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U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND
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17 DEC 2004

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: High Energy Laser Systems Test Facility (HELSTF) Enhanced Laser and Range Operations Environmental Assessment (EA) - Coordinating Draft

1. The U.S. Army Space and Missile Defense Command is preparing an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality regulations implementing NEPA. This EA is in support of the Enhanced Laser and Range Operations at HELSTF on White Sands Missile Range, NM.

2. The Coordinating Draft EA describes the potential environmental impacts of enhancing the capabilities and the operation of the HELSTF. Enhancement activities would include the testing of one or more of the new laser technologies or completion of one or more new range operations. These laser technologies are from various DoD and civilian agencies. Enhanced testing would begin in the second quarter of fiscal year 2005, and occur concurrent with existing activities. This Coordinating Draft EA is being provided to the state and federal agencies.

3. Please review the enclosed Coordinating Draft EA and provide comments by 28 JAN 05 to:

U.S. Army Space and Missile Defense Command
SMDC-EN-V/Ms. Julia Elliott
P.O. Box 1500, Huntsville, AL 35807-3801
Or by data facsimile: (256) 955-5074

17 DEC 2004

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SUBJECT: High Energy Laser Systems Test Facility (HELSTF) Enhanced Laser and Range Operations Environmental Assessment (EA) - Coordinating Draft

4. If you have any questions or comments, please contact Julia Elliott (256) 955-4822, DSN 645-4822.

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High Energy Laser Systems Test Facility (HELSTF) Enhanced Laser and Range Operations

Coordinating Draft

Environmental Assessment

17 December 2004

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HELSTF is the most comprehensive site in the United States capable of supporting directed energy technologies for the DoD, other government agencies, industry, and academia. HELSTF represents a national investment of approximately $800 million in high energy laser technology. As a result of the existing laser technologies and supporting infrastructure, which have an established record of successful and innovative laser testing, research, and development, HELSTF is an important national asset to support continued laser technologies. It is imperative that our nation's military and scientific communities have access to up-to-date facilities for increasingly complex research, development, testing, and evaluation of new and existing laser technologies. National defense also requires that foreign laser technologies be evaluated to counter threats to U.S. and Allied deployed forces.

The purpose of the Proposed Action is to enhance the capability of HELSTF in order to better accommodate a more comprehensive suite of lasers, beam directors, sensors, associated equipment, meteorological equipment, multiple test areas, and pointing and tracking systems.

The Proposed Action is needed for HELSTF to remain technologically competitive in directed energy development and to provide a comprehensive test facility for all aspects of military laser technology.

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

INTRODUCTION AND SCOPE

This Environmental Assessment (EA) analyzes the potential environmental consequences of enhancing the capabilities and the operation of the High Energy Laser Systems Test Facility (HELSTF), White Sands Missile Range, (WSMR), New Mexico. The environmental resource areas analyzed herein reflect the unique features of HELSTF and the environmental setting. The U.S. Army Space and Missile Defense Command proposes to develop a fully enhanced capability to conduct laser testing at HELSTF, including associated range operations. The enhancement would include the testing of one or more of the new laser technologies or completion of one or more of the new range operations that are described in the Proposed Action section. These laser technologies are from various Department of Defense (DoD) and civilian agencies. Enhanced testing would begin in the second quarter of fiscal year 2005 and would occur concurrent with existing activities at HELSTF.

This EA also presents for revalidation the activities currently being conducted at HELSTF, as well as potential new activities. The No-action Alternative describes the current ongoing activities at HELSTF and is an update of what was described in the 1998 HELSTF EA. The Proposed Action presents several new types of laser developments and associated range operations that would potentially occur at HELSTF.

PURPOSE AND NEED

The purpose of the Proposed Action is to enhance the capability of HELSTF to better accommodate a more comprehensive suite of lasers, beam directors, sensors, associated equipment, meteorological equipment, multiple test areas, and pointing and tracking systems. The Proposed Action is needed for HELSTF to remain technologically competitive in laser development and to provide a comprehensive test facility for all aspects of military laser technology.

NO-ACTION ALTERNATIVE

By describing the No-action Alternative first in the document, a baseline of activities is provided that will make new activities presented in the Proposed Action much more understandable. Additionally, the previous HELSTF EA is now over 6 years old, so another purpose of reanalyzing the elements of the No-action Alternative is to revalidate the current activities at HELSTF. Under the No-action Alternative, the same laser test activities that currently occur at HELSTF and that were previously analyzed in the HELSTF EA, 1998, and the Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) EA, 1998, would continue. No additional enhanced laser activities would occur at HELSTF.

The current HELSTF activities are directly involved with the use or production of a high energy laser beam. Table ES-1 lists these activities and changes that have occurred since the previous analysis was completed.

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Table ES-1: No-Action Alternative

Lasers	
Mid-Infrared Advanced Chemical Laser (MIRACL)	• Fluorspar process not in use • Testing level expected to remain the same or decrease
Mobile Tactical High Energy Laser Test Bed (MTHEL TB)	• No change in activities
Low-Power Chemical Laser (LPCL)	• Emission scrubber improved • Hydrogen fluoride now collected and sent to a temporary less than 90-day accumulation site • Testing level expected to remain the same or decrease
Laser Device Demonstration (LDD)	• Not currently in use • Hydrogen added as part of new hydrogen fluoride optics • Restarting would require refurbishment of emission scrubber system
Pulsed Laser Vulnerability Test System (PLVTS)	• Coalescing filter now separates and reuses oil that was previously disposed
Facilities	
Beam Transfer Area	• No change in activities
Effects Test Area	• No change in activities
Hazard Test Area/Test Cell B	• No change in activities
Vacuum Test System	• No change in activities
Sea-Lite Beam Director	• No change in activities
Army Pointer Tracker	• No change in activities
Safety Systems	
Hardwire Abort System	• No change in activities
Fire Protection	• No change in activities
Hazardous Atmosphere Monitor & Detection System	• No change in activities
Dedicated Safety Intercom Net	• No change in activities
Medical Support	• No change in activities
Chemistry Laboratory	• No change in activities
Support Activities	• No change in activities

PROPOSED ACTION

The U.S. Army Space and Missile Defense Command proposes to develop a fully enhanced capability to conduct laser testing at HELSTF, including the associated range operations. The enhancement would include the testing of one or more of the new laser technologies or completion of one or more of the new range operations, additional target launches, and facility and system improvements. Enhanced testing would begin in the second quarter of fiscal year 2005, and would occur concurrently with existing activities at HELSTF. Table ES-2 lists the proposed activities.

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Table ES-2: Proposed Action

Lasers	
Solid State Heat Capacity Laser (SSHCL)	Program intended to develop a lightweight, high-average-power, high-pulse-energy solid state laser technology.
Mobile Tactical High Energy Laser (MTHEL)	MTHEL Test Bed (TB) technology on a mobile platform at the Limor site.
Airborne Laser (ABL)	Program would use the Mid-Infrared Advanced Chemical Laser (MIRACL) to simulate the ABL by altering wavelengths.
Advanced Tactical Laser (ATL)	The ATL could use HELSTF test areas for targets. Also, would use the MIRACL to simulate the ATL by altering wavelengths.
High Power Carbon Dioxide Lasers	Similar to Pulsed Laser Vulnerability Test System (PLVTS)
Free-Electron Laser (FEL)	An electric discharge laser that represents an alternative to conventional lasers with flexibility and high power.
Targets and Flight Testing	Most target launches would occur at established launch sites and artillery firing points, others would occur from launch vehicles parked on existing dirt roads and trails.
Facility and System Improvements	Implementation of a new closed-loop cooling system for the MIRACL that would eliminate the use of chromates. Potential improvements, that would occur on previously disturbed land include: ▪ New sewage lagoons ▪ FEL facility ▪ Additional electrical substation

METHODOLOGY

Thirteen broad resource areas were considered to provide a context for understanding the potential effects of the No-action Alternative and the Proposed Action and to provide a basis for assessing their severity. A few resource areas are not expected to be affected sufficiently to warrant further discussion or are already analyzed in the referenced HELSTF documents. The areas determined to warrant analysis are air quality, airspace, biological resources, cultural resources, hazardous materials and waste, health and safety, infrastructure and transportation, and water resources.

RESULTS

This section summarizes the conclusions of the analyses made for each of the resource areas based on the application of the described methodology. Within each resource summary, only those activities for which a potential environmental concern was determined are described.

Air Quality

Under the No-action Alternative, HELSTF emission levels would continue to be monitored and maintained according to WSMR's Title V Air Permit. Air pollution dispersion modeling is conducted prior to operation or refueling of any chemical laser system on HELSTF. The HELSTF Atmospheric Sciences Group has a staff on site during these activities to perform dispersion-modeling functions in accordance with an approved HELSTF procedure.

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The emission scrubber system on the Low-Power Chemical Laser (LPCL) was replaced since the 1998 HELSTF EA, as the previous system was more difficult to maintain and prone to a quick loss of scrubbing efficiency. The improved LPCL scrubber system continues to remove DF and HF from exhaust emissions.

It is anticipated that the proposed laser systems would either have no air pollutants, or emission levels produced would be similar to the existing systems and would remain within the existing parameters of WSMR's Title V Permit. The Mid-Infrared Advanced Chemical Laser (MIRACL) laser could be used to simulate Airborne Laser (ABL) and Advanced Tactical Laser (ATL) operations before the actual testing at WSMR. The operation of MIRACL at different wavelengths would not change effluents, and anticipated emissions would be similar to those described for MIRACL.

Due to the intervals between testing events, target launches associated with each test are discrete events. The prevailing conditions at WSMR lend themselves to the rocket emissions rising and dispersing, causing no overall impact on local air quality.

Although minor short-term impacts associated with construction activities for facility improvements may occur, no exceedances of ambient air quality standards would be anticipated.

Airspace

Laser activities would have the potential to impact current aerial activities within WSMR airspace. Depending on the individual test design and safety parameters, the standard procedure of one or more of the restricted areas being recalled by WSMR is possible. In addition, military coordination efforts through prior notices of closure are required from WSMR to inform Holloman Air Force Base, ensuring minimization of any adverse effects on aircraft operations.

In the unlikely event that the target should move out of contact with the laser beam, test design and safety parameters would ensure that the laser beam and potential targets would not exceed any restricted airspace at energy levels that could have the potential to result in eye damage to pilots.

Biological Resources

Continuing activities and proposed activities conducted at HELSTF are not likely to affect biological resources since the area has little vegetation and no substantial wildlife habitat. Wildlife use of the site is limited to transient species such as birds and lizards. No listed plant or wildlife species have been observed at the HELSTF site.

Launch activities would take place in previously disturbed areas and generally are not expected to adversely affect plant species or wildlife. The potential for debris to land on an individual cactus or wildlife species is possible; however, debris landing on an individual plant or animal would not be detrimental to the whole population.

No impacts to biological resources are anticipated from facility improvements since the area is previously disturbed with little vegetation and thus provides no substantial wildlife habitat.

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Cultural Resources

Continuing activities and proposed activities conducted at HELSTF are not likely to affect cultural resources, since the area is covered by asphalt or previously disturbed; moreover, no traditional cultural resources, nor cultural resources that are National Register of Historic Places-listed or listed on New Mexico's State Register of Cultural Properties have been observed within the immediate area of HELSTF facilities.

In the event that previously undisturbed areas are identified for facility improvements, a cultural resources survey could be required. However, construction of the Free Electron Laser (FEL) building, substation, and new sewage lagoons or are planned to take place within previously disturbed areas.

Hazardous Material and Waste

Operation of the existing systems would not impact the use, storage, transportation, or disposal of hazardous materials at HELSTF. All routine hazardous wastes generated at HELSTF are managed in temporary less than 90-day accumulation sites. Non-routine and large-quantity one-time wastes are managed as needed by the hazardous waste contractor. No long term storage of hazardous waste occurs at HELSTF.

The primary byproduct of environmental concern produced by the MIRACL is deuterium fluoride (DF), which is chemically equivalent to hydrogen fluoride (HF). The DF, which is gaseous, makes up a part of the MIRACL exhaust. The exhaust is chemically scrubbed to remove the hazardous nature of the fluoride. The resulting sodium fluoride solution is accumulated onsite in a tank that circulates the solution repeatedly until disposal is required. The sodium fluoride solution is disposed of in one of two ways: disposal by a licensed hazardous waste handler or treating the solution with lime to generate a non-hazardous solid waste, a calcium fluoride sludge commonly known as fluorspar.

The emission scrubber system of the LPCL has been changed and improved since the 1998 HELSTF EA. The new system allows the HF to be collected and sent to a temporary less than 90-day accumulation site for proper disposal.

Previously, the excess or contaminated Pulse Forming Network oil and minerals for the Pulsed Laser Vulnerability Test System were disposed of through the HELSTF hazardous waste collection and disposal system. Currently a coalescing filter separates the oil and the oil is reused; therefore there is a minor decrease in hazardous waste generated.

The MIRACL laser may be used to simulate the ABL and ATL. Operation of the MIRACL would be at different wavelengths; however, this would not change current hazardous material use or production and handling of hazardous waste.

In addition to laser activities, the assembly of target and flight testing has the potential to involve hazardous materials and to generate hazardous waste. Any potential effects would be minimized by following appropriate standard operating procedures and regulations, including the HELSTF Hazardous Material Management Policy, the HELSTF Hazardous Chemical Spill/Release Response Plan, the HELSTF Hazardous Material Management Policy, and WSMR hazardous material and hazardous waste management procedures.

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Any hazardous materials used or hazardous waste generated during construction for facility improvements would follow appropriate HELSTF and WSMR standard operating procedures. The current cooling system used for the MIRACL is an 11,000-gallon closed-loop system. Current planning includes the possible replacement of the cooling system with a system not using chromates. This replacement, if it occurs, would require the disposal of the chromates.

Health and Safety

Health and safety concerns associated with laser operation and activities of the Proposed Action are anticipated to be similar to those of the No-Action Alternative. Similar standard operating procedures would be developed for each proposed laser and included in the HELSTF Safety Standard Operating Procedures and Laser Safety Information.

A FEL is expected to generate x-ray radiation hazards significant enough to require protection, including lead shielding in buildings. However, these concerns would be addressed through standard operating procedures that would minimize any impact to the health and safety of the public and workers.

In addition to laser activities, target and flight testing has the potential to affect the health and safety of personnel and the public. Any potential effects would be minimized by following appropriate standard operating procedures and regulations and establishing appropriate on-base roadblocks prior to lasing activities. The implementation of personnel safety practices would limit the number of people exposed to increased hazards and, as a result, no health and safety impacts are expected.

It is anticipated that any construction activity associated with facility improvements would be done in accordance with all HELSTF and WSMR regulations and would not pose an impact to the health and safety of personnel or the public

Infrastructure and Transportation

Under the No-action Alternative, infrastructure and transportation demands would remain at current levels, as would the requirement for periodic routine maintenance and repair. Infrastructure and transportation resources exceed current needs.

The Proposed Action would be compatible with ongoing test programs and procedures at HELSTF. No adverse impacts on infrastructure or transportation within the HELSTF region of influence are expected to occur as a result of the Proposed Action. This includes electrical power, water usage, wastewater, and solid waste. The possible exception is in the case of the FEL. Higher power requirements for the FEL could require the construction of a new substation, if current facilities are determined to be inadequate.

The current resources are sufficient to meet the demands of facilities improvement activities. Adequate supply exists for increased personnel levels. Such activities, including the new substation, FEL building, and new sewage lagoons, would have little or no impact on current water, wastewater, or solid waste handling capacity or levels.

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Water Resources

Under the No-action Alternative water usage would not increase at HELSTF and therefore would be unlikely to affect the water availability or water quality.

Based on the anticipated number of tests and minimal water demand by the proposed new laser systems, the total HELSTF usage would not increase under the Proposed Action. Thus, the proposed activities would not be expected to affect the water availability or water quality.

All potential construction activities for facility improvements would utilize standard operating procedures to curtail any potential dust generation and erosion during construction. No significant impacts to the water supply are expected as a result of construction water requirements. In addition, through maintaining effective grading and drainage controls, impacts due to erosion from construction would not occur.

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ACRONYMS AND ABBREVIATIONS

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ABL	Airborne Laser
ACTD	Advanced Concept Technology Demonstration
APT	Army Pointer Tracker
ATL	Advanced Tactical Laser
BOSS	Battlefield Optical Surveillance System
C^3I	Command, Control, Communication, and Intelligence
CaF_2	calcium fluoride
CEQ	Council on Environmental Quality
CM	Cruise Missile
CO_2	carbon dioxide
COIL	Chemical Oxygen Iodine Laser
DF	deuterium fluoride
DoD	Department of Defense
DPSS FO	Diode Pumped Solid State Fiber Optic
EA	Environmental Assessment
FEL	Free-Electron Laser
FY	fiscal year
HELSTF	High Energy Laser Systems Test Facility
HF	hydrogen fluoride
km	kilometer
kV	kilovolt
kW	kilowatt
LDD	Laser Device Demonstration
LPCL	Low-Power Chemical Laser
MDA	Missile Defense Agency
MIRACL	Mid-Infrared Advanced Chemical Laser
MSDS	Material Safety Data Sheets
MTHEL	Mobile Tactical High Energy Laser
MTHEL TB	Mobile Tactical High Energy Laser Test Bed
MW	megawatt
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act

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Nd:YAG	Neodymium: Yttrium Aluminum Garnet
PCB	Polychlorinated Biphenyl
PLVTS	Pulsed Laser Vulnerability Test System
PRA	Pressure Recovery Assembly
psi	pounds per square inch
PTS	Pointer Tracker Subsystem
SLBD	Sea-Lite Beam Director
SMDTC	US Army Space and Missile Defense Technical Center
SSHCL	Solid State Heat Capacity Laser
THEL	Tactical High Energy Laser
TNT	trinitrotoluene
USASMDC	U.S. Army Space and Missile Defense Command
WSMR	White Sands Missile Range

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1.0
PURPOSE AND NEED

1.0 PURPOSE AND NEED

1.1 INTRODUCTION

This Environmental Assessment (EA) analyzes the potential environmental consequences of enhancing the capabilities and the operation of the High Energy Laser Systems Test Facility (HELSTF). The National Environmental Policy Act (NEPA) of 1969, Council on Environmental Quality (CEQ) Regulations Implementing NEPA, Department of Defense (DoD), and applicable Service environmental regulations that implement these laws and regulations direct DoD officials to consider environmental consequences when authorizing and approving federal actions. The environmental resource areas analyzed herein reflect the unique features of HELSTF and the environmental setting. The U.S. Army Space and Missile Defense Command (USASMDC) proposes to develop a fully enhanced capability to conduct laser testing at HELSTF, including associated range operations. The enhancement would include the testing of one or more of the new laser technologies or completion of one or more of the new range operations that are described in the Proposed Action section. These laser technologies are from various DoD and civilian agencies. Enhanced testing would begin in the second quarter of fiscal year (FY) 2005, and would occur concurrent with existing activities at HELSTF.

1.2 BACKGROUND

HELSTF, located at the U.S. Army White Sands Missile Range (WSMR), New Mexico, has been designated as the DoD National Test Range for high energy laser test and evaluation. It is the nation's Tri-Service (U.S. Army, U.S. Air Force, and U.S. Navy) High Energy Laser Systems Test Facility. The facility is located 38 miles northeast of Las Cruces, New Mexico, and 70 miles north of El Paso, Texas (figure 1-1). The USASMDC manages HELSTF, which is the most comprehensive site in the United States capable of supporting U.S. Government, industry, academia, and foreign government high energy laser device testing as well as laser lethality, damage, and vulnerability testing. HELSTF represents a national investment of approximately $800 million in high energy laser technology. As a result of the existing laser technologies and supporting infrastructure, which have an established record of successful and innovative laser testing, research, and development, HELSTF is an important national asset to support continued laser technologies. It is imperative that our nation's military and scientific communities have access to up-to-date facilities for increasingly complex research, development, testing, and evaluation of new and existing laser technologies. National defense also requires that foreign laser technologies be evaluated to counter threats to U.S. and Allied deployed forces.

Fully operational since the fall of 1985, the facility has supported a host of high energy laser test programs for organizations such as the Missile Defense Agency (MDA), other DoD organizations, the National Aeronautics and Space Administration (NASA), aerospace defense and commercial technology companies, and universities and academic institutions. Non-lasing tests at HELSTF's Vacuum Test System have provided NASA a facility to test orbital and suborbital devices to verify proper operation prior to launch. Several organizations, including

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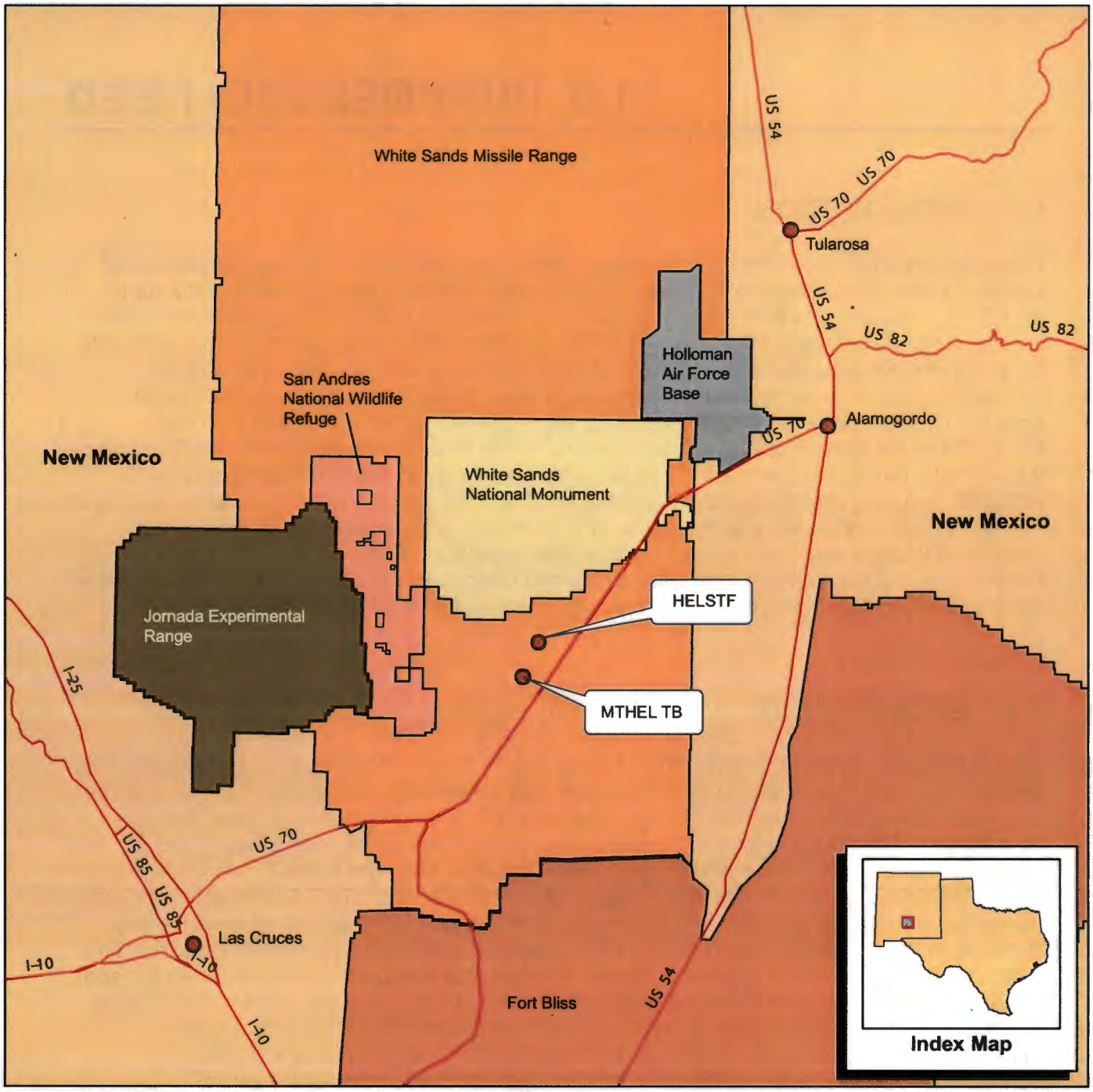

EXPLANATION

HELSTF = High Energy Laser System Test Facility
MTHEL TB = Mobile Tactical High Energy Laser Test Bed

Vicinity Location Map

New Mexico

NORTH

Scale
0 5.5 11 miles

12-17-04 Location

Figure 1-1

MDA, have used the high energy laser beam's pointing device to collect high-quality infrared and visual spectra imagery of missiles in flight. Most recently, HELSTF has hosted the Mobile Tactical High Energy Laser Test Bed (MTHEL TB) system that successfully shot down target artillery rockets and projectiles with a radar guided chemical laser.

HELSTF was established at WSMR at the Multi-Function Array Radar (MAR) site, a test location that was not being actively used. The site was chosen because of the 90,000 square feet of previously constructed concrete-reinforced space that was available, and its advantageous safety, security, and instrumentation considerations. The MAR facilities were constructed in 1963. The construction of the laser systems from 1981 to 1983 led to the name change of the facility. Operation of HELSTF began in 1984.

The location of HELSTF at WSMR provides access to over 5,000 square miles of highly instrumented land space and 7,000 square miles of controlled airspace for high energy laser testing. The wide array of laser systems, instrumentation, and test facilities currently in use makes HELSTF a unique national asset. Activities at HELSTF have previously been analyzed in the *High Energy Laser Systems Test Facility (HELSTF) Environmental Assessment*, 1998, and the *Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) Environmental Assessment*, 1998.

