ENVIRONMENTAL IMPACT ANALYSIS PROCESS

VOLUME III
FINAL ENVIRONMENTAL IMPACT STATEMENT
CONSTRUCTION AND OPERATION OF
TITAN IV/CENTAUR LAUNCH COMPLEX

VANDENBERG AIR FORCE BASE, CALIFORNIA
AUGUST 1990

DEPARTMENT OF THE AIR FORCE

COVER SHEET

(a) Responsible Agency: U.S. Air Force (USAF)

(b) Proposed Action: Construction and operation of Titan IV/Centaur Launch Complex (TCLC) on South Vandenberg Air Force Base (VAFB), California, for launching the Titan IV/Centaur space vehicle. This action would: (1) support requirements for timely and reliable launch of critical Department of Defense (DOD) satellites from a location where highly inclined and polar orbits can be safely achieved, (2) provide capability to launch payloads in the 10,000 pound class to high energy, inclined orbits, and (3) maintain assured access to space by providing backup launch capability for the Titan IV/NUS (No Upper Stage).

(c) Preferred Alternative: Based on environmental analysis undertaken for the Draft Environmental Impact Statement (EIS), comments on the Draft EIS received from federal, state, and local government agencies, elected officials, the public (individuals and organizations), and Congressional action, USAF has determined that the conversion and subsequent operation of the existing Space Launch Complex 6 (SLC-6) is the preferred alternative to meet DOD launch program requirements.

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(d) Designation: Final Environmental Impact Statement (Final EIS)

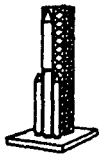
(f) Abstract: This EIS addresses the construction and operation of the proposed action on South VAFB, California, to provide for processing and launch of the Titan IV/Centaur, an unmanned space launch vehicle, capable of launching payloads in the 10,000-pound class into high energy, near-polar orbits.

Alternatives considered include the no action alternative and the development and operation of the facility at three undeveloped sites and one developed site (SLC-6) on south VAFB.

Primary impacts to the physical environment of South VAFB would involve soil and vegetation loss during construction (for the undeveloped alternatives) and effects of sonic boom on Channel Islands wildlife during launch events. Primary impacts to the human environment of north Santa Barbara County relate to the potential for a maximum of 550 employment opportunities during project construction and 400 during operations. The primary regional effects of temporary and permanent population growth would be increases in economic activity and in demands on public services and facilities. Other impacts would include the visual impacts from implementation at one of the undeveloped sites and the potential closure of Jalama Beach County Park during launch events. Potential impacts to health and safety also would occur, related to the fuels utilized.

Impacts to the environment from implementation of the proposed action at the Vina Terrace, Boathouse Flats or Cypress Ridge site would be similar. For most environmental considerations, impacts from the proposed implementation at SLC-6 would be substantially less.

(g) Released to the public August 10, 1990.



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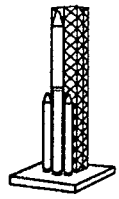

SUMMARY

SUMMARY

Consistent with the President's Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500 - 1508) and Air Force Regulation AFR 19-2, this Final Environmental Impact Statement (EIS) does not reprint the Draft EIS (USAF 1989c) since changes to the Draft EIS in response to comments are minor. Unless indicated otherwise, the term Space Launch Complex 7 (SLC-7) was used for convenience throughout the Draft EIS to refer to the proposed new launch capability. That program has been retitled Titan IV/Centaur Launch Complex (TCLC), and that new title is used throughout this final EIS. As described in Chapter 1.0, Introduction, this Final EIS provides public and agency comments and responses to those comments, addenda and errata to the Draft EIS, documentation of the Draft EIS public hearings, and additional information in response to comments.

INTRODUCTION

The U.S. Air Force (USAF) has proposed the construction and operation of the TCLC in support of the Department of Defense (DOD) space program. The proposed action would be located at Vandenberg Air Force Base (VAFB), California (see Figure S.1, Regional Location Map), and be designed for a minimum operational period of 25 years.

The Titan IV/Centaur is an unmanned, expendable space launch vehicle capable of launching critical DOD satellites, including payloads in the 10,000-pound class, to high-energy orbits. The proposed space launch complex allows achievement of polar and highly inclined orbits. It would be designed specifically to accommodate the Titan IV/Centaur, but would also serve as a backup to other facilities for launch of the Titan IV/NUS (No Upper Stage) to assure access to space and timely and reliable launch of critical missions. The proposed facility represents the latest modification to the continuing Titan program at VAFB.

VAFB is assigned to the USAF Strategic Air Command (SAC). As host command, SAC's 1st Strategic Aerospace Division (1STRAD) is responsible for providing management, operational analysis, and material support for SAC and over 40 federal and civilian tenant agencies located at VAFB, as well as for controlling and conducting the SAC Intercontinental Ballistic Missile (ICBM) operational flight tests into the Western Test Range (WTR). VAFB provides extensive launch and technical support facilities to sustain the variety of space and missile systems that operate from the base.

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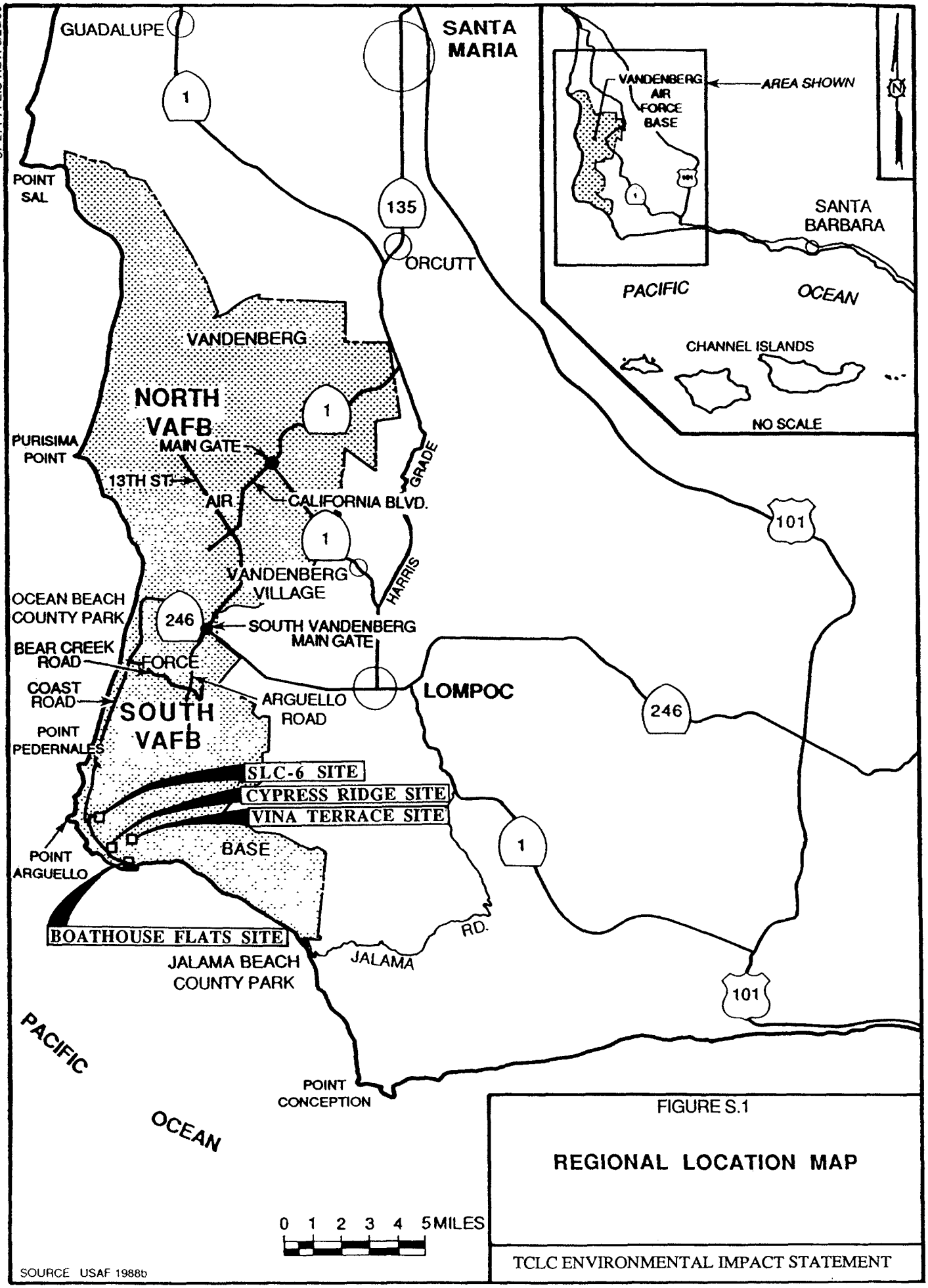


FIGURE S.1

REGIONAL LOCATION MAP

TCLC ENVIRONMENTAL IMPACT STATEMENT

A principal tenant of VAFB is the Western Space and Missile Center (WSMC). WSMC and the Eastern Space and Missile Center (ESMC) are subordinate organizations to Air Force Systems Command (AFSC), Space Systems Division (SSD). ESMC is responsible for operating and maintaining the Eastern Test Range (ETR) at Cape Canaveral Air Force Station (CCAFS), Florida, while WSMC is responsible for operating and maintaining the Western Test Range at VAFB. WSMC goals are to:

- Process and launch all U.S. polar orbiting satellites, utilizing Atlas, Titan, and Scout booster rockets.
- Conduct flight tests and evaluations of all new USAF ICBM systems, including Peacekeeper, Rail Garrison, modified Minuteman, and Small ICBM.
- Operate the WTR (a national test range) in support of critical space programs, ICBM development, and aeronautical systems testing to assure essential telemetry, flight analysis, and range safety.

In addition to the Titan program, VAFB has hosted ongoing space launch activities associated with the Scout, Delta, Atlas, and Space Shuttle programs for over 25 years. Space Launch Complex 6 (SLC-6) was modified for the Space Shuttle from its original configuration for the Manned Orbital Laboratory (MOL) program, but has since been placed in mothball status. It is being evaluated as an alternative for the proposed action. Other recent construction activities at VAFB have centered on Space Launch Complex 4 (SLC-4). SLC-4 East is being modified for processing and launch of the Titan IV/NUS. SLC-4 West has been modified and is currently an operational Titan II facility.

VAFB is located on a promontory of the California coast where space vehicles can be launched in southerly directions over the Pacific Ocean without overflying populated areas. This ability to launch over unpopulated areas is necessary for the maintenance of a controlled launch safety program. VAFB provides the only location within the contiguous United States where hazards from southerly launches of large boosters can be maintained at acceptable levels. In general, the VAFB launch azimuths are complementary to the over-water launch azimuths available at CCAFS and the National Aeronautic and Space Administration (NASA) Kennedy Space Center in Florida, which both provide for near-equatorial satellite orbits.

The configuration of the Titan IV/Centaur vehicle requires a specific launch pad design and associated support facilities. Although these facilities exist at CCAFS in Florida, launches from them are constrained for safety reasons to easterly azimuths between 35 and 120 degrees. Consequently, polar orbits cannot be safely achieved.

Based on the environmental analysis undertaken for the Draft EIS, the comments received from federal, state, and local government agencies, elected officials, the public (individuals and organizations) on the Draft EIS, and Congressional action taken since the issuance of the Draft EIS, USAF has determined that the conversion of and subsequent operation of the existing SLC-6 is the preferred alternative to meet DOD launch program requirements.

PROPOSED ACTION

PROJECT ELEMENTS

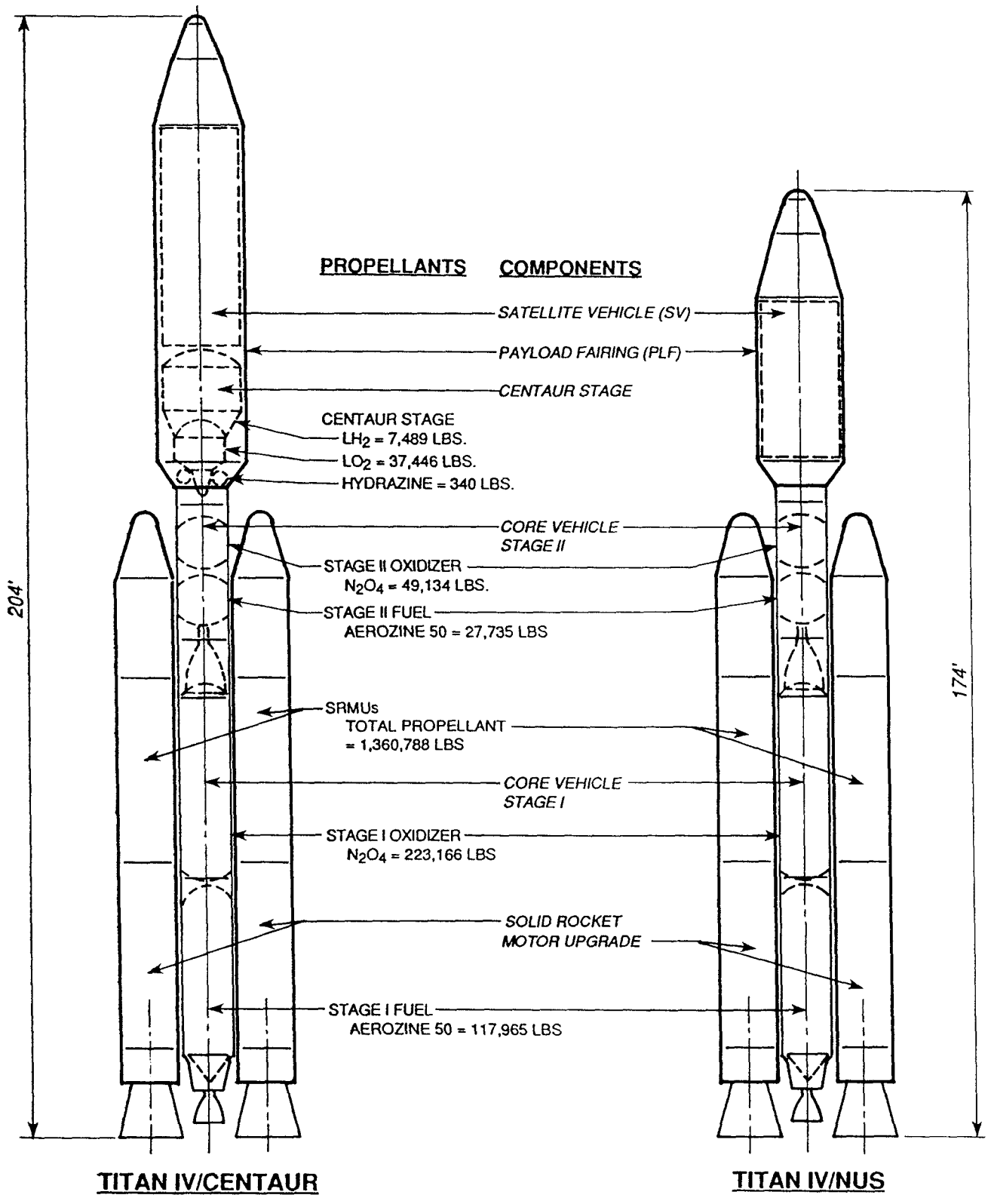
This section provides descriptions of project elements common to the alternatives considered. Discussion of elements particular to individual alternatives are contained in the Project Alternatives section. Project elements necessary for the proposed TCLC include the Titan IV/Centaur vehicle, onsite facilities, adjacent offsite facilities (such as utilities and other ancillary facilities), and other existing VAFB facilities (such as the Launch Control Center).

The launch complex provides the ability to assemble, check out, and launch the Titan IV/Centaur or, in the case of a launch abort, to safely shut down the vehicle systems. Its design includes launch control and check-out equipment. Following a launch, post-launch refurbishment and preparation for the next launch would occur according to specific mission requirements. Commodity storage capacity for propellants (fuels, oxidizers, etc.) is planned to meet a timely turnaround requirement for successive launches.

Ancillary facilities adjacent to the launch complex include a parking area for privately-owned vehicles (POVs), a weather station, a sanitary sewage treatment plant, evaporation/percolation ponds, an electrical substation, and utility corridors. Elements of the launch complex, including the Titan IV/Centaur space launch vehicle, primary support structures, and ancillary structures, are described below.

Titan IV/Centaur Space Launch Vehicle

Components of the Titan IV/Centaur include two upgraded Solid Rocket Motors (SRMUs), Core Vehicle (stages I and II), Centaur Stage, Payload Fairing (PLF), and Satellite Vehicle (SV) (see Figure S.2, Titan IV Vehicle Configurations). Another configuration that would be supported from the proposed launch complex is the Titan IV/NUS launch vehicle (see Figure S.2).



LEGEND

LH_2	-	LIQUID HYDROGEN
LO_2	-	LIQUID OXYGEN
N_2O_4	-	NITROGEN TETROXIDE
AEROZINE	-	50% HYDRAZINE, 50% UDMH

SOURCE: USAF 1988b

FIGURE S.2

TITAN IV
VEHICLE CONFIGURATIONS

The two SRMUs power the initial liftoff and together contain a total of approximately 1.4 million pounds of solid rocket propellant. The SRMUs fire for approximately two and one-half minutes, at which time they separate from the core vehicle. The expended SRMUs fall into the ocean and are not recovered. The core vehicle is constructed in two stages and uses liquid propellants consisting of a fuel and an oxidizer. Stage I burns for approximately three minutes, at which time it separates from Stage II. Stage II then burns for approximately four minutes, at which time it separates from the remainder of the space vehicle. These stages also fall into the ocean and are not recovered. The Centaur is the last stage of the space launch vehicle and is used to boost the satellite into high energy orbit with one to three burns, depending on the desired orbit altitude for the satellite. After the final burn, the Centaur separates from the satellite and remains in orbit.

The PLF consists of three sections called "trisectors" which, when joined, form the cylindrical satellite housing. The PLF trisectors are jettisoned during the Stage I burn, fall into the ocean, and are not recovered.

Primary Support Structures

Various support structures and equipment are necessary to process and launch the Titan IV/ Centaur. These consist of specific structures at the launch complex as well as facilities and utilities located elsewhere on VAFB. The primary support structures described below would be located within the launch complex area.

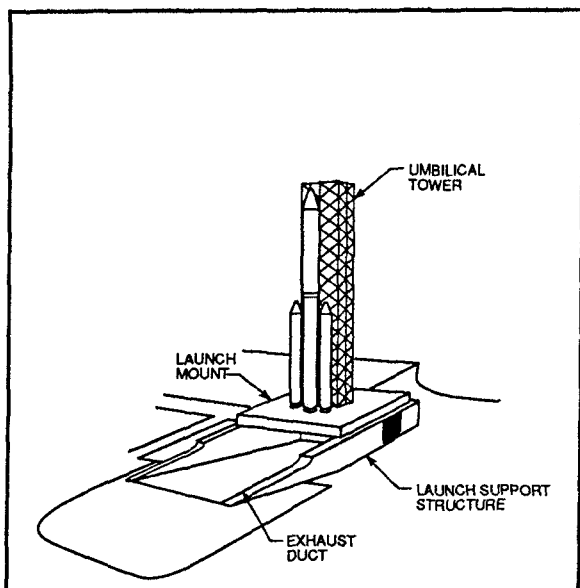
Launch Support Structure

The Launch Support Structure (LSS) is a partially underground concrete structure, located near the launch mount area (see Figure S.3, Conceptual Design, Primary TCLC Support Structures). The LSS would have electrical, computer, and communications equipment necessary for processing the launch vehicle.

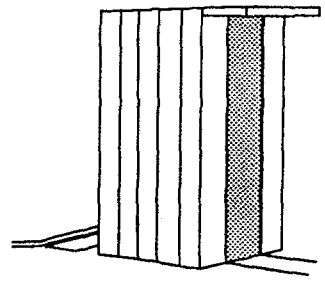
The LSS would be constructed to withstand the effects of a launch. This is accomplished by designing the structure to withstand launch-induced overpressure and by providing flame shields and protective coatings to reduce the effect to the structure from heat generated by the SRMUs.

Launch Mount, Umbilical Tower, and Exhaust Duct

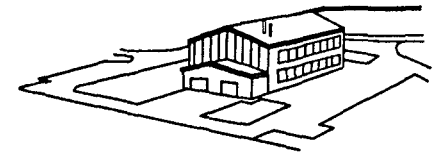
The Launch Mount (LM) and Umbilical Tower (UT) are situated near each other over the exhaust duct (see Figure S.3). The LM provides structural support for the launch vehicle. It also provides the staging area and facilities necessary to support launch-related activities, including assembly of the launch vehicle components, systems check-out, and launch. The exhaust duct, an open



LAUNCH SUPPORT STRUCTURES



MOBILE SERVICE TOWER



OPERATIONS SUPPORT BUILDING

FIGURE S.3

CONCEPTUAL DESIGN PRIMARY TCLC SUPPORT STRUCTURES

concrete channel, directs the exhaust flames and resulting plumes from the ignition of the two SRMUs away from the launch deck and complex for safe dispersal. The exhaust duct also stores wastewater runoff from launch deluge and fire suppression activities for treatment at a later date. The UT provides electrical, propellant, and air conditioning systems to support the launch vehicle while it is on the LM. The UT also provides personnel access to various levels of the space launch vehicle during final launch preparation.

Mobile Service Tower

The Mobile Service Tower (MST) (see Figure S.3) is an approximately 300-foot-high structure, housing a 220- to 240-ton crane to be used for vehicle assembly and a clean enclosure for satellite vehicle integration and testing. The MST has internal platforms that provide access to the launch vehicle. The MST is located on a track and is moved into place surrounding the LM. Launch vehicle components arrive at the launch pad deck on transporters and are positioned under the MST crane to be hoisted into a vertical position on the LM.

Operations Support Building

The Operations Support Building (OSB) provides facilities necessary for daily engineering and operations support and coordination of the proposed project (see Figure S.3). Included within the OSB are: briefing/training room, technical operations area, offices, data library, communications equipment, launch complex management center, maintenance and machine shops, storage, toilets, lockers, showers, lunchroom, and other necessary personnel support areas.

Ancillary Project Elements

Ancillary project elements at other locations within VAFB also are necessary for operating the TCLC. These include roads, buildings, storage facilities, and utilities. Ancillary roads and utilities would link the TCLC with other existing VAFB systems.

Roads and Parking

New roads would be constructed or existing roads would be upgraded to provide access to and security patrol roads for the facility. A POV parking area would be located adjacent to the launch complex within the site boundary.

Support Equipment Buildings

Support equipment buildings would be provided within the fenced launch complex area. These facilities would include a paint and lubricant storage building, ordnance bunker, storage facility, essential power building, and other structures, as necessary.

Propellant and Gas Holding Areas

Propellant and gas holding areas include a gas storage area, Titan IV core vehicle fuel and oxidizer holding areas, payload fuel and oxidizer holding pads, and cryogenic commodity holding areas. The various holding areas would be equipped with pollution control devices, as appropriate. Storage facilities and approximate commodity quantities are as follows:

- The Gas Storage Area would include storage and handling facilities for approximately 3,000 cubic feet of gaseous helium, at 6,000 psig, and 5,000 cubic feet of gaseous nitrogen, also at 6,000 psig.
- The Titan Core Vehicle Oxidizer (N_2O_4) Storage Area would consist of a 40,000-gallon ready storage vessel (RSV), pump, vapor control system, propellant loading unit, and a 40,000-gallon waste vessel. Separate containment areas are provided for the storage and waste vessels. These areas are sized to contain about 60,000 gallons each.
- The Titan Booster Vehicle Fuel (Aerozine 50) Storage Area would consist of a 40,000-gallon RSV, pump, vapor control system, propellant loading unit, and a 40,000-gallon waste vessel. In addition, an automatic deluge water system would dilute any spill, thereby reducing the possibility of vapors escaping to the atmosphere. There would be two separate containment areas for the RSV and waste vessel. Each containment area would have a volume of approximately 175,000 gallons and would be designed to hold the contents of each vessel, plus deluge water, at a ratio of 1:3. In addition, there is a 1,500-gallon sump within the waste tank containment area. The sump functions as a drain from each area and is designed for one-way flow so that fluid which enters cannot flow out.
- The Payload Fuel and Oxidizer Holding Pads would be used for short-term storage until payload fuel and oxidizer could be transferred to the satellite vehicle.
- The Cryogenic Holding Areas would include storage for about 15,000 gallons of liquid oxygen (LO_2), about 40,000 gallons of liquid hydrogen (LH_2), and about 4,000 gallons of liquid helium (LHe). The liquid hydrogen area would use a flare stack to burn excess vapor, and the liquid oxygen area would use a dump pond to evaporate liquid oxygen spills. Liquid helium spills would be contained by a wall surrounding the liquid helium tank.

Utilities/Utility Corridors

Utilities necessary for operation of the proposed action would include a series of onsite systems, including water (potable, wastewater, and deluge), sanitary sewer, propane gas, communications, and electrical. Configurations of utility corridors for each alternative are provided in the discussion of Project Alternatives.

Electrical

Electrical demand for the launch complex is estimated to be approximately 6,000 kVA. A switching mechanism in the substation would allow either commercial or standby power to be fed to the secondary power distribution system. During launch processing, the Space Transportation System (STS) Power Plant would be used to supply power, with commercial power providing a standby power source. For launch, commercial power would be used, with the STS Power Plant providing backup. An essential power generator has also been included in the proposed concept. This would be a 480 V, three-phase generator capable of supplying a minimum of 500 kVA. In case of a power failure during launch operations (i.e., in the event of failure of both the STS Power Plant and commercial power supply), the essential power generator would supply power for the launch site security system and for essential launch shutdown and safety functions.

Propane

Propane gas would be utilized for heating and cooling and as auxiliary fuel for flare stack pilot flames, if required. Appropriate storage vessels and distribution lines would be provided in support of these needs.

Potable Water

A distribution system would supply water for fire suppression, launch deluge, washdown, and domestic uses. For each Titan IV/Centaur launch, approximately 146,000 gallons of water would be required. Of this amount, 80,000 gallons would be used for pre-launch check-out, 26,000 gallons for launch deluge, and 40,000 gallons for post-launch washdown. Of the 146,000 gallons, 20,000 would evaporate during launch and form a ground cloud. Based on fire suppression water requirements, a minimum of 800,000 gallons would be stored in reserve. This storage and distribution would be achieved through a supply system interconnected with the existing VAFB water supply system.

Wastewater Treatment and Disposal

Disposal of wastewater from launch deluge and pad washdown would be accomplished by the use of existing VAFB treatment and disposal facilities. Wastewater would be disposed of by either evaporation at the SLC-6 evaporation ponds or by first treating the water at the SLC-6 treatment plant prior to use of the SLC-6 evaporation ponds. An ultraviolet (UV)/ozone wastewater treatment system would be used to treat launch deluge and pad washdown water, if available at VAFB. A sanitary sewage treatment facility located onsite would be utilized to treat domestic wastewater.

Communications

Communications equipment would be provided for voice (intercom and telephone), closed circuit TV, computer data, public address, and area warning systems. Remote video and film cameras would be positioned at offsite locations surrounding the launch complex. Communications would be via buried fiber-optic cable, scheduled for completion prior to the initial launch.

Other VAFB Facilities

There are facilities and systems at VAFB that serve as common support for the existing launch complexes. The proposed action would utilize a number of these facilities during launch preparation and operations (see Figure S.4, Titan Program, Existing VAFB Facilities). For example, facilities are in place for the receipt, testing, inspection, and assembly of vehicle components. Building 8510 on North VAFB would be used as a Launch Control Center (LCC) during launch operations to communicate with the launch complex and the launch vehicle. Other systems are in place for transportation and utilities (electric power, water, gas, and communications) that could be utilized/extended to support the proposed action.

Safety Systems

A mission-specific safety plan would be developed by USAF to ensure that each launch operation is in compliance with applicable regulations, as specified in USAF documents, including the following:

- AFR 800-16 - Acquisition Management, USAF Safety Programs (including AFSC Supplement 1, AFR 800.16)
- WSMCR 127-1 - Range Safety Regulation
- 1STRADR 127-200 - Missile Mishap Prevention
- AFR 127-100 - Explosive Safety Standard
- AFM 88 Series - Design Criteria and Standards for Air Force Construction
- EM-385-1-1 - Safety and Health requirements for all Corps of Engineers activities and operations.
- 1STRAD/SEWE - Explosive Site Safety Plan
- Hazard Analysis, to be developed by launch support contractors.
- AFOSH - U.S. Air Force Occupational Safety and Health

The Safety Plan would also recognize the following codes and regulations:

- NFPA/NFC - National Fire Protection Association, National Fire Codes
- ANSI - American National Standards Institute
- OSHA - Occupational Safety & Health Administration

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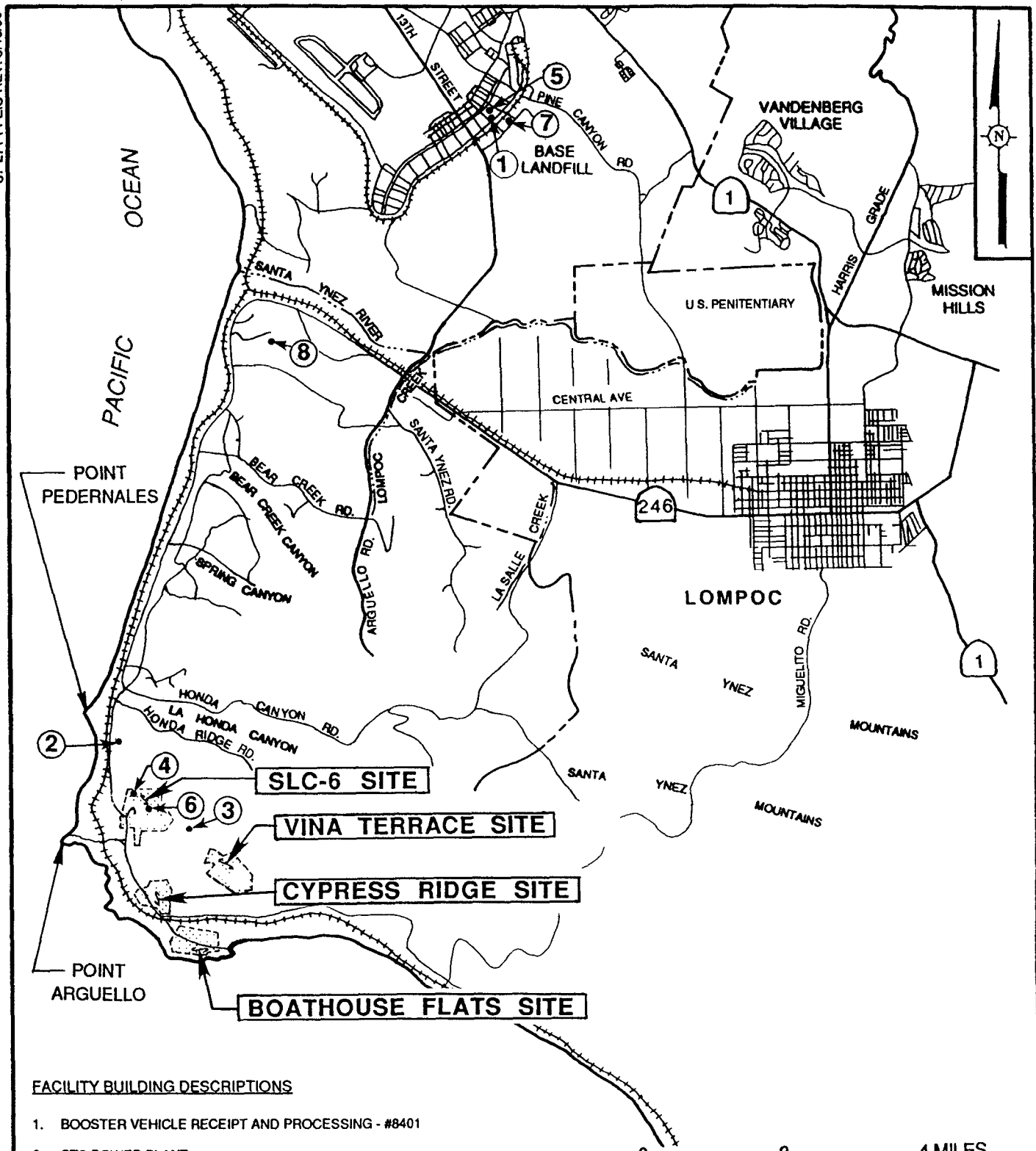


FACILITY BUILDING DESCRIPTIONS

1. BOOSTER VEHICLE RECEIPT AND PROCESSING - #8401
2. STS POWER PLANT
3. WATER STORAGE
4. SRMU RECEIPT, INSPECTION AND STORAGE - #398
5. PAYLOAD FAIRING RECEIPT AND PROCESSING - #8337
6. SLC-6 WASTEWATER TREATMENT PLANT - SLC-6 SITE
7. LAUNCH CONTROL CENTER - #8510
8. HYPERGOLIC PROPELLANT STOCKPILE FACILITIES #975 AND #977

FIGURE S.4

TITAN PROGRAM
EXISTING VAFB FACILITIES

Fire Protection System

Fire detection, alarm, and suppression systems would be provided for the fuel holding areas, support facilities buildings, LSS, ordnance bunker, MST, and other structures. The OSB and LSS would have Halon fire extinguishing systems installed in selected areas to protect computer and electrical equipment as consistent with USAF Engineering Technical Letter 88-8 (USAF 1988d). Ultraviolet detectors and infrared flame detectors used in the fuel holding area would activate both the area deluge system and alarms at the OSB and the VAFB Fire Department. For oxidizer holding areas, a fire detection and alarm system would be provided. However, an area deluge system would not be included, due to the reactivity of N_2O_4 with water.

Cathodic Protection

An active cathodic protection system would be provided in accordance with AFM 88-45. The equipment that would be protected includes the underground piping and some of the aboveground and/or any underground storage tanks. The cathodic protection system would include rectifiers, groundbeds, test stations, interface bonds, and sacrificial anodes.

Security

Security measures for the proposed action are an integral component of project safety requirements. Security measures would be incorporated within the project design and through operational procedures. Elements of site security include a perimeter security fence, clear zone, entrapment area road, security lighting, security standby power, intrusion detection system, and security patrol roads. Security measures include use of entry controllers, alarm monitors, alarm/security response teams, and appropriate weapons, radios, and vehicles in accordance with USAF regulations.

Safety

Safety procedures for the area surrounding the launch site would be established. Prior to launch, the coastal waters and surrounding areas would be patrolled, and train movement through VAFB would be monitored. Jalama Beach County Park would be selectively closed to public access prior to space launches near this area. Before launch procedures would begin at the TCLC, the USAF would encourage that only essential personnel remain on offshore oil rigs in the path of the space vehicle over-flight.

Emergency egress for personnel would be provided consistent with WSMCR 127-1. Emergency egress for surface personnel would consist of gates in the perimeter security fencing that could be opened from the inside in case of emergency. In addition to provisions for evacuation of surface personnel, the launch pad area would be equipped with a tunnel(s) to provide access to sheltered areas that are sufficiently distant from the launch pad to ensure personnel safety.

Quantity-Distance Criteria

Quantity-Distance Criteria (QD) are used to establish safe distances from launch complexes and associated support locations to nonrelated facilities and roadways. These regulations are established by DOD and USAF Explosives Safety Standards. The criteria utilize the TNT (trinitrotoluene) explosive equivalent of propellants onboard a fueled launch vehicle, or stored components or propellants, to determine safe distances from space launch operations for processing and holding areas. For the Titan IV/Centaur, this TNT equivalent amount is 72,000 pounds for a fully loaded vehicle on the pad prior to launch. This translates into a minimum allowable distance from an inhabited building to the propellant-loaded launch vehicle of 1,700 feet, and a minimum allowable distance to an uncontrollable public thoroughfare of 1,000 feet. The proposed action is designed to meet these criteria.

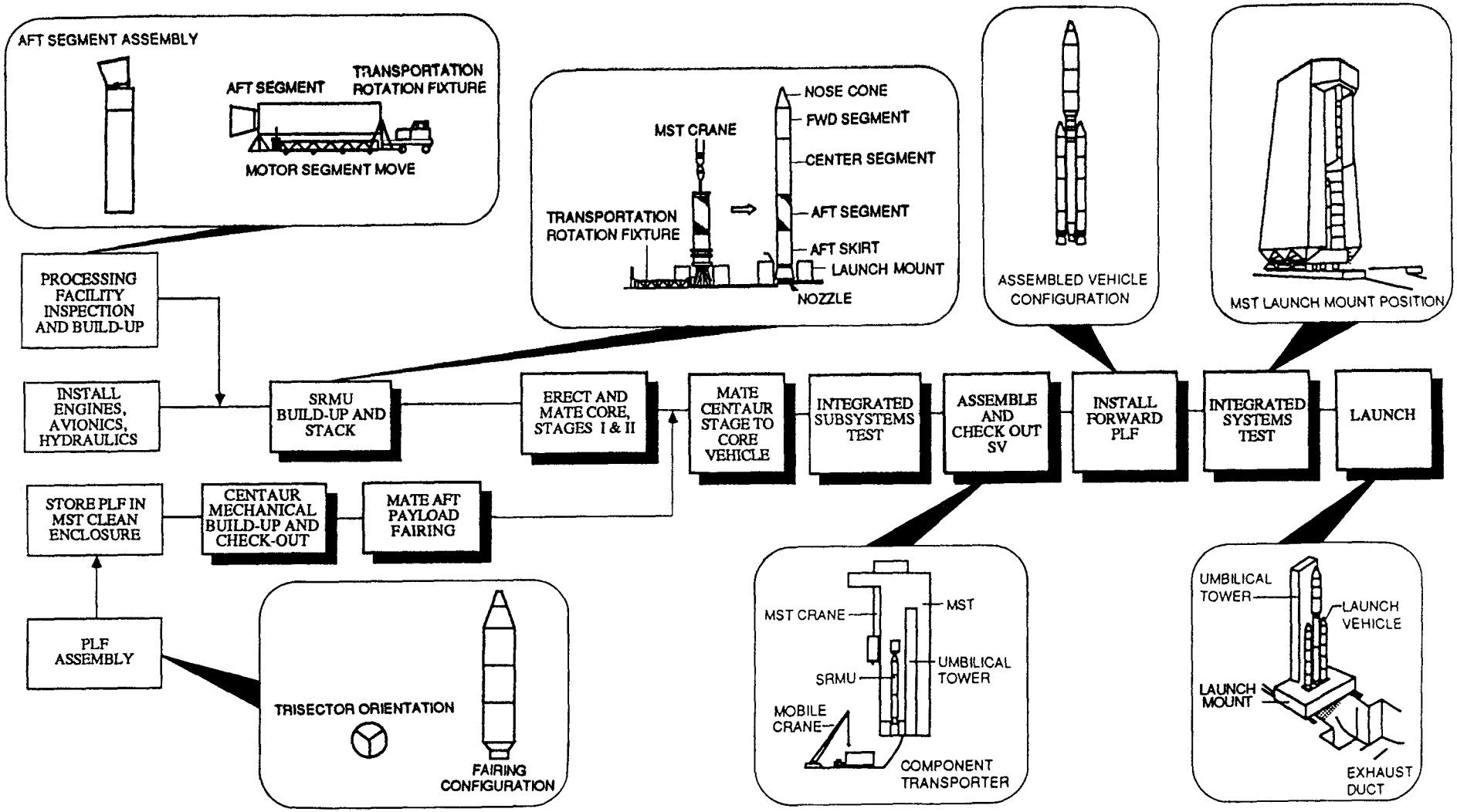
PROJECT OPERATIONS

The Titan IV/Centaur launch vehicle components would be transported separately to VAFB. Upon arrival, the components would undergo a variety of receiving inspections and off-line processing before being transported to the TCLC launch pad for integration, test, and launch.

Launch process operations that would occur at the launch site include launch preparation, launch operations, and post-launch refurbishment. These activities, planned to begin in 1994 or 1995, are described in the following paragraphs.

Launch Preparation

Launch preparation activities involve assembly and testing of the Titan IV/Centaur vehicle. Vehicle assembly is depicted in Figure S.5 (Titan IV/Centaur, Typical Vehicle Assembly Flow Diagram). The launch vehicle components and payload elements would be transported to the launch pad from their off-line processing areas or from the point of arrival at VAFB on their individual transporters. The elements would be sequentially erected on the LM.



LEGEND:

MST = MOBILE SERVICE TOWER
PLF = PAYLOAD FAIRING
SV = SATELLITE VEHICLE
SRMU = SOLID ROCKET MOTORS

= DENOTES ON-PAD ACTIVITY

SOURCE: USAF 1988c.

FIGURE S.5

TITAN IV/CENTAUR TYPICAL VEHICLE ASSEMBLY FLOW DIAGRAM

TCLC ENVIRONMENTAL IMPACT STATEMENT

Following successful completion of integrated system tests, the satellite would be brought to the launch site and erected in a clean enclosure in the MST, where pre-launch check-outs and testing would be conducted. The PLF sections would then be installed.

Completion of the vehicle assembly and testing activities leads to a pre-launch phase in which the launch vehicle and payload are prepared for launch countdown. This includes battery installation, propellant loading, ordnance installation (e.g., stage separation charges), and other selected hookups.

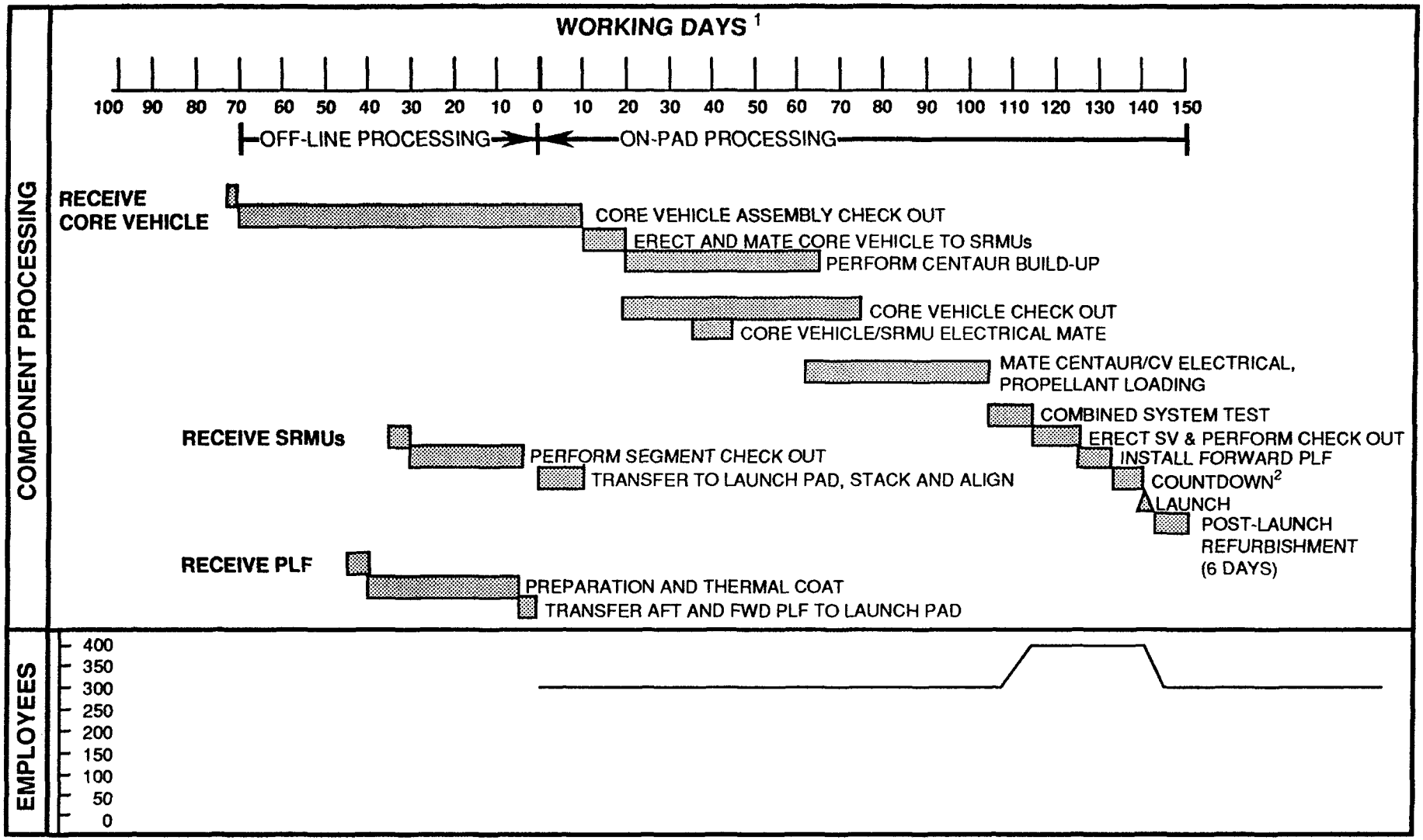
Titan IV core vehicle commodity servicing is provided by propellant loading systems installed at the launch pad and comprised of ready storage vessels, propellant loading units, and piping. Propellants would be piped from onsite storage vessels and transfer systems to the launch vehicle through umbilicals at the UT.

Scheduling of launch preparation activities is depicted in Figure S.6 (Titan IV/Centaur, Typical Vehicle Assembly Time Line and Labor Requirements). As shown, off-line processing of vehicle components would occur over a 70-day period. Components would then be transferred to the launch site for approximately 150 days of vehicle assembly and testing.

Launch Operations

Countdown and launch activities are divided into two parts, known as the R-count and the terminal count. The R-count begins approximately two weeks prior to launch and involves activities such as installation of flight batteries, oxidizer and propellant loading, and ordnance installation. The terminal count begins approximately one day prior to launch and includes activities such as Centaur propellant loading, vehicle verification and guidance checks, range safety checks, moving the MST away from the vehicle, and the final countdown to launch. The launch complex would be evacuated of all nonessential personnel prior to fueling the Centaur stage. After Centaur fueling has started and been stabilized, all other personnel are evacuated.

Launches from the TCLC would be controlled from an LCC located on North VAFB. The LCC would communicate with the TCLC by a fiber-optic cable link, with a launch complex computer receiving commands. The LCC would be used to perform the pre-launch testing and check-out and would run the entire countdown and launch phase. Selected pre-launch onsite testing and check-out functions would be performed at the launch pad. The terminal launch countdown would start approximately 500 minutes prior to launch and could include built-in time delays. The MST would be moved back to the park position away from the launch pad during the countdown.



NOTES

1. Time line shown as working days based on 8-hour/day, 5-day/week schedule.
2. 24-hour/day work schedule.

Source: USAF 1988c.

FIGURE S.6

TITAN IV/CENTAUR TYPICAL VEHICLE ASSEMBLY TIME LINE AND LABOR REQUIREMENTS

At ignition, water would be sprayed at the vehicle exhaust from valves located at the UT, LM, LSS, and exhaust duct. This spray cools the SRMU exhaust in order to minimize damage to the launch pad. Approximately 26,000 gallons of water would be sprayed during the vehicle launch.

Total operations personnel is estimated at 300 during normal launch operations. About 400 persons would be onsite for final vehicle processing for a period of approximately one month.

Post-launch Refurbishment

Following a launch, washdown and cleanup of the launch area would be completed. Post-launch activities would also entail replenishment of commodities such as propellants, cryogenics and gases, and minor repair to launch support facilities.

Other activities following a launch would include the receipt and off-line processing of vehicle components in preparation for the next launch. The initiation of this phase would be concurrent with and overlap the previously described on-pad launch preparation activities.

PROJECT ALTERNATIVES

Alternatives to the Titan IV/Centaur vehicle and locations for the launch complex were evaluated in the Draft EIS. Alternative launch vehicles, including the Space Shuttle, were considered but determined not to be viable based on lack of availability or inability to achieve required orbits. Alternative locations for the Titan IV/Centaur launch complex at and remote to VAFB were also evaluated. CCAFS was rejected because of the inability to launch vehicles from that location and safely attain polar orbits. Other sites remote to VAFB were eliminated from further consideration due to location and/or the absence of necessary infrastructure.

The no action alternative was also evaluated and determined not to be a viable solution to DOD mission requirements. Use of existing Titan IV launch facilities neither supports the requirement for timely launches of critical DOD satellites nor provides the backup capability (i.e., for launches from CCAFS and SLC-4 East) which experience demonstrates is necessary for assured access to space.

From the range of alternatives considered, it was determined that the development of Titan IV/Centaur launch facilities at South VAFB would present the most reasonable course of action, considering mission requirements, technical needs and cost, engineering, and design

considerations. Based on siting factors and mission requirements, three undeveloped sites, Cypress Ridge, Boathouse Flats, Vina Terrace, and one developed site, SLC-6, were identified for detailed consideration. The locations of the four sites are shown in Figure S.7 (Alternative Sites).

CYPRESS RIDGE

If the proposed action were to be implemented at Cypress Ridge, it is anticipated that construction would require a period of approximately four years, beginning in 1990, as shown in Figure S.8 (Preliminary Construction Schedule and Personnel Requirements for Undeveloped Sites). There is the potential for construction to require five years, in which case the activation/operations phase would occur in Year 6, one year later than indicated in the figure.

Facility Construction

Initial construction activities following final design would primarily entail grading for the project site, POV parking area, roads, and evaporation/percolation ponds. In order to accommodate the 50-acre Cypress Ridge site, approximately 120 acres would be disturbed by grading activities, equipment movement and storage, and the establishment of temporary construction "laydown" areas (see Figure S.9, Conceptual Layouts for Undeveloped Sites).

Depending upon the final design and grading plans for the Cypress Ridge site, earth movement would involve a minimum of about 1.5 million cubic yards (CY) each of cut and fill. Between 0.2 and 0.6 million CY of fill would come from borrow areas located on VAFB. The balance of the unused cut material would be removed from the project area and transferred to either a spoil site located about three miles north of the Cypress Ridge site near Point Arguello or another, approved location. The top six inches of topsoil would be removed and stockpiled onsite for respreading on disturbed areas for revegetation and erosion control after completion of construction. Appropriate erosion control measures would be implemented at the stockpile.

New paved road construction for access to the launch complex would include the realignment of a portion of the existing Space Shuttle External Tank Tow Route (Coast Road) (see Access Road in Figure S.9) and/or provision for other roads to give access to the site, the electrical substation, and the sanitary sewage treatment plant. New roadways within the launch complex area would include a perimeter road, an entrapment area road, and other access roads linking project elements and associated parking.

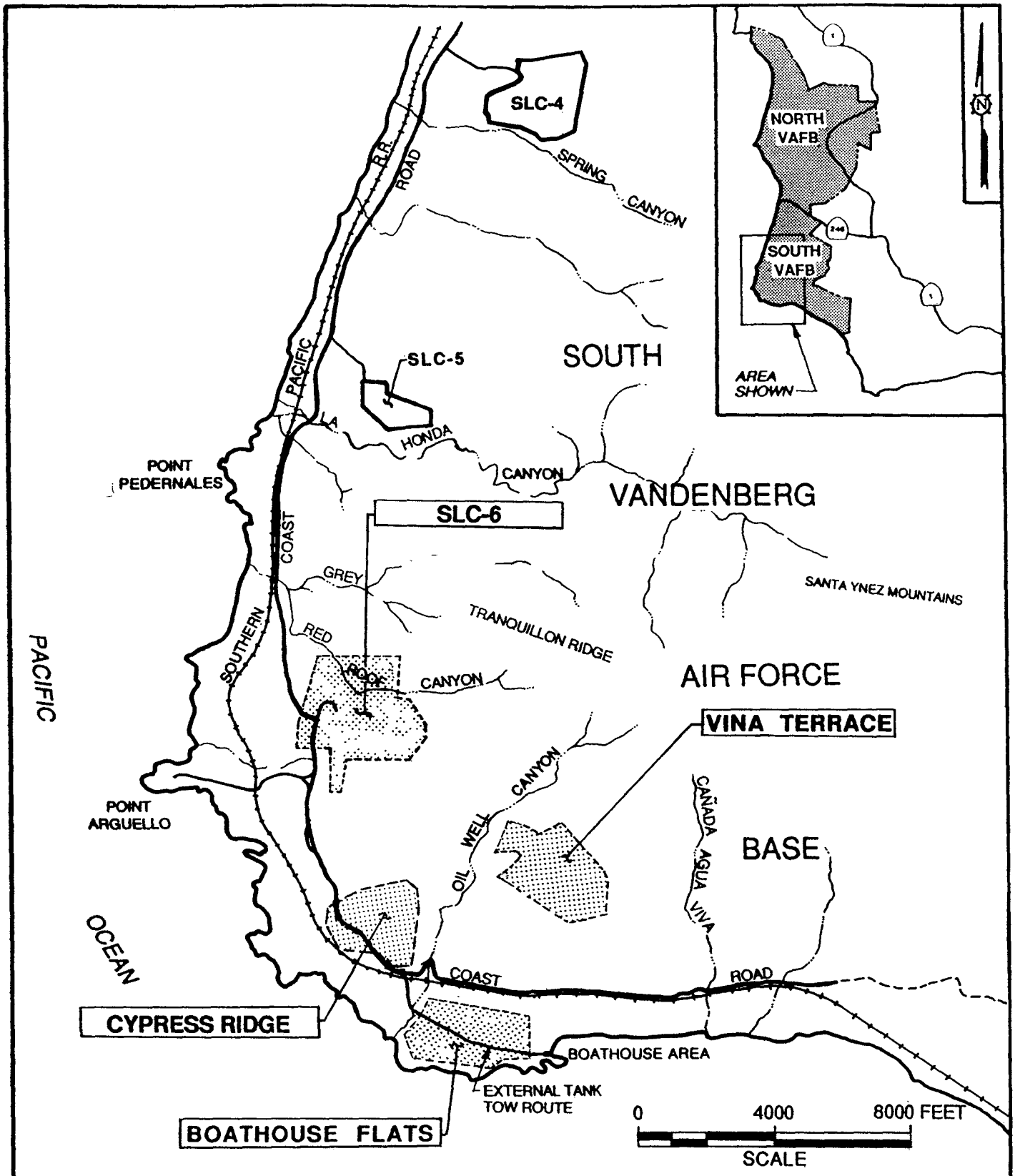
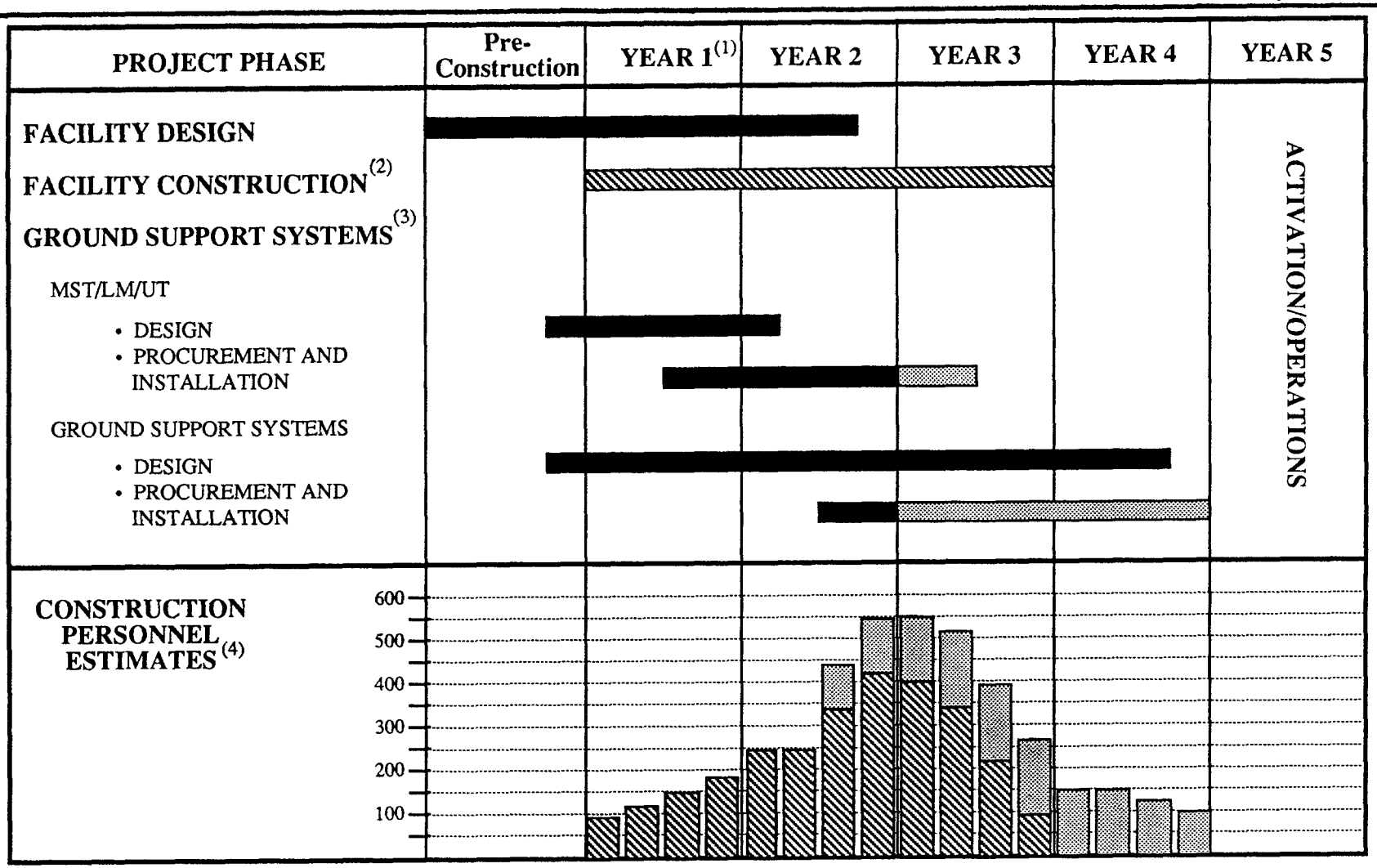


FIGURE S.7

ALTERNATIVE SITES

SOURCE: USAF 1989c.



(1) Years indicated do not necessarily correspond to calendar dates and indicate the least time anticipated for completion of activities. Actual construction may extend through Year 5, with Activation/Operations occurring in Year 6.

(2) Facility construction includes grading, road construction, utilities, Operations Support Building, Launch Service Structure, fencing, and reclamation.

(3) Ground Support Systems include Mobile Service Tower, Launch Mount, Umbilical Tower, and other ground equipment.

(4) Includes USAF, Aerospace, Army Corps of Engineers, and private contractor construction personnel.

On-Site Off-Site Facility Construction

On-Site Off-Site Aerospace Equipment Installation

FIGURE S.8

PRELIMINARY CONSTRUCTION SCHEDULE AND PERSONNEL REQUIREMENTS FOR UNDEVELOPED SITES

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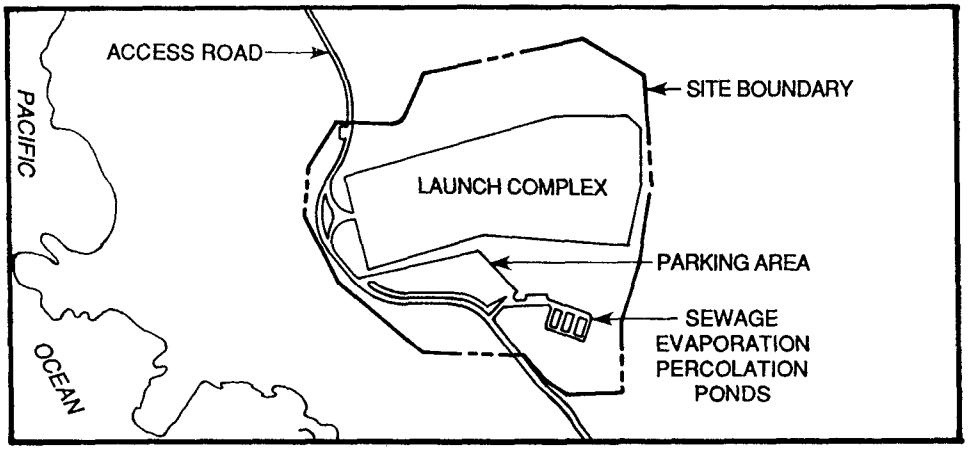
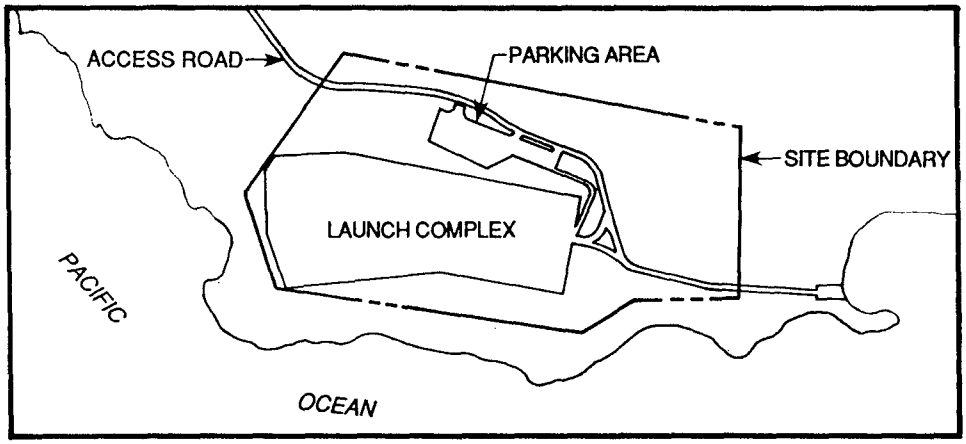
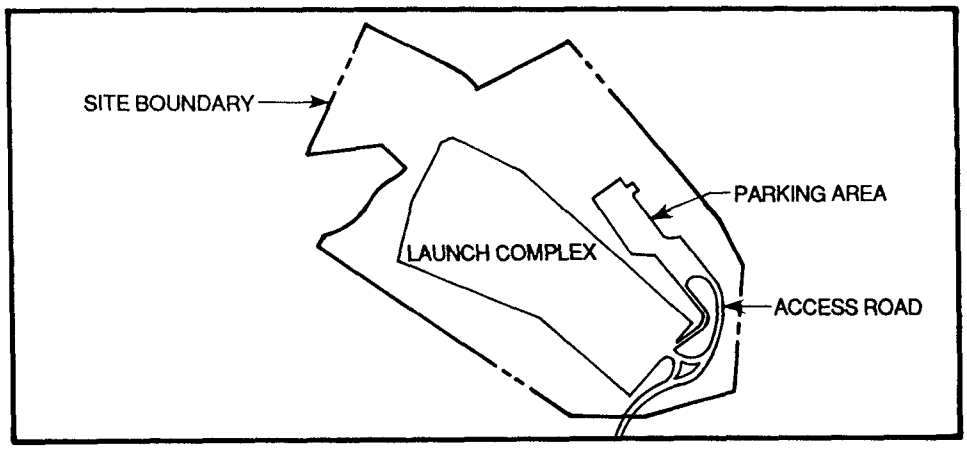


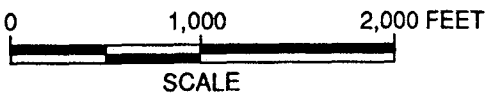
CYPRESS RIDGE CONCEPTUAL LAYOUT



BOATHOUSE FLATS CONCEPTUAL LAYOUT



VINA TERRACE CONCEPTUAL LAYOUT



SOURCE: USAF 1989c.

FIGURE S.9

CONCEPTUAL LAYOUTS FOR UNDEVELOPED SITES

TCLC ENVIRONMENTAL IMPACT STATEMENT

Corridors for communication, water, electrical, and other utilities would temporarily disturb about 65 acres of land (see Figure S.10, Utility Corridors, Cypress Ridge Alternative). The majority of utility distribution lines are planned for underground installation. For electrical power lines, only those portions crossing existing roads or railroads would be located underground. Water distribution lines would be extended from an existing water storage site located on a knoll about 1.5 miles north and east of the Cypress Ridge site and also from the Space Shuttle External Tank Processing and Storage Facility. In addition, there would be a utility corridor easement to accommodate the future provision of natural gas to the site.

Construction of the Titan IV/Centaur facilities at the Cypress Ridge site would include previously discussed structures, such as the LSS, OSB, and ancillary support facilities. Fencing and landscaping would be completed after construction of these buildings.

Laydown areas would be cleared, grubbed, and graded. Temporary parking would be provided at the site of the future POV parking lot. During construction, this area would be fenced and used for a contractors' village, with temporary mobile office units (trailers), equipment storage area, maintenance facilities, parking, and for other construction needs.

A temporary concrete batch plant and truck washdown area would be provided within the boundaries of the laydown area located north of the Space Shuttle External Tank Storage and Check-out Facility. The washdown area would be provided with an impoundment to contain collected washdown water and concrete waste to be disposed of at completion of construction in accordance with county and Regional Water Quality Control Board (RWQCB) regulations. If necessary, due to the potential for surface runoff, a nonpoint source discharge permit would be obtained from the RWQCB.

The level of employment during the anticipated three-year facility construction phase is expected to range from about 100 to 425 people, with peak facility construction occurring at the end of year two and lasting for about six months (see Figure S.8). Average employment over the three-year period would be about 250 people.

Automobile traffic for the facility construction phase is estimated to average 250 cars per day, based on a worst-case assumption that every employee would drive one car to the site. A maximum of 425 cars per day could occur for a limited duration during peak construction.

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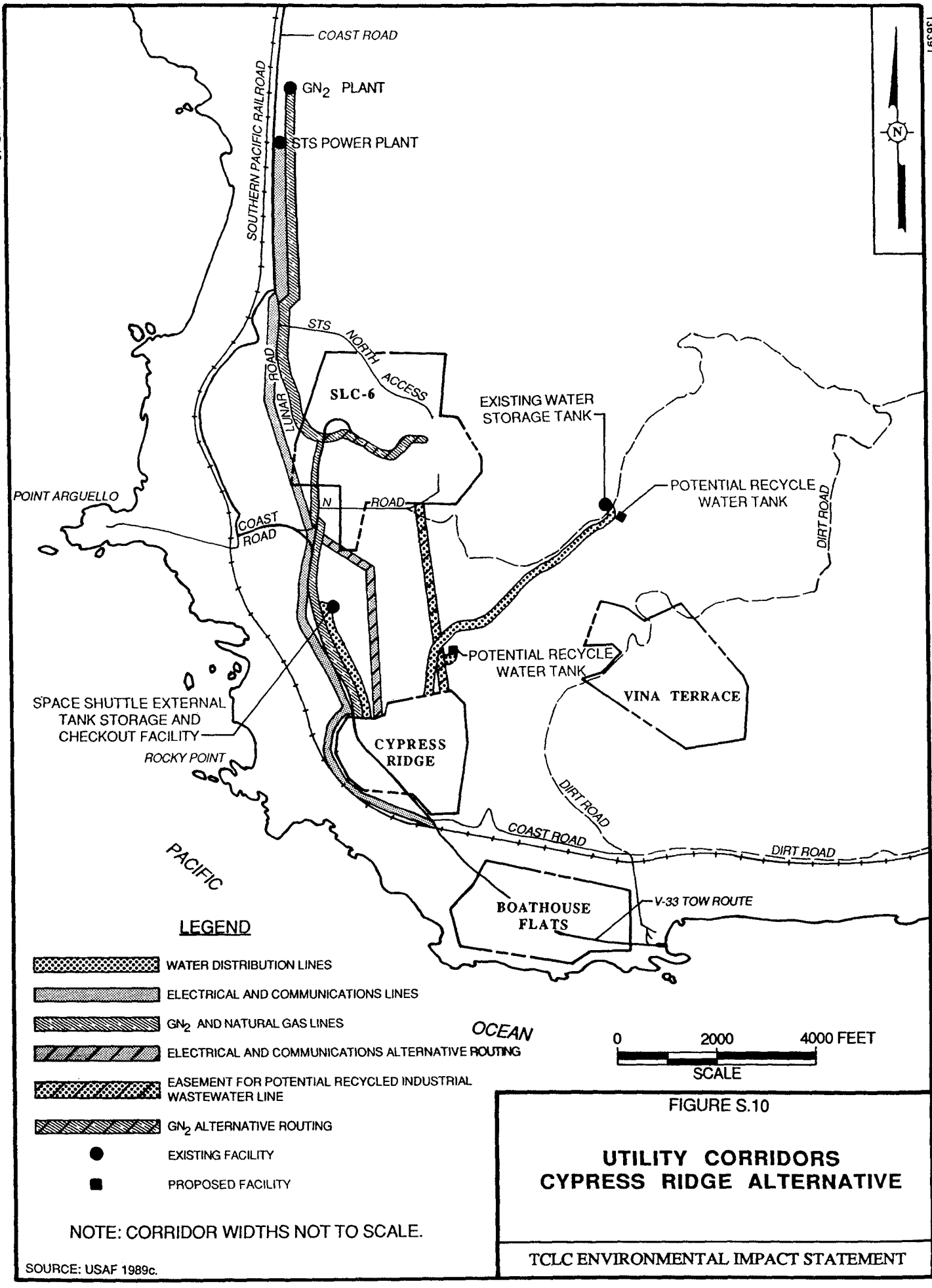


NOTE: CORRIDOR WIDTHS NOT TO SCALE.

SOURCE: USAF 1989c.

FIGURE S.10

UTILITY CORRIDORS
CYPRESS RIDGE ALTERNATIVE

TCLC ENVIRONMENTAL IMPACT STATEMENT

Truck traffic is estimated to reach a maximum of 45 to 50 trucks per day during the early part of construction when site preparation is being completed, decreasing to approximately 25 to 35 trucks per day toward the end of construction.

Ground support systems design, procurement, and installation would be the second phase of construction and would begin approximately 24 months after the start of facility construction. This phase would consist of the construction and installation of equipment directly linked to the vehicle and its performance, such as umbilical systems, flight control devices, and support structures, including the LM, MST, UT, and the propellant holding vessels. Some equipment, such as the MST, would be shipped in modules via shallow-draft ocean barge to the Space Shuttle External Tank Landing Facility (Boathouse area), then transported to the site via the External Tank Tow Route (see Figure S.7). Employment during this phase is expected to range from about 75 to 175 persons (see Figure S.8). Automobile traffic could reach a maximum of about 175 cars per day during the peak employment period of this phase.

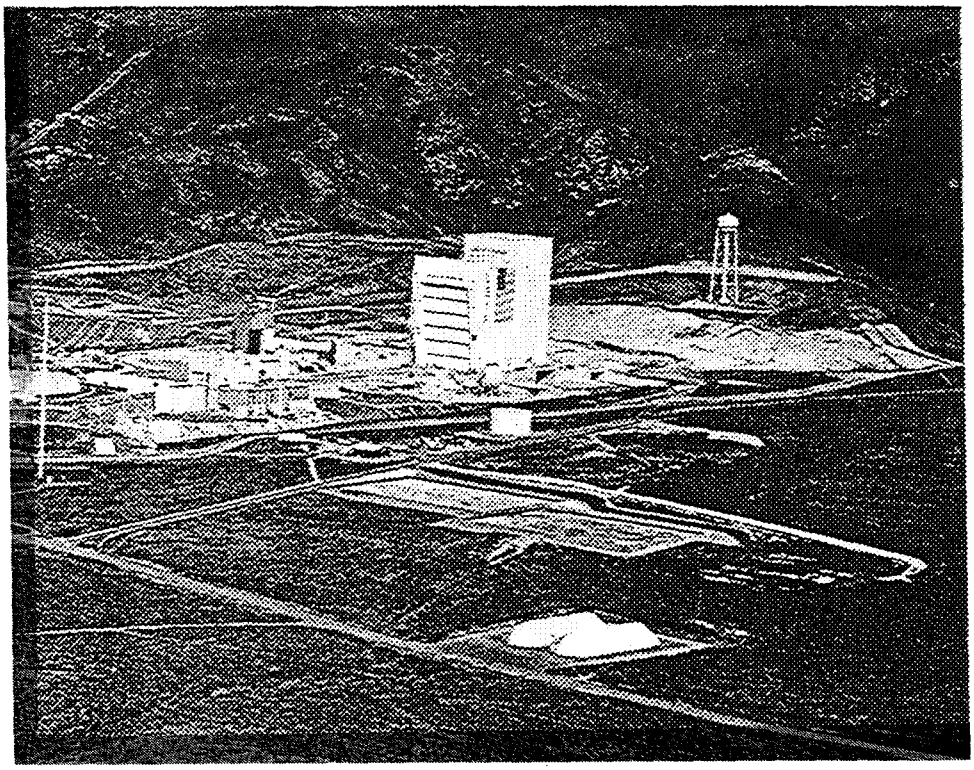
Because the facility construction and ground support systems installation phases are expected to overlap for a period of about 18 months, peak employment greater than that for either phase alone is expected. This peak is anticipated to occur at the end of year two and last for about six months, with employment of about 550 people per day and a potential for a maximum of 550 cars per day (see Figure S.8). During the other 12 months of this overlap period, average employment onsite would be about 370 people, with a corresponding maximum of approximately 370 cars per day.

SLC-6

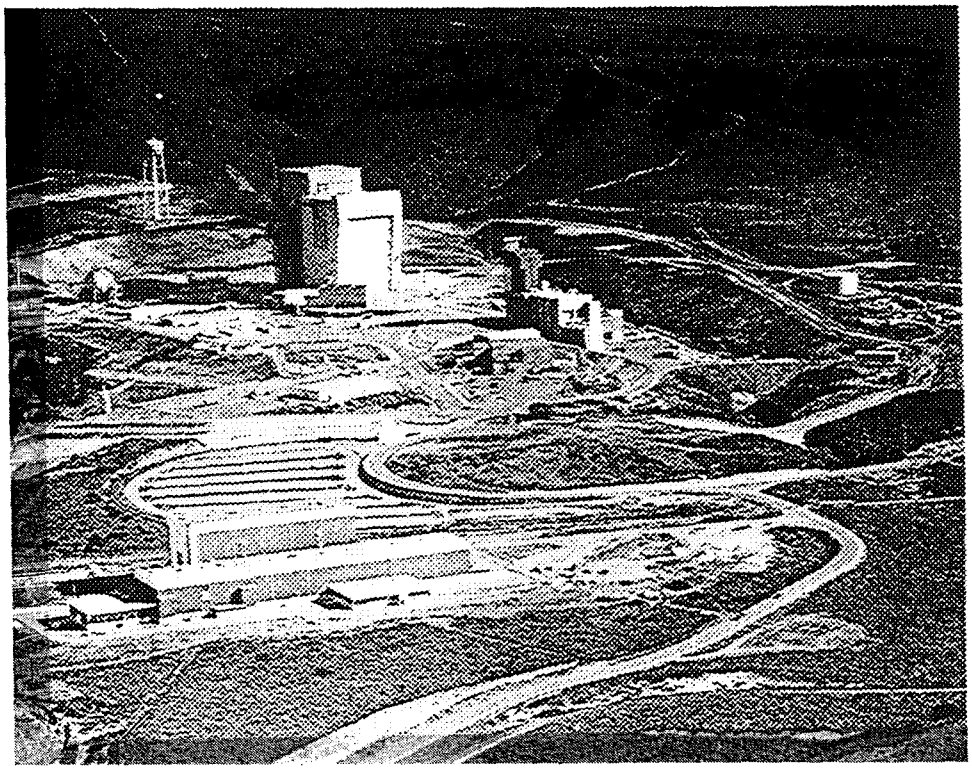
The SLC-6 site is a developed space launch complex currently configured for the Space Shuttle (see Figure S.11, SLC-6 and Surrounding Areas). SLC-6 was originally constructed in 1970 for the Titan IIIM manned launch space vehicle. The Titan IIIM was to be used for the MOL program.

Subsequent to cancellation of the MOL program, SLC-6 was modified for the Space Shuttle. However, primarily as a result of the 1986 Challenger disaster, the USAF has not used SLC-6 for Shuttle launches.

SLC-6 is located about one mile inland from the Pacific Ocean. The fenced complex covers an area of about 100 acres, although the total area that would be utilized for Titan IV/Centaur launches is estimated to be about 280 acres. Access to SLC-6 is primarily through the South Vandenberg Main Gate, as shown in Figure S.1.



EXISTING SLC-6 FACILITIES AND ADJACENT HILLS
VIEWED FROM THE SOUTH-SOUTHWEST.



EXISTING SLC-6 FACILITIES AND ADJACENT HILLS
VIEWED FROM THE NORTH-NORTHWEST.

FIGURE S.11

SLC-6 AND SURROUNDING AREAS

TCLC ENVIRONMENTAL IMPACT STATEMENT

Project Facilities

Conversion of SLC-6 to support the Titan IV/Centaur would involve retention of some facilities, modification of others, demolition of some, and new construction. All construction or modification activities are planned to occur in areas disturbed by previous construction. A list of major facilities and their utilization for the TCLC is shown in Table S.1 (Existing SLC-6 Facilities and Proposed Utilization). The existing site configuration for the Space Shuttle, which would be modified for the Titan IV/Centaur, is shown in Figure S.12 (Space Launch Complex 6).

In addition to those facilities discussed in the description of the proposed action, SLC-6 is equipped with a Payload Changeout Room (PCR), Payload Processing Room (PPR), and Shuttle Assembly Building (SAB). The PCR is not planned for use as a part of the TCLC and likely would be demolished. The PPR would be modified to process Titan payloads to be launched from various facilities at VAFB.

The SAB would be utilized as an all-weather enclosure during the vehicle integration and preparation phases of the launch cycle. During final pre-launch activities, the SAB would be backed away for vehicle preparation and launch.

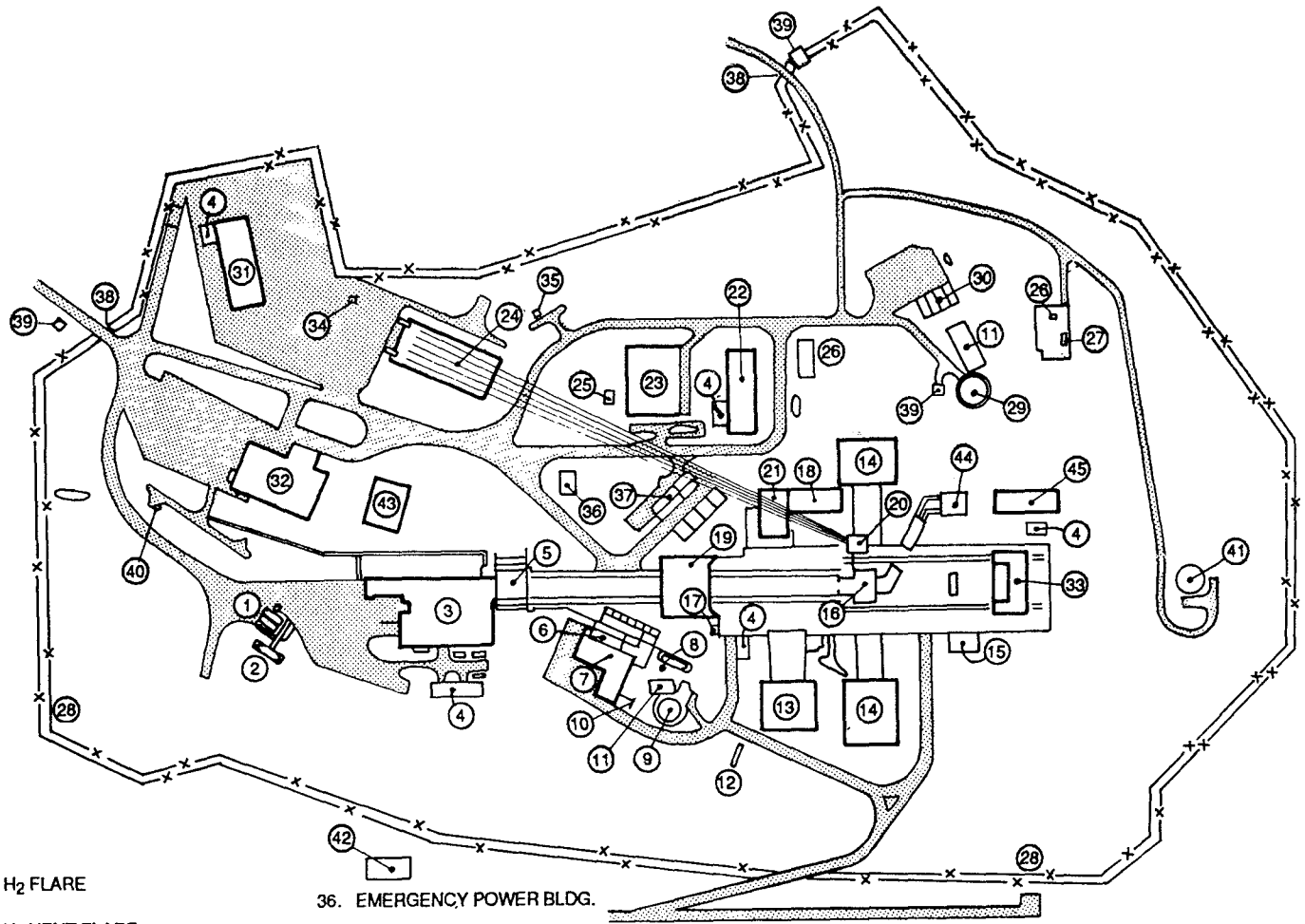
The Access Tower (AT) would be demolished, and the existing MST, originally built for the Titan IIIM and modified for the Space Shuttle, would likely be demolished and replaced with a new structure. The existing LM, designed for the Space Shuttle, would be demolished and replaced by a structure designed for the Titan IV. The exhaust ducts would be modified to suit the Titan IV configuration. The existing Solid Rocket Booster (SRB) ducts and the Space Shuttle Main Engine (SSME) duct would be combined into a single exhaust duct.

Other major onsite facilities which would be modified or upgraded for the requirements of the proposed action include the communications system, security system, and guardhouse. Some facilities/systems which were constructed for the Space Shuttle would be inspected and brought to full operational capability for the proposed action. These include the hydrazine and N_2O_4 storage and transfer systems, the industrial wastewater treatment facility, evaporation ponds, water tank, and utilities (water distribution, electricity, natural gas, sewage disposal). The POV parking area would be situated in its present location northwest of the fenced launch site. Other systems built for the Space Shuttle, such as the Ice Suppression System (ISS), would not be used for the TCLC. Also present at SLC-6 are several underground diesel fuel and jet fuel storage tanks. These tanks would be modified to meet all current regulations before being utilized for the Titan IV program.

TABLE S.1

EXISTING SLC-6 FACILITIES AND PROPOSED UTILIZATION

FACILITY	STATUS				PROPOSED UTILIZATION
	UTILIZED IN PRESENT CONFIGURATION	UTILIZED WITH MODIFICATIONS	MOTHBALLED OR UTILIZED FOR OTHER PROJECTS	DEMOLITION	
Payload Processing Room (PPR)		X			Modified to accommodate Titan payloads
Payload Changeout Room (PCR)				X	Subject to demolition
Shuttle Assembly Building (SAB)	X				Utilized in present configuration
Access Tower (AT)				X	Subject to demolition
Aerial Escape Tram				X	Disassembled and disposed of offsite
Launch Mount (LM)				X	Subject to demolition
Launch Exhaust Ducts (LD)		X			Modified to accommodate Titan IV/Centaur
Mobile Service Tower (MST)				X	Subject to demolition
Operations Support Building (OSB)	X				Modified to accommodate Titan IV/Centaur
Launch Control Center (LCC)		X			Utilized for office space
Security Systems, guard shack		X			Completed, modify as necessary
Hydrazine Storage and Transfer		X			Modified, prepared for use, APCD permit
Nitrogen Tetroxide ($N_2 O_4$) Storage and Transfer		X			Modified, prepared for use, APCD permit
Cryogenic Storage Areas		X			Modified, prepared for use
Industrial Wastewater Treatment Facility		X			Modified with addition of equipment and storage capacity, cleaned, prepared for operation
Deluge Water Transfer System	X				Inspected, cleaned, prepared for operation
Communications System		X			Modified to accommodate Titan IV/Centaur
Utilities					Inspected, cleaned, prepared for operation
Water	X				
Electricity	X				
Propane	X				
Sewage Disposal	X				
Water Tank	X				Inspected, cleaned, prepared for use
Parking	X				Utilized in present configuration



LEGEND

1. SE PROPELLANT PADS
2. CONTAMINATED HYPERGOLIC WASTE TANK
3. PAYLOAD PREPARATION ROOM
4. ELECTRICAL SUBSTATION
5. PAYLOAD CHANGEOUT ROOM
6. OXIDIZER HOLDING AREA
7. OXIDIZER UNLOADING AREA
8. OXIDIZER VAPOR BURNER
9. LO_2 STORAGE TANK
10. GO_2 STORAGE
11. VAPORIZER PAD
12. LO_2 WASTE TANK
13. SSME EXHAUST DUCT
14. SRB EXHAUST DUCT
15. FACILITY VALVE PIT
16. LAUNCH MOUNT
17. ELECT. EQUIP. BLDG.
18. AIR CONDITIONING SHELTER
19. SHUTTLE ASSEMBLY BLDG.
20. ACCESS TOWER
21. SUPPORT EQUIP. BLDG.
22. COMPLEX SERVICE BLDG.
23. GAS STORAGE AREA
24. SLIDEWIRE EMERGENCY EGRESS LANDING AREA
25. FAN HOUSE
26. H_2 FLARE
27. H_2 VENT FLARE
28. EMERGENCY EGRESS GATE
29. LH_2 STORAGE AREA
30. FUEL UNLOADING AREA
31. READY BLDG.
32. LAUNCH CONTROL CENTER (V28)
33. MOBILE SERVICE TOWER
34. AIR INTAKE
35. FLAMMABLE STORAGE BLDG.
36. EMERGENCY POWER BLDG.
37. FUEL HOLDING AREA
38. GATE
39. GUARD SHELTER
40. PUMP HOUSE
41. SPACE SHUTTLE WATER STORAGE TANK
42. WASTEWATER TREATMENT FACILITY
43. OPERATIONS SUPPORT BUILDING
44. ICE SUPPRESSION SYSTEM BLDG.
45. JP-4 FUEL AREA

N

0 500 1000 FEET

SCALE

FIGURE S.12

SPACE LAUNCH COMPLEX 6

Facility Construction

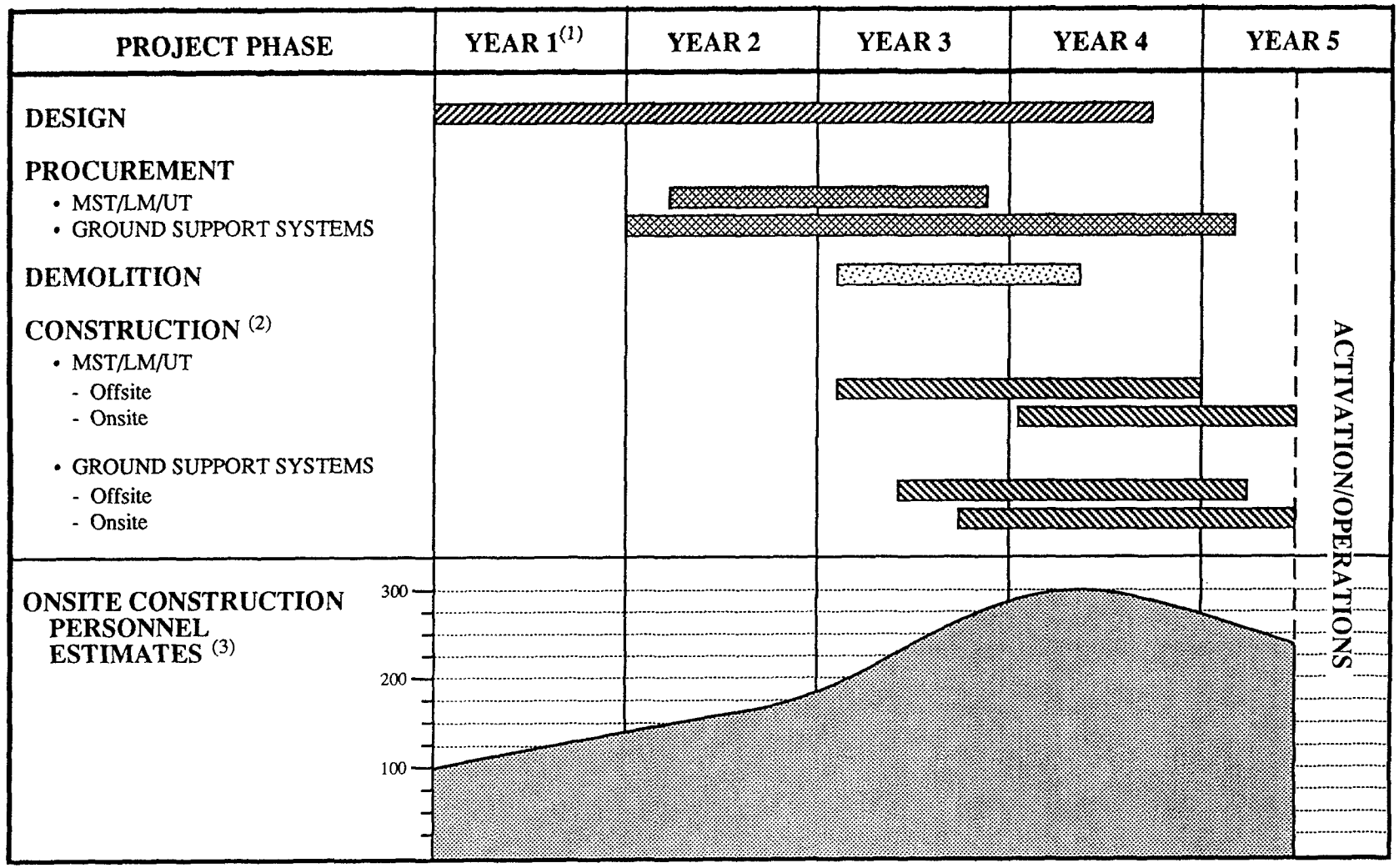
Implementation of the SLC-6 alternative would involve demolition prior to construction of new project facilities or modification of existing facilities. The concrete and steel LM would be removed, producing approximately 1,000 tons of steel. Demolition of the exhaust ducts would generate approximately 5,200 cubic yards of waste concrete and 7,500 tons of steel. Concrete generated by the demolition of the exhaust ducts would be disposed of at an approved VAFB spoil site, and steel resulting from this operation would be salvaged for scrap. Demolition would be accomplished primarily by using jackhammers to crack the concrete and torches to cut through the steel reinforcing bars. The PCR, AT, and MST would be demolished, resulting in approximately 9.5, 5.0, and 12.5 million pounds of steel respectively, to be recycled. Demolition would be accomplished primarily by cutting the structures into sections with torches and disassembling with a portable crane.

As shown in Figure S.13 (Preliminary Construction Schedule and Personnel Requirements for Implementation of TCLC at SLC-6), modification of existing facilities and construction of new facilities would begin near the conclusion of demolition. Overall, facility design, demolition, and construction are expected to occur over a period of four and one-half years. Demolition is expected to take about one year and three months, with facility construction, integration, and check-out occurring over a 28-month period. As shown in Figure S.13, demolition and construction employment is expected to range from approximately 100 to 300 people, with an expected average over the period of approximately 200 people.

Automobile traffic is expected to average 200 cars per day, based on a worst-case assumption that every employee would drive one car to the site. A maximum of 300 cars per day may occur for a limited duration during peak construction. Truck traffic is estimated to reach a maximum of 35 to 40 trucks per day during the early part of construction, when demolition and site preparation are being completed, decreasing to about 20 to 30 trucks with the completion of construction.

Facility Operations

For the most part, project operations would be the same as with the other alternatives. However, the onsite location of the industrial wastewater treatment facility would simplify some procedures. The facility would be located approximately 600 feet from the launch exhaust ducts where the deluge water would be collected. The existing system would be utilized to pump the deluge water from the launch duct to the treatment facility.



(1) Years do not necessarily correspond to calendar dates and indicate the least time anticipated for completion of activities.

(2) Includes integration and checkout.

(3) Includes USAF, Aerospace, and private contractor construction personnel located at VAFB.

LEGEND

DESIGN PROCUREMENT DEMOLITION CONSTRUCTION

FIGURE S.13
PRELIMINARY CONSTRUCTION SCHEDULE AND PERSONNEL REQUIREMENTS FOR IMPLEMENTATION OF TCLC AT SLC-6

Other operational procedures would be the same as those discussed in the description of the proposed action.

BOATHOUSE FLATS

A 130-acre site known as Boathouse Flats is located adjacent to the coastline, south of the SLC-6 and Cypress Ridge sites (see Figure S.7). The site is relatively level, with elevations ranging from 50 to 150 feet. This alternative was selected based upon an anticipated reduction of project costs for grading, access, and utilities extensions. A conceptual layout for implementation of the TCLC at Boathouse Flats is shown in Figure S.9.

Grading to develop the launch complex at this site would require about 0.6 million CY of cut and about 0.4 million CY of fill. A maximum of 0.4 million CY of fill would be taken from a borrow area located on VAFB. The amount of fill required would depend on the suitability of the cut material for use as fill.

A portion of the Space Shuttle External Tank Tow Route intersects the site and would provide construction and operations access (see Access Road in Figure S.9), although some modifications would be necessary. Electricity, underground piping, and communications would be extended to the site from SLC-6, along the existing Coast Road and External Tank Tow Route, then along the northern site boundary to the launch complex (see Figure S.14, Utility Corridors, Boathouse Flats Alternative). The area of disturbance for utilities would be about 90 acres. A distribution line for potable water would be extended about two miles from the existing water tank, disturbing an area of about one acre. Personnel requirements for construction of the TCLC at Boathouse Flats are shown in Figure S.8.

VINA TERRACE

The Vina Terrace alternative site is located about one and one-half miles east of the Pacific Ocean (see Figure S.7). It occupies about 150 acres on a westerly sloping terrace, with elevations ranging between 600 and 800 feet. This alternative was selected based upon an anticipated reduction in impacts to cultural resources. The complex would require grading in the amount of about 10 million CY of cut (no fill is anticipated). It also would require construction of a new access road. In order to accommodate the six percent road grade limitation for transportation of vehicle components, the access road would be approximately three miles in length. A conceptual layout for the TCLC at Vina Terrace is shown in Figure S.9. Utilities, including electricity,

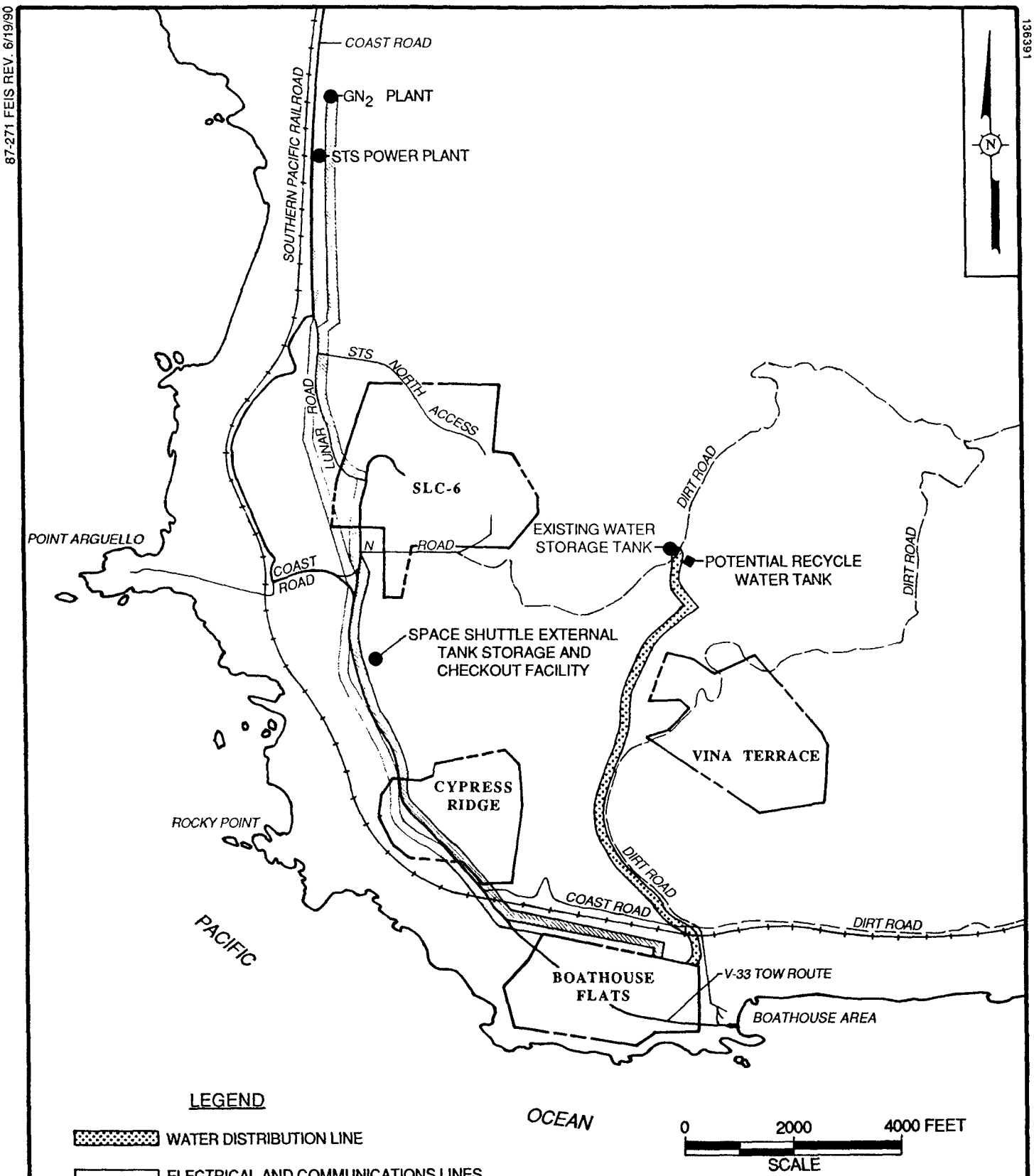


FIGURE S.14

UTILITY CORRIDORS
BOATHOUSE FLATS ALTERNATIVE

underground piping, and communications, would be extended along this new roadway (see Figure S.15, Utility Corridors, Vina Terrace Alternative). The area of disturbance for the road and utilities would be about 100 acres.

Personnel estimates for construction of the TCLC at Vina Terrace are shown in Figure S.8.

ENVIRONMENTAL SETTING

The four alternative sites considered for the TCLC are located within the same general area of South VAFB (see Figure S.7). Therefore, the characteristics of the existing environmental setting are similar for the four sites. The primary differences relate to topography, distance to the ocean, and level of development. The Boathouse Flats site is located on a relatively flat plain atop a coastal bluff adjacent to the Pacific Ocean at an elevation of approximately 50 feet. The Vina Terrace site lies along a ridge line at an elevation of about 800 feet. The Cypress Ridge site is intermediate between the two in terms of location and topography. SLC-6 is located on an elevated marine terrace about one mile north of the Cypress Ridge site. Unlike the other three sites, SLC-6 has been extensively developed with structures and facilities designed to support launches of the Space Shuttle.

The TCLC alternative sites are located at the western-most terminus of the Santa Ynez Mountains and are underlain by bedrock of the Monterey Formation. Several potentially active faults are known to exist within 60 miles of this area. Surface water resources in the vicinity are limited, consisting primarily of a small number of perennial and ephemeral streams that drain into the ocean. Potable water is provided from the nearby Lompoc Terrace aquifer, as no appreciable ground water supply has been found in the vicinity of the four sites. The area is generally arid, with average annual precipitation of about 16 inches per year, occurring primarily between November and April. Stream flow depends mainly on rainfall, with relatively high yields during periods of precipitation due to the steep local topography.

The climate of the region is Mediterranean. During summers, the area is characterized by persistent night and morning low clouds and fog, and is also subject to Santa Ana wind conditions, when strong, gusty, warm and dry winds blow westward from the inland desert. The air quality is generally good, with the exception of infrequent occasions when ozone exceeds ambient air quality standards. These occasions occur primarily when meteorological conditions are such that pollutants generated in the Los Angeles basin are transported northwest to the VAFB area.

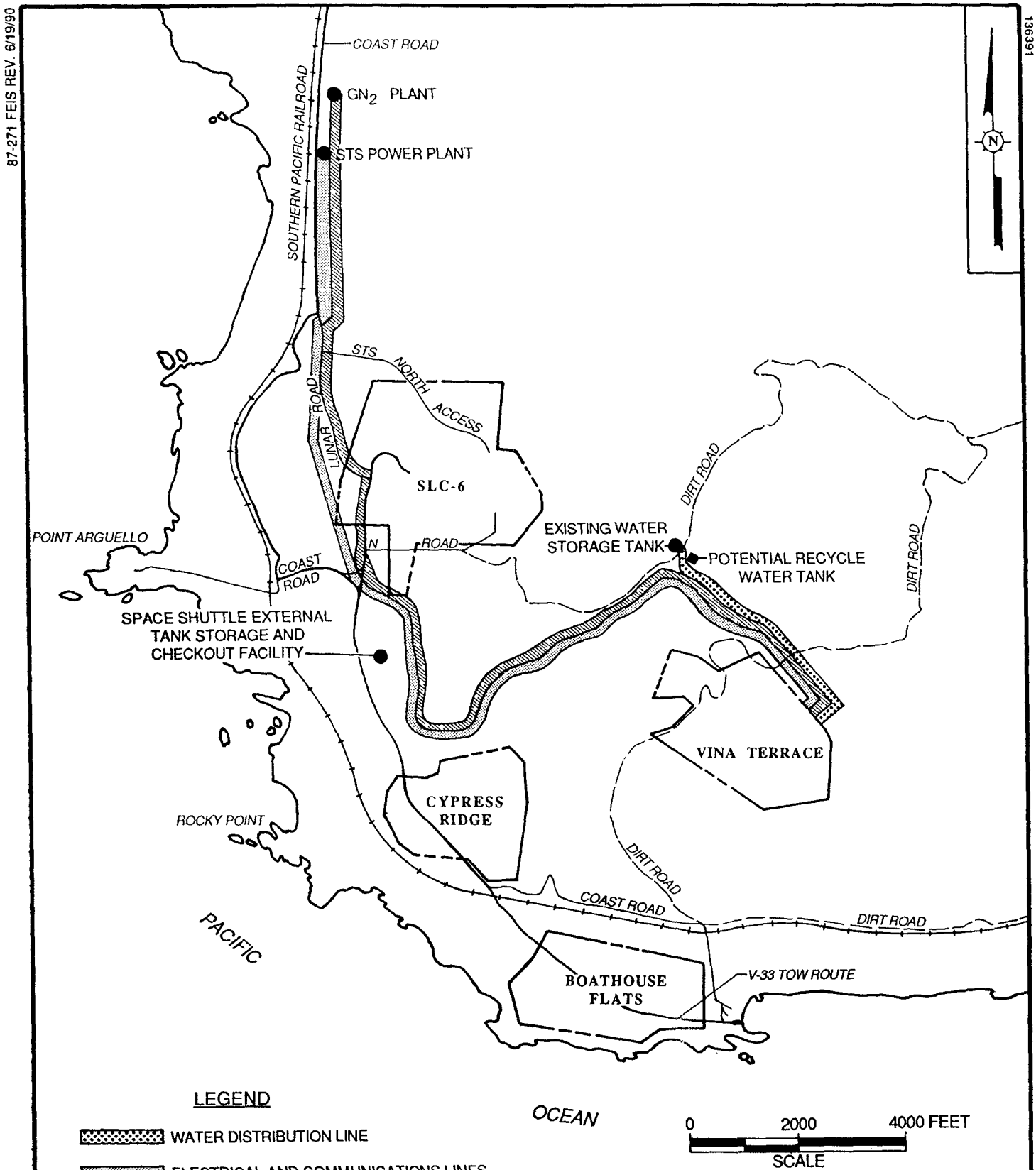


FIGURE S.15

UTILITY CORRIDORS
VINA TERRACE ALTERNATIVE

TCLC ENVIRONMENTAL IMPACT STATEMENT

The TCLC alternative sites are located within an ecological boundary region between the coastal southern and central California provinces. At the southern end of the Coast Ranges and western end of the Transverse Ranges, the area contains a number of plant and animal species that have reached their northern, southern, or western limits. For this reason, the area is one of ecological and biogeographical interest. Much of the local vegetation has been modified or disturbed by human activities over the past century. In general, the proposed project area is vegetated with central coastal scrub, ruderal plants, riparian scrub, and small wetlands. In some places, individuals of the Federal Category 2 candidate species curly-leaved monardella (*Monardella undulata* var. *frutescens*) occur. Other special interest plants in the project area include large-leaved wallflower, western dichondra, and fiddleneck.

Because of its coastal orientation, the project vicinity contains terrestrial, aquatic, and marine animals. In general, the wildlife community tends to be composed of common, wide-ranging reptile, amphibian, mammal, and bird species that frequent a variety of habitat types found throughout the region. Active sign of badger (*Taxidea taxus*), a regionally rare mammal, was observed on the Cypress Ridge site during 1988 field inventories. Mountain lion (*Felis concolor*), a protected species in the state of California, may be expected to occur in the vicinity. Six species of birds that are federal- or state-listed or federal candidate species are known or expected to occur in the vicinity: California brown pelican, ferruginous hawk, American peregrine falcon, California least tern, Western snowy plover, and long-billed curlew. The unarmored three-spined stickleback, a federal- and state-listed endangered species, has been introduced into Honda Creek, about two miles north of SLC-6 and about three miles north of the Cypress Ridge, Boathouse Flats, and Vina Terrace sites.

The northern (Santa Barbara) Channel Islands are included in the environmental analysis because they are situated beneath the space vehicle overflight area and could experience launch-related impacts, primarily from sonic booms. The northern Channel Islands contain a relatively depauperate animal population composed of species that are common and widespread along the mainland. The island fox, a state-listed threatened species, occurs on the largest islands. Within the marine region of the project area are several haul-out areas for harbor seals, California sea lions, and occasional elephant and Northern fur seals. Harbor seals are the only known pinniped species to use these hauling grounds as rookeries in the spring.

The visual environment in the vicinity of South VAFB is varied, characterized by rolling hills, valleys utilized for agriculture, urbanization of the nearby Lompoc Valley, and the VAFB launch complexes and support structures. Topography is dominated by the east-west trending Santa Ynez

Mountains, which narrow near the coast and terminate in the project area. All four alternative sites are at the western extremity of these mountains and slope toward the south onto an elevated marine terrace.

The primary socioeconomic area of VAFB influence is the North County region of Santa Barbara County, north of the Santa Ynez Mountains. Generally, North County employment is concentrated in agriculture, manufacturing, and government. VAFB is a major economic force in this area, estimated to provide about two-thirds of local employment. Santa Barbara County had an estimated 1988 population of 345,000, with 32,300 in Lompoc, 53,000 in Santa Maria, and about 8,000 at VAFB. The North County is a growth area, in response to employment opportunities related to VAFB, the oil and gas industry, and as a bedroom community to the city of Santa Barbara. Both temporary and permanent housing are available in nearby areas, as are public services and utilities.

The area in the vicinity of the alternative sites is primarily undeveloped and rural, and sound levels measured for most of the region are low, with average background community noise equivalent levels (CNEL) of about 40 to 45 A-weighted decibels (dBA). Higher noise levels occur in industrial areas and along transportation corridors. Land use both in the county and in the vicinity of VAFB consists primarily of agriculture and other undeveloped uses, and a few urbanized areas, primarily the communities of Lompoc and Santa Maria (see Figure S.1). Land use on VAFB is primarily (97 percent) open space. Developed public recreation in the vicinity of the proposed project area is limited and consists of Jalama Beach County Park, south of VAFB, and Ocean Beach County Park, at the mouth of the Santa Ynez River (see Figure S.1).

The transportation system in the area consists of the highways in the vicinity of Lompoc and VAFB and surface streets within the city of Lompoc. The main transportation routes in the area connect with Highway 101, the primary north-south transportation corridor in the region (see Figure S.1). Access to VAFB and the project area is provided by four gates and paved roadways through the base. In general, there is little traffic on South VAFB roads.

IMPACTS AND MITIGATION MEASURES

There are potential impacts to the natural and human environments that could result from implementation of the proposed action. Many of these would be minor, and most would be minimized through project design and/or application of existing state, federal, and USAF rules and regulations, and/or mitigation measures. Potential impacts to the natural environment are

to geology and soils, vegetation, wildlife, water resources, and air quality. Potential impacts to the human environment are to noise, cultural and visual resources, waste management, health and safety, socioeconomics, transportation, land use, and recreation.

GEOLOGY AND SOILS

At the Cypress Ridge, Boathouse Flats and Vina Terrace sites, geology and soils impacts would occur primarily during the four-year project construction period, especially during grading activities, with soil loss on the order of 4,000 tons per year anticipated. This would be mitigated to the extent possible by erosion control measures during construction. Implementation of the proposed action at SLC-6 would minimize soil loss, since grading or excavation activities are not anticipated. Other potential impacts to all of the sites, such as from earthquakes and slope failure, would be minimized through project design.

VEGETATION

Vegetation would be lost as a result of selecting one of the undeveloped sites. The amount lost would depend on the site chosen, with a potential temporary loss of 120 to 150 acres due to construction disturbance, and a permanent loss of about 50 acres, which would be covered by impervious surfaces. No additional disturbance is anticipated at SLC-6, as the launch complex is already developed, and no grading or excavation is planned. Development at the Cypress Ridge site would result in the loss of about 800 to 1,000 mature individuals of the Federal Category 2 candidate species curly-leaved monardella (*Monardella undulata* var. *frutescens*). This impact would not be significant on a regional level due to the size of regional populations.

WILDLIFE

Wildlife populations would decrease or be displaced due to loss of habitat, resulting primarily from grading activities at the Cypress Ridge, Boathouse Flats, or Vina Terrace site. Implementation of the project at one of these sites would represent a small decrease in available habitat on South VAFB. These effects would not be significant. Implementation of the project at SLC-6 would result in a lower level of impact since there would be minimal loss of habitat. Operational effects of launch-related sonic booms are expected to produce minor impacts to Channel Islands wildlife. These sonic boom impacts would be the same from the four sites.

WATER RESOURCES

Local (South VAFB) and regional (Lompoc and Santa Maria) water resources would be affected by ground water withdrawal for direct project construction and operations needs and for domestic use by project construction and operations personnel and their families. Increases in withdrawal from

the local aquifer are expected to be about 380 acre-feet per year during the anticipated four-year construction phase at the Cypress Ridge, Boathouse Flats, or Vina Terrace site. Construction at SLC-6 would minimize water consumption during construction as there would be less demand for water for dust control, the primary use of water during construction. Overall, effects to the local ground water basin from construction are expected to be minor.

The long-term effect to ground water resources from operations would be significant in that the projected 45 acre-feet per year requirement for operations represents a 17 percent increase in water demand which would add to the existing overdraft condition of the local aquifer. Withdrawals from the aquifers supplying water to the regional environment are dependent on the number of project personnel and would, therefore, be the same for all four sites during operations. Regional demand for water would be expected to increase by approximately 305 acre-feet per year, or 0.2 percent over existing rates. The regional aquifers are currently in an overdraft condition. Therefore, the anticipated increase in water use would be significant, based on the long-term operational demand related to the proposed action.

AIR QUALITY AND METEOROLOGY

Potential air quality impacts during construction at the Cypress Ridge, Vina Terrace, or Boathouse Flats site would primarily be dust from earthmoving operations and would be mitigated by onsite watering. Potential construction impacts would be minimized by implementation of the proposed action at the SLC-6 site. At SLC-6, a relatively small amount of dust would be generated by demolition activities; however, the significant emissions from earthmoving activities associated with the undeveloped sites are not anticipated.

Operational air quality impacts would be similar for all four sites, consisting of fuel and oxidizer vapors, plus combustion products such as carbon monoxide (CO), sulfur dioxide (SO_2), nitrous oxide (NO_x), and hydrogen chloride (HCl). These emissions would be minor and infrequent and, therefore, insignificant. The greatest source of emissions would be from vehicle launches. The primary air contaminants that would result from launches are HCl and aluminum oxide (Al_2O_3) from combustion of the SRMUs, and CO and NO_x from combustion of hypergolic fuels. Based on modeling contained in the Risk Assessment for the proposed activity (Environmental Solutions, Inc., 1989), a potential vehicle failure would produce similar emissions. Standard VAFB launch operations procedures would result in minimum migration of pollutants into inland uncontrolled areas near VAFB. Studies indicate that the short duration and intermittent nature of proposed

activities would not measurably affect local and regional air quality. It is expected that project-related emissions would result in a small reduction in stratospheric ozone. Launch activities would not be expected to contribute significantly to global warming. Impacts to air quality from operations would be the same for the alternative sites.

NOISE

Noise would occur primarily from normal launch events and would result in noise levels of about 100 dBA at Lompoc and 90 dBA at Santa Maria, persisting for about 60 seconds for a maximum of three launches per year. Due to its short duration and the fact that is nuisance level, such noise would not be significant. Significant cumulative impacts from VAFB launches are not expected due to low noise levels in sensitive areas. Noise impacts would be similar from the four alternative sites.

VISUAL RESOURCES

Visual impacts would result from conversion of the Cypress Ridge, Boathouse Flats, or Vina Terrace sites from undeveloped open space to an active, industrial-type use. On a local basis, if the proposed action were implemented at one of the undeveloped sites, it would represent a southerly extension of the existing array of space launch complexes and, as such, would not be a unique visual feature. Due to the distances from which it would be viewed and the limited number of persons involved, these impacts are not considered significant. Implementation of the proposed action at the SLC-6 site would result in the least visual impact, since the site has already been fully developed and is part of existing viewer expectations. Changes made to accommodate the Titan IV/Centaur program at SLC-6 would be visually minimal.

CULTURAL RESOURCES

Regional impacts to historic and prehistoric cultural resources would not be expected from implementation of the project at any of the alternative sites. However, the caliche plant fossils on San Miguel Island may be affected by the shock from launch-induced sonic booms, regardless of the chosen alternative. Within the proposed project vicinity, there could be effects to the historic former U.S. Coast Guard Rescue Station (Boathouse), to archaeological sites which preliminary studies indicate may be eligible for inclusion in the National Register of Historic Places (NRHP), and to a prehistoric Chumash rock art site. Disturbance to archaeological resources would occur primarily from grading and trenching activities at the Cypress Ridge, Boathouse Flats, and Vina Terrace sites.

These potential impacts would be mitigated through avoidance by design, a pre-project data recovery program, and onsite construction monitoring as developed through consultation with the State Historic Preservation Officer (SHPO) or Advisory Council on Historic Preservation (ACHP). Implementation of the proposed action at SLC-6 would minimize the potential for impacts to buried archaeological resources since no excavation or earth moving activities are anticipated.

SOCIOECONOMICS

The extent of potential socioeconomic effects would depend on the number of persons who move to the area for the employment opportunities provided by the proposed project, shown in Figures S.8 and S.13. These additional persons would increase demands for housing, public services, and utilities, primarily in Lompoc and Santa Maria. Assuming maximum impacts, population could increase by 1,440 in the North County area during construction at Cypress Ridge, Boathouse Flats, or Vina Terrace, and by 1,470 during operations. Implementation of the proposed action at SLC-6 would result in a smaller population increase during project construction (approximately 790 persons) and the same population increase during operations. In general, these impacts are expected to be beneficial to the growing North County area due to increased tax revenues. Adverse socioeconomic impacts would include increased demands for public services and infrastructure. Accordingly, the beneficial impacts from construction of the proposed project at SLC-6 would be less than if one of the undeveloped sites were selected, as fewer construction personnel would be required. Potential transportation impacts to regional streets and highways also would occur as a result of additional construction and operations workers who may move to the area for employment. There also could be delays in entering VAFB due to additional traffic at the Main and South Gates. These impacts would not be significant for implementation of the proposed action at any of the four sites, and no mitigation measures are proposed.

HEALTH AND SAFETY

Potential health and safety impacts are primarily related to the possible occurrence of an accident involving a launch anomaly, hypergolic propellant transportation, and storage and/or transportation and preparation of the SRMU segments. Risks to the public from a launch anomaly would be from debris scatter and exhaust gases. These risks are maintained at safe levels through adherence to USAF safety procedures and are therefore insignificant. Rupture of hypergolic storage vessels could result in the release of toxic gases and the possibility of explosion. Shipments of hypergolic propellants are in compliance with U.S. Department of Transportation regulations for transport of hazardous materials. Hypergolic propellants have been shipped to VAFB since 1958, with no major accidents. An SRMU accident could result in ignition of the propellant and subsequent

release of HCl, Al_2O_3, and heat, with subsequent adverse health effects. Impacts related to fuel transport and use are not expected to significantly affect the public, and no mitigation measures are proposed. Some human health impacts may result from the depletion of stratospheric ozone. These impacts would primarily be a small increase in skin cancer rates.

LAND USE AND RECREATION

Land use and recreation impacts would occur as a result of potential health and safety risks associated with launches from any of the four potential sites. These impacts primarily would be to future potential land use and temporary disruption of existing offshore oil and gas extraction activities and shoreline and marine recreation. Initial concerns were that agricultural areas having potential for residential use in areas southeast of VAFB could be affected by launches from the proposed project. However, in an independent action, USAF is proposing to acquire real estate interests over potentially affected private lands, thereby minimizing the potential for land use impacts to these areas.

WASTE MANAGEMENT

Project implementation would result in the generation of domestic, industrial, and hazardous wastes. The generation of domestic wastes during construction would be greater at an undeveloped site than at SLC-6, as a greater number of construction personnel would be required. Domestic waste generated during operations would be the same for the four alternative sites. It is anticipated that the SLC-6 alternative would produce greater construction debris due to demolition of existing facilities. There are storage, treatment, and disposal facilities available on VAFB and in the project region with the capacity to routinely accommodate construction debris and domestic and industrial wastes. Therefore, these wastes would not create a significant impact.

It is estimated that 119 tons of hazardous waste per year would be generated from operations and require appropriate treatment or disposal. This would be less than 0.02 percent of the approximately 576,000 tons of hazardous waste disposed of in California in 1987 (CDHS 1989). In addition, it is estimated that implementation of the proposed action at the SLC-6 site would generate an additional 80,000 gallons of hazardous waste during construction due to replacement of hypergolic fuel and oxidizer delivery systems. Disposal of construction and operations hazardous wastes at an appropriate facility would incrementally shorten the facility's useful life and so is considered adverse. No mitigation measures for waste management are proposed.

SUMMARY OF MITIGATION MEASURES

Table S.2, Summary of Mitigation Measures, shows the range of activities that would be undertaken to minimize impacts at each of the alternative sites. Mitigation measures were developed for the construction and operations phases of the proposed action at the level of detail consistent with project conceptual design. Additional mitigation details would be developed as project design proceeds and, where appropriate, in consultation with government agencies.

COMPARATIVE ANALYSIS OF ALTERNATIVES

A comparative analysis of the alternatives was prepared in compliance with Section 1502.14 of the CEQ guidelines for preparation of an Environmental Impact Statement. The result of this analysis is a summary comparison of potential environmental effects of the proposed action as implemented at the four alternative sites, shown in Table S.3 (Comparative Summary of Impacts for Project Alternatives). The table provides comparisons of potential effects to specific environmental resource areas and compares these effects among the four alternatives. Four symbols are used to indicate the extent of relative impact among the four alternatives, ranging from least impact (indicated by O), to low intermediate (indicated by ⊗), to high intermediate (indicated by ◐), to most impact (indicated by ●). An example of this comparison is Geology and Soils - Excavation, where the SLC-6 alternative is O, Boathouse Flats ⊗ , Cypress Ridge ◐ , and Vina Terrace ●. This example shows that, for the proposed action, the SLC-6 site would result in the least impact from excavation, and the Vina Terrace site would result in the largest impacts. The Cypress Ridge site, with a ◐ , would result in higher impacts than Boathouse Flats ⊗ , but less than Vina Terrace. An impact that would be the same under more than one alternative may be shown as Ø or, when two or more of the project alternatives have the same relative impact, they may be shown with the evaluative O, ◐ , ⊗ , or ●.

