as those energetic materials for which NSWC Crane does not have experience in manufacturing at the limited production scale or does not have experience in performing the T&E operation(s). The material may not have been previously reviewed or tested because:

(1) It is a new product of a development/evaluation effort,

(2) It is of unknown origin, or

(3) The organization has no experience in handling or processing it.

Experimental pyrotechnic compositions are one example of new materials that are the outcome of an R&D effort. Contractor-generated energetic materials being subjected to T&E to generate data to submit Qualification and Final (Type) Qualification packages are an example of new materials for which the organization has no prior experience in handling or processing.

b. Safety information submitted for MPERC review should be required to support design operational processes and/or tests using the new material which can be performed without subjecting personnel to unacceptable risks of injury by inadvertent ignition, detonation, poisoning, etc. Traditional energetic material sensitivity data is a minimum requirement. In addition, the nature of the processing operation, use and/or test, to which the new material will be subjected should be evaluated for potential hazards.

c. A major NSWC Crane R&D mission is the development of new pyrotechnic ordnance items or product improvement of existing pyrotechnic ordnance items. Historically, this development proceeds through stages (defined in terms of the material quantities being processed), which eventually at the final stage, results in the incorporation of a new experimental composition into an ordnance device. The initial stages are directed toward formulating the new composition at the laboratory scale. At this stage only small quantities of the new material are evaluated for performance, stability, sensitivity, and processing characteristics. Materials which survive this initial screening process are scaled-up to an evaluation of whether they can be manufactured on a larger scale. At each scale-up stage, manufacturing and processing techniques are evaluated, as well as the effect of scale-up on performance and safety characteristics. At each stage the emphasis is shifted toward obtaining different types of safety, processing and performance information. To address potential storage stability issues, a test plan will be included that describes how storage stability is going to be verified. Exhibit 14-2 illustrates the format required by the peer review for the various stages.

3. Process Peer Review Requirements

a. Process peer reviews are required when new processes are to be used in R&D or T&E operations employing energetic materials; for example, when:

(1) A new processing technology is planned to be used;

(2) A process is planned for scale-up, (e.g., from laboratory stage to concept stage);

(3) A process has been modified to produce and/or test a different type of energetic material or product; or

(4) A process has not been used to process or evaluate energetic materials for an extended time period (e.g., not used for six or more years).

b. Process peer review submissions should be made early in the planning stage for the process. Each case will be evaluated individually. MPERC reviews at various levels of implementation of the new process will be done as appropriate (e.g., at procurement, set-up, inert evaluation, and final configuration phases). The areas to be addressed in MPERC submissions would include description and definition of the process, analysis of process's system safety characteristics, configuration management requirements, unique training and procedural requirements, and appropriate test plan to verify the new process prior to its use with energetic materials. Exhibit 14-3 illustrates the format for peer review submissions for processes, equipment, and facilities.

c. Processes for the manufacture of energetic materials must take into account both the safety aspects of the process, and the effects of the process on the resulting material. The MPERC submissions for such processes must address the requirements for both a new material (Exhibit 14-2) and a new process (Exhibit 14-3).

4. Equipment Peer Review Requirements

a. Peer reviews are required for approval of the use of new or modified major equipment and associated software. Examples of equipment that should be reviewed are:

(1) Equipment used in the testing of energetic materials or devices

(2) Blenders, mixers, presses, extruders, and grinders used in the manufacture of energetic materials/devices

(3) Equipment used in sample preparation and demilitarization of energetic materials

(4) Mounts and fixtures used in the testing of energetic materials.

NOTE: INITIATING PARTY IS RESPONSIBLE FOR UPDATING THE MPERC PACKAGE WITH THE EXPLOSIVE SAFETY OFFICE TO REFLECT THE LATEST CHANGE IN CONFIGURATION. A REVISION LETTER WILL BE ASSIGNED TO THE UPDATED MPERC PACKAGE.

Examples of equipment that does not require a new peer review are:

(1) Replacement of components for maintenance or upgrade or

(2) Software or electronic updates that continue or enhance the original safeguards.

(3) Minor equipment (simple tools and jigs) does not require peer review. Diagnostic equipment that does not impart energy to the test sample does not require peer review (e.g., infrared radiometers, cameras, data acquisition systems, oscilloscopes, etc.)

(4) Commercial off-the-shelf items such as firing systems if used as intended.

b. Equipment submissions should be prepared per the format provided in Exhibit 14-3. The submission should address the following areas: equipment process, analysis of equipment's system safety characteristics, firing circuit interlocks and redundant safety systems, configuration management, preventive maintenance, unique training and procedural operational requirements, and proposed test plan to verify the equipment's operational design prior to its use with energetic materials.

c. After the equipment has been approved by the Peer Review Committee, the Explosives Safety Office will assign an Evidence of Compliance (EOC) equipment number. An example of EOC number identification is 160801-01 (YYMMDD-XX). An EOC number must be affixed to the piece of equipment. The method of identification, in order of precedence, will be by steel engraving tool, steel stamping or indelible ink, or a locally produced label. Note: If the item is steel engraved or stamped, the locally produced label need not be applied. The EOC number must be listed in the equipment list of the SOP process which utilizes the equipment.

5. Facilities Peer Review Requirements

a. Peer review of new or modified facilities is required prior to finalizing the concept design stage. Modified facilities require peer review when the original intent of the facility has been changed. Exhibit 14-3 illustrates the format for peer review submissions for processes, equipment, and facilities.

b. Facilities submissions for peer review should address the following areas: Processes and types of materials and devices the facility is being designed for, analysis of facilities safety characteristics, electrical (hazardous locations) requirements, lightning, bonding, and grounding systems, fire suppression systems, personnel protection systems, and preventive maintenance.

EXHIBIT 14-2
FORMAT FOR PEER REVIEW SUBMISSIONS FOR NEW MATERIALS

EVIDENCE OF COMPLIANCE
for
NEW MATERIALS

Nomenclature: Composition

Description and Usage: ..... Enclosure (1)

Required Data for Start-up: ..... Enclosure (2)

Failure Mode Analysis: ..... Enclosure (3)

Storage Stability Plan: ..... Enclosure (4)

Originator: Joe Smith Branch Manager: Paul Mann

Code: WXRL Code: WXRL

Date: 6/29/2017 Date: 6/29/2017

Approved: Dr. Rains Date: _____
MPERC Chairperson

Guidance for Completing
Evidence of Compliance Form for
New Materials and Manufacturing Processes

1. Nomenclature. Provide sufficient information so that the specific material or process for manufacture is distinguished from others.

2. Roadmap Stage. Using the New Material Development Roadmap that follows, identify stage based on material batch size.

NEW MATERIAL DEVELOPMENT ROADMAP	
New Compostion	**New Manufacturing Process**
Exploratory (up to 10 g)	
Laboratory Stage (up to 100 g)	
Concept Stage (up to 1 kg)	
Prototype Stage (up to 5 kg)	
Design Evaluation Stage (up to 30 kg)	

3. Description and Usage. Provide enough information to describe the material and process. Provide the building, bay, room, etc., to identify a facility and include the types of work to be performed in processing this material.

a. New materials - Address the intended use and proper handling of the material. Describe the physical and chemical characteristics of the material. Provide formulations for compositions. This may include a list of ingredients and ranges of percentages.

b. New processes - Provide information detailed enough to enable the MPERC to understand the procedures for the manufacturing process. Also provide a specific description of equipment used to process the material.

