# Draft Finding of No Significant Impact (FNSI)
# For
# Building and Operating a Fragment Containment Test Stand for Conducting Munitions Testing at Picatinny Arsenal, New Jersey

## BACKGROUND

In April 2008 a rogue fragment from a static detonation travelled off the installation and damaged private property. As a result of that action, open detonation munitions testing at Picatinny Arsenal was suspended. Subsequently tests were moved to another military installation (Aberdeen Proving Grounds), to the Research and Development Contractor's test facility, or to a commercial test services provider (e.g., National Technical Services Corporation in Camden, Arkansas). Moving explosives from Picatinny Arsenal to these facilities requires additional logistical, transportation and security measures adding to the research costs and schedule.

The Armament Research, Development, and Engineering Center (ARDEC) at Picatinny Arsenal conducts research, development and engineering of conventional munitions used by the Army and the Department of Defense. In its mission to research, develop, and engineer conventional munitions, the ARDEC is required to conduct engineer tests to verify design and performance. Engineer tests include ballistic and stationary or static tests to subject the munition to its gun launch environment and to subject it to stationary tests to determine its function, performance, reliability, and safety characteristics. The range of items undergoing engineer tests by ARDEC includes propellant charges, pyrotechnics, fuzing, infantry munitions, cannon-caliber munitions, engineer munitions, mortar and artillery projectiles, tank ammunition, warheads for precision munitions, and submunitions. Stationary or static engineer tests that are conducted include functioning tests (static detonation), slow cook off tests, sympathetic detonation tests, and tests to determine the response of the munitions to external threats such as fragments, bullets, and shaped charge munitions. Such threats are present in the battlefield and are created by the opposing combatant forces with their weapons and munitions.

Each test day will involve on average two to four tests (for all tests, except slow cook-off tests). The Army proposes to annually conduct up to 400 tests inside the fully-enclosed,

steel-reinforced concrete FCTS with a total net explosive weight not to exceed 2,400 pounds.

## ALTERNATIVES CONSIDERED

This Environmental Assessment (EA) identifies and evaluates alternatives for resuming static detonation testing at Picatinny Arsenal. This EA discusses three alternative designs for a facility to achieve the ARDEC Director's requirement of having a 99.9999999% confidence level of containing test fragments generated during munitions testing. Each of the three alternative designs offered varying level of attainment of the 99.9999999% fragment containment confidence level. The preferred alternative included design features that to the extent practical, attained confidence levels approaching the 99.9999999% for static detonation tests. The exception to achieving the confidence level are those involving bullet and fragment impact tests. These two tests require the opening of a small ten-inch by ten-inch port in which fragment and bullets can enter the test chamber and strike the munition. This small opening, potentially, can facilitate the escape of fragments generated during testing. However, the opening is located four feet above ground and is oriented parallel to the ground. Any fragment escaping through this opening will likely be stopped by the external equipment to perform the tests and the surrounding terrain. Additional measures, such as the addition of external fragment shields, maybe adopted based on further design refinements and future operating experience to further reduce the likelihood of fragments during the fragment and bullet impact tests.

Two alternative designs were considered and ultimately rejected because they did not provide the level of fragment containment required.

1. An all-steel structure was discarded because it would not likely provide the required 99.9999999% confidence level of containing fragments from munitions testing. Additionally, the fabrication cost and long-term maintenance costs for the facility were excessive. Construction would be labor intensive and require people highly skilled in steel assembly and welding. There was also concern over the ability of welds to withstand the blast pressure of daily munitions testing. See Figures A-1 through A-3, Appendix A of the Environmental Assessment.

2. The pre-cast concrete FCTS design was discarded because it did not meet the requirement for fragment containment (See Figures A-4 through A-6). The walls and roof of this alternative were made of steel-reinforced, pre-cast concrete, and the interior surfaces would be lined with steel plates. However, there were four large openings through which fragments could escape to the open atmosphere.

To meet mission and environmental requirements, the location of the proposed FCTS needs to meet the following requirements:

- Year round access by construction equipment, material handling equipment, large supply vehicles, and fire and safety vehicles;
- Sufficient buildable area to build the FCTS;
- Sufficient electrical power to run test data acquisition and recording, and slow cook-off ovens;
- Minimize and/or control infiltration of residue into groundwater and streams;
- Minimize and/or control adverse impacts on wetlands and riparian habitats;

## THE PREFERRED ALTERNATIVE

The proposed design for the fragment containment test stand (FCTS) is a fully-enclosed steel-reinforced concrete structure with four-foot thick floor, walls, and roof. The floor and walls will be covered with 4-inch thick steel plates. The ceiling will be covered with 2-1/2 inch steel plates. This FCTS will have a solid steel blast door, and specially designed ports for cameras and four vents in the ceiling to vent gases created during munitions testing (See Figures A-7 through A-12). The vents were designed to contain fragments inside the test stand (See Figure A-12). This is the Preferred Alternative for the design of the FCTS.

To meet the containment, security, access, land area and environmental requirements, it was determined that a totally-enclosed steel-reinforced concrete FCTS, located at Test Range (TR) 616 will be the best on-site alternative. This is the Preferred Alternative for the location of the FCTS.

## SUMMARY OF THE ANALYSIS

Analysis determined that building the fully-enclosed, steel-reinforced concrete FCTS would have long-term positive impact on:

- Safety, because of the three possible concepts, the preferred alternative offers the best possible solution to achieving the required 99.9999999% confidence level of containing fragments generated during munitions testing;

- Natural resources, because there would be no risk of fragments from munitions testing wounding wildlife and no risk of fragments embedding themselves in trees and vegetation near the test site;

- Noise, because the steel-reinforced concrete FCTS would absorb much of the sound energy generated from munitions testing, reducing the magnitude of the noise reaching inhabited areas on the installation and the surrounding community;

- Hazardous waste because fragments, potentially contaminated with explosive constituents, would remain inside the FCTS where they could more easily be collected for proper treatment or disposal.
- Water resources, to include surface and groundwater. Prior to April 2008, testing munitions was conducted on open stands, with dust, particulate matter and explosive residue being disbursed on open ground. This residue can migrate to surface and/or groundwater. Conducting munitions testing within the fully-enclosed FCTS limit the amount of particulate matter that could migrate to water resources;
- Air Quality, because some portion of the dust and particulate generated from munitions testing will remain inside the FCTS;
- Traffic safety, because there would be no further requirement to transport explosive munitions on roadways to other test facilities.

Building the FCTS will have a short-term minor positive impact on the local economy. Building the fully-enclosed steel-reinforced concrete FCTS will require purchasing local products, such as forming lumber, concrete, and other materials from suppliers in the area near Picatinny Arsenal, and may also provide some short-term employment opportunities.

There would be minor short-term negative impacts on air quality resulting from dust and emissions generated during the construction process. Some additional dust may be generated during excavation, and there will be some minor additional emissions from construction vehicles during the eight-month construction period. Any potential dust generated during construction period can be mitigated by spraying water on the soil during excavation. There also will be long-term positive impacts on air quality – it is expected that some percentage of the dust and unexploded constituents from munitions testing will be remain inside the totally-enclosed test stand. This would have a positive effect on air quality compared to the earlier practice where dust and explosive residues were emitted into the atmosphere.

Conducting munitions testing within the proposed fully-enclosed test stand would likely have a positive impact on both vegetation and wildlife. Under previous operating conditions, fragments from munitions testing could injure or kill wildlife and would become imbedded in trees. Conducting munitions testing within a totally-enclosed structure will eliminate the risk to wildlife and eliminate the potential of fragments becoming embedded in trees.

Table 1. Alternative Analysis Matrix, Building the fully-enclosed steel-reinforced concrete FCTS

| Valued Environmental Component | No Action Alternative | Build the FCTS (The Preferred Alternative) |
|---|---|---|
| Airspace | No impact | No impact |
| Air Quality | No impact | Short-term minor negative impact. Long-term positive |
| Cultural Resources | No impact | No impact |
| Energy | No impact | No impact |
| Environmental Justice | No impact | No impact |
| Facilities and Infrastructure | No impact | No impact |
| Floodplains | No impact | No impact |
| Hazardous Material & Hazardous Waste | No impact | Long-term minor positive |
| Natural Resources | No impact | Long-term positive impact |
| Noise | No impact | Long-term positive impact |
| Safety | No impact | Long-term positive impact |
| Socioeconomics | Long-term negative impact | Short-term positive impact |
| Soil Erosion | No impact | Minor short-term impact |
| Solid Waste | No impact | No impact |
| Threatened & Endangered | No impact | No impact |
| Traffic and Transportation | Long-term negative impact | Short-term minor negative impact; long-term positive |
| Water Resources | No impact | Long-term positive impact |

Conducting munitions testing inside the fully-enclosed FCTS will likely have a positive impact on water resources. Being fully-enclosed and water-proof, unexploded constituents from munitions testing will be contained in the FCTS and collected after every test, precluding these constituents from migrating to surface waters and groundwaters.

Construction activities will require excavation and soil movement and which create opportunities for soil erosion, resulting in a negative impact on surface water quality. This could create a negative effect on soil erosion could contribute additional sediment to surface waters.

There will be a short-term minor negative impact on traffic and transportation during the construction period. The estimated workforce of 10-15 persons will have a negligible contribution to the existing traffic congestion on roadways leading to the installation. Overall, construction vehicles will have a minor impact on traffic on local roadways, and

a negligible impact on the installation. There could be higher level impact on the three days during which the concrete will be poured. During these three days, assuming eight cubic yards of concrete per truck, pouring the slab will require approximately 27 trips by concrete trucks, the walls 33 trips, and the roof 24 trips. To minimize the potential impact on traffic congestion on local roadways leading to Picatinny Arsenal (NJ Route 15 in particular), concrete pouring will be scheduled to begin after the morning peak traffic period.

Table 2 provides a matrix of the alternative sites for building the FCTS using the evaluation criteria listed above. This matrix indicates that Test Range (TR) 616 is the preferred site for building the FCTS.

Table 2. Matrix of alternative analysis for siting the FCTS.

| | Year-round Access | Sufficient Area | Electrical power | Potential Impact to Surface water | Impact wetlands/ Riparian area |
|---|---|---|---|---|---|
| Alt 1 No Action | | | | | |
| Test Range 616 | + | + | + | + | + |
| Test Range 650 | + | + | + | - | - |
| Test Range 654 | - | + | + | + | + |
| Test Range 670 | + | - | + | + | + |
| Test Range 1222 | - | + | + | - | - |

## MITIGATIONS

Construction activities, particularly excavation and soil movement, could have a minor negative impact on local air quality. The contractor will be required to implement dust suppression best management practices.

Construction activities will require excavation and soil movement and which create opportunities for soil erosion, resulting in a negative impact on surface water quality. The construction contractor will be required to install and maintain best management practices to prevent and control soil erosion from the construction site.

The State Historical Preservation Officer has concurred there is little risk to uncovering or damaging resources of historical or cultural value. Regardless, the construction contractor will be briefed on the potential of finding such resources, indications of what such resources could be, and the proper steps, in accordance with the installation's Integrated Cultural Resource Management Plan, to preserve those resources.

Vehicles delivering construction materials may contribute to the traffic congestion on roadways leading to Picatinny Arsenal, especially New Jersey Route 15, which has very high levels of traffic congestion during both morning and evening peak hours. To reduce the impact of these vehicles further increasing traffic congestion on NJ Route 15, the prime construction contractor will schedule deliveries of construction materials during non-peak traffic periods.

Operation and maintenance of the facility calls for daily cleaning of the interior of the FCTS. Some residue from munitions testing may exit the FCTS via the four vent stacks. The area beneath those vent stacks will be cleaned daily and any residue from munitions testing will be collected and managed in accordance with New Jersey regulations governing solid and hazardous waste. The vent stacks will be cleaned on a regular frequency based on operational experience and will be specified in the FCTS's standing operating procedures.

Unexploded constituents from munitions testing could contribute to existing soil contamination, and pose a risk to surface and/or ground-waters. Subsequent testing of surface soil around the FCTS will be conducted annually for the first three years and then every three years afterwards. If contamination above a level of concern is found, mitigation actions will be required.

## CONCLUSION

Building the fully-enclosed, steel-reinforced concrete FCTS at Test Range 616 will have no significant effects on the human health or natural environment, and will have no significant cumulative effects on human health or the natural environment

## APPROVAL

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Fragment Containment Test Stand

# Environmental Assessment

Building and Operating a Fragment Containment

Test Stand for Conducting

Munitions Testing at

Picatinny Arsenal, New Jersey

April 2010

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## Executive Summary

In April of 2008 a rogue fragment from a static detonation on Picatinny Arsenal travelled off the installation and damaged private property. Subsequently, tests were moved to either other military installations (Aberdeen Proving Grounds), to the Research and Development Contractor's test facility, or to a commercial test services provider (National Technical Services Corporation in Camden, Arkansas). Moving explosives from Picatinny Arsenal to these facilities requires additional logistical, transportation and security measures adding to the research costs and schedule.

This Environmental Assessment (EA) identifies and evaluates alternatives for resuming static munitions detonation testing at Picatinny Arsenal.

The preferred alternative is to build a fully-enclosed, steel-reinforced concrete Fragment Containment Test Stand (FCTS) at Test Range 616 on Picatinny Arsenal. The proposed design for the FCTS will have a floor, walls, and roof made of four-foot thick steel-reinforced concrete. The floor and interior walls of the FCTS will be lined with 4-inch thick steel plates, and the ceiling will have 2-1/2ich steel plates. The FCTS will have a solid steel blast door, and specially-designed ports for cameras and four ceiling vents. The ports and vents have design features that ensure no fragments leave the containment test stand. Of the three design alternatives, the preferred alternative offers the best possible solution for achieving the required 99.9999999% confidence level of containing fragments generated during munitions testing. See Figures A-7 through A-12.

Two alternative designs were considered and ultimately rejected because they did not provide required level of confidence of containing fragments from munitions testing.

1. An all-steel structure was discarded because it would not likely provide the required 99.9999999% confidence level of containing fragments from munitions testing. Other factors for discarding this alternative were the initial cost for construction, and the long-term maintenance costs for the facility. Construction would be labor-intensive and require people highly skilled in steel assembly and welding. There was also concern over the ability of welds to withstand the daily blast pressure of munitions testing (See Figures A-1 through A-3).

2. The pre-cast concrete FCTS design was discarded because it did not meet the requirement for fragment containment (See Figures A-4 through A-6). The walls and roof of this alternative were made of steel-reinforced, pre-cast concrete, and the interior surfaces would be lined with steel plates. However, there were four large openings through which fragments could escape to the open atmosphere.

Analysis determined that building the fully-enclosed, steel-reinforced concrete FCTS would have long-term positive impact on:

- Safety, because of the three alternative designs considered, the preferred alternative offers the best possible solution to achieving the required 99.9999999% confidence level of containing fragments generated during munitions testing;
- Natural resources, because there would be no risk of fragments from munitions testing wounding wildlife and no risk of fragments embedding themselves in trees and vegetation near the test site;
- Noise, because the solid concrete FCTS would absorb much of the sound energy generated from munitions testing, reducing the magnitude of the noise reaching inhabited areas on the installation and the surrounding community;
- Hazardous waste because fragments, potentially contaminated with explosive constituents, would remain inside the FCTS where they could more easily be collected for proper treatment or disposal.
- Water resources, to include surface and groundwater. Prior to April 2008, testing of munitions was conducted on open stands, with dust, particulate matter and explosive residue being disbursed on open ground. This residue can migrate to surface and/or groundwater. Conducting munitions testing within the fully-enclosed FCTS limit the amount of particulate matter that could migrate to water resources;
- Air Quality, because some portion of the dust and particulate generated from munitions testing will remain inside the FCTS;
- Traffic safety, because there would be no further requirement to transport explosive munitions on roadways to other test facilities.

There would be short-term positive effect on socioeconomics resulting from the employment of 10-15 construction workers during the estimated eight-month construction period. There would also be the short-term impact of the need to purchase construction materials, such as framing lumber, reinforcing steel and concrete from local businesses.

There would be short-term minor negative impacts on air quality resulting from dust and emissions generated during the construction process. Some additional dust may be generated during excavation, and there will be some minor additional emissions from construction vehicles during the estimated eight-month construction period. Any

potential dust generated during the construction period can be mitigated by spraying water on the soil during excavation. There also will be long-term positive impacts on air quality – it is expected that some percentage of the dust and particulate matter from munitions testing will be contained inside the totally-enclosed test stand. This would have a positive effect on air quality compared to the earlier practice where dust and explosive residues were emitted into the atmosphere.

There will be a short-term minor negative impact on traffic and transportation during the construction period. The estimated workforce of 10-15 persons will have a negligible contribution to the existing traffic congestion on roadways leading to the installation. Construction vehicles are expected to have a minor impact on traffic on local roadways, and a negligible impact on the installation. There could be higher level impact on the three days during which the concrete will be poured. During these three days, assuming eight cubic yards of concrete per truck, pouring the slab will require approximately 27 trips by concrete trucks, the walls 33 trips, and the roof 24 trips. To minimize the potential impact on traffic congestion on local roadways leading to Picatinny Arsenal (NJ Route 15 in particular), concrete pouring should be scheduled to begin after the morning peak traffic period.

There are some low-level concentrations of explosive residue contamination near the prospective site for the FCTS at Test Range 616. Unexploded constituents from munitions testing could contribute to existing soil contamination, and pose a risk to surface and/or ground-waters. Subsequent testing of surface soil around the FCTS will be conducted annually for the first three years and then every three years afterwards. If contamination above a level of concern is found, mitigation actions will be required.

Table E.1 provides a summary of the environmental effects of the No Action alternative and of building and operating the proposed FCTS. Building and operating the fully-enclosed, steel-reinforced concrete FCTS is the preferred alternative.

Table E.1 Alternative Analysis Matrix, Building the fully enclosed, steel-reinforced concrete FCTS

| Valued Environmental Component | No Action Alternative | Build the FCTS (The Preferred Alternative) |
|---|---|---|
| Airspace | No impact | No impact |
| Air Quality | No impact | Short-term minor negative impact. Long-term positive |
| Cultural Resources | No impact | No impact |
| Energy | No impact | No impact |
| Environmental Justice | No impact | No impact |
| Facilities and Infrastructure | No impact | No impact |
| Floodplains | No impact | No impact |
| Hazardous Material & Hazardous Waste | No impact | Long-term minor positive |
| Natural Resources | No impact | Long-term positive impact |
| Noise | No impact | Long-term positive impact |
| Safety | No impact | Long-term positive impact |
| Socioeconomics | Long-term negative impact | Short-term positive impact |
| Soil Erosion | No impact | Minor short-term impact |
| Solid Waste | No impact | No impact |
| Threatened & Endangered | No impact | No impact |
| Traffic and Transportation | Long-term negative impact | Short-term minor negative impact; long-term positive |
| Water Resources | No impact | Long-term positive impact |

To meet mission and environmental requirements, the location of the proposed FCTS needs to meet the following requirements:

- Year round access by construction equipment, material handling equipment, large supply vehicles, and fire and safety vehicles;
- Sufficient buildable area to build the FCTS;
- Sufficient electrical power to run test data acquisition and recording, and slow cook-off ovens;
- Minimize and/or control infiltration of residue into groundwater and streams;
- Minimize and/or control adverse impacts on wetlands and riparian habitats;

Table E.2 provides a matrix of the alternative sites for building the FCTS using the evaluation criteria listed above. This matrix indicates that Test Range (TR) 616 is the preferred site for building the FCTS. TR 616 has year-round access, sufficient area, and neither construction nor operation of the FCTS would impact surface waters or

wetlands. Each of the other alternative sites considered for the FCTS did not have year-round access, enough surface area or had potential for impacting surface water or wetlands.

Table E.2 Matrix of alternative analysis for siting the FCTS.

| | Year-round Access | Sufficient Area | Electrical power | Impact Surface water | Impact wetlands/ Riparian area |
|---|---|---|---|---|---|
| Alt 1 No Action | | | | | |
| Test Range 616 | + | + | + | + | + |
| Test Range 650 | + | + | + | - | - |
| Test Range 654 | - | + | + | + | + |
| Test Range 670 | + | - | + | + | + |
| Test Range 1222 | - | + | + | - | - |

Test Range 616 was determined the best site among five alternative locations for the FCTS. This alternative meets the installation's security, access, land area and environmental requirements. This is the Preferred Alternative for the location of the FCTS.

Analysis of the potential environmental impacts, using the conditions before April 2008 as a baseline, determined that building and operating the FCTS at Test Range 616 would have no, or *de minimis* impact on the environmental categories of airspace, energy, facilities and infrastructure, threatened and endangered species, floodplains, environmental justice, solid waste and cultural resources.

Building the FCTS at Test Range 616 will have no significant impact on the human health or natural environment, and will have no significant cumulative effects on human health or the natural environment.

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# SECTION 1
# INTRODUCTION, PURPOSE AND NEED FOR THE PROPOSED ACTION

## 1.1 Introduction

The Garrison Commander, Picatinny Arsenal and the Director, US Army Armament Research, Development, and Engineering Center (ARDEC) at Picatinny Arsenal, New Jersey, propose to construct, operate, and maintain a Fragment Containment Test Stand (FCTS) on Picatinny Arsenal. This Environmental Assessment (EA) analyzes and documents the potential site-specific environmental and socioeconomic impacts associated with constructing, operating and maintaining a FCTS at Picatinny Arsenal.

On April 11, 2008, during a static detonation test of an artillery projectile, a rogue fragment resulting from the detonation testing travelled off the installation and damaged private property. The Installation Commander and the ARDEC Director subsequently directed that all future tests involving static detonation of warheads and munitions would be conducted in enclosed test facilities in order to confine all fragments on the test range. As a result of this directive, static detonation test operations at Picatinny Arsenal have been suspended until an appropriate Fragment Containment Test Stand (FCTS) is constructed. Constructing the FCTS will enable ARDEC to resume its explosive static detonation testing activities in support of its research and development mission.

The goal is to build an FCTS that achieves the ARDEC Director's requirement of a 99.9999999% confidence level of fragment containment performance, and which exceeds the test range standards outlined in Department of Army Pamphlet (DA Pam) 385-63, *Range Safety* (US Army, 2003). DA Pam 385-63 (paragraph 1-5b) establishes fragment hazard exclusion zones that ensure personnel located outside of zone will not be exposed to fragment hazards of more than one in one million probability level during any test (US Army, 2003). The ARDEC Director's requirement is 10-times more protective than the Army minimum standard.

The ARDEC conducts research, development and engineering of conventional munitions used by the Army and the Department of Defense. In its mission to research, develop, and engineer conventional munitions, the ARDEC is required to conduct engineer tests to verify design and performance. Engineer tests include ballistic and stationary or static tests to subject the munition to its gun launch environment and to subject it to stationary tests to determine its function, performance, reliability, and safety characteristics. The range of items undergoing engineer tests by ARDEC includes propellant charges, pyrotechnics, fuzing, infantry munitions, cannon caliber munitions, engineer munitions, mortar and artillery projectiles, tank ammunition, warheads for

precision munitions, and submunitions. Stationary or static engineer tests that are conducted include functioning tests (static detonation), slow cook off tests, sympathetic detonation tests, and tests to determine the response of the munitions to external threats such as fragments, bullets, and shaped charge munitions. Such threats are present in the battlefield and are created by the opposing combatant forces with their weapons and munitions.

