

LPM - SP&L 745



Liquid Propellant Missile (LPM) Site Preparation and Launch



Environmental Assessment

25 July 2002

to comply with the State General National Pollutant Discharge Elimination System Permit for Construction Activities has been filed with the California Regional Water Quality Control Board. Revegetation of the launch site will prevent future soil erosion.

A soil sample will be taken before and after launches in the vicinity of the Mobile Launcher to ensure the soil is not contaminated from launch activities.

Hazardous Materials and Hazardous Waste. Hazardous materials will be handled in accordance with federal and state regulations and the 30th Space Wing Hazardous Materials Management Plan. Propellants (fuel and oxidizer) will be stored at the Hypergolic Storage Facility until shortly before launch at which time they would be transported to the loading site in accordance with Department of Transportation procedures. An inventory of hazardous materials will be performed by the base Environmental Flight in order to provide to emergency response personnel. Any accidental spills would be handled in accordance with the 30th Space Wing Hazardous Materials Emergency Response Plan.

The waste generated by the LPM site preparation, pre-launch, and launch activities will not be substantial. Hazardous waste will be managed in accordance with federal and state regulations and the 30th Space Wing Hazardous Waste Management Plan. Waste water from washdown of the Mobile Launcher will be disposed of in accordance with the 30th Space Wing Wastewater Management Plan.

Health and Safety. Site preparation and hazardous materials handling would be conducted in accordance with the Occupational Safety and Health Administration regulations and 30th Space Wing Safety procedures to control exposure of workers to safety and health hazards. Explosive safety quantity-distances have been established by the 30th Space Wing Safety Office around the propellant storage and loading sites and the launch site. A launch hazard area will also be established by that office to protect base personnel and nearby landowners. Danger zone closures will be established by the 30th Range Squadron to reduce hazards to aircraft, mariners, and offshore oil rig workers in the Western Range.

Land Use. After the mission is complete, the launch area will be restored to its original vegetated condition and continue to be used for cattle grazing. All temporary structures such as concrete pads and footing and communication cabling will be removed unless otherwise directed by the 30th Space Wing. The project will not significantly affect coastal uses or resources and potential closures of Point Sal State Beach are within the limits agreed to by the California Coastal Commission for the Targets program. The California Coastal Commission has concurred with the 30th Space Wing's negative determination of impacts to the state-designated coastal zone for the LPM site preparation and launches.

Environmental Justice. The Proposed Action would not result in disproportionately high or adverse effect on minority or low-income populations in the area.

**ADDENDUM TO LIQUID PROPELLANT MISSILE (LPM)
SITE PREPARATION AND LAUNCH
FINDING OF NO SIGNIFICANT IMPACT**

BACKGROUND:

The LPM Site Preparation and Launch Environmental Assessment (EA) is related to the Theater Ballistic Missile Defense Targets EA, 1997, which analyzed the potential for impacts of launching up to 30 target missiles per year from selected existing sites on Vandenberg Air Force Base (AFB).

ENVIRONMENTAL CONSEQUENCES:

Air Quality. LPM Site Preparation and Launch would not substantially impact the regional air quality since the estimate of total emissions does not exceed current air quality standards within the Santa Barbara Air Basin. Site preparation would require the disturbance (grading and mowing) of up to approximately 7.3 hectares (18 acres). Dust suppression measures such as periodically watering the graded areas of the site and reducing vehicle speeds would be implemented. Proper vehicle maintenance would serve to minimize exhaust emissions. There would be no emissions from propellant loading activities since it is a closed loop system. Emissions from launch preparation activities would be regulated in accordance with Santa Barbara County Air Pollution Control District Rules and Regulations. An air quality conformity analysis has been completed and a conformity determination is not required.

Biological Resources. Site preparation, pre-launch, or launch activities would not have significant adverse impacts to vegetation, wildlife, threatened/endangered species, or wetlands. The Proposed Action includes restoring the vegetation of the launch area to its original condition and moving the cattle currently grazing in the launch area to another grazing area on the base prior to site preparation. A qualified biologist will survey the launch area one week and immediately prior to site preparation to ensure no burrowing owls are present.

Each missile booster would have approximately 208 liters (55 gallons) of residual propellant upon entering the ocean. The natural buffering capacity of seawater and the ocean currents would neutralize chemical reaction. The National Marine Fisheries Service believes the launches will not have an adverse effect on marine resources under their authority. Launch operations will comply with the terms and conditions of the U.S. Fish and Wildlife Service Biological Opinion for the Targets program.

Cultural Resources. No historic or prehistoric resources are located within the area of the launch site. Outside of the launch site all cabling will be laid above the ground surface. The State Historic Preservation Officer has concurred with the 30th Space Wing's finding of No Historic Properties Affected for the Proposed Action. The Proposed Action has been coordinated with the Santa Ynez Chumash Elders Council.

Water Quality and Geology/Soils. A Stormwater Pollution Prevention Plan has been prepared for the site preparation activities. This provides Best Management Practices to prevent soil erosion and discharges of sediment into surface waters during storm events. A Notice of Intent

LIQUID PROPELLANT MISSILE (LPM) SITE PREPARATION AND LAUNCH
ENVIRONMENTAL ASSESSMENT

AGENCY: Missile Defense Agency

ACTION: Finding of No Significant Impact

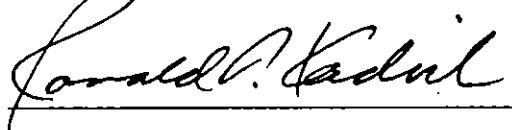
PROPONENT:



DATE: _____

MICHAEL E. JOHNSON
COL, AD
Project Manager
Missile Defense Targets
Joint Project Office

APPROVED:



DATE: 22 Aug 02

RONALD T. KADISH
Lieutenant General, USAF
Director

ALTERNATIVES TO THE PROPOSED ACTION:

No-action. Under the No-action Alternative, MDA would not proceed with the two LPM launches from a new ground surface launch area. Selection of this alternative would not allow the collection of important flight test data as defined in the mission requirements. Other ongoing activities at Vandenberg AFB would continue.

Several other candidate site locations were initially considered for the LPM flight tests but were eliminated from further consideration because of various constraints.

ENVIRONMENTAL EFFECTS:

Proposed Action. To provide a context for understanding the potential effects of the Proposed Action and a basis for assessing the significance of potential impacts, several environmental resource areas were evaluated. The resource areas determined to have a potential for impacts were air quality, biological resources, geology and soils, hazardous materials and waste, health and safety, land use, and water resources. Each environmental resource was evaluated according to a list of activities that were determined to be necessary to accomplish the Proposed Action.

Implementation of the Proposed Action would result in negligible impacts to the resource areas listed above on Vandenberg AFB. All activities would be in compliance with applicable federal, state, and local regulations and requirements.

Alternatives. Under the No-action Alternative, no environmental consequences associated with the LPM site preparation and launch activities are anticipated.

CONCLUSION: The resulting environmental analysis shows that no significant impacts would occur from the proposed LPM site preparation and launch activities. Preparation of an Environmental Impact Statement, therefore, is not required. A follow-up action list will be developed and completed by the Executing Agent to ensure compliance with the actions described in the EA.

DEADLINE FOR RECEIPT OF WRITTEN COMMENTS: TBD

POINT OF CONTACT: Submit written comments or requests for a copy of the LPM Site Preparation and Launch EA to:

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

inches), for stabilization. A clearing of 3 meters (10 feet) would be required around the slabs for fire hazard mitigation. Two of these concrete pads would be on Avery Road, a dirt road in the southern portion of the base that is already cleared and used by the fire department for fire protection. The third boresight target concrete pad would be located between the runways at the airfield. The fourth boresight target would be located on an area of the airfield that is already paved.

The missile would be transported to the propellant loading site, approximately 1.6 kilometers (1 mile) north of the launch site, for propellant loading operations. The propellants would be transported from the Hypergolic Storage Facility to the propellant loading area 1 day prior to fueling operations. The launch contractor would load one propellant component per day about 4 to 6 days before the scheduled launch (e.g., oxidizer loaded one day; main fuel loaded the next, etc). When the main fuel and oxidizer have been loaded into the missile, the missile would be lowered onto the Mobile Launcher, which would then proceed to the launch area.

Once the missile has arrived at the launch site and system checkouts have been performed, approximately 38 liters (10 gallons) of initiator fuel would be transferred into the missile by remote commands at the Launch Control Van approximately 15 minutes before the scheduled launch. During flight, the missile would follow a pre-programmed trajectory in a westerly direction and would then fall into the broad ocean area approximately 300 kilometers (186 miles) off the coast of Vandenberg AFB. The maximum duration of the powered flight would be approximately 60 seconds. The inert missile payload would not separate during flight. It is anticipated that approximately 208 liters (55 gallons) of propellant would remain in the missile at the end of the flight. There are currently no plans to recover the LPMs after flight testing.

After the target is launched, the Mobile Launcher would be driven to the wash-down area at the Missile Maintenance Facility. The Mobile Launcher would be washed down to remove missile blast residue, and the collected wastewater would be tested for proper disposal. The Mobile Launcher would then be driven to Building 1900 for refurbishment and then back to the propellant loading area in preparation for the second launch. It is anticipated that up to 100 people would be located at Vandenberg AFB for up to 90 days to conduct the flight tests. Program personnel would be housed in area hotels throughout the missions.

After the mission is complete and soil samples determine that the soil is not contaminated from launch activities, the launch area would be restored to its prior condition by redistributing the soil collected from preparing the launch area. This soil would contain original seed to help rejuvenate the vegetation and restore the area to its original condition. All temporary structures such as concrete footings, equipment towers, fiber optics/communication cabling, and shale would be removed from the launch site and fueling site upon the completion of the Proposed Action unless directed otherwise by Vandenberg AFB.

The launch site would be prepared by scraping topsoil from the launch area to expose a pure sand/dirt ground base surface. The proposed launch area is in a fenced pasture that currently contains livestock, which would be relocated during the project. A 200-meter (656-foot) radius area around the selected launch point is to be closely mowed. Within 150 meters (492 feet) of the launch point, the site would be graded by scraping approximately 5 to 8 centimeters (2 to 3 inches), but no more than 30 centimeters (12 inches), of topsoil to remove all debris and to expose a pure sand/dirt ground base surface. The middle region, approximately 60 meters (197 feet) from the launch point, would be packed down and rolled to a semi-flat ground surface. A portion of the innermost 30-meter (98-foot) radius area would be leveled to within two degrees to position the Mobile Launcher.

Any scraped dirt not being used would be moved to the western side of the site. Water would be used periodically for dust suppression until the site is revegetated or local shale from Vandenberg AFB could be added to the exposed sand/dirt surface layer to improve compaction and dust suppression. The shale would be removed from the launch site once the project is complete as part of the revegetation and restoration process. A second empty Mobile Launcher would be located approximately 100 meters (328 feet) from the launch point and would serve as a reference vehicle. Two paths of Vandenberg AFB shale would be laid to serve as vehicle entry points to the launch site to aid in vehicle path compaction and dust suppression, and would be removed from the launch area once the project is complete. A vehicle parking area, approximately 700 square meters (7,500 square feet), prepared by mowing (and shale, if recommended by range), would be located just inside one of the launch area entry points. It is anticipated that no more than a total of approximately 7.3 hectares (18 acres) would be disturbed at the launch area for the project.

Launch area power would be supplied by range generators. All electrical and fiber optic cables outside the launch radius would be placed on the ground surface, routed through existing culverts, and along existing electricity poles. No trenching would be required beyond the launch area. Portable floodlights with permitted portable generators would be required at the launch site for the night test. Several other minor construction projects would also be performed to ready the launch area.

One temporary 25-meter (82-foot) tower and a separate concrete slab would be installed approximately 100 meters (328 feet) from the center of the launch site to accommodate mounting of various instruments and lighting. Two 1.8- by 2.4-meter (6- by 8-foot) concrete foundations would be poured at 100 meters (328 feet) from the center of the launch site. One would be used for the tower footing, and the other would be used for optical site instrumentation. Three existing optical support sites would also be used to collect data during the flight tests. Instrumentation at these sites would use calibration and boresight targets (light and heat elements that emit a specific, known radiant intensity in a specific infrared waveband) to accomplish optical alignment and measurement calibration. The boresight targets would be on user-provided tripods and would in three cases require precisely placed concrete slabs, 1.5 meters by 1.5 meters by 7.6 centimeters (5 feet by 5 feet by 3

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**LIQUID PROPELLANT MISSILE (LPM) SITE PREPARATION AND LAUNCH
ENVIRONMENTAL ASSESSMENT**

MISSILE DEFENSE AGENCY

AGENCY: Missile Defense Agency (MDA)

ACTION: Finding of No Significant Impact

BACKGROUND: The U.S. Army Space and Missile Defense Command, on behalf of MDA, has conducted an Environmental Assessment (EA) of the potential environmental consequences of proposed Liquid Propellant Missile (LPM) site preparation and launch activities at Vandenberg Air Force Base (AFB). This EA has been prepared in accordance with the National Environmental Policy Act of 1969, as amended, and its implementing regulations, 40 U.S. Code 4321 *et seq* and 42 Code of Federal Regulations (CFR) 1500-1508, respectively; 32 CFR Part 61 (Army Regulation 200-2), *Environmental Analysis of Army Actions*; 32 CFR 989 (Air Force Instruction 32-7061), *Environmental Impact Analysis Process*; Department of Defense Instruction 4715.9, *Environmental Planning and Analysis*; and Executive Order 12114, *Environmental Effects Abroad of Major Federal Actions*. The purpose of the Proposed Action is to conduct flight tests from a ground-surface launch area to collect data from certain types of launch and flight scenarios using LPMs.

DESCRIPTION OF THE PROPOSED ACTION:

MDA proposes to conduct flight tests using two LPMs launched from a new ground surface site at Vandenberg AFB, one during the day and one at night. These tests would also consist of associated pre-flight preparation and post-flight activities such as transportation of the missile and liquid propellant to and storage at Vandenberg AFB, launch and support site preparation, missile fueling, waste disposal, and site restoration. These LPMs would be flight tested to gather information and no intercept attempts would be made. Mission requirements for the proposed tests dictate that the missiles launch from a ground surface (sand/dirt) launch area, not from a concrete pad, and that there be no infrastructure within 300 meters (984 feet) of the launch site.

The missile proposed for use in the flight tests is a single-stage liquid-fueled ballistic missile with an inertial guidance system and a non-separating payload. The missile is composed of a payload section, a guidance and control section, and a propulsion section. The missile would not carry a live warhead. The payload section would house telemetry and flight termination instrumentation. The maximum range of the missile is approximately 300 kilometers (186 miles).

The main fuel for the missile is coal tar distillate. For the two proposed launches, approximately 1,135 liters (300 gallons) of main fuel would be required per launch. Approximately 1,893 liters (500 gallons) of the oxidizer, inhibited red fuming nitric acid, would be required per launch. Also, approximately 38 liters (10 gallons) of initiator fuel would be used during each launch.

REPORT DOCUMENTATION PAGE

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) The Missile Defense Targets Joint Project Office proposed to launch two liquid propellant missiles (LPMs), one during the day and one at night within a 2- to 3-week period. A ground surface (sand/dirt) launch area with no existing concrete pad and no infrastructure within a 300-meter (984-foot) radius is required. The area would be prepared by scraping topsoil from the launch area to expose a pure sand/dirt ground base surface. It is anticipated that no more than a total of approximately 7.3 hectares (18 acres) would be disturbed at the launch area for the project. The missile proposed for use in the flight test is a single-stage liquid-fueled ballistic missile with an inertial guidance system and a non-separating payload. Some equipment associated with the liquid propellant missile proposed for launch would be transported to the range for the LPM flight tests: mobile launcher, a truck-mounted equipment enclosures, Launch Control Van, closed loop Propellant Transfer System, Transfer and Fueling Trailer, Propellant Operation and Staging Trailer, and other supporting equipment. After the mission is complete, the launch area would be restored to its original condition by redistributing the soil collected from preparing the launch area.				
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22a. NAME OF RESPONSIBLE INDIVIDUAL Ms. Sharon Mitchell		22b. TELEPHONE (Include Area Code) (256) 955-4392		22c. OFFICE SYMBOL SMDC-EN-V

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Introduction

The Missile Defense Targets Joint Project Office has a priority requirement to launch two liquid propellant missiles (LPMs), one during the day and one at night within a 2- to 3-week time period. A ground surface (sand/dirt) launch area with no existing concrete pad and no infrastructure within approximately 300 meters (984 feet) is required.

The purpose of the Proposed Action is to conduct flight tests from a ground surface launch area to support mission requirements of collecting data from certain types of launch and flight scenarios using LPMs and to validate the models used to develop missile defense algorithms. Such flight tests are needed to fully validate system design and operational effectiveness of defensive missiles and other defense systems utilized by the various services in the Department of Defense.

This environmental assessment provides an analysis to support federal decisions relating to the potential environmental effects of activities associated with launching the two LPMs from a new launch site on Vandenberg Air Force Base (AFB). This environmental assessment tiers from a previous National Environmental Policy Act document (*Theater Ballistic Missile Targets Programmatic Environmental Assessment, 1997*), which analyzed the potential for impacts of pre-flight preparation, flight tests, and post-flight activities associated with launching LPMs from selected existing sites on Vandenberg AFB.

Program Activities

The missile proposed for use in the flight tests is a single-stage, liquid-fueled ballistic missile with an inertial guidance system and a non-separating payload. The main fuel of the missile is coal tar distillate, and the oxidizer is inhibited red fuming nitric acid. The LPM possesses a flight termination system that would provide Range Safety personnel with the capability to terminate thrust during the powered flight by initiating the propellant shut-off system of the missile. These LPMs would be flight tested to gather information only, and no intercept attempts would be made.

The unfueled LPMs and test and support equipment would be transported to Vandenberg AFB by over-the-road common carrier truck from U.S. Government storage depots or contractor facilities. Liquid propellants would be transported in U.S. Department of Transportation approved containers directly to the Hypergolic Storage Facility on Vandenberg AFB for storage until required for operations. The initiator fuel would be stored with the main fuel at the Hypergolic Storage Facility until shortly before launch, at which time it would be transferred to a pressurized vessel. The LPMs and support equipment would undergo system checkout, missile integration, and end-to-end functional testing.

The launch site would be prepared by scraping topsoil from the launch area to expose a pure sand/dirt ground base surface. The proposed launch area is in a fenced pasture that currently contains livestock, which would be relocated during the project. A 200-meter (656-foot) radius area about the selected launch point is to be closely mowed. Within 150 meters (492 feet) of the launch point, the site would be graded by scraping approximately 5 to 8 centimeters (2 to 3 inches), but no more than 30 centimeters (12 inches), of topsoil to remove all debris and to expose a pure sand/dirt ground base surface.

The middle region, approximately 60 meters (197 feet) from the launch point, would be packed down and rolled to a semi-flat ground surface. A portion of the innermost 30-meter (98-foot) radius area would be leveled to within two degrees to position the Mobile Launcher.

Two paths of Vandenberg AFB shale, 5 to 7 meters (16 to 23 feet) wide, would be laid to serve as vehicle entry points (off the existing paved road) to the launch site. The shale would aid in vehicle path compaction and dust suppression, and would be removed from the launch area once the project is complete. A vehicle "parking area," approximately 700 square meters (7,500 square feet), prepared by mowing (and shale, if recommended by range), would be located just inside one of the launch area entry points. Water would be used periodically for dust suppression throughout the project duration until the site is revegetated. It is anticipated that no more than a total of approximately 7.3 hectares (18 acres) would be disturbed at the launch area for the project.

Launch area power would be supplied by range generators. All electrical and fiber optic cables outside the launch radius would be placed on the ground surface, routed through existing culverts, and along existing power poles. No trenching would be required beyond the launch area. Portable floodlights with permitted generators would be required at the launch site for the night test. Two pre-fabricated locking entrance gates would be installed in the existing fencing as an entry point to the launch site area. One temporary 25-meter (82-foot) tower and a separate concrete slab would be installed at locations approximately 100 meters (328 feet) from the launch point to accommodate mounting of various instruments and lighting.

Three existing optical support sites would also be used to collect data during the flight tests. Instrumentation at these sites would use calibration and boresight "targets," (light and heat elements that emit a specific, known radiant intensity in a specific infrared waveband) to accomplish optical alignment and measurement calibration. These boresight targets would be on user-provided tripods and would in three cases require precisely placed concrete slabs, 1.5 meters by 1.5 meters by 7.6 centimeters (5 feet by 5 feet by 3 inches), for stabilization. A clearing of 3 meters (10 feet) would be required around the slabs for fire hazard mitigation. Two of these concrete pads would be on Avery Road, a dirt road in the southern portion of the base that is already cleared and used by the fire department for fire protection. The third boresight target concrete pad would be located between the runways at the airfield. A slab form would be placed on top of the ground, without any grading, and the concrete poured. The fourth target would be located on an area of the airfield that is already paved. Minimal additional clearing is anticipated by the

Vandenberg AFB Safety and Environmental Office. Upon mission completion, the concrete would be broken and removed.

Once functional testing is completed, the missile would be transported from the storage area to the propellant loading site. This site is approximately 1.6 kilometers (1 mile) north of the launch site and has available water, communication, electricity, and an 18- by 24-meter (60- by 80-foot) concrete pad. Some additional concrete would be required on the pad to level it to a natural slope. A concrete berm would be placed down the center of the fueling area on the pad to form two fueling lanes; i.e., the Transfer and Fueling Trailer would be positioned on one side for the oxidizer loading; then it would be positioned on the other side for the main fuel loading. The gradient and containment lips would ensure that no spilled propellant could reach the ground surface. The 30th Civil Engineering Squadron Engineer Flight would perform a site inspection prior to propellant loading. The propellants would be transported from the Hypergolic Storage Facility to the propellant loading area 1 day before fueling operations. One propellant component would be loaded per day (oxidizer one day, main fuel the next day) for safety reasons, about 4 to 6 days before the scheduled launch. The Propellant Operation and Staging Trailer would be available at the site for emergency response and decontamination of equipment in the event of a mishap.

The missile would follow a pre-programmed trajectory in a westerly direction and would then fall into the broad ocean area approximately 300 kilometers (186 miles) off the coast of Vandenberg AFB. The maximum duration of the powered flight would be approximately 60 seconds. The inert missile payload would not separate during flight. It is anticipated that approximately 208 liters (55 gallons) of propellant would remain in the missile at the end of the flight. There are currently no plans to recover the LPMs after flight testing for the intended broad ocean impact.

After the target is launched, the Mobile Launcher would be driven to the wash-down area for removal of propellant residue. The Mobile Launcher would then be prepared for the next launch and driven back to the propellant loading area.

After the mission is complete, pending the results of the post launch soil sampling, the launch area would be restored to its original condition. Restoration would include measures required to remove any contaminated soil and then redistributing the soil removed during preparation of the launch area. This soil would contain original seed to help rejuvenate the vegetation and restore the area to its original condition. All temporary structures such as concrete footings, equipment towers, fiber optics/communication cabling, and shale would be removed from the launch site and fueling site upon the completion of the Proposed Action unless directed otherwise by Vandenberg AFB.

Alternatives

If the No-action Alternative is selected, no environmental consequences associated with the LPM program are anticipated. Vandenberg AFB would continue their ongoing activities, including launch of target missiles.

Several other candidate site locations were initially considered for the LPM flight tests but were eliminated from further consideration because of various constraints. White Sands Missile Range is unable to provide the distance needed to safely demonstrate the full range the LPM requires as part of the mission. The required 300-meter (984-foot) clear zone around the launch area could not be accommodated at Wake Island Launch Center. Additionally, costs to transport and perform the flight tests at Wake Island would be too prohibitive for the available program funding. Other areas on Vandenberg AFB were considered, but the Environmental Office recommended against their use due to mission constraints and the proximity of protected sites, coastal zones, archaeological resources, and other environmental constraints.

