



DEPARTMENT OF THE ARMY
OFFICE OF THE PROJECT MANAGER
MANEUVER AMMUNITION SYSTEMS
(OPM-MAS)
PICATINNY ARSENAL NJ 07806-5000

**PROGRAMMATIC ENVIRONMENTAL ASSESSMENT (PEA)
CARTRIDGE, 120mm, ADVANCED MULTI-POURPOSE (AMP) XM1147 HIGH
EXPLOSIVE MULTI-PURPOSE WITH TRACER (HEMP-T)**

05 November 2021

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05 November 2021

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SECTION ONE: EXECUTIVE SUMMARY/ENVIRONMENTAL ANALYSIS

This Programmatic Environmental Assessment (PEA) is provided for the 120mm Advanced Multi-Purpose (AMP) XM1147 High Explosive Multi-Purpose with Tracer (HEMP-T) and supports a successful Type Classification – Standard decision and Full Materiel Release. 32 Code of Federal Regulations (CFR) Part 651, also known as Army Regulation 200-2, defines the policies, responsibilities, and procedures for implementing the National Environmental Policy Act (NEPA). According to this regulation, the Environmental Assessment (EA) is a written analysis that serves to (1) provide analysis sufficient to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FoNSI); and (2) aid federal agencies in complying with NEPA when no EIS is required. Consequently, this PEA is a programmatic review.

The proposed action for this program is to design, develop, produce and field a 120mm cartridge capable of providing the same capabilities as the following 120mm cartridges: [1] the M830 High Explosive Anti-Tank with Tracer (HEAT-T) round for use against armor and light armor, [2] the M830A1 HEAT-MP-T for use against light armor, [3] the M1028 Canister (CAN) round for use against massed infantry, and [4] the M908 High Explosive Obstacle Reducing with Tracer (HE-OR-T) round for reducing obstacles. Additionally, the program seeks to provide the ability to both engage dismounted Anti-Tank Guided Missile (ATGM) teams at extended ranges and breaching walls in support of dismounted infantry. The cartridge developed by this program to provide these capabilities is the 120mm Advanced Multi-Purpose (AMP) XM1147 High Explosive Multi-Purpose with Tracer (HEMP-T).

Since no environmental impacts are expected from the manufacturing, testing, or demilitarization of the XM1147, a FoNSI has been prepared for the XM1147 program.

SECTION TWO: PEA REQUIREMENT AND METHODOLOGY

In accordance with the President's Council on Environmental Quality (CEQ) Code of Federal Regulations (CFR) Title 40: Protection of the Environment, Parts 1500 through 1508, implementing the National Environmental Policy Act (NEPA) of 1969, all federal agencies must consider the environmental consequences of a proposed action(s). The intent of this PEA is to determine program compliance with NEPA as implemented by DOD Instruction 5000.02T and 32 CFR 651. Institution of a thorough life cycle environmental program will ensure that the mission requirements for the XM1147 program are met in the most cost effective and timely manner while ensuring the Army demonstrates its leadership commitment in meeting its regulatory compliance and moral obligations.

Information for this PEA was obtained from reviewing program documentation and the Technical Data Packages (TDPs). A material assessment was performed to identify the hazardous materials used in the manufacture of the XM1147 cartridges and the environmental impact of these hazardous materials.

1. PURPOSE AND NEED FOR PROPOSED ACTION

1.1. Purpose

To design, develop, produce, and field a 120mm cartridge capable of effectively engaging the following target types: armor, light armor, massed infantry, and dismounted Anti-Tank Guided Missile (ATGM) teams. Additionally, the program seeks to provide the ability to both reduce obstacles and breach walls in support of dismounted infantry.

1.2. Need

The ability to engage desired target types are currently met through the use of four different cartridges. The XM1147 will reduce the Army's logistical burden while allowing tank crews to utilize a single munition for multiple engagement scenarios. Additionally, current 120mm ammunition does not meet the performance requirements necessary to engage and defeat dismounted ATGM teams at extended ranges or have the ability to effectively breach double reinforced concrete walls. The XM1147 will provide the necessary capability required for the 120mm cartridge in all operational environments and conditions.

2. GENERAL DESCRIPTION OF PROPOSED ACTION

2.1. Introduction

The XM1147 Program was initiated to design, develop, produce and field a multi-purpose, 120mm tank cartridge that can deliver the same capabilities as the following 120mm tank cartridges: [1] the M830 High Explosive Anti-Tank with Tracer (HEAT-T) round for use against armor and light armor, [2] the M830A1 HEAT-MP-T for use against light armor, [3] the M1028 Canister (CAN) round for use against massed infantry, and [4] the M908 High Explosive Obstacle Reducing with Tracer (HE-OR-T) round for reducing obstacles. Additionally, the program seeks to provide the ability to both engage dismounted Anti-Tank Guided Missile (ATGM) teams at extended ranges and breaching walls in support of dismounted infantry.

The XM1147 Program entered Milestone B in 1QFY15. Shortly thereafter, the XM1147 program solicited contractors to develop the XM1147 cartridge by either submitting (and developing) their own design or to continue developing the Government baseline design, known as the XM1069, developed during Technology Development Phase efforts. After contractors submitted their proposals, two prototypes were selected to undergo testing and development efforts in Engineering and Manufacturing Development (EMD) Phase 1. In FY17, both prototype designs participated in the Phase I Demonstration where each design was subjected to a series of tests so that their performance could be evaluated with respect to the XM1147 Performance Specification. After reviewing the performance results of both designs, the Government down-selected to the XM1147 design made by Northrop Grumman Innovation Systems (NGIS). In 2QFY17, the Government awarded NGIS with the EMD Phase II effort so that the design could be finalized and qualified for fielding. The XM1147 Program is approaching its Type Classification – Standard (TC-STD) date, which is scheduled for Q1FY22 and Full Materiel Release (FMR) is scheduled for Q3FY22. The XM1147 Program is an Acquisition Category III Program managed by the Office of the Project Manager Maneuver Ammunition Systems (PM MAS) for the Joint Program Executive Officer Armaments and Ammunition (JPEO AA).

