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6.0 GLOSSARY OF TERMS

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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 (S1.4-19711) and accounts for the response of the human ear

Adjacent Band—all frequencies that are within approximately 5 percent of the operating frequency of the interfering transmitter

Advisory Council on Historic Preservation—a 19-member body appointed, in part, by the President of the United States to advise the President and Congress and to coordinate the actions of Federal agencies on matters relating to historic preservation, to comment on the effects of such actions on historic and archaeological cultural resources, and to perform other duties as required by law (Public Law 89-655; 16 U.S. Code 470)

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

Aesthetic—a pleasing appearance, effect, or quality that allows appreciation of character-defining features, such as of the landscape

Aggregate—materials such as sand, gravel, or crushed stone used for mixing with a cementing material to form concrete or alone as railroad ballast or graded fill

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 Defense Identification Zone—the area of airspace over land or water, extending upward from the surface, within which the ready identification, the location, and the control of aircraft are required in the interest of national security

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

Air Route Traffic Control Center (ARTCC)—a facility established to provide air traffic control service to aircraft operating on Instrument Flight Rules flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to aircraft operating under Visual Flight Rules.

Air Shed—a volume of air with boundaries chosen to facilitate determination of pollutant inflow and outflow

Air Traffic Control—a service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic

Airspace—the space lying above the earth or above a certain land or water area (such as the Gulf of Mexico); the space lying above a nation and coming under its jurisdiction

Airspace, Controlled—airspace of defined dimensions within which air traffic control service is provided to Instrument Flight Rules flights and to Visual Fight Rules flights in accordance with the airspace classification. Controlled airspace is divided into five classes, dependent upon location, use, and degree of control: Class A, B, C, D, and E.

Airspace, Special Use—airspace of defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon non-participating aircraft

Airspace, Uncontrolled—uncontrolled airspace, or Class G airspace, has no specific definition but generally refers to airspace not otherwise designated and operations below 365.7 meters (1,200 feet) above ground level. No air traffic control service to either Instrument Flight Rules or Visual Flight Rules aircraft is provided other than possible traffic advisories when the air traffic control workload permits and radio communications can be established.

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

Alkaline—basic, having a pH greater than 7

Alluvium—general term for deposits made by streams on river beds, flood plains, and alluvial fans

Ambient Air—that portion of the encompassing atmosphere, external to buildings, to which the general public has access

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, particulate matter, 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

Amplitude—the maximum departure of the value of a sound wave from the average value

Anadromous—going from salt water to fresh water or up rivers to spawn

Annual Average Daily Traffic (AADT)—the total volume passing a point or segment of a highway facility in both directions for 1 year divided by the number of days in the year

Aquifer—the water-bearing portion of subsurface earth material that yields or is capable of yielding useful quantities of water to wells

Archaeology—a scientific approach to the study of human ecology, cultural history, and cultural process

Area of Potential Effect—the geographic area within which direct and indirect impacts generated by the Proposed Action and alternatives could reasonably be expected to occur and thus cause a change in historic, architectural, archaeological, or cultural qualities possessed by the property

Asbestos—a carcinogenic substance formerly used widely as an insulation material by the construction industry; often found in older buildings

Asbestos-containing material (ACM)—any material containing more than 1 percent asbestos

Association—a group that forms together because of similar environmental requirements

Attainment Area—an air quality control region that has been designated by the U.S. Environmental Protection Agency and the appropriate state air quality agency as having ambient air quality levels as good as or better than the standards set forth by the National Ambient Air Quality Standards, as defined in the Clean Air Act. A single geographic area may have acceptable levels of one criteria air pollutant, but unacceptable levels of another; thus, an area can be in attainment and non-attainment status simultaneously.

Average Daily Traffic (ADT)—the total volume of traffic passing a given point or segment of a roadway in both directions divided by a set number of days

Ballistic Missile—any missile that does not rely upon aerodynamic surfaces to produce lift and consequently follows a ballistic trajectory when thrust is terminated

Bedrock—the solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface

Benthic—associated with the bottom of a body of water

Bifaces—stone tools that have been flaked on both sides

Biological Resources—a collective term for native or naturalized vegetation, wildlife, and the habitats in which they occur

Booster—an auxiliary or initial propulsion system that travels with a missile or aircraft and that may not separate from the parent craft when its impulse has been delivered; may consist of one or more units

Boreal—pertaining to the north

Borough—civil division of the State of Alaska corresponding to a county in most other states

Candidate species—a species of plant or animal for which there is sufficient information to indicate biological vulnerability and threat, and for which proposing to list as “threatened” or “endangered” is or may be appropriate

Capacity—the maximum rate of flow at which vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic, and control conditions

Carbon Monoxide—a colorless, odorless, poisonous gas produced by incomplete fossil-fuel combustion; it is one of the six pollutants for which there is a national ambient standard (see Criteria Pollutants)

Census Tract—small, relatively permanent statistical subdivisions of a county that are delineated for all metropolitan areas and other densely populated counties

Chlorofluorocarbons (CFCs)—a group of inert, nontoxic, and easily liquefied chemicals (such as Freon) used in refrigeration, air conditioning, packaging, or insulation or as solvents or aerosol propellants

Colluvium—a general term applied to loose deposits, usually at the foot of a slope or cliff and brought there chiefly by gravity; includes talus and cliff debris

Continental United States—the United States and its territorial waters between Mexico and Canada, but excluding overseas states; often abbreviated CONUS

Control Area (CTA)—a controlled airspace extending upwards from a specified limit above the earth

Controlled Airspace—an airspace of defined dimensions within which air traffic control service is provided to Instrument Flight Rules flights and to Visual Flight Rules flights in accordance with the airspace classification

Controlled Environment—areas that may be occupied by personnel who accept potential exposure to radiation as a contingency of employment or duties, by individuals who knowingly enter areas where such levels of radiation are to be expected, and by personnel passing through such areas

Controlled Firing Area (CFA)—airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to non-participating aircraft and to ensure the safety of persons and property on the ground

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

Criteria Pollutants—pollutants identified by the U.S. Environmental Protection Agency (required by the Clean Air Act to set air quality standards for common and widespread pollutants); also established under state ambient air quality standards. There are standards in effect for six criteria pollutants: sulfur dioxide, carbon monoxide, particulate matter, nitrogen dioxide, ozone, and lead.

Cultural Resources—prehistoric and/or historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered of importance to a culture, subculture, or community for scientific, traditional, religious, or any other reason

Cumulative Impact—the impact of the environment which results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Decibel (dB)—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; the accepted standard unit for the measurement of sound

Degradation—the process by which a system will no longer deliver acceptable performance

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

Dewater—to remove water, such as in sewage processing

Distance Measuring Equipment (DME)—equipment on-board aircraft that transmits paired pulses at a specific spacing which are received at a ground station. The station's transponder then transmits paired pulses back to the aircraft at the same pulse spacing but on a different frequency. The time required for the round trip of this signal exchange is measured in the airborne distance measuring equipment unit and is translated into distance from the aircraft to the ground station.

Drainage Basin—watershed

Drive-to-Work Area—the area within which it would be reasonably expected that personnel would commute to the site of the proposed action. This region may vary in size considerably from place to place, depending on the quality of roads, the level of traffic congestion and the local availability of similar quality jobs.

Easement—a right of privilege (agreement) that a person or organization may have over another's property; an interest in land owned by another that entitles the holder of the easement to a specific limited use

Effluent—an outflowing branch of a main stream or lake; waste material (such as smoke, liquid industrial refuse, or sewage) discharged into the environment

Electroexplosive Device—a single unit, device, or subassembly in which electrical energy is used to initiate an enclosed explosive, propellant, or pyrotechnic material

Electromagnetic Interference—electromagnetic radiation that disrupts electronic and electrical systems

Electromagnetic Radiation (EMR)—waves of energy with both electric and magnetic components at right angles to one another

Emission Inventory—a listing, by source, of the amount of air pollutants discharged into the atmosphere of a community

Encroachment—the placement of an unauthorized structure or facility on someone's property or the unauthorized use of property

Endangered Species—a plant or animal species that is threatened with extinction throughout all or a significant portion of its range

En Route Airway—a low altitude (below 18,000 feet mean sea level) airway based on a center line that extends from one navigational aid or intersection to another navigational aid (or through several navigational aids and intersections) specified for that airway

Environmental Justice—an identification of potential disproportionately high and adverse impacts on low-income and/or minority populations that may result from proposed Federal actions (required by Executive Order 12898)

Erosion—the wearing away of a land surface by water, wind, ice, or other geologic agents

Estuary—a water passage where the tide meets a river current; an arm of the sea at the lower end of a river; characterized by brackish water

Explosive Class 1.1—explosives that have a mass explosion hazard (one that affects almost the entire load instantaneously)

Explosive Class 1.3—explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard, or both, but not a mass explosion hazard

Explosive Class 1.4—explosives that present a minor explosion hazard with no projection of fragments of appreciable size or range expected

Explosive Safety Quantity-Distance—the quantity of explosive material and distance separation relationships providing defined types of protection based on levels of risk considered acceptable

Flight Information Region (FIR)—an airspace of defined dimensions within which flight information service and alerting service are provided. Flight information service is provided for the purpose of giving advise and information useful for the safe and efficient conduct of flights, and alerting service is provided to notify appropriate organizations regarding aircraft in need of search and rescue aid and to assist such organizations as required.

Flight Level—a level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury stated in three digits that represent hundreds of feet. For example, flight level 250 represents a barometric altimeter indication of 25,000 feet; flight level 255 represents an indication of 25,500 feet.

Flood Hazard Zones—typically lowland areas bordering streams or rivers onto which overflow is most likely to spread at flood stage

Floodplain—the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands; includes, at a minimum, that area subject to a 1 percent or greater chance of flooding in any given year (100-year floodplain)

Fluvial—of or pertaining to rivers; of or produced by the action of a river or stream

Fly-by-Wire—aircraft that rely completely on electrical wires to relay flight commands instead of the usual cables and linkage controls

Friable—easily crumbled or reduced to powder

Fugitive Dust—any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of man. Fugitive dust may include emissions from haul roads, wind erosion of exposed soil surfaces, and other activities in which soil is either removed or redistributed.

Glacial till—unstratified drift, deposited by a glacier without reworking by meltwater, and consisting of a mixture of clay, silt, sand, gravel, and boulders ranging widely in size and shape

Great Circle Route—the shortest course between two points on the surface of a sphere. Great circle routes, which require constantly changing headings, are most useful beyond the equatorial regions and for distances greater than several hundred miles. Long-distance air

traffic uses great circle routes routinely, saving time and fuel. Navigational radio signals also follow great circle paths.

Groundwater—water within the earth that supplies wells and springs; specifically, water in the zone of saturation where all openings in rocks and soil are filled, the upper surface of which forms the water table

Grub—to clear by digging up roots and stumps

Habitat—the area or type of environment in which an species or ecological community normally occurs

Harmonically Related Band—harmonically related receivers and sub-harmonically related transmitters. Harmonic frequencies include those frequencies that are integer multiples of the operating frequencies of the interfering transmitter. Subharmonic frequencies are those frequencies that are simple fractions of the operating frequencies of the interfering transmitter.

Hazardous Material—a substance that can cause, because of its physical or chemical properties, an unreasonable risk to the health and safety of individuals, property, or the environment

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

Hertz—the standard radio equivalent of frequency in cycles per second of an electromagnetic wave. Kilohertz (kHz) is a frequency of one thousand cycles per second. Megahertz (MHz) is a frequency of one million cycles per second.

High Energy Radiation Area—an area charted on visual aeronautical charts for radar systems that emit energy that could be hazardous to certain aircraft instrument systems. These areas required to be charted by the Federal Aviation administration shall be shown on sectionals, terminal air charts, and world aeronautical charts with the "sawtooth" symbol. Aircraft flight through the area is not subject to restrictions.

High Power Effects—interference in electronic devices produced by very high power emitters which has not been predictable by the classical analysis processes; i.e., processes that predict antenna-coupled, case-coupled, spurious and intermodulation responses

Historic Properties—under the National Historic Preservation Act, these are properties of national, state, or local significance in American history, architecture, archaeology, engineering, or culture, and worthy of preservation

Hydrocarbons—any of a vast family of compounds containing hydrogen and carbon, including fossil fuels

IFR Military Training Routes (IR)—training routes mutually developed by the Department of Defense and the Federal Aviation Administration to provide for military operational and training requirements that cannot be met under the terms of FAR 91.117 (Aircraft Speed). Accordingly, the Federal Aviation Administration has issued a waiver to DOD to permit operation of an aircraft below 10,000 feet mean sea level in excess of 250 knots indicated airspeed along

Department of Defense/Federal Aviation Administration mutually developed and published Instrument Flight Rules routes.

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.

Impervious Surface—an external part or layer whose impermeability does not allow entrance or passage of water

In-band—all frequencies that are within the operating frequency of the interfering transmitter

Infrastructure—the system of public works of a country, state, or region, such as utilities or communication systems; physical support systems and basic installations needed to operate a particular area or facility

Instrument Flight Rules (IFR)—rules governing the procedures for conducting instrument flight; also a term used by pilots and controllers to indicate type of flight plan

Inversion—an increase of temperature with height through a layer of air; usually associated with stable (but stagnant) air conditions

Ionizing Radiation—particles or photons that have sufficient energy to produce direct ionization in their passage through a substance. X-rays, gamma rays, and cosmic rays are forms of ionizing radiation.

Jet Routes—a route designed to serve aircraft operating from 5,486 meters (18,000 feet) up to and including flight level 450, referred to as J routes with numbering to identify the designated route

Lead—a heavy metal 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)

Lead-based Paint—paint on surfaces with lead in excess of 1.0 milligram per square centimeter as measured by X-ray fluorescence detector or 0.5 percent lead by weight

Level of Service—describes operational conditions within a traffic stream and how they are perceived by motorists and/or passengers; a monitor of highway congestion that takes into account the average annual daily traffic, the specified road segment's number of lanes, peak hour volume by direction, and the estimated peak hour capacity by a roadway's functional classification, area type, and signal spacing

Littoral—species found in tide pools and near-shore surge channels

Maritime—of, relating to, or bordering on the sea

Material Safety Data Sheet—presents information, required under the Occupational Safety and Health Act Standards, on a chemical's physical properties, health effects, and use precautions

Maximum Permissible Exposure—as established by the Nuclear Regulatory Commission, exposure standards set at a level where apparent injury from ionizing radiation during a normal lifetime is unlikely

Mesosphere—the third highest layer in our atmosphere, occupying the region 50 to 80 kilometers (31 to 50 miles) above the Earth's surface, above the troposphere and stratosphere, and below the thermosphere, the coldest layer of the atmosphere

Metamorphic—rock derived from preexisting igneous rock changed by temperature, stress, chemical environment or any combination of these factors

Migratory Birds—avians characterized by their practice of passing, usually periodically, from one region or climate to another

Military Operations Area—an airspace assignment of defined vertical and lateral dimensions established outside Class A areas (formerly Positive Control Areas) to separate certain military activities from Instrument Flight Rules traffic and to identify for Visual Flight Rules traffic where these activities are conducted

Military Training Routes (MTR)—airspace of defined vertical and lateral dimensions established for the conduct of military flight training at airspeeds in excess of 250 knots

Minority—minority populations, as reported by the 2000 Census of Population and Housing, includes Black, American Indian, Eskimo or Aleut, Asian or Pacific Islander, Hispanic, or other

Mitigation—a method or action to reduce or eliminate adverse environmental impacts

Mobile Sources—any movable source that emits any regulated air pollutant

Mortality—the number of deaths in a given time or place

National Airspace System—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 (NAAQS)—as set by the U.S. Environmental Protection Agency under Section 109 of the Clean Air Act, nationwide standards for limiting concentrations of certain widespread airborne pollutants 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). Currently, six pollutants are regulated: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide (see Criteria Pollutants).

National Environmental Policy Act (NEPA)—Public Law 91-190, passed by Congress in 1969. The Act established a national policy designed to encourage consideration of the influences of human activities, such as population growth, high-density urbanization, or industrial development, on the natural environment. 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 decisionmaking process.

National Register of Historic Places (National Register)—a register of districts, sites, buildings, structures, and objects important in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under authority of Section 2 (b) of the Historic Sites Act of 1935 and Section 101 (a)(1) of the National Historic Preservation Act of 1966, as amended

Native Americans—used in a collective sense to refer to individuals, bands, or tribes who trace their ancestry to indigenous populations of North America prior to Euro-American contact

Native Species—plants or animals living or growing naturally in a given region and often referred to as indigenous

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

Navigational Aid—any visual or electronic device, airborne or on the surface, which provides point-to-point guidance information or position data to aircraft in flight

Nitrogen Dioxide—gas formed primarily from atmospheric nitrogen and oxygen when combustion takes place at high temperatures

Nitrogen Oxides—gases formed primarily by fuel combustion

Non-attainment 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 of the national or state ambient air quality standards

Non-directional Radio Beacon (NDB)—an L/MF or UHF radio beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine the aircraft's bearing to or from the radio beacon and “home” on or track to or from the station

Non-ionizing Radiation—electromagnetic radiation at wavelengths whose corresponding photon energy is not high enough to ionize an absorbing molecule. All radio frequency, infrared, visible, and near ultraviolet radiation are non-ionizing.

Nonpoint Source—type of pollution originating from a combination of sources

Notice to Airmen (NOTAM)—a notice containing information, not known sufficiently in advance to publicize by other means, the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System) the timely knowledge of which is essential top personnel concerned with flight operations

Out-of-Band—those frequencies that are not in-band, adjacent-band, or harmonically related band frequencies

Ozone—a compound consisting of three oxygen atoms

Ozone-depleting Substances—a group of chemicals that are inert under most conditions but within the stratosphere react catalytically to reduce ozone to oxygen

Paleontology—the study of life in the past geologic time, based on fossil plants and animals

Palustrine Emergent—small, shallow, permanent, or intermittent water bodies dominated by trees, shrubs, persistent emergents, and emergent mosses or lichens

Particulate Matter—particles small enough to be airborne, such as dust or smoke (see Criteria Pollutants)

Peak-Hour Volume (PHV)—the hourly volume during the maximum volume hour of the day

Pelagic—of the ocean waters

Per Capita—per unit of population; by or for each person

Permafrost—permanently frozen subsoil, for a minimum of 2 years, occurring in perennially frigid areas

Permeability—a quality that enables water to penetrate

Permissible Exposure Limit (PEL)—that exposure level expressed in electric field, magnetic field, or plane wave power density to which an individual may be exposed and which, under conditions of exposure, will not cause detectable bodily injury in light of present medical knowledge

Pesticide—any substance, organic, or inorganic, used to destroy or inhibit the action of plant or animal pests; the term thus includes insecticides, herbicides, fungicides, rodenticides, miticides, fumigants, and repellents. All pesticides are toxic to humans to a greater or lesser degree. Pesticides vary in biodegradability.

Photochemically Reactive—substances whose chemical reactions are initiated by sunlight

Physiographic Province—a region of which all parts are similar in geologic structure and climate and which has had a unified geomorphic history

Phytoplankton—single-celled marine plants that are found for at least part of their lives in the water column (pelagic), although a few species live on the sea floor (benthic)

Pinniped—having finlike feet or flippers, such as a seal or walrus

PM-10—particulate matter less than or equal to 10 micrometers in diameter

Point Source—a distinct and identifiable source, such as a sewer or industrial outfall pipe, from which a pollutant is discharged

Population Density—the average number of individuals per unit of space

Positive Controlled Area—airspace designated in Federal Aviation Administration Regulation Part 71 within which there is positive control of aircraft; also referred to as Class A airspace

Power Density—the amount of power per unit area in a radio frequency field, usually expressed in milliwatts per square centimeter

Prehistoric— Literally, "before history", or before the advent of written records. In the old world writing first occurred about 5400 (the Sumarians) years ago. Generally, in North America and the Pacific region the prehistoric era ended when European explorers and mariners made written accounts of what they encountered. This time will vary from place to place.

Prevention of Significant Deterioration—the Prevention of Significant Deterioration program, created by the Clean Air Act, consists of two parts—requirements for best available control technology on major new or modified sources and compliance with an air quality increment system

Prime Farmland—environmentally significant agricultural lands protected from irreversible conversion to other uses by the Farmlands Protection Policy Act

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

Radar—a radio device or system for locating an object by means of radio waves reflected from the object and received, observed, and analyzed by the receiving part of the device in such a way that characteristics (such as distance and direction) of the object may be determined

Region of Influence—the geographical region that would be expected to be affected in some way by the Proposed Action and alternative

Relative Humidity—the ratio of the amount of water vapor actually present in the air to the greatest amount possible at the same temperature

Relief—the difference in elevation between the tops of hills and the bottoms of valleys

Restricted Area—airspace designated under Federal Aviation Administration Regulation Part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use, and Instrument Flight Rules/Visual Flight Rules 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.

Rookery—breeding place or colony of gregarious birds or animals

Runoff—the portion of precipitation on land that ultimately reaches water bodies

Scoping—a process initiated early during preparation of an environmental impact statement to identify the scope of issues to be addressed, including the significant issues related to the Proposed Action. During scoping, input is solicited from affected agencies as well as the interested public.

Seine—a large net with sinkers on one edge and floats on the other, which hangs vertically in the water and is used to enclose fish when its ends are pulled together or are drawn ashore

Sensitive Habitat—habitat that is susceptible to damage from intrusive actions

Sensitive Receptor—an organism or population of organisms sensitive to alterations of some environmental factor (such as air quality or sound waves)

Shrink-Swell Potential—the volume change of a particular soil with changes in moisture content

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

Soil Complex—a mapping unit consisting of two or more recognized taxonomic units used in detailed soil studies and classifications

Solid Waste—municipal waste products and construction and demolition materials; includes non-recyclable materials with the exception of yard waste

Specific Absorption Rate—the time rate at which radio frequency energy is absorbed per unit mass of material, usually measured in watts per kilogram (W/kg)

State Historic Preservation Officer (SHPO)—the official within each state, authorized by the state at the request of the Secretary of the Interior, to act as liaison for purposes of implementing the National Historic Preservation Act

Stationary Source—any building, structure, facility, installation, or other fixed source that emits any regulated air pollutant

Stratosphere—the second major layer of the atmosphere that lies above the troposphere in which temperatures rise with increasing altitude

Subsistence—the traditional harvesting of natural resources for food, clothing, fuel, transportation, construction, art, crafts, sharing, and customary trade

Substrate—the layer of soil beneath the surface soil; the base upon which an organism lives

Sulfur Dioxide—a toxic gas that is produced when fossil fuels, such as coal and oil, are burned

Thermal Distress/Damage—the process by which heat generated in the body causes harm to cell tissue

Thermosphere—the outer layer or region of the atmosphere which is first exposed to the sun's radiation and so is first heated by the sun

Threatened Species—a plant or animal species likely to become endangered in the foreseeable future

Topography—the configuration of a surface including its relief and the position of its natural and man-made features

Traditional Native Resources—prehistoric sites and artifacts, historic areas of occupation and events, historic and contemporary sacred areas, material used to produce implements and sacred objects, hunting and gathering areas, and other botanical, biological, and geographical resources of importance to contemporary American Indian groups

Transient—remaining a short time in a particular area

Troposphere—the lowest layer of the atmosphere, the layer where most of the world's weather takes place

Turbid—the condition of being thick, cloudy, or opaque as if with roiled sediment; muddy

Uncontrolled Environment—areas where personnel would not expect to encounter higher levels of radiation such as living quarters, workplaces, and public access areas

Understory—a foliage layer occurring beneath and shaded by the main canopy of a forest

Unstratified—sediments deposited with an absence of layering

Upland—an area of land of higher elevation

Vista—a distant view through or along an avenue or opening

Visual Flight Rules—rules that govern the procedures for conducting flight under visual conditions. It is also used by pilots and controllers to indicate a type of flight plan.

VFR Military Training Routes (IR)—training routes developed by the Department of Defense to provide for military operational and training requirements that cannot be met under the terms of FAR 91.117 (Aircraft Speed). Accordingly, the Federal Aviation Administration has issued a waiver to DOD to permit operation of an aircraft below 10,000 feet mean sea level in excess of 250 knots indicated airspeed along Department of Defense developed and published Instrument Flight Rules routes.

Volatile Organic Compound—one of a group of chemicals that react in the atmosphere with nitrogen oxides in the presence of heat and sunlight

Volcaniclastic—containing volcanic material

Wastewater—water that has been previously utilized; sewage

Water Table—the upper limit of the portion of the ground wholly saturated with water

Wetlands—those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. This classification includes swamps, marshes, bogs, and similar areas.

Yearly Average Day-Night Sound Level—utilized in evaluating long-term environmental impacts from noise; annual mean of the day-night sound level

Zooplankton—single and multi-celled animals that live passively or semi-passively in the water column

Zoning—the division of a municipality (or county) into districts for the purpose of regulating land use, types of buildings, required yards, necessary off-street parking, and other prerequisites to development. Zones are generally shown on a map, and the text of the zoning ordinance specifies requirements for each zoning category.

7.0 CONSULTATION COMMENTS AND RESPONSES (SCOPING)

7.0 CONSULTATION COMMENTS AND RESPONSES (SCOPING)

Summary of the Public Scoping Process

The CEQ Regulations implementing the NEPA require an open process for determining the scope of issues related to the Proposed Action and its alternatives. Comments and questions received, as a result of this process, assist the DoD in identifying potential concerns and environmental impacts to the human and natural environment.

The GMD ETR EIS public scoping period began on 28 March 2002, when the Notice of Intent to prepare an EIS was published in the *Federal Register*. The scoping comment period was originally scheduled to end on 10 May 2002, but was extended to 20 May 2002 in response to public request. Subsequently, inclusion of the SBX in the EIS analysis extended scoping and the comment period even further, through 20 December 2002.