Methodology

To assess the significance of any impact, a list of activities necessary to accomplish the Proposed Action was developed. The affected environment at all applicable locations was then described. Next, proposed activities were analyzed within the context of the existing environment to determine the environmental effects of these activities.

No new impacts to airspace or new sources of noise are anticipated. Noise generated during preparation of the launch site and support facilities would be temporary and similar to other construction noise levels on Vandenberg AFB. The sites proposed for use were selected to avoid the potential for impacts to cultural resources. No adverse impacts to minority or low-income communities (Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*) are anticipated. No environmental health and safety risks that may disproportionately affect children (Executive Order 13045, *Federal Actions to Address Protection of Children from Environmental Health Risks and Safety Risks*) are anticipated. Existing infrastructure would be used, and no change is anticipated to the visual and aesthetic environment of the proposed locations. Personnel would be drawn from the existing workforce with minimal beneficial impacts to socioeconomics in the affected regions.

The Proposed Action has the potential to result in impacts to air quality, biological resources, geology and soils, hazardous materials and waste, health and safety, land use, and water resources.

Environmental Consequences

Only those activities for which a potential environmental concern was determined are described within each resource summary.

Proposed Action

Air Quality

Water would be used periodically for dust suppression throughout the project duration until the site is restored. Most construction-related emissions would have a transient, localized impact on air quality (i.e., once construction ceases, pollutant emissions cease, and air quality returns to its prior state).

Missile launches are short-term, discrete events, thus allowing time between launches for emissions to be dispersed. Emissions from launch preparation and launch activities would be regulated in accordance with the agreement between Vandenberg AFB and the Santa Barbara County Air Pollution Control District for Vandenberg AFB to apply innovative pollution prevention techniques to reduce emissions from their facilities.

Biological Resources

Standard operating procedures for spill prevention, containment, and control measures while transporting equipment and materials would preclude impacts to biological resources. Removal of vegetation could displace small wildlife, but it would not result in a substantial reduction in habitat available for wildlife in the area. No adverse impacts are anticipated to sensitive plant species as a result of launch site preparation. Normal launch activities are not expected to impact vegetation. The increased presence of personnel during construction would tend to cause birds and other mobile species of wildlife to temporarily leave the area that would be subject to the highest level of noise. Therefore, no direct physical auditory changes to wildlife are anticipated. The sites proposed for use were selected to avoid the potential for adverse impacts to wetlands.

A launch mishap, early flight termination, or residual fuel remaining in the system at missile impact could result in the release of liquid propellant from the missile. If impact is in the ocean, this would initially cause spattering, an increase in water temperature, and lowering of the pH value in a localized area. However, the natural buffering capacity of sea water and the strong ocean currents would neutralize reaction to any release of liquid propellant in a relatively short period of time. The possibility of a spill or other accident in land areas involving hazardous materials impacting sensitive habitat is considered remote. Missile launch noise may startle some wildlife species and cause flushing behavior in birds, but affected species are expected to return to normal behavior within a short time. Personnel would avoid bird nesting and roosting locations and pinniped haulout areas.

Geology and Soils

Best Management Practices would be implemented both during and following construction activities for the purpose of preventing soil erosion and controlling pollutant discharges into waterways during storm events. These could include the construction of berms, swales, and runoff diversion ditches, and periodic watering of exposed soil to prevent erosion. The risk of accidental spills of hazardous chemicals during project construction affecting project soils is expected to be minor and temporary in duration.

Spill prevention, containment, and control measures would prevent accidental spill impacts. A soil sample would be taken before and after launches in the vicinity of the Mobile Launcher to ensure the soil is not contaminated from launch activities.

Hazardous Materials and Waste

All hazardous materials would be handled and stored in accordance with applicable state and Vandenberg AFB regulations, particularly the *Hazardous Materials Management Plan* and the *Hazardous Waste Management Plan*, as well as the chemical Material Safety Data

Sheets. Such measures would be designed to minimize hazardous materials impacts to personnel and the environment. The waste generated by the LPM construction and launch activities would not be substantial and would not result in a substantial increase in the total quantities of hazardous waste generated at Vandenberg.

Health and Safety

Construction activities would be conducted in accordance with the Occupational Safety and Health Administration, U.S. Air Force, and U.S. Army Corps of Engineers requirements for health and safety to control exposure to occupational safety and health hazards. Applicable safety regulations and requirements would be followed which would minimize the potential for accidents, as well as provide the means for mitigating adverse effects if an accident were to occur. No effects to the public are anticipated.

All target missile prelaunch operations involving explosive materials would require implementation of a written procedure that has been approved by the 30th Space Wing Safety Office and must be conducted under the supervision of explosive-certified personnel. Implementation of standard safety procedures and the similarity to current operations reduce the potential for safety hazards. Explosive safety quantity-distances have been established by the 30th Space Wing Safety Office around propellant handling and explosive storage facilities to ensure safety in the event of an explosion. Launch hazard areas and surface danger zones would be established to minimize the potential for health and safety impacts during launches.

Land Use

The land proposed for use is currently fenced and used for livestock grazing. After the mission is complete, the launch area would be restored to its original condition. The three optical support sites that would be used to collect data during the flight tests are currently used for similar purposes. Other proposed program activities would take place in existing facilities and locations. These activities would not alter the uses of the sites, which were in the past or are currently used to support missile and rocket testing. There are no known conflicts with land use plans, policies, and controls at Vandenberg AFB.

Water Resources

Best Management Practices would be implemented both during and following construction activities for the purpose of preventing soil erosion and thus a potential for pollutant discharges into waterways during storm events. These could include the construction of berms, swales, and runoff diversion ditches, and periodic watering of exposed soil to prevent erosion. The risk of accidental spills of hazardous chemicals during project construction and launch activities affecting ground or surface water is expected to be minor and temporary in duration. Water requirements for the Proposed Action would not represent a substantial increase in usage at Vandenberg AFB.

Cumulative Impacts

Cumulative impacts are those that result when impacts of an action are combined with the impacts of past, present, and reasonably foreseeable future actions at a location.

Construction and renovation projects such as road repairs and refurbishment of facilities occur on Vandenberg AFB on a regular basis. Launch activities also occur on a regular basis. Cumulative impacts to air quality, biological resources, geology and soils, hazardous materials and waste management, health and safety, land use, and water would potentially occur if all of the projects were to happen concurrently. However, since the Proposed Action is a temporary, very short-term activity (two launches), when combined with the staggered construction and launch schedules for other actions, as well as the use of different areas on the base, no significant cumulative impacts are anticipated.

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ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

30 CES/CEVPN	30 th Civil Engineering Squadron/Environmental Management
30 CES/CEX	Readiness Flight
30 SW/SE	30 th Space Wing/Safety Office
AC	alternating current
AFB	Air Force Base
BOE	Bureau of Explosives
CFR	Code of Federal Regulations
DoD	Department of Defense
DOT	Department of Transportation
EA	Environmental Assessment
EPA	United States Environmental Protection Agency
ESQD	explosive safety quantity-distance
LHA	Launch Hazard Area
LPM	liquid propellant missile
MDTJPO	Missile Defense Targets Joint Project Office
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
OSHA	Occupational Safety and Health Administration
PM-10	particulate matter less than 10 microns in diameter
ROI	region of influence
SBCAPCD	Santa Barbara County Air Pollution Control District
TAFT	Transfer and Fueling Trailer

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1.0
PURPOSE AND NEED

1.0 PURPOSE AND NEED

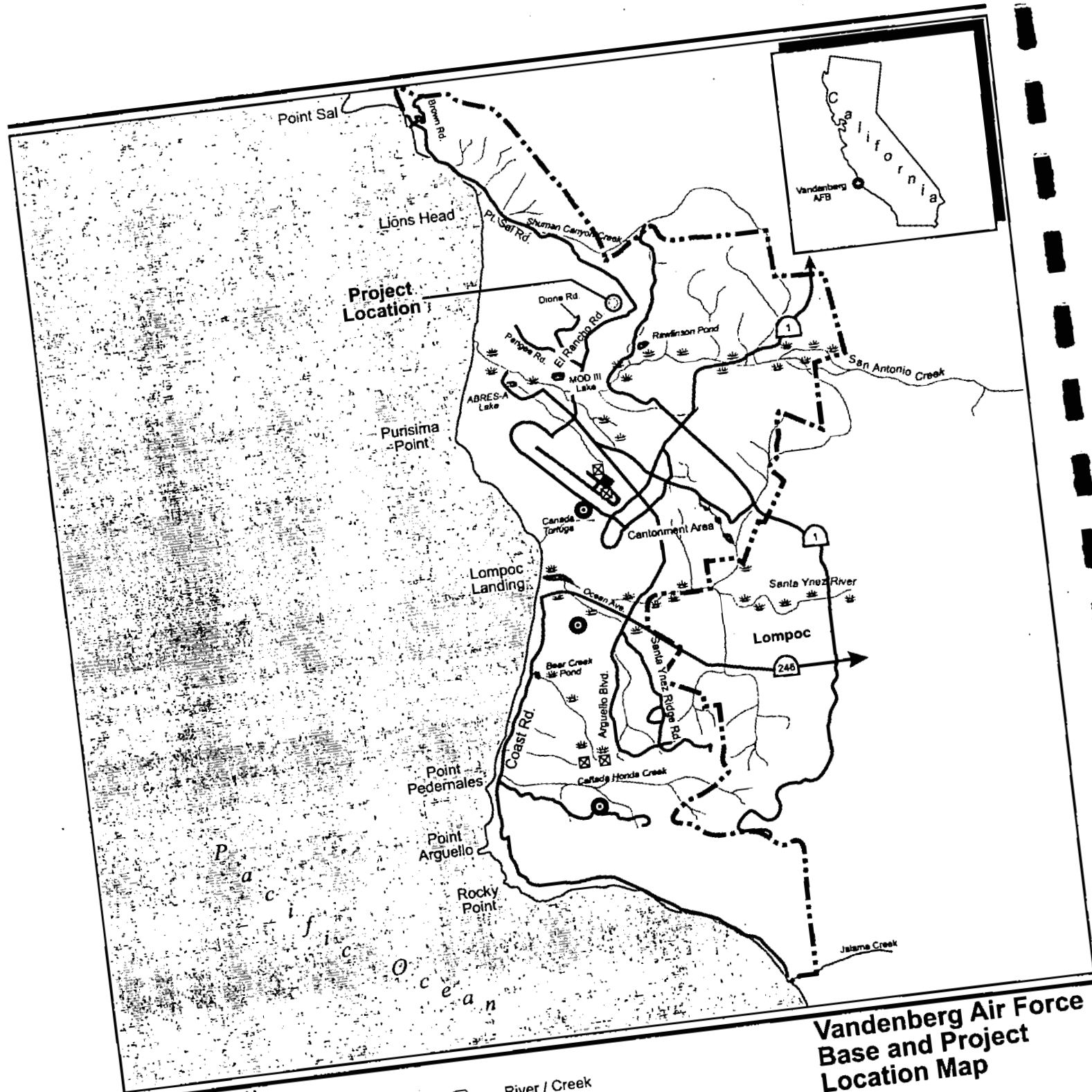
1.1 PREFACE

The National Environmental Policy Act (NEPA) of 1969, as amended, the Council on Environmental Quality Regulations which implement NEPA (Code of Federal Regulations [CFR], Title 40, Parts 1500-1508), Department of Defense (DoD) Instruction 4715.9, *Environmental Planning and Analysis*, and the applicable service regulations that implement these laws and regulations 32 CFR Part 61 (Army Regulation 200-2), *Environmental Analysis of Army Actions*, and 32 CFR 989 (Air Force Instruction 32-7061), *The Environmental Impact Analysis Process*, and Executive Order 12114, *Environmental Effects Abroad of Major Federal Actions* direct DoD lead agency officials to consider potential environmental impacts and consequences when authorizing or approving federal actions.

1.2 SCOPE OF ENVIRONMENTAL ASSESSMENT

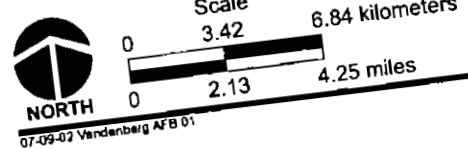
The Missile Defense Targets Joint Project Office (MDTJPO) has a priority requirement to launch two liquid propellant missiles (LPMs), one during the day and one at night within a 2- to 3-week time period. A ground surface (sand/dirt) launch area with no existing concrete pad and no infrastructure within approximately 300 meters (984 feet) is a mission requirement. Accordingly, this environmental assessment (EA) evaluates the potential environmental effects of activities associated with launching two LPMs from a newly prepared ground surface launch area at a location on Vandenberg Air Force Base (AFB) (figure 1-1). These LPMs would be flight tested to gather information only, and no intercept attempts would be made. Associated pre-flight preparation and post-flight activities include transportation of the missile and liquid propellant to and storage at Vandenberg AFB, missile fueling, and waste disposal.

The *Theater Ballistic Missile Targets Programmatic Environmental Assessment* (U.S. Department of the Air Force, 1997) evaluated an expansion of the missile launch capability at Vandenberg AFB. The programmatic EA evaluated launching up to 30 solid and liquid fueled missiles per year from various existing launch sites on Vandenberg AFB in support of future U.S. Army, U.S. Navy, and U.S. Air Force operations in the Western Range. The liquid fueled missiles analyzed in the programmatic targets EA are similar to the proposed LPMs. One of the launch sites analyzed in the programmatic targets EA was the Rail Garrison Peacekeeper site, which is approximately 3 kilometers (2 miles) west of the proposed LPM launch site. Potential impacts of the proposed LPM launches would fall within the parameters of those identified for launches from the Rail Garrison launch site in the programmatic targets EA. The environmental consequences, as identified in the programmatic targets EA, will be accepted and summarized in applicable portions of this EA.



EXPLANATION

- Land Area
- Water Area
- Vandenberg Air Force Base Boundary
- Road
- River / Creek
- Wetlands
- Optical Site
- Bore Sites



Vandenberg Air Force Base and Project Location Map

California

Figure 1-1

LPM Site Preparation and Launch EA

1.3 BACKGROUND

The Western Test Range (figure 1-2) includes a broad area of the Pacific Ocean that extends westward from the coast of southern California. The range functions as the test area for space and missile operations, and includes a network of tracking and data-gathering facilities (supplemented by instrumentation on aircraft) throughout California, Hawaii, and the South Pacific. The Western Range supports U.S. Air Force, U.S. Army, U.S. Navy, and National Aeronautics and Space Administration exercises and test activities. Only that portion of the range affected by a launch is usually activated during missile launches from Vandenberg AFB. Activation of the affected range area consists of instructing ships and airplanes not to enter the area by the issuance of a Notice to Mariners and a Notice to Airmen, respectively, and either sheltering or evacuating people in the activated area. Together, Vandenberg AFB and the adjoining Western Test Range offer a large area of operation, a proven safety record, and the capability to provide a wide range of missile testing and data collection activities for various customers.

1.4 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

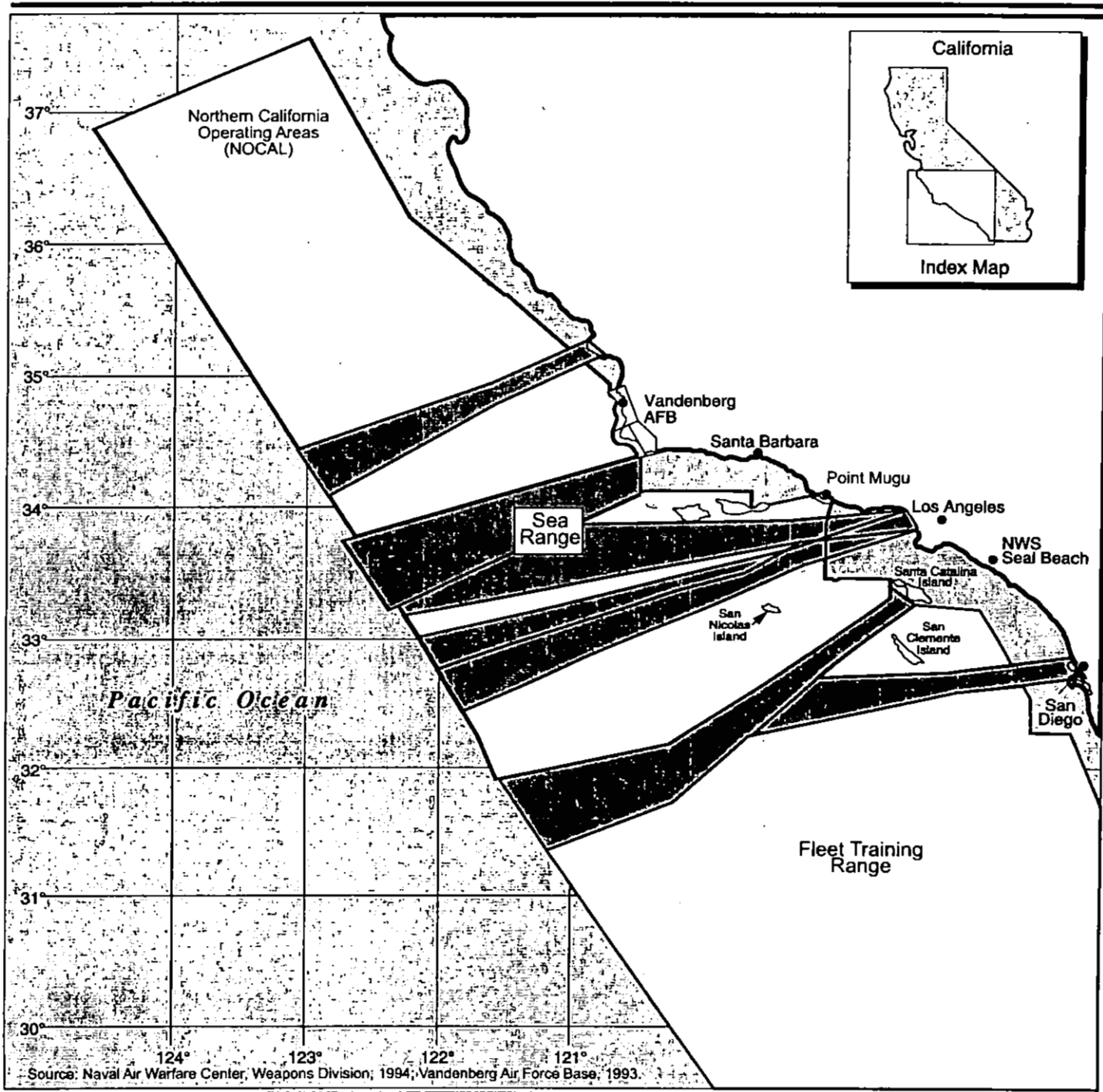
The purpose of the Proposed Action would be to conduct flight tests from a ground surface launch area to support mission requirements of collecting data from certain types of launch and flight scenarios using LPMs. Such flight tests are needed to fully validate system design and operational effectiveness of terminal segment defensive missiles and other defense systems utilized by the various services in the DoD. The resulting data will validate the models used to develop missile defense algorithms.

1.5 DECISION TO BE MADE



The MDTJPO is the proponent of this action. The Director, Missile Defense Agency (formerly known as the Ballistic Missile Defense Organization), will decide whether to proceed with the proposed site preparation and launch activities based on the findings of this EA.

1.6 RELATED DOCUMENTATION

As cited below, previous NEPA documentation prepared for related programs includes the *Theater Missile Defense Extended Test Range Environmental Impact Statement*, which analyzed the impacts of launching target missiles from ships located in the Pacific Ocean and interceptor missiles launched from various launch sites on Vandenberg AFB and the associated Western Range Test Area; and the *Theater Ballistic Missile Targets Programmatic Environmental Assessment* (U.S. Department of the Air Force, 1997), which evaluated an expansion of the missile launch capability at Vandenberg AFB. The



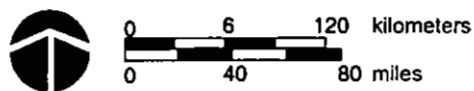
EXPLANATION

-  Test Range Area
-  Air Traffic Corridors

Western Range Area Location

Air Traffic Corridors,
Vandenberg Air Force Base

Figure 1-2



programmatic EA evaluated launching up to 30 solid and liquid fueled missiles per year from various existing launch sites on Vandenberg AFB in support of future U.S. Army, U.S. Navy, and U.S. Air Force operations in the Western Range. Approximately 20 missile launches are estimated for fiscal year 2002 based on ballistic test requirements.

U.S. Army Space and Strategic Defense Command, 1994. *Theater Missile Defense Extended Test Range Final Environmental Impact Statement*, January.

U.S. Department of the Air Force, 1997. *Theater Ballistic Missile Targets Programmatic Environmental Assessment, Vandenberg Air Force Base, California*, December.

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2.0

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

MDTJPO proposes to conduct flight tests using two LPMs launched from a new ground surface site at Vandenberg AFB. These tests would also consist of associated pre-flight preparation and post-flight activities such as transportation of the missile and liquid propellant to and storage at Vandenberg AFB, launch and support site preparation, missile fueling, waste disposal, and site restoration. These LPMs would be flight tested to gather information, and no intercept attempts would be made. A description of the proposed flight test activities is provided in the following sections.

As stated previously, mission requirements for the proposed tests dictate that the missiles launch from a ground surface (sand/dirt) launch area, not from a concrete pad, and that there be no infrastructure within approximately 300 meters (984 feet) of the launch site. These requirements effectively eliminated the possibility of using launch sites identified and analyzed in the 1997 Programmatic EA for the proposed flight tests, and a new candidate location was then later identified through siting analysis. Other candidate locations originally considered but not further analyzed are discussed in section 2.9.

2.1 MISSILE AND EQUIPMENT DESCRIPTION

2.1.1 LIQUID PROPELLANT MISSILE

The missile proposed for use in the flight tests is a single-stage liquid-fueled ballistic missile with an inertial guidance system and a non-separating payload. The missile is approximately 11 meters (36 feet) long, 0.9 meter (2.9 feet) in diameter, and is composed of a payload section, a guidance and control section, and a propulsion section. The propulsion section consists of the propellant tanks, rocket engine, and associated valves, plumbing, and interface structure. The missile would not carry a live warhead; the payload section would house telemetry and flight termination instrumentation. The maximum range of the missile is approximately 300 kilometers (186 miles), and the missile combusts a liquid propellant consisting of a main fuel, an oxidizer, and an initiator fuel (table 2-1). The oxidizer is hypergolic with the initiator fuel, and exothermically reacts with the main fuel requiring a shock to combust. This missile was described and analyzed in the 1997 Programmatic EA.

The main fuel for the missile is coal tar distillate. For the two proposed launches, approximately 1,135 liters (300 gallons) of main fuel would be required per launch, or 2,270 liters (600 gallons) total. Approximately 1,893 liters (500 gallons) of the oxidizer, inhibited red fuming nitric acid, would be required per launch, or 3,785 liters (1,000 gallons) total. Also, approximately 38 liters (10 gallons) of initiator fuel would be used during each launch. All hazardous materials would be handled and stored in accordance

with applicable Vandenberg AFB and state regulations, as well as the chemical Material Safety Data Sheets (appendix C). The chemical Material Safety Data Sheets (appendix C) provide the characteristics of the main fuel, oxidizer, and initiator fuel.

Table 2-1: Liquid Propellant Constituents

Propellant Component	Ingredients	Percent by Weight
Main Fuel	Coal Tar Distillate	100
Oxidizer	Inhibited Red Fuming Nitric Acid	100
Initiator Fuel	Triethylamine	50
	Dimethylanilines	50

Other chemicals, such as ethyl alcohol, isopropyl alcohol, and liquid and gaseous nitrogen would be used for equipment cleaning and sensor cooling. The Vandenberg AFB rag exchange program would be utilized to reduce the amount of waste generated from solvent usage. The Vandenberg AFB Hazardous Materials Pharmacy would supply the needed chemicals. These materials are routinely used at Vandenberg AFB in ongoing operations.