1.3 PURPOSE AND NEED

The purpose of the Proposed Action is to enhance the capability of HELSTF to better accommodate a more comprehensive suite of lasers, beam directors, sensors, associated equipment, meteorological equipment, multiple test areas, and pointing and tracking systems. The Proposed Action is needed for HELSTF to remain technologically competitive in laser development and to provide a comprehensive test facility for all aspects of military laser technology.

1.4 SCOPE OF THIS DOCUMENT

This EA presents for revalidation the activities currently being conducted at HELSTF, as well as potential new activities. The No-action Alternative describes the current ongoing activities at HELSTF and is an update of what was described in the 1998 HELSTF EA. By describing the No-action Alternative first in the document, a baseline of activities is provided that will make new activities presented in the Proposed Action much more understandable. Additionally, the previous HELSTF EA is now over 6 years old, so another purpose of reanalyzing the elements of the No-action Alternative is to revalidate the current activities at HELSTF. The Proposed Action presents several new types of laser developments and associated range operations that would potentially occur at HELSTF.

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1.5 DECISION(S) TO BE MADE

Based on information presented in this EA, a determination will be made if the EA is sufficient to warrant a Finding of No Significant Impact, or if an Environmental Impact Statement (EIS) is required to further assess environmental impacts of the Proposed Action. A Finding of No Significant Impact would allow a decision to be made regarding the Proposed Action or one of the alternatives without the need to do further environmental analysis.

The decision to be made is whether to enhance the test capabilities of HELSTF to allow the testing of new and more technologically advanced laser systems. A further decision would be whether to make full or partial enhancement. A decision not to make the enhancements (the No-action Alternative) would indicate that the current level of activities at HELSTF would continue.

1.6 RELATED ENVIRONMENTAL DOCUMENTATION

The conclusions of the NEPA studies below have been summarized and incorporated by reference into this document, as appropriate. The development of these studies included conducting requisite agency consultations encompassing the activities and analyses addressed in this EA.

High Energy Laser Systems Test Facility (HELSTF) Environmental Assessment (U.S. Army Space and Missile Defense Command), February 1998.

The Proposed Action of the 1998 HELSTF EA was to moderately increase the level of onsite laser activities, other onsite activities, and offsite activities at HELSTF. This moderately increased activity included the use of the Nautilus, Mid-Infrared Advanced Chemical Laser (MIRACL), Low Power Chemical Laser (LPCL) and Pulsed Laser Vulnerability Test System (PLVTS) systems. New target launch sites were also analyzed. In addition to the Proposed Action Alternative, the HELSTF EA considered a No-action Alternative and a High Level of Activity Alternative. The resulting environmental analysis showed that no significant impacts would occur from the proposed HELSTF laser testing program. Appendix B includes the signed Finding of No Significant Impact.

Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) Environmental Assessment (U.S. Army Space and Missile Defense Command), April 1998.

The THEL EA analyzed the production and testing of a transportable, defensive weapon designed to defend against artillery rockets and projectiles through the use of a high energy laser to damage or destroy the munition before it can reach its target. The THEL ACTD, now called the MTHEL TB, consists of a Command, Control, Communications, and Intelligence Subsystem; a Laser Subsystem to generate a high power laser beam; and a Pointer Tracker Subsystem (PTS) to acquire, track, and target appropriate threats.

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Analysis was prepared for testing at HELSTF that included:

- Lasing of targets by the THEL ACTD Fire Unit (Laser Subsystem and PTS)
- Use of 24 existing paved areas as launch points
- Use of four impact areas, three of which are in previously bladed areas
- Use of area between launch and aim points as debris impact area
- Launch of up to approximately 300 live and 80 inert target missiles during the first phase of testing (first 9 months)
- Launch of up to approximately 220 rockets and 620 artillery projectiles during the second phase of testing (subsequent 4 years)

The resulting environmental analysis showed that no significant impacts would occur from the proposed THEL ACTD program. Appendix B includes the signed Finding of No Significant Impact.

White Sands Missile Range Range-Wide Environmental Impact Statement (White Sands Missile Range), January 1998.

The WSMR Range-Wide EIS analyzed a wide scope of ongoing activities at the installation. Most of these activities include the testing of ground-to-ground and ground-to-air tactical missiles. A suite of target vehicles, rockets, artillery, and missiles was also analyzed.

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2.0
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This chapter describes the No-action Alternative and the Proposed Action. Included in the No-action Alternative are current ongoing laser activities at HELSTF that were previously analyzed in the HELSTF EA, 1998, and the THEL ACTD EA, 1998. However, because these EAs are over 6 years old, the activities are evaluated to determine what changes have occurred and to revalidate the analysis. These activities consist of lasers, facilities, Safety Systems, Chemistry Laboratory, and various support activities. The current activities occur within the HELSTF fenced boundary or on nearby WSMR land and are supported by HELSTF. Table 2-1 lists these activities and changes since previous analysis was completed. Under the No-action Alternative, no other enhanced laser activities would occur.

Table 2-1: No-Action Alternative Change in Activities

Lasers	
Mid-Infrared Advanced Chemical Laser (MIRACL)	• Fluorspar process not in use • Testing level expected to remain the same or decrease
Mobile Tactical High Energy Laser Test Bed (MTHEL TB)	• No change in activities
Low-Power Chemical Laser (LPCL)	• Emission scrubber improved • HF now collected and sent to a temporary less than 90-day accumulation site • Testing level expected to remain the same or decrease
Laser Device Demonstration (LDD)	• Not currently in use • Hydrogen added as part of new hydrogen fluoride optics • Restarting would require refurbishment of emission scrubber system
Pulsed Laser Vulnerability Test System (PLVTS)	• Coalescing filter now separates and reuses oil that was previously disposed
Facilities	
Beam Transfer Area	• No change in activities
Effects Test Area	• No change in activities
Hazard Test Area/Test Cell B	• No change in activities
Vacuum Test System	• No change in activities
Sea-Lite Beam Director	• No change in activities
Army Pointer Tracker	• No change in activities
Safety Systems	
Hardwire Abort System	• No change in activities
Fire Protection	• No change in activities
Hazardous Atmosphere Monitor & Detection System	• No change in activities
Dedicated Safety Intercom Net	• No change in activities
Medical Support	• No change in activities
Chemistry Laboratory	• No change in activities
Support Activities	• No change in activities

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The Proposed Action consists of enhancements of current lasers and the addition of new laser technologies at HELSTF. These enhancements would include the testing of one or more of the new laser technologies or completion of one or more of the new range operations, additional target launches, and facility and system improvements. Table 2-2 lists the activities proposed.

Table 2-2: Proposed Action

Lasers	
Solid State Heat Capacity Laser (SSHCL)	Program intended to develop a lightweight, high-average-power, high-pulse-energy solid state laser technology.
Mobile Tactical High Energy Laser (MTHEL)	MTHEL TB technology on a mobile platform at the Limor site.
Airborne Laser (ABL)	Program would use the MIRACL to simulate the ABL by altering wavelengths.
Advanced Tactical Laser (ATL)	The ATL could use HELSTF test areas for targets. Also, would use the MIRACL to simulate the ATL by altering wavelengths.
High Power Carbon Dioxide Lasers	Similar to PLVTS.
Free-Electron Laser (FEL)	An electric discharge laser that represents an alternative to conventional lasers with flexibility and high power.
Targets and Flight Testing	Most target launches would occur at established launch sites and artillery firing points, others would occur from launch vehicles parked on existing dirt roads and trails.
Facility and System Improvements	Implementation of a new closed-loop cooling system for the MIRACL that would eliminate the use of chromates. Potential improvements, that would occur on previously disturbed land include: ▪ New sewage lagoons ▪ FEL facility ▪ Additional electrical substation

2.1 NO-ACTION ALTERNATIVE (CONTINUE CURRENT LEVEL OF TESTING AND CAPABILITIES)

Under the No-action Alternative, the same laser test activities that currently occur at HELSTF and that were previously analyzed in the HELSTF EA, 1998, and the THEL ACTD EA, 1998, would continue. No additional enhanced laser activities would occur at HELSTF.

These current activities are those that occur within HELSTF's fenced boundary, or are nearby on WSMR land and are supported from HELSTF. These activities are directly involved with the use or production of a high energy laser beam. These activities are unique to HELSTF, and the high-energy laser beams are potentially very destructive. However, with the exception of the MTHEL TB, these activities are strictly controlled, completely contained within HELSTF's boundaries, and have the lowest level of environmental concern. Figures 2-1 and 2-2 show the current HELSTF boundaries and Test Cell areas.

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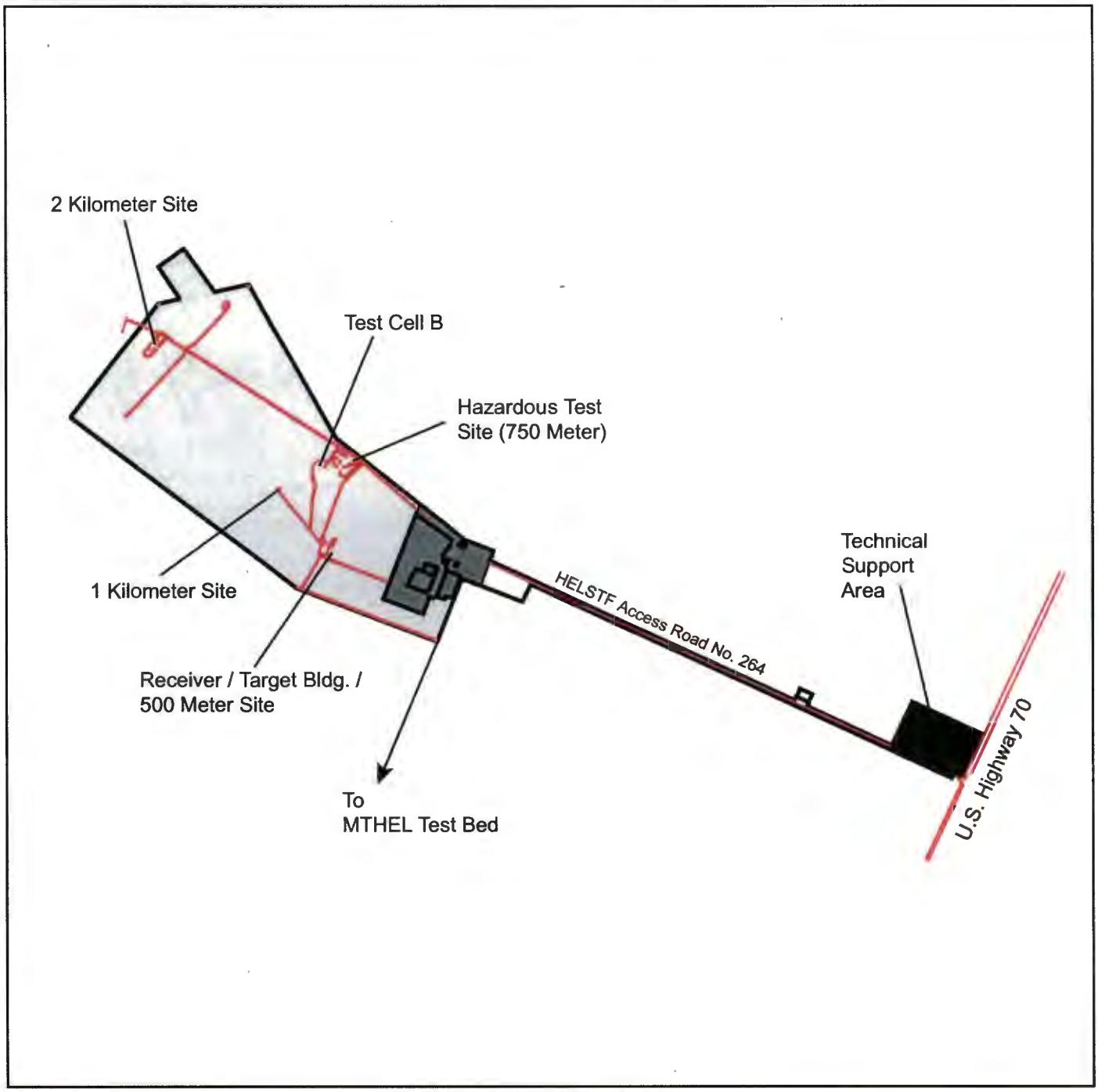


EXPLANATION

- Roads
- Boundary Fence
- Down Range Target Areas
- Laser System Testing Center and Test Cell Area

High Energy Laser Test Facility (HELSTF)

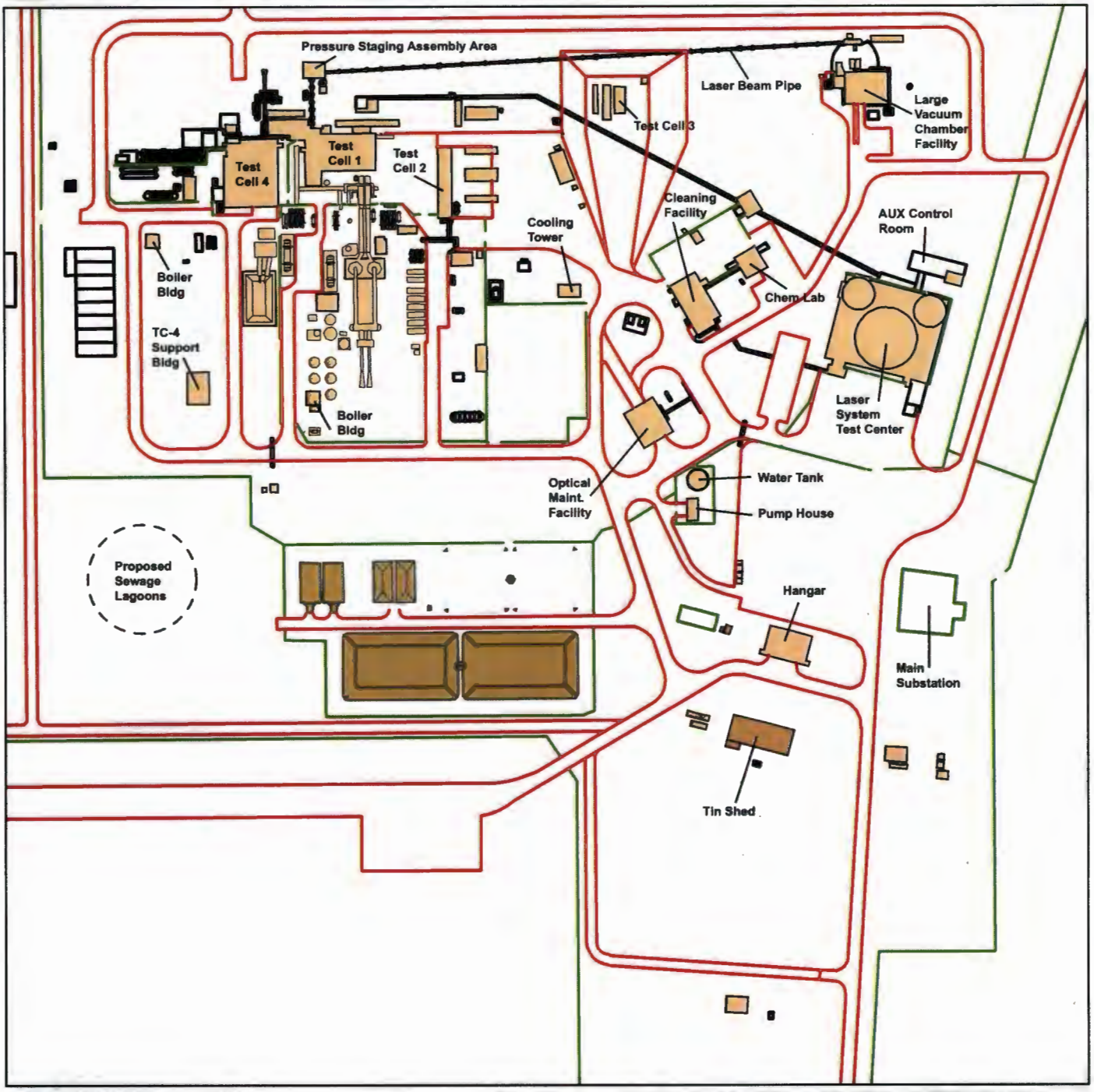
New Mexico

NORTH

Not to Scale

Figure 2-1

12-17-04 HELSTF



EXPLANATION

- Buildings
- Sewage Lagoon
- Road
- Existing Boundary Fence

Laser System Test Center and Test Cell Area

NORTH

Not to Scale

Figure 2-2

12-17-04 Laser System Test Center

2.1.1 MID-INFRARED ADVANCED CHEMICAL LASER

The MIRACL is a deuterium fluoride (DF) chemical laser that was initially lased in 1980. It is the first megawatt-class, continuous wave chemical laser built in the free world.

For the past few years, the MIRACL has operated for six to eight tests per year. This testing schedule would potentially decrease to as little as one per year after 2005. However, the MIRACL could also be used to simulate the ABL and Advanced Tactical Laser (ATL) (section 2.2.1.2), in which case six to eight tests per year could still be performed annually. Use of the MIRACL for ABL and/or ATL simulation would require the conversion from DF to HF, which changes the beam wavelength. However, impacts, including emissions, would be comparable. Because of the nature of the facility, a significant amount of equipment setup, breakdown, and maintenance is required between operating events. The maximum practical operating schedule for the MIRACL is about one event per week. The MIRACL combusts a fuel (ethylene) and an oxidizer (nitrogen trifluoride) to produce fluorine atoms, which then react with deuterium to produce the laser beam. Helium gas is used to stabilize the reaction and control the temperature. The laser's output power can be varied from full power down to 12 percent by altering the fuel flow rates and mixture. The gaseous exhaust produced by the MIRACL is drawn out of the system and into a scrubber by means of a vacuum created by the Pressure Recovery System. The Pressure Recovery System creates a vacuum using superheated steam.

The gases needed by the MIRACL and HELSTF's other smaller chemical lasers are supplied by the HELSTF Fluid Supply System. Fluids currently in the Fluid Supply System are helium, nitrogen, nitrogen trifluoride, ethylene/helium mix, fluorine, deuterium, argon, sulfur hexafluoride, and oxygen.

2.1.2 MOBILE TACTICAL HIGH ENERGY LASER TEST BED

The MTHEL TB, formerly known as the ACTD THEL, was analyzed in the THEL ACTD EA, 1998. The MTHEL TB has been in operation at HELSTF since 1999.

The MTHEL TB, located approximately 3.4 miles southwest of the main HELSTF complex, is composed of the following subsystems:

- Laser Subsystem, which generates the high power beam. The Laser Subsystem consists of six assemblies, which include the Laser Controller Assembly, Gain Generator Assembly, Laser Optics Assembly, Fluid Supply Assembly, Pressure Recovery Assembly, and Laser Enclosure Assembly. The MTHEL TB uses a DF chemical beam to engage its targets.
- PTS, capable of steering the beam such that the system optically tracks the threat objects and directs the laser beam to the target
- Command, Control, Communication, and Intelligence (C^3I) Subsystem, which controls and monitors the MTHEL TB system; provides battle management, including target acquisition through the fire control radar, engagement control, kill assessment, and communication with other assets; and provides the operator interfaces.

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Upon detection by the MTHEL TB fire control radar, the radar establishes trajectory information about the incoming rocket, and then "hands off" the target to the PTS, which includes the beam director. The PTS tracks the target optically, and then begins a "fine tracking" process for MTHEL TB's beam director, which then places MTHEL TB's high energy laser on target. The energy of the laser causes intense heating of the target, which causes its warhead to explode. The debris from the target falls quickly to the ground, far short of the defended area.

2.1.3 LOW-POWER CHEMICAL LASER

The LPCL is used to align the optics in the MIRACL beam path prior to a MIRACL event. The LPCL is an electrically driven continuous wave, DF/hydrogen fluoride (HF) laser, which has a laser beam with wavelengths similar to that of the MIRACL. The LPCL has a maximum output of up to 100 watts and is typically operated for 300 to 600 hours per year, although testing frequency would decrease if MIRACL laser testing decreases. At full power, the LPCL can operate continuously for 3 hours. The LPCL uses sulfur hexafluoride gas rather than nitrogen trifluoride. A new scrubber system was installed since the HELSTF EA, 1998 analysis to improve the exhaust emission efficiency, as the previous system was more difficult to maintain and prone to a quick loss of scrubbing efficiency.

2.1.4 LASER DEVICE DEMONSTRATION

The Laser Device Demonstration (LDD) is a 10- to 15-kilowatt (kW) mid-infrared chemical laser that permits access to MIRACL-like characteristics at lower power levels. The LDD uses fluorine rather than nitrogen trifluoride. Hydrogen has been added as part of the new HF optics that are now being used. The LDD typically operates 0 to 900 seconds per year. Typical LDD test programs have included materials effects and hardening, optical components, and precursors to major MIRACL tests. The LDD is not currently in use. If reactivated, the scrubber system would require refurbishment before it could be operational.

2.1.5 PULSED LASER VULNERABILITY TEST SYSTEM

The PLVTS is a threat surrogate capable of duplicating many tactical laser systems. The device is a closed-cycle, electric discharge, pulsed carbon dioxide laser operating at a wavelength of 10.6 microns with a power of 12 kW. The PLVTS, which has been operational at HELSTF since June 1992, supports testing of systems and materials to the effects of medium- to high-power laser illumination. The system is tested an average of 2 times per month or 24 times a year, with a maximum of about 4 times per month. The system consists of a suite of lasers including excimer, argon-ion, Neodymium:Yttrium Aluminum Garnet (Nd:YAG), tunable dye, deuterium fluoride, and carbon dioxide, as well as frequency doubling devices. These lasers can be utilized in the laboratory environment, sent through the 50-centimeter telescope to the HELSTF downrange test areas, or sent through the 60-centimeter pointer tracker for illumination of airborne platforms and satellites. The centerpiece of the PLVTS is the Textron HPPL-300 electric discharge carbon dioxide laser. Unlike the chemical lasers such as MIRACL, the HPPL-300 requires only 200 kW of external power (of which 120 kW is converted to laser energy). The medium in this laser is a 3:2:1 mixture of helium, nitrogen, and carbon dioxide. Lead shielding around the device limits the emitted x-ray radiation (as routinely measured by the WSMR Radiation Protection Office). An electric discharge of up to 27 kilovolts (kV) excites the nitrogen molecules in the mixture, which then transfer energy to the carbon dioxide molecules in

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collisions. The helium is provided to remove heat and return the carbon dioxide to its ground state so it may be pumped again by the nitrogen. The vibrationally excited carbon dioxide molecules emit photons that are controlled by the mirrors in the laser cavity and are emitted as a laser beam at a wavelength of 10.6 microns. The HPPL-300 emits its energy as a series of 30-microsecond pulses, providing peak powers of up to 33 megawatts (MW) at the output. The device can produce an average output power of over 12 kW.

The HPPL-300 hosts a closed-cycle gas recirculation system in which flowing gases in the laser cavity are circulated continuously. The laser gas is replaced at a rate of 5 standard cubic feet per minute during operation to purge carbon monoxide generated during the electrical discharge. The exhaust gases, consisting of helium, nitrogen, carbon-dioxide, and a trace amount of carbon monoxide and oxygen, are released directly into the atmosphere without scrubbing approximately two times per month. Approximately 424 cubic feet are exhausted each month. The gas supply consists of six bottles of helium, four bottles of nitrogen, and two bottles of carbon dioxide. This gas supply will sustain typical laser operations for approximately 3 days before gas bottle replacement is required.

The PLVTS Pulse-Forming Network contains approximately 2,140 gallons of Shell Dial-AX mineral oil for electrical insulation and cooling purposes. Previously, Pulse-Forming Network oil contaminated from dust or water leaks was disposed of through the HELSTF hazardous waste collection and disposal system. Now a coalescence filter separates the oil, and the oil is reused. During system maintenance, mineral oil coated tools and instruments are wiped with paper towels which, along with any contamination filtered from the oil, are disposed of through the HELSTF hazardous waste collection/disposal. While the PLVTS has never used or produced polychlorinated biphenyls (PCBs) as part of its network, as a precaution, the mineral oil waste products are examined for traces of PCBs. As with the oil system, the glycol water system is closed cycle and does not "wear out." As such, only during maintenance procedures does any of the glycol water mixture escape and require clean up with paper towels. These towels are also disposed of through the HELSTF hazardous waste collection/disposal.

2.1.6 BEAM TRANSFER AREA

The Beam Transfer Area acts as a switchyard that allows the MIRACL, LPCL, and Krypton beam to illuminate static targets in the Effects Test Area, Hazard Test Area, or the Vacuum Test System, or to be used by the Sea-Lite Beam Director (SLBD) to engage flying targets. By using the Beam Transfer Area's sophisticated control system, tests can be conducted at different test areas during the same MIRACL run. For example, tests can be conducted at the Hazardous Test Area, the Vacuum Test System and the Effects Test Area during a single lase, by switching the beam from one area to another.