A number of methods were used to inform the public about the GMD ETR Program and of the locations of the scheduled scoping meetings. These included:

- The Notice of Intent announcement in the *Federal Register*
- Paid advertisements in local and regional newspapers

Public scoping meetings were held at the locations listed in table 7-1. During these public scoping meetings, attendees were invited to ask questions and make comments to the program representatives at each meeting. In addition, written comments were received from the public and regulatory agencies at the scoping meeting, and by letter and e-mail during the extended comment period. Comments received from the public and agencies pertaining to specific resource areas and locations were considered, and more detailed analysis provided in the EIS. Those comments received from the public concerning DoD policy and program issues are outside the scope of what is required to be analyzed in an EIS.

Table 7-1: Scoping Meeting Locations and Dates

Meeting Location	Date
Kodiak, Alaska—Kodiak High School	16 April 2002
Anchorage, Alaska—Egan Convention Center	18 April 2002
Lompoc, California—Town Hall Council Chambers	25 April 2002
Honolulu, Hawaii—Best Western Hotel	18 September 2002
Seattle, Washington—Hilton Conference Center	17 October 2002
Oxnard, California—Public Library	22 October 2002
Port of Valdez—Valdez Civic Center	19 November 2002
Port Adak—Bob Reeves High School	5 December 2002

Native Village Meetings

A series of village coordination meetings was held on Kodiak Island in June and July 2002 in partial fulfillment of a pledge from the GMD Program Office to reach out to Native residents to explain the Proposed Action at KLC. The team visited the Villages of Akhiok, Ouzinkie, Port Lions, Afognak, Kodiak, and Larsen Bay.

Several generic issues were raised, including the following:

- The environmental consequences of flying rockets from KLC
- The request from the Village of Old Harbor for a fallout shelter
- Job opportunities associated with the Proposed Action
- Most village attendees expressed feelings of patriotism and support for what was being planned

Agency Meetings

An agency meeting was held in the offices of the Alaska Division of Governmental Coordination in Anchorage in April 2002 to provide an overview of the Proposed Action to the represented agencies and to solicit input on the EIS. Agencies represented at this meeting included the USFWS, the Alaska Department of Fish and Game, the U.S. Army Corps of Engineers, the U.S. Coast Guard, and the Alaska Department of Natural Resources. Some of the comments from the agencies are listed below:

- The USFWS recommended that an alternative site to the current proposed launch site at KLC should also be considered, if possible, because this ridge area is a sensitive area and there are public use concerns.
- The agencies requested more detailed information regarding the Proposed Action and alternatives.
- A trip with the agencies to the proposed construction site at Kodiak was suggested and agreed upon for the near future.
- A trip to Kodiak was conducted in May of 2002. The USFWS was the only agency in attendance. After reviewing the proposed KLC sites, the concern over the ridge area noted during the meeting was lessened.

An additional agency meeting was held in the offices of the Alaska Division of Governmental Coordination Offices in Anchorage in November 2002 to provide additional information regarding the potential siting of the SBX at Adak or the Port of Valdez, and to solicit input on the Coordinating Draft EIS. Agencies represented included the Alaska Department of Environmental Conservation, the U.S. Army Corps of Engineers, and the Alaska Department of Natural Resources. Some of the comments from the agencies are listed below:

- Migratory bird site adjacent to Valdez is an Aquatic Resource of National Importance. Air quality is a potential concern.
- Valdez Narrows is closed when a tanker is passing through.

- An Alaska Department of Natural Resources permit will be required for all actions within 4.8 kilometers (3 miles) of the shore. This would include barge landing sites and mooring sites. Mooring sites would also require a Section 10 Permit.
- Need to add SOPs for debris recovery in case of an accident at KLC. This is the highest probability for perchlorate contamination.

An agency meeting was also held in Honolulu in September 2002 with representatives from the USFWS and the FAA. This meeting centered primarily on the potential siting of the SBX at Pearl Harbor. Some of the comments from the agencies included:

- Questions from the FAA on the proposed operation of the radar and the effects of radiological hazards and interference with air traffic at the Honolulu International Airport.
- Questions from the USFWS mainly concerning the effects of the radar on bird populations.

Results of Public Scoping Meetings

The public scoping meetings used an information/exhibit format with a formal presentation on the GMD Program Overview and the Environmental Analysis Process. A sampling of some of the comments expressed by the public included:

- Concern about the chemicals in the air and the harm that they will do to the environment
- Concern about the pristine fisheries and wilderness, and belief that a thorough investigation of the effects of launch activities should occur in the EIS
- Concern that the EIS could ever fully address all the short- and long-term impacts around KLC
- Concern about the expansion of KLC, since the facility is located in a seismically active area
- Concern about putting valuable resources of Kodiak Island at risk due to toxic substances integral to missile launch operations
- Concern with the hazardous materials that are released in the explosion of a rocket, in flight, on the pad, or in a launch silo. The EIS should address the effects of all potential rocket fuels and payloads
- Concern about the safety of the Proposed Action
- Concern about the health hazards from radars such as the X-band
- Concern that mobile telemetry radars will not be limited to the roads and will be taken into sensitive areas and damage will occur to the land
- Concern that GMD is expensive and will require cuts in funding for human services
- Opposes the U.S. Government's plan for continuing research and development of the Missile Defense Program
- A desire that additional work be done on measuring the cumulative impacts to the environment

- Concern that the Narrow Cape road on Kodiak Island will be closed

Table 7-2 summarizes the number of comments received from the public at the scoping meetings, and from other sources, for each resource category.

Table 7-2: Number of Comments by Resource Area and Location

Resource Area	Kodiak, AK	Anchorage, AK	Lompoc, CA	Honolulu, HI	Seattle, WA	Oxnard, CA	Valdez, AK	Adak, AK	Other	Total
Air Quality	3		1						1	5
Airspace Use		1	1						1	3
Biological Resources	3	2	3							8
Cultural Resources		1								1
EIS Process	20	14	1						1	36
Environmental Justice										0
Geology and Soils	10	2								12
Hazardous Materials and Hazardous Waste	14	4	1				1			20
Health and Safety	14	7	3				2		5	31
Land Use and Aesthetics	6	6								12
Noise		2								2
Policy	5	6							205	216
Program	14	20	3	2		6	8	3	80	136
Socioeconomics	1	5	1			2	2		12	23
Subsistence	8	3								11
Transportation	4	2					3			9
Utilities										0
Water Resources	6		2							8
Other	6	17	2				1	4	2	32
TOTAL	114	92	18	2	0	8	17	7	307	565

Note: No comments were received at the Seattle scoping meeting

Summary of Comments By Category

Code Key:
S = comments received during the public scoping period
T = oral comments (transcripts)
W = written comments or e-mail comments
= sequential numbers assigned to each letter, e-mail, oral comment (transcript) in the order in which they were received

= specific issues identified and numbered sequentially within each comment letter or e-mail.

7.1 AIR QUALITY

- ❑ Concerned about the chemicals in the air and the harm that it will do to the environment

S-T-0016-1 S-W-0019-2

- ❑ What are the impacts on the air after repeated launches at KLC?

S-W-0036-9

- ❑ What will be the effect of a launch pad failure on the air?

S-W-0036-14

- ❑ Does rocket exhaust fumes have toxic effects on the local terrestrial, fresh water and marine environment?

S-W-0124-2

7.2 AIRSPACE

- ❑ Concerned about the environmental impacts that will occur in space and will they be evaluated in the EIS

S-T-0005-9 S-W-0107-3 S-W-0120-9

7.3 BIOLOGICAL RESOURCES

- ❑ Concerned about the pristine fisheries and wilderness and believes a thorough investigation of the affects of launch activities should occur in the EIS.

S-T-0003-3 S-W-0100-6

- ❑ Concerned about the affects of a rocket going into the ocean and how impacts are measured.

S-T-0010-5

- ❑ Conduct wetland delineations within the footprint of the proposed alternatives.

S-W-0035-2

- ❑ Identify the direct, indirect, and cumulative impacts of each alternative to fish, wildlife and wetland resources. The scope of this assessment should include impacts related to habitat losses, construction activities, and long-term operation of the facility.

S-W-0035-3

- ❑ Vandenberg is located in a sensitive marine area.

S-W-0121-1

- ❑ The missiles use solid propellants for fuel. The burning of solid propellants creates exhaust fumes, which are toxic to plant growth as well as causing acid rain and damage to the ozone layer.

S-W-0121-4

- ❑ Are studies being done on the plankton bloom since it starts in February and the waters come alive near the shores?

S-W-0124-3

7.4 CULTURAL RESOURCES

- ❑ Concerned about the cultural resources.

S-T-0003-4

7.5 EIS PROCESS

- ❑ Suggested that the EIS address rather than no alternatives, see other alternative other than KLC for interceptor; such as sea-based locations as opposed to land-based.

S-T-0001-4

- ❑ Does not believe that an EIS for the GMD Extended Test Range could ever fully address all the short and long-term impacts around KLC.

S-W-0002-5 S-W-0095-4

- Expressed concern over the need for scoping meetings in two villages, Old Harbor and Akhiok, also Juneau, Fairbanks. Additional meetings should be held in Kodiak and Anchorage, Alaska.

S-T-0001-3 S-T-0008-10 S-W-0060-3 S-W-0080-12
S-W-0122-2

- Complete a worst impact commitment, no more incrementalism.

S-W-0006-3 S-T-0006-2 S-T-0010-4

- How can you do an EIS when the program is not complete?

S-T-0004-1

- Concerned over the scoping meeting format.

S-W-0005-1

- Concerned that DoD is exempt from environmental laws.

S-T-0006-1

- What will the cumulative environmental impacts be on the total program?

S-T-0010-3 S-W-0036-4 S-W-0080-11

- Concerned that DoD has a conflict of interest doing the EIS.

S-W-0008-1 S-W-010-2

- Concerned about the short time for the EIS to be completed, does not allow for enough time to evaluate all areas.

S-W-0008-2 S-W-010-1 S-W-0036-1 S-W-0124-6

- Need to do an EIS on the effects of war.

S-W-0028-5

- Feels that comments received from other environmental documents should be added to the EIS.

S-W-0036-5

- Need to explain how you will obtain the exemption to the Marine Mammal Protection Act with regards to the Endangered Steller's sea lion, whale species, and depleted harbor seal populations, when fishermen cannot.

S-W-0036-6

- Concerned that the scoping meeting in Kodiak did not give the public a chance to verbally comment on the GMD Extended Test Range.

S-W-0060-1 S-W-0100-1

- Need to explain the difference between the GMD Validation of Operational Concept and the GMD Extended Test Range and why there was no public notice in the newspapers of a Draft EA.

S-W-0075-1

- Request an extension of the comment period to allow for a full 30 days after the scoping meeting. Feel the EIS is being fast tracked and people are not being given a chance to comment.

S-W-0080-1 S-W-0102-1 S-W-0122-1

- Would like a public repository in Anchorage for GMD documents.

S-W-0090-1

- Notice of Availability and copies of the Draft EIS need to be sent to the State of Hawaii Office of Environmental Quality Control and to the University of Hawaii Environmental Center. This is especially important since no scoping meetings are planned in Hawaii.

S-W-0110-3

- Concerned that the scoping meeting for California was held in Lompoc, since this project will have enormous and substantive direct and cumulative adverse effects on the southern California region, including criteria and hazardous air pollutants, disruption of sensitive terrestrial marine ecosystems and further disrupt the social fabric of Santa Barbara County. Very little information was provided about the project, depriving the so-called scoping process.

S-W-0119-1

- The EIS needs to include for KLC: Ground Water Protection Plan, Storm Water Pollution Prevention Plan, Emergency Plan for the KLC launch pad, Storm Water Plan, Spill Prevention and Control Plan, Pesticide use, Expeditious Recovery Plan of flight test vehicles and debris containing hazardous materials.

S-W-0120-4

- Would like to know if a compliance review has been done, and if so where can it be reviewed.

S-W-0126-2

- The EIS needs to assess the Sea-Based Midcourse Defense or intercept tests of any system against targets launched more than 1,200 kilometers from the Pacific Missile Range Facility.

S-W-0127-2

7.6 ENVIRONMENTAL JUSTICE

No comments were received for this resource area.

7.7 GEOLOGY AND SOILS

- Concerned that the expansion of KLC is an intelligent endeavor since the facility is located in a seismically unstable area.

S-W-0002-6 S-W-0004-2 S-T-0002-3 S-T-0003-1
S-W-0020-4 S-W-0095-5 S-W-0100-4

- What are the impacts on the soil after repeated launches at KLC.

S-W-0036-8

- What will be the effect of a launch pad failure on the soil?

S-W-0036-13

- Requested an up-to-date seismic study be done for the Narrow Cape area on Kodiak before any further infrastructure expansion on Kodiak Launch Complex.

S-W-0080-2 S-W-0122-4 S-W-0124-5

7.8 HAZARDOUS MATERIALS AND HAZARDOUS WASTES MANAGEMENT

- Concerned about putting valuable resources of Kodiak Island at risk due to toxic substances integral to missile launch operations.

S-W-0002-4

- Want the government to pledge to never use nuclear materials in Kodiak.

S-W-0006-2

- If nuclear tips are used in the future, will they be studied? They need to be addressed in the EIS.

S-T-0004-2 S-T-0004-4 S-W-0100-3 S-W-0122-3
S-W-0125-1

- Concerned that MDA will place nuclear tips on interceptors at Fort Greely and not tell the Pentagon.

S-T-0005-2 S-T-0005-4

- Concerned that the potential of experimental fuels, that because of their nature, impacts of these fuels cannot be adequately assessed.

S-W-0020-3

- Need to list all types of Hypergolic Missile Fuels, Oxidizers Pesticides and other hazardous toxic materials being proposed for use and storage at the proposed alternatives.

S-W-0080-3 S-W-0120-3 S-W-0120-8 S-W-0120-13
S-W-0121-3

- Concerned with the hazardous material that are released in the explosion of a rocket, in flight, on the pad, or in a launch silo. Also feels that the EIS should address this area and cover the effects from all potential rocket fuels and payloads.

S-W-0124-4

- What types of fueling systems will be used at KLC to prevent accident spills or leaks of propellants and other hazardous liquids?

S-W-0120-11

- The EIS should address responsibilities and clean-up plans for any hazardous materials that may be associated with KLC.

S-W-0126-3

- Department of Natural Resources manages state owned tidelands and submerged land, which includes all lands offshore to the 3-mile territorial limit. Department of Natural Resources would like the EIS to address the responsibility for removal of any debris or hazardous materials that may fall onto state tidelands and submerged lands as the result of rocket launches.

S-W-0126-5

- ❑ Concerned about debris from launches at Vandenberg AFB.

S-T-0025-3

- ❑ Need to provide information on refueling in Valdez.

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S-T-0027-4

7.9 HEALTH AND SAFETY

- ❑ Concerned about the potential disastrous effects and danger.

S-W-0003-1	S-T-0008-3	S-W-011-2	S-T-0015-3
S-W-0050-1	S-W-0058-3	S-W-0065-4	S-W-0125-2

- ❑ Concerned the population will have to move or will the launch affect their normal lives.

S-T-0003-7

- ❑ Is the actual launch building secure?

S-W-011-1

- ❑ Concerned with safety for residents of Akhiok and Old Harbor, need to provide shelters.

S-W-012-1

- ❑ Concerned about risking health and safety with every toxic rocket launch.

S-T-0015-1 S-W-0095-3

- ❑ The health hazards from radars such as the X-band should be included in the EIS and the proposed sites for the radars for southern Alaska.

S-W-0076-3	S-W-0080-9	S-W-0080-13	S-W-0120-5
S-W--120-6	S-W-0120-15		

- ❑ Concerned about the 9 November 2001 missile accident in Kodiak and would like more information.

S-W-0076-4

- ❑ Need to explain the risks and hazardous associated with the Strategic Target System launcher, booster stages and payloads and any other proposed launch vehicles to be launched from KLC.

S-W-0080-4

- MDA should eliminate any launch trajectory over 220 degrees SW down the east side of Kodiak Island, because the whole south end of Kodiak Island will be within 70 nm Warning Zone, and any SW launches will jeopardize the safety of Kodiak Island residents from any potential missile accident, fallout or contaminates.

S-W-0080-5 S-W-0120-1 S-W-0122-7

- Expressed the opinion that the only environmentally safe and healthy nuclear weapons are non-existent ones.

S-W-0088-1

- Concerned about the powerful transmitters that are being used to track the targeted objects. Feels that Airborne laser and other missile systems are unsafe and have caused many health problems. What the effects on migrating birds?

S-W-0106-1 S-W-0120-10

- The EIS should include an Impact Risk Analysis for all populated villages which are within the over flight exclusion zone.

S-W-0120-12

- Feels that every time a missile is launched, war is simulated, other nations may perceive the Central Coast of California as being at war with them, and highly likely a target for these nations.

S-W-0121-5

- Will the SBX be required to meet the same standards as other ships?

S-T-0027-6

- Need to address security requirements while in the Port of Valdez.

S-T-0027-8

- The EIS needs to contain a detailed analysis of the safety aspects of launches at azimuths other than 280 degrees.

S-W-00127-3

- Need to do a better job addressing the reliability of the target and interceptor rockets in the EIS. The analysis should include a discussion of failures in launches.

S-W-0127-4

- Need to evaluate possible impacts associated with radar operation while the platform is in port, including those related to public safety and health.

S-W-0128-4

7.10 LAND USE AND AESTHETICS

- Concerned that the City of Cordova has been involved in the program and what the purpose of the Atco trailer that has been placed there before and during launches.

S-T-0007-2 S-T-0007-4 S-T-0007-5

- Concerned that mobile telemetry radars will not be limited to the roads and will be taken to sensitive areas and damage will occur to the land.

S-W-009-1

- An important aspect of the local environment is that Kodiak is an essentially undisturbed and lightly developed area would be harmed by the proposed large-scale development. Need to assess impacts of development (more traffic, noise, detraction from scenery, etc).

S-W-0020-5 S-W-0126-1

- How will you protect and compensate the public of the potential loss of their land due to contamination?

S-W-0036-16

- Need to list all Kodiak Island regions and communities, which will be potentially impacted by the MDA's proposed short or long-term GMD activities.

S-W-0080-6

- No previous chemical analysis has been done on the surrounding land areas in the Narrow Cape vicinity to check for rocket/missile contaminates and pollutants, which may have settled on nearby terrain. Narrow Cape is a populated area for hunting, hiking, and picnics, berry picking and fishing.

S-W-0120-2

- Further expanding the GMD program to Alaska will cause further pollution and contamination to the land, air and waters.

S-W-0120-16

- Concerned about the rapid erosion of the sand due to the removal of beach sand that has been taken from Bear Paw Ranch.

S-P-0002-1

- ❑ The EIS should address the long term use of or removal of any facilities constructed at KLC.

S-W-0126-2

7.11 NOISE

- ❑ Concerned that the noise will bother wildlife and individuals seeking a wilderness experience.

S-W-009-2

- ❑ Need to study the impact of sound on the gray whales, mother and calves included, all the endangered and non-endangered species in the launch area.

S-W-0036-7

7.12 POLICY

- ❑ Does not believe that the putting of nuclear tips on interceptors is a wise given our commitment to the 1967 Outer Space Treaty as well as the Nuclear Non-proliferation Treaty.

S-W-0002-3 S-W-0019-1 S-W-0095-2 S-W-0104-1
S-W-0113-2

- ❑ Feel that this current political climate does not justify expanding the military.

S-W-0019-5

- ❑ Concerned that Donald Rumsfield exempted the MDA from normal Pentagon weapons oversight.

S-T-0005-1

- ❑ Concerned that MDA is exempt from reporting to the Pentagon on time lines and costs and from the testing and oversight office overseeing their test.

S-T-0005-3

- ❑ Does MDA complete environmental studies for sites in other countries?

S-T-0005-10

- Instead of expanding missile program, the United States should accept the proposal from Canada, China and Russia to negotiate a Space Weapons Ban.

S-W-0023-6 S-W-0044-5 S-W-0067-5 S-W-0072-5
S-W-0073-3 S-W-0074-5 S-W-0084-2 S-W-0085-5
S-W-0087-5 S-W-0091-5 S-W-0108-2 S-W-0109-2
S-W-0112-5 S-W-0117-5 S-W-0118-5

- Concerned that the decision-maker, Secretary of Defense is not an environmental expert.

S-W-0008-3

- GMD will encourage a new arms race and move it into outer space.

S-W-0014-2 S-W-0015-2 S-W-0017-1 S-W-0018-3
S-W-0021-3 S-W-0022-1 S-W-0023-4 S-W-0023-5
S-W-0024-3 S-W-0025-3 S-W-0026-3 S-W-0027-3
S-W-0028-3 S-W-0029-3 S-W-0030-3 S-W-0031-1
S-W-0033-3 S-W-0036-3 S-W-0039-3 S-W-0042-2
S-W-0043-3 S-W-0044-2 S-W-0044-4 S-W-0045-3
S-W-0049-3 S-W-0051-3 S-W-0053-1 S-W-0055-3
S-W-0056-3 S-W-0057-1 S-W-0063-3 S-W-0064-3
S-W-0065-2 S-W-0066-3 S-W-0067-4 S-W-0069-2
S-W-0070-3 S-W-0071-3 S-W-0072-4 S-W-0073-2
S-W-0074-4 S-W-0078-3 S-W-0081-3 S-W-0085-4
S-W-0086-3 S-W-0087-4 S-W-0091-4 S-W-0093-3
S-W-0094-3 S-W-0097-3 S-W-0099-3 S-W-0101-2
S-W-0103-2 S-W-0104-4 S-W-0107-1 S-W-0111-3
S-W-0112-4 S-W-0113-3 S-W-0114-2 S-W-0115-3
S-W-0117-4 S-W-0118-4

- GMD is expensive and it will require cuts in funding for human services for a non-existent threat.

S-W-0014-3 S-W-0015-3 S-W-0016-1 S-W-0016-3
S-W-0017-2 S-W-0018-1 S-W-0019-3 S-W-0021-1
S-W-0023-1 S-W-0023-2 S-W-0024-1 S-W-0025-1
S-W-0026-1 S-W-0027-1 S-W-0028-2 S-W-0029-4
S-W-0030-1 S-W-0031-3 S-W-0033-1 S-W-0034-1
S-W-0039-1 S-W-0042-1 S-W-0043-1 S-W-0043-4
S-W-0044-3 S-W-0045-1 S-W-0046-1 S-W-0047-1
S-W-0049-1 S-W-0051-1 S-W-0053-3 S-W-0054-2
S-W-0055-1 S-W-0056-1 S-W-0057-2 S-W-0058-1
S-W-0061-1 S-W-0062-2 S-W-0063-1 S-W-0064-4
S-W-0065-1 S-W-0066-1 S-W-0067-1 S-W-0069-1
S-W-0070-1 S-W-0071-1 S-W-0072-1 S-W-0074-1
S-W-0078-1 S-W-0079-3 S-W-0081-1 S-W-0083-2
S-W-0084-1 S-W-0085-1 S-W-0086-1 S-W-0087-1
S-W-0089-1 S-W-0091-1 S-W-0093-1 S-W-0094-2

S-W-0096-1	S-W-0097-1	S-W-0098-3	S-W-0099-1
S-W-0101-1	S-W-0103-1	S-W-0107-2	S-W-0111-2
S-W-0112-1	S-W-0113-4	S-W-0115-1	S-W-0117-1
S-W-0118-1			

- Feels that the Unites States has no business trying to control and dominate the globe.

S-W-0014-4	S-W-0015-4	S-W-0016-2	S-W-0017-3
S-W-0018-4	S-W-0021-4	S-W-0024-4	S-W-0025-4
S-W-0026-4	S-W-0027-4	S-W-0028-4	S-W-0030-4
S-W-0031-4	S-W-0033-4	S-W-0039-4	S-W-0041-3
S-W-0044-1	S-W-0045-4	S-W-0049-4	S-W-0056-4
S-W-0063-4	S-W-0065-3	S-W-0066-4	S-W-0071-4
S-W-0078-4	S-W-0079-4	S-W-0081-4	S-W-0085-6
S-W-0093-4	S-W-0097-4	S-W-0104-2	S-W-0115-4

- Feels we would be wise to befriend North Korea by encouraging their reunification with South Korea and by offering trade agreements. Treating them like an enemy will surely make them behave like an enemy,

S-W-0039-6

- Concerned that the U.S. defense budget is larger than all the other countries combined. Need to use this budget for educational and environmental area.

S-W-0040-1

- Feels that deployment missile defense would be an offensive military move and provoke the enemy. There is legitimate concern about the proliferation of weapons of mass destruction.

S-W-0042-4	S-W-0067-3	S-W-0072-3	S-W-0074-3
S-W-0085-3	S-W-0087-3	S-W-0091-3	S-W-0112-3
S-W-0117-3	S-W-0118-3		

- Provide information about launching interceptors from missile silos in Kodiak and how the Intermediate-Range Nuclear Forces Treaty will be violated if this is done.

S-W-0080-15

- Concerned that the defense policy should be based on short-term concerns, not long-term considerations that would lead the U.S. to have such systems. Who has the power to launch a war against the United States (China), feels that the Unites States is trying to consolidate its hold on global power.

S-W-0098-2

- Feels that we should build peaceful relationships with people of the globe. Defense of one's homeland is a legitimate goal, but should evaluate the effectiveness and worth of the cost.

S-W-0098-4 S-W-0114-1 S-W-0115-6

- The expense to the U.S. taxpayer is not justifiable for this type of research and development with regard to the level of protection it might give the Unites States against terrorism.