The LPM also possesses a flight termination system. The flight termination system provides Range Safety personnel with the capability to terminate thrust during the powered flight by initiating the propellant shut-off system of the missile. A flight termination command could be issued by the Range Safety Officer under certain conditions, such as violation of established range safety boundaries, loss of real-time missile position data from on-board navigation units, or unstable or erratic flight. The estimated time between receipt of this command and thrust termination is 400 milliseconds.

2.1.2 SUPPORTING EQUIPMENT

Some equipment associated with the LPM proposed for launch would be transported to the range for the LPM flight tests. This equipment is described below.

2.1.2.1 Mobile Launcher

The Mobile Launcher is a wheeled vehicle used to launch the missile. Powered by a 525-horsepower diesel engine, it has a maximum road speed of about 30 to 40 kilometers per hour (19 to 25 miles per hour). The Mobile Launcher powers a hydraulic pump used to erect the missile from a horizontal to a vertical position for launch. It also contains an electrical generator that would supply power to the fire control electronics.

2.1.2.2 Pad Equipment Shelter

The Pad Equipment Shelter is a truck-mounted equipment enclosure. It would serve as the electrical interface between the Mobile Launcher and the Launch Control Van, and would be supplied with 120-volt single-phase alternating current (AC) as well as 208-volt, 3-

phase AC. The Pad Equipment Shelter would be used to relay signals from the missile and the Mobile Launcher (via fiber optic cable) and send commands to the missile and the Mobile Launcher from the Launch Control Van. During launch, the unmanned Pad Equipment Shelter would be located in the launch area approximately 38 meters (125 feet) from the Mobile Launcher.

2.1.2.3 Launch Control Van

The Launch Control Van is a truck-mounted equipment and personnel enclosure, approximately 7.3 meters (24 feet) long and 4 meters (13 feet) high that houses the operations control center. The Launch Control Van contains workstations for the Test and Operations Directors, a telemetry specialist, and a ground safety officer. The Launch Control Van interfaces with the missile and Mobile Launcher via a fiber optic cable to the Pad Equipment Shelter. It is supplied with power like the Pad Equipment Shelter. The Launch Control Van would be positioned outside the immediate launch area during a launch.

2.1.2.4 Propellant Transfer System

The Propellant Transfer System is a pumping system designed to transfer propellants from the shipping containers to the missile. This is a closed-loop system with no release to the atmosphere. It would be located at the propellant loading area for missile fueling activities.

2.1.2.5 Transfer and Fueling Trailer

The Transfer and Fueling Trailer (TAFT) would be used to transport the missile to and from various areas during integration and propellant loading activities, which are necessary during pre-flight build-up. The TAFT includes rotation support cradles, missile-to-TAFT tie-down, TAFT tie-down and hoist point, a front axle assembly with steering ability, and tow bar.

2.1.2.6 Propellant Operation and Staging Trailer

The Propellant Operation and Staging Trailer would be a range-supplied vehicle or mobile trailer, approximately 12 meters (40-feet) in length with shelving and a long workbench which would be used to store personnel protective equipment and emergency response equipment. Such equipment would be used for hazardous operations in the unlikely event of a leak while loading missile propellant. The Propellant Operation and Staging Trailer would be located in the vicinity of hazardous operations during the staging and launch activities.

2.1.2.7 Other Equipment

Other supporting equipment such as a 10.2-metric-ton (10-ton) mobile crane, handling dolly, aeroshell lifting sling, and a missile hoist assembly would also be required during operations. This equipment would be located at the propellant loading area. Vandenberg AFB-permitted portable generators would be used as power sources at test ground

instrumentation sites. All portable generators and tactical equipment would be registered with the 30 CEV Environmental Office.

2.2 MISSILE, EQUIPMENT AND LIQUID PROPELLANT TRANSPORTATION TO VANDENBERG AFB

The LPMs and test and support equipment would be transported to Vandenberg AFB approximately 6 to 8 weeks before launch by over-the-road common carrier truck from U.S. Government storage depots or contractor facilities. Liquid propellants would be transported in U.S. Department of Transportation (DOT) approved containers. Appropriate safety measures would be followed during transportation of the propellants as required by DOT and as described in 49 CFR 171-180. All transportation would be performed in accordance with appropriate DOT approved procedures and routing, as well as Occupational Safety and Health Administration (OSHA) requirements and U.S. Army safety regulations.

2.3 MISSILE AND LIQUID PROPELLANT STORAGE AT VANDENBERG AFB

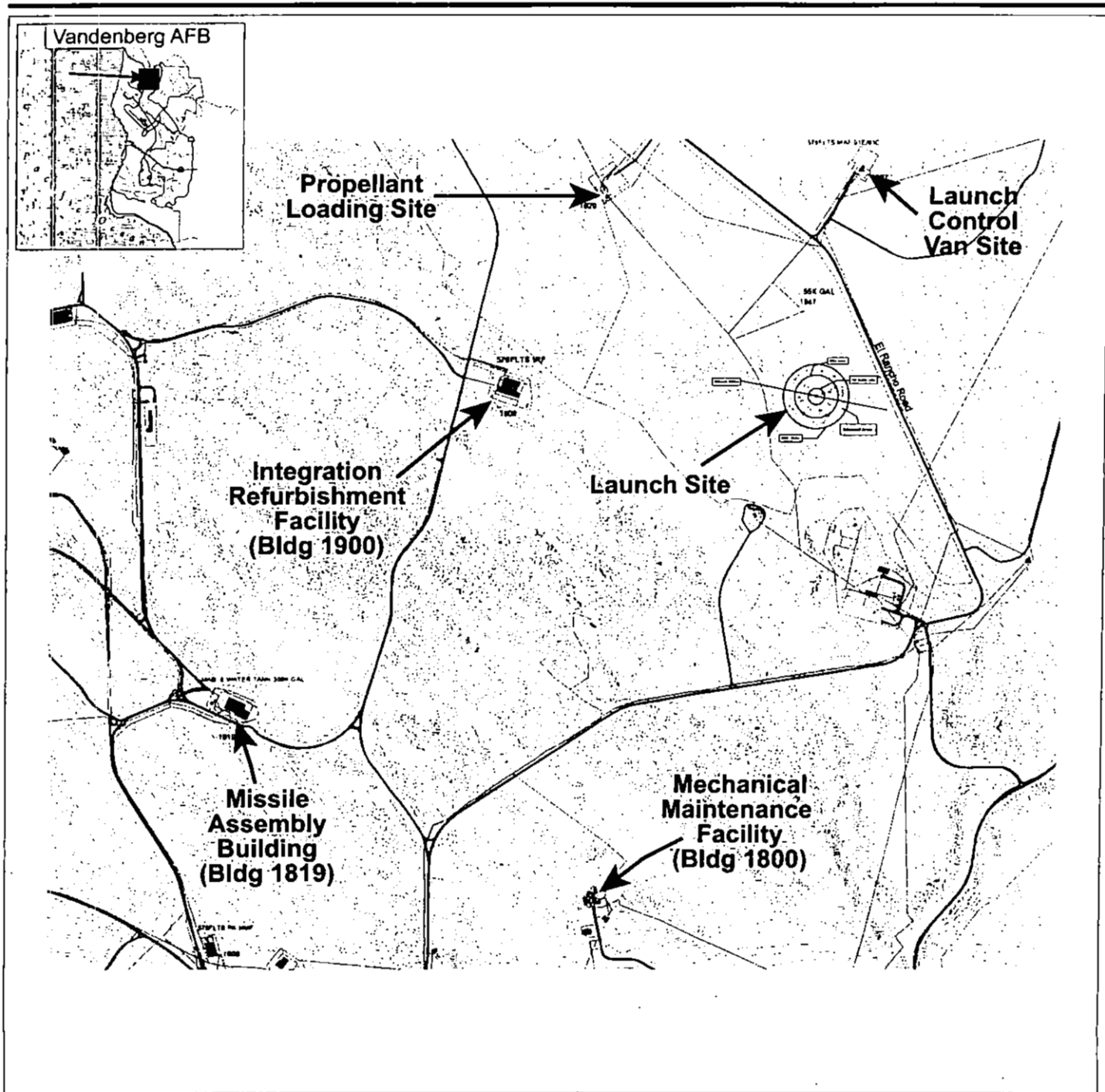
Upon arrival at Vandenberg AFB, the unfueled LPMs and support equipment would be delivered to Buildings 1819 and 1900 for receiving inspections and would then be secured for storage until assembly and launch operations proceed. The missiles and support equipment would undergo system checkout, missile integration, and end-to-end functional testing at Building 1900.

The liquid propellant would be transported directly to the Hypergolic Storage Facility, Buildings 1974 and 1976, for storage until required for operations. The initiator fuel would be stored with the main fuel at the Hypergolic Storage Facility until shortly before launch, at which time it would be transferred at the Propellant Loading Site to a pressurized vessel mounted on the Pad Equipment Shelter.

2.4 LAUNCH AND SUPPORT SITE PREPARATION

2.4.1 PROPOSED LAUNCH SITE

The proposed launch area radius would be approximately 200 meters (656 feet), with the center of the launch circle defined by that radius situated approximately 400 meters (1,312 feet) south of Building 1947 and 300 meters (984 feet) west of El Rancho Road (figure 2-1). The proposed launch area is currently in use as a fenced pasture, which contains livestock; however, the livestock would not be located in the pasture during the project.



EXPLANATION

AFB = Air Force Base

Proposed Facility and Equipment Sites



Unknown Scale

Figure 2-1

A 200-meter (656-foot) radius area about the selected launch point is to be closely mowed. Within 150 meters (492 feet) of the launch point, the site would be graded by scraping approximately 5 to 8 centimeters (2 to 3 inches), but no more than 30 centimeters (12 inches), of topsoil to remove all debris and to expose a pure sand/dirt ground base surface.

The middle region, approximately 60 meters (197 feet) from the launch point, would be packed down and rolled to a semi-flat ground surface. A portion of the innermost 30-meter (98-foot) radius area would be leveled to within two degrees to position the Mobile Launcher. It is anticipated that no more than a total of approximately 7.3 hectares (18 acres) could be disturbed at the launch area for the project. Any scraped dirt not being used would be moved to the western side of the site. Water would be used periodically for dust suppression until the site is revegetated.

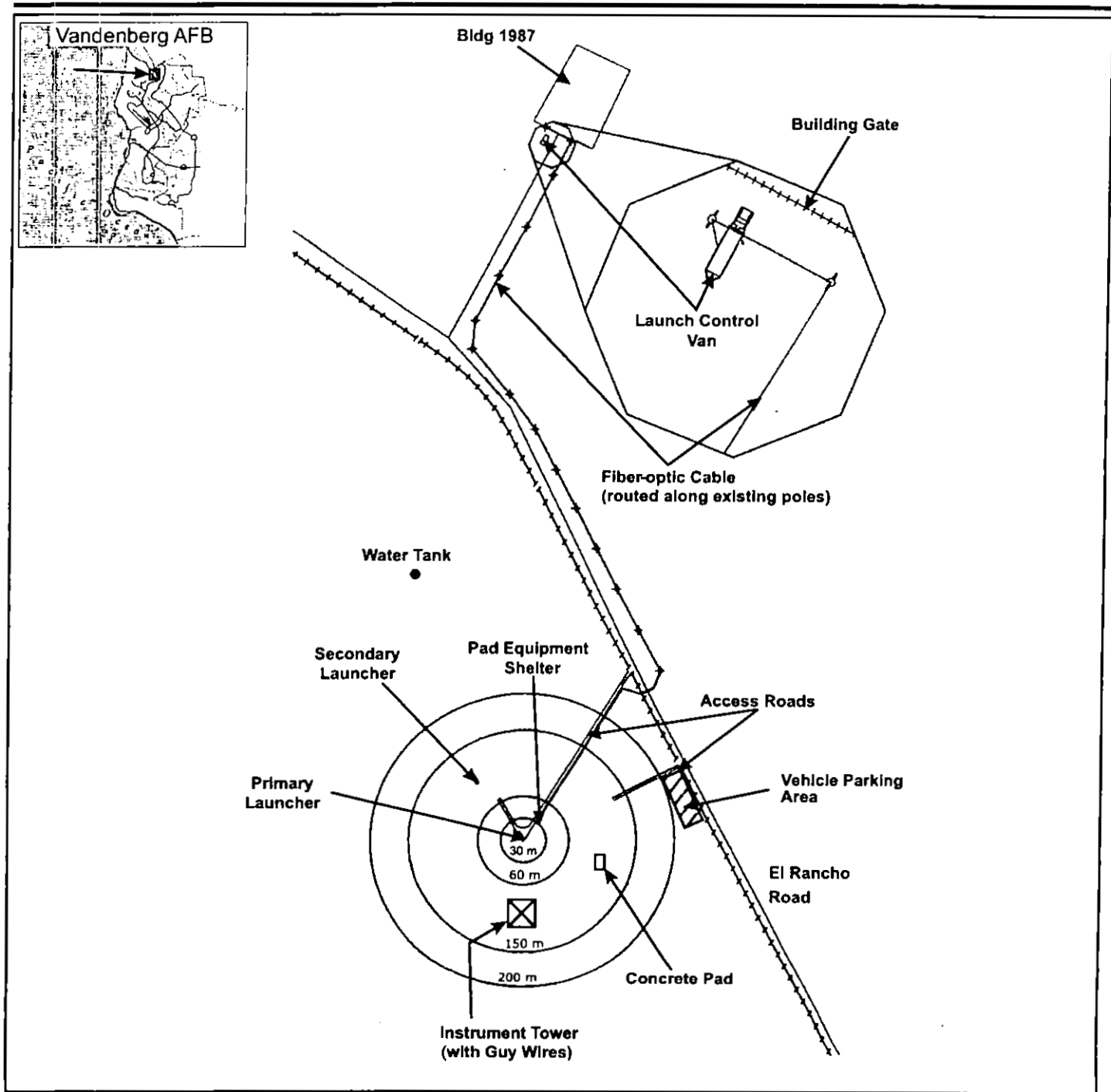
Two paths, 5 to 7 meters (16 to 23 feet) wide, of Vandenberg AFB shale would be laid on top of the exposed sand/dirt surface layer to serve as vehicle entry points (off the existing paved road) to the launch site. The shale would aid in vehicle path compaction and dust suppression, and would be removed from the launch area once the project is complete. A vehicle "parking area," approximately 700 square meters (7,500 square feet), prepared by mowing (and shale, if recommended by range), would be located just inside one of the launch area entry points. The shale would be removed from the launch site once the project is complete as part of the restoration process. A second Mobile Launcher would be located approximately 100 meters (328 feet) from the launch point. This secondary launcher would serve as a reference vehicle only and would not have a missile on it. A Stormwater Pollution Prevention Plan would be developed for the site to satisfy the requirements of the National Pollutant Discharge Elimination System.

Range-supplied portable generators would be used to supply all necessary power to the launch area for test operations. All electrical and fiber optic cables outside the launch radius would be placed on the ground surface, in cable trays, or routed through existing culverts and along existing electricity poles. No trenching would be required beyond the launch area. Portable floodlights with permitted portable generators would be required at the launch site for the night test. Several other minor construction projects would also be performed to ready the launch area. Two pre-fabricated locking entrance gates, approximately 1.5 x 5 meters (5 x 16 feet), would be installed in existing fencing as entry points to the launch site area.

2.4.2 GROUND SITE SUPPORT

2.4.2.1 Launch Area Towers

One temporary 25-meter (82-foot) tower and a separate concrete slab would be installed at locations approximately 100 meters (328 feet) from the launch point to accommodate mounting of various instruments and lighting. A 1.8- x 2.4-meter (6- x 8-foot) concrete foundation would be poured to support the tower frame structure and the standalone slab would be 3.0 x 3.0 x 0.1 meters (10 feet x 10 feet x 4 inches). All fixtures and mounting would be placed on or attached to the concrete foundations. Figure 2-2 depicts the proposed launch site layout and the fiber-optic route to the Launch Control Van.



EXPLANATION

AFB = Air Force Base

Representative Launch Site Layout

Vandenberg Air Force Base

Figure 2-2



Not to Scale

07-09-02 Rep Launch Layout

LPM Site Preparation and Launch EA

2.4.2.2 Optic Sites

Three existing optical support sites would also be used to collect data during the flight tests. These sites include Optical Sites 54 and 81 and an area off Tangair Road near the airfield along the road to Facility 1583. A standard mobile optical tracking mount (supplied by Vandenberg AFB), as routinely deployed on the range to collect engineering film and video, would be stationed on existing concrete pads and paved areas at site 54 and the Tangair Road site during the proposed test flights. The Tangair Road site does not have an existing concrete pad, and may require some minor roadside grading and filling to level the area. Portable 3.0- x 4.3-meter (10- x 14-foot) work centers would be located at each optic site to house computer equipment. There would be two work centers at the Tangair Site, one at Optical Site 54, and two at Optical Site 81. Vandenberg AFB would provide permitted portable generators to meet electricity requirements at each optical site.

2.4.2.3 Administration Offices

A temporary lab trailer would be placed next to Building 1755 (Helicopter Hangar) to provide office space for program personnel close to flight line activities. Four more trailers would also be stationed about a block further down the street in an existing parking area. The trailers would be approximately 3.7 x 18.3 meters (12 x 60 feet) in size, and would be configured with electrical and telephone service by Vandenberg AFB. Administrative offices will not require water and sewer hookup. Lavatories in the administrative trailers will have containing tanks that will be serviced along with other portable toilets on the base. It is anticipated that a potential maximum of 100 people would be located at Vandenberg AFB for up to 90 days to conduct the flight tests. Program personnel would be housed in area hotels throughout the missions.

2.4.2.4 Boresights

Instrumentation at the optics sites would utilize calibration and boresight "targets" (light and heat elements that emit a specific, known radiant intensity in a specific infrared waveband) to accomplish optical alignment and measurement calibration. These boresight targets would be on user-provided tripods and will, in three cases, require precisely-placed 1.5-meter x 1.5-meter x 7.6-centimeter (5-foot x 5-foot x 3-inch) concrete slabs for stabilization and 3 meters (10 feet) of clearing around the slabs for fire hazard mitigation. Two of these concrete pads would be on Avery Road, a dirt road in the southern portion of the base that is already cleared and used by the fire department for fire protection. The third boresight target concrete pad would be between the runways at the airfield. A slab form would be placed on top of the ground, without any grading, and the concrete poured. The fourth target would be located on an area of the airfield that is already paved. Minimal additional clearing is anticipated by the Vandenberg AFB Safety and Environmental Office. Upon completion of the target launch operations, the concrete would be broken and removed.

2.5 PROPELLANT LOADING

Once functional testing is completed in Building 1900, the missile would be transported on the TAFT from the storage areas to the propellant loading site (Building 1920) for propellant loading operations. This site is located approximately 1.6 kilometers (1 mile) north of the launch site. The site has water, communication, and electricity infrastructure available, but would need some additional minor modifications in order to accommodate the TAFT, Mobile Launcher, and other equipment used during propellant loading. The area is fenced with a locking entry gate for controlled access, and it has an existing 18- x 24-meter (60- x 80-foot) concrete pad. Some additional concrete would be required on the pad to level it to a natural slope, and concrete lips would be added around three sides of the fueling area to contain any spilled propellant. A concrete berm would also be placed down the center of the fueling area to form two fueling lanes; i.e., the TAFT would be positioned on one side for the oxidizer loading; then the TAFT would be positioned on the other side for the main fuel loading. The gradient and containment lips would ensure that no spilled propellant could reach the ground surface. The 30th Civil Engineering Squadron Engineer Flight would perform a site inspection prior to propellant loading.

The propellant loading site would also require some fill and compacted local shale to build up the roadway and level out areas to allow for equipment transportation. Instead of reconnecting electricity to the site, Vandenberg AFB would supply generator power as well as water service to the site. Floodlights would be installed for security lighting, and several portable environmental shelters would be placed on the existing concrete pad to protect the equipment from inclement weather. The propellant loading area would also have eyewash and decontamination stations, as well as fuel and oxidizer container storage areas to store the propellant drums at the site during loading operations. Empty bulk liquid propellant containers would be available for use in the event that the missile must be de-fueled.

The propellants would be transported from the Hypergolic Storage Facility to the propellant loading area 1 day prior to fueling operations. The launch contractor would load one propellant component per day about 4 to 6 days before the scheduled launch (e.g., oxidizer loaded one day; main fuel loaded the next, etc). All propellant-loading equipment would be leak-checked before use, and equipment and operations would be monitored for leaks during loading operations to ensure there is no release to the atmosphere.

The Propellant Operation and Staging Trailer would be available at the site for emergency response and decontamination of equipment in the event of a mishap. The launch contractor would be responsible for the first response and would assist Vandenberg AFB personnel with any required cleanup activities as requested. All personnel involved in the propellant loading operations would wear appropriate personal protective equipment, such as respirators, safety glasses or face shields, and protective outer garments, and would receive specialized training in liquid propellant handling, spill containment, and cleanup procedures prior to beginning operations.

When the main fuel and oxidizer have been loaded into the missile, the TAFT would be positioned under the 10.2-metric-ton (10-ton) crane at the propellant loading site. The crane would lift the missile; the TAFT would be removed from underneath the hoisted missile; then the Mobile Launcher would be positioned underneath the missile. The missile would be lowered onto the Mobile Launcher, which would then proceed to the launch area. All propellant loading procedures would be reviewed and approved by Vandenberg AFB Safety Office prior to any operations.

2.6 FLIGHT TEST ACTIVITIES

Once the missile has arrived at the launch site and system checkouts have been performed, approximately 38 liters (10 gallons) of initiator fuel would be transferred into the missile by remote commands at the Launch Control Van approximately 15 minutes before the scheduled launch. The two Mobile Launchers (one for launching the LPM and one as a reference vehicle) would be located at the launch site because of mission requirements. Absorbent materials would be used to capture any potential leaks or spills from the Mobile Launcher. This material would be removed before launch. The launch contractor would be responsible for the first response and would assist Vandenberg AFB personnel with any required cleanup activities as requested. Any such leak or spill would be cleaned up in accordance with applicable Vandenberg AFB regulations.

During flight, the missile would follow a pre-programmed trajectory (reviewed and approved by Vandenberg AFB Range Safety Division) in a westerly direction and would then fall into the broad ocean area approximately 300 kilometers (186 miles) off the coast of Vandenberg. The maximum duration of the powered flight would be approximately 60 seconds. The inert missile payload would not separate during flight. It is anticipated that approximately 208 liters (55 gallons) of propellant would remain in the missile at the end of the flight. There are currently no plans to recover the LPMs after flight testing.

A soil sample would be taken before and after launches, prior to site restoration, in the vicinity of the Mobile Launcher to ensure the soil is not contaminated from launch activities. Although the level of noise for this missile during launch and flight is expected to be small and relatively short in duration, noise monitoring would be performed for the first launch in compliance with the *Final Threatened/Endangered Species Monitoring Plan for the Theater Ballistic Missile Targets Program* (Vandenberg Air Force Base, 1999).

An explosive safety quantity-distance (ESQD) estimated to be 381 meters (1,250 feet) would be established around the launch site. All hazardous debris resulting from a missile failure on the pad would be contained within the ESQD. During all launch activities, provisions would be made in accordance with Eastern and Western Range 127-1, *Range Safety Requirements*, to maintain a stand-by emergency response team (consisting of fire-fighting, safety, medical, and bioenvironmental engineering personnel) near the launch site to ensure immediate response and rapid control in the event of an accident.

