Draft Final
Environmental Assessment

Construction and Operation of an Outdoor Firing Range (G-2 Area) at Picatinny Arsenal

Submitted to:

U.S. Department of the Army
ARDEC
Picatinny Arsenal, New Jersey, 07806-5000

Purchase Order Number: W15QKN-04-M-0235
Submitted by:

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August 2005

SIGNATURES AND APPROVAL

ENVIRONMENTAL ASSESSMENT
CONSTRUCTION AND OPERATION OF AN OUTDOOR FIRING RANGE (G-2 AREA)

U.S. Department of the Army
U.S. Army Armament Research, Development, and Engineering Center
(ARDEC)
Picatinny Arsenal, New Jersey 07806-5000

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SIGNATURES AND APPROVAL (CONTINUED)

ENVIRONMENTAL ASSESSMENT
CONSTRUCTION AND OPERATION OF AN OUTDOOR FIRING RANGE (G-2 AREA)

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EXECUTIVE SUMMARY

(a) Lead Agency and Location: U.S. Department of the Army (U.S. Army), Picatinny Arsenal, Rockaway Township, New Jersey (NJ)

(b) Proposed Action: To construct a full-scale, environmentally friendly test bed, outdoor small arms live firing range at Picatinny's G-2 area, just south of Lake Denmark, off Lake Denmark Road.

(c) Responsible Officials: LTC Kerry T. Skelton, Garrison Commander
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The Rangesafe Technology Demonstration Initiative (RTDI) based at Picatinny Arsenal has successfully conducted environmental technology demonstrations on existing firing ranges throughout the United States. The U.S. Army proposes to build upon this work and enhance its capability to conduct testing of new gun range technologies by establishing an environmentally friendly outdoor firing range at Picatinny Arsenal that will function as a range technologies test bed. Construction of such a range technologies test bed will enable the detailed study and demonstration of improved technologies, management practices and provide a long-term demonstration site for observing technologies and practices in action. Such new and improved technologies will include novel bullet impact media, methods for berm soil storm water runoff treatment and maintenance strategies for bullet recovery and recycling at an active range. The need for a range technologies test bed has been confirmed by scientists from the U.S. Army Corps of Engineers (USACE), Engineer Research and Development Center (ERDC) laboratories in Vicksburg, MS and Hanover, NH.

In addition to providing the Army with the ability to evaluate new range technologies, the outdoor firing range will also serve as the development platform for new training practices for the Picatinny Arsenal Homeland Defense Training and Technology Test bed (T3). This will allow the opportunity to observe training practices at all levels of government, including Picatinny Arsenal and other federal agencies as well as, state, county and local governments, involving military, law enforcement and first responders.

The U.S. Army tasked Tetra Tech EM Inc. (Tetra Tech) to conduct an environmental assessment (EA) at Picatinny Arsenal for the construction and operation of an environmentally friendly outdoor firing range in the G-2 area. The proposed action includes the construction, operation, and maintenance of an environmentally friendly outdoor firing range within the G-2 area of Picatinny Arsenal that will function as a range technologies test bed and the development platform for new training practices.

The proposed facility would be constructed in an existing, disturbed area where former site operations and recent unexploded ordnance (UXO) clearance activities have occurred. This area is currently classified as an inactive range according to the December 2003 Closed, Transferred, and Transferred Range/Site Inventory Report. The proposed action includes the construction of a firing range with a firing line to target distance of 25 yards. The range would contain 21 five-foot wide firing lanes. The firing line is anticipated to be a stationary target at a fixed 25-yard line. The firing range would contain all pistol calibers, up to and including .44 magnum, military 5.56 millimeter (mm) rifle ammunition and 12-gauge shotgun slugs with minimal bullet fragmentation or ricochet potential.

The baseline design for the firing range is a Kirtland Air Force Base (AFB) design, verified by the U.S. Army-wide ricochet competency experts located at U.S. Army Armament Research, Development and Engineering Center (ARDEC) as a safe design for the proposed activities. The design is intended to allow qualification at 25 yards. This proposed outdoor firing range would only operate during daytime hours.

In accordance with the U.S. Environmental Protection Agency's (EPA) Best Management Practices (BMPs) for Lead at Outdoor Shooting Ranges, BMPs would be incorporated into the proposed facility construction. These include installing vegetative ground cover, a liner beneath the impact berm and filter beds; ground contouring; and the use of an earthen backstop. The BMPs would inhibit lead migration, control and contain bullets and help in removing and recycling the lead generated from facility operations. Several safety and environmental components included in the proposed action's design minimize the potential for projectiles to exit the firing range and for lead and other metals to impact the environment.

This EA was prepared to evaluate the potential impacts of the proposed action and the no-action alternative on human health and the environment. It includes an analysis of potential impacts, based on the use of regulatory standards that are protective of both human health and the environment, to determine both necessary design elements of the range and when adaptive management actions would be triggered during operation and maintenance.

Potentially impacted resources include air quality; soil and geology; water; biological, and cultural and archeological resources; the socio-economic environment; recreation; transportation and traffic patterns; and hazardous materials and conditions.

The proposed action would result in direct, permanent and major beneficial impacts to the socio-economic environment by providing the U.S. Army with a much-needed, environmentally friendly outdoor firing range and a means to evaluate new and promising technologies related to "green ranges." It also would provide a training and qualification facility for military and outside law enforcement.

The proposed action may cause minor adverse impacts to several resources at the proposed site, but those impacts would be further reduced through the implementation of a variety of BMPs incorporated into the design and construction of the range and included in the adaptive management measures that would be implemented as needed during operation. For example, although the noise modeling performed by the US Army CHPPM indicated that noise impacts would be minor, provisions are still included for conducting additional noise contour modeling and a noise test after the range is built. If required, based on the results of the noise test, additional noise abatement equipment would be installed as an adaptive management measure. This redundant approach to minimizing impacts to the extent possible assures compliance with New Jersey regulations and the US Army Noise Abatement Program.

In terms of impacts to human health and the environment, built-in range design features, standard operating procedures and implementation of adaptive management measures will ensure that there are no appreciable impacts to human health and the environment associated with lead and other constituents associated with operation of the range. The range would be constructed and operated as an environmentally-friendly, state-of-the-art facility, maintained to manage any potential adverse impacts. Environmental compliance monitoring will be conducted during operation of the range. If contaminants above regulatory levels are detected during monitoring activities, they would be remediated in compliance with applicable regulations to protect human health and the environment. Health risk-based soil cleanup criteria are used to determine when remedial action would be necessary, as established by the State of New Jersey. Collectively, the BMPs, engineering controls, compliance monitoring and adhering to health risk-based regulatory criteria ensure that construction or operation of the proposed firing range will not result in major or moderate adverse impacts to human health or the environment.

The conclusion of no significant impact is predicated upon implementation of the BMPs, mitigation and adaptive management measures during construction and operation of the range. Collectively, the BMPs, mitigation and adaptive management measures to be implemented have been identified as Environmental Protection Provisions (Appendix F) in this EA. These Environmental Protection Provisions include safety, measures to prevent lead migration, measures that are protective of soil, surface water and

groundwater and environmental monitoring. The additional environmental documentation required to be prepared for this project prior to construction and operation, as identified in Appendix F, further details and specifies procedures for implementation of the Environmental Protection Provisions, thus ensuring that the proposed outdoor firing range can be constructed and operated in a manner that is protective of human health and the environment. The most relevant Environmental Protection Provisions are summarized below.

Safety

- Perform construction and operation activities in accordance with an approved Health and Safety Plan in accordance with OSHA, U.S. Department of Labor, as well as any other Federal, State or local applicable statutes or regulations.
- Install firing line cover for projectile containment and noise abatement.
- Install continuous modular concrete sidewalls and an overhead replaceable baffle system
- Install safety and security measures (posting signs, red flag warning system, etc.).
- Establish and maintain a no hunting buffer zone extending a minimum 100yds around the entire facility.

Noise

- Install earthen impact berm that will attenuate sound.
- Conduct a noise test during the initial startup period of the range to determine noise levels at the closest off-post residence and public meeting place.
- Implement additional noise abatement measures, if warranted, to further attenuate sound thereby ensuring the noise levels do not exceed the New Jersey regulated noise level and/or comply with the U.S. Army's Environmental Noise Abatement Program. Such measures include, but are not limited to back berms, sand bags, acoustical coatings on sidewalls, baffles and the firing line cover, insulation and sound boxes and tubes.

Prevention of Lead Migration

- Install vegetative cover, a liner beneath the impact berm and filter beds, use ground contouring and use an earthen backstop as prevention measures.
- Install an engineered system to collect and treat stormwater runoff and water that percolates through the surface soils in the vicinity of the berm.
- Conduct pretreatment of effluent to remove lead to below applicable regulatory levels that are protective of human health and the environment prior to discharge.
- Collect and analyze samples of the effluent discharge water stored in the treated water holding tank prior to discharge to ensure effluent is below applicable regulatory levels and safe to discharge; include option (as contingency plan) for disposal of the water if effluent is not below the applicable regulatory level.

Protection of Soils

- Prior to construction, collect and analyze samples of the surface soils and subsurface soils to establish background concentrations of lead and other metals in the footprint of the range and parking area.
- During construction, implement environmental protection measures (e.g. liner, filter beds) to inhibit lead and other metals from migrating to soils beyond the impact berm area.
- Physically remove and recycle lead/projectiles from the impact berm during operation of the range to minimize projectile fragmentation and leaching of lead.

- Physically remove lead/projectiles from the range floor and apply lime to maintain soil pH at a range of 6.5 to 8.5 to reduce leaching potential.
- During operation of the range, collect and analyze samples of surface soil from the range floor (away from the impact area that is protected by liner) to ensure operation of the range is protective of human health and the environment.
- Implement site investigation/remedial actions in accordance with the NJDEP Technical Requirements for Site Remediation (TRSR) if results of samples collected from the range floor exceed the NJDEP current health-based Non Residential Direct Contact Soil Cleanup Criteria (NRDCSCC).

Protection of Surface and Ground Waters

- Prior to construction, collect and analyze samples of the groundwater to establish background concentrations of lead and other metals in the project area.
- Prior to construction, install two groundwater monitoring wells in accordance with N.J.S.A. 58:4 to monitor potential discharges to groundwater upgradient and downgradient of the range. Alternatively, evaluate existing well system to determine if these wells are adequate to monitor potential discharges.
- During construction, install stormwater control measures and follow BMPs to minimize sediment loads in stormwater runoff.
- During construction, implement BMPs and collect and treat runoff water during operation to inhibit lead and other metals from impacting the groundwater.
- Obtain approval (and applicable permit) from NJDEP including establishing effluent discharge monitoring and sampling to ensure operation of the range is protective of human health and the environment.
- Monitor treated effluent through sampling and analyses to ensure operation of the range is protective of human health and the environment.
- Monitor groundwater through sampling and analyses to ensure operation of the range is protective of human health and the environment.
- Implement site investigation/remedial actions in accordance with the NJDEP TRSR if results of samples collected from the groundwater monitoring wells exceed the NJDEP current health-based Ground Water Quality Standards (GWQS)

Environmental Monitoring

Environmental Monitoring includes sampling to be performed prior to construction to establish background levels in soils and groundwater and sampling to be performed during operation of the range to ensure the range is operated in a manner that is protective of human health and the environment. Environmental monitoring to be performed during operation of the range includes:

1. Surface soil samples from range floor (compliance monitoring)
2. Treatment train influent water samples (performance monitoring)
3. Treatment train effluent water samples (performance and compliance monitoring)
4. Groundwater samples from groundwater monitoring wells (compliance monitoring)

Based on the analyses presented in this EA and information provided by all consulted personnel, the proposed activities would have minor to no adverse impacts to the resources examined. Therefore, the preparation of an environmental impact statement (EIS) is not warranted at this time. This decision would be documented through a finding of no significant impact (FNSI).

ACRONYM LIST

AAQS	Ambient Air Quality Standards
ACM	Asbestos-containing materials
ADNL	A-weighted day night sound level
AFB	Air Force Base
AHPA	Archeological and Historic Preservation Act
ANSI	American National Standards Institute
AR	U.S. Army Regulation
ARDEC	Armament Research, Development, and Engineering Center
ASTM	American Society for Testing and Materials
bgs	below ground surface
BMP	Best Management Practice
BNA	Base neutral/acid extractable compounds
Btu	British Thermal Units
C1	Category One
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CHPPM	Center for Health Promotion and Preventive Medicine
CO	Carbon monoxide
COC	Contaminant of Concern
CRM	Cultural Resource Manager
CWA	Clean Water Act
DA	Department of the Army
dB	Decibel
dBA	A-Weighted decibels
DoD	U.S. Department of Defense
EA	Environmental Assessment
EAO	Environmental Affairs Office
EDR	Environmental Data Resources, Inc.
EIS	Environmental impact statement
EPA	U.S. Environmental Protection Agency
ERDC	Engineer Research and Development Center
ESA	Endangered Species Act
EUL	Enhanced-Use Leasing
FICUN	Federal Interagency Committee on Urban Noise
FNSI	Finding of No Significant Impact
FS	Feasibility Study
FW2-NT	Freshwater 2 – Trout Production
FWPCA	Federal Water Pollution Control Act
HHRA	Human Health Risk Assessment
ICRMP	Integrated Cultural Resource Management Plan
ICUZ	Installation Compatible Use Zone
IH	Industrial Hygiene
INRMP	Integrated Natural Resource Management Plan
ISAL	Industrial Soil Action Levels
ISC	Installation Spill Contingency
JCI	Johnson Control, Inc.
KCS	Known Contaminated Site
LAER	Lowest achievable emission rate
L_{dn}	Day-night sound level
LOC	Levels of Concern
$\mu g/m^3$	micrograms per cubic meter
MCL	Maximum Contaminant Levels
Mm	Millimeter
MMBtu/hr	Million British Thermal Units per hour
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
NCTIP	National Center For Transportation and Industrial Productivity
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NRHP	Natural Register of Historic Places
N.J.A.C.	New Jersey Administrative Code
NJ	New Jersey
NJAAQS	New Jersey Ambient Air Quality Standards
NJDEP	New Jersey Department of Environmental Protection
NJPDES	New Jersey Pollutant Discharge Elimination System
NJ SHPO	New Jersey State Historic Preservation Office
NNSR	Non-Attainment New Source Review
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NRDCSCC	Non-Residential Direct Contact Soil Cleanup Criteria
NTNCWS	Non-transient, non-community water system
O_3	Ozone
OB/OD	Open Burning/Open Detonation
OSHA	Occupational Safety and Health Act
PAH	Polycyclic Aromatic Hydrocarbons
PAM	Pamphlet
Pb	Lead
PCB	Polychlorinated Biphenyls
PCi/L	Picocuries per liter
PM	Particulate Matter
PM_{10}	Particulate matter (equal to 10 microns in diameter)
$PM_{2.5}$	Particulate matter (equal to 2.5 microns in diameter)
ppm	parts per million
PSD	Prevention of Significant Deterioration
PWS	Public Water System
Q/D Arc	Quality-Distance Arc
RBC	Risk-based criteria
RCRA	Resource Conservation and Recovery Act
RDCSCC	Residential Direct Contact Soil Cleanup Criteria
RI	Remedial investigation
RTDI	Rangesafe Technology Demonstration Initiative
SESC	Soil Erosion and Sediment Control
SHPO	State Historic Preservation Office
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
sq. ft.	Square Feet
SMP	Soil Management Plan
SVOC	Semivolatile Organic Compounds
T3	Picatinny Homeland Defense Training and Technology Test Bed
Tetra Tech	Tetra Tech EM Inc.
T&E	Threatened and Endangered
TPH	Total Petroleum Hydrocarbons
TPY	Tons Per Year
TSP	Total Suspended Particulates
U.S. Army	U.S. Department of the Army

U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
VOC	Volatile Organic Compounds

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1.0 INTRODUCTION AND PURPOSE

The U.S. Army (U.S. Army) tasked Tetra Tech EM, Inc. (Tetra Tech) to prepare this environmental assessment (EA) for the proposed construction, operation, and maintenance of an environmentally friendly outdoor firing range within the G-2 area of Picatinny Arsenal for the U.S. Army Picatinny Arsenal installation in Rockaway Township, Morris County, New Jersey (NJ). Picatinny Arsenal is residence to the Armament Research, Development, and Engineering Center (ARDEC) and houses several other U.S. Department of Defense (DoD) tenant organizations and numerous private contractors.