The comparisons shown in Table S.3 are relative and do not indicate an absolute level or magnitude of impact. Therefore, although the level of effect may be greater at one site than at another, the actual effect on the environment may be minimal or insignificant. Further, the ratings do not provide a mechanism for comparison of effect between categories. Therefore, a O in one category could indicate an effect either greater or less than a O in another category. The symbols provide a mechanism for comparisons within a category. They do not provide sufficient information to compare impacts between categories.

TABLE S.2

SUMMARY OF MITIGATION MEASURES

ENVIRONMENTAL CONSIDERATION	PROJECT SITE MITIGATION			
	CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
Geology and Soils	1. Incorporate results of geotechnical investigations into facilities design and grading requirements. 2. Locate critical structures away from potential slide planes. 3. Provide surface drainage/ erosion control plan for project construction and operations. Include settling basins, energy dissipators, and/or flow dividers. 4. Utilize revegetation to reduce runoff.	1. Complete erosion control efforts begun on east boundary of site.	1. Same as Cypress Ridge Mitigation Measures 1-4.	1. Same as Cypress Ridge Mitigation Measures 1-4.
Water Resources	1. During construction, minimize surface runoff by revegetation, construction of temporary drainage devices, and other erosion control measures. 2. After construction, reclaim and revegetate disturbed areas. Establish permanent drainage and erosion control measures, in accordance with the restoration plan.	1. Same as Cypress Ridge Mitigation Measure 2.	1. Same as Cypress Ridge Mitigation Measures 1-2.	1. Same as Cypress Ridge Mitigation Measures 1-2.
Vegetation	1. Provide the opportunity for interested parties to recover specimens of special interest plants prior to construction. 2. Pre-plan construction activities to minimize the extent of disturbed land and avoid wetlands. 3. Limit construction vehicle travel to designated roads and staked areas.	1. Limit construction to previously disturbed areas. 2. Same as Cypress Ridge Mitigation Measures 5 and 7.	1. Same as Cypress Ridge Mitigation Measures 1-7.	1. Same as Cypress Ridge Mitigation Measures 1-7.

TABLE S.2

SUMMARY OF MITIGATION MEASURES

ENVIRONMENTAL CONSIDERATION	PROJECT SITE MITIGATION			
	CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
Vegetation - (Cont'd.)	4. Stockpile the top six inches of topsoil for revegetation. 5. Utilize soil stabilization measures, such as erosion control material, soil cement, and/or gunite, especially on areas of steep slopes or highly erodible soils. 6. Appropriate environmental monitor will be present, as necessary, during clearing and grading activities. 7. Establish a monitoring program to assess operational air emissions impacts to vegetation, with an emphasis on sensitive species.			
Wildlife	1. Formulate and implement a construction and restoration plan to minimize loss of wildlife habitat. 2. Control offsite activity by construction and operations personnel. Restrict workers from unauthorized visits to sensitive wildlife areas such as harbor seal haul out grounds and marine bird roost sites and nesting colonies. 3. A qualified biologist will inspect construction activities periodically.	1. Same as Cypress Ridge Mitigation Measures 2, 3, 4, and 6.	1. Same as Cypress Ridge Mitigation Measures 1-6.	1. Same as Cypress Ridge Mitigation Measures 1-6.

TABLE S.2

SUMMARY OF MITIGATION MEASURES

ENVIRONMENTAL CONSIDERATION	PROJECT SITE MITIGATION			
	CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
Wildlife - (Cont'd.)	4. Employ proper procedures and equipment at the External Tank Landing Facility to minimize the opportunity for wildlife to be affected by spills, human interference, or other hazards. 5. Appropriate environmental monitor will be present, as necessary, during clearing and grading activities. 6. Establish a monitoring program to assess operational noise and air emissions impacts to wildlife, with an emphasis on listed species.			
Air Resources	1. During project construction, water the project site and other construction areas as necessary to minimize visible particulate emissions. Minimize emissions from construction equipment and vehicles by proper engine maintenance. 2. If necessary, modify ground disturbing activities to maintain opacity at or below recommended levels. 3. Launch events will occur only during periods of favorable meteorological conditions, based on a forecast Toxic Hazard Corridor prepared for each launch. 4. Install and maintain air pollution control equipment as necessary on project elements which emit air contaminants.	1. Same as Cypress Ridge Mitigation Measures 1-6.	1. Same as Cypress Ridge Mitigation Measures 1-6.	1. Same as Cypress Ridge Mitigation Measures 1-6.

TABLE S.2

SUMMARY OF MITIGATION MEASURES

ENVIRONMENTAL CONSIDERATION	PROJECT SITE MITIGATION			
	CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
Air Resources - (Cont'd.)	5. During construction, if required by SBCAPCD, activities may be curtailed in order to reduce emissions. 6. If feasible, air conditioning systems would utilize CFC-22, rather than CFC-12. 7. Conduct acceptance testing for the fire suppression systems, using freon 12.			
Waste Management	1. Require construction contractors to submit waste management plan that identifies the wastes to be generated during construction and their manner of handling and disposal. 2. Upgrade or replace existing evaporation ponds at SLC-6 in order to comply with new regulations, as necessary, to accept waste brine solution. 3. Use paints and primers with low metal content on structures which come into contact with deluge water. 4. If necessary, enlarge present or build new VAFB hazardous waste storage facilities.	1. Same as Cypress Ridge Mitigation Measures 1-4.	1. Same as Cypress Ridge Mitigation Measures 1-4.	1. Same as Cypress Ridge Mitigation Measures 1-4.
Noise	1. During launch events, exclude personnel from site areas exposed to the greatest noise levels. Provide hearing protection, as necessary.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.

TABLE S.2

SUMMARY OF MITIGATION MEASURES

ENVIRONMENTAL CONSIDERATION	PROJECT SITE MITIGATION			
	CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
Visual Resources	1. Use low glare lights which are shielded from areas outside the perimeter of the launch complex, as appropriate.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.
Cultural Resources	1. Avoidance is the preferred mitigation and will be utilized where feasible. 2. Implement data recovery procedures where avoidance is not feasible. 3. Qualified observers, including a Native American(s), will be present to monitor ground disturbing activities. 4. In general, design alignment of underground and aboveground utilities and access roads to avoid disturbance to known or suspected archaeological sites. 5. Mitigate potential impacts to the rock art site through pre-launch documentation and post-launch monitoring. 6. Limit movement of construction vehicles to staked areas. 7. Place power poles outside of intact archaeological sites, as feasible. 8. Design underground communications and utilities to avoid known or suspected site deposits, as feasible.	1. Same as Cypress Ridge Mitigation Measures 3, 5, and 10.	1. Same as Cypress Ridge Mitigation Measures 1-10. 2. As feasible, avoid the archaeological site complex at Oil Well Canyon by project design. 3. Avoid areas along the bluff, as feasible.	1. Same as Cypress Ridge Mitigation Measures 1-10.

TABLE S.2

SUMMARY OF MITIGATION MEASURES

ENVIRONMENTAL CONSIDERATION	PROJECT SITE MITIGATION			
	CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
Cultural Resources - (Cont'd.)	9. Utilize qualified personnel to monitor for paleontological resources during earthmoving activities. 10. Implement an accelerated maintenance program at the former U.S. Coast Guard Rescue Station (Boathouse).			
Transportation	1. Support USAF policy of encouraging car pooling and staggered work hours to diminish peak traffic.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.
Health and Safety	1. No additional mitigation measures beyond established USAF procedures are proposed for Health and Safety issues. 2. The Santa Barbara County Local Coastal Plan allows higher-density residential development of the Bixby Ranch and other nearby properties, although the process of securing rezoning and permits has not begun at this time. To prevent this type of development, USAF has begun a detailed study of acquiring a real estate interest in these properties. This action would prevent an unacceptable level of cumulative risk to the population living in these areas. Otherwise, USAF could restrict launches to days with favorable wind conditions. Development	1. Same as Cypress Ridge Mitigation Measures 1-2.	1. Same as Cypress Ridge Mitigation Measures 1-2.	1. Same as Cypress Ridge Mitigation Measures 1-2.

TABLE S.2

SUMMARY OF MITIGATION MEASURES

ENVIRONMENTAL CONSIDERATION	PROJECT SITE MITIGATION			
	CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
Health and Safety - (Cont'd.)	of the ranch under current zoning (one house per 320 acres) does not create an unacceptable risk, due to the low population density.			
Socioeconomics	1. No mitigation measures are proposed for Socioeconomics.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.
Land Use	1. No additional mitigation measures beyond established USAF procedures are proposed for Land Use issues. 2. The Santa Barbara County Local Coastal Plan allows higher-density residential development of the Bixby Ranch and other nearby properties, although the process of securing rezoning and permits has not begun at this time. To prevent this type of development, USAF has begun a detailed study of acquiring a real estate interest in these properties. This action would prevent an unacceptable cumulative level of risk to the population living in these areas. Otherwise, USAF could restrict launches to days with favorable wind conditions. Development of the ranch under current zoning (one house per 320 acres) does not create an unacceptable risk, due to the low population density.	1. Same as Cypress Ridge Mitigation Measures 1-2.	1. Same as Cypress Ridge Mitigation Measures 1-2.	1. Same as Cypress Ridge Mitigation Measures 1-2.

TABLE S.2

SUMMARY OF MITIGATION MEASURES

ENVIRONMENTAL CONSIDERATION	PROJECT SITE MITIGATION			
	CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
Recreation	1. No mitigation measures are proposed for Recreation.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.

TABLE S.3

COMPARATIVE SUMMARY OF IMPACTS FOR PROJECT ALTERNATIVES

RESOURCE	POTENTIAL EFFECT	ALTERNATIVE SITE			
		CYPRESS RIDGE	SLC-6	BOAT-HOUSE FLATS	VINA TERRACE
1. Geology and Soils	• Earthquake	Ø	Ø	Ø	Ø
	• Landslide	◐	⊗	○	●
	• Erosion	◐	⊗	○	●
	• Soil losses				
	- Construction	◐	○	⊗	●
	- Operations	◐	⊗	○	●
	• Excavation	◐	○	⊗	●
	• Fill	●	○	◐	○
	• Borrow site(s)	●	○	◐	○
	• Spoil site(s)	◐	○	⊗	●
2. Water Resources					
• Ground Water	• Water Use	Ø	Ø	Ø	Ø
• Surface Water	• Increased runoff	◐	○	⊗	●
	• Contamination from spill	Ø	Ø	Ø	Ø
3. Vegetation	• Loss of habitat	⊗	○	●	◐
	• Loss of sensitive species	●	○	◐	⊗
	• Operational deposition	◐	⊗	○	●
4. Wildlife					
• Channel Islands birds, mammals	• Launch noise, sonic boom	Ø	Ø	Ø	Ø
• Nearshore marine birds, mammals	• Construction/operations disturbance	⊗	⊗	●	○
	• Use of External Tank Landing Facility	Ø	Ø	Ø	Ø
	• Air Emissions	◐	◐	●	○
• Terrestrial birds, wildlife	• Loss of habitat, roosting sites	⊗	○	◐	●
	• Launch noise, sonic boom	Ø	Ø	Ø	Ø
	• Air emissions	Ø	Ø	Ø	Ø

Legend

○ = Least impact compared to other three sites
⊗ = Low intermediate impact compared to other three sites
◐ = High intermediate impact compared to other three sites
● = Most impact compared to other three sites
Ø = Same impact as other site(s)

TABLE S.3

COMPARATIVE SUMMARY OF IMPACTS FOR PROJECT ALTERNATIVES

RESOURCE	POTENTIAL EFFECT	ALTERNATIVE SITE			
		CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
5. Air Quality/Meteorology	• Facility construction dust	◐	○	⊗	●
	• Pre-launch and post-launch processing emissions	Ø	Ø	Ø	Ø
	• Launch emissions	Ø	Ø	Ø	Ø
	• Vehicle failure emissions	Ø	Ø	Ø	Ø
	• Stratospheric ozone depletion	Ø	Ø	Ø	Ø
6. Waste Management					
• Domestic Waste	• Santa Maria sewage treatment facility	Ø	Ø	Ø	Ø
• Industrial Waste	• Construction				
	- North VAFB Class III landfill	Ø	●	Ø	Ø
	- Lompoc Class II landfill	Ø	●	Ø	Ø
	• Operations				
	- North VAFB Class III landfill	Ø	Ø	Ø	Ø
	- Lompoc Class II landfill	Ø	Ø	Ø	Ø
• Hazardous Waste	• North VAFB hazardous waste storage facility				
	- Construction	Ø	●	Ø	Ø
	- Operations	Ø	Ø	Ø	Ø
	• Class I landfill				
	- Construction	Ø	●	Ø	Ø
	- Operations	Ø	Ø	Ø	Ø
7. Noise	• Normal launch	Ø	Ø	Ø	Ø
	• Explosion	Ø	Ø	Ø	Ø
8. Visual Resources	• Impair view from Jalama Beach	⊗	○	◐	●
	• Impair view from railroad	◐	○	●	⊗

Legend

○ = Least impact compared to other three sites
⊗ = Low intermediate impact compared to other three sites
◐ = High intermediate impact compared to other three sites
● = Most impact compared to other three sites
Ø = Same impact as other site(s)

TABLE S.3

COMPARATIVE SUMMARY OF IMPACTS FOR PROJECT ALTERNATIVES

RESOURCE	POTENTIAL EFFECT	ALTERNATIVE SITE			
		CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
9. Cultural Resources					
• U.S. Coast Guard Rescue Station	• Disturbance from normal launch • Vibration and emissions	◐ ◐	○ ○	● ●	⊗ ⊗
• Rock Art Site	• Vibration and emissions • Disturbance from explosion	⊗ ⊗	● ●	○ ○	◐ ◐
• Archaeological Resources	• Disturbance from grading and earthmoving	●	○	◐	⊗
• Paleontology	• Disturbance from grading and earthmoving	◐	○	●	⊗
• Caliche Fossils	• Vibration from sonic boom	Ø	Ø	Ø	Ø
10. Transportation	• Increase in traffic • Need for additional traffic control	Ø Ø	○ ○	Ø Ø	Ø Ø
11. Health and Safety	• Normal launch • Unscheduled event • Explosion damage • Fire damage • Stratospheric ozone depletion	Ø Ø ◐ ◐ Ø	Ø Ø ⊗ ⊗ Ø	Ø Ø ● ○ Ø	Ø Ø ○ ● Ø
12. Socioeconomics	• Construction - Increased employment - Increased population - Increased housing demand - Increased demand to public services/utilities - Increased local/regional spending • Operations - Increased employment - Increased population - Increased housing demand - Increased demand to public services/utilities - Increased local/regional spending	 Ø* Ø Ø Ø Ø* Ø* Ø Ø Ø Ø*	 ○* ○ ○ ○ ○* Ø* Ø Ø Ø Ø*	 Ø* Ø Ø Ø Ø* Ø* Ø Ø Ø Ø*	 Ø* Ø Ø Ø Ø* Ø* Ø Ø Ø Ø*

Legend

○ = Least impact compared to other three sites
⊗ = Low intermediate impact compared to other three sites
◐ = High intermediate impact compared to other three sites
● = Most impact compared to other three sites
Ø = Same impact as other site(s)
* = Positive/beneficial impact

TABLE S.3

COMPARATIVE SUMMARY OF IMPACTS FOR PROJECT ALTERNATIVES

RESOURCE	POTENTIAL EFFECT	ALTERNATIVE SITE			
		CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
13. Land Use	• Interference to adjacent/nearby uses	Ø	Ø	Ø	Ø
	• New development area	⊗	○	◐	●
	• Coastal zone management	◐	○	●	⊗
14. Recreation	• Jalama Beach closures	Ø	Ø	Ø	Ø
	• Marine recreation interruptions	Ø	Ø	Ø	Ø

Legend

○ = Least impact compared to other three sites
⊗ = Low intermediate impact compared to other three sites
◐ = High intermediate impact compared to other three sites
● = Most impact compared to other three sites
Ø = Same impact as other site(s)

CONCLUSIONS

Based on environmental evaluation and the comparative analysis of impacts, there would be fewer environmental impacts associated with reconfiguration of SLC-6 than with development of either the Cypress Ridge, Boathouse Flats or Vina Terrace alternative. Also, for the four sites evaluated, most environmental impacts would not be considered significant after implementation of mitigation measures. However, many of those impacts would not occur, and most others would be reduced, if the proposed action is implemented at SLC-6 rather than at one of the undeveloped sites.

Implementation of the proposed action at SLC-6 would involve site demolition, in addition to facility modification and construction activities. However, additional excavation or ground clearing is not anticipated and the proposed activities would occur within areas that have been previously disturbed. Therefore, compared to the undeveloped sites, converting SLC-6 would result in less soil loss from construction and less impact to borrow and spoil sites.

Further, with the SLC-6 conversion, impacts to vegetation and special interest plants would be substantially lower, since ground clearing activities are not planned. There also would be less impact to animal habitat and to sensitive animal species. In addition, since most major facilities are already built at SLC-6 or would be replaced with facilities of equal size, there would be less visual impact than with development of one of the other sites.

However, conversion of SLC-6 would result in greater generation of liquid hazardous waste during construction generated by modifications to the hypergolic fuel and oxidizer delivery systems. Since fewer personnel would be required for construction activities at SLC-6 than at an undeveloped site, fewer economic benefits would be generated in the region during the project construction period.

Overall, the reconfiguration of SLC-6 for the Titan IV/Centaur program represents the environmentally preferred alternative since it would result in fewer environmental impacts than would implementation of the proposed action at one of the three undeveloped sites.

Based on the analysis of alternatives contained in the Draft EIS (USAF 1989c), comments received during review of the Draft EIS, program goals and requirements, and Congressional action taken since the issuance of the Draft EIS, USAF has determined that the conversion of and subsequent operation of the existing SLC-6 is the preferred alternative to meet DOD launch program requirements.

Chapter 1.0

INTRODUCTION

1.0 INTRODUCTION

The purpose of this Final Environmental Impact Statement (EIS) is to respond to comments on the Draft EIS for the Construction and Operation of Space Launch Complex 7 (SLC-7) for the Titan IV/Centaur at Vandenberg Air Force Base (VAFB), California (USAF 1989c). It should be noted that, subsequent to circulation of the Draft EIS, the name of the proposed action was changed from Space Launch Complex 7 to Titan IV/Centaur Launch Complex (TCLC). This change reflects the addition of the conversion of Space Launch Complex 6 (SLC-6) as one of the preferred alternatives.

1.1 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This Final EIS has been prepared in accordance with: (1) the National Environmental Policy Act (NEPA), as implemented by Executive Order 11514, 42 USC 4321, (2) the President's Council on Environmental Quality (CEQ) Regulations, Title 40 Code of Federal Regulations (CFR) Part 1500 *et seq.*, and (3) U.S. Air Force (USAF) Regulations AFR19-1, AFR19-2, AFR19-7, and AFR19-9, which constitute USAF directives for compliance with NEPA.

The following briefly summarizes the Environmental Impact Analysis Process (EIAP) for the proposed action:

- Notice of Intent to Prepare an EIS - The Notice of Intent to prepare an EIS for the proposed action was published in the Federal Register and in local newspapers located within the region of the proposed action on April 8, 1988.

- Public Scoping Meetings - Public scoping meetings were held on May 3 and May 5, 1988, to solicit input from interested individuals, groups, government organizations, and elected officials. Items or issues to be addressed in the Draft EIS were compiled from both oral and written statements. These meetings were announced by: (1) publishing the Notice of Intent in the Federal Register, (2) letters to agencies, public officials, and public interest groups, (3) legal notices in local and regional newspapers, and (4) a USAF official news release to local and regional news media.

- Preparation of the Draft EIS - A Draft EIS was prepared that identified, described, and analyzed the environmental issues associated with the proposed action and alternatives. The Draft EIS was published on July 20, 1989.

- Preparation of Supporting Documents to the EIS - Supporting documents to the EIS were prepared and contained the detailed analyses from which the discussions about the existing environment and potential project

impacts presented in the Draft EIS were drawn. These documents were made available to government agencies and the public upon request. Supporting documents prepared included:

- Biological Assessment, Titan IV/Centaur Launch Complex, Vandenberg Air Force Base, California.
- Federal Consistency Determination.
- Cultural Resources Inventory for Titan IV/Centaur Launch Complex, Vandenberg Air Force Base, California.
- Waste Assessment, Titan IV/Centaur Launch Complex, Vandenberg Air Force Base, California.
- Risk Assessment: Supplement to the Draft Environmental Impact Statement for the Proposed Construction and Operation of Space Launch Complex 7, Vandenberg Air Force Base, Santa Barbara County, California.

- Review and Comment of the Draft EIS - The Draft EIS was released for public review on July 20, 1989, to interested individuals, groups, government representatives, and agencies. The Draft EIS was filed with the Environmental Protection Agency (EPA) on July 21, 1989. The Federal Register Notice of Availability appeared on July 28, 1989, and initiated the 45-day public comment period. The public comment period ended on September 11, 1989.

- Public Hearing - Public hearings were held on August 30 and 31, 1989, during the Draft EIS review period to provide agencies, organizations, and the public with an opportunity to verbally comment on the Draft EIS.

- Preparation of the Final EIS - This Final EIS incorporates and responds to public comments received as a result of review of the Draft EIS.

- Record of Decision - After publication of the Notice of Availability of the Final EIS and a 30-day waiting period, the USAF will make a decision regarding the proposed action and will prepare and publish a public Record of Decision.

1.2 PUBLIC REVIEW

During the draft EIS review period, comments were received from federal, state, and local government agencies, elected officials, and the public (individuals and organizations). Written comments were submitted to Headquarters Space Systems Division (SSD/DEV) in El Segundo, California. Written comments were received from 24 commenters, among whom were five federal, three state, three county, and two local agencies. Two private interest groups and one Native American organization also provided written comments. The remaining eight commenters were private individuals.

Verbal comments were received at two public hearings held in the Grossman Gallery of the Lompoc Public Library, Lompoc, California, on August 30, 1989, and in the Santa Barbara County Superintendent of Schools Auditorium, Santa Barbara, California, on August 31, 1989. A total of 46 persons attended the Lompoc public hearing, and 16 attended in Santa Barbara. Seven of those in attendance had verbal comments.

Table 1.1 (Numerical Summary of Comments on Draft EIS) summarizes written and verbal comments received on the Draft EIS. Those who submitted the greatest number of comments were the County of Santa Barbara Resource Management Department (53), the County of Santa Barbara Air Pollution Control District (50), and the Bixby Ranch Company (31 and 14 comments in two separate letters). In total number of comments submitted, the next group consisted of the Department of Interior Office of Environmental Project Review (24), Environmental Protection Agency (23), National Marine Fisheries Service (16), and Marine Mammal Commission (13). The remaining 16 commenters each had six or fewer separate comments in their written and verbal submissions.

Of the 272 total separate written and verbal comments, the greatest number addressed Wildlife (48), Air Quality/Meteorology (47), and Health and Safety (41). The issues of next greatest concern were Vegetation (25), Water Resources (15), Land Use (11), Project Alternatives (10), and Cultural Resources (9). Other issues each received seven comments or less. There were also 18 "Other" comments which addressed various concerns, ranging from a verbal statement that written comments would be submitted later to comments as to the adequacy of the Risk Assessment prepared for the Draft EIS. Issues that were addressed in the Draft EIS but were not mentioned in any of the verbal or written comments included the Scoping Process, Mitigations, Noise, and Transportation.

The USAF responses address each comment individually as consistent with the CEQ regulations (40 CFR Part 1503). Since changes to the text of the Draft EIS in response to the comments are minor, the Draft EIS was not completely rewritten. Instead, the Final EIS consists of a summary, public and agency comments, responses to comments, and addenda and errata to the Draft EIS (40 CFR Part 1502.9).

TABLE 1.1

NUMERICAL SUMMARY OF COMMENTS ON DRAFT EIS

COMMENTER \ COMMENT CATEGORY	NO COMMENT	EIS PROCESS	DRAFT EIS FORMAT	PURPOSE AND NEED	SCOPING PROCESS	REGULATORY COMPLIANCE	PROJECT ALTERNATIVES	SUMMARY/CUMULATIVE IMPACTS	SUMMARY/MITIGATIONS	GEOLOGY AND SOILS	WATER RESOURCES	VEGETATION	WILDLIFE	AIR QUALITY/METEOROLOGY	WASTE MANAGEMENT	NOISE	VISUAL RESOURCES	CULTURAL RESOURCES	TRANSPORTATION	HEALTH AND SAFETY	SOCIOECONOMICS	LAND USE	RECREATION	OTHER	UNAVOIDABLE ADVERSE EFFECTS	SHORT TERM VS LONG TERM	NO. COMMENTS PER SUBMITTAL
WRITTEN COMMENTS																											
FEDERAL AGENCIES																											
National Marine Fisheries Service	--	--	--	--	--	--	--	--	--	--	--	--	16	--	--	--	--	--	--	--	--	--	--	--	--	--	16
Environmental Protection Agency	--	--	--	--	--	3	--	--	--	--	--	8	2	5	5	--	--	--	--	--	--	--	--	--	--	--	23
Department Interior/Office of Environmental Project Review	--	--	--	--	--	--	--	--	--	--	--	12	6	--	--	--	--	1	--	2	--	--	--	2	1	--	24
Marine Mammal Commission	--	--	--	--	--	--	--	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	--	--	--	13
Federal Aviation Administration	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
CALIFORNIA STATE AGENCIES																											
State of California/Office of Planning and Research	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
The Resources Agency of California	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Regional Water Quality Control Board	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	1	--	--	4
SANTA BARBARA COUNTY AGENCIES																											
County of Santa Barbara/Air Pollution Control District	--	--	2	1	--	--	--	1	--	--	--	--	--	36	--	--	--	--	--	4	--	--	--	6	--	--	50
Santa Barbara County Park Department	--	--	--	--	--	--	--	1	--	1	--	--	--	--	--	--	--	--	--	1	--	1	2	--	--	--	5
County of Santa Barbara/Resource Management Department	--	--	1	--	--	--	1	--	--	1	3	5	11	5	3	--	2	--	--	7	5	1	--	2	3	2	53
LOCAL AGENCIES																											
City of Lompoc	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1
Vandenberg Village Community Services District	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
BUSINESSES/ORGANIZATIONS																											
Bixby Ranch Company (September 8, 1989)	--	1	--	--	--	3	3	--	--	--	--	--	--	--	--	--	--	--	--	15	--	7	--	2	--	--	31
Bixby Ranch Company (October 6, 1989)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11	--	--	--	3	--	--	14
NATIVE AMERICAN ORGANIZATIONS																											
Tribal Elders Council/Santa Ynez Band of Mission Indians	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6	--	--	--	--	--	--	--	--	6
INDIVIDUALS																											
Maurice Cooper	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	2
Nancy Flanders	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Lawrence E. Liles/Local Union 413, I.B.E.W.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1
John J. Markon	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Michael E. McClure	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1
J.C. Picciuolo	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Mary Gaines Read	--	--	--	--	--	--	1	--	--	--	1	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	3
Donald D. Smith	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
VERBAL COMMENTS																											
NATIVE AMERICAN ORGANIZATIONS																											
Elaine Schneider	--	--	--	--	--	--	1	--	--	--	5	--	--	--	--	--	--	1	--	--	1	--	--	--	--	--	2
Reggie Pagaling	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	2
VARIOUS																											
Howard Grantz	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5
James Spellman, Jr.	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	2
Bill Mullins	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	2
LeRoy Scolari	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Jeremy Graves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
TOTAL COMMENTS PER CATEGORY	2	1	4	1	0	7	10	2	0	3	15	25	48	47	11	0	2	9	0	41	7	11	2	18	4	2	272

87-271 (7/24/90)

1.3 FINAL EIS FORMAT

The remainder of the Final EIS is organized under the following primary headings:

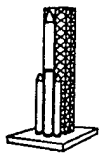
- 2.0 Public Comments and Responses
  - Comments received from federal, state, and local government agencies, elected officials, and the public (individuals and organizations), and the responses to those comments are contained in this chapter. Both written comments and the transcripts of public hearings are included.
- 3.0 Addenda and Errata to the Draft EIS
  - Factual corrections and additions or modifications to the analysis contained in the Draft EIS in response to public and agency comments.
- 4.0 List of Preparers
  - Identifies individuals and organizations responsible for producing the Final EIS.
- 5.0 References
  - List of materials referenced in the text of the Final EIS.
- 6.0 Final EIS Mailing List
  - Agencies, organizations, elected officials, and individuals to whom the Final EIS was mailed.
- 7.0 Documentation of Draft EIS Public Hearings
  - Documentation of the Draft EIS public hearings.
- 8.0 List of Acronyms and Abbreviations
  - List of Acronyms and Abbreviations used in the Final EIS.
- Appendix A - Global Warming
  - This appendix provides a brief discussion of potential global warming impacts that may occur as a result of the proposed action.
- Appendix B - White Paper on Bixby Ranch Update
  - The white paper on Bixby Ranch Update is provided in this appendix.

- Appendix C - Summary of Risk Assessment

  - This appendix provides the Executive Summary of the Risk Assessment performed for Titan IV/Centaur launches and related activities.

- Appendix D - Threatened and Endangered Species Consultation

  - This appendix documents the Threatened and Endangered Species Consultation (Section 7) with the National Marine Fisheries Service and U.S. Fish and Wildlife Service.



Chapter 2.0

PUBLIC COMMENTS AND RESPONSES

2.0 PUBLIC COMMENTS AND RESPONSES

2.1 WRITTEN PUBLIC COMMENTS AND RESPONSES

This section contains written comments received from federal, state, and local government agencies, elected officials, and the public (individuals and organizations) and responses to those comments, per the President's Council on Environmental Quality (CEQ) Regulations (40 CFR Part 1503). Verbal comments from the public hearings and responses to those comments are provided in Section 2.2, Public Hearing Comments and Responses. Comments are numbered consecutively as indicated on the comment letters, and responses are keyed to those comment numbers. This section is structured so that each comment letter is followed by its response(s). Where a comment warrants changes or additions to the Draft EIS, it is noted in the response and the change is provided in Chapter 3.0 (Addenda and Errata to the Draft Environmental Impact Statement).

The following is a summary of the comment letters received on the Draft EIS:

Letter No.	Correspondent
Federal Agencies	
1	U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, E. C. Fullerton, Regional Director
2	U.S. Environmental Protection Agency, Region IX, Deanna Wieman, Director, Office of External Affairs
3	U.S. Department of the Interior, Patricia Sanderson Port, Regional Environmental Officer
4	Marine Mammal Commission, John R. Twiss, Jr., Executive Director
5	U.S. Department of Transportation, Federal Aviation Administration, Barry S. Brayer, Manager, Planning and International Aviation Staff, AWP-A
State Agencies	
6	State of California, Office of Planning and Research, Robert P. Martinez, Director
7	The Resources Agency of California, Gordon F. Snow, Ph.D., for Assistant Secretary of Resources
8	California Regional Water Quality Control Board, Central Coast Region, William R. Leonard, Executive Officer

Santa Barbara County Agencies

9	County of Santa Barbara, Air Pollution Control District, Deborah S. Pontifex, Responsible Agency Review
10	Santa Barbara County Park Department, Michael H. Pahos, Director of Parks
11	County of Santa Barbara, Resource Management Department, Jeffrey T. Harris, Deputy Director

Local Agencies

12	City of Lompoc, King Patrick Leonard, Planning Director
13	Vandenberg Village Community Services District, Howard E. Grantz, President, Board of Directors

Businesses/ Organizations

14	Bixby Ranch Company (September 8, 1989), Kenneth C. Bornholdt, Senior Vice President and General Counsel
15	Bixby Ranch Company (October 6, 1989), Kenneth C. Bornholdt, Senior Vice President and General Counsel

Native American Organizations

16	Tribal Elders Council, Manuel Armenta, Chairman, and David D. Dominguez, Chairman, Santa Ynez Band of Mission Indians

Individuals

17	Maurice "Greg" Cooper, Lompoc, California
18	Nancy Flanders, Lompoc, California
19	Lawrence E. Liles, Santa Barbara, California
20	John J. Markon, Lompoc, California
21	Michael E. McClure, Lompoc, California
22	J.C. Picciuolo, Lompoc, California
23	Mary Gaines Read, Lompoc, California
24	Donald D. Smith, Lompoc, California

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
300 South Ferry Street
Terminal Island, California 90731

September 12, 1989 F/SWR14:BH

Mr. John Edwards
HQ SSD/DEV
P.O. Box 92960
Los Angeles, CA 90009-2960

Dear Mr. Edwards,

This letter represents a review of your Draft Environmental Impact Statement for the construction and operation of Space Launch Complex 7 (SLC-7) at Vandenberg Air Force Base (VAFB). The development of this site is not likely to affect the population of harbor seals or California sea lions in California adversely. However, this project has the potential to adversely affect the local stock of harbor seals and California sea lions that use the Channel Islands, the area from Pt. Conception to Pt. Arguello and in particular the seals occupying the area near Rocky Pt.

General Comments:

VAFB is located adjacent to the Channel Islands which support major populations of California sea lions, harbor seals, northern fur seals and elephant seals. Concerns relative to the impact of sonic booms on seals by the previously proposed space shuttle launches were thoroughly examined and indicated that only minor disturbances would be expected. Given that lower level sonic booms are estimated from the Titan vehicles we do not expect this type of noise to adversely affect the seals. However, in order [1] to verify that no impact will occur an appropriate monitoring program should be instituted.

South VAFB contains 12 of the 36 haulout sites located in Santa Barbara County but south VAFB comprises a much smaller proportion of the coastline in the county. The 533 seals counted at these sites in the 1988 survey account for approximately 42% of the seals observed in that county during the census. This situation probably exists at least in part because of the restricted nature of beach access on south VAFB which precludes human disturbance. It is of particular interest that the haulout use has expanded over the last few years, both in terms numbers of haulouts used and numbers of seals present, in the vicinity of Rocky Pt. This may be a result of disturbance at other mainland sites and or an increasing regional population. The fluctuating annual counts in the most recent years at these haulout sites suggest that movements between other mainland and island haulouts commonly occur. It is also important to note that at least one of the

south VAFB haulouts is used for pupping.

All four of the proposed SLC-7 sites are located within two miles of a least one of the haulouts areas. The proposed SLC sites are all closer to seal haulout areas than any of the other SLCs that are currently in operation. Because of this close proximity we agree that noise and air pollution from launch operations may potentially impact the seals and may constitute a take under the Marine Mammal Protection Act. In order for this take to be legal, a small take permit needs to be obtained from NOAA Fisheries. It is possible that the existing small take permit [2] issued for the space shuttle could be modified although there are some additional impacts under this project that need to be considered.

The DEIS states that launch noise may result in a temporary hearing loss for terrestrial biota within a three to five mile radius of the launch facility. However, although the DEIS acknowledges that the long, loud noise of the launch may disturb animals, it does not identify the degree of disturbance launch noise may produce. It should be noted that for short, loud noises such as sonic booms, it has been found that disturbance of harbor seals may not occur unless there is an accompanying visual stimulus. Given that only three, well separated launches are scheduled per year we do not expect that hearing impairment or permanent displacement would occur. However, monitoring of seal hearing ability and behavioral responses to simulated levels of launch noise would prove valuable in evaluating these potential impacts. Further, monitoring of the seasonal occurrence of seals would identify the times of year when the fewest seals are [3] present and thus when the lowest impact from launches on the regional stock would be expected. Finally, appropriate monitoring of the local harbor seals should be conducted during all actual launches after the SLC is constructed to ensure no short or long term effects exist.

Impacts on air quality from launch gases were identified as a factor of concern for pinnipeds. However, despite the modeling of a Toxic Hazard Corridor which may result in launch postponement if it encompasses an unprotected human population, no similar consideration is given to wildlife. We feel that local pinniped haulout sites should be also be considered [4] relative to this model and launch postponement occur if the seals would be exposed to levels of toxic gases that would adversely impact humans respiratory systems. Should it be necessary to determine toxic gas concentrations around a launch site, monitoring around SLC-4 at distances similar to that which seals would be found on haulouts from the proposed SLC sites should be initiated.

Specific Comments:

[5] p.1-10 section 1.5.1.2. This section should note that if a "take" is expected to occur that a small take permit is required.

[6] p. 1-22 section 1.5.6. A "small take permit" from NOAA Fisheries should be added to this list.

[7] p. 2-59 section 2.3.4. This section should also include impact information concerning seals which use mainland haulout sites.

[8] p. 2-60 second paragraph, line 4. Delete "Guadalupe fur seal" and insert "northern elephant seal"

[9] p. 2-53 sixth paragraph line 3. The species of cetacean in this sentence is not identified.

[10] p. 3-64 Boathouse flats section. Due to this site's close proximity to the seal haulouts, seals should be discussed in this section.

[11] p. 4-40 first paragraph, line 7. There have been no direct studies to demonstrate that space shuttle generated sonic booms will not permanently damage hearing in marine mammals.

[12] p. 4-40 sixth paragraph, line 2. "only one launch would occur during the pupping season" - it should be noted that this is probably for harbor seals since the other species generally breed at other times. However, because of the separation of pupping times it is more accurate to note that more than one launch may occur during seal or sea lion pupping seasons.

[13] p. 4-41 first paragraph, line 1. Insert "harbor seals" between ... 120 pups....

[14] p. 4-41 fourth paragraph, line 6. We are not aware of a small take permit being in process for SLC-4.

[15] p. 4-53 first paragraph. The analyses of effect of Titan IV programs have occurred at SLC-4 which is located several miles from the harbor seal haulouts. The 1988 report which cited does not state how the biota were monitored during launches. Thug it is inappropriate to state that there was no significant impact to marine biota.

[16] p. B-43. Callorhinus ursinus, northern fur seal; depleted; none - should be added to the three columns in Table B.11 under mammals.

We appreciate the opportunity to review the DEIS. If you have any questions about our comments please contact Mr. Brad Hanson of my staff at (213) 514-6666.

Sincerely,

E C Fullerton

E. C. Fullerton

RESPONSE TO LETTER 1

Received From: U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
E. C. Fullerton, Regional Director

Comment No. 1: Monitoring Program

As discussed in Draft EIS Section 4.4.5, Mitigation Measures, a monitoring program with an emphasis on threatened and endangered species would be implemented to assess impacts to wildlife from noise and air emissions. The National Marine Fisheries Service (NMFS) and United States Fish and Wildlife Service (USFWS) will be consulted in the development of this program. The program will build on the ongoing efforts being undertaken by Sea World Research Institute (SWRI) to gather data on pinnipeds and seabird populations. The SWRI monitoring program is directed toward gathering the data necessary to determine population trends and to develop a model of pinniped and seabird population responses to space launch activities.

Comment No. 2: Incidental Take Permit

The potential need for an incidental take permit is discussed in Draft EIS Section 4.4.1, Regional Environment. Additional discussion regarding the need for an incidental take permit is contained in Appendix D.1, Threatened and Endangered Species Consultation with National Marine Fisheries Service, of this document.

Comment No. 3: Monitoring Program

As noted in response to Comment No. 1, a monitoring program would be developed in cooperation with NMFS and USFWS. The specific duration of the program and its content would be developed to ensure that regulatory requirements are met.

Comment No. 4: Rocket Exhaust Impacts to Pinnipeds

As indicated in Draft EIS Section 4.4.2.1, Cypress Ridge, best available scientific information indicates that impacts to local fauna including pinnipeds are not expected to be significant. Therefore, real-time modeling, such as for a toxic hazard corridor (THC), would not be necessary. In addition, launches would be monitored to minimize impacts to pinnipeds.

Comment No. 5: Incidental Take Permit

The additional information to be added to Section 1.5.1.2, Marine Mammal Protection Act (page 1-10 of the Draft EIS), is contained in Chapter 3.0 of the Final EIS (page 3-2).

Comment No. 6: Incidental Take Permit

The additional information to be added to Draft EIS Section 1.5.6, Federal Permit Compliance, is contained in Chapter 3.0 of the Final EIS (page 3-6).

Comment No. 7: Impacts to Seals at Haulout Sites

The information summarizing impacts to seals which use mainland haulout sites is contained in Draft EIS Section 2.3.4, Wildlife, page 2-61.

Comment No. 8: Northern Elephant Seal Identification

The suggested changes to the text of Section 2.3.4 (page 2-60) are contained in Chapter 3.0 of the Final EIS (page 3-8).

Comment No. 9: Cetacean Species

The cetacean species referred to on page 3-53 of the Draft EIS is the gray whale. The revision to the text of the Draft EIS is contained in Chapter 3.0 of the Final EIS (page 3-13).

Comment No. 10: Seal Discussion

There are several areas near the Boathouse Flats alternative site that are of importance to marine mammals. The pocket beach immediately north of the mouth of Oil Well Canyon is a hauling ground and rookery for the area. Additional haulout sites occur to the north toward Rocky Point and include the boathouse breakwater. The 1986 census produced a total of 500 seals for these sites (Hanan et al. 1987).

Comment No. 11: Sonic Boom Studies

The Space Shuttle analysis referred to on page 4-40 of the Draft EIS is the collective body of work on the potential effects of Space Shuttle sonic booms on marine mammals located within the region of influence. While there have not been direct observations made of Space Shuttle impacts to marine mammals (since the Space Shuttle has not been launched from VAFB), the work undertaken in support of the Shuttle included using other sources of noise to simulate launch activities and observed the resulting animal behavior. In addition, extensive field observation of a wide variety of stimuli, including sonic booms from airplanes, and resultant animal behavior have been documented (Jehl and Cooper 1980).

Comment No. 12: Pupping Season

Pupping seasons for pinnipeds in the region are as follows:

Pinniped	Pupping Season
California sea lion	mid-May to late June
Northern fur seal	early June to late July
Northern elephant seal	mid-January to early February
Harbor seal	mid-February to mid-April

The text on Draft EIS page 4-40 was written in reference to the harbor seal, which has a short pupping season. As indicated by the pupping seasons shown, pupping may occur almost continuously from January through July, a period long enough for two launches to occur if the timing were coincident with these periods. The revision to the text is contained in Chapter 3.0 of the Final EIS (page 3-16).

Comment No. 13: Harbor Seals

The text on page 4-41 of the Draft EIS pertains to harbor seals. The appropriate revision to the text is contained in Chapter 3.0 of the Final EIS (page 3-16).

Comment No. 14: Incidental Take Permit for SLC-4

The Incidental Take Permit for SLC-4 was submitted to NMFS on April 17, 1990.

Comment No. 15: Impacts to Marine Biota

This text summarizes the results of conclusions drawn for the Biological Assessment for Titan II and IV operations at SLC-4 (Engineering Science and Sea World Research Institute 1988). On page 6-3 of the Titan II and IV biological assessment, the text notes that, "There would be no air-emission-related impact to marine biota or to Channel Islands biota from operation of the proposed Titan II and Titan IV programs." The report was written prior to launches and draws its conclusions from analysis, rather than monitoring. This information can be used to make preliminary conclusions about the potential for impacts from operations of the proposed action which would be rigorously tested through the proposed monitoring program.

Comment No. 16: Northern Fur Seal

The revised Table B.11 to the recent status of the Northern fur seal is shown in Section 3.2 of the Final EIS.

LETTER 2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

11 SEP 1989

HQ Space Systems Division
U.S. Air Force
P.O. Box 92960
ATTN: Mr. John Edwards
Los Angeles AFB, California 90009-2960

Dear Mr. Edwards:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for **CONSTRUCTION AND OPERATION OF SPACE LAUNCH COMPLEX 7, VANDENBERG AIR FORCE BASE, Santa Barbara County, California.** The proposed launch facility would provide for processing and launch of the Titan IV/Centaur, an unmanned space vehicle, for 10,000 pound Department of Defense payloads into high energy, near polar orbits. The proposed project will require a number of infrastructure facilities, including a launch support structure, launch mount and umbilical tower, mobile service tower, sewage treatment facilities, support buildings, propellant and gas holding areas, roads, and power and utility lines. The proposed Cypress Ridge site and three alternative sites (Boathouse Flats, Vina Terra and Space Launch Complex 6) are located within the same general area of south Vandenberg Air Force Base. The Space Launch Complex 6 site was previously developed for Space Shuttle activities but is now in an inactive status, while the other three sites are undeveloped.

Our comments are provided pursuant to EPA's authorities under the National Environmental Policy Act (NEPA), Section 309 of the Clean Air Act, and the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of NEPA. We have classified this DEIS as Category EC-2, Environmental Concerns - Insufficient Information (please see "Summary of Rating Definitions and Follow-up Actions").

We have environmental concerns because the proposed project may have adverse impacts on waters of the United States, including wetlands and other "special aquatic sites" regulated under Section 404 of the Clean Water Act. The Final Environmental Impact Statement (FEIS) will need to more fully discuss the proposed project's compliance with the Section 404(b)(1) Guidelines.

11 SEP 1989

We also request that the FEIS contain more information on existing air quality conditions in Santa Barbara County and air quality modeling; information on compliance with the Resource Conservation and Recovery Act (particularly its corrective action, underground storage tank and waste minimization provisions); and a commitment that SLC-7 activities will not interfere with the assessment, identification and cleanup of hazardous substances if they are discoverd on the project site. Finally, we request that the U.S. Air Force work closely with the U.S. Fish and Wildlife Service on potential impacts to threatened, endangered and candidate species.

We appreciate the opportunity to comment on the proposed project. Please send us three copies of the FEIS at the same time it is officially filed with EPA's Washington, D.C. office. If you have any questions, please call me at 415-974-8083 (FTS 454-8083) or David Tomsovic at 415-974-7451 (FTS 454-7451).

Sincerely,

Deanna M. Wieman

Deanna M. Wieman, Director
Office of External Affairs

Enclosures: one page EIS rating sheet
six pages of comments on DEIS

cc: Robert B. Cameron, Air Force AFRCE, San Francisco
District Engineer, Army Corps of Engineers, Los Angeles
Nancy Kaufman, U.S. Fish and Wildlife Service, Laguna Niguel
Deborah Pontifex, Santa Barbara County APCD, Santa Barbara
Jeffrey Harris, Santa Barbara County Resource Management Department, Santa Barbara
William Leonard, Regional Water Quality Control Board, San Luis Obispo

COMMENTS BY U.S. EPA TO U.S. AIR FORCE (USAF) ON DRAFT EIS FOR SPACE LAUNCH COMPLEX 7 (SLC-7), VANDENBERG AIR FORCE BASE, SANTA BARBARA COUNTY, CALIFORNIA. SEPTEMBER 1989.

11 SEP 1989

REGULATORY COMPLIANCE COMMENTS

[17] 1. The regulatory compliance section of the DEIS (page 1-21) states that the Resource Conservation and Recovery Act (RCRA) incorporates special standards for wastewater treatment units. We recommend that the regulatory section of the FEIS note that other provisions of the RCRA may also be applicable, including those on corrective action, underground storage tanks, and waste minimization.

[18] 2. The regulatory compliance section (DEIS, page 1-20) on the Clean Water Act should be amended to discuss Section 313. Section 313 requires that each department or agency of the Federal Government engaged in an activity that may result in the discharge or runoff of pollutants must comply with all Federal, State and local requirements respecting the control and abatement of water pollution to the same extent as any nongovernmental entity.

[19] 3. We recommend that two Executive Orders (EO) be included in the FEIS's regulatory compliance section. They are: (1) Executive Order 11990, "Protection of Wetlands," May 24, 1977; and (2) Executive Order 12088, "Federal Compliance with Pollution Control Standards," October 13, 1978.

EO 11990 provides that, "Each agency...shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands..." and that no new construction shall occur in wetlands unless the agency finds that there is "no practicable alternative to such construction and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use."

EO 12088 provides that each Federal agency shall cooperate and consult with the EPA and State/local agencies on the prevention, control and abatement of environmental pollution. The EO is currently being revised and its provisions may significantly change. We recommend that the FEIS discuss compliance with the revised EO if it is signed by the President before the FEIS is issued.

WETLANDS COMMENTS - CLEAN WATER ACT (CWA)

We commend the U.S. Air Force for developing alternatives that avoid the placement of fill or project features in wetlands. For example, the DEIS (pages 4-32 and 4-33) states that power lines will be placed to avoid wetlands. However, as the DEIS states on page 1-23, a Section 404 permit may be required from the U.S. Army Corps of Engineers, depending upon final project design and operational procedures. Section 404 governs the placement of dredged or fill material into waters of the United States,

including wetlands and other "special aquatic sites."

We request that the FEIS discuss the proposed project's consistency with Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials [the 404(b)(1) Guidelines, found at 40 CFR Part 230]. We recommend that the U.S. Air Force work closely with EPA and the Army Corps of Engineers' Los Angeles District should Section 404 prove applicable. In order to demonstrate compliance with the 404(b)(1) Guidelines, the proposed project must meet the following criteria.

1. The proposed discharge must be the **practicable alternative** which would have the least adverse impact on the aquatic ecosystem [40 CFR 230.10(a)].

[20] 2. The proposed project must not cause or contribute to significant degradation of waters of the United States, including wetlands and other special aquatic sites [40 CFR 230.10(c)]. Significant degradation includes the loss of fish and wildlife habitat and the loss of other wetland habitat values and functions. Significant degradation also includes cumulative impacts.

3. The proposed project does not violate State-adopted, EPA-approved water quality standards or jeopardize the continued existence of any species listed as threatened or endangered under the Endangered Species Act [40 CFR 230.10(b)].

4. All appropriate and practicable steps have been taken to minimize adverse impacts on the aquatic ecosystem (i.e., mitigation) [40 CFR 230.10(d)]. It is essential that the Air Force undertake every practicable effort to **first avoid** and **then reduce** the amount of fill placed into waters of the United States. The FEIS's alternatives analysis should fully document the avoidance and minimization of adverse impacts on aquatic ecosystems. Finally, the FEIS must describe appropriate and practicable measures to compensate for the **unavoidable** loss of wetlands and other waters of the United States.

In order to assist EPA, the Army Corps of Engineers, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service and the California Department of Fish and Game in evaluating the proposed project's consistency with the 404(b(1) Guidelines, we recommend that the FEIS contain the following information.

[21] * the number of acres subject to Section 404 jurisdiction that would be filled,

[22] * a brief assessment of the historic cumulative loss or degradation of waters of the United States on Vandenberg Air Force Base,

[23] * the types and quantities of fill material that would be discharged into waters of the United States, including wetlands and other special aquatic sites,

[24] * the number of acres subject to Section 404 jurisdiction that would be permanently lost or degraded due to impacts other than the placement of fill (e.g., the impacts of erosion, sedimenta-

tion and runoff of pollutants on wetland habitats; accidental discharge of fuels or other toxic substances into wetland habitats; diversion of water from wetland habitats), 11 SEP 1989

[25] * the habitat value and location of habitats permanently lost or degraded,

[26] * a specific mitigation proposal to fully compensate for the loss or degradation of wetland habitats, including the proposed mitigation replacement ratio, the habitat value and proposed location of replacement habitats, specific grading and revegetation plans, and a biological maintenance and monitoring program,

[27] * clear mitigation goals and objective, quantifiable criteria by which to judge the success or failure of mitigation, and

[28] * firm commitments by the U.S. Air Force to ensure the restoration or creation of wetland habitats of equal or greater resource value, and commitments to ensure their protection for the life of the project.

BIOLOGICAL RESOURCE COMMENTS

The proposed project may have an adverse impact on a plant, *Monardella undulate* var. *frutescens*, listed as a candidate species under the Federal Endangered Species Act (ESA). The development of the Cypress Ridge site (the preferred alternative in the DEIS) would involve the loss of 800-1,000 mature individuals. The DEIS notes that this significant impact "could be minimized by revegetation."

[29] We encourage the U.S. Air Force to work closely with the U.S. Fish and Wildlife Service on ESA concerns. The FEIS should document any ESA Section 7 consultation which has been performed. The vegetation section of "Summary of Mitigation Measures" in the FEIS should be amended to include Section 7 consultation information and any recommendations made by the U.S. Fish and Wildlife Service.

HAZARDOUS WASTE/UNDERGROUND STORAGE TANK SYSTEM COMMENTS - RESOURCE CONSERVATION AND RECOVERY ACT - (RCRA)

The DEIS's discussion on the hazardous materials and hazardous waste associated with the proposed project is comprehensive. It provides an excellent overview of the types and volumes of hazardous and toxic materials associated with the construction and operation of a space launch facility. For clarification, we recommend that the FEIS discuss the following RCRA issues in greater detail.

[30] 1. The FEIS should discuss the applicability of any RCRA corrective action requirements which may be necessary at the four alternative sites. The FEIS should also discuss the applicability of State laws/rules governing the identification, assessment and cleanup of hazardous substances or hazardous waste, as it relates to the four alternative sites.

2. In 1984 Congress amended the Resource Conservation and Recovery Act by adding Subtitle I, which required the EPA to develop regulations to protect ground water resources and public health from leaks from underground storage tank (UST) systems containing petroleum products or hazardous chemicals. An UST is defined as any tank, including underground piping connected to the tank, that has at least ten percent of its volume underground. Certain types of tanks are not covered by EPA's UST regulations (e.g., tanks holding 110 gallons or less; emergency spill and overfill tanks; surface impoundments and pits; septic tanks and systems to collect storm water and wastewater).

[31] The FEIS should assess whether any RCRA-regulated UST systems exist on sites proposed for SLC-7 activities. If there are any UST systems on the proposed sites, we recommend that the FEIS assess the potential for contamination of soil or ground water resources due to leaks or discharges.

[32] The FEIS should discuss RCRA requirements for existing and proposed UST systems. It should also discuss the applicability of any State or local laws/rules concerning UST systems since Congress has given States the authority to adopt UST laws that are more stringent than Federal RCRA requirements.

3. The 1984 RCRA amendments mandate waste minimization in order to protect public health and the environment. Waste minimization means the reduction, to the extent feasible, of any solid or hazardous waste that is generated, treated, disposed of, or stored. We commend the U.S. Air Force for proposing actions that would reduce the amount of hazardous waste generated by the proposed project (e.g., using paints and primers with low contents of metals such as lead, zinc and cadmium, DEIS, page 4-94).

[33] We strongly encourage the adoption of "fullscale waste minimization" as a waste management mitigation measure. As the DEIS notes on page 3-83, "alternatives should be considered before designating wastes for landfill disposal. One alternative is waste minimization by onsite/offsite recycling."

We suggest that the FEIS identify the array of methods that will be used to achieve waste minimization. They may include the following approaches and techniques:

* purchase fewer toxic and more nontoxic production materials;
* inventory and trace all raw materials;
* install equipment that produces minimal or no waste;
* modify equipment to enhance recovery or recycling options;
* substitute nonhazardous for hazardous raw materials;
* segregate wastes by type for recovery;
* eliminate sources of leaks and spills;
* separate hazardous from nonhazardous wastes; and
* recycle onsite and offsite for reuse.

HAZARDOUS SUBSTANCE COMMENTS - COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT, AS AMENDED BY SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (CERCLA/SARA) 11 SEP 1989

[34] The DEIS states (pages 3-90 to 3-92) that, according to the Department of Defense's Installation Restoration Program, none of the four alternative sites contain any hazardous waste locations and do not come under the jurisdiction of either the Comprehensive Environmental Response, Compensation and Liability Act or the Superfund Amendments and Reauthorization Act (CERCLA-SARA). However, we request that the FEIS contain a commitment to ensure the following, if hazardous substances are located at any of the four alternative sites.

1. If the U.S. Air Force discovers evidence of hazardous substances contamination in the future, it will promptly notify the EPA and comply with all applicable requirements of CERCLA/SARA and the National Contingency Plan (NCP).

2. The FEIS should also contain a commitment that if CERCLA hazardous substances are discovered at the proposed project sites, no construction will occur until the requirements of CERCLA/SARA and the NCP have been fully satisfied. CERCLA/SARA/NCP activities would take priority over new construction at any contaminated sites until CERCLA/SARA compliance has been achieved.

3. The U.S. Air Force will coordinate with appropriate State and local regulatory agencies (e.g., Regional Water Quality Control Board; California Department of Health Services; city and county health departments) to determine their concerns on the identification, assessment or cleanup of hazardous substances or hazardous waste.

AIR QUALITY COMMENTS - CLEAN AIR ACT

[35] 1. The FEIS should note the EPA's May 1988 State Implementation Plan (SIP) Call for Santa Barbara County. This SIP Call requires the County to prepare a new Plan to meet the ozone standard. The Plan will control emissions for the entire county.

[36] 2. The FEIS should contain a more detailed discussion of how the U.S. Air Force modeled potential air quality impacts and the potential for violation of air quality standards. The FEIS should provide more detailed information to justify the conclusion that there would be no violations of Federal or State air quality standards. The FEIS should address the increments for Prevention of Significant Deterioration, including the new nitrogen dioxide increment.

[37] We understand that the Santa Barbara County Air Pollution Control District (SBCAPCD) may have concerns regarding the appropriateness of the model used in the DEIS. Although we have not received a copy of the SBCAPCD's comment letter on the SLC-7 DEIS, we strongly recommend that the U.S. Air Force fully

coordinate air quality modeling and compliance with Federal/State air quality standards with the SBCAPCD. This is critical because the SBCAPCD must issue an Authority to Construct (ATC) permit to the U.S. Air Force, and has been delegated compliance and enforcement authorities under the Federal Clean Air Act.

[38] 3. The DEIS notes (page 2-81, 4-64/4-66) that scheduling of launches will help to minimize adverse air quality impacts. In light of the 1987 determination by the SBCAPCD that north Santa Barbara County is a nonattainment area for ozone and its precursor pollutants, we recommend that the U.S. Air Force coordinate its launch schedule with the SBCAPCD, unless precluded by national security considerations. We recommend that the air resources section of the "Summary of Mitigation Measures" be amended to include coordination of launch schedules with the SBCAPCD to help protect air quality and to prevent violations of Federal/State air quality standards.

[39] 4. The DEIS states that the U.S. Air Force will use, where feasible, chlorinated fluorocarbons (CFCs) that are not as destructive of the stratosphere as products that have been used in past decades. We commend the efforts of the U.S. Air Force to protect the stratosphere, and urge that every effort be made to not use CFC products which are destructive of the stratosphere.

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION*

11 SEP 1989

Environmental Impact of the Action

LO--Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1--Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

RESPONSE TO LETTER 2

Received From: U.S. Environmental Protection Agency, Region IX,
Deanna Wieman, Director, Office of External Affairs

Comment No. 17: Discussion of Resource Conservation and Recovery Act (RCRA)

USAF concurs that other sections of RCRA may be applicable to the proposed action. The additional text is contained in Chapter 3.0 of the Final EIS (page 3-5).

Comment No. 18: Discussion of Clean Water Act

A discussion of Section 313 of the Clean Water Act (33 USC Part 1251, *et seq.*), Federal Facilities Pollution Control, is contained in Chapter 3.0 of the Final EIS (page 3-4).

Comment No. 19: Discussion of Executive Orders 11990, Protection of Wetlands, and 12088, Federal Compliance with Pollution Control Standards.

Discussion of Executive Orders 11990 and 12088 is contained in Chapter 3.0 of the Final EIS (pages 3-5 and 3-6).

Comment No. 20: Discussion of Project Consistency with Clean Water Act Section 404 (Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials)

A Section 404 permit or modification to the current permit (88-201-KK) may be required to perform maintenance dredging at Harbor V-33 if project materials are brought to VAFB by water transport. It is not known at this time if this maintenance dredging would be required, since project materials may be delivered to VAFB by land. Permit 88-201-KK allows maintenance dredging to a depth of 12.4 feet below mean sea level to accommodate barge usage until 1991. Disposal of dredged material would be at the abandoned borrow site located along the coastal bluffs at Point Pedernales (as per Permit 88-201-KK) or at another, approved site.

As noted in Section 2.1.4.1 and depicted on Figure 2.1.11, unused cut (or fill) material would be removed from the project area and transferred to a spoil site located about three miles north

of Cypress Ridge, near Point Arguello. The site is neither on nor in any waters or wetlands. Further, as discussed in Section 2.3.3, impacts to wetlands and riparian habitat would be avoided. In Section 3.4.2.1, Wildlife of Riparian Woodland/Wetland Habitats, it is noted that there are no threatened or endangered species expected to occur in these habitats in the study area.

Comment No. 21: Number of Acres Subject to Section 404 Jurisdiction That Would Be Filled

This information would be provided should a Section 404 permit become necessary.

Comment No. 22: Historic Cumulative Loss or Degradation of Waters on Vandenberg Air Force Base

See response to Comment 21.

Comment No. 23: Types and Quantities of Fill Material

See response to Comment 21.

Comment No. 24: Number of Acres Subject to Section 404 Jurisdiction that Would Be Permanently Lost or Degraded

See response to Comment 21.

Comment No. 25: Value and Location of Habitat That Would Be Permanently Lost or Degraded

See response to Comment 21.

Comment No. 26: Specific Mitigation Proposal for Loss or Degradation of Wetlands

See response to Comment No. 21. Mitigation measures are not necessary since loss or degradation of wetlands is not expected to occur.

Comment No. 27: Wetlands Mitigation Goals, Objectives, and Criteria

See response to Comment Nos. 21 and 26.

Comment No. 28: U.S. Air Force Commitments to Ensure Restoration or Creation of Wetlands to Offset Impacts

See response to Comment No. 26. Since impacts to wetlands are not anticipated, there are no requirements for restoration or creation of wetlands.

Comment No. 29: Include Section 7 Consultation and Recommendations as Mitigation for Vegetation

Section 7 consultation information regarding vegetation is included in Draft EIS Section 1.5.1, Endangered Species, and Appendix D.2, Threatened and Endangered Species Consultation, U.S. Fish and Wildlife Service, of this document. Specific mitigation measures will be developed in cooperation with USFWS and formally adopted in the ROD.

Comment No. 30: Applicability of RCRA Corrective Action Requirements at Proposed and Alternative Sites

If underground storage tanks (USTs) are discovered at the site selected for development, corrective actions required by Santa Barbara County Ordinance No. 3421 (An Urgency Ordinance to Add Article III to Chapter 18 of the Santa Barbara Code Requiring Permits for the Underground Storage of Hazardous Materials and Providing for the Application of Fees), as administered by Santa Barbara County Health Care Services, would apply. Corrective measures would be taken or a variance would be obtained from Santa Barbara County. These requirements are at least as stringent, as those levied by the RCRA.

Comment No. 31: Discussion of RCRA-Regulated Underground Storage Tanks at Proposed and Alternative Sites

There have been no indications of USTs noted at the undeveloped project sites considered. However, SLC-6 has the following USTs that are subject to RCRA regulations:

Location	Size[1]	Quantity	Product
Payload Preparation Room	27,054	1	No. 2 Fuel Oil
Ice Suppression System	20,000	2	JP-4 Aviation Fuel
Security Entry Control Building	550	1	No. 2 Fuel Oil
North Security Entry Control Building	550	1	No. 2 Fuel Oil
Fuel Unloading Area	3,000	1	Propane

[1] Gallons

The payload preparation room tanks are currently full of No. 2 Fuel Oil and are regularly used to fire boilers in that building. This tank is regularly monitored for leaks. The ice suppression system tanks are full of JP-4 aviation fuel and are monitored on a quarterly basis since the facility is in mothball status. The tanks at the security entry control buildings are kept full of No. 2 Fuel Oil and are used regularly to fire a small diesel generator (north security entry control building) and boilers (main security entry control building). The tank at the fuel unloading area is kept full of propane and monitored on a quarterly basis.

Should SLC-6 be selected for development of the proposed action, these tanks would either be brought to compliance standards, as noted in response to Comment No. 32, or a variance would be obtained.

Based on current usage, monitoring, and compliance requirements, the potential for contamination of ground water is low.

Comment No. 32: Discussion of RCRA Requirements for Existing and Proposed Underground Storage Tanks

There are no USTs included in the proposed action at this time. However, should there be a need for USTs, the minimum RCRA requirements for all new USTs (including underground pipes connected thereto) would be met. These requirements are:

- The owner or operator must certify that the UST is installed properly.
- The UST must be protected from corrosion. A steel UST must be cathodically protected and sealed with a corrosion-resistant coating. Other USTs must be made of noncorrodible material or of a composite of steel and noncorrodible material.
- The UST must be equipped with devices that prevent spills and overfills. Correct tank filling procedures must be followed.
- The UST must have a leak detection method that provides monitoring for leaks at least every 30 days.

Additionally, all new chemical USTs must have secondary containment equipped with an interstitial leak detection system in the confined area between the primary and secondary walls. All pressurized piping not provided with interstitial or continuous monitoring must have an emergency cutoff pressure monitor.

At the end of 10 years, all USTs currently in the ground now will be required to meet the same requirements that presently apply to new USTs. During this 10-year time period, specific leak detection methods, designated by EPA, must be implemented within given time limits, dependent upon tank type and chemical content. An alternative method allows a combination of daily inventory control and periodic tank tightness testing.

Response to a leak or spill from a UST would be in two stages: immediate and long-term. The regulatory authority must be notified within 24 hours of a leak or spill, unless it is smaller than the reportable quantity identified under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and is immediately contained and cleaned up. Owners and operators of USTs are financially responsible for leaks, including the costs of cleanup, bodily injury, and property damage.

The applicability of local regulations is discussed in response to Comment No. 30.

Comment No. 33: Methods That Will Be Used for Waste Minimization

Consistent with AFR 19-1, USAF will avoid or minimize the creation of wastes throughout the complete cycle of operations of the proposed action. Wastes that are created will be disposed of by reprocessing, recycling, and reusing when possible.

Waste from the proposed action would be consolidated through utilization of the existing VAFB hazardous waste accumulation system. As documented in the Titan IV/Centaur Waste Assessment (Environmental Solutions, Inc. 1990a), the following specific mitigation measures would be implemented:

- Launch wastewater would be recycled after being treated.
- Low metallic content paint would be used on surfaces that come into contact with launch wastewater.
- Hypergolic fuels and oxidizer residue would be separated from launch wastewater so that wastes are not mixed.
- Hypergolic fuels would be handled as follows:
  - Operational television coverage will be used to monitor propellant transfer activities.
  - Redundancy will be used wherever possible in order to provide a high level of system safety.
  - Proper training and frequent briefings will be provided to employees before they handle hypergolic fuels and oxidizers.
  - Engineering design will be used wherever possible to reduce the likelihood of a spill.

Facility engineering that would support the development of additional, process-specific mitigation measures has not yet occurred . However, in accordance with the DOD established goal of 50 percent reduction of hazardous waste by 1992, USAF will:

- Purchase fewer toxic and more nontoxic production materials;
- Inventory and trace all raw materials;
- Install equipment that produces minimal or no waste;
- Modify equipment to enhance recovery or recycling operations;
- Substitute nonhazardous for hazardous raw materials;
- Segregate wastes by type for recovery;
- Eliminate sources of leaks and spills;
- Separate hazardous from nonhazardous waste; and
- Recycle onsite and offsite.

Comment No. 34: Commitment to Ensure Compliance With CERCLA/SARA (Superfund Amendment and Reauthorization Act) if Hazardous Substances Are Found at the Proposed or Alternative Sites

As per the requirements of CERCLA/SARA, should hazardous substances be located at any of the four alternative sites the USAF will:

- Promptly notify EPA and comply with all applicable requirements of CERCLA/SARA and the National Contingency Plan (NCP).
- Not begin construction until the requirements of CERCLA/SARA and NCP have been fully satisfied.
- Coordinate with appropriate state and local agencies to determine their concerns on the identification, assessment, or cleanup of hazardous substances or hazardous waste.

These compliance procedures also are noted in Chapter 3.0 of the Final EIS (page 3-9).

Comment No. 35: EPA's State Implementation Plan (SIP) Call for Santa Barbara County

A discussion of the EPA's May 1988 SIP Call for Santa Barbara County is contained in Chapter 3.0 of the Final EIS (page 3-4).

Comment No. 36: Discussion of Air Quality Impacts

See response to Comment No. 86.

Comment No. 37: Coordination of Air Quality Modeling with Santa Barbara County Air Pollution Control District (SBCAPCD)

Compliance with SBCAPCD specifications is addressed in Draft EIS Section 4.5.2.1, Cypress Ridge. Also, see response to Comment No. 86.

Comment No. 38: Coordination of Launch Schedule with Santa Barbara County Air Pollution Control District

As noted in Draft EIS Section 4.5.2.1, Cypress Ridge, USAF utilizes the THC forecast to ensure that launch emissions do not pose unacceptable risks to human health and safety. Potential launch opportunities are limited in number due to the necessity to meet satellite positioning requirements. Other launch constraints, such as those suggested, would impact the potential to meet mission requirements and, in turn, adversely impact national security.

Comment No. 39: Use of Chlorinated Fluorocarbons

As described in Draft EIS Section 3.5.3.2, Regulatory Environment, and directed by Engineering Technical Letter 88-8, USAF will utilize environmentally preferable chlorofluorocarbons wherever possible. This is consistent with EPA's "protection of stratospheric ozone" rule (40 CFR Part 82).

LETTER 3

United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
BOX 36098, 450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102

ER 89/646

SEP 15 1989

Mr. John Edwards
HQ Space Systems Division
Post Office Box 92960
Worldways Postal Center
Los Angeles, California 90009-2960

Dear Mr. Edwards:

This is in response to the request for the Department of the Interior's comments on the Draft Environmental Impact Statement (DEIS) for Space Launch Complex 7, Vandenberg Air Force Base, Santa Barbara County, California. We have the following comments to offer:

The DEIS is in fact one of the best we have reviewed in its treatment of cultural properties and the federal procedures for dealing with them.

[40] We are concerned about the extent of impacts to cultural resources on Vandenberg in the selection of a construction site for the Titan IV/Centaur space launch vehicle and urge consideration of an alternative that will preserve in situ as many sites as possible. Many years ago we recommended that a National Register District be created that would include all of Vandenberg Air Force Base and still feel this would be a more practical solution to dealing with the cultural resources there than your proposal (page 4-120) to create a district for South Vandenberg. We also concur that a top cultural resources priority at the Base is the preparation of a Historic Preservation Plan.

The following comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. et seq.), and other authorities mandating Department of the Interior concerns for environmental values. Since the Air Force is currently preparing a Biological Assessment in anticipation of formal Section 7 Consultation under the Endangered Species Act, we have focused our review on non-endangered fish and wildlife resources.

The proposed action is the construction and operation of a Titan IV/Centaur space launch complex on Cypress Ridge, south Vandenberg Air Force Base. In addition to the proposed site on Cypress Ridge, three alternative sites have also been considered (SLC-6, Vina Terrace, and Boathouse Flats). The project is designed for a minimum of 25 years, with construction planned to begin in 1990, followed by operations in 1994.

Based on the extensive evaluation in the DEIS, the Fish and Wildlife Service concurs that there would be fewer impacts to fish and wildlife resources associated with the reconfiguration of SLC-6 than with the development of either the proposed Cypress Ridge site or the Boathouse Flats or Vina Terrace alternatives. Since no additional ground disturbance would be required with the use of the SLC-6 facility, impacts to vegetation and wildlife habitat from construction on the Base are not expected. On the other hand, selection of either of the other alternatives would result in the loss of 185 to 280 acres. Development of the proposed Cypress Ridge site would also result in the loss of about 800 to 1,000 mature individuals of the federal candidate species curly-leaved monardella (Monardella undulata var. frutescens), plus many more seedlings. Development at the Boathouse Flats location would result in the loss of approximately six acres of wetlands and 40 to 50 mature individuals of curly-
[41] leaved monardella plus seedlings.

Selection of any of the alternatives other than reconfiguration of SLC-6, including the proposed Cypress Ridge site, should include mitigation for losses of riparian wetlands and coastal scrub habitats. Mitigation plans should include creation of new wetland habitat for habitat lost, restoration and revegetation of disturbed coastal scrub habitats for habitat lost, and long-term monitoring of revegetation efforts. The Fish and Wildlife Service will be happy to coordinate with your staff in developing these plans.

[42] The DEIS has not considered the frequency of launches from the proposed facility in the analysis of impacts to vegetation and fish and wildlife resources. Estimates of the types and number of launches per year, and the cumulative effect of associated noise and disturbance and acidic deposition on fish and wildlife should also be included.

[43] The Fish and Wildlife Service has commented previously on the need for a comprehensive cumulative impact analysis from space launch programs on Vandenberg Air Force Base. There are several different programs on Vandenberg which involve launches of various space launch vehicles. The cumulative impacts of these various programs to fish and wildlife resources both on Vandenberg and within their zone of influence (i.e., Channel Islands) need to be addressed. Baseline impacts from existing space launch programs must be established before any additional impacts due to this project can be adequately addressed as required by the National Environmental Policy Act of 1969.

Specific Comments on the DEIS for Space Launch Complex 7

[44] Page 2-25 - More information is needed on the locations of the proposed borrow and spoil pits indicated in Figure 2.1.11. Borrow areas adjacent to the Santa Ynez River may contain riparian/wetland resources which could be impacted by borrow activity. This needs clarification.

[45] Page 3-45 - How were wetlands delineated for this analysis? Methods for delineation should be described.

[46] Page 3-49 - The Fish and Wildlife Service did not receive a biological assessment concurrent with release of the DEIS.

[47] Page 3-51 - Information on use of rocky and sandy shorelines by marine birds should be updated.

[48] Page 3-130 - Details of any spill prevention and cleanup plans for responding to accidents along the propellant transport route should be presented.

[49] Page 3-136 - What assumptions were made in generating ground level HCL concentrations?

[50] Page 4-24 - The Fish and Wildlife Service encourages the proposed design to avoid impacts to small wetlands along utility corridors.

[51] Page 4-24 - Population estimates for Monardella undulata var. frutescens need to updated.

[52] Page 4-25 - Potential invasion of disturbed areas by exotic plants should be vigorously monitored and weeded as appropriate.

[53] Page 4-27 - More information is needed on what kinds of impacts to vegetation (i.e., damage or loss) from the acidic deposition of HCL and also AL_2O_3. If this information is not available, the Fish and Wildlife Service suggests that a monitoring plan be implemented to document these affects. This plan should be coordinated with monitoring plans being devised for other space launch programs.

[54] Page 4-27 - Will seedlings be affected by this deposition?

[55] Page 4-29 - How does fog and/or rainfall interact with acid which has been deposited on soils and vegetation? How long may any affects persist?

[56] Page 4-30 - Define temporary disturbance.

[57] Page 4-33 - The mitigation measures identified will require much elaboration. The Fish and Wildlife Service will be happy to assist the Air Force in developing specific mitigation plans.

[58] Pages 4-35 through 4-47 - This discussion needs more elaboration and justification for the conclusions stated within. Among other things, estimates of the frequency of impacts (i.e., noise and disturbances from launches, and repeated acidic deposition) need to be incorporated into the analysis. Also, the individual sensitivity of various species affected should be analyzed. Since the opening remarks in this section state that impacts from launch noise and focused sonic booms and their short- and long- term impacts on marine birds and mammals are studied in detail in the Biological Assessment for this project, we will defer any detailed comments to our review of the Assessment.

[59] Page 4-43 - What is meant by a "short" time?

[60] Page 4-45 - The tidewater goby is not proposed for listing.

[61] Page 4-54 - Cumulative impacts include other space launch programs operating at Vandenberg. This discussion needs quite a bit more elaboration.

[62] Page 4-55 - The monitoring plans discussed need to be elaborated quite a bit. Specific plans for each resource impacted should be developed. The Fish and Wildlife Service will be happy to coordinate with the Air Force in developing such plans.

[63] Page 4-173 - Unavoidable adverse effects to vegetation and wildlife should be described in more detail.

If you have any questions regarding cultural resources, please contact Holly Dunbar, National Park Service, at (415) 556-5190. For questions regarding fish and wildlife resources, please contact Ms. Donna Brewer, Fish and Wildlife Service, at (714) 643-4270.

Thank you for affording us an opportunity to comment on this document.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPR
Regional Director, NPS
Regional Director, FWS

RESPONSE TO LETTER 3

Received From: United States Department of the Interior
Patricia Sanderson Port, Regional Environmental Officer

Comment No. 40: Avoidance of Cultural Resources

As noted in the Summary of this document, the conversion of SLC-6 is one of USAF's preferred alternatives. This alternative would minimize disturbance of cultural resources (Section 4.9.2.2, SLC-6). The appropriateness of a National Register District or its area will be determined as a result of Section 106 consultations with the California State Historic Preservation Officer (SHPO) and the federal Advisory Council on Historic Preservation (ACHP).

Comment No. 41: Mitigation Measures for Loss of Habitat

The mitigation measures suggested for revegetation of the proposed and alternative sites are contained in Draft EIS Section 4.3.4, Mitigation Measures. Since wetlands are not expected to be impacted, mitigation measures are not anticipated for that resource. One of the primary planning tools for establishing mitigation measures for vegetation would be an erosion control and restoration plan. Participation of USFWS in the development of this plan is desirable and would be coordinated as appropriate.

Comment No. 42: Effects of Multiple Launches on Fish and Wildlife Resources

The analysis of impacts to fish and wildlife resources contained in the Draft EIS is structured around a targeted launch rate of three Titan IV/ Centaur vehicles per year (Section 2.1.5, Launch Preparation and Operation, and Section 2.1.6, Overall Project Schedule and Personnel, establish the baseline launch rate of three per year for the life of the project). The analyses of potential impacts from the proposed action address the effects of multiple launches in the following manner:

Vegetation. The operations subsections contained in Section 4.3, Vegetation, address the potential effects of multiple launches by drawing on information generated by analyses undertaken at John F. Kennedy Space Center (Schmalzer et al. 1986). Schmalzer et al. observed changes in species composition 30 months after the first Space Shuttle launch from

Kennedy Space Center. During this time period, there were nine Space Shuttle launches from Pad 39A. It is from this analysis that the Draft EIS concludes that impacts to vegetation could result in damage to sensitive species and changes in vegetation cover type.

Wildlife - Acidic Deposition. The analyses contained in Section 4.4.2, Local Terrestrial and Aquatic Environment, also base impact conclusions on a launch rate of three vehicles per year. As noted on page 4-43, impacts to terrestrial fauna are expected to be short term and insignificant, based on previous analyses of rocket operations from SLC-4 (Engineering Science 1987; Engineering Science and Sea World Research Institute 1988). The conclusions reached regarding Titan operations from SLC-4 were based on a total launch rate of seven vehicles per year (four Titan IV and three Titan II vehicles). It was concluded that, as a result of launches from SLC-4, there would be only short-term and localized impacts to terrestrial and aquatic fauna. It was also concluded that there would be no air emission-related impacts to marine mammals located on the Channel Islands. In addition, an analysis of launch-related acidic deposition from TCLC launches into Honda Creek was performed. This analysis showed that Honda Creek has buffering capacity in excess of the amount needed to neutralize HCl deposition resulting from launches and protect the unarmored three-spine stickleback. Since the pH and, therefore, the buffering capacity of Honda Creek would not be changed as a result of a launch occurrence, multiple launches would not create additional adverse impacts.

Marine Birds - Noise. Section 4.4.1, Regional Environment, contains a discussion of potential impacts to marine birds and mammals from noise associated with multiple launches. As cited in Section 4.4.1, Bowles and Stewart (1980) and Schreiber and Schreiber (1980) have studied the potential noise-related effects to marine birds from multiple launches of the Space Shuttle, which were expected to reach as high as 20 per year, with operations lasting for nine years. It is expected that launch noise associated with the Titan IV would be equal to or less than that associated with the Space Shuttle. Bowles and Stewart monitored marine bird populations on San Miguel and Prince Islands from 1979 to 1980 and concluded that the level of disturbance at that time did not have a measurable effect on marine bird populations on San Miguel Island and that there is no evidence that the increased rate of startle (from proposed Space Shuttle operations) would have any perceptible effect on the avifauna of San Miguel or Prince Islands. Schreiber and Schreiber note that the only risk from single or multiple launches is a minimal risk of nest collapse for Cassion's auklet. They concluded that they do not expect more than normal annual fluctuations in critical factors such as changes in population levels, shifts in seasonal timing, and nesting success due to anticipated Space Shuttle operations. Therefore,

based on the Titan IV/Centaur being launched fewer times per year (three) and producing less noise per launch than the Space Shuttle, the Draft EIS concluded that noise from the proposed action would have an insignificant effect on marine birds.

Marine Mammals - Noise. Potential noise impacts to marine mammals from multiple launches are addressed in Section 4.4.1 of the Draft EIS, Regional Environment. As cited in Section 4.4.1, the analysis that Chappell (1980) undertook for the Space Shuttle program at VAFB showed that hearing loss in marine mammals would be expected to be short-term (as much as several days) following each shuttle launch, but with no cumulative effects to auditory systems. Bowles and Stewart (1980) analyzed the potential for startle responses in pinnipeds based on their observations from 1979 to 1980 and found that there was no evidence of permanent haul-out or rookery abandonment from isolated stimuli, including sonic booms from rocket launches. In addition, because the stimulus from a sonic boom is short and not localized, few relocations would be expected from the high level of Space Shuttle activity. In addition, the analysis presented in Section 4.4.1 discussed the frequency of planned launches with regard to the potential for impacts during pupping season and found that the risks of mother-pup separation are small based on a rate of three launches per year from the proposed action.

Comment No. 43: Comprehensive Cumulative Impact Analysis

Consistent with NEPA, the Draft EIS includes analyses of cumulative impacts. Other activities at VAFB are discussed to establish existing conditions and to determine cumulative impacts, as appropriate. As described in response to Comment No. 42, the analysis is based on a launch rate of three vehicles per year. This may be compared to the higher launch rate of 20 per year for the Space Shuttle from VAFB which resulted in an acceptable level of impacts.

In the Draft EIS, other activities at VAFB are considered in the description of the existing environment and in the determination of impacts where they are related to the proposed action. An example of this approach is for vegetation, where Section 3.3.1, Regional Environment, broadly discusses influences on vegetation and provides baseline acreage for each vegetation type that takes into consideration the lands required for other launch and support facilities. When cumulative impacts are discussed in Section 4.3.3, Cumulative Impacts, the impacts to vegetation from the existing South VAFB launch complexes (SLC-3, -4, -5, and -6) are considered in light of the additional increment of impact posed by the proposed action.

The best available source of information regarding impacts to wildlife resources on the Channel Islands is the work associated with the launch of the Space Shuttle from VAFB (see response to Comment No. 42). These analyses include such diverse influences on existing animal behavior as airplane and helicopter overflights, missile operations, human intrusion, boat noise, and others. This body of knowledge provides much of the background for the conclusions drawn about cumulative impacts to wildlife in the Draft EIS (Section 4.4.4, Cumulative Impacts) and, with the analysis of the proposed action, is sufficient to address potential impacts. Additional information regarding cumulative impacts from VAFB operations may result from the launch monitoring program described in the Draft EIS. If future adverse impacts were found to be greater than expected, an analysis would be performed to determine the need to supplement this EIS, develop mitigation measures, determine their potential effectiveness, and decide if they would be implemented.

Comment No. 44: Borrow and Spoil Pits

The potential borrow pits adjacent to the Santa Ynez River are no longer being considered as areas that would be utilized as a source of construction material for the proposed action. A revised Figure 2.1.11 is provided in Section 3.3 of the Final EIS.

Comment No. 45: Delineation of Wetlands

The small wetlands west of Building 330 were delineated based on the boundary between the area supporting *Carex praegracilis, Juncus balticus, Juncus effusus*, and other hydrophytic plants, and the area dominated by upland plants. Wetlands in the project area were delineated using vegetation as an indicator. Delineation according to the Corps of Engineers Wetlands Delineation Manual or its successor the Federal Manual for Identifying and Delineating Jurisdictional Wetlands was deemed unnecessary since all areas possibly subject to Corps of Engineers jurisdiction under Section 404 of the Clean Water Act would be avoided during construction of the overhead power line. Power poles would be placed away from riparian corridors and the small wetlands west of Building 330.

Comment No. 46: Biological Assessment

The Biological Assessment was not released to the USFWS and NMFS as indicated in the Draft EIS. The Biological Assessment was provided to these agencies on March 16, 1990. The Section 7 consultation process is for the SLC-6 alternative documented in Appendix D, Threatened and Endangered Species Consultation. The change to the text is noted in Chapter 3.0 of the Final EIS (page 3-2).

Comment No. 47: Marine Bird Information

In July 1989, the USFWS performed a sea bird survey, updating the information contained in the Draft EIS in marine bird use of rocky and sandy shorelines in the South VAFB area. The results of this survey have not been made available by USFWS to the public or other agencies at this time. When available, this information will be evaluated to determine whether the proposed action would have any potentially significant adverse impacts. If so, USAF will consider if the EIS would be supplemented.

Comment No. 48: Transport Spill Prevention and Cleanup Plan

Transportation of hypergolic propellants between the manufacturers and VAFB is currently regulated under Department of Transportation (DOT) exemption E-3121 (for nitrogen tetroxide [N_2O_4]) and under DOT special approval number SA-860506 (for hydrazines). The N_2O_4 exemption requires the preparation of an emergency response plan (Emergency Response Plan for Nitrogen Tetroxide: Highway Transportation Routes, Headquarters U.S. Air Force, 1 July, 1988) since it is a Class A poison (poisonous gases or liquids of such a nature that a very small amount of the gas, or vapor of the liquid, mixed with air is dangerous to life). The response plan for N_2O_4 specifies measures for protection of human health and safety and environmental resources and is coordinated with other federal, state, and local agencies. The DOT special approval for hydrazines contains no such requirement.

Response to spills of hydrazines that occur during transport would be in a manner consistent with procedures established by the NCP (40 CFR Part 300), as well as applicable state and local laws and regulations. The purpose of the NCP is to effectuate the response process and responsibilities created by CERCLA (Public Law 96-510) and the authorities established by Section 311 of the Clean Water Act. Response actions undertaken would be by DOD and other

federal, state, and local agencies, consistent with the appropriate federal regional contingency plan for reporting (including a report to the National Response Center [NRC]), response, and cleanup.

Response to spills of hypergolic propellants occurring on VAFB would be consistent with the base Spill Prevention and Response (SPR) Plan (1st Strategic Aerospace Division OPlan 234-89, Spill Prevention Control and Countermeasures [SPCC]/Oil and Hazardous Substance Contingency Plan [OHSCP], Spill Prevention Response [SPR] Plan (USAF 1989b)). This plan fulfills the requirements of 40 CFR Parts 27, 110, 112.7, 264, 265, and Air Force Regulation AFR 19-5.

The SPR Plan contains five sections:

- SPCC Plan;
- VAFB Spill Log;
- OHSCP Plan;
- Special Actions Required by the EPA Regional Administrator, and
- Plan Approval.

The purpose of the SPCC Plan is to address the storage and management of oils, fuels, and hazardous substances/materials. The plan describes procedures, structures, and equipment utilized to prevent oil and hazardous substances/materials spills with the potential of discharging to navigable waters of the United States as defined in 40 CFR Part 112, and to mitigate impacts to the environment from such spills.

Specific controls and countermeasures addressed in the SPCC Plan include:

- Materials compatibility;
- Integrity testing;
- Secondary containment;
- Drainage control;
- Corrosion protection;
- Overfill protection;
- Traffic collision protection;
- Security, and
- Marking and labeling.

The objective of the OHSCP is to provide coordinated, effective, and efficient procedures to minimize damages from accidental discharges of oil or hazardous materials. The OHSCP includes emergency response procedures, an emergency notification list, responsibilities and actions of response personnel, a listing of emergency response equipment, and mechanisms for OHSCP-related training.

Comment No. 49: HCl Concentration Assumptions

Draft EIS Figure 3.11.2, Titan IV/Centaur Normal Launch HCl Isopleths (p. 3-136), is shown for illustrative purposes only; it applies to assumed conditions at a future, unspecified launch. The HCl isopleths shown are the output of the Rocket Exhaust Effluent Dispersion Model (REEDM) computer air dispersion model which is run in a real-time mode prior to launches from VAFB. REEDM utilizes launch-specific meteorological data as inputs for model runs rather than assumptions about ambient conditions. REEDM combines known information about HCl output from normal launches and launch anomalies with real meteorological conditions to predict ground-level HCl concentrations. Figure 3.11.2 as modified to reflect its hypothetical nature is provided in Section 3.3 of the Final EIS.

Comment No. 50: Avoidance of Wetlands

Wetlands along utility corridors will be avoided by placing power poles so that they do not impinge upon or cause indirect impacts to the wetlands areas in the utility corridors (see response to Comment No. 45). An engineering survey has been made of this area, and it has been determined that small adjustments in pole spacing would be feasible and sufficient to avoid impacts to wetlands.

Comment No. 51: *Monardella undulata* var. *frutescens* Populations

The only additional information on population estimates of *Monardella undulata* var. *frutescens* since the development of the Draft EIS is an estimate of the total number of individuals of this taxon destroyed by construction of the Peacekeeper in Rail Garrison project (November 1987) on the San Antonio Terrace of North VAFB. The Environmental Assessment for the Rail Garrison project estimated that 14,339 plants would be destroyed. This approximation was based on estimates presented in the Biological Assessment for the proposed MX Flight Test Program (HDR 1980). There were no actual counts made of the number of plants lost during the Rail Garrison project construction, nor is there any information at this time regarding the success of revegetation efforts involving this plant (Tetra Tech 1989). The Nature Conservancy, which is studying populations of *Monardella* and several other plants on VAFB, does not have population information on this plant (The Nature Conservancy 1989).

Comment No. 52: Exotic Plant Invasion

As noted in the Draft EIS, page 4-33, the Erosion Control and Restoration Plan (ECRP) would specify measures to control the invasion of exotic plants from construction disturbance. Development of the ECRP would be coordinated with the USFWS.

Comment No. 53: Impacts to Vegetation from HCl and Al_2O_3

Information regarding the impacts to vegetation from acidic deposition and aluminum oxide (Al_2O_3) from Titan IV launches is sparse since only one launch has occurred. Some preliminary additional information about potential impacts to vegetation from Titan IV launch-related acidic deposition was collected at the first Titan IV launch from CCAFS (USAF 1989a). The launch report notes that a field investigation of the area under and around the predicted exhaust cloud path (predictions taken from the REEDM model) did not note any acidic deposition in either the near- or far-field regions. In addition, none of the acid spotting or aroma characteristics of Space Shuttle launches were noted by pad area workers. It appears that the Titan IV deluge system does not use water in quantities large enough to generate a ground cloud of the size generated by a Space Shuttle launch. Due to similarities in the amounts of water used at CCAFS and VAFB for Titan IV launches, the analysis undertaken in the Draft EIS may overstate potential impacts since it assumes them to be on the magnitude of Space Shuttle launches.

Additional information about launch impacts to vegetation from acidic deposition and Al_2O_3 would be gathered in accordance with the launch monitoring plan discussed in Draft EIS Section 4.3.4, Mitigation Measures (page 4-33). Development of this plan would be coordinated with the USFWS.

Comment No. 54: Impacts to Vegetation Seedlings from HCl and Al_2O_3

Both mature individuals and the seedlings which surround *Monardella undulata* var. *frutescens* would be affected by deposition, should it occur. For additional information on acidic deposition, see response to Comment No. 53.

Comment No. 55: Fog and/or Rainfall with Interaction Acid

Changes in impacts to vegetation due to meteorological conditions would depend on the types of condition and their timing relative to acidic deposition.

Schmaltzer et al. (1986) indicates that high relative humidity or misting of plants prior to exposure to HCl resulted in increased plant damage compared to dry exposure. If rain or high humidity were to occur following exposure to HCl gas, presumably some dilution effect would be noted and impacts might abate. However, most of the impacts discussed in Draft EIS Section 4.3, Vegetation, would be from wet acidic deposition near the launch pad and would not depend upon the presence of moisture for activation and subsequent plant damage. If rain were to occur following such deposition, some dilution may occur.

Additional information regarding these types of impacts may be generated through the launch monitoring program (see response to Comment No. 53).

Comment No. 56: Temporary Disturbance

The text of Draft EIS page 4-30 should read "Temporary disturbance to habitat for 50 to 100 mature individuals." Temporary disturbance refers to the project construction period. The plants themselves could be avoided altogether with careful planning of power line pole locations and with monitoring. The appropriate change to the Draft EIS, page 4-30 of the text is noted in Chapter 3.0 of the Final EIS (page 3-15).

Comment No. 57: Mitigation Measures

See response to Comment No. 53.

Comment No. 58: Impacts to Wildlife

See response to Comment No. 42 for information on multiple launch effects. The information presented in Draft EIS Sections 4.4.1, Regional Environment, and 4.4.2, Local Terrestrial and Aquatic Environment, is summarized from the Biological Assessment.

Comment No. 59: Definition of Short Time

It is expected that terrestrial biota exposed to the air pollutants present in the Titan IV/Centaur exhaust plume would be subject to irritation of exposed areas that would last a matter of hours. Additional information about these types of effects may be generated as a result of the proposed operations monitoring. See response to Comment No. 41.

Comment No. 60: Status of Tidewater Goby

The change which deletes reference to the tidewater goby as a candidate for federal listing is in Chapter 3.0 of the Final EIS (page 3-16).

Comment No. 61: Cumulative Impacts

See response to Comment No. 42.

Comment No. 62: Monitoring Plan

See response to Comment No. 53. Development of this plan would be coordinated with the USFWS.

Comment No. 63: Unavoidable Adverse Effects to Vegetation and Wildlife

Unavoidable adverse effects to vegetation and wildlife that were not identified as significant are discussed briefly in Draft EIS Section 4.17.2, Other Unavoidable Adverse Effects. Additional discussion of impacts to vegetation are contained in Section 4.17.1, Significant Unavoidable Adverse Effects, which summarizes the impacts to *Monardella undulata* var. *frutescens*, a Category 2 species.

LETTER 4

MARINE MAMMAL COMMISSION
1625 EYE STREET, N W
WASHINGTON, DC 20006

11 September 1989

Mr. John Edwards
HQ Space Systems Division
P.O. Box 92960
Worldways Postal Center
Los Angeles, CA 90009-2960

Dear Mr. Edwards:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the Draft Environmental Impact Statement (DEIS) for the Construction and Operation of Space Launch Complex 7 at Vandenberg Air Force Base, California. We offer the following comments and recommendations concerning the assessment of the possible effects of the proposed action on marine mammals.

General Comments

The DEIS indicates (pp. 3-51 through 3-54) that six species of pinnipeds, 25 to 30 or more species of cetaceans, and the southern sea otter occur in or near areas that could be affected by construction and operation of Space Launch Complex 7. It notes (pp. 4-52 and 4-53) that marine mammals could be disturbed or otherwise affected by construction activities, by vessels carrying construction supplies (if supplies are transported over ocean rather than land routes), by fuel and chemical spills, by noise from rocket launches and subsequent sonic booms, by exhaust gases emitted by the rockets, and by falling bits of metal and fuel in the event that a rocket has to be destroyed during or soon after launch. It concludes on p. 4-41 that some marine mammals could be affected, particularly by loud sonic booms, and that a "small incidental take permit" may be required. It does not indicate the number of the various species of marine mammals that might be affected, what proportion of local and/or regional marine mammal populations might be affected, whether any of the potentially affected species or populations are being affected by other human activities (e.g., being caught and killed during commercial fishing operations, or being disturbed by offshore oil and gas exploration and development), and what if any steps will be taken to verify the predicted effects, detect possible unforeseen effects, and avoid or minimize the possible adverse effects of both construction and operation of the facility on marine mammals.

[64]

Disturbance and injury of harbor seals, sea lions, sea otters, or other marine mammals would constitute taking which is prohibited by the Marine Mammal Protection Act. Section 101(a)(5) of the Act provides that the Secretaries of the Interior and Commerce may authorize the taking of small numbers of marine mammals as described in the DEIS if, after notice and opportunity for public comment, the Secretary finds that the take would have a negligible impact on the affected species or population stock(s) and prescribes regulations setting forth, among other things, requirements pertaining to the monitoring and reporting of such taking. Thus, without reliable information on the number as well as the species of marine mammals that might be affected, and how [65] those species or population stocks are being affected by other human activities, it will not be possible to make the findings necessary to obtain a "small take" exemption.

Specific Comments

P. 1-10 (Marine Mammal Protection Act): This section should be expanded to note that the Marine Mammal Protection Act of 1972 established a moratorium on the taking of marine mammals and that, [66] if it is determined that the proposed action could result in the taking of marine mammals, the Air Force will be required to seek a waiver of the moratorium on taking, or a "small take" exemption as provided for by Section 101(a)(5) of the Act.

P. 2-60, par. 1: This paragraph states that "[t]he primary effects on marine mammals are anticipated to be minor, short-term hearing loss and/or startle responses that could result in the mammals running to water..." and "[a]mong the four pinniped species that breed on San Miguel Island (California sea lion, harbor seal, northern fur seal, and Guadalupe fur seal), the nature of the startle response would probably differ among each of the species." The rationale for the statement that the primary effect would be minor, short-term hearing loss and/or startle responses is not self-evident from information presented in the DEIS. That is, while the DEIS cites references which support and justify concluding that launch noise and sonic booms could result in short-term hearing loss and/or startle responses, neither the [67] cited references nor information provided in the DEIS appear to justify the conclusion that these would be the primary effects and that the effects likely would be minor (e.g., the DEIS does not provide convincing evidence that noise from launches would not cause harbor seals to abandon haul-out and pupping sites along the shoreline of Vandenberg Air Force Base, or that fuel spills or exhaust gas emissions would not be toxic and adversely affect the food webs of which harbor seals and other marine mammals are a part.). In addition, of the four pinniped species mentioned, only the California sea lion, the harbor seal, and the northern fur seal commonly breed (or pup) on San Miguel Island. Conversely, the northern elephant seal, a species not mentioned, is known to breed and pup on San Miguel Island.

Pp. 2-73 to 2-78 (Summary of Cumulative Impacts): As currently drafted, this and other sections of the DEIS dealing with cumulative impacts do not appear to consider or take into account the full range of human activities that may be affecting marine mammals and other ecosystem components that could be [68] affected by the proposed activity. There is no mention or discussion, for example, of how pinniped populations in the area have been or are being affected by other military activities in the area, by commercial fisheries, by offshore oil and gas exploration and development, etc.

P. 2-81 (Item 2.5.4.6): This entry in the table appears to indicate that a monitoring program will be established to assess the impacts of operational noise and air emissions on wildlife. The DEIS does not provide a clear description of the nature, scale, or length of monitoring programs planned or being considered. Because of the uncertainty concerning both the immediate and the long-term effects of the proposed action on marine mammals, it would be desirable and appropriate to include a [69] marine mammal monitoring program as part of the proposed action. Therefore, if it has not already been done, the Marine Mammal Commission recommends that the Air Force consult the National Marine Fisheries Service and the Fish and Wildlife Service to determine the immediate and long-term monitoring programs that would be required to verify the predicted effects and to detect the possible unforeseen effects of the proposed action on marine mammals, particularly harbor seals, California sea lions, and elephant seals that pup and breed in areas that could be affected by the proposed action.

Pp. 3-51 to 3-54 (Marine Mammals): This section, in concert with Appendix B, identifies the species of marine mammals that could be affected by the proposed action. As noted earlier, [70] neither it nor other sections of the DEIS indicate the numbers of various species of marine mammals that might be affected by the proposed action. Consequently, there is insufficient information to judge the likely significance of possible effects.

This section should be expanded to indicate, among other things, the pupping seasons of pinnipeds known to pup in areas [71] that could be affected by the proposed action. To avoid or minimize possible adverse effects, launch operations should be scheduled, as possible, to avoid periods when pupping or breeding could be affected.

This and other relevant sections of the DEIS also should be expanded to note and take into consideration that, during sea otter surveys conducted in the spring of 1989 by the Fish and [72] Wildlife Service and the California Department of Fish and Game, 20 sea otters, including females with pups, were seen betwen Pt. San Luis and Pt. Conception.

P. 3-63, pars. 2 and 3 (Marine Mammals): This section notes that there are several sizeable harbor seal haul-out and breeding sites along the shoreline near the proposed Cypress Ridge site. The DEIS does not, but should, provide an assessment of the possibility that construction and operation of the proposed Cypress Ridge launch complex would cause seals to temporarily or permanently abandon or avoid these haul-out sites and the effects that such a response might have on population size and
[73] productivity. In this context, it is important to consider that there may be a number of more or less discrete populations or subpopulations or harbor seals along the California coast, that some or all of the populations or subpopulations may be at or near carrying capacity, and that seals that leave or are forced out of their home areas may move to nearby sites already occupied, cause densities at these sites to exceed carrying capacity, and cause even more animals to be affected.

P. 4-35, last paragraph: Among other things, this paragraph notes that the short- and long-term impacts of launch noise and
[74] focused sonic booms are described in the SLC-7 Biological Assessment (Environmental Solutions Inc. 1989b). Many of the conclusions set forth in the DEIS appear to be based on this document. I would be grateful, therefore, if you could send us a copy.

Pp. 4-52 to 4-54 (Marine Mammals): For the reasons noted
[75] earlier, this section and other sections of the DEIS should be expanded to indicate the numbers as well as species of marine mammals that possibly could be affected.

P. 4-173, par. 2 (Unavoidable Adverse Effects on Wildlife): The first sentence in this section states that: "[t]he noise and sonic boom resulting from a launch event would be expected to
[76] adversely affect marine birds, pinnipeds, and terrestrial wildlife." This statement does not appear to be fully consistent with other statements in the DEIS which, as noted above, indicate that effects on pinnipeds and other marine mammals are not expected to be significant.

Summary

In summary, the DEIS does not provide a complete assessment of the possible impacts of the proposed action on marine mammals. Among other things, it does not provide an assessment of the numbers of various marine mammal species that possibly could be affected, or how the effects might be compounded by such things as offshore oil and gas exploration and development, and incidental take during commercial fishing operations. In addition, it does not provide a clear indication of the uncertainties concerning the possible effects of construction and operation of the proposed launch complex or the monitoring program that would be conducted to verify the predicted effects and detect any possible unforeseen effects on marine mammals.

Because of the uncertainties concerning the possible effects of the proposed actions on marine mammals, it would be desirable and appropriate to expand the proposed action to include both short- and long-term monitoring programs designed to verify the predicted effects and detect the possible unforeseen effects of the proposed action on marine mammals. Consequently, if it has not already been done, the Commission recommends that the Air Force consult the National Marine Fisheries Service and the Fish and Wildlife Service to determine how to most cost-effectively monitor marine mammal distribution, densities, productivity and behavior, in concert with construction and operation of the proposed launch facilities, to verify the predicted effects and detect the possible unforeseen effects of the proposed action on marine mammals.

* * * * *

If you or your staff have questions about our comments or recommendation, please let me know.

Sincerely,

John R. Twiss, Jr.
Executive Director

cc: Nancy Foster, Ph.D.
Mr. Jeffrey D. Opdycke

RESPONSE TO LETTER 4

Received From: Marine Mammal Commission - John R. Twiss, Jr., Executive Director

Comment No. 64: Impacts to Marine Mammal Populations From the Proposed Action and Other Human Activities

The species of marine mammals that may be impacted by the proposed project are shown in Table B.10 of Volume II (Appendices) of the Draft EIS. The proportion of local and/or regional marine mammal populations that might be affected is expected to be small, as described in Draft EIS Sections 4.4.1, Regional Environment, and 4.4.3, Local Marine Environment. To quantitatively estimate the proportions of populations that may be impacted is difficult due to the dynamics of marine mammal behavior. Populations of marine mammals fluctuate every year by virtue of activities like pupping and breeding on a rookery, moulting on a beach, or migrating through an area. In addition, some of the populations change on a secular time scale. Examples of this are the logarithmic growth of California sea lions and elephant seals over the past several decades, and the influx of heretofore exotic populations like the bottlenose dolphin as a result of meso-scale changes in oceanography.

The effect of other human activities on marine mammal populations in the region is difficult to assess and there is no comprehensive measure available to determine this effect. Information on the effects of human activities might be gleaned from records of beach-cast animals maintained by a few museums in California and possibly from records in marine mammal rehabilitation centers. There are isolated studies of particular species where coastal fisheries seem to have had an impact on population numbers (e.g., sea otter and harbor porpoise).

Causes of population change cannot be correlated specifically to any single set of factors such as human impact or food supply/productivity. For example, in recent years, the Steller sea lion population has dwindled, while California sea lions and elephant seal populations have grown abundantly. Gray whales have increased in number, and there has been a consistent seasonal presence of humpback and blue whales.

The steps that will be taken to verify and minimize predicted impacts are described in Draft EIS Section 4.4.5, Mitigation Measures. These steps include construction and operations monitoring and restriction of offsite activity by construction and operations personnel. The monitoring plans would be developed in coordination with USFWS and NMFS to minimize

the impacts from the monitoring itself. In addition, an incidental take permit would be necessary for marine mammals (see Appendix D). The conditions specified in this permit would ensure that impacts to marine mammals would be minimized.

Comment No. 65: Information Necessary for "Small Take" Exemption

See Appendix D for information regarding an incidental take permit for marine mammals.

Comment No. 66: Marine Mammal Protection Act

See response to Comment No. 5.

Comment No. 67: Impacts to Marine Mammals

The conclusions drawn in the comparative analysis summary of impacts at the proposed and alternative sites (Draft EIS Section 2.3.4, Wildlife) indicate that the primary effects on marine mammals would be minor, short-term hearing loss and/or startle responses that could result in the mammals running to water (see response to Comment No. 42). These impacts are characterized as minor since they are below the significance levels described in Section 4.4, Wildlife. The conclusion that the primary effects would be short-term hearing loss and/or startle responses is based on the analyses undertaken in support of Space Shuttle operations from VAFB, which provide the best scientific information available at this time.

Potential noise impacts to harbor seals are addressed in Draft EIS Section 4.4.2.1, Cypress Ridge, where it is noted that the maximum A-weighted sound level expected from a Titan IV/Centaur launch is 110 dBA outside of the launch complex, a level well below that analyzed for noise impacts to pinnipeds on the Channel Islands. As noted in Section 4.4.1, Regional Environment, the expected impacts to pinnipeds on the Channel Islands are short-term hearing loss and/or startle responses. Studies of pinnipeds on the Channel Islands in support of the Space Shuttle found no evidence of dangerous leaping, self-damage, crushing, or breeding colony abandonment as a result of sonic booms or loud overflights. Since noise levels from sonic booms would be much lower along the VAFB shoreline, it would be expected that impacts to pinnipeds would be no greater than those noted for the Channel Islands.

Potential impacts to marine mammals due to fuel spills and exhaust gas emissions are discussed in Section 4.4.3.2, Marine Mammals. Potential impacts were determined not to be significant.

In addition, as discussed in Section 4.4.5, Mitigation Measures, should the External Tank Landing Facility become a major point for delivery of equipment, material, or supplies, spill containment and cleanup facilities would be made available to contain and remove spilled substances.

The northern elephant seal is discussed in terms of existing environment and potential impacts in Draft EIS Sections 3.4.1.3, Marine Mammals, and 4.4.1.3, Marine Mammals. Naming the Guadalupe fur seal in 2.3.4, Wildlife, as a pinniped species breeding on San Miguel Island is an error. The text should instead name the northern elephant seal as a species that breeds on San Miguel Island. The appropriate change to the text of page 2-60 is noted in Chapter 3.0 of the Final EIS (page 3-8).

Comment No. 68: Cumulative Impacts to Marine Mammals

See responses to Comment Nos. 64 and 42. There are no additional data available to characterize potential effects by industries such as commercial fisheries and off-shore oil and gas exploration and development.

Comment No. 69: Marine Mammal Monitoring Program

As noted in responses to Comment Nos. 1, 3, and 15, and in Draft EIS Section 4.4.5, Mitigation Measures, an operations monitoring program, which would include marine mammals, would be developed in consultation with NMFS and USFWS. In addition to the harbor seal, California sea lion, and northern elephant seal, the monitoring program would include the northern fur seal and sea otter.

Comment No. 70: Marine Mammal Population Information

As described in response to Comment No. 64, the number of marine mammals that may be impacted fluctuates widely by time of year and, in addition, is likely to change from current population levels by the time the project is operational. The significance of the potential effects is determined based on scientific information that indicates that the effects to individuals would be temporary and that the viability of marine mammal populations would not change. In addition, USAF compliance with the Threatened and Endangered Species Section 7 consultation process ensures that the potential impacts would not affect species viability.

Comment No. 71: Pinniped Pupping Seasons

See response to Comment No. 12 for information regarding pinniped pupping and breeding seasons. Adverse effects would be minimized through the mitigation measures indicated in Draft EIS Section 4.4.5, Mitigation Measures, and through the proposed monitoring program.

Comment No. 72: Sea Otters

Draft EIS Section 3.4.1.3 discusses the sea otter's presence in the region. In addition to the 20 animals seen in the spring of 1989, sea otters have been regularly seen along this stretch of coast for a decade or longer. Additional text for Draft EIS page 3-53 is contained in Chapter 3.0 of the Final EIS (page 3-13).

Comment No. 73: Harbor Seal Haul-Out Site Abandonment

The potential construction-related impacts to harbor seals are discussed in Draft EIS Section 4.4.3.2, Marine Mammals. There is no published evidence that suggests there is either a single continuous population or a number of discreet sub-populations of harbor seals along this part of the California coast. In addition, the home area of a harbor seal is not known. The only information on these populations is contained in the California Department of Fish and Game (CDFG)/NMFS census data. There is some indication that the seals may move from one site to another along the coast. If this occurs naturally, then the idea of seals moving to nearby sites and thereby upsetting the capacity of an area to support a population is moot. The present tagging work of CDFG/NMFS may provide insight regarding movements of seals in the Point Conception/ Point Arguello area.

Comment No. 74: Copy of Biological Assessment

A copy of the Biological Assessment has been provided to the Marine Mammal Commission.

Comment No. 75: Marine Mammal Population

See response to Comment No 64.

Comment No. 76: Consistency of Marine Mammal Impact Conclusions

As discussed in Draft EIS Section 4.17, Unavoidable Adverse Effects, and response to Comment No. 67, adverse effects such as short-term hearing loss and startle responses are expected to occur. Review of these impacts against the criteria for significance (Section 4.4, Wildlife) shows that, although adverse, the expected impacts are not considered significant.

LETTER 5

US Department
of Transportation

**Federal Aviation
Administration**

Western-Pacific Region

P O Box 92007
Worldway Postal Center
Los Angeles, CA 90009

September 7, 1989

Department of the Air Force
HQ Space Systems Division
P.O. Box 92960
Worldway Postal Center
Los Angeles, CA., 90009-2960

Attention: Mr. John Edwards

Dear Mr. Edwards:

[77] We have coordinated the review of the Draft Environmental Impact Statement for Space launch Complex 7 at Vandenberg AFB, California, within our regional office, and have not received any adverse comments.

We appreciate the opportunity afforded us for reviewing the subject Draft EIS.

Sincerely,

Barry S. Brayer

Barry S. Brayer
Manager, Planning & International Aviation Staff, AWP-4

RESPONSE TO LETTER 5

Received From: U.S. Department of Transportation, Federal Aviation Administration
Barry S. Brayer, Manager, Planning and International Aviation Staff, AWP-4

Comment No. 77: Review of Draft EIS

Comment noted.

LETTER 6

State of California
GOVERNOR'S OFFICE
OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET
SACRAMENTO 95814

GEORGE DEUKMEJIAN
GOVERNOR

(916) 323-7480

DATE: September 11, 1989

TO: Department of the Air Force
HQ Space Systems Division
P. O. Box 92960
Worldways Postal Center
Los Angeles, CA 90009-2960
ATTN: Mr. John Edwards

FROM. Office of Planning and Research
State Clearinghouse

RE: Draft Environmental Impact Statement, Construction and Operation of Space Launch Complex 7, Vandenberg Air Force Base, Santa Barbara County (SCH 89072807

As the designated California Single Point of Contact, pursuant to Executive Order 12372, the Office of Planning and Research transmits attached comments as the State Process Recommendation.

[78] This recommendation is a consensus; no opposing comments have been received. Initiation of the "accommodate or explain" response by your agency is, therefore, in effect.

Sincerely,

Robert P. Martinez
Director

Attachment

cc: Applicant

RESPONSE TO LETTER 6

Received From: State of California Governor's Office of Planning and Research
Robert P. Martinez, Director

Comment No. 78: Single State Agency Point of Contact Comments

The consensus recommendation of no opposing comments is noted.

LETTER 7

Resources Building
1416 Ninth Street
95814
(916) 445-5656
TDD (916) 324-0804

GEORGE DEUKMEJIAN
GOVERNOR OF
CALIFORNIA

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

California Conservation Corps
Department of Boating and Waterways
Department of Conservation
Department of Fish and Game
Department of Forestry
Department of Parks and Recreation
Department of Water Resources

Air Resources Board
California Coastal Commission
California Tahoe Conservancy
California Waste Management Board
Colorado River Board
Energy Resources Conservation And Development Commission
San Francisco Bay Conservation and Development Commission
State Coastal Conservancy
State Lands Division
State Reclamation Board
State Water Resources Control Board
Regional Water Quality Control Boards

Department of the Air Force
HQ Space Systems Division
P. O. Box 92960
Worldways Postal Center
Los Angeles, CA 90009-2960
ATTN: Mr. John Edwards

September 11, 1989

Dear Mr. Edwards:

The State has reviewed the Draft Enviornmental Impact Statement, Construction and Operation of Space Launch Complex 7, Vandenberg Air Force Base, Santa Barbara County, submitted through the Office of Planning and Research.

We coordinated review of this document with the California Highway Patrol, the California Coastal Commission, the Central Coast Regional Water Quality Control Board, and the Departments of Fish and Game, Health Services, Parks and Recreation, and Transportation.

[79] The Central Coast Regional Water Quality Control Board replied directly in correspondence dated August 9, 1989. The California Coastal Commission will require a consistency determination.

Thank you for providing an opportunity to review this project.

Sincerely,

Gordon F. Snow, Ph.D
for Assistant Secretary for Resources

cc: Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814
(SCH 89072807)

RESPONSE TO LETTER 7

Received From: The Resources Agency of California
Gordon F. Snow, Ph.D.

Comment No. 79: California Coastal Commission (CCC) Consistency Determination

As noted in Draft EIS Section 1.5.3.2, a Federal Consistency Determination for the TCLC has been prepared and submitted to the CCC.

LETTER 8

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD — CENTRAL COAST REGION
1102 A LAUREL LANE
SAN LUIS OBISPO, CALIFORNIA 93401
(805) 549-3147

August 9, 1989

Mr. John Edwards
HQSSD/DEV
P.O. Box 92960
Los Angles, CA 90009-2960

Dear Mr. Edwards:

SUBJECT: VANDENBERG AIR FORCE BASE, PROPOSED SPACE LAUNCH COMPLEX 7, ENVIRONMENTAL IMPACT REPORT

We reviewed the draft environmental impact statement (EIS) for the subject project dated July 20, 1989. The specific plan as proposed, involves either modification of Space Launch Complex 6 (SLC-6) or construction and operation of (SLC-7), to accommodate launches for the Titan IV/Centaur. Either alternative to the proposed plan would occur on South Vandenberg Air Force Base, Lompoc, California.

The main aspects requested to be addressed in the EIS were presented in our letter to Mr. Robert Mason, dated May 23, 1988. This letter summarized that our major regulatory responsibilities included discharges to land or surface waters which may affect ground or surface water quality. Our recommendation was that the EIS address all potential ground or surface water quality concerns. Our comments on the EIS are as follows:

[80] 1. Page 4-81. It is stated that the RWQCB requires an investigation of the preferred location for the domestic wastewater ponds to ensure compliance with Resolution No. 83-12. It should be brought to your attention that this resolution pertains only to septic tanks and subsurface disposal systems and not evaporation/percolation ponds. Instead, the disposal system should be designed to comply with waste discharge requirements adopted by the Regional Board. A report of waste discharge should be submitted and existing waste discharge requirements revised to include the proposed domestic waste discharge.

[81] 2. Page 4-82. The City of Lompoc's landfill is classified as a Class III landfill. References in the EIS to "Lompoc Class II Landfill" should be changed accordingly.

3. Regarding the potential impacts to water quality from launch exhaust ground clouds, we found that potential acid deposition on the evaporation/percolation ponds was not addressed. The [82] EIS estimates that acid deposition of 7.89 gal/acre near the launch area could be expected from the exhaust cloud. The problem of acidifying these ponds during the launchings and the long term affect from percolation into the soil should be considered.

Methods described for the disposal of industrial wastewaters were well outlined. Either of the options considered are acceptable, whether it be transportation to the existing SLC-6 site in tanker trucks, or the construction of a waste treatment system at SLC-7. It is expected that after launch an estimated 106,000 gallons of water could be recovered for storage/reuse. Because of ground water overdraft conditions in the Lompoc Basin and, due to the low average precipitation of the area, it is highly encouraged that the industrial waste treatment process be extended to include recycling [83] of treated water. This would allow for the maximum in water resource conservation.

Should you have any further comments or questions, please refer them to Mr. Bill Meece or Mr. Jay Cano at this office.

Very truly yours,

for WILLIAM R. LEONARD
Executive Officer

EIR/VAFB0727

GDM:sm

cc: Colonel Morris, Environmental Task Force, 1 STRAD/ET, Vandenberg AFB, CA 93437-5000
Peggy O'Halloran, Santa Barbara County Environmental Health Services
State Clearinghouse

RESPONSE TO LETTER 8

Received From: California Regional Water Quality Control Board, Central Coast Region
William R. Leonard, Executive Officer

Comment No. 80: Interpretation of Resolution No. 83-12 (Subsurface Disposal Systems)

The interpretation of Resolution No. 83-12 as contained in Draft EIS Section 4.6.2, Local Impacts (pages 1-19, 1-20, and 4-81), is incorrect, since the resolution applies only to septic tanks and subsurface disposal systems, not to evaporation/percolation ponds. The discussion of the California Porter-Cologne Water Quality Act (Section 1.5.5.3, California Porter-Cologne Water Quality Act) will be revised to include the requirement for a report of waste discharge. These changes to the Draft EIS are noted in Chapter 3.0 of the Final EIS (pages 3-4, 3-5, and 3-18).

Comment No. 81: Classification of City of Lompoc Landfill

The City of Lompoc's landfill should be identified as a Class III facility (Draft EIS pages 3-85, 4-82, and 4-90). These changes to the Draft EIS are noted in Chapter 3.0 of the Final EIS (pages 3-14 and 3-18).

Comment No. 82: Acidification of Evaporation/Percolation Ponds

Acidification of the facility's evaporation/percolation ponds would occur as a result of the acidic deposition associated with Titan IV/ Centaur launches. To address this issue, USAF will analyze methods of siting or designing the ponds or structures associated with the ponds so that pH is maintained at an acceptable level (as outlined in California Regional Water Quality Control Board [RWQCB], Central Coast Region Order No. 89-88 or other agreement and as per RCRA requirements). This analysis will be coordinated with RWQCB and the Report of Waste Discharge permit process.