A launch hazard area (LHA), from which non-essential personnel would be excluded during launch activities, would be established around the launch site by the Range Flight Safety Division. The LHA is calculated to contain missile debris in the event of a missile termination shortly after launch. Personnel within the LHA would be protected within or behind impervious structures.

Termination of a flight after it has left the launch pad would occur in the event of an off-course flight. The flight termination system would be activated, terminating the flight's vehicle thrust, and the intact missile would then follow a ballistic trajectory, approved by Range Flight Safety, and impact within the flight corridor. Areas such as shipping lanes and air routes would be verified clear in accordance with existing Vandenberg AFB standard operating procedures.

2.7 POST-FLIGHT ACTIVITIES

After the target is launched, the Mobile Launcher would be driven to the wash-down area at Building 1800, the Missile Maintenance Facility. The Mobile Launcher would be washed down to remove missile blast residue, and the collected wastewater would be tested for proper disposal. Approximately 1,893 liters (500 gallons) of wastewater would be generated for each launch. The Mobile Launcher would then be driven to Building 1900 for refurbishment and then driven back to the propellant loading area in preparation for the second launch.

Once the mission is completed, all empty drums remaining from the propellant loading operations would be returned to the Hypergolic Storage Facility for storage and then shipped back to the supplier. The propellant loading system would be flushed and cleaned using a closed loop system while on the concrete pad at the propellant loading site. The oxidizer loading system would be flushed with water, and the main and starter fuel loading systems would each be flushed with ethyl alcohol using a closed loop system. It is currently anticipated that approximately 8,328 liters (2,200 gallons) of oxidizer rinse solution and approximately 2,915 liters (770 gallons) of main fuel and initiator fuel alcohol rinse solutions (combined) would be collected for each missile fueled. The waste fuel and oxidizer solutions would be collected in empty drums and disposed of according to Vandenberg AFB *Hazardous Waste Management Plan* regulations, as described in section 3.4.

Other hazardous wastes that could be generated from launch activities include cleaning solvents. Any unused hazardous materials remaining after the mission would be returned to the Vandenberg Hazardous Materials Pharmacy, the chemical manufacturer, or the supplier. Any hazardous wastes generated would be disposed of in accordance with applicable Vandenberg AFB *Hazardous Waste Management Plan* regulations, as described in section 3.4. The proposed LPM flight tests would generate wastes similar to others generated during ongoing operations at Vandenberg AFB.

After the mission is complete and soil samples determine that the soil is not contaminated from launch activities, the launch area would be restored to its original condition by

redistributing the soil collected from preparing the launch area. This soil would contain original seed to help rejuvenate the vegetation and restore the area to its original condition. All temporary structures such as concrete footings, equipment towers, fiber optics/communication cabling, and shale would be removed from the launch site and fueling site upon the completion of the Proposed Action unless directed otherwise by Vandenberg AFB.

2.8 NO-ACTION ALTERNATIVE

Under the No-action Alternative, MDTJPO would not proceed with LPM launches from a new ground surface launch area. Selection of this alternative would not allow the collection of important flight test data as defined in the mission requirements. Other ongoing activities at Vandenberg AFB would continue.

2.9 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

Several other candidate site locations were initially considered for the LPM flight tests but were eliminated from further consideration because of various constraints.

White Sands Missile Range

Flight distance and scheduling requirements eliminated White Sands Missile Range from consideration for the LPM flight tests. White Sands Missile Range is unable to provide the distance needed to safely demonstrate the full range the LPM requires as part of the mission.

Wake Island Launch Center

While the launch of LPMs at Wake Island Launch Center was previously analyzed in the *Wake Island Launch Center Supplemental Environmental Assessment* (U.S. Army Space and Missile Defense Command, 1999), the required 300-meter (984-foot) clear zone around the launch area could not be accommodated. Additionally, costs to transport and perform the flight tests at Wake Island Launch Center would be too prohibitive for the available program funding.

Space Launch Complex-5, Vandenberg AFB

Space Launch Complex-5 was initially considered for the LPM flight tests; however, at this location the 300-meter (984-foot) clear zone program requirement could not be accommodated.

Other Areas on Vandenberg AFB

Other areas on Vandenberg AFB were considered, but the Environmental Office recommended against their use due to mission constraints and the proximity of protected sites, coastal zones, archaeological resources, and other environmental constraints.

3.0
AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

This section describes the environmental characteristics that may be affected by the Proposed Action at Vandenberg AFB. To provide a baseline point of reference for understanding any potential impacts, the affected environment is concisely described; any components of greater concern are described in greater detail. The EA evaluates the potential environmental effects of activities associated with preparing a new ground surface launch area at a location on Vandenberg AFB for launching two LPMs. The EA also evaluates related activities, such as safety issues associated with the transport, handling, and storage of liquid propellant and missile fueling, which could have potential impacts on public health and safety or the environment. The EA will summarize the analyses in existing related NEPA documents as appropriate for launch impacts.

Available reference materials, including EAs, Environmental Impact Statements, and base master plans, were reviewed. Questions were directed to installation and facility personnel, and private contractors. Site visits were also conducted to gather the baseline data presented below.

Environmental Resources

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

No new impacts to airspace are anticipated as a result of the proposed activities. Noise generated during preparation of the launch site and support facilities would be temporary and similar to other site preparation noise levels on Vandenberg AFB. No impacts to personnel or the public are anticipated. The sites proposed for use were selected to avoid cultural resources. Existing infrastructure would be used, and no change is anticipated to the visual and aesthetic environment of the proposed locations. Personnel would be drawn from the existing workforce, with minimal beneficial impacts to socioeconomics in the affected regions.

The Proposed Action has the potential to result in impacts to seven of these resource areas: air quality, biological resources (includes noise impacts, geology and soils, hazardous materials and waste, health and safety, land use, and water resources. These resources are discussed below. Environmental justice impacts are discussed in section 4.9.

Environmental Setting

Vandenberg AFB is located in Santa Barbara County, California, approximately 88 kilometers (55 miles) north of Santa Barbara. The cities nearest to the base are Lompoc, 11 kilometers (7 miles) southeast, and Santa Maria, 27 kilometers (17 miles) northeast. The 399-square-kilometer (154-square-mile) base covers more than 396,606 hectares (98,000 acres) along 56 kilometers (35 miles) of undeveloped Pacific coastline. Vandenberg AFB's climate is Mediterranean, or dry summer subtropical.

3.1 AIR QUALITY

Air quality in a given location is described by the concentrations of various pollutants in the atmosphere, expressed in units of parts per million, or micrograms per cubic meter. Pollutant concentrations are determined by the type and amount of pollutants emitted into the atmosphere; the physical characteristics of the air basin, including size and topography; and meteorological conditions related to prevailing climate. The significance of a pollutant concentration is determined by comparison with National Ambient Air Quality Standards (NAAQS) and local ambient air standards that establish limits on the maximum allowable concentrations of various pollutants to protect public health and welfare.

Region of Influence

For inert pollutants (all pollutants other than ozone and its precursors, nitrogen oxide and reactive organic compounds), the region of influence (ROI) is generally limited to an area extending no more than a few tens of miles downwind from the source. For the launch site preparation air quality analysis, the ROI for project operational activities is a circular area with a radius of only several hundred feet centered on the site of activity. The ROI for missile launches encompasses the air basin surrounding Vandenberg AFB.

Affected Environment

An air basin is an area within a state, often comprising several counties, which has been designated as such by the California Air Resources Board based upon similar meteorological and geographic conditions. Vandenberg AFB is located in the South Central Coast Air Basin, which consists of San Luis Obispo, Santa Barbara, and Ventura counties (State of California Air Resources Board, 2000). With respect to air quality, Santa Barbara County is divided into North County and South County. Vandenberg AFB is located within North County (U.S. Department of the Air Force, 1995).

The State of California has adopted ambient air quality standards that either meet or exceed the NAAQS. The California Ambient Air Quality Standards are more strict than the NAAQS for ozone, carbon monoxide, sulfur dioxide, particulate matter less than 10 microns in diameter (PM-10), and lead. In addition to the six criteria pollutants covered by the NAAQS, California Ambient Air Quality Standards also contain standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility.

According to U.S. Environmental Protection Agency (EPA) guidelines, areas with air quality surpassing the NAAQS are designated as being in attainment; areas with a lesser air quality are classified as non-attainment areas. Santa Barbara County is in attainment for all federal standards except ozone and in state non-attainment for both ozone and PM-10. (Santa Barbara County Air Pollution Control District, 2000a,b) The Santa Barbara County Air Pollution Control District (SBCAPCD) is currently seeking redesignation from the California Air Resources Board and EPA as being in attainment for federal ozone standards (Fredrickson, 2001).

The SBCAPCD administers regulations for non-vehicular air pollution sources, and is required to monitor air pollutant levels to ensure federal and state ambient air quality standards are met or develop a plan to meet them. (Air Force Center for Environmental Excellence, 1999) The California Air Resources Board and local air pollution control districts such as SBCAPCD operate more than 200 air monitoring stations in California (State of California Air Resources Board, 2000). Vandenberg AFB has one Prevention of Significant Deterioration station, located on South Vandenberg AFB near the Power Plant (Vandenberg Air Force Base, 2002b).

The 1994 Vandenberg AFB emissions inventory results showed that missile launch emissions accounted for less than 1 percent of the total of PM-10 and 2.3 percent of the total of carbon monoxide. Since 1991, all new stationary sources of emissions (and modifications) at Vandenberg AFB have applied best available current technology and offset emissions at a 1.2 to 1.0 ratio. Therefore, current emissions at Vandenberg AFB, at least for stationary sources, are likely to be similar to or less than the 1994 emissions inventory. (U.S. Department of the Air Force, 1997)

3.2 BIOLOGICAL RESOURCES

The Natural Resources section of the 30th Civil Engineering Squadron/Environmental Management (30 CES/CEVPN) provides review and oversight for natural resource issues pertaining to base programs and projects. Responsibilities include rare species inventories, sensitive habitat protection, maintenance of Geographic Information System databases of rare and listed species, and endangered and threatened species monitoring, management, and protection.

Region of Influence

The ROI for biological resources includes the area within and adjacent to the proposed launch site and propellant loading site on Vandenberg AFB that could potentially be affected by ground disturbance, noise, emissions, and debris as a result of site preparation and launch. The endangered subspecies of *Gaviota tarplant* was not observed during the recent biological survey conducted at the proposed sites in September 2001 (appendix D).

Affected Environment

Vegetation

The proposed launch site is located on the San Antonio Terrace. It is a heavily disturbed area (currently being used for cattle grazing) composed mainly of non-native grassland (dominated by veldt grass) and central coast scrub, which is located in the southwestern portion of the site and dominated by coyote brush and mock heather. To the northeast of the site, approximately 450 meters (1,476 feet) and across Point Sal Road, the grassland grades into oak woodland. (Vandenberg Air Force Base, 2001a)

Kellogg's horkelia (*Horkelia cuneata sericea*) was the only special status plant species found during the recent survey (Vandenberg Air Force Base, 2001a). No other special status plant species were expected to be found at the site. This status applies to species not listed under the Federal Endangered Species Act or the California Endangered Species Act, but which nonetheless are declining at a rate that could result in listing, or historically occurred in low numbers and known threats to their persistence currently exist.

Wildlife

Vandenberg AFB plant communities provide habitat for many resident and migratory animals. The Western fence lizard, garter snake, brush rabbit, deer mouse, common crow, and mule deer are typical examples. Common wildlife species in the area also include pocket gophers, California ground squirrels, rabbit, and badger. Birds such as ring-billed, Heerman's, and glaucous-winged gulls, as well as western wood-pewee, rhinoceros auklets, red-winged blackbird, red-tailed hawk, great horned owl, and golden eagle have also been sighted. (U.S. Department of the Air Force, 1991; 2000)

The loggerhead shrike (*Lanius ludovicianus*), and the western burrowing owl (*Speotyto cunicularia hypugea*) were identified as being present or potentially present in the project area. Both species are listed as special concern species. (Vandenberg Air Force Base, 2001a)

The Magnuson-Stevens Fishery Conservation and Management Act requires that federal agencies consult with the National Marine Fisheries Service on activities that could harm Essential Fish Habitat areas. Essential Fish Habitat includes those waters and substrate (sediment, hard bottom) necessary to the complete life cycle of fish, from spawning to maturity. The east-west boundary for coastal pelagic species (Pacific sardine and mackerel, northern anchovy, jack mackerel, and market squid), groundfish (including species of rockfish, shark, and cod), and highly migratory fish (tunas, marlin, and swordfish) includes all marine and estuary waters from the coast of California to the limits of the Exclusive Economic Zone (the 322-kilometer [200-mile] limit) where the United States has exclusive authority over fishing management. Saltwater species commonly taken off the coast of Vandenberg AFB include surf perch, cabezon, kelp bass, rockfish, and abalone. Fishing regulations are enforced by Vandenberg AFB security police game wardens.

Marine mammals that are known or expected to occur on or around the Vandenberg AFB coastline include pinnipeds (seals and sea lions) and cetaceans (whales and dolphins).

California sea lions, Pacific harbor seals, northern fur seals, and elephant seals are located within the ROI. Pinniped haulout sites are concentrated near Purisima Point, primarily Pacific harbor seals, and the area surrounding Point Sal, primarily California sea lions (figure 1-1). Northern fur seals do not regularly haul out on Vandenberg AFB. (U.S. Department of the Air Force, 1999)

Individuals and small groups of gray whales are frequently seen inshore during the spring and fall. In addition, harbor porpoises may be found within 24 kilometers (15 miles) of the coast. Most other cetaceans remain further offshore.

Threatened and Endangered Species

Vandenberg AFB's diverse habitats support a wide variety of listed species. Those with the potential to occur within the ROI are shown in table 3-1.

Table 3-1: Listed Species Known or Expected to Occur in the ROI

Scientific Name	Common Name	Status	
		State	Federal
Fish			
<i>Eucyclogobius newberryi</i>	Tidewater goby	E	E
<i>Gasterosteus aculeatus williamsoni</i>	Unarmored threespine stickleback	E	E
Amphibians			
<i>Rana aurora draytoni</i>	California red-legged frog	CSC	T
Birds			
<i>Brachyramphus marmoratus</i>	Marbled murrelet	E	T
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	CSC	T
<i>Pelecanus occidentalis californicus</i>	California brown pelican	E	E
<i>Sterna antillarum browni</i>	California least tern	E	E
Mammals			
<i>Enhydra lutris nereis</i>	Southern sea otter	T	T
Plants			
<i>Eriodictyon capitatum</i>	Lompoc yerba santa	R	E
<i>Hemizonia increscens ssp. villosa</i>	Gaviota tarplant	E	E

Source: California Polytechnic State University, Biological Sciences Department, 1995; Chapman, 1996; Christopher, 1995; Vandenberg Air Force Base, 1996; U.S. Fish and Wildlife Service, 2001.

NOTES:

CSC	California Species of Concern	R	Rare
E	Endangered	T	Threatened

Status Definition

California Species of Concern—Native species or subspecies that have become vulnerable to extinction because of declining population levels, limited ranges, or rarity. The goal is to prevent these from becoming endangered by addressing the issues of concern early enough to secure long-term viability.

The four known locations of Lompoc yerba santa (*Eriodictyon capitatum*), a federal endangered plant species, occur in western Santa Barbara County. Two of these locations, composed of three groups, are on Vandenberg AFB, approximately 8 kilometers (5 miles) south of the launch site. This plant is associated with the central maritime chaparral and bishop pine forest, which are threatened habitat types with limited distribution. (U.S. Environmental Protection Agency, 2001)

The U.S. Fish and Wildlife Service has listed the Gaviota tarplant (*Hemizonia increscens* ssp. *Villosa*) as endangered. It occurs within a narrow band of coastal terrace grassland between Gaviota and Santa Barbara (U.S. Environmental Protection Agency, 2001), southeast of Optical Site 81. It has been identified as occurring in two locations on the Vandenberg AFB, one near Lion's Head, northwest of the proposed launch area, and one near Space Launch Complex-6 in the southern portion of the base. (Vandenberg Air Force Base, 2002b)

The tidewater goby (*Eucyclogobius newberryi*), a federal and California Department of Game and Fish endangered species, occurs in Shuman Canyon Creek, which is approximately 3 kilometers (2 miles) north of the project area. San Antonio Creek, located approximately 4 kilometers (2.5 miles) south of the proposed launch site, is one of the largest streams on base. Several freshwater marshes have been recorded along the San Antonio that, along with the creek itself and the lagoon at its mouth, are frequented by both common and rare Vandenberg species (U.S. Department of the Air Force, 1991); the unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*), a federal and state endangered fish, the endangered tidewater goby, and the California red-legged frog (*Rana aurora*), listed as threatened under the Endangered Species Act.

San Antonio Creek, and to a lesser extent Shuman Canyon Creek, offer foraging areas for the state and federally listed endangered California least tern (*Sterna antillarum brownii*). These seabirds preferentially forage in near-shore and coastal areas that have adequate supplies of prey fish (U.S. Department of the Air Force, 1992). Historically, least terns have nested at the Santa Ynez River mouth and at a few locations between Purisima Point and San Antonio Creek; however, the only nesting in recent years has been at Purisima Point (Vandenberg Air Force Base, 2002b).

The California brown pelican (*Pelecanus occidentalis californicus*), a federal and state endangered subspecies, and the western snowy plover (*Charadrius alexandrinus nivosus*), a federal threatened shorebird, are commonly observed in the Vandenberg AFB area, which provides winter roosting for the former and nesting and roosting sites for the latter (U.S. Department of the Air Force, 1991). The pelicans roost at Point Sal, northwest of the proposed launch site and nesting plovers are located in coastal areas south of the proposed launch site. Brown pelicans also occasionally roost at the mouths of Shuman and San Antonio creeks as well as at Point Sal and Purisima Point (Vandenberg Air Force Base, 2002b). California brown pelicans and western snowy plovers are also known to utilize areas within the vicinity, particularly Purisima Point. Snowy plovers nest northwest, west and southwest of the proposed launch site (Vandenberg Air Force Base, 2002b). According to the "Checklist of Birds on Vandenberg AFB," the marbled murrelet

(Brachyramphus marmoratus) is a rare to very rare visitor to the base (Department of Defense and La Purisima Audubon Society, no date).

The federally and state threatened southern sea otter (*Enhydra lutris nereis*) has been observed off the entire length of Vandenberg AFB's shoreline. Currently the only known resident colony is off Purisima Point. (Vandenberg Air Force Base, 2002b)

Environmentally Sensitive Habitat

The installation envelops one of the major southern California dune systems, with areas still resembling their original condition, and occupies one of the state's six remaining coastal dune systems. Extensive central foredunes and coastal dune scrub are located on the North Vandenberg coast (U.S. Department of the Air Force, 1991).

3.3 GEOLOGY AND SOILS

Region of Influence

The ROI for impacts to geology and soils includes the areas that could be potentially disturbed by the Proposed Action.

Affected Environment

Geology

Vandenberg AFB is located in the Santa Maria Basin, which is bounded on the northeast by the San Raphael Mountains of the Southern Coast Ranges, on the south by the Santa Ynez Mountains of the Western Transverse Ranges, and on the west by the Pacific Ocean. North of the Santa Ynez river, the Southern Coast Ranges are composed of northwest-southeast trending faults and folds of the earth's crust that appear as elongated valleys and ranges on the surface. South of the Santa Ynez River, the Western Transverse Ranges are composed of east-west trending valleys and ranges. Major features on the base include the Casmalia and Purisima Hills, San Antonio Terrace, Barka Slough, Lompoc Valley, Burton Mesa, and beaches, rocky headlands, and points. (U.S. Department of the Air Force, 2000)

Soils

Soil on Vandenberg AFB is generally shallow, ranging in thickness from 0 to 1 meter (0 to 3 feet). Erosion potential for soils in the ROI ranges from slight to high (very sandy soils). Erosion potential is generally dependent on slope and vegetative cover, with steeper slopes having a higher potential for erosion. (U.S. Army Space and Strategic Defense Command, 1994) Developed slopes are often stabilized to prevent erosion (U.S. Department of the Air Force, 2000). The U.S. Department of Agriculture has not identified any of the soils on Vandenberg AFB as prime farmlands.

3.4 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

Several regulatory agencies (e.g., EPA, OSHA, and DOT) have promulgated differing definitions of a "hazardous material" as applied to a specific situation. Of these definitions, the broadest and most applicable is the definition specified by the DOT for regulation of the transportation of these materials. As defined by the DOT in 49 CFR 171.8, a hazardous material is a substance or material that is capable of posing an unreasonable risk to health, safety, or property when transported in commerce and has been so designated.

Waste materials are defined in 40 CFR 261.2 as any discarded material (i.e., abandoned, recycled, or "inherently waste-like") that is not specifically excluded. This waste can include materials that are solid, liquid, and gaseous (but contained). Hazardous waste is further defined as any solid waste not specifically excluded, which meets specified concentrations of chemical constituents or has certain toxicity, ignitability, corrosivity, or reactivity characteristics.

The State of California has assumed responsibility for regulation of all hazardous waste activities previously regulated by EPA. California has adopted and elaborated the requirements found in the Federal Regulations, which are rewritten in Title 22 of the California Code of Regulations.

Region of Influence

The ROI for potential impacts related to hazardous materials/wastes would be limited to areas of the base to be used for launch activities, footprint of trajectory, prelaunch site preparation, and in areas where liquid propellant would be stored and handled.

Affected Environment

Hazardous Materials Activities

Due to the diversity in missions performed at Vandenberg AFB, a wide variety of hazardous material types and quantities are in use. Their use must conform to federal, DoD, and U.S. Air Force hazardous materials management requirements. Hazardous materials are tracked by EnTrack[®] System personnel within Vandenberg's Logistic Group (Sanchez, 2002). Such materials fall into two basic use categories: materials used in facility maintenance activities and those used in various missile test operations.

The use of all hazardous materials is subject to ongoing inspection by Vandenberg AFB personnel to ensure compliant waste and material handling processes (Sanchez, 2002). The majority of these materials are consumed in operational processes, leaving the remainder to be collected as hazardous waste.

Typical hazardous materials used in base infrastructure support include various cleaning solvents (chlorinated and non-chlorinated), fluids, paints, pesticides, motor fuels, and other petroleum products. These materials arrive at Vandenberg AFB by typical freight delivery routes (truck, rail, air), after which they may be issued to individual users through the

facility supply system (Hazardous Materials Pharmacy). These users provide storage of all materials in accordance with established procedures applicable to individual operations.

Range testing operations, such as missile launches, also employ a wide variety of hazardous materials. Cleaning solvents (chlorinated and non-chlorinated), chlorinated fluorocarbons, various painting compounds, explosive materials, oxidizers, and propellants are typical examples, though their types and quantities vary depending upon specific system and test-configuration requirements. Hazardous materials used in conjunction with these programs are brought on base by the agency responsible for testing the individual systems. Each agency utilizing Vandenberg AFB is responsible for procurement, distribution, and management of its hazardous materials, which must conform to the requirements of Vandenberg AFB *Hazardous Material Management Plan*. The Missile Defense Agency would be responsible for the shipment and distribution of hazardous materials to Vandenberg AFB. Vandenberg AFB Safety and Environmental offices would be responsible for the receipt and storage of hazardous materials, and the disposal of hazardous waste.

Prior to each launch or space booster fueling operation, the Vandenberg AFB Safety Office computes a toxic hazard corridor to ensure surrounding communities are not at risk in the event of an anomaly. Only when meteorological conditions indicate this corridor does not extend off the base is the operation allowed to proceed.

