	GODDARD TECHNICAL STANDARD	**GSFC-STD-8715.1**
Goddard Space Flight Center **Greenbelt, MD 20771**		**Approved: 06-13-2016** **Revalidation Date: 06-13-2021**

Goddard Space Flight Center (GSFC) Explosive Safety Program

MEASUREMENT SYSTEM IDENTIFICATION: METRIC/SI (ENGLISH)

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Goddard Space Flight Center (GSFC) Explosive Safety Program

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DOCUMENT HISTORY LOG

Status	Document Revision	Approval Date	Description
Baseline	-	06-13-2016	Initial Release

FOREWORD

This standard is published by the Goddard Space Flight Center (GSFC) to provide uniform engineering and technical requirements for processes, procedures, practices, and methods that have been endorsed as standard for NASA programs and projects, including requirements for selection, application, and design criteria of an item.

This standard establishes the requirements for implementing the Explosive Safety Program for Goddard Space Flight Center (GSFC) including the component facilities which comply with the requirements of NASA-STD-8719.12, *Safety Standards for Explosives, Propellants, and Pyrotechnics* and GPR 8715.10, *GSFC Explosive Safety Program*. It defines the Explosive Safety Program process for applicable work performed at GSFC and other sites designated for GSFC approved programs and projects.

Requests for information, corrections, or additions to this standard should be submitted via "Contact Us" on the GSFC Technical Standards website at http://standards.gsfc.nasa.gov.

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GSFC Explosive Safety Program

1. SCOPE

1.1 Purpose

The purpose of this standard is to define procedures required for the GSFC Explosive Safety Program in accordance with NASA-STD-8719.12, *Safety Standard for Explosives, Propellants, and Pyrotechnics*, specifically applied to locations under the influence of Goddard Space Flight Center (GSFC).

1.2 Applicability

This standard is applicable to all GSFC facilities, including Wallops Flight Facility (WFF), Independent Verification and Validation Facility (IV&V), Goddard Institute for Space Studies (GISS), Columbia Science Balloon Facility (CSBF), and other sites designated for GSFC approved programs and projects.

2. APPLICABLE DOCUMENTS

2.1 General

a. NASA-STD-8719.12, Safety Standard for Explosives, Propellants, and Pyrotechnics
b. NPR 8715.3, NASA General Safety Program Requirements
c. GPR 8715.10, GSFC Explosive Safety Program

2.2 Government Documents

a. NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping
b. Department of Defense Explosive Safety Board, Technical Paper 18, *Minimum Qualifications for Unexploded Ordnance Technicians and Personnel*
c. International Traffic in Arms Regulations, Part 121.1, The United States Munitions List
d. GSFC Form 23-2, GSFC Explosive Facility License
e. AFMAN 91-201, Explosive Safety Standards
http://www.wbdg.org/ccb/AF/AFM/afman_91_201.pdf
f. P5400-7, ATF Federal Explosives Law and Regulations
http://www.atf.gov/files/publications/download/p/atf-p-5400-7.pdf
g. NASA-STD-1600.1, NASA Security Program Requirements, Article 4.1
h. U.S. NAVY Ordnance Information System (OIS) website
https://www.ois.disa.mil/portal/nolsc.jsp?body=1

2.3 Non-Government Documents

N/A

2.4 Order of Precedence

When this standard is applied as a requirement or imposed by contract on a program or project, the technical requirements of this standard take precedence, in the case of conflict, over the technical requirements cited in applicable documents or referenced guidance documents.

3. ACRONYMS AND DEFINITIONS

3.1 Acronyms and Abbreviations

AA&E	Arms, Ammunition, and Explosives
AHJ	Authority Having Jurisdiction
BATF	Bureau of Alcohol, Tobacco, and Firearms
CAA	Competent Authority Approval
CAP	Corrective Action Plan
CBL	Commercial Bill of Lading
CSBF	Columbia Scientific Balloon Facility, Palestine, Fort Sumner, Texas
DoD	United States Department of Defense
DOT	United States Department of Transportation
DSC	Differential Scanning Calorimetry
DTA	Differential Thermal Analysis
EAP	Emergency Action Plan
EELP	Explosives, Energetic Liquids, and Pyrotechnics
EFL	Explosive Facility License
ELV	Expendable Launch Vehicle
EOD	Explosive Ordnance Disposal
ESO	Explosive Safety Officer
ESP	Explosive Site Plan
FMU	Federal Munitions List
FOM	Facility Operations Manager
GBL	Government Bill of Lading
GISS	Goddard Institute for Space Studies
GPR	Goddard Procedural Requirements
GSFC	Goddard Space Flight Center
HERO	Hazards of Electromagnetic Radiation to Ordnance
IDLH	Immediately Dangerous to Life and Health
IED	Improvised Explosive Devices
IV&V	NASA Independent Verification and Validation
LN	Lot Number
LPS	Lightning Protection System
MEC	Munitions and Explosives of Concern
MOA	Memorandum of Agreement

MOU	Memorandum of Understanding
MSDS	Material Safety Data Sheet
NALC	Naval Ammunition Logistics Code
NASA	National Aeronautics and Space Administration
NEW	Net Explosive Weight
NPR	NASA Procedural Requirements
NSN	National Stock Number
OIS	Ordnance Information Service
OTCC	Ordnance Training and Certification Committee
PHMSA	Pipeline of Hazardous Material Safety Administration
PM	Program (Project) Manager
PN	Part Number
POP	Performance Oriented Packaging
POV	Privately Owned Vehicle
PPE	Personnel Protective Equipment
QD	Quantity Distance
RF	Radio Frequency
RFID	Radio Frequency Identification and Detection
SBL	Straight Bill of Lading
SDS	Safety Data Sheet (OSHA Global Harmonization)
SN	Serial Number
UN	United Nations
US	United States
UXO	Unexploded Ordnance
WFF	NASA Wallops Flight Facility

3.2 Definitions

Approved: Complying with the provision(s) of this document and with instructions and details issued by the GSFC Explosive Safety Officer (ESO).

Authorized User: All personnel that handle explosive material(s) are certified to the task assigned and competent for safe execution of the program, project, or mission regardless of onsite, offsite, host, or tenant activity.

Barricade: An intervening approved barrier, natural or artificial, of such type, size, and construction as to limit, in a prescribed manner, the effect of an explosion on nearby buildings or exposures.

Bonding: The process of connecting two or more conductive objects by means of a conductor.

Compatibility: Chemical property of materials to coexist without adverse reaction for an acceptable period of time. Compatibility in storage exists when storing materials together does not increase the probability of an accident or, for a given quantity, the magnitude of the effects of such an accident. Storage compatibility groups are assigned to provide for segregated storage.

Competent Authority Approval (CAA): An approval letter by the competent authority (national agency that is responsible, under its national law, for the control or regulation of some aspect of hazardous materials transportation) that is required under international standard, to authorize offering in commerce hazardous material. For example, United States Department of Transportation (DOT), Pipeline of Hazardous Material Safety Administration (PHMSA) is the national agency for the United States.

