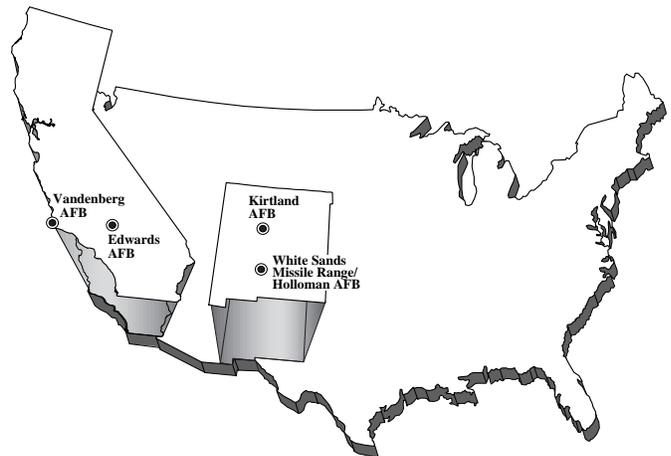


APPENDICES



APPENDIX A GLOSSARY OF TERMS AND ACRONYMS/ ABBREVIATIONS

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GLOSSARY OF TERMS AND ACRONYMS/ABBREVIATIONS

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GLOSSARY OF TERMS AND ACRONYMS/ABBREVIATIONS

A-Weighted Sound Level. A number representing the sound level which is frequency-weighted according to a prescribed frequency response established by the American National Standards Institute (1983) and accounts for the response of the human ear.

Acquire. When applied to acquisition sensors, to detect the presence and location of a target in sufficient detail to permit identification.

Acquisition, Tracking and Pointing. The process of acquiring target (or targets) within a given field-of-view and maintaining a precision track while enabling the pointing of a sensor or weapon at the target so that it may be destroyed.

Active Sensor. A sensor that illuminates a target, producing return-secondary radiation, for tracking and/or identifying the target. An example is radar.

Adaptive Optics. Optical systems that can be modified by controlling the shape of a deformable mirror to compensate for distortions of a laser light passing through the atmosphere. It is used to reduce the dispersive effect of the atmosphere on a laser-beam weapon.

Aeronautical chart. A map used in air navigation containing all or part of the following: topographic features, hazards and obstructions, navigation aids, navigation routes, designated airspace, and airports.

Aerospace Ground Equipment. Fixed and mobile systems used for aircraft maintenance, startup, fueling, power, and air conditioning.

Air Basin. A region within which the air quality is determined by the meteorology and emissions within it with minimal influence on and impact by contiguous regions.

Air Installation Compatible Use Zone (AICUZ). A concept developed by the Air Force to promote land use development near its airfields in a manner that protects adjacent communities from noise and safety hazards associated with aircraft operations, and to preserve the operational integrity of the airfields.

Air Quality Control Region. A contiguous geographic area designated by the Federal government in which communities share a common air pollution status.

Air Shed. A volume of air with boundaries chosen to facilitate determination of pollutant inflow and outflow.

Airport Radar Service Area. Regulatory airspace surrounding designated airports wherein air traffic control provides vectoring and sequencing on a full-time basis for all IFR and VFR aircraft.

Air Route Traffic Control Center (ARTCC). A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight.

Airport Traffic Area. Airspace within a radius of 5 statute miles of an airport with an operating control tower, encompassing altitudes between the surface and 3,000 feet above ground level in which an aircraft cannot operate without prior authorization from the control tower.

Air Traffic Control (ATC). A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic.

Airway. A Class E airspace area established in the form of a corridor, the centerline of which is defined by radio navigational aids.

Altitude. Height, measured as a distance along the extended earth's radius above a given point, such as average sea level.

Ambient Air Quality Standards. Standards established on a state or federal level that define the limits for airborne concentrations of designated "criteria" pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, total suspended particulates, ozone, and lead), to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

American National Standards Institute (ANSI). Serves as a consensus standard developed by representatives of industry, scientific communities, physicians, Government Agencies, and the public.

Atmospheric Dispersion. The process of air pollutants being dispersed into the atmosphere. This occurs by the wind that carries the pollutants away from their source and by turbulent-air motion that results from solar heating of the Earth's surface and air movement over rough terrain and surfaces.

Attainment area. A region that meets the National Ambient Air Quality Standards for a criteria pollutant under the Clean Air Act.

Background Noise. The total acoustical and electrical noise from all sources in a measurement system that may interfere with the production, transmission, time averaging, measurement, or recording of an acoustical signal.

Beam Control. Technologies associated with controlling the physical properties of high-energy beams and steering the energy transmitted by those beams to the target vehicle.

Biota. The plant and animal life of a region.

Boost Phase. The powered-flight portion of a missile from launch to termination of thrust of the rocket's final stage.

Carbon monoxide (CO). A colorless, odorless, poisonous gas produced by incomplete fossil-fuel combustion. One of the six pollutants for which there is a national ambient standard (see Criteria pollutants).

Chemical Oxygen Iodine Laser (COIL). A laser in which chemical action is used to produce the laser energy.

Commercial aviation. Aircraft activity licensed by state or federal authority to transport passengers and/or cargo for hire on a scheduled or nonscheduled basis.

Controlled Airspace. An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification.

Control Zone. Controlled airspace with a normal radius of 5 statute miles from a primary airport plus any extensions needed to include instrument arrival and departure paths, encompassing altitudes between the surface and 14,449 feet mean sea level.

Council on Environmental Quality. Established by the National Environmental Policy Act (NEPA), the CEQ consists of three members appointed by the President. CEQ regulations (40 Code of Federal Regulations Parts 1500-1508, as of July 1, 1986) describe the process for implementing NEPA, including preparation of environmental assessments and environmental impact statements, and the timing and extent of public participation.

Criteria pollutants. The Clean Air Act required the U.S. Environmental Protection Agency to set air quality standards for common and widespread pollutants after preparing "criteria documents" summarizing scientific knowledge on their health effects. Today there are standards in effect for six "criteria pollutants": sulfur dioxide (SO₂), carbon monoxide (CO), particulate matter less than 10 microns in diameter (PM₁₀), nitrogen dioxide (NO₂), ozone (O₃), and lead (Pb).

Cumulative impacts. The combined impacts resulting from all activities occurring concurrently at a given location.

Day-Night Average Sound Level (DNL). The 24-hour average-energy sound level expressed in decibels, with a 10-decibel penalty added to sound levels between 10:00 p.m. and 7:00 a.m. to account for increased annoyance due to noise during night hours.

Decibel. A unit of measurement on a logarithmic scale which describes the magnitude of a particular quantity of sound pressure or power with respect to a standard reference value.

Department of Defense Flight Information Publication (DOD FLIP). A publication used for flight planning, en route, and terminal operations. FLIP is produced by the Defense Mapping Agency.

Disproportionately high minority and/or low-income area. A census tract or block numbering area in which the percentage of minority and/or low-income population is greater than that of the community of comparison as a whole.

Employment. The count of the number of jobs: persons holding more than one job are counted in each job.

Endangered species. A species that is threatened with extinction throughout all or a significant portion of its range.

Environmental Impact Analysis Process. The process of conducting environmental studies as outlined in Air Force Regulation 19-2.

Environmental Justice. An identification of potential disproportionately high and adverse human health or environmental effects on minority and/or low-income populations that may result from proposed federal undertakings (required by Executive Order 12898).

Environmental Protection Agency. The federal and/or state agency that regulates environmental matters and oversees the implementation of environmental laws.

Executive Order 12898. Issued by the President on February 11, 1994, this Executive Order requires federal agencies to develop implementation strategies, identify minority and low-income populations that may be disproportionately impacted by proposed federal actions, and solicit the participation of minority and low-income populations.

Flight Level (FL). A level of constant atmospheric pressure related to a surface datum of 29.92 inches of mercury. Each is stated in three digits that represent hundreds of feet. For example, flight level (FL) 250 represents a barometric altimeter indication of 7,620 meters (25,000 feet).

General aviation. All aircraft which are not commercial or military aircraft.

Halon. Bromine-containing compounds with long atmospheric lifetimes whose breakdown in the stratosphere cause depletion of ozone. Halons are used in firefighting.

Hazardous Air Pollutant (HAP). One of 45 substances (originally 189 substances were listed in the 1990 Amendments) listed in the Clean Air Act as pollutants that present or may present a threat of adverse human health effects or adverse environmental effects when released into the air.

Hazardous material. Generally, a substance or mixture of substances that has the capability of either causing or significantly contributing to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or posing a substantial present or potential risk to human health or the environment. Use of these materials is regulated by Department of Transportation, Occupational Safety and Health Administration (OSHA), and Superfund Amendments and Reauthorization Act (SARA).

Hazardous waste. A waste, or combination of wastes, which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Regulated under the Resource Conservation and Recovery Act (RCRA).

Hypergolic. Two or more substances capable of igniting spontaneously upon contact.

Impacts/Effects. An assessment of the meaning of changes in all attributes being studied for a given resource; an aggregation of all the adverse effects, usually measured using a qualitative and nominally subjective technique. In this EIS, as well as in the Council on Environmental Quality regulations, the word impact is used synonymously with the word effect.

Indirect Effects. The economic effects not included in the exogenous (direct) change entered through policy variables for a simulation.

Induced Effects. Economic effects resulting from the re-spending of wages, i.e., new employees have money to spend.

Infrared. A range of electromagnetic-radiation wavelengths longer than visible light and shorter than microwave wavelengths.

Instrument Flight Rules (IFR). Rules governing the procedures for conducting instrument flight.

Institute of Electrical and Electronics Engineers (IEEE). The IEEE is a non-profit, technical professional association of more than 350,000 individual members in 150 countries. Through its members, the IEEE is a leading authority in technical areas ranging from computer engineering, biomedical technology and telecommunications, to electric power, aerospace/consumer electronics, and radiofrequency/microwave radiation.

Interstate. The designated National System of Interstate and Defense Highways located in both rural and urban areas; they connect the east and west coasts and extend from points on the Canadian border to various points on the Mexican border.

Jet Route. A route designed to serve aircraft operations from 18,000 feet MSL up to an including flight level 450. The routes are referred to as “J” routes with numbering to identify the designated route.

joule (J). The work done when the point of application 1...unit of force [Newton] moves a distance of 1 meter in the direction of the force; a unit of measure for energy.

Launch Azimuth. Missile-launch direction measured in degrees clockwise from the local north-pointing longitude line at the launch site.

Launch Detection. Initial indication by any one of a variety of sensors that a booster has been launched from some point on the surface of the earth, with initial characterization of the booster type.

Lead (Pb). A heavy metal used in many industries, which can accumulate in the body and cause a variety of negative effects. One of the six pollutants for which there is a national ambient air quality standard (see Criteria pollutants).

Loudness. The qualitative judgment of intensity of a sound by a human being.

Low-Income Population. Persons below the poverty level, designated as \$12,674 for a family of four in 1989 by the U.S. Bureau of the Census.

Maximum Permissible Exposure (MPE). The rms and peak electric and magnetic field strengths, their squares, or the plane-wave equivalent power densities associated with these fields and the induced and contact currents to which a person may be exposed without harmful effect and with an acceptable safety factor.

Mean Sea Level (MSL). The average height of the sea surface if undisturbed by waves, tides, or winds.

Micron. A unit of length equal to one millionth of a meter; also called a micrometer. There are approximately 25,400 microns per inch.

Military Authority Assumes Responsibility For Separation of Aircraft (MARSA). A condition whereby the military services involved assume responsibility for separation between participating military aircraft in the ATC system. It is used only for required IFR operations which are specified in letters of agreement or other appropriate FAA or military documents.

Military Operations Area (MOA). Airspace areas of defined vertical and lateral limits established for the purpose of separating certain training activities, such as air combat maneuvers, air intercepts, and acrobatics, from other air traffic operating under instrument flight rules.

Military Training Route (MTR). Airspace of defined vertical and lateral limits established for the purpose of separating certain training activities such as air combat maneuvers, air intercepts, and aerobatics from other air traffic operating under IFR.

Minority Population. Persons designated as Black; American Indian, Eskimo, or Aleut; Asian or Pacific Islander; other; and of Hispanic origin in census data.

Missile Alternative Range Target Instrument (MARTI). A balloon mounted target board utilized for flight testing of the airborne laser systems.

Mitigation. A method or action to reduce or eliminate program impacts.

National Airspace System (NAS). The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, and manpower and material. Included are system components shared jointly with the military.

National Ambient Air Quality Standards. Section 109 of the Clean Air Act requires the U.S. Environmental Protection Agency to set nationwide standards, the National Ambient Air Quality Standards (NAAQS), for widespread air pollutants. Currently, six pollutants are regulated by primary and secondary NAAQS: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (PM₁₀), and sulfur dioxide (see Criteria pollutants).

National Environmental Policy Act. Public Law 91-190, passed by Congress in 1969. The National Environmental Policy Act (NEPA) established a national policy designed to encourage consideration of the influences of human activities (e.g., population growth, high-density urbanization, industrial development) on the natural environment. NEPA also established the Council on Environmental Quality. NEPA procedures require that environmental information be made available to the public before decisions are made. Information contained in NEPA documents must focus on the relevant issues in order to facilitate the decision-making process.

Native vegetation. Plant life that occurs naturally in an area without agricultural or cultivational efforts. It does not include species that have been introduced from other geographical areas and have become naturalized.

Nautical Mile. An international unit of distance equal to 1,852 meters, 6,076 feet, or 1.151 statute miles.

Navigable Airspace. Airspace at or above the minimum flight altitudes prescribed in the Federal Aviation Regulations included airspace needed for safe takeoff and landing.

Nitrogen dioxide (NO₂). Gas formed primarily from atmospheric nitrogen and oxygen when combustion takes place at high temperature. NO₂ emissions contribute to acid deposition and formation of atmospheric ozone. One of the six pollutants for which there is a national ambient standard (see Criteria pollutants).

Nitrogen oxides (NO_x). Gases formed primarily by fuel combustion, which contribute to the formation of acid rain. Hydrocarbons and nitrogen oxides combine in the presence of sunlight to form ozone, a major constituent of smog.

Noise. Any sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying (unwanted sound).

Noise attenuation. The reduction of a noise level from a source by such means as distance, ground effects, or shielding.