Each test day will involve on average two to four tests per day (for all tests, except slow cook-off tests). Of the 200 test days, the information in Table 1.1 provides an approximate of the mix of munitions and test types performed (in total number of tests). Table 1.1 also provides the type of explosive fill used and the highest net explosive weight used for each category of ammunition family, except the 155mm and 105mm artillery projectile, which represents the average of three 155mm artillery HE projectiles.

Table 1.1 Estimated number and types of tests to be conducted in the FCTS.

| **Ammunition Family** | **Intentional Static Detonation** | **Slow Cook-Off** | **Bullet Impact** | **Fragment Impact** | **Sympathetic Detonation** | **Shape Charge Jet Impact** |
|---|---|---|---|---|---|---|
| 155mm & 105mm Artillery Projectiles | 5 | 5 | 5 | 5 | N/A | 5 |
| Explosive Fill type: TNT; Explosive Weight: 17.8 lbs.* | | | | | | |
| 105mm & 120mm Tank Ammunition | 5 | 5 | 5 | 5 | 5 | 5 |
| Explosive Fill type: Comp A-3; Explosive Weight: 4.53 lbs. | | | | | | |
| 120mm, 81mm & 60mm mortar | 40 | 10 | 10 | 10 | 10 | 10 |
| Explosive Fill type: Comp B; Explosive Weight: 3.46 lbs. | | | | | | |
| Engineer Munitions | 20 | 10 | 10 | 10 | 10 | 10 |
| Explosive fill type: Comp B; Explosive Weight: 31lbs. | | | | | | |
| 155mm Propellant Charges | N/A | 5 | 5 | 5 | 5 | 5 |
| Explosive fill type: M31A1 Stick; Explosive Weight: 1.25 lbs. | | | | | | |
| 155mm Propellant Charges | N/A | 2 | 2 | 2 | 2 | 2 |
| Explosive fill type: M6 Propellant; Explosive Weight: 22 lbs. | | | | | | |
| Warheads and sub-munitions | 20 | 10 | 10 | 10 | 10 | 10 |
| Explosive fill type: C-4; Explosive Weight: 0.63 lbs. | | | | | | |
| Infantry Cartridges | N/A | 10 | 10 | 10 | 10 | 10 |
| Explosive fill type: Comp A5; Explosive Weight: 5.75 lbs. | | | | | | |

* This represents the average net explosive weight (NEW) of munitions tested in this category.

The Army proposes to annually conduct approximately up to 400 tests inside the FCTS with a total net explosive weight not to exceed 2,400 pounds.

This Environmental Assessment (EA) provides decision makers, regulatory agencies and the public with information on the potential environmental and socioeconomic effects of constructing, operating, and maintaining the FCTS at the selected location. The analysis contained within this document, along with information from other agencies and the public through the scoping and commenting process will enable the Army decision maker to assess the environmental and socioeconomic impacts of constructing, operating and maintaining the FCTS at TR 616 and to make an informed decision on meeting the need to support the static detonation testing mission while reducing risk.

## 1.2 Location and History of Picatinny Arsenal

The location and history of Picatinny Arsenal is discussed in detail in the Programmatic Environmental Assessment prepared for the installation's master plan (Picatinny Arsenal, 2009). The Arsenal's population, based on the 2006 Army Stationing Information System (ASIP), stood at 3,940 persons. The Picatinny's projected 2012 population is 3,963.

## 1.3 The Fragment Containment Test Stand (FCTS)

In order to continue mission activities of testing munitions systems at Picatinny, the installation has initiated action to build a test stand that will preclude a recurrence of the April 2008 event when a rogue fragment from a static detonation travelled off the installation and damaged private property.

The FCTS design and construction goals are to:

(1) Design and construct a FCTS capable of confining primary/secondary fragments from static detonation tests of 155mm and below high-explosive (HE) projectiles and warheads.

(2) Support Slow Cook Off, Fragment Impact, Bullet Impact, Sympathetic detonation, Shape Charge Jet Impact (SCJI), and Static Functioning Tests in accordance with (IAW) MIL-STD-2105C for 155mm, 120mm, 105mm, 81mm, and 60mm HE munitions, tank munitions, medium and cannon-caliber munitions, engineer munitions, fuses, propellant charges, rocket warheads, and infantry munitions (grenades, shoulder fired munitions).

(3) Support comparative testing and exploitation of foreign munitions through static functioning tests and insensitive munitions tests in accordance with Military Standard (MIL-STD) 2105C.

(4) Support repetitive static detonation tests of up to 30-pound TNT warheads located one to four feet above the floor of the FCTS.

(5) Support a maximum annual work load of 200 test days, on average two tests per day for large-caliber munitions. Daily testing frequency is dependent on the munitions and the engineer test being conducted.

## 1.4 Purpose of the Proposed Action

The purpose of the Proposed Action is to implement the Installation Commander's and ARDEC Director's decision to construct, operate and maintain a FCTS to support the engineering test activities in support of munitions research and development.

## 1.5 Need for the Proposed Action

Picatinny Arsenal needs a test facility that allows the installation to conduct tests on military munitions and in a location on Picatinny Arsenal that protects human health and the environment, as discussed below.

### 1.5.1 FCTS Design and Constructing Supports the Engineering Testing Activities

The FCTS must be able to serve as a test stand for conducting static detonation tests, slow cook off tests, fragment impact tests, shape charge jet impact tests and bullet impact tests. These static detonation tests assess the response of improved and newly developed munitions to unplanned stimulus as defined in MIL-STD-2105C.

The FCTS must accomplish five primary functions:

- Prevent the escape of fragments generated by the detonation of munitions under test at the center of the FCTS.
- Withstand the severe blasts generated from the detonation of 155mm high explosive (HE) artillery munitions.
- Resist blast loads within their elastic range.
- Have a 25-year operational life.
- Have replaceable and repairable armor plates on the floor, walls and ceiling.

### 1.5.2 FCTS Location Supports the Engineering Testing Activities

The location of the FCTS must support its construction, continuing operations and maintenance. The range should be within reasonable proximity of the ARDEC facilities to facilitate the efficient movement of people and material between their R&D site and the range. The road network to the range, and the areas designated for vehicles and

personnel at the range should be accessible year-round. Access restricted by weather conditions, the width and slope of the roads, or the area size could delay FCTS construction, the delivery and retrieval of materials and static detonation test items, and the response of emergency vehicles. Given the limited range facilities and volume of R&D static detonation test requirements, the range should be of adequate size to support the FCTS and its operations. The existence of sufficient electrical power to support the data gathering and recording operations, and the larger requirement of the slow cook-off ovens, is important to the construction of the FCTS without the extra effort and cost of installing a new electrical system. The range location should support range construction, operations and maintenance while minimizing and controlling the infiltration of explosive residue into groundwater and streams and adverse impacts on wetlands and riparian habitats.

## 1.6 Installation Sustainability

On October 1, 2004, the Secretary of the Army and Army Chief of Staff issued *The Army Strategy for the Environment* (Army, 2004a) which focuses on the preservation of the Army's training and testing lands and the interrelationships between mission, environment and community. A sustainable installation simultaneously meets the current Army mission and conserves installation resources to meet future mission requirements while safeguarding human health, improving quality of life and enhancing the natural environment. A sustained natural environment is necessary to support the missions of Army installations.

## 1.7 Scope of the Analysis

This EA addresses the environmental and socioeconomic impacts related to the construction, operation, and maintenance of an FCTS at Picatinny Arsenal. This EA has been developed in accordance with the National Environmental Policy Act, regulations issued by the Council on Environmental Quality (CEQ), 40 CFR Parts 1505-1508; and the Army's implementing procedures published in AR 200-1 *Environmental Protection and Enhancement* and 32 CFR Part 651, *Environmental Analysis of Army Actions*.

This EA serves as a decision making tool for constructing and siting an FCTS at Picatinny Arsenal. This analysis includes direct and indirect environmental impacts of the Proposed Action and alternatives, any adverse environmental effects that cannot be avoided if the Proposed Action is to be implemented, irreversible or irretrievable commitments of resources and cumulative effects. All proposed FCTS construction and locations are within the boundaries of Picatinny Arsenal.

## 1.8 Decision to be Made

This EA supports the decision-making process related to the proposed action. Specifically, the Picatinny Arsenal Garrison Commander and ARDEC Director must decide whether or not to build, operate and maintain the proposed FCTS, and if so, where to build the FCTS.

## 1.9 Related Environmental Documentation

This Environmental Assessment complies with both Federal (40 CFR Parts 1500-1508) and Army (32 CFR Part 651) regulations governing implementation of the National Environmental Policy Act (NEPA). This EA complies with all applicable environmental, natural resource, and cultural resource statutes, regulations, and guidelines. Such additional statutes, regulations, and guidelines may require permits, approvals, consultations with outside agencies, or implementation of mitigation measures. Those considerations are included in the analyses set forth in this EA. The additional statutes, regulations, and guidelines reviewed and consulted in the preparation of this EA are provided under References in Section 6.

## 1.10 Public Review Process

Public participation is essential to a successful NEPA analysis. Both Federal and Army Regulations government NEPA (40 CFR Parts 1500-1508 and 32 CFR Part 651, respectively) require opportunities for the public to participate in the EA process. The Army is required to notify the interested public when the EA is available and ensure the public is able to access the findings of the environmental analysis. Copies of the EA are available at the Picatinny Arsenal webpage (http://picac2w4.pica.army.mil/ead/), and the Rockaway Township Free Public Library, located at 61 Mount Hope Road.

All members of the public, federally-recognized Indian Tribes, federal, state and local agencies are invited to review and comment on the Final Environmental Assessment (EA) and Draft Finding of No Significant Impact for this action. Members of the public can provide their comments to the Chief of Public Affairs at Picatinny Arsenal. Send comments by mail to Mr. Peter Rowland, Public Affairs Officer, Building 171, Picatinny Arsenal, NJ 07806-5000, or by FAX to (973) 724-7483.

# SECTION 2
# DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

## 2.1 Introduction

This chapter describes a Proposed Action for Picatinny Arsenal to build, operate and maintain a Fragment Containment Test Stand (FCTS) at Test Range (TR) 616 on Picatinny Arsenal. This chapter also describes the alternative selection criteria, alternatives considered but not carried forward for further analysis, and the No Action Alternative as required by the National Environmental Policy Act (NEPA) (40 CFR 1508.25(b)).

## 2.2 Proposed Action

The Army's Proposed Action is to build, operate and maintain an FCTS at TR 616 that will support the static detonation testing mission while maintaining a 99.9999999% confidence level of containing fragments from munitions testing. The following subparagraphs describe the decision-making process that led to this proposed action.

## 2.3 Alternative FCTS Designs

### 2.3.1 Alternative FCTS Designs Considered but not Carried Forward for Analysis

The ARDEC staff considered, and discarded two alternatives before identifying the preferred alternative. Early design alternatives that were considered and discarded as viable alternatives are discussed below.

#### 2.3.1.1 All-Steel FCTS.

The first proposed design of an FCTS was an all-steel facility built with on-hand materials and in-house labor, augmented with purchase of additional structural steel. This facility would have a concrete floor, with walls and ceiling made of plate steel. The side walls would be reinforced with vertical I-beams, and further reinforced with I-beams extending at an angle behind each wall to provide additional support to resist the overpressure of static detonation testing. Detailed analysis of this alternative determined that the 9 U-frame center box design (See Figure A-2, Appendix A) would withstand testing of 120mm mortar rounds, but not 155mm artillery rounds. Additionally, the construction method would require extensive labor hours of highly skilled welders. Also, the steel and welds will be subject to bending and shear stresses of the static detonation testing and could require high frequency of inspection and repair.

The design was upgraded to a 13 U-frame center box design (See Figure A-3, Appendix A), and was determined to be able to withstand 20,000 test cycles of blast loads from 155mm high-explosive projectiles. The ARDEC staff determined this design would be too expensive to build, expensive to maintain and would likely not meet the requirement for a 99.9999999% confidence level of containing fragments generated from munitions testing. This alternative was rejected because of the excessive cost required to build and maintain an all-steel FCTS, and the possibility of not achieving a 99.9999999% confidence level of containing fragments from munitions testing. Illustrations of the all-steel design concept are provided in Figures A-1 through A-3, Appendix A.

#### 2.3.1.2 Pre-cast Concrete Fragment Containment Test Stand

The installation also considered a design for the FCTS that consisted of four pre-cast concrete walls with a steel-reinforced concrete roof. Each wall would consist of pre-cast steel-reinforced concrete (see Figures A-4 through A-6 Appendix A). This alternative would have five sub-assemblies: a 40-foot long wall, a 32-foot long wall, and two 24-foot long walls and a roof assembly. All walls would be 15 feet high, 12.67 feet thick at the base, and taper to 54 inches thick at the top. The interior surface of each wall would be lined with replaceable armor plates. The roof would consist of a number of two-foot by two-foot by six-foot concrete blocks, also lined with replaceable steel plates. The floor of the center section would consist of one-foot thick reinforced concrete, with an armor plate on top. There would be an eight-foot wide forklift access at one end of the center section. The floor of the FCTS would be an integral part of the steel-reinforced concrete pad that extends three feet beyond the outside dimension of the walls, making the total footprint of this design 46 feet by 64 feet. This design would withstand the blast pressure from all ammunition items to be tested. However, because of the size of the openings (see Figures A-4 and A-5), it was determined this alternative would not meet the required 99.9999999% confidence level of containing fragments from munitions testing and was eliminated from further consideration.

### 2.3.2 Description of Alternatives for Building the FCTS

#### 2.3.2.1 Alternative 1. The No Action Alternative

Under this alternative testing of munitions generating fragments would not be conducted at Picatinny Arsenal. Such testing would continue to be conducted at other installations and/or commercial testing services providers that meet safety and security requirements.

2.3.2.2 Alternative 2. Build a Fully Enclosed Steel-Reinforced Concrete Fragment Containment Test Stand (FCTS

This proposed design for the FCTS is fully enclosed. The floor, walls and roof are all made of steel-reinforced concrete and would be four feet thick. A steel blast door will be centered in one wall. The opposite wall will have an aperture to site a camera. Each of the other two walls will also have apertures for cameras, and one of those walls will have an aperture to conduct weapon firing. The aperture for weapon firing is only open when performing bullet impact and fragment impact tests. For all other tests, this aperture is closed. There are two 12-inch diameter apertures in the FCTS that allow moving heated air into the FCTS for the cook-off tests. Heated air is ducted through the openings to an insulated box inside the center of the FCTS. The hot air gradually heats the box inside the FCTS, in which is the munition being tested. The two 12" pipe openings are closed when the FCTS is not conducting slow cook off tests.

The footprint of this FCTS is a square 31 feet, 4 inches on each side, totaling 981.6 square feet (sf). The interior of the blast chamber is a square, 20 feet-8 inches per side, with a ceiling height of 16 feet, 8 inches. The blast door is five feet wide and eight feet tall.

The FCTS has four vent stacks to allow the venting of gasses generated during munitions testing. The proposed design has two features to prevent fragments from exiting the test changer. First is a steel plate covering the interior opening of the vent stack. The second is the “inverted U” shape of the discharge end of the vent stack that discharges vertically down to the facility’s roof. These design elements are shown in Figure A-12, Appendix A.

The floor and walls of the fully-enclosed, steel-reinforced concrete FCTS will have 4-inch thick steel plates to protect the concrete from the destructive effects from fragments generated during munitions testing. The steel plates on the ceiling will be 2-1/2 inches thick. These steel plates can be replaced.

2.4 Alternative Sites for the FCTS

2.4.1 Alternative Considered but Not Carried Forward for Analysis

2.4.1.1 Build the FCTS on Picatinny Arsenal at a Site Outside the Existing Testing Area (Area 600

This alternative fails to satisfy the purpose and need of the Proposed Action. Each alternative must meet the requirement for controlled access to ensure safe and secure operations. The 600 area, where all the existing ranges are located, meets this

requirement. Locating the FCTS outside access-controlled area (Area 600) on the installation also poses increased safety risk as well as increased security requirements on movement and control of explosives. Several sites in the 600 area contain sufficient open space for the range and FCTS. The cantonment area cannot be considered a potential location for public safety reasons and conflicts with other installation functions. This alternative is eliminated from further consideration in this EA.

#### 2.4.1.2 Build the FCTS on another Army or DOD installation

This alternative fails to satisfy the purpose and need of the Proposed Action. Fundamental to building the FCTS is to provide timely engineering test services to the many munitions development programs supporting the Department of Defense. Without this engineering test capability for static tests, many programs will have to conduct testing at other installations (e.g., Aberdeen Proving Ground, MD), at the test contractor's facilities or at commercial test facility providers. Each of these alternatives increases the time, and cost for conducting these tests. Building the FCTS on another installation would by necessity require increased transportation between Picatinny and the engineering test site. This alternative would have a notable negative impact on the Picatinny workforce that is integral to the continued success of ARDEC's munitions testing activities.

### 2.4.2 Description of Alternatives Sites for the FCTS

This section discusses alternatives considered for the site of the FCTS. Key factors in selecting a site for the FCTS include:

- Year round access by construction equipment, material handling equipment, large supply vehicles, and fire and safety vehicles;
- Sufficient buildable area to build the FCTS;
- Sufficient electrical power to run test data acquisition and recording, and slow cook-off ovens;
- Minimize and/or control infiltration of residue into groundwater and streams; and
- Minimize and/or control adverse impacts on wetlands and riparian habitats.

The alternative sites for building the FCTS include are identified below. Section 3.4 provides the analysis of these alternative sites.

- Alternative 1, The No Action Alternative. This is the companion to the No Action Alternative of not building the FCTS. This alternative was discussed in Section 2.3.2.1.

- Alternative 2, Test Range 616
- Alternative 3, Test Range 650
- Alternative 4, Test Range 654
- Alternative 5, Test Range 670
- Alternative 6, Test Range 1222 (the Gorge)

2.5. Building the Fully-Enclosed Steel-Reinforced Concrete FCTS

Prior to land disturbing activities, the proposed construction site will be evaluated for UXO and discarded military munitions, and the soil will be tested for contamination that could pose a health threat. The installation has a series of controls and standing operating procedures (SOPs) relating to ground disturbing activities that protect human health and the environment. These procedures are required in the installation's protocol on soil disturbing activities during construction activities (Picatinny Arsenal, 2004).

Four test pits were dug at Test Range 616 for geotechnical analysis revealed buried inert ordnance parts (Joseph Wu, 2010). These parts and any other ordnance parts subsequently discovered will be removed in accordance with existing safety procedures prior to further site preparations.

Site preparation will require excavation of an area approximately 40 feet by 40 feet to a depth of approximately six feet. Soil will be monitored for unexploded ordnance (UXO) during excavation. Excavated soil will be sampled pursuant to New Jersey Technical Regulations and analyzed and compared to applicable New Jersey standards for reuse. Soils that meet NJ standards will be re-used on site. Soils that do not meet NJ standards will be disposed of as hazardous waste.

The first stage of construction will be placing forms and reinforcing bar for the foundation. The foundation will be 4-feet thick base of steel-reinforced concrete. The foundation will require approximately 209 cubic yards (cy) of concrete and poured in one day. The walls will require 261 cy of concrete and the ceiling/roof another 187cy of concrete. In addition to the materials listed below the walls and floor of the FCTS will be lined with 4-inch thick panels of plate steel. The ceiling will be lined with 2-1/2 inch steel plates. This steel is intended to protect the concrete from the accumulated damage inflicted by fragments generated during munitions testing. These plate steel panels will be designed to be replaced when they can no longer protect the concrete structure from the fragments. Table 2.1 provides a listing of major construction components required for this FCTS.

Table 2.1. Major Construction Components for the fully enclosed, steel-reinforced concrete FCTS

| Material | Quantity | Unit of Measure |
|---|---|---|
| Concrete | 657 | cubic yard |
| Gravel Fill | 54 | cubic yard |
| Reinforcing steel | 180 | tons |
| Wood framing | 5,599 | square feet |
| Steel Blast Door | 5,800 | pounds |

## 2.6 Operating the FCTS

The facility will be used to conduct static detonation tests of high munitions ranging from 60mm HE mortar projectiles to 155 mm HE artillery rounds. The FCTS will also be used to support slow cook-off, fragment impact, bullet impact, shape charge jet impact tests for propellant charges, fuzing, infantry munitions, cannon-caliber munitions, engineer munitions, 60mm, 81mm, 105mm, 120mm and 155mm high explosive (HE) munitions. Table 1.1 lists the likely munitions that will undergo testing in a given year.

Annual operations average 200 test days. Daily operations begin at 7 am and usually ends by 4 pm. With exception, for urgent projects, testing may occur after 4 pm but always ends before dusk and can occur, but very rarely, on Saturdays. The engineering tests are controlled from a hardened control building to ensure personnel safety. Functioning (detonation) of the stationary munition inside the FCTS is normally achieved by an electric blasting cap imbedded to a booster charge placed in the munition. Other insensitive munitions-related tests require the use of additional test equipment (such as cook off oven, fragment launcher, or .30 caliber rifle) to perform the tests in accordance with the military standards, Test personnel normally comprise of the test engineer, range safety officer, test technicians, and occasionally project personnel attend to witness the test. Each test is governed by the Test Plan and Standing Operating Procedures, The Test Plan is designed to evaluate the effectiveness of the munition. Standing Operating Procedures exist and are followed to ensure safety. Following each test, the FCTS is inspected and swept before the next test is set up. The ammunition, munition, and energetics used is recorded for every test. At a minimum, test data includes a digital photographs, physical measurements, such as general velocity, pressure and temperature.

## 2.7 Maintaining the FCTS

After each static detonation test, the FCTS and immediate area are inspected for test items and fragments. All sizable metal pieces will be picked up and brought to the

expended material storage for disposal. Any sizable item from munitions testing will be picked up, placed in a sealable container and returned either to a magazine for storage or disposed of in the proper method. The surfaces of the replaceable steel plates on the FCTS will be cleaned and inspected for wear and abrasion after each test. The vent stacks will be cleaned on a regular frequency. That frequency will be based on operational experience and specified in the document specifying the FCTS's standing operating procedures. Residue collected from this cleaning will sampled and managed in accordance with New Jersey environmental regulations.