Custodian: An individual (designated by the Program and/or Project Manager (PM)) responsible for the accountability of all explosive materials, receiving, storing, issuing, transfers, and disposition.

Deteriorated Ammunition and Explosives: Some explosives and ammunition deteriorate in storage. The deterioration normally occurs at such a slow rate that most explosives and ammunition remain serviceable for many years. However, under unfavorable storage conditions when the ammunition is subjected to abnormally high temperatures or exposed to moisture for a prolonged period, the rate of deterioration is accelerated. Most explosives and ammunition give off heat as they deteriorate, but where the rate of deterioration is slow, the heat generated is dissipated by conduction, radiation and no noticeable rise in temperature occurs. If the deterioration rate increases, heat may be generated so quickly that it cannot be dissipated. This accelerates the deterioration rate until the temperature may become high enough to cause the explosives or ammunition to burst into flame. In instances when the explosives are confined, an explosion or detonation may result. This cause of fire can be nearly eliminated through an effective ammunition and explosives surveillance inspection program.

Escort: The management of a visitor's movements and/or accesses implemented through the constant presence and monitoring of the visitor by appropriately designated and properly trained U.S. Government or approved contractor personnel.

Explosives: Term "explosive" or "explosives" includes any chemical compound or mechanical mixture that, 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 that exert pressures in the surrounding medium. The term applies to materials that either detonate or deflagrate.

Explosives, Energetic Liquids, and Pyrotechnics (EELP): Applicable to energetic liquids used for propulsion or operation of missiles, rockets, and other related devices.

Explosive Article: An article containing one or more explosive substances.

Explosive Facility License (EFL): Formal documented permission from the GSFC Explosives Safety Officer (ESO) to operate a Licensed Explosive Location.

Explosive Safety Officer (ESO): A trained and experienced person is designated as the ESO at each NASA Center to manage the Installation Explosives, Propellants, and Pyrotechnic Safety Program.

Facility: Buildings, structures, and other real property improvements including utilities and collateral equipment.

Facility Operations Manager (FOM): Individual having responsibility for conducting operations at a NASA facility. Monitoring matters that affect safety utilization and general livability of their assigned buildings and facilities including adjacent grounds, sidewalks, and parking lots. Central point of contact for coordination of building maintenance, repair, rehabilitation, and modifications.

Hazards of Electromagnetic Radiation to Ordnance (HERO): The potential that electromagnetic radiation has to adversely affect explosives, such as munitions, dynamite, trinitrotoluene, fuses, and blasting caps, especially electro-explosive devices used as detonators. However, exposure to electromagnetic radiation, such as might emanate from the end of an energized optical fiber or might be produced by radio transmitters and radar, can cause premature actuation of electro-explosive devices. Electromagnetic radiation can damage or trigger solid-state circuits, cause erratic readings in test equipment, and set off electrical blasting caps, any of which may be part of a munitions detonating device. Thus, there is a high potential for munitions or electro-explosive devices, such as proximity fuses, to be adversely affected by electromagnetic radiation.

Inert (As Applicable to Explosives): Containing no explosives or chemical agents. Material shows no exothermic decomposition when tested by Differential Scanning Calorimetry (DSC) or Differential Thermal Analysis (DTA). Moreover, the inert material should show no incompatibility with energetic material with which it may be combined when tested by recognized compatibility tests. Inert material does not alter the onset of exotherm of the DSC or DTA trace of the energetic material nor increase the rate of decomposition or gas evolution of the energetic material.

LITE Box: An approved container of Arms, Ammunition and Explosives (AA&E) that has been opened and items removed or a container, certified by documentation or Performance Oriented Packaging (POP), with less than the approved amount of AA&E within. This container should be properly marked and labeled as "LITE BOX".

Material Safety Data Sheet (MSDS)/ Safety Data Sheet (SDS): The direct identification for all hazardous material.

Public Highway: Any street, road, or highway not under NASA custody used by the general public for any type of vehicular travel.

Quantity Distance (QD): Quantity of explosives material and distance separation relationships which provide defined types of protection. These relationships are based on levels of risk considered acceptable for the stipulated exposures and are tabulated in the appropriate QD tables.

Small Arms Ammunition: Ammunition used in firearms of calibers up to and including caliber .60 and shotguns.

Surveillance Inspection: Visual inspection of explosive stock.

Transient: A person with official business on a production line or operation but who is not routinely assigned to a specific limited location. Typically, transients are roving supervisors, quality assurance, safety personnel, or maintenance personnel. Official visitors are considered transients.

Unserviceable Explosive: Explosive which cannot be used for its intended purpose.

Waiver: A written authorization to depart from a specific directive requirement. A documented authorization releasing a program or project from meeting a requirement after the requirement is put under configuration control at the level the requirement will be implemented. A written authorization granting relief from an applicable requirement and documenting the acceptance of any associated risk. For NASA Expendable Launch Vehicle (ELV) payload projects, waivers typically are approved for a single mission and have a specific duration. However, a waiver identified early in the design or specification/requirement review(s) may apply throughout the project or to multiple missions that use a common upper stage and/or a common spacecraft bus. A variance that authorizes departure from a specific safety requirement where an increase in risk, due to the fact that the requirement is not satisfied, has been documented and accepted by the appropriate authority. A variance that authorizes departure from a specific safety requirement where a certain level of risk has been documented and accepted.

4. REQUIREMENTS

4.1 Management Requirements

In accordance with GPR 8715.10, all explosive facilities and locations, operations and personnel involved with Explosives, Energetic Liquids and Pyrotechnics (EELP) within the scope of this standard shall be controlled. This includes the identification, delivery control, inventory control, and expenditure of the EELPs. The management of explosive safety is under the direction of the GSFC ESO via the Safety Division within the Safety and Mission Assurance Directorate and the Safety Office within the Suborbital and Special Orbital Projects Directorate (Wallops Flight Facility).

EELPs are controlled in the following manners:

a. Identification of the EELP is made upon the initial approval of the EELP material to be received on-site, and continues until final expenditure. EELP material received on behalf of programs, projects, and missions is included. Additionally, Munitions and Explosives of Concern (MEC), and Unexploded Ordnance (UXO) encountered or discovered is also included. See Appendix D for information concerning MEC and/or UXO.

> **Exception**: UXO determined by the GSFC ESO to be an Immediately Dangerous to Life and Health (IDLH), shall be treated as an emergency response and Explosive Ordnance Disposal (EOD) personnel will be requested. These items should be addressed immediately.