4. Required Data for Start-up. See Roadmap Stage Descriptions for specific requirements for each stage.

5. Failure Mode Analysis. Provide sufficient information to address an analysis of the material's safety characteristics that are appropriate for the specific process being addressed. List anything that could go wrong that would cause injury. Give mitigations to prevent personnel injury. The description of the various topics used in this section should be directed from the perspective of the safety characteristics. This section can contain a number of different submissions to support the analysis of the safety characteristics. Use references to shorten the required description.

a. For a new material, at a minimum, a description of the sensitivity, stability, and compatibility characteristics should be addressed.

b. For a new process, at a minimum, a description of the appropriate system safety design characteristics which would include describing controls; interlocks; equipment electrical hazard class, division and group compatibility with the site that the equipment or process will be used;

other unique design and/or operating characteristics, unique training requirements, etc., should be addressed.

6. Storage Stability Test Plan. A test plan must be included that describes how storage stability of the new material is going to be verified. The test plan will include a statement that the Peer Review Committee will be notified should there be any aging trends observed during stability testing.

EXPLORATORY STAGE

1. Maximum Batch Size: 10 grams

2. Purpose: Determine basic characteristics of new compositions. MPERC Package not required for this stage. Data generated will support MPERC Package for Laboratory Stage.

3. Information/Documentation Required Prior to Start Up:

a. Standard Operating Procedure/Supplemental Document/ Mixing Sheets

b. Laboratory Safety Standards

c. Safety Data Sheets

4. Information to be Obtained:

a. Output Characteristics (flame, smoke, etc.)

b. Process Anomalies (if observed)

c. Thermal Stability (Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC), and/or Thermogravimetric Analysis (TGA)

d. Hazard Sensitivity Data (electrostatic, friction, and impact)

LABORATORY STAGE

1. Maximum Batch Size: 100 grams

2. Purpose: Determine safety of preparation and processing as new compositions or manufacturing processes are evaluated for expected performance/output.

3. Information/Documentation Required Prior to Start Up:

a. Standard Operating Procedure and Supplemental Document as applicable

b. Laboratory Safety Standards

c. Safety Data Sheets

d. Experimental Composition Processing Worksheet - a brief theoretical or design analysis summarizing the composition formulator's research supporting laboratory scale work. This worksheet could contain thermodynamic predictions, modeling, evaluations of potential compatibility, toxicity and environmental issues, as well as proposed processing approaches (e.g., blending and consolidation), and the type of data required to evaluate the processing approaches, etc.

e. Test Plan for Verification of Storage Stability. A test plan must be included that describes how storage stability is going to be verified. The test plan will include a statement that the Peer Review Committee will be notified should there be any aging trends observed during stability testing.

f. Hazard Sensitivity Data (New compositions only). Electrostatic, friction, and impact from Exploratory Stage

g. Thermal Stability (New compositions only). DTA, DSC, or TGA from Exploratory Stage

4. Information to be Obtained:

a. Hazard Sensitivity Data (electrostatic, friction, and impact) from up 100 gram batch

b. Thermal Stability (DTA, DSC, or TGA) from up to 100 gram batch

c. Output Characteristics (flame, smoke, etc.)

d. Processing Evaluation (appropriate data to support choices of blending and consolidation techniques)

e. Process Anomalies (if observed)

CONCEPT STAGE

1. Maximum Batch Size: 1000 Grams (500 grams recommended).

2. Purpose: Determine if processing larger batch sizes affects safety or composition properties and evaluate performance/output.

3. Information Required Prior to Start Up:

a. Hazard Sensitivity Data from Laboratory Stage.

b. Thermal Stability (DTA/DSC) from Laboratory Stage.

c. MPERC Committee Concurrence.

d. Standard Operating Procedure.

e. Test Plan for Verification of Storage Stability. (Note 1)

4. Information to be Obtained:

a. Hazard Sensitivity Data. (Note 2)

b. Thermal Stability (DSC or DTA).` (Note 2)

c. Process Parameters. (Note 3)

d. Consolidation Hazards. (Note 4)

e. Burning Characteristics (Consolidated and In-Process). (Note 5)

Note 1: A test plan must be included that describes how storage stability is going to be verified. The test plan will include a statement that the Peer Review Committee will be notified should there be any aging trends observed during stability testing.

Note 2: Validate that scale-up has not modified composition safety properties. (Sensitivity data is obtained on a sample of the concept composition blend prior to performing additional processing steps such as extrusion.)

Note 3: Formulator decides on tests required to evaluate safety aspects of composition processing parameters (e.g., composition compatibility with potential ignition compositions).

Note 4: Formulator evaluates hazards associated with consolidation (pressing or blending) of composition.

Note 5: Formulator gives consideration to potential hazards of accidental ignition during various process steps.

PROTOTYPE STAGE

1. Maximum Batch Size: 5000 GRAMS

2. Purpose: Prepare composition at large enough batch size to be able to evaluate processing at Limited Production Scale quantities.

3. Information Required Prior to Start Up:

a. Hazard Sensitivity Data from Concept Stage

b. Burning Characteristics (Consolidated and In-Process)

c. Thermal Stability (DSC or DTA) from Concept Stage

d. Updated Standard Operating Procedure (if required)

e. MPERC Committee Concurrence

f. Test Plan for Verification of Storage Stability (Note 1)

4. Information to be Obtained:

a. Hazard Sensitivity Data (Note 2)

b. Thermal Stability (DSC and/or DTA) (Note 2)

c. Burning Characteristics (Consolidated and In-Process) (Note 3)

d. Burning Characteristics in Worst Case Scenario in Processing Sequences (e.g., blending, consolidation) (Note 4)

e. Compatibility Testing (Note 5)

f. High Temperature Storage (14 day) (Note 6)

g. Formulation Tolerances with Hazard Sensitivity Data (Note 7)

Note 1: A test plan must be included that describes how storage stability is going to be verified. The test plan will include a statement that the Peer Review Committee will be notified should there be any aging trends observed during stability testing.

Note 2: Validate that scale-up has not modified composition's safety properties.

Note 3: Evaluation of safety aspects of composition processing parameters.

Note 4: Formulator’s worst case accidental ignition of composition. Purpose is to identify if under certain conditions (e.g., critical height, confinement, etc.) the composition's behavior changes from burning to deflagration or detonation so choice of processing parameters can be modified.

Note 5: Formulator evaluates potential compatibility problems between composition and other materials it might come in contact within its end item configuration. This evaluation can involve anything from a literature search to testing (e.g., thermal analysis, microcalorimetry and compatibility testings spelled out in MIL-STD-1751(Series)).

Note 6: Formulator at the prototype processing scale evaluates the long term high temperature storage (e.g., 70 0C for 14 days) properties of the composition. This evaluation can involve isothermal DSC or DTA or oven conditioning experiments to look for changes in the physical and chemical properties of the composition.