2.2. Operation Description

The tank's loader will pull cartridge from the tank ammunition storage rack and insert into the chamber of the gun. The tank crew sights and ranges the target causing the relevant programming information to be passed through the Ammunition Data Link (ADL) to the XM1147 cartridge including: fuzing mode, time to function and detonation delays. The gunner will squeeze the trigger at the tank commander's direction. When the gunner squeezes the trigger, the primer ignites causing the propellant and cartridge case to combust. The resulting combustion gases rapidly expand and propels the projectile out of the gun tube. Upon muzzle exit, the projectile's stabilizing fins deploy. Once the projectile reaches its target, it will detonate in accordance with the selected fuze mode and destroy the target. The XM1147 Cartridge has three fuze set modes: airburst, point detonate with short delay, and point detonate with long delay. The selected fuze mode depends on the target type. The gun's breech will eject the case base immediately following the shot. The crew will then stow the case base for later disposal. A visual diagram of the basic XM1147 AMP Cartridge operational overview is shown below in Figure 1.

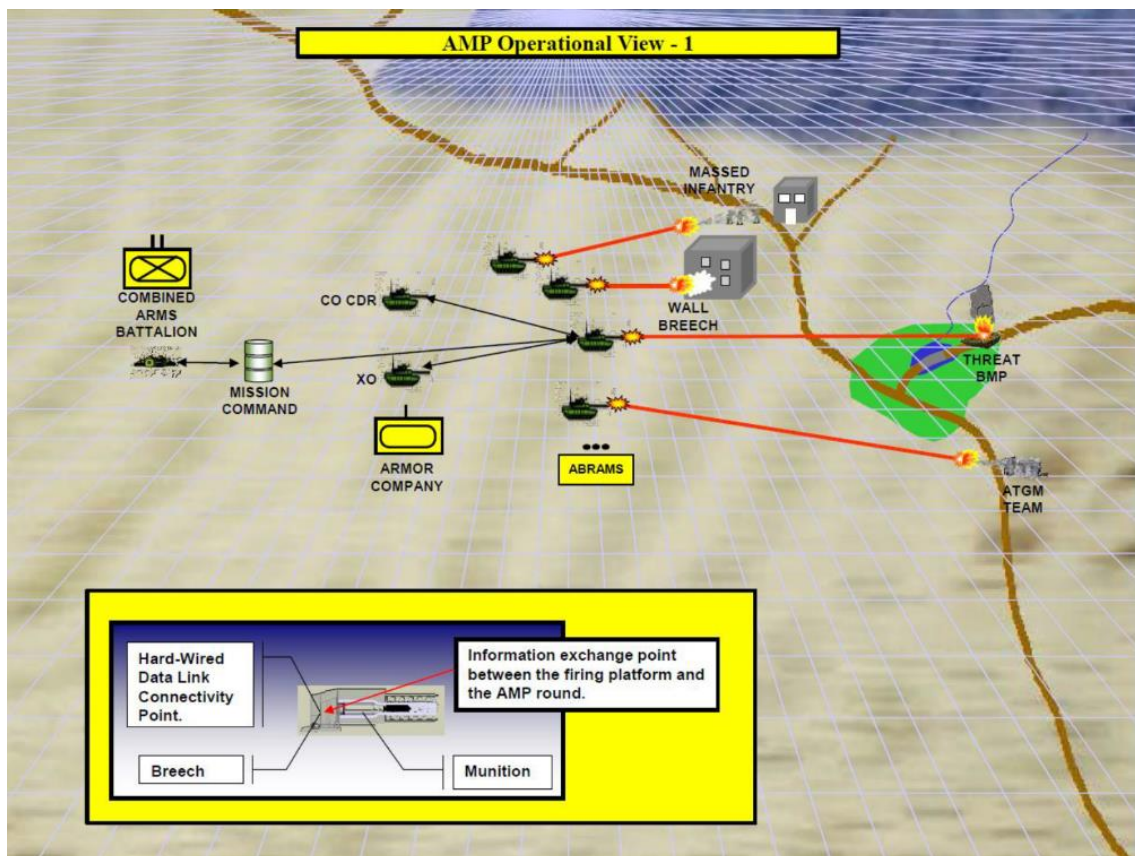


Figure 1: XM1147 AMP Operational Overview

2.3. System Description

The XM1147 Cartridge, shown below in Figure 2, has two major subsystems; the propulsion system and projectile. The propulsion system consists of: the case base, the electric primer, the propellant, the combustible cartridge case, and the ADL components that connect the Abrams tank ADL system to the projectile's programmable fuze. The projectile consists of the: windscreen assembly, injection molded fragment matrix, warhead body, base, and the boom and fin assembly. The target-penetrating blast-fragmenting warhead body is loaded with PAX3 high explosive. The base houses the multi-mode programmable fuze that is connected to the data link in the rear of the cartridge for power and data transfer. The programmable fuze can be set to one of three modes: airburst, point detonate, and point detonate with delay. The fuze will default to point detonate mode when fired without having been programmed. The boom and fin assembly consists of six folding fins that are deployed at muzzle exit.



Figure 2: XM1147 120mm Advanced Multi-Purpose (AMP) Cartridge

2.4. Environment, Safety and Health Analysis of Materials

2.4.1. XM1147 Cartridge Energetics and Materials Comparison

Table 1, shown below, lists the major components of the XM1147 as well as material types as compared with already fielded 120mm cartridges. Due to their sensitive nature, energetic materials are always regulated. The remaining, Non-energetic XM1147 materials (bodies, metal alloys, etc.), were evaluated against applicable regulations as well. Note that even though some of the remaining materials used in the XM1147 are regulated materials (i.e. hazardous), the materials selected for use in these cartridges were the best available at the time.

An energetic material is a compound that can undergo rapid, self-sustaining, exothermic, reduction-oxidation reactions. Energetic materials may be categorized according to their intended uses: (a) explosives, (b) propellants, and (c) pyrotechnics. Explosives and propellants evolve large volumes of hot gas when burned; they differ primarily in their rates of reaction. Pyrotechnics are materials capable of undergoing self-contained and self-sustained exothermic chemical reactions for the production of heat, light, gas, smoke and/or sound. Energetic materials may also be grouped according to their rate of reaction.