Comment No. 83: Recycling Treated Launch Waste Water

In response to concerns regarding regional water supplies, additional mitigation measures for water use have been developed. In preliminary analyses of water use and potential supplies for operations of the proposed action, it has been determined that deluge water (approximately

146,000 gallons per launch) can be obtained from recycled water supplies. To provide the TCLC with sufficient recycled launch deluge water, waste waters would be collected from other locations on VAFB, treated by utilizing the SLC-6 waste water treatment plant, and held at the water storage tank(s) shown in Draft EIS Figure 2.1.7 (Preliminary Utility Corridors and Construction Areas: Proposed Alignment) until needed for launches. This water would be used during construction for dust control and other non-potable purposes, thereby reducing ground water demand. This action would decrease operational demand for water from the Lompoc Terrace ground water basin by approximately 1.3 acre-feet per year.

The additional potential demand for water from the Lompoc Terrace would be for sanitary and other uses for personnel stationed at the facility throughout the year. This estimate for potential additional demand was generated by utilizing a consumption rate of 40 gallons per person per day. As noted in the Draft EIS (Section 4.2.4, Mitigation Measures), USAF would utilize low water use fixtures to reduce water demands. In addition, USAF would analyze alternative methods of enhancing water supplies, such as desalinization of sea water and utilizing recycled water for non-potable uses such as toilets and other fixtures. USAF would undertake the appropriate measures recommended in the analysis.

LETTER 9

County of Santa Barbara
AIR POLLUTION CONTROL DISTRICT

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PHONE: (805) 681-5325 FAX (805) 967-4872

JAMES M. RYERSON
Air Pollution Control Officer

WILLIAM A. MASTER
Assistant Director

August 31, 1989

John Edwards
HQ SSD/DEV
PO Box 92960
Los Angeles, CA 90009-2960

RE: Draft EIS on VAFB's SLC-7 (7/20/89)

Dear Mr. Edwards:

Thank you for giving the Santa Barbara County Air Pollution Control District an opportunity to review the EIS for VAFB's Space Launch Complex 7 (SLC-7). Our comments are grouped below into General Comments and Specific Comments. We also provide comments on the EIS's adequacy in addressing our 5/17/88 scoping comments.

GENERAL COMMENTS

G1. The overall format of the document is very confusing to the reader. The current format does not allow for a specific issue area to be reviewed in depth without searching through the entire document. Each issue area (e.g., air quality) should be addressed entirely within one section. The Air Quality Section should cover each of the following topics:

1. Environmental setting;
2. Description of proposed project and alternatives;
3. Emissions of criteria and toxic/non-criteria pollutants;
4. Impacts of:
   - Inert pollutants,
   - Reactive pollutants,
   - Toxic pollutants,
   - Odor, and
   - Visibility;
5. Mitigation measures;
6. AQAP consistency; and
7. Stratospheric air quality.

[84]

The discussion of impacts should include both the proposed project and all applicable alternatives.

G2. Throughout the document, there are many impacts which are claimed to be insignificant without adequate reference or discussion of the basis for this determination. Blanket

[85]

statements of insignificance have little meaning without supporting information to allow verification. As the document stands, the reader is not able to verify the claims made regarding the impacts from the proposed project and alternatives. Further information is needed to create a full disclosure document, as required by NEPA.

G3. There is a major problem with the value quoted in the EIS for 1-hour NO_2 impacts. Further, there is no quantitative basis from which to compare the impacts between the proposed project and alternatives since no air quality modeling was performed in the EIS.

The NO_2 value cited in the EIS (354 ug/m^3) is from a report titled *Evaluation of Existing Meteorological Data in Support of SLC-7 Authority to Construct Pre-Construction Monitoring (PCM) Data Requirements*. This report was conducted independently of the EIS solely for the purpose of evaluating PCM sites in conjunction with the District's ambient air monitoring requirements for the Authority To Construct (ATC) permit. The report does not meet the requirements of an Air Quality Impact Assessment (AQIA) and therefore is not acceptable for assessing the significance of air quality impacts. Three major requirements were not met:

[86]

1. The modeling in the report did not assess all pollutants and averaging periods of concern.

2. The report did not compare the highest modeled NO_2 concentration to the appropriate air quality standard. (The NO_2 concentration cited in the EIS [354 ug/m3] represents the highest mean value of the high five 1-hour NO_2 concentrations).

3. The ozone limiting methodology in the report (calculating NO_2 impacts from hourly values of ozone and NO_2) only applies when assessing PCM data requirements. For AQIA purposes, the highest monitored values for ozone and NO_2 should be used to determine the NO_2 impact from the proposed project.

A valid AQIA should be performed for both the proposed project and each alternative. Without this modeling, there is insufficient data to determine potential air quality impacts, and to compare alternatives.

G4. The Impact Summary Tables (pp. 2-73 through 2-78) should be revised to include Class I, II, III, and IV impact classifications. For each issue area, impacts for the proposed project and all alternative scenarios should be grouped by impact classification as follows:

[87]

- Class I: Significant, cannot be mitigated to a level where they are not significant.

- Class II: Significant, can be mitigated to a level where they are not significant.

- Class III: Adverse but not significant.

- Class IV: Beneficial impacts.

A suggested format for the tables would be to include the following information (listed from left to right in the table):

1. A description of the impact;
2. The location and scope of the impact;
3. The appropriate mitigation measure to be implemented (including reference to where the measure is detailed in the EIS);
4. The government agency responsible for the mitigation; and
5. The residual impact after mitigation.

The proposed project and each alternative should be listed vertically under each issue area. This type of format would allow for a clear and concise summary of the impacts and mitigation measures associated with the proposed project and alternatives.

SPECIFIC COMMENTS (Volume I)

Section 1: Introduction

Section 1.5.4: Air Quality

1. Page 1-14, last para.

[88] 1. Next to last sentence. The EIS states that there are no deadlines to attain the California Ambient Air Quality Standards (CAAQS). This is not true. The California Clean Air Act (CCAA), adopted in 1988, requires that nonattainment areas reduce nonattainment pollutants or their precursors by 5% per year until attainment is met. The CCAA thus requires documented progress toward attainment of the CAAQS.

[89] 2. Last sentence. The EIS states that the District has not adopted AAQS more stringent than the CAAQS. This is not true. District Rule 310 prohibits emissions of H_2S that result in a 3-minute average ambient concentration greater than 0.06 ppm of H_2S.

[90] 2. Page 1-15, Table 1.5.1 (Ambient Air Quality Standards). The footnotes for this table are missing.

[91] 3. Page 1-16, 2nd para, 2nd sentence. The EIS states that northern Santa Barbara County has historically been in

attainment of both the NAAQS and the CAAQS. In checking records since 1983, the VAFB Watt Road station has recorded a minimum of 1 state violation every year. In the North County, between 1986 through 1988, the state ozone standard was exceeded on 73 days and the federal ozone standard was exceeded on 8 days. In addition, during April and May 1989, the federal ozone standard was exceeded on at least 3 days in the Lompoc/Vandenberg area.

The District's PSD monitoring stations measured 22 exceedances of the state 24-hour PM_{10} standard in North County from 1986 through 1988. Prior to 1986, PM_{10} was not monitored much in this area.

4. Page 1-16, 2nd para., last sentence. The EIS states that North County will continue to be a federal attainment area for ozone and PM_{10} until the EPA redesignates it nonattainment. EPA has recently stated its intent to expand the nonattainment area for ozone to include the entire county. In addition, the Santa Barbara-Santa Maria-Lompoc area was recently included in EPA's press release of areas failing to meet the federal ozone standard. [92]

Furthermore, the California Air Resources Board (ARB) has formally designated the entire county nonattainment for both ozone and PM_{10}. They have also designated a portion of North County as nonattainment for H_2S.

5. Page 1-16, 3rd para., 4th sentence. The EIS states that the District will soon declare North County nonattainment for PM_{10}, due to violations of the CAAQS for this pollutant. The District already has recognized that PM_{10} is nonattainment in North County. In 1988, a review of the preceding 3 years of monitoring data revealed that the state PM_{10} standard had been exceeded 107 times; this included exceedances in North County. With this information, the District initiated preparation of a State Implementation Plan for PM_{10}, and began to regulate PM_{10} and its precursors as a nonattainment pollutant. (Letter dated 4/19/88 to the APCD Board of Directors) [93]

6. Page 1-16, last para., 1st sentence. The EIS should reflect that the District is empowered to enforce not only the national ambient air quality standards (NAAQS) per the federal Clean Air Act, but also the California AAQS per the recently enacted California Clean Air Act. [94]

7. Page 1-16, last partial sentence. In this sentence, the EIS describes the measures the District could take to improve air quality. This description should be reworded to reflect the following phased approach the District normally follows in implementing new emission control rules. [95]

1. Retrofit existing sources with new controls.

2. Tighten the New Source Review (NSR) rule:

   - Make smaller sources subject to it.
   - Require more stringent control beyond Best Available Control Technology (BACT).

3. Implement technology-forcing rules.

8. Page 1-17, 2nd full para., 1st sentence. This sentence should be modified to state that all new or modified stationary sources which emit or may emit nonattainment pollutants are subject to the NSR rule. [96]

9. Page 1-17, 2nd full para., last sentence. The document states that "once a unit has been constructed and verified to be in compliance with SBCAPCD regulations, a PTO is issued". Issuance of a PTO (Permit to Operate) is not automatic: an application for a PTO must first be submitted to the District. [97]

10. Page 1-17, last para., 3rd sentence. This sentence should be corrected to state that the required input to air quality models includes 1 year of representative ambient air quality and meteorological data. The 4th sentence in this paragraph should be deleted. [98]

11. Page 1-19, 2nd para. The EIS states that the 1 year of preconstruction monitoring data must be "descriptive" of the proposed project location. In fact, this monitoring data must be <u>representative</u>. This term is defined in the District's *Air Quality and Meteorological Monitoring Protocol*.

In January 1989, the District determined that the locations of the Pt. Arguello and Jalama Beach monitoring stations would provide suitable meteorological data for the Air Quality Impact Analysis (AQIA). At that time, the District also determined that the maximum air quality values measured at any of the 3 stations mentioned in the EIS (Pt. Arguello, Jalama Beach, and SLC-6) over the previous 3 years could be used for background air quality. It has not been determined whether the preconstruction monitoring requirements of data recovery and representativeness (collected in the 3 years prior to ATC approval) have been met. It is VAFB's responsibility to supply data that meet these specifications. [99]

12. Page 1-19, 3rd para. The EIS states that "VAFB has a large inventory of emission offset credits 'banked' with SBCAPCD which, if available, could be applied against any emissions increases attributable to operation of SLC-7". VAFB's 1984 *Emissions Offset and Banking Agreement* states (p. 3) that "if banked emissions are not used within 6 months, they shall expire". Furthermore, within the last year the [100]

banking provision in District Rules was deleted. The document should be revised accordingly.

[101] 13. Page 1-19, 4th para., 2nd sentence. The EIS states that the individual sources and characteristics of emissions from SLC-7 would not vary in relation to the site which is eventually chosen. While this may be true, the site chosen does affect the selection of a location for preconstruction monitoring. The preconstruction monitoring locations were chosen based on a particular source (project) location. If this source location is changed, the project would need to be remodeled using the new location. The proposed location for preconstruction monitoring would then be re-evaluated based on the results of this modeling.

Section 2: Proposed Action and Alternatives

Section 2.1.3.5: Safety Systems

[102] 14. Page 2-22, last para., RE: Quantity-Distance Criteria. The "safety clear zones" referred to here do not appear to be shown in Figure 2.1.2 (Proposed Cypress Ridge Site and Alternatives) for existing space launch complexes.

Section 2.3.5: Air Quality

[103] 15. Page 2-62, 1st para, last sentence. Please provide references for the "previous studies" mentioned in this paragraph.

[104] 16. Page 2-62, 2nd para. In the discussion at the bottom of the paragraph, please provide reference to where the calculations of construction emissions are provided.

[105] 17. Page 2-63, 1st full sentence. Again, please provide reference to where more detailed information on the "operational control procedures" are documented.

Section 2.3.11: Health and Safety

[106] 18. Page 2-69, 2nd para. The "1981 Study" referred to here should be fully referenced.

[107] 19. Page 2-69, 3rd para. Following the phrase "Toxic Hazard Corridor" there should be a reference to p. 3-128 where this term is explained.

Section 2.4: Summary of Cumulative Impacts

20. Page 2-74, Section 2.4.5 (Air Resources). This table does not adequately summarize all the impacts from the proposed project and alternatives.

[108] 1. Without air quality modeling, it is impossible to compare impacts (NO_2, CO, SO_2, PM_{10}) between the proposed project and alternatives.

[109] 2. A comparison of emissions is not an adequate substitute for the results of a site-specific AQIA.

[110] 3. The operational NO_X and ROC emissions from the proposed project and alternatives may contribute to existing ozone standard exceedances and should be documented as such.

[111] 4. This table should present Class I, II, III, and IV impacts as stated in comment G4.

Section 2.5: Summary of Mitigation Measures

[112] 21. Page 2-81, Section 2.5.5 (Air Resources). This table should be deleted and combined with the impact summary tables per comments G4 and 20.

Section 3: Affected Environment

Section 3.5: Air Quality and Meteorology

[113] 22. Page 3-67. The EIS should note that there is a substantial climatic difference between the coastal areas of south and north Santa Barbara County (divided by Point Conception). For example, the climate at Point Arguello is substantially different than the climate at Santa Barbara Harbor.

[114] 23. Page 3-67, 2nd para, last sentence. High ozone values have been measured in Santa Barbara County primarily during post-Santa Ana conditions. However, this is not the only circumstance when high ozone values have been recorded locally. The reference USAF 1988b, *Environmental Assessment for the Titan IV Space Launch Vehicle Modifications and Operations*, is cited here. Does this assessment document high ozone occurrences in Santa Barbara County?

[115] 24. Page 3-71, 3rd para, last sentence. Inland sources are not the only sources of pollutants in the area. There are substantial sources along the coastal areas, offshore, and at VAFB. Also, the District is currently studying PM_{10} occurrence in the County to determine the actual source contributions.

[116] 25. Page 3-71, last para. The EIS discusses attainment only with respect to the federal standards. Please discuss the area's attainment in relation to state standards, too.

[117] 26. Page 3-71, last para., 2nd sentence. This sentence should read: In the past, air quality monitoring stations in northern Santa Barbara County have measured exceedances of the federal ozone and PM_{10} standards. Southern Santa Barbara County has been officially designated by the EPA as nonattainment for ozone. See also comment 4.

[118] 27. Page 3-71, last para., last sentence. The EIS states that recently North County exceeded the NAAQS for ozone. The federal ozone standard was exceeded in North County on 8 days from 1986 through 1988, with violations occurring in all years during that period.

[119] 28. Page 3-72, 1st 2 paras. The document discusses only federal designations of nonattainment status. Consideration should also be given to state nonattainment designations (i.e., the California Clean Air Act designations of July 1989). Ambient ozone and PM_{10} values should also be discussed in relation to the CCAA regulations.

[120] 29. Page 3-73, Table 3.5.1 (Measured Air Quality Data Summary). Data presented in this table are not current. Data through mid-1989 are available and should be used in this table.

[121] 30. Page 3-76, 3rd para., last 2 sentences. The EIS states that localized pollutant concentrations can exceed recorded levels at the SLC-6 site due to the cumulative effect of other sources during the night when wind speeds are low. It continues to say that "these conditions would not be expected to persist due to higher wind speeds during daytime hours". This statement is misleading. There is no guarantee that wind speeds will be higher during the day than at night. Furthermore, such stable conditions need to persist for only one hour for a 1-hour standard (e.g., NO_2) to be exceeded.

Section 3.11: Health and Safety

[122] 31. Page 3-125, RE: Regional Environment. The EIS should include a clear explanation of how county and city emergency response agencies will be notified of any aborted flights, as well as all incidents likely to affect the general public's safety. The EIS should also explain how 1STRAD and WSMC will cooperate with these agencies in handling such incidents.

[123] 32. Page 3-128, RE: Special Safety Procedures. This section should state what criteria are used to define the "Toxic Hazard Corridors". Are the concentrations used the "Immediately Dangerous to Life and Health" (IDLH) values, "Threshold Limit Values" (TLVs), "Time Weighted Averages" (TWA), or are they other criteria?

[124] 33. Page 3-129, RE: Hypergolic Transportation Safety, 2nd para. This paragraph indicates SLC-4 West and SLC-4 East requirements for fuel and oxidizer. It should also include: the projected number of shipments for SLC-7, and the truck vessel size, or quantity of fuel in each shipment.

[125] 34. Page 3-134, RE: WSMC Range Safety Procedures. The model output from the REEDM model should be provided to the county emergency response agencies following any aborted launches. (See p. 3-135, Meteorological Restrictions.)

Section 4: Environmental Consequences and Mitigation Measures

[126] 35. Page 4-63, 4th para. Please refer to comment G3 which discusses the problems with the statements in this paragraph and the modeling analysis.

36. Page 4-69, 1st partial para. The EIS states that since the emission rates of several pollutants (CO, SO_X, PM_{10}, and ROC) would be lower relative to their state standards (the CAAQS, California Ambient Air Quality Standards) than those for NO_x, their contribution to cumulative impacts would therefore be insignificant. This reasoning is not technically sound.

[127] As mentioned in comment G3, the modeling (for evaluation of PCM stations) cited in the EIS is not appropriate for evaluation of the proposed project (SLC-7). Therefore, any comparisons to this modeling are not valid. To properly quantify the impacts associated with the proposed project and alternatives, site-specific air quality modeling should be performed for all pollutants and averaging times of concern.

EIS'S ADEQUACY IN ADDRESSING APCD SCOPING COMMENTS

The following comments address the EIS' adequacy in responding to the District's 5/17/88 scoping comments. The comment numbers identified below correspond to the comments in our original letter (attached).

[128] 37. Comment 1.C (emission impacts should be modeled). The EIS did not model emission impacts for either the proposed project or the alternatives. This point is also noted above.

[129] 38. Comment 2 (emission offsets should be clearly identified). The EIS' treatment of the offset issue is far too general.

[130] 39. Comment 3 (an air quality analysis for the proposed project should be done). An air quality analysis (i.e., modeling) for the proposed project was not done in the EIS.

[131] 40. Comment 5 (cumulative impacts should address the expected number of launches per year at VAFB, characterizing both the launch location and type of space launch vehicle). The expected number of launches per year at VAFB was not characterized either in terms of the launch location or the type of space launch vehicle. The EIS presents only a summary of total VAFB emissions relative to those from SLC-7.

[132] 41. Comment 6 (offsite impacts, such as those from transporting fuel for the Titan Centaur to VAFB, should be addressed). The EIS does not appear to address the impact of transporting fuel to the base for the Titan Centaur.

[133] 42. Comment 7 (the need for SLC-7 in light of potential Congressional action to put VAFB's existing launch facilities in "caretaker" status should be discussed). This point was not discussed in the EIS.

If you have any questions on these comments, please contact me.

Sincerely,

Barbara Brass for

Deborah S. Pontifex
Responsible Agency Review

AQPLAN\IARCORR\VAFB2.WP5

Attachment: APCD 5/17/88 scoping comments on EIS

cc: David Tomsovic, EPA/Region IX, w/ attachment
Morris Gary, APCD
Ivor John, APCD
Tom Murphy, APCD
Duane Sikorski, APCD
Jean Thomson, APCD
VAFB SLC-7 EIS file, w/ attachment
PLNG Chron file

2-70

County of Santa Barbara
AIR POLLUTION CONTROL DISTRICT

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JAMES M. RYERSON
Air Pollution Control Officer

WILLIAM A. MASTER
Assistant Director

May 17, 1988

Department of the Air Force
HQ Space Division/DEV
PO Box 92960
Los Angeles, CA 90009-2960

ATTENTION: Mr. Robert Mason

REGARDING: Scoping Comments on the EIS for Titan Centaur SLC-7

Dear Mr. Mason:

The District is pleased to respond to your request for comments on the scope of the EIS for the construction and operation of the space launch complex 7 (SLC-7) for the Titan Centaur space launch vehicle. Our comments on the proposed project are presented below.

1. Emissions.

   A. The EIS should discuss emissions separately for each of the three phases of the project: construction, "activation", and operations, as defined in the project description.

   B. The EIS should quantify all emissions associated with each phase of the project by specific emission source.

   C. Emissions should be presented for both peak-hour and for short-term average conditions. Emission impacts should be modeled and compared with the national, state and District ambient air quality standards and allowable air quality increments.

   D. Emissions of toxic air pollutants, as identified by the Air Resources Board and the Environmental Protection Agency, should be clearly identified and quantified. Some of these toxic compounds may require a risk assessment.

2. Offsets.

   Proposed sources of emission offsets, and the corresponding level of emission reduction as required by District Rules and Regulations, should be clearly identified in the EIS.

3. Status of Criteria Pollutants.

The EIS should present the air quality analysis for the proposed project in the context of the following pollutants being regulated under New Source Review by District rules: ozone, PM_{10} (particulate matter with aerodynamic diameter less than or equal to 10 microns), and their precursors.

4. Emergency Response Planning Associated With Hazardous and Toxic Materials.

A. The storage and handling procedures for all hazardous and toxic materials associated with the project should be discussed in detail, particularly in light of the recent (5/4/88) explosion of a space shuttle fuel plant in Henderson, Nevada.

B. Emergency response procedures in the event of an accident on the ground or immediately after liftoff of the Titan Centaur should also be discussed in detail. (VAFB has experienced an explosion of its Titan series rocket on at least one occasion in the recent past.)

The EIS should propose appropriate mitigation measures for items (A) and (B), where necessary to protect the health and welfare of the residents of Santa Barbara County and adjoining areas.

Additional safety-related concerns to be addressed in the EIS include:

- The proposed route to VAFB for transporting fuels for the Titan Centaur, and safety procedures associated with this transport; and

- Safety procedures to protect personnel aboard offshore platforms in the Titan Centaur's flight path, as well as contingency plans should an accident occur in flight.

5. Cumulative Impacts.

The EIS should address the cumulative air quality impact of launches from SLC-7 in combination with launches from other existing launch facilities at VAFB. The expected number of launches per year at VAFB should be characterized in terms of both the launch location and type of space launch vehicle.

6. Offsite Impacts.

Potential impacts associated with the project that may occur outside VAFB's borders (e.g., transportation of the fuel for the Titan Centaur) should be discussed with respect to location and magnitude of impact.

7. Need for the Project.

   The need for a new space launch complex at VAFB at this time should be discussed in light of a potential Congressional decision to put existing space launch facilities at VAFB in "caretaker" status.

The District appreciates this opportunity to comment on the scope of the EIS. We would like to continue to be involved at regular and frequent intervals during preparation of the EIS. We can offer the Air Force significant personnel expertise on air quality issues specific to this project which would improve the quality of the environmental analysis. To this end, we would like to develop a funding mechanism with VAFB to ensure our continued participation.

Sincerely,

Deborah S. Pontifex

Deborah S. Pontifex
Interagency Liaison

JMR/kj
4429C

cc: Jeffrey Harris, RMD
Susan Strachan, County Office of Disaster Preparedness
VAFB SLC-7 File
Responsible Agency Review File
MSED Chron File

RESPONSE TO LETTER 9

Received From: County of Santa Barbara, Air Pollution Control District,
Deborah S. Pontifex, Responsible Agency Review

Comment No. 84: Environmental Impact Statement Format

The format of the Draft EIS was developed to be consistent with the CEQ Regulations, Section 1502.10, Recommended Format. The recommended format and corresponding chapters in the Draft EIS are as follows:

CEQ Format	Draft EIS Section
• Cover Sheet	Cover Sheet
• Summary	Summary
• Table of Contents	Table of Contents
• Alternatives Including the Proposed Action	The Proposed Action and Alternatives (Chapter 2.0)
• Affected Environment	Affected Environment (Chapter 3.0)
• Environmental Consequences	Environmental Consequences and Mitigation Measures (Chapter 4.0)
• List of Preparers	List of Preparers (Chapter 5.0)
• List of Agencies, Organizations, and Persons to Whom Copies of the Statement Are Sent	List of Recipients of Draft EIS (Chapter 7.0)

Comment No. 85: Significance of Impacts

The Draft EIS is more than a full disclosure document; it is designed to be used by Federal officials in conjunction with other material to plan actions and make decisions (40 CFR Part 1502.1). Per requirements of the CEQ Regulations (40 CFR Parts 1500.1, 1500.2, 1500.4, 1501.7, 1502.1, and 1508.26), the Draft EIS builds on the identification of significant issues through the scoping process, analyzes those and other issues, and discusses them in proportion to their significance. The Draft EIS is analytic rather than encyclopedic and emphasizes issues that are useful to decision makers and the public. Additional technical information is available from the supporting documents, such as the Risk Assessment, which are referenced throughout the Draft EIS.

Conclusions about the significance of an impact are based on the context and intensity of the impact (40 CFR Part 1508.26). Among other things, conclusions take into consideration the unique characteristics of the area (such as threatened or endangered species of plants and

animals), controversy (such as concerns regarding water resources), uncertainty or risks (such as impacts to human health and safety), cumulative impacts, and others, consistent with CEQ Regulations, Part 1508.26. Where previous analyses in other reports have covered the same issues, these analyses have been referenced and briefly summarized. The criteria by which the significance of impacts to each resource are evaluated are discussed in Chapter 4.0 of the Draft EIS.

Comment No. 86: Air Quality Modeling

USAF recognizes SBCAPCD's desire to review detailed air quality modeling results for each of the alternative sites. However, the evaluations of air contaminant emission sources discussed in the Draft EIS have been performed as consistent with NEPA and the CEQ guidelines to determine if there is the potential for significant environmental impacts to result from construction and operation of the proposed action. Proposed sources of air contaminant emissions (hydrogen flares, hypergolic vapor control systems, and emergency electrical power generator) are minor, have been permitted by SBCAPCD at other VAFB SLCs, and have been demonstrated by SBCAPCD-approved source testing to operate within specifications dictated by SBCAPCD.

In addition, impacts would be minimized since SBCAPCD regulations require that best available control technology (BACT) be applied to all proposed sources of air contaminant emissions. Furthermore, no permits to construct or operate the facility will be issued by SBCAPCD unless all emission increases due to construction and operation can be demonstrated to be offset, resulting in a net benefit to air quality.

Detailed air quality modeling of the type requested is required to be performed as part of an Air Quality Impact Analysis (AQIA) in support of an Authority to Construct (ATC) permit application submitted to SBCAPCD. Permits to construct or operate will not be issued unless results of the AQIA demonstrate that air contaminant emissions resulting from construction and operation will not contribute to the violation of any ambient air quality standards in the region.

With respect to comparison of the proposed alternatives on the basis of potential air quality impacts, the four alternatives considered are situated in the same general vicinity (separated by approximately one mile). Therefore, it is reasonable to assume that potential impacts to regional air quality will be similar, regardless of the alternative selected. The alternative sites

are all within 2,000 feet of terrain features that are in excess of the tallest stack heights currently anticipated for construction at the proposed facility. Therefore, localized air quality impacts would be similar for each of the proposed alternatives.

In summary, NEPA guidelines require that the level of analysis be consistent with the magnitude of the environmental impacts anticipated. The sources of air contaminant emissions associated with the proposed action are minor and would be constructed and operated in full compliance with SBCAPCD requirements. The detailed air quality modeling requested by SBCAPCD will be performed in support of project permit applications. No significant differences in potential local or regional air quality impacts are expected relative to the proposed siting alternatives.

Comment No. 87: Cumulative Impact Summary Table

Section 2.4 of the Draft EIS is intended to provide decision makers and the public with a concise summary of the cumulative impacts that would result if the project were implemented at each of the alternative sites. The table is structured by resource, consistent with the format of the Draft EIS, so that sections of the document may be easily referred to for additional detail regarding impacts. In addition, the table is designed to compare cumulative impacts to each resource across the alternatives.

The impact classification system suggested is not a requirement of NEPA or the CEQ Regulations, and need not be included in the Draft EIS. However, the information requested is contained in the document in both the Summary and Chapter 4.0 (Environmental Consequences and Mitigation Measures).

Comment No. 88: Deadlines for Attainment of California Ambient Air Quality Standards

Text for the air quality portions of the Draft EIS were prepared prior to passage of the California Clean Air Act (CCAA). The CCAA mandates that nonattainment areas reduce nonattainment pollutants or their precursors by five percent per year until attainment is achieved. The amended text that discusses the CCAA is contained in Section 3.0 of the Final EIS (pages 3-2 and 3-3).

Comment No. 89: Santa Barbara County Air Pollution Control District Rule 310

SBCAPCD Rule 310, which prohibits emissions of hydrogen sulfide (H_2S) that result in a three-minute average ambient concentration greater than 0.6 ppm, is more restrictive than the California Ambient Air Quality Standard for H_2S (0.3 ppm, one-hour average concentration). Page 1-14 of the Draft EIS has been amended as suggested and is included in Chapter 3.0 of the Final EIS (page 3-2).

Comment No. 90: Footnotes for Table 1.5.1

The footnotes to amend Table 1.5.1 are included in Chapter 3.0 of the Final EIS (page 3-3).

Comment No. 91: Historical Attainment Status of Northern Santa Barbara County

The discussion on page 1-16 of the Draft EIS was prepared in mid-1988 on the basis of information supplied by SBCAPCD. The conclusions derived in Draft EIS Section 1.5.4.1 regarding the attainment status of North Santa Barbara County with respect to ozone, PM_{10}, and their precursors are in full agreement with SBCAPCD's description of present attainment status. All air quality evaluations performed in support of the Draft EIS assumed that ozone, PM_{10}, and their precursors are nonattainment pollutants.

Comment No. 92: Federal Attainment Status for Northern Santa Barbara County

See response to Comment No. 91.

Comment No. 93: PM_{10} Attainment Status for Northern Santa Barbara County

See response to Comment No. 91.

Comment No. 94: Santa Barbara County Air Pollution Control District Enforcement of California Ambient Air Quality Standards

See response to Comment No. 88. Amended text for Draft EIS page 1-14 that discusses the CCAA is included in Chapter 3.0 of the Final EIS (pages 3-2 and 3-3).

Comment No. 95: Santa Barbara County Air Pollution Control District Implementation of New Emission Control Rules

The potential corrective measures listed in Section 1.5.4.2 of the Draft EIS were presented as USAF's best interpretation of steps which SBCAPCD may take to improve air quality. Per SBCAPCD regulations, a more encompassing description of potential corrective measures would include:

- Retrofit existing sources with new controls.
- Tighten the New Source Review (NSR) rule:
  - Make smaller sources subject to it.
  - Require more stringent control beyond BACT.
- Implement technology-forcing rules.

Comment No. 96: New Source Review Applicability

Amended text for Draft EIS page 1-17 that discusses new source review requirements is included in Chapter 3.0 of the Final EIS (page 3-4).

Comment No. 97: Issuance of Permit to Operate

Amended text for Draft EIS page 1-17 that discusses the issuance of a permit to operate is included in Chapter 3.0 of the Final EIS (page 3-4).

Comment No. 98: Data Input to Air Quality Models

Amended text for Draft EIS page 1-17 that discusses input to air quality models is included in Chapter 3.0 of the Final EIS (page 3-4).

Comment No. 99: Description of Preconstruction Monitoring Data

Amended text for Draft EIS page 1-19 responding to SBCAPCD's interpretation of a disparity between the terms "descriptive" and "representative" is included in Chapter 3.0 of the Final EIS

(page 3-3). SBCAPCD has indicated that data collected at either the Point Arguello or Jalama Beach station are representative. A letter dated January 27, 1989, from SBCAPCD to VAFB regarding this subject states:

> The District has determined that meteorological data collected at either the Point Arguello or the Jalama Beach monitoring station locations can provide data representative of the reasonable worst-case meteorological conditions at the proposed project site for use in the Air Quality Impact Analysis (AQIA) (SBCAPCD 1989).

USAF has previously acknowledged that it will accept responsibility for ensuring that data required for use in the AQIA satisfy SBCAPCD's standards for acceptance and data recovery.

Comment No. 100: Emissions Offset and Banking Agreement

It is USAF's understanding that emissions offset credits enumerated in VAFB's 1984 "Emissions Offset and Banking Agreement" are valid and fully available for use to offset emissions from the proposed action and other VAFB activities. The Banking Agreement was signed and executed as a binding legal agreement between SBCAPCD and VAFB and was adopted by SBCAPCD's Board of Directors on November 5, 1984. The agreement predates SBCAPCD's 1988 deletion of the banking provision in their regulations. Discussions regarding emissions offset credits necessary for the proposed action would be conducted prior to submittal of an ATC application to SBCAPCD.

Comment No. 101: Preconstruction Monitoring for Alternative Sites

As noted in the response to Comment No. 86, the alternative project sites are in the same vicinity and have common critical terrain features. If one of the alternatives is selected for project construction, USAF agrees that modeling analyses would be required to determine whether the existing data sets for Point Arguello and Jalama Beach are representative of each of the alternative sites. The USAF believes that these analyses would demonstrate that data exists that is representative of reasonable worst-case meteorological conditions at each of the alternative sites.

Comment No. 102: Safety Zones for Figure 2.1.2 (Proposed Cypress Ridge Site and Alternatives)

This figure has been revised to delete the safety clear zone. The revised figure is provided in Section 3.3 of the Final EIS.

Comment No. 103: Previous Air Quality Studies

Table 4.5.2 of the Draft EIS demonstrates that, at most, project operational emissions are expected to be one percent of current annual VAFB emissions. Information cited in "Final Programmatic Environmental Assessment for Commercial Expendable Launch Vehicle Programs" (US DOT 1988) indicates that VAFB contributes one to two percent of recorded regional emissions.

Comment No. 104: Calculation of Construction Emissions

The discussion of fugitive dust emissions from construction activities in Section 2.3.5 and 4.5.2.1 of the Draft EIS is in error. Modifications to Draft EIS pages 2-62, 4-60, and 4-67 appear in Chapter 3.0 of the Final EIS (pages 3-9 and 3-17). In addition, a revised Table 4.5.3 is provided in Section 3.2 of the Final EIS. Estimates of construction emissions at the SLC-6, Boathouse Flats, and Vina Terrace sites are also provided in Section 3.2 of the Final EIS.

The revised estimated fugitive dust emissions from construction activities were calculated on the basis of the EPA emission factor for heavy duty construction operations, 1.2 tons of particulate matter per acre per month of activity. It was assumed that, during a worst-case construction year, 34 acres would be disturbed, and approximately 50 percent of the total particulate emissions would be controlled by watering. Furthermore, it was assumed that 50 percent of the total suspended particulate matter is less than 10 microns in diameter (PM_{10}).

Comment No. 105: Information on Operational Control Procedures

As cited on Draft EIS page 2-20, safety systems and procedures are defined in a number of documents. The following specifically address meteorological restrictions on launches:

USAF. 1985. Western Space and Missile Center (Air Force Systems Command) Regulation 127-1, Range Safety Requirements, Vandenberg Air Force Base, California. May.

USAF. 1976. 1st Strategic Aerospace Division (Strategic Air Command) Regulation 127-200, Missile Mishap Prevention, Vandenberg Air Force Base, California. October.

Comment No. 106: 1981 Study

As shown on Draft EIS page 3-129, the 1981 study cited is:

Madrone Associates. 1981. Environmental assessment for a new hypergolic propellant storage facility, Vandenberg Air Force Base, California. June.

The requested reference for the 1981 study has been added to Draft EIS page 2-69. The amended text is shown in Chapter 3.0 of the Final EIS (page 3-9).

Comment No. 107: Toxic Hazard Corridor Explanation

The requested reference to the location of the discussion of the THC procedure has been added to Draft EIS page 2-69. The amended text is shown in Chapter 3.0 of the Final EIS (page 3-9).

Comment No. 108: Comparison of Air Quality Impacts at Proposed and Alternative Sites

See response to Comment No. 86.

Comment No. 109: Necessity for Site-Specific Air Quality Impact Analysis

See response to Comment No. 86.

Comment No. 110: Relationship Between Operational NO_X and Reactive Organic Compounds (ROC) Emissions and Ozone Standard Exceedances

The SBCAPCD new source review guidelines require that operational NO_X and ROC emissions must be offset at a ratio of 1.2 to 1, such that a net benefit to air quality results. Therefore, it is not anticipated that operational NO_X and ROC emissions from the proposed project would contribute to existing ozone standard exceedances.

Comment No. 111: Cumulative Impacts Summary Table

See response to Comment No. 87.

Comment No. 112: Mitigation Measures Summary Table

See response to Comment No. 87.

Comment No. 113: Climatic Description

The USAF agrees that there is a substantial climatic difference between the coastal areas of south and north Santa Barbara County. However, this is not pertinent to the evaluation of potential air contaminant impacts from the proposed action.

Comment No. 114: High Ozone Value Occurrences

The reference mentioned in this comment was incorrectly cited in the Draft EIS. The correct document is Draft EIR/EIS, Proposed ARCO Coal Oil Point Project (Chambers Group, Inc. 1986). Revisions to page 3-67 and Chapter 8.0 of the Draft EIS are included in Chapter 3.0 of the Final EIS (pages 3-14 and 3-22).

Comment No. 115: Area Pollutant Sources

Amended text for Draft EIS page 3-71 that discusses sources of air pollutants is included in Chapter 3.0 of the Final EIS (page 3-14).

Comment No. 116: Attainment of State Air Quality Standards

Amended text for Draft EIS page 3-71 that discusses attainment of state air quality standards is included in Chapter 3.0 of the Final EIS (page 3-14).

Comment No. 117: Northern and Southern Santa Barbara County Attainment Status

As stated in the last paragraph on page 3-71 of the Draft EIS, southern Santa Barbara County is in nonattainment for ozone, and exceedances of the national ambient air quality standards for ozone have been recently recorded in northern Santa Barbara County.

Comment No. 118: Northern Santa Barbara County Exceedance of National Ambient Air Quality Standard for Ozone

As stated in the last paragraph on page 3-71 of the Draft EIS, exceedances of the national ambient air quality standards for ozone have been recently recorded in northern Santa Barbara County.

Comment No. 119: Consideration of State Nonattainment Designations

See response to Comment 116.

Comment No. 120: Data Used in Table 3.5.1 (Measured Air Quality Data Summary)

The purpose of the information presented in Draft EIS Table 3.5.1 and the related discussion is to illustrate that north Santa Barbara County is not in attainment of the California Ambient Air Quality Standards (CAAQS) for ozone and PM_{10} and the National Ambient Air Quality Standard (NAAQS) for ozone. As a result, air quality analyses presented in the Draft EIS were performed on the basis that ozone, PM_{10}, and their precursors are nonattainment pollutants. Inclusion of additional air quality monitoring data into Table 3.5.1 would not alter the assumptions upon which air quality analyses were performed.

Comment No. 121: Wind Speeds

Amended text for Draft EIS page 3-76 that discusses changes in wind speeds is included in Chapter 3.0 of the Final EIS (page 3-14).

Comment No. 122: Explanation of Emergency Response Agency Notification and Coordination

As described in Draft EIS Section 3.11.1, Regional Environment (pages 3-125, 3-126), the emergency response protocol is set out in the Hazardous Materials Emergency Response Area Plan (see response to Comment No. 159). The plan is briefly summarized on Draft EIS page 3-126 and includes participating agencies and the responsibility of the Santa Barbara County Hazardous Materials Coordinator to coordinate emergency response activities.

Comment No. 123: Definition of Toxic Hazard Corridors

The limits applied to protect the public should an emergency situation occur are short-term public emergency guidance levels (SPEGL), established by the National Research Council in 1989. The SPEGLs, in parts per million, are as follows:

Duration	Hydrazine	UDMH	NO_2[(a)]
30 min	NL	NL	2
1 hour	2	24	1
2 hours	1	48	0.5
24 hours	0.08	1	NL

NL = No Limit.

[(a)] N_2O_4 limits are the same as for NO_2 since there is rapid dissociation from N_2O_4 to NO_2.

Comment No. 124: Hypergolic Transportation Safety

Draft EIS Section 3.11.2, Local Environment, is part of the description of the existing environment. As such, it is appropriate to include a discussion of existing transportation of hypergolic materials (i.e., shipments for operations at SLC-4 East and West), but inappropriate to include the potential shipments that would result from the proposed action. Information about projected hypergolic propellant shipment requirements to support proposed project activities is included in Draft EIS Section 4.11.1, Regional Impacts.

Comment No. 125: Range Safety Procedures

The flow of emergency information between USAF and other government agencies is defined in the Hazardous Materials Emergency Response Area Plan (see response to Comment No. 122) and in a mutual aid agreement between USAF and the City of Lompoc (Draft EIS Section 3.11.1, Regional Environment).

Comment No. 126: Nitrogen Dioxide Impact Value

See response to Comment No. 86.

Comment No. 127: Significance of Impacts

See response to Comment No. 86.

Comment No. 128: Draft EIS Adequacy in Addressing Santa Barbara County Air Pollution Control District Scoping Comment 1.C (Emission Impacts Should Be Modeled)

See response to Comment No. 86.

Comment No. 129: Draft EIS Adequacy in Addressing Santa Barbara County Air Pollution Control District Scoping Comment 2 (Emission Offsets Should Be Clearly Identified)

See response to Comment No. 100.

Comment No. 130: Draft EIS Adequacy in Addressing Santa Barbara County Air Pollution Control District Scoping Comment 3 (An Air Quality Analysis for the Proposed Project Should Be Done)

See response to Comment No. 86.

Comment No. 131: Draft EIS Adequacy in Addressing Santa Barbara County Air Pollution Control District Scoping Comment 5 (Cumulative Impacts Should Address Expected Number of Launches per Year at VAFB, Characterizing Both the Launch Location and Type of Space Launch Vehicle)

As noted in Draft EIS Section 4.5.1, Regional Impacts, it is expected that launches from other SLCs would produce emissions that are intermittent, of short duration, and would not produce regionally significant impacts to air quality.

Since other launch activities are not regionally significant air contaminant emitters, it was determined in consultation with SBCAPCD and as indicated in an October 4, 1988 letter, that only major regional emitters (the Space Transportation System Power Plant and three offshore oil platforms) would be considered in the cumulative analysis undertaken for the project preconstruction monitoring modeling. The Draft EIS uses this logic in its analysis of cumulative impacts (Section 4.5.3, Cumulative Impacts). Emissions from other sources (such as other VAFB launches) would be included as baseline air quality conditions for the analysis of potential violations of the CAAQS.

Comment No. 132: Draft EIS Adequacy in Addressing Santa Barbara County Air Pollution Control District Scoping Comment 6 (Offsite Impacts, Such as Those From Transporting Fuel for the Titan Centaur to VAFB, Should Be Addressed)

Draft EIS Section 4.0, Environmental Consequences and Mitigation Measures, addresses impacts to areas outside of VAFB, including the location and potential magnitude of impact. Some of these are:

- Section 4.2, Water Resources, discusses regional impacts to water resources (the Lompoc Plain and Lompoc Upland ground water basins) that are clearly outside of VAFB.
- Section 4.4, Wildlife, discusses potential impacts to wildlife in a region that includes areas outside of VAFB, such as the Channel Islands.
- Section 4.5, Air Quality and Meteorology, analyzes impacts to air quality on a county-wide basis and impacts to stratospheric ozone on a world-wide basis.
- Section 4.7, Noise, analyzes impacts to areas outside of VAFB, such as Lompoc and Santa Maria.
- Section 4.10, Transportation, discusses impacts to highways in the region and the City of Lompoc.
- Section 4.11, Health and Safety, discusses off base hypergolic propellant transportation, in a probabilistic fashion.
- Section 4.12, Socioeconomics, discusses impacts to local communities.

Comment No. 133: Draft EIS Adequacy in Addressing Santa Barbara County Air Pollution Control District Scoping Comment 7 (The Need for SLC-7 in Light of Potential Congressional Action to Put VAFB's Existing Launch Facilities in "Caretaker" Status Should Be Discussed)

The need for the proposed action is discussed in Draft EIS Section 1.3, Purpose and Need for the Proposed Action. In addition, SLC-6 (the only launch facility currently in mothball status) is analyzed throughout the Draft EIS as an alternative and has been identified by USAF as a preferred alternative. SLCs 3, 4, and 5 were also considered as alternatives and eliminated from further consideration for various reasons, including Titan IV/Centaur incompatibility with scheduled missions, vehicle sizes, and configurations of these launch complexes.

The Final EIS identifies the conversion of SLC-6 as a preferred alternative, as indicated in the Summary. The decision to identify the conversion of SLC-6 as a preferred alternative is the result of the analysis of environmental impacts contained in the Draft EIS, comments on the Draft EIS from government agencies, private groups, and individuals, and recent Congressional action.

Santa Barbara County Park Department

610 Mission Canyon Rd., Santa Barbara, Ca. 93105 (805) 568-2461

"At Rocky Nook Park"

MICHAEL H. PAHOS
Director of Parks

FRANK LAURAN
Deputy
Director of Parks

September 6, 1989

HQ Space Systems Division
P.O. Box 92960
Worldway Postal Center
Los Angeles, CA 90009-2960

Attn: Mr. John Edwards

Re: Draft EIS for the Construction and Operation of the Space Launch Complex 7 at Vandenburg Air Force Base, California

Dear Mr. Edwards,

The Santa Barbara County Park Department has the following comments to the above referenced document:

[134] Page 2-9:
The document lists several sizes and weights of expended and jettisoned material that falls into the ocean and not recovered. The document does not address the potential "scatter pattern" of the debris, the possibility of greater danger to the public and surrounding vicinity or the length of evacuation necessary during this type of emergency.

[135] Page 2-23:
Facility Construction - The document does not address the impacts from air quality, traffic, wildlife disturbance, recreation use, noise and construction disturbance due to the proposed borrow pit along Highway 246.

[136] Page 2-71:
Land Use - The document states that there would be a maximum of three launches per year from SLC-7 and six per year from other space launch complexes beginning in 1994. Does this mean that there will be nine (9) additional launches in 1994? Nine new launches in addition to those presently occurring every year is not an insignificant impact

to the parks and recreational systems within the area and should be addressed within the document.

The document does not address any vibration or sonic boom overpressure to existing aquifer(s), underground waterlines or above ground storage tanks within close proximity of the project (within 2 miles). The long term contamination and draft on the existing aquifer and the effects on other common users must be addressed.

Page 2-71:
Recreation - The document does not address the impact to the parks during delayed launches. Park personnel have reported delays of up to 7 days where, during this period, the park remained evacuated. There has been no willingness, on the part of VAFB in the past to consider the public need for recreation in the scheduling of launches. From a park operational standpoint, the document does not address the impacts of any launch schedule occurring during peak
[137] season use or the impact to public recreation during this peak season due to the dependency of public use.

The criteria for developing launch schedules or launch windows must include the impacts to public recreational use. There is a lack of sensitivity to the recreation needs that the Santa Barbara County Park Department serves. The launch program needs to incorporate the demand of dependable public recreational use.

It is absurd to list 'no mitigation measures' to the impacts on recreational use . Those impacts listed in this correspondence need
[138] to be evaluated and addressed. The Santa Barbara County Park Department cannot justly represent itself and give adequate recreation availability to the public recreation users with a project and its mitigations or lack thereof as this document exists.

Your cooperation and attention to the concerns and comments of the Park Department is appreciated.

Sincerely,

Michael H. Pahos
Park Director

cc: Weldon Hobbs, Park Superintendent

Resource Management Department

RESPONSE TO LETTER 10

Received From: Santa Barbara County Park Department
Michael H. Pahos, Park Director

Comment No. 134: Debris Scatter

The weights referred to in Draft EIS Section 2.1.3.1 and Figure 2.1.6 are for the maximum size satellite, threat capability, and fuel. Although the overall lengths of both the Titan IV/Centaur and Titan IV/NUS are given, as is the size of the payload faring, neither sizes nor weights were provided for the individual expended SRMUs and stages.

For further information regarding potential debris scatter and risks to the public, see responses to Comment Nos. 200 and 201. Delayed launches are discussed in the response to Comment No. 137.

Comment No. 135: Impacts Due to Proposed Borrow Pit Along Highway 246

The potential borrow pits adjacent to the Santa Ynez River are no longer being considered as areas that would be utilized as a source of construction material for the proposed action. A revised Draft EIS Figure 2.1.11 is provided in Section 3.3 of the Final EIS.

Comment No. 136: Increases in Number of Launches and Effects of Sonic Boom/Vibration on Aquifer(s), Underground Water Lines, and Aboveground Storage Tanks

The annual launch rates from 1986 projected through 1995 are represented in Draft EIS Table 4.13.1. As shown, six launches per year are projected for the years 1990 through 1994. In 1995 the proposed action would add three launches per year for a total of nine stated on Draft EIS page 2-71.

The sonic boom focal range is shown in Draft EIS Figure 4.4.1 and discussed in Section 4.4.1.1. The area of greatest potential effect would be San Miguel Island, where there are no aboveground storage tanks. Aquifers and underground water lines would not be affected by sonic boom overpressures, even if they were present.

There has not been and should not be contamination of the aquifer by the proposed action, as contaminants associated with it would not be introduced into the aquifer in significant quantities. As stated in Draft EIS Section 3.2.2.1 (page 3-22), the Lompoc Terrace ground water basin has a total storage capacity of about 60,000 acre-feet. Approximately one-third of that storage is above mean sea level. Contamination by sea water intrusion could occur only if water would be removed from storage below sea level (USAF 1982). However, as noted in Draft EIS Section 4.2.2, the 45 acre-feet per year over current demand required by project operations would add to existing overdraft conditions and, therefore, be a significant impact.

Comment No. 137: Impacts to Parks During Delayed Launches

The scheduling of launches is dependent upon the narrow time frame of an available window for any specific launch and, therefore, cannot be arbitrarily arranged to occur at a time that might be more convenient relative to recreational park operations. Launch delays during these windows are due to either adverse atmospheric conditions or mechanical problems that would need to be resolved before the launch could safely occur. Every effort is made to meet projected launch schedules, thereby minimizing impacts to recreational uses of the park. It is expected that Jalama Beach would be closed for no more than six days per year for launches associated with the proposed action. The probability that a launch from the TCLC would require restricting access to Jalama Beach County Park during weekends is approximately one in three which would, on the average, result in the closure of Jalama Beach for two weekend days per year.

Comment No. 138: Mitigation Measures for Recreation

No additional mitigation measures, other than those that are part of the proposed action, would occur.

LETTER 11

County of Santa Barbara

2-91

RESOURCE MANAGEMENT DEPARTMENT

John Patton, Director

September 7, 1989

Mr. John Edwards
HQ Space Systems Division
PO Box 92960
Worldways Postal Center
Los Angeles, CA 90009-2960

RE: Comments on the SLC 7 EIS

Dear Mr. Edwards:

Thank you for the opportunity to review the SLC 7 EIR. Our detailed comments are attached and include three major concerns that I would like to emphasize here.

[139] First, the alternative of upgrading the SLC 6 site to accommodate this project is clearly far superior environmentally to the other alternatives. The SLC 6 alternative would entirely avoid earthmoving activities and loss of native vegetation, reducing the risk of erosion, air quality impacts, and biological impacts. The SLC 6 alternative would also avoid significant visual impacts and would have smaller growth inducing effects. Minimization of water use and attendant impacts on the Lompoc Terrace groundwater basin would also result from the SLC 6 alternative. For all of these reasons, this department feels that the SLC 6 alternative should be chosen to implement the Titan IV/Centaur launch program.

[140] Second, the growth inducing impacts of the SLC 7 project clearly have potentially significant environmental implications for Santa Barbara County. Increased demand for housing and public services would exacerbate existing regional and local groundwater overdraft, air quality problems, and traffic constraints. The increased demand for government services such as police and fire protection would pose a substantial burden on local governments which are already fiscally constrained. Furthermore, the increased need for housing would increase pressure to convert the County's prime agricultural land or significant biological communities to urban use. The significance of these issues should be strongly stated in the Final EIS.

[141] Thirdly, to decrease the extent to which the project would reduce stratospheric ozone, the use of chlorofluorocarbon (CFC) 22 as refrigerant instead of CFC 12 is strongly recommended. The potential for the project to result in a 0.01 percent depletion of stratospheric ozone and as many as an additional 25,000 carcinomas and 1,000 new melanomas worldwide must be acknowledged to be a highly significant impact.

123 E. Anapamu Street, Santa Barbara, CA 93101
PHONE (805) 568-2000 FAX (805) 568-2030

This department appreciates having had an opportunity to comment on this EIS. Please feel free to contact Alice McCurdy at (805) 568-2006 if you have questions about our concerns.

Sincerely,

Jeffrey T. Harris, Deputy Director
Division of Environmental Review & Compliance

JTH:AKM:jms:6674A
Attachment
cc: John Patton, RMD
Doug Anthony, RMD

Santa Barbara County Comments on SLC 7 EIS

[142] p. S-4 The comment stating that the northern Channel Islands have "a poorly developed animal population" should be re-worded to acknowledge the extreme biological significance of these islands, especially for marine mammals and birds.

[143] p. S-9 The generation of 119 tons of hazardous waste/year must be acknowledged as a cumulatively significant contribution to the state's hazardous waste load. It is unacceptable not to propose mitigation for waste management.

[144] What is the basis for the finding of no significant impact regarding the effects of fuel transport and use on human health and safety? The County would consider safety impacts significant if the potential for a fatal accident exceeds one chance in a million per year.

[145] p. S-10 As explained in comments that follow, this department does not concur with the EIS' conclusion that most environmental impacts would not be considered significant after implementation of mitigation measures. This finding is also inconsistent with the section dealing with significant unavoidable adverse effects (p. 4-171: geo/soils, water use, veg., air quality, health and safety).

[146]

[147] p. 2-57 The estimate of the project's contribution to groundwater overdraft should include the secondary water demand from induced growth.

[148] p. 2-60 The document should state whether any egg losses are expected for the California least tern. If so, any such losses should be considered significant. Please provide a reference for the comment that no mother-pup separation would be expected. It is incorrect to state that grey whales occur infrequently in the project area. To avoid impacting this sensitive mammal, launches should be timed to avoid the peak migration season through the channel.

[149]

[150]

[151] p. 2-63 A 0.01% depletion of stratospheric ozone should be identified as a highly significant project impact. The cumulative impacts worldwide of ozone depletion must be generically addressed; this is <u>not</u> accomplished on p. 2-74.

[152]

[153] p. 2-66 Implementing the project at the undeveloped sites would create a significant intrusion into expansive, higly scenic coastal views from the County's Jalama Park.

[154] p. 2-70 Given the total world population, what would be the expected number of lethal and non lethal cancers attributable to the project?
i.e.; 2/10 mil x 5 bil. people = 1,000 new melanomas
5/mil x 5 bil. people = 25,000 new carcinomas (worst case)

[155] p. 2-70 It seems likely that growth impacts would be experienced in the Santa Ynez Valley, especially the community of Buellton. The justification for stating that the project's growth effects would be largely beneficial is unclear.

[156] p. 2-71 The potential health and safety effects to the proposed Bixby housing referred to here must be addressed, at least briefly.

[157] p. 2-79 Mitigation for vegetation loss should include compensation through offsite habitat restoration and preservation of offsite habitat in perpetuity.

[158] p. 3-58 The local form of Anniella pulchra is a regionally declining, sensitive species which has been classified as a "species of concern" by the California Department of Fish & Game.

[159] p. 3-125 The status of the Hazardous Materials Response Plan should be updated.

[160] p. 3-129 The document should note that one accident would be expected every 5+ years.

[161] p. 3-139 Please provide a reference to the comment that VAFB activities have a minor economic impact on the Santa Ynez Valley.

[162] p. 4-16 The increases in overdraft attributable to direct and indirect project water uses (380 AFY construction, 305 AFY operation) are not "small" and should be acknowledged to be substantial.

[163] p. 4-24 The loss of 90 acres of central coastal scrub and Venturan coastal sage scrub would clearly be significant under County standards. It is meaningless to call the loss insignificant because it represents a loss of less than 1 percent of that community; would the authors judge the loss of 1.0% of Amazonian rainforest to be an insignificant loss?

[164] p. 4-32 Similarly, the cumulative loss of central coastal scrub habitat should be identified as significant.

[165] p. 4-32 Mitigation for the loss of up to 100 mature and at lease as many seedlings of the candidate plant Monardella undulata var. frutescens should be insured by the project proponent, and not left up to the volunteer efforts of the botanical community. Also, mitigation for habitat loss should include compensation through offsite habitat restoration and preservation of comparable habitat offsite in perpetuity.

[166] p. 4-39 The potential for any egg loss in the California least tern nesting colonies should be identified as a potentially significant and unavoidable impact.

[167] p. 4-39 The potential for permanent hearing loss in sea otters and pinnipeds must be identified as a potentially significant, unavoidable project effect.

[168] p. 4-40 Unless the SLC-7 launches are timed to avoid the 75 day breeding period on San Miguel Island, it appears that impacts to pinniped populations would be significant due to the potential for some mortality from pup abandonment, etc.

[169] p. 4-48 Due to the rarity of the burrowing owl in Santa Barbara County, loss of habitat for this species from the Boathouse Flats alternative should be considered significant.

[170] p. 4-51 The temporary loss of the Boathouse area as a roosting area for brown pelicans should be classified as significant but short-term due to the sensitivity of this species.

[171] p. 4-53 Similarly, the Boathouse Flats alternative should be identified as causing a potentially significant disruption to pinnipeds' use of the shoreline immediately fronting the site.

[172] p. 4-55 Mitigation should include prohibiting launches during the 75 day breeding period for pinnipeds on San Miguel Island.

[173] p. 4-57 et seq. It is unclear what standards have been used to assess the significance of the projects' air quality impacts. Use of the County's thresholds of significance are recommended. The County's threshold for long term emissions is 2.5 lbs/hr. for non-attainment pollutants and 5.0 lbs/hr. for attainment pollutants. The County's short term threshold is the generation of 2.5 tons of pollutants per three month period.

[174] p. 4-69 The County strongly supports the use of CFC 22 instead of CFC 12 to reduce damage to stratospheric ozone.

[175] p. 4-75 The 0.01 percent reduction in stratospheric ozone and the resultant increase in the incidence of cancer must be identified as a significant impact on air quality and public health. The potential for increased cancers worldwide must be noted. Due to the global nature of the health-related impacts, it is unreasonable to limit the impact assessment to the statistic of 5 cancers per 100 million persons.

[176] p. 4-90 The analysis of cumulative effects should include a discussion of the status and problems encountered at the Class I hazardous waste site at Casmalia.

[177] p. 4-102 et seq. The visual impacts of the Cypress Ridge, Boathouse Flats, and Vina Terrace alternatives should be identified as significant and unavoidable due to the project's intrusion into expansive, highly scenic coastal views from the south.

[178] p. 4-110 This appears to be the first reference to the Manzanita Road borrow site. Any other environmental effects (erosion, loss of vegetation, impacts to wildlife, aesthetics, etc.) associated with use of this borrow site must be analyzed.

[179] p. 4-127 The last sentence on this page is not meaningful.

[180] p. 4-133, -4 The document should state clearly that statistically, a hypergolic propellant accident would be expected every 2 years (1.56 accidents/ 3 years = 1 accident/2 years).

[181] p. 4-134 The number here for the excess cancer rate for melanomas differs from the estimate on p. 2-70; the numbers should be reconciled.

[182] p. 4-134 The risk assessment must be described here in enough detail to indicate the likelihood of hazards occurring and the severity of hazards when they do occur. Project effects should be identified as significant since the project has the potential to increase the incidence of cancer; other safety hazards posed by the project may also be significant.

[183] p. 4-140 et seq. The County conducted a study of the regional impacts of growth and found that, for every new direct job, 1.182 indirect jobs are created (REGIS, 1980). This higher multiplier should be used to analyze population growth and impacts. Using the 1.182 figure, 473 indirect jobs would result from project operations.

[184] p. 4-141 The housing impacts should be evaluated in terms of percent change in vacancy rates, rather than relative to the absolute number of vacant housing units.

[185] p. 4-142 Construction phase and long term effects on public services would appear to be significant for more issues than increased overdraft alone; the need for additional firefighters and police should be expected to have a significant impact on fiscally-constrained local governments.

[186] p. 4-153 The potential for the SLC-7 operations work force to increase pressures to rezone non-urban land in the Lompoc Valley must be identified as a significant environmental impact; the bulk of Lompoc Valley's non-urban land is either prime agricultural land or biologically significant native habitat (most notably Burton Mesa chaparral).

[187] p. 4-165 As described in the preceeding comments, we do not concur either that short term effects can be mitigated to a level of insignificance or that there are few significant long term effects.

[188] p. 4-166 Given the limited recharge potential of the Lompoc Terrace groundwater basin (250 AFY, p. 3-22), an overdraft of 45 AFY should be identified as environmentally significant.

[189] p. 4-166 et seq. Again, the potential for project-induced growth must be considered potentially significant environmentally due to the likely pressure to convert prime farmland and/or biologically sensitive habitat to urban use.

p. 4-171 The preceding comment regarding p. 4-165 also applies here.

[190] p. 4-172 The 0.01 percent depletion of stratospheric ozone must be identified as highly significant due to the potential for large numbers of additional cases of cancer worldwide.

[191] p. 4-173 As stated in our previous comments, impacts to wildlife would appear to include significant, unavoidable impacts.

AKM:jms:6674A

RESPONSE TO LETTER 11

Received From: County of Santa Barbara, Resource Management Department
Jeffrey T. Harris, Deputy Director

Comment No. 139: Selection of SLC-6 Conversion

The Draft EIS Summary concludes that there would be fewer environmental impacts associated with the conversion of SLC-6 than with development at the Cypress Ridge, Boathouse Flats, or Vina Terrace sites. NEPA does not require the selection of the environmentally preferred alternative, but rather consideration of environmental values in the decision-making process. However, SLC-6 has been identified by USAF as the alternative preferred for project implementation as indicated in the Summary of this document. The decision to identify the conversion of SLC-6 as the preferred alternative is a result of the analysis of environmental impacts contained in the Draft EIS, comments on the Draft EIS from federal, state, and local agencies, elected officials, the public (individuals and organizations), and recent Congressional action. The decision of whether or not to proceed with the project and the selection of its location will be documented in the Record of Decision (ROD), expected in 1990.

Comment No. 140: Growth-Inducing Impacts

Potential growth-inducing impacts associated with the proposed action are addressed in the Draft EIS under Water Resources (Section 4.2), Air Quality and Meteorology (Section 4.5), Waste Management (4.6), Transportation (Section 4.10), Socioeconomics (Section 4.12), Land Use Impacts and Relationship to Plans (Section 4.13), and Recreation (Section 4.14). The criteria for evaluation of the potential significance of impacts are described in each of those sections. Where these criteria are exceeded, the impact is denoted as significant (as with water resources). See responses to Comment Nos. 155, 184, and 185 for discussion of fiscal and land use issues.

Comment No. 141: Significance of Stratospheric Ozone Depletion

The Draft EIS Section 4.5.4, Stratospheric Ozone, states that the air conditioning systems for the proposed action must utilize environmentally preferred chlorofluorocarbons (CFCs) as refrigerants, where feasible. In addition, it is noted that USAF is recommending the use of CFC-22 as a replacement for CFC-12 since it is environmentally preferable. Draft EIS

Section 4.5.4.4, Environmental Consequences of Stratospheric Effects, notes that the risk level of additional melanomas is calculated to be 5 per 100 million persons, a level that is considerably below the commonly acceptable level of one excess cancer per one million persons used for environmental risk analyses. Therefore, the potential impact is not considered significant.

Comment No. 142: Description of Channel Islands Animal Population

The northern Channel Islands are important sites for populations of marine mammals and birds, as discussed in Draft EIS Section 3.4.1.4, Channel Islands Wildlife. The summary is broadly written to indicate that the land mammal fauna of the northern Channel Islands is depauperate, with only 16 native and 19 introduced species recorded. The language contained in the Draft EIS is not meant to imply that the northern Channel Islands wildlife is not of ecological or scientific interest.

Comment No. 143: Significance of Hazardous Waste Impacts

The expected 119 tons of hazardous waste that the proposed action would generate in one year is less than 0.02 percent of the hazardous waste disposed of in California in 1987. As such, it would contribute a very small share to hazardous waste disposal and is not considered cumulatively significant. This waste would be disposed of in a manner that is consistent with federal, state, and local laws and regulations. A discussion of mitigation measures is contained in response to Comment No. 33.

Comment No. 144: Significance of Impacts to Human Health and Safety From Hypergolic Fuel Transport

The basis for the finding of no significant impact to human health and safety from fuel transport is contained in Draft EIS Section 4.11.1.2, Normal Operations. The expression of the hypergolic fuels transportation accident rate as a function of time and mileage is correct as shown in the Draft EIS. An additional method of presenting this information is in terms of the accident risk per year. At the hypergolic propellant shipment rate needed for the proposed action only, an accident may occur every 4.5 years. This is based on the historic accident rate of about 1.56 accidents per one million round-trip vehicle miles between the points of manufacture (Mississippi and Alabama) and VAFB and the fact that it would take more than seven years to travel one million round-trip vehicle miles. The current risks for VAFB

programs is approximately one accident every 3.2 years. Adding the risk from the proposed action to existing risk would result in a total accident rate of approximately one accident every 2.3 years. In addition to this low accident rate, the vehicles are specially designed to resist rupture or spill, thereby further reducing the potential for adverse consequences. Risks for hypergolic fuel transportation are not calculated in the potential for fatalities, but rather in the potential for an accident to occur. There have not been any fatalities associated with USAF transport of hypergolic fuel.

Comment No. 145: Findings of Significance and Consistency of Findings in Summary and Draft EIS Section 4.17 (Unavoidable Adverse Impacts)

Findings of significance are addressed in responses to Comment Nos. 141, 151, 153, 163, 164, 166, 167, 168, 169, 170, 171, 173, 175, and 185.

Comment No. 146: Consistency of Summary and Section 4.17.1, Significant Unavoidable Adverse Effects

The conclusions of the Draft EIS Summary note that most potential environmental impacts would not be considered significant after implementation of mitigation measures. This is consistent with Draft EIS Section 4.17, Unavoidable Adverse Effects, where significant unavoidable adverse effects are limited to geology and soils (the potential impacts from a major regional earthquake), water use (ground water use), vegetation (local, not regional, significant impacts to *Monardella undulata* var. *frutescens*), air quality (impacts to stratospheric ozone), and health and safety (potential impacts from transport and handling accidents and health-related effects of ozone depletion). It should be noted that impacts to geology and soils and health and safety (transport and handling) are low probability events. In comparison to this limited number of concerns, impacts to vegetation (regional), wildlife, waste management, cultural resources, transportation, land use, and recreation were not considered to be significant unavoidable adverse effects.

Comment No. 147: Induced Growth Demand for Ground Water

As described in Draft EIS Section 4.2.1, Regional Impacts, estimates of worst-case growth-induced demands for ground water during the construction and operations phases of the proposed action are 290 and 305 acre feet per year, respectively.

Comment No. 148: California Least Tern Egg Losses

The analyses completed for the Draft EIS determined that least tern egg losses would not likely occur. As shown in Draft EIS Figure 4.4.1 (Titan IV/Centaur Sonic Boom Footprint), the intense portion of the sonic boom would be a considerable distance from least tern nesting sites. Schreiber and Schreiber (1980) analyzed the effects of impulse noise (such as sonic booms) on seabirds of the Channel Islands (area directly under the focus sonic boom area). Their analysis focused on Brandt's cormorants, western gulls, and Cassin's auklets, since these species represent common birds that nest on cliffs, on the ground, and in burrows, respectively. For the purposes of this analysis, the least tern is most like the western gull, since they both nest on the ground. Schreiber and Schreiber concluded that there was no potential sonic boom risk to the western gull for overheating, chilling, kicking eggs, predation, or nest collapse. It would be expected that these results are applicable to the least tern. In addition, effects to least tern nesting activities from minuteman missile launches were analyzed by HDR Sciences (1989). This analysis noted that activity during the launch period was within the expected range of normal behavior and that the launch had no adverse effects on reproductive behavior.

Jehl and Cooper (1980) performed experiments on domestic chickens and their eggs to determine the potential impacts from sonic booms. Their experiments did not reveal significant effects of simulated sonic booms on ovulation, oviposition, hatchability, or viability of chicks. In addition, there was no noticeable effect on the hatchability of thin-shelled eggs. Evans et al. (1979) also investigated sonic boom effects on bird eggs. They noted that sound pressure levels sufficient to break eggs are approximately one level of magnitude greater than those expected to accompany a Space Shuttle launch. In addition, they found no reason to believe that thin-shelled eggs would be damaged by sonic booms.

Based on these analyses, and since the sonic booms associated with the Titan IV would not be as great as those produced by the Space Shuttle, least tern egg losses are not expected as a result of the proposed action.

Comment No. 149: Pinniped References Regarding Mother-Pup Separation

The requested references, which find low risk of mother-pup separation in pinnipeds, are found in Draft EIS Section 4.4.1.3, Marine Mammals:

Bowles, A., and Stewart, B. S. 1980. Disturbances to the pinnipeds and birds of San Miguel Island, 1979-80. In: Jehl, J. R. ; Cooper, C. F. , eds. Potential effects of Space Shuttle sonic booms on the biota and geology of the California Channel Islands: research reports. Prepared by the Center for Marine Studies, San Diego State University, in cooperation with Hubbs/Sea World Research Institute. Prepared for USAF, Headquarters, Space Division, El Segundo, California. Tech Rep 80-1. Section 4, pp. 99-137.

Stewart, B. S.; Antonelis, G. A., Jr.; DeLong, R. L.; Yochem, P. K. 1988. Abundance of harbor seals on San Miguel Island, California, 1927 through 1986. Bulletin of Southern California Academy of Science 87(1):39-43.

Comment No. 150: Gray Whales

Draft EIS Section 4.4.1.3, Marine Mammals, notes that gray whales are known to pass within 100 miles of the VAFB shoreline during the annual winter-spring migration periods. It is not necessary to time launches to avoid these periods due to the limited potential for impact. Noise would rapidly attenuate below the surface of the ocean and with distance from the source.

Comment No. 151: Significance of Stratospheric Ozone Depletion

The depletion of stratospheric ozone is identified as a potentially significant unavoidable adverse impact in Draft EIS Section 4.17.1.4, Air Quality.

Comment No. 152: Cumulative Impacts to Ozone

Draft EIS Section 3.5.3, Air Quality of the Stratosphere, discusses worldwide trends in impacts to stratospheric ozone depletion (Ozone Trends Panel 1988; EPA 1987, 1988, 1989). This section notes conclusions drawn from the Ozone Trends Panel and the Environmental Protection Agency documenting the extent of stratospheric ozone depletion. The impact analysis contained in Section 4.5.4, Stratospheric Ozone, utilizes the current level of depletion of stratospheric ozone as the baseline for calculating the 0.01 percent change in the rate of depletion and notes the potential results of this change.

Comment No. 153: Significance of Visual Impacts to Jalama Beach County Park

USAF recognizes the scenic quality and the user sensitivity of the Jalama Beach area. The criteria adopted for determination of significance of visual impacts is contained in Draft EIS Section 4.8, Visual Resources, as follows:

- A substantial, negative aesthetic effect for a large number of people.
- Initial introduction of human elements into a pristine area.
- Degrading the aesthetic value of an area with artificial illumination.

As indicated in Draft EIS Section 4.8.1, Regional Impacts, construction of the proposed action at one of the undeveloped sites would not significantly alter the visual resource quality at Jalama Beach due to the distance from which the facilities would be viewed (approximately 8 miles). At this distance, the proposed action would not be dominant in the landscape and would not obstruct public views of the coastline. Human elements now visible from Jalama Beach include offshore oil drilling platforms which are more dominant than project structures would be if constructed at an undeveloped site.

Comment No. 154: Calculation of Potential Cancer Impacts

As noted in Draft EIS Section 4.5.4, Stratospheric Ozone, operation of the proposed action would result in a small increase in the melanoma rate from 10 per 100,000 persons to 10.005 per 100,000 persons. This translates to a risk level of 5 per 100 million persons, considerably below the commonly accepted risk rate of 1 in one million. Based on a world population of approximately 5.128 billion (Houghton Mifflin 1989), approximately 1,000 additional melanomas would be expected world wide as a result of the proposed action.

Comment No. 155: Distribution of Growth-Induced Impacts

Growth impacts in the Santa Ynez Valley, including Buellton, are addressed in detail in Draft EIS Section 4.12, Socioeconomics, where it is noted that the expected increase in population resulting from operations of the proposed action is expected to be approximately 550 persons in 1995. The beneficial and adverse impacts to socioeconomic resources are discussed in Section 4.12, which addresses additional requirements for public services and increased economic benefits in the region. The proposed action would provide long-term employment for skilled and professional personnel. The average wages associated with these jobs ($27,650 for off-base military personnel and $45,220 for civilians) would place them in the upper 34

percent of annual 1984 household income for Santa Barbara County (USDC 1985a). It is anticipated that this high wage rate and accompanying tax revenues would have a positive overall impact on the provision of public services.

Comment No. 156: Summary of Potential Impacts to Human Health and Safety at the Proposed Bixby Ranch Development

There has been no proposal for development of housing at the Bixby Ranch submitted to Santa Barbara County. The potential health and safety impacts to areas outside of VAFB, including the Bixby Ranch, are discussed in Draft EIS Section 4.11, Health and Safety, which provides a summary of the Risk Assessment undertaken for the proposed action (Environmental Solutions, Inc. 1989). The conclusions summarized from the Risk Assessment note that present safety measures are sufficient to mitigate the potential risks to public health and safety from implementation of the proposed action based on current land use conditions. Additional information regarding potential health and safety impacts to the public are contained in responses to Comment Nos. 200 and 201 and in Appendix C of this document, Summary of Risk Assessment.

Comment No. 157: Mitigation Measures for Vegetation Impacts

The proposed mitigation measures for vegetation impacts are described in Draft EIS Section 4.3.4, Mitigation Measures. Proposed measures are extensive in nature due to the habitat value of the area and include:

- Specimen recovery by interested scientific parties.
- Construction pre-planning to avoid sensitive areas.
- Staking of sensitive areas for avoidance during construction and to minimize overall habitat loss.
- Biological monitoring during and after construction.
- Topsoil stockpiling.
- Revegetation with endemic plants.
- Soil stabilization measures.
- Erosion control and restoration plan.
- Acidic deposition monitoring.
- Exotic plant invasion control.

Additional mitigation measures, including potential compensation for lost habitat, may be developed in consultation with federal and state agencies as described in response to Comment No. 41.

Comment No. 158: Status of *Anniella pulchra*

The form of the California legless lizard (*Anniella pulchra*) local to the project area has not been classified as a species of concern by the California Department of Fish and Game. However, local forms of this species may be of concern in other regions of the state.

Comment No. 159: Status of Hazardous Materials Response Plan

The Hazardous Materials Emergency Response Area Plan was published in June 1988 by the Santa Barbara County Office of Emergency Management (SBCOEM). This document is currently undergoing revision for planned publication in late summer 1990 (Personal communication with SBCOEM 1990).

Comment No. 160: Hypergolic Propellant Transport Accident Rate

See response to Comment No. 144 for information on the hypergolic propellant transport accident rate.

Comment No. 161: Existing Vandenberg Air Force Base Economic Influence on Santa Ynez Valley

The most comprehensive description of the relationship between VAFB and surrounding communities available at the time of analysis was contained in:

> USAF 1987. Economic resource impact statement for Vandenberg Air Force Base, fiscal year 1987, prepared by Cost Branch, Comptroller Division, 4392nd Aerospace Support Wing, Vandenberg Air Force Base, California.

Updates to this document are available from USAF (4392nd Aerospace Wing, Comptroller Division, Vandenberg Air Force Base). Additional information regarding place of residence for the VAFB workforce is available from the 1980 Census of population. The census Journey to Work statistics (U.S. Department of Commerce 1985b; U.S. Department of Commerce 1985c) show that less than four percent of the VAFB work force lived in the Santa Ynez Census County Division (CCD) in 1980.

Comment No. 162: Description of Increases in Ground Water Overdraft

Draft EIS Section 4.2.1, Regional Impacts, notes that the potential increases in ground water overdraft attributable to project construction and operations are 290 and 305 acre-feet per year, respectively. These increases represent approximately 0.2 percent additional demand on ground water resources, a comparatively small amount. In addition, Draft EIS Section 4.2.1 notes that, while small, these increases in demand are significant due to existing overdraft. Mitigation measures are described in Draft EIS Section 4.2.4, Mitigation Measures, and discussed in the response to Comment No. 83.

Comment No. 163: Significance of Impacts to Venturan Coastal Sage Scrub

The criteria developed by Santa Barbara County for significance of impacts to vegetation such as Venturan coastal sage scrub are broadly defined as disturbance to, or loss of a known resource via one of the following:

- Grading and/or construction activities
- Vegetation removal
- Human and/or domestic animal encroachment
- Chemical pollution
- Noise pollution
- Landscaping with non-native invading plant species

(Santa Barbara County Department of Resource Management 1989).

Under Santa Barbara County criteria, any disturbance or removal of Venturan coastal sage scrub (by the methods noted above) would be determined to be significant. Applying these criteria to the impacts at the proposed or alternative sites would result in a determination of significance by Santa Barbara County. The analysis contained in the Draft EIS utilized a different set of criteria and is consistent with these criteria in determining that these impacts would not be significant since they represent disturbance to less than one percent of the combined communities of central coastal scrub and Venturan coastal sage scrub present on VAFB.

Comment No. 164: Significance of Impacts to Central Coastal Scrub

As noted in response to Comment No. 163, any disturbance or removal of vegetation such as central coastal scrub would be determined by Santa Barbara County to be significant. Applying these criteria to the impacts at the alternative sites would result in a determination of significance

by Santa Barbara County. The analysis contained in the Draft EIS determined that these impacts would not be significant since they represent less than one percent of the combined communities of central coastal scrub and Venturan coastal sage scrub.

Comment No. 165: Mitigation Measures for *Monardella undulata* var. *frutescens*

Mitigation measures proposed for the loss of endemic vegetation are contained in Draft EIS Section 4.3.4, Mitigation Measures, and are addressed in the response to Comment No. 157.

Comment No. 166: Significance of Potential California Least Tern Egg Losses

As stated in response to Comment No. 148, least tern egg losses are not expected as a result of the proposed action.

Comment No. 167: Significance of Potential Hearing Loss to Sea Otters and Pinnipeds

The potential for hearing loss in sea otters and pinnipeds is addressed in Draft EIS Section 4.4.1.3, Marine Mammals, where it is noted that best available information indicates that permanent hearing loss is not likely. Expectations are that impacts which may occur to hearing would be short-term (Chappell 1980). In addition, mitigation measures have been proposed, to ensure protection of the resource (Draft EIS Section 4.4.5, Mitigation Measures). The Draft EIS documents that potential short-term hearing impacts would not affect species viability and, therefore, would not be significant. See responses to Comment Nos. 42 and 67.

Comment No. 168: Significance of Potential Launch Impacts to Pinnipeds on San Miguel Island

The potential for mortality to pinniped pups is discussed in Draft EIS Section 4.4.1.3, Marine Mammals. Best available scientific information points to the limited probability of mother-pup separation occurring to pinnipeds on San Miguel Island as a result of launch-related noise (Stewart et al. 1988). In consultation with NMFS, a launch monitoring program has been proposed, to document potential impacts to the resource (Draft EIS Section 4.4.5, Mitigation Measures) and determine necessary modifications to mitigation measures. See response to Comment No. 1.

Comment No. 169: Significance of Potential Impacts to Burrowing Owl Habitat at Boathouse Flats Alternative Site

Although the burrowing owl has been observed near the Boathouse Flats site, Draft EIS Section 4.4.2.3, Boathouse Flats, notes that, due to the present degraded condition of the grassland habitat at this site, and the widespread occurrence of this habitat and its associated species elsewhere in the VAFB region, the loss of this habitat is not expected to significantly affect the viability of the species. Draft EIS Section 3.3.1, Regional Environment, notes that grassland acreage on VAFB totals approximately 18,650 acres. Table 3.3.1 notes that the Boathouse Flats site is made up of 130 acres of non-native grassland, which is approximately 0.7 percent of this type of non-native grassland on VAFB.

Comment No. 170: Significance of Potential Impacts to Brown Pelicans From the Boathouse Flats Alternative Site

The criteria for significance of impacts to wildlife are contained in Draft EIS Section 4.4, Wildlife. Section 4.4 notes that impacts to wildlife would be significant if they:

- Substantially diminish habitat for a terrestrial or marine species.
- Substantially affect a rare or endangered species of animal or its habitat.
- Interfere substantially with the movement of resident or migratory wildlife species.
- Interfere substantially with reproductive behavior.

Draft EIS Section 4.4.3.1, Marine Birds, notes that a temporary dispersal of California brown pelicans could occur as a result of construction activities. This dispersal is expected to be short-term, with the birds seeking alternate roost sites on offshore rocks in the Point Pedernales and Rocky Point areas or on the sandy beach near the mouth of the Santa Ynez River. This impact is insignificant when compared to the criteria stated above, since it would be short-term and alternative roost sites are available nearby.

Comment No. 171: Significance of Potential Impacts to Pinnipeds From the Boathouse Flats Alternative Site

A significant impact would occur if harbor seals were to permanently abandon areas near the Boathouse Flats site. However, as indicated in Draft EIS Section 4.4.3.2, Marine Mammals, there is no clear evidence that this abandonment would occur. Additional information regarding harbor seal response would be developed through the monitoring program described in response to Comment No. 1.

Comment No. 172: Mitigation Measures for Pinniped Breeding Season

Draft EIS Section 4.4.1.3, Marine Mammals, discusses potential launch-related impacts to pinnipeds on San Miguel Island. On the basis of a maximum of one launch during the breeding season, breeding statistics, and normal mother-pup behavior (Stewart et al. 1988), the risks and potential consequences of mother-pup separation are small. In light of this finding, it is not necessary to restrict launches during this period. In addition, potential impacts to pinnipeds from project launches during breeding season would be minimized through the proposed monitoring program.

Comment No. 173: Significance of Air Quality Impacts

The criteria that were established to determine significance of potential air quality impacts are contained in Draft EIS Section 4.5, Air Quality and Meteorology. An impact is considered significant if it causes:

- Violation of an ambient air quality standard.
- Contribution to an existing or projected air quality violation.
- Exposure of sensitive receptors to substantial pollutant concentrations.

As noted in the text of Section 4.5, these criteria would not be violated.

Using Santa Barbara County standards for significance of 2.5 pounds per hour for non-attainment pollutants and 5.0 pounds per hour for attainment pollutants, emissions from the proposed action would be considered insignificant since threshold limits would not be violated. Calculated values (from Draft EIS Table 4.5.2, page 4-59) are as follows:

Criteria Pollutant	Emission Level (Pounds per Hour)
Nitrogen Oxides	1.16
Sulphur Dioxide	0.004
Carbon Monoxide	0.17
PM_{10}	0.02
Reactive Organic Compounds	0.05

Comment No. 174: Use of CFC-22

Comment noted.

Comment No. 175: Significance of Stratospheric Ozone Impacts

The incremental cancer risk falls below the commonly acceptable level of one excess cancer per one million persons used for environmental risk analysis. The potential for increased cancers is noted in Draft EIS Section 4.5.4.4, Environmental Consequences of Stratospheric Effects, where potential effects are calculated on a world-wide basis. The expression of the incremental cancer risk that may occur as a result of the proposed action as 5 per 100 million persons is a commonly accepted method of describing risk. It is appropriate in this utilization, as it communicates the magnitude of the risk in an easily understandable form. See response to Comment No. 141.

Comment No. 176: Discussion of Casmalia Waste Disposal Facility in Cumulative Impacts

Including a discussion of the status of the Casmalia Class I hazardous waste disposal site would not be applicable to the proposed action. There are no plans to utilize this facility as a disposal site for potential project wastes.

Comment No. 177: Significance of Visual Impacts

See response to Comment No. 153.

Comment No. 178: Analysis of Potential Manzanita Road Borrow Site

Throughout the Draft EIS, the potential Manzanita Road Borrow Site is discussed to the extent necessary to evaluate expected impacts at that location. Due to its limited size and its location on the interior of VAFB, it is not prominent in the discussions contained in Chapter 4.0, Environmental Consequences and Mitigation Measures. The site was included in surveys for cultural resources, vegetation, and wildlife. It is highlighted in the discussion of potential

impacts to cultural resources since the cultural resources inventory determined that potentially important resources have been recorded there. The pages and sections where the Manzanita Road Borrow Site is discussed or referred to are:

Page	Section Title
2-23	Project Construction Activities
2-25	Project Construction Activities
2-57	Geology and Soils
2-68	Cultural Resources
3-33	Local Environment
3-49	Wildlife
3-112	Prehistoric Resources
4-110	Cypress Ridge
4-111	SLC-6
4-113	Boathouse Flats
4-114	Vina Terrace
4-119	Vina Terrace

Comment No. 179: Meaning of Last Sentence on Page 4-127

The sentence, "Health and safety impacts related to construction of the proposed action are not anticipated to present a higher risk potential than what would be expected for similar types of projects." was included in the regional impacts discussion of health and safety (Draft EIS Section 4.11, Health and Safety) to impart to the reader that construction of the proposed action does not present unusual risks to the public, and that impacts to health and safety are similar to those encountered in other large construction projects. Additional explanation regarding construction risks is contained in Chapter 3.0 of the Final EIS (page 3-19).

Comment No. 180: Expression of Hypergolic Fuels Transportation Accident Rate

See response to Comment No. 144 for information on hypergolic transportation accident rate.

Comment No. 181: Potential Excess Cancer Rate

The excess cancer rate shown for melanomas on page 2-70 of the Draft EIS is in error. The correct rate is 5 per 100 million persons, as shown on Draft EIS pages 4-75 and 4-134. The corrected text is contained in Chapter 3.0 of the Final EIS (page 3-9).

Comment No. 182: Summary of Risk Assessment

The Risk Assessment (Environmental Solutions, Inc. 1989) is a technical document and is summarized in Draft EIS Section 4.11, Health and Safety, in easily understood language, consistent with the President's Council on Environmental Quality Regulations (40 CFR Part 1500.8 *et seq.*). It is presented at a depth of detail appropriate to the significance of the impacts (40 CFR, Part 1502.2(b)). In addition, the Summary from the Risk Assessment is provided in Appendix C of this document. If more information is desired, the Risk Assessment is available from:

HQ Space Systems Division
HQ SSD/DEV
P.O. Box 92960
Los Angeles, California 90009-2960
ATTN: Mr. John Edwards
Telephone: (213) 643-0934

Text to be inserted into the Draft EIS addressing the availability of the Risk Assessment is contained in Chapter 3.0 of the Final EIS (page 3-20).

Comment No. 183: Regional Employment Multiplier

The Draft EIS calculates indirect employment for construction and operations in the following fashion:

	Direct Employment	Employment Multiplier	Indirect Employment	Total Employment
Construction	370	0.41	150	520
Operations	400	0.41	165	565

The source of the employment multiplier used is the Fiscal Year 1987 Vandenberg AFB Economic Resource Impact Statement (USAF 1987). The multiplier is based on empirical observation of employment at VAFB and the calculation of secondary jobs created (SJC) within the region of economic impact. In fiscal year 1987, VAFB employment from military funding was 10,466, comprised of military (3,936), civilian (1,479), contract civilian (4,992), and other civilian (50).

The SJC total of 4,309 was calculated as follows (USAF 1987):

$$SJC = \frac{RPAY \times (M-1)}{P_{RS}} + \frac{RCONS \times M}{P_{RS}} + \frac{RMAT \times M}{P_W}$$

Where:

M = Gross Income Multiplier (2.7759)
P_{RS} = Trade Service Sector Sales per Worker ($73,160)
P_W = Wholesale Sector Sales per Worker ($112,980)
RCONS = Estimated Labor and Services Expenditures Off-base in Economic Impact Region ($12,776,442)
RMAT = Estimated Materials and Equipment Expenditures Off-base in Economic Impact Region ($15,333,444)
RPAY = Estimated Payroll Expenditures Off-base in Economic Impact Region ($154,247,881)

These calculations result in a relationship between employment created within the region and base employment of 4,309/10,446 (SJC/Base Employment), resulting in an employment multiplier of 0.41. The Santa Barbara County multiplier would be expected to be different since it applies to the entire county.

Comment No. 184: Evaluation of Housing Impacts

Utilizing the data referenced in the Draft EIS, potential housing impacts to Lompoc and Santa Maria (expected locations for the majority of the in-migrants) can be evaluated in terms of percent change in vacancy rates. In January of 1988, the combined Lompoc and Santa Maria housing statistics showed a total of 31,705 housing units, with 30,312 units occupied and 1,393 vacant (California Department of Finance 1988), with a vacancy rate of 4.4 percent. The proposed action would create the demand for approximately 305 housing units during peak construction and 315 for operations. Subtracting these estimates from the total vacant units results in a projected vacancy rate of approximately 3.4 percent during both construction and operations. This value is higher than the minimum vacancy rate standard of two percent developed by U.S. Department of Housing and Urban Development as providing residents of housing market areas with adequate rental choices (HDR 1981).

Comment No. 185: Significance of Impacts to Community Services

The criteria utilized to determine the significance of impacts to community services are contained in Draft EIS Section 4.12, Socioeconomics, as follows:

- Substantial growth or concentration of population.
- Displacement of a large number of people.
- The need for substantial new housing.
- The need for additional utilities distribution facilities.
- Shortages in public supply of water, energy, and/or services.

As described in Section 4.12.1.1, Cypress Ridge, socioeconomic impacts are expected to be relatively small. Population growth is expected to be one percent or less of projected 1995 populations of impacted areas. This potential growth is dispersed throughout local communities and is less than historical growth rates, where from 1980 to 1986 Lompoc, Santa Maria, and Solvang each experienced average annual growth rates of approximately 3.1 percent, 4.9 percent, and 4.3 percent, respectively. Demand for housing during construction is expected to be approximately 15 percent of existing vacant units in Lompoc and Santa Maria, which would decrease underutilization of this resource without large displacement of persons or the need for substantial new housing. Operations-related housing demand is likely to increase the need for single family housing units. The latitude to accommodate this type of demand is evident in land use plans where land is zoned for future single family residential growth (Santa Barbara County Cities Area Planning Council, 1985; 1987). In addition, the City of Lompoc controls rezoning of land and may determine not to rezone additional areas. If this were to occur, growth would shift to a different area within the region.

As noted in Draft EIS Section 4.12.1, Regional Impacts, related demands for additional public utilities and services are not expected to require the construction of new water, waste treatment, energy generating, or distribution facilities. Incremental demands for additional public services such as police and fire staff are expected to be limited (see Table 4.12.2, Operations Employment Public Service Impacts) and offset by growth in the tax base as a result of new residents.

Comment No. 186: Potential Impacts to Land Use

See response to Comment No. 185.

Comment No. 187: Opinion on Nonconcurrence of Impacts

Comment noted. Commenter's opinions of nonconcurrence regarding mitigation of impacts and long-term effects are addressed in responses to specific comments.

Comment No. 188: Significance of Impacts to the Lompoc Terrace Ground Water Basin

As noted in Draft EIS Section 4.2.2, Local Impacts, the demand for an additional 45 acre-feet of water, while minor in volume, would be significant, as the Lompoc Terrace aquifer is in overdraft condition.

Comment No. 189: Significance of Impacts from Project-Induced Growth

See response to Comment No. 185.

Comment No. 190: Significance of Impacts Related to Stratospheric Ozone Depletion

See response to Comment No. 141.

Comment No. 191: Significance of Impacts to Wildlife

See responses to Comment Nos. 148, 166, 167, 168, 169, 170 and 171.

LETTER 12

CITY OF
LOMPOC
VALLEY OF FLOWERS

September 19, 1989

Mr. Robert Mason
H.Q. Space Division/Dev
P.O. Box 92960
Los Angeles, CA 90009-2960

Dear Mr. Mason:

Thank you for providing a public hearing and review of the SLC-7 project Draft EIS in Lompoc last week.

[192] Our concern is that the construction workers population estimate of 25% Lompoc, 75% Santa Maria, is not an historically sound assumption. we believe the split is more likely to be 50%-50%, plus or minus 5%.

Our comments of May 16, 1989 should be considered as you proceed, particularly as related to County road monies/Gann spending limit vs. already poor road conditions surrounding Lompoc.

Thank you for this opportunity to comment.

Very truly yours,

King Patrick Leonard
Planning Director

KPL:mv

cc: Jeremy Graves, Associate Planner

CITY HALL, 100 CIVIC CENTER PLAZA, P.O. BOX 8001, LOMPOC, CA 93438-8001
(805) 736-1261; FAX: (805) 736-5347

RESPONSE TO LETTER 12

Received From: King Patrick Leonard, Planning Director, City of Lompoc

Comment No. 192: Construction Worker Population Ratio

The percentages stated in Draft EIS Section 4.12, Socioeconomics (Lompoc Valley, 25%, Santa Maria Valley, 75%), were not in reference to the settlement patterns of construction workers but refer to the distribution of indirect jobs that would result from local construction expenditures.

LETTER 13

VANDENBERG VILLAGE
COMMUNITY SERVICES DISTRICT

Pride In Community Involvement

DIRECTORS:
J. W. Sutherland
H. E. Grantz
P. C. White
R. L Fisher
L. P. Manton

MANAGER:
R. W. Brett

August 28, 1989

HQ Space Systems Division
P.O. Box 92960
Worldways Postal Center
Los Angeles, California 90009-2960

ATTN: Mr. John Edwards

Subject: Draft Environmental Impact Statement
Construction and Operation of Space Launch Complex 7

Water is perhaps the most critical environmental issue in this region, yet it receives scant mention in three separate locations in this E.I.R.

[193] This E.I.R. describes a consequence of this project as increasing the water usage in the Lompoc Valley by 176 acre-feet per year (section 4.2.3.2). However, it completely fails to address the environmental impact of this project on the local water basin - the Lompoc Plain aquifer which is severely overdrafted.

This aquifer was overdrafted 7990 acre-feet during the last six water years (July 1 through June 30), a very critical situation. The City of Lompoc is committed to provide water from this same overdrafted aquifer for the Allan Hancock Campus, the WYE area, Spaceport Museum and for the several hundred additional homes under construction or approved for construction. This aquifer is so overdrafted and over-committed that there is serious doubt that it can provide the water required for this project. This must be covered in this E.I.R.

The additional water consumption that would result from this project greatly exceeds the threshhold of significance established by Santa Barbara County.

[194] This E.I.R. must be expanded to discuss and define the specific impacts and their mitigation on both the Lompoc Plain aquifer and the Uplands aquifer due to this project. The increasing overdraft of the Lompoc Plain aquifer results in additional water being drained from our Uplands aquifer as a consequence.

For specific details on the extent of this overdraft, I refer you to Table 7 on page 32 (copy attached) the eleventh annual report, dated June 14, 1989 on the Water Supply Conditions of the Santa Ynez Water Conservation District. This was prepared by

Stetson Engineers Inc.
224 Avenida Del Mar, Suite D
San Clemente, California 92672
(714) 492-2777

The sections of the subject E.I.R. that relate to water are totally unacceptable. They must be rewritten and expanded to define the environmental impact on the Lompoc Plain aquifer.

This environmental impact is of critical concern to all residents of the Lompoc Valley.

H. E. Grantz

Howard E. Grantz
President, Board of Directors
Vandenberg Village Community
Services District

cc Encl. (1)

Table 7

ESTIMATED ANNUAL CHANGE IN GROUND-WATER STORAGE BENEATH THE LOMPOC PLAIN FOR THE PAST 10 YEARS AND CURRENT YEAR (1988-89)[1]

Water Year[2]	Change in Storage (Acre-Feet)	Accumulated Dewatered Storage at End of Water Year (Acre-Feet)
1977-78		14,420
1978-79	2,670	11,750
1979-80	-390	12,140
1980-81	-1,070	13,210
1981-82	-930	14,140
1982-83	3,680	10,460
1983-84	-1,630	12,090
1984-85	-2,480	14,570
1985-86	-510	15,080
1986-87	-150	15,230
1987-88	-870	16,100
1988-89[3]	-2,350	18,450

-7990 ACRE-FEET

[1] *Based upon dewatered storage estimated by U.S. Bureau of Reclamation, all values rounded.*

[2] *July 1 through June 30.*

[3] *Projected.*

RESPONSE TO LETTER 13

Received From: Vandenberg Village Community Services District
Howard E. Grantz, President, Board of Directors

Comment No. 193: Discussion of Impacts to the Lompoc Plain Aquifer

As described in Draft EIS Section 3.2.1.2, Ground Water, the Lompoc Valley contains the City of Lompoc and surrounding communities which receive their water from both the Lompoc Plain and Lompoc Upland ground water basins. Since both basins are water sources, it follows that the additional 176 acre-foot demand for water created by in-migrants to the Lompoc Valley due to operations of the proposed action would be supplied from both the Lompoc Plain and Upland ground water basins (see Draft EIS Section 4.2.1, Regional Impacts). Calculations of the potential additional demands to the two aquifers were combined to accommodate the uncertainties regarding the exact distribution of population increases related to the proposed action. See response to Comment No. 253 for additional information regarding ground water conditions.

Comment No. 194: Expand Discussion of Impacts to the Lompoc Plain and Lompoc Upland Aquifers

As indicated in response to Comment No. 193, the Draft EIS discusses impacts to the Lompoc Plain and Upland aquifers with as much detail as possible given the uncertainties about the potential choice of residence by project-related in-migrants. The results of the analysis contained in Draft EIS Section 4.2.1, Regional Impacts, show that the combined impacts to the Lompoc Plain and Upland aquifers, while not large as a fraction of demand, are significant due to the current overdraft conditions in these aquifers. Mitigation measures for water resources are discussed in Draft EIS Section 4.2.4, Mitigation Measures. Additional mitigation measures are discussed in response to Comment No. 83.

LETTER 14

BIXBY RANCH COMPANY
a California Limited Partnership

Fred H. Bixby, Founder • 1875-1952

Kenneth C Bornholdt
Senior Vice President
& General Counsel

September 8, 1989

HQ Space Systems Division
P. O. Box 92960
Worldways Postal Center
Los Angeles, California 90009-2960

Attention: Mr. John Edwards

Re: DRAFT ENVIRONMENTAL IMPACT STATEMENT
CONSTRUCTION AND OPERATION OF SPACE
LAUNCH COMPLEX 7

Gentlemen:

In May of 1988 at the NEPA scoping stage for Space Complex 7 (SLC-7) Bixby Ranch Company (Bixby) provided detailed comments on the environmental issues that should be addressed in the SLC-7 Draft Environmental Impact Statement (DEIS). Bixby's central concern was then and remains today that the Air Force consider fully and carefully the health and safety risks to present and future occupants of the Bixby Ranch property that immediately adjoins South VAFB, downwind and downrange of the four alternative Titan IV/Centaur launch sites. In Bixby's scoping letter dated 13 May 1988 (attached as Letter 10 at page A-83 of the DEIS) Bixby raised a number of important questions including the following:

> What are acceptable risk levels? How were those levels derived or developed? How do those risk levels compare to other similar hazardous operations (e.g., nuclear power facilities) in terms of impacts on surrounding property? What are the uncertainties with these risk levels?

As the Air Force addressed these and other questions, Bixby advanced several subjects for very specific consideration in the EIS including:

13. The EIS should analyze the impact of potential accidents on surrounding land uses currently existing and land uses foreseeable during the operational lifetime of SLC-7.

15. The EIS should include a discussion of all mitigation measures which will limit the impacts of the project on the health, safety and welfare of the present and future human and wildlife populations on the base and surrounding area to a level of non-significance.

18. The EIS should include the size, shapes and locations of probable hazard footprint areas, based upon all possible launch factors, which will encompass all possible hazards associated with blast, sonic boom, noise, toxic fumes, debris impact and other hazardous situations.

[195] Bixby's letter formally offered the opportunity to the Air Force contractor, Environmental Solutions, Inc., "to meet with us, visit our property and review our development plans."

The response to Bixby's concerns in the DEIS is woefully inadequate and clearly fails to satisfy the Air Force's statutory obligations. The DEIS does little more than announce that future development of the Bixby Ranch property would place "structures and persons . . . within the launch range hazard [196] zone for operation at either the proposed or alternative sites, as well as other, currently active space launch complexes at South VAFB" (DEIS at p. 4-157). The DEIS then simply and impermissibly relegates that acknowledged problem to a separate proceeding in a separate time frame by stating:

> In its recently updated Safety and Hazard Risk Assessment, the USAF concluded that development at Bixby Ranch or other privately owned properties east of VAFB would be incompatible with the future of space operations and safety at VAFB. As a result, the USAF has begun a detailed study of the real estate interests involved in order to define a potential land acquisition, both of the Bixby Ranch property and other affected private lands near VAFB. The purpose of such a program would be to protect the USAF polar orbit capability for as long as it is needed. The USAF will continue to oppose any incompatible development through the local planning and zoning process.
>
> (DEIS at p. 4-157).

107

The additional launches could impact potential use of the Bixby Ranch properties. The federal government lacks the authority to regulate land use on non-federal lands to prevent encroachment of incompatible uses into launch Range Safety Zones, such as would occur with development of the Bixby Ranch. Therefore, under independent action, the USAF is engaged in preliminary activities to acquire lands which, under other ownership, could adversely affect the USAF mission at VAFB.

(DEIS at p. 4-160).

[197] Immediately following the last quoted text, the DEIS inexplicably announces that none of the alternative SLC-7 sites require mitigation measures respecting land use impacts. That this is not correct is clearly established by a document recently released by the Air Force which, curiously, is not mentioned at all in the DEIS references. The omitted document does not speak blandly of "incompatible uses," but rather of unacceptable human health and safety risks on the Bixby Ranch property. Surely such unacceptable human risks require Air Force mitigation measures for land use impacts.

The Air Force Must Address Risks to Present and Future Human Populations on Adjoining Lands

[198] The DEIS is fullsome in its treatment of risks to VAFB base personnel at other complexes and on-site contractors in all aspects of construction and operation of SLC-7, but it is much less than that in dealing with risks to human populations downrange and downwind of the base's boundaries. Only cursory attention is paid to emergency procedures for off-site populations during launch events. There is brief mention of clearing offshore areas of commercial and recreational vessels and of recommendations made for removal of non-essential personnel from offshore oil and gas platforms (DEIS at p. 4-174), and there is also mention of an agreement between VAFB and the County Parks Department, the County Sheriff, and the California Highway Patrol to close Jalama Beach County Park during launch events (DEIS at p. 3-126 to 3-127).

[199] It is noteworthy and troubling in light of the apparent judgment that has been reached about dangers to human populations on Bixby Ranch that no approach has ever been made

to Bixby about any agreement to protect human occupants present on Bixby's property. The DEIS should, therefore, explicitly state than no evacuation agreement has been reached with Bixby to protect human occupants of Bixby's property.

[200] Equally troubling is the failure of the DEIS meaningfully to address the health and safety risks to future residents of the planned cluster residential development on Bixby Ranch. The segments of the DEIS quoted above do state that such a development would be, in the judgment of the Air Force, incompatible with Vandenberg's space mission, but no information or analysis is provided on the nature and extent of the perceived risks or how they might be ameliorated. For [201] example, the Bixby request for hazard footprint information was ignored totally. All that is provided is the conclusion of incompatibility as determined by a "Safety and Hazard Risk Assessment" which is cryptically summarized in the DEIS (DEIS at pp. 4-127 to 4-137). Despite the DEIS offer to provide such Assessment, Bixby's request in its 13 May 1988 scoping letter that it be furnished copies of all documents used as references in the EIS and Bixby's recent specific requests in letters dated 9 August 1989 and 28 August 1989 (copies attached), such Assessment has not been made available to Bixby. Thus, Bixby [202] has been totally denied the opportunity to comment on an important conclusion in the DEIS. As a result, the DEIS process is fatally flawed.

Bixby has been furnished another significant document that does indeed address the human health and safety impacts at Bixby Ranch. In a "White Paper on Bixby Ranch Update," stamped 15 July 1988 but furnished to Bixby by the Air Force under a cover letter of 14 October 1988 (Bixby White Paper), the conclusion was reached that:

> "A developed Bixby Ranch would present a quandary to the Center; full-scale evacuation would undoubtedly be impractical, so the options would be to accept an unprecedented degree of risk, or defer the operation for better wind conditions. Launch delays while waiting for favorable winds would be inordinately expensive, and in practice a whole range of vital launch azimuths would have to be eliminated. Accepting the risk is simply untenable - while most flights are successful, and a "winning streak" might hold for several launches, eventually a disaster will occur that the Air Force can not tolerate.
>
> (Bixby White Paper at p. 10)

For some reason the Bixby White Paper was not mentioned in the DEIS nor included among the 16 pages of documents referenced in Chapter 8 of the DEIS. In order that it may at least become [203] part of the record, a copy is attached to this comment letter. Attaching the Bixby White Paper to this letter, of course, does not redress the Air Force's failure to make the information and analysis available in the NEPA public commenting process.

In light of the conclusions in the Bixby White Paper the clear inference in the DEIS that over water launch azimuths at [204] Vandenberg of 150 to 201 degrees are safe is incorrect and should be clarified (See DEIS at p. 1-5). The Bixby White Paper shows that launch azimuths within those boundaries create unacceptable levels of risk to the public on Bixby property under Air Force launch criteria. Likewise, the statement that VAFB is the only location where southerly launches of large [205] boosters can be made at acceptable risk levels is not true when compared to the conclusions reached in the Bixby White Paper that such launches reach unacceptable levels of risk (See DEIS at p. 2-2). Finally, why would the Air Force conduct an acquisition study for the Bixby and other property if hazards [206] to public safety can be maintained at "acceptable levels"? These inconsistencies on core health and safety concerns must be addressed to meet the Air Force's NEPA obligations.

The Air Force Must Provide for Mitigation of Adverse Environmental Impacts

NEPA in Section 102(2)(C)(ii) imposes on federal agencies the requirement to prepare EISs for federal actions significantly affecting the human environment and requires that those EISs deal with "any adverse environmental effects which cannot be avoided should the proposal be implemented." The binding regulations of the Council on Environmental Quality fleshing out this language expressly oblige federal agencies to address mitigation measures. (40 C.F.R. §§ 1502.14(f), 1502.16(h)).

The Court of Appeals for the Ninth Circuit (which includes California) has underscored the importance of the mitigation requirement and the need for full EIS treatment of mitigation measures. Methow Valley Citizens Council v. Regional Forester, 833 F.2d 810, 819 (9th Cir. 1987) ("The Forest Service's EIS contains scattered pages in which they enumerate

possible mitigation measures and identify mitigation goals . . .[These are] lacking both a detailed description of required or possible mitigation measures, and any analysis as to the effectiveness of these measures"); Oregon Natural Resources Council v. Marsh, 832 F.2d 1489, 1494 (9th Cir. 1987) (Because the wildlife mitigation plan here merely lists measures to be used and includes neither an analysis nor an explanation of effectiveness, it is inadequate to satisfy the NEPA or Counsel [sic] on Environmental Quality mitigation guidelines"); Northwest Indian Cemetery Protective Association v. Peterson, 795 F.2d 688 (9th Cir. 1986).

[207] In the DEIS for SLC-7 the Air Force's omission is more egregious than that of any of the agencies in any of the above cited cases. The DEIS blithely states that no mitigation is required for land use impacts (DEIS at pp. 4-160 and 4-161). This, of course, is plainly wrong as the White Paper clearly demonstrates.

[208] The DEIS itself also demonstrates the error in its mention of the "independent action" and "detailed study" to be undertaken to acquire property interests near VAFB that otherwise would be incompatible with the Air Force's Vandenberg mission.

[209] Further, the fact the Air Force has begun a "study" of the possibility of purchasing Bixby's incompatible interests does not, in fact, minimize any potential environmental impact (See DEIS at pp. S-8, 2-71 and 2-78). The DEIS should not merely speak of a future study, the outcome of which is totally uncertain, and all references to that study should be deleted (See DEIS p. 2-71, Sec. 2.4.13 and the second sentence of paragraph 2 of DEIS p. 2-78, Sec. 2.5.13).

[210] Finally, the statement in the DEIS that "no mitigation measures are proposed for Land Use" (Sec. 2.5.13 at DEIS p. 2-84) is totally unwarranted. Instead the DEIS should state that the Air Force must acquire such land interests as are needed to remove the adverse effects on the USAF mission at VAFB. The actual acquisition of incompatible land interests is a mitigation measure not a cumulative impact, and a "study" is neither one.

[211] In fact, the study of the Bixby property is done and the only appropriate mitigation measure for that property in light of it is to acquire the incompatible land interests or change the launch azimuths to eliminate the hazards.

Although the Air Force is contemplating some mitigation measures despite failing to recognize them as such, those measures are inadequate and are impermissibly proposed to be the subject of a separate, future proceeding. The following are only a few of the matters that should have been considered by the Air Force in the DEIS itself and that should be subject to NEPA's public commenting process:

[212] What, after all, is the hazard footprint and, within that footprint, what are the specific risks to present and prospective uses of impacted privately owned land?

[213] What measures are necessary to warn and otherwise protect the owners and occupants of potentially impacted private lands?

[214] To what extent will it be necessary to evacuate identified private lands during launch events and what measures should fairly be made respecting evacuations such as giving timely launch notices and compensating impacted landowners?

[215] Under what circumstances and with respect to what specifically identified lands will there be a need for a taking of private property interests in order to accomplish the Air Force's space mission while protecting human health and safety?

[216] In instances where such takings must occur, what should be the nature and extent of the takings with respect to each potentially impacted privately owned parcel of land?

[217] With respect to the possible future residential development on Bixby Ranch, the Air Force's mitigation obligations ought to be no less than those obligations imposed on the Navy when it considered the possible relocation of its Naval Oceanographic Program from Prince George's County, Maryland. In Prince George's County v. Holloway, 404 F. Supp. 1181 (D.C. Dist. 1975), the court held that the Navy failed to comply with NEPA when it failed to address "disturbing questions" about the availability at the proposed relocation site of adequate housing and schools for low- and moderate-income groups and racial minorities. In speaking to the Navy's NEPA obligations the court stated:

> Where, as here, adverse environmental effects are noted, the federal agency, as part of its statutory obligation to evaluate alternatives, must consider possible methods for ameliorating or mitigating the environmental impact at the site chosen.
>
> 404 F. Supp. at 1187.

The court specifically rejected the Navy's handling of the housing and schooling concerns separately from the EIS process that focused on the relocation project as a whole:

> One of the primary purposes of the Act was to prevent the very type of fragmented and compartmentalized analysis that occurred here. Instead, the statute directs that the agency employ a more integrated and comprehensive approach which takes account of the overall effect of the various projects.
>
> 404 F. Supp. at 1186.

[218] Surely, from the perspective of NEPA's explicit concern for impacts on the human environment, the Navy's need to consider the housing requirements of relocated personnel does not differ significantly from the Air Force's need to consider the health and safety implications for future residents of a housing development adjacent to South VAFB within the hazard zone. These housing impact questions are both clearly part and parcel of the total project impacts required to be considered by the two branches of the armed services.

The Alternative Safety Risks at Vandenberg and Cape Canaveral Must be Analyzed

[219] The DEIS discussion of alternatives is deficient because there is no analysis of the comparative safety of launches from Cape Canaveral and from VAFB. In several places the DEIS makes conclusory statements that crucial polar orbits cannot be "safely" achieved at Cape Canaveral which is purportedly constrained to azimuths between 35 and 120 degrees. In contrast the DEIS claims that VAFB allows "over-water" launch azimuths of 150 to 201 degrees, which by inference are branded "safe" (See DEIS at p. S-2, 1-5 and 2-35). That inference of safety is, however, totally destroyed by the Bixby White Paper as to VAFB launches within the referenced azimuths.

[220] Thus, the DEIS presents only unexplained, unanalyzed over-water assumptions of safety. What is required instead is a thorough analysis and comparison of the precise human health and safety risks at Cape Canaveral and VAFB. The unsupported conclusions in the DEIS are clearly insufficient.

The Air Force Must Take Account of Environmental Advantages of the SLC-6 Site

[221] If the proposed project is to go forward, the comparative environmental impacts expected at the four alternative sites strongly favor choosing the site of the existing SLC-6 facility. Entirely apart from arguments grounded on seeking to gain some benefits for the taxpayers for an expensive facility that has been moth-balled since the day of its completion, the use of the SLC-6 site would have the least impact on the environment. The choice of Cypress Ridge, Boathouse Flats, or Vina Terrace would disturb presently undeveloped lands and would also impair a valued visual resource from both offshore vessels and on shore sites such as Jalama Beach County Park. In contrast the SLC-6 site has already been altered by development, and Titan IV/Centaur launch facilities installed there would not be visible from Jalama Park (DEIS at pp. 3-97 to 3-99 and 4-101 to 4-104). The high values ascribed to California's remaining natural coastal landscapes argues strongly that only the most compelling of needs should result in their being sacrificed.

The only environmental impacts identified in the DEIS that are unique to SLC-6 involve the partial demolition of the existing facilities and the disposal of wastes generated by that demolition. Clearly the most significant of those impacts would be the need to dispose of hazardous waste generated by flushing hypergolic-contaminated fuel and oxidizer systems using a total of 82,000 gallons of liquid chemical. Although the residual liquid would have to be treated as a hazardous waste, the DEIS indicates that "if handled properly, the hazardous waste generated during the flushing activity would not have significant impact on the local environment" (DEIS at p. 4-89).

[222] Thus, the DEIS discloses no compelling argument against choosing the SLC-6 site and discloses no non-environmental reason favoring the other sites that would warrant the environment sacrifice that would ensue were any of the other sites chosen.

The Deficiencies in the DEIS
Oblige the Air Force to
Prepare a Supplemental DEIS

[223] In view of the serious deficiencies in the Air Force's compliance with NEPA the Air Force should complete its "study" (or admit that the Bixby White Paper is that study) fashion appropriate mitigation measures based on that study's outcome, and prepare an appropriate supplemental DEIS. Such is mandated by the Council on Environmental Quality regulations whenever "there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts" (40 C.F.R. §1502.9(c) (1)(ii); See Stop H-3 Association v. Dole, 740 F.2d 1442, 1463-65 (9th Cir. 1984) (holding that new information obligated the Secretary of Transportation to prepare a supplemental EIS in connection with a proposed highway)). Here the Air Force is clearly obliged to complete the gathering of the new information essential to fashion mitigation measures and then set forth in detail what mitigation measures are required and an analysis demonstrating their effectiveness. See Stop H-3 Association v. Dole, 740 F.2d at 1463 ("A federal agency has a continuing duty to gather and evaluate new information relevant to the environmental impact of its actions, even after the release of an EIS.")

[224]

[225] Once a supplement is prepared the Air Force must circulate and file it in the same fashion as the DEIS unless alternative procedures are specifically approved by the Council on Environmental Quality. 40 C.F.R. §1502.9(c)(4).

* * *

We appreciate the opportunity to comment on the DEIS and renew our previous offer to meet and review the serious safety issues that have been raised by this project but as yet not properly analyzed as to the Bixby property.

Very truly yours,

Kenneth C. Bornholdt

KCB/vja

WHITE PAPER

15 JUL 1988

ON

BIXBY RANCH UPDATE

I. OBJECTIVE. The objective of this paper is to present a perspective on the effects of a housing development on the Bixby Ranch adjacent to Vandenberg AFB, and to update the safety hazards assessment previously accomplished in 1983. The discussion following concludes that the potential hazards are more severe than those projected in earlier studies, due principally to a shift from Space Shuttle to expendable boosters of the Titan family, along with a significant increase in the total space vehicle launch frequency. We conclude that a residential cluster on Bixby property is basically incompatible with the national defense mission and should be resisted if the Air Force is to maintain the geographically unique Vandenberg AFB space launch port for high inclination/polar satellites.

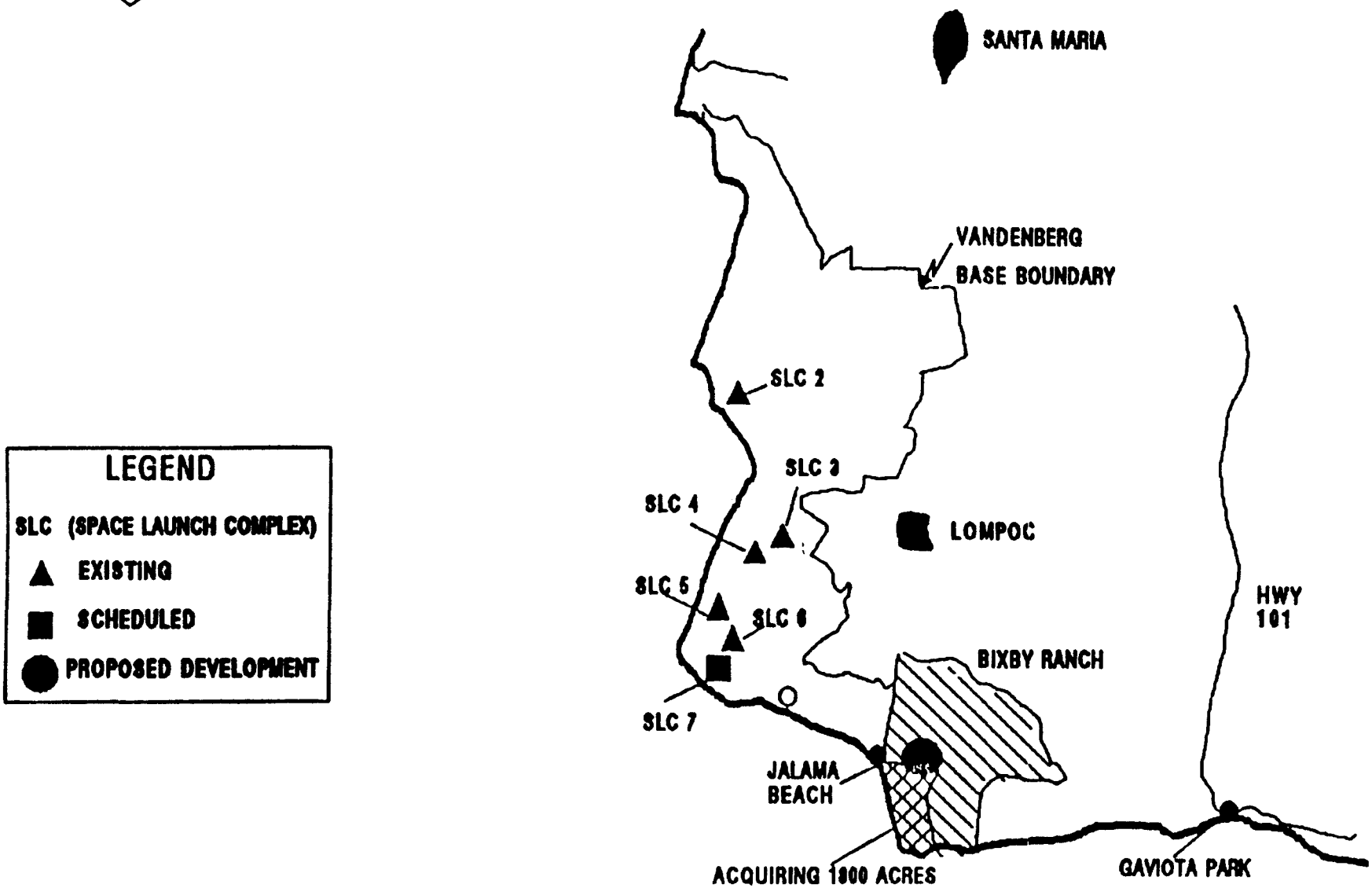
II. BACKGROUND.