Residual ordnance and explosive scrap will be identified and dispositioned by EOD personnel.

b. Delivery control includes delivery methods with tracking information. Communication with the shipper is the responsibility of the Custodian. Delivery control also includes control movement of EELP. Escort vehicles with ordnance handlers are required for any placarded EELP while on NASA property. Transportation is limited to approved explosive routes. The exception is Hazard Class 1.4 explosives under 1,000 lbs. gross aggregate weight.

c. Inventory control includes how the material is physically received, inspected, stored, transported, delivered, and integrated. Inventory control includes timely and accurate reporting of storage and movement to responsible authorities.

d. Expenditure includes function as designed, function by testing, de-militarization, and recoverability. Recoverability of unused assets includes re-usable shipping containers as well as unused explosive articles and substances. This should be included in project plans prior to execution of the project. Any unused project material, to be stored post project for a period of 30 days or more shall be approved through the GSFC ESO, in writing. Department of Defense (DoD) material, including re-usable shipping and storage containers, will be returned to a DoD site, unless the Custodian requires further use of the material. Most DoD material listed above is tracked through the DoD Ordnance Information Service (OIS) as serialized assets. Unusable non-hazardous scrap material should be turned into deemed salvage. Prior to disposition, all markings identifying explosive content, and will be covered. This includes all stencils and markings, as well as all labeling. Items identified in the United States Federal Munitions List (FMU) should be turned into the appropriate military organization, or dispositioned accordingly.

e. Communication includes all correspondence related to EELP logistics which shall be transmitted encrypted. The GSFC ESO shall be made aware, in advance and in writing, a minimum of two weeks prior to major scheduled EELP deliveries. This can be accomplished by providing either a Government Bill of Lading (GBL), Commercial Bill of Lading (CBL), or Straight Bill of Lading (SBL) for identified AA&E movements, inbound as well as outbound. Information should include the following:

(1) Complete identification of the material
(2) Planned storage/staging locations
(3) Responsible persons identified by full name, contact phone number, email address
(4) NASA Program Representative
(5) On-site manager (Project, Site Supervisor, etc.)
(6) Custodian, certified to receive, maintain, and issue the explosive material

f. Site Brief shall be performed for all operations covered by the scope of this standard. A local in-brief should be established prior to commencement of programs or projects to all participants. This brief should include, at a minimum, general operating safety, UXO/MEC awareness training, emergency procedures, primary names and contact information, emergency service locations and contact information, primary and secondary evacuation locations, support available, and hazard communications. In-brief participants include employees and non-escorted

employees working within the hazardous storage and processing areas. A sign-in sheet will be completed by all personnel briefed with their contact information and the purpose of the briefing, and recorded. Records should be maintained locally within the sited area. An annual review of the site brief is required.

g. Hazard Communication shall occur concerning all EELP. All EELP shall have current Safety Data Sheets (SDS) or in some cases, equivalent documents, available and readily accessible to all personnel within the area. This document set will be available upon receipt of explosive material.

The material received shall be in accordance with the Explosive Site Plan (ESP) developed for the specific planned storage/processing location(s).

The material received shall be in accordance with the approved Explosive Facility License (EFL) developed, reviewed, and approved for the specific planned storage/processing location(s).

Fire Symbols are used to identify contents within a building or room (as applicable).

h. Transportation includes logistics support that should be in accordance with approved local standards. All placarded AA&E material, including EELP liquids used for propulsion or operation of missiles, rockets, and other devices, shall be escorted on and off station by personnel trained and certified in the material, or station security. Only approved explosive routes will be utilized.

> **Caution:** Hazards of Electromagnetic Radiation to Ordnance (HERO) awareness should be exercised when ordnance items are transported on established roads and sites. Consideration should be made to request Radio Frequency (RF) Avoidance prior to transiting these areas.

GSFC movement of Hazard Class 1.4 explosives is authorized at the direction of the Custodian. Any movement utilizing public highways requires supporting transportation documentation. One exception is the completion of delivery of Hazard Class 1.4 by GSFC transportation personnel to the final delivery location, including material commercially delivered (FEDEX, UPS, etc.) to Receiving. GSFC transportation (Logistics) shall use the receiving documents as a manifest for approved delivery.

> **Caution**: At no time shall any hazardous material be stored in, or transported via privately owned vehicles (POV).

4.1.1 Identification of Explosive Safety Personnel

The GSFC ESO is responsible for the approval of planned and existing explosive facilities involving EELP or occurring within the hazardous storage and processing areas created by EELP.

The Ordnance Training and Certification Committee (OTCC) is responsible for training programs and certification of all personnel in jobs related to AA&E under the GSFC ESO's authority.

4.1.2 Program Requirements

All programs, projects, and missions shall have formal requirements for AA&E. This includes:

a. Safe receipt, storage, and expenditure of all AA&E via Memorandum of Agreements (MOA), Memorandum of Understanding (MOU), contracts, or other agreements.

b. Assignment of responsibilities for the program, project, or mission.

c. Operational and engineering controls available and maintained for safe storage and use of the material delivered. Operational controls include Personnel Protective Equipment (PPE), and all required equipment. Engineering Controls include approved facilities for any operations involved in AA&E.

d. Planning for new construction, or changes, alterations, or modifications to licensed storage of EELP sites. Requests for changes requires a review by the Center ESO. Include in the request the risk of this change and the planned effect on the ESP and EFL.

4.1.3 Mishap Reporting

All mishaps are reported in accordance with NPR 8621.1. The GSFC ESO shall be notified of mishaps concerning explosives by project personnel and/or emergency responders as expeditiously as practical, but in all cases within 24 hours.

4.1.4 Site Safety and Health Plan

The Project/Program Manager (PM) is the direct site user representative responsible for developing processes and procedures required to ensure a strong explosive safety program. The PM shall develop approved processes and procedures for all operations involving AA&E. The PM assigns written identification of key personnel, training and certifications, and accountability of related material. The PM develops a formal training program to maintain certifications for employees with continuous monitoring to ensure current qualifications and certifications. The PM provides support to provide all employees with a safe working environment.

The Custodian is the direct representative responsible for accountability of all AA&E within the scope of this document. The Custodian provides program/project deliverables for the safe receipt, storage, movement, assignment and expenditure of all AA&E assets. The Custodian is responsible for maintaining an accurate inventory of all AA&E, and deliverable requirements for reporting.

The end user includes all personnel, through training, certification, and formal authorization, permitted to handle AA&E and EELP.

4.1.5 Security Plan

In coordination with the Center's safety, logistics, environmental, and transportation officials, the Protective Services Offices shall ensure that the Center develops and implements security plans specifically designed to provide the appropriate level of protection in the transportation, receipt, access, use, storage, and accountability of hazardous materials used by NASA. Security Plans will include:

a. Review of shipping/transportation procedures to ensure appropriate precautions are in place and recommend changes and/or adjustments.

b. Appropriate sharing of threat information associated with the targeting of hazardous materials.

c. Establishment of center-specific receipt, escort, and hand-off procedures.

d. Establishment of security procedures for permanent and temporary storage/holding areas to include defining secure areas.

In addition, incorporating appropriate security measures, outlined in the various chapters of this standard and others, into project plans, facility plans, construction and modernization projects, and requests for proposals impacting program security.