This EA was prepared in accordance with the requirements of the various federal, state and local statutes, including but not limited to the following:

- National Environmental Policy Act of 1969 (NEPA) as amended,(42 CFR, 1970);
- Council on Environmental Quality (CEQ) Regulations for Implementing NEPA , (40 CFR, 1984);
- Environmental Analysis of Army Actions: Final Rule, (32 CFR, 2002);
- U.S. Army Regulation (AR) 200-1, *Environmental Protection and Enhancement* (U.S. Army, 2002a);
- U.S. AR 200-3, *Natural Resources – Land, Forest, and Wildlife Management* (U.S. Army, 1995);
- U.S. AR 200-4, *Cultural Resource Management* (U.S. Army, 1998a);
- Federal Water Pollution Control Act Amendment of 1972 (Clean Water Act), as amended (EPA, 2002);
- New Jersey Department of Environmental Protection (NJDEP) site cleanup, air quality and wetlands guidance and regulations, including the Technical Requirements for Site Remediation (NJDEP, 2003a)
- New Jersey State Historical Preservation Office (NJ SHPO) guidance and regulations, including but not limited to compliance with the National Historic Preservation Act (NHPA) of 1966 as amended (NPS, 2000), and the Archeological and Historic Preservation Act (AHPA) as amended (NPS, 1974).

In addition, the EA was prepared using various guidance for firing ranges including the U.S. Environmental Protection Agency Best Management Practices (BMPs) for Lead at Outdoor Shooting Ranges (EPA, 2001) and U.S. AR 385-63 (U.S. Army, 2003a) and Pamphlet (PAM) 385-63 (U.S. Army, 2003b).

The following subsections provide a description of and location information for the proposed action; describe the purpose, need, and objective of the proposed action; present decisions to be made and the scope of the analysis to be conducted; and present applicable statutes, regulations and guidelines for the proposed action.

1.1 DESCRIPTION AND LOCATION OF THE PROPOSED ACTION

The proposed action includes the construction, operation, and maintenance of an environmentally friendly outdoor firing range within the G-2 area of Picatinny Arsenal that will function as a range technologies test bed and the development platform for new training practices. The G-2 area is located on the east side of Picatinny Arsenal, off Lake Denmark Road (see Figure 1, Site Location Map and Figure 2, Project Area Site Plan). Former uses at the G-2 Area include a drop tower test facility for shipping containers, flare tests in the early 1980s and more recently, training for anti-mech/defensive combat and offensive combat and helicopter operations. The project area, where the proposed outdoor firing range would be constructed, is located within the G-2 Area and is presently an inactive, disturbed parcel of land classified as an inactive range. The proposed action includes constructing and operating a range with a firing line to target distance of 25 yards. It would contain 21, five-foot-wide lanes of fire. The range would accommodate all pistol calibers, up to and including .44 magnum, military 5.56-millimeter (mm) rifle

ammunition, and 12-gauge shotgun slugs with minimal bullet fragmentation or ricochet potential. The range construction would include continuous modular concrete sidewalls along its length and overhead baffles to contain any ricochet of fired materials. A gravel parking facility would be constructed adjacent to the existing access road to accommodate a maximum of 24 vehicles. The range would be equipped with engineered systems to prevent lead and other metals from migrating in stormwater runoff, therefore preventing impacts to downstream surface water or the underlying groundwater. The proposed action is discussed in more detail in Section 2.1 of this report.

1.2 PURPOSE, NEED AND OBJECTIVE OF THE PROPOSED ACTION

The purpose of the proposed action is to construct and operate an environmentally friendly outdoor firing range within the G-2 area of Picatinny Arsenal that will function as a range technologies test bed and the development platform for new training practices. This outdoor firing range will build upon the successes of the environmental technology demonstrations on existing firing ranges throughout the United States performed by the Rangesafe Technology Demonstration Initiative (RTDI) program which is based at Picatinny Arsenal. The U.S. Army proposes to build upon this work and enhance its capability to conduct thorough testing of new gun range technologies by establishing a range technologies test bed. Construction of such a range technologies test bed will enable the detailed study and demonstration of improved technologies, management practices and provide a long-term demonstration site for observing technologies and practices in action. Such new and improved technologies will include novel bullet impact media, methods for berm soil storm water runoff treatment and maintenance strategies for bullet recovery and recycling at an active range. The need for a range technologies test bed has been confirmed by scientists from the U.S. Army Corps of Engineers (USACE), Engineer Research and Development Center (ERDC) laboratories in Vicksburg, MS and Hanover, NH.

In addition to providing the Army with the ability to evaluate new range technologies, the outdoor firing range will also serve as the development platform for new training practices for the Picatinny Arsenal Homeland Defense Training and Technology Test bed (T3). This will allow the opportunity to observe training practices at all levels of government, including Picatinny Arsenal and other federal agencies as well as, state, county and local governments, involving military, law enforcement and first responders.

The outdoor firing range will provide the Army with the needed capability to examine the performance of environmental technologies in a controlled environment, while the range is being subjected to real-life training and qualification use. The outdoor firing range will serve as a real-life training environment for the testing of new armament technologies.

1.3 DECISIONS TO BE MADE AND SCOPE OF THE ANALYSIS TO BE CONDUCTED

This EA supports the U.S. Army's decision-making process related to the proposed action in accordance with the requirements of NEPA and applicable U.S. Army regulations. It summarizes findings determining whether the environmental impacts that could result from implementing the proposed action are either not significant, with minor to no adverse impact, thereby warranting the U.S. Army to prepare a finding of no significant impact (FNSI) for the proposed action; or a finding of significant adverse impact, thereby warranting an additional level of NEPA analysis in the form of an environmental impact statement (EIS).

The scope of the EA evaluates impacts to the natural, man-made and social environments that may result from the proposed action. The scope of the analysis set forth in this EA is defined by the potential range of environmental impacts that could result from implementing the proposed action and no-action alternatives. In addition to the considerations related to NEPA and applicable regulations, the U.S. Army must consider the military mission and natural resource management goals of the installation.

1.4 STATUTORY BASIS AND COMPLIANCE WITH APPLICABLE STATUTES, REGULATIONS AND GUIDELINES

In addition to fulfilling the requirements of NEPA, its associated regulations and the regulations of the U.S. Army, this EA complies with applicable environmental, natural and cultural resource statutes, regulations and guidelines. These may require permits, approvals, consultations with outside agencies or implementation of adaptive management measures. These considerations are included in the analyses discussed in this EA.

1.5 PERMITS, LICENSES AND OTHER DOCUMENTS NECESSARY TO IMPLEMENT THE PROPOSED ACTION

Prior to construction and operation of the proposed outdoor firing range facility, various permits and management plans are necessary. In addition, standard operating procedures (SOPs) are required to be followed during construction or operation. These permits, plans and documents are further described in applicable sections of this report and include

- Modification to Picatinny Arsenal Title V Operating Permits
- Well Drilling Permit for new monitoring wells
- Design Plans for the Engineered System to remove lead
- Permit to discharge treated water; may include New Jersey Pollutant Discharge Elimination System (NJPDES) Permit or amendment to the existing PICA Stormwater Permit
- Soil Erosion and Sediment Control Plan, to be submitted to the EAO for approval
- Soil Management Plan
- Public Complex Stormwater General Permit
- Sample and Analyses Plan for compliance monitoring, performance monitoring and establishing background concentrations in soil and groundwater
- Range Operations Manual
- Health and Safety Plans for construction and operation

Picatinny Arsenal Soil Management SOP and SOPs outlined in Section 5.10 of the 2003-2008 ICRMP (SOP #1 through #12, as applicable)

- Implementation of Environmental Protection Provisions and mitigative measures as outlined in Appendix F.

2.0 ALTERNATIVES

This section of the EA provides a detailed description of the alternatives considered, including the preferred alternative (proposed action), no-action alternative and alternatives considered but not carried forward for additional analysis and evaluation. The main selection criteria used to formulate the alternatives and determine a suitable location for the proposed action include the following:

1. Security and access: Locate the facility such that it would be accessible from a public road. By making the facility accessible from a public road, outside agency users would be allowed access without compromising the security of operations in the main portion of the installation.

2. Environmental impact: Locate the facility in an abandoned, previously disturbed or developed area that minimizes impacts to the environment. The site should be ideally bordered by dense vegetation that can naturally attenuate sound.

3. Beneficial reuse: Locate the facility in an area already developed, preferably not currently in-use and easily accessible for future users.

4. Existing roads and infrastructure: Locate the facility in an area that can maximize use of existing roads within Picatinny Arsenal.

2.1 PREFERRED ALTERNATIVE

The proposed action includes the construction, operation, and maintenance of an environmentally friendly outdoor firing range within the G-2 area of Picatinny Arsenal that will function as a range technologies test bed and the development platform for new training practices. The proposed facility would be constructed in an existing, disturbed section of the G-2 area where former site operations and recent unexploded ordnance (UXO) clearance activities have occurred. The proposed action includes the construction and operation of a firing range with a firing line to target distance of 25 yards. The proposed firing range would contain 21, five-foot-wide firing lanes. The firing line is anticipated to be a stationary target at a fixed 25-yard line. The target can be positioned at closer distances through the use of movable target stands. The firing range would contain all pistol calibers, including .44 magnum, military 5.56 mm rifle ammunition, 12-gauge shotgun slugs and shot with minimal bullet fragmentation or ricochet potential. The baseline design for the firing range is a Kirtland Air Force Base (AFB) design, verified by the U.S. Army-wide ricochet competency expert, Mr. Ernesto Vazquez, located at ARDEC as a safe design for the proposed activities. Kirtland gun range models are included in Attachment 1.

In accordance with EPA's BMPs for Lead at Outdoor Shooting Ranges (EPA, 2001), BMPs have been incorporated into the design of the proposed facility. These include installing vegetative ground cover and filter beds, ground contouring and the use of an earthen backstop. The BMPs would help prevent lead migration, control and contain bullets and help in removing and recycling the lead generated from facility operations. Several safety and environmental components would be included in the range construction to minimize the potential for projectiles exiting the range and inhibit lead and other metals from impacting the environment. Proposed construction, safety and environmental protection measures and anticipated operation and maintenance activities include the following:

- Performing earthwork (cut and fill) for general grading and construction of an impact berm. The maximum cut depth is estimated at four feet below existing grade. Excavated material is to be used at the site for impact berm and site grading.
- Excavating bedrock outcropping approximately 8.5 feet vertically and 12.5 feet horizontally into the base of the rock. Bedrock material would be used for landscaping at the site, outside the range area.
- Installing foundations for concrete side berms and baffle footings.
- Installing continuous modular concrete sidewalls and an overhead steel baffle system for projectile containment.
- Installing and leveling gravel for a parking area that would accommodate up to 24 vehicles.
- Resurfacing (sealing) the existing access road.
- Constructing a firing line cover for projectile containment and noise abatement.
- Installing an engineered system to collect and treat stormwater runoff and water that percolates through the surface soils in the vicinity of the berm to inhibit the migration and potential impacts of lead and other metals to downstream surface waters and the underlying groundwater.
- Installing groundwater monitoring wells to monitor lead and other metal concentrations in groundwater upgradient and downgradient of the range.
- Collecting and analyzing samples of groundwater and treated stormwater for compliance monitoring.
- Collecting and analyzing samples of surface soil for compliance monitoring.
- Installing appropriate safety and security measures to include posting signs, implementing a red flag warning system and installing separate lock mechanisms at the entrance gate to prevent unauthorized access.

The earthwork would entail cutting into the existing slope, grading to level, sloping the range in accordance with the design specifications and filling the impact berm. Net fill is anticipated to be necessary during earthwork; therefore, no soil is anticipated to require off-site disposal.

The risk of projectiles leaving the confines of the range would be mitigated by the use of an overhead steel baffle system and concrete sidewalls. The steel baffles would intercept the angles of fire from the firing line, thereby causing the projectiles to ricochet back down into the range and prevent any projectiles from leaving the range and impacting the surrounding environment. The concrete sidewalls would prevent projectiles from leaving the sides of the range. An additional benefit of the concrete sidewalls is that the footprint for the range is greatly reduced, thereby eliminating the need for large earthen berms.

A level, gravel-covered parking area would be constructed near the access road within the western section of the G-2 area to accommodate 24 vehicles. The existing access road to the G-2 area, off Lake Denmark Road, would be resurfaced, but not widened. The existing road is partially paved with patches of gravel in areas where repairs have been performed. The resurfacing would consist of placement of an asphalt topcoat/sealer over the road surface. The existing road surface would not be disrupted by scarification during the resurfacing. No utility (water, electrical, or sewer) improvements are planned for the facility. The range would operate during daylight hours only, with operations starting no sooner than 0700 for noise ordinance compliance. No lighting would be installed. A portable latrine would be provided for the users of the facility and routinely serviced.

Stormwater in areas near the impact berm would be directed into the engineered system as discussed below. Stormwater from other areas would be managed by surface grading and drainage in accordance with the soil erosion and sediment control (SESC) plan and applicable landscaping plans. The SESC plan must be routed through the Picatinny Arsenal Environmental Affairs Office (EAO) prior to submitting to the Morris County Soil Conservation District. Drainage would be directed away from the small wetlands located southwest of the area. Landscaping plans would include revegetation of the disturbed areas within and immediately surrounding the proposed project area.

In addition, the state has requested that a Stormwater Management Plan (SMP) be in place for the proposed facility, which would become a part of Picatinny's Stormwater Pollution Prevention Plan. This information would be incorporated into the documentation for the facility-wide stormwater permit. The EAO would prepare the SMP using information supplied by the proponent. This information is to include BMPs and additional controls to reduce or prevent contamination at the site, to include an annual inspection of the range and training to be provided to the proponents by the environmental training contractor.