1. BIXBY RANCH. The 23,700 acre Bixby property is comprised of two original Spanish land grants: the Jalama Ranch and the Cojo Ranch. There are 1800 acres additional on the ocean side owned by Chevron which the Bixby owners are negotiating for, which could bring the total property to 25,500 acres. It is zoned as 'Agricultural Preserve' (the Chevron parcel zoning also allows for oil production facilities) and is used today for cattle grazing. The Santa Barbara Countal Coastal Plan and Coastal Zoning Ordinance provide for cluster residential development on 2% of gross acreage. If a development plan is approved, Bixby could develop as many as 510 units on 510 acres including the Chevron parcel. Figure 1 shows the relationship of the Bixby property to the base with a marker indicating the likely location of the cluster, roughly 10 miles southeast of the launch facilities on Vandenberg. The Figure 1 also shows the location of Jalama Beach County Park, which for safety reasons is evacuated routinely for certain space launch azimuths today.

The foremost goal of Safety is to provide positive protection to life and property through controls on a missile or space booster launch. A real-time missile flight safety system has been developed and used for years to provide positive protection within prescribed Impact Limit Lines (ILL). The system is designed to trace, predict, and display vehicle flight performance in order to contain debris from destruct action within this ILL. The ILL must diverge outward from the main ground trace of the vehicle to account for debris scatter, wind effects, time delays for human response and relaying a destruct signal, and normal performance deviations of the vehicle itself. Inside of the ILL, positive protection cannot be guaranteed; for that reason, the ILL is constructed to exclude population centers to the extent possible, with special control measures such as evacuation for any remaining within it. The proposed Bixby development falls inside the ILL for most of the space launch systems at Vandenberg. The implications of this are described in more detail in the Risk Analysis section below.

2. PRIOR DEVELOPMENT PLAN. A development plan was proposed by the Bixby owners in the 1981 time frame for 470 residential units on 470 acres. The Air Force pursued three courses of action to counter this encroachment threat. First the Air Force objections to the proposed development were presented to

BIXBY DEVELOPMENT



DEVELOP.GEM 19 JUN 89

Figure 1

local government representatives. The objections on the basis of public safety were given at hearings before the Santa Barbara County Planning Commission, the Santa Barbara County Board of Supervisors and the California Coastal Commission. Separate meetings were held with staff members of the county and state commissions.

A second action was to meet directly with Bixby Ranch Company representatives, allowing a "one-on-one" discussion without debating the differences in public. Mutual concerns were discussed with a view toward finding a resolution of the development issue acceptable to the Air Force and Bixby. Lastly, headquarters (SAC, AFSC, and AF) were advised of the encroachment issue impact on capability at Vandenberg AFB and the possibility that a restrictive easement through condemnation proceedings would be required. The Bixby development plan was withdrawn by Bixby in 1983 because it did not meet the "clustering" requirement of the County Coastal Plan and Ordinance. The Air Force adopted the following approach in 1984 for Bixby Development:

(a) Establish a planning "wedge" in the outyear MCP.

(b) Take no further action pending Bixby submission of a revised plan.

(c) Make the "utmost effort to discourage and defeat a development plan through efforts with local government."

3. CURRENT BIXBY DEVELOPMENT. Bixby Ranch has reinitiated development planning and visited the Deputy Assistant Secretary of the Air Force for Installation (SAF/RI) office this past April to discuss the situation. Vandenberg AFB officials have not yet been contacted, nor has the Santa Barbara County Planning Commission received a new draft plan. We understand that the development concept involves nearly 500 single residences, 70 multi-family units, a golf course with a large adjacent lodge, and an airstrip. Very briefly, Bixby's process would involve submittal of a development plan to the county with a request to change the zoning to "ARC-Agricultural-Residential Cluster Overlay District," a type permitted by the Santa Barbara County Coastal Plan and Coastal Zoning Ordinance. The development plan would be accepted or denied by the County within one year, and numerous public hearings would be held during that time, and subsequently as the various subdivision maps are produced and acted on. The zoning change and approval of specific construction elements within the plan would come from the County. The California Coastal Commission would also have approval authority for various elements of the plan.

The Bixby development project would probably require at least two or three years from first notice to the county until necessary approvals can be obtained from the County Planning Commission and Board of Supervisors and the California Coastal Commission.

III. HAZARD DISCUSSION.

1. LAUNCH MODEL. Prior to the Challenger disaster in January of 1986, the Vandenberg space launch schedule was heading toward a workload involving three or four Space Shuttle launches per year, a smattering of smaller boosters such as Scout, and a phase-out through the 1980's of Atlas, Thor, and Titan family expandable boosters. The man-rated Shuttle -- which before January 1986 was

estimated to have a probability of failure one order of magnitude lower than for the large expendable booster types -- still created enough risk to a development project at Bixby Ranch that such a project was deemed incompatible. Most of the Shuttle exit azimuths were in an easterly direction and the impact limit line encompassed Bixby and other property out to Gaviota pass, about 25 miles down the coastline.

Today's projection into the 1990's shows increasing use of expendables, with 6 to 10 Titan II, Titan IV, and Titan IV/Centaur launches per year. Additionally, the likelihood of commercial expendables is growing, involving Atlas and Thor-family vehicles and new low-cost boosters such as those being developed by the American Rocket Company. The Air Force is also studying the need for very large vehicles at Vandenberg AFB in the 1990's, capable of payload of 90-100 thousand pounds, with projected high launch rates.

Summarizing, the launch rates in the 1990's are expected to be higher compared to projections made in 1981-1983. The vehicles will be complex launch systems like the Shuttle without the man-rated features. Because there is no other geographic location in the continental United States that permits launching in a southerly direction without overflying populated areas, Vandenberg AFB capabilities must be preserved. Bixby Ranch development is incompatible with the future mission model for Vandenberg AFB.

2. WEATHER. The hazards associated with booster flights can be assigned to four categories; debris, toxic exposure, secondary effects (smoke and fire), and sonic effects. Each of these is directly affected by prevailing weather conditions at the time of the prelaunch or launch activity.

The prevailing winds over Vandenberg are out of the west-northwest more than 90% of the time. Figure 2 depicts the east-west component of annual winds from the surface to 70,000 feet. Residents of this coastal region are familiar with trees and shrubs that all have a permanent leaning with branches canted to the southeast. Surface winds tend to be from the northwest, shifting around more to due west and increasing altitude.

With such prevailing winds, debris from a booster explosion is carried toward the southeast quadrant. While the impact locations of the fragments depend on many factors, the denser atmosphere at lower altitudes will exert the most influence on debris transport due to winds, and lighter fragments will be carried farther from the "vacuum" impact point than heavier pieces. For a Titan IV-class vehicle and the geometry of the launch site and Bixby development site, the period of endangerment will generally fall between 50 and 80 seconds of flight, and the significant fragments would be spread through a region on the order of 20 miles long and 6 or 8 miles wide. Figure 3 shows the debris dispersion for selected pieces from a destruct at about 50 seconds of flight with average winds, banana-shaped by the influence of the wind. The debris hazard is of vital importance in this examination, and is treated in more detail in the Section IV - Risk Analysis.

BIXBY RANCH UPDATE

VANDENBERG ANNUAL WIND PROFILE

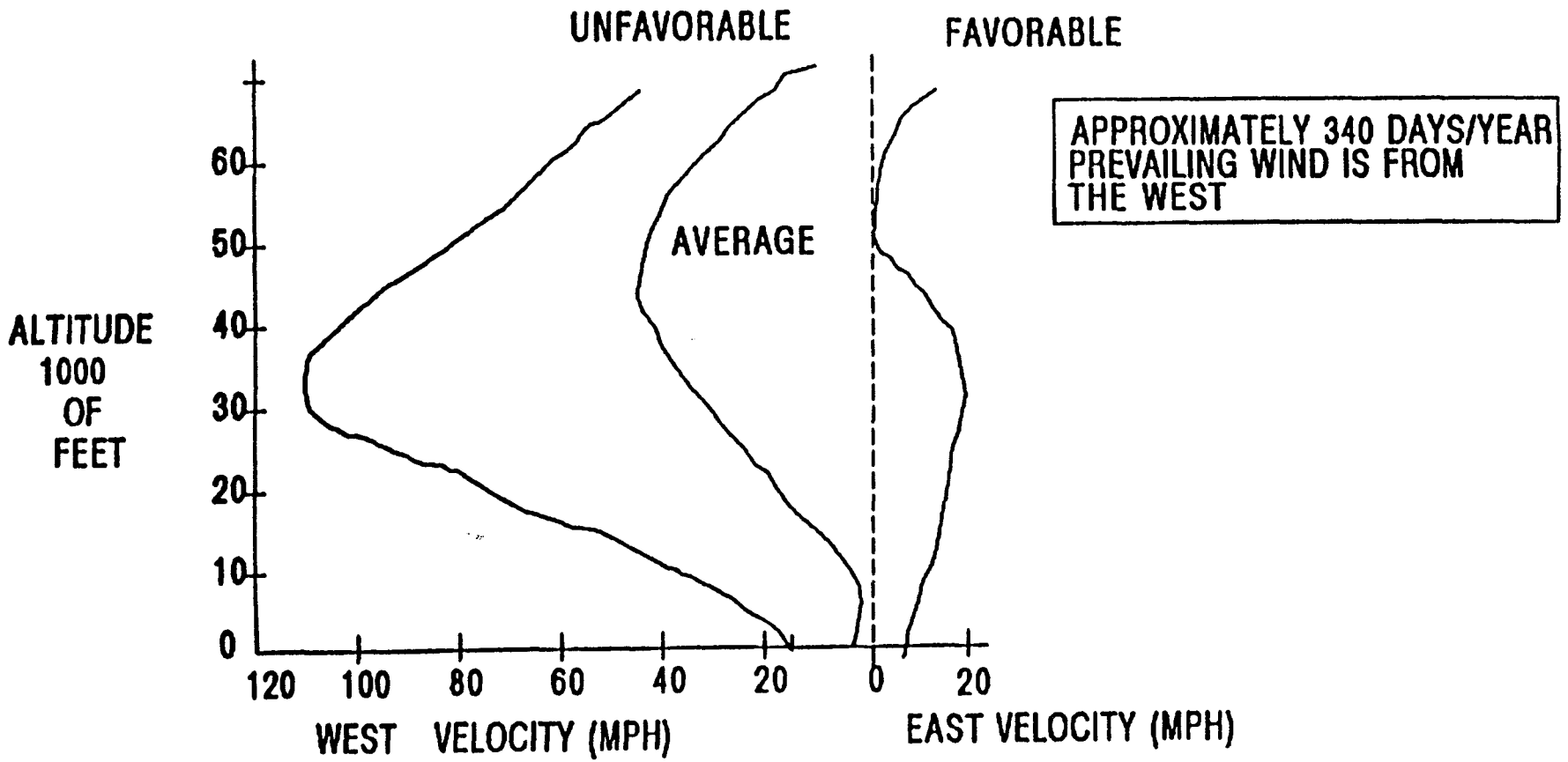


Figure 2

Titan boosters release toxic products to the atmosphere during normal performance which must be considered, and can release very large amounts in a catastrophic abort situation. During normal flight, the solid motors of the Titan 34D/Titan IV emit about 30,000 pounds of hydrogen chloride, a toxic gas that irritates the throat and respiratory system. If an explosion on or near the pad occurs, 200,000 pounds or more of HCL gas will be released in a short period of time, plus more than 10,000 pounds of vaporized, uncombusted liquid fuel and oxidizer, which are particularly hazardous. Because the AF Surgeon General has declared that the vapor from liquid propellants is potentially carcinogenic, public emergency exposure limits have been reduced for the fuel by factors of 80 to 120. Given the low level prevailing wind direction on South Vandenberg, toxic products from Titan facilities will be blown generally in the direction of the proposed Bixby development.

In addition, an explosion on or near the pad will initiate brush fires which will create a huge volume of smoke, less harmful but extremely irritating. The brush fires around the Titan pad following the accident in May, 1986 burned for over a day before being extinguished. Smoke was carried many miles to the southeast, and complaints were received from Jalama Beach and communities further down the coast.

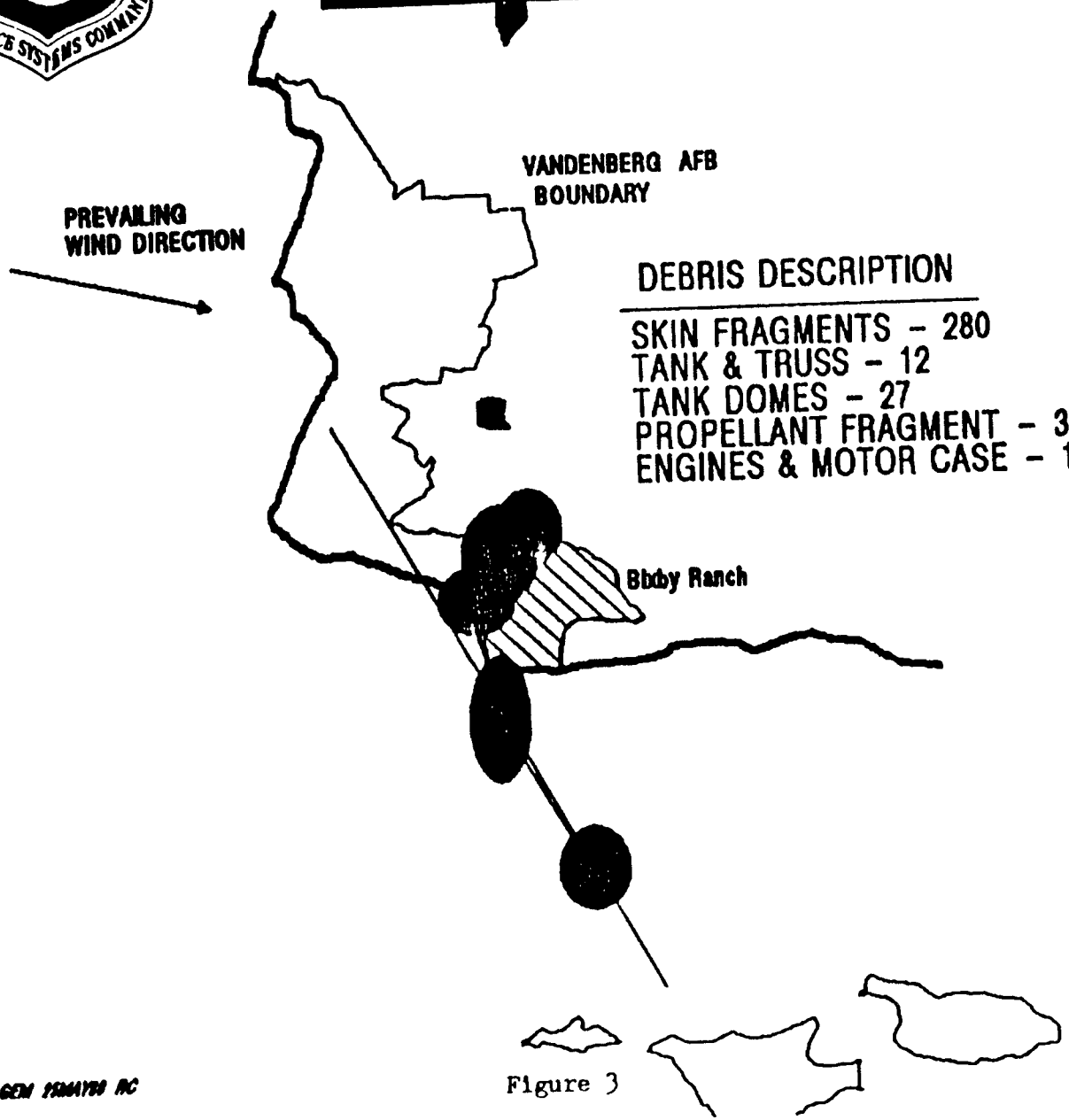
A vehicle could conceivably be destroyed at a point early enough in the trajectory where the debris cannot yet reach Bixby, but high enough in altitude such that the toxic gases are not a problem. Ground fires and smoke from impacting debris are still a serious concern in that case, and fires can consume many thousands of acres in the area's semi-arid environment before being brought under control, depending on the time of year.

Another frequent Vandenberg weather phenomenon, temperature inversion, enhances the transport of toxic propellants and smoke. These inversions, with bases between 900-1400 feet AMSL, act as a cap or lid over the ground layer, inhibiting vertical mixing. The net result is higher toxic concentrations carried further downwind when an inversion is in place.

Titan boosters generate considerable noise at liftoff, and mandated protection for the general public generally extends 5 or 6 miles out from the pad, not a serious problem with respect to Bixby. However, a catastrophic abort could result in a high-order detonation of the solid propellants, creating a shock wave. The shock wave could break windows up to 10 miles away, presenting hazards to persons near them. Furthermore, the very frequent temperature inversion condition at Vandenberg could focus the blast overpressure and increase the range of broken windows by a large factor.

3. RISK MANAGEMENT. The degrees of risk presented by debris, toxic, and blast overpressure are analyzed prior to launch using the actual weather conditions at both the Eastern and Western Test Ranges. If the risks are too high, the Center Commander will defer or scrub the operation until weather conditions change for the better. At Vandenberg AFB, conditions have been known to persist because of the unusual climatology, and missions have occasionally been scheduled and rescheduled numerous times to finally gain approval. Today's constraints mainly involve the city of Lompoc and its environs, to the northeast of the launch pad area, and do not present a major handicap to launch operations. The Bixby development, on the other hand, being downwind and downrange of the launch complexes, introduces an element of

Titan IV Failure



DEBRIS DESCRIPTION	RANGE OF WEIGHT (LBS)
SKIN FRAGMENTS - 280	5 - 60
TANK & TRUSS - 12	150 - 1,000
TANK DOMES - 27	1,000 - 4,000
PROPELLANT FRAGMENT - 3850	10 - 2,000
ENGINES & MOTOR CASE - 16	5,000 - 20,000

Figure 3

extremely high significance to risk management and acceptance.

IV. RISK ANALYSIS.

1. DEBRIS HAZARDS. The mechanism of greatest risk to people is from debris, as it can rain down without warning. Ordinary houses do not afford much protection from fragments. The debris impact pattern can only be described in a probab_lity distribution sense. A booster can self-destruct, or destruct commands can be sent to it by a Range Safety Officer observing an anomaly or off-course performance.

The ILL concept introduced above in Section II needs some further elaboration. The ILL establishes the boundary of positive control, but because it is defined long in advance of the launch it takes into account only the expected winds, maximum turn rates, nominal performance envelopes, and average margins for response delays. It is necessarily developed under the assumption that catastrophic destruction will occur at each point along the trajectory.

For the actual launch, an analysis of the risks must be undertaken for all of the people and property remaining within the ILL using the real failure rates and measured winds. The analysis must include people at tracking and instrumentation sites, power plants, the outside observers, and the off-base public. The analysis must show whether the launch can proceed, if certain areas need to be evacuated, or if the operation should be delayed awaiting more favorable conditions.

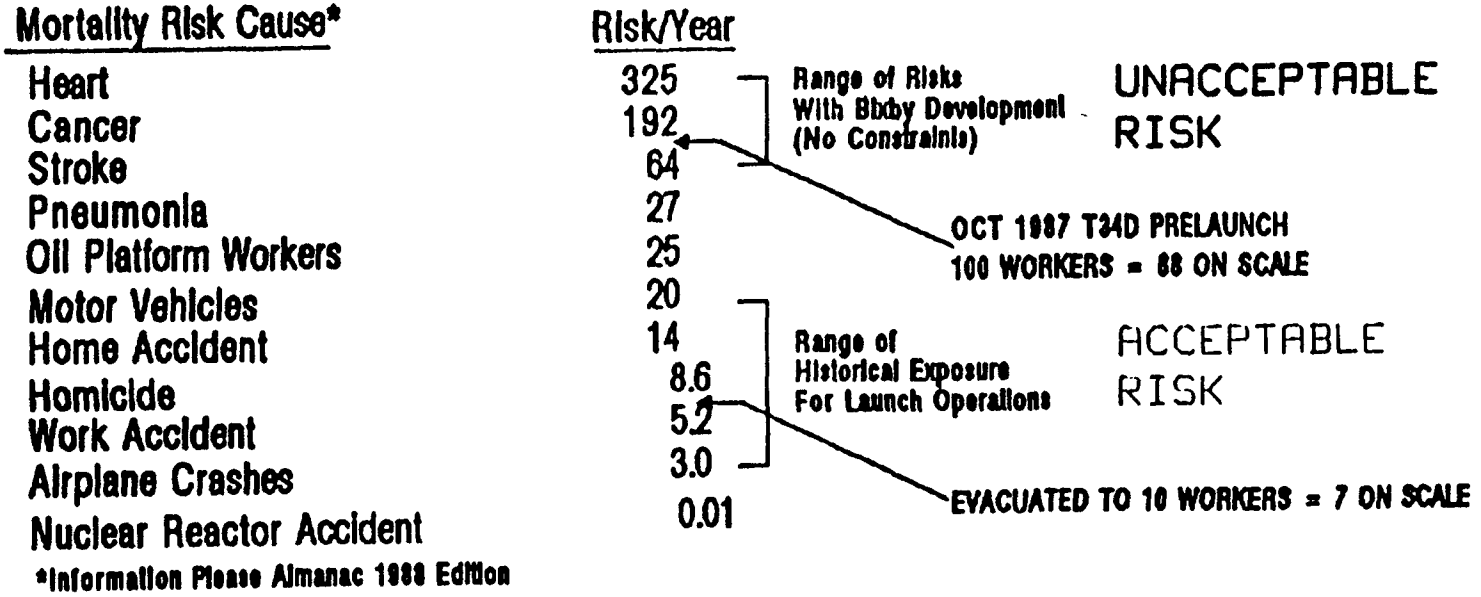
The major tool used to estimate these risks for ESMC and WSMC is the Launch Area Risk Analysis (LARA) computer program. LARA is a highly sophisticated program that integrates the specific flight trajectory with failure rates, wind conditions, lift and drag characteristics, debris distributions, and velocity changes from the explosion, to provide risk estimates on the ground. LARA provides individual and cumulative risks for all sites, and employs a library of populations as well as compensating for four levels of sheltering protection. LARA it provides the best estimate obtainable with what we know about modeling the process today. One can submit conservative inputs to LARA to arrive at a conservative estimate. For our studies in this paper, we have used average annual winds and the known failure rates of the launch vehicles. Moreover, the debris fragments are based on vehicle contractor analysis and exposure times are consistent with on-azimuth vehicle failures.

2. RISK ACCEPTANCE AND MORTALITY COMPARISONS. LARA is a vitally important tool for the Commander at launch time. An understanding of the meaning of the estimates it provides can be obtained from Figure 4, which lists the levels of risk from several hazards encountered in daily life. Note that the risks are scaled for convenience to an annual basis per 100,000 population. The bracket at the top of the list shows the range of risks that would be encountered regularly, using average winds and realistic failure rates, if Bixby were developed to a population of 1700 or more. By contrast, with roughly 50 persons total, Bixby undeveloped presently contributes less that one unit on this scale.

The arrows to the right in Figure 4 indicate risk levels predicted by LARA for workers on a specific oil platform for a Titan launch in October, 1987. The platform population of slightly over 100 workers presented a risk of 68 on this scale, unacceptable for launch approval. Evacuated down to 10 persons,

BIXBY RANCH UPDATE

MORTALITY RISKS PER 100,000 POPULATION IN THE UNITED STATES



*Information Please Almanac 1988 Edition

Figure 4

the risk esposure was reduced to the equivalent of about 7, and approval was given to launch. (NOTE: the request to evacuate and follow through was made possible by the lease agreements involving Vandenberg AFB operations managed by the Department of Interior, Minerals Management Service.)

For an Atlas operation in January of 1988 LARA indicated a risk to Lompoc that exceeded 50 when converted to this scale. The launch was scrubbed, restarted the next day, and the winds had shifted enough that the risks to the same area had dropped to 0.02 equivalence.

A developed Bixby Ranch would present a quandary to the Center; full-scale evacuation would undoubtedly be impractical, so the options would be to accept an unprecedented degree of risk, or defer the operation for better wind conditions. Launch delays while waiting for favorable winds would be inordinately expensive, and in practice a whole range of vital launch azimuths would have to be eliminated. Accepting the risk is simply untenable -- while most flights are successful, and a 'winning streak' might hold for several launches, eventually a disaster will occur that the Air Force can not tolerate.

3. SPECIFIC TRAJECTORY EXAMPLES. Sample LARA-derived products are shown in Figures 5 and 6 for two Titan operations. These are risk-contour plots indicating the influence of average winds over the Bixby area time-of-hazard. 'Unacceptable' on these charts means that the risks are in the upper bracket of Figure 4 and are in excess of an amount the Center Commander has ever approved in the past. Such risks would place the general public at a risk above their exposure in daily living.

As discussed above, the prevailing winds are such that the true 'line of acceptability' for the winds on launch day would be displaced to some extent east or west of the 'average.' However, it may not move very far in either direction, and the number of days waiting for favorable conditions is indeterminate. For some azimuths and launch window constraints, it is much longer than just a few days.

The critical space missions in the next decade require a projection of the frequency of use of various azimuths for the several Titan programs in the 1990's. By examining a series of LARA runs done originally for evaluating the hazards to offshore oil rigs, we estimate that 90% of all the Titan launches in the mid-90's would have the 'unacceptable' boundary enclosing the proposed Bixby development project for average wind conditions.

TITAN IV FROM SLC 4 – 160 deg AZIMUTH

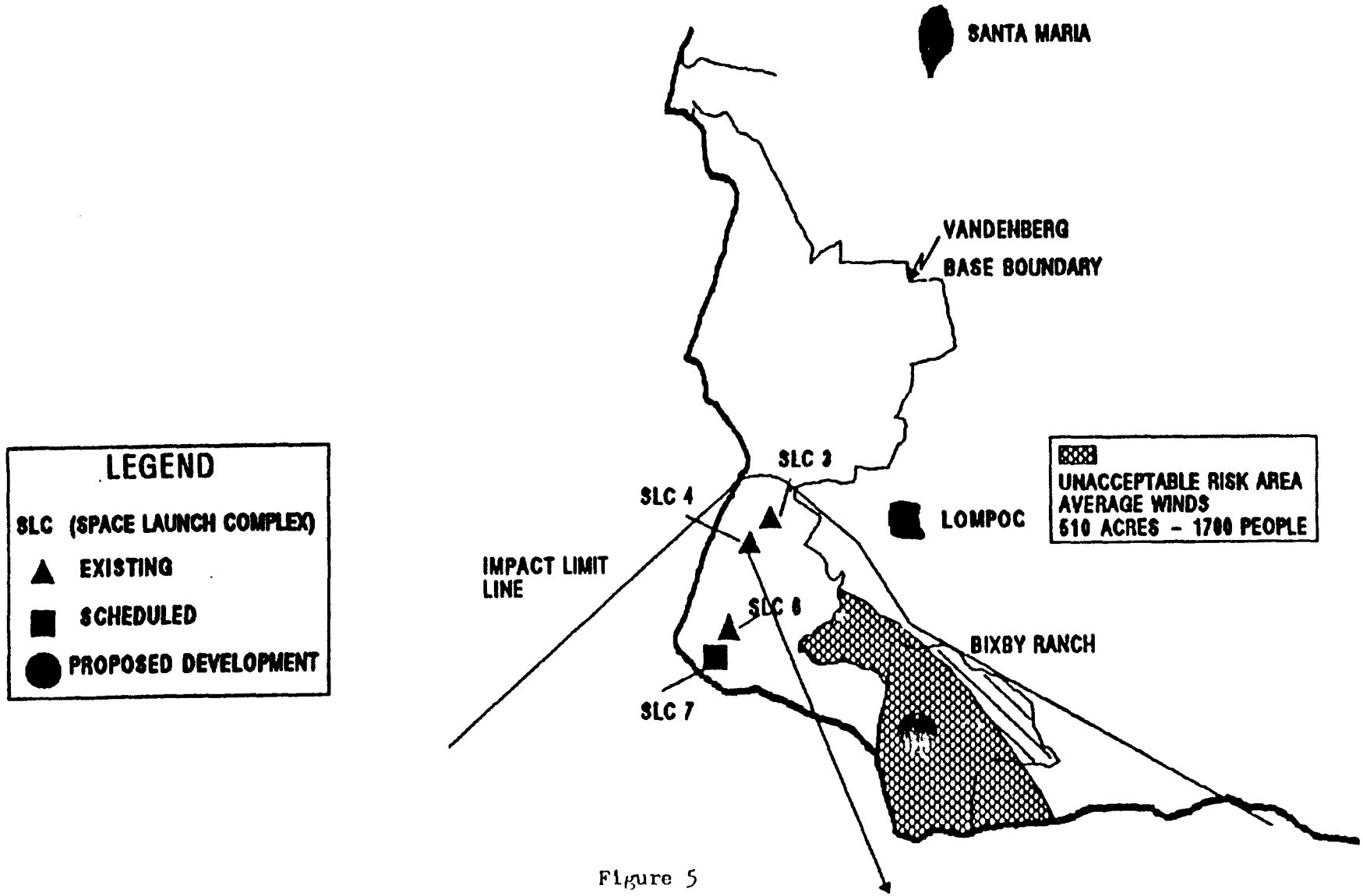


Figure 5

TITAN II SLC 4 – 172 deg AZIMUTH

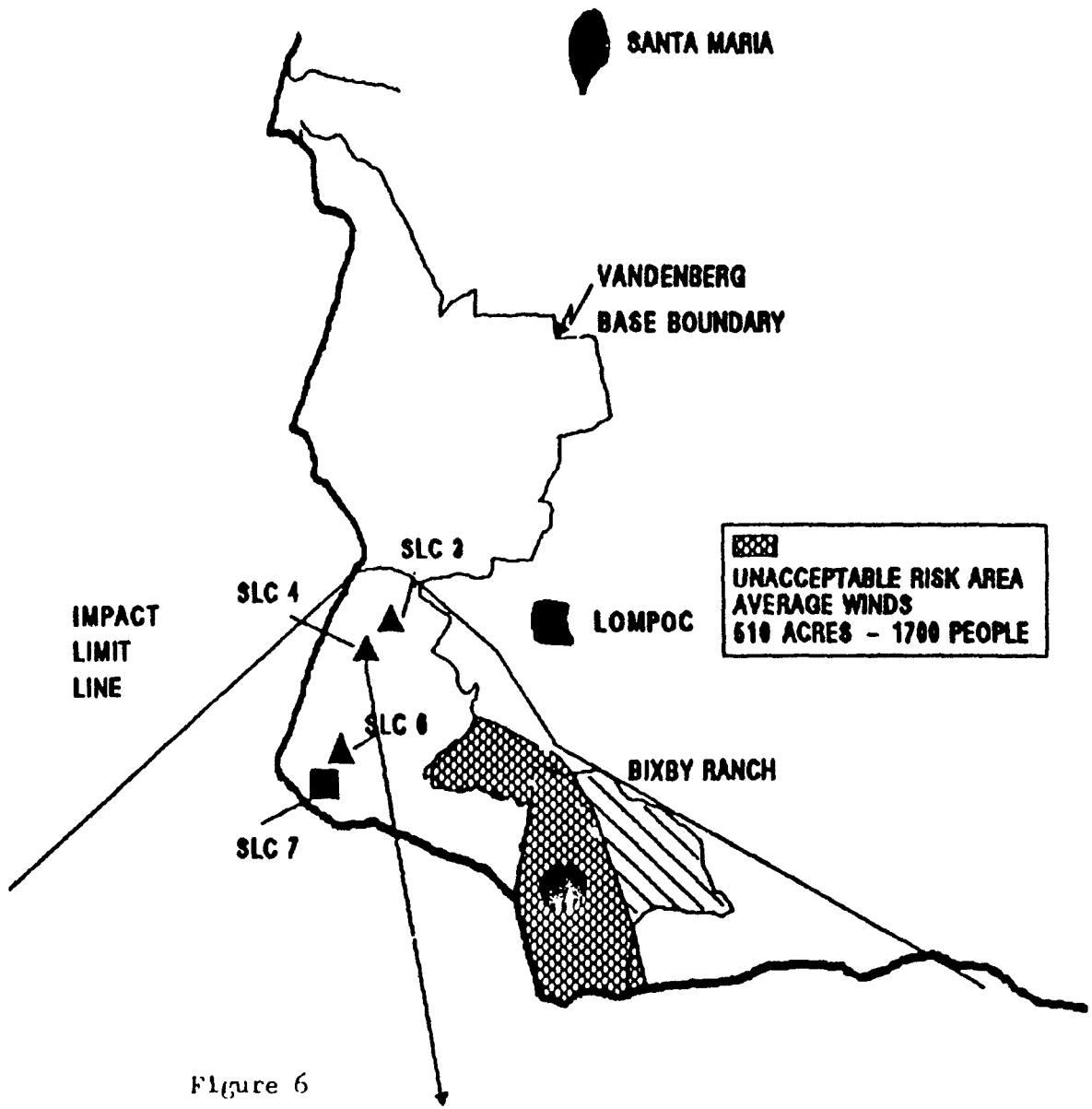


Figure 6

V. CONCLUSIONS.

The Bixby Ranch property is situated downrange and downwind from Vandenberg such that the hazard level is unquestionably high for the space launch business. It is difficult to imagine a worse location for a substantial number of people from the risk standpoint.

Over the years, we have become much more sophisticated in estimating risks at Vandenberg, and the inherent conservatism of the process has given way to a high degree of refinement in the way of models and computer programs. We do not believe it is overly conservative to state that a Bixby development would have far-reaching consequences on the space launch programs at Vandenberg AFB. Because Vandenberg is the only viable polar launch base in the continental U.S., the Bixby development would be a major impediment to the national military space program.

RESPONSE TO LETTER 14

Received From: Bixby Ranch Company (September 8, 1989)
Kenneth C. Bornholdt, Senior Vice President and General Counsel

Comment No. 195: Meeting with Bixby Ranch Company

On November 22, 1988, personnel from USAF and the project environmental contractor, Environmental Solutions, Inc., met with Bixby Ranch personnel (Kenneth Bornholdt and John Baucke) to visit the Bixby Ranch and discuss Bixby Ranch Company concerns.

Comment No. 196: Consideration of Real Estate Interest Acquisition in Separate NEPA Document

The CEQ Regulations (40 CFR Part 1508.25) provide guidelines for determining if actions are sufficiently interconnected to require evaluation in a single environmental document. Actions should be considered in a single environmental document if they are: (1) connected, (2) cumulative, or (3) similar. The appropriateness of consideration of real estate interest acquisition separately from the proposed action can be determined by the application of these guidelines.

Connected Actions. Actions are connected if they:

(i) Automatically trigger other actions which may require environmental impact statements.
(ii) Cannot or will not proceed unless other actions are taken previously or simultaneously.
(iii) Are interdependent parts of a larger action and depend on the larger action for their justification.

The construction and operation of the proposed action would not automatically trigger the necessity to obtain an interest in lands near South VAFB. There is no conflict between the proposed action and current land use plans, policies, or controls for the area of concern. The proposed action can proceed without any prior or simultaneous actions regarding such real estate interests. The project to acquire interest in lands south of VAFB predates the proposed action and is predominantly driven by launches from SLC-3 and SLC-4. Construction of a cluster development on Bixby Ranch property near Jalama Beach would severely inhibit launches from those SLCs, but would have a limited effect on the proposed action.

The proposed action can proceed without the acquisition of real estate interests in properties adjacent to South VAFB, since current population levels and population levels in the reasonably foreseeable future present acceptable risks. Only those projects that are reasonably definite and contemporaneous with each other need be considered in an EIS. If the Bixby Ranch or other properties adjacent to South VAFB were to be developed to a level far greater than current agricultural zoning allows, then the risks to the general population could increase to an unacceptable level. At this time, consideration of substantially higher levels of population is speculative, since a plan for development has not been submitted to the County of Santa Barbara or other government agency. Also, there are physical impediments to development, including the provision of services to the area, such as major road improvements and the supply of potable water. Any development plan is subject to considerable social and political controversy and could be denied during the agency review and approval processes required by the Santa Barbara County Planning Commission, the Santa Barbara County Board of Supervisors, and the CCC. While the Bixby Ranch Company may contemplate going forward with a development, they have not done so to date, and it is not especially likely that the necessary zoning changes will be enacted to enable them to do so.

These two potential actions are not interdependent parts of a larger action that depend on the larger action for their justification. These actions are not, for example, parts of a highway network that have utility only when considered as a part of the larger grouping. Each of these potential actions has independent utility and would represent a usable and reasonable expenditure without other considerations. Modification of SLC-6 or construction of a new complex to meet the objective of the proposed action represents a needed addition to the nation's space launch capability and is independent of the adjacent landowner's contemplated but not yet proposed plans. However, the real estate interest acquisition project will continue to be pursued whether or not the proposed action is implemented.

Cumulative and Similar Actions. In addition to not being connected, the potential real estate interest acquisition falls outside the scope the Draft EIS since it is neither cumulative nor similar to the proposed action. Together, the two actions are not expected to result in cumulatively significant impacts as they are dissimilar. One proposes the construction of a space launch complex, and the other proposes to acquire an interest in lands adjacent to South VAFB to protect the current mission at VAFB, regardless of implementation of the proposed action.

Comment No. 197: Mitigation Measures for Land Use Impacts

As stated in Draft EIS Section 4.11.5, Mitigation Measures, it was determined in the Risk Assessment (Environmental Solutions, Inc. 1989) that, at current population levels, USAF safety procedures mitigate risks to the public to an acceptable level. To prevent future potential high density residential development on the Bixby Ranch and other nearby properties, USAF has begun a detailed study of acquiring real estate interests in these properties. This action would prevent an unacceptable level of cumulative risk to the populations living in those areas. Otherwise, USAF could restrict launches to days with favorable wind conditions.

Additional information for insertion into the Draft EIS regarding mitigation measures for land use impacts is contained in Chapter 3.0 of the Final EIS (page 3-21).

The commenter does not provide a reference for the USAF document he referred to which addresses risks to the Bixby Ranch property. Therefore, a response to this portion of the comment cannot be made.

Comment No. 198: Emergency Procedures for Offsite Populations

Emergency procedures are discussed in Draft EIS Section 3.11.1, Regional Environment, at a level of detail that is consistent with the findings of the analysis undertaken for the Risk Assessment (Environmental Solutions, Inc., 1989), per CEQ Regulations (40 CFR Parts 1500.1, 1500.2, 1500.4, 1501.7, 1502.1, and 1508.26). See response to Comment No. 159 for the status of the local emergency response plan.

Comment No. 199: Evacuation Agreement Between USAF and Bixby Ranch

Since Bixby Ranch is located in Santa Barbara County, emergency procedures, including potential evacuations, are coordinated through the County as described in Draft EIS Section 3.11, Regional Environment. These procedures are considered adequate for reasonable protection of the public in the unlikely event of an accident.

Comment No. 200: Health and Safety Risks to Future Bixby Ranch Residents

Health and safety risks to current population levels and populations in the reasonably foreseeable future are addressed in the Draft EIS, Section 4.11, Health and Safety, and were found to be low. These risks are maintained at a low level since, as a part of its decision to

launch a vehicle, USAF evaluates risks to the general public at both the individual and collective levels and takes appropriate measures to avoid or minimize risks. Established USAF safety procedures for launches from VAFB are the following:

- Launches are not conducted when an individual member of the general public would be exposed to a risk of injury or death greater than one in one million.
- When collective risk from a single launch approaches 30 in one million (or three in one hundred thousand), WSMC/SE takes special precautions to protect the population at risk.

Utilizing this risk-minimizing approach, USAF ensures that risks to the general public are maintained at very low levels for both individuals and the collective population, regardless of population size or density.

Individual Risks

The highest allowable level of individual risk for a member of the general public to become a casualty during a launch at VAFB is one in one million. To ensure that risks are below this level, a one in one million casualty expectation contour (defining a Caution Zone) is established several weeks prior to a launch. The Caution Zone is defined using conservatively high estimates of wind effects and failure probability. Shapes and sizes of Caution Zones vary considerably for different ambient wind conditions, vehicles, and trajectories, but are typically oval or teardrop in shape, with a width of approximately one mile and a downrange extent of three to five miles. Caution Zones are generally contained within VAFB boundaries, and may extend to parts of the ocean where populations are controlled (for example, oil production platforms).

On the day of launch, the Caution Zone is reevaluated to confirm that it protects against an individual one in one million risk for the actual wind profile and failure rate associated with the planned launch. This analysis and defining the Caution Zone are accomplished by using highly sophisticated computer programs such as Launch Area Risk Analysis (LARA), which accounts for the factors that are known to influence debris scatter and impact patterns (see response to Comment No. 201). Because the one in one million debris individual risk contour is generally contained within VAFB boundaries, the off-base risk exposure is generally far below this value by one or more orders of magnitude (i.e., risks as small as one in ten million or less). Persons located on-base, such as the press and launch support crew, may be exposed to slightly higher individual risks during launches.

For purposes of comparison of launch risks to commonly accepted risks, the following table shows individual annual risks of death from a variety of causes and an individual's risk of death or injury from launch operations. To make this comparison, it is necessary to convert the risk from a single launch to risks that may accumulate over a year. In a worst-case analysis, it is conceivable, although highly unlikely, that a member of the general public could be at or near the edge of the Caution Zone (which defines the one in one million risk line) for a total of 10 launches in one year. If this were to occur, the individual would be exposed to the upper bound of permitted risk (one in one million) 10 times during the year, resulting in an accumulated risk of one in one hundred thousand, as shown in the table below.

ANNUAL SOCIETAL RISK RATES

Mortality Risk Cause	Risk/Year[1]
Heart	325.0/100,000
Cancer	192.0/100,000
Stroke	64.0/100,000
Pneumonia	27.0/100,000
Oil Platform Workers	25.0/100,000
Motor Vehicles	20.0/100,000
Home Accident	14.0/100,000
Homicide	8.6/100,000
Work Accident	5.2/100,000
Airplane Crashes	3.0/100,000
Worst-Case Accumulated Launch Risk	1.0/100,000

[1]Units are expected deaths

As the table shows, even in a worst-case situation, the maximum acceptable individual risk permitted by USAF over one year is one-twentieth of the risk of death from an auto accident for the same time period. This clearly illustrates that risks from launches represent a small incremental increase in an individual's total risk.

Collective Risks

Although the risks from a single launch to individual members of the public are small and typically much less than one in one million, USAF also considers the collective risks to persons within conceivable reach of debris.

Collective risk is the summation of the individual risks that persons would be exposed to during a launch. For example, if one million persons were strung out along the periphery of the Caution Zone on a launch, each with an individual risk of one in one million, the expectation is that, on the average, there would be one casualty for that launch.

Historically, no member of the public has been injured as a direct result of debris from a launch accident in roughly 70 years of combined ESMC (located in Cape Canaveral, Florida) and WSMC operations. Excluding the direct launch support personnel (who are under a separate, higher collective risk limit), normal WSMC/SE operating procedures restrict launch conditions or control populations to maintain the collective risk to the public for a given launch to below approximately 30 in one million.

Table 2.1 (Summary of Collective Risks from VAFB Launches in 1989) shows the actual collective risks to the public that have resulted from VAFB launches in 1989. This table shows that, in 1989, collective risks for most individual launches approached zero and for the entire year were 2.741 in one million, well below even the 30 in one million action level established for a single launch.

Additional material for insertion into the Draft EIS regarding health and safety risks is contained in Chapter 3.0 of the Final EIS (pages 3-10 and 3-11).

Response to Comment No. 201: Hazard Footprint

Health and Safety Risks to current population levels and populations in the reasonably foreseeable future are addressed in the Draft EIS, Section 4.11, Health and Safety. These risks were found to be low. However, the Santa Barbara County Local Coastal Plan allows higher-density residential development of the Bixby Ranch and other nearby properties. The process of securing rezoning and permits for higher-density residential development has not begun. To prevent this type of development, USAF has begun a detailed study of acquiring real estate interests in these properties. A study undertaken in support of potential real estate interest acquisition provides "hazard footprint" type of information for hypothetical future populations in areas south and east of South VAFB (TENERA 1990).

The TENERA report provides a summary of the methodology used to determine risks to off-base populations and examples of the risks that would be incurred to hypothetical future populations from a variety of launches. Prior to a launch, USAF assesses the potential effects

TABLE 2.1

SUMMARY OF COLLECTIVE PUBLIC RISKS FROM VAFB LAUNCHES IN 1989[1]

VEHICLE	MISSION TYPE	DATE	OFF-BASE RISK[2]
Minuteman III	Ballistic	1/25/89	0
Minuteman III	Ballistic	2/22/89	0
Minuteman III	Ballistic	3/7/90	0
Peacekeeper	Ballistic	3/19/89	0.044×10^{-6}
Small ICBM	Ballistic	5/11/89	0
Minuteman III	Ballistic	7/6/89	0
Minuteman III	Ballistic	7/11/89	0
Titan II	Orbital	9/5/89	2.64×10^{-6}
Peacekeeper	Ballistic	9/14/89	0
Minuteman III	Ballistic	9/26/89	0
AMROC	Ballistic	10/5/89	0
Minuteman III	Ballistic	11/7/89	0.03×10^{-6}
Delta Cobe	Orbital	11/18/89	0
Cumulative Collective Risk for 1989			2.714×10^{-6}

87-271 (7/5/90)

[1]Source: USAF 1990.
[2]Units are expected casualties which include deaths and injuries.

of the launch to off-base populations. As a result of this assessment, the launch may proceed as planned, be modified in terms of trajectory or other factors, require off-base population control, or be postponed. The hazards associated with a launch are: impacting hardware normally jettisoned during flight, debris impact resulting from a malfunctioning or destroyed vehicle, toxic chemical exposure associated with dispersing propellants, shock waves from an explosion, and sonic effects. "Hazard footprint" type information is descriptive of the debris impact resulting from a malfunctioning or destroyed vehicle (launch anomaly). This type of hazard is assessed by developing an impact limit line (ILL) and simulating a launch anomaly on the LARA computer program.

The ILL is a boundary which defines the area within which WSMC/SE attempts to provide positive protection from launch risks. Whenever possible, launches are allowed only when the predicted patterns of debris from potential destruction of a launch vehicle are contained within the ILL. The ILL is located by using the outer limit of predicted debris patterns generated during previous analyses of a collection of launch azimuths and modifying the line to exclude major population centers. Since the ILL describes the area within which most debris from a launch anomaly would be contained, it could be considered a "hazard footprint."

The LARA program divides the area bounded by the ILL into many subareas and calculates the risk in each of these subareas from a given launch. Important variables included in the LARA calculation include:

- Population densities in subareas within the ILL
- Wind direction and velocity
- Launch azimuth
- Vehicle type
- Launch site

The LARA program evaluation includes identification of areas of unacceptable risk within the ILL. The risks associated with each subarea are totaled to provide a cumulative risk associated with the launch. The output of the LARA program is the expected casualty (E_C) (including both injury and death) associated with a particular launch. As described in response to Comment No. 200, E_C values associated with launches are very low. Given the E_C for a particular launch, USAF may determine to proceed as planned, modify the launch in terms of trajectory or other factors, require off-base population control, or postpone the launch.

The TENERA report includes some examples of LARA evaluations for a variety of vehicles and launch azimuths from existing and proposed launch complexes on South VAFB. Their

analysis shows that, because of the relative nearness of the four alternative sites on South VAFB, a launch anomaly would produce similar results with regard to risks to a hypothetical Bixby Ranch residential development, regardless of the launch site chosen.

Figure 2.1, Results of LARA Analysis for Launch Azimuth of 192 Degrees from Cypress Ridge Site, shows the results of a LARA analysis of a possible Titan IV launch assuming a launch azimuth of 192 degrees and completion of the hypothetical Bixby Ranch development. The illustration shows that the analysis of these launch conditions did not result in the identification of areas of unacceptable risk to future hypothetical off-base populations. Figure 2.2, Results of LARA Analysis for Launch Azimuth of 153 Degrees from Cypress Ridge Site, shows the results of a similar launch, with the exception of a southeasterly launch azimuth of 153 degrees. Under these conditions, portions of areas south and east of South VAFB would present USAF with unacceptable risk under current safety standards if the Bixby Ranch development were to occur. As indicated above, since risks to hypothetical future populations do not appear to be sensitive to launch site location within South VAFB, these results can be expected to be the same for any of the TCLC alternative sites.

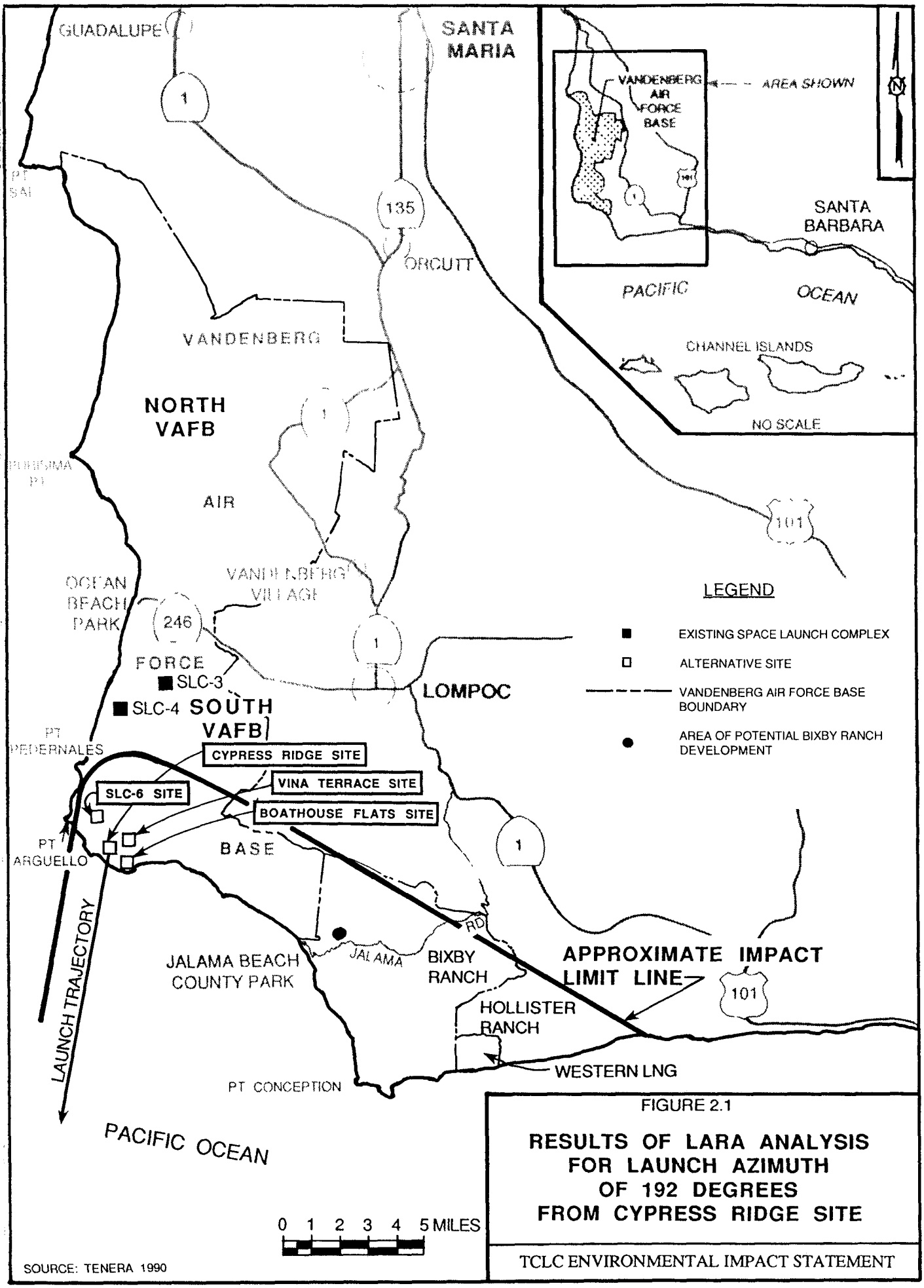
Comment No. 202: Availability of Risk Assessment

The Draft EIS provided information at a level of detail necessary to understand the potential risks to public health and safety. The Risk Assessment was sent to Bixby Ranch Company on September 8, 1989, to provide additional requested information. Per Bixby Ranch Company request, additional comments on the Draft EIS were accepted for incorporation into the Final EIS after the designated end of the public comment period. A Summary of the Risk Assessment is provided in Appendix C. Other references cited in the Draft EIS are available and may be obtained through the Freedom of Information Act (5 USC 552), consistent with CEQ Regulations (40 CFR Part 1506.6).

Comment No. 203: White Paper on Bixby Ranch Update

The White Paper (USAF 1988a) is a preliminary land use planning document that provides summary-level risk information about a number of VAFB programs and speculates about hypothetical impacts from potential future land development to existing programs at SLC-3 and SLC-4. The White Paper is provided in Appendix B. The Risk Assessment was undertaken and provided to the public to address these risks specifically for the proposed action and, as such, is a more recent and complete source of information than the White Paper.

87-271/FEIS REV 07/06/90



SOURCE: TENERA 1990

FIGURE 2.1

RESULTS OF LARA ANALYSIS FOR LAUNCH AZIMUTH OF 192 DEGREES FROM CYPRESS RIDGE SITE

TCLC ENVIRONMENTAL IMPACT STATEMENT

87-271/FEIS REV. 07/06/90

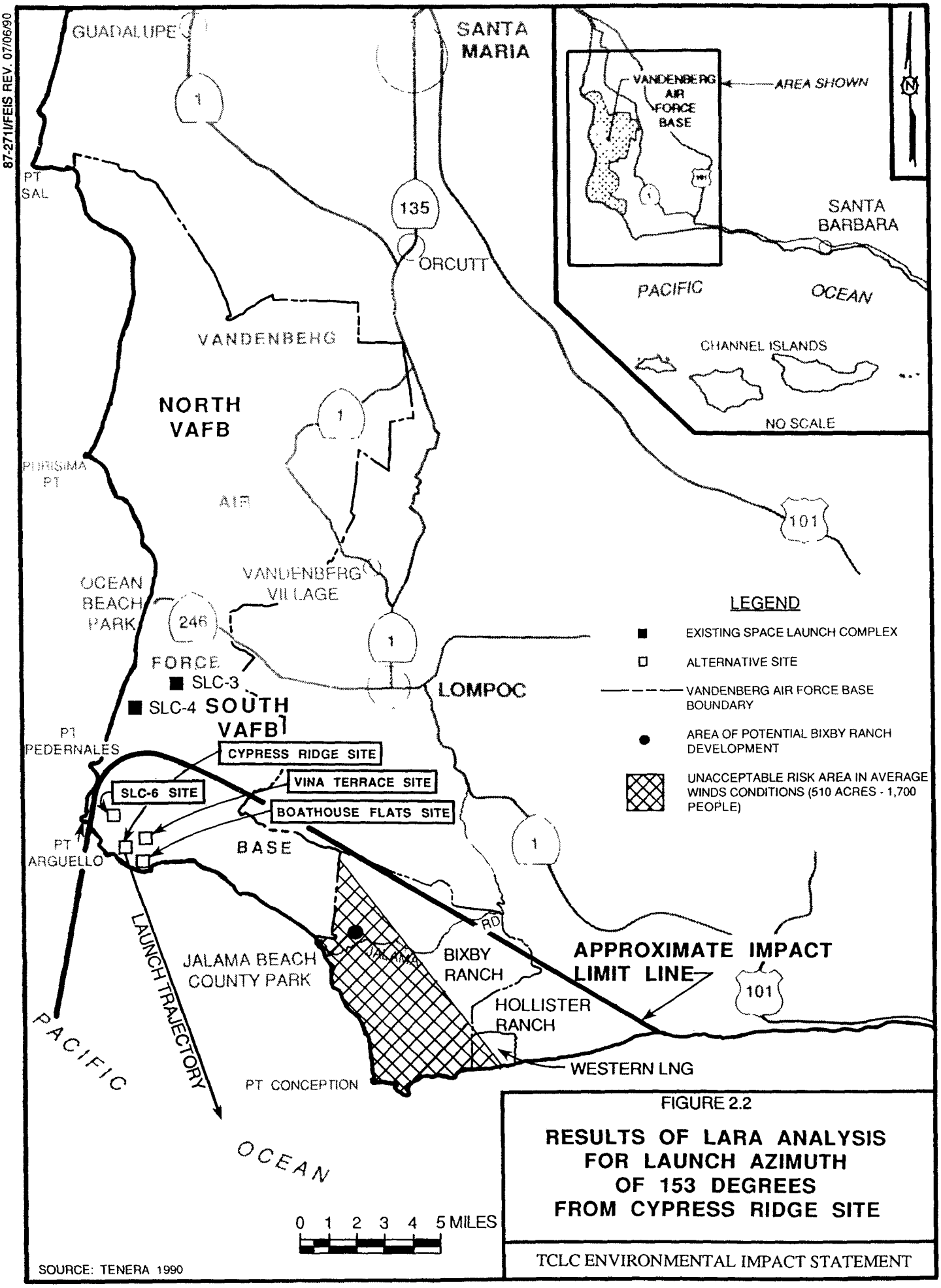


FIGURE 2.2

RESULTS OF LARA ANALYSIS FOR LAUNCH AZIMUTH OF 153 DEGREES FROM CYPRESS RIDGE SITE

Comment No. 204: Launch Risks

Launching Titan IV vehicles from South VAFB at azimuths from 150 to 210 degrees presents an acceptable risk to public health and safety at current and reasonably foreseeable future levels of population. See response to Comment No. 200. The White Paper (USAF 1988a) addresses the potential for higher levels of risk based on a hypothetical development scenario. It does not identify unacceptable levels of risk to VAFB operations at current population levels.

Comment No. 205: Launch Risks

See response to Comment No. 204.

Comment No. 206: Property Acquisition Study

Launch-related hazards exist at acceptable levels, given current population of the Bixby Ranch and adjacent areas. The hypothetical Bixby Ranch development would increase population levels markedly. Activities at VAFB are integral components of the national defense, so the USAF must plan for future contingencies even if they are not "reasonably foreseeable," as required by NEPA. Acquisition of real estate interests near South VAFB is one of several ways USAF can prevent development from encroaching and adversely impacting mission capabilities. The environmental impacts from potential real estate interest acquisition will be addressed in a separate NEPA document (see response to Comment No. 196). The USAF has opposed high density development of the Bixby Ranch property since plans were originally discussed in 1981 and has pursued three courses of action to prevent such development. First, USAF objected to proposed plans at hearings before the Santa Barbara County Planning Commission, the Santa Barbara County Board of Supervisors, and the California Coastal Commission. Second, USAF met with Bixby Ranch Company representatives to determine if a resolution to the development issue was possible. And last, USAF began to consider acquisition of an interest in properties near South VAFB.

After the Bixby Ranch plan was withdrawn in 1983, USAF adopted the following approach to the potential land acquisition:

- Establish a planning budget in a future year's military construction program.
- Take no further action pending Bixby Ranch Company submission of a revised plan.
- Continue to oppose development plans through the local planning process.

Bixby Ranch Company has not submitted a development plan. If such a plan were submitted, it would be subject to the local planning process as described in response to Comment No. 196.

In the meantime USAF has prepared a separate environmental assessment on a land interest acquisition program encompassing the Bixby Ranch properties. That document was published on July 20, 1990.

Comment No. 207: Mitigation Measures for Land Use

At present and reasonably foreseeable levels of population in areas near South VAFB, no mitigation measures are required. If high-density residential development were to occur in the Bixby Ranch or other nearby properties, additional mitigation measures may be necessary as discussed in response to Comment No. 197.

To provide an accurate record, it should be noted that the court cases cited here have been overturned on merit by the Supreme Court of the United States. Methow Valley was overturned in Methow Valley Citizens Council v. Regional Forester, 109 S. Ct. 1835 (1989). Oregon Natural Resources Council was overturned in Oregon Natural Resources Council v. Marsh, 109 S. Ct. 1851 (1989). Northwest Indian Cemetery Protective Association was overturned in Northwest Indian Protection Association v. Peterson, 108 S. Ct. 1319 (1989).

Comment No. 208: Mitigation Measures for Land Use

The independent action referred to in the Draft EIS is not a mitigation measure for the proposed action but, as mentioned in response to Comment No. 206, is one approach that USAF is utilizing to prevent potential encroachment near South VAFB. These properties are currently compatible with the proposed action, although they would become less so with VAFB's mission if they were significantly developed. See response to Comment Nos. 197 and 207.

Comment No. 209: Consideration of Land Acquisition in Separate NEPA Document

Environmental impacts of the proposed action are fully discussed in Draft EIS Chapter 4.0, Environmental Consequences and Mitigation Measures. The Draft EIS does not suggest that preliminary USAF activities to acquire land interests near South VAFB are mitigation measures for land use impacts of this present proposed action. Land acquisition around VAFB would be

for the purpose of preventing future encroachment which could impact launches from all of the SLC's, not to mitigate potential impacts from the proposed action. See response to Comment No. 196.

Comment No. 210: Mitigation Measures for Land Use Impacts

See response to Comment Nos. 197 and 206.

Comment No. 211: Mitigation Measures for Land Use Impacts

The analyses to support the potential acquisition of real estate interests near South VAFB have not yet been undertaken. Acquiring incompatible real estate interests would only be necessary if a plan for development were produced and approved and such development presented unacceptable risks to the general public. See response to Comment Nos. 197 and 207.

Comment No. 212: Hazard Footprint

See response to Comment No. 201.

Comment No. 213: Emergency Procedures for Offsite Populations

See response to Comment No. 198.

Comment No. 214: Evacuation of Lands Near South VAFB

At the current level of development and at reasonably foreseeable future levels, evacuation of these lands is not anticipated.

Comment No. 215: Acquisition of Lands Near South VAFB

The necessity to acquire real estate interests near South VAFB to prevent future encroachment from development will be determined under separate NEPA documentation, as described in Draft EIS Section 4.13.1, Regional Impacts. See response to Comment Nos. 196 and 206.

Comment No. 216: Acquisition of Lands Near South VAFB

See response to Comment Nos. 196 and 206. The necessary real estate interests near South VAFB would be defined in a separate action.

Comment No. 217: Mitigation Measures

See response to Comment No. 197. Additional information for insertion into the Draft EIS regarding mitigation measures for land use is contained in Chapter 3.0 of the Final EIS (page 3-21).

Comment No. 218: Mitigation Measures

The legal decision cited in the comment refers to the necessity to consider the impacts to housing and schools resulting from an influx of military personnel into an area. The development of the proposed action presents a different set of considerations, as impacts to potential future residents are, by definition, hypothetical. See response to Comment Nos. 197 and 217.

Comment No. 219: Launch Risks at VAFB and Cape Canaveral Air Force Station (CCAFS)

CCAFS is discussed as an alternative in Draft EIS Section 2.2.2.1, Existing Government Sites. CCAFS is eliminated from consideration in detail since, as indicated, safe launch azimuths are limited to between 35 and 120 degrees, which do not support the mission requirements described in Section 1.3, Purpose and Need for the Proposed Action. VAFB currently supports polar orbit launches with acceptable levels of risk. These impacts are discussed in proportion to their importance, per CEQ Regulations (40 CFR Parts 1500.1, 1500.2, 1500.4, 1501.7, 1502.1, and 1508.26). The White Paper referenced in the comment does not address existing levels of risk, or the additional increment of risk posed by launches from the proposed action. Its purpose is to discuss potential future additional risks related to the entire VAFB space program (and particularly SLC-3 and SLC-4) which could occur as a result of hypothetical development on lands adjacent to South VAFB.

Comment No. 220: Launch Risks at VAFB and CCAFS

See response to Comment No. 219.

Comment No. 221: Selection of SLC-6

See response to Comment No. 139.

Comment No. 222: Selection of SLC-6

See response to Comment No. 139.

Comment No. 223: Supplemental Draft EIS

As noted in response to Comment Nos. 196 and 206, the acquisition of real estate interests near South VAFB will be analyzed under other NEPA documentation since the potential actions are clearly separable. Since new circumstances or information have not come to light, it is not necessary to prepare a supplement to the Draft EIS.

Comment No. 224: Gather and Evaluate New Information

As noted in Draft EIS Section 2.5, Summary of Mitigation Measures, USAF recognizes the necessity of continuing to gather information about potential launch-related impacts to biota through a monitoring program. As additional environmental information is obtained, USAF will consider it in accordance with AFR 19-7 (Environmental Pollution Monitoring).

Comment No. 225: Draft EIS Supplement

As described in response to Comment No. 223, a supplemental Draft EIS will not be necessary to fulfill the requirements of NEPA.

LETTER 15

BIXBY RANCH COMPANY
a California Limited Partnership

Fred H. Bixby, Founder • 1875-1952

Kenneth C. Bornholdt
Senior Vice President
& General Counsel

October 6, 1989

Mr. Robert C. Mason, AICP
HQ SSD/DEV
P. O. Box 92960
Los Angeles, CA 90009-2960

Re: Risk Assessment Supplement to
Draft EIS for SLC-7 at
Vandenberg AFB (September 1989)

Dear Mr. Mason:

[226] We have reviewed the above-referenced document with the SLC-7 Draft EIS and have concluded (i) that it does not support the conclusions reached in the Draft EIS (e.g., see: pp. S-2, 2-69, 4-130) that Vandenberg AFB is the environmentally preferred site and all health and safety impacts are analyzed therein, and (ii) that it does not in any way cure the defects [227] noted in Bixby's comment letter dated 8 September 1989. For the reasons stated herein, when the Risk Assessment is read together with the Draft EIS and the White Paper on Bixby Ranch Update dated July 15, 1988 ("Bixby White Paper"), the Draft EIS is clearly incomplete and inadequate for several reasons.

[228] The principal defect in the Draft EIS exists because the Risk Assessment assumes in all the risk analyses contained therein, that the Air Force launch policy employing LARA would prohibit a launch where adverse wind direction and speed conditions would result in debris falling in "undesirable" (i.e., populated) areas (see: p.p. 2-13, 4-15 and 7-1). [229] Accordingly, the Risk Assessment calculated probabilities of risk solely by analyzing the probability of error in the LARA computer program itself (see: p.9-2). Thus, the conclusion of no significant adverse risks to populations on Bixby Ranch is easily reached given the low probability of computer error in LARA (see: p. S-7). [230] However, none of that can be squared with the Bixby White Paper, and the Draft EIS is clearly flawed in its failure to address this stark clash in two Air Force documents.

What the Air Force concluded in the Bixby White Paper is that because Bixby is directly downwind and down range of Vandenberg AFB most of the time due to prevailing unfavorable wind speeds and direction, that LARA would have permitted Titan launches under existing Air Force launch policy only 10% of the time when the Bixby property is developed (see: p. 10). Furthermore, the Air Force stated in the Bixby White Paper that being able to launch space vehicles only 10% of the time makes operations at Vandenberg AFB (including SLC-7) "inordinately expensive" and therefore makes acceptance of the risk of development on Bixby Ranch "untenable" (see: p. 10). Absent in the Draft EIS is any discussion of the economy of using Vandenberg AFB to launch space vehicles only 10% of the time over a developed Bixby Ranch, which could very well be [231] significantly less than using an alternative site either on or off Vandenberg AFB, even though other cost factors for those sites may be higher. This omission constitutes a fatal flaw in the Draft EIS.

It is also significant to note that the evacuation procedures mentioned in the Risk Assessment do not apply to [232] Bixby Ranch (see: p. 2-14), and, therefore, that the Air Force does not know at any point in time how many people there may be or where on the Bixby property for any given Titan launch. Accordingly, no accurate population count can be made for the Bixby property to input into LARA and meaningfully apply the [233] Air Force launch policy and make a safe launch. Thus, the basic assumption used in the Risk Assessment for the Bixby property is totally invalid for lack of any population data.

In addition to these principal defects, we have the following comments concerning other inadequate and incomplete features of the Risk Assessment, which, in turn, render the Draft EIS which relies upon it likewise defective:

[234] 1. There is no analysis done of the public risk from the launch of a Titan IV/Centaur in terms of casualty expectancy.

[235] 2. What were the assumptions made concerning existing and future population densities surrounding Vandenberg AFB?

[236] 3. It is unclear what the precise launch azimuths of SLC-7 will be, the launch danger area (the Impact Limit Line) or hazard zone LARA applies to, or what specific property ownerships are within these areas.

BIXBY RANCH COMPANY

[237] 4. Sonic boom effect was not addressed.

[238] 5. We note that the Risk Assessment provided to us is dated "September 1989", while the Draft EIS released in July 1989 referred to a risk assessment made prior to July 1989.

[239] The last point evokes the question whether the Draft EIS was based on an earlier version of the Risk Assessment than that provided to us by the Air Force's letter dated 8 September 1989. If so, all commenters on the Draft EIS should be provided all changes that were made in the Risk Assessment subsequent to the version considered in the Draft EIS, an explanation of the reasons for those changes, and an additional time period within which to comment thereon.

In conclusion, we believe substantial analytical work and revisions to the Draft EIS need to be undertaken to comply with NEPA and the regulations promulgated thereunder.

We appreciate your cooperation in giving us until October 9 to comment on the Risk Assessment and your commitment to have these comments and your responses made part of the Final EIS.

Very truly yours,

Kenneth C. Bornholdt

KCB/vja

RESPONSE TO LETTER 15

Received From: Bixby Ranch Company (October 6, 1989)
Kenneth C. Bornholdt, Senior Vice President and General Counsel

Comment No. 226: VAFB as Environmentally Preferred Site

The referenced document, "Risk Assessment Supplement to the Draft EIS for SLC-7 at Vandenberg AFB, September 1989," was provided to the commenter at his specific request. USAF recognizes that, as cited in the Draft EIS, the title of the Risk Assessment may have been confusing to some readers. It is not, in fact or in legal effect, a "supplement" to the Draft EIS or a "revised draft" as contemplated under the CEQ Regulations, 40 CFR Part 1502.9(a). As stated in the first sentence of the original September 8, 1989, transmittal letter to the commenter, it is "the SLC-7 Risk Assessment referenced in the Draft EIS for SLC-7." The Risk Assessment is not part of the Draft EIS, but is a technical background study which supports the less detailed analysis and conclusions on such risks which are presented in that Draft EIS. The "September 1989" Risk Assessment document was simply the finalized version of the risk assessment study which had been accomplished prior to publication of the Draft EIS. Data and conclusions from that original version of the risk assessment study were used in the Draft EIS. The September 1989 version sent to the commenter did not differ materially in data or conclusions from those used in the Draft EIS. The Final EIS (Chapter 3.0) references the updated September 1989 version (page 3-22).

Contrary to the suggestion in the comment, the Draft EIS did not come to the conclusion that VAFB "is the environmentally preferable site." Instead, the Draft EIS described a narrowing process by which reasonable alternatives were chosen to accomplish the Air Force's objective of safely supporting space launches which could place military satellites into polar orbits. For reasons elaborated in the Draft EIS, that process concluded by proposing four alternative Titan IV/Centaur launch sites on South VAFB. Of those, conversion of SLC-6 was identified (page S-9 of the Draft EIS) as the alternative with the lowest level of environmental impacts.

Comment No. 227: Comments From Bixby Ranch Company Dated September 8, 1989

Comments on the Draft EIS received from Bixby Ranch Company dated September 8, 1989, are fully addressed in this Final EIS.

Comment No. 228: Basis for Analyses in Risk Assessment

The assessment of various kinds of risks to public health and safety are based on the use of the LARA model, as well as many other assumptions detailed in the Risk Assessment. The utilization of the LARA model in determining potential risks to public health and safety is limited to the launch anomaly event and the burning debris pathway. Risks from normal launches and operations utilize other modeling assumptions. See response to Comment No. 196.

Comment No. 229: Calculations of Probabilities of Risk

As noted in response to Comment No. 228, the use of LARA and its associated probability of error is a modeling assumption only for risks related to a launch anomaly (see response to Comment No. 201). The calculation of probabilities for other risks, such as those from normal launches and operations events, are based on other operational assumptions. For example, the discussion of the Particulate and Gas Dispersion Pathway (Risk Assessment, Chapter 4.0) is not based on LARA error at all, but on worst-case events and atmospheric conditions. Conclusions contained in the Draft EIS are based upon various assumptions and conditions, many of which are not related to LARA. See response to Comment No. 196.

Comment No. 230: White Paper

As noted in response to Comment No. 203, the White Paper (USAF 1988a) is a land use planning document that evaluates the potential base-wide impacts from potential future population encroachment near South VAFB. As such, it addresses different issues than the Draft EIS. See response to Comment No. 196.

Comment No. 231: Potential Operation Restrictions on Proposed Action

The White Paper (USAF 1988a) indicates that 90 percent of all Titan launches in the 1990s (including those from SLC-4 East and West, as well as from the proposed action) would pose

unacceptable risks if areas near South VAFB were developed. The conclusion reached for these three launch sites does not translate into a 90 percent level of unacceptable launch conditions from the proposed action, since it would be located west of SLC-4 and would support different missions. In addition, as noted in response to Comment No. 200, risks to public health and safety are acceptable at current and reasonably foreseeable future levels of population. See response to Comment No. 196.

Comment No. 232: Evacuation Procedures

As noted in response to Comment No. 199, evacuation procedures are coordinated by Santa Barbara County.

Comment No. 233: Input into the LARA Model

Since the LARA model is run in a real-time mode for specific launches, the population estimates used as input would reflect levels at that point in time. The LARA model runs would utilize conservative population estimates, taking into consideration evacuation measures, if any. Analyses contained in the Risk Assessment are valid since they were not dependent on specific LARA model runs or population estimates, but rather on the potential error contained in LARA calculations. See response to Comment No. 196.

Comment No. 234: Casualty Expectancy

The analysis of risk to public health and safety in the Risk Assessment is presented in an easily understandable form in Table S.1 in the Risk Assessment (Summary of Relative Potential Risk SLC-7 Operations). Risks are shown as low, moderate, and high (relative to each other). It is not necessary to address risks in terms of casualty expectancy. See Appendix C for a reprint of the Risk Assessment Summary.

Comment No. 235: Assumptions on Population Densities

The methodology used in the Risk Assessment did not require the calculation of population densities for areas near VAFB. The methodology was based on calculating impact conditions at the area of concern and comparing those impact conditions to hazard criteria. For example, for the Particulate and Gas Dispersion Analyses (Risk Assessment, Chapter 4.0), doses were

calculated for various events and downwind distances for areas such as Bixby Ranch. These doses were then compared to exposure limits to determine if limits were violated. No such limits were violated for areas outside of VAFB. See response to Comment No. 196.

Comment No. 236: Launch Azimuths

Precise launch azimuths are mission-specific, so were not available at the time of preparation of the Draft and Final EIS. See response to Comment No. 201.

Comment No. 237: Sonic Booms

The potential impacts of sonic booms are addressed in Draft EIS Section 4.7, Noise. It is not necessary to duplicate this analysis in the Risk Assessment.

Comment No. 238: Risk Assessment Version

The Risk Assessment analyses were complete prior to the release of the Draft EIS, but publication was delayed until September 1989. See response to Comment No. 226.

Comment No. 239: Risk Assessment Version

The Risk Assessment dated September 1989 is the document on which the Draft EIS was based. As noted in response to Comment No. 238, the Risk Assessment analyses were complete prior to release of the Draft EIS, but publication was delayed until September 1989. See response to Comment No. 226.

LETTER 16

WRITTEN STATEMENT Sept. 5, 1989

UNITED STATES AIR FORCE
PROPOSED TITAN IV/CENTAUR SPACE LAUNCH COMPLEX 7
VANDENBERG AIR FORCE BASE, CALIFORNIA

[240] 1. We agree that there are sites in this general area/vicinity.

[241] 2. The Air Force Base has not authorized testing of the sites, nor, has it chosen a site for this project.

[242] 3. Phase I is all that was conducted in this area. There was excavation done by the Core of Engineers, but not in any archaeological form.

[243] 4. Some of these sites have burials, we do not know which sites have the burials because there has been no testing, and there is a need for this testing.

[244] 5. No Phase II was done in this area.

[245] You may suggest a time and place for a meeting with regard to the above issues at any time; however, just give us prior notification.

Submitted by: The Tribal Elders Council

s/ Manuel Armenta
Manuel Armenta, Chairman, Tribal Elders Council

s/ David D. Dominguez
David D. Dominguez, Chairman, Santa Ynez Band of Mission Indians

RESPONSE TO LETTER 16

Received From: Tribal Elders Council - Manuel Armenta, Chairman and David D. Dominguez, Chairman, Santa Ynez Band of Mission Indians

Comment No. 240: Presence of Cultural Resources

Comment noted. Native American monitors were present during field inventories and site testing.

Comment No. 241: Status of Site Testing

Draft EIS Section 1.5.2.4, Status of Proposed Action, indicates that a surface inventory for cultural resources has been completed for the proposed and alternative sites. Neither determinations of NRHP eligibility nor effects testing for sites identified in the inventory has occurred. The site chosen for development of the proposed action will be determined after review of the Final EIS and will be published in the ROD. Testing would be performed following the publication of the ROD.

Comment No. 242: Status of Site Testing

Limited subsurface testing for NRHP eligibility and effects has been performed for some areas associated with the proposed action, in support of geotechnical investigations undertaken by the U.S. Army Corps of Engineers. Consultations with California SHPO regarding potential impacts to cultural resources resulted in "No Effects" opinions.

Comment No. 243: Status of Site Testing

The information generated during cultural resources inventories, described in Draft EIS Section 3.9, Cultural Resources, does not support conclusions about either the presence or absence of burial sites within the cultural resources study area. Prior to site construction, subsurface testing for cultural resources and construction monitoring would be conducted as necessary, as described in Section 1.5.2.4, Status of Proposed Action.

Comment No. 244: Phase II

Comment noted.

Comment No. 245: Potential Cultural Resources Meeting

Local Native Americans would participate in subsurface testing programs, consistent with the regulations described in Draft EIS Section 1.5.2.4, Status of the Proposed Action. Notification would be given prior to project-related meetings with Native American peoples.

LETTER 17

WRITTEN STATTEMENT

UNITED STATES AIR FORCE
PROPOSED TITAN IV/CENTAUR SPACE LAUNCH COMPLEX 7
VANDENBERG AIR FORCE BASE, CALIFORNIA

My statement about the proposed Titan IV Centaur launch site project centers around two subjects:

[246] 1.Can the tremendous thrust of the Titan IV Centaur upon launch cause movement in the earthquake faults that are in the area? Will an earthquake and or liquifaction occur as a result of the seismic vibrations induced upon the earth surface?

[247] 2.Will the U.S.Air Force be responsible for property damages caused by the launch pressures, sounds, and vibrations? With the increase in thrust of the Titan IV Centaur the potential for broken windows, cracked concrete, broken dishes and panic among people is increased also.

Submitted By: Maurice "Greg" Cooper
805 N. Seventh st.
Lompoc, Ca. 93436

Please give to Air Force representative or mail to: HQ Space System DIvision/DEV, Attention: Mr. John Edwards, Post Office Box 92960, Los Angeles, CA 90009-2960. Written staements must be received no later than September 11, 1989.

RESPONSE TO LETTER 17

Received From: Maurice "Greg" Cooper - Lompoc, California

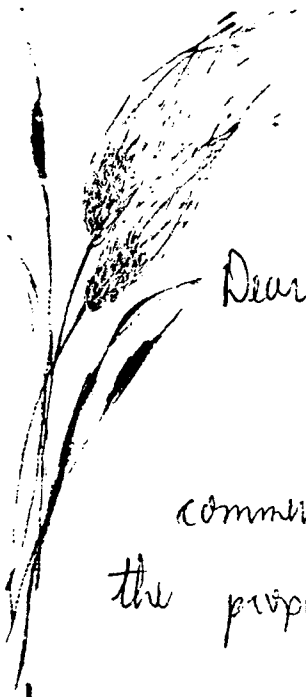
Comment No. 246: Launch-Related Earthquakes

An earthquake is caused by the abrupt release of slowly-accumulated strain at depth on a fault system. Although the thrust of the Titan IV/Centaur seems to be tremendous, the vibrations caused by that thrust would be insufficient to cause fault rupture. Therefore, earthquakes would not be directly attributable to launch activity.

Comment No. 247: Responsibility for Launch-related Property Damages

The Risk Assessment performed for the proposed action (Environmental Solutions, Inc. 1989) analyzed the likelihood of property damages such as structural damage and window breakage and found the risks to be small for areas outside of VAFB. Persons experiencing property damage allegedly resulting from launch activities at VAFB may file claim against the United States in accordance with the Federal Tort Claims Act and AFR 112-1, Claims and Tort Litigation.

LETTER 18



8/3/89

4049 St. Andrews
CT.
Lompoc Ca 93436

Dear Rep. Edwards

Thank you for asking for comments (SB News Press 8/3/89) on the proposed Shuttle complex at Vandenberg.

[248] If water is the only real hassle (ie, using existing H_2O basins) then I'm sure the government could also allot money to convert sea water to drinking water to use at the shuttle site. Then there would be no problem. (I say that with reservation)

Space exploration sounds exciting if done peacefully, and for the good of mankind.

Respectfully
Nancy Flanders

RESPONSE TO LETTER 18

Received From: Nancy Flanders - Lompoc, California

Comment No. 248: Desalinization Plant

See response to Comment No. 83.

LETTER 19

WRITTEN STATEMENT

U. S. Air Force Proposed Titan IV/Centaur Launch Complex 7
Vandenberg Air Force Base, California

9/1/89

Dear Sirs: I support the construction of this project. It will create new jobs both in its construction and in its operations. It is a progressive step in the "missile country" mission established for our nation at VAFB. The local economy is linked in both attitude and economically to the base's objectives.

There was only one speaker at the public EIS hearing in Santa Barbara on August 31. I am not fully informed on the Chumash "Western Gate" concerns, but I believe they will be outweighed by national defense concerns. However, I believe that some sensitivity should be expressed in this area. One idea I've had would [249] be to dedicate VAFB property south of SLC-7 as a "cultural" reserve. This dedication could serve the Air Force by establishing a buffer strip of land on the south base yet appease the native American concerns. Additionally, assistance in developing a local indian heritage center (at Jalama Beach??) could be a focal point for all archaeological fundings on the base.

Submitted by Lawrence E. Liles

Name: Lawrence E. Liles, Business Manager

Address: Local Union 413, I.B.E.W., 415 Chapala Street, Santa Barbara, CA 93101

Submit to: Attn Mr. John Edwards
HQ SSD/DEV
P. O. Box 92960
Los Angeles, CA 90009-2960

Comments must be received no later than Sept. 11, 1989

RESPONSE TO LETTER 19

Received From: Lawrence E. Liles - Santa Barbara, California

Comment No. 249: Mitigation Measures for Cultural Resources Impacts

As noted in Draft EIS Section 4.9.4, Mitigation Measures, the mitigations for cultural resources impacts associated with the proposed action would be developed in consultation with the California State Office of Historic Preservation. They would be consistent with applicable laws and regulations, including the National Historic Preservation Act of 1966 (NHPA), as amended, and the ACHP regulations for the Protection of Historic Properties (36 CFR Part 800), which encourage participation by local governments, Native American tribes, and the public. Within this context, comments are particularly sought from the Elders Council of the Santa Ynez Reservation, the Coastal Band of the Chumash Nation, and other interested parties to ensure full discussion of cultural resources mitigation measures. In addition, it is recommended that a NRHP district be established on South VAFB be to provide a more comprehensive treatment of cultural resources in the area. Since cultural material from VAFB is curated at the University of California at Santa Barbara, the scientific community would also be involved in discussions regarding the development of a heritage center if it were to contain cultural materials.

LETTER 20

John J. Markon

1532 West North Avenue

Lompoc, California 93436

October 3, 1989

Mr. John Edwards, Air Force Space Systems
P.O.Box 92960 WPC
Los Angeles. Ca. 90009

Dear Mr. Edwards:

In a situation where Lompoc is on the verge of water rationing, the Air Force would further exacerbate the shortage with up to 700 additional acre feet expended annually, during SLC 7 construction. According to the draft EIR, the 1500 new construction workers and families would use over 300 acre feet annually. The construction site would use almost 400 acre feet more.

Lompoc's problem is basically one of uncontrolled development, where the problems of water shortage, school crisis and traffic congestion are only mitigated after the fact. The reality being that the resultant mitigation is only lip service and our town is now in trouble in all three of these areas.

The time has come for any future development to solve the concomitant problems BEFORE and not after the fact. If the Air Force would desire acceptance by Lompoc residents of this extreme intrusion into our mutual water supply, let them first do something to improve the water supply BEFORE any construction is started. [250]

Praise by local business is accorded the nine million dollar boost the construction would give the local economy. Residents, however, do not benefit and only suffer from the mess and the overstressing of Lompoc's resources. Is the greed for business and commercial profit worth the destruction of our good life style? As a resident who loves this valley, I say no.

The Air Force has no need to cater to local business and should build only where it is appropriate and not a stress upon local resources. Failing to first find a way to solve our water problem, the Air Force should build instead in Florida, where fortunately the water tables are better. SLC-7 in Lompoc would only further contribute to the environmental disasters caused by Lompoc's development. [251]

Sincerely yours

John J. Markon

cc: Senator Cranston
Congressman Lagomarsino

RESPONSE TO LETTER 20

Received From: John J. Markon - Lompoc, California

Comment No. 250: Water Supply Improvement

See response to Comment No. 83.

Comment No. 251: Desirability of Florida as Titan IV/Centaur Launch Site

As described in Draft EIS Section 2.2.2.1, Existing Government Sites, Cape Canaveral Air Force Station/Cape Kennedy was evaluated as an alternative to the proposed action (page 2-36). This alternative was rejected since the Titan IV/Centaur cannot safely achieve near-polar orbits and satisfy mission objectives from this location.

WRITTEN STATTEMENT

UNITED STATES AIR FORCE
PROPOSED TITAN IV/CENTAUR SPACE LAUNCH COMPLEX 7
VANDENBERG AIR FORCE BASE, CALIFORNIA

[252] I would like to state that I am all for SLC 7. And givin all the info the Air Force has had to go through to come up with this plan, Alternatives etc., I dont think we should waste any time in getting started. Im sure there are items on national security you cannot discuss with the public and have your reasons for not using SLC 6 (which Im opposed to) or modify SLC 4 west. As a Union Pipe Fitter Local 114 S.B. my livelyhood rest on the base moving foward into the future, and as a resident of Lompoc I look foward to many years here.

Good Luck

thanks

Michael E McClure

Submitted By: Michael E McClure
620 N Larkspur
Lompoc, CA 93436

Please give to Air Force representative or mail to: HQ Space System DIvision/DEV, Attention: Mr. John Edwards, Post Office Box 92960, Los Angeles, CA 90009-2960. Written staements must be received no later than September 11, 1989.

RESPONSE TO LETTER 21

Received From: Michael E. McClure - Lompoc, California

Comment No. 252: Construction of Proposed Project

Comment noted.

LETTER 22

Mr. J.C. Picciuolo
4185 Vanguard Drive
Lompoc, CA 93436

Department of the Air Force
Headquarters Space Systems Divsion/DEV
Attn: Mr. John Edwards
Post Office Box 92960
Los Angeles, CA 90009-2960

31 August 1989

Dear Sir:

I request that the following be considered as part of the formal public comments on your Draft EIS for Space Launch Complex 7 at Vandenberg Air Force Base.

I am concerned that the Draft EIS does not adequately address the impact on water resources in the region. Specifically, I have identified a possible misstatement in the draft which may require correction or clarification after appropriate research has been done by your staff.

On page 3-22 of your Draft (Vol. I), where the Lompoc Terrace ground water basin is discussed under the section heading Ground Water, the following sentences appear:

> "These distinct boundaries keep the basin almost entirely within South VAFB" -and- "Presently, South VAFB is the only user of water from the basin."

[253] Your implication seems to be that water drawn from the Lompoc Terrace basin by VAFB does not affect other ground water resources in the area. A study dated 1963 is cited by you as the authority for this information.

I would like to draw your attention to a much more current study, The Tenth Annual Engineering Survey Report on Water Supply Conditions of the Santa Ynez River Water Conservation District 1987-1988, dated June 2, 1988, produced by Stetson Engineers Inc. On page 24 of this study, the following sentence appears:

> "The Lompoc Plain basin is in direct hydrological continuity with the Lompoc Upland and Lompoc Terrace basins."

Your EIS should incorporate the most current information available.

Sincerely,

J.C. Picciuolo

RESPONSE TO LETTER 22

Received From: J.C. Picciuolo - Lompoc, California

Comment No. 253: Impacts to Lompoc Terrace Ground Water Basin

The approximate physical boundary of the Lompoc Terrace aquifer (almost entirely within South VAFB) is shown to emphasize that VAFB is the only organization that directly withdraws water from the Lompoc Terrace aquifer. The Stetson report (Stetson 1988) does indicate that there is hydrological continuity between the Lompoc Plain Basin and the Lompoc Terrace Basin. In addition, it indicates that current test drilling being undertaken by the U.S. Geological Survey may "revise the present understanding of the subsurface geology" (Stetson 1989).

Additional detail regarding the hydrologic relationship between the the Lompoc Plain, Lompoc Terrace, and Lompoc Upland aquifers is provided in a 1982 analysis by Earth Sciences Associates (Earth Sciences Associates 1982). This detailed analysis also indicates the hydrological continuity between the three aquifers. The report indicates that ground water gradients are toward the Lompoc Plain from both of the other aquifers. The Lompoc Terrace and Lompoc Uplands aquifers lose approximately 400 and 1,300 acre-feet per year, respectively, to the Lompoc Plain aquifer (Earth Sciences Associates 1982). It is anticipated that, with the relatively large storage capacity of the Lompoc Terrace aquifer (approximately 60,000 acre-feet), and the relatively small draw-down (approximately 380 acre-feet per year for construction and approximately 260 acre-feet per year during operations), the hydrological continuity between the Lompoc Terrace aquifer and the Lompoc Plain aquifer would not be disturbed in the foreseeable future. As described in response to Comment No. 83, construction and operations demand for water would be reduced to the extent practicable by conservation practices and recycling.

September 8, 1989

Gentlepeople:

Please take SLC 6 out of mothballs, and do not do #7 -- I was
[254] unable to attend the August 30 meeting in Lompoc -- #7 will cause too much air pollution from new autos for the people who will be hired for the work -- I believe I recall it will be a 4-year period. In addition, our enviornment cannot tolerate
[255] that much water loss for construction and operation. The land will be even more violated than it is now.

This is somthing that I really do not believe we need to spend all that money on -- and where will it come from, with Mr. Bush's "read my lips" lines, and now his "drug war"? It is simply Spend - Spend - Spend - We have enough debt already -

[256] NO -- please -- go to SLC6, not 7. Thank you,

Mary Daines Read

MS. MARY READ
610 EAST PINE AVE 31
LOMPOC, CA 93436

RESPONSE TO LETTER 23

Received From: Mary Gaines Read

Comment No. 254: Air Pollution from Automobile Emissions for Project Alternative Sites

As discussed in Draft EIS Section 4.12.1, Regional Impacts, there are expected to be 150 fewer employees during the construction phase for the conversion of SLC-6 than for the development of the Cypress Ridge, Vina Terrace, or Boathouse Flats sites.

As stated in Draft EIS Section 4.5.2.2, SLC-6, the selection of the SLC-6 conversion would avoid most of the construction-related air quality impacts associated with the undeveloped sites, including some of the automobile emissions.

Additional information for insertion into the Draft EIS regarding construction-related air quality impacts for construction at the alternative sites is provided in Section 3.2 of this Final EIS.

Comment No. 255: Ground Water Use

See responses to Comment Nos. 83, 193 and 194.

Comment No. 256: Selection of SLC-6

See response to Comment No. 139.

LETTER 24

WRITTEN STATTEMENT

UNITED STATES AIR FORCE
PROPOSED TITAN IV/CENTAUR SPACE LAUNCH COMPLEX 7
VANDENBERG AIR FORCE BASE, CALIFORNIA

7 September 1989

In a meeting at Vandenberg AFB on 23 August 1989, B. Gen. Honeywill was asked by a civilian range safety engineer if it was the Air Force's intent to "close the door" on SLC-6 by its selection of Cypress Ridge as the SLC-7 site. The ensuing discussion revealed that hazardous operations at the Cypress Ridge site would cause the shutdown and evacuation of SLC-6. The WSMC safety engineer present confirmed that certain operations at Cypress Ridge would "interdict" SLC-6 operations.

[257] The DEIS addresses the potential for closure of Jalama beach but does not identify the potential impact on SLC-6. If NASA intends to use SLC-6 for future Shuttle or Shuttle C operations, should not the EIS identify the impact the Cypress Ridge site would have on their operations and schedule?

Submitted By: Donald D. Smith
245-A Burton Mesa Blvd.
Lompoc, California 93436

Please give to Air Force representative or mail to: HQ Space System DIvision/DEV, Attention: Mr. John Edwards, Post Office Box 92960, Los Angeles, CA 90009-2960. Written staements must be received no later than September 11, 1989.

RESPONSE TO LETTER 24

Received From: Donald D. Smith - Lompoc, California

Comment No. 257: Potential Impacts to SLC-6

There are no current plans for the utilization of SLC-6 for either the Space Shuttle or Shuttle C. If SLC-6 were to be utilized in the future and the proposed action constructed at one of the undeveloped sites, operations of SLC-6 would be coordinated with those at the other site, per USAF safety regulations. Since the use of SLC-6 for the Space Shuttle or Shuttle C is speculative at this time, it is not addressed in the Draft or Final EIS. See response to Comment No. 139.

2.2 PUBLIC HEARING COMMENTS AND RESPONSES

The CEQ regulations require that diligent efforts be made to involve the public in preparing and implementing NEPA procedures (40 CFR Part 1506.6). These regulations require that a public hearing be held to solicit comment on the Draft EIS if there is substantial environmental controversy concerning the proposed action. In accordance with these requirements, public hearings were held at 7:00 p.m. on August 30 and 31 in the Grossman Gallery of the Lompoc Public Library, Lompoc, California, and in the Santa Barbara County Superintendent of Schools Auditorium in Santa Barbara, California.

This section contains the transcripts of the public hearings as submitted by the Certified Shorthand Reporter. The comments contained in the public hearing transcripts are numbered consecutively, and the responses are keyed to those numbers. This section is structured so that the transcript for each hearing is followed by the comments made at that hearing and the responses to those comments. Where a comment warrants changes or additions to the text of the Draft EIS, it is so noted in the response, and the additional material is contained in Chapter 3.0 (Addenda and Errata to the Draft EIS) of the Final EIS.

NUMBER OF COMMENTS	COMMENTS MADE AT PUBLIC HEARINGS
Local Agencies	
5	Lompoc Community Development Department, Jeremy Graves, Planner
1	Vandenberg Village Community Services, Harold Grantz, President, Board of Directors
Native American Organizations	
6	Elaine Schneider, Representative, Chumash Cultural Heritage Association, Santa Ynez Indian Reservation
7	Reggie Pagaling, associated with the Chumash Cultural Heritage Association, Santa Ynez Indian Reservation
Businesses/Organizations	
2	National Space Society, James Spellman, Jr.
Individuals	
3	W. S. Mullins
4	LeRoy Scolari

NOTE: No comments at the public hearings were made by members of federal, state, or county agencies.

2.2.1 LOMPOC, CALIFORNIA PUBLIC HEARING

2.2.1.1 Lompoc, California Public Hearing Transcript

ORIGINAL

PUBLIC HEARING

DEPARTMENT OF THE AIR FORCE

SYSTEMS COMMAND

DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED TITAN IV/CENTAUR SPACE LAUNCH COMPLEX 7 VANDENBERG AIR FORCE BASE, CALIFORNIA } NO

REPORTER'S TRANSCRIPT OF PROCEEDINGS

Wednesday, August 30, 1989

7:00 P.M.

Lompoc, California

REPORTED BY:
ELLEN Q. BRESSI
CSR No. 7184

CERTIFIED ORIGINAL

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CERTIFIED SHORTHAND REPORTERS
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133 EAST DE LA GUERRA STREET, SUITE 420 • SANTA BARBARA, CA 93101 • (805) 682-6636

PUBLIC HEARING
DEPARTMENT OF THE AIR FORCE
SYSTEMS COMMAND
WEDNESDAY, AUGUST 30, 1989

DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR
PROPOSED TITAN IV/CENTAUR SPACE LAUNCH COMPLEX 7
VANDENBERG AIR FORCE BASE, CALIFORNIA

GROSSMAN GALLERY, LOMPOC PUBLIC LIBRARY
501 EAST NORTH AVENUE
LOMPOC, CALIFORNIA
7:00 P.M.

REPORTER BY:
ELLEN Q. BRESSI
CSR. No. 7184

APPEARANCES:

COLONEL MIKE McSHANE, Military Trial Judge, designated as presiding officer by the Office of the Judge Advocate General in Washington

LIEUTENANT GENE BRANCH, Administrative officer

COLONEL MIKE HAYNER, Western Space and Missile Center at Vandenberg Air Force Base; Space Launch Complex 7 Program Manager

COLONEL BILL LEOHNARD, Design, construction and environmental anaylsis of Systems Command facilities and programs at Vandenberg Air Force Base

JOHN EDWARDS, Manager of the environmental analysis for Space Launch Complex 7

DAN EVANS, Environmental Solutions, Incorporated, Air Force contractor conducting the environmental analysis for Space Launch Complex 7

PUBLIC SPEAKERS:

HOWARD E. GRANTZ
JAMES SPELLMAN, JR.
W.S. MULLINS
LEROY SCOLARI
JEREMY GRAVES
ELAINE M. SCHNEIDER

LOMPOC, CALIFORNIA
WEDNESDAY, AUGUST 30, 1989
7:05 P.M.
-o0o-

COL. McSHANE: Good evening, ladies and gentlemen. My name is Mike McShane. I'm a full-time Military Trial Judge for Air Force Courts Marshall. I've been designated by the office of the Judge Advocate General in Washington as Presiding Officer for tonight's public hearing upon the Draft Environmental Impact Statement.

I want to start out by advising you that the National Environmental Policy Act and Implementing Regulations require federal agencies to carefully analyze the potential environmental impacts of proposed actions, and to use those analyses in arriving at decisions or recommendations on whether and how to proceed with those actions.

The Air Force has prepared and distributed, in accordance with applicable regulations, a Draft Environmental Impact statement addressing a proposal for the construction and operation of a Titan IV/Centaur Space Launch Complex in support of the Department of Defense Space

Program. That's what we're going to be talking about here tonight.

I am not here as an expert on this proposal, nor have I had any connection with its development. I'm not here to act as legal advisor as to the Air Force Experts who will address this proposal. My purpose is simply to insure that we have a fair, orderly hearing, and that all who wish to be heard have a fair chance to speak.

Let me just take a moment to explain how tonight's hearing will proceed. This isn't going to be a debate nor a referendum or vote upon the proposal itself. There will be no demonstrations, nor should you signify your agreement or disagreement with a speaker's position by applause or other expressions of approval or disapproval. That adds nothing to the hearing record and simply wastes your valuable time. In fact, this may be the only time available for your personal input to our government's decision making process.

What this informal hearing is intended to provide is a public forum for two-way communications, with a view to improvement of the overall decision making process. You notice I said "two-way communications." Part 1 of that

calls for you to listen carefully to what the Air Force experts say as you are briefed on the proposal and its anticipated environmental consequences.

After the briefing you'll be able to ask questions to clarify, in your minds, any points made in the briefing or in the Draft Environmental Impact statement. Part 2 of this process is for you to tell the Air Force experts what you think to give Air Force decision makers the benefit of your knowledge of the local area affected by the proposal and any environmental hazards you perceive.

I'd like to emphasize that this is a proposal and nothing that's already been decided, approved or funded. Our hearing isn't for the purpose of justifying anything, but rather to identify and assess pertinent impacts, including your personal perspective of those impacts.

If you have not already done so, please fill out one of the registration cards that we have back there. You may indicate on the registration card if you would like to ask a question or make a statement.

We'll have a recess later on, and after that recess we'll collect those cards and I will recognize members of the public for the purpose of putting a question to these Air Force experts that we have, or making a statement about the proposal. Don't be shy or hesitant to ask a question or make a statement. This is an informal hearing and there are no dumb questions.

I want to help insure that all who wish to speak have a fair chance to be heard, so please help me enforce the following ground rules:

First, only speak after I recognize you and please address your remarks to me.

Second, speak slowly and clearly, starting out with your full name, your address and the capcity in which you appear. That is, as a public official, a designated representative of a private association, or as a person speaking solely in his or her individual capacity.

We have a court reporter here, Mrs. Ellen Bressi, and she has to make a verbatim record of these proceedings. So please speak slowly and clearly so she can do her job properly.

Third, if you have any questions for the panel, ask the questions one at a time. I will allow a reasonable number of questions.

Fourth, as put out in the public notice, individuals will be allowed five minutes to speak, and those representing groups will be allowed 10 minutes to speak, and elected public officials will be allowed 10 minutes to speak. If there's time remaining, after everyone has had an opportunity to speak, I can recall anybody who wishes to make additional comments.

Fifth, honor any requests from me that you cease speaking.

Sixth, do not speak while another person is speaking. Only one person will be recognized at a time.

And finally, I'm sure that this is a no smoking area, so everyone will appreciate your cooperation with that rule.

As we go along here, it is possible that there will be questions that these Air Force representatives will be unable to answer. That could

occur for one or two reasons: First, although there's a good deal of expertise assembled here, they will not attempt to answer questions tonight unless they are confident they can do so accurately. And second, there may be questions that have national security implications and these must be reviewed further before answers are provided. If these should occur and the question is relevant, I can assure you it will be addressed in the final document and all of you may request copies of that final document.

If we run out of time before everyone gets to speak, you are invited to fill out a written statement. I think those are available there in the back of the room. You will note that the statements can be submitted at any time prior to the 11 September 1989, by mailing them to the address which is listed on that written statement.

Regardless of whether you put your statement on the record tonight or mail it in later, it will be carefully considered and made part of the record of these proceedings. It will have equal weight and will receive the same careful consideration, whether it's made during tonight's hearing or afterward.

I want to thank everybody who's turned out here tonight. Your presence is commendable in that it reflects a great interest in your community and in those things that are important to it. Let me assure you that your interest is the primary purpose for us being here.

It's now my pleasure to introduce Colonel Leohnard who will brief tonight's proposal.

COL. LEOHNARD: Thank you, Colonel McShane.

As mentioned, I'm Bill Leohnard and I'm the Director of Acquisition Civil Engineering at Space Systems Division. My Directorate is responsible for the design, construction, and environmental analysis of Space Systems Command facilities and projects constructed at Vandenberg Air Force Base. And this includes the project for which we're here this evening, the proposed space Complex 7 for the Titan IV/Centaur space launch vehicle.

Before I go any further, I'd like to introduce the rest of the people at the head table. First is Lieutenant Branch who's going to be acting as our administrative officer this evening. To his right is Colonel Mike Hayner who is with the Western

Space and Missile Center at Vandenberg Air Force Base and is the Space Launch Complex 7 Program Manager. To his right is Mr. John Edwards, a member of my staff and the manager of the environmental analysis for the Space Launch Complex 7. And to his right is Mr. Dan Evans, representing Environmental Solutions Incorporated, the Air Force contractor conducting the environmental analysis for this proposed contract.

We will try to answer questions you may have about the Environmental Impact Analysis Process, the proposed action, or the Draft EIS, but if questions become too technical, we don't know the answers, or time is limited, let me assure you they will be addressed fully in our Final Environmental Impact Statement.

(Slide Change.)

COL. LEOHNARD: I will now explain the Environmental Impact Analysis Process and how it is conducted, and give you an overview of the propsed action and the general findings of that Draft EIS.

The National Environmental Policy Acts, or NEPA, is implemented by the President's Council on Environmental Quality Regulations. NEPA requires that the federal agencies analyze

potential environmental impacts of a proposed project and carefully consider alternatives to the proposed project, including the no-action alternative. These analyses are then used to make decisions and recommendations on whether and how to proceed with the project.

As shown on the screen, the Environmental Impact Analysis Process is started when the Air Force project proponent requests environmental impact analysis from Air Force environmental planners. The project proponents do this at an early stage in project planning to determine the extent of the environmental documentation needed, whether it be a Categorical Exclusion, Environmental Assessment or an Environmental Impact Statement.

The regulations of the President's Council on Environmental Quality allow Categorical Exclusions for classes of action that do not individually or cumulatively affect the environment. Therefore, these actions require neither Environmental Assessment nor an Environmental Impact Statement.

Early in the analysis process, we determined that this space launch complex did not

qualify for a Categorical Exclusion.

The next step in the EIAP is to determine whether a project needs an Environmental Assessment or a more extensive Environmental Impact Statement. If it appears that the project will not have any significant impacts, the environmental planners will elect to proceed with an Environmental Assessment.

In early 1988 when we were planning the proposed action, it was determined that due to the potential for significant impacts, we would proceed with an Environmental Impact Statement.

The completion of this process then is the decision made by the Air Force about whether to proceed with the proposed action, a modification of the proposal, or to terminate the project completely.

(Slide change.)

COL. LEOHNARD: The first step in preparation of an EIS is to publish a Notice of Intent in the Federal Register and to make this notice available to newspapers and other media and interested parties within the area. The notice for the proposed SLC-7 project was published in the Federal Register on 8 April 1988.

The next step in the Environmental Impact Analysis Process is to hold a public meeting to obtain agency and public opinions on the issues that should be addressed within the Environmental Impact Statement.

The purpose of that meeting is to identify significant issues and focus the scope of the EIS. The public meetings for the proposed SLC-7 project were held on 3 May 1988 in Lompoc, and 5 May 88 in Goleta.

Issues were further identified in consultation with State, local and federal agencies, as well as internal Air Force review.

(Slide Change.)

COL. LEOHNARD: Based upon these scoping efforts, we began extensive data gathering and analytical efforts which culminated in the preparation of a Draft EIS. Over 270 copies of the Draft EIS were mailed on 19 July 1989 to all individuals and organizations who requested a copy. In addition, we made copies available to local libraries for public reading.

The Draft EIS was filed with the Environmental Protection Agency on 21 July 1989. The Draft EIS notice of availability appeared in

the Federal Register on 28 July 1989, and thus began the 45-day public comment period which will end on 11 September 1989.

During the public comment period, two actions take place: The first is a public hearing which is held in order to receive comments on the draft document, and that's why we're here this evening. The second activity during the 45-day period is that written comments may be submitted to the Air Force by interested individuals and agencies. All comments that are received during the public hearing, either oral or written, and during the 45-day comment period, are addressed in the Final Environmental Impact Statement.

Once the Final EIS is prepared, copies are distributed in the same way as the draft document. The Final EIS is filed with the EPA, which publishes a notice of filing in the Federal Register. Once that notice appears, a 30-day post filing waiting period starts before the record of decision can be made. All mitigation measures that are approved by the decision makers are required to be implemented.

Once the decision has been made, it is reported and announced to the public. The

Final EIS and Record of Decision on this project will be published early next year. The Record of Decision will explain the conclusions reached by the Air Force, and the rationale for the selection and alternatives considered.

(Slide change.)

COL. LEOHNARD: After the potential issues associated with the proposed project are identified, the preparation of the draft EIS is initiated. Prior to the analysis of potential impacts, a description of the proposed actions and its alternatives is developed. In particular, the development and consideration of alternatives to the proposed action is important to the Environmental Impact Analysis process.

(Slide change.)

COL. LEOHNARD: In order to draw up a list of reasonable alternatives to the proposed project, the proponents select objectives that must be met by the potential alternatives.

Next slide please.

(Slide change.)

COL. LEOHNARD: The objectives of this project are to:

Provide a space launch complex to

support launch vehicles that carry large payloads;

To utilize an expendable launch vehicle;

Provide the capability to achieve high altitude orbits;

And last, to provide a location that can launch satellites safely into a polar orbit.

(Slide change.)

COL. LEOHNARD: Following the identification of the objectives, conceptual studies identified the components necessary to fulfill the objectives -- the project objectives. These studies resulted in the formulation of the proposed actions and the development of alternatives.

The following illustrations show the required project components as developed by the proposed actions. They would also apply to the alternates considered.

(Slide change.)

COL. LEOHNARD: The first of the major project elements is the Titan IV/Centaur Space launch vehicle itself. The vehicle is approximately 204 feet long and supports a payload fairing of 86 feet in length,

giving it the capacity for transporting large payloads. This the latest version of the Titan vehicle and is equipped with two upgraded solid rocket motors, a liquid fueled core vehicle, and a Centaur upper stage that allows it to put payloads in the 10,000-pound class into high earth orbit.

(Slide change.)

COL. LEOHNARD: This next overhead shows the artist's rendering of the configuration of the launch pad. Major elements present on the pad include the mobile service tower, the umbilical tower, the launch mount and launch support structure, exhaust duct, the operation support building, propellent storage areas and maintenance structures.

The timeline for construction of the proposed actions indicates that it would take at least four years to build; operations would begin in the year 5. Facility design and construction would involve planning for and undertaking site grading, road construction, utilities development, erection of the security fence and the operations support building, the launch support structure, as well as carrying out site rehabilitation measures.

Design and construction of ground support systems follow shortly after the facility construction begins. The ground support systems are the aerospace equipment which includes the mobile service tower, the launch mount, the umbilical tower and other support equipment. Beginning somewhere around the start of the fifth year the facility would be complete and launch preparations would begin.

(Slide change.)

COL. LEOHNARD: As with the construction of any space launch complex there are also numerous offsite facilities which are required to support launch operations. This overhead shows several of these:

Launch assembly facility;

Payload faring receipt and processing facility;

The propellant storage area;

The solid rocket motor receipt and processing building where the individual segments of the solid rocket motors would be inspected and pre-assembled prior to transport to the launch pad;

And the launch control center.

Additional offsite facilities would include the utilities necessary to supply electrical power, communications, water, and other essential commodities to the launch site.

(Slide change.)

COL. LEOHNARD: Project operations are depicted in the next overhead. Operations would be conducted at a level to support two Titan IV launches per year, with the capability to surge to three launches per year.

Launch operations include:

The delivery, check-out and transportation to the pad with the solid rocket motors;

Delivery and erection of the core vehicle;

Mating and check-out of the various segments of the vehicle;

Erection of the Centaur upper stage;

Insertion of the payload;

Installation of the payload faring;

Vehicle fueling;

And finally, vehicle launch.

Post-launch operations include cleaning the pad and refurbishing it in time to support the next scheduled launch.

(Slide change.)

COL. LEOHNARD: As required by NEPA, the Air Force has developed and analyzed a number of alternatives that could achieve the desired mission objectives. The purpose of this exercise is to make certain that the proposed action is not selected without due and deliberate consideration of other methods that may be available to achieve the same goals.

(Slide change.)

COL. LEOHNARD: The range of alternatives analyzed include the "no-action" alternative, different launch vehicles, launch locations outside of Vandenberg, and existing the undeveloped launch site on Vandenberg. Some alternatives were considered and eliminated since they could not reasonably achieve the goals of the proposed action or because they would result in equal or greater environmental impacts.

If the "no-decision" alternative were to be pursued, the SLC-7 project would not be

developed, and the Titan IV/Centaur could not be launched from Vandenberg. It is has been determined that this would unacceptably impact national security. Current defense programs rely on our future ability to launch heavy payloads into near polar orbits. Since there are no other space launch vehicles available to meet the mission requirements, there would be no displacement effect to result in environmental impacts elsewhere.

(Slide change.)

COL. LEOHNARD: Other launch vehicles were considered. These included the Space Transportation System, or a space shuttle, and the Titan IV NUS, that is, "No Upper Stage."

(Slide change.)

COL. LEOHNARD: The space shuttle is a reasonable alternative since it's capacity is roughly equipped with Titan IV/Centaur; however, use of the space shuttle was eliminated from further consideration since it is not available for launches from Vandenberg, and since launches from Cape Canaveral Air Force Station in Florida cannot safely provide the required polar orbits.

Titan IV, without the upper stage,

was considered since it represents the Air Force's largest capacity launch vehicle currently in use. This alternative was eliminated, however, since the Titan IV, without the upper stage, cannot achieve the required high earth orbit combined with capacity requirements.

(Slide change.)

COL. LEOHNARD: Alternative launch locations outside of Vandenberg were considered for use by Air Force to launch the Titan IV.

Next slide.

(Slide change.)

COL. LEOHNARD: Facilities are available to launch the Titan IV/Centaur from Cape Canaveral; however, this alternative was eliminated from further consideration since near polar orbits cannot be achieved given the large payload requirements.

The U.S. Department of the Navy maintains a missile test range on San Clemente Island, off the coast of Southern California. Use of this range would allow for attainment of near polar orbits. However, the launch support facilities shown earlier are lacking at this site. Development of the launch site itself and the

necessary facilities including power, sewer, water supply, communications and vehicle processing and preparation facilities would be costly and would result in comparable or greater environmental impacts.

The State of Hawaii was evaluated for its capacity to support the space vehicle launch activities. Hawaii also was eliminated from further consideration as an alternative site, because the environmental impact would be greater than those of the options being considered at Vandenberg Air Force Base.

The proposed action could be accommodated on other islands in the South Pacific that would allow for polar orbit to be achieved; however, the necessary support facilities including such items as labor force are scarce commodities on these islands. In addition, an entirely new launch support system would be required, including launch control center, telemetry and tracking facilities, propellant storage and vehicle component processing facilities.

It is anticipated that the environmental impacts from development of a Titan IV/Centaur launch facility in the South Pacific

would be similar to or greater than those incurred at Vandenberg Air Force Base due to the additional construction and the remote nature of the locations. Therefore, this alternative was eliminated from further consideration.

(Slide change.)

COL. LEOHNARD: With the obvious advantages of existing launch support facilities and the general capability of attaining near polar orbits, sites on Vandenberg were identified as reasonable alternatives to the proposed action. Sites identified include some considered and eliminated from further analysis and some considered in detail.

(Slide change.)

COL. LEOHNARD: Sites considered and eliminated from further analysis including existing launch complexes SLC-2, -3, -4, and -5.

SLC-2 is a small pad, currently used by the Delta Rocket Program. It's use would require complete razing and reconstruction to meet the Titan IV/Centaur requirements. In addition, due to its location, SLC-2 cannot safely support near polar orbits with the necessary payload capacity.

SLC-3 East and West are currently being used to launch Atlas vehicles. Like SLC-2, utilizing SLC-3 would require razing the existing facilities and building new ones, since existing facilities are too small to support the Titan IV/Centaur. In addition, SLC-3 is closer to Lompoc than the proposed site, and would result in higher levels of noise in that community.

SLC-4 East is currently being refurbished to accommodate the Titan IV/No Upper Stage vehicle, and SLC-4 West is an operational Titan II facility. These launch complexes will be fully utilized by the existing programs and not available for other use.

(Slide change.)

COL. LEOHNARD: From the suite of alternatives considered, those mentioned previously have been eliminated from further consideration as not feasible in support of the project requirements, or since environmental impacts would be equal to or greater than the proposed actions. This analytical process has resulted in a number of alternatives that were considered in more detail.

(Slide change.)

COL. LEOHNARD: The alternatives considered

in detail are all located on South Vandenberg and include the proposed Cypress Ridge site --

(Slide change.)

COL. LEOHNARD: -- SLC-6 --

(Slide change.)

COL. LEOHNARD: -- the Vina Terrace alternative site.

(Slide change.)

COL. LEOHNARD: All are located -- and the Boathouse site. I got those two backwards.

All are located so that the near polar launches can be safely achieved and existing offsite facilities and support utilities at Vandenberg can be utilized.

Next one.

(Slide change.)

COL. LEOHNARD: The proposed Cypress Ridge site is currently undeveloped and is being utilized for cattle grazing. The site occupies approximately 120 acres of gently sloping marine terrace, approximately one-half mile from the ocean.

(Slide change.)

COL. LEOHNARD: The SLC-6 alternative site is very different from the others considered in

detail, since it is a developed space launch complex today. The SLC-6 complex was originally built in 1970 for the Manned Orbiting Laboratory program. When constructed, SLC-6 was configured to launch Titan III vehicles. Subsequent to the cancellation of the Manned Orbiting Laboratory program, SLC-6 was modified to support the space shuttle launches. However, primarily due to the 1986 Challenger disaster, we have not used SLC-6 for shuttle launches.

SLC-6 site is approximately 100 acres in size, located on the westerly sloping terrace, approximately one mile from the ocean. Since it is a developed site, there is very little vegetation present.

Next slide.

(Slide change.)

COL. LEOHNARD: The Boathouse Flats alternative site, like the proposed Cypress Ridge site, is an undeveloped area approximately 130 acres in size. The Boathouse Flats site, however, is primarily grassland and is much closer to the ocean than the Cypress Ridge site.

(Slide change.)

COL. LEOHNARD: The Vina Terrace alternative

site is also undeveloped and slightly larger than the previous two sites, approximately 150 acres. This additional size is necessary, since the Vina Terrace area is the steepest in topography of the alternatives. This area is vegetated with a mix of grasses and coastal shrub, and at approximately one-and-one-half miles, it is the furthest from the ocean.

Next one.

(Slide change.)

COL. LEOHNARD: After three alternatives to be addressed in detail were identified, the potential environmental impacts from the proposed action and alternatives were analyzed for the inclusion in the Draft EIS. This process began with the efforts to characterize the existing environment based upon the issues identified during our scoping process.

(Slide change.)

COL. LEOHNARD: As you can see, a wide variety of the data was gathered to address the potential impact. Intensive surveys of vegetation, wildlife and cultural resources were undertaken by the environmental contractor to support the analysis process.

Information to characterize the remaining resources was generated through empirical observations, reviews of the existing literature and consultation with government agencies.

(Slide change.)

COL. LEOHNARD: After data that described the existing environment are gathered, the potential environmental impacts were determined through extensive analytical activities performed by the environmental subcontractor. Mitigation measures to abate potential impacts were developed next. The final step in the environmental evaluation of the proposed action was then to reevaluate impacts with the mitigation measures included.

(Slide change.)

COL. LEOHNARD: This illustration is an overview of the most important potential environmental impacts that would result from the construction phase or proposed action.

You will note that most of the impacts that would result from the project construction, such as those to the geology and the soils, vegetation, wildlife and cultural resources would result from the activities, such as earth moving in the development site itself.

Impacts to water resources and economic benefits would result from the temporary presence of construction personnel in the local communities.

(Slide change.)

COL. LEOHNARD: This next illustration is an overview of the most important potential impacts that would result from the operations phase. Impacts to health and safety, vegetation, and wildlife are expected to be concentrated in the vicinity of the launch pad itself.

Potential impacts to water resources, socioeconomics, air quality, noise levels and recreation are expected to occur in areas surrounding Vandenberg.

That concludes my briefing.

I guess after a short recess we will entertain questions and comments.

COL. McSHANE: Thank you, Colonel Leohnard.

Let me go over the procedures again for the benefit of some who may have come in after we got started.

You were invited to fill out a registration card when you came in. If you have

not done that, please do so while we're taking a break.

Regarding the making of a statement tonight, elected public officials will be called upon first for their statements, then representatives of organizations. Those persons will have 10 minutes to speak, if they desire to use that long. Individual's statements should be limited to five minutes so that all interested parties have an opportunity to speak.

If you do not wish to make a public statement, or if we run out of time before you have an opportunity to speak, or if you have additional comments beyond those you are able to make within your allotted time, you may turn in your written comments after the meeting or send them to the address provided on the comment statement that they have back there.

I recognize that some people may wish to make statements on defense policy, nuclear weapons, arms control and fiscal policy at this meeting; however, such comments are best directed to policy makers such as your congressman and senators. Please limit your comments to environmental issues.

We'll take a 10-minute recess.

Please try and be back here by about

7:43.

(Brief recess.)

COL. McSHANE: If everyone would please have a seat, we'll get started again.