Note 7: Formulator at the prototype processing scale probability is considering the issue of composition formulation tolerances. A part of this evaluation should be a consideration of possibility that the formulation tolerance range could affect the composition's physical and sensitivity properties. For example, evaluation potential of self-ignition that results when binder curing generates heat that raises the temperature of the composition.

DESIGN EVALUATION STAGE

1. Maximum Batch Size: 30 KILOGRAMS (or largest batch size planned in production if less than 30 kilograms).

2. Purpose:

a. Demonstrate safe production of large batches and provide sufficient material for evaluation of new designs.

b. If 2.a. is met, develop data required to generate a Hazardous Component Safety Data Statement (HCSDS) form (ARRCOM Form 47-4) for the composition and device components in which the composition will be incorporated.

c. If 2.a. is met, generate data required to submit a Qualification Package for the Composition per reference (c).

3. Information Required Prior to Start Up:

a. Updated Standard Operating Procedure

b. Hazard Sensitivity Data for all formulations from Prototype Stage

c. Burning Characteristics (Consolidated and In Process)

d. Thermal Stability (DSC or DTA) from Prototype Stage

e. Compatibilities

f. High Temperature Storage (14 day)

g. MPERC Committee Concurrence

h. Test Plan for Verification of Storage Stability (Note 1)

4. Information to be Obtained:

a. Processing Parameters (Note 2)

b. Thermal Analysis (Note 2)

c. Burning Characteristics (Consolidated and In Process) (Note 2)

d. Hot/Cold Ignition/Burning Characteristics (Note 3)

e. Hazard Sensitivity Data (Electrostatic, Friction, Impact) (Notes 4 and 5)

f. Ignition Temperature (Henkin 5 Second and Henkin Minimum) (Note 5)

g. Vacuum Thermal Stability (Notes 5 and 6)

h. Cap Test (Notes 5 and 7)

i. Gap Test (Notes 5 and 8)

j. Ignition and Unconfined Burning (Notes 5 and 9)

k. Self-Heating (DSC/DTA) (Notes 5 and 10)

l. Toxicity (Notes 5 and 11)

m. Aging Characteristics (Notes 5 and 12)

Note 1: A test plan must be included that describes how storage stability is going to be verified. The test plan will include a statement that the Peer Review Committee will be notified should there be any aging trends observed during stability testing.

Note 2: Formulator validates that scaling up to production stage has not modified the safety aspects of processing the composition.

Note 3: Formulator validates that composition does not exhibit performance and/or safety problems with hot or cold ignition and burning.

Note 4: Data required to complete HCSDS form.

Note 5: Data required to generate the Composition Qualification Package per reference (c) requirements.

Note 6: Specific test described in reference (c) and reference (d) which involves measuring weight lost holding samples (2 inch cubes or cylinders) at 75 0C for 48 hours.

Note 7: Specific test described in reference (c) and reference (d) involving samples (2 inch cubes or cylinders) and measures the sensitivity of the sample to initiation by shock from a blasting cap.

Note 8: Specific test described in reference (c) and reference (d) and is another shock sensitivity test.

Note 9: Specific test described in reference (c) and reference (d) involving monitoring the behavior of samples (2 inch cubes or cylinders) placed in burning kerosene-soaked sawdust.

Note 10: Specific test described in reference (c) and reference (d) where isothermal heat flow measurement data is used to calculate if sample has ability to self-heat to reaction.

Note 11: Specific test described in reference (c) and reference (d) where an evaluation of literature information is used to assess potential toxicity issues.

Note 12: Aging characteristics called out in proposed revision of reference (c) and will probably specify specific test conditions.

EXHIBIT 14-3
FORMAT FOR PEER REVIEW SUBMISSIONS FOR EQUIPMENT, PROCESSES, AND FACILITIES

EVIDENCE OF COMPLIANCE
FOR
PROCESSES, EQUIPMENT, AND FACILITIES

Choose appropriate type of review(s):

_____ Process _____ Equipment _____ Facility

Nomenclature: _____

Description and Usage: ……Enclosure (1)

Photographs: ……Enclosure (2)

Failure Mode Analysis: ……Enclosure (3)

Configuration Management: ……Enclosure (4)

Preventive Maintenance Plan: ……Enclosure (5)

Sketches, Drawings, Catalogs, Reports, etc.: ……..……Enclosure (6)

Originator: _____ Branch Manager: _____

Code: _____ Code: _____

Date: _____ Date: _____

Approved: _____ Date: _____
MPERC Chairperson

Evidence of Compliance (EOC) Number: _____

Guidance for Completing Evidence of Compliance Form For Process, Equipment, and Facilities

1. Nomenclature: Provide sufficient information so that the specific material or process is distinguished from others. Also provide a specific manufacturer, model number/drawing number, and serial number for each specific piece of equipment. Provide the building, bay, room, etc., to identify a facility and include the types of work to be performed.

2. Description and Usage: Provide enough information to describe the process, equipment, and/or facility and its use including a description of the history of its use.

a. Facilities and Equipment - Address the usage pattern (e.g., if it is used in a cyclic pattern that involves being placed in storage/mothball status when not in use, address requirements for a maintenance/inert check-out as part of the startup procedure after being removed from a long-term storage/mothball status). Black and white or colored photographs may be used.

b. New processes - Information must be detailed enough to enable the MPERC to understand the procedures and what is to be accomplished by performing the process.

3. Failure Mode Analysis: Provide sufficient information to address an analysis of the equipment, facility, or process safety characteristics (design and/or operating parameters), which are appropriate for the specific equipment, facility, or process being addressed. List anything that could go wrong that would cause injury. Give mitigations to prevent personnel injury. A table with columns for “Failure Modes”, "Impacts”, and “Mitigations” is encouraged as a format for the analysis. Two examples are found at the end of this section.

a. As a minimum, if appropriate for the specific piece of equipment, facility, or process, this should address the following topics:

(1) A description of the appropriate system safety design characteristics which would include describing controls; firing circuits; interlocks; equipment electrical hazard class, division and group compatibility with the site that the equipment or process will be used; other unique design and/or operating characteristics; unique training requirements; etc.

(2) Documented Safety Certifications, which could include Test Plan Verification Reports, Independent Engineering Reviews, Failure Mode Analysis, History of Safety/Usage, etc.

b. The description provided of the various topics used in this section should be directed from the perspective of the safety characteristics. This section can contain a number of different submissions to support the analysis of the safety characteristics. Use references to shorten the required description.

4. Configuration Management: Reference the Configuration Management Plan that the equipment is maintained under (Branch, Department, etc.) or provide a copy of the Configuration Management Plan if the plan is unique to this specific equipment.

a. Configuration Management as far as the requirements of this form are concerned, refers to a management system that assures that the drawings of the equipment are maintained current and that a system exists which describes how changes and modifications to the equipment are made, reviewed, and documented.

b. This plan should be designed to meet the requirements of the custodian of the plan. For example, sketches which contain the appropriate level of detailed information to meet the needs of the configuration management plan and the use of the equipment are acceptable.