2.1.7 EFFECTS TEST AREA

The Effects Test Area is an indoor laser effects laboratory for testing materials and equipment components that are less than 3.3 feet across. The Effects Test Area houses a Target Material Handling System capable of handling up to 60 material samples, each one measuring 10 inches square by 3 inches thick. The system allows the flexibility to modify these samples to add instrumentation, cooling, heating, or stress devices to the materials being tested. The Target Material Handling System is also equipped with an air-flow system capable of producing 0.2 to 0.9 Mach air flows across the target. With a cycle rate of 1 second, the system provides an

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extremely flexible and economical materials testing capability. Also available at the Effects Test Area are unique diagnostic instruments, including pyrometers, particle imagers, and plume extinction measurement devices.

2.1.8 HAZARD TEST AREA/TEST CELL B

The Hazard Test Area/Test Cell B facility is located 2,950 feet downrange from Test Cell 1. The facility consists of relay and shaping optics, diagnostic instrumentation, and a test pad. The Hazard Test Area/Test Cell B facility is capable of supporting high-energy laser effects testing on a wide variety of samples ranging from those of the size used in the Effects Tests Area to full-scale and operational targets. Up to 21 targets have been lased at the Hazard Test Area during a single test run. The test pad is rated to withstand a 20,000-pound TNT-equivalent blast.

2.1.9 VACUUM TEST SYSTEM

The Vacuum Test System consists of a 50-foot-diameter sphere capable of producing a vacuum equivalent to an altitude of 600,000 feet for the simulation of a low-earth orbit environment. Connected to the MIRACL through a series of optics and a 1,000-foot-long laser beam pipe, multiple targets in the large vacuum chamber can be illuminated in a single MIRACL run. The Vacuum Test System has the only large vacuum chamber in the country capable of allowing the entry of full-power, high-energy laser beams and small explosives. Test articles up to 15 feet in diameter, 30 feet in length, and weighing 25 short tons can be accommodated. The Vacuum Test System is also used for non-lasing activities.

2.1.10 SEA-LITE BEAM DIRECTOR

The SLBD is located in a special structure, 67 feet above ground level, on top of Test Cell 1. In addition to pointing the MIRACL high-energy laser beam, the SLBD has been used successfully to passively track and image aircraft and missiles in flight. Both the SLBD's visible and infrared sensors collect high-speed, high-quality imagery of plume and hardbody signatures and phenomenology, as well as recording point-of-intercept imagery. The SLBD has been used to successfully capture in-flight imagery of various interceptor missiles during target intercepts.

2.1.11 ARMY POINTER TRACKER

The Army Pointer Tracker (APT) is a 24-inch dynamic pointer tracker developed for tracking and illumination of aerial platforms and satellites to the PLVTS located within Test Cell 3 of HELSTF. The APT utilizes aircraft hydraulic fluid operating at 3,000 pounds per square inch (psi) in a closed-cycle configuration for system operation. The fluid is continually cleaned and cooled as it circulates through the system. Only during maintenance procedures does any of the hydraulic fluid escape and require cleanup with paper towels. These towels are also disposed of through the HELSTF hazardous waste collection/disposal.

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2.1.12 SAFETY SYSTEMS

HELSTF is equipped with a variety of safety systems to protect personnel and equipment during the preparation and conduct of high-energy laser tests. These systems include the following:

- **Hardwired Abort System**—This system includes over 200 software, hardware, and man-in-the-loop aborts. Manual aborts can be initiated by the WSMR Range Safety Officer, the HELSTF Site Safety Officer, or the HELSTF Test Director when, in their opinion, problems exist with either target or laser system. The automatic abort system is built into critical subsystem hardware and software timeline routines. The abort system continuously monitors these systems for failures or out-of-spec operations. If initiated, abort signals are routed to the System Abort Logic and Switching Unit. In response, this unit initiates an orderly shutdown of the affected laser and support systems.
- **Fire Protection**—Fire protection is provided by installed sprinkler and water deluge systems, Halon 1301 fire suppression systems, fire hose, and extinguisher stations. Halon is used in interior areas to protect critical equipment or in spaces where flammable fluids are used. Additionally, WSMR provides round-the-clock protection and remote monitoring of all HELSTF fire alarms. There is an operational fire department located at HELSTF. HELSTF's safety standard operating procedures require WSMR firefighters and equipment to be onsite during all MIRACL lasing activities.
- **Hazardous Atmosphere Monitor and Detection System**—This 24-hour automated system is dedicated to detection of toxic, flammable, or asphyxiating gases in the laser system test complex and Test Cell Area. This system is remotely monitored. The system is capable of remotely controlling selected air-conditioning and ventilation equipment to purge toxic gases from areas that may have been exposed to leaks.
- **Dedicated Safety Intercom Net**—An emergency announcing system is provided on a dedicated intercom net throughout the facility. This system is used by the site monitor or Site Safety Officer to notify personnel prior to the start of any hazardous operation. In the event of an emergency, personnel are notified as to the nature and location of the emergency and immediate action to be taken.
- **Medical Support**—The HELSTF Fire Department is staffed by emergency medical technicians. A fully equipped ambulance is available for emergency transportation of sick or injured persons to local medical facilities at WSMR or surrounding communities.

2.1.13 CHEMISTRY LABORATORY

The Chemistry Laboratory performs quality control analysis of the fluids used at HELSTF as well as a wide variety of analyses in support of test operations, customer requests, and environmental and safety tasks. The Chemistry Laboratory is equipped with a wide range of analytical equipment.

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2.1.14 SUPPORT ACTIVITIES

Support activities at HELSTF are typical of activities that would be performed at any light industrial or commercial site:

- Food preparation and garbage disposal
- Security
- Fabrication, inspection, repair, and maintenance of wooden and metal structures and objects
- Interior and exterior painting
- Facility interior inspection, alteration, repair, and maintenance
- Sandblasting
- Fencing erection, inspection, repair, and maintenance
- Masonry construction, inspection, repair, and maintenance
- Roof inspection, repair, maintenance, and replacement
- Door inspection, repair, maintenance, and replacement
- Vehicle maintenance and repair
- Emergency first aid and medical evacuation
- Heavy and light vehicle operation
- Hazardous waste temporary less than 90-day accumulation site

2.2 PROPOSED ACTION

The USASMDC proposes to develop a fully enhanced capability to conduct laser testing at HELSTF, including the associated range operations. The enhancement would include the testing of one or more of the new laser technologies or completion of one or more of the new range operations that are described in this Proposed Action section. These laser technologies are from various DoD and civilian agencies. Enhanced testing would begin in the second quarter of FY 2005, and would occur concurrent with existing activities at HELSTF.

2.2.1 POSSIBLE FUTURE LASER TECHNOLOGY/SYSTEMS DEVELOPMENT AND TESTING

Enhanced testing at HELSTF could include one or more of several types of existing experimental and conceptual laser systems. This section will describe these systems and their intended battlefield targets. Proposed laser systems to be tested at HELSTF can be categorized into three basic technologies: solid state lasers, chemical lasers, and free electron lasers (FELs). Under each of these three basic laser systems, several specific laser systems will be described.

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2.2.1.1 Solid State Lasers

Solid State Heat Capacity Laser

The goal of the Solid State Heat Capacity Laser (SSHCL) development program is to develop a lightweight, high-average-power, high-pulse-energy solid state laser technology that is suitable for a variety of short-range and time-critical air and missile defense missions. Because of its expected compact size, the SSHCL has the potential to be mounted on either a ground-mobile or airborne platform. Since the SSHCL is an electrically driven laser, a hybrid-electrical ground vehicle is ideally suited to carry such devices because the same prime power source can provide both the propulsion of the vehicle and power to the laser. The vehicle and the laser would be powered using the vehicle's diesel engine with electrical power stored in lithium ion batteries. Emissions would be from the diesel engine only and there would be no laser by-products.

The first SSHCL to be tested at HELSTF was the 10-kW flash-lamp pumped heat-capacity laser in 2004. It was used in conjunction with the APT beam director to assess scaled range testing. Future 10-kW SSHCL testing would be against static targets in 2005 and against dynamic targets in 2006. Testing frequency would potentially be one test per week in 2005 and two tests per month in 2006. The SSHCL would be located and fired from Test Cell "4". It is expected that the SSHCL would be tested against targets located in Test Cell "B", the 500 Meter Site and the 2 Kilometer Site.

Based on the success of the 10-kW tests, a 25-kW diode pumped SSHCL module and a 100-kW diode pumped SSHCL would possibly be developed and tested as part of a sequence of SSHCL development and would be on site at HELSTF as early as 2006. The 100-kW diode pumped system would be integrated with a more robust beam director to perform dynamic, full range testing, but would be tested in the same facility as the 10-kW laser.

Power for the 10-kW would be provided by standard commercial electric power. The 25-kW and the 100-kW would be fired from lithium ion batteries. The batteries would be recharged with commercial power.

The target set includes artillery projectiles, tactical rockets, and aerial drones. The system may also be tested on buried and unburied landmines, and Improvised Explosive Devices.

2.2.1.2 Chemical Lasers

Mobile Tactical High Energy Laser

Transition to a Mobile THEL (MTHEL) began in FY 2001 with an amendment to the U.S.-Israeli THEL Memorandum of Agreement initiating an MTHEL System Engineering and Trade Studies program. At the end of 2001, the study defined a range of candidate MTHEL weapon system architectures that can be built with existing technology. The MTHEL would use essentially the same technology that was proven in the MTHEL TB, but will be tested on a mobile platform.

Chemicals used during the process include ethylene, nitrogen trifluoride, deuterium, helium, liquid oxygen, JP-8 (jet fuel), and water. Effluents include DF, tetrafluoromethane, HF, nitrogen, carbon dioxide, and water. Exhaust emissions could be scrubbed or just emitted to the atmosphere. Byproducts would be minimal and would be handled in a similar manner as the

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MTHEL TB. Onboard storage would be provided for water requirements. The standoff area is estimated to be 492 feet (a 180-degree radius) behind the exhaust.

The MTHEL program's goal is to develop one or two mobile THEL prototypes capable of defending against a broad category of threats. The objective MTHEL weapon system will consist of DF Laser firing units and Battle Management and Control capable of managing firing units. MTHEL will be designed to provide a defense against artillery rockets, artillery projectiles, mortars, unmanned aerial vehicles, cruise missiles, and short-range ballistic missiles.

The prototypes would be mounted on a common Army vehicle platform and would consist of three elements: Battle Management Command and Control, Sensor, and Laser Firing Platform. The laser with the Optical Beam Control System and Pressure Recovery System would be mounted on a trailer. A second vehicle would provide the Fuel Supply Element. Approximately 20 MTHEL tests would be conducted a year, starting in 2009. Testing would occur at the HELSTF Limor site.

Airborne Laser

The U.S. Air Force initiated development of the Airborne Laser (ABL) program, and MDA now manages the program. The objective of the ABL program is to develop a cost-effective, flexible airborne high energy laser system that has the capability to acquire, track, and destroy ballistic missiles during their powered boost phase. The ABL is being installed on a modified commercial 747-400F freighter, and will be able to be deployed worldwide within 24 hours. The program goal is to deliver an initial operating capability in 2007. The laser subsystem of the ABL is based on the Chemical Oxygen Iodine Laser (COIL) technology developed by the Air Force in the 1980s. Unlike the HF/DF chemical lasers, the COIL is not a combustion-driven device. The chemical reactions occur relatively close to room temperature, and as a result the COIL has improved beam quality.

ABL testing would occur at WSMR/Holloman AFB as discussed in the Final Supplemental EIS Airborne Laser Program, June 2003, but not at HELSTF. However, the MIRACL laser may be used to simulate the ABL before the actual ABL is tested at WSMR. This could occur in FY 2005, FY 2006, or later. To use the MIRACL to simulate the ABL, some changes would be required. MIRACL is normally operated at 3.6 to 4.0 microns. Altering the MIRACL to operate at different wavelengths (2.7 and 1.6 microns, for example) may be used to simulate operation of the COIL of the ABL and other HF/DF chemical lasers. Operation of MIRACL at different wavelengths would not change effluents or necessitate significant changes in HELSTF infrastructure. Outside lasing would involve use of both static and dynamic targets and test areas similar to those currently in use. Operation of the MIRACL to simulate COIL devices, as described above, could be used for ABL and another Air Force project, the ATL testing (see next section). The use of the MIRACL for ABL and ATL is addressed under the MIRACL (section 2.1.1). Another potential test activity that could be considered for HELSTF includes use of HELSTF assets, such as the SLBD, for tracking targets during actual ABL or ATL engagements with ballistic missile targets. These activities and their analyses are addressed under the No-Action Alternative.

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Advanced Tactical Laser

The ATL is an emerging concept for a family of compact, modular COIL high energy laser weapon systems that have a high degree of commonality at the subsystem level and that draw heavily on technology developed over the last decade in various Army and Air Force programs. ATL provides a unique capability to conduct engagements at significant standoff distances with little or no collateral damage. Platform independent, the ATL is designed as a modular weapon system that can roll-on/roll-off any number of tactical platforms, including ground fighting vehicles, tactical aircraft, or rotorcraft. The weapon element of the ATL is readily reconfigured for ground-vehicle installation for use in air defense applications. The airborne ATL concept envisions a 100- to 300-kW infrared laser carried on a tactical platform such as the AC-130U Spectre. Aircraft used in testing would be staged from Kirkland Air Force Base. The primary mission application is air-to-ground strike missions in situations where collateral damage limitation is a primary consideration.

The first low power testing of ATL at HELSTF would occur in 2005 and is expected to be conducted from an AC-130U. Six to seven tests are expected to take place in 2005. Up to 20 tests per year would occur in 2006 and 2007. Potential targets for the ATL would be stationary vehicles and simulated communications towers on or near roads in existing HELSTF test areas, most likely on the existing road between the Laser System Test Facility and the 2 Kilometer Site. This document does not address the ATL system and operations, only ATL's use of HELSTF targets.

The MIRACL could also be used to simulate ATL testing. If implemented, a conversion from DF to HF would be required. Additionally, the beam wavelengths would change. Scrubber, removal, and emissions would remain about the same. The use of the MIRACL is described in section 2.1.1.

High Power Carbon Dioxide Lasers

The PLVTS, described in section 2.1.5, is a carbon dioxide laser that was previously analyzed in the HELSTF EA and is currently being tested at HELSTF. Other carbon dioxide lasers similar to the PLVTS may also be tested at HELSTF. Other carbon dioxides lasers would most likely use the same facilities as the PLVTS and have similar testing operations and frequencies. Therefore, impacts of other carbon dioxide lasers would be similar to those of PLVTS and are covered in the PLVTS analysis.

2.2.1.3 Free Electron Lasers

A FEL is an electric discharge laser that provides intense, powerful beams of laser light that can be tuned to a precise color or wavelength. FELs absorb and release energy at any wavelength, because the electrons are freed of atoms. This key feature enables the FEL to be controlled (more precisely than conventional lasers) to produce intense powerful light in brief bursts with extreme accuracy. Minimal chemical/fuel usage, emissions, or byproducts are anticipated. Water requirements are also minimal.

FELs represent a radical alternative to conventional lasers, as potentially the most flexible, high-power, and efficient generators of tunable coherent radiation from the ultra-violet to the infrared. A FEL does not have the restrictions of conventional lasers on operating wavelengths, and is constrained only by the phase-matching condition for strong interactions between the electrons

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and laser field; i.e., for a given periodic magnet (wiggler) structure, the wavelength is determined only by the energy of the electron beam.

A FEL could be considered for use as a test device at HELSTF, either augmenting or replacing the MIRACL laser. This would be feasible only in the long term, and only if technology advances in FEL research allow reliable operation of high-power devices well in excess of 100 kW. Installation of a high-power FEL would involve infrastructure changes, including providing protection from induced radiation and provisions for high-capacity electrical power supply to HELSTF.

If the FEL is tested at HELSTF, it may be tested in Test Cell 4 or could potentially require a new test facility. The current substation would likely be adequate, however, an additional electrical substation could be required to accommodate increased power demands for this new laser technology. These potential activities are addressed in section 2.2.6.

Testing would potentially be as frequent as several times per day. Operation of the laser would be expected to generate x-ray radiation hazards (Stanford University, 1990). Lead shielding would be installed in test facilities to prevent radiation from escaping test cells.

2.2.2 COMPONENTS OF TEST AND EVALUATION OF LASER TECHNOLOGIES AND WEAPONS SYSTEMS

The U.S. Army Space and Missile Defense Technical Center (SMDTC), which is part of the USASMDC, is developing high energy lasers to defeat a wide variety of targets, including tactical rockets, artillery projectiles, aerial drones, mines, and unexploded ordnance. Each target offers its own unique engagement challenges, and, in many cases, no other single weapon system exists that is capable of successfully eliminating these threats. SMDTC has a requirement to conduct all types of test and evaluation of high energy lasers. Those tests that would be conducted at HELSTF under the Proposed Action are outlined in this section.

2.2.2.1 Lethality Test and Evaluation

The kill mechanism for a target is different for a high energy laser weapon compared to the hit-to-kill or warhead detonation of a kinetic energy interceptor. The high energy laser weapon can eliminate a target by disrupting its infrared sensor, burning through a critical structural component, or heating a target's warhead or fuel tank, causing a range of reactions that neutralize the target. SMDTC has an extensive lethality test program to validate computer simulations of laser beam and target interactions. This basic science test and evaluation program uses a variety of high-power laser beam sources to irradiate different types of materials, explosives, and projectile components. These laser beam sources include MIRACL and MTHEL TB located at HELSTF, pulsed SSHCLs (10 to 100 kW) and a lower-power solid-state laser mounted on a tactical vehicle, and the PLVTS laser.

- **Basic Science Laser Beam Propagation**—The initial tests would be against non-explosive static materials such as sheet metals and other structural components. The goal is to see what effect the laser beam has on these static targets.
- **Static Testing**—The next-higher-level of lethality testing is the irradiation of static targets. Projectiles are instrumented with thermocouples to document their response

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to the laser beam, and are spun in a blowing air environment to simulate actual flight conditions.

- **Dynamic Testing**—The highest level of lethality testing is with dynamic or in-flight targets. This is the most expensive type of testing and requires thorough planning. It has been a challenge to integrate projectiles with instrument packages that accurately measure temperature changes, and are also survivable during flight. In fact, most targets are not instrumented. This makes it difficult to determine the actual location of the laser beam on a target. Generally, the testers rely on backscatter measurements from the target to verify achieving an accurate aim point, resulting in placing the maximum fluence on the target. Dynamic testing would use a host of targets, including tactical rockets, artillery projectiles, aerial drones, and ground vehicles.

2.2.2.2 Beam Characterization

This type of testing is to verify the characteristics of the high energy laser beam as it leaves the weapon system and propagates through the atmosphere to the target. By the very nature of the laser beam, it is not possible without great expense to actively measure the beam's output power and wave front characteristics, exiting from a high energy laser. However, it is possible—for example, on the MTHEL TB—to estimate the beam characteristics by measuring its thermal effects on the exit window and mirrors within the optical train. Also, as the beam propagates to the target, atmospheric molecules, aerosols, temperature changes, and wind conditions affect the direction, size, and quality of the beam. The laser's pointer tracker subsystem must be capable of recognizing and adjusting for these perturbations to the laser beam before it reaches the target. Down-range targets are often used to evaluate atmospheric effects on the laser beam to validate propagation computer simulations.

2.2.2.3 Beam Pointing

Another objective during high energy laser test and evaluation is to consistently know the true location of the beam. Since high energy laser beams are normally in the infrared, systems depend on accurate tracking measurements of elevation and azimuth to point the laser beam. Fine corrections are made based on backscatter measurements from the target. Receiving and using radar track data from different types of sensors on the battlefield will be a major challenge to high energy laser weapon system developers.

It is also critical that a high energy laser weapon system identify, early–on, the type of target it is tracking so as to properly select the most efficient aim point for the laser beam. SMDTC recently completed tests to verify the aim point selection for the 4.8-inch Katyusha rocket. This rocket was mounted on a pole 1,640 feet away from the MTHEL TB. By varying the rocket's orientation, SMDTC verified the performance of the algorithm used to compute the aim point offset from the nose of the rocket.

2.2.2.4 Relay Mirror System

Relay Mirror Systems are currently being developed at other military installations. Relay mirrors would allow directed energy weapons fired from ground or sea or air to overcome many limiting factors, including hitting targets beyond the line of sight and refocusing beams that lose some of their form traveling though the atmosphere. This and future mirror systems could be tested in

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the vacuum chamber at HELSTF. The MIRACL laser could potentially be used to illuminate and test relay mirrors. Testing could potentially include locating the relay apparatus on Salinas Peak.

2.2.2.5 High Energy Laser Low Aspect Target Tracking

High Energy Laser Low Aspect Target Tracking is a U.S. Navy project that would use the MIRACL laser to test engagement scenarios of specific low-flying, level-trajectory targets. This type of test would evaluate the applicability of laser defense of naval vessels from cruise and other flat trajectory missiles with head-on engagements. High Energy Laser Low Aspect Target Tracking engagements would use tactical rockets or aerial drones for dynamic target engagements.

2.2.3 TARGET LAUNCHES IN SUPPORT OF DYNAMIC TESTING

Several classes of dynamic targets would potentially be used for laser testing at HELSTF. These targets fall within four classes, which will be described in this section. These types of rockets are routinely tested or used as targets at WSMR. On average, 400 target system missions a year are conducted at WSMR.

2.2.3.1 Tactical Rockets

This class of target includes artillery rockets, anti-tank missiles, and surface-to-air anti-aircraft missiles. Artillery rockets are short-range battlefield rockets that are designed to extend the tactical reach of the field artillery. These rockets would be in various sizes up to approximately 13.4 inches (with a potential range of up to approximately 47 miles). Most would have a unitary high explosive or a cluster warhead.

Anti-tank missiles are shoulder or tube launched. They are low, level-trajectory rockets that are guided by wire or laser designator. Warheads are high explosive anti-tank shaped charges that are designed to penetrate vehicle armor.

Surface-to-air anti-aircraft missiles would be small-diameter, shoulder-fired missiles that are normally used to engage low-altitude jet and rotor-wing aircraft. These missiles are heat or infrared guided and normally have a relatively small high explosive fragmentation warhead that is designed to disable aircraft.

2.2.3.2 Artillery Projectiles

Artillery projectiles are the explosive projectiles used in howitzers and mortars. Howitzer projectiles would range in size from 6 to 8 inches and would have high-explosive filler. Mortar projectiles would range in size from 3 to 4.7 inches and would also have a high-explosive filler.

2.2.3.3 Aerial Drones

Aerial drones are sub-scale, turbojet-powered or propeller-driven, fixed-wing aircraft. Many of the turbojet-powered targets were originally designed to be used for air-to-ground and air-to-air gunnery practice. Most of the drones have command guidance systems, and the operator can

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track them either visually or through radar. Drones can simulate a variety of targets, mimicking the heat and radar returns of missiles, cruise missiles, and aircraft. In addition, they can drop chaff and flares. Drones would be launched from a ground site with the aid of solid fuel boosters to accelerate the vehicles. A small turbojet engine would then take over for the remainder of the flight. The drone's route of flight would be programmed prior to launch, or changed during flight by a ground controller using a radio link. At the end of the mission, a parachute recovery system could be used to recover undamaged vehicles.

Propeller-driven aerial drones are sometimes known as unmanned aerial vehicle. Most of these targets were originally designed as reconnaissance and intelligence-gathering platforms.

2.2.3.4 Ground Targets

Lasers would potentially be tested against two types of ground targets. The first would be stationary or moving wheeled or armored vehicles that are remotely controlled. Vehicles may be empty, may have only fuel on board, or may be combat loaded to test the effects of the laser on on-board ammunition and weapons systems. Most target vehicles would be stationary on established test stands or parked on established roads or disturbed areas. Testing on stationary wheeled vehicles currently occurs at WSMR and HELSTF. The second type of ground target would be an operational communications tower, buildings, and other simulated infrastructure.

All debris resulting from target engagements would be cleared by HELSTF personnel. Hazardous wastes would be disposed of in accordance with applicable laws and regulations.

2.2.4 TARGET LAUNCH AND FIRING POINTS

Most target launches and artillery firings would occur at established launch sites and artillery firing points as described in the WSMR Range-Wide EIS, January 1998, and the HELSTF EA, 1998. Some launches would occur from launch vehicles parked on existing dirt roads and trails. Launches from this type of site would require an Explosive Launch Permit from the WSMR Environmental Office. Appropriate biological and archaeological surveys would be conducted prior to the issuance of the Explosive Launch Permit. Figure 2-3 shows the locations of launch points that have been used for previous laser testing.

For some laser tests involving longer-range artillery rocket targets, launches from McGregor Range at Fort Bliss would be required. Fort Bliss straddles the New Mexico-Texas border and is adjacent to WSMR to the south. Launches of large artillery rockets were previously analyzed in the *Fort Bliss Texas and New Mexico, Mission and Master Plan Programmatic Environmental Impact Statement,* December, 2000. Only established launch points would be used at Fort Bliss.