This is the time when you'll be able to make your statements about the Draft Environmental Impact Statement and also ask any questions that you might have about it.

Our procedure will be that once I call on you, please step up here to the microphone. We want everybody to be able hear your question and your statement, and we want our court reporter to be able to record it.

Please state your name and your affiliation, or your address, and then ask your question or make your statement. If you read from a prepared statement which you want entered into the record, please leave it with me and we'll see that it gets attached to the record.

Now, in sorting through the cards I found that only three people indicated that they wanted to make a statement. If that was just an error in marking the card, please let us know, because it looks like we're going to have plenty of time for people to make statements here.

Start out with Mr. Howard Grantz.

MR. GRANTZ: Thank you.

My name is Howard Grantz. I live at 367 St. Andrews Way in Vandenberg Village. I'm here as a President of the Vandenberg Village Community Services District. I have a prepared statement for the secretary and for the press.

Our primarily concern, as a services district, is that for water. Water is perhaps the most critical environmental issue in this part of California. This EIR describes the consequence of a project, the consequence of the water, as being a consumption of 176 acre feet per year and that's a consequence. It does not discuss the impact upon our environment, the [258] impact upon the local aquifer for which the water is extracted. This is called the "Lompoc Plain Aquifer."

This aquifer is overdrafted now and has been by almost 8,000 acre feet in the last six years. In addition to that, we are committed as a [259] city here, to provide water for the WYE at 500 acre feet per year, Allan Hancock Campus, the Spaceport Museum, and several hundred houses being built. Now, on top of that, we'll have a demand

then for this water for this project. And there's a question in my mind as to whether or not we'll have enough water to provide for the needs of this program.

Therefore, the point we're making is that this EIR, which treats water very lightly, should be expanded to cover much more detail, the impact upon the Lompoc Plain Aquifer. As a consequence of that, as that aquifer is overdrafted, it draws water from our aquifer and the Uplands Aquifer. And therefore then, there are two aquifers that are affected: The one here in which Lompoc gets its water and the one in the Uplands.

[260]

Another point of interest, the amount of water being consumed -- or will be consumed, goes beyond the County's threshold of significance, which should be remembered. Therefore, we believe - we as a community services district - that this EIR should be expanded to discuss and define the specific impacts and their mitigation on both the Lompoc Plain Aquifer and the Uplands Aquifer due to this project.

[261]

The increased overdraft in the Lompoc Plain aquifer results in additional water being drained from our Uplands aquifer. For specific details on the water consumption, the mitigation

factors and details of our aquifer, I refer you to a report done by the Stetson Engineers which is referenced in this document.

The section of the EIR that related to water, should be rewritten and expanded to fill these parts I just mentioned because the environmental impact on our aquifers concern all people here in the Valley. [262]

Thank you very much.

COL. McSHANE: Thank you, sir.

Colonel Leohnard, did you want to comment on that at this time or reserve that for the final report?

COL. LEOHNARD: We'll reserve that for the final report.

COL. McSHANE: All right.

Next speaker is James Spellman, Jr.

MR. SPELLMAN: Good evening, Colonel, Members of the staff, ladies and gentlemen. I'm Jim Spellman. My current address is 416 West North Avenue. I'm here as a representative of the National Space Society which is a private nonprofit public information organization; however, when it comes to tonight, I choose to elect to speak more as an individual and not as representative of an

organization. And I hope to keep to the five-minute limit.

You would think that with the organization that I belong to, we would obviously want to support seeing the Space Launch Complex 7 being built; however, in this person's opinion that is not necessarily the case. We do feel that the Titan IV is a necessary vehicle for the short access into space; however, we do question the need for the construction of SLC-7 out here in this area.

What I have here, and I'm afraid my graphs are not as great as yours, but I have a listing here of the Titan family which is a following series from the original Titan 1 that was being built in the 1950s, to the current Titan IV. As you will notice, there is a little bit of a commonality in the launch vehicle, particularly in the first stage.

Currently we have two launch pads, SLC-4 East and SLC-4 West. Now, the east pad has been modified to handle the Titan IV with No Upper Stage. And the SLC-4 West pad is currently being used for the Titan II operations, which I might add, it has been done at a considerable savings to the tax payers. The Titan II was originally a

weapons system, and I believe there was somewhere between 50 and 100 of those vehicles deployed throughout the United States. They have now been modified and converted into space launch vehicles which, as I said, is considerable savings to the public.

However, there is a finite set of those Titan IIs that have been constructed for or reconfigured for space launch vehicles. My question is: Why do we not reconfigure the launch [263] pad as SLC-4 West to handle, at the present time, both Titan II as well as the Titan IV with the universal launch mount?

There has also been some talk about the Titan II being upgraded with solid rocket boosters which would essentially make it look very much like a shorter version of the Titan IV/Centaur.

Some other considerations that were made tonight was the inclusion of SLC-6 as a possibility of modifying for Titan IV/Centaur use, and there was also some consideration that using the space shuttle vehicle at SLC-6, but that was ruled out.

However, nothing has been stated tonight about the Shuttle C, which is an unmanned

version of the space shuttle, which is capable of taking about a 100,000 pound payload into orbit which is twice the capacity of Titan IV.

And once again, I apologize for the size of my graphics, but as you'll notice, Shuttle C is not very much different than the shuttle. The orbiter has been replaced with an unmanned canister. I would think that another alternative would be to consider using the Shuttle C, which can be brought on line by 1994, at least one or two years earlier than Titan IV/Centaur, and [264] capable of taking a greater payload. That would also leave the option open, in the future, for using the regular shuttle out here because of the launch commonality between the two systems.

Thank you very much.

COL. McSHANE: Thank you.

W.S. Mullins.

MR. MULLINS: Bill Mullins, 1204 North Orchid.

Two issues I'd like to see addressed in the EIR: One, is an in depth study of the water; and the other is the socioeconomic development of the shuttle --

UNIDENTIFIED SPEAKER: Excuse me. We

cannot hear you in the back.

THE WITNESS: Oh, I'm sorry.

[265] The two issues I'd like to see addressed in the EIR: One, is the in depth look at the water as to how it can be mitigated; and

[266] the other is socioeconomics of the facilities for the SLC-7 pertaining to domestic versus foreign products.

I'd like to see that addressed somewhat in the EIR.

Thank you.

COL. McSHANE: Thank you.

LeRoy Scolari.

MR. SCOLARI: LeRoy Scolari, 423 North "G" Street. I'm a local rancher in the area immediately east of the proposed construction site.

In going through the document, I find very little reference in regards to land use and other impacts in that area. I find considerable treatment of the area generally south and east in the Palama Beach area, Bixby Ranch, but very little for those lands that are primarily east of the launch site itself, east and somewhat south. In other words, the immediate boundaries to the south of South

Vandenberg on the inland side.

Can anyone -- if anyone can direct me as to how that's been treated, I'd appreciate it. But if it hasn't been treated, I'd like to ask that it be treated. [267]

COL. McSHANE: Colonel Leohnard, do you have someone who can talk about that tonight?

COL. LEOHNARD: Well, no. We'll look it up.

MR. EDWARDS: Give us a minute.

COL. LEOHNARD: We looked at it in terms of its impact on the project and our project's impact on the area, and found no significant impacts one way or the other.

We have our consistency plan which also addresses that before the Coastal Commission now, but we'd be willing and glad to go back and take another look to make sure we haven't missed anything.

MR. SCOLARI: I might say that the area concerned is not within the coastal zone. It's on the -- over the hill side from it.

COL. LEOHNARD: Okay. If at the end, if you could come up and show us on your map precisely what you're talking about, it would help us a lot.

COL. McSHANE: Thank you.

Next speaker is Jeremy Graves.

MR. GRAVES: My name is Jeremy Graves. I'm an associate planner with the Lompoc Community Development Department.

We appreciate the Air Force holding hearings in Lompoc, both at this time and May of '88, as well as tonight. We appreciate the review period you've provided with the public.

As you can see, this is an issue of great interest to the Lompoc Community. The City of Lompoc is not providing a prepared written statement tonight, but we will be providing a [268] written statement prior to the conclusion of your review period.

Thank you once again for holding the public hearing tonight.

COL. McSHANE: Thank you.

That's all the cards that I have that show that people wanted to speak. Is there anyone else who desires to speak?

Okay. We got one.

Elaine Schneider.

MS. SCHNEIDER: My name is Elaine Schneider. I'm a representative from the Chumash Cultural

Heritage Association, affiliated with the Santa Ynez Indian Reservation. I am a member of the Santa Ynez Indian Reservation. What I'd like to address is the cultural resource issue that's going to be impacted by these projects.

We've worked with Vandenberg for a very long time, for over 10 years now, and the impacts every time have been to Native American sites almost. This time this project will cause a destruction of -- in these three different areas, will cause a major destruction of Native American sites.

Cypress Ridge site, the Boathouse site, which has already been scraped once, has lost cultural heritage material. The other site, they say is a lot of vegetation on it, when we looked through it there was nothing -- it was not really visible. But the Cypress Ridge site which is next to SLC-6, contains everything including what we call, "The Gateway to the West," which is our buriel grounds.

[269] We, of the Indian community, are very upset at the possibility of not using SLC-6 since it's already been taken apart, put back together again three or four times. Why can't it

be used? Why can't the government money be spent to upgrade that site for this project? Why does another Native American site have to be destroyed?

We have said a lot. Maybe not in public, but through the official program or process of what we've tried to do. We've been there, we watched it be destroyed, and we're there again, and we're waiting to see if it's going to be destroyed again. How much more does the Native American community and the Chumash nation and its people have to take, before somebody listens to our side?

I am asking that the Cypress Ridge site not be touched again. It may not -- it may not mean anything to you, but it is our buriel sites that are destroyed. There is not enough information in there to tell you our side of it. We need to project our image. Our rights have to be protected somewhere. That's what we're asking for. That's why I'm here at this meeting. I want to see that SLC-6 be upgraded to handle this project, and the destruction of the other sites be preserved -- I don't mean "destruction," I mean that the area be preserved.

I am not a very good speaker and I

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apologize for this nervousness, but I do want to stress that we are the first people of this area, we want to see it preserved for our children. You should see what is out there. We have sites. We have people that can give you verbal history of out there.

One of the sites in the area -- or the Cypress Ridge site and the Boathouse area and the other sites are near enough to Noqto. That's 13 feet of midden. That's over 10,000 years of living that could be possibly impacted by these sites being -- by this project being built out there.

It's only a dirt road right now, but if this project proceeds, it will become a paved road. The paved road causes buildings. It causes access. It let's people park there. It let's raiders in. It causes destruction.

SLC-6, we watched it, the site being taken apart, the information taken out for Indians for you, and paperwork for somebody to read. It's in the history. It's in the museum. It hasn't even been catalogued for you to see what's been taken out of there. No reports have been written on it yet. And yet here comes this

new project, SLC-7, to do damage a mile down the road, just about.

You can see SLC-6 from Cypress Ridge. Cypress Ridge is going to have to have a water line to SLC-7. SLC-7 means you're going to go down a ridge, across a little valley, build a road that you put in there. They took a whole road out, now you're talking about building another road for SLC-7.

I'm skipping around, but these are things that happened on sites which are visible, which we saw happen. We saw destruction. We saw preservation also. I'm not saying it's all been bad, but I'm saying that the possibility of building SLC-7 in the Cypress Ridge area will [270] cause a major loss of our heritage, because the impacts would be to what we call "Our Gate to the World Beyond."

Thank you.

COL. McSHANE: Thank you.

Anyone else desire to speak tonight? Anyone else have a question for any of the panel members?

We will conclude the proceedings in a couple minutes. Please remember that you have until

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11 September 1989, to submit written materials to be included in the transcript of the hearings. And those written statements will be fully considered and addressed in the Final Environmental Impact Statement. Once again the oral and the written statements and comments will be afforded equal wait.

Officials of the Air Force appreciate your efforts to come out tonight and contribute your views to this public hearing. We thank you for your courteous attention. Please be assured that the Air Force decision makers will carefully consider each viewpoint raised here tonight when deciding the ultimate course of action on this proposal.

Thank you.

This public hearing is adjourned at 8:06 p.m.

STATE OF CALIFORNIA)
) ss.
COUNTY OF VENTURA)

I, ELLEN Q. BRESSI, CSR No. 7184, do hereby certify:

THAT the above-referenced hearing was taken at the time and place therein named and was thereafter reduced into typewritten form by computer-assisted transcription;

THAT the foregoing pages numbered 5 through 48 consist of a full, true, and correct transcription of my notes so taken;

I further certify that I am not interested in the event of this action.

IN WITENSS WHEREOF, I have hereunto subscribed my name on this 9th day of September, 1989.

Ellen Q. Bressi
ELLEN Q. BRESSI
Certified Shorthand Reporter

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2.2.1.2 Responses to Comments Received at Public Hearing
Lompoc, California, August 30, 1989

Commenter No. 1: Vandenberg Village Community Services - Howard Grantz, President

Comment No. 258: Impacts on Lompoc Plain Aquifer and Lompoc Uplands Aquifer

Comment: It does not discuss the impact upon our environment, the impact upon the local aquifer for which the water is extracted. This is called the "Lompoc Plain Aquifer."

Response: Impacts to the Lompoc Plain and Upland aquifers are discussed in Draft EIS Section 3.2.1.2, Ground Water, and are addressed in response to Comment Nos. 193 and 194. Additional detail regarding hydrologic relationships between the Lompoc Plain, Lompoc Terrace, and Lompoc Upland aquifers is provided in response to Comment No. 253.

Comment No. 259: Impacts on Community Water Supplies

Comment: This aquifer is overdrafted now and has been by almost 8,000 acre feet in the last six years. In addition to that, we are committed as a city here, to provide water to the Wye at 500 acre feet per year, Alan Hancock Campus, the Spaceport Museum, and several hundred houses being built. Now, on top of that, we'll have a demand then for water for this project. And there's a question in my mind as to whether or not we'll have enough water to provide for the needs of this program.

Response: See responses to Comment Nos. 83, 147, 162, 193, and 194. The Draft EIS notes that the increased water demands that would be expected to arise from the proposed project would be small, but significant, since the Lompoc Plain aquifer is in overdraft.

Comment No. 260: Impacts on Lompoc Plain Aquifer and Lompoc Uplands Aquifer

Comment: Therefore, the point we're making is that this EIR (sic), which treats water very lightly, should be expanded to cover much more detail, the impact upon the Lompoc Plain Aquifer. As a consequence of that, as the aquifer is overdrafted, it draws water

from our aquifer and the Uplands Aquifer. And therefore then, there are two aquifers that are affected: the one here in which Lompoc gets its water and the one in the Uplands.

Response: See response to Comment No. 194. See response to Comment No. 253 for a description of the hydrologic relationships between the Lompoc Plain, Lompoc Terrace, and Lompoc Upland aquifers.

Comment No. 261: Santa Barbara County Level of Significance for Ground Water Impacts

Comment: Another point of interest, the amount of water being consumed --- or will be consumed, goes beyond the County's threshold of significance, which should be remembered.

Response: The proposed withdrawals are above Santa Barbara's significance threshold of 7.68 acre feet per year.

Comment No. 262: Discussion of Impacts to Ground Water in Draft EIS

Comment: The section of the EIR (sic) that related to water, should be rewritten and expanded to fill these parts I just mentioned because the environmental impact on our aquifers concern all people here in the Valley.

Response: See responses to Comment Nos. 258, 259, 260, and 261.

Commenter No. 2: James Spellman, Jr., National Space Society

Comment No. 263: Use of SLC-4 for Titan IV and Titan II

Comment: My question is: Why do we not reconfigure the launch pad at SLC-4 West to handle, at the present time, both Titan II as well as the Titan IV with the universal launch mount?

Response: As described in Draft EIS Section 2.2.3, VAFB Launch Sites, SLC-4 West is an operational launch facility with scheduled missions that would be incompatible with the mission requirements for the Titan IV/Centaur from VAFB.

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Comment No. 264: Use of Shuttle C in Place of Titan IV/Centaur

Comment: I would think that another alternative would be to consider using the Shuttle C, which can be brought on line by 1994, at least one or two years earlier than Titan IV/Centaur, and capable of taking a greater payload. That would also leave the option open, in the future, for using the regular shuttle out here because of the launch commonality between the two systems.

Response: At this point in time, the Shuttle C is an unfunded program in the development stage that does not have a firm schedule for completion. This uncertainty regarding project completion precluded the Shuttle C from consideration as an alternative vehicle.

Commenter No. 3: W. S. Mullins

Comment No. 265: Mitigation of Water Resources

Comment: ... the in depth look at the water as to how it can be mitigated ...

Response: Mitigation measures proposed for conservation of water resources are contained in Sections 4.2.4.1 through 4.2.4.4 of the Draft EIS. Additional mitigation measures to reduce the demand for ground water are contained in response to Comment No. 83. Measures to control erosion and surface water runoff have been incorporated into the project design criteria, and low-use water fixtures would be installed in new facilities to reduce water consumption.

Comment No. 266: Acquisition of Domestic and Foreign Materials

Comment: ... is socioeconomics of the facilities for the SLC-7 pertaining to domestic versus foreign products.

Response: Materials for construction and operation of the proposed action would be procured as consistent with the Buy American Act (41 USC 10), per Federal Acquisition Regulation (FAR), Part 25, Foreign Acquisition, and applicable USAF regulations. The Buy American Act requires that only domestic end products be acquired for public use except for materials where cost would be unreasonable, where purchasing

domestic materials would be against the public interest, or if the material is not made in the United States. As a result of these regulations, it is anticipated that the bulk of materials for construction and operation of the proposed action would come from domestic sources.

Commenter No. 4: LeRoy Scolari, Local Rancher

Comment No. 267: Impacts on Lands East of the Project Site

Comment: I find considerable treatment of the area generally south and east in the Palma (sic) Beach area, Bixby Ranch, but very little for those lands that are primarily east of the launch site itself, east and somewhat south.

Response: Lands to the east and south of VAFB were analyzed in the Draft EIS in terms of land use and other impacts. Impacts to lands in these areas are minimal, as they are sheltered from the proposed and alternative launch locations by the Santa Ynez mountains. The emphasis placed on the Bixby Ranch and Jalama Beach areas resulted from their identification at the public scoping meetings held for the Environmental Impact Analysis Process in compliance with NEPA. Potential impacts considered for these areas included Air Quality and Meteorology (Section 4.5), Noise (Section 4.7), Transportation (Section 4.10), Health and Safety (Section 4.11), and Socioeconomics (Section 4.12).

Commenter No. 5: Jeremy Graves, Associate Planner, Lompoc Community Development Department

Comment No. 268: Written Comments to be Provided

Comment: The City of Lompoc is not providing a prepared written statement tonight, but we will be providing a written statement prior to the conclusion of your review period.

Response: Comment noted.

Commenter No. 6: Elaine Schneider, Representative: Chumash Cultural Heritage Association, Santa Ynez Indian Reservation

Comment No. 269: Selection of SLC-6

Comment: We, of the Indian community, are very upset at the possibility of not using SLC-6 since it's already been taken apart, put back together again three or four times. Why can't it be used?

Response: See response to Comment No. 139.

Comment No. 270: Impacts to the Chumash "Gate to the World Beyond"

Comment: I'm not saying it's all been bad, but I'm saying that the possibility of building the proposed project on the Cypress Ridge area will cause a major loss of our heritage, because the impacts would be to what we call "Our Gate to the World Beyond."

Response: As noted in response to Comment No. 249, development of the proposed action would be consistent with applicable laws and regulations for the regional preservation of Native American heritage, such as the "Gate to the World Beyond," to the fullest extent possible.

2.2.2 SANTA BARBARA, CALIFORNIA PUBLIC HEARING

2.2.2.1 Santa Barbara, California Public Hearing Transcript

ORIGINAL

PUBLIC HEARING

DEPARTMENT OF THE AIR FORCE

SYSTEMS COMMAND

DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED TITAN IV/CENTAUR SPACE LAUNCH COMPLEX 7 VANDENBERG AIR FORCE BASE, CALIFORNIA

NO.

REPORTER'S TRANSCRIPT OF PROCEEDINGS

Thursday, August 31, 1989

7:05 P.M.

Santa Barbara, California

REPORTED BY:
ELLEN Q. BRESSI
CSR No. 7184

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PUBLIC HEARING
DEPARTMENT OF THE AIR FORCE
SYSTEMS COMMAND
THURSDAY, AUGUST 31, 1989

DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR
PROPOSED TITAN IV/CENTAUR SPACE LAUNCH COMPLEX 7
VANDENBERG AIR FORCE BASE, CALIFORNIA

SANTA BARBARA
COUNTY SUPERINTENDENT OF SCHOOLS AUDITORIUM
4400 CATHEDRAL OAKS ROAD
SANTA BARBARA, CALIFORNIA
7:05 P.M.

REPORTER BY:
ELLEN Q. BRESSI
CSR. No. 7184

APPEARANCES:

COLONEL MIKE McSHANE, Military Trial Judge, designated as presiding officer by the Office of the Judge Advocate General in Washington

LIEUTENANT GENE BRANCH, Administrative officer

COLONEL MIKE HAYNER, Western Space and Missile Center at Vandenberg Air Force Base; Space Launch Complex 7 Program Manager

COLONEL BILL LEOHNARD, Design, construction and environmental anaylsis of Systems Command facilities and programs at Vandenberg Air Force Base

JOHN EDWARDS, Manager of the environmental analysis for Space Launch Complex 7

DAN EVANS, Environmental Solutions, Incorporated, Air Force contractor conducting the environmental analysis for Space Launch Complex 7

PUBLIC SPEAKERS:

REGGIE PAGALING

SANTA BARBARA, CALIFORNIA

THURSDAY, AUGUST 31, 1989

7:05 P.M.

-o0o-

COL. McSHANE: Good evening, folks. My name is Mike McShane. I'm a full-time Military Trial Judge for the Air Force Courts Marshall. I've been designated by the office of the Judge Advocate General in Washington as presiding officer for tonight's public hearing upon the Draft Environmental Impact Statement.

I want to start out by advising you that the National Environmental Policy Act and Implementing Regulations, require federal agencies to carefully analyze the potential environmental impacts of proposed actions, and to use those analyses in arriving at decisions or recommendations on whether and how to proceed with those actions.

The Air Force has prepared and distributed, in accordance with applicable regulations, a Draft Environmental Impact Statement addressing a proposal for the construction and operation of a Titan IV/Centaur Space Launch Complex in support of the Department of Defense Space

Program.

I am not here as an expert on this proposal nor have I had any connection with its development. I'm not here to act as a legal advisor to the Air Force experts who will address this proposal. My purpose is simply to insure that we have a fair, orderly hearing and that all who wish to be heard have a fair chance to speak.

Let me take just a moment to explain how tonight's hearing will proceed. This isn't going to be a debate nor a referendum or vote upon the proposal itself. There will be no demonstrations, nor should you signify your agreement or disagreement with a speaker's position by applause or other expressions of approval or disapproval. That adds nothing to the hearing record and simply wastes your valuable time.

What this informal hearing is intended to provide is a public forum for two-way communications, with a view to improvement of the overall decision making process. The first part of that two-way communication calls for you to listen carefully to what the Air Force experts say as you are briefed on the proposal and its

anticipated environmental consequences.

After that briefing, you will be able to ask questions to clarify, in your own minds, any points made in the briefing or in the Draft Environmental Impact Statement. Part 2 of this two-way communication process is for you to tell the Air Force experts what you think, to give Air Force decision makers the benefit of your knowledge of the local area affected by the proposal and any environmental hazards you perceive.

This is a proposal. It's not something that's already been decided, approved or funded. Our hearing isn't for the purpose of justifying anything, but rather to identify and assess pertinent impact, including your personal prospectives as to those impacts.

If you have not already done so, you should fill out one of these public hearing registration cards. It's just kind of to keep the attendance and also to indicate on there if you want to make a statement.

Later on, I will recognize members of the public for the purpose of putting questions to the Air Force experts, or making statements about this proposal. Don't be shy or hesitant to

ask questions or make statements. This is an informal hearing and you can ask any questions that you want to ask.

I want to help insure that all those who wish to speak have a fair chance to be heard, so please help me enforce the following ground rules:

First, only speak after I recognize you and please address your remarks to me.

Second, speak clearly and slowly, starting out with your full name, address and the capacity in which you appear. That is, as a public official, a designated representative of a private association, or a person speaking solely in his or her own behalf, so that our court reporter, Mrs. Bressi who has to make a verbatim record of these proceedings, can do her job professionally.

Third, if you have a question for the panel, ask one question at a time. I will allow a reasonable number of questions.

Fourth, honor any request from me that you cease speaking.

Fifth, do not speak while another is speaking. Only one person will be recognized at a time.

And finally, I'm sure that this is a no smoking area, so everyone should please comply with that rule.

It is possible that there will be questions here tonight that the Air Force experts can't answer. That could happen for one or two reasons: First, even though we do have a lot of expertise here, they will not attempt to answer any question unless they are confident that they can answer it accurately. And second, there may be questions that have national security implications, and these must be reviewed further before answers are provided. If this should occur and if the question is relevant, I can assure you that it will be addressed in the final document, and each of you may request a copy of that document.

You're invited to fill out a written comment sheet, if you desire to do so, rather than making the public statement or if you want to do so in addition to make a public statement. Statements can be submitted at any

time prior to 11 September 1989, and you can mail them to the address which is listed on the comment sheet or leave them here tonight.

Regardless of whether you read your statement on the record tonight or mail it in later, it will be carefully considered and made part of the record of these proceedings. It will have equal weight and receive the same careful consideration, whether made during tonight's hearing or afterward.

I want to thank everyone who turned out tonight. Your presence here is commendable in that it reflects a great interest in your community and in those things that are important to it. Let me assure you that your interest is the primary purpose for us being here.

Now it's my pleasure to introduce Colonel Bill Leonard, who will brief the proposal tonight.

Colonel.

COL. LEOHNARD: Thank you, Colonel McShane.

As mentioned, I'm Colonel Bill Leohnard, Director of Acquisition Civil Engineering at Space Systems Division in Los Angeles. My Directorate is responsible for the

design, construction and environmental analysis of Systems Command facilities located in Vandenberg Air Force Base. This includes the project for which we are here tonight, the proposed Space Launch Complex 7 or Titan IV/Centaur Space Launch Vehicle.

First I'd like to introduce the other individuals on the dais, who will be assisting us this evening. Next to Colonel McShane is Lieutenant Branch who is acting as our administrative officer for this evening. To his right is Colonel Mike Hayner, who is with the Western Space and Missile Center at Vandenberg Air Force Base, and is the Space Launch Complex 7 Program Manager. To my right is Mr. John Edwards, a member of my staff and the manager of the environmental analysis for SLC-7. To his right is Mr. Dan Evans, representing Environmental Solutions Incorporated, the Air Force contractor conducting the environmental analysis for the proposed project.

As Colonel McShane mentioned, we will try to answer all your questions about the Environmental Impact Analysis Process and the Proposed Action, or the Draft EIS, but those questions that we are unable to answer, rest

assured that they will be addressed within the Final Environmental Impact Statement.

(Slide change.)

COL. LEOHNARD: I will now explain how the Environmental Impact Analysis Process is conducted, and give you an overview of our proposed action and the general findings of the Draft Environmental Impact Statement.

The National Environmental Policy Act, or NEPA, is implemented by the President's Council on Environmental Quality Regulation. NEPA requires that the federal agencies analyze potential environmental impacts of a proposed project and carefully consider alternatives, including the no-action alternative. These analyses are then used to make decisions and recommendations on whether and how to proceed with the project.

As shown on the screen, the Environmental Impact Analysis is started when the Air Force project proponent requests environmental impact analysis from the Air Force environmental planners. The project proponents do this at an early stage in the project planning to determine the extent of environmental documentation needed,

whether it be a Categorical Exclusion, an Environmental Assessment or Environmental Impact Statement.

The regulation of the President's Council on Environmental Quality allow Categorical Exclusions for classes of action that do not individually or cumulatively affect the environment. Therefore, these actions require neither an Environmental Assessment nor an Environmental Impact Statement.

Early in the analysis process we determined that this space launch complex did not qualify for a Categorical Exclusion.

The next step in the Environmental Analysis Process is to determine if the project needs an Environmental Assessment or the more extensive Environmental Impact Statement. If it appears that the project will have any significant impacts, the environmental planners will elect to proceed with an Environmental Impact Statement.

In early 1988, when we were planning this proposed action, it was determined that due to the potential significant impacts we would proceed with an Environmental Impact Statement.

The completion of this process, then, is the decision made by the Air Force about whether to proceed with the proposed action, a modification of that proposed action, or to terminate the project altogether.

(Slide change.)

COL. LEOHNARD: The first step in the preparation of an EIS is to publish a Notice of Intent in the Federal Register and to make this notice available to newspapers and other media and interested party within the area. The notice for the proposed SLC-7 project was published in the Federal Register April 8th, 1988.

The next step in the Environmental Impact Analysis Process is to hold a meeting to obtain the agency and public opinions on the issues that should be addressed within the EIS.

The purpose of that meeting is to identify significant issues and focus the scope of the Environmental Impact Statement.

The public scoping meetings for SLC-7 were held on May 3rd, 1988, in Lompoc, and May 5th, 1988, in Goleta.

Issues were further identified in consultation with State, local and federal

agencies, as well as by internal Air Force review.

(Slide change.)

COL. LEOHNARD: Based on the scoping efforts, we began extensive data gathering and analytical efforts which culminated in the preparation of the Draft EIS. Over 270 copies were mailed on July 19th, 1989, to all individuals and organizations who had requested a copy. In addition, we made copies available to local libraries for public reading.

The Draft EIS was filed with the Environmental Protection Agency on 21 July 1989, and the notice of availability appeared in the Federal Register on July 28th, 1989. Thus began the 45-day public comment period for the which will end on September 11th of this year.

During the public comment period, two actions will take place: The first is the public hearing which is held in order to receive comments on the draft document, which is why we are here this evening. The second activity during the 45-day period is that written comments may be submitted to the Air Force by interested individuals and agencies. All comments that are received during the public hearing, either oral or

written, and during the 45-day comment period, are addressed in the Final Environmental Impact Statement.

Once the Final EIS is prepared, copies will be distributed in the same manner as the draft document. The Final EIS is filed with the EPA, which publishes a Notice of Filing in the Federal Register. Once this notice appears, a 30-day post filing waiting period starts before the Record of Decision can be made. All mitigation measures that are approved by the decision makers are required to be implemented.

Once the decision has been made, it is reported and announced to the public. The Final EIS and Record of Decision on this project will be published in early next year. The Record of Decision will explain the conclusion reached by the Air Force, the rationale for that selection and the alternatives considered.

(Slide change.)

COL. LEOHNARD: After the potential issues associating with the proposed project are identified, the preparation of the Draft EIS is initiated. Prior to the analysis of potential impacts, a description of the proposed actions and

its alternatives are developed. In particular, the development and consideration of alternatives to the proposed action is an important part of the Environmental Impact Analysis Process.

(Slide change.)

COL. LEOHNARD: In order to draw a list of reasonable alternatives, the proponents select objectives that must be met by the potential alternative.

(Slide change.)

COL. LEOHNARD: The objectives of this project are to:

Provide a launch complex to support a launch vehicle that can carry a large payload;

Utilize expendable launch vehicle;

Provide capability to achieve high altitude orbit;

And last, to provide a location that can launch satellites safely into a polar orbit.

(Slide change.)

COL. LEOHNARD: Following the identification of these objectives, conceptual studies identified the components necessary to fulfill the project

objectives. These studies resulted in the formulations of the proposed action and the development of its alternatives.

The following illustrations show the required project components as developed for the proposed action. They would also apply to the alternatives considered.

(Slide change.)

COL. LEOHNARD: The first of the major project elements is the Titan IV/Centaur space vehicle itself. The vehicle is approximately 204 feet long and supports a payload faring of 86 feet in length, giving it the capacity of transporting very large payloads. This is the latest version of the Titan vehicle and is equipped with two upgraded solid rocket motors, a liquid fueled core vehicle, and a Centaur upper stage that allows it to put payloads in the 10,000 pound class into a high earth orbit.

(Slide change.)

COL. LEOHNARD: The next overhead shows an artist's rendering of the configuration of the launch pad. The major elements present on the pad include the mobile service tower, the umbilical tower, the launch mount and launch support

structure, the exhaust duct, and the operation support building, propellant storage areas and maintenance structures.

The timeline for construction of the proposed action shows that it would take at least four years to build; operations would begin in the fifth year. Facility design and construction would involve planning for and undertaking site grading, road construction, utilities development, and erection of security fencing and operation support building and the launch support structure, as well as carrying out site rehabilitation measures.

Design and construction of the ground support systems follows shortly after facility construction begins. The ground support systems are aerospace equipment which includes mobile service tower, the launch mount, the umbilical tower and other support equipment. Beginning somewhere around the start of the fifth year, the facility will be complete and launch preparations would begin.

(Slide change.)

COL. LEOHNARD: As with the construction of any space launch complex, there are also numerous offsite facilities which are required to support launch operations. This overhead shows several of

these:

The vehicle assembly building;

The payload faring receipt and processing facility;

The propellant storage area;

The solid rocket motor receipt and processing building, where the individual segments of the solid rocket motors would be inspected and sub-assembled prior to transport to the launch pad;

And the launch control center.

Additional offsite facilities would include utilities necessary to supply electrical power, communications, water and other essential commodities to the launch site.

(Slide change.)

COL. LEOHNARD: Project operations are depicted on the next overhead. Operations would be conducted at a level to support two Titan IV launches per year, with a capability to surge to three launches in a year.

Launch operations include:

The delivery, check-out and transportation to the pad of the solid rocket motors;

Delivery and erection of the core vehicle;

Mating and check-out for the various segments of the vehicle;

Erection of the Centaur upper stage;

Insertion of the payload;

Installation of the payload faring;

Vehicle fueling;

And vehicle launch.

Post launch operations include cleaning the launch pad and refurbishing it in time to support the next scheduled launch.

(Slide change.)

COL. LEOHNARD: As required by NEPA, the Air Force has developed and analyzed a number of alternatives that could achieve the desired mission objectives. The purpose of this exercise is to make certain that the proposed action is not selected without due and deliberate consideration for other methods that might be available to achieve the same goals.

(Slide change.)

COL. LEOHNARD: The range of alternatives

analyzed includes the no-action alternative, different launch vehicles, launch locations outside of Vandenberg, and existing and undeveloped launch sites on Vandenberg. Some alternatives were considered and eliminated, since they could not reasonably achieve the goals of the proposed action, or because they would result in equal or greater environmental impacts.

If the no-action alternative were pursued, then SLC-7 project would not be developed and the Titan/IV Centaur could not be launched at Vandenberg Air Force Base. It has been determined that this would unacceptably impact national security. Current defense programs rely on our future ability to launch heavy payloads into near earth orbits -- excuse me, polar orbits. Since there are no other space launch vehicles available to meet this mission requirement, there would be no displacement effect to result in environmental impacts elsewhere.

(Slide change.)

COL. LEOHNARD: Other launch vehicles were considered. These include the Space Transportation System, or the shuttle, and the Titan IV NUS, that is, No Upper Stage.

(Slide change.)

COL. LEOHNARD: The space system is an alternative, but its capacity at Vandenberg is not equivalent to the Titan IV/Centaur. In addition, the use of the space shuttle was eliminated from further consideration since it is not available for launches from Vandenberg, and since launches from Cape Canaveral in Florida cannot safely provide the required near polar orbit.

The Titan IV without the upper stage was considered, since it represents the Air Force's largest capacity vehicle currently in use. This alternative was eliminated, however, since the Titan IV without the upper stage cannot achieve the required high earth orbit to combine with the capacity requirements.

(Slide change.)

COL. LEOHNARD: Alternative launch locations outside of Vandenberg were considered for use by the Air Force to launch the Titan IV/Centaur.

(Slide change.)

COL. LEOHNARD: Facilities are available for launch of the Titan/IV Centaur from Cape Canaveral Air Force Station; however, this

alternative was eliminated from further consideration since near polar orbits cannot be achieved, given the large payload requirements.

U.S. Department of Navy maintains a missile test range on Clemente Island, off the coast of Southern California. Use of this range would allow for attainment of the near polar orbits. However, the launch support facilities shown earlier are lacking at this site. The development of the launch site itself and the necessary facilities including power, sewer, water supply, communications and vehicle processing and preparation facilities, would be costly and would result in comparable or greater environmental impact.

The State of Hawaii was also evaluated for its capability to support space launch activities. However, Hawaii was eliminated from further consideration as an alternative launch site because the environmental impacts would be greater than those considered at Vandenberg Air Force Base.

The proposed action could be accommodated at other islands in the South Pacific that would allow for polar orbit to be achieved;

however, necessary support facilities including such items as labor force are scarce commodities on these islands. In addition, an entirely new launch support system would be required, including a launch control center, telemetry and tracking facilities, propellant storage, and vehicle component processing facilities.

It is anticipated that the environmental impact from the development of the Titan IV/Centaur Launch Facility in the South Pacific would be similar or greater to those incurred at Vandenberg, due to the additional construction and the remote nature of the locations. Therefore, this alternative was eliminated from further consideration.

(Slide change.)

COL. LEOHNARD: With the obvious advantages of existing launch support and general capability of obtaining near polar orbits, sites from Vandenberg were identified as reasonable alternatives to the proposed action. The sites identified include some considered and eliminated from further analysis, and some considered in detail.

(Slide change.)

COL. LEOHNARD: Sites considered and eliminated from further analysis include Launch Complexes 2, 3, 4, and 5.

SLC-2 is a small pad currently used by the Delta Rocket Program. Its use would require complete razing and reconstruction to meet the Titan IV/Centaur requirements. In addition, due to its location, SLC-2 cannot safely support near polar orbits with the necessary payload capability.

SLC-3 East and West are currently being used to launch Atlas vehicles. Like SLC-2, utilizing SLC-3 would require complete razing of the existing facilities and building new ones, since the existing facilities are too small to support Titan IV/Centaur. In addition, SLC-3 is closer to Lompoc than the proposed site, which would result in higher levels of noise within that community.

SLC-4 East is currently being refurbished to accommodate the Titan IV/NUS missions, and SLC-4 West is an operation Titan II facility. These launch complexes will be fully utilized in their existing programs and not available for other uses.

(Slide change.)

COL. LEOHNARD: From the suite of alternatives considered, those mentioned previously have been eliminated from further consideration as not feasible in support of project requirements, or since environmental impacts would be equal to or greater than the proposed action. This analytical process has resulted in a number of alternatives and will be considered in more detail.

(Slide change.)

COL. LEOHNARD: The alternatives considered in detail are all located on South Vandenberg and include the proposed Cypress Ridge site --

(Slide change.)

COL. LEOHNARD: -- as well as Space launch Complex 6 --

(Slide change.)

COL. LEOHNARD: -- the Boathouse Flats area --

(Slide change.)

COL. LEOHNARD: -- and the Vina Terrace alternative site.

All are located so that near polar launches can be safely achieved and existing offsite facilities and support facilities at Vandenberg can be utilized.

(Slide change.)

COL. LEOHNARD: The proposed Cypress Ridge site is currently undeveloped and is being utilized for cattle grazing. The site occupies approximately 120 acres of gently sloping marine terrace, approximately one-half mile from the ocean.

(Slide change.)

COL. LEOHNARD: The SLC-6 alternative site is very different from the others considered in detail, since it is a developed space launch complex already. The SLC-6 complex was originally built in 1970 for the Manned Orbiting Laboratory Program. When constructed, SLC-6 was configured to launch Titan III vehicles. Subsequent to the cancellation of the Manned Orbiting Laboratory Program, SLC-6 was modified to support space launch vehicles -- excuse me, space shuttle launch vehicles. However, primarily due to the 1986 Challenger disaster, we have not used SLC-6 for shuttle launches.

SLC-6 is a site approximately 180 acres in size, located on a westerly sloping terrace, approximately one mile from the ocean. Since it is a developed site, it would be very low

vegetation -- there is very low vegetation present.

(Slide change.)

COL. LEOHNARD: The Boathouse Flats alternative site, like the proposed Cypress Ridge site, is an undeveloped area of approximately 130 acres in size. This site, however, is primarily grassland and is much closer to the ocean than the Cypress Ridge site.

(Slide change.)

COL. LEOHNARD: The Vina Terrace alternative site is also undeveloped and is slightly larger than the Cypress Ridge site, approximately 150 acres. This additional size is necessary since the Vina Terrace area is the steepest topography of the alternatives. This area is vegetated with a mix of grasses and coastal shrub, and at approximately one-and-one-half miles is the furthest from the ocean.

(Slide change.)

COL. LEOHNARD: After the three alternatives to be addressed in detail were identified, potential environmental impacts from the proposed action and alternatives were analyzed for inclusion in the Draft EIS. This process began with efforts to characterize

the existing environment, based upon the issues identified during the scoping process.

(Slide change.)

COL. LEOHNARD: As you can see, a wide variety of data was gathered to address potential impacts. Intensive surveys of vegetation, wildlife and cultural resources were undertaken by the environmental contractor to support the analytical process. Information to characterize the remaining resources was generated through empirical observations, reviews of existing literature, and consultation with government agencies.

(Slide change.)

COL. LEOHNARD: After the data that describe the existing environments were gathered, the potential environmental impacts were determined through extensive analytical activities performed by the environmental subcontractor.

Mitigation actions to abate potential impacts were developed next. The final step in the environmental evaluation of the proposed action was then to reevaluate the impacts with the mitigation actions included.

(Slide change.)

COL. LEOHNARD: The illustration in this

overhead is of the most important potential environmental impacts that would result during the construction phase of the proposed action.

You will note that most of the impacts would result in the project construction, such as those geological in source, vegetation, wildlife and cultural resources. These would result from activities such as earth moving and construction on the site itself. Impacts to water resources and economic benefits would result from the temporary presence of construction personnel within the local communities.

(Slide change.)

COL. LEOHNARD: The next illustration is an overview of the most important potential impacts that would result from the operations phase. Impacts to health and safety, vegetation, and wildlife are expected to be concentrated in the vicinity of the launch pad. Potential impacts from water resources, socioeconomics, air quality, noise levels, and recreation are expected to occur in the areas around Vandenberg Air Force Base.

That concludes the briefing.

COL. McSHANE: Thank you, Colonel Leonard.

You were invited to fill out an

attendance card when you arrived. If you have not filled one out yet, please do so during the short break we're going to have here.

Regarding the making of a statement tonight, if we have any elected public officials, I'll call on you first. After that we'll ask for representatives of organizations who want to speak, and then I'll ask for people who are speaking in their individual capacities.

If you do not wish to make your public statement tonight or if you have additional comments beyond those that you wish to make orally, you may provide written comments after this meeting or send them to the address provided on the comment sheet.

I recognize that some people may wish to make statements on defense policy, nuclear weapons, arms control and fiscal policy at this meeting; however, such comments are best directed to policy makers such as your congressmen and senators. Please limit your comments here tonight to environmental issues.

We need to, I guess, move the tables around a little bit, and I need to get the comment cards. We'll take just a couple minutes

of recess and we'll get back together.

(Brief recess.)

COL. McSHANE: Okay, folks, we're ready to start back up.

I have a grand total of one individual who wanted to speak to us tonight.

Reggie -- I'm sorry, I can't --

MR. PAGALING: Pagaling.

COL. McSHANE: "Pagaling." Okay.

MR. PAGALING: My name is Reggie Pagaling. I live at 633 Eucalyptus Drive, No. 10, in Solvang, California, and I'm associated with the Cultural Heritage Associates, affiliated with the Santa Ynez Indian Reservation.

Last night my sister spoke about SLC-6 and SLC-7, this proposed project, and I'd like to reiterate on a number of the same things, however, what we know about the area and what is going on today as we've expressed a number of times.

Science is always taking a new turn and those new turns in archaeology are ever changing. Even now that approach and methodology is changing us to a point where we may not even have to excavate. And although we're familiar with some of the

archaeologists doing the environmental work, more theories and more different approaches, as to assess the total impact, are upon us at this time.

We are the first people of the area, we've adopted this nation, and we're looking forward to continuing working with you. And we realize that defense is a priority, but just like energy is priority, the L & G Plant that was proposed at Point Conception was occupied in the 1970s.

And I'm not saying that we're going to look to occupy a military base, I mean, that's really ridiculous. However, we do look forward to doing what we can to protect what is left of our heritage. I know I'd like to protect it for my children and my children's children.

[271] The paper this morning read that the Air Force was promising that there was going to be no further encroachment into the southern part of the base. But we know from discussions that this was implied, but I know you always have your options.

[272] And I think one option you still should pursue is the utilization of SLC-6. There, we still see socioeconomic support of the

community, providing jobs for people, if and when, that gets implemented and utilized.

We mentioned yesterday that it's almost like our heaven; well, it is. It's our sacred lands. We are known as the "Protectors of the Western Gateway," not only among the traditionals here, but in the Hopi legends, in the Navajo nation, and the all the way back to the Seneca in New York. So we look forward to our role in the Indian world, to assuring that we can protect that.

We don't want to see Mother Earth destroyed any more and we don't want to desecrate our sacred lands. And at this time I'd really like to ask you to pursue SLC-6 and utilize it, and leave our sacred lands and our Western Gateway alone.

Thank you.

COL. McSHANE: Thank you.

Anybody else?

This is your opportunity to make comments about the proposal.

There being no further comments, we'll adjourn the meeting.

Thank you.

(Whereupon the public hearing was concluded at 7:47 p.m.)

STATE OF CALIFORNIA)
) ss.
COUNTY OF VENTURA)

I, ELLEN Q. BRESSI, CSR No. 7184, do hereby certify:

THAT the above-referenced hearing was taken at the time and place therein named and was thereafter reduced into typewritten form by computer-assisted transcription;

THAT the foregoing pages numbered 4 through 35 consist of a full, true, and correct transcription of my notes so taken;

I further certify that I am not interested in the event of this action.

IN WITENSS WHEREOF, I have hereunto subscribed my name on this 9th day of September, 1989.

Ellen Q. Bressi
ELLEN Q. BRESSI
Certified Shorthand Reporter

2.2.2.2 Responses to Comments Received at Public Hearing
Santa Barbara Public Meeting, August 31, 1989

Commenter No. 7: Reggie Pagaling, associated with Chumash Cultural Heritage Association, Santa Ynez Indian Reservation.

Comment No. 271: Further Development on South VAFB

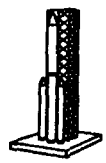
Comment: The paper this morning read that the Air Force was promising that there was going to be no further encroachment into the southern part of the base. But we know from discussions that this was implied, but I know you always have your options.

Response: Comment noted.

Comment No. 272: Selection of SLC-6

Comment: And I think one option you should still pursue is the utilization of SLC-6.

Response: See response to Comment No. 139.



Chapter 3.0

ADDENDA AND ERRATA TO THE DRAFT EIS

3.0 ADDENDA AND ERRATA TO THE DRAFT EIS

This chapter contains factual corrections and additions or modifications to the analyses contained in the Draft EIS based on public and agency comments. The addenda and errata provided in the following sections are applicable to the Draft Environmental Impact Statement, Construction and Operation of Space Launch Complex 7 at Vandenberg Air Force Base, California, July 20, 1989. As previously noted, SLC-7 has been renamed TCLC in response to the inclusion of SLC-6 as one of the four alternatives considered.

This chapter is organized into three sections for ease of reference. Section 3.1, Draft EIS Text, contains additions and modifications made to the text of the Draft EIS. Section 3.2, Draft EIS Tables, contains revised or new tables to replace or add to those contained in the Draft EIS. Section 3.3, Draft EIS Figures, contains revised or new figures to replace or add to those contained in the Draft EIS.

3.1 DRAFT EIS TEXT

This section contains additions or modifications to the text of the Draft EIS. The material to be changed or added is contained in quotation marks and is identified, as appropriate, by Draft EIS Section, page(s), paragraph(s), and line(s). The paragraph may be identified by counting from the top of the page, including partial paragraphs.

Summary, page S-1, second paragraph, after the third sentence, insert "Unless the context indicates otherwise, the term 'SLC-7' is used for convenience throughout the Draft EIS to refer to the proposed new Titan IV/Centaur Launch Complex (TCLC). In the Final EIS, the term TCLC is used throughout to refer to that same complex. Achieving that objective through conversion of the existing SLC-6 is one of the alternatives under consideration."

Summary, page S-2, after fourth full paragraph, insert "The preferred alternative for meeting program launch requirements and environmental considerations is the conversation of SLC-6."

Summary, page S-2, fifth paragraph, seventh line, change "The proposed Cypress Ridge and alternative Boathouse Flats and" to "The Cypress Ridge, Boathouse Flats, and."

Chapter 1.0, page 1-1, first paragraph, after the first sentence, insert "Unless the context indicates otherwise, the term 'SLC-7' is used for convenience throughout the Draft EIS to refer to the proposed new Titan IV/Centaur Launch Complex (TCLC). In the Final EIS, the term TCLC is used throughout to refer to that same complex. Achieving that objective through conversion of the existing SLC-6 is one of the alternatives under consideration."

Section 1.4, page 1-7, third paragraph, second sentence, change "(SLC-7 Scoping Process, Summary of Issues)" to "(Scoping Process, Summary of Issues)."

Section 1.5.1.2, page 1-10, first paragraph, at end of paragraph, insert "The Marine Mammal Protection Act established a moratorium on the taking of marine mammals and that if it appears that incidental taking of marine mammals would occur, an incidental take permit from NMFS would be required, as provided in Section 101(a)(5) of the Act."

Section 1.5.1.4, page 1-10, third paragraph, fourth line, change "(Environmental Solutions, Inc. 1989b)" to "(Environmental Solutions, Inc. 1990a)."

Section 1.5.1.4, page 1-10, fourth sentence, fifth and sixth lines, change "the Biological Assessment was submitted to USFWS and NMFS concurrently with the Draft EIS." to "the Biological Assessment will be submitted to USFWS and NMFS as available."

Section 1.5.3.2, page 1-13, second sentence, third and fourth lines, change "(Environmental Solutions, Inc. 1989c)" to "(Environmental Solutions, Inc. 1990b)."

Section 1.5.4.1, page 1-14, last paragraph, fifth, sixth, and seventh lines, change "There is no deadline for attainment of the CAAQS. To date, SBCAPCD has not adopted any ambient air quality standards more stringent than the CAAQS" to "The California Clean Air Act calls for attainment of the CAAQS 'by the earliest possible date.' California air districts not in attainment of ozone, CO, NO_2, and SO_2 standards must reduce emissions of these pollutants and their precursors by five percent per year until standards are attained. SBCAPCD has adopted its own three-minute average hydrogen sulfide standard of 0.6 ppm."

Section 1.5.4.1, page 1-15, Table 1.5.1, add the following footnotes:

"Notes

(1) California standards, other than carbon monoxide, sulfur dioxide (1 hour), nitrogen dioxide and particulate matter - PM_{10}, are values that are not to be equaled or exceeded. The carbon monoxide, sulfur dioxide, and particulate matter - PM_{10} standards are not to be exceeded.

(2) National standards, other than ozone and those based on annual averages or annual geometric means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

(3) Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25° C and a reference pressure of 760 mm of mercury. All measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

(4) Any equivalent procedure which can be shown to the satisfaction of the Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.

(5) National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the Environmental Protection Agency.

(6) National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the implementation plan is approved by the EPA.

(7) Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship of the reference method" and must be approved by EPA.

(8) At locations where the state standards for oxidant and/or suspended particulate matter are violated. National standards apply elsewhere.

(9) Prevailing visibility is defined as the greatest visibility which is attained or surpassed around at least half of the horizon circle, but not necessarily in continuous sectors."

Section 1.5.4.1, page 1-16, first paragraph, add the following sentence to end of paragraph "As mentioned above, areas that do not attain the CAAQS for ozone, CO, NO_2, and SO_2 must reduce the emissions of these pollutants and their precursors by five percent per year until attainment is met. Specific AQAPs for attainment of the CAAQS must be submitted to CARB by July 1991."

Section 1.5.4.1, page 1-16, third paragraph, sixth line, after "formation." add "The EPA's State Implementation Plan Call (May 1988) for Santa Barbara County requires the County to prepare a new Plan to meet the ozone standard. The Plan will control emissions for the entire county."

Section 1.5.4.2, page 1-17, third paragraph, first line, change "emits or controls" to "emits or may emit air contaminants to the atmosphere or controls; " change "air contaminants to the atmosphere" to "air contaminants."

Section 1.5.4.2, page 1-17, third paragraph, third line, change "regulations, a Permit to Operate (PTO) is issued" to "regulations, an application for a Permit to Operate (PTO) may be filed with SBCAPCD."

Section 1.5.4.2, page 1-17, fifth paragraph, fifth line, change "(1) meteorological" to "(1) one year of meteorological."

Section 1.5.4.2, page 1-17, fifth paragraph, sixth line, change "(2) background" to "(2) one year of background."

Section 1.5.4.2, page 1-18, first paragraph, first line, delete sentence beginning with "By imposition of."

Section 1.5.4.4, page 1-19, second paragraph, second line, change "descriptive" to "representative."

Section 1.5.5.1, page 1-19, fifth paragraph, first and second lines, change "California Regional Water Quality Control Board, Resolution No. 83-12 and Order No. 83-60" to "California Regional Water Quality Control Board, Order No. 83-60 and Report of Waste Discharge Permit."

Section 1.5.5.1, page 1-19, fifth paragraph, fourth line, delete sentence which begins "Resolution No. 83-12."

Section 1.5.5.1, page 1-20, first paragraph, first line, delete line.

Section 1.5.5.1, page 1-20, first paragraph, second line, delete line.

Section 1.5.5.1, page 1-20, first paragraph, third line, delete "than 2,500 gallons per day (average daily flow)."

Section 1.5.5.1, page 1-20, first paragraph, sixth line, add "The wastewater system would require a Report of Waste Discharge permit for operation."

Section 1.5.5.2, page 1-20, insert this paragraph between the third and fourth paragraphs "Section 313 of the Clean Water Act requires that each department or agency, of any branch of the federal government having jurisdiction over any property or facility, or engaged in an activity resulting, or which may result, in the discharge or runoff of pollutants, shall be subject to, and comply with all federal, state, interstate, and local requirements respecting the control and abatement of water pollution in the same manner, and to the same extent as any non-governmental entity."

Section 1.5.5.1, page 1-20, first paragraph, after the last sentence, add "A report of waste discharge would be submitted to the Regional Board."

Section 1.5.5.6, page 1-21, third paragraph, second line, after "wastewater treatment units." add "Other provisions of RCRA that may be applicable include Subtitle F, Section 6001 through 6004, Federal Responsibilities; Subtitle H, Section 8002(r), Minimization of Hazardous Waste; and Subtitle I, Regulation of Underground Storage Tanks (USTs) including, but not limited to, Section 9003, Release Detection, Prevention and Correction Regulations."

Section 1.5.5.8, page 1-22, second paragraph, first sentence, first line, change "(Environmental Solutions, Inc. 1989e)" to "(Environmental Solutions, Inc. 1990c)."

Page 1-22, add new Sections 1.5.5.9 and 1.5.5.10:

"1.5.5.9 Executive Order 11990

"EO 11990 provides that, 'Each agency. . .shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands' and that no new construction shall occur in wetlands unless the agency finds that there is 'no practicable alternative to such construction and that the proposed action includes all practicable measures to minimize harm to the wetlands which may result from such use.'

"1.5.5.10 Executive Order 12088

"EO 12088 requires that each Federal agency shall cooperate and consult with the EPA and state/local agencies on the prevention, control, and abatement of environmental pollution."

Section 1.5.6, page 1-22, add at end of list:

"• Incidental Take Permit National Marine Fisheries Service"

Section 2.1.2, page 2-4, second paragraph, second line, change "(Proposed Cypress Ridge Site and Alternatives)" to "(Alternative Sites)."

Section 2.1.2, page 2-4, second paragraph, second line, change "(Proposed Cypress Ridge Site)" to "(Conceptual Layout, Cypress Ridge Site)."

Section 2.1.3.5, page 2-22, fourth paragraph, sixth and seventh lines, delete "Safety clear zones determined by these criteria are shown for existing space launch complexes and the proposed SLC-7 in Figure 2.1.2."

Section 2.1.4, page 2-23, first paragraph, first line, change "construction of the SLC-7 project" to "construction of the proposed action at one of the undeveloped sites."

Section 2.1.4, page 2-23, first paragraph, second and third lines, change "(Preliminary Construction Schedule and Personnel Requirements for the Proposed Action)" to "(Preliminary Construction Schedule and Construction Requirements for Undeveloped Sites)."

Section 2.1.5.1, page 2-30, third paragraph, first and second lines, change "(Titan IV/Centaur, Typical Vehicle Assembly Time Line)" to "(Titan IV/Centaur, Typical Vehicle Assembly Time Line and Labor Requirements)."

Section 2.1.6, page 2-32, fifth paragraph, first line, change "the proposed action" to "implementation of the proposed action at one of the undeveloped sites."

Section 2.2.1.1, page 2-35, third paragraph, fourth line, change "cannot safety" to "cannot safely."

Section 2.2.3.2, page 2-41, second paragraph, fourth line, change "(SLC-6 Alternative)" to "(SLC-6 Site)."

Section 2.2.3.2, page 2-41, fourth paragraph, third line, delete "Payload Changeout Room (PCR)."

Section 2.2.3.2, page 2-41, fourth paragraph, third line, change "(PPR), and" to "(PPR) and."

Section 2.2.3.2, page 2-41, fifth paragraph, third line, delete first two sentences.

Section 2.2.3.2, page 2-41, fifth paragraph, second and third lines, change "be used for processing payloads" to "be modified to process Titan payloads." Add this corrected sentence to the previous paragraph.

Section 2.2.3.2, page 2-45, first paragraph, third through seventh lines, delete third through sixth sentences from "The existing Mobile Service Tower" to "modified for the Titan IV/Centaur."

Section 2.2.3.2, page 2-45, second paragraph, insert the following as the beginning of second paragraph: "The existing Payload Changeout Room (PCR) would likely be demolished, as would the Access Tower (AT). The existing Mobile Service Tower (MST), originally built for the Titan IIIM and modified for the Space Shuttle, would likely be demolished and replaced with a new structure."

Section 2.2.3.2, page 2-45, second paragraph, third line, delete third and fourth sentences. Insert the following: "The duct would likely be enlarged to encompass both Solid Rocket Booster (SRB) ducts, as well as the Space Shuttle Main Engine (SSME) duct."

Section 2.2.3.2, page 2-45, fourth paragraph, fourth line, delete third sentence.

Section 2.2.3.2, page 2-46, first paragraph, insert the following paragraph between existing first and second paragraph: "The PCR, AT, and MST would likely be demolished, resulting in approximately 9.5, 5.0, and 12.5 million pounds of steel, respectively, to be recycled. Demolition

would be primarily by cutting the structures into sections with torches and disassembling with a portable crane. Modifications to the Exhaust Duct would involve some demolition, resulting in 6,300 cubic yards of concrete and steel, comprised of approximately 80 percent concrete and 20 percent steel."

Section 2.2.3.2, page 2-46, second paragraph, delete paragraph. Add new second paragraph as follows: "As shown in Figure 2.2.3a (Preliminary Construction Schedule and Personnel Requirements for Implementation of the Proposed Action at SLC-6), modification to existing facilities and construction of new facilities would begin near the end of demolition. Overall, facility design, demolition, and construction are expected to occur over a period of four and one-half years. Demolition is expected to take about one year and three months, with facility construction, modification, and check-out occurring over a 28-month period. As shown in Figure 2.2.3a, demolition and construction employment are expected to range from approximately 100 to 300 people, with an expected average of approximately 200 people."

Section 2.2.3.3, page 2-47, first paragraph, second and third lines, change "(Conceptual Site Layout, Boathouse Flats Alternative)" to "(Conceptual Layout, Boathouse Flats Site)."

Section 2.2.3.3, page 2-47, first paragraph, at end of third line, insert "The anticipated duration of project construction and estimated construction personnel requirements for this alternative are shown in Figure 2.1.10."

Section 2.2.3.4, page 2-47, fourth paragraph, seventh line, change "(Conceptual Site Layout, Vina Terrace Alternative)" to "(Conceptual Layout, Vina Terrace Site)."

Section 2.2.3.4, page 2-47, at the end of the fourth paragraph, insert "The anticipated duration of project construction and estimated construction personnel requirements for this alternative are shown in Figure 2.1.10."

Section 2.3, page 2-51, first paragraph, fourth and fifth lines, change "(Comparative Summary of Impacts, Space Launch Complex 7)" to "(Comparative Summary of Impacts for Project Alternatives)."

Section 2.3.4, page 2-60, second paragraph, fourth line, change "(Guadalupe fur seal)" to "(Northern elephant seal)."

Section 2.3.5, page 2-62, second paragraph, sixth line, change "Present estimates anticipate that approximately 250 tons of particulate material (controlled emissions) could be generated" to "Present estimates anticipate that controlled emissions of particulate matter less than 10 microns in diameter (PM_{10}) could amount to 122.4 tons per year (TPY)."

Section 2.3.5, page 2-62, second paragraph, last line, change "4 tons" to "5.2 tons."

Section 2.3.11, page 2-69, third paragraph, eighth line after "processing plants and VAFB" add "(Madrone Associates 1981)."

Section 2.3.11, page 2-69, fourth paragraph, third line after "populated area" add "(for information regarding the Toxic Hazard Corridor procedure, see Section 3.11.2.1, 1STRAD Safety Procedures)."

Section 2.3.11, page 2-70, second paragraph, third line, change "It is expected that an excess skin cancer rate for carcinomas of one to five for one million persons and an excess cancer rate of about two per 10 million persons for melanomas could result from the proposed action" to "It is expected that an excess cancer rate of about five per 100 million persons for melanomas could result from the proposed action."

Section 2.4.11, page 2-77, replace with:

2.4.11 Health and Safety	1. The addition of three SLC-7 launches per year at VAFB would increase the opportunity for accidents related to propellant transport/transfer, SRMU transport/handling, and launch operations. 2. The potential for accidents would increase with activation of Titan IV operations at SLC-4 East, also located on South VAFB. 3. Assuming that higher-density residential development may eventually take place on the Bixby Ranch and other nearby properties, an unacceptable cumulative risk of injury to persons in the area could exist if a launch anomaly were to occur at certain altitudes and in certain wind conditions.	1. Cumulative impacts would be the same as Cypress Ridge 1-3.	1. Cumulative impacts would be the same as Cypress Ridge 1-3.	1. Cumulative impacts would be the same as Cypress Ridge 1-3.

Section 2.5.11, page 2-84, replace with:

2.5.11 Health and Safety	1. No additional mitigation measures beyond established USAF procedures are proposed for Health and Safety issues. 2. The Santa Barbara County Local Coastal Plan allows higher-density residential development of the Bixby Ranch and other nearby properties, although the process of securing rezoning and permits has not begun. To prevent this higher density type of development, USAF has begun a detailed study of acquiring real estate interest in these properties. This action would prevent an unacceptable level of cumulative risk to the population living in these areas. Otherwise, USAF could restrict launches to days with favorable wind conditions. Development of the Ranch under current zoning (one house per 320 aces) would not create an unacceptable risk, due to the low population density.	1. Cumulative impacts would be the same as Cypress Ridge 1-2.	1. Cumulative impacts would be the same as Cypress Ridge 1-2.	1. Cumulative impacts would be the same as Cypress Ridge 1-2.

Section 2.5.13, page 2-84, replace with:

2.5.11 Land Use	1. No additional mitigation measures are proposed for Health and Safety issues. 2. The Santa Barbara County Local Coastal Plan allows higher-density residential development of the Bixby Ranch and other nearby properties, although the process of securing rezoning and permits has not begun. To prevent this higher density type of development, USAF has begun a detailed study of acquiring real estate interests in these properties. This action would prevent an unacceptable level of cumulative risk to the population living in these areas. Otherwise, USAF would restrict launches to days with favorable wind conditions. Development of the Ranch under current zoning (one house per 320 aces) would not create an unacceptable risk, due to the low population density.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.	1. Same as Cypress Ridge.

Section 2.6, page 2-86, after second paragraph, add "After consideration of environmental impacts and program launch requirements, it has been determined that the preferred alternative is the conversion of SLC-6."

Section 3.1.2.6, page 3-13, fifth paragraph, last line, change "(SLC-7 Drainage Areas and Discharge Points)" to "(Drainage Areas and Discharge Points)."

Section 3.3.2, page 3-33, first paragraph, last line, change "(Vegetation Communities, Proposed and Alternative Sites)" to "(Vegetation Communities at Alternative Sites)."

Section 3.3.2, page 3-33, third paragraph, last sentence, sixth and seventh lines, change "(Environmental Solutions, Inc. 1989b)" to "(Environmental Solutions, Inc. 1990a)."

Section 3.3.2.2, page 3-40, first paragraph, seventh and eighth lines, change "(Approximate Distribution of Vegetation, Proposed and Alternative Sites)" to "(Approximate Distribution of Vegetation, Alternative Sites)."

Section 3.4, page 3-49, first paragraph, fourth through seventh lines, change "(Environmental Solutions, Inc., 1989b), which has been submitted to the USFWS and the NMFS concurrently with this Draft EIS for formal consultation in accordance with Section 7 of the Endangered Species Act and Marine Mammal Protection Act" to "(Environmental Solutions, Inc. 1990a), which will be submitted to the USFWS and NMFS for formal consultation in accordance with the Marine Mammal Protection Act and Section 7 of the Endangered Species Act."

Section 3.4.1.3, page 3-53, third paragraph, first line, change "are used by sea otters" to "are used by sea otters (20 sea otters were observed by USFWS in the Spring of 1989)."

Section 3.4.1.3, page 3-53, sixth paragraph, second line, change "Solitary individuals" to "Solitary gray whale individuals."

Section 3.4.2.1, page 3-59, second paragraph, fifth sentence, eighth line, change "(Environmental Solutions, Inc. 1989b)" to "(Environmental Solutions, Inc. 1990a)."

Section 3.4.2.1, page 3-63, second paragraph, third sentence, fourth and fifth lines, change "(Environmental Solutions, Inc. 1989b)" to "(Environmental Solutions, Inc. 1990a)."

Section 3.5.1.1, page 3-67, second paragraph, last line, change "(USAF 1988b)" to "(Chambers 1986)."

Section 3.5.1.2, page 3-71, third paragraph, fourth line, change "brought to the area from" to "from coastal, offshore, and."

Section 3.5.1.2, page 3-71, after third paragraph, add "North Santa Barbara County does not attain the CAAQS for ozone and PM_{10}. Therefore, in accordance with the California Clean Air Act, ozone, PM_{10}, and their precursors are nonattainment pollutants, and SBCAPCD must ensure that their emissions are reduced by 5 percent per year until attainment is met."

Section 3.5.2.2, page 3-76, third paragraph, fifth line, delete "nighttime."

Section 3.5.2.2, page 3-76, third paragraph, sixth line, delete entire last sentence.

Section 3.6.2.2, page 3-85, first paragraph, fifth line, change "A Class II Landfill" to "A Class III Landfill."

Section 3.9, page 3-102, second paragraph, second through fourth lines, change "Complete details of the literature search and inventory have been submitted concurrently with this Draft EIS to the California Historic Preservation Officer (SHPO), Advisory Council and Santa Ynez Reservation" to "Details of the completed literature search and inventory will be submitted to the California State Historic Preservation Officer (SHPO), Advisory Council, and Santa Ynez Reservation."

Section 3.9.2.3, Cypress Ridge, page 3-110, first paragraph, sixth line, change "(Environmental Solutions, Inc. 1989d)" to "(Environmental Solutions, Inc. 1990b)."

Section 3.11, page 3-125, first paragraph, second sentence, fourth and fifth lines, change "(Environmental Solutions, Inc. 1988f)" to "(Environmental Solutions, Inc. 1989f)."

Section 3.11.2.2, page 3-135, fourth paragraph, eighth line, change "(Titan IV/Centaur Normal Launch HCl Isopleths)" to "(Titan IV/Centaur Hypothetical HCl Isopleths, Normal Launch)."

Section 3.13.1.2, page 3-152, after first paragraph add "However, no Bixby Ranch plan approval process or property development has actually begun. The necessary rezoning by Santa Barbara County has not been applied for. Potable water, utilities (including sewage disposal), and suitable road access are lacking at this geographically remote location, and constructing such facilities would diminish potential profits to be made from the development."

Section 4.1.2.1, page 4-4, fifth paragraph, second and third lines, change "(Potential Ground Motion at Project Area)" to "(Potential Regional Ground Motion)."

Section 4.3.2.1, page 4-25, fifth paragraph, fourth line, change "(Near-field Acidic Deposition Titan IV/Centaur Launch)" to "(Near-field Acidic Deposition, Cypress Ridge Site, Titan IV/Centaur Launch)."

Section 4.3.2.3, page 4-30, second paragraph, first line, change "Temporary disturbance of 50 to 100 mature individuals" to "Temporary disturbance to habitat for 50 to 100 mature individuals."

Section 4.3.2.3, page 4-30, third paragraph, seventh line, after "acid deposition." add "The worst-case near-field acidic deposition pattern from launches at the Boathouse Flats Site is shown in Figure 4.3.3 (Near-field Acidic Deposition, Boathouse Flats Site, Titan IV/Centaur Launch)."

Section 4.3.2.4, page 4-31, third paragraph, third line, end of first sentence, insert "The worst-case near-field acidic deposition pattern from launches at the Vina Terrace site is shown in Figure 4.3.4 (Near-field Acidic Deposition, Vina Terrace Site, Titan IV/Centaur Launch)."

Section 4.3.4.1, page 4-33, fourth paragraph, eighth, ninth, and tenth lines, delete last sentence.

Section 4.4.1.1, page 4-35, fourth paragraph, first sentence, second and third lines, change "(Environmental Solutions, Inc. 1989b)" to "(Environmental Solutions, Inc. 1990a)."

Section 4.4.1.1, page 4-35, fourth paragraph, third sentence, fifth and sixth lines, change "(Environmental Solutions, Inc. 1989b)" to "(Environmental Solutions, Inc. 1990a)."

Section 4.4.1.1, page 4-36, fourth paragraph, fifth sentence, tenth line, change "(Environmental Solutions, Inc. 1989b)" to "(Environmental Solutions, Inc. 1990a)."

Section 4.4.1.3, page 4-40, sixth paragraph, second line, change "during the pupping season" to "during the harbor seal pupping season."

Section 4.4.1.3, page 4-41, first paragraph, first line, change "100 to 120 pups" to "100 to 120 harbor seal pups."

Section 4.4.1.3, page 4-41, fourth paragraph, fifth line, change "(Environmental Solutions, Inc. 1989b)" to "(Environmental Solutions, Inc 1990a)."

Section 4.4.2.1, page 4-43, fourth paragraph, second and third lines, change "(Acidic Deposition in Vicinity of Honda Creek, Proposed Action)" to "(Acidic Deposition in Vicinity of Honda Creek, Cypress Ridge Site, Titan IV/Centaur Launch)."

Section 4.4.2.1, page 4-45, fourth paragraph, third through fifth lines, change "tidewater goby, a Category 2 candidate species proposed for federal listing" to "the tidewater goby, a Federal Category 2 candidate species."

Section 4.4.2.2, page 4-48, first paragraph, eighth line, after "expected to be significant." add "The maximum anticipated acidic deposition pattern for Honda Creek from a Titan IV/Centaur launch at SLC-6 is shown in Figure 4.4.4 (Acidic Deposition In Vicinity of Honda Creek, SLC-6 Site, Titan IV/Centaur Launch)."

Section 4.4.2.3, page 4-49, first paragraph, second line, after "occur in the vicinity." insert "The maximum anticipated acidic deposition pattern for Honda Creek from a Titan IV/Centaur launch at the Boathouse Flats site is shown in Figure 4.4.5 (Acidic Deposition in Vicinity of Honda Creek, Boathouse Flats Site, Titan IV/Centaur Launch)."

Section 4.4.2.4, page 4-49, fourth paragraph, third line, delete third sentence, add new third sentence "The analysis of maximum anticipated acidic deposition into Honda Creek shown in Figure 4.4.6 (Acidic Deposition in Vicinity of Honda Creek, Vina Terrace Site, Titan IV/Centaur Launch) illustrates that impacts would be of the same order of magnitude as previously discussed for the other alternatives. These impacts are expected to be localized, short-term, and insignificant in nature. Additional impacts to migrant or transient regionally rare and declining species and listed species of birds or land mammals from exposure to launch emissions are also expected to be insignificant."

Section 4.5.1, page 4-57, fifth paragraph, second line, change "(SLC-7 Operational Emissions)" to "(TCLC Operational Emissions)."

Section 4.5.1, page 4-57, fifth paragraph, fourth line, change "(Comparison of SLC-7 and VAFB Annual Emissions)" to "(Comparison of TCLC and VAFB Annual Emissions)."

Section 4.5.2.1, page 4-60, fourth paragraph, third line, change "500" to "490."

Section 4.5.2.1, page 4-60, fourth paragraph, seventh line, delete entire last sentence beginning with "Ground disturbing activities" and replace with "It is assumed that approximately 50 percent of the total suspended particulate matter is emitted as particulate matter less than 10 microns in diameter (PM_{10})."

Section 4.5.2.1, page 4-60, fifth paragraph, second and third lines, change "(SLC-7 Estimated Construction Equipment Emissions at the Cypress Ridge Site)" to "(Estimated Construction Emissions, Cypress Ridge Site)."

Section 4.5.2.2, page 4-67, first paragraph, prior to first line, insert "Estimated construction emissions from conversion of the SLC-6 site are shown in Table 4.5.4a (Estimated Construction Emissions, SLC-6 Site)."

Section 4.5.2.3, page 4-67, delete third paragraph and replace with "Construction emissions estimated for the Boathouse Flats Site are shown in Table 4.5.4b (Estimated Construction Emissions, Boathouse Flats Site). As described for the Cypress Ridge and SLC-6 sites, construction emissions are temporary so impacts to air quality are not expected to have a significant impact on the environment."

Section 4.5.2.4, page 4-67, delete fourth paragraph and replace with "Construction emissions estimated for the Vina Terrace Site are shown in Table 4.5.4c (Estimated Construction Emissions, Vina Terrace Site). As described for the previous sites, construction emissions are temporary, so impacts to air quality are not expected to have a significant impact on the environment."

Section 4.5.3, page 4-67, sixth paragraph, change "(SLC-7 Cumulative Emissions)" to "(Cumulative Emissions)."

Section 4.5.4.4, page 4-75, second paragraph, seventh line after "This translates to a risk level of five per 100 million persons" add "for melanomas."

Section 4.6.1, page 4-77, fourth paragraph, first line, replace second sentence with "However, demolition of the SLC-6 launch mount, payload changeout room, access tower, and mobile service tower, modifications to the exhaust ducts, and removal of the hypergolic propellant delivery systems would result in regional impacts to industrial disposal facilities."

Section 4.6.1.3, page 4-79, third paragraph, seventh and eighth lines, change "(North VAFB Hazardous Wastes, Titan II, IV, and SLC-7 Programs)." to "(North VAFB Hazardous Wastes, Titan II and IV Programs and Proposed Action)."

Section 4.6.2.1, page 4-81, third paragraph, delete fifth, sixth, and seventh lines.

Section 4.6.2.1, page 4-81, fourth paragraph, first line, delete "per Resolution 83-12."

Section 4.6.2.1, page 4-82, third paragraph, third line, change "Lompoc Class II landfill" to "Lompoc Class III landfill."

Section 4.6.2.1, page 4-83, second paragraph, sixth line, change "(Estimated Launch Wastewater Characteristics)" to "(Estimated Launch Wastewater Characteristics After Hypochlorite Treatment)."

Section 4.6.2.1, page 4-83, third paragraph, second and third lines, change "(SLC-7 Launch Wastewater Generation and Treatment Cycle)." to "(Launch Wastewater Generation and Treatment Cycle)."

Section 4.6.2.1, page 4-87, first paragraph, fourth and fifth lines, change "(Summary, VAFB and SLC-7 On-site Hazardous Waste Generation)." to "(Summary, On-site Hazardous Waste Generation, VAFB and Proposed Action)."

Section 4.6.2.2, page 4-87, fifth paragraph, first line, delete first sentence. Replace with "Modification of the SLC-6 site would require demolition of the existing launch mount, payload changeout room, access tower, mobile service tower (MST), modifications to the exhaust duct, and refitting the fuel and oxidizer systems and various other facilities located at SLC-6."

Section 4.6.2.2, page 4-89, first paragraph, first line, change "135 tons" to "8,750 tons."

Section 4.6.2.2, page 4-89, first paragraph, first and second lines, delete first complete sentence, which begins, "This steel would." Insert "Demolition of the payload changeout room would produce about 9.5 million pounds of steel. Modification of the exhaust duct would produce about 5,040 cubic yards of concrete and 1,260 cubic yards of steel."

Section 4.6.2.2, page 4-89, first paragraph, third line, change "as scrap." to "as scrap, to be recycled."

Section 4.6.3.2, page 4-90, fourth paragraph, fourth line, change "or the Class II landfill" to "or the Class III landfill."

Section 4.6.4, page 4-94, after fifth paragraph, add the next two paragraphs:

"If the U.S. Air Force discovers evidence of hazardous substances contamination in the future, it will promptly notify the EPA, and will comply with all applicable requirements of CERCLA/SARA and the National Contingency Plan (NCP). Further, if CERCLA hazardous substances are discovered at the project site, no construction would occur until the requirements of CERCLA/SARA and the NCP had been fully satisfied.

"The U.S. Air Force would coordinate with appropriate state and local regulatory agencies to determine their concerns on the identification, assessment, or cleanup of hazardous substances or hazardous waste."

Section 4.10, page 4-121, second paragraph, change "(Estimated SLC-7 Personnel Requirements)" to "(Estimated Personnel Requirements)."

Section 4.11.1.1, page 4-127, fifth paragraph. Delete paragraph and replace with "Health and safety impacts related to the construction of the proposed action are similar to those encountered in other large construction projects and do not present unusual risks to the public."

Section 4.11.5.1, page 4-134, fourth paragraph, last line, add "If more information is necessary, the Risk Assessment is available from:

Mr. John Edwards
HQ SSD/DEV
P. O. Box 92960
Los Angeles, California 90009-2960
Telephone: (213) 643-0934"

Section 4.13.1.2, page 4-157, first and second paragraphs. Delete and replace Section 4.13.1.2 with the following four paragraphs:

"The conceptual plans that have been announced for cluster residential development of Bixby Ranch or similar proposals for lands south and east of South VAFB are for high density development, which could result in unacceptably high risks from future USAF launches. However, consistent with current operations procedures, these risks could be reduced to acceptable levels through launch restrictions or other protective measures.

"These potentially high risks would be due to greater population density and the potential for debris scatter that may result from a launch anomaly at certain wind conditions and altitudes. These risks are from falling launch debris or fires started by such debris. These risks are addressed in detail in the White Paper on Bixby Ranch Update (USAF 1988), the Risk Assessment for this project (Environmental Solutions, Inc. 1989f), and Evaluation of Vandenberg Air Force Base Launch Risk Model and Application (TENERA 1990).

"However, no plan approval process or property development has begun for the Bixby Ranch or other properties south and east of VAFB. For the case of Bixby Ranch, the agriculture-residential cluster overlay district zoning has not been applied for from Santa Barbara County. In addition, potable water, utilities (including sewage disposal), and suitable road access are lacking at this geographically remote location. Constructing such facilities would diminish potential profits to be made from development of the property.

"In order to prevent potential future higher risks, USAF has begun a detailed study of the real estate interests in the area for the purpose of evaluating the feasibility of potential real estate acquisition, both of the Bixby Ranch property and other private lands south and east of South

VAFB. Such an acquisition would protect USAF polar orbit capability for as long as it is needed. In addition to this acquisition effort, USAF will continue to oppose any incompatible development through the local planning and zoning processes (USAF 1988j)."

Section 4.13.4, pages 4-160 and 4-161. Delete and replace Section 4.13.4 with:

"4.13.4 MITIGATION MEASURES

4.13.4.1 Cypress Ridge

Impacts to land use from implementation of the proposed project at the Cypress Ridge site, given current levels of development on lands south and east of South VAFB, are short-term and infrequent and do not require mitigation. To prevent higher density development from occurring in areas south and east of South VAFB, USAF has begun a detailed study of the real estate interests in the area for the purpose of evaluating the feasibility of potential real estate acquisition, both of the Bixby Ranch property and other private lands south and east of South VAFB. Otherwise, as is consistent with current operations procedures, these risks could be reduced to acceptable levels through launch restrictions or other protective measures.

4.13.4.2 SLC-6

Impacts to land use and mitigation measures for implementation of the proposed action at SLC-6 would be the same as described for Cypress Ridge.

4.13.4.3 Boathouse Flats

Impacts to land use and mitigation measures for implementation of the proposed action at Boathouse Flats would be the same as described for Cypress Ridge.

4.13.4.4 Vina Terrace

Impacts to land use and mitigation measures for implementation of the proposed action at Vina Terrace would be the same as described for Cypress Ridge."

Section 4.17.3, page 4-175, delete entire section.

Chapter 8.0, page 8-2, change "California Air Resources Board. 1987. Air Resources Board fact sheet 38. CARB: Sacramento, August." to "California Air Resources Board. 1988. Air Resources Board fact sheet 38. CARB: Sacramento, July."

Chapter 8.0, page 8-2, add "Chambers Group, Inc., 1986, Draft EIR/EIS, Proposed Arco Coal Oil Point Project, Volume I and Appendix 6 - Terrestrial Biology, SCH No. 84011105, SLC No. EIR-401, SBC No. 86-EIR-12, U.S. Army COE Permit Appl. No. 85-047-RC, September."

Chapter 8.0, page 8-5, first reference, first line, change "1989b" to "1990a."

Chapter 8.0, page 8-5, third reference, first line, change "1989d" to "1990b."

Chapter 8.0, page 8-5, fourth reference, first line, change "1989e" to "1990c."

Chapter 8.0, page 8-12, add "USAF. 1979. Final Report, An Inventory of Air Pollutant Emissions for Space Shuttle Construction and Operations at Vandenberg Air Force Base and Port Hueneme. Prepared for Department of the Air Force, Headquarters Space and Missile Systems Organization. Prepared by Tetra Tech, Inc. May."

Chapter 8.0, insert at top of page 8-13, "USAF. 1982a. Supplemental water study for Vandenberg Air Force Base, California. Task Ib, review of water supply alternatives. March."

Chapter 8.0, page 8-13, change "USAF. 1982a" to "USAF. 1982b."

Chapter 8.0, page 8-13, change "USAF. 1982b" to "USAF. 1982c."

3.2 DRAFT EIS TABLES

3.2 DRAFT EIS TABLES

The following tables are provided as addenda and errata to the Draft EIS. The materials included here either replace existing tables contained in the Draft EIS or are inserts into that document. The page number shown on the top of the page corresponds to the replacement/insertion page for the Draft EIS.

TABLE 1.4.1

SCOPING PROCESS SUMMARY OF ISSUES

	Oral Comments	Written Comments	Total
SAFETY (including operations, accidents, propellant transport, and emergency response plans)	1	7	8
RECREATION (impact of operations on closure of Jalama Beach County Park and Ocean Beach County Park)	1	5	6
AIR QUALITY (impacts of toxic pollutants and operations emissions)	-	6	6
ALTERNATIVES (use of existing/alternate sites)	1	3	4
SOCIOECONOMICS (impacts on local employment, population, and housing)	1	3	4
VEGETATION/WILDLIFE (effects of toxic pollutants, noise, and habitat removal)	-	4	4
WATER RESOURCES (ground and surface water quality, ground water extraction)	-	3	3
LAND USE (compatibility with surrounding properties)	-	2	2
WASTE MANAGEMENT (disposal of hazardous/toxic wastes and wastewater)	-	2	2
CULTURAL RESOURCES	-	1	1
TRANSPORTATION	-	1	1

Note: Appendix A.6 contains responses to the written scoping comments and shows where each comment is addressed in the Draft EIS.

TABLE 1.5.1

AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING TIME	CALIFORNIA STANDARDS (1)		NATIONAL STANDARDS (2)		
		CONCENTRATION (3)	METHOD (4)	PRIMARY (3,5)	SECONDARY (3,6)	METHOD (4,7)
Ozone	1 Hour	0.09 ppm (180 ug/m3)	Ultraviolet Photometry	0.12 ppm (235 ug/m3)	Same as Primary Standards	Ethylene Chemiluminescence
Carbon Monoxide	8 Hour	9.0 ppm (10 mg/m3)	Non-dispersive Infrared Spectroscopy (NDIR)	9 ppm (10 mg/m3)	—	Non-dispersive Infrared Spectroscopy (NDIR)
	1 Hour	20 ppm (23 mg/m3)		35 ppm (40 mg/m3)		
Nitrogen Dioxide	Annual Average	—	Gas Phase Chemilumi-nescence	0.053 ppm (100 ug/m3)	Same as Primary Standards	Gas Phase Chemiluminescence
	1 Hour	0.25 ppm (470 ug/m3)		—		
Sulfur Dioxide	Annual Average	—	Ultraviolet Fluorescence	0.03 ppm (80 ug/m3)	—	Pararosoaniline
	24 Hour	0.05 ppm (8) (131 ug/m3)		0.14 ppm (365 ug/m3)	—	
	3 Hour	—		—	0.5 ppm (1300 ug/m3)	
	1 Hour	0.25 ppm (655 ug/m3)		—	—	
Suspended Particulate Matter (PM_{10})	Annual Geometric Mean	30 ug/m3	Size Selective Inlet High Volume Sampler and Gravimetric Analysis	—	—	—
	24 Hour	50 ug/m3		150 ug/m3	Same as Primary Standards	Inertial Seperation and Gravimetric Analysis
	Annual Arithmetic Mean	—	—	50 ug/m3		
Sulfates	24 Hour	25 ug/m3	Turbidimetric Barium Sulfate	—	—	—
Lead	30 Day Average	1.5 ug/m3	Atomic Absorption	—	—	Atomic Absorption
	Calendar Quarter	—		1.5 ug/m3	Same as Primary Standards	
Hydrogen Sulfide	1 Hour	0.03 ppm (42 ug/m3)	Cadmium Hydroxide STRactan	—	—	—
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 ug/m3)	Tedlar Bag Collection, Gas Chromatography	—	—	—
Visibility Reducing Particles	1 Observation	In sufficient amount to reduce the prevailing visibility to less than 10 miles when the relative humidity is less than 70 percent. (9)		—	—	—

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Source: California Air Resources Board 1988.

TABLE 2.2.1

EXISTING SLC-6 FACILITIES AND PROPOSED UTILIZATION

FACILITY	STATUS				PROPOSED UTILIZATION
	UTILIZED IN PRESENT CONFIGURATION	UTILIZED WITH MODIFICATIONS	MOTHBALLED OR UTILIZED FOR OTHER PROJECTS	DEMOLITION	
Payload Processing Room (PPR)		X			Modified to accommodate Titan payloads
Payload Changeout Room (PCR)				X	Subject to demolition
Shuttle Assembly Building (SAB)	X				Utilized in present configuration
Access Tower (AT)				X	Subject to demolition
Aerial Escape Tram				X	Disassembled and disposed of offsite
Launch Mount (LM)				X	Subject to demolition
Launch Exhaust Ducts (LD)		X			Modified to accommodate Titan IV/Centaur.
Mobile Service Tower (MST)				X	Subject to demolition
Operations Support Building (OSB)	X				Modified to accommodate Titan IV/Centaur
Launch Control Center (LCC)		X			Utilized for office space
Security Systems, guard shack		X			Completed, modify as necessary
Hydrazine Storage and Transfer		X			Modified, prepared for use, APCD permit
Nitrogen Tetroxide (N_2O_4) Storage and Transfer		X			Modified, prepared for use, APCD permit
Cryogenic Storage Areas		X			Modified, prepared for use
Industrial Wastewater Treatment Facility		X			Modified with addition of equipment and storage capacity, cleaned, prepared for operation.
Deluge Water Transfer System	X				Inspected, cleaned, prepared for operation
Communications System		X			Modified to accommodate Titan IV/Centaur
Utilities					Inspected, cleaned, prepared for operation
Water	X				
Electricity	X				
Propane	X				
Sewage Disposal	X				
Water Tank	X				Inspected, cleaned, prepared for use
Parking	X				Utilized in present configuration

TABLE 2.3.1

COMPARATIVE SUMMARY OF IMPACTS FOR PROJECT ALTERNATIVES

RESOURCE	POTENTIAL EFFECT	ALTERNATIVE SITE			
		CYPRESS RIDGE	SLC-6	BOAT-HOUSE FLATS	VINA TERRACE
1. Geology and Soils	• Earthquake	Ø	Ø	Ø	Ø
	• Landslide	◐	⊗	○	●
	• Erosion	◐	⊗	○	●
	• Soil losses				
	- Construction	◐	○	⊗	●
	- Operations	◐	⊗	○	●
	• Excavation	◐	○	⊗	●
	• Fill	●	○	◐	○
	• Borrow site(s)	●	○	◐	○
	• Spoil site(s)	◐	○	⊗	●
2. Water Resources					
• Ground Water	• Water Use	Ø	Ø	Ø	Ø
• Surface Water	• Increased runoff	◐	○	⊗	●
	• Contamination from spill	Ø	Ø	Ø	Ø
3. Vegetation	• Loss of habitat	⊗	○	●	◐
	• Loss of sensitive species	●	○	◐	⊗
	• Operational deposition	◐	⊗	○	●
4. Wildlife					
• Channel Islands birds, mammals	• Launch noise, sonic boom	Ø	Ø	Ø	Ø
• Nearshore marine birds, mammals	• Construction/operations disturbance	⊗	⊗	●	○
	• Use of External Tank Landing Facility	Ø	Ø	Ø	Ø
	• Air Emissions	◐	◐	●	○
• Terrestrial birds, wildlife	• Loss of habitat, roosting sites	⊗	○	◐	●
	• Launch noise, sonic boom	Ø	Ø	Ø	Ø
	• Air emissions	Ø	Ø	Ø	Ø

Legend

○ = Least impact compared to other three sites
⊗ = Low intermediate impact compared to other three sites
◐ = High intermediate impact compared to other three sites
● = Most impact compared to other three sites
Ø = Same impact as other site(s)

TABLE 2.3.1 (Continued)

COMPARATIVE SUMMARY OF IMPACTS FOR PROJECT ALTERNATIVES

RESOURCE	POTENTIAL EFFECT	ALTERNATIVE SITE			
		CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
5. Air Quality/Meteorology	• Facility construction dust	◐	○	⊗	●
	• Pre-launch and post-launch processing emissions	Ø	Ø	Ø	Ø
	• Launch emissions	Ø	Ø	Ø	Ø
	• Vehicle failure emissions	Ø	Ø	Ø	Ø
	• Stratospheric ozone depletion	Ø	Ø	Ø	Ø
6. Waste Management					
• Domestic Waste	• Santa Maria sewage treatment facility	Ø	Ø	Ø	Ø
• Industrial Waste	• Construction				
	- North VAFB Class III landfill	Ø	●	Ø	Ø
	- Lompoc Class II landfill	Ø	●	Ø	Ø
	• Operations				
	- North VAFB Class III landfill	Ø	Ø	Ø	Ø
	- Lompoc Class II landfill	Ø	Ø	Ø	Ø
• Hazardous Waste	• North VAFB hazardous waste storage facility				
	- Construction	Ø	●	Ø	Ø
	- Operations	Ø	Ø	Ø	Ø
	• Class I landfill				
	- Construction	Ø	●	Ø	Ø
	- Operations	Ø	Ø	Ø	Ø
7. Noise	• Normal launch	Ø	Ø	Ø	Ø
	• Explosion	Ø	Ø	Ø	Ø
8. Visual Resources	• Impair view from Jalama Beach	⊗	○	◐	●
	• Impair view from railroad	◐	○	●	⊗

Legend

○ = Least impact compared to other three sites
⊗ = Low intermediate impact compared to other three sites
◐ = High intermediate impact compared to other three sites
● = Most impact compared to other three sites
Ø = Same impact as other site(s)

TABLE 2.3.1 (Continued)

COMPARATIVE SUMMARY OF IMPACTS FOR PROJECT ALTERNATIVES

RESOURCE	POTENTIAL EFFECT	ALTERNATIVE SITE			
		CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
9. Cultural Resources					
• U.S. Coast Guard Rescue Station	• Disturbance from normal launch	◐	○	●	⊗
	• Vibration and emissions	◐	○	●	⊗
• Rock Art Site	• Vibration and emissions	⊗	●	○	◐
	• Disturbance from explosion	⊗	●	○	◐
• Archaeological Resources	• Disturbance from grading and earthmoving	●	○	◐	⊗
• Paleontology	• Disturbance from grading and earthmoving	◐	○	●	⊗
• Caliche Fossils	• Vibration from sonic boom	Ø	Ø	Ø	Ø
10. Transportation	• Increase in traffic	Ø	○	Ø	Ø
	• Need for additional traffic control	Ø	○	Ø	Ø
11. Health and Safety	• Normal launch	Ø	Ø	Ø	Ø
	• Unscheduled event	Ø	Ø	Ø	Ø
	• Explosion damage	◐	⊗	●	○
	• Fire damage	◐	⊗	○	●
	• Stratospheric ozone depletion	Ø	Ø	Ø	Ø
12. Socioeconomics	• Construction				
	- Increased employment	Ø*	○*	Ø*	Ø*
	- Increased population	Ø	○	Ø	Ø
	- Increased housing demand	Ø	○	Ø	Ø
	- Increased demand to public services/utilities	Ø	○	Ø	Ø
	- Increased local/regional spending	Ø*	○*	Ø*	Ø*
	• Operations				
	- Increased employment	Ø*	Ø*	Ø*	Ø*
	- Increased population	Ø	Ø	Ø	Ø
	- Increased housing demand	Ø	Ø	Ø	Ø
	- Increased demand to public services/utilities	Ø	Ø	Ø	Ø
	- Increased local/regional spending	Ø*	Ø*	Ø*	Ø*

Legend

○ = Least impact compared to other three sites
⊗ = Low intermediate impact compared to other three sites
◐ = High intermediate impact compared to other three sites
● = Most impact compared to other three sites
Ø = Same impact as other site(s)
* = Positive/beneficial impact

TABLE 2.3.1 (Continued)

COMPARATIVE SUMMARY OF IMPACTS FOR PROJECT ALTERNATIVES

RESOURCE	POTENTIAL EFFECT	ALTERNATIVE SITE			
		CYPRESS RIDGE	SLC-6	BOATHOUSE FLATS	VINA TERRACE
13. Land Use	• Interference to adjacent/nearby uses	Ø	Ø	Ø	Ø
	• New development area	⊗	○	◐	●
	• Coastal zone management	◐	○	●	⊗
14. Recreation	• Jalama Beach closures	Ø	Ø	Ø	Ø
	• Marine recreation interruptions	Ø	Ø	Ø	Ø

Legend

○ = Least impact compared to other three sites
⊗ = Low intermediate impact compared to other three sites
◐ = High intermediate impact compared to other three sites
● = Most impact compared to other three sites
Ø = Same impact as other site(s)

TABLE 3.2.1

SURFACE WATER QUALITY
POINT ARGUELLO AREA

PARAMETER [a]	SLC-6 [b,d] CANYON	OIL WELL [b,d] CANYON	CAÑADA [c,d] AQUA VIVA	DRINKING WATER STANDARDS/ CRITERIA [e]
Watershed Area (acres)	323	706	570	NA
pH (pH units)	7.7	7.8	9.6	5.0-9.0
Chemical Oxygen Demand	86	57	10	NS
Total Organic Carbon	13	7	7	NS
Oil and Grease	0.38	0.45	1.5	NS
Nitrate	0.35	0.45	0.5	45
Phosphate	NR	NR	NR	NS
Cadmium	NR	NR	NR	0.01
Chromium	NR	NR	NR	0.05
Iron	4.9	0.394	17	0.3
Lead	NR	NR	NR	0.05
Zinc	NR	NR	NR	5.0
Calcium	84	79	99	NS
Magnesium	60	72	86	NS
Potassium	8	8	14	NS
Sodium	184	139	130	NS
Total Hardness	470	500	1,100	400
Aluminum	3.922	0.516	9.5	NS
Chloride	352	354	300	250
Total Dissolved Solids	1,207	1,095	2,100	500
Specific Conductance	1,584 µmho/cm	1,374 µmho/cm	2,400 µmho/cm	1,600 µmho/cm
Sulfate	159	167	980	250
Turbidity	98 NTU	14 NTU	130 NTU	5 NTU
Total Acidity	40	42	20	NS
Alkalinity	292	249	250	400
Dissolved Oxygen	9.5	9.1	9.6	NS

NR = Not reported
NS = No established standard
NA = Not applicable

[a] Mg/L, except where noted.

[b] Mean values from samples taken in 1986.

[c] Value from single sample 3/31/86.

[d] Source: USAF 1988a.

[e] Source: CCR, Title 22, Chapter 15, Article 5, Part 64435.

TABLE 3.3.1

APPROXIMATE DISTRIBUTION OF VEGETATION AT ALTERNATIVE SITES

PLANT COMMUNITY	PRIMARY SITE (ACRES)	UTILITY CORRIDORS (ACRES)	TOTAL (ACRES)	PERCENT OF SITE DISTURBED
CYPRESS RIDGE				
Venturan coastal sage scrub	4.5	0.0	4.5	2.4
Grassland - coastal scrub	8.5	8.0	16.5	9.0
Grassland - nonnative	18.5	9.0	27.5	14.9
Ruderal	4.5	4.0	8.5	4.7
Central coastal scrub	83.5	37.0	120.5	65.0
Riparian/wetland	0.5	5.0	5.5	3.0
Central dune scrub	0.0	2.0	2.0	1.0
Chaparral	0.0	0.1	0.1	0.0
	120.0	65.1	185.1	100.0
SLC-6				
Not vegetation	140.0	Utility corridors	140.0	50.0
Ruderal	44.0	not required for	44.0	15.7
Central coastal scrub	82.0	SLC-6 Alternative.	82.0	29.3
Chaparral	9.5		9.5	3.4
Maritime chaparral	1.0		1.0	0.3
Riparian/wetland	3.5		3.5	1.3
	280.0		280.0	100.00
BOATHOUSE FLATS				
Grassland - nonnative	130.0	19.0	149.0	68.0
Grassland - coastal scrub	0.0	10.0	10.0	4.6
Ruderal	0.0	8.0	8.0	3.6
Riparian/wetland	0.0	5.0	5.0	2.2
Central coastal scrub	0.0	42.0	42.0	19.1
Central dune scrub	0.0	2.0	2.0	1.0
Venturan coastal sage scrub	0.0	3.0	3.0	1.4
Chaparral	0.0	0.1	0.1	0.1
	130.0	89.1	219.1	100.0
VINA TERRACE				
Central coastal scrub	90.0	60.0	150.0	59.2
Grassland - nonnative	25.0	14.0	39.0	15.4
Grassland - coastal scrub	20.0	11.0	31.0	12.2
Venturan coastal sage scrub	15.0	7.0	22.0	8.7
Ruderal	0.0	2.0	2.0	0.8
Chaparral	0.0	2.0	2.0	0.8
Riparian/wetland	0.0	5.0	5.0	2.0
Central dune scrub	0.0	2.0	2.0	0.8
Not vegetation	0.0	0.2	0.2	0.1
	150.0	103.2	253.2	100.0

TABLE 4.1.3

POTENTIAL REGIONAL GROUND MOTION

FAULTS	APPROXIMATE DISTANCE FROM PROJECT VICINITY (MILES)	MCE [1]	MPE [2]	PGA [3] (MCE)	PGA [4] (MPE)
Hosgri	11	7.5	7.0	0.28	0.20
Santa Lucia Bank	29	7.5	7.1	0.13	0.10
Unnamed Faults - Santa Lucia Bank	34	7.5	7.0	0.12	0.08
Offshore Lompoc	12	6.5	6.3	0.14	0.11
Offshore Purisima	15	6.5	6.3	0.11	0.09
Point Conception	13	6.5	6.3	0.14	0.11
Molino	22	6.0	5.9	0.05	0.05
Santa Ynez, including South Branch	20	7.5	7.2	0.17	0.13
Pezzoni - Casmalia	23	6.8	6.5	0.10	0.07
Los Alamos - Baseline	25	7.0	6.5	0.10	0.07
Santa Maria, Foxen, Little Pine	28	7.4	7.0	0.13	0.09
Big Pine	51	7.25	6.9	0.06	0.05
San Andreas	64	8.25	8.25	0.12	0.12

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[1] MCE - Maximum Credible Earthquake Magnitude
[2] MPE - Maximum Probable Earthquake Magnitude
[3] PGA (MCE) - Peak Horizontal Ground Acceleration (g), for the MCE
[4] PGA (MPE) - Peak Horizontal Ground Acceleration (g), for the MPE

TABLE 4.5.1

TCLC OPERATIONAL EMISSIONS

LAUNCHES PER YEAR - 3

1) PROPANE COMBUSTION-RELATED SOURCES:

SOURCE	HRS/ LAUNCH	LB/HR PROPANE	MM-BTU/ HR	GALLONS/ HR PROPANE	NO_x			SO_x			CO			PM			ROC		
					LB/M-GAL	LB/HR	LB/YR	LB/M-GAL	LB/HR	LB/YR	LB/M-GAL	LB/HR	LB/YR	LB/M-GAL	LB/HR	LB/YR	LB/M-GAL	LB/HR	LB/YR
Operations Support Building	N/A	16	0.34	3.9	12.4	0.05	423	0.014	0.00	0	3.1	0.01	106	0.44	0.00	15	0.25	0.00	9
Guard House	N/A	6	0.13	1.5	12.4	0.02	158	0.014	0.00	0	3.1	0.00	40	0.44	0.00	6	0.25	0.00	3
Launch Service Structure	1680	242	5.20	58.9	12.4	0.73	3678	0.014	0.00	4	3.1	0.18	920	0.44	0.03	131	0.25	0.01	74
H2 Flare (booster)	300	10.2	0.22	2.5	12.4	0.03	28	0.014	0.00	0	3.1	0.01	7	0.44	0.00	1	0.25	0.00	1
H2 Flare (payload)	300	10.2	0.22	2.5	12.4	0.03	28	0.014	0.00	0	3.1	0.01	7	0.44	0.00	1	0.25	0.00	1
Fuel Vapor Incinerator[1]	45	3080	66.17	749	12.4	9.29	1254	0.014	0.01	1	3.1	2.32	313	0.44	0.33	44	0.25	0.19	25
Oxidizer Vapor Scrubber[1]	45	0	0.00	0.0	12.4	31.16	4207	0.014	0.00	0	3.1	0.00	0	0.44	0.00	0	0.25	0.00	0
TOTALS		3364.4		818.3		41.31	9776		0.01	5		2.53	1393		0.36	198		0.20	113

2) LAUNCH ESSENTIAL POWER GENERATION

SOURCE	HRS/ MONTH	MONTH/ YEAR	GALLONS/HR. DIESEL	NO_x			SO_x			CO			PM_{10}			ROC		
				LB/M-GAL	LB/HR	LB/YR	LB/M-GAL	LB/HR	LB/YR	LB/M-GAL	LB/HR	LB/YR	LB/M-GAL	LB/HR	LB/YR	LB/M-GAL	LB/HR	LB/YR
Diesel Engine	2	12	40	469.0	18.76	450	31.2	1.25	30	102.0	4.08	98	33.5	1.34	32	37.5	1.50	36

87-271 (7/3/90)

3) SHARED USE FACILITY EMISSIONS

SOURCE	FAIRING PROCESSINGS PER YEAR	NO_x		SO_x		CO		PM_{10}		ROC	
		LB/HR	LB/YR	LB/HR	LB/YR	LB/HR	LB/YR	LB/HR	LB/YR	LB/HR	LB/YR
Bldg. 8337 Payload Fairing Spray Booths	10	0	0	0	0	0	0	0	0	4.75	249

4) NET EMISSIONS INCREASE (PRELIMINARY CALCULATION)

SOURCE	NO_x		SO_x		CO		PM_{10}		ROC	
	LB/HR	LB/YR	LB/HR	LB/YR	LB/HR	LB/YR	LB/HR	LB/YR	LB/HR	LB/YR
Total of All Emission Sources	60.07	10,226	1.26	35	6.61	1,491	1.70	230	6.45	398

[1] USAF is presently engaged in studying alternative methods for control of fuel and oxidizer vapor emissions. Preliminary analyses have determined that the worst-case 1-hour average emissions would result from usage of a fuel vapor incinerator and an oxidizer vapor scrubber.

Source: TRC Environmental Consultants 1988.

TABLE 4.5.2

COMPARISON OF TCLC AND VAFB ANNUAL EMISSIONS

SOURCE	NO_x (tons/year)	SO_x (tons/year)	CO (tons/year)	PM_{10} (tons/year)	ROC[1] (tons/year)
VAFB[2]	511.2	149.00	1,545.00	101.1	468.5
PROPOSED ACTION	5.1	0.02	0.75	0.1	0.2
TOTAL	516.3	149.02	1,545.75	101.2	468.7
PERCENT CHANGE[3]	1.0	0.01	0.04	0.09	0.04

87-271 (7/25/90)

(1) Value shown is for Reactive Organic Compounds.
(2) From 1986 Vandenberg Air Force Base Emissions Inventory (USAF 1988c).
(3) Percent change in total VAFB annual emissions due to the proposed action.

TABLE 4.5.3

ESTIMATED CONSTRUCTION EQUIPMENT EMISSIONS
CYPRESS RIDGE SITE

EQUIPMENT		EQUIPMENT EMISSION FACTOR[1] (pounds/hour/unit)					EQUIPMENT EMISSIONS (pounds/hour)				
TYPE	NUMBER	CO	HC	NO_x	SO_x	TSP	CO	HC	NO_x	SO_x	TSP
Dozer	5	0.35	0.12	1.26	0.14	0.11	1.75	0.60	6.30	0.70	0.55
Scraper	18	1.26	0.28	3.84	0.46	0.41	22.68	5.04	69.12	8.28	7.38
Crane	3	0.68	0.15	1.69	0.14	0.14	2.04	0.45	5.07	0.42	0.42
Loader	15	0.57	0.25	1.89	0.18	0.17	8.55	3.75	28.35	2.70	2.55
Grader	5	0.15	0.04	0.71	0.09	0.06	0.75	0.20	3.55	0.45	0.30
Water Truck	4	1.79	0.19	4.17	0.45	0.26	7.16	0.76	16.68	1.80	1.04
Oiler Truck	1	1.79	0.19	4.17	0.45	0.26	1.79	0.19	4.17	0.45	0.26
Haul Truck	50	1.79	0.19	4.17	0.45	0.26	89.15	9.50	208.50	22.50	13.00
Compactor	17	0.30	0.07	0.86	0.07	0.05	5.11	1.19	14.62	1.19	0.85
Paver	1	0.30	0.07	0.86	0.07	0.05	0.30	0.07	0.86	0.07	0.05
Vibrating Drum	1	0.68	0.15	1.69	0.14	0.14	0.68	0.15	1.69	0.14	0.14
		Total Combined Emissions (pounds/hour)					140.30	21.90	358.91	38.70	26.54
		Total Combined Emissions (pounds/day)					1,122.40	175.20	2,871.28	309.60	212.32
		Total Combined Emissions (tons/year)[2]					145.91	22.78	373.27	40.25	27.60

87-271 (6/29/90)

[1] Reference: U.S. EPA 1985.
[2] Based on 8-hour day, 260-day year.

TABLE 4.5.4a

ESTIMATED CONSTRUCTION EMISSIONS
SLC-6 SITE

EQUIPMENT		EQUIPMENT EMISSION FACTOR[1] (pounds/hour/unit)					EQUIPMENT EMISSIONS (pounds/hour)				
TYPE[2]	NUMBER[3]	CO	HC	NOx	SOx	TSP	CO	HC	NOx	SO_2	TSP
Miscellaneous Vehicles (onsite and offsite trucks)	4	1.794	0.192	4.166	0.454	0.256	7.2	0.8	16.7	1.8	1.0
Off Highway Trucks	4	1.794	0.192	4.166	0.454	0.256	7.2	0.8	16.7	1.8	1.0
Cranes	10	0.675	0.152	1.691	0.143	0.139	6.8	1.5	16.9	1.4	1.4
Heavy Equipment[4] (graders, wheeled equipment, dozers, etc.)	16	0.959	0.186	1.575	0.160	0.142	7.3	3.0	25.2	2.6	2.3
		Total Combined Emissions (pounds/hour)					28.5	6.1	75.5	7.6	5.7
		Total Combined Emissions (pounds/day)					184.8	44.0	503.8	50.0	39.6
		Total Combined Emissions (tons/year)					24.0	5.7	65.5	6.5	5.1

87-271 (7/1/90)

(1) Emission factors assumed use of diesel fuel in all equipment (U.S. EPA 1985).
(2) All equipment was assumed to operate 8 hours/day, 260 days/year with the exception of miscellaneous vehicles which operate 2 hours/day, 260 days/year.
(3) Equipment quantities were assumed to be one-half of those used to convert SLC-6 from the MOL program to the STS program (USAF 1979) due to the greatly reduced scope of the conversion.
(4) The emission factor for Heavy Equipment is the average of the emission factors for loaders and dozers (U.S. EPA 1985).

TABLE 4.5.4b

ESTIMATED CONSTRUCTION EQUIPMENT EMISSIONS
BOATHOUSE FLATS SITE

EQUIPMENT		EQUIPMENT EMISSION FACTOR[1] (pounds/hour/unit)					EQUIPMENT EMISSIONS (pounds/hour)				
TYPE	NUMBER	CO	HC	NOx	SOx	TSP	CO	HC	NOx	SOx	TSP
Dozer	5	0.35	0.12	1.26	0.14	0.11	1.75	0.60	6.30	0.70	0.55
Scraper	6	1.26	0.28	3.84	0.46	0.41	7.56	1.68	23.04	2.76	2.46
Crane	3	0.68	0.15	1.69	0.14	0.14	2.04	0.45	5.07	0.42	0.42
Loader	15	0.57	0.25	1.89	0.18	0.17	8.55	3.75	28.35	2.70	2.55
Grader	5	0.15	0.04	0.71	0.09	0.06	0.75	0.20	3.55	0.45	0.30
Water Truck	4	1.79	0.19	4.17	0.45	0.26	7.16	0.76	16.68	1.80	1.04
Oiler Truck	1	1.79	0.19	4.17	0.45	0.26	1.79	0.19	4.17	0.45	0.26
Haul Truck	33	1.79	0.19	4.17	0.45	0.26	59.07	6.27	137.61	14.85	8.58
Compactor	13	0.30	0.07	0.86	0.07	0.05	3.90	0.91	11.18	0.91	0.65
Paver	1	0.30	0.07	0.86	0.07	0.05	0.30	0.07	0.86	0.07	0.05
Vibrating Drum	1	0.68	0.15	1.69	0.14	0.14	0.68	0.15	1.69	0.14	0.14
		Total Combined Emissions (pounds/hour)					93.55	15.03	238.50	25.25	17.00
		Total Combined Emissions (pounds/day)					748.40	120.24	1,908.00	202.00	136.00
		Total Combined Emissions (tons/year)[2]					97.29	15.63	248.04	26.26	17.68

87-271 (6/29/90)

[1] Reference: U.S. EPA 1985.
[2] Based on 8-hour day, 260-day year.

TABLE 4.5.4c

ESTIMATED CONSTRUCTION EQUIPMENT EMISSIONS
VINA TERRACE SITE

EQUIPMENT		EQUIPMENT EMISSION FACTOR[1] (pounds/hour/unit)					EQUIPMENT EMISSIONS (pounds/hour)				
TYPE	NUMBER	CO	HC	NOx	SOx	TSP	CO	HC	NOx	SOx	TSP
Dozer	5	0.35	0.12	1.26	0.14	0.11	1.75	0.6	6.30	0.70	0.55
Scraper	12	1.26	0.28	3.84	0.46	0.41	15.12	3.36	46.08	5.52	4.92
Crane	3	0.68	0.15	1.69	0.14	0.14	2.04	0.45	5.07	0.42	0.42
Loader	40	0.57	0.25	1.89	0.18	0.17	22.80	10.00	75.60	7.20	6.80
Grader	5	0.15	0.04	0.71	0.09	0.06	0.75	0.20	3.55	0.45	0.30
Water Truck	4	1.79	0.19	4.17	0.45	0.26	7.16	0.76	16.68	1.80	1.04
Oiler Truck	5	1.79	0.19	4.17	0.45	0.26	8.95	0.95	20.85	2.25	1.30
Haul Truck	70	1.79	0.19	4.17	0.45	0.26	125.30	13.30	291.90	31.50	18.20
Compactor	18	0.30	0.07	0.86	0.07	0.05	2.40	0.56	6.88	0.56	0.40
Paver	2	0.30	0.07	0.86	0.07	0.05	0.60	0.14	1.72	0.14	0.10
Vibrating Drum	2	0.68	0.15	1.69	0.14	0.14	1.36	0.30	3.38	0.28	0.28
		Total Combined Emissions (pounds/hour)					188.23	30.62	478.01	50.82	34.31
		Total Combined Emissions (pounds/day)					1,505.84	244.96	3,824.08	406.56	274.48
		Total Combined Emissions (tons/year)[2]					195.76	31.84	497.12	52.85	35.68

87-271 (06/29/90)

[1] Reference: U.S. EPA 1985.
[2] Based on 8-hour day, 260-day year.

TABLE 4.5.5

CUMULATIVE EMISSIONS

SOURCE	NO_x (tons/year)	SO_x (tons/year)	CO (tons/year)	PM_{10} (tons/year)	ROC (tons/year)
Proposed Action	24.5	1.40	5.4	1.6	6.50
STS Power Plant	18.0	0.14	22.5	2.91	2.55
Offshore Oil Platforms	232.0	18.00	154.0	3.8	NA
TOTAL	274.5	19.54	181.9	8.31	9.05

87-271 (7/3/90)

NA = Not Available

Source: TRC Environmental Consultants 1988.

TABLE 4.6.1

ESTIMATED LAUNCH WASTEWATER CHARACTERISTICS AFTER HYPOCHLORITE TREATMENT

CONTAMINANT[1]	CONCENTRATION A[2]	CONCENTRATION B[2]	CONCENTRATION C[2]	DRINKING WATER STANDARDS/ CRITERIA[4]
pH (units)	20-3.3	9.0	7.0	5-9
Aluminum	52.0	1.4	0.35	N.S.
Barium	1.2	0.8	0.2	1.0
Cadmium	0.2	0.03	0.01	0.01
Calcium	465.0	465.0	115.2	80[3]
Chromium	0.6	0.02	0	0.05
Copper	0.7	0.002	0	1.0
Iron	30.0	0.1	0.02	0.3
Lead	1.4	0.02	0	0.05
Magnesium	57	3.4	0.83	27[3]
Manganese	0.7	0.35	0.09	0.05
Nickel	1.3	0.65	0.16	N.S.
Selenium	4	2.1	0.52	0.01
Silver	0.2	0.1	0.02	0.05
Sodium	181.0	689.5	172.4	82[3]
Zinc	270.0	0.1	0.03	5.0
Chloride	2,881.0	2,881.0	713.7	500
Silica	70	6.4	1.6	N.S.
Sulfate	79	85.6	21.2	500
Suspended Solids	320	0	0	N.S.

87-271 (6/29/90)

[1] Concentration = mg/L.
[2] Source: USAF 1983.
[3] Typical South VAFB Ground Water Concentrations.
[4] Source: CCR, Title 22, Chapter 15, Article 5, Part 64435.

N.S. = No Standard

TABLE 4.10.1

ESTIMATED PERSONNEL REQUIREMENTS

AREA OF RESIDENCE	PROJECT PHASE		
	FACILITY CONSTRUCTION/ AEROSPACE EQUIPMENT INSTALLATION		OPERATIONS
	UNDEVELOPED SITES	SLC-6	ALL ALTERNATIVES
City of Lompoc	165	90	80
Lompoc Valley	60	33	85
Santa Maria Valley	200	108	150
VAFB Housing	100	54	70
Santa Ynez, South Santa Barbara County, Ventura County	25	15	15
TOTAL	550	300	400

Note: Estimates reflect anticipated peaks in personnel requirements during project construction and operations.

Source: Environmental Solutions, Inc. estimates 1988.

TABLE 4.12.1

CONSTRUCTION EMPLOYMENT PUBLIC SERVICE IMPACTS [1]

	PUBLIC SERVICE MULTIPLIERS[2]				ADDITIONAL RESIDENTS				PUBLIC SERVICE IMPACTS				TOTAL
	LOMPOC		SANTA MARIA	OTHER	LOMPOC		SANTA MARIA	OTHER	LOMPOC		SANTA MARIA	OTHER	
	INC.	UNINC.[3]			INC.	UNINC.[3]			INC.	UNINC.[3]			
Police Officers	0.0015	0.00146	0.00118	0.00146	430/ 235	420/ 230	525/ 290	65/ 35	0.65/ 0.36	0.61/ 0.34	0.62/ 0.34	0.09/ 0.05	1.97/ 1.09
Fire Fighters	0.0009	0.00117	0.0006	0.00117	430/ 235	420/ 230	525/ 290	65/ 35	0.39/ 0.21	0.49/ 0.27	0.32/ 0.18	0.08/ 0.04	1.28/ 0.7
School Enrollment	0.219	0.219	0.185	0.107	430/ 235	420/ 230	525/ 290	65/ 35	94/ 52	92/ 51	97/ 53	7.0/ 3.9	290/ 160
Water Use (Urban)[4]	0.14	0.24	0.21	0.24	430/ 235	420/ 230	525/ 290	65/ 35	60/ 33	101/ 56	110/ 61	16/ 9	287/ 159
Sewage Treatment[5]	70	70	70	70	430/ 235	420/ 230	525/ 290	65/ 35	30,100/ 16,555	29,400/ 16,170	36,750/ 20,213	4,550/ 2,503	100,800/ 55,441
Solid Waste Disposal[6]	1.4	1.4	1.9	1.7	430/ 235	420/ 230	525/ 290	65/ 35	602/ 331	588/ 323	998/ 549	111/ 61	2,299 1,264

6/14/90 (87–271)

[1] Cypress Ridge/SLC-6. Impacts related to SLC-6 assumed to be approximately 55 percent of those for Cypress Ridge, Boathouse Flats, and Vina Terrace.
[2] Multiplier units are per resident.
[3] Includes VAFB, Mission Hills, Vandenberg Village.
[4] Acre-feet per year.
[5] Gallons per day.
[6] Tons per year.

Source: Santa Barbara County 1987.

TABLE 4.13.1

PROJECTED MISSILE LAUNCH RATES
VAFB 1986 - 1995

VEHICLE	LAUNCHES PER YEAR[5]									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Atlas[1]	2	1								
Scout[2]	1	1	1	1	1	1	1	1	1	1
Thor/Delta[1]	0	0	0							
Titan III B[1]	0	1								
Titan 34 D[1]	1	1	1							
Titan II[3]			1	3	3	3	3	3	3	3
Titan IV[3] (SLC-4E)				1	2	2	2	2	2	2
Titan IV/[4] Centaur										3
TOTAL	4	4	3	5	6	6	6	6	6	9

6/14/90 (87-271)

[1] Program being phased out (US DOT 1988).
[2] Government maximum launches per year (US DOT 1988).
[3] Projected launches (USAF 1988b).
[4] Projected launches (see Section 2.1.6).
[5] Years 1986 and 1987 reflect actual launches.
Years 1988 through 1995 represent predicted launches.