S-W-0002-2 S-W-0039-2 S-W-0052-1 S-W-0073-1
S-W-0098-1 S-W-0113-1 S-W-0115-5

- Are air-launched and sea-launched targets with ranges greater than 500 kilometers prohibited by the Intermediate-Range Nuclear Forces Treaty?

S-W-0126-1 S-W-0127-5

7.13 PROGRAM

- Feels that no real threat exists, the military seems to be creating enemies to justify this program.

S-W-0018-2 S-W-0021-2 S-W-0023-3 S-W-0024-2
S-W-0025-2 S-W-0026-2 S-W-0027-2 S-W-0028-1
S-W-0029-2 S-W-0030-2 S-W-0031-2 S-W-0033-2
S-W-0036-2 S-W-0043-2 S-W-0045-2 S-W-0048-1
S-W-0049-2 S-W-0053-2 S-W-0054-1 S-W-0055-2
S-W-0056-2 S-W-0062-1 S-W-0063-2 S-W-0064-2
S-W-0066-2 S-W-0067-2 S-W-0070-2 S-W-0071-2
S-W-0072-2 S-W-0074-2 S-W-0078-2 S-W-0079-2
S-W-0081-2 S-W-0083-1 S-W-0085-2 S-W-0086-2
S-W-0087-2 S-W-0091-2 S-W-0093-2 S-W-0094-1
S-W-0097-2 S-W-0099-2 S-W-0104-3 S-W-0109-1
S-W-0111-1 S-W-0112-2 S-W-0115-2 S-W-0117-2
S-W-0118-2

- Oppose the missiles in KLC.

S-W-0004-4 S-T-0002-2 S-W0013-1 S-W-0120-17

- Opposes the U.S. Government's plan for continuing research and development of the Missile Defense Program.

S-W-0002-1 S-W-0002-8 S-T-0010-1 S-T-0011-1
S-T-0005-15 S-W-0014-1 S-W-0015-1 S-W-0038-1
S-W-0059-1 S-W-0068-1 S-W-0079-1 S-W-0080-16
S-W-0082-1 S-W-0095-1 S-W-0105-1 S-W-0108-1
S-W-0109-3 S-W-0116-1

- Show that the program will work, concerned that this is an impractical idea.

S-W-0006-4 S-T-0008-4 S-T-0008-7 S-T-0009-1
S-T-0005-13 S-T-0005-14 S-W-0019-4 S-W-0029-1
S-W-0046-3 S-W-0048-2 S-W-0064-1 S-W-0120-14

- Concerned with launching 20 Scud missiles off Poker Flats Research Range at University of Alaska Fairbanks and how it fits into the program.

S-T-0007-3

- Concerned about the possibility that an X-Band Radar will be placed at Poker Flats to look at the missiles.

S-T-0007-7

- Concerned about the inevitable problems with using Kodiak, such as landscapes, environment and human population and the resources.

S-T-0003-5

- Doesn't trust the MDA agency, or the U.S. Army in Alaska.

S-T-0005-5 S-T-0005-7 S-T-0008-1
S-T-0005-12

- Would like more information on the type of launch vehicle or kill vehicle that will be used.

S-T-0014-1

- Concerned that the X-Band radar will come to Vandenberg AFB.

S-T-0016-3

- Concerned that the U.S. Army is spending a lot of money on EISs and other environmental data when Vandenberg has been doing this type of testing for years and with no impacts.

S-T-0018-1

- Hopes decision-makers will weigh the pros and cons of this program and find there is not enough evidence that the returns will outweigh the possible losses.

S-W-0002-7 S-W-0095-6

- Wants details of possible nuclear tipped missiles

S-W-0004-1 S-T-0010-7

- Would like more information on Fort Greely, since it is not supposed to be part of the Extended Test Range, concerning the building of silos, and other construction is going on.

S-T-0005-8

- Concerned that silos and interceptors should not be put in Alaska just to test the effects of the cold on rocket fuel.

S-T-0005-11

- Suggested not firing from Vandenberg AFB or Kwajalein but from different locations.

S-W-0032 -1

- Feels that telecommunication infrastructure, including possible routes for fiber optic links between Kodiak, Shemya, and Fort Greely should be included in the Test Bed EIS.

S-W-0037-1 S-W-0080-14

- Concerned that if the Ballistic Missile Defense System were carried out it would make nuclear war more likely.

S-W-0041-1 S-W-0058-4

- Feels that missile defense is detrimental to the environment.

S-W-0042-3 S-W-0121-8

- Would like a separate on-site EIS for Kodiak, and concerned that Kodiak will be thrown into the GMD EIS at the last minute and that no additional scoping meetings are going to be held in Kodiak.

S-W-0060-4 S-W-0076-1 S-W-0124-1

- Suggested that MDA include all phases of the GMD Extended Test Range (and all proposed locations) in the Extended Test Range EIS for Kodiak and Vandenberg, concerning the fact that all site locations will work in correlation in testing phases of the missile and radar systems in the North Pacific.

S-W-0075-2

- If interceptors are going to be launched from Fort Greely over Alaska, that information needs to be included in an EIS.

S-W-0075-3

- Suggested the EIS should include information on the radars at KLC and also at Sheyma.

S-W-0076-2

- Would like the following items addressed in detail in the Draft EIS: installation of test Battle Management Command and Control capability with In-Flight Interceptor Communication System Data Terminals, Defense Satellite Communication System, two launch silos, telemetry facility, launch silos chiller facilities, alterations to existing launch control facilities, alterations to existing missile assembly building, booster storage area, missile Hypergolic Fuel and Oxidizer Storage Building, Diesel Transfer Point and mission electrical power, buried power and communication lines.

S-W-0077-1 S-W-0080-10

- Encouraged the U.S. Army to continue testing missile defense. It helps create jobs and protects us against the threat of attack from terrorist-harboring nations.

S-W-0092-1

- The EIS should discuss any radar facilities and other sensors, communications, and other facilities in Hawaii and that would be used in any GMD tests. X-Band radars need to be discussed.

S-W-0110-1

- Since previous environmental analyses of missile defense tests near Hawaii have not analyzed impact of tests of the Navy Theater-Wide system or intercept tests of any system against targets launched more than 1,200 kilometers from the Pacific Missile Range Facility, any such tests that might be part of GMD testing need to be examined in detail.

S-W-0110-2

- Need to do a better job notifying people in Hawaii. Need to send notices to the State of Hawaii Office of Environmental Quality Control.

S-T-0019-1 S-W-0127-6

- Supports locating the program at Naval Base Ventura

S-T-0020-1 S-T-0021-1 S-T-0022-1
S-T-0023-1 S-T-0026-1 S-W-0129-1
S-W-0130-1 S-W-0131-1 S-W-0132-1

- Concerned about the lack of information to evaluate about the program in Oxnard and would like extension of comment period.

S-T-0024-1 S-T-0025-1

- ❑ Need to notify local agencies including Channel Beach area.

S-T-0025-2 S-W-0134-1

- ❑ Will there be a meeting in Adak?

S-T-0027-1

- ❑ The EIS should discuss relevant sensors, communications, and other facilities in Hawaii as part of the cumulative impacts along with other missile defense testing planned near Hawaii.

S-W-0127-1

- ❑ Support of the siting of the SBX in Everett, Washington and would like more information.

S-W-0128-1

- ❑ Would like information on the Notice of Intent sent to the Beacon Foundation.

S-W-0133-1 S-W-0135-1

7.14 SOCIOECONOMICS

- ❑ Comments expressing need to employ local contractors to assist in preparing the EIS.

S-T-0001-2

- ❑ Concerned that the program will have adverse effects on tourism.

S-T-0012-2 S-W-0122-5

- ❑ Would like to know how extensively economic and social impact will be measured and the cumulative impacts.

S-T-0010-2 S-T-0010-8 S-W-0046-2

- ❑ Would like to have the majority of work at Vandenberg AFB.

S-T-0014-2

- ❑ Concerned about the social impact of possibility becoming a target for terrorist attack on Alaska because of the project.

S-T-0011-2

- ❑ The military budget benefits only the military/industrial complex.

S-W-0039-5 S-W-0041-2 S-W-0048-3 S-W-0051-2
S-W-0055-4 S-W-0056-5 S-W-0058-2 S-W-0094-4
S-W-0099-4 S-W-0103-3` S-W-0111-4

- ❑ Program would have a positive economic benefit to Ventura County.

S-T-0021-2 S-T-0022-2 S-W-0129-2
S-W-0132-2

- ❑ Need to evaluate possible impacts to recreational commercial boat traffic in the Snohomish River Channel.

S-W-0128-3

- ❑ Need to evaluate the possible heightened security measures that might impede ship-board commerce.

S-W-0128-5

7.15 SUBSISTENCE

- ❑ Suggested testing subsistence food at KLC (berries, fish, etc) for contaminants.

S-W-0006-1 S-W-0020-1 S-W-0036-11

- ❑ Concerned how the launches will affect subsistence and commercial fishing and hunting.

S-T-0008-6 S-T-0008-9 S-T-0012-1 S-W-0080-8
S-W-0100-7 S-W-0121-2 S-W-0122-6

- ❑ How will you compensate the public for potential loss of land at Narrow Cape and the sea offshore of KLC, major fishing grounds and a tourist location?

S-W-0036-17

7.16 TRANSPORTATION

- ❑ Concerned that the Narrow Cape road will be closed.

S-W-0004-3

- ❑ Concerned how the missiles will be transported between Fort Greely and Kodiak.

S-T-0008-8 S-W-0036-12

- Will missiles be moved after testing?

S-W-011-3

- Potential environmental and human impact (damage) due to human error in the transportation of propellants and other toxic materials along the road system should be included in the EIS.

S-W-0100-5 S-P-0002-2

- Need to cover navigation or transportation into the Port of Valdez in the EIS.

S-T-0027-2

- Wanted to know if there would be a helicopter pad on the SBX?

S-T-0027-3

- Need to discuss types of escort services required for the SBX in the Port of Valdez.

S-T-0027-5

- Need to provide information of the possible impact to ship navigation, berthing and maneuvering in the Port of Everett.

S-W-0128-2

7.17 UTILITIES

No comments were received for this resource area.

7.18 WATER RESOURCES

- Concerned about the toxics that go into the water, they are hazardous to fishermen, surfers, anyone who goes into the water.

S-T-0015-2

- Concerned about the drinking water standards from test done on the western complex of Vandenberg AFB.

S-T-0016-2

- Conduct a thorough evaluation of alternatives pursuant to the Clean Water Guidelines.

S-W-0035-1

- What are the impacts on the fresh water and near shore marine environment after repeated launches at KLC.

S-W-0036-10

- What will be the effect of a launch pad failure on the water (both fresh and marine)?

S-W-0036-15

- Would like to know if pesticides will be used at Kodiak Test Bed Facility and the potential hazards to local waters.

S-W-0077-2

- Would like to see the KLC Waste Water Plan and Storm Water Pollution Prevention Plan for the run-off to surrounding waters, grasslands and wildlife in the Narrow Cape area.

S-W-0080-7

- The EIS should address the projects needs for and sources of gravel or water resources.

S-W-0126-4

7.19 OTHER

- Concerned about the credibility of AADC.

S-T-0001-1

- Does not believe the information that Vandenberg AFB supplies to the public.

S-T-0017-1

- Requested a copy of all comments and who gave them.

S-W-0007-1

- Concerned about the past military not cleaning up, and not providing information on cleanups.

S-T-0002-1 S-T-0002-4 S-T-0008-2 S-T-0008-5

- Concerned about the bad weather affecting the launches.

S-T-0003-2

- Would like to meet with the contractors to discuss the Alaskan Environment.

S-T-0003-6 S-T-0009-2

- Concerned that the subcontractors are part or subsidiaries of defense industry organizations.

S-T-0004-3

- Concerned about the plan to place 200 interceptors at Fort Greely and to be effective anti-ballistic missile, it would have to have a multi-megaton nuclear explosive on the tip of the interceptor.

S-T-0005-6

- Concerned about the roles of the universities in the EIS Process.

S-T-0007-1 S-T-0007-6

- Concerned about the Scud missile program in Alaska.

S-T-0010-6

- Concerned about the psychological aspect of the potential threat of becoming more a target because of the program.

S-T-0011-3 S-T-0013-1

- Concerned that the recent EA has already issued a Finding of No Significant Impact, without waiting to review the comments.

S-T-0004-5

- Feels the current ecological monitoring program is inadequate because it fails to include samples from control sites away from the proposed launch area. Before, after, control, impact method would be the standard protocol.

S-W-0020-2

- Concerned that the EA for Ground-Based Midcourse Defense Validation of Operational Concept did not provide program details for Kodiak and Fort Greely. Feels the Notice of Intent for GMD Extended Test Range is the same program. Thought that a meeting was to be held prior to a Notice of Intent for EIS. Want to know if a separate “on-site” EIS for Kodiak will be performed, as was promised in the lawsuit. Feels that any EIS being done which includes part of Alaska as part of a Defense Test Bed should include Kodiak, Shemya Island, and Fort Greely.

S-W-0060-2

- Feels that the community was duped by KLC, since they were told that there would not be any military applications and that the whole process of an EIS was scrapped because of one U.S. Senator who had the authority to change protocol. No one from the original meetings attended the scoping meeting. Does not know who or what to believe.

S-W-0100-2

- The Draft EIS should include all Department of Energy programs, which will be tested at KLC.

S-W-0120-7

- Proximity to Diablo Canyon Nuclear Power Plant and Chevron Oil Refinery creates hazards for military activity at Vandenberg.

S-W-0121-6

- Clean up of bases exceeds all the money in the work; clean up of missile launches over the ocean is incalculable.

S-W-0121-7

- Concerned that launches from Earth and building in space will negatively impact our environment to the point that the “protection” afforded by this system will be negated by the effect on our biosystem.

S-W-0123-1

- Called to verify number.

S-P-0001

- Need to address if the SBX will be moored or anchored in port.

S-T-0027-7

8.0 PUBLIC HEARING TRANSCRIPTS, COMMENTS, RESPONSES, AND PETITIONS

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9.0 CONSULTATION COMMENTS AND RESPONSES

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10.0 REFERENCES

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APPENDIX A
RELATED ENVIRONMENTAL DOCUMENTATION

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RELATED ENVIRONMENTAL DOCUMENTATION

Table A-1 summarizes some of the most pertinent related National Environmental Policy Act documentation that has been used in the preparation of the *Ground-Based Midcourse Defense Extended Test Rage Environmental Impact Statement*. These environmental assessments and Environmental Impact Statements have previously been prepared to support the development of the specific technologies that may be used as part of the Ground-Based Midcourse Defense System. The information and analyses contained in these National Environmental Policy Act documents were used in the development of this Environmental Impact Statement. Several of the documents have been incorporated by reference and are cited in the Environmental Impact Statement where applicable. Many of these documents are available in digital format at the following website: http://www.huntsville.edaw.com/pubdocs/. This link was in operation when the Ground-Based Midcourse Defense Extended Test Rage Environmental Impact Statement was completed, and every effort will be made to maintain the website for the duration of the Proposed Action.

Table A-1: Related Environmental Documentation

Date/Document Title	Locations of Actions	Missiles Analyzed	Sensors Analyzed	Activities Analyzed
1. *Final Environmental Impact Statement Proposed Actions at U.S. Army Kwajalein Atoll* (U.S. Army Strategic Defense Command, 1989) (Web Link)	U.S. Army Kwajalein Atoll launches from Meck, Omelek, and Roi-Namur; construction on Kwajalein	Exoatmospheric Reentry Interceptor System, Space Based Interceptor, High Endoatmospheric Defense Interceptor Strategic Target System	Kiernan Reentry Measurement System, Ground-Based Radar, Airborne Optical Adjunct, High Altitude Learjet Observatory and Infrared Instrumentation System, Mid-Course Sensors Experiment, Optical Aircraft Measurement System, Ground-Based Surveillance and Tracking System	Demonstration/validation interceptor and target launches, concept development activities, construction
2. *Final Environmental Impact Statement for the Strategic Target System* (U.S. Army Strategic Defense Command, 1992) (Web Link)	Kauai Test Facility, Pacific Missile Range Facility	Strategic Target System	Not applicable	Construction of flight support facilities and the launch of Strategic Target System vehicles
3. *Kauai Test Facility (KTF) Environmental Assessment* (U.S. Department of Energy, 1992) (Web Link)	Kauai Test Facility, not Pacific Missile Range Facility	Strategic Target System and Exoatmospheric Discrimination Experiment	FPO-14 equivalent	Evaluate the impact of continuing test operations at Kauai Test Facility on the environment (continuing the existing Kauai Test Facility and program; constructing new roadways, fencing, fuel handling, and launch pad facilities; and vertical and rail launch vehicles)

Table A-1: Related Environmental Documentation (Continued)

Date/Document Title	Locations of Actions	Missiles Analyzed	Sensors Analyzed	Activities Analyzed
4. *Final Ground Based Radar (GBR) Family of Radars Environmental Assessment* (U.S. Army Program Executive Office, 1993) (Web Link)	Raytheon, Massachusetts for manufacture; White Sands Missile Range, New Mexico; Fort Bliss, New Mexico; U.S. Army Kwajalein Atoll	Not applicable	Theater Missile Defense Ground Based Radar and Ground Based Radar–Test	Fabrication and testing of the Ground Based Radar to demonstrate discrimination capabilities and validation of the technology
5. *Final Supplemental Environmental Impact Statement Proposed Actions at U.S. Army Kwajalein Atoll* (U.S. Army Space and Strategic Defense Command, 1993) (Web Link)	Launches from Meck, Omelek, Illeginni, and Roi-Namur; sensors on Gagan, Gellinam, Eniwetak, Ennylabegan, Kwajalein, Legan, Meck, Omelek	Theater High Altitude Area Defense, PATRIOT, Terrier, Nike Hercules, Extended Range Interceptor SR-19, M55A1, M56A1, Castor I, M57A1, Talos, Antares II, Black Brant VB, Orbus I, NIHKA (liquid), meteorological and sounding rockets	Kiernan Reentry Measurement System, Ground-Based Element, Airborne Optical Adjunct, High Altitude Learjet Observatory and Infrared Instrumentation System, Optical Aircraft Measurement System, Ground-Based Surveillance and Tracking System	Up to 172 annual launches, construction of new launch facilities and other facilities, installation of new sensor systems and fiber-optic communication
6. *Environmental Assessment (EA) for Theater Missile Defense (TMD) Ground Based Radar (GBR) Testing Program at Fort Devens, Massachusetts* (U.S. Army Program Executive Office Missile Defense, 1994) (Web Link)	Fort Devens, Massachusetts	Not applicable	Theater Missile Defense–Ground Based Radar	System testing as part of demonstration/validation of the Ground Based Radar program, full power antenna radar tests
7. *Theater Missile Defense Extended Test Range Environmental Impact Statement* (U.S. Army Space and Strategic Defense Command, 1994) (Web Link)	White Sands Missile Range, New Mexico; Eglin Air Force Base, Florida; Western Range (Vandenberg Air Force Base, California); U.S. Army Kwajalein Atoll; Wake Island	Theater High Altitude Area Defense, Extended Range Interceptor, PATRIOT, Corps Surface-to-Air Missile, PATRIOT Advanced Capability-3, Army Tactical Missile System Hera family (M56A-1, SR19-AJ-1, Castor IV, Castor IVB, M57A-1, Orbis I)	Theater Missile Defense - Ground Based Radar, PATRIOT radar	Extended range tests of target and interceptor missiles and sensor systems (ground-, sea-, based), 100 flight tests; construction, use of simulants (TEP, diatomaceous earth)

Table A-1: Related Environmental Documentation (Continued)

Date/Document Title	Locations of Actions	Missiles Analyzed	Sensors Analyzed	Activities Analyzed
8. *Wake Island Environmental Assessment* (U.S. Space and Strategic Defense Command, 1994) (Web Link)	Wake Island	Theater High Altitude Area Defense, Extended Range Interceptor, PATRIOT, Corps Surface-to-Air Missile, PATRIOT Advanced Capability-3, Army Tactical Missile System Hera, (M56A-1, SR19-AJ-1, Castor IV, Castor IVB, M57A-1, Orbis I)	Theater Missile Defense - Ground Based Radar. Kwajalein Missile Range Safety System, AN/MPS-36 C-band tracking radar, telemetry receivers, optical sensors, PATRIOT radar (AN/MPQ-53)	Long distance missile flight tests in support of TCMP tests (75 to 100 surface-to-air and surface-to-surface defensive missiles), use of simulants (TEP), ground- and sea-based tests, use of MLS
9. *U.S. Army Kwajalein Atoll Temporary Extended Test Range Environmental Assessment* (U.S. Army Space and Strategic Defense Command, 1995) (Web Link)	Kwajalein, Meck, Roi-Namur, Illeginni, Gellinam, Legan, Omelek, and Aur islands	PATRIOT Hera, liquid target missile	Theater High Altitude Area Defense radar, PATRIOT radar, U.S. Army Kwajalein Atoll Range sensors	Construction of temporary target launch site on Bigen Island, launch of liquid and/or solid target missiles, PATRIOT missile launches from Meck or Illeginni, intercept over Kwajalein Lagoon or open ocean
10. *Environmental Assessment of the Kodiak Launch Complex* (Federal Aviation Administration, 1996) (Web Link)	Kodiak Island, Alaska	Lockheed Martin Launch Vehicles 1 and 2, Minuteman II (modified for commercial use), Taurus, and Conestoga	Not applicable	Examine the potential for environmental impacts resulting from the proposed Kodiak Launch Complex construction and operation. The proposed Kodiak Launch Complex would support commercial rocket launches to place small satellites into orbit

Table A-1: Related Environmental Documentation (Continued)

Date/Document Title	Locations of Actions	Missiles Analyzed	Sensors Analyzed	Activities Analyzed
11. *Final Environmental Assessment for the Proposed Refuge Logistics and Operations Support and Public Use Program at Midway Atoll National Wildlife Refuge* (U.S. Department of the Interior, Fish and Wildlife Service, 1996) (Web Link)	Midway Atoll	Not applicable	Not applicable	Public use of Midway Atoll National Wildlife Refuge
12. *Environmental Assessment for the U.S. Air Force atmospheric interceptor technology Program* (U.S. Department of the Air Force, 1997) (Web Link)	Kodiak Island, Alaska	Minuteman II	Phased Array Warning System (PAVE PAWS) radar, HAVE STARE tracking radar	Two sub-orbital missile launches

Table A-1: Related Environmental Documentation (Continued)

Date/Document Title	Locations of Actions	Missiles Analyzed	Sensors Analyzed	Activities Analyzed
13. *Final Theater Ballistic Missile Targets Programmatic Environmental Assessment* (U.S. Department of the Air Force, 1997) (Web Link)	Vandenberg Air Force Base, California	Lance, HERMES Target System, PATRIOT as a Target, Black Brant IX, Two-stage (or DR-2) Terrier, Terrier/Orion, Castor I, and STRYPI II, Storm, ARIES, Hera. Theater High Altitude Area Defense, the PATRIOT Advanced Capability-2 and PATRIOT Advanced Capability-3, Corps Surface-to-Air Missile; the Navy Standard Missile 2, Block III or IVA; and the Air Force theater ballistic missile	Ground-based optical sensors, radar, and telemetry stations may be supplemented by ship-based or airborne sensors	In cooperation with Vandenberg Air Force Base, the U.S. Army Space and Missile Defense Command proposes to launch up to 30 small, solid- and liquid-propellant theater ballistic missiles and sounding rockets from mobile launchers on several launch sites on Vandenberg Air Force Base. In addition, it is proposed that larger target missiles, such as the Storm, ARIES, and Hera, be launched from a 50k rail launcher located on Space Launch Complex -5
14. *Supplemental Environmental Assessment for the Proposed Public Use Program at Midway Atoll National Wildlife Refuge* (U.S. Department of the Interior, Fish and Wildlife Service, 1997) (Web Link)	Midway Atoll National Wildlife Refuge	Not applicable	Not applicable	Proposes that shore-based fishing, the taking of lobsters, night-diving, night-fishing, glass-bottom boating, kayaking tours, and the development of a designated trail system through a closed area of Sand Island be included in the Public Use Plan for the Refuge

Table A-1: Related Environmental Documentation (Continued)

Date/Document Title	Locations of Actions	Missiles Analyzed	Sensors Analyzed	Activities Analyzed
15. *Programmatic Environmental Assessment Air Drop Target System Program (Department of Defense, Ballistic Missile Defense Organization, 1998)* (Web Link)	No specific area	SR-19-AJ-1 rocket motor	C-band beacon tracking	Air launch of target booster
16. *Pacific Missile Range Facility Enhanced Capability Final Environmental Impact Statement* (U.S. Department of the Navy, 1998) (Web Link)	Pacific Missile Range Facility, Niihau, Kaula, Kaena Point, Space Surveillance System on the island of Maui, Tern Island, Johnston Atoll, Open Pacific Ocean	Interceptor missiles (Standard Missile-2 Block IV, Theater High Altitude Area Defense, PATRIOT Advanced Capability-2, PATRIOT Advanced Capability-3, Advanced Medium-Range, Air-to-Air Missile, Medium Extended Air Defense System) Solid and liquid propellant target missiles (Strategic Target System, Hermes, PATRIOT as a Target, Storm, Hera; Lance, FMA)	Precision tracking, surveillance, and identification-friend-or-foe radars	Ground-, air-, and sea-launches of target and interceptor missiles with intercepts over the broad ocean area
17. *Theater Missile Defense Extended Test Range Supplemental Environmental Impact Statement – Eglin Gulf Test Range* (U.S. Department of the Air Force, 1998) (Web Link)	Eglin Air Force Base, Florida; Florida Keys; Gulf of Mexico	Theater High Altitude Area Defense, Standard Missile-2 Block IV, Standard Missile-3, PATRIOT Advanced Capability-2, PATRIOT Advanced Capability-3, Medium Extended Air Defense System, Hera, Storm II, PATRIOT as a Target, Lance, HERMES, Black Brandt 9, Pegasus	Ground Based Radar, airborne sensors, ship-based sensors, and space-based sensors	Ground-, air-, and sea-launches; intercepts in Gulf of Mexico