Nonattainment area. An area that has been designated by the U.S. Environmental Protection Agency or the appropriate state air quality agency, as exceeding one or more National or California Ambient Air Quality Standards.

Ozone (O³) (ground level). A major ingredient of smog. Ozone is produced from reactions of hydrocarbons and nitrogen oxides in the presence of sunlight and heat. Some 68 areas, mostly metropolitan areas, did not meet a December 31, 1987 deadline in the Clean Air Act for attaining the ambient air quality standard for ozone.

Passive Sensor. A sensor that detects naturally occurring emissions from a target for tracking and/or identification purposes.

Personal Income. The sum of wage and salary disbursements, other labor income, proprietor's income, rental income, personal dividend income, personal interest income, and transfer payments, less personal contributions for social insurance.

Pharmacy Concept. The use of a base central supply location to distribute hazardous materials/products to Air Force organizations. As part of the process, customers are to return unused portions of the materials/products for subsequent use or disposal.

Polychlorinated biphenyls (PCBs). Any of a family of industrial compounds produced by chlorination of biphenyl. These compounds are noted chiefly as an environmental pollutant that accumulates in organisms and concentrates in the food chain with resultant pathogenic and teratogenic effects. They also decompose very slowly.

Prevention of Significant Deterioration (PSD). In the 1977 Amendments to the Clean Air Act, Congress mandated that areas with air cleaner than required by National Ambient Air Quality Standards must be protected from significant deterioration. The Clean Air Act's Prevention of Significant Deterioration program consists of two elements: requirements for best available control technology on major new or modified sources, and compliance with an air quality increment system.

Prevention of Significant Deterioration Area. A requirement of the Clean Air Act (160 et seq.) that limits the increases in ambient air pollutant concentrations in clean air areas to certain increments even though ambient air quality standards are met.

Prohibited Area. Airspace designated under FAR Part 73 within which no person may operate an aircraft without the permission of the using agency.

Radon. A naturally occurring, colorless, and odorless radioactive gas that is produced by radioactive decay of naturally occurring uranium.

Restricted Area. Airspace designated under FAR Part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use and IFR/VFR operations in the area may be authorized by the controlling air traffic control facility when it is not being utilized by the using agency. Restricted areas are depicted on en route charts.

Ruderal. Weedy or introduced vegetation growing in disturbed areas.

Slow Routes. Slow speed low altitude training routes used for military air operations at or below 1,500 feet at airspeeds of 250 knots or less.

Solvent. A substance that dissolves or can dissolve another substance.

Sound. The auditory sensation evoked by the compression and rarefaction of the air or other transmitting medium.

Sulfur dioxide (SO₂). A toxic gas that is produced when fossil fuels, such as coal and oil, are burned. SO₂ is the main pollutant involved in the formation of acid rain. SO₂ also can irritate the upper respiratory tract and cause lung damage. During 1980, some 27 million tons of SO₂ were emitted in the United States, according to the Office of Technology Assessment. The major source of SO₂ in the United States is coal-burning electric utilities.

Theater. The geographical area outside the continental United States for which a commander of a unified or specified command has been assigned.

Theater Ballistic Missile. A ballistic missile whose target is within a theater or which is capable of attacking targets in a theater.

Theater Missile Defense. The strategies and tactics employed to defend a geographical area outside the United States against attacks from short-range, intermediate-range or medium-range ballistic missiles.

Threatened species. Plant and wildlife species likely to become endangered in the foreseeable future.

Trajectory. The curve described by an object moving through space.

Transition Area. Controlled airspace extending 700 feet or more upward from the surface of the earth when designated in conjunction with an airport for which an approved instrument approach procedure has been prescribed; or from 1,200 feet or more above the surface of the earth when designated in conjunction with airway route structures or segments. Unless otherwise specified, transition areas terminate at the base of the overlying controlled airspace.

U.S. Environmental Protection Agency (EPA). The independent federal agency, established in 1970, that regulates federal environmental matters and oversees the implementation of federal environmental laws.

Visual Flight Rules (VFR). Rules that govern the procedures for conducting flight under visual conditions.

Volatile Organic Compounds (VOCs). Compounds containing carbon, excluding CO, CO₂, carbonic acid, metallic carbides, metallic carbonates, and ammonium carbonate.

Wetlands. Areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil. This classification includes swamps, marshes, bogs, and similar areas.

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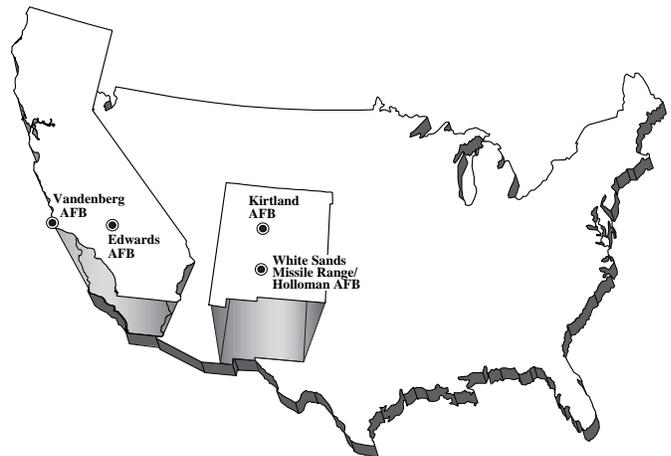
ACRONYMS AND ABBREVIATIONS

| | |
|------------------|--|
| AAA | American Automobile Association |
| AAF | Army Air Field |
| ABL | Airborne Laser |
| ACM | asbestos-containing material |
| AEHD | Albuquerque Environmental Health Department |
| AFB | Air Force Base |
| AFFTC | Air Force Flight Test Center |
| AFI | Air Force Instruction |
| AFOSH | Air Force Office of Safety and Health |
| AFRL/HEDO | Air Force Research Laboratory Optical Radiation Branch |
| AGE | aerospace ground equipment |
| AGL | above ground level |
| AHERA | Asbestos Hazard Emergency Response Act |
| AIRS | Aerometric Information Retrieval System |
| ANSI | American National Standards Institute |
| AQCB | Air Quality Control Board |
| AQCR | Air Quality Control Region |
| AR | Army Regulation |
| ARS | active ranging system (laser) |
| ARTCC | Air Route Traffic Control Center |
| ATC | air traffic control |
| ATCAA | Air Traffic Control Assigned Airspace |
| BASH | Bird-Air Strike Hazard |
| B.C. | Before Christ |
| BHP | basic hydrogen peroxide |
| BHPO | Base Historic Preservation Officer |
| BILL | Beacon Illuminator Laser |
| BMDS | Ballistic Missile Defense System |
| BPD | Boost Phase Defense |
| CAA | Clean Air Act |
| CAE | control area extension |
| CCR | Code of California Regulations |
| CEQ | Council on Environmental Quality |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CFA | controlled firing area |
| CFR | Code of Federal Regulations |
| Cl ₂ | chlorine |
| CO | carbon monoxide |
| CO ₂ | carbon dioxide |
| COC | Chemical of Concern |
| COIL | chemical, oxygen, iodine laser |
| Council | Advisory Council for Historic Preservation |
| CPSC | Consumer Product Safety Commission |
| ° | degree |
| dB | decibel |
| dBA | decibel A-weighted |
| DNL | day-night average sound level |
| D ₂ O | deuterium oxide |

| | |
|-------------------------------|--|
| D ₂ O ₂ | deuterated hydrogen peroxide |
| DOD | Department of Defense |
| DOE | Department of Energy |
| DOT | Department of Transportation |
| EA | environmental assessment |
| EHS | extremely hazardous substance |
| EIS | environmental impact statement |
| EPA | Environmental Protection Agency |
| EPCRA | Emergency Planning and Community Right-to-Know Act |
| EWR | Eastern and Western Range |
| F | Fahrenheit |
| FAA | Federal Aviation Administration |
| FAR | Federal Aviation Regulation |
| FDA | Food and Drug Administration |
| FEIS | final environmental impact statement |
| FIFRA | Federal Insecticide, Fungicide, and Rodenticide Act |
| FL | flight level |
| FONSI | Finding of No Significant Impact |
| FR | Federal Register |
| GMD | Ground-based Midcourse Defense |
| GPRA | Ground Pressure Recovery Assembly |
| H ₂ O ₂ | hydrogen peroxide |
| HAP | hazardous air pollutants |
| He | helium |
| HEL | High-Energy Laser |
| HELSTF | High-Energy Laser Systems Test Facility |
| HI-DESERT TRACON | High Desert Terminal Radar Approach Control |
| HUD | Department of Housing and Urban Development |
| ICAO | International Civil Aviation Organization |
| ICBM | intercontinental ballistic missile |
| I ₂ | iodine |
| IFR | instrument flight rules |
| IMF | Integrated Maintenance Facility |
| IRP | Installation Restoration Program |
| IRST | infrared search and track |
| JP-# | jet propulsion fuel |
| KAFBI | Kirtland AFB Instruction |
| kg | kilograms |
| km | kilometer |
| LANL | Los Alamos National Laboratory |
| LC | Launch Complex |
| LF | Launch Facility |
| LGAC | laser-generated air contaminants |
| µg/l | micrograms per liter |
| µg/m ³ | micrograms per cubic meter |
| µm | micrometers |
| MARSA | military authority assumes responsibility for separation of aircraft |
| MARTI | Missile Alternative Range Target Instrument |
| MCAS | Marine Corps Air Station |
| MCL | maximum contaminant level |

| | |
|------------------|---|
| MDA | Missile Defense Agency |
| MILCON | Military Construction |
| MMS | Minerals Management Service |
| MOA | Military Operations Area |
| MOU | Memorandum of Understanding |
| MPE | maximum permissible exposure |
| mph | miles per hour |
| MSDS | material safety data sheet |
| MSL | mean sea level |
| MTR | military training route |
| NAAQS | National Ambient Air Quality Standards |
| NAS | Naval Air Station |
| NASA | National Aeronautics and Space Administration |
| NAWS | Naval Air Weapons Station |
| NBC | nuclear, biological, or chemical |
| Nd:YAG | Neodymium:Yttrium Aluminum Garnet |
| NEPA | National Environmental Policy Act |
| NESHAP | National Emissions Standards for Hazardous Air Pollutants |
| NFPA | National Fire Protection Association |
| NH ₃ | anhydrous ammonia |
| NHPA | National Historic Preservation Act |
| nm | nautical mile |
| NMAC | New Mexico Administrative Code |
| NMDGF | New Mexico Department of Game and Fish |
| N ₂ | nitrogen |
| NOHD | Nominal Ocular Hazard Distance |
| NOHZ | Nominal Ocular Hazard Zone |
| NOI | Notice of Intent |
| NOTAM | Notice to Airmen |
| NO _x | nitrogen oxides |
| NRHP | National Register of Historic Places |
| NSR | New Source Review |
| OPNAVINST | Office of the Chief Naval Operations Instruction |
| OPR | Office of Primary Responsibility |
| OSHA | Occupational Safety and Health Administration |
| PAH | polynuclear aromatic hydrocarbon |
| PCB | polychlorinated biphenyl |
| pH | hydrogen ion concentration |
| PIRA | Precision Impact Range Area |
| P.L. | Public Law |
| PM ₁₀ | particulate matter equal to or less than 10 microns in diameter |
| POL | petroleum, oil, and lubricants |
| ppm | parts per million |
| PRS | pressure recovery system |
| RANS | Range Squadron |
| RCRA | Resource Conservation and Recovery Act |
| ROD | Record of Decision |
| ROI | region of influence |
| SEIS | supplemental environmental impact statement |
| SEL | sound exposure level |

| | |
|-------------------|--|
| SHEL | Surrogate High-Energy Laser |
| SHPO | State Historic Preservation Officer |
| SIF | System Integration Facility |
| SIL | System Integration Laboratory |
| SIP | State Implementation Plan |
| SLC | Space Launch Complex |
| SMDC | Space and Missile Defense Command |
| SO ₂ | sulfur dioxide |
| SOP | Standard Operating Procedure |
| SPO | System Program Office |
| SUA | special use airspace |
| SW | Space Wing |
| TEL | transporter/erector/launcher |
| TILL | Track Illuminator Laser |
| TMD | theater missile defense |
| TRICS | Transportable Integrated Chemical Scrubber |
| U.S.C. | United States Code |
| USCG | U.S. Coast Guard |
| UV | Ultraviolet |
| VFR | visual flight rules |
| VMT | vehicle miles traveled |
| VOC | volatile organic compound |
| WCOOA | West Coast Offshore Operating Area |
| W/cm ² | watts per square centimeter |
| WSMR | White Sands Missile Range |
| WSRF | White Sands Radar Facility |



APPENDIX B
1997 FEIS EXECUTIVE SUMMARY
AND RECORD OF DECISION

APPENDIX B

**1997 FEIS EXECUTIVE SUMMARY
AND RECORD OF DECISION**

EXECUTIVE SUMMARY

This is a summary of the Final Environmental Impact Statement (FEIS) for the Program Definition and Risk Reduction (PDRR) Phase of the Airborne Laser (ABL) Program. A complete copy of the Final Environmental Impact Statement (FEIS) can be viewed at the libraries listed at the end of the Executive Summary. This FEIS examines the potential for impacts to the environment as a result of conducting U.S. Air Force (USAF) PDRR Phase activities at various proposed military locations.

PROGRAM OVERVIEW

The Airborne Laser Acquisition Program has completed the Concept Design Phase, with two competing contractors developing a proposed system design. The next acquisition phase is the PDRR, for which this document was prepared. The selected contractor will proceed with verifying preliminary design and engineering and building a prototype ABL aircraft that can be tested. If the demonstration tests of the prototype are successful, two phases will follow. Engineering, Manufacturing and Development (EMD) will include building a second full-scale ABL aircraft and operational performance tests. Production will involve procuring an additional five aircraft. The ABL acquisition program is depicted in Figure ES-1.

The PDRR ABL Program will comply with National Aerospace Standard 411 or a comparable program. This Hazardous Material Management Program will ensure environmental compliance and seek to minimize the use of all hazardous materials. The USAF will also develop a pollution prevention program to ensure that the environment is protected to the greatest extent feasible. The PDRR ABL contractor will be required to implement a comprehensive system safety program, using MIL-STD-882-C as guidance. The program will identify hazards and impose design requirements, operating procedures, and management controls to prevent mishaps.