4.1.6 Accountability Requirements / Program Deliverables

All EELP shall be accounted for, while in the control of projects, programs, and missions.

Accountability begins when the material, regardless of method of delivery, is received by projects, programs, and missions, as well as, tenant activities off site under GSFC's authority.

EELP surveillance inspection program for Deteriorated Ammunition and Explosives shall be established for inspection, by lot sampling, of all explosives and Small Arms Ammunition in long term storage. The surveillance inspection period begins upon visual receipt inspection and will not exceed 3 years.

The material is tracked on a continuous basis, and shall reflect a current and accurate inventory. All receipts, issues, surveillance inspections, and expenditures should be updated within 1 work-day.

> **Exception:** Expenditures at remote sites shall be updated within 3 work-days, or when secure validation in writing can be transmitted.

Accountability ends when the material is expended through functioning as designed, transfer, or disposal.

Accurate accountability records shall be maintained through established requirements.

Archive records shall be maintained in accordance with prescribed regulations.

4.1.7 Reporting Requirements

Formal timetables should be established for the accurate and timely minimum reporting of AA&E to the responsible authorities. EELP property custodians shall provide an inventory of explosive assets to GSFC ESO by the 1st of each month. Per NASA-STD-8719.12 the ESO will maintain and track the monthly explosive assets inventory.

A copy of the monthly inventory shall be provided by the GSF ESO to the site Associate Chief of Protective Services and the site's Emergency Services.

The inventory shall be maintained and available to the GSFC ESO on demand, in addition to the monthly minimum requirements.

Customized reports, for specific applications, shall be provided by the Custodian.

Note: See Appendix C for additional guidance concerning inventory and reporting.

4.2 Accountability of Arms, Ammunition, and Explosives (AA&E)

All AA&E shall be maintained through the best accountability practices.

4.2.1 Organizational Responsibility

All programs, projects, and missions shall maintain responsibility for the material within GSFC control.

4.2.2 Unserviceable Items

Material deemed unserviceable shall be identified and documentation of such provided to the GSFC ESO.

Unserviceable AA&E shall be segregated and isolated from program material, and clearly labeled.

Each program is responsible for developing disposition processes for unserviceable AA&E.

If the material is considered for identification as hazardous waste, the Custodian should submit a request to excess through the Program Manager (PM). The PM shall forward the request to the GSFC ESO. If the GSFC ESO approves the request, the material is declared as hazardous waste.

4.2.3 Government and Contractor Supplied

a. All material delivered to GSFC control on behalf of the DoD, or other government agencies including NASA shall be identified as government furnished material.

b. All material delivered to GSFC control supporting commercial endeavors shall be identified as contractor supplied. Commercial programs and projects shall provide Bureau of Alcohol, Tobacco, and Firearms (BATF) license for the material utilized. Contractor supplied material shall be received and stored in separate locations isolated from government furnished material.

4.2.4 Communication

Communication, internally and externally, includes receipt, expenditure, etc.

The custodian of incoming/outgoing AA&E movements will communicate with appropriate personnel on the anticipated receipt/shipment, specifically EELP with emphasis on AA&E. The following shall be notified:

- GSFC ESO
- Protective Services, emergency services and handling personnel
- Support personnel as required
- Other agencies on the receipt, shipment, and expenditure as required
- OIS representative for DOD material as required

Communication on receipt and shipment shall be transmitted to responsible authorities as per Section 4.1.7.

Receipt, shipment, and expenditure shall be updated in the inventory program within 1 work day.

4.3 Storage Authorization for Explosives and Small Arms Ammunition

4.3.1 Planning

All operations, including receipt, storage, and transportation, involving AA&E shall be planned in advance. Inbound shipments regardless of mode of entry, shall be supported for safe, secure, and timely completion.

GSFC ESO shall be notified two weeks in advance of any placard shipment.

4.3.2 Storage Authorization

All storage of EELP material shall be approved by the GSFC ESO via the approved ESP and EFL.

a. The ESP shall be developed in accordance with NASA-STD-8719.12 by the program, project, or mission for approval by the GSFC ESO.

b. The EFL shall be requested by the program, project, or mission, in writing to the GSFC ESO. The EFL will be issued by the ESO based on the ESP. The EFL should be validated annually.

4.3.3 Explosive Site Plans, Explosive Facility Licenses, Waivers

Temporary storage at remote locations, including requirements for portable EELP storage, will be sited and approved by GSFC ESO.

All storage locations shall be suitable for AA&E to be stored. The program, project, or mission is responsible for maintaining approved storage per this standard and the ESP.

4.3.4 Organization License for Use

All host and tenant activities operating with EELP on behalf of NASA GSFC, regardless of the location, shall be identified through formal MOA, MOU, contracts, or written program requirements.

The program Facility Manager for the Site shall develop a written ESP, in accordance with NASA-STD-8719.12 for submission to the GSFC ESO.

Note: NASA programs/projects/missions operating as tenant activities may be licensed locally by the host ESO. The GSFC ESO shall review this license, and approve.

After approval by the ESO, an EFL is issued for the approved location. The original license is maintained by the ESO, and a signature copy is posted at the site, protected from weather, for all personnel entering the location for review and compliance.

If there is a planned mission, project, etc., that requires a variance from the license; a formal request is made to the ESO, for a temporary waiver. The duration of the waiver is not to exceed 90 days.

4.4 Inspections and Audits

4.4.1 Internal Inspections and Audits

Programs, projects, and missions are responsible for validating their explosive safety program on a reoccurring schedule not to exceed 6 months.

Audit records shall be maintained by the custodian and made available when required by the GSFC ESO.

A deficiency tracking program shall be established and maintained by the custodian, and made available when required by the GSFC ESO. Audits should include spot checks and follow-ups with deficiency resolution.

4.4.2 External Inspections and Audits

The GSFC ESO should utilize the Explosive Site License Inspection Checklist (Appendix B). The checklist serves to validate program's, project's, and mission's explosive safety program.

Audit schedule shall not to exceed 12 months.

Improvements and significant contributions shall be noted.

Minor deficiencies, completed prior to exit brief, shall be noted.

Other deficiencies, to be completed within 30 days, shall be recorded and corrective actions forwarded to the GSFC ESO.

Deficiencies requiring more than 30 days implementation requires a Corrective Action Plan (CAP) and shall be submitted to the GSFC ESO within 30 days.

A copy of the audit shall be forwarded to the appropriate PM.

4.5 Facility Requirements

4.5.1 Facility Siting

All facilities involved with stages of EELP shall maintain the locations to the best extent possible.

Facilities shall be sited per NASA-STD-8719.12 which provides site planning guidance for site plans, licensing requirements, and storage requirements for AA&E.