Hazardous Waste Activities

Vandenberg AFB regulations, particularly the *Hazardous Waste Management Plan* (dated 15 November 2000), specify all procedures for packaging, handling, transporting, and disposing of hazardous waste. Hazardous wastes generated during Vandenberg AFB activities are initially collected at the point of generation and, if not reused or recycled on site, transported to the consolidated collection-accumulation point managed by the compliance section of the base Environmental Office in Civil Engineering. Here it is containerized and segregated by type. Following initial containerization, waste must be removed from the consolidated collection-accumulation point within 90 days, at which point all hazardous waste must be transported to an off-site Treatment, Storage, and Disposal Facility (Vandenberg Air Force Base, 2001b).

3.5 HEALTH AND SAFETY

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

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

The well-being, safety, or health of members of the public—Members of the public are considered to be persons not physically present at the location of the operation, including

workers at nearby locations who are not involved in the operation and the off-base population. Also included within this category are hazards to equipment, structures, flora, and fauna.

Region of Influence

The ROI for health and safety of workers includes the immediate work areas, the propellant loading site, the launch site, and the flight corridor. The ROI for public safety includes the above and any bordering areas that may be affected by proposed activities.

Affected Environment

Vandenberg AFB is involved in the ongoing test and evaluation of various missiles, with safe procedural practices as a primary objective. To accomplish this, an aggressive safety evaluation and control system has been implemented, based on more than 40 years experience in test and evaluation.

Proposed on-base program operations must receive prior approval, accomplished by the user through presentation of the program to Space Wing/Safety Office (30 SW/SE). All safety analyses, standard operating procedures, and other safety documentation applicable to those operations affecting Vandenberg AFB or the Western Range Area and its controlled range space must be provided, along with an overview of mission objectives, support requirements, and schedule. The 30 SW/SE evaluates this information, ensuring that all Western Range Area safety requirements are met.

Preceding operations that may involve ground impact of objects within the range, an evaluation is made to ensure that populated areas, critical range assets, and civilian property susceptible to damage are outside predicted impacts limits. A Notice to Mariners and a Notice to Airmen are published and circulated in accordance with established procedures to provide warning to personnel (including recreational users of the range space and controlled sea areas) concerning any potential impact areas that should be avoided. Radar and visual sweeps of hazard areas are accomplished immediately prior to operations to ensure evacuation of non-critical personnel. Prior to missile flight operations, 30 SW/SE evaluates the performance of all target missiles.

Vandenberg AFB possesses significant emergency response capabilities that include its own Fire Department, Disaster Control Group, and Security Police Force, in addition to contracted support for handling accidental releases of regulated, hypergolic propellants and other hazardous substances. Readiness Flight (30 CES/CEX) manages the overall base emergency response program and is responsible for developing and updating the Vandenberg AFB *Hazardous Material Emergency Response Plan*. Additionally, the Readiness Flight chairs the Hazardous Materials Planning Team, ensures that follow-on elements of the Disaster Control Group are assembled as required by the On-Scene Commander in the event of a release response, and maintains training certificates for spill response team members. (Vandenberg Air Force Base, 1999)

According to the Santa Barbara County Integrated Hazardous Materials Management System Operation Agreement, the base Fire Department approves and maintains the

business plans and hazardous material inventories prescribed by the California Health and Safety Code, which are developed by organizations assigned to or doing business on the base. This information can be retrieved electronically in the event of an emergency. Additionally, the base Fire Department conducts onsite facility inspections, as required, to identify potentially hazardous conditions that could lead to an accidental release. It should be noted that the Vandenberg AFB Fire Department is advised of all operations involving the transfer of hypergolic propellants on the base. During launch operations, Fire Department response elements are pre-positioned to expedite response in the event of an anomaly. (Vandenberg Air Force Base, 1999)

3.6 LAND USE

Region of Influence

The ROI for land use includes all proposed sites and locations off base that may have the potential to be impacted (for example, through restricted access) by proposed activities.

Affected Environment

The installation is bounded on the west by 56 kilometers (35 miles) of Pacific Ocean coastline, and occupies approximately 6 percent of the county's total land area. The base is composed of the following land use areas: airfield operations and maintenance/space and missile launch, industrial, outdoor recreation, open space, and cantonment (U.S. Department of the Air Force, 1998). The base contains 340 kilometers (520 miles) of roads, 27 kilometers (17 miles) of railroad tracks, and nearly 1,000 buildings (U.S. Department of the Air Force, 1997).

The installation is divided into northern and southern regions by the Santa Ynez River and West Ocean Avenue (see figure 1-1) (U.S. Department of the Air Force, 1997). Approximately 90 percent of the use of land on Vandenberg AFB is designated open space. Development has mainly occurred on North Vandenberg AFB (U.S. Department of the Air Force, 1998). Most of southern Vandenberg AFB is undeveloped open space, some of which is leased for grazing. The remaining portion contains several mountaintop tracking stations, an administrative and industrial area, and space launch complexes with support facilities. (U.S. Department of the Air Force, 1997)

Coastal Zone Management

A federal activity in or affecting a coastal zone requires preparation of a Coastal Zone Consistency Determination. The area along the western coast of Vandenberg AFB is the North Coast Planning Area. Vandenberg AFB's coastal zone extends inland from about 1.2 kilometers (0.75 mile) at the northern boundary to 7.2 kilometers (4.5 miles) at the southern end. The widest portion of the coastal zone occurs at San Antonio Creek and south of Cañada Honda Creek to the southern boundary. (U.S. Department of the Air Force, 1998)

Recreation

County and state parks, as well as public access beaches on Vandenberg AFB proper, are some of the few public coastal access points between Gaviota and Point Sal. Two public access beaches that exist on, or immediately adjacent to, Vandenberg AFB (Point Sal Beach State Park and Ocean Beach County Park) are within the ROI. Both are especially popular for surf fishing and are open to the public, except during missile launches when access roads can be closed and visitors evacuated under an agreement between Vandenberg AFB and Santa Barbara County. All closure and evacuation agreements have been consolidated under an Evacuation Agreement, giving the base the right to evacuate and close the beaches up to 48 hours before a launch. (U.S. Department of the Air Force, 1997)

In addition to the state beach and county parks, several coastal areas on Vandenberg AFB itself are open to public use. Ocean Beach County Park, at the end of Highway 246, is located approximately mid-way down the western coastal edge of Vandenberg AFB near Optical Site 54. (U.S. Department of the Air Force, 1997)

3.7 WATER RESOURCES

Region of Influence

The ROI for impacts to water resources includes the water bodies that could be potentially disturbed by the Proposed Action.

Affected Environment

Surface Water

The Santa Ynez River forms the boundary between northern and southern Vandenberg AFB. Several drainages occur in the southern part of the base, with Cañada Honda Creek and Bear Creek being the largest (figure 1-1). There are no permanent lakes, impoundments, or perennial streams on southern Vandenberg AFB.

Northern Vandenberg AFB has three primary drainage systems that terminate in the ocean: Canada Tortuga Creek, San Antonio Creek, and Shuman Canyon Creek (figure 1-1). San Antonio Creek is the largest with perennial flow and a yearly runoff of 4.4 million cubic meters (3,600 acre-feet). Five small impoundments are also located on northern Vandenberg AFB. (U.S. Army Space and Strategic Defense Command, 1994)

Groundwater

Most groundwater on Vandenberg AFB occurs in unconsolidated alluvial deposits beneath river and stream channels in the valleys and canyons (U.S. Department of the Air Force, 2000). The southern portion of the base includes a part of the Lompoc Terrace Basin and the Lompoc Plain Basin. Other users of the Lompoc Plain Basin include the Federal Correctional Institute and the City of Lompoc. The San Antonio Creek Basin is on northern

Vandenberg AFB; agricultural irrigation is the main user of the basin's groundwater. (U.S. Army Space and Strategic Defense Command, 1994)

The base monitors its potable water supply wells for a series of water quality parameters. The entire base, both north and south areas, receives purchased water from the Central Coast Authority of the State Water Project. The purchased water supply is supplemented by four groundwater wells in the San Antonio well field, in times when the State Water Project supply cannot meet base demand. Vandenberg AFB drinking water meets both federal and state drinking standards. (Vandenberg Air Force Base, 2002a)

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4.0
ENVIRONMENTAL CONSEQUENCES

4.0 ENVIRONMENTAL CONSEQUENCES

This section describes the potential environmental consequences of the proposed activities by comparing these activities with the potentially affected environmental components. Section 4.1 provides discussions of the potential environmental consequences of these activities. The amount of detail presented in each section is proportional to the potential for impacts. Sections 4.2 through 4.10 provide discussions of the following with regard to proposed program activities: environmental effects of the No-action Alternative; adverse environmental effects that cannot be avoided; conflicts with federal, state, and local land use plans, policies, and controls for the area concerned; energy requirements and conservation potential; irreversible or irretrievable commitment of resources; relationship between short-term use of the human environment and the maintenance and enhancement of long-term productivity; natural or depletable resource requirements and conservation potential; Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, and Executive Order 13045, *Federal Actions to Address Protection of Children from Environmental Health Risks and Safety Risks*.

To assess the potential for and significance of environmental impacts from the proposed program activities, a list of activities was developed (chapter 2.0) and the environmental setting was described, with emphasis on any special environmental sensitivities (chapter 3.0). Program activities were then compared with the potentially affected environmental components to determine the environmental impacts of the proposed activities.

To help define the affected environment and determine the significance of program-related effects, written, personal, and telephone contacts were made with applicable agencies and installation offices. Chapter 7 provides a list of those contacted.

No new impacts to airspace are anticipated as a result of the proposed activities. Noise generated during preparation of the launch site and support facilities would be temporary and similar to other site preparation noise levels on Vandenberg AFB. The sites proposed for use were selected to avoid cultural resources. A concurrence letter from SHPO is included in appendix B. Existing infrastructure would be used, and no change is anticipated to the visual and aesthetic environment of the proposed locations. Personnel would be drawn from the existing workforce, with minimal beneficial impacts to socioeconomics in the affected regions. The concrete slabs necessary for temporary bore sight requirements would be installed on previously disturbed areas with no additional environmental impact.

Activities associated with launching the LPMs would result in a potential for impacts similar to or less than those discussed in the Theater Ballistic Missile Targets Programmatic EA (for airspace, cultural resources, infrastructure, noise, socioeconomics, and visual and aesthetics; those impacts were determined to be insubstantial) (U.S. Department of the Air Force, 1997). The results of analysis provided in the Theater Ballistic Missile Targets

Programmatic EA (U.S. Department of the Air Force, 1997) are summarized as applicable in the following paragraphs and in specific resource sections.

Airspace. All launches and debris impacts would take place in either existing restricted area or warning airspace that would be cleared of nonparticipating aircraft. The launches would be short-term events, after which joint-use airspace would be released to other users. Scheduling would minimize impacts.

Cultural Resources. The probability of debris generated by launch mishap or flight termination striking the ground where surface or subsurface archaeological deposits are located is remote. No impacts to historical structures are expected to result from noise-induced vibration. Any unexpected discovery of cultural resources during the course of missile testing would be reported to the Vandenberg AFB Environmental Division.

Infrastructure. The limited use of base infrastructure required for the Proposed Action would have no adverse impacts.

Noise. Although site preparation activities would temporarily increase ambient noise levels, they would not be noticeable to sensitive receptors in the Lompoc Valley or Santa Maria. Personnel working close to the launch site would wear hearing protection that would reduce the launch noise levels to prescribed health and safety levels. Launch noise would be short term and similar to that caused by existing programs and is not expected to cause any hearing damage to residents living adjacent to the base. Noise impacts to sensitive wildlife are discussed under biological resources.

Socioeconomics. The limited use of local restaurants and motels would have a slight positive effect on the economy and the temporary use of such accommodations during tourist season would have a very limited effect.

Visual and Aesthetics. Alteration of the area's visual setting would be temporary. Once the test launches are completed, the launch site will be restored to its original condition.

4.1 PROPOSED ACTION

The Proposed Action has the potential to result in new or different impacts to the resource areas discussed below:

4.1.1 AIR QUALITY

The Proposed Action would not substantially impact the regional air quality since the estimate of total operation emissions of the project does not exceed current air quality standards within the Santa Barbara Air Basin. Previous target emissions analyses from Vandenberg AFB showed insignificant impacts to air quality in the region.

Launch Site Preparation Activities

Site preparation activities would be a source of dust (PM-10) emissions and exhaust emissions. Dust emissions are primarily a product of ground disturbance. Water would be used periodically for dust suppression throughout the project duration until the site is revegetated. Levels of dust generated would change through time depending on the level and type of ongoing site preparation activity, weather conditions, and soil types being disturbed. Construction equipment exhaust emissions would also vary through time depending on site preparation activity levels. According to analysis provided in the Theater Ballistic Missile Targets EA, no volatile organic compounds/reactive organic gases would be used in missile preparation activities (U.S. Department of the Air Force, 1997). Most site preparation-related emissions would have a transient, localized impact on air quality (i.e., once site preparation ceases, pollutant emissions cease, and air quality returns to its prior state).

The proposed site preparation would require the disturbance of no more than approximately 7.3 hectares (18 acres). It is assumed this site preparation would include approximately one month of grading. Potential fugitive dust amounts were estimated using the Air Quality Thresholds of Significance spreadsheets (Sacramento Metropolitan Air Quality Management District, 1997). Table 4-1 presents the estimate of potential site preparation PM-10 emissions at Vandenberg AFB.

Table 4-1: Potential Launch Site Preparation-Related PM-10 Emissions

Source	Emission Factor kilograms/hectare (pounds/acre)	Grades hectares (acres)/year	Exposed days/year	Emissions kilograms (pounds)/year	Emissions metric tons (tons)/year
Bulldozing	1,046 (933)	7.3 (18.0)	NA	7,619 (16,796)	7.6 (8.4)
Grading	1.5 (1.3)	7.3 (18.0)	NA	10.6 (23.4)	0.011(0.012)
Vehicle Traffic	1,019 (909)	7.3 (18.0)	NA	7,422 (16,362)	7.4 (8.2)
Erosion of Soil Piles	0.17 (0.15)/day	7.3 (18.0)	90	110 (243)	0.11 (0.12)
Erosion of Graded Surface	29.6 (26.4)/day	7.3 (18.0)	90	19,400 (42,768)	19.4 (21.4)
TOTAL				34,561 (76,192)	34.6 (38.1)

Source: Derived from Sacramento Metropolitan Air Quality Management District, 1997.

Approximately 35 metric tons (38 tons) of PM-10 could be produced during the site preparation of the launch site. This number would be reduced by half to approximately 17 metric tons (19 tons) utilizing dust suppression measures such as periodically watering the areas being graded; minimizing unnecessary traffic; reducing vehicle speeds near the work areas; and wet sweeping or otherwise removing soil and mud deposits from paved roadways and parking areas. Proper tuning and preventative maintenance of vehicles would serve to minimize exhaust emissions and maximize vehicle performance. (Vandenberg Air Force Base, 2000)

Emissions from launch preparation would be regulated in accordance with the Memorandum of Agreement between Vandenberg AFB and the SBCAPCD. Vandenberg AFB complies with the SBCAPCD rules and regulations listed below. The Proposed Action would comply with these and any other applicable rules:

- Rule 317, *Organic Solvents*, provides limits to any solvent materials used in the project.
- Rule 323, *Architectural Coatings*, provides for coating materials applied to an architectural structure.
- Rule 330, *Surface Coating of Metal Parts and Products*, applies if metal parts are coated on base prior to construction.
- Rule 353, *Adhesives and Sealants*, applies if adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, or any other primers are used during the project unless specifically exempted by this rule.
- Only California Air Resources Board certified blasting medium would be permitted if abrasive blasting were used.
- Any portable equipment powered by an internal combustion engine of 20 British horsepower or higher used in this project must be registered in the California State-wide Portable Equipment Registration Program or have a valid SBCAPCD Permit to Operate.
- Additionally this project must comply with any other applicable SBCAPCD rules that may apply including but not limited to Rule 302, *Visible Emissions*; Rule 303, *Nuisance*; and Rule 304, *Particulate Matter*. (Vandenberg Air Force Base, 2001b; 2002b)

Launch Activities

Missile launches are short-term, discrete events, thus allowing time between launches for emissions to be dispersed. Emissions from launch activities would be regulated in accordance with the Memorandum of Agreement between Vandenberg AFB and the SBCAPCD; therefore, impacts to air quality would not be substantial. (U.S. Department of the Air Force, 1997)

Determination of Non-Applicability

Air quality impacts from Vandenberg AFB target launches have been previously examined in the Theater Ballistic Missile Targets EA. It was determined that approximately 2.7 metric tons (3 tons) of volatile organic compounds (reactive organic gases) and 1.8 metric tons (2 tons) of nitrogen oxide would be emitted as a result of 30 missile launches (solid and liquid) per year, including mobile and launch emissions (U.S. Department of the Air Force, 1997). The federal *de minimis* annual limits are 45 metric tons (50 tons). The SBCAPCD emission budgets for on-road mobile source reactive organic gases and nitrogen oxides are 15.8 metric tons (17.42 tons) and 20 metric tons (22.07 tons) per day, respectively. Analysis provided in the Theater Ballistic Missile Targets EA determined that five target missile launches in one day would result in 0.070 metric ton (0.078 ton) of reactive organic gases and 0.102 metric ton (0.112 ton) of nitrogen oxides.

No federal *de minimis* levels have been established for state non-attainment areas. However, potential emissions are less than the federal *de minimis* level for serious federal PM-10 non-attainment. Additionally, since the region is in federal attainment, SBCAPCD has not established 2001 planning values for PM-10. Therefore, no quantitative analysis of regional significance can be made.

Based on these results, the review of the Proposed Action as required by the General Conformity Rule resulted in a finding of presumed conformity with the State Implementation Plan. Total foreseeable direct and indirect emissions caused by the launch of two LPMs are both less than the mandated federal *de minimis* thresholds and less than 10 percent of the established SBCAPCD budget. The two proposed launches would not cause or contribute to any new violation of any air quality standards in the ROI and should be ruled as being exempt from the requirement for a Conformity Determination due to non-applicability.

Cumulative Impacts

Although the dust generated during site preparation would add to any generated in the immediate vicinity of the launch site, no exceedance of air quality standards or health-based standards of non-criteria pollutants would be anticipated. Missile launches are short-term, discrete events, thus allowing time between launches for emission products to be dispersed. The Proposed Action, when added to existing actions on Vandenberg AFB is not expected to result in cumulative impacts to air quality. Air quality impacts from prior Vandenberg AFB target launches have been determined to be insignificant. Based on these results, the two proposed launches would not cause or contribute to any violation of any air quality standards.

4.1.2 BIOLOGICAL RESOURCES

All transportation of equipment and materials such as fuels would be conducted in accordance with DOT regulations. Standard operating procedures for spill prevention, containment, and control measures while transporting equipment and materials would preclude impacts to biological resources.

Launch Site Preparation Activities

Vegetation

Approximately 450 hectares (1,110 acres) of land in the Point Sal area are currently used for grazing purposes. Clearing of the land required for the new temporary launch site would represent less than a 2 percent loss. Although removal of vegetation could displace small wildlife, it would not result in a substantial reduction in habitat available for wildlife since similar habitat is available adjacent to the proposed launch site. After the mission is complete, the launch area would be restored to its original condition by primarily redistributing the soil collected from preparing the launch area. This soil would contain original seed to help rejuvenate the vegetation and restore the area to its original condition. A recommendation was made in the biological survey (appendix D) to collect seed from Kellogg's horkelia, a federal species of concern, found throughout the proposed launch site

prior to site preparation activities. This seed could be used during the restoration process and/or for restoration in other areas of Vandenberg AFB (Vandenberg Air Force Base, 2001a). The site would also be monitored to assess the revegetation process and to determine if undesirable exotic species are present on site that need to be eradicated and whether supplemental seeding of native species is required (Vandenberg Air Force Base, 2002). All applicable U.S. Air Force, DOT, and U.S. Army safety regulations, and OSHA requirements would be followed, which would minimize the potential for accidental spills, as well as provide the means for mitigating or minimizing effects to vegetation if an accident were to occur.

Wildlife

The cattle currently grazing on the proposed launch site would be moved to another grazing area on the base prior to launch site preparation. Rotational grazing is a common practice on Vandenberg AFB to allow pasture areas to regenerate (Air Force Center for Environmental Excellence, 1999).

A qualified biologist should survey the launch area within 2 to 3 weeks (if activities take place between April and June) or a week (during other time periods) prior to site preparation and again immediately prior to initiation of work on site to ensure no burrowing owls are present. Loggerhead shrikes would normally leave the area when site preparation activities begin. However, during their breeding period from March through May, a qualified biologist should survey the area for nesting activity 2 to 3 weeks prior to and again immediately prior to initiation of work. (Vandenberg Air Force Base, 2001a)

The effects of noise on wildlife vary from serious to no effect in different species and situations. Behavioral responses to noise also vary from startling to retreat from favorable habitat. Animals can also be very sensitive to sounds in some situations and very insensitive to the same sounds in other situations. (Larkin, 1996) Launch site preparation noise may disturb wildlife in the immediate vicinity during the site preparation period. Since there are no absolute standards of short-term noise impacts for potentially noise-sensitive species, a short-term maximum noise exposure of 92 decibels has been suggested as a significance cut-off for impacts (U.S. Army Strategic Defense Command, 1990; 1989). This noise level is equivalent to being 1 meter (3 feet) from a power lawnmower. Typically the noise at 15 meters (50 feet) from a construction site does not exceed an equivalent sound level of 90 A-weighted decibels. Most of the noise and human activity would be caused by truck traffic to and from the launch preparation site and the use of heavy machinery and excavation equipment. The increased presence of personnel would tend to cause birds and other mobile species of wildlife to temporarily leave the area that would be subject to the highest level of noise. Therefore, no direct physical auditory changes are anticipated. Wildlife is known to exhibit a startle effect when exposed to short-term noise impacts. Studies (Anderson et al., 1986; Anderson and Rongstad, 1989; Ellis et al., 1991; and Institute for Raptor Studies, 1981) indicate that birds usually show signs of disturbance, such as the fluttering of wings, when the noise occurs, but quickly return to normal behavior after the event.

In the unlikely event of an accidental release of stored liquid propellant, emergency response personnel would comply with Vandenberg AFB's Hazardous Materials Emergency Response Plan in order to prevent impacts to biological resources in the vicinity. All applicable U.S. Air Force, DOT, and U.S. Army safety regulations, and OSHA requirements would be followed which would also minimize the potential for accidental spills, as well as provide the means for mitigating or minimizing effects to wildlife if an accident were to occur.

Site activities would not impact Essential Fish Habitat since no water bodies would be affected.

Threatened and Endangered Species

No adverse impacts are anticipated to the Gaviota tarplant and Lompoc yerba santa as a result of proposed site preparation activities since these plant species have not been identified within the area proposed for disturbance. Site preparation activities would not impact water bodies that could potentially contain the tidewater goby, unarmored threespine stickleback, or California red-legged frog. The California least tern, California brown pelican, and western snowy plover are unlikely to transit through the area affected by the Proposed Action during site preparation. These seabirds preferentially forage and roost along the coast over 6 kilometers (4 miles) away from the proposed launch area. The marbled murrelet is also unlikely to be in the area. Proposed site preparation activities are unlikely to adversely affect these listed birds. Site preparation activities would not result in impacts to the southern sea otter, which are also only present along the coast.

Environmentally Sensitive Habitat

The proposed launch site is inland and not within the coastal dune system. No adverse impacts to the coastal dune systems are anticipated. Accidental release of fuel or oxidizer during filling operations or while stored are expected to be contained by berms before reaching the edge of the launch area. The sites proposed for use were selected to avoid the potential for adverse impacts to wetlands.