NEED FOR AND PURPOSE OF ACTION

The United States needs a more accurate and effective defense against mobile theater ballistic missiles (TBMs) by destroying them during boost phase, just after launch. The debris would then fall back on the aggressor. The U.S. and its allies have a limited capability to defend against hostile TBM attacks. Current capabilities are limited to defense of troops or high-value assets within a small area of a theater of operations as the missile nears its target. Improvements in missile range and accuracy, the rapid increase in the number of missile-capable nations, and the absence of arms limitation treaties increase the threat. TBM launchers are difficult to detect because the launchers and support equipment are highly mobile.

The purpose of the PDRR ABL Phase is to demonstrate under operational conditions that the USAF can use a high-energy chemical oxygen iodine laser (COIL) onboard an aircraft to acquire and destroy TBM targets during boost phase (while the rocket motor is still burning).

PDRR ABL DESCRIPTION

The PDRR ABL is a modified B747 aircraft that would accommodate a laser-weapon device and laser-fuel storage tanks. The aircraft would also incorporate a low-powered acquisition, tracking and pointing laser, a laser-beam control system designed to focus the beam on target, and a beam director (telescope) enclosed in a turret at the front of the aircraft. A Battle Management Command Center provides computerized control of all aspects of the laser-weapon system, communications, and intelligence systems onboard the aircraft (Figure ES-2).

The PDRR ABL would fly at high altitude, and would detect and track launches of TBMs using onboard sensors. Active tracking of the missile would begin when the TBM breaks clear of the clouds at approximately 40,000 feet above mean sea level (AMSL). The high-energy laser (HEL) would then be directed horizontally or in an upward position toward the missile. The energy from the laser would heat the missile's booster components and cause a stress fracture, which would destroy the missile. The geometry of the tests would preclude operation of the laser except at a horizontal or upward angle.

The COIL operates by creating chemical reactions between chlorine gas and a mixture of hydrogen peroxide and alkali metal hydroxides. Iodine is added to the mixture, and the chemicals are pulled through a mixing nozzle at high velocities. The reaction of the chemicals creates light energy, which is then focused by mirrors and lenses into a laser beam.

The USAF has more than 25 years experience in working with chemical lasers. Fundamental work on chemical lasers began in 1960. The COIL was invented in 1977 at the Air Force Weapons Laboratory, which has since become a part of the USAF Phillips Laboratory, and has been under continuous development since then. A dedicated COIL facility was constructed at Kirtland AFB in 1979, giving the USAF 17 years of experience in routine storage and handling of laser chemicals and operation of the COIL. The USAF has also had experience with lasers integrated aboard aircraft. The Airborne Laser Laboratory aircraft was tested in the early 1980s, using a laser to successfully destroy five air-to-air missiles.

IMPLEMENTING REGULATIONS

The USAF is committed to conducting the PDRR ABL Phase activities in compliance with all applicable environmental laws, regulations, executive orders, DoD and USAF instructions, permits, and consultation and compliance agreements with regulatory agencies.

The Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR §§ 1500-1508), DoD Instruction 4715.9, *Environmental Planning and Analysis*, DoD Regulation 5000.2-R, *Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs*, and Air Force Instruction (AFI) 32-7061, *The Environmental Impact Analysis Process*, direct USAF officials to consider environmental consequences when authorizing or approving federal actions. This FEIS evaluates the environmental consequences and impacts of specific PDRR ABL Phase activities and informs the public of the important issues and any reasonable alternatives that would avoid or minimize adverse impacts of the PDRR ABL Phase activities.

DECISION TO BE MADE

The decision to be made by the USAF is to determine where the activities will occur. The PDRR ABL Phase requires a Home Base, a Diagnostic Test Range, and an Expanded-Area Test Range. The decision possibilities include selecting the proposed action, selecting one of the alternatives, or selecting the no-action alternative. The Assistant Secretary of the Air Force for Acquisitions will be the decision-maker.

PUBLIC PARTICIPATION

Public scoping meetings were held in New Mexico and California in April and May 1995. The scoping process identified seven significant issues, which are described in detail in Table 1-1 and addressed in Chapters 1 and 3. Those issues are 1) laser-eye safety and potential beam impacts, 2) aircraft safety, 3) impacts on air quality and upper atmosphere, 4) impacts to marine mammals and endangered species, 5) storage and handling of laser fuel, 6) impacts on surrounding communities, and 7) impacts on recreation and commercial fishing.

The DEIS was issued in October 1996. Copies were made available for review in local libraries and provided to those requesting them. At public hearings held in early-to-mid December 1996, the Air Force presented the findings of the DEIS and invited public comments through January 10, 1997. All comments were reviewed and addressed and have been included in their entirety in Volume II of this document.

The text of this FEIS has been revised, when appropriate, to reflect responses to public comments. These changes range from typographical corrections to additional analyses. Notable changes to the FEIS include modification of the document to address questions about the impacts of PDRR ABL activities on the upper atmosphere, the addition of clarifying language regarding potential impacts of missile debris on marine mammals, revised language to show the status of lands surrounding White Sands Missile Range, and a description of future environmental documentation to be prepared for the Airborne Laser Program.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

A Home Base, Diagnostic Test Range, and Expanded-Area Test Range are required to effectively demonstrate the ability of the PDRR ABL to destroy a TBM in boost phase. This FEIS considers the following locational alternatives for PDRR ABL activities:

| | |
|-----------------------------------|---|
| Home Base (1999-2002) | Edwards Air Force Base (Proposed Action) Kirtland Air Force Base (Alternative 1) |
| Diagnostic Test Range (2001-2002) | White Sands Missile Range (Proposed Action) China Lake Naval Air Warfare Center (Alternative 1) Western Range, including Vandenberg AFB and/or Point Mugu Naval Air Warfare Center Weapons Division and their operational areas (Alternative 2) |
| Expanded-Area Test Range 2002) | Western Range, including Vandenberg AFB and/or Point Mugu (2001- and their operational areas (Proposed Action) |
| No-action Alternative | PDRR ABL activities would not be conducted at any location |

The proposed action is the USAF preferred alternative: selection of Edwards AFB as Home Base, White Sands Missile Range as Diagnostic Test Range, and the Western Range as Expanded-Area Test Range.

Home Base. The Home Base is the location where the laser-weapon system will be integrated into the aircraft and where ground tests and initial aircraft flight tests will occur. The Home Base will also house the B747 aircraft, its flightline maintenance, ground test facilities, fuel storage and transfer, ground pressure recovery system for the laser, and technical and support personnel.

Diagnostic Test Range. The Diagnostic Test Range is the location for initial airborne equipment checks of the laser-weapon system after it has been integrated into the aircraft, including acquisition, tracking and pointing of missile and drone targets. These checks may include flights to determine airworthiness of the B747 aircraft and to test the air-refueling modifications to the plane. Although up to 20 flights of the PDRR ABL aircraft may occur, a maximum of six missiles and four drones would be launched and recovered at the Diagnostic Test Range.

Expanded-Area Test Range. The Expanded-Area Test Range is the location where the PDRR ABL laser-weapon system would track and destroy either a single TBM or multiple TBMs during boost phase. Up to ten flights of the PDRR ABL aircraft may occur, and up to ten missiles may be launched at the

Expanded-Area Test Range. However, the high-energy laser would only be used against a maximum of six missiles.

ADDITIONAL ENVIRONMENTAL DOCUMENTATION

The Missile Defense Act of 1991 mandated the development of a theater missile defense (TMD) program to defend United States personnel and assets against the threat of theater ballistic missiles. Various elements of the TMD program were delegated to the Army, Air Force, Navy, and Marine Corps. The Ballistic Missile Defense Organization (BMDO) was designated as the management office, and it prepared the Final Theater Missile Defense Programmatic Life-Cycle Environmental Impact Statement (U.S. Army, 1993). TMD integrated three components: (1) Active Defense, to destroy enemy missiles in flight; (2) Counterforce, to destroy an enemy's ability to launch missiles; and (3) Passive Defense, to evade detection and enhance survival from missile attack. The TMD Programmatic Life-Cycle EIS addressed, in broadest terms, the potential environmental impacts of the proposed research, development, and testing of the various TMD components. While calling for a mix of Active Defense, Counterforce, and Passive Defense, it did not focus on system-specific or site-specific activities, and was intended to be a first-tier document from which future environmental documentation could be prepared.

The USAF concluded that a deficiency in Active Defense, that is, destroying missiles during their boost phase, should be addressed. It made the decision to build on its long experience with high-energy lasers and fund the early ABL concept-design phase. The USAF prepared this FEIS to study the potential impacts of PDRR ABL activities on alternative locations where the weapons system might be tested and to assist the decision makers in the site selection process. This FEIS will be supplemented by additional environmental documentation. The USAF expects to prepare an Environmental Assessment to cover the Engineering, Manufacturing, and Development Phase of the Airborne Laser Program, and a full Programmatic EIS to cover production, deployment, maintenance and training for the system.

ENVIRONMENTAL IMPACTS ASSESSMENT

Routine PDRR ABL operations would impact environmental resources at Home Base and the Test Ranges, but the impacts are of short duration. The assessment of potential impacts is based on the requirements in 40 CFR § 1508.27. Those guidelines established by the CEQ specify that significance should be determined in relationship to both context and intensity (severity).

An interdisciplinary team analyzed the affected environment and the impact from the PDRR ABL Phase activities at each location. This analysis was performed very early in the development of the ABL so that environmental considerations could be incorporated into the design.

SUMMARY OF ENVIRONMENTAL IMPACTS

The consequences for each environmental attribute at the proposed and alternative locations have been assessed. The environmental impact analyses were based on the two competing contractor designs. Where the contractor designs differed, the USAF provided a set of assumptions to encompass both designs and ensure an appropriate analysis of potential environmental impacts. Table ES-1 summarizes the environmental impacts of routine PDRR ABL activities at Home Base. Because activities at the Test Ranges differ from those at Home Base, Table ES-2 summarizes the environmental impacts of routine PDRR ABL activities at the ranges.

Potential impacts to upper atmosphere and those resulting from accidents are not site-specific. Therefore, they are discussed separately from the environmental attributes listed in the impact tables.

Impacts to Upper Atmosphere (Normal Operations). Routine operation of the high-energy laser (HEL) at 12 km altitude will release chlorine and ammonia in the upper reaches of the troposphere and in the lower stratosphere. However, at normal aircraft cruising speed, the concentrations of the chemicals in the mixing volume of the atmosphere would be low and would not pose any toxicity hazards. The concentration levels would rapidly disperse in the high winds. In the troposphere, chlorine emissions would be quickly converted to water soluble forms, and most would be removed from the atmosphere through precipitation without ever reaching the stratosphere. If the ABL aircraft is flying in the stratosphere when the HEL is fired, the local concentration of chlorine would increase approximately 35 percent for a short period of time (less than 24 hours). The naturally occurring winds would continue to mix the chlorine from the HEL firing within the stratosphere. The long term increase of chlorine in the stratosphere from all PDRR ABL HEL firings would be less than 3×10^{-7} percent over normal background levels of chlorine. Flights by the Black Brant and Orion target missiles would emit chlorine into the stratosphere. However, emission levels would rapidly decrease to the background level, as stratospheric winds disperse the chlorine.

Impacts to Upper Atmosphere (Emergency Operations). The PDRR ABL aircraft has Halon 1301, a Class I ozone-depleting substance, on board as a fire suppressant. The Halon 1301 could be released in the event of a fire onboard the aircraft. The probability of a fire is extremely low and in the unlikely event of a release, a very small amount of Halon would reach the atmosphere. An emergency operation could involve the dumping of aircraft fuel and laser chemicals into the atmosphere. However, concentration levels would be well below toxic exposure limits in the mixing volume of the atmosphere and would have no measurable long-term impacts on the environment.

Accidents. Accidents involving spills of fuels, fires, explosions, or other events may have harmful environmental impacts to natural resources. The possibility of such occurrences would be remote, and strict compliance with federal and state regulations for safety, transportation, and hazardous material handling would minimize adverse impacts to every degree feasible.

CUMULATIVE IMPACTS

Cumulative impacts result from the incremental impact of a PDRR ABL Phase alternative when combined with the impacts of *other* past, present, and reasonably foreseeable future actions at a location. Those activities and resource attributes associated with implementing PDRR ABL Phase activities which may contribute to cumulative impacts are summarized in the Cumulative Impact section of each location. However, no specific information regarding activities of other programs which may be scheduled at the locations in the years 1999-2002 is currently available for analysis. A more detailed analysis will be done as the information becomes available and as PDRR ABL system test details are defined.

Generally, the contribution to cumulative impacts from PDRR ABL activities at each specific site is minor. Two items, however, deserve further mention. First, missile launches at all the ranges are likely to result in startle responses in local wildlife. It is especially true, however, at Vandenberg AFB which has the fewest launches per year of any of the proposed ranges under current operations. Second, PDRR ABL Phase activities at the Home Base would add several million dollars in wages and procurement spending to the local economy, providing a beneficial effect.

CONCLUSION

The purpose of this FEIS is two-fold: 1) to determine the environmental impacts of PDRR ABL Phase activities, and 2) to utilize this information to incorporate environmental considerations early in the design process. The USAF will review the design and analyze any hazards associated with the PDRR ABL Phase. Once safety and environmental hazards are identified, design modifications, safety features, and operational procedures will be defined to reduce the risks to workers the public, and the environment.