XM1147 Energetics and Materials Comparison	
Item Component	XM1147 Material Types
Projectile	
Warhead	
Tracer	
Case	
Propellant	
Case Base	
Primer	

Notes:

- Indicates materials that are identical to those used in already fielded 120mm cartridges.
- Indicates materials that are substantially similar to those used in already fielded 120mm cartridges.

Table 1: XM1147 Energetics and Materials Comparison

2.5. Overall Health Effects

The inert and energetic materials used in the XM1147 design were reviewed to identify those materials that are subject to environmental and Occupational Safety and Health Administration (OSHA) regulations and could therefore cause health effects. The relative hazard was assessed by considering the amount of material used, the toxicity of the material, and the potential for exposure. The following materials were considered to present potential health risks in the life cycle of this program: (1) energetic materials contained within unfired cartridges and (2) the combustion products of these energetic materials. The unfired energetic materials risks are mitigated in all acquisition phases of the program by use of approved safety standards and equipment designed to safely handle these materials.

From an environmental impact perspective, there should be little-to-no change to the environmental impact from the use of this cartridge as compared to the already fielded cartridges that the XM1147 will replace. Both the legacy 120mm tank cartridges that will be replaced and the XM1147 Cartridge is for combat use only and will not be use in training operations.

3. ALTERNATIVES CONSIDERED

3.1. No Action Alternative

The only alternative to the XM1147 Cartridge is the “no action” alternative, in which the Army would continue to use the currently fielded 120mm cartridges. This is not a viable alternative as continued use of these legacy rounds would: have a larger logistical burden, decrease flexibility with respect to conducting a wide variety of combat scenarios, and prevent the fielding of additional combat capabilities deemed necessary to engage current battlefield threats.

3.2. No Action Alternative Environmental Impacts

Production: 120mm cartridges will continue to be produced to replace those that are used in combat operations. The production facilities for these cartridges are well established. Hazardous materials generated during the manufacturing of 120mm cartridges are disposed of in accordance with local, state and federal regulations. There are no significant environmental impacts.

Training: The legacy tank cartridges (M830, M830A1, M1028 and M908) are used for combat only and are not used in training operations.

Demilitarization and Disposal: With no replacement alternative to the legacy 120mm tank cartridges, the Army will retain the existing inventory and continue to use it in combat operations until a suitable replacement becomes available. Under the No Action Alternative, the legacy 120mm tank cartridges would not likely be demilitarized or disposed.

4. ENVIRONMENTAL IMPACTS OF PROPOSED ACTION

4.1. Engineering and Manufacturing Development Phase

4.1.1. Description of Activities

In addition to modeling and simulation activities, the Engineering and Manufacturing Development (EMD) stage testing activities have been broken down into two phases: EMD Phase I and EMD Phase II. EMD Phase II testing is further broken down into two major testing blocks: [1] Design and Development Testing (DDT) and [2] Development Test and Evaluation (DT&E). These test activities require the production of XM1147 cartridges.

- (1) Engineering and Manufacturing Development Phase I Testing: These tests were conducted on two competing prototype designs of the XM1147 Cartridge. The first tests consisted of lethality and integrated cartridge testing which allowed for design improvements in preparation for the final set of tests known as Phase I Demonstration testing. These performance evaluation tests were conducted on both final prototype designs in order to determine which design would be selected for further development.
- (2) Engineering and Manufacturing Development Phase II Testing: EMD Phase II testing consists of two sequential testing activities: (a) Design and Development Testing and (b) Development Test and Evaluation.
 - a. Design and Development Testing (DDT): These tests were conducted by the system contractor to evaluate components, subsystems and system performance. Test results were used to improve the design as necessary until it met or exceeded the program's performance requirements for the system.
 - b. Development Test and Evaluation (DT&E): These tests were conducted on final production design cartridges by the Government and military personnel and evaluated both the cartridge technical/operational requirements and manufacturing facility readiness for Low Rate Initial Production (LRIP). Examples of such testing includes: lethality testing against intended target sets, corrosion testing, long term storage testing, fuze performance and sensitivity testing, and accuracy testing.

All test activities required the production of XM1147 cartridges. The bulk of XM1147 live-fire testing was conducted at well-established testing ranges at Yuma Proving Ground in Arizona. Table 2, below, summarizes the projected number of test items required for each of these test activities. These production quantities can change (increase or decrease), depending on the outcome of the various tests. Thus, the following numbers represent an "order of magnitude" estimation of test quantities.

XM1147 Test Activity			
EMD Phase I	EMD Phase II		Total
	DDT	DT&E	
140	415	900	1,455

Table 2: Estimated Cartridge Production for XM1147 Test Activities

4.1.2. Affected Environments

(a) Affected environments will be air, ground and water at production and test facilities within the U.S. The system contractor, Northrup Grumman, is responsible for ensuring that subcontractors comply with all contract requirements concerning the environment. The subcontractors are responsible for the control of hazardous materials used and hazardous wastes generated in accordance with all local, state, and federal environmental laws and regulations. They are also responsible for obtaining all necessary environmental permits and to comply with OSHA regulations. The key/major subcontractor manufacturing facilities are listed below, in Table 3. These facilities are well established and have previously manufactured components very similar to those used in the XM1147. The majority of XM1147 testing was conducted at Yuma Proving Ground located near Yuma, AZ. A relatively small number of tests were conducted at Aberdeen Proving Ground located near Aberdeen, MD.