Launch Activities

Vegetation

Normal launch activities are not expected to impact vegetation. The possibility of a spill or other accident involving hazardous materials impacting sensitive habitat is considered remote. (U.S. Department of the Air Force, 1997)

Wildlife

Although the level of noise for this missile during launch and flight is expected to be small and relatively short in duration, noise monitoring would be performed for the first launch in compliance with the *Final Threatened/Endangered Species Monitoring Plan for the Theater Ballistic Missile Targets Program* (Vandenberg Air Force Base, 1999). Disturbance to wildlife from the launches would be brief and is not expected to have a lasting impact nor a measurable negative effect on migratory bird populations. Wildlife such as waterfowl would quickly resume feeding and other normal behavior patterns after a launch is

completed. Waterfowl driven from preferred feeding areas by aircraft or explosions usually return soon after the disturbance stops, as long as the disturbance is not severe or repeated (Federal Aviation Administration, 1996). The altitude of the target missiles would be of sufficient distance from the coast to minimize potential noise and visual disturbances to species that have a tendency to react more to visual than aural stimuli. (U.S. Department of the Air Force, 1997)

Debris impact and booster drops in the broad ocean area would occur approximately 300 kilometers (186 miles) off the coast, within the 370-kilometer (200-nautical mile) limit of the Economic Exclusion Zone. The natural buffering capacity of seawater and the strong ocean currents would neutralize reaction to any release of the small amount of liquid propellant contained within the two LPMs proposed for launch. An early flight termination or mishap could result in debris impact along the flight corridor, which could temporarily impact fishing activities in the immediate area. Due to the small amount of propellant involved and the few number of launches, the National Marine Fisheries Service believes the project will not adversely affect trust marine resources (National Marine Fisheries Service, 2002).

Threatened and Endangered Species

No adverse impacts are anticipated to the Gaviota tarplant and Lompoc yerba santa as a result of proposed launch activities since these plant species have not been identified within the area proposed for disturbance. Launch activities are not expected to impact water bodies that could potentially contain the tidewater goby, unarmored threespine stickleback, or California red-legged frog. The California least tern, California brown pelican, and western snowy plover preferentially forage and roost along the coast away from the proposed launch area. The marbled murrelet is also unlikely to be in the area. According to analysis in the 1997 Theater Ballistic Missile Targets EA, the 92-decibel noise contour of a Lance missile launched from the Rail Garrison Site on Vandenberg AFB was approximately 2 kilometers (1 mile) east of the coastline. No noise impacts to coastal or pelagic species were anticipated from Lance missile launches from this location. The noise from the LPM proposed for launch would be similar to that of the Lance missile. The LPM launch site is approximately 3.5 kilometers (2 miles) further inland than the Rail Garrison launch site and thus no impacts to coastal and pelagic species from the noise of the launch are anticipated. The approximate altitude of the LPM in relation to the coastal area would be 4,780 meters (15,580 feet). At this altitude disturbance as a result of visual stimulus is unlikely. Proposed launch activities are unlikely to adversely affect the long-term well-being, reproduction rates, or survival of these listed birds. Launch activities are not anticipated to result in impacts to southern sea otters, which are most commonly present approximately 10 kilometers (6 miles) to the southwest along the coast.

Debris impact and booster drops in the broad ocean area are not expected to adversely affect marine mammal species protected by the Marine Mammal Protection Act of 1972. An early flight termination or mishap could result in debris impact along the flight corridor. Sensitive marine species are widely scattered and occupy relatively small surface areas, and the probability of debris striking a threatened or endangered species is considered remote. (U.S. Department of the Air Force, 1997)

Environmentally Sensitive Habitat

No adverse impacts to the coastal dune systems are anticipated as a result of launch activities. Personnel would be instructed to avoid bird nesting and roosting locations and pinniped haulout areas.

Cumulative Impacts

The potential cumulative impacts to biological resources from activities associated with preparing for and launching two LPMs would not be substantial. Launch activities on Vandenberg AFB are scheduled and coordinated to minimize the potential for cumulative impacts.

No cumulative impacts to biological resources are expected as a result of fuel and oxidizer transport or filling operations. Accidental releases or spills would be contained before reaching sensitive vegetation or wildlife. The amount remaining in the LPM that could be released during launch is not expected to result in an increased potential for cumulative impact to marine species.

4.1.3 GEOLOGY AND SOILS

Launch Site Preparation Activities

Site preparation activities would involve the removal of vegetation and grading for site preparation and access. No unique geologic features that could be affected by project site preparation are known to exist at the project site.

Best Management Practices would be implemented both during and following site preparation activities for the purpose of preventing soil erosion and controlling pollutant discharges into waterways during storm events. These could include the construction of berms, swales, and runoff diversion ditches, and periodic watering of exposed soil to prevent erosion. A soil sample would be taken before and after launches in the vicinity of the *Mobile Launcher* to ensure the soil is not contaminated from launch activities.

A Stormwater Pollution Prevention Plan would be developed for the site to satisfy the requirements of the National Pollutant Discharge Elimination System. In the event that a release of hazardous material or waste would occur, affected areas would be treated in accordance with applicable federal, state, and local regulations. Therefore, the risk of accidental spills of hazardous chemicals during project site preparation affecting project soils is expected to be minor and temporary in duration.

Launch Activities

Spill prevention, containment, and control measures described in section 2.5 would prevent accidental spill impacts to geology and soils. Modeling results indicated no significant impact to soils from the deposition of exhaust products. (U.S. Department of the Air Force, 1997)

Cumulative Impacts

Preparation of the launch site and other areas for the proposed activities would not result in significant cumulative impacts to geology and soils. The addition of two LPM launches per year, when added to the missile impacts typical at Vandenberg AFB, would not result in a significant impact to soils. Adherence to established procedures would minimize the potential for spills and any impacts to soils. The amount of soil disturbed by LPM test activities would be relatively small, and the potential for cumulative impacts on soil is considered minor.

4.1.4 HAZARDOUS MATERIAL AND WASTE

Launch Site Preparation Activities

Potential environmental impacts related to hazardous materials and waste include their use and generation during site preparation and operation activities. Hazardous materials that could be used include motor fuels, oils, paints, and solvents. Use of hazardous materials would be minimized in accordance with the pollution prevention practices of Vandenberg AFB. Concrete lips would be added around three sides of the concrete fueling area to contain any spilled propellant. All hazardous materials and waste would be handled, stored, and disposed of in accordance with applicable Vandenberg AFB and state regulations, particularly the *Hazardous Materials Management Plan*, the *Hazardous Waste Management Plan*, and Chapter 2, *Wastewater Generation, Collection and Compliance* of U.S. Air Force Instruction 32-7041, *Water Quality Compliance*, as well as any applicable Chemical Material Safety Data Sheets. Such measures would be designed to minimize the potential for impacts to personnel and the environment.

The Vandenberg AFB rag exchange program would be utilized to reduce the amount of waste generated from any solvent usage. The waste generated by the LPM site preparation and launch activities would not be substantial.

Launch Activities

The existing hazardous materials storage and handling capabilities at Vandenberg AFB are adequate to ensure that all materials are safely handled in accordance with applicable regulatory procedures. A site-specific Spill Prevention Control and Countermeasure Plan would provide resources and guidelines for use in the control, cleanup, and emergency response for spills of hazardous material or waste. In the event that release of hazardous material or waste would occur, affected areas would be treated in accordance with Vandenberg AFB's *Hazardous Materials Emergency Response Plan* and applicable federal, state, and local regulations. It is currently anticipated that approximately 8,328 liters (2,200 gallons) of oxidizer rinse solution and approximately 2,915 liters (770 gallons) of main fuel and initiator fuel alcohol rinse solutions (combined) would be collected for each missile fueled. The waste fuel and oxidizer solutions would be collected in empty drums and disposed of according to Vandenberg AFB *Hazardous Waste Management Plan* regulations, as described in section 3.4. The proposed LPM flight tests would generate wastes similar to others generated during ongoing operations at Vandenberg AFB and would not result in a substantial increase in the total quantities of hazardous waste. (U.S. Department of the Air Force, 1997)

Cumulative Impacts

Hazardous materials used and hazardous wastes generated by the Proposed Action, when added to existing and expected future programs, would not adversely affect existing permits or programs at Vandenberg AFB. The base has implemented an emergency response procedure that would aid in the evaluation and cleanup of any hazardous materials released. Therefore, cumulative impacts relative to hazardous materials or hazardous wastes are not expected.

4.1.5 HEALTH AND SAFETY

Launch Site Preparation Activities

Preparation for the temporary launch site would include mainly clearance of existing vegetation and grading. Site preparation activities would be conducted in accordance with OSHA, U.S. Air Force, and U.S. Army Corps of Engineers requirements for health and safety to control exposure to occupational safety and health hazards.

Potential impacts to health and safety could result from accidents during transportation of the fuel and oxidizer to, and on, Vandenberg AFB. However, Federal Aviation Administration, applicable U.S. Air Force, DOT, and U.S. Army safety regulations, and OSHA requirements would be followed to minimize the potential for accidents, as well as provide the means for mitigating adverse effects if an accident were to occur. No effects to the public are anticipated.

Launch Activities

All target missile prelaunch operations involving explosive materials would require implementation of a written procedure that has been approved by 30 SW/SE and must be conducted under the supervision of explosive-certified personnel. Implementation of standard safety procedures such as the issuance of Notices to Airmen and Notices to Mariners and the similarity to current operations serve to reduce the potential for safety hazards and minimize the risk to personnel and the public. Test mishaps are defined in terms of three scenarios: missile failure on the launch pad, motor failure or abbreviated flight, and termination of a flight after the missile has left the launch pad. Missile failure on the launch pad would be characterized by either a detonation of the missile or a deflagration in which the propellant explodes and burns. Motor failure or abbreviated flight could also be characterized by missile detonation or deflagration.

The boundaries of LHAs are dependent upon the characteristics of the missile system being launched, the planned flight trajectory, and the launching range capabilities. The LHA is calculated by using the maximum response time and the travel distance of the missile in all directions within that time to project the debris pattern and determine the outer limits. Non-essential mission personnel are excluded from the LHA during launch operations. Personnel required to work within the LHA boundaries are normally protected within or behind impervious structures. ESQDs surrounding the launch sites are calculated based on the equivalent explosive force of all propellant and pyrotechnic materials contained in the flight vehicle. ESQDs have been established around propellant handling and explosive

storage facilities. LHAs and surface danger zones would be established to minimize the potential for health and safety impacts during launches. To ensure immediate response and rapid control of the site in the event of an accident, Vandenberg AFB could maintain a stand-by emergency response team near the launch site. (U.S. Department of the Air Force, 1997)

Cumulative Impacts

All work on the Proposed Action would be performed in accordance with applicable health and safety regulations. No injuries or illnesses are anticipated. No other activities have been identified within the ROI that when combined with the Proposed Action would have a cumulative impact on health and safety.

4.1.6 LAND USE

Launch Site Preparation Activities

No more than 7.3 hectares (18 acres) of land would be disturbed during the site preparation phase. This land is currently fenced and used for livestock grazing. After the mission is complete, the launch area would be restored to its original condition by redistributing the soil collected from preparing the launch area. All temporary structures such as concrete footings, equipment towers, fiber optics/communication cabling, and shale rock would be removed from the launch site and fueling site upon completion of the launch events unless directed otherwise by Vandenberg AFB. The three optical support sites that would be used to collect data during the flight tests are currently used for similar purposes.

Other proposed program activities would take place in existing facilities and locations. These activities would not alter the uses of the sites, which were in the past or currently are used to support missile and rocket testing. There are no known conflicts with land use plans, policies, and controls at Vandenberg AFB.

Launch Activities

Since the Proposed Action would use existing facilities on a military installation that currently launches missiles and the temporary launch site would be restored after completion of the Proposed Action, no adverse impacts to land use are anticipated. (U.S. Department of the Air Force, 1997)

Cumulative Impacts

No other activities have been identified that, when added to the temporary conversion of the fenced pasture to accommodate the LPM launches and the installation of temporary support facilities, would create a cumulative change to land use on Vandenberg AFB.

4.1.7 WATER RESOURCES

Launch Site Preparation Activities

A Stormwater Pollution Prevention Plan would be developed for the site to satisfy the requirements of the National Pollutant Discharge Elimination System. Best Management Practices would be implemented both during and following site preparation activities for the purpose of preventing soil erosion and thus a potential for pollutant discharges into waterways during storm events. These could include the site preparation of berms, swales, and runoff diversion ditches, and periodic watering of exposed soil to prevent erosion.

Therefore, the risk of accidental spills of hazardous chemicals during project site preparation and launch activities affecting ground or surface water is expected to be minor and temporary in duration. The natural buffering capacity of seawater and the strong ocean currents would neutralize reaction to any release of liquid propellant.

Launch Activities

No impacts to surface water or groundwater from LPM emissions are anticipated from a nominal launch. There is a remote possibility that an early flight termination could result in liquid propellant and missile debris deposition in water bodies. However, the probability of any individual water body, spring, or creek being directly impacted is extremely low. If the oxidizer and fuel do not explode or burn at impact, then they would most likely be deposited on the ground. The inhibited red fuming nitric acid and initiator fuel would volatilize into the atmosphere. Any residual nitric acid would not appreciably affect groundwater.

In the highly unlikely event that the propellants are deposited in surface water, residual nitric acid would cause a substantial, short-term pH change. The acid would mix with the water and eventually be neutralized and diluted. Coal tar distillate fuel would not mix with the water, but would form a slick on the surface that would stick to surfaces it contacts. Hydrazine fuels would degrade primarily into nitrogen gas and water over a period of hours to weeks. Spill prevention, containment, and control measures would prevent or minimize impacts to water resources from accidental spill or a launch anomaly (U.S. Department of the Air Force, 1997).

Cumulative Impacts

The risk of accidental spills of hazardous chemicals during project site preparation and launch activities affecting ground or surface water is expected to be minor and temporary in duration, and no cumulative impacts are anticipated.

Hazardous prelaunch operations including LPM fueling would be conducted in accordance with established standard operating procedures and all other applicable regulations. Adherence to these procedures would minimize the potential for spills, and any impacts to water resources and the potential for cumulative impacts on the quality of surface water or groundwater is considered minor.

4.2 CUMULATIVE IMPACTS

Although the dust generated during site preparation would add to any generated in the immediate vicinity of the launch site, no exceedance of air quality standards or health-based standards of non-criteria pollutants would be anticipated. Missile launches are short-term, discrete events, thus allowing time between launches for emission products to be dispersed. Air quality impacts from prior Vandenberg AFB target launches have been determined to be insignificant. Based on these results, the two proposed launches would not cause or contribute to any violation of any air quality standards. The Proposed Action, when added to existing actions on Vandenberg AFB such as other ongoing launches from adjacent areas, is not expected to result in cumulative impacts to air quality.

Minor, short-term effects to wildlife from construction and launch noise are anticipated; however, the potential cumulative impacts to biological resources from activities associated with preparing for and launching two LPMs in addition to the launches currently being conducted in the adjacent areas would not be substantial. No cumulative impacts to biological resources as a result of fuel and oxidizer transport or filling operations are expected. Accidental releases or spills would be contained before reaching sensitive vegetation or wildlife. The amount of propellant remaining in the two LPMs that could be released during launch is not expected to result in an increased potential for cumulative impact to marine species.

Preparation of the launch site and other areas for the proposed activities would not result in cumulative impacts to geology and soils. The addition of two LPM launches per year, when added to the missile impacts typical at Vandenberg AFB, would also not result in a significant impact to soils. Adherence to established procedures would minimize the potential for spills and any impacts to soils. The amount of soil disturbed by LPM test activities would be relatively small, and the potential for cumulative impacts on soil is considered minor.

Hazardous materials used and hazardous wastes generated by the Proposed Action, when added to existing and expected future programs, would not adversely affect existing permits or programs at Vandenberg AFB. The base has implemented an emergency response procedure that would aid in the evaluation and cleanup of any hazardous materials released. Therefore, cumulative impacts relative to hazardous materials or hazardous wastes are not expected.

All work on the Proposed Action would be performed in accordance with applicable health and safety regulations. No other activities have been identified within the ROI that when combined with the Proposed Action would have a cumulative impact on health and safety.

The temporary conversion of the fenced pasture to accommodate the LPM launches and the installation of temporary support facilities would not create a cumulative change to land use on Vandenberg AFB.

The risk of accidental spills of hazardous chemicals during project site preparation and launch activities affecting ground or surface water is expected to be minor and temporary in duration. Hazardous prelaunch operations including LPM fueling would be conducted in accordance with established standard operating procedures and all other applicable regulations. Adherence to these procedures would minimize the potential for spills, and any impacts to water resources and the potential for cumulative impacts on the quality of surface water or groundwater is considered minor.

4.3 ENVIRONMENTAL EFFECTS OF THE NO-ACTION ALTERNATIVE

If the No-action Alternative is selected, no environmental consequences associated with the LPM program are anticipated. Vandenberg AFB would continue to launch target missiles as analyzed in prior EAs such as the Theater Ballistic Missile Targets Programmatic EA (U.S. Department of the Air Force, 1997) and the EA for Air Force Small Launch Vehicle (U.S. Department of the Air Force, 1991).

4.4 ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

Adverse environmental effects that cannot be avoided include removal of vegetation at the proposed launch site, minor short-term noise impacts to wildlife, the release of small amounts of pollutants into the atmosphere and ocean, and minor increased generation of hazardous materials at program-related sites. Any hazardous waste generated would be managed in compliance with Resource Conservation and Recovery Act, DoD, and other applicable federal, state, and local regulations.

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

All of the proposed program activities would take place within a military installation dedicated to similar activities and within existing facilities and locations. Launch activities, although proposed for an area not previously used for missile launches, would be similar to launch activities currently conducted on Vandenberg AFB. There are no known conflicts with land use plans, policies, and controls at Vandenberg AFB.

4.6 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Anticipated energy requirements of the LPM program would be well within the energy supply capacity of all facilities. Energy requirements would be subject to any established energy conservation practices at Vandenberg AFB.

4.7 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

The Proposed Action is not expected to result in the loss or impact on threatened or endangered species, and no loss of cultural resources, such as archaeological or historic sites. Moreover, there would be no changes in land use or preclusion of development of underground mineral resources that were not already constrained.

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

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

Proposed LPM program activities would take advantage of existing facilities and infrastructure to the extent practicable. The uses of the sites, which were or are to support missile and rocket launches, would not be altered. Therefore, the Proposed Action does not eliminate any options for future use of the environment for the locations under consideration.

4.9 NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL

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

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

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

**4.11 FEDERAL ACTIONS TO ADDRESS PROTECTION OF CHILDREN
FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS
(EXECUTIVE ORDER 13045)**

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

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6.0
LIST OF PREPARERS

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Government Preparers

Dennis R. Gallien, Environmental Engineer,
U.S. Army Space and Strategic Defense Command
B.S., 1979, Industrial Chemistry, University of North Alabama
Years of Experience: 23

Sharon G. Mitchell, Environmental Engineer, Environmental Division,
U.S. Army Space and Missile Defense Command
B.S.E., 1991, Industrial and Systems Engineering, University of Alabama in
Huntsville
Years of Experience: 12

Contractor Preparers

Seon Farris, Environmental Engineer, Teledyne Solutions, Inc.
M.S.E., in progress, Environmental Engineering, University of Alabama in Huntsville
B.S., 1993, Chemical Engineering, Auburn University
Years of Experience: 7

Amy Fenton-McEniry, Technical Editor, EDAW, Inc.
B.S., 1988, Biology, University of Alabama in Huntsville
Years of Experience: 13

Rachel Y. Jordan, Associate, EDAW, Inc.
B.S., 1972, Biology, Christopher Newport College, Virginia
Years of Experience: 14

Edd V. Joy, Manager, EDAW, Inc.
B.A., 1974, Geography, California State University, Northridge
Years of Experience: 29

Steve Scott, Principal, EDAW, Inc.
B.S., 1973, Geology, California State University, San Diego
Years of Experience: 30

William Sims, Geographic Information Services Specialist, EDAW, Inc.
B.S., 1993, Geography, University of North Alabama
Years of Experience: 9

James E. Zielinski, Environmental Planner, EDAW, Inc.
B.S., 1984, Biology, University of Alabama in Birmingham
Years of Experience: 15

7.0
AGENCIES AND INDIVIDUALS CONTACTED

7.0 AGENCIES AND INDIVIDUALS CONTACTED

Missile Defense Agency (MDA)
GC, TERC-E

Missile Defense Targets Joint Project Office (MDTJPO)
Short and Medium Range Targets Product Office (SMRTPO)

Vandenberg Air Force Base
30 CES/CEV, 30 CES/CEVPP, 30 CES/CEVC, 30 CES/CEVPN, DET9/TEVS

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APPENDIX A
DISTRIBUTION LIST

APPENDIX A

DISTRIBUTION LIST

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Federal Consistency Coordinator, Jim Raives
San Francisco CA

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Protection Services Division
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Dr. Knox Mellon
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Santa Barbara County
Air Pollution Control District
Attn: Project Review
Goleta CA

Vandenberg AFB
30 CES/CEV

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APPENDIX B
CORRESPONDENCE



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND
MISSILE DEFENSE AND SPACE TECHNOLOGY CENTER
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

FEB 20 2002

Environmental Division

Mr. Doug Allard
Santa Barbara County
Air Pollution Control District
Project Review
26 Castilian Drive, Suite B-23
Goleta, California 93117

Dear Mr. Allard:

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 (USASMDC) is preparing an Environmental Assessment (EA) in support of two liquid propellant missile (LPM) launches from Vandenberg Air Force Base (AFB), California.

The Missile Defense Targets Joint Project Office proposes to launch two LPMs, one during the day and one at night, within a 2- to 3-week time period. A ground surface (sand/dirt) launch area with no concrete pad or infrastructure within a 300-meter (984-foot) radius is required. The area would be prepared by scraping topsoil from the launch area to expose a pure sand/dirt ground base surface. It is anticipated that approximately 7.3 hectares (18 acres) would be disturbed at the launch area for the project. The inland area proposed for use is currently used for cattle grazing. No sensitive biological species have been identified at the site. The site was selected to avoid the potential for impacts to cultural resources.


The missile proposed for use in the flight tests is a single-stage liquid-fueled ballistic missile with a non-separating payload. The tests would consist of associated pre-flight preparation and post-flight activities such as transportation of the missile and liquid propellant to and storage at Vandenberg AFB, launch and support site preparation, missile fueling, waste disposal, and site restoration. After the mission is complete, the launch area would be restored to its prior condition by re-distributing the soil collected from preparing the surface.

The Coordinating Draft EA is being distributed to various agencies, including your office, for review and comment prior to preparing the Final EA for public review.

Please review this information and provide comments no later than March 12, 2002 to U.S. Army Space and Missile Defense Command, SMDC-EN-V-N/Ms. Sharon Mitchell, P.O. Box 1500, Huntsville, Alabama 35807-3801 or data facsimile 256 955-5074.

If you have any questions or comments, please contact Ms. Sharon Mitchell at 256 955-4392.

Sincerely,


Edwin P. Janasky
Colonel, U.S. Army
Deputy Chief of Staff,
Engineer



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND
MISSILE DEFENSE AND SPACE TECHNOLOGY CENTER
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

FEB 20 2002

Environmental Division

Mr. Roger Briggs
California Regional Water
Quality Control Board
Central Coast Region
81 Higuera Street, Suite 200
San Luis Obispo, California 93401-2219

Dear Mr. Briggs:

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 (USASMDC) is preparing an Environmental Assessment (EA) in support of two liquid propellant missile (LPM) launches from Vandenberg Air Force Base (AFB), California.