TABLE B.11

SPECIALLY PROTECTED MARINE SPECIES

SPECIES	FEDERAL STATUS	CALIFORNIA STATE STATUS
REPTILES		
Deremochelys coriacea leather-back sea turtle	Endangered	None
Caretta caretta loggerhead sea turtle	Threatened	None
Chelonia mydas green sea turtle	Threatened	None
Lepidochelys olivacea Pacific Ridley sea turtle	Threatened	None
MAMMALS		
Eubalaena glacialis japonica Pacific right whale	Endangered	None
Eschrichtius robustus gray whale	Endangered	None
Balaenoptera musculus blue whale	Endangered	None
Balaenoptera physalus fin whale	Endangered	None
Balaenoptera borealis sei whale	Endangered	None
Megaptera novaeangliae humpback whale	Endangered	None
Physeter catodon sperm whale	Endangered	None
Arctocephalus townsendi Guadalupe fur seal	Threatened	Rare, Protected
Enhydra lutris California sea otter	Threatened	Protected
Callorhinus ursinus northern fur seal	Depleted	None

Source: Woodhouse 1988.

3.3 DRAFT EIS FIGURES

3.3 DRAFT EIS FIGURES

The following figures are provided as addenda and errata to the Draft EIS. The materials included here either replace existing figures contained in the Draft EIS or are inserts into that document. The page number shown on the top of the page corresponds to the replacement/insertion page for the Draft EIS.

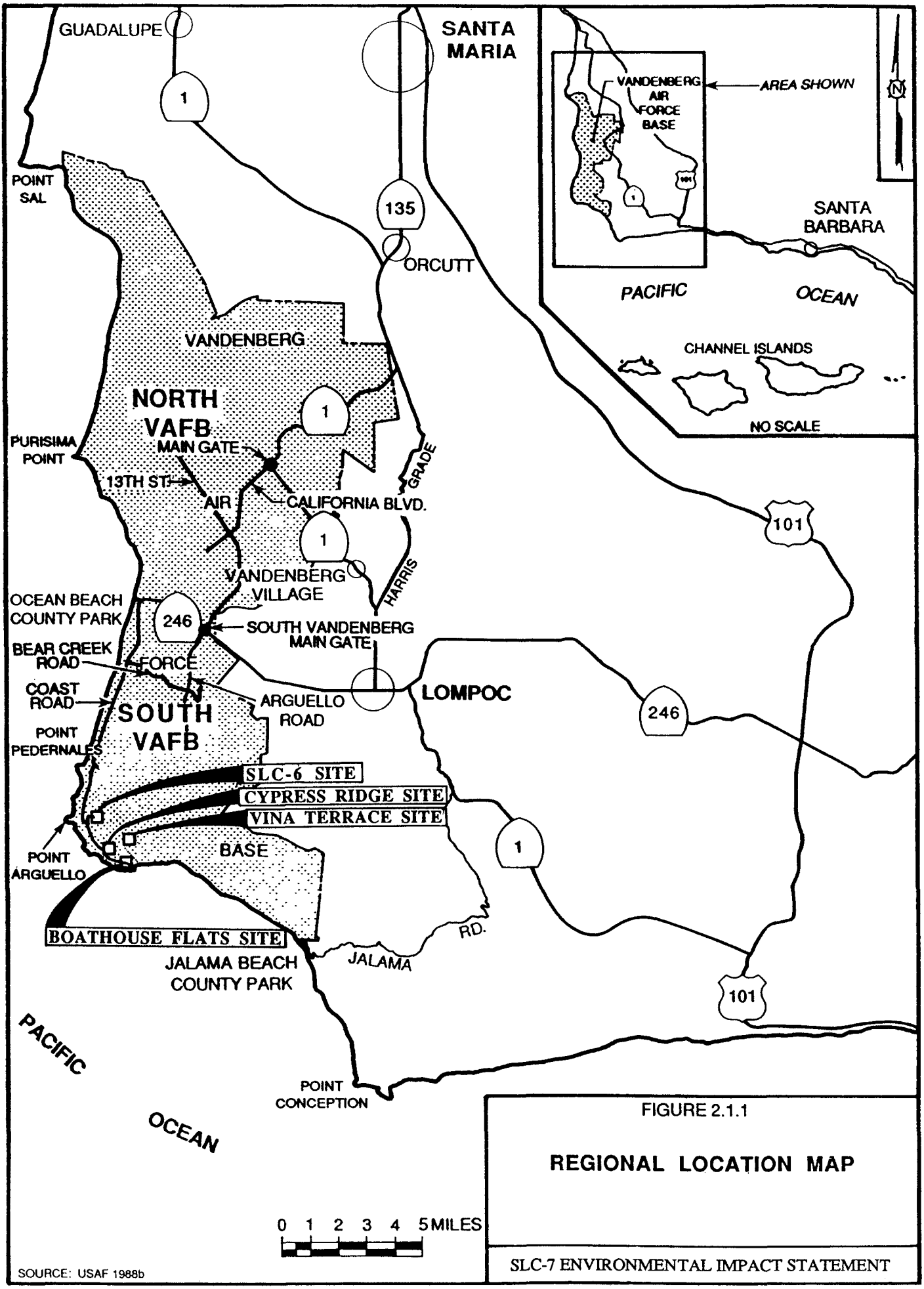


FIGURE 2.1.1

REGIONAL LOCATION MAP

SLC-7 ENVIRONMENTAL IMPACT STATEMENT

87-271-I FEIS REV. 5/29/90

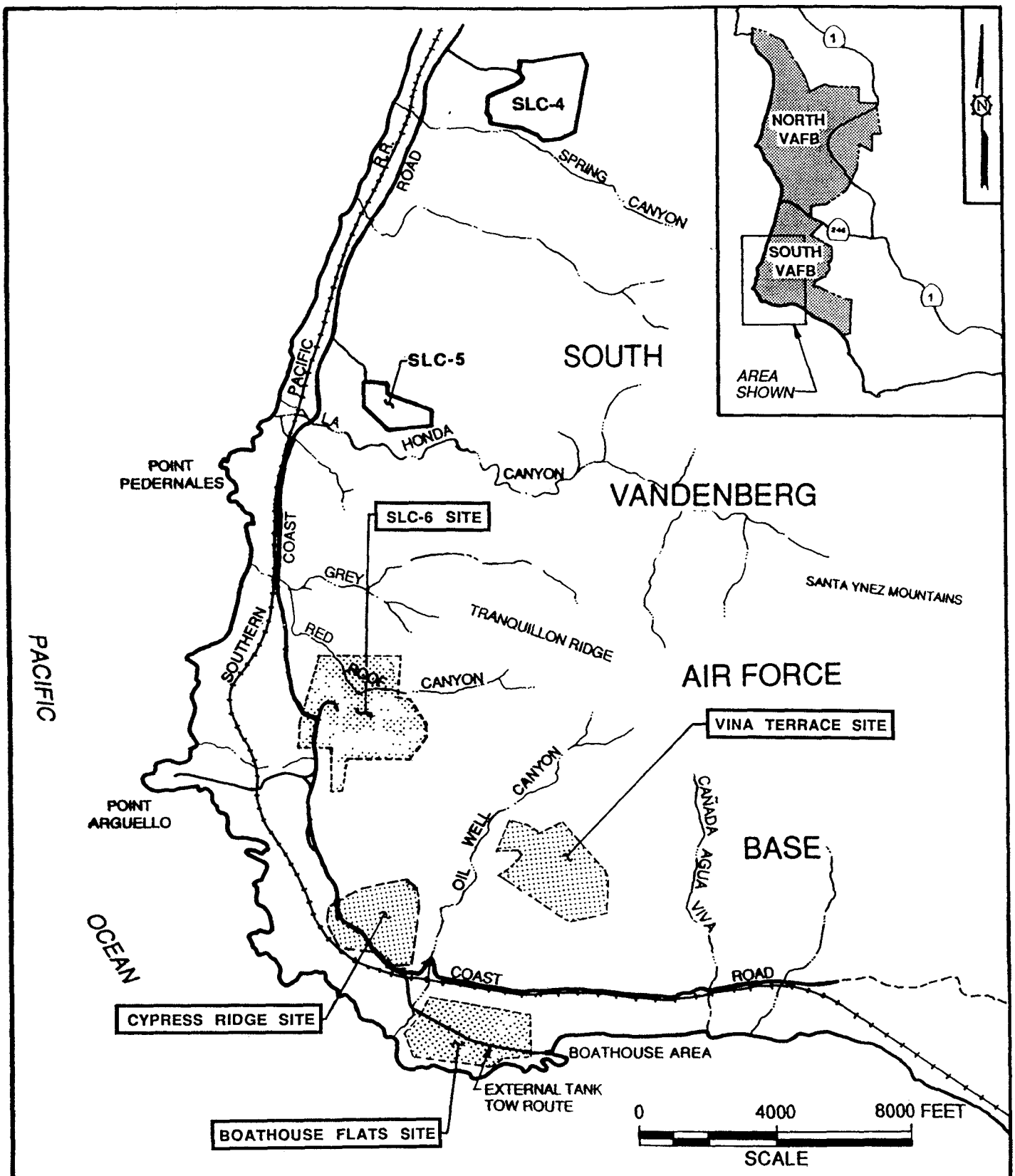
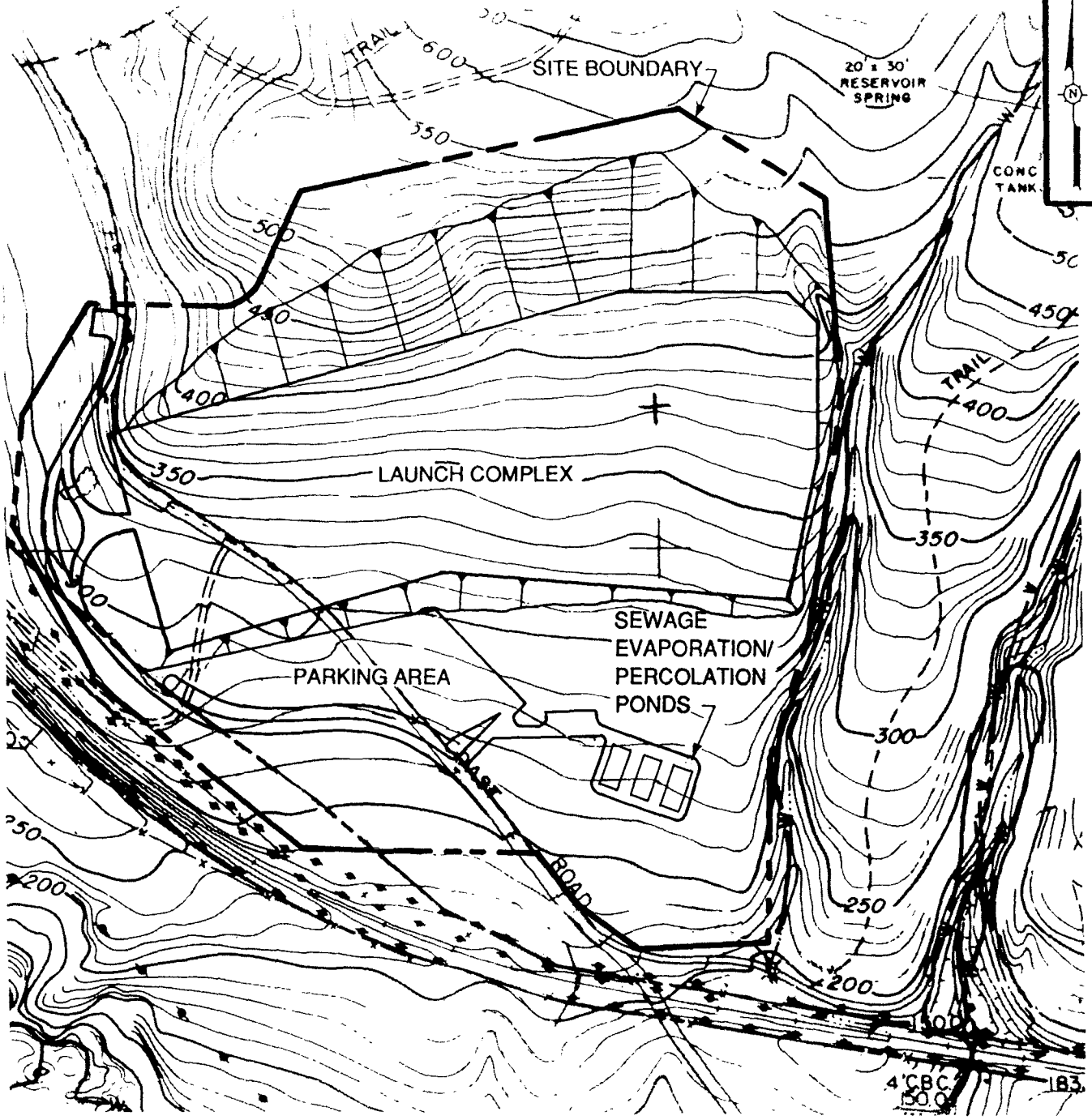


FIGURE 2.1.2

ALTERNATIVE SITES

SOURCE: USAF 1986.



0 500 1,000 FEET

SCALE

CONTOUR INTERVAL: 10 FEET

NOTE ACTUAL PLACEMENT OF FACILITIES SUBJECT TO USAF CRITERIA AND FINAL DESIGN CONSIDERATIONS

TOPO: MAPPING DONE BY INTERNATIONAL MAPPING CORPORATION, LOS ANGELES, CALIF

FIGURE 2.1.3

CONCEPTUAL LAYOUT CYPRESS RIDGE SITE

SLC-7 ENVIRONMENTAL IMPACT STATEMENT

87-271-I FEIS REV. 6/29/90

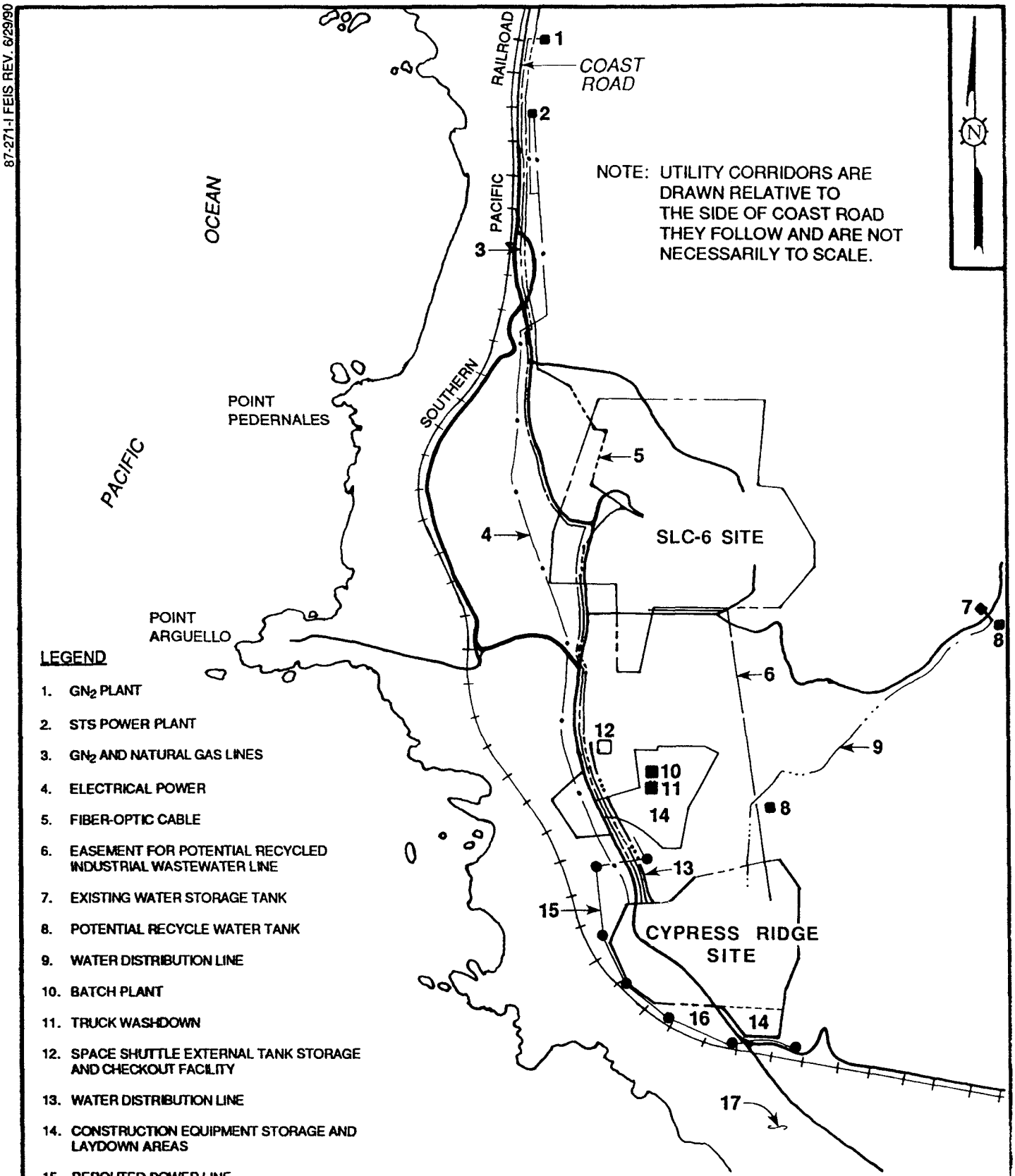


FIGURE 2.1.7

PRELIMINARY UTILITY CORRIDORS AND CONSTRUCTION AREAS PROPOSED ALIGNMENT

SLC-7 ENVIRONMENTAL IMPACT STATEMENT

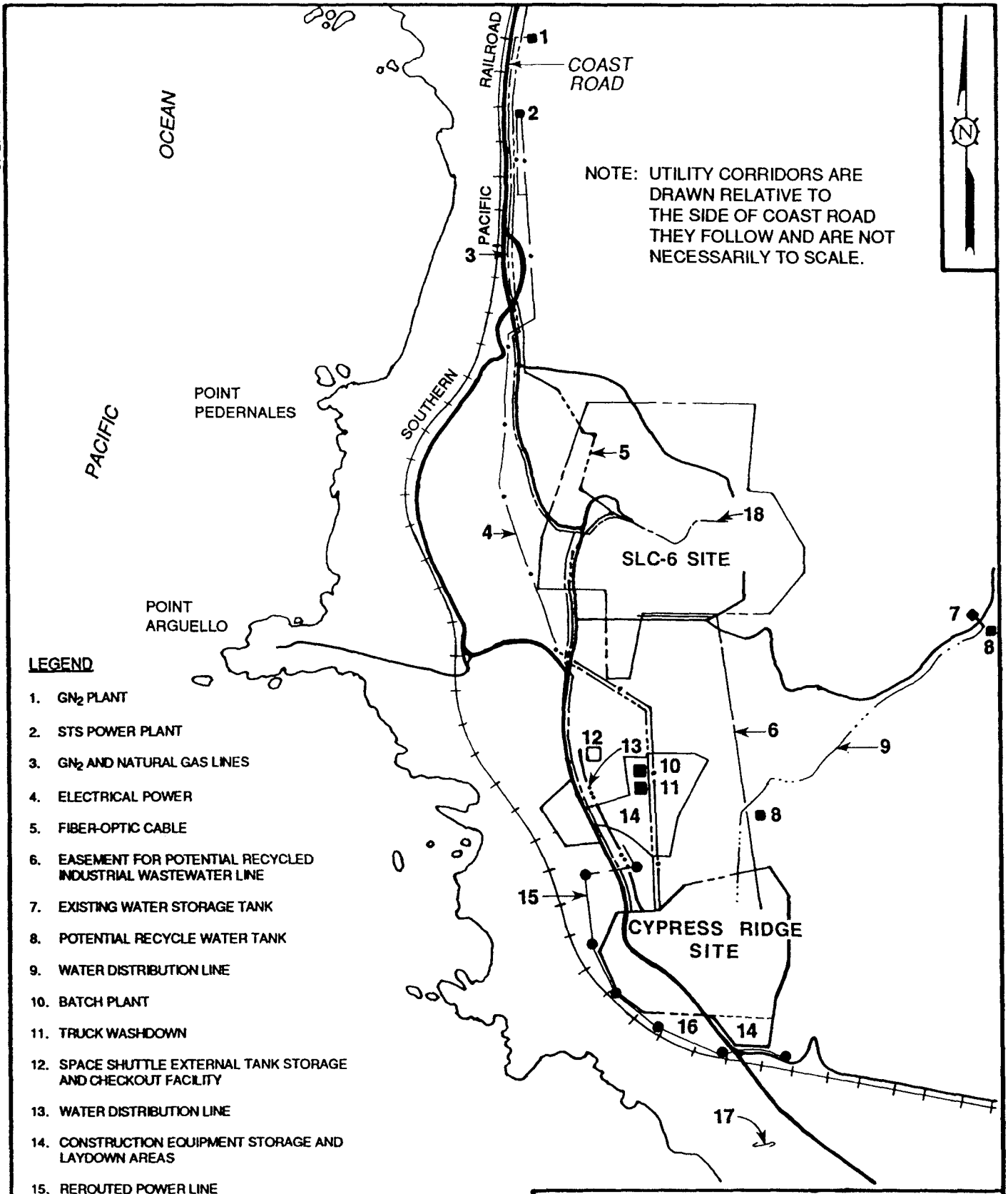
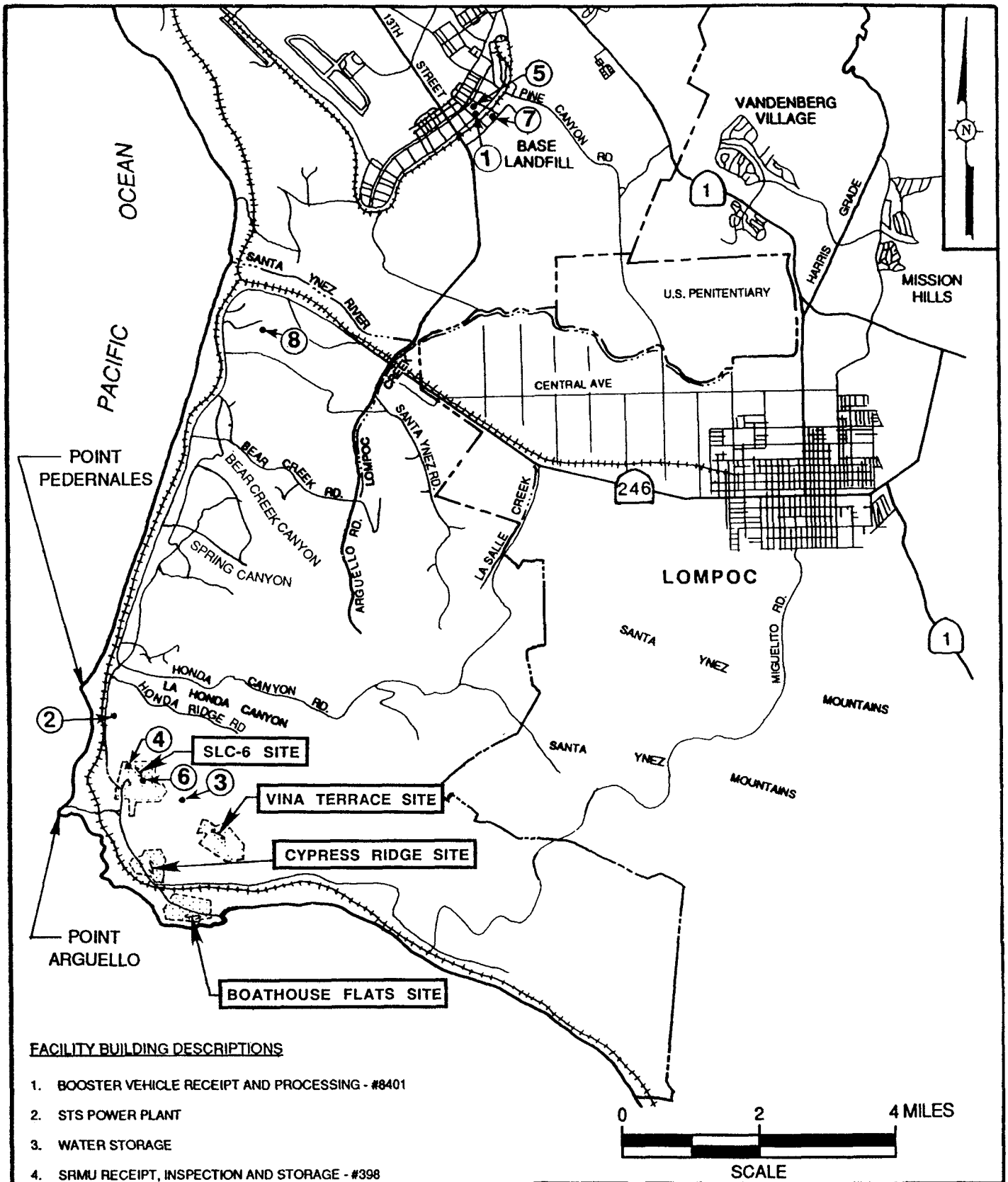


FIGURE 2.1.8

PRELIMINARY UTILITY CORRIDORS AND CONSTRUCTION AREAS ALTERNATIVE ALIGNMENT

SLC-7 ENVIRONMENTAL IMPACT STATEMENT

87-271-I FEIS REV. 5/29/90

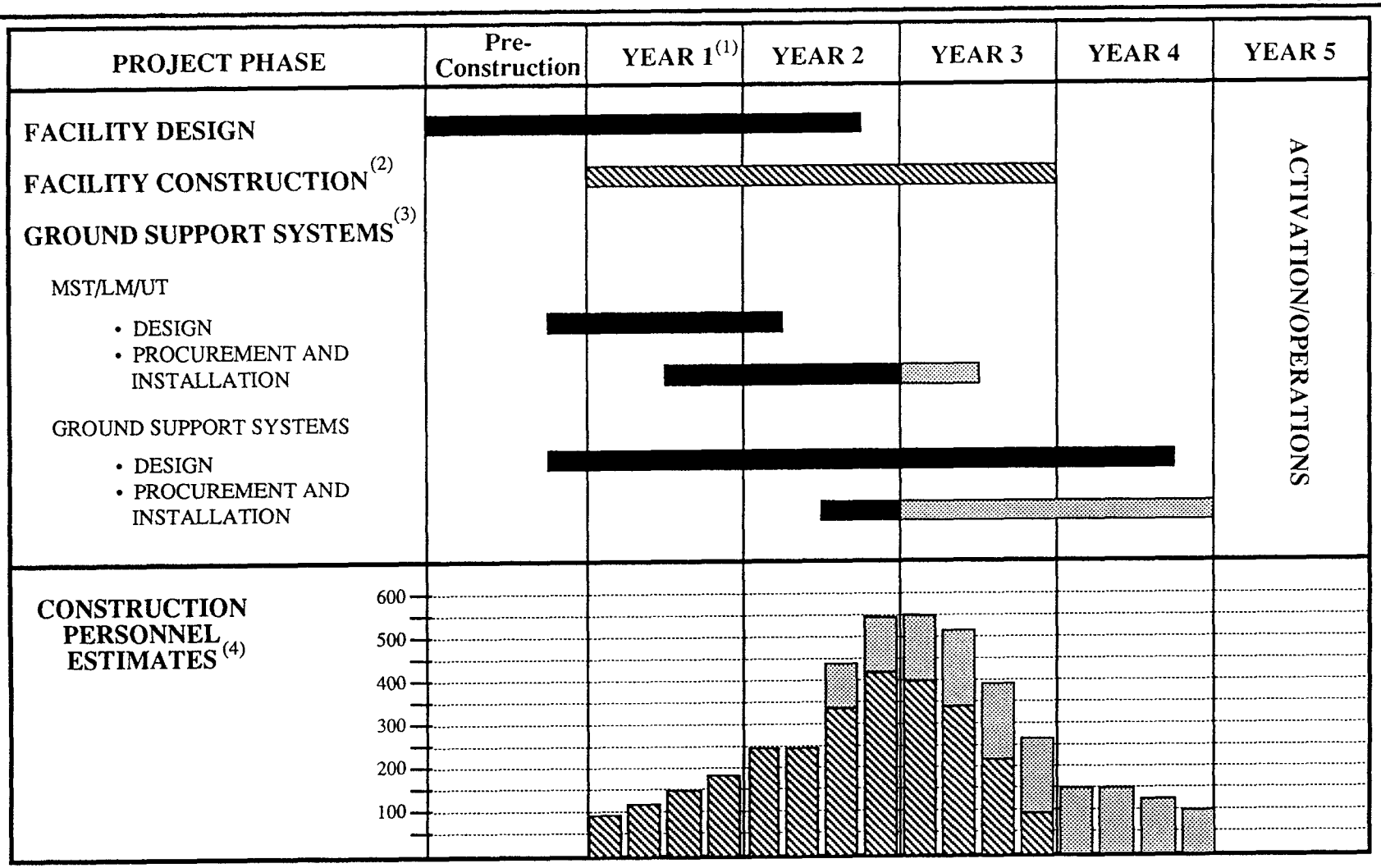


FACILITY BUILDING DESCRIPTIONS

1. BOOSTER VEHICLE RECEIPT AND PROCESSING - #8401
2. STS POWER PLANT
3. WATER STORAGE
4. SRMU RECEIPT, INSPECTION AND STORAGE - #398
5. PAYLOAD FAIRING RECEIPT AND PROCESSING - #8337
6. SLC-6 WASTEWATER TREATMENT PLANT - SLC-6 SITE
7. LAUNCH CONTROL CENTER - #8510
8. HYPERGOLIC PROPELLANT STOCKPILE FACILITIES #975 AND #977

FIGURE 2.1.9

TITAN PROGRAM
EXISTING VAFB FACILITIES



(1) Years indicated do not necessarily correspond to calendar dates and indicate the least time anticipated for completion of activities. Actual construction may extend through Year 5, with Activation/Operations occurring in Year 6.

(2) Facility construction includes grading, road construction, utilities, Operations Support Building, Launch Service Structure, fencing, and reclamation.

(3) Ground Support Systems include Mobile Service Tower, Launch Mount, Umbilical Tower, and other ground equipment.

(4) Includes USAF, Aerospace, Army Corps of Engineers, and private contractor construction personnel.

On-Site Off-Site Facility Construction

On-Site Off-Site Aerospace Equipment Installation

FIGURE 2.1.10

PRELIMINARY CONSTRUCTION SCHEDULE AND PERSONNEL REQUIREMENTS FOR UNDEVELOPED SITES

SLC-7 ENVIRONMENTAL IMPACT STATEMENT

87-271-I FEIS REV. 5/29/90

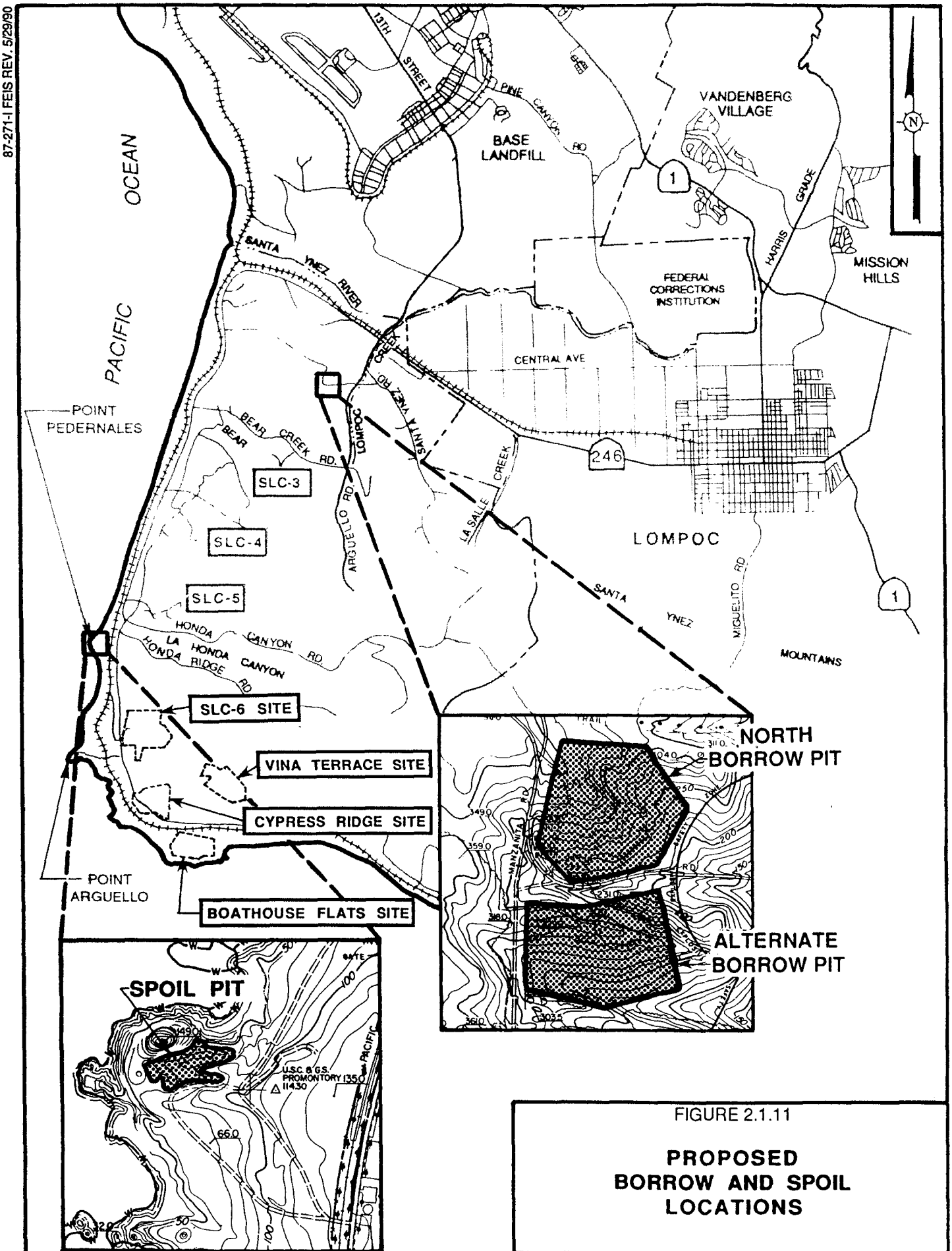
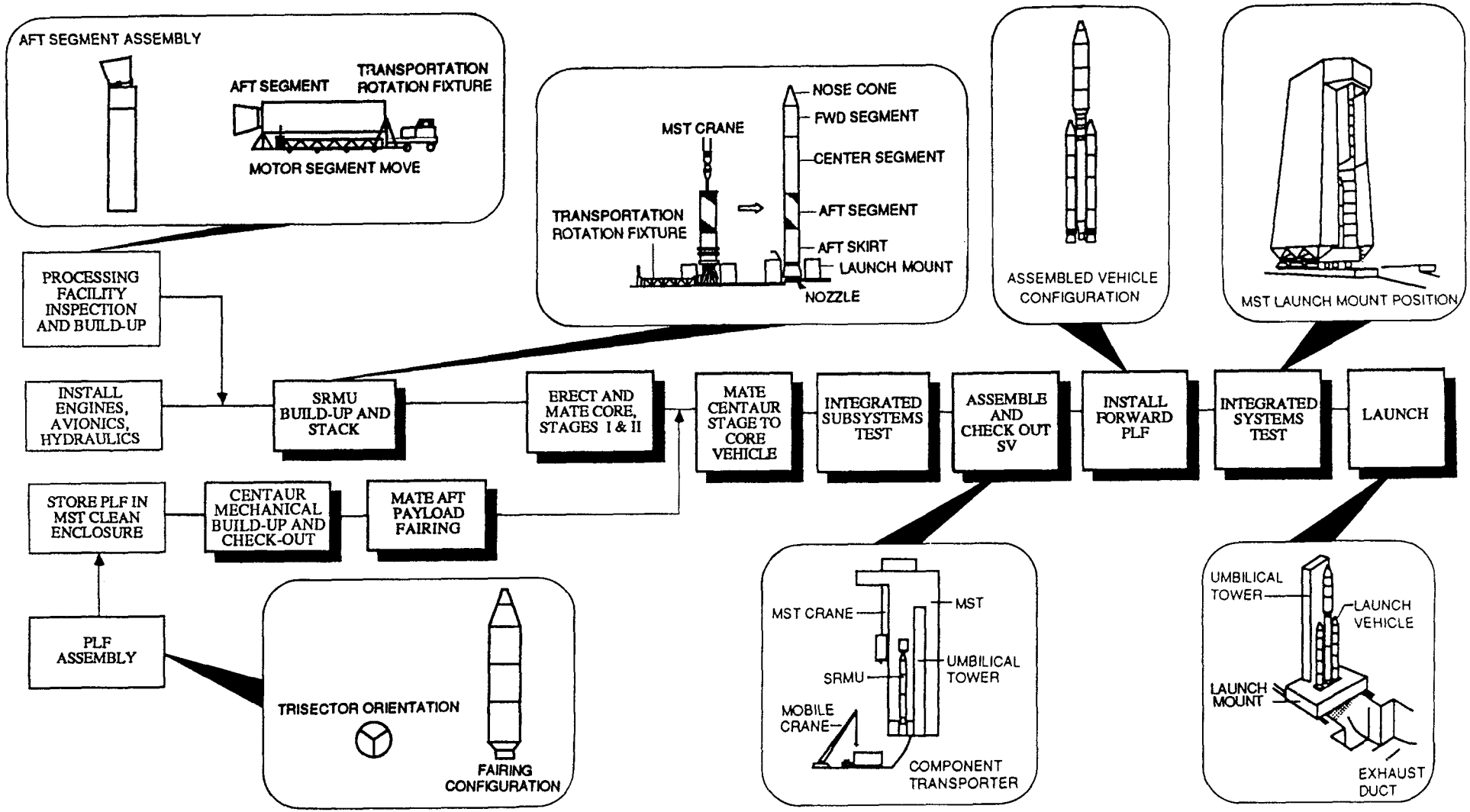


FIGURE 2.1.11

PROPOSED BORROW AND SPOIL LOCATIONS



LEGEND

MST = MOBILE SERVICE TOWER
PLF = PAYLOAD FAIRING
SV = SATELLITE VEHICLE
SRMU = SOLID ROCKET MOTORS

= DENOTES ON-PAD ACTIVITY

SOURCE: USAF 1988d.

FIGURE 2.1.12

TITAN IV/CENTAUR TYPICAL VEHICLE ASSEMBLY FLOW DIAGRAM

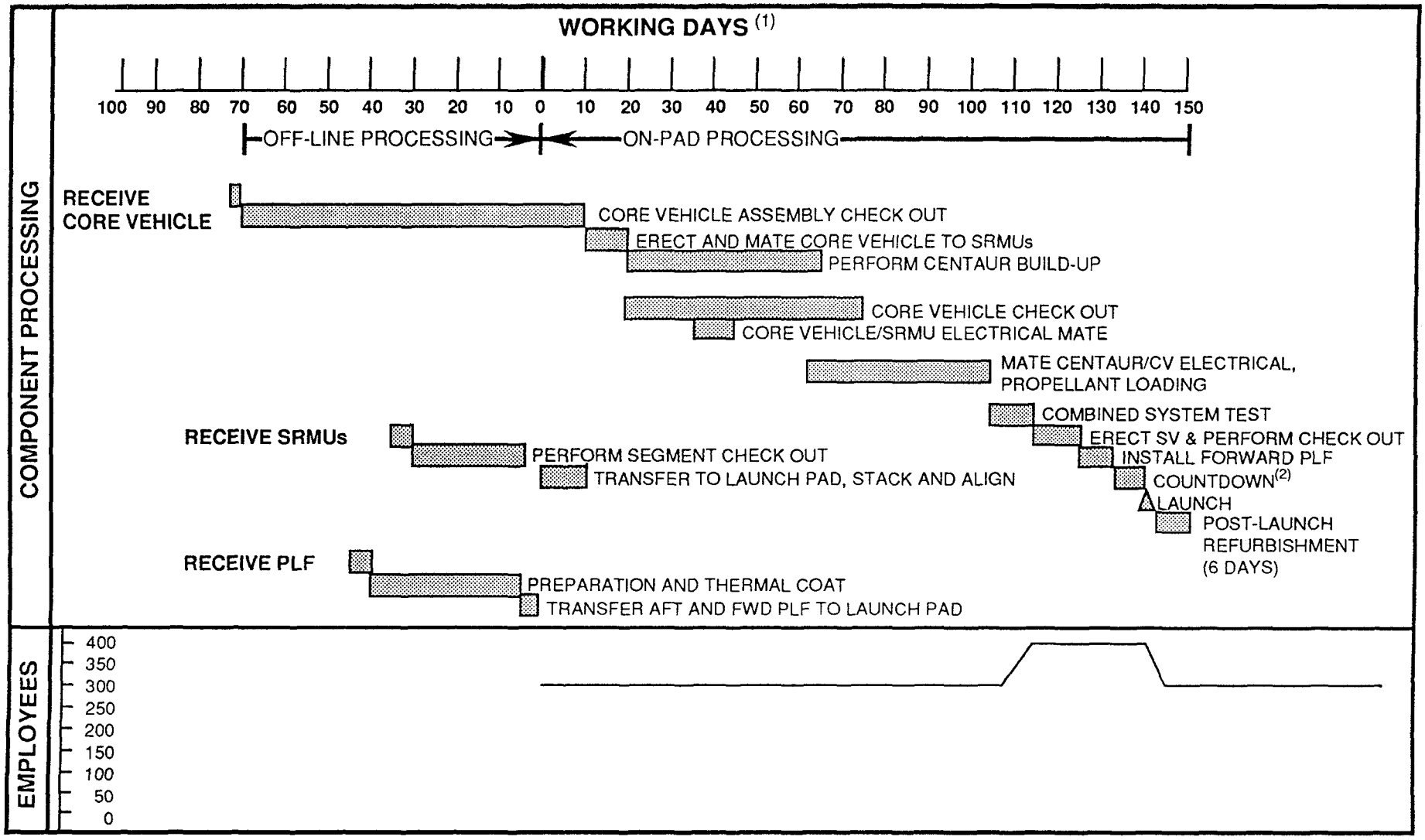


FIGURE 2.1.13

TITAN IV/CENTAUR TYPICAL VEHICLE ASSEMBLY TIME LINE AND LABOR REQUIREMENTS

NOTES

(1) Time line shown as working days based on 8-hour/day, 5-day/week schedule.

(2) 24-hour/day work schedule.

Source: USAF 1988d.

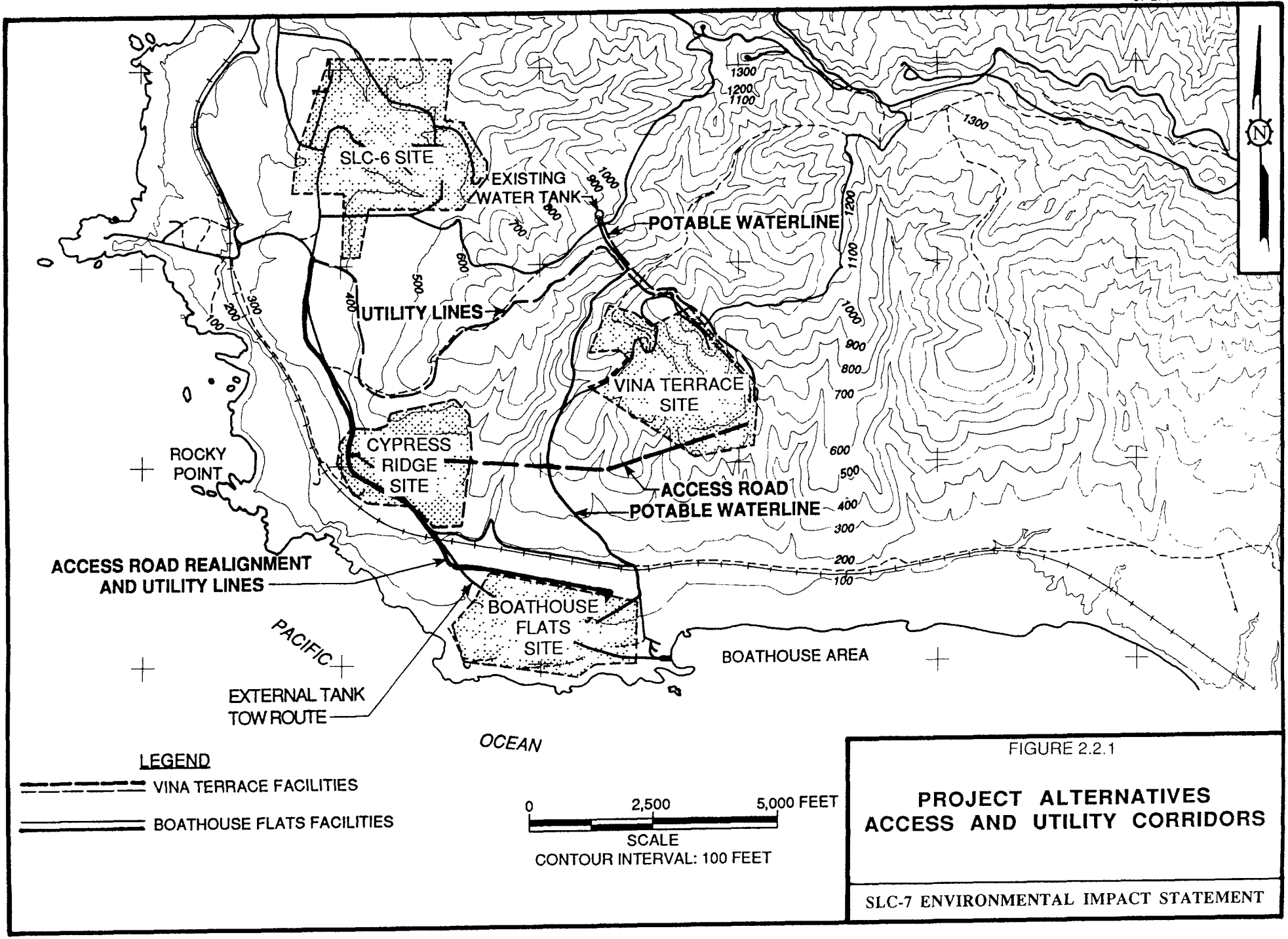
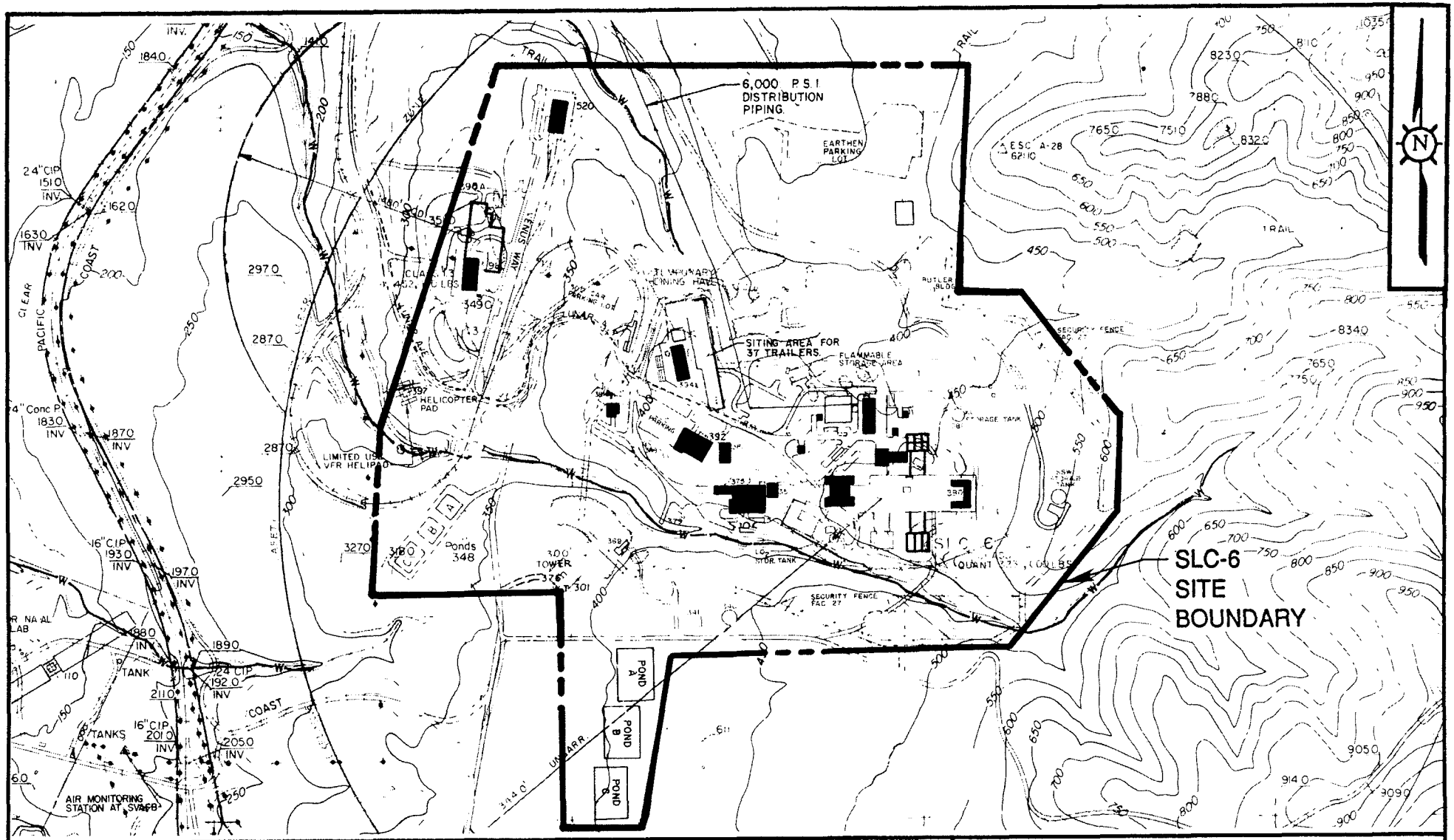


FIGURE 2.2.1

PROJECT ALTERNATIVES ACCESS AND UTILITY CORRIDORS

SLC-7 ENVIRONMENTAL IMPACT STATEMENT



0 800 1,600 FEET

SCALE

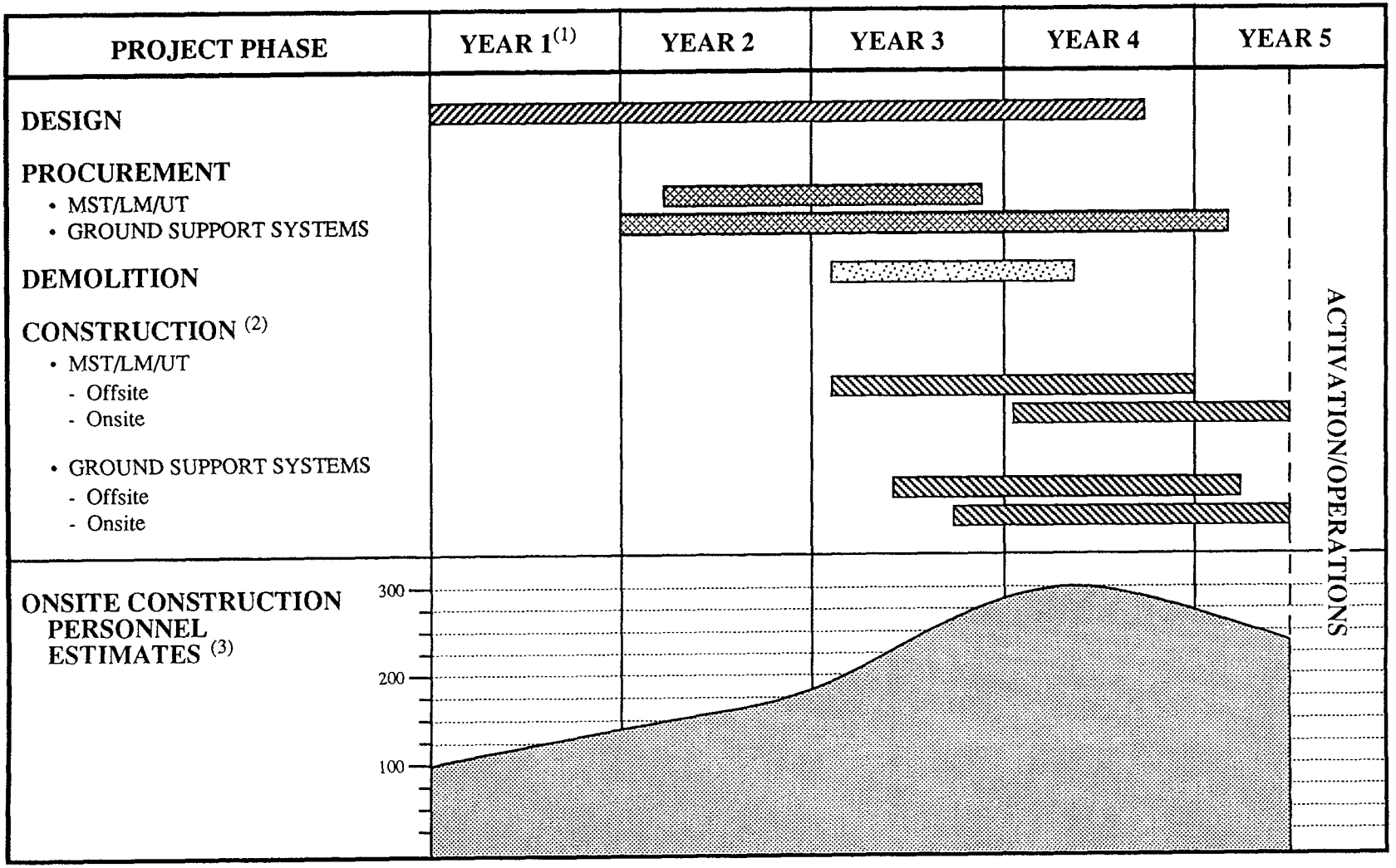
CONTOUR INTERVAL: 10 FEET

TOPO: MAPPING DONE BY INTERNATIONAL MAPPING CORPORATION, L.A., CALIF.

FIGURE 2.2.2

SLC-6 SITE

SLC-7 ENVIRONMENTAL IMPACT STATEMENT



(1) Years do not necessarily correspond to calendar dates and indicate the least time anticipated for completion of activities.

(2) Includes integration and checkout.

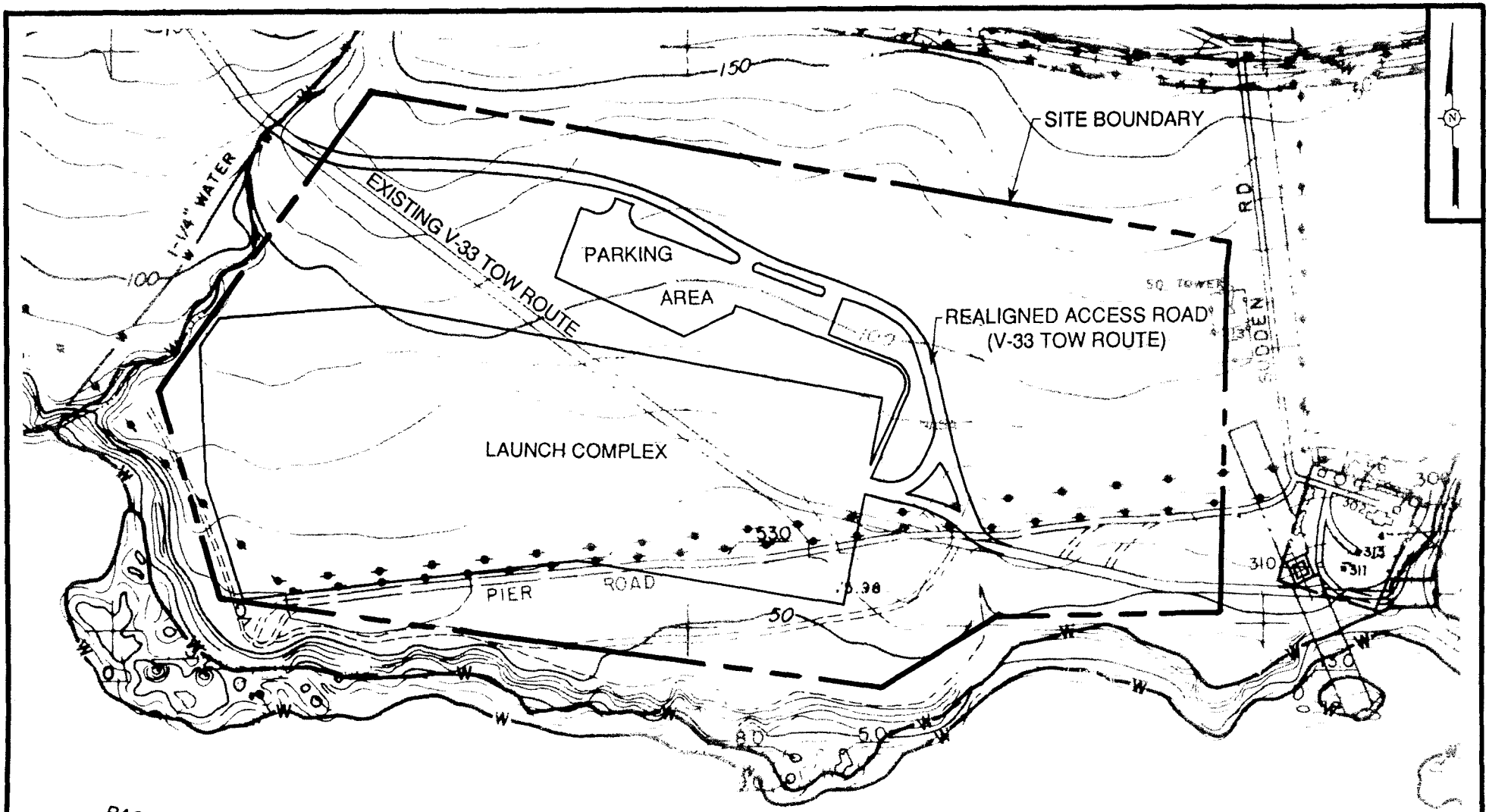
(3) Includes USAF, Aerospace, and private contractor construction personnel located at VAFB.

LEGEND

DESIGN PROCUREMENT DEMOLITION CONSTRUCTION

FIGURE 2.2.3a
PRELIMINARY CONSTRUCTION SCHEDULE AND PERSONNEL REQUIREMENTS FOR IMPLEMENTATION OF PROPOSED ACTION AT SLC-6

SLC-7 ENVIRONMENTAL IMPACT STATEMENT



TOPO: MAPPING DONE BY INTERNATIONAL MAPPING CORPORATION, LOS ANGELES, CALIF.

FIGURE 2.2.4

CONCEPTUAL LAYOUT
BOATHOUSE FLATS SITE

SLC-7 ENVIRONMENTAL IMPACT STATEMENT

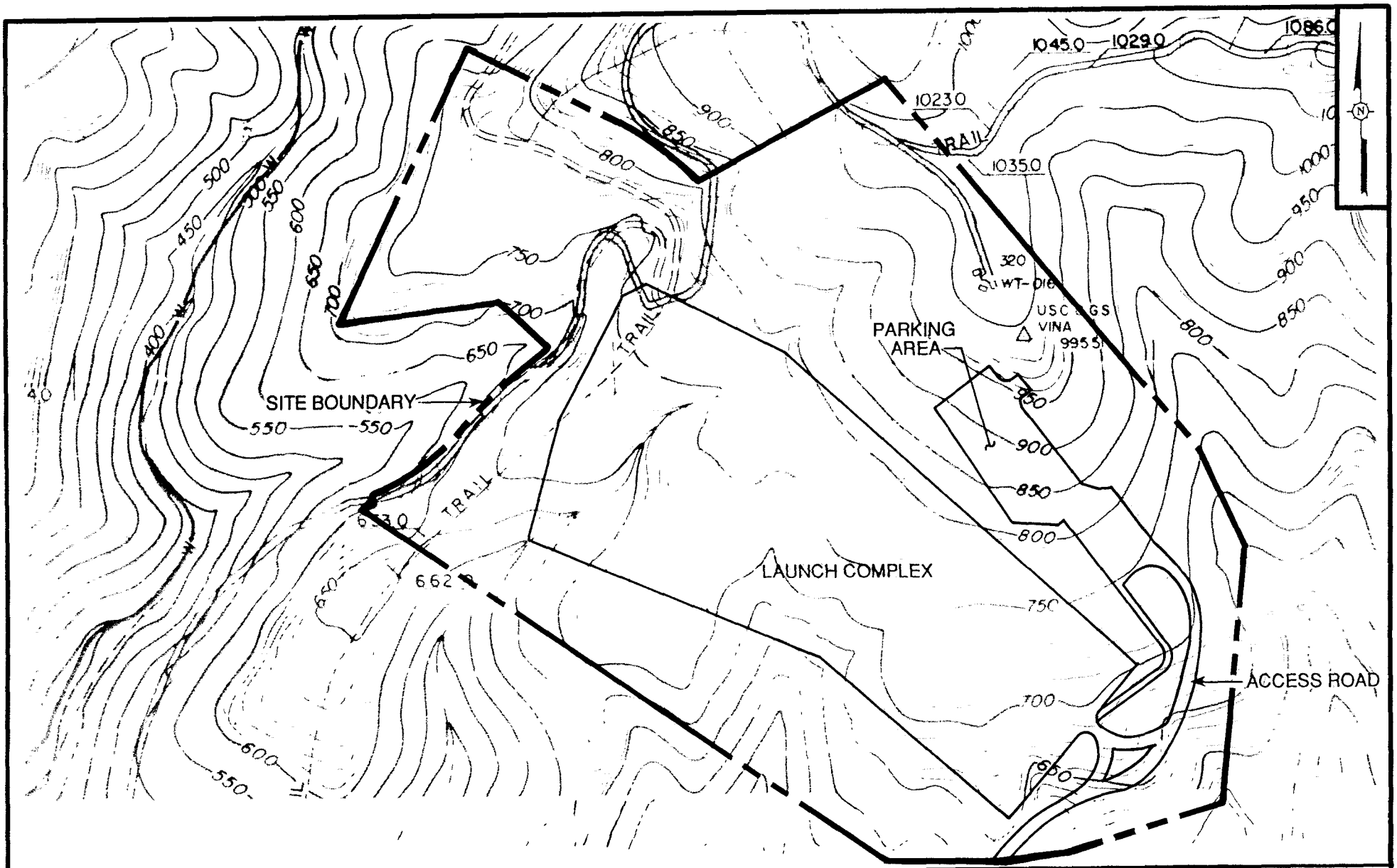
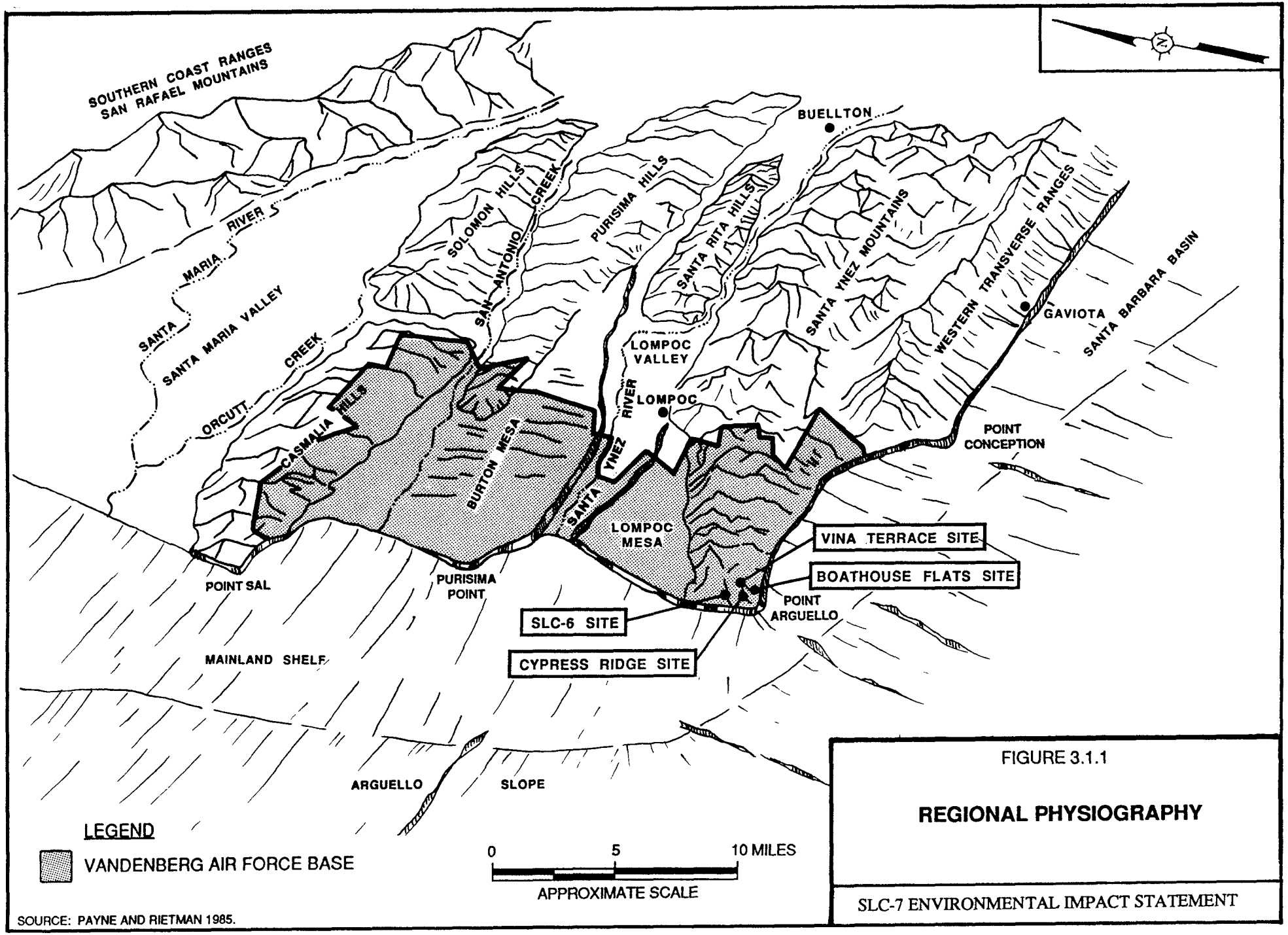


FIGURE 2.2.5

CONCEPTUAL LAYOUT
VINA TERRACE SITE

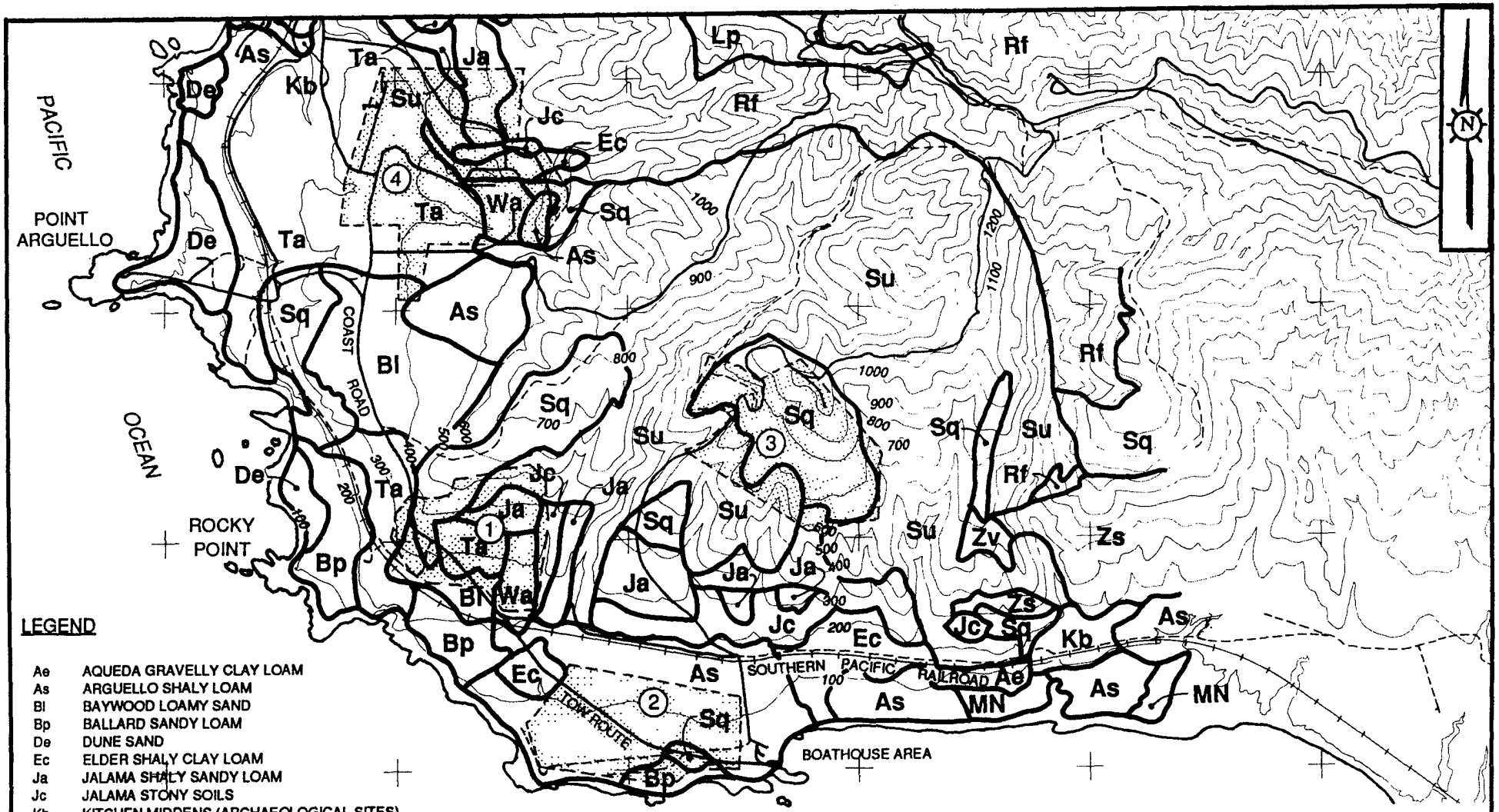
SLC-7 ENVIRONMENTAL IMPACT STATEMENT



SOURCE: PAYNE AND RIETMAN 1985.

FIGURE 3.1.1

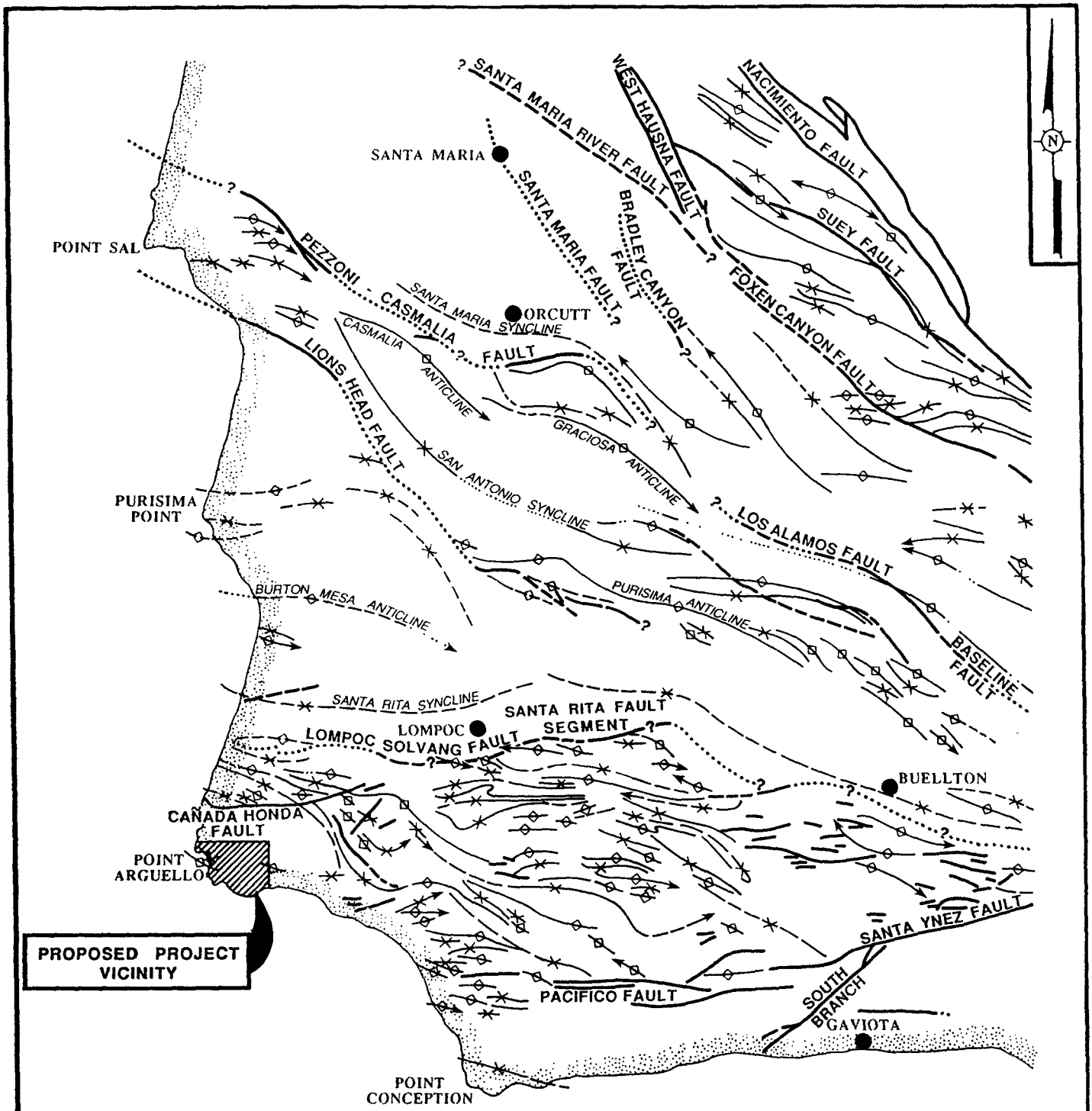
REGIONAL PHYSIOGRAPHY



SOURCE: USAF 1987d. VAFB MASTER PLAN - DEVELOPMENT PLAN, PREPARED BY: KEN O'BRIAN & ASSOCIATES, LOS ANGELES, CALIF.

FIGURE 3.1.2

LOCAL SOILS MAP (SOIL SERIES)



PROPOSED PROJECT VICINITY

NOTE THIS FIGURE SHOWS THE KNOWN ONSHORE STRUCTURES

0 5 10 MILES
SCALE

EXPLANATION

ANTICLINAL AXIS AND END ARROWS INDICATE PLUNGE

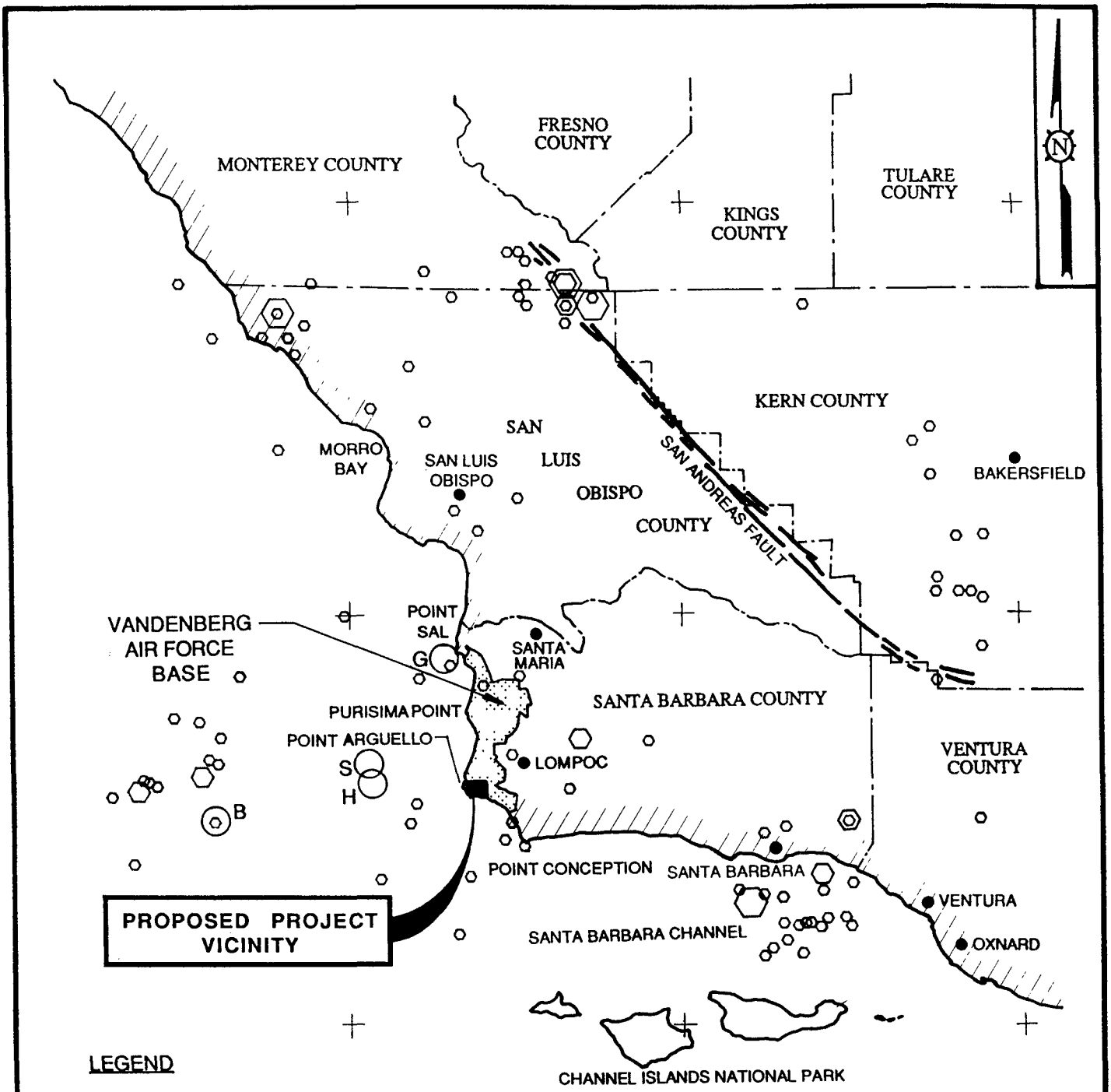
SYNCLINAL AXIS, END ARROWS INDICATE PLUNGE

FAULTS, SOLID WHERE EXPOSED, DASHED WHERE INFERRED AND DOTTED WHERE DOUBTFUL OR BURIED

MODIFIED FROM: DIBBLEE (1950), WOODRING AND BRAMLETT (1950), YERKES AND OTHERS (1981), BUCHANAN AND BANKS (1978), SYLVESTER AND DARROW (1979), IN: PAYNE AND RIETMAN (1985).

FIGURE 3.1.3

GEOLOGIC STRUCTURES MAP (ONSHORE FEATURES)



LEGEND

MAGNITUDES

- 4.0 - 4.9
- 5.0 - 5.9
- 6.0 - 7.1
- 7.3 - 1927 EARTHQUAKE

G - GAWTHROP

H - HANKS

S - SMITH

B - BYERLY

0 25 50 MILES

APPROXIMATE SCALE

REFERENCE: EARTH TECHNOLOGY CORPORATION 1984, REAL ET AL. 1978, IN: PAYNE AND RIETMAN 1985.

FIGURE 3 1 4

EARTHQUAKE EPICENTER MAP (MAGNITUDE 4.0 OR GREATER)

SLC-7 ENVIRONMENTAL IMPACT STATEMENT

87-271-I FEIS REV. 5/29/90

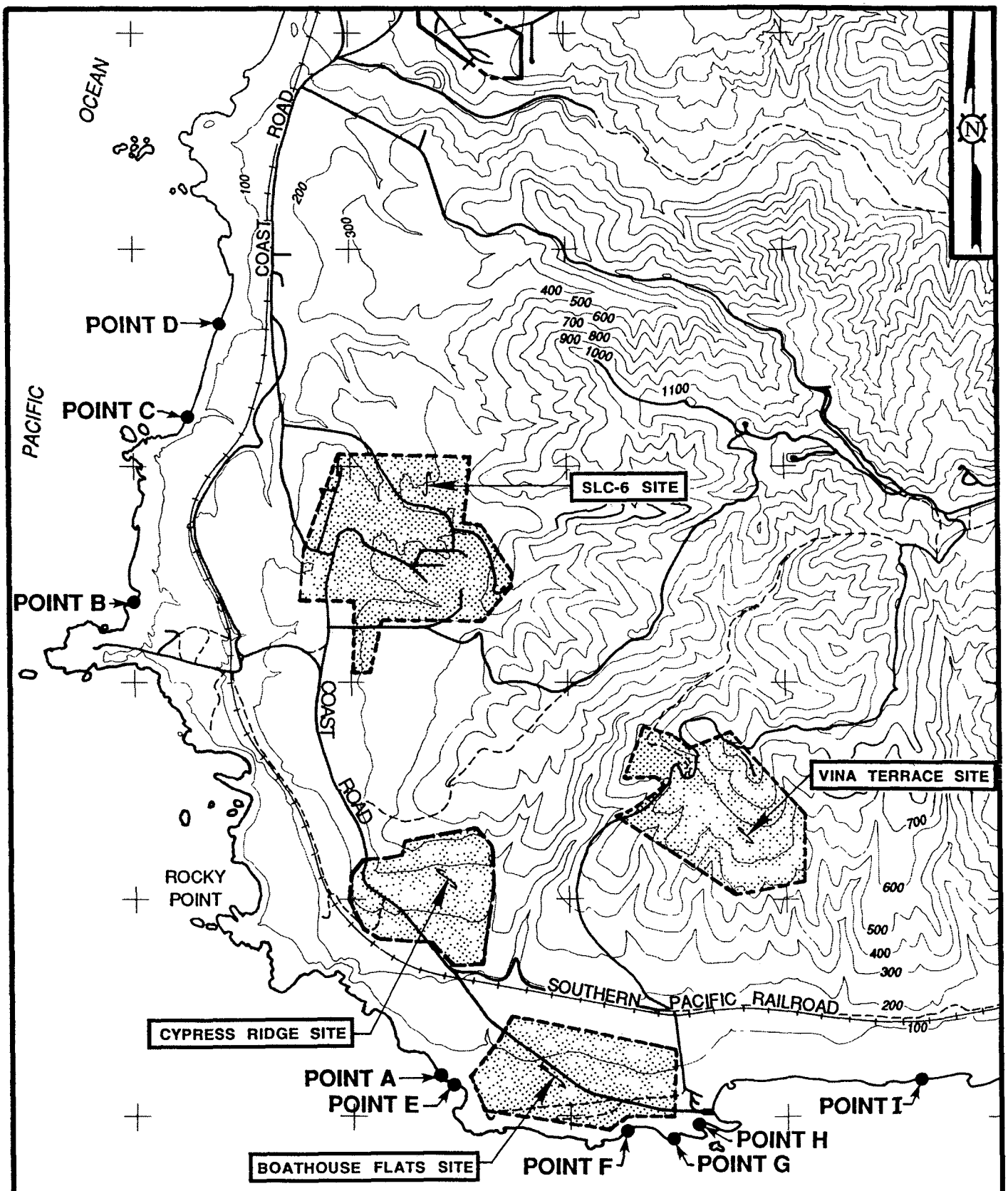
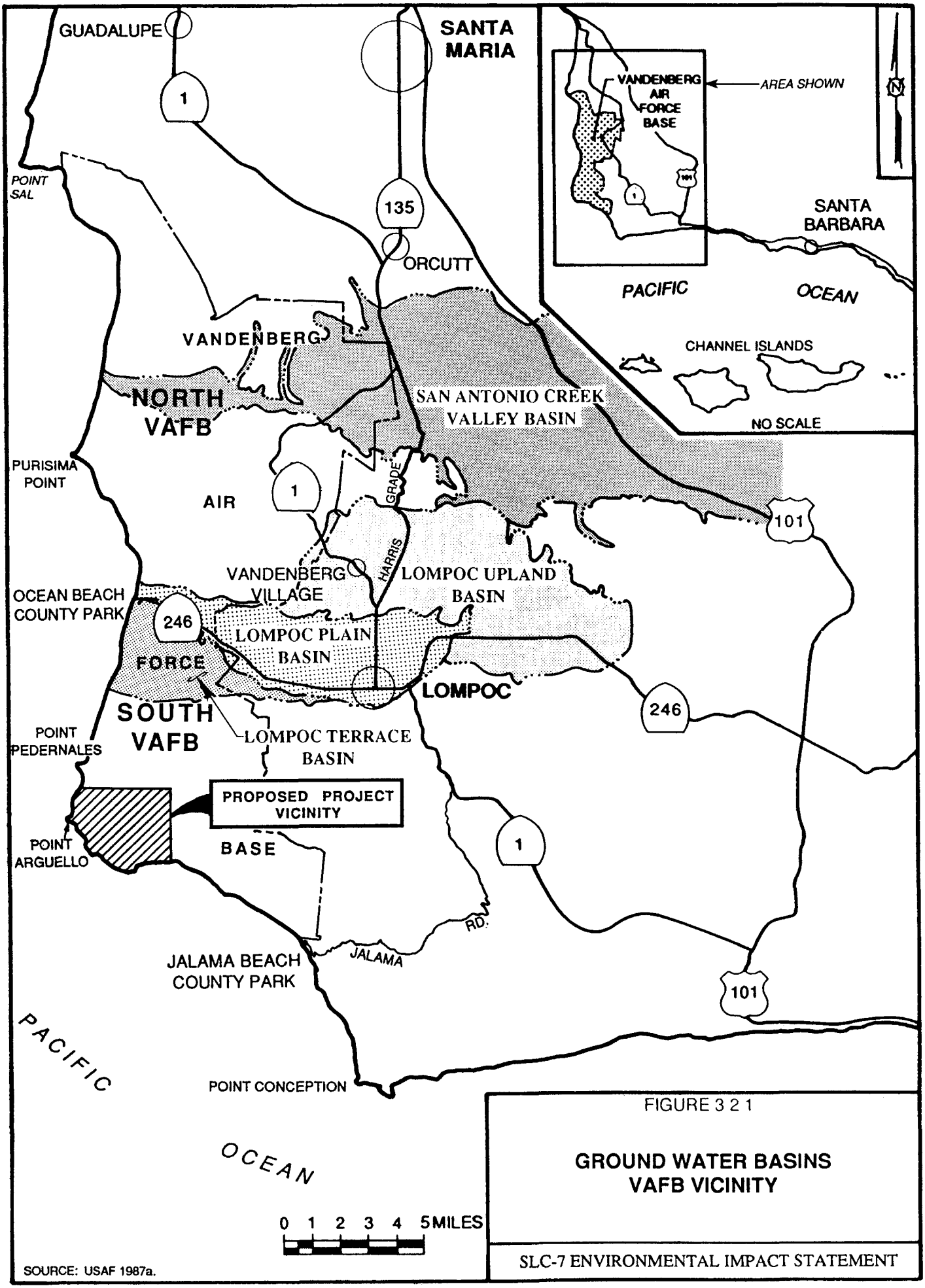


FIGURE 3.1.5

DRAINAGE AREAS AND DISCHARGE POINTS

SOURCE: USAF 1987d. VAFB MASTER PLAN DEVELOPMENT PLAN BY KEN O'BRIAN & ASSOCIATES, LOS ANGELES, CALIFORNIA

87-271-I FEIS REV. 5/30/90

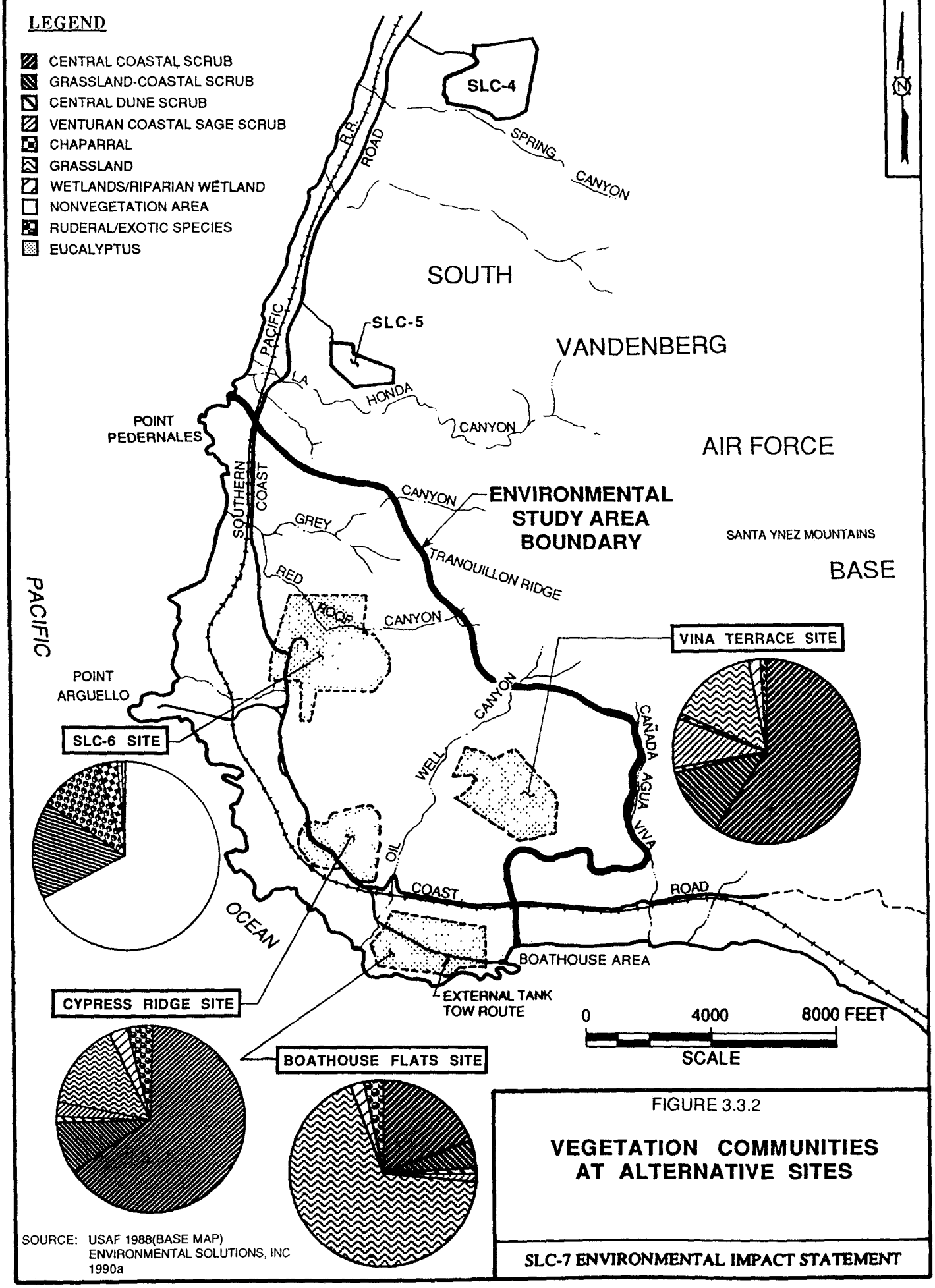


SOURCE: USAF 1987a.

FIGURE 3 2 1

GROUND WATER BASINS VAFB VICINITY

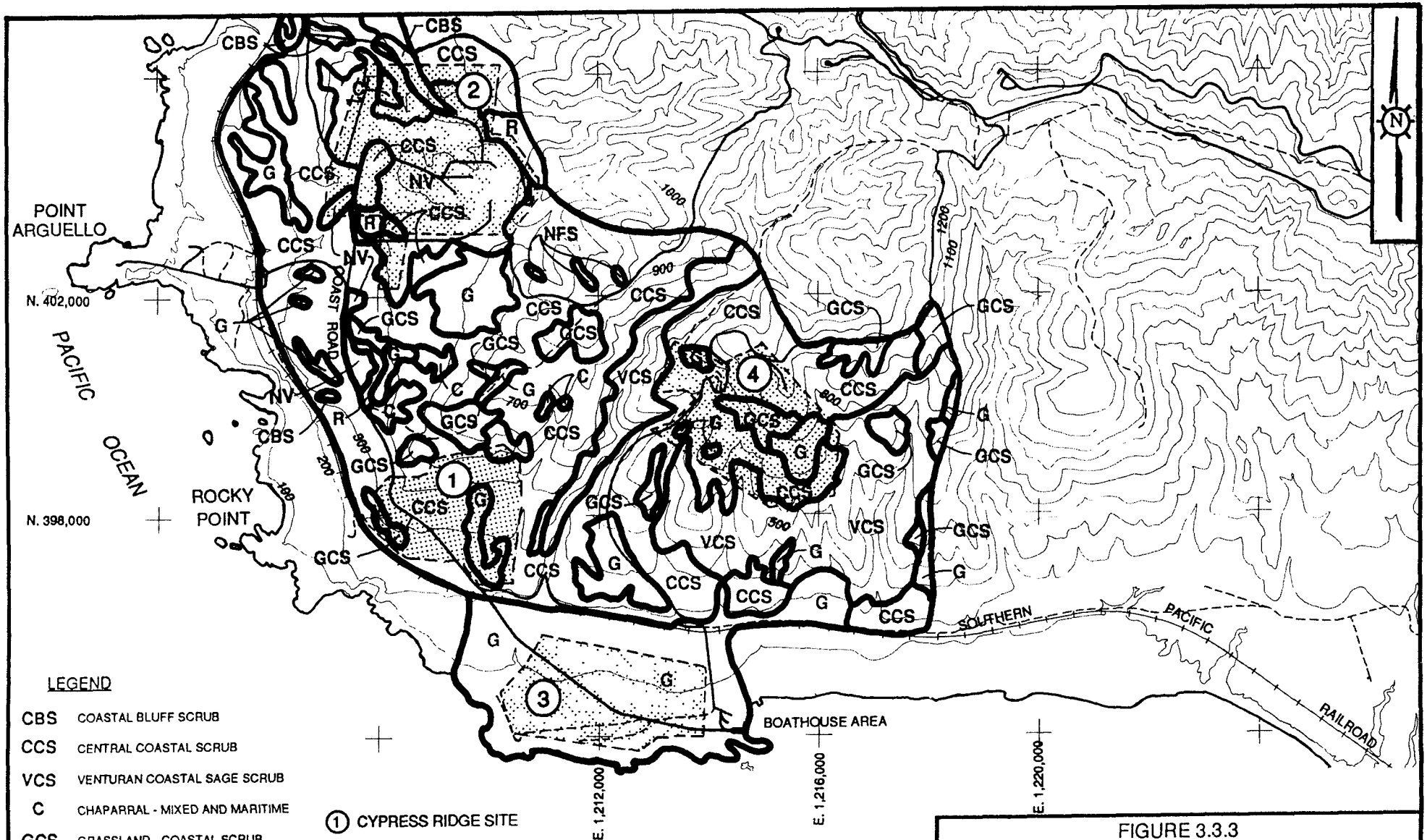
SLC-7 ENVIRONMENTAL IMPACT STATEMENT



SOURCE: USAF 1988(BASE MAP)
ENVIRONMENTAL SOLUTIONS, INC 1990a

FIGURE 3.3.2

VEGETATION COMMUNITIES AT ALTERNATIVE SITES



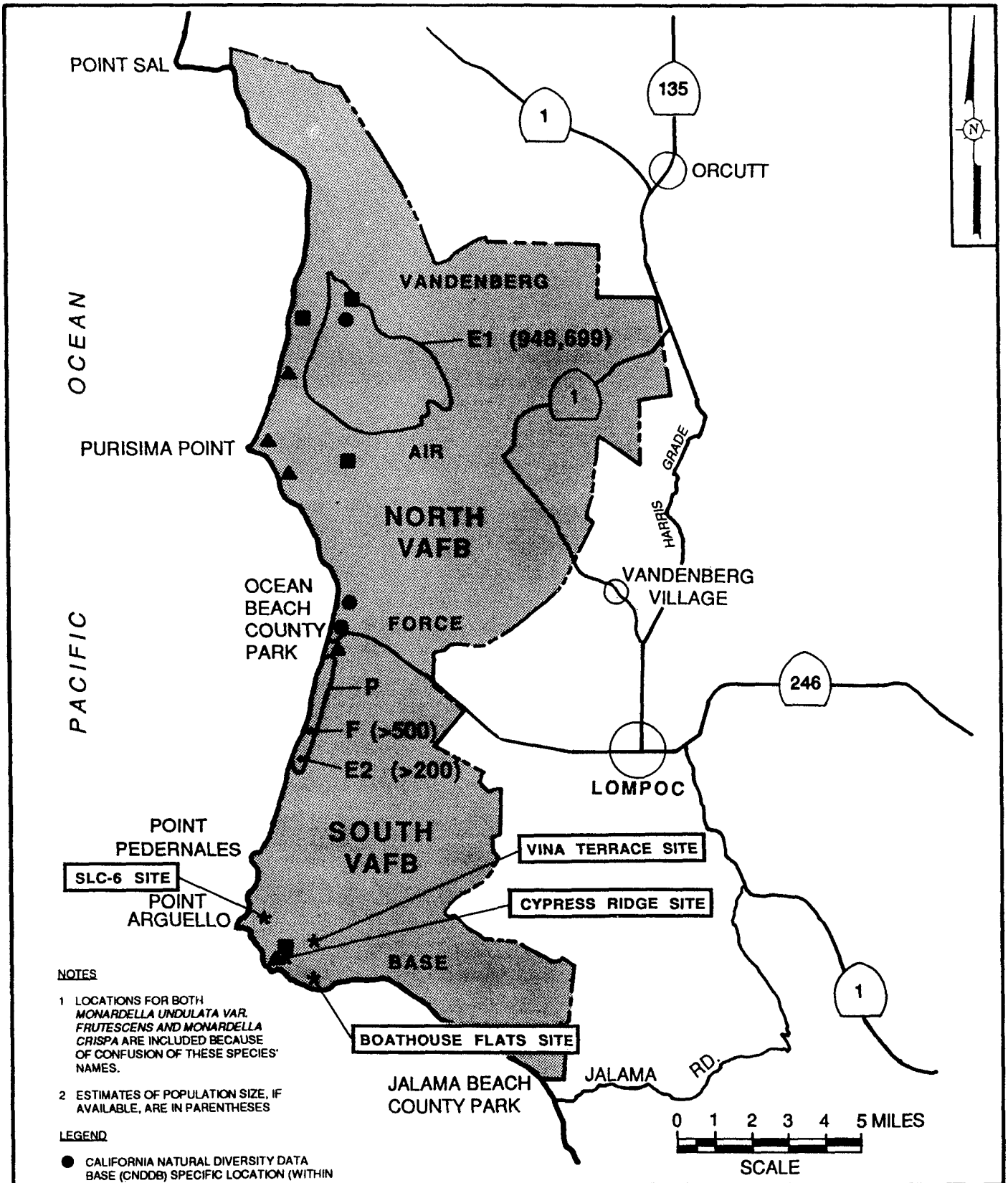
LEGEND

CBS	COASTAL BLUFF SCRUB
CCS	CENTRAL COASTAL SCRUB
VCS	VENTURAN COASTAL SAGE SCRUB
C	CHAPARRAL - MIXED AND MARITIME
GCS	GRASSLAND - COASTAL SCRUB
G	GRASSLAND
R	RUDERAL
NV	NONVEGETATION
NFS	NORTH FACING SLOPE - DOMINATED BY HUCKLEBERRY AND SALAL

SOURCE: USAF 1987d.

FIGURE 3.3.3

PLANT COMMUNITIES ENVIRONMENTAL STUDY AREA



NOTES

1 LOCATIONS FOR BOTH *MONARDELLA UNDULATA VAR. FRUTESCENS AND MONARDELLA CRISPA* ARE INCLUDED BECAUSE OF CONFUSION OF THESE SPECIES' NAMES.

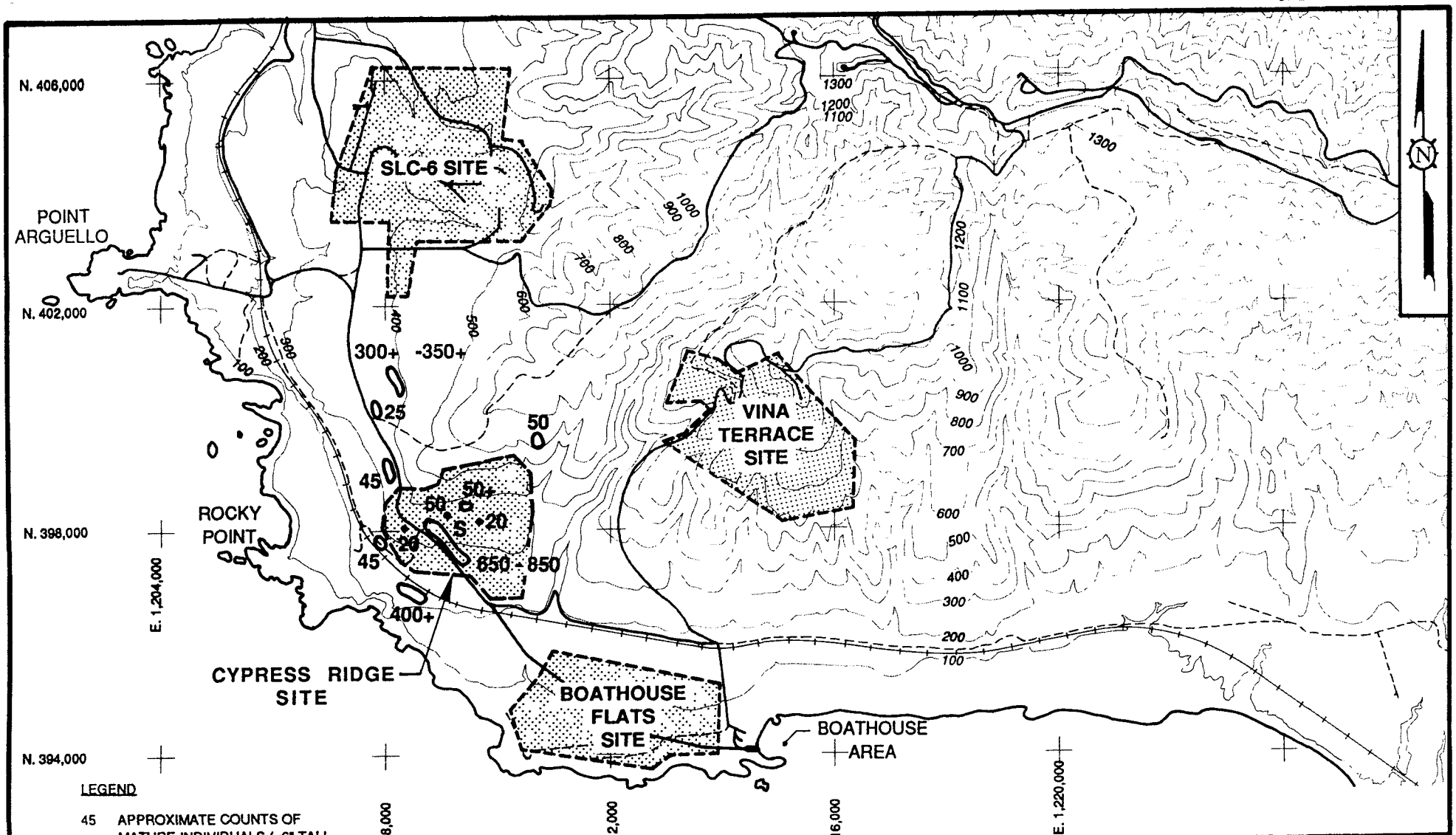
2 ESTIMATES OF POPULATION SIZE, IF AVAILABLE, ARE IN PARENTHESES

LEGEND

- ● CALIFORNIA NATURAL DIVERSITY DATA BASE (CNDDB) SPECIFIC LOCATION (WITHIN 80 ACRES)
- ▲ CNDDB NONSPECIFIC LOCATION (WITHIN 1 MILE)
- ■ CNDDB GENERAL LOCATION (WITHIN 5 MILES)
- ★ LOCATION OF ALTERNATIVE SITES
- E1 HDR 1980
- E2 USAF 1987a
- F FIELD OBSERVATIONS DURING THIS STUDY
- P R NICHOLS (PERS. COMM.), GENERAL LOCATION

FIGURE 3.3 4

LOCATIONS OF CURLY-LEAVED MONARDELLA AND CRISP MONARDELLA ON VAFB



SOURCE: USAF 1987d.

FIGURE 3.3.5

ENVIRONMENTAL STUDY AREA COLONIES OF MONARDELLA UNDULATA VAR. FRUTESCENS

SLC-7 ENVIRONMENTAL IMPACT STATEMENT

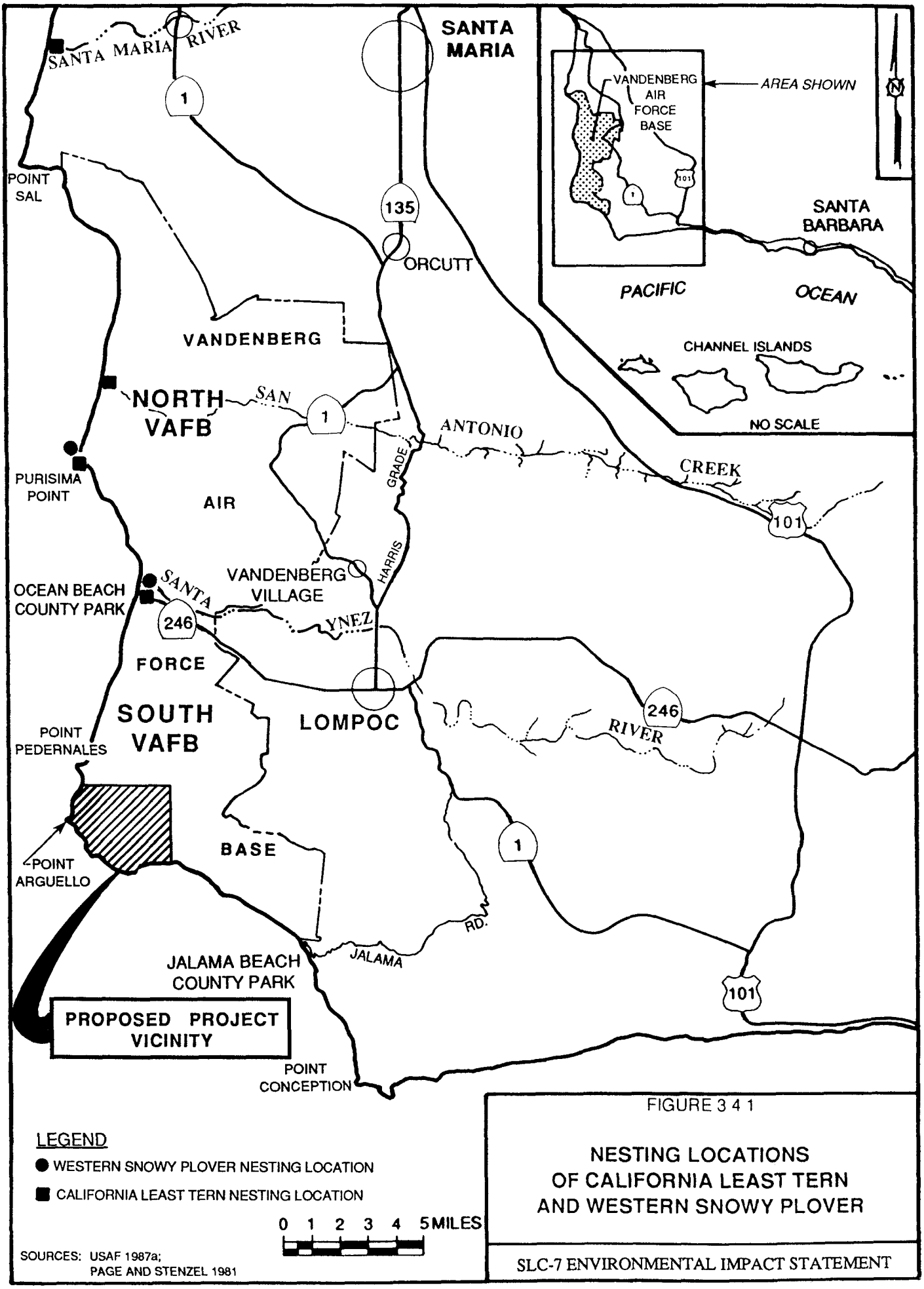
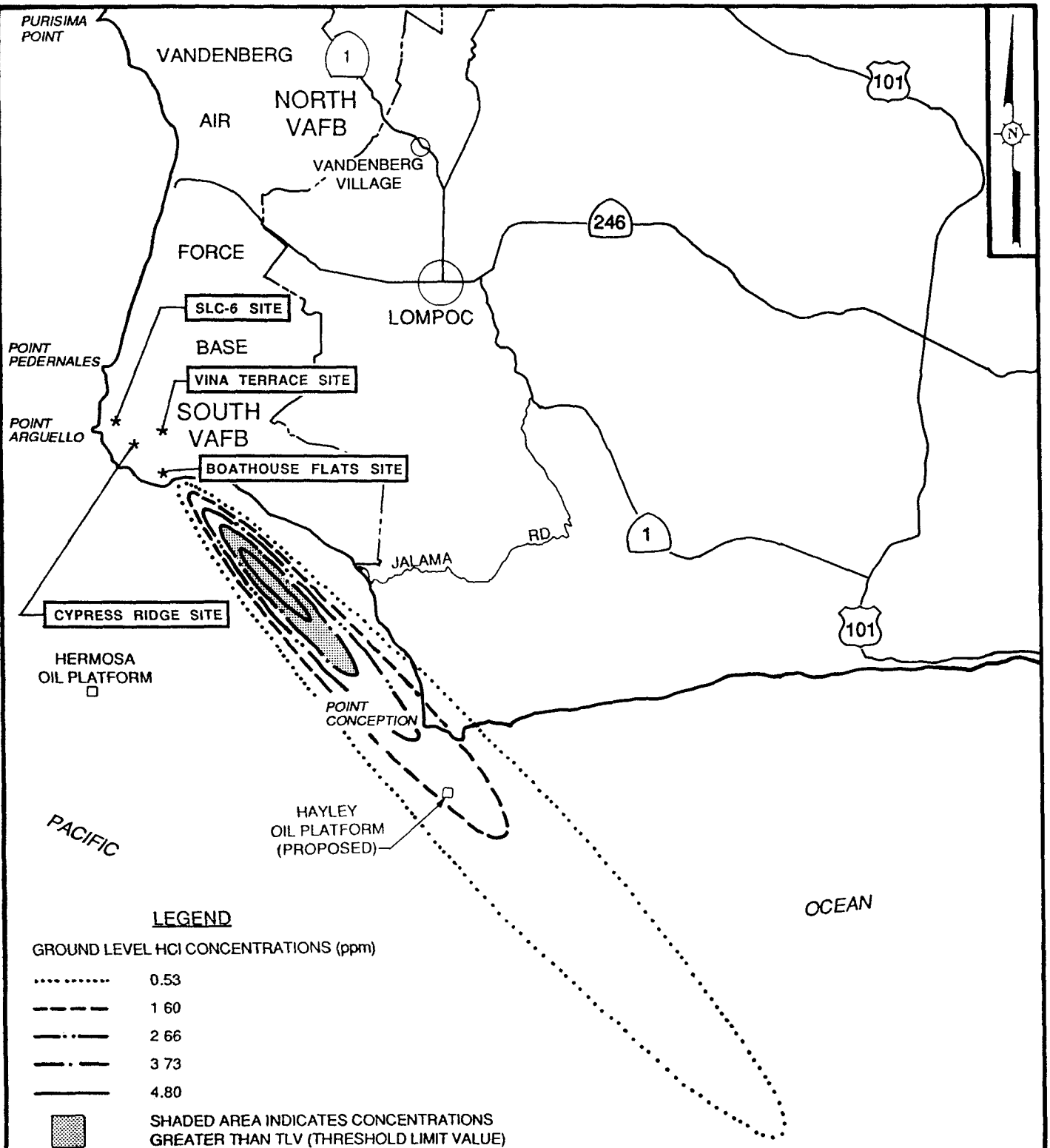


FIGURE 3 4 1

NESTING LOCATIONS OF CALIFORNIA LEAST TERN AND WESTERN SNOWY PLOVER



NOTE:
HCl ISOPLETHS SHOWN IN THIS EXAMPLE WERE GENERATED BY REEM USING HYPOTHETICAL METEOROLOGICAL CONDITIONS FOR A LAUNCH FROM THE CYPRESS RIDGE SITE. THE INCIDENCE OF HCl ISOPLETHS FROM THIS OR OTHER ALTERNATIVE SITES WOULD BE EXPECTED TO BE SIMILAR, WITH THE ACTUAL DISPERSION PATTERN DEPENDENT ON METEOROLOGICAL CONDITIONS AT THE TIME OF LAUNCH.

SOURCE: USAF 1988i.

FIGURE 3 11 2

TITAN IV/CENTAUR HYPOTHETICAL HCl ISOPLETHS NORMAL LAUNCH

SLC-7 ENVIRONMENTAL IMPACT STATEMENT

87-271-I FEIS REV. 5/29/90

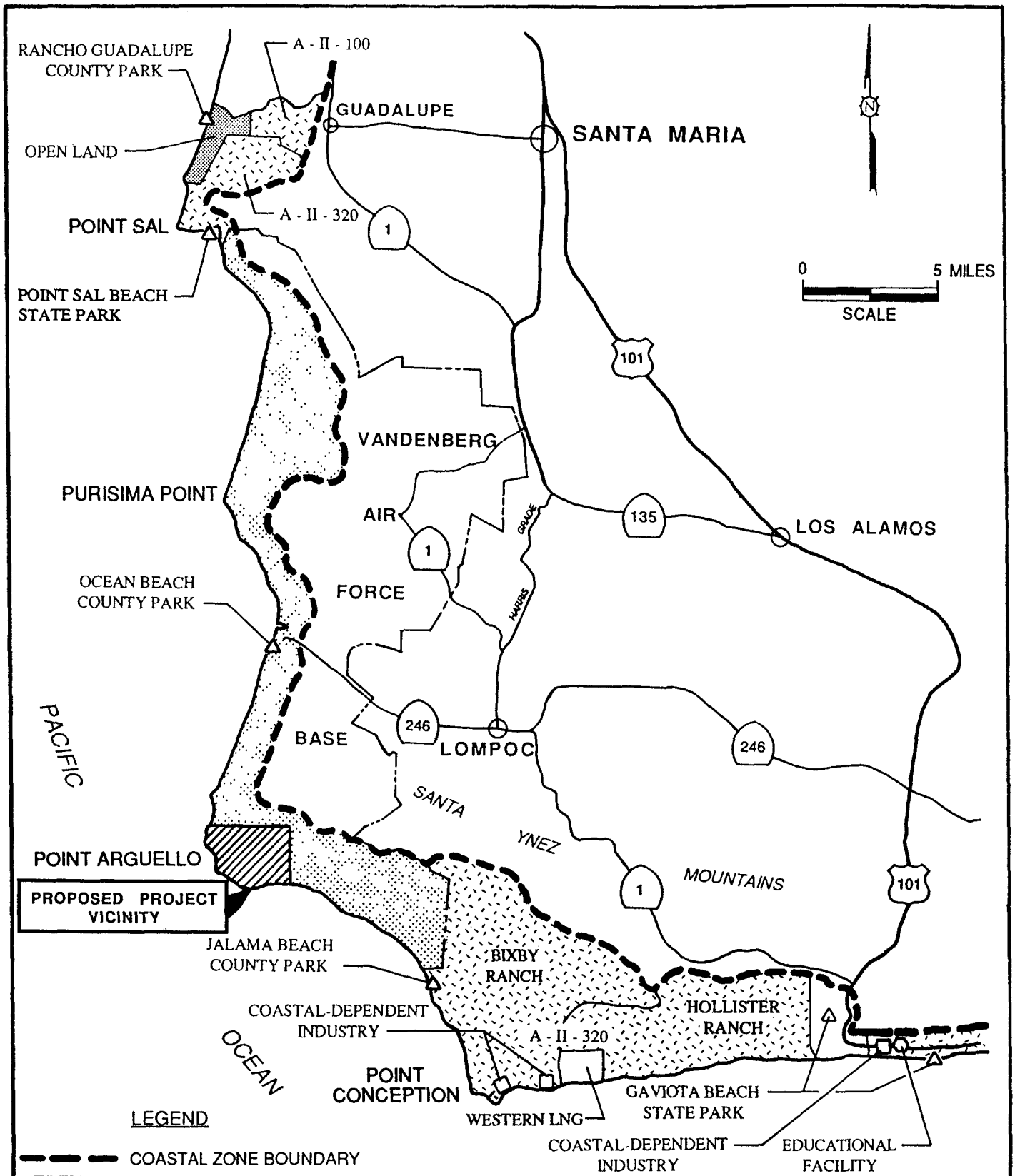
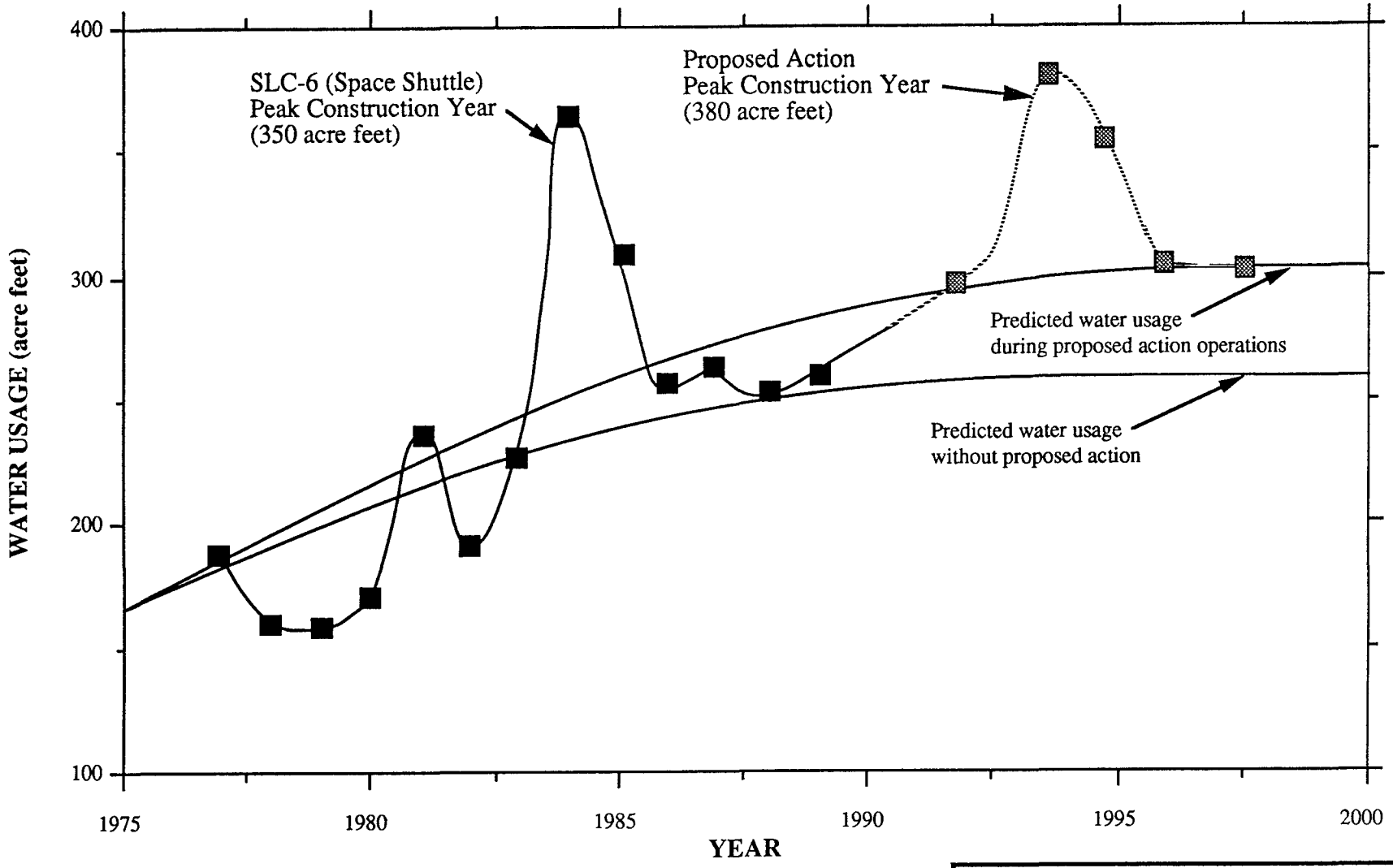


FIGURE 3.13 1

COASTAL ZONE
NORTH COAST PLANNING AREA



LEGEND

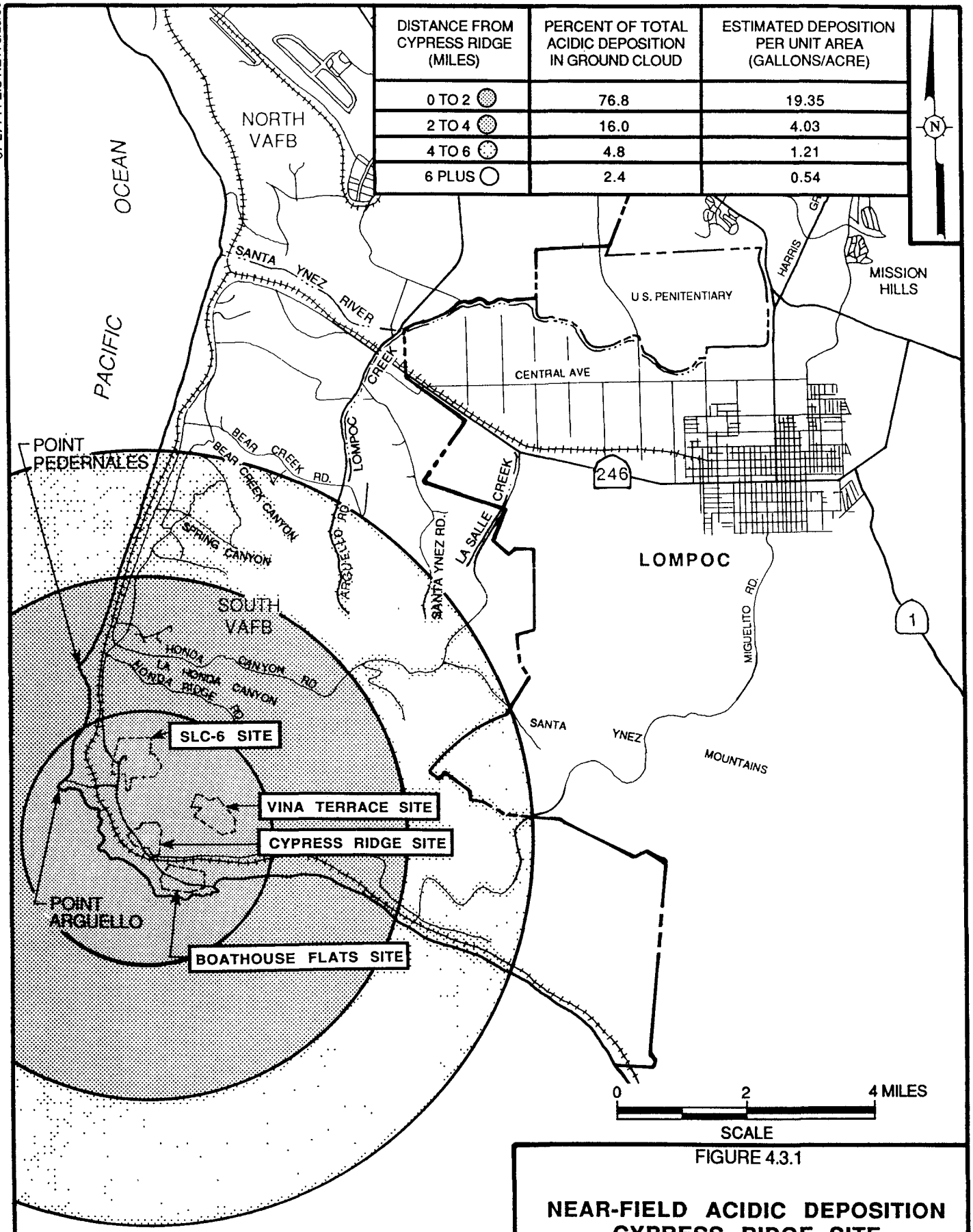
Actual Water Usage

Water Usage with Proposed Action

Source: USGS 1988.