Table A-1: Related Environmental Documentation (Continued)

Date/Document Title	Locations of Actions	Missiles Analyzed	Sensors Analyzed	Activities Analyzed
18. *Booster Verification Tests Environmental Assessment* (U.S. Department of the Air Force, 1999) (Web Link)	Vandenberg Air Force Base	Booster Verification Flight Vehicle	Not applicable	Two booster verification test flights. The Environmental Assessment covers all pre-flight, in-flight, and post-flight operational activities; modification of the existing Minuteman II silo at LF-21, minor modifications to the communications and launch control buildings, and installation of a temporary above-ground fiber-optic communication line connecting LF-21 to the base communication system
19. *Wake Island Launch Center (WILC) Supplemental Environmental Assessment* (U.S. Army Space and Missile Defense Command, 1999) (Web Link)	Wake Island	Liquid propellant target missile	Not listed	Minimal new site preparation, liquid propellant transfer and fueling, liquid propellant missile launches
20. *Final Supplemental Environmental Impact Statement for the Evolved Expendable Launch Vehicle Program* (U.S. Department of the Air Force, 2000) (Web Link)	Cape Canaveral Air Force Station, Florida; Vandenberg Air Force Base, California	Atlas V, Delta IV	Not applicable	To allow the addition of up to five strap-on solid rocket motors to the Atlas V lift vehicle and to allow the use of larger solid rocket motors on the Delta IV lift vehicle. Both vehicles are part of the Evolved Expendable Launch Vehicle program

Table A-1: Related Environmental Documentation (Continued)

Date/Document Title	Locations of Actions	Missiles Analyzed	Sensors Analyzed	Activities Analyzed
21. *National Missile Defense Deployment Environmental Impact Statement* (Department of Defense, 2000) (Web Link)	Alaska, North Dakota	Ground-Based Interceptor	X-Band Radar, Upgraded Early Warning Radar (PAVE PAWS), Satellite Detection Systems	This Environmental Impact Statement examines the potential for impacts to the environment as a result of the potential deployment of a land-based National Missile Defense system
22. *Final Environmental Assessment for U.S. Air Force Quick Reaction Launch Vehicle Program* (U.S. Department of the Air Force, 2001) (Web Link)	Kodiak Island, Alaska	Minutemen I M-56 motor, Minuteman II/III SR-19 motor, Minuteman II/III SR-19/Minuteman I/II M-57, Delta II Castor IVB Minuteman I/II M-57	Not applicable	Consists of eight sub-orbital missile launches from the Kodiak Launch Complex on Kodiak Island, Alaska; one Quick Reaction Launch Vehicle per year
23. *Final Environmental Assessment for the North Pacific Targets Program* (U.S. Army Space and Missile Defense Command, 2001) (Web Link)	Kodiak, Alaska; Kauai Test Facility, Pacific Missile Range Facility; Open Ocean near U.S. Army Kwajalein Atoll	Strategic Target System	Not applicable	The Proposed Action is to increase launch capability of the Strategic Target System in order to provide ballistic missile targets to test North American sensors, and for possible use in testing various sensors and ground-based interceptors at U.S. Army Kwajalein Atoll/Kwajalein Missile Range and various sensors and ship-based interceptors at Pacific Missile Range Facility

Table A-1: Related Environmental Documentation (Continued)

Date/Document Title	Locations of Actions	Missiles Analyzed	Sensors Analyzed	Activities Analyzed
24. *Alternate Boost Vehicle Verification Tests Environmental Assessment* (U.S. Army Space and Missile Defense Command, 2002) (Web Link)	Vandenberg Air Force Base, California	Alternate Boost Vehicle	Not applicable	Modification of the existing Minuteman II silo at LF-23 Confirm the Alternate Boost Vehicle and silo designs, demonstrate silo egress, test the booster under operationally representative conditions through test flights of the Alternate Boost Vehicle (10 intercontinental ballistic missiles per year)
25. *Ground-Based Midcourse Defense(GMD) Validation of Operational Concept (VOC) Environmental Assessment* (U.S. Army Space and Missile Defense Command, 2002) (Web Link)	Fort Greely, Alaska; Clear Air Force Station, Alaska; Eareckson Air Force Station, Alaska; Eielson Air Force Base, Alaska; Beale Air Force Base, California	Ground-Based Interceptor	X-Band Radar, In-flight Interceptor Communication System Data Terminal, Upgraded Early Warning Radar, COBRA DANE, Space-Based Detection System	Prove construction techniques for Ground-Based Midcourse Defense components and validate the operational concept of Ground-Based Midcourse Defense
26. *Final Environmental Impact Statement / Overseas Environmental Impact Statement Point Mugu Sea Range* (U.S. Department of the Navy, 2002) (Web Link)	Naval Air Warfare Center Weapons Division Point Mugu/Naval Air Warfare Center Weapons Division Point Mugu Sea Range	Vandal Smaller	Range Radars and Telemetry	In addition to conducting current test and training operations at the Naval Air Warfare Center Weapons Division Point Mugu Sea Range, Naval Air Warfare Center Weapons Division Point Mugu proposes to accommodate Theater Missile Defense testing and training, accommodate an increase in current levels of training exercises, and modernize facilities to enhance the existing testing and training capabilities at Naval Air Warfare Center Weapons Division Point Mugu

Table A-1: Related Environmental Documentation (Continued)

Date/Document Title	Locations of Actions	Missiles Analyzed	Sensors Analyzed	Activities Analyzed
27. *Development and Demonstration of the Long Range Air Launch Target System Environmental Assessment* (U.S. Department of Defense, 2002) (Web Link)	Yuma Proving Ground, Central Pacific Broad Ocean Area	Long Range Air Launch Target	Not applicable	Two validation tests. The Long Range Air Launch Target demonstration would test a ballistic missile target comprising a launch vehicle delivery system and a simulated re-entry vehicle

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APPENDIX B
RESOURCE DESCRIPTIONS INCLUDING LAWS AND REGULATIONS CONSIDERED

APPENDIX B
RESOURCE DESCRIPTIONS INCLUDING LAWS AND REGULATIONS CONSIDERED

AIR QUALITY

Air quality in a given location is described as the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$), or in a pollution standard index. Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The significance of a pollutant concentration is determined by comparing it to federal and state ambient air quality standards (AAQS).

The Federal Clean Air Act (42 United States Code [USC] 7401) requires the adoption of national ambient air quality standards (NAAQS) to protect the public health, safety, and welfare from known or anticipated effects of air pollution. Air quality is defined by ambient air concentrations of specific pollutants. Seven air pollutants have been identified by the U.S. Environmental Protection Agency (EPA) as being of concern nationwide: carbon monoxide, ozone, nitrogen dioxide, particulate matter equal to or less than 10 microns in size (PM-10) (also called respirable particulate and suspended particulate), fine particulate matter equal to or less than 2.5 microns in size (PM-2.5), sulfur dioxide, and lead. The EPA has established NAAQS for these pollutants, which are collectively referred to as criteria pollutants, as shown in table B-1. Alaska, Hawaii, California and Washington have established state AAQS. Emissions of air pollutants from operations in each state are limited to the more restrictive standard (federal or state). Table B-1 compares the NAAQS and the state AAQS. The NAAQS are applicable at sites within the United States; applicability at the other project sites is discussed in the individual sections that follow.

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

The Clean Air Act Amendments of 1990 (Public Law [PL] 101-549, 104 Statute 2399) required the EPA to promulgate rules to ensure that federal actions in areas classified as nonattainment or maintenance areas conform to the appropriate state implementation plan. These rules, known together as the General Conformity Rule (40 Code of Federal Regulations [CFR] 51.850-860 and 40 CFR 93.150-160), require any federal agency responsible for an action to determine if its action conforms to pertinent guidelines and regulations. Certain actions are exempt from conformity determinations if the projected emission rates would be less than specified emission rate thresholds, known as *de minimis* limits.

Table B-1: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Alaska State Standard	Hawaii State Standard	California State Standard	Washing ton State Standard	National Primary Standard	National Secondary Standard
Carbon Monoxide	8-hour	10 mg/m^3 (9 ppm)	5 mg/m^3 (4.5 ppm)	10 mg/m^3 (9 ppm)	10 mg/m^3 (9 ppm)	10 mg/m^3 (9 ppm)	None
	1-hour	40 mg/m^3 (35 ppm)	10 mg/m^3 (9 ppm)	23 mg/m^3 (20 ppm)	40 mg/m^3 (35 ppm)	40 mg/m^3 (35 ppm)	None
Nitrogen Dioxide	Annual (1)	100 µg/m^3 (0.053 ppm)	70 mg/m^3 (0.037 ppm)	None	94 µg/m^3 (0.05 ppm)	100 µg/m^3 (0.053 ppm)	Same as Primary
	1-hour	None	None	470 µg/m^3 (0.25 ppm	None	None	None
Ozone	8-hour (2)	None	None	None	None	157 µg/m^3 (0.08 ppm) (1)	Same as Primary
	1-hour	235 µg/m^3 (0.12 ppm)	100	180 µg/m^3 (0.09 ppm)	235 µg/m^3 (0.12 ppm)	235 µg/m^3 (0.12 ppm)	Same as Primary
Lead	30-day average	None	None	1.5 µg/m^3	None	None	None
	Quarterly (1)	1.5 µg/m^3	1.5 mg/m^3	None	None	1.5 µg/m^3	Same as Primary
PM-2.5	Annual (3)	None	None	None	None	15 µg/m^3	Same as Primary
	24-hour (4)	None	None	None	None	65 µg/m^3	Same as Primary
PM-10	Annual (arithmetic mean)	50 µg/m^3	50 mg/m^3	None	50 µg/m^3	50 µg/m^3	Same as Primary
	24-hour (5)	150 µg/m^3	150 mg/m^3	50 µg/m^3	150 µg/m^3	150 µg/m^3	Same as Primary
	Annual (geometric mean)	None	None	30 µg/m^3	None	None	None
Sulfur Dioxide (6)	Annual (1)	80 µg/m^3 (0.03 ppm)	80 µg/m^3 (0.03 ppm)	None	53.3 µg/m^3 (0.02 ppm)	80 µg/m^3 (0.03 ppm)	None
	24-hour	365 µg/m^3 (0.14 ppm)	365 µg/m^3 (0.14 ppm)	105 µg/m^3 (0.04 ppm)	262 µg/m^3 (0.10 ppm)	365 µg/m^3 (0.14 ppm)	None
	3-hour	1300 µg/m^3 (0.5 ppm)	1300 µg/m^3 (0.5 ppm)	None	None	None	1300 µg/m^3 (0.5 ppm)
	1-hour	None	None	655 µg/m^3 (0.25 ppm)	1050 µg/m^3 (0.4 ppm)	None	None
Ammonia	8-hour	2.1 mg/m^3 (3.0 ppm)	None	None	None	None	None
Reduced Sulfur (6)	30-minute	50 µg/m^3 (0.02 ppm)	None	None	None	None	None
Hydrogen Sulfide	1-hour	None	35 µg/m3 (0.025 ppm)	42 µg/m3 (0.03 ppm)	None	None	None
Total Suspended Particles	Annual (geometric mean)	None	None	None	60 µg/m3	None	None
	24-hour	None	None	None	150 µg/m3	None	None

Table B-1: Federal and State Ambient Air Quality Standards (Continued)

Pollutant	Averaging Time	Alaska State Standard	Hawaii State Standard	California State Standard	Washing ton State Standard	National Primary Standard	National Secondary Standard
Sulfates	24-hour	None	None	25 µg/m3	None	None	None
Visibility Reducing Particles	8-hour (10 am to 6pm, PST)	None	None	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer - visibility of ten miles or more due to particles when the humidity of less than 70 percent.		None	None

Source: Alaska Department of Environmental Conservation, Division of Air and Water Quality, 2002; State of Hawaii, Department of Health, Clean Air Branch, 2001; Ventura County Air Pollution Control District, 2000; Washington State Department of Ecology, Air Quality Program, 1999.

(1) Calculated as the arithmetic mean

(2) Calculated as the 3-year average of the fourth highest daily maximum 8-hour ozone concentration

(3) Calculated as the 3-year average of the arithmetic means

(4) Calculated as the 98th percentile of 24-hour PM-2.5 concentration in a year (averaged over 3 years) at the population-oriented monitoring site with the highest measured values in the area.

(5) Calculated as the 99th percentile of 24-hour PM-10 concentrations in a year (averaged over 3 years).

(6) Measured as sulfur dioxide

mg/m^3 = milligrams per cubic meter

µg/m^3 = micrograms per cubic meter

PM-2.5 = fine particulate matter equal to or less than 2.5 microns in size

PM-10 = particulate matter equal to or less than 10 microns in size (also called respirable particulate and suspended particulate)

ppm = parts per million

The federal laws and regulations also define a group of pollutants called hazardous air pollutants, toxic air contaminants, or air toxics. These pollutants are regulated by the National Emissions Standards for Hazardous Air Pollutants section of the Clean Air Act. Exposure to these pollutants can cause or contribute to cancer, birth defects, genetic damage, and other adverse health effects. The source and effects are generally local rather than regional. Evaluation is based on case studies, not standards for ambient concentration. Examples of air toxics include benzene, asbestos, and carbon tetrachloride.

AIRSPACE

Types of Airspace

Controlled and Uncontrolled Airspace

As part of the national airspace system, controlled and uncontrolled airspace is divided into six classes, dependent upon location, use, and degree of control. Figure B-1 depicts the various classes of controlled airspace. Class A airspace, which is not specifically charted, includes airspace overlying the waters within 22.2 kilometers (12 nautical miles) of the coast. Unless otherwise authorized, all aircraft must be operated under Instrument Flight Rules (IFR).

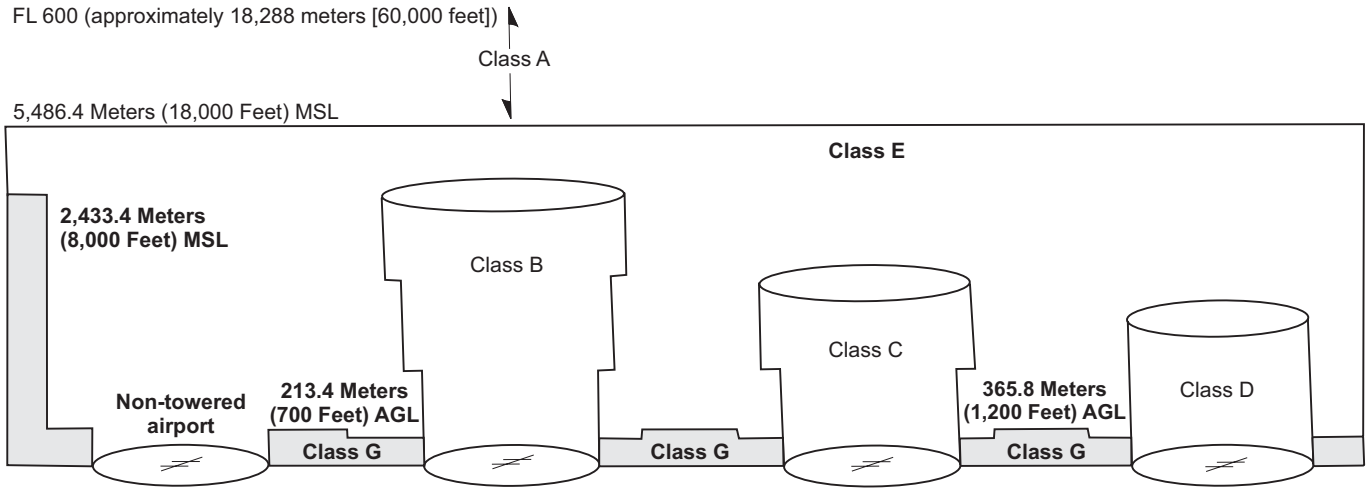
Class B airspace is generally that airspace surrounding the nation's busiest airports in terms of IFR operations or passenger enplanements. An air traffic control clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace.

Class C airspace is generally that airspace surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. Class D airspace is generally that airspace surrounding those airports that have an operational control tower. Class E airspace is controlled airspace that is not Class A, Class B, Class C, or Class D airspace. Uncontrolled airspace, or Class G airspace, has no specific definition but generally refers to airspace not otherwise designated and operations below 365.8 meters (1,200 feet) above ground level. No air traffic control service to either IFR or Visual Flight Rules (VFR) aircraft is provided other than possible traffic advisories when the air traffic control workload permits and radio communications can be established (Illman, 1993).

Special Use Airspace

Complementing the classes of controlled and uncontrolled airspace described above are several types of special use airspace used by the military to meet its particular needs. Special use airspace consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of these activities, or both. Except for controlled firing areas, special use airspace areas are depicted on aeronautical charts. Special use airspace, except controlled firing areas, are charted on IFR or visual charts and include hours of operation, altitudes, and the controlling agency. Only the kinds of special use airspace found in the region of influence are described. These include the following:

- Restricted Areas contain airspace identified by an area on the surface of the earth within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Activities within these areas must be confined, because of their nature, or limitations imposed upon aircraft operations that are not a part of these activities, or both.



Approximate maximum ceilings:
Class B: 2,433.4 Meters (8,000 Feet) AGL
Class C: 1,219.2 Meters (4,000 Feet) AGL
Class D: 762 Meters (2,500 Feet) AGL

Source: Illman, 1993

EXPLANATION
AGL = Above Ground Level
FL = Flight Level
MSL = Above Mean Sea Level

The Six Classes of Non-Military Airspace

Not to Scale

Figure B-1

Restricted Areas denote the existence of unusual, often invisible, hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. Restricted Areas are published in the Federal Register and constitute Federal Aviation Regulation Part 73 (Federal Aviation Regulation and Aeronautical Information Manual Aviation Supplies and Academics, Inc., 1996)

- Warning Areas are airspace that may contain hazards to non-participating aircraft in international airspace. Warning Areas are established beyond the 5.6-kilometer (3-nautical-mile) limit. Although the activities conducted within Warning Areas may be as hazardous as those in Restricted Areas, Warning Areas cannot be legally designated as Restricted Areas because they are over international waters (Federal Aviation Regulation and Aeronautical Information Manual, Aviation Supplies and Academics, Inc., 1996). By Presidential Proclamation No. 5928, dated 27 December 1988 (issued in 1989), the U.S. territorial limit was extended from 5.6 to 22.2 kilometers (3 to 12 nautical miles). Special Federal Aviation Regulation 53 establishes certain regulatory warning areas within the new (5.6- to 22.2-kilometer [3- to 12-nautical-mile]) territorial airspace to allow continuation of military activities while further regulatory requirements are determined.

Other Airspace Areas

Other types of airspace include airport advisory areas, military training routes, temporary flight restrictions areas, flight limitations and prohibitions areas, parachute jump aircraft operations areas, published VFR routes, and terminal radar service areas (Aviation Supplies and Academics, Inc. Federal Aviation Regulation and Aeronautical Information Manual, 1996).

Special Airspace Use Procedures

Other types of airspace, and special airspace use procedures used by the military to meet its particular needs, include air traffic control assigned airspace and altitude reservation (ALTRV) procedures. Both of these are described below:

- Air Traffic Control Assigned Airspace, or airspace of defined vertical and lateral limits, is assigned by air traffic control to provide air traffic segregation between specified activities being conducted within the assigned airspace and other IFR air traffic. Air Traffic Control Assigned Airspaces are usually established in conjunction with Military Operations Areas, and serve as an extension of Military Operations Area airspace to the higher altitudes required. These airspace areas support high altitude operations such as intercepts, certain flight test operations, and air refueling operations.
- ALTRV Procedures are used as authorized by the Central Altitude Reservation Function, an air traffic service facility, or appropriate Air Route Traffic Control Center, under certain circumstances, for airspace utilization under prescribed conditions. An ALTRV receives special handling from FAA facilities. According to FAA Handbook 7610.4H, Chapter 3, ALTRVs are classified as either moving or stationary, with the latter normally defining the fixed airspace area to be occupied as well as the specific altitude(s) and time period(s) the area will be in use. ALTRVs may encompass certain rocket and missile activities and other special operations as may be authorized by FAA approval procedures.

BIOLOGICAL RESOURCES

Native or naturalized vegetation, wildlife, and the habitats in which they occur are collectively referred to as biological resources. Existing information on plant and animal species and habitat types in the vicinity of the proposed activities was reviewed with special emphasis on the presence of any species listed as rare, threatened, or endangered by federal or state agencies to assess their sensitivity to the effects of the Proposed Action and alternatives. Biological studies consisted of literature review, field reconnaissance, agency and installation consultation, and map documentation. For the purpose of discussion, biological resources have been divided into the areas of vegetation, wildlife, threatened and endangered species, and environmentally sensitive habitats.

The Endangered Species Act of 1973 (16 USC 1531 *et seq.*) declares that it is the policy of Congress that all federal departments and agencies shall seek to conserve endangered species and threatened species. Further, the act directs federal agencies to use their authorities in furtherance of the purposes of the act. Under the Endangered Species Act, the Secretary of the Interior creates lists of endangered and threatened species. The term endangered species means any species which is in danger of extinction throughout all or a significant portion of its range. The act defines a threatened species as any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

A key provision of the Endangered Species Act for federal activities is Section 7 consultation. Under Section 7 of the act, every federal agency must consult with the Secretary of the Interior, U.S. Fish and Wildlife Service (USFWS), to ensure that any agency action (authorization, funding, or execution) is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species.

Through the Fish and Wildlife Coordination Act of 1958 (16 USC 661 *et seq.*), Congress encourages all federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities, to conserve and promote conservation of nongame fish and wildlife and their habitats. Further, the act encourages each state to develop a conservation plan.

The Fish and Wildlife Coordination Act requires a federal department or agency that proposes or authorizes the modification, control, or impoundment of the waters of any stream or body of water (greater than 4.1 hectares [10 acres]), including wetlands, to first consult with the USFWS. Any such project must make adequate provision for the conservation, maintenance, and management of wildlife resources. The act requires a federal agency to give full consideration to the recommendations of the USFWS and to any recommendations of a state agency on the wildlife aspects of a project.

The Migratory Bird Treaty Act of 1918, as amended (16 USC 703-712) protects most species of migratory birds. Specifically, the act prohibits the pursuit, hunting, taking, capture, possession, or killing of such species or their nests and eggs.

The Clean Water Act (33 USC 1251 *et seq.*), Section 404, regulates the dredging and filling of jurisdictional wetlands. Permits from the U.S. Army Corps of Engineers are required for

conducting dredging and filling operations.

The Marine Mammal Protection Act of 1972, as amended (16 USC 1361 *et seq.*), gives the USFWS and National Marine Fisheries Service co-authority and outlines prohibitions for the taking of marine mammals. The act also provides for penalties for the use of fishing methods in contravention of any regulations or limitations enacted by governmental agencies to achieve the purposes of the act. A take would result from an attempt to harass, hunt, capture, or kill or attempt to harass, hunt, capture, or kill any marine mammal. Subject to certain exceptions, the act establishes a moratorium on the taking and importation of marine mammals. Exceptions to the taking prohibition allow USFWS and National Marine Fisheries Service to authorize the incidental taking of small numbers of marine mammals in certain instances. The Marine Mammal Commission, which was established under the act, reviews laws and international conventions, studies world-wide populations, and makes recommendations of federal officials concerning marine mammals.

The Bald and Golden Eagle Protection Act (16 USC 668 *et seq.*) establishes penalties for the unauthorized taking, possession, selling, purchase, or transportation of bald or golden eagles, their nests, or their eggs. Any federal activity that might disturb eagles requires consultation with the USFWS for appropriate mitigation.

The National Wildlife Refuge System Administration Act of 1966 (16 USC 668dd-668ee) consolidates the authorities for categories of areas previously established that are administered by the Secretary of the Interior for the conservation of fish and wildlife, including species that are threatened with extinction. All lands, waters, and interests therein administered as wildlife refuges, etc., are designated as the National Wildlife Refuge System.

The Magnuson–Stevens Fishery Conservation and Management Act (16 USC 1801 *et seq.*) requires that federal agencies consult with the National Marine Fisheries Service on activities that could harm Essential Fish Habitat areas. Essential Fish Habitat refers to "those waters and substrate (sediment, hard bottom) necessary to fish for spawning, breeding, feeding or growth to maturity."

The conservation of species and habitats of special concern at U.S. Army Kwajalein Atoll (USAKA), including threatened and endangered species, are addressed in the USAKA Environmental Standards (UES). The objective of the USAKA Environmental Standards is to ensure that actions taken at USAKA are not likely to jeopardize the continued existence of these species or to result in destroying or adversely changing the habitats on which they depend.

CULTURAL RESOURCES

Cultural resources include prehistoric and historic artifacts, archaeological sites (including underwater sites), historic buildings and structures, and traditional resources (such as Native American and Native Hawaiian religious sites). Paleontological resources are fossil remains of prehistoric plant and animal species and may include bones, shells, leaves, and pollen. Cultural resources of particular concern include properties listed or eligible for inclusion in the National Register of Historic Places (National Register). Only those cultural resources determined to be potentially significant under 36 CFR 60.4 are subject to protection from adverse impacts resulting from an undertaking. To be considered significant, cultural resources must meet one or more of the criteria established by the National Park Service that would make that resource eligible for inclusion in the National Register. The term "eligible for inclusion in the National

Register" includes all properties that meet the National Register listing criteria which are specified in Department of Interior regulations at 36 CFR 60.4. Therefore, sites not yet evaluated may be considered potentially eligible to the National Register and, as such, are afforded the same regulatory consideration as nominated properties. Whether prehistoric, historic, or traditional, significant cultural resources are referred to as historic properties.