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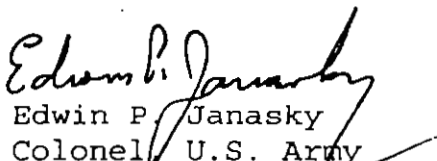
The missile proposed for use in the flight tests is a single-stage liquid-fueled ballistic missile with a non-separating payload. The tests would consist of associated pre-flight preparation and post-flight activities such as transportation of the missile and liquid propellant to and storage at Vandenberg AFB, launch and support site preparation, missile fueling, waste disposal, and site restoration. After the mission is complete, the launch area would be restored to

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If you have any questions or comments, please contact Ms. Sharon Mitchell at 256 955-4392.

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Edwin P. Janasky
Colonel U.S. Army
Deputy Chief of Staff,
Engineer



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND
MISSILE DEFENSE AND SPACE TECHNOLOGY CENTER
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

FEB 20 2002

Environmental Division

Mr. Art Lopez
Santa Ynez Chumash Indian Reservation
Tribal Elders Council
P. O. Box 365
Santa Ynez, California 93460

Dear Mr. Lopez:

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 (USASMDC) is preparing an Environmental Assessment (EA) in support of two liquid propellant missile (LPM) launches from Vandenberg Air Force Base (AFB), California.

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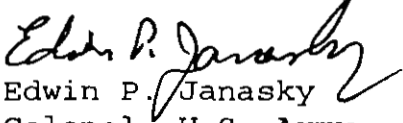
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Deputy Chief of Staff,
Engineer



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND
MISSILE DEFENSE AND SPACE TECHNOLOGY CENTER
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

FEB 20 2002

Environmental Division

Mr. Rod McInnis
National Marine Fisheries Service
Director, Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

Dear Mr. McInnis:

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 (USASMDC) is preparing an Environmental Assessment (EA) in support of two liquid propellant missile (LPM) launches from Vandenberg Air Force Base (AFB), California.

The Missile Defense Targets Joint Project Office proposes to launch two LPMs, one during the day and one at night, within a 2- to 3-week time period. A ground surface (sand/dirt) launch area with no concrete pad or infrastructure within a 300-meter (984-foot) radius is required. The area would be prepared by scraping topsoil from the launch area to expose a pure sand/dirt ground base surface. It is anticipated that approximately 7.3 hectares (18 acres) would be disturbed at the launch area for the project. The inland area proposed for use is currently used for cattle grazing. No sensitive biological species have been identified at the site. The site was selected to avoid the potential for impacts to cultural resources.

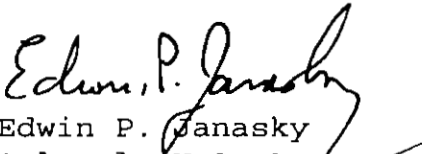
The missile proposed for use in the flight tests is a single-stage liquid-fueled ballistic missile with a non-separating payload. The tests would consist of associated pre-flight preparation and post-flight activities such as transportation of the missile and liquid propellant to and storage at Vandenberg AFB, launch and support site preparation, missile fueling, waste disposal, and site restoration. After the mission is complete, the launch area would be restored to its prior condition by re-distributing the soil collected from preparing the surface.

The Coordinating Draft EA is being distributed to various agencies, including your office, for review and comment prior to preparing the Final EA for public review.

Please review this information and provide comments no later than March 12, 2002 to U.S. Army Space and Missile Defense Command, SMDC-EN-V-N/Ms. Sharon Mitchell, P.O. Box 1500, Huntsville, Alabama 35807-3801 or data facsimile 256 955-5074.

If you have any questions or comments, please contact Ms. Sharon Mitchell at 256 955-4392.

Sincerely,


Edwin P. Janasky
Colonel, U.S. Army
Deputy Chief of Staff,
Engineer



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND
MISSILE DEFENSE AND SPACE TECHNOLOGY CENTER
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

FEB 20 2002

Environmental Division

Dr. Knox Mellon
California Department of Parks and Recreation
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

Dear Dr. Mellon:

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 (USASMDC) is preparing an Environmental Assessment (EA) in support of two liquid propellant missile (LPM) launches from Vandenberg Air Force Base (AFB), California.

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Edwin B. Janasky
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U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND
MISSILE DEFENSE AND SPACE TECHNOLOGY CENTER
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

FEB 20 2002

Environmental Division

Ms. Diane Noda
U.S. Fish and Wildlife Service
Ventura Field Office
2493 Portola Road, Suite B
Ventura, California 93003

Dear Ms. Noda:

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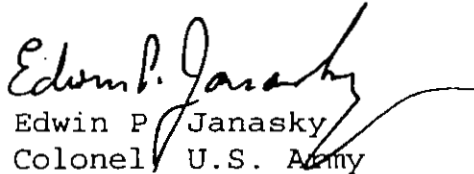
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If you have any questions or comments, please contact Ms. Sharon Mitchell at 256 955-4392.

Sincerely,


Edwin P. Janasky
Colonel U.S. Army
Deputy Chief of Staff,
Engineer



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

MAR - 8 2002

F/SWR4: MH

Ms. Sharon Mitchell
U. S. Army Space and Missile Defense
SMDC-EN-V-N
P. O. Box 1150
Huntsville, Alabama 35807-3801

Dear Ms. Mitchell:

The National Marine Fisheries Service (NMFS) has reviewed your Coordinating Draft Environmental Assessment for the launch of two liquid propellant missile launches from Vandenberg Air Force Base, California. It is our understanding that the project includes jettisoning approximately 55 gallons of propellant at the end of each missile flight. The propellant includes the main fuel of coal tar distillate, a nitric acid oxidizer and an inhibitor fuel of triethylamine and dimethylanilines. The draft report does not mention the effects of these hazardous materials on those trust marine resources under our authority as delegated by the Magnuson-Stevens Fishery Conservation and Management Act, the Endangered Species Act and the Marine Mammal Protection Act. However, given the small quantities of propellant involved and the few number of launches, NMFS believes that project will not adversely affect its trust resources.

The NMFS appreciates the effort of the U. S. Army Space and Missile Defense Command to notify us of this proposed project. In the event the project is expanded, NMFS will require additional information and a detailed analysis of the effects of the liquid propellant on its resources.

Sincerely,

Rodney R. McInnis
Acting Regional Administrator





United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

In Reply, refer to:

March 20, 2002

Sharon Mitchell
U.S. Army Space and Missile Defense Command
SMDC-EN-V-N
Huntsville, Alabama 35807-3801

Subject: Comments on the Draft Environmental Assessment for Two Liquid Propellant
Missile Launches from Vandenberg Air Force Base, Santa Barbara County,
California

Dear Ms. Mitchell:

We would like to thank you for the opportunity to comment on the subject draft environmental assessment. We do not have comments at this time but we look forward to receiving the final environmental assessment and working with you on any other necessary coordination under the Endangered Species Act of 1973, as amended. If you have any questions regarding this letter, please contact Catrina Martin of my staff at (805) 644-1766.

Sincerely,

for Diane K. Noda
Field Supervisor



DEPARTMENT OF THE AIR FORCE
30TH SPACE WING (AFSPC)

RECEIVED
APR 12 2002
By _____

RECEIVED
FEB 27 2002
VAFB OHP

25 FEB 2002

USAF
CC

30 CES/CEV
806 13th St Ste 116
Vandenberg AFB CA 93437-5242

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

Dear Dr. Mellon

The Department of the Air Force, Vandenberg Air Force Base (VAFB), California wishes to notify you of our finding of No Historic Properties Affected for the Liquid Propellant Missile Test program (The Program) on North VAFB. This notification is made per Section 106 of the National Historic Preservation Act of 1966 (NHPA), the Archeological Resources Protection Act (ARPA), and Air Force Instruction 32-7065. The program is located on North VAFB (Atch 1) and an Environmental Assessment (EA) is being developed.

Background

The Missile Defense Target Joint Program Office has a priority requirement to launch two liquid propellant missiles (LPMs), one during the day and one during the night, within a 2 - 3 week period. The mission requirements specify a ground surface (dirt/sand) launch area with no concrete pad and no infrastructure within a 300 meter radius. The missile to be used in the flight tests is a single-stage, liquid-fueled ballistic missile with an inertial guidance system. It will be launched from a mobile launcher, and supporting systems are all road mobile vehicles and trailers. The tests will be for data gathering purposes and no intercept will be attempted. The only ground disturbance associated with the program is at the launch site itself. All supporting activities will use existing VAFB facilities. After the second launch all of the equipment will be removed.

800.4(a)(1)

The only ground disturbance associated with the project is at the proposed launch site. This is on North VAFB, 400 m south of building 1947 and 300 m west of El Rancho Road (Atch 2). Approximately 18 acres would be disturbed. The entire launch site would be 300 m in diameter, with a 120 m diameter interior area. Within the latter area, the ground would be scraped to a depth of 5 - 31 cm (2 - 12 inches), to form the launch surface. The surrounding area would contain a pattern of monitoring sensors that would be buried at a depth of 31 cm or shallower. Outside the launch site itself all cabling, etc. will be laid above the ground surface, in cable trays, existing culverts, or on existing power poles. The launch site would be surrounded by temporary fencing for security. The subsidiary fuel handling, maintenance, and other support

activities will all take place at already developed facilities. Access to the launch site will be on an existing two-track road that will not be modified.

APE: The Area of Potential Effect (APE) for the project is a circle 400 m in diameter centered on the launch pad (Atch 3). This provides a 50 m construction buffer around the launch site.

800.4(a)(2)

At this time most of VAFB was surveyed; only a few areas that were too steep or heavily vegetated have not been covered. None of the areas within the project area fell into either of the latter categories. VAFB has over 400 cultural resource reports on file, and our GIS system has all of our known resource sites entered into it. For the EA, a search using both our GIS and our records was performed. The original project location was moved to avoid potential impacts to cultural resources.

800.4(a)(3)

Because the project is located within the boundaries of a restricted military installation and no identified archaeological sites exist nearby, we know of no individuals or organizations outside the base who have significant concerns with historic resources within the APE of this project.

800.4(a)(4)

The Native American group most closely tied to the Vandenberg area are the Chumash. They occupied this part of the coast in the historic period and archaeological records indicate that the Chumash culture has considerable antiquity in this area. There are modern descendants of the ethnohistoric Chumash living in the area today, many of whom reside on the nearby Santa Ynez Reservation. Vandenberg Air Force Base maintains a Nation-to-Nation relationship with the Tribal Elders Council of the Santa Ynez Chumash Indian Reservation. The Santa Ynez Chumash are the nearest Federally recognized tribal group and its members have some of the closest historic ties to identified villages on the base. The Cultural Resources section schedules regular meetings with the elders council, usually quarterly. In addition, we have recently completed the draft of an ethnohistoric and ethnographic overview of sacred and traditional sites in the Vandenberg area. This report was prepared by Roger Mason, David Earl, and John Johnson, and includes interviews with Chumash elders regarding the presence of traditional cultural properties, resource gathering areas, or other places of concern located within the boundaries of the base. Several areas were identified by informants but none were in or near the APB of this project. In addition, EAs are routinely provided to the Santa Ynez Tribal Elders Council.

800.4(b)(c)(d) Identification and Evaluation of Historic Properties and Results of Investigations

Using a 60 m buffer around each archaeological site, no historic or prehistoric resources are located within ¼ mile of the APE. The buffer zone for the nearest archaeological site is some 435 m to the west. The project is, however, located within the projected corridor of the Anza Trail, a National Historic Trail commemorating the early Spanish exploration of the California Coast. The trail corridor covers a broad swath in this area, partly due to uncertainties about its exact alignment. There are no existing physical manifestations of the trail itself in the Vandenberg area.

800.5 Assessment of Adverse Effects

No historic or prehistoric sites exist within the APE. Although the project is located within the Anza Trail corridor it will have no permanent effects on the trail itself. The rocket will be launched from a mobile launch vehicle, which will be removed when the test is completed, and all other project impacts will take place within existing facilities. Annual grasses presently cover the proposed launch site area. These are expected to re-establish following removal of the mobile launch vehicle. Therefore, the project will not have lasting visual effects on the trail corridor. Based on these factors, the Air Force has determined that under 36 CFR 800.4 (d)(1) there will be No Historic Properties Affected by the Liquid Propellant Missile Test program at VAFB.

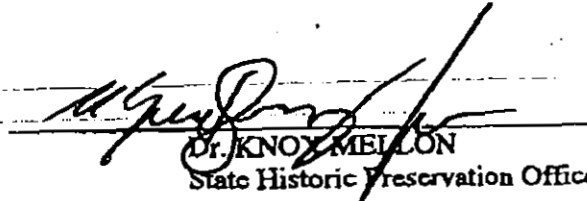
You may indicate the SHPO's concurrence with the USAF's determination pursuant to 36 CFR 800.5(b), by executing the signature block below and then returning a copy of the signed correspondence to the USAF.

Your receipt and concurrence will constitute satisfactory evidence of USAF compliance with Section 106 for the undertaking. If you do not concur with the USAF's determination, further consultation will be necessary.

If you have any questions please contact Mr. Robert Peterson at (805) 606-7453 (robert.peterson@vandenberg.af.mil) or Mr. Larry Spanne at 605-0748.

Sincerely


SCOTT W. WESTFALL, Lt Col, USAF
Commander, Environmental Flight

Concur: 
Dr. KNOX MELLON
State Historic Preservation Officer

Date: 4/8/2002

- Attachments:
1. Locator Map
2. Project Map
3. APE Map

cc:
HQ AFSPC/CEV
30 CBS/CC/CEV/CEVPC

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APPENDIX C
MATERIAL SAFETY DATA SHEETS



Material Safety Data Sheet

SPECIAL RP FUEL

April 20, 2001

MSDS #: CPC00002

CHEVRON PHILLIPS CHEMICAL COMPANY LP
1301 McKinney Street
Houston, Texas 77010-3030

PHONE NUMBERS

Emergency: (800) 231-0623 or
(510)231-0623 (International)
TRANSPORTATION (24 HR): CHEMTREC
(800)424-9300 OR (703)527-3887
Technical Services: (800) 852-5531
For Additional MSDSs: (800) 852-5530

A. Product Identification

Synonyms: Rocket Propulsion Fuel
Chemical Name: Mixture
Chemical Family: Hydrocarbon mixture
Chemical Formula: Mixture
CAS Reg. No.: Mixture
Product No.: 1063062, 1062257

Product and/or Components Entered on EPA's TSCA Inventory: YES

This product is in U.S. commerce, and is listed in the Toxic Substances Control Act (TSCA) Inventory of Chemicals; hence, it may be subject to applicable TSCA provisions and restrictions.

B. Components

<u>Ingredients</u>	<u>% By Vol.</u>
Heavy Catalytic Cracked Naphtha	30-35
Olefin Hydrocarbons	25-30
Toluene (108-88-3)	5-10
m-Xylene (108-38-3)	5-10
Benzene (71-43-20)	5-10
N-Heptane (142-82-5)	5-10

Light catalytic cracked petroleum distillate (64741-59-9)	5-10
Phenol (108-95-2)	1-5

C. Personal Protection Information

Ventilation: Use adequate explosion proof ventilation.

Respiratory Protection: For concentrations exceeding the recommended exposure limits, use NIOSH/MSHA approved air purifying respirator equipped with organic vapor cartridges. In case of spill or leak resulting in unknown concentration, use NIOSH/MSHA approved supplied air respirator.

Eye Protection: Use safety glasses with side shields or face shield if splashes could occur.

Skin Protection: Use Viton™ or Barricade™ coated gloves. Use Viton™ or Barricade™ protective garments to prevent skin contact.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Do not get in eyes, on skin or on clothing. Do not breathe vapor, mist or fume. Use only with adequate ventilation. Wash thoroughly after handling. Immediately remove and launder contaminated clothing before reuse. Wear protective equipment and/or garments described in Section C if exposure conditions warrant.

Store and use in a well-ventilated area. Store in a tightly closed container. Provide means for controlling leaks and spills. Keep away from heat, sparks, and flame. Bond and ground during liquid transfer.

E. Reactivity Data

Stability: Stable

Conditions to Avoid: Heat, sparks or flames

Incompatibility (Materials to Avoid): Oxygen or strong oxidizing agents.

Hazardous Polymerization: Will Not Occur

Hazardous Decomposition Products: Carbon oxides and various hydrocarbons formed when burned.

F. Health Hazard Data

Recommended Exposure Limits:

Ingredients	Source	TWA		STEL	
		ppm	mg/m3	ppm	mg/m3
Heavy Catalytic Cracked Naphtha (64741-54-4)	OSHA	100	400	-	-
	ACGIH	-	-	-	-
Olefin Hydrocarbons	OSHA	-	-	-	-
	ACGIH	-	-	-	-
Toluene (108-88-3)	OSHA	100	375	150	560
	ACGIH	50	188	-	-
m-Xylene (108-38-3)	OSHA	100	435	150	655
	ACGIH	100	434	150	651
Benzene (71-43-20)	OSHA	1	-	5	-
	ACGIH	0.5	1.6	2.5	8
N-Heptane (142-82-5)	OSHA	400	1600	500	2000
	ACGIH	400	1640	500	2050
Phenol (108-95-2)	OSHA (Skin)	5	19	-	-
	ACGIH (Skin)	5	19	-	-
Light catalytic cracked petroleum distillate (64741-59-9)	OSHA [Polynuclear Aromatics (PNA)]	-	0.2	-	-
	ACGIH [Polynuclear Aromatics (PNA)]	-	0.2	-	-

Acute Effects of Overexposure:

Eye: Corrosive, contact causes burns.

Skin: Corrosive, contact causes burns. Toxic by skin absorption. Chemical is absorbed through the skin in liquid or vapor phase.
Avoid any skin contact.

Inhalation: Toxic if inhaled. Irritating to the nose, throat causing coughing, wheezing and/or shortness of breath.

Ingestion: Toxic if swallowed. Corrosive and may cause severe and/or permanent damage to mouth, throat and stomach. If swallowed, may be aspirated into the lungs, resulting in pulmonary edema and chemical pneumonitis.

Subchronic and Chronic Effects of Overexposure:

Benzene has been designated as a carcinogen by the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), and the Occupational Safety and Health Administration (OSHA). Benzene may produce blood changes which include reduced platelets, reduced red blood cells, reduced white blood cells, aplastic anemia, and acute nonlymphocytic leukemia. Benzene has produced fetal death in laboratory animals and caused chromosome changes in humans and mutation changes in cells of other organisms.

Polynuclear aromatic (PNAs) hydrocarbons are a complex combination of hydrocarbons from heavy paraffinic distillate. PNAs are designated carcinogens by IARC, NTP and OSHA. Kidney, lung, and skin tumors have been reported in laboratory animals repeatedly exposed to PNAs. Lung tumors have been reported in humans repeatedly exposed to PNAs. Stillbirths, mutagenesis (DNA) and liver damage have been reported in laboratory animals exposed to PNAs.

Exposure of pregnant rats during gestation to toluene at levels 250 ppm and higher produced some maternal toxicity and embryo/fetotoxicity. A lifetime inhalation study in rats did not show any toxic effects even at the high dose of 300 ppm.

Behavioral signs of hearing loss were observed in rodents exposed well above the PEL for toluene subchronically. Comparable effects have not been reported in humans.

Other Health Effects:

Combustion (burning) of most carbon-containing material forms carbon monoxide. Carbon monoxide inhalation may cause carboxyhemoglobinemia. Chronic exposure to carbon monoxide causes fatigue, poor memory, loss of sensation in fingers, visual disturbances and insomnia. Carboxyhemoglobinemia is frequently misdiagnosed as flu.

Sensitive subpopulations to the inhalation of carbon monoxide exist. Carbon monoxide displaces oxygen in the bloodstream and therefore, can adversely affect people with pre-existing heart disease, pregnant women and smokers.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	<u>X</u>	<u>X</u>	Toxic	<u>X</u>	---
Suspect Carcinogen	---	---	Corrosive	<u>X</u>	---
Mutagen	<u>X</u>	---	Irritant	---	---
Teratogen	---	---	Target Organ Toxin	<u>X</u>	<u>X</u>
Allergic Sensitizer	---	---	Specify-Lung-Aspiration Hazard		
Highly Toxic	---	---	-Blood, Lung, Liver and Kidney Nervous System Toxin		
			-Reproductive Toxin Embryo/Fetotoxin		
			-Skin Hazard Photosensitizer		

First Aid and Emergency Procedures:

Eye: Immediately hold eyelids apart and irrigate eyes with running water for

at least 15 minutes and continue to irrigate until otherwise directed by a Physician. Treat for shock as necessary. Seek immediate medical attention.

Skin: Immediately flood affected area with running water for at least 15 minutes while removing contaminated clothing and shoes. Treat for shock as necessary. Seek immediate medical attention.

Inhalation: Immediately remove from exposure. If breathing is difficult, give oxygen. If breathing ceases, administer artificial respiration followed by oxygen. Treat for shock as necessary. Seek immediate medical attention.

Ingestion: If vomitus is bloody, do not attempt to give anything by mouth, otherwise, immediately rinse the mouth and lips and assist the subject in swallowing large amounts of water. Do not induce vomiting or attempt chemical neutralization. Treat for shock as necessary. Seek immediate medical attention.

Note to Physician: Highly toxic and possible aspiration into lungs. Induce vomiting under medical supervision due to the possibility of aspiration into lungs.

G. Physical Data

Appearance: Amber
Odor: Aromatic
Boiling Point: 140F - 428F
Vapor Pressure: 2-2.5 PSI
Vapor Density (Air = 1): <1
Solubility in Water: Slightly
Specific Gravity (H₂O = 1): 0.8 0.83
Percent Volatile by Volume: NA
Evaporation Rate (Butyl Acetate = 1): NA

H. Fire and Explosion Data

Flash Point (Method Used): <40F <4C(TCC)
Flammable Limits (% by Volume in Air): LEL 1.4% (Estimated)
UEL 7.6% (Estimated)
Fire Extinguishing Media: Dry chemical, foam, carbon dioxide (CO₂)

Special Fire Fighting Procedures: Evacuate area of all unnecessary personnel. Shut off source, if possible. Use NIOSH/MSHA approved self-contained breathing apparatus and other protective equipment and/or garments described in Section C if conditions warrant. Water fog or spray may be used to cool exposed equipment and containers. Do not

spray water directly on fire -
product will float and could be
reignited on surface of water.

Fire and Explosion Hazards: Carbon oxides and various
hydrocarbons formed when burned.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:

Evacuate area of all unnecessary personnel. Wear protective equipment and/ or garments described in Section C if exposure conditions warrant. Shut off source, if possible and contain spill. Keep out of water sources and sewers. Protect from sources of ignition. Absorb in dry, inert material (sand, clay, etc.). Transfer to disposal containers using non-sparking equipment.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):

Incinerate or place in RCRA permitted waste management facility.

J. DOT Transportation

Shipping Name: Gasoline
Hazard Class: 3 (Flammable Liquid)
ID Number: UN 1203
Packing Group: II
Marking: Gasoline, UN 1203
Label: Flammable Liquid
Placard: Flammable/1203
Hazardous Substance/RQ: RQ (Benzene)
Shipping Description: Gasoline, 3, UN 1203, PGII, RQ (Benzene)
Packaging References: 49 CFR 173.150, 173.202, 173.242

K. RCRA Classification - Unadulterated Product as a Waste

Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP).

Benzene: 6.0% (TCLP)
Flash: < 40F]

L. Protection Required for Work on Contaminated Equipment

Contact immediate supervisor for specific instructions before work is initiated. Wear protective equipment and/or garments described in Section C if exposure conditions warrant.