4.5.2 Licensing

Facilities will have an EFL, posted in the facility, which includes the following:

- Identification of the specific facility
- Organizational responsibility
- Specific hazard classes and explosive limits

An approved waiver, with justification, shall be formally requested to the GSFC ESO for exceeding the parameters of the ESP. This request should include the project, risk mitigation methodology, specific variance from the license, and inclusive dates the waiver is requested to cover.

4.5.3 Locations

Location of EELP for facilities shall include the following:

a. An Emergency Action Plan (EAP), approved by the local on-site Safety authority.

b. Applicable elements of the EAP shall be communicated to permanent employees on an annual basis and to temporary employees and workers in the area prior to commencement of operations.

c. Applicable elements of the EAP shall be briefed to transients prior to their participation, regardless of level of participation, to commencement of operations.

All Buildings shall have current, correct fire symbol(s) for the EELP stored within the building.

All Buildings shall have approved fire extinguishers. An inspection program by site fire personnel will be reoccurring and periodic, and records of inspection, with discrepancy reporting and disposition, should be maintained.

EELP storage shall have approved ordnance grounding systems and lightning protection systems (LPS), bonded together, unless the EFL waives this requirement.

The grounding systems will be approved (certified) annually by facilities personnel and indicate approval via anti-tamper labels / stickers or other approved means.

Security requirements will include limited access through engineering controls (access gates, approved lockers, certified locks, etc.). For certain operations, at the discretion of the ESO and documented in the ESP, a combination of engineering and operational controls shall be developed and approved by the GSFC ESO. Access to FMU material, including AA&E, should be limited to Custodians.

Primary requirements shall include access (key cards, keys) to the minimum number of authorized personnel (trained and certified) and emergency services.

Housekeeping shall be maintained in accordance with NASA-STD-8719.12. Excess flammable materials will be removed immediately after operations from all storage locations.

MEC/UXO considerations should be used by Custodians to determine safe and secure storage. This includes planning for isolation of MEC/UXO deemed safe for movement (not considered IDLH). If IDLH, siting and licensing MEC/UXO in place shall be provided by the GSFC ESO. See Appendix D for information concerning MEC and/or UXO.

Disposition includes planning for material utilized for MEC/UXO clearance operations. This includes planning for approved and isolated storage, disposal, siting, and licensing.

Records of MEC/UXO, with accompanying identification and location, shall be forwarded to the GSFC ESO. The Office of Protective Services, and the Environmental Office located at the site shall also be notified.

Expenditure of material (functioning as designed) shall be reported to the Custodian and the responsible program, project, or mission in a timely manner.

Upon completion of any program, project, or mission, no explosive FMU material shall remain, unless formally approved by the GSFC ESO.

If approval is granted, a Custodian shall be identified.

The identification shall include full name, title, email address, work address, and phone number(s).

4.5.4 Explosive Storage

All EELP within approved storage buildings, bunkers, lockers, etc., shall be maintained in the shipping and storage configuration except during specific approved operations.

Containers shall be properly closed and sealed in the certified shipping configuration. Containers should be moved to operational and processing locations prior to opening.

LITE boxes shall be clearly marked and only be opened during inventory and issue.

Containers in storage shall be identified with approved labeling and marking on the outside of the containers to accurately reflect the contents, including:

a. Proper shipping name
b. United Nations (UN) identification number
c. National Stock Number (NSN) if available, or manufacturer part number
d. Naval Ammunition Logistics Code (NALC) if applicable
e. Part Number (PN) (vendor and local) preceded by "PN"
f. Unit of Issue
g. Item Description
h. Lot Number (LN) preceded by "LN", and Serial Number (SN) preceded by "SN". If single container with multiple serial numbers, mark "various". The serial numbers may be marked separately for inventory purposes.
i. Date of Manufacture
j. Net Explosive Weight (NEW) each, preceded by "NEW Ea.", and unit of measurement.
k. Current and appropriate labelling for the hazard within the container. All non-applicable attached labels removed or destroyed.
l. An Radio Frequency Identification and Detection (RFID) label may be attached, if applicable, along with program requirement labelling.

EELP shall be properly stored in accordance with fire safety regulations.

EELP shall be stored in such a manner to allow authorized personnel (trained and certified) as well as certified equipment within the facility.

EELP shall be stored to allow adequate air circulation, minimal allowable container stacking, and inventory.

Contractor supplied material shall be isolated and segregated from government material for better control (inventory, etc.) via the custodians.

Grounding and bonding shall be in accordance with NASA-STD-8719.12.

"INERT" items shall be clearly labeled and stored. Positive control will be maintained on "INERT" items.

Prior to the retirement of any explosive facility, no explosive material/FMU items shall remain, unless formally approved by the GSFC ESO.

Disposition of post program, project, or mission material, including recovery and return of explosive assets, shall be approved by the GSFC ESO prior to shipment of the material to the remote site.

If post program, project, or mission material is to be dispositioned at the remote site, material shall be accounted for and reported to the Custodian.

4.5.5 Small Arms, Ammunition Storage

Small Arms Ammunition stored in armories, ready service lockers, etc., has a unique set of facility requirements and is controlled by the Authority Having Jurisdiction (AHJ).

The control of these assets is critical, due to the wide use and easily pilfer-able nature of the material.

Positive control of these items shall be maintained by the Custodian.

5. GUIDANCE

5.1 Reference Documents

See Table 1 – Applicable and Reference Documents and Additional Resources

5.2 Key Word Listing

N/A

Table 1 Applicable and Reference Documents and Additional Resources

NO.	DOCUMENT NUMBER	TITLE AND AUTHORITY	DATE	REFERENCING PARAGRAPH
	NASA-STD-8719.12	Safety Standard for Explosives, Propellants, and Pyrotechnics		
	NASA-STD-1600.1	NASA Security Program Requirements Article 4.1		
	AFMAN 91-201	Explosive Safety Standards http://www.wbdg.org/ccb/AF/AFM/afman_91_201.pdf		
	P5400-7	ATF Federal Explosives Law and Regulations http://www.atf.gov/files/publications/download/p/atf-p-5400-7.pdf		
		U.S. Navy Ordnance Information System (OIS) Website https://www.ois.disa.mil/portal/nolsc.jsp?body=1 (DOD CAAC Card and DOD Sponsor Required, Oracle SQL Client required on PC)		
		Assistance concerning Small Arms Ammunition and Explosive Safety is available from the ESO and the WFF Safety Office. Contact information can be found at: **https://safety.wff.nasa.gov/person.html**		

APPENDIX A – Explosive Facility License (Template)

GSFC Explosive Facility License

1. Location	2. Organization	3. License No.

I. Facility Data

4. Facility Identification		
5. Primary Use		6. Applicable
7. Room Number	8. Room Use	9. Construction

II. Explosive Limits Requested

(If more space is needed, use continuation sheet)

Class/ Division A	Compatibility Group(s) B	Nomenclature	Quantity	Fire Symbol E

III. Certifying Officials

Typed Name and Title of Requesting Official	Signature	Date
Typed Name and Title of Security Official	Signature	Date
Typed Name and Title of Fire Protection Official	Signature	Date
Typed Name and Title of Environmental Official	Signature	Date

IV. Approving Official

Explosive Safety Officer (ESO)	Signature	Date

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GSFC Explosive Facility License
(continuation sheet)

II. Explosive Limits Requested
(continuation sheet)

Class/ Division A	Compatibility Group(s) B	Nomenclature	Quantity	Fire Symbol E

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NRRS 1/117B

Check the GSFC Technical Standards Program website at http://standards.gsfc.nasa.gov or contact the Executive Secretary for the GSFC Technical Standards Program to verify that this is the correct version prior to use.