Numerous laws and regulations require that possible effects to cultural resources be considered during the planning and execution of federal undertakings. These laws and regulations stipulate a process of compliance, define the responsibilities of the federal agency proposing the action, and prescribe the relationship among other involved agencies (e.g., State Historic Preservation Officer, the Advisory Council on Historic Preservation). In addition to the National Environmental Protection Act, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the National Historic Preservation Act ((16 USC 470 *et seq.*) especially Sections 106 and 110), the Archaeological Resources Protection Act of 1979 (16 USC 470aa-470mm), the Antiquities Act of 1906 (16 USC 431), and the Native American Graves Protection and Repatriation Act (25 USC 3001 et seq.).

HAZARDOUS MATERIALS AND HAZARDOUS WASTE

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (PL 96-510, 42 USC 9601, *et seq.*) authorizes the EPA to enforce remediation of past contamination. The law authorized federal agencies to respond to the release or imminent release of hazardous substances into the environment through emergency response procedures coordinated with state governments.

The Emergency Planning and Community Right-to-Know Act of 1986 (PL 99-499, 42 USC 11001, *et seq.*) as part of the Superfund Amendments and Reauthorization Act of 1986 Title III (PL 99-499, 42 USC 9611, *et seq.*) establishes the emergency planning efforts at state and local levels and provides the public with potential chemical hazards information.

The Federal Insecticide, Fungicide, and Rodenticide Act of 1972 (PL 92-516, 7 USC 136, *et seq.*) regulates the labeling requirement and disposal practices of pesticide usage.

The Hazardous Materials Transportation Act of 1975 (PL 93-633, 49 USC 1801, *et seq.*) gives the U.S. Department of Transportation authority to regulate shipments of hazardous substances by air, highway, or rail. These regulations, found at 49 CFR Parts 171–180, may govern any safety aspect of transporting hazardous materials, including packing, repacking, handling, labeling, marking, placarding, and routing (other than with respect to pipelines).

The Military Munitions Rule (62 FR 6621, 40 CFR 260, *et seq.*) identifies when conventional and chemical military munitions become a hazardous waste under the Resource Conservation and Recovery Act, and provides safe storage and transport of such waste. It amends existing regulations regarding emergency responses involving both military and non-military munitions and hazardous waste and explosives. The rule also exempts hazardous waste generators and transporters from needing Resource Conservation and Recovery Act manifests when traveling through or close to adjacent properties under the control of the same person.

The Nuclear Regulatory Commission (PL 93-438, 42 USC 5801, *et seq.*) regulates radioactive materials, including depleted uranium; enforcement of this statute is conducted under 10 CFR 19, 20, 21, 30, and 40, Nuclear Regulatory Commission Standards for Protection Against Radiation. These health and safety standards were established as protection against ionizing radiation resulting from activities conducted under the licenses issued by the Nuclear Regulatory Commission. The handling, storage, establishing radiation protection programs, record keeping, transport, and disposal of radioactive materials are subject to Nuclear Regulatory Commission standards.

The Ocean Dumping Act (PL 92-532, 33 USC 1401, *et seq.*) is Title I of the Marine Protection, Research, and Sanctuaries Act of 1972. The Ocean Dumping Act regulates what can be dumped into the ocean in order to protect the marine environment. It restricts allowed dumping to designated locations, and strictly prohibits dumping of materials such as radioactive and biological warfare substances. The U.S. Coast Guard conducts surveillance as a regulatory measure.

The Oil Pollution Act of 1990 (PL 101-380, 33 USC 2701, *et seq.*) requires oil storage facilities and vessels to submit to the federal government plans detailing how they will respond to large discharges. The Oil Pollution Act also established a trust fund for cleaning up oil spills when the responsible party is incapable or unwilling to do so. The Oil Pollution Act requires the development of Area Contingency Plans to prepare and plan for oils spill response on a regional scale.

The Pollution Prevention Act of 1990 (PL 101-508, 42 USC 13101, *et seq.*) requires the EPA to develop standards for measuring waste reduction, serve as an information clearinghouse, and provide matching grants to state agencies to promote pollution prevention. Facilities with more than 10 employees that manufacture, import, process, or otherwise use any chemical listed in and meeting threshold requirements of Emergency Planning and Community Right-to-Know Act must file a toxic chemical source reduction and recycling report.

The Resource Conservation and Recovery Act of 1976, as amended 1984 (PL 94-580, PL 98-616 [1984], and 42 USC 6901, *et seq.*) authorizes the EPA to regulate the generation, storage, and disposal of hazardous wastes. The Resource Conservation and Recovery Act also manages underground storage tanks. See also Utilities Regulations.

The Toxic Substances Control Act of 1976 (PL 94-469, 15 USC 2601, *et seq.*) establishes that the EPA has the authority to require the testing of new and existing chemical substances entering the environment, and, subsequently, has the authority to regulate these substances. The Toxic Substances Control Act also regulates polychlorinated biphenyls.

HEALTH AND SAFETY

29 CFR Parts 1910 and 1926—Regulatory requirements related to the Occupational Safety and Health Act of 1970 have been codified in 29 CFR Part 1910, *General Industry Standards,* and 29 CFR 1926, *Construction Industry Standards.* The regulations contained in these sections specify equipment, performance, and administrative requirements necessary for compliance with federal occupational safety and health standards, and apply to all occupational (workplace) situations in the United States. Requirements specified in these regulations are monitored and

enforced by the Occupational Safety and Health Administration (OSHA), which is a part of the U.S. Department of Labor.

With respect to ongoing work activities at the proposed action locations, the primary driver is the requirements found in 29 CFR Part 1910. These regulations address such items as electrical and mechanical safety and work procedures, sanitation requirements, life safety requirements (fire and evacuation safety, emergency preparedness, etc.), design requirements for certain types of facility equipment (such as ladders and stairs lifting devices), mandated training programs (employee Hazard Communication training, use of powered industrial equipment, etc.), and recordkeeping and program documentation requirements. For any construction or construction-related activities, additional requirements specified in 29 CFR 1926 also apply.

EM 385-1-1, *U.S. Army Corps of Engineers Safety and Health Requirements Manual*—All work activities undertaken or managed by the U.S. Army Corps of Engineers, which can include many types of federal construction projects, must comply with the requirements of EM 385-1-1. In many respects the requirements in this manual reflect those in 29 CFR 1910 and 1926, but also include U.S. Army Corps of Engineers-specific reporting and documentation requirements.

Range Commanders Council (RCC) Standard 321-02, *Common Risk Criteria for National Test Ranges*. RCC Standard 321-02 sets requirements for minimally-acceptable risk criteria to occupational and non-occupational personnel, test facilities, and non-military assets during range operations. Methodologies for determining risk are also set forth.

RCC Standard 319-92, *Flight Termination System Commonality Standards*, specifies performance requirements for flight termination systems used on various flying weapons systems.

49 CFR—Requirements pertaining to the safe shipping and transport handling of hazardous materials (which can include hazardous chemical materials, radioactive materials, and explosives) are found in the U.S. Department of Transportation Hazardous Materials Regulations and Motor Carrier Safety Regulations codified in 49 CFR Parts 107, 171-180 and 390-397). These regulations specify all requirements that must be observed for shipment of hazardous materials over highways (truck shipment) or by air. Requirements include specific packaging requirements, material compatibility issues, requirements for permissible vehicle/shipment types, vehicle marking requirements, driver training and certification requirements, and notification requirements (as applicable).

The Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 USC 1251, *et seq.*) has special enforcement provisions for oil and hazardous substances. For example, the Spill Prevention Control and Countermeasure Plan covers the release of hazardous substances, as identified by EPA, which could reasonably be expected to discharge into the waters of the United States.

Marine Terminals, 29 CFR Part 1917, applies to employment within a marine terminal (as defined in Part 1917.2) including the loading, unloading, movement or other handling of cargo, ship's stores, or gear within the terminal or into or out of any land carrier, holding or consolidation area, and any other activity within and associated with the overall operation and functions of the terminal, such as the use and routine maintenance of facilities and equipment.

Cargo transfers accomplished with the use of shore-based material handling devices are also regulated.

Safety and Health Regulations for Longshoring, 29 CFR Part 1918, applies to longshoring operations and related employments aboard marine vessels.

LAND USE

Land use is described as the human use of land resources for various purposes, including economic production, natural resources protection, or institutional uses. Land uses are frequently regulated by management plans, policies, ordinances, and regulations that determine the types of uses that are allowable or protect specially designated or environmentally sensitive uses. Potential issues typically stem from encroachment of one land use or activity on another or an incompatibility between adjacent land uses that leads to encroachment.

The Coastal Barrier Resources Act of 1983 (16 USC 3501) is designed to curtail federal subsidization of development on fragile coastal barriers. The act prohibits designated federal expenditures and financial assistance, including flood insurance, for development within the coastal barrier system.

The Coastal Zone Management Act of 1972 (16 USC 1451 *et seq.*) is designed to preserve and develop the resources of the coastal zone. The act seeks to do so by providing funds to states that develop and implement programs for management of land and water uses consistent with the act's standards.

Executive Order 11988, *Floodplain Management* (amended by Executive Order 12148, *Federal Emergency Management*), was designed to improve federal policy on floodplain management. The order requires federal agencies to avoid direct or indirect support of floodplain development when there is a "practicable" alternative. The order applies to acquisition, disposal, or management of federal land; undertaking, financing, or assisting construction projects; and conducting activities affecting land use, including planning, regulating, and licensing.

Executive Order 11990, *Protection of Wetlands,* was designed to prevent federal agencies from causing or encouraging unnecessary destruction of wetland areas.

The Farmland Protection Act of 1981 (7 USC 4201 *et seq.*) is designed to require federal agencies to consider alternatives to projects that would convert farmlands to nonagricultural use. The reach of the act is limited to procedures to assure that the actions of federal agencies do not cause U.S. farmland to be irreversibly converted to nonagricultural uses in cases in which other national interests do not override the importance of the protection of farmland nor otherwise outweigh the benefits of maintaining farmland resources.

The Federal Land Policy and Management Act of 1976 (43 USC 1701 *et seq.*) repeated a number of public land statutes and instituted a number of new programs including review of all lands managed by the Bureau of Land Management for possible designation by Congress as "wilderness," including a stipulation that the federal agency must manage the public lands so as not to impair their wilderness potential.

The Wilderness Act of 1964 (16 USC 1131-1136) provided Congressional protection of several named wilderness areas and also established a National Wilderness Preservation System for inclusion of lands within national forests, national parks, and national wilderness refuges.

NOISE

Noise is most often defined as unwanted sound. Sound levels can be easily measured, but the variability in subjective and physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "loudness" or "noisiness." Physically, sound pressure magnitude is measured and quantified in terms of a level scale in units of decibels (dB).

The human hearing system is not equally sensitive to sound at all frequencies. Because of this variability, a frequency-dependent adjustment called A-weighting has been devised so that sound may be measured in a manner similar to the way the human hearing system responds. The abbreviation for A-weighted sound level, dBA, is often used for expressing the units of the sound level quantities. Typical A-weighted noise levels measured for various sources are provided in table B-2. When sound levels are read and recorded at distinct intervals over a period of time, they indicate the statistical distribution of the overall sound level in a community during the measurement period. The most common parameter derived from such measurements is the energy equivalent sound level (L_{eq}). L_{eq} is a single-number noise descriptor that represents the average sound level in a real environment where the actual noise level varies with time.

B-2: Noise Levels of Common Sources

Source	Noise Level (in A-weighted decibels)	Comment
Air raid siren	120	At 15.2 meters (50 feet) (threshold of pain)
Rock Concert	110	
Airplane, 747	102.5	At 304.8 meters (1,000 feet)
Jackhammer	96	At 3.0 meters (10 feet)
Power lawn mower	96	At 0.9 meters (3 feet)
Football game	88	Crowd size: 65,000
Freight train at full speed	88 to 85	At 9 meters (30 feet)
Portable hair dryer	86 to 77	At 0.3 meters (1 foot)
Vacuum cleaner	85 to 78	At 1.5 meters (5 feet)
Long range airplane	80 to 70	Inside
Conversation	60	
Typical suburban background	50	
Bird calls	44	
Quiet urban nighttime	42	
Quiet suburban nighttime	36	
Library	34	
Bedroom at night	30	
Audiometric (hearing testing booth)	10	Threshold of hearing without hearing loss

Source: Cowan, 1994

While the A-weighted scale is often used to quantify the sound level of an individual event and is related to subjective response, psychoacousticians (scientists specializing in the effects of noise on people) have determined that the degree of annoyance response and other effects depend on a number of factors. Some of the factors identified by researchers that affect our perception and cause us to categorize a sound as an annoyance or "noise" are magnitude of the event sound level in relation to the background (i.e., ambient) sound level, duration of the sound event, frequency of occurrence of events, and time of day at which events occur.

Several methods have been devised to relate noise exposure over time to community response. The EPA has developed the Day-Night Average Sound Level (L_{dn}) as the rating method to describe long-term annoyance from environmental noise. L_{dn} is similar to a 24-hour L_{eq} A-weighted, but with a 10 dB penalty for nighttime (10:00 p.m. to 7:00 a.m.) sound levels to account for the increased annoyance that is generally felt during normal sleep hours. The U.S. Air Force also uses L_{dn} for evaluating community noise impact.

The Community Noise Equivalent Level (CNEL) has been adopted by the State of California for environmental noise monitoring purposes. CNEL is also similar to the A-weighted L_{eq}, but includes a penalty of 5 dB during evening hours (7:00 p.m. to 10:00 p.m.), while nighttime hours (10:00 p.m. to 7:00 a.m.) are penalized by 10 dB. For outdoor noise, the L_{dn} noise descriptor is usually 0.5 to 1 dB less than CNEL in a given environment.

CNEL and L_{dn} values can be useful in comparing noise environments and indicating the potential degree of adverse noise impact. However, averaging the noise event levels over a 24-hour period tends to obscure the periodically high noise levels of individual events and their possible adverse effects. These metrics have limitations in their usefulness, and the use of other noise metrics may be necessary to assess noise impact. In recognition of this limitation of the L_{dn} and CNEL metrics, the EPA uses single-event noise impact analyses for sources with a high noise level and short duration.

The maximum sound level (L_{max}) is a noise descriptor that can be used for high-noise sources of short duration, such as space vehicle launches. The L_{max} is the greatest sound level that occurs during a noise event. The term "peak" defines peak sound over an instantaneous time frame for a particular frequency.

Regulatory Framework

Federal and state governments have established noise regulations and guidelines for the purpose of protecting citizens from potential hearing damage and various other adverse physiological, psychological, and social effects associated with noise. The federal government preempts the state on control of noise emissions from aircraft, helicopters, railroads, and interstate highways.

The following are federal regulations and guidelines. The state regulations and guidelines are discussed under each facility according to its jurisdiction.

The Noise Control Act (PL 92-574, 42 USC 4901, *et seq.*) directs all federal agencies, to the fullest extent within their authority, to carry out programs within their control in a manner that promotes an environment free from noise that jeopardizes the health or welfare of any American.

The act requires a federal department or agency engaged in any activity resulting in the emission of noise to comply with federal, state, interstate, and local requirements respecting control and abatement of environmental noise. OSHA has established noise limits for workers. For an 8-hour work day, people should not be exposed to a continuous noise level greater than 90 dBA. In addition, personnel should not be exposed to noise levels higher than 115 dBA for periods longer than 15 minutes. For the general public, the EPA recommends a 24-hour average noise level not to exceed 70 dBA. Typical noise exposure levels are shown in table B-3.

B-3: Permissible Noise Exposures*

Duration (hours per day)	Sound level (dBA) Slow Response
8	90
6	92
4	95
3	97
2	100
1 to 1.5	102
1	105
0.5	110
0.25 or less	115

Source: 29 CFR 1910.95, table G-16

*Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level

The Department of Defense Noise–Land Use Compatibility Guidelines state that sensitive land use, such as residential areas, are incompatible with annual L_{dn} greater than 65 dBA. Table B-4 shows typical land use zones for noise and their accompanying day-night noise levels.

Table B-4: Definition of Land Use Zones for Noise

Noise Zone	Compatibility with Noise Sensitive Land Uses	Percent of Population Highly Annoyed	C-Weighted Annual Average Day-Night Sound Level (L_{dn})
I	Acceptable	Less than 15%	Less than 62 dB
II	Normally Unacceptable	15–39%	62–70 dB
III	Unacceptable	More than 39%	More than 70 dB

Source: U.S. Army Regulation 200-1

The California Division of Aeronautics has set noise standards governing airports that operate under a valid permit issued by the Division. These regulations control the noise in communities in the vicinity of airports. For persons residing in the vicinity of an airport, state noise standards establish a CNEL of 65 dB as an acceptable level of noise to a reasonable person.

Noise Sources

The major operational noise source is missile launch noise. Three distinct noise events are associated with launch and ascent of a launch vehicle: on-pad missile noise, in-flight missile noise, and sonic boom.

On-pad missile noise occurs when engines are firing but the vehicle is still on the pad. Deflectors or an exhaust tunnel usually turns the missile exhaust horizontally. Noise is highly directional, with maximum levels in lobes that are at about 45 degrees from the main direction of the deflected exhaust. Noise levels at the vehicle and within the launch complex are high. Because the sound source is at or near ground level, propagation from the missile to off-site locations grazes along the ground and tends to experience significant attenuation over distance. On-pad noise levels are typically much lower than in-flight noise levels because sound propagates in close proximity to the ground and undergoes significant attenuation when the vehicle is on or near the pad.

In-flight missile noise occurs when the vehicle is in the air, clear of the launch pad, and the engine exhaust plume is in line with the vehicle. In the early part of the flight, when the vehicle's motion is primarily vertical, noise contours are circular. The sound source is also well above the ground and therefore experiences less attenuation as it propagates to large distances. The shapes of the contours for launch vehicle ascent are approximately circular, particularly for the higher levels near the center. The outer contours tend to be somewhat distorted. They can be stretched out in the launch direction or broadened across the launch direction, depending on specific details of the launch. Because the contours are approximately circular, it is often adequate to summarize noise by giving the sound levels at a few distances from the launch site. On-pad noise contours are much smaller than in-flight contours. Because in-flight noise is greater than on-pad noise, analysis in this study has concentrated on in-flight noise.

The major source of missile noise is from mixing of the exhaust flow with the atmosphere, combustion noise in the combustion chamber, shock waves and turbulence in the exhaust flow, and occasional combustion noise from the post-burning of fuel-rich combustion products in the atmosphere. The emitted acoustic power from a missile engine and the frequency spectrum of the noise can be calculated from the number of engines, their size and thrust, and their flow characteristics. Normally, the largest portion of the total acoustic energy is contained in the low-frequency end of the spectrum (1 to 100 hertz). Noise measurements conducted during a Titan IIID launch indicated that the maximum sound pressure levels occurred at around 20 to 50 hertz (U.S. Air Force, 1991).

To evaluate the potential noise impact associated with launch and ascent, it is necessary to consider not only the overall sound level but also the frequency spectrum and the duration of exposure. High noise levels can cause annoyance and hearing damage. As previously discussed, OSHA has established noise limits to protect workers at their work places. According to these standards, no worker shall be exposed to noise levels higher than 115 dBA. The exposure level of 115 dBA is limited to 15 minutes or less during an 8-hour work shift (U.S. Air Force, 1992). The OSHA standards are the maximum allowable noise levels for the personnel in the vicinity of the launch pad. Off site, concerns for noise are community annoyance, damage to fragile structures, and adverse effects on animals.

Another noise characteristic of launch vehicles is that they reach supersonic (faster than the speed of sound) speeds and will generate sonic booms. A sonic boom, the shock wave resulting from the displacement of air in supersonic flight, differs from other sounds in that it is impulsive and very brief (less than 1 second for aircraft; up to several seconds for launch vehicles). Sonic booms are generally described by their peak overpressure in pounds per square foot.

Sonic booms can vary from inconsequential to severe, depending on the physical aspects of the launch vehicle, the trajectory of the launch, and weather conditions at the time of launch. Physical features of the launch vehicle that influence the occurrence and intensity of sonic booms include the vehicle's overall length and width, the length of each stage, and the shape of the nose cone. Trajectory criteria that affect sonic booms include the time from launch, the angle of the flight path from the horizontal, velocity of the launch vehicle, altitude of launch vehicle, range from the launch site, and the position at which stage separation occurs (Chappel, 1980; Habor, 1981; National Aeronautics and Space Administration, 1989; TALTY, 1988; U.S. Air Force, 1995).

The initial shock wave propagates along a path that grazes the Earth's surface due to the angle of the vehicle and refraction of the lower atmosphere. As the vehicle pitches over, the direction of propagation of the shock wave becomes more perpendicular to the earth's surface. These direct and grazing shock waves can intersect to create a focused sonic boom. The focused sonic boom is typically narrow, about 1.6 kilometers (1 mile) of intense focus, followed by a larger region of multiple sonic booms (Versar, 1991).

SOCIOECONOMICS

Socioeconomics is defined as the basic attributes and resources associated with the human environment, in particular population and economic activity. Socioeconomic resources consist of several primary elements including population, employment, and income. Other aspects often described may include housing and employment characteristics, and an overview of the local economy.

TRANSPORTATION

The purpose of the transportation section is to address the ground, aviation, and ocean transport systems within an organized framework and their use within a region of influence defined for each location.

Ground Transportation

Ground transportation refers to the movement of vehicles through a road and highway network. Roadway operating or pavement conditions and the adequacy of the existing and future roadway system to accommodate vehicular movements are typically described in terms of the volume-to-capacity ratio. This ratio is a comparison of the average daily traffic volume to the capacity of the roadway. The volume-to-capacity ratio corresponds to a Level of Service rating, ranging from free-flowing traffic conditions (Level of Service A) for a volume-to-capacity of usually less than 30 percent, to forced flow, congested conditions (Level of Service F) for a volume-to-capacity of usually 100 percent or greater (i.e., roadways operating at or beyond design capacity).

Aviation Transportation

Aviation transportation refers to the movement of aircraft through airspace. The control of airspace used by air traffic varies from very highly controlled to uncontrolled areas. Examples of highly controlled air traffic situations are flight in the vicinity of airports, where aircraft are in critical phases of flight (take-off and landing), flight under IFR, and flight on the high or low altitude route structure (airways). Less controlled situations include flight under VFR or flight outside of U.S. controlled airspace (e.g., flight over international waters off the coast of California, Hawaii, or Alaska).

Ocean Transportation

Ocean traffic is the transportation of commercial, private, or military vessels at sea, including submarines. Ocean traffic flow in congested waters, especially near coastlines, is controlled by the use of directional shipping lanes for large vessels (cargo, container ships, and tankers). Traffic flow controls are also implemented to ensure that harbors and ports-of-entry remain as uncongested as possible. There is less control on ocean traffic involving recreational boating, sport fishing, commercial fishing, and activity by naval vessels. In most cases, the factors that govern shipping or boating traffic include the following: adequate depth of water; weather conditions (primarily affecting recreational vessels); the availability of fish of recreational or commercial value; and water temperature (higher water temperatures will increase recreational boat traffic and diving activities).

UTILITIES

The purpose of the utilities section is to address the existing rate of consumption, generation, and distribution of utilities (i.e., energy, water, wastewater, and solid waste/construction debris). The analysis of these issues is conducted within a region of influence defined for each location.

Energy

Energy refers to the power that is produced by a central electrical power plant or, in some cases, by individual power generators. The power would be utilized for both construction and operational activities on different sites (i.e., Ronald Reagan Ballistic Missile Defense Test Site at Kwajalein Atoll, Pacific Missile Range Facility in Hawaii, and Vandenberg Air Force Base in California). The current capabilities and capacities of each system are evaluated.

Water

Water refers to the system that produces water and the network that distributes that water. This water system is usually controlled, managed, and distributed by an entity (i.e., utility purveyor). In the absence of a water system, individualized water wells or a series of wells meet the demand for water. The water system is identified by potable, or drinkable, freshwater and nonpotable water used for other activities such as construction, operations, irrigation, and more. In some cases the non-potable system is saltwater. The water system is composed of a source that produces the water and the treatment systems that cleanse and purify it, making it available for use. The water available to public must meet certain standards (i.e., EPA standards). The current capabilities and capacities of these systems are analyzed.

Wastewater

There are different methods of treating wastewater that is produced by a development. Wastewater can be collected in a central system and then directed to a treatment plant where it can be treated and then discharged. In many instances, the wastewater is further treated and reclaimed for use as nonpotable water. In the absence of a central system, septic systems collect and treat water either individually (individual households) or collectively (within a community). The current capabilities and capacities of these systems are analyzed.

Solid Waste Disposal

Solid waste disposal includes the collection, handling, and disposal of waste. Designated landfills within an area or region are the final destinations where solid waste is transported for processing. Solid waste is usually first processed to separate out recyclable products. Solid waste disposal also includes practices such as open burning, septage disposal, and burial in open or excavated trenches. Current systems of solid waste collection and disposal and their capabilities and capacities are evaluated.