5. Preventive Maintenance: Preventive maintenance plans are required for all pilot plant processing equipment. Preventive maintenance plans may be appropriate for other equipment and facilities. Provide a copy of the preventive maintenance plan that includes the following:

a. A method for verifying that PM is performed on schedule.

b. A criteria for when recertification is required as a result of inactivity or lack of PM.

c. Inspection schedules for filter media, scrubber fluids, and equipment surfaces contacting energetic materials if they are not covered by an SOP.

d. A schedule and means of documentation for checking metal-to-metal clearances of process equipment components that contact energetic materials.

6. Sketches, Drawings, Catalogs, Reports, etc.: Attach and/or reference documents which support the approval of this equipment.

Failure Mode Analysis Example 1

POSSIBLE FAILURE MODES	IMPACT	MITIGATIONS
Hazards during loading of rocket motor into launcher		
Rocket motor fires pre-maturely during loading	Injury to personnel, damage to equipment and ordnance item.	Premature initiation will be avoided by mechanical shunting of firing system at all times. All unnecessary personnel will be out of the area during handling of ordnance items. All technicians handling ordnance must wear approved and tested grounding straps.
Rocket motor assembly is dropped or falls from lifting assembly during loading /unloading	Injury to personnel, damage to equipment and ordnance item	Minimize personnel in area, use only approved lifting equipment, observe SOP for dropped ordnance procedures.
Hazards during transporting Launcher by boat to launch platform		
Drop launcher during loading and unloading	Injury to personnel, damage to equipment and ordnance item	Use certified sling and material handling equipment. Minimize personnel during operation.
Launcher rolls around on boat deck.	Injury to personnel on boat, damage to launcher.	Secure launcher to boat during transport operations. Minimize number of personnel in boat.
Personnel falling in the water	Possible drowning or injury	Coast Guard approved life jackets are available on all watercraft onboard Lake Glendora Test Facility. Use of Coast Guard approved life jackets is required for non-swimming personnel.
Mechanical injuries (struck by, pinched, crushed etc.)	Personnel injuries	Proper PPE will be required for all personnel involved.
Hazards during loading of launcher into gondola		
Gondola fixture fails to support full up loaded with launch tube.	Personnel injury, loss of equipment and / or ordnance items.	Robust design used with acceptable safety factors (Design details and stress calculations presented on following pages). Suitable safety lanyards in place to assist in locating dropped fixture.
Rocket motor assembly is dropped or lost overboard during loading/assembly.	Personnel injury, loss of ordnance item or equipment	Use only certified sling and material handling equipment. Minimize personnel on site. Maintain safety (tag) line on ordnance item during loading.
Personnel falling in the water	Possible drowning or injury	Coast Guard approved life jackets are available on all watercraft onboard Lake Glendora Test Facility. Use of Coast Guard approved life jackets is required for non-swimming personnel.

Failure Mode Analysis Example 2

POSSIBLE FAILURE MODES	IMPACT	MITIGATIONS
Hazards during fixture assembly		
Electrical Shock	Injury to personnel	Proper grounding, secure all electrical lines, minimize personnel in the area, and eliminate exposed wire connections. Firing system will be assembled by qualified personnel.
Heavy Components Mishandled	Injury to personnel, damage to equipment	Two person lift for heavy components will be utilized where appropriate.
Hazards during operation		
Structural Failure of Test Fixture	Injury to personnel, damage to equipment/facility	Robust design used with acceptable safety factors.
Structural Failure of Test Fixture due to Improper Assembly	Injury to personnel, damage to equipment/facility	Test fixture will be assembled by qualified personnel.
Bullet Impact with Facility	Injury to personnel, damage to equipment/facility.	The weapons mount is in a fixed orientation that restricts the motion of the weapon. The fixture will not be mounted in such a manner the facility components are within the field of fire. If an alternate mounting method is driven by test requirements, other means of mechanically restricting the weapon's motion will be employed.
Bullet Impact with Personnel	Injury/fatality to personnel	Operating personnel will follow the governing SOP and facility documents when conducting the testing.
Personnel Injuries	Mechanical injuries	Proper PPE as specified in CR-JXNN-SO-P-0754B-SD05 will be required for all personnel involved.
Inadvertent Firing	Injury/fatality to personnel	Weapon operator must have firing key in his/her possession at all times when in proximity of weapon mount.
Laser Activated without eye-safe filter	Injury to personnel	Laser is not being used.
RF-signal initiates test item. (HERO)	Injury/fatality to personnel	All transmitters will be secured when ammunition is on site.
Noise	Injury to personnel	Double hearing protection must be utilized by all personnel near the firing line.

EXHIBIT 14-4
FORMAT FOR PEER REVIEW SUBMISSIONS FOR EQUIPMENT, PROCESSES, AND FACILITIES

MPERC NOT REQUIRED

Nomenclature: Composition

Originator: Joe Smith Branch Manager: Paul Mann

Code: WXRL Code: WXRL

Date: 6/29/2017 Date: 6/29/2017

A review of the submitted information was performed. The equipment or process does not require MPERC Package submittal and approval.

A MPERC package will not be required to be submitted to the MPERC Committee for review.

Approved: Dr. Rains Date: 6/29/2017
MPERC Chairperson

APPENDIX A
ACRONYM LIST

Acronym	Definition
A&E	Ammunition and Explosives
AESO	Assistant Explosives Safety Officer
AMHAZ	Ammunition and Hazardous Materials
ARSM	Assistant Range Safety Manager
CAAA	Crane Army Ammunition Activity
CALO	Command Airspace Liaison Officer
CAMTC	Camp Atterbury Maneuver Training Center
CAP	Corrective Action Plan
CB	Citizen's Band
CDNS	Computer Desktop Notification System
CFA	Controlled Firing Area
CNRMA	Commander, Navy Region Mid-Atlantic
CO	Commanding Officer
CWA	Construction Worker Authorization
DESR	Defense Explosive Safety Regulation
DDESB	DoD Explosives Board
DLA	Defense Logistics Agency
DoD	Department of Defense
DODIC	Department of Defense Identification Code
DON	Department of the Navy
DTID	Defense Turn-in Document
ECP	Entry Control Point
EED	Electroexplosive Device
EER	Explosives Event Report
EHW	Explosive Hazardous Waste
EID	Electrically Initiated Devices
EMCON	Emissions Control
EME	Electromagnetic Environment
EMO	Emergency Management Office
EMR	Electromagnetic Radiation
EOD	Explosive Ordnance Disposal
EP	Environmental Protection
ES	Exposed Site
ESA	Explosive Site Approval
ESAMS	Enterprise Safety Applications Management System
ESAR	Explosives Safety Site Approval Request
ESARD	Explosives Safety Site Approval Request Determination
ESCS	Explosives Safety Compliance System
ESI	Explosives Safety Inspections
ESMP	Explosives Safety Management Program