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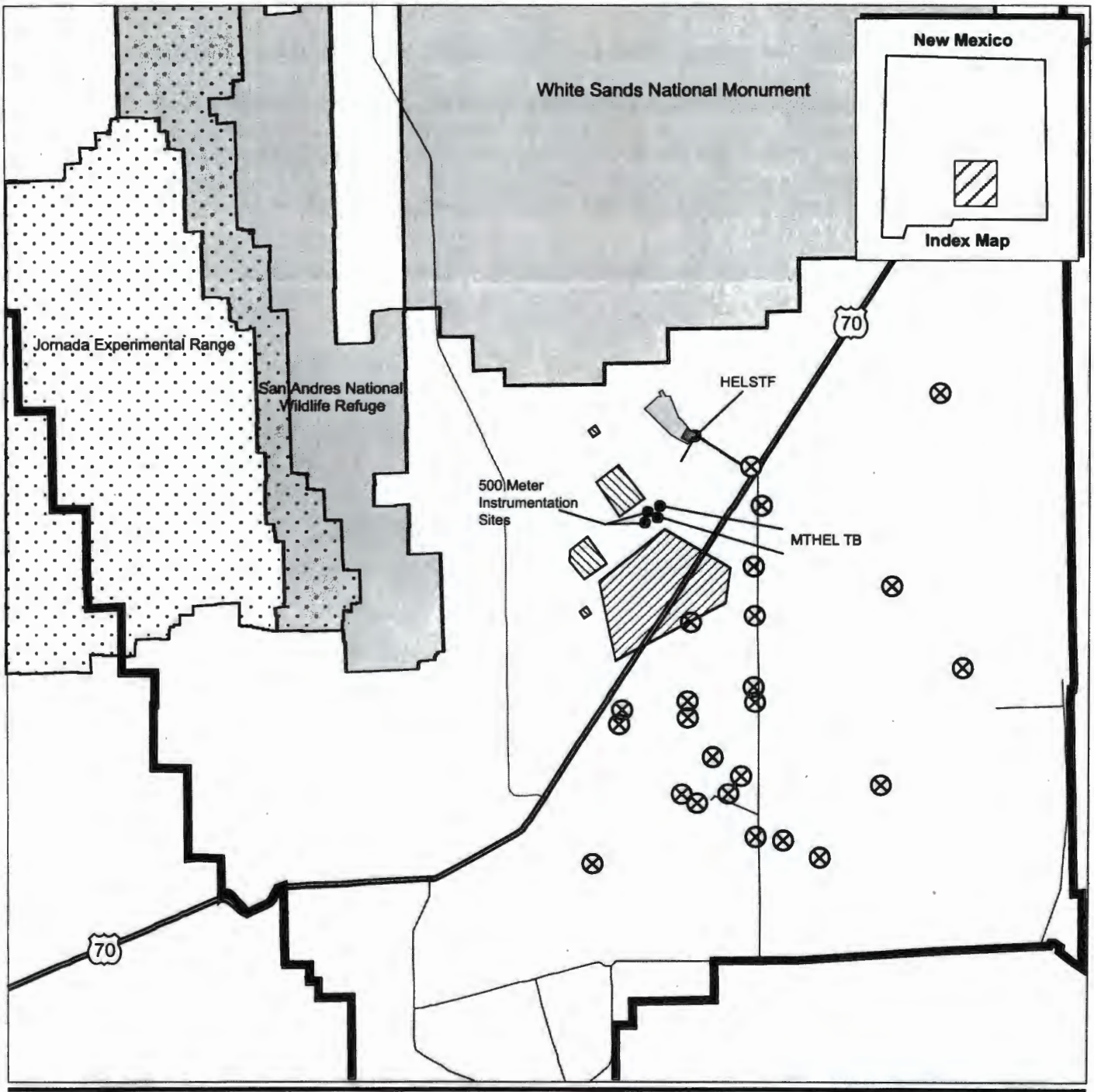

EXPLANATION

- Target Impact Area
- Target Debris Area
- Jornada Experimental Range
- Potential Launch Site
- THEL ACTD Locations
- WSMR Boundary
- Roads

HELSTF = High Energy Laser System Test Facility
MTHEL TB = Mobile Tactical High Energy Laser Test Bed

NORTH

Scale
0 2.3 4.5 miles

12-17-04 Impact Debris Area

Potential HELSTF Impact / Debris Areas and Target Launch Points

Figure 2-3

2.2.5 ASSOCIATED ROCKET AND ARTILLERY IMPACT AREAS

No new target impact areas would be required for laser testing at HELSTF. Only current impact areas that are analyzed in the WSMR Range-Wide EIS, January 1998; the HELSTF EA, 1998; and the THEL ACTD EA, 1998, would be used for activities associated with laser testing at HELSTF. Figure 2-3 shows the locations of impact and debris areas that have been used for previous laser testing. If new test requirements should determine that additional impact areas need to be established, follow-on environmental analysis would be prepared.

All debris resulting from target engagements would be cleared by HELSTF personnel. Hazardous wastes would be disposed of in accordance with applicable laws and regulations.

2.2.6 FACILITY AND SYSTEM IMPROVEMENTS

Some infrastructure improvements at HELSTF would potentially be required for some new activities, or existing facilities would potentially be improved to enhance current activities. Though some details are not yet available, the following potential activities could be conducted:

- The existing MIRACL laser optics chromate closed-loop cooling system could be redesigned to eliminate the use of undesirable chromates. If implemented, the chromates would require proper removal and disposal using a certified hazardous waste contractor.
- New sewage lagoons would be constructed in a previously disturbed open area adjacent to the existing sewage lagoons and drying beds within the next few years. The location has been determined to be uncontaminated. The capacity of the new lagoons would not be larger than the existing ones. The lagoons accept primarily sanitary sewage, but also take some non-contaminated process water. No discharge would occur. Sewage treatment would be confined to the lagoon and would eventually evaporate. WSMR would close the old sewage lagoons, which are suspected of leaking, after the new ones are completed. New fencing could be required around the perimeter of the new lagoons.
- If the FEL may potentially require a new test facility. This building would be built on a one-acre area that has been previously disturbed. A possible location could be an existing gravel parking lot that is adjacent to the MIRACL Pressure Recovery System.
- An additional electrical substation may be required to accommodate increased power demands for the FEL. The substation would be located in a previously disturbed area on HELSTF.

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3.0
AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

This chapter describes the environmental characteristics that may be affected by the Proposed Action. The information provided serves as a baseline from which to identify and evaluate environmental changes resulting from conducting enhanced HELSTF laser and range operations. To provide a baseline point of reference for understanding any potential impacts, the affected environment is briefly described; any components of concern are described in detail.

Several NEPA documents (section 1.5) have been prepared that analyze the effects of laser-related operations at HELSTF, target launch sites, and target impact areas. These available reference materials, EAs, EISs, and installation master plans, were acquired to assist in the selection of environmental resources that could be affected and their subsequent description in the following affected environment discussion. To fill data gaps (questions that could not be answered from the literature) and to verify and update available information, installation and facility personnel; federal, state, and local regulatory agencies; and private individuals were contacted.

Environmental Resources

Thirteen broad areas of environmental consideration were considered to provide a context for understanding the potential effects of the Proposed Action and to provide a basis for assessing their severity. These areas included air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, infrastructure and transportation, land use, noise, socioeconomics, water resources, and environmental justice.

Although the potential construction of a new FEL facility would require a limited amount of clearing and excavation, it is not expected to create any adverse erosion effects to geology or soils. The facility would be constructed on a previously disturbed area of approximately 1 acre. Any construction activities would follow applicable standards and guidelines. Based on initial analysis, it was determined that the proposed activities would not result in impacts to land use or to the visual and aesthetic environment of the areas proposed for use. HELSTF would continue to be used for laser tests and research. The Proposed Action is consistent with the mission of HELSTF and WSMR and would not conflict with any known land use plans, policies, or controls.

The proposed enhanced activities would result in noise effects from laser operations and target launches similar to those analyzed in prior documents such as the HELSTF and THEL ACTD EAs (U.S. Army Space and Missile Defense Command, 1998a; b) and are thus not discussed further.

Only a limited number of employees would be involved in the proposed enhanced activities; thus, there would be no socioeconomic concerns. Because there would be little to no effect to off-range populations, disproportionate impacts would not occur to any minority or low-income populations as required under Executive Order 12898 (Environmental Justice) or environmental health and safety risks that may disproportionately affect children as required under Executive Order 13045 (Protection of Children).

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Air quality, airspace, biological resources, cultural resources, hazardous materials and wastes, health and safety, infrastructure and transportation, and water resources are analyzed.

3.1 AIR QUALITY

Air quality in a given location is described by the concentrations of various pollutants in the atmosphere, expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Pollutant concentration is determined by the type and amount of pollutants emitted into the atmosphere; the physical characteristics, including size and topography of the affected air basin; and meteorological conditions related to prevailing climate. The significance of a pollutant concentration is determined by comparison with National Ambient Air Quality Standards (NAAQS) and state ambient air quality standards (AAQS) that establish limits on the maximum allowable concentrations of six pollutants to protect public health and welfare. These pollutants include carbon monoxide, lead, oxides of nitrogen, ozone, particulate matter (with a diameter less than or equal to 10 micrometers [PM-10] and with a diameter less than or equal to 2.5 micrometers [PM-2.5]), and sulfur dioxide.

According to the EPA guidelines, an area with air quality better than the NAAQS is designated as being in attainment; areas with worse air quality are classified as nonattainment areas. A nonattainment designation is given to a region if the primary NAAQS for any criteria pollutant are exceeded at any point in the region for more than 3 days during a 3-year period. Pollutants in an area may be designated as unclassified when there is insufficient data for the U.S. Environmental Protection Agency (EPA) to determine attainment status.

New Mexico has established AAQS. Emissions of air pollutants from operations in New Mexico are limited to the more restrictive standard (federal or state). Table 3-1 compares NAAQS and New Mexico AAQS.

Region of Influence

The region of influence (ROI) for air quality would include the air basin surrounding the areas in which the proposed activities would take place, including HELSTF, potential target launch sites, and impact areas. HELSTF is located in Otero County. The potential target launch sites and impact areas are located in portions of Doña Ana and Otero counties.

Affected Environment

Climate

The climate of HELSTF, potential launch sites, and impact areas is typical of arid regions at low altitudes. Rainfall varies with elevation, but averages approximately 10 inches annually. Annual snowfall totals average approximately 8 inches. The prevailing winds are from the west, except during July and August when the wind has a strong southerly component.

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Table 3-1: Federal and New Mexico Air Quality Standards

		National Standards	New Mexico Standards
Ozone	8-hour average	0.08 ppm	None
	1-hour average	0.12 ppm	None
Carbon Monoxide	8-hour average	9.0 ppm	8.7 ppm
	1-hour average	35.0 ppm	13.1 ppm
Nitrogen Dioxide	Annual average	0.053 ppm	0.05 ppm
	24-hour average	None	0.10 ppm
Sulfur Dioxide	Annual average	0.03 ppm	0.02 ppm (1)
	24-hour average	0.14 ppm	0.10 ppm (1)
	3-hour average	0.5 ppm	None
Lead	Calendar quarter	1.5 $\mu g/m^3$	None
PM-10	Annual average	50 $\mu g/m^3$	60 $\mu g/m^3$ (2)
	24-hour average	150 $\mu g/m^3$	150 $\mu g/m^3$ (2)
PM-2.5	Annual average	15 $\mu g/m^3$	60 $\mu g/m^3$ (2)
	24-hour average	65 $\mu g/m^3$	150 $\mu g/m^3$ (2)

Source: New Mexico Environment Department, 2004
(1) New Mexico standard with the exception of the area within 5.6 kilometer (3.5 miles) of the Chino Mines Company
(2) The maximum allowable concentrations of total suspended particulate in the ambient air
$\mu g/m^3$ = micrograms per cubic meter
PM-2.5 = particulate matter with a diameter less than or equal to 2.5 micrometers
PM-10 = particulate matter with a diameter less than or equal to 10 micrometers
ppm = parts per million

Regional Air Quality

While the main HELSTF facility is located within Otero County, launch sites and impact areas could also be located in portions of Doña Ana County as well. Otero County is in attainment for all state and federal air quality standards. In Doña Ana County, the Sunland Park area is in marginal nonattainment for 1-hour ozone levels and the town of Anthony is in moderate nonattainment for PM-10 levels; however, areas within the ROI are considered to be in attainment for all state and federal air quality standards. In response to the PM-10 levels, a Natural Events Action Plan for Doña Ana County was submitted to the EPA in December 2000. In response to the ozone exceedances, a State Implementation Plan was instated by the State of New Mexico. (U.S. Environmental Protection Agency, 2004) In addition, WSMR has signed a Memorandum of Agreement with the New Mexico Environment Department in support of the Doña Ana County Natural Events Action Plan. In the agreement, WSMR agreed to consider reasonable efforts to control dust generation and to develop and implement a Particulate Matter Control Plan that would control human-caused dust. (New Mexico Environment Department, Air Quality Bureau, 2000)

Existing Emission Sources

WSMR currently operates under an approved Title V Air permit, which includes all HELSTF facilities. WSMR is currently in compliance with their Title V Air permit. Air pollution sources at HELSTF includes boilers, aboveground storage tanks, degreasers, wood working, a paint booth,

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sand blasting, and existing laser activities. All of these sources are currently covered under WSMR's Title V Air permit.

3.2 AIRSPACE

Airspace is defined as that space which lies above a nation and comes under its jurisdiction. Although airspace is generally viewed as being infinite space, it is a finite resource with distinct vertical, horizontal, and often temporal dimensions.

Under the Federal Aviation Act of 1958, as amended (42 U.S. Code [USC] 1301 et seq.), the Federal Aviation Administration (FAA) is charged with the safe and efficient use of our nations airspace through the establishment of specific airspace criteria and usage limits. Certain types of uses within the described ROI include controlled airspaces, uncontrolled airspaces, and restricted areas.

Controlled airspace is described as an area within which Air Traffic Control (ATC) service is provided to flights in accordance with the airspace classification. Specific designations include class A, class B, class C, class D, and class E airspace areas. An uncontrolled airspace is an area that has not been classified as a controlled airspace and is designated as class G. In addition, no ATC services are provided, and the only requirement for flight is certain visibility and cloud clearance minimums. Both controlled and uncontrolled airspaces are subject to certain pilot qualifications, operating rules, and equipment requirements.

The only special use airspace in the ROI is the restricted areas airspaces which are used by military testing or flight training and are not usually accessed by civilian or commercial aircraft. Activities within these areas must be confined, because of their nature, or limitations imposed upon aircraft operations that are not a part of these activities, or both.

Region of Influence

The ROI for airspace includes the complex of controlled and uncontrolled airspaces, and restricted areas under the governance of WSMR and Fort Bliss, and the corridor of airspace between WSMR and Fort Bliss (figure 3-1).

Affected Environment

The Deputy for Air Force, WSMR is the using agency responsible for the 13 restricted areas within WSMR's airspace. All aircraft that have not been previously authorized and scheduled are prohibited from entering any restricted airspace. With the exception of R-5107B, all restricted areas are joint-use and provisionally released to the FAA for civilian aircraft under a shared-use agreement between WSMR and the FAA. However, R-5107C, D, F, G, H, and J; R-511A; and R-5109A and B are used extensively by Holloman AFB for training. (U.S. Army Space and Missile Defense Command, 1998a)

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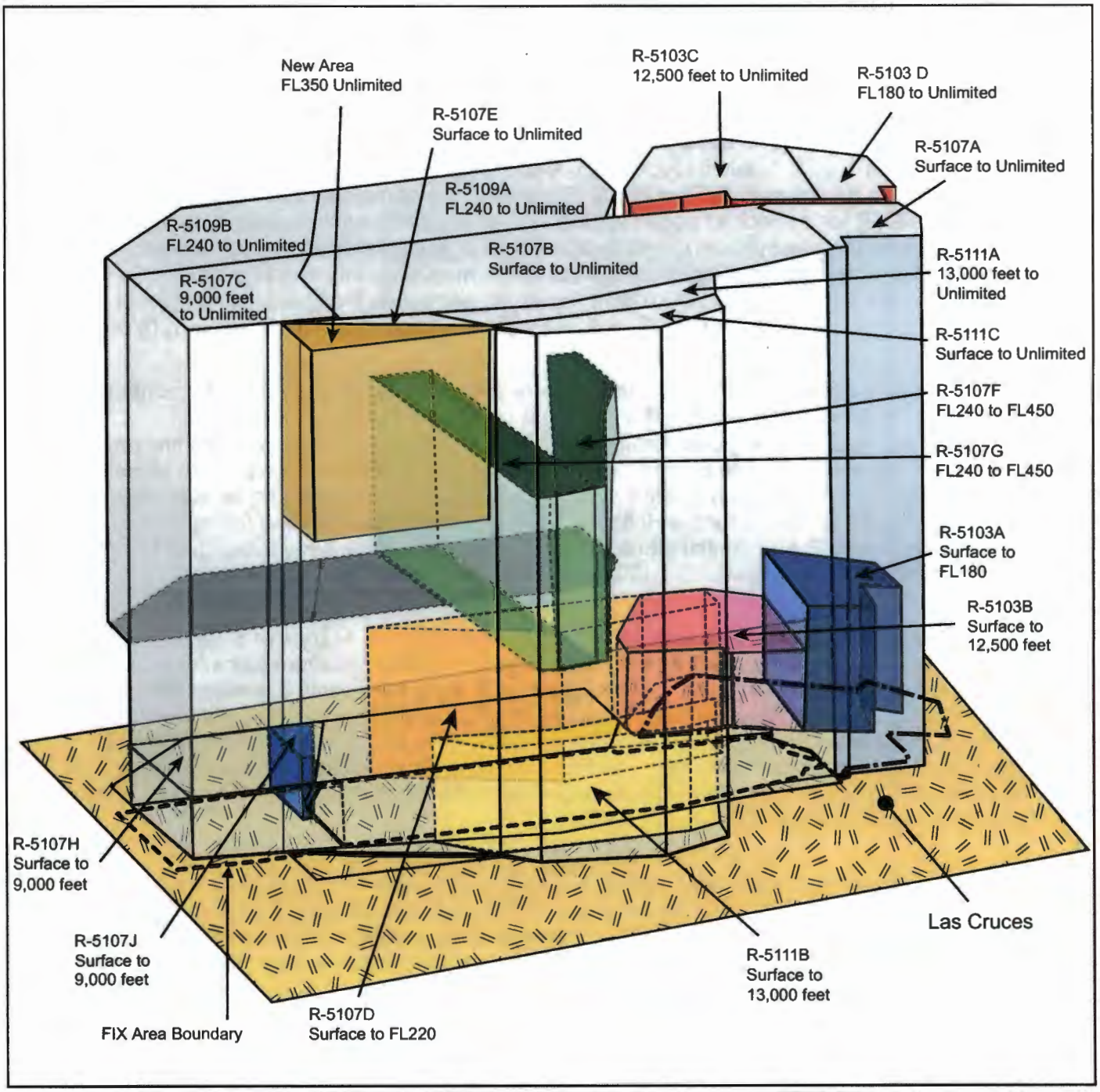

EXPLANATION

White Sands Missile Range Base Boundary

Fort Bliss Boundary

White Sands Missile Range Airspace

White Sands Missile Range,
New Mexico

Not to Scale

NORTH

Figure 3-1

12-17-04 WSMR Airspace ROI

By the agreement with the FAA through the Albuquerque Air Route Traffic Control Center (ARTCC), some of the airspace in the ROI is controlled under a radar approach control facility located at Holloman Air Force Base (AFB). The radar approach control airspace has been divided into areas 1, 2, 3, 4, and 5 (figure 3-2). Depending on the airspace and safety requirements of a particular WSMR or HELSTF mission, one or more of these areas can be recalled by WSMR for a specified period of time. Radar approach control areas 1, 2, and 3 are recalled regularly for research and development missions, resulting in limiting instrument approaches from the north, limiting departures to the north directly into WSMR airspace, modifying visual flight rule (VFR) arrival from the south, and tightening instrument flight rule (IFR) departures to the southwest. (U.S. Army Space and Missile Defense Command, 1998a)

Aircraft arriving or departing from Holloman AFB are controlled by the base air traffic control tower facility. Holloman AFB is located within a transition area that also contains the Alamogordo–White Sands Regional Airport as shown in figure 3-3. An approach control area has been established to provide air traffic control approach and departure services to aircraft transiting between those airports located within the approach control area and enroute airspace system. Controlled airspaces for the Holloman vicinity include a control zone (class D), a transition area (class E) and continental control area (class E). (U.S. Army Space and Missile Defense Command, 1998a)

A control zone is a controlled airspace area typically covering a buffer zone of 5 statute miles around an airport with extensions including instrument arrival and departure paths. A transition area is designated to contain arriving and departing IFR operations within a terminal area, or while transiting between the terminal area and enroute airspace system. The continental control area for this ROI includes airspace at and above 1,200 feet above ground level (AGL) that is outside of restricted or prohibited areas. Aircraft that move into the continental control area from the Holloman Approach Control are under the control of the Albuquerque ARTCC. (U.S. Army Space and Missile Defense Command, 1998a)

In New Mexico, uncontrolled airspace (class G) in the ROI includes all of the airspace outside the lateral boundaries of the transition area and WSMR restricted airspace from the surface to 1,200 feet AGL. The Albuquerque ARTCC controls all airspace adjacent to the WSMR and Fort Bliss restricted areas. Air traffic within the controlled airspaces (classes A and E) are managed within sectors that divide the airspace both vertically and horizontally. (U.S. Army Space and Missile Defense Command, 1998a)

The Commanding General, Fort Bliss is the using agency responsible for the five restricted areas within Fort Bliss's airspace. All are considered joint-use areas and provisionally released to the FAA for civilian aircraft under a shared-use agreement between Fort Bliss and the FAA. (U.S. Army Space and Missile Defense Command, 1998a)

A narrow controlled airspace (class E) floored at 1,200 feet exists above an uncontrolled airspace (class G) between WSMR and Fort Bliss. This air corridor is a VFR flyway approximately 53 miles long traveling between the El Paso and Alamogordo areas (figure 3-3). (U.S. Army Space and Missile Defense Command, 1998a)

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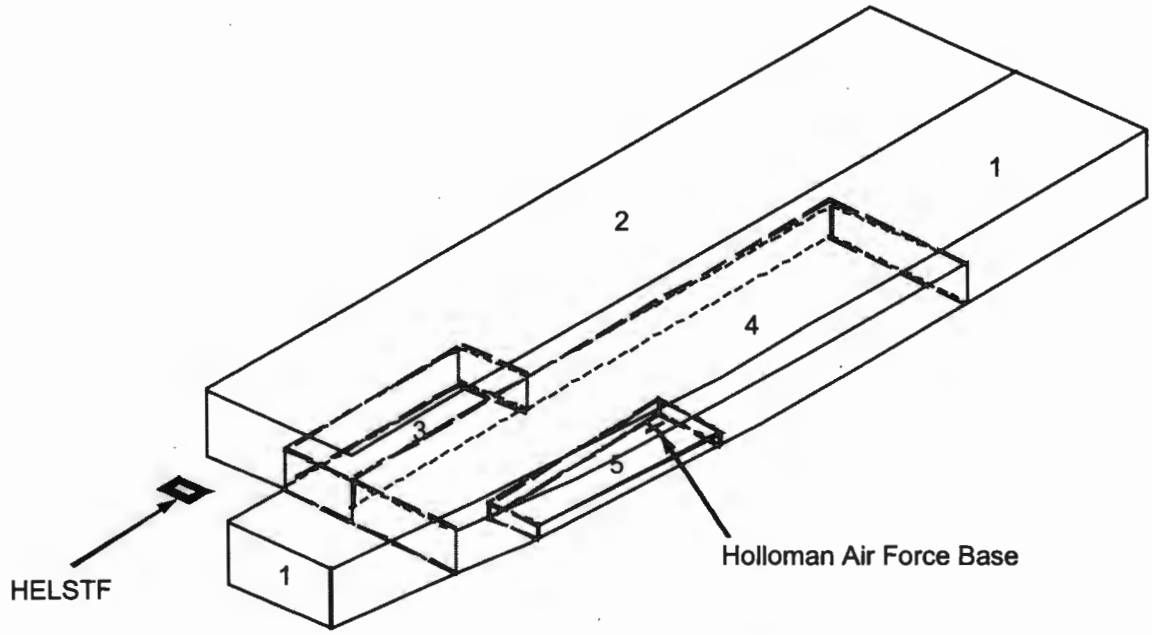


EXPLANATION

1. Surface to 22,000 feet MSL (except areas 4 and 5)
2. Surface to 22,000 feet MSL
3. Surface to 15,000 feet MSL
4. Surface to, but not including, 15,000 feet MSL
5. Surface to 8,000 feet MSL

HELSTF = High Energy Laser System Test Facility
MSL = Mean Sea Level

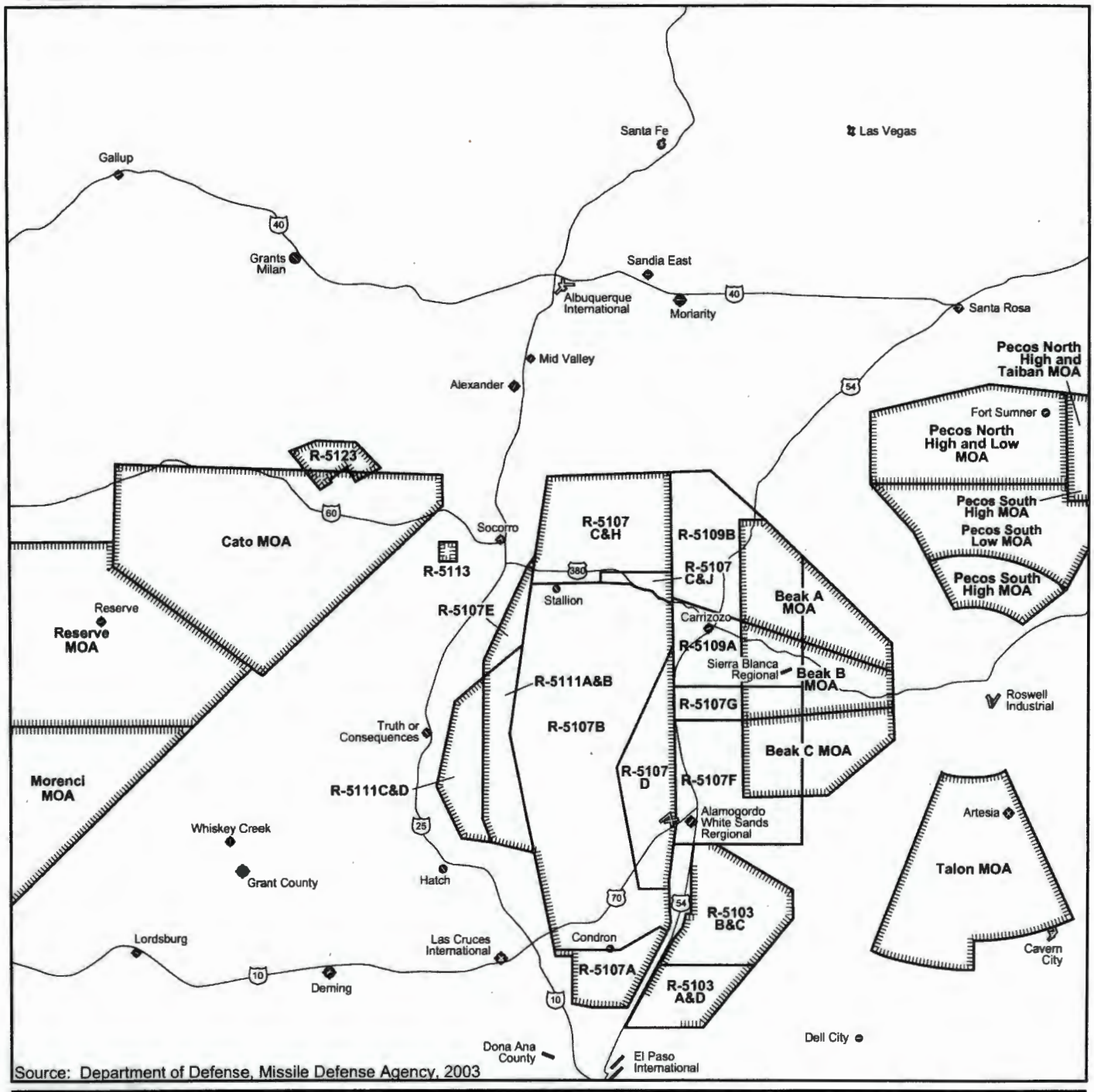
Radar Approach Control Areas

NORTH

Not to Scale

Figure 3-2

12-17-04 Radar Control Areas



Source: Department of Defense, Missile Defense Agency, 2003

EXPLANATION

Special Use Airspace

Special Use Airspace and Airports/Airfields in the White Sands Missile Range Region

New Mexico

Figure 3-3

NORTH

Scale

0 27.7 55.3 miles

12-17-04 WSMR ROI Airspace

3.3 BIOLOGICAL RESOURCES

Native or naturalized vegetation, wildlife, and the habitats in which they occur are collectively referred to as biological resources. Existing information on plant and animal species and habitat types in the vicinity of the proposed sites was reviewed, with special emphasis on the presence of any species listed as threatened or endangered by federal or state agencies, to assess their sensitivity to the effects of the Proposed Action. For the purpose of discussion, biological resources have been divided into the areas of vegetation, wildlife, threatened and endangered species, and environmentally sensitive habitats.