REPOSITORIES

The full Environmental Impact Statement will be available for review for at least 30 days from the Notice of Availability published in the *Federal Register* at the following libraries:

Government Documents Section
Zimmerman Library
University of New Mexico
Albuquerque, New Mexico

Reference Section
E.P. Foster Library
651 E. Main Street
Ventura, California

Reference Section
Albuquerque Public Library
501 Copper N.W.
Albuquerque, New Mexico

Government Documents Section
University Library
New Mexico State University
Las Cruces, New Mexico

Reference Section
Branigan Memorial Library
202 East Picacho Avenue
Las Cruces, New Mexico

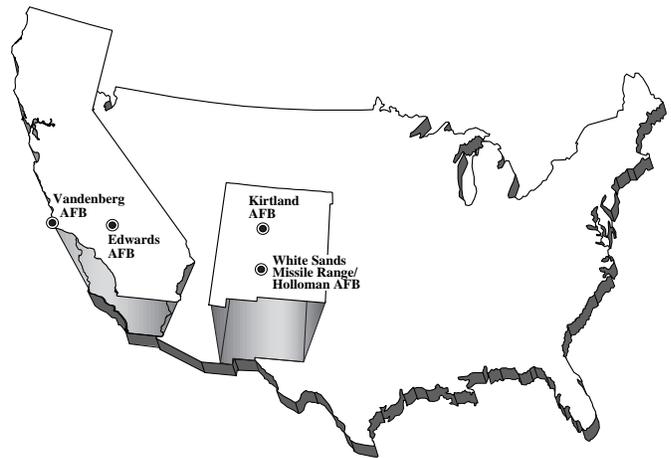
Roy A. Knapp Library
Antelope Valley College
3041 W. Avenue K
Lancaster, California

Base Library
Building 2665
Edwards Air Force Base, California
Base Library
Building 22204
Kirtland AFB, New Mexico

Lompoc Public Library
501 E. North Avenue
Lompoc, California
Alamogordo Public Library
920 Oregon Avenue
Alamogordo, New Mexico

Socorro Public Library
401 Park Street
Socorro, New Mexico

Truth or Consequences Public Library
325 Library Lane
Truth or Consequences, New Mexico



APPENDIX C NOTICE OF INTENT

APPENDIX C
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DEPARTMENT OF DEFENSE

Office of the Secretary

PREPARATION OF A SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (SEIS) FOR THE AIRBORNE LASER (ABL) PROGRAM.

AGENCY: Missile Defense Agency (MDA), Department of Defense

ACTION: Notice of Intent

SUMMARY:

MDA is preparing a Supplemental final environmental impact statement (SEIS) for the Program Definition and Risk Reduction (PDRR) Phase of the Airborne Laser Program (ABL) (April 1997) and Record of Decision (ROD) (September 1997). The SEIS will analyze proposed ABL Program test activities at Kirtland Air Force Base (AFB), Holloman Air Force Base (AFB), and White Sands Missile Range (WSMR), New Mexico, and Edwards Air Force Base (AFB), Vandenberg Air Force Base (AFB), and the adjacent Point Mugu Naval Air Warfare Center (PMNAWC) Sea Range, California. The SEIS will be prepared in accordance with the National Environmental Policy Act, (NEPA) as amended (42 U.S. Code [U.S.C.] 4321, et seq.), and the Council on Environmental Quality Regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508).

The ABL is a laser weapon system installed on a Boeing 747-400F aircraft capable of operating for extended periods of time. Up to two such aircraft would be developed. The ABL weapon system is proposed to include four lasers:

- Active Ranging System (ARS) Laser (a small carbon dioxide laser used to begin tracking a target),

- Track Illumination Laser (TILL), (a solid state laser used to provide detailed tracking of a target),
- Beacon Illuminator Laser (BILL), (a solid state laser used to measure atmospheric distortion), and
- High-Energy Laser (HEL), (i.e., Chemical Oxygen-Iodine Laser (COIL) - a chemical laser used to destroy a target).

An additional laser, a surrogate for the HEL (SHEL), will be used during testing in place of the HEL. The SHEL is a low-power solid-state laser that would be used in both ground and flight testing. The ABL also would include an Infrared Search and Track (IRST) sensor (a passive infrared device used to identify heat sources).

The 1997 PDRR ABL final environmental impact statement (FEIS) analyzed use of a COIL HEL on board an aircraft to destroy ballistic missiles in the boost phase. The ROD on the FEIS documented the Air Force's decision to proceed with PDRR phase ABL home base activities at Edwards AFB, diagnostic test activities over WSMR, and expanded area test activities at Vandenberg AFB and the PMNAWC Sea Range. Since completion of the FEIS, specific proposed test activities have been identified and additional information made available about the proposed testing that warrant preparation of an SEIS.

FOR FURTHER INFORMATION CONTACT: Ms. Pamela Bain, Director, External Affairs, Missile Defense Agency, 7100 Defense Pentagon, Washington, DC 20301-7100.

SUPPLEMENTARY INFORMATION: The MDA is developing an ABL element of the Ballistic Missile Defense System (BMDS). The BMDS being developed is intended to provide an effective defense for the United States, its deployed forces, and its friends and

allies from limited missile attack, during all segments of an attacking missile's flight. The BMDS includes separate elements to provide a defense during each of the three segments of missile flight. These segments are boost, midcourse, and terminal. While multiple elements could be used to defend against an attack, if necessary, during each of the threat's flight segments, each BMDS element is designed to work separately to provide a militarily significant defense, even if no other BMDS element exists.

The ABL element of BMDS is being developed to provide an effective defense to limited ballistic missile threats during the boost segment of an attacking missile's flight. The Air Force began development of the ABL program aircraft in November 1996. In October 2001, ABL was transferred from the Air Force to the Ballistic Missile Defense Organization, which was renamed in January 2002 as the MDA.

ALTERNATIVES: Test activities and proposed alternative test locations to be addressed in the SEIS include:

- Ground tests of the ARS, TILL, BILL, and SHEL at Kirtland AFB WSMR/Holloman AFB.
- Flight tests of the ARS, TILL, BILL, SHEL and HEL (i.e., COIL) at WSMR
- Flight tests of the ARS, TILL, BILL, and HEL at Vandenberg AFB and the PMNAWC Sea Range
- Ground and flight tests of the ARS, TILL, BILL, SHEL, and HEL at EAFB.

As proposed, the ABL aircraft would be housed in an existing hanger at Edwards AFB. Edwards AFB is also where the laser device would be integrated into the aircraft, where ground and flight tests would occur, and where initial flight tests of the aircraft would be

performed. The ABL aircraft also would be flown to Kirtland AFB to conduct ground testing and would use existing runways at both bases. Additional flight tests would take place at WSMR. Both ground and flight tests would take place at Vandenberg AFB and the PMNAWC Sea Range. Flight tests that include ABL destruction of a missile are proposed at WSMR and/or Vandenberg AFB and the PMNAWC Sea Range.

PDRR ABL ground tests¹ are proposed to include tests of individual components, integration of the components on the ABL, and ground test of the integrated ABL. Flight tests are proposed to test each stage of the target acquisition and destruction process. Early flight tests will test the ARS, TILL, and BILL ability to provide accurate tracking and targeting. The flight tests will progress to use of SHEL, and will culminate with tests of the entire ABL element's ability to destroy a representative threat missile using the COIL HEL. Targets for flight tests are proposed to include target boards attached to balloons (MARTI²) and to piloted aircraft (Proteus³), sounding rockets, Lance, Black Brant, Aries missiles, and a limited number of representative threat missiles.

Although the FEIS (1997) analyzed both ground and flight tests involving the COIL HEL, the majority of these tests have not yet been performed. All tests proposed for the ABL PDRR phase are summarized in the following table. The table includes the tests analyzed in the FEIS which have not yet been performed, as well as additional ground and flight tests required for testing the ARS, TILL, BILL, SHEL, and HEL.

¹ Ground tests include rotoplane, billboard, and range simulator targets. The billboard target is a piece of material such as Plexiglas or stainless steel that contains sensors. A rotoplane target is a spinning ground target designed to simulate a missile in flight.

² Missile Alternative Range Target Instrument (MARTI) Drop is a balloon with a target board attached used during flight tests.

³ Proteus Aircraft is a manned aircraft with a target board attached that is used during flight tests.

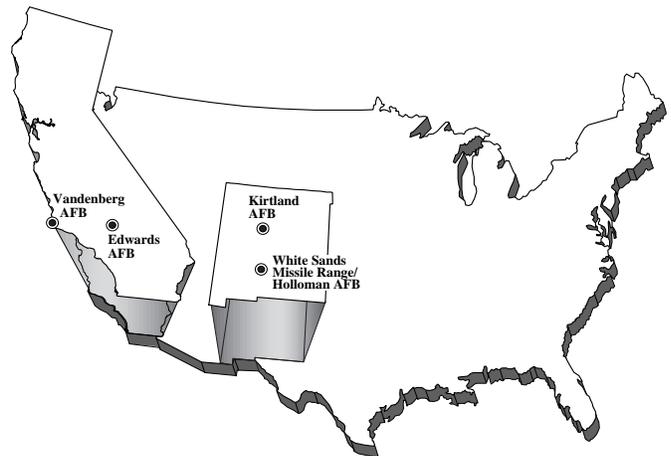
| Proposed Test Location | Type of Test | Type of Flight Engagement for Each Aircraft | | |
|------------------------|---------------------|---|------------------|----------------|
| | | MARTI Drop | Proteus Aircraft | Missile Launch |
| Vandenberg AFB | Flight Tests | 0 | 0 | 25 |
| WSMR/Holloman AFB | Ground/Flight Tests | 50 | 50 | 35 |
| Edwards AFB | Ground/Flight Tests | 50 | 50 | 0 |
| Kirtland AFB | Ground Tests | 0 | 0 | 0 |

AFB = Air Force Base
WSMR = White Sands Missile Range

SCOPING PROCESS: This SEIS will assess environmental issues associated with the proposed action, reasonable alternatives including the No-Action Alternative, and foreseeable future actions and cumulative effects. Under the No-Action Alternative, there would be no change to ABL test activities from those documented in the PDRR ABL ROD signed in September 1997. Scoping will be conducted to identify environmental, safety and occupational health issues to be addressed in the SEIS. Public scoping meetings will be held as part of the SEIS preparation process, as described below. Public comments will be solicited to assist in scoping related environmental issues for analysis in the SEIS. Alternatives to the proposed actions may be identified verbally and in writing during the public scoping process.

| Location | Date | Place | Time |
|-----------------|---------|--|-----------|
| Lancaster, CA | 4/1/02 | Antelope Valley Inn 44055 North Sierra Highway | 7:00 p.m. |
| Lompoc, CA | 4/3/02 | Lompoc City Council Chambers 100 Civic Center Plaza | 7:00 p.m. |
| Albuquerque, NM | 4/15/02 | Albuquerque Marriott 2101 Louisiana Boulevard, NE | 7:00 p.m. |
| Las Cruces, NM | 4/17/02 | Holiday Inn de Las Cruces 201 E. University Avenue | 7:00 p.m. |

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**APPENDIX D
ENVIRONMENTAL IMPACT STATEMENT
MAILING LIST**

APPENDIX D

ENVIRONMENTAL IMPACT STATEMENT MAILING LIST

APPENDIX D
ENVIRONMENTAL IMPACT STATEMENT MAILING LIST

This list of recipients includes interested federal, state, and local agencies and individuals that have expressed an interest in receiving the document. This list also includes the governors of California and New Mexico, as well as United States senators and representatives and state legislators.

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Federal Officials – State of California

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The Honorable Barbara Boxer
United States Senator
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The Honorable Dianne Feinstein
United States Senator
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The Honorable Dianne Feinstein
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The Honorable William Thomas
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Washington, DC 20510

The Honorable Jeff Bingaman
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505 South Main
Las Cruces, NM 88001

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Washington, DC 20510-3101

U.S. House of Representatives

The Honorable Joe Skeen
Rayburn House Office Building
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Washington, DC 20515

The Honorable Tom Udall
502 Cannon House Office Building
Washington, DC 20515

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The Honorable George Runner
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Office of the Governor
State Capitol Building
Santa Fe, NM 87503

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Roswell, NM 88202

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Glencoe, NM 88324

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Albuquerque, NM 87102

The Honorable Sheryl Williams Stapleton
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3035 Hillrise Drive
Las Cruces, NM 88011

The Honorable Benjamin B. Rios
233 South San Pedro Street
Las Cruces, NM 88001

The Honorable Gloria C. Vaughn
503 E. 16th Street
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The Honorable J. Paul Taylor
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The Honorable Joseph Cervantes
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Las Cruces, NM 88001

The Honorable Dona G. Irwin
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Mayor of Lancaster
City of Lancaster Mayor's Office
44933 North Fern Avenue
Lancaster, CA 93534

Mayor of Lompoc
City of Lompoc Mayor's Office
100 Civic Center Plaza
Lompoc, CA 93438-8001

Mayor of Palmdale
City of Palmdale Mayor's Office
38300 Sierra Highway
Palmdale, CA 93550

Santa Barbara County Board of Supervisors
Joni Gray
401 East Cypress Avenue
Lompoc, CA 93436

Santa Barbara County Board of Supervisors
Gail Marshall
105 East Anapamu Street
Santa Barbara, CA 93101

Local Officials - New Mexico

City of Alamogordo Mayor's Office
1316 E. 9th Street
Alamogordo, NM 88310

City of Albuquerque Mayor's Office
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Albuquerque, NM 87103

Mayor of Las Cruces
200 N. Church
Las Cruces, NM 88001

Mayor, Village of Tularosa
703 St. Francis Drive
Tularosa, NM 88352

Mayor, Town of Carrizozo
P.O. Box 247
Carrizozo, NM 88301-0247

Federal Agencies

U.S. Army Corps of Engineers
Los Angeles District
Ventura Regulatory Office
2151 Alessandro Drive, Suite 255
Ventura, CA 93001

U.S. Department of Agriculture Forest Service
Lincoln National Forest
Forest Supervisor
1101 New York Avenue
Alamogordo, NM 88310-6992

U.S. Department of the Interior
Bureau of Land Management, NEPA Coordinator
Las Cruces District Office
1800 Marquess Street
Las Cruces, NM 88005

U.S. Department of the Interior
Bureau of Land Management, NEPA Coordinator
Roswell District Office
2909 W. Second Street
Roswell, NM 88201-2019

Department of the Interior
Bureau of Land Management
NM State Office
P.O. Box 27115
Santa Fe, NM 87503

Department of the Interior
U.S. Fish and Wildlife Service
NM Ecological Services State Office
2105 Osuna NE
Albuquerque, NM 87113

Department of the Interior
U.S. Fish and Wildlife Service
2493 Portola Road, Suite B
Ventura, CA 93003

Department of the Interior
U.S. Fish and Wildlife Service
San Andres National Wildlife Refuge
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Las Cruces, NM 88004

Department of Energy
P.O. Box 5400
Albuquerque, NM 87185-5400

Department of the Interior
Office of Environmental Affairs
1849 C. Street NW
Washington, DC 20240