APPENDIX B – Explosive Site License Inspection Checklist

Introduction

This Explosive Site License Inspection Checklist provides measurable feedback to any explosive safety program. Unless otherwise noted, all references are from NASA-STD-8719.12, Safety Standard for Explosives, Propellants, and Pyrotechnics.

This Inspection Checklist is made available to all end users as part of the GSFC Standard for the Explosive Safety Program.

This Inspection Checklist serves to:

- Validate your explosive accountability
- Validate responsible organizations
  - On NASA property, the three levels of responsibility (Responsible Organization, Program Manager, and Custodian) and communication
  - For NASA programs and projects at other host activities, identification of responsibilities, as well as support infrastructure
  - To provide support to NASA GSFC organizations in support of NASA-STD-8719.12

A copy of the license inspection report will be completed, and forwarded to the GSFC ESO within 5 business days of completion of this visit. It will include:

- Minor deficiencies, completed prior to exit brief, will be noted as "corrected."
- Other deficiencies to be completed within 30 days, and corrected actions forwarded to the GSFC Explosive Safety Officer.
- Deficiencies requiring more than 30 days to implement require a Corrective Action Plan submitted to the GSFC Explosive Safety Officer within 30 days.

A copy of this inspection is maintained on file in accordance with established standards.

Management Responsibility

Program/Project Manager: PM is responsible for oversight of all programs, projects, etc., ensuring accountability of all Hazard Class 1 material, from start to post program or project activities including recovery. The PM is also responsible for development of processes and procedures related to manufacturing, handling, storage, transportation (on and off site), processing, testing, or use of explosives, or assemblies containing explosives. The PM is directly responsible for ensuring a comprehensive explosive safety program, to include monitoring by internal audits. In addition, the PM is responsible for identifying, in writing, custodian(s) and authorized users.

Authorized User: All personnel that handle explosive material are certified to the task assigned and competent for safe execution of the program/project/etc., regardless of onsite/off site/host or tenant activity.

Custodian: The custodian is responsible for accountability of all explosive materials, receiving, storing, issuing, transfers, and disposition.

Checklist Organization

The checklist is divided into nine parts, as follows:

Part A: Management
- Shows a formalized program in place
- Shows program supportive of explosive operations

Part B: Training:
- All personnel involved in the explosive program are trained
- Listing of specific certification requirements

Part C: Accountability:
- All explosive material accounted for
- A review of the inventory control

Part D: Storage Authorization and Small Arms Ammunition Storage:
- Buildings and structures are licensed to store the material

Part E: Inspections/Audits:
- A variety of inspections and audits accompany storage locations for Class 1 material

Part F: Building Exterior:
- The building is in a condition adequate to store explosive material

Part G: Explosive Storage:
- The explosive material is safely stored
- The explosive material is secure

Part H: Small Arms Ammunition Storage:
- This area used for validating specifically Small Arms Ammunition
- Access control is addressed

Part I: Tenant Activities (In addition to A through F):
- For fixed NASA programs and projects offsite, a path to determine NASA-STD-8719.12 compliance
- For offsite locations used for temporary missions/projects, a path to develop NASA-STD-8719.12 compliance

Explosive Facility License Inspection Checklist

Location	Site	Building	Storage Location	Date
For NASA/GFSC Tenant Activities: (Palestine, WSMR, etc.) or Remote Sites (PFRR, PMRF, etc.) only				
Site EXPLOSIVE SAFETY OFFICER			Code	Phone
E-MAIL Address				
ALL SITES				
Responsible Organization			Code	Phone
EMAIL Address				
Program/Project Manager			ORG	Phone
EMAIL Address				
Custodian			ORG	Phone
EMAIL Address				
Storage Type	ECM	AGM	Storage Building	Other

A. MANAGEMENT	YES	NO	N/A
1. Does the site have formal program/project/mission requirements for the explosive material?			
2. Does the site have a Program/Project Manager identified by the perspective organization in writing?			
3. Does the site have a Site Safety and Health Plan? Does the plan include Explosive Safety?			
4. Does the site have a Security Plan?			
5. Does the Program/Project/mission have accountability program for the material received?			
6. Does the Program/Project/mission have deliverable(s) to report to NASA on the receipt, storage, and expenditure of the material? What is the written timetable?			
7. Does the Program/Project/mission have deliverable(s) to report to their perspective organization receipt, storage, and expenditure of the material? What is the written timetable?			
8. Is there a Satellite Accumulation Area Manager identified in writing and on file with activity Environmental Office?			

Comments

B. TRAINING	YES	NO	N/A
1. Are all personnel trained for the tasks required? a. Ordnance Team Leaders b. Ordnance Team Members c. Ordnance Under Instruction Members d. Transportation e. Hazardous Waste f. Equipment operators			
2. Are all certifications current?			
3. Are all personnel designated in writing for the tasks required?			
4. Are all personnel trained and certified on Hazard Communication?			
5. Are all personnel trained on Emergency Procedures for the material utilized?			
6. Are designated personnel trained for Automated External Defibrillator, if installed?			
7. Are emergency services personnel trained in emergency response related to explosive mishaps?			
8. Do personnel have awareness training in Unexploded Ordnance/Material and Explosive Concern (UXO/MEC)?			
9. Do designated personnel receive environmental training in Resource Conservation Recovery Act?			