Region of Influence

The ROI for biological resources would include areas within the boundaries of the WSMR South Range, primarily areas that may be disturbed at HELSTF, existing/potential new launch sites, and existing impact areas.

Affected Environment

WSMR is located in the northern Chihuahuan Desert and features a diverse biotic community composed of grasslands, shrublands, and woodlands (figure 3-4). More than 300 wildlife species have been documented at WSMR, including migratory waterfowl and raptors and mammal species ranging from large mammals such as the introduced African oryx to rodents. Less than half of the species are known as regular residents.

Vegetation

The areas proposed for use are located within areas composed of closed basin scrub and plains-mesa sand scrub. Common species include creosotebush, black grama, bush muhly, tarbush, fourwing saltbush, alkali sacaton, and honey mesquite. Scattered pinyon pine and alligator juniper are present, with ground cover of a variety of grama grasses. The thin stony soil on the lower slopes within the mountains supports sparse grasses and a variety of shrubs and cacti. (White Sands Missile Range, 2001)

Wildlife

Bird species diversity on WSMR is directly related to characteristics of available vegetation. Dry habitat dominated by creosote has the lowest number of species. The most common birds in the ROI include the black-throated sparrow, cactus wren, northern mockingbird, mourning dove, and western kingbird. The mountain plover, recently removed as a species proposed for listing by the U.S. Fish and Wildlife Service (USFWS) (U.S. Fish and Wildlife Service, 2003), has a summer range that includes portions of the Tularosa Basin, and it has been observed on WSMR. Raptors located in the area include the red-tail hawk, northern harrier, western burrowing owl, and great horned owl.

The primary native large mammals present within the Tularosa Basin are mule deer, pronghorn, and a remnant population of desert bighorn sheep. The most common larger mammals within the ROI include the coyote, common gray fox, and kit fox. The introduced African oryx occur throughout the area. Small mammals common in the ROI include the kangaroo rat and desert pocket mouse.

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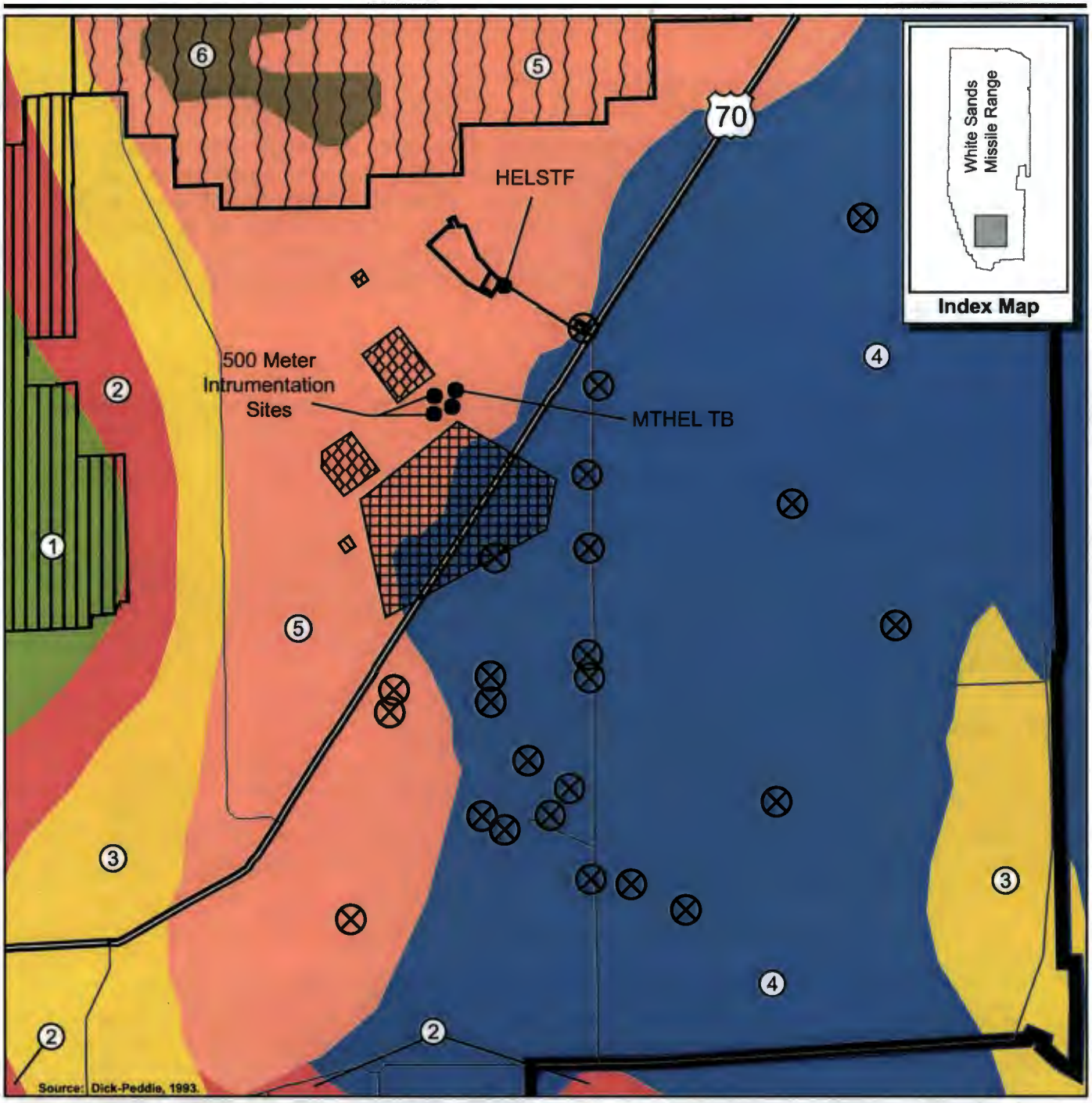

EXPLANATION

- WSMR Boundary
- Roads
- Potential Launch Site
- Target Impact Area
- Target Debris Area
- San Andres National Wildlife Refuge
- White Sands National Monument

1 - Coniferous and Mixed Woodland
2 - Desert Grassland (Ecotone)
3 - Chihuahuan Desert Scrub
4 - Plains-Mesa Sand Scrub
5 - Closed Basin Scrub
6 - Dune Area
HELSTF = High Energy Laser System Test Facility
MTHEL TB = Mobile Tactical High Energy Laser Test Bed

NORTH

Scale
0 1.5 3 miles

12-17-04 S Range Veg

Vegetation Map, South Range

White Sands Missile Range, New Mexico

Figure 3-4

An abundant, diverse group of reptiles is common in the ROI. Lizards are the most frequently observed reptile, and snake species are also abundant. The roundtail horned lizard, collared lizard, state threatened Texas horned lizard, New Mexico whiptail, western whiptail, night snake, longnose snake, western rattlesnake, and western diamondback rattlesnake are found in the majority of habitat on WSMR. Few amphibians are found on WSMR, only a total of 10 species. The green toad and Couch's spadefoot toad have been observed in the ROI. (White Sands Missile Range, 2001; 1998)

Threatened and Endangered Species

Threatened and endangered species in the ROI (table 3-2) include plants and animals listed as threatened, endangered, or candidates for listing by the USFWS.

Table 3-2: Federally Listed Species Known or Expected to Occur in the Vicinity of the Proposed Action

Scientific Name	Common Name	Status	
		State	Federal
Birds			
Charadrius melodus circumcinctus	Piping plover	T	T
Empidonax traillii extimus	Southwestern willow flycatcher	E	E
Falco femoralis septentrionalis	Aplomado falcon	E	E
Sterna antillarum athalassos	Least tern	E	E
Strix occidentalis lucida	Mexican spotted owl	--	T
Plants			
Hedeoma todsenii	Todsen's pennyroyal	E	E

Source: White Sands Missile Range, 2001; Department of Defense, Missile Defense Command, 2002; U.S. Fish and Wildlife Service, 2004.

NOTES:

E = Endangered

T = Threatened

Todsen's pennyroyal (figure 3-5) is the only federally listed plant species known to occur on WSMR. It is located in 3 known populations within the San Andres Mountains on WSMR and 15 sites in the Sacramento Mountains east of WSMR (University of New Mexico, 2001). The localities of these known populations are outside areas likely affected by the program. (White Sands Missile Range, 1998)

There are historical records of the endangered least tern's (*Sterna antillarum athalassos*) occurrence on WSMR, but it is now listed as a rare visitor to the vicinity (New Mexico Department of Game and Fish, 2002a). The threatened Mexican spotted owl has been sighted on WSMR, and appropriate habitat may be present. The endangered southwestern willow flycatcher (*Empidonax traillii extimus*) and threatened piping plover (*Charadrius melodus circumcinctus*) have not been sighted on WSMR; however, suitable habitat may be present in the vicinity. (White Sands Missile Range, 1998)

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EXPLANATION

- WSMR Boundary
- Roads
- Potential Launch Site
- Target Impact Area
- Target Debris Area
- San Andres National Wildlife Refuge
- White Sands National Monument
- Desert Bighorn Sheep Habitat
- Wetlands

HELSTF = High Energy Laser System Test Facility
MTHEL TB = Mobile Tactical High Energy Laser Test Bed

NORTH

Scale
0 1.5 3 miles

Sensitive Habitat, South Range

White Sands Missile Range, New Mexico

Figure 3-5

12-17-04 S Range Habitat

There have been three reported sightings of the federally endangered northern Aplomado falcon (*Falco femoralis septentrionalis*) on or near WSMR since 1991. The most recent confirmed sighting occurred in August 1992, just east of San Antonio near WSMR's northern range. Two unconfirmed reports during a 1994 survey period indicated falcons in the vicinity of the Black and Rita sites located along the eastern boundary of WSMR, outside the ROI. (U.S. Department of the Interior, 1994)

Although not listed by the USFWS as threatened or endangered, two species are considered, at the request of the New Mexico Department of Game and Fish, when proposing projects on WSMR: desert bighorn sheep (*Ovis canadensis mexicana*) and White Sands pupfish (*Cyprinodon tularosa*). Desert bighorn sheep, a state group 1 endangered species, occupy the upper reaches of the San Andres Mountains, appearing individually and in small bands. Five new radio-collared rams were introduced into the herd and are being tracked by the USFWS (White Sands Missile Range, 2000). In November 2002, 31 ewes and 20 rams from both Arizona and New Mexico were released at the southern end of WSMR (White Sands Missile Range, Public Affairs Office, 2002). Reintroduction of bighorn sheep has been identified as critical to state recovery efforts, and the San Andres Mountains are considered the best and largest bighorn sheep habitat in New Mexico (U.S. Army Environmental Center, 2003).

The White Sands pupfish, which is listed as endangered by the State of New Mexico, is the only fish known to occur naturally on WSMR and is endemic to the Tularosa Basin (New Mexico Department of Game and Fish, 2002b). It has been documented in the waters of Salt Creek, Lost River, Malpais and Mound Springs, and Malone Draw. The population appears relatively stable within its limited range. (U.S. Army Space and Strategic Defense Command, 1994; U.S. Department of the Interior, 1996) Habitat for the White Sands pupfish is outside the ROI of the known locations proposed for use as part of the Proposed Action.

Environmentally Sensitive Habitat

Several sensitive areas are located within WSMR or adjacent to its boundaries. Sensitive wildlife habitats occurring within the ROI include raptor nesting areas and regionally valuable habitats such as grama grasslands and pinyon-juniper woodland. (U.S. Army Space and Strategic Defense Command, 1994) The San Andres National Wildlife Refuge, an area adjacent to sites used to support HELSTF activities that provides habitat for a variety of sensitive species, was established in 1941 by Executive Order 8646 for the conservation and development of natural wildlife resources. The refuge supports a population of state endangered desert bighorn sheep, as well as mule deer, mountain lions, golden eagles, and gray vireos. The refuge is within WSMR boundaries and operates under a co-use agreement. All missions with the potential to impact protected wildlife within the refuge are subject to review by the USFWS Refuge Manager. Natural resources management is the responsibility of the USFWS. (U.S. Army Space and Strategic Defense Command, 1997)

The closest areas currently designated as Critical Habitat for the Mexican spotted owl are located northwest and east of WSMR and outside the ROI. (U.S. Fish and Wildlife Service, 2004)

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3.4 CULTURAL RESOURCES

Cultural resources are those tangible and intangible aspects of cultural systems, both past and present, that are valued by or representative of a given culture, or that contain information about a culture. They include prehistoric or historic sites, structures, districts, artifacts, rock inscriptions, burial sites or other physical evidence of human activity, including archaeological (prehistoric and historic), ethnographic or traditional (e.g., American Indian), and historic buildings and structures. For the purposes of this EA, cultural resources are also defined to include paleontological resources. Whether prehistoric, historic, or traditional, significant cultural resources are often referred to as "historic properties."

NEPA requires all DoD installations to consider the environmental effects of their proposed programs, projects, and actions prior to initiation. NEPA guidelines not only protect and conserve the natural resources, but also protect cultural resources. It is the baseline policy for WSMR to avoid cultural resources or adverse effects to cultural resources whenever possible. In May 1985, WSMR entered into a Programmatic Memorandum of Agreement (PMOA) with the Advisory Council on Historic Preservation and the New Mexico State Historic Preservation Officer (SHPO) which is still in effect and to which all users of the facility are bound. This PMOA sets forth procedures governing the treatment of archaeological resources on a programmatic basis, implementing mitigation measures to reduce or eliminate adverse impacts to the range's cultural resources. The WSMR Integrated Cultural Resources Management Plan (ICRMP) presents the plan for management of cultural resources, and satisfies legal requirements (federal and state laws; local agreements) regarding such properties. Furthermore, it allows for amendments to cultural legislation which came into effect after the PMOA was signed, satisfies the existing PMOA, and is the primary tool used to implement the WSMR cultural resources management program (White Sands Missile Range, Environment and Safety Directorate, 2002), in consultation with the New Mexico SHPO. It is HELSTF policy to support the WSMR ICRMP to conserve, protect and manage cultural resources located on HELSTF. Site personnel finding a cultural resource at HELSTF are required to advise the HELSTF Environmental and Safety Manager of its nature and location. New projects are reviewed for cultural resource impacts through the NEPA review process.

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Region of Influence

The ROI for cultural resources incorporates all areas of possible ground disturbance, including the area within HELSTF's fenced boundary, the existing or potential new launch sites, and the existing or potential debris impact areas (figure 3-3).

Affected Environment

The physiography and climate of WSMR have supported a cultural resources chronology that extends into the past for approximately 11,000 years.

Historic Resources and Structures

As little is known of area cultural development circa A.D. 1400-1540, WSMR's Historic Period (Protohistoric and Euroamerican) is generally accepted as beginning about the time Hispanic exploration and occupation (the Spanish Entrada) began.

Within the HELSTF ROI, cultural resources surveys have been limited; however, no Protohistoric sites have been identified thus far. In addition, there are no known Euro-American sites within the ROI. (U.S. Army Space and Missile Defense Command, 1998b)

There are no military era or National Register-listed properties within the ROI, nor are there any New Mexico State Register properties, National Historic Landmarks, or National Natural Landmarks.

Traditional Resources and Consultation

Significant traditional resources may include burial sites, ceremonial areas, caves, mountains, water sources, plant gathering areas, or any other natural area culturally important for religious or hereditary reasons, and are afforded the same regulatory protection as other historic properties. WSMR's abundant cultural resource sites and immense unsurveyed area, coupled with Apache reticence to reveal site locations, preclude complete enumeration of National Register-listed or -eligible properties. At this date, there are no recorded traditional sites within the ROI.

Paleontological Resources

There are no recorded paleontological resources or National Natural Landmarks within the HELSTF ROI.

3.5 HAZARDOUS MATERIALS AND WASTE

Although several regulatory agencies (e.g., the EPA, the Occupational Safety and Health Administration [OSHA], and the U.S. Department of Transportation [DOT]) have differing definitions of a "hazardous material" as applied to a specific situation; a general definition of a hazardous material is a substance or material that is capable of posing an unreasonable risk to health, safety, or property. The New Mexico Environment Department is responsible for regulation of all hazardous materials in New Mexico.

Region of Influence

The ROI for hazardous materials and hazardous waste at HELSTF would include all locations where these substances are used, stored, transported, or disposed.

Affected Environment

Hazardous Materials Management

Organizations and private contractors at WSMR (including HELSTF) are responsible for the management of hazardous materials. The WSMR Environment and Safety Directorate has primary responsibility for compiling and tracking hazardous materials information. The WSMR Hazardous Materials Minimization Center purchases and dispenses the majority of hazardous materials used on WSMR and HELSTF. Organizations purchase the materials, use what they need, then return the unused portion. This process is designed to minimize the amount of hazardous materials on-base and also to ensure its use.

HELSTF is responsible for safe storage and handling of the materials they obtain. The WSMR Environment and Safety Directorate is responsible for inspecting all hazardous materials

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storage facilities at WSMR, documenting the findings, verifying corrective actions, and maintaining accurate records as required by U.S. Army Regulation 420-90, *Fire Protection*. The WSMR Explosive Ordnance Disposal section handles all ordnance and ordnance by-products. Hazardous materials used in support activities include various cleaning solvents, paints, cleaning fluids, pesticides, fuels, coolants, and other materials. Hazardous materials used in range tests include those listed above as well as explosives, propellants, and gases used for HELSTF laser testing (i.e., nitrogen fluoride, fluorine, deuterium, sulfur hexafluoride, fluoride, and 71- to 85-percent hydrogen peroxide).

Appendix A of the HELSTF Integrated Contingency Plan (Hazardous Chemical Spill/Release Response Plan [U.S. Army Space and Missile Defense Command, 2003c]) establishes responsibility, outlines personnel duties, and provides resources and guidelines for use in the control, clean-up, and emergency response for spills. Releases of materials above threshold quantities are reported to the EPA and to state and local level agencies with emergency planning authority as mandated by the Emergency Planning and Community Right-to-Know Act of 1986. Material Safety Data Sheets (MSDSs) are kept at the use and storage sites of each material.

Hazardous Waste Management

WSMR is responsible for tracking hazardous wastes; for proper hazardous waste identification, storage, transportation, and disposal; and for implementing strategies to reduce the volume and toxicity of the hazardous waste generated on base. The New Mexico Environment Department's Hazardous Waste Bureau provides regulatory oversight and technical guidance to hazardous waste generators and treatment, storage, and disposal facilities in New Mexico.

The WSMR Environment and Safety Directorate implements the WSMR hazardous waste tracking system, which tracks hazardous wastes from the generation of the waste through the accumulation and storage sites until they are shipped off the range by an authorized contractor. All hazardous waste is disposed of via permitted procedures through the WSMR Hazardous Waste Storage Facility.

The HELSTF Hazardous Waste Management Plan (U.S. Army Space and Missile Defense Command, 2003a) established a systematic approach to handling hazardous wastes in a manner that meets federal, state, WSMR, and USASMDC regulations and policies. At HELSTF physical inventories are performed by each facility on HELSTF, logged by each hazardous waste generator, and tracked by the hazardous waste contractor. Currently, hazardous waste generated is taken to a temporary less than 90-day, accumulation site and then sent to the WSMR Hazardous Waste Storage facility for proper disposal.

3.6 HEALTH AND SAFETY

Health and safety includes consideration of any activities, occurrences, or operations that have the potential to affect one or more of the following:

The well-being, safety, or health of workers—Workers are considered to be persons directly involved with the operation producing the effect or who are physically present at the operational site.

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The well-being, safety, or health of members of the public—Members of the public are considered to be persons not physically present at the location of the operation, including workers at nearby locations who are not involved in the operation and the off-base population. Also included within this category are hazards to equipment, structures, plants, and wildlife.

Existing environmental documents were reviewed to determine if public and occupational health and safety concerns are an issue. Applicable safety regulations were also reviewed with regard to hazardous materials.

Region of Influence

The standards applicable to evaluations of health and safety effects differ for workers and the public. The ROI for worker safety is limited to a very small area and would not extend beyond HELSTF and testing areas. The ROI for public safety includes HELSTF as well as offsite areas that may be affected by the Proposed Action or related mishaps.

Affected Environment

WSMR provides a Safety and Health program for all employees, and ensures that the public off base is advised of any potential hazards present at the facility. The Quality Assurance, Reliability, and Safety Office is responsible for implementing occupational and system safety requirements, identifying potential health and safety hazards, and developing controls to protect employees and facility assets. WSMR Emergency Services provides emergency response to fire, explosion, chemical release, and associated medical emergencies.

HELSTF has extensive plans and procedures to handle an emergency. While the current test schedule does not require a staffed fire department, fire protection of the site is provided by a WSMR fire station. The nurse aid station is staffed by a full-time nurse and an emergency medical technician during normal working hours, during high energy laser testing, and during hazardous fluid transfers (fluorine). In the event of an emergency, prior arrangements have been set up with Holloman AFB Hospital, the WSMR McAfee Clinic, and the Las Cruces Memorial Hospital to accept and communicate with the HELSTF ambulance. A full-time safety officer also is on site to oversee hazardous fluid transfers and laser testing. (White Sands Missile Range, 1998)

Over the years, HELSTF has developed extensive standard operating procedures to cover all laser operations and hazardous fluid transfers. The standard operating procedures are updated annually.

The HELSTF Safety Office trains site employees on the hazardous chemicals kept at the site (hazardous communications), confined space entry, and hazardous materials spill response in case of an emergency. The Safety Office also maintains the MSDS files for the site. The MSDSs are available for review at any time. Hazardous chemicals maintained at HELSTF are monitored 365 days a year, 24 hours a day, by a site surveillance team as well as a highly sophisticated Hazardous Atmospheric Monitoring System. In the event of an emergency, site surveillance personnel follow written procedures to alert appropriate personnel and to correct the emergency situation. Emergency procedures are updated annually.