Acronym	Definition
ESO	Explosives Safety Officer
ESQD	Explosives Safety Quantity Distance
ESSA	Explosives Safety Self-Assessment - ch1
ESSG	Explosives Safety Steering Group
F&ES	Fire and Emergency Services
FMD	Facility Management Division
GIS	Geographic Information System
GOV	Government Owned Vehicle
HCB	Hazard Control Briefing
HERO	Hazard of Electromagnetic Radiation to Ordnance
HWPS	Hazardous Waste Profile Sheet
IBD	Inhabited Building Distance
IC	Incident Commander
ICO	Installation Commanding Officer
IHC	Interim Hazard Classification
ILD	Intraline Distance
ISSA	Inter-Service Support Agreements
IT	Information Technology
JMC	Joint Munitions Command
JQR	Job Qualification Requirement
LGTF	Lake Glendora Test Facilities
LPS	Lightning Protection System
LRSO	Laser Range Safety Officer
MDAS	Material Documented as Safe
MDEH	Material Documented as an Explosive Hazard
MHz	Megahertz
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPERC	Materials, Processes, Equipment and Facilities Review Committee
MPMF	MPPEH Management Form
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Sites
MTR	Military Training Route
NALC	Navy Ammunition Logistics Code
NAR	Notice of Ammunition Reclassification
NAVFAC MidLant	Naval Facilities and Engineering Command Mid-Atlantic
NEW	Net Explosive Weight
NFPA	National Fire Prevention Association
NOSSA	Naval Ordnance Safety and Security Activity
NSA	Naval Support Activity
NSN	National Stock Number
NSWC	Naval Surface Warfare Center, Crane Division
ORM	Operational Risk Management

Acronym	Definition
OTA	Ordnance Test Area
PAN	Percussion Actuated Neutralizer
PED	Personal Electronic Devices
PES	Potential Explosion Site
PM	Preventative Maintenance
POC	Point of Contact
POV	Privately Owned Vehicle
PPE	Personal Protective Equipment
PRSO	Primary Range Safety Officer
PTR	Public Traffic Route
PWD	Public Works Department
PWFD	Personal Wearable Fitness Devices
PWMD	Personal Wearable Medical Devices
PWO	Public Works Officer
QASAS	Quality Assurance Specialist Ammunition Surveillance
QTR	Qualification and Training Range
RAC	Risk Acceptance Code
RCO	Range Control Officer
RDT&E	Research, Development, Test, and Evaluation
RESRB	Regional Explosive Safety Review Board
RF	Radio Frequency
RFI	Request for Information
RFSO	Radio Frequency Safety Officer
ROIC	Range Officer in Charge
RSM	Range Safety Manager
RSO	Range Safety Officer
SADT	Site Approval Development Team
SAMI	Small Arms Marksmanship Instructor
SD	Supplemental Documents
SDZ	Surface Danger Zone
SFTR	Surveillance Functional Test Range
SOP	Standard Operating Procedure
SPOC	Single Point of Contact
SUA	Special Use Airspace
SWAF	Special Weapons Assessment Facility
SWC	Security Watch Commander
SWESD	Special Warfare and Expeditionary Systems Department
TL	Team Leader
UAS	Unmanned Aircraft Systems
UIC	Unit Identification Code
UXO	Unexploded Ordnance
WebSAR	Web-based Automated Site Submission Module
WTC	Work Task Code

Acronym	Definition
WTM	Waste Transfer Manifest

APPENDIX B
DEFINITIONS

Active Facility - Any structure that has previously been certified (either site approved or grandfathered) for use with explosive materials. Facilities in a mothballed status are not considered active.

Ammunition - A contrivance charged with explosives, propellants, pyrotechnics, initiating composition or chemical material for use in connection with defense or offense, including demolitions, training, ceremonial, or non-operational purposes.

Armor Piercing (AP). Ammunition, bombs, bullets, projectiles, or the like, designed to penetrate armor or other resistant targets.

Barrier. A permanent or temporary impediment to foot and/or vehicular traffic that personnel are prohibited to pass without approval from the Range Control Officer. A barrier may be a sentinel, wire fencing, gate, sign or other access limiting device.

Bunker. A fortified structure for the protection of personnel. Also known as personnel protective shelters/barricades.

Camp Atterbury. All ranges within the confines of Camp Atterbury Maneuver Training Center (CAMTC). Camp Atterbury Range 22 Building 22411 was approved by Naval Ordnance Safety and Security Activity (NOSSA) with Crane Site Approval S/A 19-08 for Navy RDT&E functions. Range 22 is owned by CAMTC and has a Memorandum of Understanding with NSWC Crane for RTD&E ordnance testing.

Cease Fire. A command given to any unit or individual firing any weapon to stop engaging the target. A command given by anyone observing an unsafe firing condition on any range to immediately terminate an active “hot” firing status of a weapon or weapon system.

Check Fire. Same as Cease Fire, but the term is used primarily by artillery, mortar, and naval gunfire support operations to cause a temporary halt in firing.

Cold Gun. A gun whose barrel and chamber temperature have not been raised to a temperature at which cook-off of a round is possible. A loaded round can remain in the chamber with little or no danger of cook-off.

Cold Range. A firing condition where authorization for fire a weapon system or initiate an explosives firing system has not been given or has been revoked by the Range Safety Officer or Range Control Officer.

Cook-Off. Any reaction of ammunition caused by the absorption of heat from its environment. In loaded guns it consists of the accidental and spontaneous discharge of, or explosion in, the gun caused by an overheated chamber or barrel igniting a fuze, propellant charge, or bursting charge.

Cook-off may also occur in explosive-loaded components when they are exposed to excessive heat or flame wash from any source, such as live steam, fire, rocket or gas turbine exhaust.

Command Airspace Liaison Office (CALO). CALOs are appointed by station Commanding Officers to represent the interests of their commands and assigned flying units on Special Use Airspace (SUA) and other airspace issues. The CALO is the command's resident authority on airspace matters. CALOs conduct liaison with local FAA facilities on local routine airspace matters. They maintain direct liaison with the appropriate RAC, NAVREP and Range Liaison Officer (USMC only), and with other organizations within the command to ensure coordination of DON airspace policy within their airspace. They ensure copies of all pertinent command correspondence are forwarded to the appropriate RAC for information and/or review. CALOs are responsible for coordinating administrative airspace functions.

Composition/Formulation - In the general sense, refers to a type of energetic material, e.g., a PBXN formulation, a propellant formulation, an illumination flare composition or formulation. In the specific sense, refers to the exact physical mixture that makes up the composition which usually is expressed in terms of weight percentages of ingredients (e.g., a smoke composition might be described as 39 weight percent green dye, 41 weight percent sugar and 20 weight percent potassium chlorate).

Crane Site. All ranges within the confines of geographic Crane (e.g., does not include Lake Glendora).

Critical Certification Parameters - Features of an explosive facility (e.g., lightning protection, ESQD separation, explosive limits, etc.) that were identified in the initial site submission or as part of the grandfathered criteria and considered essential to maintain when operating with explosives.

Deflagration - A rapid chemical reaction in which the output of heat is sufficient to enable the reaction to proceed and be accelerated without input or 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.