U.S. Environmental Protection Agency
Office of Environmental Policy and Compliance
Main Interior Building, MS 2340
1849 "C" Street, NW
Washington, DC 20240

U.S. Environmental Protection Agency
Office of Federal Activities, Room 7241
Ariel Rios Building (south Oval Lobby)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

U.S. Environmental Protection Agency, Region 6
Regional Administrator
First Interstate Bank Tower at Fountain Place
1444 Ross Avenue, 12th Floor
Suite 120
Dallas, TX 75202-2733

U.S. Environmental Protection Agency, Region 9
Director, Office of Federal Activities
75 Hawthorne Street
San Francisco, CA 94105

Federal Aviation Administration
ASW-900/AF Rep.
Fort Worth, TX 76193-0640

FAA ABQ ARTCC ZAB-530
8000 Louisiana Boulevard, NE
Albuquerque, NM 87109-5000

U.S. Forest Service
Sandia Ranger District
Cibola National Forest
11776 Highway 337
Tijeras, NM 87509

U.S. Department of the Interior
National Park Service
White Sands National Monument
P.O. Box 1086
Holloman AFB, NM 88330

HQ FAA/ATA-300
800 Independence Avenue, SW
Room 422
Washington, DC 20591

FAA, Western Pacific Region
Air Traffic Division, AWP-520.5
15000 Aviation Boulevard
Hawthorne, CA 90250

FAA Southwest Region
ASW-520.6
2601 Meacham Boulevard
Fort Worth, TX 76137-0920

National Marine Fisheries Service
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802-4213

Department of Defense

ATZC-DOE-C
B624, Pleasanton Road
Fort Bliss, TX 79916-6812

ATZC-B
USA Combined Arms Support Battalion
Fort Bliss, TX 79916-6812

49 CES/CEVA
550 Tabosa Avenue, Building 55
Holloman AFB, NM 88330-8458

HQ AFCEE/ECE
3300 Sidney Brooks
Brooks City-Base, TX 78253-5112

HQ AFSPC/CEVP
150 Vandenberg Street, Suite 1105
Peterson AFB, CO 80914-4150

ASC/TMI
3300 Target Road, Building 760
Kirtland AFB NM 87117-6612

377 CES/CEVQ
2050 Wyoming Boulevard SE
Suite 119
Kirtland AFB, NM 87117-5270

CSC, ABL BEE
Federal Sector-Defense Group
Air Force Flight Test Center
P.O. Box 446
Edwards AFB, CA 93523-0046

30 SW/XPR
806 13th Street, Suite 3A
Vandenberg AFB, CA 93437-5244

U.S. Army White Sands Missile Range
Commander
White Sands Missile Range, NM 88002-5000

AFFTC/EM
5 East Popsin Avenue, Building 2650 A
Edwards AFB, CA 93524-1130

HQ ACC/CEVP
11817 Canon Boulevard, Suite 213
Newport News, VA 23606

HQ ACC/DR-ABL
204 Dodd Boulevard, Suite 103
Langley AFB, VA 23665-2777

HQ AFMC/CEVQ
4225 Logistics Avenue, Room A128
Wright-Patterson AFB, OH 45433-5747

Chief, WS-ES-C
Building 163
WSMR, NM 88002-5000

30 CES/CEV
806 13th Street, Suite 116
Vandenberg AFB, CA 93437-5242

46 TG Det 1/TGORE
Building 124, Room 138
WSMR, NM 88002-5000

Missile Defense Agency
7100 Defense
Pentagon, Washington DC 20301-7100

NAVAIR Weapons Division, Code 529600E
Building 53
575 I Avenue, Suite 1
Point Mugu, CA 93042-5049

HQ USAF/ILEPB
1260 Air Force Pentagon
Washington, DC 20330

SMDC-EN-V-N
U.S. Army Space and Missile Defense Command
106 Wynn Drive
Huntsville, AL 35807

AFRL-HEDO
Brooks AFB, TX 78253

State of California Agencies

California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

California Coastal Commission
Federal Consistency Review
45 Fremont Street
San Francisco, CA 94105-2219

California Department of Fish and Game
1416 Ninth Street
Sacramento, CA 95814

California Department of Fish and Game
P.O. Box 2330
Lake Isabella, CA 93240

California Environmental Protection Agency
Department of Toxic Substances Control
1001 I Street
Sacramento, CA 95812-2828

California Regional Water Quality Control Board
Central Coast Region
81 Higuera Street, Suite 200
San Luis Obispo, CA 93401-5414

State of California Clearinghouse
Governors Office
1400 Tenth Street, Room 121
Sacramento, CA 95814

California State Historic Preservation Officer
Office of Historic Preservation
Department of Parks and Recreation
P.O. Box 942896
Sacramento, CA 94296-0001

State of New Mexico Agencies

New Mexico Department of Energy, Minerals, and Natural Resources
Mining and Minerals Department
1220 South St. Francis Drive
Santa Fe, NM 87505

New Mexico Department of Game and Fish
Villagra Building
P.O. Box 25112
Santa Fe, NM 87504

New Mexico Environment Department
Environmental Impact Review Coordinator
Harold Runnels Building
1190 St. Francis Drive, P.O. Drawer 26110
Santa Fe, NM 87502-0110

New Mexico Environment Department
Air Quality Bureau
Harold S. Runnels Building
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87505

New Mexico Environment Department
Hazardous and Radioactive Materials Bureau
Harold S. Runnels Building
P.O. Box 26110
Santa Fe, NM 87505

State Historic Preservation Office
Villa Rivera Building, 3rd Floor
228 East Palace Avenue
Santa Fe, NM 87503

Local Government Agencies-California

Antelope Valley Air Quality Management District
43301 Division Street, Suite 206
Lancaster, CA 93539-4409

Kern County Air Pollution Control District
2700 M Street
Suite 302
Bakersfield, CA 93301-2307

Mojave Desert Air Quality Management District
14306 Park Avenue
Victorville, CA 92392-2310

City of Lompoc Planning Department
100 Civic Center Plaza
Lompoc, CA 93438-8001

Santa Barbara County
Air Pollution Control District
26 Castilian Drive, Suite B-23
Goleta, CA 93117

Santa Barbara County Department of Planning & Development
123 East Anapamu Street
Santa Barbara, CA 93101-2058

Other Agencies/Individuals - California

Santa Ynez Chumash Indian Reservation
Tribal Elders Council
P.O. Box 365
Santa Ynez, CA 93460

Chairman Delia Dominguez
Kitanemuk
981 North Virginia Street
Covina, CA 91722

San Manuel Board of Mission Indians
Tribal Chairman Deron Marquez
3284 Victoria Avenue
Highland, CA 92346-1737

Native American Heritage Commission
915 Capital Mall, Room 364
Sacramento, CA 95814

La Purisima Audubon Society
P.O. Box 2045
Lompoc, CA 93438

Environmental Defense Center
906 Garden Street, Suite 2
Santa Barbara, CA 93101

Sierra Club
Box 333
Lompoc, CA 93436

UC Santa Barbara
Dept of Ecology, Evolution and Marine Biology
Santa Barbara, CA 93106-4610

Santa Barbara Museum of Natural History
2559 Puesta del Sol Road
Santa Barbara, CA 93105-2936

Santa Barbara News Press
908 North H Street
Lompoc, CA 93436

Santa Maria Times
3200 Skyway Drive
P.O. Box 400
Santa Maria, CA 93456

California Native Plant Society
1530 Bayview Heights Drive
Los Osos, CA 93402-4412

Robert E. Blaschkg

Fred Kovol

James Kuga

Mary Anna Navarro

Charles Wehunt

Local Government Agencies-New Mexico

Albuquerque International Sunport
P.O. Box 9022
Albuquerque, NM 87119

City of Albuquerque Environmental Health Department
P.O. Box 1293
Albuquerque, NM 87103

Dona Ana County Manager
180 W. Amador
Las Cruces, NM 88001

Dona Ana County Commission
180 W. Amador
Las Cruces, NM 88001

Lincoln County Manager
300 Central Avenue, P.O. Box 711
Carrizozo, NM 88301-711

Lincoln County Commission
300 Central Avenue, P.O. Box 711
Carrizozo, NM 88301-711

Otero County Manager
1000 New York Avenue
Alamogordo, NM 88310-6935

Otero County Commission
1000 New York Avenue
Alamogordo, NM 88310-6935

Sierra County Manager
311 Date Street
Truth or Consequences, NM 87901

Sierra County Commission
311 Date Street
Truth or Consequences, NM 87901

Socorro County Manager
P.O. Box 1
Socorro, NM 87801-0001

Socorro County Commission
P.O. Box 1
Socorro, NM 87801-0001

Other Agencies/Individuals-New Mexico

Governor Steuwart Paisano
Sandia Pueblo
P.O. Box 6008
Bernalillo, NM 87004

Governor Alvino Lucero
Isleta Pueblo
P.O. Box 1270
Isleta, NM 87022

Governor Joe V. Cajero
Jemez Pueblo
P.O. Box 100
Jemez Pueblo, NM 87024

Executive Committee
Mescalero Apache Tribe
P.O. Box 227
Mescalero, NM 88340

Chairman Gene Maroquin
Apache Tribe of Oklahoma
P.O. Box 1220
Anadarko, OK 73005

Bosque Del Apache Wildlife Refuge
P.O. Box 1246
Socorro, NM 87801

New Mexico State University
Jornada Experimental Refuge
Las Cruces, NM 88003-8001

Robert Anderson

John Geddie

Jeanne Pahls

John Roberts

Libraries

Alamogordo Public Library
920 Oregon Avenue
Alamogordo, NM 88310

Albuquerque Public Library
501 Copper Avenue NW
Albuquerque, NM 87102

Branigan Memorial Library
200 East Picacho Avenue
Las Cruces, NM 88001

Edwards AFB Library
5 W. Yeager Boulevard, Building 2665
Edwards AFB, CA 93524

E.P. Foster Library
651 E. Main Street
Ventura, CA 93001

Holloman AFB Library
496 Fourth Street, Building 224
Holloman AFB, NM 88330

Kirtland AFB Library
Building 20250
Kirtland AFB, NM 87117

Lancaster Library
601 West Lancaster Boulevard
Lancaster, CA 93534

Lompoc Public Library
501 E. North Avenue
Lompoc, CA 93436-3406

New Mexico State Library
1209 Camino Carlos Rey
Santa Fe, NM 87507-5166

New Mexico Tech Library
801 Leroy Place
Socorro, NM 87801

Palmdale City Library
700 E. Palmdale Boulevard
Palmdale, CA 93550

Santa Barbara Public Library
40 East Anapamu Street
Santa Barbara, CA 93101-2000

Santa Maria Public Library
420 South Broadway
Santa Maria, CA 93454-5199

Socorro Public Library
401 Park Street
Socorro, NM 87801

Truth or Consequences Public Library
325 Library Lane
Truth or Consequences, NM 87901-2375

University of California at Santa Barbara Library
Government Publications Department
Santa Barbara, CA 93106-9010

University of New Mexico
Zimmerman Library
1900 Roma NE
Albuquerque, NM 87131-1466

WSMR Post/Technical Library
Building 464
White Sands Missile Range, NM 88002

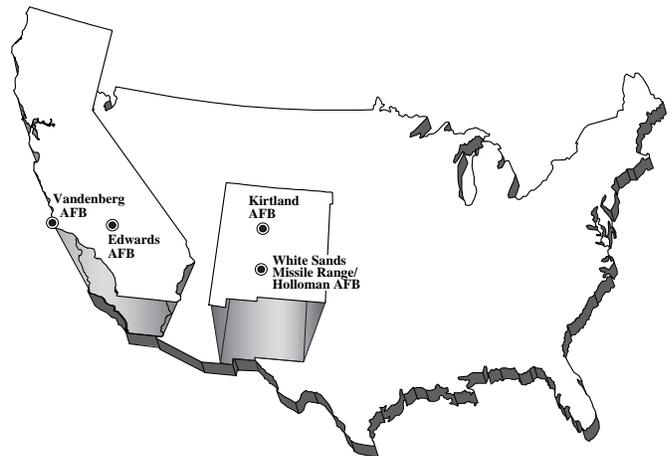
El Paso Public Library
501 N. Oregon
El Paso, TX 79901

New Mexico State University
Branson Library, Dept. 3475
P.O. Box 30006
Las Cruces, NM 88003

New Mexico State University-A Library
2400 North Scenic Drive
Alamogordo, NM 88310

University of Texas-El Paso Library
500 West University Avenue
El Paso, TX 79968

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APPENDIX E AGENCY LETTERS AND CORRESPONDENCE

APPENDIX E

AGENCY LETTERS AND CORRESPONDENCE



United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

July 11, 2002

Cons. # 2-22-02-I-513

Charles J. Brown, Environmental Coordinator
Project Execution Division
Headquarters Air Force Center for
Environmental Excellence
Brooks Air Force Base
San Antonio, Texas 78201

Dear Mr. Brown:

Thank you for your June 7, 2002, letter requesting information on threatened or endangered species or important wildlife habitats that could be affected by ground-based testing of the Airborne Laser (ABL) Program at Kirtland Air Force Base, Bernalillo County, New Mexico. The Air Force is preparing a Supplemental Environmental Impact Statement to update base assignments and testing parameters associated with the proposed testing. Systems and lasers to be tested include the Active Ranging System, Beacon Illumination Laser, Tracking Illumination Laser, and Surrogate High-Energy Laser.

The list of federally endangered, threatened, proposed, and candidate species included in your letter is incomplete. We have enclosed a current list of species that may be found in Bernalillo County, New Mexico. Additional information about these species is available on the Internet at <http://nmrareplants.unm.edu>, <http://nrmhp.unm.edu/bisonm/bisonm.cfm>, and <http://ifw2es.fws.gov/endangeredspecies>. Under the Endangered Species Act, as amended (Act), it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with us further. If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts. Please keep in mind that the scope of federally listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect or cumulative effects.

Candidates and species of concern have no legal protection under the Act and are included in this document for planning purposes only. We monitor the status of these species. If significant declines are detected, these species could potentially be listed as endangered or threatened.

Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. We recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands. These habitats should be conserved through avoidance, or mitigated to ensure no net loss of wetlands function and value.