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The HELSTF Facility Disaster Control Plan was last updated in 1998. The plan presents potential accident or emergency conditions that could occur at HELSTF and the procedures to be followed in the event of such an occurrence. The primary considerations in dealing with accident or emergency conditions are presented in the Disaster Control Document. Individuals responsible for handling an emergency situation, including an emergency that could affect the public, also are described in the Disaster Control Plan. (White Sands Missile Range, 1998)

A number of Local Emergency Planning Commissions are also involved in emergency management, planning, and response for the area. Some of these include Doña Ana County/Las Cruces, El Paso, Otero/Alamogordo, Sierra/Truth or Consequences, Socorro, and Torrance. (U.S. Army Space and Missile Defense Command, 1998a)

3.7 INFRASTRUCTURE AND TRANSPORTATION

For the purposes of this EA, infrastructure elements include facilities and systems that provide power (electricity), potable (drinkable) water, wastewater treatment, and collection and disposal of solid waste for the affected installation. Transportation includes the primary transportation routes on WSMR and, specifically, potentially affected highways within the immediate HELSTF vicinity.

Region of Influence

The ROI for infrastructure and transportation analysis incorporates all areas within HELSTF's fenced boundary, the existing or potential new launch sites, and the existing or potential debris impact areas.

Affected Environment

Electricity

Approximately 94 percent of WSMR's electrical service is furnished by El Paso Electric Company. Power is provided by two onsite transformers to both HELSTF and other up-range WSMR users. Current electricity usage at HELSTF is well within capacity, with no foreseeable problems concerning adequate supply (Reynolds, 2004c).

A number of generators are available for use at WSMR; all are considered portable, although some are semi-permanently stationed. Generators range in their output capability from 10 to 700 kilovolt-amperes. Certain lasers and the BOSS rely on generator power as a potential alternative to battery or commercial electric sources.

Water

The potable water supply sources for WSMR are obtained mainly from wellfields (Department of Defense, Missile Defense Agency, 2002) and is tested quarterly (Reynolds, 2004a). HELSTF's water flows through 6-inch polyvinyl chloride conduits from four such wells located 8 miles away; three of these are currently in use. HELSTF is the only group drawing water from these particular wells, yet the piping does not have adequate supply capacity, leaving the system to be utilized instead for storage and creating a need for increased size in distribution piping (Reynolds, 2004a). Water at HELSTF is chlorinated and processed by the Reverse Osmosis system before being made available through booster pumps and gravity flow, which is constructed to distribute it to and from several storage tanks. The Pump House has a 20,000-

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gallon holding tank. Although all health and primary drinking water standards are met by onsite potable water, a high concentration of total dissolved solids has been an issue and, as a result, aesthetic standards (such as taste or odor) are increasingly problematic (Reynolds, 2004a).

Wastewater

Most HELSTF-generated wastewater is collected by means of sewage collection lines and transferred to the site's lined sewage lagoon facilities, which function by evaporation. It is estimated that the four lagoons hold approximately 3 million gallons and are generally 85 to 95 percent full. Sewage depth within the evaporation ponds averages about 38 inches. Currently, HELSTF has six septic systems: three serve the Technical Support Area (Guard Shack, Cafeteria and main TSA facilities); the rest serve the MTHEL Test Bed, Hangar (Heavy Equipment Shop) and the Tin Shed/MTHEL support trailers (Reynolds, 2004c). Proposed sewage lagoons, which would replace the current lagoons, are currently being designed to replace the existing lagoons that potentially have leaks. It is anticipated that the capacity of the proposed lagoons will not exceed the capacity of the existing lagoons. (Reynolds, 2004b)

Solid Waste

Currently, WSMR manages all HELSTF solid waste removal via waste collection and transport as well as the utilization of landfills. Additional waste pickups are coordinated as required. There are three operating landfills located on the Main Post, Stallion Range, and NASA area.

Transportation

U.S. 70 provides direct access to the Small Missile Range gate and to Range Road 1 via the Las Cruces and El Paso gates, and is the only U.S.-designated highway within the ROI. U.S. 70 is in good condition and provides Las Cruces and Alamogordo access to WSMR via Range Road 1 (Department of Defense, Missile Defense Agency, 2002). This highway is located within the evacuation area for HELSTF flight tests, and as a result is temporarily closed during such activities. Closures are common and well understood and anticipated by local motorists. Prominent notices are posted beside the road in both directions, and an agreement with the state allows WSMR to establish planned roadblocks lasting 60 minutes (with the option of an extension by up to 1 hour and 10 minutes).

HELSTF is located on WSMR Range Road (HELSTF Access Road) 264, some 2.2 miles north of U.S. 70. HELSTF access is monitored by WSMR DoD guards during operational hours and by HELSTF site surveillance during non-operational hours.

3.8 WATER RESOURCES

Water resources include both surface water and groundwater. Water quality and the consumption and diversion of water are regulated by a number of federal and state agencies. The EPA, along with the state of New Mexico, issues permits under the Clean Water Act to maintain and restore the potential affected water resources within the ROI.

Region of Influence

The ROI for water resources includes all surface water and groundwater within the Tularosa Basin area of WSMR. The primary areas of consideration are the MAR wellfield, potential target impact and debris areas, and HELSTF.

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Affected Environment

The source of all surface water and groundwater in the Tularosa Basin is limited to precipitation. Over half of the rainfall occurs from June to September. The average annual precipitation for the lower elevations at WSMR is approximately 10 inches while the nearby mountains receive approximately 18 to 20 inches. HELSTF and potential target impact and debris areas occupy rather flat terrain. Although the potential for flash floods and standing water does exist, the occurrence is extremely infrequent. (U.S. Army Space and Missile Defense Command, 1998b)

Water supply sources are a critical concern throughout the Tularosa Basin and in many areas of WSMR. Freshwater aquifers are in a state of potential overdraft causing declining water tables and degraded water quality.

Surface Water. Infrequent thunderstorm rainfall and snow melt from the surrounding mountainous areas exclusively supplies the limited surface water on WSMR. Most runoff occurs slowly due to gentle slopes with rapid percolation into sandy soils. Several intermittent drainages enter the ROI from the San Andres Mountains that form the western edge of the Tularosa hydrologic basin. Perennial surface waters within the ROI are limited to the intermittent appearance of Lake Lucero, which is also an expression of the groundwater table. (U.S. Army Space and Missile Defense Command, 1998a)

Groundwater. Groundwater recharge within the area is primarily from the fairly permeable alluvial fan material along the base of the Sacramento Mountains at the western edge of Alamogordo. Comparatively little recharge occurs in the valley floor due to the existence of impermeable clay, silt, and evaporative deposits. The groundwater in the valley flows south through the basin eventually reaching the Rio Grande Valley near El Paso, Texas. Most groundwater is drawn from underlying fill material, which is somewhat thin along the base of the mountains but several thousands of feet thick in the center of the valley. (U.S. Department of the Interior, Bureau of Reclamation, 2003)

Water for HELSTF is supplied almost exclusively by three wells located at the MAR wellfield. Runoff from the San Andres Mountains and direct precipitation percolates through the alluvial fan deposits to form the alluvial aquifers. The total estimated volume of water in the Tularosa Basin is 4.2 billion acre-feet. An estimated 98 percent of the Tularosa Basin's groundwater is considered of poor quality and classified as saline having a dissolved solid concentration in excess of 35,000 milligrams per liter (mg/L) (parts per million) (U.S. Department of the Interior, Bureau of Reclamation, 2003).

In the vicinity of the MAR wellfield, it has been estimated that 450,000 acre-feet of fresh groundwater are in storage. The water supply line from the wells to HELSTF has a capacity of approximately 200 gallons per minute. According to the HELSTF EA and THEL ACTD EA, the three MAR wells yielded approximately 380 gallons per minute and produced approximately 52.6 million gallons per year. Present water usage at HELSTF from the MAR wells is unknown.

Depth to water within the ROI ranges from zero at Lake Lucero to approximately 330 feet below ground level on some alluvial fan surfaces. Depth to water in the MAR wells is approximately 215 to 272 feet below ground level. Depth to water at HELSTF and the potential target impact

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areas is approximately 70 feet below ground level. (U.S. Army Space and Missile Defense Command, 1998a)

Quality freshwater generally occurs along the base of the Sacramento Mountains range at the eastern edge of the basin and the western edge near the Organ and San Andres Mountains. Water from the MAR wells is considered reasonably fresh, with dissolved solids of approximately 500 to 700 mg/L (U.S. Army Space and Missile Defense Command, 1998a).

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4.0
ENVIRONMENTAL CONSEQUENCES

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 AIR QUALITY

This section addresses potential environmental impacts caused by changes to the air quality environment due to the continuing No-action Alternative or the Proposed Action.

4.1.1 NO-ACTION ALTERNATIVE

Potential impacts from the No-action Alternative would result from current levels of HELSTF operations. These current activities occur within HELSTF's fenced boundary or nearby on WSMR land supported from HELSTF. These activities are directly involved with the use or production of a high energy laser beam. The impacts of these activities were analyzed in the HELSTF EA and THEL ACTD EA (U.S. Army Space and Missile Defense Command, 1998a; b) and are summarized below. Any changes to activities to HELSTF since the 1998 EAs were published are also addressed.

HELSTF emission levels would continue to be monitored and maintained according to WSMR's Title V Air Permit. As presented in the 1998 HELSTF EA, table 4-1 lists estimated emissions from stationary sources at HELSTF and Title V emission limits for all of WSMR. Laser emissions include HF emitted by the MIRACL, LDD and LPCL.

Air pollution dispersion modeling is conducted prior to operation or refueling of any chemical laser system on HELSTF (U.S. Army Space and Missile Defense Command, 1998a). The HELSTF Atmospheric Sciences Group has a staff on site during these activities to perform dispersion-modeling functions in accordance with an approved HELSTF procedure. Two dispersion models are currently used at HELSTF. The first, OCEAN BREEZE/DRY GULCH is used to model non-buoyant plumes and includes support for planned laser refueling operations and in response to alarms that might indicate a hazardous chemical release. The second, INPUFF is used to support laser operations where the HF plume is known to be buoyant. (Reynolds, 2004c) Table 4-2 lists the emission factors associated with the MIRACL, LDD, and LPCL during operation for HF.

Current emission scrubbing system for the MIRACL is designed to remove 85 percent of the HF released; however, no HF has been detected in exhaust emissions when tested. Current levels of HF emitted by MIRACL testing would continue to be within the WSMR Title V Air Permit levels, as analyzed in the 1998 HELSTF EA.

The primary emission anticipated due to operation of the MTHEL TB would be HF. As analyzed in the THEL ACTD EA, the MTHEL TB operations at HELSTF would be within the WSMR Title V permit levels.

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Table 4-1: Existing Estimated Emissions at HELSTF

Source	Emission Type	Estimated Emission Level (tons per year)	WSMR Title V Air Permit Emission Limit (tons per year)
Lasers	HF (HAP)	0.64	9.9
Boilers	PM	0.60	0.74
	SO_2	2.55	8.79
	CO	0.15	1.43
	NO_X	0.60	6.45
	VOC	0.01	0.2
Gasoline Aboveground Storage Tank	VOC	1.40	41.1
Degreasers	VOC	6.76	21.8
Woodworking	PM	0.30	7.8
Paint Booth	PM	0.0174	0.2
	VOC	0.642	6.1
Sandblasting	PM	32.5	68.5
	PM_{10}	27.9	58.5

Source: U.S. Army Space and Missile Defense Command, 1998

HF = hydrogen fluoride
HAP = hazardous air pollutant
CO = carbon monoxide
NO_x = oxides of nitrogen
PM = particulate matter
PM_{10} = particulate matter less than 10 microns in size
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4-2: HELSTF Laser HF Emission Factors

Laser	HF Emission Factor
MIRACL	5.75 pounds per second
LDD	0.001 pounds per second
LPCL	0.0001 pounds per second

Source: Sanchez, 2004
HF = hydrogen fluoride
LDD = Laser Device Demonstration
LPCL = Low-Power Chemical Laser
MIRACL = Mid-Infrared Advanced Chemical Laser

Operations for the LPCL are anticipated to remain as analyzed in the 1998 HELSTF EA and are not expected to increase HF emissions. The emission scrubber system on the LPCL was replaced since the 1998 HELSTF EA, as the previous system was more difficult to maintain and prone to a quick loss of scrubbing efficiency. The improved LPCL scrubber system continues to remove DF and HF from exhaust emissions.

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The LDD is currently not in use; however, it would be possible to utilize the LDD once the emission scrubber is refurbished. It is expected that any HF emissions would be similar to those previously analyzed and would not increase.

Exhaust gases from the PLVTS consist of approximately 424 cubic feet of helium, nitrogen, and carbon dioxide (in a 3:2:1 mixture), as well as a trace amount of carbon monoxide and are released directly into the atmosphere about twice a month. No post scrubbing is performed on the PLVTS exhaust emissions.

4.1.2 PROPOSED ACTION

The Proposed Action Alternative includes the use of solid state lasers (SSHCL), chemical lasers (MTHEL, ABL, ATL, High Power Carbon Dioxide) and FEL, as well as additional target and flight testing in conjunction with laser testing and possible facility improvements.

4.1.2.1 Lasers

Previous testing of an SSHCL at HELSTF was the 10-kW flash-lamp pumped heat-capacity laser in 2004. Future 10-kW SSHCL testing would be against static targets in 2005 and against dynamic targets in 2006. The 10-kW flash-lamp pumped heat capacity laser would be powered by standard commercial power. The proposed 25-kW and 100-kW diode pumped SSHCLs would be powered by lithium ion batteries, which would be charged from commercial power. It is anticipated that the proposed SSHCLs would have no byproducts; therefore, no air pollutants are anticipated. Engine emissions could be anticipated from the proposed SSHCL ground vehicle; however, this vehicle is expected to be a hybrid-electrical one with minimal diesel engine emissions. Therefore, anticipated emissions associated with the SSHCL would remain within emission limits established in WSMR's Title V air permit.

The proposed MTHEL would be a mobile prototype. Emission levels produced by the MTHEL are anticipated to be similar to the existing MTHEL TB and would include DF, tetrafluoromethane, HF, nitrogen, water, and carbon dioxide. A scrubber may also be used to remove chemicals from the exhaust of the proposed MTHEL. It is expected that the emission levels of the proposed MTHEL would also remain within the existing parameters of WSMR's Title V Permit.

The MIRACL laser could be used to simulate ABL operations before the actual ABL is tested at WSMR. The operation of MIRACL at different wavelengths would not change effluents or necessitate significant changes in HELSTF infrastructure. Anticipated emissions would be similar to those described in 4.1.1 for the existing MIRACL and would not impact WSMR's Title V Permit.

The MIRACL laser could also be used to simulate the ATL before the actual ATL is brought to HELSTF for testing. In the event that MIRACL is used, the current use of DF would have to be converted to HF and would result in different wavelengths. It is expected that these changes, while not trivial, would not change MIRACL effluents or cause significant changes in HELSTF infrastructure. Anticipated emissions would be similar to those described in 4.1.1 for the existing MIRACL.

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Other carbon dioxide lasers similar to the PLVTS may also be tested at HELSTF. These lasers would most likely use the same facilities as the PLVTS and have similar testing frequencies. Like the PLVTS, no post scrubbing would be required as the anticipated emissions, including helium, nitrogen, and carbon dioxide, would not significantly impact air quality at HELSTF.

A FEL could be considered for use as a test device at HELSTF, either augmenting or replacing the existing MIRACL laser. This would be feasible only in the long term and only if technology advances in FEL research allow reliable operation of high-power devices well in excess of 100 kW. It is expected that the emission levels from the proposed FEL would be similar to those produced by the existing MIRACL laser and would be included in the current WSMR Title V Air Permit levels.

4.1.2.2 Targets and Flight Testing

Static or dynamic testing of any of the proposed lasers could include tactical rockets, artillery projectiles, aerial drones, and ground targets and would not require additional target impact areas.

Due to the intervals between testing events, target launches associated with each test are discrete events. The prevailing conditions at WSMR lend themselves to the rocket emissions rising and dispersing, causing no overall impact on local air quality. In addition, previous analysis in the HELSTF EA, THEL ACTD EA, and the WSMR Range-Wide EIS for testing events determined that air quality impacts would be short-term and localized.

Ground impacts of targets, whether intact or as debris, may cause a brief puff of fugitive dust. Due to the small amount of dust typically raised and the conditions at HELSTF being favorable to pollution dispersion, no air quality degradation is foreseen from target missiles impacting the ground. Previous analysis also determined that this level of fugitive dust would not cause an impact to regional air quality.

Debris-recovery activities would have no measurable effect on air quality. Emissions due to ground vehicle activity would be minimal, and any effects would be short-term due to dissipation and dilution.

4.1.2.3 Facility Improvements

Some infrastructure improvements at HELSTF would potentially be required for some new activities, or existing facilities would potentially be improved to enhance current activities. Included in these improvements would be a test facility for the proposed FEL, along with an additional electrical substation to accommodate increased power demands for this new laser technology. Also, new sewage lagoons with perimeter fencing would be constructed, replacing existing lagoons. It is anticipated that all would be conducted in accordance with appropriate regulations and permits. Although minor short-term impacts typically associated with construction activities may occur, no exceedances of ambient air quality stands would be anticipated.

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4.1.3 CUMULATIVE IMPACTS

All operations at HELSTF are subject to restrictions imposed by WSMR's Title V Air Permit. This permit establishes specific limits on emissions which may not be exceeded by any combination of actions on WSMR. HELSTF is not expected to cause the emission levels established by this permit to be exceeded. The projected cumulative impacts to air quality due to the Proposed Action would be minimal in nature and would not require a change in WSMR's regulatory status.

4.2 AIRSPACE

The potential impacts to airspace are based on whether activities have the potential to result in an obstruction to air navigation; modification to or new requirements for special use airspace; changes to existing air routes; or additional restricted access to regional airfields and airports.

4.2.1 NO-ACTION ALTERNATIVE

Under the No-action Alternative, potential impacts consist of effects that could occur as a result of current levels of HELSTF program activities. The impacts of these activities have been previously analyzed in the HELSTF EA and THEL ACTD EA (U.S. Army Space and Missile Defense Command, 1998a; b) and are summarized below. Any changes to activities to HELSTF since the 1998 EAs were published are also addressed.

Ongoing laser operations would have the potential to affect current aerial activities within WSMR airspace. The foremost concern involves the potential for permanent eye damage to pilots as a result of exposure from direct or reflected beams. However, as previously mentioned in the HELSTF EA, coordination measures would be taken to minimize or avoid any adverse impacts.

Closure of the restricted airspace above HELSTF laser operations would ensure aircraft are not exposed to laser beams. This closure could have a potential operational impact on Holloman AFB by temporarily affecting approach and departure routes through closing restricted areas that are often used for advanced flight training. However, closures are generally for less than 1 hour, 15 to 20 times each year. In addition, military coordination efforts through prior notices of closure are required from WSMR to inform Holloman AFB. This coordination ensures minimization or avoidance of any adverse effects on aircraft operations.

The illumination of targets by laser operations does not present the potential for the laser beams to affect unrestricted airspace. All targets are positioned within the restricted airspace and no more than 3 miles from the test bed. In the unlikely event that the target should move out of contact with the laser beam, test parameters would ensure the immediate shutdown of the laser beam operation by targeting verification software. Also, through laser test design and safety parameters, beams would not exceed the restricted airspace boundaries at an altitude of less than 60,000 feet.

As stated in the THEL ACTD EA, a limited number of tests have the potential to affect a small portion of the narrow corridor of controlled (class E) airspace located between WSMR R-107B and Fort Bliss R-5103 B and C restricted areas. Laser beams are not anticipated to exceed any

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restricted area that has not previously been cleared of non-participating aircraft. The FAA would provide notice to any potential affected aircraft through a Notice to Airmen in order to clear the airspace. Additionally, as specific test scenarios continue to develop, coordination between with the Deputy for Air Force, WSMR, and the FAA would continue to be essential in the minimization of any potential adverse conflicts of schedule between HELSTF and aircraft operations.

4.2.2 PROPOSED ACTION

The Proposed Action Alternative includes the use of solid state lasers, chemical lasers, and FEL, as well as additional targets and flight testing in conjunction with laser testing, and possible facility improvements.

4.2.2.1 Lasers

Laser activities related to the Proposed Action would have the potential to impact current aerial activities within WSMR airspace. Depending on the individual test design and safety parameters, one or more of the restricted areas would have the potential to be recalled by WSMR. The foremost concern involves the potential for permanent eye damage to pilots as a result of exposure from direct or reflected beams. As mentioned under the No-action Alternative, radar approach control areas above Holloman AFB recalled by WSMR would temporarily affect approach and departure routes by closing restricted areas. However, generally closures exist for less than 1 hour per test. In addition, military coordination efforts through prior notices of closure are required from WSMR to inform Holloman AFB, ensuring minimization of any adverse effects on aircraft operations.

4.2.2.2 Targets and Flight Testing

The foremost concern during lasing activities involves the potential for permanent eye damage to pilots as a result of exposure from direct or reflected beams. However, in the unlikely event that the target should move out of contact with the laser beam, test design and safety parameters would ensure that the laser beam and potential targets would not exceed any restricted airspace at energy levels that could have the potential to result in eye damage or at altitudes less than 60,000 feet. Therefore, eye damage resulting from the exposure to laser beams would be avoided.

4.2.2.3 Facility Improvements

Under the Proposed Action, facility improvements at HELSTF would have no effect on airspace. Thus, no adverse impacts to airspace would occur.

4.2.3 CUMULATIVE IMPACTS

No other airspace activities have been identified in the area that would result in cumulative impacts to aircraft operations when combined with the Proposed Action. The required scheduling process for the use of airspace within restricted areas would preclude the potential for cumulative impacts to existing airspace users. All laser operations would be in airspace that has been cleared of all non-participating aircraft. In the unlikely event that laser beams exceed

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restricted airspace boundaries, laser beams would exist within eye-safe energy levels or at altitudes above 60,000 feet.

4.3 BIOLOGICAL RESOURCES

Typical HELSTF laser tests consist of guided lasing operations, launch of representative targets, and target payload and debris within designated impact areas. The potential exists for impacts to biological resources as a result of noise, laser operation, and debris from these activities. The Proposed Action could include facility improvements such as construction of a new FEL facility, which could impact biological resources. If new launch pads or target impact areas in undisturbed locations are required, additional environmental documentation would be prepared as needed.

4.3.1 NO-ACTION ALTERNATIVE

Potential impacts from the No-action Alternative consist of effects that could occur as a result of current levels of HELSTF program activities. These current activities occur within HELSTF's fenced boundary or nearby on WSMR land supported from HELSTF. These activities are directly involved with the use or production of a high energy laser beam. The impacts of these activities were analyzed in the HELSTF EA and THEL ACTD EA (U.S. Army Space and Missile Defense Command, 1998a; b) and are summarized below. Any changes to activities at HELSTF since the 1998 EAs were published are also addressed.

Continuing activities conducted within HELSTF's fenced boundary are not likely to affect biological resources since the area has little vegetation and thus no substantial wildlife habitat. Wildlife use of the site is limited to transient species such as birds and lizards. No listed plant or wildlife species have been observed at the HELSTF site.

No listed or special-status plants, such as the Todsen's pennyroyal, have been identified at or adjacent to current launch sites or debris impact areas. Fire prevention and suppression plans would continue to be implemented to minimize the potential for impacts to biological resources. Any ground fire would be quickly extinguished, where possible, minimizing impacts to wildlife habitat.

Target launch noise at the launch sites would continue to cause startle effects in wildlife in the immediate and surrounding area; however, these effects would be localized and short-term. No adverse impacts to desert bighorn sheep from prior launch noise have been identified from the use of the Lola launch site, which at approximately 3,940 feet from the San Andres National Wildlife Refuge is the launch site closest to bighorn habitat. Desert bighorn sheep are not likely to be affected by continued activity at HELSTF. The least tern, Mexican spotted owl, and Aplomado falcon are transient or rarely seen and are not likely to be adversely affected by intermittent launch noise or debris. No noise or debris impacts are anticipated to the piping plover or southwestern willow flycatcher, which have not been observed on WSMR, although suitable habitat may be present. The closest habitat for the state endangered White Sands pupfish is approximately 20 miles northwest of the laser site and would not be affected by continuing current HELSTF testing. The potential for debris to land on an individual cactus or

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wildlife species is possible; however, debris landing on an individual plant or animal would not be detrimental to the whole population.

As discussed in the prior EAs, laser light from the lasers used in HELSTF operations has a high potential for causing retinal damage in wildlife even at a considerable distance from the source. No laser beams are operated in such a manner that has the potential to strike the eyes of desert bighorn sheep located in the San Andres National Wildlife Refuge at power levels above 0.1 watts per square centimeter (W/cm^2) (the maximum permissible exposure level for human eye exposure). This is achieved by operating under one or a combination of the following conditions:

- Avoiding azimuths and elevation angles in the direction of bighorn sheep habitat
- Operating at reduced power levels, such that the power level would be below 0.1 W/cm^2 if the laser beam were to strike the eye of a bighorn sheep
- Operating with the beam focused distant enough from bighorn sheep habitat so that beam divergence would result in power levels below 0.1 W/cm^2 if the beam were to strike the eye of a bighorn sheep

The probability of a bird, especially a listed bird species such as the least tern, southwestern willow flycatcher, Mexican spotted owl, piping plover, or Aplomado falcon, flying into or along the beam and being adversely impacted would continue to be considered remote.