Vendor	Location	Component(s)
American Ordinance	Middletown, IA	Load, Assemble, and Pack
Radford Army Ammunition Plant	Radford, VA	Propellant
Tech Ord (AMTEC)	Clear Lake, SD	Explosive train components
Allegany Ballistics Laboratory	Keyser, WV	Case Base, Fuze
WPI	Green Bay, WI	Projectile Base and related components
K&G	Faribault, MN	Projectile Fin and Boom assembly
Lakes Area Manufacturing	Shafer, MN	Projectile Body
Armtec	Coachella, CA	Cartridge Case
Holston Army Ammunition Plant	Kingsport, TN	Main Explosive Fill
Teamvantage	Forest Lake, MN	Fragmentation Matrix

Table 3: XM1147 Cartridge Key/Major Subcontractor Manufacturing Facilities

(b) Transportation procedures for XM1147 cartridges from production to storage and/or to testing facilities will be the same as those for currently fielded cartridges and will not impose an environmental hazard. XM1147 cartridges are shipped in palletized PA171 metal containers. Each pallet consists of 25 PA171 containers and each container holds a single cartridge packed in dunnage for a total of 25 XM1147 cartridges per pallet. Storage of XM1147 cartridges will occur at the same locations, i.e. government depots, as currently fielded 120mm cartridges.

4.1.3. Direct and Indirect Environmental Impacts of Activities

(a) Air Quality.

(1) Manufacturing: Impact on air quality is expected to be minimal. Production processes and equipment in the U.S. to be used for XM1147 have been refined in previous production of components similar to those used in the XM1147 cartridges to minimize impact on air quality.

(2) Testing: Air Quality impacts for testing are evaluated at the respective test facility and will not be evaluated in this PEA.

(b) Surface/Ground Water.

(1) Manufacturing: The impact of XM1147 manufacture on water quality is insignificant. Equipment has been installed to collect and pre-treat industrial process wastewater at the contractor's facilities, where required to meet discharge permits for the industrial wastewater treatment plants or municipal wastewater treatment plants. Manufacturers are expected to contain and clean up all accidental spills in compliance with local, state and federal laws.

(2) Testing: Surface/Ground Water impacts for testing are evaluated at the respective test facility and will not be evaluated in this PEA.

(c) Soil Erosion, Disruption of Wetlands, Farmlands, and Other Lands of Concern: All facilities for manufacturing and testing XM1147 are currently established. No disruption of land is anticipated.

(d) Noise:

(1) Manufacturing: Impact from noise during XM1147 manufacture is insignificant. All private facilities are expected to comply with Occupational Noise Exposure standards under 29 CFR 1910.95.

(2) Testing: Noise impacts for testing are evaluated at the respective test facility and will not be evaluated in this PEA.

(e) Hazardous Wastes:

(1) Manufacturing: Impact from hazardous wastes during XM1147 manufacture is insignificant. All hazardous wastes are handled and disposed of by accepted methods that meet federal, state and local regulations and cause no significant effect on the environment.

(2) Testing: Hazardous wastes generated during testing as well as the resulting impacts for testing are evaluated at the respective test facility and will not be evaluated in this PEA.

(f) Commitment of Resources/Energy: XM1147 manufacturing operations does not have a significant impact on energy usage.

(g) Areas of Cultural/Archeological Significance: To the best of our knowledge, there is no impact on areas of cultural/archeological significance due to XM1147 manufacture and testing.

(h) Flora and Fauna Factors: Impact on flora and fauna from XM1147 system manufacturing operations is insignificant since XM1147 manufacturing sites are well established.

4.2. Production/Deployment Phase

4.2.1. Description of Activities

The XM1147 program enters this phase after completing the Milestone C (MS C) decision process. Once MS C has been approved, the program will begin Low Rate Initial Production (LRIP) of the XM1147. Once the manufacturing process is mature, the program will undergo the Full Rate Production decision point and will then enter Full Rate Production (FRP) of the XM1147. The projected XM1147 production quantities are listed, below, in Table 4.

Projected XM1147 Yearly Production Quantities			
FY 2021	FY 2022	FY 2023	FY 2024
700	2800	4200	5000

Table 4: Projected XM1147 Yearly Production Quantities

4.2.2. Affected Environments

(a) Affected environments will be air, ground and water at production and test facilities within the U.S. During this phase, testing is generally limited to Lot Acceptance Testing which is conducted at Yuma Proving Ground. The system contractor, Northrop Grumman, is responsible for ensuring that subcontractors comply with all contract requirements concerning the environment. The subcontractors are responsible for the control of hazardous materials used and hazardous wastes generated in accordance with all local, state, and federal environmental laws and regulations. They are also responsible for obtaining all necessary environmental permits and to comply with OSHA regulations. The system contractor and key/major subcontractor manufacturing facilities are listed in Table 3. These facilities are well established and have previously manufactured components similar to those used in the XM1147.

(b) Transportation procedures for XM1147 cartridges from production to storage and/or to testing facilities will be the same as those for currently fielded cartridges and will not impose an environmental hazard. XM1147 cartridges are shipped in palletized PA171 metal containers. Each pallet consists of 25 PA171 containers and each container holds a single cartridge packed in dunnage for a total of 25 XM1147 cartridges per pallet. Storage of XM1147 cartridges will occur at the same locations, i.e. government depots, as currently fielded 120mm cartridges.

4.2.3. Direct and Indirect Environmental Impacts of Activities

(a) Air Quality:

- (1) Manufacturing: Impact on air quality is expected to be minimal. Production processes and equipment in the U.S. to be used for XM1147 have been refined in previous production of components similar to those used in the XM1147 cartridges to minimize impact on air quality.
- (2) Testing: Air Quality impacts for testing are evaluated at the respective test facility and will not be evaluated in this PEA.

(b) Surface/Ground Water:

- (1) Manufacturing: The impact of XM1147 manufacture on water quality is insignificant. Equipment has been installed to collect and pre-treat industrial process waste water at the contractor's facilities, where required, to meet discharge permits for the industrial wastewater treatment plants or municipal wastewater treatment plants. Manufacturers are expected to contain and clean up all accidental spills in compliance with local, state and federal laws.
- (2) Testing: Surface/Ground Water impacts for testing are evaluated at the respective test facility and will not be evaluated in this PEA.

(c) Soil Erosion, Disruption of Wetlands, Farmlands, and Other Lands of Concern: All facilities for manufacturing and testing XM1147 are currently established. No disruption of land is anticipated.