Detonation - A violent chemical reaction within a chemical compound or mechanical mixture evolving heat and pressure. A detonation is a reaction that proceeds through the reacted material toward the unreacted material at a supersonic velocity. The result of the chemical reaction is exertion of extremely high pressures on the surrounding medium forming a propagating shock wave that is originally of supersonic velocity.

Downrange. A descriptive term used to address the orientation of personnel, material, or property relative to the direction or path of ammunition and or explosives (to include guided missiles and rockets) fired or launched from weapons systems. The direction of orientation is from the firing line or position toward the target.

Dud. Explosive munition which has not been armed as intended or which has failed to explode after being armed or function as intended when fired.

Electro-Explosive Device (EED) - Any single discrete unit, device, or subassembly whose actuation is caused by the application of electric energy which, in turn, initiates an explosive, propellant or pyrotechnic material contained therein. The term electro-explosive device does not include complete assemblies which have electric initiators as subassemblies, but includes only subassemblies themselves. Synonymous with electric initiator.

Electrically Initiated Device (EID) - A single unit, device or subassembly that uses electrical energy to produce an explosive, pyrotechnic, thermal, or mechanical output. Examples include: electroexplosive devices (such as hot bridgewire, semiconductor bridge, carbon bridge, and conductive composition), laser initiators, exploding foil initiators, burn wires, and fusible links.

Energetic Material - The component of, or an item of ammunition, that is inherently designed to produce the necessary energy required for ignition, propulsion, detonation, fire or smoke, thus enabling the item to function. The energetic material component of ammunition can be broken down into the following broad classes: high explosive, propellant, and pyrotechnics.

Equipment - For the purpose of this document, equipment refers to any apparatus, machine, device, or system used to carry out operations (e.g., processing and/or test and evaluation) on energetic materials or devices containing energetic materials.

Essential Personnel. Personnel whose duties require them to remain within an ESQD arc and are directly involved in ammunition and explosives handling operations. Essential personnel do not include vendors, commercial delivery vehicles (unless carrying mission related materials), dependents or non-DoD personnel except as categorized above.

Expended Ordnance. Ordnance material, such as hardware, that results from a test evolution and contains only non-explosive waste products.

Experimental Composition - For the purpose of this document experimental composition refers to any new energetic material composition which is still in the RDT&E evaluation phase, i.e., has not been qualified in accordance with the requirements of reference (b). In the pyrotechnic RDT&E sense "experimental composition" refers to a formulation or composition that NSWC Crane does not have experience in manufacturing at the limited production scale quantities (e.g., 30 kilograms). An experimental pyrotechnic composition refers to a formulation which previously has never been evaluated because it involves a new/original concept or a new combination of ingredients or minor modifications of existing production compositions (i.e., ingredient percent changes that go beyond the normal ranges for individual composition ingredients).

Explosive - The term "explosive" or "explosives" includes any chemical compound or mechanical mixture which, when subjected to heat, impact, friction, detonation or other suitable initiation, undergoes a very rapid chemical change with the evolution of large volumes of highly heated gases which exert pressures in the surrounding medium. The term applies to high explosives, propellants and pyrotechnics that either detonate, deflagrate, burn vigorously, generate heat, noise, smoke, or sound.

Explosives Area. Any area of a shore establishment in which explosives or ammunition are manufactured, stored, processed, or otherwise handled.

Explosives Operation - Any operation that involves an explosive material. Examples include preparation of explosive materials, production, renovation, maintenance, re-work, demilitarization of explosive materials, test and evaluation of explosive materials, and the handling associated with transportation and magazine operations.

Explosives Safety. The summation of all actions conducted at DON activities, ashore, and afloat, designed to manage and control the risks and hazards inherent with ammunition and explosives operations. Explosives safety is the process used to prevent premature, unintentional, or unauthorized initiation of explosives and devices containing explosives; and with minimizing the effects of explosions, combustion, toxicity, and any other deleterious effects. Explosives safety includes all mechanical, chemical, biological, electrical, and environmental hazards associated with explosives, hazards of electromagnetic radiation to ordnance, and combinations of the foregoing. Equipment, systems, or procedures and processes whose malfunction would hazard the safe manufacturing, handling, maintenance, storage, transfer, release, testing, delivery, firing, or disposal of explosives are also included.

Explosives Safety Management - A cost effective risk management process, including policies, procedures, standards, engineering, and resources that addresses potential probabilities and consequences of mishaps involving DoD military munitions or other encumbering explosives or munitions, to sustain operational capabilities and readiness and to protect people, property, and the environment.

Explosives Safety Self-Assessment (ESSA) - Formal plans which enable the activity to conduct continual periodic assessments of safety and compliance appraisals in support of the command's explosives operations as well as the programs and processes that maintain a safe operational environment.

Explosives Safety Steering Group (ESSG) - The ESSG serves as the Technical Authority for administration and development of host ESMP policy in concert with DoD requirements and amplifying Department of the Navy and Department of the Army policy.

Exposed Site - Any facility or area of improvement that is encumbered by an explosives safety quantity distance arc generated from a potential explosive site.

Facility Certification - The completed process of approval by an officially designated review authority that permits operations involving explosives/explosive ordnance to be considered.

Facility License - A document issued by the Host Explosives Safety Office that provides the critical certification parameters. The license is valid for a specified period after issuance and must be renewed to enable the facility to continue with explosive operations.

Failure Mode Analysis – A form of analysis highlighting failure modes, impacts of failure modes and mitigations. A table with columns for "Failure Modes", "Impacts", and "Mitigations" is encouraged as a format for the analysis.

Facilities - For the purposes of this chapter, a structure that is built, fabricated, constructed, installed, or established to serve a particular purpose related directly to the performance of explosive processes.

Firing Line. The line which consists of firing points or positions, from which weapon systems are fired downrange.

Firing Position. The point or location at which a weapon system excluding demolition) is placed for firing. For demolition, the firing position is the point or location at which the firing crew is located during demolition operations.

Fixture - A device designed to contain or support a test item undergoing dynamic forces. Fixtures are sometimes referred to as mounts.

Free Space Transmission: Transmitting radar/microwave/RF transmissions into open air (does not include transmission into dummy loads).

General Public. Persons not associated with a DoD installation's mission or operations such as visitors, to include guests of personnel assigned to the installation, or persons not employed or contracted by DoD or the installation.

Hangfire. A brief, undesired delay in the functioning of ordnance after initiating action is taken. Temporary failure or delay in the action of a primer, igniter, or propelling charge.

HERO Safe Ordnance: Any ordnance item that is proven by test or analysis to be sufficiently shielded, or otherwise so protected that all electrically initiated devices (EIDs) contained by the item are immune to adverse effects (safety or reliability) when the item is employed in the radio frequency environment delineated in MIL-STD-464 (series). Note: Percussion-initiated ordnance has no HERO requirements.

HERO Susceptible Ordnance: Any ordnance system containing EIDs that have been proven by test or analysis to be adversely affected by RF energy such that safety and/or reliability of the system is in jeopardy when the system is employed in the expected RF environment.