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U.S. Fish and Wildlife Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until nesting is complete.

We suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding fish, wildlife, and plants of State concern.

Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. In future correspondence regarding this project, please refer to consultation # 2-22-02-I-513. If you have any questions about the information in this letter, please contact Maureen Murphy at the letterhead address or at (505) 346-2525, ext.115.

Sincerely,



Joy E. Nicholopoulos
Field Supervisor

Enclosure

cc: (w/o enc)

Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry
Division, Santa Fe, New Mexico

FEDERAL ENDANGERED, THREATENED,
PROPOSED, AND CANDIDATE SPECIES
AND SPECIES OF CONCERN IN NEW MEXICO
Consultation Number 2-22-02-I-513
July 11, 2002

Bernalillo County

ENDANGERED

Black-footed ferret (*Mustela nigripes*)**
Southwestern willow flycatcher (*Empidonax traillii extimus*)
Whooping crane (*Grus americana*) nonessential experimental
Rio Grande silvery minnow (*Hybognathus amarus*)

THREATENED

Bald eagle (*Haliaeetus leucocephalus*)
Mexican spotted owl (*Strix occidentalis lucida*)

PROPOSED THREATENED

Mountain plover (*Charadrius montanus*)

CANDIDATE

Yellow-billed cuckoo (*Coccyzus americanus*)

SPECIES OF CONCERN

New Mexican meadow jumping mouse (*Zapus hudsonius luteus*)
Pecos River muskrat (*Ondatra zibethicus ripensis*)
Townsend's big-eared bat (*Corynorhinus townsendii*)
American peregrine falcon (*Falco peregrinus anatum*)
Arctic peregrine falcon (*Falco peregrinus tundrius*)
Baird's sparrow (*Ammodramus bairdii*)
Black tern (*Chlidonias niger*)
Northern goshawk (*Accipiter gentilis*)
Millipede (*Comanachelus chihuanus*)

Index

| | | |
|--------------------|---|--|
| Endangered | = | Any species which is in danger of extinction throughout all or a significant portion of its range. |
| Threatened | = | Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. |
| Candidate | = | Candidate Species (taxa for which the Service has sufficient information to propose that they be added to list of endangered and threatened species, but the listing action has been precluded by other higher priority listing activities). |
| Species of Concern | = | Taxa for which further biological research and field study are needed to resolve their conservation status <u>OR</u> are considered sensitive, rare, or declining on lists maintained by Natural Heritage Programs, State wildlife agencies, other Federal agencies, or professional/academic scientific societies. Species of Concern are included for planning purposes only. |
| * | = | Introduced population |
| ** | | Survey should be conducted if project involves impacts to prairie dog towns or complexes of 200-acres or more for the Gunnison's prairie dog (<i>Cynomys gunnisoni</i>) and/or 80-acres or more for any subspecies of Black-tailed prairie dog (<i>Cynomys ludovicianus</i>). A complex consists of two or more neighboring prairie dog towns within 4.3 miles (7 kilometers) of each other. |
| *** | = | Extirpated in this county |
| † | = | May occur in this county from re-introductions in Colorado. |



United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

July 12, 2002

Cons. # 2-22-02-I-514

Charles J. Brown, Environmental Coordinator
Project Execution Division
Headquarters Air Force Center for
Environmental Excellence
Brooks Air Force Base
San Antonio, Texas 78201

Dear Mr. Brown:

Thank you for your June 7, 2002, letter requesting information on threatened or endangered species or important wildlife habitats that could be affected by air-based testing of the Airborne Laser (ABL) Program at White Sands Missile Range, including portions of Doña Ana, Lincoln, Otero, Sierra, and Socorro Counties in New Mexico. The Air Force is preparing a Supplemental Environmental Impact Statement to update base assignments and testing parameters associated with the proposed testing. Systems and lasers to be tested include the Active Ranging System, Beacon Illumination Laser, Tracking Illumination Laser, Surrogate High-Energy Laser, High-Energy Laser, .

We have enclosed a current list of species that may be found in Doña Ana, Lincoln, Otero, Sierra, and Socorro Counties, New Mexico. Additional information about these species is available on the Internet at <<http://nmrareplants.unm.edu>>, <<http://nmmhp.unm.edu/bisonm/bisonm.cfm>>, and <<http://ifw2es.fws.gov/endangeredspecies>>. Under the Endangered Species Act, as amended (Act), it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with us further. If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts. Please keep in mind that the scope of federally listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect or cumulative effects.

Candidates and species of concern have no legal protection under the Act and are included in this document for planning purposes only. We monitor the status of these species. If significant

declines are detected, these species could potentially be listed as endangered or threatened. Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. We recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands. These habitats should be conserved through avoidance, or mitigated to ensure no net loss of wetlands function and value.

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U.S. Fish and Wildlife Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until nesting is complete.

We suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding fish, wildlife, and plants of State concern.

Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. In future correspondence regarding this project, please refer to consultation # 2-22-02-I-514. If you have any questions about the information in this letter, please contact Maureen Murphy at the letterhead address or at (505) 346-2525, ext.115.

Sincerely,



Joy E. Nicholopoulos
Field Supervisor

Enclosure

cc: (w/o enc)

Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry
Division, Santa Fe, New Mexico

FEDERAL ENDANGERED, THREATENED,
PROPOSED, AND CANDIDATE SPECIES
AND SPECIES OF CONCERN IN NEW MEXICO

Consultation Number 2-22-02-I-514

July 11, 2002

Doña Ana County

ENDANGERED

Interior least tern (*Sterna antillarum*)
Northern aplomado falcon (*Falco femoralis septentrionalis*)
Southwestern willow flycatcher (*Empidonax traillii extimus*)
Rio Grande silvery minnow (*Hybognathus amarus*)***
Sneed pincushion cactus (*Coryphantha sneedii* var. *sneedii*)

THREATENED

Bald eagle (*Haliaeetus leucocephalus*)
Mexican spotted owl (*Strix occidentalis lucida*)

CANDIDATE

Yellow-billed cuckoo (*Coccyzus americanus*)

SPECIES OF CONCERN

Desert pocket gopher (*Geomys bursarius arenarius*)
Organ Mountains Colorado chipmunk (*Eutamias quadrivittatus australis*)
Townsend's big-eared bat (*Corynorhinus townsendii*)
Western red bat (*Lasiurus blossevillii*)
Pecos River muskrat (*Ondatra zibethicus ripensis*)
White Sands woodrat (*Neotoma micropus leucophaea*)
American peregrine falcon (*Falco peregrinus anatum*)
Arctic peregrine falcon (*Falco peregrinus tundrius*)
Baird's sparrow (*Ammodramus bairdii*)
Bell's vireo (*Vireo bellii*)
Black tern (*Chlidonias niger*)
Desert viceroy butterfly (*Limenitis archippus obsoleta*)
Anthony blister beetle (*Lytta mirifica*)
Doña Ana talussnail (*Sonorella todseni*)
Alamo beard tongue (*Penstemon alamosensis*)
Desert night-blooming cereus (*Cereus greggii* var. *greggii*)
Mescalero milkwort (*Polygala rimulicola* var. *mescalorum*)
Nodding rock-daisy (*Perityle cernua*)
Organ Mountain evening-primrose (*Oenothera organensis*)
Organ Mountain figwort (*Scrophularia laevis*)
Sand prickly pear (*Opuntia arenaria*)
Sandhill goosefoot (*Chenopodium cycloides*)
Standley whitlow-grass (*Draba standleyi*)

Lincoln County

ENDANGERED

- Black-footed ferret (*Mustela nigripes*)**
- Northern aplomado falcon (*Falco femoralis septentrionalis*)
- Kuenzler hedgehog cactus (*Echinocereus fendleri* var. *kuenzleri*)

THREATENED

- Bald eagle (*Haliaeetus leucocephalus*)
- Mexican spotted owl (*Strix occidentalis lucida*)

PROPOSED THREATENED

- Mountain plover (*Charadrius montanus*)

CANDIDATE

- Black-tailed prairie dog (*Cynomys ludovicianus*)

SPECIES OF CONCERN

- New Mexican meadow jumping mouse (*Zapus hudsonius luteus*)
- Organ Mountains Colorado chipmunk (*Eutamias quadrivittatus australis*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)
- Pecos River muskrat (*Ondatra zibethicus ripensis*)
- Penasco (Least) chipmunk, (*Tamias minimus atristriatus*)
- American peregrine falcon (*Falco peregrinus anatum*)
- Arctic peregrine falcon (*Falco peregrinus tundrius*)
- Baird's sparrow (*Ammodramus bairdii*)
- Northern goshawk (*Accipiter gentilis*)
- Yellow-billed cuckoo (*Coccyzus americanus*)
- White Sands pupfish (*Cyprinodon tularosa*)
- Sacramento mountain salamander (*Aneides hardii*)
- Bonita diving beetle (*Deronectes neomexicana*)
- Sacramento Mountains silverspot butterfly (*Speyeria atlantis capitaneensis*)
- Sacramento Mountains blue butterfly (*Icaricia icariodes*)
- Desert viceroy butterfly (*Limenitis archippus obsoleta*)
- Goodding's onion (*Allium gooddingii*)
- Sierra Blanca cliff daisy (*Chaetopappa elegans*)
- Wright's marsh thistle (*Cirsium wrightii*)

Otero County

ENDANGERED

Black-footed ferret (*Mustela nigripes*)**
 Interior least tern (*Sterna antillarum*)
 Northern aplomado falcon (*Falco femoralis septentrionalis*)
 Southwestern willow flycatcher (*Empidonax traillii extimus*)
 Kuenzler hedgehog cactus (*Echinocereus fendleri* var. *kuenzleri*)
 Sacramento prickly poppy (*Argemone pleiakantha* ssp. *pinnatisecta*)
 Todsens pennyroyal (*Hedeoma todsenii*)

PROPOSED ENDANGERED

Sacramento Mountains checkerspot butterfly (*Euphydryas anicia cloudcrofti*)

THREATENED

Bald eagle (*Haliaeetus leucocephalus*)
 Mexican spotted owl (*Strix occidentalis lucida*)
 Sacramento Mountains thistle (*Cirsium vinaceum*)

PROPOSED THREATENED

Mountain plover (*Charadrius montanus*)

CANDIDATE

Black-tailed prairie dog (*Cynomys ludovicianus*)

SPECIES OF CONCERN

Desert pocket gopher (*Geomys bursarius arenarius*)
 Guadalupe southern pocket gopher (*Thomomys umbrinus guadalupensis*)
 New Mexican meadow jumping mouse (*Zapus hudsonius luteus*)
 Penasco (Least) chipmunk, (*Tamias minimus atristriatus*)
 Townsend's big-eared bat (*Corynorhinus townsendii*)
 White Sands woodrat (*Neotoma micropus leucophaea*)
 American peregrine falcon (*Falco peregrinus anatum*)
 Arctic peregrine falcon (*Falco peregrinus tundrius*)
 Baird's sparrow (*Ammodramus bairdii*)
 Bell's vireo (*Vireo bellii*)
 Black tern (*Chlidonias niger*)
 Northern goshawk (*Accipiter gentilis*)
 Yellow-billed cuckoo (*Coccyzus americanus*)
 Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*)
 White Sands pupfish (*Cyprinodon tularosa*)
 Sacramento mountain salamander (*Aneides hardii*)
 Sacramento Mountains silverspot butterfly (*Speyeria atlantis capitansensis*)
 Sacramento Mountains blue butterfly (*Icaricia icarioides*) new subspecies
 Alamo beard tongue (*Penstemon alamosensis*)

Desert night-blooming cereus (*Cereus greggii* var. *greggii*)
 Goodding's onion (*Allium gooddingii*)
 Guadalupe rabbitbrush (*Chrysothamnus nauseosus* var. *texensis*)
 Gypsum scalebroom (*Lepidospartum burgessii*)
 Sierra Blanca cliff daisy (*Chaetopappa elegans*)
 Villard's pincushion cactus (*Escobaria villardii*)
 Wright's marsh thistle (*Cirsium wrightii*)

Sierra County

ENDANGERED

Black-footed ferret (*Mustela nigripes*)**
 Northern aplomado falcon (*Falco femoralis septentrionalis*)
 Southwestern willow flycatcher (*Empidonax traillii extimus*)
 Whooping crane (*Grus americana*), experimental, non essential population
 Gila trout (*Oncorhynchus gilae*)
 Rio Grande silvery minnow (*Hybognathus amarus*)***
 Todsens's pennyroyal (*Hedeoma todsenii*), with critical habitat

THREATENED

Bald eagle (*Haliaeetus leucocephalus*)
 Mexican spotted owl (*Strix occidentalis lucida*)
 Chiricahua leopard frog (*Rana chiricahuensis*)

CANDIDATE

Black-tailed prairie dog (*Cynomys ludovicianus*)*
 Yellow-billed cuckoo (*Coccyzus americanus*)

SPECIES OF CONCERN

Organ Mountains Colorado chipmunk (*Eutamias quadrivittatus australis*)
 Townsend's big-eared bat (*Corynorhinus townsendii*)
 Southwestern otter (*Lutra canadensis sonorae*)
 White Sands woodrat (*Neotoma micropus leucophaea*)
 American peregrine falcon (*Falco peregrinus anatum*)
 Arctic peregrine falcon (*Falco peregrinus tundrius*)
 Baird's sparrow (*Ammodramus bairdii*)
 Bell's vireo (*Vireo bellii*)
 Black tern (*Chlidonias niger*)
 Northern goshawk (*Accipiter gentilis*)
 Desert sucker (*Catostomus clarkii*)
 Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*)
 Sonora sucker (*Catostomus insignis*)
 White Sands pupfish (*Cyprinodon tularosa*)
 Desert viceroy butterfly (*Limenitis archippus obsoleta*)

Mineral Creek mountainsnail (*Oreohelix pilsbryi*)
 Duncan's pincushion cactus (*Coryphantha duncanii*)
 Pinos Altos flame flower (*Talinum humile*)
 Sandhill goosefoot (*Chenopodium cycloides*)