The range would include an engineered system to collect and treat runoff water and water that percolates through the surface soils in the vicinity of the berm to inhibit lead and other metals from impacting downstream surface waters and underlying groundwater. This passive treatment system utilizes Metsorb, a proprietary innovative technology for metals adsorption developed by Stevens Institute of Technology and Hydroglobe and tested at Fort Dix, New Jersey. Figure 3 is a schematic diagram of the storm water management and engineered treatment system.

Impermeable barriers would be placed beneath and in front of the impact berm to capture any water that percolates through the soil, directing it to a lined drainage trench. The drainage trench would be located at the base of the impact berm and also collect stormwater runoff from the berm. Water from the drainage channel would be routed through the Metsorb treatment vessel prior to being discharged. The water from the drainage channel would be discharged either to groundwater (similar to a septic field) or to surface

water. The final construction plans would include provisions for coordinating, permitting and monitoring the discharge through the EAO and NJDEP as required. Any discharge to surface or groundwater identified during design and construction would be subject to NJPDES permit standards that are protective of human health and the water resource receiving the discharge. Information on the Metsorb technology is presented in Attachment 2.

Compliance monitoring points for the treated surface water, groundwater and soils would be established. All samples collected for compliance monitoring will be analyzed at a laboratory certified by the State of New Jersey to perform the analyses. Laboratory deliverables will be provided for compliance monitoring sampling events following NJ Reduced Laboratory Data Deliverables - Non-USEPA/CLP Methods format. Discharge from the engineered water treatment system will be monitored in accordance with and NJPDES permit requirements. The range construction would include installation of two groundwater monitoring wells; one located upgradient and one located downgradient from the range. The locations of the wells shall be specified in the construction plans that would be reviewed by the EAO. Prior studies (Shaw, 2004) indicate that the bedrock groundwater flows southwest and shallow groundwater (unconsolidated aquifer) does not occur in this area. If existing groundwater monitoring wells in the project area are intended to be used for the proposed monitoring activities, they would be included in the construction plans. Collectively, the impermeable barriers, stormwater management and the engineered system for metals removal would assure compliance with the guidelines established in EPA's BMPs for Lead at Outdoor Shooting Ranges (EPA, 2001).

A soil sampling plan will be established as part of range maintenance activities. Surface soil will be sampled during scheduled removal of projectiles from the berm area, to assure compliance with health-based soil standards/criteria.

Operation and maintenance activities would include frequent utilization of the range, routine landscaping, maintenance of the range, periodic removal and recycling of projectiles, collection of samples for environmental compliance (groundwater samples from the monitoring wells, treated storm water samples from the engineered system and surface soil samples from the range). This information shall be described in the Range Operations Manual to be prepared by Picatinny Arsenal.

2.2 NO-ACTION ALTERNATIVE BUT NOT CARRIED OUT FOR ANALYSIS

Under the no-action alternative, the development plans for an outdoor firing range would not be implemented. The existing conditions of the G-2 area at Picatinny Arsenal would remain. However, the no-action alternative would not accomplish the purpose, need and objective of the proposed action discussed in Section 1.2. Specifically, the construction, operation, and maintenance of an environmentally friendly outdoor firing range functioning as a range technologies test bed and the development platform for new training practices would not be accomplished.

2.3 ALTERNATIVES CONSIDERED

Numerous alternative locations within Picatinny Arsenal were considered for the placement of the proposed facility. These locations include the Post Farm/3500 area, Lake Denmark Road, Berkshire Trail, old pistol range, open area near the front gate, skeet range, 200 area, 1500 area and the Bott-Farley site. The Bott-Farley site was deemed the second most suitable site to the G2 area and is further described below. The other sites were eliminated from further consideration due to one or more of the following constraints: lack of a UXO survey or clearance, impacts to wetlands, special use airspace hazards, existing environmental contamination, impacts to noise receptors, conflicts with Quantity

Distance Arcs (Q/D Arc), potential conflicts with archeological sites, inadequate access, potential conflicts with other planned developments and need for tree removal.

The Bott-Farley site is located on-post, in the eastern-southeastern section of Picatinny Arsenal, within the secured 1400 area located directly south of the intersection of Farley and Bott Road. This site was rejected due to site access and health, safety and security concerns associated with mission-related activities involving the use, testing, and storage of explosive materials.

The Bott-Farley site is located within the main post of the installation, which has stringent security measures and security checkpoints. Users of the range would be bringing weapons into Picatinny Arsenal and would be required to adhere to security control restraints to access the site. This would burden both the users of the range and security personnel.

Multiple explosive storage magazines and explosive testing facilities are present throughout the installation. They are each assigned a Q/D Arc based upon the size and type of explosive being stored or utilized. The Q/D Arc measures the potential risk to human health or the environment within the installation caused by an explosion from a given source. The Bott-Farley site is located within Building 1463's Q/D Arc, creating a potentially hazardous condition if the proposed facility were to be placed in that location.

In addition, tree cutting and potential habitat destruction, UXO and archeological surveys would be required prior to proceeding with development at the Bott-Farley site. There may be additional impacts to human health and the environment, as yet undefined pending the outcome of such surveys.

The G-2 area provides an appropriate location for the proposed facility because of its remote, off-post location within Picatinny Arsenal; significant distance from neighbors; and status as an inactive and highly disturbed site. Because the access road and cleared area within the G-2 area would provide sufficient access to the range, no tree cutting or habitat destruction would be required. In addition, placing the outdoor firing range in the G-2 area would make it convenient to the Homeland Defense Technologies and Security Readiness Center located within the 3500 area to the south.

3.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

A description of the historic and current land uses; environmental, social, and economical resources, including air quality, soils and geology; water, biological, cultural, and socio-economic resources; land use; transportation; recreation and documented hazardous conditions at the proposed location of the outdoor firing range facility are discussed in Appendix A. These conditions were determined from information and documentation obtained from Picatinny Arsenal and public record, interviews with knowledgeable personnel and a site reconnaissance of the project area and surrounding vicinity.

4.0 ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

This section describes the significance, duration and timing of the potential impacts and environmental consequences of the preferred and no-action alternatives considered in this EA. Potential impacts are presented in the order in which the alternatives were discussed in Section 2.0, are described for the specific resource areas discussed in Appendix A and summarized in Appendix B. Adaptive management measures, when applicable, are also discussed in this section. The irreversible and irretrievable commitment of resources, relationship between short-term uses and long-term productivity and potential cumulative impacts are also analyzed. The criteria and terminology used to characterize the significance,

duration and timing of impacts, as well as adaptive management measures have been summarized in Appendix C.

4.1 PREFERRED ALTERNATIVE

The following subsections describe the potential impacts of the preferred alternative to air resources; water resources; soil and geologic resources; biological resources; archaeological, historic and aesthetic resources; the socio-economic environment and environmental justice, including current land use, transportation, and recreation; and known hazardous materials or conditions. Irreversible and irretrievable commitment of resources, relationship between short-term uses and long-term productivity and potential cumulative impacts also are analyzed.

4.1.1 Potential Impacts to Air Resources

This section discusses the potential impacts to air quality and noise in the proposed project area.

4.1.1.1 Potential Impacts to Air Quality

The proposed outdoor firing range would increase the air contaminants released to the atmosphere both during construction and operation. Once in operation, increased vehicular traffic and the discharge of ammunition would generate fugitive particulate air emissions, most significantly lead. Emissions from each activity are described in relation to the proposed outdoor firing range. The air health risk assessment details the potential impact of lead on public health and ambient air concentrations. The proposed outdoor firing range's impact on Picatinny's air emissions is discussed from both a quantitative and regulatory perspective.

Construction

Construction would cause direct, temporary and minor adverse impacts to air quality in the areas immediately adjacent to the proposed site. Exhaust and dust dispersed by construction vehicles and equipment would impact the air quality periodically. However, the temporary impacts would not affect the status of the region as an attainment area under the Clean Air Act (CAA) (40 CFR, 1990) because the impacts would be confined to the immediate vicinity of the site. The impacts from airborne emissions during construction and excavation would be mitigated by minimizing the number of vehicles used during construction and the trips the vehicles would make to and from the site, and by using dust-suppression techniques, such as periodic wetting of work areas.

Motor Vehicle Emissions

Air emissions generated by employee vehicles and users of the proposed outdoor firing range would increase the overall emissions associated with existing traffic conditions. These emissions are considered a direct, permanent and minor impact as only a maximum of 24 vehicles can park at the firing range. During facility operations, encouraging carpooling and allowing sufficient time between shifts of user groups would minimize the emissions increase due to additional traffic. The motor vehicle emissions are minimal and there are no regulations limiting emission increases by mobile sources at a facility. Programs such as PSD (40 CFR, 2003a) and Title V (NJDEP 2003c) apply only to stationary sources.

Outdoor Firing Range Emissions

The proposed outdoor firing range is anticipated to be used predominantly by law enforcement entities that operate hand pistols and military personnel that operate rifles. Calibers up to and including .44

magnum, military 5.56-millimeter (mm) rifle ammunition, 12-gauge shotgun slugs, and shot are anticipated for use at the range. The shooting of firearms would generate air emissions within an area that does not currently have any emissions. The .45 caliber has been used to calculate the air emissions, since this would be the type of ammunition expected to be most fired at the proposed outdoor firing range.

The range's air emissions are fugitive emissions pursuant to New Jersey's air pollution control regulations related to operating permits (NJDEP, 2003c) since they are directly or indirectly released into the outdoor atmosphere which can not reasonably pass through a stack or chimney. The Title V Permit lists non-source fugitive emissions as a "reasonable estimate of emissions." Therefore, the non-source fugitive emissions in the Title V permit are not emission limits like those for the permitted sources. The estimated non-source fugitive emissions are implied values rather than permitted conditions.

Table 4-1 presents the proposed range's emissions for all six of the criteria pollutants promulgated under primary and secondary National Ambient Air Quality Standards (NAAQS) (40 CFR, 2003b) or for which a New Jersey Ambient Air Quality Standard (NJAAQS) has been promulgated at N.J.A.C. 7:27-13 (NJDEP, 1991). It should be noted that the June 2004 Title V Permit does not include the existing outdoor ranges and that lead emissions are not estimated for the indoor range. Therefore, the unapproved estimated emissions from the September 2003 Title V Renewal (Picatinny 2003) and the actual emissions from the 2003 Annual Emission Statement (Picatinny 2004a) also have been included in Table 4-1.

TABLE 4-1 –OUTDOOR FIRING RANGE AND FACILITY EMISSIONS

AREA	CRITERIA POLLUTANT EMISSIONS (tons/year)					
	NO_x	CO	VOC	TSP/PM_{10}	SO_2	Pb
Proposed Outdoor Firing Range	0.0061	0.047	0.00041	0.305	0.0011	0.0106
Existing Firing Ranges' Estimated Emissions - 6/04 Title V	0.00	15.83	0.00	2.19	.021	0.000
Existing Firing Ranges' Estimated Emissions - 9/03 Title V Renewal	0.0141	0.109	0.00095	0.71	0.0026	0.01285
Existing Firing Ranges' Actual Emissions - 2003 Emission Statement	0.0125	0.093	0.00081	0.0606	0.00223	0.011

Source: Picatinny, 2003 and 2004a
Note 1: The criteria air pollutants are as follows for all tables in this section:

CO = Carbon monoxide
NO_x = Nitrogen oxides
Pb = Lead
SO_2 = Sulfur dioxide
TSP = Total suspended particulates
PM_{10} = Particulates with a diameter of 10 microns or less
VOC = Volatile organic compounds

Except for the lead emissions, all the emission factors for the proposed outdoor firing range are based on the open detonation emission factors in the Emission Factors for the Disposal of Energetic Materials by Open Burning and Open Detonation (OB/OD) (DoD, 1998). Its lead emissions were based on the indoor firing range stack test results, conducted October 2001 (DoD, 2001). The emission calculations for the proposed outdoor firing range are provided in Appendix D.

The proposed outdoor firing range emissions are comparable to those for Picatinny's existing firing ranges. It is concluded that the estimated emissions for the proposed outdoor firing range are representative of the operation and as such have been used in this analysis.

Health Risk Assessment and Ambient Air Impacts

Although the range's emissions would be low, a health risk assessment analysis was prepared to determine if this project poses any potential health risks to the public. The proposed range's maximum 24-hour average impact at ground level needs to be less than a lead concentration of 0.1 micrograms per cubic meter ($\mu g/m^3$), or a Hazard Index of 1, to be considered to have "…no appreciable health risk…" to children who are the most sensitive, and the public (NJDEP, 1994).

The first level risk screening calculated a maximum 24-hour lead concentration of 0.92 $\mu g/m^3$, or a Hazard Index of 9.2. A more rigorous second-level risk screening analysis was performed. For the second-level screening, a computerized mathematical air dispersion model provided a more accurate estimate of ambient air concentrations which predicted a maximum 24-hour lead concentration of 0.069 ug/m^3 below the "no appreciable health risk" criteria. The risk assessment calculations and air dispersion modeling are included in Appendix D.

TABLE 4-2 AMBIENT AIR CONCENTRATIONS FOR LEAD

Description	Lead Concentration ($\mu g/m^3$)
Predicted Maximum at nearest Picatinny Property Line	0.069 (24-hour avg.)
Predicted Maximum for Heliport at Picatinny	0.016 (24-hour avg.)
Predicted Maximum for Mobile Home Park in Picatinny	0.028 (24-hour avg.)
Predicted Maximum for Residential Area 1 outside Picatinny	0.020 (24-hour avg.)
Predicted Maximum for Residential Area 2 outside Picatinny	0.012 (24-hour avg.)
No Appreciable Risk Concentration	0.10 (24-hour avg.)
New Brunswick Site 2001 Maximum 3-Month Average	0.230
New Brunswick Site 2001 Calendar 1st Quarter Average	0.066
New Brunswick Site 2001 Calendar 2nd Quarter Average	0.106
New Brunswick Site 2001 Calendar 3rd Quarter Average	0.150
New Brunswick Site 2001 Calendar 4th Quarter Average	0.146
National Lead Standard (Calendar Quarter Arithmetic Means)	1.5 (3-month avg.)
New Jersey Lead Standard (3-Month Arithmetic Means)	1.5 (3-month avg.)

As shown in Table 4-2, the computer model predicted a worst-case maximum 24-hour average ambient air concentration of 0.069 $\mu g/m^3$ at the nearest Picatinny Arsenal property line. Impacts at other sensitive receptors were also predicted. The lead concentration at the nearby Heliport was predicted to be about 25% of the nearest property line concentration. The lead concentration at the mobile home park located within Picatinny Arsenal, the closest residential area to the proposed outdoor firing range, was predicted to be about half the value of that predicted at the nearest property line. The lead concentrations at the nearest residential areas outside Picatinny Arsenal were predicted to be 20% to 33% of the value at the nearest property line. It is therefore concluded that there is no appreciable risk for lead for public health from the proposed outdoor firing range.

Table 4-2 also lists the average lead concentrations for the closest lead monitoring station in New Jersey. Its maximum 3-month average served as both background lead concentration and as a point of comparison for the modeled lead concentrations.