Comments

C. ACCOUNTABILITY	YES	NO	N/A
1. Is the organization storing Small Arms Ammunition and/or explosives identified in writing?			
2. Is the organization storing and maintaining explosives and Small Arms Ammunition accountability?			
3. Does the organization have an accurate inventory of the material stored, issued, and expended?			
4. Does the organization have a Small Arms Ammunition and explosives expenditure program?			
5. Does the organization turn in unserviceable explosive components to the center's ordnance storage area?			
6. Is government furnished and commercial material separated and isolated?			
7. Does the organization provide encrypted communications related to Small Arms Ammunition and explosives logistics?			
Comments			

D. STORAGE AUTHORIZATION AND SMALL ARMS AMMUNITION STORAGE (SMALL ARMS AMMUNITION WILL BE STORED IN BUILDINGS DESIGNED AND LICENSED FOR SMALL ARMS AMMUNITION)	YES	NO	N/A
1. Is the person being inspected the custodian for the location?			
2. Is the material shipped, received, or imported to, on behalf of, "an agency of the United States" (NASA, DOD, etc.) –or-			
3. Is the material shipped, received, or imported under the regulation of the military of the United States of explosive materials for, or their distribution to or storage or possession by and agency of the United States (NASA, DOD, etc.) –or-			
4. Does the organization have a BATF P5400 license for the material?			
5. Is a copy of the BATF P5400 license available onsite?			
6. If required, is the Lightning Protection System certified?			
7. Are other organizations storing material in the facility?			
8. Are their inventories up to date and accurate?			
9. Memorandums of agreement/memorandums of understanding on file with the host organization and program/project.			
10. Current Explosive Safety Officer signature for both host and tenant organizations.			
11. Are there identified INERT explosive items?			
12. Is there a location identified in writing as the center ordnance storage area?			
13. Are current Safety Data Sheets or other hazard identification information readily available to all personnel?			
Comments			

E. INPECTIONS/AUDITS	YES	NO	N/A
1. Does the Program/Project/mission have an internal audit/inspection program for the explosive material? a. What is the periodicity? b. Where are audit records kept? c. What is the deficiency tracking and resolution process?			
2. Does the spot inspection documentation include? a. The program, project, activity or work area inspected. b. The date and time of the inspection. c. The inspector's name and their organization or office symbol. d. A brief description of the areas, equipment or processes/procedures reviewed as well as observations (include positive findings), hazards or unsafe work practices. When qualified safety personnel identify hazards, assign corrective action as applicable. e. Causes of deficiencies and hazards, as noted. f. Recommendations for corrective action. g. Names and phone number of responsible person. (Note: Ensure appropriate follow-up actions (every 30 days) are conducted and documented until findings are closed.).			
3. Does the Program/Project/mission maintain records of this external audit/inspection program for the explosive material? a. Is there a record of deficiency resolution? b. Is this communicated to Explosive Safety Officer			
4. Are periodic fire inspections performed in each storage/processing area?			
5. Are fire drills held within the explosive storage area at 12 month intervals?			
6. Are periodic building inspections performed in each storage/processing area?			
Comments			

F. BUILDING EXTERIOR	YES	NO	N/A
1. Is the structure in good condition suitable to the material stored?			
2. Is the proper firefighting equipment installed for the material stored? Are current inspections visible?			
3. Are there planned improvements for the structure?			
4. Is correct fire symbol posted?			
5. If required, is (are) additional fire symbol(s) posted? a. For multi-cell and multi-cube buildings: Individual fire/chemical hazard posted on each door. b. For multiple hazard articles, consult NASA-STD-8719.12 for display.			
6. Is the explosive site plan available?			
7. Is the capacity chart posted with allowed net explosive weight, current storage weight, allowable number of workers and transient personnel posted?			
8. Does the building have an approved lightning protection system? Is the testing current?			
9. If required: Is bonding present and serviceable?			
10. Is all ordnance properly grounded?			
11. Is there excess vegetation or flammable materials within 50 feet? Note: Earth Covered Magazine 50 feet requirement not applicable, except around ventilators.			
Comments			

G. EXPLOSIVE STORAGE	YES	NO	N/A
1. Are all employees within the area familiar with the building/area Emergency Action Plan, and the location on file of the current edition? How is this communicated with transients?			
2. Is there a current Explosive License for this location?			
3. Is the building temperature and humidity sufficient for the material stored?			
4. Are the explosives properly stacked?			
5. Is there sufficient dunnage to ensure adequate air circulation?			
6. Is the magazine inventory being maintained and available for each part number, lot number, serial number, date of manufacture, and expiration?			
7. Is there a Surveillance inspection program in place for long term storage?			
8. Are explosives clearly segregated from other material?			
9. Are suspect and hazard waste identified explosives clearly segregated from other material?			
10. Are LITE Boxes identified?			
11. Are adequate key and lock control procedures for explosive storage structures being maintained?			
12. Is the explosive compatibility correct?			
13. For Activities supported by and utilizing Department of Defense provided material, is there an Ordnance Information Service manager available for support?			
14. Does the user receive material lot suspension/restriction of DOD identified material?			
15. Is there evidence of good housekeeping?			
Comments			

H. SMALL ARMS AMMUNITION STORAGE	YES	NO	N/A
1. Are all employees within the area familiar with the building/area emergency action plan, and the location on file of the current edition? How is this communicated?			
2. Is Small Arms Ammunition clearly segregated from other explosives?			
3. Is Small Arms Ammunition properly packed and marked, with security closures visible on unopened boxes?			
4. Are LITE BOXES identified?			
5. Is the Small Arms Ammunition reportable to Center security?			
6. Are adequate key and lock control procedures for Small Arms Ammunition storage structures being maintained?			
7. Is the Small Arms Ammunition in the armories and weapon issue points in compliance with 4.25.9.1.12.1 and stored in a separate locked container firmly secured to the structure?			
8. For Activities supported by and utilizing Department of Defense provided material, is there an Ordnance Information Service manager available for support?			
9. Is there evidence of good housekeeping?			
Comments			

I. TENANT ACTIVITIES (IN ADDITION TO A THROUGH F)	YES	NO	N/A
1. Are all employees within the area familiar with the building/area emergency action plan, and the location on file of the current edition? How is this communicated?			
2. Is there a path to the host activity Emergency Services, for identification to identification of assets, for Emergency Response?			
3. Are there memorandums of agreement/memorandums of understanding on file with host organization and program/project?			
4. Is there an Explosive Safety Office on site?			
5. Does the Host Explosive Safety Office provide Explosive Site Plan/Explosive Facility License in accordance with Host Organization directives?			
6. Does the Host Activity provide Logistics Support?			
7. For Activities supported by and utilizing Department of Defense provided material, is there an Ordnance Information Service manager available for support?			
8. Is there evidence of good housekeeping?			
Comments			

APPENDIX C – Inventory Reporting Elements

Inventory control is a continuous process. It involves an overview of the reporting Custodian, listing of the programs, projects, or missions reporting on behalf of, identification of the material by site, project, and piece identification. All GSFC reporting Custodians are responsible for providing an accurate explosive inventory, in a format provided by the GSFC ESO. All entries will be in pounds (net explosive weight). The GSFC ESO or designee will consolidate the total inventory. A secure or hand carried copy will be provided by the GSFC ESO to the Office of Protective Services and Emergency Medical Services.

Note: Lot and serial numbers, along with the date of manufacture should be included in this inventory.

AA&E reporting by site, building, room and location is the primary identification to "place" the material at that location. (Example: Star 30 Rocket Motors may be at multiple GSFC locations under a single reporting Custodian).

AA&E by reporting organization/project identifies the organization responsible for the AA&E, and specifically which project the material is to be used for. (Example: NASA Code 840, Range and Mission Management Office is the NASA organization with multiple projects that material is stored on behalf of).