M. Hazard Classification

This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

<input type="checkbox"/> Combustible Liquid	<input type="checkbox"/> Flammable Aerosol	<input type="checkbox"/> Oxidizer
<input type="checkbox"/> Compressed Gas	<input type="checkbox"/> Explosive	<input type="checkbox"/> Pyrophoric
<input type="checkbox"/> Flammable Gas	<input checked="" type="checkbox"/> Health Hazard (Section F)	<input type="checkbox"/> Unstable
<input checked="" type="checkbox"/> Flammable Liquid	<input type="checkbox"/> Organic Peroxide	<input type="checkbox"/> Water Reactive
<input type="checkbox"/> Flammable Solid		

Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

N. Additional Comments

SARA 313

This product contains the following toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Chemical Name	CAS Number	Conc.
Toluene	108-88-3	9.0%
m-Xylene	108-38-3	8.0%
Benzene	71-43-2	6.0%
Phenol	108-95-2	1.05%
o-Cresol	95-48-7	1.05%

Chevron Phillips Chemical Company LP believes that the information contained herein (including data and statements) is accurate as of the date hereof. NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE AS CONCERNS THE INFORMATION HEREIN PROVIDED. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with any other materials or in any process. Further, since the conditions and methods of use of the product and information referred to herein are beyond the control of Chevron Phillips, Chevron Phillips expressly disclaims any and all liability as to any results obtained or arising from any use of the product or such information. No statement made herein shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents.



Lyndon B. Johnson Space Center
White Sands Test Facility
Material Safety Data Sheet
WSTF MSDS 4441

The information listed below is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. NASA or their contractor shall not be held liable for any damage resulting from handling or from contact with the above product.

Prepared By: NASA JSC WSTF
P.O. Drawer 20
Las Cruces, NM 88004
Days: (505) 524-5159
Emergency: (505) 524-5111

Product Name: Red Fuming Nitric Acid

1. Chemical and Common Names:

Nitric Acid, Red Fuming, a.k.a. UN 2032; CAS: 7697-37-2; Acide Nitrique (French); Acido Nitrico (Italian); Aqua Fortis; Azotic Acid; Azotowy kwas (Polish); Hydrogen Nitrate, Nitric Acid, over 40% (DOT); Salpetersaure (German); Salpeterzuroplossingen (Dutch); Nitric Acid, fuming (DOT); Nitric Acid, Red Fuming (DOT); Nitrous Fumes; Red Fuming Nitric Acid, RFNA

2. Physical and Chemical Characteristics:

Colorless to yellow to red corrosive liquid
Soluble in water
Boiling Point: 64.2 C
Melting Point: -52.0 C
Flash Point: Not Flammable
Autoignition Temperature: N/A
Lower Explosion Limit: N/A
Upper Explosive Limit: N/A
Vapor pressure: 139 mm @ 20 C
Vapor Density: 1.58
Specific Gravity: 1.55
DOT classification: Nitric Acid, Red Fuming; Label: Corrosive, Oxidizer and Poison. 8, UN 2032, Packing Group I, RQ: 1000



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3. Physical Hazards

Corrosive

Corrosive irritant to eyes, skin and mucous membranes.

Incompatibilities: Combustible organics, oxidizable matter, wood, turpentine, metal powder, hydrogen sulfide, etc.; strong bases.

4. Health Hazards:

Poison by inhalation. A corrosive irritant to skin, eyes, mucous membranes and teeth. Although not combustible, RFNA is a powerful oxidizing agent which may cause combustible materials to ignite. Can react explosively with many reducing agents. Will react with water or steam to produce heat and toxic, corrosive, and flammable vapors. When heated to decomposition it emits highly toxic fumes of NO_x .

Experimental teratogenic and reproductive effects.

Inhalation causes upper respiratory irritation which may seem to clear up only to return within a short time with increased severity. May also cause corrosive burns to the nose, throat and mouth. Can cause nitrogen oxide poisoning and pulmonary edema (fluid build up in the lungs). Ingestion may result in corrosive burns to the mouth, throat and stomach. Can be fatal if swallowed. Skin contact will result in severe burns. Absorption through the skin may be fatal. Eye contact may cause corneal burns, conjunctivitis, blindness.

Symptoms of exposure may include eye irritation, irritation of the mucous membranes, skin irritation, delayed pulmonary edema, pneumonitis, bronchitis, and dental erosion. May cause coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting.

Consensus Reports: EPA Genetic Toxicology Program.

5. Primary Route(s) of Entry

**Harmful by inhalation, skin contact, and if swallowed.
Target Organs:** eyes, respiratory system, skin, teeth.



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6. **Exposure Limits:**
OSHA PEL: (Transitional: TWA 2 ppm) TWA 2 ppm; STEL 4 ppm
ACGIH TLV: TWA 2 ppm; STEL 4 ppm
Niosh REL: (Nitric Acid) TWA 2 ppm
DFG MAK: 10 ppm (25 mg/m³)
IDLH Level: 100 ppm.

7. **Carcinogenic information:**
Not listed as a carcinogen or potential carcinogen.

8. **Generally Applicable Precautions for Safe Handling and Use (including appropriate hygienic practices, protective measures, and procedures for clean-up of spills and leaks):**

Dilute small spills with plenty of water only if the resulting splattering and reaction can be safely contained, then dilute with alkali. Otherwise use an inert absorbent.

Avoid inhalation of vapors and skin contact
Keep away from incompatible substances (fuels, other flammable substances, reducing agents)
Keep away from heat and direct sun
Store in well ventilated, properly drained site
Follow "Code for the Storage of Liquid and Solid Oxidizing Materials" (NFPA No. 43A)

9. **Generally Applicable Control Measures (engineering controls, work practices, or personal protective equipment):**

Wear appropriate NIOSH/MSHA-approved respirator or S.C.B.A., chemical-resistant gloves (Butyl rubber, Responder[™]), safety goggles, other protective clothing.

Use only in chemical fume hood
Safety shower and eye bath
Face shield
Do not breathe vapor
Do not get in eyes, on skin, or clothing
Avoid Prolonged or repeated exposure
Wash thoroughly after handling
Keep tightly closed



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Keep away from heat and direct sun
Store in cool dry place

10. Emergency and First Aid Procedures

First-Aid

In case of eye or skin contact, immediately flush eyes or skin with copious amounts of water for at least 15 minutes while removing contaminated clothing and shoes. Assure adequate flushing of the eyes by separating the eyelids with fingers. Get medical attention.

If inhaled, remove to fresh air. Keep victim warm and at rest. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

If swallowed, dilute with large amounts of water or milk if victim is conscious. Do not induce vomiting.

Call a physician.

Wash contaminated clothing before reuse.

Fire Fighting

Nitrogen oxides may be present from vented or ruptured containers. If water is added violent spattering may occur. Fight large fires with flooding amounts of water. In such cases, full protective equipment is recommended. Small fires should be treated with dry chemical extinguishers. Considerable heat is evolved when contacted with water. Wear SCBA under fire conditions. May cause ignition with certain combustible and organic materials. Nitration of wood and organics increases their flammability. Can react explosively with metallic powders, carbides, hydrogen sulfide and turpentine. Toxic nitrogen oxides will be released which may support combustion. Fight fires as appropriate for the fuel involved.

11. Date of Preparation: November 29, 1994

Current as of: October 20, 1997



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This information was compiled using information contained in the **HAZARDOUS CHEMICALS DESK REFERENCE** second edition, Richard J. Lewis Sr., Van Nostrand Reinhold 1991, ISBN 0-442-00497-4, the **QUICK SELECTION GUIDE TO CHEMICAL PROTECTIVE CLOTHING** second edition, Krister Forsberg and S.Z. Mansdorf, Van Nostrand Reinhold 1993, ISBN 0-442-01215-2 and the **NIOSH POCKET GUIDE TO CHEMICAL HAZARDS**, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, 1990, NIOSH No. 85-114.



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Material Safety Data Sheet
WSTF MSDS 4440

The information listed below is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. NASA or their contractor shall not be held liable for any damage resulting from handling or from contact with the above product.

Prepared By: NASA JSC WSTF
P.O. Drawer 20
Las Cruces, NM 88004
Days: (505) 524-5159
Emergency: (505) 524-5111

Product Name: Mixed Amine Fuel

1. Chemical and Common Names:

- Triethylamine, a.k.a. UN1296; CAS 121-44-8; (diethylamine)ethane; *n,n*-diethylmethanamine; ethanamine; *n,n*-diethyl; TEA; triethylamina (German); trietilamina (Italian)
- 2,4 dimethylaniline, a.k.a. 2,4-Xylidine; UN 1711; CAS 95-68-1; 1-amino-2,4-dimethylbenzene; 4-amino-1,3-dimethylbenzene; 4-amino-3-methyltoluene; 4-amino-1,3-xylene; 2,4-dimethylbenzidine; 2,4-dimethylphenylamine; 2-methyl-*p*-toluidine; 4-methyl-*o*-toluidine; 2,4-xylidene (MAK); *m*-xylidine (DOT); *m*-4-xylidins (DOT)
- 2,6 dimethylaniline, a.k.a. 2,6-Xylidine; UN 1711; CAS 87-62-7; 2,6-dimethylbenzenamine; NCI-C56188; *o*-xylidine; 2,6-xytylamine
- 2,3 dimethyl aniline, a.k.a. 2,3-Xylidine; UN 1711; CAS 87-59-2; 2,3-dimethylbenzenamine; 2,3-dimethylphenylamine; 2,3-xytylamine; *o*-Xylidine (DOT)
- 3,4 dimethylaniline, a.k.a. 3,4-Xylidine; UN 1711; CAS 95-64-7; 3,4-Dimethylaminobenzene; 3,4-Dimethylphenylamine; 3,4-Xytylamine

2. Physical and Chemical Characteristics of Mixture:

Colorless liquid
Aromatic odor
Miscible in water, alcohol and ether
Boiling point: 88.8 °C
Melting Point: -115 °C
Flash point: -6 °C



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Autoignition Temperature: 311 °C
Lower Explosive Limit: 1.2% by volume
Upper Explosive Limit: 5% by volume
Vapor pressure: 51.75 mm @ 20 °C
Vapor Density: 3.5
Specific Gravity: 0.726
DOT classification: Flammable liquids, poisonous, n.o.s. (triethylamine, xylidines), 3, UN 1992, Packing Group II, RQ 5000

3. Physical Hazards

Flammable (USA definition)
Corrosive
Causes Burns

Incompatibilities: Acids, Oxidizing Agents
Hazardous Combustion or decomposition products: carbon monoxide, carbon dioxide, and nitrogen oxides

Irritation data:

SKN-RBT 10 mg/2H OPEN MLD	AMIEBC 4,119,51
SKN-RBT 365 mg OPEN MLD	UCDS 3/23/70
SKN-RBT 500 mg/24H MLD	857CAE -,434,86
EYE-RBT 250 mg OPEN SEV	AMIOBC 4,119,51
EYE-RBT 50 PPM/300-I SEV	AMIEBC 3,287,51
EYE-RBT 250 U _g /24H SEV	857CAE -,434,86

TOXICITY DATA:

ORL-RAT LD50: 460 mg/Kg	AMIEBC 4,119,51
ORL-MUS LD50: 346 mg/Kg	HYSAAV 30(7-9),351,65
IHL-MUS LD50: 6 gm/M3/3H	85GMAT -,113,82
IPR-MUS LD50: 405 mg/Kg	YKZAJ 97,1117,77
SKN-RBT LD50: 5700 mg/Kg	AMIEBC 4,119,51
IHL-MAM LD50: 6 gm/M3	TPKVAL 14,80,75



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4. Health Hazards:

Moderately toxic by ingestion and skin contact. Mildly toxic by inhalation. Experimental reproductive effects. Mutation data reported. A skin and severe eye irritant. Can cause kidney and liver damage. A very dangerous fire hazard when exposed to heat, flame, or oxidizers. Explosive in the form of vapor when exposed to heat or flame.

Lachrymator (strong eye irritant).

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Inhalation may be fatal as a result of spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema (fluid build up in the lungs).

Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

5. Primary Route(s) of Entry

Harmful by inhalation, in contact with skin, and if swallowed
Readily absorbed through skin
Poison by intravenous route.
Target Organs: central nervous system, liver, kidneys, heart

6. Exposure Limits:

OSHA PEL (8H TWA): 10 ppm (100mg/m³)
ACGIH TLV-TWA: 10 ppm
STEL: 15 ppm

7. Carcinogenic Information:

Xylidine is listed by the ACGIH as a class A2 carcinogen. Class A2 signifies a suspected human carcinogen and a proven animal carcinogen.
Reported in EPA TSCA Inventory



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8. **Generally Applicable Precautions for Safe Handling and Use (including appropriate hygienic practices, protective measures, and procedures for clean-up of spills and leaks):**

Wash thoroughly after handling
Keep tightly closed
Keep away from heat, sparks, and open flame
Store in cool dry place

9. **Generally Applicable Control Measures (engineering controls, work practices, or personal protective equipment):**

Wear appropriate NIOSH/MSHA-approved respirator, chemical-resistant gloves (composite butyl/nitrile rubber), safety goggles, other protective clothing.

Use only in chemical fume hood
Safety shower and eye bath
Face shield
Do not breathe vapor
Do not get in eyes, on skin, or clothing
Avoid Prolonged or repeated exposure
Wash thoroughly after handling
Keep tightly closed
Keep away from heat, sparks, and open flame
Store in cool dry place

10. **Emergency and First Aid Procedures:**

First-Aid

In case of eye or skin contact, immediately flush eyes or skin with copious amounts of water for at least 15 minutes while removing contaminated clothing and shoes. Assure adequate flushing of the eyes by separating the eyelids with fingers.

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.



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If ingested, wash out mouth with water provided person is conscious. Do not induce vomiting.

Call a physician.

Wash contaminated clothing before reuse.

Fire Fighting

Carbon dioxide, dry chemical powder or appropriate foam.

Wear self-contained breathing apparatus (SCBA) and protective clothing to prevent contact with skin and eyes.

Vapor may travel considerable distance to source of ignition and flash back.

Emits toxic fumes under fire conditions.

11. Date of Preparation:

December 12, 1994

Current as of: Monday, February 02, 1998

This information was compiled using information contained in the MSDS of each constituent chemical, the HAZARDOUS CHEMICALS DESK REFERENCE second edition, Richard J. Lewis Sr., Van Nostrand Reinhold 1991, ISBN 0-442-00497-4, the AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS 1994-1995 edition, ISBN 1-882417-06-2, and the QUICK SELECTION GUIDE TO CHEMICAL PROTECTIVE CLOTHING second edition, Kristor Forsberg and S. Z. Mansdorf, Van Nostrand Reinhold 1993, ISBN 0-442-01215-2.

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APPENDIX D
BIOLOGICAL SURVEY



BIOLOGICAL SURVEY

SURVEY FOR THE PROPOSED LIQUID PROPELLANT MISSILE LAUNCH SITE

Submitted To:

30CES/CEV and Det 9,
SMC/TEVS

25 October 2001

Prepared By:

SRS Technologies
Systems Development Division
Lompoc, CA

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Executive Summary

In preparation for two liquid propellant missile launches at Vandenberg Air Force Base (VAFB), a site of approximately 17 acres must be cleared and leveled. Prior to this work, a survey was conducted on 9 September 2001 to identify any plant and animal species present in the area. Survey results were based on visual confirmation, animal sign, and habitat type. Seven mammal, nine herpetile, and ten avian species were identified as present or potentially present in the area. Two Federal Species of Concern (FSC) were identified, the loggerhead shrike (*Lanius ludovicianus*) and the western burrowing owl (*Speotyto cunicularia hypugea*). Twenty-three plant species were identified in the area, including the FSC, Kellogg's horkelia (*Horkelia cuneata* ssp. *sericea*).

Site Description

The proposed launch site is located within Vandenberg Air Force Base (VAFB) on the San Antonio Terrace. It is composed mostly of non-native grassland and central coast scrub. The grassland is dominated by veldt grass (*Ehrharta calycina*). The central coast scrub is located in the southwestern portion of the site and is dominated by coyote brush (*Baccharis pilularis*) and mock heather (*Ericameria ericoides*). To the north east of the site, approximately 450m and across Point Sal Road, the grassland grades into oak woodland.

Methods

The proposed launch site and access road were surveyed on foot on 9 Sept. 2001. Animal and plant species encountered were identified [to subspecies (ssp.) when possible] and recorded. Species were also listed when signs of their presence (tracks and scat) were found in the project area. In addition to surveying the area on foot, an avian survey was conducted from a blind in the center of the site.

Results

Seven mammalian, eight herpetile, and ten avian species were identified as having the potential to be present at the project site (Table 1). Of the species expected to occur due to habitat type present on the site, only four mammal, two lizard, and nine bird species were confirmed to be in the area. More detailed surveys at various times of the year could confirm the presence of additional species. However, it was not felt that the added effort would provide significantly different results from this and past surveys. Two FSC animals, the loggerhead shrike (*Lanius ludovicianus*), and the western burrowing owl (*Speotyto cunicularia hypugea*) were identified as being present or potentially present in the project area. Both species are also listed as California Species of Concern (CSC).

Twenty-three plant species were identified during the field survey (Table 2). Kellogg's horkelia (*Horkelia cuneata sericea*), listed as a FSC, was the only special status plant species found. No other special status plant species were expected to be found at the site.

Table 1. Wildlife species present or likely to occur within project site.

SCIENTIFIC NAME	COMMON NAME
Mammals	
<i>Canis latrans</i>	Coyote
<i>Spermophilus beecheyi</i>	California ground squirrel
<i>Lepus californicus</i> **	Blacktail jackrabbit
<i>Microtus californicus</i>	California vole
<i>Peromyscus californicus</i>	California mouse
<i>Peromyscus maniculatus</i> **	Deer mouse
	Domestic cattle
Herpetiles	
<i>Crotalus viridis</i> **	Western rattlesnake
<i>Elgaria multicarinata</i>	Southern alligator lizard
<i>Eumeces skiltonianus</i> **	Western skink
<i>Pseudacris regilla</i> **	Pacific Treefrog
<i>Pituophis melanoleucus</i> **	Gopher snake
<i>Sceloporus occidentalis</i>	Western fence lizard
<i>Thamnophis elegans</i> **	Western terrestrial garter snake
<i>Thamnophis sirtalis</i> **	Common garter snake
Avian	
<i>Buteo jamaicensis</i>	Red-tailed hawk
<i>Chamaea fasciata</i>	Wrentit
<i>Euphagus cyanocephalus</i>	Brewer's blackbird
<i>Falco sparverius</i>	American kestrel
<i>Sayornis saya</i>	Say's phoebe
<i>Speotyto cunicularia</i> ssp. <i>hypugea</i> *	Western burrowing owl
<i>Sturnella neglecta</i>	Western meadowlark
<i>Thyromanes bewickii</i>	Bewick's wren
<i>Zonotrichia atricapilla</i>	Golden-crowned sparrow
<i>Lanius ludovicianus</i> * **	Loggerhead shrike

* Federal Special Concern Species and California Species of Concern

**Species potentially in area based on habitat type and previous surveys, but not encountered during the survey.

Table 2. Plant species identified within project site.

SCIENTIFIC NAME	COMMON NAME
<i>Baccharis pilularis</i>	Coyote brush
<i>Bromus diandrus</i>	Rip-gut brome
<i>Bromus hordeaceus</i>	Soft-chess brome
<i>Calystegia macrostegia</i> ssp. <i>cyclostegia</i>	Morning glory
<i>Carpobrotus chilensis</i>	Sea fig
<i>Carpobrotus edulis</i>	Hottentot fig
<i>Chorizanthe</i> sp.	Spineflower
<i>Croton californica</i>	Croton
<i>Ehrharta calycina</i>	Veldt grass
<i>Eremocarpus setigerus</i>	Turkey mullein
<i>Ericameria ericoides</i>	Mock heather
<i>Eriogonum parvifolium</i>	Coastal buckwheat
<i>Erodium</i> sp.	Filaree
<i>Gnaphalium luteo-album</i>	Cudweed
<i>Hemizonia increscens</i> ssp. <i>increscens</i>	Tarplant
<i>Heterotheca grandiflora</i>	Telegraph weed
<i>Horkelia cuneata</i> ssp. <i>sericea</i> *	Kellogg's horkelia
<i>Lessingia filaginifolia</i>	California aster
<i>Lotus</i> sp.	Deerweed
<i>Lupinus albifrons</i>	Bush lupine
<i>Quercus agrifolia</i>	Coast live oak
<i>Rubus ursinus</i>	California blackberry
<i>Toxicodendron diversilobum</i>	Poison oak

*Federal Special Concern Species

Discussion/Recommendations

Western Burrowing Owl

Burrowing owls are year-round residents of open, dry grassland, desert habitats, and open scrub communities. This small owl can be active during the day and night. They usually nest in abandoned ground squirrel (or other small mammal) burrows, although they may dig their own burrows in soft soil. Although no nesting records have been documented on VAFB in the last decade, they have been sighted in coastal scrub habitat on north and south VAFB during the winter months.

The presence of a burrowing owl at this site may represent an overwintering individual. The possibility exists that one or more owls could be present in underground burrows when site preparation begins. This has the potential to impact the owl(s) if the site

preparation is initiated while the bird(s) are still in the burrows. A qualified biologist should survey the area within a week prior to site preparation and again immediately prior to initiation of work to ensure no burrowing owls are present in the area where they could potentially be injured by equipment. In addition, even though nesting burrowing owls have not been reported on VAFB in the last decade, a qualified biologist should survey the site for nesting activity two to three weeks prior to, and immediately prior to initiation of site preparation, if preparation is going to be done between April and June during the burrowing owl's breeding season.

Loggerhead shrike

This common resident and winter visitor of lowlands and foothills throughout California prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. It builds nests on stable branches of densely foliated shrubs or trees. The shrike's breeding period extends from March through May, with young becoming independent in July or August.

The presence of loggerhead shrikes at the site is not of concern outside of their breeding season since any individuals in the area will most likely leave at the beginning of the site preparation. However, during the breeding season there is the possibility of nesting individuals within the project area, specifically in the coast scrub. A qualified biologist should survey this area for nesting activity two to three weeks prior to and immediately prior to initiation of work to determine whether any nests are present that could potentially be impacted by the project.

Kellogg's horkelia

This matting herbaceous perennial plant is widely distributed throughout Vandenberg in the central coastal scrub in sandy soils on old dunes and coastal sand hills. Kellogg's horkelia is located throughout the site. It is recommended that seed be collected from the area prior to site preparation in order to reseed after the site is abandoned and/or for restoration in other areas within VAFB.

California Horned Lizard

Horned lizards are found in areas with abundant, open vegetation such as riparian scrub, coastal sage scrub, coastal dune scrub, open chaparral, and annual grassland with loose sandy soils and an open shrub canopy. This ground dweller is active above ground in April through October. Horned lizards often bask in the early morning on the ground, or on elevated objects such as low boulders or rocks. Periods of inactivity and winter hibernation are spent burrowed into the soil under surface objects such as logs and rocks, in mammal burrows or in crevices.

Silvery Legless Lizard

This fossorial lizard is found primarily in areas with sandy or loose organic soils or where there is plenty of leaf litter in coastal dune scrub, valley-foothill scrub, chaparral, and coastal scrub habitat types. Legless lizards can seek cover under surface objects such as flat boards, cow patties, and rocks where they lie barely covered in loose soil. They are often encountered buried in leaf litter or burrowing near the surface through loose or sandy soil.

California horned lizards and silvery legless lizards were surveyed for at the site and none were found. Both species were excluded from Table 1 because there was no suitable habitat found and their occurrence at the site is highly unlikely. The ground cover is fairly dense veldt grass and the soils are compacted, effectively deterring any burrowing by these two species.

Recommendations Summary:

1. Site preparation should occur between the months of August and March to minimize potential impacts to special status breeding birds.
2. Conduct surveys for western burrowing owls two to three weeks prior and immediately prior to site preparation.
3. Conduct surveys for loggerhead shrike breeding activity two to three weeks prior and immediately prior to site preparation, if the work is to occur between March and July.
4. Collect Kellogg's horkelia seed from the area to reseed after site is abandoned and/or for restoration in other areas within VAFB.

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