Socorro County

ENDANGERED

Black-footed ferret (*Mustela nigripes*)**
 Interior least tern (*Sterna antillarum*)
 Northern aplomado falcon (*Falco femoralis septentrionalis*)
 Southwestern willow flycatcher (*Empidonax traillii extimus*)
 Whooping crane (*Grus americana*) nonessential experimental
 Rio Grande silvery minnow (*Hybognathus amarus*)
 Socorro isopod (*Thermosphaeroma thermophilus*)
 Alamosa tryonia (springsnail) (*Tryonia alamosae*)
 Socorro pyrg (springsnail) (*Pyrgulopsis neomexicana*)

THREATENED

Bald eagle (*Haliaeetus leucocephalus*)
 Mexican spotted owl (*Strix occidentalis lucida*) with critical habitat
 Piping plover (*Charadrius melodus*)
 Chiricahua leopard frog (*Rana chiricahuensis*)

PROPOSED THREATENED

Mountain plover (*Charadrius montanus*)

CANDIDATE

Black-tailed prairie dog (*Cynomys ludovicianus*)
 Yellow-billed cuckoo (*Coccyzus americanus*)
 Chupadera pyrg (springsnail) (*Pyrgulopsis chupaderae*)

SPECIES OF CONCERN

Allen's big-eared bat (*Idionycteris phyllotis*)
 Desert pocket gopher (*Geomys bursarius arenarius*)
 New Mexican meadow jumping mouse (*Zapus hudsonius luteus*)
 Organ Mountains Colorado chipmunk (*Eutamias quadrivittatus australis*)
 Townsend's big-eared bat (*Corynorhinus townsendii*)
 Pecos River muskrat (*Ondatra zibethicus ripensis*)
 American peregrine falcon (*Falco peregrinus anatum*)
 Arctic peregrine falcon (*Falco peregrinus tundrius*)
 Baird's sparrow (*Ammodramus bairdii*)
 Bell's vireo (*Vireo bellii*)
 Black tern (*Chlidonias niger*)

Northern goshawk (*Accipiter gentilis*)
 Rio Grande sucker (*Catostomus plebeius*)
 Desert viceroy butterfly (*Limenitis archippus obsoleta*)
 Fugate's blue-star (*Amsonia fugatei*)
 Sandhill goosefoot (*Chenopodium cycloides*)

Index

| | | |
|--------------------|---|--|
| Endangered | = | Any species which is in danger of extinction throughout all or a significant portion of its range. |
| Threatened | = | Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. |
| Candidate | = | Candidate Species (taxa for which the Service has sufficient information to propose that they be added to list of endangered and threatened species, but the listing action has been precluded by other higher priority listing activities). |
| Species of Concern | | Taxa for which further biological research and field study are needed to resolve their conservation status <u>OR</u> are considered sensitive, rare, or declining on lists maintained by Natural Heritage Programs, State wildlife agencies, other Federal agencies, or professional/academic scientific societies. Species of Concern are included for planning purposes only. |
| * | = | Introduced population |
| ** | = | Survey should be conducted if project involves impacts to prairie dog towns or complexes of 200-acres or more for the Gunnison's prairie dog (<i>Cynomys gunnisoni</i>) and/or 80-acres or more for any subspecies of Black-tailed prairie dog (<i>Cynomys ludovicianus</i>). A complex consists of two or more neighboring prairie dog towns within 4.3 miles (7 kilometers) of each other. |
| *** | | Extirpated in this county |
| † | | May occur in this county from re-introductions in Colorado. |



MESCALERO *Apache* TRIBE
San Manuel, Phoenix, Arizona, New Mexico 88340

TRIBAL HISTORIC PRESERVATION OFFICE
101 Central Avenue
P.O. Box 227
Mescalero, New Mexico 88340
Phone: 505/464-4494 ext. 279 or 270
Fax: 505/464-9191

Mr. Charles J. Brown
HQ AFCEE/ECE
3207 Sidney Brooks
Brooks AFB, TX 78235-5344

(X) The *Mescalero Apache Tribe* has determined that the proposed EIS for the Airborne Laser Program **WILL NOT AFFECT** any objects, sites, or locations important to our traditional culture or religion.

() The *Mescalero Apache Tribe* has determined that the proposed project by _____ **WILL AFFECT** objects, sites, or locations important to our traditional culture or religion. We request that the _____ undertake further consultations to evaluate the effects of the project on these sites.

In the future, we request that you minimally provide us with the following items to aid in our determination:

- Cultural Resource Survey Reports
- Site Forms
- Maps (Both General and Site Specific)
- Research Designs (If Applicable)
- Data Recovery Plans (If Applicable)
- Photographs

Thank you for providing the Mescalero Apache Tribe the opportunity to comment on this project. We look forward to reviewing and commenting on future Dept. of the Air Force projects.

CONCUR:

Donna Stern-McFadden

Name

Donna Stern-McFadden
Signature

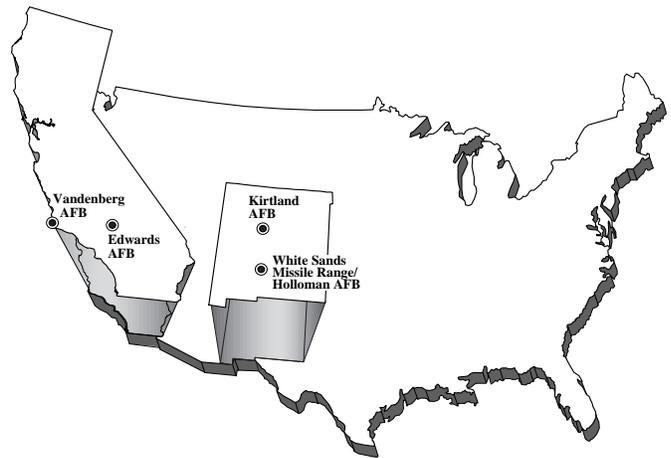
10/16/02

Date

Tribal Historic Preservation Officer

Title

COMMENTS:



APPENDIX F AIR QUALITY

Aircraft Ground Equipment (AGE) Emissions Estimation

A new set of AGE schedules and equipment types were provided. These are listed in Table 1. The new emissions estimation will require more specific emission factor estimates for each piece of equipment as well as a revised estimate of the annual number of hours of activity for each of the major pieces of equipment listed.

Table 1. A summary of test and support equipment and its usage for the current ABL program

| Test Location | Period of Use | Equipment | Qty | Diesel cart usage duration | Notes |
|---------------|---------------------------------------|--------------------------------------|-----|---|--|
| SIL | 7/03 - 9/03 | Hydraulic Mule (Skydrol) | | Assume 1 cart 24 hrs/week | One is used as back up to the one required. Boeing purchased 3 additional electric mules. The program has the use of 4 electric and 2 diesels. |
| SIL | 7/03 - 9/03 | Air Conditioners | | Assume 2 carts 216 hrs/week | AF provided AC's are diesel. We have PCO approval to lease or buy additional AC's to support test program. Plan is to only procure electric. We also have a RFQ on a facility air-conditioning system that would negate the need of using the external AC's. |
| SIL | 7/03 - 9/03 | Electric Generator Cart (400 dc pwr) | | Assume 2 carts 216 hrs/week | Used to provide power to SIL during testing. |
| SIL | 7/03 - 9/03 | Generator - Back-up (150kv) | | 12 wks*30 1 min/wk=6 hours | Back-up for TRICS & FASSM (emergency only) - check runs 30 min/week |
| SIL | 7/03 - 9/03 | Generator - Back-up (400kv) | | 12 wks*30 1 min/wk=6 hours | Back-up for GATOR (emergency only) - check runs 30 min/week |
| Cleanroom | 7/03 - 9/03 | Hydraulic Mule (Skydrol) | | Assume electric 1 cart | Boeing purchased 3 additional electric mules. The program has the use of 4 electric and 2 diesels. |
| IMF Chem Ops | 7/03 - 9/03, 3/04 - 5/04, 5/04 - 6/05 | BHP Fill Cart Generator | | Assume 1 test/ week in 03; 1/week for 3-5/04 and 1.5/week for 04-05; 8 hours 1 per test | Period of use is for SIL testing, HEL ground testing and flight testing including post demo. Generator would be running approximately 8 hours for every 120 hours or every BHP fill if testing intervals greater than 120 hours. |

Table 1. A summary of test and support equipment and its usage for the current ABL program

| Test Location | Period of Use | Equipment | Qty | Diesel cart usage duration | Notes |
|---------------------------|---------------------------------------|---|-----------------|--|---|
| IMF Chem Ops | 7/03 - 9/03, 3/04 - 5/04, 5/04 - 6/05 | Semi truck | | Use same number of tests shown for BHP 2 fill cart generator | For every 120 hours (or BHP fill with intervals greater than 120 hours) during testing the semi use would be 8 hours for fill, 8 hours for dump. Semi would also be used for Scrubber fills and dumps - 31 hours/two months, chemical deliveries of 6 hours/month, drainage of sprayball (p/o GPRA) for each test series (3) of 4 hours each. (sequencing of trucks will be on separate page) |
| IMF Chem Ops | 7/03 - 9/03, 3/04 - 5/04, 5/04 - 6/05 | Truck to pull carts with panel hooks | | Assume AF tug; Use same number of tests shown for BHP fill cart generator; assume 8 hours ops/test 2 ops/test | We have not identified what this truck will be. It needs to be a tug or heavy axle truck. If we can get a truck using unleaded fuel we will. |
| IMF | 5/03 - 6/05 | Generator (150 kv) | | 1 30 min/week | Back-up for facility power - check runs 30 min/week |
| IMF | 5/03 - 6/05 | Generator (75 kv) | | 1 30 min/week | Back-up for facility power - check runs 30 min/week |
| IMF | 5/03 - 6/05 | Generator | | 1 30 min/week | Back-up for fire pump - check runs 30 min/week |
| Aircraft (in hanger) | 7/03 - 9/03, 3/04 - 5/04 | Air Conditioners | Up to 9 | Assume electric carts per 3 Feb 03 email | This will depend on the time of year. The first set of dates does not require the same number of AC's if Laser is not installed. Second set of dates would not require the 9-12 number for that time of year. At this time we envision procuring (lease or buy) only electric. AF is providing 3 AC-80's that are diesel run. |
| Aircraft (in hanger) | 7/03 - 9/03, 3/04 - 5/04 | Hydraulic Mule (Skydrol) | | 2 NA | We will use the electric in the hanger. (put on list to show that diesel will not be used) |
| Aircraft (in hanger) | 7/03 - 9/03, 3/04 - 5/04 | Trielectron Electric Power carts (150 kv) | | 2 NA | These are electric (put on list to show that diesel carts will not be used) |
| Aircraft (outside hanger) | 10/03 - 11/03, 5/04 - 6/05 | Air Conditioners | Up to 9 hot day | Assume electric carts per 3 Feb 03 email | AF provided AC's are diesel. We have PCO approval to lease or buy additional AC's to support test program. Plan is to only procure (purchase and/or lease) electric. (These will supplement at all times to keep aircraft cool) |

Table 1. A summary of test and support equipment and its usage for the current ABL program

| Test Location | Period of Use | Equipment | Qty | Diesel cart usage duration | Notes |
|---------------------------|----------------------------|----------------------------------|-----|--|---|
| Aircraft (outside hanger) | 10/03 - 11/03, 5/04 - 6/05 | Hydraulic Mule (Skydrol) | 2 | Assume 2 carts 16 hrs/week | Boeing purchased 3 additional electric mules. The program has the use of 4 electric and 2 diesel. (used during testing) |
| Aircraft (outside hanger) | 5/04 - 6/05 | Engine start cart | 3 | Assume 1 flight per week; 5 minutes per flight for each of the three carts | Uses JP-08, which is a diesel grade fuel. Needed whenever the aircraft is turned on. This would be for flight and checkouts. Power can be applied externally for ground tests (electric trielectrons (150 kv) (Used during testing) |
| Aircraft (outside hanger) | 10/03 - 11/03, 5/04 - 6/05 | Trielectron Electric Power Carts | 2 | Assume 2 carts 16 hrs/week | |
| Miscellaneous | 2/03 - 6/05 | Welder (50hp) | 1 | | Approximately 5 hours per week |
| | | Generator (50hp) | 1 | | Approximately 5 hours per week |

Table 1 contains considerably more information than the use of generic AGE units used to make previous emission estimates. The equipment specifics (to the extent they are known) are presented in Table 2. Electric versions of this equipment are not considered in the calculations. Gasoline, propane, or LNG are not considered as alternative fuels.

Diesel emission factors can vary greatly. However for the present study data was obtained directly for several manufacturers. The size of the engine, fuel, environment, and load/rpms all influence the emission factors. Relatively detailed information was forthcoming from the Cummins diesel engine specifications. For other engine makes the small engine (4 cylinder) emission factors were taken from the 4BT3.9-G4 for the tug and AC units, while the large (6 cylinder) engine emission factors are taken from the Cummins 6CTA8.3-G2 exhaust emission data. These specification sheets are attached.

Table 2. Diesel Equipment Summary

| Equipment | Abbreviation | Prime Mover | Base Horsepower |
|-------------------------------|--------------|--------------------------|-----------------|
| Tiger Diesel Tug | TUG | Perkins 4.236 | 63 |
| Trielectron 400HZ 150KVA | GS | Cummins Diesel 6CTA8 | 219 |
| Trielectron 400HZ 400KVA | GB | Cummins Diesel QSX18 | 605 |
| Trielectron Diesel AC | AC | Perkins 1004 Euro Diesel | 71 |
| Trielectron ASP 180 Air Start | SC | Detroit Diesel Series 60 | 300 |
| Semi-Truck | ST | Detroit Diesel Series 60 | 300 |
| ALS Skydrol LD-4 | HM | Same as tug | Same as tug |

The emission factors are summarized in Table 3 for each type of unit.