FIGURE 4.2.1

SOUTH VAFB
PROPOSED GROUND WATER
WITHDRAWAL RATES



NOTE:

WIND SPEED = 9.8 MILES PER HOUR
COMPUTATION PERFORMED BY TRAJM
(NASA 1983)

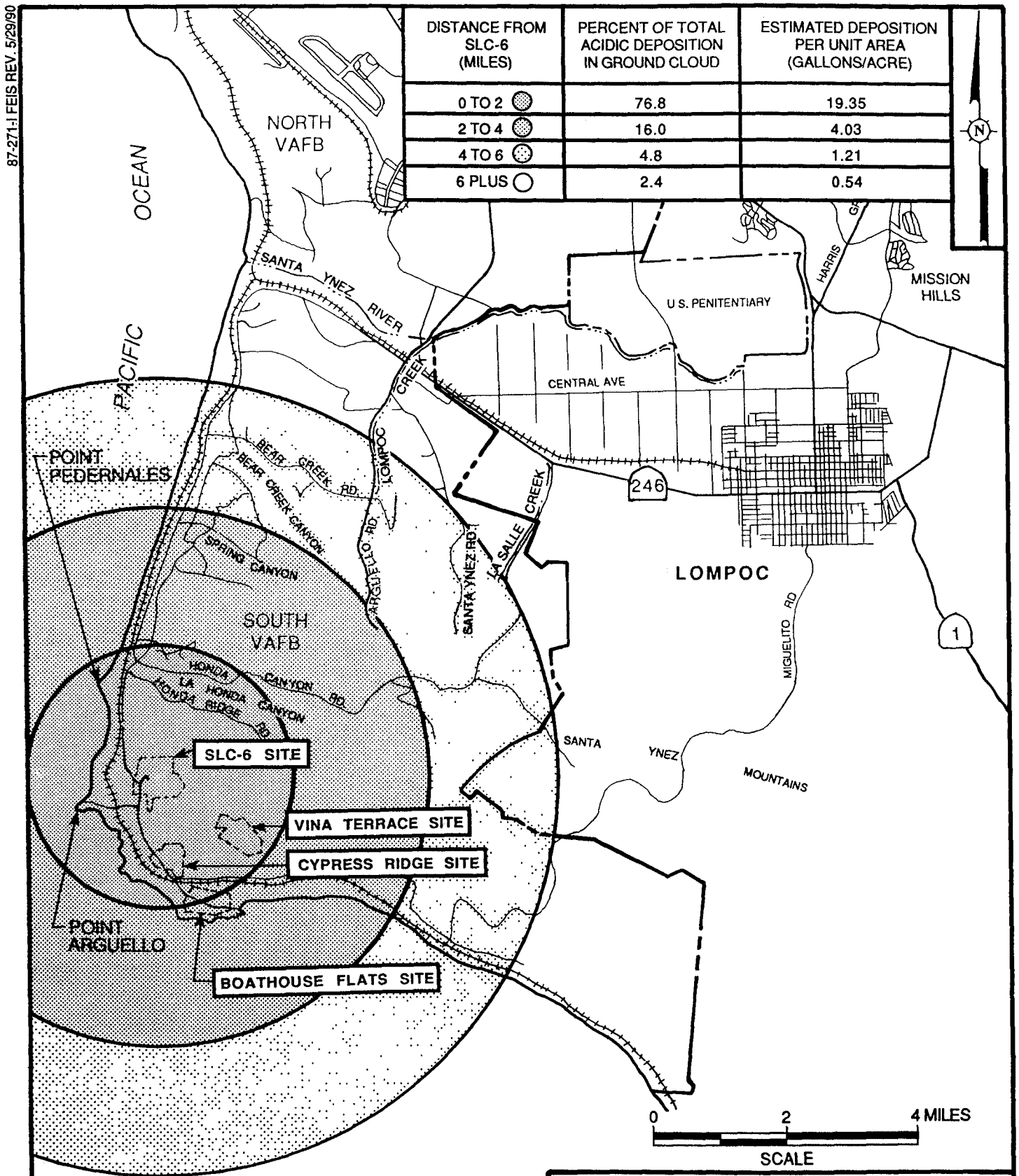
SOURCE: UNITED STATES AIR FORCE 1987a.

FIGURE 4.3.1

NEAR-FIELD ACIDIC DEPOSITION
CYPRESS RIDGE SITE
TITAN IV/CENTAUR LAUNCH

87-271-I FEIS REV. 5/29/90

DISTANCE FROM SLC-6 (MILES)	PERCENT OF TOTAL ACIDIC DEPOSITION IN GROUND CLOUD	ESTIMATED DEPOSITION PER UNIT AREA (GALLONS/ACRE)
0 TO 2	76.8	19.35
2 TO 4	16.0	4.03
4 TO 6	4.8	1.21
6 PLUS	2.4	0.54



NOTE:

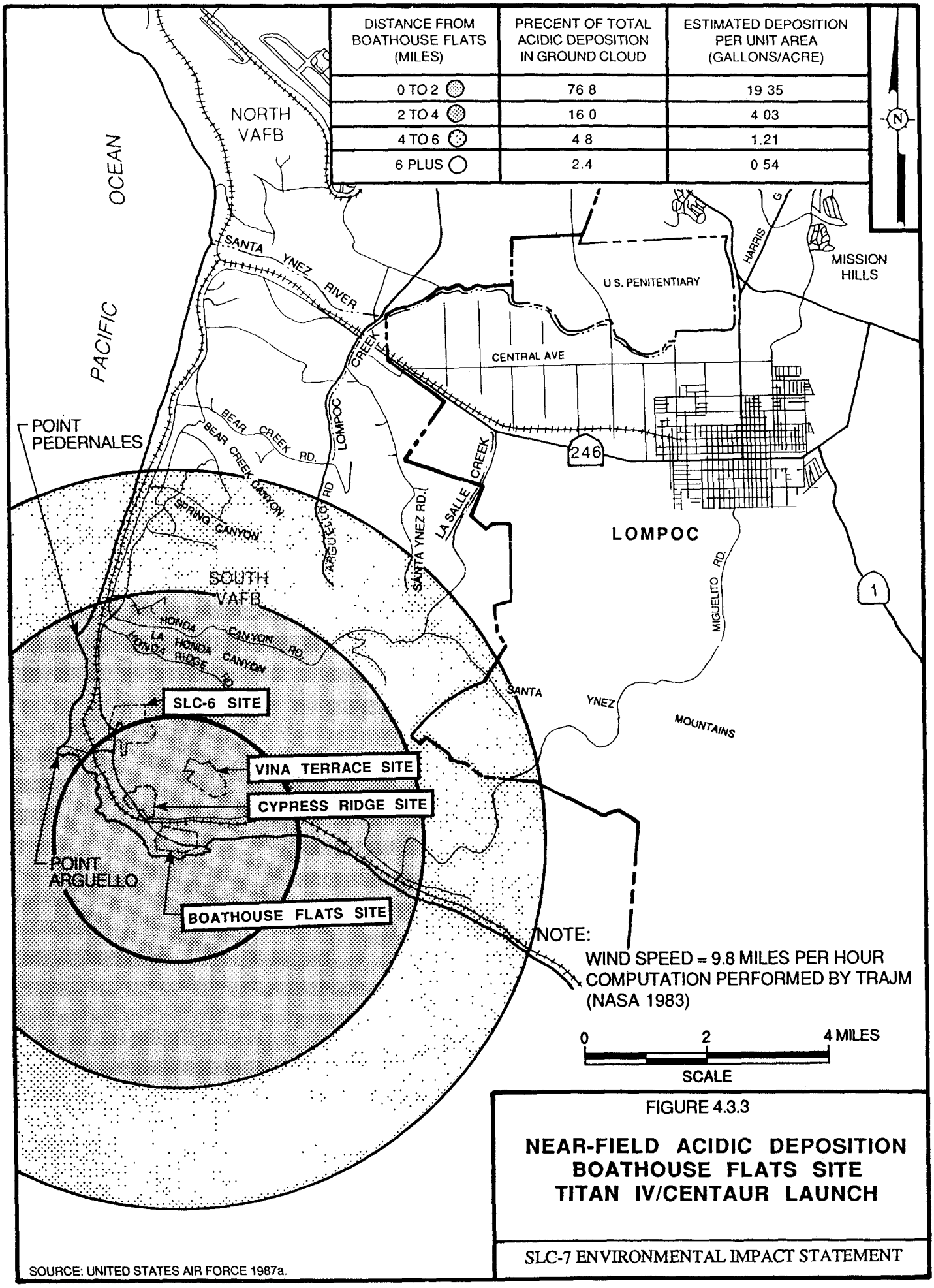
WIND SPEED = 9.8 MILES PER HOUR
COMPUTATION PERFORMED BY TRAJM
(NASA 1983)

SOURCE: UNITED STATES AIR FORCE 1987a.

FIGURE 4.3.2

NEAR-FIELD ACIDIC DEPOSITION SLC-6 SITE TITAN IV/CENTAUR LAUNCH

SLC-7 ENVIRONMENTAL IMPACT STATEMENT



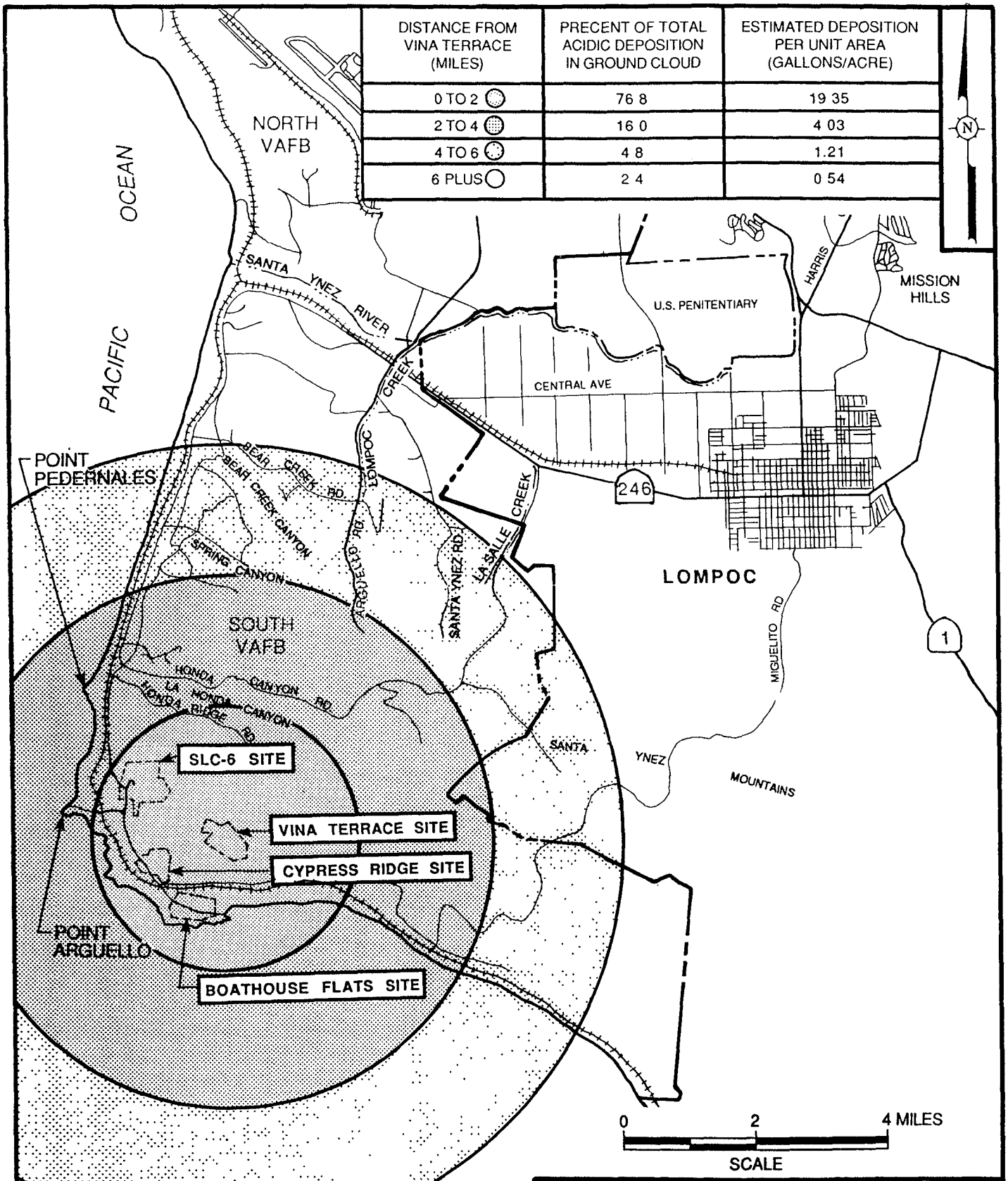
SOURCE: UNITED STATES AIR FORCE 1987a.

FIGURE 4.3.3

NEAR-FIELD ACIDIC DEPOSITION BOATHOUSE FLATS SITE TITAN IV/CENTAUR LAUNCH

87-271-I FEIS REV. 5/31/90

DISTANCE FROM VINA TERRACE (MILES)	PRECENT OF TOTAL ACIDIC DEPOSITION IN GROUND CLOUD	ESTIMATED DEPOSITION PER UNIT AREA (GALLONS/ACRE)
0 TO 2	76 8	19 35
2 TO 4	16 0	4 03
4 TO 6	4 8	1.21
6 PLUS	2 4	0 54



NOTE:

WIND SPEED = 9.8 MILES PER HOUR
COMPUTATION PERFORMED BY TRAJM
(NASA 1983)

SOURCE: UNITED STATES AIR FORCE 1987a.

FIGURE 4.3.4

NEAR-FIELD ACIDIC DEPOSITION
VINA TERRACE SITE
TITAN IV/CENTAUR LAUNCH

SLC-7 ENVIRONMENTAL IMPACT STATEMENT

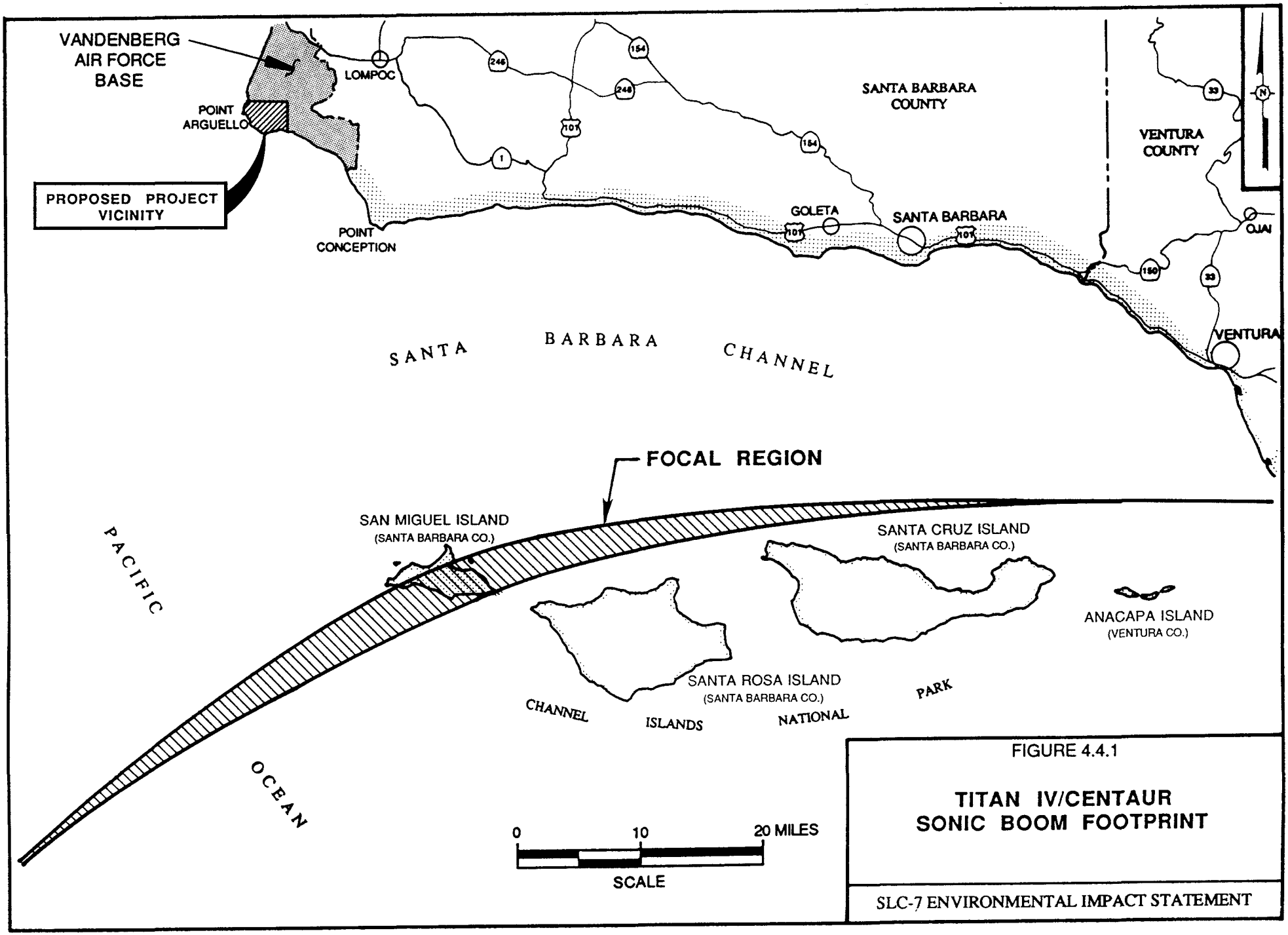
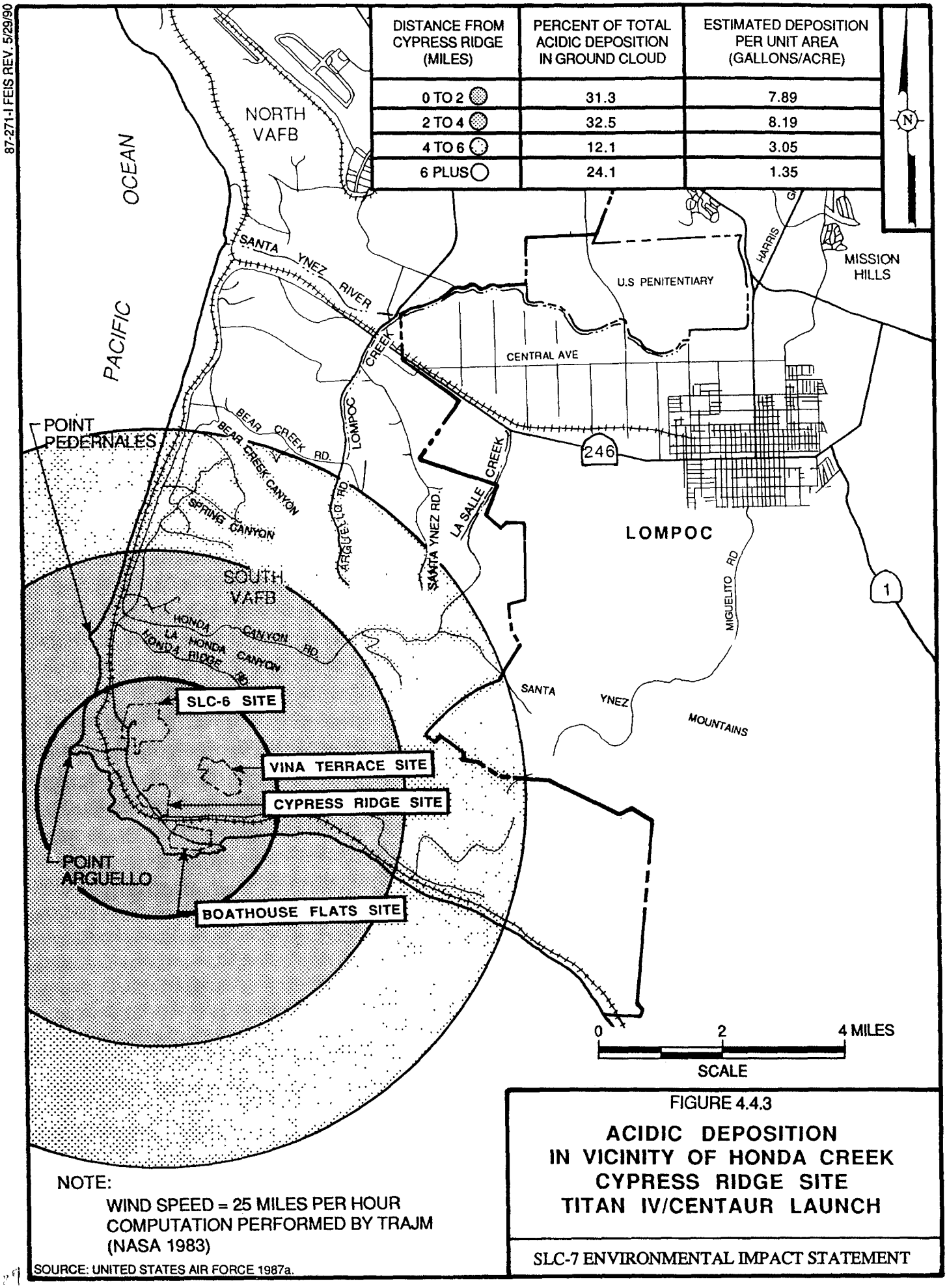


FIGURE 4.4.1

TITAN IV/CENTAUR SONIC BOOM FOOTPRINT

87-271-I FEIS REV. 5/29/90



NOTE:

WIND SPEED = 25 MILES PER HOUR
COMPUTATION PERFORMED BY TRAJM
(NASA 1983)

SOURCE: UNITED STATES AIR FORCE 1987a.

FIGURE 4.4.3

ACIDIC DEPOSITION IN VICINITY OF HONDA CREEK CYPRESS RIDGE SITE TITAN IV/CENTAUR LAUNCH

SLC-7 ENVIRONMENTAL IMPACT STATEMENT

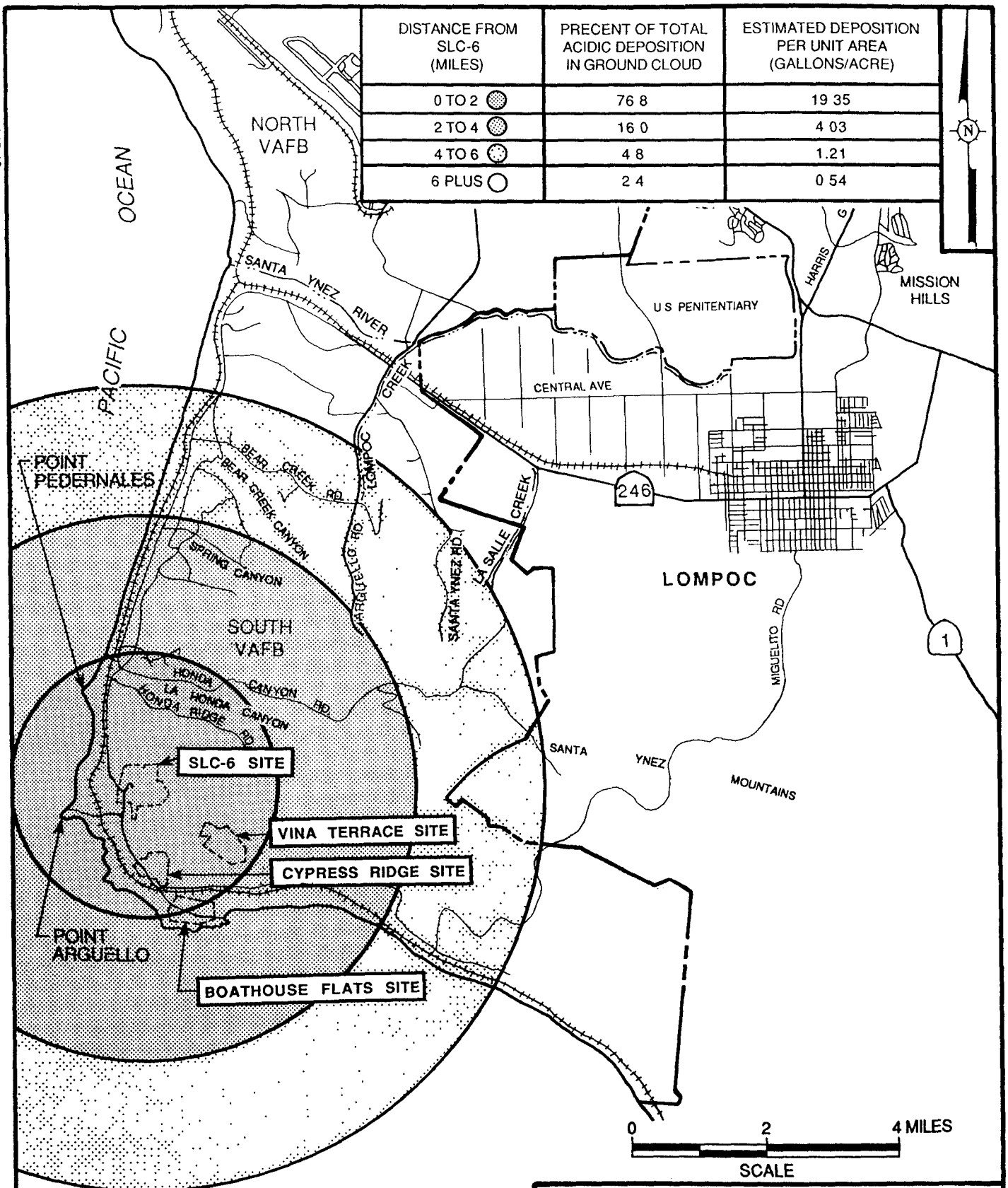


FIGURE 4.4.4

ACIDIC DEPOSITION IN VICINITY OF HONDA CREEK SLC-6 SITE TITAN IV/CENTAUR LAUNCH

NOTE:

WIND SPEED = 9.8 MILES PER HOUR
COMPUTATION PERFORMED BY TRAJM
(NASA 1983)

SOURCE: UNITED STATES AIR FORCE 1987a.

87-271-I FEIS REV. 5/29/90

DISTANCE FROM BOATHOUSE FLATS (MILES)	PERCENT OF TOTAL ACIDIC DEPOSITION IN GROUND CLOUD	ESTIMATED DEPOSITION PER UNIT AREA (GALLONS/ACRE)
0 TO 2	31.3	7.89
2 TO 4	32.5	8.19
4 TO 6	12.1	3.05
6 PLUS	24.1	1.35

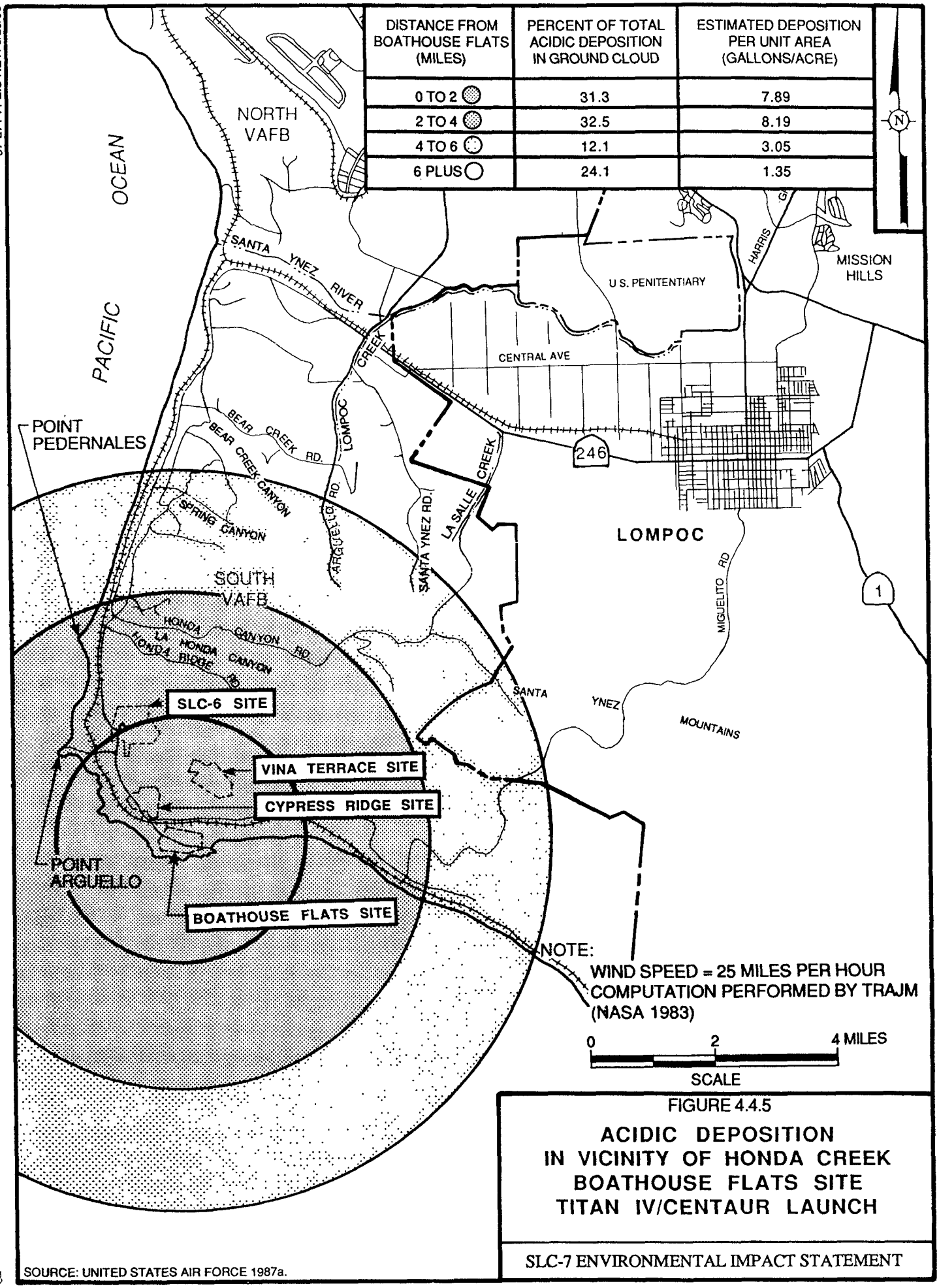
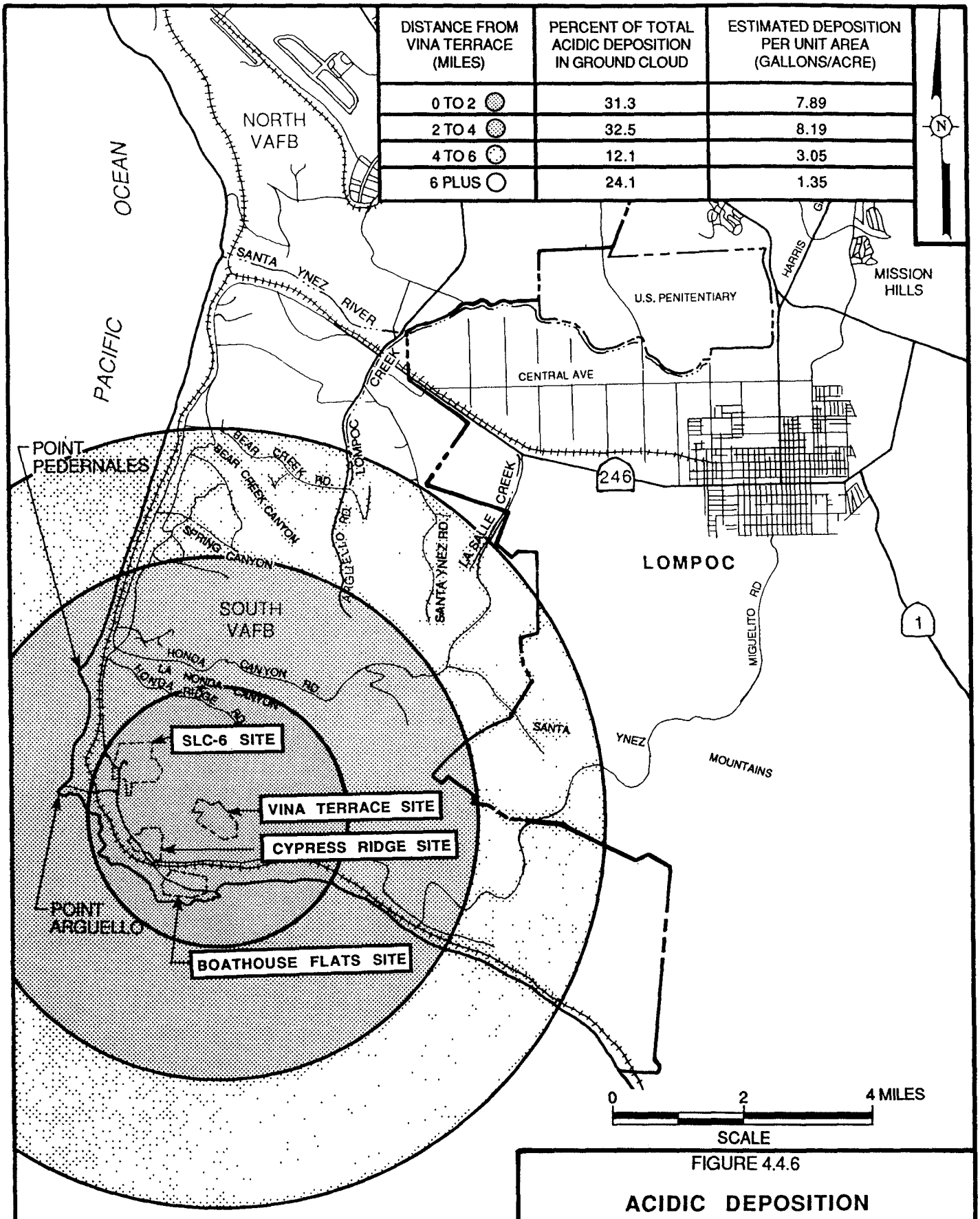


FIGURE 4.4.5

ACIDIC DEPOSITION IN VICINITY OF HONDA CREEK BOATHOUSE FLATS SITE TITAN IV/CENTAUR LAUNCH

SOURCE: UNITED STATES AIR FORCE 1987a.



NOTE:

WIND SPEED = 25 MILES PER HOUR
COMPUTATION PERFORMED BY TRAJM
(NASA 1983)

SOURCE: UNITED STATES AIR FORCE 1987a.

FIGURE 4.4.6

ACIDIC DEPOSITION IN VICINITY OF HONDA CREEK VINA TERRACE SITE TITAN IV/CENTAUR LAUNCH

HAZARDOUS WASTE DESCRIPTION	EPA WASTE NUMBER	QUANTITY OF WASTE GENERATED BY TITAN PROGRAM ON NORTH VAFB (TONS/YEAR)	
		CURRENT	PROPOSED ACTION
Ignitables (liquid and/or solid)	D001	2.5	2.1
Corrosives (acid or base liquids and/or solids)	D002	0.4	0.7
Reactives (solid and/or liquid)	D003	0	0
Halogenated Solvents (toxic poisons)	F001	3.8	3.3
Halogenated Solvents (toxic irritating poisons)	F002	0.8	0.7
Non-Halogenated Solvents (ignitable poisons)	F003	0.93	0.81
Contains Misc. EP Toxics, Listed Acute Hazardous Wastes, Listed Toxic Wastes, and California Listed Wastes	Other	27.2	23.3
TOTAL *		**35.6**	**30.9**

*Rounded to the nearest tenth.

Source: USAF 1988b.

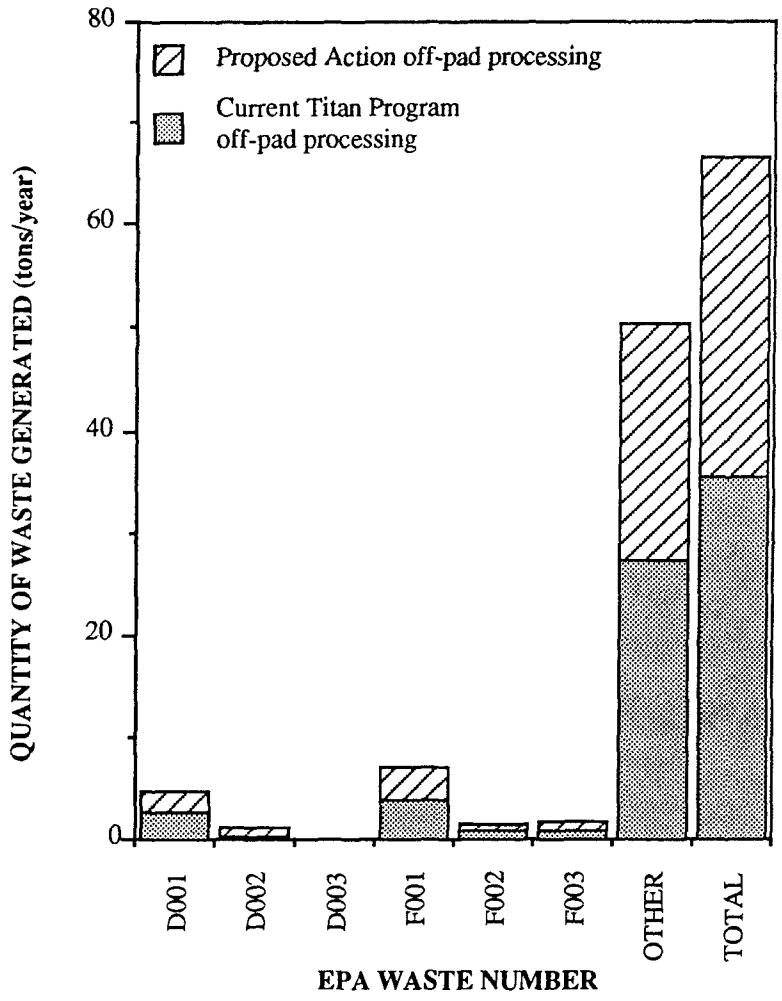
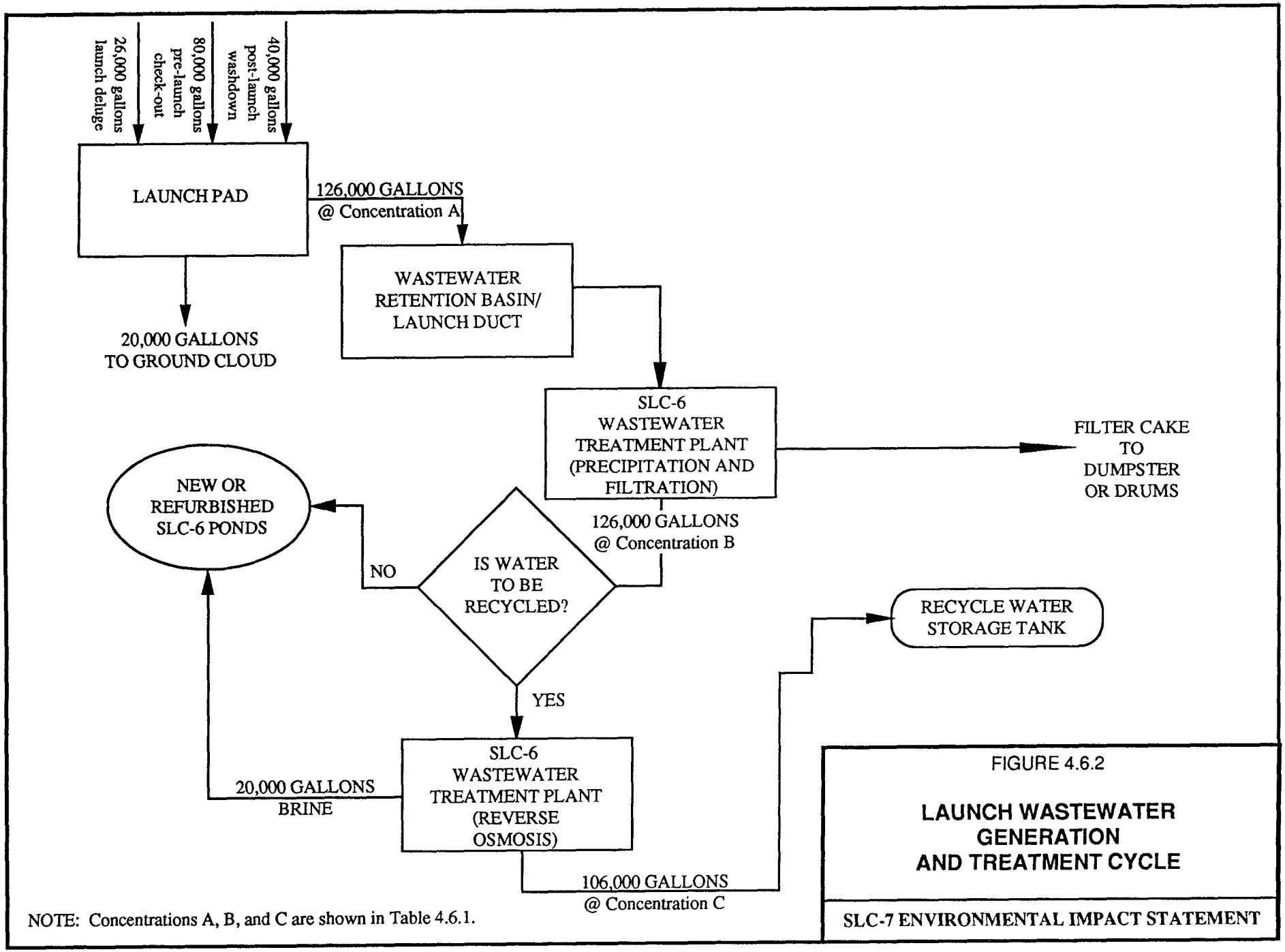


FIGURE 4.6.1

NORTH VAFB HAZARDOUS WASTES TITAN II AND IV PROGRAMS AND PROPOSED ACTION

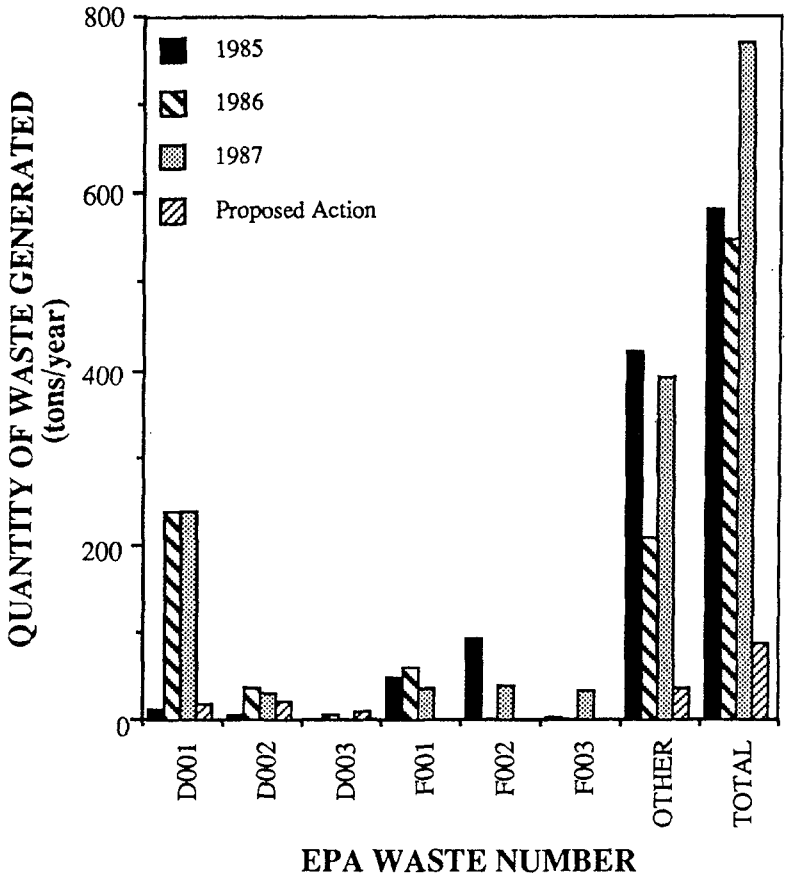


NOTE: Concentrations A, B, and C are shown in Table 4.6.1.

FIGURE 4.6.2

LAUNCH WASTEWATER GENERATION AND TREATMENT CYCLE

HAZARDOUS WASTE DESCRIPTION	EPA WASTE NUMBER	QUANTITY OF WASTE GENERATED (TONS/YEAR)			
		1985	1986	1987	PROPOSED ACTION
Ignitables (liquid and/or solid)	D001	11.9	238.1	238.6	19.0
Corrosives (acid or base liquids and/or solids)	D002	5.5	35.4	29.7	21.7
Reactives (solid and/or liquid)	D003	0	6.9	0	8.8
Halogenated Solvents (toxic poisons)	F001	47.5	60.9	36.6	0.6
Halogenated Solvents (toxic irritating poisons)	F002	92.1	0	40.4	0.02
Non-Halogenated Solvents (ignitable poisons)	F003	2.2	0.25	32.1	1.4
Contains Misc. EP Toxics, Listed Acute Hazardous Wastes, Listed Toxic Wastes, and California Listed Wastes	Other	422.8	208.1	392.7	36.9
TOTAL		**582.0**	**549.7**	**770.1**	**88.4**

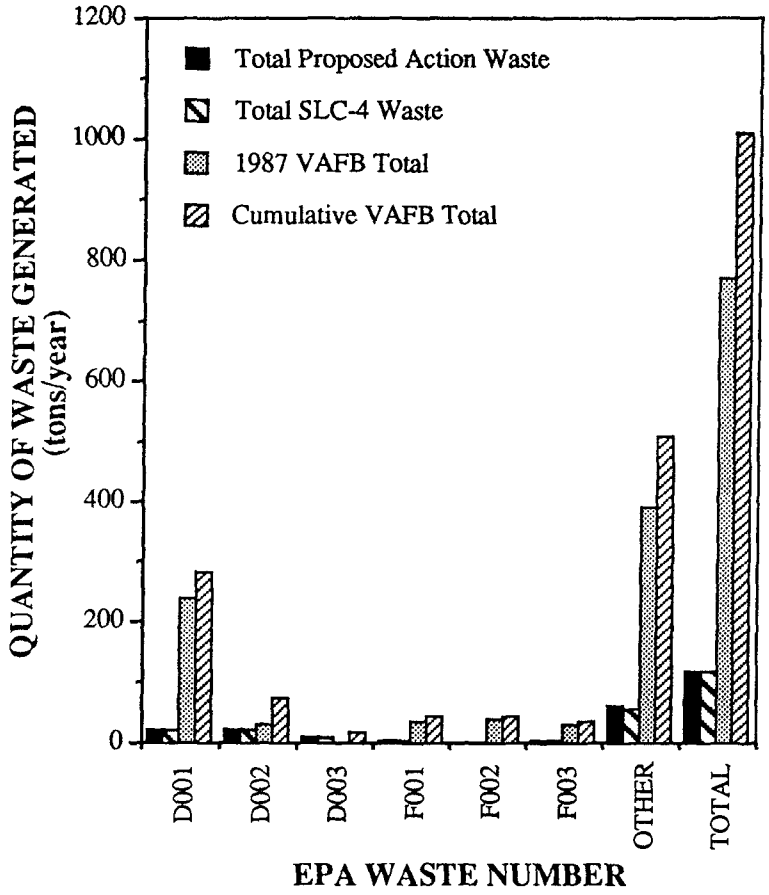


Source: USAF 1988k.

FIGURE 4.6.3

SUMMARY
ONSITE HAZARDOUS WASTE GENERATION
VAFB AND PROPOSED ACTION

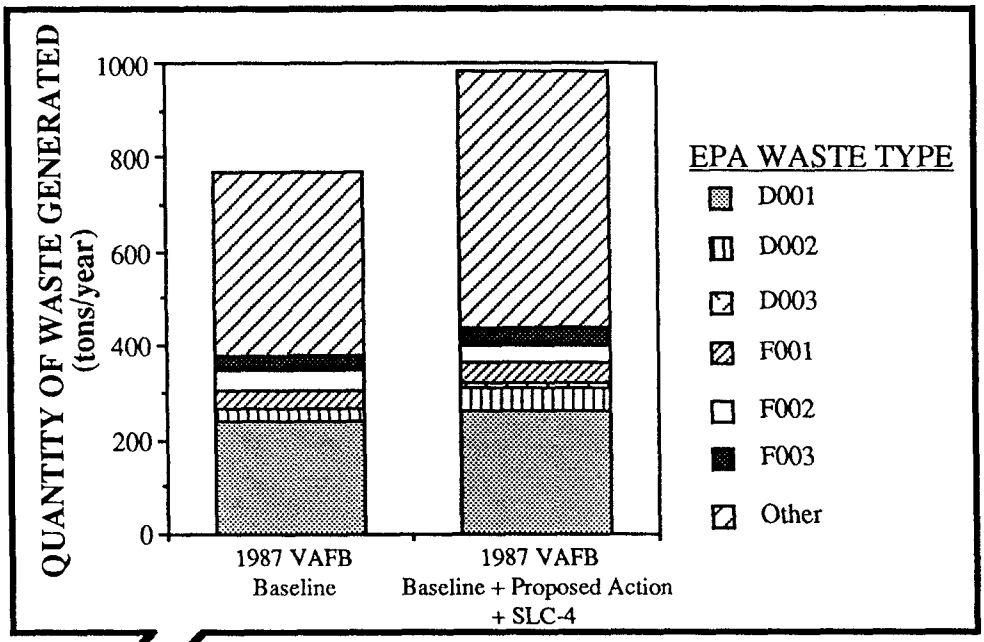
HAZARDOUS WASTE DESCRIPTION	EPA WASTE NUMBER	QUANTITY OF WASTE GENERATED (TONS/YEAR)			
		PROPOSED ACTION	SLC-4	1987 VAFB TOTAL	CUMULATIVE VAFB TOTAL
Ignitables (liquid and/or solid)	D001	21.0	22.6	238.6	282.3
Corrosives (acid or base liquids and/or solids)	D002	22.4	21.8	29.7	73.9
Reactives (solid and/or liquid)	D003	8.8	8.7	0	17.5
Halogenated Solvents (toxic poisons)	F001	3.9	4.3	36.6	44.8
Halogenated Solvents (toxic irritating poisons)	F002	0.72	0.82	40.4	41.94
Non-Halogenated Solvents (ignitable poisons)	F003	2.21	2.33	32.1	36.64
Contains Misc. EP Toxics, Listed Acute Hazardous Wastes, Listed Toxic Wastes, and California Listed Wastes	Other	60.2	58.6	392.7	511.5
TOTAL		**119.2**	**119.1**	**770.1**	**1008.5**

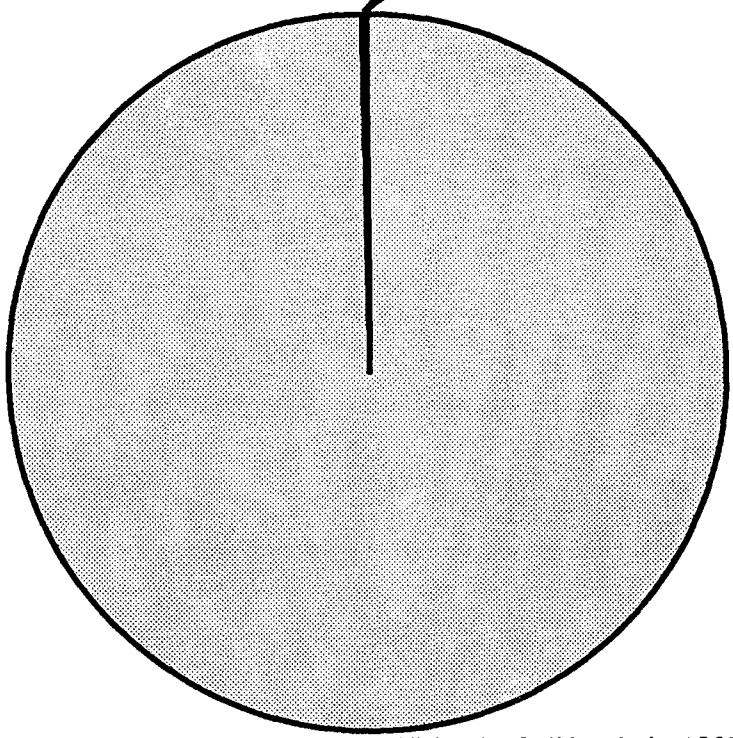


Source: USAF 1988k.

FIGURE 4.6.4

SUMMARY
VAFB CUMULATIVE
HAZARDOUS WASTE GENERATION



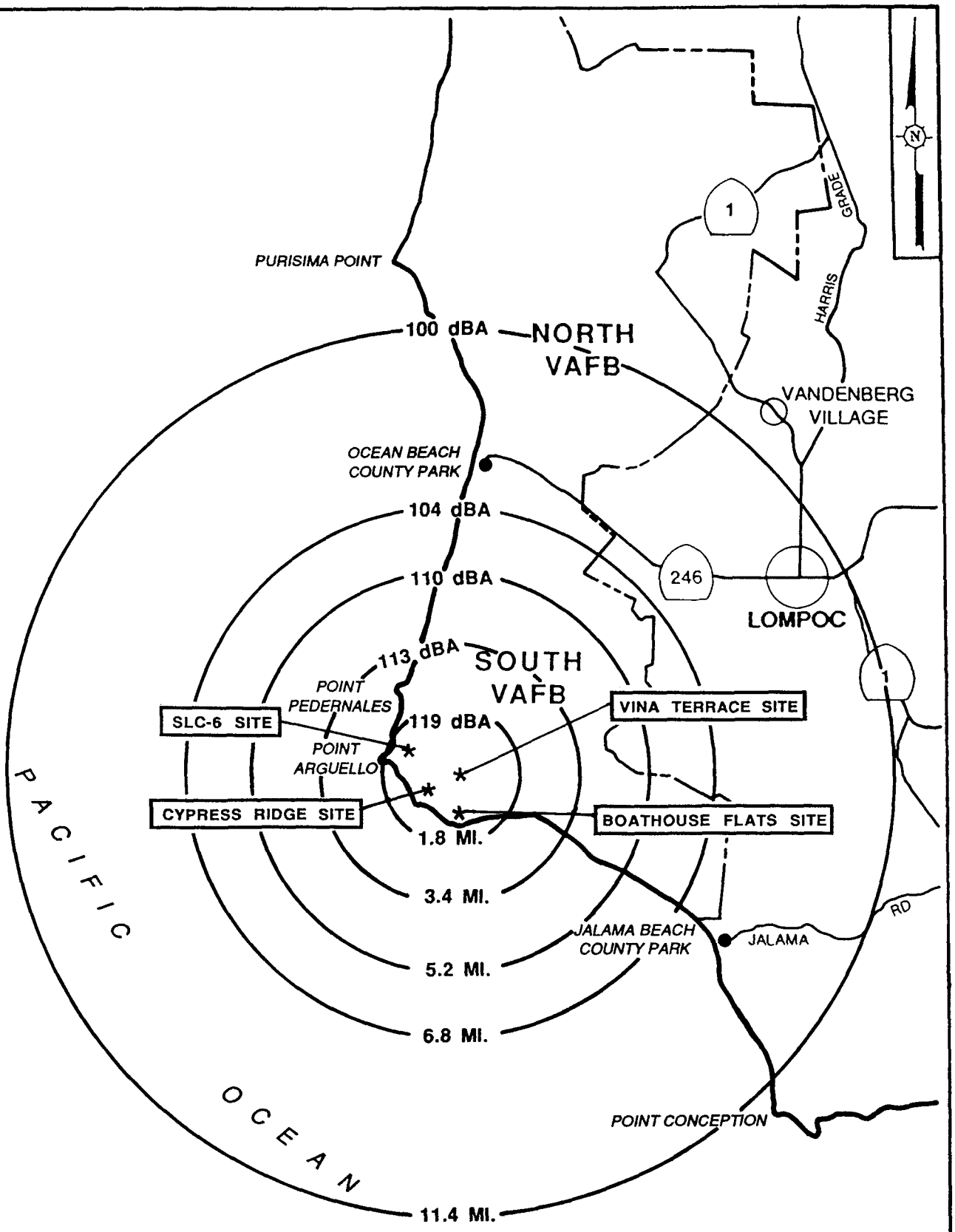


Total Hazardous Waste Landfilled in California in 1987
576,000 tons

FIGURE 4.6.5

COMPARISON OF VAFB AND CALIFORNIA HAZARDOUS WASTES

Source: CDHS 1989.



NOTE

IMPACTS FROM THE SLC-6, BOATHOUSE FLATS, AND VINA TERRACE SITES DUE TO NOISE FROM CONSTRUCTION AND OPERATIONS WOULD BE ESSENTIALLY THE SAME AS SHOWN FOR THE CYPRESS RIDGE SITE.

0 1 2 3 4 5 MILES

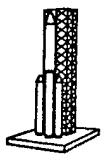
SCALE

SOURCE: USAF 1988b

FIGURE 4.7.1

PROJECTED MAXIMUM NOISE LEVELS FROM TITAN IV/CENTAUR LAUNCH

SLC-7 ENVIRONMENTAL IMPACT STATEMENT



Chapter 4.0

LIST OF PREPARERS

4.0 LIST OF PREPARERS

This Final Environmental Impact Statement has been prepared by Environmental Solutions, Inc. for the Department of the Air Force, Space Systems Division. Environmental Project Manager John R. Edwards of the Space Systems Division, Directorate of Acquisition Civil Engineering, Environmental Planning Division (SSD/DEV) also provided information and assistance in preparing this document.

U.S. Air Force, Space Systems Division

JOHN R. EDWARDS
Environmental Project Manager
M.S. Environmental Engineering, 1976, University of Southern California
B.S. Zoology, 1973, University of California, Los Angeles

Eleven years experience as an environmental engineer and project manager for various projects including:

- Environmental Assessments and Environmental Impact Statements.
- Air Pollution Control.
- Hazardous Waste Treatment.
- Permits for projects which include the U.S. Air Force Space Shuttle, radar stations, and missile programs.

Environmental Solutions, Inc.

MIRO KNEZEVIC
Executive Vice President
Principal Resource Coordinator
Ph.D. Civil Engineering, 1978, University of Southern California
M.S. Civil Engineering (Environmental), 1973, University of Maryland
B.S. Civil Engineering, 1971, University of Maryland

Fourteen years of experience as project engineer and project manager for various projects including:

- Environmental Impact Statements and Assessments.
- RCRA Part B compliance documentation.
- Surface and ground water quality assessments.
- Waste Discharge Requirement Reports for the STS Power Plant and Space Shuttle Launch Pad, Vandenberg Air Force Base (VAFB).
- Management and engineering activities associated with MX and Assembly Test and System Support construction surveillance at VAFB, hazardous waste inventory and assessment for RCRA Part A at VAFB, RCRA Part B preparation for Kirtland Air Force Base, and RCRA Part B compliance evaluation for radioactive waste for the Waste Isolation Pilot Plant for the Department of Energy.

TIM C. LASSEN
Project Manager
B.S. Civil Engineering, 1970, Purdue University
P.E. State of California, 1983

Eleven years of experience in environmental management and engineering activities including:

- Environmental Assessments and Permitting.
- Project Director on landfill project for major rail transportation company.
- Project Manager on hydrogeological assessments, remedial action plan development, and cleanup of contaminated soil and ground water.
- Manager, Environment and Hazardous Materials Control for major rail transportation company. Responsible for the following programs: Principal reviewer of Environmental Assessments and Environmental Impact Reports, environmental audits, spill response and prevention, hazardous waste management, industrial wastewater treatment, state and CERCLA Superfund, underground tank inventories and compliance, air quality, asbestos, and noise abatement programs.

DANIEL M. EVANS, AICP
Project Manager
M.S. Planning, 1985, University of Tennessee
B.A. Political Science, 1976, Knox College

Eleven years of experience in environmental impact analysis and project management including:

- Environmental Assessments and Environmental Impact Statements.
- Development and implementation of methodology to gather socioeconomic data used in microcomputer analytical system for Dam Safety Risk Analysis Regional Data Development for the U.S. Army Corps of Engineers.
- Participation in preparation of Environmental Analyses for small Hydropower Developments for the Federal Energy Regulatory Commission.
- Member of an interdisciplinary Oak Ridge National Laboratory team "Analyzing Water Resources Issues for the 1980s."
- Management of environmental impact analysis team for the Environmental Assessment for the proposed Northeast Regional Communications Facility.
- Regional Economic/Environmental Policy Analysis for the Department of Energy, including environmental implications of regional industrial shifts, regional fuel consumption forecasting for the manufacturing sector, and analysis of product mix and energy intensity as determinants of energy consumption.

CAROLYN E. TRINDLE
Assistant Project Manager
M.A. Business Administration, 1981, Pepperdine University, California
M.A. Secondary Education, 1974, University of Missouri, Kansas City
Bachelor of Journalism, 1965, University of Missouri, Columbia

Fourteen years of experience in project management and environmental planning for various projects including:

- Environmental Assessments and Environmental Impact Reports for major mining and energy development projects.
- Socioeconomic and planning documents for proposed industrial projects and military installations.
- Environmental documents for establishing the F/A-18A aircraft at Kaneohe Bay, Oahu, Hawaii, and for impacts of constructing satellite earth stations in urban Southern California locales.
- Permitting for major mining projects.

PETER HAYDEN
Assistant Project Manager
B.S. Mathematics, 1980, University of the Pacific, Stockton, California

Eight years of experience in air quality research including:

- Development of emissions inventories.
- Conducting and managing air quality studies to assess regulatory compliance of existing and proposed facilities.
- Conducting air quality monitoring and modeling studies to determine ambient pollution concentrations in the vicinity of industrial and government facilities.

DAVID BROWN
Project Planner
M.S. Geography, 1984, University of California, Riverside
B.S. Geography, 1980, University of California, Riverside

Seven years of experience in project management and environmental planning, including:

- Project manager and principal author of Environmental Impact Statement/ Environmental Impact Report for Bureau of Land Management/County of San Bernardino gold mine project.
- Management of Environmental Impact Reports and Environmental Impact Assessments for commercial, industrial, and residential projects. Support for environmental documentation through public and agency reviews and public hearing processes.
- Conducted environmental technical analyses, including land use consistency and compatibility, aesthetics, socioeconomic, infrastructure requirements and availability, and fiscal impact.

GREGORY S. KINDT
Project Engineer
B.S. Chemical Engineering, 1985, South Dakota School of Mines and Technology

Five years of experience conducting engineering activities in support of:

- Environmental Assessments.
- Air quality, hazardous waste, and risk assessments.
- Regulatory and hazardous emissions reviews for gold mine.

VIRGINIA M. CARMICHAEL
Senior Environmental Scientist/Planner
B.S. Geology/Biology, 1979, Metro State College

Seven years of experience in geology and environmental management.

- Principal author of Reclamation Plan for Bureau of Land Management gold mine project.
- Conducted environmental analyses for varied types of projects, including transportation corridors, jail sites, airports, residential developments, pipeline projects, commercial developments, landfills, and reservoirs.
- Managed federal minerals program at various duty sites.

PAUL COLLINS
Wildlife Consultant
M.A. Zoology, 1982, University of California, Santa Barbara
B.A. Zoology, 1973, University of California, Santa Barbara

- Wildlife consultant on six major Environmental Impact Statements/Environmental Impact Reports for offshore oil developments in Santa Barbara County.
- Associate Curator of Vertebrate Zoology, Santa Barbara Museum of Natural History.

DIANA HICKSON
Project Botanist
M.A. Geography, 1987, University of California, Santa Barbara
B.A. Geography, 1983, University of California, Santa Barbara

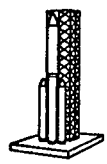
- Compilation of fire history at VAFB.
- Survey of VAFB vegetation communities for Basewide Biological Monitoring Program.

CHESTER KING
Project Archaeologist
Ph.D. Anthropology, 1981, University of California, Davis
M.A. Anthropology, 1966, University of California, Los Angeles
B.A. Anthropology, 1964, University of California, Los Angeles

- Completed Ethnohistory of VAFB.
- Principal investigator for cultural resources on several Environmental Impact Statements/Environmental Impact Reports.
- Author of numerous articles on North American Indians, including the Chumash who once populated the areas now occupied by South VAFB.

CHARLES D. WOODHOUSE, JR.
Marine Biologist
Ph.D. Zoology and Oceanography, University of British Columbia
M.A. Marine Biology, 1964, University of Oregon
B.A. Biology, 1962, University of California, Santa Barbara

- Consultant to Marine Mammal Commission, Washington D.C.
- Deputy Director of Santa Barbara Museum of Natural History/Curator of Vertebrate Zoology.
- Program Director, Oceanic Biology Program, Office of Naval Research, Washington, D.C. 1971 to 1974.
- Principal Coordinator of natural resources study on the Channel Islands National Monument for National Park Service, 1978 to 1979.



Chapter 5.0

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5.0 REFERENCES

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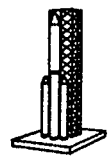

FINAL EIS MAILING LIST

6.0 FINAL EIS MAILING LIST

6.1 FEDERAL AGENCIES

Advisory Council on Historic Preservation
Washington, DC

Advisory Council on Historic Preservation
Western Office of Project Review
Golden, CO
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Federal Aviation Administration
Regional Headquarters
Los Angeles, CA

Intragency Archaeological Services Branch
National Park Service
Western Region
San Francisco, CA

Marine Mammal Commission
Washington, DC

U.S. Army Corps of Engineers
Sacramento, CA
Attn: John Harris, CESPK-ED-M

U.S. Army Corps of Engineers
Los Angeles, CA
Attn: Paul Apodaca

U.S. Coast Guard
Marine Safety Division
Long Beach, CA
Attn: U.S. Coast Guard Chief

U.S. Department of Agriculture
Soil Conservation Service
Santa Maria, CA

U.S. Department of Agriculture
U.S. Forest Service
Santa Lucia Ranger District
Santa Maria, CA
Attn: Keith Gunther, District Ranger

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Rockville, MD

U.S. Department of Commerce
National Oceanic and Atmospheric
Administration
National Marine Fisheries Services
Northwest and Alaska Fisheries Center
Seattle, WA

U.S. Department of Commerce
National Oceanic and Atmospheric
Administration
National Marine Fisheries Service
Southwest Region
Terminal Island, CA
Attn: E. C. Fullerton, Regional Director

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National Oceanic and Atmospheric
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National Marine Fisheries Service
Terminal Island, CA
Attn: James Lecky, Marine Biologist

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U.S. Department of the Interior
Bureau of Indian Affairs
Central California Agency
Sacramento, CA

U.S. Department of the Interior
Bureau of Land Management
Washington, DC
Attn: Division of Planning and
Environmental Control

U.S. Department of the Interior
Bureau of Land Management
Sacramento, CA
Attn: Planning Division

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National Park Service
Channel Islands National Park
Ventura, CA
Attn: William H. Ehorn, Superintendent

U.S. Department of the Interior
National Park Service
Channel Islands National Park
Ventura, CA
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Western Regional Office
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Office of the Secretary
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Regional Environmental Officer
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Attn: Cliff Haupt

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U.S. Environmental Protection Agency
Headquarters
Washington, DC

6.2 STATE AGENCIES

California Coastal Commission
San Francisco, CA
Attn: Mr. Peter Douglas

California Department of Fish and Game
Sacramento, CA

California Department of Parks and Recreation
La Purisima Mission District
Lompoc, CA
Attn: Russell G. Guiney, District Superintendent

California Native Plant Society
San Luis Obispo, CA
Attn: President, San Luis Obispo Chapter

California Regional Water Quality Control Board
Central Coast Region
San Luis Obispo, CA
Attn: William R. Leonard, Executive Officer

California State Historic Preservation Office
Sacramento, CA
Attn: SHPO

Governor's Office of Planning Research
Sacramento, CA

La Purisima Mission State Park
Lompoc, CA

Native American Heritage Commission
Sacramento, CA
Attn: Larry Myers, Executive Secretary

The Resources Agency of California
Office of the Secretary
Sacramento, CA

6.3 COUNTY AGENCIES

Santa Barbara County
Resource Management Department
Santa Barbara, CA

Health Care Services
Environmental Health Services
Santa Barbara, CA
Attn: Ben Gale, Director

Santa Barbara County
Air Pollution Control District
Santa Barbara, CA
Attn: James M. Ryerson,
Air Pollution Control Officer

Santa Barbara County
Air Pollution Control District
Santa Barbara, CA
Attn: Deborah Pontifex

Santa Barbara County
Board of Supervisors
Santa Barbara, CA
Attn: Chairman

Santa Barbara County
Board of Supervisors
Santa Barbara, CA
Attn: David M. Yager, Supervisor, 1st District

Santa Barbara County
Board of Supervisors
Santa Barbara, CA
Attn: Thomas Rogers, Supervisor, 2nd District

Santa Barbara County
Board of Supervisors
Santa Barbara, CA
Attn: William B. Wallace, Supervisor, 3rd District

Santa Barbara County
Cities Area Planning Council
Santa Barbara, CA
Attn: Gerald R. Lorden, Executive Director

Santa Barbara County
Flood Control and Water Agency
Santa Barbara, CA
Attn: James Stubchaer, Engineer-Manager

Santa Barbara County
Office of Disaster Preparedness
Hazardous Materials Coordinator
Santa Barbara, CA
Attn: Susan Strachan

Santa Barbara County
Park Department
Santa Barbara, CA
Attn: Mike Pahos, Director of Parks

Santa Barbara County
Park Department
Santa Maria, CA
Attn: Weldon Hobbs

6.4 LOCAL AGENCIES

City of Lompoc
Lompoc, CA
Attn: Karl Braun, Mayor Pro-Tem

City of Lompoc
Lompoc, CA
Attn: Jeremy Graves, Associate Planner

City of Lompoc
Lompoc, CA
Attn: Marvin Loney, Mayor

City of Lompoc
Lompoc, CA
Attn: William S. Mullins, Councilman

City of Lompoc
Lompoc, CA
Attn: Jim Smith, Councilman

City of Lompoc
Lompoc, CA
Attn: Gene Stevens, Councilman

City of Lompoc
Department of Community Development
Lompoc, CA
Attn: King Leonard, Planning Director

City of Santa Barbara
Community Development Department
Santa Barbara, CA
Attn: Director

City of Santa Maria
Santa Maria, CA
Attn: George S. Hobbs, Jr., Mayor

City of Santa Maria
Santa Maria, CA
Attn: James A. May, Councilman

City of Santa Maria
Santa Maria, CA
Attn: Robert Orach, Councilman

City of Santa Maria
Santa Maria, CA
Attn: Curtis J. Tunnel, Councilman

City of Santa Maria
Santa Maria, CA
Attn: Thomas B. Urbanske, Mayor Pro-Tem

City of Santa Maria
Department of Community Development
Santa Maria, CA

Environmental Health Services
Lompoc, CA
Attn: Richard Runyon

Health Care Services
Lompoc, CA
Attn: Larry Bishop, Supervisor

Lompoc General Plan Advisory Committee
Lompoc, CA

Lompoc Valley General Plan Advisory
Committee
Lompoc, CA
Attn: Jane Green, Secretary

6.5 LIBRARIES

Buellton Library
Buellton, CA

Goleta Library
Goleta, CA

Lompoc Public Library
Lompoc, CA

Montecito Library
Montecito, CA

Santa Barbara City Library
Central Branch
Santa Barbara, CA

Santa Maria City Library
Santa Maria, CA

Santa Maria City Library
Guadalupe Branch
Guadalupe, CA

Santa Maria City Library
Orcutt Branch
Orcutt, CA

Solvang Library
Solvang, CA

University of California at Santa Barbara
Library Reference Department
Santa Barbara, CA

Ventura County Library
E.P. Foster Branch
Ventura, CA

Village Library
Vandenberg Village, CA

6.6 ORGANIZATIONS

California Wildlife Trust
Hermosa, CA
Attn: Edward S. Loosli, Director

Chumash Cultural Heritage Association
Solvang, CA
Attn: Reggie Pagaling

Coastal Band of the Chumash Nation
Santa Barbara, CA
Attn: John Ruiz, Cultural Resource Coordinator

Elders Council of the Santa Ynez Reservation
Santa Ynez, CA

Environmental Defense Center
Santa Barbara, CA

Federation of American Scientists
Washington, D.C.
Attn: Steven Aftergood

Historical Society (Lompoc Valley)
Lompoc, CA

Historical Society of Santa Maria
Santa Maria, CA
Attn: Ted A. Bianchi, Sr.

Hollister Ranch Owners' Association
Gaviota, CA
Attn: Alvin J. Remmenga

La Purisima Mission Association
Lompoc, CA

League of Women Voters
Santa Barbara, CA
Attn: Marty Blum, President

Lompoc Valley Chamber of Commerce
Lompoc, CA
Attn: Lee Bohlmann, Executive Director

National Audubon Society
La Purisma Chapter
Lompoc, CA
Attn: Debra Argel, President

Planning and Conservation League
Sacramento, CA
Attn: Larry Moss

Santa Maria Valley Chamber of Commerce
Santa Maria, CA
Attn: Charlie Jackson, Executive Director

Santa Ynez Indian Reservation
Business Council
Santa Ynez, CA
Attn: James Pace, Chairman

Scenic Shoreline Preservation Conference
Santa Barbara, CA
Attn: Fred Eissler

Sierra Club (Arguello Group)
Lompoc, CA
Attn: Connie Geiger

Sierra Club National Headquarters
San Francisco, CA

United Chumash Central Counsel
Santa Barbara, CA

6.7 BUSINESSES

ACTA Incorporated
Torrance, CA
Attn: Jerold Haber

Bixby Ranch Company
Santa Barbara, CA
Attn: John M. Baucke

Bixby Ranch Company
Los Angeles, CA
Attn: Kenneth C. Bornholdt

Bixby Ranch Co.
Los Olivos, CA
Attn: Andrew Mills

CH_2M Hill
Portland, OR
Attn: Dan Heagerty

Community Construction Co.
Lompoc, CA
Attn: Bea Smith

County News Service
Santa Barbara, CA
Attn: John Hankins

Fluor Daniel
Irvine, CA
Attn: E. R. Phillips

General Dynamics
San Diego, CA
Attn: Mike Haro

General Dynamics
Space Systems Division
Vandenberg Air Force Base, CA
Attn: George Lacombe

General Dynamics
San Diego, CA
Attn: Harvey Jewett

Ground Systems Associated Contractor
Vandenberg AFB, CA
Attn: M. W. Milligan

Hubbs-Sea World Research Institute
San Diego, CA

Lockheed Space Operations Company
Lompoc, CA
Attn: Steve Bridge

Lompoc Record
Lompoc, CA
Attn: Chuck Bolcom

Lompoc Record
Lompoc, CA
Attn: David Nert

Los Angeles Magazine
Los Angeles, CA
Attn: Rodger Clair

Martin Marietta Corp.
Vandenberg Air Force Base, CA
Attn: Robbie Robinson

Martin Marietta Corp.
Vandenberg Air Force Base, CA
Attn: Mel Wheeler

Martin Marietta Denver Aerospace
Denver, CO
Attn: Eldon Milner

McDonnell Douglas
Vandenberg Air Force Base, CA
Attn: Bill Sobszak

McDonnell Douglas Space Systems Co.
Huntington Beach, CA
Attn: Larry R. Nelson

Robert Nichaus
Santa Barbara, CA
Attn: Jeff Eitucci

Pacific Enterprises
Los Angeles, CA
Attn: Mark Portner

Pillsbury, Madison & Sutro
Washington, DC
Attn: Gen. Sugiyama

San Luis Obispo Telegram - Tribune
San Luis Obispo, CA

Santa Barbara News-Press
Santa Barbara, CA

Santa Maria Times
Santa Maria, CA

Santa Maria Valley Developers, Inc.
Santa Maria, CA

Sverdrup Corporation
St. Louis, MO
Attn: Lieu Smith

TAD Corps
Washington, D.C.
Attn: Doyle McDonald

Thomas Paine Associates
Santa Monica, CA
Attn: Dr. Thomas O. Paine

WESCO
Novato, CA
Attn: Diana Hickson

6.8 INDIVIDUALS

Mike Anderson
Lompoc, CA

Larry Austin
Lompoc, CA

Raymond Bellrose
Lompoc, CA

Don Benn
Santa Barbara, CA

Jennifer Bessette
Lompoc, CA

Steve Bridge
Lompoc, CA

Walter B. Burnett
Lompoc, CA

Tony Cayabyab
Lompoc, CA

Paul Collins
Santa Ynez, CA

Greg Cooper
Lompoc, CA

Judy Y. Cooper and Laura M. Cooper
Lompoc, CA

Peter Coulston
Salt Lake City, UT

S. R. Datrell
Santa Maria, CA

Darlene Dial and Terry Dial
Santa Maria, CA

David A. Dimalty
Lompoc, CA

Nicole M. Donla
Lompoc, CA

David A. Dunaltz
Lompoc, CA

Andrew N. Dunlap
Lompoc, CA

Robert Dwyer
Lompoc, CA

Clay Easterly
Knoxville, TN

Commander Carl W. Erickson
USN (Ret)
Livingston, TX

Charles R. Eshelman
Goleta, CA

Scott Feirn
Lompoc, CA

Ray Fincham
Santa Monica, CA

Gary Gault
Santa Maria, CA

Robert Gibson
Paso Robles, CA

Vince Gomez
Santa Ynez, CA

Tom Gooch
Lompoc, CA

Jeremy Graves
Lompoc, CA

Fred Halneka
Lompoc, CA

Kathryn L. Harter
Lompoc, CA

Charles Hutchison
Lompoc, CA

George Johnson
Lompoc, CA

Dominic Keen
Lompoc, CA

Michael E. Kelley
Lompoc, CA

Chester King
Topanga Canyon, CA

Ray Kunze
Lompoc, CA

George LaCombe
Lompoc, CA

Larry Lane
Lompoc, CA

Jackson Leeds
Washington, DC

Larry Liles
Santa Barbara, CA

Joe Manieri
Bay St. Louis, MS

Michael J. McDermott
Lompoc, CA

Mike McElligott
Lompoc, CA

Mark D. Mopson
Lompoc, CA

J. C. Picciuolo
Lompoc, CA

Richard A. Proctor
Lompoc, CA

Tony Roberts
Lompoc, CA

Donn Robertson
Lompoc, CA

K. K. Rodriguez
Lompoc, CA

Barbara Russell
Avila Beach, CA

Allen Schauffler
San Luis Obispo, CA

Elaine Schneider
Santa Maria, CA

Sandra Schweiger
Orcutt, CA

Le Roy Scolari and Joan Scolari
Lompoc, CA

Donald Shaw
White Oak, PA

Maria Slizys
Lompoc, CA

Aubrey B. Sloan
Santa Maria, CA

Don D. Smith
Lompoc, CA

Donald D. Smith
Lompoc, CA

Steve Sorkin
Goleta, CA

James Spellman, Jr.
Vandenberg AFB, CA

Steen W. Steensen
Lompoc, CA

Steve Strachan
Lompoc, CA

K. R. Taybro
Goleta, CA

Tad Weber
Lompoc, CA

Lisa Weetman
San Luis Obispo, CA

Dorene Wettck
Lompoc, CA

Joe Wisely
Goleta, CA

Charles D. Woodhouse
Santa Barbara, CA

Jimmy Wyest
Lompoc, CA

Michael I. Zeenin
Lompoc, CA

Roger Zimmerman
Lompoc, CA

6.9 ELECTED OFFICIALS

Alan Cranston, U.S. Senator
Los Angeles, CA

Ed Davis, State Senator
(19th District)
Northridge, CA

George Deukmejian, Governor
Sacramento, CA

Gary Hart, State Senator
(18th District)
Santa Barbara, CA

DeWayne Holmdahl, Supervisor
(4th District)
Lompoc, CA

Robert Lagomarsino, Congressman
(19th District)
Santa Barbara, CA

Toru Miyoshi, Supervisor
(5th District)
Santa Maria, CA

Office of the Mayor
Santa Barbara City Hall
Santa Barbara, CA

Eric Seastrand, State Assemblyman
(29th District)
San Luis Obispo, CA

Pete Wilson, U.S. Senator
Los Angeles, CA

Cathie Wright, State Assemblywoman
(37th District)
Simi Valley, CA

6.10 EDUCATIONAL/RESEARCH INSTITUTIONS

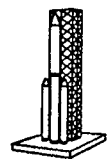
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, CA
Attn: Dr. Mario J. Molina

Lompoc Unified Schools
Lompoc, CA
Attn: Domenic Signorelli

Oak Ridge National Laboratory
Energy Division
Integrated Analysis and Assessment Section
Oak Ridge, TN

Superintendent of Schools
Santa Barbara, CA
Attn: William J. Cirone

Ltr. 8/15/90
Save Our Coast
Marlin Gilchrist
209 West Ortega
Santa Barbara, CA 93101



Chapter 7.0

DOCUMENTATION OF DRAFT EIS PUBLIC HEARINGS

7.0 DOCUMENTATION OF DRAFT EIS PUBLIC HEARINGS

The material in this section is provided to document the Environmental Impact Analysis Process (EIAP) and its consistency with the National Environmental Policy Act (NEPA) as implemented by the Regulations of the President's Council on Environmental Quality (CEQ) (40 CFR Parts 1500 - 1508). In particular, this section demonstrates consistency with CEQ requirements for public involvement (40 CRF Part 1506.6). Documentation of public notice is shown in the Federal Register Notice of Availability of Draft EIS, mailing list for notification of Draft EIS public hearings, notification of Draft EIS public hearings, and publication dates for newspaper notifications of Draft EIS public hearings.

Public hearings on the Draft EIS were held at Lompoc and Santa Barbara, California, on August 30 and 31, 1989. The public hearing summary handout, public hearing registration card, written statement form, and list of attendees and speakers are provided to demonstrate public involvement in the EIAP and NEPA process. The same handouts were distributed at both public hearings.

7.1 FEDERAL REGISTER NOTICE OF AVAILABILITY OF DRAFT EIS

Dower House Road
Washington, DC
Janitorial Service
The Rexnord Building
4277 Poche Court West
New Orleans, Louisiana

C.W. Fletcher,
Executive Director.

[FR Doc. 88-7748 Filed 4-7-88; 8:45 am]
BILLING CODE 6820-33-M

DEPARTMENT OF DEFENSE

Department of the Air Force

Intent (NOI) To Prepare an Environmental Impact Statement for the Proposed Construction and Operation of Space Launch Complex 7 at Vandenberg Air Force Base (AFB), California

The Department of the Air Force is proposing to construct and operate Space Launch Complex 7 (SLC-7) at Vandenberg AFB to launch Department of Defense satellites beginning in 1994 into polar orbit aboard Titan Centaur expendable space launch vehicles. The proposed location of SLC-7 is near Cypress Ridge on South Vandenberg, approximately one mile south of SLC-6, the Vandenberg AFB launch site for the Space Shuttle. The proposed action includes the construction of the launch complex and support facilities, the extension of roads and utilities on Vandenberg AFB, and the launching of the Titan Centaur. In addition, existing launch support facilities constructed for other space launch systems at Vandenberg AFB (i.e., Space Shuttle) are proposed to be used and/or modified as required to support the new launch complex. The satellites proposed to launch aboard the Titan Centaur from SLC-7 require polar orbits. Vandenberg AFB is the only existing U.S. government launch site that can launch satellites into polar orbits without over flying populated land masses. Therefore, Vandenberg AFB is the only feasible location for the proposed SLC-7. Alternative sites on Vandenberg AFB are being evaluated for SLC-7 including a coastal terrace near Point Arguello, and an upland terrace approximately one miles south of the proposed Cypress Ridge site.

The Department of the Air Force will hold two public scoping meetings to solicit inputs on significant environmental issues associated with the construction and operation of SLC-7 at Vandenberg AFB. These scoping meetings are scheduled for May 3, 1988 at the Lompoc Civic Auditorium, 217 South "L" Street, Lompoc, CA from 7:00—10:00 pm; and May 5, 1988 at the Goleta Valley Community Center, 5679 Hollister Avenue, Goleta, CA from 7:00—10:00 pm. In addition to these two scoping meetings, written inputs to the scoping process are solicited. Comments in response to this NOI or as part of the scoping process are requested in writing within 30 calendar days from publication of this notice in the Federal Register.

Questions concerning the proposed action or the NEPA process for the action, comments on this NOI, or written inputs to the scoping process should be mailed to Mr. Robert Mason, Department of the Air Force, Headquarters Space Division/DEV, P.O. Box 92960, Los Angeles, CA 90009-2960. Telephone inquiries should be directed to Mr. Mason at (213) 643-1409.

Patsy J. Conner,
Air Force Federal Register Liaison Officer.

[FR Doc. 88-7710 Filed 4-7-88; 8:45 am]
BILLING CODE 3910-01-M

DEPARTMENT OF EDUCATION

Proposed Information Collection Requests

AGENCY: Department of Education.

ACTION: Notice of proposed information collection requests.

SUMMARY: The Director, Information Technology Services, invites comments on the proposed information collection requests as required by the Paperwork Reduction Act of 1980.

DATE: Interested persons are invited to submit comments on or before May 9, 1988.

ADDRESSES: Written comments should be addressed to the Office of Information and Regulatory Affairs, Attention: Jim Houser, Desk Officer, Department of Education, Office of Management and Budget, 726 Jackson Place, NW., Room 3208, New Executive Office Building, Washington, DC 20503. Requests for copies of the proposed information collection requests should be addressed to Margaret B. Webster, Department of Education, 400 Maryland Avenue, SW., Room 5624, Regional Office Building 3, Washington, DC 20202.

FOR FURTHER INFORMATION CONTACT: Margaret B. Webster, (202) 732-3915.

SUPPLEMENTARY INFORMATION: Section 3517 of the Paperwork Reduction Act of 1980 (44 U.S.C. Chapter 35) requires that the Office of Management and Budget (OMB) provide interested Federal agencies and the public an early opportunity to comment on information collection requests. OMB may amend or waive the requirement for public consultation to the extent that public participation in the approval process would defeat the purpose of the information collection, violate State or Federal law, or substantially interfere with any agency's ability to perform its statutory obligations.

The Director, Information Technology Services, publishes this notice containing proposed information collection requests prior to submission of these requests to OMB. Each proposed information collection, grouped by office, contains the following: (1) Type of review requested, e.g., new, revision, extension, existing or reinstatement; (2) Title; (3) Frequency of collection; (4) The affected public; (5) Reporting burden; and/or (6) Recordkeeping burden; and (7) Abstract. OMB invites public comment at the address specified above. Copies of the requests are available from Margaret Webster at the address specified above.

Dated: April 4, 1988

Carlos U. Rice,
Director for Information Technology Services.

Office of Planning, Budget, and Evaluation

Type of Review: New
Title: Administrative Cost Study of the College Cost Containment Project
Frequency: One time only
Affected Public: Businesses or other for-profit, non-profit institutions
Reporting Burden:
Responses: 600
Burden Hours: 900
Recordkeeping:
Recordkeepers: 0
Burden Hours: 0
Abstract: This study will collect information from postsecondary institutions that have participated in the College Cost Containment Project. The Department will use the data to analyze and test cost reduction methods.

Office of Special Education and Rehabilitation Services

Type of Review: New
Title: Evaluation of State Vocational Agency Costs
Frequency: One time only
Affected Public: State or local governments
Reporting Burden:
Responses: 40
Burden Hours: 920
Recordkeeping:
Recordkeepers: 0
Burden Hours: 0
Abstract: This study will collect information on Vocational

7.2 NEWS RELEASE FOR DRAFT EIS PUBLIC HEARINGS

August 1, 1989

AIR FORCE ANNOUNCES PUBLIC
HEARINGS ON VANDENBERG AIR FORCE BASE
SPACE LAUNCH PROJECT

LOS ANGELES AIR FORCE BASE, Calif. -- Officials at Headquarters Air Force Space Systems Division announced here today that public hearings will be held to provide the public an opportunity to comment on the Draft Environmental Impact Statement for the Space Launch Complex 7 (SLC-7) project at Vandenberg Air Force Base.

These meetings are open to all interested individuals, groups, and government agencies. They will be held at the following times and places:

1. August 30, 1989, 7:00 p.m.
   Grossman Gallery of the Lompoc Public Library
   501 East North Avenue
   Lompoc, CA

2. August 31, 1989, 7:00 p.m.
   Santa Barbara Superintendent of Schools Auditorium
   4400 Cathedral Oaks Road
   Santa Barbara, CA

The U.S. Air Force is proposing construction and operation of a new space launch complex (SLC-7) for the Titan IV/Centaur launch vehicle at Vandenberg. The proposed facility represents the latest modification to the Titan program and is a continuation of the USAF Space Launch program at this Santa Barbara County base.

During the hearing, individuals are limited to 5-minute presentations and representatives of groups to 10 minutes. If a more lengthy statement is necessary, the speaker is asked to provide a written copy and summarize it orally according to the above time limits.

Written statements may be submitted to:

Headquarters Space Systems Division
SSD/DEV
ATTN: Mr. John Edwards
P. O. Box 92969
Los Angeles, CA 90009-2960

7.3 MAILING LIST FOR NOTIFICATION OF DRAFT EIS PUBLIC HEARINGS

MAILING LIST FOR NOTIFICATION OF DRAFT EIS PUBLIC HEARINGS

Advisory Council on Historic Preservation
Washington, DC

Advisory Council for Historic Preservation
Western Office of Project Review
Golden, CO
Attn: Director

Mike Anderson
Lompoc, CA

John M. Baucke
Bixby Ranch Company
Santa Barbara, CA

Raymond Bellrose
Lompoc, CA

Don Benn
Santa Barbara, CA

Jennifer Bessette
Lompoc, CA

Anthony Blackett
Lompoc, CA

Board of Supervisors
Santa Barbara, CA
Attn: Chairman

Kenneth C. Bornholdt
Bixby Ranch Company
Los Angeles, CA

Steve Bridge
Lompoc, CA

Walter B. Burnett
Lompoc, CA

California Coastal Commission
San Francisco, CA
Attn: Peter Douglas

California Department of Fish and Game
Sacramento, CA

California Native Plant Society
San Luis Obispo, CA
Attn: President, San Luis Obispo Chapter

California Regional Water Quality Control Board
Central Coast Region
San Luis Obispo, CA
Attn: William R. Leonard, Executive Officer

California State Historic Preservation Office
Sacramento, CA
Attn: SHPO

California Wildlife Trust
Hermosa, CA
Attn: Edward S. Loosli, Director

Tony Cayabyab
Lompoc, CA

Central Coast Indian Council
Paso Robles, CA
Attn: Director

City of Lompoc
City Hall
Lompoc, CA
Attn: Gene Stevens, Councilman

City of Lompoc
City Hall
Lompoc, CA
Attn: Jeremy Graves, Associate Planner

City of Lompoc
City Hall
Lompoc, CA
Attn: Jim Smith, Councilman

City of Lompoc
City Hall
Lompoc, CA
Attn: Karl Braun, Mayor Pro-Tem

City of Lompoc
City Hall
Lompoc, CA
Attn: Marvin Loney, Mayor

City of Lompoc
City Hall
Lompoc, CA
Attn: William S. Mullins, Councilman

City of Lompoc
Department of Community Development
Lompoc, CA
Attn: King Leonard, Planning Director

City of Santa Barbara
Community Development Department
Santa Barbara, CA
Attn: Director

City of Santa Maria
Santa Maria, CA
Attn: Curtis J. Tunnel, Councilman

City of Santa Maria
Santa Maria, CA
Attn: George S. Hobbs, Jr., Mayor

City of Santa Maria
Santa Maria, CA
Attn: James A. May, Councilman

City of Santa Maria
Santa Maria, CA
Attn: Robert Orach, Councilman

City of Santa Maria
Santa Maria, CA
Attn: Thomas B. Urbanske, Mayor Pro-Tem

City of Santa Maria
Department of Community Development
Santa Maria, CA

Paul Collins
Santa Ynez, CA

Judy Y. Cooper
Lompoc, CA

Laura M. Cooper
Lompoc, CA

County of Santa Barbara
Resource Management Department
Santa Barbara, CA

Alan Cranston, U.S. Senator
Los Angeles, CA

S.R. Datrell
Santa Maria, CA

Ed Davis, State Senator
(19th District)
Northridge, CA

George Deukmejian, Governor
Sacramento, CA

Darlene Dial
Santa Maria, CA

Terry Dial
Santa Maria, CA

David A. Dimalty
Lompoc, CA

Nicole M. Donla
Lompoc, CA

David A. Dunaltz
Lompoc, CA

Andrew N. Dunlap
Lompoc, CA

Robert Dwyer
Lompoc, CA

Clay Easterly
Knoxville, TN

William H. Ehorn, Superintendent
U.S. Department of the Interior
National Park Service
Channel Islands National Park
Ventura, CA

Elders Council of the Santa Ynez Reservation
c/o Elaine Schneider
Santa Ynez, CA

Charles R. Eshelman
Goleta, CA

Federal Aviation Administration
Regional Headquarters
Worldway Postal Center
Los Angeles, CA

Scott Feirn
Lompoc, CA

Fluor Daniel
Irvine, CA
Attn: E.R. Phillips

Gary Gault
Santa Maria, CA

General Dynamics
San Diego, CA
Attn: Harvey Jewett

Robert Gibson
Paso Robles, CA

Tom Gooch
Lompoc, CA

Governor's Office of Planning Research
Sacramento, CA

Russell G. Guiney, District Superintendent
California Department of Parks and
Recreation
La Purisima Mission District
Lompoc, CA

Jerold Haber
NTS Engineering
Los Angeles, CA

Fred Halneka
Lompoc, CA

Gary Hart, State Senator
(18th District)
Santa Barbara, CA

Kathryn L. Harter
Lompoc, CA

Health Care Services
Environmental Health Services
Santa Barbara, CA
Attn: Ben Gale, Director

Health Care Services
Lompoc, CA
Attn: Larry Bishop, Supervisor

Diana Hickson
WESCO
Novato, CA

Historical Society (Lompoc Valley)
Lompoc, CA

Historical Society of Santa Maria
Santa Maria, CA
Attn: Ted A. Bianchi, Sr.

Hollister Ranch Owners' Association
Gaviota, CA
Attn: Alvin J. Remmenga

DeWayne Holmdahl, Supervisor
4th District
Lompoc, CA

Hubbs-Sea World Research Institute
San Diego, CA

Interagency Archaeological Services Branch
National Park Service Western Region
San Francisco, CA

George Johnson
Lompoc, CA

Dominic Keen
Lompoc, CA

Michael E. Kelley
Lompoc, CA

Mike Kelly
Isla Vista, CA

Chester King
Topanga Canyon, CA

Ray Kunze
Lompoc, CA

Robert Lagomarsino, Congressman
(19th District)
Santa Barbara, CA

La Purisima Mission Association
Lompoc, CA

La Purisima Mission State Park
Lompoc, CA

Larry Lane
Lompoc, CA

League of Women Voters
Santa Barbara, CA
Attn: Marty Blum, President

Lockheed Space Operations Company
Lompoc, CA
Attn: Steve Bridge

Lompoc General Plan Advisory Committee
Lompoc, CA

Lompoc Record
Lompoc, CA

Lompoc Valley Chamber of Commerce
Lompoc, CA
Attn: Lee Bohlmann, Executive Director

Lompoc Valley General Plan Advisory Committee
Lompoc, CA
Attn: Jane Green, Secretary

Los Angeles Times
Santa Barbara Edition
Santa Barbara, CA

Marine Mammal Commission
Washington, DC

Martin Marietta Corp.
DE00A
Vandenberg Air Force Base, CA
Attn: Robbie Robinson

Martin Marietta Corp.
Vandenberg Air Force Base, CA
Attn: Mel Wheeler

Doyle McDonald
TAD Corps
Washington, D.C.

McDonnell Douglas
Bill Sobszak
Vandenberg Air Force Base, CA

Eldon Milner
Martin Marietta Denver Aerospace
Denver, CO

Toru Miyoshi, Supervisor
5th District
Santa Maria, CA

Dr. Mario J. Molina
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, CA

Mark D. Mopson
Lompoc, CA

Larry Myers, Executive Secretary
Native American Heritage Commission
Sacramento, CA

National Audubon Society
La Purisma Chapter
Lompoc, CA
Attn: Debra Argel, President

David Nert
Lompoc Record
Lompoc, CA

Office of the Mayor
Santa Barbara City Hall
Santa Barbara, CA

James Peach
Isla Vista, CA

Pillsbury, Madison & Sutro
Washington, DC
Attn: Gen. Sugiyama

Planning and Conservation League
Sacramento, CA
Attn: Larry Moss

Deborah Pontifex
SBCAPCD
Santa Barbara, CA

John Riughnuser
Lompoc, CA

Donn Robertson
Lompoc, CA

K.K. Rodriguez
Lompoc, CA

Richard Roop
Oak Ridge National Laboratory
Oak Ridge, TN

Richard Runyon
Environmental Health Services
Lompoc, CA

Barbara Russell
Avila Beach, CA

San Luis Obispo Telegram - Tribune
San Luis Obispo, CA

Santa Barbara County Flood Control
and Water Agency
Santa Barbara, CA
Attn: James Stubchaer, Engineer-Manager

Santa Barbara County Parks Department
Santa Barbara, CA
Attn: Mike Pahos, Director of Parks

Santa Barbara County Air Pollution Control
District
Santa Barbara, CA
Attn: James M. Ryerson,
Air Pollution Control Officer

Santa Barbara County Board of Supervisors
Santa Barbara, CA
Attn: Chairman

Santa Barbara County Board of Supervisors
Santa Barbara, CA
Attn: David M. Yager, Supervisor, 1st
District

Santa Barbara County Board of Supervisors
Santa Barbara, CA
Attn: Thomas Rogers, Supervisor, 2nd
District

Santa Barbara County Board of Supervisors
Santa Barbara, CA
Attn: William B. Wallace, Supervisor, 3rd
District

Santa Barbara County
Cities Area Planning Council
Santa Barbara, CA
Attn: Gerald R. Lorden, Executive Director

Santa Barbara County Office of
Disaster Preparedness
Hazardous Materials Coordinator
Santa Barbara, CA
Attn: Susan Strachan

Santa Barbara News
Santa Barbara, CA

Santa Maria Times
Santa Maria, CA

Santa Maria Valley Chamber of Commerce
Santa Maria, CA
Attn: Charlie Jackson, Executive Director

Santa Maria Valley Developers, Inc.
Santa Maria, CA

Santa Ynez Indian Reservation
Business Council
Santa Ynez, CA
Attn: James Pace, Chairman

Scenic Shoreline Preservation Conference
Santa Barbara, CA
Attn: Mr. Fred Eissler

Elaine Schneider
Santa Maria, CA

Eric Seastrand, State Assemblyman
(29th District)
San Luis Obispo, CA

Donald Shaw
White Oak, PA

Sierra Club (Arguello Group)
Lompoc, CA
Attn: Connie Geiger

Sierra Club National Headquarters
San Francisco, CA

Domenic Signorelli,
Lompoc Unified Schools
Lompoc, CA

Maria Slizys
Lompoc, CA

Aubrey B. Sloan
Santa Maria, CA

Bea Smith
Community Const.
Lompoc, CA

Don D. Smith
Lompoc, CA

Steve Sorkin
Goleta, CA

Steen W. Steensen
Lompoc, CA

Steve Strachan
Lompoc, CA

Superintendent of Schools
Santa Barbara, CA
Attn: William J. Cirone

Sverdrup Corporation
St. Louis, MO
Attn: Lieu Smith

The American Cetacean Society
National Headquarters
San Pedro, CA
Attn: Millie Payne, Executive Secretary

The Resources Agency of California
Office of the Secretary
Sacramento, CA

Russ Thompson
Lompoc, CA

S.M. Times
Santa Maria, CA

United Chumash Central Counsel
Santa Barbara, CA

U.S. Army Corps of Engineers
Attn: John Harris, CESPK-ED-M
Sacramento, CA

U.S. Coast Guard
Marine Safety Division
Long Beach, CA
Attn: U.S. Coast Guard Chief

U.S. Department of Agriculture
U.S. Forest Service
Santa Lucia Ranger District
Santa Maria, CA
Attn: Keith Gunther, District Ranger

U.S. Department of Agriculture
Soil Conservation Service
Santa Maria, CA

U.S. Department of Commerce
National Oceanic and Atmospheric
Administration
National Marine Fisheries Services
Northwest and Alaska Fisheries Center
Seattle, WA

U.S. Department of Commerce
National Oceanic and Atmospheric
Administration
Rockville, MD

U.S. Department of Commerce
National Oceanic and Atmospheric
Administration
National Marine Fisheries Service
Southwest Region
Terminal Island, CA
Attn: E.C. Fullerton, Regional Director

U.S. Department of Commerce
National Oceanic and Atmospheric
Administration
National Marine Fisheries Services
Terminal Island, CA
Attn: Dana J. Seagars, Marine Biologist

U.S. Department of Housing and
Urban Development
San Francisco, CA

U.S. Department of the Interior
Fish and Wildlife Service
Laguna Niguel Field Office
Laguna Niguel, CA
Attn: Nancy M. Kaufman, Field Supervisor

U.S. Department of the Interior
Bureau of Indian Affairs
Central California Agency
Sacramento, CA

U.S. Department of the Interior
Bureau of Land Management
Washington, DC
Attn: Division of Planning and
Environmental Control

U.S. Department of the Interior
Bureau of Land Management
Sacramento, CA
Attn: Planning Division

U.S. Department of the Interior
Office of the Secretary
Washington, DC

U.S. Department of the Interior
Regional Environmental Officer
San Francisco, CA
Attn: Patricia Port

U.S. Department of the Interior
U.S. Fish and Wildlife Service
Western Regional Office
Portland, OR

U.S. Department of Labor
Occupational Safety and Health
Administration
Washington, DC

U.S. Department of Transportation
Washington, DC

U.S. Department of Transportation
San Luis Obispo, CA
Attn: Henry O. Case

U.S. Environmental Protection Agency
Office of Federal Activities
Region IX
San Francisco, CA
Attn: Jacqueline Wyland, Chief

U.S. Environmental Protection Agency
Office of Federal Activities
Region IX
San Francisco, CA
Attn: David Tomjovic

U.S. Environmental Protection Agency
Headquarters
Washington, DC

U.S. Fish and Wildlife Service
Sacramento Endangered Species Office
Sacramento, CA
Attn: Gail C. Kobetich

Frank Ugolini
Channel Islands National Park
Ventura, CA

Tad Weber
Lompoc, CA

Western Regional Office
National Park Service
San Francisco, CA

Dorene Wettck
Lompoc, CA

Pete Wilson, U.S. Senator
Los Angeles, CA

Joe Wisely
Goleta, CA

Charles D. Woodhouse
Santa Barbara, CA

Cathie Wright, State Assemblywoman
(37th District)
Simi Valley, CA

Jimmy Wyest
Lompoc, CA

Michael I. Zeenin
Lompoc, CA

LIBRARY DISTRIBUTION

Buellton Library
Buellton, CA

Goleta Library
Goleta, CA

Lompoc Public Library
Lompoc, CA

Montecito Library
Montecito, CA

Santa Barbara City Library
Central Branch
Santa Barbara, CA

Santa Maria City Library
Santa Maria, CA

Santa Maria City Library
Guadalupe Branch
Guadalupe, CA

Santa Maria City Library
Orcutt Branch
Orcutt, CA

Solvang Library
Solvang, CA

Reference Department
Library
University of California
Santa Barbara, CA

Ventura County Library
E.P. Foster Branch
Ventura, CA

Village Library
Vandenberg Village, CA

7.4 NOTIFICATION OF DRAFT EIS PUBLIC HEARINGS

DEPARTMENT OF THE AIR FORCE
WASHINGTON DC 20330 - 1000

OFFICE OF THE ASSISTANT SECRETARY

July 21, 1989

TO: ALL INTERESTED GOVERNMENT AGENCIES, PUELIC GROUPS, AND INDIVIDUALS

Attached for your review and comment is the Draft Environmental Impact Statement (EIS) for the Construction and Operation of the Space Launch Complex 7 at Vandenberg Air Force Base (VAFB), California. The document is provided in compliance with the regulations of the President's Council on Environmental Quality.

The Draft EIS addresses the construction and operation of a new or modified space launch complex for the Titan IV/Centaur space launch vehicle at VAFB. The proposed facility represents the latest modification to the Titan program and is a continuation of the space launch program at this Santa Barbara County base. Alternatives to the proposed action which are considered in detail are the development and operation of the facility at three other sites on south VAFB. Two of these sites are undeveloped, and the third is the existing Space Launch Complex 6, which currently is configured to support launches of the Space Shuttle.

There will be a forty-five day review and public comment period for the Draft EIS, which will end on September 11, 1989. Public hearings on the Draft EIS will be held by the Air Force on August 23 and 24, 1989. The August 23 hearing will be held at 7:00 pm in the Grossman Gallery at the Lompoc Public Library, 501 East North Avenue, Lompoc, California. The August 24 hearing will be held at 7:00 pm in the Santa Barbara County Superintendent of Schools Auditorium, 4400 Cathedral Oaks Road, Santa Barbara, California. Those agencies and individuals who desire to provide written comments may do so by submitting them to the Air Force by September 11, 1989. Written comments or questions on the Draft EIS should be directed to:

HQ Space Systems Division
P.O. Box 92960
Worldways Postal Center
Los Angeles, CA 90009-2960
ATTN: Mr. John Edwards
Telephone (213) 643-0934

GARY D. VEST
Deputy Assistant Secretary of the Air Force
(Environment, Safety and Occupational Health)

2 Attachments
1. Draft EIS
2. Draft EIS Appendices

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE DIVISION (AFSC)
LOS ANGELES AIR FORCE BASE, PO BOX 92960
LOS ANGELES, CA 90009-2960

10 August 1989

TO: ALL INTERESTED GOVERNMENT AGENCIES, PUBLIC GROUPS, AND INDIVIDUALS

The dates for the Space Launch Complex 7 Draft Environmental Impact Statement (EIS) public hearing announced in the July 21, 1989 letter from Deputy Assistant Secretary Vest that was inserted in the Draft EIS have been changed from August 23 and 24, 1989. The new dates and locations are:

1. August 30, 1989, 7:00 p.m.
   Grossman Gallery of the Lompoc Public Library
   501 East North Avenue
   Lompoc, California

2. August 31, 1989, 7:00 p.m.
   Santa Barbara Superintendent of Schools Auditorium
   4400 Cathedral Oaks Road
   Santa Barbara, California

WILLIAM E. LEONHARD, JR., COL, USAF
Director Acquisition Civil Engineering

7.5 NEWSPAPER NOTIFICATION OF DRAFT EIS PUBLIC HEARINGS

ANNOUNCING

The Establishment of the U.S. Penitentiary

CAREER INFORMATION HOTLINE

805-736-2193

A pre-Recorded, weekly update of positions available at the

UNITED STATES PENITENTIARY LOMPOC, CALIFORNIA

EXCITING THINGS ARE HAPPENING AT TOM WILLIAMS OLDSMOBILE CADILLAC SUBARU UNDER NEW MANAGEMENT

1989 CADILLAC FLEETWOOD

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DISCOUNT $5,334.60
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410 State Street 966-7146

PUBLIC NOTICE

THE U S AIR FORCE HEADQUARTERS SPACE SYSTEMS DIVISION ANNOUNCES **PUBLIC HEARINGS** TO PROVIDE THE PUBLIC AN OPPORTUNITY TO COMMENT ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE AIR FORCE SPACE LAUNCH COMPLEX 7 (TITAN IV/CENTAUR) PROJECT AT VANDENBERG AIR FORCE BASE, CA. THESE MEETINGS ARE OPEN TO ALL INTERESTED INDIVIDUALS, GROUPS, AND GOVERNMENTAL AGENCIES AND WILL BE HELD ON **AUGUST 30, 1989, BEGINNING AT 7:00 P.M. AT THE GROSSMAN GALLERY OF THE LOMPOC PUBLIC LIBRARY, 501 EAST NORTH AVENUE IN LOMPOC, CA, AND ON AUGUST 31, 1989 BEGINNING AT 7:00 P.M. AT SANTA BARBARA COUNTY SUPERINTENDENT OF SCHOOLS AUDITORIUM, 4400 CATHEDRAL OAKS ROAD IN SANTA BARBARA, CA.** IN ORDER TO ACCOMMODATE ALL SPEAKERS, INDIVIDUALS WILL BE ALLOWED FIVE MINUTES THOSE REPRESENTING GROUPS WILL BE ALLOWED TEN MINUTES TO SPEAK. EXTENDED COMMENTS SHOULD BE SUBMITTED IN WRITING, AND MAY BE SENT DIRECTLY TO HQ SSD/DEV, ATTN: MR JOHN EDWARDS, P O BOX 92960, LOS ANGELES, C 90009-2960. WRITTEN STATEMENTS SHOULD BE MAILED TO REACH HQ SSD BY SEPTEMBER 11, 1989. FOR ADDITIONAL INFORMATION CALL MR. EDWARDS AT (213) 643-0934.

YOUR OPINIONS DAILY...

on the News-Press Forum Page.

Palmdale lures L.A. home

By Paul Nussbaum
Knight-Ridder News Service

PALMDALE — The names read like a list of singles bars: California Dawn. Reflections Images Moon Shadows Tigertail Sunburst.

But these establishments are more alluring than any nightspot, more attractive than any club scene They are offering Southern California's greatest seduction: An affordable home.

These are the housing developments of Palmdale, a windblown plateau in the Mojave Desert 45 miles north of Los Angeles, where, for $150,000, you can buy a new house today and move in next year

House-starved commuters from Los Angeles have turned this small aerospace town in the sagebrush into the fastest-growing city in California and one of the fastest growing in the nation Palmdale is home to 50,000 people today, up from only 12,227 in 1980, and city officials predict that it will house a population of 118,000 by the year 2000

For Los Angeles workers who have given up on ever affording a home there, where the median cost is $220,000, the $160,000 median price for a two-story, three-bedroom, two-bath house in Palmdale looks attractive Real estate refugees from Los Angeles have turned Palmdale and the surrounding Antelope Valley into a vast bedroom community of look-alike ersatz Spanish developments at the outer edge of commuter tolerance

More than 80 percent of the new home buyers are Los Angeles commuters, and every day, 40,000 cars from the Antelope Valley clog the freeway that links Palmdale to "down below" Already, the 45-mile drive can take two hours or more during rush hours

"It has just been an explosion of people," says Deputy City Administrator Tom Combiths "When the (San Fernando) Valley filled up, there was no place left for people to go The next place north that was developable was Palmdale Here, people can still get the American dream — to have your own quarter-acre"

For years, Palmdale was little more than an extension of the aerospace firms at nearby Edwards Air Force Base and the Air Force's vast Plant 42 The stealth bomber and the space shuttle were built here, and Rockwell, Northrop, Lockheed and McDonnell Douglas all have local production plants, booming or busting depending on the latest military budgets.

But it's no longer the giants of aerospace that power Palmdale, it's the midgets of real estate — the first-time home-buyers

"People just wouldn't believe for years that it wasn't aerospace, it was the commuter" that was driving the local growth, Combiths said. "But then Rockwell laid off 4,000 people a year and a half ago,

Housing

Continued from Page A 1

L.A., people could be abrupt and rude, but here, they're all so willing to help"

The Confers are part of a growing exodus from Southern California by emigrants who have decided the price of paradise is too high. More Americans are moving out of the Los Angeles region than into it, and about 40 percent of those are returning to the states of their birth

"There is not necessarily an economic motivation for doing it," says James Minuto, who has studied the migration patterns for the Southern California Association of Governments "They just want to go home"

In the 30 years between 1980 and 2010, about 8 1 million people will move into the six-county greater Los Angeles region from other parts of the United States, according to projections by the association of governments. But about 9 million will move out.

That doesn't mean Southern California will stop growing. Foreign immigration and new births will push the population ever upward, demographers predict. By 2010, the population of the six-county area is expected to reach 18 3 million, up from 13 million now.

But the departures are helping change the fabric of Southern California Those moving out tend to be predominantly white, more affluent, slightly older and better educated than those moving in.

"Those leaving are fed up, while those coming are seeking opportunities," says Peter Morrison of the Rand Corp, the Santa Monica-based research group. "It's causing a lot of redistribution of racial and ethnic groups It's amazing how rapidly it is changing."

Within 21 years, based on current trends, the shifting population and migration patterns will create a Southern California where those who are now minorities will be the majority By 2010, Hispanics, Asians and blacks are expected to make up 59 percent of the population, compared with just 39 percent in 1980

For those who leave, a combination of factors usually pushes them

For many, crime, pollution, traffic, the cost of housing and the poor quality of the public schools have taken the luster off sunny Southern California. A recent Los Angeles Times survey found that nearly half of Los Angeles residents have considered moving out in the past year.

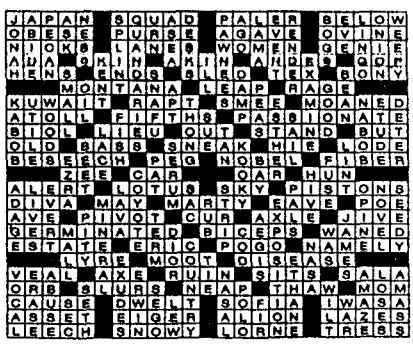
Ted Vollmer, a journalist who took a hefty salary cut in March to move from Los Angeles to La Crosse, Wis., (pop 50,000), said the change has been wonderful

"It was such a hassle to do anything or go anywhere, you felt trapped in your house," said Vollmer, 38, who grew up near Milwaukee. "My son had to spend two hours on a bus every day to go to a junior high school where he was frightened to death. He was beat up a couple of times and threatened other times. His grades plummeted. And all I could see was the same thing happening to my daughter when she got older

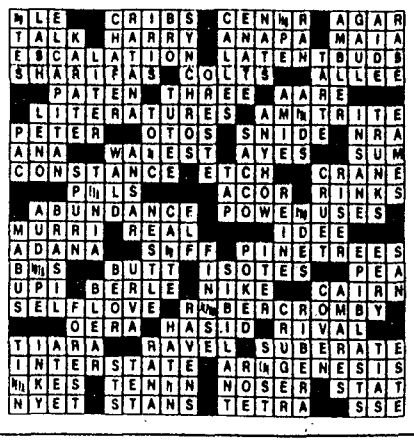
"I lived 4½ miles from work, and I never knew whether it would take me 10 minutes or 45 minutes to drive to the office"

Now, Vollmer says, his 14-year-old son is going out for the school football team, and his schoolwork has improved The family lives two

CROSSWORD SOLUTION



NYT CROSSWORD SOLUTION



7.6 NEWSPAPER PUBLICATION DATES OF DRAFT EIS PUBLIC HEARING NOTICES

NEWSPAPER PUBLICATION DATES OF DRAFT EIS PUBLIC HEARINGS NOTICES

The Notice of Public Hearings[1] for the proposed TCLC project at Vandenberg Air Force Base appeared in the following newspapers on the dates shown:

- *Lompoc Record*
  - August 13, 1989
  - August 22, 1989
  - August 29, 1989
- *San Luis Obispo County Telegram-Tribune*
  - August 19, 1989
- *Santa Barbara News-Press*
  - August 13, 1989
  - August 22, 1989
  - August 29, 1989
- *Santa Maria Times*
  - August 13, 1989
  - August 22, 1989
  - August 29, 1989
- *Ventura County Star Free Press*
  - August 13, 1989
  - August 22, 1989
  - August 29, 1989

(1) See Section 7.5 for example of published notice.