VISUAL AND AESTHETIC RESOURCES

The significance of visual effects is very subjective and depends upon the degree of alteration, the scenic quality of the area disturbed, and the sensitivity of the viewers. The degree of alteration refers to the height and depth of maximum cut and fill areas and the introduction of urban elements into an existing natural environment or a substantial increase of structural elements into an already urban environment, while acknowledging any unique topographical formation or natural landmark. Sensitive viewers are those who utilize the outdoor environment or value a scenic viewpoint to enhance their daily activity and are typically residents or recreation users. Changes in the existing landscape where there are no identified scenic values or sensitive viewers are considered less than significant. It is also possible to acknowledge a visual change, as possibly adverse, but not significant, because either viewers are not sensitive or the surrounding scenic quality is not high.

Visual impacts would also occur if proposed development is inconsistent with existing goals and policies of jurisdictions in which the project is located.

WATER RESOURCES

Potentially affected water resources include freshwater surface and groundwater resources and marine waters in the region of influence described in the next section. Potential changes in the availability of water supplies as a result of project water use requirements also are addressed. As required by Executive Order 11988, *Floodplain Management*, potential effects to floodplains were considered; however, none of the proposed facilities in any of the action alternatives would be constructed in a floodplain and further analysis of such issues is not warranted. Potentially affected wetland resources are described under Biological Resources.

Water quality and the consumption and diversion of water are regulated by a number of federal and state agencies. The EPA has the primary authority for implementing and enforcing the Clean Water Act (after 1977, the Clean Water Act became the common name of the 1972 Federal Water Pollution Control Act). The EPA, along with state agencies to which the EPA has delegated some of its authority, issues permits under the Clean Water Act to maintain and restore the quality of our nation's water resources. The Clean Water Act requires permits for

activities that result in the discharge of pollutants to water resources or the placement of fill material in waters of the United States.

Stormwater Pollution Prevention Plans are typically prepared and permitted under the National Pollutant Discharge Elimination System to ensure construction activities do not lead to unacceptable levels of erosion and water pollution. The Safe Drinking Water Act of 1974 (42 USC 300f *et seq.*), and its 1986 and 1996 amendments, provides the EPA with the authority to regulate the quality of the nation's drinking water supplies, including surface water and groundwater sources. The EPA has delegated some of its authority for enforcement to all of the states, with the exception of Wyoming and the District of Columbia. The appropriation of water, including diversions, consumption of potable water, and other uses are usually regulated by the same state agencies that regulate water quality.

The state agency with water quality and water rights permitting authority related to this project in Alaska is the Alaska Department of Environmental Conservation. This state agency issues water quality standards that must be at least as stringent as the national standards developed by the EPA. The water quality standards of Alaska are extensive, and cover a wide variety of water contaminants or other physical characteristics of water, such as turbidity, temperature, dissolved oxygen, pH, total dissolved solids, and heavy metals.

The California State Water Resources Control Board and its local Central Coast Regional Water Quality Control Board also have the authority to help regulate water quality at Vandenberg Air Force Base.

ENVIRONMENTAL JUSTICE

Examination of Minority and Low Income populations is warranted through the adoption of a 1994 directive designed specifically to examine impacts to such things as human health of minority populations, low-income populations, and Indian tribes and is commonly known as Environmental Justice. Executive Order 12898 (*Environmental Justice,* CFR 7629 [1994]) requires each federal agency to achieve environmental justice by addressing "disproportionately high and adverse human health and environmental effects on minority and low-income populations." The demographics of the affected area should be examined to determine whether minority populations, low-income populations, or Indian tribes are present in the area impacted by the Proposed Action. If so, a determination must be made whether the implementation/ development of the proposed project may cause disproportionately high and adverse human health or environmental effects on the minority populations or low-income populations present.

The Council on Environmental Quality defined "minority" to consist of the following groups: Black/African American, Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native, and Hispanic populations (regardless of race). Additionally, for the purposes of this analysis, "minority" also includes all other non-white racial categories within the census such as "Some other race" and "Two or more races." The Interagency Federal Working Group on Environmental Justice guidance states that a "minority population" may be present in an area if the minority population percentage in the area of interest is "meaningfully greater" than the minority population in the general population.

Council on Environmental Quality defined "low income populations" as those identified with the annual statistical poverty thresholds from the Bureau of the Census. The accepted rationale in

determining what constitutes a low-income population is similar to minority populations, in that when the low-income population percentage within the area of interest is "meaningfully greater" than the low-income population in the general population, the community in question is considered to be low-income.

EXECUTIVE ORDER 12114

Executive Order 12114, *Environmental Effects Abroad of Major Federal Actions,* represents the U.S. Government's exclusive and complete determination of the procedural and other actions to be taken by federal agencies to further the purpose of the National Environmental Policy Act, with respect to the environment outside the United States, its territories, and possessions. This Executive Order enables responsible officials of federal agencies to be informed of pertinent environmental considerations and to take such considerations into account, with other pertinent considerations of national policy in making decisions regarding proposed actions. Although based on independent authority, this Order furthers the purpose of the National Environmental Policy Act and the Marine Protection Research and Sanctuaries Act of 1972 (33 USC 1401 *et seq.*; 16 USC 1431 *et seq.*) and the Deepwater Port Act of 1974, as amended (33 USC 1501-1524), consistent with the foreign policy and national security policy of the United States.

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APPENDIX C
MISSILE LAUNCH SAFETY AND EMERGENCY RESPONSE

APPENDIX C
MISSILE LAUNCH SAFETY AND EMERGENCY RESPONSE

This appendix discusses in general terms the potential health and safety hazards associated with missile launch operations. The information herein focuses on the nature and control of the potential hazards and public risks associated with pre-launch, launch, and emergency response.

The information in this appendix is derived from numerous sources including: *30th Space Wing/Vandenberg Air Force Base, Final Launch Site Safety Assessment* (Federal Aviation Administration, 2002); Standard 321-02, *Common Risk Criteria for National Test Ranges, Subtitle: Inert Debris (*Range Commanders Council, Range Safety Group, 2002); *The Hazard Analysis of Commercial Space Transportation*, FAA Office of Commercial Space Transportation (Federal Aviation Administration, 1997); *Casualty Areas from Impacting Inert Debris for People in the Open, Final Report* (Department of the Air Force, 30th and 45th Space Wing, 1995); Eastern and Western Range Safety Policies and Procedures, AFR 127-1 (Department of the Air Force, 1997); *Theater Missile Defense Extended Test Range, Supplement to the Draft Environmental Impact Statement* (U.S. Army Space and Strategic Defense Command, 1994).

While range safety is location, facility and mission-dependent, the Department of Defense has established standards and protocols to eliminate or acceptably minimize potential health and safety risks/hazards.

Safety regulations are directed at preventing the occurrence of potentially hazardous accidents and minimizing or mitigating the consequences of hazardous events. This is accomplished by employing system safety concepts and risk assessment methodology to identify and resolve prospective safety hazards.

Ground Safety

Procedures have been established to handle and store all materials (propellants, etc.) which may be a hazard, control and monitor electromagnetic emissions, and govern transportation of materials to and from a facility. Storage of propellants and explosives is controlled by quantity–distance criteria. Failure modes and effects analyses are prepared when necessary for all potentially hazardous activities and devices.

Accidents occurring before launch can result in on-pad explosions, potential destruction of the vehicle, damage to facilities within range of the blast wave, and dispersion of debris in the vicinity of the pad. The types of accidents depend upon the nature of the propellants. An accident in handling storable hypergolic propellants could produce a toxic cloud, likely to move as a plume and disperse beyond the boundaries of the facility. The risk to the public would then depend upon the concentration of population in the path of this toxic plume and on the ability to evacuate or protect the population at risk until the cloud is dispersed. It is obviously advantageous if the winds generally blow away from populated areas. There are also specific

safety requirements and risks associated with ground support equipment. The design and use of this equipment must incorporate safety considerations.

The Range Safety Control process is predicated on risk avoidance, minimization of accident impacts, and protection of population centers. Risk values related to missile launch activities are categorized in two ways: probability of vehicle failure, including all possible failure modes that could lead to debris impact events and their probabilities and consequence estimation. The casualty estimation used is generally one of two types: the probability of casualty, defined as the probability of one or more persons sustaining an injury or the expected number of casualties, defined as the number of persons expected to sustain an injury as a result of at least one object impact in a specific area.

Protection of life and property, on and off range, is the prime concern of Range/Mission Safety personnel.

Range safety is accomplished by establishing:

- Requirements and procedures for storage and handling of propellants, explosives, radioactive materials and toxics
- Performance and reliability requirements for flight termination systems on the vehicle
- A real-time tracking and control system at the Range
- Mission abort, vehicle destruct, or flight termination criteria that are sufficient to provide the necessary protection to people both on and outside the boundaries of the launch facility

Health and safety risks/hazards associated with pre-launch and launch activities are generally broken down into:

- Ground safety—handling of propellants, ordnance, noise, hazardous operations, toxics, etc.
- Flight analysis—vehicle trajectory, mission, etc.
- Flight termination systems
- Ground operations and flight operations

Launch Planning

Minimization of the probability of terminating a “good” flight and simultaneous minimization of the potential of risk due to malfunctioning missile is accomplished through careful mission planning, preparation, and approval before launch. Planning is in two parts:

- Mission definition such that land overflights or other higher risk aspects of launch are avoided and/or minimized
- Development of data that support the real-time decision and implementation of active control and destruct activities

Hazard potential exists because of the large quantities of liquid and/or solid propellants and they could be unintentionally released in case of a launch accident. This potential hazard decreases with time into the flight because the quantities of on-board propellants decrease as they are consumed and the vehicle/missile moves away from both the launch site and nearby populated areas.

Federal Aviation Administration Clearance Procedures

Aeronautical information is distributed through the Airmen's Information System and the Notice to Airmen (NOTAM) System.

The Airmen's Information System consists of civil aeronautical charts and publications, such as airport/facility directories, published and distributed by the Federal Aviation Administration, National Aeronautical Charting Office. The aeronautical charts and the airport/facility directories contain more permanent data and are the main sources to notify airmen of changes in or to the National Airspace System.

The NOTAM System is a telecommunication system designed to distribute unanticipated or temporary changes in the National Airspace System, or until aeronautical charts and other publications can be amended. This information is distributed in the Notice to Airmen Publication. The Notice to Airmen Publication is divided into four parts: (1) NOTAMs expected to be in effect on the date of publication, (2) revisions to Minimum En Route Instrument Flight Rules Altitudes and Changeover Points, (3) International—flight prohibitions, potential hostile situations, foreign notices, and oceanic airspace notices, (4) special notices and graphics such as military training areas, large scale sporting events, air shows, and airport specific information – Special Traffic Management Programs. Notices in Sections 1 and 2 are submitted through the National Flight Data Center, ATA-110. Notices in sections 3 and 4 are submitted and processed through Air Traffic Publications, ATA-10. Air Traffic Publications, ATA-10 issues the Notice to Airmen Publication every 28 days.

The Coast Guard District is responsible for developing and issuing Local Notices to Mariners. Local Notices to Mariners are developed from information received from Coast Guard field units, the General Public, U.S. Army Corps of Engineers, U.S. Merchant Fleet, National Oceanic and Atmospheric Administration, National Ocean Service, and other sources, concerning the establishment of, changes to, and deficiencies in aids to navigation and any other information pertaining to the safety of the waterways within each Coast Guard District. This information includes: Reports of channel conditions, obstructions, hazards to navigation, dangers, anchorage's, restricted areas, regattas, information on bridges such as proposed construction or modification, the establishment or removal of drill rigs and vessels, and similar items.

The actual implementation of operational plans under launch conditions ultimately determines the actual risk exposure levels on and off site. Integral to the analysis are the constraints posed by the following:

- Launch area/range geometry and siting
- Nominal flight trajectories/profiles
- Launch /release points

- Impact limit lines, whether based on risk to population/facilities or balanced risk criteria
- Flight termination system and destruct criteria
- Wind/weather restrictions
- Instrumentation for ground tracking and sensing onboard the vehicle
- Essential support personnel requirements

The range safety group (or its equivalent) typically reviews and approves launch plans, imposes and implements destruct lines and other safeguards, such as NOTAMS, Air Space Danger Area Notifications and radio-frequency monitoring.

The launch (normal and failure) scenarios are modeled and possible system failure modes are superimposed against the proposed nominal flight plan. The hazard to third parties is dependent on the vehicle configuration, flight path, launch location, weather, and many other factors.

A blast danger area around the missile on the launch pad and a launch danger area (a circle centered on the pad with tangents extended along the launch trajectory) are prescribed for each missile depending on its type, configuration, amount of propellant and their toxicity, TNT (trinitrotoluene) equivalents, explosive fragment velocities anticipated in case of an accident, typical weather conditions, and plume models of the launch area.

Typical mission approval documentation submitted to the range: Flight Plan approval and Flight Termination reports.

Each launch is evaluated based on:

- Range user data submission requirements from the hazard analysis viewpoint
- Launch vehicle analyses to determine all significant failure modes and their corresponding probability of occurrence
- The vehicle trajectory, under significant failure mode conditions, which is analyzed to derive the impact of probability density functions for intact, structurally failed and destructed options
- The vehicle casualty area based on anticipated (modeled) conditions at the time of impact
- Computed casualty expectations given the specific launch and mission profile, population data near the range and along the ground track. Shelters may be provided or evacuation procedures adopted, in addition to restricting the airspace along the launch corridor and notifying the air and shipping communities (NOTAM) to avoid and/or minimize risks
- An Accident Risk Assessment Report prepared to identify hazards of concern, causes, controls, and verification procedures for implementing such controls

Risk Models and Safety Criteria Used At National Ranges

The Range Safety Group, Range Commanders Council has reviewed a number of the computer models used at national ranges.

The evaluation of launch associated hazards is based on range destruct criteria designed to minimize risk exposure to on- and off-range population and facilities. Computer models are used to simulate missions for optimization and approval or run in real time for range safety control officers to minimize flight performance.

Launch risk exposure to the public is primarily controlled in real time by the range safety personnel rather than the range users.

Range safety reports, safety analysis reports and other such probabilistic Hazard Analyses must be prepared by range users for mission approval at most national ranges whenever a new launch vehicle configuration, an unusually hazardous payload, or a trajectory with land overflight are involved.

Range safety guidelines minimize post-launch risks to the public by imposing a number of restrictions: e.g., no land overflight corridors are selected if it is possible to have launches and flight paths over water. However, for land locked launches, strict overflight criteria restrict both land and airspace corridors to on-Range and extended range areas. There are no intentional off-range land impacts permitted for any normally jettisoned booster and sustainer castings and sufficient safety margins are provided within the destruct corridor to avoid impacts on population centers by accidentally or intentionally generated debris.

Models run sequentially or in parallel are designed to compute risks based on estimating both the probabilities and consequences of launch failures as a function of time into the mission. Databases include data on mission profile, launch vehicle specifics, local weather conditions, and the surrounding population distribution. Given a mission profile, the risks will vary in time and space. Therefore, a launch trajectory optimization is performed by the range for each proposed launch, subject to risk minimization and mission objectives constraints. The debris impact probabilities and lethality are then estimated for each launch considering the geographic setting, normal jettisons, failure debris and demographic data to define destruct lines to confine and/or minimize potential public risk of casualty or property damage.

A circular or an elliptical footprint dispersion model to analyze vacuum and wind-modified instantaneous impact points from both normal stages jettisoned during launch and launch debris (failure or destruct). The debris dispersal estimates generally assume bivariate Gaussian dispersion distributions. Risk contours are estimated as impact probabilities or casualties expected per unit area centered on the II (nominal impact points) or on a specific site (land, community or range) of interest. All these models are similar in approach, but quite site-specific in the use of databases, which depend on Range location and on the use databases, which depend on Range location and on the geographic area and associated population distribution at risk. The models may be run either as simulation to assist in analyzing and selecting launch options, or can be run in real time, to monitor launch operations.

The Launch Risk Analysis program calculates relative risks to population centers on the flight corridor ground-track. Real-time debris footprint display is based on computed and wind-corrected trajectory and Launch Risk Analysis impact patterns moving with the tracked vehicle and their position relative to the fixed, prescribed destruct and impact limit lines. If the failed vehicle encroaches upon these lines, a destruct decision must be made or withheld according to clearly formulated destruct criteria.

Launch Hazards

Generally, the on-board destruct system is not activated early in flight (during the first 10 seconds or so) until the failed vehicle clears the Range. This protects Range personnel and facilities from a command explosion. Failures during the very early portion of launch and ascent can be divided into two categories: propulsion and guidance/control. Lighting, wind, and other meteorological hazards (e.g., temperature inversions) must be considered before launch countdown. Propulsion failures produce a loss of thrust and the inability of the vehicle to ascend. Depending on its altitude and speed when thrust ceases, the vehicle can fall back intact or break up under aerodynamic stresses. If the vehicle falls back, the consequences are similar to those of an explosion on the ground.

The exception is when intact solid rocket motors impact the ground at a velocity exceeding approximately 91 meters per second (300 feet per second). In that case, the explosive yield may be significantly increased. If there are liquid fuels (hydrogen-oxygen), there is also potential for a large explosion, much higher overpressures, and more damage to structures at the launch facility. It could also create higher overpressures off the facility that could break windows and possibly do minor structural damage to residential and commercial buildings.

Solid rocket motor failures can be due to a burn-through of the motor casing or damage or burn-through of the motor nozzle. In a motor burn-through there is a loss of chamber pressure and an opening is created in the side of the case, frequently resulting in structural breakup. The nozzle burn-through may affect both the magnitude and the direction of thrust. There is no way to halt the burning of a solid rocket once initiated. Hence, a solid rocket motor failure almost inevitably puts the entire launch vehicle and mission at risk.

The purpose of the Range Safety Control system is to destroy, halt, or neutralize the thrust of an errant vehicle before its debris can be dispersed off-Range and become capable of causing damage or loss of life. Without a flight termination system, the debris could land on a population center and, depending upon the type of debris (inert or burning propellant), cause considerable damage. The destruct system generally is activated either on command or spontaneously at or soon after the time of failure. In-flight destruction limits vehicle debris dispersion and enables dispersion of propellants, thus reducing the possibility of secondary explosions upon ground impact. The destruct systems on vehicles having cryogenics are designed to minimize the mixing of the propellants, i.e., holes are opened on the opposite ends of the fuel tanks. Solid rocket destruct systems usually consist of linear shaped charges running along the length of the rocket which open up the side of the casing like a clam shell, causing an abrupt loss of pressure and thrust. It may, however, produce many pieces of debris in the form of burning chunks of propellant and fragments of the motor casing and engines.

In addition to complete loss of control, three other early flight guidance and control failures have been observed with launch vehicles over the life span of the space program: failure to pitch

over, pitching over but flying in the wrong direction (i.e., failure to roll before the pitchover maneuver), and having the wrong trajectory programmed into the guidance computer. The likelihood of these circumstances depends upon the type of guidance and control used during the early portion of flight. The types are open or closed loop (i.e., no feedback corrections) and programmer or guidance controlled. In the case of vehicles that use programming and open-loop guidance during the first portion of flight, failure to roll and pitch is possible, although relatively unlikely, based on historical flight data. If the vehicle fails to pitchover, it rises vertically until it is destroyed. As it gains altitude, the destruct debris can spread over an increasingly larger area. Consequently, most Ranges watch for the pitchover, and if it does not occur before a specified time, they destroy the vehicle before its debris pattern can pose significant risk to structures and people outside the launch facility or the region anticipated to be a hazard zone, where restrictions on airspace and ship traffic apply. Failure to halt the vehicle within this time can produce a significant risk to those not associated with launch operations.

Of greatest concern to Range Safety Control during the steep ascent phase is the capability of the vehicle to wander off course immediately following a malfunction. The Range Safety Control system must be able to respond before debris becomes a hazard. Consequently the design of the destruct lines must take into consideration: (1) the delay between decision and destruct; (2) the highest rate that the vehicle can move its IIP toward a protected area; (3) the effect of the winds; and (4) the contribution of any explosion to the scatter of debris.

The potential for damage to ground sites from a launch vehicle generally decreases with time into flight since fuel is consumed as the vehicle gains altitude. If it breaks up or is destroyed at a higher altitude, the liquid fuels are more likely to be dispersed and lead to lower concentrations on the ground. In addition, if there are solid propellants, they will have been partially consumed during the flight period before the failure and will continue to burn in free fall after the breakup.

Very early in flight, when the vehicle is still close to the ground, there is less opportunity for debris to be scattered. The debris fall within a footprint is affected by the range of ballistic coefficients of the pieces, the wind speed and direction, velocity contributions due to explosion and random lift.

Debris that is very dense and has a high ballistic coefficient (b) is not as affected by drag and will tend to land closer to the vacuum IIP. High ballistic coefficients can be associated with pumps, other compact metal equipment, etc. Panels or pieces of motor and rocket skin offer a high drag relative to their mass (a low ballistic coefficient) and consequently slow down much more rapidly in the atmosphere. After slowing down they tend to fall and drift with the wind. A piece of debris with a very low ballistic coefficient (b=1) is shown to stop its forward flight almost immediately and drift to impact in the direction of the wind. Pieces having intermediate value ballistic coefficients show a combination of effects and fall along a centerline. From a lethality standpoint, the pieces having a higher ballistic coefficient impact at a higher velocity and can cause more damage (depending upon their size).

The boundaries of the debris dispersion footprint are not precise but rather represent a contour which contains, for example, 95 percent of the debris. Thus, when considering the hazard to structures or people on the ground, one must consider the hazard area for debris impacts in the terms of a dynamic pattern.

For all launches, the boosters, sustainers, and other expendable equipment are always jettisoned and fall back to the Earth. Therefore, in planning a mission, care must be taken to keep these objects from impacting on land, offshore oil platforms, aircraft, and shipping lanes. The impact locations are normally quite predictable, so risks can be avoided or minimized.

Failure modes and associated probability of failure are required if other than a normal launch is addressed. Estimates for failure mode probabilities are typically based upon knowledge of a vehicle's critical systems and expert assessment of their reliability combined with historical data, when available. Launch vehicle data used may include: propellants, explosive/fuel chemical properties, fragmentation characteristics, mass, shape, ballistic coefficients, flight dynamics, flight termination system, guidance and control, stage burn times and separation characteristics, lethality of debris, as represented by lethal area.

The regions or areas exposed to launch operations or accident hazards must be identified. These may be subdivided into smaller sections, critical locations of people or buildings that are specified for subsequent risk calculations. All risk analyses require estimates of the probabilities of debris/fragments from failed vehicle impacting within hazardous distances of personnel or structures in the region. The probability of an impact for a public area requires consideration of all failure chains which could endanger it and always implies a flight termination system failure.

It is important to determine what occurs after vehicle failure fragmentation leading to ground impact. The number of fragments, their sizes and shapes will ultimately define the hazard and casualty area for a given vehicle or fragment impact. Debris pieces are characterized by their size, mass, area, and ballistic coefficient to determine if they survive re-entry and their terminal velocity at ground impact.

Flight Corridors

Vehicle performance is determined at all Ranges by visual observation (early in the flight) and by real-time telemetry measurements of vehicle status as a backup to the computed (wind-corrected) behavior of the instantaneous impact point. The actual location of the missile is less important than the where it and/or its debris will land in case of normal launch operation, accidental failure, abort or destruct. Therefore, when tracking a missile, velocity data must be obtained either directly or by differentiating successive measures of position. Radar trackers measure vehicle position in terms of azimuths, elevation and range relative to the tracker, expressed in a launch-pad centered reference coordinate system.

Early in the flight, visual observation and telemetry may be the only means of determining whether there is a malfunction or whether the vehicle maintains correct altitude. Vehicle position and velocity data and the predicted instantaneous impact point(s) are displayed in real time in the Launch Control Center.

Early in the flight the (predicted) instantaneous impact point advances slowly. As the vehicle altitude, velocity, and acceleration increase, the IIP change rate also increases from zero to several miles per second. It is the advancing IIP that the Range Safety Officer usually observes during a launch. Prior to launch a map with lines indicating the limits of excursion which, when exceeded, will dictate a command signal to terminate flight.

Destruct Lines

Destruct lines are deliberately offset from land or populated areas to accommodate:

- Vehicle performance characteristics and wind effects
- The correction for using a vacuum instead of a drag-corrected impact point
- The scatter of vehicle debris
- The inaccuracies and safety-related tolerances of the vehicle tracking and monitoring system
- The time delays between the IIL impingement on a destruct line and the time at which flight termination actually takes place (i.e. human decision time lag)

By proper selection of destruct lines, debris can be prevented from impacting on or near inhabited areas.

Debris Impact Areas

Debris consists of missile fragments that may land upon structures or populated areas. Fragments may include burning propellants which could explode or burn thus posing additional hazards (explosion or fire).

Depending on the specific circumstances of the event: vehicle design, accident location, failure mode, propellant type, amount of propellant available/released, mode of release, environmental conditions, and proximity of people and property.

Vehicle altitude increases rapidly with time into flight, roughly reaching 37 kilometers (20 nautical miles) in the first 2 minutes of flight. Furthermore, the location of the launch site and the direction of the launch are usually selected so the vehicle moves away from population centers. Thus, the “separation” distance between the vehicle and the potentially vulnerable communities/populations, in case of vehicle accident, increases with time. As time elapses from liftoff, the quantity of propellants remaining on board decreases very rapidly. Note that the total remaining propellant weight decreases by about 50 percent within 2 minutes from liftoff. Also the explosive potential (or TNT yield) of a given quantity of propellant may change as time elapses from liftoff.

Generally, the hazard from propellant explosion decreases rapidly with time into flight, except for the first 10 to 25 seconds. Activation of the flight termination system is likely to further reduce such explosion hazards by dispersing the propellant. Typically, the flight termination system is not activated during the first 8-12 seconds (depending on the missile, mission and site/facility) in order to avoid damage to the pad facilities.