The maximum lead concentration predicted at the Picatinny Arsenal property line is less than that for all of the background data. As shown in Table 4-2, the National and New Jersey standard for ambient air lead concentrations, designed to protect human health from lead inhalation is a maximum 3-month average of 1.5 $\mu g/m^3$. Concentrations measured (and predicted by modeling) over a 3-month period are significantly lower than those measured over 24-hours.

Even when conservatively adding the maximum 24-hour average concentration from the outdoor range (i.e. impact of 0.069 $\mu g/m^3$) to the highest background concentration of 0.23 $\mu g/m^3$, the total of 0.30 $\mu g/m^3$ is less than 20% of the ambient air quality standard. Therefore, it is concluded that the proposed outdoor firing range would not cause an exceedance of the ambient air quality standard for lead.

In addition, a detailed lead emissions impact analysis was prepared for assessing current Picatinny Arsenal operations vs. current operation plus the proposed outdoor firing range, see Appendix G for this impact analysis report. This impact analysis predicted a worst-case maximum 24-hour average ambient air concentration of 0.0031 ug/m^3 for lead emissions from the proposed range at the Picatinny Arsenal property line where maximum impacts from all operations was predicted to occur; contributing far below the short-term (24-hour average) exposure level considered by NJDEP to have no significant risk. Also, the study indicated ambient air quality impacts of lead emissions from current Picatinny Arsenal operations are well below the National Ambient Air Quality Standard. Therefore, Picatinny Arsenal's plans to construct and operate the outdoor firing range will not cause a significant increase to these impacts. Maximum impacts from all Arsenal operations were found to occur nearby the Open Burning Grounds which is the overwhelming contributor of lead emissions.

Air Quality Quantitative and Regulatory Impacts

The air quality impact from Picatinny Arsenal as a result of the proposed outdoor firing range was evaluated from a quantitative and regulatory perspective. The quantitative analysis details the impact on the mass of facility emissions. The regulatory analysis discusses the applicability of state and federal regulations to the proposed range. Both analyses include:

- Comparison of Facility and Proposed Outdoor Range's Emissions
- Comparison of Non-Source Fugitive and Proposed Outdoor Range's Emissions
- Comparison with Proposed Range Emissions and NSR/PSD Emission Thresholds
- Regulatory Impact of the Proposed Outdoor Range

Comparison of Facility and Proposed Outdoor Range Emissions

Table 4-3 shows the proposed outdoor firing range emissions, the permitted source emission limits, the non-source fugitive estimated emissions and the facility total air emissions as per Picatinny's Title V Permit, dated June 8, 2004 (Picatinny 2004a). The proposed range's emissions of all pollutants are a fraction of the current Arsenal emissions. Specifically for lead, outdoor range emissions are predicted to be less than 8% of the actual emissions for 2003 and less than 0.2% of total maximum allowable emissions in the June 2004 Title V Permit (Picatinny 2004a).

TABLE 4-3 ANTICIPATED OUTDOOR FIRING RANGE AND FACILITY EMISSIONS

AREA	CRITERIA POLLUTANT EMISSIONS (tons/year)					
	NO_x	CO	VOC	TSP/PM_{10}	SO_2	Pb
Proposed Outdoor Firing Range	0.0061	0.047	0.00041	0.305	0.0011	0.0106
Overall Picatinny Permitted Source Emissions	128.0	49.08	8.56	23.9/ 20.42	64.1	0.0084
Total Estimated Non-Source Fugitive Emissions	2.08	93.03	13.69	128.91/56.15	0.59	7.30
Facility Emissions (Total) – Title V	130.08	142.11	22.25	64.69	64.69	7.3084
% Outdoor Range of Facility Total	0.005	0.033	0.0018	0.47	0.0017	0.15
2003 Facility Emissions (Total)	46.32	16.93	12.25	8.32	27.09	0.14
% Outdoor Range of 2003 Total	0.013	0.278	0.0033	3.67	0.0041	7.57

Source: Picatinny 2004a

Noting that lead emissions for the proposed range are higher than the lead emissions for the permitted sources at Picatinny Arsenal, these sources either process little to no lead, or are able to contain their vents for particulate removal in control devices. These sources include fuel oil burning boilers, a hot air decontamination oven, a hazard waste incinerator, a flare testing operation and an indoor firing range, which has no lead emissions in the Title V Permit (Picatinny, 2004a).

As a non-source fugitive emissions activity, the proposed outdoor firing range's emissions are more appropriately compared to those of other non-source fugitives. Unlike the permitted sources, the non-source fugitive activities have neither vents nor control devices. The fugitive emissions exhaust uncontrolled to the atmosphere.

Considering mass emissions increases, the proposed range, once in operation would have a direct, permanent and minor adverse impact upon the project area and the facility as a whole.

Comparison of the Non-Source Fugitives and the Proposed Range Estimated Emissions

Table 4-4 shows the proposed outdoor firing range emissions, the non-source fugitive estimated emissions and a breakdown of the individual non-source fugitive activities per the Picatinny's Title V Permit, dated June 8, 2004 (Picatinny, 2004a). The proposed outdoor firing range emissions of all pollutants are a small fraction of the current Arsenal fugitive emissions. Specifically for lead, outdoor range emissions are predicted to be less than 9% of the 2003 actual non-source fugitive emissions and less than 0.2% of the total allowable emissions for non-source fugitive in the June 2004 Title V Permit. Considering mass emissions increases, the proposed range, once in operation would have a minor adverse impact upon the non-source fugitive emissions.

TABLE 4-4 – NON-SOURCE FUGITIVE EMISSIONS

AREA	CRITERIA POLLUTANT EMISSIONS (tons/year)					
	NO_x	CO	VOC	TSP/PM_{10}	SO_2	Pb
Proposed Outdoor Firing Range	0.0061	0.047	0.00041	0.305	0.0011	0.0106
Open Burning Ground Estimated Emissions	0.077	0.040	0.005	73.9/1.14	.069	7.30
Flare Testing Estimated Emissions	0.00	3.12	0.00	35.78	0.00	0.00
Testing Procedures (Gorge Area) Estimated Emissions	0.042	1.42	0.157	4.64	0.035	0.00
Building Decontamination Estimated Emissions	1.96	88.45	13.53	14.59	0.49	0.00
Total Picatinny Non-Source Fugitive Estimated Emissions	2.08	93.03	13.69	128.91/56.15	0.59	7.30
% Outdoor Range of Total Title V	0.29	0.05	0.003	0.24 – 0.54	0.19	0.15
2003 Fugitive Emissions (Total)	4.30	0.12	0.53	3.35	0.02	0.13
% Outdoor Range of 2003 Fugitives	0.141	39	0.077	9.10	0.55	8.15

Source: Picatinny, 2004a

All of the non-source fugitive lead emissions currently in the Title V Permit are attributed to open burning, where waste energetic materials are burned in open metal pans. Although open burning is a non-source fugitive activity and a more appropriate match than the permitted sources, its emissions are not the best available comparison.

It should be noted that while not yet approved, Picatinny's Title V Permit Renewal, submitted in September 2003 (Picatinny, 2003), revised the non-source fugitive activities and their associated emissions. Their emission factors were updated and some non-source fugitive activities such open detonation, outdoor ranges and exempt laboratory hoods were added. The emissions for these additional activities have been previously included in the facility's Annual Emission Statement, but not in its Title V Permit (Picatinny, 2004b). The revised lead emissions for the non-source fugitives would be modified. The majority of the lead emissions would still be from open burning (0.38 tpy). However, the increase in lead emissions represented by the proposed outdoor firing range operation increases to approximately 3% of the total fugitive emissions (0.384 tpy). This increase would not exceed any regulatory threshold and would result in a direct, permanent and minor adverse impact.

Comparison of Proposed Range Emissions and NSR/PSD Emission Thresholds

New emissions of attainment pollutants are regulated under N.J.A.C. 7:27-22 (NJDEP, 2003c) for major facilities like Picatinny Arsenal. Since Picatinny Arsenal is located in a non-attainment area for ozone, it is potentially subject to New Source Review (NSR) provisions for NOx and VOC emissions and Prevention of Significant Deterioration (PSD) provisions for NOx, TSP, PM10, CO, SO2 and lead emissions (40 CFR, 2003b).

Table 4-5 shows the proposed range estimated emissions, the current air emissions netting summary and NSR and PSD emission increase thresholds. The emission netting summary accounts for emission increases and/or decreases in the most recent five-year contemporaneous period from July 1999 to July 2004.

TABLE 4-5 - OUTDOOR FIRING RANGE ESTIMATED EMISSIONS

AREA	CRITERIA POLLUTANT EMISSIONS (tons/year)					
	NO_x	CO	VOC	TSP/PM_{10}	SO_2	Pb
Proposed Outdoor Firing Range	0.0061	0.047	0.00041	0.305	0.0011	0.0106
Air Emissions Netting Summary (7/99-7/04)	13.59	35.94	10.46	5.32/4.69	-6.75	0.00674
Emission Netting with Proposed Outdoor Firing Range Emissions	13.590061	35.987	10.4600041	5.625/4.995	-6.7489	0.01734
NSR Significant Threshold	25	100	25	25/15	40	0.6
PSD Significant Threshold	40	100	40	25/15	40	0.6

Source: EPA, 2004b

As shown in Table 4-5, there would be no emission increases above EPA's PSD levels if the proposed outdoor firing range is permitted at this time. However, another netting analysis would need to be performed when the proposed outdoor firing range is added to the Title V permit to account for any additional emission changes at Picatinny Arsenal. Picatinny's current netting analysis (from July 1999 to July 2004) shows that criteria pollutants (NO_x and VOC) are well below the significance thresholds for NSR.

Regulatory Impact

Pursuant to N.J.A.C. 7-27-22.1 (NJDEP, 2003c), the proposed outdoor firing range's air emissions are non-source fugitive emissions, since they are directly or indirectly released into the outdoor atmosphere which can not reasonably pass through a stack or chimney. Major facilities such as Picatinny Arsenal must include all significant and insignificant sources in its Title V Permit.

However, pursuant to N.J.A.C. 7:27-22.6 (f) (5) (ii) (NJDEP, 2003c), a major facility should include in its Title V permit each air contaminant, if any, emitted as fugitive emissions and not associated with any source operation; the cause of that air contaminant being emitted as fugitive emissions; and a reasonable estimate of the facility's fugitive emissions of that air contaminant, in tons per year, and any other units required to verify compliance with any applicable requirement.

Therefore, the proposed range would be listed in the Title V permit as a non-source fugitive activity with a reasonable estimate of its emissions. The non-source fugitive emissions in the Title V permit are not emission limits like those for the permitted sources. The estimated non-source fugitive emissions are implied values rather than permitted conditions.

A separate permit modification to construct and operate the proposed outdoor firing range would not be required. Picatinny's Title V permit could be modified to add the proposed range as a non-source fugitive activity in any permit modification or in its five-year renewal as was done with the existing outdoor firing range in the September 2003 Title V Renewal. As with the existing firing ranges, the proposed range would not have any applicable requirements in the Facility Specific Section of the Title V Permit.

The estimated emissions from the proposed range would not be subject to either the NSR requirements for NOx and VOC or the PSD requirement for NOx, TSP, PM10, CO, SO2 or lead. Future increases in emissions and/or addition of new emission sources and non-source fugitive activities would need to be examined for NSR/PSD applicability.

The required air emission levels for non-attainment pollutants would have to be determined at the time the project is permitted. Facility changes between now and when the project is permitted would need to be captured in a netting analysis, similar to the summary one included for July 1999 to July 2004.

A netting analysis incorporates creditable emission reductions and other emission increases that have occurred at the facility during the contemporaneous period, beginning five years prior to the proposed construction and ending with the start of operation of the proposed construction. Although there is sufficient room in the netting analysis now to accommodate the small increase in emissions from the proposed outdoor firing range, there may not be in the future.

This analysis indicates that the proposed outdoor firing range would be able to comply with all regulatory requirements. There are minor adverse impacts that would result from the proposed action.

4.1.1.2 Potential Noise Impacts

Noise related to the proposed action within the project area could potentially cause direct, temporary and minor adverse impacts; indirect, permanent, minor adverse impacts; and direct, permanent and minor adverse impacts in the project area. The potential impacts to human receptors are discussed below. The potential effects of noise on fauna are discussed in Section 4.1.4.

The use of construction machinery and the slight increase in vehicle traffic at the site during construction would increase noise to a level above the current level at the site resulting in a direct, temporary and minor adverse impact. The impacts would affect the site only during construction. The impacts related to construction noise would have a minor significance due to the localized nature and temporary duration of the noise. These impacts would be reduced by minimizing the number of vehicles used during construction, days during which construction would take place, and trips the vehicles would make to and from the site.

The surrounding area, including Lake Denmark Road, would be impacted by noise created from an increase in commuting traffic to and from the firing range after it is built. However, the noise levels from traffic would result in a direct, permanent and minor adverse impact. During facility operations, encouraging carpooling and allowing sufficient time between shifts of user groups would minimize the increase in noise levels from traffic.

Indirect, permanent and minor adverse impacts during operation could result to users from exposure to noise while operating firearms, thus creating the potential for hearing loss in users of and workers at the outdoor firing range. According to the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM), the impulse noise level measured under normal operation from a typical weapon at the shooter position was reported to be 157dB (U.S. Army, 2004b). Use of appropriate hearing protection and adherence to occupational hearing conservation programs would mitigate these impacts. Guidance related to hearing hazards and industrial noise is contained in AR 40-5 (U.S. Army, 1990) and Department of the Army (DA) PAM 40-501 (U.S. Army, 1998c). In addition, adherence to standard operating procedures (SOPs) that limit noise generation for the outdoor range would be required, and would be established by the proponent prior to construction and operation of the range.

Noise propagated from the firing of weapons in the proposed area is anticipated to also create a direct, permanent and minor adverse impact on the project area and areas surrounding the firing range. Criteria used to evaluate potential impacts to human receptors and their associated land uses are published by the U.S. Army DA PAM 200-1, Chapter 7 (U.S. Army, 2002b). The criteria used for compatible land use by

DoD and all Federal agencies is from the Federal Interagency Committee on Urban Noise (FICUN) (now the Federal Interagency Committee on Aviation Noise, 1980), DA PAM 200-1 Table 7-3 (U.S. Army, 2002b) and DoD Instruction 4765.57 (DoD, date unknown). In addition, noise is regulated by the State of New Jersey (N.J.A.C, 2000).

In accordance with Army Regulation AR200-1 (U.S. Army, 2002a), Picatinny Arsenal maintains an Environmental Noise Management Program. As part of this program, Picatinny Arsenal periodically updates noise data. The most recent report containing noise data was presented in the Draft Installation Compatible Use Zone (ICUZ) Study (U.S. Army, 2004a). The study indicated that the proposed project area is in Noise Zone I. Noise Zone 1 classification means that land uses including residential, schools, religious establishments and public meeting places are compatible with the noise levels present. The study also concluded that Noise Zones II and III do not extend beyond the installation boundary. Noise Zones II and III are classified as "normally incompatible" and "incompatible," respectively. In other words, areas outside the current installation boundary meet Noise Zone 1 classification. The study also indicates that follow-up studies would be conducted when there are significant changes to the installation's noise profile. While the study addresses the current noise profile at Picatinny Arsenal, no data measurements or specific information were presented for small arms fire. Therefore, the Army conducted computer modeling to predict noise levels that would be generated during operation of the proposed outdoor firing range. The results are discussed below.