HERO Unreliable Ordnance: Any electrically initiated ordnance item, including those having a HERO SAFE ORDNANCE or HERO SUSCEPTIBLE ORDNANCE classification, whose performance is degraded when exposed to the radio frequency environment, is defined as being HERO UNRELIABLE ORDNANCE when its internal wiring is physically exposed; when tests are being conducted on the item that result in additional electrical connections to the item; when EIDs having exposed wire leads are present, handled, or loaded in any but the tested condition; when the item is being assembled or disassembled; or when such ordnance items are damaged

causing exposure of internal wiring or components or destroying engineered HERO protective devices.

- Ordnance items containing EIDs, whose performance is degraded due to exposure to the radio frequency environment, which have not been classified as HERO SAFE or SUSCEPTIBLE by either test or design analysis are HERO UNRELIABLE ORDNANCE and are subject to the restrictions of Chapter 2, Figure 2-2 of NAVSEA OP 3565/NAVAIR 16-1-529. Items that fall into this classification may be exempted from being classified as HERO UNRELIABLE ORDNANCE as the result of HERO tests conducted to determine specific susceptibility.

HERO Unsafe Ordnance: Any electrically initiated ordnance item, including those having a HERO SAFE ORDNANCE or HERO SUSCEPTIBLE ORDNANCE classification, whose inadvertent initiation or detonation causes an immediate catastrophic event that has the potential to either destroy equipment or injure personnel, is defined as HERO UNSAFE ORDNANCE; when its internal wiring is physically exposed; when tests are being conducted on the item that result in additional electrical connections to the item; when EIDs having exposed wire leads are present, handled, or loaded in any but the tested condition; when the item is being assembled or disassembled; or when such ordnance items are damaged causing exposure of internal wiring or components or destroying engineered HERO protective devices.

- Ordnance items containing EIDs, whose inadvertent initiation or detonation causes an immediate catastrophic event that has the potential to either destroy equipment or to injure personnel, which have not been classified as HERO SAFE or SUSCEPTIBLE by either test or design analysis are HERO UNSAFE ORDNANCE and are subject to the restrictions of chapter 2, figure 2-2 of reference (a). Items that fall into this classification may be exempted from being classified as HERO UNSAFE ORDNANCE as the result of HERO tests conducted to determine specific susceptibility.

HERO Warning Label: A label with a red and yellow triangle on white background (see Exhibit 11-2). It contains HERO separation distances for unsafe and susceptible ordnance. Unsafe distance is to be used for operating buildings/areas and magazines with open doors. Susceptible distances are to be used for magazines with closed doors.

High Explosive - An explosive, in which the transformation from its original composition and form, once initiated, proceeds with virtually instantaneous and continuous speed through the total mass. The explosion is accompanied by the rapid evolution of a large volume of gas and heat, causing very high pressure and widespread shattering effect.

Hot Gun. A gun whose barrel has been raised to a temperature at which cook-off of a round is possible.

Hot Range. A firing condition where authorization to fire a weapon system or initiate and explosives firing system has been given by the Range Safety Officer or Range Control Officer.

Impact Area. The identified area within a range intended to capture or contain ammunition, munitions, or explosives and resulting debris, fragments, and component from various weapon system employment. No personnel other than EOD will enter the impact Area.

Inert Ordnance. Ordnance and components that contain no explosive material. Inert ordnance and components include ordnance and components with all explosive materials removed and replaced with inert material; empty ammunition or components; ammunition or components that were manufactured with inert material in place of explosive material.

Initial Certification - Official approval by higher authority which illustrates compliance with all applicable safety requirements for a new facility.

Interlocks - An interlock can be part of equipment or facilities to provide protection; a device that causes or prevents an action from occurring. The primary function of a safety interlock is to terminate a potentially serious hazard if a protective barrier is breached. Interlocks are classified into three main types: key-operated, mechanical, and electrical. A specific interlock, however, may involve more than one of the above types.

Lake Glendora. Lake Glendora Test Facility.

Major Equipment - Equipment containing complex systems which are used to:

- Test energetic materials or devices containing energetic materials for quality or performance (e.g., test systems, test chambers, mounts, etc.).
- Process energetic materials in concept, prototype and design evaluation stages of the manufacturing development process (e.g., blenders, mixers, presses, extruders, grinders).
- Process energetic materials for other purposes such as samples preparation and demilitarization.

Major Facility Change - Alterations to an existing facility such that the result is something new is added that never existed before.

Malfunctions. Failure of an ammunition item to function as expected when fire, launched, or when explosive items function under conditions that should not cause functioning. Malfunctions include hangfires, misfires, duds, abnormal functioning, and premature functioning of explosive items under normal handling, maintenance, storage, transportation, and tactical deployment. Malfunctions do not include accidents or incidents that arise solely from negligence, malpractice, or situations such as vehicle accidents or fires.

Material Documented as Safe (MDAS) - MDAS is MPPEH that has been assessed and documented as not presenting an explosive hazard and for which the chain of custody has been established and maintained. The material is no longer considered MPPEH.

Material Documented as an Explosive Hazard (MDEH) - MDEH is MPPEH that cannot be documented as MDAS, that has been assessed and documented as to the maximum explosive hazards the material is known or suspected to present, and for which the chain of custody has

been established and maintained. This material is no longer considered to be MPPEH.

Material Potentially Presenting an Explosive Hazard MPPEH - Material owned or controlled by the DoD that, prior to determination of its explosives safety status, potentially contains explosives or munitions (for example, munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris) or potentially contains a high enough concentration of explosives that the material presents an explosive hazard (for example, equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization, or disposal operations). Excluded from MPPEH are military munitions within the Department of Defense's established munitions management system and other hazardous items that may present explosion hazards (such as gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Minor Equipment - Minor equipment is considered to be all of the simple tools and jigs used in the process.

Misfire. Failure of a component to fire or explode following an intentional attempt to cause the item to do so. Failure of a primer or the propelling charge of a projectile to function wholly or in part.

Mission-Essential Area. The area within the SDZ located adjacent to the impact area that is allowed to be occupied only by essential personnel needed to accomplish the assigned task or mission.

New Material - For the purpose of this document addressing RDT&E requirements, new material refers to an energetic material (e.g., experimental composition) for which NSWC Crane does not have experience in manufacturing at the limited production scale (up to 30 kilogram batch sizes) or does not have experience in performing the T&E operations.

New Process - For the purpose of this document, new process refers to a new technology, or test and evaluation approach, for which NSWC Crane does not have experience. A new process may or may not involve new equipment.

Non-MPPEH Items: Articles, equipment, buildings, or other items (e.g., vehicles) that never contained ammunition or were never contaminated with explosives do not pose an explosive hazard and are not considered MPPEH. From an explosives safety perspective, it is safe to conduct welding, drilling, or sawing on these materials and to release them to the general public.

Non-Standard Lightning Protection System (LPS) - A lightning protection system that does not meet the current requirements of NAVSEA OP 5, Volume 1.

NSA Crane. Naval Support Activity Crane, all tenants, contractors, and visitors.

Ordnance - Military material such as combat weapons of all kinds with ammunition and equipment required for their use. Ordnance includes everything which makes up ship or aircraft

armament - guns, ammunition, and all equipment needed to control, operate, and support the weapons.