(d) Noise:

- (1) Manufacturing: Impact from noise during XM1147 manufacture is insignificant. All private facilities are expected to comply with Occupational Noise Exposure standards under 29 CFR 1910.95.
- (3) Testing: Noise impacts for testing are evaluated at the respective test facility and will not be evaluated in this PEA.

(e) Hazardous Wastes:

- (1) Manufacturing: Impact from hazardous wastes during XM1147 manufacture is insignificant. All hazardous wastes are handled and disposed of by accepted methods that meet federal, state and local regulations and cause no significant effect on the environment.
- (2) Testing: Noise impacts for testing are evaluated at the respective test facility and will not be evaluated in this PEA.

- (f) Areas of Cultural/Archeological Significance:** To the best of our knowledge, there is no impact on areas of cultural/archeological significance due to XM1147 manufacture and testing. All XM1147 manufacturing and testing sites are well established.
- (g) Flora and Fauna Factors:** Impact on flora and fauna from XM1147 manufacturing and testing is insignificant. All manufacturing and testing sites are well established.

4.3. Operation and Support Phase

4.3.1. Description of Activities

The XM1147 Cartridge is a war reserve cartridge. As such, the XM1147 will not be used in training operations. The XM1147 Cartridge will be stored at depot locations across the United States.

4.3.2. Affected Environments

Affected environments for this phase are the depots where the XM1147 cartridges are stored. Supply, storage, and transportation systems and procedures for the XM1147 cartridges will be the same as for existing 120mm cartridges. XM1147 cartridges will be transported, stored, requisitioned, and handled as Class V materiel. Storage of XM1147 cartridges will occur at the same locations, i.e. government depots and temporary holding areas, as currently fielded 120mm cartridges.

4.3.3. Direct and Indirect Environmental Impacts of Activities

- (a) **Air Quality:** No impact on air quality is expected. These facilities have equipment and processes that have been designed to minimize impact on air quality. Equipment has been installed to utilize alternate processes that reduce or eliminate the use of hazardous materials
- (b) **Surface/Ground Water:** No impact on water quality is expected. Equipment has been installed to collect and pre-treat industrial process waste water at the depot facilities, where required to meet discharge permits for the industrial wastewater treatment plants or municipal wastewater treatment plants. Depots are expected to contain and clean up all accidental spills in compliance with local, state and federal laws
- (c) **Soil Erosion, Disruption of Wetlands, Farmlands, and Other Lands of Concern:** All depot and holding facilities for XM1147 cartridges are currently established. No disruption of land is anticipated.
- (d) **Noise:** No impact from noise during XM1147 transportation and holding area operations is expected. All operations are expected to comply with hearing protection standards of AR 40-5, Preventive Medicine
- (e) **Hazardous Wastes:** In general, storage and handling operations do not generate hazardous waste. However, there is a possibility of damaging rounds in transit. Should this occur, the rounds would be rendered safe and disposed of in accordance with approved methods.
- (f) **Commitment of Resources/Energy:** XM1147 depot and handling areas will not have a significant impact on energy usage.

- (g) Areas of Cultural/Archeological Significance:** To the best of our knowledge there is no impact on areas of cultural/archeological significance due to XM1147 depot and holding area operations. All depot sites are well established.
- (h) Flora and Fauna Factors:** Impact on flora and fauna from XM1147 depot and holding area operations is insignificant.

4.4. Demilitarization/Disposal Phase

The Demilitarization/Disposal Phase will begin when the XM1147 Cartridge is type classified obsolete. The XM1147 cartridges will then be turned in to the Resource Recovery & Disposition Account. Initially, the inventory of cartridges will be offered for foreign military sale or assistance programs. The remaining stocks will then be placed in the demilitarization account.

4.4.1. Description of Activities

XM1147 cartridges will be received and stored at designated demilitarization sites. Upon reception, the cartridges will be inspected both to determine the overall condition as well as the manufacturing information of the items (lot number, place of origin, etc.). The demilitarization process begins with removing XM1147 from its packaging followed by the disassembly of the XM1147 cartridge itself. Energetics will, in order of preference, either be: reused, recycled, sold, burned in an environmentally safe incinerator. Parts contaminated with energetics will either be burned or flashed in an environmentally safe incinerator. The disposition alternatives of the XM1147 non-energetic components and their packaging materials are summarized in Table 5, below.

XM1147 Non-Energetic Materials Disposition		
Item	Material	Disposition
Case Base	Steel	Recycle/Landfill
Fin Boom Assembly	Aluminum	Recycle/Landfill
Warhead Body	Steel	Recycle/Landfill
Windscreen	Aluminum Alloy, Tungsten, Nickel, Iron, Thermoplastic	Resale/Reuse/Recycle
Electronics	Multiple Materials including Lead Solder	Landfill
PA171	Steel, Plastic	Resale/Reuse/Recycle
Dunnage	Steel, Plastic, Foam	Resale/Reuse/Recycle/Landfill
Pallet	Steel	Resale/Reuse/Recycle

Table 5: XM1147 Disposition Alternatives Summary

4.4.2. Affected Environments

Affected environments are those that are dedicated demilitarization sites that operate APE (Ammunition Peculiar Equipment) 1236M2 Deactivation Furnaces. Such sites include McAlester Army Ammunition Plant, Tooele Army Depot, and Lake City Army Ammunition Plant.

4.4.3. Direct and Indirect Environmental Impacts of Activities

Materials and their byproducts resulting from the demilitarization/disposal phase will be recycled or treated at sites dedicated to this type of activity. No significant impact to the local environment is expected from the demilitarization/disposal of XM1147 cartridges. All disposal operations will be covered under approved standard operating procedures and safety procedures. Safety and hazard control plans will be in place at all times during demilitarization/disposal operations.