When a vehicle is in flight at significant altitude, the debris will land over a much larger area. Distribution of debris impacts is dependent upon the forces acting on the fragments. Initially, the velocity vector of the vehicle is of primary importance, and this contribution is affected by the velocity vectors resulting from the turns, tumbling and/or explosions. Thereafter, the effects of the atmosphere on the fragments during free fall (which depend on wind and fragment size, shape, and mass) become important.

Furthermore, impacting launch vehicle fragments can be divided into four categories:

- Inert pieces of vehicle structure
- Pieces of solid propellant (some of which may burn up during free fall)
- Vehicle structures which contain propellant (solid or liquid) that may continue to burn after landing (but are non-explosive). They may pose the risk of starting secondary fires at the impact points.
- Fragments which contain propellant and which can explode upon impact (if their velocity is greater than roughly 91 meters per second [300 feet per second])

The casualty area of an impacting fragment is the area about the fragment impact point within which a person would become a casualty. Casualties may result from a direct hit, from a bouncing fragment, from a collapsing structure resulting from an impact on a building or other shelter, from the overpressure pulse created by an explosive fragment, from a fire or toxic cloud produced by the fragment or some combination thereof. The hazard area is increased if a fragment has any significant horizontal velocity component at impact which could result in bouncing or other horizontal motion near ground level.

Casualty area is also affected by the sheltering of people by structures. Structures may be divided into classes (for occupational purposes) depending on the degree of protection they afford.

Emergency Response

Each launch facility has an Emergency Response Plan that defines the initial response requirements and procedures to be implemented in the event that flight system malfunction and/or flight termination occurs during flight activities associated with Ground-Based Midcourse Defense Extended Test Range activities. The following paragraphs present a general description of the emergency response process.

It is the policy of each launch facility to immediately respond in the event of an emergency during any missile flight operation. Initial response to any areas impacted by flight hardware shall be to secure and render safe the area for follow-on recovery and restoration activities. All areas affected by ground impact of flight hardware shall be cleared of all recoverable debris and environmentally restored. The recovery of launch hardware shall be accomplished in a manner consistent with each launch location's requirements as set forth in applicable environmental documentation and conditions specified by the appropriate land owner.

In the event of a flight termination or malfunction, Flight Safety will immediately determine the projected impact area(s) for all debris and flight hardware. The Emergency Response Coordinator will be notified, and the Emergency Response Plan will be initiated.

An initial assessment team will be immediately dispatched to the predicted impact area(s) to assess the situation.

Key elements of information to be obtained by the initial assessment team will include:

- Exact impact location(s)
- Extent and condition of impact location(s)
- Personnel injuries
- Indications of fires and/or hazardous materials releases
- Extent of property damage

Results will be reported back to the Emergency Response Coordinator as expeditiously as possible. Based on this assessment, the Emergency Response Coordinator will call up and dispatch to the impact site(s) the appropriate elements of a contingency team.

The Contingency Team will be designated by the Emergency Response Coordinator and will consist of those elements determined to be required, based on the initial assessment. Elements which may be included on the Contingency Team may include, depending on the situation, communications, logistics, public affairs, staff judge advocate, security, health and safety, Explosive Ordnance Disposal, recovery, fire safety, and civilian agency personnel.

The initial priorities for the Contingency Team are the following:

- Emergency rescue and/or emergency medical treatment
- Establish site security
- Contain, control, and extinguish fires
- Confine hazardous materials

All elements of the Contingency Team will be under the control of an On Scene Incident Coordinator, designated by the Emergency Response Coordinator. The On Scene Incident Coordinator will retain on-scene control of all initial response elements until initial response operations are complete and recovery and site restoration activities commence.

The highest priorities during any emergency response operation are the rescue of injured or trapped personnel and the control of any fires produced by a launch or impact event. Rescue of injured and trapped personnel is of the highest priority. Responsibility for emergency rescue is shared among all initial response personnel but most especially by the first-on-scene security personnel and the fire response units (military or civilian). Rescues should be attempted using appropriate safety equipment and protective clothing (i.e., respirators, protective clothing, etc., as necessary). Since rescue may require entry into the impact area, care should be taken to avoid hazards associated with hazardous debris or fires. Under no circumstances shall rescue personnel unnecessarily endanger themselves during rescue activities. (Rescue personnel should *never* require rescue by other response personnel.)

Emergency response operations are complete once all impact sites have been secured, rescue operations are completed, any fires have been extinguished, and initial site reconnaissance has been performed. Recovery and site restoration activities can then be initiated. Using the results

of the initial site reconnaissance, plans will be developed for the recovery of all debris and the restoration of the site(s) to natural conditions.

Additional post-launch recovery and restoration areas may be determined by the launch operator prior to and throughout mission-specific operations. The recovery of launch hardware will be accomplished in a manner consistent with the launch site procedures, and requirements set forth in applicable environmental documentation and conditions specified in agreements with appropriate land owners.

The launch site operator is responsible for planning, performance, and control of launch activities. This includes:

- Using results of analysis provided by Flight Safety to determine flight hardware impact zones which fully encompass the areas designated in the analysis
- Ensuring that appropriate agreements with all affected landowners are in place and adequately address recovery requirements
- Coordinating with local civilian authorities concerning recovery requirements
- Providing recovery plans to applicable agencies/personnel in accordance with current launch site policies
- Establishing appropriate travel routes (ground/air) prior to launch activities to outline access into recovery areas
- Perform visual inspections and obtain radar data to insure expeditious recovery of the missile
- Ensure complete recovery of missile hardware

The recovery team is responsible for the recovery of all missile debris and restoration of impact areas to their natural condition. Recovery personnel will have overall responsibility for controlling recovery and restoration operations. Air units composed of helicopters and support equipment will transport recovery personnel to road-inaccessible impact sites. Air support equipment will also transport the missile components out of all land and near-shore impact sites and perform quality assurance inspections or sweeps to ensure proper recovery procedures.

Each launch location is subject to all federal and state regulations involving waste/material handling and disposal, endangered species, and historical resource preservation. Implementation of these regulations may require the assistance of civilian agencies and law enforcement authorities during recovery and restoration operations. Civilian assistance will be requested by each launch location in accordance with existing agreements.

The following is a list of personnel, equipment, transportation, and operational requirements that typically would be necessary to perform recovery activities:

Personnel

- . Helicopter pilots
- . Helicopter co-pilots

- Helicopter crew chief
- Explosive Ordnance Disposal personnel (2)
- Recovery personnel
- Project representative
- Owner representative (if required by controlling agent)
- Environmental representative (if required by controlling agent)

Roadblocks

Roadblocks shall be utilized to limit unauthorized access into recovery areas that include locations in the vicinity of public roadways or thoroughfares. The Recovery Team Coordinator will designate appropriate roadblock locations on roads leading into recovery areas. Roadblocks will be coordinated by the launch site security personnel, augmented as needed by local law enforcement personnel. At each roadblock positive communication will be established and maintained with the Recovery Team Coordinator and other security personnel/roadblocks. This communication would occur using either landlines (telephones), cellular telephone, or military radio systems.

Certain critical response personnel, such as ambulance/medical or fire response units, shall be permitted to pass through "active" roadblocks in the performance of their duties.

Debris Recovery

Personnel will arrive at impact site by appropriate mode. Recovery transportation vehicles will remain at nearest accessible road. Explosive Ordnance Disposal members of the recovery team will be the first on scene and will be responsible for the identification, handling, control, and rendering safe of minor detonating charges and other minor hazardous debris. Other responsibilities include:

- Providing initial impact site control to prevent exposure for recovery personnel (Security personnel will assume this role as impact zone access controls are eased.)
- Maintaining area safety and rendering safe potential explosive materials
- Conducting initial impact site assessments for the identification of debris and the determination of recovery equipment requirements
- Assisting in dismantling of launch hardware prior to recovery and transport operations

Recovery personnel will then handle the next phase of the recovery including:

- Collect small missile parts
- Dismantle larger pieces into manageable sections
- Transport recovered parts by helicopter to recovery vehicles waiting at accessible roads

Environmental Restoration

Recovery operations will be coordinated with the Environmental Office at each launch site. If deemed necessary, an archaeologist and biologist will accompany Explosive Ordnance Disposal personnel during the initial site assessment to determine if cultural or sensitive biological resources are present at the impact site. These resource specialists will assist in the determination of recovery equipment requirements and recovery transport routes.

All recovery and restoration activities will be carried out in accordance with Memorandum of Agreements signed by appropriate state and federal agencies and other potentially affected organizations. Impacted areas will be restored to a natural condition in accordance with land owners agreements and agency requirements.

APPENDIX D
ENGINEERING FIELD ANALYSIS OF SEISMIC DESIGN BUILDING STANDARDS FOR EXISTING FACILITIES AT KODIAK LAUNCH COMPLEX

APPENDIX D
ENGINEERING FIELD ANALYSIS OF SEISMIC DESIGN BUILDING STANDARDS FOR EXISTING FACILITIES AT KODIAK LAUNCH COMPLEX

Kodiak Island is located in one of the world's most seismically active regions, producing three of the largest magnitude earthquakes of the last 100 years, including the great Mw 9.2, 1964 Prince William Sound Earthquake. The potential for severe ground shaking at Kodiak Launch Complex (KLC) over the design life of KLC is high and has been discussed in section 3.1.5. Existing KLC facilities were designed in 1997 under seismic design guidelines as specified in the 1994 Uniform Building Code for high seismic areas. New facilities and infrastructure envisioned under the GMD Extended Test Range would conventionally be designed and constructed under the newer International Building Code. Modifications in the newer code have brought about questions of whether the standards are sufficient given the severe seismic setting. In addition, recent and on-going seismic hazard evaluation studies at the U.S. Coast Guard Loran Station, Narrow Cape, Alaska (U.S. Coast Guard Civil Engineering Unit, 2001, 2002, 2003) indicate that "the shaking hazard at Kodiak is significantly greater than was previously recognized and exceeds standards such as the Uniform Building Code that have traditionally been used as a basis for design and construction in the Kodiak area."

Probabilistic and deterministic seismic hazard analyses are currently in progress to develop ground motion response spectra for the Loran facilities. (Carver, personal communication, 2002) This analysis is currently not available for use in the Draft Environmental Impact Statement. Upon completion of the study, this information will be evaluated and taken into consideration relative to discussions of appropriate seismic design standards for GMD facilities at KLC.

Given the preliminary nature of ongoing seismic hazard evaluation studies, the remainder of this analysis addresses several questions:

- How does the Code under which the original KLC structures were designed (LLC building, LS, IPF building and the SCAT building) compare with the current code? This issue takes into account that as time goes by the Code officials and experts in the field of seismic design gain knowledge and incorporate this knowledge into the future Building Code editions.

- Are the existing structures constructed as originally designed? This question requires inspection of the existing structures to ensure that they were constructed as designed.

KLC is located at Narrow Cape on Kodiak Island, Alaska. The facility, per the Construction Drawings, was designed in 1997. At that time, the 1994 edition of the Uniform Building Code

was in place. Per the drawings, this is the Code to which the facilities were designed. For the purpose of this study, we are assuming that this is true and that the structures are properly designed using this Code. We were not able to obtain a copy of the calculations to verify the design of the structures, but believe this to be a valid assumption. To answer the first question, how does the Code in which the structures were designed compare with the current Code, we performed calculations using the two Codes. These calculations are attached for your reference. Although the two Codes are completely different in the method for obtaining the design base shear, they both, once calculated, use this number in the same way to design the structure. Therefore, we can compare the design base shear values calculated with each Code and determine which code requires a stronger design. As you can see from the calculations the Uniform Building Code, 1994 edition required approximately a 10% greater design base shear than the International Building Code, 2000 edition. This is a considerable amount when taking everything into account. (ASCG Incorporated, 2002)

In answering the second question, are the structures constructed as designed, we traveled to the site and inspected the structures. We used the Construction Documents that we received and compared them to the actual structures in the field. Each building was inspected with special attention to the bracing system. Although some components could not be directly observed due to them being hidden by siding or wall coverings, most of the braces could be directly observed and compared to the Construction Documents. We did not find any discrepancies in the bracing construction. (ASCG Incorporated, 2002)

After reviewing all of the documents and comparing the loading requirements of each Code, we have determined that if the structures were designed and built with the latest techniques for resisting seismic forces, in accordance with the latest Building Codes, the structures would not require any modifications. Since the Code actually requires less load capacity now than it did when these structures were designed, it is our opinion that the structures should be able to withstand a sizable seismic event without a catastrophic failure. (ASCG Incorporated, 2002)

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DATE: 8/8/02 SHT.: 1 OF
PREPARED BY: RTB
SUBJECT: KODIAK SEISMIC STUDY

PURPOSE: TO DETERMINE WHETHER THE UBC 97 CODE OR THE IBC 2000 CODE WILL REQUIRE MORE LOAD BE APPLIED TO THE STRUCTURES @ THE FACILITY

METHOD: WILL CALCULATE THE TOTAL DEAD LOAD FACTOR (DESIGN BASE SHEAR) THAT EACH CODE WILL REQUIRE AND COMPARE THEM.

CRITERIA: WILL USE THE INFORMATION ON THE DRAWINGS ALONG WITH THE MAPS IN THE CODES. WILL USE SIMILAR ASSUMPTIONS AS ORIGINAL DESIGN.

RESULTS:

LAUNCH CONTROL CENTER
IBC = .207 W
UBC = .229 W
UBC CONTROLS

LAUNCH STRUCTURE
IBC = .156 W
UBC = .172 W
UBC CONTROLS

IPF
IBC = .207 W
UBC = .229 W
UBC CONTROLS

SCAT
IBC = .207 W
UBC = .229 W
UBC CONTROLS

UBC 94 CODE CONTROLS THE AMOUNT OF FORCE APPLIED TO THE STRUCTURE IN EVERY CASE

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STRUCTURE SUMMARY:

- LAUNCH CONTROL CENTER
  - 175' x 80' x 14' E.H.
  - METAL BUILDING w/ MOMENT FRAMES & X-BRACING
  - 4:12 ROOF SLOPE
  - Rw = 6
  - CATEGORY II

- LAUNCH STRUCTURE
  - 85' x 40' x 210' HIGH
  - METAL STRUCTURE w/ X-BRACING
  - Rw = 3
  - CATEGORY II

- INTEGRATED PROCESSING FACILITY (IPF)
  - 100' x 71' x 50' E.H.
  - METAL BUILDING w/ MOMENT FRAMES & X-BRACING
  - 4:12 ROOF SLOPE
  - Rw = 6
  - CATEGORY II

- SCAT
  - 70' x 50' x 50' E.H.
  - METAL BUILDING w/ MOMENT FRAMES & X-BRACING
  - 4:12 ROOF SLOPE
  - Rw = 6
  - CATEGORY II

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DATE: _____ SHT.: 3 OF _____
PREPARED BY: KTS
SUBJECT: LAUNCH CONTROL CENTER

LAUNCH CONTROL CENTER:

UBC 94

GIVEN: ZONE 4
$S_1 = 1.0$
OCCUPANCY CATEGORY II
$R_W = 6$

DESIGN PER 1627.8.2 USE STATIC PROCEDURE (1628)

$$V = \frac{ZIC}{R_W} W$$

$Z = .40$ (TABLE 16-I)
$I = 1.25$ (TABLE 16-K)
$R_W = 6$ (TABLE 16-N)

$$C = \frac{1.25\,S}{T^{2/3}} = 11.42 > 2.75 \therefore \text{USE } 2.75$$

$$T = C_t (h_n)^{3/4} = .035$$

$C_t = .035$
$h_n = 0$
$S = 1.0$

$$V = \frac{(.4)(1.25)(2.75)}{6} W = .229\,W$$

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LAUNCH CONTROL CENTER

IBC 2000

GIVEN: $S_S = 1.75$ (MAPS)
$S_1 = 0.60$ (MAPS)
SITE CLASS A (TABLE 1615.1.1)
SEISMIC USE GROUP II

DESIGN:

$F_a = .8$ (TABLE 1615.1.2(1))
$F_v = .8$ (TABLE 1615.1.2(2))

$S_{MS} = .8(1.75) = 1.4$ (16-16)

$S_{M1} = .8(.60) = .48$ (16-17)

$S_{DS} = 2/3(1.4) = .93$ (16-18)

$S_{D1} = 2/3(.48) = .32$ (16-19)

SEISMIC DESIGN CATEGORY = D (PER TABLE 1616.3)
USE EQUIVALENT LATERAL-FORCE PROCEDURE 1617.4
(PER TABLE 1616.6.3)

$V_{ASD} = \frac{C_S W}{1.4}$ (16-34 MODIFIED FOR ASD)

C_S (16-35) $= \frac{S_{DS}}{\frac{R}{I_E}}$ => .194 (< 1.90, $> .051$) : OK USE .194

$S_{DS} = .93$ (16-18)
$R = 6$ (TABLE 1617.6)
$I_E = 1.25$ (1616.2)

$C_{S\,MAX}$ (16-36) $= \frac{S_D}{\left(\frac{R}{I_E}\right)T}$ => 1.90

$S_{D1} = .32$
$R = 6$
$I_E = 1.25$
$T = .035$ (1617.4.2.1)

$C_{S\,MIN}$ (16-37) $= .044\, S_{DS}\, I_E$ => .051

$V = \frac{.194}{1.4} W = .138 W$

PER 1617.2 MUST APPLY REDUNDANCY FACTOR DUE TO SDC = D
MAX $\rho = 1.5$ ∴ $V = .138 W \rho = .207 W$

D-6

LAUNCH STRUCTURE ;

UBC 94

GIVEN: ZONE 4 $R_W = 8$
$S_1 = 1.0$
OCCUPANCY CATEGORY II

DESIGN : PER 1627.8.2 USE STATIC PROCEDURE (1628)

$$V = \frac{ZIC}{R_W} W$$

$Z = .40$ (TABLE 16-I)
$I = 1.25$ (TABLE 16-K)
$R_W = 8$ (TABLE 16-N)

$$C = \frac{1.25\,S}{T^{2/3}} = 16.5 \geq 2.75 \therefore \text{USE } 2.75 \text{ max}$$

$$T = C_t (h_n)^{3/4} = .020$$

$C_t = .020$
$h_n = 0'$
$S = 1.0$

$$V = \frac{(.40)(1.25)(2.75)}{8} W = \boxed{.172\,W}$$

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LAUNCH STRUCTURE:

IBC 2000

GIVEN: $S_S = 1.75$
$S_1 = .60$
SITE CLASS A (TABLE 1615.1.1)
SEISMIC USE GROUP II

DESIGN: $F_a = .8$ (TABLE 1615.1.2(1))
$F_v = .8$ (TABLE 1615.1.2(2))
$S_{MS} = .8(1.75) = 1.4$ (16-16)
$S_{M1} = .8(0.60) = .48$ (16-17)
$S_{DS} = 2/3(1.4) = .93$ (16-18)
$S_{D1} = 2/3(.48) = .32$ (16-19)
SEISMIC DESIGN CATEGORY "D" (TABLE 1616.3)
USE EQUIVALENT LATERAL FORCE PROCEDURE 1617.4
(TABLE 1616.6.3)

$V_{ASD} = \frac{C_S}{1.4} W$ (16-34 MODIFIED FOR ASD)

$C_S = \frac{S_{DS}}{R/I_E} \Rightarrow .145 \begin{matrix} < 2.5 \\ > .051 \end{matrix}$ ∴ USE .145

$S_{DS} = .93$
$R = 8$
$I_E = 1.25$

$C_{S\,MAX} = \frac{S_{D1}}{\left(\frac{R}{I_E}\right)T} \Rightarrow 2.5$

$S_{D1} = .32$
$R = 8$
$I_E = 1.25$
$T = .020$ (1617.4.2.1)

$C_{S\,MIN} = .044 S_{DS} I_E = .051$

$V = \frac{.145}{1.4} W = .104 W$

PER 1617.2 MUST APPLY REDUNDANCY FACTOR DUE TO SDC = D
MAX $\rho = 1.5$ ∴

$V = .104 W \rho = \underline{.156 W}$

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ASCG
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DATE: _____ SHT.: 7 OF _____
PREPARED BY: RJB
SUBJECT: IPF BLDG.

IPF BUILDING :

UBC 94

GIVEN : ZONE 4
$S_1 = 1.0$
OCCUPANCY CATEGORY I
$R_W = 6$

DESIGN PER 1627.8.2 USE STATIC PROCEDURE (1628)

$$V = \frac{ZIC}{R_W} W$$

$Z = .40$ (TABLE 16-I)
$I = 1.25$ (TABLE 16-K)
$R_W = 6$ (TABLE 16-N)

$$C = \frac{1.25 S}{T^{2/3}} = 11.42 > 2.75 \therefore \text{USE } 2.75$$

$$T = C_t (h_n)^{3/4} = .035$$

$C_t = .035$
$h_n = 0$
$S = 1.0$

$$V = \frac{(.4)(1.25)(2.75)}{6} W = .229 W$$

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IPF BUILDING!

IBC 2000

GIVEN: $S_S = 1.75$ (maps)
$S_1 = 0.60$ (maps)
SITE CLASS A (TABLE 1615.1.1)
SEISMIC USE GROUP II

DESIGN: $F_a = .8$ (TABLE 1615.1.2(1))
$F_v = .8$ (TABLE 1615.1.2(2))
$S_{MS} = .8(1.75) = 1.4$ (16-16)
$S_{M1} = .8(0.60) = .48$ (16-17)
$S_{DS} = 2/3(1.4) = .93$ (16-18)
$S_{D1} = 2/3(.48) = .32$ (16-19)
SEISMIC DESIGN CATEGORY = D (TABLE 1616.3)
USE EQUIVALENT LATERAL-FORCE PROCEDURE 1617.4
(TABLE 1616.6.3)

$V_{ASD} = \frac{C_S}{1.4} W$ (16-34 MODIFIED FOR ASD)

$C_S = \frac{S_{DS}}{\frac{R}{I_E}} \Rightarrow .194 \begin{matrix} \leq 1.9 \\ > .051 \end{matrix}$. OK USE .194
(16-35)

$S_{DS} = .93$ (16-18)
$R = 6$ (TABLE 1617.6)
$I_E = 1.25$ (1616.2)

$C_{SMAX} = \frac{S_{D1}}{\left(\frac{R}{I_E}\right)T} \Rightarrow 1.90$
(16-36)

$S_{D1} = .32$ $I_E = 1.25$
$R = 6$ $T = .035$ (1617.4.2.1)

$C_{SMIN} = .044 S_{DS} I_E \Rightarrow .051$
(16-37)

$V = \frac{.194}{1.4} W = .138W$

PER 1617.2 MUST APPLY REDUNDANCY FACTOR DUE TO SDC = D
MAX $\rho = 1.5$ ∴

$V = .138 W\rho = \underline{\underline{.207W}}$

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SCAT BUILDING.