Table 3. Emission Factors for Equipment (g/hr)

| Equipment | BHP | VOC | NOX | CO | PM | SO2 |
|------------------|------------|------------|------------|-----------|-----------|------------|
| TUG | 63 | 10.44 | 502.74 | 93.87 | 19.53 | 38.43 |
| GS | 219 | 105.12 | 1419.12 | 65.7 | 39.42 | 129.21 |
| GB | 605 | 18.15 | 4277.35 | 544.50 | 48.00 | 531.00 |
| AC | 71 | 20.59 | 566.58 | 105.79 | 22.01 | 43.31 |
| SC | 300 | 144.00 | 1944.00 | 90.00 | 54.00 | 177.00 |
| ST | 300 | 144.00 | 1944.00 | 90.00 | 54.00 | 177.00 |
| HM | 63 | 10.44 | 502.74 | 93.87 | 19.53 | 38.43 |

The schedule of activity for each piece of equipment overlaps calendar year. Furthermore, schedules have been adjusted as the time for implementation of the ABL approaches. A generic year 1 and year 2 approach is being used where year 1 is 2003-2004 and year 2 is 2004-2005. Three types of AGE use is presented in Table 1, AGE for the SIL testing, AGE for IMF OPS, and Aircraft RAMP parking. Three activity tables were prepared for use in modeling. Table 4a summarizes the annual activity for SIL operations. Table 4b summarizes AGE activity for IMF OPS and Table 4c summarizes the activity for RAMP operations. The second year RAMP operations were assumed to stretch over 10 months in the final year rather than breaking up the accounting by specific calendar year.

Table 4a. A summary of SIL AGE activity by equipment type

| Equipment | MPY | DPM | HPD | NU | Annual Unit Hours |
|------------------|------------|------------|------------|-----------|--------------------------|
| AC | 3(0) | 16 | 4 | 2 | 384(0) |
| GS | 3(0) | 4 | 0.5 | 1 | 6(0) |
| GS | 3(0) | 4 | 0.5 | 1 | 6(0) |
| GB | 3(0) | 16 | 4 | 2 | 384(0) |
| HM | 3(0) | 16 | 1 | 1 | 48(0) |

MPY = months per year
DPM = days per month
HPD = hours per day
NU = number of units
() = denotes second year

Table 4b. A summary of IMF OPS AGE activity by equipment type

| Equipment | MPY | DPM | HPD | NU | Annual Hours |
|------------------|------------|------------|------------|-----------|---------------------|
| GS | 3(10) | 4(6) | 8 | 1 | 96(480) |
| ST | 3(10) | 4(6) | 16 | 2 | 384(1920) |
| TUG | 3(10) | 4(6) | 8 | 2 | 192(960) |
| GS | 3(10) | 4 | 0.5 | 3 | 18(60) |

MPY = months per year
DPM = days per month
HPD = hours per day
NU = number of units
() = denotes second year

Table 4c. A summary of RAMP AGE activity by equipment type

| Equipment | MPY | DPM | HPD | NU | Annual Hours |
|------------------|------------|------------|------------|-----------|---------------------|
| HM | 3(10) | 16 | 4 | 2 | 384(1280) |
| SC | 3(10) | 4 | 0.25 | 3 | 9(30) |
| GS | 3(10) | 16 | 4 | 2 | 384(1280) |
| GS | 3(10) | 20 | 1 | 2 | 120(400) |

MPY = months per year
DPM = days per month
HPD = hours per day
NU = number of units
() = denotes second year

The total emission from each component of AGE for the two years is presented in Table 5. This table indicates that AGE emissions are still a minor component of the overall base inventory. When added to mobile emissions the total emissions remain less than the 50-tons/year conformity threshold.

Table 5. A summary of the AGE emissions by component and total in Tons/Year

| YEAR 1 | SIL | IMF OPS | RAMP | ALL |
|-----------------|------------|----------------|-------------|------------|
| VOC | 0.018 | 0.076 | 0.064 | 0.158 |
| NOx | 2.082 | 1.105 | 1.018 | 4.206 |
| CO | 0.28 | 0.066 | 0.077 | 0.423 |
| PM | 0.031 | 0.032 | 0.031 | 0.093 |
| SO ₂ | 0.245 | 0.099 | 0.09 | 0.434 |
| YEAR 2 | | | | |
| VOC | 0 | 0.378 | 0.214 | 0.591 |
| NOx | 0 | 5.48 | 3.395 | 8.875 |
| CO | 0 | 0.328 | 0.257 | 0.585 |
| PM | 0 | 0.158 | 0.102 | 0.26 |
| SO ₂ | 0 | 0.491 | 0.299 | 0.79 |



**Power
Generation**

Exhaust Emission Data Sheet

40DGCA

50 Hz Diesel Generator Set

ENGINE

| | |
|--|--|
| Model: Cummins 4BT3.9-G4 | Bore: 4.02 in. (102 mm) |
| Type: 4 Cycle, In-line 4 Cylinder Diesel | Stroke 4.72 in. (120 mm) |
| Aspiration: Turbocharged | Displacement: 239 cu. in. (3.9 liters) |
| Compression Ratio: 16.5:1 | |
| Emission Control Device: Turbocharger | |

| PERFORMANCE DATA | STANDBY | PRIME |
|-------------------------------|---------|-------|
| BHP @ 1500 RPM (50 Hz) | 87 | 79 |
| Fuel Consumption (gal/Hr) | 4.4 | 3.9 |
| Exhaust Gas Flow (CFM) | 380 | 362 |
| Exhaust Gas Temperature (°F) | 1015 | 965 |

EXHAUST EMISSION DATA

(All Values are Grams per HP-Hour)

| COMPONENT | STANDBY | PRIME |
|---|---------|-------|
| HC (Total Unburned Hydrocarbons) | 0.17 | 0.29 |
| NOx (Oxides of Nitrogen as NO ₂) | 8.74 | 7.98 |
| CO (Carbon Monoxide) | 3.28 | 1.49 |
| PM (Particulate Matter) | 0.63 | 0.31 |
| SO ₂ (Sulfur Dioxide) | 0.61 | 0.61 |

TEST CONDITIONS

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (± 2%). Pressures, temperatures, and emission rates were stabilized.

| | |
|-------------------------|--|
| Fuel Specification: | ASTM D975 No. 2-D diesel fuel with 0.03-0.05% sulfur content (by weight), and 40-48 cetane number. |
| Fuel Temperature: | 99 ± 9 ° F (at fuel pump inlet) |
| Intake Air Temperature: | 77 ± 9 ° F |
| Barometric Pressure: | 29.6 ± 1 in. Hg |
| Humidity: | NOx measurement corrected to 75 grains H ₂ O/lb dry air |
| Reference Standard: | ISO 8178 |

The NOx, HC, CO and PM emission data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subject to instrumentation and engine-to-engine variability. Field emissions test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.



**Power
Generation**

Exhaust Emission Data Sheet

85DGDB

50 Hz Diesel Generator Set

ENGINE

| | |
|--|--|
| Model: Cummins 6BT5.9-G6 | Bore: 4.02 in. (102 mm) |
| Type: 4 Cycle, In-line 6 Cylinder Diesel | Stroke 4.72 in. (120 mm) |
| Aspiration: Turbocharged | Displacement: 359 cu. in. (5.9 liters) |
| Compression Ratio: 16.5:1 | |
| Emission Control Device: Turbocharger | |

| <u>PERFORMANCE DATA</u> | <u>STANDBY</u> | <u>PRIME</u> |
|-------------------------------|----------------|--------------|
| BHP @ 1500 RPM (50 Hz) | 143 | 130 |
| Fuel Consumption (gal/Hr) | 7.0 | 6.4 |
| Exhaust Gas Flow (CFM) | 655 | 605 |
| Exhaust Gas Temperature (°F) | 1080 | 1025 |

EXHAUST EMISSION DATA

(All Values are Grams per HP-Hour)

| <u>COMPONENT</u> | <u>STANDBY</u> | <u>PRIME</u> |
|------------------------------------|----------------|--------------|
| HC (Total Unburned Hydrocarbons) | 0.30 | 0.32 |
| NOx (Oxides of Nitrogen as NO2) | 9.50 | 8.66 |
| CO (Carbon Monoxide) | 2.86 | 1.87 |
| PM (Particulate Matter) | N/A | N/A |
| SO ₂ (Sulfur Dioxide) | 0.59 | 0.60 |

TEST CONDITIONS

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (± 2%). Pressures, temperatures, and emission rates were stabilized.

| | |
|-------------------------|--|
| Fuel Specification: | ASTM D975 No. 2-D diesel fuel with 0.03-0.05% sulfur content (by weight), and 40-48 cetane number. |
| Fuel Temperature: | 99 ± 9 ° F (at fuel pump inlet) |
| Intake Air Temperature: | 77 ± 9 ° F |
| Barometric Pressure: | 29.6 ± 1 in. Hg |
| Humidity: | NOx measurement corrected to 75 grains H2O/lb dry air |
| Reference Standard: | ISO 8178 |

The NOx, HC, CO and PM emission data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subject to instrumentation and engine-to-engine variability. Field emissions test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.



ENGINE

| | |
|--|--|
| Model: Cummins 6CTA8.3-G2 | Bore: 4.49 in. (114 mm) |
| Type: 4 Cycle, In-line 6 Cylinder Diesel | Stroke 5.32 in. (135 mm) |
| Aspiration: Turbocharged and Aftercooled | Displacement: 504 cu. in. (8.3 liters) |
| Compression Ratio: 16.8:1 | |
| Emission Control Device: Turbocharger and Jacket Water Aftercooler | |

PERFORMANCE DATA

STANDBY

PRIME

| | | |
|-------------------------------|------|------|
| BHP @ 1500 RPM (50 Hz) | 241 | 219 |
| Fuel Consumption (gal/Hr) | 11.9 | 10.7 |
| Exhaust Gas Flow (CFM) | 1225 | 1100 |
| Exhaust Gas Temperature (°F) | 1046 | 996 |

EXHAUST EMISSION DATA

(All Values are Grams per HP-Hour)

COMPONENT

STANDBY

PRIME

| | | |
|------------------------------------|------|------|
| HC (Total Unburned Hydrocarbons) | 0.31 | 0.48 |
| NOx (Oxides of Nitrogen as NO2) | 6.49 | 6.48 |
| CO (Carbon Monoxide) | 0.30 | 0.30 |
| PM (Particulate Matter) | 0.22 | 0.18 |
| SO ₂ (Sulfur Dioxide) | 0.60 | 0.59 |

TEST CONDITIONS

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (± 2%). Pressures, temperatures, and emission rates were stabilized.

| | |
|-------------------------|--|
| Fuel Specification: | ASTM D975 No. 2-D diesel fuel with 0.03-0.05% sulfur content (by weight), and 40-48 cetane number. |
| Fuel Temperature: | 99 ± 9 ° F (at fuel pump inlet) |
| Intake Air Temperature: | 77 ± 9 ° F |
| Barometric Pressure: | 29.6 ± 1 in. Hg |
| Humidity: | NOx measurement corrected to 75 grains H2O/lb dry air |
| Reference Standard: | ISO 8178 |

The NOx, HC, CO and PM emission data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subject to instrumentation and engine-to-engine variability. Field emissions test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.



**Power
Generation**

Exhaust Emission Data Sheet 400DFEJ

50 Hz Diesel Generator Set

Engine Information:

| | |
|---|---|
| Model: Cummins QSX15-G8 | Bore: 5.39 in. (137 mm) |
| Type: 4 Cycle, In-Line, 6 Cylinder Diesel | Stroke: 6.65 in. (169 mm) |
| Aspiration: Turbo-charged with air-to-air charge air cooling | Displacement: 912 cu. in. (14.9 liters) |
| | Compression Ratio: 17:1 |
| Emission Control Device: Turbocharged and Low Temperature Aftercooled | |

| PERFORMANCE DATA | <u>1/4</u> Standby | <u>1/2</u> Standby | <u>3/4</u> Standby | <u>Full</u> Standby | <u>Full</u> Prime |
|------------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|-----------------------------|
| BHP @ 1500 RPM (50 Hz) | 168 | 335 | 503 | 670 | 605 |
| Fuel Consumption (gal/Hr) | 8.2 | 15.9 | 22.9 | 31.7 | 27.7 |
| Exhaust Gas Flow (CFM) | 1040 | 1860 | 2460 | 3240 | 2860 |
| Exhaust Gas Temperature (°F) | 670 | 825 | 870 | 970 | 915 |
| EXHAUST EMISSION DATA | | | | | |
| HC (Total Unburned Hydrocarbons) | 0.10 | 0.03 | 0.02 | 0.08 | 0.03 |
| NOx (Oxides of Nitrogen as NO2) | 5.85 | 5.08 | 6.67 | 6.31 | 7.07 |
| CO (Carbon Monoxide) | 0.40 | 1.00 | 1.20 | 0.40 | 0.90 |
| PM (Particulate Matter) | 0.16 | 0.16 | 0.10 | 0.08 | 0.08 |

All values are Grams per HP-Hour

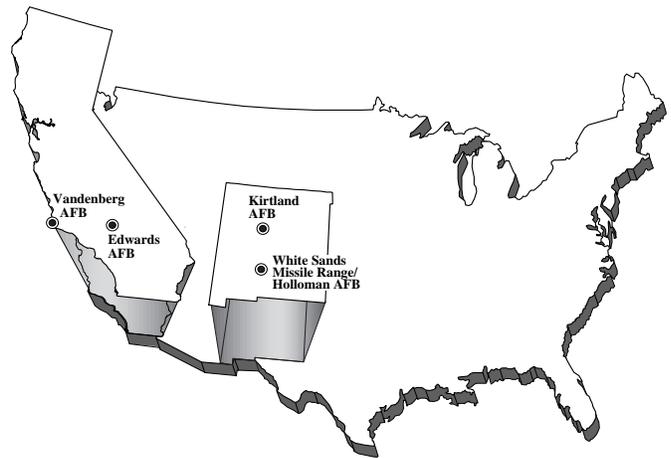
TEST CONDITIONS

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (± 2%). Pressures, temperatures, and emission rates were stabilized.

| | |
|-------------------------|--|
| Fuel Specification: | ASTM D975 No. 2-D diesel fuel with 0.03-0.05% sulfur content (by weight), and 40-48 cetane number. |
| Fuel Temperature: | 99 ± 9 ° F (at fuel pump inlet) |
| Intake Air Temperature: | 77 ± 9 ° F |
| Barometric Pressure: | 29.6 ± 1 in. Hg |
| Humidity: | NOx measurement corrected to 75 grains H2O/lb dry air |
| Reference Standard: | ISO 8178 |

The NOx, HC, CO and PM emission data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subject to instrumentation and engine-to-engine variability. Field emissions test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

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APPENDIX G DEBRIS ANALYSIS OF ABL TEST TARGETS

APPENDIX G

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