7.7 PUBLIC HEARING SUMMARY HANDOUT

PUBLIC HEARING

DEPARTMENT OF THE AIR FORCE
SYSTEMS COMMAND

SPACE LAUNCH COMPLEX 7
DRAFT EIS
VANDENBERG AIR FORCE BASE, CALIFORNIA

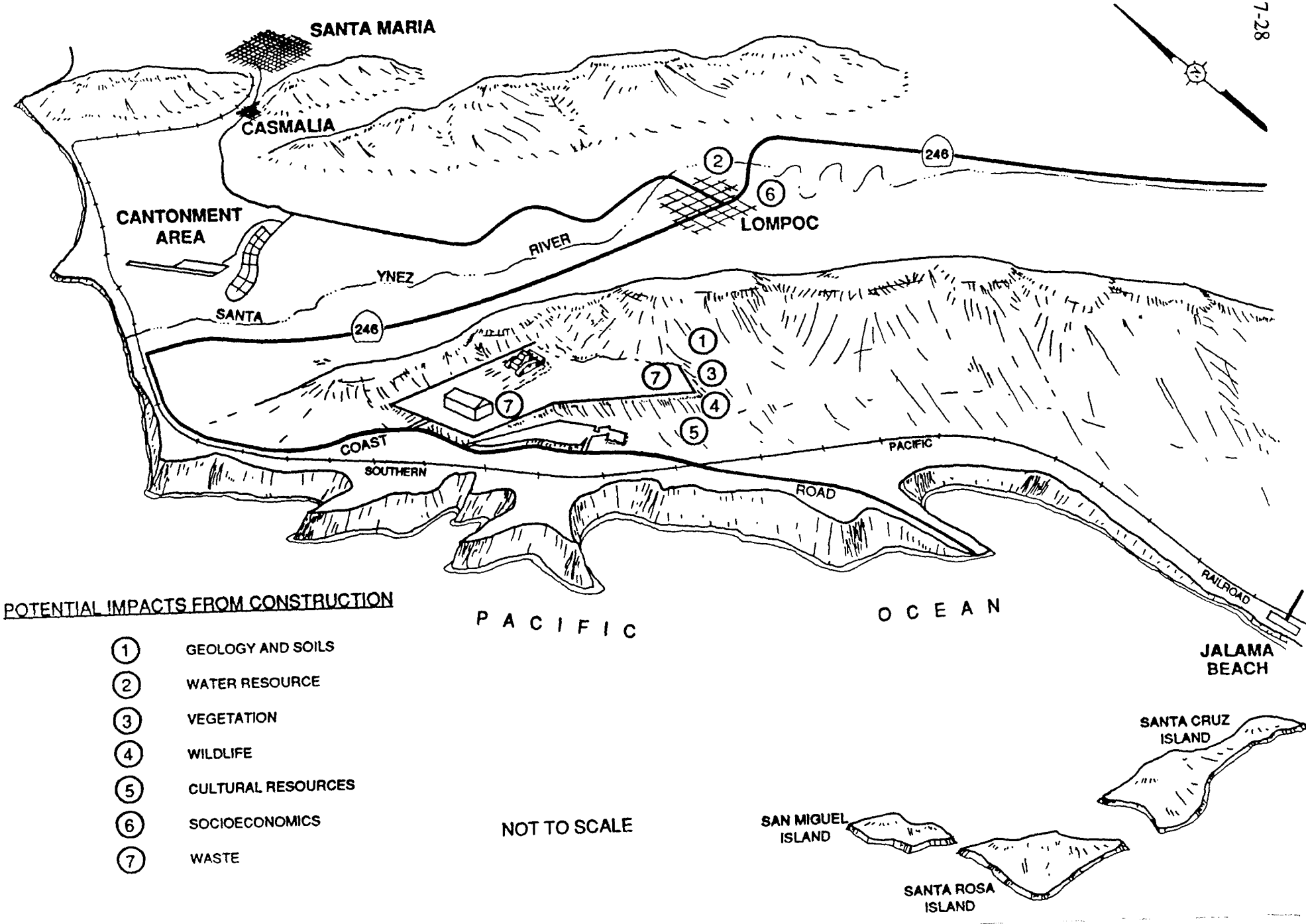
This meeting is one of two being held in the Santa Barbara area to solicit comments from community interest groups, individuals, elected officials, and governmental agencies on the adequacy and completeness of the Draft Environmental Impact Statement (EIS) prepared to address the potential environmental consequences of the proposed Space Launch Complex 7 project. The project would involve construction and operation of a space vehicle launch complex at Vandenberg Air Force Base in northwestern Santa Barbara County, California. A summary of the Draft EIS that describes the proposed action, its potential environmental impact, and mitigation measures is available at this meeting.

Those who desire to comment on the Draft EIS may do so by completing the SPEAKER'S CARD and presenting it to a U.S. Air Force representative. In order to be sure there is time available for all persons who wish to comment, appropriate time limits will be announced during the meeting. Verbal comments of considerable length should also be submitted in writing, either to an Air Force representative at the meeting or to the Department of the Air Force, Headquarters Space Systems Division/DEV, Attention: Mr. John Edwards, Post Office Box 92960, Los Angeles, California 90009-2960. In order to receive full consideration, written comments should be received by the Air Force on or before September 11, 1989.

The proposed Space Launch Complex 7 project is subject to environmental review in compliance with the National Environmental Policy Act, as implemented by the regulations of the President's Council on Environmental Quality (CEQ). The CEQ regulations direct Federal agencies which have made a decision to prepare an EIS to engage in a public review process. The purposes of this public review process are to share expertise, disclose agency analyses, and check for accuracy of the draft environmental document.

Following review of the Draft document, a Final EIS will be prepared and made available for a 30-day public review period. It is anticipated that the Final EIS for this project will be completed and released for review early in 1990. The Final EIS will reflect the oral comments received at the two public hearings and written comments submitted during the public review period.

Thank you for your attendance and participation.


SANTA MARIA
CASMALIA
CANTONMENT AREA
LOMPOC
246
RIVER
YNEZ
SANTA
COAST
SOUTHERN
PACIFIC
ROAD
RAILROAD
P A C I F I C
O C E A N
JALAMA BEACH
SANTA CRUZ ISLAND
SAN MIGUEL ISLAND
SANTA ROSA ISLAND
NOT TO SCALE
POTENTIAL IMPACTS FROM CONSTRUCTION
1 GEOLOGY AND SOILS
2 WATER RESOURCE
3 VEGETATION
4 WILDLIFE
5 CULTURAL RESOURCES
6 SOCIOECONOMICS
7 WASTE

7.8 PUBLIC HEARING REGISTRATION CARD

UNITED STATES AIR FORCE
ENVIRONMENTAL IMPACT ANALYSIS PROCESS
PROPOSED TITAN IV/CENTAUR SPACE LAUNCH COMPLEX 7

PUBLIC HEARING REGISTRATION CARD

(Please Print Clearly)

Name: _____

Address: _____

City: _____ State, Zip: _____

Affiliation: _____

Area of Environmental Concern: _____

☐ I would like to make a statement

☐ Please send me a copy of the Draft EIS

☐ Please send me a copy of the Final EIS

So that all who wish to speak may be heard, individuals should limit statements to 5 minutes; group/organization representatives should limit statements to 10 minutes. Thank you.

PLEASE GIVE THIS CARD TO AIR FORCE REPRESENTATIVE

7.9 WRITTEN STATEMENT FORM

WRITTEN STATEMENT

U. S. Air Force Proposed Titan IV/Centaur Launch Complex 7
Vandenberg Air Force Base, California

Submitted by

Name : _____

Address: _____

_____

Submit to: Attn Mr. John Edwards
HQ SSD/DEV
P. O. Box 92960
Los Angeles, CA 90009-2960

Comments must be received no later than Sept. 11, 1989

7.10 DRAFT EIS PUBLIC HEARINGS ATTENDANCE AND SPEAKERS LISTS

DRAFT EIS PUBLIC HEARING ATTENDANCE

The following individuals attended the Public Hearings on the Draft EIS:

AUGUST 30, 1989
LOMPOC, CALIFORNIA

George Armenta
Larry Austin
Sarah H. Berry
Harry Bernard
Chuck Bolcom
Edmund Burke
Thomas C. Calkins
Bess Christensen
Greg Cooper
Steve Cresswell
Ray Fincham
Patricia M. Fresh
Vince Gomez
Howard E. Grantz
Jeremy Graves
Robert Hardaway
Weldon Hobbs
Charles Hutchison
Anthony R. Kent
Constance Kent
George La Combe
Jess Leyva
R. Lillard
Mike McClure
Mike McElligott
Michael W. Milligan
Andrew Mills
W. S. Mullins
Larry R. Nelson
Reggie Pagaling
Diane Paszek
J. C. Picciuolo
Tony Roberts
Allen Schauffler
Elaine M. Schneider
Sandra Schweiger
Joan Scolari
Le Roy Scolari
Aubrey B. Sloan
Donald D. Smith
James Spellman, Jr.
Steen Steensen
Steve Tuoly
Tad Weber
Dorene Wellck
Roger Zimmerman

AUGUST 31, 1989
SANTA BARBARA, CALIFORNIA

Donald M. Benn
Scott Blankenship
Tom Demery
John Hankins
Michael Haro
Karen Kivela
Larry Liles
M. J. McDermott
Andrew Mills
Larry R. Nelson
Reggie Pagaling
Richard Proctor
Elaine M. Schneider
William Sobczyk
K. R. Taylor
Lisa Weetman

DRAFT EIS PUBLIC HEARING SPEAKERS

The following individuals presented oral statements at the Draft EIS Public Hearings:

AUGUST 30, 1989
LOMPOC, CALIFORNIA

SPEAKERS	CONCERNS
Howard Grantz, President Vandenberg Village Community Services Vandenberg Village, CA	Impacts to Lompoc Plain and Lompoc Upland Aquifers and adequacy of community water supplies.
James Spellman, Jr. National Space Society VAFB, CA	Possibilities of using SLC-4 and Shuttle C as alternatives.
W. S. Mullins Lompoc, CA	Mitigation measures for water resources and USAF purchase of domestic versus foreign products.
Le Roy Scolari, Rancher Lompoc, CA	Impacts on lands east of the project site.
Jeremy Graves, Associate Planner Lompoc Community Development Department Lompoc, CA	Written comments to be provided prior to end of comment period.
Elaine Schneider, Representative Chumash Cultural Heritage Association Santa Ynez Indian Reservation, CA	Preference for use of SLC-6, and impacts to the Chumash "Gate to the World Beyond."

AUGUST 31, 1989
SANTA BARBARA, CALIFORNIA

SPEAKER	CONCERNS
Reggie Pagaling Chumash Cultural Heritage Association Santa Ynez Indian Reservation, CA	Further development on VAFB and preference for use of SLC-6.

Chapter 8.0

LIST OF ACRONYMS AND ABBREVIATIONS

8.0 LIST OF ACRONYMS AND ABBREVIATIONS

1STRAD	First Strategic Aerospace Division
1STRAD/ET	First Strategic Aerospace Division, Environmental Management
ACHP	Advisory Council on Historic Preservation (Federal)
AFB	Air Force Base
AFM	Air Force Manual
AFOSH	Air Force Occupational Safety and Health
AFR	Air Force Regulations
AFS	Air Force Station
AFSC	Air Force Systems Command
Al_2O_3	Aluminum Oxide
ANSI	American National Standards Institute
AOU	American Ornithologists Union
APCD	Air Pollution Control District
AQAP	Air Quality Attainment Plan
AQIA	Air Quality Impact Analysis
ARCO	Atlantic Richfield Company
AT	Access Tower
ATC	Authority to Construct
BACT	Best Available Control Technology
BTU	British Thermal Unit
C	Centigrade
CAAQS	California Ambient Air Quality Standards
CAP	Collection Accumulation Point
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCAFS	Cape Canaveral Air Force Station
CCC	California Coastal Commission
CCD	Census County District
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDOHS	California Department of Health Services

CDWR	California Department of Water Resources
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CESA	California Endangered Species Act
CFC	Chlorofluorocarbon
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CH_4	Methane
CHP	California Highway Patrol
CNDDB	California Natural Diversity Data Base
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO_2	Carbon Dioxide
CO	Carbon Monoxide
COE	Corps of Engineers
CRWQCB	California Regional Water Quality Control Board
CSBRMD	County of Santa Barbara Resource Management Department
CY	Cubic Yards
dB	Decibels
dBA	Decibels (A-Weighted Sound Level)
DOD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
DOHS	Department of Health Services
EA	Environmental Assessment
E_C	Expected Casualty
ECRP	Erosion Control/ and Restoration Plan
EIAP	Environmental Impact Analysis Process
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EM	Engineering Manual

EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act (Federal)
ESMC	Eastern Space and Missile Center
ETR	Eastern Test Range
F	Fahrenheit
FAR	Federal Acquisition Regulation
FDH	Formaldehyde Dimethyl Hydrazone
FEIS	Final Environmental Impact Statement
FPA	Flight Plan Approval
FTSA	Flight Termination System Approval
FVIS	Fuel Vapor Incinerator System
FVSS	Fuel Vapor Scrubber System
Gal	Gallon
GN_2	Nitrogen Gas
GO_2	Gaseous Oxygen
gpd	Gallons per day
gpm	Gallons per minute
H_2	Hydrogen
H_2S	Hydrogen Sulfide
HC	Hydrocarbon
H_2O	Water
HCl	Hydrogen Chloride
Hr	Hour
HSWA	Hazardous and Solid Waste Amendments
HWTP	Hazardous Wastewater Treatment Plant
Hz	Hertz

ICBM	Intercontinental Ballistic Missile
ICU	Intersection Capacity Utilization
ILC	Initial Launch Capability
ILL	Impact Limit Line
IRP	Installation Restoration Program
ISS	Ice Suppression System
JP-4	Jet Propulsion Fuel
km	Kilometers
kV	Kilovolt
kVA	Kilovolt-ampere
LARA	Launch Area Risk Analysis
LB	Pound
LCC	Launch Control Center
LCP	Local Coastal Plan
LD	Launch Exhaust Duct
L_{eq}	Equivalent Sound Level
LH_e	Liquid Helium
LH_2	Liquid Hydrogen
LM	Launch Mount
L_{max}	Maximum Sound Level
LN	Liquid Nitrogen
LO_2	Liquid Oxygen
LOS	Level of Service
LSS	Launch Support Structure
M	Earthquake Magnitude
MCE	Maximum Credible Earthquake
MCL	Maximum Contamination Levels
Mg/L	Milligrams per liter
mg/m^3	Milligrams per cubic meter
mm	Millimeters
MMPA	Marine Mammal Protection Act
MOL	Manned Orbital Laboratory

MPE	Maximum Probable Earthquake
mph	Miles per hour
Ms	Surface Wave Magnitude
MSGSA	Missile System Ground Safety Approval
MST	Mobile Service Tower
MVA	Megavolt-ampere
N_2O_4	Nitrogen Tetroxide
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NCP	National Oil and Hazardous Substance Contingency Plan
NDIR	Non-Dispersive Infrared Spectroscopy
NDMA	Nitrosodimethylamine
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NFC	National Fire Code
NHPA	National Historic Preservation Act
NIPDWR	National Interim Primary Drinking Water Regulations
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrous Oxide
NPDES	National Pollution Discharge Elimination System
NPPA	Native Plant Protection Act
NR	Not Reported
NRC	National Response Center
NRHP	National Register of Historic Places
NS	No Established Standard
NSR	New Source Review
NUS	No Upper Stage

O_3	Ozone
OAL	Operations Approval Letter
OHSCP	Oil and Hazardous Substance Contingency Plan
OSC	On-Scene Coordinator
OSB	Operations Support Building
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
PCR	Payload Changeout Room
PGA	Peak Ground Acceleration
PG&E	Pacific Gas and Electric Company
PLF	Payload Fairing
PM_{10}	Particulate matter less than 10 microns aerodynamic diameter
POTW	Publicly-owned treatment works
POV	Privately-owned vehicle
ppm	Parts per million
PPR	Payload Processing Room
PSD	Preventative Source Determination
psf	Pounds per square foot
psi	Pounds per square inch
psig	Pounds per square inch-gauge
PTO	Permit to Operate
QD	Quantity-Distance Criteria
RCRA	Resource Conservation and Recovery Act
REEDM	Rocket Exhaust Effluent Dispersion Model
ROC	Reactive Organic Compounds
ROD	Record of Decision
RSV	Ready Storage Vessel
RWQCB	Regional Water Quality Control Board
SAB	Shuttle Assembly Building
SAC	Strategic Air Command
SAMTO	Space and Missile Test Organization
SARA	Superfund Amendment and Reauthorization Act

SBCAPCD	Santa Barbara County Air Pollution Control District
SBCCAPC	Santa Barbara County Cities Area Planning Council
SBCOEM	Santa Barbara County Office of Emergency Management
SC	Sandy clay
SENEL	Single Event Noise Exposure Level
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SJC	Secondary Jobs Created
SLAMS	State and Local Air Monitoring Stations
SLC-4, -6, -7	Space Launch Complex 4, 6 and 7
SLC-4E	Space Launch Complex 4 East
SLC-4W	Space Launch Complex 4 West
SM	Silty Sand
SMSA	Standard Metropolitan Statistical Area
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxide
SP	Poorly graded sand with gravel
SPA	Statement of Program Acceptance
SPCC	Spill Prevention, Control, and Countermeasure Plan
SPEGL	Short-term Public Emergency Guidance Level
SPL	Sound Pressure Level
SPR	Spill Prevention and Response
SRB	Solid Rocket Booster
SRMU	Solid Rocket Motor Upgrades
SSD/DEV	Space Systems Division/Division of Environmental Planning
SSME	Space Shuttle Main Engine
STRAD	Strategic Aerospace Division
STS	Space Transportation System
SV	Satellite Vehicle
SWEI	Sea World Research Institute

TCLC	Titan IV/Centaur Launch Complex
THC	Toxic Hazard Corridor
TNT	Trinitrotoluene
TOG	Total Organic Gases
TPCA	Toxic Pits Control Act
TPY	Tons Per Year
TSP	Total Suspended Particulates
UCSB	University of California, Santa Barbara
UDMH	Unsymmetrical dimethyl hydrazine
US EPA	United States Environmental Protection Agency
USAF	United States Air Force
USC	University of Southern California
UV	Ultraviolet
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
UT	Umbilical Tower
VAB/HTF	Vehicle Assembly Building/Horizontal Test Facility
VAFB	Vandenberg Air Force Base
WINDS	Weather Information Network and Display System
WSMC	Western Space and Missile Center
WSMCR	Western Space and Missile Center Range Safety Regulation
WTR	Western Test Range
µg/L	Micrograms per liter
$\mu g/m^3$	Micrograms per cubic meter

Appendix A

GLOBAL WARMING

APPENDIX A

GLOBAL WARMING

1. Global climate could be impacted from rocket exhaust emissions associated with the operation of the proposed Titan IV/Centaur Launch Complex (TCLC) located on South Vandenberg Air Force Base (VAFB), California. An analytical evaluation of emissions from Titan IV/Centaur launches has been performed to determine if launch-related emissions would be expected to contribute significantly to global climate changes (global warming). This Appendix describes the technical basis for global warming and estimates the potential effects of proposed Titan IV/Centaur launches upon global climate.

A.1 BACKGROUND

1. Recent climatological research suggests that the temperature of the lower atmosphere is rising because of the atmospheric buildup of trace gases. These gases are termed "greenhouse gases" because they allow visible and ultraviolet light (shortwave radiation) to pass through the atmosphere and heat the earth's surface. This heat is re-radiated in the form of infrared energy (longwave radiation) and is partially absorbed by the greenhouse gases before it escapes into space.

2. The greenhouse gases are vitally important for life. It has been estimated that without the greenhouse effect, the earth's surface would be approximately 33° C (59° F) colder than it is today, too cold to support life as we know it (Abrahamson 1989). Five naturally occurring atmospheric gases are responsible for the greenhouse effect: carbon dioxide (CO_2), tropospheric ozone (O_3), methane (CH_4), nitrous oxide (N_2O), and water vapor (H_2O).

3. The concentrations of CO_2, O_3, CH_4, N_2O, and H_2O have been increasing over the past 100 years due to increased levels of human activities such as fossil fuel combustion and deforestation. In addition, greenhouse gases, such as chlorinated fluorocarbons (CFCs), have been added to the atmosphere over the last 30 years (Ozone Trends Panel 1988). Also, stratospheric ozone, which absorbs sunlight before it reaches the earth's surface, has recently been noted to have been decreasing in concentration during the past 20 years. This depletion contributes to global warming because it allows more shortwave radiation to enter the earth's atmosphere, thus contributing to more infrared energy being trapped by the greenhouse gases in the lower atmosphere .

4. On the basis of available climatological data, researchers have determined that the average global temperature has increased by approximately 0.6° C (1° F) over the last 100 years (Hansen 1987). During the same period, atmospheric concentrations of CO_2 have risen from approximately 280 parts per million (ppm) to 350 ppm (MacDonald 1989). Atmospheric concentrations of CH_4 have doubled during the last 100 years, and the other greenhouse gases have been noted to be increasing at rates from 0.2 to 5 percent per year.

5. Combustion that accompanies the atmosphere is presently estimated to contain approximately 700 billion tons of CO_2 (Woodwell 1989). CO_2 is emitted to the atmosphere by fossil fuels combustion, the deforestation, and the respiration products of photosynthesis, while it is removed from the atmosphere by the oceans and photosynthesis. Given the present rate of fossil fuels combustion and deforestation, the combined effect of increases in atmospheric concentrations of each of the greenhouse gases over the next 50 years has been estimated by some researchers to be equivalent to a doubling of present concentrations of CO_2 (California Energy Commission 1989). Researchers note that, during the next fifty years, atmospheric concentrations of CO_2 may increase at a rate of 1.5 ppm per year to approximately 450 ppm by the year 2030 (Ramanathan et al. 1985). Atmospheric scientists, with the aid of global climatological models have estimated that, as a result of the predicted increase in atmospheric CO_2 concentrations, global temperatures between the equator and 50° latitude (northern and southern hemispheres) may increase at the rate of 0.06° C per year to a total of approximately 3° C by the year 2030 (Schlesinger and Mitchell 1985). The temperature increase in polar regions (60° latitude) may be up to two times greater, or approximately 6° C (Brasseur and Soloman 1986).

6. If estimates of global temperature increase over the next 50 to 100 years are correct, researchers have determined that significant environmental consequences may result, including but not limited to glacial melting, rising ocean levels, loss of coastal and delta wetland habitat, decrease in drinking and irrigation water supplies, increased demand for electrical energy, increased urban air pollution, and deforestation.

A.2 PROPOSED PROJECT CONTRIBUTION TO GLOBAL CO_2 EMISSIONS

1. The exhaust products emitted from a single Titan IV/Centaur launch vehicle are listed in Table 4.5.6 of the Draft EIS. As shown in this table, a Titan IV/Centaur launch vehicle would emit approximately 44 tons of CO_2. Assuming three Titan IV/Centaur launches per year, project launches would emit approximately 132 tons of CO_2 per year. Air contaminant

emissions anticipated from normal launch support activities are presented in Table 4.5.1 of the Draft EIS. On the basis of fuel consumption information presented in the table, it may be estimated that proposed project launch support activities would result in the emission of 1,104 tons of CO_2 per year. Thus, total CO_2 emissions from are anticipated to be 1,236 tons per year. When compared with present global emissions of CO_2 from the combustion of fossil fuels (approximately 5.5 billion tons per year), operations of the proposed action would increase current global CO_2 emissions by approximately twenty-three millionths of one percent in one year.

2. As noted above, depletion of the earth's stratospheric ozone layer is expected to contribute to global warming. However, no significant depletion of the stratospheric ozone layer is expected as a result of exhaust products from proposed Titan IV/Centaur launches. This topic is discussed in detail in Draft EIS Section 4.5.4, Stratospheric Ozone.

A.3 ENVIRONMENTAL CONSEQUENCES OF PROPOSED PROJECT OPERATIONS

1. Due to the complexity of global climatic modeling, a simplified analytical approach was undertaken that scaled data regarding existing CO_2 levels and anticipated global CO_2 buildup and temperature increase rates. Other greenhouse gases emitted by proposed project operations, including gases that may contribute to depletion of the stratospheric ozone layer, were not considered in this analysis. This is because of the complexity of modeling their interrelated impacts and the primary importance of CO_2 emissions to global warming (due to their abundance with respect to the other greenhouse gases). This macro approach omits detailed spatial, temporal, and climatological processes that would be undertaken in large scale computer analyses, but is conservative enough to reasonably encompass potential effects.

2. Researchers have estimated that an accumulation of approximately three billion tons per year of excess CO_2 in the earth's atmosphere could be responsible for a global temperature increase of approximately 0.06° C per year at 50° latitude during the next 50 to 100 years (Woodwell 1989), or 0.12° C per year at 60° latitude (Brasseur and Soloman 1986). The potential environmental consequences of proposed Titan IV/Centaur launches with respect to global warming were assumed to be proportional to the ratio of estimated global temperature increase and accumulation of CO_2. On the basis of this assumption, total estimated CO_2 emissions during one year of operations (see Section A.2) were estimated to result in a global temperature increase of 2.5×10^{-8}° C at 50° latitude, or 5.0×10^{-8}° C at 60° latitude.

3. Assuming that present atmospheric levels of CO_2 would double during the next 50 years, resulting in a global temperature increase of 6° C at 60° latitude (see Section A.1), and an estimated project life of 25 years, the proposed action would be expected to contribute to a temperature increase of approximately 1.3×10^{-7}° C at 60° latitude. As mentioned earlier, 60° latitude corresponds to the earth's polar regions where the greatest environmental consequences due to global warming (i.e., glacial melting) would be expected to occur. On the basis of these analyses, it is considered that emissions of greenhouse gases from proposed Titan IV/Centaur launches would not contribute significantly to global warming.

A.4 REFERENCES

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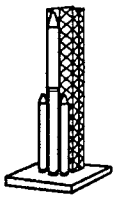

Appendix B

WHITE PAPER ON BIXBY RANCH UPDATE

APPENDIX B

WHITE PAPER ON BIXBY RANCH UPDATE

The White Paper on Bixby Ranch Update is provided in its entirety in the Final EIS on pages 2-132 to 2-144.

Appendix C

SUMMARY OF RISK ASSESSMENT

APPENDIX C

SUMMARY OF RISK ASSESSMENT

The material that follows is a reprint of the Summary of the Risk Assessment undertaken for the proposed action in support of the Draft Environmental Impact Statement (USAF 1989c). Since this is a reprint of previously produced material, the proposed project is referred to as SLC-7 instead of Titan IV/Centaur Launch Complex. The conclusions drawn in the Summary are valid for implementation of the proposed action at any of the four alternative sites under consideration.

SUMMARY

1. The U.S. Air Force (USAF) has proposed to construct and operate a Titan IV/Centaur space launch complex in support of the Department of Defense space program. The proposed action, known as Space Launch Complex 7 (SLC-7), would be located at Vandenberg Air Force Base (VAFB), California, and would be designed for a minimum operational period of 25 years.

2. This Risk Assessment has been prepared as a supporting technical document to the Draft Environmental Impact Statement (EIS) prepared for the proposed SLC-7. During the Environmental Impact Analysis Process (EIAP), various environmental and public health and safety issues were raised. Many of the issues were addressed in the Draft EIS through incorporation of previous analyses and reports from similar projects and operations. Other issues were addressed by citing existing Air Force regulations and policies to avoid or minimize such issues. Issues that were addressed in this fashion include impacts to terrestrial animals, marine mammals, waste management, the Channel Islands, safety procedures for offshore oil platforms, and others. The remaining issues comprise the scope of this assessment.

3. The principle environmental and health and safety issues addressed in this Risk Assessment are identified by exposure pathways as follows:

   - Particulate and Gas Dispersion of various contaminants, including hydrogen chloride (HCL), aluminum oxide (Al_2O_3), carbon monoxide (CO), nitrogen dioxide (NO_2) and byproducts of liquid hypergolic fuel reactions with air, as they relate to health issues.
   - Acidic Deposition effects on biota inhabiting sensitive wetland areas such as the Santa Ynez River and Honda Creek and vegetation near the proposed and alternative launch sites.
   - Air Blast and Noise as it relates to public health and safety and structures, including potential window breakage.
   - Burning Debris as it relates to potential damage to structures.
   - Surface Runoff from an accidental spill of hypergolic fuels during on-base transportation, resulting in potential runoff effects to surface waters.

4. As shown in Table S.1 (Summary of Relative Potential Risk SLC-7 Operations), the individual risk analyses followed development of scenarios leading to a potential consequence. Scenario development included identification of: (1) an event, such as a normal launch or launch anomaly; (2) an outcome, such as rocket exhaust or a hypergolic propellant spill; (3) a

TABLE S.1
SUMMARY OF RELATIVE POTENTIAL RISK SLC-7 OPERATIONS

EVENTS CONSIDERED	POTENTIAL OUTCOMES	PATHWAYS ANALYZED	POTENTIAL RECEPTORS	POTENTIAL CONSEQUENCE	RESULT	MITIGATING FACTORS	PROBABILITY OF CONSEQUENCE OCCURRING	RELATIVE POTENTIAL RISK/RECEPTOR AREAS				
								PROPOSED SLC-7 VICINITY*	JALAMA BEACH COUNTY PARK	LOMPOC AND U.S. PENITENTIARY	BIXBY RANCH & NORTH VAFB	HOLLISTER RANCH
1. Normal Launch	• Rocket Exhaust	- Particulate and Gas Dispersion	Human Respiratory System	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	Toxic Hazard Corridor (THC) Analysis	N/A	N/A	○	○	○	○
			Human Dermal Absorption	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	THC Analysis	N/A	N/A	○	○	○	○
		- Acidic Deposition	Vegetation	Vegetation Loss	Loss of Surf Thistle and Curly-leaved Monardella	None	N/A	●	N/A	N/A	N/A	N/A
			Stream	Aquatic Life Loss	pH Not Affected	None	N/A	○	N/A	N/A	N/A	N/A
		- Noise Propagation	Human Auditory System	Acute or Chronic Illness	90 to 120 dB	None	N/A	N/A	○	○	○	○
			Structures	Property Loss	Window Breakage	None	1×10^{-4} to 8×10^{-2}	●	◒	◒	◒	○
2. Launch Anomaly	• Rocket Exhaust	- Particulate and Gas Dispersion	Human Respiratory System	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	THC Analysis	N/A	N/A	○	○	○	○
			Human Dermal Absorption	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	THC Analysis	N/A	N/A	○	○	○	○
		- Acidic Deposition	Vegetation	Vegetation Loss	Loss of Surf Thistle and Curly-leaved Monardella	None	N/A	●	N/A	N/A	N/A	N/A
			Streams	Aquatic Life Loss	pH Not Affected	THC Analysis	N/A	○	N/A	N/A	N/A	N/A
		- Noise Propagation	Human Auditory System	Acute or Chronic Illness	90 to 120 dB	None	N/A	N/A	○	○	○	○
			Structures	Property Loss	Window Breakage	None	1×10^{-4} to 8×10^{-2}	●	◒	◒	◒	○
	• Rocket Destruction	Particulate and Gas Dispersion	Human Respiratory System	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	THC Analysis	N/A	N/A	○	○	○	○
			Human Dermal Absorption	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	THC Analysis	N/A	N/A	○	○	○	○
		- Burning Debris	Structures	Property Loss	Fire Damage to Structures	Launch Risk Analysis (LARA), USAF & Other Emergency Response Procedures	2×10^{-5}	◒	◒	◒	◒	◒
		Air Blast	Structures	Property Loss	Window Breakage	None	1×10^{-6} to 1×10^{-1}	●	◒	◒	◒	○
		Hypergolic Fuel Vapor Dispersion	Human Respiratory System	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	THC Analysis	N/A	N/A	○	○	○	○
			Human Dermal Absorption	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	THC Analysis	N/A	N/A	○	○	○	○
3. SRMU Accident	• SRMU Propellant Combustion	- Particulate and Gas Dispersion	Human Respiratory System	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	THC Analysis	N/A	N/A	○	○	○	○
			Human Dermal Absorption	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	THC Analysis	N/A	N/A	○	○	○	○
		- Burning Debris	Structures	Property Loss	Fire Damage to Structures	LARA, USAF & Other Emergency Response Procedures	2×10^{-5}	◒	○	○	○	○
		- Air Blast	Structures	Property Loss	Window Breakage	None	1×10^{-6} to 1×10^{-1}	●	◒	◒	◒	○
4. Hypergolic Fuel Accident	• Hypergolic Fuel Spill	- Surface Runoff	Ground water	Acute or Chronic Illness	Potential Ground Water Contamination	USAF Hazardous Materials Transportation Procedures	5×10^{-6}	◒	N/A	N/A	N/A	N/A
			Streams	Aquatic Life Loss	Loss of Unarmored Three-Spine Stickleback	USAF Hazardous Materials Transportation Procedures	5×10^{-6}	◒	N/A	N/A	N/A	N/A
		- Hypergolic Fuel Vapor Dispersion	Human Respiratory System	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	THC Analysis	N/A	N/A	○	○	○	○
			Human Dermal Absorption	Acute or Chronic Illness	Toxicity Exposure Limits Not Exceeded	THC Analysis	N/A	N/A	○	○	○	○
5. Cryogenic Fuel Accident	• Cryogenic Fire/Explosion	- Air Blast	Structures	Property Loss	Window Breakage	None	N/A	◒	○	○	○	○
		- Burning Debris	Structures	Property Loss	Fire Damage to Structures	USAF & Other Emergency Response Procedures	N/A	○	○	○	○	○
6. Propane Accident	• Propane Fire/Explosion	Air Blast	Structures	Property Loss	Window Breakage	None	N/A	◒	○	○	○	○
		Burning Debris	Structures	Property Loss	Fire Damage to Structures	USAF & Other Emergency Response Procedures	N/A	○	○	○	○	○

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LEGEND: ○ Low Relative Risk
◒ Moderate Relative Risk
● High Relative Risk

N/A = Not Applicable
*Includes areas inside of Vandenberg Air Force Base where populations would be controlled. As a consequence, impacts to human respiratory and auditory systems and dermal absorption are not applicable.

pathway, such as particulate and gas dispersion; (4) a receptor, such as the human respiratory system; and (5) a consequence or effect on a receptor.

5. In addition to scenarios, Table S.1 displays the following summary level information about mitigating factors, probabilities, and the relative potential risk for receptor areas:

   - Mitigating Factors include safety measures undertaken by the USAF to minimize potential risks to public health and safety and the environment from launches and operational activities.
   - Probabilities are shown where calculated and are indicated as not applicable when probabilities were not calculated due to low level consequences.
   - Relative Potential Risks are worst-case in nature since they are based on conservative assumptions and risks are shown to be applicable to all receptors for a given scenario. For example, under actual operations and launch conditions, worst-case conditions may not exist and events propagated through the gas and particulate dispersion pathway would not impact upwind receptors. Relative potential risks are indicated in Table S.1 as not applicable when risks were not estimated for human receptors in the proposed SLC-7 vicinity or for environmental resources outside of VAFB.

6. Two broad categories of events were considered in this assessment: (1) launches, and (2) operations. Launch events are made up of both normal launches and launch anomalies. Operations include a variety of unplanned events (anomalies) including solid rocket motor upgrade (SRMU) accident, hypergolic fuel accident, cryogenic fuel accident, and propane accident. Operational anomalies may be the result of activities undertaken in preparation for a launch such as transportation or handling accidents within the confines of VAFB.

7. For normal launches the outcomes, pathways, receptors, and consequences were considered as a certainty (i.e., in a non-probabilistic fashion). Operations anomalies were evaluated on the basis of their potential consequences, and when considered to be significant, the probability of their occurrence was estimated through either formal analysis or from available operating experience.

8. Analyses were performed based on pathways linking events to outcomes and consequences. The report is organized in terms of the following pathways:

   - Particulate and gas dispersion of chemicals from both normal launch procedures and launch anomalies.
   - Acidic deposition on the area surrounding the launch complex.
   - Air blast and noise propagation resulting from an explosion, plus noise from nozzle exhaust during a normal launch.

- Burning debris resulting from a launch anomaly or explosive accident.
- Surface runoff of chemicals resulting from a spill of liquid chemicals on the ground surface.

9. Receptors addressed in the Risk Assessment comprise locations and resources proximate to the SLC-7 site. Those locations are:

- Historical U.S. Coast Guard Lifeboat Rescue Station (the Boathouse)
- Jalama Beach County Park
- Ocean Beach County Park
- North VAFB Cantonment Area
- City of Lompoc
- U.S. Penitentiary near Lompoc
- Bixby Ranch
- Hollister Ranch
- Wetlands of Santa Ynez River and Honda Creek
- Offshore oil drilling platforms

10. The following briefly discusses, by event, outcome, and pathway, the results of this assessment.

- Normal Launch
  - No significant impacts were found to result as a consequence of a normal launch to the receptors considered at the locations shown in Table S.1.
  - A high relative potential risk from a normal launch is to vegetation near the proposed or alternative launch sites where there are populations of curly-leaved monardella *(Monardella undulata* var. *frutescens)* and surf thistle (*Cirsium rhothophilum*) (plants nominated for federal listing as threatened or endangered) that may suffer partial or complete defoliation as a result of acidic deposition.
  - A high relative risk was also found for impacts from normal launches at the historic former U.S. Coast Guard Lifeboat Rescue Station (Boathouse) where there is a potential for window breakage. The maximum probability associated with window breakage is 8×10^{-2}.
  - Dosage levels for aluminum oxide, hydrogen chloride gas, carbon monoxide, and nitrogen dioxide were calculated at each of the receptors and compared to threshold levels for acute and chronic illnesses. These doses were found to be considerably lower than threshold levels in a worst-case approach. Since threshold limits were not approached, probabilities of occurrence were not calculated. Highest dosages occurring in uncontrolled areas were found at Lompoc and the U.S. Penitentiary. Doses at these locations were less than acute thresholds by a factor of a least 60 (carbon monoxide) and were below chronic thresholds by three orders of magnitude.

- Launch Anomaly
  - A launch anomaly is an unplanned event that results in the destruction of the launch vehicle. The destruction may take place as a result of the vehicle failure or may be initiated by Air Force personnel in a programmed destruction.
  - The results of the analysis of the rocket exhaust outcome of a launch anomaly are the same as those summarized above for a normal launch, since prior to the occurrence of an anomaly the rocket exhaust characteristics are the same in both cases. A launch anomaly could potentially result in detonation of the SRMUs.
  - The effects of a rocket destruction outcome are similar to a normal launch with the exceptions of: (1) a higher probability of window breakage at the Boathouse; and (2) the potential for burning debris to start fires that may lead to property losses. The probability of window breakage at the Boathouse due to a launch anomaly is $1x10^{-1}$. The probability associated with property losses due to burning debris is a maximum of $2x10^{-5}$ based on the probability of a launch anomaly occurring ($2x10^{-2}$) and the conditional probability of uncertainties in the launch risk analysis program (LARA) that would allow debris to fall in an area where public property losses could occur.
  - Dosage levels for aluminum oxide, hydrogen chloride gas, carbon monoxide, and nitrogen dioxide were also calculated at each of the receptors for a launch anomaly and compared to threshold levels for acute and chronic illnesses. While higher than doses associated with a normal launch, these doses were also found to be considerably lower than threshold levels in a worst-case approach. Highest dosages occurring in uncontrolled areas were found at Jalama Beach County Park. Doses at Jalama Beach were less than acute thresholds by a factor of at least 5 (carbon monoxide) and were below chronic thresholds by three orders of magnitude. In addition to the above mentioned combustion products, this assessment calculated the predicted doses of hypergolic fuel reaction products and compared them with threshold levels. The highest dosages were found at Jalama Beach County Park (unsymmetrical dimethyl hydrazine [UDMH], miscellaneous reaction products, and nitrosodimethylamine [NDMA]) and the North Vandenberg Air Force Base Cantonment Area (formaldehyde dimethyl hydrazone [FDH]). At all receptor locations, dosages were below chronic threshold limits by at least a factor of 9 (miscellaneous reaction products) and were below acute threshold limits by at least a factor of 8.

- SRMU Accident
  - An SRMU accident is an event that could occur during transport or handling of the SRMUs in or near the launch complex that would produce sufficient kinetic energy to begin combustion of the propellant contained in the SRMU. The worst-case air dispersion conditions produced by a potential SRMU accident are the same as those described for a normal launch, where the SRMUs burn for 120 seconds, and a launch anomaly where detonation could potentially occur.

- Hypergolic Fuel Accident
  - A hypergolic fuel accident could potentially result in a spill that may produce hypergolic fuel vapor dispersion and potential impacts to surface water and ground water.
  - A hypergolic fuel accident that would reach surface water would impact aquatic wildlife present in the streams, including the federally protected unarmored three-spine stickleback (known to be present in Honda Creek) and other endemic species. While the consequences of such an event would be undesirable, the probability associated with a spill are very low. Based on the vehicle transportation rate, the probability of a spill is 2×10^{-5}.
  - Hypergolic fuel vapor dispersion would also result from a cold spill (i.e., a spill where combustion of the fuels on contact with the ground would not occur). Assuming that the spill takes place near the proposed or alternative launch sites, the highest doses were calculated to occur at Jalama Beach. Doses at Jalama Beach associated with the hypergolic fuel vapor/air reaction products are three orders of magnitude below the acute and chronic threshold limits for NDMA and a factor of 2.5 below the acute and chronic threshold limits for miscellaneous reaction products.

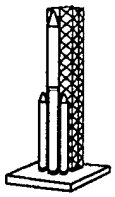
- Cryogenic Fuel Accident
  - A cryogenic fuel accident may result in an explosion or fire that could cause damage to structures through air blast or fires resulting from burning debris. It was found that the explosive energy that would result from this kind of event would be less than that generated by rocket destruction associated with a launch anomaly, with a resulting lower potential risk for broken windows at the Boathouse. The potential for fire to impact off-base structures is low due to existing base safety procedures and the distances to receptors located off-base.

- Propane Accident
  - A propane accident may result in an explosion or fire that could cause damage to structures through air blast or fires resulting from burning debris in a manner similar to a cryogenic fuel accident. It was found that the explosive energy that would result from this kind of event would also be less than that generated by rocket destruction associated with a launch anomaly, with a resulting lower potential risk for broken windows at the Boathouse. The potential for fire to impact off-base structures, as with a cryogenic fuel accident, is low.

RESULTS

1. Based on the results of this Risk Assessment, as summarized above, no significant adverse risks to surrounding populations or the environment were identified.

2. Operations accidents, normal launches, and launch anomalies are associated with a limited number of high probability and low impact consequences (such as window breakage at the Boathouse) and low probability high impact consequences (such as property loss from burning debris). The probabilities associated with potentially high impact consequences are maintained at a low level due to strict adherence to USAF safety procedures.



Appendix D

THREATENED AND ENDANGERED SPECIES CONSULTATION

APPENDIX D

THREATENED AND ENDANGERED SPECIES CONSULTATION

This Appendix contains materials documenting the Threatened and Endangered Species consultations with the National Marine Fisheries Service (NMFS) and the U. S. Fish and Wildlife Service (USFWS) for implementation of the Titan IV/Centaur Launch Complex (TCLC) at the SLC-6 alternative as consistent with the Endangered Species Act of 1973, as amended (Section 7, Interagency Cooperation). The consultations were based on the material contained in the Biological Assessment for the proposed action (Environmental Solutions, Inc. 1990b). Appendix D.1 and D.2, respectively, discuss the consultations with NMFS and USFWS.

APPENDIX D.1

THREATENED AND ENDANGERED SPECIES CONSULTATION NATIONAL MARINE FISHERIES SERVICE

This section of Appendix D contains materials documenting the Threatened and Endangered Species consultation (Section 7 consultation) undertaken with the NMFS for the proposed TCLC as implemented at SLC-6. Material provided here includes the TCLC consultation letter and other communications regarding the biological opinion for the Space Shuttle which are referenced in the TCLC consultation letter. Specific communications provided are:

- **Date**: June 15, 1990
  From: U. S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, E. C. Fullerton, Regional Director
  To: U. S. Air Force, Headquarters 1st Strategic Aerospace Division, Environmental Management, Col. Daryl G. Atwood, Deputy Director.
- **Date**: August 1, 1986
  From: U. S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, William G. Gordon, Assistant Administrator for Fisheries
  To: U. S. Air Force, Headquarters Space Division, Acquisition Civil Engineering, Col. Raymond E. Rogers, Director.
- **Date**: April 9, 1982
  From: U. S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alan W. Ford, Regional Director
  To: U. S. Air Force, Headquarters Space Division, Directorate of Environmental Planning, Lt. Col. R. C. Wooten, Director.

Based on information contained in the Biological Assessment (Environmental Solutions, Inc. 1990b), NMFS concluded in its June 15, 1990 letter that the impacts of the TCLC would be comparable to or less than those that would have been incurred by Space Shuttle program activities at SLC-6. As a consequence, NMFS determined that the conclusions and recommendations contained in the biological opinion for the Space Shuttle continue to be valid and that formal consultation for the TCLC was not considered necessary.

In its letter, NMFS continues to support the development and implementation of monitoring programs to assess the impacts of launches on pinnipeds, including the Guadalupe fur seal, at Vandenberg Air Force Base (VAFB) and the Channel Islands. These issues were previously discussed at discussed at a June 1989 informal consultation meeting. As indicated in the Biological Assessment (Environmental Solutions, Inc. 1990b), the U. S. Air Force (USAF) will undertake a monitoring program in compliance with USAF Regulations AFR 19-7 and AFR 126-1. The program will be developed in consultation with NMFS and USFWS to address data needs and agency concerns identified in the consultation process. These mitigation measures will be formally adopted in the Record of Decision (ROD) for the proposed action.

The monitoring program will be structured to address both the construction and operation phases of the proposed action and will focus on Threatened and Endangered and other sensitive species. Although details of the monitoring program will be developed in cooperation with NMFS, it is anticipated that the monitoring program will address potential impacts to marine mammals from launch-related acidic deposition, noise, and sonic booms. The TCLC monitoring program will build on and expand the Sea World Research Institute program that was instituted to comply with monitoring requirements for the Space Shuttle program at VAFB. It is anticipated that for marine mammals, the program will focus on species found on San Miguel and San Nicholas Islands and on the mainland in areas that may be impacted by the proposed action. Discussion of proposed monitoring for other biological resources is described in Appendix D.2, Threatened and Endangered Species Consultation with U. S. Fish and Wildlife Service.

The Biological Opinion for the Space Shuttle program (determined by NMFS to be valid for the TCLC) indicated that the proposed action is not likely to jeopardize the continued existence of Threatened or Endangered marine mammal species. The opinion was issued subsequent to the promulgation of regulations that allow USAF a small take of marine mammals incidental to launches of the Space Shuttle. The regulations for incidental takings associated with the Space Shuttle program would be updated and revised to reflect the less intense nature of the proposed action (i.e., lower launch rate and smaller space launch vehicle than the Space Shuttle program).

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
300 South Ferry Street
Terminal Island, CA 90731

June 15, 1990 F/SWR14:JHL

Daryl G. Atwood
Colonel, USAF
Deputy Director, Environmental Management
Headquarters 1st Strategic Aerospace Division
Vandenberg Air Force Base, CA 93437-5000

Dear Colonel Atwood:

We have reviewed the biological assessment on the proposed conversion of Space Launch Complex Six (SLC-6) for use in the Titan IV/Centaur Launch Program in the context of your request for consultation under the Section 7 of the Endangered Species Act. SLC-6 is the facility that was originally constructed for use in the Space Shuttle Program. We conducted consultations on the construction and operation of SLC-6 in 1982 (Letter April 9, 1982 From Allen W. Ford, Regional Director NMFS Southwest Region to Lt. Col. R.C. Wooten Jr. HQ Space Division), and again in 1986 subsequent to our listing of the guadalupe fur seal as a threatened species (Biological Opinion dated August 1 1986, from William Gordon, Assistant Administrator for Fisheries, NOAA to Col. Raymond E. Rogers HQ Space Division).

Based on the information contained in the biological assessment, we think that the impacts of modifying SLC-6 and launching Titan IV/Centaur boosters will be comparable to or less than those considered in previous consultations for the Space Shuttle Program. Thus the conclusions and recommendations contained in the letters and biological opinions referenced above continue to be valid and there is no need to proceed through the formal consultation process for this project.

We continue to support the development of monitoring programs to assess the impacts of launches on pinnipeds, including the guadalupe fur seal, at Vandenberg and on the Channel Islands. In June of 1989, we met with several members of your staff and your consultant, Environmental Solutions, Inc., to discuss the problems of disturbance to pinnipeds and the need to assess the impacts of the SLC-7 program. We recommend that you continue the development of those monitoring programs. If needed, we would be pleased to assist.

Sincerely,

E. C. Fullerton
Regional Director

F/M411:ML

AUG 1 1986

Colonel Raymond E. Rogers
Director of Acquisition Civil Engineering
Headquarters Space Division (AFSC)
Los Angeles Air Force Station
P.O. Box 92960, Worldway Postal Center
Los Angeles, CA 90009

Dear Colonel Rogers:

Enclosed are a biological opinion and statement regarding incidental taking prepared by the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act of 1973 (ESA). The opinion and statement concern the impacts of proposed launches and returns of the Space Transportation System (STS), or space shuttle, from Vandenberg Air Force Base, California.

Based on our review of the available information on the proposed activities and on the biology and ecology of the threatened Guadalupe fur seal on the northern Channel Islands, we have determined that the proposed activities are not likely to jeopardize the continued existence of this species. Please note that the enclosed biological opinion in no way permits the taking of this threatened species. Such taking, unless properly permitted, is prohibited under Section 102 of the Marine Mammal Protection Act (MMPA). Section 17 of the ESA states that unless otherwise provided, no provision of the ESA shall take precedence over any more restrictive provision of the MMPA. Under Section 101(a)(3)(B) of the MMPA, the taking of depleted species of marine mammals can be permitted only for scientific purposes. Therefore, the appended statement concerning incidental taking of endangered or threatened species pursuant to Section 7(b)(4) of the ESA does not authorize taking of the threatened Guadalupe fur seal.

We are recommending that the Guadalupe fur seal be included within the monitoring program described in the regulations (issued April 7, 1986) that allow the Air Force a small take of marine mammals incidental to launchings of the space shuttle from Vandenberg. New information on the timing, location, and nature of activities associated with STS program should be reviewed by the Air Force on a case-by-case basis to determine if additional consultation with NMFS is required pursuant to Section 7.

F/SWR3:Seagars

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Consultation must be reinitiated if there is a modification to the proposed action, if a new species is listed, if critical habitat is designated in the area covered by your program, or if new information reveals impacts of identified activities that may affect listed species.

I look forward to continued cooperation during future consultations.

Sincerely,

/s/ James E. Douglas, Jr.

for William G. Gordon
Assistant Administrator
for Fisheries

Enclosure

cc:F/SWR3(Seagars), F/M411,F(2), F/M
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Endangered Species Act

Section 7 Consultation - Biological Opinion

AGENCY: United States Air Force (USAF)

ACTIVITY: Operations associated with the launch and return of the space shuttle from Vandenberg Air Force Base, California

CONSULTATION CONDUCTED BY: National Marine Fisheries Service (NMFS)

DATE OF ISSUANCE: AUG 1 1986

BACKGROUND: On March 4, 1986, the United States Air Force (USAF) requested initiation of formal consultation on a biological assessment for operations associated with the Space Transportation System (STS), or space shuttle program, from Vandenberg Air Force Base, California. The purpose of this consultation is to consider impacts of the proposed activities on the threatened Guadalupe fur seal.

This opinion is based on information acquired through consultation with the USAF, Headquarters Space Division, Los Angeles, CA, information contained in the biological assessment prepared for this project (USAF, 1986), the proposed and final rules (NMFS 1985a,b) listing the Guadalupe fur seal as "threatened" according to the Endangered Species Act, the final and supplement to the Final Environmental Impact Statement prepared for the project (USAF 1979, 1983), and additional materials provided by the USAF that describe changes in program activities (correspondence of November 8, 1983, August 16, 1984, November 20, 1984, and March 5, 1985). Additional supporting materials, including published and unpublished research reports, referred to by the above documents are incorporated by reference.

PROPOSED ACTIVITY: Launches of the STS from Vandenberg Air Force Base (VAFB) were expected to begin no earlier than July 15, 1986, with a second launch scheduled for late 1986. However, it is possible that this schedule will be delayed up to one year or more as a result of the Challenger accident at Kennedy Space Center, Florida in February, 1986 (M. Mondl, pers. comm.). Between 28 (USAF 1986) and 80 (USAF 1979, 1983) space shuttle launches may take place from VAFB during the ten year life span

of the STS project.

Depending on the trajectory and the azimuth of the STS, sonic booms with intensities more powerful (4-6 pounds per square foot or psf) than supersonic military aircraft (0.5-2.0 psf) are expected to occur over Anacapa, Santa Cruz, Santa Rosa, and San Miguel Islands. Up to seven launches are predicted to occur with trajectories that will produce "focused" sonic booms over the Northern Channel Islands. Focused sonic booms will occur when the STS pitches over from vertical to horizontal flight; this results in "focusing" of sonic boom energy and may result in overpressures of up to 10 - 12 psf within a narrow "focal region". This overpressure of 10 - 12 psf is equal to 147.6 decibels (NMFS 1986). Since the focal region is expected to occur in a band downrange of VAFB approximately 80 miles wide and 1000 feet long (uprange-downrange), it is expected to occur only over San Miguel and Santa Rosa Islands and their adjacent waters.

Lower pressure, "conventional" intensity, sonic booms (0.5-2 psf) are expected to occur over the San Miguel and Santa Rosa Island areas as a result of orbiter returns to the VAFB area.

As part of the final regulations (NMFS 1986: April 7, 1986; Federal Register 51[66]: 11737-11742) authorizing the incidental taking of small numbers of non-depleted pinnipeds due to STS operations, the USAF is required to monitor the impacts of focused sonic booms from STS operations on the pinniped populations on the Northern Channel Islands.

These regulations do not authorize any taking of pinniped species during those times of year for which NMFS cannot determine that the incidental taking will have a negligible impact. The first Letter of Authorization issued to the USAF to authorize incidental taking will not authorize a take during either January 1 through February 15 or May 15 through - July 31 (M. Lorenz, pers. comm.).

Additional details concerning the proposed project are available in the biological assessment prepared for the project (USAF 1986) and other documents referenced above.

STATUS OF SPECIES CONSIDERED IN THIS OPINION

Common Name	Scientific Name	Status
Guadalupe fur seal	Arctocephalus townsendi	Threatened

BIOLOGICAL INFORMATION: It is likely that Guadalupe fur seals formerly ranged approximately from 18° N (Revillagigedo Islands) to 37° N (Monterey Bay, California). Breeding likely occurred in the California Channel Islands from San Miguel Island south to Guadalupe, the San Benitos and Cedros Islands, and perhaps as far south as Socorro Island. The species does not currently breed in the Southern California Bight. All breeding activity and virtually the entire population of approximately 1600 animals is found on or near Guadalupe Island (256 km west of Baja California, Mexico). Animals typically come ashore in the Southern California Bight during the breeding season (early May to July -- possibly to early August). A few juveniles and an occasional adult have been observed during this period each year on San Miguel Island since 1968 (less than 6 animals in any one year). Three individuals were seen north of the project area at Piedras Blancas in 1938. Other observations offshore California include recent sightings of 2 animals on San Nicolas Island, single individuals at Santa Barbara and San Clemente Islands, and at three pelagic and two coastal locations. No further information is available which describes the species pelagic distribution, feeding areas, or prey species.

Additional detailed biological information concerning the Guadalupe fur seal is available in the NMFS status review (Seagars 1984), the various published and unpublished reports referenced within the status review, and notices of the proposed and final rule to list the species as published in the Federal Register (40[2]: 294-296 and 50[24]: 51251-51258). Additional information is contained in the biological assessment prepared for the proposed STS project (USAF 1986) and references cited in that assessment. Information contained in the above documents is incorporated into this opinion by reference.

ASSESSMENT OF IMPACTS: If STS launches were to take place during the summer months when Guadalupe fur seals were expected to be on or near San Miguel Island, between 1 to 5 individuals could be

disturbed by sonic booms of varying intensities. The potential impacts of these sounds to pinnipeds (other than the Guadalupe fur seal) on the Channel Islands was discussed in the proposed (Federal Register 50[148]: 31200-31205) and final rule (51[66]: 11737-11742) governing the taking of small numbers of non-depleted pinnipeds due to STS operations. Additional information is provided in the biological assessment prepared for the STS project (USAF 1986).

The following is a summary of this information. Animals under water outside the focusing region are not expected to be affected because almost all sound from the launch would be reflected at the water's surface. Animals on land or with their heads outside of water and within the path of the focused sonic boom could experience some temporary hearing threshold shift, but this threshold change should last a short time (minutes to hours) and minimally disrupt animal behavior. The Air Force expects that STS sonic booms, both launches and returns, will alter slightly the acoustic environment of San Miguel Island and are predicted to increase the frequency of sudden movements to the water for northern fur seals and California sea lions by 15 per cent. Similar results could be expected for Guadalupe fur seals. Although the startle effect of these sounds could result in panic and concomitant physiological stress, the frequency of these sonic booms will be low compared to the frequency of naturally induced startle-causing events. For the present, these acoustic events could result in disturbance to a few resting individuals. It is unlikely that such disturbance in the future could discourage incipient colonizers or affect breeding activity should a breeding colony become established on San Miguel Island within the life of the proposed project.

CUMULATIVE EFFECTS: There are a number of State tideland oil and gas related activities either in progress or scheduled for the immediate future which also have some potential to result in disturbance to Guadalupe fur seals on San Miguel Island. Potential disturbance from these activities would most likely be the result of oil spill clean-up programs on or around the Pt. Bennett area of San Miguel Island. However, since there are so few Guadalupe fur seals in the project area, the potential for disturbance due to oil spill clean-up activities is low, the potential for disturbance as a result of STS operations is low, and the potential for a combined or sequential disturbance from both projects is negligible, we believe that any cumulative effects are well below any threshold which would result in adverse impacts to either individuals or the population.

NMFS will monitor Air Force and OCS activities and review information concerning listed species for indications of cumulative impacts. The monitoring programs of the USAF and the Minerals Management Service should provide information that may help to identify any such impacts.

CONCLUSIONS: The NMFS conclusion concerning the potential for disturbance to Guadalupe fur seals from STS operations is based on the following: the majority of the population is located far to the south of the project area; fur seals are widely dispersed at sea during winter months; only 0.2 percent of the total world population is present on San Miguel Island from May to August; the affects of impulse sound from sonic booms on the auditory system of Guadalupe fur seals are expected to be minimal and temporary in duration; the timing of (at least the first two) launches likely to produce high intensity focused sonic booms over San Miguel Island is expected to occur outside of the period when Guadalupe fur seals typically inhabit the Island; and the predicted increase in possible disturbance to fur seals from STS generated sonic booms is low (15 %). Therefore, NMFS concludes that the proposed activities are not likely to jeopardize the continued existence of the Guadalupe fur seal.

CONSERVATION RECOMMENDATIONS: NMFS recommends that the USAF include Guadalupe fur seals on San Miguel Island within the monitoring program described by the regulations authorizing the taking of non-depleted pinnipeds (NMFS 1986) and within the Letter of Authorization issued to the USAF for the Space Shuttle Program. NMFS recommends that the USAF provide the results of these studies to NMFS so that an assessment can be made of any need to modify measures designed to protect the Guadalupe fur seal on San Miguel Island.

REINITIATION OF CONSULTATION: Reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) if the amount or extent of taking specified in the incidental take statement is exceeded (incidental take of marine mammals is not authorized by this biological opinion); (2) if new information (such as that collected through the recommended monitoring program) reveals effects of the action that may affect the Guadalupe fur seal in a manner or to an extent not previously considered; (3) if the identified action is subsequently modified in a manner that causes an effect to the Guadalupe fur seal that was not considered in the biological opinion; or (4) if a new species is listed or critical habitat designated that may be

affected by the identified action.

STATEMENT REGARDING INCIDENTAL TAKING PURSUANT TO SECTION 7(b)(4) OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED

Any marine mammal population listed pursuant to the ESA is considered depleted under the Marine Mammal Protection Act of 1972 (MMPA). According to Section 17 of the ESA, no provision of the ESA is to take precedence over a more restrictive, conflicting provision of the MMPA. The MMPA is more restrictive than the ESA because the MMPA prohibits taking from depleted stocks except for scientific research. Therefore, Section 7(b)(4) of the ESA is not applicable to the threatened Guadalupe fur seal population and no take is authorized.

REFERENCES CITED

National Marine Fisheries Service. 1985a. Proposed Rule: Threatened Fish and Wildlife; Guadalupe Fur Seal. Federal Register 50(2):294-298.

National Marine Fisheries Service. 1985b. Final Rule: Threatened Fish and Wildlife; Guadalupe Fur Seal. Federal Register 50(241): 51252-51258.

National Marine Fisheries Service. 1985c. Proposed Rule: Regulations governing small takes of marine mammals incidental to specified activities. Federal Register 50(148):31200-31205.

National Marine Fisheries Service. 1986. Final Rule: Regulations governing small takes of marine mammals incidental to specified activities. Federal Register 51(66):11737-11742.

United States Air Force. 1986. Biological assessment for the Guadalupe fur seal, Arctocephalus towndsendi. 6p.

United States Air Force. 1983. Supplement to the Final Environmental Impact Statement, Space Shuttle Program, Vandenberg Air Force Base, California.

United States Air Force. 1979. Final Environmental Impact Statement, Space Shuttle Program, Vandenberg Air Force Base, California.

Seagars, D. J. 1984. The Guadalupe fur seal: a status review. NMFS, Southwest Region Admin. Rept., SWR-84-6; 29p.

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Revised:gec:7/24/86

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
300 South Ferry Street
Terminal Island, California 90731

April 9, 1982

F/SWR31:DJS
F/NWC3:GA
F/SWR33:RSH

Lt. Col. R. C. Wooten, Jr.
Headquarters Space Division, SD/DEV
P.O. Box 92960
Worldway Postal Center
Los Angeles, CA 90009

Dear Colonel Wooten:

We have reviewed the Draft Supplement to the Final Environmental Impact Statement (DSFEIS) for the Space Shuttle Program at Vandenberg AFB, California and offer the following general comments for your consideration. These comments address issues relating to marine fisheries, endangered species, marine mammals, and their habitats for which the National Marine Fisheries Service (NMFS) is responsible.

Construction Activities at Point Arguello

The proposed construction activities at the Point Arguello boathouse area will have short and long-term adverse impacts to marine fishery resources of concern to our agency. The short term effects include the destruction of benthic organisms by dredging activities. These impacts are relatively minor since recolonization should occur rapidly. The long-term effects involve the permanent removal of an existing pier, submerged rocks, and a small kelp bed all of which serve to enhance fishery resources. In addition, construction of the proposed dock would eliminate approximately 0.4 acres of intertidal habitat.

The proposed mitigation is directed only to reducing impacts to intertidal and subtidal areas. The mitigation does not address the need to compensate the permanent habitat losses associated with this project. Although the document indicates that one potential option for the disposal of dredge material could be the creation of an artificial reef, which could have an enhancement value to fish resources, the suitability of dredge material for this type of project remains to be determined.

We feel the construction of an artificial reef would be an appropriate compensatory measure to offset the losses associated with this project since the reef would essentially replace in kind the habitat lost through construction activities. The final document should explore further the feasibility of this concept for habitat compensation.

Endangered Species

The final SFEIS should note that the NMFS is the federal agency responsible for administration of the Endangered Species Act of 1973 as amended (ESA) as it pertains to threatened and endangered marine species. Concerns pertaining to marine turtles are shared with the Department of Interior, Fish and Wildlife Service (FWS). Sea otters are also under the their jurisdiction.

The final SFEIS should note that species listed by the NMFS as endangered or threatened which are likely to occur within the area to be impacted by actions of this project include:

Gray whale	(Eschrictius robustus)
Blue whale	(Balaenoptera musculus)
Humpback whale	(Megaptera novaeangliae)
Right whale	(Eubalaena spp.)
Fin whale	(Balaenoptera physalus)
Sei whale	(B. borealis)
Sperm whale	(Physeter catodon)
Leatherback sea turtle	(Dermochelys coriacea)
Pacific hawksbill sea turtle	(Eretmochelys imbricata brissa)
Green sea turtle	(Chelonia mydas)

For the species listed above there has been no critical habitat proposed or designated in the southern California area.

The loggerhead sea turtle (Caretta caretta) and Pacific ridley sea turtle (Lepidochelys olivacea) are occasionally found in the area and are listed as threatened.

Section 7 of the ESA requires federal agencies to consider the impacts of a proposed action to listed species. We have treated your February 5, 1982, request for comments on the DSFEIS as a request for informal consultation pursuant to the ESA. We have reviewed the Final Environmental Impact Statement and DSFEIS and agree with the conclusions that the proposed action will not jeopardize the continued existance of any listed species for which the NMFS is responsible.

We concur with your recommended mitigation (#2, page 2-140) to limit blasting to periods when gray whales are absent from the immediate construction area. We further recommend that a reconnaissance of waters adjacent to the Boathouse cove be conducted during the gray whale migration period (December - March) to determine if gray whales are present in the immediate area.

These comments conclude our informal review under the ESA. In the event that any new evidence becomes available which indicates the project may have adverse impacts on listed species within the project area, we request that the

U.S. Air Force (USAF) initiate the formal consultation process. We futher recommend that formal consultation be initiated if another species in the project area is listed as threatened or endangered.

Marine Mammals

The DSFEIS predicts (summary, page ix and elsewhere) disturbance to pinnipeds on the northern Channel Islands due to Space Shuttle generated sonic booms. A 15 percent increase in pinniped mass movements from the shores of the islands to the water is predicted as a direct result of Space Shuttle generated sonic booms. Disturbance and/or displacement is predicted to occur to harbor seals at the Point Arguello Boathouse from proposed construction activities.

The Marine Mammal Protection Act of 1972, as amended (MMPA), places a moratorium on the taking of marine mammals. The definition (50 CFR 216.3, 216.11 et seq.) of take includes among other activities harassment, killing and "...the negligent or intentional operation of an aircraft or...any other negligent or intentional acts which result in disturbing or molesting of a marine mammals." Section 101 (a)3 of the MMPA as amended describes conditions by which the Secretary is authorized to waive the moratorium on taking provided specific conditions are met. Public law 97-58 amended the MMPA by adding, among other things, a new Section 101 (a)5 to allow individuals engaging in activities, other than commercial fishing, to take small numbers of marine mammals incidentally within a specified geographic region. The amendments and proposed general regulations (50 CFR 228 Subpart A) (enclosed) describe the process by which a formal written request must be submitted to receive consideration for a Letter of Authorization to allow activities which may result in the "take" of marine mammals. It is recommended that you contact our office so that we may assist you in exploring the potential for submission of a formal written request via these mechanisms of exemption.

We note that several statements which attempt to describe the effects of sonic booms to pinnipeds appear to inaccurately report the results of USAF contracted studies. Several references state that the present rate of disturbances to pinnipeds at San Miguel Island exceeds 100 major disturbances per year. It is unclear how this rate was obtained. It appears that Cooper and Jehl (1980) may have erred initially when they calculated this estimate by adding the estimated disturbance rates of otariids (given as 4 to 5 per month for California sea lions and northern fur seals) and harbor seals (2-3 per month-reported by Bowles and Stewart, 1980). For example, both otariids and harbor seals can be affected by the same loud sonic boom while in other instances a relatively quieter sonic boom may affect only a small group of geographically isolated harbor seals. Therefore, the disturbance rates for the two groups must be analyzed separately. Additionally, Bowles and Stewart (1980) use differing criteria for defining a "major event" for otariids and phocids. Neither of these definitions include the criterion "causing at least half the population to vacate the beach" (DSFEIS). It appears likely that estimates from separate analyses would result in lower rates of current annual disturbance and higher percentage increases in disturbance caused by shuttle-generated sonic booms.

The percent contribution of sonic booms and boat noises relative to total disturbance also should be presented in the Final SFEIS. Adopting these recommended changes in the Final SFEIS would result in a more accurate description of the complex interactions of pinnipeds and disturbing stimuli on San Miguel Island.

We are also concerned with the implication that the low abundance of harbor seals in the northern Channel Islands relative to the world population can be used as a rationale for not considering the species to be sensitive to disturbance during the pupping season (Page F-15, paragraph 4). Harbor seals on the northern Channel Islands are protected at all times under the MMPA and by being within the Channel Islands National Park and should not be overlooked when scheduling space shuttle activities which could adversely impact them. Bowles and Stewart (1980) state that for both harbor seals and otariids, the period of greatest potential impact occurs from March through July. They also note that "among the pinnipeds, harbor seals were most likely to startle." We concur with these statements. The mitigation measure offered in Section 2.7.2.3 (DSFEIS) should be improved to ensure that the flight director will avoid scheduling shuttle launches that will create large sonic-boom over-pressures at San Miguel Island during the breeding seasons (March-July), if a practical alternative exists.

Finally, there is a chance of significant impact of shuttle-generated booms on marine mammal hearing (Page 2-86, paragraph 1), and this points out the need for an experimental evaluation of this potential impact. We recognize the problems involved with studies designed to evaluate the effect of shuttle-generated booms on pinnipeds (Chappell, 1980). We suggest that the USAF can overcome the logistic and technical problems and that scientists would prefer to face the difficulties of interpretting the results of such an experiment rather than relying on extrapolations from experiments performed on other species. Therefore, we urge the USAF to consider supporting such research.

Sincerely yours,

Alan W. Ford
Regional Director

Encl

Literature Cited

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Chappall, M. A. 1980. Possible physiological effects of space shuttle sonic booms on marine mammals, In Potential Effects of Space Shuttle Sonic Booms on the Biota and Geology of the California Channel Islands: Research Reports, USAF Technical Report #80-1, pages 195-228.

Cooper, C. F., and J. R. Jehl. 1980. Potential effects of space shuttle sonic booms on the biota and geology of the California Channel Islands: Synthesis of research and recommendations, USAF Technical Report #80-2, 14 pages.

APPENDIX D.2

THREATENED AND ENDANGERED SPECIES CONSULTATION
U.S. FISH AND WILDLIFE SERVICE

This section of Appendix D contains materials documenting the Threatened and Endangered Species consultation (Section 7 consultation) undertaken with the USFWS for the proposed TCLC as implemented at SLC-6. The consultation letter regarding the proposed action is provided here.

The Biological Opinion (Opinion) rendered by USFWS states that the proposed action is not likely to jeopardize the continued existence of the listed species present in the area of potential impact. Listed species of concern are the California brown pelican, California least tern, American peregrine falcon, and the unarmored threespine stickleback. USFWS believes that the proposed action is likely to result in some level of take in the form of harassment by noise and other disturbances during launches and potentially some loss of habitat due to vehicle exhaust. Animal mortality of listed species is not expected. As a consequence, the taking in the form of harassment is authorized by the Opinion and an incidental take permit is not required at this time. If future monitoring data shows that mortality of listed species is occurring, an incidental take permit may be required at that time.

To minimize harassment of listed species, USFWS is requiring that USAF:

- Develop a monitoring plan to assess the impacts of launch noise and sonic booms that considers both individual and cumulative effects from the TCLC and other launch programs on VAFB. In the event that taking of listed species is documented, additional measures would need to be implemented to avoid, minimize, or mitigate the take. If necessary, these measures would be developed in coordination with USFWS and the California department of Fish and Game (CDFG).
- Develop a monitoring plan to assess the short- and long-term individual and cumulative impacts of deposition of HCl and Al_2O_3 in areas near the launch pad. In the event that taking of listed species is documented, additional measures would need to be implemented to avoid, minimize, or mitigate the take. If necessary, these measures would be developed in coordination with USFWS and CDFG.
- Engage the services of a qualified raptor biologist to investigate the potential use of areas of South VAFB by the American peregrine falcon. In the event that nesting activities are identified, a monitoring program would be developed to measure the impact of the TCLC on the species. If necessary, these measures would be developed in coordination with USFWS and CDFG.

As indicated in the Biological Assessment (Environmental Solutions, Inc. 1990b), USAF will undertake a monitoring program in compliance with USAF Regulations AFR 19-2 and AFR 126-1. The program will be developed in consultation with USFWS and NMFS to address data needs and agency concerns identified in the consultation process as outlined above. USAF

will develop monitoring plans to address the above-described requirements in coordination with USFWS. These mitigation measures will be formally adopted in the ROD for the proposed action.

The preface to the Opinion indicates that an evaluation of potential effects to candidate species will be forwarded to USAF by USFWS at a future date as part of informal consultation since it does not address threatened or endangered species. Impacts to candidate species will be fully considered since USAF regulation AFR 126-1 provides that species proposed for listing or under review for proposed listing are afforded the same protection as species already listed. Personal communication with USFWS (Donna Brewer, Fish and Wildlife Biologist, Ventura Office, June 21, 1990) indicated that the forthcoming evaluation of potential effects to candidate species will specifically address the need to integrate monitoring of curly-leaved monardella (a candidate species for listing) with the monitoring measures outlined above. These mitigation measures will be formally adopted in the ROD for the proposed action.

Conservation recommendations identified in the Opinion are USFWS suggestions regarding discretionary measures to minimize or avoid impacts on listed species or critical habitat or to develop additional information. They will be evaluated with regard to the proposed action and discussed in the ROD.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE ENHANCEMENT
SOUTHERN CALIFORNIA FIELD STATION
Ventura Office
2140 Eastman Avenue, Suite 100
Ventura, California 93003

June 12, 1990

Colonel Orville J. Robertson
Director, Environmental Management
Department of the Air Force
Headquarters 1st Strategic Aerospace Division
Vandenberg Air Force Base, California 93437-5000

Re: Formal Section 7 Consultation - Construction and Operation of Titan IV/Centaur space launch complex, Vandenberg Air Force Base, California (# 1-6-90-F-23)

Dear Colonel Robertson:

This responds to your request dated March 16, 1990, and received by the U.S. Fish and Wildlife Service (Service) on March 22, 1990, for formal consultation pursuant to Section 7 of the Endangered Species Act (Act) of 1973, as amended. At issue are the effects of construction and operation of the proposed Titan IV/Centaur space launch complex program on the following listed species: California brown pelican (Pelecanus occidentalis californicus), California least tern (Sterna antillarum browni), American peregrine falcon (Falco peregrinus anatum), and unarmored threespine stickleback (Gasterosteus aculeatus williamsoni).

Species which are candidates for federal listing may also be affected based on their possible occurrence in areas affected by project operations. Although candidate species are not protected by the Act, and therefore not covered in this Opinion, we recommend consideration of such species early in the planning process since they may become listed during later phases of the proposed action. Consideration of candidate species is especially important with respect to long-term actions. An evaluation of potential effects to candidate species (i.e., acidic deposition and candidate plants) will be forwarded to your office under separate cover.

Threatened or endangered marine mammals which may be affected by the proposed action, excluding the southern sea otter, are under the jurisdiction of the National Marine Fisheries Service and therefore, are not considered in this consultation. Formal

consultation with National Marine Fisheries Service regarding the effects of this project on marine mammals may be required.

BIOLOGICAL OPINION

It is our Opinion that implementation of the subject project as proposed is not likely to jeopardize the continued existence of the California brown pelican, California least tern, American peregrine falcon, or unarmored threespine stickleback.

DESCRIPTION OF THE PROPOSED ACTION

The United States Air Force (Air Force) has proposed to construct and operate a new Titan IV/Centaur space launch complex (SLC) on south Vandenberg Air Force Base, Santa Barbara County. As originally proposed in their draft Environmental Impact Statement (EIS), the Air Force's preferred alternative was to construct an entirely new complex (SLC-7) at Cypress Ridge (Environmental Solutions, 1989). Subsequently, the Air Force was redirected by language in the 1990 Congressional Appropriations Bill to pursue a reconfiguration of an existing space launch complex (SLC-6) on south Vandenberg Air Force Base which is currently in mothball status. Reconfiguration of SLC-6 was previously identified by the Air Force as an alternative to the construction of SLC-7 and has been evaluated in a draft Environmental Impact Statement (EIS). This Opinion analyses the impact of the construction and operation of SLC-6 and is based on information contained in the draft EIS (Environmental Solutions, 1989), the Biological Assessment (Environmental Solutions, 1990) and previous documents provided to the Service on Titan IV missile programs (Engineering Science, 1988a,b).

The Air Force invested 3.1 billion dollars to plan and construct the Space Shuttle launch site (SLC-6) on Vandenberg. Following the Challenger accident, and discovery that the lift capability of the shuttle was inadequate to provide launches to a polar orbit from Vandenberg, the Air Force deactivated SLC-6. The currently proposed reconfiguration of SLC-6 for use by Titan IV/Centaur vehicles will allow the Air Force to resume plans for polar orbit launches. Also, reconfiguration of the existing SLC-6 complex will not require the financial cost or extensive grading needed to construct an entirely new complex. All construction or modification activities for the Titan IV/Centaur discussed in the Biological Assessment are planned to occur in areas previously disturbed in construction of SLC-6. The Titan IV/Centaur program is anticipated to be operational by 1994-1995 and support a maximum of three launches per year from the modified SLC-6 facility.

Components of the Titan IV/Centaur vehicle include two upgraded solid rocket motors, core vehicle, Centaur stage, payload faring, and satellite vehicle. The solid rocket motors, which power the initial takeoff, together contain a total of approximately 1.4 million pounds of solid rocket propellant , consisting of ammonium perchlorate and an aluminum binder fuel. During a launch, these rockets fire for approximately 2.5

minutes, at which time they separate from the core vehicle and fall into the ocean. The core vehicle consist of two stages and uses liquid propellants consisting of a fuel, Aerozine 50 (50 percent hydrazine and 50 percent unsymmetrical dimethyl hydrazine, and an oxidizer, nitrogen tetroxide (N_2O_4). During a launch, the first stage burns for approximately three minutes then separates from the second stage. The second stage then burns for approximately four minutes and separates from the remainder of the space vehicle. Like the solid rocket motors, both stages fall into the ocean and are not recovered. The Centaur stage, containing liquid hydrogen, liquid oxygen, and hydrazine, is used to boost the satellite into high energy orbit using one to three burns, after which it separates from the satellite but remains in orbit.

Inter-related and interdependent actions are "connected" actions that would not occur but for the proposed action and therefore must be considered with the subject action. Inter-related and interdependent actions associated with the Titan IV/Centaur Program which may affect listed species include the transportation by air, rail, barge, and truck of Titan IV components, including propellant fuels, to Vandenberg. At the present time, transportation of propellant fuels by marine barge is not proposed and therefore not considered in this Opinion.

EFFECTS OF THE PROPOSED ACTION ON LISTED SPECIES

Sources of potential impact to threatened or endangered species considered in this Opinion include those activities associated with the operational phase of the Titan IV/Centaur program. The degree to which listed species may be affected during any planned phase of this program are assumed to be dependent upon its proximity to both the launch site and the planned launch trajectory. Exceptions may include accidental events such as fire, propellant spills, explosions, and early inflight terminations. Since no earth moving or excavation activities are proposed during the construction phase, impacts to listed species are not anticipated from the construction of SLC-6.

The Biological Assessment (Assessment) adequately describes the abundance and distribution of listed species in the vicinity of proposed activities on Vandenberg Air Force Base (Vandenberg) as well as offshore areas which may be exposed to noise and sonic booms associated with launch events. Additional information on listed species is provided below as appropriate.

Sources of potential impacts to listed species from operational phases of this program include launch noise, sonic booms, and acidic deposition:

Launch noise. Noise generated during the launch of a Titan IV vehicle will produce noise and vibrations which may have adverse affects on listed species, depending upon their proximity to the launch trajectory. Effects of intense, short-term vibration on animals of any species are largely unknown, however some information on the effects of noise is available. Results of studies of noise on several species of birds and

mammals are summarized in Center for Marine Studies, 1980; Hunt, 1985; and are briefly reviewed in the Assessment. Exposures to noise are expected to be brief in duration (approximately 2 minutes) and occur at low frequencies. Minimum sound levels which may cause auditory effects in humans, including temporary hearing loss, occur at 115-220 dB. The Assessment estimates that temporary physiological damages, such a short-term hearing impairment, are likely within a three to five-mile radius of SLC-6. Although the Assessment concludes that launch noise from Titan IV/Centaur launches will not exceed 110 dBA outside of the SLC-6 launch complex, conflicting modeling information submitted previously to the Service regarding approximate maximum noise levels from Titan IV launches from SLC-4 suggests that levels as high as 119 dBA may be detected at 1.8 miles (Figure 1). Startle responses in marine birds and marine mammals are known to occur at impulses of as little as 80 to 90 dB flat sound pressure levels (Bowles and Stewart, 1980). Based on information contained in the Assessment, noises of this intensity may occur within 20 to 30 miles of the launch site from Titan IV/Centaur launches.

Sonic booms. The threshold for temporary auditory damage from exposure to a single sonic boom has been found to occur in the range of 138 dB to 169 dB (Chappell, 1980). According to the Assessment, the maximum, worst-case, A-weighted sound level expected to be detected at San Miguel Island during a Titan IV/Centaur launch is 147 dBA based on a predicted overpressure of 10 psf (Figure 2). Since this level is within the threshold for temporary auditory damage, listed species within range of detecting these levels may be adversely affected.

Acidic deposition: During a Titan IV/Centaur launch, ignition products consisting of hydrogen chlorine gas (HCl), aluminum oxide (Al_2O_3), carbon monoxide (CO), and water (H2O) are released. When combined with water, the HCl gas has a strong tendency to combine with the water and evaporate, forming a ground cloud. Twenty-six thousand gallons of deluge water will be used during each launch, with approximately 75% or 20,000 gallons evaporating into the ground cloud. As the launch cloud condenses, it forms water droplets which scavenge the HCl gas, becoming hydrochloric acid. The pH of these droplets would be between 0.1 and 1.0. Based on information provided by the Air Force for a typical Titan IV launch (Environmental Solutions, 1988), peak concentrations of hydrogen chloride and aluminum oxides could reach 8 ppm and 38 mg/m^2, respectively, at distances of approximately 5 kilometers (3.1 miles) downwind of the launch pad (Figures 3 and 4). Predominant wildlife habitats in the vicinity of SLC-6 includes central coastal scrub, chapparal, introduced grasslands and riparian/wetlands. Peak concentrations are expected to persist for two to 15 minutes in any location depending upon wind conditions.

Accidental events: Potentially adverse impacts to listed species may also occur in the event of a fire, explosion, accidental spill of propellant at the launch site or during transportation to Vandenberg, and early inflight terminations. No estimates of the probability for most of these events have been provided.

Hypergolic propellant fuels such as hydrazine, unsymmetrical dimethyl hydrazine, Aerozine-50 (A-50), and nitrogen tetroxide (N_2O_4) are toxic. Nitrogen tetroxide, an oxidizer, exists in gaseous form and is listed as a Class A poison. The other hypergolic fuels exists as a highly flammable liquids. Transportation of these fuels to Vandenburg in support of the Titan IV/Centaur program is estimated at nine shipments of oxidizer and five shipments of fuel per launch, or at a launch rate of three per year, 27 shipment of oxidizer and 15 shipments of fuel. The accident rate for hypergolic propellant shipments is about 1.56 per one million round trip vehicle miles traveled.

Based on the proposed number of shipments for the Titan IV/Centaur programs, one accident may be expected in a seven year period. Since shipments come from manufacturing plants in Mississippi and Alabama, the expected accident, which may or may not result in a release of product, could occur anywhere along these routes.

American peregrine falcon. Peregrine falcons historically nested at locations which are near or on Vandenberg Air Force Base. Reported historical nesting locations in this vicinity include Point Sal, Point Conception, south of Point Arguello, and all of the Channel Islands. There has been a recent increase in breeding peregrine falcons along the central California coast, and this expanding population appears to be moving south at a fairly rapid rate. Wintering peregrines are regularly seen at San Miguel and Anacapa Islands, and at least two pairs have attempted to nest at San Miguel this season. Peregrines have also attempted to nest near Jalama Beach and Point Arguello in recent years. There is, hence, a good chance of peregrines successfully nesting again on Vandenberg Air Force Base.

Although peregrine falcons tend to be relatively tolerant of many human activities, prolonged disturbances near nest sites during the critical nesting period from about February 1 through August 1 may lead to the loss of productivity and/or site abandonment. Photographers, rock climbers, construction and timber harvest are examples of disturbances that if in close proximity to a nest site can lead to interference with incubation or parental care. Short-term disturbances also may lead to a loss of productivity. Cade (1960) observed several instances where incubating peregrines were startled and bolted off the nest, kicking eggs out of the scrape in the process. Detailed studies of responses of raptors to jet overflights and sonic booms by Ellis (1981) however, observed no significant adverse behavioral responses from peregrine and prairie falcons. Harmata et al. (1978) observed no significant reactions by prairie falcons during repeated disturbances by low flying aircraft and their sonic booms. Habituation to existing levels and frequency of noise and disturbance from sonic booms on Vandenberg and at San Miguel Island may minimize impacts if birds become established there and become accustomed to these events prior to nesting.

Studies cited in earlier documents prepared by the Air Force in support of the Titan IV program have concluded no impacts are likely based on information on egg hatchability and physiological responses of chickens to carbide cannon booms (Cooper and Jehl,

1980). However, studies of pesticide effects on chickens have demonstrated that unrelated bird species may react quite to pesticide contamination, both behaviorally and physiologically. It is likely that this is also true for effects of booms on different species eggs as well. Due to the persistence of DDT contamination, peregrine eggs in California are still thinner than normal. This increases the chances of egg crushing, hence, making meaningful comparisons with chickens even more questionable.

Since peregrine falcons have recently re-established nesting in the Channel Islands, including San Miguel Island, there is a likelihood that a focused sonic boom may occur during the peregrine's critical nesting period. In the event the peregrines have re-established nesting near Point Arguello, the likelihood that noise from a launch may occur during this critical time is also high. However, based on the results of studies by Ellis (1981) and others, we believe that adverse impacts for the most part are unlikely. The exception would be if birds were incubating eggs on Point Arguello within detection distance of elevated launch noises, or if a focused sonic boom occurred over the Channel Islands, especially San Miguel Island, while peregrines were incubating.

Previous Titan IV programs have estimated that there is a 90-100% chance that sonic booms will occur over San Miguel Island during the spring (0-25% chance for booms over Anacapa Island). Noise levels from a focused sonic boom at San Miguel Island are estimated to be 147 dBA (Figure 2). The worst case scenario would be that a startled incubating peregrine would crack or break thin-shelled eggs. The likelihood of a peregrine breaking an egg after being startled by a sonic boom or launch is rather remote, and if it did in fact occur, would not pose a threat to the survival of the species as a whole. However, given that maximum noise levels between 113 and 119 dBA may be reached at Point Arguello during a Titan IV launch from SLC-6, up to nine Titan IV launches (three from this proposal) per year are planned from south Vandenberg, and peregrines may have recently begun nesting in this area again, it is probably more likely that peregrines would be impacted on the mainland. Since peregrines have recently attempted nesting on the Channel Islands and are likely to attempt nesting near Point Arguello, if they have not done so already, further information on site specific affects of these anticipated activities would be highly desirable in order to more accurately assess impacts.

California brown pelican. Brown pelicans are colonial nesters, using offshore islands for colony sites. Anacapa Island supports the only consistently active pelican nesting colony in the southern California bight (Point Conception to Punta Eugenia, Baja California).

Like many seabirds, brown pelicans are very sensitive to noise and disturbance during the nesting season (Anderson and Keith, 1980). The degree to which noise and disturbance from Titan IV launches may cause adverse affects to seabird species is partially dependent on individual behavioral responses and stage of nesting, as well as the degree of habituation to each stimulus (Parsons and Burger, 1982). For example,

the panic of one nesting or roosting bird may stimulate the reaction of several other birds. Disturbances at a late stage of nesting, when re-nesting is no longer possible (such as the late-incubation or hatchling) may also cause a greater impact (Anderson and Keith, 1980).

Anderson and Keith (1980) found injuries to young brown pelicans due to predators at Anacapa Island occurred up until about three weeks of age, when downy young are ultimately able to defend themselves against potential predators such as Heermans' and Western gulls. During their studies, Anderson and Keith found that western gulls will attack even large (3-4 week old) chicks until either 1) regurgitation of fish occurred, diverting the predator from further attack on the young pelican, or 2) removal of the eyes or more often uropygial gland/entrails of the chick occurred. These investigators also observed western gulls eating small whole pelican chicks (1-3 days old) when adults had been flushed from the nests. Additional losses of chicks occurred due to trampling by flushing adults and larger, disturbed chicks and occasional impalement on cacti which surround the colony.

Once brown pelican young are about four to six weeks of age, the most significant aspect of disturbance would probably be losses of food through regurgitation by the stressed chicks. Anderson and Keith (1980) have found that disturbances, especially early in the breeding season, may have lasting and profound behavioral effects.

Historically, many islands off the west coast of Baja California were used as pelican rookeries (Jehl, 1973). All except Los Coronados have been abandoned as active nesting colonies, largely because of various types of human disturbance (Anderson, UC Davis, pers. comm.). When disruption is of a less severe nature, disturbance-induced reductions in productivity result from 1) death of nestlings from hyper- or hypothermia and injury, 2) nest desertion by uneasy adults (this occurs more readily early in the nesting season), and 3) egg losses to overheating and to predation by gulls when adults are driven from the nest for extended periods (Anderson et al., 1976). The greatest potential for major disturbance occurs early in the nesting cycle, when pelicans are most prone to abandon nests. Even a one-time disturbance, if at a critical time in the breeding cycle, can cause abandonment of a colony or cohort within a colony (Gress and Anderson, 1981).

Although the Air Force did not provide an estimate of the probability that breeding brown pelicans at Anacapa Island might be impacted by sonic booms during a Titan IV/Centaur launch, previous estimates for Titan launches from SLC-4 have predicted probabilities ranging from 0 to 23% (Engineering Science, 1988). Although studies on surrogate seabird species (gulls and cormorants) by Schreiber and Schreiber (1980) indicate a low probability of adverse response to sonic booms, it is difficult to correlate a shot-gun blast (which is a directional sound source) with that of a sonic boom. Accordingly, the Service remains concerned about possible adverse effects to this species. Given that some level of noise and disturbance is likely to occur at this

important colony, further definition of the impacts of Titan IV missile launches would be desirable.

California least tern. The Assessment adequately addresses available ecological and biological information on California least tern populations found within areas potentially affected by the Titan IV/Centaur program. Of the three colonies currently found on Vandenberg Air Force Base, only the Santa Ynez River mouth colony is likely to be affected by noise and/or acidic fallout during launches. This site is currently heavily impacted by human disturbances and, given the low reproductive successes of this colony in recent years, is probably more important to the species as a post-breeding and feeding area.

The Santa Ynez River mouth is located approximately 7.5 miles north of the SLC-6 facility. Post-breeding and possibly breeding terns may experience noise from launches and experience a startle effect. Given the reduced intensity of the launch noise at this distance from the site (Figure 1), impacts to post-breeding terns are likely to be short-term and unlikely to cause significant effects. On the other hand, nesting terns are more likely to be adversely affected due to increased exposure of eggs or chicks to predators while away from the nest. However, based on preliminary studies of the effects of noise from Minutemen missile launches 6.6 miles from nesting tern colonies (Henningson, Durham and Richardson, 1981) and the anticipated level of launch noise at the Surf colony (100-104 dBA), the startle effects from launch noise and resulting vibrations should cause only slight disturbances and brief breaks in incubation which are within the range of normal behaviors. Toxic ground clouds may not effect this species due to their distance from the SLC-6 facility, however, the data addressing this potential are not thoroughly developed. Although the Service feels it is probably unlikely that significant effects to nesting terns from the Titan IV/Centaur program will occur, further information on impacts of Titan IV missile launches would be desirable.

Unarmored threespine stickleback. Unarmored threespine stickleback are currently present in Honda Creek (approximately 1.5 miles north of SLC-6). Although fishes often have good hearing at low frequencies (Fay and Popper, 1980), attenuation of sound at the water's surface, among other factors, make it unlikely that sticklebacks will be significantly affected by noise from a Titan IV launch. Studies of the effects of sonic booms with amplitudes as high as 140 dB and underwater sounds with amplitudes of 130 dB suggest that a startle reaction will occur. This will likely be a short-term impact.

The potential that a toxic ground cloud may have an adverse impact on the freshwater stream environment of this species is of greater concern. Studies of the effects of space shuttle exhaust plumes on fishes have documented gill damage and death of fishes within 400 m (0.3 miles) of the launch pad, and no effects to fishes situated 6,100 m (3.7 miles) away (Hawkins et al., 1984). Studies of Space Shuttle launches at

Kennedy Space Center have documented damage to vegetation from exposure to exhaust ground clouds containing hydrochloric acid and aluminum oxide and have measured acidities of <0.5 pH within these clouds. Near-field acute vegetation damage was found up to 1.2 km (0.74 miles) from the launch pad; far-field effects due to movement of the clouds were spotty but were detected up to 22 km (13.64 miles) from the launch site (Schmalzer et al., 1985; Dreschel and Hall, 1985). The only study of a Titan IV launch conducted to date (cited in Environmental Solutions, 1989) suggests that, due to the smaller volumes of water used, impacts from Titan IV launches may be less detrimental.

Since Honda Creek is located within 2 miles of the SLC-6 facility, it is possible that sudden or dramatic increases in pH in the Creek may occur. Modeling information provided by the Air Force (Environmental Solutions, 1989) indicates that the acidic deposition rate in the area of Honda Creek would be about 19.35 gallons per acre (Figure 5). Major assumptions made in this analysis included 1) the wind was blowing from the south at about 9.8 miles per hour; 2) the width of the stream was three feet; 3) the depth of the stream was six inches; 4) the length of the affected stream was one kilometer; and 5) the width of the ground cloud was one kilometer when it reached the stream. Using these assumptions, the surface area of the affected stream was assumed to be 0.225 acres with a volume of 36,734 gallons.

Assumptions about the existing water quality of Honda Creek were also made during this modeling analysis. Based on information from other streams in the area, the pH of the stream was assumed to be 7.7, the concentration of Ca_2CO_3 in the stream was 250 mg/l, the concentration of Na in the stream was 150 mg/l, and no fresh water would displace the water in the stream once the acid was deposited.

Based on the above assumptions, the model predicts that the amount of acidic deposition that would fall into the stream is 4.35 gallons with a pH of 0.1. Combining this with the water assumed to be in the stream at a pH of 7.7, and assuming no neutralizing reactions take place, the pH in the affected stream may change from 7.7 to 4.3 (Evans, Environmental Solutions, pers. comm.).

The Air Force's analysis concludes that although levels of HCl in the stream could be raised to 3.43 mg/l, the natural buffering capacity of the stream (due to the presence of Ca and Na) will probably minimize the change in stream pH. In fact, the Air Force has assumed that no change in pH will occur due to these buffering capacities due to presumed excesses in Na and Ca_2CO_3 in the stream. While the Service concurs that some buffering is likely to occur, the lack of information on the rate of possible changes and almost exclusive use of assumed values make it impossible to conclude with any certainty that no effects to resident unarmored threespine stickleback are likely. In addition, the effects of deposition of up to 25 mg/m^3 of aluminum oxide in this system are completely unknown (Figure 4).

Loss of sticklebacks from Honda Creek, although anticipated to be few in numbers, could hinder and potentially inhibit the recovery of this subspecies. Only a few populations of unarmored threespine stickleback remain, all of which are presently threatened by a variety of natural and/or human-induced modifications of their habitat. Loss of the Honda Creek population would further reduce the ability of this species to withstand threats to their habitat and increase the potential for a single event to greatly reduce their numbers. Given the distance of Honda Creek from SLC-6, the increased potential for creating clouds with elevated pH due to frequent fog conditions in this area, and the nearby location (1.3 miles) of SLC-4 with its own Titan IV Program, additional information on the impacts of Titan missile launches would be desirable.

CUMULATIVE IMPACTS

Cumulative effects are those impacts of future State and private actions affecting endangered and threatened species that are now reasonably certain to occur in the action area. Future federal actions, including new launch facilities and programs, will be subject to the consultation requirements established in Section 7 of the Act, and therefore, are not considered cumulative to the proposed action. With the exception of the following ongoing federal activities on Vandenberg Air Force Base, (which represent the cumulative baseline), there are no State or private activities which may be considered cumulative to the Titan IV/Centaur Program.

In addition to the Titan IV/Centaur program, Vandenberg Air Force Base has been a base of operations for ongoing space launch activities associated with the Scout, Delta, Atlas, and other Titan programs. Estimates of the number of scheduled launches from these programs, other than the Titan IV, have not been provided to the Service.

The cumulative effects of an additional three launches per year of the Titan IV/Centaur vehicle to a baseline of six launches per year will bring the total number of Titan vehicle launches to nine per year from south Vandenberg Air Force Base. This estimate includes an estimated 13 launches of the Titan II from SLC-4 over a 5 year period, and an estimated 25 launches of the Titan IV from SLC-4 over a 7 year period. The cumulative effects of these launches on threatened or endangered species are unknown. Since information on the cumulative effects of launches and sonic booms is sparse, we are unable to identify a threshold of disturbance, if it exists, that would result in significant impacts to listed species. We have assumed in this Opinion, based on existing information, that current levels of noise and disturbance are below these critical thresholds and we expect that impacts associated with the subject action are also below these levels. We have also assumed that short-term changes in the pH of Honda Creek due to acidic deposition from an individual launch will not jeopardize the continued existence of the stickleback. A much better understanding of the effects of an individual launch event are needed before the cumulative impacts of up to nine launches a year can be addressed.

The cumulative number of hypergolic propellant shipments to support the Titan IV program at SLC-4 and SLC-6 is estimated at 63 oxidizer shipment and 32 fuel shipments per year from Mississippi and Alabama. Since the accident rate is 1.56 accidents per million vehicle round trips, approximately one accident is estimated to occur every three years, presumably at any location between Vandenberg and the manufacturing sites.

It should be noted that the above assumptions do not abrogate the need for the Air Force to monitor effects from their cumulative activities to better define the impacts on these listed species. Further information will be important to verify that, collectively, these actions are not likely to jeopardize the continued existence of any listed species which occur on the base. We anticipate that monitoring programs required for the Titan II and Titan IV Space launch vehicle modification and operation program (# 1-6-88-F-53) at SLC-4, and the monitoring programs addressed within the incidental take statement of this Opinion will satisfy information needs regarding affects of these programs to listed species.

INCIDENTAL TAKE

Section 9 of the Endangered Species Act prohibits any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species without special exemption. Under the terms of Section 7(b)(4) and 7 (o)2, taking that is incidental to and not intended as part of the agency action is not considered taking within the bounds of the Act provided that such taking is in compliance with this Incidental Take statement. Based on your Assessment, and the above analysis, we believe the subject action is likely to result in some level of take in the form of harassment by noise and other disturbances during launches and potentially some loss of habitat due to toxic ground clouds. Based on the assumptions made in this Opinion, we do not anticipate any take in the form of mortality. No incidental take (i.e., mortality) is therefore authorized. In order to minimize the impacts of harassment of the species discussed herein, we specify the following reasonable and prudent measures:

1) The Air Force shall develop and implement a monitoring plan, in consultation with the Service, to better quantify the impacts of noise to threatened and endangered birds from launches from Titan IV vehicles and mitigate, to the extent feasible, any take.

2) The Air Force shall develop and implement a monitoring plan to better quantify the influence and effects of exhaust plumes from Titan vehicles on threatened and endangered species, and mitigate, to the extent feasible, any take.

The following terms and conditions explain in detail how the foregoing measures are to be implemented:

1) The monitoring plan to assess the impacts of launch noise and sonic booms shall consider both individual and cumulative affects from the Titan IV/Centaur program as well as other launch programs on the Base. In the event that taking of listed species is documented, (i.e. nest abandonment or failure), additional measures (i.e. scheduling to avoid critical periods) shall be implemented to avoid, minimize, or mitigate take. Such measures shall be coordinated with the Service and the California Department of Fish and Game.

2) The monitoring plan to assess the short- and long-term impacts of deposition of HCl and Al_2O_3 shall also be designed to consider the individual and cumulative affects associated with introducing these chemicals into areas, especially freshwater streams, occupied by listed species. As much as possible, methodologies used in studies of Space Shuttle launches shall be considered in order to allow comparison of data. These studies should be coordinated with monitoring of impacts to non-endangered fish and wildlife resources, especially candidate plants, within the range of deposition. In the event that taking of listed species or their habitat is documented, additional measures (i.e. planting additional cover, increasing stream flows) shall be implemented to avoid, minimize, or mitigate take. Such measures shall be coordinated with the Service and the California Department of Fish and Game.

3) The Air Force shall engage the services of a qualified raptor biologist and investigate the potential use of areas on south Vandenberg Air Force Base by the peregrine falcon. In the event that nesting activities are identified, the Air Force shall prepare a monitoring program to measure the impact of the Titan IV program on this species. This program shall be coordinated with the Service and the California Department of Fish and Game.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term "conservation recommendations" has been defined as suggestions of the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information. In furtherance of the purposes of the Act, we recommend:

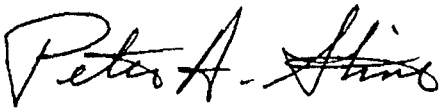
1) The Air Force should expand their ongoing least tern colony monitoring effort to include more frequent surveys of the three colonies within their jurisdiction. Methods of survey should be coordinated with the Service to ensure that information collected is comparable with that collected from other colonies. If necessary, fencing of colonies and/or predator control methods should be developed and implemented.

2) Given likely increases in numbers of southern sea otters expected to be found in waters offshore of Vandenberg Air Force Base in future years, these areas should be surveyed on a regular basis. Methods of survey should be coordinated with the Service to ensure comparability with surveys throughout the existing range.

3) Due to the presence of suitable habitat for the least Bell's vireo on Vandenberg Air Force Base, especially in riparian corridors along San Antonio Creek, surveys should be conducted each season by a qualified ornithologist familiar with this species to determined if vireos are utilizing these habitats. As suggested above, these surveys should be coordinated with the Service.

This concludes formal consultation on this action. Reinitiation of formal consultation is required if the amount or extent of incidental take is exceeded, if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion, if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion, and/or if a new species is listed or critical habitat designated that may be affected by the action.

Sincerely,



Peter A. Stine
Office Supervisor

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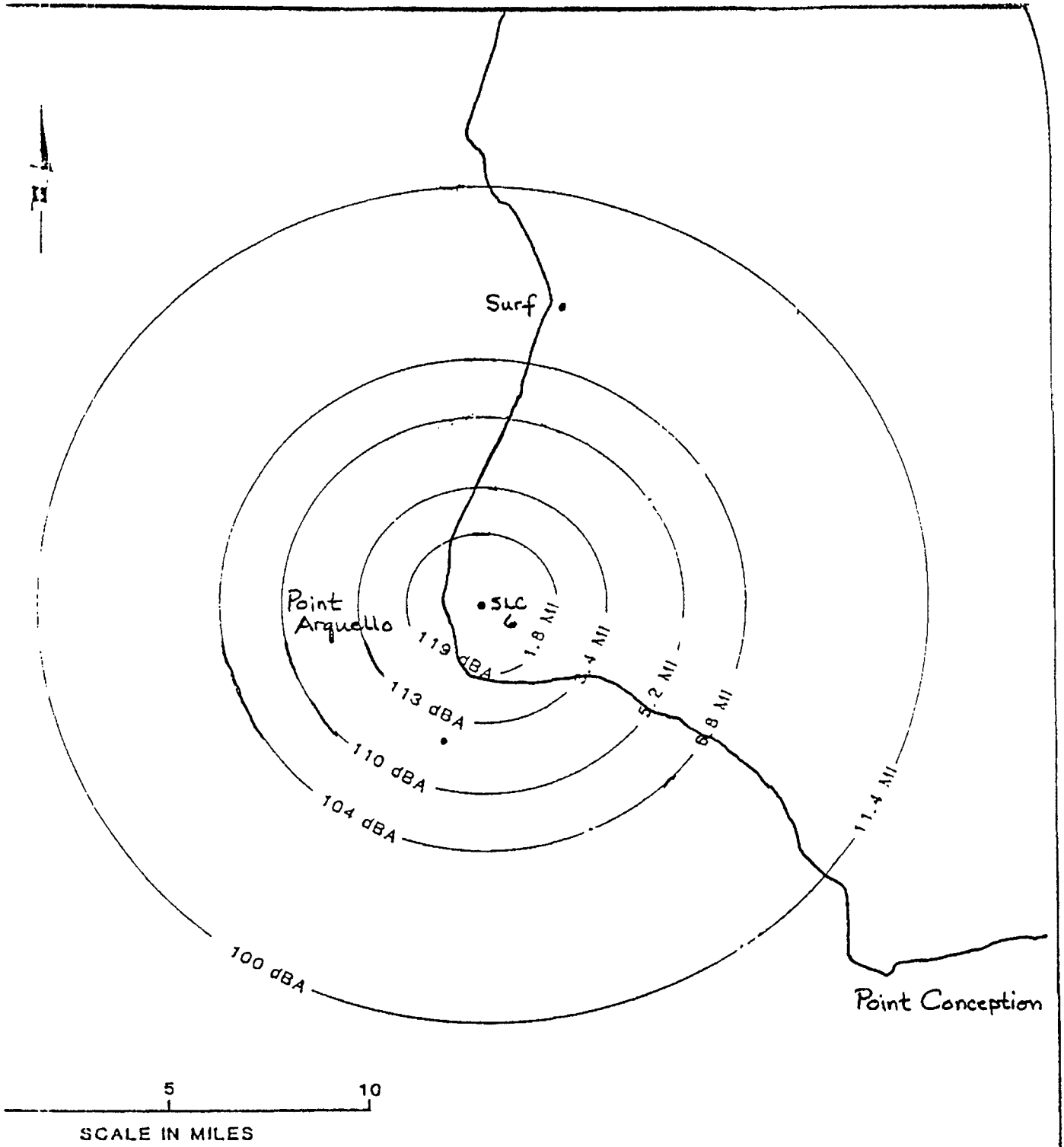

FIGURE 1

APPROXIMATE TITAN IV MAXIMUM NOISE LEVEL CONTOURS FROM SLC-6

VANDENBERG AIR FORCE BASE

E: Engineering Science, 1986. (Modified for SLC-6.)

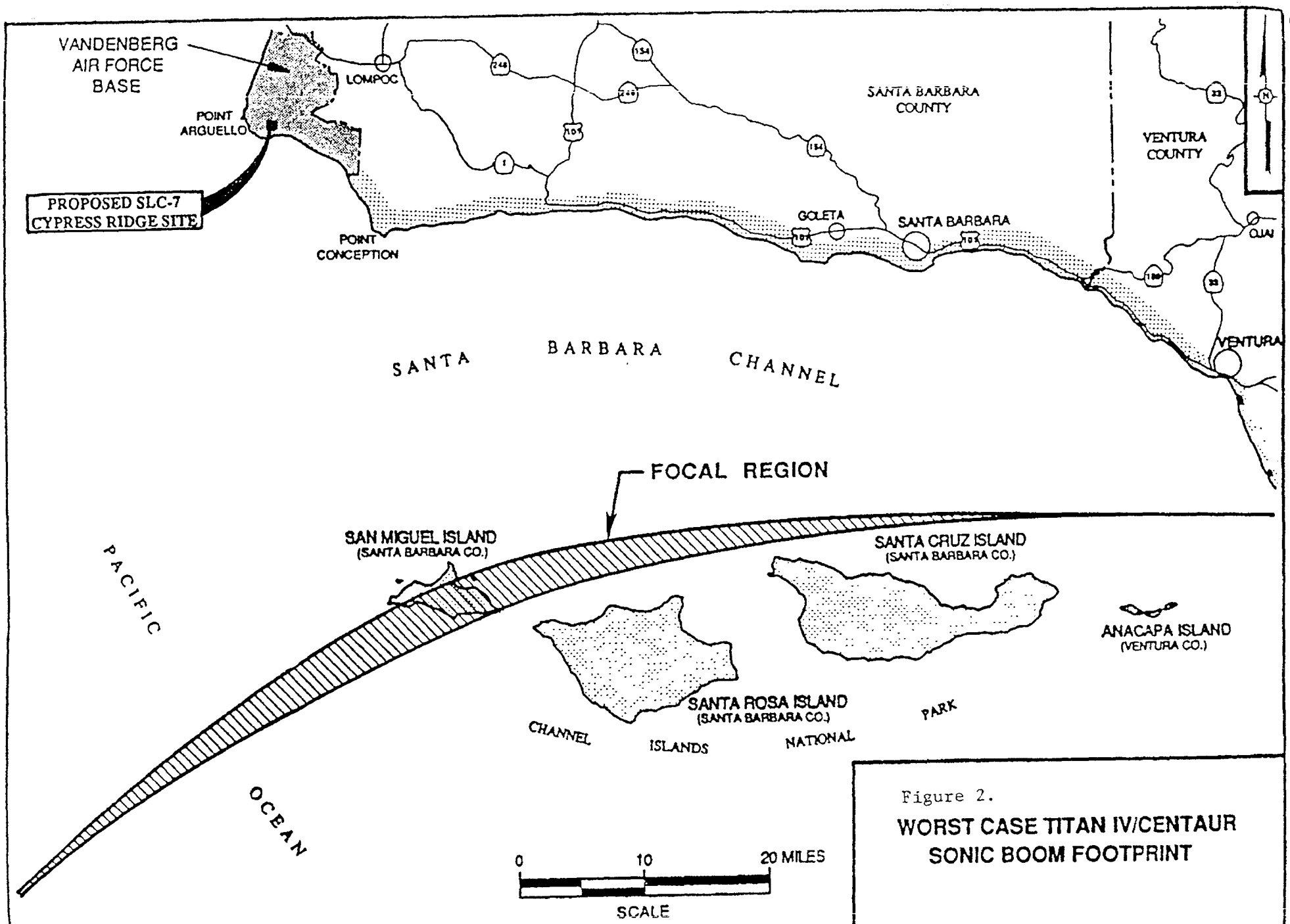

Figure 2.

WORST CASE TITAN IV/CENTAUR SONIC BOOM FOOTPRINT

SOURCE: SLC-7 Sonic Boom Assessment, prepared by NTS Engineering, 1989.

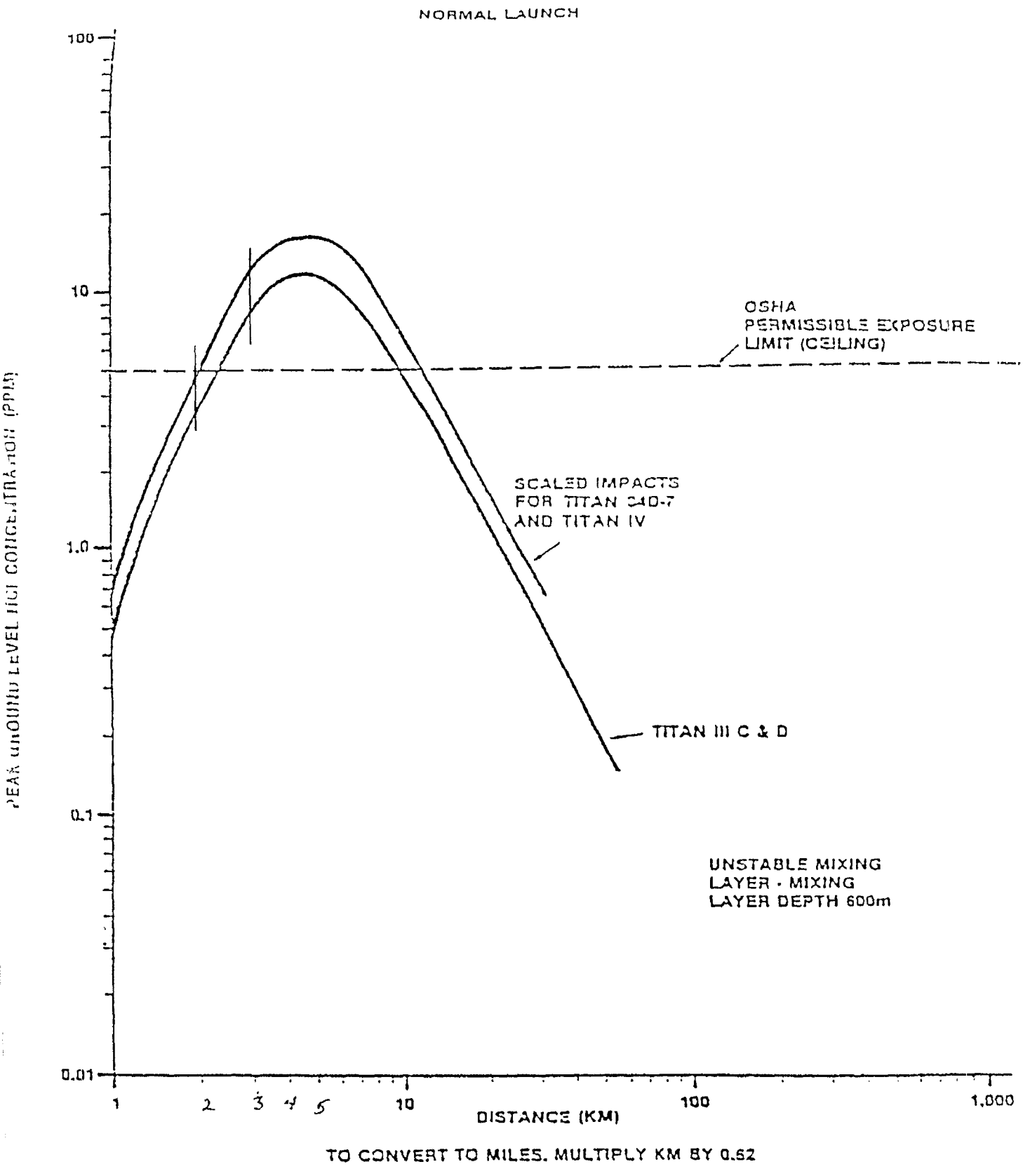

FIGURE 3

PREDICTED GROUND LEVEL HCl CONCENTRATION PROFILE AS A FUNCTION OF DISTANCE FROM LAUNCH SITE

SOURCE: USAF, 1986

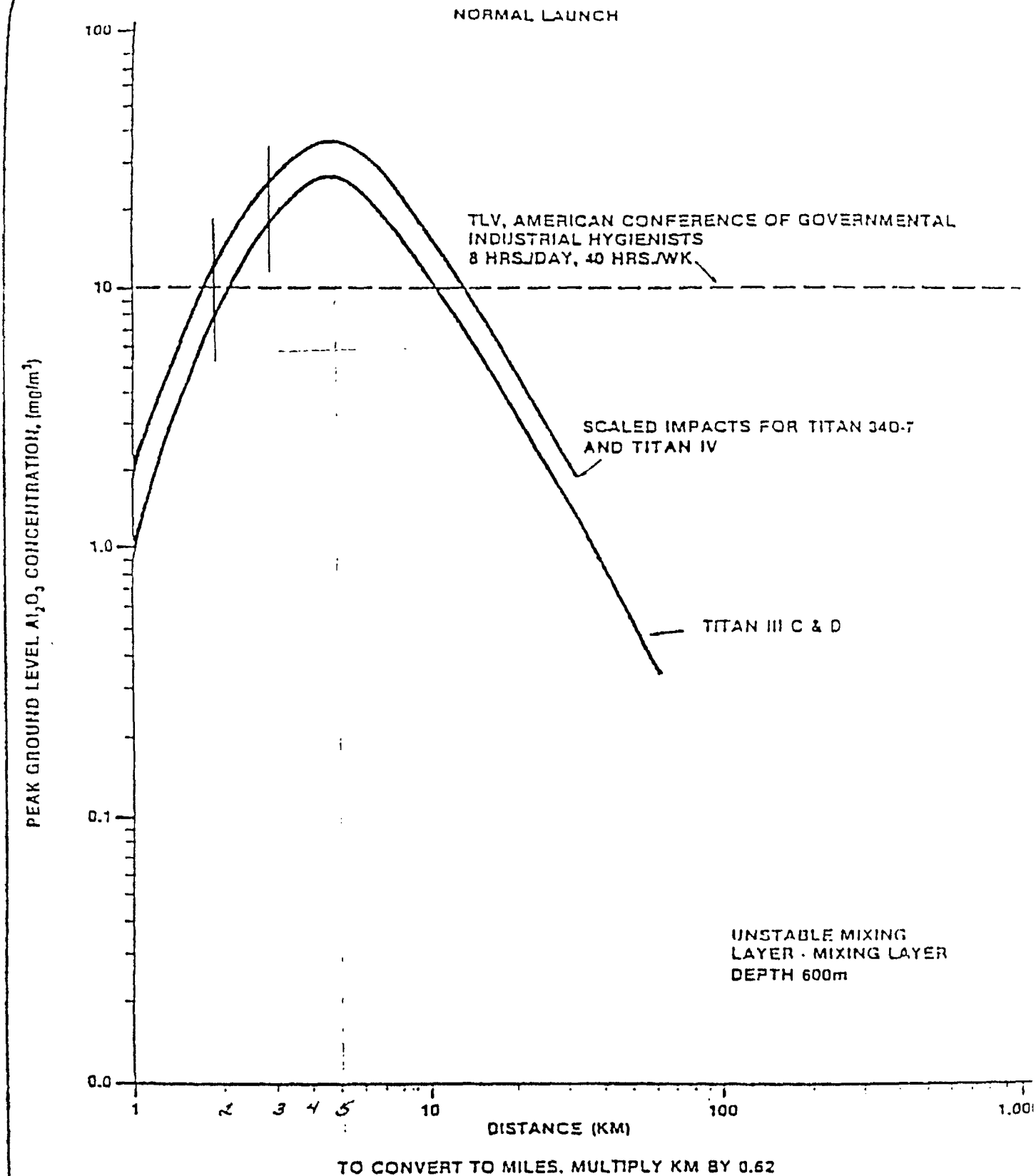

FIGURE 4

PREDICTED GROUND LEVEL Al_2O_3 CONCENTRATION PROFI AS A FUNCTION OF DISTANCE FROM LAUNCH SI

SOURCE: USAF, 1988