- (a) **Air Quality:** XM1147 disposal will be carried out within government facilities that are off limits to the general public at all times. After-burner and scrubber systems are part of the current incinerator furnace design to insure all toxic emissions are reduced to an insignificant amount. No other emission points have been identified to date.
- (b) **Surface/Ground Water Quality:** XM1147 demilitarization and disposal will be achieved in accordance with approved procedures at sites and facilities dedicated for this type of activity. The facilities will be designed to contain and pretreat the effluents generated prior to their release to waste treatment plants. No discharge or run-off will result from this phase that could cause physical, chemical or biological perturbations since it is carried out away from bodies of water. Therefore, no environmental impact on water quality will result from the XM1147 disposal.
- (c) **Solid and Hazardous Waste:** Metal parts that have been in contact with explosives will be decontaminated (flushed) and may need to be disposed as solid waste if not sold for recycling. The ash from Contaminated Waste Processors, deactivation furnaces, explosive waste incinerators and associated air scrubbers may be hazardous waste. The ash residue will be analyzed in accordance with Hazardous Waste Regulations 40 CFR (Code of Federal Regulations) 261.24 and the Toxicity Characteristics Leaching Procedure (TCLP) of the Resource Conservation and Recovery Act (RCRA) and will be disposed of in accordance with applicable guidelines. Any hazardous materials that cannot be recovered and resold, such as sump sludge or other explosive contaminated residue materials from demilitarization operations will be disposed of as hazardous waste. Specific disposal procedures could include transportation off-site by a licensed hazardous waste hauler. No significant generation of waste is anticipated.
- (d) **Flora and Fauna:** Disposal is conducted at facilities dedicated to the disposal of ordinance and will thus have no effect on local flora and fauna.
- (e) **Noise:** There is no significant noise produced during XM1147 disposal.

5. CONCLUSIONS

The U.S. Army initiated the XM1147 Program to produce a 120mm cartridge capable of effectively engaging: armor, light armor, massed infantry, and dismounted Anti-Tank Guided Missile (ATGM) teams as well as provide the additional capability to both reduce obstacles and breach walls in support of dismounted infantry.

The XM1147 Program entered the acquisition lifecycle at Milestone B and is currently approaching the Type Classification – Standard decision point. The primary contractor, Northrup Grumman, is responsible for ensuring that subcontractors comply with all contract requirements concerning the environment. Potential environmental impacts for the life cycle of the XM1147 have been evaluated by phases: the Engineering and Manufacturing Development phase, the Production/Deployment phase, the Operation and Support phase, and the Demilitarization/Disposal Phase.

Engineering and evaluation tests were mostly conducted at various test ranges at Yuma Proving Ground, AZ. Additionally, a relatively small amount of tests were conducted at Aberdeen Proving Ground, MD. All of these test facilities and test ranges are well established. The affected environments at these facilities will be air, ground and water. The bulk of the combustion product emissions consist of gases that are naturally abundant in the atmosphere (water, carbon dioxide, nitrogen) and are very similar to those produced by other 120mm cartridges that are already fielded. XM1147 cartridge combustion products will quickly disperse on outdoor test ranges.

No environmental impacts will result from the XM1147 program during training operations as use of these cartridges will be restricted to combat use only. Materials and their by-products resulting from the demilitarization/disposal phase will be recycled or treated at sites dedicated to this type of activity. No significant impact to the local environment is expected from the demilitarization/disposal of XM1147 cartridges.

It was concluded that:

- a. This is not an action that will significantly affect the quality of the human environment.
- b. This action will not have a significant impact on the environment.
- c. This action is not likely to be environmentally controversial.
- d. This action does not require an environmental impact statement.

Given that there is no expected environmental impact, A Finding of No Significant Impact has been prepared as the NEPA document for the XM1147 program and is attached to this PEA.

6. ORGANIZATIONS AND PERSONS CONTACTED

Combat Capabilities Development Command Armaments Center (DEVCOM), Picatinny, NJ:

- Katherine Guarini, Explosives Technology Division, [FCDD-ACM-EW]
- Scott Hamilton, Tank Munitions Engineering Branch [FCDD-ACE-QME]
- Jason Mishock, Line of Sight (LOS) / Beyond Line of Sight (BLOS) Division [FCDD-ACM-ML]

7. REFERENCES

1. 32 Code of Federal Regulations Part 651 “Environmental Analysis of Army Actions; Final Rule”, dated 01 July 2011.

Appendix A

List of Acronyms

Appendix A: List of Acronyms

A

AC	Armaments Center
APE	Ammunition Peculiar Equipment
AR	Army Regulation
ATC	Aberdeen Test Center

C

CCDC	Combat Capabilities Development Command
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMR	Conditional Material Release

D

DEVCOM	Development Command, Combat Capabilities
DOD	Department of Defense
DODI	Department of Defense Instruction
DT	Development Tests
DT&E	Developmental Test and Evaluation

E

EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPCRA	Emergency Planning & Community Right-to-know Act
EPVAT	Electronic Pressure Velocity & Action Time

F

FAAT	First Article Acceptance Testing
FAR	Federal Acquisition Regulation
FAT	First Article Test
FHC	Final Hazard Classification
FMR	Full Material Release
FoNSI	Finding of No Significant Impact
FRP	Full Rate Production
FY	Financial Year

I

ICUZ	Installation Compatible Use Zone
IOT	Initial Operational Test
ISCP	Installation Spill Control Plan

J

JPEO AA	Joint Program Executive Officer Armaments and Ammunition
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L

LAP	Loading, Assembly and Packaging
LAT	Lot Acceptance Test
LFT&E	Live Fire Test and Evaluation
LRIP	Low Rate Initial Production
LUA	Limited User Assessment
LUE	Limited User Evaluation
LUT	Limited User Test

M

MOA	Memorandum Of Agreement
MOPP	Mission Oriented Protective Posture
MS	Milestone
MTP	Master Test Plan

N

NEPA	National Environmental Policy Act
NTC	National Training Center

O

OB/OD	Open Burn/Open Detonate
OCONUS	Outside the Continental United States
ODS	Ozone Depleting Substance
OHG	Offensive Hand Grenade
OPM SW	Office of the Project Manager Soldier Weapons
OSHA	Occupational Safety & Health Administration
OT&E	Operational Test and Evaluation

P

PEO	Program Executive Office
PESHE	Programmatic Environmental Safety and Occupational Health Evaluation
PM	Project Manager
PM CCS	Project Manager Close Combat Systems
POC	Point Of Contact
PPQT	Pre-Production Qualification Test
PQT	Production Qualification Test
POHG	Practice Offensive Hand Grenade
PVT	Production Verification Test