After every static detonation test the surfaces (floor, walls and ceiling) of the FCTS will be cleaned of any fragments, dust and debris. Fragments, dust and debris will be flashed at the hot gas decontamination unit on Picatinny Arsenal, and thereafter managed as solid waste. The other materials will be managed as required by New Jersey regulations governing management of solid and hazardous waste. ARDEC will develop a standing operating procedure (SOP) for cleaning the FCTS that has been approved by the installation's Environmental Affairs Division and an Occupational Health Physician. The SOP must address proper collection of fragments and particulate to protect human health and the environment, and it must comply with all regulatory requirements for collecting, storing, and transporting solid and hazardous waste. The SOP must address training required for personnel who maintain the facility, as well as personal protective equipment (PPE) required by personnel involved in cleaning and maintaining the FCTS.

# SECTION 3
# AFFECTED ENVIRONMENT AND CONSEQUENCES

## 3.1 Introduction

This EA evaluates the potential environmental effects of building and operating a fully enclosed, steel-reinforced Fragment Containment Test Stand (FCTS) at Test Range 616 on Picatinny Arsenal. This is the preferred alternative. This EA has considered several environmentally-related resource areas which, for purposes of evaluation, have been identified as program resources areas. Analysis of building, operating and maintaining the FCTS is provided in Sections 3.2 and 3.3. Analysis of the site selection is provided in Section 3.4.

## 3.2 Resource Areas Eliminated from Further Consideration

Analysis of potential environmental effects associated with an EA typically addresses numerous resource areas that may be affected by implementation of proposed actions. In the case of Picatinny Arsenal building, operating and maintaining a fully-enclosed, steel-reinforced concrete FCTS, some environmental resource areas that typically receive attention have been initially examined and determined not to warrant further analysis. These areas include airspace, energy, facilities and infrastructure, natural resources, threatened and endangered species, soil erosion, floodplains, environmental justice, and solid waste. Each of these subject areas are discussed briefly below.

### 3.2.1 Airspace

This element evaluates the potential for the alternative courses of action to affect airspace, and aircraft operations above the site of the proposed action, or above the area of influence of the proposed action.

Picatinny Arsenal has no facilities for aircraft operations. There is no heliport and no future plans to build one. The airspace above Picatinny Arsenal is neither restricted nor controlled. There are two regional airports in the vicinity of Picatinny Arsenal. Morristown Municipal Airport is approximately 10 miles southeast of Picatinny Arsenal, near the intersection of Route 287 and Route 24. Teterboro Airport is situated approximately 25 miles east of Picatinny Arsenal in the boroughs of Teterboro, Moonachie, and Hasbrouck Heights in Bergen County, New Jersey. Both facilities are reliever airports that support general aviation and charter services only (Picatinny Arsenal, 2009). The no action alternative will have no impact on airspace at Picatinny Arsenal. The fully-enclosed, steel-reinforced FCTS offers the best possible solution to

achieving the required 99.9999999% confidence level of containing fragments from munitions testing, which enhances safety of aircraft flying above the installation.

### 3.2.2 Energy

Building the FCTS will require some amount of energy in the form of gasoline to run electric an electric generator and diesel fuel for heavy equipment. Operating the FCTS will require nominal electric power to operate instrumentation equipment necessary to support the installation's testing activities. This energy consumption will be virtually the same as the energy level required before using the FCTS. Maintaining the FCTS will require using a high-filtration vacuum to collect dust and debris after each munitions test. This is a de-minimus level of energy that will not affect the installation's overall energy use. Building, operating and maintaining the FCTS will have virtually no impact on energy.

### 3.2.3 Facilities and Infrastructure

Facilities encompass all aspects of Army real property management. Army real property includes lands, facilities and infrastructure. This includes land (and interests in land), leaseholds, standing timber, buildings, improvements and appurtenances. Facilities are buildings, structures, and other improvements, to include ranges, to support the Army mission. Infrastructure is the combination of supporting systems, such as roadways and bridges and utilities, which enable the use of this land and resident facilities.

Conducting munitions research and development testing involves minimal facilities and infrastructure support. This activity does not require drinking water, sewer, permanent communications, or natural gas. A very small amount of electric power is needed to support test instrumentation.

Building the FCTS will require some electrical power, and water. The construction contractor will provide electricity by portable generators, will truck-in water necessary for construction activities, and provide a portable latrine for the construction workforce. Picatinny Arsenal will continue provide portable latrines as needed for the testing workforce. Operating and maintaining the FCTS will not require water, sewer, or natural gas, and will require minimal electric power to support test instrumentation.

Building, operating and maintaining the FCTS will have no impact on facilities or infrastructure.

### 3.2.4 Natural Resources

A complete description of the installation's natural resources is available in Section 4.2.10 of the Programmatic EA for the Picatinny Arsenal Real Property Master Plan (Picatinny Arsenal, 2009). Picatinny Arsenal is approximately 70% forested, and the forest-type is classified as being within the New Jersey Highlands Region. Forested areas account for almost 4,100 acres on the Arsenal. Fauna present at Picatinny Arsenal include a wide variety of terrestrial mammals, birds, reptiles, amphibians, fish, and insects. The Picatinny Arsenal Integrated Natural Resources Management Plan provides a comprehensive inventory of known plant and animal species found on the installation (Picatinny Arsenal, 2001).

Conducting munitions testing within the proposed test chamber would likely have a positive impact on both vegetation and wildlife. Under previous operating conditions, fragments from munitions testing could injure or kill wildlife and could become imbedded in trees. Conducting munitions testing within a fully enclosed structure will eliminate the risk to wildlife and eliminate the potential of imbedding fragments in trees.

### 3.2.5 Threatened and Endangered Species

The Picatinny Arsenal Integrated Natural Resources Management Plan identifies two federally-endangered species, the Indiana bat (*Myotis sodalis*) and the bog turtle (*Clemmys muhlenbergii*). These species are either present or have been sighted previously at Picatinny Arsenal. The Endangered Species Management Plans for both species provide descriptions of the habitat and characteristics of threatened or endangered species for the installation, and they have been reviewed by the US Fish and Wildlife Service (USFWS).

Picatinny Arsenal has established a protocol for removing trees that may be part of Indiana bat habitat. Prior to removing trees larger than five inches in diameter, the Picatinny Arsenal Natural Resources manager should be contacted to determine if Indiana bat habitat is present. Tree removal is allowed between November 15 and April 1. All tree cutting must be coordinated with the installation's Natural Resource Manager, and consultation with the US Fish and Wildlife Service is required for any trees to be cut down in a zone of concern for the Indiana bat.

### 3.2.6 Soil Erosion

This element evaluates the potential for the alternative courses of action to cause soil erosion. Soil erosion reduces the opportunity for sustaining vegetative growth and can contribute to increased sedimentation of surface waters.

Static detonation tests were commonly performed on a steel plate, atop a 30-foot square concrete pad. The area around the concrete pad is level, gravel-covered open ground, with minimal vegetation for a radius of approximately 100 to 150 feet.

All Soil Erosion and Sediment Control Practices will be installed in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey, and will be in place prior to any major soil disturbance, or in their proper sequence and maintained until permanent protection is established (Morris County, 2006). The objective of this plan is to reduce construction-related erosion and sedimentation in surface waters. Direct impacts to water resources, such as the degradation of water quality from nonpoint source pollution, are mitigated through application of Best Management Practices (BMPs) designed to reduce such impacts. Examples of BMPs include: the use of silt fences to minimize erosion and siltation in aquatic habitats, and siting new facilities away from surface water bodies. The construction contractor will prepare a Soil Erosion and Sedimentation Control plan for approval by Morris County before construction begins, and will implement BMPs to reduce, to the maximum extent possible, stormwater runoff from the site. Conducting static detonation testing research at other installations will have little or no effect on soil erosion at Picatinny Arsenal.

### 3.2.7 Floodplains

None of the potential sites for building the FCTS are within the installation's 100-year floodplain (Picatinny Arsenal, 2007, Figure 5.2). Building, operating and maintaining the FCTS will not impact floodplains.

### 3.2.8 Environmental Justice

This element evaluates the potential for the alternative courses of action to have a disproportionate impact on minority or low-income populations or communities.

The purpose of Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations is to avoid the disproportionate environmental, economic, social, or health impacts from Federal actions and policies on minority and low–income populations or communities (Executive Office of the President, 1994).

As shown on Table 3.1, within the Newark Primary Metropolitan Statistical Area (PMSA) region of influence (ROI) the average minority population of 29 percent is higher than that in the State of New Jersey (23 percent). Morris County, which contains the Picatinny Arsenal, has a minority population of 12 percent, which is substantially lower than that of the ROI. Based on the most recent US Census estimates, the proportion of

persons below poverty (or low-income persons) in the ROI (nine percent) is slightly higher than that of the State of New Jersey (8.4 percent).

Table 3.1 Minority and Low-Income Populations, Picatinny Arsenal Region of Influence

| **County** | ***Total Population (2005) (estimated)*** | ***Percent Minority Population (2005) (estimated)*** | **Median Household Income (2004 $)** | **Persons Below Poverty (2004)** | **Percent Persons Below Poverty (2004)** |
|---|---|---|---|---|---|
| Essex | 791,057 | 49 | $44,486 | 107,230 | 13.9 |
| Morris | 490,593 | 12 | $82,173 | 19,608 | 4.1 |
| Sussex | 153,130 | 4 | $71,013 | 6,628 | 4.4 |
| Union | 531,457 | 29 | $55,247 | 48,078 | 9.1 |
| Warren | 110,376 | 4 | $61,281 | 5,944 | 5.4 |
| ROI, Total/Avg. | 2,076,613 | 29 | $58,648 | 187,488 | 9.0 |
| New Jersey | 8,717,925 | 23 | $57,338 | 717,238 | 8.4 |

Source: US Census Bureau, 2000 US Census; US Census Bureau, Small Area Income and Poverty Estimates, 2005.

The proposed action will occur on currently existing ranges designed for this purpose. Conducting static detonation testing research at other installations will have no effect on minority or economically disadvantaged populations in Morris County or at Picatinny Arsenal. Building, operating and maintaining the FCTS will have no disproportionate adverse impact to minority or economically disadvantaged populations of Morris County or at Picatinny Arsenal.

### 3.2.9 Solid Waste

This element evaluates the potential for the alternative courses of action to generate solid waste, and potential impact on the installation's ability to manage and dispose of the waste in accordance with governing regulations.

Building the FCTS will generate some solid waste, largely in the form of cardboard and wood that is the packaging for materials used to build the FCTS. Building the FCTS will require wooden forms for concrete that will become solid waste when no longer needed. Proper management and disposal of solid waste generated during the construction process is the responsibility of the construction contractor, who will be required to manage and dispose of solid waste in accordance with applicable regulations promulgated by the State of New Jersey. The contractor will implement best management practices to effectively manage solid waste generated during the construction process, to include residue resulting from cleaning concrete trucks.

Static detonation testing historically generates minimal amounts of solid waste, commonly dunnage and packing materials for transporting explosives to the range. The installation has properly managed this waste in the past, and will continue existing practices, which meet New Jersey Department of Environmental Protection regulations. Building, operating and maintaining the FCTS will have a negligible impact on solid waste.

## 3.3 Resource Areas

### 3.3.1 Introduction

A program resource area is a subject area that warrants further discussion because of the potential effect the proposed action may have on a valued environmental component. Resource areas in this category include: cultural resources, land Use, traffic and transportation, air quality, socioeconomics, noise and water resources.

### 3.3.2 Safety

#### 3.3.2.1 Affected Environment

This element evaluates the potential for the alternative courses of action to impact personal safety of the workforce and of the general population.

The FCTS is a fully enclosed chamber within which ARDEC will conduct experiments and testing on military munitions. The purpose building the FCTS is to prevent fragments generated from these experiments and tests from causing injury to the population and damage to property on and around Picatinny Arsenal.

#### 3.3.2.2 Threshold of Significance

The threshold of significance for safety is the potential risk of an injury during the construction, operations or maintenance of the FCTS.

#### 3.3.2.3 Alternative 1. The No Action Alternative

Not building the FCTS will have a positive effect on safety at Picatinny Arsenal. However, not building the FCTS will result in the continuation of munitions testing at other installations, requiring the transport of explosives on public roadways. This poses slightly increased safety risk to the public than if the explosives were not being transported on public roadways.

#### 3.3.2.4 Alternative 2. Build the Fully Enclosed Steel-Reinforced Concrete FCTS

Some elements of construction have an inherent safety risk. The construction contractor will prepare and implement a worksite safety plan to reduce the risk of injury to the construction workforce.

Military munitions and munitions testing have inherent risks. ARDEC has policies and procedures that ensure the safety of the testing workforce and range personnel. These policies and procedures will be approved by the appropriate safety officials before testing operations begin within the FCTS.

The FCTS is a fully enclosed test chamber. The gas vent stacks have redundant safety features which further reduce the risk of a fragment from exiting the test stand (See Figure A-12, Appendix A). Of the three design alternatives, the fully-enclosed, steel-reinforced FCTS offers the best possible solution for achieving the 99.9999999% confidence level of containing fragments generated from munitions testing and have a long-term positive effect on safety.

### 3.3.3 Cultural Resources

#### 3.3.3.1 Affected Environment

Phase I cultural resource surveys have been conducted for approximately 630 acres at Picatinny Arsenal. The recorded inventory of archaeological sites at Picatinny Arsenal consists of 21 prehistoric and 21 historic period sites (Huggan, 2009). Historic building assessments have been conducted for roughly 75-80% of the installation's buildings and structures. These assessments have defined a total of 105 historic buildings within five NRHP eligible historic districts, with two buildings and the Main Gates individually eligible (Huggan, 2009).

Additionally, previous historic map research and archaeological sensitivity models performed for Picatinny Arsenal's Integrated Cultural Resources Management Plan (Picatinny Arsenal, 2003) have assessed that over 90 potential historic archaeological sites have been recorded, and/or noted across the Arsenal.

#### 3.3.3.2 Threshold of Significance

Violation of applicable Federal laws and regulations, such as the National Historic Preservation Act (NHPA), the Archeological Resources Protection Act (ARPA), the Native American Grave Protection and Repatriation Act (NAGPRA), the American Indian Religious Freedom Act (AIRFA), or Executive Order 13007. Any disturbance that

cannot be mitigated and affects the integrity of a site that is eligible, or potentially eligible for listing on the National Register of Historic Places.

#### 3.3.3.3 Alternative 1. The No Action Alternative

The No Action Alternative will not involve ground-disturbing activities. The No Action Alternative will have no effect on cultural resources.

#### 3.3.3.4 Alternative 2. Build the Fully-Enclosed Steel-Reinforced Concrete FCTS

Building and operating the FCTS will occur on previously disturbed ground which has a very strong confidence level of not having historical or cultural resources. The construction contractor and workforce will be briefed by the installation's cultural resource specialist on signs of historical or cultural resources.

Construction and operation of the ranges could potentially impact the integrity of the National Register-eligible sites. Failure to implement data recovery could lead to an irrevocable loss of valuable information on the history and prehistory of the region. Therefore, the Proposed Action would potentially have a negative impact on these archeological sites; mitigation measures are discussed below.

The Native American Graves Protection and Repatriation Act of 1990 requires agencies to inventory their collections, publish information, and then repatriate to the appropriate "culturally affiliated" Native American tribe all human remains and associated cultural items. This law also requires consultation with such tribe(s) prior to planned excavation and in the case of accidental discovery to stop work for at least 30 days while consultation occurs. The New Jersey State Historical Preservation Officer has concurred with the the selection of Test Range 616 as the preferred location for the FCTS (See Appendix C).

If potential cultural resources or artifacts are discovered during construction or operation of the FCTS, operations should be halted and the Cultural Resources Coordinator will be consulted (ARDEC, 2005).

### 3.3.4 Land Use

#### 3.3.4.1 Affected Environment

This element evaluates the potential for any of the alternative courses of action to affect land uses at, or adjacent to the site where the action will take place. To meet minimum safety requirements and minimize disruption to the general public, static detonation test ranges at Picatinny Arsenal and at other military installations and facilities are

commonly set in remote locations. At Picatinny Arsenal, those ranges are located away from the installation's cantonment area and away from the installation's boundary and the general public. Moving the test operations will not likely impact land use at other installations.

#### 3.3.4.2 Threshold of Significance

The threshold of significance for land use is altering the existing land use in such a matter as to cause severe incompatibility with adjacent land uses, or significant changes to existing land use or regional land use.

#### 3.3.4.3 Alternative 1. The No Action Alternative

Under the no action alternative outdoor munitions testing would not occur and would not affect adjoining land use.

#### 3.3.4.4 Alternative 2. Build the Fully Enclosed Steel-Reinforced Concrete FCTS

Of the three alternative designs, the fully-enclosed steel-reinforced FCTS is the best possible solution for achieving a 99.9999999% confidence level of containing fragments munitions testing, will contain a large percentage of noise energy, and some portion of dust and exhausts. Building the fully-enclosed, steel-reinforced concrete FCTS will reduce the effects of munitions testing and reduce its effects on adjoining land uses.

### 3.3.5 Traffic and Transportation

#### 3.3.5.1 Affected Environment

This element evaluates the potential for the alternative courses of action to impact traffic and transportation systems, cause traffic congestion or pose a safety risk.

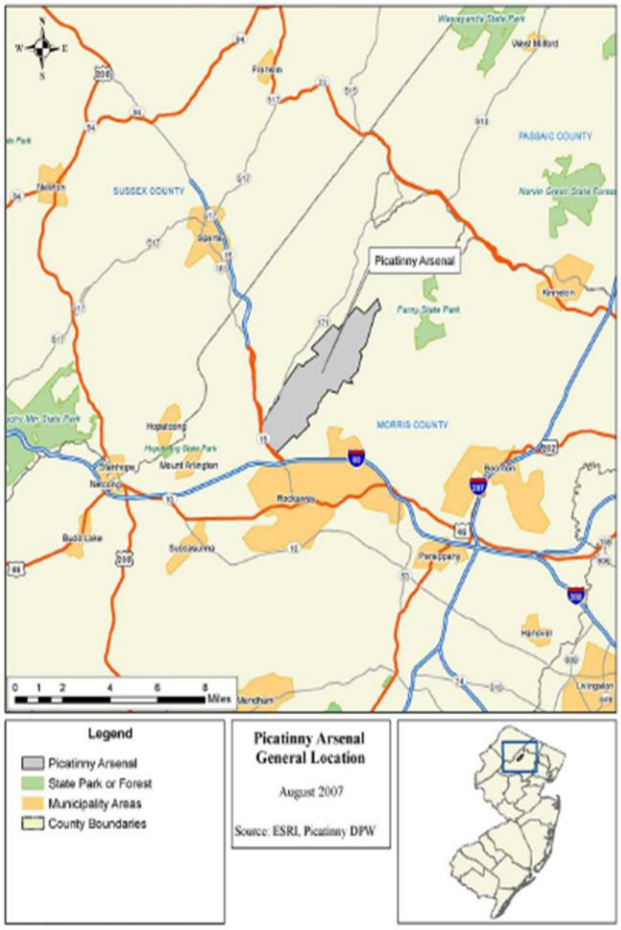
Picatinny is situated in proximity to three Interstate highway corridors. Interstate 80 (I-80), which passes just south of the installation, is the major east-west route connecting the New York City area with Cleveland, Ohio, and points west (Figure 3.1). To the south, Interstate 78 (I-78) connects Newark and Allentown, Pennsylvania. Interstate 287 passes east of Picatinny, providing a bypass of New York City while connecting to I-87, I-80, I-78, and the New Jersey Turnpike (See Figure 3.1).

State Route 15 is the primary access to Picatinny, both from I-80 and points north. Route 15 is a four-lane major arterial road with access restricted to grade-separated interchanges and signalized intersections at major cross-streets. The two major access points to the regional road network are the Picatinny main gate on Parker Road and the installation's commercial truck gate on Phipps Road, both of which lead directly to

Route 15. Route 46, which is located approximately three miles southeast of the main entrance, is the third access point to the installation.

A traffic study was conducted in August 2007 to evaluate the potential effects on level of service on Route 15 resulting from increased workforce population on Picatinny Arsenal (Clough, Harbour and Associates, (CHA), 2007). This study analyzed the level of

Figure 3.1 Picatinny Arsenal and Surrounding Area




Reference: Picatinny Arsenal, 2007, p. 24.

service (LOS) on Route 15 based on projected traffic volume from Picatinny as well as projected traffic volume based historic traffic volume on Route 15. Historical traffic volumes on the section of Route 15 near Picatinny indicate the average daily traffic volumes in the project area have increased at an annual rate of approximately 0.5 percent between 2000 and 2006. Traffic volume during AM and PM peak periods has exhibited a similar growth trend. Data obtained from the New Jersey Transportation

Planning Authority (NJTPA) indicate average annual growth rate through 2010 of 1.0 percent per year for the AM peak and 2.0 percent per year for the PM peak in the area near Picatinny. The traffic study used the higher values and traffic volumes were adjusted by a factor of 1.041 (1% compounded for 4 years) for the AM peak condition, and a factor of 1.082 (2% compounded for 4 years) for the PM peak condition (CHA, 2007, p. 13).

Increased traffic from Picatinny will contribute to existing traffic congestion on NJ Route 15 that currently experiences Level of Service E during morning and peak hours. A study by Clough, Harbour and Associates (CHA, 2007) determined that modifications to the traffic signal timing would mitigate the impact from increased traffic volume from Picatinny. Level of service would not necessarily improve above existing levels (LOS E), but they would get no worse (Picatinny Arsenal, 2008a).

Picatinny's road network serves administrative, commercial, living, and industrial areas and provides connections to the local off-post transportation network. Picatinny has approximately 84 miles of roads. Roads are classified as either primary or secondary according to their relative importance and function as part of the roadway network. Primary roads include all roads and streets that serve as main distribution arteries for traffic originating outside and within the installation and that provide access to, through, and between functional areas. Secondary roads supplement primary roads by providing access to, between, and within functional areas. There are no reported systemic safety or congestion issues with the road network on the installation (Picatinny Arsenal, 2008a).

3.3.5.2. Threshold of Significance

The threshold of significance for traffic are changes to traffic patterns resulting in an intersection reaching a Level of Service (LOS) E or worse or impairment to emergency response efforts or impediment of traffic supporting the training and security mission.

3.3.5.3 Alternative 1. The No Action Alternative

Not building the FCTS will require Picatinny Arsenal to continue to ship explosive materials to other installations or commercial activities for testing. This increases the risk, however slight, to the general public. This will have long-term, minor negative impact.

3.3.5.4 Alternative 2. Build the Fully-Enclosed Steel-Reinforced Concrete FCTS

Building the fully enclosed steel-reinforced concrete FCTS will require a work crew of approximately 10 to 15 people over a period of approximately six to eight months. Ten to 15 additional vehicles per day over this period is insignificant in the context of the overall population of approximately 3,950 that drives onto Picatinny Arsenal on a daily basis. The FCTS construction workforce will contribute to the overall congestion that exists on New Jersey (NJ) Route 15 during both morning and evening peak hours. However, the addition of approximately 10 to 15 vehicles over the period of approximately six months will have a negligible and temporary negative impact on traffic congestion on NJ Route 15.