The U.S Army Center for Health Promotion and Preventative Medicine (CHPPM) utilizes the Army Small Arms Range Noise Assessment Model (SARNAM) to predict noise levels that would be generated from small arms firing (USACE, 1999). SARNAM incorporates SOUNDPROP, a computer model developed at the US Army Construction Engineering Research Laboratories, to extrapolate the source model from one meter distance to the receiver location. The predictions are based on the Fast Field Program (FFP) and the Parabolic Equation (PE) methods (ANSI, 1990 and Li, et al, 1994). CHPPM ran a computer simulation using information provided by the proponent on the types of weapons anticipated to be used at the proposed outdoor firing range (calibers up to 9mm pistol and M16 rifle). The results of the predicted noise levels generated by SARNAM at 90 degrees and 180 degrees from the shooter (zero degrees being the direction of fire) are included in Appendix E. The table below summarizes the predicted noise levels at the 50^{th} percentile.

Table 4-6 Summary of Predicted Noise Levels at 50 Percentile

Source	50 meters		100 meters		1000 meters	
	90^{O} Direction	180^{O} Direction	90^{O} Direction	180^{O} Direction	90^{O} Direction	180^{O} Direction
M9 9mm	114	110	107	104	79	78
M16	122	112	116	105	84	76

Note: Results shown are in Decibels (dB) Unweighted Peak Level
Source: US Army CHPPM SARNAM Model, August 24-26, 2004

According to CHPPM, the Army has annoyance thresholds for small arms range noise that are based on studies of community reactions to noise. For daytime thresholds, it was concluded that, "It would appear then, that a mean unweighted peak sound pressure level around 85 linear peak sound level (dBP) would be a reasonable criterion for land-use planning" (Hede and Bullen, 1982). A later study (O'Loughlin, et al., 1986) took a slightly more conservative approach to new and expanded ranges, stating; "When a new range is opened or there is a substantial increase in activity, it would be sensible to adopt a more conservative criterion. A level of 80 dBP may reasonably be adopted until further research into this

aspect is undertaken." Table 4-6 shows that the predicted noise levels, at 90 and 180 degrees, 1,000 meters away, ranged from 76 to 84 dBP, below the 85 dBP 1982 annoyance threshold. Utilizing the 80dBP criterion, only the M16 at 90 degrees would exceed the annoyance threshold.

Compliance with New Jersey Noise Control Regulations (N.J.A.C., 2000) is determined based on whether noise generated from stationary sources exceeds the noise level criteria established for residential properties. The criteria include continuous airborne sound that is greater than 65 A-weighted decibels (dBA) between 0700 and 2200 and impulsive air sound greater than 80 dBA between the source of the sound and closest residential property boundary. The determination is made based on a noise test, during which noise levels are measured at a residential property boundary. The off-post residences closest to the proposed project are approximately 3,400 feet to the east, and the closest public meeting place is approximately 6,700 feet northeast of the project area (Figure 4). Table 4-6 indicates that the predicted noise level for the M16 at 90 degrees (which would be east or west) would be 84dBP. However, CHPPM has concluded that based on experience and the presence of existing terrain and wooded areas these levels would be attenuated to below the NJ level of 80 dBP.

This conclusion is based partly on the fact that the SARNAM Model data results presented are based on the worst case scenario of a mild downwind condition over flat terrain. The entire area surrounding the project area is forested, including the area between the firing range and the off-post residences. This vegetation would reduce the sound levels created at the proposed outdoor firing range. The terrain is hilly; the presence of hills between the range and off-post receptors would also reduce sound. This suggests that any adverse impacts to the existing residences in the surrounding community would be minor.

Operation of the proposed outdoor firing range would change the on-post land use in the project area from Noise Zone I to Noise Zones II and III. The Army assesses land use compatibility using average day-night sound levels (ADNL). In support of assessing potential noise impacts at small arms ranges for planning and preliminary designs, US Army CHPPM relies on ADNL data that has been generated from modeling and/or recorded sound levels at numerous small arms firing ranges, similar in design as the proposed outdoor firing range at Picatinny Arsenal.

US Army CHPPM has indicated that a typical 25 meter M 16 (loudest weapon) range with berms, baffles and firing shed shows the ADNL boundary between the Noise Zone I and II is approximately 135 meters from the range at 90 degrees. Based on this analysis, the Noise Zones II and III would remain entirely on Picatinny Arsenal. The installation boundary 90 degrees east of the proposed outdoor firing range is at a distance of approximately 335 meters. The off-post areas adjacent to and east and southeast of the proposed outdoor firing range are located within the community of Rockaway and as shown on Figure 4, are situated in a hilly, densely forested area which is part of the Highlands Preservation zone.

Tetra Tech contacted the Rockaway Township Engineer to discuss land use plans for the surrounding properties outside of the Picatinny Arsenal boundary to the east-southeast of the proposed outdoor firing range. The Rockaway Township Engineer stated that except for one property, no plans for development have been brought in front of the planning board and no plans have been approved. An old project (from more than 10 years ago) by the name of "Villages at Rockaway" (located on a hilltop south of Snake Hill Road, adjacent to the Picatinny Arsenal boundary and south of the proposed outdoor firing range) was brought to the planning board. This development was never approved and no plans for development have been brought to the planning board since then. Additionally, Rockaway has no plans to develop the areas east and southeast of the proposed outdoor firing range. The State of New Jersey has also placed

significant restrictions on development within the Highlands Preservation zone. The above information indicates that operation of the range would be compatible with adjacent land uses off-post.

The firing range design includes an earthen impact berm, concrete sidewalls and firing line cover. The earthen impact berm would attenuate sound. Additional noise abatement measures are incorporated in the proposed action. U.S. Army contractors would conduct a noise test during the initial startup period of the proposed action to determine noise levels at the closest off-post residences and public meeting places, and implement additional noise abatement mitigation measures, if warranted, to further attenuate sound, thereby ensuring the noise levels do not exceed the noise level criteria at the residences as cited above. U.S. Army and its contractors acknowledge that additional sound abatement measures may also be needed to comply with the U.S. Army's Environmental Noise Abatement Program. Such measures include, but are not limited to back berms, sand bags, acoustical coatings on sidewalls, baffles and the firing line cover, insulation and sound boxes and tubes. Based on the above information, the noise levels anticipated during the operation of the firing range would result in minor adverse impacts from the proposed action.

4.1.2 Potential Impacts to Water Resources

This section discusses potential impacts to groundwater; surface and stormwater; wetlands, coastal zones, wild and scenic rivers and floodplains.

4.1.2.1 Potential Impacts to Groundwater

The proposed action would not have a short-term or long-term impact on the groundwater at the site. Although disturbances to the ground surface and subsurface would take place during excavation activities and installation of new foundations, the maximum depth of disturbance for the proposed action (5 - 6 feet below ground surface [bgs]) is above the estimated depth to the bedrock groundwater (18.5 feet bgs) within the project area. None of the three on-site bedrock monitoring wells (1MW-2, 1MW-3, and 1MW-4) (see Figure 2 for location of wells) are within the footprint of the proposed outdoor firing range. Shallow groundwater was not identified within the unconsolidated (till/fill) materials above the bedrock. Therefore, groundwater is not anticipated to be encountered during construction activities. Indirect, permanent adverse impacts could result if lead and other metals leached from the projectiles and migrated into the underlying groundwater. However, as part of the range construction, an engineered system (see section 4.1.7 for details) used to collect and treat runoff water and water that percolates through the surface soils would be installed in the vicinity of the berm and regularly monitored to prevent lead and other metals from impacting underlying groundwater. Therefore, no long-term adverse impacts to groundwater would result from the proposed action. See section 4.1.7 for further information on potential impacts to groundwater from lead and other metals during range operations.

4.1.2.2 Potential Impacts to Surface Water and Stormwater

There would be no direct impacts to surface water resources related to the proposed action, because no surface water resources exist within the project area and there are no direct or indirect routes for surface water in the project area to reach the surface water resources. Figure 5 identifies wetland and surface water constraints associated within the proposed project area. Several streams are located in the area. The closest stream is an unnamed stream located approximately 800 feet SW that flows into the G2 pond. This stream was mapped from the Picatinny Arsenal Sportsman map and is not a mapped stream on USGS maps or classified by NJDEP. The next closest stream is Ames Brook (also known as Hibernia Brook according to NJDEP data) that is classified as an FW2-TPC1 by the NJDEP. This is a trout production stream Category One (C1) water which in general have exceptional resource value and are protected from

measurable changes in water quality as set forth in anti-degradation policies (N.J.A.C. 7:9B-1.5(d)). This includes but is not limited to establishment of a 300-foot protection area buffer along the waterway and streams that drain into or are upstream of the C1 water and prohibiting effluent discharges within the C1 protection areas. There is no direct pathway from the project area (no discharge to incised channel, intermittent stream, etc.) to these surface waters. In addition, there is no indirect pathway to surface water from these streams because these streams are a great distance away, the ground surface between the project area and the streams is unpaved and forested (vegetation and soil permeability promote natural percolation) and there is no surface water effluent discharge to create a overland flow.

The proposed action may create indirect, temporary and minor adverse impacts to nearby surface water resources during the construction and operation activities of the proposed facility. The G-2 Pond is located approximately 1,000 feet to the southwest and downgradient of the project area. Also, Ames Brook (a Hibernia Brook tributary to Lake Ames) is located approximately 1,200 feet to the south and downgradient of the area. The proposed facility would slightly increase impervious surfaces within the project area, due to the construction of concrete side berms. This may result in an indirect impact to nearby surface water resources due to a small increase in stormwater runoff. The project would also comply with any applicable provisions of the stormwater regulations.

Indirect, permanent adverse impacts could result if lead or other metals become entrained in surface water and run off the firing range. However, the construction plans for the proposed action include stormwater in areas near the impact berm being directed into an engineered system to collect and treat runoff, in accordance with EPA's BMPs for Lead at Outdoor Shooting Ranges (EPA, 2001); see section 4.1.7 for further information on potential impacts to surface water and groundwater from lead and other metals during range operations. Stormwater from other areas would be managed by surface grading and drainage in accordance with the SESC and applicable landscaping plans. Landscaping plans include revegetation of disturbed areas outside the firing range. Incorporation of these stormwater control measures and BMPs within the design and construction of the facility would result in indirect, permanent and minor beneficial impacts to the nearby surface waters.

In addition, the state has requested that a Stormwater Management Plan (SMP) be in place for the proposed facility, which would become of a part of Picatinny's Stormwater Pollution Prevention Plan. This information would be incorporated into the documentation for the facility-wide stormwater permit. The EAO would prepare this SMP using information supplied by the proponent. This information is to include BMPs (e.g., casings and shells picked up and recycled or disposed of properly), institutional controls to reduce or prevent contamination at the site, would require an annual inspection of the range and training to be provided to the proponents by the environmental training contractor.

Stormwater control measures or BMPs implemented during construction and operation could include the alteration of the topography of the surrounding property to divert stormwater away from surface waters, and/or construction of a filtration system directed away from nearby surface waters. BMPs used during construction would adhere to the SESC plan and SMP; include the implementation of engineering controls, erosion barriers, and construction BMPs (silt fences, straw bales); protect surface waters through minimizing sediment loads in stormwater runoff; minimize vegetation removal; and include the revegetation of the disturbed areas. The overall water quality in the region would not be impacted in any manner regulated under the Clean Water Act, Federal Water Protection Act, Federal Water Pollution Control Act or applicable state regulations.

Minor adverse impacts to surface water or stormwater would occur from the proposed action.

4.1.2.3 Potential Impacts to Wetlands

During a site reconnaissance, no wetland areas were identified within the project area. Figure 5 identifies NJDEP mapped wetlands surrounding the project area. The closest NJDEP mapped wetland to the project area is located approximately 420 feet west-north. Available documentation indicates that a small wetland area may be present within the forested and undeveloped areas adjacent to the southeast corner of the project area. This potential wetland area is approximately three to four feet wide and 20 feet in length. This area is not hydrologically connected to any other water sources and as such would be classified as an isolated wetland. The New Jersey State regulatory definition (NJDEP, 2003a) identifies wetlands as areas that are "inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation…." . Three characteristics necessary for an area to be considered a regulated wetland are hydrophytic vegetation, hydric soils and wetland hydrology. This area has the hydrology. However, soils are borderline hydric and there is no dominance of hydrophytic vegetation. It may not meet the NJDEP wetland criteria. Even though the area is small, isolated and does not provide much habitat, the occurrence of the Indiana Bat in this area has resulted in the Fish and Wildlife Service requiring a 150-foot transition area around this area if it is classified as a wetlands. Disturbance from the proposed action would occur more than 150 feet from this area. Therefore, there would be no direct impact on this area related to the construction or operation of the proposed action.

No adverse impacts to wetlands would occur from the proposed action.

4.1.2.4 Potential Impacts to Wild and Scenic Rivers, and Floodplains

There are no designated wild or scenic rivers within the boundaries of Picatinny Arsenal. Therefore, the regulations under the Wild and Scenic Rivers Act (NPS, 1968) are not applicable to the installation and its activities. There are no floodplains or flood prone areas in proximity to the project area and the proposed action would not significantly alter the topography or drainage to cause flooding downstream. Therefore no measurable adverse impacts would result from the proposed action.

4.1.3 Potential Impacts to Topography, Soils and Geologic Resources

This section discusses impacts to topography, soils and geology.

4.1.3.1 Potential Impacts to Topography

The proposed construction activities within the project area would create direct, permanent and minor adverse impacts to the topography of the area. The proposed construction activities would require excavation and grading to create a relatively level grade for the placement of the outdoor firing range and proposed parking area, thus altering the existing terrain. Minimizing the amount of disturbance to topography and orienting the firing range to utilize existing grades and profiles would minimize the impacts to topography. Final construction plans have not yet been prepared; however the preliminary plans include the following construction activities:

- Earthwork (cut and fill) for general grading and construction of an impact berm; maximum cut depth is estimated at approximately four feet below existing grade. Excavated material would be used throughout the site for impact berm and site grading.

- Excavation of bedrock outcropping approximately 8.5 feet vertically and 12.5 feet horizontally into the base of the rock. Bedrock material is to be reused for landscaping in the project area, outside the range itself.

Minor adverse impacts to topography would occur from the proposed action.

4.1.3.2 Potential Impacts to Soils

Soils in the project area consist of sandy loam. The proposed construction activities would cause direct, permanent, minor adverse impacts to the soils within the project area. The soils in this area have already been disturbed as a result of prior development, former operations and recent UXO clearance activities in the site area. In addition, no soils are proposed to be removed from the site. Therefore, minor impacts would include the removal of herbaceous vegetation, excavation of up to approximately six feet of soil and filling the impact berm, mixing of soil during site grading, compaction caused by the use of construction vehicles and erosion of soil during construction and excavation activities.