R

RCRA	Resource Conservation and Recovery Act
RDECOM	Research, Development, and Engineering Command
RDT&E	Research, Development, Test and Evaluation
RFP	Request For Proposal

S

SARA	Superfund Amendment and Reauthorization Act
SCS	Soil Conservation Service
SHPO	State Historic Preservation Officer
SMI	Storage Monitoring Inspections
SPCCP	Spill Prevention Control & Countermeasures Plan

T

TC	Type Classify
TCLP	Toxicity Characteristics Leaching Procedure
TDP	Technical Data Package
TSD	Treatment, Storage and Disposal

U

UMR	Urgent Material Release
US	United States
USAPHC	United States Army Public Health Center
UXO	Unexploded Ordinance

Appendix B

Environmental Regulation Synopsis

Appendix B: Environmental Regulation Synopsis

How To Use This Appendix:

This appendix provides a synopsis of U.S. environmental law/protocol/ regulations and how they apply to the XM1147 program.

The major environmental issue in contracting is to ensure that all contractual documents comply with a large number of environmental laws/regulations/protocols. Applicable laws for the XM1147 program are listed here:

Law/Regulation

Synopsis of Applicability to XM1147

Toxic Substance Control Act (TSCA)

Regulates manufacture, import, processing and distribution in commerce, use and disposal of chemical substances. Established a comprehensive inventory of all chemical substances manufactured or processed in the US. EPA is authorized under TSCA to regulate existing and new chemicals if such chemicals are determined to pose an "unreasonable risk" to human health or the environment. Regulatory authority is dependent in part on whether the chemical is new or existing. A chemical is "new" if it is not on the TSCA inventory or if it is an existing chemical for which a new use is being proposed (Significant New Use Rule).

Specific Applicability:

Production sites for components manufactured in the U.S.

Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA)

Sets forth community right-to-know standards for facilities that store, use, process or distribute chemicals.

Specific Applicability:

Storage/test/training/demil sites in U.S. for the XM1147 cartridges. Also, production sites for components manufactured in the U.S.

Superfund Amendment and
Reauthorization Act
(SARA)

Passed by Congress in October 1986 to reauthorize the CERCLA funding provisions described above for hazardous waste dump sites. Also established a nationwide community right-to-know and emergency planning program under Title III of the Act, known as EPCRA (see above discussion).

Specific Applicability:
Storage/test/training/demil sites in U.S. for XM1147 cartridges. Also, production sites for components manufactured in the U.S.

Clean Air Act

Establishes program to control air pollution through emission regulations. Authority to implement has been delegated to the states.

Specific Applicability:
Storage/test/training/demil sites in U.S. for XM1147 cartridges. Also, production sites for components manufactured in the U.S.

Clean Water
Act

Establishes program to control wastewater discharge to the environment through the issuance of National Pollutant Discharge Elimination System (NPDES) permits for "point source" discharges. Includes oil and hazardous substances regulations that govern reporting, prevention and remediation of spills.

Specific Applicability:
Storage/test/training/demil sites in U.S. for XM1147 cartridges. Also, production sites for components manufactured in the U.S.

Water Quality Act of 1987

Adopted revisions and additions to Clean Water Act standards, including greater emphasis on water quality standards for toxics, and stiffer penalties.

Specific Applicability:
Storage/test/training/demil sites in U.S. for XM1147 cartridges. Also, production sites for components manufactured in the U.S.

National Environmental Policy Act	Sets forth requirements for performance of environmental assessments (EA) that address anticipated impacts to the environment and applicable mitigation, including consideration of alternatives.
	Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S. Also directly applicable to systems engineering and Programmatic Environment, Safety and Health Evaluation (PESHE) for the entire the XM1147 Program.
Occupational Safety and Health Act	Sets standards for safe and healthy workplaces.
	Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.
Solid Waste Disposal Act	Sets regulations for handling, transport and disposal of solid (nonhazardous) waste.
	Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.
Resource Conservation and Recovery Act	Empowers EPA to define those wastes that are hazardous, sets regulations on generation of hazardous waste, establishes performance requirements for hazardous waste management units and institutes a permit system for hazardous waste treatment facilities.
	Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.
Safe Drinking Water Act	Sets standards of purity for potable water sources.
	Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.

Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) (CERCLA)

Enacted to remedy uncontrolled releases of contaminants from hazardous waste sites. Intended to address past, present and threatened releases. Three major programs cover release reporting, emergency response, and remedial response. Contains provisions governing determination of who is liable and for seeking reimbursement for emergency/remedial response activities.

Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.

Federal Insecticide, Fungicide, and Rodenticide Act

Governs licensing and registration of pesticide products.

Specific Applicability: No specific applicability to XM1147 cartridge program. Applicable to operations at U.S. storage/test/training/demil sites.

Pollution Prevention Act (PPA)

Establishes a national policy of the US that pollution should be prevented or reduced at the source whenever feasible. Also contains reporting requirements for source reduction processes, recycling processes, amount of chemicals entering the environment and amount of chemicals treated.

Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.

Montreal Protocol to Ban Ozone

Mandates timetable to eliminate production of Ozone Depleting Substances (ODS). Specifically, production of Class 1 ODS cease on 31 December 1995.

National Defense Authorization Act for FY 1993 (ODS restrictions)

Extends specifically to DOD and DOD contractor facilities requirements in the Montreal Protocol to Ban Ozone Depleting Substances. Prohibits appropriation of funds to pay for DOD systems to DOD/DOD contractor facilities that fail to comply with the Montreal Protocol.