The construction process will generate increased volumes of truck traffic delivering materials for the FCTS. There will be a short-term increase in truck traffic when the contractor first moves vehicles and construction equipment to the site. This will have a minor, and short-term impact on traffic on the installation. Increased truck traffic during peak hours could have moderate, though temporary impact on level of service, and as such, the contractor should move vehicles and construction equipment to the site during off-peak hours.

The increase in traffic volume from construction vehicles will likely contribute to a short-term increase in traffic congestion on roadways leading to the installation, particularly NJ Route 15. This roadway experiences level of service (LOS) E during morning and evening peak hours (Picatinny Arsenal 2008a). This increase in traffic volume from construction vehicles will have a negligible impact on roadways on the installation.

Small numbers of trucks will deliver construction materials over the course of the six-month construction period, which will not impact traffic on roads leading to, or on the installation.

Concrete will be poured into forms for the FCTS in three segments – the slab, the walls and the roof. During each segment all of the concrete will be poured in one day. The slab requires approximately 209 cubic yards (cy) of concrete; the walls 262 cy, and the roof 188 cy. Assuming eight cubic yards of concrete per truck, pouring the slab will require approximately 27 concrete trucks, the walls 33 trucks, and the roof 24 trucks. These trucks will deliver concrete over the course of the day, and it is likely several will be on the road during morning peak hours. This could impact level of service on NJ Route 15 during morning peak hours. To mitigate any impact on level of service on NJ Route 15 and morning peak onto the installation, delivery of concrete trucks should be scheduled to begin after morning peak traffic hours.

Construction-related vehicles could have a moderate, but short-term impact on traffic congestion, particularly NJ Route 15. These impacts can be mitigated by scheduling construction-related truck traffic to arrive on site after the morning peak traffic period.

### 3.3.6 Air Quality

#### 3.3.6.1 Affected Environment

The Clean Air Act (CAA), the primary federal statute regulating air emissions, applies fully to the Army and all its activities. The CAA categorizes regions of the United States as nonattainment areas if air quality within those areas does not meet the required ambient air quality levels set by the National Ambient Air Quality Standards (NAAQS). The National and New Jersey Ambient Air Quality Standards (NJAAQS) consist of primary and secondary standards for "criteria air pollutants": sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter. Picatinny Arsenal is located in Morris County, New Jersey which meets both the national and the state's ambient air quality standards (AAQS) for five of the seven criteria pollutants. Currently, Morris County has been designated as nonattainment for the eight-hour Ozone NAAQS (Moderate) and nonattainment for the $PM_{2.5}$ NAAQS.

States have the authority to establish emission source requirements to achieve attainment of the AAQS. These requirements may be uniform for all sources or may be specifically tailored for individual sources. Source emission requirements in SIPs may be established for stationary and mobile sources. Implementation of the act's requirements, for purposes of achieving NAAQS, is achieved primarily through SIPs and various federal programs. The CAA requires states to develop State Implementation Plans (SIPs) that establish requirements for the attainment of NAAQS within their geographic areas. SIPs must identify major sources of air pollution, determine the reductions from each source necessary to attain NAAQS, establish source-specific and pollutant-specific requirements as necessary for the area, and demonstrate attainment of NAAQS by the applicable deadlines established in the CAA. If a state fails to submit a SIP that attains the NAAQS, then EPA imposes a Federal Implementation Plan (FIP) for that region.

Under Section 176(c) of the CAA, the Army is prohibited from engaging in, supporting, providing assistance for, or approving activities (e.g., issuing a license or permit) that are inconsistent with SIP requirements. This is known as the General Conformity Rule. According to Section 176(c), activities must conform to an implementation plan's purpose of "eliminating or reducing the severity and number of violations" of NAAQS and achieving "expeditious attainment" of such standards. Such activities must not cause or contribute to a new violation; increase the frequency or severity of an existing violation; or delay timely attainment of any standard, required interim emission reduction, or other milestone. As a result, conformity determinations are required to ensure that state air quality standards will not be exceeded and that the action will

comply fully with the SIP. Installations must consider the effects that planned projects and activities will have on air quality both on and off post.

Measured ambient air quality data from New Jersey Department of Environmental Protection (NJDEP) monitors in the vicinity of Picatinny Arsenal are summarized in Table D-1, Appendix D. As this table illustrates, the measured concentrations for criteria pollutants at monitors in the vicinity of the Arsenal are below the established standard, and except for ozone, and the new 24-hour standard for $PM_{2.5}$ (35 µg/$m^3$ ) are generally only a small fraction of the National and New Jersey AAQS.

Based on facility-wide potential emission rates, Picatinny Arsenal is classified as a major source of air pollutants in accordance with the provisions of the New Jersey Administrative Code Title 7, Chapter 27, Subchapter 22 (NJAC 7-27:22) and is subject to the Federal Title V operating permit program requirements. Picatinny Arsenal is currently operating under a Title V Operating Permit issued by the NJDEP. Picatinny Arsenal's Title V Operating Permit identifies significant, insignificant, and fugitive sources of air contaminant emissions from stationary sources on the installation. New air emission source activities are added to the permit as activities and operations dictate. New air emission sources as well as modifications to existing sources are identified and reviewed in the context of NJAC 7-27) and the Code of Federal Regulations. Table 3.2 lists the Arsenal's potential to emit values for regulated air pollutants.

Table 3.2 Picatinny Arsenal Permitted Potential Pollutant Emissions as of January 2009[1]

| **Pollutant** | **Emissions (tons)[2]** |
|---|---|
| Volatile organic compounds (VOCs) | 11.4 |
| Nitrogen Oxides ($NO_x$) | 14 |
| Carbon monoxide (CO) | 46.9 |
| Sulfur dioxide ($SO_2$) | 25.5 |
| Particulate matter , $PM_{10}$ | 9.08 |
| Total suspended particulates (TSP) | 9.86 |
| Lead (Pb) | 0.0084 |
| Hazardous air pollutants (HAPs) | 1.5 |

1. Source Operating Permit BOP090001;
2. Does not include emissions from insignificant sources

Range operations at the Arsenal are categorized as fugitive emissions and are not subject to the provision of the Arsenal's operating permit. However, they are

inventoried and reported annually. Several emissions estimation tools were used to provide a baseline estimate of emissions resulting from “future” operations that will occur at a test range on Picatinny Arsenal. Tools included the following:

- Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, AP-42, Fifth Edition;
- Open Burn/Open Detonation Dispersion Model (OBODM) and User's Guide Volume I;
- EPA/600/R-98/103, Emission Factors for the Disposal of Energetic Materials by Open Burning and Open Detonation (OB/OD) August 1998;
- EPA/600/R-98/103, Emission Factors for the Disposal of Energetic Materials by Open Burning and Open Detonation (OB/OD) August 1998;
- South Coast Air Quality Management District CEQA Air Quality Handbook.

Table D-3, Appendix D provides a baseline estimate of the emissions of criteria pollutants for the munition items to be tested in the FCTS.

Picatinny Arsenal conducted a computer model of air emissions of open burning operations in August 2005. Additionally, an air dispersion modeling analysis was conducted using the computer simulation model ISCT3 to evaluate the impacts of hazardous air pollutants that will be generated from detonations on the range(s). The results of the modeling demonstrate that ambient air quality impacts of air pollutants resulting from operations on Picatinny Arsenal are below the NAAQS. To maintain current emissions levels, future FCTS operations will be limited to 200 pounds per day (net explosive weight) and 2,400 pounds per year (Bob Smith, 2009).

#### 3.3.6.2 Threshold of Significance

The threshold of significance for impacts to air quality would be if the Proposed Action could cause violation(s) of National Ambient Air Quality Standards, violation of the installation’s Title V Operating Permit, and/or violation of National Emission Standards for Hazardous Air Pollutants on the Installation or in the immediate surrounding area.

#### 3.3.6.3 Alternative 1. The No Action Alternative

A direct, positive impact to air quality at Picatinny Arsenal could result from implementing the No Action alternative. If static detonation testing is conducted to Aberdeen or Yuma Proving Grounds, or at the National Technical Services Corp, at

Camden Arkansas, the Arsenal's overall totals for emissions of air pollutants resulting from these tests will be eliminated. However, this alternative will result in longer test cycles; additional workload required for determining the interim transportation hazards classification, paper work for transport of test items, contracting for transport and testing services, and the less efficient use of project engineer labor to travel to proving grounds and to Camden Arkansas to coordinate and witness the tests. Executing this alternative for an extended period (e.g., several years), will incur noticeable costs to support testing for munitions programs in development, and product improvements.

3.3.6.4 Alternative 2. Build the Fully Enclosed Steel-Reinforced Concrete FCTS

Under the preferred alternative, Picatinny Arsenal will design, construct, and operate fully-enclosed, steel-reinforced FCTS. This alternative provides ARDEC with the capability to perform its munitions R&D mission to include the vital mission of static detonation tests to verify performance prior to formal and costly technical and operational tests performed by the Army Materiel Command's Developmental Test Command and the Operational Test Command. Implementing this alternative will have a negligible adverse impact on the overall air quality of the local airshed. Currently, the processes occur in the open on ranges. Though the processes will remain virtually identical to open detonation operations of the past, they will occur within an enclosed structure that precludes shrapnel/fragments becoming airborne and leaving the facility. Total emissions of air pollutants resulting from operation of the FCTS will remain the same as currently exist on Picatinny Arsenal. Table 1.1 provides details about the expected numbers and types of tests on munitions that would be conducted annually within the FCTS.

The Maximum Annual Work Load for the FCTS is approximately 200 test days, with an average of two tests per day with a total annual schedule of up to 400 tests per year. Each test day will involve on average two to four tests (for all tests, except slow cook-off tests). The total number of tests (339) and pounds of net explosive weight (1,982 lbs) is below the 2,400-pund maximum quantity allowed by the State of New Jersey.

Table D-2, Appendix D provides the details for the items to be tested in the FCTS. The table reflects the operational profile by munition item on an annual basis. Guidance received from the Picatinny Arsenal Environmental office regarding an acceptable method to demonstrate air emissions was to illustrate FCTS operations in terms of net explosive weight. As long as the munition items detonated within the proposed FCTS do not exceed a net explosive weight (NEW) of 200 pounds in a 24-hour period then emissions of air pollutants remain as modeled earlier (no net change). The second half of the operational threshold is an annual NEW limitation. As long as FCTS operations

process less than 2,400 pounds (NEW) annually, there will be no change in the total emissions of air pollutants on Picatinny Arsenal. Table D-2, Appendix D illustrates these operational limitations. The munition item with the highest individual value of NEW are 155mm HE projectiles at 23.8 pounds. If tested twice in a 24-hour period, the total net explosive weight will be no more than 47.6 pounds; well below the 200-pound threshold.

The second half of the operational limitation is the ability to demonstrate that the FCTS will process no more than 2,400 pounds annually. Multiplying the total tests by the net explosive weight of each munition tested results in a total of 1,982 pounds, well below the 2,400-pound threshold.

Emissions of air pollutants associated with the operation of the FCTS will be no greater than current totals for the same processes being conducted on open ranges at the Arsenal. Table D-3, Appendix D summarizes the total emissions associated with the FCTS. Available emission factors illustrate that operation of the FCTS results in a contribution of less than 100 pounds per year of any criteria pollutant. Operation of the FCTS will not introduce any new air pollutants. The only actual change to the Arsenal's operations will be that the testing that had been conducted in the open will now be conducted within a structure. Though long-term and occurring throughout the life of the facility, there is no anticipated net increase in overall air pollutant emissions resulting from the operation of the FCTS.

Construction-related emissions associated with building the FCTS will be temporary (approximately six to eight months) and produce no long-term effects on the regional airshed. Using the South Coast Air Quality Management District (SCAQMD) and EPA's emission factors and guidelines, air emissions from the proposed construction projects were estimated for the non-attainment pollutants (in accordance with the conformity regulations).

Table D-4, Appendix D summarizes the estimated short-term non-attainment pollutant emissions for the FCTS construction project. It is expected that under this alternative, construction of the proposed FCTS will cause negligible adverse impact on air quality. The sources of the emissions factor used to develop the construction emissions are the SCAQMD CEQA Air Quality Handbook and the EPA's Non-road Engine and Vehicle Emission Study (November 1991). It can reasonably be anticipated that the FCTS construction will result in a total of 6.92 tons of NOx, 0.99 tons of VOCs, and 34.24 tons of PM-10. The result is a very conservative estimate based on the area of the construction project.

It is anticipated that no more than three and one-half acres will be involved in the construction of the FCTS. There will be minimal/sporadic excavating, grading and scraping. As such, it can be reasonably expected that minimal particulate emissions will be generated during the eight-month period of construction. In this alternative the FCTS will be completely cast-in-place at Picatinny Arsenal.

When compared to the *de minimis* values of 100 tons per year (tpy) of Nitrous Oxides ($NO_x$), 50 tpy for volatile organic compounds (VOC) and 50 TPY for particulate matter ($PM_{2.5}$ ), the emissions associated with implementing the proposed action are below the *de minimis* levels. As a result the Proposed Action to build the FCTS on TR 616 is not significant and is not subject to the General Conformity rule requirements (Appendix E contains the Record of Non-applicability). It is expected that some portion of the dust and particulate generated from munitions testing will remain inside the FCTS and will not contribute to air quality issues in the region, resulting in a positive effect on regional air quality.

### 3.3.7 Socioeconomics

#### 3.3.7.1 Affected Environment

Picatinny Arsenal is located in Morris County, New Jersey. Morris County is one of 21 counties in New Jersey. It is part of the New York-Northern New Jersey-Long Island, NY-NJ-PA Metropolitan Statistical Area. In 2006, Morris County's population of 487,371 ranked 10th in the state. The per capita personal income (PCPI) of $67,788 ranked first in the state and was 145 percent of the state average ($46,763), and 185 percent of the national average ($36,714). In 1996, the Morris County PCPI was $41,954 and ranked second in the state. The 1996-2006 average annual growth rate of PCPI was 4.9 percent. The average annual growth rate for the state was 4.4 percent and for the nation was 4.3 percent. Morris County has shown a steady growth rate and moderate growth is expected to continue. The Picatinny Arsenal area is expected to show moderate employment increases, particularly in the service sectors.

In 2006 Morris County had a total personal income (TPI) of $33,037,825. This TPI ranked fourth in the state and accounted for 8.2 percent of the state total. In 1996 the TPI of Morris was $18,913,368 and ranked fifth in the state. The 1996-2006 average annual growth rate of TPI was 5.7 percent. The average annual growth rate for the state was 5.0 percent and for the nation was 5.4 percent.

Total personal income includes net earnings by place of residence; dividends, interest, and rent; and personal current transfer receipts received by the residents of Morris. In 2006 net earnings accounted for 75.6 percent of TPI (compared with 73.9 in 1996);

dividends, interest, and rent were 17.6 percent (compared with 19.7 in 1996); and personal current transfer receipts were 6.9 percent (compared with 6.4 in 1996).

Earnings of persons employed in Morris County increased to $27,704,415 in 2006, an increase of 5.9 percent over 2005 estimates. The average annual growth rate from the 1996 estimate of $14,924,365 to the 2006 estimate was 6.4 percent. The average annual growth rate for the state was 5.0 percent and for the nation was 5.5 percent.

3.3.7.2 Threshold of Significance

The threshold of significance for socioeconomics is if the proposed action causes unusual population growth or reduction, unusual increase/decrease in housing demand, substantial increase/decrease in demand for public services, or a substantial increase/decrease in employment opportunities. Changes that fall outside the historic range of economic variation for the region.

3.3.7.3 Alternative 1. The No Action Alternative

Implementing the no action alternative, moving static detonation testing to other facilities, will result in permanent, adverse impacts to socioeconomic conditions at in Rockaway Township and Morris County. First the FCTS will not be built, which will eliminate up to $2 million in construction costs, and associated jobs, from the local economy. Moving static detonation testing to other facilities (i.e., Aberdeen Proving Ground or Yuma Proving Ground) may lead to permanent relocation of the organization and its employees, resulting in a loss of total personal income in Morris County and surrounding area.

3.3.7.4 Alternative 2. Build the Fully Enclosed Steel-Reinforced Concrete FCTS

Under the preferred alternative, building the FCTS will cause short-term positive impact to the socio-economic environment during the construction period. Salaries for the estimated 10 to 15 construction workers and supply of construction materials (see table 2.1) will have a short-term positive effect on the local economy.

Temporary in nature, construction of the FCTS may have a very minor, temporary impact on housing if the construction workforce lives outside the region and elects to rent local housing.

The FCTS, due to its fragment containment capability, may become the preferred location for static detonation testing research, and support conditions for growth and expansion of the ARDEC mission and its employment base, and the local economy. The FCTS is estimated to save $750,000 per year in test costs when compared with

conducting static detonation testing research at other installations. The savings result from use of the FCTS at Picatinny Arsenal, operational improvements, and reduction or elimination of explosives transport. The construction jobs will likely be filled from the regional work force, creating no changes in population, housing demand, or school population.

### 3.3.8 Noise

#### 3.3.8.1 Affected Environment

Noise is unwanted or unwelcome sound usually caused by human activity and added to the natural acoustic setting of a locale. It is further defined as sound that disrupts normal activities or that diminishes the quality of the environment. Community response to noise is generally not based on a single event, but on a series of events over time. Factors that have been found to affect the subjective assessment of the daily noise environment include the noise levels of individual events, the number of events per day, and the times of the day at which the events occur.

Sound is usually measured using the decibel (dB). The descriptor of a 24-hour noise environment is the day-night average sound level (DNL). DNL is an average measure of sound, taking into account the loudness of a sound-producing event, the number of times the event occurs and the time of day. Night noise is weighted more heavily because it is assumed to be more annoying. The DNL descriptor is accepted by federal agencies as a standard for estimating impact and establishing guidelines for compatible land uses.

The use of average noise levels over a protracted time period generally does not adequately assess the liklihood of community noise complaints. The metric PK15(met) accounts for statistical variation in received single event peak noise level that is due to weather. It is the calculated peak noise level, without frequency weighting expected to be exceeded by 15 percent of all events that might occur. If there are multiple weapon types fired from one location, or multiple firing locations, the single event level used should be the loudest level that occurs at each receiver location. Installations assess noise from small arms ranges using a single event metric, either PK 15(met) or A-weighted sound exposure level (ASEL). Installations use the land use planning zone (LUPZ) contour to better predict noise impacts when levels of operations at airfields or large caliber weapons ranges are above average. Installations also manage noise-sensitive land uses, such as housing, schools, and medical facilities as being acceptable within the LUPZ and noise zone I, normally not recommended in noise zone II, and not recommended in noise zone III (Table 3.3) (U.S. Army, 2007a).

Table 3.3 Department of the Army Noise Limits for Land Use Zones

| Noise Zone | Noise limits (dB) | | |
|---|---|---|---|
| | **Aviation ADNL** | **Impulsive CDNL** | **Small Arms PK 15 (met)** |
| LUPZ | 60 - 65 | 57 – 62 | N/A |
| I | < 65 | < 62 | < 87 |
| II | 65 – 75 | 62 – 70 | 87 – 104 |
| III | > 75 | > 70 | > 104 |

Reference AR 200-1, Table 14-1, page 44, (U.S. Army 2007a)

The US Army Center for Health Promotion and Preventive Medicine conducted a noise study on Picatinny Arsenal in 2007 (Picatinny Arsenal, 2007b). That study analyzed noise generated from munitions testing on the existing ranges on the installation. The locations of those ranges are shown in Figure B-1.

The noise contours in Figure B-2 were determined based on munitions testing conducted on open ranges, with little or no barriers. The noise contour line for Land Use Planning Zone I extends beyond the installation boundary at three locations, each of which is uninhabited. Within the installation boundary, the noise contour for LUPZ does not extend beyond the general area of the installations ranges, and does not extend to family housing, parks, or recreational areas.

The locations of sites considered for building the FCTS are shown in Figure B-1, Appendix B. Army Regulation (AR) 200-1 defines noise zones and recommended land use guidelines for large caliber weapons noise using C-weighted DNL (CDNL). Although this metric is effective for land use planning, experience at Army installations has shown that noise complaints resulting from large caliber weapons and demolition training/testing are usually attributed to a single loud event, at a particular point in time, versus the average noise dose received at any one location. Often complaints are received from areas that are considered “acceptable” with the noise environment using the CDNL criteria stated in AR 200-1 (US Army, 2007). To this end, the Army has adopted the practice of assessing large caliber weapons noise using both the CDNL and the PK15(met) metrics.

Since there are multiple testing activities occurring at any given time on Picatinny Arsenal, all of which have the ability to generate substantial noise, it is prudent to evaluate the sum of these activities rather than the individual parts. In effect, this provides a “worst case scenario” for large caliber and impulsive noise on the installation; therefore, all noise contours modeled for the Arsenal are for combined testing operations. The CDNL noise contours for combined operations are shown in Figure B-

2, Appendix B. The CDNL Noise Zones II and III shown in Figure B-2 for combined operations are completely contained within the installation boundary and are compatible with Federal guidelines.

With the exception of two locations the 130 dB noise contour is entirely contained within the installation boundary. The contour leaves the installation boundary at two points along the northwest boundary of the installation. The land off the installation within the 130-dB contour is uninhabited. There are no incompatible land uses within the 130dB noise contour.

Conducting static detonation testing within the FCTS will have a minor positive impact on noise, compared to noise generated from detonations on an open test stand. Some of the noise energy generated within the FCTS will reverberate, or bounce off the walls of the test stand, and will exit the test stand with less energy. At a distance of 100 meters and beyond, the noise resulting from an explosion conducted within the FCTS will be less than if the same explosion occurred on an open test stand (Whiteford, 2009).

3.3.8.2 Threshold of Significance

The threshold for significance for noise is the presence of noise above the threshold levels for each Land Use Planning Zone as prescribed in Table 14-1 of Environmental Protection and Enhancement (US Army, 2007). See Table 3.3, above.

3.3.8.3 Alternative 1. The No Action Alternative

The no action alternative would have no impact on noise.

3.3.8.4 Alternative 2. Build the Fully-Enclosed Steel-Reinforced Concrete FCTS

This alternative will build a fully-enclosed steel-reinforced concrete test chamber. Of the three alternative designs this alternative is the best possible solution for achieving the required 99.9999999% confidence level of containing fragments generated from munitions testing. While achieving that goal, the fully enclosed test stand will also enclose a large portion of the noise energy generated from munitions testing.

Past practices of conducting munitions testing on open terrain resulted in minor off-installation excursions of the LUPZ noise contour. The LUPZ noise contour does not infringe on sensitive land uses on the installation, such as medical or recreational facilities or family housing. Confining the blast and resultant noise effects within a concrete enclosure will have a noticeable impact on reducing the LUPZ noise contour, and having a positive impact on the effects of noise.

### 3.3.9 Water Resources.

#### 3.3.9.1 Affected Environment

This element evaluates the potential for the munitions testing on Picatinny Arsenal to affect water resources, which include both surface water and groundwater.