The soil excavation, soil movement to (and within the site) and soil covering conducted during the construction activities would be managed in accordance with the 2003 Picatinny Arsenal Soil Management Standard Operating Procedures (SOP) developed by the EAO, as well as in accordance with the SESC plan required by the Morris County Soil Conservation District.

Impacts during construction and operation of the proposed facility would be mitigated by adhering to the SESC plan, implementing engineering controls and BMPs (such as silt fences and straw bales) during construction, protecting surface waters, and minimizing sediment loads in stormwater runoff. Additional measures include minimizing the number of construction vehicles used on-site and revegetating disturbed areas. These measures would help minimize soil disturbance and erosion and stabilize the soils after construction activities are completed.

Because there are contaminated soils in the project area, and there is a potential for lead impacting the soils during operation of the range, special provisions for handling and testing (sampling/analyzing) soils are required. This information along with assessment of the potential impacts associated with contaminated soils is discussed in Section 4.1.7.

Minor adverse impacts to soils would occur from the proposed action.

4.1.3.3 Potential Impacts to Geological Resources

The proposed action would result in adverse, direct, permanent and minor impacts to geology. Impacts would include the removal of the top layer of soils, which include glacial till and glacial boulders and excavation of bedrock outcropping during construction of the proposed outdoor firing range. The impacts are minor because the bedrock and glacial till is not a unique resource and the disturbance not resulting in an alteration of the regional geology. The planned reuse of boulders at the site for erosion control or landscaping would provide a permanent, minor beneficial impact. No additional impacts from operations or maintenance would be placed upon the surrounding geological formations.

No mitigation measures are applicable for the geology within the project area. Shifting the location of the proposed firing range further south could reduce the impacts to the bedrock. However, this would create greater impacts to other natural resources such as trees.

Minor adverse impacts to geology would occur from the proposed action.

4.1.4 Potential Impacts to Biological Resources

This section discusses potential impacts to flora, fauna and threatened, endangered and sensitive species.

4.1.4.1 Potential Impacts to Flora

During construction activities, minor adverse impacts are anticipated to result from the removal and disruption of herbaceous vegetation within the project area. However, a majority of the identified flora within the project area is considered invasive plant species. The removal of invasive species would create a minor beneficial impact to the site area. Additional minor beneficial impacts would result from revegetation activities and incorporating native vegetation into the proposed landscape design. Because the project location is already disturbed and invasive plant species are abundant in this area, no adverse impact to flora is anticipated during proposed construction and operation activities.

As part of the proposed action, measures would be implemented to protect the native vegetation surrounding the project area. These include the implementation of soil erosion barriers or BMPs (such as silt fences, straw bales, and sediment traps) to minimize and control storm water runoff; segregation and storage of topsoil and replacing it in areas disturbed during construction after activities have been completed; removal of only the minimum amount of vegetation necessary to accommodate the proposed facility; and active revegetation of disturbed areas with native vegetation.

Minor adverse impacts to flora would occur from the proposed action.

4.1.4.2 Potential Impacts to Fauna

The proposed construction and operation of the outdoor firing range would cause direct, permanent and minor impacts to wildlife in the vicinity of project area due to the increased noise levels associated with the range construction and operation activities to be performed at the proposed site. The project area is currently an inactive and disturbed site, overgrown with invasive species. The invasive plant species provide little food and shelter for local wildlife. Therefore, no adverse impacts are anticipated to occur on the wildlife populations of the project area. The proposed construction and operation of the outdoor firing range would also cause a minor impact to deer and small game because this area is a hunting area (see section 4.1.6.1 for assessment of hunting area impacts).

Minimizing the number of vehicles on site, trips to and from the site during construction and days spent performing construction activities would help minimize the temporary, higher noise levels within the project area that may impact local faunal species.

No measurable impacts to fauna would occur from the proposed action.

4.1.4.3 Potential Impacts to Threatened, Endangered and Sensitive Species

As discussed in Appendix A, forested areas surrounding the project area and alongside existing roadways (G-1 Road and G-2 Road) exhibit evidence of potential Indiana Bat (*Myotis sodalis*) habitat for foraging, roosting and nesting. In addition, Picatinny Arsenal has stated that an Indiana Bat was caught within the immediate vicinity of the proposed project area along the G-2 Road. The proposed action is expected to create no measurable impact on the Indiana Bat habitat because the proposed action does not include cutting of trees during construction or projectiles exiting the range into the forested area. Although operations at the proposed firing range would create noise, USFWS concluded that the proposed activities would not impact any local population of Indiana Bat, during a field consultation on July 15, 2004.

No measurable adverse impacts to threatened, endangered and sensitive species would occur from the proposed action.

4.1.5 Potential Impacts to Archeological, Historical and Aesthetic Resources

In relation to archeological resources, the proposed area of construction lies outside any identified archeologically sensitive areas according to the 2003-2008 Integrated Cultural Resource Management Plan (ICRMP) (U.S. Army 2003e). Figure 6 shows the identified archeological constraints within the proposed project area. However, the October 2003 Archeological Field Inspection, originally performed in 1997 and finalized in 2003, identified the project area as being located in the vicinity of Sensitivity Area 34. As stated in the Field Inspection report, Phase IB surface inspection and shovel testing is recommended for "undisturbed" locations within Sensitivity Area 34 (Panamerican, 2003). The proposed area of excavation for firing range construction within Sensitivity Area 34 is highly disturbed from former activities and previous UXO clearance activities. Therefore, Phase IB surface inspection and shovel testing is not recommended.

No adverse impacts are anticipated by the proposed action. However, direct, adverse impacts could result from excavation if undefined or unidentified artifacts of archaeological significance are discovered. If artifacts are unearthed during implementation of the proposed action, it could inadvertently be subjected to an adverse impact through potential displacement of a resource while operating earth-moving machinery on-site. The project area is located in the vicinity of Sensitivity Area 34. Phase IB surface inspection and shovel testing was not recommended for disturbed areas within Sensitivity Area 34. The area where excavation activities associated with range construction are proposed has already been highly disturbed from past operations and UXO clearance. Also, the proposed parking area on-site will be the location set aside for staging of debris and equipment during construction activities.
If unexpected archeological artifacts or cultural resources of significance are discovered during construction or unintentionally damaged, the property would be treated as eligible in the National Register of Historic Places (NHRP) and the property would be required to be avoided until an eligibility determination is made. All construction activities would cease in the area of the discovery until consultation with the NJ SHPO is conducted by Picatinny's Cultural Resource Manager (CRM). In addition, SOPs outlined in Section 5.10 of the 2003-2008 ICRMP must be adhered to, in accordance with federal, state and DoD regulations (U.S. Army 2003e).

The access road to the proposed outdoor firing range facility intersects an archeologically sensitive area. It is proposed that the existing access road be resurfaced with an asphalt topcoat/sealer over the existing road surface, but would not be widened or disrupted by scarification during any resurfacing activities. Because resurfacing of the access road would not result in disturbance to the underlying and surrounding ground or

roadbed, there is no measurable impact on the identified archeological resources associated with the proposed action. By only placing an asphalt topcoat/sealer along the surface of the existing roadway, any potentially existing cultural artifacts located underneath the roadway are being further preserved by this action, rather then disrupted. However, according to the 2003-2008 ICRMP, if unintentional damage occurs to the roadway or immediate area of the roadway while applying the topcoat/sealer, or during any other construction related activity, the CRM must be notified immediately of the damages (U.S. Army 2003e) and activities within the damaged area must cease until approval to proceed is granted by the CRM.

For the purpose of identifying historical resources, an evaluation of such resources has been conducted on the impacts of the proposed construction and operation activities within the project area. The 2003-2008 ICRMP for Picatinny Arsenal identified multiple actual or potential historic sites within the installation. However, none of these sites, areas, or structures is found within the immediate vicinity of the project area, and therefore there is no anticipated impact to historical resources (U.S. Army 2003e).

Construction of the firing range would result in little to no impact on the aesthetic resources of Picatinny Arsenal. The proposed action is reactivating a highly disturbed, and unutilized site in an operational state to that similar of its former purpose. The aesthetics of the site will remain primarily unchanged, except for the location of the range and the parking area.

Adverse impacts to archeological, historical and aesthetic resources would occur from the proposed action, if the aforementioned mitigation measures are not implemented and compliance to SOPs is not adhered to.

4.1.6 Potential Impacts to the Socio-Economic Environment and Environmental Justice

The proposed action would cause direct, permanent, major beneficial impacts to the socio-economic environment within Picatinny Arsenal because it would create an opportunity to redevelop a previously disturbed, inactive area of the installation and provide the U.S. Army with a much-needed environmentally friendly, outdoor firing range and training and qualification facility for local and regional law enforcement and military personnel. Also, direct, temporary and permanent, minor beneficial impacts would result due to creating jobs during construction and operation of the proposed facility.

In addition, according to the U.S. Army, Picatinny Arsenal has received numerous positive responses from potential users of the firing range facility, including state police and local law enforcement in surrounding communities. This action would enhance and complement Picatinny's mission capabilities, reduce its installation costs, and increase employment opportunities during the proposed construction and operational life of the range.

Under the provisions of Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EO 12898, 1994), no impacts to environmental justice concerns in the region would result from the proposed action because no minority or low-income populations are present within the vicinity of the proposed project area.

This section also discusses potential impacts to current land use and transportation.

4.1.6.1 Potential Impacts to Current Land Use

Construction and operation of the proposed outdoor firing range would not change the land use classification. According to the December 2003 Closed, Transferred, and Transferred Range/Site Inventory Report (U.S. Army, 2003d) the G-2 area is identified as an inactive range. Constructing and operating the proposed outdoor firing range would change the status from inactive to active thus providing a permanent, minor, beneficial impact.

Direct, temporary and permanent minor adverse impacts would result during construction and operation. The land use would change from an inactive, open area to an active construction site, then an active range that would disrupt hunting activities currently taking place. In addition, indirect, permanent minor adverse impacts would affect surrounding recreational hunting areas during facility operations, due to the loss of hunting area and displacement of small game and deer during operation of the firing range. At a minimum, a 100 yard no hunting buffer zone will be established around the range facility with the potential for prohibiting hunting in the majority of Hunting Area 8. PICA Safety Office shall make a final determination prior to operating the range. The impacts are considered minor because other hunting areas are available nearby.

The range operations would cause an indirect, minor adverse impact to public safety because although there is a locking gate at the proposed entrance to the firing range, many personnel have keys to this gate and could enter a live fire area. The Range Operations Manual to be developed would include installing appropriate safety measures such as posting signs, implementing a red flag warning system and installing separate lock mechanisms at the entrance gate to prevent unauthorized access to minimize potential safety hazards. The PICA Safety Office has indicated that additional perimeter fencing would not be required. The PICA Safety Office has also indicated through consultation with the Federal Aviation Administration (FAA) that "operation of this range will not interfere with the national airspace system"; this includes no impact to airspace operations at the Picatinny Arsenal heliport.

Small areas of land in the project area would be designated to temporarily store materials used for construction of the proposed facility. These storage areas would be located in previously disturbed areas away from contaminated or potentially contaminated and wetland buffer areas identified in this report. Materials stored on site may include lumber, concrete, foundation materials, sheet metal and steel beams and baffles. Debris and equipment storage areas would also be established during construction at the location of the proposed parking area. Debris is expected to be loaded into temporary, mobile dumpsters and removed from the site and disposed of in a municipal landfill in accordance with Picatinny Arsenal SOPs. Because the property is already identified as a developed and disturbed parcel of land classified as an inactive range, the adverse impacts created during construction are considered to be of minor significance.

4.1.6.2 Potential Impacts to Transportation

Direct and indirect, temporary and minor adverse impacts to traffic would result during construction due to an increase in construction vehicles commuting to and from the site. Also, a direct and indirect, permanent and minor adverse impact would result to traffic patterns during operational activities due to increased traffic along Lake Denmark Road. Although traffic patterns may be impacted, Lake Denmark will not be shut down at any point once the range is in normal operation. The impacts to traffic during construction would be mitigated by minimizing the number of vehicles used during construction, minimizing the number of trips the vehicles would make to and from the site, and minimizing the number of days during which construction would take place. During operation, encouraging carpooling and allowing sufficient time between shifts of user groups would minimize the traffic impact.

Minor adverse impacts to transportation would occur from the proposed action.

4.1.7 Potential Impacts to Human Health and the Environment

Potential impacts to human health and the environment could result from known or suspected soil contamination at the site resulting from past activity and from proposed operation of the firing range.

However, any existing contamination is both unrelated to the proposed action and outside the immediate area where the range would be constructed. In addition, the range design includes safety and containment features that will minimize potential release, exposure and therefore, impacts resulting from the proposed action. These built-in design features, combined with redundant safety, health and environmental compliance standard operating procedures and implementation of adaptive management measures, as needed, will ensure that there are no appreciable impacts to human health and the environment associated with lead and other constituents during construction and operation of the range. Collectively, this aforementioned information is identified as Environmental Protection Provisions, which are discussed in more detail in Appendix F. Some of the most relevant Environmental Protection Provisions are summarized in the sections below.

The assessment of impacts to human health and the environment from operation of the range in regards to air, surface water, groundwater and soil is summarized below. Potential impacts associated with existing or potential contamination from past uses of the site and potential impacts associated with occupational and range use hazards, and an assessment of health risks associated with range closure are also discussed.

Air Resources

The most recent computer model used in performing the health risk assessment for exposure to lead in air from all Arsenal operations predicted that the proposed G2 operation would contribute a worst-case maximum 24-hour average ambient air concentration of 0.0031 µg/m^3 at ground level at the Picatinny Arsenal property line where maximum impacts from all Arsenal operations occurred. This is far below the NJDEP criterion of 0.1 ug/m^3, or a Hazard Index of 1, considered to be "…no appreciable health risk…" to children who are the most sensitive, and to the public (NJDEP, 1994). The Arsenal's maximum impacts were found to occur at the Picatinny Arsenal property line nearby the Open Burning Grounds. Therefore, range operations are considered to have no appreciable risk via the air pathway of exposure. See Section 4.1.1.1 for a detailed description of the air health risk assessment.

Surface Water and Groundwater Resources

There would be no direct impacts to human health and/or the environment from surface water resources related to the proposed action, because no surface water resources exist within the project area. While there is some level of risk associated with operation of any range, as projectiles will be fired, in this case, the risks are not highly uncertain. The uncertainty is reduced through the use of redundant safety, containment and environmental control measures in the proposed action's design, standard operating procedures for the proposed range and use of adaptive management measures.

Potential impacts to human health and the environment are directly reduced by use of the NJDEP health risk-based soil and impacts to groundwater cleanup criteria and NJPDES effluent limits for surface water discharges as part of range operation procedure. These standards have been developed on a chemical-specific basis and are designed to prevent unacceptable risks. Their use in compliance with NJDEP regulations assures the control of any adverse impacts to human health and the environment.

The following summarizes the control measures described in Section 2.1, Appendix F and other areas of the document, applicable to surface and groundwater resources that would be implemented during construction and operation of the proposed action to ensure the range would not result in adverse impacts to human health and/or the environment:

- Implementing BMPs during construction and operation of the range to prevent the migration of lead and other metals in accordance with EPA's BMPs for Lead at Outdoor Shooting Ranges (EPA, 2001).