DoDI 5000.02 (formerly the Defense Acquisition Guidebook)	Specific Applicability: XM1147 production sites in the U.S.
	Extends NEPA analysis and environmental compliance of proposed actions to cover all DOD acquisition programs. The Project manager shall identify and evaluate system safety and health hazards, define risk levels, and establish a program that manages the probability and severity of all hazards associated with development, use, and disposal of the system.
	Specific Applicability: Applicable to all phases of the XM1147 program, from Material Solution Analysis Phase through Demilitarization/Disposal.
AR 200-1, Environmental Protection	AR 200-1 is the Army's main environmental protection document. AR 200-1 sets forth environmental goals and policies, environmental quality and protection enhancement policies and includes discussion on major Army programs including Army Research & Development, water resources management, air pollution abatement, hazardous materials management, solid/hazardous waste management, noise abatement, asbestos abatement, oil/hazardous substance spill contingency planning/control and emergency response and radon reduction.
	Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.
AR 200-2, Environmental Effects of Army Actions	Provides format guidance and requirements for preparation of Environmental Assessment (EA) and provides a list of Categorical Exclusions from the EA documentation requirements.
	Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.
AR 420-47, Solid and Hazardous Waste Management	Sets forth Army requirements for actions to comply with RCRA, SARA, and CERCLA.
	Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.

AR 420-40, Historical Preservation

Sets forth Army requirements for actions to preserve historical sites at Army installations.

Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.

AR 420-76, Pest Management and DOD Directive 4150.7, DOD Pest Management Program

Sets forth Army requirements for actions to comply with the Federal Insecticide, Fungicide, and Rodenticide Act (see above).

Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.

Executive Order 11990, Protection of Wetlands

Sets forth a policy for compliance with all applicable wetlands protection regulations at Federal facilities.

Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.

Executive Order 11988, Floodplain Management

Sets forth a policy for compliance with all applicable floodplain protection and management regulations at Federal facilities.

DOD Directive 4210.15, Hazardous Material Pollution Prevention

Sets forth an instruction and policy for hazardous materials management by the implementation of pollution prevention at DOD facilities.

Specific Applicability: XM1147 cartridge production/storage/test/training/demil sites in the U.S.

Executive Order 13148, Greening The Government Through Leadership in Environmental Management

Sets forth requirements and goals for a 10% reduction Annually, or 40% overall by December 31, 2006, of reported Toxic Release Inventory releases and off-site transfers of toxic chemicals for treatment and disposal.

Pollution Prevention Requirements

Specific Applicability: U.S. Government Owned production/storage/test/training/demil facilities (including operations involving XM1147 cartridges).

Federal Facilities Compliance
Act

The Federal Facilities Compliance Act extends the breadth of authority of the applicable environmental regulations (especially RCRA, SARA, and CERCLA) and provisions for fines and incarceration to Federal facilities. That is, Federal facilities are no longer able to declare sovereign immunity to lawsuits arising from environmental deficiencies.

Specific Applicability: XM1147 cartridge
production/storage/test/training/demil sites in the U.S.

FINDING OF NO SIGNIFICANT IMPACT

1. Project Identification: 120mm Advanced Multi-Purpose (AMP) XM1147 High Explosive Multi-Purpose with Tracer (HEMP-T) Cartridge Program

2. Description of Proposed Action:

This action involves all phases of the XM1147 program, from system design and development to demilitarization and disposal.

The U.S. Army initiated the XM1147 Program to produce a 120mm cartridge capable of effectively engaging: armor, light armor, massed infantry, and dismounted Anti-Tank Guided Missile (ATGM) teams as well as provide the additional capability to both reduce obstacles and breach walls in support of dismounted infantry.

3. Discussion of Anticipated Environmental Effects:

A Programmatic Environmental Assessment (PEA) was prepared to investigate impacts of the XM1147 during system design and development, production, testing, deployment, and demilitarization & disposal, and is summarized as follows:

- a. Affected environments will be air, ground and water at production, test and training facilities within the U.S. The system contractor, Northrup Grumman, is responsible for ensuring that subcontractors comply with all contract requirements concerning the environment. The subcontractors are responsible for controlling hazardous materials used and hazardous wastes generated in accordance with all local, state, and federal environmental laws and regulations. They are also responsible to obtain all necessary environmental permits and to comply with OSHA regulations. U.S. Army test facilities are required to conduct NEPA analyses for their respective XM1147 activities and are, thus, not covered in the XM1147 PEA.
- b. The impact on air quality from manufacturing XM1147 will be insignificant because pollution control equipment is installed in the manufacturing facilities to meet federal, state, and local air quality regulations. The components are manufactured in facilities that are well established and have the required air emission permits.
- c. Water quality is not expected to be significantly impacted by XM1147 activities at manufacturing sites. Where necessary, equipment has been installed to collect and pre-treat industrial process wastewater at the contractors' plants to meet permit requirements.
- d. Solid wastes generated during manufacturing of the XM1147 are expected to be either recovered and recycled or disposed of in accordance with existing environmental regulations.

- e. Hazardous materials used in the manufacture of components, and in the loading, assembling, and packaging of the XM1147 were the best available and pose no significant hazard while the cartridges are in storage or use. All hazardous wastes generated by the manufacturers are expected to be collected, stored, treated, and disposed of by methods that meet federal, state, and local regulations and cause no significant effect on the environment.
- f. Noise levels will be consistent with site specific requirements of manufacturing facilities. They will pose no threat to the quality of the environment.
- g. The XM1147 will only be used in combat operations. Should it be later decided to use the XM1147 in training operations, each proposed training site will need to perform their own environmental assessment in order to evaluate the potential environmental impacts.
- h. Demilitarization and disposal will be accomplished using resource recovery and recycling to the maximum extent possible. All remaining components will be disposed of in accordance with local, state, and federal law & regulations.

4. Conclusions:

Based on preparation of the PEA, the proposed XM1147 Program will not significantly impact the environment. The following determinations for this program are noted:

- a. It is not an action that will significantly affect the quality of the human environment.
- b. It will not have a significant impact on the environment.
- c. It is not likely to be environmentally controversial.
- d. It does not require an environmental impact statement.

5. Point of Contact (POC) for Public Comments:

Project Manager
Maneuver Ammunition Systems
ATTN: SFAE-AA-MAS (Ms. KATHERINE GUARINI),

By Email: usarmy.pica.ccdc-ac.mbx.picatinny-public-affairs@mail.mil

By Phone: 973-724-6364 [Picatinny Public Affairs Office]

6. Public Comment Period:

Comments regarding these findings should be forwarded to the POC within thirty (30) days of public notification.