The surface water systems of Picatinny consist of two lakes, 178 ponds, four perennial brooks, several intermittent runs, three freshet waterfalls, and a few springs and seeps scattered throughout the installation. Picatinny falls within the northern portion of New Jersey's delineated Watershed Management Area Six in the Rockaway Sub-watershed. Watershed Management Area Six serves as the primary water supply for northern New Jersey. Green Pond Brook joins the Rockaway River about one mile downstream of the installation. A more detailed discussion of the surface water systems on Picatinny Arsenal is provide in the Programmatic Environmental Assessment for the Installation's master plan (Picatinny Arsenal, 2008).

Groundwater at Picatinny Arsenal is found in sediments deposited within the last one million years during the Quaternary Period (Lusardi, 2008). The water-bearing zones include a confined aquifer, a confined bedrock aquifer, and a shallow unconfined aquifer. Picatinny Arsenal overlies a sole source aquifer and is in the stream flow source zone of the Rockaway River Basin, the sole source of drinking water for numerous towns in Morris County. A complete characterization of the flow and direction of groundwater at Picatinny has not been accomplished. The Rockaway River flows into the Boonton Reservoir, the drinking water source for Jersey City (USEPA, 1991).

Green Pond Brook influences groundwater flow and flows in a southwesterly direction through the center of the Arsenal. Groundwater flow is primarily horizontal and upward in both the unconfined and confined glacial aquifers, and discharges into Green Pond Brook. There are three water supply wells in use at Picatinny Arsenal, located southwest of Picatinny Lake and screened from the confined aquifer system. Based on the monitoring wells located in the vicinity of the proposed site location, the depth to groundwater is 8-20 feet. (Lusardi, 2008).

Production and testing activities at Picatinny have lead to wide-spread contamination of groundwater, surface water, soil, and sediment. These media have been impacted by a wide variety of contaminants such as VOCs, metals, pesticides, PAHs, PCBs, explosives, and radiologicals. Exposure to these contaminated media could pose a health hazard.

Five composite soil samples from the sand/dirt mound and the slug containment stand were obtained in June 2009. The samples were analyzed for volatile organic compounds, semi-volatile organic compounds, target list metals and baseline explosives. The majority of the analyses were found be laboratory method detection limits or applicable regulatory guidance values. The explosives HMX and RDX were detected in one sample at concentrations of 24 milligrams per kilogram (mg/kg) and 0.93 mg/kg, respectively. These concentrations were below the New Jersey Non-Residential Soil Cleanup Criteria standards of 10,000 mg/kg and 26 mg/kg for HMX and RDX, respectively.

#### 3.3.9.2 Threshold of Significance

The threshold of significance for impacts to water resources would be if the Proposed Action could cause unpermitted deposition of dredged or fill material into wetlands or other "Waters of the U.S.", a violation of state water quality criteria, a violation of federal or state discharge permits, and/or potential degradation of an aquifer.

#### 3.3.9.3 Alternative 1. The No Action Alternative

Under the no action alternative munitions testing will not continue and further soil contamination from explosive constituents will cease. While not improving quality of either surface or groundwater, the quality of those waters will get no worse. The No Action Alternative will have no impact on water resources.

#### 3.3.9.4 Alternative 2. Build the Fully-Enclosed Steel-Reinforced Concrete FCTS

The risk to further groundwater contamination from the installation's munitions test mission comes from the uncontrolled dispersion of explosive constituents after detonation. Under this alternative, not only all fragments but some portion of the dust and residue from munitions testing will remain inside the FCTS. The FCTS is water-tight, and no rainwater will wash contaminated residue from the munitions testing from the site and into surface or groundwater.

Operation and maintenance of the facility calls for daily cleaning of the interior of the FCTS. All fragments and residue from munitions testing will be collected and disposed of in accordance with New Jersey regulations governing solid and hazardous waste.

Some residue from munitions testing may exit the FCTS via the four vent stacks. The area beneath those vent stacks will be cleaned daily and any residue from munitions testing will be collected and managed in accordance with New Jersey regulations governing solid and hazardous waste.

Conducting munitions testing inside the totally-enclosed FCTS is the best possible solution to achieving the required 99.9999999% confidence level of containing fragments from munitions testing. Additionally, the FCTS will contain some portion of the residue from munitions testing. Containing, and controlling this material significantly reduces the risk of this material contaminating surface water, wetlands or groundwater at Picatinny Arsenal, and will have an overall positive effect on surface water and groundwater resources at Picatinny Arsenal.

As indicated, there are some low-level concentrations of some explosive residue contamination near the prospective site for the FCTS at TR 616. Unexploded constituents from munitions testing could contribute to existing soil contamination, and pose a risk to surface and/or ground-waters. Subsequent testing of surface soil around the FCTS will be conducted annually for the first three years and then every three years afterwards. If contamination above a level of concern is found, mitigation actions would be required.

### 3.3.10 Hazardous Materials and Hazardous Waste

#### 3.3.10.1 Affected Environment

This element evaluates the potential for the alternative courses of action to generate hazardous material and hazardous waste, and that materials' impact on human health and the environment.

The Resource Conservation and Recovery Act (RCRA) require generators of hazardous waste to obtain a permit if they generate 1000 kg (2,200 lb) of hazardous waste. Picatinny currently operates under Permit number 1409E1HP07 for Hazardous Waste Storage. The research and testing operations at Picatinny generate a large variety of hazardous wastes. Picatinny has approximately 90 points of waste generation located throughout various operations. Picatinny has an interim permit, issued by NJDEP, that authorizes storage, open burning and open detonation (OB/OD) of waste/excess explosives and propellants. Hazardous waste generation has dramatically declined in recent years, and Picatinny continues to meet Army goals of waste minimization. Hazardous waste generated on Picatinny is properly stored, managed and manifested to meet appropriate regulations promulgated under RCRA.

The installation constructed an Explosives Waste Incinerator (EWI) for the treatment of waste propellants and explosives generated at the facility. A trial burn of the EWI was conducted and a trial burn report and notice of compliance was submitted for approval to the NJDEP. Some modifications to the equipment, operating parameters and permit limits were requested and warranted as a result of trials burn evaluation. It is expected

that NJDEP will issue final modified air and RCRA permits and the EWI will operate for some time in a “prove-out” phase, evaluating the treatment of burning various types of explosives and propellants. Plans are to reduce most open burning of waste/excess propellants and explosives once the incinerator is fully operational, at which time the current open burning grounds site (Building 1179) will be closed.

3.3.10.2 Threshold of Significance

The threshold of significance for hazardous material or hazardous waste is if the storage, use, transport, or disposal of hazardous materials substantially increases human health risk or environmental exposure; or violates applicable Federal, State or Army regulations, or results in non-compliance with the Installation's hazardous waste (RCRA Part B) permit.

3.3.10.3 Alternative 1. The No Action Alternative

Under the No Action alternative, hazardous waste generated from static detonation testing will occur at other test sites, and will not affect human health or the environment at Picatinny Arsenal.

3.3.10.4 Alternative 2. Build the Fully-Enclosed Steel-Reinforced Concrete FCTS

When conducting static detonation testing within the FCTS, some portion of the residue and explosive constituents from the explosion will cling to the fixed surfaces of the FCTS. Of the three alternative designs, this alternative offers the best possible solution for achieving the required 99.9999999% confidence level of containing fragments from munitions testing. The fragments and fines should be handled and accumulated as if they were hazardous waste. Fragments and explosive residue will be collected after every test and then flashed in the installation’s hot gas decontamination unit, and subsequently managed and disposed of as solid waste.

These fragments, some of which were contaminated with explosive residue, were as a result of munitions testing distributed around the test site. Those pieces large enough to be detected by the human eye were collected and then flashed in the installation’s hot gas decontamination unit. Those too-small to be seen remained on the ground. As a result of conducting testing within the fully-enclosed, steel-reinforced concrete FCTS fragments, and some portion of residue from munitions testing will be contained within the FCTS and collected and properly managed and disposed of. This reduces the amount of potentially hazardous material exposed to the environment, and will have a minor, long term positive effect.

The explosive residue may pose an inhalation health risk to unprotected workers. To ensure protection of human health and the environment, a standing operating procedure (SOP) should be developed that outlines the process, equipment and personal protection equipment (PPE) required by workers who collect fragments and clean the surfaces of the FCTS. The SOP should be reviewed and approved by the Picatinny Arsenal Environmental Affairs Division and an Occupational Medicine Physician.

The vent stacks will be cleaned on a regular frequency. That frequency will be based on operational experience and specified in the document specifying the FCTS's standing operating procedures. Residue collected from this cleaning will sampled and managed in accordance with New Jersey environmental regulations.

Static detonation testing will not generate hazardous waste or hazardous material after fragments and dust-type particulates are collected and treated in the installation's hot gas decontamination unit. Preparing and following the safety and protective elements prescribed in the SOP described above will provide the necessary protection for human health and the environment.

Building the FCTS will generate little if any hazardous waste. The management and maintenance of the facility can be accomplished with little or no risk to human health or the environment.

## 3.4 Analysis of Alternative Sites

### 3.4.1 Alternatives Considered

The alternatives considered for siting the FCTS are listed below. The locations under consideration are illustrated in Figure B-1, Appendix B. Figure B-1 includes Range 3620 which is not among the viable alternatives for locating the FCTS.

**Alternative 1. Test Range 616.**

TR 616 is five (5) acres in size, is accessible by a one-lane paved road, and has no environmentally sensitive areas.

- **Alternative 2. Test Range 650.**

TR 650 is four (4) acres in size, is accessible from the main access road, and contains a small pond.

- **Alternative 3. Test Range 654.**

TR 654 is three (3) acres in size, and is accessible from a narrow, twisting one-lane road. There are no environmentally sensitive sites at this range.

- **Alternative 4. Test Range 670.**

TR 670 is two acres (2) in size, is accessible from the main road, and has no environmentally sensitive sites.

- **Alternative 5. Test Range 1222 (the Gorge).**

TR 1222 is three (3) acres. It is the furthest from range control and the R&D facilities. A stream runs through the area. TR 1222 is accessible from an unimproved road that is subject to washout during heavy rain.

3.4.2 Evaluation Criteria

To meet mission and environmental requirements, the location of the proposed FCTS is should meet the following requirements:

- Year round access by construction equipment, material handling equipment, large supply vehicles, and fire and safety vehicles;
- Sufficient buildable area to build the FCTS;
- Sufficient electrical power to run test data acquisition and recording, and slow cook-off ovens;
- Minimize and/or control infiltration of residue into groundwater and streams;
- Minimize and/or control adverse impacts on wetlands and riparian habitats;

### 3.4.3 Alternatives Analysis

Each of the proposed sites for building the FCTS are within the installation's existing range area. These sites are within a controlled-access area of the installation and removed from the installation's general population. Each site meets the requirements for safety.

Test Range (TR) 616 is five acres in size, is accessible by a one-lane paved road, and has no environmentally sensitive areas. TR 650 is four acres and is accessible from the main access road, but contains a small pond. TR 654 is three acres, and is only accessible from a narrow, twisting one-lane road. TR 670 is two acres and is accessible from the main road. TR 1222 is three acres, it is a considerable distance from range control and the R&D facilities, and a stream runs through it. TR 1222 is accessible from an unimproved road that is subject to washout during heavy rain. An environmentally sensitive creek runs through this range. Evaluating the test ranges according to size, accessibility and environmentally sensitive conditions makes TR 616 the preferred alternative for constructing the FCTS.

Table 3.4 provides a matrix of the alternative sites for building the FCTS using the evaluation criteria listed above. This matrix indicates that Test Range 616 is the preferred site for building the FCTS.

Table 3.4 Matrix of alternative analysis for siting the FCTS

| | **Year-round Access** | **Sufficient Area** | **Electrical power** | **Impact Surface water** | **Impact wetlands/ Riparian area** |
|---|---|---|---|---|---|
| Alt 1 No Action | | | | | |
| Test Range 616 | + | + | + | + | + |
| Test Range 650 | + | + | + | - | - |
| Test Range 654 | - | + | + | + | + |
| Test Range 670 | + | - | + | + | + |
| Test Range 1222 | - | + | + | - | - |

Building the FCTS on Test Range 616 would result in the removal of a mixed stand of saplings and herbaceous vegetation alongside the ridgeline bordering TR 616. Approximately 30 feet of herbaceous vegetation on the northern and western boundaries of TR 616 are expected to be removed to create a firebreak, resulting in a minimal adverse impact. The minimum amount of vegetation necessary to create a firebreak will be removed. Since the project location is already disturbed, no adverse

impact to flora is anticipated during proposed construction and operation. By minimizing the number of vehicles on site, trips to and from the site during construction, and days spent performing construction activities will help minimize the temporary, higher noise levels within the project area that may impact local fauna. No long-term adverse impacts to fauna are expected. Conducting static detonation testing at other facilities will reduce the impact on the installation's natural resources. Constructing, operating and maintaining the FCTS at TR 616 will have a minimal impact on natural resources at Picatinny Arsenal.

Although construction and operations at TR 616 will create noise, the proposed activities are not expected to impact any local population of Indiana bat. No saplings larger than five inches were identified during an inspection of TR 616. The preferred location does not contain any bog turtle habitat. Engineering BMPs will be used during construction to minimize runoff from the site, and to minimize potential effects to bog turtle habitat. No effects to bog turtles are expected to result from the proposed action. Constructing, operating and maintaining the FCTS at TR 616 will not impact threatened and endangered species at Picatinny Arsenal..

TR 616 is not located within a historic district, and no known archaeological or cultural resources of significance are located onsite. The site was surveyed in 2007 and evaluated as not eligible for inclusion on the National Register of Historic Places (NRHP). TR 616 is classified as potentially sensitive, but disturbed. Picatinny Arsenal received concurrence on the proposed action on the determination of no effect to Archaeological Properties and Historic Properties/Buildings from the State of New Jersey Historic Preservation Office (Exhibit C-1, Appendix C).

### 3.5 Cumulative Effects

Cumulative effects are the result of the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. The scope of cumulative effects is also important to consider. The first step in cumulative effects analysis is to identify the potentially significant effects associated with the Proposed Action.

Discussions above determined the proposed action of building the FCTS at Test Range 616 would have no impact on several environmental subject areas, to include airspace, energy, facilities and infrastructure, natural resources, threatened and endangered species, soil erosion, floodplains, environmental justice, and solid waste. Building and operating the FCTS will have no direct, indirect or cumulative impact on airspace energy, facilities and infrastructure, soil erosion, floodplains, environmental justice or

solid waste. The removal of small trees and underbrush near the FCTS site will have no cumulative effect on natural resources at Picatinny Arsenal.

Conducting munitions testing inside a fully enclosed FCTS will provide a significant increased level of safety for munitions testing. This level of safety could attract other testing to be conducted in the FCTS and have a long-term positive impact on the safety of munitions testing.

Building and operating the FCTS at TR 616 will is a single event at an isolated location. As discussed earlier (Section 3.3.3), there is no expected impact on cultural resources.

Building and operating the FCTS at TR 616 is expected to have some minor impacts on traffic and transportation during the construction period. Traffic congestion on roadways leading to Picatinny Arsenal, specifically NJ Route 15, could worsen if there were other construction projects on the installation, or additional growth or development that would increase peak-hour traffic volume on Route 15. As noted in Section 3.3.5, there would be a minor increase in traffic volume during the estimated eight-month construction period, but operating the FCTS would not generate any additional traffic volume. Additional traffic volume during the construction period could increase traffic congestion during peak hours and decrease level of service. The contribution to traffic congestion from building the FCTS would be relatively minor and limited to the estimated eight-month construction period. To minimize the potential impact of building the FCTS, the installation could request/require the contractor to ensure deliveries are made to avoid travel during peak travel hours. Overall cumulative impacts of building the FCTS on traffic would be minor.

Building the FCTS is expected to have minimal impact on air quality during the eight-month construction period from dust generated during excavation and construction vehicles. The additional emissions from other sources, such as additional traffic or point sources could decrease air quality in the immediate area during the construction period. Munitions testing inside the fully enclosed FCTS will contain a vast portion of the residue and unexploded constituents within the FCTS. This will significantly reduce the level of emissions from munitions testing during the life of the FCTS. The reduced level of emissions from the FCTS will have a positive cumulative impact on air quality in the area.

Building the FCTS at TR 616 will have a positive short-term impact on the local economy. Knowing that building the FCTS to be eight-month job, it is unlikely any of the workers would move to the area and impact housing or schools. Operating the FCTS

will not likely increase the full-time population of Picatinny. Building and operating the FCTS will have no cumulative impact on socioeconomics.

There will be some minor increased noise levels while building the FCTS. The noise will generally be localized to the immediate area surrounding the FCTS and limited to business hours. There would be no cumulative effects to noise during the eight-month construction period. The FCTS is a fully enclosed facility. It is expected that a significant portion of the noise energy generated from munitions testing will remain inside the FCTS, resulting in significant reduction in the level of noise leaving the test range.

Building and operating the FCTS at TR 616 is expected to have minimal impact on water resources at Picatinny Arsenal. Best management practices will be used during construction to control erosion and limit additional sediment to surface waters. Some portion of air emissions from munitions testing will remain within the FCTS, and reduce the quantity of unexploded explosive constituents distributed on the soil surface around the test site.

Building the FCTS will generate little if any hazardous waste. Operating the FCTS will generate waste that may be hazardous from regular collection of the explosive residue from the interior surfaces of the FCTS. This material will be collected and managed as hazardous waste. Picatinny Arsenal is a licensed large quantity hazardous waste generator, and is licensed to generate, and them properly manage any quantity of hazardous waste. Additional material collected, dust and unexploded residue could amount to as much as one pound per munitions test, or a total of about 400 pounds per year. Operating the FCTS would have no cumulative impact on the installation's hazardous waste operations and procedures or the installation's license to generate and manage hazardous waste.

The potential cumulative effects of building and operating the fully enclosed FCTS at Test Range 616 would not be significant.

# SECTION 4
# CONCLUSION

This EA identifies and evaluates alternatives for continuing the static detonation testing at Picatinny Arsenal. This EA evaluated several design alternatives for the FCTS to achieve the ARDEC Director's requirement of having a 99.9999999% confidence level of containing fragments generated from munitions testing. This EA also evaluated several alternative locations for building the FCTS on the installation.

The preferred alternative is to build a fully-enclosed, steel-reinforced concrete Fragment Containment Test Stand (FCTS) at Test Range 616 on Picatinny Arsenal. The proposed design for the FCTS will have four-foot thick steel reinforced concrete on the floor, walls, and roof, and the ceiling lined with 2-1/2-inch thick steel plates. The floor and walls of the inside of the FCTS will be lined with 4-inch thick steel plates. Of the three alternative designs, the fully-enclosed, steel-reinforced concrete FCTS offers the best possible solution of achieving the required 99.9999999% confidence level of containing fragments generated during munitions testing. This proposed design will have a solid steel blast door, and specially-designed ports for cameras and four vents in the ceiling to vent gases created during munitions testing.

Two alternative designs were considered and ultimately rejected because they did not provide the level of fragment containment required.

1. An all-steel structure was discarded because would not likely achieve the required 99.9999999% confidence level of containing fragments generated during munitions testing. Other factors for discarding this alternative were the initial cost for construction, and the long-term maintenance costs for the facility. Construction would be labor-intensive and require people highly skilled in steel assembly and welding. See Figures A-1 through A-3.

2. The pre-cast concrete FCTS design was discarded because it would not achieve the required 99.9999999% confidence level of containing fragments from munitions testing. See Figures A-4 through A-6.

Test Range 616 was determined the best site among five alternative locations for the FCTS. This alternative meets the installation's security, access, land area and environmental requirements. This is the Preferred Alternative for the location of the FCTS.

Analysis of the potential environmental impacts, using the conditions before April 2008 as a baseline, determined that building and operating the FCTS at Test Range 616 would have no, or *de minimis* impact on the environmental categories of airspace, energy, facilities and infrastructure, threatened and endangered species, floodplains, environmental justice, solid waste and cultural resources. Table 4.1 provides a matrix of the potential effects of the no action alternative and the preferred alternative.

Analysis determined there building the FCTS would have long-term positive impact on:

- Safety, because of the three alternative designs considered, the preferred alternative offers the best possible solution to achieving the required 99.9999999% confidence level of containing fragments generated during munitions testing;
- Natural resources, because there would be no risk of fragments from munitions testing wounding wildlife and no risk of fragments embedding themselves in trees and vegetation near the test site;
- Noise, because the steel-reinforced concrete FCTS would absorb much of the sound energy generated from munitions testing, reducing the magnitude of the noise reaching inhabited areas on the installation and the surrounding community;
- Hazardous waste because fragments, potentially contaminated with explosive constituents, would remain inside the FCTS where they could more easily be collected for proper treatment or disposal.
- Water resources, to include surface and groundwater. Prior to April 2008, munitions testing was conducted on open stands, with dust, particulate matter and explosive residue being disbursed on open ground. This residue can migrate to surface and/or groundwater. Conducting munitions testing within the fully-enclosed FCTS limit the amount of particulate matter that could migrate to water resources;
- Air Quality, because some portion of the dust and particulate generated from munitions testing will remain inside the FCTS;
- Traffic safety, because there would be no further requirement to transport explosive munitions on roadways to other test facilities.

There would be short-term minor negative impacts on air quality resulting from dust and emissions generated during the construction process. Some additional dust may be generated during excavation, and there will be some minor additional emissions from construction vehicles during the six-month construction period. Any potential dust generated during construction period can be mitigated by spraying water on the soil during excavation. There will be long-term positive impacts on air quality – it is expected that some percentage of the dust and from munitions testing will be contained inside the totally-enclosed test stand. This would have a positive effect on air quality compared to the earlier practice where dust and explosive residues were emitted into the atmosphere.

The no-action alternative would have long-term minor negative effect on traffic because of the requirement to move military explosives on the public roadways from Picatinny to either another military installation or a commercial testing facility.

Table 4.1 Alternative Analysis Matrix, Building the fully enclosed, steel-reinforced concrete FCTS

| **Valued Environmental Component** | **No Action Alternative** | **Build the FCTS (The Preferred Alternative)** |
|---|---|---|
| Airspace | No impact | No impact |
| Air Quality | No impact | Short-term minor negative impact. Long-term positive |
| Cultural Resources | No impact | No impact |
| Energy | No impact | No impact |
| Environmental Justice | No impact | No impact |
| Facilities and Infrastructure | No impact | No impact |
| Floodplains | No impact | No impact |
| Hazardous Material & Hazardous Waste | No impact | Long-term minor positive |
| Natural Resources | No impact | Long-term positive impact |
| Noise | No impact | Long-term positive impact |
| Safety | No impact | Long-term positive impact |
| Socioeconomics | Long-term negative impact | Short-term positive impact |
| Soil Erosion | No impact | Minor short-term impact |
| Solid Waste | No impact | No impact |
| Threatened & Endangered | No impact | No impact |
| Traffic and Transportation | Long-term negative impact | Short-term minor negative impact; long-term positive |
| Water Resources | No impact | Long-term positive impact |

There will be a short-term minor negative impact on traffic and transportation during the construction period. The estimated workforce of 10-15 persons will have a negligible contribution to the existing traffic congestion on roadways leading to the installation. Construction vehicles will have a short-term minor impact on traffic on local roadways, and a negligible impact on the installation. There could be higher level impact on the three days during which the concrete will be poured. During these three days, Assuming eight cubic yards of concrete per truck, pouring the slab will require approximately 27 trips by concrete trucks, the walls 33 trips, and the roof 24 trips. To minimize the potential impact on traffic congestion on local roadways leading to Picatinny Arsenal (NJ Route 15 in particular), concrete pouring should be scheduled to begin after the morning peak traffic period.