Peer Review - A management system to assure safety concerns are addressed by more than one technically competent professional. Peers are defined as colleagues who understand the work and assess the potential hazards associated with it. Appendix G of NAVSEA OP 5 Volume 1, requires that Navy employees shall not perform RDT&E work with energetic materials independent of peer review.

Pilot Plant - A facility designed to demonstrate industrial processing of energetic materials techniques that would include scale-up of laboratory processes to transition concept and/or products into full-scale production. A pilot plant maintains a high degree of flexibility in order to, (a) develop intellectual property and reduce it to practice, (b) develop and demonstrate processing techniques, (c) produce live and dummy test units for the RDT&E community, and (d) provide a limited production capability. Examples of pilot plants would be Building 198, Building 3348, and Building 3338.

Premature Detonation/Functioning. A type of malfunctioning in which ordnance functions before the expected time or circumstance.

Primary Danger Area. An area within the SDZ where hazards are known to exist and in which no unprotected personnel or material is permitted since injury or death to such personnel and damage to material is probable. Target, dispersion, and ricochet areas are primary danger areas.

Process - Any operation which is carried out on a material or device to either change its condition or to test and evaluate its characteristics. Examples of processes in pyrotechnics R&D would include blending, mixing, drying, consolidating, extrusion, machining, cutting, and shaping/sizing. Examples of processes in T&E would include function testing, sensitivity testing and environmental testing.

Process Hazard Analysis - A systematic review of a new process or change to an existing process such that hazard mitigations in the form of structural design, distance, shielding, fire suppression and lightning protection are identified. The level of effort is generally in line with a preliminary hazard analysis.

Propellant - Energetic material which provides the energy required for propelling a projectile. Specifically, an explosive charge for propelling a bullet or shell, (or the like); also a fuel, either solid or liquid, for propelling a rocket or missile.

Pyrotechnics - The subclass of explosives designed to produce specific desired effects such as light, sound, color, or smoke when the fuel and oxidizer in the material chemically react at a controlled rate usually with duration of seconds.

Range. A designated land or water area set aside, managed**,** and used to conduct research on, develop, test and evaluate military munitions and explosives, other ordnance, or weapon systems, or to train military personnel in their use and handling. Ranges include firing lines

(indoor/outdoor) and positions, maneuver areas, test pads, detonation pads, impact areas, and buffer zones with restricted access and exclusionary areas.

Range Control. A central office/location on an installation that coordinates all range operations. Crane Range Safety Officers and Range Safety Manager liaison with the Camp Atterbury Range Control for Crane operation on Camp Atterbury.

Range Control Officer (RCO). An individual appointed to provide safety oversight for multiple explosive operations at one range location (i.e., OTA, SWAF, LGTF).

Range Officer in Charge (ROIC). An individual appointed to oversee range operations conducted only at Camp Atterbury or Muscatatuck. This individual is responsible for checking ranges out for use, ensuring Command appointed Range Safety Officer (RSO), Laser Range Safety Officer (LRSO), and Radio Frequency Safety Officer (RFSO) are present while the range is in operation, and is responsible for the enforcement of safety requirements established for the safe conduct of range operations.

Range Safety Manager. An individual appointed to oversee ranges/test areas located on or operated by NSA Crane for the purpose of ensuring adherence to requirements such as proper siting and interface with personnel/functions from outside the range.

Range Safety Officer (RSO). An individual officially designated by the applicable Department Director, Commander/Commanding Officer, or Officer-in-Charge to perform safety oversight duties over ordnance range operations. This individual is responsible for the enforcement of safety requirements established for the safe conduct of ordnance range operations.

Research and Development (R&D) - In the general sense, R&D refers to work directed toward generating new technology. The function of R&D in the development of operational capabilities is the production of information required to achieve such capabilities.

Research, Development, Test, and Evaluation (RDT&E) - In the general sense, RDT&E refers to the systematic process to assure the Navy and Marine Corps are equipped with new and improved assets in a timely and effective fashion. For planning, funding, and review purposes, RDT&E is structured in six categories (6.1 basic research, 6.2 exploratory development [6.1 and 6.2 are referred to as technology base development], 6.3 advanced development, 6.4 engineering development, 6.5 management & support, and 6.6 operational systems development). In the RDT&E process, test and evaluation (T&E) is the control mechanism that determines whether a program goes from one category to the next category, i.e., programs advance by achievements of preset-thresholds, verified by T&E. In the specific sense of this chapter, the term RDT&E is expanded also to include the workload supported by Support of Procurement funds.

Ricochet. To skip, bounce, or fly off at an angle after striking an object or surface.

Safety Submission - A package of information that provides details of the process involved, the number of personnel exposed and the results of the process hazard analysis. Details of facility

hazard mitigation designs are presented including those for protective structures and lightning protection.

Single Point Of Contact (SPOC). The NSWC Crane Division assigned Government employee who serves as the liaison with the applicable Camp Atterbury counterpart performing the same function for range operations and scheduling of all testing and/or training at Camp Atterbury. The NSWC Crane Division single point of contact is staffed to the Ordnance Range Branch (JXRN) as the Primary, whereas Back-Up single point of contacts may be from the same branch or other NSWC Crane branches as appropriate.

Site Plan - A package of information that illustrates the proposed location of a new or changed facility, the general process involved, the type and amount of explosives involved, and the nature of the facilities that surround the site. Detailed ESQD drawings are submitted as part of the package.

Special Use Airspace. Airspace of defined dimension identified by an area on the surface of the earth wherein activities must be confined because of their nature and or wherein limitations may be imposed upon aircraft operations that are not part of those activities.

Standard Lightning Protection System (LPS) - A lightning protection system that meets the current requirements of NAVSEA OP 5, Volume 1.

Surface Danger Zone. The ground and airspace designated within the training complex (to include associated safety areas) for vertical and lateral containment of projectiles, fragments, debris, and components resulting from the firing, launching, or detonation of weapon systems to include explosives and demolitions.

Target Area. The point or location within the SDZ where targets (static/moving) are emplaced for weapon system engagement. For demolitions, it is the point or location where explosive charges are emplaced.

Test and Evaluation (T&E) - In the general sense, T&E refers to work directed toward an evaluation of the characteristics of a material or device. The evaluation can be performed during the RDT&E phase, production phase, or storage life phase.

Tracer. A device that fits into or attached to ordnance. It normally contains a starting mixture and illuminant and leaves a trail of flame or smoke to show the trajectory of the ordnance.

Unexploded Ordnance (UXO). Ammunition and Explosives (AE) which have been primed, fused, armed, or otherwise prepared for action and which have been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installations/communities, personnel, or material, and remains unexploded either by malfunction or design or any other cause.

Uprange. The orientation of personnel, material, or property relative to the direction or path of AE (to include guided missiles and rockets) fired or launched from weapons systems. The orientation is from the target area toward the firing line or position.

Wait Time. A period of time designed to allow certain ordnance design characteristics to occur, e.g., battery/capacitor to bleed down, thermal batteries to cool, self-destruct mechanism to function.