UBC 94

GIVEN: ZONE 4
$S_1 = 1.0$
OCCUPANCY CATEGORY II
$R_W = 6$

DESIGN PER 1627.8.2 USE STATIC PROCEDURE (1628)

$$V = \frac{ZIC}{R_W} W$$

$Z = .40$ (TABLE 16-I)
$I = 1.25$ (TABLE 16-K)
$R_W = 6$ (TABLE 16-N)

$$C = \frac{1.25\ S}{T^{2/3}} = 11.42 > 2.75 \therefore \text{USE } 2.75$$

$$T = C_t (h_n)^{3/4} = .035$$

$C_t = .035$
$h_n = 0$
$S = 1.0$

$$V = \frac{(.4)(1.25)(2.75)}{6} W = .229 W$$

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SCAT :

IBC 2000

GIVEN: $S_S = 1.75$ (MAPS)
$S_1 = 0.60$ (MAPS)
SITE CLASS A (TABLE 1615.1.1)
SEISMIC USE GROUP II

DESIGN: $F_a = .8$ (TABLE 1615.1.2.(1))
$F_v = .8$ (TABLE 1615.1.2(2))
$S_{MS} = .8(1.75) = 1.4$ (16-16)
$S_{M1} = .8(.60) = .48$ (16-17)
$S_{DS} = 2/3(1.4) = .93$ (16-18)
$S_{D1} = 2/3(.48) = .32$ (16-19)

SEISMIC DESIGN CATEGORY = D (PER TABLE 1616.3)
USE EQUIVALENT LATERAL-FORCE PROCEDURE 1617.4
(PER TABLE 1616.6.3)

$V_{ASD} = \frac{C_S}{1.4} W$ (16-34 MODIFIED FOR ASD)

$C_S = \frac{S_{DS}}{R/I_E}$ (16-34) $\Rightarrow .194 \begin{matrix} < 1.90 \\ > .051 \end{matrix}$ OK USE .194

$S_{DS} = .93$
$R = 6$
$I_E = 1.25$ (T1616.2)

$C_{S\,MAX} = \frac{S_{D1}}{\left(\frac{R}{I_E}\right)T}$ (16-36) $\Rightarrow 1.90$

$S_{D1} = .32$
$R = 6$
$I_E = 1.25$
$T = .035$ (1617.4.2.1)

$C_{S\,MIN} = .044 S_{DS} I_E = .051$ (16-37)

$V = \frac{.194}{1.4} W \Rightarrow .138W$

PER 1617.2 MUST APPLY REDUNDANCY FACTOR DUE TO SDC = D
MAX $\rho = 1.5$ ∴

$V = .138 W\rho = \underline{.207\ W}$

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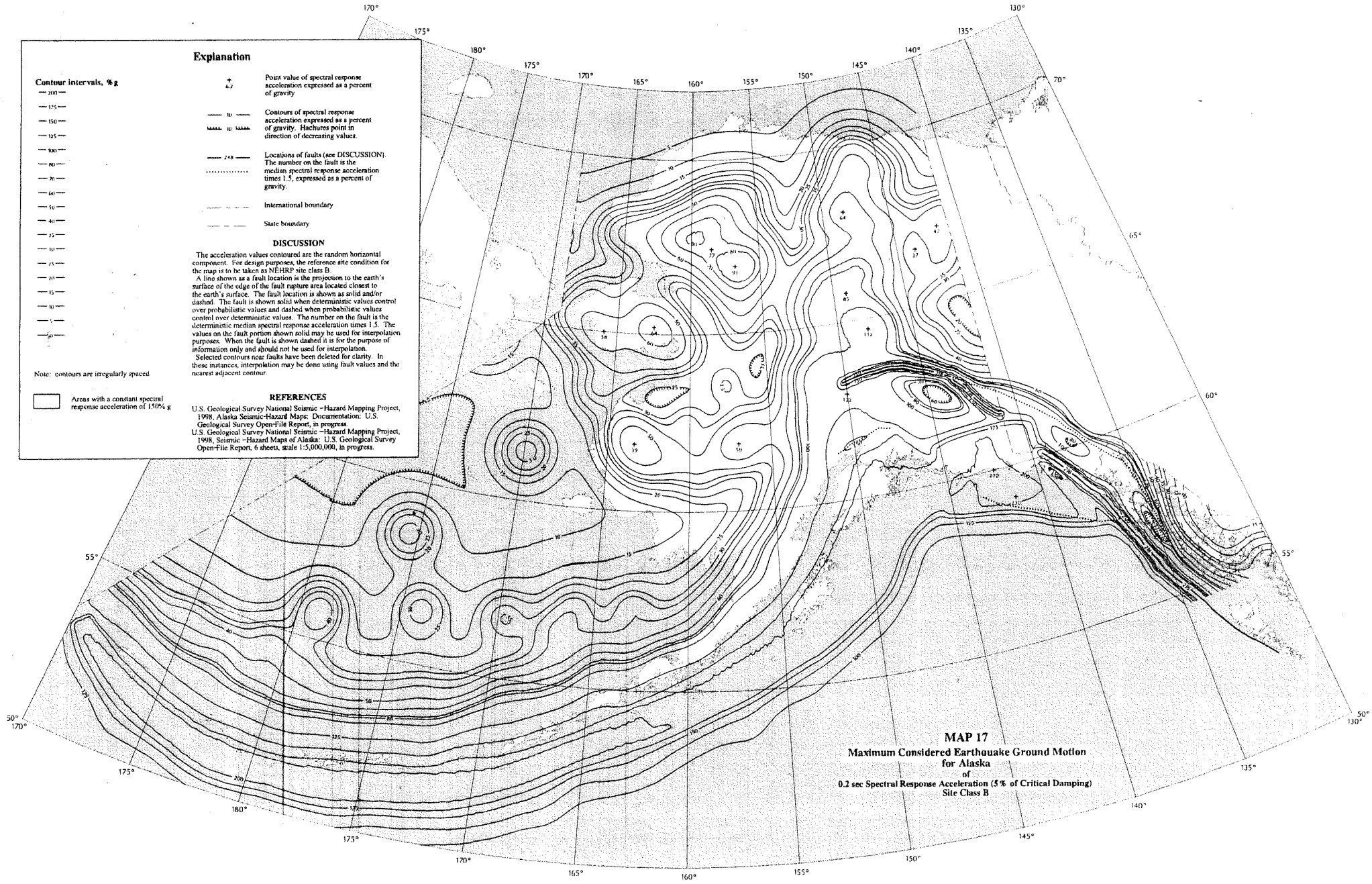


Scale 1:7,000,000

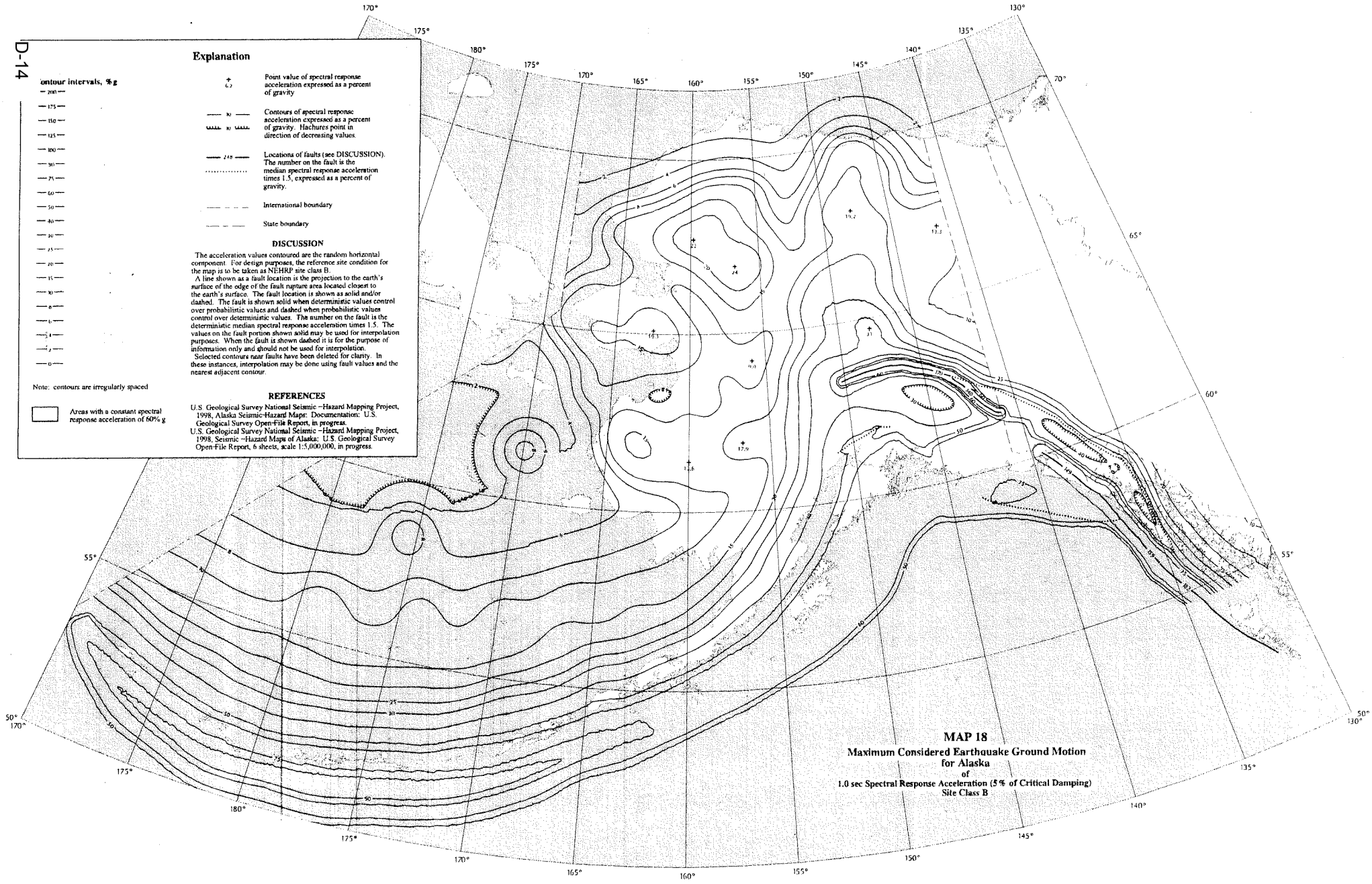
100 0 100 200 300 400 500 600 700 800 900 1000 1100 MILES

100 0 100 200 300 400 500 600 700 800 900 1000 1100 KILOMETERS

Digital data prepared with ARC/INFO 7.1.1
running under Solaris 2.5 on a UNIX workstation

Albers Equal-Area Conic Projection
Standard Parallels 55°N and 65°N
Central Meridian 160°W

Prepared for USGS / BSSC Project 97
by
U.S. Geological Survey (USGS)
Building Seismic Safety Council (BSSC)
Federal Emergency Management Agency (FEMA)



Explanation

contour intervals, %g

200 — 175 — 150 — 125 — 100 — 90 — 75 — 60 — 50 — 40 — 30 — 25 — 20 — 15 — 10 — 8 — 6 — 4 — 2 — 0

Note: contours are irregularly spaced

Areas with a constant spectral response acceleration of 60% g

Point value of spectral response acceleration expressed as a percent of gravity

Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values.

Locations of faults (see DISCUSSION). The number on the fault is the median spectral response acceleration times 1.5, expressed as a percent of gravity.

International boundary

State boundary

DISCUSSION

The acceleration values contoured are the random horizontal component. For design purposes, the reference site condition for the map is to be taken as NEHRP site class B.

A line shown as a fault location is the projection to the earth's surface of the edge of the fault rupture area located closest to the earth's surface. The fault location is shown as solid and/or dashed. The fault is shown solid when deterministic values control over probabilistic values and dashed when probabilistic values control over deterministic values. The number on the fault is the deterministic median spectral response acceleration times 1.5. The values on the fault portion shown solid may be used for interpolation purposes. When the fault is shown dashed it is for the purpose of information only and should not be used for interpolation.

Selected contours near faults have been deleted for clarity. In these instances, interpolation may be done using fault values and the nearest adjacent contour.

REFERENCES

U.S. Geological Survey National Seismic –Hazard Mapping Project, 1998, Alaska Seismic-Hazard Maps: Documentation: U.S. Geological Survey Open-File Report, in progress.

U.S. Geological Survey National Seismic –Hazard Mapping Project, 1998, Seismic –Hazard Maps of Alaska: U.S. Geological Survey Open-File Report, 6 sheets, scale 1:5,000,000, in progress.

MAP 18

Maximum Considered Earthquake Ground Motion for Alaska of 1.0 sec Spectral Response Acceleration (5% of Critical Damping) Site Class B

Scale 1:7,000,000

100 0 100 200 300 400 500 600 700 800 900 1000 1100 MILES

800 0 100 200 300 400 500 600 700 800 900 1000 1100 KILOMETERS

Digital data prepared with ARC / INFO 7.1.1 running under Solaris 2.5 on a UNIX workstation

Albers Equal-Area Conic Projection
Standard Parallels 55°N and 65°N
Central Meridian 160°W

Prepared for USGS / BSSC Project 97
by
U.S. Geological Survey (USGS)
Building Seismic Safety Council (BSSC)
Federal Emergency Management Agency (FEMA)

APPENDIX E
POTENTIAL PERMITS, LICENSES, AND ENTITLEMENTS REQUIRED

APPENDIX E
POTENTIAL PERMITS, LICENSES, AND ENTITLEMENTS REQUIRED

KODIAK LAUNCH COMPLEX

Air—The existing Alaska Department of Environmental Conservation Air Permit under the Clean Air Act will be upgraded to include Ground-Based Midcourse Defense activities

Cultural Resources—As project details are further delineated, additional archaeological surveys may be required to verify the absence of sites within the area of potential effect.

Land Use—Coastal Consistency Determination under the Alaska Coastal Management Act of 1977

Water Resources—Existing Alaska Department of Environmental Conservation (ADEC) National Pollutant Discharge Elimination System permit (under Section 402 of the Clean Water Act for non-point sources from construction activities) will be updated to include Ground-Based Midcourse Defense activities

Wetlands—Section 404 Permit under the Clean Water Act

MIDWAY

No permits, licenses, or entitlements identified

RONALD REAGAN BALLISTIC MISSILE DEFENSE TEST SITE

No permits, licenses, or entitlements identified

PACIFIC MISSILE RANGE FACILITY

No permits, licenses, or entitlements identified

VANDENBERG AIR FORCE BASE

Biological Resources—Section 7 (Endangered Species Act) consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service; Section 10(a) incidental take permit under the Endangered Species and Marine Mammal Protection Acts

Cultural Resources—As project details are further delineated, coordination would occur with the Environmental Planning Section and the Cultural Resources Section at Vandenberg AFB to further ensure that cultural resources would be protected

SEA-BASED X-BAND RADAR

Airspace—Federal Aviation Administration initiated Notices to Airmen and Notices to Mariners when the Sea-Based X-Band Radar is testing

Biological Resources—Section 7 (Endangered Species Act) consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service

Land Use—Coastal Consistency Determination depending on location of the Primary Support Base

BROAD OCEAN AREA

Airspace—Federal Aviation Administration initiated Notices to Airmen and Notices to Mariners when the Sea-Based X-Band Radar is testing

APPENDIX F
CONSULTATION REQUEST LETTERS

DEPARTMENT OF DEFENSE
MISSILE DEFENSE AGENCY
GROUND-BASED MIDCOURSE DEFENSE
JOINT PROGRAM OFFICE
P.O. Box 1500
Huntsville, AL 35807-3801

GMS-E

November 4, 2002

Mr. Robert Arnberger, Regional Director
U.S. Department of the Interior
National Park Service
AK Area Field Office
2525 Gambell Street, Room 107
Anchorage, AK 99503-2892

Dear Mr. Arnberger:

In compliance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality regulations implementing NEPA, the U. S. Army Space and Missile Defense Command, on behalf of the Missile Defense Agency (MDA), is preparing the *Ground-Based Midcourse Defense (GMD) Extended Test Range (ETR) Environmental Impact Statement* (EIS). MDA proposes to develop the capability to conduct more realistic interceptor flight tests in support of GMD by extending the existing GMD test range. This extension would increase the realism of GMD testing by providing an area in which to conduct multiple engagement scenarios using trajectories, geometries, distances, and speed of targets and interceptors that more closely resemble those in which an operational system would be required to provide an effective defense.

The Proposed Action would include pre-launch activities, target and ground-based interceptor (GBI) missile launches from a number of widely separated locations, and missile intercepts over the Pacific Ocean. Target missile would be launched from Vandenberg Air Force Base (AFB), CA; Kodiak Launch Complex (KLC), Kodiak, AK; Pacific Missile Range Facility (PMRF), Kauai, HI; Ronald Reagan Ballistic Missile Defense Test Site (RTS), U.S. Army Kwajalein Atoll; or from mobile platforms in the western Pacific Ocean. GBI missiles would be launched from Vandenberg AFB, KLC, or RTS. Dual target and interceptor missile launches would occur in some scenarios.

Missile acquisition and tracking would be provided by existing ship-borne sensors, a new sea-based X-Band radar, and land-based sensors in the Pacific region; a mobile sensor positioned at KLC, PMRF, RTS, or Vandenberg AFB; the prototype X-Band radar at RTS; and existing/ upgraded radars at Beale AFB, CA, and Clear Air Force Station and Eareckson Air Station, AK. In-Flight Interceptor Communication System Data Terminals (IDTs) would be constructed near the proposed GBI launch sites and in the mid-Pacific region. Commercial Satellite Communications terminals would be constructed at launch locations that do not have fiber optic communications links and in the mid-Pacific region.

The EIS considers the long-term conservation and protection of the coral reef ecosystem and related marine resources and species of the Northwestern Hawaiian Islands as required by Executive Order 13196, *Final Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve.* The EIS also investigates the potential for adverse impact to Essential Fish Habitat in accordance with the Magnuson-Stevens Fishery Conservation and Management Act.

This Coordinating Draft EIS is being distributed to various agencies, including your office, for review and comment prior to preparing the Draft EIS for public review. It is our desire to ensure that any concern you might have about our efforts to identify natural resources and assess potential impacts is fully addressed.

Please review this information and provide comments by December 5, 2002 to Deputy Commanding General, U.S. Army Space and Missile Defense Command, Attention: SMDC-EN-V (Ms. Sharon Mitchell), P.O. Box 1500, Huntsville, AL 35807-3801 or by data facsimile 256-955-5074 or e-mail sharon.mitchell@smdc.army.mil. If you have any questions or comments, please contact Ms. Mitchell at 256-955-4392.

Mike Holland
for STEVE DAVIS
Colonel, U.S. Army
Director, Site Activation World Wide
Ground-Based Midcourse Defense

Enclosure:
As stated

Similar letters were sent to the following agencies:

ALASKA

Mr. Greg Ballogh, U.S. Fish and Wildlife Service, Anchorage Ecological Services Office, 605 W 4th Ave Rm G62, Anchorage AK 99501

Mr. Chuck Bell, State Conservationist, U.S. Department of Agriculture, Natural Resource Conservation Service, Alaska State Office, 949 East 36th Ave Ste 400, Anchorage AK 99508-4302

Ms. Judith E. Bittner, State Historic Preservation Officer, Alaska Department of Natural Resources, Office of History and Archaeology, Division of Parks and Outdoor Recreation, 550 West 7th Ave Ste 1310, Anchorage AK 99501

Ms. Michele Brown, Commissioner, Alaska Department of Environmental Conservation, 401 Willoughby Ave Ste 105, Juneau AK 99801-1795

Ms. Michelle Davis, Alaska Regional Coordinator, Native American Fish and Wildlife Society, 707 A St, Anchorage AK 99501

Mr. Samuel Demientieff, Fairbanks Agency, Bureau of Indian Affairs, Federal Building & Courthouse, 101 12th Ave Box 16, Fairbanks AK 99701

Mr. Clarence Goward, FAA Anchorage, 222 West 7th Ave Box 14, Anchorage AK 99513

Ms. Jeanne L. Hanson, Field Office Supervisor for Habitat Conservation, U.S. Department of Commerce, National Marine Fisheries Service, 222 West Seventh Ave No 43, Anchorage AK 99513-7577

Mr. Kevin Harun, Executive Director, Alaska Center for the Environment, 806 G St Ste 100, Anchorage AK 99501

Mr. Jeff Hughes, Alaska Department of Fish and Game, Division of Wildlife Conservation, Region 2, 333 Raspberry Rd, Anchorage AK 99518-1599

Mr. Albert Kahklen, Field Representative, Bureau of Indian Affairs, 3601 C Street, Suite 1100, Anchorage AK 99503

Mr. Ronald G. King, Chief, Alaska Department of Environmental Conservation, Division of Air and Water Quality, Air Quality Improvement Section, 610 University Ave, Fairbanks AK 99709-3643

Mr. William D. McGee, Regional Environmental Supervisor, Alaska Department of Environmental Conservation, 610 University Ave, Fairbanks AK 99501

Mr. Ervin McIntosh, Field Supervisor, U.S. Department of the Interior, U.S. Fish and Wildlife Service, Ecological Service/Fairbanks, 101-12th Ave, Fairbanks AK 99701-6267

Ms. Maureen McCrae, Alaska Office of Management and Budget, Division of Governmental Coordination, Project Review Coordinator, 550 W 7th Avenue Ste 1660, Juneau AK 99501

Ms. Cynthia Navarrette, Alaska Native Health Board, 3700 Woodland Drive Ste 500, Anchorage AK 99517

Mr. Alvin G. Ott, Regional Supervisor, Alaska Department of Fish and Game, Region III, Habitat Protection Division, 1300 College Rd, Fairbanks AK 99701-1599

Mr. Steven Pennoyer, Regional Administrator, U.S. Department of Commerce, National Marine Fisheries Service, Alaska Regional Office, 709 West 9th, Juneau AK 99802-1668

Mr. Curt Wilson, U.S. Bureau of Land Management, 222 West 7th Ave, Anchorage AK 99513
Mr. Everett Robinson Wilson, U.S. Department of the Interior, U.S. Fish and Wildlife Service, Aleutian Ecological Services, Region 7, 1101 East Tudor Rd, Anchorage AK 99503

CALIFORNIA

California Regional Water, Quality Control Board, Central Coast Region, 81 Higuera St Ste 200, San Luis Obispo CA 93401-5427
Mr. Rodney McInnis, Acting Regional Administrator, Department of Fish and Game, California Coastal Commission, National Marine Fisheries Service Director, Southwest Region, 501 West Ocean Boulevard, Suite 4200, Long Beach CA 90802-4213
Mr. Jim Raives, Federal Consistency Coordinator, California Coastal Commission, 45 Fremont St Ste 200, San Francisco CA 94105-2219
Santa Barbara County Air Pollution Control District, 26 Castilian Drive, Goleta CA 93117

HAWAII

Mr. Gilbert Coloma-Agaran, SHPO, Department of Land and Natural Resources, Kakuhihewa Bldg Rm 555, 601 Kamokila Blvd, Kapolei, HI 96707
Mr. Charles Karnella, NOAA, 1601 Kapiolani Blvd Suite 1110, Honolulu HI 96814-4700
Mr. Curtis Martin, Hazard Evaluation and Emergency Response Office, 919 Ala Moana Blvd Rm 201, Honolulu HI 96814
Ms. Barbara Maxfield, U.S. Fish and Wildlife Service, 300 Ala Moana Blvd Rm 3-122, Honolulu HI 96850
Mr. Mike Molina, U.S. Fish and Wildlife Service, 300 Ala Moana Blvd Rm 3108, Honolulu HI 96580
Mr. Ben Nakamiyo, Federal Aviation Administration, 300 Ala Moana Blvd Ste 7-128, Honolulu HI 96850-4953
Mr. John Naughton, National Marine Fisheries Service, Pacific Islands Office, 1601 Kapiolani Blvd Ste 1110, Honolulu HI 96814-4700
Mr. Francis Oishi, Hawaii DLNR, 1151 Punchbowl St Rm 330, Honolulu HI 96813
Mr. Howard Park, Federal Aviation Administration, 760 Worchester Ave, Honolulu HI 96818-5125
Ms. Debbie Saito, Federal Aviation Administration, Honolulu Control Facility, 760 Worchester Ave, Honolulu HI 96818

REPUBLIC OF THE MARSHALL ISLANDS

Mr. John Bungitak, General Manager, Republic of the Marshall Islands Environmental Protection Authority, P.O. Box 1322, Majuro Atoll, Republic of the Marshall Islands 96960
Mr. Lenest Lanki, Secretary to the RMI Minister of Internal Affairs/Historic Preservation Officer, P.O. Box 1454, Majuro Atoll, Republic of the Marshall Islands MH 96960-1454

WASHINGTON

Mr. Terry Barton, Environmental Affairs, Naval Station Everett
2000 West Marine View Drive, Everett WA 98207-5001
Mr. Robert Donnelly, NWR/NMFS, 7600 Sand Point Way, Seattle WA 98115
Ms. Ann Kenny, Department of Ecology, NW Regional Office, 3190 160th Ave SE, Bellevue WA 98008-5452
Mr. John Miller, Environmental Affairs, Naval Station Everett, 2000 West Marine View Drive, Everett WA 98207-5001
Mr. Michael Motta, Environmental Affairs, Naval Station Everett, 2000 West Marine View Drive, Everett WA 98207-5001

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APPENDIX G
COOPERATING AGENCIES ACCEPTANCE LETTERS

U.S. Department
of Transportation
Federal Aviation
Administration

800 Independence Ave., S.W.
Washington, D.C. 20591

NOV 13 2001

Ronald T. Kadish
Lieutenant General, USAF
Director
Ballistic Missile Defense Organization
7100 Defense Pentagon
Washington D.C. 203091-7100

Dear General Kadish:

It has come to my attention that the Department of Defense Ballistic Missile Defense Organization (BMDO) will be proposing construction and operations in support of the National Missile Defense System at the Kodiak Launch Complex (KLC). I also understand that in conjunction with the proposed activities at KLC, the BMDO will be initiating an environmental review process pursuant to the National Environmental Policy Act (NEPA). The Federal Aviation Administration (FAA) Office of the Associate Administrator for Commercial Space Transportation, the Federal agency responsible for licensing the operation of U.S. commercial launch facilities, is reviewing the license renewal process for the KLC. The license renewal process will also require NEPA review. Given the similar timing and the fact that the BMDO and FAA actions are connected, I propose that the FAA and BMDO work together to fulfill their NEPA obligations.

By way of background, the FAA issued a launch site operator license to the Alaska Aerospace Development Corporation (AADC) in September 1998 that specifies the terms and conditions under which the KLC can be operated. The AADC license is valid for a period of five years. The current license expires in September 2003 and will need to be renewed prior to that time. As part of the license renewal process and pursuant to NEPA, the FAA must make an environmental determination regarding any proposed modification to the terms of the launch site operator license. This would include any proposed addition or change to on-site facilities and operations at KLC. The FAA is advising that AADC begin the environmental portion of the license renewal process as soon as possible. We note that if the AADC license is not renewed prior to September 2003, the KLC launch site operator license will expire and no launches could occur at the facility.

NEPA emphasizes agency cooperation early in the environmental review process. Recognizing that the FAA has jurisdiction by law over the operation of the launch facility and any commercial launches proposed to take place at KLC, the FAA proposes that a cooperative environmental process is appropriate. Currently both BMDC and FAA are beginning a NEPA environmental review process for the KLC facility. The proposed actions to be evaluated under NEPA by BMDO must also be considered by the FAA during the license renewal process. It seems clear that environmental documentation to meet the needs of both agencies could be addressed in one Environmental Impact Statement (EIS) thereby reducing paperwork and delay. Therefore, the FAA requests that the BMDO designate the FAA a cooperating agency, as provided in 40 CFR § 1501.6, for an EIS to cover both proposed construction and operations in support of the National Missile Defense System test activities at the KLC as well as proposed renewal of the ADDC launch site operator license.

Specific arrangements and details pertaining to the responsibilities and regulatory requirements of each agency can be discussed and outlined in a future Memorandum of Agreement between the BMDO and the FAA. Initiating this arrangement early in the NEPA review process will help to ensure that the concerns and requirements of both agencies are thoroughly addressed.

Please feel free to contact me at (202) 267-7793 or Michon Washington from my staff at (202) 267-9305. I look forward to hearing back from you regarding the FAA request for designation as cooperating agency on the BMDO EIS and to working with you on this project.

Sincerely,

Patricia G. Smith
Associate Administrator for
Commercial Space Transportation

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