# SECTION 5
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# SECTION 7
# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AAQS | Ambient Air Quality Standards |
| AP-42 | Air Pollution Emission Factors |
| AR | Army Regulation |
| ARDEC | Armaments Research Development and Engineering Center |
| | |
| BMP | Best Management Practice |
| BRAC | Base Realignment and Closure |
| | |
| CAA | Clean Air Act |
| CDNL | C-weighted Day Night Level (of noise) |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| CO | Carbon Monoxide |
| COA | Course of Action |
| | |
| DNL | Day Night Level ( of noise) |
| DA Pam | Department of the Army Pamphlet |
| | |
| EA | Environmental Assessment |
| EO | Executive Order |
| | |
| FCTS | Fragment Containment Test Stand |
| FNSI | Finding of No Significant Impact |
| | |
| HAPs | Hazardous Air Pollutants |
| HFD | Hazardous Fragment Distance |
| H.E. | High Explosive |
| | |
| IM | Insensitive munition |
| ICRMP | Integrated Cultural Resources Management Plan |
| INRMP | Integrated Natural Resource Management Plan |
| IONMP | Installation Operational Noise Management Plan |
| ISCST3 | Industrial Source Complex Short Term. A computer model that is the US EPA's current regulatory model for many New Source Review (NSR) and other air permitting applications |

| | |
|---|---|
| mm | millimeter |
| MIL STD | Military Standard |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NEW | net explosive weight |
| NJAC | New Jersey Administrative Code |
| NJAAQS | New Jersey Ambient Air Quality Standards |
| NJDEP | New Jersey Department of Environmental Protection |
| $NO_x$ | oxides of nitrogen |
| $NO_2$ | nitrogen dioxide |
| $O_3$ | ozone |
| OBOD | open burning open detonation |
| ogive | In ballistics or aerodynamics, an ogive is a pointed, curved surface mainly used to form the approximately streamlined nose of a bullet or other projectile. |
| Pb | lead |
| PCPI | per capita personal income |
| PK15(met) | peak sound level, without frequency weighting and accounting for the statistical variation cause by weather, expected to be exceeded by 15 percent of all events that might occur. A PK15(met) level of greater than 30 dB has a high risk of complaints, 115-130 dB has a moderate risk of complaints, and below 115 dB has a low risk of complaints. |
| PM | particulate matter |
| $PM_{2.5}$ | particulate matter less than 2.5 microns in size |
| $PM_{10}$ | particulate matter less than 10 microns in size |
| PMSA | Primary Metropolitan Statistical Area |
| PPE | personal protective equipment |
| PTE | potential to emit |
| Q-D | Quality-Distance |
| R&D | Research and Development |
| ROI | Region of Influence |
| RONA | Record of Non-Applicability |
| SCAQMD | South Coast Air Quality Management District |
| SERDP | Strategic Environmental Research and Development Program |
| SIP | state implementation plan |
| $SO_2$ | sulfur dioxide |
| SOP | standing operating procedure |

| | |
|---|---|
| TPI | total personal income |
| TPY | tons per year |
| TSP | Total suspended particulates |
| USACHPPM | US Army Center for Health Promotion and Preventive Medicine |
| USEPA | US Environmental Protection Agency |
| USFWS | US Fish and Wildlife Service |
| $\mu g/m^3$ | micro-gram per cubic meter |
| VOC | volatile organic compound |
| WP | white phosphorous |

# APPENDIX A

# FIGURES AND DRAWINGS

Figure A-1  Conceptual Drawing, All-Steel Fragment Containment Test Stand - Center Box with 9 U-Frames

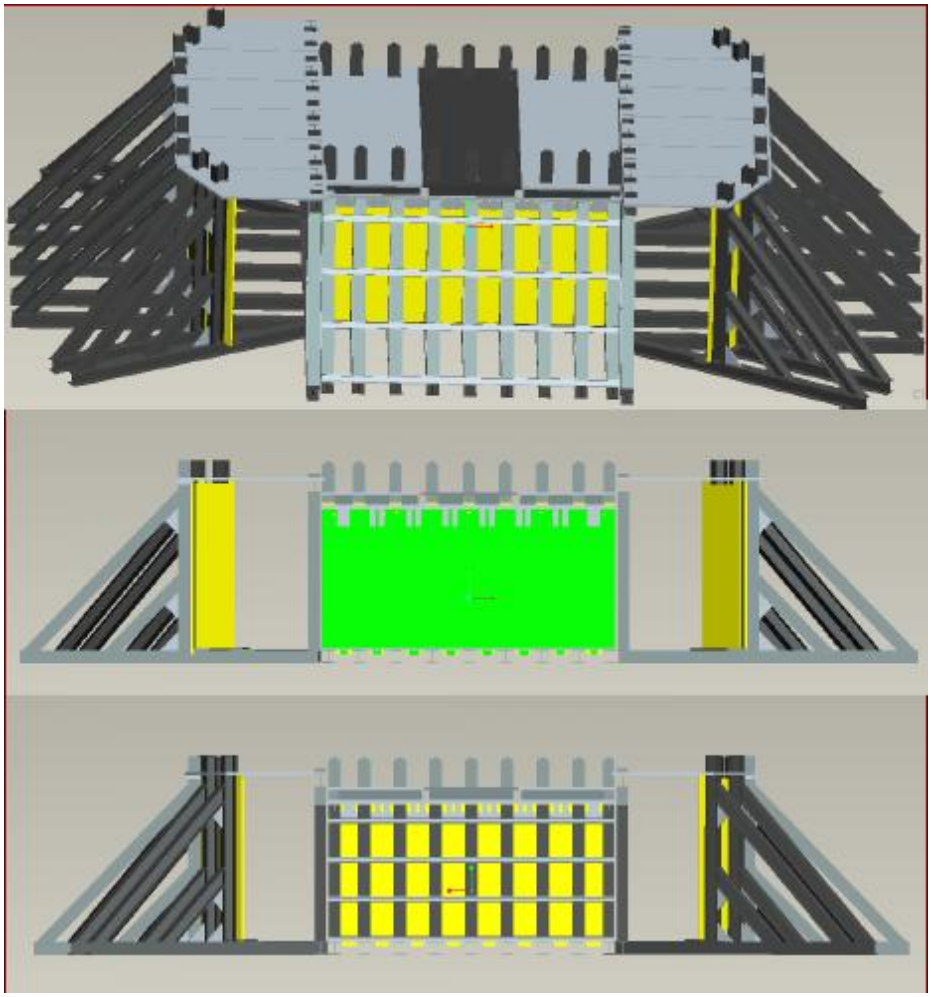


Figure A-2  All-Steel Fragment Containment Test Stand – Center Box with 9 U-Frames and with 13 U-Frames

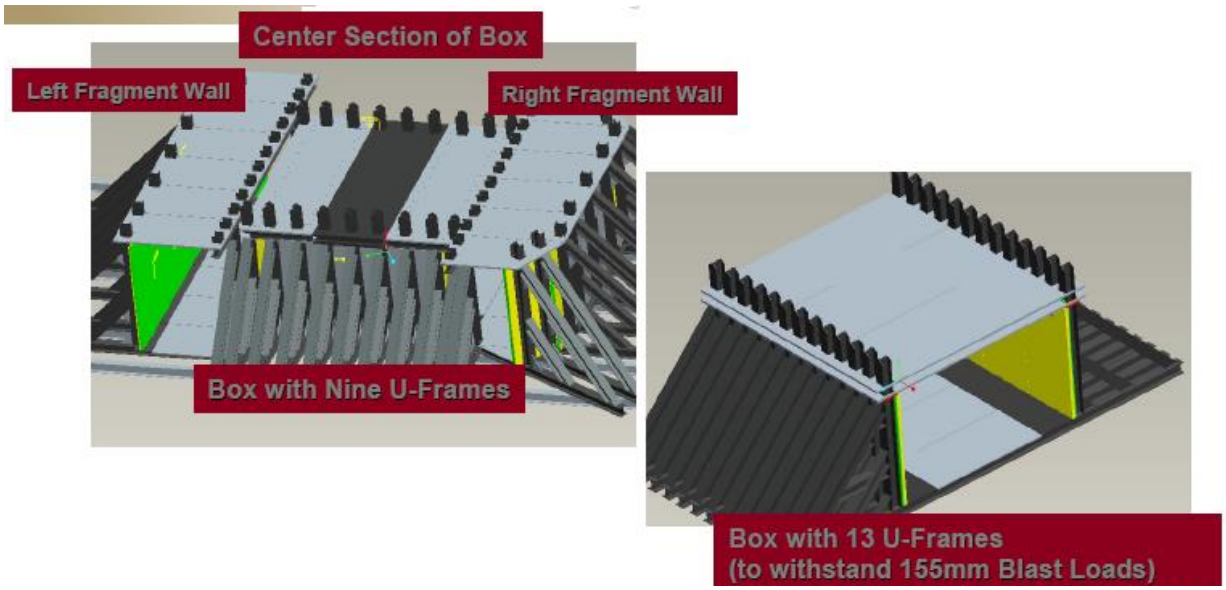


Figure A-3  All-Steel FCTS - Detail of a section of the Center Box with 13 U-Frames

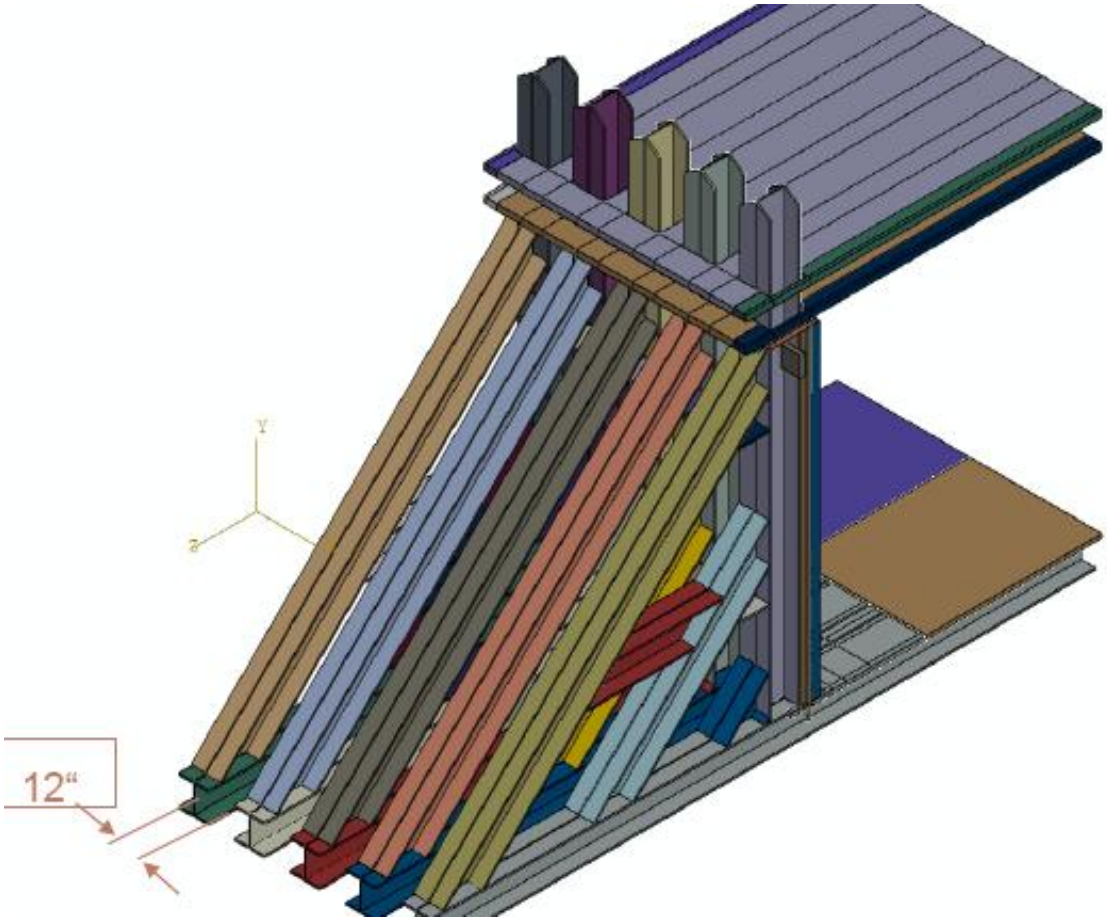


Figure A-4  Orthogonal View, Pre-Cast Concrete Fragment Containment Test Stand (FCTS)

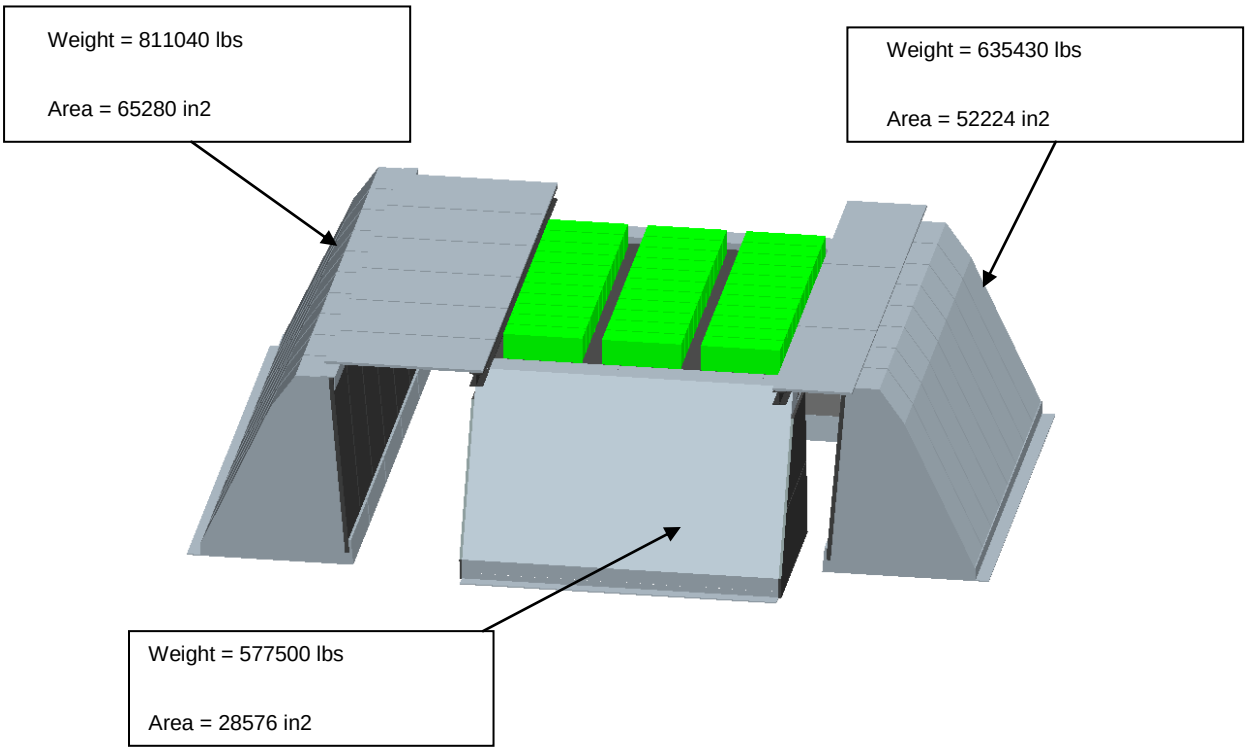


Figure A-5  Pre-Cast Concrete FCTS - Front View

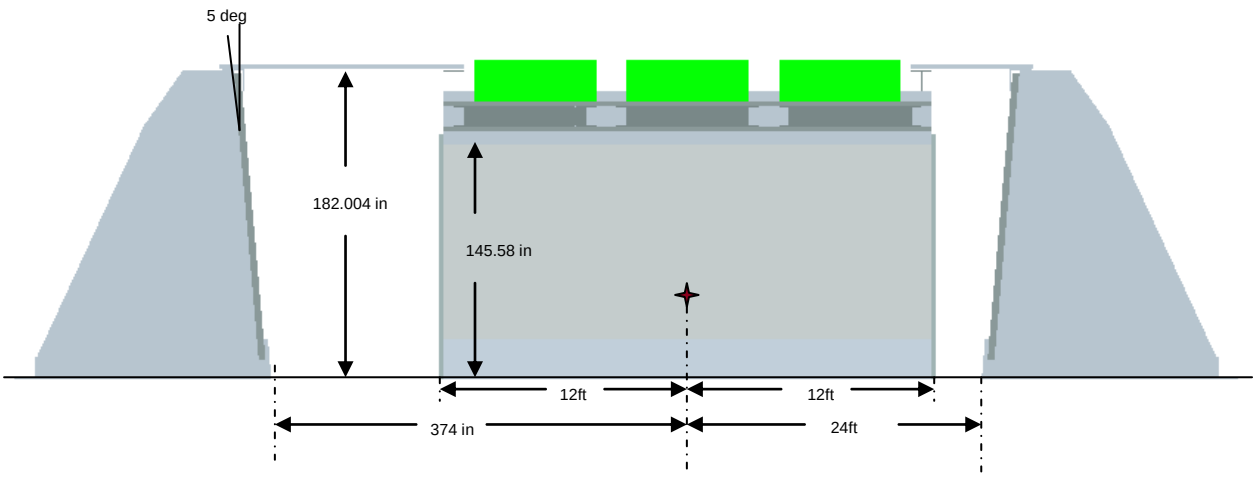


Figure A-6  Pre-Cast Concrete FCTS – Interior Elevation View

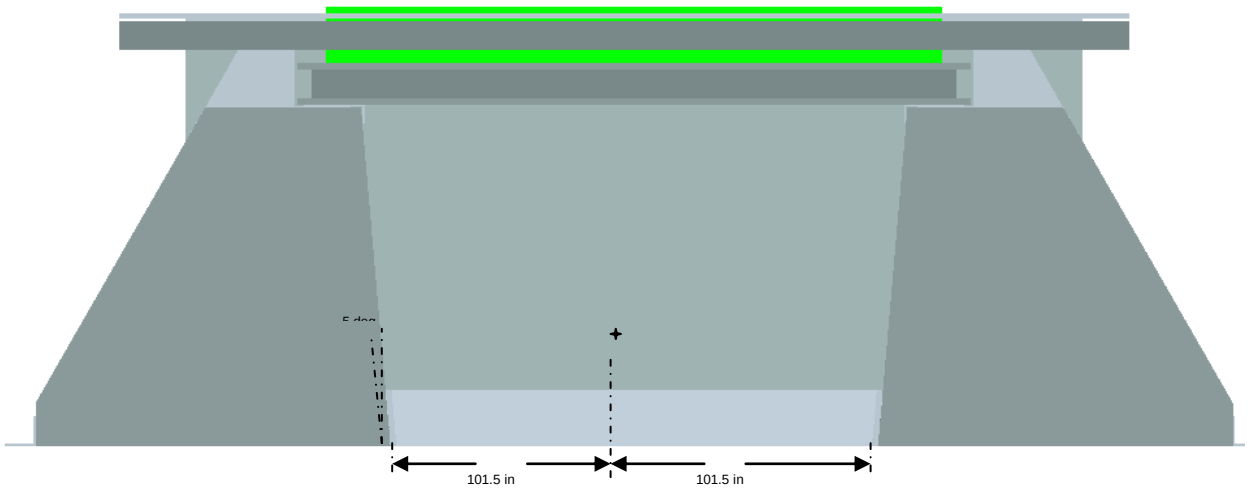


Figure A-7  Fully-enclosed steel-reinforced FCTS - Orthogonal view

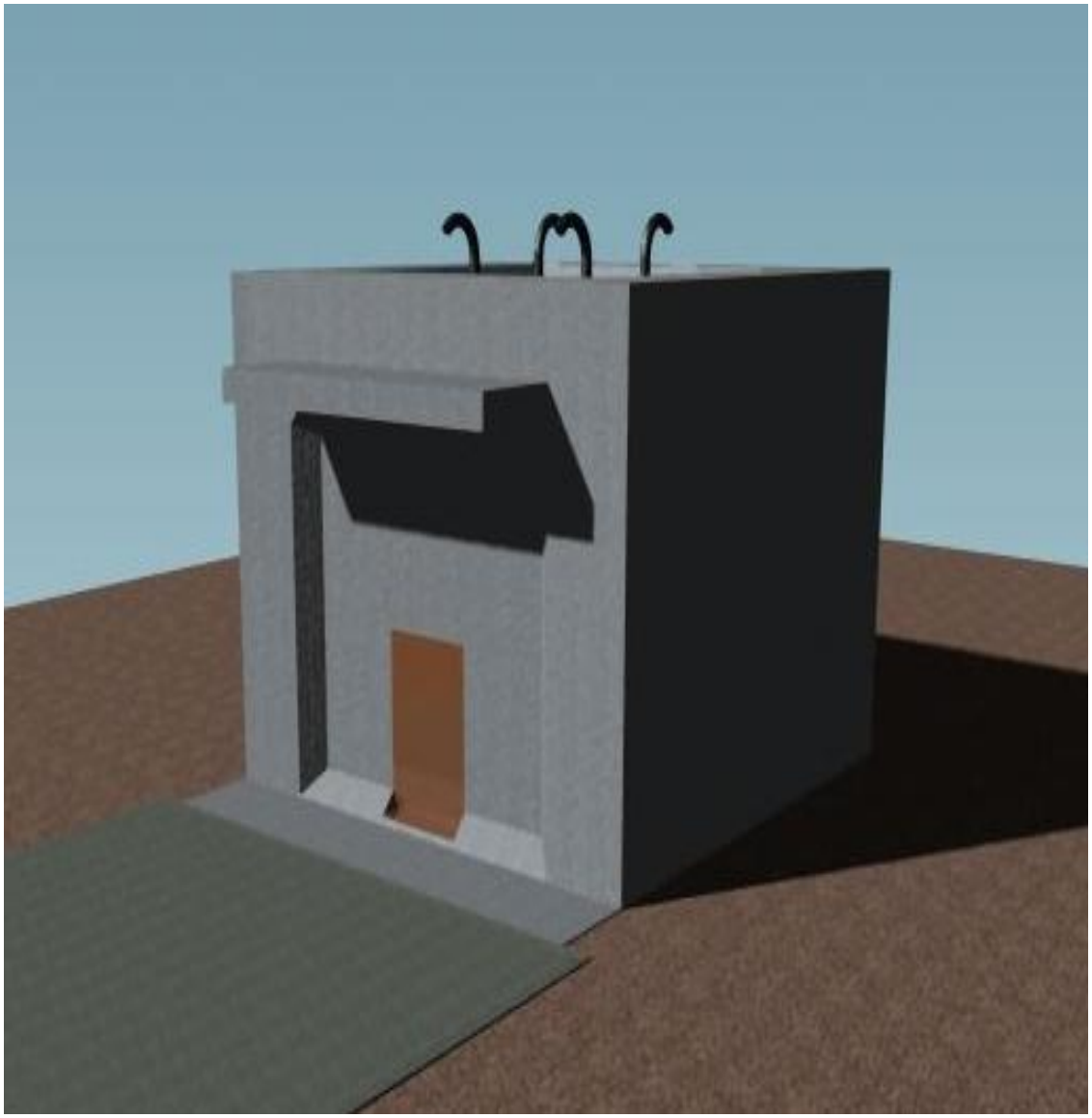


Figure A-8  Fully enclosed, Steel-reinforces Concrete FCTS – Top, Cross-Sectional View