AA&E reporting identification specifically identifies the material within a licensed building. (Example: An above-ground Magazine stores 4 Mk70 Terriers, 3 Star 6B, and a box of 100 NSI. The Mk 70 and Star 6B reports NEW/NEWQD (as applicable, in pounds), NSN, P/N, Lot Number, Serial Number, Date of Manufacture/cast date, and shelf life. The box of NSI will include all the above listed information with the exception of serial numbers because the serial number will be replaced with a piece count per container).

Additional AA&E reporting requirements shall include:

- Multiple single pieces within the same lot (may be made a single entry).
- An item received with an identified NSN and part number that is modified will change the part number. Existing identification of the specific item may change to the modified version.
- Temperature and humidity storage, if requested.
- Ordnance condition code, if requested.

Reports will include only active material. Inventory programs shall include a path to archive (purge, etc.) expended AA&E. Archive records should be accessible to inventory control personnel.

APPENDIX D – Munitions and Explosives of Concern (MEC) and Unexploded Ordnance (UXO)

Regardless of NASA/DoD material, MEC and UXO constitute an unknown, therefore severe risk to employees and visitors on GSFC property, as well as increased risk to GSFC property. If at any time the identified material cannot be determined to be safe to handle, including movement, the material will be identified as Immediately Dangerous to Life and Health (IDLH).

MEC/UXO includes suspect or actual item(s) 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, facilities, personnel or material and remains unexploded either by malfunction or design or for any other cause.

MEC/UXO includes deliberately placed, mailed, or otherwise found on site. If item(s) are assumed to be Improvised Explosive Devices (IED), or similar item(s), the following also applies, with the primary consideration being evacuation of personnel to a safe evacuation area and, to accountability for all personnel.

If a potential UXO/MEC is discovered, all operations within the area will cease until the area is safe.

Primary consideration will be the 3R's of UXO: Recognize, Retreat, Report.

The Witness (the individual discovering the item(s)) shall:

- Recognize the potential MEC/UXO. If time permits, and it is safe to do so, take photos of the item(s), and record any markings or colors, as well as relative size
- Retreat to a safe area, as far from the item(s) as possible. On exiting the area, leave markings to show location and path to the item(s)
- Report to the Office of Protective Services on an installation phone, 911.
  - Provide contact information for the caller, with caller's location.
  - Provide information on the item(s)
  - Provide information on hazards surrounding the incident site
  - Any unusual markings, colors, nomenclature, and physical condition

The Office of Protective Services secures the area, evacuates all personnel to an initial distance of 1,250 feet, and provides safe separation, perimeter monitoring, initial photographs, and secondary hazards within the area.

- Office of Protective Services will begin initial notification of the incident.
  - The GSFC Explosive Safety Officer (ESO) shall coordinate the incident.
  - Emergency Services shall be respond to the incident location, if required
  - The Facility Operations Manager (FOM) of the nearest building to the incident shall be notified.
  - The Office of Protective Services will also interview witnesses.

The GSFC ESO will:

- Identify the item(s), condition, and establish a chain of custody of the item(s).
  - If positively identified, the minimum safe distances will be provided to the Office of Protective Services. If the item is determined to be unfired/undamaged, and can be safely moved to a secure accumulation area, isolated from any program materials, the GSFC ESO will authorize movement by personnel qualified by DDESB Technical Paper 18, *Minimum Qualifications for Unexploded Ordnance Technicians and Personnel* to a secure accumulation area, isolated from any program, project, or mission materials.
  - If the item(s) cannot be positively identified, the initial safe separation of 1,250 feet shall be validated by the GSFC ESO. Unless positively identified otherwise, the item(s) will be considered Hazard Class 1.1, damaged. The GSFC ESO shall determine if the item(s) are NASA program material and locate and contact project personnel.
  - Contact DoD Explosive Ordnance Disposal (EOD) for assistance, if unknown items are present or IDLH.
  - Allow operations to resume after area is cleared of MEC/UXO.

Project personnel (if applicable) will be made available to the GSFC ESO to:

- Identify the item(s) including arming and firing
- Positively determine the condition
- Determine the hazards of the item in the current condition (HERO, chemical release, sensitivity, ejection, shock)
- Provide supporting documentation on the specific item(s)
- Provide historical information

Facility Operations Manager (FOM), when possible, reports to the Incident Commander, and provides:

- Possible secondary hazards in the immediate vicinity of the incident
  - Buried cabling
  - Overhead heating
- Personnel that may be within the QD area
  - Contractors working independently.
  - NASA employees.
- Operations within the QD area.
  - Identify active projects.
  - Identify critical property within the hazard area that constitute, if damaged, could significantly affect NASA operations.

Appendix D – 1 Quick Reference

Munitions and Explosives of Concern (MEC) & Unexploded Ordnance (UXO)

MEC/UXO includes suspect or actual item(s) which has been primed, fused, armed or otherwise prepared for action, and which has been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, facilities, personnel or material and remains unexploded either by malfunction or design or for any other cause. MEC/UXO includes deliberately placed, mailed, or otherwise found on site. Primary consideration will be the 3R's of UXO: Recognize, Retreat, Report.

DO NOT TOUCH THE ITEM(S) OR CAUSE IT TO MOVE.

YOUR SAFETY and the safety of everyone around you is not the main thing,
IT'S THE ONLY THING.

If you find it:

Recognize the item(s), in the shortest possible time.

If it has been there a long time and shows no sign of handling/movement, then take pictures (if possible, from a safe distance, 100' using a cell phone).

Your Name/Code/Project _____ Phone Number_____

Look for:
Item Location
Building #/Room #/Location in the room_____
Outside: Near_____ Side of _____

Approximate size _____

Shape _____

Colors _____

Markings _____

Condition _____

Odors or smoke _____

Sounds _____

Retreat from the area. Evacuate everyone to a safe rally point. Report. Call Security. Identify yourself, where you are, and what you have discovered. Let them know exactly where you will be when they arrive on scene.

Responders

Security (Office of Protective Services)
Activate base wide alert system/echo alert, if required
Account for all personnel
    Dismiss all non-essential personnel
Initial evacuation of all personnel
    1,250 Feet for unknown
      300 Feet from building for small suspect package
Recall F.O.M. in or near building closest to the item
Contact Explosive Safety Officer
Dispatch EMS, if required
Interview Witness
    Use the checklist above to identify, if possible.
    Take possession of all pictures, drawings, etc.

Interview F.O.M.
    Operations within the evacuation area
    Contracts or contractors within the evacuation area
    Any personnel not accounted for
    Are there any hazardous materials within the evacuation area?
    What kind, amounts, where and how are they stored

Facility Operations Manager

Report to Security
Report Operations within the evacuation area
Report any and all personnel that are or have been in the evacuation area
Report any and all hazardous material within the evacuation area
Identify any and all critical systems within the evacuation area
Identify any and all underground cables, piping, etc., within the evacuation area.
Review the photographs, drawings, etc.
Is this NASA mission/project material?
    Identify and recall technical authority for the item