MIRACL testing is anticipated to maintain the current testing schedule of six to eight tests per year as analyzed in the HELSTF EA. The MTHEL TB, located approximately 3.4 miles southwest of the main HELSTF complex has been in operation at HELSTF since 1999. During numerous tests at WSMR, the system has successfully engaged tactical rockets and artillery projectiles. The energy of the laser causes intense heating of the target, which causes its warhead to explode. The debris from the target falls quickly to the ground. No adverse impacts have been identified.

LPCL is typically operated for 300 to 600 hours per year. The LDD typically operates 0 to 900 seconds per year. PLVTS would continue to be tested on average of 24 times per year. No impacts to biological resources are anticipated from the continued use of these devices.

4.3.2 PROPOSED ACTION

Enhanced testing at HELSTF could include the use of one or more of several types of existing experimental and conceptual laser systems. Proposed laser systems to be tested at HELSTF can be categorized into three basic technologies: solid state lasers, chemical lasers, and FELs. Various target launches and flight testing as described in section 2.2.3 would be performed in conjunction with laser testing. Facility improvements could also be required.

4.3.2.1 Lasers

The enhanced SSHCL would be located and fired from within the HELSTF fenced boundary, with impacts similar to those identified in the HELSTF and THEL EAs as discussed above. Since the SSHCL is electrically generated, no effluents would be produced onsite.

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Approximately 20 MTHEL tests would be conducted per year, starting in 2009. Testing would occur at the existing HELSTF Limor site with impacts similar to those identified in the HELSTF and THEL EAs as discussed above.

The MIRACL laser may be used to simulate the ABL and ATL before the actual systems are tested at WSMR. Operation of MIRACL at different wavelengths would not change effluents or necessitate significant changes in HELSTF infrastructure. Outside lasing would involve use of both static and dynamic targets and test areas similar to those currently in use. No additional impacts to biological resources are anticipated. Another potential test activity that could be considered for HELSTF includes use of HELSTF assets, such as the SLBD, for tracking targets during actual ABL or ATL engagements with ballistic missile targets with impacts similar to those discussed above.

Other carbon dioxide lasers would most likely have similar testing frequencies and use the same facilities as the PLVTS, which was previously analyzed in the HELSTF EA and is currently being tested at HELSTF. Impacts anticipated to occur to biological resources would be similar to those identified in the PLVTS discussion.

4.3.2.2 Targets and Flight Testing

It is expected that the SSHCL would be tested against static targets located in existing sites with impacts similar to those identified in the HELSTF and THEL EAs. Additional targets would include artillery projectiles, tactical rockets, and aerial drones. The system may also be tested on buried and unburied landmines, and Improvised Explosive Devices.

Potential targets for the ATL would be stationary vehicles and simulated communications towers on or near roads in existing HELSTF test areas, most likely on the existing road between the Laser Systems Test Center and the 2 Kilometer Site. ABL testing is anticipated to have impacts similar to those described above.

Launch activities would take place in previously disturbed areas and generally are not expected to adversely affect plant species. No listed or special-status plants, such as the Todsen's pennyroyal, have been identified in areas at or adjacent to the launch sites or impact areas. The use of existing sites would allow launches in areas where much of the vegetation has previously been disturbed or removed. The small amount of foraging habitat that could potentially be removed by program activities would not result in jeopardy to the continued existence of any listed species. The potential for debris to land on an individual cactus or wildlife species is possible; however, debris landing on an individual plant or animal would not be detrimental to the whole population. Fire prevention and suppression plans would continue to be implemented. Any ground fire would be quickly extinguished, where possible, minimizing impacts to vegetation remaining in the area. As discussed above, target launch noise at the launch sites could potentially cause startle effects in wildlife in the immediate and surrounding area; however, these effects would be localized and short term.

4.3.2.3 Facility Improvements

The FEL testing may potentially require a new test facility. This facility could be built on an existing gravel parking lot that is adjacent to the MIRACL Pressure Recovery System. The area

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would be approximately 1 acre and has been disturbed during previous construction projects. An additional electrical substation may be required to accommodate increased power demands for this new laser technology. New sewage lagoons with perimeter fencing would be constructed, replacing existing lagoons. No impacts to biological resources are anticipated since the area is previously disturbed with little vegetation and thus provides no substantial wildlife habitat.

No species that would be particularly sensitive to the construction-generated noise are expected to occur in the affected area. The bighorn sheep located approximately 7 miles west of the proposed construction areas are not likely to be adversely affected by construction noise. An effort would be made to dig trenches in sections so that cable could be buried the same day. Any trapped wildlife would be moved to a safe location away from the construction. All electrical poles would be designed to minimize the possibility of avian electrocution. All wiring would be grounded and any necessary guywires would be marked for visibility.

4.3.3 CUMULATIVE IMPACTS

Impacts from HELSTF testing programs, when added to the impacts described and analyzed in the WSMR Range-Wide EIS and other WSMR environmental documents, include target or target debris impacts; repetitive reentry into debris recovery areas; noise effects of launches and debris recovery equipment; and emissions from missile and laser testing. Cumulative impacts have been identified to biological resources particularly, but not exclusively, associated with debris recovery operations. Several mitigations were proposed in the WSMR Range-Wide EIS to minimize individual project impacts as well as cumulative impacts. Activities are planned to avoid wetlands and adjacent areas when possible. Locations and types of wetlands within project areas are determined and WSMR requests reviews by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency for Section 404 permit applicability and certification. No wetlands are expected to be affected by the Proposed Action. Surveys are undertaken for threatened and endangered species. A Geographic Information System is used to assist in the selection of preferred and alternative sites that minimize adverse consequences to sensitive resources. Potential adverse impacts to these resources are then reviewed in NEPA documentation tiered to the WSMR Range-Wide EIS. Plant and wildlife surveys have been completed for areas that could potentially be affected by the Proposed Action, and no threatened or endangered species except those described above were identified.

To meet minimum environmental protection requirements under NEPA and the Endangered Species Act, proposed entry routes into debris recovery areas would continue to be selected to minimize the potential for adverse effects. Range Personnel would be instructed concerning the prohibition of taking, collecting, harassing, or otherwise injuring protected species. The debris recovery activities would be coordinated with WSMR and any applicable agencies to avoid or reduce the potential for cumulative impacts.

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4.4 CULTURAL RESOURCES

Typical HELSTF laser tests consist of guided lasing operations, launch of representative targets, and target payload and debris within designated impact areas. As specified in the HELSTF EA, activities that could result in direct or indirect impacts on cultural resources include: (1) direct impacts due to missile or missile debris that could potentially disturb surface and subsurface remains, resulting in the loss of valuable spatial information; or direct laser impacts either to a cultural resource or resulting in fires; (2) raw missile fuel or fuel fires could contaminate soils, reducing the potential for obtaining accurate radiometric information valuable for determining dates of occupation; (3) debris recovery or firefighting efforts within impact areas could result in ground disturbance that could have the potential for damaging both surface and subsurface cultural remains; (4) construction efforts associated with the modification of existing facilities, or the building of new facilities; or (5) unauthorized removal of cultural artifacts. Effects to cultural resources are generally lessened or prevented by avoidance (travel only on the existing roads). No new target impact areas would be required for HELSTF laser testing.

4.4.1 NO-ACTION ALTERNATIVE

Under the No-action Alternative, the same laser test activities that currently occur at HELSTF and that were previously analyzed in the HELSTF EA and the THEL ACTD EA would continue. Any changes to activities at HELSTF since these EAs were published are also addressed. No additional enhanced laser activities would occur at HELSTF.

Continuing activities conducted within HELSTF's fenced boundary are not likely to affect cultural resources, since the area is asphalted or previously disturbed; moreover, no traditional cultural resources, nor cultural resources that are NRHP-listed or listed on New Mexico's State Register of Cultural Properties have been observed at the HELSTF site. Per WSMR's *Integrated Cultural Resources Management Plan*, March 2002, the majority of WSMR's cultural sites are surface sites; disturbed areas are generally considered free of cultural resources. Other onsite activities are not directly involved with the use or production of high-energy laser beams. These activities are not potentially destructive, and may have potential impact on only a limited environment. These activities are strictly controlled, and thus have the lowest level of environmental concern.

Laser activities would continue to take place within a fenced concrete pad area; thus, no adverse effects to cultural resources are expected as a result of laser facility operations.

Current plans indicate the MIRACL testing schedule would maintain the current level of six to eight annual tests. The chances of any impact on cultural resources from MIRACL-related activities would therefore be the same as previously analyzed in the HELSTF EA.

The MTHEL TB has been in operation at HELSTF since 1999. During several tests at WSMR, the system has successfully engaged tactical rockets and artillery projectiles. The energy of the laser causes intense heating of the target, which causes its warhead to explode. The debris from the target falls quickly to the ground. According to the THEL ACTD EA, no adverse impacts to cultural resources have been identified.

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Activities involving the LPCL, LDD, and PLVTS are strictly controlled, and have the lowest level of environmental concern; under the No-action Alternative, the chances of any impact on cultural resources would remain minimal.

4.4.2 PROPOSED ACTION

Enhanced testing at HELSTF could include one or more of several types of existing experimental and conceptual laser systems. This section will describe these systems and their intended battlefield targets. Proposed laser systems to be tested at HELSTF can be categorized into three basic technologies: solid state lasers, chemical lasers, and FELs. Additionally, target and flight testing in conjunction with laser testing and possible facilities improvements could be performed.

4.4.2.1 Lasers

The SSHCL would be located and fired from Test Cell 4 within the HELSTF fenced boundary. It is expected that the SSHCL would be tested against targets located in Test Cell B, the 500 Meter Site and the 2 Kilometer Site, all located within HELSTF boundaries. These sites are currently in use, with impacts similar to those identified in the HELSTF and THEL EAs. These activities are consistent with those currently being conducted at HELSTF; therefore, impacts to cultural resources would not occur.

Beginning in 2009, some 20 MTHEL mobile prototype tests would be conducted annually. This testing would occur at the HELSTF Limor site, although other sites could potentially be chosen based on the system's testing requirements. Per the THEL EA, the Limor site has previously been surveyed for the presence of cultural resources, and no such sites were located. Therefore, no impacts to cultural resources are expected from the increased testing at the Limor site.

As mentioned previously, neither traditional cultural resources, nor cultural resources that are NRHP-listed or listed on New Mexico's State Register of Cultural Properties have been observed within the immediate area of HELSTF facilities.

The MIRACL laser may be used to simulate the ABL before the actual ABL is tested at WSMR. As discussed in the No-action Alternative, no impacts to cultural resources would be anticipated.

No new impacts are anticipated from low-power testing of the ATL at HELSTF as potential targets (e.g., vehicles and simulated communications towers) would be located on or near roads within existing HELSTF test areas.

Other carbon dioxide lasers would likely use the same facilities, and have the same impacts, as the PLVTS (previously analyzed in the HELSTF EA and currently being tested at HELSTF) and thus have similar testing frequencies. No impacts on cultural resources would occur.

4.4.2.2 Targets and Flight Testing

In most cases, HELSTF-related target launch sites are located on already established and utilized areas as described in the *WSMR Range-Wide EIS*, 1998, the THEL ACTD EA, 1998,

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and the HELSTF EA, 1998. Since neither construction nor ground disturbance would be required for existing launch sites, no cultural resources surveys are required. Targets and flight testing would produce no impacts on cultural resources.

Any new launch areas utilized in laser operations and testing activities may require a survey for cultural resources. Some launches would occur from launch vehicles parked on existing dirt roads and trails. Launches from this type of site would require an Explosive Launch Permit from the WSMR Environmental Office. Appropriate archaeological surveys would be conducted prior to the issuance of the Explosive Launch Permit.

Successful flight testing would result in targets falling into designated debris impact areas. However, the very nature of flight testing makes the exact impact point difficult to predict accurately, and there is a remote possibility that missile debris could land on a cultural resource. Although the probability of debris striking the ground where surface or subsurface cultural resources are located is extremely remote, an archaeological monitor would be included on the debris recovery team to assist in the selection of an entry path, ensure that no inadvertent impacts arise from the recovery of missile debris, and that any cultural resources are avoided. A single access road to each recovery site would be marked, rubber-tired vehicles would be used to locate the debris, and impact sites would be entered and exited in single file. All actual retrieval would be routine. Off-road travel during debris recovery would be kept to a minimum.

For some laser tests involving longer-range artillery rocket targets, launches from Fort Bliss's McGregor Range would be required. Launches of large artillery rockets were previously analyzed in the *Fort Bliss Texas and New Mexico, Mission and Master Plan Programmatic EIS,* December, 2000. Only established launch points would be used at Fort Bliss.

Should avoidance measures fail and an inert missile directly impacts an archaeological site, the missile would likely be left in place to avoid the ground disturbance impacts associated with debris recovery. This would be determined through consultation with the New Mexico State Historic Preservation Office. As discussed in Section 3.4, previous cultural surveys within the immediate HELSTF area revealed no cultural resources present and there are no Natural Historic Landmarks, National Natural Landmarks, or National or State Register-listed cultural properties within the ROI. A live missile could impact an archaeological site and cause serious adverse effects, but given the scarcity of known sites in the immediate area, and the unlikely event of an errant missile striking an unknown cultural resource, the possibility is considered extremely remote. However, if such an event occurred , a damage assessment would be conducted and coordinated with the New Mexico State Historic Preservation Office.

4.4.2.3 Facility Improvements

As stated, certain improvements or amendments to HELSTF infrastructure would potentially be required to enhance current activities or to facilitate new activities. The FEL's higher power requirements could require the construction of a new substation, if the current proves inadequate, as well as a potential new building for the laser. Additionally, new sewage lagoons with perimeter fencing would be constructed, replacing existing lagoons.

In the event of any new ground disturbance, a cultural resources survey could be required. However, that event is unlikely, as construction of the FEL building, substation, and new

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sewage lagoons would take place within previously disturbed areas. Therefore, no impacts to cultural resources are anticipated.

4.4.3 CUMULATIVE IMPACTS

Cultural Resource impacts from HELSTF Enhanced Laser and Ranger Operations testing programs, when added to the impacts described and analyzed in the HELSTF EA and the THEL ACTD EA, include missile or missile debris impacts; repetitive use of entryways into missile- or missile debris recovery areas; compaction and surface pressure from the recovery team and equipment affecting fragile resources (for example, ceramics); and unauthorized artifact collection. Cumulatively these types of impacts have the potential to adversely affect cultural resources; however, following the current SOPs, the potential for cumulative impacts would be reduced.

To meet minimum environmental protection requirements under NEPA and related cultural resources legislation, proposed entry routes into debris recovery areas would continue to be selected to minimize the potential for adverse effects. Range personnel would be instructed concerning the prohibition of collecting (pothunting) or otherwise damaging cultural resources. Debris recovery activities would be coordinated with WSMR and any applicable agencies to avoid or reduce the potential for cumulative impacts.

4.5 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

This section addresses potential environmental impacts caused by changes to the hazardous materials and hazardous waste environment due to the continuing No-action Alternative or the Proposed Action.

4.5.1 NO-ACTION ALTERNATIVE

Potential impacts from the No-action Alternative consist of effects that could occur as a result of current levels of HELSTF program activities. These current activities occur within HELSTF's fenced boundary or nearby on WSMR land supported from HELSTF. These activities are directly involved with the use or production of a high energy laser beam. The impacts of these activities were analyzed in the HELSTF EA and THEL ACTD EA (U.S. Army Space and Missile Defense Command, 1998a, b) and are summarized below. Any changes to activities to HELSTF since the 1998 EAs were published are also addressed.

HELSTF approved a Hazardous Material Management Policy (U.S. Army Space and Missile Defense Command, 2003b), which details the responsibility of every individual, including the HELSTF Director, the HELSTF Environmental and Safety Manager, HELSTF individuals, and contractors. The Hazardous Material Management Policy has requirements for issuing, controlling, storing, and disposing of hazardous material. As an enhancement to the Hazardous Material Management Policy, HELSTF would occasionally evaluate the existing industrial processes and systems to reduce the existing hazardous materials that are used in an effort to avoid, reduce, mitigate, or eliminate the use of hazardous material and the generation of solid or hazardous waste.

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Table 4-3 lists the hazardous materials used by MIRACL, LDD, PLVTS, LPCL, and MTHEL TB.

Table 4-3: Hazardous Material Used by Laser

Laser	Hazardous Material	Average Amount Used Per Run (pounds)
MIRACL	Deuterium	35
	Fluorine	1
	Ethylene	10
	Nitrogen trifluoride	840
LDD	Deuterium	0.036 per second
	Ethylene	0.017 per second
	Fluorine	0.19 per second
PLVTS	None	None
LPCL	Deuterium	1.8
	Sulfur hexafluoride	130
	Oxygen	25
MTHEL TB	Deuterium	200
	Ethylene	550
	Nitrogen trifluoride	4,100
	71 to 85 percent hydrogen peroxide	20,000

Source: U.S. Army Space and Missile Defense Command, 1998a;b

Appendix A of the Integrated Contingency Plan, the Hazardous Chemical Spill/Release Response Plan, details responsibility, outlines personnel duties, and provides resources and guidelines for use in control, clean-up, and emergency response for any spills of hazardous materials or wastes at HELSTF. (U.S. Army Space and Missile Defense Command, 2003c)

All routine hazardous wastes generated at HELSTF are managed in temporary less than 90-day accumulation sites. Each site is emptied weekly by the HELSTF Hazardous Waste Contractor, and the waste is transferred to hazardous waste management facilities at WSMR. Non-routine and large quantity one-time wastes are managed as needed by the hazardous waste contractor. No long term storage of hazardous waste occurs at HELSTF. (Reynolds, 2004)

The primary byproduct of environmental concern produced by the MIRACL is DF, which is chemically equivalent to HF. The DF, which is gaseous, makes up a part of the MIRACL exhaust. The exhaust is chemically scrubbed to remove the hazardous nature of the fluoride. Accumulated after each run is sodium fluoride, consisting of approximately 1 percent sodium hydroxide, which is corrosive. The system is designed for no less than 85 percent of the DF to be removed from the exhaust by the scrubber (U.S. Department of the Army, 1995). However, emission testing has not previously detected DF in the exhaust following scrubbing.

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The resulting sodium fluoride solution is accumulated onsite in a tank that circulates the solution repeatedly until disposal is required. The sodium fluoride solution is disposed of in two ways. The method currently used due to a tank maintenance problem is to accumulate the sodium fluoride solution along with the sodium hydroxide and have it transported and disposed of by a licensed hazardous waste handler. Disposal occurs after every six to eight lasing events and includes approximately 20,000 gallons of untreated DF solution.

The previously used method is to treat the solution with lime to generate a non-hazardous solid waste, a calcium fluoride sludge commonly known as fluorspar. Thus, the potentially hazardous fluorine from the DF is chemically transformed into a non-hazardous form. Approximately 1,390 pounds of fluorspar sludge are produced for every MIRACL run. The fluorspar-water mixture is discharged into an open concrete bed, where the fluorspar settles to the bottom and the water evaporates. Fluorspar is disposed of, as necessary, through WSMR, using established WSMR solid waste management procedures.

The test bed version of the MTHEL would continue to produce similar hazardous materials and hazardous waste as analyzed in the THEL ACTD EA. These are similar to the MIRACL with the exception of a hydrogen peroxide feed system and the use of hydrogen instead of fluorine. The hydrogen peroxide system would continue to require the use of a 71- to 73-percent hydrogen peroxide solution, pressurized nitrogen, and pressurized helium. Handling, storage, and use of these hazardous materials would continue to be done in accordance with the existing MTHEL Hydrogen Peroxide Management Plan and MTHEL Test Bed Laser Subsystem Hydrogen Peroxide Transfer Procedure.

In addition, the residual, off-specification and decomposing hydrogen peroxide used for the test bed version of the MTHEL must be safe for handling, transfer or disposal. This hydrogen peroxide must be reduced (by a concentration of dilution or normal decomposition) to less than 5 percent concentration by weight prior to transfer out or before additional hydrogen peroxide can be added to the run tank. This reduction of hydrogen peroxide concentration is performed to ensure that the process continues to operate without generating a hazardous waste. (Northrop Grumman Space Technology, 2002)

Operation of the LPCL would continue as previously analyzed, and would not impact the use, storage, transportation, or disposal of hazardous materials at HELSTF. However, the emission scrubber system of the LPCL has been changed and improved since the 1998 HELSTF EA. The new system allows the HF to be collected and sent to a temporary less than 90-day accumulation site for proper disposal.

The chemicals previously analyzed for the LDD—helium, nitrogen, ethylene, deuterium, and fluorine—would continue to be used at HELSTF. Hydrogen has been added as part of the new HF optics; it is anticipated this will not significantly increase the hazardous material levels at HELSTF. Currently the LDD is not in use. If the LDD is not reactivated, there would be a decrease in the amount of hazardous materials used. In the event the LDD is reactivated, new emission scrubbers would be installed. The LDD could potentially return to its previous capacity. In the event the LDD is updated and put back into use, hazardous wastes would be as previously analyzed and would not impact the levels of hazardous wastes produced by HELSTF.

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Operation of the PLVTS would continue as described previously with the exception of the Pulse-Forming Network. Previously, the excess or contaminated Pulse Forming Network oil and minerals were disposed of through the HELSTF hazardous waste collection and disposal system. Currently a coalescing filter separates the oil and the oil is reused; therefore there is a minor decrease in hazardous waste generated. Operation of the PLVTS would not impact the use, storage, transportation, or disposal of hazardous materials at HELSTF.

Current operation of the APT requires the use of aircraft hydraulic fluid. The hydraulic fluid is continually cleaned and cooled as it circulates through the system. Only during maintenance procedures does any of the hydraulic fluid escape and require cleanup with paper towels. These towels are disposed of through the HELSTF hazardous waste collection/disposal. Previously analysis determined that operation of the APT would not impact the use, storage, transportation, or disposal of hazardous materials at HELSTF.

The HELSTF Chemistry Laboratory performs quality control analysis of the fluids used at HELSTF as well as a wide variety of analyses in support of test operations, customer requests, and environmental and safety tasks. Previous analysis in the HELSTF EA and the THEL ACTD EA determined the activities at the Chemistry Laboratory would not increase the hazardous materials used or hazardous waste produced at HELSTF.

Hazardous materials typically used for HELSTF support activities (as listed in section 2.1.14) would include solvents, paints, lubricants, oils, and similar materials. Handling, storage, and use of these materials would continue to be done in accordance with the existing HELSTF Hazardous Material Management Policy, and any generation of hazardous waste would follow the HELSTF Hazardous Waste Management Plan.

4.5.2 PROPOSED ACTION

The Proposed Action Alternative includes the use of solid state lasers, chemical lasers, and FEL, as well as additional targets and flight testing in conjunction with laser testing, and possible facility improvements.

4.5.2.1 Lasers

The SSHCL would require lithium ion batteries to be powered. It is not anticipated that these batteries would be replaced once brought to HELSTF; however, in the event that the lithium ion batteries would require disposal, they would be managed as needed by the hazardous waste contractor at HELSTF. Other hazardous materials or hazardous waste is not anticipated.

The use of a mobile prototype MTHEL would include the use of the following hazardous materials: ethylene, nitrogen trifluoride, deuterium, helium, liquid oxygen, and JP-8 fuel. It is anticipated that the levels of these materials used would be similar to the previously described MTHEL TB and would not significantly increase the hazardous material levels at HELSTF. The MTHEL mobile prototype would also produce hazardous waste if a scrubber is used to clean potential emissions. The levels of hazardous wastes anticipated would also be similar to those of the MTHEL TB and would be handled in accordance with guidelines set in the HELSTF Hazardous Waste Management Plan.

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generation facilities, with no impacts on power resources. No impacts to electricity levels, capacity, or capability are expected (Reynolds, 2004c).

Due to increased personnel and activity levels, water usage, and wastewater and solid waste production would increase slightly, but these levels would not overload the HELSTF infrastructure. The current resources are sufficient to meet the demands of targets and flight testing activities. Targets and flight testing activities, therefore, would have little or no impact on current water, wastewater, or solid waste handling capacity or levels.

Targets and flight testing activities would require the movement of personnel outside and within WSMR. Thus the Proposed Action would cause a slight increase in traffic levels on WSMR range roads. These roads have restricted access and current traffic levels are low. Transient personnel attending the Proposed Action would add very little to these current traffic volumes. There would be little or no impact on existing roads, either within or outside WSMR.

4.7.2.3 Facility Improvements

Certain infrastructure improvements at HELSTF would potentially be required for some new activities, or existing facilities would potentially be improved to enhance current activities. For example, the FEL's higher power requirements could require the construction of a new substation, if current facilities prove inadequate. While construction would result in an increase in demand placed upon on HELSTF infrastructure, the limited duration of construction would produce no lasting effect; in addition, such construction would increase the capacity of available electric distribution within the area.

An associated FEL building, if required, would be connected with HELSTF's established power, water, and wastewater lines. Any new power lines at WSMR are subject to updated guidelines for the protection of birds of prey from injury and death from electrocution. The addition of a new substation would have a positive impact on electrical capacity at HELSTF.

Additionally, new sewage lagoons with perimeter fencing would be constructed, replacing existing lagoons. It is anticipated that the capacity of the proposed lagoons will not exceed the combined current wastewater demands (Reynolds, 2004b). Potential impacts to current water, water, or solid waste handling capacity would not be expected. Due to increased personnel utilized for facility improvements, water usage, wastewater and solid waste production would likely increase slightly, but these levels would not overload the HELSTF infrastructure. The current resources are sufficient to meet the demands of facilities improvement activities. As referenced in section 4.7.2.1, adequate supply exists for increased personnel levels. Such activities, therefore, would have little or no impact on current water, wastewater, or solid waste handling capacity or levels.