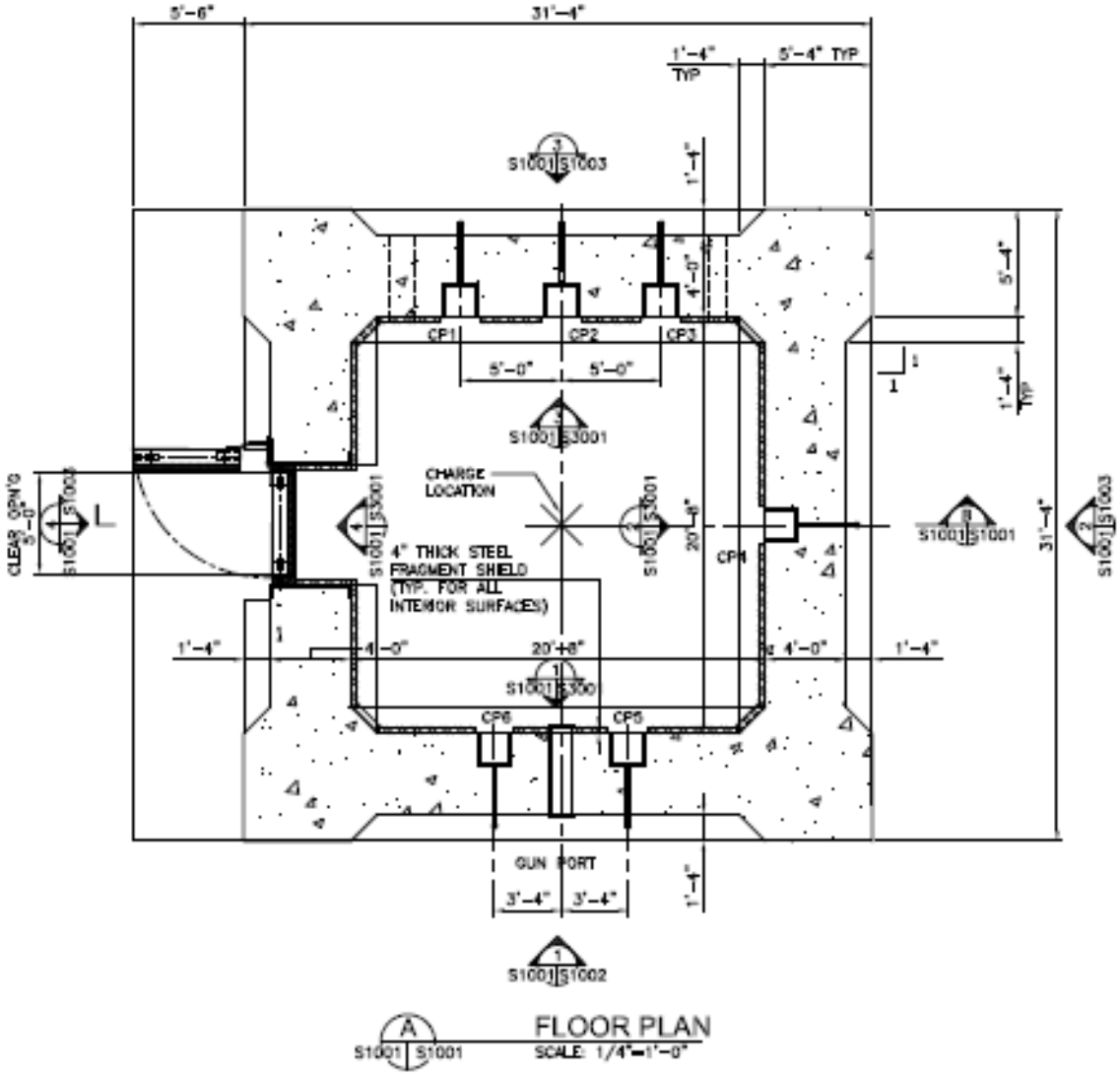


Figure A-9  Fully enclosed, steel-reinforced concrete FCTS – Side Cross-Sectional View

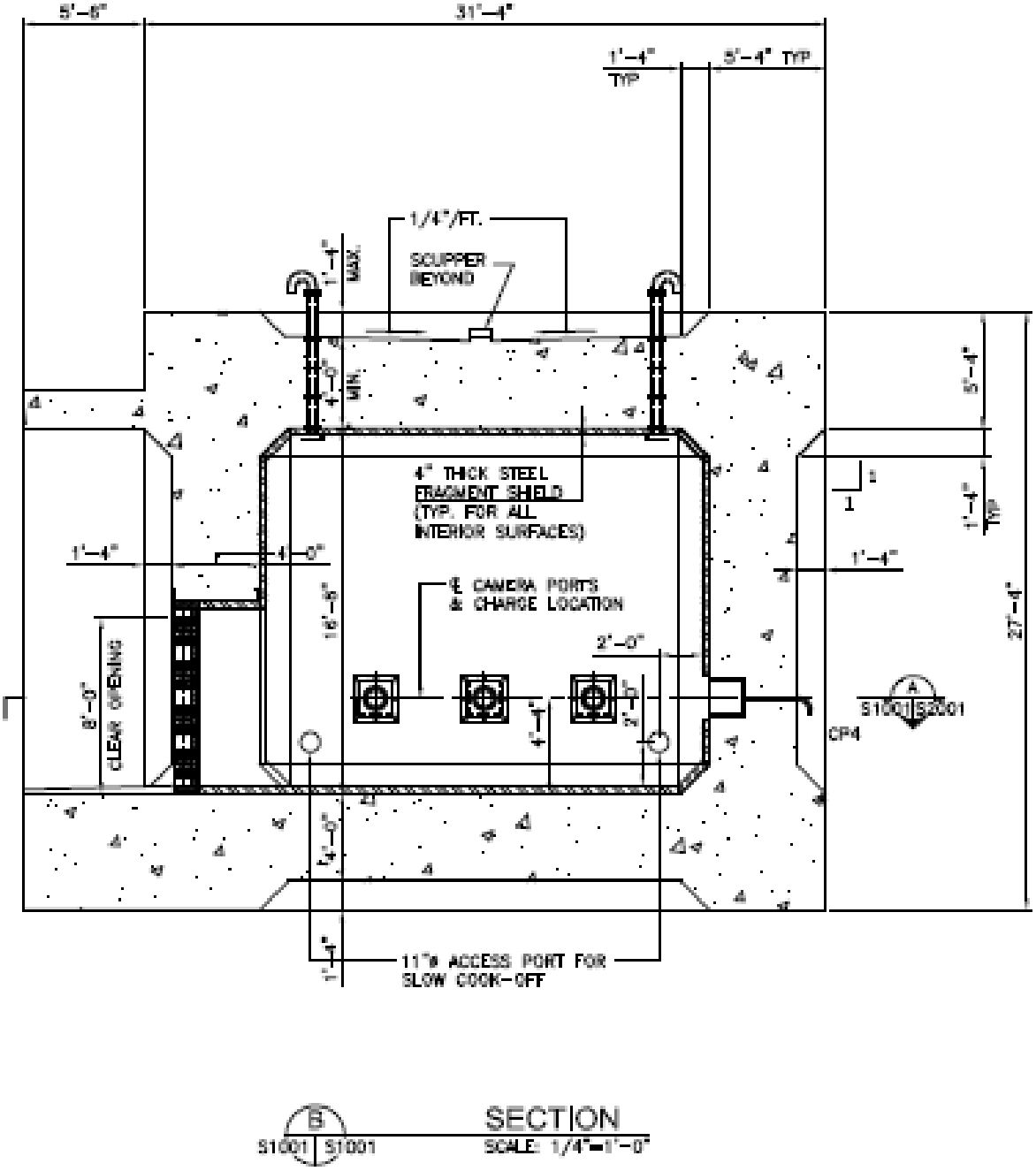


Figure A-10  Fully enclosed, steel-reinforced concrete FCTS – Plan view of steel-reinforcing.

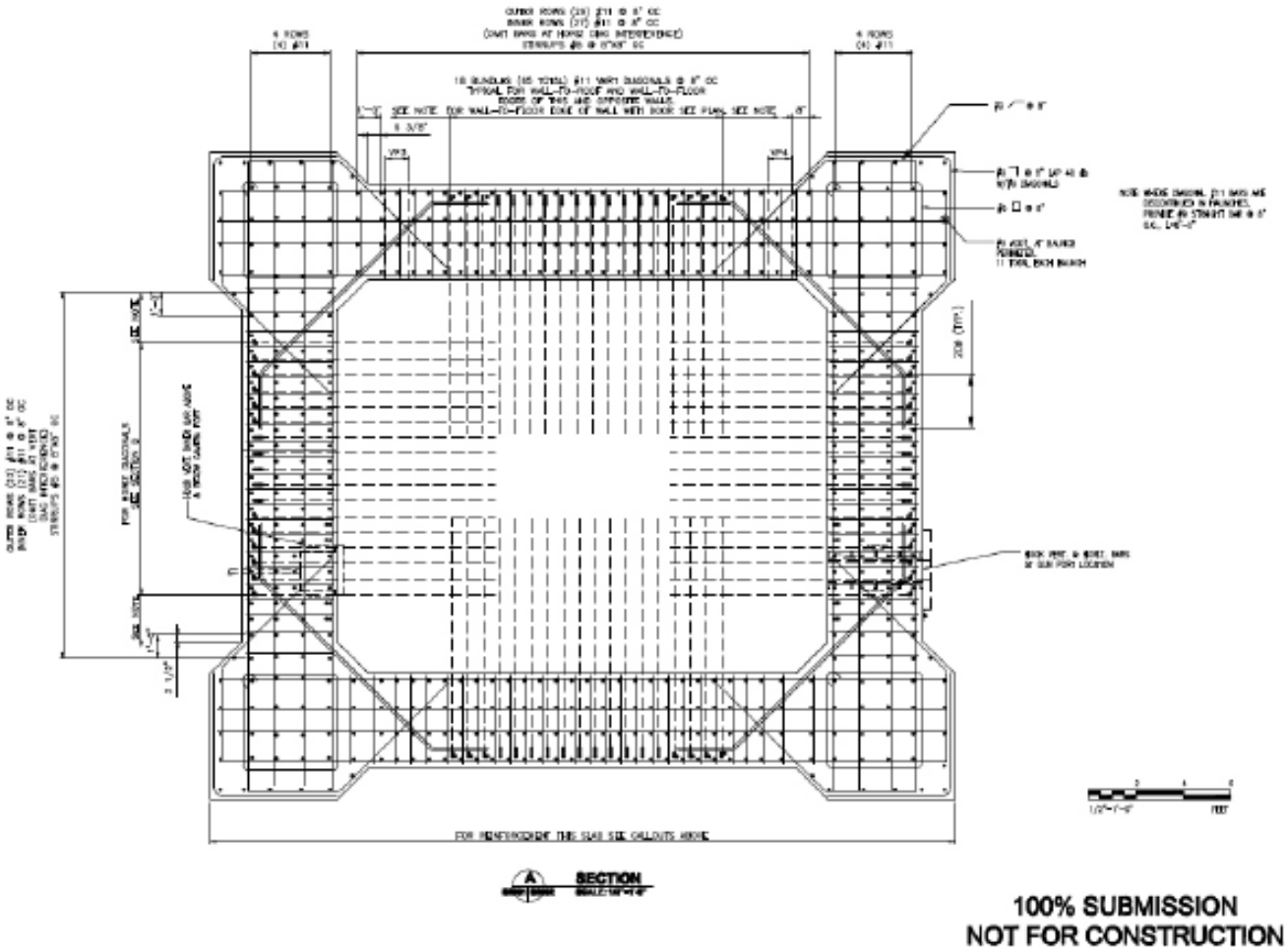


Figure A-11  Fully enclosed, steel-reinforced concrete FCTS – Side view of steel-reinforcing.

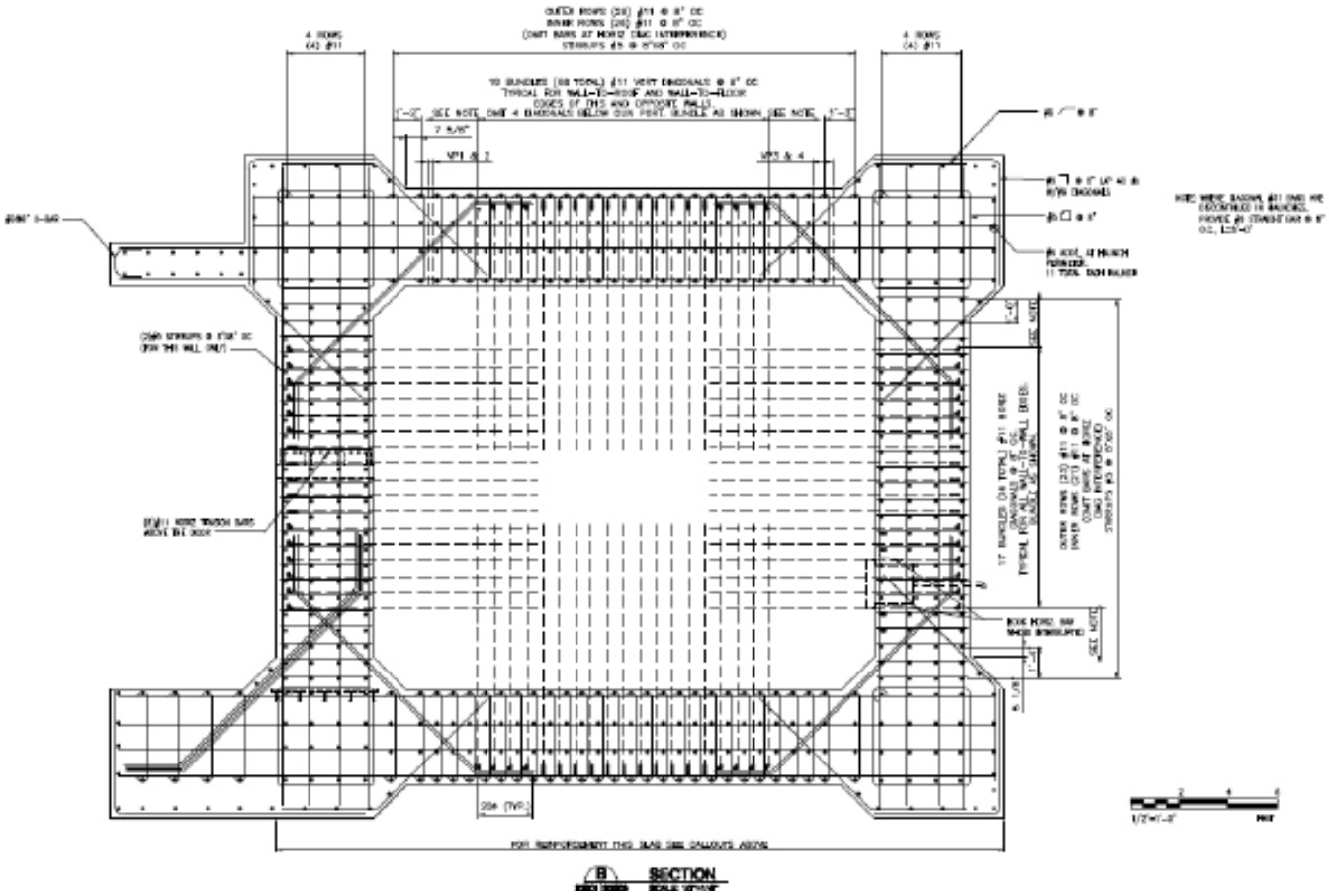
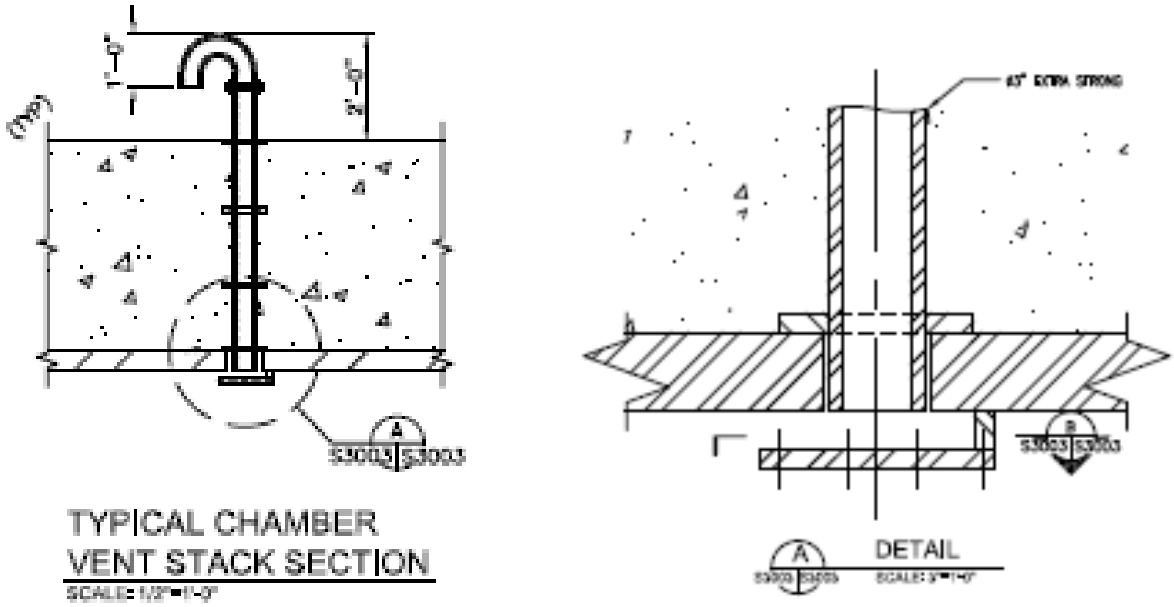


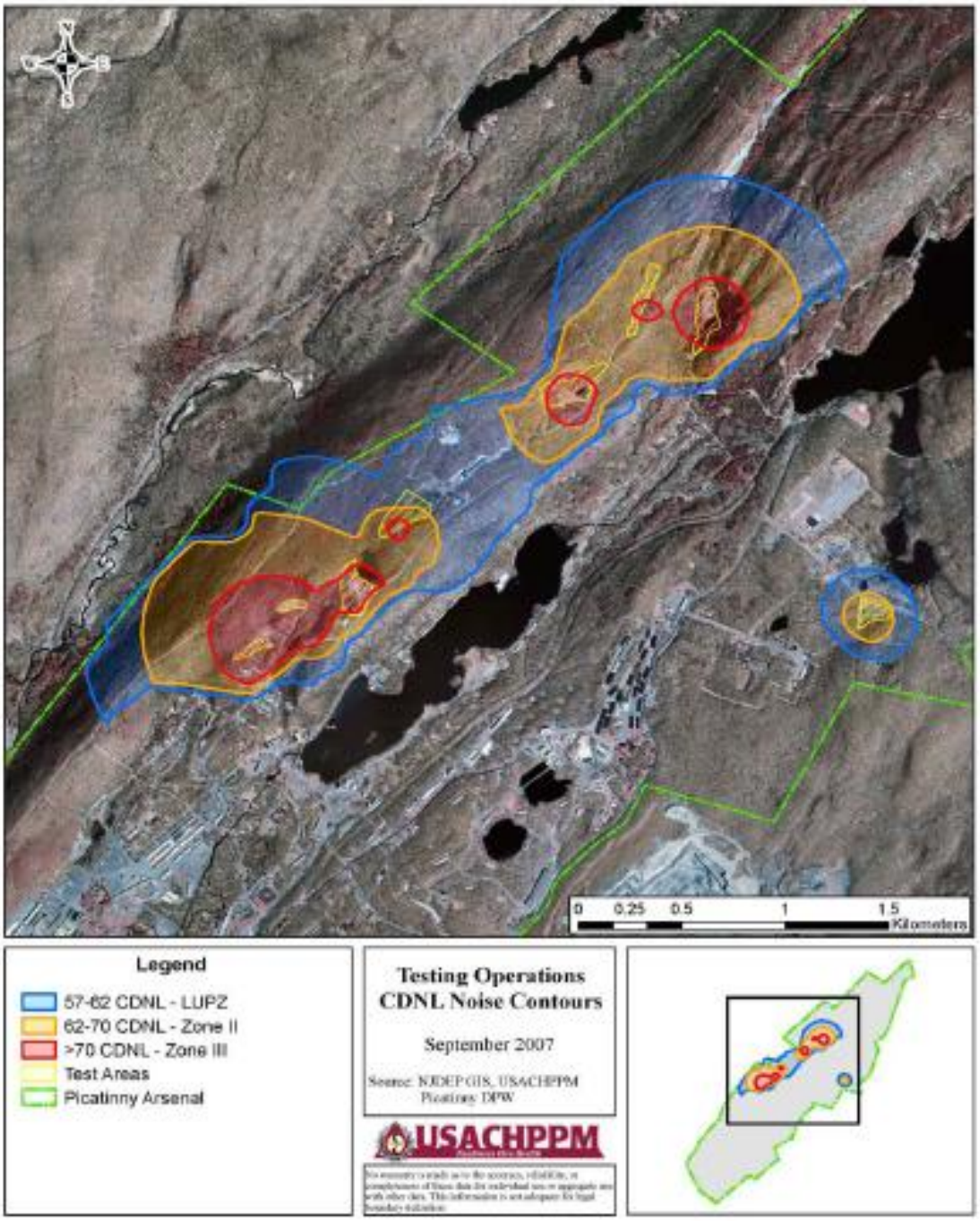
Figure A-12  Fully enclosed, steel-reinforced concrete FCTS – Typical Chamber Vent Stack.