- Installing an engineered system to collect and treat stormwater runoff or water that percolates through the surface soils in the vicinity of the berm. The engineered system will include:

    1. Impermeable barriers placed several feet below grade beneath and in front of the impact berm to capture the water that percolates though the soil and direct it to through a lined drainage trench to a treatment system for removal of metals.

    2. A passive treatment system utilizing Metsorb, a proprietary innovative technology for metals adsorption that was developed by Stevens Institute of Technology and Hydroglobe and tested at Fort Dix, New Jersey.

    3. Tanks for temporary storage of pre and post treated water prior to discharge. Concentrations of up to approximately 400 ppb could be stored in the pretreatment tank. Sampling and analyses would be conducted prior to discharge as described in Appendix F

    4. Monitoring points to test the treated water and groundwater monitoring wells located upgradient and downgradient of the proposed firing range for routine monitoring of potential metals concentrations in groundwater.

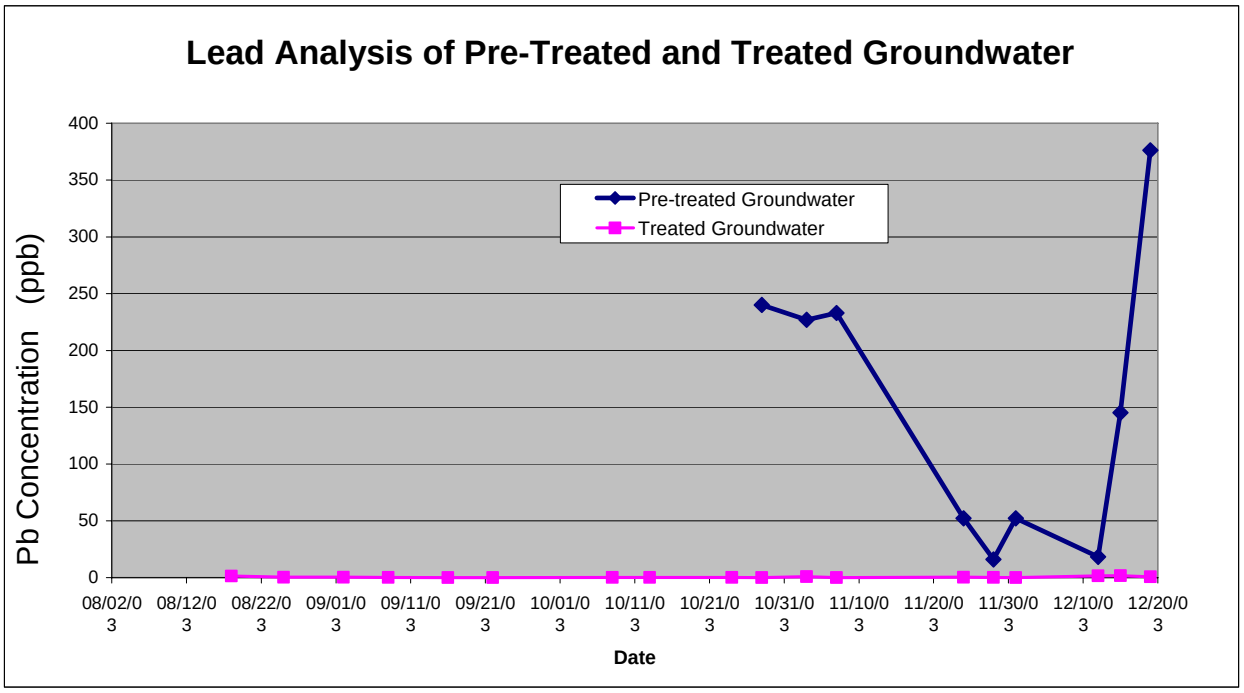
- Conducting compliance monitoring during operation of the range and implementing remedial action in accordance with applicable permits and regulations if the levels detected exceed the regulatory criteria established (effluent limits for discharge to ground water would be determined in the permitting process for treated water effluent).

- Performing physical removal of lead from soils, periodic testing of soils, removal of soil hotspots

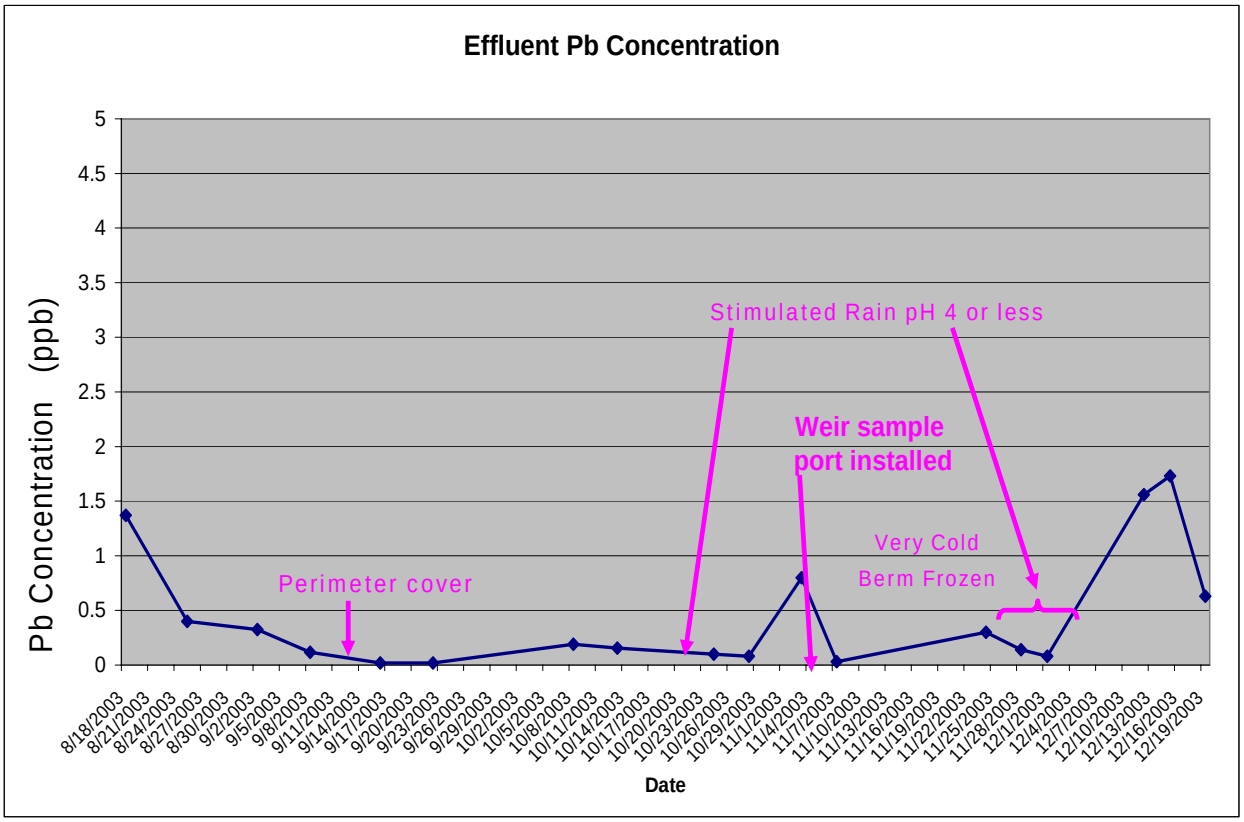
and other actions to inhibit migration of lead and other constituents to surface and groundwater.

The following charts illustrate the results of lead analyses of pre-treated and treated water from the Metsorb Demonstration study at Fort Dix Range 26. This study was based upon leaching heavily contaminated soils containing projectiles with simulated acid rainfall to simulate worst-case conditions (100 year storm design). The influent analytical results were between 2 and 375 ppb. The effluent analytical results were between non-detect and 2 ppb. Hydroglobe, the proprietor of Metsorb has indicated that higher removal rates can be achieved with design modifications. The data indicates that the lead concentrations in the treated stormwater from the range can be reduced to levels that would be in compliance with NJDEP standards.

Ft Dix Range 26 Pilot Test Influent and Effluent Results



Ft Dix Range 26 Pilot Test Effluent Results



Soils

There would be a direct, permanent and minor adverse impact to soil resources related to the proposed action because projectiles containing lead and other constituents will be fired into the earthen impact berm. If the projectiles remained in the soil and there were no environmental control measures in place to inhibit migration of the lead, there could be adverse impacts to human health and the environment.

While there is some level of risk associated with operation of any range, as projectiles will be fired, the risks related to the proposed action are not highly uncertain. The uncertainty is reduced through the use of redundant safety, containment and environmental control measures in the proposed action's design, standard operating procedures for the proposed range and use of adaptive management measures. This includes compliance with health risk-based soil cleanup criteria established by the NJDEP.

The following summarizes the control measures described in Section 2.1 and other areas of the document, applicable to soil resources to be implemented during construction and operation of the proposed action to ensure the range would not result in adverse impacts to human health and/or the environment:

- Impermeable barriers that would inhibit lead from migrating vertically downward and impacting subsurface soils below the liner.

- Pretreatment of effluent to levels that are protective of human health and the environment prior to discharge to groundwater/soil.

- Performing physical removal of lead/projectiles from the impact berm
- Performing physical removal of lead/projectiles from the range floor and application of lime to reduce leaching potential.
- Conducting compliance monitoring during operation of the range (collecting and analyzing samples of surface soil).
- Physically removing soil "hot spots" outside of the area of the berm containing engineering controls as and adaptive management measure, should analytical results of compliance monitoring samples exceed the health risk-based NJDEP soil cleanup criteria.

The above range design features, combined with appropriate operating procedures and adherence to adaptive management measures will ensure that there are no impacts to human health and the environment associated with lead and other constituents during operation of the range. Note that the current NJDEP soil cleanup criteria applicable to operation of the range are the Non-Residential Direct Contact Soil Cleanup Criteria (NRDSCC). The current NRDSCC for lead is 600 mg/kg. The operations manual would specify this level for conducting a "hot spot" removal action. The NJDEP has proposed Soil Remediation Standards. When these standards are adopted, actionable lead levels would be re-evaluated at this site and other sites at Picatinny Arsenal.

Potentially Contaminated Areas

This section discusses potential impacts associated with potentially contaminated areas identified or suspected to exist in the project area. Figure 7 presents the potential areas of environmental concern. Soil contamination (existing or potential) was not identified in areas where excavation, grading or range operations are proposed. Known or potentially contaminated areas of concern in the project area identified in this EA report include the following:

- Lead contaminated soils in the vicinity of Former Building 3566.
- Lead and barium contaminated soils in the vicinity of UXO test pit TP-05.
- Potential contaminated soils in the vicinity of a former electrical switch box and in the vicinity of drums identified at two locations adjacent to the project area.

The lead and barium contaminated soils in the project area (but outside the area where excavation or grading is proposed) are small, isolated areas containing concentrations below the NRDCSCC. Small isolated areas with concentrations below NRDCSCC are generally not remediated at Picatinny Arsenal unless there is an unacceptable risk (e.g., potential impact to a nearby sensitive receptor).

A Human Health Risk Assessment prepared as part of the Feasibility Study for Group III, and reported in the IAP, identified Site 1 (which is the G2 Area) as having a medium risk rating status. A screening level Human Health Risk Assessment (reflecting existing conditions and unrelated to any analysis of the proposed action) was also done as part of the 2001 Remedial Investigation by IT Corporation (IT, 2001b). In that screening level assessment, Site 1 was screened out from further consideration as levels of contamination detected did not exceed any applicable health-based soil standards or risk-based concentrations. This indicates that at present, both cancer and non-cancer risks are at acceptable levels, i.e., below a 1×10^{-4} level for carcinogenic effects and a non-carcinogenic effects Hazard Index of less than 1.

The contaminants of concern (COCs) identified at the site were metals in soil and sediment. The EAO is currently evaluating the areas where drums were observed. As stated above, soil contamination (existing or potential) was not identified in areas where excavation or grading related to range construction is proposed. Construction and operation of the range is not anticipated to contribute to the cumulative impact to COCs present at this site, as it is outside the area where contamination was detected, soil management SOPs will be followed and the range soils will be maintained at levels within applicable soil cleanup criteria for range-related constituents. Therefore, operation of the range would have no measurable impact to the risk level for the site. In addition, construction and operation of the range would not impact future remedial actions (e.g., a removal action) that may be required upon completion of the FS, as it is outside the area(s) of concern.

Occupational and Range Use Hazards

Indirect, permanent and minor adverse impacts to firing range maintenance staff could occur due to potential exposure to lead and other constituents contained in the impact berm soil. Indirect, temporary and minor adverse impacts could affect range staff and users due to the potential exposure of lead dust and explosive residue generated during weapons firing and/or during periodic projectile removal.

Potential impacts associated with lead exposure would be minimized by following worker protection guidelines and regulations specified by OSHA (29 CFR 1919.132, 1910.120 and 1926) (29 CFR, 1970), EPA's BMPs for Lead at Outdoor Shooting Ranges (EPA, 2001) and U.S. Army SOPs during construction and operation activities.

Indirect, permanent and minor adverse impacts during operation activities could result to users and staff from exposure to noise levels while operating firearms, thus creating the potential for hearing loss in users and staff at the outdoor firing range. Use of appropriate hearing protection and adherence to occupational hearing conservation programs would mitigate these impacts to hearing. Guidance related to hearing hazards and industrial noise is contained in AR 40-5 (U.S. Army, 1990) and DA PAM 40-501 (U.S. Army, 1998c). These potential adverse impacts are considered minor because following worker protection guidance and hearing conservation programs render them largely preventable.

Range Closure

If the range were to be closed at some point in the future, as discussed in Section 4.1.8, there would be some irreversible and irretrievable commitment of resources. Closure would likely involve an assessment of existing conditions and applicable standards to determine regulatory requirements and appropriate closure activities. Removal of range structures, revegetation of the range area and final berm cleanout are anticipated. Compliance monitoring and remediation would be conducted as required at the time of closure. At this time, a Human Health Risk Assessment is not required by NJDEP for small arms range closure, as the cleanup criteria are already health-based (ITRC, 2003).

In terms of impacts to human health and the environment, the range design features, standard operating procedures and adherence to adaptive management measures will ensure that there are no appreciable impacts to human health and the environment associated with lead and other constituents associated with closure of the range. The range would be constructed and operated as an environmentally-friendly, state-of-the-art facility and be maintained to manage any potential adverse impacts. Clean closure is the ultimate expected result.

4.1.8 Irreversible and Irretrievable Commitment of Resources

The proposed action would not commit the project area to a permanent use as an outdoor firing range, thus the action is not irreversible. The proposed area for construction is inactive, and there are no buildings, utility or manpower resources being lost as a result of the proposed action. Labor and machinery resources committed during construction would be irretrievable; however, resources expended on range components such as moveable targets, side berms, baffles, firing line cover and the engineered runoff collection system could be retrieved and utilized at another location.