Facility improvements at HELSTF would require the movement of personnel outside and within WSMR. The WSMR road network comprises low-usage range roads. The scale of facility improvement activities is relatively small and would have little or no impact on existing roads, either within or outside WSMR.

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4.7.3 CUMULATIVE IMPACTS

Proposed activities are compatible with ongoing test programs and procedures at HELSTF. No impacts on infrastructure within the HELSTF ROI are expected to occur as a result. The addition, on a transient basis, of program-specific personnel would make little or no impact on the local community and would increase road traffic minimally, with little or no degradation of roads or increase in travel times.

When added to the existing impacts as described and analyzed in the HELSTF and THEL ACTD EAs, cumulative infrastructure and transportation impacts are anticipated to be minimal or nonexistent.

4.8 WATER RESOURCES

Water resources within the ROI could potentially be affected by HELSTF operations, construction activities, accidental spills of hazardous materials, and target impact and debris recovery areas.

4.8.1 NO-ACTION ALTERNATIVE

Potential impacts from the No-action Alternative consist of effects that could occur as a result of current levels of HELSTF program activities. These current activities occur within HELSTF's fenced boundary or nearby on WSMR land supported from HELSTF. These activities are directly involved with the use or production of a high energy laser beam. The impacts of these activities were analyzed in the HELSTF EA and THEL ACTD EA (U.S. Army Space and Missile Defense Command, 1998a; b) and are summarized below. Any changes to activities to HELSTF since the 1998 EAs were published are also addressed.

Under the No-action Alternative water usage would not increase at HELSTF. Since it is estimated that each MIRACL test uses approximately 110,000 gallons of water primarily for steam generation, water usage at HELSTF corresponds primarily to the number of MIRACL tests. Based on the total number of laser tests analyzed in the HELSTF EA and THEL ACTD EA, water usage was approximately 17.6 million gallons per year. Under the No-action Alternative, water usage would be expected to remain the same, and therefore would be unlikely to affect the water availability or water quality.

Potential impacts to surface water and groundwater resulting from accidental spills of hazardous materials during HELSTF operations or target debris recovery would be minimized as activities would follow all standard operating procedures involving spill prevention, control, cleanup, and emergency response measures. Moreover, compliance with the New Mexico Water Quality Act and the Clean Water Act would protect the quality of surface water and groundwater during HELSTF related activities.

Little if any changes to the surface drainage would occur from debris recovery. Potential target debris would be recovered in accordance with WSMR Regulation 70-8, Security, Recovery, and Disposition of Classified and Unclassified Test Material Impacting On and Off Range. Impacts to the soil from debris recovery or fire containment would be minimized by following various

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standard operating procedures, which include but are not limited to: using existing roads to the maximum extent possible, traveling single file to the recovery site, restricting recovery efforts in areas with wet or saturated soil, and utilizing an environmental monitor to accompany the recovery team to ensure minimal impact to vegetation.

4.8.2 PROPOSED ACTION

The Proposed Action Alternative includes the use of solid state lasers, chemical lasers, and FEL, as well as additional targets and flight testing in conjunction with laser testing, and possible facility improvements.

4.8.2.1 Lasers

Possible impacts exist resulting from the potential overdraft of fresh water aquifers causing declining water tables and degraded water quality. However, based on the anticipated number of tests and minimal water demand by the proposed new laser systems, the total HELSTF usage would not increase under the Proposed Action. Thus, the proposed activities would not be expected to affect the water availability or water quality. In addition, monitoring of water levels and water quality sampling at the MAR wells would continue and preclude significant effects on the aquifer.

All tests are designed to avoid the only perennial surface water body within the ROI, Lake Lucero. Although a potential impact to water resources could occur in the event of an accidental fuel spill, potential target debris or fluids coming in contact with groundwater resources, fluids would be rapidly buffered by the desert soil minimizing any significant adverse effects. Also, all activities would follow standard operating procedures involving spill prevention, control, cleanup, and emergency response measures. Accordingly, any potential impacts to surface water and groundwater would be significantly minimized or entirely avoided.

4.8.2.2 Targets and Flight Testing

All target impacts and/or debris occurring as a result of laser operations would generally be of nominal concern at WSMR in regard to its potential to adversely affect a water resource. Potential target debris would be recovered in accordance with WSMR Regulation 70-8, *Security, Recovery, and Disposition of Classified and Unclassified Test Material Impacting On and Off Range*. In addition, impacts to water resources from debris recovery efforts or fire containment would be minimized by following standard operating procedures.

4.8.2.3 Facility Improvements

All potential construction activities would utilize standard operating procedures to curtail any potential dust generation and erosion during construction. For dust suppression and site preparation, only minimal water requirements would be necessary. Water provisions would be supplied by HELSTF main installation area. No significant impacts to the water supply are expected to be produced as a result of the construction water requirements. In addition, through maintaining effective grading and drainage controls, impacts due to erosion from construction would not occur.

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4.8.3 CUMULATIVE IMPACTS

The Proposed Action is not expected to combine with related past, ongoing, or reasonably foreseeable actions to cause any substantial cumulative impacts to water resources. While water supply sources are a critical concern throughout the Tularosa Basin and in many areas of WSMR, monitoring of water levels and water quality sampling at the MAR wells would continue and preclude significant effects and prevent any unforeseeable impacts.

4.9 CUMULATIVE IMPACTS

The Proposed Action would consist of developing and further enhancing the capability to conduct laser testing at HELSTF through the testing of one or more of the new laser technologies or completion of any of the new range operations described in the Proposed Action section 2.2. Proposed HELSTF activities, in combination with past, current, and foreseeable future activities, such as the Motor Deflagration and Rupture Effects on Payloads Program (MUDPACK), would not be expected to result in cumulative impacts. MUDPACK would use the PLVTS laser or other existing HELSTF laser systems for static testing. A standalone environmental assessment is being prepared to address the MUDPACK activities and is expected to be completed in Spring 2005. Additionally, potential military training exercises could be performed in the vicinity of HELSTF and would require program coordination.

The Proposed Action would not contravene any WSMR permit restrictions or air quality regulatory status. In addition, due to the intervals between discrete testing events, emission products would be dispersed further minimizing the potential for impacts to air quality, biological resources, and public health and safety. Using the required scheduling process for the use of airspace within the restricted areas would preclude the potential for cumulative impacts to existing airspace users. No significant cumulative impacts to biological resources or cultural resources have been identified as a result of prior or current HELSTF related activities and no cumulative impacts are expected as a result of the Proposed Action. Any potential increase in hazardous materials and hazardous waste would not be expected to cause cumulative impacts to hazardous material or hazardous waste management as management practices and procedures are implemented during all phases of operation. Adherence to the high safety standards at HELSTF would serve to keep any cumulative safety impacts attributable to all HELSTF operations within acceptable standards to both workers and the public. Additional demands on electrical, wastewater, solid waste, and water systems to support program specific personnel are expected to be within the current infrastructure capacity of HELSTF. Adherence to established hazardous waste and spill prevention procedures and both monitoring of water levels and water quality sampling of the MAR wells would preclude the potential for cumulative impacts to water resources.

4.10 ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

Adverse environmental effects that cannot be avoided include the release of small amounts of pollutants into the atmosphere; minor noise impacts on wildlife; short-term impact to vegetation; minor increased generation of hazardous materials; and increased noise levels at program-related sites. However, through implementation of the program actions described within this

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document, these effects would be minimized. Overall, no significant individual or cumulative adverse environmental impacts are anticipated to result from the No Action or Proposed Action alternative.

4.11 CONFLICTS WITH FEDERAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AREA CONCERNED

All of the proposed program activities would take place in existing facilities and at dedicated laser and missile testing locations on DoD installations. These activities would not alter the uses of the sites, which were used in the past or are currently used to support laser and missile testing. No conflicts with land use plans, policies, and controls would be anticipated.

4.12 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Anticipated energy requirements of the HELSTF activities would be well within the energy supply capacity of all facilities. Energy requirements would be subject to any established energy conservation practices at each facility.

4.13 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

The proposed activities would result in no loss of threatened or endangered species, and no loss of cultural resources such as archaeological or historic sites. Moreover, there would be no changes in land use or preclusion of development of underground resources that were not already precluded.

The amount of materials required for any program-related activities and energy used during the project would be small. Although the proposed activities would result in some irreversible or irretrievable commitment of resources such as various metallic materials, minerals, and labor, this commitment of resources is not significantly different from that necessary for many other defense research and development programs carried out over the past several years. Proposed activities would not commit natural resources in significant quantities.

4.14 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Proposed HELSTF activities would take advantage of existing facilities and infrastructure. The proposed upgrades to these facilities or locations would not alter the uses of the sites, which were or are to support laser facilities and testing. Therefore, the Proposed Action does not eliminate any options for future use of the environment for the locations under consideration.

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4.15 NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL

Other than various structural materials and fuels, the program would require no significant natural or depletable resources.

4.16 FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS (EXECUTIVE ORDER 12898)

Proposed activities would be conducted in a manner that would not substantially affect human health and the environment. This EA has identified no effects that would result in disproportionately high or adverse effect on minority or low-income populations in the area. The activities would also be conducted in a manner that would not exclude persons from participating in, deny persons the benefits of, or subject persons to discrimination because of their race, color, national origin, or socioeconomic status.

4.17 FEDERAL ACTIONS TO ADDRESS PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS (EXECUTIVE ORDER 13045, AS AMENDED BY EXECUTIVE ORDER 13229)

This EA has not identified any environmental health and safety risks that may disproportionately affect children, in compliance with Executive Order 13045, as amended by Executive Order 13229.

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7.0
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7.0 AGENCIES AND INDIVIDUALS CONTACTED

Missile Defense Agency

State of New Mexico
- Department of Game and Fish
- Energy, Minerals, and Natural Resources Department
- Environment Department

U.S. Army Air Defense Center and Fort Bliss
- Directorate of Environment

U.S. Army Space and Missile Defense Command
- HELSTF Directorate

U.S. Department of Agriculture
- Forest Service

U.S. Department of the Interior
- Director, Office of Environmental Policy and Compliance

U.S. Fish and Wildlife Service

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- SFIM-SW-WS-EF-C

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APPENDIX A
DISTRIBUTION LIST

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New Mexico Department of Game and Fish
Santa Fe, New Mexico

New Mexico Energy, Minerals, and Natural
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Santa Fe, New Mexico

New Mexico Environment Department
Santa Fe, New Mexico

U.S. Army Air Defense Center and Fort Bliss
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ATTN: ATZC-DOE-C
Fort Bliss, Texas

U.S. Army Space and Missile Defense Command
HELSTF Directorate, SMDC-AC-H
White Sands Missile Range, New Mexico

U.S. Department of Agriculture, Forest Service
Magdalena, New Mexico

Director, Office of Environmental Policy and Compliance
U.S. Department of the Interior
Washington, D.C.

U.S. Fish and Wildlife Service
Albuquerque, New Mexico

White Sands Missile Range
SFIM-SW-WS-EF-C
White Sands Missile Range, New Mexico

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APPENDIX B
CORRESPONDENCE

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CORRESPONDENCE

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APPENDIX C
RELATED NEPA DECISION DOCUMENT

HIGH ENERGY LASER SYSTEMS TEST FACILITY (HELSTF) ENVIRONMENTAL ASSESSMENT

UNITED STATES ARMY SPACE AND MISSILE DEFENSE COMMAND

AGENCY: U. S. Army Space and Missile Defense Command (USASMDC)

ACTION: Finding of No Significant Impact

BACKGROUND: Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 CFR 1500-1508), Department of Defense Directive 6050.1, and Army Regulation 200-2, the USASMDC has conducted an Environmental Assessment (EA) of the potential environmental consequences of the HELSTF program activities at White Sands Missile Range, New Mexico.

HELSTF is the Department of Defense National Test Range for high energy laser device testing which began in 1985. The facility also tests laser lethality, damage and vulnerability for a broad spectrum of U.S. Government, industry, foreign government, research and academic institutions. Among the activities supported by HELSTF are: the Ballistic Missile Defense Organization (BMDO) and its predecessor organization, the Strategic Defense Initiative Organization, the Department of Defense, and the National Aeronautics and Space Administration (NASA). The HELSTF program represents a national investment of approximately $800 million in high energy laser research and technology. Continued research, development, testing and evaluation of new and existing laser technology is necessary in order for the United States to remain economically and technologically competitive. National defense also requires that foreign laser technology be evaluated for threats to U.S. and Allied military forces, and that potential military applications of existing and emerging laser technologies be assessed.

DESCRIPTION OF THE PROPOSED ACTION: The purpose of the proposed Army action is to moderately increase the level of on-site laser activities, other on-site activities, and off-site activities at HELSTF. This moderately increased activity level would be characterized by the following:

- continued Nautilus program testing at HELSTF for both on-site static tests and off-site dynamic tests;
- the addition of Tactical High Energy Laser (THEL) program activities at HELSTF, which would consist of minor construction and the tracking of dynamic targets;
- adding the Apache, Checker, Chuck, Geri, and Laura sites to the Lola site for the delivery (e.g., by launch) of representative threat targets;
- up to approximately 25 targets (or their debris) would fall into the Nautilus Impact Area (NIA) per year;
- a general increase of HELSTF activities by approximately 150 percent, with, for example, the MIRACL being operated 15 to 20 times per year.
- an increase in HELSTF personnel to approximately 600 full-time staff with the addition of 20 to 50 program personnel during program tests;

- program tests occurring approximately 15 to 20 times per year.

The Proposed Action by the Army would occur within the HELSTF's normal areas of operation at the White Sands Missile Range (WSMR), New Mexico.

ALTERNATIVES CONSIDERED: In addition to the Proposed Action Alternative, the HELSTF EA considers a No Action Alternative and a High Level of Activity Alternative. The No Action Alternative considers continuation of on-site laser, other on-site, and off-site activities at HELSTF at the current level of intensity and frequency. This includes six to eight MIRACL runs per year, the impact of up to approximately 10 targets (or their debris) into the NIA per year, approximately 250 full-time staff, and continued Nautilus program testing. The No Action Alternative, however, does not consider discontinuation of laser testing activities at HELSTF.

The High Level of Activity Alternative would include all the activities of the Proposed Action Alternative, but at even higher levels of intensity and frequency. This would include 30 to 50 MIRACL runs per year, the impact of up to approximately 150 targets (or their debris) into the NIA per year, approximately 1,500 full-time staff, and the simultaneous occurrence of four or more testing programs similar to Nautilus.

A number of alternative actions were examined but were eliminated from further consideration due to operational or technical considerations. Evaluation of closure or realignment of HELSTF was not carried forward due to the unique laser testing capabilities that exist at HELSTF and are not available elsewhere in the nation.

The Addition of Free Electron Laser to HELSTF was an alternative action considered but deferred. The free electron laser technology under development by Boeing has not matured sufficiently to evaluate potential environmental consequences. USASMDC, therefore, has deferred further consideration of this alternative until information necessary for analysis becomes available.

ENVIRONMENTAL EFFECTS: To assess the significance of potential direct, indirect and cumulative environmental impacts, ten broad environmental resource areas were identified. The HELSTF program includes three categories of activities: on-site laser activities that occur within the fenced boundaries of the HELSTF Operating Area; other on-site activities not directly involved with the use or production of high energy laser beams; and off-site activities for which a high energy laser beam or target occurs outside the HELSTF fenced boundary. The on-site laser, other on-site, and off-site activities were then evaluated in ten environmental resources areas to determine the potential effects of the proposed action, and alternative actions.

The 10 broad environmental resources are as follows: air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, infrastructure and transportation, noise, and water resources.

Table 1 depicts the summary of analyses made for each of the 10 environmental resources areas for each of the three alternative actions.

CONCLUSION: The resulting environmental analysis shows that no significant impacts would occur from the proposed HELSTF laser testing program. Preparation of an Environmental Impact Statement, therefore, is not required.

DEADLINE FOR RECEIPT OF WRITTEN COMMENTS: March 21, 1998

POINT OF CONTACT: Submit written comments or requests for a copy of the HELSTF EA to:

U.S. Army Space and Missile Defense Command
Attention: SMDC-EN-V
Post Office Box 1500
Huntsville, Alabama 35807-3801

PROPONENT: _____ DATE: 11 February 1998

Larry D. Anderson
COL, OD
Director, HELSTF

APPROVED:

_____ DATE: 17 FEB 98

Jerry Laws
Brigadier General, USA
Commanding

Table 1: HELSTF Proposed Action and Alternatives Activities and Environmental Issues

Activity	No-Action Alternative	Proposed Action	High Level Alternative	Air Quality	Airspace	Biological Resources	Cultural Resources	Geology and Soils	Hazardous Materials and Waste	Health and Safety	Infrastructure and Transportation	Noise	Water Resources
ON-SITE LASER ACTIVITIES													
MIRACL	◆	◆	◆	Mitigated Impact	Mitigated Impact	Mitigated Impact	Mitigated Impact	Insignificant Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact
LPCL	◆	◆	◆	Insignificant Impact	No Impact	No Impact	No Impact	No Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact
LDD	◆	◆	◆	Insignificant Impact	No Impact	No Impact	No Impact	No Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact
PLVTS	◆	◆	◆	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Beam Transfer Area	◆	◆	◆	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Effects Test Area	◆	◆	◆	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Hazard Test Area	◆	◆	◆	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Vacuum Test System	◆	◆	◆	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
OTHER ON-SITE ACTIVITIES													
Vacuum Test System	◆	◆	◆	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Sea-Lite Beam Director	◆	◆	◆	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Safety Systems	◆	◆	◆	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Chemistry Laboratory	◆	◆	◆	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Technical Support Activities	◆	◆	◆	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
OFF-SITE ACTIVITIES													
Sea-lite Beam Director	◆	◆	◆	No Impact	Mitigated Impact	Mitigated Impact	Mitigated Impact	Insignificant Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact
Nautilus Program Testing	◆	◆	◆	Insignificant Impact	Mitigated Impact	Mitigated Impact	Mitigated Impact	Insignificant Impact	Insignificant Impact	No Impact	Insignificant Impact	No Impact	No Impact
Increased Nautilus or two or more Nautilus-like programs		◆	◆	Insignificant Impact	Mitigated Impact	Mitigated Impact	Mitigated Impact	Insignificant Impact	Insignificant Impact	No Impact	Insignificant Impact	No Impact	No Impact
Four or more Nautilus-like Programs			◆	Mitigated Impact	Mitigated Impact	Mitigated Impact	Mitigated Impact	Insignificant Impact	Insignificant Impact	No Impact	Insignificant Impact	No Impact	No Impact

TACTICAL HIGH ENERGY LASER
ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION
ENVIRONMENTAL ASSESSMENT

UNITED STATES ARMY SPACE AND MISSILE DEFENSE COMMAND

AGENCY: U. S. Army Space and Missile Defense Command (USASMDC)

ACTION: Finding of No Significant Impact

BACKGROUND: Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 CFR 1500-1508), Department of Defense Directive 6050.1, and Army Regulation 200-2, the USASMDC has conducted an Environmental Assessment (EA) of the potential environmental consequences of the Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) program activities.

The purpose of the THEL ACTD program is to develop a tactical laser capable of defending against artillery rockets and other projectiles by means of a directed energy defensive weapons system. For several years, the U.S. Army Space and Missile Defense Command (USASMDC) has pursued development of a tactical high energy laser concept that could provide new air and missile defense capability. Numerous Department of Defense (DOD) high-energy laser development programs over the last 20 years have proven and demonstrated that beam generation and beam pointing technologies can support the THEL concept.

In April 1996, Shimon Peres, then Prime Minister of Israel, met with President Clinton. During the meeting, the U.S. made a commitment to assist Israel in the development of a tactical laser to help negate the Katyusha rocket threat to Israel. In May 1996 the DOD committed to work with the Israeli Ministry of Defense to structure an ACTD to evaluate the effectiveness of a THEL.

DESCRIPTION OF THE PROPOSED ACTION: The THEL ACTD prototype is a transportable, defensive weapon designed to defend against artillery rockets and projectiles through the use of a high energy laser to damage or destroy the munition before it can reach its target, denying the enemy full use of their weapon. The THEL ACTD prototype consists of the following components:

- A Command, Control, Communications, and Intelligence Subsystem to serve as a central control station and communications hub for the complete system
- A Laser Subsystem to generate a high power laser beam
- A Pointer Tracker Subsystem (PTS) to acquire, track, and target appropriate threats

The THEL ACTD program would involve production and testing of the laser subsystem and PTS and field testing and system integration of the THEL ACTD prototype. Production and testing of the Laser Subsystem and PTS would take place at contractor facilities at the

following locations: El Segundo, Redondo Beach, and San Juan Capistrano, California; Boulder, Colorado; and Pittsburgh, Pennsylvania. Field-testing and system integration of the THEL ACTD prototype would take place at White Sands Missile Range (WSMR), New Mexico.

Testing of the PTS and Laser Subsystem would involve:

- At Redondo Beach, the testing of the PTS by use of a low-power, eye-safe laser
- At CTS, hot flow and limited integration testing for 1 minute per day or less
- At CTS, propagation of a high energy laser beam onto a block of acrylic plastic and into a calorimeter, both of which would be less than 3 meters (10 feet) away

Field-testing and integration of the THEL ACTD prototype at WSMR would involve:

- Construction of an equipment area to support the Laser Subsystem
- Lasing of targets by the THEL ACTD Fire Unit (Laser Subsystem and PTS)
- Use of 24 existing paved areas as launch points
- Use of 4 impact areas, 3 of which are in previously bladed areas
- Use of area between launch and aim points as debris impact area
- Launch of up to approximately 300 live and 80 inert target missiles during the first phase of testing (first 9 months)
- Launch of up to approximately 220 rockets and 620 artillery projectiles during the second phase of testing (subsequent 4 years)

ALTERNATIVES CONSIDERED: A number of alternative actions were examined but were eliminated from further consideration due to operational or technical considerations. Static testing at TRW's Capistrano Test Site with dynamic testing at Camp Pendleton was not carried forward due to ground-to-air laser permitting restrictions at Camp Pendleton. THEL ACTD prototype testing at the High Energy Laser Systems Test Facility (HELSTF) at WSMR was eliminated from further consideration due to the cost impacts of additional construction, operation, safety, and environmental mitigation. After determining that WSMR would offer a more comprehensive testing base and provide a more cost effective location, the alternative of shipping the THEL ACTD prototype to Israel without integrated testing at WSMR was eliminated from further consideration. Under the no-action alternative, the testing proposed for WSMR would not be conducted and the THEL ACTD prototype would not be tested or forwarded to Israel. The alternative to terminate the THEL program after ACTD testing at WSMR was deferred for later decision. At that time, options for termination of the program would be reevaluated and additional environmental analysis performed as needed.

ENVIRONMENTAL EFFECTS: To provide a context for understanding the potential effects of the proposed action and a basis for assessing the significance of potential impacts, several environmental resource areas were evaluated. The resource areas were as follows: air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, infrastructure, land use, noise, and water resources. Each environmental resource was evaluated according to a list of activities that were determined to be necessary to accomplish the proposed action.

Table 1 depicts the summary of analyses made for each of the eleven environmental resource areas for the activities associated with the proposed action. Under the no-action alternative, no environmental consequences associated with the THEL ACTD prototype production, development, and testing are anticipated.

CONCLUSION: The resulting environmental analysis shows that no significant impacts would occur from the proposed THEL ACTD program. Preparation of an Environmental Impact Statement, therefore, is not required.

Table 1: THEL ACTD Proposed Action Activities and Environmental Issues

Activity	Air Quality	Airspace	Biological Resources	Cultural Resources	Geology and Soils	Hazardous Materials and Waste	Health and Safety	Infra-structure	Land Use	Noise	Water Resources
Fabrication and Assembly											
TRW, Inc. El Segundo / Redondo Beach, CA	No Impact	No Impact	No Impact	No Impact	No Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact	No Impact
TRW, Inc. Redondo Beach, CA	No Impact	No Impact	No Impact	No Impact	No Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Ball Aerospace Boulder, CO	No Impact	No Impact	No Impact	No Impact	No Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Contraves-Brashears Pittsburgh, PA	No Impact	No Impact	No Impact	No Impact	No Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact	No Impact
TRW, Inc. San Juan Capistrano	No Impact	No Impact	No Impact	No Impact	No Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Component Testing											
TRW, Inc. Space Park Facility El Segundo / Redondo Beach, CA	No Impact	No Impact	No Impact	No Impact	No Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact	No Impact
TRW, Inc. San Juan Capistrano, CA	Mitigated Impact	No Impact	Insignificant Impact	No Impact	No Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Field testing and Integration											
WSMR, NM	Mitigated Impact	Mitigated Impact	Mitigated Impact	Mitigated Impact	Insignificant Impact	Insignificant Impact	No Impact	Mitigated Impact	No Impact	No Impact	No Impact

DEADLINE FOR RECEIPT OF WRITTEN COMMENTS: 28 May 1998

POINT OF CONTACT: Submit written comments or requests for a copy of the THEL ACTD EA to:

U.S. Army Space and Missile Defense Command
Attention: SMDC-EN-V (Thomas Craven)
Post Office Box 1500
Huntsville, Alabama 35807-3801

PROPONENT:

DATE: 15 Apr 98

RICHARD J. BRADSHAW, JR.
Program Manager
THEL Program Office

APPROVED:

DATE: 20 Apr 98

EDWARD G. ANDERSON III
Lieutenant General, U.S. Army
Commanding Officer

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