# APPENDIX B

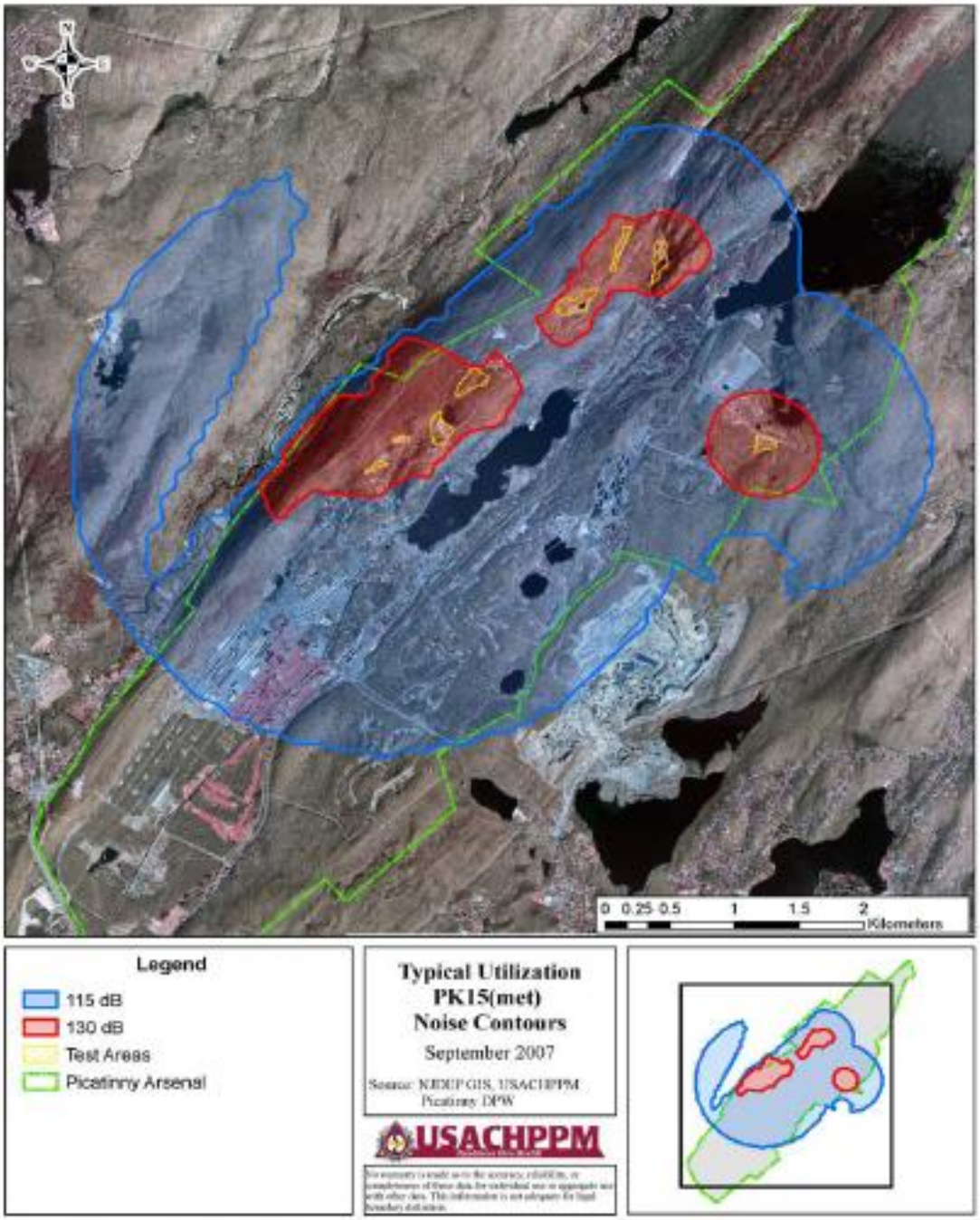
# MAPS

Figure B-1  Combined Testing Operations CDNL Noise Contours




Reference Picatinny Arsenal, 2007, pg 37.

Figure B-2  Typical utilization PK15(met) Noise Contours




Reference, Picatinny Arsenal, 2007, p. 38.

# APPENDIX C

# SUPPLEMENTAL DATA

**Exhibit C-1. Letter of concurrence from the New Jersey State Historic Preservation Officer.**

DEPARTMENT OF THE ARMY
UNITED STATES ARMY INSTALLATION MANAGEMENT AGENCY
NORTHEAST REGIONAL OFFICE GARRISON
PICATINNY ARSENAL, NEW JERSEY 07806-5000

RECEIVED
OCT 27 [redacted] 2008
HISTORIC PRESERVATION OFFICE

October 22, 2008

09-0098-1 DS
HPO-K2008-CBB

Environmental Affairs Division

Mr. Daniel Saunders
Acting Deputy State Historic Preservation Officer
State of New Jersey Historic Preservation Office
Department of Environmental Protection
Division of Parks and Forestry
501 East State Street CN 404
Trenton, New Jersey 08625-0404

SUBJECT: 616 Test Range, Fragment Containment Test Stand

Dear Mr. Saunders,

Picatinny Arsenal has proposed to erect a new test stand with fragment containment capabilities at the 616 Test Range. This new test stand will ensure that no fragments or secondary debris generated during engineer tests will go beyond the established fragment hazard zone. This will ensure the safety of the 616 Range testing personnel and the safety of the public that adjoins the installation's boundary within this immediate vicinity. The enclosed maps and photos depict the Area of Potential Effects (APE) for this undertaking.

The existing 616 Test Range was developed before 1957 according to an aerial from Historic Aerials.com (NETR, LLC; enclosed copy). Since the 1950s, the Test Range has been used for conducting demonstrations of various armaments. A circular structure is depicted in this 1957 aerial. Prior to the 1950s, the area remained wooded with an Unnamed Street within its vicinity (NJ DEP iMap, copy enclosed). A latter aerial from 1963 depicts the Test Range's current appearance, Bldg. 616, a concrete pad, and surrounding test stands (Historic Aerials.com, NETR, LLC; enclosed copy and photos). Bldg. 616 was constructed in 1963 as an Ordnance/Test and Evaluation Facility for the Range. This structure was evaluated for the National Register of Historic Places (NRHP) by Panamericon Consultants, Inc. in 2007 as 'Not Eligible'. Picatinny submitted this 2007 report to your office in November with no response to date; therefore the installation is assuming your concurrence with the determination of Bldg. 616 as being 'Not Eligible' for the NRHP.

Additionally, historic map research and recent archaeological sensitivity models performed for Picatinny's Integrated Cultural Resource Management Plan have assessed that over 100 + potential historic archaeological sites may potentially exist across the installation (HPO-G99-010). According to Picatinny's Geographic Information Systems map files and the Arsenal's Cultural Resource Manager with Chugach Industries, Inc., Mr. Jason Huggan, who meets *the Secretary of Interior's Standards as a Registered Professional Archaeologist*, no potential historic archaeological sites have been mapped within the vicinity of the undertaking. Furthermore, Mr. Huggan concurs with the sensitivity model that the area surrounding the 616 Test Range is potentially sensitive, yet disturbed, for Cultural Resources. However, considering the existing Test Range and the surrounding area have been cleared, graded and developed for over the past 50 + years, no significant Archaeological Properties are likely to be affected by the proposed undertaking.

**Exhibit C-1 (continued). Letter of concurrence from the New Jersey State Historic Preservation Officer.**

We request that your office ***concur*** with our determination of 'No Effect' to Archaeological Properties and Historic Properties/Bldgs. for the erection of a new test stand so that the installation can meet its necessary Safety requirements within the 616 Test Range.

Please mail your response to the following address:

Mr. Jason Huggan
Cultural Resource Manager
Chugach Industries, Inc.
Environmental Affairs Office
Bldg. 319
Picatinny Arsenal, NJ 07806

If you require further information, please feel free to contact Mr. Jason Huggan at (973) 724-3664, jason.j.huggan@us.army.mil.

Sincerely,

for

Thomas Solecki
Chief, Environmental Affairs Division

ENCLOSURES FOR OFFICIAL USE ONLY

I concur with your finding that there are no historic properties affected within the project's area of potential effects. Consequently, pursuant to 36 CFR 800.4(d)(1), no further Section 106 consultation is required unless additional resources are discovered during project implementation pursuant to 36 CFR 800.13.

11/17/08

DANIEL D SAUNDERS
Date
Deputy State Historic Preservation Officer

# APPENDIX D

# AIR QUALITY DATA

Table D-1. Measured Ambient Concentrations in Vicinity of Picatinny Arsenal (Morris County

| Pollutant | Monitor Site | Averaging Period | Year | Measured Concentrations ($\mu g/m^3$) | Primary NAAQS /NJAAQS ($\mu g/m^3$) | Percent of NAAQS /NJAAQS (%) |
|---|---|---|---|---|---|---|
| $SO_2$ | Chester | 3-hour | 1999 | 138.6 | 1300[a] | 10.7 |
| | | 24-hour | 1999 | 69.3 | 365 | 19.0 |
| | | Annual[b] | 1998 - 2000 | 10.7 | 80 | 13.3 |
| TSP | Phillipsburg | 24-hour | 1996 | 94.0 | 260 | 36.2 |
| | | Annual[b] | 1997 | 40.4 | 75 | 53.9 |
| $PM_{10}$ | Clifton | 24-hour | 1998 | 63.0 | 150 | 42.0 |
| | | Annual[c] | 1998 | 25.5 | 50 | 51.0 |
| $PM_{2.5}$ | Morristown | 24-hour | 2000 | 32.4 | 65 | 49.8 |
| | | Annual | 2000 | 12.9 | 15 | 86.0 |
| $NO_2$ | Chester | 1-hour | 1998 | 130.1 | 470[d] | 27.7 |
| | | Annual[b] | 1998 1999 | 23.0 | 100 | 23.0 |
| CO | Morristown | 1-hour | 1998 | 7,340 | 40,000 | 18.4 |
| | | 8-Hour | 1999 | 4,777 | 10,000 | 47.8 |
| Pb | New Brunswick | 3-month | 1999 | 0.183 | 1.5 | 12.2 |
| $O_3$ | Chester | 1-hour | 1999 | 237.6 | 235 | 101.1 |

(a) Secondary standard.
(b) Based on 12-month maximum for comparison to NJAAQS; NAAQS based on calendar year value, which is lower than 12-month maximum.
(c) Based on calendar year value for comparison to NAAQS; no comparable NJAAQS.
(d) NJDEP 1-hr guideline value; not an ambient standard.

Table D-2. Annual Net Explosive Weight of Munitions to be Detonated at the FCTS

| Diameter | Model Number | Explosive Fill | Explosive Weight (lbs) | Projectile Weight (lbs) | Drawing Number | Propellant Charge | Annual Usage Rate | Annual Net Explosive Weight (lbs) |
|---|---|---|---|---|---|---|---|---|
| 155mm | M107 | TNT | 14.6 | 91.3 | 9312769 | M3A1, M4A1, M119A1 | 0.1 | 116.8 |
| 155mm | M795 | TNT | 23.8 | 103.4 | 9312769 | M203A1, M3A1, M4A2, M119A2 | 0.1 | 190.4 |
| 155mm | M549 | Comp B | 16 | 96 | 9235999 | M119A1, M4A2 | 0.1 | 128 |
| 155mm | M549A1 | TNT | 15 | 96 | 9235999-1 | M119A1, M4A2 | 0.1 | 120 |
| 155mm | M864 | Comp A5 | 7.4 | 102 | 9381131 | M119A1, M4A2 | 0.1 | 59.2 |
| 105mm | M1 | Comp B | 5.06 | 40 | 9211611 | | 0.15 | 303.6 |
| 120mm | M934 | Comp B | 7.6 | 30 | | | 0.6 | 364.5 |
| 120mm (Tank) | M830 | Comp B | 7.6 | 30 | | | 0.15 | 455.7 |
| 81mm | M889 | Comp B | 1.8 | 8.96 | | | 0.6 | 88.5 |
| 81mm | M821A1 | Comp B | 1.8 | 9 | | | 0.6 | 88.5 |
| 60mm | M720 | Comp B | 0.6 | 3.75 | | | 0.6 | 26.8 |
| 60mm | M888 | Comp B | 0.6 | 3.75 | | | 0.6 | 26.8 |
| | | | | | | | Total: | 1,968.9 |

Table D-3. FCTS Operational Emissions of Criteria Pollutants

| Munition Item Tested | | 60mm M888 | 60mm M720 | 81mm M821A1 | 81mm M889 | 120mm (tank) M830 | 120mm M934 | 105mm M393A3 | 105mm M456A2 | 155mm M549A1 | 155mm M795 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NEW Composition | | Comp B | Comp B | Comp B | Comp B | Comp A3 | Comp B | Comp A3 | Comp B | TNT | TNT |
| NEW, (lbs) | | 3.46 | 3.46 | 3.46 | 3.46 | 4.53 | 3.46 | 6.6 | 2.14 | 15 | 23.8 |
| # Items per Year | | 15 | 15 | 15 | 15 | 16 | 30 | 8 | 6 | 8 | 8 |
| Emissions by Pollutant | **NOx** | 4.93E-01 | 4.93E-01 | 4.93E-01 | 4.93E-01 | 0.00E+00 | 9.85E-01 | 0.00E+00 | 1.22E-01 | 1.26E+00 | 1.99E+00 |
| | **Pb** | 1.68E-04 | 1.68E-04 | 1.68E-04 | 1.68E-04 | 5.38E-04 | 3.35E-04 | 5.38E-04 | 4.15E-05 | 4.17E-04 | 6.61E-04 |
| | **CO** | 2.18E-01 | 2.18E-01 | 2.18E-01 | 2.18E-01 | 2.06E+00 | 4.36E-01 | 2.06E+00 | 5.39E-02 | 8.04E+00 | 1.28E+01 |
| | **SO2** | 6.75E-03 | 6.75E-03 | 6.75E-03 | 6.75E-03 | 0.00E+00 | 1.35E-02 | 0.00E+00 | 1.67E-03 | 1.69E-02 | 2.68E-02 |
| | **PM10** | 6.38E-01 | 6.38E-01 | 6.38E-01 | 6.38E-01 | 4.53E+01 | 1.28E+00 | 4.53E+01 | 1.58E-01 | 1.12E+01 | 1.77E+01 |
| | **PM2.5** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

Table D-3 (continued). FCTS Operational Emissions of Criteria Pollutants

| Munition Item Tested | | 155mm M107 | 155mm Propellant | 155mm Propellant | Engineer Munitions | Warheads and Sub-munitions | Infantry Cartridges | Total Emissions (lbs/year) |
|---|---|---|---|---|---|---|---|---|
| NEW Composition | | TNT | M6 | M31A1 | Comp B | C-4 | Comp A5 | |
| NEW, (lbs) | | 14.6 | 22 | 31 | 1.25 | 0.63 | 5.75 | |
| # Items per Year | | 8 | 10 | 15 | 70 | 70 | 50 | **359.00** |
| Emissions by Pollutant | **NOx** | 1.22E+00 | 1.67E+00 | 1.81E+01 | 8.31E-01 | 2.78E-01 | 0.00E+00 | **28.46** |
| | **Pb** | 4.06E-04 | 0.00E+00 | 4.42E-02 | 2.83E-04 | 6.17E-03 | 5.38E-04 | **0.05** |
| | **CO** | 7.83E+00 | 2.09E-02 | 2.74E+02 | 3.68E-01 | 9.26E-01 | 2.06E+00 | **311.82** |
| | **SO2** | 1.65E-02 | 0.00E+00 | 5.72E-01 | 1.14E-02 | 5.29E-03 | 0.00E+00 | **0.69** |
| | **PM10** | 1.09E+01 | 0.00E+00 | 4.23E+02 | 1.08E+00 | 9.26E-01 | 4.53E+01 | **604.77** |
| | **PM2.5** | 0.00E+00 | 0.00E+00 | 3.77E+00 | 0.00E+00 | 6.62E-01 | 0.00E+00 | **4.43** |

Table D-4. FCTS Construction Emissions

| Activity/Emission Source | Estimated Emissions | | | | |
|---|---|---|---|---|---|
| | CO | VOC | NOx | SOx | PM10 |
| Construction Equipment | 13216.73 | 1910.03 | 13379.20 | 1250.65 | 794.72 |
| Fugitive Dust (Heavy Construction) | 0.00 | 0.00 | 0.00 | 0.00 | 67200.00 |
| Fugitive Dust Vehicle Emissions | 0.00 | 0.00 | 0.00 | 0.00 | 486.35 |
| On-Road Trip/Vehicle Emissions | 570.95 | 70.83 | 452.26 | 3.64 | 8.61 |
| **TOTAL EMISSIONS, lb/yr** | **13787.67** | **1980.87** | **13831.46** | **1254.30** | **68489.68** |
| **T/yr** | **6.89** | **0.99** | **6.92** | **0.63** | **34.24** |

# APPENDIX E

# Record of Non-applicability (RONA)

**RECORD OF NON-APPLICABILITY (RONA) FOR**

**CLEAN AIR ACT CONFORMITY**

Fragmentation Containment Test Stand

U.S. Army Research, Development and Engineering Command

Picatinny Arsenal (Morris County), New Jersey

## INTRODUCTION

The U.S. Environmental Protection Agency (USEPA) published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule* in the 30 November 1993, Federal Register (40 Code of Federal Regulations [CFR] Parts 6, 51, and 93). The U.S. Army Center for Health Promotion and Preventive Medicine published the *Technical Guide for Preparing a Record of Nonapplicability for the Conformity Rule,* in November 2003. These publications provide implementing guidance to document CAA Conformity Determination requirements.

Federal regulations state that no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license to permit, or approve any activity that does not conform to an applicable implementation plan. It is the responsibility of the Federal agency to determine whether a Federal action conforms to the applicable implementation plan, before the action is taken (40 CFR Part 1 51.850[a]).

The general conformity rule applies to federal actions proposed within areas which are designated as either nonattainment or maintenance areas for a National Ambient Air Quality Standards (NAAQS) for any of the criteria pollutants. Former nonattainment areas that have attained a NAAQS are designated as maintenance areas. Emissions of pollutants for which an area is in attainment are exempt from conformity analyses.

The Proposed Action would occur within Morris County New Jersey. This county is currently in nonattainment of the 8-hour ozone ($O_3$) and $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5 µm or less) NAAQS. The Morris County is in attainment (or simply hasn't been designated) status for $NO_2$, $SO_2$,

Lead (Pb), and $PM_{10}$. Therefore, only project emissions of ozone (since ozone is not a direct emission, its precursors, volatile organic compounds [VOCs] and oxides of nitrogen [NOx]) and particulate matter are analyzed for conformity rule applicability. Table E-1 illustrates the requirements:

TABLE E-1. AIR POLLUTANTS SUBJECT TO A GENERAL CONFORMITY REVIEW[1]

| **If the installation is located in an area designated as a Nonattainment or Maintenance area for…** | **Then a general conformity review must be performed for…** |
|---|---|
| $O_3$ | nitrogen oxides ($NO_x$) and volatile organic compounds (VOCs) |
| $PM_{2.5}$ | $PM_{2.5}$ and $PM_{2.5}$ precursors such as acid gases or metals* |

1. Technical Guide for Preparing a RONA for the Conformity Rule, USACHPPM, 2003

The annual *de minimis* levels for this region are listed in Table 2. Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* levels (40 CFR Part 1, Section 51.853[b]) and are not regionally significant (totals less than 10 percent of projected regional emissions for that pollutant) (40 CFR Part 1, Section 93.153). Since Morris County is within the Ozone Transport Region, the de minimis values for VOCs are 50 tons and 100 tons for NOx.

TABLE E-2. GENERAL CONFORMITY POLLUTANT THRESHOLD RATES (TONS PER YEAR)[1]

| Pollutant | Tons/Year |
|---|---|
| **$O_3$ (Volatile Organic Compounds [VOC] or Nitrogen Oxides [NOx])** | |
| Serious | 50 |
| Severe | 25 |
| Extreme | 10 |
| **Marginal and Moderate $O_3$ nonattainment areas inside an $O_3$ transport region** | |
| VOCs | 50 |
| NOx | 100 |
| **Particulate Matter** | |
| Moderate and Maintenance Areas | 100 |
| Serious | 70 |

[1] Source: 40 CFR 51

**PROPOSED ACTION**

Action Proponent: the U.S. Army Research, Development and Engineering Command (ARDEC) proposes construction activities to build a Fragmentation Containment Test Stand on Test Range 616.

Location: U.S. Army, Installation Management Command, Picatinny Arsenal, New Jersey.

Proposed Action Name: ARDEC proposes to design and construct a Fragment Containment Test Stand capable of confining primary/secondary fragments resulting from static detonation tests of munition items ranging in size from 60 mm high explosive (HE) mortar projectiles to 155mm HE Projectiles and Warheads.

Proposed Action & Emissions Summary: The Proposed Action involves an eight month (approximate length) construction projects to erect a fragmentation containment facility to prevent fragments from leaving the testing range. Operation of the test facility will produce no addition to Picatinny Arsenal's current emissions of air pollutants. This project is to take test activities that currently are conducted on an open range (i.e., open detonation) and place them

within a partially enclosed structure to preclude fragments from leaving the confines of the range. Emissions of air pollutants resulting from operation of the range are identical to current values. The only net effects will occur as a result of the construction activities required to build the test stand on Range 616. This project is envisioned to last for eight months.

Annual emissions from all construction activities were calculated by assuming that construction activities would occur within the eight month project timeline. Estimated construction emissions due to implementation of the Proposed Action are shown in Table 3. Based on the air quality analysis for the Proposed Action, the maximum estimated emissions would be below conformity *de minimis* levels and would be less than 10 percent of projected regional emissions.

Table E-3. Estimated Total Net Project Emissions – Tons per Year

| **Emission Source** | **Pollutant (tons/year)** | | |
|---|---|---|---|
| | **VOC** | **$NO_x$** | **$PM_{2.5}$** |
| Construction Equipment - Diesel | 1.4 | 13.2 | |
| Construction Equipment – Gasoline | 0.32 | 0.04 | |
| **Total Emissions** | **1.72** | **13.24** | **29** |
| *de minimis* threshold | 50 | 100 | 50 |
| Exceeds *de minimis* threshold? | No | No | No |

**Affected Air Basin**: Morris County, New Jersey

**Date RONA Prepared**: 17 April 2009

**RONA Prepared by**: U.S. Army Research, Development and Engineering Command

**Proposed Action Exemption**:

Provisions in the General Conformity Rule (Section 51.853(c) (1)) allow for exemptions from performing a conformity determination if total emissions of individual non-attainment or maintenance area pollutants resulting from a proposed action fall below specific threshold values (*i.e.*, *de minimis* levels) or would result in no emission increase. As discussed above, the change in the levels of $NO_x$ and VOCs caused by the proposed action to build the

Fragmentation Containment Test Stand would involve either emissions below *de minimis* levels or result in no emissions increase. Therefore, the proposed action is exempt from requirements under the General Conformity Rule.

To the best of my knowledge, the information provided is correct and accurate and I concur in the finding that the proposed Fragmentation Containment Test Stand and testing on Range 616 will conform to the New Jersey State Implementation Plan.

**RONA Approval**:

Signature: _____
Date:_____

Name/Rank: _____