If at some time the proposed outdoor firing range should no longer be used, it could be removed and the site could be regraded and revegetated with new trees, with natural forest succession allowed to occur. However, the lead and other metals contained in soils within the impact berm would require either remediation approved by the Army and either NJDEP or EPA per the appropriate authority, or beneficial reuse of the soil such as relocation and placement as an impact berm at another outdoor firing range within Picatinny Arsenal if such reuse is permitted at the time of closure.

4.1.9 Relationship between Short-Term Uses and Long-Term Productivity

The proposed action consists of the long-term conversion of highly disturbed, inactive land within Picatinny Arsenal to an operational outdoor firing range facility. Short-term uses associated with the proposed action would include the temporary storage of construction equipment on-site, including vehicles, materials, dumpsters and temporary bathroom facilities. Also, a temporary increase in human occupancy of the site would occur while construction workers are traversing through the project area.

The operation of the firing range would enhance the long-term productivity of Picatinny Arsenal by providing a small arms outdoor firing range that would be used for the training and qualification of U.S. Army personnel, Picatinny Arsenal police and local law enforcement agencies. This improves personnel readiness and capability. The facility would also provide an area for demonstrating innovative technologies for lead removal developed at Picatinny Arsenal, thus increasing the productivity and commitment of Picatinny Arsenal in environmental stewardship. Currently, the project area does not contribute to productivity at Picatinny Arsenal as it is not being utilized and contains no structural assets.

4.1.10 Potential Cumulative Impacts

Cumulative impacts result from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions. The scope of cumulative impacts is also important to consider. This analysis considers cumulative impacts at the proposed project site and installation scale.

Former uses at the G-2 Area include a drop tower test facility for shipping containers, flare tests in the early 1980s and, more recently, training for anti-mech/defensive combat and offensive combat and helicopter operations (U.S. Army 2003a). These former uses of the land have left it highly disturbed. The site is currently unutilized and classified as an inactive range. The proposed construction, operation and maintenance of the range would have a net positive, cumulative impact on the proposed project location and the Picatinny facility, as demolition rubble and debris, concrete foundations and other evidence of past disturbance would be cleared and the site would become active.

Future plans have not been formulated for construction of any additional facilities at the proposed site location, or in the overall G-2 Area. The proponent acknowledges that any additional development in the project area would require analysis to evaluate potential impacts, in accordance with NEPA and

applicable U.S. Army regulations. At the installation scale, Picatinny Arsenal has indicated that the construction of the proposed facility would provide a beneficial impact to its Homeland Security mission. The proposed facility would also provide a cumulative beneficial impact on the Rangesafe Technology Demonstration Initiative program based at Picatinny Arsenal, providing a facility to conduct environmental technology demonstrations in a setting that is protective of safety, human health and the environment.

Potential cumulative impacts that could occur from the operation of the range include noise and environmental impacts associated with lead and other metals being released to air, soil and water. The potential cumulative impacts to these resources are discussed below.

Potential cumulative impacts may result from the noise that would be propagated during operation of the firing range. These potential noise impacts would contribute to the cumulative impact of the Picatinny Arsenal noise profile. However, as indicated in section 4.1.1.2, the noise that would be generated is anticipated to be a minor concern. The proponent would implement noise abatement measures, if warranted, to reduce the noise levels to assure compliance with U.S. Army and NJDEP regulations. The creation of Noise Zone II and III in the project area would add to the areas within Picatinny Arsenal where there are restrictions on certain kinds of land uses (i.e., residential, public meeting places). However, as indicated in section 4.1.1.2, these impacts are considered minor because the areas where these Noise Zones would occur are not suitable for development because of other environmental restrictions.

Potential cumulative impacts could result from the release of lead and other metals into the environment (air, soil, water) during operation of the range. The risk assessment for lead impacts to air indicated that emissions generated from operation of the range would not exceed any regulatory thresholds and there is sufficient room in the netting analyses now to accommodate the small increase in emissions. Emissions from the range would need to be included in future emission netting analyses.

A detailed lead emissions impact analysis was prepared for assessing current Picatinny Arsenal operations vs. current operation plus the proposed outdoor firing range, see Appendix G for this impact analysis report. This impact analysis predicted a worst-case maximum 24-hour average ambient air concentration of 0.0031 ug/m^3 for lead emissions from the proposed range at the Picatinny Arsenal property line where lead impacts are maximum from all Arsenal opererations. Considering all Picatinny Arsenal property line locations, the impact analysis predicted a worst-case maximum 24-hour average ambient air concentration of 0.069 ug/m^3 from the proposed range, which is below the short-term (24-hour average) exposure level considered by NJDEP to have no significant risk to prenatal and/or child development. Additionally, when adding all Arsenal operations to the analysis, the worst-case maximum 24-hour average ambient air concentration increased to 0.073 ug/m^3 at that location, remaining below the 'no significant risk' level. Also, the study indicated ambient air quality impacts of lead emissions from current Picatinny Arsenal operations are well below the National Ambient Air Quality Standard (1.5 ug/m^3). As a result, the cumulative air impacts from operation of the outdoor firing range with the current operations does not exceed current regulatory standards (NAAQS for Lead), and is below the NJDEP 'no significant risk' level, therefore, the cumulative impacts are considered insignificant. Picatinny Arsenal's plans to construct and operate the outdoor firing range will not cause a significant increase to these impacts. The overwhelming contributor of lead emissions from the Arsenal is the current Open Burning operations. The proposed outdoor range does not contribute to these air impacts from the current burning operations based on the limited emissions from the outdoor range and significant distance between these two sources. Therefore, the cumulative impacts from current operations plus the proposed outdoor range remain well below the NAAQS, and therefore are considered insignificant.

Cumulative impacts to soil and water are addressed in the design of the proposed action. This includes the installation of an engineered system to collect and treat storm water runoff and water that percolates through the surface soils in the vicinity of the berm. It would also inhibit the migration and potential impacts of lead and other metals to downstream surface waters and the underlying groundwater. During operation of the range, periodic testing of treated stormwater, groundwater and surface soils would be performed for compliance monitoring and remedial action would be implemented in accordance with applicable permits and regulations if the levels detected exceed the regulatory criteria established for each media. The range design features, combined with appropriate operating procedures and adherence to adaptive management measures would ensure that there are no cumulative impacts to human health and the environment associated with lead and other metals during operation of the range.

Picatinny Arsenal is an active installation that supports research and development of armaments and has supporting functions in Homeland Defense and Security. Therefore, various installation- and tenant-sponsored projects are routinely implemented to address the current needs of the U.S. Army. To ensure compliance with NEPA and other applicable statutes and regulations, Picatinny follows an adaptive management methodology by reviewing proposed projects against existing installation management plans, NEPA documentation, other applicable documentation and by creating new documentation, as necessary. As such, Picatinny Arsenal assesses each project through the NEPA process and Army regulations. There are cumulative impacts to consider on a continual basis as projects are planned and implemented. The proposed action does not result in a significant change to the overall impacts to human health, environment and other resources of Picatinny Arsenal.

4.2 NO-ACTION ALTERNATIVE

The no-action alternative does not involve the construction of an outdoor firing range; therefore, the no-action alternative does not impact land use, air resources, water resources, soil and geologic resources, biological resources, socio-economic conditions, transportation, recreation or hazardous materials and conditions. However, the no-action alternative would not meet the stated need or mission of Picatinny Arsenal and would not result in the potential beneficial socio-economic and aesthetic impacts of the proposed action.

5.0 CONCLUSIONS

This EA was prepared to evaluate the potential impacts on the natural and human environment from activities associated with the Army's proposal to construct and operate a small arms outdoor firing range in the G-2 Area at Picatinny Arsenal. The EA examined two alternatives in detail, the proposed action and the no-action alternative, as described in Section 2.0.

The EA has evaluated potential impacts to land use, air quality, noise, topography, geology and soils, water resources, wetlands, biological resources, cultural, historic and aesthetic resources, socioeconomics and environmental justice, transportation and hazardous materials and conditions. Cumulative impacts were also assessed.

The proposed action would result in direct, permanent and major and beneficial impacts to the socio-economic environment by providing the Army with an environmentally friendly outdoor firing range, and a training and qualification facility for local and regional law enforcement and military personnel.

Based on the analyses presented in this EA, which are summarized in the table presented in Appendix B, and the information provided by all consulted personnel listed in Table 5-1, the proposed action would have minor to no adverse impacts to the resources examined. The proposed action would cause minor

adverse impacts to several resources at the proposed site. The proposed action does not result in an appreciable change to the cumulative impacts to human health, environmental and other resources of Picatinny Arsenal. Potential adverse impacts that would result from construction and operation of the range would be avoided or reduced through the implementation of a variety of engineered features and BMP's that are included in the design of the proposed action, BMPs included as construction and operation procedures, and would be implemented as adaptive management measures during construction and operation as needed.

The conclusion of no significant impact is predicated upon implementation of the BMPs, mitigation and adaptive management measures during construction an operation of the range. Collectively, the BMPs, mitigation and adaptive management measures to be implemented have been identified as Environmental Protection Provisions (Appendix F) in this EA. These Environmental Protection Provisions include safety, measures to prevent lead migration, measures that are protective of soil, surface water and groundwater and environmental monitoring. The additional environmental documentation required to be prepared for this project prior to construction and operation, as identified in Appendix F, further details and specifies procedures for implementation of the Environmental Protection Provisions, thus ensuring that the proposed outdoor firing range can be constructed and operated in a manner that is protective of human health and the environment. The most relevant Environmental Protection Provisions are summarized below.

Safety

- Perform construction and operation activities in accordance with an approved Health and Safety Plan in accordance with OSHA, U.S. Department of Labor, as well as any other Federal, State or local applicable statutes or regulations.
- Install firing line cover for projectile containment and noise abatement.
- Install continuous modular concrete sidewalls and an overhead replaceable baffle system
- Install safety and security measures (posting signs, red flag warning system, etc.).
- Establish and maintain a no hunting buffer zone extending a minimum 100yds around the entire facility.

Noise

- Install earthen impact berm that will attenuate sound.
- Conduct a noise test during the initial startup period of the range to determine noise levels at the closest off-post residence and public meeting place.
- Implement additional noise abatement measures, if warranted, to further attenuate sound thereby ensuring the noise levels do not exceed the New Jersey regulated noise level and/or comply with the U.S. Army's Environmental Noise Abatement Program. Such measures include, but are not limited to back berms, sand bags, acoustical coatings on sidewalls, baffles and the firing line cover, insulation and sound boxes and tubes.

Prevention of Lead Migration

- Install vegetative cover, a liner beneath the impact berm and filter beds, use ground contouring and use an earthen backstop as prevention measures.
- Install an engineered system to collect and treat stormwater runoff and water that percolates through the surface soils in the vicinity of the berm.
- Conduct pretreatment of effluent to remove lead to below applicable regulatory levels that are protective of human health and the environment prior to discharge.

- Collect and analyze samples of the effluent discharge water stored in the treated water holding tank prior to discharge to ensure effluent is below applicable regulatory levels and safe to discharge; include option (as contingency plan) for disposal of the water if effluent is not below the applicable regulatory level.

Protection of Soils

- Prior to construction, collect and analyze samples of the surface soils and subsurface soils to establish background concentrations of lead and other metals in the footprint of the range and parking area.
- During construction, implement environmental protection measures (e.g. liner, filter beds) to inhibit lead and other metals from migrating to soils beyond the impact berm area.
- Physically remove and recycle lead/projectiles from the impact berm during operation of the range to minimize projectile fragmentation and leaching of lead.
- Physically remove lead/projectiles from the range floor and apply lime to maintain soil pH at a range of 6.5 to 8.5 to reduce leaching potential.
- During operation of the range, collect and analyze samples of surface soil from the range floor (away from the impact area that is protected by liner) to ensure operation of the range is protective of human health and the environment.
- Implement site investigation/remedial actions in accordance with the NJDEP Technical Requirements for Site Remediation (TRSR) if results of samples collected from the range floor exceed the NJDEP current health-based Non Residential Direct Contact Soil Cleanup Criteria (NRDCSCC).

Protection of Surface and Ground Waters

- Prior to construction, collect and analyze samples of the groundwater to establish background concentrations of lead and other metals in the project area.
- Prior to construction, install two groundwater monitoring wells in accordance with N.J.S.A. 58:4 to monitor potential discharges to groundwater upgradient and downgradient of the range. Alternatively, evaluate existing well system to determine if these wells are adequate to monitor potential discharges.
- During construction, install stormwater control measures and follow BMPs to minimize sediment loads in stormwater runoff.
- During construction, implement BMPs and collect and treat runoff water during operation to inhibit lead and other metals from impacting the groundwater
- Obtain approval (and applicable permit) from NJDEP including establishing effluent discharge monitoring and sampling to ensure operation of the range is protective of human health and the environment.
- Monitor treated effluent through sampling and analyses to ensure operation of the range is protective of human health and the environment.
- Monitor groundwater through sampling and analyses to ensure operation of the range is protective of human health and the environment.
- Implement site investigation/remedial actions in accordance with the NJDEP TRSR if results of samples collected from the groundwater monitoring wells exceed the NJDEP current health-based Ground Water Quality Standards (GWQS)

Environmental Monitoring

Environmental Monitoring includes sampling to be performed prior to construction to establish background levels in soils and groundwater and sampling to be performed during operation of the range to ensure the range is operated in a manner that is protective of human health and the environment. Environmental monitoring to be performed during operation of the range includes:

1. Surface soil samples from range floor (compliance monitoring)
2. Treatment train influent water samples (performance monitoring)
3. Treatment train effluent water samples (performance and compliance monitoring)
4. Groundwater samples from groundwater monitoring wells (compliance monitoring)

The preparation of an EIS is not warranted at this time. This decision would be documented through a finding of no significant impact (FNSI).

Table 5-1 lists personnel consulted in the preparation of this EA report. Table 5-2 lists personnel responsible for the preparation of this EA report.

Table 5-1: CONSULTED PERSONNEL

NAME	FUNCTION	OFFICE	EXTENSION	INTERVIEWED
Dave Banashefski	Site Development Director	AMSRD-AAR-EMB	4369	Yes
Joe Clark	Hazardous Materials	AMSTA-AR-PSE	5951	Yes
Tim Dewald	Industrial Hygiene	AMSTA-AR-PW	8458	Yes
Ted Gabel	Site Remediation Manager	AMSTA-AR-PSE	6748	Yes
Edward Pinson	Safety Office	AMSTA-AR-CO-JCI	2977	Yes
Gil Myers	NEPA Specialist	AMSTA-AR-PSE	5957	Yes
Kelly Ridgel	Cultural Resource Manager	AMSTA-AR-CO-JCI	8014	Yes
Jonathan Van De Venter	Natural Resource Manager	AMSTA-AR-PSE	4691	Yes
Annette Scherer	Senior Endangered Species Biologist	U.S. Fish and Wildlife Service	609-646-9310	Yes
Dr. William Russell	Program Manager Army Operational Noise	USACHPPM	(410) 436-3829	Yes
Ernesto Vazquez	ARDEC Ricochet Modeling/Simulation Competency Expert	AMSRD-AAR-AEM-A	(973)724-2758	Yes

Table 5-2: LIST OF PREPARERS

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Figures

Appendices

Attachments